



Netra™ X4200 M2 Server Service Manual

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Preface

This *Netra X4200 M2 Server Service Manual* contains information and procedures for maintaining and upgrading the Netra™ X4200 M2 server.

Before You Read This Document

It is important that you review the safety guidelines in the *Netra X4200 M2 Server Safety and Compliance Guide (820-0068)*.

Product Updates

For product updates that you can download for the Netra X4200 M2 server, go to the following web site:

www.sun.com/netra/x4200

Related Documentation

For a description of the document set for the Netra X4200 M2 server, see the *Netra X4200 M2 Server Getting Started Guide* that is packed with your system and also posted at the product's documentation web site. See the following URL, then navigate to your product:

<http://www.sun.com/documentation>

Translated versions of some of the product documents are available at the documentation web site. English documentation is revised more frequently and might be more up-to-date than the translated documentation.

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Using UNIX Commands

This document might not contain information about basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices. Refer to the following for this information:

- Software documentation that you received with your system
- Solaris™ Operating System documentation, which may be found at:

<http://docs.sun.com>

Typographic Conventions

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

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

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Netra X4200 M2 Server Service Manual, part number 820-0063-11

Introduction to the Netra X4200 M2 Server

This chapter provides an overview of the Netra™ X4200 M2 server, including features and orderable components.

Features of the Server

The Netra X4200 M2 server is designed to take full advantage of the exceptional power and performance of the AMD Opteron processor.

The server includes an extensive set of reliability, availability, and serviceability (RAS) features. The server also provides a remote, Integrated Lights Out Manager (ILOM) Service Processor function, including remote boot and remote software upgrades.

[TABLE 1-1](#) summarizes the features of the Netra X4200 M2 server.

TABLE 1-1 Summary of Netra X4200 M2 Server Features

| Feature or Component | Netra X4200 M2 Server |
|-------------------------|--|
| CPU | Up to two Next Generation AMD64 Opteron 200 Series dual-core processors (1Mbyte L2 cache per core) |
| Memory | Up to eight DIMMs (up to 32GB capacity) Qualified DIMMs: <ul style="list-style-type: none">• 667-MHz Registered ECC DDR2 DIMMs (PC5300) |
| Hard disk drives (HDDs) | Up to four Serial-Attached SCSI (2 SAS or 4 SAS); hot pluggable HDDs (2.5 inch or 63.5 mm) |

TABLE 1-1 Summary of Netra X4200 M2 Server Features (*Continued*)

| Feature or Component | Netra X4200 M2 Server |
|---------------------------------------|--|
| Baseboard management controller (BMC) | Motorola MPC8248 at 266MHz |
| RAID options | Four-channel SAS RAID disk controller |
| Network I/O | <ul style="list-style-type: none">• Four 10/100/1000Mbps Ethernet ports (RJ-45 connectors)• One 100BASE-T Ethernet management port (RJ-45 connector)• One RS-232 serial port (RJ-45 connector) |
| PCI I/O | <ul style="list-style-type: none">• One PCI Express slot for MD2 low profile cards (support x1, x4, and x8 width cards)• Three full-height PCI-X slots for 64-bit 133 MHz, 3x, 2x full-length, 1x half-length |
| Other I/O | <ul style="list-style-type: none">• Two USB 2.0 ports• One VGA video port |
| Removable media devices | Internal slim DVD drive (with 2x HDD option) |
| Power | Two 550W power supplies (DC or AC option) |
| Alarms | Four fail-safe, dry contact telco alarms (critical, major, minor, and user) |
| Fans | Two fan modules, containing five fans; also one fan in each power supply |

Netra X4200 M2 Server Orientation

This section contains illustrations that you can use to become familiar with the components of the Netra X4200 M2 server.

Netra X4200 M2 Server Front Panel Features

FIGURE 1-1 and FIGURE 1-2 show the features of the front panel.

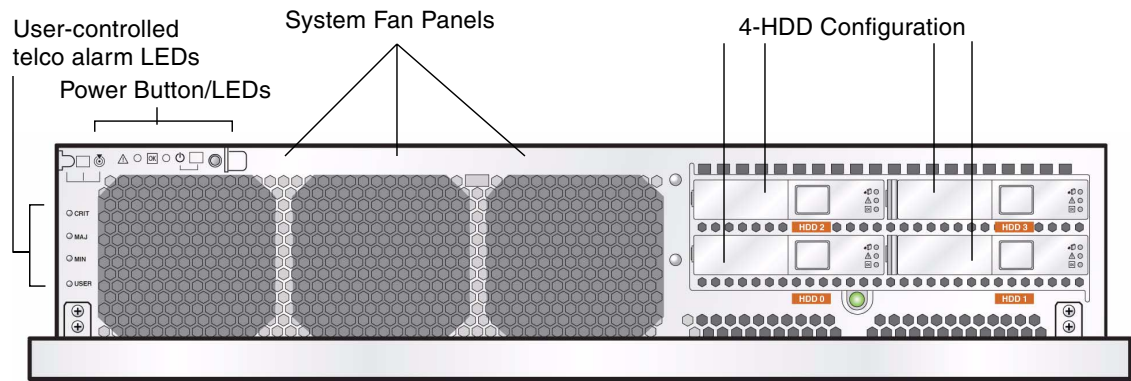


FIGURE 1-1 Netra X4200 M2 Server Front Panel (4HDD)

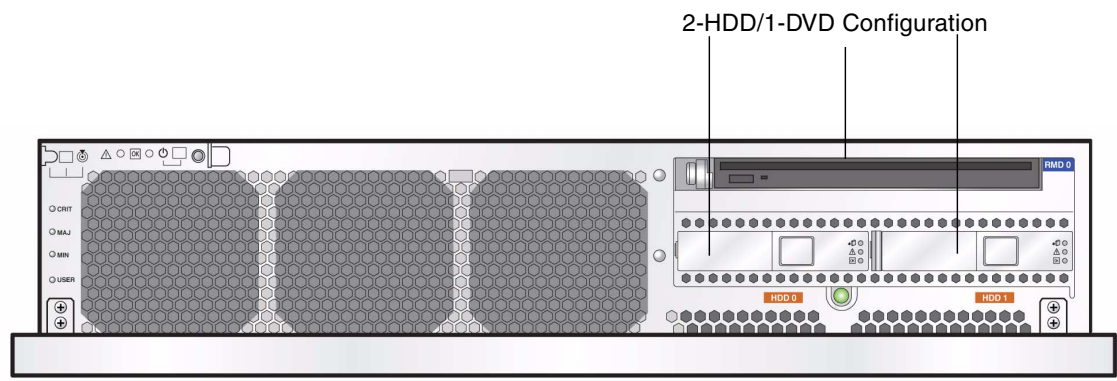


FIGURE 1-2 Netra X4200 M2 Server Front Panel (2-HDD/1 DVD)

Netra X4200 M2 Server Rear Panel Features

FIGURE 1-3 shows the features of the rear panel.

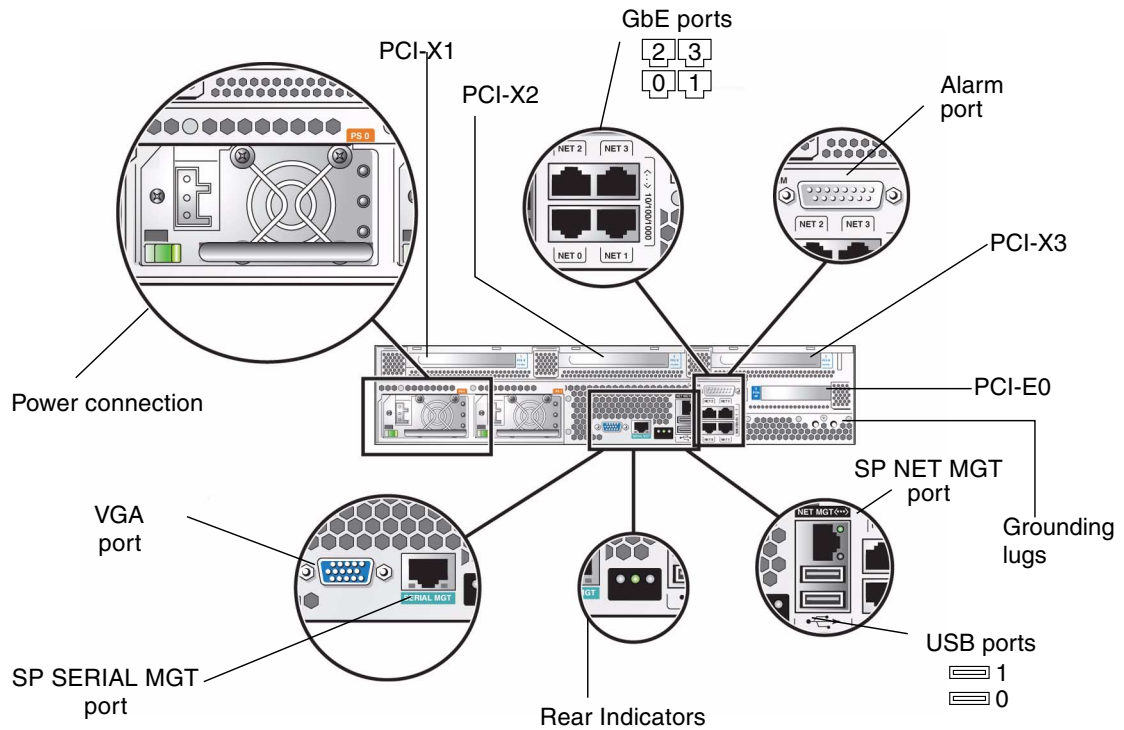


FIGURE 1-3 Netra X4200 M2 Server Rear Panel

Netra X4200 M2 Server Components

FIGURE 1-4 shows the locations of the Netra X4200 M2 server replaceable components, with the top covers removed.

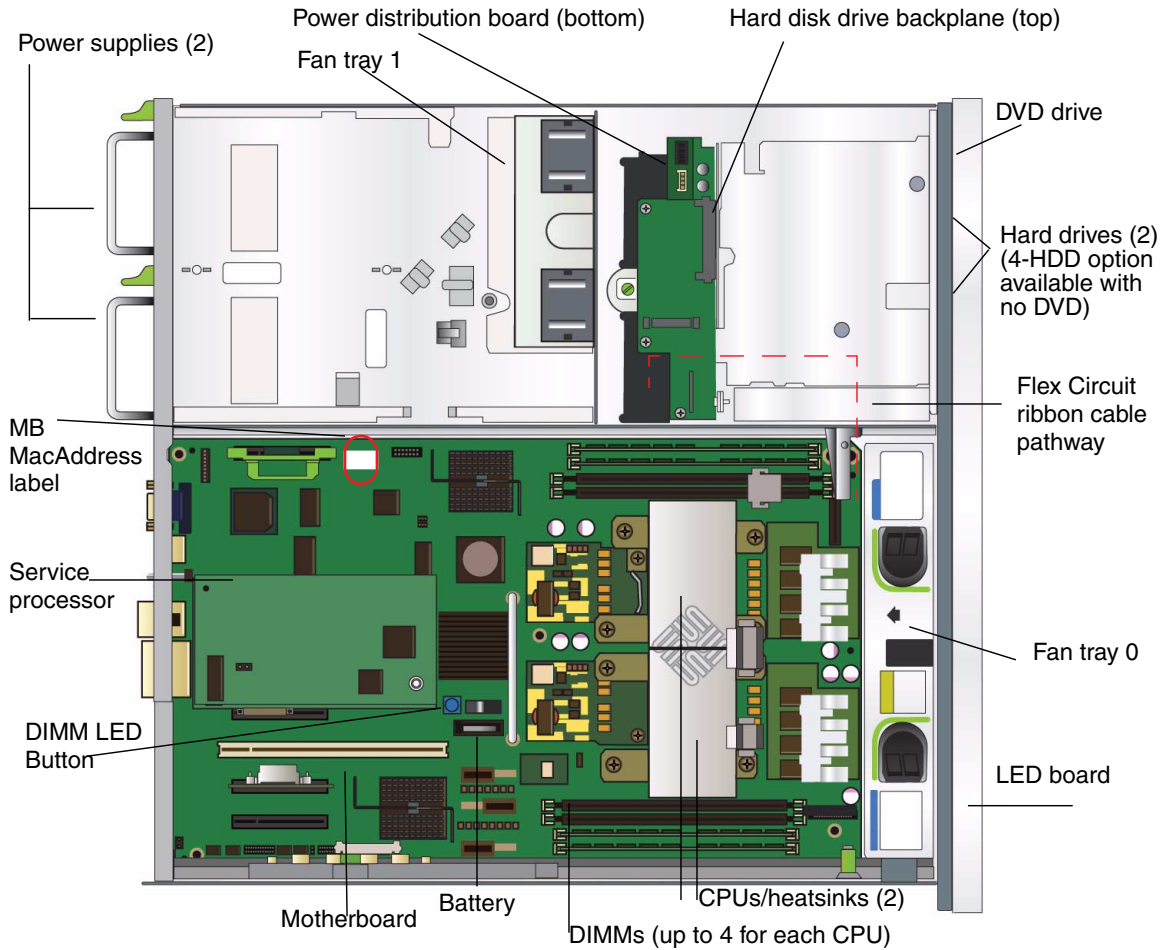


FIGURE 1-4 Netra X4200 M2 Replaceable Component Locations

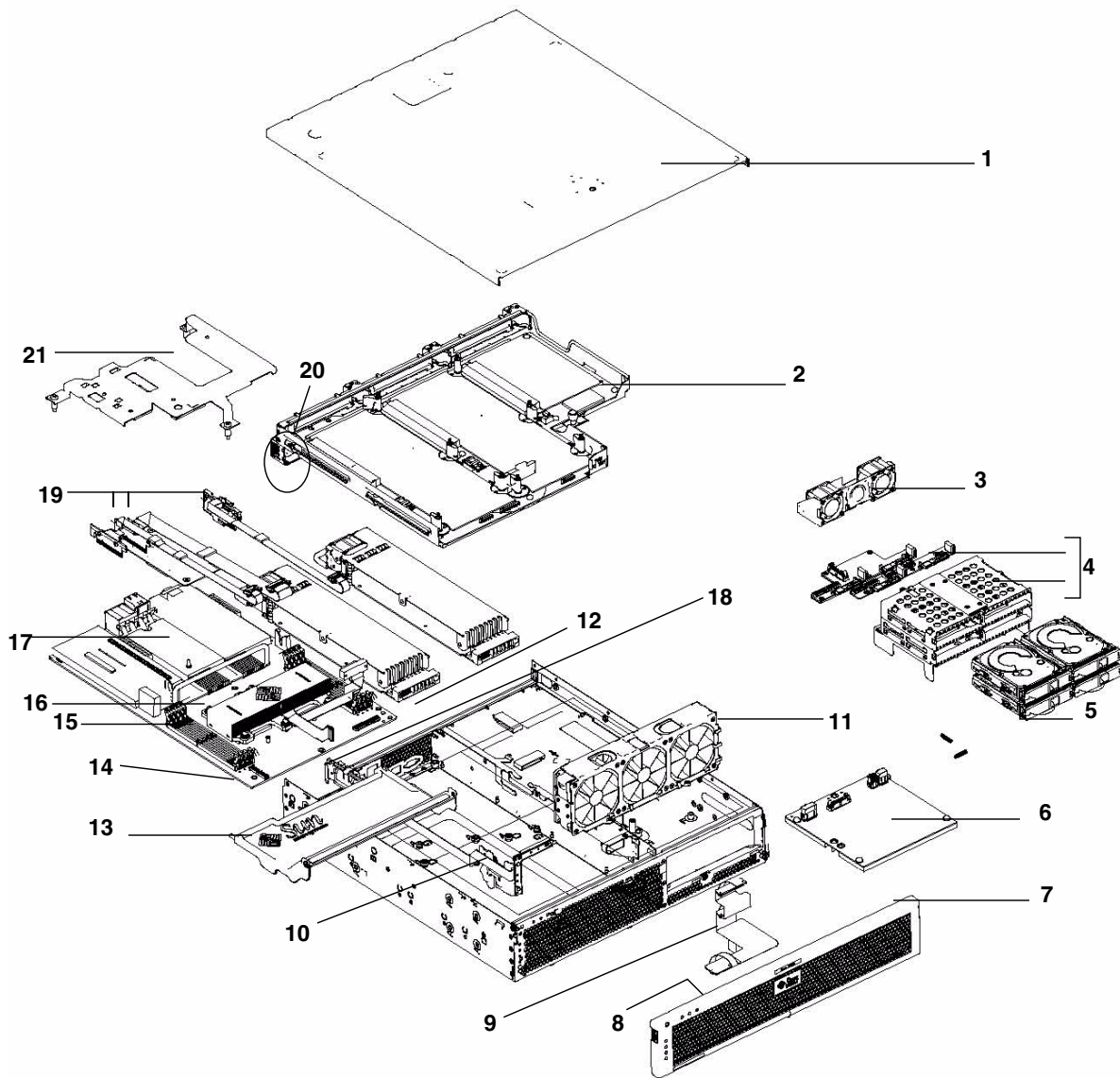


FIGURE 1-5 Customer Replaceable Units (Note that all FRUs are customer-replaceable)

TABLE 1-2 Netra X4200 M2 Server FRU List

| Item No. | FRU | Replacement Instructions | Description | FRU Name* |
|----------------|--------------------------|---|---|-------------------------------|
| 1 | Top cover | “Removing the Top Cover” on page 33 | | |
| 2 | PCI Tray | “Maintaining the PCI Tray” on page 34 | The PCI tray is a carrier for the PCI-X and PCI-E cards. | PCI Tray |
| 3 | Hard drive fan assembly | “Replacing the Hard Drive Fan Assembly” on page 58 | Fans that provide supplemental cooling of the hard drives and optical media drive. | |
| 4 | Mass storage assembly | “Replacing the Mass Storage Assembly” on page 47 | Bays that house hard drives and optical media drive. | |
| 5 | Hard drives | “Replacing a Hard Drive” on page 43 | SFF SAS, 2.5-inch form-factor hard drives. | HDD0 HDD1 HDD2 HDD3 |
| (not pictured) | DVD drive | “Replacing the DVD Drive” on page 40 | DVD drive | DVD |
| 6 | Power distribution board | “Replacing the Power Distribution Board” on page 98 | Provides the main 12V power interconnect between the power supplies and the other boards. | PDB |
| 7 | Bezel | “Opening the Front Bezel” on page 33 | Protects and provides access to hard drives, DVD drive, LEDs, and power button. Passive latch for earthquake. | |
| 8 | Air filter | | Cleans air before it enters system. Filter media meets NEBS requirements. | |
| 9 | Flex circuit cable | “Replacing the Mass Storage Assembly” on page 47 | Two versions (2HDD and 4HDD) available to prevent shorting. | |
| 10 | LED board | “Replacing the LED Board” on page 62 | Contains the push-button circuitry and LEDs that are displayed on the bezel of the box. | LEDDBD |
| 11 | System Fan Assembly | “Replacing the System Fan Assembly” on page 53 | Fans for the motherboard assembly. | FT0/FM0 FT0/FM1 FT0/FM2 |
| 12 | Power supplies (PS) | “Replacing a Power Supply” on page 95 | The power supplies provide -3.3 VDC standby power at 3 Amps and 12 VDC at 25 Amps. When facing the rear of the system, PS0 is on the left and PS1 is on the right. | PS0 PS1 |

TABLE 1-2 Netra X4200 M2 Server FRU List (Continued)

| Item No. | FRU | Replacement Instructions | Description | FRU Name* |
|----------|---|---|---|--|
| 13 | DIMM/CPU duct | “Replacing the DIMM/CPU Duct” on page 68 | Duct aids cooling of DIMMS and CPU. | |
| 14 | Motherboard assembly | “Replacing the Motherboard Assembly” on page 82 | <p>The motherboard assembly is comprised of the following boards that must be replaced as a single FRU:</p> <ul style="list-style-type: none"> • The CPU board – Comprises the central processing subsystem for the server, which includes the UltraSPARC T1 CPU processor, 16 DIMM connectors, the memory controllers, and supporting circuitry. • The I/O board – Provides the I/O logic, including the connectors for the PCI-X and PCI-E interfaces, Ethernet interfaces, all the power interconnections, and miscellaneous logic. <p>Note: This assembly is provided in different configurations to accommodate the different processor models (4, 6, and 8 core).</p> | <p>MB</p> <p>IOBD</p> |
| 15 | DIMMs | “Replacing Memory Modules (DIMMs)” on page 71 | <p>Can be ordered in the following sizes:</p> <ul style="list-style-type: none"> • 1 GB • 2 GB • 4 GB | |
| 16 | Battery | “Replacing the Battery” on page 38 | Battery | BAT |
| 17 | Graphics Redirect and Service Processor (also known as Service Processor) | “Replacing the GRASP Board” on page 66 | Independent processor module that enables remote management of the server. | SP |
| 18 | Alarm board | “Replacing the Alarm Board” on page 103 | Provides dry-contact switching according to alarm conditions. | |
| 19 | PCI-X cards | “Replacing a PCI-X Card” on page 88 | Optional add-on cards. | <p>PCIX1</p> <p>PCIX2</p> <p>PCIX3</p> |

TABLE 1-2 Netra X4200 M2 Server FRU List (*Continued*)

| Item No. | FRU | Replacement Instructions | Description | FRU Name* |
|----------|-------------------------------|--|---|-----------|
| | Cable kit/Goldfinger | “Removing the PCI Tray and PCI-E Ribbon Cables” on page 34 | PCI-E ribbon cables that connect the motherboard to the PCI tray. | |
| 20 | PCI-E card | “Replacing the PCI-E Card” on page 92 | Optional add-on cards. | PCIE0 |
| 21 | PCI-E cable hold-down bracket | “Removing the PCI-E Cable Hold-Down Bracket” on page 36 | | |

* The FRU name is used in system messages.

Accessory Kit

TABLE 1-3 lists the contents of the accessory kit that is shipped with the Netra X4200 M2 servers.

TABLE 1-3 Netra X4200 M2 Accessory Kit

| Item | Part Number |
|--|-------------|
| WRIST,STRAP,10MM,STUDS | 250-1691-01 |
| M5,NUT,KIT,ENXU | 370-6066-01 |
| RTE,23.19,07.88,02.00,SW,NGA,K ACT | 401-4137-01 |
| <i>Netra X4200 M2 Server Getting Started Guide</i> (printed sheet) | 820-1052-10 |
| Serial-to-RJ45 cable adapter (DB9S-to-RJ45F) | 530-3100-01 |
| WAGO ASSEMBLY KIT | 565-1882-01 |
| TMNL,SMI BINARY CODE LICENSE | 816-4835-10 |
| SUN GENERIC SAFETY DOC | 816-7190-10 |
| MNL,DCT SUN INSTALL CHECK TOOL | 817-0440-12 |
| SUPP LIC TERMS SA | 817-5245-10 |
| TMNL,SOFTWARE LICENSE AGREEMNT | 819-0764-10 |
| DCT,ENTITLEMENT DOC HDW-S10 | 819-1755-10 |
| CARD,GSG,NETRA_X4200-M2_SERVER ACT | 820-1052-01 |

Powering On and Configuring BIOS Settings

This chapter contains the following procedures and information:

- “Powering On the Server” on page 12
- “Powering Off the Server” on page 14
- “Configuring BIOS Settings” on page 15
- “Resetting ILOM and BIOS Passwords” on page 20
- “Using the Clear CMOS Jumper” on page 22
- “Using the Reset and NMI Switches” on page 23
- “Updating the BIOS” on page 24

Powering On the Server

Note – Before powering on your server for the first time, follow the installation and cabling instructions provided in the *Netra X4200 M2 Server Setup Guide*, which is online at the URL described in “[Related Documentation](#)” on page xii.



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

1. **Verify that input (AC/DC) power cords have been connected to the server's power supplies and that standby power is on.**

In standby power mode, the Power/OK LED on the front panel flashes, indicating that the service processor is working and the system is ready to be fully powered on to main power mode. See [FIGURE 2-1](#) for the LED location.

2. **Use a ballpoint pen or other stylus to press and release the recessed Power button on the server front panel. See [FIGURE 2-1](#) for the Power button location.**

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

Note – The ILOM Service Processor will boot immediately after AC/DC power is applied. The host system/motherboard is held in reset mode and the BIOS code will not execute until the ILOM boot is complete.

[FIGURE 2-1](#) shows the LED location on the server front panel with the bezel open.

Power/OK LED Power button

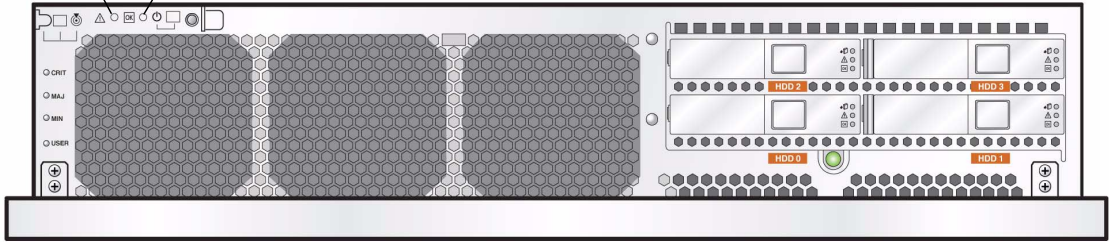


FIGURE 2-1 Server Front Panel With Bezel Open

[FIGURE 2-2](#) shows the LED location on the front panel with the bezel closed.

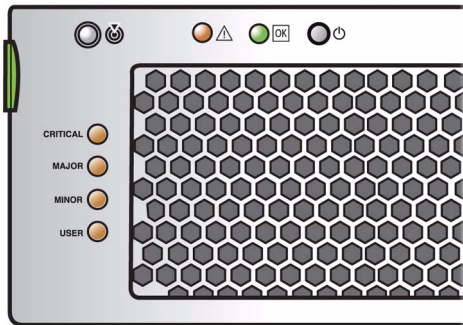


FIGURE 2-2 Server Front Panel With Bezel Closed

Powering Off the Server

- **Choose a method for shutting down the server from main power mode to standby power mode.**
 - **Graceful shutdown:** Use a ballpoint pen or other stylus to press and release the Power button on the front panel. This causes Advanced Configuration and Power Interface (ACPI) enabled operating systems to perform an orderly shutdown of the operating system. Servers not running ACPI-enabled operating systems will shut down to standby power mode immediately.
 - **Emergency shutdown:** Press and hold the Power button for four seconds to force main power off and to enter standby power mode. When main power is off, the Power/OK LED on the front panel will begin flashing, indicating that the server is in standby power mode.



Caution – When you use the Power button to enter standby power mode, power is still directed to the Graphics Redirect and Service Processor (GRASP) board and power supply fans. The Power/OK LED flashes during standby power mode. To completely power off the server, you must disconnect the AC or DC power cords from the back of the power supplies.

Configuring BIOS Settings

This section describes how to view and/or modify the Basic Input Output System (BIOS) settings. For a description of BIOS Setup screens, see [“BIOS Setup Screens Summary” on page 18](#).

The BIOS has a Setup utility stored in the BIOS flash memory. The Setup utility reports system information and can be used to configure the BIOS settings. The configured data is provided with context-sensitive Help and is stored in the system's battery-backed CMOS RAM. If the configuration stored in the CMOS RAM is invalid, the BIOS settings will default to the original state specified at the factory.

The BIOS Setup utility contains seven menu screens, which are displayed in the following order: Main, Advanced, PCI/PnP, Boot, Security, Chipset, and Exit.

Use the left and right arrow keys to move sequentially back and forth through the seven screens. Fields that can be reconfigured are displayed in color. All other fields are not configurable. Use the up and down arrow keys to scroll through a screen's menu. Use the Tab key to move back and forth across columns.

Changing the Configuration of a BIOS Menu Item

You can change the BIOS configuration using several different interfaces:

- Use a USB keyboard and mouse, and a VGA monitor connected directly to the server.
- Use the remote video console of the ILOM Service Processor and redirect the server's console output. See [“Redirecting Console Output” on page 121](#)

TABLE 2-1 Local-to-Remote Key Mapping

| Local Keyboard | Remote Keyboard | Local Keyboard | Remote Keyboard |
|----------------|-----------------|----------------|-----------------|
| F1 | Ctrl-Q | F9 | Ctrl-O |
| F2 | Ctrl-E | F10 | Ctrl-S |
| F7 | Ctrl-A | F12 | Ctrl-N |
| F8 | Ctrl-P | | |

Note – Function keys only work when you are using a local connection. When you are changing a BIOS configuration remotely, you will need to map your keyboard appropriately.

- 1. To change the system's parameters, enter the BIOS Setup utility by pressing the F2 key while the system is performing the power-on self-test (POST).**
POST testing is indicated when the Power/OK LEDs on the front and back panels go into slow-blink mode.
- 2. Highlight the field to be modified using the arrow and Tab keys.**
- 3. Press Enter to select the field.**
A dialog box appears. The box presents you with the options available for the setup field that you have chosen.
- 4. Modify the setup field and close the screen.**
- 5. To modify other setup parameters, use the arrow and Tab keys to navigate to the desired screen and menu item, and repeat Steps 1 through 4. Otherwise, go to [Step 6](#).**
- 6. Press and release the right arrow key until the Exit menu screen is displayed.**
- 7. Follow the instructions on the Exit menu screen to save your changes and exit the BIOS Setup utility.**

BIOS Considerations

This section contains information and considerations regarding the system BIOS.

Peripheral Component Interconnect (PCI) Card Slot Booting Priority

For the locations of the PCI slots, see [“Replacing a PCI-X Card” on page 88](#) and [“Replacing the PCI-E Card” on page 92](#).

The slots for the Netra X4200 M2 Server PCI cards are detected by the BIOS during startup in the following order:

1. PCI-E Slot 0
2. PCI-X Slot 2
3. PCI-X Slot 3
4. PCI-X Slot 4
5. PCIX Slot 1

Ethernet Port (NIC) Device and Driver Naming

These servers each have four 10/100/1000BASE-T Gigabit Ethernet ports (NICs). The chassis labeling of the physical ports is shown in [FIGURE 2-3](#).

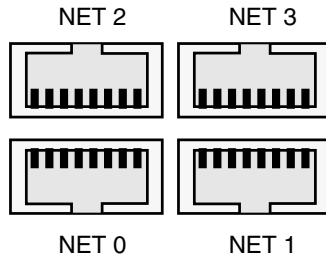


FIGURE 2-3 Ethernet Port Chassis Labeling Designations

Note – The device naming for the NICs is reported differently by different interfaces and operating systems.

Netra X4200 M2 Server NIC Naming

[FIGURE 2-4](#) illustrates the default naming used by the various operating systems for the four NICs shown in [FIGURE 2-3](#).

| BIOS | | Solaris 10 | | Red Hat Linux | | SuSE Linux | | Windows 2003 | |
|----------|----------|------------|----------|---------------|------|------------|------|--------------|------|
| slot 110 | slot 111 | e1000 g0 | e1000 g1 | eth0 | eth1 | eth2 | eth3 | net3 | net4 |
| slot 108 | slot 109 | nge0 | nge1 | eth2 | eth3 | eth0 | eth1 | net | net2 |

FIGURE 2-4 Netra X4200 M2 NIC Naming

Netra X4200 M2 Server NIC Booting Priority

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

1. NET 0 (Nvidia NGE 0)
2. NET 1 (Nvidia NGE 1)
3. NET 2 (Intel E1000 G0)
4. NET 3 (Intel E1000 G1)

BIOS Option ROM Size Limitation

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

AMD PowerNow! Feature Disabled by Default

The AMD PowerNow! feature, which is accessed from the BIOS Setup utility Advanced menu, is disabled by default on Netra X4200 M2 servers. If you want to enable this feature, review the *Netra X4200 M2 Server Product Notes* (820-0067) for any outstanding known issues for your operating system.

Descriptions of the BIOS Setup Screens

TABLE 2-2 contains summary descriptions of the seven top-level BIOS Setup screens.

TABLE 2-2 BIOS Setup Screens Summary

| Screen | Description |
|----------|---|
| Main | General system information. |
| Advanced | Configuration interface for the CPUs, IDE, SuperIO, ACPI, Event Log, HyperTransport, IPMI, MPS, PCI Express Configuration, PowerNow!, Remote Access, and USB. |
| PCI/PnP | Configure Plug-and-Play (PnP) devices by the BIOS (default), or by the operating system (if applicable). |
| Boot | Configure the boot device priority (hard disk drives and the ATAPI DVD drive). |
| Security | Install or change the user and supervisor passwords. |
| Chipset | Configuration options for the NorthBridge and SouthBridge devices, and PCI-X devices. Note that the Memory Chipkill option is enabled by default. Enabling Chipkill improves system reliability but degrades system performance under specific applications. |
| Exit | Save or discard changes. |

FIGURE 2-5 summarizes the BIOS menu tree

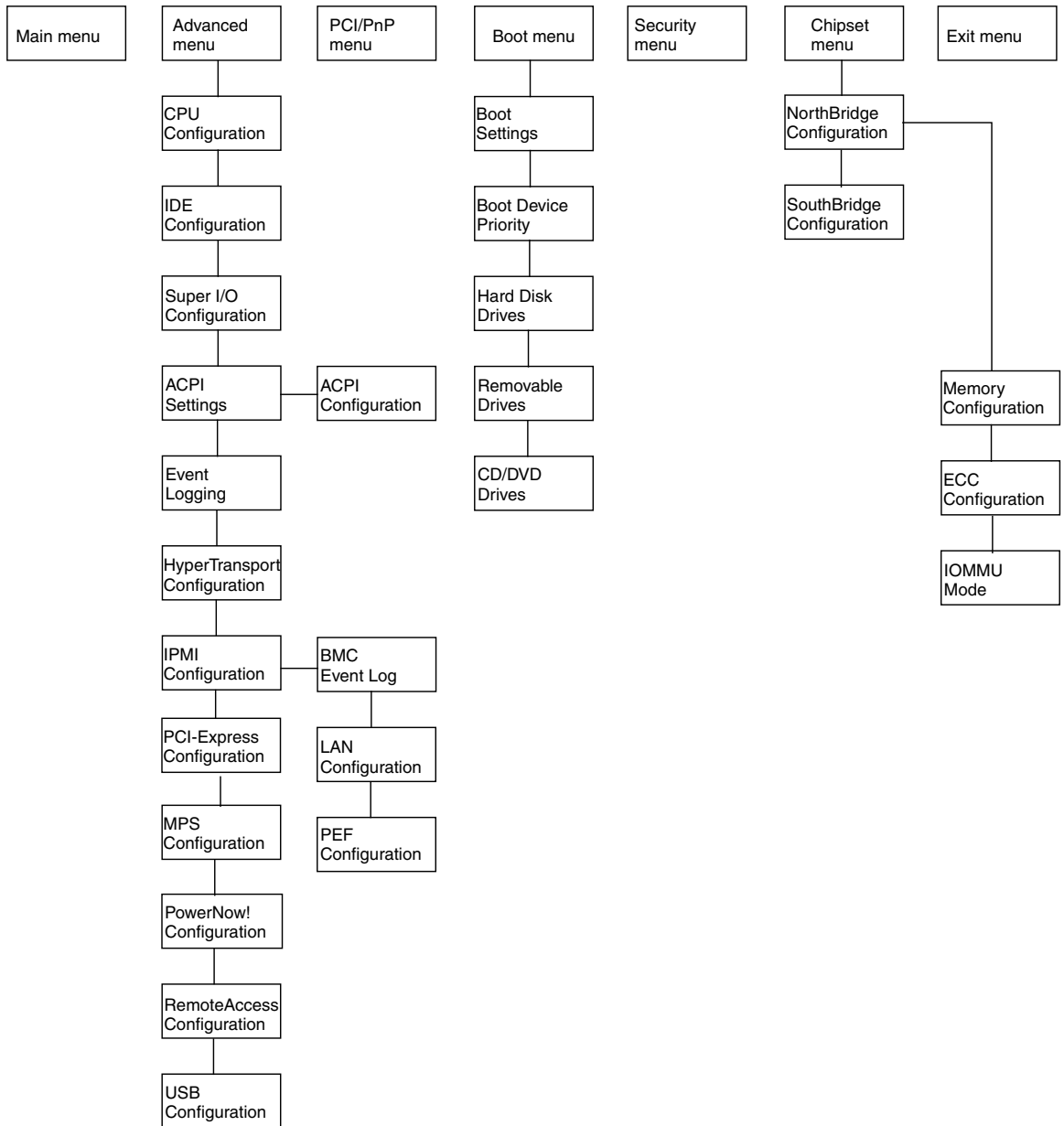


FIGURE 2-5 Netra X4200 M2 Server BIOS Menu Tree

Resetting ILOM and BIOS Passwords

This procedure describes how to reset the Administrator password (root password) for the ILOM Service Processor to the default after it has been set once during initial setup.

Note – This procedure simultaneously removes any BIOS password that was set.

1. **Shut down the server to standby power mode by using a ballpoint pen or other stylus to press and release the recessed Power button on the front panel.**

See [“Powering Off the Server”](#) on page 14.

2. **Disconnect the AC or DC power cords from the server.**



Caution – Before handling components, attach an electrostatic discharge (ESD) wrist strap to the grounding post that is built into the rear of the chassis (see [FIGURE 1-3](#) for the location). The system’s printed circuit boards and hard disk drives contain components that are extremely sensitive to static electricity.

3. **If the server is in a rack, slide it far enough from the rack so that you can remove the cover. If you cannot safely view and access the motherboard, remove the server from the rack.**

4. **Remove the cover from the server.**

See [“Removing the Top Cover”](#) on page 33.

5. **Install the shorting jumper across the J12 header pins.**

See [FIGURE 2-6](#) for the J12 jumper location. The function of the J12 jumper is to clear the ILOM Service Processor (SP) password.

6. **Reinstall the cover to the server.**

7. **Reconnect AC or DC power cords to the server.**

The server powers up to standby power mode, indicated when the Power/OK LED on the front panel is flashing.

8. **Return the server to main power mode by using a ballpoint pen or other stylus to press and release the recessed Power button on the front panel.**

Note – You must allow the entire server, not just the SP, to reboot to main power mode to complete the password reset. This is because the state of the **J12** jumper cannot be determined without the host CPU running. Wait until the end of POST, when you see the CMOS password cleared by jumper message, after which both the BIOS and SP passwords are reset.

- The ILOM SP password is reset to the default, **changeme**.
- The BIOS password is also reset by a separate operation performed by the BIOS when it discovers the presence of the J12 jumper. The BIOS password is not reset to **changeme**, it is removed so that there is no longer a BIOS password set. If you had a BIOS password set, you are no longer prompted for one.

9. **Log in to the ILOM web GUI using **root** as the user name and **changeme** as the password.**

Refer to the *Integrated Lights Out Manager Administration Guide* (819-1160).

10. **Change the default password to a password of your choice.**

11. **Repeat Step 1 through Step 8 to remove the J12 jumper. Remove the jumper in Step 5 rather than inserting it.**

Note – If you do not remove the **J12** jumper, the ILOM SP and BIOS passwords will be reset every time you power-cycle the server.

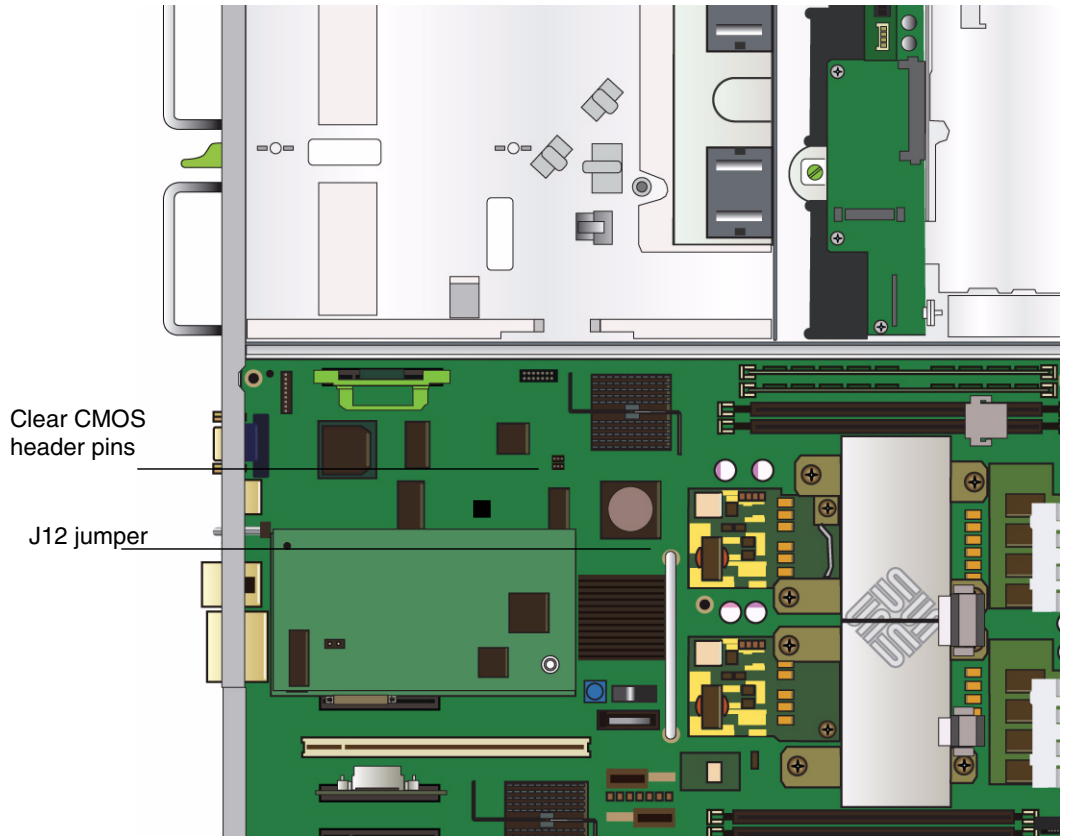


FIGURE 2-6 Clear CMOS and J12 Jumper Locations on the Motherboard

Using the Clear CMOS Jumper

You can use the Clear CMOS jumper to clear the server's CMOS settings in the event of a system hang. For example, if the server hangs because of incorrect settings and will not boot, use this jumper to invalidate the settings and reboot with defaults.

1. **Shut down the server to standby power mode by using a ballpoint pen or other stylus to press and release the recessed Power button on the front panel.**
See [“Powering Off the Server”](#) on page 14.
2. **Disconnect the AC or DC power cords from the server.**



Caution – Before handling components, attach an ESD wrist strap to the grounding post that is built into the rear of the chassis (see [FIGURE 1-3](#) for the location). The system’s printed circuit boards and hard disk drives contain components that are extremely sensitive to static electricity.

3. **If the server is in a rack, slide it far enough from the rack so that you can remove the cover. If you cannot safely view and access the motherboard, remove the server from the rack.**

4. **Remove the top cover from the server.**
See “[Removing the Top Cover](#)” on page 33.

5. **Remove the PCI tray.**
See “[Removing the PCI Tray and PCI-E Ribbon Cables](#)” on page 34.

6. **Install the shorting jumper across the Clear CMOS header pins.**
See [FIGURE 2-6](#) for the Clear CMOS jumper location at J9.

7. **Wait 10 seconds, then remove the shorting jumper.**
This jumper removes battery power from the SouthBridge chipset where the CMOS settings are stored, thereby removing the CMOS settings.

8. **Reinstall the cover to the server.**

9. **Reconnect AC or DC power cords to the server.**
The server powers up to standby power mode, indicated when the Power/OK LED on the front panel is flashing.

Using the Reset and NMI Switches



Caution – Do not use the Reset and NMI switches unless you are instructed to do so by authorized Sun service personnel.

The Non-Maskable Interrupt (NMI) switch (SW3 on the motherboard) sends an NMI order to the CPUs, which is used by Field Service for debugging activities at the request of Service personnel. The button for this switch can be pushed by inserting a paper clip or similar stylus through the hole provided on the rear of the chassis (see [FIGURE 2-7](#), which shows the NMI Switch location on the Netra X4200 M2 server).

The Reset switch (SW4 on the motherboard) sends a reset order to the CPUs, resetting the main system, but not the service processor. The button for this switch can be pushed by inserting a paper clip or similar stylus through the hole provided on the rear of the chassis (see [FIGURE 2-7](#), which shows the Reset switch location on the Netra X4200 M2 server).

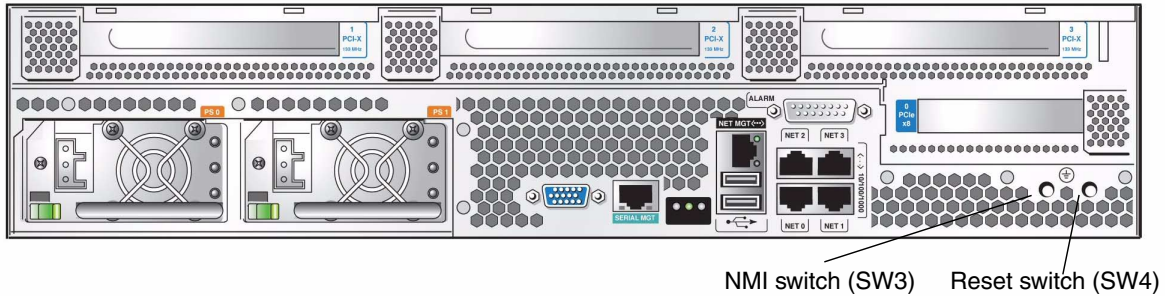


FIGURE 2-7 NMI and Reset Switches on Rear Panel

Updating the BIOS

The BIOS is updated whenever you update the ILOM Service Processor firmware. For instructions on updating the firmware, refer to the *Integrated Lights Out Manager Administration Guide* (819-1160).

Power-On Self-Test (POST)

For information about BIOS POST testing, POST codes, POST code checkpoints, and console redirection, see [Appendix B, “BIOS POST Codes”](#) on page 121.

Maintaining the Netra X4200 M2 Server

This chapter contains information and procedures for servicing the Netra X4200 M2 server hardware, including component removal and replacement procedures.

This chapter contains the following sections:

- [“Tools and Supplies Needed” on page 26](#)
- [“Locations of the Netra X4200 M2 Components” on page 26](#)
- [“Starting the Maintenance Procedures” on page 28](#)
- [“Maintaining the PCI Tray” on page 34](#)
- [“Replaceable Component Procedures” on page 37](#)
- [“Replacing the Mass Storage Assembly” on page 47](#)
- [“Replacing the DVD Drive” on page 40](#)
- [“Replacing a Hard Drive” on page 43](#)
- [“Replacing the System Fan Assembly” on page 53](#)
- [“Replacing the Hard Drive Fan Assembly” on page 58](#)
- [“Replacing the LED Board” on page 62](#)
- [“Replacing the GRASP Board” on page 66](#)
- [“Replacing the DIMM/CPU Duct” on page 68](#)
- [“Replacing Memory Modules \(DIMMs\)” on page 71](#)
- [“Replacing a CPU and Heatsink” on page 76](#)
- [“Replacing the Motherboard Assembly” on page 82](#)
- [“Replacing a PCI-X Card” on page 88](#)
- [“Replacing the PCI-E Card” on page 92](#)
- [“Replacing a Power Supply” on page 95](#)
- [“Replacing the Power Distribution Board” on page 98](#)
- [“Replacing the Alarm Board” on page 103](#)

Tools and Supplies Needed

The Netra X4200 M2 server can be serviced with the following items:

- No. 2 Phillips screwdriver
- Antistatic wrist strap
- Ballpoint pen or other stylus (to press the recessed Power button)
- Long-nosed pliers (optional for Graphics Redirect and Service Processor (GRASP) board removal)
- 8 mm screwdriver.

Locations of the Netra X4200 M2 Components

[FIGURE 3-1](#) shows the locations of the replaceable Netra X4200 M2 components that are documented in this chapter.

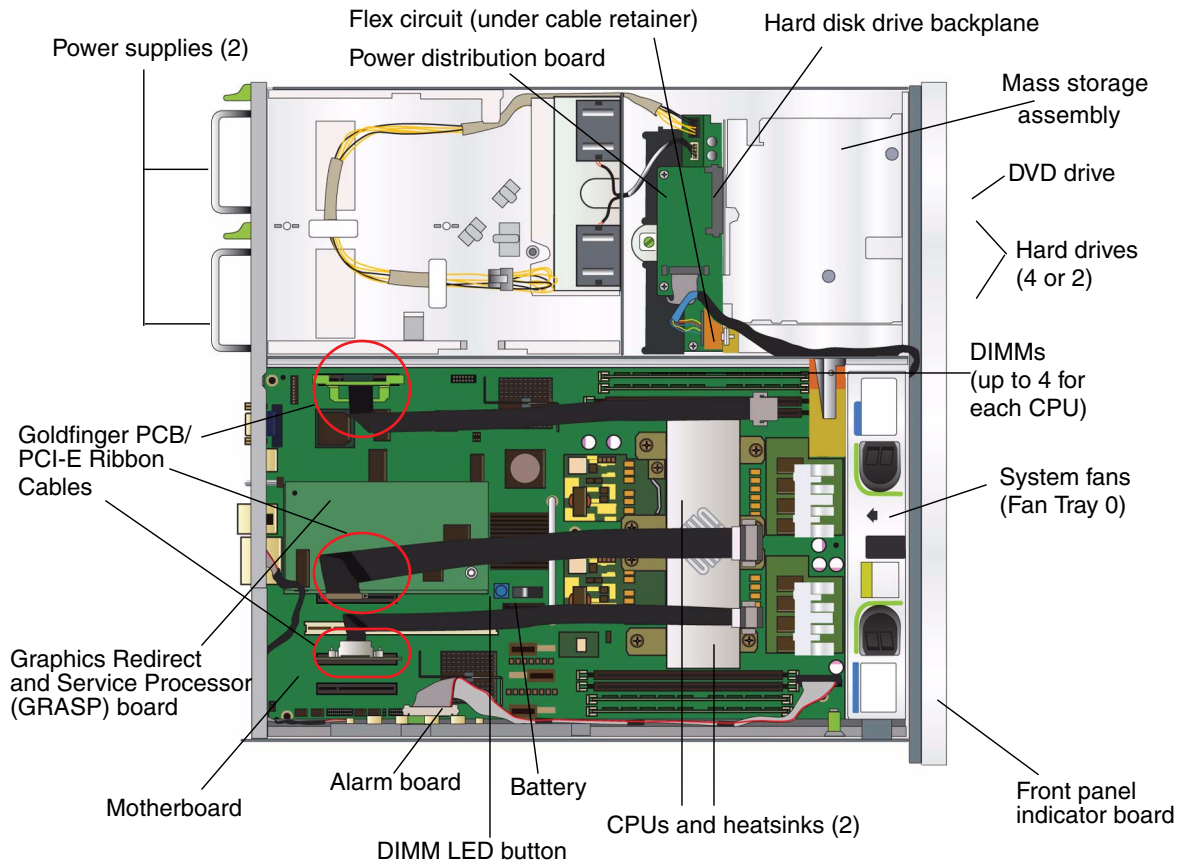


FIGURE 3-1 Netra X4200 M2 Replaceable Component Locations

Starting the Maintenance Procedures

Use the preparatory procedures in this section when you are referred to them from the removal and replacement procedures.

Powering Off the Server

- **Choose one of the following methods for shutting down the server from main power mode to standby power mode. See [FIGURE 3-2](#).**
 - **Graceful shutdown:** Use a ballpoint pen or other stylus to press and release the recessed Power button on the front panel. This causes Advanced Configuration and Power Interface (ACPI) enabled operating systems to perform an orderly shutdown of the operating system. Servers not running ACPI-enabled operating systems will shut down to standby power mode immediately.
 - **Emergency shutdown:** Press and hold the Power button for four seconds to force main power off and enter standby power mode. When main power is off, the Power/OK LED on the front panel will begin flashing, indicating that the server is in standby power mode.

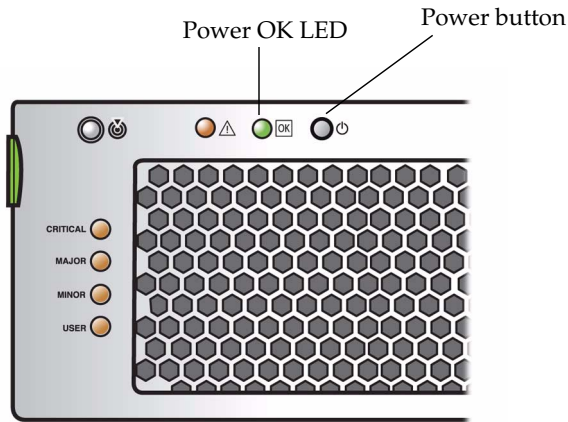


FIGURE 3-2 Power Button and Power/OK LED Locations



Caution – When you use the Power button to enter standby power mode, power is still directed to the GRASP board and power supply fans, indicated when the Power/OK LED is flashing. To completely power off the server, you must disconnect the AC or DC power cords from the back panel of the server.

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 0
 - PCI-X 1
 - PCI-X 2
 - Alarm
 - PCI-E 0
 - SER MGT

- NET MGT
- USB 1
- USB 0
- NET 0
- NET 1
- NET 2
- NET 3
- Power supply 0
- Power supply 1



Caution – Before unplugging the AC or DC power cords from the server or handling internal components, attach an electrostatic discharge (ESD) wrist strap to the button-snap grounding post inside the chassis just behind the mass storage assembly (see [FIGURE 3-10](#) for the location). The system’s printed circuit boards and hard disk drives contain components that are extremely sensitive to static electricity.

3. **Disconnect both power cords from the server’s power supplies.**
4. **Turn off all peripheral devices connected to the system server.**
5. **Label any peripheral cables and/or telecommunication lines that must be disconnected in order to remove and replace a specific component.**
6. **Remove the server from the rack.** See [“Removing the Server From the Rack” on page 30](#)

Removing the Server From the Rack



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 3-3](#).

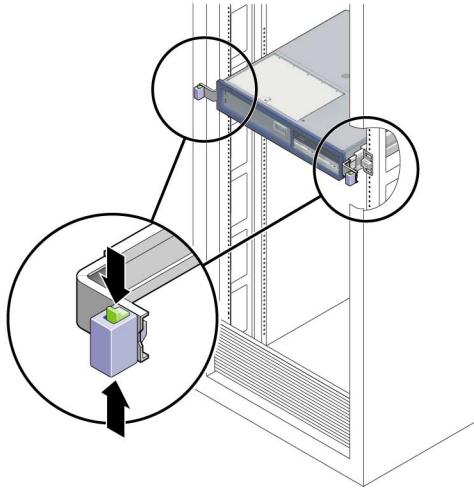


FIGURE 3-3 Slide Release Latches

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



Caution – The server weighs approximately 40 lb (18 kg). The next step requires two people to dismount and carry the chassis.

4. **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.

5. **Set the server on a sturdy work surface.**
6. **Perform antistatic measures.**

See [“Performing Antistatic Measures” on page 31](#).

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 button-snap grounding post inside the chassis just behind the mass storage assembly (see [FIGURE 3-10](#) for the location). Then disconnect the power cords from the server.

Removing the Top Cover

1. Press down on the cover release and, using the indent for leverage, slide the cover toward the rear of the chassis approximately 0.5 inch (12 mm). See [FIGURE 3-4](#).
2. Grasp the cover by its rear edge and lift it straight up from the chassis.

Note – When you remove any cover, the intrusion switch that is on the front I/O board automatically powers down the system to standby mode.

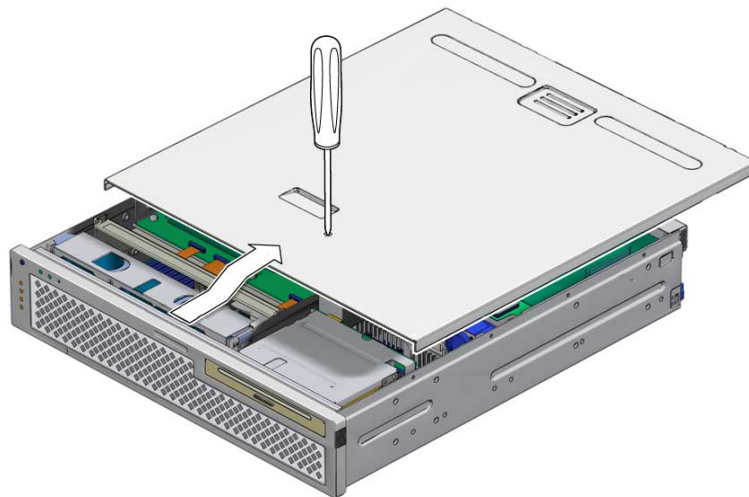


FIGURE 3-4 Removing the Top Cover

Opening the Front Bezel

1. Locate the green tabs on either side of the bezel and pull the bezel forward and down. See [FIGURE 3-5](#).
2. Pull the bezel away from the chassis.

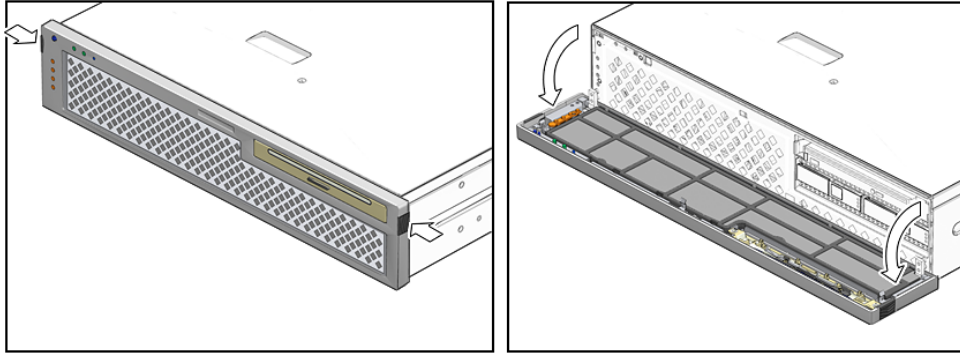


FIGURE 3-5 Opening the Front Bezel

Maintaining the PCI Tray

Removing the PCI Tray and PCI-E Ribbon Cables

The PCI tray is a carrier for the PCI-X and PCI-E cards. You need to remove the PCI tray to replace the following components:

- PCI-E card
- LED board
- DIMM/CPU duct
- Alarm board
- DIMMs/CPU
- GRASP
- Battery
- Mass storage array
- System fans
- Motherboard assembly

It is not necessary to remove the PCI tray for other components; however, when the PCI tray is removed, additional working space is provided.

1. Disconnect the PCI tray cable at location J2 and loosen the thumbscrew adjacent to it (FIGURE 3-6). Also disconnect the PCI-E cables shown in FIGURE 3-6.

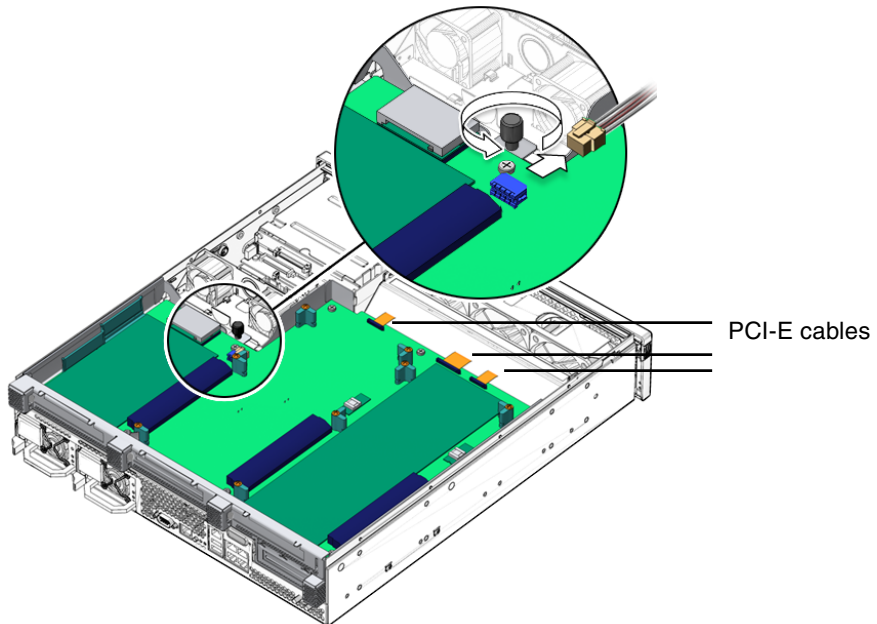


FIGURE 3-6 Disconnecting the PCI Tray Power Cable and Loosening the Thumbscrew

Note – The thumbscrew is captive and cannot be fully removed from the PCI tray.

2. Slide the PCI tray back about 1 inch (25 mm) and lift up on the back edge (FIGURE 3-7).

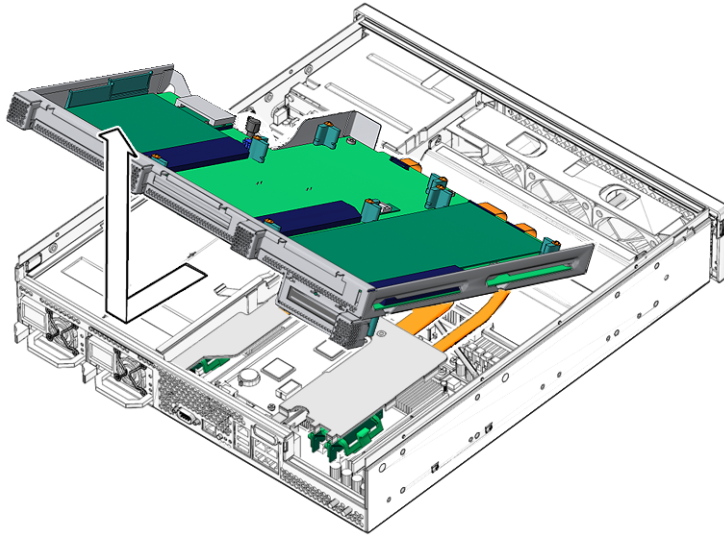


FIGURE 3-7 Lifting the PCI Tray

Removing the PCI-E Cable Hold-Down Bracket

- Loosen the three captive screws that hold the PCI-E cable hold-down bracket in position, and lift the U-plate up and off of the motherboard (**FIGURE 3-8**). Note the ribbon cable and goldfinger locations on the motherboard (**FIGURE 3-9**).

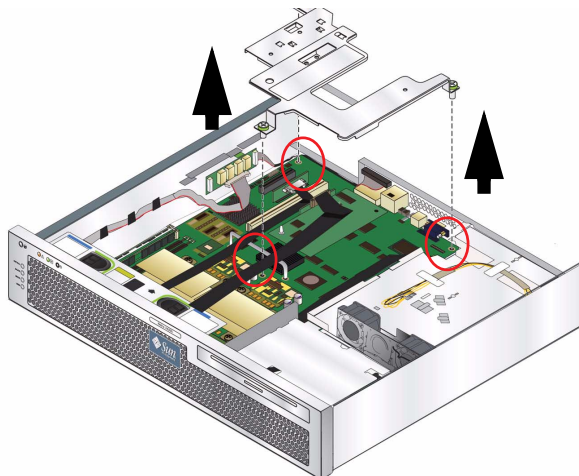


FIGURE 3-8 Screw Locations and Removal of the PCI-E cable Hold-Down Bracket

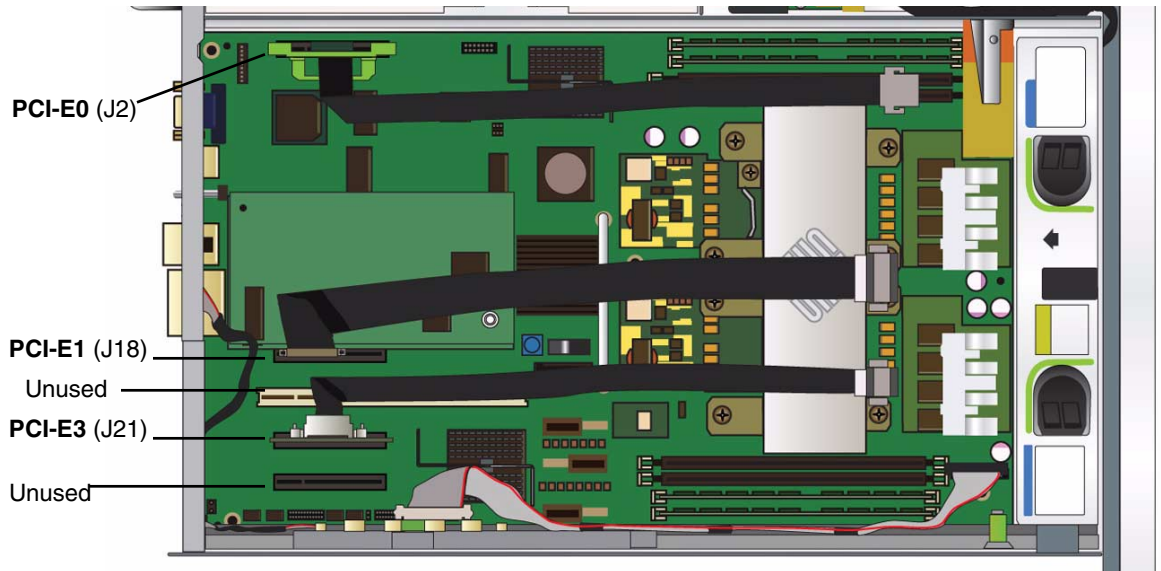


FIGURE 3-9 Ribbon Cable and Goldfinger Board Locations on the Motherboard

Replaceable Component Procedures

Note – All FRUs are customer-replaceable.

Supported components and their part numbers are subject to change over time. For the most up-to-date list of replaceable components for these servers, see the following URL:

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

1. Click on the name and model of your server.
2. On the product page that opens for the server, click on Full Components List for the list of components.



Caution – Before handling components, attach an ESD wrist strap to the button-snap grounding post inside the chassis just behind the mass storage assembly (see [FIGURE 3-10](#) for the location). The system's printed circuit boards and hard disk drives contain components that are extremely sensitive to static electricity.

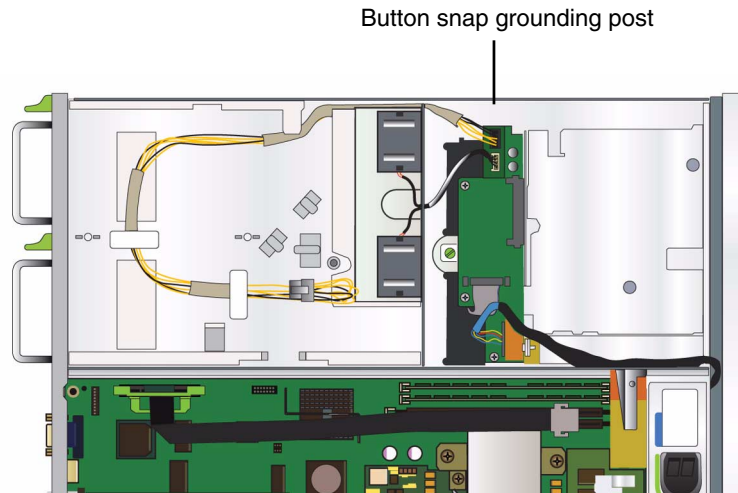


FIGURE 3-10 Location of Button Snap Grounding Post

Replacing the Battery

Follow these steps to remove and replace the system battery.

Part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, go to:

<http://www.sun.com/netra/x4200>

1. **Power off the server as described in “Powering Off the Server” on page 28.**
2. **If the server is in a rack, slide it far enough from the rack so that you can remove the cover. If you cannot safely view and access the component, remove the server from the rack.**
3. **Remove the cover of the assembly as described in “Removing the Top Cover” on page 33.**

Note – Record the orientation (polarity) of the battery in its holder before you remove it. The positive polarity, marked with a “+” symbol, should be facing toward the chassis center.

4. Remove the battery by gently pulling the clip away from the battery face and lifting the battery straight up (FIGURE 3-11).

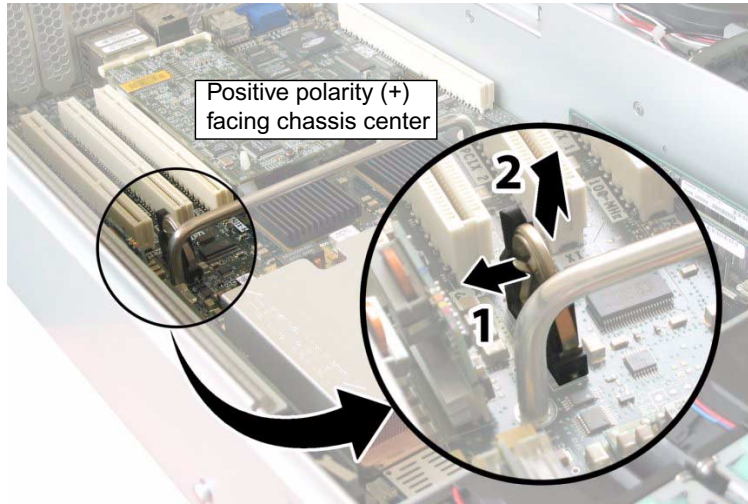


FIGURE 3-11 Removing the Battery

5. Installation is the reverse of this procedure.

Note – Install the new battery in the holder with the same orientation (polarity) as the battery that you removed. The positive polarity, marked with a “+” symbol, should be facing toward the chassis center.

Replacing the DVD Drive

Note – All FRUs are customer-replaceable.

Removing the DVD Drive

1. Prepare the server for optical media drive removal. See:
 - “Powering Off the Server” on page 28
 - “Disconnecting Cables From the Server” on page 29
 - “Removing the Server From the Rack” on page 30
 - “Performing Antistatic Measures” on page 31
 - “Removing the Top Cover” on page 33
1. After you remove the top cover, open the bezel. Press the green tabs on either side of the bezel and pull the bezel forward and down (FIGURE 3-12).

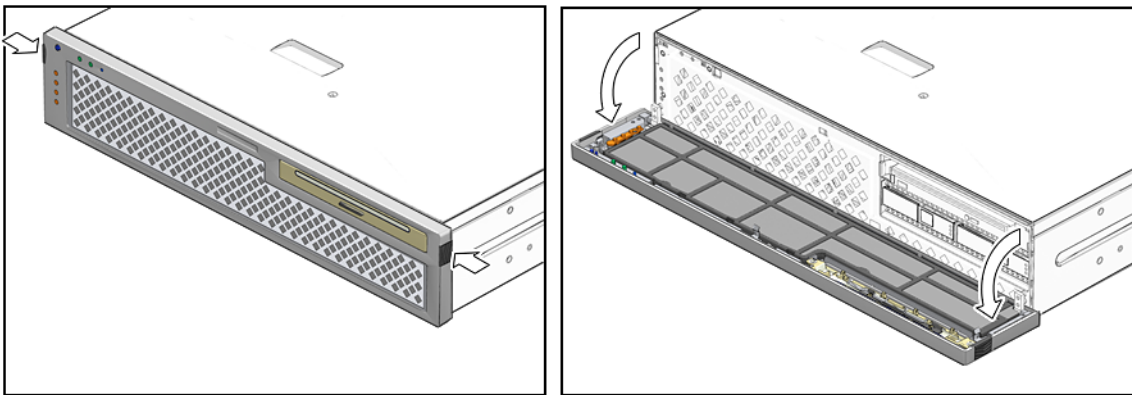


FIGURE 3-12 Opening the Bezel

2. Insert a small plastic probe into the opening at the back of the DVD drive (FIGURE 3-13).

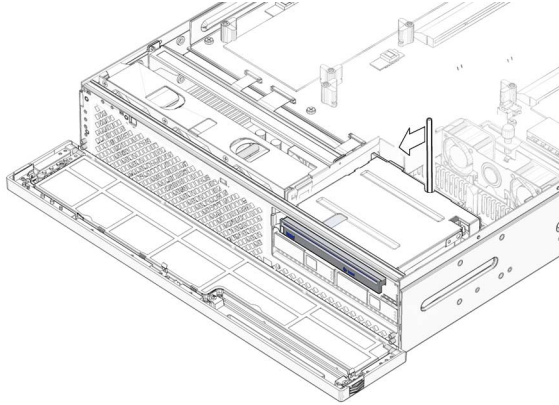


FIGURE 3-13 Inserting the Probe at the Back of the DVD Drive

3. Push the release tab to the left and pull the probe forward, freeing the DVD drive (FIGURE 3-14).

Note – Do not pull on the DVD faceplate, which could come loose if pushed from the back with the probe

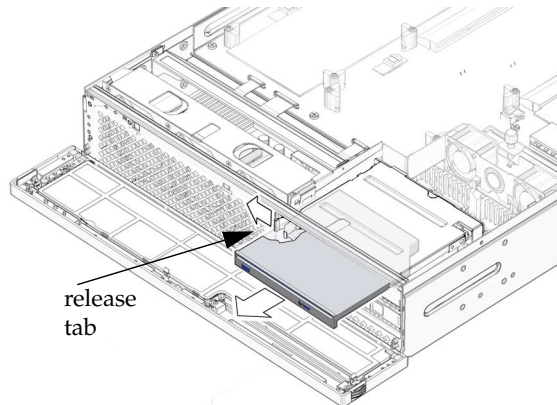


FIGURE 3-14 Releasing the DVD Drive

4. Remove the DVD drive from the mass storage assembly and set it aside on an antistatic mat.

5. Consider your next step:

- If you removed the DVD drive as part of another procedure, return to that procedure.
- Otherwise, continue to [“Installing the DVD Drive” on page 42](#).

Installing the DVD Drive

1. Remove the replacement DVD drive from its packaging and place the drive on an antistatic mat.
2. Hold the release tab to the left and insert the DVD drive into the mass storage assembly ([FIGURE 3-15](#)).

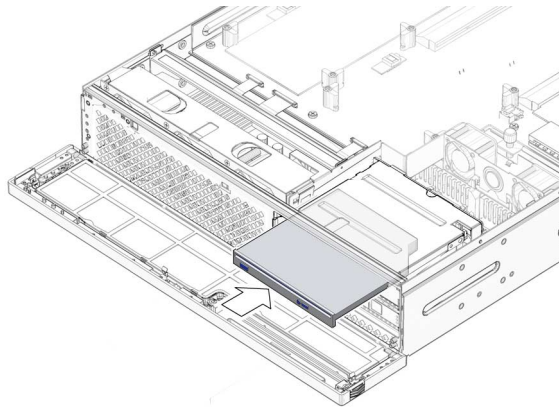


FIGURE 3-15 Inserting the DVD Drive

3. Press the DVD drive in until it seats and release the tab. Ensure that the DVD device fully seats into the mating DVD board.
4. Close the bezel.
5. Consider your next step:
 - If you installed the DVD drive as part of another procedure, return to that procedure.
 - Otherwise, perform the following tasks to bring the server back online:
 - [“Installing the Top Cover” on page 126](#)
 - [“Removing Antistatic Measures” on page 127](#)
 - [“Reinstalling the Server Chassis in the Rack” on page 127](#)

- “Reconnecting Cables to the Server” on page 130
- “Powering On the Server” on page 131

Replacing a Hard Drive

The hard disk 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 take the drive offline (prevent any applications from accessing it, and remove the logical software links to it) before you can safely remove 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 the conditions listed above, you must shut down the system before you replace the hard drive. See “Powering Off the Server” on page 28.

Note – Replacing a hard drive does not require removing the server from a rack. Nor does the procedure require removing the top cover of the server.

Removing a Hard Drive

1. Press the green tabs on either side of the bezel and pull the bezel forward and down (FIGURE 3-16).

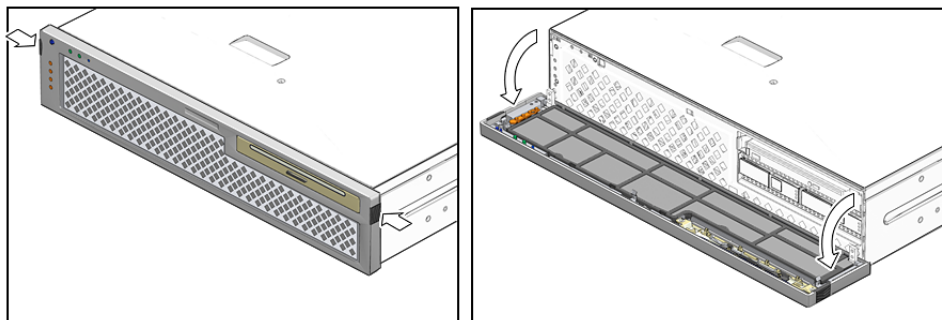


FIGURE 3-16 Opening the Bezel

2. Identify the location of the hard drive that you want to remove (FIGURE 3-17).

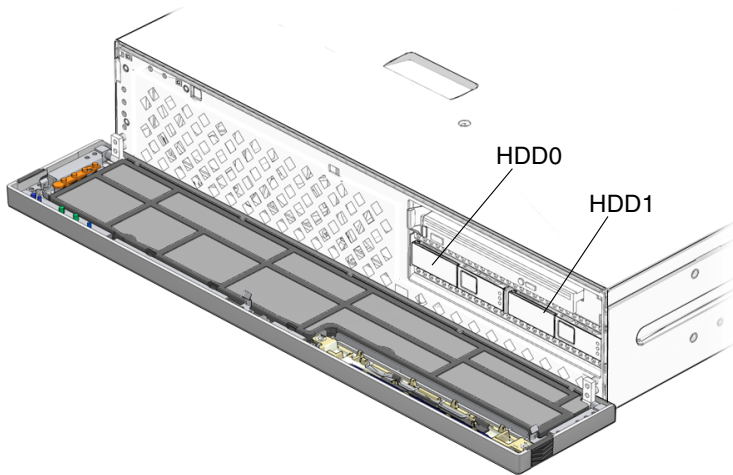


FIGURE 3-17 HDD Locations on a 2x HD/DVD configuration

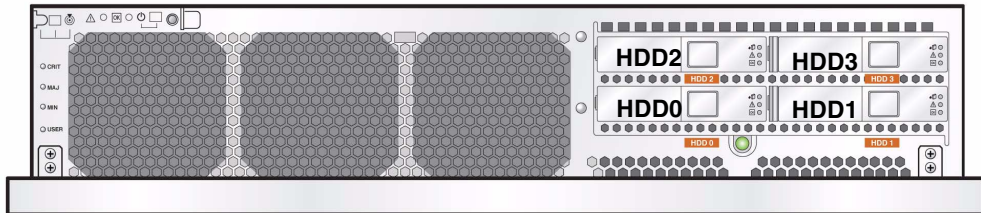


FIGURE 3-18 HDD Locations on a 4x HDD configuration

3. Issue the 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 3-19) to open the hard drive latch.

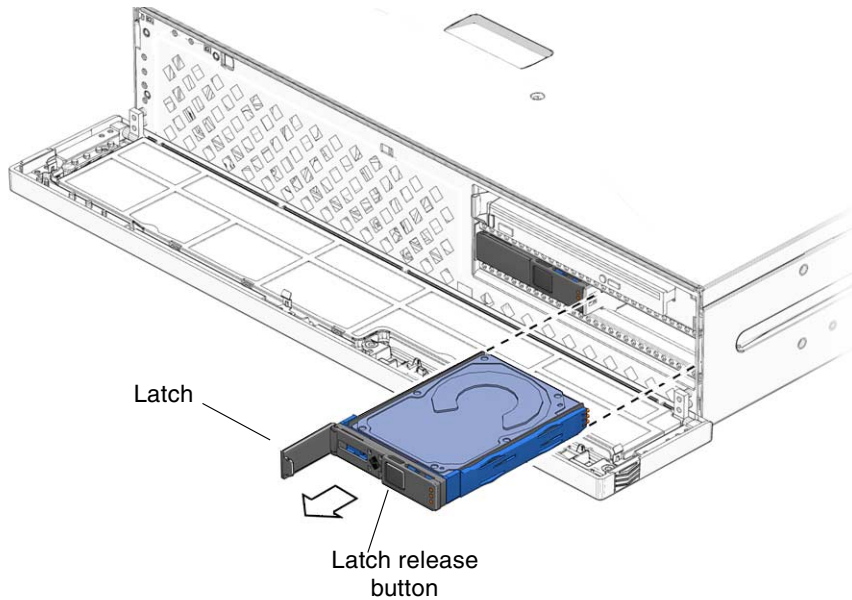


FIGURE 3-19 Opening the Hard Drive Latch



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 3-20](#)).

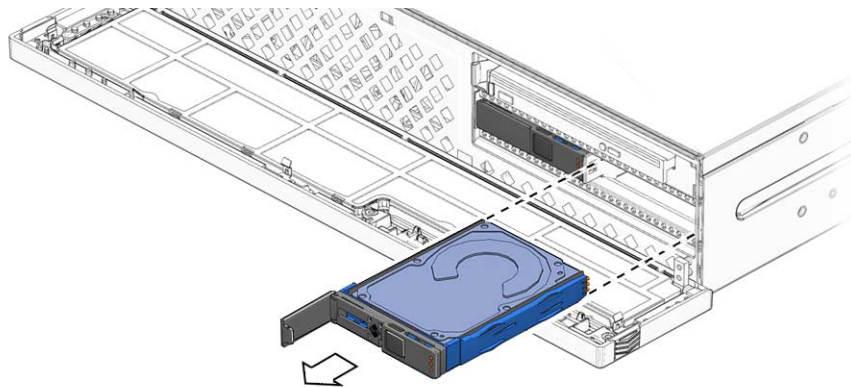


FIGURE 3-20 Removing the Hard Drive From the Server

6. Consider your next steps:

- If you are replacing the hard drive, continue to [“Installing a Hard Drive” on page 46](#).
- If you are not replacing the hard drive, perform administrative tasks to configure the server to operate without the hard drive.

Installing a Hard Drive

1. Remove the replacement hard drive from its packaging and place the drive 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. See [FIGURE 3-21](#). 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 3-21](#)).

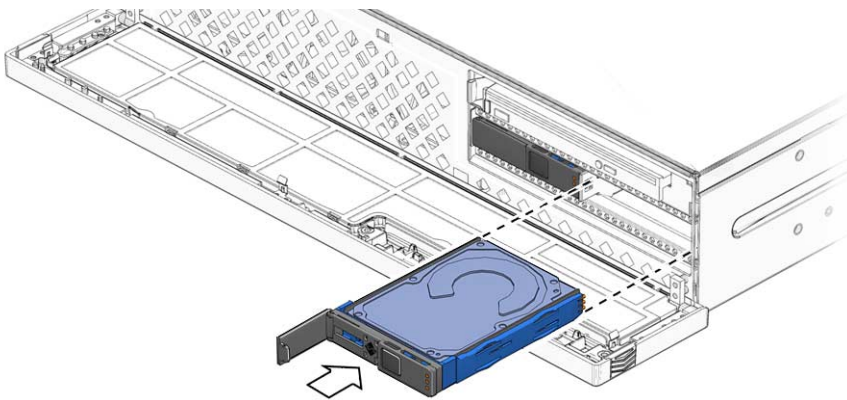


FIGURE 3-21 Installing the Hard Drive Into the Server

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

5. Close the front bezel ([FIGURE 3-22](#)).

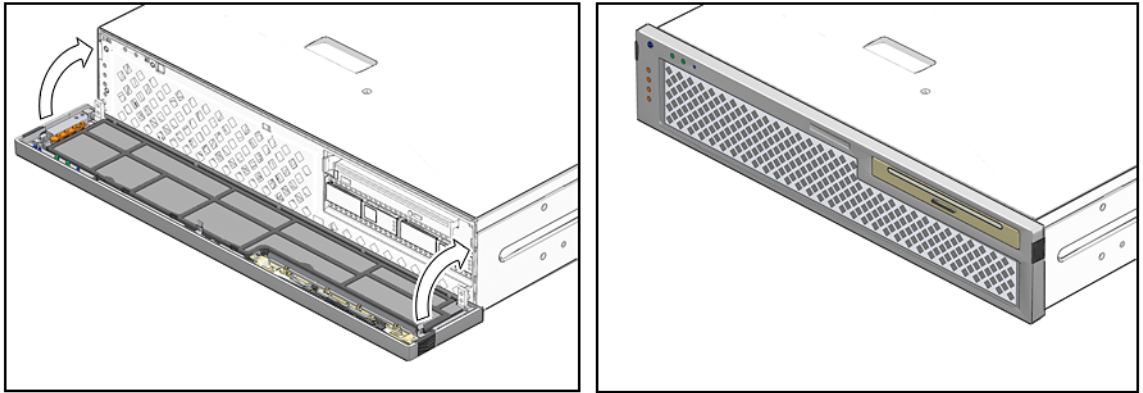


FIGURE 3-22 Closing the Bezel

6. Perform administrative tasks to reconfigure the hard disk drive.

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

Replacing the Mass Storage Assembly

Mass Storage Assembly Connectors

FIGURE 3-23 identifies the five key connections that must be made on the mass storage assembly. The corresponding connections are:

1. Flex circuit connector
2. System fan connector
3. Ribbon cable connector to the power distribution board
4. Hard drive fan connector
5. PCI tray power cable

Note – Do not remove the DVD connector.

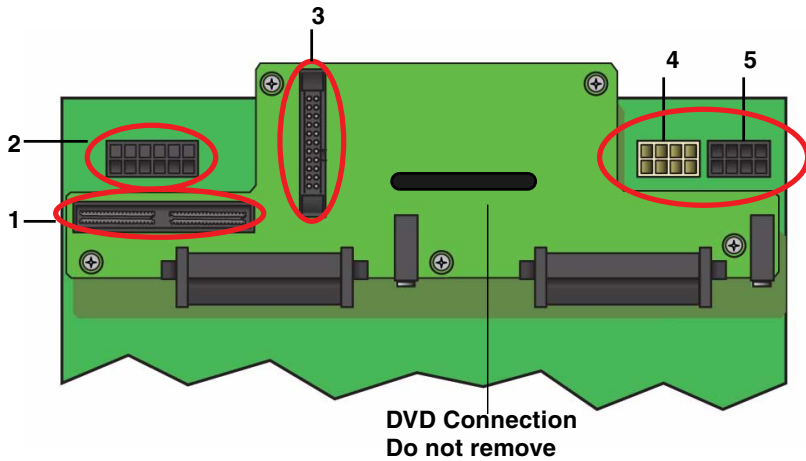


FIGURE 3-23 Five Key Connections of the Mass Storage Assembly

[FIGURE 3-24](#) shows how the five key connections look when the cables are plugged in

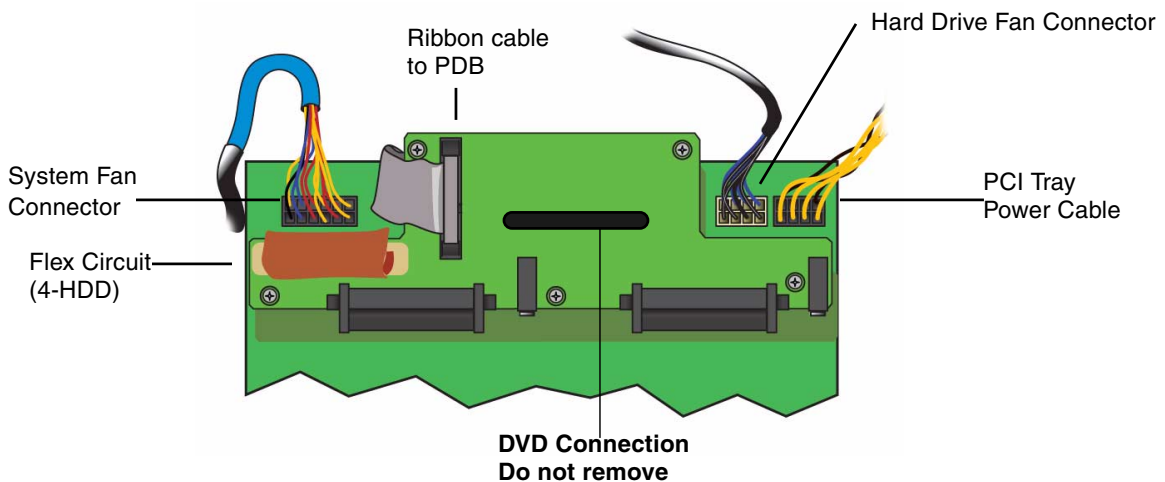


FIGURE 3-24 Populated Mass Storage Assembly Connectors

[FIGURE 3-25](#) shows an angled perspective of the path of the flex circuit connector from the motherboard to the 2- and 4-hard drive locations on the hard drive backplane.

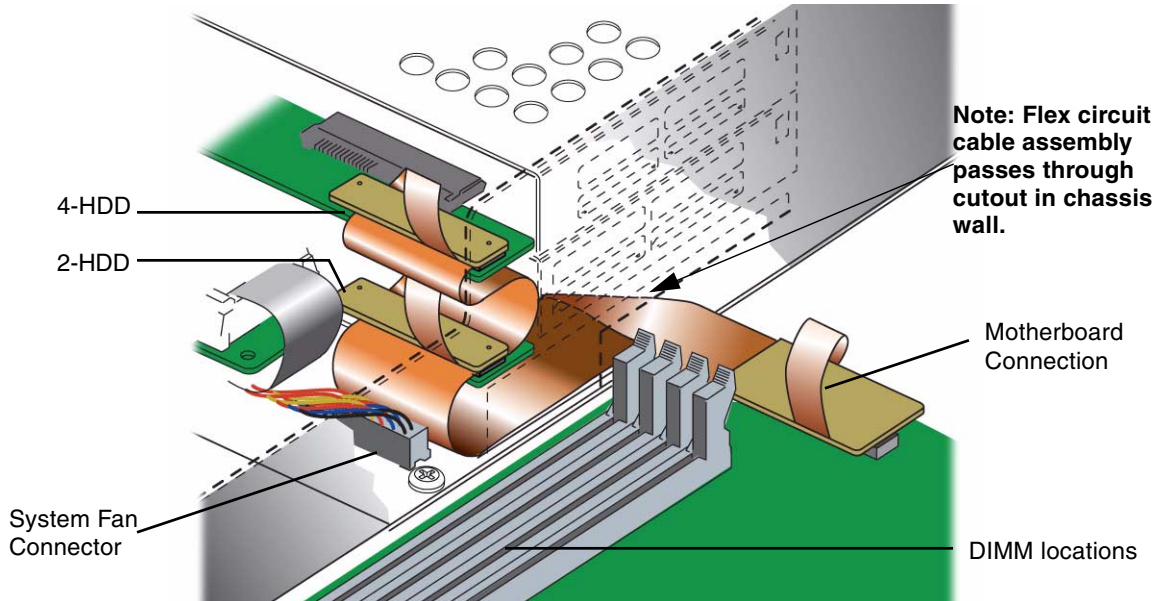


FIGURE 3-25 Path of the Flex Cable From Motherboard to 2- and 4-HDD Connections

Removing the Mass Storage Assembly

1. Prepare the server for mass storage assembly removal. See:
 - “Powering Off the Server” on page 28
 - “Disconnecting Cables From the Server” on page 29
 - “Removing the Server From the Rack” on page 30
 - “Performing Antistatic Measures” on page 31
 - “Removing the Top Cover” on page 33
2. Remove the DVD drive and all the hard drives. See:
 - “Removing the DVD Drive” on page 40
 - “Removing a Hard Drive” on page 43
3. Disconnect the following cables from the mass storage assembly and power distribution board (FIGURE 3-24):
 - System fan
 - Hard drive fan
 - PCI tray power cable

- Flex circuit
 - Ribbon cable to power distribution board (PDB)
4. Move the cables as far out of the way as possible.
 5. Loosen both the screw at the back of the mass storage assembly and the screw at the front of the chassis (FIGURE 3-26).

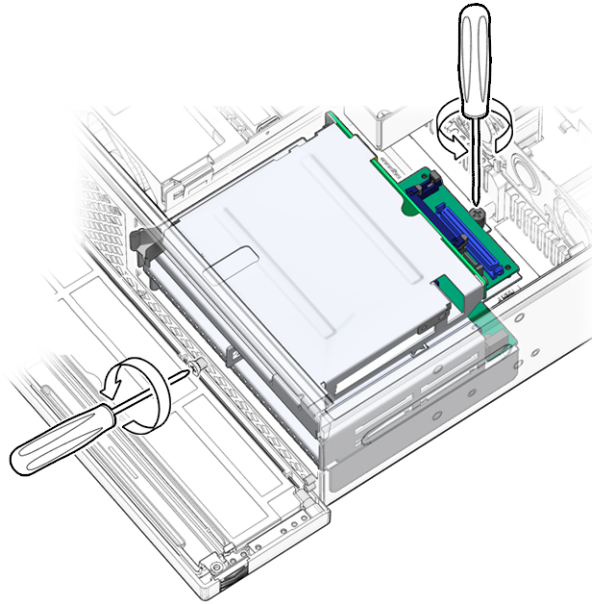


FIGURE 3-26 Loosening the Mass Storage Assembly Screws

Note – The screws are captive and cannot be completely removed.

6. Slide the mass storage assembly back, pivot the back end up, and lift the assembly out of the chassis (FIGURE 3-27).



Caution – As you remove the assembly, be careful that the flex cable does not get caught on the flex circuit or the PDB ribbon cable.

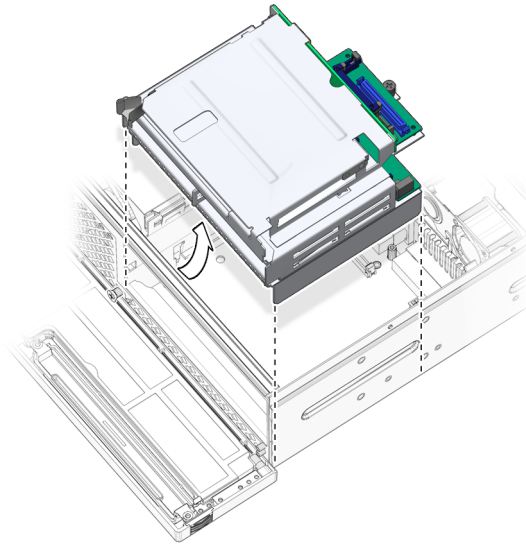


FIGURE 3-27 Lifting the Mass Storage Assembly From the Chassis

7. **Set the mass storage assembly aside on an antistatic mat.**
8. **Consider your next step:**
 - If you removed the mass storage assembly as part of another procedure, return to that procedure.
 - Otherwise, continue to [“Installing the Mass Storage Assembly”](#) on page 51.

Installing the Mass Storage Assembly

1. **Remove the replacement mass storage assembly from its packaging and place it on an antistatic mat.**
2. **Move the cables as far out of the way as possible.**
3. **Pivot the front of the mass storage assembly down and lower the assembly into the chassis, sliding it forward (FIGURE 3-28).**

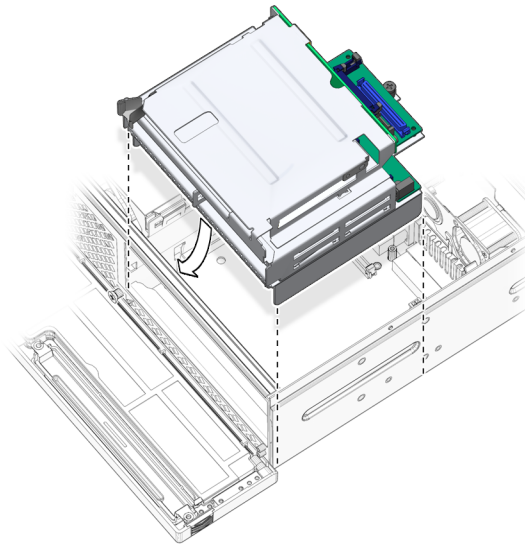


FIGURE 3-28 Setting the Mass Storage Assembly Into Place

4. Tighten the screws at the front of the chassis and the back of the mass storage assembly ([FIGURE 3-29](#)).

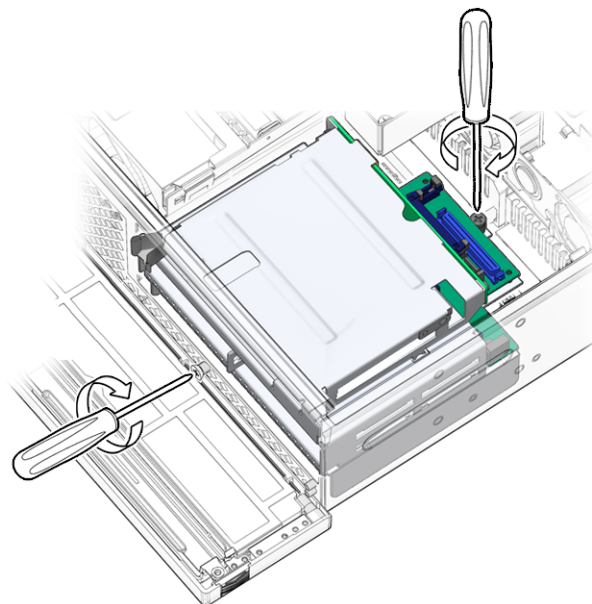


FIGURE 3-29 Tightening the Mass Storage Assembly Screws

5. **Connect the following cables to the mass storage assembly** ([FIGURE 3-24](#)):
 - System fan
 - Hard drive fan
 - PCI tray power cable
 - Flex circuit
 - Ribbon cable to power distribution board
6. **Install the DVD drive and the hard drives. See:**
 - [“Installing the DVD Drive” on page 42](#)
 - [“Installing a Hard Drive” on page 46](#)
7. **Close the front bezel.**
8. **Consider your next step:**
 - If you installed the mass storage assembly as part of another procedure, return to that procedure.
 - Otherwise, perform the following tasks to bring the server back online:
 - [“Installing the PCI Tray” on page 108](#)
 - [“Installing the Top Cover” on page 112](#)
 - [“Removing Antistatic Measures” on page 113](#)
 - [“Installing the Server Chassis in the Rack” on page 114](#)
 - [“Reconnecting Cables to the Server” on page 115](#)
 - [“Powering On the Server” on page 116](#)

Replacing the System Fan Assembly



Caution – Netra X4200 M2 fans are not hot swappable; you must power off the server before replacing. Do not operate the server without fans.

Note – This fan assembly is also referred to as Fan Tray 0.

Removing the System Fan Assembly

1. **Prepare the server for fan assembly removal. See:**
 - “Powering Off the Server” on page 28
 - “Disconnecting Cables From the Server” on page 29
 - “Removing the Server From the Rack” on page 30
 - “Performing Antistatic Measures” on page 31
 - “Removing the Top Cover” on page 33
2. **Undo the thumbscrew at location J2 and slide the PCI tray back to the fully open position.**
3. **Reach down behind the flex circuit.**
4. **Disconnect the fan assembly cable at connector J3 on the power board by depressing the connector retention latch while pulling the connector housing straight up (FIGURE 3-30).**

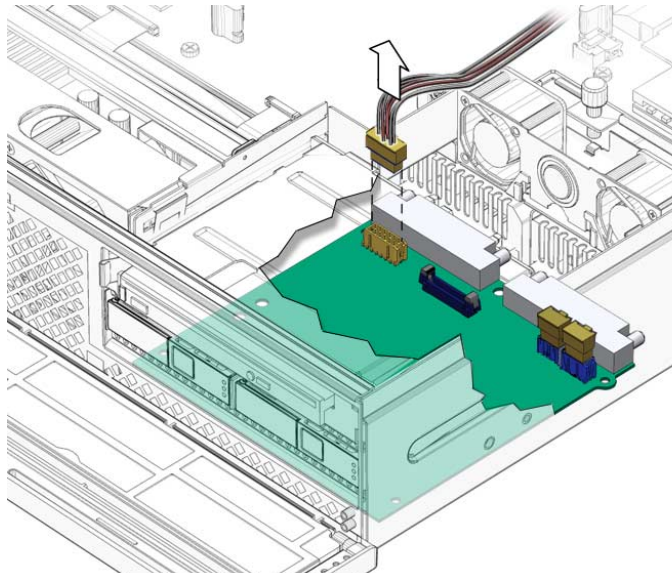


FIGURE 3-30 Disconnecting the System Fan Assembly Cable

5. **Remove the fan assembly cable from the cable guides.**
6. **Insert your forefinger and thumb into the holes at the top of the fan assembly, squeeze your fingers together, and lift the fan assembly from the chassis (FIGURE 3-31).**

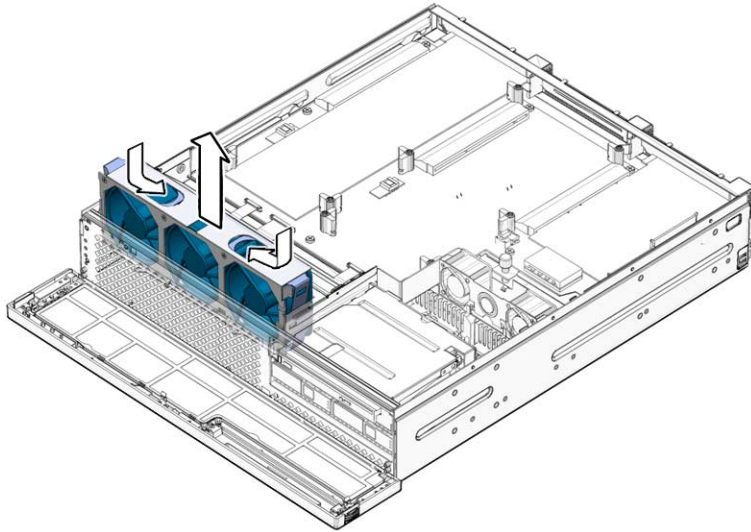


FIGURE 3-31 Lifting the System Fan Assembly From the Chassis

7. **Set the fan assembly aside on an antistatic mat.**
8. **Consider your next step:**
 - If you removed the fan assembly as part of another procedure, return to that procedure.
 - Otherwise, continue to [“Installing the System Fan Assembly”](#) on page 55.

Installing the System Fan Assembly

1. **Remove the replacement fan assembly from its packaging and place the assembly on an antistatic mat.**
2. **Insert your forefinger and thumb into the holes at the top of the fan assembly, squeeze your fingers together, and lower the fan assembly into the chassis ([FIGURE 3-32](#)).**

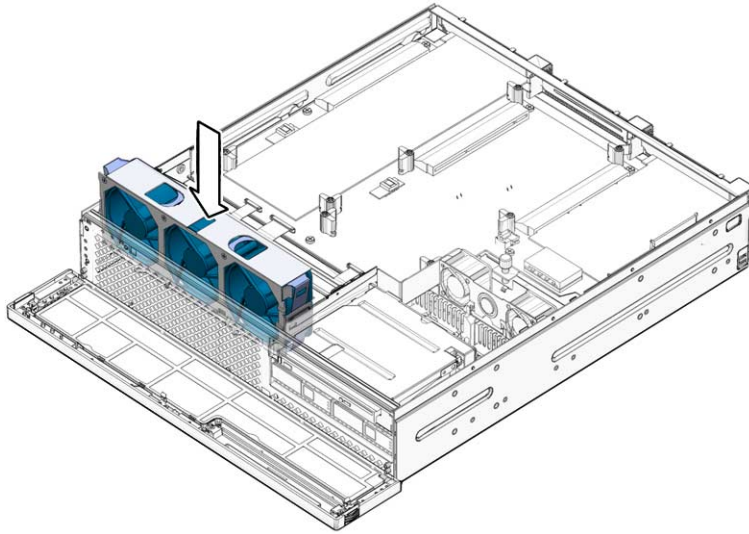


FIGURE 3-32 Lowering the Fan Assembly Into the Chassis

- 3. Reconnect the system fan assembly cable to connector J3 on the power board (FIGURE 3-33).**

Note – The connector is not easy to see because it is positioned under the flex circuit. [FIGURE 3-25](#) shows the flex circuit connection location.

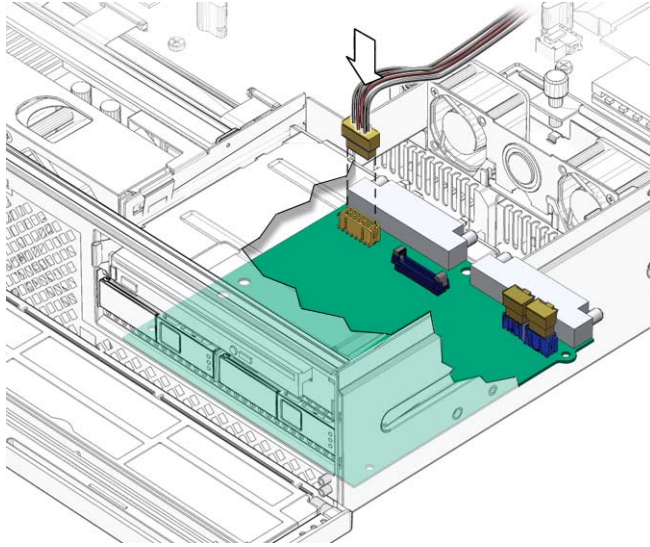


FIGURE 3-33 Connecting the Fan Assembly Cable

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:
 - [“Installing the Top Cover”](#) on page 112
 - [“Removing Antistatic Measures”](#) on page 113
 - [“Installing the Server Chassis in the Rack”](#) on page 114
 - [“Reconnecting Cables to the Server”](#) on page 115
 - [“Powering On the Server”](#) on page 116

Replacing the Hard Drive Fan Assembly



Caution – Netra X4200 M2 fans are not hot swappable; you must power off the server before replacing. Do not operate the server without fans.

Note – This fan assembly is also referred to as Fan Tray 1.

Removing the Hard Drive Fan Assembly

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

- [“Powering Off the Server” on page 28](#)
- [“Disconnecting Cables From the Server” on page 29](#)
- [“Removing the Server From the Rack” on page 30](#)
- [“Performing Antistatic Measures” on page 31](#)
- [“Removing the Top Cover” on page 33](#)

2. Disconnect the hard drive fan assembly cable from the power board connector J5. The connector's location can also be seen in [FIGURE 3-24](#).

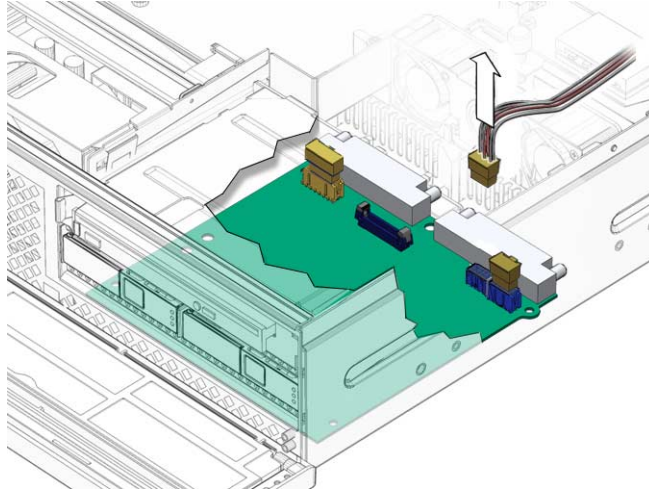


FIGURE 3-34 Disconnecting the Hard Drive Fan Assembly Cable

3. Carefully lift the hard drive fan assembly cable from the cable guides.
4. Push the green release button on the center of the hard drive fan bracket, and pivot the bracket backward ([FIGURE 3-35](#)).

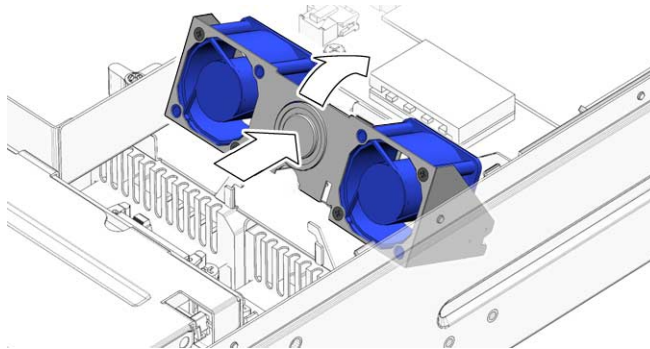


FIGURE 3-35 Releasing the Hard Drive Fan Bracket

5. Slide the bracket forward and lift the hard drive fan assembly from the chassis

(FIGURE 3-36).

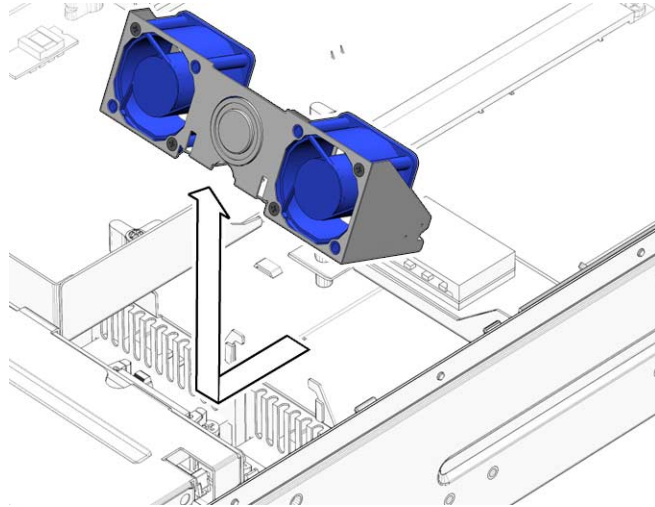


FIGURE 3-36 Lifting the Hard Drive Fan Assembly From the Chassis

6. Set the hard drive fan assembly aside on an antistatic mat.
7. Continue to [“Installing the Hard Drive Fan Assembly”](#) on page 60.

Installing the Hard Drive Fan Assembly

1. Remove the replacement hard drive fan assembly from its packaging and place the assembly on an antistatic mat.
2. Lower the hard drive fan assembly down, and slide the hard drive fan bracket back so that the tabs enter the slots (FIGURE 3-37).

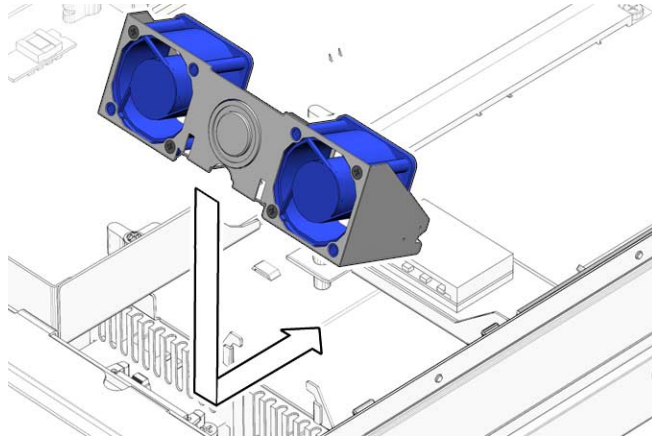


FIGURE 3-37 Lowering the Hard Drive Fan Assembly

3. Pivot the hard drive fan bracket forward until it clicks ([FIGURE 3-38](#)).

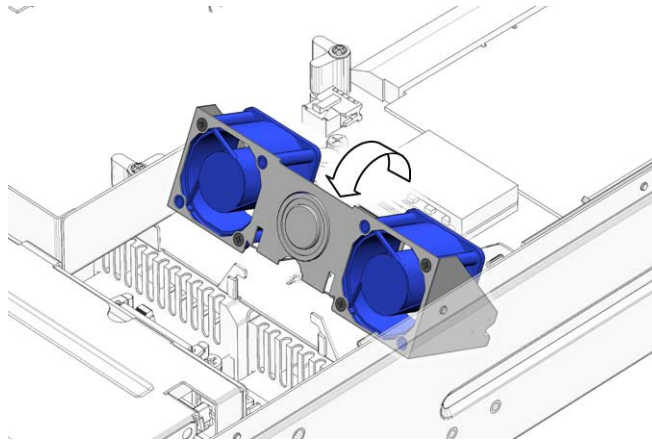


FIGURE 3-38 Securing the Hard Drive Fan Bracket

4. Connect the hard drive fan assembly cable to the power board at connector J5 ([FIGURE 3-39](#)).

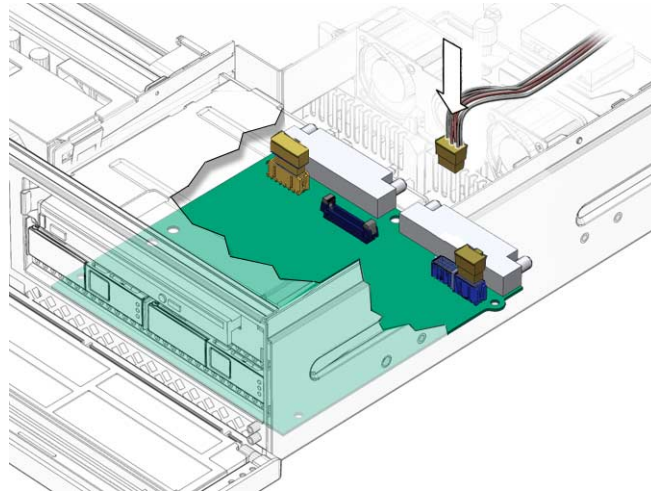


FIGURE 3-39 Connecting the Hard Drive Fan Assembly Cable

5. **Route the hard drive fan assembly cable back into the cable guides.**
6. **Perform the following tasks to bring the server back online:**
 - [“Installing the Top Cover” on page 126](#)
 - [“Removing Antistatic Measures” on page 127](#)
 - [“Reinstalling the Server Chassis in the Rack” on page 127](#)
 - [“Reconnecting Cables to the Server” on page 130](#)
 - [“Powering On the Server” on page 131](#)

Replacing the LED Board

Removing the LED Board

1. **Prepare the server for LED board removal.**
 - [“Powering Off the Server” on page 28](#)
 - [“Disconnecting Cables From the Server” on page 29](#)
 - [“Removing the Server From the Rack” on page 30](#)
 - [“Performing Antistatic Measures” on page 31](#)

- “Removing the Top Cover” on page 33
 - “Removing the PCI Tray and PCI-E Ribbon Cables” on page 34
2. **Remove the DIMM/CPU duct.**
See “Removing the DIMM/CPU Duct” on page 68.
 3. **Remove the system fan assembly.**
See “Removing the System Fan Assembly” on page 54.
 4. **Loosen the thumbscrew of the LED board and swing the board out to the left (FIGURE 3-40).**

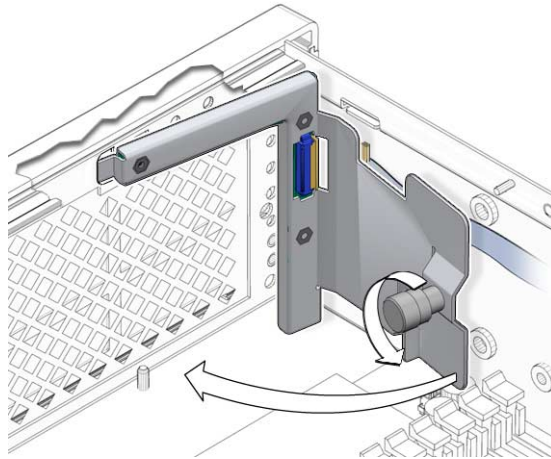


FIGURE 3-40 Removing the LED Board From the Chassis

5. **Carefully lift the LED board and cable from the cable clips.**
6. **Disconnect the cable from the LED board (FIGURE 3-41).**

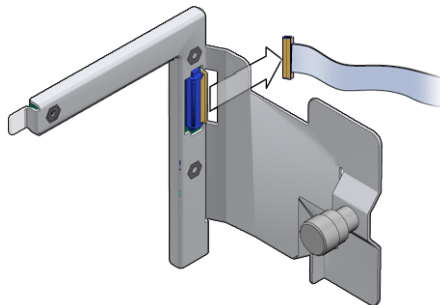


FIGURE 3-41 Disconnecting the Cable From the LED Board

7. Set the LED board aside on an antistatic mat.
8. Continue to [“Installing the LED Board”](#) on page 64.

Installing the LED Board

1. Remove the replacement LED board from its packaging and place the board on an antistatic mat.
2. Connect the cable to the LED board ([FIGURE 3-42](#)).

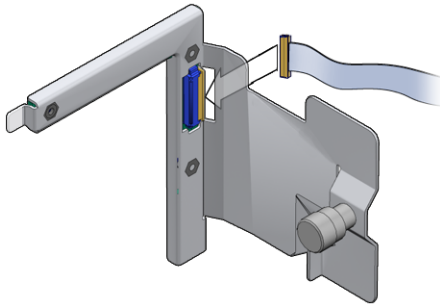


FIGURE 3-42 Connecting the Cable to the LED Board

3. Insert the tab on the LED board into the slot on the chassis ([FIGURE 3-43](#)).

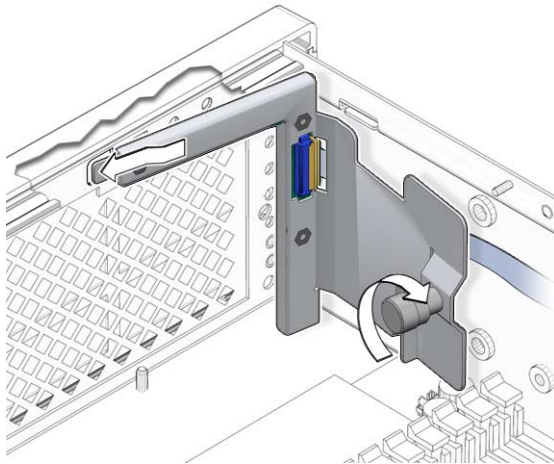


FIGURE 3-43 Inserting the LED Board Tab

4. Swing the LED board right to the chassis and tighten the thumbscrew (FIGURE 3-44).

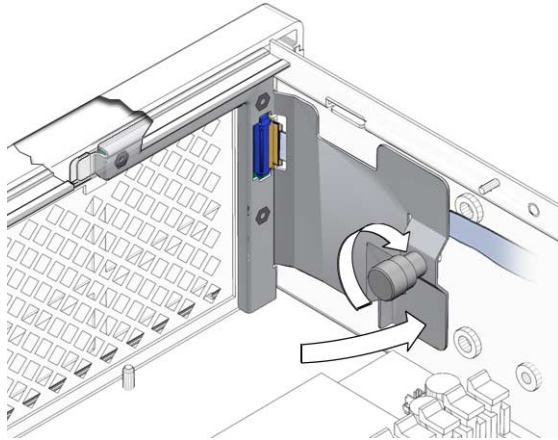


FIGURE 3-44 Securing the LED Board to the Chassis

5. Route the LED board cable back into the cable guides.
6. Install the system fan assembly.
See [“Installing the System Fan Assembly”](#) on page 55.
7. Install the DIMM/CPU duct.
See [“Installing the DIMM/CPU Duct”](#) on page 69.
8. Perform the following tasks to bring the server back online.
 - [“Installing the Top Cover”](#) on page 126
 - [“Removing Antistatic Measures”](#) on page 127
 - [“Reinstalling the Server Chassis in the Rack”](#) on page 127
 - [“Reconnecting Cables to the Server”](#) on page 130
 - [“Powering On the Server”](#) on page 131

Replacing the GRASP Board

Follow these steps to remove and replace the Graphics Redirect and Service Processor (GRASP) board.

1. Prepare the server for GRASP board removal.

- “Powering Off the Server” on page 28
- “Disconnecting Cables From the Server” on page 29
- “Removing the Server From the Rack” on page 30
- “Performing Antistatic Measures” on page 31
- “Removing the Top Cover” on page 33
- “Removing the PCI Tray and PCI-E Ribbon Cables” on page 34
- “Removing the PCI-E Cable Hold-Down Bracket” on page 36

Removing the GRASP Board

1. Power off the server as described in “Powering Off the Server” on page 28.

Note – Remove AC/DC power supply unit inlet cables and attach a wrist strap to the button-snap grounding post inside the chassis just behind the mass storage assembly (see [FIGURE 3-10](#) for the location).

2. If the server is in a rack, slide it far enough from the rack so that you can remove the cover. If you cannot safely view and access the component, remove the server from the rack.

3. Remove the cover as described in “Removing the Top Cover” on page 33.



Caution – There is a power status LED (CR1) on the GRASP board that indicates whether 3.3V standby power is reaching the GRASP board. The GRASP board is not hot-pluggable and should never be removed while this LED is lit.

4. Squeeze the plastic standoff that protrudes through the GRASP board to press the standoff’s locking tabs. See procedure inset 1 in [FIGURE 3-45](#).

If you have difficulty pressing the locking tabs with your fingers, you can use a pair of long-nosed pliers.

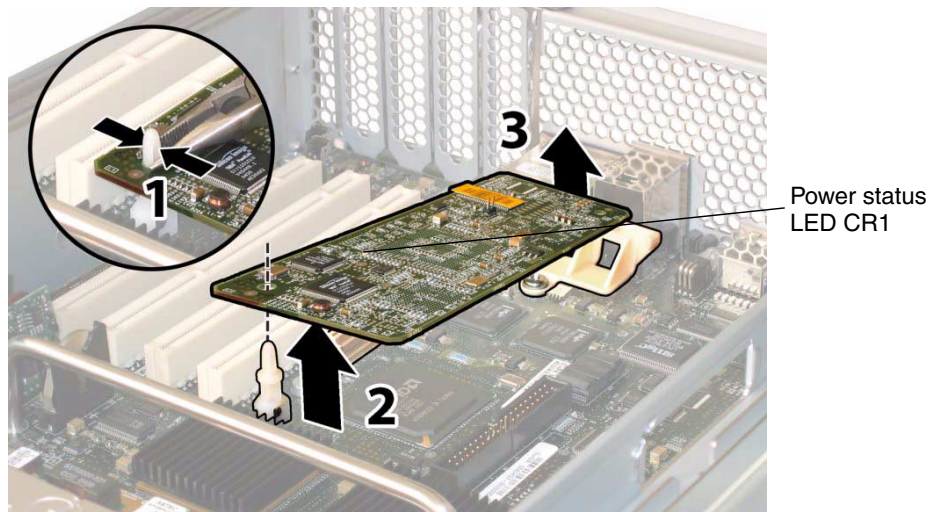


FIGURE 3-45 Removing the GRASP Board From the Motherboard

5. Raise the corner of the GRASP board until it is clear of the locking tab. See Procedure 2 in [FIGURE 3-45](#).
6. Pivot the front edge of the GRASP board upward to disengage it from the rear plastic bracket and to disengage its connector from the motherboard. See Procedure 3 in [FIGURE 3-45](#).

Note – Gently lift to avoid bending the GRASP board while removing or installing.

Installing the GRASP Board

To install the GRASP board, reverse the steps you used to remove the GRASP board. Push firmly on the center of the board to avoid bowing and ensure full mating of the motherboard connector.

Replacing the DIMM/CPU Duct

Removing the DIMM/CPU Duct

1. Prepare the server for DIMM/CPU duct removal. See:
 - “Powering Off the Server” on page 28
 - “Disconnecting Cables From the Server” on page 29
 - “Removing the Server From the Rack” on page 30
 - “Performing Antistatic Measures” on page 31
 - “Removing the Top Cover” on page 33
 - “Removing the PCI Tray and PCI-E Ribbon Cables” on page 34
2. Raise the DIMM/CPU duct into the vertical position (FIGURE 3-46).

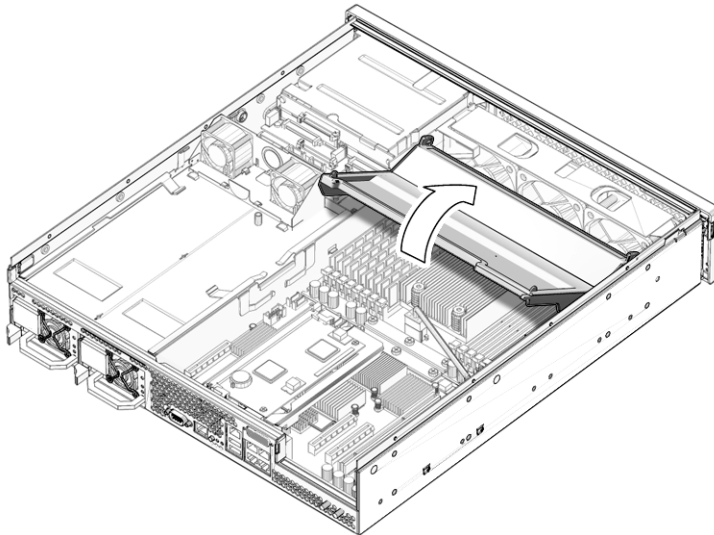


FIGURE 3-46 Raising the DIMM/CPU Duct

3. Unhook the duct from the pins of the chassis ([FIGURE 3-47](#)).

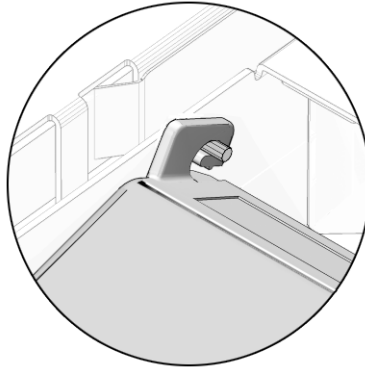


FIGURE 3-47 Unhooking the DIMM/CPU Duct From the Pins of the Chassis

4. Lift the duct out of the chassis, and set it aside on an antistatic mat.
5. Consider your next step:
 - If you removed the DIMM/CPU duct as part of another procedure, return to that procedure.
 - Otherwise, continue to [“Installing the DIMM/CPU Duct”](#) on page 69.

Installing the DIMM/CPU Duct

1. Remove the replacement DIMM/CPU duct from its packaging.
2. Position the duct vertically over the pins of the chassis and hook the duct to the pins of the chassis ([FIGURE 3-47](#)).
3. Lower the duct down to the horizontal position ([FIGURE 3-48](#)).

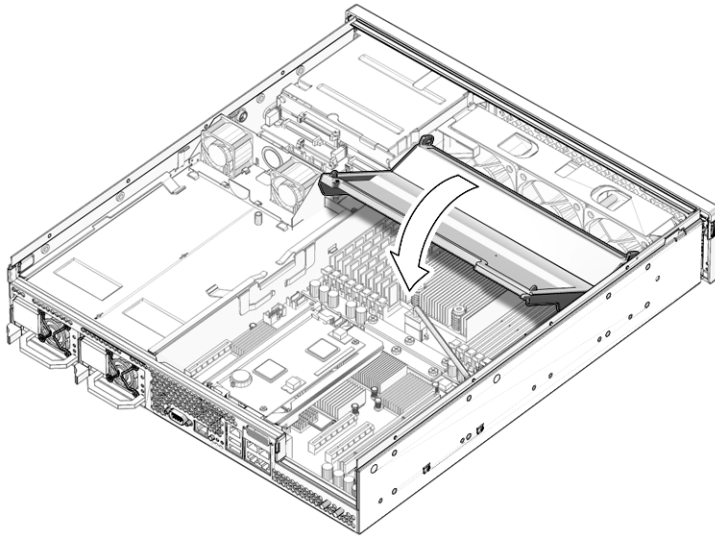


FIGURE 3-48 Lowering the DIMM/CPU Duct

4. Consider your next step:

- If you installed the DIMM/CPU duct as part of another procedure, return to that procedure.
- Otherwise, perform the following tasks to bring the server back online:
 - [“Installing the Top Cover” on page 126](#)
 - [“Removing Antistatic Measures” on page 127](#)
 - [“Reinstalling the Server Chassis in the Rack” on page 127](#)
 - [“Reconnecting Cables to the Server” on page 130](#)
 - [“Powering On the Server” on page 131](#)

Replacing Memory Modules (DIMMs)

Follow these steps to remove and replace the server's dual inline memory modules (DIMMs).

Removing a DIMM

1. Prepare the server for DIMM removal. See:

- "Powering Off the Server" on page 28
- "Disconnecting Cables From the Server" on page 29
- "Removing the Server From the Rack" on page 30
- "Performing Antistatic Measures" on page 31
- "Removing the Top Cover" on page 33

Note – You will only need to slide the PCI tray back for this procedure.

2. Flip the DIMM/CPU duct open. DIMMs are located underneath. See [FIGURE 3-49](#).

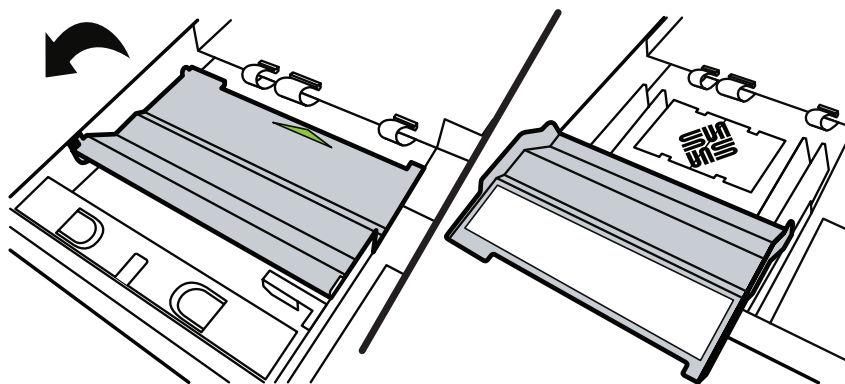


FIGURE 3-49 Flipping the DIMM/CPU Duct open

3. Identify the DIMM to remove and press the ejector levers open, releasing the DIMM ([FIGURE 3-50](#)).

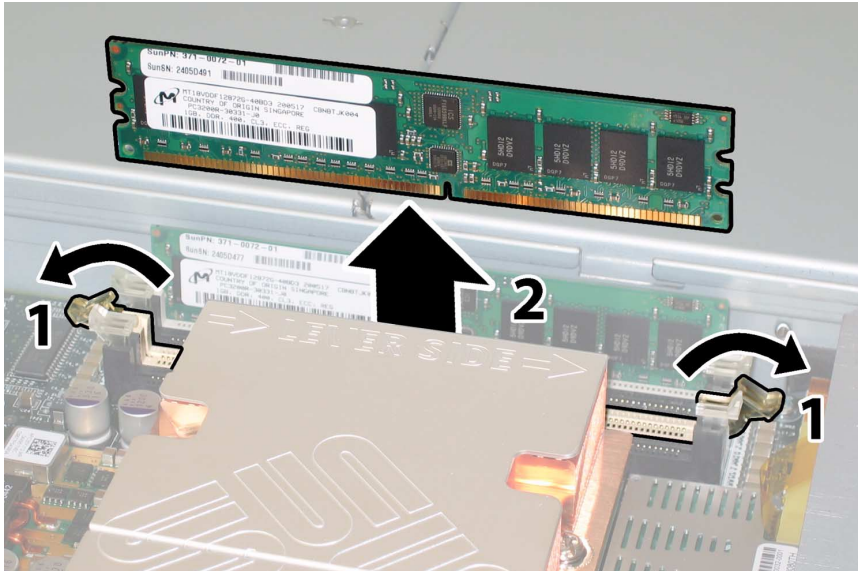


FIGURE 3-50 Releasing and removing the DIMM

For the Netra X4200 M2 server, you can view the DIMM fault LEDs without the power cords attached. These LEDs can be lit by a capacitor on the motherboard for up to one minute. To light the DIMM fault LEDs, push the small button on the motherboard labeled “DIMM SW2.” See [FIGURE 3-51](#) for the numbering and pairing of the Netra X4200 M2 DIMM slots.

Note – To push the DIMM SW2 button, the PCI Tray must be removed and the button must be pushed through the hole in the PCI-E cable hold-down bracket.

Netra X4200 M2 DIMM Population Rules

The DIMM population rules for the Netra X4200 M2 server are as follows:

- The Netra X4200 M2 server uses only DDR2 DIMMs.
- Each CPU can support a maximum of four DDR2 DIMMs.
- Each pair of DIMMs must be identical (same manufacturer and capacity).
- The DIMM slots are paired and the DIMMs must be installed in pairs (A1 and B1, A0 and B0). The memory sockets are colored black or white to indicate which slots are paired by matching colors.

- CPUs with only a single pair of DIMMs must have those DIMMs installed in that CPU's white DIMM slots (A1 and B1).

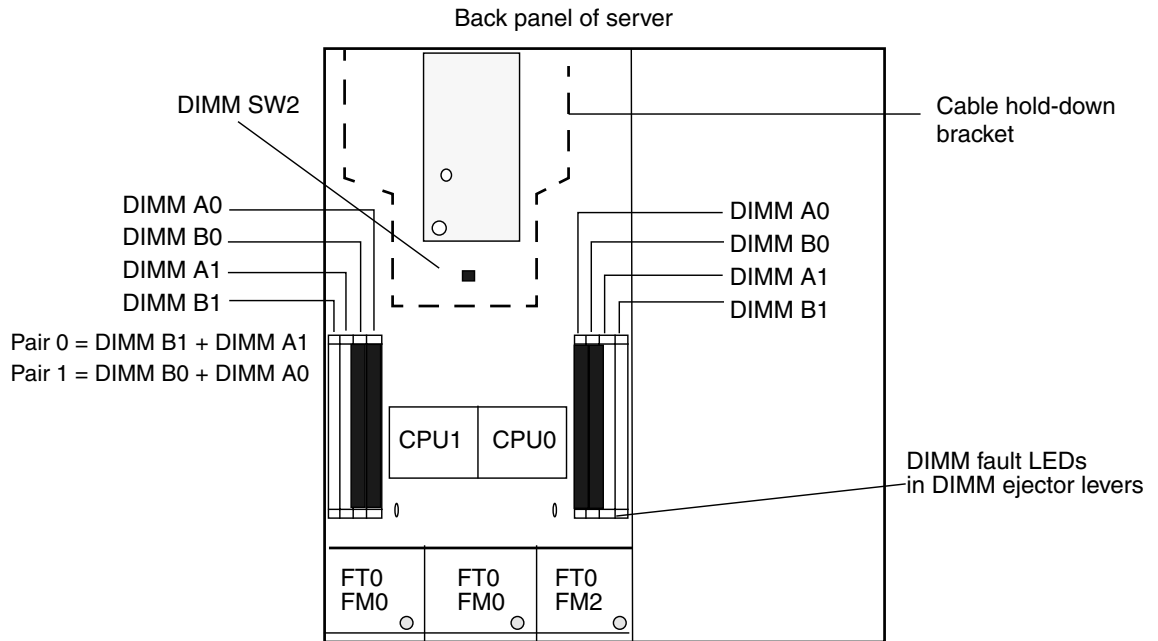


FIGURE 3-51 Netra X4200 M2 DIMM Slot Numbering and Pairing

Supported DIMM Configurations For Netra X4200 M2

TABLE 3-1 Supported DIMM Configurations for Netra X4200 M2

| Slot A1 | Slot B1 | Slot A0 | Slot B0 | Total Memory Per CPU |
|---------|---------|---------|---------|----------------------|
| 1 GB | 1 GB | 0 | 0 | 2 GB |
| 1 GB | 1 GB | 1 GB | 1 GB | 4 GB |
| 2 GB | 2 GB | 1 GB | 1 GB | 6 GB |
| 4 GB | 4 GB | 1 GB | 1 GB | 10 GB |
| 2 GB | 2 GB | 0 | 0 | 4 GB |
| 2 GB | 2 GB | 2 GB | 2 GB | 8 GB |

TABLE 3-1 Supported DIMM Configurations for Netra X4200 M2 (Continued)

| Slot A1 | Slot B1 | Slot A0 | Slot B0 | Total Memory Per CPU |
|---------|---------|---------|---------|----------------------|
| 4 GB | 4 GB | 2 GB | 2 GB | 12 GB |
| 4 GB | 4 GB | 0 | 0 | 8 GB |
| 4 GB | 4 GB | 4 GB | 4 GB | 16 GB |

4. Set the DIMM aside on an antistatic mat.
5. Repeat steps 3 and 4 for all DIMMs to be removed.
6. Consider your next step:
 - If you removed the DIMMs as part of another procedure, return to that procedure.
 - If you are to install DIMMs, continue to [“Installing a DIMM” on page 74](#).
 - If you are to only remove DIMMs:
 - a. Install the DIMM/CPU duct.
See [“Installing the DIMM/CPU Duct” on page 69](#).
 - b. Perform the following tasks to bring the server back online:
 - [“Installing the Top Cover” on page 126](#)
 - [“Removing Antistatic Measures” on page 127](#)
 - [“Reinstalling the Server Chassis in the Rack” on page 127](#)
 - [“Reconnecting Cables to the Server” on page 130](#)
 - [“Powering On the Server” on page 131](#)

Installing a DIMM

1. Flip the DIMM/CPU duct open. DIMMs are located underneath. See [FIGURE 3-49](#).

Note – Locate DIMM numbering on the bottom of the air duct.

2. Ensure that the DIMM slot ejectors at each end of the memory socket are fully open (rotated outward) to accept the new DIMM.
3. Align the notch in the bottom edge of the DIMM with the key in the DIMM socket. See [FIGURE 3-52](#).

4. Press down evenly on both top corners of the DIMM until the ejectors snap over the cutouts in the left and right edges of the DIMM (FIGURE 3-52).

Note – Install DIMMs in pairs into alternate slots.

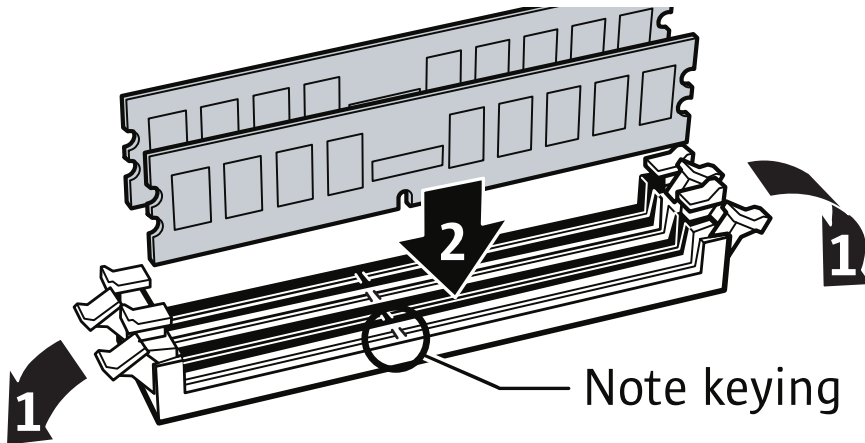


FIGURE 3-52 Inserting the DIMM Into the Slot

5. Repeat steps 3 through 5 for all DIMMs to be installed.
6. Consider your next step:
 - If you installed DIMMs as part of another procedure, return to that procedure.
 - If you are to only install DIMMs:
 - a. Install the DIMM/CPU duct.
See “Installing the DIMM/CPU Duct” on page 69.
 - b. Perform the following tasks to bring the server back online:
 - “Installing the Top Cover” on page 126
 - “Removing Antistatic Measures” on page 127
 - “Reinstalling the Server Chassis in the Rack” on page 127
 - “Reconnecting Cables to the Server” on page 130
 - “Powering On the Server” on page 131

Replacing a CPU and Heatsink

Follow these steps to remove and replace a CPU and its heatsink in a Netra X4200 M2 server.

Supported components and their part numbers are subject to change over time. For the most up-to-date list of replaceable components for these servers, see the following URL:

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



Caution – Some AMD CPUs are released as Special Editions, which might differ in wattage from non-Special Edition versions of the CPU. Do not mix Special Edition CPUs with non-Special Edition versions. Always make sure that all CPUs in the server have the same part number.

Removing a Netra X4200 M2 CPU and Heatsink

1. Power off the server as described in “Powering Off the Server” on page 28.
2. If the server is in a rack, slide it far enough from the rack so that you can remove the main cover. If you cannot safely view and access the component, remove the server from the rack.
3. Remove the top cover as described in “Removing the Top Cover” on page 33.
4. Identify which CPU and heatsink you are replacing.

The designation of the two CPUs in the server is shown in [FIGURE 3-53](#). There is a fault LED on the motherboard for each CPU (see [FIGURE 3-53](#) for the LED location):

- LED is off: CPU is operating properly.
- LED is lit (amber): CPU has encountered a voltage or heat error condition.

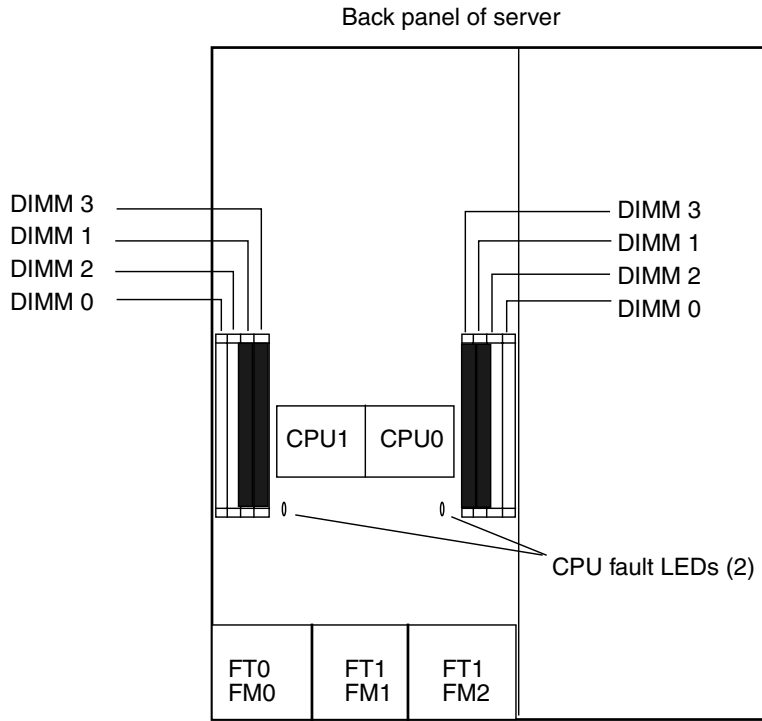


FIGURE 3-53 CPU and Fault LED Locations

5. Remove the CPU and heatsink from the motherboard:

- a. **Hold down on the top of the heatsink to prevent it from tipping unevenly while you alternately loosen the four spring-loaded mounting screws that secure the heatsink to the motherboard. Turn the screws 180-degrees at a time, then remove the screws when they are detached. See [FIGURE 3-54](#) and [FIGURE 3-55](#).**

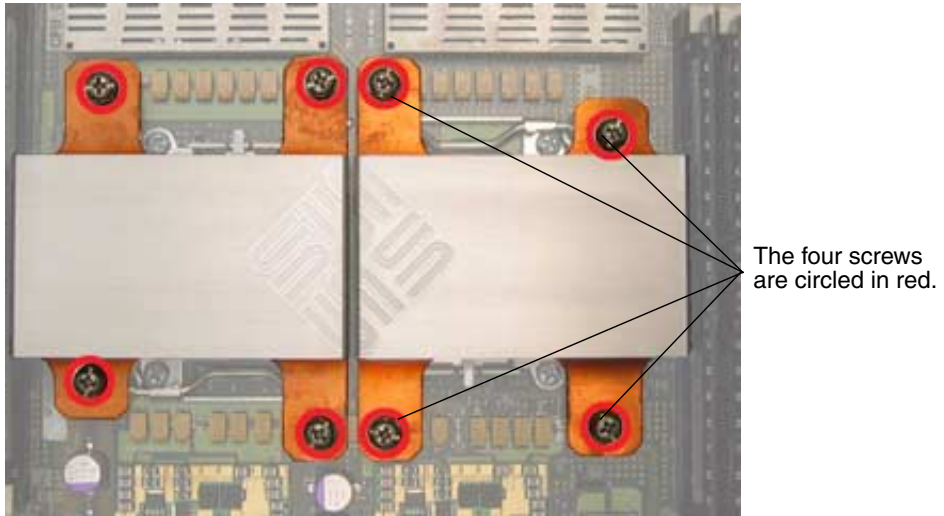


FIGURE 3-54 Location of the Heatsink Screws

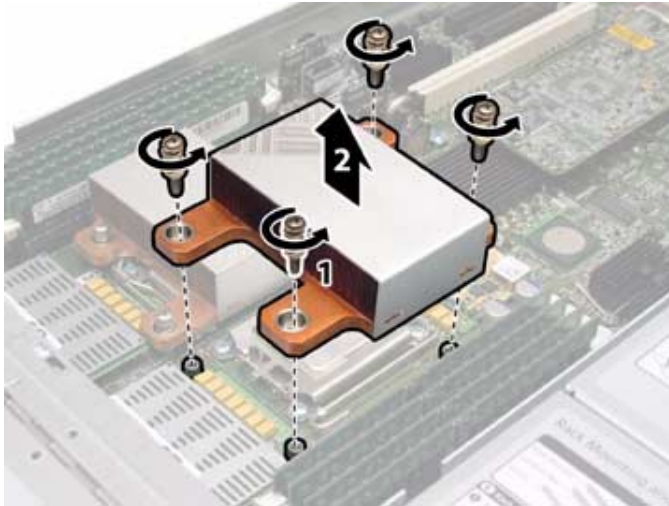


FIGURE 3-55 Removing the Heatsink

- b. Twist the heatsink slightly to lift it off of the board. Turn the heatsink upside down and allow the spring in each of the four mounting holes to fall out into your hand.**

Note – Set the heatsink upside down on a clean, flat surface to prevent the thermal grease from contaminating other components.

- c. Pull the CPU socket lever slightly away from the socket. See [FIGURE 3-56](#).
- d. Pivot the lever up, into the fully open, vertical position.

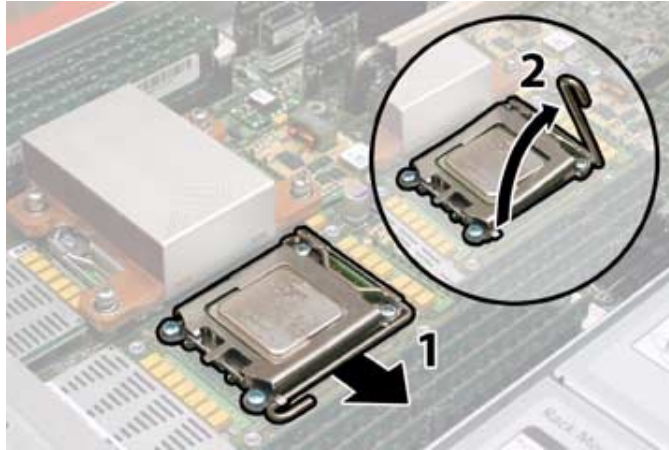


FIGURE 3-56 Releasing the CPU Socket Lever

- e. Open the hinged plate that covers the CPU until it is in the fully open position and lift the CPU out of the socket, leaving the lever in the vertical, open position. See [FIGURE 3-57](#).

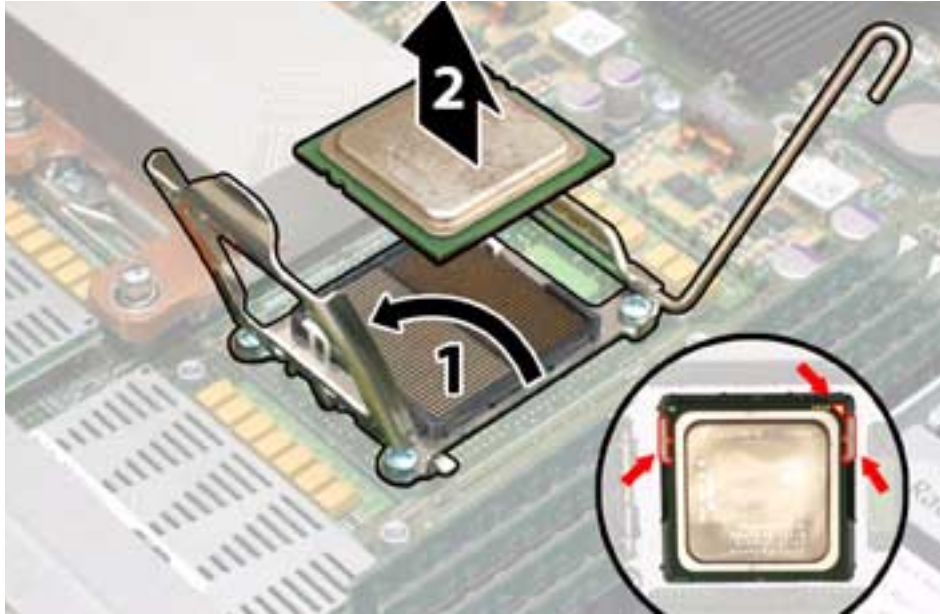


FIGURE 3-57 Removing the CPU From the Socket

Installing a Netra X4200 M2 CPU and Heatsink

1. Install the new CPU and heatsink:

Note – Mixing CPU speeds or mixing dual-core CPUs with single-core CPUs is not supported. Use two identical CPUs in your server.

- a. Unpack the new CPU and heatsink.
- b. Ensure that the CPU socket release lever and retainer plate are in the fully open position.
- c. Align the CPU in the socket as shown in [FIGURE 3-57](#).

Note – Use the alignment keys in the CPU socket to match the alignment notches on the sides of the CPU. See inset of [FIGURE 3-57](#).

- d. Gently set the CPU onto the pins in the socket.

- e. When the CPU is fully seated in the socket, pivot the hinged retainer plate down onto the top of the CPU.
- f. Pivot the release lever down and into the locked position, at the side of the socket.

The release lever must lock down the retainer plate as you close the lever. See [FIGURE 3-56](#) for a view of how the lever locks down the edge of the plate.

- g. If you are reinstalling an existing CPU or heatsink, use an alcohol pad to clean all old thermal grease from the component surface.



Caution – Ensure that the thermal grease in the syringe supplied with the CPU is pliable and not stiff. If your syringe of grease has aged, the grease might be too stiff to adequately spread out and ensure thermal conductance.

- h. Use one syringe of thermal grease (0.5 g) to carefully apply grease to the top of the CPU in three lines in the pattern shown in [FIGURE 3-58](#).

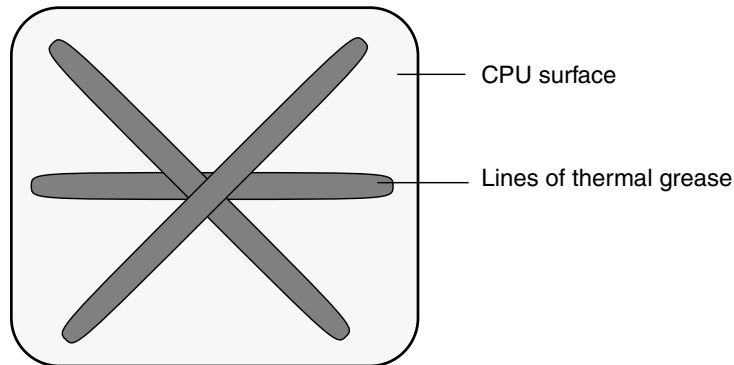


FIGURE 3-58 Required Pattern for Thermal Grease Application

- 2. Turn the heatsink upright and reinstall the four springs and mounting bolts.



Caution – Avoid moving the heatsink after it has contacted the top of the CPU. Too much movement could disturb the layer of thermal grease, leading to component damage.

- 3. Carefully position and align the heatsink over the CPU.

Note – The heatsink is not symmetrical and it must be aligned before you place it on the CPU. Note that the half of the Sun Microsystems logo imprinted on the top of the heatsink will create a complete logo when correctly aligned with the adjacent heatsink.

4. Lower the heatsink onto the CPU, aligning the mounting bolts with their holes on the motherboard.
5. Alternately tighten the four heatsink mounting screws 180-degrees at a time until each spring is completely compressed.

Replacing the Motherboard Assembly

Removing the Motherboard Assembly

1. Prepare the server for motherboard assembly removal. See:
 - [“Powering Off the Server”](#) on page 28
 - [“Disconnecting Cables From the Server”](#) on page 29
 - [“Removing the Server From the Rack”](#) on page 30
 - [“Performing Antistatic Measures”](#) on page 31
2. Remove the following components:
 - Top cover – [“Removing the Top Cover”](#) on page 33
 - PCI tray – [“Removing the PCI Tray and PCI-E Ribbon Cables”](#) on page 34
 - Cable hold-down bracket – [“Removing the PCI-E Cable Hold-Down Bracket”](#) on page 36
 - Cables for PCI-E – [“Removing the PCI Tray and PCI-E Ribbon Cables”](#) on page 34
 - DIMM/CPU duct – [“Removing the DIMM/CPU Duct”](#) on page 68
 - System Fan assembly – [“Removing the System Fan Assembly”](#) on page 54
 - DIMMs – [“Removing a DIMM”](#) on page 71
 - Alarm board – [“Replacing the Alarm Board”](#) on page 103
 - Graphics Redirect and Service Processor (GRASP) board – [“Removing the GRASP Board”](#) on page 66.

3. **Disconnect the cables from the following connectors on the motherboard assembly (FIGURE 3-59):**
 - Flex Circuit (J7)
 - Front I/O (J23)

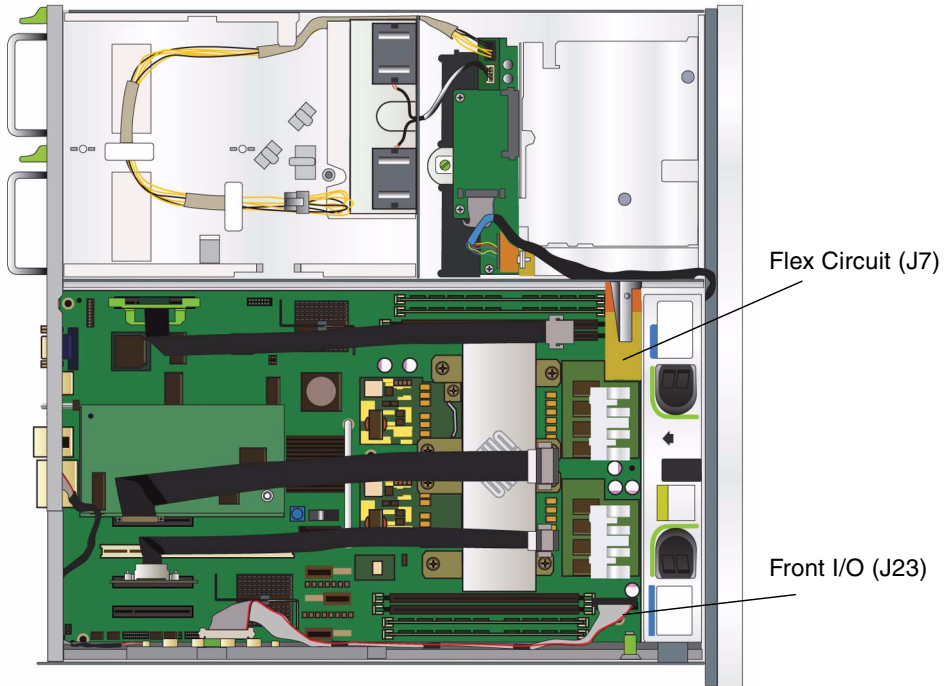


FIGURE 3-59 Disconnecting the Cables From the Motherboard Assembly

4. **Use an 8mm nut-driver to remove the two bus-bar nuts and six other screws that secure the motherboard assembly to the chassis. See FIGURE 3-60.**

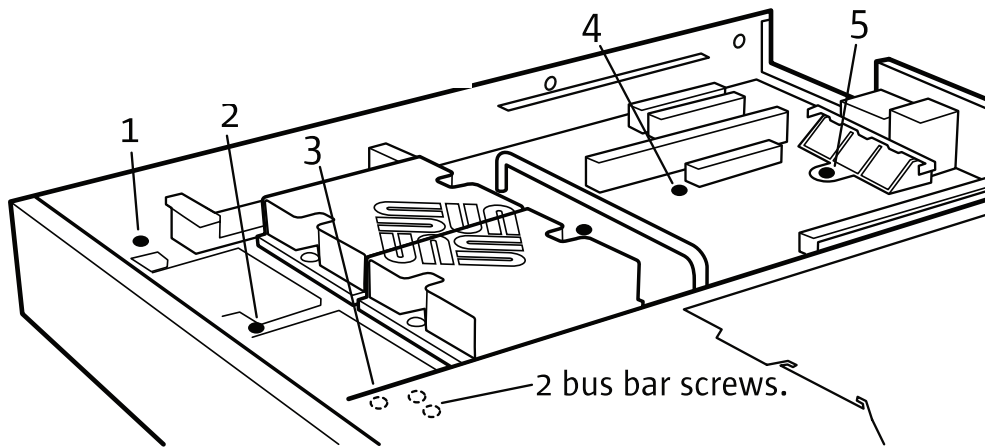


FIGURE 3-60 Motherboard Securing Screws and Bus-Bar Screw Locations

5. Use the lifting handle to raise the forward edge of the board until it has cleared the bus-bar studs.



Caution – When lifting the board, use caution to avoid damaging the light pipes and connectors on the rear edge of the motherboard.

6. Slide the board toward the front of the chassis until the connectors and light pipes are clear of the chassis back panel gasketing. Then raise the motherboard and remove it from the chassis.

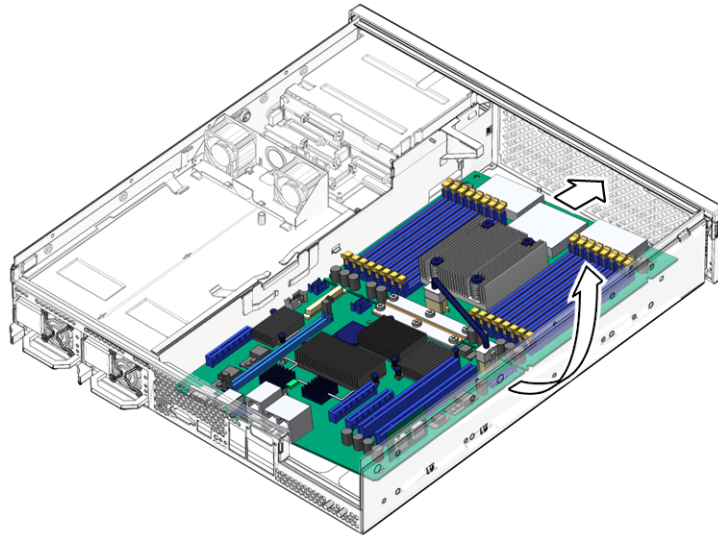


FIGURE 3-61 Removing the Motherboard Assembly From the Chassis

7. Set the motherboard assembly aside on an antistatic mat.
8. Continue to [“Installing the Motherboard Assembly” on page 86.](#)

Note – After you replace the motherboard FRU, you must use the `servicetool` command to update FRU information about the motherboard. See [“Servicetool FRU Update Procedure” on page 117.](#)

Installing the Motherboard Assembly

1. Remove the replacement motherboard assembly from its packaging and place the assembly 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 3-62), carefully seating the rear I/O connectors into the rear gasketing.

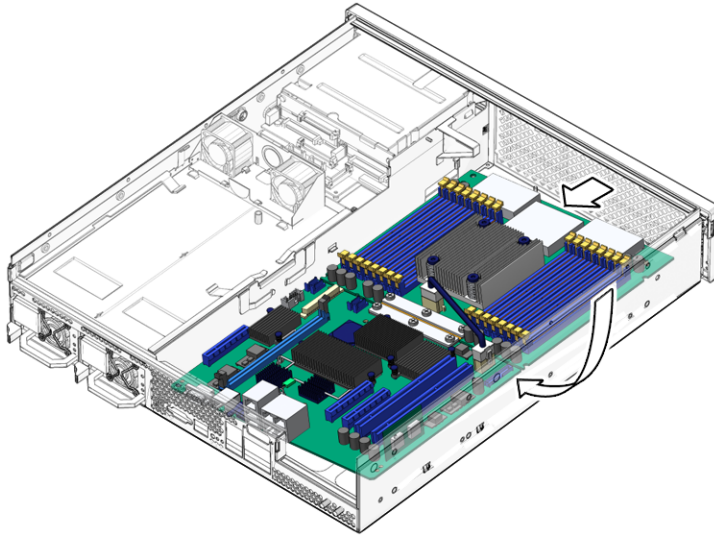


FIGURE 3-62 Installing the Motherboard Assembly Into the Chassis

3. Align the motherboard assembly screw holes over the chassis standoffs.
4. Install the two bus bar screws and five other screws (FIGURE 3-60).
5. Reconnect the cables to the following connectors on the motherboard assembly:
 - Flex Circuit (J7)
 - Front I/O (J23)

6. Install the following components:

- Graphics Redirect and Service Processor (GRASP) board – See [“Installing the GRASP Board” on page 67](#).
- Alarm board – See [“Replacing the Alarm Board” on page 103](#)
- DIMMs – See [“Installing a DIMM” on page 74](#)
- Fan assembly – See [“Installing the System Fan Assembly” on page 55](#)
- DIMM/CPU duct – See [“Installing the DIMM/CPU Duct” on page 69](#)
- Cables for PCI-E – See [“Reconnecting Cables to the Server” on page 115](#)
- Cable hold-down bracket – See [“Removing the PCI-E Cable Hold-Down Bracket” on page 36](#)
- PCI tray – [“Removing the PCI Tray and PCI-E Ribbon Cables” on page 34](#)
- Top cover – [“Removing the Top Cover” on page 33](#)

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

- [“Installing the Top Cover” on page 126](#)
- [“Removing Antistatic Measures” on page 127](#)
- [“Reinstalling the Server Chassis in the Rack” on page 127](#)
- [“Reconnecting Cables to the Server” on page 130](#)
- [“Powering On the Server” on page 131](#)

8. Once installed, the new motherboard needs to have chassis/system dynamic send number/part number information programmed, as well as updating to the Netra X4200-specific BIOS image, using the servicetool update procedure (See [“Servicetool FRU Update Procedure” on page 117](#)).

Replacing a PCI-X Card



Caution – The total power consumption of all PCI cards combined is not to exceed 80 watts. The maximum power of any one PCI card is 25 watts.

Removing a PCI-X Card

1. Prepare the server for PCI-X card removal. See:
 - “Powering Off the Server” on page 28
 - “Disconnecting Cables From the Server” on page 29
 - “Removing the Server From the Rack” on page 30
 - “Performing Antistatic Measures” on page 31
 - “Removing the Top Cover” on page 33
2. Identify the PCI-X card to remove, loosen the appropriate securing screw (FIGURE 3-63), and twist the green retention latches away from the card.

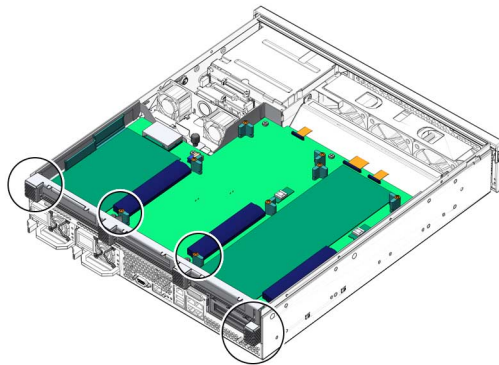


FIGURE 3-63 PCI Tray and Location of PCI Card Securing Screws

Note – The screws are captive and cannot be completely removed from the PCI tray.

Note – Both short and long green retention latches are provided with the default PCI tray assembly and may need to be repositioned to support cards depending on form factor (that is, short versus long or full-height versus half-height ([FIGURE 3-64](#))).

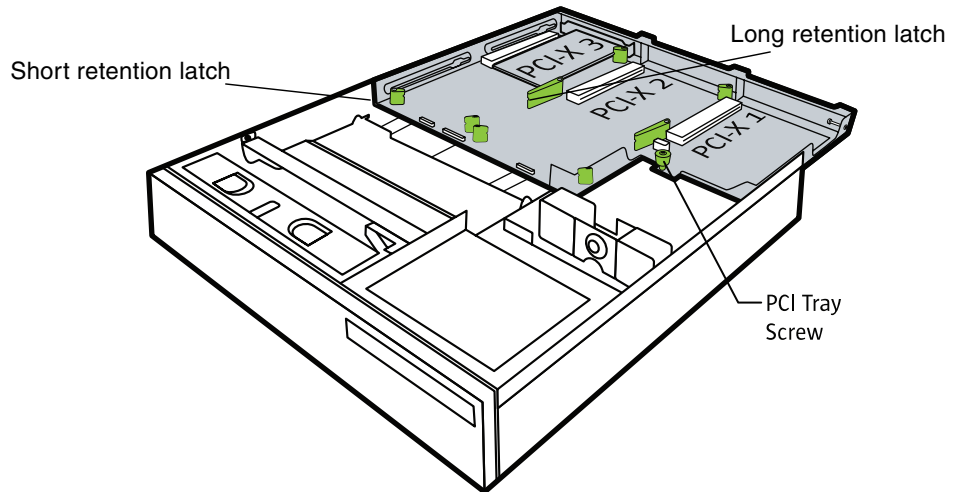


FIGURE 3-64 Locations of PCI Tray Screw and Retention Latches

3. Slide the PCI-X card to the left and lift it out of the PCI tray ([FIGURE 3-65](#)).

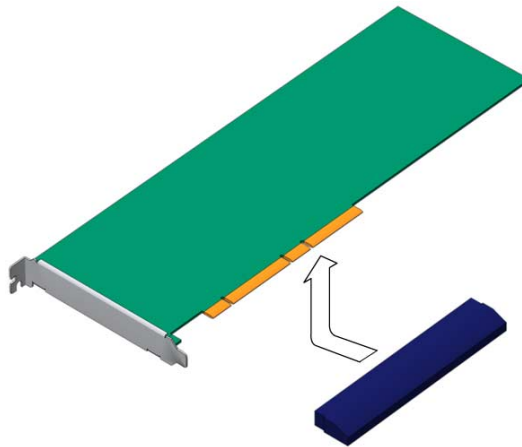


FIGURE 3-65 Lifting the PCI-X Card From the PCI Tray

Set the PCI-X card aside on an antistatic mat.

4. **Consider your next step:**
 - If you are replacing the PCI-X card, continue to [“Installing a PCI-X Card” on page 90](#).
 - If you will not replace the PCI-X card:
 - a. Install a filler panel.
 - b. Slide the PCI tray back into closed position.
 - c. Tighten the PCI-X card securing screw if it was removed for PCI-E card service.
5. **Perform the following tasks to bring the server back online:**
 - [“Installing the Top Cover” on page 126](#)
 - [“Removing Antistatic Measures” on page 127](#)
 - [“Reinstalling the Server Chassis in the Rack” on page 127](#)
 - [“Reconnecting Cables to the Server” on page 130](#)
 - [“Powering On the Server” on page 131](#)

Installing a PCI-X Card

1. **Prepare the server for PCI-X card installation. See:**
 - [“Powering Off the Server” on page 28](#)
 - [“Disconnecting Cables From the Server” on page 29](#)
 - [“Removing the Server From the Rack” on page 30](#)
 - [“Performing Antistatic Measures” on page 31](#)
 - [“Removing the Top Cover” on page 33](#)
2. **Determine where you will install the PCI-X card and loosen the appropriate securing screw** ([FIGURE 3-63](#)).

Note – The screws are captive and cannot be completely removed from the PCI tray.

Note – PCI-X slot 1 has one securing screw and no green latch.

3. **Remove the replacement PCI-X card from its packaging and place it onto an antistatic mat.**
4. **If a filler panel is installed, remove it.**

5. Lower the PCI-X card into position on the PCI tray, then slide it to the right to seat it into the connector (FIGURE 3-66).

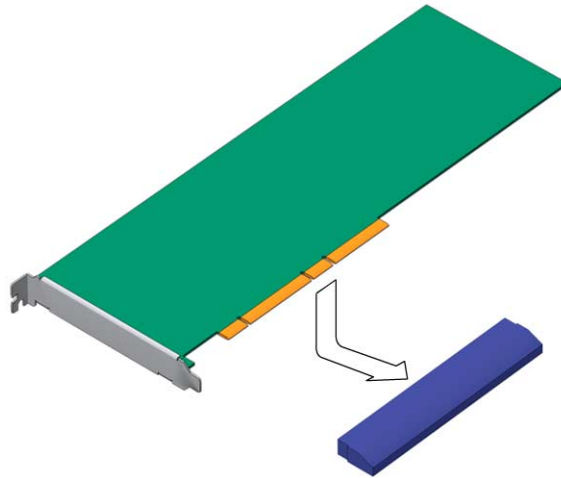


FIGURE 3-66 Installing the PCI-X Card Into the PCI Tray

6. Tighten the PCI-X card bracket screw.

Note – The captive PCI card bracket screws are located on the sides of the PCI tray assembly for PCI-E slot 0 and PCI-X slot 1 only. All other slots use green retention latches for securing plug-in cards.

7. Using a Philips screwdriver, remove and reposition green retention latches to properly secure the installed option cards.
8. Perform the following tasks to bring the server back online:
 - “Installing the Top Cover” on page 126
 - “Removing Antistatic Measures” on page 127
 - “Reinstalling the Server Chassis in the Rack” on page 127
 - “Reconnecting Cables to the Server” on page 130
 - “Powering On the Server” on page 131

Replacing the PCI-E Card



Caution – The total power consumption of all PCI cards combined is not to exceed 80 watts. The maximum power of any one PCI card is 25 watts.

Removing the PCI-E Card

1. Prepare the server for PCI-E card removal. See:

- [“Powering Off the Server” on page 28](#)
- [“Disconnecting Cables From the Server” on page 29](#)
- [“Removing the Server From the Rack” on page 30](#)
- [“Performing Antistatic Measures” on page 31](#)
- [“Removing the Top Cover” on page 33](#)
- [“Removing the PCI Tray and PCI-E Ribbon Cables” on page 34](#)

2. Flip the PCI tray over, place on an antistatic mat, and loosen the PCI-E card securing screw (FIGURE 3-67).

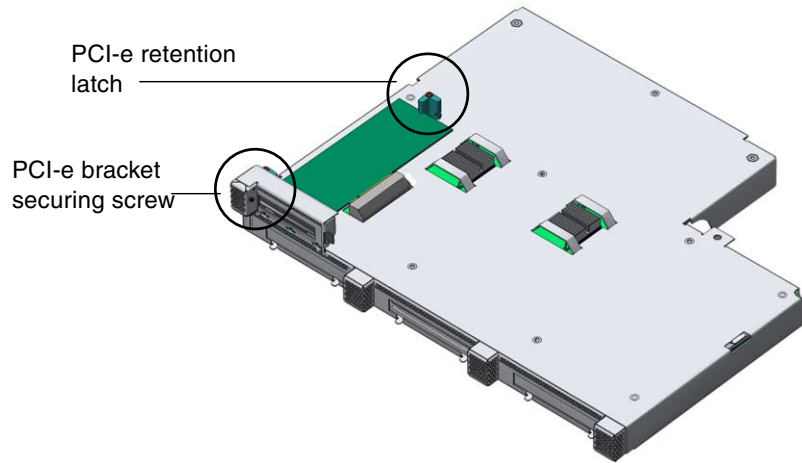


FIGURE 3-67 PCI Tray (flipped over) and PCI-E Card Securing Screw Location

Note – The screw is captive and cannot be completely removed from the PCI tray.

3. Slide the PCI-E card to the left and lift it out of the PCI tray (FIGURE 3-68).

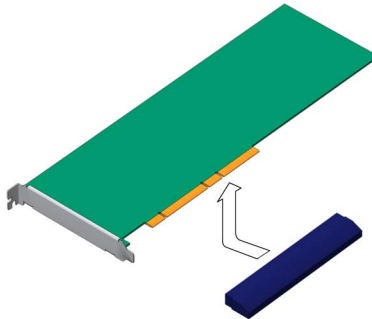


FIGURE 3-68 Lifting the PCI-E Card From the PCI Tray

4. Set the PCI-E card aside on an antistatic mat.
5. Consider your next step:

- If you are replacing the PCI-E card, continue to [“Installing the PCI-E Card” on page 94](#).
 - If you will not replace the PCI-E card:
 - a. Install a filler panel.
 - b. Tighten the PCI-E card securing screw.
- 6. Perform the following tasks to bring the server back online:**
- [“Installing the Top Cover” on page 126](#)
 - [“Removing Antistatic Measures” on page 127](#)
 - [“Reinstalling the Server Chassis in the Rack” on page 127](#)
 - [“Reconnecting Cables to the Server” on page 130](#)
 - [“Powering On the Server” on page 131](#)

Installing the PCI-E Card

- 1. Prepare the server for PCI-E card installation. See:**
 - [“Powering Off the Server” on page 28](#)
 - [“Disconnecting Cables From the Server” on page 29](#)
 - [“Removing the Server From the Rack” on page 30](#)
 - [“Performing Antistatic Measures” on page 31](#)
 - [“Removing the Top Cover” on page 33](#)
 - [“Removing the PCI Tray and PCI-E Ribbon Cables” on page 34](#)
- 2. Flip the PCI tray over, place it on an antistatic mat, and loosen the PCI-E card securing screw (FIGURE 3-67).**

Note – The screw is captive and cannot be completely removed from the PCI tray.

- 3. Remove the replacement PCI-E card from its packaging and place the card onto an antistatic mat.**
- 4. If a filler panel is installed in the PCI tray slot, remove it.**
- 5. Lower the PCI-E card into position on the PCI tray, then slide it to the right to seat it into the connector (FIGURE 3-69).**

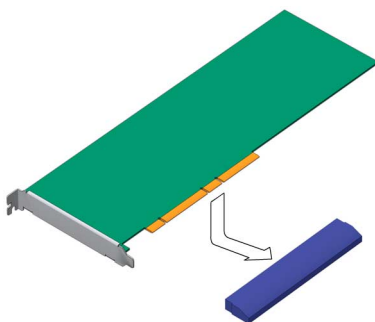


FIGURE 3-69 Installing the PCI-E Card Into the PCI Tray

6. Tighten the captive PCI-E card securing screw and adjust the green retention latch.
7. Perform the following tasks to bring the server back online:
 - “Installing the PCI Tray” on page 108
 - “Installing the Top Cover” on page 126
 - “Removing Antistatic Measures” on page 127
 - “Reinstalling the Server Chassis in the Rack” on page 127
 - “Reconnecting Cables to the Server” on page 130
 - “Powering On the Server” on page 131

Replacing a Power Supply

The server’s redundant hot-pluggable 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.



Caution – It is a violation of UL rules to add a DC power supply into a chassis that does not have the DC label indicating the correct safety information. (There is no functional difference that would prevent this, aside from the DC label.)



Caution – Do *not* mix AC and DC power supplies in the same server.

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 airflow in the server.

Removing a Power Supply

1. Identify which power supply requires replacement (FIGURE 3-70).

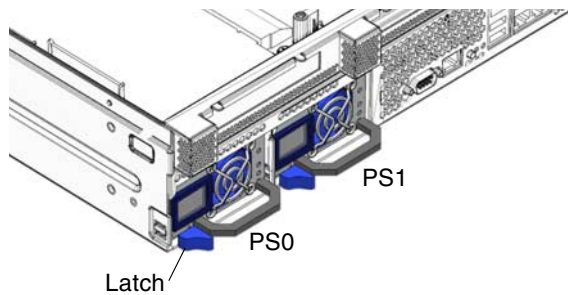


FIGURE 3-70 Power Supplies Locations

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. Disconnect the power cord from the faulty power supply.
3. Grasp the power supply handle and push the power supply latch to the right (FIGURE 3-70).
4. Pull the power supply out of the chassis (FIGURE 3-71).

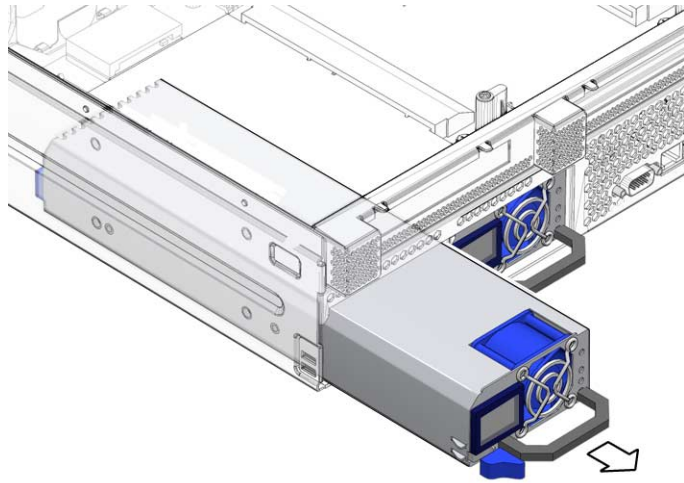


FIGURE 3-71 Removing a Power Supply From the Chassis

5. Continue to [“Installing a Power Supply”](#) on page 97.

Installing a Power Supply

1. Remove the replacement power supply from its packaging and place the supply 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 3-72](#)).

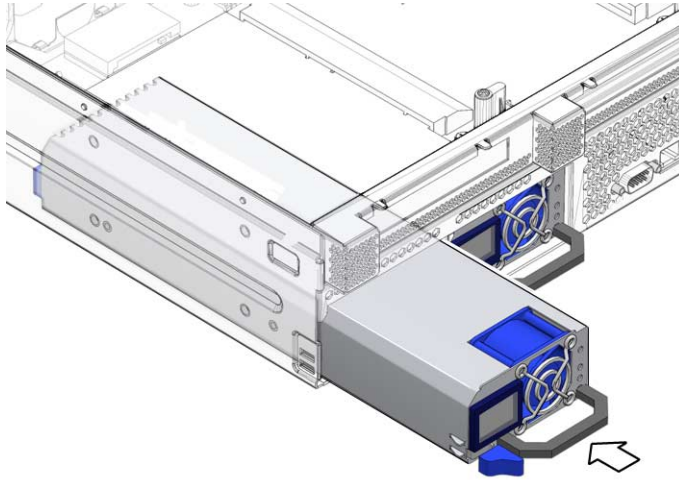


FIGURE 3-72 Installing a Power Supply Into the Chassis

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.**

Replacing the Power Distribution Board

Removing the Power Distribution Board

1. **Prepare the server for power board removal. See:**
 - [“Powering Off the Server” on page 28](#)
 - [“Disconnecting Cables From the Server” on page 29](#)
 - [“Removing the Server From the Rack” on page 30](#)
 - [“Performing Antistatic Measures” on page 31](#)
 - [“Removing the Top Cover” on page 33](#)
 - [“Opening the Front Bezel” on page 33](#)
 - [“Removing the PCI Tray and PCI-E Ribbon Cables” on page 34](#)

2. Remove the power supplies, the optical media drive, the hard drives, and the mass storage assembly. See:
 - “Removing a Power Supply” on page 96
 - “Removing the DVD Drive” on page 40
 - “Removing a Hard Drive” on page 43
 - “Removing the Mass Storage Assembly” on page 49
3. Remove the five screws and two bus bar screws that secure the power board to the chassis (FIGURE 3-73).

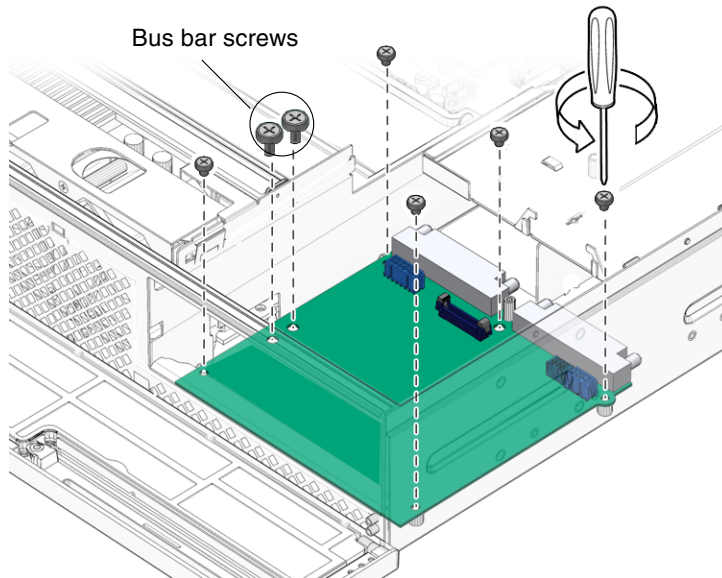


FIGURE 3-73 Removing the Power Board Screws

4. Lift the power board out of the chassis and set it aside on an antistatic mat (FIGURE 3-74).

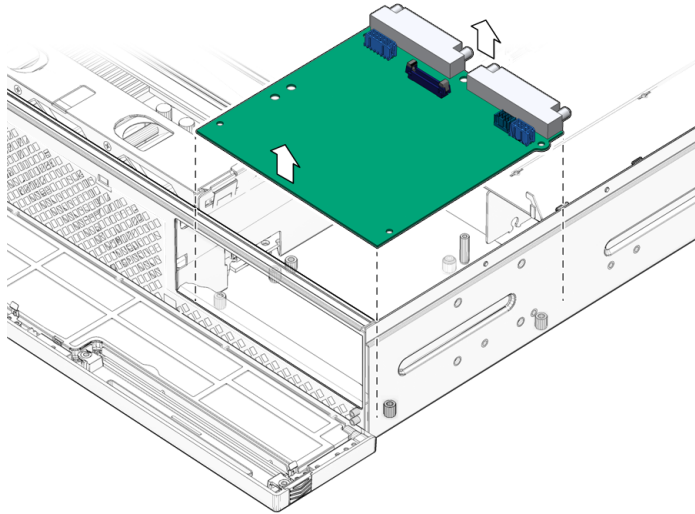


FIGURE 3-74 Lifting the Power Board From the Chassis

5. Continue to [“Installing the Power Distribution Board”](#) on page 100.

Note – Do not move the two-pin jumper on the power distribution board from the default 2-3 position (markings on the board say “Ontario”). This is the required position for operation of the Netra X4200 M2 server.

Installing the Power Distribution 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 ([FIGURE 3-75](#)).

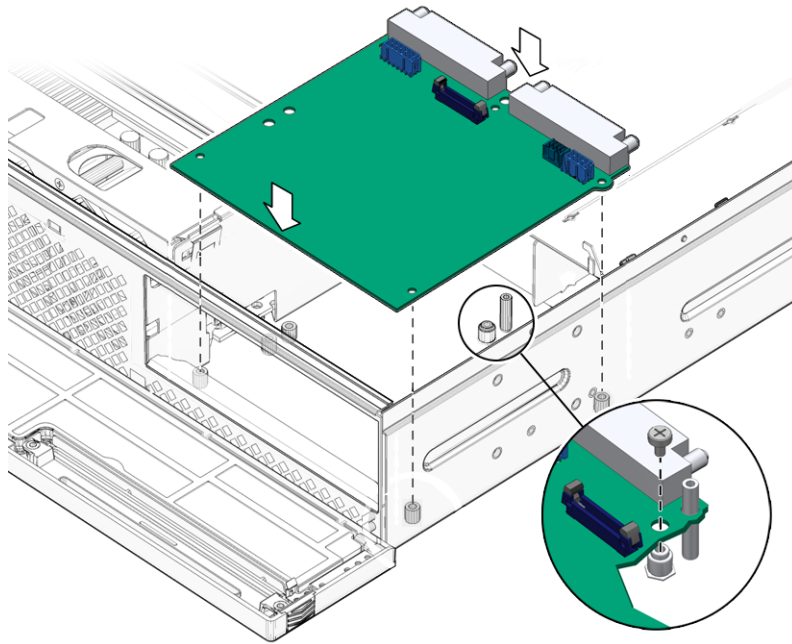


FIGURE 3-75 Lowering the Power Board Into the Chassis

- 3. Install the five screws and two bus bar screws to secure the power board to the chassis (FIGURE 3-76).**

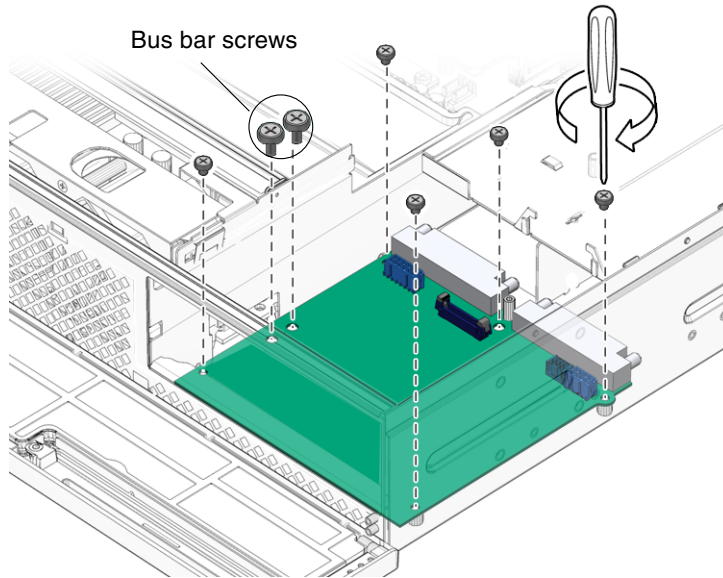


FIGURE 3-76 Securing the Power Board to the Chassis

Note – Tighten the two power board screws firmly.

4. **Install the mass storage assembly, the hard drives, the DVD drive, and the power supplies. See:**
 - [“Installing the Mass Storage Assembly”](#) on page 51
 - [“Installing a Hard Drive”](#) on page 46
 - [“Installing the DVD Drive”](#) on page 42
 - [“Installing a Power Supply”](#) on page 97

5. **Perform the following tasks to bring the server back online See:**
 - [“Installing the Top Cover”](#) on page 112
 - [“Closing the Front Bezel”](#) on page 113
 - [“Removing Antistatic Measures”](#) on page 113
 - [“Installing the Server Chassis in the Rack”](#) on page 114
 - [“Reconnecting Cables to the Server”](#) on page 115
 - [“Powering On the Server”](#) on page 116

Replacing the Alarm Board

Removing the Alarm Board

1. Prepare the server for alarm board removal. See:
 - “Powering Off the Server” on page 28
 - “Disconnecting Cables From the Server” on page 29
 - “Removing the Server From the Rack” on page 30
 - “Performing Antistatic Measures” on page 31
 - “Removing the Top Cover” on page 33
 - “Removing the PCI Tray and PCI-E Ribbon Cables” on page 34
2. Disconnect all three cables from the alarm board at their connectors (FIGURE 3-77).

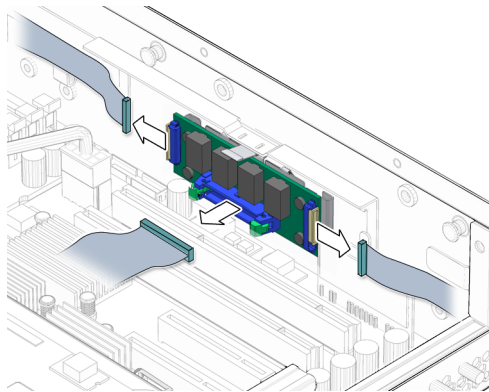


FIGURE 3-77 Disconnecting the Cables From the Alarm Board

3. Push down on the green tab, pivot the alarm board inward, and lift the alarm board out of the chassis (FIGURE 3-78).

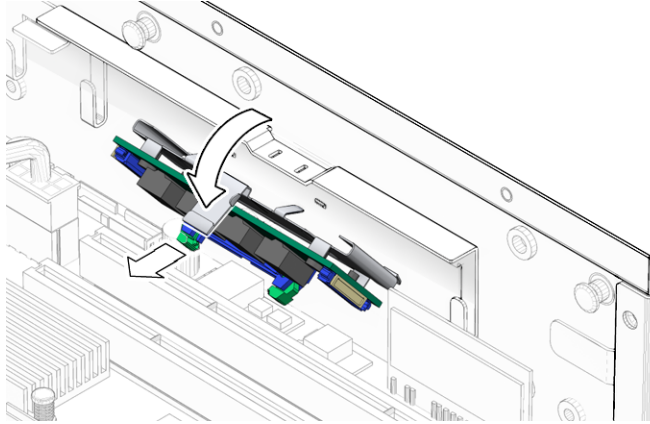


FIGURE 3-78 Lifting the Alarm Board Out of the Chassis

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 [“Installing the Alarm Board”](#) on page 104.

Installing the Alarm Board

1. **Remove the replacement alarm board from its packaging and place the board on an antistatic mat.**
2. **Align the tabs of the alarm board with the slots in the chassis wall** ([FIGURE 3-79](#)).

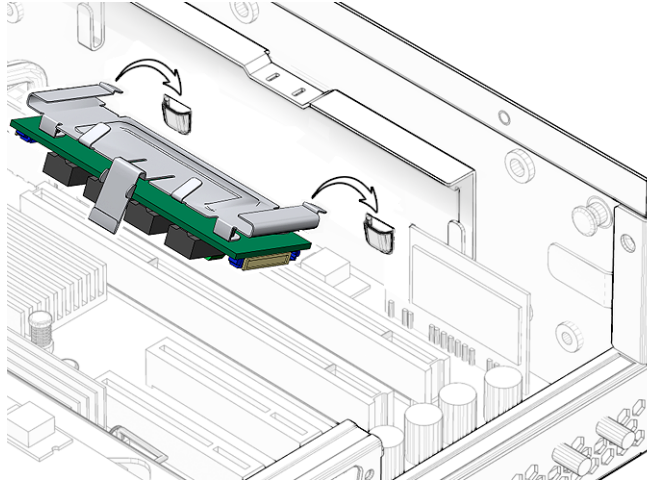


FIGURE 3-79 Aligning the Alarm Board With Chassis Wall

3. Swing the alarm board up to the chassis wall until it clicks into place ([FIGURE 3-80](#)).

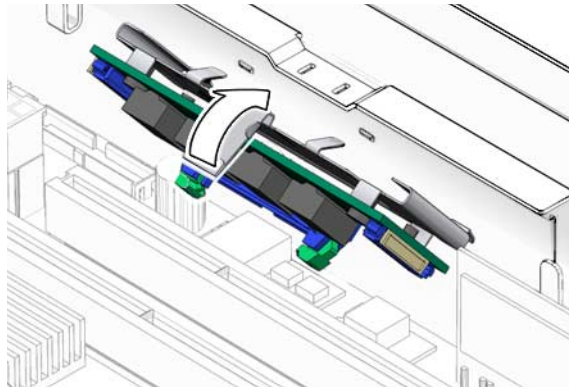


FIGURE 3-80 Swinging the Alarm Board Into Place

4. Reconnect all three cables to the alarm board at their connectors ([FIGURE 3-81](#)).

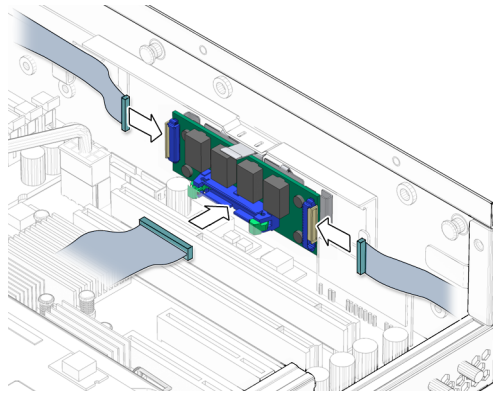


FIGURE 3-81 Connecting the Cables to the Alarm Board

5. Route the cables into the cable guides.

6. 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:
 - [“Installing the Top Cover” on page 112](#)
 - [“Closing the Front Bezel” on page 113](#)
 - [“Removing Antistatic Measures” on page 113](#)
 - [“Installing the Server Chassis in the Rack” on page 114](#)
 - [“Reconnecting Cables to the Server” on page 115](#)
 - [“Powering On the Server” on page 116](#)

Finishing the Maintenance Procedures

Use the procedures in this section to finish the removal and replacement procedures. Tasks to perform to finish the procedures:

- [“Installing the PCI Tray” on page 108](#)
- [“Installing the Top Cover” on page 112](#)
- [“Closing the Front Bezel” on page 113](#)
- [“Removing Antistatic Measures” on page 113](#)
- [“Installing the Server Chassis in the Rack” on page 114](#)
- [“Reconnecting Cables to the Server” on page 115](#)
- [“Powering On the Server” on page 116](#)

Installing the PCI Tray

1. Reconnect the following PCI-E cable/goldfinger assembly at the following connectors on the motherboard assembly (FIGURE 3-82):

- PCI-E0x8 (J2)
- PCI-E1x8 (J18)
- PCI-E3x8 (J21)

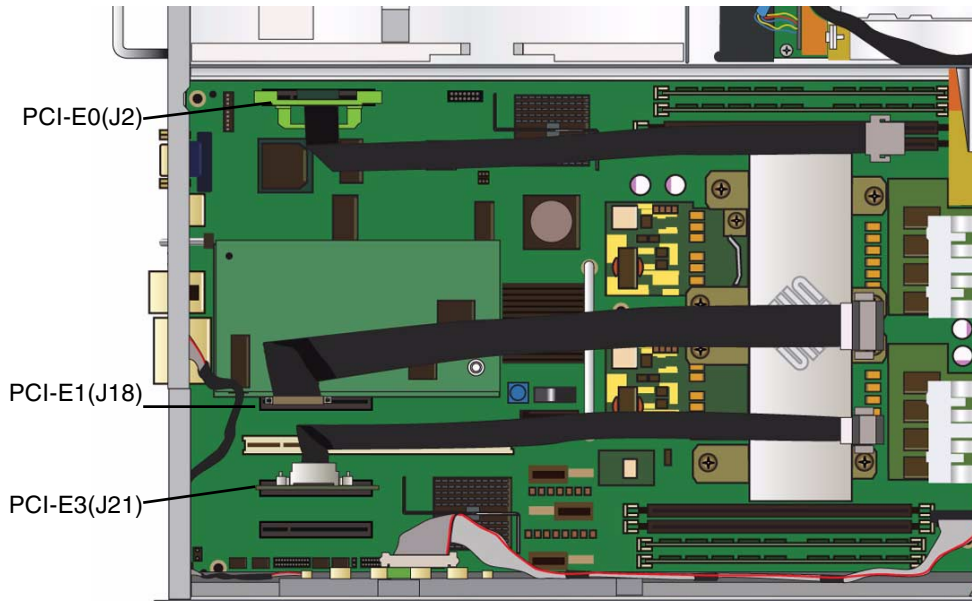


FIGURE 3-82 Reconnecting the PCI-E Cables/Goldfinger Assembly.

2. Reconnect the PCI-E cable cover and tighten the three captive screws that hold it in position (FIGURE 3-83).

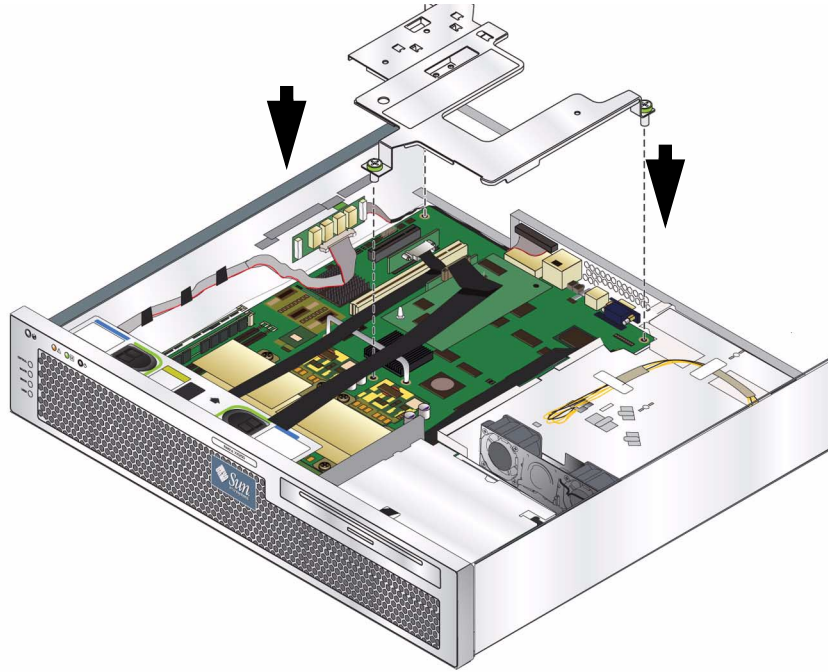


FIGURE 3-83 Reconnecting the PCI-E Cable Cover

3. Lower the PCI tray and slide it forward (FIGURE 3-84).

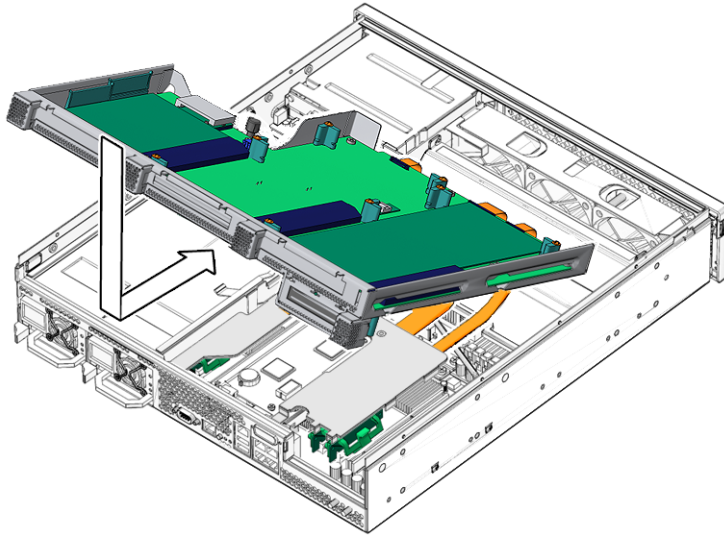


FIGURE 3-84 Lowering the PCI Tray

4. Tighten the thumbscrew and reconnect the cable at J2 (FIGURE 3-85).
5. Reconnect PCI-E cables from the motherboard into connectors J6, J7, and J1 on the front edge of the PCI tray. Wiggle the connections to ensure they are latched and fully seated (FIGURE 3-85).

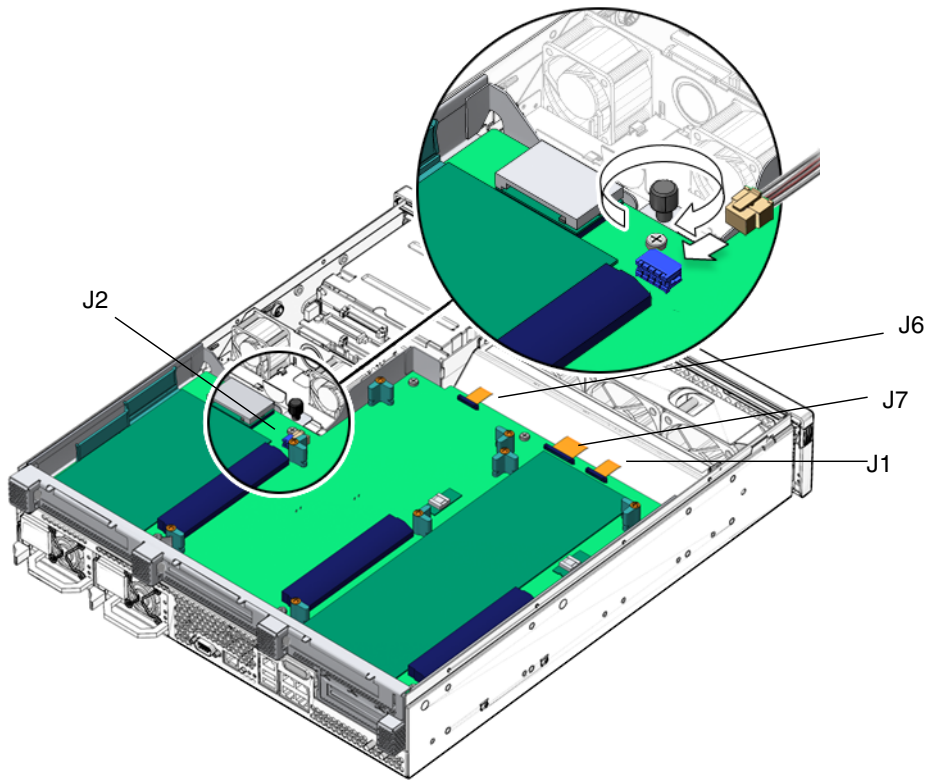


FIGURE 3-85 Reconnecting J2 and Tightening the Thumbscrew

6. Install the top cover.

See [“Installing the Top Cover”](#) on page 112.

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. Slide the cover forward until it latches into place (FIGURE 3-86).

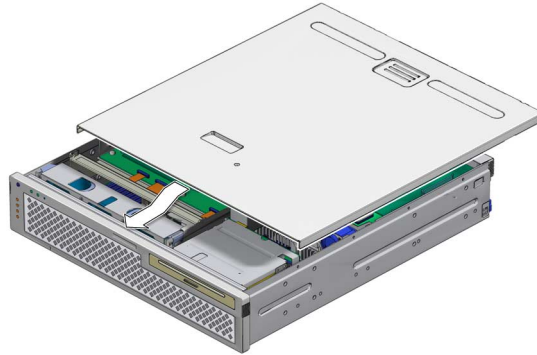


FIGURE 3-86 Installing Top Cover

3. Remove the antistatic precautions.

See [“Removing Antistatic Measures”](#) on page 113.

Closing the Front Bezel

1. To close the bezel, push it up until it clicks securely in place.

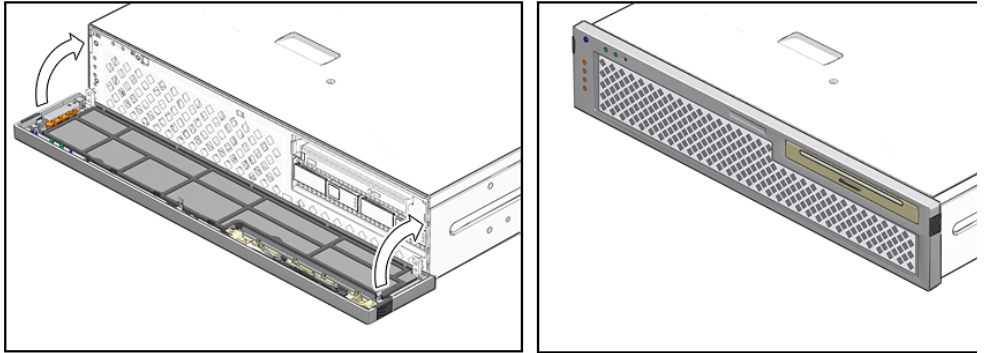


FIGURE 3-87 Closing the Front Bezel

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 [“Installing the Server Chassis in the Rack”](#) on page 114.



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

Installing 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.

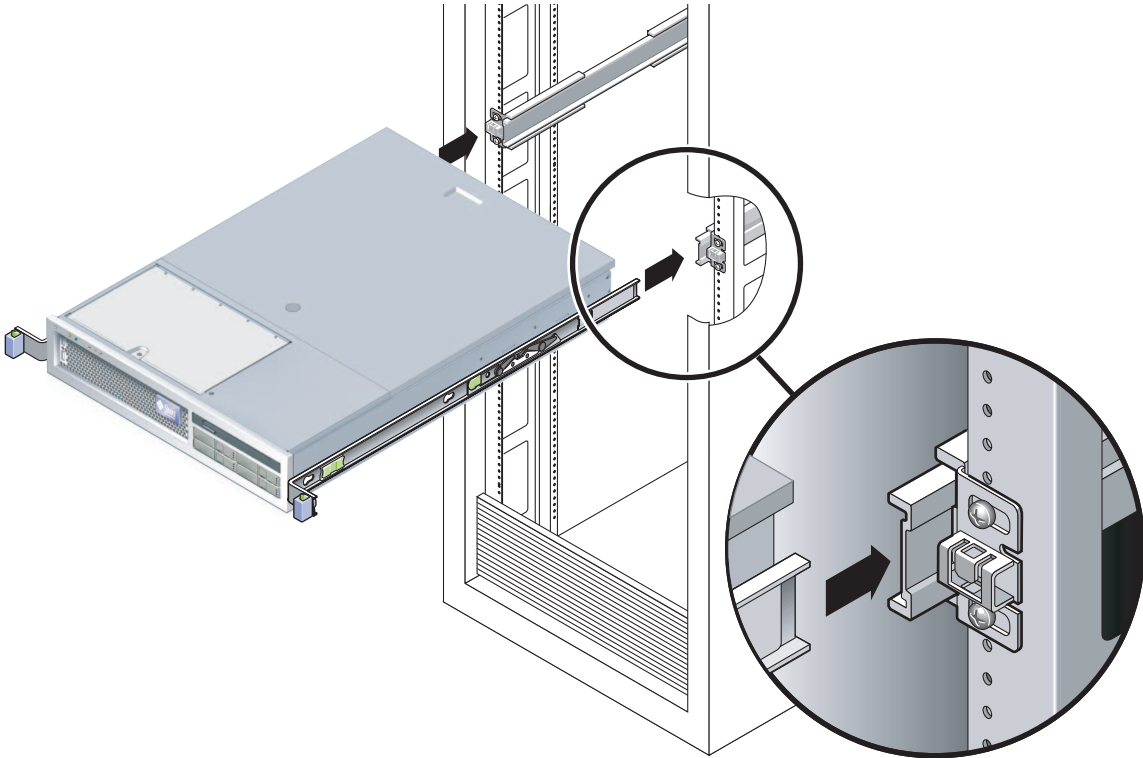


FIGURE 3-88 Returning the Server to the Rack

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 3-89](#)).

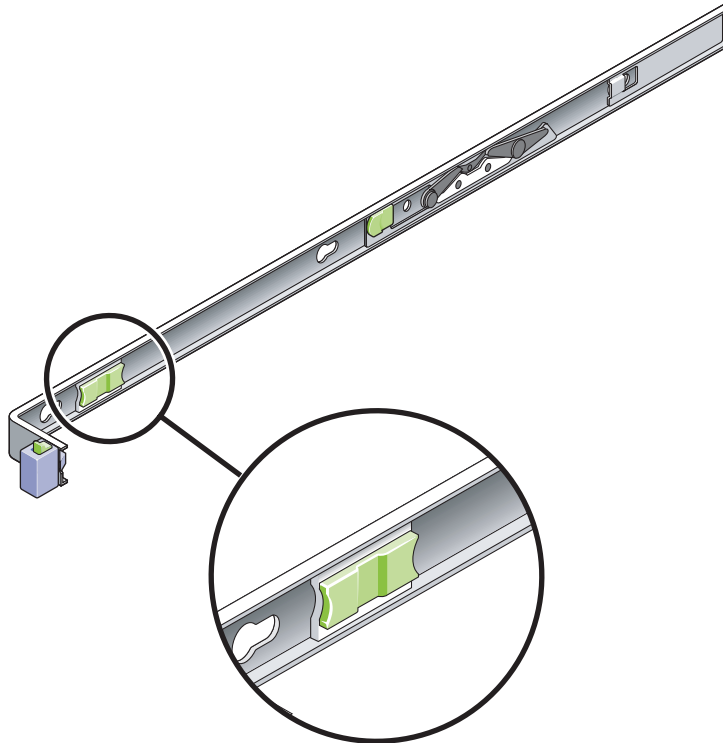


FIGURE 3-89 Release Levers

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 cables to the back of the server.**
See [“Reconnecting Cables to the Server”](#) on page 115.

Reconnecting Cables to the Server

1. **Reconnect the following cables as appropriate:**
 - GBE 1
 - GBE 0
 - GBE 3
 - GBE 2
 - USB 0
 - USB 1

- NET MGT
 - SER MGT
 - TTYA
 - PCI-E 0
 - Alarm
 - PCI-X 2
 - PCI-X 1
 - PCI-X 0
 - Power supply 1
 - Power supply 0
2. **If necessary, reinstall the appropriate cables into the CMA.**
 3. **Power on the server.**
See [“Powering On the Server”](#) on page 116.

Powering On the Server

As soon as the power cords are connected, standby power is applied, and depending on the configuration of the firmware, the system might boot. If not, follow this procedure.

- **Use one of these steps to power on the server:**

- Use the tip of a pen or other stylus to press the Power button on the bezel (FIGURE 3-90).

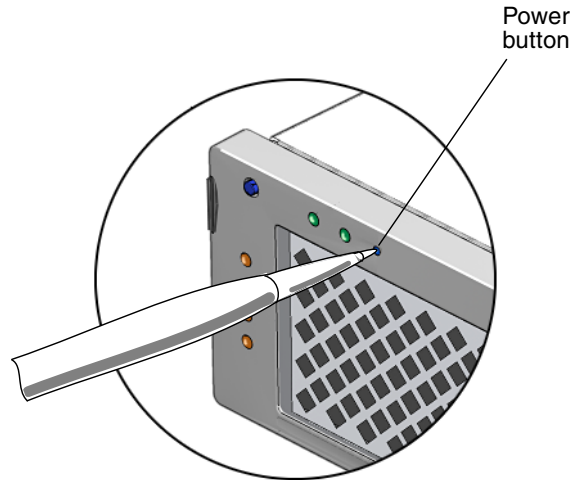


FIGURE 3-90 Powering On the Server

- Alternatively, issue the `poweron` command to the service processor console. For example:

```
start /SYS
```

ServiceTool FRU Update Procedure



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

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

```
# ssh <SP IP address> -l sunservice
```

```
# <SP IP Address>'s password: changeme
```
2. At the prompt, enter the `servicetool` command with options. The options are defined in the table below.

```
# servicetool --fru_update=mainboard <Other Options>=<value>
```

| Other Options | Value |
|-----------------------------|--|
| --board_replaced=BOARD | Update FRU information for BOARD after board has been replaced |
| --fru_product_part_number | Write a new part number to the FRU. |
| --fru_product_serial_number | Write a new serial number to the FRU. |
| --fru_chassis_serial_number | Write a new chassis serial number to the FRU. |
| --fru_asset_tag | Write a new asset tag to the FRU. |

3. Watch the output from the command and respond to the confirmation prompts to continue the update and to reboot the server:

Servicetool is going to update the mainboard FRU with product and chassis information collected from the removed mainboard.

The following preconditions must be true for this to work:

- * The new mainboard must be installed.
- * The service processor must not have been replaced with the motherboard.
- * The service processor firmware must not have been upgraded prior to the motherboard replacement; do firmware upgrades after component swaps!

Do you want to continue (y|n)? **y**

Mainboard FRU configuration has been updated.

Updating FRUs...done

[(flash)root@SUNSP00144F3A22D5:~]#

System Specifications

This appendix contains physical, power, environmental, and acoustic noise emission specifications for the Netra X4200 M2 server.

Netra X4200 M2 Specifications

TABLE A-1 Netra X4200 M2 Physical Specifications

| Specification | Value |
|---------------|----------------------|
| Width | 17.4 inches (442 mm) |
| Height | 3.5 inches (89 mm) |
| Depth | 20 inches (508 mm) |
| Weight | 37.2 pounds (17 kg) |

TABLE A-2 Netra X4200 M2 Power Specifications

| Specification | Value |
|---|---|
| DC Power | -48VDC or -60VDC (12.7A at -48VDC, 10.2A at -60VDC) |
| AC Power | 100-240 VAC, 50/60 Hz |
| Maximum input current at 200 to 240 VAC | 3.2 A |

TABLE A-2 Netra X4200 M2 Power Specifications (*Continued*)

| Specification | Value |
|--|--------|
| Maximum input current at 100 to 120 VAC | 6.5 A |
| Maximum power | 550 W |
| Maximum output supply current of each USB port | 500 mA |

TABLE A-3 Netra X4200 M2 Environmental Specifications

| Specification | Value |
|-----------------------------|---|
| Temperature (operating) | 41 - 104° F 5 - 40° C |
| Temperature (non-operating) | -40 to 70° C (-40 to 158° F) relative humidity: up to 93%, noncondensing, 38° C (100.4° F) max. wet bulb |
| Temperature (storage) | -40 to 70° C (-40 to 158° F) |
| Humidity | 5% - 85% non-condensing Short-term: -5 to 55° C (25 113° F), 5% to 90% relative humidity, noncondensing, but not to exceed 0.024 kg water/kg dry air (0.053lb dry air) |
| Operating altitude | 0 - 10,000 feet (0 - 3048 m) |

TABLE A-4 contains the declared noise emissions in accordance with ISO 9296, A-weighted, operating, and idling.

TABLE A-4 Netra X4200 M2 Acoustic Noise Emission Specifications

| Specification | Value |
|--|-------|
| L_{wAd} at or below 77° F (25° C) (1 B = 10 dB) | 7.8 B |
| L_{wAd} at max ambient (1 B = 10 dB) | 8.3 B |
| L_{pAm} bystander at or below 77° F (25° C) | 63 dB |
| L_{pAm} at max ambient | 67 dB |

BIOS POST Codes

Power-On Self-Test (POST)

The system BIOS provides a rudimentary power-on self-test (POST). The basic devices required for the server to operate are checked, memory is tested, the LSI 1064 disk controller and attached disks are probed and enumerated, and the onboard network controllers are initialized.

The progress of the self-test is indicated by a series of POST codes.

These codes are displayed at the bottom right corner of the system's VGA screen (once the self-test has progressed far enough to initialize the video monitor). However, the codes are displayed as the self-test runs and scroll off of the screen too quickly to be read. An alternate method of displaying the POST codes is to redirect the output of the console to a serial port (see ["Redirecting Console Output" on page 121](#)).

The message, BMC Responding is displayed at the end of POST.

Redirecting Console Output

Use these instructions to access the service processor and redirect the console output so that the BIOS POST codes can be read.

1. **Initialize the BIOS Setup utility by pressing the F2 key while the system is performing the power-on self-test (POST).**
2. **When the BIOS Main Menu screen is displayed, select Advanced.**

3. When the Advanced Settings screen is displayed, select IPMI 2.0 Configuration.
4. When the IPMI 2.0 Configuration screen is displayed, select the LAN Configuration menu item.
5. Select the IP Address menu item.
The service processor's IP address is displayed using the following format:
Current IP address in BMC: xxx.xxx.xxx.xxx
6. Start a web browser and type the service processor's IP address in the browser's URL field.
7. When you are prompted, type a user name and password as follows:
User name: **root**
Password: **changeme**
8. When the ILOM Service Processor GUI screen is displayed, click the Remote Control tab.
9. Click on the Redirection tab.
10. Set the color depth for the redirection console at either 6 or 8 bits.
11. Click on the Start Redirection button.
The javaRConsole window appears and prompts you for your user name and password again.
12. When you are prompted, type a user name and password as follows:
User name: **root**
Password: **changeme**
The current POST screen is displayed.

Changing POST Options

These instructions are optional, but you can use them to change the operations that the server performs during POST testing.

1. Initialize the BIOS Setup utility by pressing the F2 key while the system is performing the power-on self-test (POST).
2. When the BIOS Main Menu screen is displayed, select the Boot menu.
3. From the Boot Settings screen, select Boot Settings Configuration.

4. **On the Boot Settings Configuration screen, there are several options that you can enable or disable:**
- **Quick Boot:** This option is disabled by default. If you enable this, the BIOS skips certain tests while booting, such as the extensive memory test. This decreases the time it takes for the system to boot.
 - **System Configuration Display:** This option is disabled by default. If you enable this, the system configuration screen is displayed before booting begins.
 - **Quiet Boot:** This option is disabled by default. If you enable this, the Sun Microsystems logo is displayed instead of POST codes.
 - **Language:** This option is reserved for future use. Do not change.
 - **Add On ROM Display Mode:** This option is set to Force BIOS by default. This option has effect only if you have also enabled the Quiet Boot option, but it controls whether output from the Option ROM is displayed. The two settings for this option are as follows:
 - Force BIOS: Remove the Sun logo and display Option ROM output.
 - Keep Current: Do not remove the Sun logo. The Option ROM output is not displayed.
 - **Boot Num-Lock:** This option is On by default (keyboard Num-Lock is turned on during boot). If you set this to off, the keyboard Num-Lock is not turned on during boot.
 - **Wait for F1 if Error:** This option is disabled by default. If you enable this, the system will pause if an error is found during POST and will only resume when you press the F1 key.
 - **Interrupt 19 Capture:** This option is reserved for future use. Do not change.
 - **Default Boot Order:** The letters in the brackets represent the boot devices. To see the letters defined, position your cursor over the field and read the definition in the right side of the screen.

POST Codes

TABLE B-1 contains descriptions of each of the POST codes, listed in the same order in which they are generated. These POST codes appear as a four-digit string that is a combination of two-digit output from primary I/O port 80 and two-digit output from secondary I/O port 81. In the POST codes listed in TABLE B-1, the first two digits are from port 81 and the last two digits are from port 80.

TABLE B-1 POST Codes

| Post Code | Description |
|-----------|--|
| 00d0 | Coming out of POR, PCI configuration space initialization, Enabling 8111's SMBus. |
| 00d1 | Keyboard controller BAT, Waking up from PM, Saving power-on CPUID in scratch CMOS. |
| 00d2 | Disable cache, full memory sizing, and verify that flat mode is enabled. |
| 00d3 | Memory detections and sizing in boot block, cache disabled, IO APIC enabled. |
| 01d4 | Test base 512KB memory. Adjust policies and cache first 8MB. |
| 01d5 | Boot block code is copied from ROM to lower RAM. BIOS is now executing out of RAM. |
| 01d6 | Key sequence and OEM specific method is checked to determine if BIOS recovery is forced. If next code is E0, BIOS recovery is being executed. Main BIOS checksum is tested. |
| 01d7 | Restoring CPUID; moving boot block-runtime interface module to RAM; determine whether to execute serial flash. |
| 01d8 | Decompressing runtime module into RAM. Storing CPUID information in memory. |
| 01d9 | Copying main BIOS into memory. |
| 01da | Giving control to BIOS POST. |
| 0004 | Check CMOS diagnostic byte to determine if battery power is OK and CMOS checksum is OK. If the CMOS checksum is bad, update CMOS with power-on default values. |
| 00c2 | Set up boot strap processor for POST. This includes frequency calculation, loading BSP microcode, and applying user requested value for GART Error Reporting setup question. |
| 00c3 | Errata workarounds applied to the BSP (#78 & #110). |
| 00c6 | Re-enable cache for boot strap processor, and apply workarounds in the BSP for errata #106, #107, #69, and #63 if appropriate. |
| 00c7 | HT sets link frequencies and widths to their final values. |
| 000a | Initializing the 8042 compatible Keyboard Controller. |
| 000c | Detecting the presence of Keyboard in KBC port. |
| 000e | Testing and initialization of different Input Devices. Traps the INT09h vector, so that the POST INT09h handler gets control for IRQ1. |
| 8600 | Preparing CPU for booting to OS by copying all of the context of the BSP to all application processors present. NOTE: APs are left in the CLI HLT state. |

TABLE B-1 POST Codes *(Continued)*

| Post Code | Description |
|------------------|--|
| de00 | Preparing CPU for booting to OS by copying all of the context of the BSP to all application processors present. NOTE: APs are left in the CLI HLT state. |
| 8613 | Initialize PM regs and PM PCI regs at Early-POST. Initialize multi host bridge, if system supports it. Setup ECC options before memory clearing. Enable PCI-X clock lines in the 8131. |
| 0024 | Decompress and initialize any platform specific BIOS modules. |
| 862a | BBS ROM initialization. |
| 002a | Generic Device Initialization Manager (DIM) - Disable all devices. |
| 042a | ISA PnP devices - Disable all devices. |
| 052a | PCI devices - Disable all devices. |
| 122a | ISA devices - Static device initialization. |
| 152a | PCI devices - Static device initialization. |
| 252a | PCI devices - Output device initialization. |
| 202c | Initializing different devices. Detecting and initializing the video adapter installed in the system that have optional ROMs. |
| 002e | Initializing all the output devices. |
| 0033 | Initializing the silent boot module. Set the window for displaying text information. |
| 0037 | Displaying sign-on message, CPU information, setup key message, and any OEM specific information. |
| 4538 | PCI devices - IPL device initialization. |
| 5538 | PCI devices - General device initialization. |
| 8600 | Preparing CPU for booting to OS by copying all of the context of the BSP to all application processors present. NOTE: APs are left in the CLI HLT state. |

POST Code Checkpoints

The POST code checkpoints are the largest set of checkpoints during the BIOS pre-boot process. [TABLE B-2](#) describes the type of checkpoints that might occur during the POST portion of the BIOS. These two-digit checkpoints are the output from primary I/O port 80.

TABLE B-2 POST Code Checkpoints

| Post Code | Description |
|-----------|---|
| 03 | Global initialization before the execution of actual BIOS POST. Initialize BIOS Data Area (BDA) variables to their default values. Initialize POST data variables. NMI, parity, video for EGA and DMA controllers are disabled at this point. |
| 04 | Check CMOS diagnostic byte to verify battery power and CMOS checksum is OK. Verify CMOS checksum manually by reading storage area. If the CMOS checksum is bad, update CMOS with power-on default values and clear passwords. Initialize status register A. Initializes data variables that are based on CMOS setup questions. Initializes both the 8259 compatible PICs in the system. |
| 05 | Initializes the interrupt controlling hardware (generally PIC) and interrupt vector table. |
| 06 | Do R/W test to CH-2 count reg. Initialize CH-0 as system timer. Install the POSTINT1Ch handler. Enable IRQ-0 in PIC for system timer interrupt. Traps INT1Ch vector to POSTINT1ChHandlerBlock. |
| C0 | Early CPU Init Start--Disable Cache--Init Local APIC. |
| C1 | Set up boot strap processor information. |
| C2 | Set up boot strap processor for POST. This includes frequency calculation, loading BSP microcode, and applying user requested value for GART Error Reporting setup question. |
| C3 | Errata workarounds applied to the BSP (#78 & #110). |
| C5 | Enumerate and set up application processors. This includes microcode loading, and workarounds for errata (#78, #110, #106, #107, #69, #63). |
| C6 | Re-enable cache for boot strap processor, and apply workarounds in the BSP for errata #106, #107, #69, and #63 if appropriate. In case of mixed CPU steppings, errors are sought and logged, and an appropriate frequency for all CPUs is found and applied. NOTE: APs are left in the CLI HLT state. |
| C7 | The HT sets link frequencies and widths to their final values. This routine gets called after CPU frequency has been calculated to prevent bad programming. |
| 0A | Initializes the 8042 compatible Keyboard Controller. |
| 0B | Detects the presence of PS/2 mouse. |
| 0C | Detects the presence of Keyboard in KBC port. |
| 0E | Testing and initialization of different Input Devices. Also, update the Kernel Variables. Traps the INT09h vector, so that the POST INT09h handler gets control for IRQ1. Decompress all available language, BIOS logo, and Silent logo modules. |

TABLE B-2 POST Code Checkpoints *(Continued)*

| Post Code | Description |
|------------------|---|
| 13 | Initialize PM regs and PM PCI regs at Early-POST. Initialize multi host bridge, if system supports it. Setup ECC options before memory clearing. REDIRECTION causes corrected data to written to RAM immediately. CHIPKILL provides 4 bit error det/corr of x4 type memory. Enable PCI-X clock lines in the 8131. |
| 20 | Relocate all the CPUs to a unique SMBASE address. The BSP will be set to have its entry point at A000:0. If less than 5 CPU sockets are present on a board, subsequent CPUs entry points will be separated by 8000h bytes. If more than 4 CPU sockets are present, entry points are separated by 200h bytes. CPU module will be responsible for the relocation of the CPU to correct address. NOTE: APs are left in the INIT state. |
| 24 | Decompress and initialize any platform specific BIOS modules. |
| 30 | Initialize System Management Interrupt. |
| 2A | Initializes different devices through DIM. |
| 2C | Initializes different devices. Detects and initializes the video adapter installed in the system that have optional ROMs. |
| 2E | Initializes all the output devices. |
| 31 | Allocate memory for ADM module and decompress it. Give control to ADM module for initialization. Initialize language and font modules for ADM. Activate ADM module. |
| 33 | Initializes the silent boot module. Set the window for displaying text information. |
| 37 | Displaying sign-on message, CPU information, setup key message, and any OEM specific information. |
| 38 | Initializes different devices through DIM. |
| 39 | Initializes DMAC-1 and DMAC-2. |
| 3A | Initialize RTC date/time. |
| 3B | Test for total memory installed in the system. Also, Check for DEL or ESC keys to limit memory test. Display total memory in the system. |
| 3C | By this point, RAM read/write test is completed, program memory holes or handle any adjustments needed in RAM size with respect to NB. Test if HT Module found an error in Boot Block and CPU compatibility for MP environment. |
| 40 | Detect different devices (Parallel ports, serial ports, and coprocessor in CPU, etc.) successfully installed in the system and update the BDA, EBDA, etc. |
| 50 | Programming the memory hole or any kind of implementation that needs an adjustment in system RAM size if needed. |
| 52 | Updates CMOS memory size from memory found in memory test. Allocates memory for Extended BIOS Data Area from base memory. |
| 60 | Initializes NUM-LOCK status and programs the KBD typematic rate. |
| 75 | Initialize Int-13 and prepare for IPL detection. |

TABLE B-2 POST Code Checkpoints *(Continued)*

| Post Code | Description |
|------------------|--|
| 78 | Initializes IPL devices controlled by BIOS and option ROMs. |
| 7A | Initializes remaining option ROMs. |
| 7C | Generate and write contents of ESCD in NVRAM. |
| 84 | Log errors encountered during POST. |
| 85 | Display errors to the user and gets the user response for error. |
| 87 | Execute BIOS setup if needed/requested. |
| 8C | After all device initialization is done, programmed any user selectable parameters relating to NB/SB, such as timing parameters, non-cacheable regions and the shadow RAM cacheability, and do any other NB/SB/PCIX/OEM specific programming needed during Late-POST. Background scrubbing for DRAM, and L1 and L2 caches are set up based on setup questions. Get the DRAM scrub limits from each node. Workaround for erratum #101 applied here. |
| 8D | Build ACPI tables (if ACPI is supported). |
| 8E | Program the peripheral parameters. Enable/Disable NMI as selected. |
| 90 | Late POST initialization of system management interrupt. |
| A0 | Check boot password if installed. |
| A1 | Clean-up work needed before booting to OS. |
| A2 | Takes care of runtime image preparation for different BIOS modules. Fill the free area in F000h segment with 0FFh. Initializes the Microsoft IRQ Routing Table. Prepares the runtime language module. Disables the system configuration display if needed. |
| A4 | Initialize runtime language module. |
| A7 | Displays the system configuration screen if enabled. Initialize the CPUs before boot, which includes the programming of the MTRRs. |
| A8 | Prepare CPU for OS boot including final MTRR values. |
| A9 | Wait for user input at config display if needed. |
| AA | Uninstall POST INT1Ch vector and INT09h vector. Deinitializes the ADM module. |
| AB | Prepare BBS for Int 19 boot. |
| AC | Any kind of Chipsets (NB/SB) specific programming needed during End- POST, just before giving control to runtime code booting to OS. Programmed the system BIOS (0F0000h shadow RAM) cacheability. Ported to handle any OEM specific programming needed during End-POST. Copy OEM specific data from POST_DSEG to RUN_CSEG. |

TABLE B-2 POST Code Checkpoints *(Continued)*

| Post Code | Description |
|------------------|---|
| B1 | Save system context for ACPI. |
| 00 | Prepares CPU for booting to OS by copying all of the context of the BSP to all application processors present. NOTE: APs are left in the CLIHLT state. |
| 61-70 | OEM POST Error. This range is reserved for chipset vendors and system manufacturers. The error associated with this value may be different from one platform to the next. |

Status Indicator LEDs

External Status Indicator LEDs

The server provides the following groups of LEDs:

- “Front and Rear Panel LEDs” on page 133
- “Hard Drive LEDs” on page 135
- “Power Supply LEDs” on page 135
- “Ethernet Port LEDs” on page 136

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

[FIGURE C-1](#) and [FIGURE C-2](#) show the locations of the external status indicator LEDs. Refer to [TABLE C-1](#) and [TABLE C-2](#) for descriptions of the LED behavior.

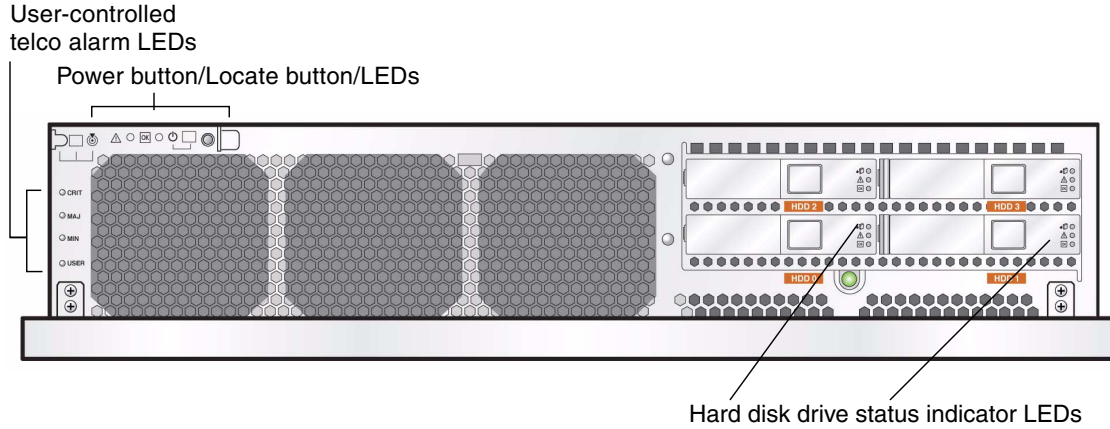


FIGURE C-1 Netra X4200 Server M2 Front Panel LEDs

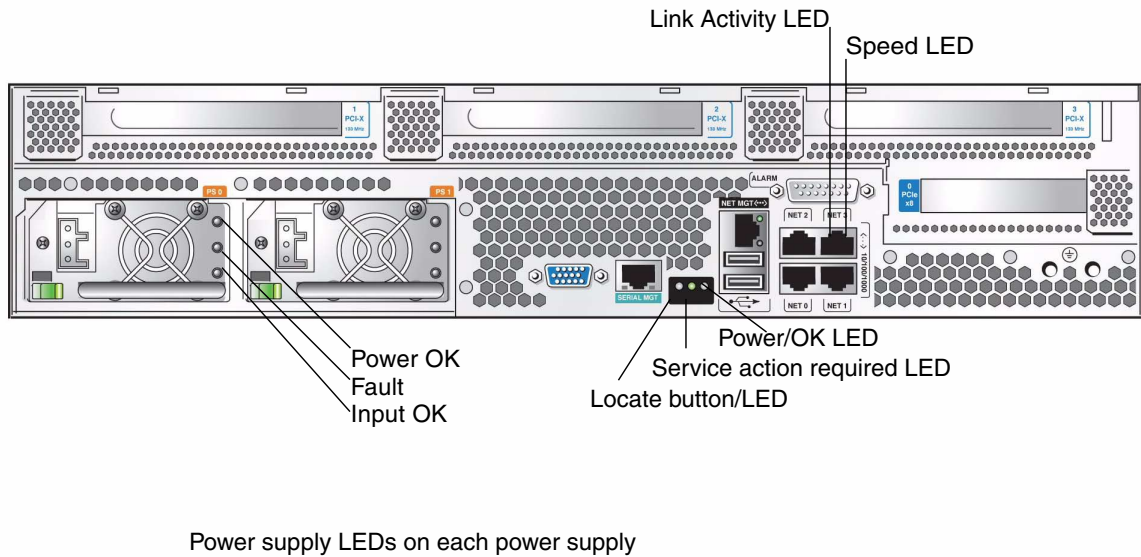


FIGURE C-2 Netra X4200 M2 Server Rear Panel LEDs

Using LEDs to Identify the State of Devices

Front and Rear Panel LEDs

The seven front panel LEDs (FIGURE C-1) are located in the upper left corner of the server chassis.

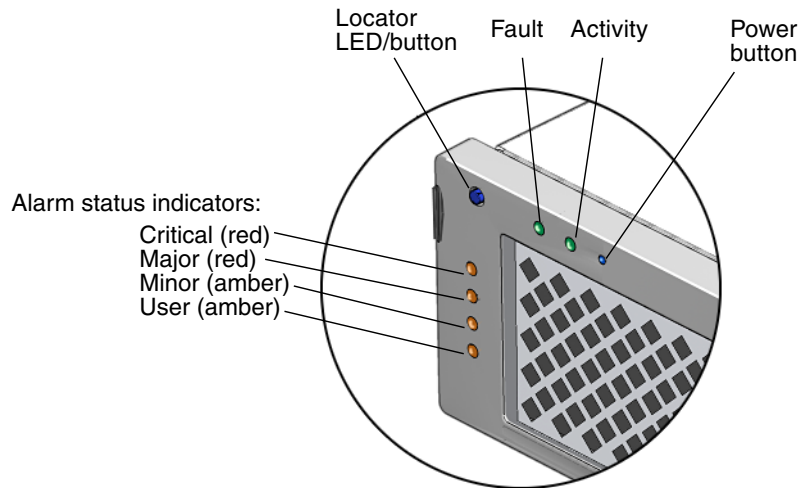


FIGURE C-3 Front Panel LEDs

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

TABLE C-1 Front and Rear Panel LEDs

| LED | Location | Color | Description |
|------------------------|----------------------------------|-------|--|
| Locator LED and button | front upper left and rear center | white | <p>Enables you to identify a particular server. The LED is activated using one of the following methods:</p> <ul style="list-style-type: none"> • Issuing the <code>setlocator on</code> or <code>off</code> command. • Pressing the button to toggle the indicator on or off. <p>This LED provides the following indications:</p> <ul style="list-style-type: none"> • 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 | <p>If on, indicates that service is required. The <code>ALOM showfaults</code> command provides details about any faults that cause this indicator to be lit.</p> |
| Activity LED | front upper left | green | <ul style="list-style-type: none"> • 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 | | <p>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.</p> |
| Alarm:Critical LED | front left | red | <p>Indicates a critical alarm. Refer to the server administration guide for a description of alarm states.</p> |
| Alarm:Major LED | front left | red | <p>Indicates a major alarm.</p> |
| Alarm:Minor LED | front left | amber | <p>Indicates a minor alarm.</p> |
| Alarm :User LED | front left | amber | <p>Indicates a user alarm.</p> |
| Power OK LED | rear center | green | <p>The LED provides the following indications:</p> <ul style="list-style-type: none"> • Off – The system is unavailable. Either it has no power or ALOM is not running. • Steady on – Indicates that the system is powered on and is running in 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. It might mean that the system diagnostics are running, or that the system is booting. |

Hard Drive LEDs

The hard drive LEDs (FIGURE C-4 and TABLE C-2) are located on the front of each hard drive that is installed in the server chassis.

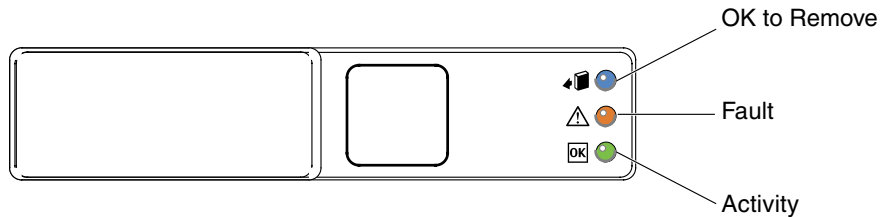


FIGURE C-4 Hard Drive LEDs

TABLE C-2 Hard Drive LEDs

| LED | Color | Description |
|--------------|-------|--|
| OK to Remove | blue | <ul style="list-style-type: none">• On – The drive is ready for hot-plug removal.• Off – Normal operation. |
| Fault | amber | <ul style="list-style-type: none">• On – The drive has a fault and requires attention.• Off – Normal operation. |
| Activity | green | <ul style="list-style-type: none">• On – Drive is receiving power. Solidly lit if drive is idle.• Flashing – The drive is processing a command.• Off – Power is off. |

Power Supply LEDs

The power supply LEDs (FIGURE C-2 and TABLE C-3) are located on the back of each power supply.

TABLE C-3 Power Supply LEDs

| LED | Color | Description |
|----------|-------|---|
| Power OK | green | <ul style="list-style-type: none">• On – Normal operation. DC output voltage is within normal limits.• Off – Power is off. |
| Fault | amber | <ul style="list-style-type: none">• On – Power supply has detected a failure.• Off – Normal operation. |
| Input OK | green | <ul style="list-style-type: none">• On – Normal operation. Input power is within normal limits.• Off – No input voltage, or input voltage is below limits. |

Ethernet Port LEDs

The four 10/100/1000 Mbps Ethernet ports each have two LEDs, as described in [TABLE C-4](#).

TABLE C-4 Ethernet Port LEDs

| LED | Color | Description |
|-----------|----------------------|---|
| Left LED | Amber or Green | Speed indicator: <ul style="list-style-type: none">• 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. |
| Right LED | Green | Link/Activity indicator: <ul style="list-style-type: none">• Steady On – a link is established.• Blinking – there is activity on this port.• Off – No link is established. |

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

Internal Status Indicator LEDs

The Netra X4200 M2 servers have internal status indicator LEDs for the fan modules, the DIMM slots, the CPUs, and the GRASP board.

[FIGURE C-5](#) shows the locations of the internal LEDs. [TABLE C-5](#) describes the LED behavior.

Note – To see the CPU LEDs or the GRASP board LED, you must put the server in standby power mode (shut down with the front panel Power button, but do not disconnect the AC or DC power cords).

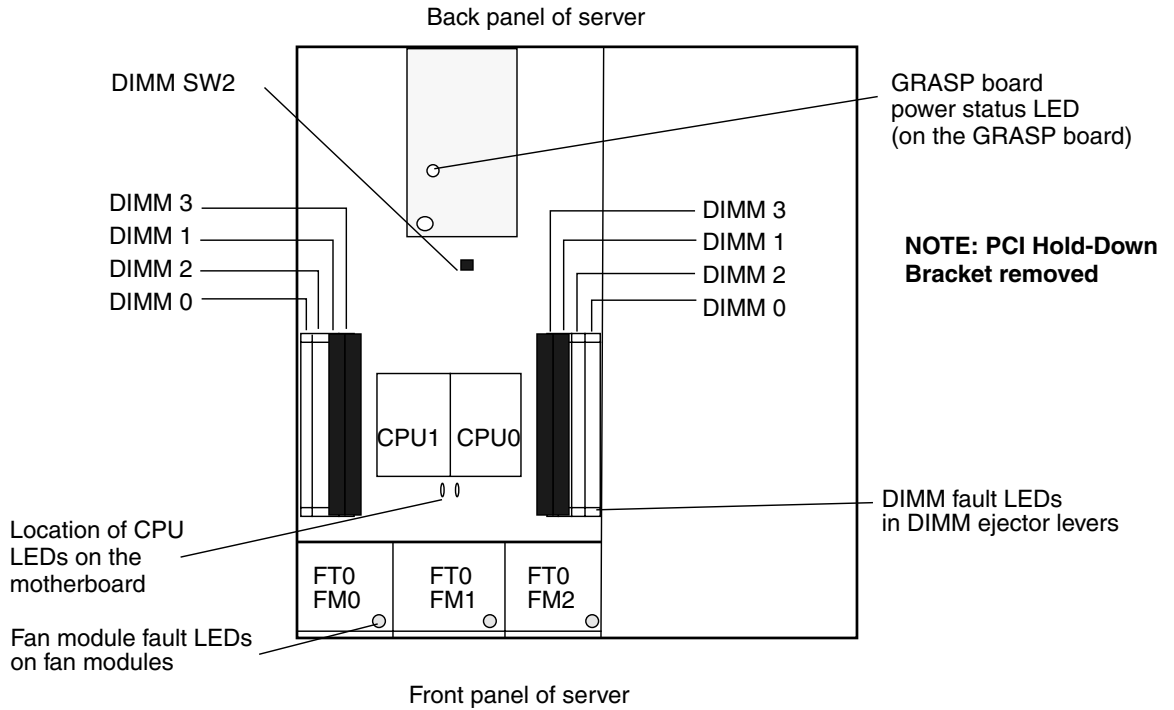


FIGURE C-5 Netra X4200 M2 Internal Status LED Locations

TABLE C-5 Internal LED Functions

| LED Name | Description |
|--|--|
| DIMM Fault LED (The ejector levers on the DIMM slots are the LEDs.) | This LED has two states: <ul style="list-style-type: none"> • Off: DIMM is operating properly. • Lit (amber): DIMM has failed. |
| CPU Fault LED (on motherboard) | This LED has two states: <ul style="list-style-type: none"> • Off: CPU is operating properly. • Lit (amber): CPU has encountered a voltage or heat error condition. |
| GRASP Board Power Status LED | This LED has two states: <ul style="list-style-type: none"> • Off: Standby power is not reaching the GRASP board. • Lit (green): 3.3V standby power is reaching the GRASP board. |

Connector Pinouts

This appendix contains information about the connector pinouts.

USB Connector

The USB connector pins and their corresponding descriptions are shown in the figure and table in this section.

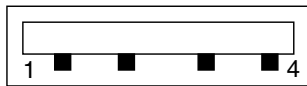


FIGURE D-1 USB Connector

TABLE D-1 USB Connector Pinouts

| Pin Number | Pin Name | Description |
|------------|----------|--|
| 1 | +5V | +5V supply |
| 2 | Data- | Negative side of differential for data |
| 3 | Data+ | Positive side of differential for data |
| 4 | Gnd | Ground |

Note – The maximum output supply current for each USB port on the server is 500 mA.

Serial Connector

The RJ-45 serial connector pins and their corresponding descriptions are shown in the figure and table in this section.

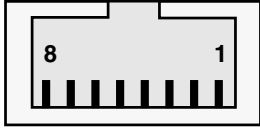


FIGURE D-2 Serial Connector

TABLE D-2 Serial Connector Pinouts

| Pin Number | Pin Name | Description |
|------------|----------|---------------------|
| 1 | RTS | Ready to send |
| 2 | DTR | Data terminal ready |
| 3 | TXD | Transmit data |
| 4 | GND | Ground |
| 5 | GND | Ground |
| 6 | RXD | Receive data |
| 7 | DSR | Data send ready |
| 8 | CTS | Clear to send |

10/100BASE-T Connector

The RJ-45 10/100BASE-T (Net Management) connector pins and their corresponding descriptions are shown in the figure and table in this section.

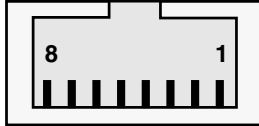


FIGURE D-3 10/100BASE-T Connector

TABLE D-3 10/100BASE-T Connector Pinouts

| Pin Number | Pin Name | Description |
|------------|----------|--------------------------------|
| 1 | TX+ | Positive side of transmit data |
| 2 | TX- | Negative side of transmit data |
| 3 | RX+ | Positive side of receive data |
| 4 | NC | No connect |
| 5 | NC | No connect |
| 6 | RX- | Negative side of receive data |
| 7 | NC | No connect |
| 8 | NC | No connect |

10/100/1000BASE-T Connector

The RJ-45 10/100/1000BASE-T connector pins and their corresponding descriptions are shown in the figure and table in this section.

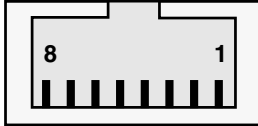


FIGURE D-4 10/100/1000BASE-T Connector

TABLE D-4 10/100/1000BASE-T Connector Pinouts

| Pin Number | Pin Name | Description |
|------------|----------|------------------------------|
| 1 | TP0+ | Positive side of data pair 0 |
| 2 | TP0- | Negative side of data pair 0 |
| 3 | TP1+ | Positive side of data pair 1 |
| 4 | TP2+ | Positive side of data pair 2 |
| 5 | TP2- | Negative side of data pair 2 |
| 6 | TP1- | Negative side of data pair 1 |
| 7 | TP3+ | Positive side of data pair 3 |
| 8 | TP3- | Negative side of data pair 3 |

VGA Video Connector

The VGA video connector pins and their corresponding descriptions are shown in the figure and table in this section.

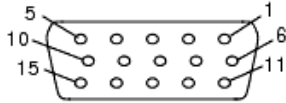


FIGURE D-5 VGA Video Connector

TABLE D-5 VGA Video Connector Pinouts

| Pin Number | Pin Name | Description |
|------------|----------|-----------------------------|
| 1 | RED | Red video |
| 2 | GRN | Green video |
| 3 | BLU | Blue video |
| 4 | ID2 | ID2 (no connect) |
| 5 | GND | Ground |
| 6 | R_GND | Red video return (ground) |
| 7 | G_GND | Green video return (ground) |
| 8 | B_GND | Blue video return (ground) |
| 9 | KEY | No pin |
| 10 | S_GND | Sync return (ground) |
| 11 | ID0 | ID0 (no connect) |
| 12 | ID1/SDA | MONID1 |
| 13 | HSYNC | Horizontal sync |
| 14 | VSYNC | Vertical sync |
| 15 | ID3/SCL | MONID2 |

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 D-6](#) shows the pin numbering of the alarm port, and [TABLE D-6](#) describes the pin signals.

Note – The alarm port relay contacts are rated for 100 V 0.2 A maximum.

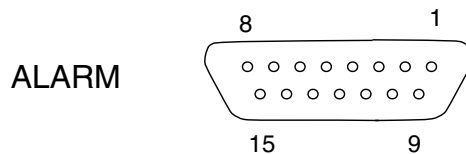


FIGURE D-6 Alarm Port Pin Numbering

TABLE D-6 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 |

Serial Attached SCSI Connector

The Serial Attached SCSI (SAS) connector pins and their corresponding descriptions are shown in the figure and table in this section.

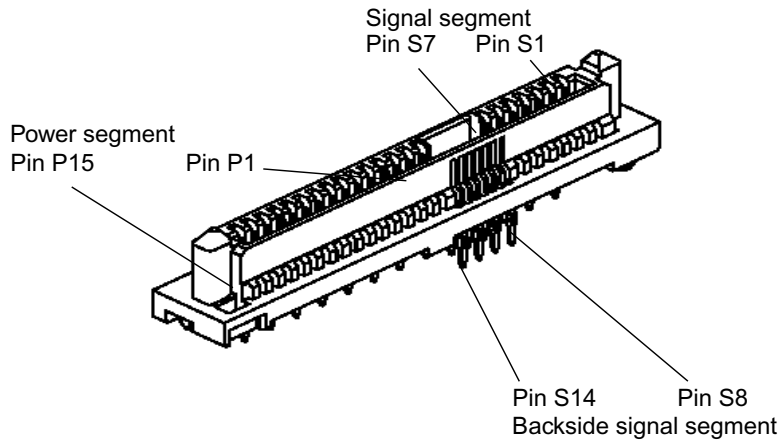


FIGURE D-7 Serial Attached SCSI Connector

TABLE D-7 Serial Attached SCSI Connector Pinouts

| Segment | Pin Number | Pin Name | Description |
|----------------|------------|----------|--|
| Signal Segment | S1 | Gnd | Second mate ground |
| | S2 | TX+ | Positive side of transmit to hard drive |
| | S3 | TX- | Negative side of transmit to hard drive |
| | S4 | Gnd | Second mate ground |
| | S5 | RX- | Negative side of receive from hard drive |
| | S6 | RX+ | Positive side of receive from hard drive |
| | S7 | Gnd | Second mate ground |

TABLE D-7 Serial Attached SCSI Connector Pinouts *(Continued)*

| Segment | Pin Number | Pin Name | Description |
|-------------------------------|-------------------|-----------------|-------------------------|
| Backside Signal Segment | S8 | Gnd | Second mate ground |
| | S9 | | Not used |
| | S10 | | Not used |
| | S11 | Gnd | Second mate ground |
| | S12 | | Not used |
| | S13 | | Not used |
| | S14 | Gnd | Second mate ground |
| Power Segment | P1 | 3.3 V | Not used |
| | P2 | 3.3 V | Not used |
| | P3 | 3.3 V | Not used |
| | P4 | Gnd | First mate ground |
| | P5 | Gnd | Second mate ground |
| | P6 | Gnd | Second mate ground |
| | P7 | 5.0 V | Pre-charge, second mate |
| | P8 | 5.0 V | Third mate 5 V |
| | P9 | 5.0 V | Third mate 5 V |
| | P10 | Gnd | Second mate ground |
| | P11 | Reserved | Not used |
| | P12 | Gnd | First mate ground |
| | P13 | 12.0 V | Pre-charge, second mate |
| | P14 | 12.0 V | Third mate 12 V |
| | P15 | 12.0 V | Third mate 12 V |

Flex Cable Motherboard Connector

The flex cable (flex circuit) motherboard connector pins and their corresponding descriptions are shown in the figure and table in this section.

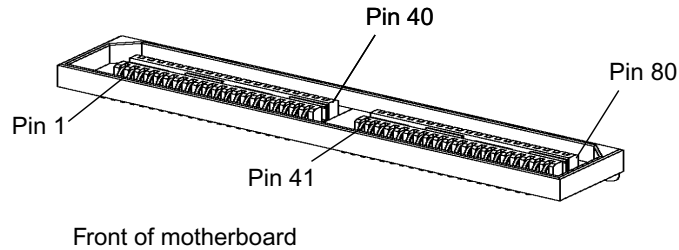


FIGURE D-8 Flex Cable Motherboard Connector

TABLE D-8 Flex Cable Motherboard Connector Pinouts

| Pin Number | Signal Name |
|------------|------------------|
| 1 | DVD_DRST_L |
| 2 | PS1_PRESENT_L |
| 3 | DVD_DDATA[8] |
| 4 | SAS_FAN_PRSENT_L |
| 5 | DVD_DDATA[7] |
| 6 | SAS_FAN_TACH |
| 7 | DVD_DDATA[9] |
| 8 | PS1_VIN_GOOD |
| 9 | DVD_DDATA[6] |
| 10 | PS1_POWEROK |
| 11 | DVD_DDATA[10] |
| 12 | SP_I2C_DAT |
| 13 | DVD_DDATA[5] |
| 14 | SP_I2C_CLK |

TABLE D-8 Flex Cable Motherboard Connector Pinouts *(Continued)*

| Pin Number | Signal Name |
|-------------------|--------------------|
| 15 | DVD_DDDATA[11] |
| 16 | GND |
| 17 | DVD_DDDATA[4] |
| 18 | +3.3 V AUX |
| 19 | DVD_DDDATA[12] |
| 20 | PS0_PRESENT_L |
| 21 | DVD_DDDATA[3] |
| 22 | PS0_ENABLE_L |
| 23 | DVD_DDDATA[13] |
| 24 | SAS_FAN_LED_L |
| 25 | DVD_DDDATA[2] |
| 26 | PS0_VIN_GOOD |
| 27 | DVD_DDDATA[14] |
| 28 | PS0_POWEROK |
| 29 | DVD_DDDATA[1] |
| 30 | DVD_DDACK_L |
| 31 | DVD_DDDATA[15] |
| 32 | DVD_DRDY |
| 33 | DVD_DDRQ |
| 34 | DVD_INT_L |
| 35 | DVD_DDDATA[0] |
| 36 | GND |
| 37 | DVD_DIOR_L |
| 38 | SAS_DISK3_RX_P |
| 39 | DVD_DIOW_L |
| 40 | SAS_DISK3_RX_N |
| 41 | DVD_DADDR[1] |
| 42 | SAS_DISK1_RX_P |
| 43 | DVD_PDIAG_L |
| 44 | SAS_DISK1_RX_N |

TABLE D-8 Flex Cable Motherboard Connector Pinouts *(Continued)*

| Pin Number | Signal Name |
|-------------------|--------------------|
| 45 | DVD_DADDR[0] |
| 46 | GND |
| 47 | DVD_DADDR[2] |
| 48 | SAS_DISK3_TX_P |
| 49 | DVD_DCS1_L |
| 50 | SAS_DISK3_TX_N |
| 51 | DVD_DCS3_L |
| 52 | GND |
| 53 | DVD_DASP_L |
| 54 | SAS_DISK1_TX_P |
| 55 | +5V |
| 56 | SAS_DISK1_TX_N |
| 57 | GND |
| 58 | GND |
| 59 | SAS_DISK2_TX_N |
| 60 | +5V |
| 61 | SAS_DISK2_TX_P |
| 62 | GND |
| 63 | GND |
| 64 | GND |
| 65 | SAS_DISK2_TX_N |
| 66 | DISK3_ACT_LED_L |
| 67 | SAS_DISK0_TX_P |
| 68 | SPINDLE_ID0 |
| 69 | GND |
| 70 | DISK2_ACT_LED_L |
| 71 | SAS_DISK2_RX_N |
| 72 | DISK1_ACT_LED_L |
| 73 | SAS_DISK2_RX_P |
| 74 | DISK0_ACT_LED_L |

TABLE D-8 Flex Cable Motherboard Connector Pinouts *(Continued)*

| Pin Number | Signal Name |
|------------|----------------|
| 75 | GND |
| 76 | SPINDLE_ID1 |
| 77 | SAS_DISK0_RX_N |
| 78 | GND |
| 79 | SAS_DISK0_RX_P |
| 80 | PS_KILL |

Motherboard Bus-Bar Power Connector

Main power is delivered to the motherboard through a bus bar. There are two pads on the underside of the motherboard that connect +12 V and ground. The pads have been designed to handle 50 A. The motherboard bus bar connector pads and their corresponding descriptions are shown in the figure and table in this section.

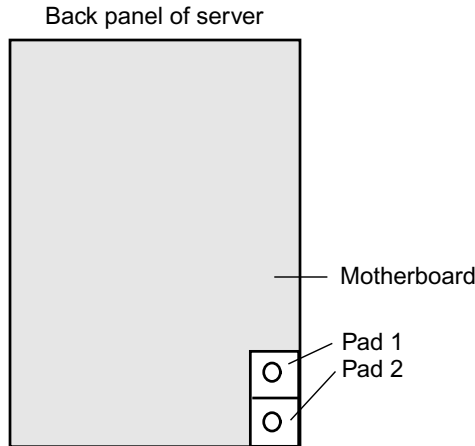


FIGURE D-9 Motherboard Bus-Bar Connector

TABLE D-9 Motherboard Bus-Bar Connector Pinouts

| Pad Number | Pad Name | Description |
|------------|----------|-------------------------------|
| 1 | +12V | +12 V DC power to motherboard |
| 2 | GND | Ground |

Front I/O Interconnect Cable Connector

The connection from the motherboard to the front I/O board is made through a short interconnect ribbon cable. On each board, there is a connector, Samtec STMM-113-02-S-D. The interconnect cable connector pins and their corresponding descriptions are shown in the figure and table in this section.

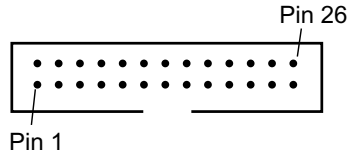


FIGURE D-10 Front I/O Interconnect Cable Connector

TABLE D-10 Front I/O Interconnect Cable Connector Pinouts

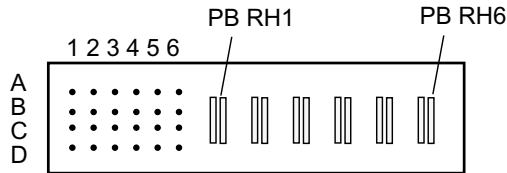
| Pin Number | Signal Name |
|------------|----------------|
| 1 | NA |
| 2 | NA |
| 3 | NA |
| 4 | NA |
| 5 | NA |
| 6 | NA |
| 7 | GND |
| 8 | GND |
| 9 | NA |
| 10 | NA |
| 11 | GND |
| 12 | GND |
| 13 | FRONT_LOCATE_L |
| 14 | NA |
| 15 | GND |
| 16 | GND |
| 17 | NA |
| 18 | +3.3 V AUX |
| 19 | GND |
| 20 | NA |
| 21 | SP_I2C_CLK |
| 22 | POWER_BUTTON_L |
| 23 | SP_I2C_DAT |

TABLE D-10 Front I/O Interconnect Cable Connector Pinouts (Continued)

| Pin Number | Signal Name |
|------------|-----------------|
| 24 | FRONT_IO_INT_L |
| 25 | FR_IO_PRESENT_L |
| 26 | VDD_RTC |

Power Supply Connector

The power supply connector pins and their corresponding descriptions are shown in the figure and table in this section.

**FIGURE D-11** Power Supply Connector**TABLE D-11** Power Supply Connector Pinouts

| Pin Number | Pin Name | Description |
|------------|---------------|---|
| PB RH1 | +12V RET | Main Power Return |
| PB RH2 | +12V RET | Main Power Return |
| PB RH3 | +12V RET | Main Power Return |
| PB RH4 | +12V | +12V Power Output |
| PB RH5 | +12V | +12V Power Output |
| PB RH6 | +12V | +12V Power Output |
| A1 | PS_KILL | Turns off both main and standby outputs |
| A2 | Current Share | Current share signal |
| A3 | Return | Ground |
| A4 | +3.3V SB | +3.3V Standby Output |
| A5 | PS A0 | EEPROM Address Bit 0 Input |

TABLE D-11 Power Supply Connector Pinouts *(Continued)*

| Pin Number | Pin Name | Description |
|------------|--------------|---------------------------------------|
| A6 | +3.3V SB | +3.3V Standby Output |
| B1 | Return | Ground |
| B2 | Fan_Cntl | Analog fan control voltage input |
| B3 | Return | Ground |
| B4 | +3.3V SB | +3.3V Standby Output |
| B5 | SDA | EEPROM Serial Data I/O |
| B6 | -PS_ON | Enable for main supply output |
| C1 | Return | Ground |
| C2 | Tach _1 | Fan tach output (2 pulses per rev) |
| C3 | Return | Ground |
| C4 | +3.3V SB | +3.3V Standby Output |
| C5 | SCL | EEPROM Serial Clock Input |
| C6 | VIN_GOOD | Input voltage above minimum spec |
| D1 | -PS_Present | Present-active low (PU) |
| D2 | NC | No Connect (Tach_2 if two-fan design) |
| D3 | Return | Ground |
| D4 | +3.3V SB | +3.3V Standby Output |
| D5 | S_INT(Alert) | Intrusion switch alert |
| D6 | POK | Output voltages within spec (PU) |

Fan Module Connector

The fan module connectors and their corresponding descriptions are shown in the figure and table in this section.

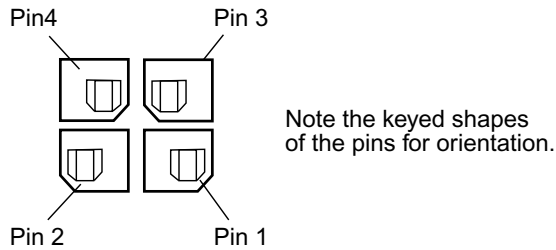


FIGURE D-12 Fan Module Connectors

Note – Fan modules in Netra X4200 M2 servers each contain one 80-mm fan (Fan A). The same connector is used for both types of fan modules, with slightly different assignments to connector pins, as shown in [TABLE D-12](#).

TABLE D-12 Fan Module Connector Pinouts

| Pin Number | Pin Name | Description |
|------------|------------|---|
| 1 | +12V | +12V power to Fan A (and to Fan B in Sun Fire X4100 fan modules) |
| 2 | GND | Ground for Fan A (and for Fan B in Sun Fire X4100 fan modules) |
| 3 | Fan A Tach | Fan A tachometer sensor |
| 4 | Fan B Tach | Fan B tachometer sensor for Sun Fire X4100 fan modules; Presence sensor (tied to Pin 2) for Netra X4200 fan modules |

Serial Attached SCSI BIOS Configuration Utility

This appendix explains how to use the LSI Logic Fusion-MPT Serial Attached SCSI (SAS) BIOS Configuration Utility. This appendix contains the following sections:

- [“Fusion-MPT SAS BIOS Overview” on page 157](#)
- [“Starting the SAS BIOS Configuration Utility” on page 158](#)
- [“Configuration Utility Screens” on page 159](#)
- [“Performing RAID Configuration Tasks” on page 195](#)

Fusion-MPT SAS BIOS Overview

The Fusion-MPT SAS BIOS features include:

- Configuration for up to 256 adapters; any four can be chosen for INT13 (bootrom) support
- Support for Message Passing Technology (MPT)
- Support for LSI53C1064 devices
- Support for SAS devices

Note – At this time, the Netra X4200 M2 servers are shipped with support for the SAS1064 controller only. SATA devices are not supported in these servers at this time.

- Support for Integrated RAID initialization (with proper firmware)

The SAS BIOS is the bootable ROM code that manages SAS hardware resources. It is specific to a family of LSI Logic Fusion-MPT SAS controllers or processors. The Fusion-MPT SAS BIOS integrates with a standard system BIOS, extending the standard disk service routine provided through INT13h.

During the boot time initialization, the SAS BIOS determines whether the system BIOS has already installed other hard disks, such as an IDE drive. If such drives are already installed, the SAS BIOS maps any SAS drives it finds behind these drives. Otherwise, the SAS BIOS installs drives starting with the system boot drive. In this case, the system boots from a drive controlled by the SAS BIOS. The LSI Logic SAS BIOS supports the BIOS Boot Specification (BBS).

Boot Initialization With BIOS Boot Specification (BBS)

The Fusion-MPT SAS BIOS supports the BIOS Boot Specification (BBS), which allows you to choose which device to boot from by selecting the priority.

To use this feature, the system BIOS must also be compatible with the BBS. If the system supports the BBS, you can use the system BIOS Setup menu to select the boot order and drive order. In the system BIOS Setup, the Boot Connection Devices menu lists the available boot options. Use that menu to select the device and rearrange the order. Then exit to continue the boot process.

Starting the SAS BIOS Configuration Utility

If you have SAS BIOS version 6.xx, and it includes the Fusion-MPT SAS BIOS Configuration Utility, you can change the default configuration of the SAS host adapters. You may decide to change these default values if there is a conflict between device settings or if you need to optimize system performance.

The version number of the SAS BIOS appears in a banner displayed on the computer monitor during bootup. If the utility is available, this message also appears during bootup:

```
Press Ctrl+C to start LSI Logic Configuration Utility...
```

This message remains on the screen for about five seconds, giving you time to start the utility. If you press Ctrl+C, the message changes to:

```
Please wait, invoking LSI Logic Configuration Utility...
```

After a brief pause, the computer monitor displays the Main menu of the Fusion-MPT SAS BIOS Configuration Utility. These messages may appear during the boot process:

- Adapter removed from boot order!

This message appears when an adapter has been removed from the system or has been relocated behind a PCI bridge.

- Adapter configuration may have changed, reconfiguration is suggested!

This message appears if none of the information in the NVRAM is valid.

- Updating Adapter List!

This message appears when fewer than four adapters are in the boot order and more adapters exist than are shown.



Caution – The SAS BIOS Configuration Utility is a powerful tool. If, while using it, you disable all of the controllers, press Ctrl+E (or Ctrl+A on versions earlier than 5.00) after memory initialization during reboot to reenable and reconfigure the controllers.

Note – Some devices detected by the Configuration Utility cannot be controlled by the SAS BIOS. Devices such as tape drives and scanners require that a device driver specific to that device be loaded. However, the SAS BIOS Configuration Utility does enable you to modify parameters for these devices.

Configuration Utility Screens

All SAS BIOS Configuration Utility screens are partitioned into the following areas, starting at the top of the screen:

- **Header Area:** This area lists static information text, including the product title and version.
- **Menu Area:** This area lists the current screen title and controller information when on screens other than Adapter List.
- **Main Area:** This is the main area for presenting data. This area has a cursor for item selection, horizontal scrolling, and vertical scrolling. The horizontal and vertical scroll bars appear here if needed.
- **Footer Area:** This area provides general help information text.

Note – The screens shown in this appendix are examples. The version numbers and the screen items shown are subject to change over the life of the product.

User Input Keys

The general key inputs that are listed in [TABLE E-1](#) apply on all screens of the SAS BIOS Configuration Utility.

TABLE E-1 User Input Keys

| Key | Definition | Description |
|------------|----------------|--|
| F1 | Help | Context-sensitive help for the field in which the cursor is positioned. |
| Arrow keys | Move cursor | Up, down, left, right movement to position the cursor. |
| Home/End | Select item | Select the item in which the cursor is positioned. |
| +/- | Change item | Items with values in [] brackets are modifiable. Numeric keypad + and numeric keypad - update a modifiable field to its next relative value. |
| Esc | Abort/Exit | The Esc key aborts the current context operation and/or exits the current screen. The user is asked to confirm, if changes have been made. |
| Enter | Execute <item> | Executable items are indicated by highlighted text and a different background color. Press Enter to execute the item's associated function. Throughout the user interface, selections that are not currently permissible are grayed out. The behavior of executable items varies throughout the Configuration Utility. |

Adapter List Screen

When you start the Fusion-MPT SAS BIOS Configuration Utility, the Adapter List screen appears, as shown in [FIGURE E-1](#). This screen displays a scrolling list of up to 256 LSI Logic SAS host adapters in the system and information about each of them. [TABLE E-2](#) describes the fields in this screen.

Use the arrow keys to select an adapter, then press Enter to view and modify the selected adapter's properties (and to access the other screens). After you select an adapter and press Enter, the adapter's devices are scanned and the Adapter Properties screen appears. See [FIGURE E-3](#).

To change the Adapter boot order, use the -, +, Insert, and Delete keys while on the Boot Order field. Press Insert or Delete to add or remove an adapter to or from the boot order. Press the - and + keys to modify an adapter's position in the boot order. If you make changes to the boot order, the Configuration Utility prompts you to save the changes before you exit the screen.

TABLE E-2 Adapter List Screen Field Descriptions (*Continued*)

| Field | Description |
|--------------|---|
| FW Revision | The Fusion MPT firmware version and type (IR or IT). |
| Status | Status indicates whether an adapter is eligible for LSI Logic software control, or whether it is reserved for control by non-LSI Logic software: <ul style="list-style-type: none">• Enabled: The BIOS is either currently controlling the adapter or will attempt to control the adapter upon reload.• Disabled: The BIOS is either not controlling the adapter or will discontinue control of the adapter upon reload. Whether Enabled or Disabled, the user can still view and modify settings for the adapter. The Boot Support setting in the Adapter Properties menu can be used to change the status of this setting. The BIOS must be reloaded (the system must be rebooted) in order for a new Boot Support setting to take effect.• Error: The BIOS encountered a problem with the adapter. Adapter settings can be viewed and modified, but the available information and functionality may be limited. |
| Boot Order | The order in which adapters will boot when the system has more than one adapter. Up to four of the total adapters in a system may be selected as bootable. To add an adapter to the boot list, press Insert while on the Boot Order field. To remove an adapter from the boot list, press Delete while on the desired adapter's Boot Order field. Press the - or + keys to change the adapter's position in the boot order. |

Global Properties Screen

To access the Global Properties screen, press Alt+N while on the Adapter List screen. To return to the Adapter List from Global Properties, press Alt+N again. [FIGURE E-2](#) shows an example of the Global Properties screen. [TABLE E-3](#) describes the fields in this screen.

```
*****
* Adapter List  Global Properties                                     *
*                                                         *
*                                                         *
*      Pause When Boot Alert Displayed  [No]                   *
*      Boot Information Display Mode     [Display adapters & installed devices] *
*      Support Interrupt                  [Hook interrupt, the Default]      *
*                                                         *
*      Restore Defaults                                                         *
*                                                         *
*                                                         *
*                                                         *
* Esc = Exit Menu           F1/Shift+1 = Help                   *
* Alt+N = Adapter List                                           *
*****
```

FIGURE E-2 Global Properties Screen

TABLE E-3 Global Properties Screen Field Descriptions

| Field | Description |
|---------------------------------|---|
| Pause When Boot Alert Displayed | This option specifies whether the BIOS pauses for user acknowledgement after displaying an alert message during boot. To continue after displaying a message, select No. To wait for the user to press a key, select Yes. |
| Boot Information Display Mode | This option controls how much information the BIOS displays about adapters and devices during boot. Possible values are: <ul style="list-style-type: none"> • Display adapters only • Display adapters and all devices • Display minimal information • Display adapters & installed devices |
| Support Interrupt | This option allows you to prevent a hook on INT40, if required. Possible values are: <ul style="list-style-type: none"> • Hook interrupt (default) • Bypass interrupt hooks |
| Restore Defaults | Press Enter to restore the default settings. |

Adapter Properties Screen

The Adapter Properties screen allows you to view and modify adapter settings. It also provides access to all other screens. [FIGURE E-3](#) shows an example of the Adapter Properties screen. [TABLE E-4](#) describes the fields of the screen.

```
*****
* LSI Logic MPT Setup Utility  v6.02.00.00 (2005.07.08)
* Adapter Properties -- SAS1064
*
* Adapter SAS1064
* PCI Slot 00
* PCI Address(Bus/Dev/Func) 02:03:00
* MPT Firmware Revision 1.04.00.00-IR
* SAS Address 50003BA0:000003BA
* Status Enabled
* Boot Order 0
* Boot Support [Enabled BIOS & OS]
*
* RAID Properties
*
* SAS Topology
*
* Advanced Adapter Properties
*
*
* Esc = Exit Menu F1/Shift+1 = Help
* Enter = Select Item -/+ = Change Item
*****
```

FIGURE E-3 Adapter Properties Screen

TABLE E-4 Adapter Properties Screen Field Descriptions

| Field | Description |
|-------------|--|
| Adapter | The specific LSI Logic SAS controller type. |
| PCI Slot | The PCI slot in which the controller is located. |
| PCI Address | The PCI address assigned to the adapter by the system BIOS. Bus value has range 0x00 - 0xFF, 0 - 255 decimal. Device value has range 0x00 - 0x1F, 0 - 31 decimal. Function has range 0x00 - 0x7, 0 - 7 decimal. |

TABLE E-4 Adapter Properties Screen Field Descriptions (Continued)

| Field | Description |
|-----------------------------|--|
| MPT Firmware Revision | The Fusion MPT firmware version and type (IR or IT). |
| SAS Address | The SAS Address assigned to this adapter. |
| Status | <p>Indicates whether an adapter is eligible for LSI Logic software control, or whether it is reserved for control by non-LSI Logic software:</p> <ul style="list-style-type: none"> • Enabled: The BIOS is either currently controlling the adapter or will attempt to control the adapter upon reload. • Disabled: The BIOS is either not controlling the adapter or will discontinue control of the adapter upon reload. Whether Enabled or Disabled, the user can still view and modify settings for the adapter. The Boot Support setting in the Adapter Properties menu can be used to change the status of this setting. The BIOS must be reloaded (the system must be rebooted) in order for a new Boot Support setting to take effect. • Error: The BIOS encountered a problem with the adapter. Adapter settings can be viewed and modified, but the available information and functionality may be limited. |
| Boot Order | The order in which adapters will boot when the system has more than one adapter. Up to four of the total adapters in a system may be selected as bootable. |
| Boot Support | <p>Indicates whether an adapter is eligible for LSI Logic software control or whether it is reserved for control by non-LSI Logic software. The options are:</p> <ul style="list-style-type: none"> • Enabled BIOS & OS (default): Both the BIOS and OS driver will control the adapter. • Enabled BIOS Only: The BIOS will control the adapter; OS drivers will not control it. Some OS drivers do not support this setting. For example, there is no way to disable an adapter in a Windows driver. • Enabled OS Only: The BIOS will not control the adapter; the OS driver will control the adapter. • Disabled: The BIOS will not control the adapter when loaded. However, the adapter will still be visible through the Configuration Protocol. <p>Changes to this setting are reflected in the Status field on the main Adapter List menu. The new setting does not take effect until the BIOS is reloaded (that is, until the system is rebooted).</p> |
| RAID Properties | Press Enter on this field to access this screen. |
| SAS Topology | Press Enter on this field to access this screen. |
| Advanced Adapter Properties | Press Enter on this field to access this screen. |

SAS Topology Screen

The SAS Topology screen presents a view of the adapter's SAS hierarchy, as shown in [FIGURE E-4](#). You can scroll right to view additional information about the devices (see [FIGURE E-5](#) through [FIGURE E-8](#).) Descriptions of the fields are given in [TABLE E-5](#).

The SAS Topology screen shows the following objects and their significant properties:

- Adapter
- PHYs
- Attached Devices
- Expanders/Enclosures

```
*****
* LSI Logic MPT Setup Utility v6.02.00.00 (2005.07.08) *
* SAS Topology -- SAS1064 *
*
*          Device Identifier          Discovery   Device *
* SAS1064(02:03:00)                  Status     Info      *
* * PHY 0                             Good *
* * PHY 1                             Good *
* * PHY 2          SEAGATE ST936701LSUN36G 0456  Good   SAS *
* * PHY 3          SEAGATE ST973401LSUN72G 0356  Good   SAS *
*
*
*
*
* Esc=Exit  F1=Help  Alt+M=More Keys *
* Alt+D=Device Properties  Alt+E=Expander Properties *
*****
```

FIGURE E-4 SAS Topology Screen

To expand the SAS Topology display, select an expander or enclosure and press Enter to display all its PHYs/devices/bays. To collapse the display, press Enter again.

While the cursor is on the Device Identifier you can perform these actions:

- Press Alt+E to access a specific Expander Properties screen or press Alt+D to access a specific Device Properties screen.
- Press Enter while on an expander or enclosure to expand or collapse the display.
- Press Enter while on a device to activate the Locate LED.

At any time while on the screen press C to clear Device Mappings for non-present devices. Scroll the cursor to the right to display further information (see [FIGURE E-5](#) through [FIGURE E-8](#)).

```
*****
* SAS Topology -- SAS1064                                     *
*                               Device Identifier             Negotiated Link           *
* SAS1064(02:03:00)                                           Speed (Gbps)                *
* * PHY 0                                                       Unknown                       *
* * PHY 1                                                       Unknown                       *
* * PHY 2                SEAGATE ST936701LSUN36G 0456        3.0                          *
* * PHY 3                SEAGATE ST973401LSUN72G 0356        3.0                          *
*                                                                 *
*                                                                 *
* Esc=Exit  F1=Help  Alt+M=More Keys                          *
* Alt+D=Device Properties  Alt+E=Expander Properties         *
*****
```

FIGURE E-5 SAS Topology Screen 2, Negotiated Link Speed

```

*****
* SAS Topology -- SAS1064
*
* Device Identifier Maximum Link
* SAS1064(02:03:00) Speed(Gbps)
* * PHY 0 3.0
* * PHY 1 3.0
* * PHY 2 SEAGATE ST936701LSUN36G 0456 3.0
* * PHY 3 SEAGATE ST973401LSUN72G 0356 3.0
*
*
* Esc=Exit F1=Help Alt+M=More Keys
* Alt+D=Device Properties Alt+E=Expander Properties
*****

```

FIGURE E-6 SAS Topology Screen 3, Maximum Link Speed

```

*****
* SAS Topology -- SAS1064
*
* Device Identifier Target
* SAS1064(02:03:00) Capabilities
* * PHY 0
* * PHY 1
* * PHY 2 SEAGATE ST936701LSUN36G 0456 SSP
* * PHY 3 SEAGATE ST973401LSUN72G 0356 SSP
*
*
* Esc=Exit F1=Help Alt+M=More Keys
* Alt+D=Device Properties Alt+E=Expander Properties
*****

```

FIGURE E-7 SAS Topology Screen 4, Target Capabilities

```

*****
* SAS Topology -- SAS1064
*
* Device Identifier Initiator
* SAS1064(02:03:00) Capabilities
* * PHY 0
* * PHY 1
* * PHY 2 SEAGATE ST936701LSUN36G 0456
* * PHY 3 SEAGATE ST973401LSUN72G 0356
*
*
* Esc=Exit F1=Help Alt+M=More Keys
* Alt+D=Device Properties Alt+E=Expander Properties
*****

```

FIGURE E-8 SAS Topology Screen 5, Initiator Capabilities

TABLE E-5 SAS Topology Screens Field Descriptions

| Field | Description |
|------------------------|---|
| Device Identifier | The ASCII device identifier string extracted from the device's inquiry data. |
| Discovery Status | The status of SAS topology discovery on this directly attached PHY or on an expander. This field is only an indicator of an error being encountered. For specific details and the error value, see the Expander Properties page for expanders and the PHY Properties page for directly attached PHYs. |
| Device Info | Indicates whether a device is SAS or SATA, and whether the device has been selected as the boot device. |
| Negotiated Link Speed | The negotiated link speed for this PHY, in Gbits/s. This field also indicates whether the PHY has been disabled. |
| Maximum Link Speed | The maximum hardware link rate possible for this PHY, in Gbits/s. |
| Target Capabilities | The target capabilities for this device. The following acronyms are used: <ul style="list-style-type: none"> • SSP - Serial SCSI Protocol • SMP - Serial Management Protocol |
| Initiator Capabilities | The initiator capabilities for this device. The following acronyms are used: <ul style="list-style-type: none"> • SSP - Serial SCSI Protocol • SMP - Serial Management Protocol |

Device Properties Screen

The Device Properties screen displays information about a specific device, as shown in [FIGURE E-9](#). To access this screen, press Alt+D on the SAS Topology screen when the cursor is on the Device Identifier field of a device.

Press Alt+N or Alt+P at any time while on this screen to cycle to the next or previous device.

```
*****
* LSI Logic MPT Setup Utility v6.02.00.00 (2005.07.08) *
* Device Properties -- SAS1064 *
* *
* *
```

```

*          Device Identifier  SEAGATE ST936701LSUN36G 0456          *
*          Scan Order        2                                  *
*          Device Information SAS                               *
*          SAS Address        5000C500:001047C9                 *
*          Serial Number      39000SZC             3LC         *
*                                                                    *
*          Verify                                                    *
*                                                                    *
*                                                                    *
*                                                                    *
*                                                                    *
*                                                                    *
*                                                                    *
*                                                                    *
*                                                                    *
*                                                                    *
*                                                                    *
*                                                                    *
*                                                                    *
* Esc=Exit   F1=Help   Alt+M=More Keys                          *
* Alt+N = Next Device   Alt+P = Previous Device   Enter = Select Item *
*****

```

FIGURE E-9 Device Properties Screen

TABLE E-6 Device Properties Screen Field Descriptions

| Field | Description |
|--------------------|---|
| Device Identifier | The ASCII device identifier string extracted from the device's inquiry data. |
| Scan Order | The scan order for this device. This is the equivalent of a SCSI ID in parallel SCSI. |
| Device Information | Indicates whether the device is SAS or SATA. |
| SAS Address | The SAS address of this device. |
| Serial Number | The serial number of this device. |
| Verify | Press Enter to access the Verify All Sectors screen. From this screen you can start a verification of all sectors on the device (see "Device Verify Screen" on page 172). If needed, you can reassign defective Logical Block Addresses (LBAs), as described in the text following TABLE E-7 . |

Device Verify Screen

To access the Device Verify screen, press Enter on the appropriate field on the Device Properties screen. This screen includes an Elapsed Time and status bar, which begins incrementing when the operation is started and which shows the current progress of the operation.

When the Device Verify screen appears (see [FIGURE E-10](#)), press Enter to begin the verification process. You can press Esc at any time to cancel the verification process. [TABLE E-7](#) describes the fields of the screen.

```

*****
* Device Verify -- SAS1064
*
* Device Identifier SEAGATE ST936701LSUN36G 0456
* SAS Address      5000C500:001047C9
* Serial Number    39000SZC          3LC
*
* All sectors on the device will be verified.
* Press Enter to continue or any other key to cancel.
*
*
* Elapsed Time:      00:00:00
*
* Percent
* Complete          0%                               100%
*
* *****
* *
* *****
*
* Esc=Exit  F1=Help  Alt+M=More Keys
*****

```

FIGURE E-10 Device Verify Screen

TABLE E-7 Device Verify Screen Field Descriptions

| Field | Description |
|-------------------|--|
| Device Identifier | The ASCII device identifier string extracted from the device's inquiry data. |
| SAS Address | The SAS address of this device. |

TABLE E-7 Device Verify Screen Field Descriptions (*Continued*)

| Field | Description |
|------------------|---|
| Serial Number | The serial number of this device. |
| Elapsed Time | The total time elapsed since the Format or Verify operation started. |
| Percent Complete | Graphical status bar that shows the current completion status of the operation. |

If the Logical Block Addresses (LBAs) can be reassigned, or need to be reassigned, the following prompt appears:

```
Reassign the block?
(Yes, No, All, nonE, Cancel)
```

The reassignment options are as follows:

- **Yes:** Reassign only this block. If another block needs to be reassigned in the future, display the prompt again.
- **No:** Do not reassign this block. If another block needs to be reassigned in the future, display the prompt again.
- **All:** Reassign the current block, and automatically reassign other blocks that need it, without displaying the prompt again.
- **None:** Do not reassign the current block, and do not automatically reassign any other blocks that need it. Do not display the prompt again.
- **Cancel:** Do not reassign anything, and stop the verification process.

Advanced Adapter Properties Screen

The Advanced Adapter Properties screen (see [FIGURE E-11](#)) allows you to view and modify infrequently accessed adapter settings. [TABLE E-8](#) describes the fields of the screen.

The Advanced Adapter Properties screen provides access to advanced Device Properties and PHY Properties. To modify the Link Error Settings Threshold Count and Threshold Time, press Enter while the cursor is on the desired field and type the new value.

```
*****
* LSI Logic MPT Setup Utility v6.02.00.00 (2005.07.08) *
* Advanced Adapter Properties -- SAS1064 *
* *
* IRQ 0B *
* NVM Yes *
* IO Port Address A800 *
* Chip Revision ID 02 *
```

```

*
*      Spinup Delay (Secs)          [ 2]
*      CHS Mapping                  [SCSI Plug and Play Mapping]
*
*      Link Error                   Threshold  Threshold
*      Settings                     Count      Time (Secs)
*      Invalid DWORDs                0         0
*      Loss of DWORD Sync            0         0
*      Running Disparity Errors      0         0
*      PHY Reset Errors              0         0
*
*      Advanced Device Properties
*      PHY Properties
*      Restore Defaults
*
* Esc = Exit Menu      F1/Shift+1 = Help
* Enter = Select Item  -/+ = Change Item
*****

```

FIGURE E-11 Advanced Adapter Properties Screen

TABLE E-8 Advanced Adapter Properties Screen Field Descriptions

| Field | Description |
|------------------|--|
| IRQ | The Interrupt Request Line used by the adapter. The system BIOS assigns this value. |
| NVM | Indicates whether an adapter has nonvolatile memory (NVM) associated with it. An adapter's configuration is stored in its associated NVM. |
| IO Port Address | The I/O Port Address used to communicate with the adapter. The system BIOS assigns this number. |
| Chip Revision ID | The Revision ID of this adapter. |
| Spinup Delay | The number of seconds to wait between spinups of devices attached to this adapter. Staggered spinups balance the total electrical current load on the system during boot. The default value is 2 seconds, with choices between 1 and 10 seconds. |

TABLE E-8 Advanced Adapter Properties Screen Field Descriptions (*Continued*)

| Field | Description |
|----------------------------|--|
| CHS Mapping | <p>Defines how the Cylinder Head Sector values are mapped onto a disk without pre-existing partition information. CHS Mapping allows two settings:</p> <ul style="list-style-type: none">• SCSI Plug and Play Mapping (default) automatically determines the most efficient and compatible mapping.• Alternate CHS Mapping utilizes an alternate, possibly less efficient, mapping that may be required if a device is moved between adapters from different vendors. <p>Note: Neither of these options has any effect after a disk has been partitioned using the FDISK command. To change the CHS Mapping on a partitioned disk, use the FDISK command to delete all partitions. Then reboot the system to clear memory. Otherwise, the old partitioning data will be reused.</p> |
| Link Error Settings | <ul style="list-style-type: none">• Invalid DWORDs: The number of invalid dwords that have been received, outside of PHY reset sequences, since the last PHY Link Error Reset.• Loss of DWORD Sync: The number of times, since the last PHY Link Error Reset, that DWORD synchronization was lost and the link reset sequence occurred.• Running Disparity Errors: The number of DWORDS with running disparity errors that have been received, outside of PHY reset sequences, since the last PHY Link Error Reset.• PHY Reset Errors: The number of times the PHY reset sequence has failed, since the last PHY Link Error Reset. |
| Threshold Count | <p>Link error count threshold values. When a Link Error Count exceeds a Threshold Count within the Threshold Time (secs) the Fusion-MPT FW may reduce the link rate. Press Enter on any of these fields to modify the value.</p> |
| Threshold Time (secs) | <p>Time, in seconds, over which to apply the Threshold Count. When a Link Error Count exceeds a Threshold Count within the Threshold Time (secs) the Fusion-MPT FW may reduce the link rate. Press Enter on any of these fields to modify the value.</p> |
| Advanced Device Properties | <p>Press Enter to view and modify Advanced Device Properties (see “Advanced Device Properties Screen” on page 176).</p> |
| PHY Properties | <p>Press Enter to view and modify PHY properties (see “PHY Properties Screen” on page 179).</p> |
| Restore Defaults | <p>Press Enter to restore the default values for all items on this screen.</p> |

Advanced Device Properties Screen

The Advanced Device Properties screen (FIGURE E-12) allows you to view and modify infrequently accessed device settings. TABLE E-9 describes the fields of the screen.

```
*****
* LSI Logic MPT Setup Utility  v6.02.00.00 (2005.07.08) *
* Advanced Device Properties -- SAS1064 *
* *
* Maximum INT 13 devices for this adapter 24 *
* Maximum Target device spinups 1 *
* *
* IO Timeout for Block Devices 10 *
* IO Timeout for Block Devices(Removable) 10 *
* IO Timeout for Sequential Devices 10 *
* IO Timeout for Other devices 10 *
* *
* LUNs to Scan for Block Devices [All] *
* LUNs to Scan for Block Devices(Removable) [All] *
* LUNs to Scan for Sequential Devices [All] *
* LUNs to Scan for Other Devices [All] *
* *
* Removable Media support [None] *
* *
* Restore Defaults *
* *
* Esc = Exit Menu F1/Shift+1 = Help *
* Enter = Select Item -/+ = Change Item *
*****
```

FIGURE E-12 Advanced Device Properties Screen

TABLE E-9 Advanced Device Properties Screen Field Descriptions

| Field | Description |
|--|---|
| Maximum INT 13 devices for this adapter | The maximum number of devices attached to the adapter for which to install a pre-OS I/O interface. The specified number of devices in the adapter's device scan order list will have an I/O interface installed. (An installed I/O interface is defined as INT 13H.) X86 platforms allow a maximum of 24 INT 13h devices per system. Therefore, fewer than the specified number of INT 13h devices may be installed. The default for X86 is 24 devices, with a range of 0-24 allowed. |
| Maximum target device spinups | The maximum number of targets that can simultaneously spin up. The IOC must delay by the time indicated in the spin-up delay field before it starts spin-up of the next set of targets. A value of 0 in this field is treated the same as a value of 1. |
| IO Timeout for Block Devices | The time, in seconds, (0-999, 0 = no timeout) that the host uses to timeout I/Os for the following devices with nonremovable media: <ul style="list-style-type: none"> • SCSI Device Type 00h - Direct Access • SCSI Device Type 04h - Write Once • SCSI Device Type 07h - Optical • SCSI Device Type 0Eh - Simplified Direct Access |
| IO Timeout for Block Devices (Removable) | The time, in seconds, (0-999, 0 = no timeout) that the host uses to timeout I/Os for the following devices with removable media: <ul style="list-style-type: none"> • SCSI Device Type 00h - Direct Access • SCSI Device Type 04h - Write Once • SCSI Device Type 05h - CD-ROM • SCSI Device Type 07h - Optical • SCSI Device Type 0Eh - Simplified Direct Access |
| IO Timeout for Sequential Devices | The time, in seconds, (0-999, 0 = no timeout) that the host uses to timeout I/Os for the following devices: <ul style="list-style-type: none"> • SCSI Device Type 01h - Sequential Access |
| IO Timeout for Other Devices | The time, in seconds, (0-999, 0 = no timeout) that the host uses to timeout I/Os for devices other than the following: <ul style="list-style-type: none"> • SCSI Device Type 00h - Direct Access • SCSI Device Type 01h - Sequential Access • SCSI Device Type 04h - Write Once • SCSI Device Type 05h - CD-ROM • SCSI Device Type 07h - Optical • SCSI Device Type 0Eh - Simplified Direct Access |

TABLE E-9 Advanced Device Properties Screen Field Descriptions (*Continued*)

| Field | Description |
|--|---|
| LUNs to Scan for Block Devices | Controls LUN scans for the following devices with nonremovable media: <ul style="list-style-type: none">• SCSI Device Type 00h - Direct Access• SCSI Device Type 04h - Write Once• SCSI Device Type 07h - Optical• SCSI Device Type 0Eh - Simplified Direct Access LUN 0 Only: Scan only LUN 0. All: Scan all LUNs. |
| LUNs to Scan for Block Devices (Removable) | Controls LUN scans for the following devices with removable media: <ul style="list-style-type: none">• SCSI Device Type 00h - Direct Access• SCSI Device Type 04h - Write Once• SCSI Device Type 05h - CD-ROM• SCSI Device Type 07h - Optical• SCSI Device Type 0Eh - Simplified Direct Access. LUN 0 Only: Scan only LUN 0. All: Scan all LUNs. |
| LUNs to Scan for Sequential Devices | Controls LUN scans for the following device: <ul style="list-style-type: none">• SCSI Device Type 01h - Sequential Access LUN 0 Only: Scan only LUN 0. All: Scan all LUNs. |

TABLE E-9 Advanced Device Properties Screen Field Descriptions (Continued)

| Field | Description |
|--------------------------------|---|
| LUNs to Scan for Other Devices | Controls LUN scans for all devices other than the following: <ul style="list-style-type: none">• SCSI Device Type 00h - Direct Access• SCSI Device Type 01h - Sequential Access• SCSI Device Type 04h - Write Once• SCSI Device Type 05h - CD-ROM• SCSI Device Type 07h - Optical• SCSI Device Type 0Eh - Simplified Direct Access LUN 0 Only: Scan only LUN 0. All: Scan all LUNs. |
| Removable Media Support | <ul style="list-style-type: none">• None: Install no INT 13H interface for any Direct Access removable media devices.• Boot Device Only: Install INT 13H interface for a Direct Access removable media device if, and only if, media is present in the device at the time of BIOS initialization and either:<ul style="list-style-type: none">• BBS System: The device is selected as the boot device. (Refer to the BIOS Boot Specification for a description of BBS.)• Non-BBS System: The device is set up as the boot device. The adapter to which the device is connected is specified as the first adapter (i.e., 0) in the Boot Adapter List. The device is specified as the first device in the adapter's device scan order list.• With Media Installed: Install INT 13H interfaces for Direct Access Removable Media devices if media is present in the device at the time of BIOS initialization. |
| Restore Defaults | Press Enter to restore the default values for all items on this screen. |

PHY Properties Screen

The PHY Properties screen ([FIGURE E-13](#)) allows you to view and modify PHY-specific settings. [TABLE E-10](#) describes the fields of the screen.

Note – The Link Error Settings values on this screen only display the current values for this PHY and cannot be modified. To modify the Threshold values, return to the Advanced Adapter Properties screen.

```

*****
* LSI Logic MPT Setup Utility  v6.02.00.00 (2005.07.08)          *
* PHY Properties -- SAS1064                                       *
*                                                                    *
*      PHY                2 (3rd of 4 PHYs)                       *
*      SAS Port           2                                         *
*      Link Status        Enabled, 3.0 Gbps                         *
*      Discovery Status    00000000                                 *
*                                                                    *
*      Device Identifier   FUJITSU MAV2073RCSUN72G 0301           *
*      Scan Order          2                                         *
*      Device Information   SAS                                     *
*      SAS Address         500000E0:10D26642                       *
*                                                                    *
*      Link Error          Link Error  Threshold  Threshold      *
*      Settings           Count        Count      Time (Secs)     *
*      Invalid DWORDS     0             0          0                *
*      Loss of DWORD Sync  0             0          0                *
*      Running Disparity  0             0          0                *
*      PHY Reset Errors   0             0          0                *
*      Reset Link Error   0             0          0                *
*      Counts                                                     *
*                                                                    *
* Esc = Exit Menu          F1/Shift+1 = Help                       *
* Enter = Reset Phy error logs  Alt+N = Next Phy  Alt+P = Previous Phy *
*****

```

FIGURE E-13 PHY Properties Screen

TABLE E-10 PHY Properties Screen Field Descriptions

| Field | Description |
|-------------|---|
| PHY | The PHY number for which this information applies. |
| SAS Port | The associated SAS Port (0 to N), as configured on this adapter. |
| Link Status | The PHY link status. Possible values are: <ul style="list-style-type: none"> • Enabled, Unknown Link Rate • PHY Disabled • Enabled, negotiation failed • Enabled, 1.5 Gbps • Enabled, 3.0 Gbps |

TABLE E-10 PHY Properties Screen Field Descriptions (*Continued*)

| Field | Description |
|---------------------|---|
| Discovery Status | A 32-bit hexadecimal value indicating the discovery status for the PHY or expander. Currently defined values are: <ul style="list-style-type: none">• Discovery Completed Successfully 0x00000000• Loop Detected 0x00000001• Unaddressable Device Exists 0x00000002• Multiple Ports 0x00000004• Expander Error 0x00000008• SMP Timeout 0x00000010• Out of Route Entries 0x00000020• SMP Response Index Does Not Exist 0x00000040• SMP Response Function Failed 0x00000080• SMP CRC Error 0x00000100 |
| Device Identifier | The ASCII device identifier string extracted from the device's inquiry data. |
| Scan Order | The scan order for this device. This is the equivalent of a SCSI ID for parallel SCSI. |
| Device Information | Indicates whether a device is SAS or SATA. |
| SAS Address | The SAS address of this device. |
| Link Error Settings | <ul style="list-style-type: none">• Invalid DWORDs: The number of invalid DWORDs that have been received, outside of PHY reset sequences, since the last PHY Link Error Reset. The count stops when it reaches the maximum value.• Loss of DWORD Sync: The number of times, since the last PHY Link Error Reset, that DWORD synchronization was lost and the link reset sequence occurred. The count stops when it reaches the maximum value.• Running Disparity Errors: The number of DWORDs with running disparity errors that have been received, outside of PHY reset sequences, since the last PHY Link Error Reset. The count stops when it reaches the maximum value.• PHY Reset Errors: The number of times the PHY reset sequence has failed, since the last PHY Link Error Reset. The count stops when it reaches the maximum value. |
| Link Error Count | Actual link error count values since the last PHY Link Error Reset. The counts stop when they reach their maximum value. |

TABLE E-10 PHY Properties Screen Field Descriptions (*Continued*)

| Field | Description |
|-------------------------|--|
| Threshold Count | Link error count threshold values. When a Link Error Count exceeds a Threshold Count within the Threshold Time (secs), the Fusion-MPT FW may reduce the link rate. |
| Threshold Time (secs) | Time, in seconds, over which to apply Threshold Count. When a Link Error Count exceeds a Threshold Count within the Threshold Time (secs), the Fusion-MPT FW may reduce the link rate. |
| Reset Link Error Counts | Press Enter to reset the Link Error Counts for this PHY or all PHYs. This operation issues a PHY Link Error Reset - SAS IO Unit Control Request Message. Note: When you press Enter, the following prompt appears: Are you sure you want to reset Phy error counts? Reset error counts for this Phy only Reset error counts for all Phys Cancel |

Integrated RAID Configuration and Management Screens

Integrated RAID configuration and management involves many screens, all of which are accessed by selecting RAID Properties on the Adapter Properties screen (see [FIGURE E-3](#)).

- If no RAID volumes are currently configured, you are asked to create a RAID volume.
- If at least one RAID volume is currently configured, you are shown the current volume(s) for management purposes.

The screens in the RAID configuration and management area are:

- Select New Array Type
- Create New Array
- View Array
- Manage Array

Select New Array Type Screen

Select the type of array to create, as shown in [FIGURE E-14](#).

The two new array type options are described in the text that appears on the screen. No further explanation is needed.

TABLE E-11 Create New Array Screen Field Descriptions (*Continued*)

| Field | Description |
|--------------|--|
| RAID Disk | <p>Specifies whether the disk is part of a RAID array (Yes or No). This field is grayed out under the following conditions:</p> <ul style="list-style-type: none">• The disk does not meet the minimum requirements for use in a RAID array.• The disk is not large enough to mirror existing data on the primary drive.• This disk has been selected as the Hot Spare for the RAID array. |
| Hot Spr | <p>Specifies whether the disk is the Hot Spare for a RAID array (Yes or No). RAID arrays are not required to have a Hot Spare. Only one Hot Spare per RAID array is permitted. You can define a Hot Spare when you create an array or at any time after creation, if the array is made up of two disks or fewer. This field is grayed out under the following conditions:</p> <ul style="list-style-type: none">• The disk does not meet the minimum requirements for use in a RAID array.• The array already has a Hot Spare.• The array is made up of the maximum number of disks (three).• The disk is not large enough to mirror existing data on the primary disk.• Integrated Striping firmware is used. (Striped arrays do not support Hot Spares.) |

TABLE E-11 Create New Array Screen Field Descriptions (*Continued*)

| Field | Description |
|--------------|---|
| Drive Status | <ul style="list-style-type: none">• Ok: Disk is online and fully functional.• Missing: Disk is not responding.• Failed: Disk has failed.• Initing: Disk is initializing.• CfgOffln: Disk is offline at host's request.• UserFail: Disk is marked failed at host's request.• Offline: Disk is offline for some other reason.• Inactive: Disk has been set inactive.• Not Syncd: Data on disk is not synchronized with the rest of the array.• Primary: Disk is the primary disk for a two-disk mirror and is operating properly.• Secondary: Disk is the secondary disk for a two-disk mirror and is operating properly.• Wrg Type: Device is not compatible for use as part of a RAID array.• Too Small: Disk is too small to mirror existing data.• Max Dsks: Maximum number of disks allowed for this type of array is reached, or Maximum number of total IR disks on a controller is reached.• No SMART: Disk does not support SMART, cannot be used in an array.• Wrg Intfc: Device interface (SAS) differs from existing IR disks. |
| Pred Fail | Indicates whether SMART is predicting device failure (Yes or No). |
| Size(MB) | <p>The size of the device, in Mbytes (1 Mbyte = (1024 x 1024) = 1,048,576 bytes). If the device is part of a two-disk array, this field reflects the size of the array, not the size of the individual disk. If the device is part of an array of three or more disks, this field is the size that the disk makes up within the array.</p> <p>Note: When creating a striped array, the usable size of the array is determined by the number of drives, multiplied by the size of the smallest drive in the array. In arrays consisting of different sized drives, excess space on larger drives is unusable.</p> |

View Array Screen

The View Array screen allows you to view the current array configuration, as shown in [FIGURE E-16](#). Press Alt+N to view the next array. Press C to create a new array. [TABLE E-12](#) describes the fields of the screen.

```
*****
* LSI Logic MPT Setup Utility v6.02.00.00 (2005.07.08) *
* View Array -- SAS1064 *
* Array 1 of 1 *
* Identifier LSILOGICLogical Volume 3000 *
* Type IM *
* Scan Order 2 *
* Size(MB) 69618 *
* Status Optimal *
* *
* Manage Array *
* *
* Scan Device Identifier RAID Hot Drive Pred Size *
* ID Disk Spr Status Fail (MB) *
* 3 FUJITSU MAV2073RCSUN72G 0301 Yes No Secondary No 69618 *
* 4 FUJITSU MAV2073RCSUN72G 0301 Yes No Primary No 69618 *
* *
* *
* *
* *
* *
* *
* Esc = Exit Menu F1/Shift+1 = Help *
* Enter=Select Item Alt+N=Next Array C=Create an array *
*****
```

FIGURE E-16 View Array Screen

TABLE E-12 View Array Screen Field Descriptions

| Field | Description |
|------------|------------------------------|
| Array | The number of the array. |
| Identifier | The identifier of the array. |
| Type | The RAID type of the array. |
| Scan Order | The scan order of the array. |
| Size(MB) | The size of the array. |
| Status | The status of the array. |

TABLE E-12 View Array Screen Field Descriptions (*Continued*)

| Field | Description |
|-------------------|---|
| Scan ID | The order in which devices are scanned. |
| Device Identifier | The ASCII device identifier string extracted from the device's inquiry data. |
| RAID Disk | Specifies whether the disk is part of a RAID array (Yes or No). This field is grayed out under the following conditions: <ul style="list-style-type: none">• The disk does not meet the minimum requirements for use in a RAID array.• The disk is not large enough to mirror existing data on the primary drive.• This disk has been selected as the Hot Spare for the RAID array. |
| Hot Spr | Specifies whether the disk is the Hot Spare for a RAID array (Yes or No). RAID Arrays are not required to have a Hot Spare. Only one Hot Spare per RAID array is permitted. You can define a Hot Spare when you create an array or at any time after creation, if the array is made up of two disks or fewer. This field is grayed out under the following conditions: <ul style="list-style-type: none">• The disk does not meet the minimum requirements for use in a RAID array.• The array already has a Hot Spare.• The array is made up of the maximum number of disks (three).• The disk is not large enough to mirror existing data on the primary disk.• Integrated Striping firmware is used. (Striped arrays do not support Hot Spares.) |

TABLE E-12 View Array Screen Field Descriptions (*Continued*)

| Field | Description |
|--------------|--|
| Drive Status | <ul style="list-style-type: none"> • Ok: Disk is online and fully functional. • Missing: Disk is not responding. • Failed: Disk has failed. • Initing: Disk is initializing. • CfgOffln: Disk is offline at host's request. • UserFail: Disk is marked failed at host's request. • Offline: Disk is offline for some other reason. • Inactive: Disk has been set inactive. • Not Syncd: Data on disk is not synchronized with the rest of the array. • Primary: Disk is the primary disk for a two-disk mirror and is operating properly. • Secondary: Disk is the secondary disk for a two-disk mirror and is operating properly. • Wrg Type: Device is not compatible for use as part of a RAID array. • Too Small: Disk is too small to mirror existing data. • Max Dsk: Maximum number of disks allowed for this type of array. reached, or Maximum number of total IR disks on a controller reached. • No SMART: Disk does not support SMART, cannot be used in an array. • Wrg Intfc: Device interface (SAS) differs from existing IR disks. |
| Pred Fail | Indicates whether SMART is predicting device failure (Yes or No). |
| Size(MB) | <p>The size of the device, in Mbytes (1 Mbyte = (1024 x 1024) = 1,048,576 bytes). If the device is part of a two-disk array, this field reflects the size of the array, not the size of the individual disk. If the device is part of an array of three or more disks, this field is the size that the disk makes up within the array.</p> <p>Note: When creating a striped array, the usable size of the array is determined by the number of drives, multiplied by the size of the smallest drive in the array. In arrays consisting of different sized drives, excess space on larger drives is unusable.</p> |

Manage Array Screen

The Manage Array screen is used to manage the current array, as shown in [FIGURE E-17](#). [TABLE E-13](#) describes the fields of the screen.

If you select Manage Hot Spare, the utility displays a hot spare management screen that has the same layout as the Create New Array screen.

If you select Synchronize Array, Activate Array, or Delete Array, you are prompted to confirm the choice by pressing Y for yes or N for no.

```

*****
* LSI Logic MPT Setup Utility  v6.02.00.00 (2005.07.08)          *
* Manage Array -- SAS1064                                         *
*                                                                    *
*   Identifier              LSILOGICLogical Volume  3000         *
*   Type                    IM                          *
*   Scan Order              2                                *
*   Size(MB)                69618                          *
*   Status                   Optimal                       *
*                                                                    *
*   Manage Hot Spare                                               *
*                                                                    *
*   Synchronize Array                                             *
*                                                                    *
*   Activate Array                                               *
*                                                                    *
*   Delete Array                                                 *
*                                                                    *
*                                                                    *
*                                                                    *
*   Esc = Exit Menu          F1/Shift+1 = Help                 *
*   Enter = Select Item                                           *
*****

```

FIGURE E-17 Manage Array Screen

TABLE E-13 Manage Array Screen Field Descriptions

| Field | Description |
|------------|------------------------------|
| Identifier | The identifier of the array. |
| Type | The RAID type of the array. |
| Scan Order | The scan order of the array. |
| Size(MB) | The size of the array. |
| Status | The status of the array. |

TABLE E-13 Manage Array Screen Field Descriptions (*Continued*)

| Field | Description |
|-------------------|---|
| Manage Hot Spare | Press Enter to modify the array hot spare configuration. This field is grayed out under the following conditions: <ul style="list-style-type: none">• The array is inactive.• The array is at its maximum number of devices.• Integrated Striping firmware is used. Striped Arrays do not support Hot Spares, so no modifications can be made to an array once it is created. |
| Synchronize Array | Press Enter to synchronize the RAID array. This field is grayed out under the following conditions: <ul style="list-style-type: none">• The array is inactive.• The array does not need to be resynchronized.• The adapter's MPT FW does not support the feature.• Integrated Striping firmware is used. |
| Activate Array | This field is used to activate a RAID array. |
| Delete Array | This field is used to delete the currently displayed RAID array. |

Exit Screen

It is important to exit the SAS BIOS Configuration Utility correctly, because some changes take effect only when you exit.

From the Adapter List, press the Esc key to exit.

In addition, a similar Exit screen appears when you exit most other screens, and it can be used to save settings. [FIGURE E-18](#) shows the Exit screen. Some options on the Exit screen might be grayed out, indicating that they are not available at this time.

The LSISAS1064 controller is based on the Fusion-MPT (Message Passing Technology) architecture. The Fusion-MPT architecture requires only a thin device driver that is independent of the I/O bus. LSI Logic provides the device drivers for various operating environments.

The ILOM Service Processor monitors the GPIOs from the SAS1064 controller. If the controller indicates a failure, the service processor lights the fault LED on the corresponding disk drive and logs the error in the SP event log.

Automatic Data Resynchronization and Hot Spares



Caution – Possible data loss: If you insert a hard disk drive (HDD) that has been configured with a RAID volume into a server that did not previously have its HDDs configured with RAID volumes, the existing HDD(s) in the server will be converted to RAID volumes during automatic synchronization and any existing data on the existing HDD(s) in the server will be erased. Before permanently removing a HDD that is part of an active RAID volume, use the LSI Configuration Utility to delete the RAID volume from the HDD to avoid causing this problem.

The SCSI parameters, including RAID volumes configuration, are set up using the LSI BIOS Configuration Utility that is accessible by pressing the CTRL+C keys during the boot process. The LSI RAID firmware and BIOS is OS-independent and you set up RAID while in MPTBIOS POST, before booting to an OS.

The parameters are saved in both the NVRAM and the disk drives. The RAID firmware needs 64 Mbytes of unused disk space at the end of each drive to store the metadata.

The metadata stored on the disk drives contains sufficient information to restore and reactivate the RAID volumes in case the NVRAM is lost (for example, when the motherboard is replaced). However, if removed, the disk drives must first be labelled to ensure that they are placed back in the same disk bays from which they were removed when reinstalled. When the system is powered on, the RAID volumes are automatically activated and resynchronization is automatically performed.

One of the disk drives can be set up as a hot-spare disk if a RAID 1 (mirroring) volume is already set up. If one of the two disk drives used in the RAID 1 volume fails, the hot-spare drive automatically replaces it in the volume and resync is immediately performed.

It must be noted that, until the resync is completed, the system is vulnerable to a failure of the now “primary” disk (the disk left from the original mirrored volume) since full data redundancy is not yet achieved. When the bad disk is replaced, the new disk automatically becomes the new hot-spare disk for the mirrored volume.

RAID Level Support

The following items describe the RAID level support for these servers:

- RAID 1 (mirroring) is supported.
- RAID 0 (striping) is supported.
- LSI RAID 1E or 1E (mirroring over more than two drives) is not supported.
- RAID 0+1 and 1+0 are not supported by the SAS1064 controller.

RAID Volume Support

The following items describe the RAID volumes supported for these servers:

- Up to two active RAID volumes are supported per system (RAID 0, RAID 1 or both).
- A striped volume (RAID 0) can contain up to four disk drives.
- A mirrored volume (RAID 1) can contain up to two disk drives.
- One disk drive can be set up as hot-spare for a RAID 1 array (one hot-spare disk per controller maximum).
- Volumes are transparent to the OS and are seen as a single physical disk drive no matter how many drives they contain.

RAID Combination Support

Possible RAID Combinations in a four-HDD server are listed below:

- Two drives RAID 0 + two drives non-RAID
- Two drives RAID 1 + two drives non-RAID
- Two drives RAID 0 + two drives RAID 1
- Two drives RAID 0 + two drives RAID 0
- Two drives RAID 1 + Two drives RAID 1
- Three drives RAID 0 + one drive non-RAID
- Four drives RAID 0
- Two drives RAID 1 + one hot-spare drive + one drive non-RAID
- Four drives non-RAID

Performing RAID Configuration Tasks

This section contains the following information and instructions for using the Configuration Utility to set up RAID:

- [“Creating a RAID 0 Volume” on page 195](#)
- [“Creating a RAID 1 Volume” on page 196](#)
- [“Creating a Second RAID Volume” on page 198](#)
- [“Viewing RAID Volume Properties” on page 198](#)
- [“Managing Hot-Spares” on page 197](#)
- [“Synchronizing an Array” on page 199](#)
- [“Activating an Array” on page 199](#)
- [“Deleting an Array” on page 199](#)
- [“Locating a Disk Drive” on page 200](#)

Note – The RAID firmware needs at least 64 Mbytes of unused disk space at the end of each drive to store metadata.

Creating a RAID 0 Volume

A RAID 0 volume, also referred to as Integrated Striping (IS), offers the ability to stripe data across multiple hard disks. This can increase storage capacity and performance by combining multiple disks into one logical volume.

Note – Use RAID 0 with caution. The only advantage of RAID 0 is to improve the overall disk performance by striping data over several disk drives. By doing this, it decreases reliability because the failure of any drive within the striped volume results in a complete loss of data. In addition, any disk drive included in a RAID 0 volume becomes non-hot-swappable.

Follow these steps to create a RAID 0 volume on an adapter that does not currently have a volume configured.

1. **In the Configuration Utility, select an adapter from the Adapter List screen.**
2. **Select the RAID Properties option.**
3. **When you are prompted to create either an IS volume or an IM volume, select Create IS Volume.**

The next screen shows a list of disks that can be added to a volume.

4. **Move the cursor to the RAID Disk column. To add a disk to the volume, change the “No” to “Yes” by pressing the + key, - key, or space bar.**

As disks are added, the Array Size field changes to reflect the size of the new volume. There are several limitations when creating a RAID 0 volume:

- All disks must be SAS (with SMART support).
- Disks must have 512-byte blocks and must not have removable media.
- There must be at least two drives in a valid volume.
- No more than eight drives are allowed in a volume.
- Hot spare drives are not allowed for RAID 0 volumes.

Note – RAID 0 does not provide any data protection in the event of disk failure. It is primarily used to increase speed.

Note – Once the number of disks in a RAID volume is set, it cannot be changed.

5. **When the volume has been fully configured, press C and select Save Changes, then exit this menu to commit the changes.**

The Configuration Utility will pause while the array is being created.

Creating a RAID 1 Volume

A RAID 1 volume, also referred to as Integrated Mirroring (IM), offers the ability to mirror data from one hard disk onto another one. This can increase reliability by combining multiple disks into one logical volume. Follow these steps to create a RAID 1 volume on an adapter that does not currently have a volume configured.

1. **In the Configuration Utility, select an adapter from the Adapter List screen.**
2. **Select the RAID Properties option.**
3. **When you are prompted to create either an IS volume or an IM volume, select Create IM Volume.**

The next screen shows a list of disks that can be added to a volume.

4. **Move the cursor to the RAID Disk column. To add a disk to the volume, change the “No” to “Yes” by pressing the + key, - key, or space bar.**

When the first disk is added, the utility will prompt you to keep existing data or overwrite existing data.

5. Press M to keep the existing data on the first disk or press D to overwrite it.

If you keep the existing data, this is called a migration. The first disk will be mirrored onto the second disk, so the data you want to keep must be on the first disk added to the volume. Data on all other disks will be lost.

As disks are added the Array Size field will change to reflect the size of the new volume. There are several limitations when creating a RAID 1 volume:

- All disks must be SAS (with SMART support).
- Disks must have 512-byte blocks and must not have removable media.
- There must be two drives in a valid volume.

6. (Optional) Add a hot spare to the volume by moving the cursor to the Hot Spare column and pressing the + key, - key, or space bar.

7. When the volume has been fully configured, press C and select Save Changes, then exit this menu to commit the changes.

The Configuration Utility will pause while the array is being created.

Note – RAID 1 provides protection against the failure of a single disk. When a disk fails, it is rebuilt to a hot spare if one is available. This can greatly increase the level of protection that RAID 1 provides.

Note – Even though multiple volumes can be created, the hot spare is a global hot spare. Only one active hot spare is allowed for all volumes.

Managing Hot-Spares

Follow these steps to add a hot- spare to a RAID 1 volume.

- 1. Select Manage Hot Spare.**
- 2. Select a disk from the list by pressing the + key, - key, or space bar.**

Note – A hot-spare must be valid RAID disk, as defined in [“Creating a RAID 1 Volume” on page 196](#).

- 3. After you select the hot-spare disk, press C.**
- 4. Select Save Changes then exit this menu to commit the changes.**

The Configuration Utility will pause while the hot spare is being added.

Follow these steps to delete a hot-spare from a RAID 1 volume.

1. **Select Manage Hot Spare.**
2. **Remove the current hot spare disk from the list by pressing the + key, - key, or space bar.**
3. **After you clear the hot-spare, press C.**
4. **Select Save Changes then exit this menu to commit the changes.**

The Configuration Utility will pause while the hot-spare is being removed.

Creating a Second RAID Volume

The LSI Logic SAS controllers support two active RAID volumes. If one volume is already configured, follow these steps to add a second volume.

1. **In the Configuration Utility, select an adapter from the Adapter List screen.**
2. **Select the RAID Properties option.**
This displays the current volume.
3. **Press C to create a new volume.**
4. **Create the new volume:**
 - To create a second RAID 0 volume, continue with Step 2 of [“Creating a RAID 0 Volume” on page 195.](#)
 - To create a second RAID 1 volume, continue with Step 2 of [“Creating a RAID 1 Volume” on page 196.](#)

Viewing RAID Volume Properties

Follow these steps to view the properties of RAID volumes.

1. **In the Configuration Utility, select an adapter from the Adapter List screen.**
2. **Select the RAID Properties option.**
The properties of the current volume are displayed.
3. **If more than one volume is configured, press Alt+N to view the next array.**
4. **To manage the current array, press Enter when the Manage Array item is selected.**

Synchronizing an Array

Synchronizing an array means that the firmware synchronizes the data on the secondary disk(s) with the data on the primary disk of the mirror. Follow these steps to start a synchronization for a RAID 1 volume.

1. **Select Synchronize Array.**
2. **Press Y to start the synchronization, or N to cancel it.**

Note – If the server is rebooted before the volume synchronization is completed, the resync resumes when the server boots.

Activating an Array

An array can become inactive if, for example, it is removed from one controller or computer and moved to another one. The Activate Array option enables you to reactivate an inactive array that has been added to a system. This option is only available when the selected array is currently inactive.

1. **Select Activate Array.**
2. **Press Y to proceed with the activation, or press N to abandon it.**

After a pause, the array becomes active.

Deleting an Array



Caution – Before deleting an array, back up all data on the array that you want to keep.

Follow these steps to delete a selected array.

1. **Select Delete Array.**
2. **Press Y to delete the array, or press N to abandon the deletion.**

After a pause, the firmware deletes the array.

Note – Once a volume has been deleted, it cannot be recovered. When a RAID 1 volume is deleted, the data is preserved on the primary disk. The master boot records (MBR) of other disks in the array are deleted. For other RAID types, the master boot records of all disks are deleted.

Locating a Disk Drive

There are several ways to physically locate a disk drive, as long as the firmware is correctly configured and the drives support disk location.

- During RAID creation, when a disk is set to Yes as part of a RAID volume, its Locate LED is enabled. When it is set back to No or the RAID volume is created, the Locate LED is cleared.
- Disks can also be located from the SAS Topology screen. To locate a disk, move the cursor to the disk and press Enter. The Locate LED on the disk remains lit until the next key is pressed.

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