Sun Fire™ X4100/X4100 M2 and X4200/X4200 M2 Servers Service Manual

Sun Microsystems, Inc.
www.sun.com

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Contents

Preface

This document contains information and procedures for maintaining and upgrading the servers.

Before You Read This Document

It is important that you review the safety guidelines in the *Sun Fire X4100/X4100 M2 and X4200/X4200 M2 Servers Safety and Compliance Guide* (819-1161).

Product Updates

For product updates that you can download for the Sun Fire X4100 or Sun Fire X4200 servers, go to

`http://www.sun.com/servers/entry/x4100/downloads.jsp`

This site contains updates for firmware and drivers, as well as CD-ROM `.iso` images.

Related Documentation

For a description of the document set, see the *Where To Find Documentation* sheet that is packed with your system and available at the product's documentation site. Refer to the following URL, then navigate to your product:

http://www.sun.com/products-n-solutions/hardware/docs/Servers/x64_servers/index.html

This site also contains translated versions of some of these documents in French, Simplified Chinese, Traditional Chinese, Korean, and Japanese. English documentation is revised more frequently and might be more up-to-date than the translated documentation.

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The Sun web site provides information about the following additional resources:

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Sun Fire X4100/X4100 M2 and X4200/X4200 M2 Servers Service Manual, 819-1157-23

CHAPTER 1

Introduction

This chapter describes the features, main components, and accessories of the Sun Fire™ X4100/X4100 M2 and X4200/X4200 M2 servers.

Note – The information in this chapter applies to all Sun Fire X4100/X4100 M2 and X4200/X4200 M2 servers, unless otherwise noted.

This chapter contains the following sections:

1.1 Features of the Servers

These servers take full advantage of the exceptional power and performance of the AMD Opteron processor. They include an extensive set of reliability, availability, and serviceability (RAS) features. The servers also provide a remote, integrated lights-out management (ILOM) service processor (SP) function, including remote boot and remote software upgrades.

TABLE 1-1 summarizes and compares the features of the servers.

TABLE 1-1 Server Features

Feature or Component	Sun Fire X4100/X4100 M2 Servers	Sun Fire X4200/X4200 M2 Servers
CPU	**Sun Fire X4100:** Up to two AMD64 Opteron 200 Series single- or dual-core processors (1-MB L2 cache per core)	**Sun Fire X4200:** Up to two AMD64 Opteron 200 Series single- or dual-core processors (1-MB L2 cache per core)
	Sun Fire X4100 M2: Up to two AMD64 Opteron 2200 Series single- or dual-core processors (1-MB L2 cache per core)	**Sun Fire X4200 M2:** Up to two AMD64 Opteron 2200 Series single- or dual-core processors (1-MB L2 cache per core)
Memory	**Sun Fire X4100:** Up to eight DIMMs (up to 32GB capacity) Qualified DIMMs: • 400-MHz Registered ECC DDR1 DIMMs	**Sun Fire X4200:** Up to eight DIMMs (up to 32GB capacity) Qualified DIMMs: • 400-MHz Registered ECC DDR1 DIMMs
	Sun Fire X4100 M2: Up to eight DIMMs (up to 32GB capacity) Qualified DIMMs: • 667-MHz Registered ECC DDR2 DIMMs	**Sun Fire X4200 M2:** Up to eight DIMMs (up to 32GB capacity) Qualified DIMMs: • 667-MHz Registered ECC DDR2 DIMMs
Disk drives	Two Serial Attached SCSI (SAS) disk drives (2.5 inch or 63.5 mm); up to four disk drives as a factory-configured option	Four Serial Attached SCSI (SAS) drives (2.5 inch or 63.5 mm)
Board management controller (BMC)	Motorola MPC8248 @ 266MHz	Motorola MPC8248 @ 266MHz
RAID options	Four-channel SAS RAID disk controller	Four-channel SAS RAID disk controller
Network I/O	• Four 10/100/1000 BASE-T Gigabit Ethernet ports (RJ-45 connectors) • One 10/100 BASE-T Ethernet management port (RJ-45 Connector) • One RS-232 serial port (RJ-45 Connector)	• Four 10/100/1000 BASE-T Gigabit Ethernet ports (RJ-45 connectors) • One 10/100 BASE-T Ethernet management port (RJ-45 Connector) • One RS-232 serial port (RJ-45 Connector)
PCI I/O	**Sun Fire X4100:** • One 133-MHz, low-profile PCIX slot • One 100-MHz, low-profile PCIX slot • Right-angle PCI risers	**Sun Fire X4200:** • One 133-MHz PCIX slot • One 100-MHz PCIX slot • Three 66-MHz PCIX slots
	Sun Fire X4100 M2: • Two 8-lane, low-profile PCIE slots • Right angle PCIE risers are provided	**Sun Fire X4200 M2:** • Four 8-lane PCIE slots • One 133-MHz PCIX slot

TABLE 1-1 Server Features *(Continued)*

Feature or Component	Sun Fire X4100/X4100 M2 Servers	Sun Fire X4200/X4200 M2 Servers
Other I/O	**Sun Fire X4100:** • Three USB 1.1 ports • One VGA video port **Sun Fire X4100 M2:** • Three USB 2.0 capable ports • One VGA video port	**Sun Fire X4200:** • Four USB 1.1 ports • One VGA video port **Sun Fire X4200 M2:** • Four USB 2.0 capable ports • One VGA video port
Removable media devices	**Sun Fire X4100:** Internal slim DVD-ROM drive (not available if 4-drives option is ordered) **Sun Fire X4100 M2:** Internal slim DVD ROM with CD-RW (not available if 4-drives option is ordered)	**Sun Fire X4200:** Internal slim DVD ROM drive **Sun Fire X4200 M2:** Internal slim DVD ROM with CD-RW
Power	Two 550W power supplies	Two 550W power supplies
Fans	Six front fan modules, each containing two 40mm fans; also one fan in each power supply	Six front fan modules, each containing a single 80mm fan; one rear fan tray; also one fan in each power supply

1.2 Replaceble Components Overview

This section contains illustrations that you can use to become familiar with the components of the Sun Fire X4100/X4100 M2 servers.

1.2.1 Sun Fire X4100/X4100 M2 Server Front Panel

FIGURE 1-1 shows the features of the front panel.

FIGURE 1-1 Sun Fire X4100/X4100 M2 Server Front Panel

Figure Legend

1	Power/OK LED
2	Power button
3	DVD-ROM drive
4	USB port
5	Serial number sticker on bezel
6	Hard disk drives (2)

1.2.2 Sun Fire X4100/X4100 M2 Server Back Panel

FIGURE 1-2 shows the features of the back panel.

FIGURE 1-2 Sun Fire X4100/X4100 M2 Server Back Panel

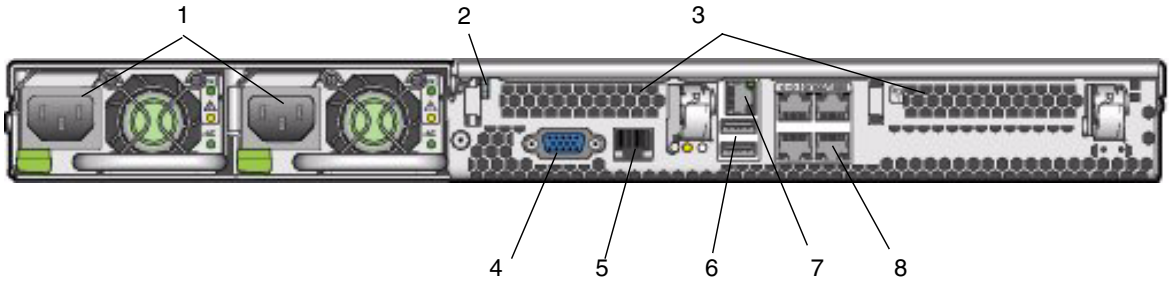


Figure Legend

1	Power supplies
2	Grounding post
3	PCI card slots (2)
4	Video connector
5	Serial management port
6	USB connectors (2)
7	10/100 Ethernet port for net management
8	10/100/1000 gigabit Ethernet ports (4)

1.2.3 Sun Fire X4100/X4100 M2 Server Components

FIGURE 1-3 shows the locations of the Sun Fire X4100 server replaceable components, with the top covers removed.

FIGURE 1-3 Sun Fire X4100 Replaceable Component Locations

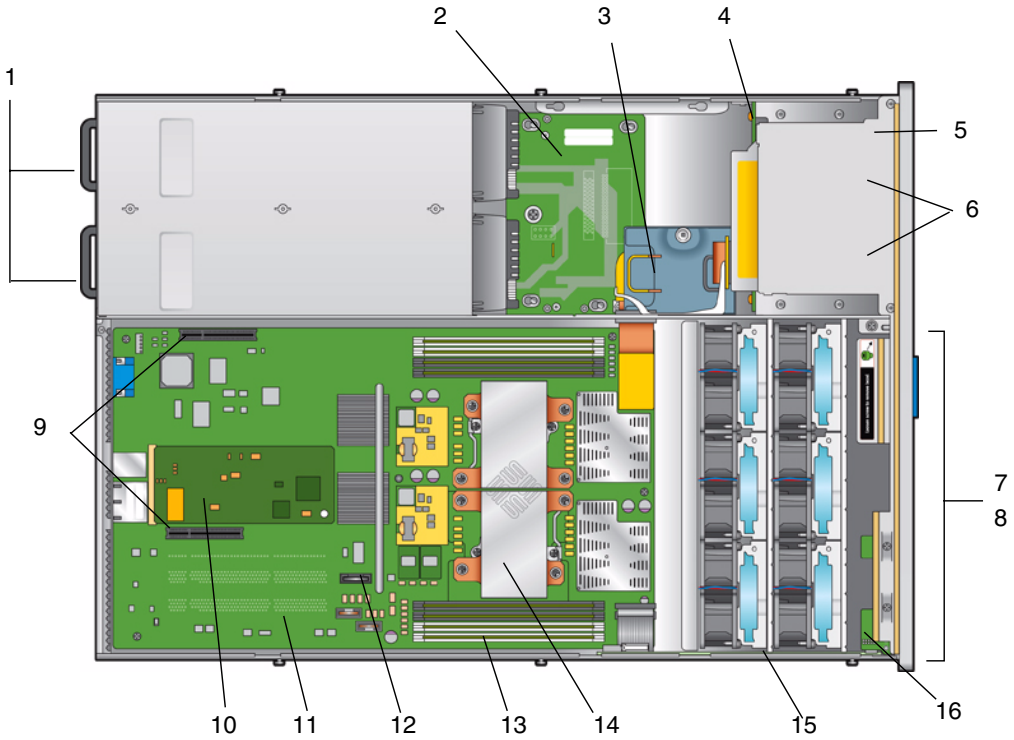


Figure Legend

1	Power supplies (2)
2	Power distribution board
3	Flex cable (underneath cable retainer)
4	Hard disk drive backplane
5	DVD-ROM drive
6	Hard drives (2) (4-drives option available with no DVD-ROM)
7	Fan modules (6)
8	Fan connector boards (2) (not visible—underneath fan modules)
9	PCI-e card slot (2)
10	Graphics-redirect and service processor (GRASP) board
11	Motherboard

Figure Legend

12	Battery
13	DIMMs (up to 4 for each CPU)
14	CPUs and heatsinks (2)
15	Front I/O board
16	Front panel indicator board

FIGURE 1-4 Sun Fire X4100 M2 Replaceable Component Locations

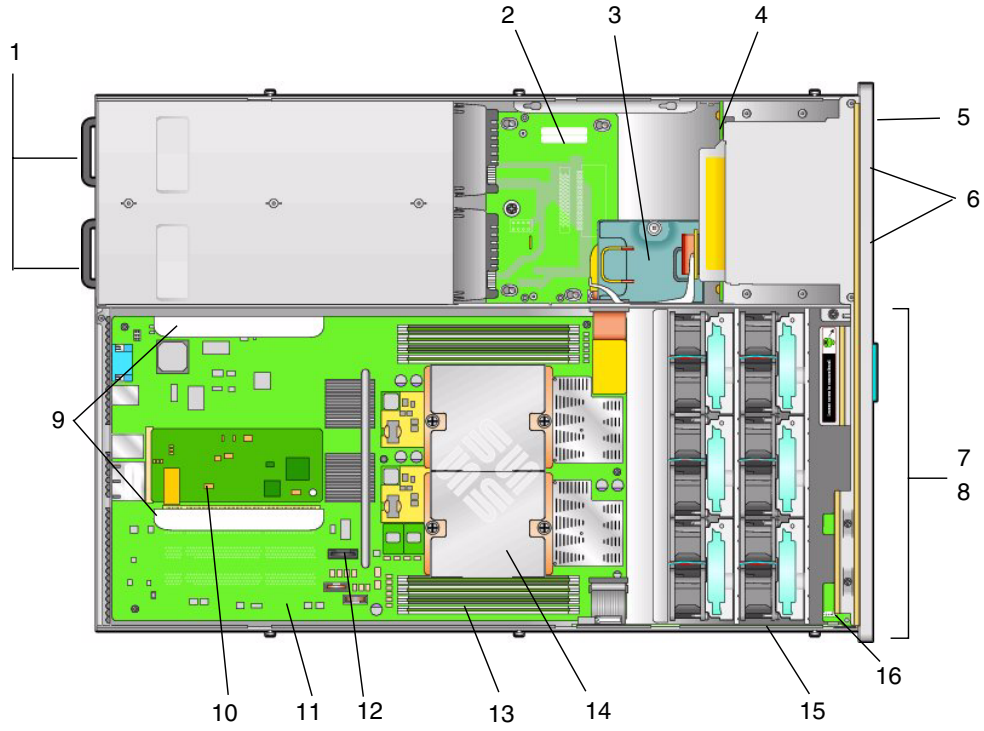


Figure Legend

1	Power supplies (2)
2	Power distribution board
3	Flex cable (underneath cable retainer)
4	Hard disk drive backplane
5	DVD-ROM drive
6	Hard drives (2), 4-drives option available with no DVD-ROM
7	Fan modules (6)
8	Fan connector boards (2) (not visible—underneath fan modules)

Figure Legend

9	PCI-X card slot (2)
10	Graphics-redirect and service processor (GRASP) board
11	Motherboard
12	Battery
13	DIMMs (up to 4 for each CPU)
14	CPUs and heatsinks (2)
15	Front I/O board
16	Front panel indicator board

FIGURE 1-4 shows the locations of the Sun Fire X4100 M2 server replaceable components, with the top covers removed.

1.2.4 Sun Fire X4200/X4200 M2 Server Front Panel

FIGURE 1-5 shows the features of the front panel.

FIGURE 1-5 Sun Fire X4200/X4200 M2 Server Front Panel

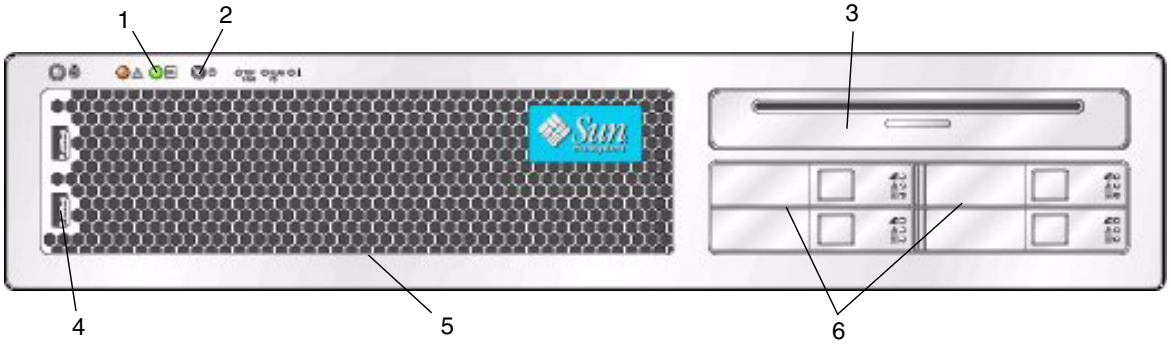


Figure Legend

1	Power/OK LED
2	Power button
3	DVD-ROM drive
4	USB ports (2)
5	Serial number sticker on bezel
6	Hard disk drives (4)

1.2.5 Sun Fire X4200/X4200 M2 Server Back Panel

FIGURE 1-6 shows the features of the back panel.

FIGURE 1-6 Sun Fire X4200/X4200 M2 Server Back Panel

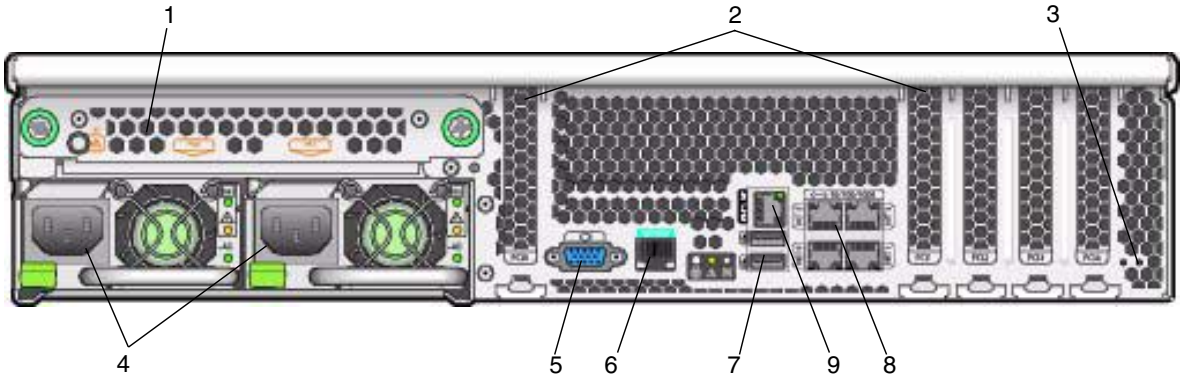


Figure Legend

1	Rear fan tray
2	PCI card slots (5)
3	Grounding post
4	Power supplies (2)
5	Video connector
6	Serial management port
7	USB connectors (2)
8	10/100/1000 gigabit Ethernet ports (4)
9	10/100 Ethernet port for net management

1.2.6 Sun Fire X4200/X4200 M2 Server Components

FIGURE 1-7 shows the locations of the Sun Fire X4200 server replaceable components, with the top covers removed.

FIGURE 1-7 Sun Fire X4200 Replaceable Component Locations

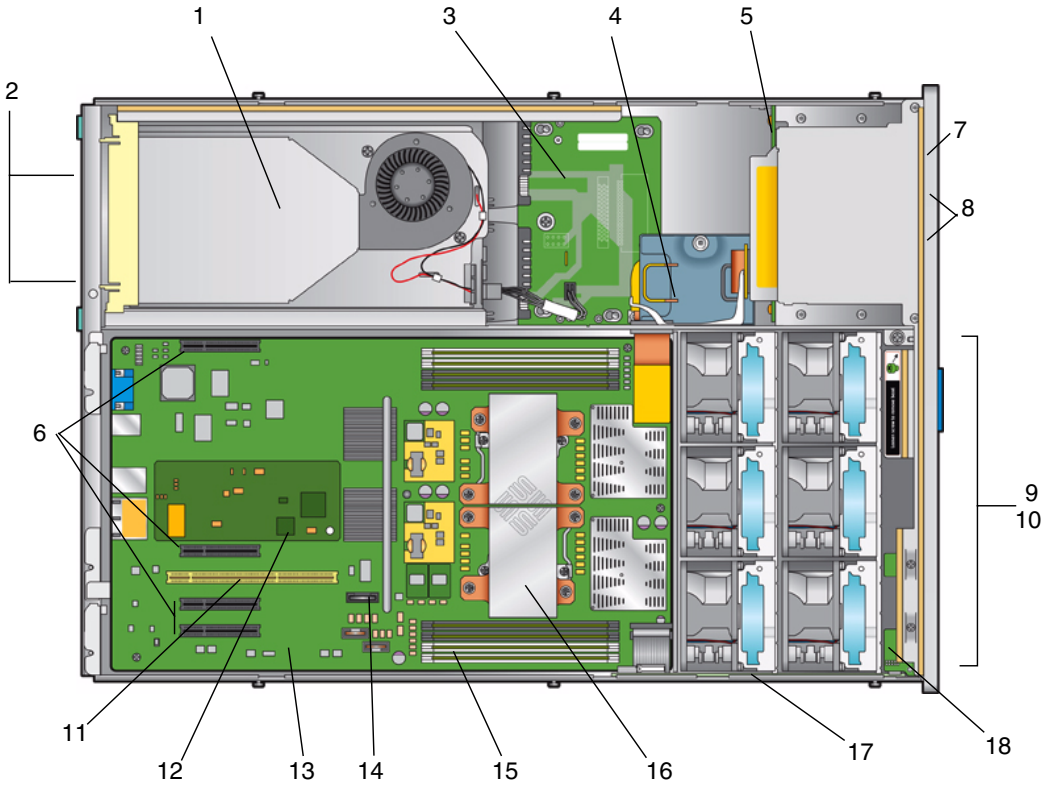


Figure Legend

1	Rear fan tray
2	Power supplies (2)
3	Power distribution board
4	Flex cable (underneath cable retainer)
5	Hard disk drive backplane
6	PCIe card slots (4)
7	DVD-ROM drive
8	Hard drives (4)
9	Fan modules (6)

Figure Legend

10	Fan connector boards (2) (not visible—underneath fan modules)
11	PCI-X card slot (1)
12	Graphics-redirect and service processor (GRASP) board
13	Motherboard
14	Battery
15	DIMMs (up to 4 for each CPU)
16	CPUs and heatsinks (2)
17	Front I/O board
18	Front panel indicator board

FIGURE 1-8 Sun Fire X4200 M2 Replaceable Component Locations

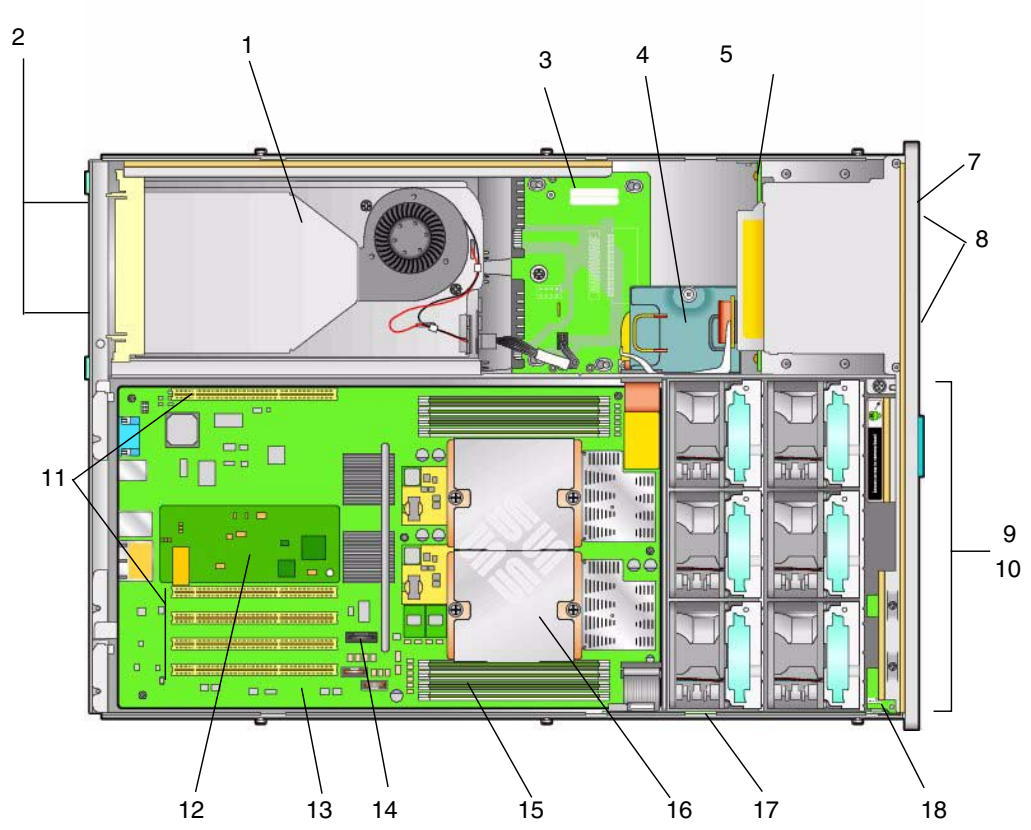


Figure Legend

1	Rear fan tray
2	Power supplies (2)
3	Power distribution board
4	Flex cable (underneath cable retainer)
5	Hard disk drive backplane
6	PCIe card slots (4)
7	DVD-ROM drive
8	Hard drives (4)
9	Fan modules (6)
10	Fan connector boards (2) (not visible—underneath fan modules)
11	PCI-X card slot (1)
12	Graphics-redirect and service processor (GRASP) board
13	Motherboard
14	Battery
15	DIMMs (up to 4 for each CPU)
16	CPUs and heatsinks (2)
17	Front I/O board
18	Front panel indicator board

FIGURE 1-8 shows the locations of the Sun Fire X4200 M2 server replaceable components, with the top covers removed.

1.3 Accessory Kits

TABLE 1-2 lists the contents of the accessory kit that is shipped with the servers.

TABLE 1-2 Accessory Kit

Item	Part Number
Sun Fire X4100/X4200 Servers Resource CD Sun Fire X4100 M2/X4200 M2 Servers Tools and Drivers CD	705-7917
Sun Fire X4100/X4200 Servers Bootable Diagnostics CD	705-7852
Sun Fire X4100/X4200 Servers Sun Installation Assistant CD	705-7918
Sun N1 System Manager DVD (depending on availability)	825-6459
Sun Fire X4100/X4200 Servers Installation Guide (printed manual)	819-1155
Where to Find Sun Fire X4100/X4200 Servers Documentation (printed sheet)	819-3119
Serial-to-RJ45 cable adapter (DB9S-to-RJ-45F)	530-3100

1.4 Additional Options and Replaceable Components

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

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

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

Note – These servers are fully compliant with the Reduction of Hazardous Substances (RoHS) Directive.

Caution – Some AMD CPUs are released as special editions, which might differ in wattage from other CPUs. Do not mix the two different types of CPUs. Always make sure that all CPUs in the server have the same part number.

CHAPTER 2

Powering On and Configuring BIOS Settings

This chapter contains the following procedures and information:

Note – The information in this chapter applies to all Sun Fire X4100/X4100 M2 and X4200/X4200 M2 servers, unless otherwise noted.

2.1 Powering On the Server

Note – Before powering on your server for the first time, follow the installation and cabling instructions provided in the *Sun Fire X4100/X4200 Servers Installation Guide*, which is shipped with the system and is also available online at:
http://www.sun.com/documentation

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 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 orFIGURE 2-2 for the LED location.

2. **Use a nonconducting pointer or stylus to press and release the recessed Power button on the server front panel which is shown in** FIGURE 2-1 or FIGURE 2-2.

FIGURE 2-1 When main power is applied to the full server, the Power/OK LED next to the Power button lights and remains lit.Front Panel of Sun Fire X4100/X4100 M2 Server

FIGURE 2-2 Front Panel of Sun Fire X4200/X4200 M2 Server

Figure Legend

1	Power/OK LED
2	Power button

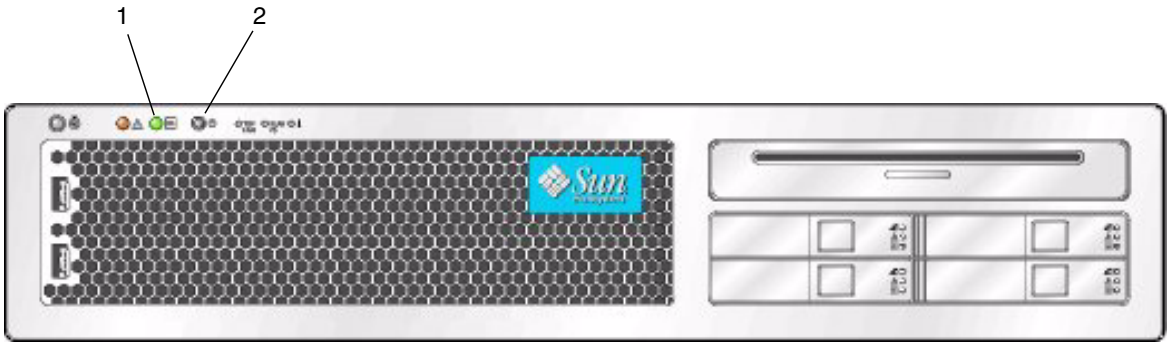


Figure Legend

1	Power/OK LED
2	Power button

2.2 Powering Off the Server

1. **Choose a method for shutting down the server from main power mode to standby power mode.**
   - **Graceful shutdown:** Use a nonconducting pointer or stylus to press and release the Power button on the front panel. This causes Advanced Configuration and Power Interface (ACPI) enabled operating systems to perform an orderly shutdown of the operating system. Servers not running ACPI-enabled operating systems will shut down to standby power mode immediately.
   - **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.

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, which is indicated when the Power/OK LED is flashing. To completely power off the server, you must disconnect the power cords from the back panel of the server.

2.3 Configuring BIOS Settings

This section describes how to view and modify the BIOS settings.

The Basic Input/Output System (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 first BIOS Setup menu screen is displayed. 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 nonconfigurable. Use the up and down arrow keys to scroll through a menu. Use the Tab key to move back and forth across columns.

2.3.1 Changing the Configuration of a BIOS Menu Item

You can change the BIOS configuration in several different interfaces.

- Use a USB keyboard, a 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 Section B.2, "Redirecting Console Output" on page B-2.
- Use a terminal (or terminal emulator connected to a computer) through the serial port on the back panel of the server.

1. **To change the system 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 is displayed. The box presents you with the options that are available for the setup field that you have chosen.

4. **Modify the setup field and close the screen.**

5. **If you need to modify other setup parameters, use the arrow and Tab keys to navigate to the desired screen and menu item, then repeat steps 1 through 3. 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 Setup utility.**

2.3.2 PCI Card Slot Boot Priority

Refer to the section that corresponds to your version of the server:

- "Sun Fire X4100/X4200 Servers PCI Slot Boot Priority" on page 2-5
- "Sun Fire X4100 M2/X4200 M2 Servers PCI Slot Boot Priority" on page 2-5

See Section 3.12.16, "Replacing PCI Cards" on page 3-72 for the locations of the PCI slots.

Sun Fire X4100/X4200 Servers PCI Slot Boot Priority

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

- Sun Fire X4100: PCIX Slot 0, PCIX Slot 1
- Sun Fire X4200: PCIX Slot 0, PCIX Slot 2, PCIX Slot 3, PCIX Slot 4, PCIX Slot 1

Sun Fire X4100 M2/X4200 M2 Servers PCI Slot Boot Priority

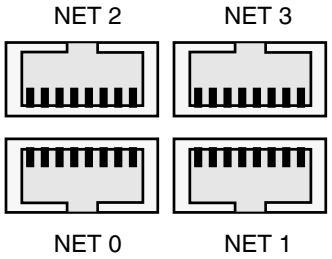
The slots for the PCI cards are detected by the BIOS during startup in the following order:

- Sun Fire X4100: PCIE Slot 0, PCIE Slot 1
- Sun Fire X4200: PCIE Slot 0, PCIE Slot 1, PCIE Slot 3, PCIE Slot 4, PCIX Slot 2

2.3.3 Ethernet Port Device and Driver Naming

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

FIGURE 2-3 Ethernet Port Chassis Labeling Designations



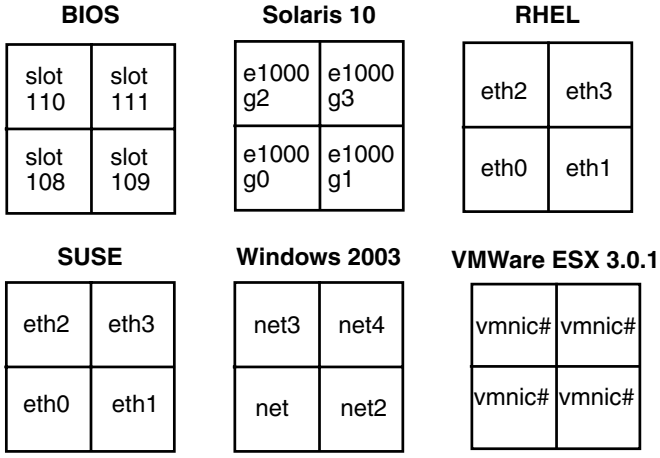
The device naming for the Ethernet ports differ according to the OS. Refer to the section below that applies to your server:

- "Sun Fire X4100/X4200 Ethernet Port Mapping" on page 6
- "Sun Fire X4100 M2/X4200 M2 Ethernet Port Mapping" on page 7

Sun Fire X4100/X4200 Ethernet Port Mapping

FIGURE 2-4 shows how various operating systems and interfaces name the four Ethernet ports shown in FIGURE 2-3.

FIGURE 2-4 Sun Fire X4100/X4200 Ethernet Port Mapping

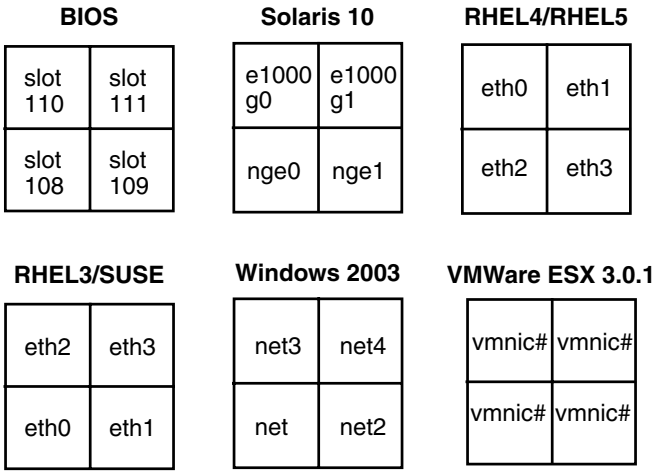


Note – VMWare ESX 3.0.1: The Ethernet port that the user assigns to the service console will be vmnic0. Other ports are mapped by ascending order of PCI bus enumerations.

Sun Fire X4100 M2/X4200 M2 Ethernet Port Mapping

FIGURE 2-5 shows how various operating systems and interfaces name the four Ethernet ports shown in FIGURE 2-3.

FIGURE 2-5 Sun Fire X4100 M2/X4200 M2 Ethernet Port Mapping



Note – VMWare ESX 3.0.1: The Ethernet port that the user assigns to the service console will be vmnic0. Other ports are mapped by ascending order of PCI bus enumerations.

2.3.4 Ethernet Port (NIC) Boot Priority

Refer to the section that corresponds to your version of the server:

Sun Fire X4100/X4200 Servers Ethernet Port Boot 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 (Intel NIC 0)
2. NET 1 (Intel NIC 1)
3. NET 2 (Intel NIC 2)
4. NET 3 (Intel NIC 3)

Sun Fire X4100 M2/X4200 M2 Servers Ethernet Port Boot 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 CK8-04 NIC)
2. NET 1 (NVIDIA IO-04 NIC)
3. NET 2 (Intel NIC)
4. NET 3 (Intel NIC)

2.3.5 BIOS Option ROM Size Limitation

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

2.3.6 BIOS Setup Screen Overview

TABLE 2-1 contains summary descriptions of the seven top-level BIOS setup screens.

TABLE 2-1 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, PowerNow!, Remote Access, and USB.
PCI/PnP	Plug-and-Play (PnP) devices can be configured by the BIOS (default) or by the operating system (if applicable).
Boot	Configure the boot device priority (hard disk drives and the ATAPI DVD-ROM 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 2-6 and FIGURE 2-7 summarize the BIOS Configuration Utility menu tree, with differences between server models noted. See Section 2.3.6.1, "BIOS Setup Menu Screens" on page 2-12 for examples of each of these screens.

FIGURE 2-6 Sun Fire X4100/X4200 BIOS Configuration Utility Menu Tree

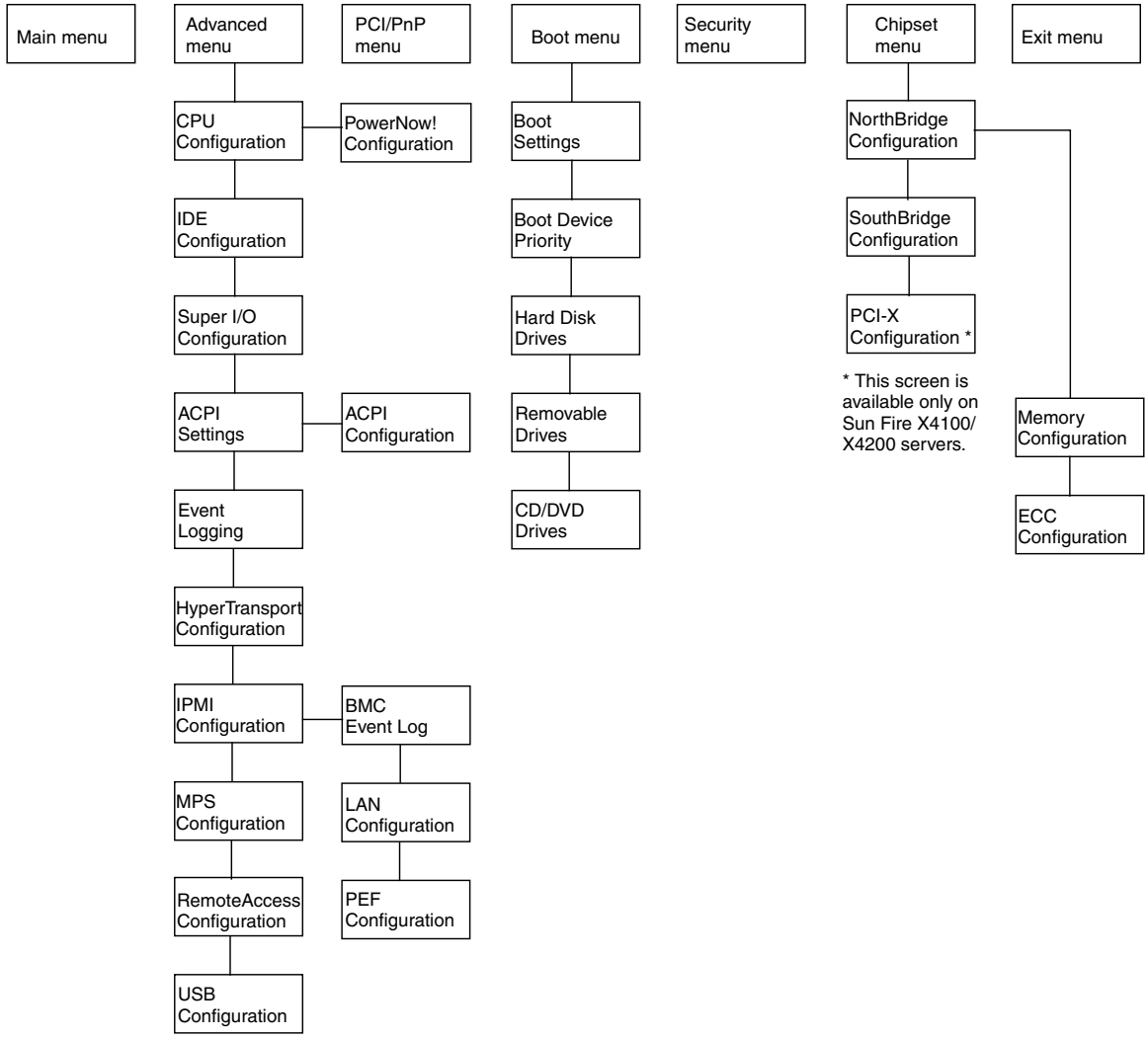
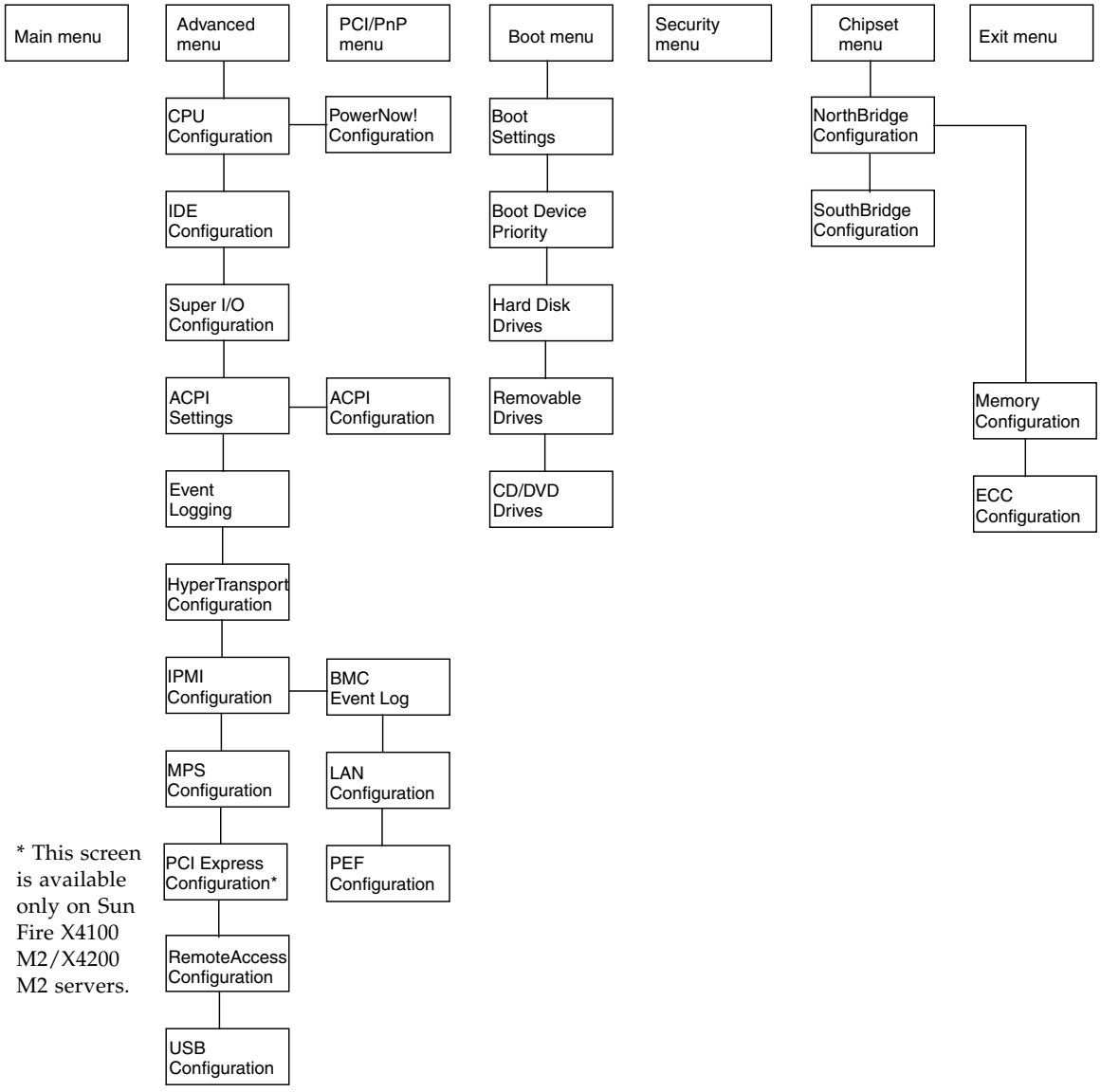


FIGURE 2-7 Sun Fire X4100 M2/X4200 M2 BIOS Configuration Utility Menu Tree



2.3.6.1 BIOS Setup Menu Screens

This section shows sample BIOS setup menu screens with optimal default settings where applicable.

Note – The screens shown are examples. Actual version numbers are subject to change over the life of the product.

BIOS Main Menu Screen

```
Main    Advanced    PCIPnP    Boot    Security    Chipset    Exit
*************************************************************************
* System Overview                                  ** Use [ENTER], [TAB]     *
* ************************************************ or [SHIFT-TAB] to      *
* AMIBIOS                                          ** select a field.        *
* Version   : 08.00.10                             **                        *
* Build Date: 06/22/05                             ** Use [+] or [-] to      *
* ID        : 0ABGA018                             ** configure system Time. *
*                                                  **                        *
* Product Name          : Sun Fire X4200           **
* System Serial Number   : 0525AMF002              *
* BMC Firmware Revision : 1.00                     **                        *
*                                                  **                        *
* Processor                                        **                        *
* Type      : AMD Opteron(tm) Processor 254        ** **    Select Screen    *
* Speed     : 2.8 GHz                              ** **    Select Item      *
* Count     : 2                                    ** +-    Change Field     *
*                                                  ** Tab   Select Field     *
* System Memory                                    ** F1    General Help     *
* Size      : 3.0 GB                               ** F10   Save and Exit    *
*                                                  ** ESC   Exit             *
* System Time                  [14:23:56]          ** ESC   Exit             *
* System Date                  [Wed 07/20/2005]    **                        *
*************************************************************************
```

2.3.6.2 BIOS Advanced Menu Main Screens

Sun Fire X4100/X4200 Servers

```
Main    Advanced    PCIPnP    Boot    Security    Chipset    Exit
********************************************************************************
* Advanced Settings                                  * Options for CPU        *
* ************************************************** *                        *
* WARNING: Setting wrong values in below sections    *                        *
*          may cause system to malfunction.          *                        *
* * CPU Configuration                                *                        *
* * IDE Configuration                                *                        *
* * SuperIO Configuration                            *                        *
* * ACPI Configuration                               *                        *
* * Event Log Configuration                          *                        *
* * Hyper Transport Configuration                    *                        *
* * IPMI 2.0 Configuration                           *                        *
* * MPS Configuration                                * **    Select Screen    *
* * AMD PowerNow Configuration                       * **    Select Item      *
* * Remote Access Configuration                      * Enter Go to Sub Screen *
* * USB Configuration                                * F1    General Help     *
*                                                    * F10   Save and Exit    *
*                                                    * ESC   Exit             *
********************************************************************************
```

```
Main    Advanced    PCIPnP    Boot    Security    Chipset    Exit
*************************************************************************************
* Advanced Settings                                  * Options for CPU        *
* ********************************************** *                           *
* WARNING: Setting wrong values in below sections    *                           *
*          may cause system to malfunction.          *                           *
* * CPU Configuration                                *                           *
* * IDE Configuration                                *                           *
* * SuperIO Configuration                            *                           *
* * ACPI Configuration                               *                           *
* * Event Log Configuration                          *                           *
* * Hyper Transport Configuration                    *                           *
* * IPMI 2.0 Configuration                           *                           *
* * MPS Configuration                                * **    Select Screen      *
* * PCI Express Configuration                        *                           *
* * AMD PowerNow Configuration                       * **    Select Item        *
* * Remote Access Configuration                      * Enter Go to Sub Screen   *
* * USB Configuration                                * F1    General Help       *
*                                                    * F10   Save and Exit      *
*                                                    * ESC   Exit               *
*************************************************************************************
```

2.3.6.3 BIOS Advanced Menu CPU Configuration Screen

Sun Fire X4100/X4200 Servers

```
          Advanced
*********************************************************************************
* CPU Configuration                                  * This option should     *
* Module Version: 14.05                              * remain disabled for    *
* Physical Count: 2                                  * the normal operation.  *
* Logical Count : 2                                  * The driver developer   *
* ************************************************ * may enable it for      *
* AMD Opteron(tm) Processor 254                      * testing purpose.       *
* Revision: E4                                       *                        *
* Cache L1: 64KB                                     *                        *
* Cache L2: 1024KB                                   *                        *
* Speed   : 2800MHz                                  *                        *
* Current FSB Multiplier: 14x                        *                        *
* Maximum FSB Multiplier: 14x                        *                        *
* Able to Change Freq.  : Yes                        * **    Select Screen    *
* uCode Patch Level     : None Required              * **    Select Item      *
*                                                    * +-    Change Option    *
* GART Error Reporting           [Disabled]          * F1    General Help     *
* MTRR Mapping                   [Continuous]        * F10   Save and Exit    *
* Speculative TLB Reload         [Enabled]           * ESC   Exit             *
*                                                    *                        *
*********************************************************************************
```

```
          Advanced
*******************************************************************************
* CPU Configuration                                 * This option should     *
* Module Version: 14.05                             * remain disabled for    *
* Physical Count: 2                                 * the normal operation.  *
* Logical Count : 2                                 * The driver developer   *
* ************************************************* * may enable it for      *
* AMD Opteron(tm) Processor 852                     * testing purpose.       *
* Revision: E4                                      *                        *
* Cache L1: 64KB                                    *                        *
* Cache L2: 1024KB                                  *                        *
* Speed   : 2.6 GHz                                 *                        *
* Current FSB Multiplier: 13x                       *                        *
* Maximum FSB Multiplier: 13x                       *                        *
* Able to Change Freq.  : Yes                       * **    Select Screen    *
* uCode Patch Level     : None Required             * **    Select Item      *
*                                                   * +-    Change Option    *
* GART Error Reporting           [Disabled]         * F1    General Help     *
* MTRR Mapping                   [Continuous]       * F10   Save and Exit    *
* CPU Overclock in MHz           [200]              * ESC   Exit             *
* Speculative TLB Reload         [Enabled]          *                        *
*                                                   *                        *
*******************************************************************************
```

2.3.6.4 BIOS Advanced Menu IDE Configuration Screen

Sun Fire X4100/X4200 Servers

```
          Advanced
*******************************************************************************
* IDE Configuration                                  * DISABLED: disables the *
* ********************************************** * integrated IDE         *
* OnBoard PCI IDE Controller     [Primary]           * Controller.            *
*                                                    * PRIMARY: enables only  *
* * Primary IDE Master              : [ATAPI CDROM]  * the Primary IDE        *
* * Primary IDE Slave               : [Not Detected] * Controller.            *
*                                                    * SECONDARY: enables     *
* Hard Disk Write Protect        [Disabled]          * only the Secondary IDE *
* IDE Detect Time Out (Sec)      [5]                 * Controller.            *
*                                                    * BOTH: enables both IDE *
*                                                    * Controllers.           *
*                                                    *                        *
*                                                    * **    Select Screen    *
*                                                    * **    Select Item      *
*                                                    * +-    Change Option    *
*                                                    * F1    General Help     *
*                                                    * F10   Save and Exit    *
*                                                    * ESC   Exit             *
*                                                    *                        *
*                                                    *                        *
*******************************************************************************
```

```
          Advanced
*******************************************************************************
* IDE Configuration                                  * DISABLED: disables the *
* ********************************************** * integrated IDE         *
* OnBoard PCI IDE Controller     [Primary]           * Controller.            *
*                                                    * PRIMARY: enables only  *
* * Primary IDE Master              : [ATAPI CDROM]  * the Primary IDE        *
* * Primary IDE Slave               : [Not Detected] * Controller.            *
*                                                    * SECONDARY: enables     *
* Hard Disk Write Protect        [Disabled]          * only the Secondary IDE *
* IDE Detect Time Out (Sec)      [5]                 * Controller.            *
*                                                    * BOTH: enables both IDE *
* ATA(PI) 80 Pin Cable Detection  [Disabled]         * Controllers.           *
* SATA0 IDE Interface             [Disabled]         *                         *
* SATA1 IDE Interface             [Disabled]         * **    Select Screen    *
* IO4 SATA0 IDE Interface         [Disabled]         * **    Select Item      *
* IO4 SATA1 IDE Interface         [Disabled]         * +-    Change Option    *
* First Boot Device from          [P-ATA]            * F1    General Help     *
*                                                    * F10   Save and Exit    *
*                                                    * ESC   Exit             *
*                                                    *                        *
*******************************************************************************
```

2.3.6.5 BIOS Advanced Menu SuperIO Chipset Configuration Screen

```
          Advanced
*******************************************************************************
* Configure Smc27X Super IO Chipset                  * Allows BIOS to Select  *
* ********************************************** * Serial Port1 Base      *
* Serial Port1 Address           [3F8/IRQ4]          * Addresses.             *
*                                                    *                        *
*                                                    *                        *
*                                                    *                        *
*                                                    *                        *
*                                                    *                        *
*                                                    *                        *
*                                                    *                        *
*                                                    *                        *
*                                                    * **    Select Screen    *
*                                                    * **    Select Item      *
*                                                    * +-    Change Option    *
*                                                    * F1    General Help     *
*                                                    * F10   Save and Exit    *
*                                                    * ESC   Exit             *
*                                                    *                        *
*                                                    *                        *
*******************************************************************************
```

2.3.6.6 BIOS Advanced Menu ACPI Settings Screen

```
          Advanced
*********************************************************************************
* ACPI Settings                                    * Yes / No                   *
* ************************************************ * ACPI support for           *
* ACPI Aware O/S                 [Yes]             * Operating System.          *
*                                                  *                            *
* * Advanced ACPI Configuration                    * Yes: If OS                 *
*                                                  * supports ACPI.             *
*                                                  *                            *
*                                                  * No: If OS                  *
*                                                  * does not support           *
*                                                  * ACPI.                      *
*                                                  *                            *
*                                                  *                            *
*                                                  * **    Select Screen        *
*                                                  * **    Select Item          *
*                                                  * +-    Change Option        *
*                                                  * F1    General Help         *
*                                                  * F10   Save and Exit        *
*                                                  * ESC   Exit                 *
*                                                  *                            *
*                                                  *                            *
*********************************************************************************
```

2.3.6.7 BIOS Advanced Menu ACPI Configuration Screen

```
          Advanced
*******************************************************************************
* Advanced ACPI Configuration                        * Enable RSDP pointers   *
* ************************************************** * to 64-bit Fixed System *
* ACPI 2.0 Features              [Yes]               * Description Tables.    *
* ACPI APIC support              [Enabled]           *                        *
* ACPI SRAT Table                [Enabled]           *                        *
* AMI OEMB table                 [Enabled]           *                        *
* Headless mode                  [Enabled]           *                        *
*                                                    *                        *
*                                                    *                        *
*                                                    *                        *
*                                                    *                        *
*                                                    *                        *
*                                                    * **    Select Screen    *
*                                                    * **    Select Item      *
*                                                    * +-    Change Option    *
*                                                    * F1    General Help     *
*                                                    * F10   Save and Exit    *
*                                                    * ESC   Exit             *
*                                                    *                        *
*                                                    *                        *
*******************************************************************************
```

2.3.6.8 BIOS Advanced Menu Event Logging Details Screen

```
          Advanced
*******************************************************************************
* Event Logging details                                * View all unread events *
* ************************************************** * on the Event Log.      *
* View Event Log                                       *                       *
* Mark all events as read                              *                       *
* Clear Event Log                                      *                       *
*                                                      *                       *
*                                                      *                       *
*                                                      *                       *
*                                                      *                       *
*                                                      *                       *
*                                                      *                       *
*                                                      *                       *
*                                                      * **    Select Screen   *
*                                                      * **    Select Item     *
*                                                      * Enter Go to Sub Screen *
*                                                      * F1    General Help    *
*                                                      * F10   Save and Exit   *
*                                                      * ESC   Exit            *
*                                                      *                       *
*                                                      *                       *
*******************************************************************************
```

2.3.6.9 BIOS Advanced Menu HyperTransport Configuration Screen

Sun Fire X4100/X4200 Servers

```
          Advanced
*********************************************************************************
* Hyper Transport Configuration                      * The HyperTransport     *
* ************************************************** * link will run at this  *
*                                                    * speed if it is slower  *
* CPU0:CPU1 HT Link Speed        [Auto]              * than or equal to the   *
* CPU0:CPU1 HT Link Width        [Auto]              * system clock and the   *
*                                                    * board is capable.      *
* CPU0:PCI-X0 HT Link Speed      [Auto]              *                         *
* CPU0:PCI-X0 HT Link Width      [Auto]              *                         *
*                                                    *                         *
* CPU0:PCI-X1 HT Link Speed      [Auto]              *                         *
* CPU0:PCI-X1 HT Link Width      [Auto]              *                         *
*                                                    *                         *
*                                                    * **    Select Screen    *
*                                                    * **    Select Item      *
*                                                    * +-    Change Option    *
*                                                    * F1    General Help     *
*                                                    * F10   Save and Exit    *
*                                                    * ESC   Exit             *
*********************************************************************************
```

```
          Advanced
*******************************************************************************
* Hyper Transport Configuration                      * The HyperTransport     *
* ************************************************** * link will run at this  *
*                                                    * speed if it is slower  *
* CPU0:CPU1 HT Link Speed        [Auto]              * than or equal to the   *
* CPU0:CPU1 HT Link Width        [Auto]              * system clock and the   *
*                                                    * board is capable.      *
* CPU0:CK804 HT Link Speed       [Auto]              *                         *
* CPU0:CK804 HT Link Width       [Auto]              *                         *
*                                                    *                         *
* CPU0:CPU1 HT Link Speed        [Auto]              *                         *
* CPU0:CPU1 HT Link Width        [Auto]              *                         *
*                                                    *                         *
* CPU1:PCI-X HT Link Speed       [Auto]              *                         *
* CPU1:PCI-X HT Link Width       [Auto]              *                         *
*                                                    * **    Select Screen    *
* PCI-X:IO4  HT Link Speed       [Auto]              * **    Select Item      *
* PCI-X:IO4  HT Link Width       [Auto]              * +-    Change Option    *
*                                                    * F1    General Help     *
*                                                    * F10   Save and Exit    *
*                                                    * ESC   Exit             *
*                                                    *                         *
*******************************************************************************
```

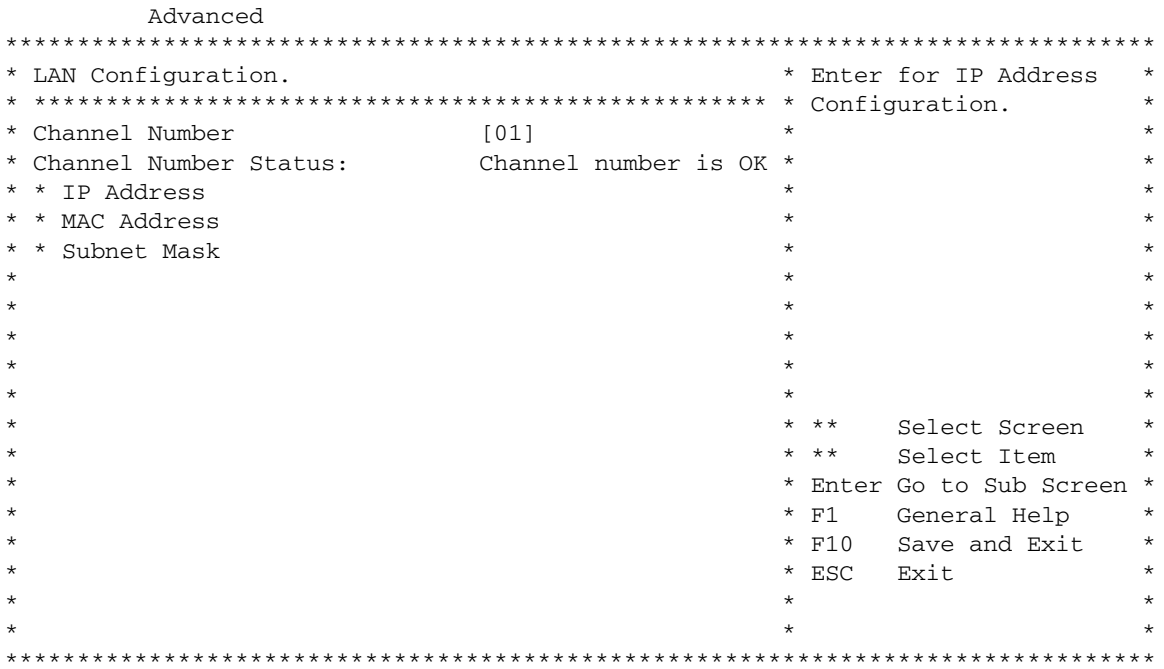
2.3.6.10 BIOS Advanced Menu IPMI Configuration Screen

```
          Advanced
*******************************************************************************
* IPMI 2.0 Configuration                          * View all events in the *
* ********************************************** * BMC Event Log.         *
* Status Of BMC                  Working          *                        *
* * View BMC System Event Log                     * It will take up to     *
* Reload BMC System Event Log                     * 60 Seconds approx.      *
* Clear BMC System Event Log                      * to read all            *
* * LAN Configuration                             * BMC SEL records.       *
* * PEF Configuration                             *                        *
* BMC Watch Dog Timer Action     [Disabled]       *                        *
*                                                 *                        *
*                                                 * **    Select Screen    *
*                                                 * **    Select Item      *
*                                                 * Enter Go to Sub Screen *
*                                                 * F1    General Help     *
*                                                 * F10   Save and Exit    *
*                                                 * ESC   Exit             *
*                                                 *                        *
*******************************************************************************
```

2.3.6.11 BIOS Advanced Menu IPMI, View BMC Event Log Screen

```
       Advanced
*******************************************************************************
* Total Number Of Entries:     36                    * Use +/- to traverse    *
* ********************************************** * the event log.          *
* SEL Entry Number:            [01]                  *                         *
* SEL Record ID:               0100                  *                         *
* SEL Record Type:             02 (System Event)     *                         *
* Event Timestamp:             1166s from SEL init   *                         *
* Generator ID:                0020                  *                         *
* Event Message Format Ver:    04 (IPMI ver 1.5)     *                         *
* Event Sensor Type:           25 (Entity Presence)  *                         *
* Event Sensor Number:         1F                    *                         *
* Event Dir Type:              08                    *                         *
* Event Data:                  00 FF FF              *                         *
*                                                    * **    Select Screen    *
*                                                    * **    Select Item      *
*                                                    * +-    Change Option    *
*                                                    * F1    General Help     *
*                                                    * F10   Save and Exit    *
*                                                    * ESC   Exit             *
*******************************************************************************
```

2.3.6.12 BIOS Advanced Menu IPMI, LAN Configuration Screen



2.3.6.13 BIOS Advanced Menu IPMI, PEF Configuration Screen

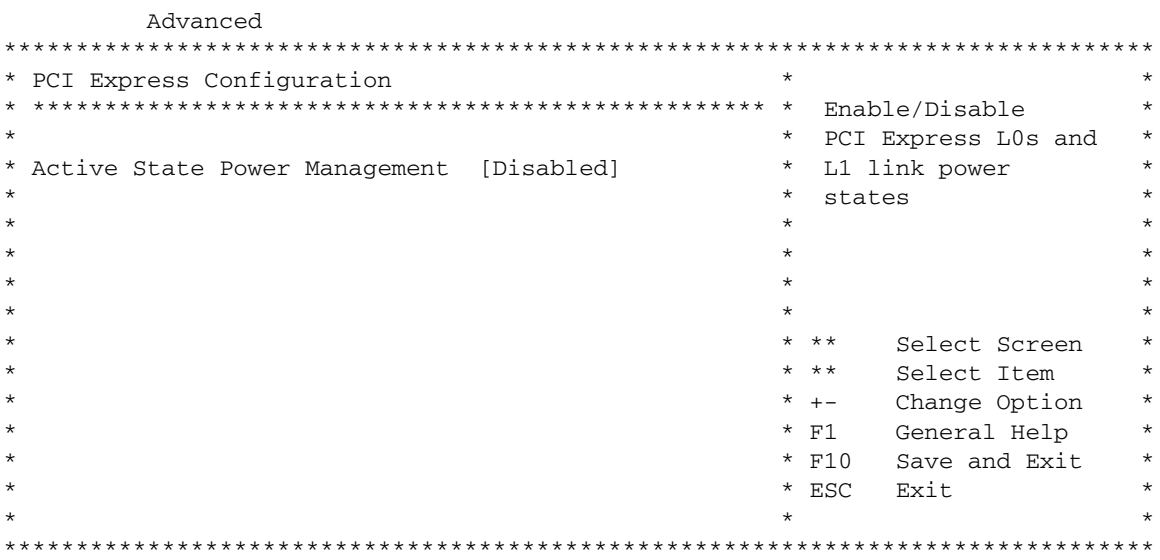
```
          Advanced
*******************************************************************************
* Set PEF Configuration Parameters Command.           * Enable or Disable PEF  *
* ************************************************* * Support.                 *
* PEF SUPPORT                    [Enabled]            * Refer Table 24.6 of    *
* * PEF Action Global Control                         * IPMI Specification 1.5 *
* Alert Startup Delay            [Disabled]           *                        *
* Startup Delay                  [Disabled]           *                        *
* Event Message For PEF Action   [Disabled]           *                        *
*                                                     *                        *
*                                                     *                        *
*                                                     *                        *
*                                                     *                        *
*                                                     * **    Select Screen    *
*                                                     * **    Select Item      *
*                                                     * +-    Change Option    *
*                                                     * F1    General Help     *
*                                                     * F10   Save and Exit    *
*                                                     * ESC   Exit             *
*                                                     *                        *
*******************************************************************************
```

2.3.6.14 BIOS Advanced Menu MPS Configuration Screen

```
          Advanced
*******************************************************************************
* MPS Configuration                                 * MPS Revision            *
* ********************************************** *                           *
* MPS Revision                  [1.4]               *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   * **    Select Screen     *
*                                                   * **    Select Item       *
*                                                   * +-    Change Option     *
*                                                   * F1    General Help      *
*                                                   * F10   Save and Exit     *
*                                                   * ESC   Exit              *
*                                                   *                         *
*                                                   *                         *
*******************************************************************************
```

2.3.6.15 BIOS Advanced Menu PCI Express Configuration Screen

Sun Fire X4100 M2/X4200 M2 Servers Only



2.3.6.16 BIOS Advanced Menu, AMD PowerNow Configuration

```
         Advanced
*******************************************************************************
* AMD PowerNow Configuration                          * Enabled/Disabled      *
* ************************************************** * PowerNow               *
* PowerNow                        [Enabled]           *                        *
*                                                     *                        *
*                                                     *                        *
*                                                     *                        *
*                                                     *                        *
*                                                     *                        *
*                                                     *                        *
*                                                     *                        *
*                                                     *                        *
*                                                     *                        *
*                                                     * **    Select Screen    *
*                                                     * **    Select Item      *
*                                                     * +-    Change Option    *
*                                                     * F1    General Help     *
*                                                     * F10   Save and Exit    *
*                                                     * ESC   Exit             *
*                                                     *                        *
*                                                     *                        *
*******************************************************************************
```

2.3.6.17 BIOS Advanced Menu Remote Access Configuration Screen

```
          Advanced
*******************************************************************************
* Configure Remote Access type and parameters         * Select Remote Access   *
* *************************************************** * type.                  *
* Remote Access                  [Enabled]            *                        *
*                                                     *                        *
* Serial port number             [COM1]               *                        *
*      Base Address, IRQ         [3F8h, 4]            *                        *
* Serial Port Mode               [09600 8,n,1]        *                        *
* Flow Control                   [None]               *                        *
* Redirection After BIOS POST    [Always]             *                        *
* Terminal Type                  [ANSI]               *                        *
* VT-UTF8 Combo Key Support      [Enabled]            *                        *
* Sredir Memory Display Delay    [No Delay]           *                        *
*                                                     * **    Select Screen    *
*                                                     * **    Select Item      *
*                                                     * +-    Change Option    *
*                                                     * F1    General Help     *
*                                                     * F10   Save and Exit    *
*                                                     * ESC   Exit             *
*                                                     *                        *
*                                                     *                        *
*******************************************************************************
```

2.3.6.18 BIOS Advanced Menu USB Configuration Screen

Sun Fire X4100/X4200 Servers

```
          Advanced
*******************************************************************************
* USB Configuration                                  * Enables support for    *
* ************************************************ * legacy USB. AUTO       *
* Module Version - 2.23.0-7.4                        * option disables        *
*                                                    * legacy support if      *
* USB Devices Enabled :                              * no USB devices are     *
*   1 Keyboard, 1 Mouse, 1 Hub, 2 Drives             * connected.             *
*                                                    *                        *
* Legacy USB Support             [Enabled]           *                        *
* Hotplug USB FDD Support        [Auto]              *                        *
* Hotplug USB CDROM Support      [Auto]              *                        *
*                                                    *                        *
* * USB Mass Storage Device Configuration            *                        *
*                                                    * **    Select Screen    *
*                                                    * **    Select Item      *
*                                                    * +-    Change Option    *
*                                                    * F1    General Help     *
*                                                    * F10   Save and Exit    *
*                                                    * ESC   Exit             *
*******************************************************************************
```

```
          Advanced
*******************************************************************************
* USB Configuration                                   * Enables support for    *
* ************************************************* * legacy USB. AUTO        *
* Module Version - 2.24.0-F.4                         * option disables        *
*                                                     * legacy support if      *
* USB Devices Enabled :                               * no USB devices are     *
*   1 Keyboard, 1 Mouse, 1 Hub, 2 Drives              * connected.             *
*                                                     *                        *
* USB Controller Support         [USB1.1+USB2.0]      *                        *
* Legacy USB Support             [Enabled]            *                        *
* USB 2.0 Controller Mode        [HiSpeed]            *                        *
* BIOS EHCI Hand-off             [Enabled]            *                        *
* Hotplug USB FDD Support        [Auto]               *                        *
* Hotplug USB CDROM Support      [Auto]               *                        *
*                                                     *                        *
* * USB Mass Storage Device Configuration             *                        *
*                                                     * **    Select Screen    *
*                                                     * **    Select Item      *
*                                                     * +-    Change Option    *
*                                                     * F1    General Help     *
*                                                     * F10   Save and Exit    *
*                                                     * ESC   Exit             *
*******************************************************************************
```

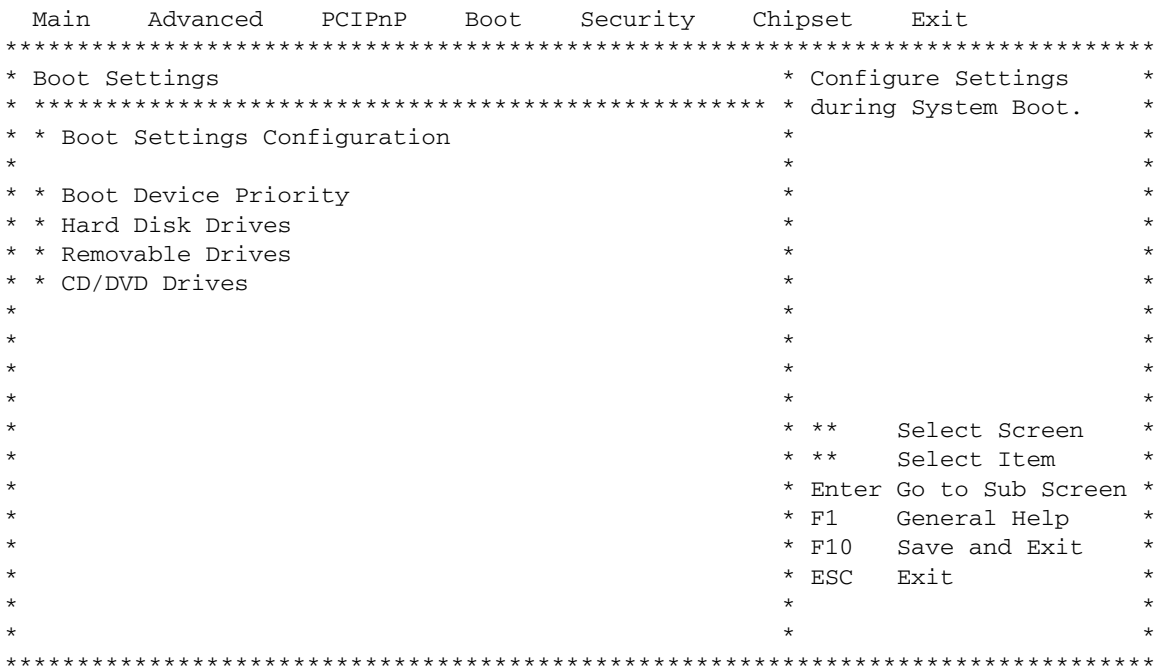
2.3.6.19 BIOS PCI/PnP Menu

Sun Fire X4100/X4200 Servers

```
  Main    Advanced    PCIPnP    Boot    Security    Chipset    Exit
*************************************************************************************
* Advanced PCI/PnP Settings                          ** NO: lets the BIOS      *
* ************************************************** configure all the       *
* WARNING: Setting wrong values in below sections    ** devices in the system. *
*          may cause system to malfunction.          ** YES: lets the          *
*                                                    ** operating system       *
* Plug & Play O/S                [No]                ** configure Plug and     *
* PCI Latency Timer              [64]                ** Play (PnP) devices not *
* Allocate IRQ to PCI VGA        [Yes]               ** required for boot if   *
* Palette Snooping               [Disabled]          ** your system has a Plug *
* PCI IDE BusMaster              [Disabled]          ** and Play operating     *
* OffBoard PCI/ISA IDE Card      [Auto]              ** system.                 *
* Onboard LSI SAS/SATA           [Enabled]           **                        *
* Onboard PCI NIC                [Enabled]           ** **    Select Screen    *
* PCIX SLOT1                     [Enabled]           ** **    Select Item      *
* PCIX SLOT2                     [Enabled]           ** +-    Change Option    *
* PCIX SLOT3                     [Enabled]           ** F1    General Help     *
* PCIX SLOT4                     [Enabled]           ** F10   Save and Exit    *
* PCIX SLOT5                     [Enabled]           ** ESC   Exit             *
* Onboard PCI NIC MAC Address                        **                        *
*   GE NIC 1 : 00 03 BA CD 51 39                     **                        *
*   GE NIC 2 : 00 03 BA CD 51 38                     ** Available: Specified   *
*   GE NIC 3 : 00 03 BA CD 51 3B                     ** DMA is available to be *
*   GE NIC 3 : 00 03 BA CD 51 3B                     ** used by PCI/PnP        *
*                                                    ** devices.               *
* IRQ3                           [Available]         ** Reserved: Specified    *
* IRQ4                           [Reserved]          ** DMA is reserved for    *
* IRQ5                           [Available]         ** use by legacy ISA      *
* IRQ7                           [Available]         ** devices.               *
* IRQ9                           [Available]         **                        *
* IRQ10                          [Available]         **                        *
* IRQ11                          [Available]         **                        *
* IRQ14                          [Available]         **                        *
* IRQ15                          [Available]         ** **    Select Screen    *
*                                                    ** **    Select Item      *
* DMA Channel 0                  [Available]         ** +-    Change Option    *
* DMA Channel 1                  [Available]         ** F1    General Help     *
* DMA Channel 3                  [Available]         ** F10   Save and Exit    *
* DMA Channel 5                  [Available]         ** ESC   Exit             *
* DMA Channel 6                  [Available]         **                        *
* DMA Channel 7                  [Available]         **                        *
*                                                    **                        *
* Reserved Memory Size           [Disabled]          **                        *
*************************************************************************************
```

```
  Main    Advanced    PCIPnP    Boot    Security    Chipset    Exit
*************************************************************************************
* Advanced PCI/PnP Settings                          ** NO: lets the BIOS      *
* ************************************************** configure all the       *
* WARNING: Setting wrong values in below sections    ** devices in the system. *
*          may cause system to malfunction.          **                        *
*                                                    ** YES: lets the          *
* Clear NVRAM                    [No]                ** operating system       *
* Plug & Play O/S                [No]                ** configure Plug and     *
* PCI Latency Timer              [64]                ** Play (PnP) devices not *
* Allocate IRQ to PCI VGA        [Yes]               ** required for boot if   *
* Palette Snooping               [Disabled]          ** your system has a Plug *
* PCI IDE BusMaster              [Disabled]          ** and Play operating     *
* OffBoard PCI/ISA IDE Card      [Auto]              ** system.                 *
* PCI Option ROM control         [Enabled]           **                        *
* Scanning onboard SAS/SATA ROM  [Enabled]           **                        *
* Scanning onboard NIC OPROM     [Enabled]           ** **    Select Screen    *
* Scanning OPROM on PCIE SLOT0   [Enabled]           ** **    Select Item      *
* Scanning OPROM on PCIE SLOT1   [Enabled]           ** +-    Change Option    *
* Scanning OPROM on PCIX SLOT2   [Enabled]           ** F1    General Help     *
* Scanning OPROM on PCIE SLOT3   [Enabled]           ** F10   Save and Exit    *
* Scanning OPROM on PCIE SLOT4   [Enabled]           ** ESC   Exit             *
* Onboard PCI NIC MAC Address                        **                        *
*   Nvidia CK804 NIC 1 : 00 03 BA CD 51 39           **                        *
*   Nvidia IO4 NIC 2   : 00 03 BA CD 51 38           ** Available: Specified   *
*   Intel GiGE NIC 3   : 00 03 BA CD 51 3B           ** DMA is available to be *
*   Intel GiGE NIC 3   : 00 03 BA CD 51 3B           ** used by PCI/PnP        *
*                                                    ** devices.               *
* IRQ3                           [Available]         ** Reserved: Specified    *
* IRQ4                           [Reserved]          ** DMA is reserved for    *
* IRQ5                           [Available]         ** use by legacy ISA      *
* IRQ7                           [Available]         ** devices.               *
* IRQ9                           [Available]         **                        *
* IRQ10                          [Available]         **                        *
* IRQ11                          [Available]         **                        *
* IRQ14                          [Available]         **                        *
* IRQ15                          [Available]         ** **    Select Screen    *
*                                                    ** **    Select Item      *
* DMA Channel 0                  [Available]         ** +-    Change Option    *
* DMA Channel 1                  [Available]         ** F1    General Help     *
* DMA Channel 3                  [Available]         ** F10   Save and Exit    *
* DMA Channel 5                  [Available]         ** ESC   Exit             *
* DMA Channel 6                  [Available]         **                        *
* DMA Channel 7                  [Available]         **                        *
*                                                    **                        *
* Reserved Memory Size           [Disabled]          **                        *
*************************************************************************************
```

2.3.6.20 BIOS Boot Menu Main Screen



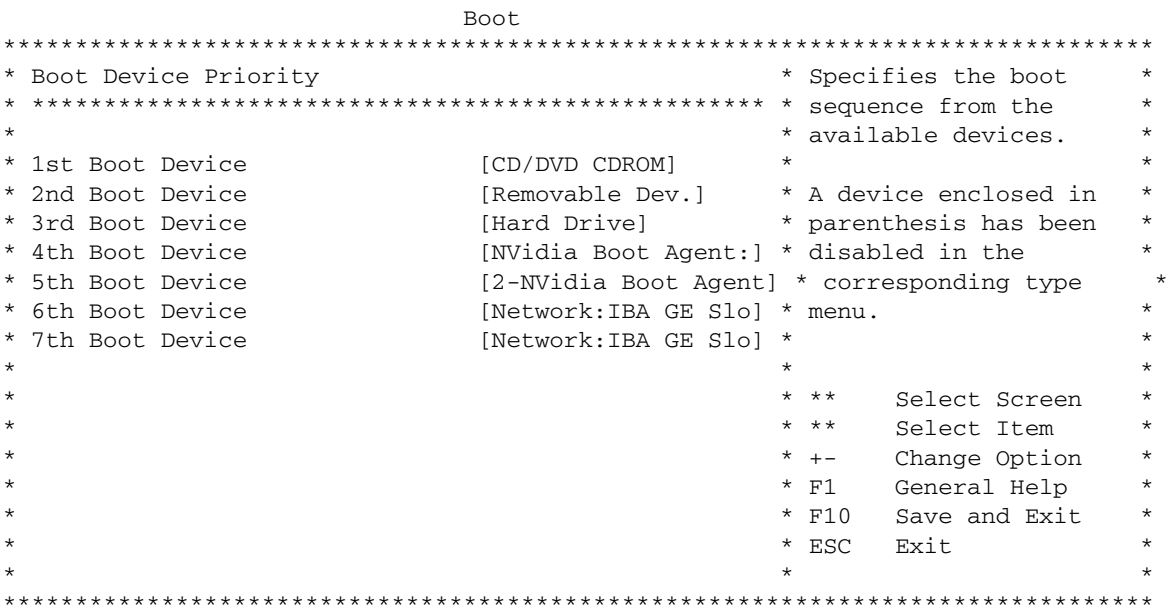
2.3.6.21 BIOS Boot Settings Configuration Screen

```
                                Boot
********************************************************************************
* Boot Settings Configuration                          * Allows BIOS to skip    *
* **************************************************** * certain tests while    *
* Quick Boot                       [Disabled]          * booting. This will     *
* System Configuration Display     [Disabled]          * decrease the time      *
* Quiet Boot                       [Disabled]          * needed to boot the     *
* Language                         [English]           * system.                *
* AddOn ROM Display Mode           [Force BIOS]        *                        *
* Bootup Num-Lock                  [On]                *                        *
* Wait For 'F1' If Error           [Disabled]          *                        *
* Interrupt 19 Capture             [Disabled]          *                        *
* Default Boot Order               [CRHB]              *                        *
*                                                      *                        *
*                                                      * **    Select Screen    *
*                                                      * **    Select Item      *
*                                                      * +-    Change Option    *
*                                                      * F1    General Help     *
*                                                      * F10   Save and Exit    *
*                                                      * ESC   Exit             *
*                                                      *                        *
*                                                      *                        *
********************************************************************************
```

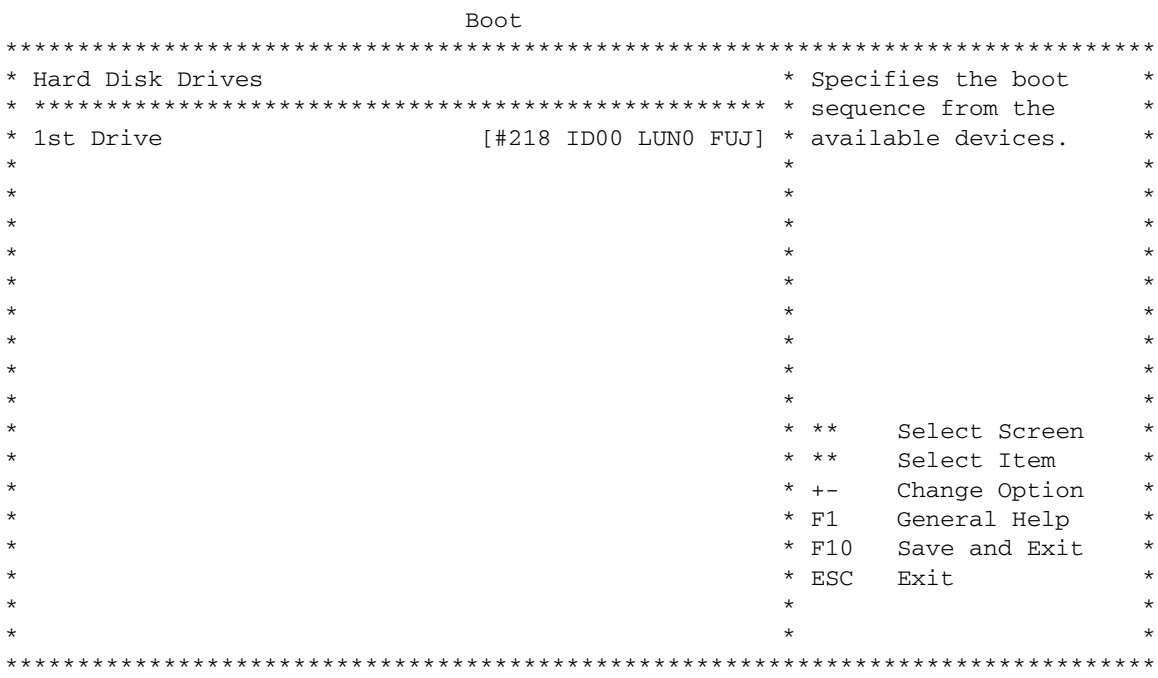
2.3.6.22 BIOS Boot Menu Boot Device Priority Screen

Sun Fire X4100/X4200 Servers

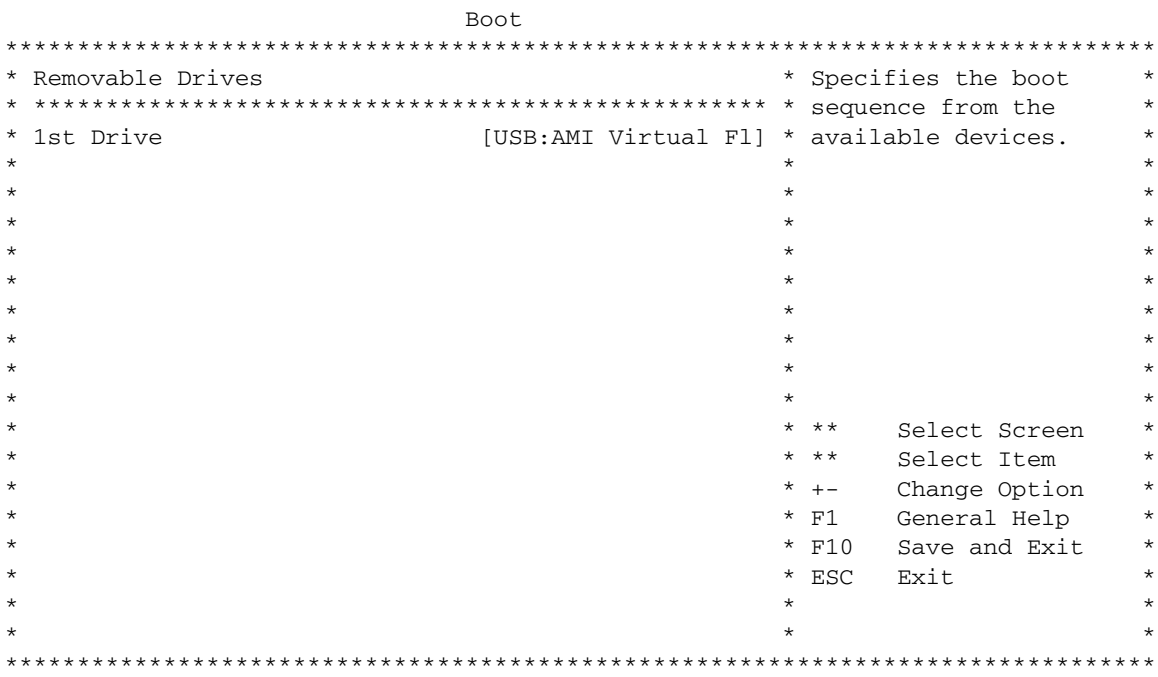
```
                                Boot
********************************************************************************
* Boot Device Priority                                 * Specifies the boot     *
* **************************************************** * sequence from the      *
*                                                      * available devices.     *
* 1st Boot Device                [CD/DVD Drives]       *                        *
* 2nd Boot Device                [Removable Dev.]      * A device enclosed in   *
* 3rd Boot Device                [Hard Drive]          * parenthesis has been   *
* 4th Boot Device                [IBA GE Slot 0108 v]  * disabled in the        *
* 5th Boot Device                [IBA GE Slot 0109 v]  * corresponding type     *
* 6th Boot Device                [IBA GE Slot 0110 v]  * menu.                  *
* 7th Boot Device                [IBA GE Slot 0111 v]  *                        *
*                                                      *                        *
*                                                      * **    Select Screen    *
*                                                      * **    Select Item      *
*                                                      * +-    Change Option    *
*                                                      * F1    General Help     *
*                                                      * F10   Save and Exit    *
*                                                      * ESC   Exit             *
*                                                      *                        *
********************************************************************************
```


Boot
Boot Device Priority
Specifies the boot sequence from the available devices.
1st Boot Device [CD/DVD CDROM]
2nd Boot Device [Removable Dev.]
3rd Boot Device [Hard Drive]
4th Boot Device [NVidia Boot Agent:]
5th Boot Device [2-NVidia Boot Agent]
6th Boot Device [Network:IBA GE Slo]
7th Boot Device [Network:IBA GE Slo]
A device enclosed in parenthesis has been disabled in the corresponding type menu.
** Select Screen
** Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit

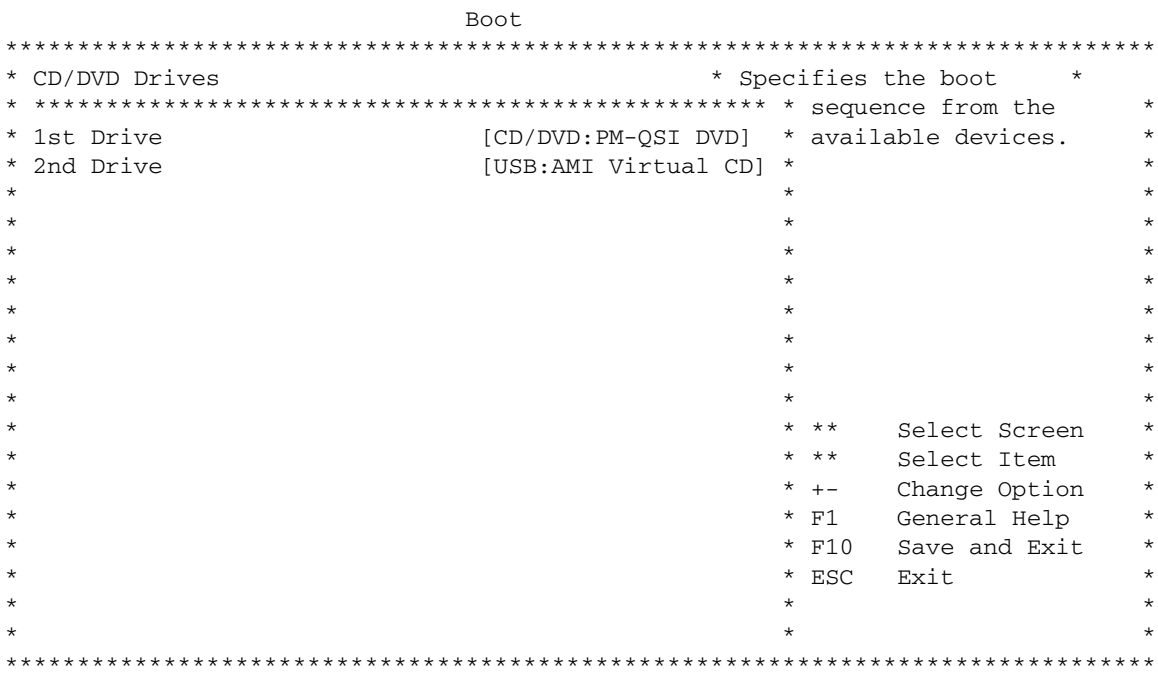
2.3.6.23 BIOS Boot Menu Hard Disk Drives Screen



2.3.6.24 BIOS Boot Menu Removable Drives Screen



2.3.6.25 BIOS Boot Menu CD/DVD Drives Screen



2.3.6.26 BIOS Security Settings Menu

```
   Main    Advanced    PCIPnP    Boot    Security    Chipset    Exit
*************************************************************************************
* Security Settings                                  * Install or Change the  *
* ************************************************ * password.               *
* Supervisor Password :Not Installed                 *                         *
* User Password       :Not Installed                 *                         *
*                                                    *                         *
* Change Supervisor Password                         *                         *
* Change User Password                               *                         *
* Clear User Password                                *                         *
*                                                    *                         *
* Boot Sector Virus Protection   [Disabled]          *                         *
*                                                    *                         *
*                                                    *                         *
*                                                    * **    Select Screen    *
*                                                    * **    Select Item      *
*                                                    * Enter Change           *
*                                                    * F1    General Help     *
*                                                    * F10   Save and Exit    *
*                                                    * ESC   Exit             *
*                                                    *                         *
*                                                    *                         *
*************************************************************************************
```

2.3.6.27 BIOS Chipset Menu Main Screen

Sun Fire X4100/X4200 Servers

```
  Main    Advanced    PCIPnP    Boot    Security    Chipset    Exit
*********************************************************************************
*                                                    * Options for NB          *
* * NorthBridge Configuration                       *                          *
* * SouthBridge Configuration                       *                          *
* * PCI-X Configuration                             *                          *
*                                                    *                          *
*                                                    *                          *
*                                                    *                          *
*                                                    *                          *
*                                                    * **    Select Screen     *
*                                                    * **    Select Item       *
*                                                    * Enter Go to Sub Screen  *
*                                                    * F1    General Help      *
*                                                    * F10   Save and Exit     *
*                                                    * ESC   Exit              *
*                                                    *                          *
*                                                    *                          *
*********************************************************************************
```

Sun Fire X4100 M2/X4200 M2 Servers

```
  Main    Advanced    PCIPnP    Boot    Security    Chipset    Exit
*********************************************************************************
*                                                    * Options for NB          *
* * NorthBridge Configuration                       *                          *
* * SouthBridge Configuration                       *                          *
* *                                                 *                          *
*                                                    *                          *
*                                                    *                          *
*                                                    *                          *
*                                                    *                          *
*                                                    *                          *
*                                                    * **    Select Screen     *
*                                                    * **    Select Item       *
*                                                    * Enter Go to Sub Screen  *
*                                                    * F1    General Help      *
*                                                    * F10   Save and Exit     *
*                                                    * ESC   Exit              *
*                                                    *                          *
*                                                    *                          *
*********************************************************************************
```

2.3.6.28 BIOS Chipset Menu NorthBridge Configuration Screen

```
                                                    Chipset
********************************************************************************
* NorthBridge Chipset Configuration                      *                        *
* ***************************************************** *                        *
* * Memory Configuration                                 *                        *
* * ECC Configuration                                    *                        *
* Power Down Control             [Auto]                  *                        *
* ***************************************************** *                        *
* Memory Timing Parameters       [CPU Node 0]            *                        *
*   Memory CLK              :200 MHz                     *                        *
*   CAS Latency(Tcl)        :3.0                         *                        *
*   RAS/CAS Delay(Trcd)     :3 CLK                       *                        *
*   Min Active RAS(Tras)    :8 CLK                       *                        *
*   Row Precharge Time(Trp):3 CLK                        * **    Select Screen    *
*   RAS/RAS Delay(Trrd)     :2 CLK                       * **    Select Item      *
*   Row Cycle (Trc)         :11 CLK                      * Enter Go to Sub Screen *
*   Row Refresh Cycle(Trfc):14 CLK                       * F1    General Help     *
*   Read Write Delay(Trwt) :4 CLK                        * F10   Save and Exit    *
*   Read Preamble           :7.0 ns                      * ESC   Exit             *
*   Asynchronous Latency    :8 ns                        *                        *
*                                                        *                        *
********************************************************************************
```

2.3.6.29 BIOS Chipset Menu NorthBridge Memory Configuration Screen

```
                                                 Chipset
********************************************************************************
* Memory Configuration                                 * MEMCLK can be set       *
* **************************************************** * by the code using       *
* Memclock Mode                   [Auto]               * AUTO, or if you use     *
* MCT Timing Mode                 [Auto]               * LIMIT, you can set      *
* User Config Mode                [Auto]               * one of the standard     *
* Bank Interleaving               [Auto]               * values.                 *
* Burst Length                    [4 Beats]            *                         *
* Enable Clock to All DIMMs       [Disabled]           *                         *
* SoftWare Memory Hole            [Disabled]           *                         *
* HardWare Memory Hole            [Disabled]           *                         *
* Node Interleaving               [Disabled]           *                         *
*                                                      *                         *
*                                                      * **    Select Screen     *
*                                                      * **    Select Item       *
*                                                      * +-    Change Option     *
*                                                      * F1    General Help      *
*                                                      * F10   Save and Exit     *
*                                                      * ESC   Exit              *
*                                                      *                         *
********************************************************************************
```

2.3.6.30 BIOS Chipset Menu NorthBridge ECC Configuration Screen

```
                                                     Chipset
********************************************************************************
* ECC Configuration                                    * DRAM ECC allows       *
* **************************************************** * hardware to report    *
* DRAM ECC Enable                 [Enabled]            * and correct memory    *
*   MCA DRAM ECC Logging          [Enabled]            * errors automatically  *
*   ECC Chip Kill                 [Enabled]            * maintaining system    *
*   DRAM SCRUB REDIRECT           [Disabled]           * integrity.            *
*   DRAM BG Scrub                 [Disabled]           *                       *
* L2 Cache BG Scrub               [Disabled]           *                       *
* Data Cache BG Scrub             [Disabled]           *                       *
*                                                      *                       *
*                                                      *                       *
*                                                      *                       *
*                                                      * **     Select Screen  *
*                                                      * **     Select Item    *
*                                                      * +-     Change Option  *
*                                                      * F1     General Help   *
*                                                      * F10    Save and Exit  *
*                                                      * ESC    Exit           *
*                                                      *                       *
*                                                      *                       *
********************************************************************************
```

2.3.6.31 BIOS Chipset Menu SouthBridge Configuration Screen

Sun Fire X4100/X4200 Servers

```
                                                   Chipset
********************************************************************************
* South Bridge Chipset Configuration                    * Enable/disable       *
* ***************************************************** * SMBUS 2.0 Controller *
* 2.0 SM Bus Controller         [Enabled]               * in South Bridge      *
* Restore on AC/Power Loss      [Power Off]             *                      *
* Power Button Behavior         [Instant Off]           *                      *
*                                                       *                      *
* HT Link 0 P-Comp Mode         [Auto]                  *                      *
* HT Link 0 N-Comp Mode         [Auto]                  *                      *
* HT Link 0 RZ-Comp Mode        [Auto]                  *                      *
*                                                       *                      *
*                                                       * **    Select Screen  *
*                                                       * **    Select Item    *
*                                                       * +-    Change Option  *
*                                                       * F1    General Help   *
*                                                       * F10   Save and Exit  *
*                                                       * ESC   Exit           *
*                                                       *                      *
********************************************************************************
```

```
                                                    Chipset
*******************************************************************************
* South Bridge Chipset Configuration                  * Enable/disable         *
* ************************************************** * SMBUS 2.0 Controller   *
* SM Bus Interface               [Enabled]            * in South Bridge        *
*                                                     *                        *
* MAC Interface                  [Enabled]            *                        *
* IO4 Interface                  [Enabled]            *                        *
* MAC Bridge Mode                [Enabled]            *                        *
* MAC Media Interface            [Enabled]            *                        *
* MAC Option ROM                 [Enabled]            *                        *
*                                                     *                        *
* Onboard IO APIC                [Enabled]            *                        *
*                                                     *                        *
* CPU Spread spectrum            [Disabled]           *                        *
* SATA Spread spectrum           [Disabled]           *                        *
* PCI-Express Spread spectrum    [Disabled]           *                        *
*                                                     *                        *
* Primary Video                  [Master PCI-Express] * **    Select Screen    *
*                                                     * **    Select Item      *
*                                                     * +-    Change Option    *
* Restore on AC/Power Loss       [Power Off]          * F1    General Help     *
* Power Button Behavior          [Instant Off]        * F10   Save and Exit    *
*                                                     * ESC   Exit             *
*******************************************************************************
```

2.3.6.32 BIOS Chipset Menu PCI-X Configuration Screen

Sun Fire X4100/X4200 Servers Only

```
                                                    Chipset
*********************************************************************************
* PCI-X Chipset Configuration                        * PCI clock is disabled/ *
* ************************************************** * enabled for 8131       *
* Errata 56 PCLK                 [Enabled]           * Errata 56 if a PCI     *
* HT Link 0 P-Comp Mode          [Auto]              * card behind 8131       *
* HT Link 0 N-Comp Mode          [Auto]              * bridge has more than   *
* HT Link 0 RZ-Comp Mode         [Auto]              * 4 functions and bus    *
* HT Link 1 P-Comp Mode          [Auto]              * speed is 133 MHz.      *
* HT Link 1 N-Comp Mode          [Auto]              *                         *
* HT Link 1 RZ-Comp Mode         [Auto]              *                         *
*                                                    *                         *
*                                                    * **    Select Screen    *
*                                                    * **    Select Item      *
*                                                    * +-    Change Option    *
*                                                    * F1    General Help     *
*                                                    * F10   Save and Exit    *
*                                                    * ESC   Exit             *
*                                                    *                         *
*********************************************************************************
```

2.3.6.33 BIOS Exit Option Menu Screen

```
  Main    Advanced    PCIPnP    Boot    Security    Chipset    Exit
********************************************************************************
* Exit Options                                         * Exit system setup      *
* **************************************************** * after saving the       *
* Save Changes and Exit                                * changes.               *
* Discard Changes and Exit                             *                        *
* Discard Changes                                      * F10 key can be used    *
*                                                      * for this operation.    *
* Load Optimal Defaults                                *                        *
*                                                      *                        *
*                                                      *                        *
*                                                      *                        *
*                                                      *                        *
*                                                      * **     Select Screen   *
*                                                      * **     Select Item     *
*                                                      * Enter Go to Sub Screen *
*                                                      * F1     General Help    *
*                                                      * F10    Save and Exit   *
*                                                      * ESC    Exit            *
*                                                      *                        *
*                                                      *                        *
********************************************************************************
```

2.4 Resetting SP and BIOS Passwords Using Jumper P4 or J12

The names and locations of this jumper differ between the Sun Fire X4100/X4200 and the X4100 M2/X4200 M2 servers:

- In Sun Fire X4100/X4200 servers this jumper is P4. See FIGURE 2-8 on page 55 for the location.
- In Sun Fire X4100 M2/X4200 M2 servers this is jumper J12. See FIGURE 2-9 on page 56 for the location.

This procedure describes how to reset the Administration password (the root password) for the ILOM Service Processor back 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 nonconducting pointer or stylus to press and release the recessed Power button on the front panel.**

   See Section 2.2, "Powering Off the Server" on page 2-3.

2. **Disconnect the 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 1-2 on page 1-5 or FIGURE 1-6 on page 1-9 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 main cover. If you cannot safely view and access the motherboard, remove the server from the rack.**

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

   See Section 3.5, "Removing the Main Cover of the Sun Fire X4100/X4100 M2 Server" on page 3-6 or Section 3.8, "Removing the Main Cover of the Sun Fire X4200/X4200 M2 Servers" on page 3-10.

5. **Install the shorting jumper across the P4 or J12 header pins.**

   See FIGURE 2-8 or FIGURE 2-9 for the jumper location. This jumper's function is to clear the ILOM SP password.

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

7. **Reconnect 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 nonconducting pointer or 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 this 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 this 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 username 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 steps 1 through 8 to remove the P4 or J12 jumper. (Remove the jumper in Step 5 rather than inserting it.)**

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

FIGURE 2-8 Location of Jumpers on the Sun Fire X4100/X4200 Motherboard

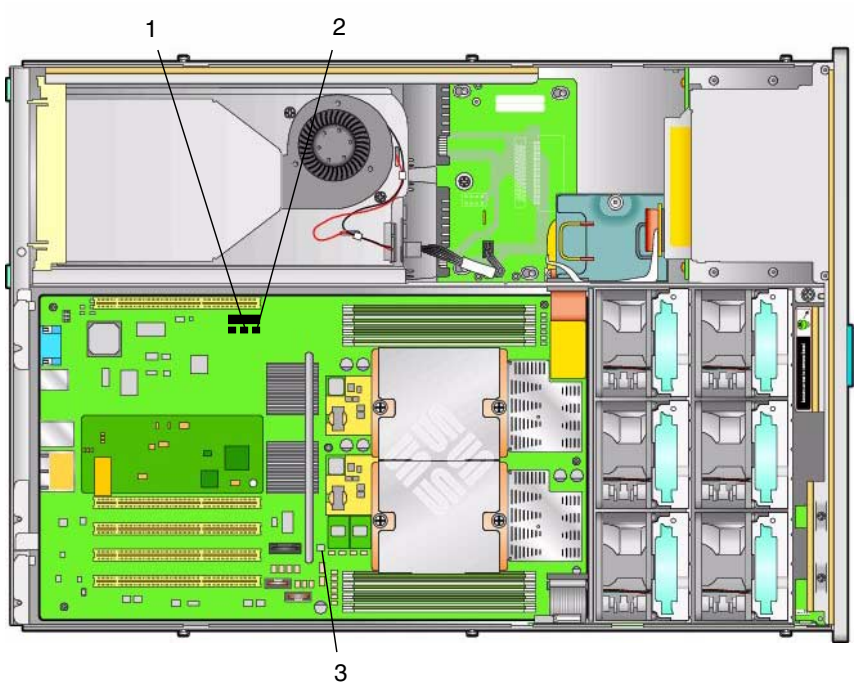


Figure Legend

1	P4, Password Clear
2	P5, Force Recovery
3	TP51/TP52, CMOS Clear

FIGURE 2-9 Location of Jumpers on the Sun Fire X4100 M2/X4200 M2 Motherboard

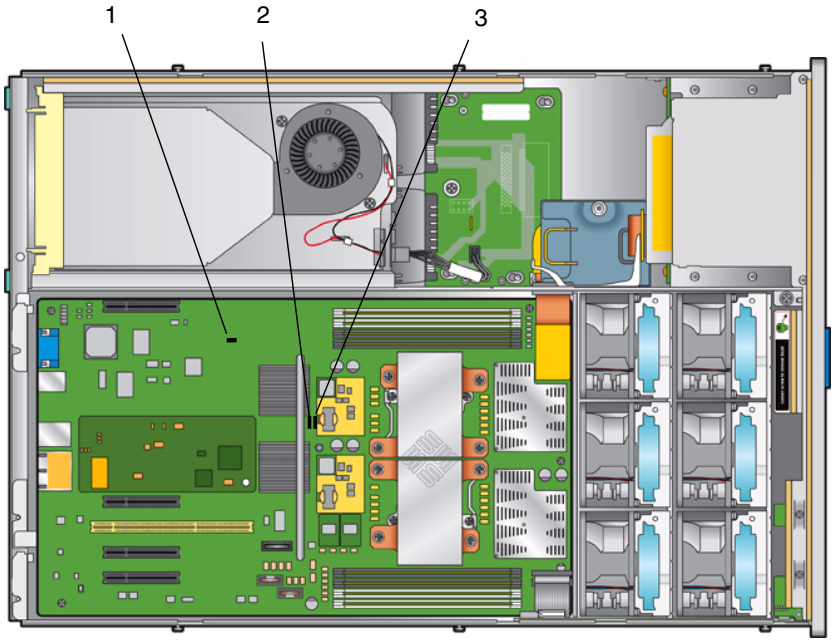


Figure Legend

1	J9, CMOS Clear
2	J12, Password Clear
3	J13, Force Recovery

2.4.1 Resetting the SP Password

If the ILOM BIOS SP password needs to be reset, do the following to reset the SP and CMOS passwords:

1. **Determine if the ILOM SP first-level booter (U-Boot) is intact. Follow documented procedures to connect to the SP serial port, apply power to the system, and observe the initial ILOM boot messages.**

   See *Sun Fire X4500/X4540 Server Installation Guide* for details.

   - If no screen output is displayed, stop here. The GRASP board must be replaced. Refer to *Sun Fire X4500/X4540 Server Service Manual* for instructions.
   - If screen output is displayed, continue to the next step.

2. **Enter the ILOM SP U-Boot command interpreter with xyzzy.**

When the message, `Booting linux in 2 seconds...` is displayed, during ILOM initial boot, type `xyzzy` to enter the U-Boot command interpreter.

Note – The characters typed does not echo. Cutting and pasting the characters improves the chance of success. You might try cycling power to the system and entering `xyzzy` several times.

---

3. **Disable automatic reboot.**

   Set the uboot environment variable, bootretry, to -1 to temporarily disable automatic reboot:

   ```
   set bootretry -1
   ```

4. **Configure to not save the current configuration:**

   ```
   set preserve_conf no
   ```

5. **Save your current environment:**

   ```
   saveenv
   ```

6. **Reboot:**

   ```
   boot
   ```

2.5 Using the Force-Recovery Jumper P5 or J13

The names and locations of this jumper differ between the Sun Fire X4100/X4200 and the X4100 M2/X4200 M2 servers:

- In Sun Fire X4100/X4200 servers this jumper is P5. See FIGURE 2-8 for the location.
- In Sun Fire X4100 M2/X4200 M2 servers this is jumper J13. See FIGURE 2-9 for the location.

You can use this jumper to force the server to flash a new BIOS in the case of a system freeze. For example, if the system freezes after an ILOM SP firmware/BIOS update, use this procedure to force the server to look for the new BIOS.

1. **Shut down the server to standby power mode by using a nonconducting pointer or stylus to press and release the recessed Power button on the front panel. See** Section 2.2, “Powering Off the Server” on page 2-3**.**

2. **Disconnect the 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 1-2 on page 1-5 or FIGURE 1-6 on page 1-9 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 main cover. If you cannot safely view and access the motherboard, remove the server from the rack.**

4. **Remove the main cover from the server.** See one of the following:
   - Section 3.5, "Removing the Main Cover of the Sun Fire X4100/X4100 M2 Server" on page 3-6
   - Section 3.8, "Removing the Main Cover of the Sun Fire X4200/X4200 M2 Servers" on page 3-10.

5. **Install the shorting jumper across the P5 or J13 header pins.**

   See FIGURE 2-8 or FIGURE 2-9 for the jumper location. This jumper's function is to instruct the system to force recovery of the latest BIOS at system reboot.

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

7. **Reconnect power cords to the server.**

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

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

   You must fully power on the server to complete the reset. This is because the state of this jumper cannot be determined without the host CPU running.

9. **Repeat steps 1 through 8 to remove the P5 or J13 jumper. (Remove the jumper in Step 5 rather than inserting it.)**

Note – If you do not remove this jumper, the server will force a recovery of the new BIOS every time that you power cycle the server.

2.6 Using the Clear CMOS Jumper TP51/TP52 or J9

The names and locations of this jumper differ between the Sun Fire X4100/X4200 and the X4100 M2/X4200 M2 servers:

- In Sun Fire X4100/X4200 servers this is jumper TP51/TP52. See FIGURE 2-8 for the location.
- In Sun Fire X4100 M2/X4200 M2 servers this is jumper J9. See FIGURE 2-9 for the location.

You can use this jumper to clear the server's CMOS settings in the case of a system freeze. For example, if the server freezes 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 nonconducting pointer or stylus to press and release the recessed Power button on the front panel.**

   See Section 2.2, "Powering Off the Server" on page 2-3.

2. **Disconnect the 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 1-2 on page 1-5 or FIGURE 1-6 on page 1-9 for the location). PCBs and drivess 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 main cover. If you cannot safely view and access the motherboard, remove the server from the rack.**

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

   See Section 3.5, "Removing the Main Cover of the Sun Fire X4100/X4100 M2 Server" on page 3-6 or Section 3.8, "Removing the Main Cover of the Sun Fire X4200/X4200 M2 Servers" on page 3-10.

5. **Install the shorting jumper across the TP51/TP52 or J9 header pins.**

   See FIGURE 2-8 or FIGURE 2-9 for the jumper location.

6. **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.

7. **Reinstall the main cover to the server.**

8. **Reconnect power cords to the server.**

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

2.7 Using the Reset and NMI Switches

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

The names of these switches differ between the Sun Fire X4100/X4200 and the X4100 M2/X4200 M2 servers:

- In Sun Fire X4100/X4200 servers, the Reset switch is SW3 and the NMI switch is SW2. See FIGURE 2-10 for the location.
- In Sun Fire X4100 M2/X4200 M2 servers, the Reset switch is SW4 and the NMI switch is SW3. See FIGURE 2-10 for the location.

The Reset switch 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 sticking a paper clip or similar object through the hole provided on the rear of the chassis (see FIGURE 2-10).

The Non-Maskable Interrupt (NMI) switch 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 sticking a paper clip or similar object through the hole provided on the rear of the chassis (see FIGURE 2-10).

FIGURE 2-10 Server Back Panels

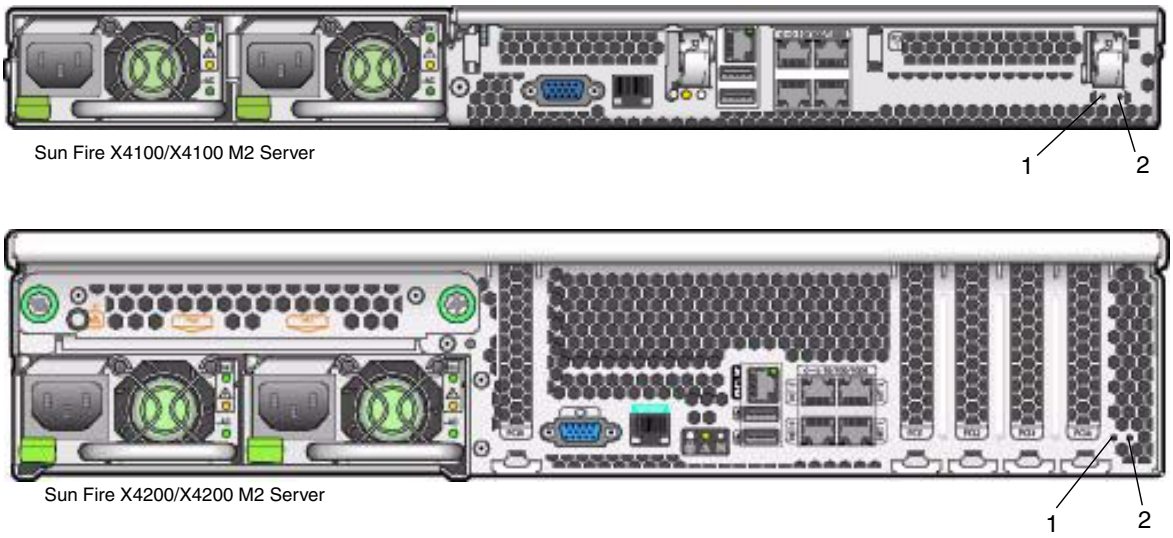


Figure Legend

1	NMI switch
2	Reset switch

2.8 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.

2.9 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 B-1.

CHAPTER 3

Maintaining the Sun Fire Servers

This chapter contains information and procedures for servicing the Sun Fire server hardware, including component removal and replacement procedures. The sections include:

Note – All information in this chapter applies to Sun Fire X4100/X4200 and X4100 M2/X4200 M2 servers, unless otherwise noted in the text.

3.1 Tools and Supplies Needed

The server can be serviced with the following items:

- No. 2 Phillips screwdriver
- Adjustable-setting torque driver (5–20 in-lbs)
- Antistatic wrist strap
- Nonconducting pointer or stylus, to press the recessed Power button
- 8-mm nut driver, for motherboard replacement
- Long-nosed pliers, optional for Graphics Redirect and Service Processor (GRASP) board removal

3.2 Locations of Replaceable Components

For locations of replaceable Sun Fire X4100/X4100 M2 and Sun Fire X4200/X4200 M2 servers, see "Replaceble Components Overview" on page 1-4.

3.3 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.

Note – The `servicetool` command is supplied on Sun Fire X4100/X4200 servers that have SP firmware 10708 and later.

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 following table.**

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

Other Options	Value
--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 for continuing the update and rebooting 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.
You MUST reboot the service processor for to complete this process.
Allow the service processor to fully boot.
DO NOT UNPLUG THE SYSTEM WHILE THE SERVICE PROCESSOR IS BOOTING!
Would you like to reboot the service processor now (y|n)? y
The system is going down NOW!!
Sending SIGTERM to all processes.
```

3.4 Powering Off the Server

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

1. **Choose a method for shutting down the server from main power mode to standby power mode. See** FIGURE 3-1 **and** FIGURE 3-2**.**
   - **Graceful shutdown:** Use a nonconducting pointer or 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.

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

FIGURE 3-1 Power Button and Power/OK LED Location – Sun Fire X4100/X4100 M2

Figure Legend

1	Power/OK LED
2	Power button

FIGURE 3-2 Power Button and Power/OK LED Location – Sun Fire X4200/X4200 M2

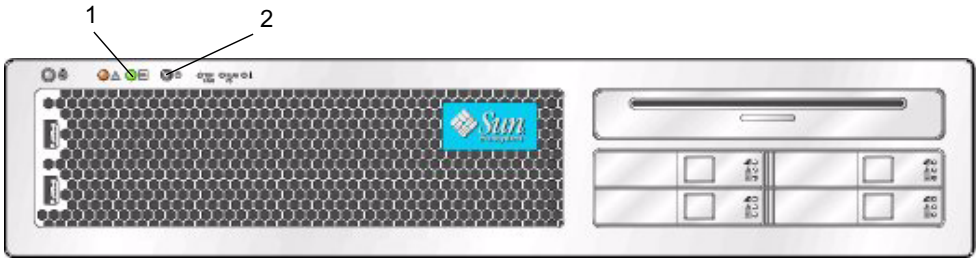


Figure Legend

1	Power/OK LED
2	Power button

Caution – Before unplugging the power cords from the server or handling internal components, attach an electrostatic-discharge (ESD) wrist strap to the grounding post that is built into the rear of the chassis (see FIGURE 1-2 on page 1-5 for the location). The system's printed circuit boards and hard disk drives contain components that are extremely sensitive to static electricity.

2. **Unplug both power cords from the server's power supplies.**
3. **Turn off all peripheral devices connected to the system.**
4. **Label any peripheral cables or telecommunication lines that must be disconnected in order to remove and replace a specific component.**

Note – If your server is a Sun Fire X4200/X4200 M2, skip ahead to Section 3.2 on page 3-2.

3.5 Removing the Main Cover of the Sun Fire X4100/X4100 M2 Server

1. **Press down on the cover release button and, using the indent for leverage, slide the main cover toward the rear of the chassis approximately 0.5 inch (12 mm). See** FIGURE 3-3**.**
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 power mode.

FIGURE 3-3 Removing the Main Cover

Note – Unclog Heatsinks and Fans – System cooling is affected by dust and contaminant build-up. Therefore, you should open and check systems approximately every six months (or more often in dirty operating environments). Check system heatsinks, fans, and air openings. If necessary, clean systems by carefully brushing, blowing, or vacuuming contaminants from the system.

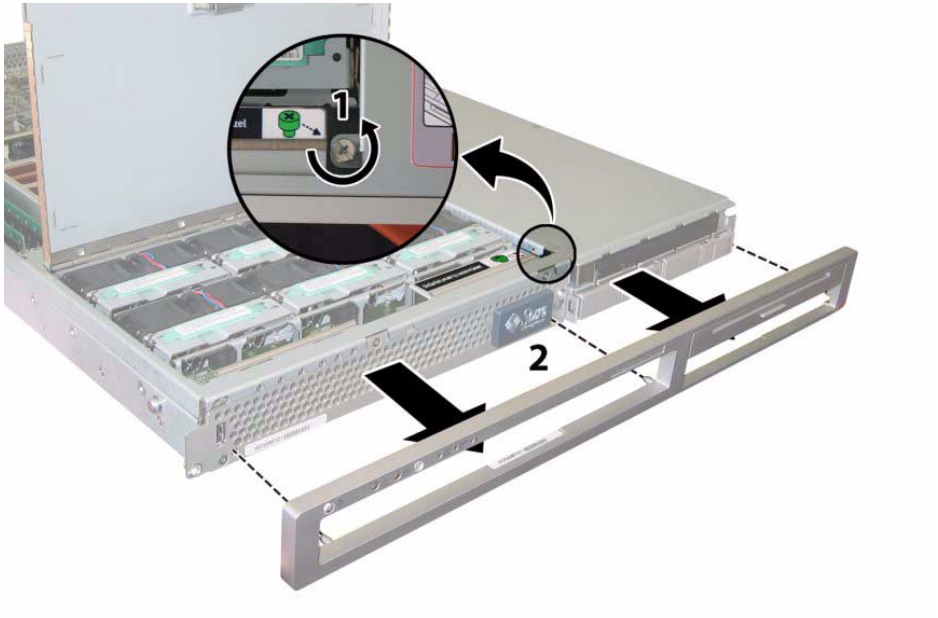
3.6 Removing the Front Bezel of the Sun Fire X4100/X4100 M2 Server

Remove the bezel from the front of the chassis by following these steps:

1. **Open the fan bay door and use a No. 2 Phillips screwdriver to unfasten the captive screw that locks the bezel in place. See** FIGURE 3-4**.**
2. **Pull the bezel away from the chassis.**

Note – Be careful to avoid bending the bezel by loosening it from the middle and both end sockets simultaneously.

FIGURE 3-4 Unfastening the Front Bezel Locking Screw



3.7 Removing the Front Cover of the Sun Fire X4100/X4100 M2 Server

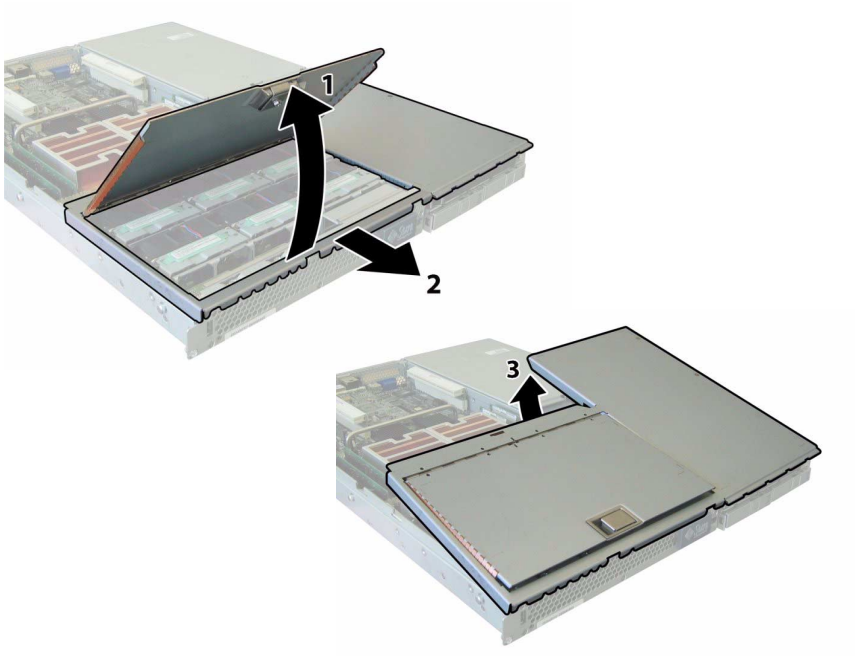
1. **Open the door to the fan bay. See** FIGURE 3-5**.**
2. **While holding the fan bay door open, slide the front cover toward the front of the chassis approximately 0.25 inch (6 mm).**
3. **Raise the rear edge of the cover first, and then lift it off the chassis.**

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

Note – When you replace the front cover, place the front edge on the chassis first, then set it down into the keyed slots on the chassis sides before sliding it back.

Note – For Sun Fire X4100 servers with the factory-configured option for four hard disk drives: You must remove the top two hard disk drives before reinstalling the front cover to provide clearance for the front cover to slide on the chassis. Reinstall the top two hard disk drives after you reinstall the front cover.

FIGURE 3-5 Removing the Front Cover



3.8 Removing the Main Cover of the Sun Fire X4200/X4200 M2 Servers

1. **Press down on the cover release and, using the indent for leverage, slide the main cover toward the rear of the chassis approximately 0.5 inch (12 mm). See** FIGURE 3-6**.**
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 3-6 Removing the Main Cover

Note – Unclog Heatsinks and Fans – System cooling is affected by dust and contaminant build-up. Therefore, you should open and check systems approximately every six months (or more often in dirty operating environments). Check system heatsinks, fans, and air openings. If necessary, clean systems by carefully brushing, blowing, or vacuuming contaminants from the system.

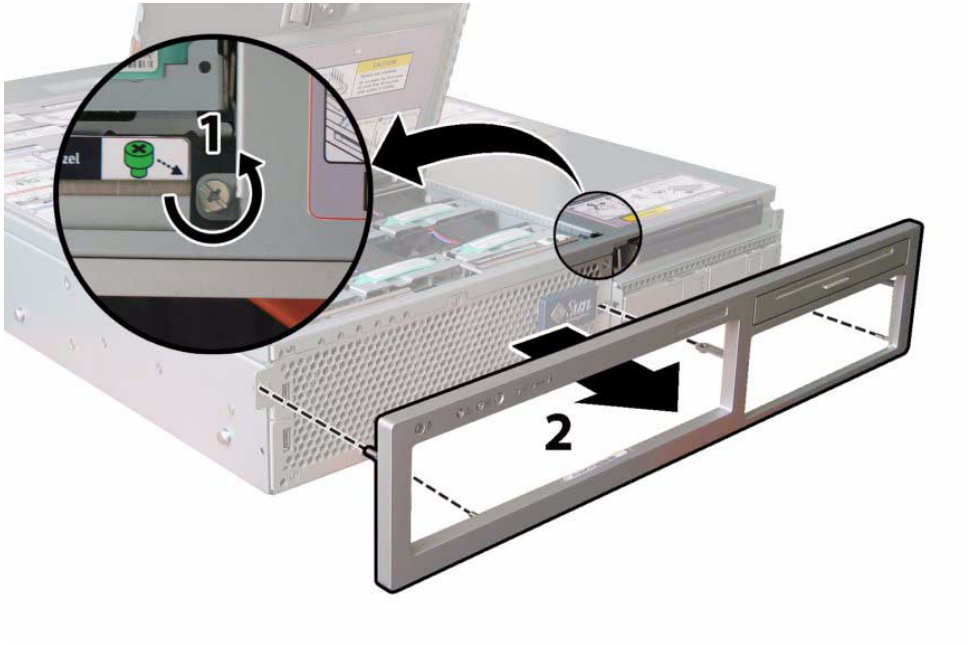
3.9 Removing the Front Bezel of the Sun Fire X4200/X4200 M2 Servers

Remove the bezel from the front of the chassis by following these steps.

1. **Open the fan bay door and use a No. 2 Phillips screwdriver to unfasten the captive screw that locks the bezel in place. See** FIGURE 3-7**.**
2. **Pull the bezel away from the chassis.**

Note – Be careful to avoid bending the bezel by gradually pulling it from the middle and both ends simultaneously.

FIGURE 3-7 Unfastening the Front Bezel Locking Screw



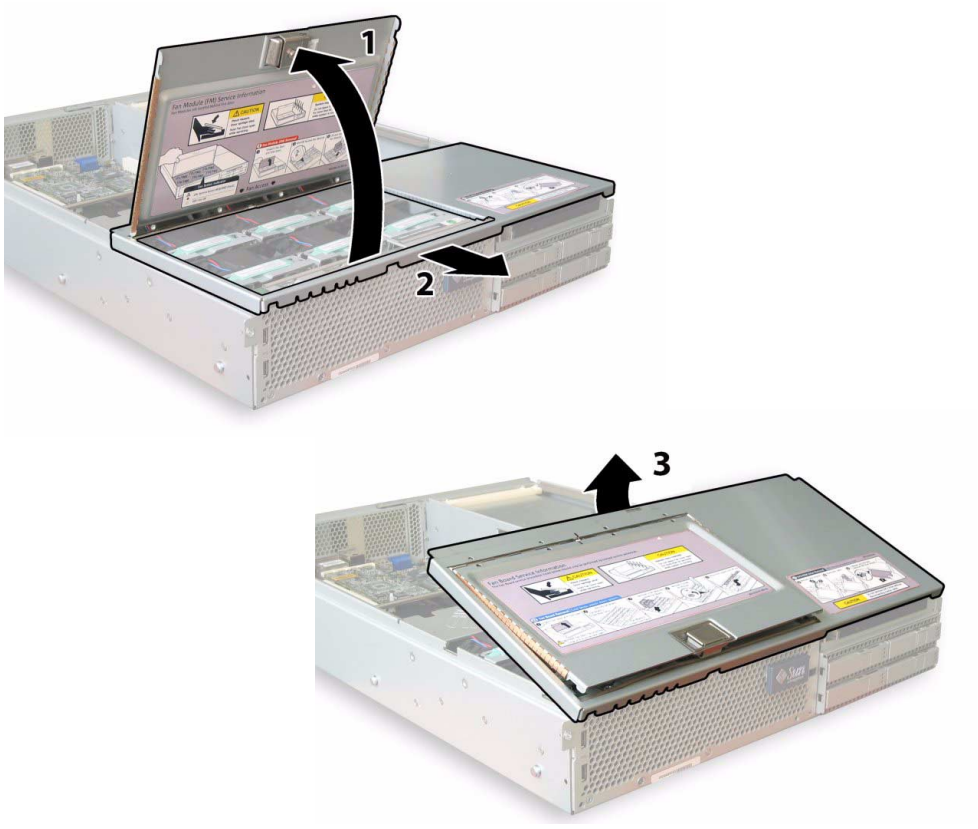
3.10 Removing the Front Cover of the Sun Fire X4200/X4200 M2 Servers

1. **Open the door to the fan bay. See** FIGURE 3-8**.**
2. **While holding the fan bay door open, slide the front cover toward the front of the chassis approximately 0.25 inch (6 mm).**
3. **Raise the rear edge of the cover first, and then lift it off the chassis.**

Note – When you replace the front cover, place the front edge on the chassis first, then set it down into the keyed slots on the chassis sides before sliding it back.

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

FIGURE 3-8 Removing the Front Cover



3.11 HT Jumper Configuration for Single-CPU Servers (Sun Fire X4100 M2 and X4200 M2)

An HT jumper is nothing more than a dummy CPU place-holder in CPU position 1 for single-CPU servers. These jumpers look like regular CPUs, with identical heat sinks, and identical maintenance procedures for replacement.

The memory slots next to an HT jumper in CPU position 1 are never populated.

To identify the single-CPU server, check the CPU count during BIOS POST:

- If CPU model is 22xx, then the CPU count is 2 (for single-CPU server).

- If CPU model is 23xx, then the CPU count is 4 (for single-CPU server).

The single-CPU server configuration can be converted to a dual-CPU configuration by adding a CPU that is identical to the one in CPU postion 0 and installing it into CPU position 1.

For DIMM population rules for a single-CPU system, see Section 3.12.14.2, "Installing DIMMs Into a Single-CPU System" on page 3-64.

3.12 Replaceable Component Procedures

Note – Customer-replaceable units (CRUs) may be replaced by the customer. Field-replaceable units (FRUs) should be replaced only by trained service technicians. Contact your Sun Service representative for assistance with FRU replacements. The designations, CRU and FRU, are provided below.

Note – All graphics in this section show Sun Fire X4200 servers unless otherwise noted. Both Sun Fire X4100 and X4200 servers are shown where significant differences exist.

Caution – Before handling components, attach an ESD wrist strap to the grounding post that is built into the rear of the chassis (see FIGURE 1-6 for the location). The system's printed circuit boards and hard disk drives contain components that are extremely sensitive to static electricity.

This section contains procedures for replacing the following components:

- Section 3.12.1, "Replacing the Battery" on page 3-15 (CRU)
- Section 3.12.2, "Replacing a CPU and Heatsink (Sun Fire X4100 and X4200 Servers)" on page 3-17 (FRU)
- Section 3.12.3, "Replacing a CPU and Heatsink (Sun Fire X4100 M2/X4200 M2 Servers)" on page 3-23 (FRU)
- Section 3.11, "HT Jumper Configuration for Single-CPU Servers (Sun Fire X4100 M2 and X4200 M2)" on page 3-13
- Section 3.12.4, "Replacing the DVD-ROM Drive" on page 3-30 (FRU)
- Section 3.12.5, "Installing a DVD-ROM Drive Upgrade Kit" on page 3-33 (FRU)
- Section 3.12.6, "Replacing a Fan Module" on page 3-38 (CRU)
- Section 3.12.7, "Replacing a Fan Connector Board" on page 3-41 (CRU)

- Section 3.12.8, “Replacing the Front Panel Indicator Board” on page 3-44 (CRU)
- Section 3.12.9, “Replacing the Front I/O Board” on page 3-46 (CRU)
- Section 3.12.10, “Replacing the Graphics Redirect and Service Processor (GRASP) Board” on page 3-51 (FRU)
- Section 3.12.11, “Servicetool FRU Update Procedure” on page 3-53
- Section 3.12.12, “Replacing a Drive” on page 3-54 (CRU)
- Section 3.12.13, “Replacing the Drives Backplane” on page 3-57 (FRU
- Section 3.12.14, “DIMM Population Rules” on page 3-61
- Section 3.12.15, “Replacing DIMMs” on page 3-65 (CRU)
- Section 3.12.16, “Replacing PCI Cards” on page 3-72 (CRU)
- Section 3.12.17, “Replacing the Motherboard” on page 3-77 (FRU)
- Section 3.12.18, “Replacing a Power Supply” on page 3-83 (CRU)
- Section 3.12.19, “Replacing the Power Distribution Board (PDB)” on page 3-86 (FRU)
- Section 3.12.20, “Replacing the Rear Fan Tray (Sun Fire X4200/X4200 M2 Servers)” on page 3-89 (CRU)

3.12.1 Replacing the Battery

Note – This component is a CRU and can be replaced by anyone.

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, refer to:

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

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

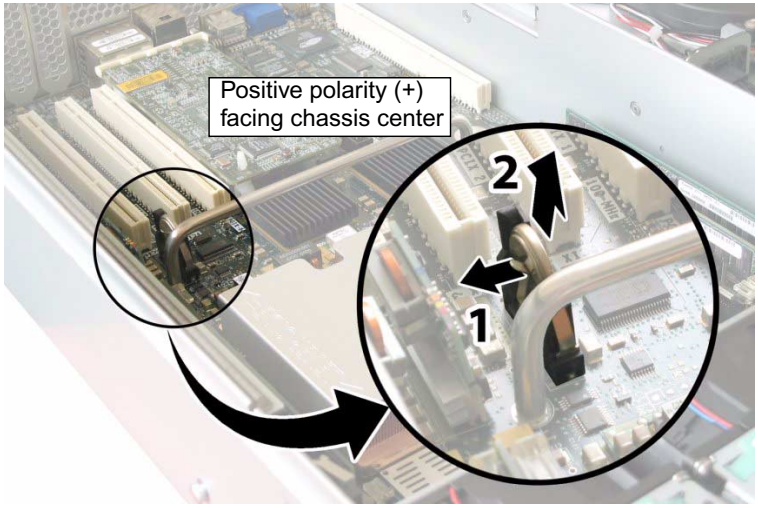
Use the following procedure to replace the battery.

1. **Power off the server as described in** Section 3.4 on page 3-4**.**
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 main cover as described in** Section 3.5 on page 3-6 **or** Section 3.8 on page 3-10**.**

Note – Note the orientation (polarity) of the battery in its holder before removing 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. See** FIGURE 3-9**.**

FIGURE 3-9 Removing the Battery



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.

3.12.2 Replacing a CPU and Heatsink (Sun Fire X4100 and X4200 Servers)

Note – If you have a Sun Fire X4200 M2 server, see "Replacing a CPU and Heatsink (Sun Fire X4100 M2/X4200 M2 Servers)" on page 3-23.

Note – This component is an FRU and should be replaced only by qualified service technicians. Contact your Sun Service representative for assistance.

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, refer to:

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

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

Use the following procedure to replace the CPU and heatsink.

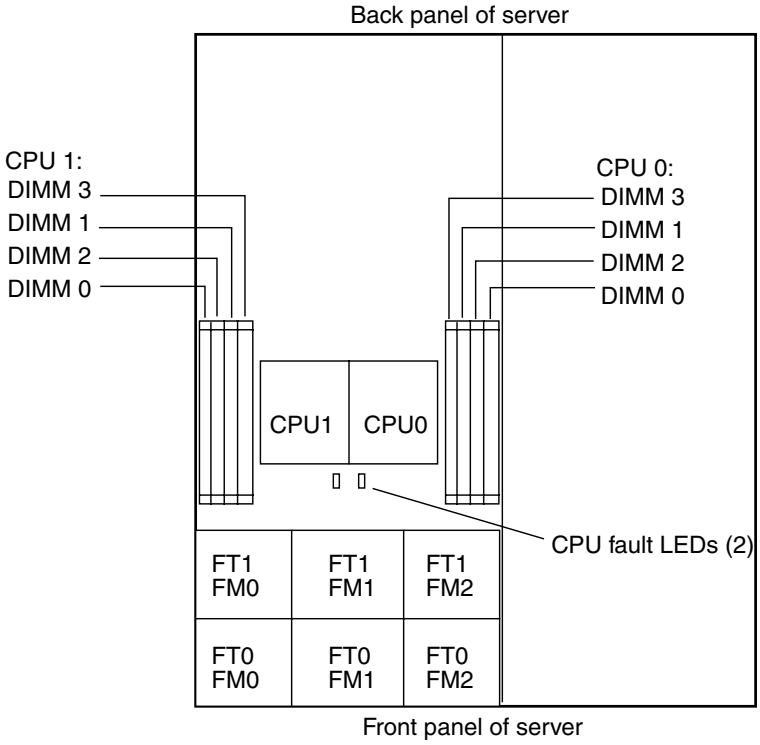
Caution – Some AMD CPUs are released as special editions, which might differ in wattage from non-special edition versions of the CPU. Do not mix special edition CPUs with non-special edition versions. Always make sure that all CPUs in the server have the same part number.

1. **Power off the server as described in** Section 3.4 on page 3-4**.**
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 main cover as described in** Section 3.5 on page 3-6 **or** Section 3.8 on page 3-10**.**
4. **Identify which CPU and heatsink you are replacing.**

   The designation of the two CPUs in the server is shown in FIGURE 3-10. There is a fault LED on the motherboard for each CPU (see FIGURE 3-11 for the LED location).

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

FIGURE 3-10 Designation of CPUs



5. **Remove the CPU and heatsink from the motherboard.**

   a. **Hold down the top of the heatsink to prevent it from tipping unevenly while you alternately loosen the two 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 3-11 **and** FIGURE 3-12**.**

FIGURE 3-11 Location of the Heatsink Screws and CPU Fault LEDs

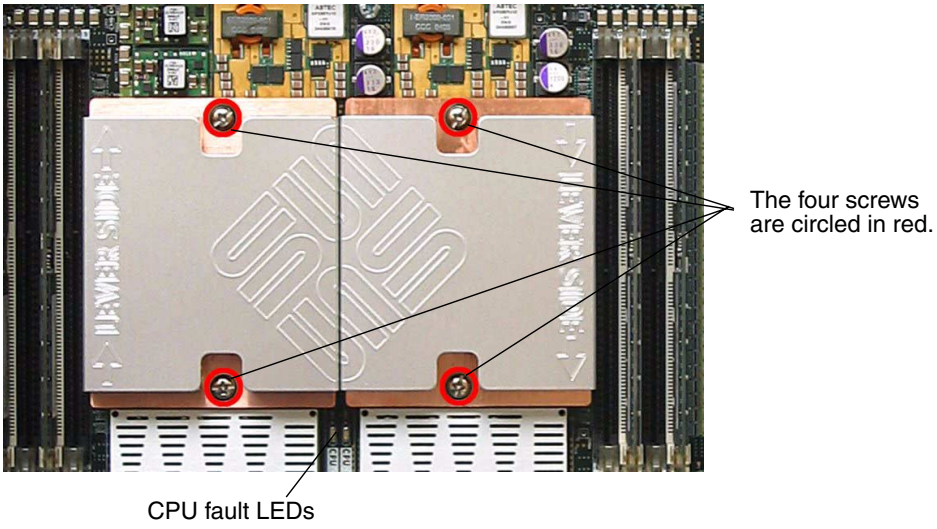
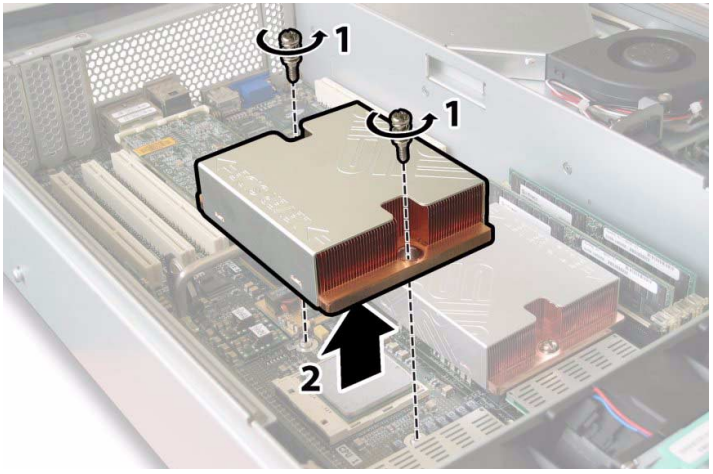


FIGURE 3-12 Removing the Heatsink



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

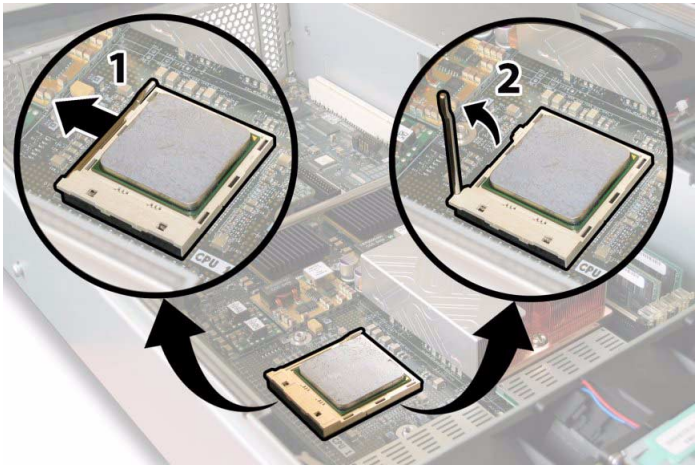
Note – Set the heatsink upside down on a clean, flat surface to prevent the thermal grease from contaminating other components.

---

c. Pull the CPU socket lever slightly away from the socket. See FIGURE 3-13**.**

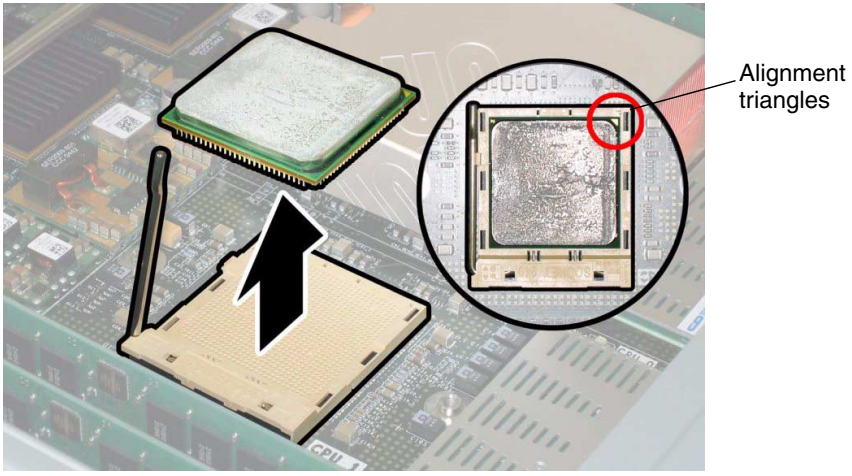
d. Pivot the lever up into the fully open, vertical position.

FIGURE 3-13 Releasing the CPU Socket Lever



e. **Lift the CPU out of the socket, leaving the lever in the vertical, open position. See** FIGURE 3-14**.**

FIGURE 3-14 Removing the CPU From the Socket



6. **Install the new CPU, or reinstall the existing CPU.**

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

Note – Align the triangle that is printed on one corner of the CPU with the tiny triangle that is imprinted on the CPU socket, as shown in the red circle in FIGURE 3-14.

---

a. **Ensure that the CPU socket release lever is in the fully open, vertical position.**

b. **If re-using the existing heatsink, clean and regrease it.**

Caution – New heatsinks have a layer of thermal grease applied at the factory. Adding additional thermal grease can damage the system. Follow this step only if you are re-using a previously installed heatsink.

---

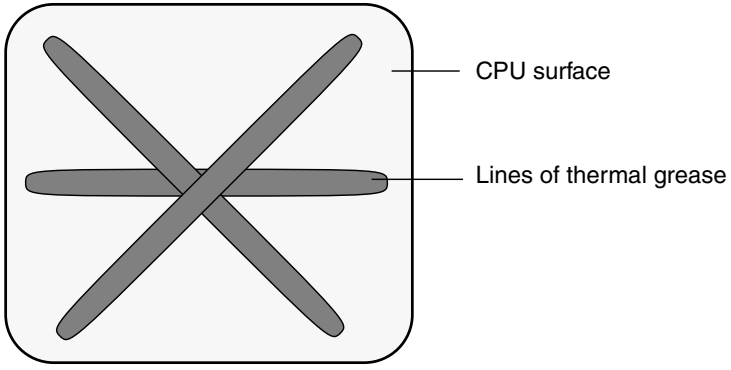
c. **Use an alcohol pad to clean all the old thermal grease from the component surface. Also, clean the dust from the heatsink fins.**

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.

d. Using one syringe of thermal grease (0.2 ml/0.5 g), carefully apply grease to the top of the CPU in three lines in the pattern shown in FIGURE 3-15**.**

Note – Two syringes of thermal grease are supplied with the new CPU, but use only one syringe for each CPU. Apply the grease in the pattern shown in FIGURE 3-15.

FIGURE 3-15 Required Pattern for Thermal Grease Application



Note – System cooling might be affected by dust and contaminant build-up. Therefore, you should open and check systems approximately every six months (or more often in dirty operating environments). Check system heatsinks, fans, and air openings. If necessary, clean systems by carefully brushing, blowing, or vacuuming contaminants from the system.

7. Align the CPU in the socket as shown in FIGURE 3-14**.**

a. Gently insert the CPU pins into the socket.

Caution – The pins on the CPU are very fragile. If the CPU is correctly aligned, it will enter the CPU socket with little or no resistance. If you feel more than minimal resistance, stop and recheck the alignment. Forcing a misaligned CPU into the CPU socket could damage both devices.

b. When the CPU is fully seated in the socket, pivot the release lever downward and into the locked position, at the side of the socket.

8. Install the heatsink.

a. Turn the heatsink upright and reinsert the two springs and mounting screws.

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.

b. 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. Turn the heatsink so that the "Lever Side" label and arrows imprinted on the top of the heatsink are pointing to the side of the CPU socket that has the release lever. Also 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. See FIGURE 3-11 on page 19.

c. Lower the heatsink onto the CPU, aligning the mounting screws with their holes on the motherboard.

d. Using an adjustable torque driver, alternately tighten the two heatsink mounting screws 180 degrees at a time until each spring is completely compressed. Tighten screws to 7 in-lbs (0.8 Nm).

3.12.3 Replacing a CPU and Heatsink (Sun Fire X4100 M2/X4200 M2 Servers)

Note – This component is an FRU and should be replaced only by qualified service technicians. Contact your Sun Service representative for assistance.

Note – If you have a Sun Fire X4200 server, see "Replacing a CPU and Heatsink (Sun Fire X4100 and X4200 Servers)" on page 3-17.

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.

Note – Software Release 2.0 or later is required to support AMD Opteron Quad-Core CPUs. Before replacing a dual-core CPU with a quad-core CPU, check the version strings against those documented in the *Sun Fire X4100 M2/X4200 M2 Servers Release Notes*. If the existing firmware is not for Software Release 2.0 or later, perform the necessary upgrade before proceeding.

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, refer to:

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

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

Use the following procedure to replace the CPU and heatsink.

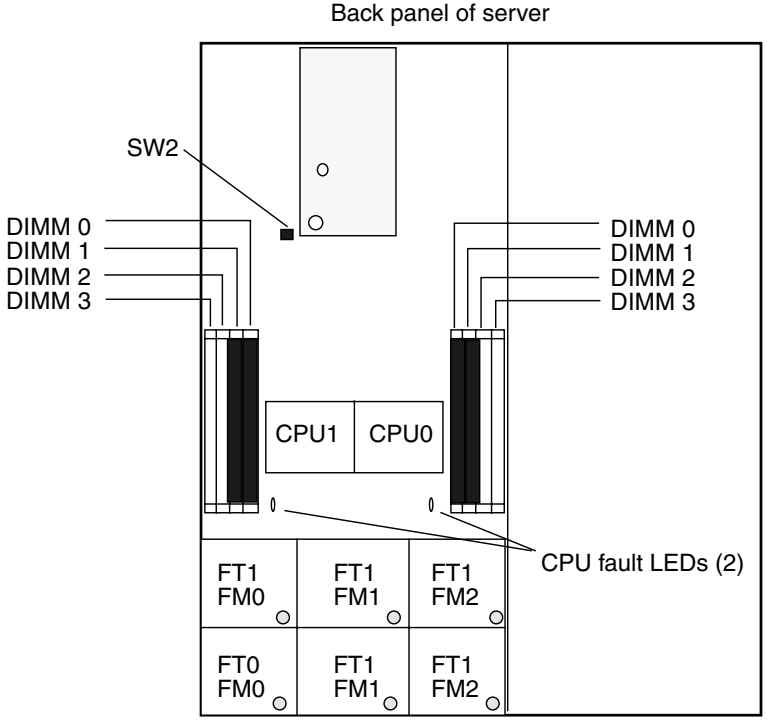
1. **Power off the server as described in** Section 3.4 on page 3-4**.**
2. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover. If you cannot safely view and access the component, remove the server from the rack.**
3. **Remove the main cover as described in** Section 3.8 on page 3-10**.**
4. **Identify which CPU and heatsink you are replacing.**

   The designation of the two CPUs in the server is shown in FIGURE 3-16. There is a fault LED on the motherboard for each CPU (see FIGURE 3-16 for the LED location):

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

Note – If the power cords are disconnected, the CPU fault LEDs can be lit for several minutes by pressing switch SW2 on the motherboard.

FIGURE 3-16 Sun Fire X4200 M2 Designation of CPUs



5. **Remove the heatsink from the motherboard. Turn the screws 180-degrees at a time, then remove the screws when they are detached. See** FIGURE 3-17 **and** FIGURE 3-18**.**

FIGURE 3-17 Location of the Sun Fire X4200 M2 Heatsink Screws

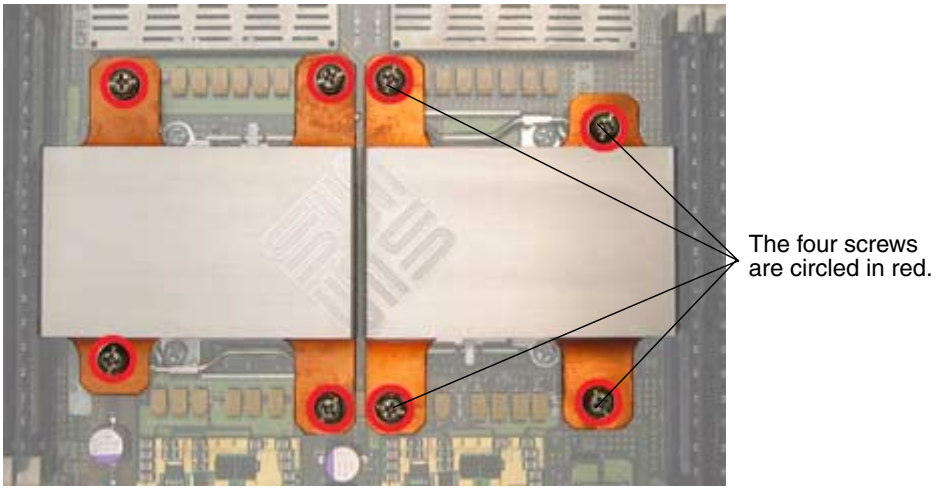
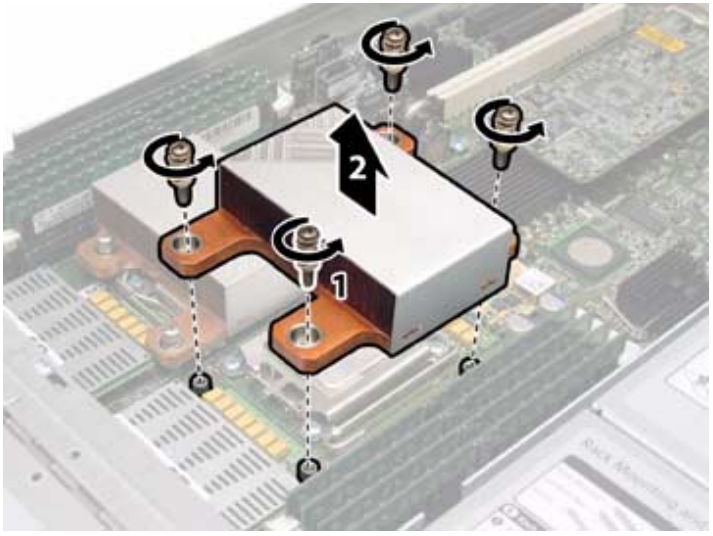


FIGURE 3-18 Removing the Sun Fire X4200 M2 Heatsink



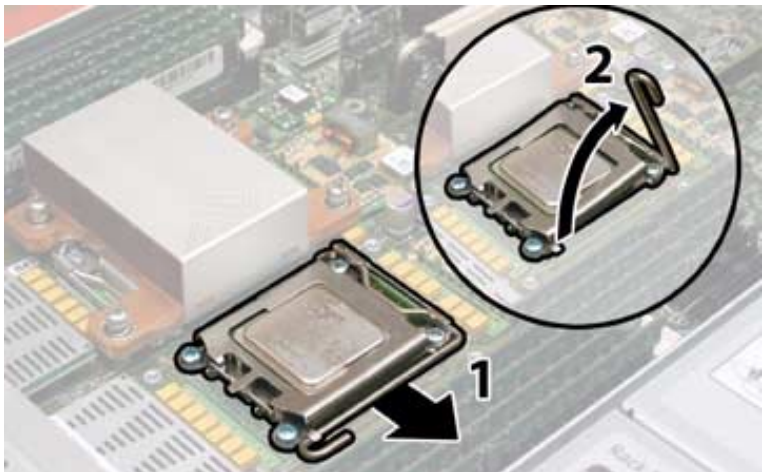
6. **Twist the heatsink slightly to lift it off the board. Turn the heatsink upside down and allow the springs in each of the four mounting holes to fall out into your hand.**

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

---

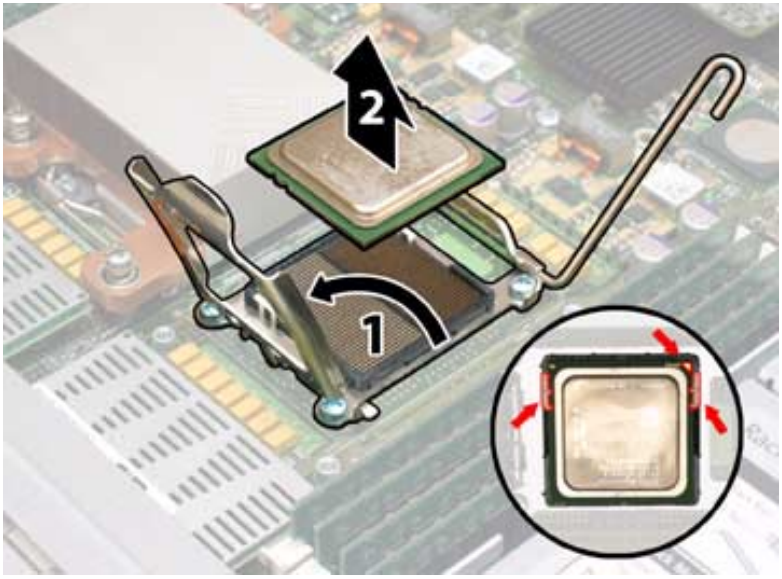
7. **Pull the CPU socket lever slightly away from the socket. See** FIGURE 3-19**.**
8. **Pivot the lever up into the fully open, vertical position.**

FIGURE 3-19 Releasing the Sun Fire X4200 M2 CPU Socket Lever



9. **Open the hinged plate that covers the CPU until it is in the fully open position.**
   See FIGURE 3-20.
10. **Lift the CPU out of the socket, leaving the lever in the vertical, open position.**
    See FIGURE 3-20.

FIGURE 3-20 Opening the Sun Fire X4200 M2 CPU Retainer Plate



11. Install the new CPU, or reinstall the existing CPU.

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

---

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

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 3-20**.**

Note – Use the alignment keys in the CPU socket to match the alignment notches on the sides of the CPU. See FIGURE 3-20.

---

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 3-19 on page 27 for a view of how the lever locks down the edge of the plate.

12. **If re-using the existing heatsink, clean and regrease it.**

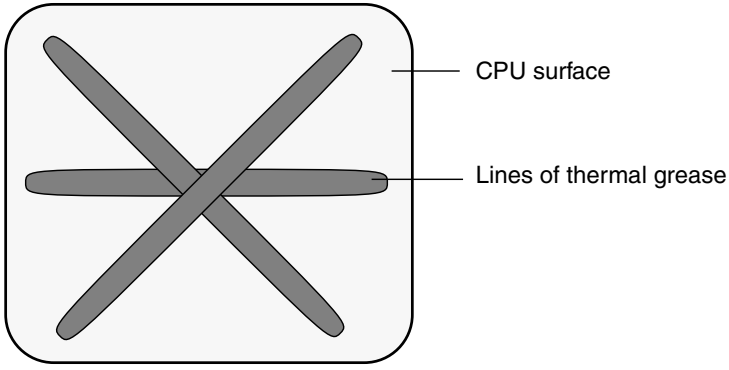
Caution – New heatsinks have a layer of thermal grease applied at the factory. Adding additional thermal grease can damage the system. Follow this step only if you are re-using a previously installed heatsink.

a. **Use an alcohol pad to clean all the old thermal grease from the component surface. Also, clean the dust from the heatsink fins.**

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

b. **Use one syringe of thermal grease (0.2 ml/0.5 g) to carefully apply grease to the top of the CPU in three lines in the pattern shown in** FIGURE 3-21**.**

FIGURE 3-21 Required Pattern for Thermal Grease Application



Note – System cooling might be affected by dust and contaminant build-up. Therefore, you should open and check systems approximately every six months (or more often in dirty operating environments). Check system heatsinks, fans, and air openings. If necessary, clean systems by carefully brushing, blowing, or vacuuming contaminants from the system.

13. **Install the heatsink.**

    a. **Turn the heatsink upright and reinsert 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.

    b. **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. See FIGURE 3-17 on page 26.

    c. **Lower the heatsink onto the CPU, aligning the mounting screws with their holes on the motherboard.**

    d. **Using an adjustable torque driver, alternately tighten the two heatsink mounting screws 180 degrees at a time until each spring is completely compressed. Tighten screws to 7 in-lbs (0.8 Nm).**

3.12.4 Replacing the DVD-ROM Drive

Note – If you are installing a DVD-ROM upgrade kit to a system that previously did not have a DVD-ROM drive, see Section 3.12.5 on page 3-33.

Note – This component is an FRU and should be replaced only by qualified service technicians. Contact your Sun Service representative for assistance.

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, refer to:

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

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

Use the following procedure to replace the DVD-ROM drive.

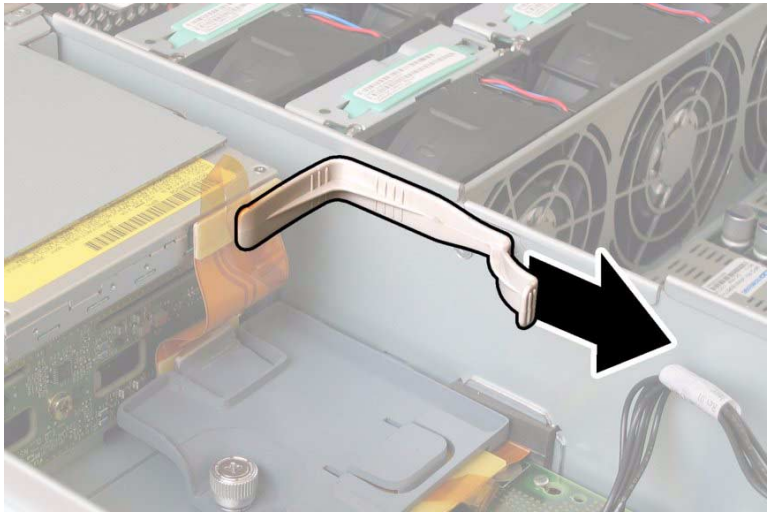
1. **Power off the server as described in** Section 3.4 on page 3-4**.**
2. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover and front cover. If you cannot safely view and access the component, remove the server from the rack.**
3. **Remove the main cover as described in** Section 3.5 on page 3-6 **or** Section 3.8 on page 3-10**.**
4. **Remove the front bezel as described in** Section 3.6 on page 3-7 **or** Section 3.9 on page 3-11**.**

Note – Always unfasten the bezel's securing screw before removing the bezel.

---

5. **Remove the front cover as described in** Section 3.7 on page 3-8 **or** Section 3.10 on page 3-12**.**
6. **Remove the upper cable retainer from the chassis midwall. See** FIGURE 3-22**.**

FIGURE 3-22 Removing the Upper Cable Retainer



7. **Disconnect the flex cable connector from the rear of the DVD-ROM drive. See** FIGURE 3-23 **and** FIGURE 3-24

FIGURE 3-23 Disconnecting the DVD-ROM Drive Flex Cable Connector (Sun Fire X4100 Server Shown)

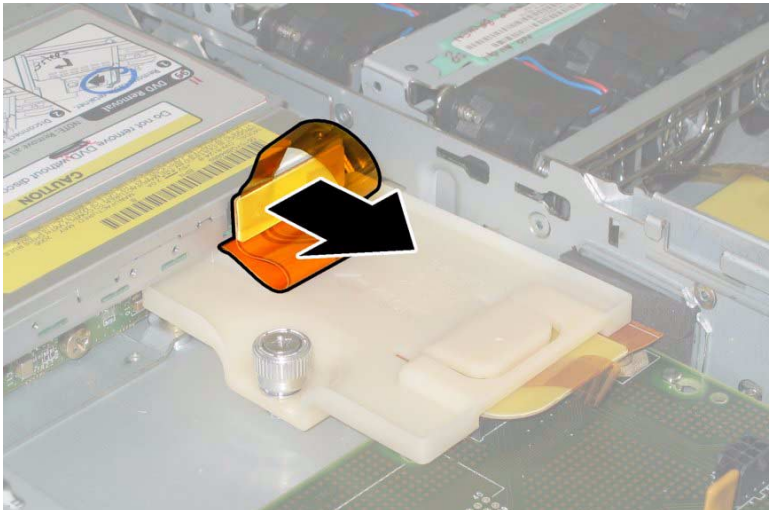
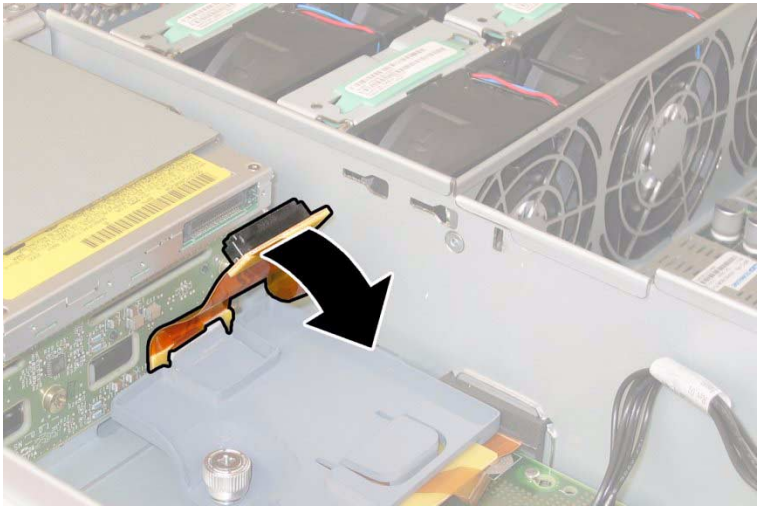
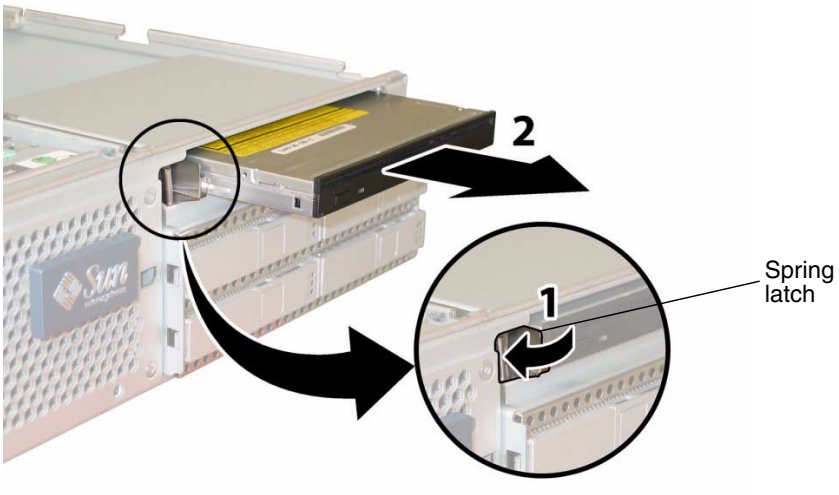


FIGURE 3-24 Disconnecting the DVD-ROM Drive Flex Cable Connector (Sun Fire X4200 Server Shown)



8. **Pull the spring latch at the front of the DVD-ROM drive to the left and hold it. Use your other hand to reach behind the drive and push it out through the front of the chassis. See** FIGURE 3-25**.**

FIGURE 3-25 Removing the DVD-ROM Drive



Installation is the reverse of this procedure. When reinstalling screws, tighten to 7 in-lbs (0.8 Nm) using an adjustable torque driver.

Note – Sun Fire X4100/X4100 M2: When you replace the DVD-ROM drive, the flex cable, and its cable retainers, reposition the flex cable to the folded position shown in FIGURE 3-23 on page 32. Do not pinch the flex cable against the back of the DVD-ROM drive, which might damage the flex cable.

3.12.5 Installing a DVD-ROM Drive Upgrade Kit

- Follow these steps to install a DVD-ROM upgrade kit to a system that previously did not have a DVD-ROM drive.
- If you are removing and replacing an existing DVD-ROM drive, see Section 3.12.4 on page 3-30.

Note – This component is an FRU and should be replaced only by qualified service technicians. Contact your Sun Service representative for assistance.

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, refer to:

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

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

Use the following procedure to install a DVD-ROM upgrade kit.

1. **Power off the server as described in** Section 3.4 on page 3-4**.**
2. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover and front cover. If you cannot safely view and access the component, remove the server from the rack.**
3. **Remove the main cover as described in** Section 3.5 on page 3-6 **or** Section 3.8 on page 3-10**.**
4. **Remove the front bezel as described in** Section 3.6 on page 3-7 **or** Section 3.9 on page 3-11**.**

Note – Always unfasten the bezel's securing screw before removing the bezel.

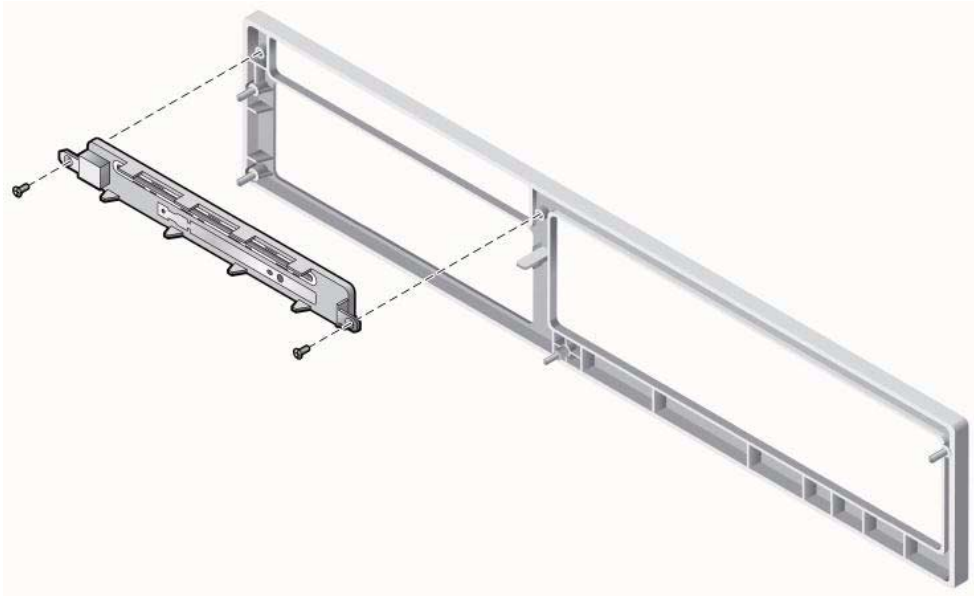
---

5. **Remove the front cover as described in** Section 3.7 on page 3-8 **or** Section 3.10 on page 3-12**.**
6. **Install the DVD-slot faceplate to the front bezel. See** FIGURE 3-26**.**
   a. **Lay the bezel face down on a work surface.**
   b. **Use a No. 2 Phillips screwdriver to remove the two screws that secure the blank filler panel to the bezel. Save the screws in a safe place because you will reinstall them in a following step.**
   c. **Remove the blank filler panel and set it aside.**
   d. **Set the new DVD-slot faceplate in place in the bezel opening.**

      Ensure that the ejector button on the faceplate is oriented toward the bottom of the bezel.

   e. **Using an adjustable torque driver, reinstall the two screws that secure the faceplate to the bezel. Tighten screws to 7 in-lbs (0.8 Nm).**

FIGURE 3-26 Installing the DVD-Slot Faceplate to the Front Bezel

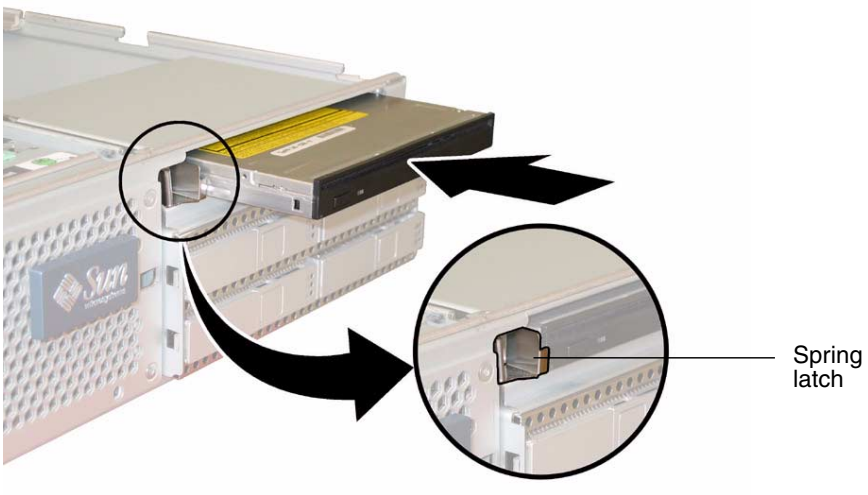


7. **Install the DVD-ROM drive into the chassis. See** FIGURE 3-27**.**

   a. **Align the rear of the DVD-ROM drive with the opening in the chassis.**

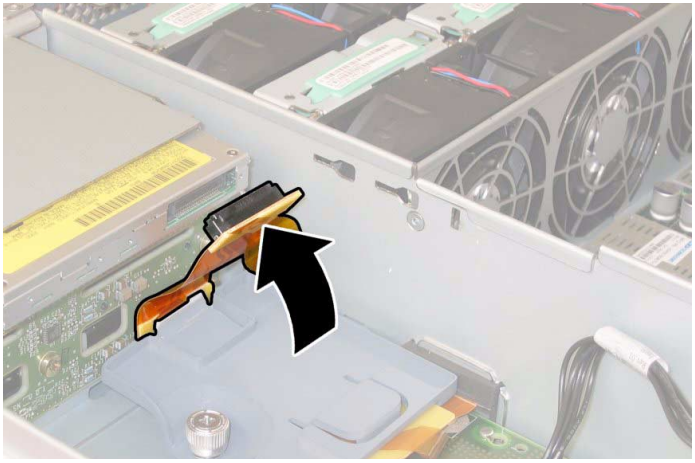
   b. **Push the DVD-ROM drive into the chassis until the spring latch on the chassis closes over the front corner of the drive.**

FIGURE 3-27 Installing the DVD-ROM Drive



8. **Connect the unused flex cable connector to the rear of the DVD-ROM drive. See** FIGURE 3-28**.**

FIGURE 3-28 Connecting the DVD-ROM Drive Flex Cable Connector

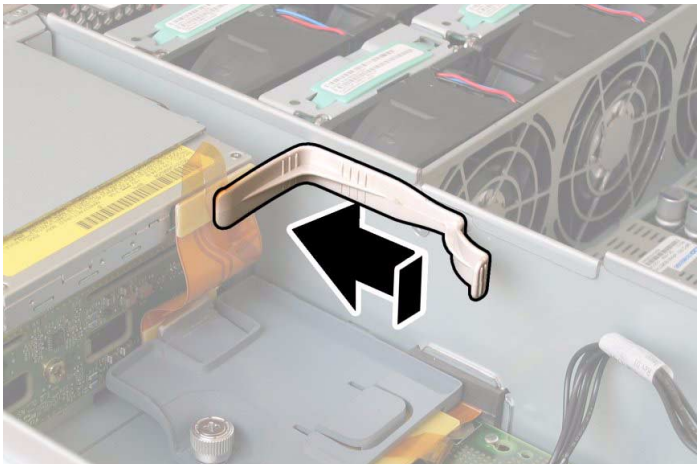


9. **Install the upper cable retainer to the chassis midwall. See** FIGURE 3-29**.**

   a. **Insert the two pegs on the cable retainer into the two holes in the chassis midwall.**

   b. **Slide the cable retainer forward until it is locked in place and it is holding the flex cable connector firmly against the rear of the DVD-ROM drive.**

FIGURE 3-29 Installing the Upper Cable Retainer



10. **Replace the chassis front cover. See** FIGURE 3-8 on page 3-13**.**

    a. **Place the front edge of the cover squarely onto the chassis top-front edge.**

    b. **Set the rear of the cover down so that it fits into the keyed slots on the chassis sides.**

    c. **Slide the cover toward the rear of the chassis to lock it in place.**

Caution – Ensure that the front edge of the cover is seated tightly and squarely against the gasket on the top-front edge of the chassis to avoid overheating the server.

11. **Replace the chassis front bezel.**

    a. **Align the pegs on the rear of the bezel with the corresponding holes in the front of the chassis.**

Note – Ensure that the new DVD-slot faceplate is over the DVD-ROM drive and that the button on the DVD-slot faceplate is oriented toward the chassis bottom. See FIGURE 3-2 on page 5.

---

    b. **Press the bezel evenly against the front of the chassis until it is flat against the front of the chassis.**

    c. **Open the fan bay door on the front cover and tighten the captive retaining screw using an adjustable torque driver. Tighten the screw to 7 in-lbs (0.8 Nm). See** FIGURE 3-7 on page 11**.**

12. **Replace the main cover to the chassis:**

    a. **Set the cover in place so that it aligns with the keyed openings in the chassis sides.**

    b. **Slide the cover toward the chassis front until it is firmly and squarely against the edge of the front cover.**

13. **Return power to the server. See** Section 2.1 on page 2-2**.**

3.12.6 Replacing a Fan Module

Note – This component is a hot-swappable CRU and can be replaced by anyone.

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, refer to:

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

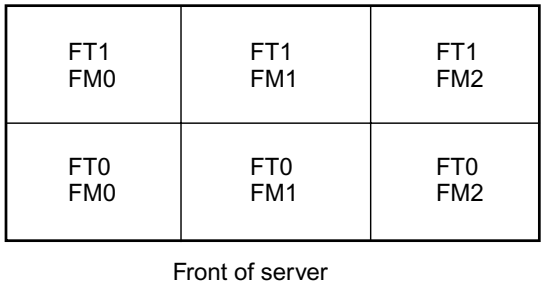
1. **Click the name and model of your server.**
2. **On the product page that opens for the server, click** `Full Components List` **to view a list of components.**

Use the following procedure to replace a fan module.

Caution – The fans are hot-swappable and can be removed and replaced while the system is running. Do not hold the fan bay door open for more than 60 seconds at a time to avoid overheating the server. Remove and replace only one fan at a time.

The internal system software designation of the fan connector boards, or fan trays (FT), and fan modules (FM) is shown in FIGURE 3-30 (viewed from the front of the server).

FIGURE 3-30 System Designation of Fan Connector Boards and Fan Modules



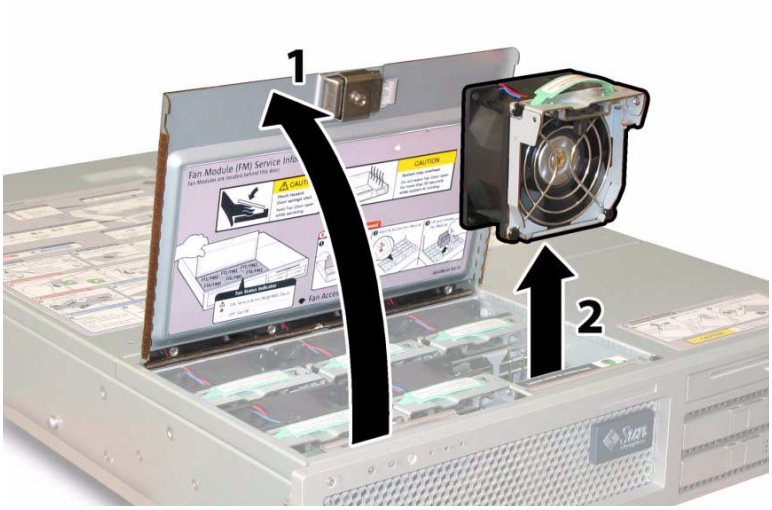
1. **If the server is in a rack, slide it far enough from the rack so that you can open the fan bay door. If you cannot safely view and access the component, remove the server from the rack.**
2. **Open the door to the fan bay and identify the defective fan module.**

- Fan module LED lit: The fan module is faulty and should be replaced.
- Fan module LED off: The fan module is operating properly.

Caution – When you open the fan bay door, be careful to hold it open with one hand so that it does not spring shut and injure your fingers. Do not hold the fan bay door open for more than 60 seconds while the server is running to avoid overheating the server.

3. **While holding the fan bay door open, grasp the faulty fan module by its plastic strap and lift it straight up out of the fan bay. See** FIGURE 3-31**.**

FIGURE 3-31 Opening the Fan Bay Door and Removing a Fan Module



4. **Visibly inspect the remaining fans and all air openings for dirt, and clean if necessary.**

Note – System cooling might be affected by dust and contaminant build-up. Therefore, you should open and check systems approximately every six months (or more often in dirty operating environments). Check system heatsinks, fans, and air openings. If necessary, clean systems by carefully brushing, blowing, or vacuuming contaminants from the system.

Installation is the reverse of this procedure.

3.12.7 Replacing a Fan Connector Board

Note – This component is a CRU and can be replaced by anyone.

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, refer to:

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

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

Use the following procedure to replace a fan connector board.

1. **Power off the server as described in** Section 3.4 on page 3-4**.**
2. **If the server is in a rack, slide it far enough from the rack so that you can open the fan bay door. If you cannot safely view and access the component, remove the server from the rack.**

Caution – When you open the fan bay door, be careful to hold it open with one hand so that it does not spring shut and injure your fingers. Do not hold the fan bay door open for more than 60 seconds while the server is running to avoid overheating the server.

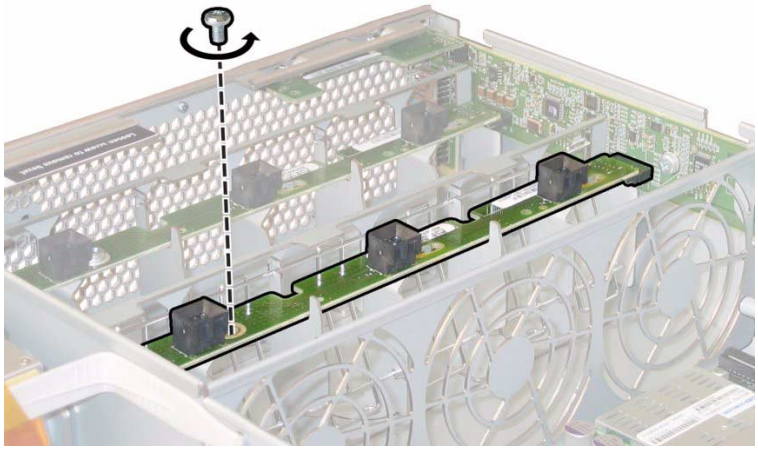
3. **Open the fan bay door and hold it open. See** FIGURE 3-31 on page 40**.**
4. **Remove the three fan modules that are connected to the fan connector board you are replacing. Grasp each fan module by its plastic strap and lift it straight up out of the fan bay.**
5. **Visibly inspect the remaining fans and all air openings for dirt, and clean if necessary.**

Note – System cooling might be affected by dust and contaminant build-up. Therefore, you should open and check systems approximately every six months (or more often in dirty operating environments). Check system heatsinks, fans, and air openings. If necessary, clean systems by carefully brushing, blowing, or vacuuming contaminants from the system.

6. **Unfasten the single screw that secures the fan connector board to the chassis. See** FIGURE 3-32**.**

Note – In the following figures, the server is shown from a rear view with the front cover off and all fans removed to provide visibility. Do not remove the covers for this procedure.

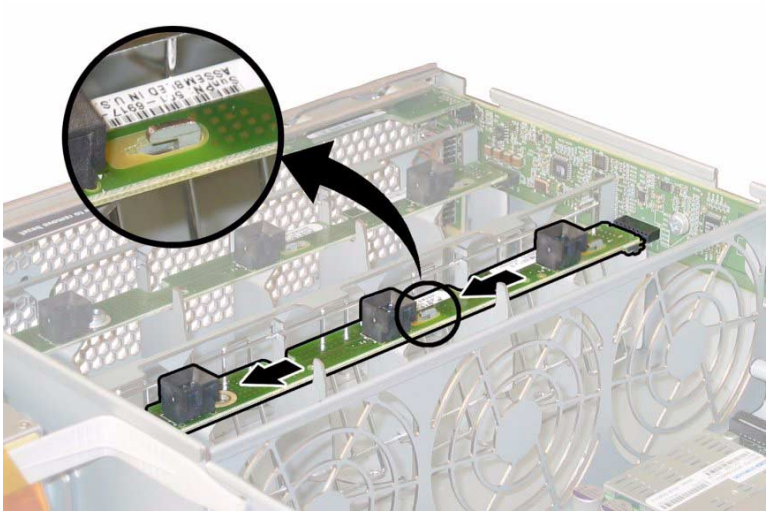
FIGURE 3-32 Unfastening the Fan Connector Board Securing Screw



7. **Slide the fan connector board toward the center of the chassis to disconnect it from the front I/O board and to release it from the two locating tabs on the chassis. See** FIGURE 3-33**.**

8. Lift the board straight up to remove it from the system.

FIGURE 3-33 Releasing the Fan Connector Board



Installation is the reverse of this procedure. When reinstalling screws, tighten to 7 in-lbs (0.8 Nm) using an adjustable torque driver.

3.12.8 Replacing the Front Panel Indicator Board

Note – This component is a CRU and can be replaced by anyone.

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, refer to:

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

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

Use the following procedure to remove and replace the front panel indicator board.

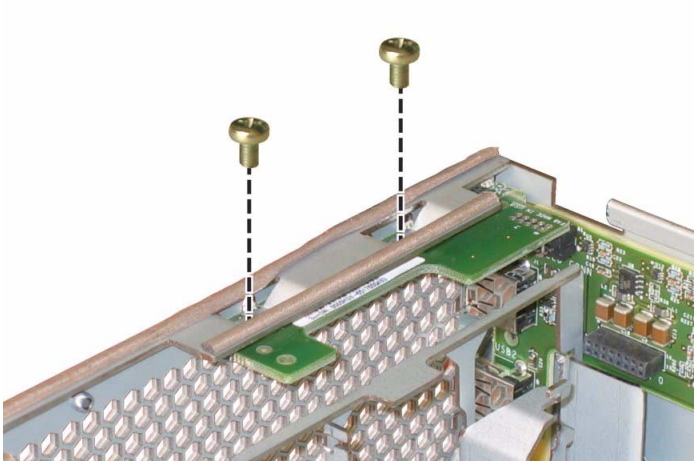
1. **Power off the server as described in** Section 3.4 on page 3-4**.**
2. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover and front cover. If you cannot safely view and access the component, remove the server from the rack.**
3. **Remove the main cover as described in** Section 3.5 on page 3-6 **or** Section 3.8 on page 3-10**.**
4. **Remove the front bezel as described in** Section 3.6 on page 3-7 **or** Section 3.9 on page 3-11**.**

Note – Always unfasten the bezel's securing screw before removing the bezel.

5. **Remove the front cover as described in** Section 3.7 on page 3-8 **or** Section 3.10 on page 3-12**.**

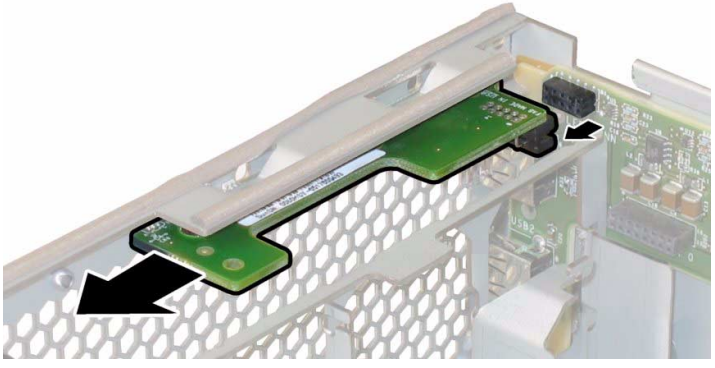
6. **Unfasten the two screws that secure the front panel indicator board to the chassis. For details, see** FIGURE 3-34**.**

FIGURE 3-34 Unfastening the Front Panel Indicator Board Screws



7. **While supporting the indicator board with your right hand, use your left hand to gently push the indicator board toward the center of the chassis to disconnect it from the front I/O board. See** FIGURE 3-35**.**

FIGURE 3-35 Removing the Front Panel Indicator Board



8. **Remove the front panel indicator board from the chassis.**

Installation is the reverse of this procedure. When reinstalling screws, tighten to 7 in-lbs (0.8 Nm) using an adjustable torque driver.

3.12.9 Replacing the Front I/O Board

Note – Sun Fire servers use different versions of the front I/O board. Do not interchange them.

Note – This component is an FRU and should be replaced only by qualified service technicians. Contact your Sun Service representative for assistance.

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, refer to:

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

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

Use the following procedure to replace the front I/O board.

1. **Power off the server as described in** Section 3.4 on page 3-4**.**
2. **Disconnect any external cables from the front I/O board's USB connectors.**
3. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover and front cover. If you cannot safely view and access the component, remove the server from the rack.**
4. **Remove the main cover as described in** Section 3.5 on page 3-6 **or** Section 3.8 on page 3-10**.**
5. **Remove the front bezel as described in** Section 3.6 on page 3-7 **or** Section 3.9 on page 3-11**.**

Note – Always unfasten the bezel's securing screw before removing the bezel.

---

6. **Remove the front cover as described in** Section 3.7 on page 3-8 **or** Section 3.10 on page 3-12**.**
7. **Remove all six fan modules by lifting each fan module by its plastic strap to disconnect it from its fan connector board.**

8. **Visibly inspect the fans and all air openings for dirt, and clean if necessary.**

Note – System cooling might be affected by dust and contaminant build-up. Therefore, you should open and check systems approximately every six months (or more often in dirty operating environments). Check system heatsinks, fans, and air openings. If necessary, clean systems by carefully brushing, blowing, or vacuuming contaminants from the system.

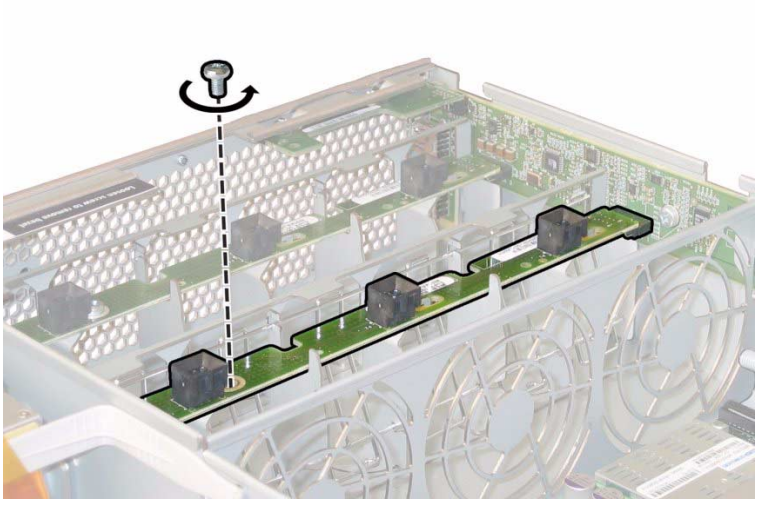
---

9. **Remove both the fan connector boards.**

   a. **Unfasten the single screw that secures each fan connector board to the chassis. See** FIGURE 3-36**.**

Note – In the following figures, the server is shown from a rear view with the front cover off and all fans removed to provide visibility.

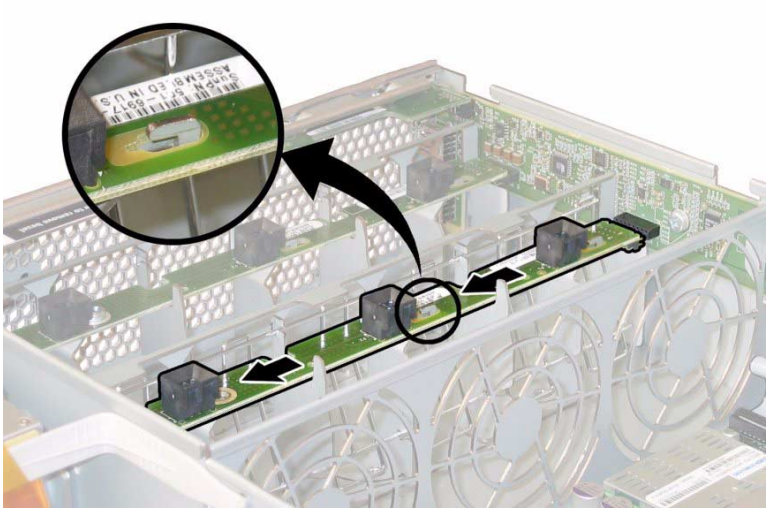
FIGURE 3-36 Unfastening the Fan Connector Board Securing Screw



   b. **Slide each fan connector board toward the center of the chassis to disconnect them from the front I/O board and to release each board from the locating tabs on the chassis. See** FIGURE 3-37**.**

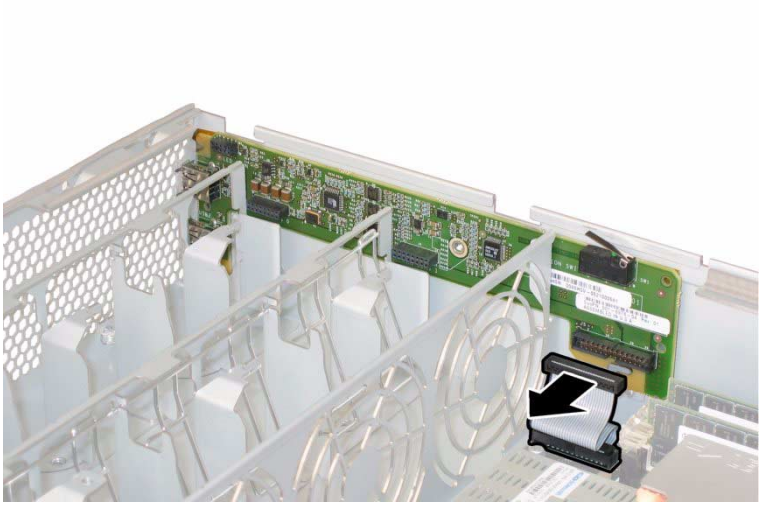
c. **Lift the fan connector boards straight up to remove them from the system.**

FIGURE 3-37 Releasing the Fan Connector Board



10. **Remove the front panel indicator board. For details, see** Section 3.12.8 on page 3-44
11. **Disconnect any external cables from the front I/O board's USB connectors.**
12. **Disconnect the front I/O interconnect cable that connects the front I/O board to the motherboard. See** FIGURE 3-38**.**

FIGURE 3-38 Disconnecting the Interconnect Cable from the Front I/O Board



13. **Unfasten the screw that secures the front I/O board to the chassis. See** FIGURE 3-39 **or** FIGURE 3-40**.**

FIGURE 3-39 Unfastening the Front I/O Board Screw From the Chassis (Sun Fire X4100 Server Shown)

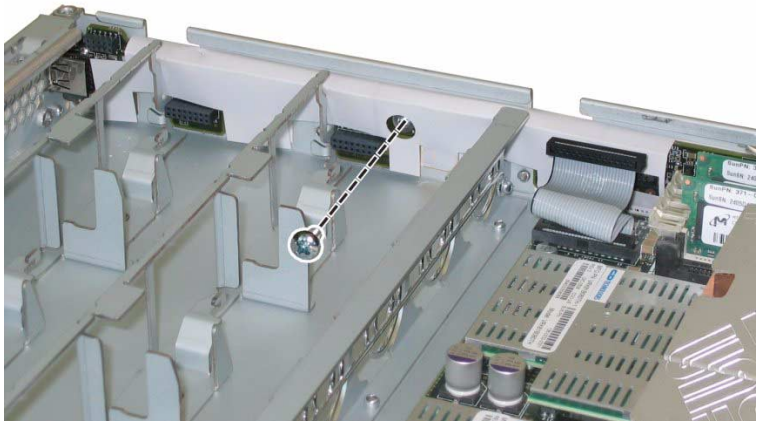
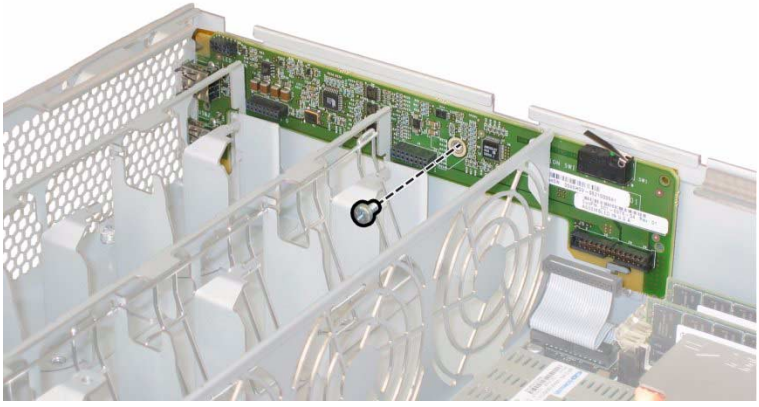


FIGURE 3-40 Unfastening the Front I/O Board Screw From the Chassis (Sun Fire X4200 Server Shown)



Note – The white plastic sheath that is attached to the front I/O board is an insulator, which protects the board components. Do not remove this insulator sheath from the front I/O board.

14. **Gently push the front I/O board toward the rear of the chassis approximately 0.25 inch (6 mm), freeing the board from the two locating tabs at its bottom-left and bottom-right corners. See** FIGURE 3-41 **or** FIGURE 3-42**.**

FIGURE 3-41 Releasing the Front I/O Board From the Chassis Locating Tabs (Sun Fire X4100 Server Shown)

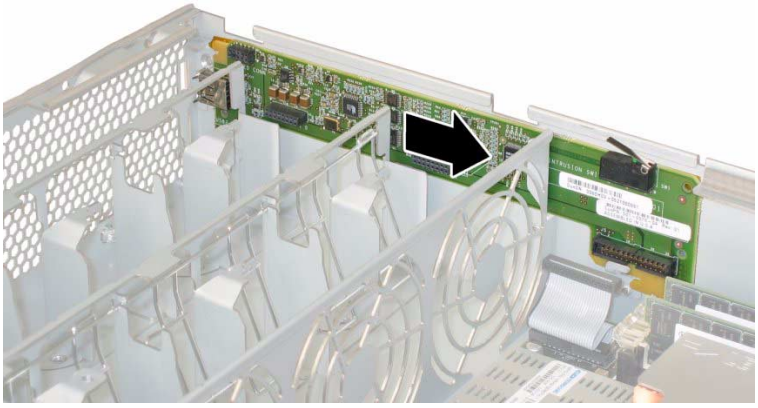
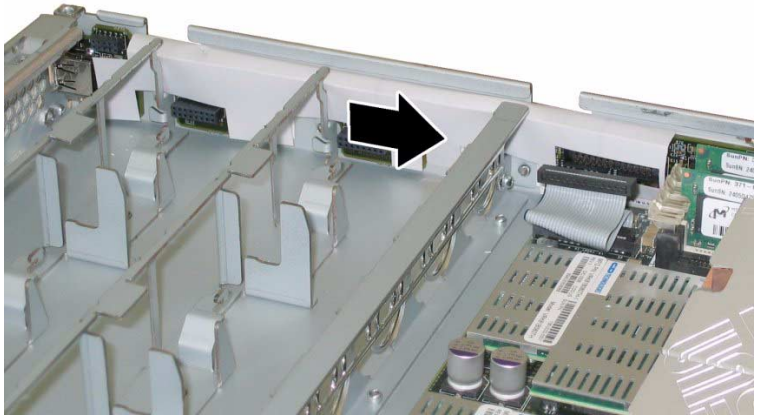


FIGURE 3-42 Releasing the Front I/O Board From the Chassis Locating Tabs (Sun Fire X4200 Server Shown)



15. Lift the front I/O board straight up and out of the chassis.

Installation is the reverse of this procedure. When reinstalling screws, tighten to 7 in-lbs (0.8 Nm) using an adjustable torque driver.

3.12.10 Replacing the Graphics Redirect and Service Processor (GRASP) Board

---

Note – Sun Fire servers use different versions of the GRASP board. These are not interchangeable.

Note – This component is an FRU and should be replaced only by qualified service technicians. Contact your Sun Service representative for assistance.

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, refer to:

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

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

Use the following procedure to remove and replace the GRASP board.

1. **Power off the server as described in** Section 3.4 on page 3-4**.**
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 main cover as described in** Section 3.5 on page 3-6 **or** Section 3.8 on page 3-10**.**

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-swappable 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** FIGURE 3-43**.**

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

FIGURE 3-43 Removing the GRASP Board

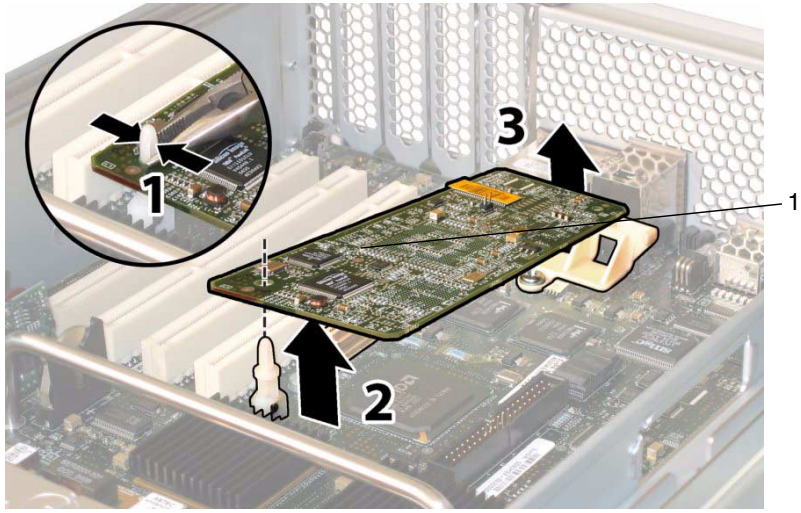


Figure Legend

1	Power status LED CR1

5. **Raise the corner of the GRASP board until it is clear of the locking tab.**

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.**

Note – Be careful to avoid bending the GRASP board while removing or installing it.

Installation is the reverse of this procedure.

Note – The ILOM software on the GRASP board and the system BIOS on the motherboard should be from the same software release, as documented in the *Sun Fire X4100/X4200 Servers Release Notes* or the *Sun Fire X4100 M2/X4200 M2 Servers Release Notes* (depending on whether or not yours is an M2 system).

After replacing the GRASP board or the motherboard, check the ILOM and system BIOS versions against those documented in the release notes. If they are not from the same software release, upgrade or downgrade the system BIOS (not the ILOM) accordingly. Once the ILOM and system BIOSare back to matching versions, you can upgrade or downgrade both to the desired versions.

Note – After you replace the GRASP board FRU, you must use the `servicetool` command to update FRU information about the board. See Section 3.12.11 on page 3-53.

3.12.11 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.

Note – Sun Fire X4100/X4200 servers with SP firmware 10708 and later support the `servicetool` command.

---

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=serviceprocessor <OtherOptions>=
<value>
```

Other Options	Value
--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 for continuing the update and rebooting the server:

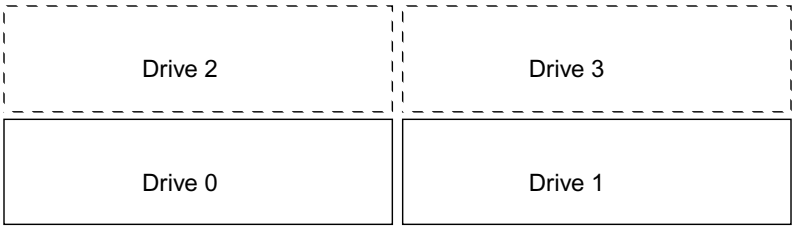
```
Servicetool is going to collect system information for the service
processor for future part swaps.

The following preconditions must be true for this to work:

    * The new service processor must be installed.

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

Service processor FRU information ready to be collected.

You MUST reboot the service processor for to complete

this process. Allow the service processor to fully boot.

DO NOT UNPLUG THE SYSTEM WHILE THE SERVICE PROCESSOR IS BOOTING!

Would you like to reboot the service processor now (y|n)? y

The system is going down NOW!!

Sending SIGTERM to all processes.
```

3.12.12 Replacing a Drive

Note – This component is a hot-swappable CRU.

Note – Sun Fire X4100/X4100 M2 only – In FIGURE 3-44, Drive 0 and Drive 1 are represent the standard system configuration; Drive 2 and Drive 3 are shown to represent the optional factory configuration of four hard drives (no DVD-ROM drive).

FIGURE 3-44 Designation of Hard Disk Drives



A single drive failure will not cause a data failure if the drives are configured as a mirrored RAID 1 volume (optional). The drive can be hot-swapped, and when a new drive is inserted, the contents are automatically rebuilt from the rest of the array with no need to reconfigure the RAID parameters. If the bad drive was configured as a hotspare, the new drive is automatically configured as a new hotspare. For information about setting up RAID configurations, refer to the *X64 Servers Utilities Reference Manual*.

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

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, refer to:

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

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

Use the following procedure to replace a drive.

1. **Observe the LEDs on the faces of the drives, and identify the defective drive.**
   - Middle LED on (amber): The drive is faulty and should be replaced.

- Bottom LED on (green): The drive is operating properly.

Note – When you replace the drives to their bays, you must return each drive to the bay from which it was removed. Temporarily label the drives when you remove them.

---

2. **Press the button on the face of the drive to release the spring-loaded securing latch. See** FIGURE 3-45**.**

3. **Grasp the securing latch and remove the drive from the drive bay.**

FIGURE 3-45 Opening the Hard Disk Drive Latch

Installation is the reverse of this procedure.

Note – If the drives were previously configured as a mirrored RAID 1 array, an automatic resynchronization is invoked and the contents are automatically rebuilt from the rest of the array with no need to reconfigure the RAID parameters. If the bad drive was configured as a hotspare, the new drive is automatically configured as a new hotspare.

Note – When you install an drive, open its securing latch before you push the drive into the bay. Push the drive into the bay until it stops, then close the securing latch to fully engage the connector on the drives backplane.

Note – For Sun Fire X4100/X4100 M2 servers with the factory-configured option for four hard disk drives: You must remove the top two hard disk drives before reinstalling the front cover to provide clearance for the front cover to slide on the chassis. Reinstall the top two hard disk drives after you reinstall the front cover.

3.12.13 Replacing the Drives Backplane

Note – This component is an FRU and should be replaced only by qualified service technicians. Contact your Sun Service representative for assistance.

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, refer to:

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

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

Use the following procedure to replace an drives backplane.

1. **Power off the server as described in** Section 3.4 on page 3-4**.**
2. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover and front cover. If you cannot safely view and access the component, remove the server from the rack.**
3. **Remove the main cover as described in** Section 3.5 on page 3-6 **or** Section 3.8 on page 3-10**.**
4. **Remove the front bezel as described in** Section 3.6 on page 3-7 **or** Section 3.9 on page 3-11**.**

Note – Always unfasten the bezel's securing screw before removing the bezel.

5. **Remove the front cover as described in** Section 3.7 on page 3-8 **or** Section 3.10 on page 3-12**.**
6. **Label the drives with adhesive notes or another method so that you will know where to reinstall them at the end of the procedure.**

Note – When you replace the drives to their bays, you must return each drive to the bay from which it was removed. Use an adhesive note or another method to temporarily label the drives after you remove them.

7. **Remove all drives from the drive bays:.**

   a. **Press the button on the face of the drive to release the spring-loaded securing latch. See** FIGURE 3-45 on page 56**.**

   b. **Grasp the securing latch and remove the drive from the drive bay.**

8. **Unfasten the spring-loaded thumbscrew that secures the flex cable retainer, and remove this retainer from the chassis. See** FIGURE 3-46**.**

FIGURE 3-46 Removing the Flex Cable Retainer

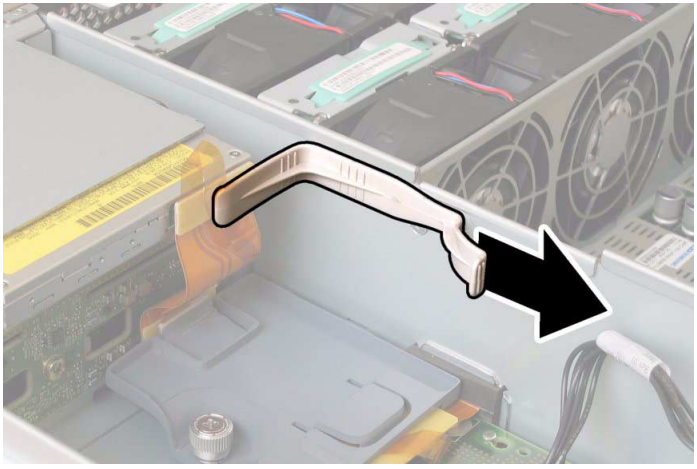
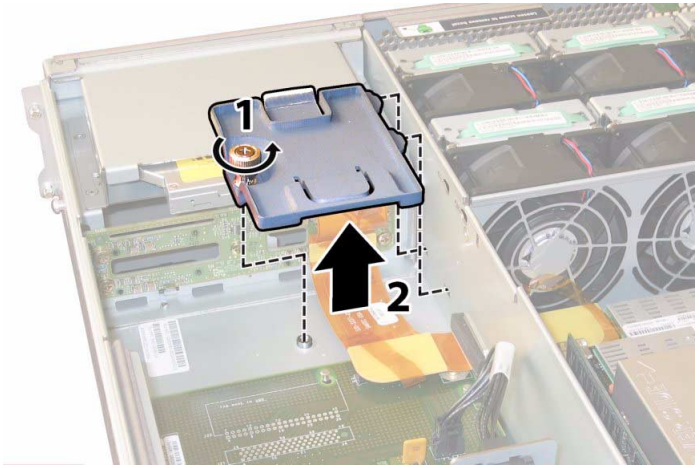


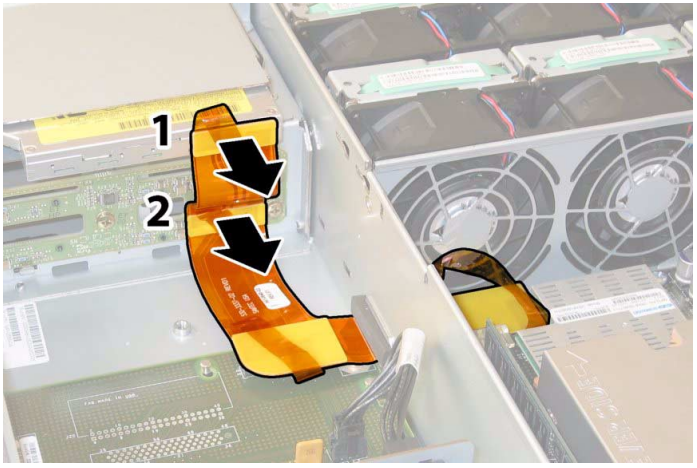
FIGURE 3-47 Removing the Upper Cable Retaine



9. **Remove the upper cable retainer from the chassis. Push the retainer toward the rear of the chassis to free it from the keyed openings in the chassis midwall. See** FIGURE 3-47**.**

10. **Disconnect the flex cable connectors from the rear of the DVD-ROM drive and the drives backplane. See** FIGURE 3-48**.**

FIGURE 3-48 Disconnecting the Flex Cable From the DVD Drive and the Drives Backplane

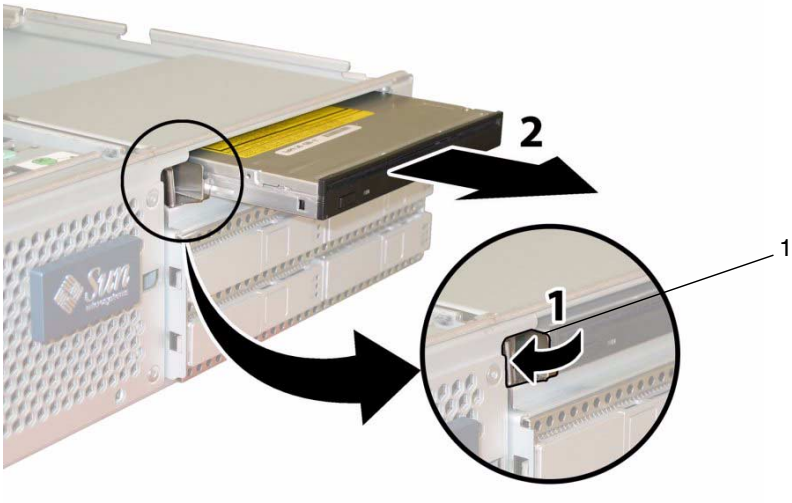


11. **Remove the DVD-ROM drive.**

    a. **Pull the spring latch at the front of the DVD-ROM drive to the left and hold it. See** FIGURE 3-49**.**

b. Use your other hand to reach behind the drive and push it out through the front of the chassis.

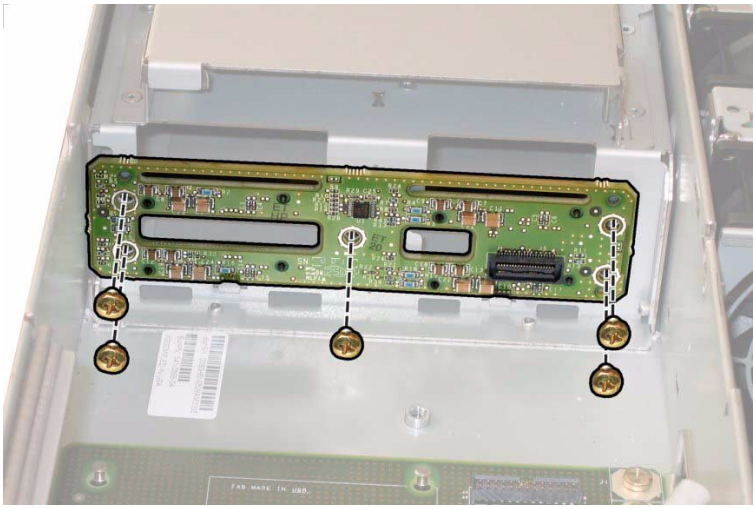
FIGURE 3-49 Removing the DVD-ROM Drive



12. **Unfasten the screws that secure the drives backplane to the rear of the drive bays. See** FIGURE 3-50**.**

13. **Remove the drives backplane from the chassis.**

FIGURE 3-50 Removing the Drives Backplane



Installation is the reverse of this procedure. When reinstalling screws, tighten to 7 in-lbs (0.8 Nm) using an adjustable torque driver.

Note – When you return the drives to their bays, you must return each drive to the bay from which it was removed. If the drives were previously configured as a mirrored RAID 1 array, an automatic resynchronization is invoked with no need to reconfigure the RAID parameters. Any hotspares are automatically reconfigured.

Note – When you reinstall an drive, open its securing latch before you push the drive into the bay. Push the drive into the bay until it stops, then close the securing latch to fully engage the connector on the drives backplane.

3.12.14 DIMM Population Rules

Note – Sun Fire X4100/X4200 servers use *only* DDR1 DIMM.
Sun Fire X4100 M2/X4200 M2 servers use *only* DDR2 DIMMs.

Note – Do not mix single-rank and dual-rank pairs on a CPU memory bank or there will be a 10% loss in performance.

Note – If you are installing single-rank DIMMs, be sure to upgrade the system BIOS to the latest version.

Note – Do not mix single-rank DIMMs and dual-rank DIMMs within a pair.

Note – For optimum performance, all DIMMs controlled by a given CPU should be the same capacity and either single-rank or dual-rank. Mixed-rank configurations are supported, but these configurations can result in lower memory performance. Note that all supported 4-GB and 8-GB DIMMs are dual-rank. For 1-GB and 2-GB DIMMs, you can identify the type by counting the DRAMs; single-rank DIMMs have 18 DRAMs, while dual-rank DIMMs have 36 DRAMs.

Sun Fire X4100/X4200

The DIMM population rules for Sun Fire X4100/X4200 servers are as follows:

- Each CPU can support a maximum of four DDR1 DIMMs.
- Each pair of DIMMs must be identical (same manufacturer, size, and speed).
- CPUs with only a single pair of DIMMs must have those DIMMs installed in that CPU's white DIMM slots (0 and 1). See FIGURE 3-51.
- See TABLE 3-1 for supported DIMM configurations for Sun Fire X4100/X4200 servers.
- The DIMM slots are paired and the DIMMs must be installed in pairs (0 and 1; 2 and 3). The memory sockets are colored black or white to indicate which slots are paired by matching colors.

Note – The system reports individual DIMM numbers when a memory fault happens.

Sun Fire X4100 M2/X4200 M2

The DIMM population rules for Sun Fire X4100 M2/X4200 M2 servers are listed here:

- Each CPU can support a maximum of four DDR2 DIMMs.
- Each pair of DIMMs must be identical (same manufacturer, size, and speed).
- CPUs with only a single pair of DIMMs must have those DIMMs installed in that CPU's white DIMM slots (3 and 2). See FIGURE 3-52.
- See TABLE 3-2 for supported DIMM configurations for Sun Fire X4100 M2/X4200 M2 servers.
- The DIMM slots are paired and the DIMMs must be installed in pairs (0 and 1; 2 and 3). The memory sockets are colored black or white to indicate which slots are paired by matching colors.

Note – The system reports individual DIMM numbers when a memory fault happens.

3.12.14.1 Supported DIMM Configurations

TABLE 3-1 Supported DIMM Configurations – Sun Fire X4100/X4200, DDR1 Only

Slot 3	Slot 1	Slot 2	Slot 0	Total Memory Per CPU
0	512 MB	0	512 MB	1 GB
512 MB	512 MB	512 MB	512 MB	2 GB
512 MB	1 GB	512 MB	1 GB	3 GB
512 MB	2 GB	512 MB	2 GB	5 GB
512 MB	4 GB	512 GB	4 GB	9 GB
0	1 GB	0	1 GB	2 GB
1 GB	512 MB	1 GB	512 MB	3 GB
1 GB	1 GB	1 GB	1 GB	4 GB
1 GB	2 GB	1 GB	2 GB	6 GB
1 GB	4 GB	1 GB	4 GB	10 GB
0	2 GB	0	2 GB	4 GB
2 GB	512 MB	2 GB	512 MB	5 GB
2 GB	1 GB	2 GB	1 GB	6 GB
2 GB	2 GB	2 GB	2 GB	8 GB
2 GB	4 GB	2 GB	4 GB	12 GB
0	4 GB	0	4 GB	8 GB
4 GB	4 GB	4 GB	4 GB	16 GB

TABLE 3-2 Supported DIMM Configurations – Sun Fire X4100 M2/X4200 M2, DDR2 Only

Slot 2	Slot 3	Slot 0	Slot 1	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 3-2 Supported DIMM Configurations – Sun Fire X4100 M2/X4200 M2, DDR2 Only *(Continued)*

Slot 2	Slot 3	Slot 0	Slot 1	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

3.12.14.2 Installing DIMMs Into a Single-CPU System

Before installing DIMMs into a single-CPU system, ensure they meet the following requirements:

- A single-CPU system **cannot** have DIMMs in the slots next to **CPU1**.
- DIMMs must be installed in pairs.
- The DIMMs in a pair must be identical as follows:
  - Same manufacturer and type.
  - Same number of memory devices.
  - Same amount of memory per device.
  - Same memory speed for all installed DIMMs in system.
- When only 1 pair of DIMMs must be installed:
  - For Sun Fire X4100/X4200: White slots next to CPU0 (See FIGURE 3-51)
  - For Sun Fire X4100 M2/X4200 M2: Black slots next to CPU0 (See FIGURE 3-52)

For information on determining if your system has one or two CPUs, see Section 3.11, "HT Jumper Configuration for Single-CPU Servers (Sun Fire X4100 M2 and X4200 M2)" on page 3-13.

3.12.15 Replacing DIMMs

Note – Sun Fire X4200 servers use *only* DDR1 DIMMs.
Sun Fire X4200 M2 servers use *only* DDR2 DIMMs.

Note – This component is a CRU.

If you are installing DIMMs into a single-CPU system, see Section 3.12.14.2, "Installing DIMMs Into a Single-CPU System" on page 3-64 before beginning your DIMMs installation.

3.12.15.1 Supported DIMMs

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, refer to:

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

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

Use the following procedure to replace server's dual, in-line memory modules (DIMMs).

Note – If you are installing 4-GB DIMMs to a Sun Fire X4200 server that did not previously have 4-GB DIMMs installed, you must first install BIOS 36 or later. BIOS 36 was included with Software Release 1.2.1. Refer to the *Sun Fire X4100/X4200 Servers Release Notes For Software Release 1.2.1*, 819-4344. (This upgrade is not necessary for Sun Fire X4100 M2/X4200 M2 servers.)

The following are a list of DIMMs supported on the X4100/X4100 M2 and X4200/X4200 M2 systems.

Note – For information on the incompatibility of some Micron DIMMs with the quad-core processor, see the *Sun Fire™ X4100 M2/X4200 M2 Servers Product Notes*.

TABLE 3-3 List of Supported DIMMs

CPU Type	DIMM Type	Part Numbers
Dual-core AMD Opteron™ processor	2x4GB DIMM (1Gb based)	X4227A-Z
	2x4GB DIMM (1Gb based)	X4233A
	2x2GB DIMM (1Gb based) single-rank	X4226A-C
Quad-core AMD Opteron™ processor	2x1GB DIMM (512Mb based)	X4225A-Z
	2x2GB DIMM (512Mb based)	X4226A-Z
	2x2GB DIMM (1Gb based) single-rank	X4226A-C

To replace DIMMs, do the following:

1. **Power off the server as described in** Section 3.4 on page 3-4**.**
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 main cover as described in** Section 3.5 on page 3-6 **or** Section 3.8 on page 3-10**.**
4. **Locate the DIMM slot on the motherboard to which you will install or replace a DIMM.**

   The DIMM ejector levers contain LEDs that can indicate a faulty DIMM:

   - DIMM ejector LED is off: The DIMM is operating properly.
   - DIMM ejector LED is on (amber): The DIMM is faulty and should be replaced.

Note the following differences between servers regarding the power requirements for viewing the DIMM fault LEDs:

- Sun Fire X4100/X4200: The DIMM fault LEDs are lit only if the server is in standby power mode, with the power cords attached. See "Powering Off the Server" on page 3-4.
- Sun Fire X4100 M2/X4200 M2: The DIMM fault LEDs can be lit for up to one minute without external power. To light the DIMM fault LEDs (from a capacitor on the motherboard) push the small button on the motherboard labeled "DIMM SW2." See FIGURE 3-52.
- FIGURE 3-51 shows the numbering and pairing of the Sun Fire X4100/X4200 DIMM slots.

- FIGURE 3-52 shows the numbering and pairing of the Sun Fire X4100 M2/X4200 M2 DIMM slots.

FIGURE 3-51 DIMM Slot Numbering and Pairing – Sun Fire X4100/X4200

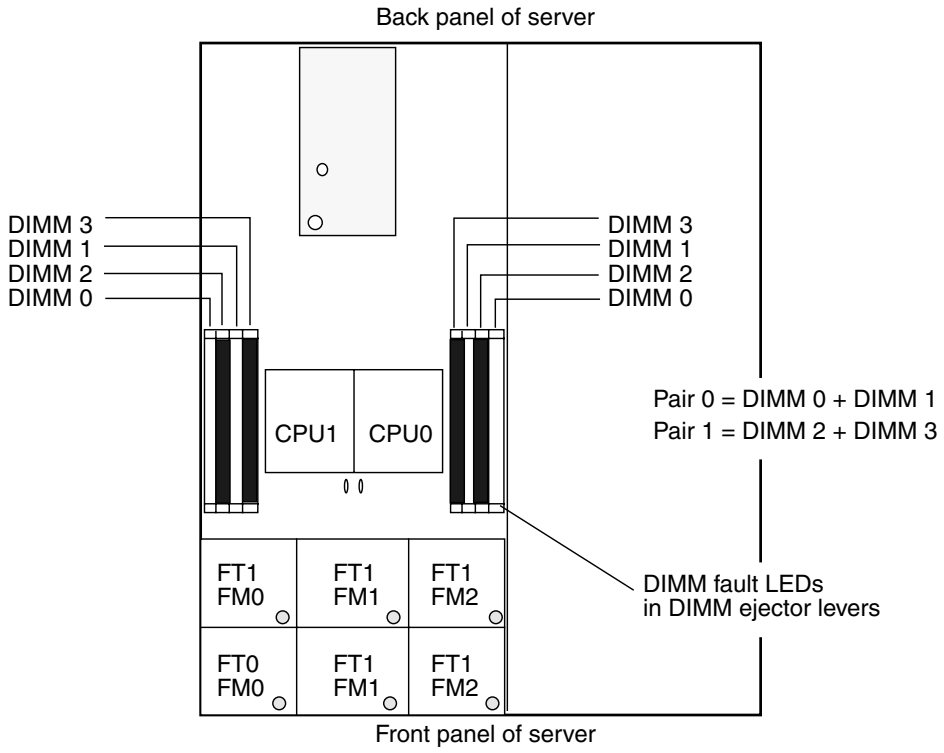
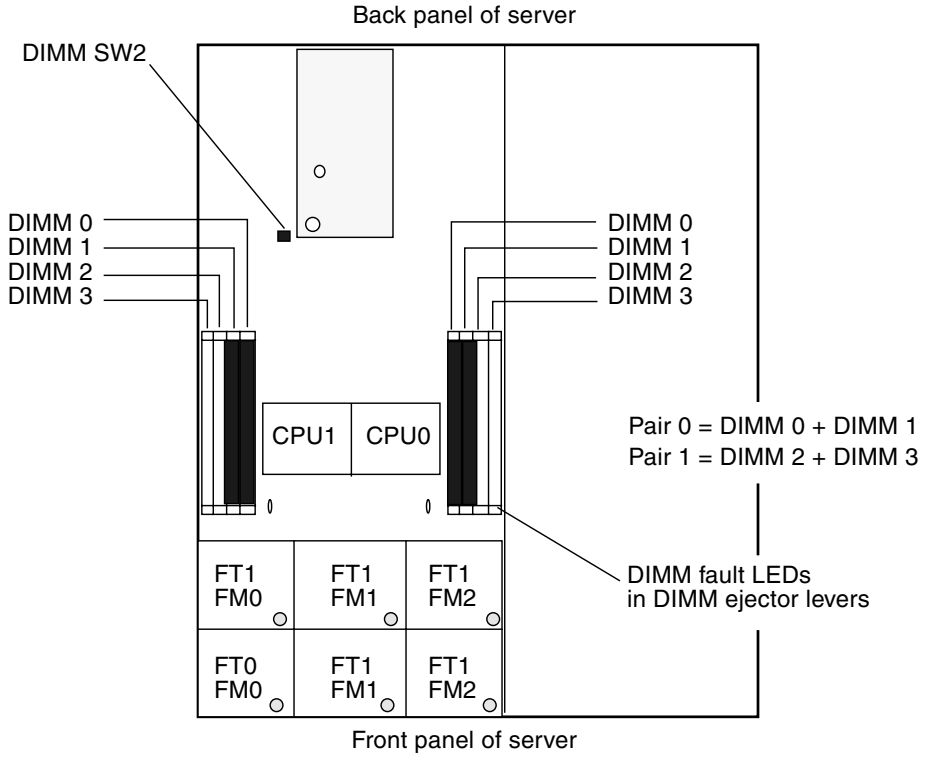


FIGURE 3-52 DIMM Slot Numbering and Pairing – Sun Fire X4100 M2/X4200 M2



5. **Before continuing with the next step, review "DIMM Population Rules" on page 3-61.**

6. **To remove a DIMM:**

   a. **Rotate both DIMM slot ejectors outward as far as they will go. The DIMM is partially ejected from the socket. See** FIGURE 3-53.

   b. **Carefully lift the DIMM straight up to remove it from the socket.**

FIGURE 3-53 Removing a DIMM

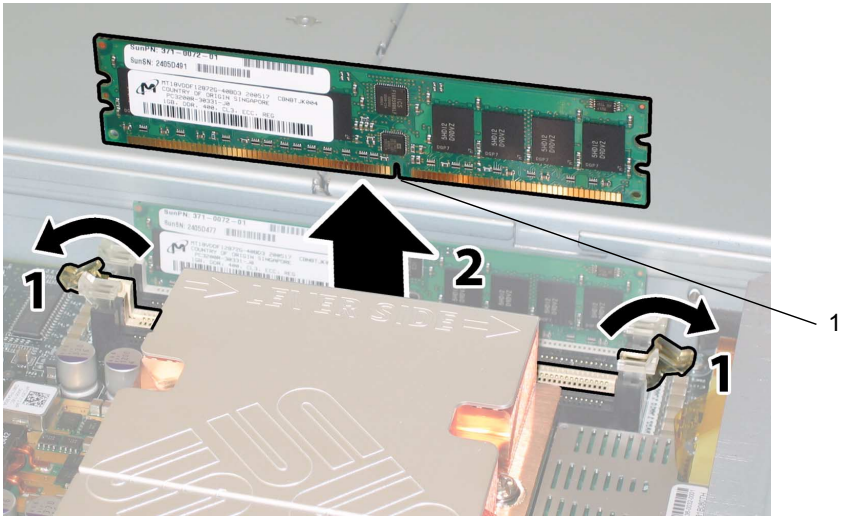


Figure Legend

1	Notch

7. To install a DIMM:

Note – The Sun Fire X4200 server uses *only* DDR1 DIMMs. The Sun Fire X4200 M2 server uses *only* DDR2 DIMMs.

---

a. Ensure that the DIMM slot ejectors at each end of the memory socket are fully open (rotated outward) to accept the new DIMM.

b. Align the notch in the bottom edge of the DIMM with the key in the DIMM socket. See FIGURE 3-53**.**

c. 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.

Caution – If you install 4-GB DIMMs in a Sun Fire X4100/X4200 server that did not previously have 4-GB DIMMs, you must replace the gaskets on the main cover to ensure containment of electrical emissions, as described in the next steps. Gasket replacement is not necessary for Sun Fire X4100 M2/X4200 M2 server.

8. **If you installed 4-GB DIMMs in a Sun Fire X4100/X4200 server that did not previously have 4-GB DIMMs installed, install gaskets on the main cover.**

Note – This gasket installation does not apply to Sun Fire X4100 M2/X4200 M2 servers.

   a. **Remove the backing strip from the adhesive on one of the new gaskets.**

   b. **Set the new gasket in place, being careful to align the end of the gasket with the front edge of the main cover. See** FIGURE 3-54**.**

   c. **Press down on the gasket to remove any trapped air and secure it firmly to the main cover.**

d. Install the remaining gasket to the main cover.

FIGURE 3-54 Installing a Main Cover Gasket for 4-GB DIMMs

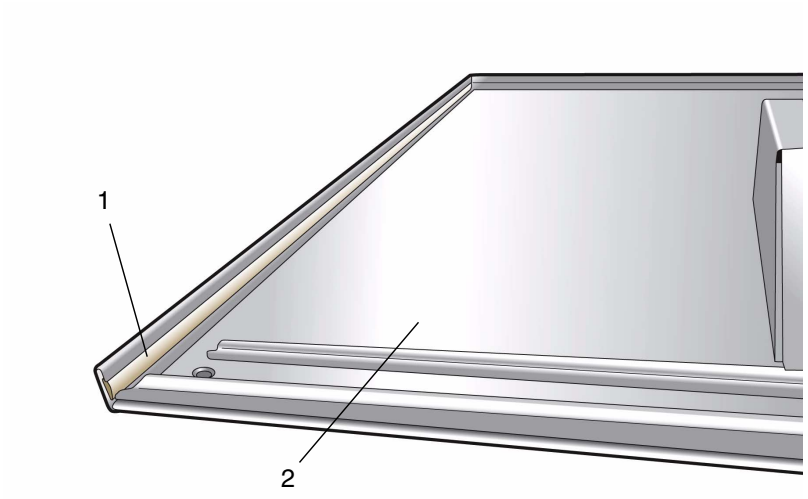


Figure Legend

1	Main cover gasket (1 of 2)
2	Underside of main cover

3.12.16 Replacing PCI Cards

Note – Sun Fire X4200 servers support only PCIX style cards; Sun Fire X4200 M2 servers support one PCIX slot and four PCI-Express (PCIE) slots.

Note – This component is a CRU and can be replaced by anyone.

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, refer to:

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

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

Use the following procedure to replace a PCI card.

1. **Power off the server as described in** Section 3.4 on page 3-4**.**
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 main cover as described in** Section 3.5 on page 3-6 **or** Section 3.8 on page 3-10**.**
4. **Locate the PCI card slot in which you will install or replace a PCI card.**

The system designation and the speeds of the five PCI slots are shown in FIGURE 3-56 and FIGURE 3-57.

The slots for the PCI cards are detected by the system BIOS during bootup in the order described in Section 2.3.2 on page 2-5.

Note – Sun Fire X4100/X4100 M2 only: The server is shipped with two PCI risers already installed in the low-profile PCI card sockets.

Note – Before you install a card, consult the manufacturer's documentation for system requirements and configuration information for your specific PCI card.

FIGURE 3-55 Designation and Speeds of PCI Slots – Sun Fire X4100/X4100 M2

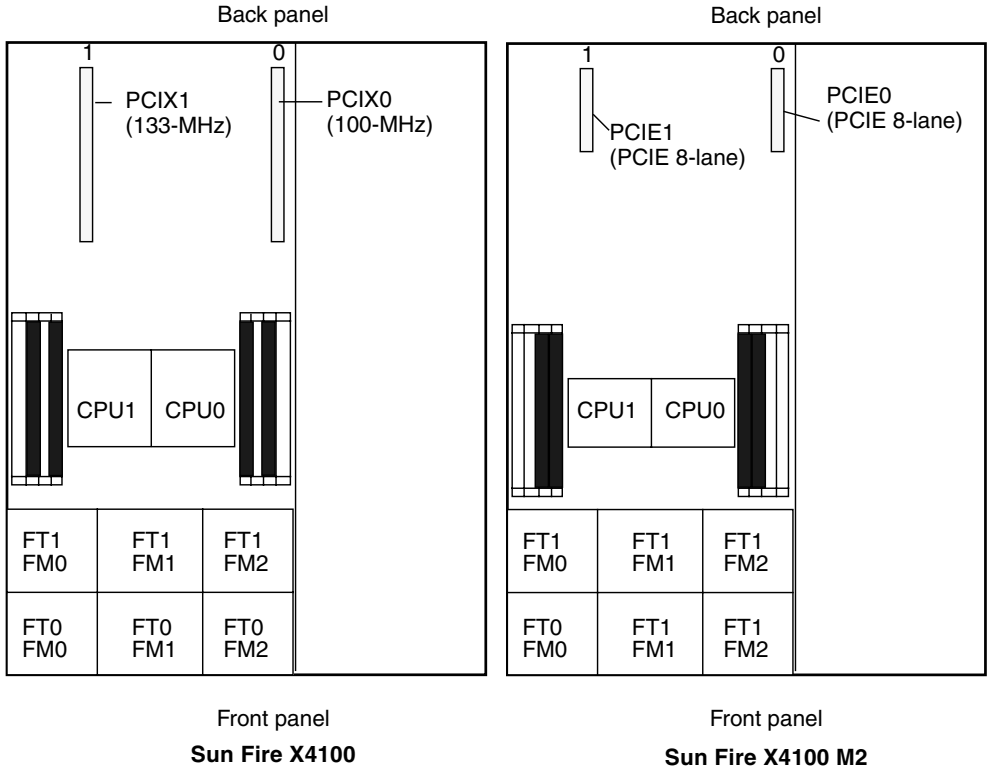


FIGURE 3-56 Designation and Speeds of PCI Slots – Sun Fire X4200

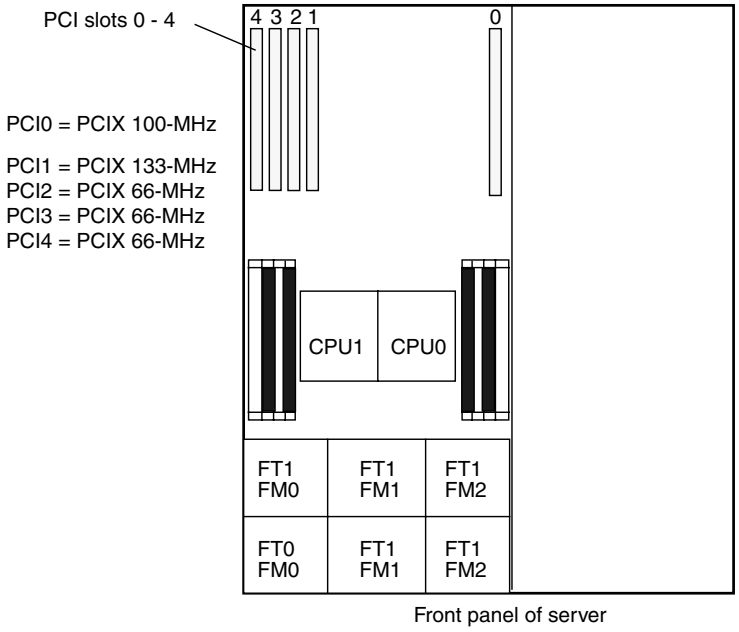
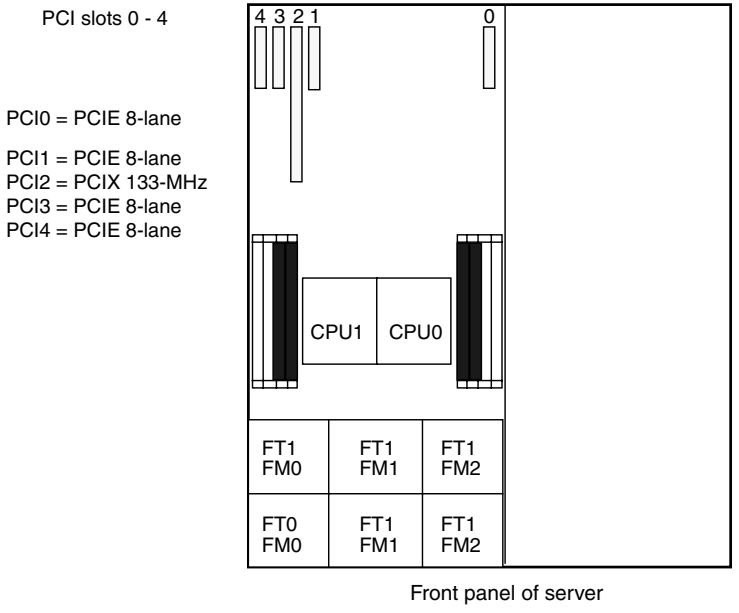


FIGURE 3-57 Designation and Speeds of PCI Slots – Sun Fire X4200 M2



5. **Remove the slot cover or PCI card from the slot. See** FIGURE 3-58 **or** FIGURE 3-59**.**

   a. **Disconnect any external cables that are attached to the PCI card.**

   b. **Working from the rear of the chassis, pivot open the PCI card latch that covers the PCI card's rear connector panel.**

   c. **Pull the PCI cards or slot covers out of the PCI slots. Ensure that each PCI card's rear connector panel is released from the tabs on the chassis rear panel.**

FIGURE 3-58 Opening a PCI Card Securing Latch (Sun Fire X4200/X4200 M2 Server Shown)

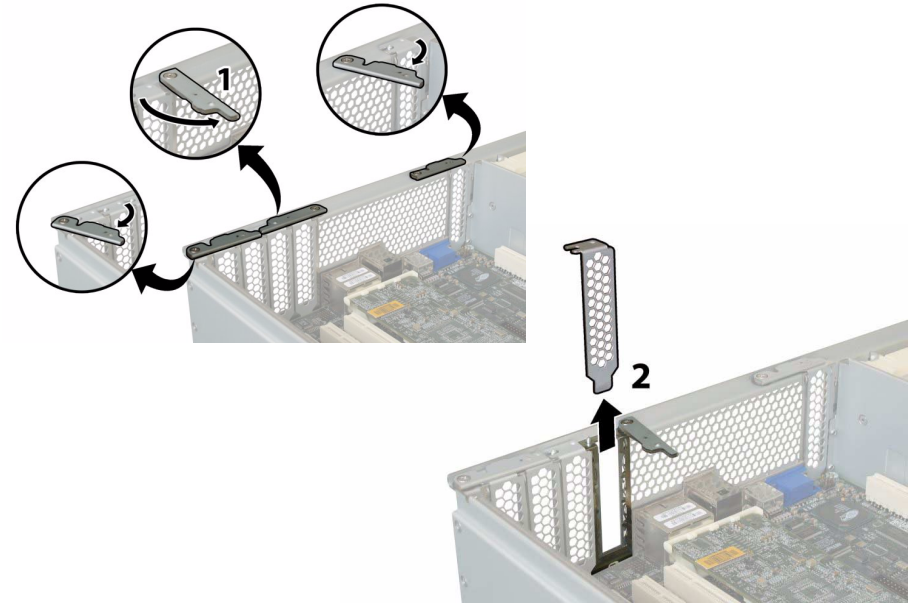
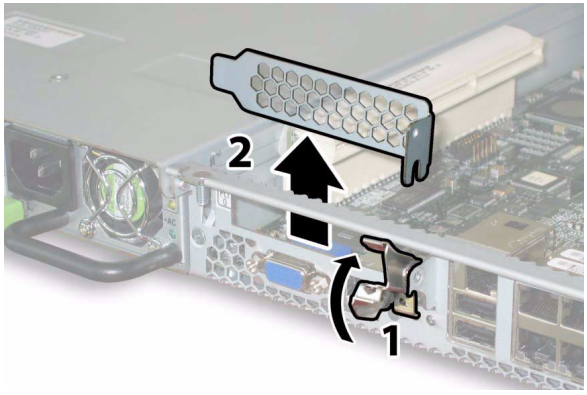


FIGURE 3-59 Opening a PCI Card Securing Latch (Sun Fire X4100/X4100 M2 Server Shown)



6. Install a PCI card.

Note – Sun Fire X4200 servers support only PCIX style cards; Sun Fire X4200 M2 servers support one PCIX slot and four PCI-Express (PCIE) slots.

---

a. Insert the PCI card into the PCI card slot. Ensure that the PCI card's rear connector panel engages the tab in the chassis rear panel.

b. Pivot the PCI card latch closed over the rear connector panel of the PCI card until it locks. See FIGURE 3-60 **or** FIGURE 3-61**.**

FIGURE 3-60 Installing a PCI Card (Sun Fire X4200/X4200 M2 Server Shown)

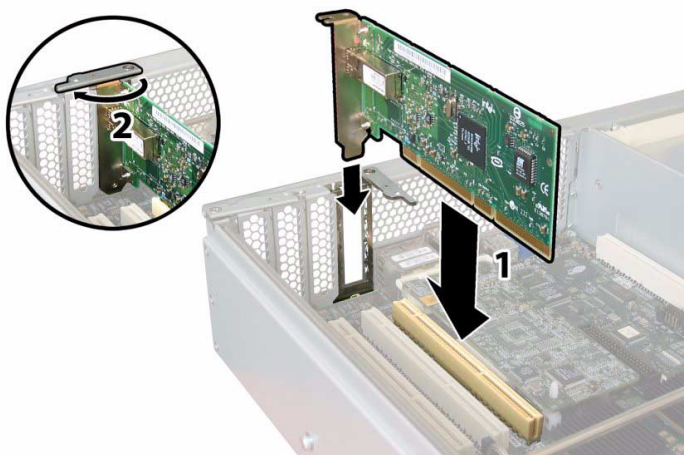
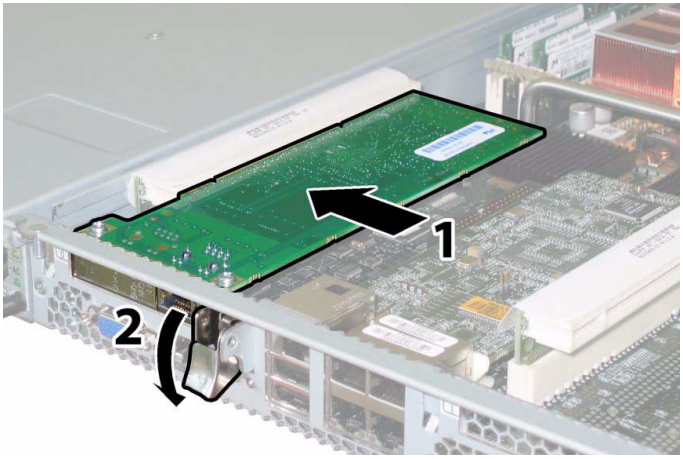


FIGURE 3-61 Installing a PCI Card (Sun Fire X4100 M2 Server Shown)



3.12.17 Replacing the Motherboard

Note – Sun Fire X4100/X4200 and X4100 M2/X4200 M2 servers use different motherboards. Do not interchange them.

Note – This component is an FRU and should be replaced only by qualified service technicians. Contact your Sun Service representative for assistance.

Note – When you install the new motherboard, you must replace the old cap-style bus bar nuts with new M5 flange-nuts that are included with your replacement motherboard. For more details, see the note at the end of this procedure.

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, refer to:

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

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

Use the following procedure to remove and replace the motherboard.

1. **Power off the server as described in** Section 3.4 on page 3-4**.**
2. **If the server is in a rack, remove the server from the rack.**
3. **Remove the main cover as described in** Section 3.5 on page 3-6 **or** Section 3.8 on page 3-10**.**
4. **Remove the front bezel as described in** Section 3.6 on page 3-7 **or** Section 3.9 on page 3-11**.**

Note – Always unfasten the bezel's securing screw before removing the bezel.

---

5. **Remove the front cover as described in** Section 3.7 on page 3-8 **or** Section 3.10 on page 3-12**.**
6. **Remove all PCI cards.**
   a. **Disconnect any external cables from the PCI cards.**
   b. **Working from the rear of the chassis, pivot each card latch to release the PCI cards. See** FIGURE 3-58 **and** FIGURE 3-59 on page 76**.**
   c. **Pull the PCI cards out of the PCI slots. Ensure that each PCI card's rear connector panel is released from the tabs on the chassis rear panel.**
7. **Sun Fire X4200/X4200 M2 Only: Pivot the PCI card latches back to their closed positions.**
8. **Remove the Graphics Redirect and Service Processor (GRASP) board, as described in** Section 3.12.10 on page 3-51**.**
9. **Remove all DIMMs from the motherboard. For details, see "Replacing DIMMs" on page 3-65.**
10. **Remove all CPUs from the motherboard.**

    Refer to one of the following procedures, depending on your model of the server:

    - "Replacing a CPU and Heatsink (Sun Fire X4100 and X4200 Servers)" on page 3-17
    - "Replacing a CPU and Heatsink (Sun Fire X4100 M2/X4200 M2 Servers)" on page 3-23
11. **Disconnect and remove the interconnect cable that connects the motherboard and the front I/O board. See** FIGURE 3-62 **and** FIGURE 3-63**.**

FIGURE 3-62 Disconnecting the Front I/O Interconnect Cable (Sun Fire X4100/X4100 M2 Server Shown)

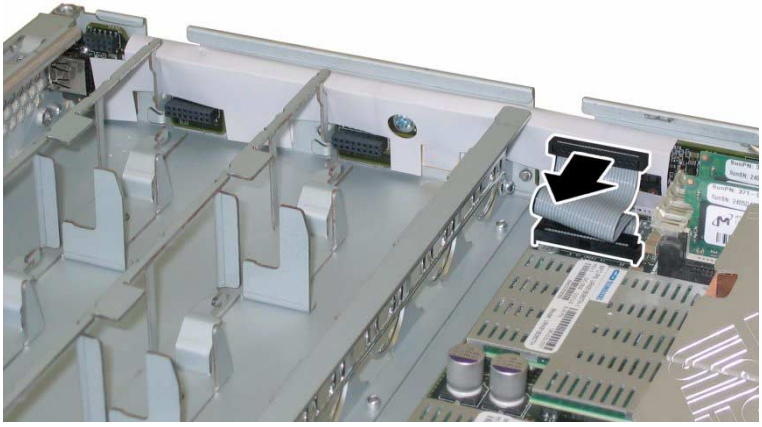
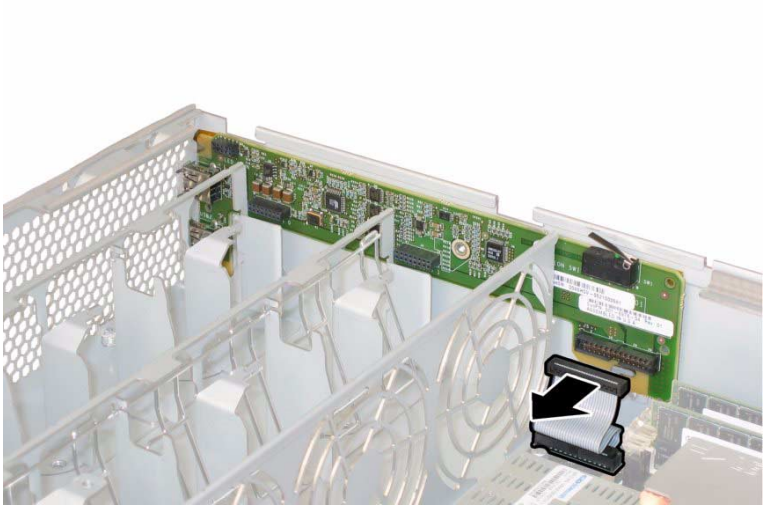


FIGURE 3-63 Disconnecting the Front I/O Interconnect Cable (Sun Fire X4200/X4200 M2 Server Shown)



12. **Unfasten the spring-loaded thumbscrew that secures the flex cable retainer and remove this retainer from the chassis. See** FIGURE 3-46 on page 58**.**

13. **Remove the upper cable retainer from the chassis. Push the retainer toward the rear of the chassis to free it from the keyed openings in the chassis midwall. See** FIGURE 3-47 on page 59**.**

14. **Remove the flex cable and its attached foam rubber gasket from the chassis inner wall by disconnecting the cable's four connectors from the following four locations. See** FIGURE 3-64**.**

    a. DVD-ROM drive

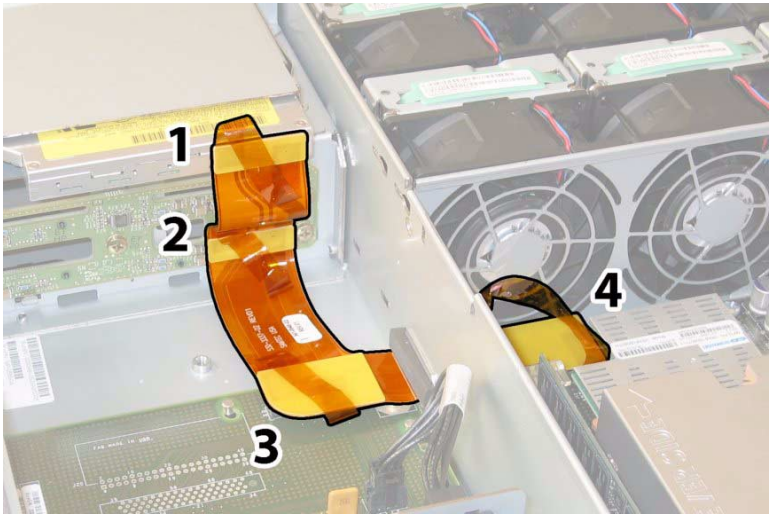
    b. Hard disk drive backplane

    c. Power distribution board

    d. Motherboard

Note – When reinstalling the flex cable, attach the connector to the power distribution board (3) first. Then attach the remaining three connectors in any order.

FIGURE 3-64 Disconnecting the Flex Cable's Four Connectors (Sun Fire X4200/X4200 M2 Server Shown)



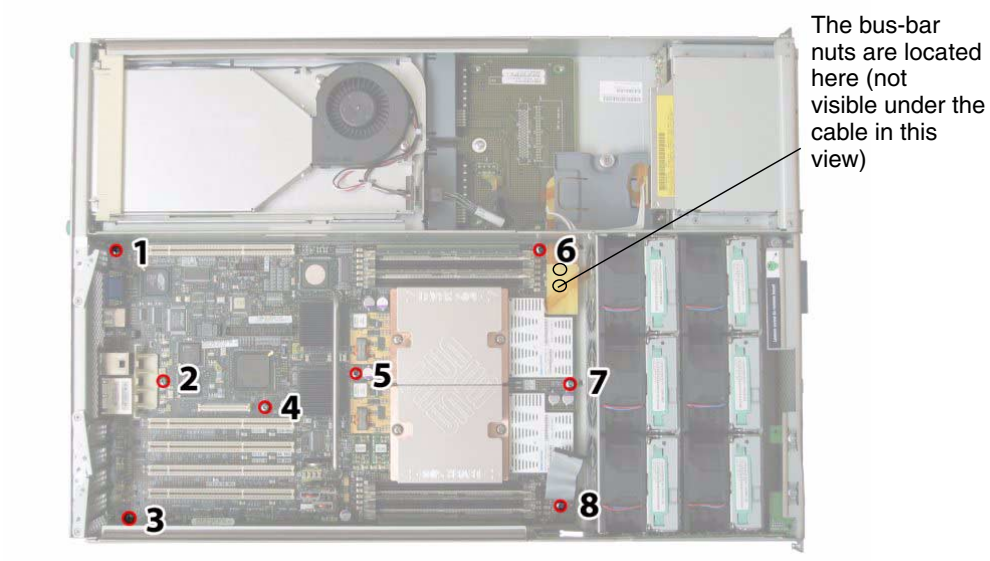
15. **Unfasten and remove the eight screws that secure the motherboard to the chassis floor. See** FIGURE 3-65 **for the location of the eight screws.**

16. **Use an 8-mm nut-driver to remove the two bus-bar nuts from the motherboard. See** FIGURE 3-65**.**

Note – When you install the new motherboard, you must replace these old cap-style bus bar nuts with new M5 flange-nuts that are included with your replacement motherboard. For more details, refer to the notes at the end of this procedure.

Note – If you remove the drives from the server for any reason during this procedure, you must return each drive to the bay from which it was removed. Therefore, temporarily label the drives after you remove them.

FIGURE 3-65 Motherboard Securing Screw and Bus-Bar Nut Locations (Sun Fire X4200/X4200 M2 Server Shown)



17. **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.

---

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

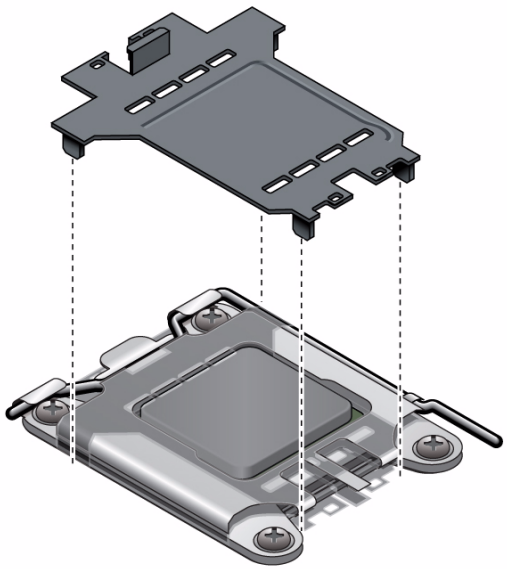
3.12.17.1 Installing the Motherboard

Installation is the reverse of this procedure. Note the following:

Caution – When reinstalling the CPUs, follow the instructions in "Replacing a CPU and Heatsink (Sun Fire X4100 and X4200 Servers)" on page 3-17 or "Replacing a CPU and Heatsink (Sun Fire X4100 M2/X4200 M2 Servers)" on page 3-23.

Note – When you replace your motherboard, you must take the plastic CPU socket covers that are present on the new replacement motherboard and install them into the CPU sockets of the old motherboard before shipping. This ensures that the CPU pins are not damaged in transit. See FIGURE 3-66.

FIGURE 3-66 Installing the CPU Socket Protective Cover



- When reinstalling screws, tighten to 7 in-lbs (0.8 Nm) using an adjustable torque driver.
- When installing the new motherboard, replace the old cap-style bus bar nuts with new M5 flange-nuts that are included with your replacement motherboard. Tighten the flange-nuts onto the bus bar studs to 18 in-lbs (2.0 Nm). Vibration can loosen the old style cap nuts; the new flange style nuts correct this.

- After you replace the motherboard, you must use the `servicetool` command to update the motherboard FRU information. See "Servicetool FRU Update Procedure" on page 3-2.
- The Sun Fire X4200/X4200 M2 servers use different motherboards. These cannot be interchanged.

Note – The ILOM software on the GRASP board and the system BIOS on the motherboard should be from the same software release, as documented in the *Sun Fire X4100/X4200 Servers Release Notes* or the *Sun Fire X4100 M2/X4200 M2 Servers Release Notes* (depending on whether or not yours is an M2 system). After replacing the GRASP board or the motherboard, check the ILOM and system BIOS versions against those documented in the release notes. If they are not from the same software release, upgrade or downgrade the system BIOS (not the ILOM) accordingly. Once the ILOM and system BIOS are back to matching versions, you can upgrade or downgrade both to the desired versions.

3.12.18 Replacing a Power Supply

DC power supplies can be ordered as a factory installed option, or they can be ordered and used to replace existing AC power supplies in the field.

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.

Note – This component is a hot-swappable CRU and can be replaced by anyone.

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, refer to:

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

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

Use the following procedure to remove and replace a power supply.

The system designation of the two power supplies is shown in FIGURE 3-67 and FIGURE 3-68.

FIGURE 3-67 Designation of Power Supplies (Sun Fire X4200/X4200 M2 Server Shown)

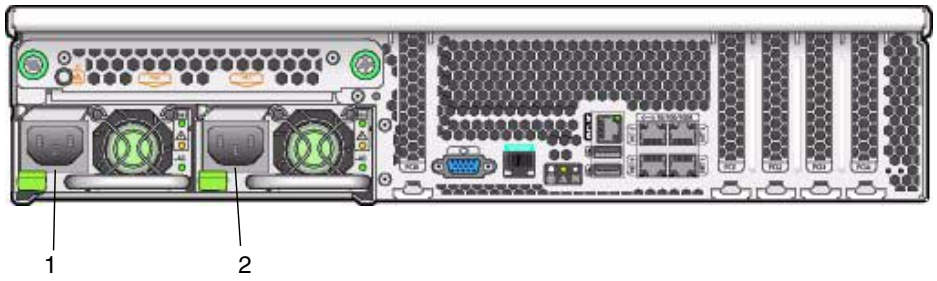


Figure Legend

1	PS0
2	PS1

FIGURE 3-68 Designation of Power Supplies (Sun Fire X4100/X4100 M2 Server Shown)

Figure Legend

1	PS0
2	PS1

1. **Identify which power supply you will replace. Each power supply has three LEDs that you can view from the rear of the server:**
   - Top LED is on (green): Power supply is operating properly.
   - Middle LED is on (amber): Power supply is faulty and should be replaced.
   - Bottom LED is on (green): Power source to power supply is operating properly.
2. **Disconnect the power cord from the power supply that you are replacing.**

   The power supplies are hot-swappable, so you do not have to shut down the server or disconnect the second power supply.

Note – The Service Action Required LEDs on the front panel and back panel blink when a power supply is unplugged. See Section C.1 on page C-1 for the LED locations and descriptions.

3. **Remove the power supply.**

   a. **Grasp the power supply handle and push the thumb latch toward the center of the power supply. See** FIGURE 3-69**.**

   b. **While continuing to push on the latch, use the handle to remove the power supply from the chassis.**

FIGURE 3-69 Removing a Power Supply (Sun Fire X4200/X4200 M2 Server Shown)

Installation is the reverse of this procedure.

Note – When installing a new power supply, press it into the bay until the thumb latch clicks, indicating that it is locked.

3.12.19 Replacing the Power Distribution Board (PDB)

Note – This component is an FRU and should be replaced only by qualified service technicians. Contact your Sun Service representative for assistance.

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, refer to:

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

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

Use the following procedure to replace the PDB.

1. **Power off the server as described in** Section 3.4 on page 3-4**.**
2. **If the server is in a rack, slide it far enough from the rack so that you can remove the main cover and front cover. If you cannot safely view and access the component, remove the server from the rack.**
3. **Remove the main cover as described in** Section 3.5 on page 3-6 **or** Section 3.8 on page 3-10**.**
4. **Remove the front bezel as described in** Section 3.6 on page 3-7 **or** Section 3.9 on page 3-11**.**

Note – Always unfasten the bezel's securing screw before removing the bezel.

5. **Remove the front cover as described in** Section 3.7 on page 3-8 **or** Section 3.10 on page 3-12**.**
6. **Remove both power supplies:**
   a. **Grasp the power supply handle and push the thumb latch toward the center of the power supply. See** FIGURE 3-69 on page 85**.**
   b. **While continuing to push on the latch, use the handle to remove the power supply from the chassis.**
7. **Unfasten the spring-loaded thumbscrew that secures the flex cable retainer and remove this retainer from the chassis. See** FIGURE 3-46 on page 58**.**
8. **Remove the upper cable retainer from the chassis. Push the retainer toward the rear of the chassis to free it from the keyed openings in the chassis midwall. See** FIGURE 3-47 on page 59**.**

9. **Remove the flex cable and its attached foam rubber gasket from the chassis midwall by disconnecting the cable's four connectors from the following four locations. See** FIGURE 3-48 on page 59**.**

   a. DVD-ROM drive

   b. Hard disk drive backplane

   c. Power distribution board (see note below)

   d. Motherboard

Note – When reinstalling the flex cable, attach the connector to the power distribution board (item 3 above) first. Then attach the remaining three connectors in any order.

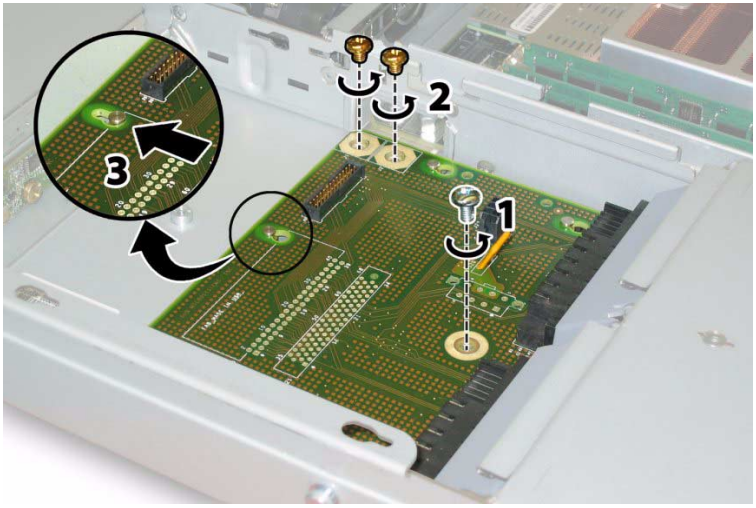
---

10. **Sun Fire X4200/X4200 M2 Only: Disconnect the rear fan tray cable from the connector on the power distribution board. See** FIGURE 3-70**.**

FIGURE 3-70 Disconnecting the Rear Fan Tray From the Power Distribution Board

11. **Use a No. 2 Phillips screwdriver to remove the three screws that secure the power distribution board to the chassis and bus bars. See** FIGURE 3-71**.**

FIGURE 3-71 Disconnecting the Power Distribution Board From the Chassis

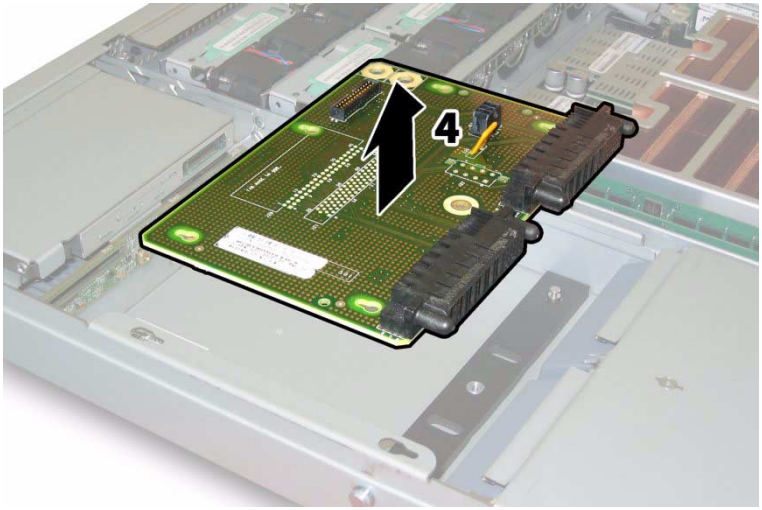


12. **Raise the plastic air baffles that cover the power supply connectors up and toward the rear of the chassis to provide clearance.**

13. **Slide the power distribution board toward the front of the chassis to release the five chassis standoffs from the keyways in the board.**

14. **Lift the board up off of the chassis standoffs and remove it from the chassis.**

FIGURE 3-72 Removing the Power Distribution Board



3.12.19.1 Installing the New Power Distribution Board

Installation is the reverse of this procedure. Note the following:

- When reinstalling screws, tighten to 7 in-lbs (0.8 Nm) using an adjustable torque driver.
- Replace the old cap-style bus bar nuts on the motherboard with new M5 flange-nuts that are included with your replacement power distribution board. Tighten the flange-nuts onto the bus bar studs to 18 in-lbs (2.0 Nm). Vibration can loosen the old style cap nuts; the new flange style nuts correct this.
- When you reinstall the power distribution board, ensure that the plastic air baffles on the chassis are fully raised to provide clearance for the rear of the board.

3.12.20 Replacing the Rear Fan Tray (Sun Fire X4200/X4200 M2 Servers)

Note – This component is a hot-swappable CRU and can be replaced by anyone.

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, refer to:

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

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

Use the following procedure to remove and replace the rear fan tray.

1. **Working from the rear of the server, unfasten the two captive thumbscrews on the face of the rear fan tray. See** FIGURE 3-73

   The internal system software designation of the rear fan tray is FT3. The rear fan tray has one fault LED on its face:

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

2. **Remove the rear fan tray from the chassis.**

   The fan tray's cable connector disengages from the internal connector on the chassis.

Note – In FIGURE 3-73, the server is shown with the cover off for visibility of the component; do not remove the cover for this procedure.

FIGURE 3-73 Removing the Rear Fan Tray

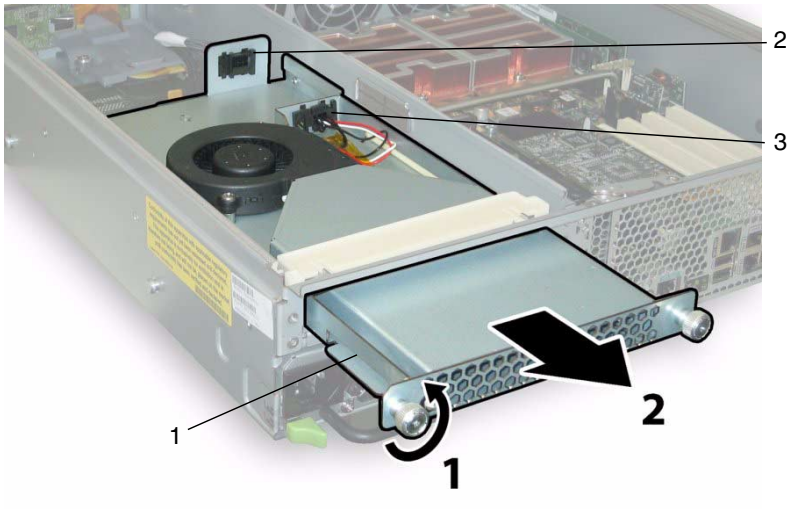


Figure Legend

1	Metal guides
2	Chassis connector to PDB
3	Fan tray cable connector

Installation is the reverse of this procedure.

Note – When you reinstall the new rear fan tray, ensure that the metal guides on the fan tray sides (see FIGURE 3-73) engage the plastic rails inside the chassis bay evenly.

APPENDIX **A**

System Specifications

This appendix contains physical, power, environmental, and acoustic noise emission specifications for Sun Fire X4100/X4100 M2 and X4200/X4200 M2 servers.

Note – The information in this appendix applies to all Sun Fire X4100/X4100 M2 and X4200/X4200 M2servers, unless otherwise noted in the text.

A.1 Sun Fire X4100/X4100 M2 Specifications

TABLE A-1 Sun Fire X4100/X4100 M2 Physical Specifications

Specification	Value
Width	17 inches (432 mm)
Height	1.7 inches (44 mm)
Depth	24 inches (610 mm)
Weight	17 pounds (8 kg)

TABLE A-2 Sun Fire X4100/X4100 M2 AC Power Specifications

Specification	Value
Universal AC Input	100–240 VAC, 50/60 Hz
Maximum input current at 200 VAC	3.5 A

TABLE A-2 Sun Fire X4100/X4100 M2 AC Power Specifications

Specification	Value
Maximum input current at 100 VAC	7.0 A
Maximum power	550 W
Maximum output supply current of each USB port	500 mA

TABLE A-3 Sun Fire X4100/X4100 M2 DC Power Specifications

Specification	Value
DC Input	–48 V or –60V Nominal
Maximum input current at –48 VDC	12.7 A
Maximum output power	550 W
Maximum output supply current of each USB port	500 mA

TABLE A-4 Sun Fire X4100/X4100 M2 Environmental Specifications

Specification	Value
Temperature (operating)	41 – 95° F 5 – 35° C
Temperature (storage)	–40 – 158° F –40 – 70° C
Humidity	10% – 90% non-condensing
Operating altitude	0 – 10,000 feet (0 – 3048 m)

TABLE A-5 contains the declared noise emissions in accordance with ISO 9296, A-weighted, operating, and idling.

TABLE A-5 Sun Fire X4100/X4100 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

A.2 Sun Fire X4200/X4200 M2 Specifications

TABLE A-6 Sun Fire X4200/X4200 M2 Physical Specifications

Specification	Value
Width	17 inches (432 mm)
Height	3.45 inches (88 mm)
Depth	24 inches (610 mm)
Weight	35 pounds (16 kg)

TABLE A-7 Sun Fire X4200/X4200 M2 AC Power Specifications

Specification	Value
Universal AC Input	100–240 VAC, 50/60 Hz
Maximum input current at 200 VAC	3.5 A
Maximum input current at 100 VAC	7.0 A
Maximum power	550 W
Maximum output supply current of each USB port	500 mA

TABLE A-8 Sun Fire X4200/X4200 M2 DC Power Specifications

Specification	Value
DC Input	–48 V or –60V Nominal
Maximum input current at –48 VDC	12.7 A
Maximum output power	550 W
Maximum output supply current of each USB port	500 mA

TABLE A-9 Sun Fire X4200/X4200 M2 Environmental Specifications

Specification	Value
Temperature (operating)	41 – 95° F 5 – 35° C
Temperature (storage)	–40 – 158° F –40 – 70° C
Humidity	10% – 90% non-condensing
Operating altitude	0 – 10,000 feet (0 – 3048 m)

TABLE A-10 contains the declared noise emissions in accordance with ISO 9296, A-weighted, operating, and idling.

TABLE A-10 Sun Fire X4200/X4200 M2 Acoustic Noise Emission Specifications

Specification	Value
L_{wAd} at or below 77° F (25° C) (1 B = 10 dB)	8.0 B
L_{wAd} at max ambient (1 B = 10 dB)	8.4 B
L_{pAm} bystander at or below 77° F (25° C)	66 dB
L_{pAm} at max ambient	69 dB

APPENDIX **B**

BIOS POST Codes

Note – The information in this appendix applies to all Sun Fire X4100/X4100 M2 and X4200/X4200 M2 servers, unless otherwise noted in the text.

The system BIOS provides a rudimentary power-on self-test. 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 two Intel dual-Gigabit Ethernet 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 Section B.2, "Redirecting Console Output" on page B-2).

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

B.1 How BIOS POST Memory Testing Works

The BIOS POST memory testing is performed as follows:

1. The first megabyte of DRAM is tested by the BIOS before the BIOS code is shadowed (that is, copied from ROM to DRAM).
2. Once executing out of DRAM, the BIOS performs a simple memory test (a write/read of every location with the pattern `55aa55aa`).

Note – This memory test is performed only if Quick Boot is *not* enabled from the Boot Settings Configuration screen. Enabling Quick Boot causes the BIOS to skip the memory test. See Section B.3, "Changing POST Options" on page B-3 for more information.

3. The BIOS polls the memory controllers for both correctable and uncorrectable memory errors and logs those errors into the service processor.

B.2 Redirecting Console Output

Use this procedure 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. **The BIOS Main Menu screen is displayed. Select Advanced.**
3. **The Advanced Settings screen is displayed. Select IPMI 2.0 Configuration.**
4. **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 the Redirection tab.**
10. **Set the color depth for the redirection console at either 6 or 8 bits.**
11. **Click the Start Redirection button.**

    The javaRConsole window is displayed 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.

B.3 Changing POST Options

This procedure is optional, but you can use it 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. **The BIOS Main Menu screen is displayed. Select the Boot menu.**
3. **The Boot Settings screen. Select Boot Settings Configuration.**
4. **The Boot Settings Configuration screen appears. 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.

B.4 POST Codes

TABLE B-1 describes 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	Comes out of POR, initializes PCI configuration space, enables 8111's SMBus.
00d1	Keyboard controller BAT, wakes up from PM, saves power-on CPUID in scratch CMOS.
00d2	Disables cache, full memory sizing, verifies that flat mode is enabled.
00d3	Detects memory and sizing in boot block, disables cache, enables IO APIC.
01d4	Tests base 512KB memory. Adjusts policies and caches first 8MB.
01d5	Copies boot block code from ROM to lower RAM. BIOS now executes out of RAM.
01d6	Determines via key sequence and OEM-specific method if BIOS recovery is forced. If next code is E0, BIOS recovery executes. Tests main BIOS checksum.
01d7	Restores CPUID, moves boot block runtime interface module to RAM, determines whether to execute serial flash.
01d8	Decompresses runtime module into RAM. Stores CPUID information in memory.
01d9	Copies main BIOS into memory.
01da	Gives control to BIOS POST.
0004	Check the CMOS diagnostic byte to determine if battery power is OK and the CMOS checksum is OK. If the CMOS checksum is bad, updates the CMOS with power-on default values.
00c2	Sets up the boot strap processor for POST. This includes frequency calculation, loading BSP microcode, and applying user requested value for the GART Error Reporting setup question.
00c3	Applies errata workarounds to the BSP (#78 & #110).

TABLE B-1 POST Codes *(Continued)*

Post Code	Description
00c6	Re-enables cache for boot strap processor, and applies workarounds in the BSP for errata #106, #107, #69, and #63 if appropriate.
00c7	The HT sets link frequencies and widths to their final values.
000a	Initializes the 8042-compatible keyboard controller.
000c	Detects the presence of a keyboard in the KBC port.
000e	Tests and initializes different input devices. Traps the INT09h vector so that the POST INT09h handler gets control for IRQ1.
8600	Prepares the CPU for booting to the OS by copying all of the context of the BSP to all application processors present. APs are left in the CLI HLT state.
de00	Prepares the CPU for booting to the OS by copying all of the context of the BSP to all application processors present. APs are left in the CLI HLT state.
8613	Initializes PM regs and PM PCI regs at early POST. Initializes the multihost bridge, if the system supports it. Sets up ECC options before memory clearing. Enables PCI-X clock lines in the 8131.
0024	Decompresses and initializes any platform-specific BIOS modules.
862a	Inititalizes BBS ROM.
002a	Generic Device Initialization Manager (DIM) – Disables all devices.
042a	ISA PnP devices – Disables all devices.
052a	PCI devices – Disables all devices.
122a	ISA devices – Static device initialization.
152a	PCI devices – Static device initialization.
252a	PCI devices – Output device initialization.
202c	Initializes different devices. Detects and initializes the video adapter installed in systems that have optional ROMs.
002e	Initializes all the output devices.
0033	Initializes the silent boot module. Sets the window for displaying text information.
0037	Displays 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	Prepares the CPU for booting to the OS by copying all of the context of the BSP to all application processors present. APs are left in the CLI HLT state.

B.5 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	Disables the NMI, parity, video for the EGA, and the DMA controllers. At this point, only ROM accesses are to the GPNV. If the BB size is 64K, requires turning on ROM decode below FFFF0000h. It should allow the USB to run in the E000 segment. Though the HT must program the NB-specific initialization, it can also program the OEM-specific initialization if needed at the beginning of BIOS POST, for instance to override default kernel variables.
04	Checks the CMOS diagnostic byte to determine if battery power is OK and the CMOS checksum is OK. Verifies the CMOS checksum manually by reading storage area. If the CMOS checksum is bad, updates the CMOS with power-on default values and clears passwords. Initializes status register A. Initializes data variables based on the CMOS setup questions. Initializes both 8259-compatible PICs in the system.
05	Initializes the interrupt controlling hardware (generally PIC) and the interrupt vector table.
06	Performs R/W test to the CH-2 count reg. Initializes CH-0 as the system timer. Installs the POSTINT1Ch handler. Enables IRQ-0 in the PIC for system timer interrupt. Traps the INT1Ch vector to POSTINT1ChHandlerBlock.
C0	Starts early CPU initialization, disables Cache, initializes local APIC.
C1	Sets up the boot strap processor information.
C2	Sets up the boot strap processor for POST. This includes frequency calculation, loading BSP microcode, and applying user requested value for the GART Error Reporting setup question.
C3	Applies errata workarounds to the BSP (#78 & #110).
C5	Enumerates and sets up application processors. This includes microcode loading and workarounds for errata (#78, #110, #106, #107, #69, #63).
C6	Re-enables cache for boot strap processor, and applies 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. APs are left in the CLI HLT state.
C7	The HT sets link frequencies and widths to their final values. This routine is called after CPU frequency has been calculated to prevent bad programming.

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

Post Code	Description
0A	Initializes the 8042-compatible Keyboard Controller.
0B	Detects the presence of a PS/2 mouse.
0C	Detects the presence of a keyboard in the KBC port.
0E	Tests and initializes different input devices. Also updates kernel variables. Traps the INT09h vector so that the POST INT09h handler gets control for IRQ1. Decompresses all available language, BIOS logo, and silent logo modules.
13	Initializes PM regs and PM PCI regs at early POST. Initializes multi host bridge if the system supports it. Sets up ECC options before memory clearing. REDIRECTION causes corrected data to be written to RAM immediately. CHIPKILL provides 4 bit error det/corr of x4 type memory. Enables PCI-X clock lines in the 8131.
20	Relocates all CPUs to a unique SMBASE address. Sets the BSP to have its entry point at A000:0. If less than 5 CPU sockets are present on a board, subsequent CPU entry points are separated by 8000h bytes. If more than four CPU sockets are present, entry points are separated by 200h bytes. The CPU module relocates the CPU to the correct address. APs are left in the INIT state.
24	Decompresses and initializes any platform-specific BIOS modules.
30	Initializes System Management Interrupt.
2A	Initializes different devices through DIM.
2C	Initializes different devices. Detects and initializes the video adapter installed in systems that have optional ROMs.
2E	Initializes all the output devices.
31	Allocates memory for the ADM module and decompresses it. Gives control to the ADM module for initialization. Initializes language and font modules for the ADM. Activates the ADM module.
33	Initializes the silent boot module. Sets the window for displaying text information.
37	Displays sign-on message, CPU information, setup key message, and any OEM-specific information.
38	Initializes different devices through the DIM.
39	Initializes DMAC-1 and DMAC-2.
3A	Initializes RTC date/time.
3B	Tests for total memory installed in the system. Also checks for DEL or ESC keys to limit memory test. Displays total memory in the system.
3C	Signals that the RAM read/write test is completed, and programs memory holes or handles any adjustments needed in RAM size for the NB. Tests if the HT module found an error in the boot block and for CPU compatibility with the MP environment.
40	Detects different devices (parallel ports, serial ports, and the coprocessor in the CPU, etc.) that are successfully installed in the system and updates the BDA, EBDA and so on.

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

Post Code	Description
50	Programs the memory hole or any implementation that needs an adjustment in system RAM size.
52	Updates the CMOS memory size from memory found in the memory test. Allocates memory for the Extended BIOS Data Area from base memory.
60	Initializes NUM-LOCK status and programs the KBD typematic rate.
75	Initializes Int-13 and prepares for IPL detection.
78	Initializes IPL devices controlled by BIOS and option ROMs.
7A	Initializes remaining option ROMs.
7C	Generates and writes the contents of ESCD in NVRam.
84	Logs errors encountered during POST.
85	Displays errors to the user and gets the user's response
87	Executes BIOS setup if needed/requested.
8C	After completing all device initialization, programs any user selectable parameters relating to the NB/SB, such as timing parameters, noncacheable regions and the shadow RAM cacheability, and do any other NB/SB/PCIX/OEM-specific programming needed during late POST. Initiates background scrubbing for the DRAM, and sets up L1 and L2 caches based on setup questions. Gets the DRAM scrub limits from each node. Applies workarounds for erratum #101.
8D	Builds ACPI tables (if ACPI is supported).
8E	Programs the peripheral parameters. Enables/disables the NMI as selected.
90	Initializes late POST system management interrupt.
A0	Checks boot password if installed.
A1	Cleans-up work necessary before booting to OS.
A2	Prepares the runtime image for different BIOS modules. Fills the free area in the F000h segment with 0FFh. Initializes the Microsoft IRQ routing table. Prepares the runtime language module. Disables the system configuration display if needed.
A4	Initializes the runtime language module.
A7	Displays the system configuration screen if enabled. Initializes the CPUs before boot, which includes the programming of the MTRRs.
A8	Prepares the CPU for OS boot including final MTRR values.
A9	Waits for user input at the config display, if needed.
AA	Uninstalls the POST INT1Ch vector and the INT09h vector. Deinitializes the ADM module.
AB	Prepares the BBS for Int 19 boot.

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

Post Code	Description
AC	Indicates chipset-specific (NB/SB) programming needed during end POST, just before giving control to runtime code booting to the OS. Programs the system BIOS (0F0000h shadow RAM) cacheability. Ports to handle any OEM-specific programming needed during end POST. Copies OEM-specific data from POST_DSEG to RUN_CSEG.
B1	Saves system context for the ACPI.
00	Prepares the CPU for booting to the OS by copying all of the context of the BSP to all application processors present. APs are left in the CLIHLT state.
61-70	Indicates OEM POST Error. This range is reserved for chipset vendors and system manufacturers. The error associated with this value may differ among platforms

APPENDIX **C**

Status Indicator LEDs

Note – The information in this appendix applies to all Sun Fire X4100/X4100 M2 and X4200/X4200 M2 servers, unless otherwise noted in the text.

C.1 External Status Indicator LEDs

FIGURE C-1 and FIGURE C-2 show the locations of the external status indicator LEDs. A Sun Fire X4200/X4200 M2 server is pictured, but the LED locations are the same for the Sun Fire X4100/X4100 M2 server.

Refer to TABLE C-3 and TABLE C-4 for descriptions of the LED behavior, which differs slightly for Sun Fire X4100/X4100 M2 and X4200/X4200 M2 servers.

FIGURE C-1 Server Front Panel LEDs

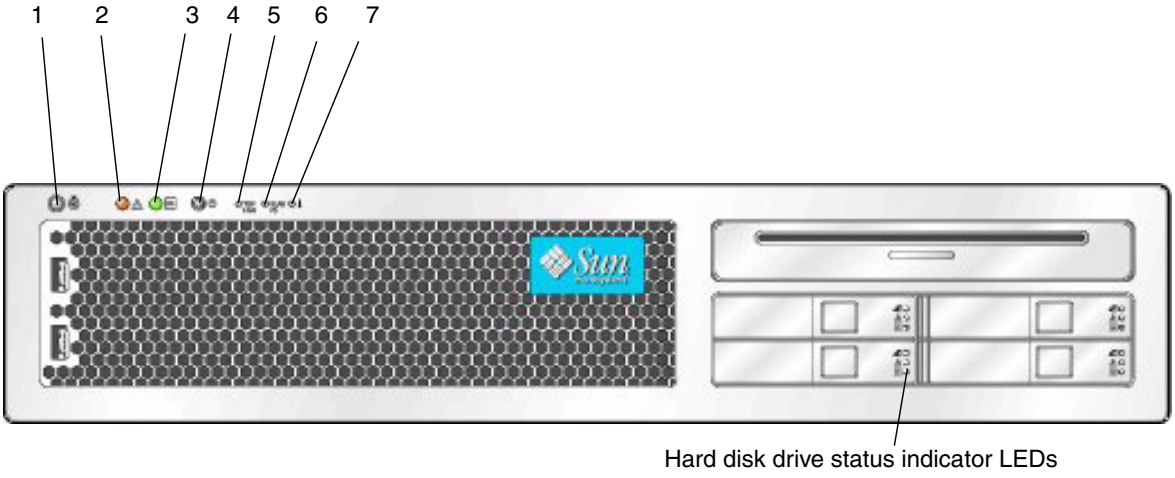


TABLE C-3 Front Panel LED Functions

LED Name	Description
Locate button/LED	This LED helps you to identify which system in the rack you are working on in a rack full of servers. • In the ILOM GUI, navigate to System Monitoring >Indicators and select the radio button next to /SYS/LOCATE. From the drop-down menu, select Turn LED On, or Set LED to Fast Blink. • In the CLI, enter: `set /SYS/LOCATE value=[Fast_Blink|Off]` • Push and release this button to make the Locate LED blink for 30 minutes. • Hold down the button for 5 seconds to initiate a "push-to-test" mode that illuminates all other LEDs both inside and outside of the chassis for 15 seconds.
Service Action Required LED	This LED has two states: • Off: Normal operation. • Slow Blinking: An event that requires a service action has been detected. It also blinks when only one power supply is plugged in.
Power/OK LED	This LED has three states: • Off: Server main power and standby power are off. • Blinking: Server is in standby power mode, with power applied to only the GRASP board and the power supply fans. • On: Server is in main power mode with power supplied to all components.
Front Fan Fault LED	This LED lights when there is a failed front cooling fan module. LEDs on the individual fan modules indicate which fan module has failed.

TABLE C-3 Front Panel LED Functions *(Continued)*

LED Name	Description
Power Supply/Rear Fan Tray Fault LED	This LED lights when: • Two power supplies are present in the system but only one has power connected. To clear this condition, either plug in the second power supply or remove it from the chassis. • Any voltage-related event occurs in the system. For CPU-related voltage errors the associated CPU Fault LED will also be illuminated. • (For Sun Fire X4200/X4200 M2 only) when the rear fan tray has failed or is removed.
System Overheat Fault LED	This LED lights when an upper temperature limit is detected.
Hard Disk Drive Status LEDs	The hard disk drives have three LEDs: • Top LED (blue): Reserved for future use. • Middle LED (amber): Hard disk drive failed. • Bottom LED (green): Hard disk drive is operating properly.

FIGURE C-2 Server Back Panel LEDs

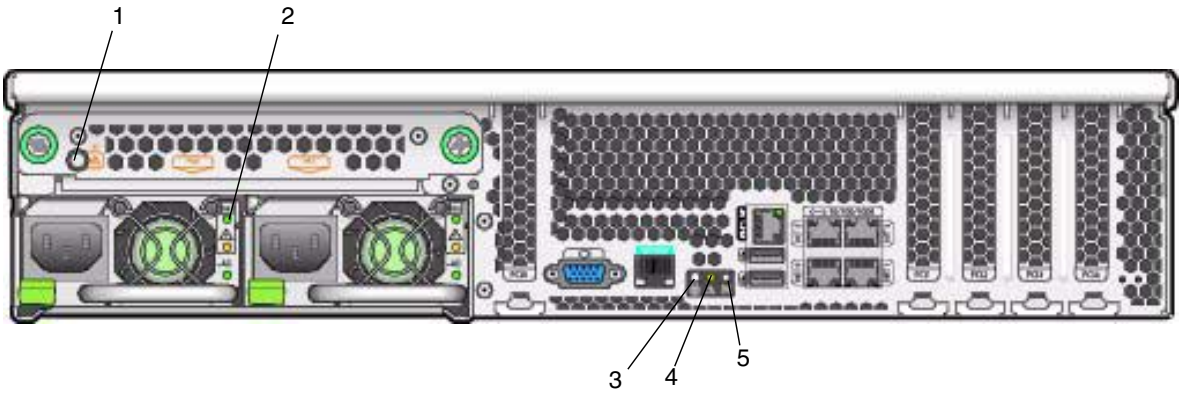


TABLE C-4 Back Panel LED Functions

LED Name	Description
Rear Fan Tray Fault LED (The rear fan tray and the LED are present only in Sun Fire X4200/X4200 M2 servers.)	This LED has two states: • Off: Fan module is operating properly. • On (amber): Fan tray has failed.
Power Supply Status LEDs	The power supplies have three LEDs: • Top LED (green): Power supply is operating properly. • Middle LED (amber): Power supply failed. • Bottom LED (green): Power supply is operating properly.
Locate button/LED (Same function as on front panel.)	This LED helps you identify which system in the rack you are working on in a rack full of servers. • Push and release this button to make the Locate LED blink for 30 minutes. • Hold down the button for 5 seconds to initiate a "push-to-test" mode that illuminates all other LEDs for 15 seconds both inside and outside of the chassis.
Service Action Required LED (Same function as on front panel.)	This LED has two states: • Off: Normal operation. • Slow Blinking: An event that requires a service action has been detected.
Power/OK LED (Same function as on front panel.)	This LED has three states: • Off: Server main power and standby power are off. • Blinking: Server is in standby power mode, with power applied to only the GRASP board and the power supply fans. • On: Server is in main power mode with power supplied to all components.

C.2 Internal Status Indicator LEDs

These servers have internal status indicator LEDs for the fan modules, the DIMM slots, the CPUs, and the GRASP board.

FIGURE C-3 shows the locations of the internal LEDs. TABLE C-5 describes the LED behavior.

Note the following differences between the Sun Fire X4100/X4200 and the X4100 M2/X4200 M2 servers regarding the power requirements for viewing the DIMM fault and CPU fault LEDs:

- For the original Sun Fire X4100/X4200 servers, to see the DIMM fault and CPU fault LEDs, you must put the server in standby power mode, with the power cords attached. See Section 2.2, "Powering Off the Server" on page 2-3.
- For the Sun Fire X4100 M2/X4200 M2 server, you can view the DIMM fault and CPU 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 fault LEDs from the capacitor, push the small button on the motherboard labeled "DIMM SW2." See FIGURE C-4.
- The internal LED locations are shown in FIGURE C-3 for Sun Fire X4100/X4200 servers.
- The internal LED locations are shown in FIGURE C-4 for Sun Fire X4100 M2/X4200 M2 servers.

FIGURE C-3 Sun Fire X4100/X4200 Internal LEDs

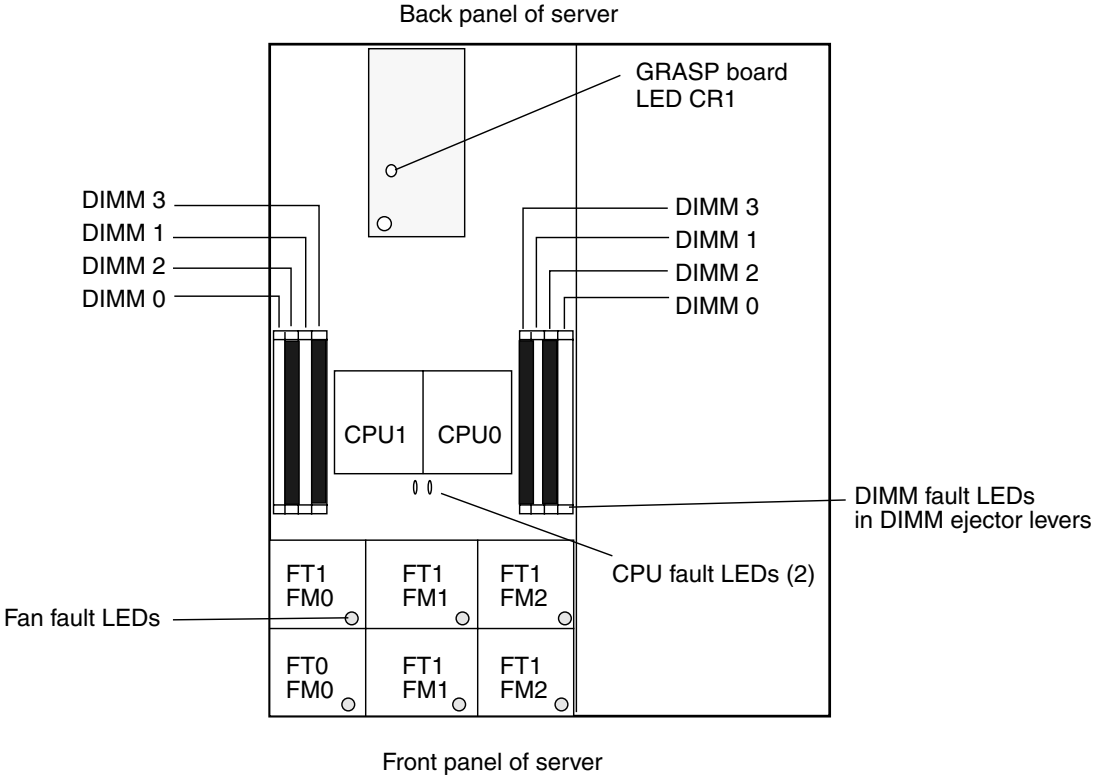


FIGURE C-4 Sun Fire X4100 M2/X4200 M2 Internal LEDs

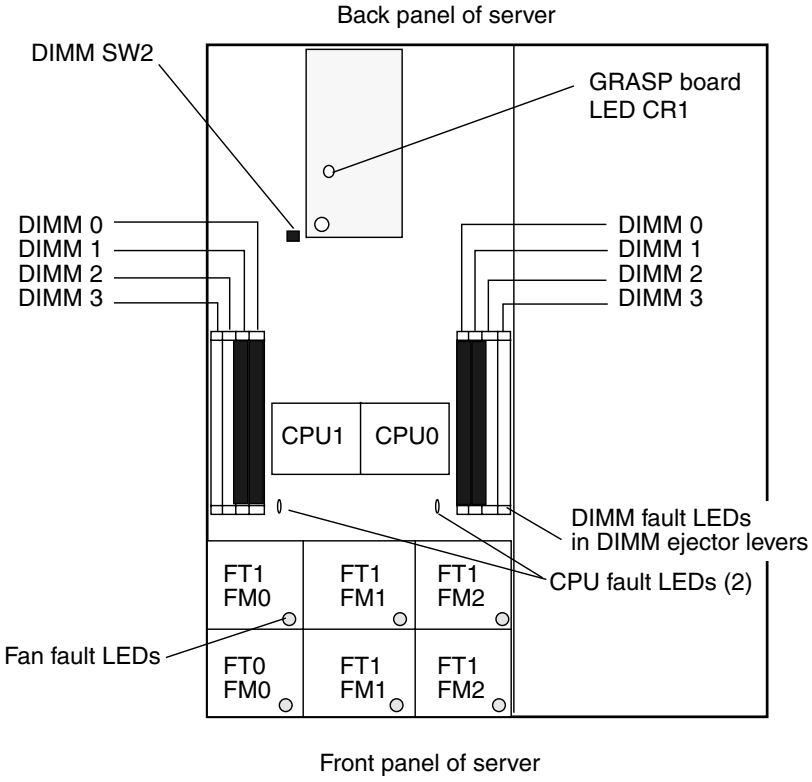


TABLE C-5 Internal LED Functions

LED Name	Description
DIMM Fault LED (The ejector levers on the DIMM slots are the LEDs.)	This LED has two states: • Off: DIMM is operating properly. • On (amber): DIMM has failed.

TABLE C-5 Internal LED Functions

LED Name	Description
CPU Fault LED (on motherboard)	This LED has two states: • Off: CPU is operating properly. • On (amber): CPU has encountered a voltage or heat error condition.
Fan Module Fault LED	This LED has two states: • Off: Fan module is operating properly. • On (amber): Fan module has failed.
GRASP Board Power Status LED	This LED has two states: • Off: Standby power is not reaching the GRASP board. • On (green): 3.3V standby power is reaching the GRASP board.

APPENDIX **D**

Sensors

This chapter covers the sensor values and locations for the server.

D.1 Sensor Values

Use the `ipmitool` command with the following agruments to view sensor status, sensor temperatures, sensor voltages, and fan speed:

CODE EXAMPLE D-1 Sensor Temperature, Voltages, and Fan Sensors

```
ipmitool -I lanplus -H <IPADDR> -U root -P changeme sdr elist full
sys.intsw         | 01h | ok  | 23.0 |

ps0.prsnt         | 1Ch | ok  | 10.0 | Device Present
ps0.vinok         | 1Eh | ok  | 10.0 | State Asserted
ps0.pwrok         | 1Dh | ok  | 10.0 | State Asserted
ps1.prsnt         | 1Fh | ok  | 10.1 | Device Present
ps1.vinok         | 21h | ok  | 10.1 | State Asserted
ps1.pwrok         | 20h | ok  | 10.1 | State Asserted
io.id1.prsnt      | 24h | ok  | 15.0 | Device Present

mb.t_amb          | 05h | ok  |  7.0 | 27 degrees C
mb.v_bat          | 06h | ok  |  7.0 | 2.82 Volts
mb.v_+3v3stby     | 07h | ok  |  7.0 | 3.22 Volts
mb.v_+3v3         | 08h | ok  |  7.0 | 3.29 Volts
mb.v_+5v          | 09h | ok  |  7.0 | 5.04 Volts
mb.v_+12v         | 0Ah | ok  |  7.0 | 12.16 Volts
mb.v_-12v         | 0Bh | ok  |  7.0 | -12.35 Volts
mb.v_+2v5core     | 0Ch | ok  |  7.0 | 2.53 Volts
mb.v_+1v5core     | 0Dh | ok  |  7.0 | 1.52 Volts
mb.v_+1v2core     | 0Eh | ok  |  7.0 | 1.22 Volts
```

CODE EXAMPLE D-1 Sensor Temperature, Voltages, and Fan Sensors

```
fp.t_amb          | 14h | ok  | 12.0 | 29 degrees C
pdb.t_amb         | 1Bh | ok  | 19.0 | 26 degrees C
io.t_amb          | 22h | ok  | 15.0 | 25 degrees C

p0.t_core         | 2Ch | ok  |  3.0 | 24 degrees C
p0.v_vdd          | 2Dh | ok  |  3.0 | 1.39 Volts
p0.v_vddio        | 2Eh | ok  |  3.0 | 1.82 Volts
p0.v_vtt          | 2Fh | ok  |  3.0 | 0.90 Volts

p1.t_core         | 35h | ok  |  3.1 | 22 degrees C
p1.v_vdd          | 36h | ok  |  3.1 | 1.39 Volts
p1.v_vddio        | 37h | ok  |  3.1 | 1.84 Volts
p1.v_vtt          | 38h | ok  |  3.1 | 0.91 Volts

ft0.fm0.f0.speed | 4Ah | ok  | 29.0 | 6400 RPM
ft0.fm1.f0.speed | 4Bh | ok  | 29.2 | 6400 RPM
ft0.fm2.f0.speed | 4Ch | ok  | 29.1 | 6700 RPM
ft1.fm0.f0.speed | 4Dh | ok  | 29.3 | 6800 RPM
ft1.fm1.f0.speed | 4Eh | ok  | 29.4 | 6600 RPM
ft1.fm2.f0.speed | 4Fh | ok  | 29.5 | 7100 RPM

io.f0.prsnt       | 25h | ok  | 15.0 | Device Present
io.f0.speed       | 26h | ok  | 15.0 | 4000 RPM

ft0.fm0.prsnt     | 44h | ok  | 29.0 | Device Present
ft0.fm1.prsnt     | 45h | ok  | 29.1 | Device Present
ft0.fm2.prsnt     | 46h | ok  | 29.2 | Device Present
ft1.fm0.prsnt     | 47h | ok  | 29.3 | Device Present
ft1.fm1.prsnt     | 48h | ok  | 29.4 | Device Present
ft1.fm2.prsnt     | 49h | ok  | 29.5 | Device Present
```

D.2 Physical Locations of Sensors

The following are the physical locations of the sensors of the server:

TABLE D-1

Sensor Name	Location
sys.intsw	U46, on MB
ps0.prsnt	U46, on MB
ps0.vinok	U46, on MB

TABLE D-1

Sensor Name	Location
ps0.pwrok	SP/SP-Board
ps1.prsnt	U46, on MB
ps1.vinok	U46, on MB
ps1.pwrok	SP/SP-Board
io.id1.prsnt	U46, on MB
mb.t_amb	U46, on MB
mb.v_bat	U46, on MB
mb.v_+3v3stby	U46, on MB
mb.v_+3v3	U46, on MB
mb.v_+5v	U46, on MB
mb.v_+12v	U46, on MB
mb.v_-12v	U46, on MB
mb.v_+2v5core	U46, on MB
mb.v_+1v5core	U46, on MB
mb.v_+1v2core	U46, on MB
fp.t_amb	U63, on MB
pdb.t_amb	U1, on 502-6902
io.t_amb	U6, on 502-6978
p0.t_core	U46, on MB
p0.v_vdd	U46, on MB
p0.v_vddio	U46, on MB
p0.v_vtt	U46, on MB
p1.t_core	U46, on MB
p1.v_vdd	U46, on MB
p1.v_vddio	U46, on MB
p1.v_vtt	U46, on MB
ft0.fm0.f0.speed	U6, on 502-6978
ft0.fm1.f0.speed	U6, on 502-6978
ft0.fm2.f0.speed	U6, on 502-6978
ft1.fm0.f0.speed	U6, on 502-6978

TABLE D-1

Sensor Name	Location
ft1.fm1.f0.speed	U6, on 502-6978
ft1.fm2.f0.speed	U6, on 502-6978
io.f0.prsnt	U46, on MB
io.f0.speed	U46, on MB
ft0.fm0.prsnt	U6, on 502-6978
ft0.fm1.prsnt	U6, on 502-6978
ft0.fm2.prsnt	U6, on 502-6978
ft1.fm0.prsnt	U6, on 502-6978
ft1.fm1.prsnt	U6, on 502-6978
ft1.fm2.prsnt	U6, on 502-6978

APPENDIX **E**

Connector Pinouts

This appendix contains information about the connector pinouts, which are the same for Sun Fire X4100/X4100 M2 and X4200/X4200 M2 servers.

Note – The information in this appendix applies to all Sun Fire X4100/X4100 M2 and X4200/X4200 M2 servers, unless otherwise noted in the text.

E.1 USB Connector

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

FIGURE E-1 USB Connector

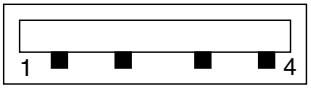


TABLE E-1 USB Connector Pinouts

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 500mA.

E.2 Serial Connector

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

FIGURE E-2 Serial Connector

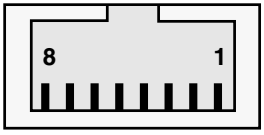


TABLE E-2 Serial Connector Pinouts

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

E.3 10/100BASE-T Connector

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

FIGURE E-3 10/100BASE-T Connector

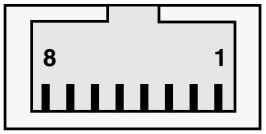


TABLE E-3 10/100BASE-T Connector Pinouts

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

E.4 10/100/1000BASE-T Connector

The RJ45 10/100/1000BASE-T connector pins and their corresponding descriptions are shown in the figure and table in this section.

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

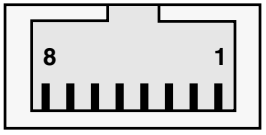


TABLE E-4 10/100/1000BASE-T Connector Pinouts

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

E.5 VGA Video Connector

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

FIGURE E-5 VGA Video Connector

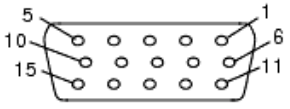


TABLE E-5 VGA Video Connector Pinouts

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)

TABLE E-5 VGA Video Connector Pinouts

Pin Number	Pin Name	Description
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

E.6 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 E-6 Serial Attached SCSI Connector

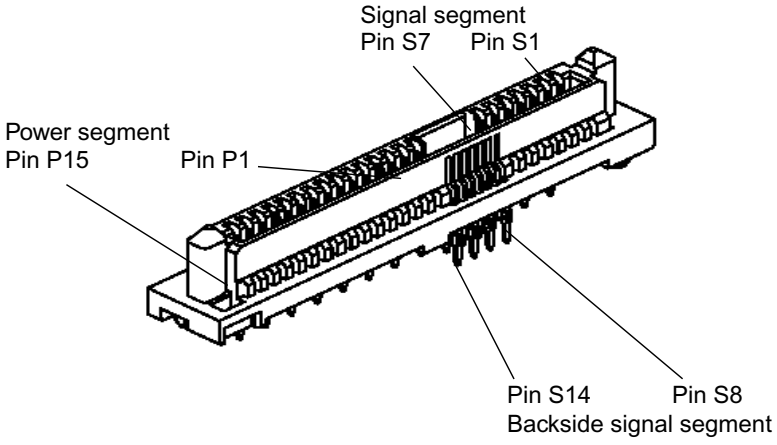


TABLE E-6 Serial Attached SCSI Connector Pinouts

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
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

TABLE E-6 Serial Attached SCSI Connector Pinouts *(Continued)*

Segment	Pin Number	Pin Name	Description
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

E.7 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 E-7 Flex Cable Motherboard Connector

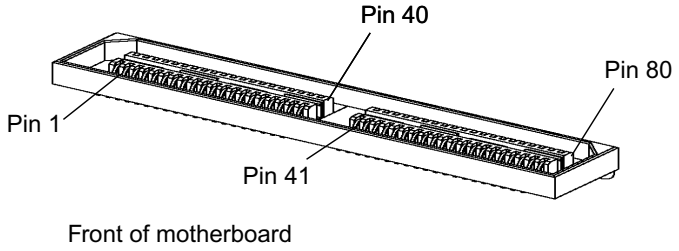


TABLE E-7 Flex Cable Motherboard Connector Pinouts

Pin Number	Signal Name
1	DVD_DRST_L
2	PS1_PRESENT_L
3	DVD_DDATA[8]
4	SAS_FAN_PRSNT_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
15	DVD_DDATA[11]
16	GND
17	DVD_DDATA[4]
18	+3.3 V AUX
19	DVD_DDATA[12]
20	PS0_PRESENT_L

TABLE E-7 Flex Cable Motherboard Connector Pinouts *(Continued)*

Pin Number	Signal Name
21	DVD_DDATA[3]
22	PS0_ENABLE_L
23	DVD_DDATA[13]
24	SAS_FAN_LED_L
25	DVD_DDATA[2]
26	PS0_VIN_GOOD
27	DVD_DDATA[14]
28	PS0_POWEROK
29	DVD_DDATA[1]
30	DVD_DDACK_L
31	DVD_DDATA[15]
32	DVD_DRDY
33	DVD_DDRQ
34	DVD_INT_L
35	DVD_DDATA[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
45	DVD_DADDR[0]
46	GND
47	DVD_DADDR[2]
48	SAS_DISK3_TX_P
49	DVD_DCS1_L
50	SAS_DISK3_TX_N

TABLE E-7 Flex Cable Motherboard Connector Pinouts *(Continued)*

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

E.8 Flex Cable Power Distribution Board Connector

The power distribution board (PDB) brings power from the chassis power supplies to the motherboard. The main power connection to the motherboard is through two bus bars. The PS_KILL signals for the power supplies are grounded on the PDB to permanently enable the AUX output. The flex cable PDB connector pins and their corresponding descriptions are shown in the figure and table in this section.

FIGURE E-8 Flex Cable PDB Connector

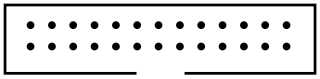


TABLE E-8 Flex Cable PDB Connector Pinouts

Pin Number	Signal Name
1	PS1_PRESENT_L
2	PS1_ENABLE_L
3	SAS_FAN_TACH
4	PS1_VIN_GOOD
5	SAS_FAN_PRSNT_L
6	PS1_POWEROK
7	PDB_I2C_DAT
8	PS_KILL
9	PDB_I2C_CLK
10	+3.3V AUX
11	GND
12	+3.3V AUX
13	GND
14	+3.3V AUX
15	PS0_PRESENT_L
16	PS0_ENABLE_L

TABLE E-8 Flex Cable PDB Connector Pinouts *(Continued)*

Pin Number	Signal Name
17	SAS_FAN_LED_L
18	PS0_VIN_GOOD
19	No connect
20	PS0_POWEROK
21	GND
22	FUSED_12V
23	GND
24	FUSED_12V
25	GND
26	FUSED_12V

E.9 Flex Cable DVD-ROM Drive Connector

The flex cable DVD-ROM drive IDE connector pins and their corresponding descriptions are shown in the figure and table in this section.

FIGURE E-9 Flex Cable DVD-ROM Drive IDE Connector

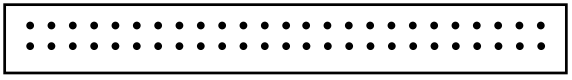


TABLE E-9 Flex Cable DVD-ROM Drive IDE Connector Pinouts

Pin Number	Signal Name
1	Audio L-CH (not supported)
2	Audio R-CH (not supported)
3	Audio Ground
4	Ground
5	RESET_L

TABLE E-9 Flex Cable DVD-ROM Drive IDE Connector Pinouts *(Continued)*

Pin Number	Signal Name
6	DD8
7	DD7
8	DD9
9	DD6
10	DD10
11	DD5
12	DD11
13	DD4
14	DD12
15	DD3
16	DD13
17	DD2
18	DD14
19	DD1
20	DD15
21	DD0
22	DMARQ
23	Ground
24	DIOR_L
25	DIOW_L
26	Ground
27	IORDY
28	DMACK_L
29	INTRQ
30	IOCS16_L
31	DA1
32	PDIAG_L
33	DA0
34	DA2
35	CS1FX_L

TABLE E-9 Flex Cable DVD-ROM Drive IDE Connector Pinouts *(Continued)*

Pin Number	Signal Name
36	CS3FX_L
37	DASP_L
38	+5V (Motor)
39	+5V (Motor)
40	+5V (Motor)
41	+5V (Logic)
42	+5V (Logic)
43	Ground
44	Ground
45	Ground
46	Ground
47	Dev Config (CSEL)
48	Ground
49	Vendor Unique
50	Vendor Unique

E.10 Motherboard Bus Bar Power Connector

Main power is delivered to the motherboard through a bus bar. There are two pads on the bottom side 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 E-10 Motherboard Bus Bar Connector

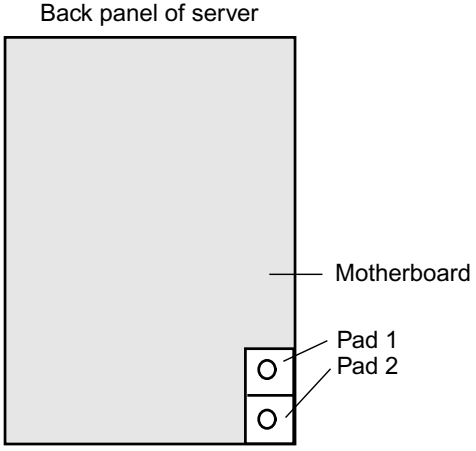


TABLE E-10 Motherboard Bus Bar Connector Pinouts

Pad Number	Pad Name	Description
1	+12V	+12 VDC power to motherboard
2	GND	Ground

E.11 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 E-11 Front I/O Interconnect Cable Connector

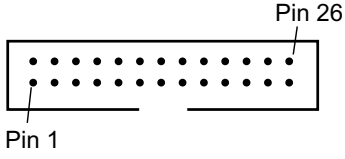


TABLE E-11 Front I/O Interconnect Cable Connector Pinouts

Pin Number	Signal Name
1	FAN_CTL0
2	FAN_CTL3
3	FAN_CTL1
4	FAN_CTL4
5	FAN_CTL2
6	FAN_CTL5
7	GND
8	GND
9	FRONT_USB2_N
10	FRONT_USB2_P
11	GND
12	GND
13	FRONT_LOCATE_L
14	+5 V
15	GND
16	GND
17	+5 V
18	+3.3 V AUX
19	GND
20	INTRUSION_SW
21	SP_I2C_CLK
22	POWER_BUTTON_L
23	SP_I2C_DAT
24	FRONT_IO_INT_L
25	FR_IO_PRESENT_L
26	VDD_RTC

E.12 Power Supply Connector

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

FIGURE E-12 Power Supply Connector

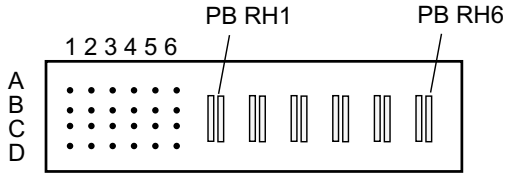


TABLE E-12 Power Supply Connector Pinouts

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	+12 V Power Output
PB RH5	+12V	+12 V Power Output
PB RH6	+12V	+12 V 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	+3.3 V Standby Output
A5	PS A0	EEPROM Address Bit 0 Input
A6	+3.3V SB	+3.3 V Standby Output
B1	Return	Ground
B2	Fan_Cntl	Analog fan control voltage input
B3	Return	Ground
B4	+3.3V SB	+3.3 V Standby Output
B5	SDA	EEPROM Serial Data I/O

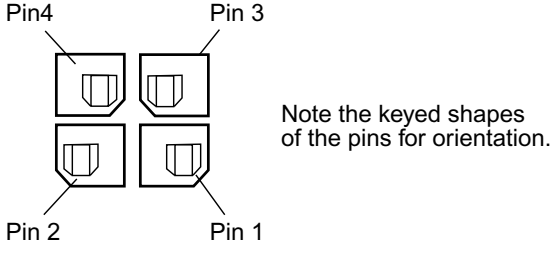
TABLE E-12 Power Supply Connector Pinouts *(Continued)*

Pin Number	Pin Name	Description
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	+3.3 V 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	+3.3 V Standby Output
D5	S_INT(Alert)	Intrusion switch alert
D6	POK	Output voltages within spec (PU)

E.13 Fan Module Connector

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

FIGURE E-13 Fan Module Connector



Note – Fan modules in Sun Fire X4100 servers each contain two 40 mm fans (Fan A and Fan B); fan modules in Sun Fire X4200 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 described in TABLE E-13.

TABLE E-13 Fan Module Connector Pinouts

Pin Number	Pin Name	Description
1	+12V	+12 V 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 Sun Fire X4200 fan modules

APPENDIX **F**

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:

Note – The information in this chapter applies to all Sun Fire X4100/X4100 M2 and X4200/X4200 M2 servers, unless otherwise noted in the text.

F.1 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 the LSI53C1064 devices
- Support for SAS devices

Note – At this time, these 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).

F.1.1 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.

F.2 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 was removed from the system or was 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 somehow disable all of the controllers, press Ctrl+E (or Ctrl+A on versions earlier than 5.00) after memory initialization during reboot to re-enable 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 allow you to modify parameters for these devices.

F.3 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.

F.3.1 User Input Keys

The general key inputs that are listed in TABLE F-1 apply on all screens of the SAS BIOS Configuration Utility.

TABLE F-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 GUI, selections that are not currently permissible are grayed out. The behavior of executable items varies throughout the Configuration Utility.

F.3.2 Adapter List Screen

When you start the Fusion-MPT SAS BIOS Configuration Utility, the Adapter List screen (shown below) appears.. 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 F-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" on page 7 appears.

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.

From the Adapter List screen (shown below), you can also press Alt+N to access the Global Properties screen. On this screen you can change global scope settings.

```
*******************************************************************************
* LSI Logic MPT Setup Utility  v6.02.00.00 (2005.07.08)                       *
* Adapter List  Global Properties                                             *
* Adapter    PCI  PCI  PCI  PCI   FW Revision          Status    Boot          *
*            Bus  Dev  Fnc  Slot                                 Order         *
* SAS1064    02   03   00   00    1.04.00.00-IR        Enabled   0             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
* Esc = Exit Menu       F1/Shift+1 = Help                                     *
* Alt+N = Global Properties -/+ = Alter Boot Order  Ins/Del = Alter Boot List  *
*******************************************************************************
```

TABLE F-2 Adapter List Screen Field Descriptions

Field	Description
Adapter	The specific LSI Logic SAS controller type.
PCI Bus	The PCI Bus number (range 0x00 - 0xFF, 0 - 255 decimal) assigned by the system BIOS to an adapter.
PCI Dev	The PCI Device (range 0x00 - 0x1F, 0 - 31 decimal) assigned by the system BIOS to an adapter.
PCI Fnc	The PCI Function (range 0x00 - 0x7, 0 - 7 decimal) assigned by the system BIOS to an adapter.
PCI Slot	The PCI slot in which the controller is installed.
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: • 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.

F.3.3 Global Properties Screen

To access the Global Properties screen (shown below), press Alt+N while on the Adapter List screen. To return to the Adapter List from Global Properties, press Alt+N again. TABLE F-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                                                        *
*******************************************************************************
```

TABLE F-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: • 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: • Hook interrupt (default) • Bypass interrupt hooks
Restore Defaults	Press Enter to restore the default settings.

F.3.4 Adapter Properties Screen

The Adapter Properties screen (shown below) allows you to view and modify adapter settings. It also provides access to all other screens. TABLE F-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                                    *
*******************************************************************************
```

TABLE F-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.
MPT Firmware Revision	The Fusion MPT firmware version and type (IR or IT).
SAS Address	The SAS Address assigned to this adapter.

TABLE F-4 Adapter Properties Screen Field Descriptions *(Continued)*

Field	Description
Status	Indicates whether an adapter is eligible for LSI Logic software control, or whether it is reserved for control by non-LSI Logic software: • 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	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: • 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. 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).
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.

F.3.5 SAS Topology Screens

The SAS Topology screen (shown below) presents a view of the adapter's SAS hierarchy. You can scroll right to view additional information about the devices (see "SAS Topology Screens" on page 10 through page 13.) Descriptions of the fields are given in TABLE F-5.

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

- Adapter
- PHYs
- Attached Devices
- Expanders/Enclosures

SAS Topology Screen

```
*******************************************************************************
* 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                         *
*******************************************************************************
```

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 the following 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 "SAS Topology Screens" on page 10 through page 13).

SAS Topology Screen 2, Negotiated Link Speed

```
*******************************************************************************
* 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                         *
*******************************************************************************
```

SAS Topology Screen 3, Maximum 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                         *
*******************************************************************************
```

SAS Topology Screen 4, Target Capabilities

```
*******************************************************************************
* 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                         *
*******************************************************************************
```

SAS Topology Screen 5, Initiator 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                         *
*******************************************************************************
```

TABLE F-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. (SATA is not supported on Sun Fire X4100 or Sun Fire X4200 servers at this time.)
Negotiated Link Speed	The negotiated link speed for this PHY, in Gbits/s. This field also indicates whether the PHY has been disabled.

TABLE F-5 SAS Topology Screens Field Descriptions *(Continued)*

Field	Description
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: • SSP - Serial SCSI Protocol • SMP - Serial Management Protocol
Initiator Capabilities	The initiator capabilities for this device. The following acronyms are used: • SSP - Serial SCSI Protocol • SMP - Serial Management Protocol

F.3.6 Device Properties Screen

The Device Properties screen (shown below) displays information about a specific device. 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       *
*******************************************************************************
```

TABLE F-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. (SATA is not supported on Sun Fire X4100 or Sun Fire X4200 servers at this time.)
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 Section F.3.7, "Device Verify Screen" on page F-15). If needed, you can reassign defective Logical Block Addresses (LBAs), as described in the text following TABLE F-7.

F.3.7 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 (shown below) appears, press Enter to begin the verify process. You may press Esc at any time to cancel the verify process. TABLE F-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                                          *
*********************************************************************************
```

TABLE F-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.
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.

F.3.8 Advanced Adapter Properties Screen

The Advanced Adapter Properties screen (shown below) allows you to view and modify infrequently accessed adapter settings. TABLE F-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                                     *
*******************************************************************************
```

TABLE F-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.
CHS Mapping	Defines how the Cylinder Head Sector values are mapped onto a disk without pre-existing partition information. CHS Mapping allows two settings: • 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. **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.
Link Error Settings	• 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	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.

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

Field	Description
Threshold Time (secs)	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.
Advanced Device Properties	Press Enter to view and modify Advanced Device Properties (see Section F.3.9, "Advanced Device Properties Screen" on page F-19).
PHY Properties	Press Enter to view and modify PHY properties (see Section F.3.10, "PHY Properties Screen" on page F-20).
Restore Defaults	Press Enter to restore the default values for all items on this screen.

F.3.9 Advanced Device Properties Screen

The Advanced Device Properties screen (shown below) allows you to view and modify infrequently accessed device settings. TABLE F-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                                     *
*******************************************************************************
```

F.3.10 PHY Properties Screen

The PHY Properties screen (shown below) allows you to view and modify PHY-specific settings. TABLE F-9 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 Errors        0          0             0        *
*           PHY Reset Errors                0          0             0        *
*           Reset Link Error Counts                                           *
*                                                                             *
* Esc = Exit Menu       F1/Shift+1 = Help                                     *
* Enter = Reset Phy error logs    Alt+N = Next Phy    Alt+P = Previous Phy    *
*******************************************************************************
```

TABLE F-9 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: • Enabled, Unknown Link Rate • PHY Disabled • Enabled, negotiation failed • Enabled, 1.5 Gbps • Enabled, 3.0 Gbps
Discovery Status	A 32-bit hexadecimal value indicating the discovery status for the PHY or expander. Currently defined values are: • 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. (SATA is not supported on Sun Fire X4100 and Sun Fire X4200 servers at this time.)
SAS Address	The SAS address of this device.

TABLE F-9 PHY Properties Screen Field Descriptions *(Continued)*

Field	Description
Link Error Settings	• 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.
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.0
	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`

F.3.11 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" on page 7.

- 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

F.3.11.1 Select New Array Type Screen

Select the type of array to create, as shown below.

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

```
*******************************************************************************
* LSI Logic MPT Setup Utility  v6.02.00.00 (2005.07.08)                       *
* Select New Array Type -- SAS1064                                            *
*                                                                             *
*                                                                             *
*      Create IM Volume        Create Integrated Mirror Array of 2            *
*                              disks plus an optional hotspare. Data          *
*                              on the primary disk may be migrated.           *
*                                                                             *
*                                                                             *
*      Create IS Volume        Create Integrated Striping array of            *
*                              2 to 8 disks.                                  *
*                              ALL DATA on array disks will be DELETED!       *
*                                                                             *
* Esc = Exit Menu       F1/Shift+1 = Help                                     *
* Enter = Choose array type to create     Esc = Return to Adapter Properties  *
*******************************************************************************
```

F.3.11.2 Create New Array Screen

The Create New Array screen (shown below) allows you to select disks for a new array. TABLE F-10 describes the fields of the screen.

For an IM volume, when the first disk is added you are asked about the data on the disks. You have two options:

- Press M to keep the existing data and migrate to an IM array. Disk synchronization will occur.
- Press D to overwrite existing data, and create a new IM array. *All data on all disks in the array will be deleted.* No synchronization occurs.

After the volume is configured, press C to create the array. You are asked to save changes, which will create the array. After the array is created, the utility returns you to the Adapter Properties screen.

```
*******************************************************************************
* LSI Logic MPT Setup Utility  v6.02.00.00 (2005.07.08)                       *
* Create New Array -- SAS1064                                                 *
*   Array Type:                        IM                                     *
*   Array Size(MB):                    69618                                  *
*                                                                             *
* Scan  Device Identifier              RAID   Hot    Drive      Pred  Size     *
* ID                                   Disk   Spr    Status     Fail  (MB)     *
*   2   FUJITSU MAV2073RCSUN72G 0301   [Yes]  [No]   Primary    ---    70007   *
*   3   FUJITSU MAV2073RCSUN72G 0301   [Yes]  [No]   Secondary  ---    70007   *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
* Esc = Exit Menu       F1/Shift+1 = Help                                     *
* Space/+/- = Select disk for array or hotspare    C = Create array           *
*******************************************************************************
```

TABLE F-10 Create New Array Screen Field Descriptions

Field	Description
Array Type	The type of array being created: IM or IS.
Array Size	The size of the array, in Mbytes.
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: • 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 hotspare for the RAID array.

TABLE F-10 Create New Array Screen Field Descriptions *(Continued)*

Field	Description
Hot Spr	Specifies whether the disk is the hotspare for a RAID array (Yes or No). RAID Arrays are not required to have a hotspare. Only one hotspare per RAID array is permitted. You can define a hotspare 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: • The disk does not meet the minimum requirements for use in a RAID array. • The array already has a hotspare. • 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 hotspares.)

TABLE F-10 Create New Array Screen Field Descriptions *(Continued)*

Field	Description
Drive Status	• 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. 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)	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. **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.

F.3.11.3 View Array Screen

The View Array screen (shown below) allows you to view the current array configuration. Press Alt+N to view the next array. Press C to create a new array. TABLE F-11 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                      *
*******************************************************************************
```

TABLE F-11 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.
Scan ID	The order in which devices are scanned.
Device Identifier	The ASCII device identifier string extracted from the device's inquiry data.

TABLE F-11 View Array Screen Field Descriptions *(Continued)*

Field	Description
RAID Disk	Specifies whether the disk is part of a RAID array (Yes or No). This field is grayed out under the following conditions: • 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 hotspare for the RAID array.
Hot Spr	Specifies whether the disk is the hotspare for a RAID array (Yes or No). RAID Arrays are not required to have a hotspare. Only one hotspare per RAID array is permitted. You can define a hotspare 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: • The disk does not meet the minimum requirements for use in a RAID array. • The array already has a hotspare. • 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 hotspares.)

TABLE F-11 View Array Screen Field Descriptions *(Continued)*

Field	Description
Drive Status	• 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. 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)	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. **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.

F.3.11.4 Manage Array Screen

The Manage Array screen (shown below) is used to manage the current array. TABLE F-12 describes the fields of the screen.

If you select Manage hotspare, the utility displays a hotspare 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                                                         *
*******************************************************************************
```

TABLE F-12 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.
Manage Hot Spare	Press Enter to modify the array hotspare configuration. This field is grayed out under the following conditions: • The array is inactive. • The array is at its maximum number of devices. • Integrated Striping firmware is used. Striped arrays do not support hotspares, so no modifications can be made to an array after it is created.

TABLE F-12 Manage Array Screen Field Descriptions *(Continued)*

Field	Description
Synchronize Array	Press Enter to synchronize the RAID array. This field is grayed out under the following conditions: • 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.

F.3.11.5 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. The Exit screen is shown below. Some options on the Exit screen might be grayed out, indicating that they are not available at this time.

```
*******************************************************************************
* LSI Logic MPT Setup Utility  v6.02.00.00 (2005.07.08)                       *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                     Adapter and/or device property changes have been made.  *
*                      Cancel Exit                                            *
*                      Save changes then exit this menu                       *
*                      Discard changes then exit this menu                    *
*                      Exit the Configuration Utility and Reboot              *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
* Esc = Exit Menu       F1/Shift+1 = Help                                     *
*                                                                             *
*******************************************************************************
```

F.4 Performing RAID Configuration Tasks

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

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

F.4.1 RAID Implementation and Support

The LSISAS1064 controller supports the Integrated RAID hardware solution, which is a highly integrated, low-cost RAID solution. It is designed for systems requiring redundancy and high availability, but not requiring a full-featured RAID implementation.

Integrated RAID includes Integrated Mirroring (IM or RAID 1) and Integrated Striping (IS or RAID 0) technology. Integrated RAID is OS independent, easy to install and configure, and does not require a special driver. A RAID Volume is seen as a single drive by the host BIOS and OS.

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.

F.4.1.1 Automatic Data Resynchronization and Hotspares

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

The SCSI parameters, including RAID volumes configuration, are set up using the LSI BIOS configuration utility 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 MB 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 make sure 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 hotspare 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 hotspare 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 hotspare disk for the mirrored volume.

F.4.1.2 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 IME (mirroring over more than two drives) is not supported.
- RAID 0+1 and 1+0 are not supported by the SAS1064 controller.

F.4.1.3 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 hotspare for a RAID 1 array (one hotspare 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.

F.4.1.4 RAID Combination Support

Possible RAID Combinations in a four-drives 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 hotspare drive + one drive non-RAID
- Four drives non-RAID

F.4.2 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.**
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.

F.4.3 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.**
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 hotspare 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 hotspare 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 hotspare is a global hotspare. Only one active hotspare is allowed for all volumes.

F.4.4 Managing Hot Spares

Follow these steps to add a hotspare 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 hotspare must be valid RAID disk, as defined in Section F.4.3, "Creating a RAID 1 Volume" on page F-36.

---

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

   The Configuration Utility will pause while the hotspare is being added.

Follow these steps to delete a hotspare from a RAID 1 volume.

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

   The Configuration Utility will pause while the hotspare is being removed.

F.4.5 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.**
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 Section F.4.2, "Creating a RAID 0 Volume" on page F-35.
   - To create a second RAID 1 volume, continue with Step 2 of Section F.4.3, "Creating a RAID 1 Volume" on page F-36.

F.4.6 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.**
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.**

F.4.7 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.

F.4.8 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.

Note – When activating two arrays (typically after a motherboard replacement) the status of the second array is shown as "degraded" according to the LSI BIOS as it waits to sync. However, this does not indicate a hardware malfunction.

Note – If there is a global hot-spare disk on the controller to which you have moved the array, the BIOS checks when you activate the array to determine if the hot-spare is compatible with the new array. An error message appears if the disks in the activated array are larger than the hot-spare disk or if the disks in the activated array are not the same type as the hot-spare disk (SATA versus SAS).

F.4.9 Deleting an Array

Caution – Before deleting an array, be sure to 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.

F.4.10 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 activate until the next key is pressed.

APPENDIX **G**

Device Paths

G.1 Sun Fire X4100/X4100 M2 Device Paths

Use the `/etc/path_to_inst` command to determine the device paths of your system.

The device paths for the Sun Fire X4100 and X4100 M2 servers is as follows:

```
Network 0 (nge0)        /pci@0,0/pci10de,cb84@a
Network 1 (nge1)        /pci@7b,0/pci10de,cb84@a
Network 2 (e1000g0)     /pci@7b,0/pci1022,7458@11/pci8086,1011@1
Network 3 (e1000g1)     /pci@7b,0/pci1022,7458@11/pci8086,1011@1,1

Disk 0        /pci@7b,0/pci1022,7458@11/pci1000,3060@2/sd@2,0
Disk 1        /pci@7b,0/pci1022,7458@11/pci1000,3060@2/sd@3,0

DVD/CDROM     /pci@0,0/pci-ide@6/ide@0/sd@0,0
TTYA          /isa/asy@1,3f8
VGA Port      /pci@0,0/pci10de,5c@9/display@3

USB (Front)          /pci@0,0/pci108e,cb84@2,1/<device>@6
USB (Rear, High)     /pci@0,0/pci108e,cb84@2,1/<device>@2
USB (Rear, Low)      /pci@0,0/pci108e,cb84@2,1/<device>@1

PCI-E Slot 0    /pci@0,0/pci10de,5d@d/<device>
PCI-E Slot 1    /pci@0,0/pci10de,5d@e/<device>
```

G.2 Sun Fire X4200/X4200 M2 Device Paths

Use the `/etc/path_to_inst` command to determine the device paths of your system.

The device paths for the Sun Fire X4200 and X4200 M2 servers is as follows:

```
Network 0 (nge0)        /pci@0,0/pci10de,cb84@a
Network 1 (nge1)        /pci@7b,0/pci10de,cb84@a
Network 2 (e1000g0)     /pci@7b,0/pci1022,7458@11/pci8086,1011@1
Network 3 (e1000g1)     /pci@7b,0/pci1022,7458@11/pci8086,1011@1,1

Disk 0         /pci@7b,0/pci1022,7458@11/pci1000,3060@2/sd@0,0
Disk 1         /pci@7b,0/pci1022,7458@11/pci1000,3060@2/sd@1,0
Disk 2         /pci@7b,0/pci1022,7458@11/pci1000,3060@2/sd@2,0
Disk 3         /pci@7b,0/pci1022,7458@11/pci1000,3060@2/sd@3,0

DVD/CDROM     /pci@0,0/pci-ide@6/ide@0/sd@0,0
TTYA          /isa/asy@1,3f8
VGA Port      /pci@0,0/pci10de,5c@9/display@3

USB (Front, High)   /pci@0,0/pci108e,cb84@2,1/hub@6/<device>@2
USB (Front, Lower)  /pci@0,0/pci108e,cb84@2,1/hub@6/<device>@1
USB (Rear, High)    /pci@0,0/pci108e,cb84@2,1/<device>@2
USB (Rear, Low)     /pci@0,0/pci108e,cb84@2,1/<device>@1

PCI-E Slot 0    /pci@0,0/pci10de,5d@d/<device>
PCI-E Slot 1    /pci@0,0/pci10de,5d@e/<device>
PCI-X Slot 2    /pci@7b,0/pci1022,7458@10/<device>
PCI-E Slot 3    /pci@7b,0/pci10de,5d@d/<device>
PCI-E Slot 4    /pci@7b,0/pci10de,5d@e/<device>
```

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