Sun Fire X4500/X4540 Server Service Manual

Service Manual

Part No. 819-4359-19
May 2010, Revision A

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Contents

Preface

This *Sun Fire X4500/X4540 Service Manual* contains information and procedures for maintaining and upgrading the server, including the system BIOS.

Related Documentation

All Sun hardware documentation is available at:

http://docs.sun.com/

For the most up-to-date information about the product name, navigate to the product name document collection using the High-End Servers and Blade Servers product category links.

Translated versions of some of these documents might also be available after the product's world-wide release date. Select a language from the drop-down list and browse or navigate to the product name x64 document collection. Available translations for the Sun Fire servers include Simplified Chinese, Traditional Chinese, French, Japanese, and Korean.

English documentation is revised more frequently and might be more up-to-date than the translated documentation.

Documentation, Support, and Training

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

Sun Function	URL
Documentation	http://www.sun.com/documentation
Support	http://www.sun.com/support/index.jsp
Training	http://www.sun.com/training/
Warranty	http://www.sun.com/service/support/warranty/index.html

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CHAPTER 1

Introduction to the Sun Fire X4500 and X4540 Servers

This chapter contains an overview of the Sun Fire™ X4500 and X4540 servers, including features and orderable components.

This chapter contains the following procedures and information:

1.1 Features of the Sun Fire X4500

The Sun Fire X4500 server is a mid-level, modular, rack-optimized server in the Sun x64 product family; the family platform includes servers engineered for AMD Opteron CPUs and deployment into commercial server markets in a slide-mounted, horizontally biased enclosure for rack cabinet installations, primarily in datacenter locations.

1.1.1 System Configurations (X4500)

The server provides the following maximum system configurations:

- 8 DDR-I DIMM slots (4 per processor), up to 2 GB per DIMM (16 GB per system)
- Up to forty-eight 3.5-inch SATA-I disk drives of 250 to 1 TB capacity each (48 TB total system capacity)
- Two 133-MHz PCI-X slots

1.1.2 Standard I/O (X4500)

The standard I/O for the Sun Fire X4500 is:

- Four 10/100/1000 BASE-T Gigabit Ethernet ports
- VGA video port
- Serial management port
- Four USB ports
- One 10/100BASE-T Ethernet management port

The Sun Fire X4500 server includes an extensive set of reliability, availability, and serviceability (RAS) features, such as:

- Hot-pluggable and redundant disk drives
- Hot-swappable fans
- Hot-swappable power supplies

The servers also provide an Integrated Lights Out Management (ILOM) service processor function that includes remote boot and remote software upgrades.

1.1.3 Summary of Features (X4500)

TABLE 1-1 summarizes the features of the Sun Fire X4500 server.

TABLE 1-1 Summary of Features (X4500)

Feature or Component	Sun Fire X4500 Server
CPU	Two Revision E AMD64 Opteron quad-core processors on two CPU modules.
Processor BIOS	8 Mbit Flash memory with LPC interface.
Memory	8 DDR-I DIMM slots (4 per processor), up to 2 GB per DIMM (16 GB per system).
Disk drives	Up to forty-eight 3.5-inch SATAType-1 disk drives of 250 to 1 TB capacity each (48 TB total system capacity).
Service Processor	SP card mounted on video card in PCI slot that runs Integrated Lights Out Manager (ILOM) as described in the ILOM documentation (see "Related Documentation" on page xiii).
Network I/O	• Four 10/100/1000BASE-T Gigabit Ethernet ports (RJ-45 connectors) • One 10/100BASE-T Ethernet net management port (RJ-45 Connector) • One RS-232 serial port (RJ-45 Connector)
PCI I/O	Two available PCI-X slots (x8), LSI SAS 1068E. (Third slot is reserved for a video card that system boots off until host software boots.) • Six SATA Controllers on IO Board, LSI SATA controller x 6. Each controller supports 8 drives • 51.5 mm (2.5 inches) maximum height • 169.3 mm (6.7 inches) maximum length
Other I/O	• Four USB 2.0 ports • One VGA video port (D-15 connector)
Power	1500 W DC max output per power supply, two bays, 1+1 redundancy, hot-swappable. 1130 W AC max system input power = 3856 BTU/hr = 0.321 Tons of Air Conditioning, 200–240 VAC.
Fans	Five fan modules; also additional fans in each power supply. Cooling is front-to-back forced air.

1.2 Features of the Sun Fire X4540

The Sun Fire X4540 server is a mid-level, modular, rack-optimized server in the Sun x64 product family; the family platform includes servers engineered for AMD Opteron CPUs and deployment into commercial server markets in a slide-mounted, horizontally biased enclosure for rack cabinet installations, primarily in datacenter locations.

1.2.1 System Configurations (X4540)

The server provides the following maximum system configurations:

- 16 DDR-II DIMM slots (8 per processor) 64GB maximum with 2 CPUs and 4 GB DIMMs, standard 32GB
- Up to forty-eight 3.5-inch SATA-II disk drives of 250 - 1TB capacity (48 TB total system capacity)
- Three x8 PCIe slots
- Supports solid-state drives

1.2.2 Standard I/O (X4540)

- Four 10/100/1000 BASE-T Gigabit Ethernet ports
- Three PCIe ports
- VGA video port
- Four USB 2.0 ports (2 front, 2 rear)
- One 10/100BASE-T Ethernet management port
- Compact Flash slot
- Serial management port (R45, no LEDs)

The Sun Fire X4540 server includes an extensive set of reliability, availability, and serviceability (RAS) features, such as:

- Hot-pluggable and redundant disk drives and SSDs
- Hot-swappable fans
- Hot-swappable power supplies
- Hot-swappable SATA disk drives

The servers also provide an Integrated Lights-Out Management (ILOM) service processor function that includes remote boot and remote software upgrades.

1.2.3 Summary of Features (X4540)

TABLE 1-2 summarizes the features of the Sun Fire X4540 server.

TABLE 1-2 Summary of Features (X4540)

Feature or Component	Sun Fire X4540 Server
CPU	Two 2000 Series quad-core AMD Opteron Processor, 2-socket configuration. Two 8000/2000 Series six-core AMD Opteron Processor
Processor BIOS	STMicro 8 Mbit Flash memory with LPC interface.
Memory	16 DDR-II DIMM slots (8 per processor), up to 4 GB per DIMM (64 GB per system).
Disk drives	Up to 48 250MB to 1 TB capacity, 3.5-inch SATA Type-I and II drives (48 TB total system capacity). One to eight 3.5" SATA SSDs.
Solid-state drives (SSD)	One to eight 32-GB, 3.5-inch, SATA SSDs can be installed into the system.
Service Processor	SP circuitry running Integrated Lights Out Manager (ILOM) as described in the ILOM documentation (see "Related Documentation" on page xiii).
Network I/O	• Four 10/100/1000BASE-T Ethernet ports (RJ-45 connectors) • One 10/100BASE-T Ethernet net management port (RJ-45 Connector) • One RS-232 serial port (RJ-45 Connector) • Four (4) USB 2.0 Ports (Type A Connector) (2x in front and 2x in rear) • Video Port (D-15 VGA Connector) • CF Type-I or Type-II slot
Serial port	• RS-232 serial interface (RJ45 connector, no LEDs) • Console only, no modem support (no RI, PPP) • Connected to ILOM by default • Default parameters 9600 baud 8 data bits No parity 1 stop bit No flow control

TABLE 1-2 Summary of Features (X4540)

Feature or Component	Sun Fire X4540 Server
PCIe I/O	Three low-profile x8 PCIe slots.
Other I/O	• Four USB 2.0 ports • One VGA video port (D-15 connector on controller) • Compact Flash card slot
Power	• 1500 W DC max output per power supply, two bays, 1+1 redundancy, hot-swappable. • 1000 Watts max input power (3412 BTU/h =Maximum air flow is 200 CFM maximum air flow. • 5 Amps max operating current @ 220 VAC (198 VAC to 264 VAC range), 50 to 60 Hz.
Fans	• Five fan modules; also additional fans in each power supply. • Cooling is front-to-back forced air. Hot swappable, Variable speed, • 7500 R.P.M. max, Top loading, Fault/OK LEDs,1.8A/18W, SATAconnector. • The SP software controls the fan speed and detects fan failure. Operation terminates if a fan tray is removed. **Note -** Do not operate the system with a fan removed for more than 60 seconds

1.3 Exterior Features, Controls, and Indicators

This section shows, lists, and describes the features and the controls and indicators on the front and rear panels of the Sun Fire X4500/X4540 server.

Note – For a quick and concise description of these features refer to the service label located on the hard drive access cover.

This section contains the following procedures and information:

- Section 1.3.6, “Component Locations (X4540)” on page 1-14
- Section 1.3.7, “Sensor Information” on page 1-15

1.3.1 Front Panel

FIGURE 1-1 shows the front panel.

FIGURE 1-1 Sun Fire X4500/X4540 Server Front Panel Features

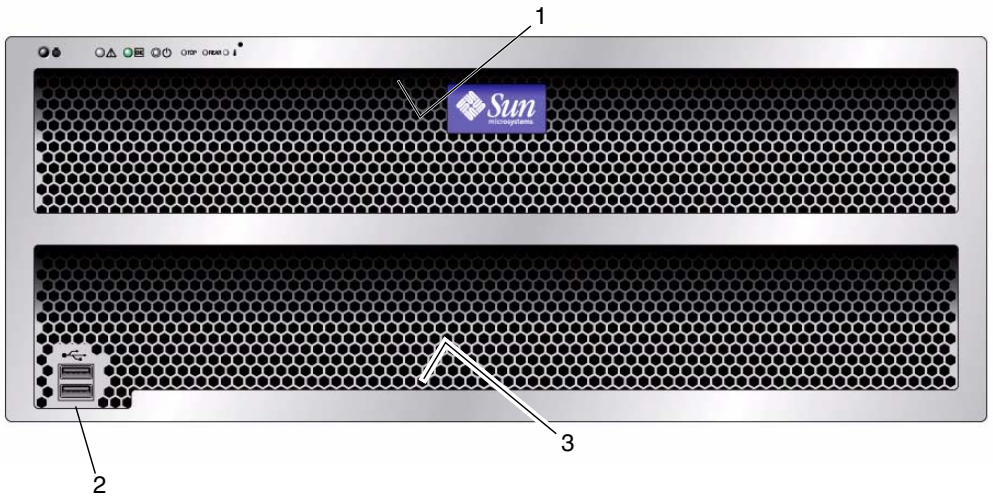


Figure Legend

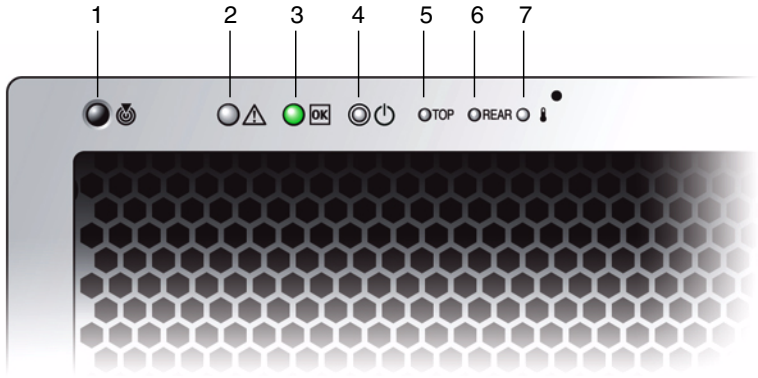
1	Serial number label
2	Two USB 2.0 connectors
3	Serial number label

1.3.2 Front Panel Controls and Indicators

FIGURE 1-2 shows a close up of the controls and indicators.

For more on LED behavior, see “Status Indicator LEDs” on page C-1.

FIGURE 1-2 Controls and Indicators



1.3.3 Rear Panel (X4500)

Figure Legend

1	Locate button/LED
2	System Fault LED
3	Power/OK LED
4	System power button
5	Top fault LED
6	Rear fault LED
7	System Over Temperature

FIGURE 1-3 shows the features of the rear panel. TABLE 1-3 lists and describes each feature.

FIGURE 1-3 Sun Fire X4500 Rear Panel

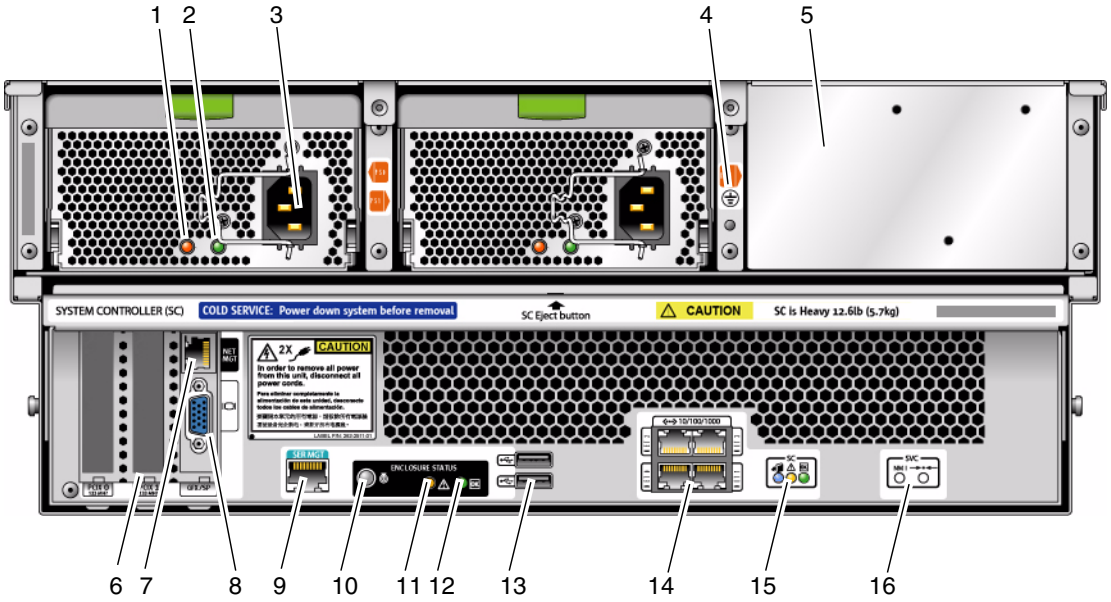


TABLE 1-3 Figure Legend—Sun Fire X4500 Rear Panel Features

#	Name	Description
1	Power Supply LED (amber)	Steady on—Fault. Service action required. Off—No fault.
2	Power Supply LED (green)	Steady on—Power is on (AC/DC are OK). Blinking —Blinks briefly once every 3 seconds. Standby power is on (AC is OK). Off — Power is off.
3	AC power connector	Each power supply has its own AC connector with a clip to secure its power cable.
4	Chassis ground	To connect grounding straps
5	Mounting plate for (Cable Management Assembly) CMA bracket	To secure the CMA, as described in the *Sun X4500-J Slide Rail Installation Guide* or the *Sun Fire X4500 Server Getting Started Guide*.
6	PCI-X-0 and PCI-X-1	Two slots for PCI-X cards.
7	Network management port	NET MGT — Net management and service processor 10/100 Mbit/sec Ethernet port.
8	Video connector	VGA port to connect video monitor.

TABLE 1-3 Figure Legend—Sun Fire X4500 Rear Panel Features

#	Name	Description
9	Serial management port	SER MGT—RJ45 serial management port (serial connection to service processor).
10	Locate button/LED (white)	Toggles on/off locally—Operators can turn on this on remotely to help them locate the enclosure in a crowded server room. Press to turn off.
11	System Fault LED (amber)	Off—Normal operation On—Service action is required. A system running under these conditions are in a fault condition, but the SP does not log the reason the service LED is illuminated: • 220VAC with only 1 PSU • 110VAC with only two PSUs
12	System Status LED (green)	Steady on— Power is on and system is operational. Blinking—Standby power is on but main power is off. Blinks briefly once every 3 seconds. Off — Power is off.
13	USB ports	To connect USB 2.0 devices.
14	10/100/1000 Gigabit Ethernet ports	To connect server to Ethernet.
15	System Controller status LEDs	Blue — Ready to remove (service action allowed) Amber — Fault (Service action required) Green — OK (no action required)
16	Reset buttons	**Caution -** Do not use these buttons unless instructed to do so by Sun service personnel. To operate these buttons, insert a nonconducting stylus into the recess. • SP — Service Processor. • HOST – This button resets the CPU but not the service processor.

1.3.4 Rear Panel (X4540)

Note – For a quick and concise description of these actions refer to the service label located on the hard drive access cover.

FIGURE 1-4 shows the features of the rear panel. TABLE 1-4 lists and describes each feature.

FIGURE 1-4 Sun Fire X4540 Server Rear Panel

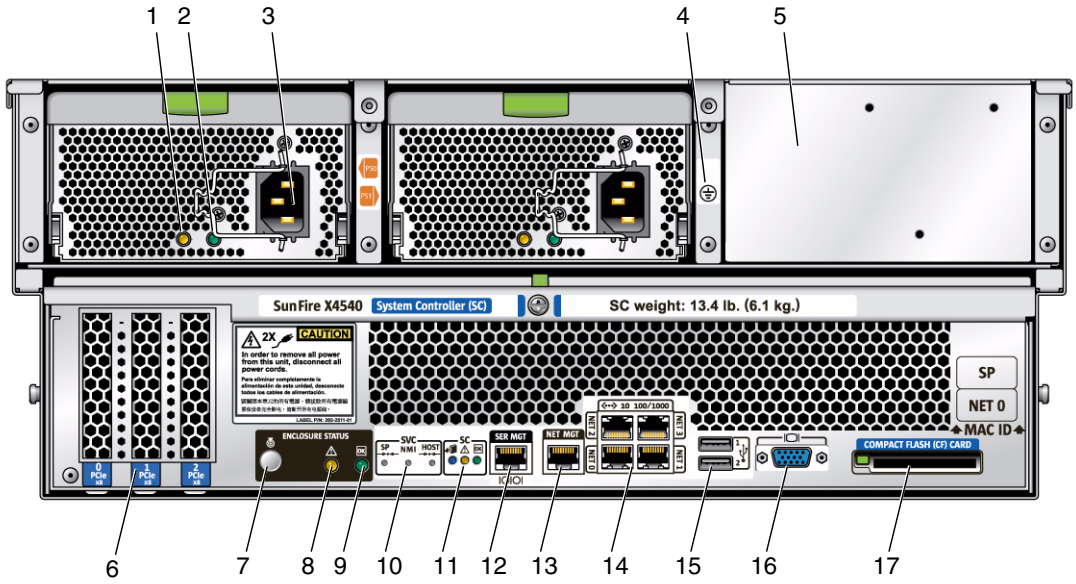


TABLE 1-4 Sun Fire X4540 Rear Panel Features

#	Name	Description
1	Power Supply Fault LED (amber)	When on, service action is required.
2	Power Supply LED (green)	Steady on—Power is on (AC/DC are OK). Blinking—Standby power is on (AC is OK). Blinks briefly every 3 seconds. Off—Power is off.
3	AC power connectors	Each power supply has its own AC connector with a clip to secure its power cable.

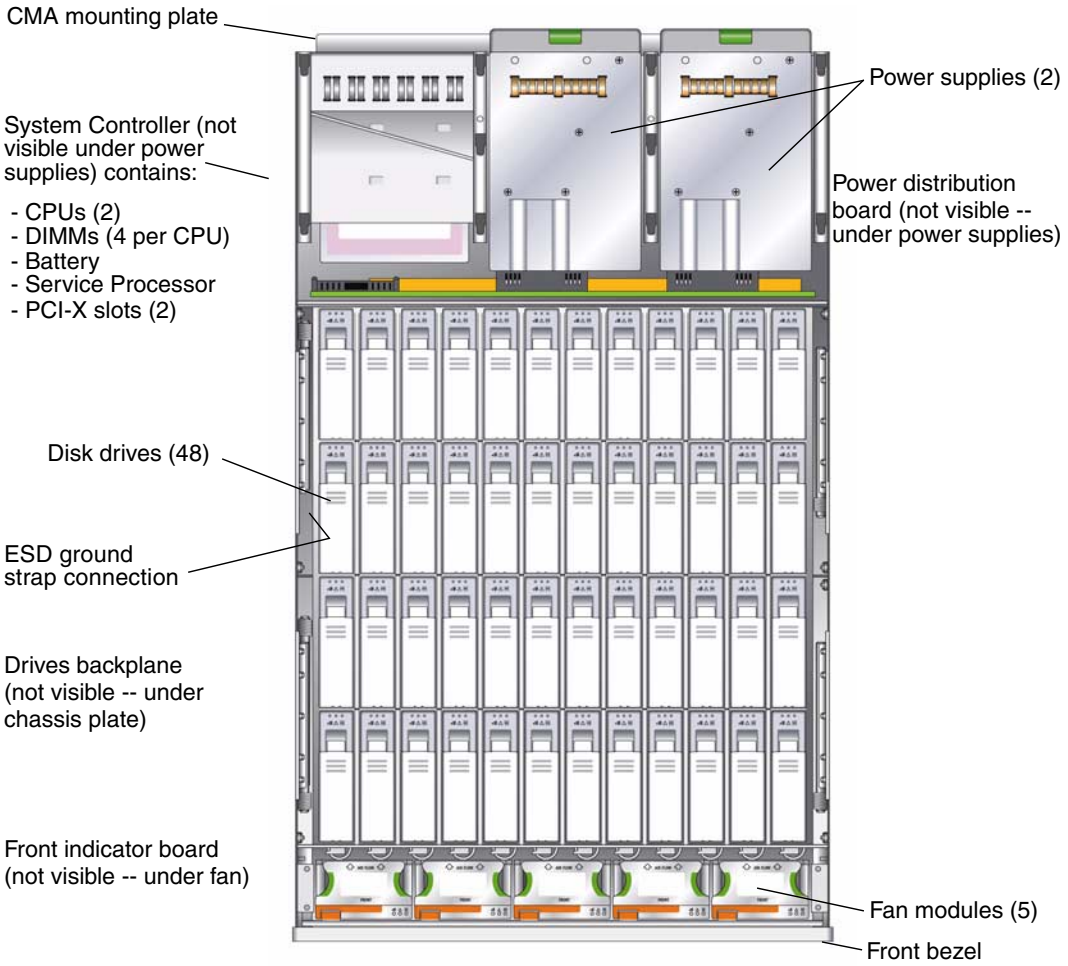
TABLE 1-4 Sun Fire X4540 Rear Panel Features

#	Name	Description
4	Chassis ground	To connect grounding straps.
5	Mounting plate	Only for mounting CMA on X4500.
6	PCIe	Three slots for X-option cards.
7	Locate button/LED (white)	Toggles on/off locally—Operators can turn on this LED remotely to help them locate the server in a crowded server room. Press to turn off.
8	Fault LED	Amber—When on, service action is required. Off—No faults present.
9	Enclosure OK LED (green)	Steady on— Power is on and system is operational. Blinking—Standby power is on but main power is off. Blinks briefly once every 3 seconds. Off — Power is off.
10	Reset buttons	**Caution -** Do not use these buttons unless instructed to do so by Sun service personnel. To operate these buttons, insert a nonconducting stylus or a straightened paper clip into the recess. • SP — Service Processor. • NMI – Non-Maskable Interrupt dump. This button sends an NMI to the CPU. It is used for debugging purposes only. (Supported on Windows platforms only.) • HOST – This button resets the CPU but not the service processor.
11	System controller status LEDs	Blue – Ready to remove (service action allowed). Amber – Fault (service action required). Green – Operational (no action required).
12	Serial management port	SER MGT—Serial management port (serial connection to service processor).
13	Network management port	NET MGT — Net management and service processor 10/100 Mbit/sec Ethernet port.
14	10/100/1000 Gigabit Ethernet ports	To connect server to Ethernet.
15	USB connectors	To connect USB 2.0 devices.
16	Video connector	VGA port to connect video monitor.
17	Compact Flash (CF) card	Slot to insert Compact Flash card. Push once and button comes out. Push second time and card ejects.

FIGURE 1-5 shows the locations of the Sun Fire X4540 server components, with the covers removed.

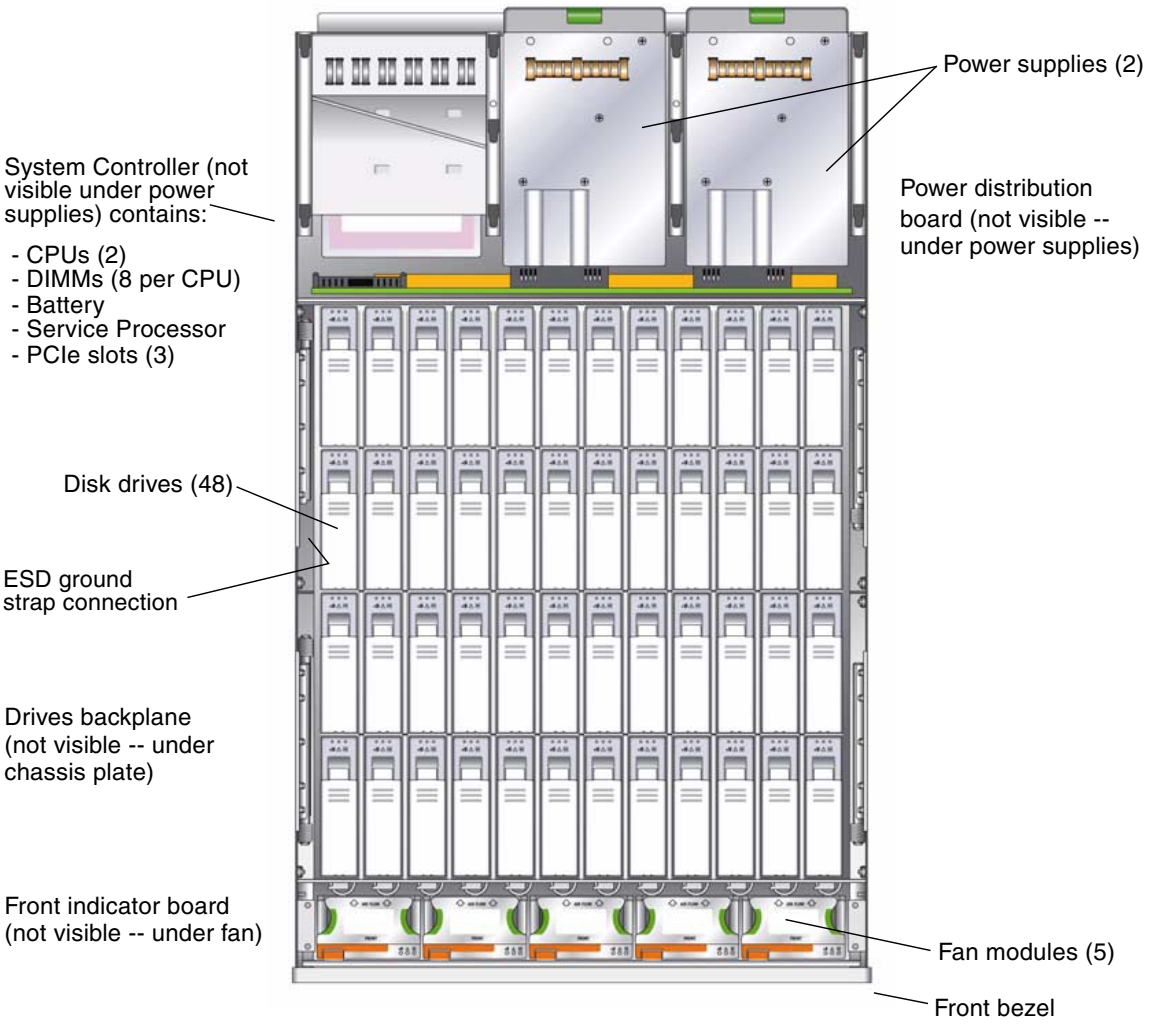
1.3.5 Component Locations (X4500)

FIGURE 1-5 Sun Fire X4500 Component Locations



1.3.6 Component Locations (X4540)

FIGURE 1-6 Sun Fire X4540 Component Locations



1.3.7 Sensor Information

Information on the location of the server's sensors can be found in *Sun Fire™ X4500/X4540 Servers Diagnostics Guide*, 819-4363.

For information on sensors that report on hardware conditions, see *Sun™ Integrated Lights Out Manager 3.0 Supplement for Sun Fire X4540 Server*, 820-5549-10.

1.4 Accessory Kit (X4500)

TABLE 1-5 lists the contents of the accessory kit that is shipped with the Sun Fire X4500 server.

Note – Because of Sun's commitment to eco-responsibility, we are not shipping a printed installation guide and software CDs for the new Sun Fire X4540 Server. Customers can order the documentation and CDs through the SunStore or Sun sales support representative. The Installation Guide and software are also available on the Web at no charge.

TABLE 1-5 Sun Fire X4500 Accessory Kit

Item
Bootable Diagnostics CD
Sun Fire X4500 Where To Find (printed manual)
Serial-to-RJ45 cable adapter (DB9S-to-RJ-45F)
Sun Fire X4500 Installation Guide (printed manual)
Sun Fire X4500 Tools and Drivers CD
Sun Installation Assistant CD
Important Safety Information for Sun Hardware Systems (printed manual)
Software License Agreement (printed manual)

1.5 Accessory Kit (X4540)

TABLE 1-6 lists the contents of the accessory kit that is shipped with the Sun Fire X4540 server.

TABLE 1-6 Sun Fire X4540 Accessory Kit

Item
Sun Fire X4540 Getting Started Guide (printed manual)
Serial-to-RJ45 cable adapter (DB9S-to-RJ-45F)
Important Safety Information for Sun Hardware Systems (printed manual)
Software License Agreement (printed manual)

1.6 Additional Options and Replaceable Components (X4500)

TABLE 1-7 lists the after-factory options and replaceable components for the Sun Fire X4500 server. Whether the items are customer-replaceable units (CRUs) or field-replaceable units (FRUs) is indicated in the last column of the table.

Supported components and their part numbers are subject to change over time. For the most up-to-date list of replaceable components, product updates, and downloads, see the following URL:
http://sunsolve.sun.com/handbook_pub/Systems/

TABLE 1-7 Sun Fire X4500 Replaceable Components

Component	Part Number	CRU or FRU
Power Supply	#300-1787, X4502A-Z (X-option)	CRU
Fan Module (5 Fan Modules/system)	#541-0458	CRU
Seagate Galaxy 250GB	#541-1468	CRU
Hitachi Kurafone2 500GB	#541-1467	CRU
Hitachi GeminiK 500GB	#541-3050	CRU
Hitachi GeminiK 750GB	#540-7244	CRU
Hitachi GeminiK 1TB	#540-7507	CRU
2-GB DIMMs, Pair (2 DIMMs, 4 GB total) Registered ECC Memory, 8 slots/system	#541-1903 X4231A-Z (X-option)	CRU
GRASP board (includes SP board and video board)	#541-2963	FRU
CPU (AMD 290, 2.8-GHz dual core), includes grease	#371-1779	FRU
System Controller Assembly (with I/O controller board and CPU board; without CPUs, DIMMs, and GRASP board.)	#541-1915	FRU
Front Indicator Board (FIB) with ribbon cable	#501-7192	FRU
System Enclosure Super FRU (includes disk backplane and FIB with ribbon cable)	#541-1907	FRU
Power Distribution Board (220 VAC)	#501-7104	FRU
Battery	#150-3993	CRU
Rack Mount X-Options		
Cable Management Arm	#371-2887, X4229A-Z (X-option)	FRU
Slide Rail Kit (JES)	#371-3493, X4228A-Z (X-option)	FRU

1.7 Additional Options and Replaceable Components (X4540)

TABLE 1-8 lists the after-factory options and replaceable components for the Sun Fire X4540 server. Whether the items are customer-replaceable units (CRUs) or field-replaceable units (FRUs) is indicated in the last column of the table.

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

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

Click the name and model of your server, and then click the Full Components List for the list of components and part numbers.

TABLE 1-8 Sun Fire X4540 Replaceable Components

Component	Marketing Part Number	CRU or FRU
Power supply (type A205), 1500W (X4500, 2 or 3 per system)	#300-1787, X4502A-Z (X-option)	CRU
Fan Module (5 Fan Modules/system)	#341-0458	CRU
Seagate 250GB	#541-3678, XRA-ST1CH-250G7KZ (X-option)	CRU
Hitachi 500GB	#541-3050, XRA-ST1CH-500G7KZ (X-option)	CRU
Hitachi 1TB	#540-7507, XRA-ST1CH-1T7K (X-option)	CRU
Seagate 500GB	#541-3679	CRU
Seagate 1TB	#541-3730	CRU
32GB 3.5" SATA SSD	#541-4077, XRA-ST1CH-32G2SSD (X-option)	CRU
2 DIMMs x 2GB, 512Mb-based, dual-rank DIMMs (4 GB total) registered ECC Memory, 16 slots/system	#541-1313 X5034 (X-option)	CRU
2 DIMMs x 2GB, 1Gb-based, single-rank DIMMs (8 GB total) registered ECC Memory, 16 slots/system	#541-3360 X4540 (X-option)	CRU

TABLE 1-8 Sun Fire X4540 Replaceable Components

Component	Marketing Part Number	CRU or FRU
2 DIMMs x 4GB, 1Gb-based, single-rank DIMMs (8 GB total) registered ECC Memory, 16 slots/system	#541-1304 X5035 (X-option)	CRU
2 DIMMs x 8GB, 2Gb-based, single-rank DIMMs (8 GB total) registered ECC Memory, 16 slots/system	#541-3419 X8356A (X-option)	CRU
System Controller Assembly with I/O controller board and CPU board; without CPUs, DIMMs, and GRASP board. (Only compatible with quad-core 2356 processor.)	#541-0491	FRU
System Controller Assembly with I/O controller board and CPU board; without CPUs, DIMMs, and GRASP board. (Compatible with quad-core 2356 or 2384 processor.)	#541-3758	FRU
Graphics Service Processor (GRASP) board, includes SP board and video board	#541-0597	FRU
CPU (quad core 2.3 GHz 2356 processor)	#371-4042	FRU
CPU (quad core 2.7 GHz 2384 processor)	#371-4438	FRU
Front Indicator Board (FIB) with ribbon cable	#501-7192	FRU
System Enclosure Super FRU with disk backplane and FIB with ribbon cable	#541-1218	FRU
System Controller Upgrade Kit (includes I/O controller board (USB) and CPU board, 2x2356, 16x2GB (1GB), and document)	B24-FSZ2-4540-CONT (X-option)	CRU
System Controller Upgrade Kit (includes I/O controller board (USB) and CPU board, 2x2435, 16x2GB (1GB), and document)	B24-BZ2-4540-CONT (X-option)	CRU
Power Distribution Board (220 VAC)	#501-7104	FRU
Battery	#150-3993	CRU
Rack Mount X-Options		
Slide Rail Kit	#350-1393, X4541 (X-option)	FRU
Cable Management Arm (compatible only with Slide Rail Kit #371-3493)	#371-2887, X4229A-Z (X-option)	FRU
New Cable Management Arm with Cable Management Bar (compatible only with Slide Rail Kit #350-1393)	#350-1363, X4542 (X-option)	FRU

CHAPTER 2

Powering On and Configuring BIOS Settings

This chapter contains the following procedures and information.

■ Section 2.23, “Disabling OPROM Scanning” on page 2-86

2.1 Powering On the Server

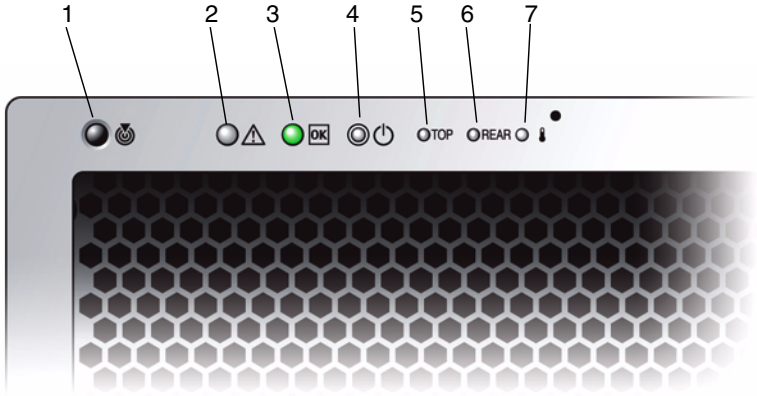
Before powering on your server for the first time, follow the installation and cabling instructions provided in the *Sun Fire X4540 Installation Guide*, available online at the URL described in “Related Documentation” on page xiii.

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

To power on main power for all server components:

1. **Verify that power cords have been connected and that standby power is on.**
   In standby power mode, the Power/OK LED (3) on the front panel flashes.

FIGURE 2-1 Front Panel Controls and Indicators



1	Locate button/LED
2	Alert LED
3	Power/OK LED (system power)
4	Power button

5	Top (disk drive or fan fault)
6	Rear (power supply or system controller fault)
7	System over temperature

2. **Use a nonconducting stylus to press and release the recessed Power button on the server front panel. See** 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.

2.2 Powering Off the Server

To power off the server from main power mode, use one of the following two methods:

- **Graceful shutdown:** Use a nonconducting 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 blinking, indicating that the server is in standby power mode.

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

2.3 Automatic Power-Off Events

The service processor shuts down the system if it detects an overtemperature condition.

The hardware shuts down the system immediately if any voltage is out of spec, or if the last working power supply fails.

See Section E.2, “Power-Off Sequence” on page E-4 for a diagram of the power-off sequence and its timing parameters.

2.4 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 default to the original state specified at the factory.

When the BIOS is started, the first BIOS Setup menu screen is displayed. The BIOS Setup utility contains seven menu screens, which are displayed in this 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 arrows, on the keyboard, to scroll through a menu.
- Use the Tab key to move back and forth across columns.

2.4.1 Changing the Configuration of a BIOS Menu Item

You can change the BIOS configuration in several different interfaces:

- Use a USB keyboard and mouse, and a VGA monitor connected directly to the server.
- Use the remote video console of the ILOM Service Processor and redirect the server's console output. See Section B.4, "Redirecting Console Output" on page B-3.
- Use a terminal (or terminal emulator connected to a computer) through the serial port on the back panel of the server.

To change the system's parameters:

1. **Enter the BIOS Setup utility by pressing the F2 key while the system is performing the power-on self-test (POST).**
2. **Highlight the field to be modified using the arrow and Tab keys.**
3. **Press Enter to select the field.**

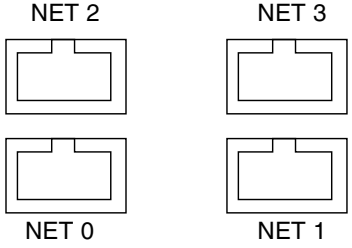
   A dialog box appears. The box presents you with the options available for the setup field that you have chosen.

4. **Modify the setup field and close the screen.**
5. **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 5.**
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.**

2.5 Ethernet Port (NIC) Device and Driver Naming

These servers each have four 10/100/1000BASE-T Gigabit Ethernet ports connected to individual Network Interface Cards (NICs). The chassis labeling of the physical ports is shown in FIGURE 1.

FIGURE 1 Ethernet Port Chassis Labeling Designations

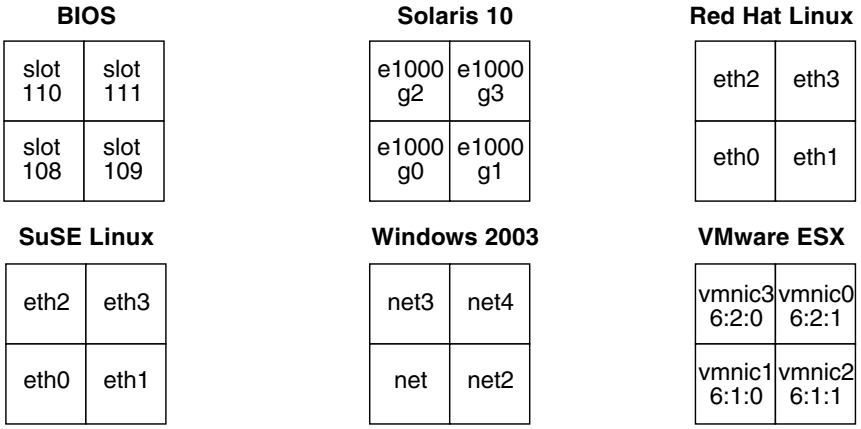


The logical device naming for the NICs is reported differently by different interfaces and operating systems.

2.5.1 NIC Naming Conventions

See FIGURE 2 for a diagram that explains how operating systems and interfaces name the four NICs shown in FIGURE 1.

FIGURE 2 Sun Fire X4500 NIC Naming Conventions



2.6 Power-On Self-Test (POST)

For information about BIOS POST testing, POST codes, POST code checkpoints, and console redirection, see Appendix B.

2.7 Load Optimal Default Settings During BIOS POST

Perform the following steps during the BIOS/Power-On Self Test (POST):

1. **Press F2 to invoke Setup.**

   After some screen messages, the BIOS setup utility appears.

2. **Press F9, or use the arrow keys to scroll to the Exit -> Load Optimal Defaults.**

   A dialog asks "Load Optimal Defaults [OK]."

3. **Press Enter.**

   The dialog box closes.

4. **Press F10 or use the arrow keys to scroll to Exit -> Save Changes and Exit.**

   A dialog asks if you want to save your changes and exit.

5. **Press Enter to save your changes and exit the BIOS utility.**

2.8 BIOS Option ROM Size Limitation

The BIOS Option ROM is 128 KB. Of these 128 KB, approximately 86 KB are used by the VGA controller, the LSI controller, and the on-board NIC. Approximately 42KB remain for the Option ROM.

2.8.1 AMD PowerNow! Feature Disabled by Default (Sun Fire X4500)

The AMD PowerNow! feature, which is accessed from the BIOS Setup utility Advanced menu, is disabled by default on this server. Some problems have been observed when using this feature on certain operating systems. If you want to enable this feature, first check the *Sun Fire X4500 Server Product Notes* for any outstanding known issues for your operating system.

2.9 BIOS Setup Screens (X4500)

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

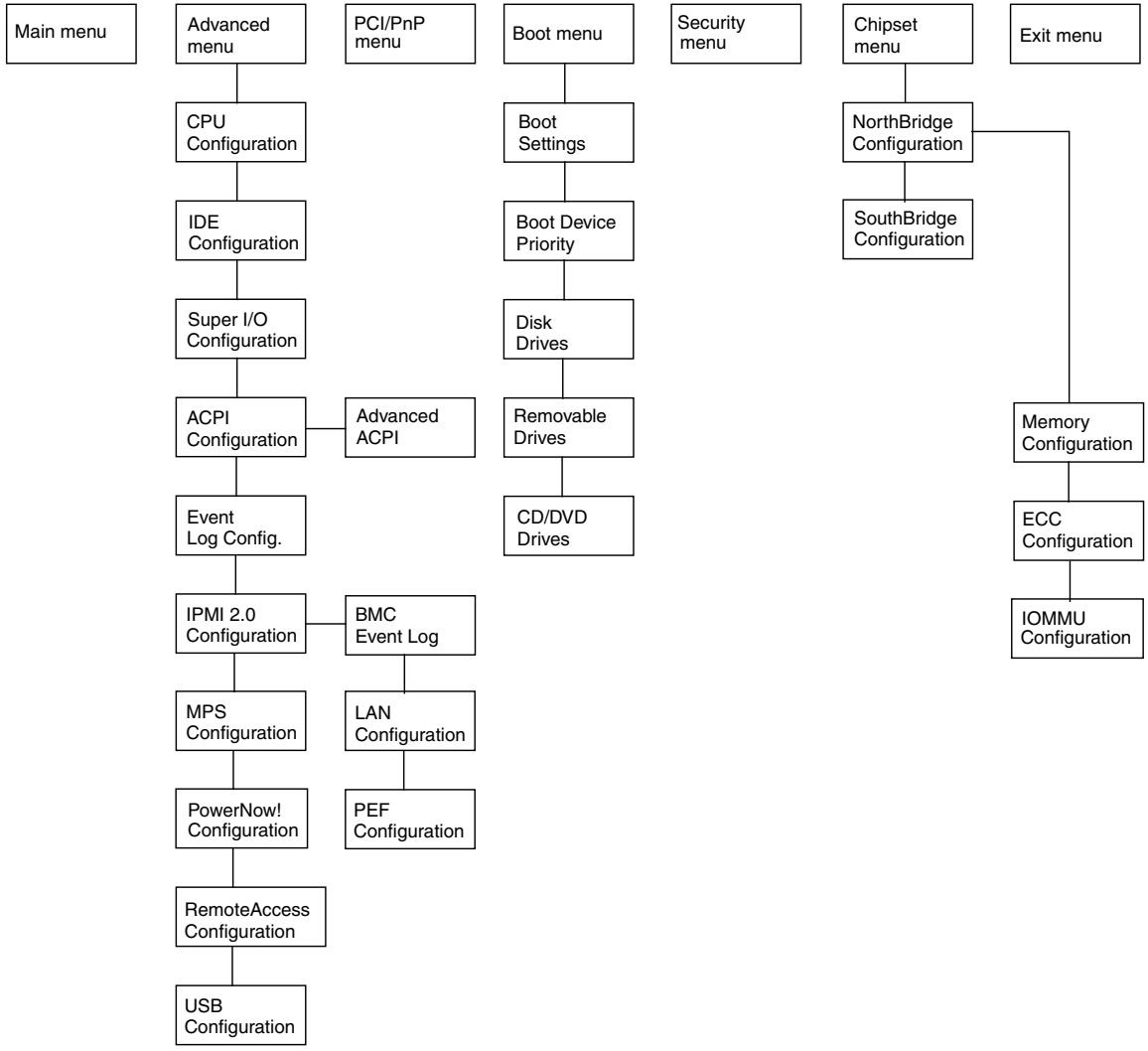
TABLE 2-1 BIOS Setup Screens Summary (X4500)

Screen	Description
BIOS Main Menu Screen (X4500)	General system information.
BIOS Advanced Menu, Main Screen (X4500)	Configuration information for the CPUs, IDE, SuperIO, ACPI, Event Log, Hyper Transport, IPMI, MPS, PCI Express, Remote Access, and USB. Twelve additional screens can be accessed from the Advanced menu.
BIOS PCI/PnP Menu (X4500)	Plug-and-Play (PnP) devices can be configured by the BIOS (default), or by the operating system (if applicable).
BIOS Boot Menu, Main Screen (X4500)	Configure the boot device priority (disk drives and the ATAPI DVD-ROM drive).
BIOS Security Settings Menu (X4500)	Install or change the user and supervisor passwords.
BIOS Chipset Menu, Main Screen (X4500)	Configuration options for the NorthBridge, SouthBridge, and PCI-X devices. Six separate screens can be accessed from the Chipset menu. Note that the Memory Chipkill option is enabled by default. Enabling Chipkill improves system reliability but degrades system performance under specific applications.
BIOS Exit Options Menu Screen (X4500)	Save or discard changes.

FIGURE 2-2 summarizes the BIOS menu tree. See Section 2.12, "BIOS Setup Menu Screens (X4500)" on page 2-12 for examples of each of these screens.

See Section t, "To Install a PCI-X or PCIe Card (FRU)" on page 3-65 for the locations of the PCI slots.

FIGURE 2-2 BIOS Utility Menu Tree (X4500)



2.10 Device Boot Detection Priority (X4500)

TABLE 2-2 shows the devices and PCI slots, and the order that the BIOS detects them.

TABLE 2-2 Devices and BIOS Detection Order

Order	Device	Bus Hex Address
1	Marvell 0	0x1
2	Marvell 1	0x2
3	USB 1.1	0x3
4	VGA	0x3
5	USB 2	0x3
6	Marvell 2	0x5
7	Marvell 3	0x6
8	ON NIC	0x7
9	ON NIC	0x8
10	Marvell 4	0xA
11	Marvell 5	0xB
12	PCI SLOT 0	0xD
13	PCI SLOT 1	0xE

See "To Install a PCI-X or PCIe Card (FRU)" on page 65 for the locations of the PCI slots.

2.11 Drives Mapping (X4500)

The following graphic shows the drives mapping scheme of the system. The boot drives are 0 or 1. (Default boot drive is in slot 0 and the default mirrored drive is in slot 8.) It is required to use one of these drives from which to boot the system.

FIGURE 2-3 Sun Fire X4500 Drives Map

Controller 3		Controller 2		Controller 5		Controller 4		Controller 1		Controller 0	
Physical # 36 Hardware SATA Port: 3/3	Physical # 37 Hardware SATA Port: 3/7	Physical # 38 Hardware SATA Port: 2/3	Physical # 39 Hardware SATA Port: 2/7	Physical # 40 Hardware SATA Port: 5/3	Physical # 41 Hardware SATA Port: 5/7	Physical # 42 Hardware SATA Port: 4/3	Physical # 43 Hardware SATA Port: 4/7	Physical # 44 Hardware SATA Port: 1/3	Physical # 45 Hardware SATA Port: 1/7	Physical # 46 Hardware SATA Port: 0/3	Physical # 47 Hardware SATA Port: 0/7
Physical # 24 Hardware SATA Port: 3/2	Physical # 25 Hardware SATA Port: 3/6	Physical # 26 Hardware SATA Port: 2/2	Physical # 27 Hardware SATA Port: 2/6	Physical # 28 Hardware SATA Port: 5/2	Physical # 29 Hardware SATA Port: 5/6	Physical # 30 Hardware SATA Port: 4/2	Physical # 31 Hardware SATA Port: 4/6	Physical # 32 Hardware SATA Port: 1/2	Physical # 33 Hardware SATA Port: 1/6	Physical # 34 Hardware SATA Port: 0/2	Physical # 35 Hardware SATA Port: 0/6
Physical # 12 Hardware SATA Port: 3/1	Physical # 13 Hardware SATA Port: 3/5	Physical # 14 Hardware SATA Port: 2/1	Physical # 15 Hardware SATA Port: 2/5	Physical # 16 Hardware SATA Port: 5/1	Physical # 17 Hardware SATA Port: 5/5	Physical # 18 Hardware SATA Port: 4/1	Physical # 19 Hardware SATA Port: 4/5	Physical # 20 Hardware SATA Port: 1/1	Physical # 21 Hardware SATA Port: 1/5	Physical # 22 Hardware SATA Port: 0/1	Physical # 23 Hardware SATA Port: 0/5
Physical # 0 Hardware SATA Port: 3/0	Physical # 1 Hardware SATA Port: 3/4	Physical # 2 Hardware SATA Port: 2/0	Physical # 3 Hardware SATA Port: 2/4	Physical # 4 Hardware SATA Port: 5/0	Physical # 5 Hardware SATA Port: 5/4	Physical # 6 Hardware SATA Port: 4/0	Physical # 7 Hardware SATA Port: 4/4	Physical # 8 Hardware SATA Port: 1/0	Physical # 9 Hardware SATA Port: 1/4	Physical # 10 Hardware SATA Port: 0/0	Physical # 11 Hardware SATA Port: 0/4
Fan Tray 0		Fan Tray 1		Fan Tray 2		Fan Tray 3		Fan Tray 4			

2.12 BIOS Setup Menu Screens (X4500)

The following figures show sample BIOS setup menu screens.

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

2.12.1 BIOS Main Menu Screen (X4500)

```
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: 04/12/06                               ** Use [+] or [-] to      *
* ID        : 0ABIG014                               ** configure system Time. *
*                                                    **                        *
* Product Name          : Sun Fire X4500             **                        *
* System Serial Number  : Not Available              **                        *
* BMC Firmware Revision : 1.00                       **                        *
*                                                    **                        *
* Processor                                          **                        *
* Dual Core AMD Opteron(tm) Processor 285            ** **    Select Screen    *
* Speed :2.6 GHz                                     ** **    Select Item      *
* Count :4                                           ** +-    Change Field     *
*                                                    ** Tab   Select Field     *
* System Memory                                      ** F1    General Help     *
* Size      : 15.9 GB                                ** F10   Save and Exit    *
*                                                    ** ESC   Exit             *
* System Time                  [16:59:00]            **                        *
* System Date                  [Thu 07/20/2006]      **                        *
*************************************************************************************
```

2.12.2 BIOS Advanced Menu, Main Screen (X4500)

```
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      *
* * Remote Access Configuration                     * **    Select Item        *
* * Trusted Computing                               * Enter Go to Sub Screen   *
* * USB Configuration                               * F1    General Help       *
*                                                   * F10   Save and Exit      *
*                                                   * ESC   Exit               *
*                                                   *                          *
*                                                   *                          *
*************************************************************************************
```

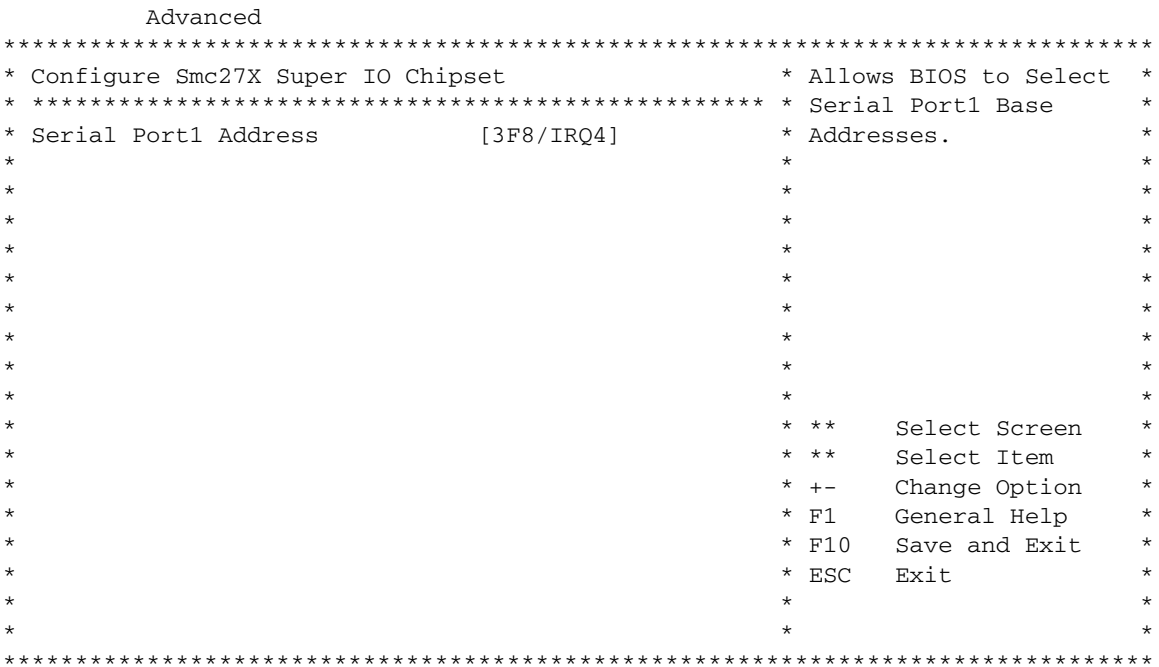
2.12.2.1 BIOS Advanced Menu, CPU Configuration Screen (X4500)

```
Advanced
*********************************************************************************
* CPU Configuration                                  * This option should     *
* Module Version: 14.09                              * remain disabled for    *
* Physical Count: 2                                  * the normal operation.  *
* Logical Count : 4                                  * The driver developer   *
* ************************************************ * may enable it for      *
* Dual Core AMD Opteron(tm) Processor 285            * testing purpose.       *
* Revision: E6                                       *                        *
* Cache L1: 256KB                                    *                        *
* Cache L2: 2048KB                                   *                        *
* Speed   : 2600MHz                                  *                        *
* Current FSB Multiplier: 13x                        *                        *
* Maximum FSB Multiplier: 13x                        *                        *
* Able to Change Freq.  : Yes                        * **    Select Screen    *
* uCode Patch Level     : 0x0                        * **    Select Item      *
*                                                    * +-    Change Option    *
* GART Error Reporting           [Disabled]          * F1    General Help     *
* MTRR Mapping                   [Continuous]        * F10   Save and Exit    *
* Speculative TLB Reload         [Enabled]           * ESC   Exit             *
*                                                    *                        *
*********************************************************************************
```

2.12.2.2 BIOS Advanced Menu, IDE Configuration Screen (X4500)

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

2.12.2.3 BIOS Advanced Menu, SuperIO Chipset Configuration Screen (X4500)



2.12.2.4 BIOS Advanced Menu, ACPI Configuration Screen (X4500)

```
Advanced
*********************************************************************************
* ACPI Settings                                    * Enable / Disable           *
* ************************************************ * ACPI support for           *
* ACPI Aware O/S                 [Yes]             * Operating System.          *
*                                                  *                            *
* * Advanced ACPI Configuration                    * ENABLE: If OS              *
*                                                  * supports ACPI.             *
*                                                  *                            *
*                                                  * DISABLE: If OS             *
*                                                  * does not support           *
*                                                  * ACPI.                       *
*                                                  *                            *
*                                                  *                            *
*                                                  * **    Select Screen        *
*                                                  * **    Select Item          *
*                                                  * +-    Change Option        *
*                                                  * F1    General Help         *
*                                                  * F10   Save and Exit        *
*                                                  * ESC   Exit                 *
*                                                  *                            *
*                                                  *                            *
*********************************************************************************
```

2.12.2.5 BIOS Advanced Menu, Advanced ACPI Configuration Screen (X4500)

```
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]            *                        *
* Remote Access                  [Enabled]            *                        *
*                                                     * **    Select Screen    *
*                                                     * **    Select Item      *
*                                                     * +-    Change Option    *
*                                                     * F1    General Help     *
*                                                     * F10   Save and Exit    *
*                                                     * ESC   Exit             *
*                                                     *                        *
*                                                     *                        *
*******************************************************************************
```

2.12.2.6 BIOS Advanced Menu, Event Logging Details Screen (X4500)

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

2.12.2.7 BIOS Advanced Menu, Hyper Transport Configuration Screen (X4500)

```
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]              *                         *
*                                                    *                         *
* PCI-X1:PCI-X2 HT Link Speed    [Auto]              * **    Select Screen    *
* PCI-X1:PCI-X2 HT Link Width    [Auto]              * **    Select Item      *
*                                                    * +-    Change Option    *
* CPU1:PCI-X3 HT Link Speed      [Auto]              * F1    General Help     *
* CPU1:PCI-X3 HT Link Width      [Auto]              * F10   Save and Exit    *
*                                                    * ESC   Exit             *
* CPU1:PCI-X4 HT Link Speed      [Auto]              *                         *
* CPU1:PCI-X4 HT Link Width      [Auto]              *                         *
*                                                    *                         *
*                                                    *                         *
*******************************************************************************
```

2.12.2.8 BIOS Advanced Menu, IPMI 2.0 Configuration Screen (X4500)

```
Advanced
*******************************************************************************
* IPMI 2.0 Configuration                          * View all events in the *
* ********************************************** * BMC Event Log.         *
* Status Of BMC                 Not Working       * It will take a max. of *
* * View BMC System Event Log                     * 15 seconds to read all *
* Clear BMC System Event Log                      * BMC SEL records.       *
* * Set LAN Configuration                         *                        *
* * Set 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             *
*                                                 *                        *
*                                                 *                        *
*******************************************************************************
```

2.12.2.9 BIOS Advanced Menu, IPMI 2.0, View BMC Event Log Screen (X4500)

```
         Advanced
*******************************************************************************
* Total Number Of Entries:         36                 * Use +/- to traverse    *
* ********************************************** * the event log.         *
* SEL Entry Number:              [ 1]                *                          *
* 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             *
*                                                    *                        *
*                                                    *                        *
*******************************************************************************
```

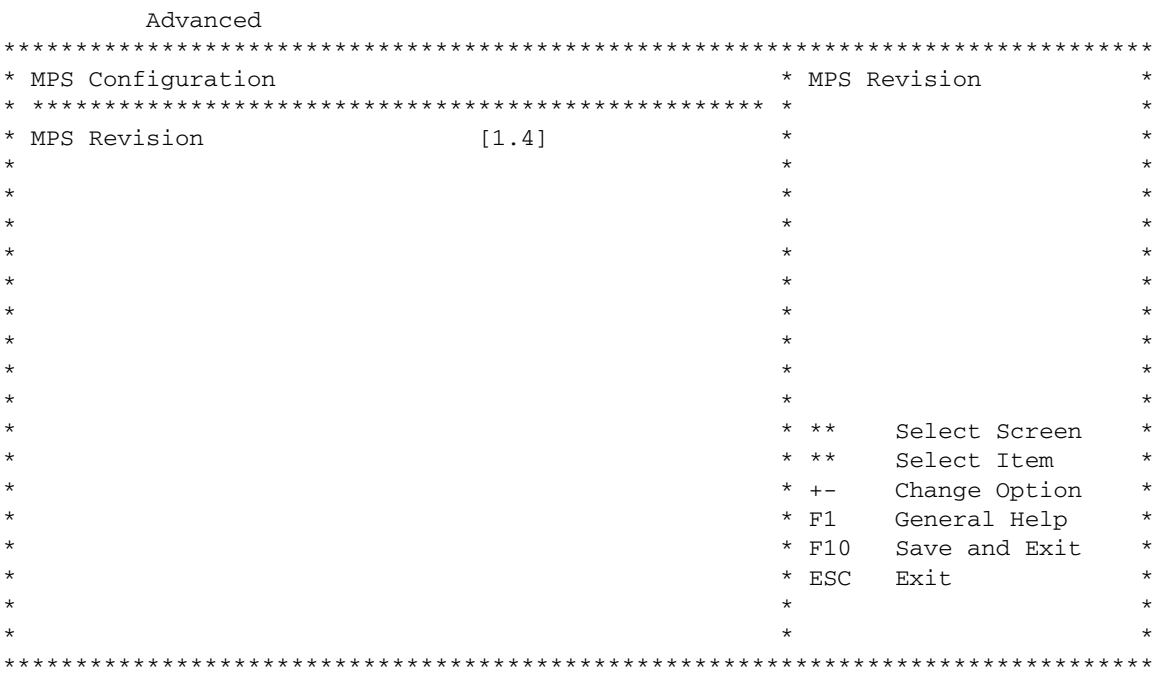
2.12.2.10 BIOS Advanced Menu, IPMI 2.0, LAN Configuration Screen (X4500)

```
Advanced
*******************************************************************************
* LAN Configuration.                                * Enter channel number   *
* ************************************************* * for LAN Configuration  *
* Channel Number                 [01]               * Command.               *
* Channel Number Status:         Channel number is OK *                       *
*                                                   * Proper value below 16. *
*                                                   *                        *
* IP Assignment                  [DHCP]             *                        *
*                                                   *                        *
* Current IP address in BMC:      010.006.042.175   *                        *
* Current MAC address in BMC:     00.03.BA.F2.09.66 *                        *
* Current Subnet Mask in BMC:     255.255.255.000   *                        *
* Current Gateway in BMC:         010.006.042.001   *                        *
*                                                   * **    Select Screen    *
* Refresh                                           * **    Select Item      *
*                                                   * Enter Update           *
* IP Address                      010.006.042.174   * F1    General Help     *
* Subnet Mask                     255.255.255.000   * F10   Save and Exit    *
* Default Gateway                 010.006.042.001   * ESC   Exit             *
*                                                   *                        *
* Commit                                            *                        *
*******************************************************************************
```

2.12.2.11 BIOS Advanced Menu, IPMI 2.0, PEF Configuration Screen (X4500)

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

2.12.2.12 BIOS Advanced Menu, MPS Configuration Screen (X4500)



2.12.2.13 BIOS Advanced Menu, AMD PowerNow Configuration (X4500)

Note – The AMD PowerNow! feature is disabled by default on Sun Fire X4500 servers. Some problems have been observed when using this feature on certain operating systems. If you want to enable this feature, first check the *Sun Fire X4500 Server Product Notes* for any currently known issues for your operating system.

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

2.12.2.14 BIOS Advanced Menu, Remote Access Configuration Screen (X4500)

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

2.12.2.15 BIOS Advanced Menu, USB Configuration Screen (X4500)

```
           Advanced
*******************************************************************************
* USB Configuration                                   * Enables support for    *
* ********************************************** * legacy USB. AUTO       *
* Module Version - 2.24.0-11.4                        * option disables        *
*                                                     * legacy support if      *
* USB Devices Enabled :                               * no USB devices are     *
*   2 Keyboards, 2 Mice, 1 Hub, 2 Drives              * connected.             *
*                                                     *                        *
* Legacy USB Support             [Enabled]            *                        *
* USB 2.0 Controller Mode        [FullSpeed]          *                        *
* BIOS EHCI Hand-Off             [Enabled]            *                        *
* Hotplug USB FDD Support        [Auto]               *                        *
* Hotplug USB CDROM Support      [Auto]               *                        *
*                                                     * **    Select Screen    *
* * USB Mass Storage Device Configuration             * **    Select Item      *
*                                                     * +-    Change Option    *
*                                                     * F1    General Help     *
*                                                     * F10   Save and Exit    *
*                                                     * ESC   Exit             *
*                                                     *                        *
*                                                     *                        *
*******************************************************************************
```

2.12.3 BIOS PCI/PnP Menu (X4500)

```
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.                 *
* Scanning onboard Marvell ROM   [Enabled]           **                        *
* Scanning onboard NIC-0 OPROM   [Enabled]           ** **    Select Screen    *
* Scanning onboard NIC-1 OPROM   [Enabled]           ** **    Select Item      *
* Scanning onboard NIC-2 OPROM   [Enabled]           ** +-    Change Option    *
* Scanning onboard NIC-3 OPROM   [Enabled]           ** Available: Specified   *
* Scanning OPROM on PCIX SLOT0   [Enabled]           ** DMA is available to be *
* Scanning OPROM on PCIX SLOT1   [Enabled]           ** used by PCI/PnP        *
* Onboard PCI NIC MAC Address                        ** devices.               *
*   GE NIC 1 : 00 14 4F 20 DA FC                     ** Reserved: Specified    *
*   GE NIC 2 : 00 14 4F 20 DA FD                     ** DMA is reserved for    *
*   GE NIC 3 : 00 14 4F 20 DA FE                     ** use by legacy ISA      *
*   GE NIC 4 : 00 14 4F 20 DA FF                     ** devices.               *
*                                                    **                        *
* IRQ3                           [Available]         **                        *
* IRQ4                           [Reserved]          **                        *
* IRQ5                           [Available]         **                        *
* IRQ7                           [Available]         ** **    Select Screen    *
* IRQ9                           [Available]         ** **    Select Item      *
* IRQ10                          [Available]         ** +-    Change Option    *
* IRQ11                          [Available]         ** F1    General Help     *
* IRQ14                          [Available]         ** F10   Save and Exit    *
* IRQ15                          [Available]         ** ESC   Exit             *
*                                                    **                        *
* DMA Channel 0                  [Available]         ** **    Select Screen    *
* DMA Channel 1                  [Available]         ** **    Select Item      *
* DMA Channel 3                  [Available]         ** +-    Change Option    *
* DMA Channel 5                  [Available]         ** F1    General Help     *
* DMA Channel 6                  [Available]         ** F10   Save and Exit    *
* DMA Channel 7                  [Available]         ** ESC   Exit             *
*                                                    **                        *
* Reserved Memory Size           [Disabled]          **                        *
*******************************************************************************
```

2.12.4 BIOS Boot Menu, Main Screen (X4500)

```
Main    Advanced    PCIPnP    Boot    Security    Chipset    Exit
*********************************************************************************
* Boot Settings                                    * Configure Settings     *
* ************************************************ * during System Boot.    *
* * Boot Settings Configuration                     *                        *
*                                                  *                        *
* * Boot Device Priority                           *                        *
* * Hard Disk Drives                               *                        *
* * Removable Drives                               *                        *
* * ATAPI CDROM Drives                             *                        *
*                                                  *                        *
*                                                  *                        *
*                                                  *                        *
*                                                  *                        *
*                                                  * **    Select Screen    *
*                                                  * **    Select Item      *
*                                                  * Enter Go to Sub Screen *
*                                                  * F1    General Help     *
*                                                  * F10   Save and Exit    *
*                                                  * ESC   Exit             *
*                                                  *                        *
*                                                  *                        *
*********************************************************************************
```

2.12.4.1 BIOS Boot Menu, Boot Settings Configuration Screen (X4500)

```
                                 Boot
*********************************************************************************
* Boot Settings Configuration                          * Allows BIOS to skip    *
* **************************************************** * certain tests while    *
* Quick Boot                     [Disabled]            * interrupt 19           *
* System Configuration Display   [Disabled]            *                        *
* Quiet Boot                     [Disabled]            * messages.              *
* AddOn ROM Display Mode         [Force BIOS]          *                        *
* Bootup Num-Lock                [On]                  *                        *
* Wait For 'F1' If Error         [Disabled]            *                        *
* Interrupt 19 Capture           [Disabled]            *                        *
*                                                      *                        *
*                                                      *                        *
*                                                      *                        *
*                                                      * **    Select Screen    *
*                                                      * **    Select Item      *
*                                                      * +-    Change Option    *
*                                                      * F1    General Help     *
*                                                      * F10   Save and Exit    *
*                                                      * ESC   Exit             *
*                                                      *                        *
*                                                      *                        *
*********************************************************************************
```

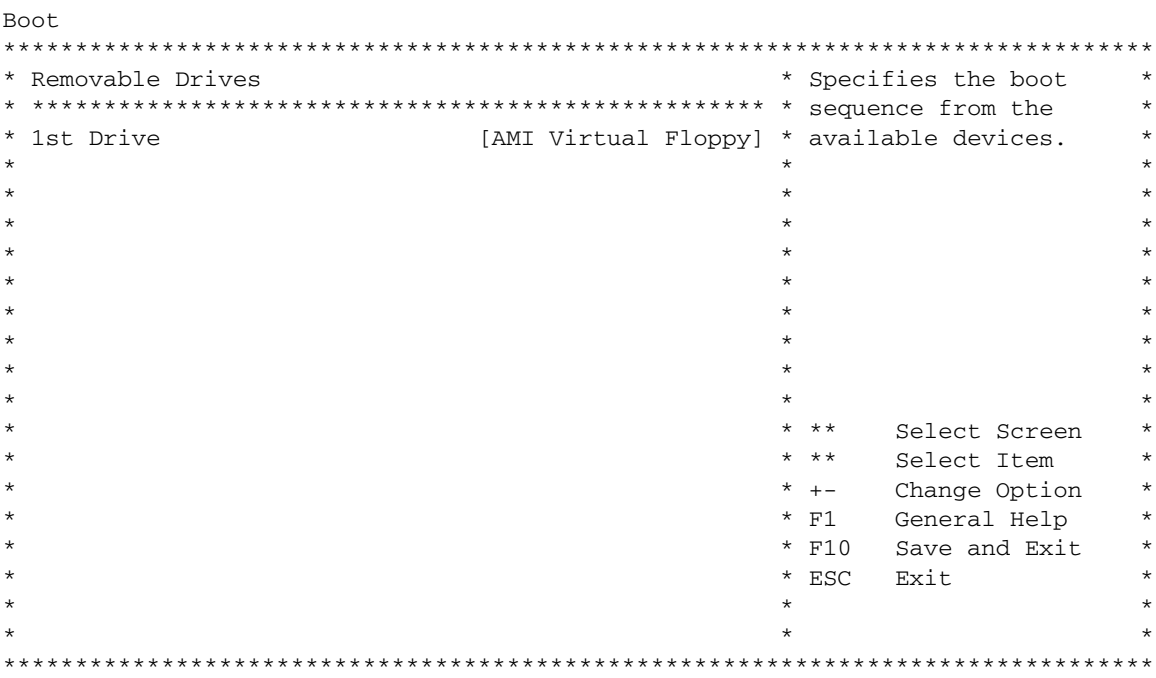
2.12.4.2 BIOS Boot Menu, Boot Device Priority Screen (X4500)

```
                                Boot
********************************************************************************
* Boot Device Priority                                 * Specifies the boot     *
* **************************************************** * sequence from the      *
*                                                      * available devices.     *
* 1st Boot Device                [ATAPI CDROM]         *                        *
* 2nd Boot Device                [Removable Dev.]      * A device enclosed in   *
* 3rd Boot Device                [Hard Drive]          * parenthesis has been   *
* 4th Boot Device                [IBA GE Slot 0708 v]  * disabled in the        *
* 5th Boot Device                [IBA GE Slot 0709 v]  * corresponding type     *
* 6th Boot Device                [IBA GE Slot 0808 v]  * menu.                  *
* 7th Boot Device                [IBA GE Slot 0809 v]  *                        *
*                                                      *                        *
*                                                      *                        *
*                                                      * **    Select Screen    *
*                                                      * **    Select Item      *
*                                                      * +-    Change Option    *
*                                                      * F1    General Help     *
*                                                      * F10   Save and Exit    *
*                                                      * ESC   Exit             *
*                                                      *                        *
*                                                      *                        *
********************************************************************************
```

2.12.4.3 BIOS Boot Menu, Disk Drives Screen (X4500)

```
                                Boot
********************************************************************************
* Hard Disk Drives                                     * Specifies the boot     *
* **************************************************** * sequence from the      *
* 1st Drive                       [SATA 06C0 S00]      * available devices.     *
* 2nd Drive                       [SATA 06C4 S01]      *                        *
*                                                      *                        *
*                                                      *                        *
*                                                      *                        *
*                                                      *                        *
*                                                      *                        *
*                                                      *                        *
*                                                      *                        *
*                                                      *                        *
*                                                      * **    Select Screen    *
*                                                      * **    Select Item      *
*                                                      * +-    Change Option    *
*                                                      * F1    General Help     *
*                                                      * F10   Save and Exit    *
*                                                      * ESC   Exit             *
*                                                      *                        *
********************************************************************************
```

2.12.4.4 BIOS Boot Menu, Removable Drives Screen (X4500)



2.12.4.5 BIOS Boot Menu, CD/DVD Drives Screen (X4500)

```
Boot
*********************************************************************************
* ATAPI CDROM Drives                                  * Specifies the boot      *
* ********************************************** * sequence from the       *
* 1st Drive                      [IOMEGA CDRW64892EX] * available devices.      *
*                                                     *                         *
*                                                     *                         *
*                                                     *                         *
*                                                     *                         *
*                                                     *                         *
*                                                     *                         *
*                                                     *                         *
*                                                     *                         *
*                                                     *                         *
*                                                     * **    Select Screen     *
*                                                     * **    Select Item       *
*                                                     * +-    Change Option     *
*                                                     * F1    General Help      *
*                                                     * F10   Save and Exit     *
*                                                     * ESC   Exit              *
*                                                     *                         *
*                                                     *                         *
*********************************************************************************
```

2.12.5 BIOS Security Settings Menu (X4500)

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

2.12.6 BIOS Chipset Menu, Main Screen (X4500)

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

2.12.6.1 BIOS Chipset Menu, NorthBridge Configuration Screen (X4500)

```
Chipset
*******************************************************************************
* NorthBridge Chipset Configuration                     *                        *
*****************************************************                         *
* * Memory Configuration                                *                        *
* * ECC Configuration                                   *                        *
* * IOMMU Option Menu                                   *                        *
* 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):13 CLK                      * F1    General Help     *
*   Read Write Delay(Trwt) :3 CLK                       * F10   Save and Exit    *
*   Read Preamble          :7.0 ns                      * ESC   Exit             *
*   Asynchronous Latency   :8 ns                        *                        *
*                                                       *                        *
*******************************************************************************
```

2.12.6.2 BIOS Chipset Menu, NorthBridge Memory Configuration Screen (X4500)

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

2.12.6.3 BIOS Chipset Menu, NorthBridge ECC Configuration Screen (X4500)

```
                                                    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                [327.7us]              *                        *
* L2 Cache BG Scrub              [ 10.2us]              *                        *
* Data Cache BG Scrub            [ 5.12us]              *                        *
*                                                       *                        *
*                                                       *                        *
*                                                       *                        *
*                                                       * **    Select Screen    *
*                                                       * **    Select Item      *
*                                                       * +-    Change Option    *
*                                                       * F1    General Help     *
*                                                       * F10   Save and Exit    *
*                                                       * ESC   Exit             *
*                                                       *                        *
*                                                       *                        *
********************************************************************************
```

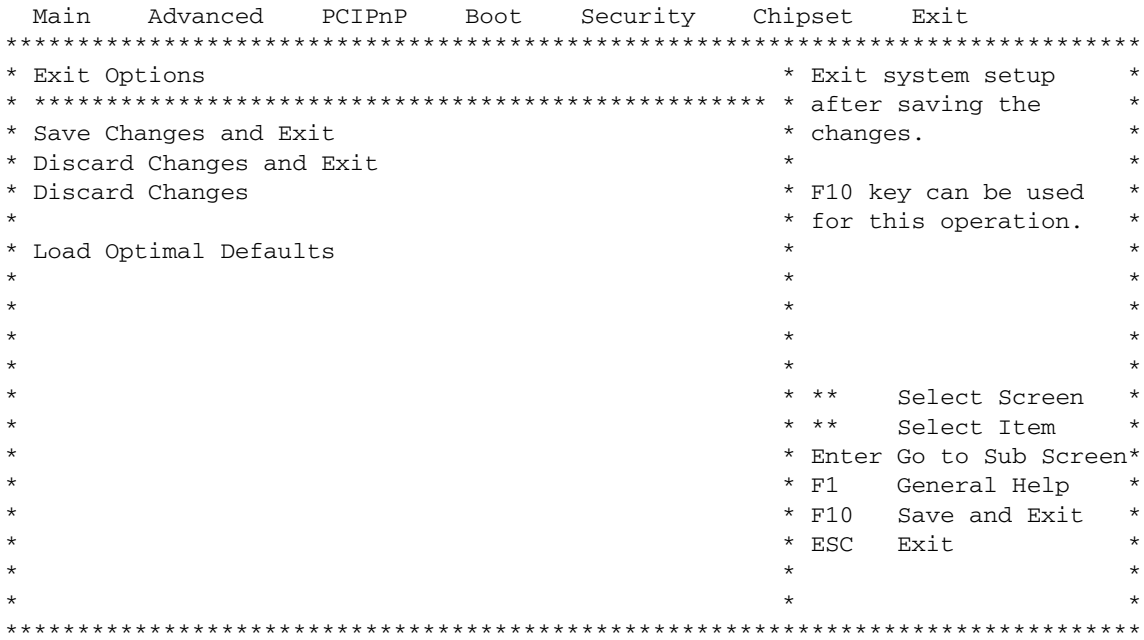
2.12.6.4 BIOS Chipset Menu, NorthBridge IOMMU Configuration Screen (X4500)

```
                                                    Chipset
*******************************************************************************
* IOMMU MODE          [AGP Present]                  * Set GART size in,      *
*                                                    * systems without AGP,   *
*                                                    * or disable altogether. *
*                                                    * Some OSes require      *
*                                                    * valid GART for proper  *
*                                                    * operation.  If AGP is  *
*                                                    * present, select        *
*                                                    * appropriate option to  *
*                                                    * ensure proper AGP      *
*                                                    * operation.             *
*                                                    *                        *
*                                                    *                        *
*                                                    * **    Select Screen    *
*                                                    * **    Select Item      *
*                                                    * +-    Change Option    *
*                                                    * F1    General Help     *
*                                                    * F10   Save and Exit    *
*                                                    * ESC   Exit             *
*                                                    *                        *
*                                                    *                        *
*******************************************************************************
```

2.12.6.5 BIOS Chipset Menu, SouthBridge Configuration Screen (X4500)

```
                                                   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       [Last State]           *                       *
* 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            *
*                                                       *                       *
*                                                       *                       *
********************************************************************************
```

2.12.7 BIOS Exit Options Menu Screen (X4500)



2.13 BIOS Setup Screens (X4540)

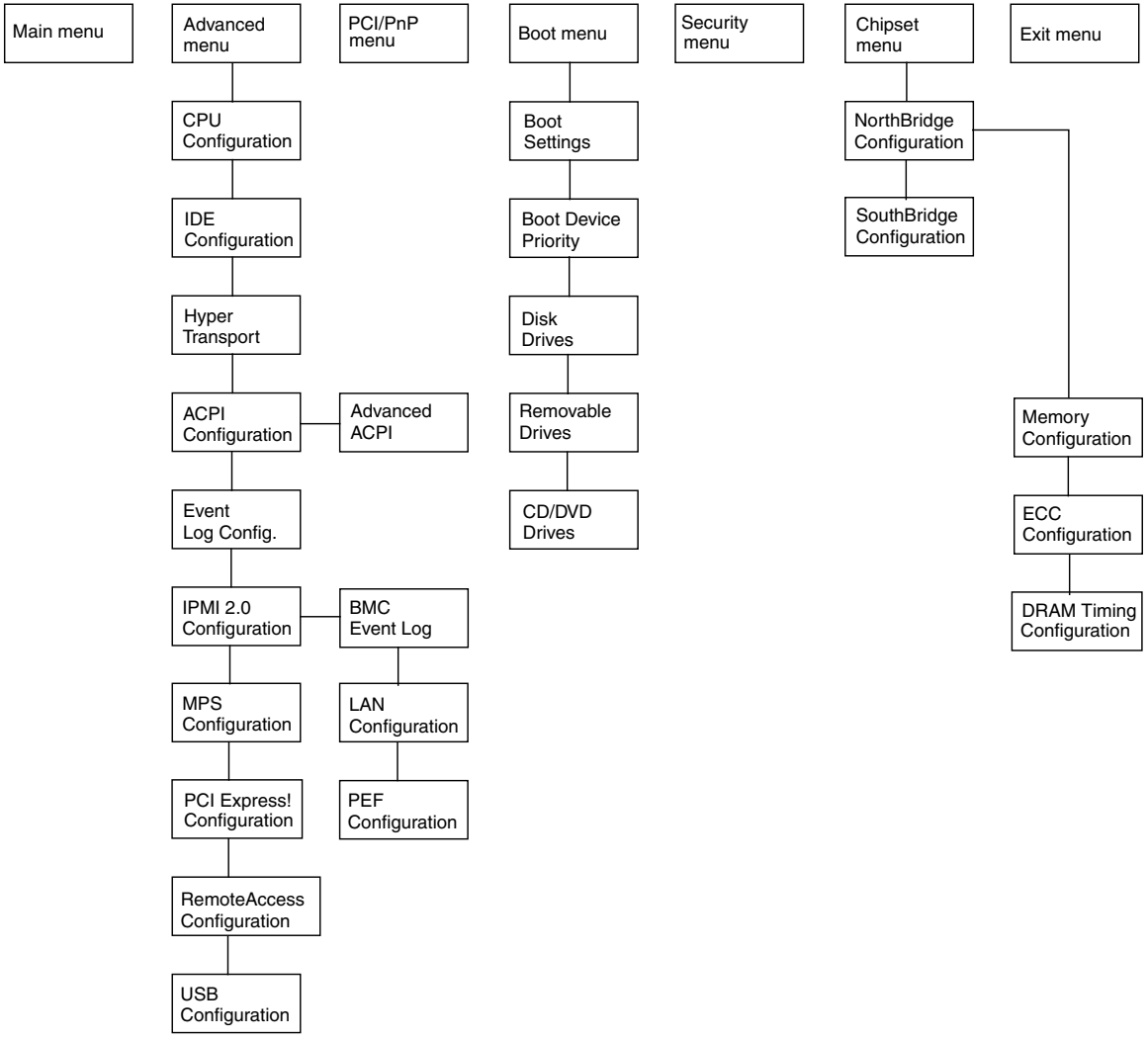
TABLE 2-3 contains summary descriptions of the seven top-level BIOS setup screens for the Sun Fire X4540.

TABLE 2-3 BIOS Setup Screens Summary

Screen	Description
BIOS Main Menu Screen (X4540)	General system information.
BIOS Advanced Menu, Advanced Settings (X4540)	Configuration information for the CPUs, IDE, HyperTransport, ACPI, Event Log, IPMI, MPS, PCI Express, Remote Access, Trusted Compuring and USB. Eleven additional screens can be accessed from the Advanced menu.
BIOS PCI/PnP Menu (X4540)	Plug-and-Play (PnP) devices can be configured by the BIOS (default), or by the operating system (if applicable).
BIOS Boot Settings Menu, Main Screen (X4540)	Configure the boot device priority.
BIOS Security Settings Menu (X4540)	Install or change the user and supervisor passwords.
BIOS Advanced Chipset Settings, Main Screen (X4540)	Configuration options for the NorthBridge, and SouthBridge devices. Five separate screens can be accessed from the Chipset menu. Note that the Memory Chipkill option is enabled by default. Enabling Chipkill improves system reliability but degrades system performance under specific applications.
BIOS Exit Options Menu Screen (X4540)	Save or discard changes.

FIGURE 2-4 summarizes the BIOS menu tree. See Section 2.16, “BIOS Setup Menu Screens (X4540)” on page 2-50 for examples of each of these screens.

FIGURE 2-4 BIOS Utility Menu Tree for Sun Fire X4540



2.14 Device Boot Detection Priority (X4540)

TABLE 2-4 shows the devices of the X4540 server in order of boot detection.

TABLE 2-4 Device Boot Detection Priority

Order	Device Order
1	VGA
2	Compact Flash
3	USB 2.0 (back ports)
4	USB 2.0 (front ports)
5	LSI 0
6	LSI 1
7	NIC 0
8	NIC 1
9	NIC 2
10	NIC 3
11	PCIe slot 0
12	PCIe slot 1
13	PCIe slot 2

2.15 Drives Mapping (X4540)

There are six on-board LSI controllers with each controller connecting to eight drives.

TABLE 2-5 LSI Drives Numeric Mapping

LSI Controller Number	IIdentification
LSI controller 0	Resides in bus 02h, device 0, function 0 connects to eight drives, ID00 to ID07
LSI controller 1	Resides in bus 03h, device 0, function 0 connects to eight drives, ID00 to ID07
LSI controller 2	Resides in bus 04h, device 0, function 0 connects to eight drives, ID00 to ID07
LSI controller 3	Resides in bus 41h, device 0, function 0 connects to eight drives, ID00 to ID07
LSI controller 4	Resides in bus 42h, device 0, function 0 connects to eight drives, ID00 to ID07
LSI Controller 5	Resides in bus 43h, device 0, function 0 connects to eight drives, ID00 to ID07

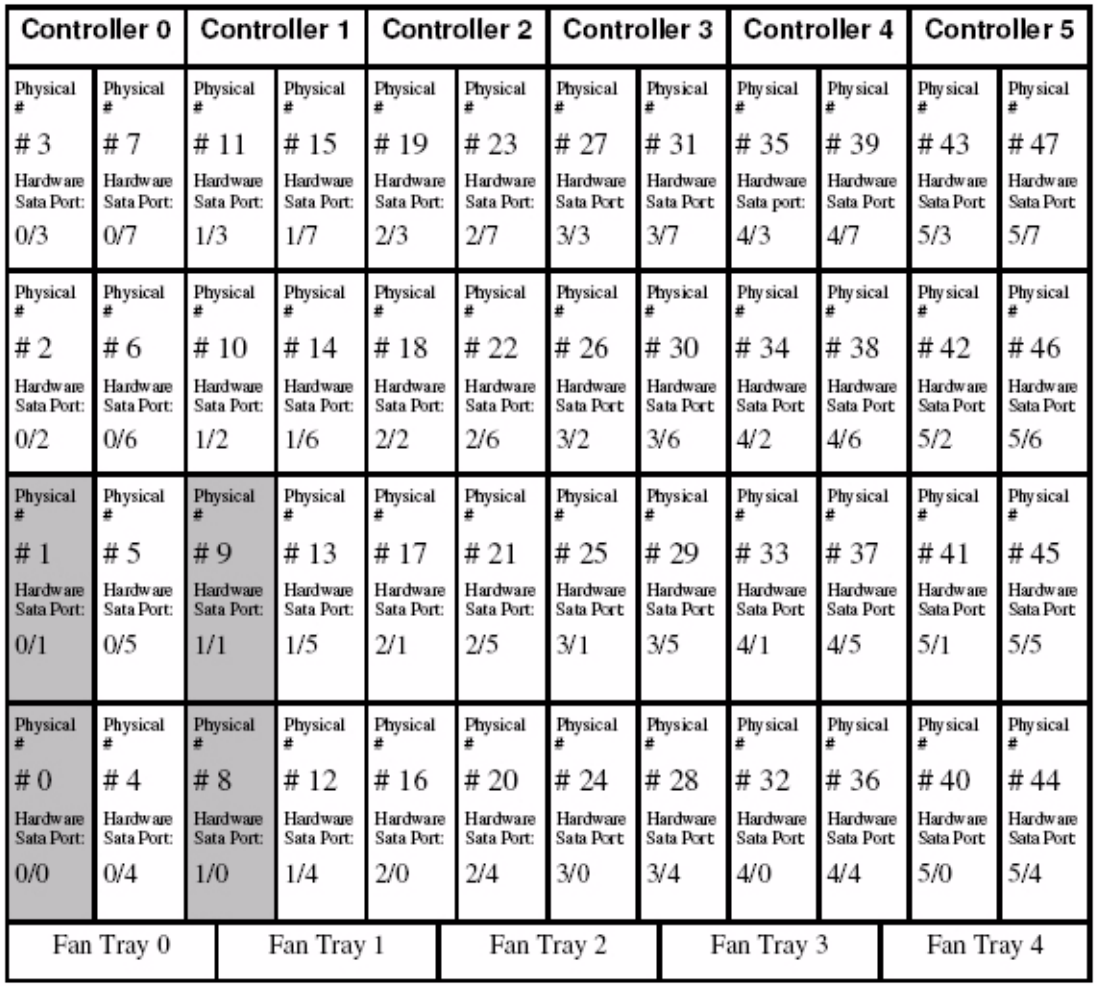
BIOS shows the drives in F2 Setup as follows (this information is obtained from the LSI BIOS option ROM):

```
SCSI: #0200 ID00

SCSI: #0300 ID01

....

....
```

This means the SCSI controller is on bus 02h, device 0, function 0, drive ID 0, or the SCSI controller is on bus 03h, device 0, function 0, drive ID 1.

The following graphic shows the drives mapping scheme of the system. The boot disks are 0, 1, 8, and 9. (Default boot drive is in slot 0 and the default mirrored drive is in slot 8.) It is required to use one of these disks from which to boot the system.

FIGURE 2-5 Sun Fire X4540 Drives Map



2.16 BIOS Setup Menu Screens (X4540)

The following figures show sample BIOS setup menu screens.

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

2.16.1 BIOS Main Menu Screen (X4540)

```
Main    Advanced    PCIPnP    Boot    Security    Chipset    Exit
*************************************************************************
* BIOS Build Version : 0ABNF010 ** or [SHIFT-TAB] to                    *
* Build Date   : 04/04/08                    ** select a field.         *
* Core Version : 08.00.14                    **                         *
*                                            ** Use [+] or [-] to       *
* Product Name          : Sun Fire X4540     ** configure system Date.  *
* Board Serial Number   : Not Available      **                         *
* BMC Firmware Revision : 2.0.2.3            ** Date Format:            *
* CPLD Revision : 2.0                        ** MM/DD/YYYY              *
*                                            **                         *
* Processor                                  **                         *
* Quad-Core AMD Opteron(tm) Processor 2356   **                         *
* Speed :2300MHz                             ** *    Select Screen     *
* Count :8                                   ** **    Select Item      *
*                                            ** +-    Change Field     *
* System Memory                              ** Tab   Select Field     *
* Size      :64.0 GB                         ** F1    General Help     *
*                                            ** F10   Save and Exit    *
* System Time                 [11:55:58]     ** ESC   Exit             *
* System Date                 [Wed 05/05/2008]                          *
*************************************************************************
```

2.16.2 BIOS Advanced Menu, Advanced Settings (X4540)

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

2.16.2.1 BIOS Advanced Menu, CPU Configuration (X4540)

```
                                  Advanced
*********************************************************************************
* CPU Configuration                                  * This option should     *
* Module Version: 13.26                              * remain disabled for    *
* AGESA Version: 3.1.8.0                             * the normal operation.  *
* Physical Count: 2                                  * The driver developer   *
* Logical Count : 8                                  * may enable it for      *
* ************************************************ * testing purpose.       *
* Quad-Core AMD Opteron(tm) Processor 2356           *                        *
* Revision: B3                                       *                        *
* Cache L1: 512KB                                    *                        *
* Cache L2: 2048KB                                   *                        *
* Cache L3: 2MB                                      *                        *
* Speed   : 2300MHz,    NB Clk: 2000MHz              *                        *
* Able to Change Freq.  : Yes                        * *    Select Screen     *
* uCode Patch Level     : 0x1000065                  * **    Select Item      *
* GART Error Reporting           [Disabled]          * +-    Change Option    *
* Microcode Update               [Enabled]           * F1    General Help     *
* Secure Virtual Machine Mode    [Enabled]           * F10   Save and Exit    *
* PowerNow                       [Disabled]          * ESC   Exit             *
* ACPI SRAT Table                [Enabled]           *                        *
*********************************************************************************
```

2.16.2.2 BIOS Advanced Menu, IDE Configuration (X4540)

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

2.16.2.3 BIOS Advanced Menu, Hyper Transport Configuration (X4540)

```
*********************************************************************************
* Hyper Transport Configuration                        * The HyperTransport     *
* ************************************************** * link will run at this  *
*                                                      * speed if it is slower  *
* HT Link Speed Configuration                          * than or equal to the   *
* NODE0:NODE1 HT Link Speed      [Auto]                * system clock and the   *
*                                                      * board is capable.      *
* NODE0:MCP55 HT Link Speed      [Auto]                *                          *
* NODE1:IO55A HT Link Speed      [Auto]                *                          *
* NODE1:IO55B HT Link Speed      [Auto]                *                          *
*                                                      *                          *
* HT Link Width Configuration                          *                          *
* NODE0:NODE1 HT Link Width      [Auto]                *                          *
*                                                      * *    Select Screen     *
* NODE0:MCP55 HT Link Width      [Auto]                * **    Select Item      *
* NODE1:IO55A HT Link Width      [Auto]                * +-    Change Option     *
* NODE1:IO55B HT Link Width      [Auto]                * F1    General Help      *
*                                                      * F10   Save and Exit     *
*                                                      * ESC   Exit              *
*********************************************************************************
```

2.16.2.4 BIOS Advanced Menu, ACPI Settings (X4540)

```
*********************************************************************************
* ACPI Settings                                    * Advanced ACPI          *
* ************************************************ * Configuration settings *
* * Advanced ACPI Configuration                    *                        *
* * Chipset ACPI Configuration                     * Use this section to    *
* * General WHEA Configuration                     * configure additional   *
*                                                  * ACPI options.          *
*                                                  *                        *
*                                                  *                        *
*                                                  *                        *
*                                                  *                        *
*                                                  *                        *
*                                                  *                        *
*                                                  * *    Select Screen     *
*                                                  * **    Select Item      *
*                                                  * Enter Go to Sub Screen *
*                                                  * F1    General Help      *
*                                                  * F10   Save and Exit     *
*                                                  * ESC   Exit              *
*                                                  *                        *
*                                                  *                        *
*********************************************************************************
```

2.16.2.5 BIOS Advanced Settings, Advanced ACPI Settings (X4540)

```
*********************************************************************************
* Advanced ACPI Configuration                      * Enable RSDP pointers   *
* ************************************************ * to 64-bit Fixed System *
* ACPI Version Features          [ACPI v1.0]       * Description Tables. Di *
* ACPI APIC support              [Enabled]         * ACPI version has some  *
* AMI OEMB table                 [Enabled]         *                        *
* Headless mode                  [Disabled]        *                        *
* EMS support(SPCR)              [Enabled]         *                        *
*                                                  *                        *
*                                                  * *    Select Screen     *
*                                                  * **    Select Item      *
*                                                  * +-    Change Option    *
*                                                  * F1    General Help     *
*                                                  * F10   Save and Exit    *
*                                                  * ESC   Exit             *
*********************************************************************************
```

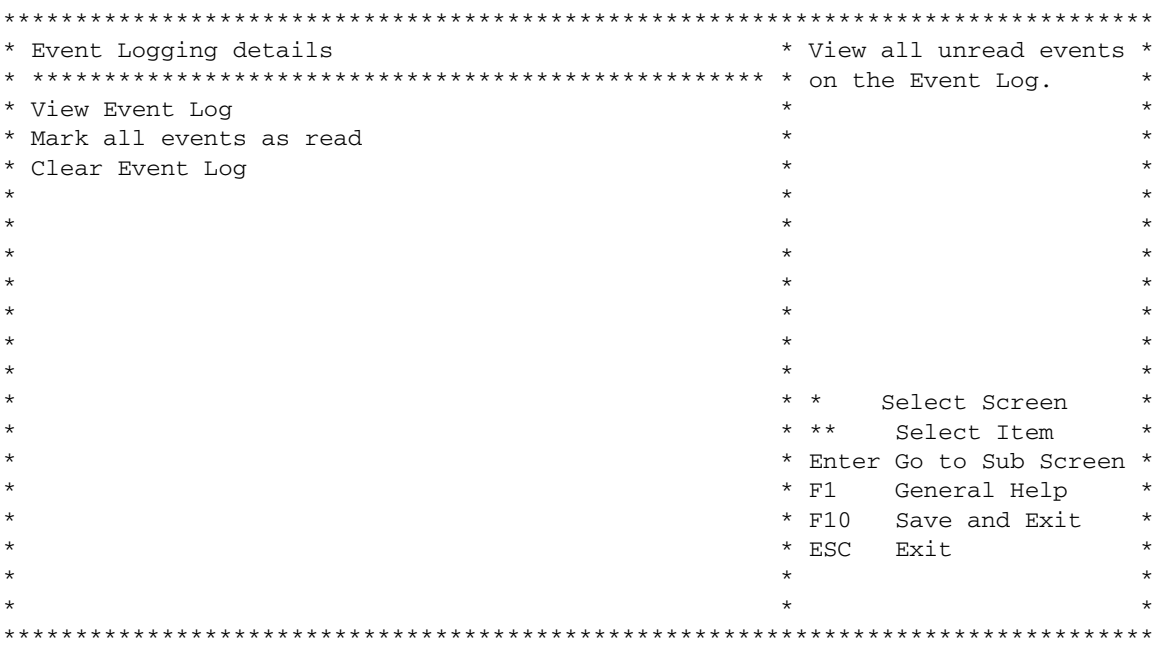
2.16.2.6 BIOS Advanced Menu, Chipset ACPI Configuration (X4540)

```
*******************************************************************************
* Chipset ACPI Configuration                        *        Options         *
* ************************************************ *                        *
* MCP55 ACPI HPET TABLE          [Enabled]          * Disabled                *
*                                                   * Enabled                 *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   * *    Select Screen     *
*                                                   * **    Select Item      *
*                                                   * +-    Change Option    *
*                                                   * F1    General Help     *
*                                                   * F10   Save and Exit    *
*                                                   * ESC   Exit             *
*                                                   *                         *
*                                                   *                         *
*******************************************************************************
```

2.16.2.7 BIOS Advanced Menu, General WHEA Configuration (X4540)

```
*******************************************************************************
* General WHEA Configuration                        * Enable or disable      *
* ************************************************ * Windows Hardware       *
* WHEA Support                   [Enabled]          * Error Architecture.    *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   * *    Select Screen     *
*                                                   * **    Select Item      *
*                                                   * +-    Change Option    *
*                                                   * F1    General Help     *
*                                                   * F10   Save and Exit    *
*                                                   * ESC   Exit             *
*                                                   *                         *
*                                                   *                         *
*******************************************************************************
```

2.16.2.8 BIOS Advanced Menu, Event Logging Details (X4540)



2.16.2.9 BIOS Advanced Menu, IPMI 2.0 Configuration Screen (X4540)

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

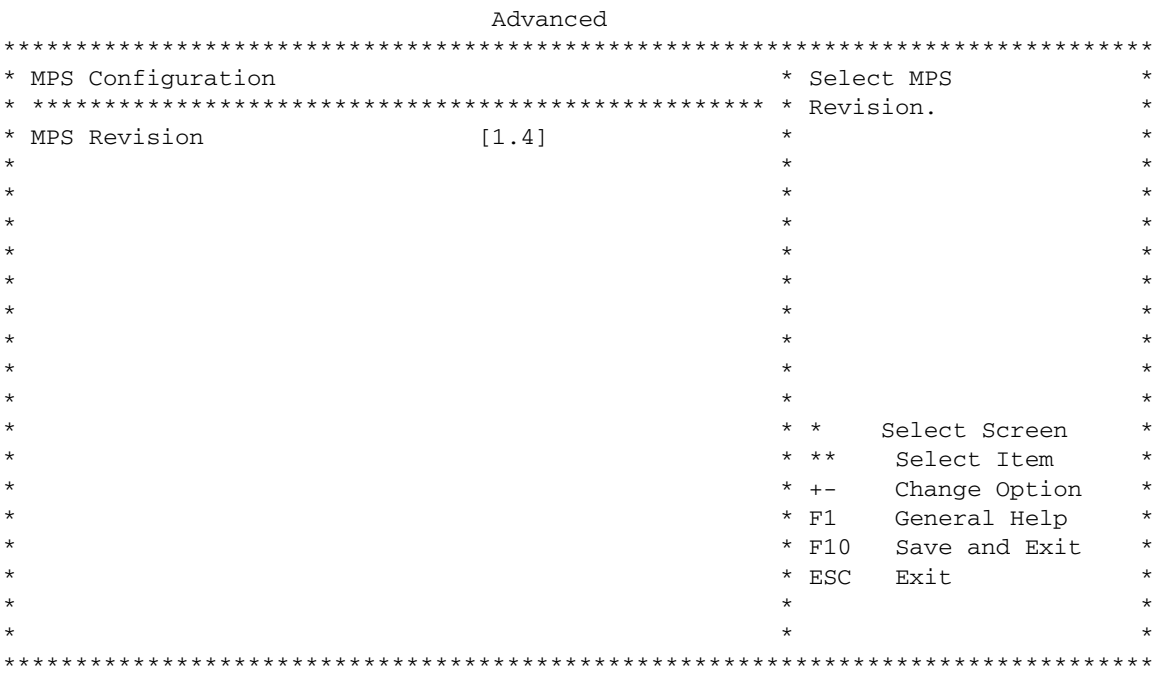
2.16.2.10 BIOS Advanced Menu, LAN Configuration (X4540)

```
*********************************************************************************
* LAN Configuration.                                 * Enter channel number     *
* ************************************************** * for LAN Configuration    *
* Channel Number                [01]                 * Command.                  *
* Channel Number Status:        Channel number is OK *                          *
*                                                    * Proper value below 16.   *
*                                                    *                          *
* IP Assignment                 [DHCP]               *                          *
*                                                    *                          *
* Current IP address in BMC:     010.006.143.102     *                          *
* Current MAC address in BMC:    00.03.BA.D8.7E.CD   *                          *
* Current Subnet Mask in BMC:    255.255.255.000     *                          *
* Current Gateway in BMC:        010.006.143.001     *                          *
*                                                    * *    Select Screen       *
* Refresh                                            * **    Select Item        *
*                                                    * Enter Update             *
* IP Address                    [010.006.143.102]    * F1    General Help       *
* Subnet Mask                   [255.255.255.000]    * F10   Save and Exit      *
* Default Gateway               [010.006.143.001]    * ESC   Exit               *
*                                                    *                          *
* Commit                                                                        *
*********************************************************************************
```

2.16.2.11 BIOS Advanced Menu, IPMI 2.0, LAN Configuration Screen (X4540)

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

2.16.2.12 BIOS Advanced Menu, MPS Configuration (X4540)



2.16.2.13 BIOS Advanced Menu, PCI Express Configuration (X4540)

```
                                 Advanced
********************************************************************************
* PCI Express Configuration                              * Enable/Disable       *
* ****************************************************** * PCI Express L0s and  *
* Active State Power-Management  [Disabled]              * L1 link power        *
*                                                        * states.              *
*                                                        *                      *
*                                                        *                      *
*                                                        *                      *
*                                                        *                      *
*                                                        *                      *
*                                                        *                      *
*                                                        *                      *
*                                                        *                      *
*                                                        * *    Select Screen   *
*                                                        * **    Select Item    *
*                                                        * +-    Change Option  *
*                                                        * F1    General Help   *
*                                                        * F10   Save and Exit  *
*                                                        * ESC   Exit           *
*                                                        *                      *
*                                                        *                      *
********************************************************************************
```

2.16.2.14 BIOS Advanced Menu, Configure Remote Access (X4540)

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

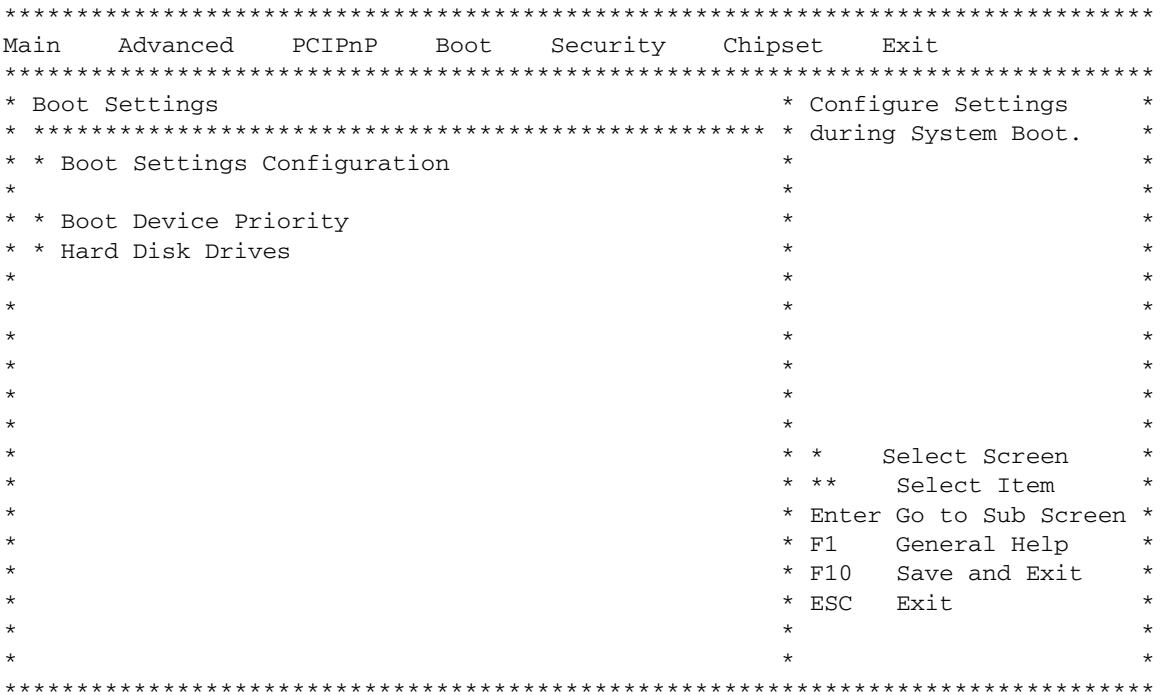
2.16.2.15 BIOS Advanced Menu, USB Configuration (X4540)

```
*********************************************************************************
* USB Configuration                                  * This is a workaround     *
* ********************************************** * for OSes without EHCI    *
* Module Version - 2.24.1-13.4                       * hand-off support.        *
*                                                    * The EHCI ownership       *
* USB Devices Enabled :                              * change should claim by   *
*   2 Keyboards, 2 Mice, 1 Hub                       * EHCI driver.             *
*                                                    *                          *
* 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]              *                          *
*                                                    * *    Select Screen       *
*                                                    * **    Select Item        *
*                                                    * +-    Change Option      *
*                                                    * F1    General Help       *
*                                                    * F10   Save and Exit      *
*                                                    * ESC   Exit               *
*********************************************************************************
```

2.16.3 BIOS PCI/PnP Menu (X4540)

```
Main    Advanced    PCIPnP    Boot    Security    Chipset    Exit
*********************************************************************************
* WARNING: Setting wrong values in below sections     **                         *
*          may cause system to malfunction.           **                         *
*                                                     **                         *
* Clear NVRAM                    [No]                 **                         *
* Plug & Play O/S                [No]                 **                         *
* PCI Latency Timer              [64]                 **                         *
* Allocate IRQ to PCI VGA        [Yes]                **                         *
* Palette Snooping               [Disabled]           **                         *
* PCI IDE BusMaster              [Disabled]           **                         *
* OffBoard PCI/ISA IDE Card      [Auto]               **                         *
*                                                     ** *    Select Screen      *
* Scanning OPROM on onboard SCSI [Enabled]            ** **    Select Item       *
* Scanning OPROM on onboard NICs [Enabled]            ** +-    Change Option     *
* Scanning OPROM on PCI-e Slot 0 [Enabled]            ** F1    General Help      *
* Scanning OPROM on PCI-e Slot 1 [Enabled]            ** F10   Save and Exit     *
* Scanning OPROM on PCI-e Slot 2 [Enabled]            ** ESC   Exit              *
*                                                     **                         *
* MAC Address NIC 0:    00:14:4F:A6:E7:E4             **                         *
* MAC Address NIC 1:    00:14:4F:A6:E7:E5             ** Reserved: Specified     *
* MAC Address NIC 2:    00:14:4F:A6:E7:E6             ** IRQ is reserved for     *
* MAC Address NIC 3:    00:14:4F:A6:E7:E7             ** use by Legacy ISA       *
*                                                     ** devices.                 *
* IRQ3                           [Available]          **                         *
* IRQ5                           [Available]          **                         *
* IRQ7                           [Available]          **                         *
* IRQ9                           [Available]          **                         *
* IRQ10                          [Available]          ** *    Select Screen      *
* IRQ11                          [Available]          ** **    Select Item       *
* IRQ14                          [Available]          ** +-    Change Option     *
* IRQ15                          [Available]          ** F1    General Help      *
*                                                     ** F10   Save and Exit     *
* DMA Channel 0                  [Available]          ** ESC   Exit              *
* DMA Channel 1                  [Available]          **                         *
* DMA Channel 3                  [Available]          **                         *
* DMA Channel 5                  [Available]          ** F1    General Help      *
* DMA Channel 6                  [Available]          ** F10   Save and Exit     *
* DMA Channel 7                  [Available]          ** ESC   Exit              *
*                                                     **                         *
*********************************************************************************
```

2.16.4 BIOS Boot Settings Menu, Main Screen (X4540)



2.16.4.1 BIOS Boot Menu, Boot Settings Configuration Screen (X4540)

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

2.16.4.2 BIOS Boot Menu, Boot Device Priority Screen (X4540)

```
                                Boot
********************************************************************************
* Boot Device Priority                                 * Specifies the boot     *
* **************************************************** * sequence from the      *
* 1st Boot Device                 [SCSI:#0200 ID00 LU] * available devices.     *
* 2nd Boot Device                 [NVIDIA Boot Agent ] *                        *
* 3rd Boot Device                 [2-NVIDIA Boot Agen] * A device enclosed in   *
* 4th Boot Device                 [3-NVIDIA Boot Agen] * parenthesis has been   *
* 5th Boot Device                 [4-NVIDIA Boot Agen] * disabled in the        *
*                                                      * corresponding type     *
*                                                      * menu.                  *
*                                                      *                        *
*                                                      *                        *
*                                                      *                        *
*                                                      * *    Select Screen     *
*                                                      * **    Select Item      *
*                                                      * +-    Change Option    *
*                                                      * F1    General Help     *
*                                                      * F10   Save and Exit    *
*                                                      * ESC   Exit             *
*                                                      *                        *
*                                                      *                        *
********************************************************************************
```

2.16.4.3 BIOS Boot Menu, Disk Drives Screen (X4540)

```
                                Boot
********************************************************************************
* Hard Disk Drives                                     * Specifies the boot     *
* **************************************************** * sequence from the      *
* 1st Drive                       [SCSI:#0200 ID00 LU] * available devices.     *
*                                                      *                        *
*                                                      *                        *
*                                                      *                        *
*                                                      *                        *
*                                                      *                        *
*                                                      *                        *
*                                                      *                        *
*                                                      *                        *
*                                                      * *    Select Screen     *
*                                                      * **    Select Item      *
*                                                      * +-    Change Option    *
*                                                      * F1    General Help     *
*                                                      * F10   Save and Exit    *
*                                                      * ESC   Exit             *
********************************************************************************
```

2.16.5 BIOS Security Settings Menu (X4540)

```
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                              *                         *
*                                                   *                         *
* Boot Sector Virus Protection   [Disabled]         *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   *                         *
*                                                   * *    Select Screen     *
*                                                   * **    Select Item      *
*                                                   * Enter Change           *
*                                                   * F1    General Help     *
*                                                   * F10   Save and Exit    *
*                                                   * ESC   Exit             *
*                                                   *                         *
*                                                   *                         *
*********************************************************************************
```

2.16.6 BIOS Advanced Chipset Settings, Main Screen (X4540)

```
Main    Advanced    PCIPnP    Boot    Security    Chipset    Exit
*************************************************************************************
* Advanced Chipset Settings                          * Options for NB          *
* ************************************************ *                           *
* WARNING: Setting wrong values in below sections    *                           *
*          may cause system to malfunction.          *                           *
*                                                    *                           *
* * NorthBridge Configuration                        *                           *
* * SouthBridge Chipset Configuration                *                           *
*                                                    *                           *
* NVMM ROM Version : 4.081.40                        *                           *
*                                                    *                           *
*                                                    *                           *
*                                                    *                           *
*                                                    * *    Select Screen      *
*                                                    * **    Select Item       *
*                                                    * Enter Go to Sub Screen  *
*                                                    * F1    General Help      *
*                                                    * F10   Save and Exit     *
*                                                    * ESC   Exit              *
*                                                    *                           *
*                                                    *                           *
*************************************************************************************
```

2.16.6.1 BIOS Advanced Chipset Settings, NorthBridge Chipset Configuration (X4540)

```
*************************************************************************************
* NorthBridge Chipset Configuration                    *                            *
* ************************************************** *                            *
* * Memory Configuration                               *                            *
* * ECC Configuration                                  *                            *
* * DRAM Timing Configuration                          *                            *
* ************************************************** *                            *
* Alternate VID                  [Auto]                *                            *
* Memory Timing Parameters       [CPU Node 0]          *                            *
* ************************************************** *                            *
*   Memory CLK             :333 MHz, 333 MHz          *                            *
*   CAS Latency(Tcl)       :5.0, 5.0                  *                            *
*   RAS/CAS Delay(Trcd)    :5 CLK, 5 CLK              *                            *
*   Row Precharge Time(Trp):5 CLK, 5 CLK              * *    Select Screen         *
*   Min Active RAS(Tras)   :15 CLK, 15 CLK            * **    Select Item          *
*   RAS/RAS Delay(Trrd)    :3 CLK, 3 CLK              * Enter Go to Sub Screen    *
*   Row Cycle (Trc)        :21 CLK, 21 CLK            * F1    General Help        *
*                                                     * F10   Save and Exit       *
*                                                     * ESC   Exit                *
*************************************************************************************
```

2.16.6.2 BIOS Chipset Menu, NorthBridge Memory Configuration Setting (X4540)

```
                                     Chipset
********************************************************************************
* Memory Configuration                                  * Enable Bank Memory     *
* ***************************************************** * Interleaving           *
* Bank Interleaving                [Auto]               *                        *
* Channel Interleaving             [XOR of Address bit] * Enable non-contiguous  *
* Enable Clock to All DIMMs        [Disabled]           * address assignment to  *
* MemClk Tristate C3/ATLVID        [Disabled]           * each chip select bank  *
* Memory Hole Remapping            [Enabled]            * to enhance cycle       *
* CS Sparing Enable                [Disabled]           * turnaround time        *
* DCT Unganged Mode                [Auto]               *                        *
* Power Down Enable                [Enabled]            *                        *
*   Power Down Mode                [Channel]            *                        *
*                                                       * *    Select Screen     *
*                                                       * **    Select Item      *
*                                                       * +-    Change Option    *
*                                                       * F1    General Help     *
*                                                       * F10   Save and Exit    *
*                                                       * ESC   Exit             *
*                                                       *                        *
********************************************************************************
```

2.16.6.3 BIOS Chipset Menu, ECC Configuration (X4540)

```
                                  Chipset
********************************************************************************
* ECC Configuration                                     * Set the level of ECC   *
* ***************************************************** * protection. Note: The  *
* ECC Mode                          [Good ]             * 'Super' ECC mode       *
*   DRAM ECC Enable                 [Enabled]           * dynamically sets the   *
*   DRAM SCRUB REDIRECT             [Enabled]           * DRAM scrub rate so     *
*   4-Bit ECC Mode                  [Enabled]           * all of memory is       *
*   DRAM BG Scrub                   [ 1.31ms]           * scrubbed in 8 hours.   *
*   Data Cache BG Scrub             [Disabled]          *                        *
*   L2 Cache BG Scrub               [Disabled]          *                        *
*                                                       *                        *
*                                                       *                        *
*                                                       *                        *
*                                                       * *    Select Screen     *
*                                                       * **    Select Item      *
*                                                       * +-    Change Option    *
*                                                       * F1    General Help     *
*                                                       * F10   Save and Exit    *
*                                                       * ESC   Exit             *
*                                                       *                        *
*                                                       *                        *
********************************************************************************
```

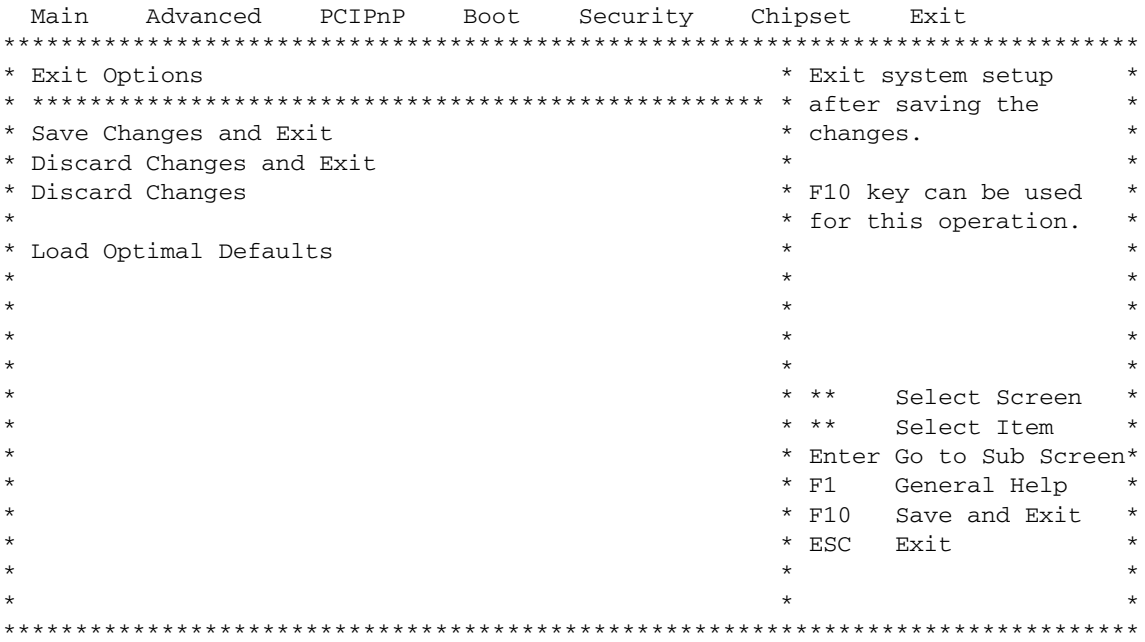
2.16.6.4 BIOS Chipset Menu, DRAM Timing Configuration (X4540)

```
                                  Chipset
*******************************************************************************
* DRAM Timing Configuration                          *        Options         *
* ************************************************* *                        *
* Memory Clock Mode              [Auto]              * Auto                   *
* DRAM Timing Mode               [Auto]              * Limit                  *
*                                                    * Manual                 *
*                                                    *                        *
*                                                    *                        *
*                                                    *                        *
*                                                    *                        *
*                                                    *                        *
*                                                    *                        *
*                                                    *                        *
*                                                    * *    Select Screen     *
*                                                    * **    Select Item      *
*                                                    * +-    Change Option    *
*                                                    * F1    General Help     *
*                                                    * F10   Save and Exit    *
*                                                    * ESC   Exit             *
*                                                    *                        *
*                                                    *                        *
*******************************************************************************
```

2.16.6.5 BIOS Chipset Menu, SouthBridge Configuration Screen (X4540)

```
                                  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        [Last State]        *                         *
* 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             *
*                                                     *                         *
*                                                     *                         *
*******************************************************************************
```

2.16.7 BIOS Exit Options Menu Screen (X4540)



2.17 Resetting the ILOM Root Password

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

Note – Sun Fire X4540 servers running ILOM 3.0 do not support the reset of ILOM root password by jumper. To reset the ILOM 3.0 root password, please refer to section, Service Processor Lost Password Recovery Procedure in *Sun™ Integrated Lights Out Manager 3.0 Supplement for Sun Fire X4540 Server* (819-4359). This procedure simultaneously removes any BIOS password that was set.

---

1. **Shut down the server to standby power mode by using a ballpoint pen or other nonconducting 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.

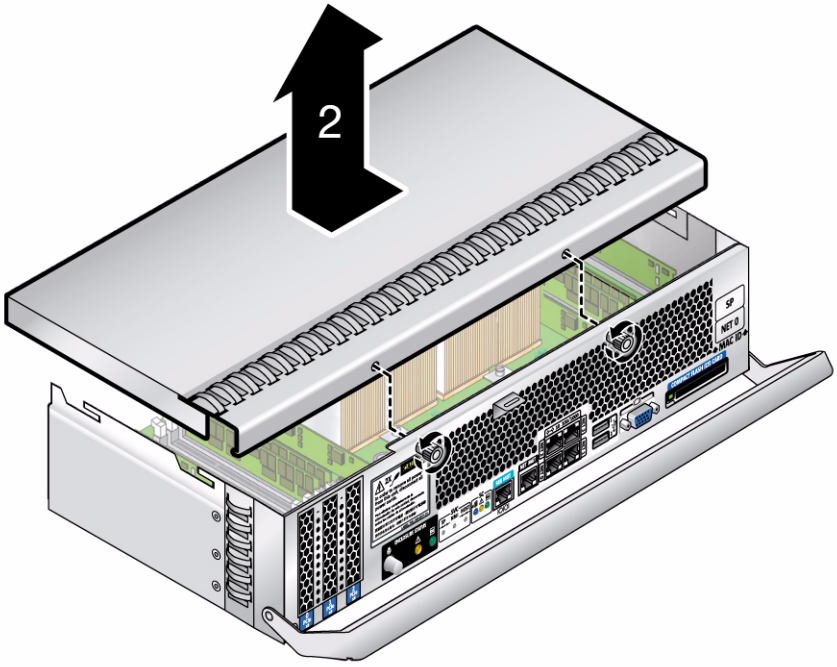
2. **Disconnect the AC power cords from the server.**

Caution – Before handling components, attach an antistatic wrist strap to bare metal on the chassis. The system's printed circuit boards and drives contain components that are extremely sensitive to static electricity.

---

3. **Remove the cable management assembly if necessary:**
   - *Sun Cable Management Assembly Installation Guide for the Sun Fire X4540 Server*
   - *Sun X4500-J Slide Rail Installation Guide* (X4500)
   - "Early-Production Slide Rail and CMA Information" on page G-1 (X4500)
4. **Remove the system controller as described in** "To Remove the System Controller (CRU)" on page 3-70**.**

FIGURE 2-6 Loosening Captive Screws and Removing the Cover



5. **Push the system controller cover toward the rear and lift the cover off.**

6. **See the CPU board and the I/O controller board.**

   The jumper is located on the I/O controller board, as shown in FIGURE 2-7 (X4500) or in FIGURE 2-8 (X4540).

FIGURE 2-7 Location of Jumpers on the I/O Controller (X4500)

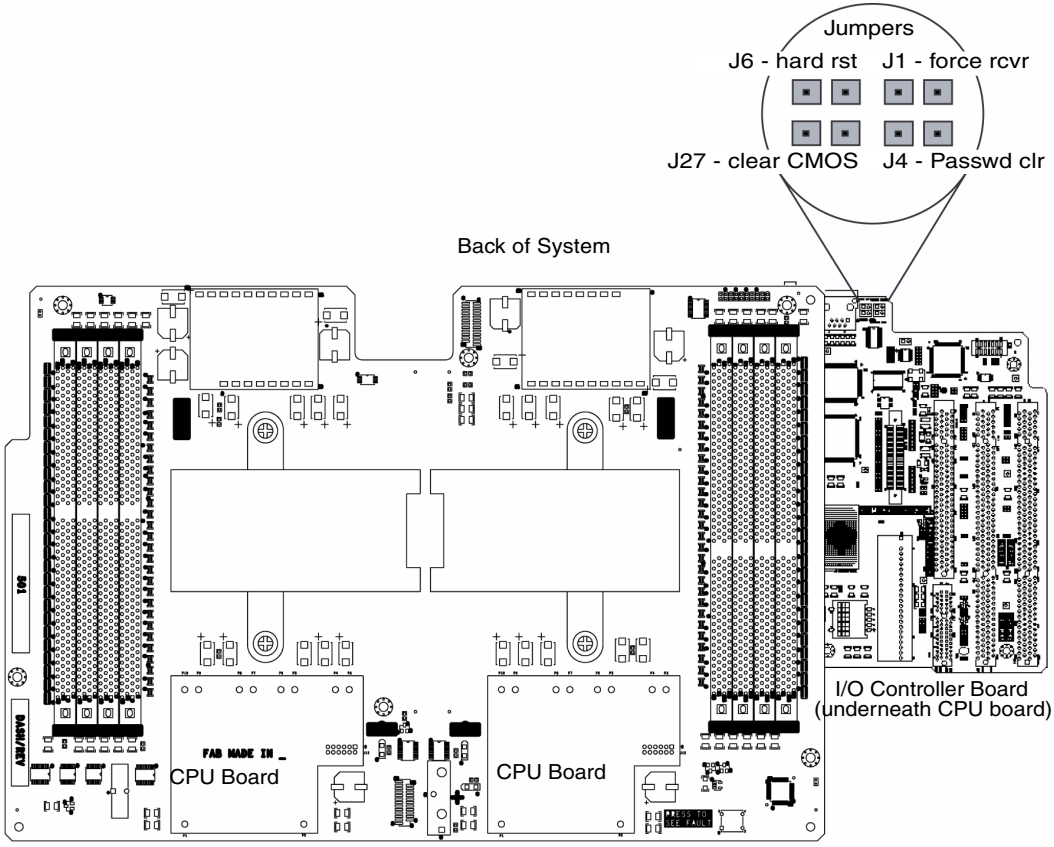
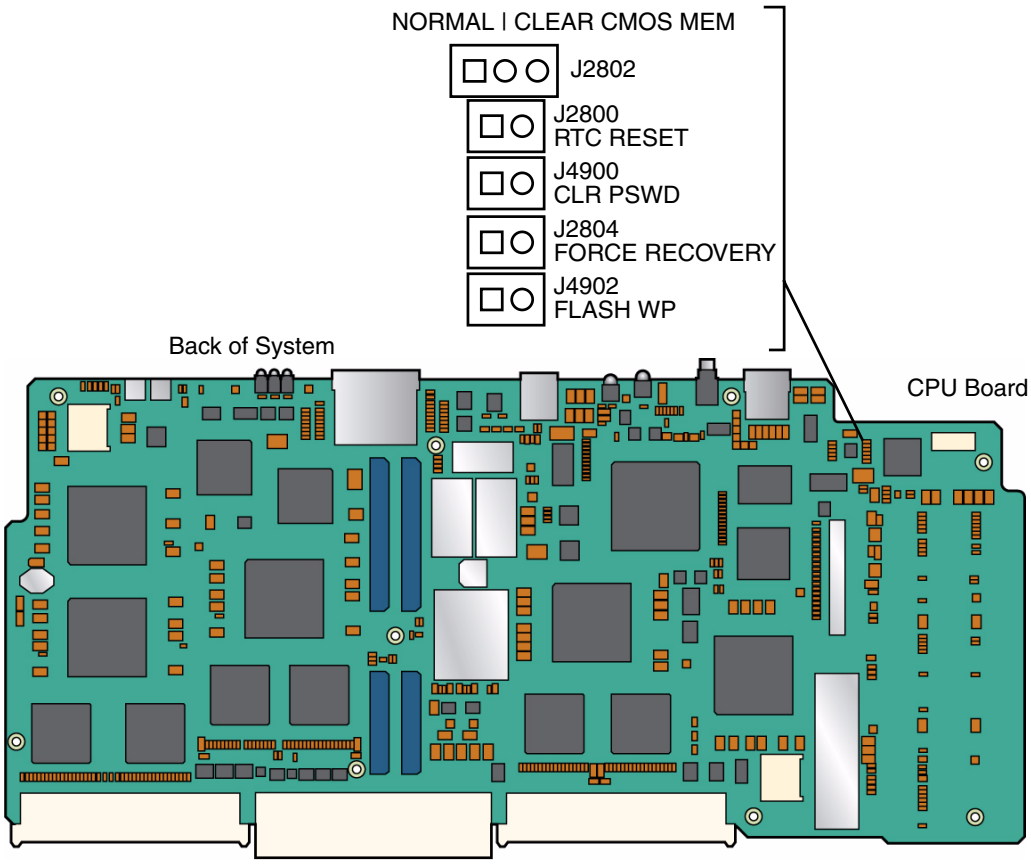


FIGURE 2-8 Location of Jumpers on the I/O Controller (X4540)



Note – The *hard rst* jumper changes the reset button from a soft reset to a hard reset. It is used for hardware debugging only.

---

7. Install the jumper across the header pins:

- On the X4500, install the jumper across the header pins labeled *passwd clr*.
- On the X4540, install the jumper across the header pins labeled *CLR PSWD* on the J4900 jumper.

The jumper's function is to clear the ILOM SP password.

8. **Replace the cable management arm as described in one of the following:**
   - *Sun Cable Management Assembly Installation Guide for the Sun Fire X4540 Server*
   - *Sun X4500-J Slide Rail Installation Guide* (X4500)
   - "Early-Production Slide Rail and CMA Information" on page G-1 (X4500)
9. **Replace the system controller as described in** "Replacing the System Controller (FRU)" on page 3-68**.**
10. **Reconnect AC power cords to the server.**

    The server enters standby power mode, indicated when the Power/OK LED on the front panel is flashing.
11. **Return the server to main power mode by using a ballpoint pen or other nonconducting stylus to press and release the recessed Power button on the front panel.**

Note – The password reset is not complete until the entire server reboots, not just the SP. This is because the state of the P20 jumper cannot be determined until the host CPU is running. Wait until the end of POST, when you see the `CMOS password cleared by jumper` message, after which both the BIOS and SP passwords are reset.

   - The ILOM SP password is reset to the default, `changeme`.
   - The BIOS password is also reset by a separate operation performed by the BIOS when it discovers the presence of the P20 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.
12. **Log in to the ILOM web GUI using `root` as the user name and `changeme` as the password.**

    For login instructions, refer to the *Integrated Lights Out Manager Administration Guide*.
13. **Change the default password to a password of your choice.**
14. **Repeat** Step 1 **through** Step 9 **to remove the jumper. (Remove the jumper in** Step n **instead of inserting it.)**

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

Note – The *hard rst* jumper changes the reset button from a soft reset to a hard reset. It is used for hardware debugging only.

2.18 Using the Clear CMOS Jumper

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

Note – Clearing CMOS settings resets the BIOS settings, including the BIOS password.

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

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

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

Caution – Before handling components, attach an antistatic wrist strap to bare metal on the chassis. The system's printed circuit boards and drives contain components that are extremely sensitive to static electricity.

3. **Remove the cable management assembly if necessary:**
   - *Sun Cable Management Assembly Installation Guide for the Sun Fire X4540 Server*
   - *Sun X4500-J Slide Rail Installation Guide* (X4500)
   - "Early-Production Slide Rail and CMA Information" on page G-1 (X4500)
4. **Remove the system controller as described in** "To Remove the System Controller (CRU)" on page 3-70.
5. **Push the system controller cover toward the rear and lift the cover off.**

   See the CPU board and the I/O controller board, as shown in FIGURE 2-7 (X4500) or in FIGURE 2-8 (X4540).
6. **Install the jumper across the header pins labelled Clear CMOS.**

   The jumper's function is to tell the system to clear the current CMOS settings at system reboot.

7. **Wait 10 seconds, then remove the jumper.**

   This jumper removes battery power from the chipset where the CMOS settings are stored, thereby removing the CMOS settings.

8. **Replace the cable management assembly if necessary:**
   - *Sun Cable Management Assembly Installation Guide for the Sun Fire X4540 Server*
   - *Sun X4500-J Slide Rail Installation Guide* (X4500)
   - "Early-Production Slide Rail and CMA Information" on page G-1 (X4500)

9. **Replace the system controller as described in** "Replacing the System Controller (FRU)" on page 3-68.

10. **Reconnect AC 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.

2.19 Resetting the SP

To reset the ILOM SP, do the following:

1. **Power off host.**
2. **Press the SP reset button.**
3. **The SP reboots.**

You can also reset the ILOM SP by shutting down the host, then removing and restoring AC power cords to the system.

For more information, see the *Sun Fire X4500/X4540 Server Integrated Lights Out Manager (ILOM) Supplement*.

2.20 Updating BIOS

BIOS is updated whenever you update the ILOM Service Processor firmware. For instructions on updating the firmware, refer to the *Sun Integrated Lights Out Manager 2.0 User's Guide.*

2.21 BIOS ROM Memory

In systems that have multiple PCI cards installed, and with the option ROM in all the cards enabled, the following error messages are displayed:

```
Not enough space to copy PCI option ROM.
Option ROM memory space exhausted.
```

The BIOS Option ROM is 128 KB. Of these 128 KB, approximately 86 KB are used by the VGA controller, the Marvell controller (X4500), the LSI SAS1068E controller (X4540) and the on-board NIC. Approximately 42 KB remain for the other option ROMs. Because of the order that the devices in the system are scanned and detected during system boot, the option ROM space is exhausted before all cards can be scanned. This affects which slots can be used for bootability.

Another side effect of this problem is that you cannot PXE boot using the on-board NICs. When you press F12 to PXE boot with this configuration, the following error message appears when the system tries to reach the PXE server:

```
PXE-ECI: Base code ROM-ID structure was not found.
Exiting Intel Boot Agent.
```

2.22 Devices and PCI Slots

Currently, the devices and PCI slots are detected by the BIOS during startup in the following order:

1. On-board SATA controllers 0 through 3
2. Onboard Intel NIC
3. On-board SATA controllers 4 and 5
4. Slot 0
5. Slot 1

To work around the problem for booting devices without exhausting all the option ROM memory:

- Do not install PCI cards in slots 0 and 1
- Use the BIOS PCI/PnP menu to disable OPROM scanning for PCI-X slots 0 and 1.

2.23 Disabling OPROM Scanning

To disable OPROM scanning:

1. **Enter the BIOS Setup utility by pressing the F2 key while the system is booting up and performing POST.**
2. **On the BIOS Main Menu screen, select the PCIPnP tab to open the PCI/PnP Settings screen.**
3. **Change the lines for Scanning OPROM on PCI-X slots 0 and 1 to Disabled.**
4. **Press and release the right arrow key until the Exit menu screen is displayed.**
5. **Follow the instructions on the Exit menu screen to save your changes and exit the Setup utility.**

To work around the problem with PXE booting, disable OPROM scanning for all PCI slots by using the procedure above. After this, you can PXE install successfully.

CHAPTER 3

Maintaining the Sun Fire X4500 and X4540 Servers

This chapter covers the following topics:

3.1 Tools and Supplies Needed

The Sun Fire X4500/X4540 server can be serviced with the following items:

- No. 2 Phillips screwdriver (10-inch recommended length with magnetic tip)
- Antistatic wrist strap
- Nonconducting stylus or other pointed object (to press the recessed Power button)

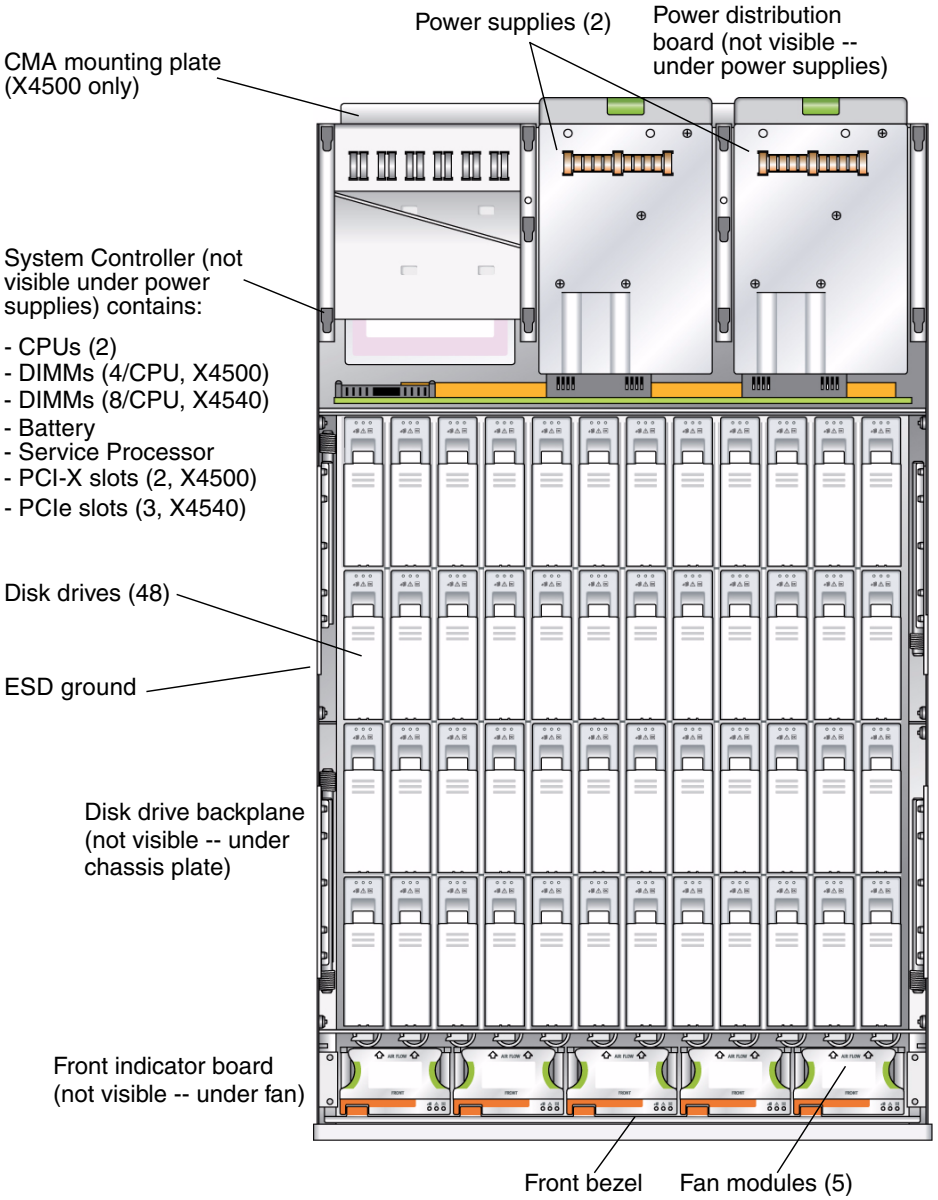
The following component replacements require additional tools:

- Replacing the power distribution board requires No. 1 and No. 2 Phillips screwdrivers.
- Replacing the front indicator board requires a No. 1 Phillips screwdriver (magnetic tip recommended).

3.2 Locations of Components

FIGURE 3-1 shows the locations of the replaceable components that are documented in this chapter.

FIGURE 3-1 Sun Fire X4500/X4540 Replaceable Component Locations



3.3 FRUs/CRUs and BIOS Compatibility (X4540)

This section lists Sun Fire X4540-supported FRUs/CRUs compatibility with the supported BIOS versions and other FRUs/CRUs.

3.3.1 HyperTransport 3.0 Support

The following table lists System Controllers supported by the Sun Fire X4540 server and their compatibility with supported CPUs, BIOS versions and HyperTransport 3.0.

TABLE 3-1

System Controller	System Controller has HT3?	CPU	Minimum BIOS Required	System has HT3?
#541-0491	No	2.3 GHz Opteron 2356 Quad-core CPU, B3 Stepping	BIOS 010 (SW 1.0)	No
#541-3758	Yes	2.3 GHz Opteron 2356 Quad-core CPU, B3 Stepping	BIOS 010 (SW 1.0)	No
#541-3758	Yes	2.7 GHz Opteron 2384 Quad-core CPU, C2 Stepping	BIOS 022 (SW 1.1)	No
#541-3758	Yes	2.6 GHz Opteron 2435 Six-core CPU, D0 Stepping	BIOS 032 (SW 2.0)	Yes

3.3.2 FRU/CRU Compatibility

The following table shows FRUs and CRUs supported by the Sun Fire X4500 and X4540 servers and their compatibility with other FRUs/CRUs.

TABLE 3-2 Sun Fire X4500/X4540 FRU/CRU Compatibility Table

Chassis	System Controller	CPU	PSU	CMA and Rail Kits	Power Distribution Board
#541-1907 (X4500)	#541-0491	#371-4042	#300-1787 (2/system)	#371-3493 (rail kit) #371-2887 (CMA/rail kit, 6/07) #350-1393 (rail kit, 3/09)	#501-7104
#541-1218 (X4540)	#541-0491	#371-4042	#300-1787 (2/system)	#371-3493 (rail kit) #371-2887 (CMA/rail kit, 6/07) #350-1393 (rail kit, 3/09)	#501-7104
#541-3423 (X4540)	#541-0491 #541-3758 (HT3)	#371-4042 (2356 processor) #371-4438 (2384 processor) #371-1468 (2435 processor)	#300-2161 (2 or 3/ system)	#350-1363 (CMA, 3/09) #350-1393 (rail kit, 3/09)	#511-1101

Note – The chassis FRUs are for replacing failed chassis or backplanes, and not for upgrading the chassis.

3.3.3 Three-PSU 110V Option

The third power supply is not supported in x4500 systems and is only supported in X4540 systems originally manufactured with either of the following CPUs:

- Enhanced Quad-Core AMD Opteron Model 2384 (2.7 GHz, 75W ACP) (Shanghai) 2384 CPU (#371-4438)
- 8000/2000 Series Six-core AMD Opteron Processor (Istanbul) 2435 (2.6 GHz, 75W ACP) (#371-1468)

Three PSUs are fully redundant at 110 VAC and provides resiliency against a power supply failure. If one power supply fails, the remaining two power supplies will continue to operate the system. Two PSUs does not provide power redundancy and is not supported.

To order the third PSU, you must first determine that the x4540 system is compatible with a third power supply (see conditions above), then order the following parts:

- X5037 (1300 W Power Supply for Sun Fire X4540 Storage Server)

- X311 or local equivalent (Power Cord Kit, North American/Asian)

Note – The third power supply is not supported in an older X4540 (#541-1218) or the Sun Fire X4500 system.

Note – When a system is configured for 3 PSUs at 100-120V AC and only 2 PSUs are installed, the amber System Fault LED LED illuminates.

For power supply part numbers, see "Replacing a Power Supply (CRU)" on page 3-40.

3.4 System Model Numbers (X4540)

The following 2356 CPUs are supported by the X4540:

TABLE 3-3 Enhanced Quad-Core AMD Opteron Processor, Model 2356

Part Number	Description	Model Numbers
#371-4042	2 Quad-core AMD Opteron 2356 CPUs (2.3 GHz, 75W ACP), 2x2356, 16x2GB DDR2-667, 48x250GB	B24-FSZ2-32F-GMH
	2 Quad-core AMD Opteron 2356 CPUs (2.3 GHz, 75W ACP), 2x2356, 16x2GB DDR2-667, 48x500GB	B24-FSZ2-32F-HMH
	2 Quad-core AMD Opteron 2356 CPUs (2.3 GHz, 75W ACP), 2x2356, 16x2GB DDR2-667, 48x1TB	B24-FSZ2-32F-SMH
	2 Quad-core AMD Opteron 2356 CPUs (2.3 GHz, 75W ACP), 2x2356, 16x4GB DDR2-667, 48x500	B24-FSZ2-64G-HMH
	2 Quad-core AMD Opteron 2356 CPUs (2.3 GHz, 75W ACP), 2x2356, 16x4GB DDR2-667, 48x1TB	B24-FSZ2-64G-SMH
	2 Quad-core AMD Opteron 2356 CPUs (2.3 GHz, 75W ACP), 2x2356, 16x2GB (1Gb), 48x250GB	B24-FSZ2-32F-GMH
	2 Quad-core AMD Opteron 2356 CPUs (2.3 GHz, 75W ACP), 2x2356, 16x2GB (1Gb), 48x500GB	B24-FSZ2-32F-HMH
	2 Quad-core AMD Opteron 2356 CPUs (2.3 GHz, 75W ACP), 2x2356, 16x2GB (1Gb), 48x1TB	B24-FSZ2-32F-SMH

The following 2384 CPUs are supported by the X4540:

TABLE 3-4 Enhanced Quad-Core AMD Opteron Processor, Model 2384

Part Number	Description	Model Numbers
#371-4438	Enhanced Quad-Core 2384 AMD Opteron Processor, (2.7 GHz, 75W ACP), 2x2384, 16x2GB (1Gb), 48x250GB, chassis with 3-PSU option	B24-FZZ2-32G-GMH
	Enhanced Quad-Core 2384 AMD Opteron Processor, (2.7 GHz, 75W ACP), 2x2384, 16x2GB (1Gb), 48x500G, chassis with 3-PSU option	B24-FZZ2-32G-HMH
	Enhanced Quad-Core 2384 AMD Opteron Processor, (2.7 GHz, 75W ACP), 2x2384, 16x2GB (1Gb), 48x1TB, chassis with 3-PSU option	B24-FZZ2-32G-SMH
	Enhanced Quad-Core 2384 AMD Opteron Processor, (2.7 GHz, 75W ACP), 2x2384, 16x4GB (1Gb), 48x500GB, chassis with 3-PSU option	B24-FZZ2-64G-HMH
	Enhanced Quad-Core 2384 AMD Opteron Processor, (2.7 GHz, 75W ACP), 2x2384, 16x4GB (1Gb), 48x1TB, chassis with 3-PSU option	B24-FZZ2-64G-SMH

The following 2384 CPUs are supported by the X4540:

TABLE 3-5 Enhanced Quad-Core AMD Opteron Processor, Model 2435

Part Number	Description	Model Numbers
#371-4681	8000/2000 Series Six-core AMD Opteron CPU 2435 (2.6GHz, 75W ACP), 2x2435, 16x2GB (1Gb), 48x1TB	B24-BZ2-32G-SMH
	8000/2000 Series Six-core AMD Opteron CPU 2435 (2.6GHz, 75W ACP), 2x2435, 16x2GB (1Gb), 48x500GB	B24-BZ2-32G-HMH

3.5 Disk Drive Compatibility

Various types of disk drives are supported on the Sun Fire X4540 server.

Note – Do not mix drives with different drive capacities.

For a list of supported drives, see "To Replace a Hard Drive (CRU)" on page 3-31.

3.6 Servicetool FRU Update Procedure

Note – The SunService account is not supported in ILOM 3.0. If your system has installed ILOM 3.0, you must contact your SunService representative if you want to enable your SunService account. The sunservice account is for the use of SunService representatives only. Do not use the SunService account unless you are instructed to do so in a procedure developed by Sun Microsystems.

1. **Use SSH to log into the sunservice account using the default password,** `changeme`**.**

   ```
   # ssh SP-IP-address -l sunservice
   # SP-IP-address password: changeme
   ```

2. **At the prompt, enter the** `servicetool` **command to indicate that you have changed the board.**

   ```
   # servicetool --board_replaced=name_of_board
   ```

   For example, type:

   ```
   # servicetool --board_replaced=mainboard
   ```

   a. *name_of_board* **is** **`mainboard`** **(that is, the system controller).**

   b. *service_processor* **is the X4500 GRASP board or the X4540 system processor.**

Note – Type `servicetool` at the SP prompt *without* options to see help screens which provide hints about options. The options are defined in the table below.

TABLE 3-6 Servicetool Options

Other Options	Value
`--board_replaced=BOARD`	Update FRU information for BOARD after board has been replaced.
`--fru_product_part_number`	Write a new product part number to the mainboard FRU.

TABLE 3-6 Servicetool Options

Other Options	Value
`--fru_product_serial_number`	Write a new product serial number to the mainboard FRU.
`--fru_chassis_serial_number`	Write a new chassis serial number to the mainboard FRU.
`--fru_asset_tag`	Write a new asset tag to the mainboard FRU.

3. **Reboot the server. 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 to complete

this process.  Allow the service processor to fully boot.s

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.
```

4. **Verify the FRU information is updated:**

   a. **Once the SP has rebooted, log into sunservice.**

   b. **Type the following:**

      `cat /var/log/frutool.log`

   c. **Make sure the last line is:**

      `frutool::info::all FRUs updated successfully`

   d. **Make sure the following is true:**

      i. Product part_number matches the part number on the back of the system.

      ii. Product serial_number matches the serial number on the back of the system.

iii. If the part number or serial number does not match, contact your Sun representative.

e. To verify a FRU update procedure use the following CLI or ipmitool to verify the updates.

```
show /sys or ipmitool
ipmitool -Hlocalhost -Uroot -Pchangeme fru list
```

3.7 Powering Off and Removing the Covers

Use the procedures in this section when you are referred to them from the removal and replacement procedures. This section covers the following topics:

3.7.1 Powering Off the Server

1. **Choose a method for shutting down the server from main power mode to standby power mode. See .**

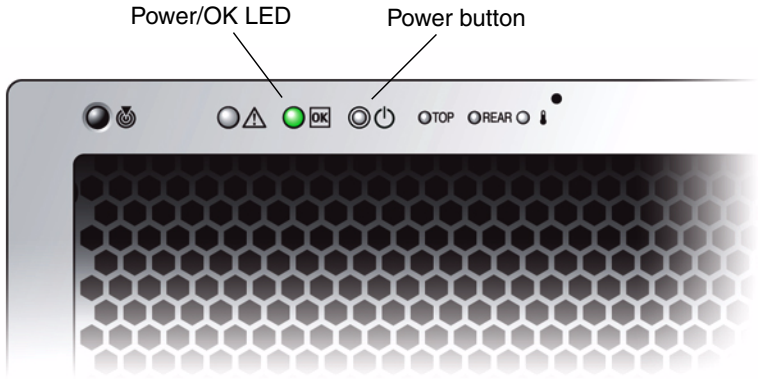
   Graceful shutdown: Use a nonconducting stylus or pointed device to press and release the recessed Power button on the front panel. This causes Advanced Configuration and Power Interface (ACPI) enabled operating systems to perform an orderly shutdown of the operating system. Servers not running ACPI-enabled operating systems will shut down to standby power mode immediately.

   Emergency shutdown: Press and hold the Power button for four seconds to force the main power off and enter standby power mode.

   When the main power is off, the Power/OK LED on the front panel begins flashing, indicating that the server is in standby power mode.

Caution – When you use the Power button to enter standby power mode, power continues to be directed to the Service Processor and power supply fans, as indicated by the flashing Power/OK LED. To power off the server completely, you must disconnect the AC power cords from the back panel of the server.

FIGURE 3-2 Sun Fire X4540 Server Front Panel



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 and telecommunication lines that must be disconnected in order to remove and replace a specific component.**

Caution – Before handling components, attach an antistatic wrist strap to bare metal on the chassis. The system's printed circuit boards and disk drives contain components that are extremely sensitive to static electricity.

3.7.2 Removing the Server From the Rack

This procedure assumes you have turned off the server, removed the cable management arm, and removed any cables or cords that would restrict the movement of the server.

Caution – To avoid serious personal injury and equipment damage while handling or moving this product, always use all four chassis handles to support the product weight.

Caution – Attempting this procedure without a mechanical lift or with fewer than *four* people could result in personal injury or equipment damage. The Sun Fire X4500/X4540 Server weighs 170 pounds (72.7 kg) when fully loaded with components. To prevent injury, use a mechanical lift to remove the server from the

rack. As a last resort, a minimum of four people could remove the server. If only two people are available, remove power supplies, disk drives, and system controller to reduce the weight to about 50 pounds before removing the server. See below.

▼ To Remove the Server From the Rack

1. **If you need to lighten the server, you can remove following from the rack:**

   a. **Power supply units:**

      To remove power supplies, see "To Remove a Power Supply (CRU)" on page 3-43.

   b. **Cable management assembly:**

      To remove the cable management assembly if necessary. See one of the following docs depending on your CMA version:

      i. *Sun Fire X4500/X4540 Installation Guide*

      ii. *Sun X4500-J Slide Rail Installation Guide* (X4500)

      iii. "Early-Production Slide Rail and CMA Information" on page G-1 (X4500)

   c. **System Controller:**

      To remove the system controller, see "Replacing the System Controller (FRU)" on page 3-68.

2. **From the front of the rack, squeeze the slide-rail locks (with green plastic handles) to release the lock and pull the server about 1.5 inches from the rack.**

3. **Push the green plastic tabs on the middle slide rails to release the first stop.**

4. **Push the green plastic tabs on the middle slide rails to release the second stop and pull the server out about 36 inches (about 90 cm) from the rack.**

5. **If you need to lighten the server, open the disk drive access cover and remove the disk drives.**

   See "To Remove the Drives Access Cover" on page 3-13.

6. **Slide the server completely out of the slide rails and place on a clean, stable surface.**

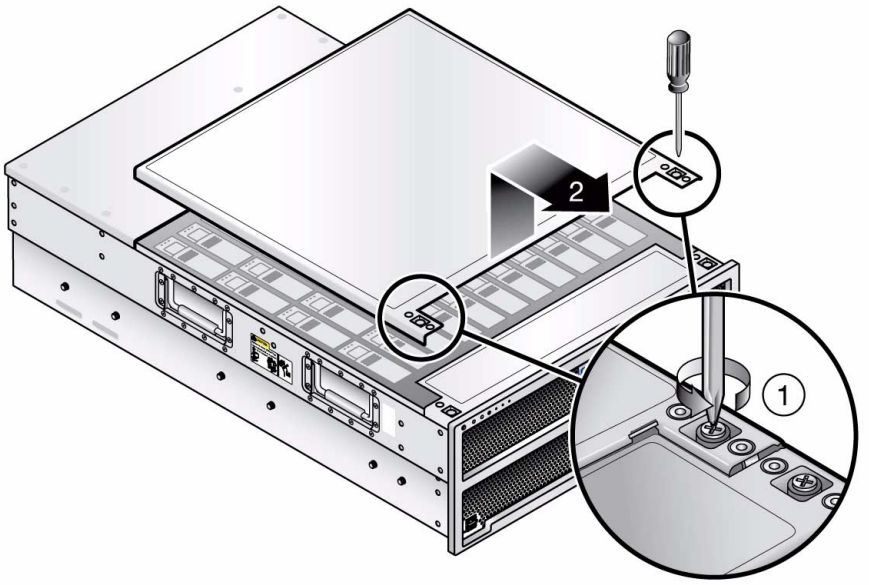
▼ To Remove the Drives Access Cover

The drives access cover protects the 48 drives in the server and ensures proper cooling to the drives and the system controller. To access the drives, you must first remove the drives access cover.

Caution – When the server is on, the drives access cover must be in place to ensure proper cooling. Do not remove the cover for more than **60** seconds when the server is on.

1. **Using a No. 2 Phillips screwdriver, loosen the left and right captive screws. See** FIGURE 3-3**.**
2. **Grasp the cover by its edges, lift the front up from the chassis, and pull it forward.**

FIGURE 3-3 Removing the Drives Access Cover (X4500 shown)



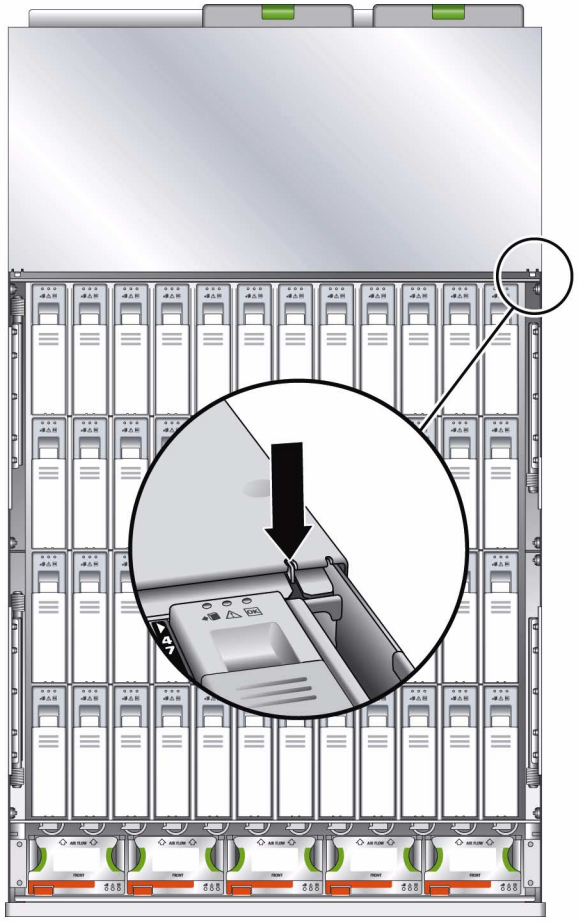
▼ To Install the Drives Access Cover

1. **Postion the cover onto the rear of the chassis so that the cover's metal lip slides under the chassis.**

Caution – Be careful not to damage the drives light pipes at the rear of the system.

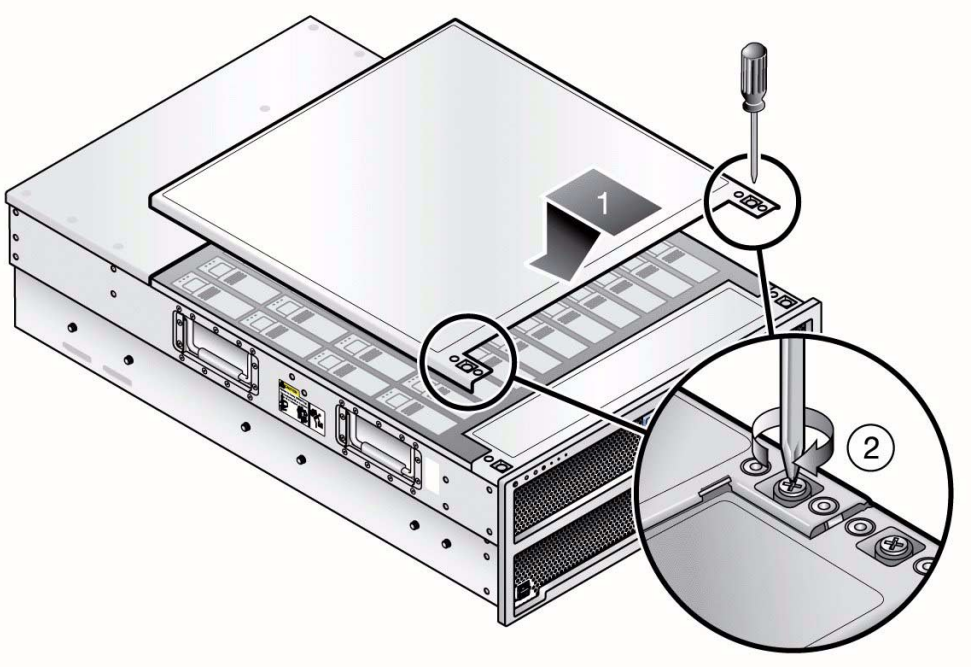
Caution – Be careful not to jam the drives access cover intrusion switch when you replace the cover. See FIGURE 3-4.

FIGURE 3-4 Drives Access Cover Intrusion Switch



2. **Lower the cover and push it toward the rear until the front end drops into place.**
3. **Using a No. 2 Phillips screwdriver, turn the left and right screws on the cover until they are hand-tightened. See** FIGURE 3-5**.**

FIGURE 3-5 Installing the Drives Access Cover



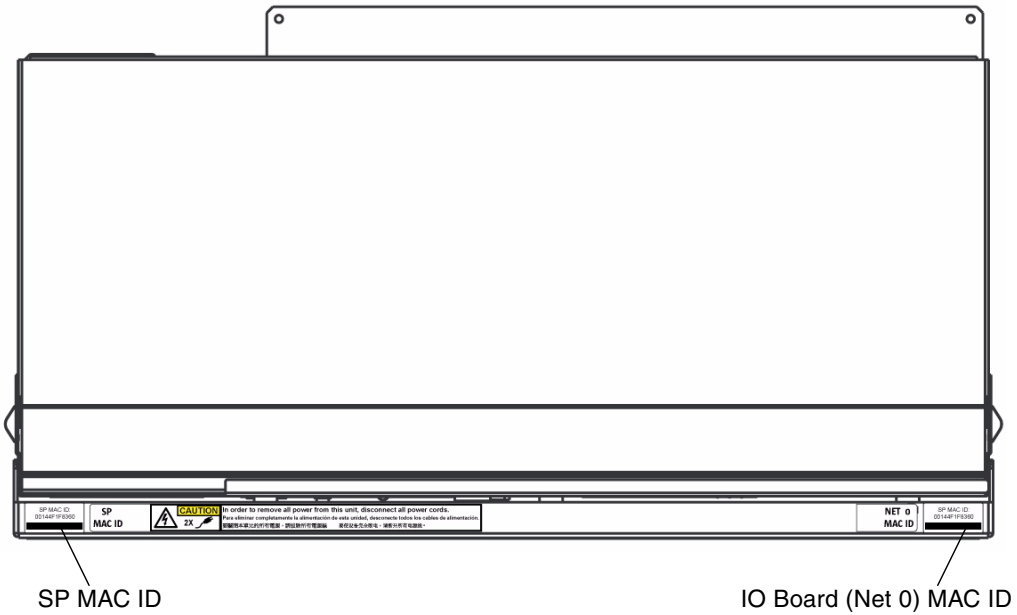
3.8 Finding the I/O Board and SP MAC Addresses

The I/O board and SP MAC addresses are printed on their respective PC boards, but they are also printed on the system controller handle. The locations appear in FIGURE 3-6.

- The SP MAC address is on the left side of the handle. Look for the label that says "SP MAC ID".
- The I/O board MAC address is on the right side of the handle. Look for the label that says "Net 0 MAC ID."

Note – If the CMA is in place, it can obscure these addresses. To view the MAC address labels when the CMA is in place, press the recessed button with a nonconducting stylus to release the system controller handle, and swivel it down partway until the addresses are visible. Return it to the closed position when you are done.

FIGURE 3-6 MAC IDs on System Controller Handle



3.9 Replaceable Component Procedures

Note – Some of the procedures in this section are for customer-replaceable units (CRUs) and some are for field-replaceable units (FRUs), as noted in the procedures and in the following list. FRU components must be replaced *only* by trained service technicians. Contact your Sun Service representative for assistance with FRU replacements.

This section contains procedures for replacing the following components:

Caution – Before handling components, attach an antistatic wrist strap to bare metal on the chassis (see FIGURE 3-31 for the location). The system's printed circuit boards and disk drives contain components that are extremely sensitive to static electricity.

3.9.1 Cable Management Arm and Cable Management Bar

For procedures on installing the Cable Management Arm and the Cable Management Bar, see one of the following documents:

- *Sun Fire X4500/X4540 Server Installation Guide* (820-4855)
- *Sun Fire X4540 Cable Management Arm Installation Guide* (820-7349) (X4540 only)
- "Early-Production Slide Rail and CMA Information" on page G-1

3.9.2 Slide Rail Documentation

For procedures on installing the chassis slide rails, see, *X4500-J Slide Rail Installation Guide* (820-7238).

3.9.3 Replacing the Power Distribution Board (FRU)

This section describes how to remove and replace the power distribution board (PDB), which is also called the power backplane. Be sure you have the tools necessary as described in Section 3.1, "Tools and Supplies Needed" on page 3-1.

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

Caution – Before handling components, attach an antistatic wrist strap to bare metal on the chassis. The system's printed circuit boards and disk drives contain components that are extremely sensitive to static electricity.

Special Tools

This component replacement requires the following tools *in addition to* the tools listed in Section 3.1, "Tools and Supplies Needed" on page 3-1:

- No. 1 Phillips screwdriver
- No. 2 Phillips screwdriver

TABLE 3-7 lists the qualified part numbers for this component. These part numbers are subject to change over time. For an updated list of components, see the following web site:

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

TABLE 3-7 Sun Fire X4500/X4540 Supported Power Distribution Board Part Number

Component	Part Number
Power distribution board to support two A205 PSUs	#501-7104
Power distribution board to support three A240 PSUs	#511-1101

▼ To Replace the Power Distribution Board

1. **Power off the server.**

   See Section 2.2, "Powering Off the Server" on page 2-3 including unplugging all cables from the enclosure.

2. **Remove the system controller.**

   See "Replacing the System Controller (FRU)" on page 3-68.

3. **Remove all power supplies.**

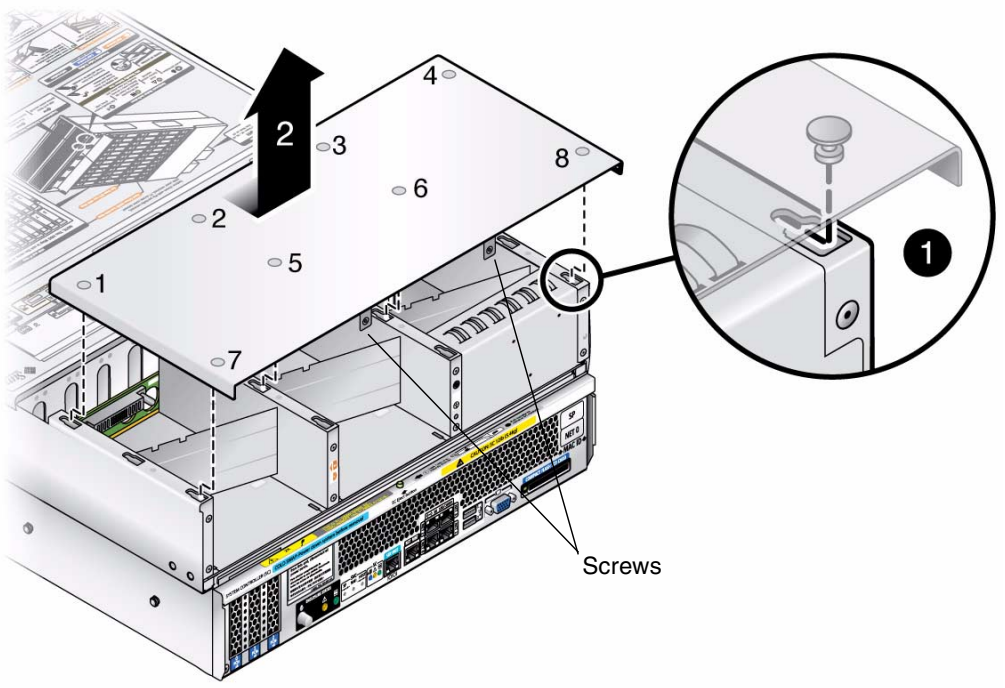
   See "To Remove a Power Supply (CRU)" on page 3-43.

4. **From the back of the enclosure, remove the power supply cover.**

Note – If another system is installed in the rack above your system and blocks access to the power supply cover. To complete some of the following steps, you may need to go to the front of your system and pull it out so it extends all the way out of the rack.

Using a No. 1 Phillips screwdriver, remove the two screws on the power supply cover. Pull the cover toward the rear of the chassis and lift. Some extra effort may be required to disengage the eight mushroom-head pins that secure the power supply cover to the chassis (see FIGURE 3-7).

FIGURE 3-7 Removing the Power Supply Area Cover



1	Remove the two screws.
2	Pull cover toward you to disengage the eight mushroom head pins.
3	Lift the cover off.

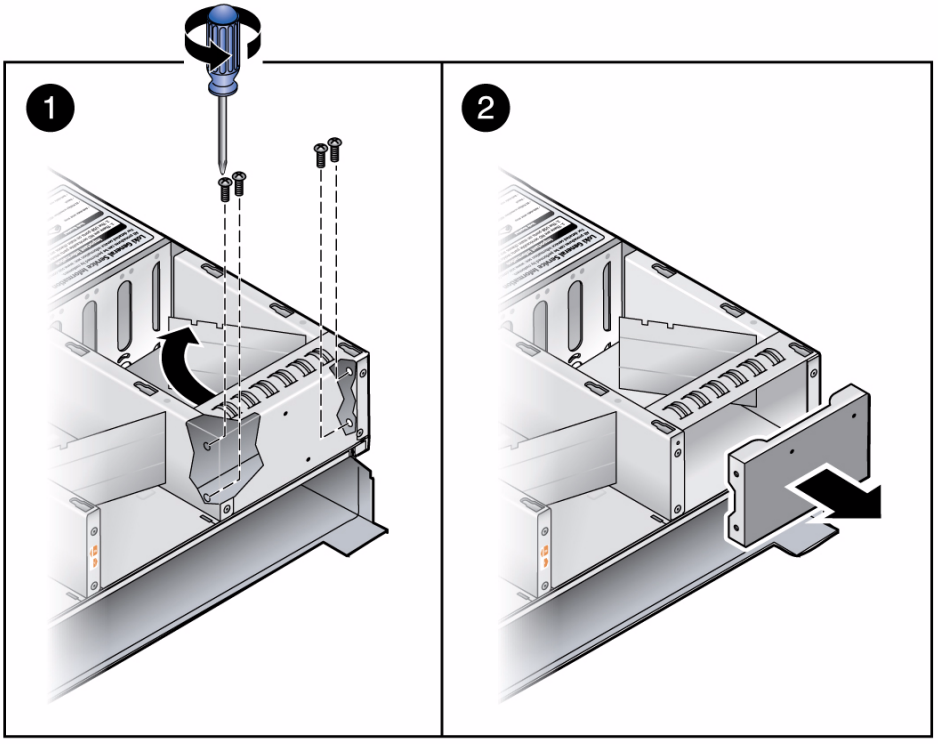
5. **Remove the cable management arm (CMA) mounting plate (power supply filler panel).**

   You must remove the CMA mounting plate to get access to one of the screws that attaches the PDB to the chassis.

   a. **Push back the power supply swing door so you can access the area behind the CMA mounting plate.**

   b. **Use a No. 2 Phillips screwdriver to remove the four screws that attach the CMA mounting plate to the bay, as shown in** FIGURE 3-8**.**

FIGURE 3-8 Removing the CMA Mounting Plate



1	Open door and remove screws.
2	Remove the CMA mounting plate.

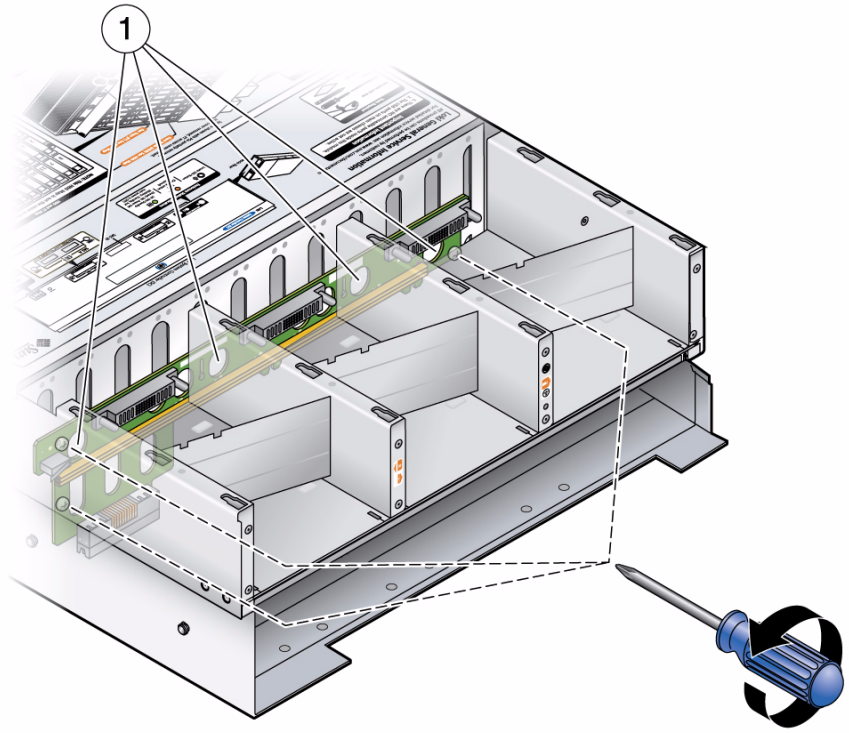
6. Remove the PDB:

a. Remove the disk drive access cover.

See "To Remove the Drives Access Cover" on page 3-13.

b. Use a No. 1 Phillips screwdriver to loosen the three captive screws that secure the PDB to the chassis. See 1 in FIGURE 3-9**.**

FIGURE 3-9 Removing the Power Distribution Board

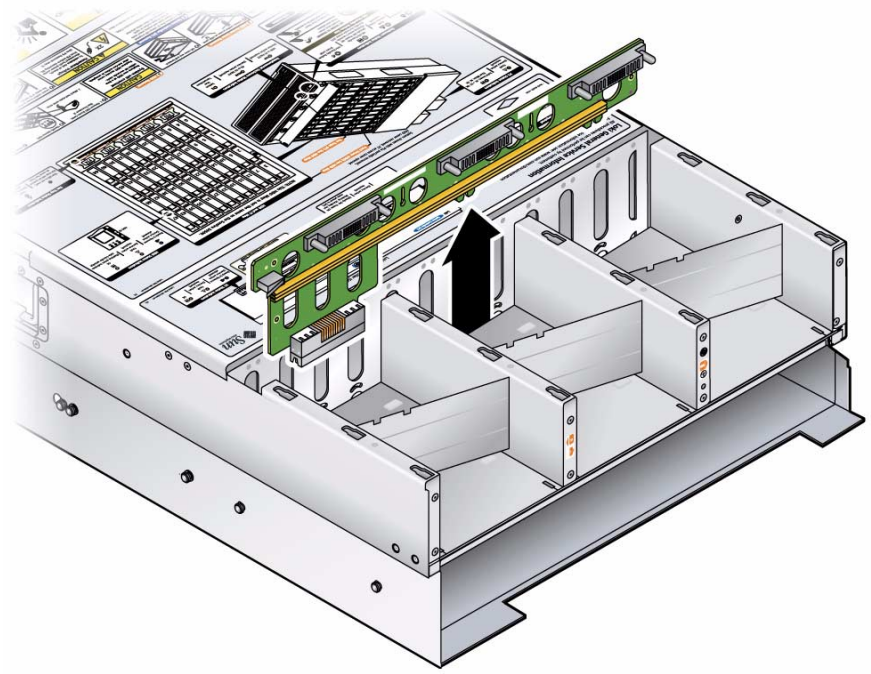


1	Grasp holes to lift PDB.

c. Put your fingers in the holes to pull the PDB up and then out of its keyed openings from the chassis standoffs. See FIGURE 3-10**.**

Caution – Be careful not to damage the intrusion switch located at the upper-left side of the PDB. The intrusion switch detects the removal of the system controller and cover.

FIGURE 3-10 Pulling Out the Power Distribution Board



7. **Install the new PDB:**

   a. **Align the new PDB so that the chassis standoffs protrude through its keyed openings, and then slide the PDB downward to lock it into place.**

   b. **Push down on the edge of the board.**

   c. **Use a No. 1 Phillips screwdriver to tighten the three captive screws that secure the PDB to the chassis. See** FIGURE 3-9**.**

   d. **Verify that the disk drive access cover intrusion switch is functioning correctly and is not bent during installation of the PDB. See** "To Install the Drives Access Cover" on page 3-13**.**

8. **Reinstall the CMA mounting plate.**

Note – Skip this step if your chassis has a third power supply—this bay will be filled with the third power supply.

---

9. **Reinstall the power supply cover.**

   a. **Align the mushroom-head pins with the indentations in the cover. This ensures that the intrusion switch is not blocked. For the locations of the mushroom-head pins, see** FIGURE 3-7**.**

   b. **Push down on the cover and then slide the cover forward into place.**

   c. **Replace the two screws at the rear of the power supply cover.**

10. **Install or reinstall the power supplies:**

Note – For a list of supported power supplies by part number, see "Replacing a Power Supply (CRU)" on page 3-40.

---

   a. **Align the power supply with the empty bay in the chassis.**

   b. **With the power supply handle in the down position, push the power supply into the bay. It will stop about three-quarters of the way in when it meets the connector on the PDB.**

   c. **Lift the power supply handle up until the power supply fully engages with the PDB (indicated when the thumb-latch clicks into place). The power supply should be flush against the chassis.**

      See "Replacing a Power Supply (CRU)" on page 3-40.

11. **Reinstall the system controller.**

    See "Replacing the System Controller (FRU)" on page 3-68.

12. **Reinstall the disk drive access cover.**

    See "To Install the Drives Access Cover" on page 3-13.

13. **Reconnect AC power cords to the power supplies.**

▼ To Replace a Fan Module (CRU)

Each fan module (also known as a fan tray) has two fans. The server has five fan modules (10 fans per server). This component is customer replaceable.

Note – Enclosure cooling might be affected by dust and contaminant build-up. It is recommended that the enclosure be opened and checked approximately every six months, or more often in dirty operating environments. Check component heat sinks, fans, and air openings. If necessary, clean the enclosure by brushing or blowing contaminants or carefully vacuuming contaminants from the enclosure.

Note – This component can be replaced by anyone.

TABLE 3-8 lists the qualified part numbers for this component. This part number is subject to change over time. For an updated list of components, see the following web site:

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

TABLE 3-8 Sun Fire X4500/X4540 Fan Module

Component	Part Number
Fan module	#541-0458

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

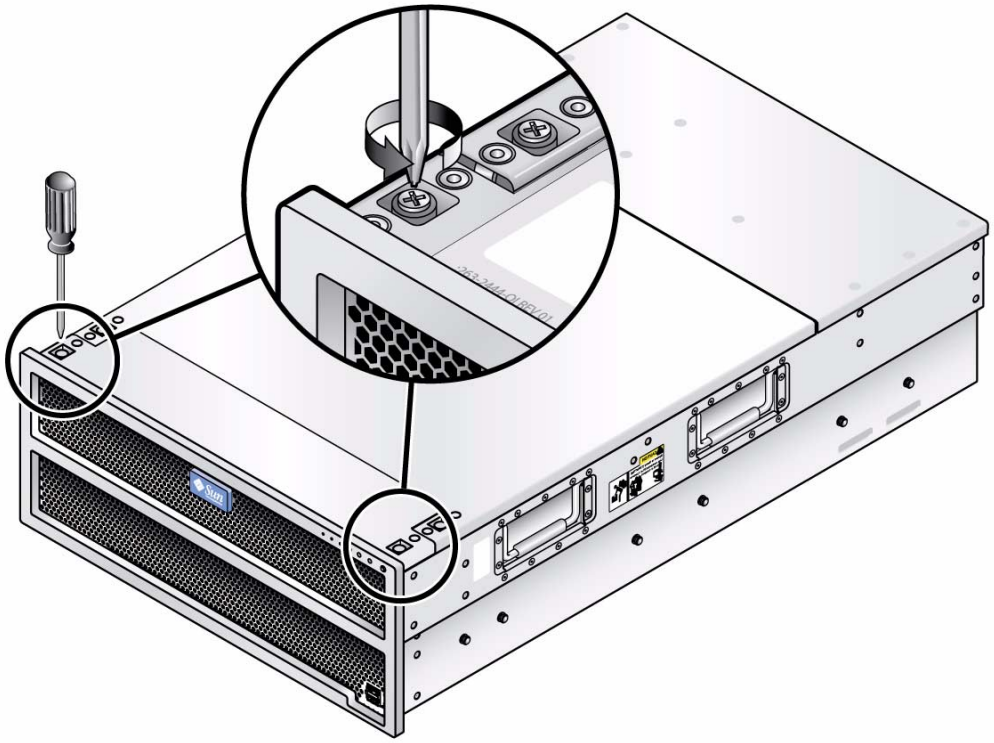
Fans are labeled FT0 (fan tray 0) to FT4 (fan tray 4). See "Locations of Components" on page 3-2.

1. **If the server is in a rack, slide it far enough out of the rack so that you can access the fan modules.**

2. **From the front of the enclosure, open the fan tray access cover.**

   Using a No. 2 Phillips screwdriver, loosen the two captive screws on the left and right sides. See FIGURE 3-11.

FIGURE 3-11 Removing the Fan Tray Cover



3. **Identify the defective fan module.**

   A defective fan module shows a lit amber (middle) LED: The fan should be replaced.

Note – If both green and amber indicators are on, then one of the two fans in the fan module is still operational. You should replace this fan module last if there is more than one fan module failure.

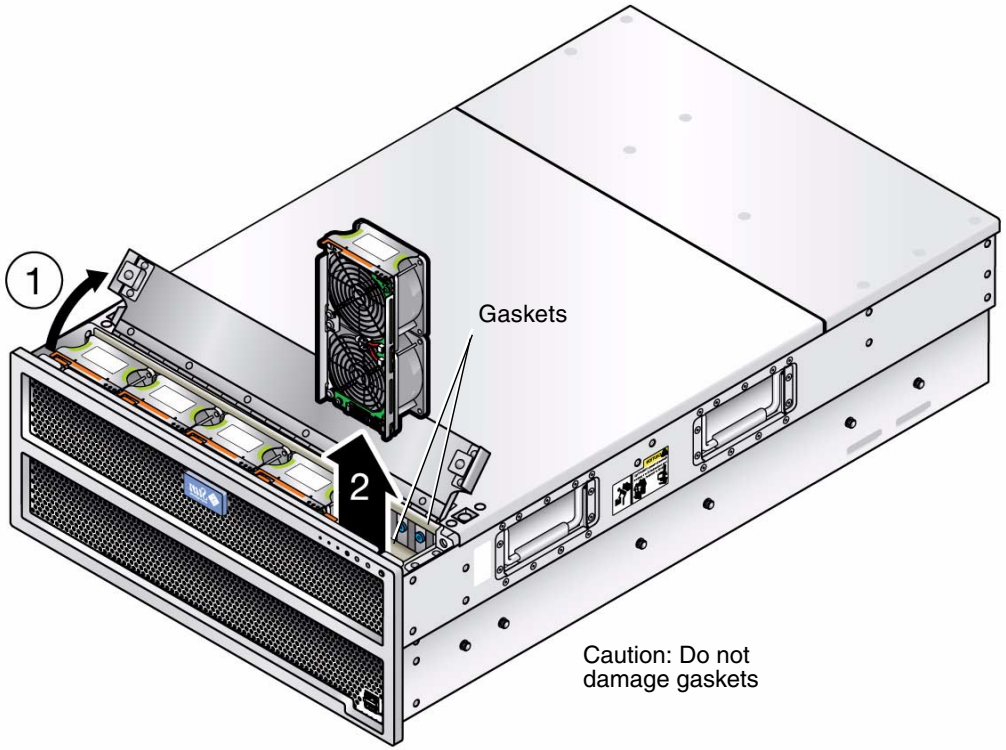
---

4. **Remove the fan module.**

Caution – Be careful to not damage the gaskets when you remove the fan module.

Using your thumb and forefinger, grasp the top handle of the fan module and lift the module up and out of the chassis. See FIGURE 3-12.

FIGURE 3-12 Removing a Fan Module



5. **Install the new fan module:**

Caution – Fan trays tend to bias forward due to a gasket at the rear of the air plenum. The fan tray must be kept vertical or the edge connector at the bottom of the fan tray will not engage the main board connector. The connector can be damaged if the fan tray is pressed too forcefully.

a. **Align the new fan module with the bay in the chassis.**

b. Lower the fan tray into the bay until it comes into contact with the connector on the fan board.

c. Push down gently until the connector is fully engaged.

Once fully engaged, the amber LED (middle) on the fan tray may light momentarily.

6. Close the fan cover and tighten the retaining screws on the left and right sides of the cover.

▼ To Replace the Front Indicator Board (FRU)

The front indicator board supports the front panel power button and front panel indicator LEDs. This board also contains the ribbon cable that connects to the disk drive backplane. Be sure you have the tools necessary as described in "Tools and Supplies Needed" on page 3-1.

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

Special Tools

This component replacement requires a No. 1 Phillips screwdriver (magnetic tip recommended).

TABLE 3-9 lists the qualified part numbers for this component. This part number is subject to change over time. For an updated list of components, see the following web site:

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

TABLE 3-9 Sun Fire X4500/X4540 Front Indicator Board

Component	Part Number
Front Indicator Board	#501-7192

Note – If you suspect the ribbon cable is bad, first replace the cable that connects the front indicator board to the disk drives backplane and then test the operation of the front indicator board.

---

1. **Power off the server.**

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

2. **If the server is in a rack, slide it far enough out of the rack so that you can access the fan modules.**

3. **From the front of the enclosure, open the fan cover.**

   Using a No. 2 Phillips screwdriver, loosen the two captive screws on the left and right sides.

4. **Remove fan tray 0 and fan tray 1.**

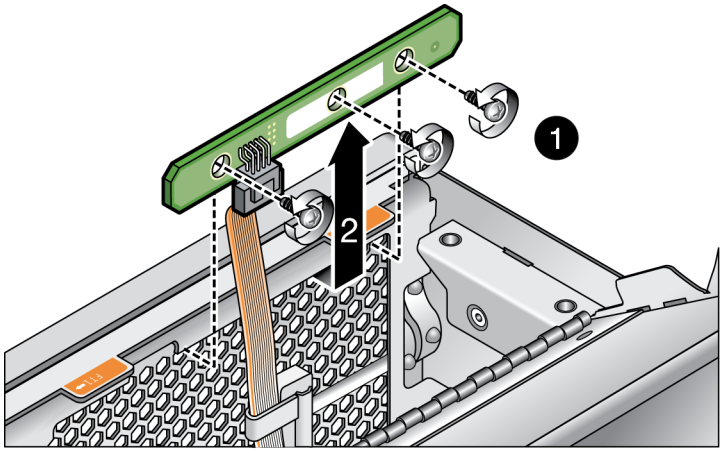
5. **Remove the disk drive access cover so that the fan cover opens more freely.**

   See "To Remove the Drives Access Cover" on page 3-13.

   Using a No. 2 Phillips screwdriver, loosen the two captive screws on the left and right sides.

6. **Using a No. 1 Phillips screwdriver, remove the three screws (see 1 in** FIGURE 3-13**) on the front indicator board, then remove (see 2 in** FIGURE 3-13**).**

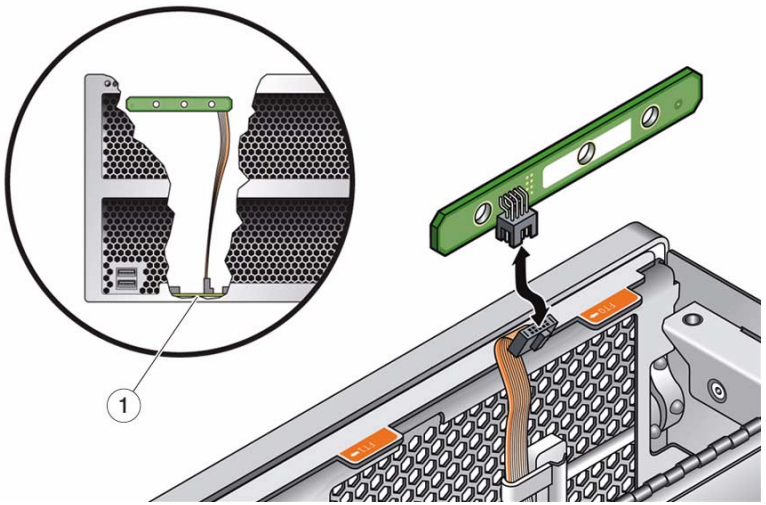
FIGURE 3-13 Removing the Front Indicator Board Screws



7. **Detach the ribbon cable from the front indicator board, see** FIGURE 3-14**.**

   If you suspect that the ribbon cable is bad, remove the old ribbon cable from the disk drives backplane and use the new ribbon cable that comes with the new front indicator board. Make sure you route the cable through the cable securing clips to prevent damage to the cable. Then test the operation of the front indicator board as described in Section 2.1, "Powering On the Server" on page 2-2.

FIGURE 3-14 Detaching the Ribbon Cable from the Disk Drives Backplane



1	Detatch the ribbon cable connector from the disk drive backplane.

8. **Install the new front indicator board:**

   a. **Align the holes in the indicator board with the two screw holes in the inside-front of the chassis.**

   b. **Using a No. 1 Phillips screwdriver, replace and tighten the two screws that secure the indicator board to the chassis.**

   c. **Connect the ribbon cable to the connector on the disk drives backplane and to the connector on the front indicator board.**

9. **Replace fan module 0 and fan module 1.**

10. **Close the fan cover and, using a No. 1 Phillips screwdriver, tighten the two screws on the left and right sides.**

11. **Replace the disk drives access cover and, using a No. 1 Phillips screwdriver, tighten the two screws on the left and right sides. See** Section t, “To Remove the Drives Access Cover” on page 3-13**.**

▼ To Replace a Hard Drive (CRU)

This section describes how to remove and replace a drive. It is a good practice to allocate five drives (roughly 10 percent of the total capacity) as hot spares.

Note – This component is a hot-pluggable CRU and can be replaced by anyone. Hot-pluggable means that the disk drive must be first brought offline by using a management software or operating system command; however, the server does not need to be powered off.

The system designation of the drives is shown on the service label.

TABLE 3-10 lists the qualified part numbers for this component. These part numbers are subject to change over time.

Note – Do not mix drives of different drive capacities.

For an updated list of components, see the following web site:
`http://sunsolve.sun.com/handbook_pub/Systems/`

TABLE 3-10 Hard Drives for the X4500 Server

Disk Drive	Part Number
Seagate 250GB SATA 3.5” drive (X4500)	#541-1468, XRA-ST1CH-250G7KZ (X-option)
Hitachi 500GB, SATA, 3.5” drive (X4500, X4540)	#541-3050, XRA-ST1CH-500G7KZ (X-option)
Hitachi 750GB, SATA, 3.5” drive (X4500, migrated X4540*)	#540-7244, XRA-ST1CH-750G7KZ (X-option)
Hitachi 1-TB , SATA 3.5" drive (X4500, X4540)	#540-7507, XRA-ST1CH-1T7K (X-option)

*—See *Sun Fire X4500-to-X4540 Migration User's Guide* (820-6559).

TABLE 3-11 Disk Drives for the X4540 Server

Disk Drive	Part Number
Seagate 250GB/7200RPM, SATA 3.5" drive (X4540)	#541-1468, XRA-ST1CH-250G7KZ (X-option)
Seagate 250GB/7200RPM, SATA, 3.5" (X4540)	#541-3678, XRA-ST1CH-250G7KZ (X-option)
Seagate 500GB, SATA, 3.5" (X4540)	#541-3679
Seagate 1TB SATA, 3.5" (X4540)	#541-3730
Hitachi 500GB/7200RPM, SATA, 3.5" (X4540)	#541-3050, XRA-ST1CH-500G7KZ (X-option)
Hitachi 1TB/7200RPM, SATA, 3.5" (X4500, X4540)	#540-7507, XRA-ST1CH-1T7K
Hitachi 2TB/7200RPM, SATA, 3.5" (X4500, X4540)	#541-4241

For a list of compatible SSDs, see "Replacing a Solid-State Drive (Sun Fire X4540 CRU)" on page 3-35.

Note – Before removing a drive, have the replacement drive ready to be installed.

For supported solid-state drives and their part numbers, see "Replacing a Solid-State Drive (Sun Fire X4540 CRU)" on page 35.

Caution – To avoid overheating the server, if the server is powered on, do not leave a disk drive out for longer than 60 seconds at a time. Remove and replace only one disk drive at a time. Replace the disk drive access cover as soon as the service tasks are completed. Before removing a drive, have the replacement drive ready to be installed.

Note – Early fan trays had a blue LED that was not activated. Later versions of the fan trays have only a green and amber LED.

1. **Remove the drives access cover.**

   See "To Remove the Drives Access Cover" on page 3-13.

2. **Identify the drive to be removed by checking its LEDs.**

   If the middle LED is on (amber), the drive is faulty and should be replaced.

3. **Use the operating system or management software to take the disk drive offline before you replace it. Not doing so could cause data loss or unexpected error messages.**

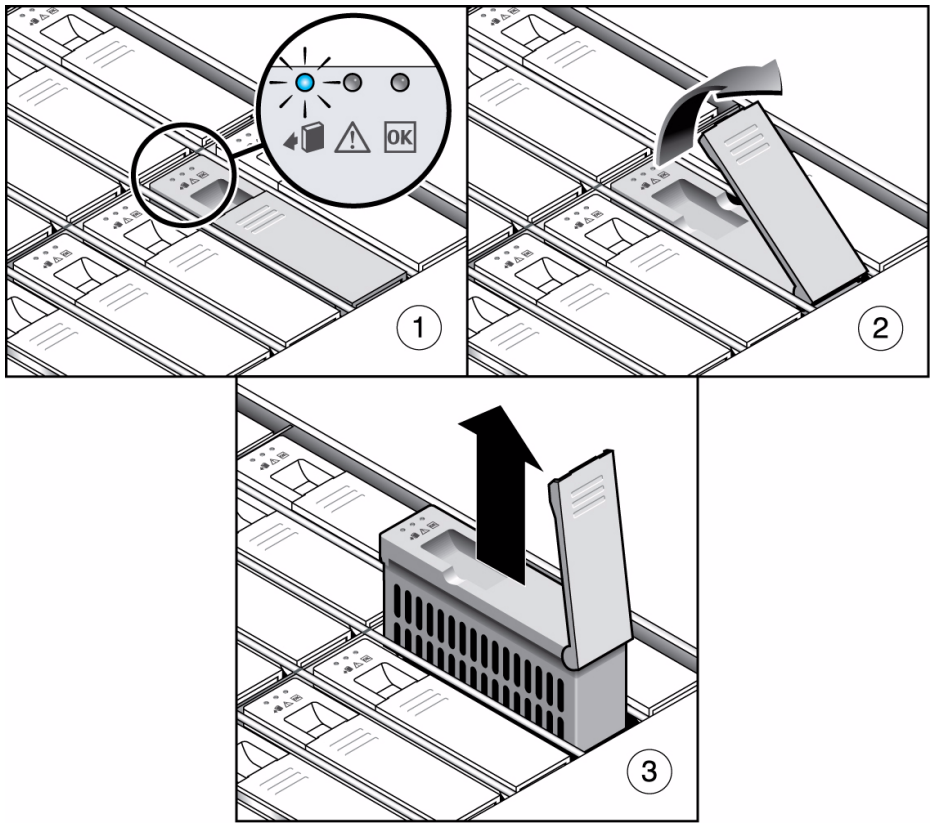
   Once the drive has been taken off line, the left (blue) LED should turn on. This means the drive is ready to be removed and service action is allowed.

Caution – Pulling a drive that has that has not been prepared for removal can cause a loss of the drive cell memory map or loss of data in its in/out buffers.

Note – If you are using the operating system command line, note that disks in the enclosure are typically identified in sequential order. Although the enclosure contains only 48 disks, your operating system may see a list of 51 devices; if this is the case, the first 4 addresses (0-3) represent the enclosure's four SAS expanders, the other 48 addresses (4-51) represent the 48 drives.

4. **Remove the drive. Lift the metal latch and remove the drive from the drive bay as shown below, or on the service label.**

FIGURE 3-15 Removing a Hard Disk Drive or Solid-State Drive



1	Identify desired drive.
2	Unlatch drive.
3	Lift and pull drive up and out of bay.

5. **Install the new drive of the same capacity as the one removed.**

   Push the drive into the bay until it stops, and make sure the drive is fully engaged with the connector on the drives backplane.

6. **Make sure the metal handle is properly seated.**

7. **Replace the disk drives access cover.**

   See "To Install the Drives Access Cover" on page 13.

8. **Configure the new drive.**

   Refer to your operating system documentation for information on adding a new disk drive.

3.9.4 Replacing a Solid-State Drive (Sun Fire X4540 CRU)

Higher performance is gained with SSDs over standard drives because SSDs enable the system to be used as cache memory for ZFS.

The following are important hardware rules and cautions when using SSDs:

- This component is a hot-pluggable custsomer-replaceable unit (CRU) and can be replaced by anyone. Hot-pluggable means that the drive must be first brought offline by using a management software or operating system command; however, the server does not need to be powered off.
- Removing a hard disk or solid state disk (SSD) before it has been prepared for removal by the software can cause data loss.
- Before removing a drive, have the replacement drive ready to be installed.
- To avoid overheating the server, if the server is powered on, do not leave a drive out for longer than 60 seconds at a time. Remove and replace only one drive at a time. Replace the drives access cover as soon as the service tasks are completed.
- To maximize the drive's lifespan, do not use these drives for functions like swapping and logging.
- The following SSDs are supported by the Sun Fire X4540 server:

TABLE 1 SSDs Supported by Sun Fire X4540 by Part Numbers

Component	Part Number*
18-GB 3.5" SSD, LZILL, SATA2 (with bracket)	#540-7763
18-GB 3.5" SSD, STEC, LZIL, SATA2 (with bracket)	#594-5620-01, XTA7210-LOGZ18G (X-option)

* — Part numbers are subject to change.

3.9.4.1 SSD Restrictions

The following are important restrictions when using SSDs:

- Do not mix SSDs of different manufacturers.
- Do not mix drives of the same manufacturer with different drive capacities.
  - SSDs are ***not*** to be installed in the boot drive slots.

TABLE 2 SSD Locations Supported by Sun Fire X4540

Controller 0		Controller 1		Controller 2		Controller 3		Controller 4		Controller 5	
3	7	11	15	19	23	27	31	35	39	43	47
2	6	10	14	18	22	26	30	34	38	42	46
1*	5	9*	13	17	21	25	29	33	37	41	45
0*	4	8*	12	16	20	24	28	32	36	40	44
Fan Trays (front of system)											

* — Boot disk slot. Do not install SSD.

Note – For an updated list of components, see the following web site:
`http://sunsolve.sun.com/handbook_pub/Systems/`

▼ To Replace an SSD

Note – Before removing a drive, have the replacement drive ready to be installed.

Use this procedure to remove a drive prior to installing an SSD. This procedure applies to hard drives and SSDs.

1. **Remove the drives access cover.**

   See "To Remove the Drives Access Cover" on page 3-13.

2. **Identify the drive to be removed by checking its LEDs.**

   If the middle LED is on (amber), the drive is faulty and should be replaced.

3. **Use the operating system or management software to take the disk drive offline before you replace it. Not doing so could cause data loss or unexpected error messages.**

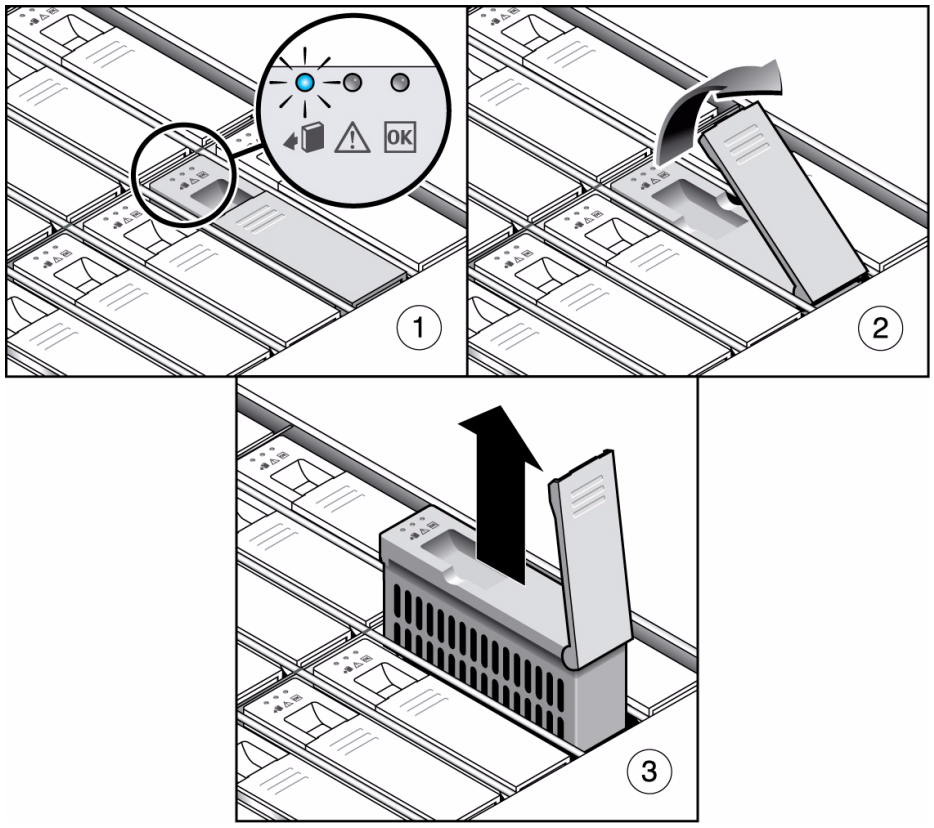
   Once the drive has been taken off line, the left (blue) LED should turn on. This means the drive is ready to be removed and service action is allowed.

Caution – Pulling an SSD that has that has not been prepared for removal can cause a loss of the drive cell memory map or loss of data in its in/out buffers.

Note – If you are using the operating system command line, note that disks in the enclosure are typically identified in sequential order. Although the enclosure contains only 48 disks, your operating system may see a list of 51 devices; if this is the case, the first 4 addresses (0-3) represent the enclosure's four SAS expanders, the other 48 addresses (4-51) represent the 48 drives.

4. **Remove the drive. Lift the metal latch and remove the drive from the drive bay as shown below, or on the service label.**

FIGURE 3-16 Removing a Hard Disk Drive or Solid-State Drive



1	Identify desired drive.
2	Unlatch drive.
3	Lift and pull drive up and out of bay.

Caution – To avoid overheating the server, if the server is powered on, do not leave a drive out for longer than 60 seconds at a time. Remove and replace only one drive at a time. Replace the drives access cover as soon as the service tasks are completed.

5. **Install the SSD (in drive bracket) into the drive bay of the system.**

   Push the drive into the bay until it stops and is fully engaged with the connector on the drive backplane. Push down the metal handle so it properly locks into place.

FIGURE 3-17 Installing the SSD into the System

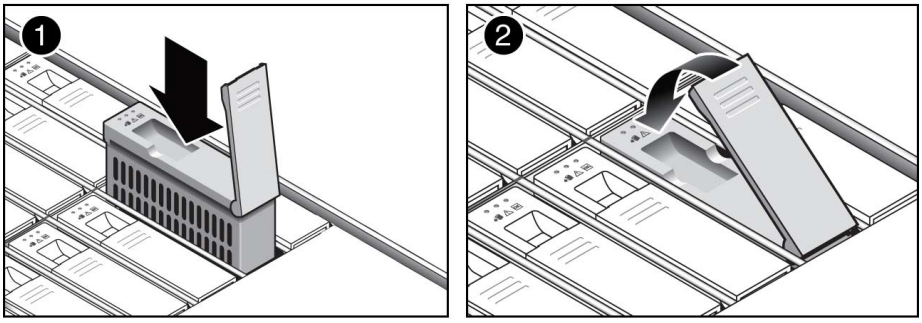


Figure Legend

1	Installing the SSD.
2	Locking the SSD in place.

6. **Replace the disk drives access cover. See** "To Install the Drives Access Cover" on page 13**.**

7. **Configure the new disk drive.**

   Refer to your operating system documentation for information on adding a new disk drive.

Note – If the drives were previously configured as a RAID 1 (or higher) 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 spare, the new drive is automatically configured as a new spare.

3.9.5 Replacing a Power Supply (CRU)

This section describes how to remove and replace a power supply unit (PSU).

Two PSUs are fully redundant at 220 VAC; if one power supply fails, the second power supply will continue to operate the system. One PSU is *not* supported, and causes the System Fault LEDs to illuminate.

Three PSUs are fully redundant at 110 VAC; if one power supply fails, the remaining two power supplies will continue to operate the system. Two PSUs does not provide power redundancy, is *not* supported, and causes the System Fault LEDs to illuminate.

Note – This component is a hot-swappable CRU and can be replaced by qualified personnel. Hot-swappable means you do not need to power off the server during replacement.

Caution – Before handling components, attach an antistatic wrist strap to bare metal on the chassis. The system's printed circuit boards and disk drives contain components that are extremely sensitive to static electricity.

TABLE 3-12 lists the qualified part number for this component. These part numbers are subject to change over time. For an updated list of components, see the following web site:

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

TABLE 3-12 Sun Fire X4500 and X4540 Supported Power Supply Part Numbers

Component	Part Number
Power supply (type A205), 1500W (X4500, 2 or 3 per system)	#300-1787, X4502A-Z (X-option)
Power supply, (type A240), 1500W, 110 VAC, (X4540, 3 per system)	#300-2161, X5037 (X-option)

The system designation of the two power supplies in the server is shown on the service label.

▼ To Access the Third Power Supply Bay

Note – If you are installing the third power supply, you must first remove the power supply cover and cable management arm mounting plate (power supply filler panel).

---

1. **From the back of the enclosure, remove the power supply cover.**

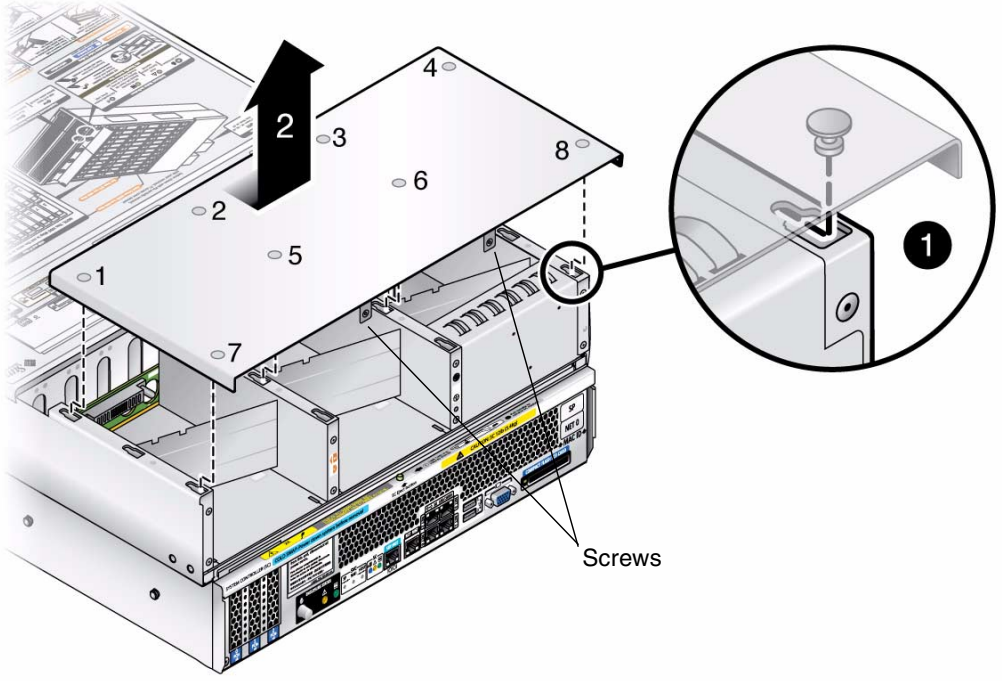
Note – If another system is installed in the rack above your system and blocks access to the power supply cover. To complete some of the following steps, you may need to go to the front of your system and pull it out so it extends all the way out of the rack.

---

2. **Using a No. 1 Phillips screwdriver, remove the two screws on the power supply cover.**

   Pull the cover toward the rear of the chassis and lift. Some extra effort may be required to disengage the eight mushroom-head pins that secure the power supply cover to the chassis. See FIGURE 3-18.

FIGURE 3-18 Removing the Power Supply Area Cover



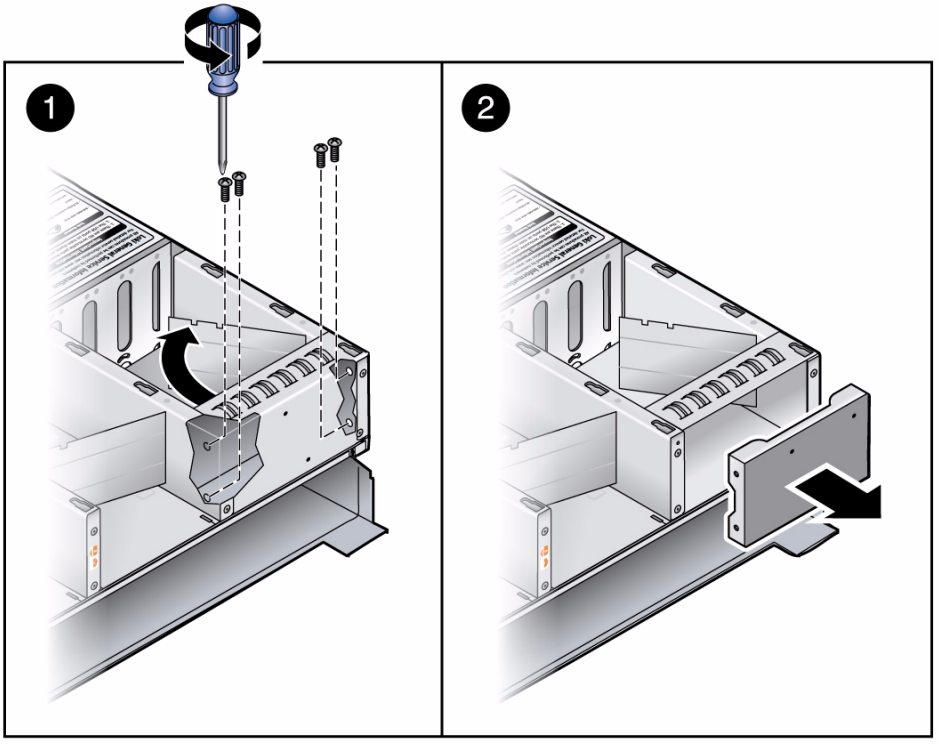
1	Remove the two screws.
2	Pull cover toward you to disengage the eight mushroom head pins.
3	Lift the cover off.

3. **Remove the cable management arm (CMA) mounting plate (power supply filler panel).**

   a. **Push back the power supply swing door so you can access the area behind the CMA mounting plate [1].**

   b. **Use a No. 2 Phillips screwdriver to remove the four screws that attach the CMA mounting plate to the bay [2]. See** FIGURE 3-8**.**

FIGURE 3-19 Removing the CMA Mounting Plate



1	Open door and remove screws.
2	Remove the CMA mounting plate.

▼ To Remove a Power Supply (CRU)

This section describes how to remove a power supply unit (PSU).

The power supplies are fully redundant at 220 VAC; if one power supply fails, the other power supply will continue to operate.

Note – This component is hot-swappable. Hot-swappable means you do not need to power off the server during replacement.

Caution – Before handling components, attach an antistatic wrist strap to bare metal on the chassis. The system's printed circuit boards and disk drives contain components that are extremely sensitive to static electricity.

The system designation of the power supplies in the server is shown on the service label.

1. **If present, remove the cable management arm, or swivel open the cable management arm to view the power supplies.**

   To replace the cable management assembly if necessary. See one of the following docs depending on your CMA version:

   - *Sun Fire X4500/X4540 Installation Guide*
   - *Sun X4500-J Slide Rail Installation Guide* (X4500)
   - "Early-Production Slide Rail and CMA Information" on page G-1 (X4500)

2. **Disconnect the AC power cord that is connected to the power supply you want to replace.**

3. **Remove the installed power suppy unit by pulling its handle downward until it disengages the unit from the connector on the PDB. Pull out the power supply.**

▼ To Install a Power Supply

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

2. **With the power supply handle in the down position, push the power supply into the power supply bay.**

   The power supply will stop about three-quarters of the way into the bay when it meets with the connector on the PDB. Lift the power supply handle up until the power supply fully engages with the PDB (indicated when the thumb-latch clicks into place). The power supply should be flush against the chassis.

3. **Connect the AC power cord to the new power supply. Use the power cord retaining clips to keep the power cord secure.**

4. **If present, swivel the cable management arm back into the closed position.**

▼ To Replace a Battery (CRU)

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

Follow these steps to remove and replace the system battery.

TABLE 3-13 lists the qualified part number for this component. These part numbers are subject to change over time. For an updated list of components, see the following web site:

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

TABLE 3-13 Sun Fire X4540/X4540 Supported Battery Part Numbers

Component	Part Number
Battery (X4500, X4540)	#150-3993

1. **Power off the server as described in** Section 3.7.1, "Powering Off the Server" on page 3-10**.**
2. **Remove the cable management arm.**

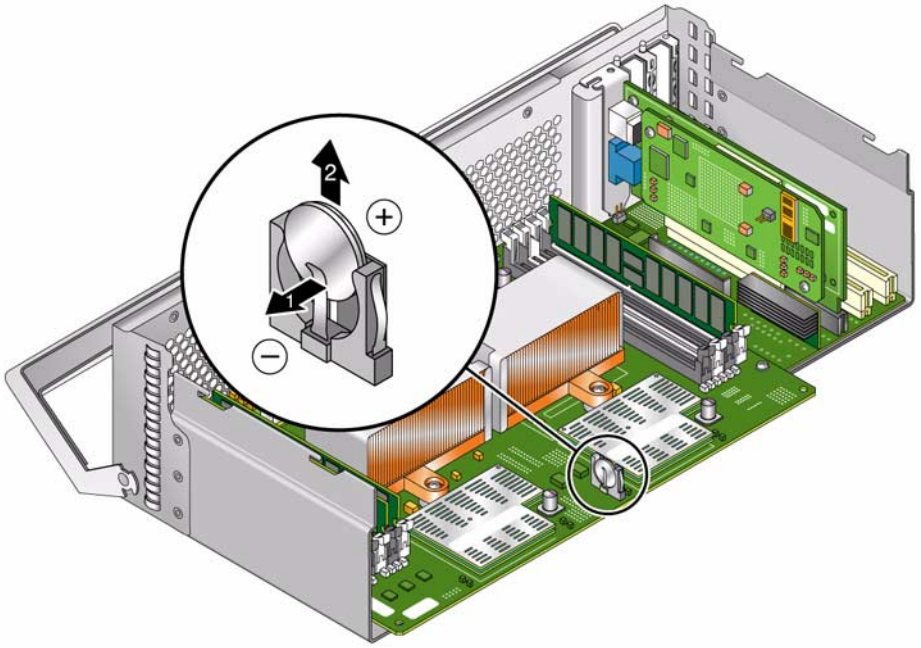
   See one of the following depending on your system:

   - *Sun Cable Management Assembly Installation Guide for the Sun Fire X4540 Server*
   - *Sun X4500-J Slide Rail Installation Guide* (X4500)
   - "Early-Production Slide Rail and CMA Information" on page G-1 (X4500)
3. **Remove the system controller as described in** "To Remove the System Controller (CRU)" on page 3-70**.**

4. **Remove the battery by gently pulling the clip away from the battery face and lifting the battery straight up. See** FIGURE 3-20 **(the X4500 system is shown).**

Note – Observe the orientation (polarity) of the battery in its holder before it is removed. The positive polarity, marked with a "+" symbol, must face toward the side where the PCI slots are located.

FIGURE 3-20 Removing the Battery



1	Gently pull the clip away.
2	Remove battery.

5. **To install a new battery, gently pull the clip away and insert.**

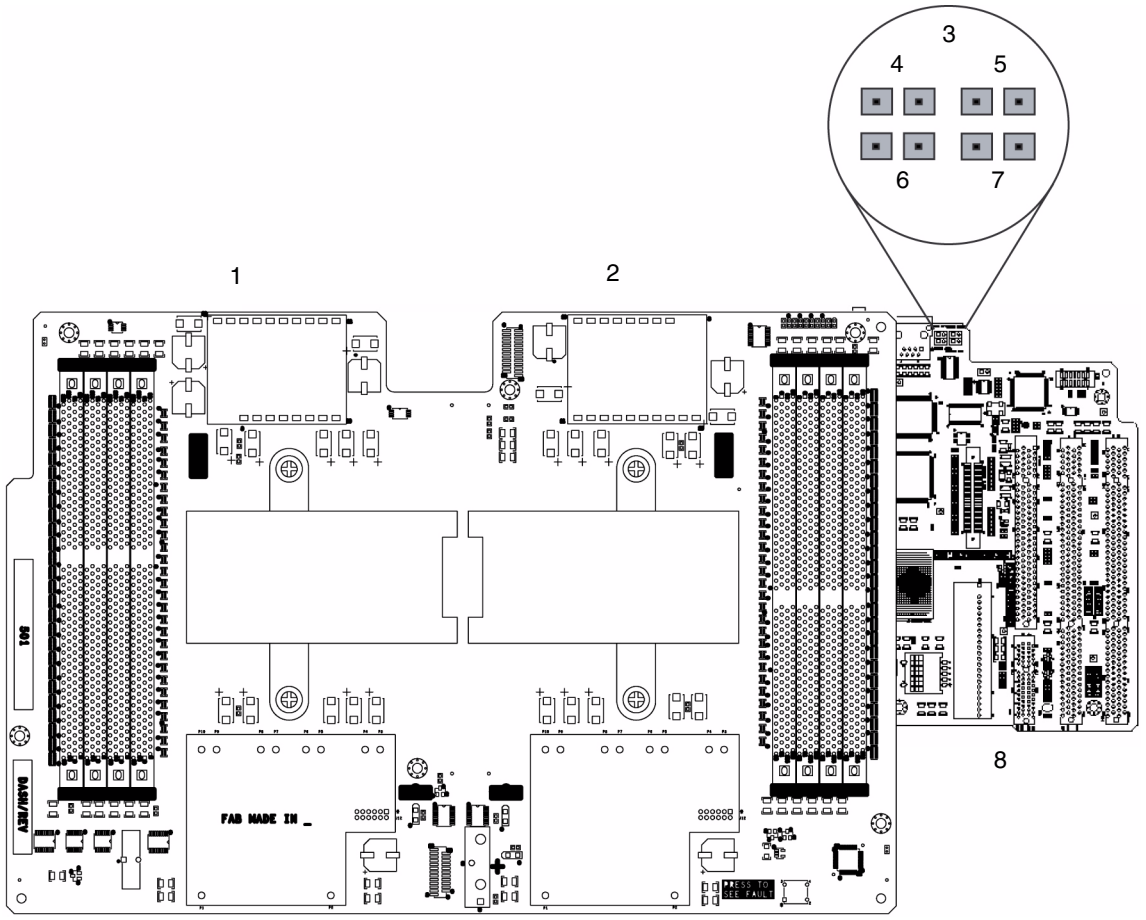
Note – Install the new battery in the holder with the same orientation (polarity) as the battery that you removed.

---

6. **In some cases for the battery to work, you *might* need to reset the CMOS on the I/O controller board.**

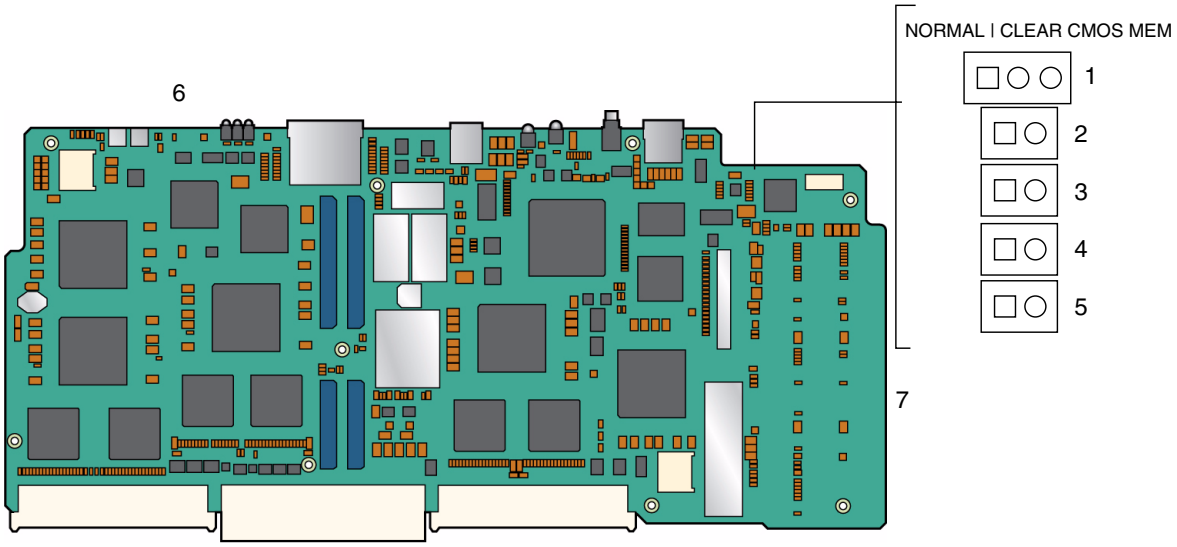
   To reset the CMOS, use a screwdriver to short the pins for one or two seconds on jumper J27 on the I/O controller board. Jumper J27 is near the serial connection to the service processor (labeled SER MGT) on the back of the server. See FIGURE 3-21 (the X4500 system is shown).

FIGURE 3-21 Location of Jumpers on the I/O Controller (X4500)



1	CPU Board
2	Back of System
3	Jumpers
4	J6 - hard rst
5	J1 - force rcvr
6	J27 - clear CMOS
7	J4 - passwd clr
8	I/O Controller Board

FIGURE 3-22 Location of Jumpers on the I/O Controller (X4540)



	NORMAL | CLEAR CMOS MEM
1	J2802
2	J2800 — RTC RESET
3	J4900 — CLR PSWD
4	J2804 — FORCE RECOVERY
5	J4902 — FLASH WP
6	Back of System
7	CPU board

▼ To Replace a CPU (FRU)

This section describes how to remove and replace a CPU.

Note – System cooling might be affected by dust and contaminant build-up. It is recommended that systems be opened and checked approximately every six months or more often in dirty operating environments. Check system heat sinks, fans, and air openings. If necessary, clean systems by brushing or blowing contaminants or carefully vacuuming contaminants from the system.

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

Note – To migrate your Sun Fire X4500 to an X4540, see the *Sun Fire X4500 to X4540 Migration Guide*.

TABLE 3-14 lists the qualified part numbers for this component. These part numbers are subject to change over time. For an updated list of components, see the following web site:

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

TABLE 3-14 Sun Fire X4500/X4540 Supported CPU Module Assembly Part Numbers

Component	Part Number
CPU, AMD 290, 2.8-GHz dual core (X4500)	#371-1779
CPU, quad core 2356 processor, 2.3 GHz (X4540)	#371-4042
CPU, quad core 2384 processor, 2.7 GHz (X4540)	#371-4438

CPU Fault Indicators

The System Controller Fault LED on the system controller indicates a problem with either the CPUs or the DIMMs. For the location of this LED, see FIGURE 3-31. This Fault LED is powered by 3.3V standby power.

DIMM and CPU fault LEDs on the CPU module provide further indications of which component has a fault condition. These CPU and DIMM fault LEDs can be lit for up to one minute by a capacitor on the CPU module, even after the CPU module is removed from the server. To light the fault LEDs from the capacitor, push the small button on the CPU board labeled, “Press to see fault.”

See FIGURE 3-23 for the LED and button locations.

- System Controller fault LED:

  Off: CPU and DIMMs are functioning properly.

  On (amber): CPU or DIMM is faulty.

DIMM fault LEDs are under the DIMM ejector levers that are toward the front of the system:

- DIMM fault LED:

Off: The DIMM is operating properly.

On (amber): The DIMM is faulty and must be replaced.

- CPU fault LEDs on CPU0 or CPU1:

  Off: The CPU is operating properly.

  On (amber): The CPU is faulty and must be replaced.

- The Battery fault LED:

  Off: The battery is operating properly.

  On (amber): The battery is faulty and must be replaced.

Note – The CPU fault and DIMM LEDs continue to indicate a failure until the system is powered up. The Battery LED continues to indicate a failure until the service processor is started.

To replace the CPU:

1. **Power off the server.**

   See Section 3.7.1, "Powering Off the Server" on page 3-10.

2. **Remove the cable management arm.**

   See one of the following depending on your system:

   - *Sun Fire X4500/X4540 Installation Guide*
   - *Sun X4500-J Slide Rail Installation Guide* (X4500)
   - "Early-Production Slide Rail and CMA Information" on page G-1 (X4500)

3. **Remove the system controller.**

   See "To Remove the System Controller (CRU)" on page 3-70.

   The CPUs are located inside the system controller.

4. **Identify which CPU module you are replacing, either CPU 0 or CPU 1.**
   The CPUs are labeled. See FIGURE 3-23 (the X4500 system is shown).

FIGURE 3-23 CPU Board LED and Button Locations (X4500)

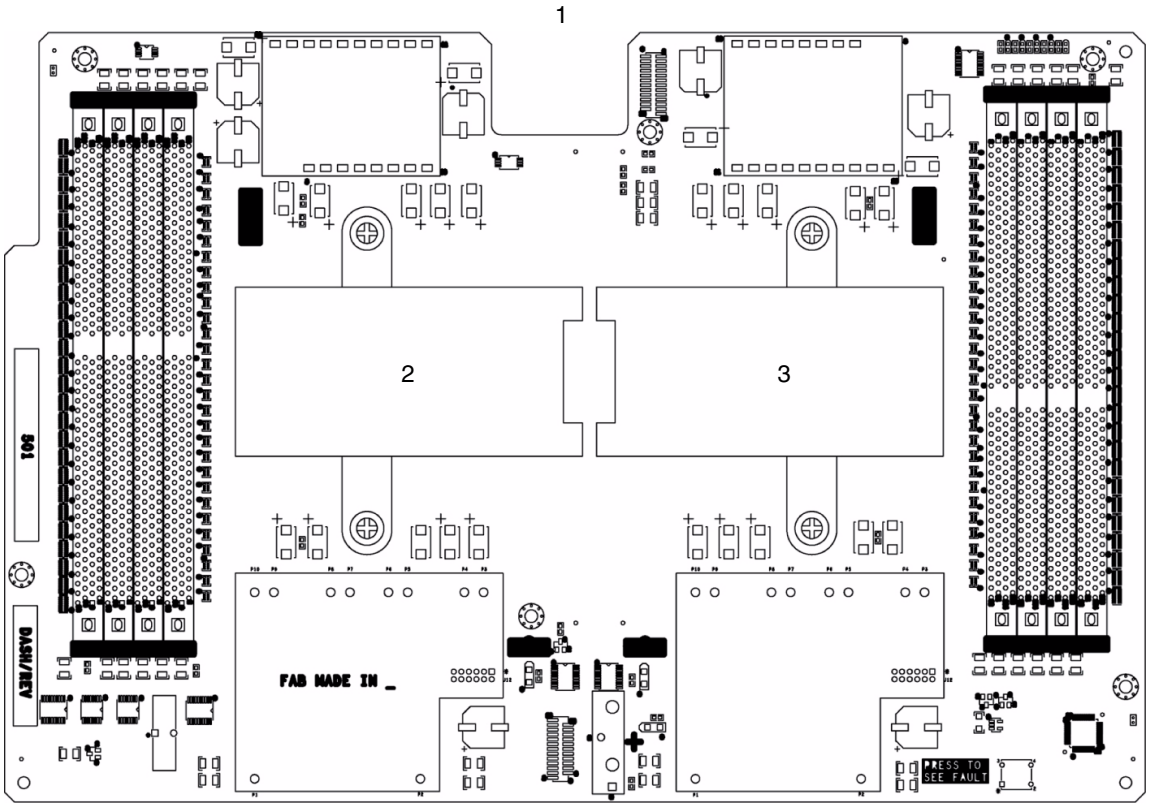


Figure Legend

1	Back of system
2	CPU 1 (under heat sink)
3	CPU 0 (under heat sink)

FIGURE 3-24 CPU Board LED and Button Locations (X4540)

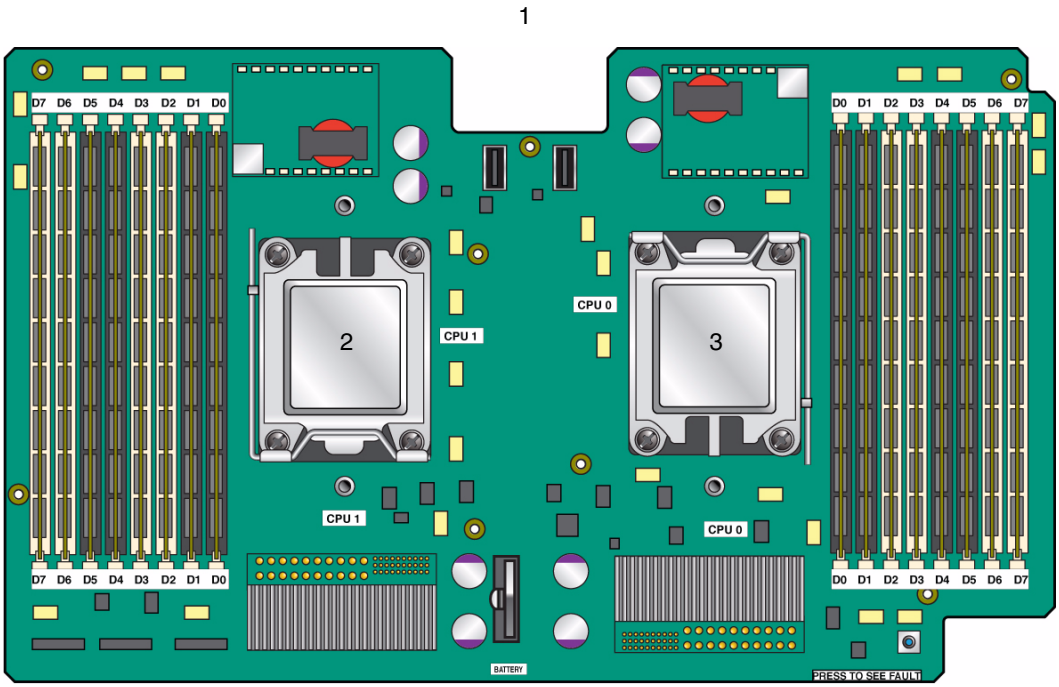
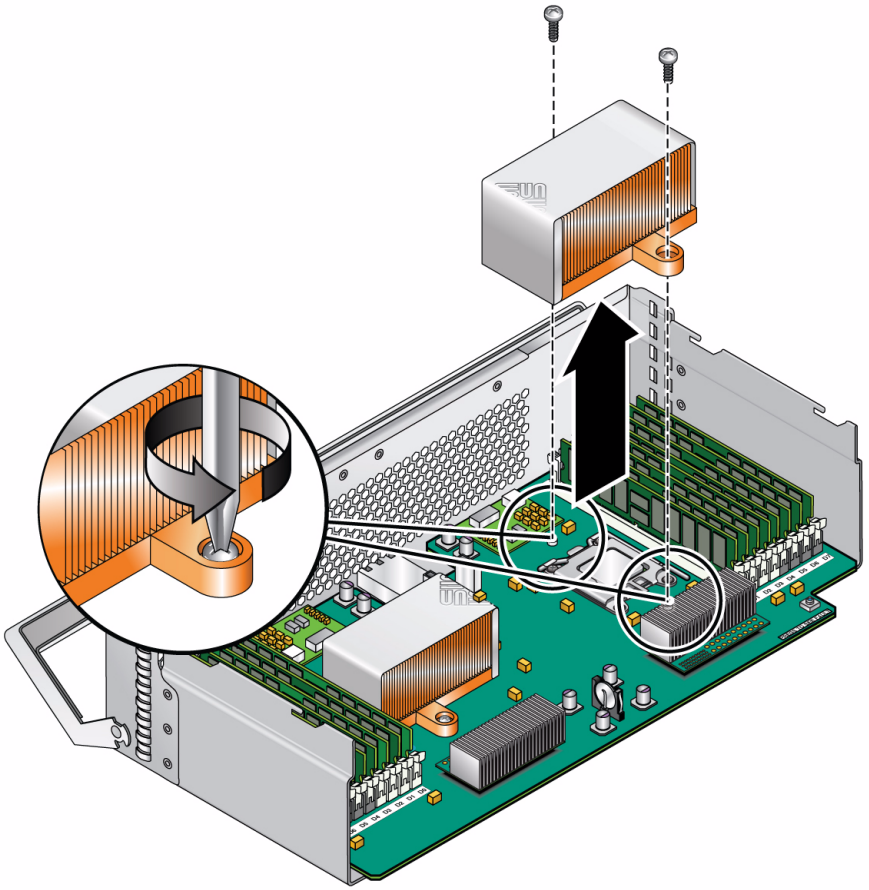


Figure Legend

1	Back of system
2	CPU 1
3	CPU 0

1. Remove the heat sink for the faulty CPU. See FIGURE 3-25 (the X4540 system is shown).

FIGURE 3-25 Removing the Heat Sink (X4540 shown)



a. Using a No. 2 Phillips screwdriver, loosen one screw two to three turns and then loosen the other screw two to three turns. Alternate between the two screws until you can remove the screws.

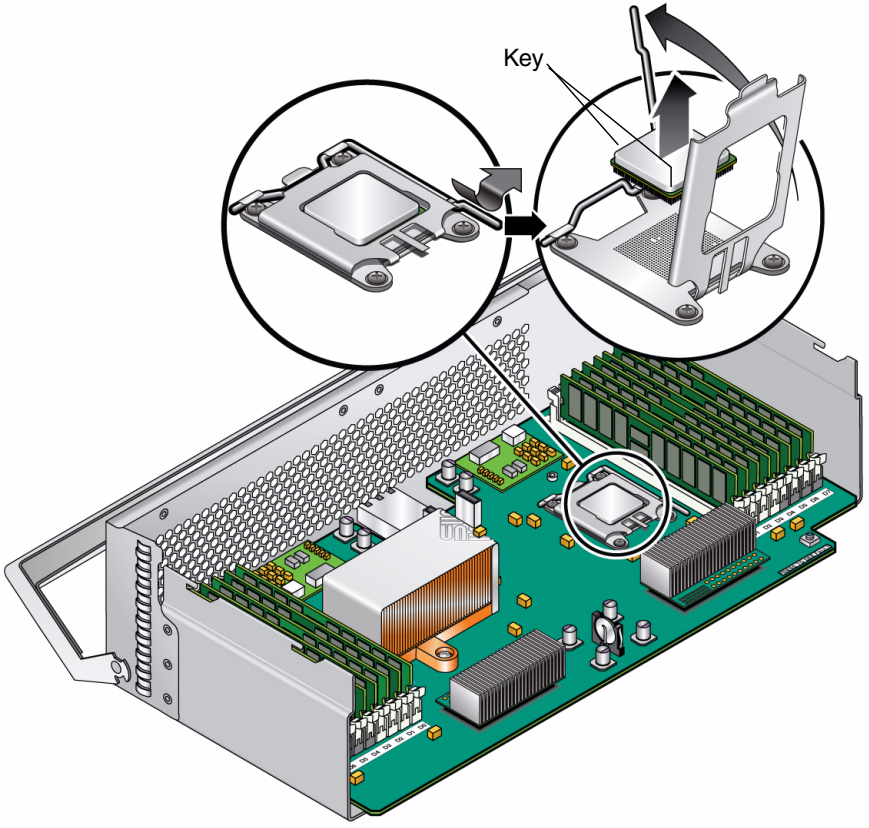
b. Gently twist the heat sink and pull it off.

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

Tip – As you pull off the heat sink, the springs in the heat sink screws might pop out. Be prepared to retrieve them.

5. **Remove the CPU by pulling the socket release lever out and up. See** FIGURE 3-26 **(the X4540 system is shown).**

FIGURE 3-26 Removing the CPU (X4540 shown)



6. **Use the included alcohol pad to remove all thermal grease from the bottom of the heat sink.**
7. **Inspect the heat sink for dust and lint. Clean if necessary.**
8. **Unpack the new CPU.**
9. **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 3-27.

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.

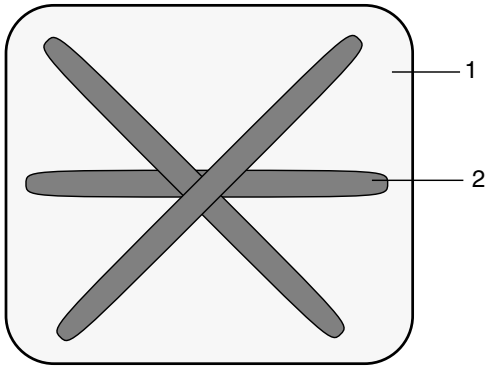
c. **Use an alcohol pad to clean all the old thermal grease from the component surface. Also, clean the dust from the heatsink fins.**

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 3-27**.**

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 3-27.

FIGURE 3-27 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.

---

10. Align the CPU to the socket.

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.

Tip – Align the gold triangle on the CPU with the white triangle on the socket. Also note the location of the keys (notches) on the CPU.

---

11. When the CPU is fully seated in the socket, pivot the release lever down until it is locked into position, at the side of 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.

---

12. **Ensure that the foam strip under the heat sink area is intact and that it has not been removed, loosened, or damaged. This foam strip is critical to proper air flow.**

13. **Carefully position the heat sink onto the CPU, aligning it with the mounting posts to reduce movement after it makes initial contact with the layer of thermal grease.**

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.

---

14. **Reinstall the heat sink by using a No. 2 Phillips screwdriver to secure the two screws.**

    a. **Tighten one screw two to three turns and then tighten the other screw two to three turns.**

    b. **Alternate between the two screws until they are firmly attached.**

15. **Return the system controller cover and tighten the three captive screws.**

16. **Replace the cable management arms and return the system controller to the server.**

▼ To Replace the GRASP Board (X4500) (FRU)

This section describes how to remove and replace the Graphics Redirect and Service Processor (GRASP) board also known as the service processor board.

Tip – If you replace the GRASP board, the SP MAC address label on the system controller handle will no longer be correct. Create a label for the new SP MAC address and place it over the existing label.

Note – After you replace the GRASP board FRU, you must use the `servicetool` command to update FRU information about the board. See Section 3.6, "Servicetool FRU Update Procedure" on page 3-8.

The GRASP board has one status LED. See Section C.3, "GRASP Board LED (Sun Fire X4500)" on page C-13 for the LED location.

- LED is off: Standby power is not reaching the GRASP board.
- LED is lit (green): 3.3V standby power is reaching the GRASP board.

TABLE 3-15 lists the qualified part numbers for this component. These part numbers are subject to change over time. For an updated list of components, see the following web site:

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

TABLE 3-15 Sun Fire X4500 Supported GRASP Board Part Numbers

Component	Part Number
Graphics Service Processor (GRASP) board, includes SP board and video board	#541-0597

1. **Power off the server as described in** Section 3.7.1, "Powering Off the Server" on page 3-10**.**
2. **Remove the cable management arm as described in one of the following:**
   - *Sun Fire X4500/X4540 Installation Guide*
   - *Sun X4500-J Slide Rail Installation Guide* (X4500)
   - "Early-Production Slide Rail and CMA Information" on page G-1 (X4500)
3. **Remove the system controller as described in** "To Remove the System Controller (CRU)" on page 3-70**.**

Caution – There is a power status LED (CR1) on the GRASP board that indicates whether 3.3V standby power is reaching the GRASP board (see FIGURE 3-28). The GRASP board is *not* hot-swappable and must never be removed while this LED is lit.

4. **Remove the GRASP board:**

Note – The GRASP board removal procedure only applies to the X4500 server.

Caution – Do not bend the GRASP board while removing it or installing it.

Carefully hold the board and lift to detach it from the left metal connector and from the bottom connectors on the I/O board.

FIGURE 3-28 Removing the GRASP Board (X4500 shown)

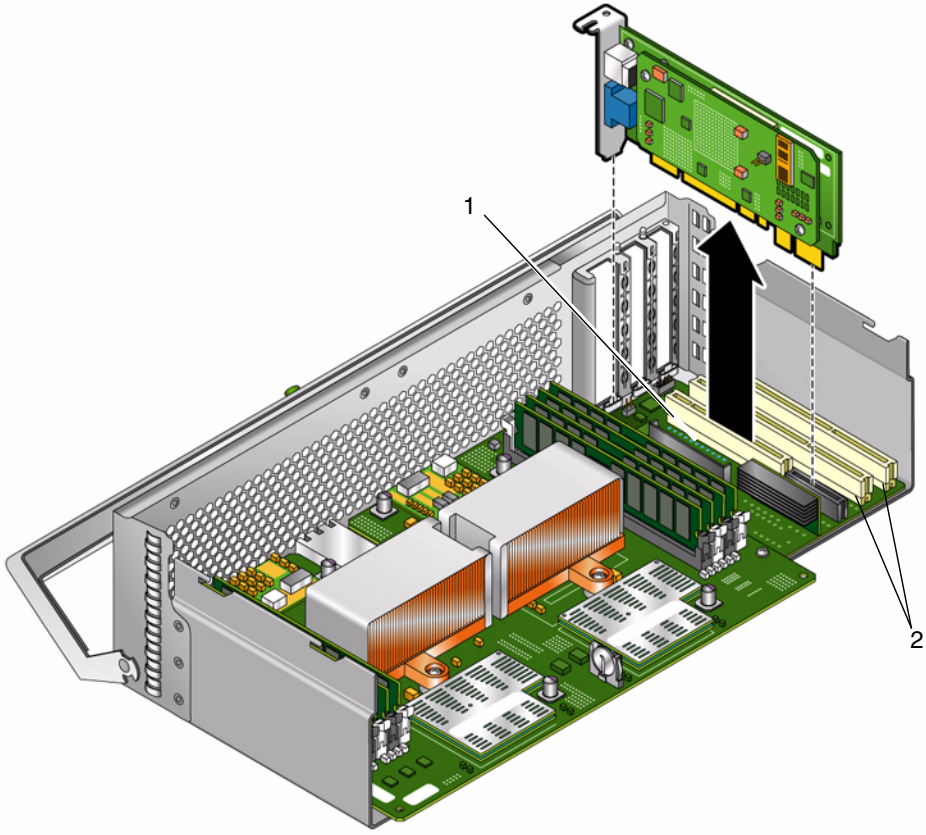


Figure Legend

1	GRASP connector
2	PCI-X connectors

5. **Install the new GRASP board.**

   Align the GRASP board so that its connectors align with the metal tab on the left, and with the bottom connectors on the I/O board. Then push the board into place.

6. **Return the system controller and the cable management arm to the server.**

   See "Replacing the System Controller (FRU)" on page 3-68.

7. **Replace the cable management assembly if necessary:**
   - *Sun Fire X4500/X4540 Installation Guide*
   - *Sun X4500-J Slide Rail Installation Guide* (X4500)

- "Early-Production Slide Rail and CMA Information" on page G-1 (X4500)

8. **Update the FRU information using `servicetool`. See** Section 3.6, "Servicetool FRU Update Procedure" on page 3-8**.**

▼ To Remove Memory Modules (DIMMs) (CRU)

This section describes how to remove and replace the server's dual inline memory modules (DIMMs).

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

Caution – DIMMs are extremely sensitive to electrostatic discharge (ESD). To avoid damaging them, use the following antistatic precautions: 1) Always wear an antistatic strap when handling DIMMs. 2) Handle DIMMs by the edges only. 3) Place DIMMs in antistatic containers for storage. 4) Place DIMMs on an antistatic mat when working with them.

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

---

1. **Power off the server as described in** Section 3.7.1, "Powering Off the Server" on page 3-10**.**
2. **Remove the cable management arm as described in one of the following:**
   - *Sun Fire X4500/X4540 Installation Guide*
   - *Sun X4500-J Slide Rail Installation Guide* (X4500)
   - "Early-Production Slide Rail and CMA Information" on page G-1 (X4500)
3. **Remove the system controller as described in** "To Remove the System Controller (CRU)" on page 3-70**.**

4. **Locate the DIMM slot on the CPU board on which you want to install or replace a DIMM.**

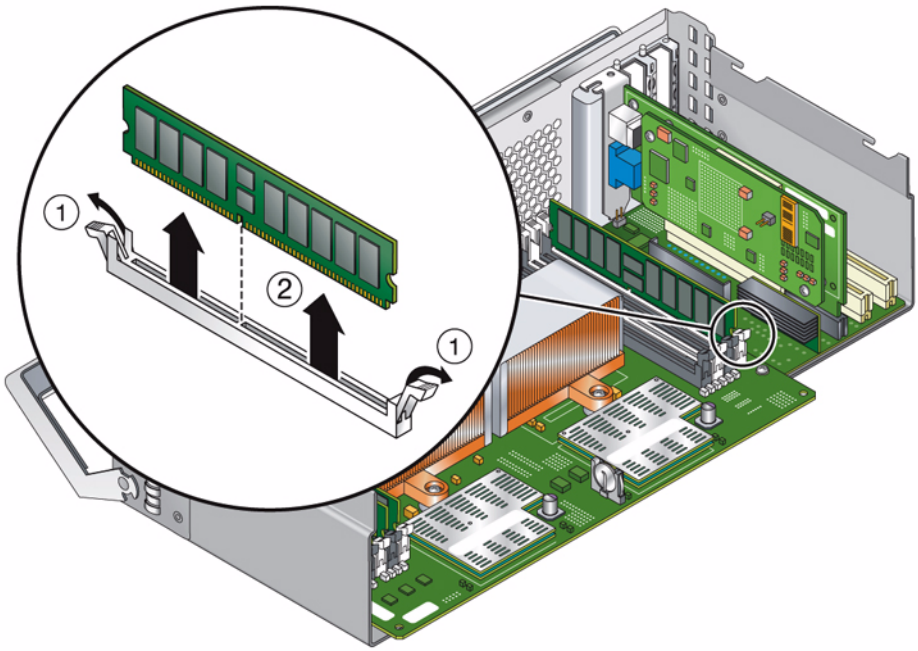
   The DIMM fault LEDs in the DIMM slot ejector levers indicate which DIMM has failed. These DIMM fault LEDs can be lit for up to one minute by a capacitor on the CPU board. To light the fault LED from the capacitor, push the small blue button on the CPU board, labeled "Press to see fault." See FIGURE 3-23 for the locations.

   One end of the DIMM ejector levers contain LEDs that can indicate a faulty DIMM:

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

   The system designation of the DIMM slots on each CPU board is shown in FIGURE 3-23 (the X4500 system is shown—4 DIMM slots).

FIGURE 3-29 Removing DIMMs on the CPU Board (X4540 shown)



5. **Review the following list of memory configuration guidelines and the supported DIMM configurations listed in TABLE 3-16 before you remove or install any DIMMs.**

   DIMM population rules for the X4500:

- Each CPU supports a maximum of four DIMMs.
- Each pair of DIMMs must be identical (same manufacturer, size, and speed).
- DIMM slots are paired and the DIMMs must be installed in pairs (0 and 1, 2 and 3). See FIGURE 3-29. The memory sockets are colored black or white to indicate which slots are paired by matching colors.
- CPUs with only a single pair of DIMMs must have those DIMMs installed in that CPU's white DIMM slots (0 and 1). See FIGURE 3-29.
- Only PC3200 ECC Registered DIMMs are supported.

TABLE 3-16 Supported DIMM Configurations — X4500

Slot 0	Slot 1	Slot 2	Slot 3	Total Memory Per CPU
2 GB	2 GB	0	0	4 GB
2 GB	2 GB	2 GB	2 GB	8 GB

DIMM population rules for the X4540:

- Each pair of DIMMs must be identical (same manufacturer, part number, size, and speed).
- DIMMs must be installed in pairs. Slots are colored-coded black or white to indicate which slots are paired by matching colors. See FIGURE 3-24.
- DIMMs must be installed in the pair of slots furthest from the CPU first, then additional DIMMs must be installed successively in the next pairs of slots: 6 and 7, 5 and 4, 2 and 3, then 0 and 1.
- CPUs with only a single pair of DIMMs must have those DIMMs installed in that CPU's DIMM slots (6 and 7).
- Only DDR-2 667 PC5300 DIMMs are supported.
- Each CPU supports a maximum of eight DIMMs.
- Total memory per CPU ranges from 2 GB (1 GB x 2 DIMMs) to 32 GB (4 GB x 8).

TABLE 3-17 Supported DIMM Configurations (X4540)

Slot 0	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6	Slot 7	Total Memory Per CPU
4 GB	4 GB	0	0	0	0	0	0	4 GB
4 GB	4 GB	4 GB	4 GB	0	0	0	0	16 GB
4 GB	4 GB	4 GB	4 GB	4 GB	4 GB	0	0	24 GB
4 GB	4 GB	4 GB	4 GB	4 GB	4 GB	0	0	24 GB
4 GB	4 GB	4 GB	4 GB	4 GB	4 GB	4 GB	4 GB	32 GB

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 3-29**.**

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

▼ To Install Memory Modules (DIMMs) (CRU)

TABLE 3-18 lists the qualified part numbers for this component. These part numbers are subject to change over time. For an updated list of components, see the following web site:

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

TABLE 3-18 Sun Fire X4500/X4540 Supported DIMM Part Numbers

Component	Part Number
4GB DDR1-400 memory (2x2GB) (X4500)	#371-1964, X4231A-Z (X-option)
4GB DDR2-667 memory (2x2GB), 512Mb based (X4540)	#541-1313, X5034 (X-option)
4GB DDR2-667 memory (2x2GB), 1GB based (X4540)	#541-3360, X4540 (X-option)
8GB DDR2-667 memory (2x4GB), 1GB based (X4540)	#541-1304, X5035 (X-option)
8GB DDR2-667 memory (2x8GB), 2GB based (X4540)	#541-3419, X8356A (X-option)

Note – If you are installing DIMMs for the first time, the DIMMs must be populated in matching pairs. The first DIMMs installed must be installed in the slots furthest from the CPU. Then, the next two closest slots are populated, and so on. There are four DIMM slots for the X4500 and eight DIMM slots for the X4540.

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

1. **Read Steps 1 through 5 in** "To Remove Memory Modules (DIMMs) (CRU)" on page 3-61**.**
2. **Install the 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 3-29**.**
   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.**
3. **Replace the system controller to the server (X4500).**

   See "Replacing the System Controller (FRU)" on page 3-68.
4. **Replace the cable management assembly if necessary. See one of the following docs depending on your CMA version:**
   - *Sun Fire X4500/X4540 Installation Guide*
   - *Sun X4500-J Slide Rail Installation Guide* (X4500)
   - "Early-Production Slide Rail and CMA Information" on page G-1 (X4500)

▼ To Install a PCI-X or PCIe Card (FRU)

The Sun Fire X4500 accommodates up to two PCI-X cards and the X4540 servers accommodates up to three PCIe expansion cards that meet PCI 2.2 specifications and the PCI-X Mechanical and Electrical Addendum with the following limitations:

- Low-profile cards only
- MD2 (6.600-in. reference) maximum length cards
- Standard component height limits
- 25W maximum power per card

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

Installing a PCI-X card is similar to installing the GRASP board.

For a list of supported PCI cards, see the following web site:

`http://www.sun.com/servers/x64/x4540/optioncards.jsp`

For an updated list of components, see the following web site:

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

From this web site, click on the Sun Fire X4540 server, then on Full Components List for the list of components. The full description of the component is listed with a Buy button beside each one.

Note – Option cards supported by operating systems are listed on the platform-specific product webpage under Companion Products. To check if the driver of your option card is available for download, check the Option Cards link on the Product Page.

1. **Power off the server.**

   See Section 3.7.1, "Powering Off the Server" on page 3-10.

2. **Remove the cable management assembly if necessary.**

   See one of the following docs depending on your CMA version:

   - *Sun Fire X4500/X4540 Installation Guide*
   - *Sun X4500-J Slide Rail Installation Guide* (X4500)
   - "Early-Production Slide Rail and CMA Information" on page G-1 (X4500)

3. **Remove the system controller.**

   See "To Remove the System Controller (CRU)" on page 3-70.

4. **Install the PCI-X board.**

   Align the PCI-X board connectors with the metal tab on the left and the bottom connectors on the I/O board. Then push the board into place. See FIGURE 3-28.

5. **Replace the system controller.**

   See "Replacing the System Controller (FRU)" on page 3-68.

6. **Replace the cable management assembly if necessary. See one of the following docs depending on your CMA version:**

   - *Sun Fire X4500/X4540 Installation Guide*

- *Sun X4500-J Slide Rail Installation Guide* (X4500)
- "Early-Production Slide Rail and CMA Information" on page G-1 (X4500)

▼ To Install the System Enclosure (FRU)

This section describes how to replace the system enclosure, which includes the chassis, the disk drives backplane, and the front indicator board and ribbon cable.

Note – This component is a FRU and must be installed only by qualified service technicians. Contact your Sun Service representative for assistance.

TABLE 3-19 lists the qualified part numbers for this component. These part numbers are subject to change over time. For an updated list of components, see the following web site:

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

TABLE 3-19 Sun Fire X4500/X4540 Supported System Enclosure Part Numbers

Component	Part Number
System enclosure including disk drives backplane and front indicator board and ribbon cable (X4500)	#541-1907
System enclosure including disk drives backplane and front indicator board and ribbon cable (2 PSUs/system) (X4540)	#541-1218
System Enclosure Super FRU with disk backplane and FIB with ribbon cable (2 PSUs/system) (X4540)	#541-3423

1. **Power off the server.**

   See Section 3.7.1, "Powering Off the Server" on page 3-10.

2. **Remove the cable management assembly if necessary.**

   See one of the following docs depending on your CMA version:

   - *Sun Fire X4500/X4540 Installation Guide*
   - *Sun X4500-J Slide Rail Installation Guide* (X4500)
   - "Early-Production Slide Rail and CMA Information" on page G-1 (X4500)

3. **Remove the system controller.**

   See "To Remove the System Controller (CRU)" on page 3-70.

4. **Remove the power supplies.**

   See "To Remove a Power Supply (CRU)" on page 3-43.

5. **Remove the fan modules.**

   See "To Replace a Fan Module (CRU)" on page 3-25.

6. **Label the drives with adhesive notes (or another method) so that you will know where to reinstall the drives at the end of this procedure.**

Note – When you remove the drives from their bays, you must return each drive to the equivalent bay in the new chassis. Use an adhesive note or another method to temporarily label the drives before you remove them.

---

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

   See "To Replace a Hard Drive (CRU)" on page 3-31.

8. **Remove old chassis from the rack.**

   See "Removing the Server From the Rack" on page 3-11

9. **Install the new chassis into the rack.**

   See the *Sun Fire X4540 Installation Guide*.

10. **Reinstall all drives to the new chassis.**

11. **Reinstall the power supplies into the new chassis.**

12. **Reinstall the fan modules into the new chassis.**

13. **Reinstall the system controller into the new chassis.**

14. **Reinstall the cable management arm.**

3.9.6 Replacing the System Controller (FRU)

This section describes how to remove and replace the system controller, which includes an I/O controller board and the CPU board. The server does not have a motherboard as a component; however, the I/O controller board and the CPU board together serve the function of a motherboard.

A replacement system controller does not include the CPU, memory (DIMMs), GRASP board (X4500) or Service Processor (X4540), or PCI cards. If these components are good, you must remove them from the old system controller and install them on the replacement system controller.

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

TABLE 3-20 lists the qualified part numbers for this component. These part numbers are subject to change over time. For an updated list of components, see the following web site:

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

TABLE 3-20 Sun Fire X4540 Supported System Controller Part Numbers

Component	Part Number
System Controller Upgrade Kit (includes I/O controller board (USB) and CPU board, 2x2356, 16x2GB (1GB), and document)	B24-FSZ2-4540-CONT (X-option)
System Controller Upgrade Kit (includes I/O controller board (USB) and CPU board, 2x2435, 16x2GB (1GB), and document)	B24-BZ2-4540-CONT (X-option)

1. **Remove the cable management assembly if necessary.**

   See one of the following docs depending on your CMA version:

   - *Sun Fire X4500/X4540 Installation Guide*
   - *Sun X4500-J Slide Rail Installation Guide* (X4500)
   - "Early-Production Slide Rail and CMA Information" on page G-1 (X4500)

2. **Remove the old system controller.**

   See "To Remove the System Controller (CRU)" on page 3-70.

3. **Move components to new system controller:**

   If the DIMMs, CPUs, heat sinks, optional PCI cards, and GRASP board (X4500) are operational and need to be moved to your new system controller, remove them from the old system controller:

   a. **See** "To Remove Memory Modules (DIMMs) (CRU)" on page 3-61 **and** "To Install Memory Modules (DIMMs) (CRU)" on page 3-64**.**

   b. **See** "To Replace a CPU (FRU)" on page 3-49**.**

   c. **See** "To Replace the GRASP Board (X4500) (FRU)" on page 3-58**.**

   d. **See** "To Install a PCI-X or PCIe Card (FRU)" on page 3-65

4. **Reinstall the new system controller into the chassis.**

   See "Replacing the System Controller (FRU)" on page 3-68.

5. **Update the FRU information using servicetool.**

   See Section 3.6, "Servicetool FRU Update Procedure" on page 3-8.

▼ To Remove the System Controller (CRU)

The system controller consists of a sub-enclosure that can be removed from the back of the main system enclosure. The system controller contains the CPUs, memory, the service processor, and optional PCI cards.

Caution – To prevent electrostatic discharge (ESD) damage to the components on the system controller, connect a ground strap between yourself and the chassis ground before proceeding.

1. **Shut down the power from the front panel and then unplug both power supply cords.**

Caution – Although both power supplies should turn off then when you remove the system controller, voltage could be present on the chassis connectors if either power supply did not shut down as expected. Thus, you must pull the power cords from the power supplies to avoid any risk from inadvertent contact with those connectors.

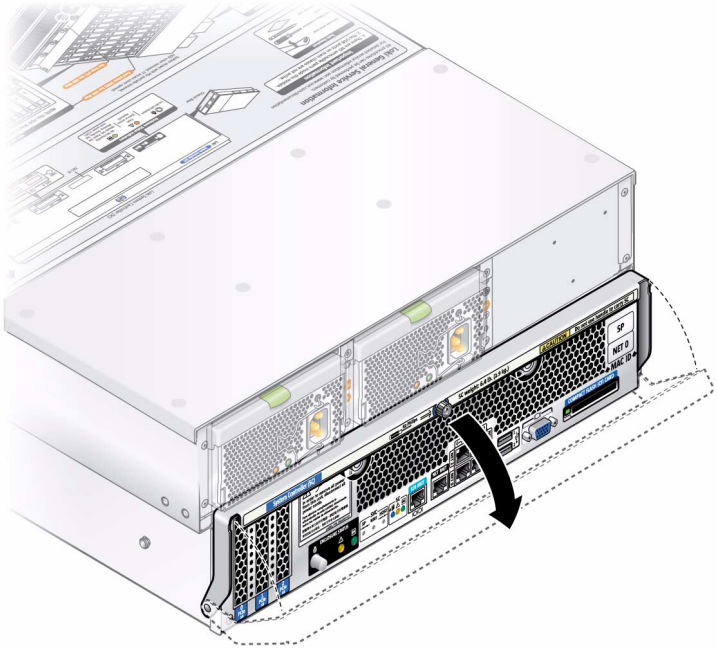
2. **Remove the CMA from the X4500 as described in one of the following:**

   See one of the following docs depending on your CMA version:

   - *Sun Fire X4500/X4540 Installation Guide*
   - *Sun X4500-J Slide Rail Installation Guide* (X4500)
   - "Early-Production Slide Rail and CMA Information" on page G-1 (X4500)

3. **Unscrew the captive screw on the system controller handle.**

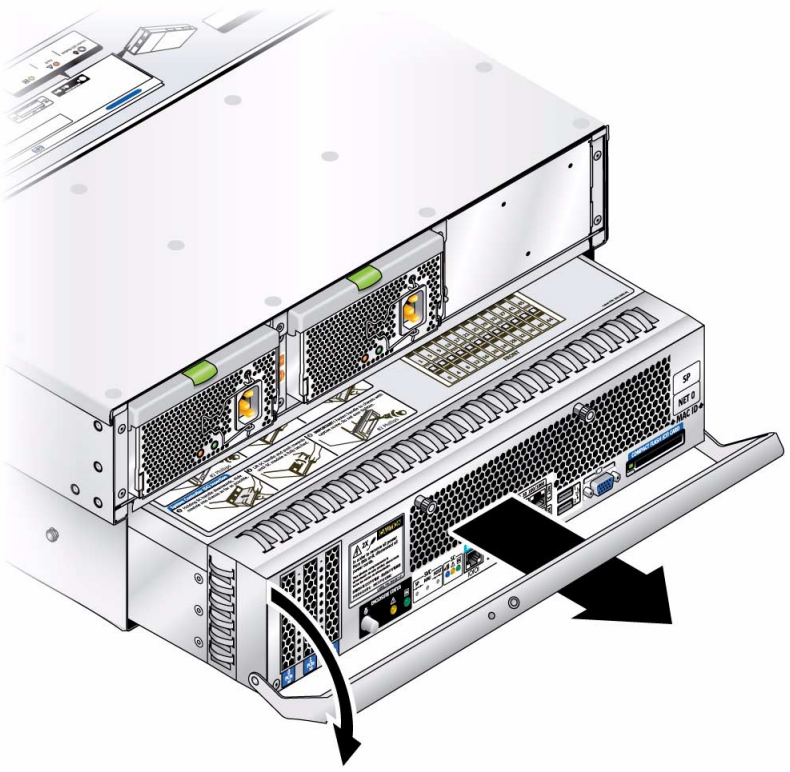
FIGURE 3-30 Opening the Protective Handle on System Controller



4. **Pull the system controller out of the chassis. See** FIGURE 3-31**.**

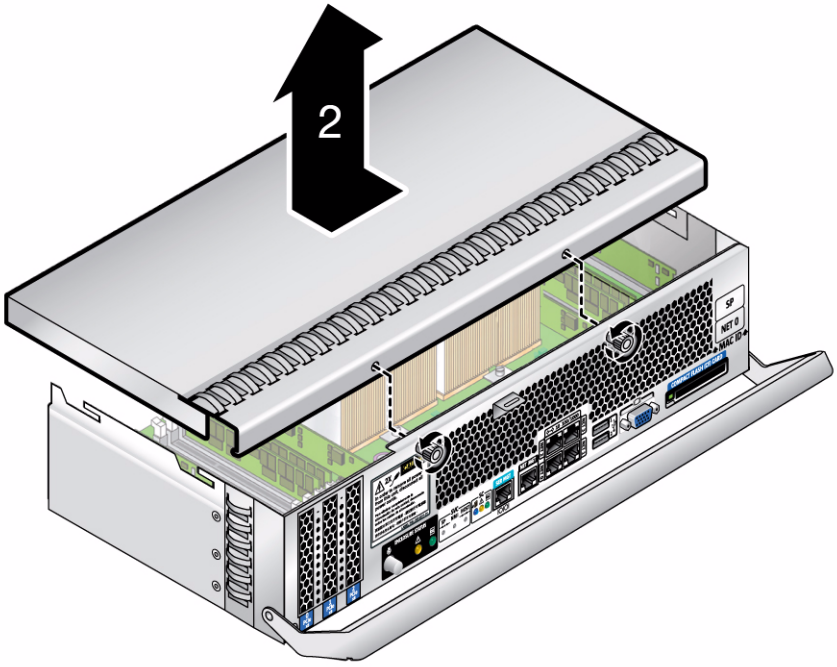
5. **Use the handle to pull the system controller from the chassis with one hand while supporting the system controller weight with the other hand.**

FIGURE 3-31 Removing the System Controller



6. **Loosen the two captive screws (with plastic green caps) under the system controller handle. See** FIGURE 3-32**.**

FIGURE 3-32 Loosening Captive Screws and Removing the Cover



7. **Remove the system controller cover.**

   Push the system controller cover toward the rear and lift it off the chassis.

▼ To Install the System Controller (CRU)

TABLE 3-21 lists the qualified part numbers for this component. These part numbers are subject to change over time. For an updated list of components, see the following web site:

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

TABLE 3-21 Sun Fire X4500/X4540 Supported System Controller Part Numbers

Component	Part Number
System controller, no CPU (X4500)	#541-1915 (FRU)
System controller, 2 x 2356, 16x 2GB (1GB based) (X4540)	B24-FSZ2-4540-CONT (X-option)
System controller, 2 x 2435, 16x 2GB (1GB based) (X4540)	B24-BZ2-4540-CONT (X-option)

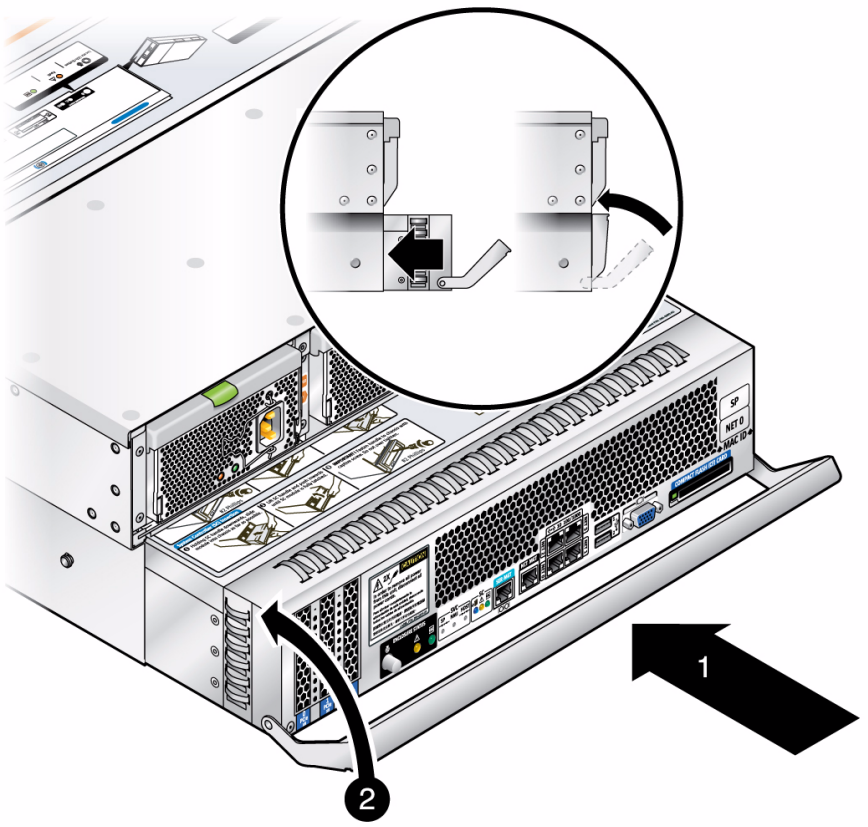
1. **Place the cover onto the system controller.**

Caution – Do not reinstall the system controller without also installing the cover. If you operate the system without the cover in place, the system might overheat and damage the system components. When this occurs, the SP might report an over temperature event at `proc.p1.t_core`.

2. **Hand tighten the two captive screws to secure the cover.**
3. **Align the system controller with the empty bay in the chassis.**

   Before replacing the system controller, make sure the cover is installed.
4. **Push the system controller into the bay until it firmly engages with the connector on the power distribution board.**

FIGURE 3-33 Replacing the System Controller



5. **Push the system controller further until it is seated firmly. Close the system controller handle.**
6. **Lift the system controller handle until its latch clicks into place.**
7. **Connect the power cables to both power supplies and make sure to use the power cord retaining clips to keep power cords attached snugly.**
8. **Replace the cable management assembly if necessary.**

   See one of the following docs depending on your CMA version:

   - *Sun Fire X4500/X4540 Installation Guide*
   - *Sun X4500-J Slide Rail Installation Guide* (X4500)
   - "Early-Production Slide Rail and CMA Information" on page G-1 (X4500)

APPENDIX **A**

System Specifications

This appendix contains physical, power, environmental, and acoustic noise emission specifications for the Sun Fire X4500/X4540 server.

TABLE A-1 Sun Fire X4500/X4540 Server Physical Specifications

Specification	Value
Width	17.3 inches (444 mm)
Height	6.8 inches (175 mm)
Depth	Without CMA • 32.5 inches (827 mm) • 29.5 inches (750 mm) for enclosure • 3 inches (77 mm) for cables With CMA (X4500) • 38 inches (966 mm)
Weight	170 pounds (472 Kg) max

TABLE A-2 Sun Fire X4500/X4540 Server 220 VAC Power Specifications

Specification for X4500/X4540 at 220 VAC	Value
Universal AC Input	200–240 VAC, 50/60 Hz
Heat output	Heat Output (max) 5800 BTU/hr (1700 W) Heat Output (typ) 3753 BTU/hr (1100 W)
Input power (Sun Fire X4500)	200–240 VAC
Maximum input power	1700 WAC

TABLE A-3 Sun Fire X4540 Server 110 VAC Power Specifications

Specification for X4540 at 110 VAC	Value
Universal AC Input	100-127VAC, 50/60Hz 12A
Heat output	Heat Output (max) 5800 BTU/hr (1700 W) Heat Output (typ) 3753 BTU/hr (1100 W)
Input power (Sun Fire X4500)	200–240 VAC
Maximum input power	1700 WAC

TABLE A-4 Sun Fire X4500/X4540 Server Environmental Specifications

Specification	Value
Operating temperature	5˚ to 32 ˚C (41 ˚C to 90˚ F) 10% to 90% relative humidity, 27º C max. wet bulb (noncondensing)
Storage temperature	-40 ˚C to 65 ˚C (-40 ˚F to 149 ˚F) up to 93% relative humidity, noncondensing, 38 ºC max wet bulb
Operating altitude	Up to 3048 meters, maximum ambient temperature is derated by 1 º C per 300 meters above 900 meters
Nonoperating altitude	Up to 12,000 meters

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

TABLE A-5 Sun Fire X4500/X4540 Server Acoustic Noise Emission Specifications

Specification	28C and below	Above 28C
Acoustic noise	Less than 83 dB sound power in ambient temperature of up to 24º C	
LwAd operating and idle	8.0 B	8.5 B
LpAm	70 dB	75 dB

APPENDIX **B**

BIOS POST Codes

This appendix describes the BIOS POST Codes. It contains the following sections:

B.1 Introduction to Power-On Self-Test (POST)

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 Marvell disk controller (X4500), or the LSI SAS1068E disk controller (X4540), and the attached disks in slot 0 and slot 1 are probed and enumerated, and the two Intel 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 lower-right hand 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 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.4, "Redirecting Console Output" on page B-3).

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

B.2 How to Load Optimal Default Settings During BIOS/POST

1. **Press F2 to invoke Setup.**

   After some screen messages, the BIOS setup utility appears.

2. **Press F9, or use the arrow keys to scroll to the Exit -> Load Optimal Defaults.**

   A dialog box asks "Load Optimal Defaults [OK]."

3. **Press Enter.**

   The dialog box closes.

4. **Press F10 or use the arrow keys to scroll to Exit -> Save Changes and Exit.**

   A dialog asks if you want to save your changes and exit.

5. **Press Enter to save your changes and exit the BIOS utility.**

B.3 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) and executed.
2. Once the code is executing in 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.5, "Changing POST Options" on page B-4 for more information.

Note – Because the Sun Fire X4500/X4540 server can contain up to 32 GB of memory, the memory test can take several minutes. You cancel POST testing by pressing any key.

---

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

B.4 Redirecting Console Output

Use these instructions to access the service processor and to 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).**

   The BIOS Main Menu screen appears.

2. **Select Advanced.**

   The Advanced Settings screen appears.

3. **Select IPMI 2.0 Configuration.**

   The IPMI 2.0 Configuration screen is displayed.

4. **Select the LAN Configuration menu item.**

5. **Select the IP Assignment option that you want to use (**`DHCP` **or** `Static`**).**

   If you choose `DHCP`, the server's IP address is retrieved from your network's DHCP server and displayed in following format:

   ```
   Current IP address in BMC : xxx.xxx.xxx.xxx
   ```

   If you choose `Static`, assign the IP address manually using these steps:

   a. **Type the IP address in the IP Address field.**

      You can also enter the subnet mask and default gateway settings in their respective fields.

   b. **Select Commit and press return to make the changes.**

   c. **Select Refresh and press return to see your new settings displayed in the** `Current IP address in BMC` **field.**

6. **Start a web browser and type the service processor's IP address in the browser's URL field.**

   A prompt appears.

7. **Type a user name and password as follows:**

   User name: **`root`**
   Password: **`changeme`**

   The ILOM Service Processor GUI screen appears.

8. **Click the Remote Control tab.**

9. **Click the Redirection tab.**

10. **Set the color depth for the redirection console to either 6 or 8 bits.**

11. **Click the Start Redirection button.**

    The javaRConsole window appears and prompts for your user name and password again.

12. **Type a user name and password as follows:**

    User name: **`root`**
    Password: **`changeme`**

    The current POST screen is displayed.

B.5 Changing POST Options

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

1. **Initialize the BIOS Setup utility by pressing the F2 key while the system is performing the POST.**

   The BIOS Main Menu screen appears.

2. **Select the Boot menu.**

3. **From the Boot Settings screen, select Boot Settings Configuration.**

   The Boot Settings Configuration screen appears.

4. Select one or more of the following options:

TABLE B-1 POST Options

Option	Description
Quick Boot	This option causes the system to boot faster by skipping certain tests, such as the extensive memory test.
System Configuration Display	This option causes the system to display the system configuration screen before booting begins.
Quiet Boot	This option causes the system to display the Sun Microsystems logo instead of POST codes.
Language	This option is reserved for future use. Do not change.
Add On ROM Display Mode	When Quiet Boot is enabled, this option controls whether output from the Option ROM is displayed: • Force BIOS (default): Remove the Sun logo and display Option ROM output • Keep Current: Display the Sun logo and do not display Option ROM output.
Boot Num-Lock	This option controls how the system sets the keyboard Num-Lock during boot. Turn this option On to set the Num-Lock On (default) or Off to turn the Num-Lock Off.
Wait for F1 if Error	Enabling this option causes the system to pause the POST if it encounters an error, and wait for an operator to press the F1 key before resuming. The default of Off.
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 on the right side of the screen.

B.6 POST Codes

TABLE B-2 contains descriptions of each of the POST codes, listed in the same order in which they are generated. These POST codes appear as a four-digit string that is a combination of two-digit output from primary I/O port 80 and two-digit output from secondary I/O port 81. In the POST codes listed in TABLE B-2, the first two digits are from port 81 and the last two digits are from port 80.

TABLE B-2 POST Codes

Post Code	Description
00d0	Coming out of POR, PCI configuration space initialization, enabling 8111's SMBus.
00d1	Keyboard controller BAT, waking up from PM, saving power-on CPUID in scratch CMOS.
00d2	Disable cache, full memory sizing, and verify that flat mode is enabled.
00d3	Memory detections and sizing in boot block, cache disabled, IO APIC enabled.
01d4	Test base 512 KB memory. Adjust policies and cache first 8MB.
01d5	Boot block code is copied from ROM to lower RAM. BIOS is now executing out of RAM.
01d6	Key sequence and OEM specific method is checked to determine if BIOS recovery is forced. If next code is E0, BIOS recovery is being executed. Main BIOS checksum is tested.
01d7	Restoring CPUID; moving boot block-runtime interface module to RAM; determine whether to execute serial flash.
01d8	Decompressing runtime module into RAM. Storing CPUID information in memory.
01d9	Copying main BIOS into memory.
01da	Giving control to BIOS POST.
0004	Check CMOS diagnostic byte to determine if battery power is OK and CMOS checksum is OK. If the CMOS checksum is bad, update CMOS with power-on default values.
00c2	Set up boot strap processor for POST. This includes frequency calculation, loading BSP microcode, and applying user requested value for GART Error Reporting setup question.
00c3	Errata workarounds applied to the BSP (#78 & #110).
00c5	Enumerate and set up application processors. This includes microcode loading, and workarounds for errata (#78, #110, #106, #107, #69, #63).
00c6	Reenable cache for boot strap processor, and apply workarounds in the BSP for errata #106, #107, #69, and #63 if appropriate.
00c7	HT sets link frequencies and widths to their final values.
000a	Initializing the 8042 compatible Keyboard Controller.
000c	Detecting the presence of keyboard in KBC port.

TABLE B-2 POST Codes *(Continued)*

Post Code	Description
000e	Testing and initialization of input devices. Traps the INT09h vector, so that the POST INT09h handler gets control for IRQ1.
8600	Preparing CPU for booting to OS by copying all the context of the BSP to all application processors present. NOTE: APs are left in the CLI HLT state.
de00	Preparing CPU for booting to OS by copying all the context of the BSP to all application processors present. NOTE: APs are left in the CLI HLT state.
8613	Initialize PM regs and PM PCI regs at Early-POST. Initialize multi-host bridge, if system supports it. Setup ECC options before memory clearing. Enable PCI-X clock lines in the 8131.
0024	Decompress and initialize any platform specific BIOS modules.
862a	BBS ROM initialization.
002a	Generic Device Initialization Manager (DIM) - Disable all devices.
042a	ISA PnP devices - Disable all devices.
052a	PCI devices - Disable all devices.
122a	ISA devices - Static device initialization.
152a	PCI devices - Static device initialization.
252a	PCI devices - Output device initialization.
202c	Initializing devices. Detecting and initializing the video adapter installed in the system that have optional ROMs.
002e	Initializing all the output devices.
0033	Initializing the silent boot module. Set the window for displaying text information.
0037	Displaying sign-on message, CPU information, setup key message, and any OEM-specific information.
4538	PCI devices - IPL device initialization.
5538	PCI devices - General device initialization.
8600	Preparing CPU for booting to OS by copying all the context of the BSP to all application processors present. NOTE: APs are left in the CLI HLT state.

B.7 POST Code Checkpoints

The POST code checkpoints are the largest set of checkpoints during the BIOS pre-boot process. TABLE B-3 describes the 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-3 POST Code Checkpoints

Post Code	Description
03	Disable NMI, Parity, video for EGA, and DMA controllers. At this point, POST code is still executing out of BIOS ROM.
04	Check CMOS diagnostic byte to determine if battery power is OK and CMOS checksum is OK. Verify CMOS checksum manually by reading storage area. If the CMOS checksum is bad, update CMOS with power-on default values and clear passwords. Initialize status register A. Initializes data variables that are based on CMOS setup questions. Initializes both the 8259 compatible PICs in the system.
05	Initializes the interrupt controlling hardware (generally PIC) and interrupt vector table.
06	Do R/W test to CH-2 count register. Initialize CH-0 as system timer. Install the POSTINT1Ch handler. Enable IRQ-0 in PIC for system timer interrupt. Traps INT1Ch vector to POSTINT1ChHandlerBlock.
C0	Early CPU Init Start-Disable Cache-Init Local APIC.
C1	Set up boot strap processor information.
C2	Set up boot strap processor for POST. This includes calculating the frequency, loading BSP microcode, and applying user-requested value for GART Error Reporting setup question.
C3	Errata workarounds applied to the BSP (#78 & #110).
C5	Enumerate and set up application processors. This includes microcode loading, and workarounds for errata (#78, #110, #106, #107, #69, #63).
C6	Reenable cache for boot strap processor, and apply workarounds in the BSP for errata #106, #107, #69, and #63 if appropriate. In case of mixed CPU steppings, errors are sought and logged, and an appropriate frequency for all CPUs is found and applied. NOTE: APs are left in the CLI HLT state.
C7	The HT sets link frequencies and widths to their final values. This routine gets called after CPU frequency has been calculated to prevent bad programming.
0A	Initializes the 8042 compatible keyboard controller.
0B	Detects the presence of PS/2 mouse.
0C	Detects the presence of keyboard in KBC port.

TABLE B-3 POST Code Checkpoints *(Continued)*

Post Code	Description
0E	Testing and initialization of input devices. Also, update the kernel variables. Traps the INT09h vector, so that the POST INT09h handler gets control for IRQ1. Decompress all available language, BIOS logo, and Silent logo modules.
13	Initialize PM regs and PM PCI regs at Early-POST. Initialize multi-host bridge, if system supports it. Set up ECC options before clearing memory. REDIRECTION causes corrected data to written to RAM immediately. CHIPKILL provides 4-bit error det/corr of x4 type memory. Enable PCI-X clock lines in the 8131.
20	Relocate all the CPUs to a unique SMBASE address. The BSP will be set to have its entry point at A000:0. If fewer than five CPU sockets are present on a board, subsequent CPUs entry points are separated by 8000h bytes. If more than four CPU sockets are present, entry points are separated by 200h bytes. CPU module is responsible for the relocation of the CPU to correct address. NOTE: APs are left in the INIT state.
24	Decompress and initialize any platform-specific BIOS modules.
30	Initialize System Management Interrupt.
2A	Initializes various devices through DIM.
2C	Initializes various devices. For all devices, assigns resources and initializes option ROM if required.
2E	Initializes all the output devices.
31	Allocate memory for ADM module and decompress it. Give control to ADM module for initialization. Initialize language and font modules for ADM. Activate ADM module.
33	Initializes the silent boot module. Set the window for displaying text information.
37	Displaying sign-on message, CPU information, setup key message, and any OEM-specific information.
38	Initializes various devices through DIM.
39	Initializes DMAC-1 and DMAC-2.
3A	Initialize RTC date/time.
3B	Test for total memory installed in the system. Also, check for DEL or ESC keys to limit memory test. Display total memory in the system.
3C	By this point, RAM read/write test and the memory controller programming are complete.
40	Detect various devices (parallel ports, serial ports, and coprocessor in CPU, etc.) successfully installed in the system and update the BDA, EBDA, etc.
50	Programming the memory hole or any kind of implementation that needs an adjustment in system RAM size if necessary.
52	Updates CMOS memory size from memory found in memory test. Allocates memory for Extended BIOS Data Area from base memory.
60	Initializes NUM-LOCK status and programs the keyboard.

TABLE B-3 POST Code Checkpoints *(Continued)*

Post Code	Description
75	Initialize Int-13 and prepare for IPL detection.
78	Initializes IPL devices controlled by BIOS and option ROMs.
7A	Initializes remaining option ROMs.
7C	Generate and write contents of ESCD in NVRam.
84	Log errors encountered during POST.
85	Display errors to the user and receives the user responses.
87	Execute BIOS setup if needed/requested.
8C	After all device initialization is done, programmed any user-selectable parameters relating to NB/SB, such as timing parameters, noncacheable regions and the shadow RAM cacheability, and do any other NB/SB/PCI-X/OEM-specific programming necessary during late-POST. Background scrubbing for DRAM, and L1 and L2 caches are set up based on setup questions. Get the DRAM scrub limits from each node. Workaround for erratum #101 is applied here.
8D	Build ACPI tables (if ACPI is supported).
8E	Program the peripheral parameters. Enable/Disable NMI as selected.
90	Late POST initialization of system management interrupt.
A0	Check boot password if installed.
A1	Clean-up work required before booting to OS.
A2	Takes care of runtime image preparation for various BIOS modules. Fill the free area in F000h segment with 0FFh. Initializes the Microsoft IRQ Routing Table. Prepares the runtime language module. Disables the system configuration display if required.
A4	Initialize runtime language module.
A7	Displays the system configuration screen if enabled. Initialize the CPUs before boot, which includes the programming of the MTRRs.
A8	Prepare CPU for OS boot including final MTRR values.
A9	Wait for user input at config display if required.
AA	Uninstall POST INT1Ch vector and INT09h vector. Deinitializes the ADM module.
AB	Prepare BBS for Int 19 boot.
AC	Any kind of chipset (NB/SB)-specific programming required during end-POST, just before giving control to runtime code booting to OS. Programmed the system BIOS (0F0000h shadow RAM) cacheability. Ported to handle any OEM specific programming required during end-POST. Copy OEM-specific data from POST_DSEG to RUN_CSEG.

TABLE B-3 POST Code Checkpoints *(Continued)*

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

APPENDIX **C**

Status Indicator LEDs

This appendix contains information about the locations and behaviors of the status and fault LEDs on the server. The information is organized to describe external LEDs that can be viewed on the outside of the server, and internal LEDs that can be viewed only with the main cover removed.

This appendix contains the following sections:

C.1 Front Panel LEDs

EXAMPLE C-1 Close Up of Controls and Indicators

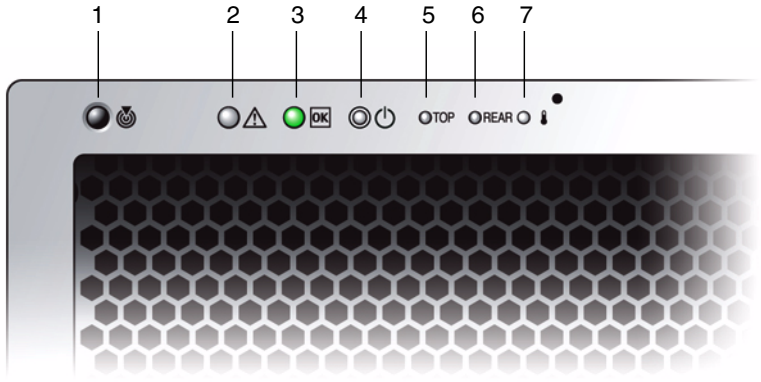


TABLE C-2 lists and describes the controls and indicators LEDs.

TABLE C-1 Controls and Indicators

#	Name	Color	Description
1	Locate button/LED	White	Press to toggle on/off locally. Remains on (as fast blinking 4Hz) for 30 minutes or until turned off. Operators can turn this LED on remotely to help them locate the server in a crowded server room: • In the ILOM GUI, navigate to System Monitoring > Indicators and select the radio button next to /SYS/LOCATE. From the Actions drop-down menu, select "Set LED to Fast Blink" or "Turn LED Off." • In the CLI, enter: `set /SYS/LOCATE value=[fast_blink|off]` • Press to turn on or off. Press the Locate LED/Switch for five seconds to turn all indicators on for 15 seconds.
2	System Fault LED	Amber	Off—Normal operation On—Service action is required. A system running under these conditions are in a fault condition, but the SP does not log the reason the service LED is illuminated: • 220VAC with only 1 PSU • 110VAC with only two PSUs
3	Power/OK LED	Green	Steady on—Power is on and system is operational. Blinking—Standby power is on but main power is off. Blinks briefly once every 3 seconds. Off—Power is off.
4	System power button		If on, press briefly for a controlled shut down. Press and hold for 4 seconds for immediate shutdown. **Caution -** Caution there may be data loss for immediate shutdown. See Section 2.1, "Powering On the Server" on page 2-2 for details.

TABLE C-1 Controls and Indicators

#	Name	Color	Description
5	Top fault LED	Amber	On—Drive or fan fault: open top cover to service.
6	Rear fault LED	Amber	On—Power supply or system controller fault (service is required at rear of system).
7	System Over Temperature	Amber	On—Server is in over-temperature condition.

TOP

REAR

C.1.1 Rear Panel LEDs

FIGURE C-1 Sun Fire X4500 Server Rear Panel

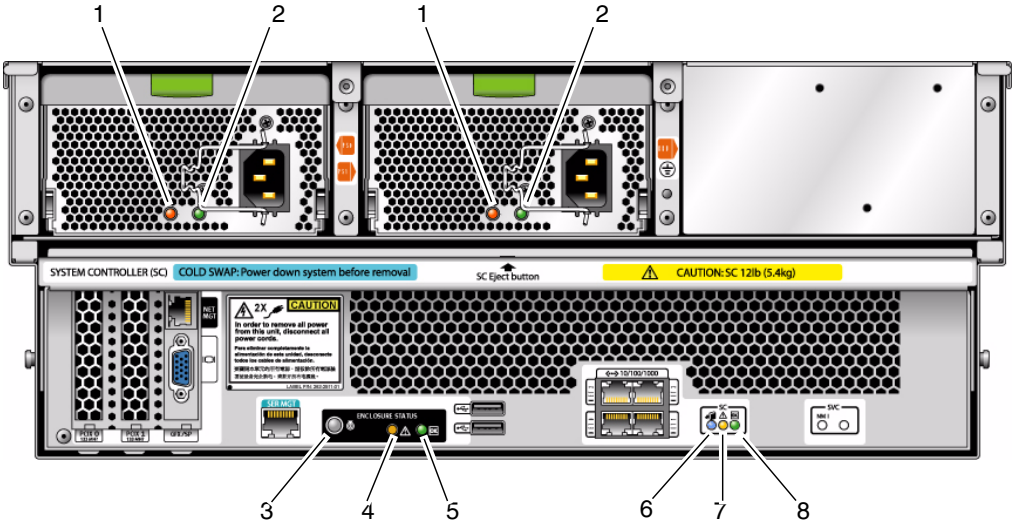


FIGURE C-2 Sun Fire X4540 Server Rear Panel

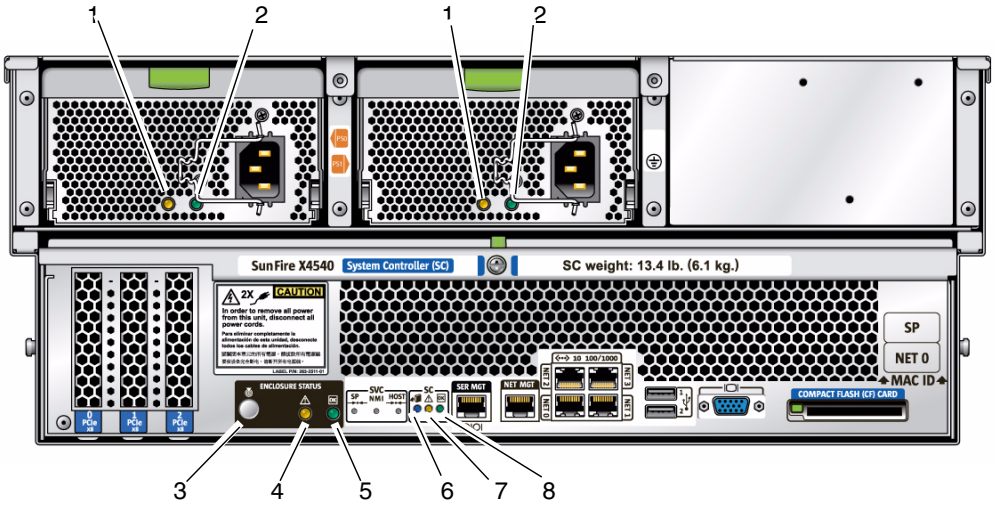


TABLE C-2 Sun Fire X4540 External LEDs

#	Name	Color	Function
1	Power Supply LED	Amber	Steady on—Fault. Service action required.
2	OK	Green	Steady on—Power is on (AC/DC are OK). Blinking —Blinks briefly once every 3 seconds. Standby power is on (AC is OK). Off — Power is off.
3	Locate button/LED	White	Toggles on/off locally—Operators can turn on this on remotely to help them locate the enclosure in a crowded server room. Press to turn off.
4	System Fault LED	Amber	Off—Normal operation On—Service action is required. A system running under these conditions are in a fault condition, but the SP does not log the reason the service LED is illuminated: • 220VAC with only 1 PSU • 110VAC with only two PSUs
5	System Power LED	Green	Steady on— Power is on and system is operational. Blinking—Standby power is on but main power is off. Blinks briefly once every 3 seconds. Off — Power is off.

TABLE C-2 Sun Fire X4540 External LEDs *(Continued)*

#	Name	Color	Function
6	Ready to Remove	Blue	Ready to remove (service action allowed)
7	Fault	Amber	Fault (Service action required)
8	OK	Green	OK (no action required)

C.2 Disk Drive and Fan Tray LEDs

FIGURE C-3 shows the location of the internal LEDs. FIGURE C-5 shows a close-up view of the disk drive and fan trays, including the symbols that identify the LEDs.

Note – On fan trays, the green and amber (OK and Fault) LEDs might be on simultaneously. This indicates that while a fan has failed, at least one of its fans is still operational.

Note – Early fan trays had a blue LED that was not activated. Later versions of the fan trays have only a green and amber LED.

FIGURE C-3 Disk Drive and Fan Trays (X4500)

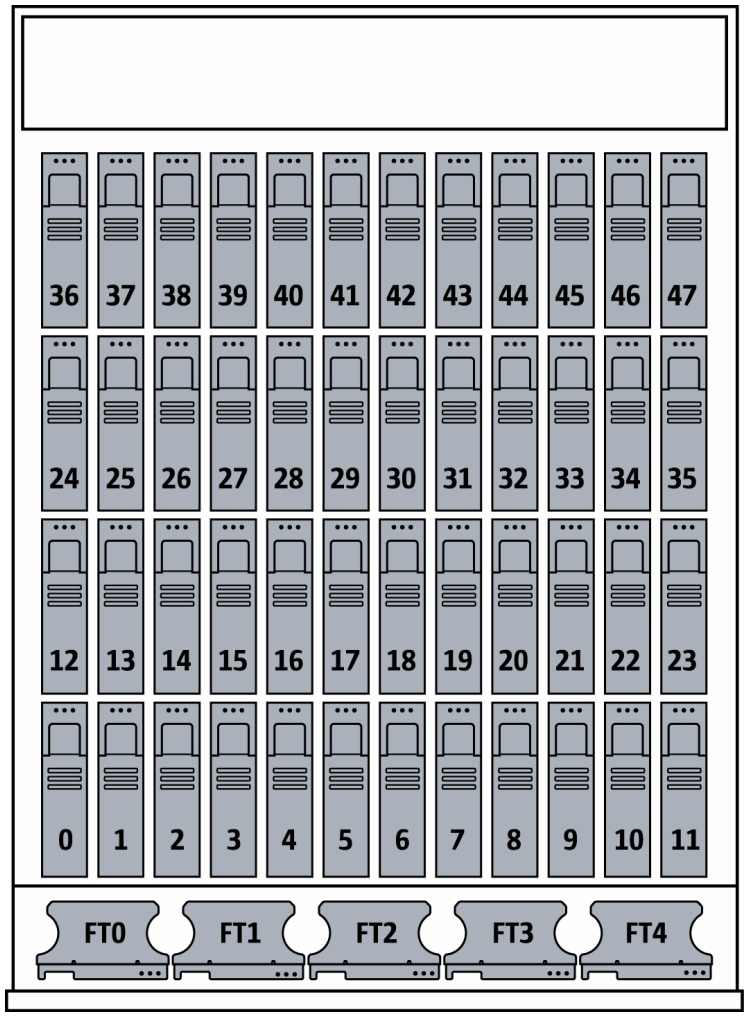


Figure Legend

0	Boot drive
1	Boot drive

FIGURE C-4 Disk Drive and Fan Trays (X4540)

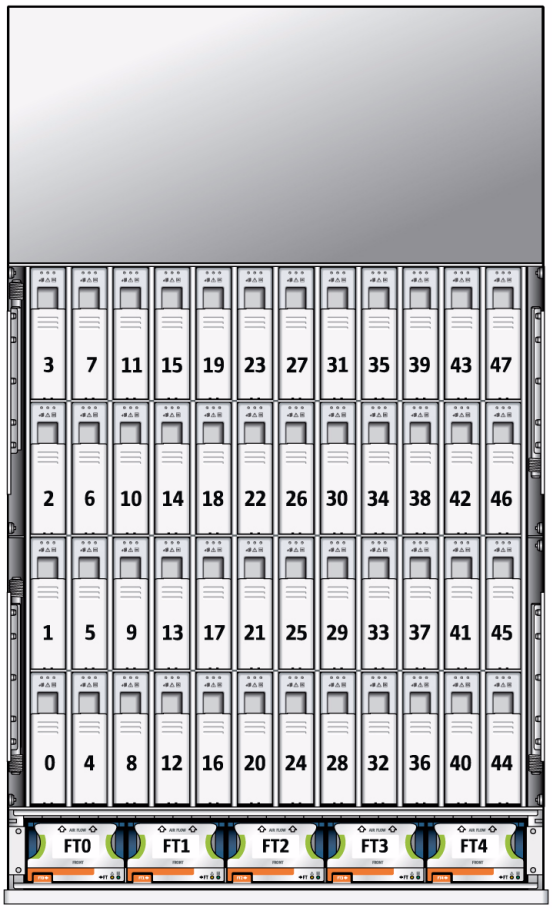


Figure Legend

1	Boot drive
2	Boot drive
3	Boot drive
4	Boot drive

FIGURE C-5 Disk Drive and Fan Tray LEDs

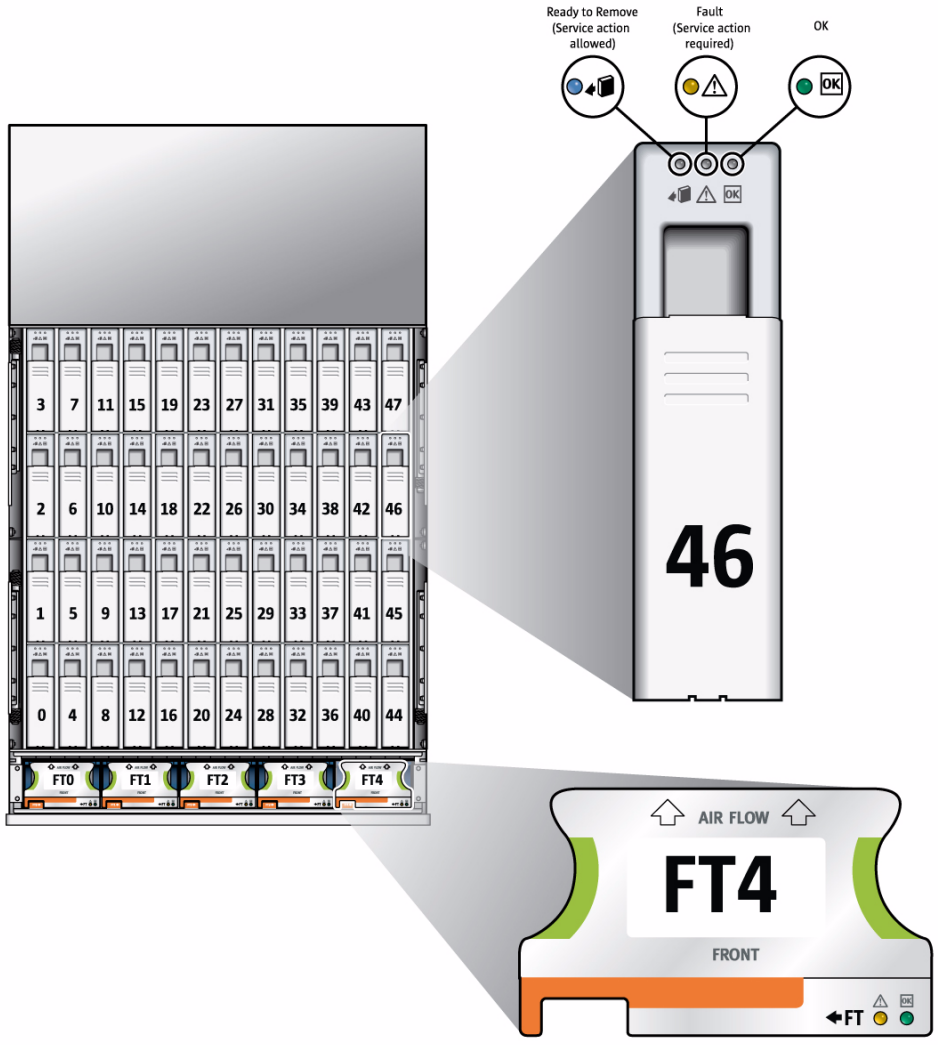


TABLE C-3 lists the disk drive LEDs:

TABLE C-3 Internal LEDs

Name	Color	Function
Disk Drives		
Status (Power)	Green	Unit is OK. See Note in Section C.2, "Disk Drive and Fan Tray LEDs" on page C-6.
Fault (Alert)	Amber	Service action is required.
Ready to Remove	Blue	Service action is allowed.
Fan Trays		
Status	Green	Unit is OK. Blinking = data transfer.
Fault	Amber	Fault (Service action required)

C.2.1 CPU Board LEDs

The CPU board has three types of LEDs. They are listed in TABLE C-3 and appear in FIGURE C-6.

The CPU LEDs are active only when the Remind button is depressed. They blink to indicate a failure; otherwise they stay Off.

Note – The CPU and DIMM LEDs continue to indicate a failure until the system is powered on. The Battery LED continues to indicate a failure until the service processor is started.

FIGURE C-6 CPU Board, Including LEDs and Remind Switch (X4500)

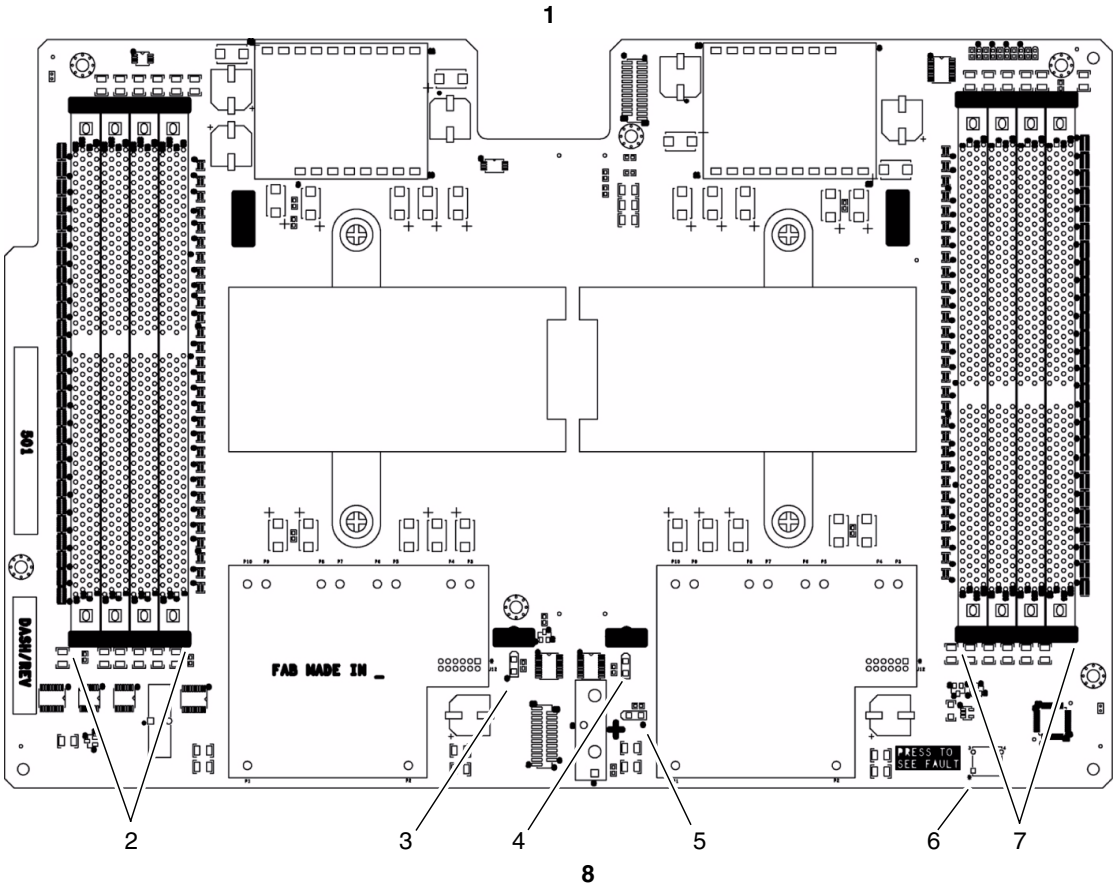


Figure Legend

1	Back of system
2	DIMM fault LEDs under DIMM eject levers
3	CPU 1 fault LED
4	CPU 0 fault LED
5	Battery fault LED
6	Remind button (LEDs are active only when the Remind button is pressed.)
7	DIMM fault LED (under DIMM eject levers)
8	Front of system

FIGURE C-7 CPU Board, Including LEDs and Remind Switch (Sun Fire X4540)

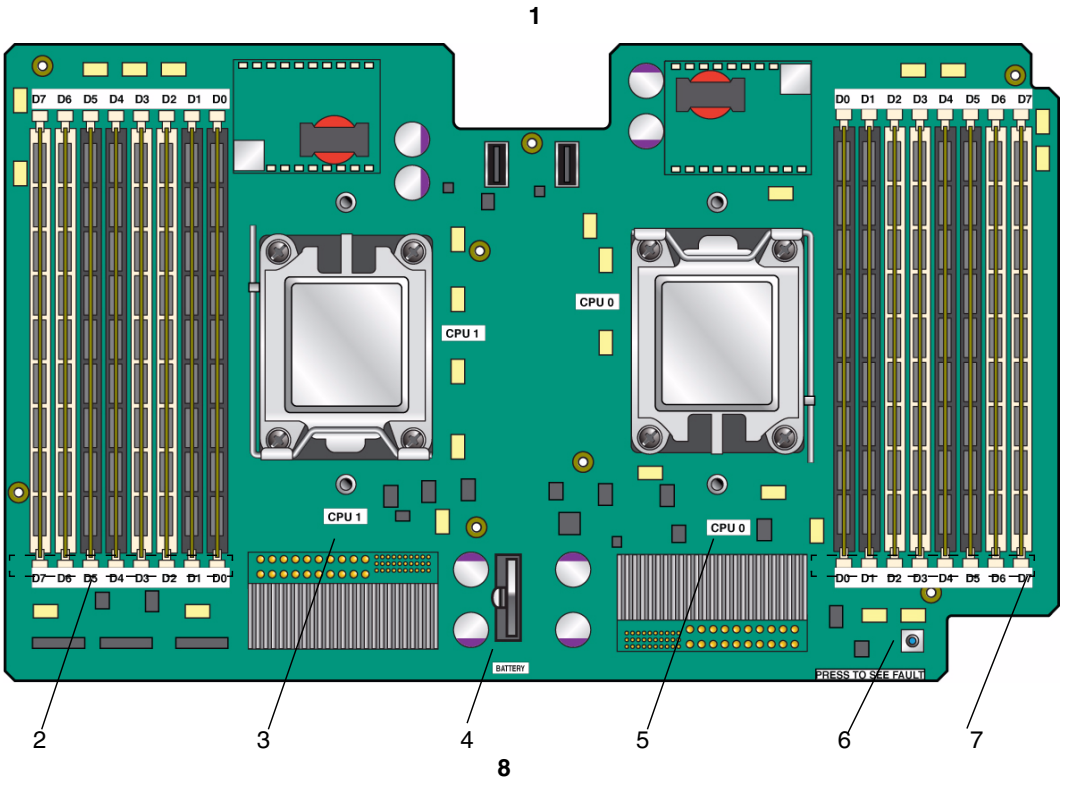


Figure Legend

1	Back of system
2	DIMM fault LEDs under DIMM eject levers (7, 6, 5, 4, 3, 2, 2, 1, 0)
3	CPU 1 fault LED
4	Battery fault LED
5	CPU 0 fault LED
6	Remind button (LEDs are active only when the Remind button is pressed.)
7	DIMM fault LEDs under DIMM eject levers (0, 1, 2, 3, 4, 5, 6, 7)
8	Front of system

TABLE C-3 lists the CPU Board LEDs:

TABLE C-4 Internal LEDs

Name	Color	Function
DIMM Failure	Amber	Blinks to indicate that the system has found a fault with the DIMM. Restart system to clear fault.
CPU Failure	Amber	Blinks to indicate that the system has found a fault with a CPU. Restart system to clear fault.
Battery Failure	Amber	Blinks to indicate that the system has found a fault with the battery. Start service processor to clear fault.

C.3 GRASP Board LED (Sun Fire X4500)

The GRASP board has one fault LED:

- LED is off: Standby power is not reaching the GRASP board.
- LED is lit (green): 3.3V standby power is reaching the GRASP board.

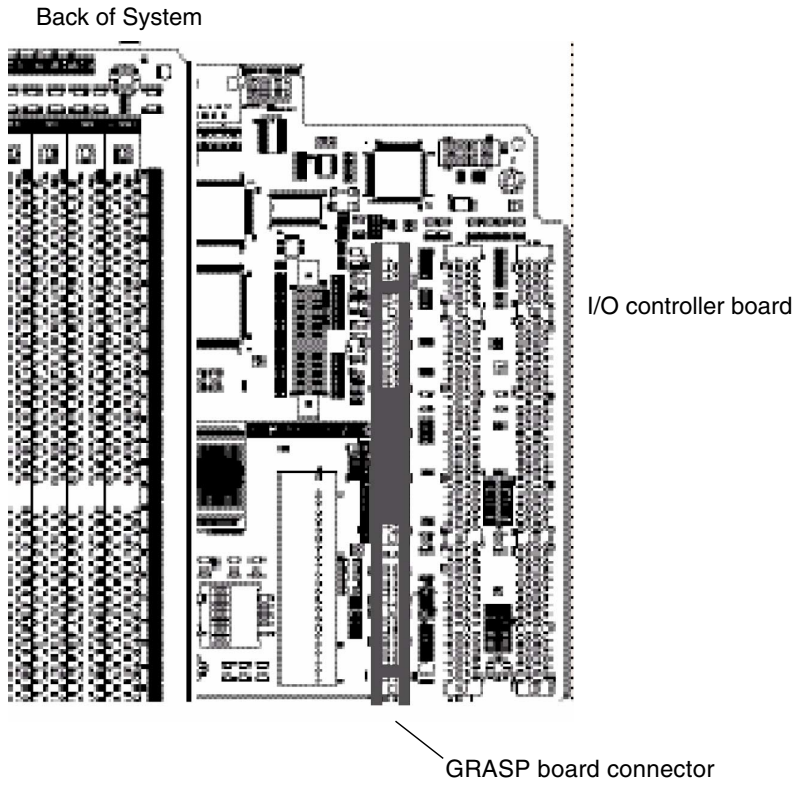
TABLE C-3 lists the CPU LEDs:

TABLE C-5 Internal LEDs

Name	Color	Function
DIMM Failure	Amber	Blinks to indicate that the system has found a fault with the DIMM. Restart system to clear fault.
CPU Failure	Amber	Blinks to indicate that the system has found a fault with a CPU. Restart system to clear fault.
Battery Failure	Amber	Blinks to indicate that the system has found a fault with the battery. Start service processor to clear fault.

The GRASP board (service processor) is located in the PCI-X slot nearest the CPU. See FIGURE C-8 for location details.

FIGURE C-8 GRASP Board Location (X4500)



C.4 CPU Module Debug LEDs

The X4500 board is shown.

FIGURE C-9 CPU Module Debug LEDs

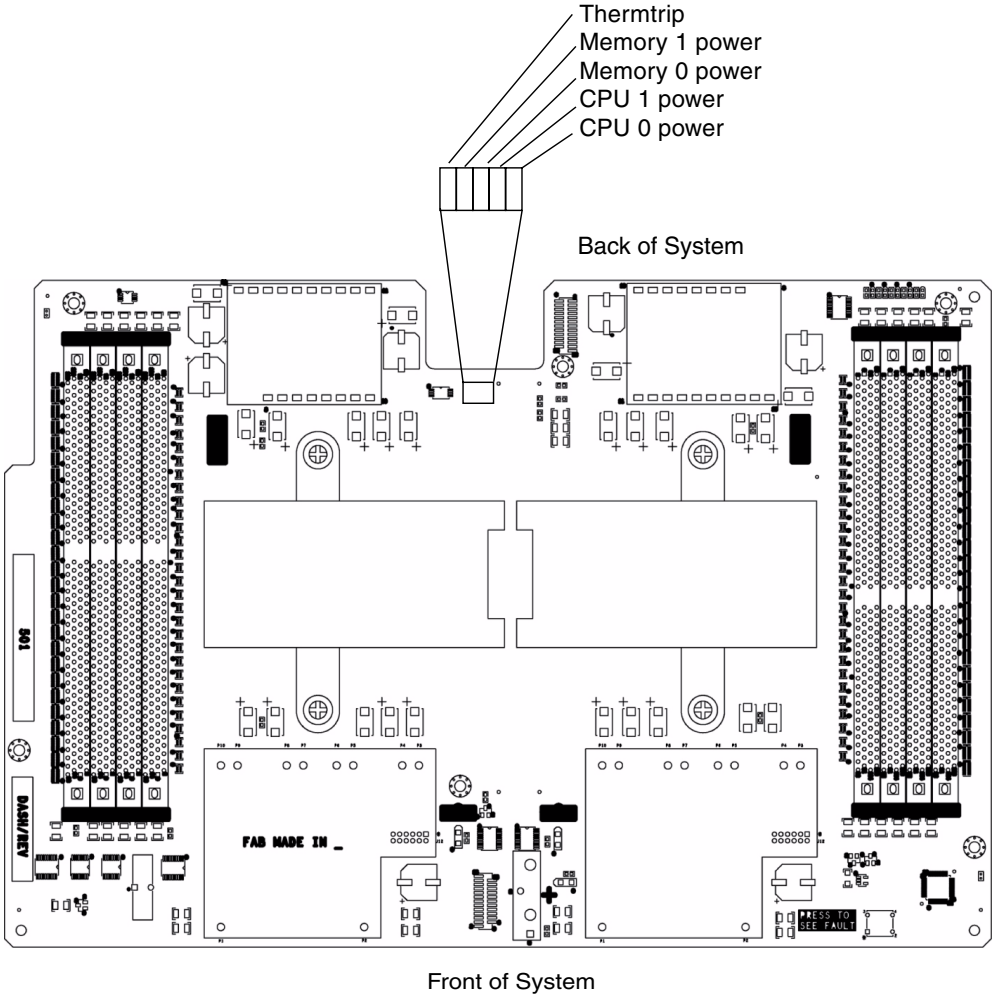
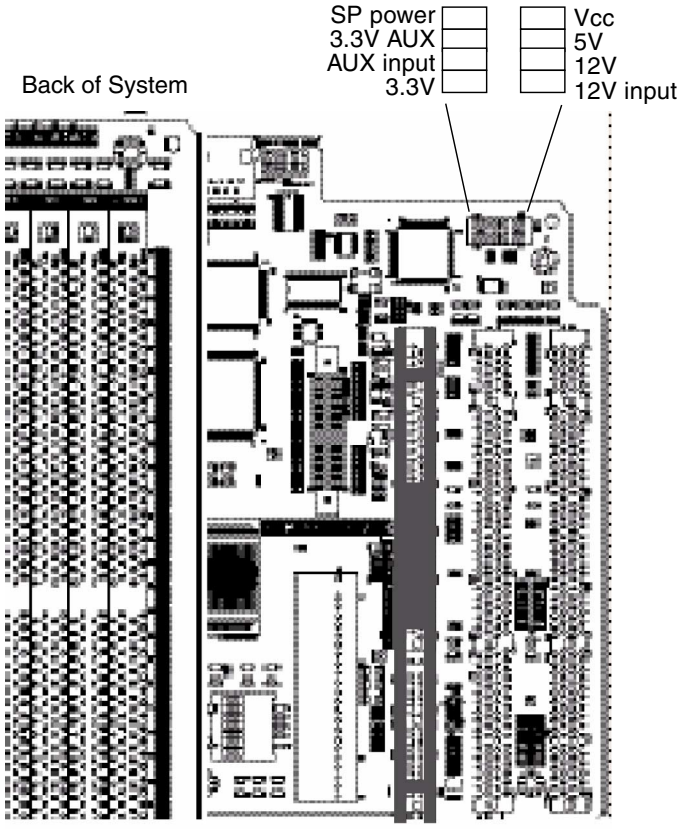


FIGURE C-10 I/O Controller Board Debug LEDs



APPENDIX **D**

Connector Pinouts

This appendix contains information about the server's connector pinouts for the following connectors:

D.1 USB Connector

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

FIGURE D-1 USB Connector

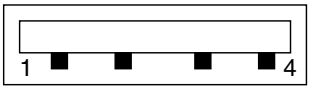


TABLE D-1 USB Connector Pinouts

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

D.2 Serial Connector

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

FIGURE D-2 Serial Connector

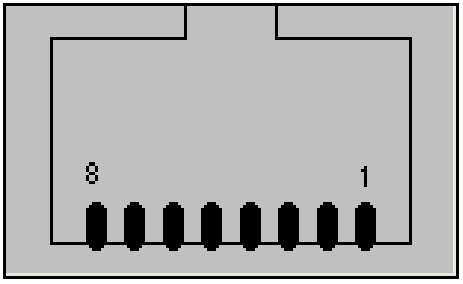


TABLE D-2 Serial Connector Pinouts

Pin Number	Pin Name	Description
1	RTS	Ready to send
2	DTR	Data terminal ready
3	TXD	Transmit data
4	GND	Ground
5	GND	Ground

TABLE D-2 Serial Connector Pinouts *(Continued)*

Pin Number	Pin Name	Description
6	RXD	Receive data
7	DCD/DSR	Data set ready
8	CTS	Clear to send

D.3 10/100BASE-T Connector

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

FIGURE D-3 10/100BASE-T Connector

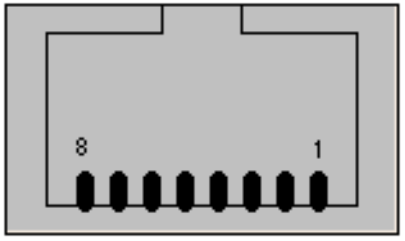


TABLE D-3 10/100BASE-T Connector Pinouts

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

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

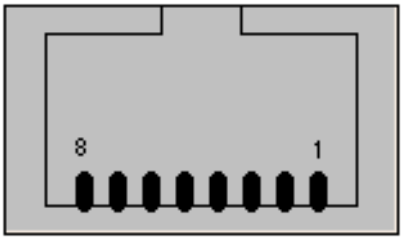


TABLE D-4 10/100/1000BASE-T Connector Pinouts

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

D.5 VGA Video Connector

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

FIGURE D-5 VGA Video Connector

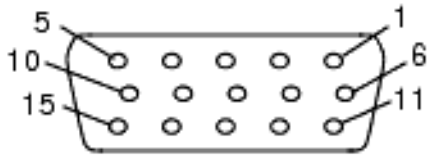


TABLE D-5 VGA Video Connector Pinouts

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

D.6 I/O-to-Disk Backplane Connectors

There are three connectors between the I/O and disk backplane:

- Power Blade Connector, J23 to J50. See TABLE D-6
- Two High-Speed Dock Connectors, J24 to J49, and J25 to J51. See FIGURE D-6, TABLE D-7 and TABLE D-8.

Power Blade Connector

This connector has ten blades and 20 signal pins, with a 30A limit per blade.

TABLE D-6 Power Blade Connector

Pin	Pin Name	Pin	Pin Name	Pin	Pin Name	Pin	Pin Name
A1	FAN4_CTL0	B1	FAN4_CTL0	C1	FAN4_CTL1	D1	FAN4_CTL1
A2	FAN3_CTL0	B2	FAN3_CTL0	C2	FAN3_CTL1	D2	FAN3_CTL1
A3	FAN2_CTL0	B3	FAN2_CTL0	C3	FAN2_CTL1	D3	FAN2_CTL1
A4	FAN1_CTL0	B4	FAN1_CTL0	C4	FAN1_CTL1	D4	FAN1_CTL1
A5	FAN0_CTL0	B5	FAN0_CTL0	C5	FAN0_CTL1	D5	FAN0_CTL1
			Blade 1				5V_DISK
			Blade 2				5V_DISK
			Blade 3				GND
			Blade 4				GND
			Blade 5				GND
			Blade 6				+12V
			Blade 7				GND
			Blade 8				+12V
			Blade 9				Gnd
			Blade 10				+12V

High-Speed Dock Connectors (Sun Fire X4500)

Each disk drive uses two 111-circuit Hi-Speed Dock connectors shown in FIGURE D-6.

FIGURE D-6 Hi-Speed Dock Connector

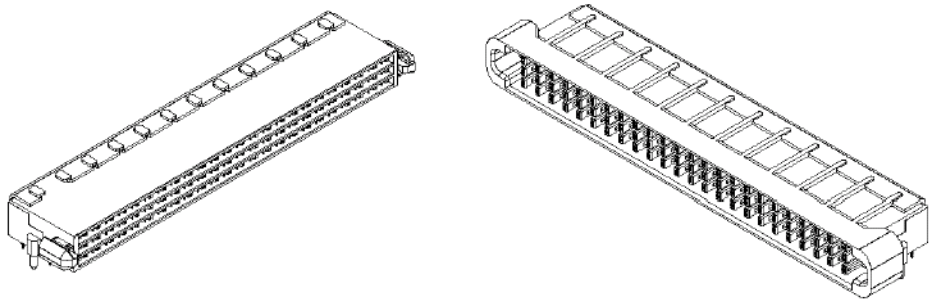


TABLE D-7 I/O-to-Disk Backplane (J24 to J49) Connector Pinouts

Pin	Pin Name	Pin	Pin Name	Pin	Pin Name
A1	FRONT_USB_P	B1	SHORT_PIN1	C1	POWER_BUTTON_L
A2	FRONT_USB_N	B2	P3_3V	C2	LOCATE_BUTTON_L
A3	5V_AUX	B3	5V_AUX	C3	P5V
A4	PS2_BATT_L	B4	GND	C4	GND
A5	DISK36_TX_P	B5	DISK36_RX_N	C5	DISK24_TX_P
A6	DISK36_TX_N	B6	DISK36_RX_P	C6	DISK24_TX_N
A7	DISK24_RX_N	B7	DISK12_TX_P	C7	DISK12_RX_N
A8	DISK24_RX_P	B8	DISK12_TX_N	C8	DISK12_RX_P
A9	DISK36_ACT_LED_L	B9	DISK24_ACT_LED_L	C9	DISK12_ACT_LED_L
A10	DISK13_ACT_LED_L	B10	DISK1_ACT_LED_L	C10	DISK0_ACT_LED_L
A11	DISK0_TX_P	B11	DISK0_RX_N	C11	DISK1_RX_P
A12	DISK0_TX_N	B12	DISK0_RX_P	C12	DISK1_RX_N
A13	DISK1_TX_N	B13	DISK13_RX_P	C13	DISK13_TX_N
A14	DISK1_TX_P	B14	DISK13_RX_N	C14	DISK13_TX_P
A15	DISK25_RX_P	B15	DISK25_TX_N	C15	DISK37_RX_P
A16	DISK25_RX_N	B16	DISK25_TX_P	C16	DISK37_RX_N
A17	DISK37_TX_N	B17	DISK2_RX_P	C17	DISK2_TX_N
A18	DISK37_TX_P	B18	DISK2_RX_N	C18	DISK2_TX_P

TABLE D-7 I/O-to-Disk Backplane (J24 to J49) Connector Pinouts *(Continued)*

Pin	Pin Name	Pin	Pin Name	Pin	Pin Name
A19	DISK25_ACT_LED_L	B19	DISK37_ACT_LED_L	C19	DISK2_ACT_LED_L
A20	DISK38_ACT_LED_L	B20	DISK26_ACT_LED_L	C20	DISK14_ACT_LED_L
A21	DISK14_RX_P	B21	DISK14_TX_N	C21	DISK26_RX_P
A22	DISK14_RX_N	B22	DISK14_TX_P	C22	DISK26_RX_N
A23	DISK26_TX_N	B23	DISK38_RX_P	C23	DISK38_TX_N
A24	DISK26_TX_P	B24	DISK38_RX_N	C24	DISK38_TX_P
A25	DISK3_RX_P	B25	DISK3_TX_N	C25	DISK15_RX_P
A26	DISK3_RX_N	B26	DISK3_TX_P	C26	DISK15_RX_N
A27	DISK15_TX_N	B27	DISK27_RX_P	C27	DISK27_TX_N
A28	DISK15_TX_P	B28	DISK27_RX_N	C28	DISK27_TX_P
A29	DISK3_ACT_LED_L	B29	DISK15_ACT_LED_L	C29	DISK27_ACT_LED_L
A30	DISK16_ACT_LED_L	B30	DISK4_ACT_LED_L	C30	DISK39_ACT_LED_L
A31	DISK39_RX_P	B31	DISK39_TX_N	C31	DISK4_RX_P
A32	DISK39_RX_N	B32	DISK39_TX_P	C32	DISK4_RX_N
A33	DISK4_TX_N	B33	DISK16_RX_P	C33	DISK16_TX_N
A34	DISK4_TX_P	B34	DISK16_RX_N	C34	DISK16_TX_P
A35	DISK28_RX_P	B35	DISK28_TX_N	C35	DISK40_RX_P
A36	DISK28_RX_N	B36	DISK28_TX_P	C36	DISK40_RX_N
A37	DISK40_TX_N	B37	DISK5_RX_P	C37	DISK5_TX_N
A38	DISK40_TX_P	B38	DISK5_RX_N	C38	DISK5_TX_P
A39	DISK28_ACT_LED_L	B39	DISK40_ACT_LED_L	C39	DISK5_ACT_LED_L
A40	DISK41_ACT_LED_L	B40	DISK29_ACT_LED_L	C40	DISK17_ACT_LED_L
A41	DISK17_RX_P	B41	DISK17_TX_N	C41	DISK29_RX_P
A42	DISK17_RX_N	B42	DISK17_TX_P	C42	DISK29_RX_N
A43	DISK29_TX_N	B43	DISK41_RX_P	C43	DISK41_TX_N
A44	DISK29_TX_P	B44	DISK41_RX_N	C44	DISK41_TX_P
A45	3_3AUX_IN	B45	3_3AUX_IN	C45	3_3AUX_IN
A46	GND	B46	5V_DISK_SENSE_N	C46	GND
A47	3_3_AUX_SENSE_P	B47	5V_DISK_SENSE_P	C47	SP_I2C_CLK
A48	3_3_AUX_SENSE_N	B48	MAMMOTH_INT_L	C48	SP_I2C_DAT

TABLE D-8 I/O-to-Backplane (J25 to J51) Connector Pinouts

Pin	Pin Name	Pin	Pin Name	Pin	Pin Name
A1	12V_SENSE_P	B1	3_3AUX_POWERGOOD	C1	VDD_RTC
A2	12V_SENSE_N	B2	PS1_ENABLE_L	C2	PS0_ENABLE_L
A3	DISK6_RX_P	B3	DISK6_TX_N	C3	DISK18_RX_P
A4	DISK6_RX_N	B4	DISK6_TX_P	C4	DISK18_RX_N
A5	DISK18_TX_N	B5	DISK30_RX_P	C5	DISK30_TX_N
A6	DISK18_TX_P	B6	DISK30_RX_N	C6	DISK30_TX_P
A7	DISK6_ACT_LED_L	B7	DISK18_ACT_LED_L	C7	DISK30_ACT_LED_L
A8	DISK19_ACT_LED_L	B8	DISK7_ACT_LED_L	C8	DISK42_ACT_LED_L
A9	DISK42_RX_P	B9	DISK42_TX_N	C9	DISK7_RX_P
A10	DISK42_RX_N	B10	DISK42_TX_P	C10	DISK7_RX_N
A11	DISK7_TX_N	B11	DISK19_RX_P	C11	DISK19_TX_N
A12	DISK7_TX_P	B12	DISK19_RX_N	C12	DISK19_TX_P
A13	DISK31_RX_P	B13	DISK31_TX_N	C13	DISK43_RX_P
A14	DISK31_RX_N	B14	DISK31_TX_P	C14	DISK43_RX_N
A15	DISK43_TX_N	B15	DISK8_RX_P	C15	DISK8_TX_N
A16	DISK43_TX_P	B16	DISK8_RX_N	C16	DISK8_TX_P
A17	DISK31_ACT_LED_L	B17	DISK43_ACT_LED_L	C17	DISK8_ACT_LED_L
A18	DISK44_ACT_LED_L	B18	DISK32_ACT_LED_L	C18	DISK20_ACT_LED_L
A19	DISK20_RX_P	B19	DISK20_TX_N	C19	DISK32_RX_P
A20	DISK20_RX_N	B20	DISK20_TX_P	C20	DISK32_RX_N
A21	DISK32_TX_N	B21	DISK44_RX_P	C21	DISK44_TX_N
A22	DISK32_TX_P	B22	DISK44_RX_N	C22	DISK44_TX_P
A23	DISK9_RX_P	B23	DISK9_TX_N	C23	DISK21_RX_P
A24	DISK9_RX_N	B24	DISK9_TX_P	C24	DISK21_RX_N
A25	DISK21_TX_N	B25	DISK33_RX_P	C25	DISK33_TX_N
A26	DISK21_TX_P	B26	DISK33_RX_N	C26	DISK33_TX_P
A27	DISK9_ACT_LED_L	B27	DISK21_ACT_LED_L	C27	DISK33_ACT_LED_L
A28	DISK22_ACT_LED_L	B28	DISK10_ACT_LED_L	C28	DISK45_ACT_LED_L

TABLE D-8 I/O-to-Backplane (J25 to J51) Connector Pinouts *(Continued)*

Pin	Pin Name	Pin	Pin Name	Pin	Pin Name
A29	DISK45_RX_P	B29	DISK45_TX_N	C29	DISK10_RX_P
A30	DISK45_RX_N	B30	DISK45_TX_P	C30	DISK10_RX_N
A31	DISK10_TX_N	B31	DISK22_RX_P	C31	DISK22_TX_N
A32	DISK10_TX_P	B32	DISK22_RX_N	C32	DISK22_TX_P
A33	DISK34_RX_P	B33	DISK34_TX_N	C33	DISK46_RX_P
A34	DISK34_RX_N	B34	DISK34_TX_P	C34	DISK46_RX_N
A35	DISK46_TX_N	B35	DISK11_RX_P	C35	DISK11_TX_N
A36	DISK46_TX_P	B36	DISK11_RX_N	C36	DISK11_TX_P
A37	DISK34_ACT_LED_L	B37	DISK46_ACT_LED_L	C37	DISK11_ACT_LED_L
A38	DISK47_ACT_LED_L	B38	DISK35_ACT_LED_L	C38	DISK23_ACT_LED_L
A39	DISK23_RX_P	B39	DISK23_TX_N	C39	DISK35_RX_P
A40	DISK23_RX_N	B40	DISK23_TX_P	C40	DISK35_RX_N
A41	DISK35_TX_N	B41	DISK47_RX_P	C41	DISK47_TX_N
A42	DISK35_TX_P	B42	DISK47_RX_N	C42	DISK47_TX_P
A43	PS0_FAN_FAIL_L	B43	PS0_POWEROK	C43	PS1_POWEROK
A44	PS1_FAN_FAIL_L	B44	PS0_PRESENT_L	C44	PS2_POWEROK
A45	PS2_FAN_FAIL_L	B45	PS1_PRESENT_L	C45	PS0_FAIL
A46	PS0_VIN_GOOD_L	B46	PS2_PRESENT_L	C46	PS1_FAIL
A47	PS1_VIN_GOOD_L	B47	PS2_VIN_GOOD_L	C47	PS2_FAIL
A48	PS2_ENABLE_L	B48	SHORT_PIN4	C48	INTRUSION_SW

High Speed Dock Connectors (Sun Fire X4540)

Each disk drive uses two 111-circuit Hi-Speed Dock connectors shown in FIGURE D-7.

FIGURE D-7 Hi-Speed Dock Connector

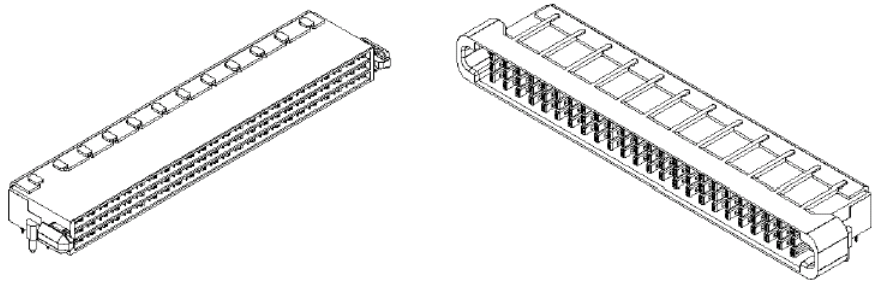


TABLE D-9 I/O-to-Disk Backplane (J24 to J49) Connector Pinouts

Pin	Pin Name	Pin	Pin Name	Pin	Pin Name
A1	FRONT_USB_P	B1	SHORT_PIN1	C1	POWER_BUTTON_L
A2	FRONT_USB_N	B2	VDD_3P3V	C2	FRONT LOCATE_BIN_L
A3	5V_AUX	B3	5V_AUX	C3	P5V
A4	PS2_BATT_L	B4	GND	C4	GND
A5	DISK3_TX_P	B5	DISK3_RX_N	C5	DISK24_TX_P
A6	DISK3_TX_N	B6	DISK3_RX_P	C6	DISK24_TX_N
A7	DISK2_RX_N	B7	DISK1_TX_P	C7	DISK12_RX_N
A8	DISK2_RX_P	B8	DISK1_TX_N	C8	DISK12_RX_P
A9	DISK3_ACT_LED_L	B9	DISK2_ACT_LED_L	C9	DISK12_ACT_LED_L
A10	DISK5_ACT_LED_L	B10	DISK4_ACT_LED_L	C10	DISK0_ACT_LED_L
A11	DISK0_TX_P	B11	DISK0_RX_N	C11	DISK1_RX_P
A12	DISK0_TX_N	B12	DISK0_RX_P	C12	DISK1_RX_N
A13	DISK4_TX_N	B13	DISK5_RX_P	C13	DISK13_TX_N
A14	DISK4_TX_P	B14	DISK5_RX_N	C14	DISK13_TX_P
A15	DISK6_RX_P	B15	DISK6_TX_N	C15	DISK37_RX_P
A16	DISK6_RX_N	B16	DISK6_TX_P	C16	DISK37_RX_N
A17	DISK7_TX_N	B17	DISK8_RX_P	C17	DISK2_TX_N
A18	DISK7_TX_P	B18	DISK8_RX_N	C18	DISK2_TX_P
A19	DISK6_ACT_LED_L	B19	DISK7_ACT_LED_L	C19	DISK2_ACT_LED_L
A20	DISK11_ACT_LED_L	B20	DISK10_ACT_LED_L	C20	DISK14_ACT_LED_L
A21	DISK9_RX_P	B21	DISK9_TX_N	C21	DISK26_RX_P

Pin	Pin Name	Pin	Pin Name	Pin	Pin Name
A22	DISK9_RX_N	B22	DISK9_TX_P	C22	DISK26_RX_N
A23	DISK10_TX_N	B23	DISK11_RX_P	C23	DISK38_TX_N
A24	DISK10_TX_P	B24	DISK11_RX_N	C24	DISK38_TX_P
A25	DISK12_RX_P	B25	DISK12_TX_N	C25	DISK15_RX_P
A26	DISK12_RX_N	B26	DISK12_TX_P	C26	DISK15_RX_N
A27	DISK13_TX_N	B27	DISK14_RX_P	C27	DISK27_TX_N
A28	DISK13_TX_P	B28	DISK14_RX_N	C28	DISK27_TX_P
A29	DISK12_ACT_LED_L	B29	DISK13_ACT_LED_L	C29	DISK27_ACT_LED_L
A30	DISK17_ACT_LED_L	B30	DISK16_ACT_LED_L	C30	DISK39_ACT_LED_L
A31	DISK15_RX_P	B31	DISK15_TX_N	C31	DISK4_RX_P
A32	DISK15_RX_N	B32	DISK15_TX_P	C32	DISK4_RX_N
A33	DISK16_TX_N	B33	DISK17_RX_P	C33	DISK16_TX_N
A34	DISK16_TX_P	B34	DISK17_RX_N	C34	DISK16_TX_P
A35	DISK18_RX_P	B35	DISK28_TX_N	C35	DISK40_RX_P
A36	DISK18_RX_N	B36	DISK28_TX_P	C36	DISK40_RX_N
A37	DISK19_TX_N	B37	DISK5_RX_P	C37	DISK5_TX_N
A38	DISK19_TX_P	B38	DISK5_RX_N	C38	DISK5_TX_P
A39	DISK18_ACT_LED_L	B39	DISK40_ACT_LED_L	C39	DISK5_ACT_LED_L
A40	DISK23_ACT_LED_L	B40	DISK29_ACT_LED_L	C40	DISK17_ACT_LED_L
A41	DISK21_RX_P	B41	DISK17_TX_N	C41	DISK29_RX_P
A42	DISK21_RX_N	B42	DISK17_TX_P	C42	DISK29_RX_N
A43	DISK22_TX_N	B43	DISK41_RX_P	C43	DISK41_TX_N
A44	DISK22_TX_P	B44	DISK41_RX_N	C44	DISK41_TX_P
A45	3_3AUX_IN	B45	3_3AUX_IN	C45	3_3AUX_IN
A46	GND	B46	5V_DISK_SENSE_N	C46	GND
A47	3_3_AUX_SENSE_P	B47	5V_DISK_SENSE_P	C47	SP_I2C_CLK
A48	3_3_AUX_SENSE_N	B48	MAMMOTH_INT_L	C48	SP_I2C_DAT

D.7 Power Supply Connector

The power supply connector has signal pins and power blades. See TABLE D-10 for signal pins and TABLE D-11 for power blades.

TABLE D-10 Power Supply Signal Connectors

X,Y	1	2	3	4	5	6	7
D	3.3AUX	GND	12LS	Spare	SCL	A0	3.3 Vsb RS+
C	3.3AUX	GND	AC OK	+12V RS+	+12V RS-	A1	3.3 Vsb RS-
B	3.3AUX	GND	PSON	PSKILL	SDA	A2	Fan fail
A	3.3AUX	GND	PRESENT	PWOK	FAIL	ACL	Reserved

TABLE D-11 Power Supply Connector Power Blades

Pin	Function
P1	12VDC
P2	12VDC Return
P3	12VDC
P4	12VDC Return
P5	12VDC
P6	12VDC Return
P7	12VDC
P8	12VDC Return

D.8 Disk Backplane to Front Indicator Connector

A 10-wire flex cable connects the disk backplane to the indicator board. TABLE D-12 lists the pins:

TABLE D-12 Disk Backplane to Front Indicator Board Pins

Disk Backplane Pin	Pin Name	Front Indicator Board Pin
1	LOCATE_LED	10
2	LOCATE_BUTTON_L	9
3	ALERT_LED	8
4	POWER_LED	7
5	POWER_BUTTON_L	6
6	FAN_FAIL_LED	5
7	PS_FAIL_LED	4
8	OVERTEMP_LED	3
9	PRESENT_L (GND on front indicator board	2
10	GND	1

D.9 Backplane To Disk Backplane Connector

The backplane to disk backplane connector has eight blades that support 30 amps each. It also has 30 signal pins. See TABLE D-13 for the blades and TABLE D-14 for the signal pins.

TABLE D-13 Backplane-to-Disk-Backplane Connector Power Blades

Pin	Function
Blade 1	+12V
Blade 2	GND
Blade 3	+12V
Blade 4	GND
Blade 5	+12V
Blade 6	GND
Blade 7	GND
Blade 8	GND

TABLE D-14 Backplane-to-Disk-Backplane Connector Signal Pins

Pin	Pin Name	Pin	Pin Name
A1	3.3V AUX	C1	.3V AUX
A2	GND	C2	GND
A3	VDD_RTC	C3	SP_I2C_CLK
A4	INTRUSION_SW	C4	SP_I2C_DAT
A5	PS2_ENABLE_L	C5	PS2_BATT_L
A6	PS2_VIN_GOOD_L	C6	PS0_POWEROK
A7	PS2_POWEROK	C7	PS1_FAN_FAIL_L
A8	PS2_FAIL	C8	PS1_POWEROK
A9	PS2_FAN_FAIL_L	C9	PS1_PRESENT_L
B1	3.3V AUX	D1	3.3V AUX
B2	GND	D2	GND
B3	PS0_FAN_FAIL_L	D3	3_3_AUX_SENSE_P

TABLE D-14 Backplane-to-Disk-Backplane Connector Signal Pins

Pin	Pin Name	Pin	Pin Name
B4	NC	D4	3_3_AUX_SENSE_N
B5	PS2_PRESENT_L	D5	PS0_FAIL
B6	PS0_PRESENT_L	D6	PS0_VIN_GOOD_L
B7	PS1_FAIL	D7	PS0_ENABLE_L
B8	PS1_VIN_GOOD_L	D8	12V_SENSE_P
B9	PS1_ENABLE_L	D9	12V_SENSE_N

D.10 Fan Tray Connectors

The fan tray uses the S-ATA hard drive connector for the interface to the disk backplane. The pins have been designed so that no damage occurs if a fan tray is accidentally inserted into a hard drive slot or vice versa.

TABLE D-15 lists the pins.

TABLE D-15 Fan Tray Connectors

Pin	Name
S1	GND
S2	REMOVE_LED_L
S3	FAIL_LED_L
S4	PRESENT_L
S5	FAN_TACH0
S6	FAN_TACH1
S7	GND
P1	FAN_CTL0
P2	FAN_CTL0
P3	No Connect
P4	GND
P5	GND
P6	GND
P7	3.3AUX

TABLE D-15 Fan Tray Connectors *(Continued)*

Pin	Name
P8	5VAUX
P9	No Connect
P10	GND
P11	OK_LED_L
P12	GND
P13	No Connect
P14	FAN_CTL1
P15	FAN_CTL1

D.11 Fan Connectors

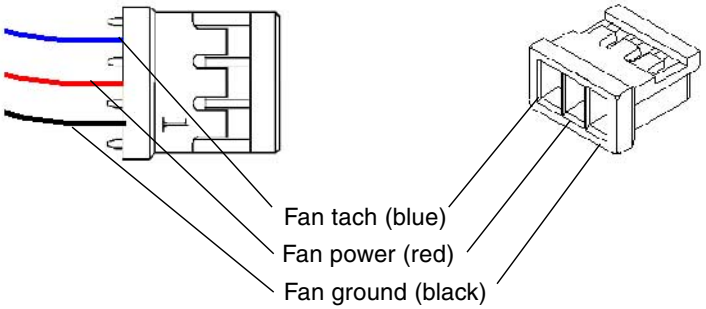
The fans have three-pin connectors, listed in TABLE D-16.

TABLE D-16 Fan Connectors

Pin	Name	Color
1	Ground	Black
2	Power	Red
3	Tach	Blue

FIGURE D-8 shows the connectors.

FIGURE D-8 Fan Connectors



APPENDIX **E**

Power Reset and Initialization Sequences

This appendix describes the power-on and power-off reset sequences.

E.1 Power-On Reset Sequence

The power-on sequence is initiated as soon as power is applied or when the power button is pushed, depending on the BIOS settings.

When the sequence is initiated, the main power supplies are enabled, then the hot-swap circuit for the main 12V rail is enabled. When 12V is up, the supplies are sequenced as follows:

- 1.5V, 3.3V, and -12V
- 1.8V, 2.5V, and 1.25V
- Processor core voltage
- 1.2V and 1.5V

When all of the rails are within 5%, the voltage monitor chip waits for 210 mS then asserts ALL_POWERGOOD, which starts the boot sequence.

The diagram in FIGURE E-1 shows the power-on sequence. TABLE E-1 defines the symbols used in the diagram and describes the power-on sequence timing parameters.

FIGURE E-1 Power-On Sequence

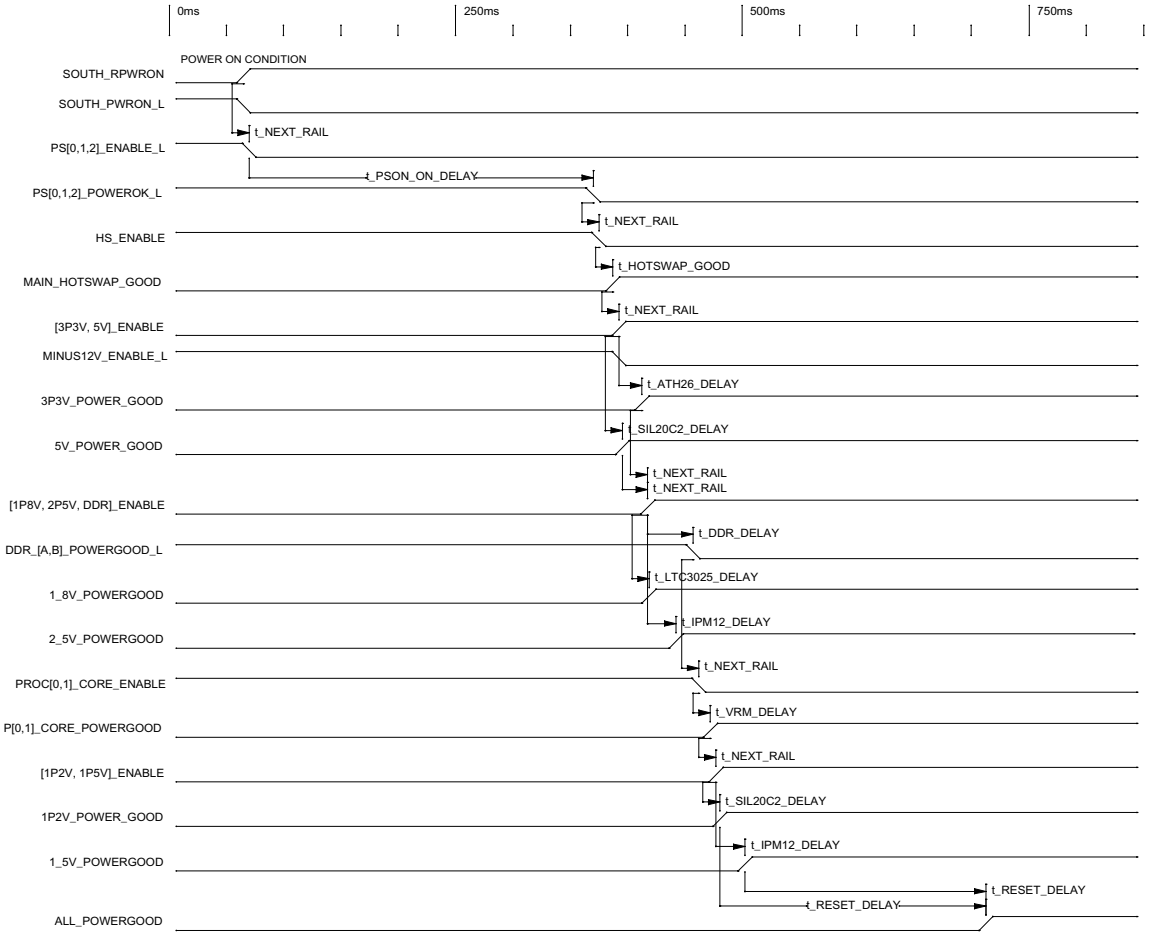


TABLE E-1 Parameters From Power-On Sequence

Parameter	Description	Value	Units
t_NEXT_RAIL	Delay from one rail, Power Good to next rail, Enable	1	mS
t_PSON_ON_DELAY	Soft-start delay for LTC3733	300	mS
t_HOTSWAP_GOOD	Delay from Hotswap Enable to Hotswap Good	12.4	mS
t_ATH26_DELAY	ATH26 Module Turn-on time + Power Good delay	20	mS
t_SIL20C2_DELAY	SIL20C2 Module Turn-on time + Power Good delay	3	mS
t_DDR_DELAY	DDR Module Turn-on time + Power Good delay	40	mS
t_LTC3025_DELAY	LTC3025 Turn-on time + Power Good delay	1	mS
t_IPM12_DELAY	IPM12 Module Turn-on time + Power Good delay	25	mS
t_VRM_DELAY	SIL06 Module Turn-on time + Power Good delay	10	mS
t_RESET_DELAY	LTC2902 delay from voltage in spec to release of reset line	210	mS

E.2 Power-Off Sequence

A power-off sequence is initiated by a request from the SP board management controller, an OS-level shutdown, a power button press, or a fault condition.

A power supply fault (main or voltage converter) or a thermal event (THERMTRIP) can trigger a hardware-level shutdown.

FIGURE E-2 shows the power-off sequence. TABLE E-2 defines the symbols used in the diagram and describes the power-off sequence timing parameters.

FIGURE E-2 Power-Off Sequence

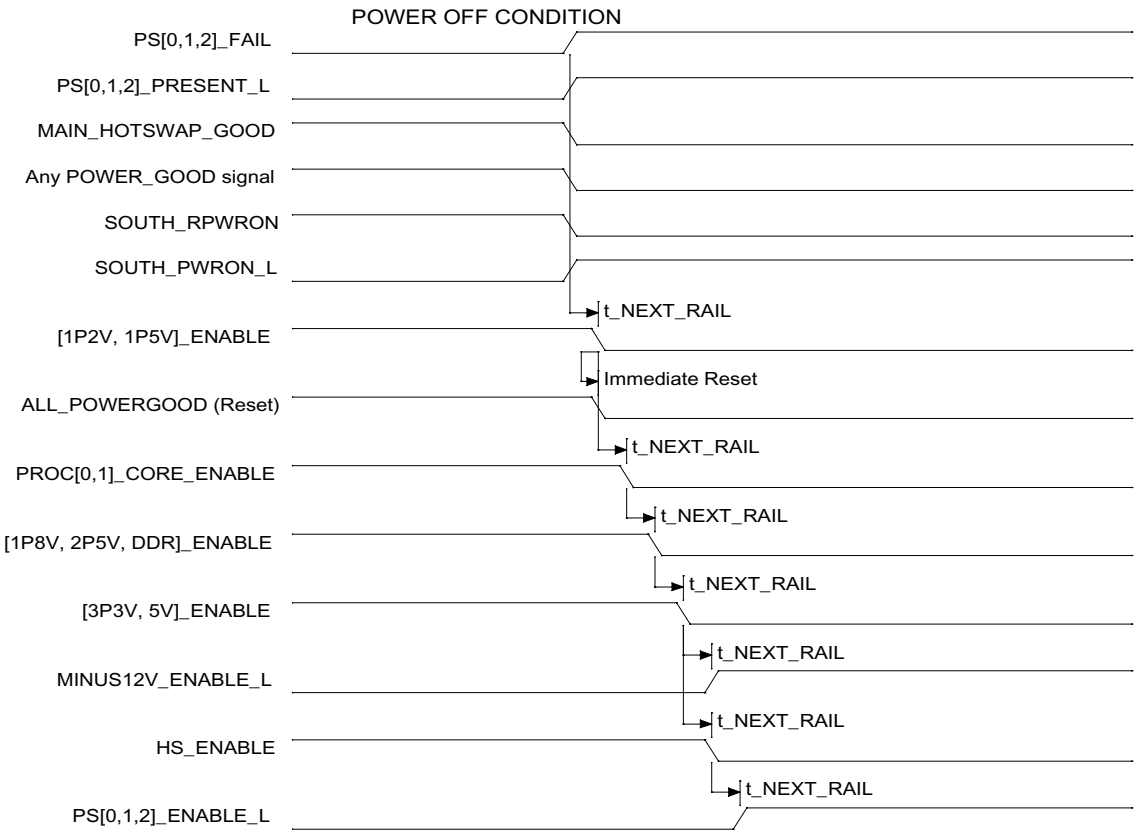


TABLE E-2 Power-Off Sequence Timing Parameters

Symbol	Parameter	Value (in ms)
t_NEXT_RAIL (fault condition)	Delay from one rail Enable deassertion to next rail Enable deassertion after a fault condition.	1 ms
t_ NEXT_RAIL (normal power-down)	Delay from one rail Enable deassertion to next rail Enable deassertion after a power-down initiated by the Host/SP.	20 ms

APPENDIX **F**

I²E Bus Devices

This appendix describes the I²E bus devices.

F.1 Power-On Reset Sequence

The Inter-IC Communication bus (I2C) is a simple 2-pin serial bus used to control some of the basic chassis management features. These include existing EEPROMs, fan controllers, and power supply monitors that are used to monitor the health and status of the chassis. In some instances, such as temperature, a separate interrupt immediately alerts the processors when it detects a problem.

F.2 I²E Bus Address Table

TABLE F-1 shows the addresses of the devices on the bus.

TABLE F-1 I²E Bus Addresses

Description	Part #	Location	Address (Hex)
Fan controller 0	VSC055-01	Disk backplane	0x1000000 (40/80)
Fan controller 1	VSC055-01	Disk backplane	0x1000001 (41/82)
System monitor	ADM1026	Front of I/O controller	0x0101100 (2C/58)
Processor inlet temp sensor	LM75	Rear of CPU board	0x1001001 (49/92)
PCI card area temp sensor	LM75	Between PCI slots on I/O controller	0x1001010 (4A/94)

TABLE F-1 I^2E Bus Addresses *(Continued)*

Description	Part #	Location	Address (Hex)
IO controller ID PROM	AT24C64B	I/O controller	0x1010010 (52/A4)
Power supply 0 ID PROM	AT24C02A	Power Supply	0x1010100 (54/A8)
Power supply 1 ID PROM	AT24C02A	Power Supply	0x1010101 (55/AA)
Power supply 2 ID PROM	AT24C02A	Power Supply	0x1010110 (56/AC)
Backplane temperature sensor	LM75	Front of Disk backplane	0x1001000 (48/90)
Backplane ID PROM	AT24C64B	Disk backplane	0x1010000 (50/A0)
Proc card ID PROM	AT24C64B	CPU board	0x1010001 (51/A2)
Service processor ID PROM	AT24C64B	GRASP	0x1010011 (53/A6)
IO expander (for Front LEDs)	PCA9556	Disk backplane	0x0011000 (18/30)
IO Expander (for Fan Enables)	PCA9556	I/O controller	0x0011001 (19/32)
IO expander (for DIMM LEDs)	PCA9556	CPU board	0x0011100 (1C/38)
IO expander (for PROC LEDs)	PCA9556	CPU board	0x0011101 (1D/3A)
Proc card system monitor	ADM1026	Front of CPU board	0x0101101 (2D/5A)
Clock generator	CDC960	I/O controller	0x1101001 (69/D2)
8-port switch (for DIMMS and PCI slots)	PCA9548	I/O controller	0x1110000 (70/E0)
DIMM0 serial presence detect	EEPROM	DIMM	0x1010000 (50/A0)
DIMM1 Serial Presence Detect	EEPROM	DIMM	0x1010001 (51/A2)
DIMM2 serial presence detect	EEPROM	DIMM	0x1010010 (52/A4)
DIMM3serial presence detect	EEPROM	DIMM	0x1010011 (53/A6)

APPENDIX **G**

Early-Production Slide Rail and CMA Information

This appendix describes information pertaining to an early-production release of the slide rail and Cable Management Assembly (CMA).

If your X4500 system has the J slide rails installed, see *Sun X4500-J Slide Rail Installation Guide* for details on removing and replacing the CMA.

G.1 Removing the Cable Management Arm for the X4500

This procedure covers the removal of the Cable Management Arm (CMA) with the Accuride slide rails installed.

Note – To access some components, you need to remove the cable management arm.

Tip – Label your cables so they are easy to identify when you need to reconnect them.

1. **Unplug power and data cables from the server.**
2. **Lift the small tab on the CMA-to-chassis bracket to release the right pinhead. See** FIGURE G-1**.**

FIGURE G-1 Removing the CMA

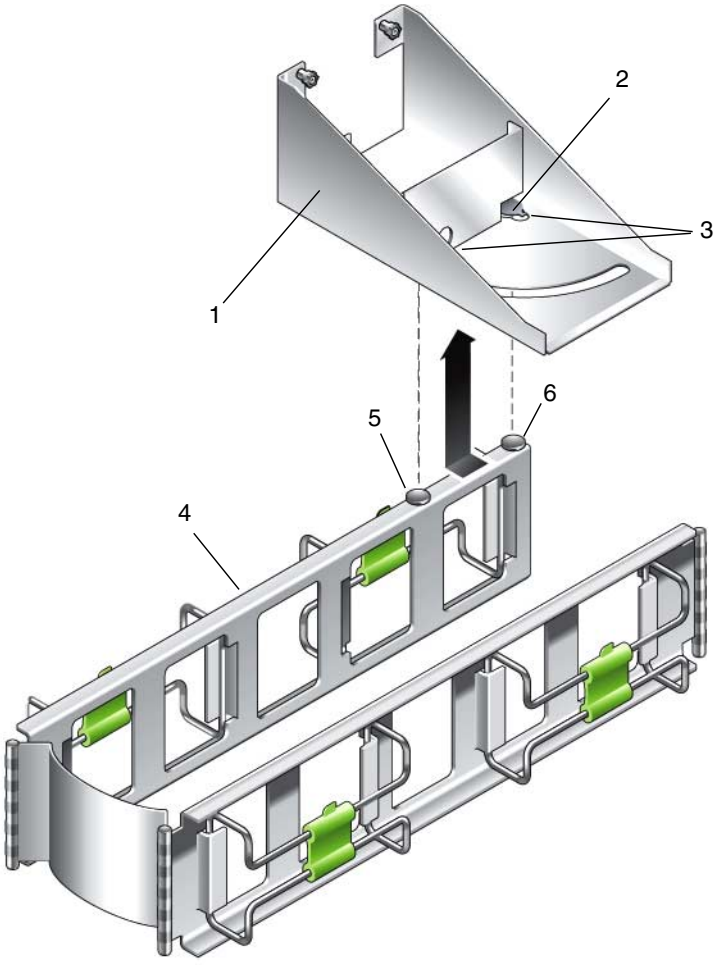


Figure Legend

1	CMA-to-chassis bracket
2	Lift tab to release pinhead
3	Keyholes

Figure Legend

4	Cable Management Arm (CMA)
5	Left pinhead
6	Right pinhead

3. **Push the CMA toward the chassis.**

   The CMA drops below.

4. **Remove the CMA from the rear of the chassis.**

5. **Remove the CMA from the slide rail extension by loosening the captive screw and pulling it outwards.**

G.2 Removing the Cable Management Arm for the X4500

1. **Mount the CMA to the CMA-to-chassis bracket.**

   a. **Align the two pinheads on the CMA with the keyholes in the bracket.**

   b. **Support the CMA by placing your hand under it. Push the CMA upward into the bracket until the pinheads on the CMA are secured into the keyholes of the bracket.**

   c. **Pull the CMA toward you until the CMA left and right pinheads lock into the keyholes with an audible snap.**

2. **Insert the other end of the CMA into the slide rail extension and hand-tighten the knurled fastener found on the CMA.**

3. **Install cables to your server, as required, and route the cables through the CMA cable hangers.**

APPENDIX **H**

Device Paths

This chapter contains the device paths for the Sun Fire X4500 and X4540.

H.1 Sun Fire X4500 Device Paths

Use the `/etc/path_to_inst` command to determine the device paths of your system.

The device paths for the Sun Fire X4500 Server is as follows:

```
Network 0 (e1000g0)     /pci@1,0/pci1022,7458@5/pci8086,1011@1
Network 1 (e1000g1)     /pci@1,0/pci1022,7458@5/pci8086,1011@1,1
Network 2 (e1000g2)     /pci@1,0/pci1022,7458@6/pci8086,1011@1
Network 3 (e1000g3)     /pci@1,0/pci1022,7458@6/pci8086,1011@1,1

Disk 0          /pci@1,0/pci1022,7458@4/pci11ab,11ab@1/disk@0,0
Disk 1          /pci@1,0/pci1022,7458@4/pci11ab,11ab@1/disk@4,0
Disk 2          /pci@1,0/pci1022,7458@3/pci11ab,11ab@1/disk@0,0
Disk 3          /pci@1,0/pci1022,7458@3/pci11ab,11ab@1/disk@4,0
Disk 4          /pci@2,0/pci1022,7458@8/pci11ab,11ab@1/disk@0,0
Disk 5          /pci@2,0/pci1022,7458@8/pci11ab,11ab@1/disk@4,0
Disk 6          /pci@2,0/pci1022,7458@7/pci11ab,11ab@1/disk@0,0
Disk 7          /pci@2,0/pci1022,7458@7/pci11ab,11ab@1/disk@4,0
Disk 8          /pci@0,0/pci1022,7458@2/pci11ab,11ab@1/disk@0,0
Disk 9          /pci@0,0/pci1022,7458@2/pci11ab,11ab@1/disk@4,0
Disk 10         /pci@0,0/pci1022,7458@1/pci11ab,11ab@1/disk@0,0
Disk 11         /pci@0,0/pci1022,7458@1/pci11ab,11ab@1/disk@4,0
```

```
Disk 12          /pci@1,0/pci1022,7458@4/pci11ab,11ab@1/disk@1,0
Disk 13          /pci@1,0/pci1022,7458@4/pci11ab,11ab@1/disk@5,0
Disk 14          /pci@1,0/pci1022,7458@3/pci11ab,11ab@1/disk@1,0
Disk 15          /pci@1,0/pci1022,7458@3/pci11ab,11ab@1/disk@5,0
Disk 16          /pci@2,0/pci1022,7458@8/pci11ab,11ab@1/disk@1,0
Disk 17          /pci@2,0/pci1022,7458@8/pci11ab,11ab@1/disk@5,0
Disk 18          /pci@2,0/pci1022,7458@7/pci11ab,11ab@1/disk@1,0
Disk 19          /pci@2,0/pci1022,7458@7/pci11ab,11ab@1/disk@5,0
Disk 20          /pci@0,0/pci1022,7458@2/pci11ab,11ab@1/disk@1,0
Disk 21          /pci@0,0/pci1022,7458@2/pci11ab,11ab@1/disk@5,0
Disk 22          /pci@0,0/pci1022,7458@1/pci11ab,11ab@1/disk@1,0
Disk 23          /pci@0,0/pci1022,7458@1/pci11ab,11ab@1/disk@5,0
Disk 24          /pci@1,0/pci1022,7458@4/pci11ab,11ab@1/disk@2,0
Disk 25          /pci@1,0/pci1022,7458@4/pci11ab,11ab@1/disk@6,0
Disk 26          /pci@1,0/pci1022,7458@3/pci11ab,11ab@1/disk@2,0
Disk 27          /pci@1,0/pci1022,7458@3/pci11ab,11ab@1/disk@6,0
Disk 28          /pci@2,0/pci1022,7458@8/pci11ab,11ab@1/disk@2,0
Disk 29          /pci@2,0/pci1022,7458@8/pci11ab,11ab@1/disk@6,0
Disk 30          /pci@2,0/pci1022,7458@7/pci11ab,11ab@1/disk@2,0
Disk 31          /pci@2,0/pci1022,7458@7/pci11ab,11ab@1/disk@6,0
Disk 32          /pci@0,0/pci1022,7458@2/pci11ab,11ab@1/disk@2,0
Disk 33          /pci@0,0/pci1022,7458@2/pci11ab,11ab@1/disk@6,0
Disk 34          /pci@0,0/pci1022,7458@1/pci11ab,11ab@1/disk@2,0
Disk 35          /pci@0,0/pci1022,7458@1/pci11ab,11ab@1/disk@6,0
Disk 36          /pci@1,0/pci1022,7458@4/pci11ab,11ab@1/disk@3,0
Disk 37          /pci@1,0/pci1022,7458@4/pci11ab,11ab@1/disk@7,0
Disk 38          /pci@1,0/pci1022,7458@3/pci11ab,11ab@1/disk@3,0
Disk 39          /pci@1,0/pci1022,7458@3/pci11ab,11ab@1/disk@7,0
Disk 40          /pci@2,0/pci1022,7458@8/pci11ab,11ab@1/disk@3,0
Disk 41          /pci@2,0/pci1022,7458@8/pci11ab,11ab@1/disk@7,0
Disk 42          /pci@2,0/pci1022,7458@7/pci11ab,11ab@1/disk@3,0
Disk 43          /pci@2,0/pci1022,7458@7/pci11ab,11ab@1/disk@7,0
Disk 44          /pci@0,0/pci1022,7458@2/pci11ab,11ab@1/disk@3,0
Disk 45          /pci@0,0/pci1022,7458@2/pci11ab,11ab@1/disk@7,0
Disk 46          /pci@0,0/pci1022,7458@1/pci11ab,11ab@1/disk@3,0
Disk 47          /pci@0,0/pci1022,7458@1/pci11ab,11ab@1/disk@7,0

TTYA                    /isa/asy@1,3f8
VGA Port                /pci@0,0/pci1022,7460@6/display@3

USB (Front, High)
/pci@0,0/pci1022,7460@6/pci1033,e0@4,2/hub@5:5.1
USB (Front, Low)
/pci@0,0/pci1022,7460@6/pci1033,e0@4,2/hub@5:5.2
USB (Rear, High)        /pci@0,0/pci1022,7460@6/pci1033,e0@4,2:3
```

```
USB (Rear, Low)          /pci@0,0/pci1022,7460@6/pci1033,e0@4,2:4

PCI-X Slot 0             /pci@3,0/pci1022,7458@9
PCI-X Slot 1             /pci@3,0/pci1022,7458@a
```

H.2 Sun Fire X4540 Device Paths

Use the `/etc/path_to_inst` command to determine the device paths of your system.

The device paths for the Sun Fire X4540 Server is as follows:

```
Network 0 (nge0)         /pci@0,0/pci10de,cb84@8
Network 1 (nge1)         /pci@0,0/pci10de,cb84@9
Network 2 (nge2)         /pci@3c,0/pci10de,cb84@8
Network 3 (nge3)         /pci@3c,0/pci10de,cb84@9

Disk 0                   /pci@0,0/pci10de,377@a/pci1000,1000@0/sd@0,0
Disk 1                   /pci@0,0/pci10de,377@a/pci1000,1000@0/sd@1,0
Disk 2                   /pci@0,0/pci10de,377@a/pci1000,1000@0/sd@2,0
Disk 3                   /pci@0,0/pci10de,377@a/pci1000,1000@0/sd@3,0
Disk 4                   /pci@0,0/pci10de,377@a/pci1000,1000@0/sd@4,0
Disk 5                   /pci@0,0/pci10de,377@a/pci1000,1000@0/sd@5,0
Disk 6                   /pci@0,0/pci10de,377@a/pci1000,1000@0/sd@6,0
Disk 7                   /pci@0,0/pci10de,377@a/pci1000,1000@0/sd@7,0
Disk 8                   /pci@0,0/pci10de,375@b/pci1000,1000@0/sd@0,0
Disk 9                   /pci@0,0/pci10de,375@b/pci1000,1000@0/sd@1,0
Disk 10                  /pci@0,0/pci10de,375@b/pci1000,1000@0/sd@2,0
Disk 11                  /pci@0,0/pci10de,375@b/pci1000,1000@0/sd@3,0
Disk 12                  /pci@0,0/pci10de,375@b/pci1000,1000@0/sd@4,0
Disk 13                  /pci@0,0/pci10de,375@b/pci1000,1000@0/sd@5,0
Disk 14                  /pci@0,0/pci10de,375@b/pci1000,1000@0/sd@6,0
Disk 15                  /pci@0,0/pci10de,375@b/pci1000,1000@0/sd@7,0
Disk 16                  /pci@0,0/pci10de,376@f/pci1000,1000@0/sd@0,0
Disk 17                  /pci@0,0/pci10de,376@f/pci1000,1000@0/sd@1,0
Disk 18                  /pci@0,0/pci10de,376@f/pci1000,1000@0/sd@2,0
Disk 19                  /pci@0,0/pci10de,376@f/pci1000,1000@0/sd@3,0
Disk 20                  /pci@0,0/pci10de,376@f/pci1000,1000@0/sd@4,0
Disk 21                  /pci@0,0/pci10de,376@f/pci1000,1000@0/sd@5,0
Disk 22                  /pci@0,0/pci10de,376@f/pci1000,1000@0/sd@6,0
Disk 23                  /pci@0,0/pci10de,376@f/pci1000,1000@0/sd@7,0
Disk 24                 /pci@3c,0/pci10de,377@a/pci1000,1000@0/sd@0,0
```

```
Disk 25                 /pci@3c,0/pci10de,377@a/pci1000,1000@0/sd@1,0
Disk 26                 /pci@3c,0/pci10de,377@a/pci1000,1000@0/sd@2,0
Disk 27                 /pci@3c,0/pci10de,377@a/pci1000,1000@0/sd@3,0
Disk 28                 /pci@3c,0/pci10de,377@a/pci1000,1000@0/sd@4,0
Disk 29                 /pci@3c,0/pci10de,377@a/pci1000,1000@0/sd@5,0
Disk 30                 /pci@3c,0/pci10de,377@a/pci1000,1000@0/sd@6,0
Disk 31                 /pci@3c,0/pci10de,377@a/pci1000,1000@0/sd@7,0
Disk 32                 /pci@3c,0/pci10de,375@b/pci1000,1000@0/sd@0,0
Disk 33                 /pci@3c,0/pci10de,375@b/pci1000,1000@0/sd@1,0
Disk 34                 /pci@3c,0/pci10de,375@b/pci1000,1000@0/sd@2,0
Disk 35                 /pci@3c,0/pci10de,375@b/pci1000,1000@0/sd@3,0
Disk 36                 /pci@3c,0/pci10de,375@b/pci1000,1000@0/sd@4,0
Disk 37                 /pci@3c,0/pci10de,375@b/pci1000,1000@0/sd@5,0
Disk 38                 /pci@3c,0/pci10de,375@b/pci1000,1000@0/sd@6,0
Disk 39                 /pci@3c,0/pci10de,375@b/pci1000,1000@0/sd@7,0
Disk 40                 /pci@3c,0/pci10de,376@f/pci1000,1000@0/sd@0,0
Disk 41                 /pci@3c,0/pci10de,376@f/pci1000,1000@0/sd@1,0
Disk 42                 /pci@3c,0/pci10de,376@f/pci1000,1000@0/sd@2,0
Disk 43                 /pci@3c,0/pci10de,376@f/pci1000,1000@0/sd@3,0
Disk 44                 /pci@3c,0/pci10de,376@f/pci1000,1000@0/sd@4,0
Disk 45                 /pci@3c,0/pci10de,376@f/pci1000,1000@0/sd@5,0
Disk 46                 /pci@3c,0/pci10de,376@f/pci1000,1000@0/sd@6,0
Disk 47                 /pci@3c,0/pci10de,376@f/pci1000,1000@0/sd@7,0

CompactFlash            /pci@0,0/pci-ide@4/ide@0/cmdk@0,0
TTYA                    /isa/asy@1,3f8
VGA Port                /pci@0,0/pci10de,370@6/display@5

USB (Front, High)       /pci@0,0/pci10de,cb84@2,1/hub@6:6.1
USB (Front, Low)        /pci@0,0/pci10de,cb84@2,1/hub@6:6.2
USB (Rear, High)        /pci@0,0/pci10de,cb84@2,1:2
USB (Rear, Low)         /pci@0,0/pci10de,cb84@2,1:3

PCI-E Slot 0            /pci@79,0/pci10de,377@a
PCI-E Slot 1            /pci@79,0/pci10de,375@b
PCI-E Slot 3            /pci@79,0/pci10de,376@f
```

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