



Sun Blade™ X6440 Server Module Service Manual

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Contents

Preface ix

- 1. Introduction to the Sun Blade X6440 Server Module 1-1**
 - 1.1 Features of the Server Module 1-1
 - 1.2 Sun Blade X6440 Server Module Orientation 1-2
 - 1.3 Documentation Kits 1-6
 - 1.4 Additional Options and Replaceable Components 1-6

- 2. Powering On and Configuring BIOS Settings 2-1**
 - 2.1 Powering On the Server 2-2
 - 2.2 Powering Off the Server 2-4
 - 2.3 Configuring BIOS Settings 2-5
 - 2.3.1 Changing the Configuration of a BIOS Menu Item 2-5
 - 2.3.2 BIOS Considerations 2-6
 - 2.3.2.1 PCI Card Slot Booting Priority 2-6
 - 2.3.2.2 Ethernet Port Device and Driver Naming 2-6
 - 2.3.2.3 Ethernet Port Booting Priority 2-7
 - 2.3.2.4 BIOS Option ROM Size Limitation 2-8
 - 2.3.3 BIOS Setup Screens 2-8
 - 2.3.4 BIOS Main Menu Screen 2-10

- 2.3.5 BIOS Advanced Menu Screens 2–11
 - 2.3.5.1 BIOS Advanced Menu Main Screen 2–11
 - 2.3.5.2 BIOS Advanced Menu CPU Configuration Screen 2–12
 - 2.3.5.3 BIOS Advanced Menu IDE Configuration Screen 2–12
 - 2.3.5.4 BIOS Advanced Menu ACPI Configuration Screen 2–13
 - 2.3.5.5 BIOS Advanced Menu Event Logging Details Screen 2–13
 - 2.3.5.6 BIOS Advanced Menu IPMI Configuration Screen 2–14
 - 2.3.5.7 BIOS Advanced Menu IPMI, LAN Configuration Screen 2–14
 - 2.3.5.8 BIOS Advanced Menu IPMI, PEF Configuration Screen 2–15
 - 2.3.5.9 BIOS Advanced Menu MPS Configuration Screen 2–15
 - 2.3.5.10 BIOS Advanced Menu PCI Express Configuration Screen 2–16
 - 2.3.5.11 BIOS Advanced Menu Remote Access Configuration Screen 2–16
 - 2.3.5.12 BIOS Advanced Menu Trusted Computing Screen 2–17
 - 2.3.5.13 BIOS Advanced Menu USB Configuration Screen 2–17
- 2.3.6 BIOS PCIPnP Menu Screen 2–18
- 2.3.7 BIOS Boot Menu Screens 2–19
 - 2.3.7.1 BIOS Boot Menu Main Screen 2–19
 - 2.3.7.2 BIOS Boot Menu Boot Settings Configuration Screen 2–20
 - 2.3.7.3 BIOS Boot Menu Boot Device Priority Screen 2–20
 - 2.3.7.4 BIOS Boot Menu Hard Disk Drives Screen 2–21
- 2.3.8 BIOS Security Settings Menu 2–21
- 2.3.9 BIOS Chipset Menu Screens 2–22
 - 2.3.9.1 BIOS Chipset Menu Main Screen 2–22

2.3.9.2	BIOS Chipset Menu NorthBridge Configuration Screen	2-23
2.3.9.3	BIOS Chipset Menu NorthBridge Memory Configuration Screen	2-23
2.3.9.4	BIOS Chipset Menu NorthBridge ECC Configuration Screen	2-24
2.3.9.5	BIOS Chipset Menu NorthBridge DRAM Timing Configuration Screen	2-25
2.3.9.6	BIOS Chipset Menu SouthBridge Configuration Screen	2-25
2.3.10	BIOS Exit Option Menu Screen	2-26
2.4	Modifying Settings Using Jumpers	2-27
2.4.1	Using the Clear CMOS Jumper J29	2-28
2.4.2	Resetting the SP Password Using Jumper J37	2-29
2.4.3	Recovering the SP Using Jumper J57	2-30
2.5	Updating the BIOS	2-31
2.6	Power-On Self-Test (POST)	2-32
3.	Diagnostics Tools	3-1
3.1	Service Processor ILOM	3-1
3.2	System Status LEDs	3-2
3.2.1	External Status Indicator LEDs	3-2
3.2.2	Internal Status Indicator LEDs	3-4
3.3	BIOS POST	3-6
3.3.1	How BIOS POST Memory Testing Works	3-6
3.3.2	Redirecting Console Output	3-7
3.4	Hardware Debug Tool (HDT)	3-8
3.4.1	HDT Functionality	3-8
3.4.2	Accessing HDT	3-8
3.4.3	HDT Commands	3-9
3.5	Pc-Check Diagnostics Overview	3-10

- 3.5.1 Accessing Pc-Check Diagnostics 3-10
- 3.6 Pc-Check Menus 3-11
 - 3.6.1 System Information Menu 3-11
 - 3.6.2 Advanced Diagnostics 3-13
 - 3.6.3 Hard Disk/Compact Flash Testing 3-14
 - 3.6.3.1 To Select and Test a Hard Drive/Compact Flash 3-14
 - 3.6.4 Burn-In Testing 3-16
 - 3.6.4.1 Performing Immediate Burn-In Testing 3-16
 - 3.6.4.2 Performing Deferred Burn-In Testing 3-18
 - 3.6.5 Diagnostic Partition 3-18
 - 3.6.6 Show Results Summary 3-18
 - 3.6.7 Print Results Report 3-20
 - 3.6.8 About Pc-Check 3-20
 - 3.6.9 Exit 3-20
- 4. Maintaining the Sun Blade X6440 Server Module 4-1**
 - 4.1 Tools and Supplies Needed 4-1
 - 4.2 Removing the Server Module From the Chassis and Removing the Cover 4-2
 - 4.2.1 Removing the Server Module From the Chassis 4-2
 - 4.2.2 Removing the Main Cover 4-4
 - 4.3 Locations of Replaceable Components 4-5
 - 4.4 Replaceable Component Procedures 4-6
 - 4.4.1 Replacing the System Battery 4-7
 - 4.4.2 Replacing the Compact Flash Module 4-8
 - 4.4.3 Replacing Memory Modules (DIMMs) 4-10
 - 4.4.3.1 DIMM Population Rules 4-10
 - 4.4.3.2 DIMM Replacement Procedure 4-10
 - 4.4.3.3 Error Correction and Parity 4-14

- 4.4.4 Adding or Replacing a RAID Expansion Module 4-14
 - 4.4.4.1 Adding, or Removing and Replacing a REM 4-14
- 4.4.5 Changing the REM Battery 4-16
- 4.4.6 Adding or Replacing a Fabric Expansion Module 4-17
 - 4.4.6.1 Adding, or Removing and Replacing a FEM 4-17
- 4.4.7 Replacing a CPU and Heatsink 4-19
- 4.4.8 Replacing the Motherboard 4-25

A. System Specifications A-1

B. BIOS POST Codes B-1

- B.1 POST Code Checkpoints B-1

C. Connector Pinouts C-1

- C.1 Front I/O Dongle C-2
- C.2 Compact Flash C-3

Index Index-1

Preface

The *Sun Blade X6440 Server Module Service Manual* contains information and procedures for maintaining and upgrading the Sun Blade™ X6440 Server Module.

Before You Read This Document

It is important that you review the safety guidelines in the *Sun Blade X6440 Server Module Safety and Compliance Guide* (820-4412) and in the *Important Information for Sun Hardware Systems* (816-7190).

Product Updates

For product updates that you can download for the Sun Blade X6440 server modules, navigate to the Sun Blade X6440 server module download site from the following web site:

<http://www.sun.com/download/index.jsp>

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

Related Documentation

The documents listed in the following table are available online at:

<http://docs.sun.com>

At that site, search for the Sun Blade™ X6440 Server Module.

Note – The last two digits of the documentation part number identify the latest version of the product documentation that is available for download (or viewing online). For example: 820-xxxx-XX.

Title	Content	Part Number	Format
<i>Sun Blade X6440 Server Module Product Notes</i>	Late-breaking information about the server module.	820-3965	PDF HTML
<i>Sun Blade X6440 Server Module Getting Started Guide</i>	Basic installation information for setting up the server module.	820-3960	PDF Print
<i>Sun Blade X6440 Server Module Installation Guide</i>	Detailed installation information for setting up the server module.	820-3961	PDF HTML Print option
<i>Sun Blade X6440 Server Module Operating System Installation Guide</i>	Installation instructions for the Solaris and Linux operating systems.	820-3962	PDF HTML
<i>Sun Blade X6440 Server Module Windows Operating System Installation Guide</i>	Installation instructions for the Windows Server operating system.	820-3963	PDF HTML
<i>Sun Blade X6440 Server Module Service Manual</i>	Information and procedures for maintaining and upgrading the server module.	820-3964	PDF HTML
<i>x64 Servers Utilities Reference Manual</i>	Information for using applications and utilities common to x64 servers and server modules.	820-1120	PDF HTML
<i>Sun Integrated Lights Out Manager 2.0 User's Guide</i>	ILOM features and tasks that are common to servers and server modules that support ILOM.	820-1188	PDF HTML

Title	Content	Part Number	Format
<i>Sun Integrated Lights Out Manager Supplement for Sun Blade X6440 Server Module</i>	ILOM information that is specific to the server module.	820-3967	PDF HTML
<i>Sun Blade X6440 Server Module Safety and Compliance Manual</i>	Hardware safety and compliance information for the server module.	820-4412	PDF
<i>Important Safety Information for Sun Hardware Systems</i>	Multilingual hardware safety and compliance information for all Sun hardware systems.	816-7190	Print

Using UNIX Commands

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

- Software documentation that you received with your system
- Solaris[™] Operating System documentation, which is at:

<http://docs.sun.com>

Typographic Conventions

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

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

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Please include the title and part number of your document with your feedback:

Sun Blade X6440 Server Module Service Manual, part number 820-3964-10

Introduction to the Sun Blade X6440 Server Module

This chapter contains an overview of the Sun Blade X6440 server module and contains the following topics:

- [Section 1.1, “Features of the Server Module” on page 1-1](#)
- [Section 1.2, “Sun Blade X6440 Server Module Orientation” on page 1-2](#)
- [Section 1.3, “Documentation Kits” on page 1-6](#)
- [Section 1.4, “Additional Options and Replaceable Components” on page 1-6](#)

1.1 Features of the Server Module

The Sun Blade X6440 server module is a 1U server designed to fit into the Sun Blade 6000 and Sun Blade 6048 Modular Systems. The Sun Blade X6440 supports four AMD Opteron quad-core Rev F processors, and embedded I/O that provides both PCI Express and Gigabit Ethernet interfaces to the Sun Blade 6000/6048 chassis midplane. A RAID expansion module (REM) provides LSI RAID functionality for externally attached RAID arrays.

Server monitoring is performed by an onboard AST2000 service processor (SP) module.

[TABLE 1-1](#) summarizes the features of the server module.

TABLE 1-1 Sun Blade X6440 Features

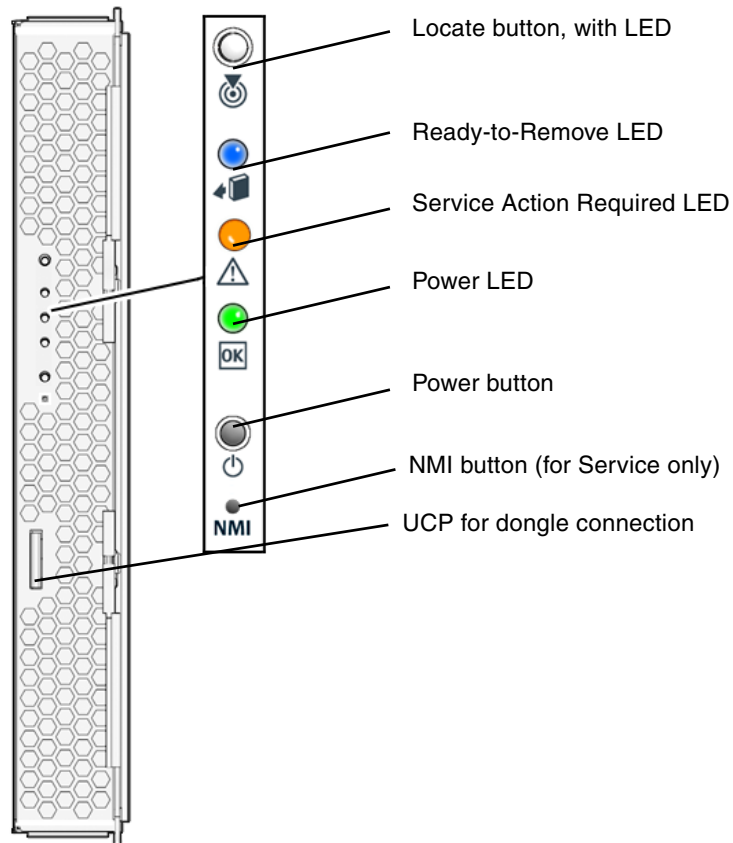
Feature or Component	Specifications
CPU	<ul style="list-style-type: none">• Up to four AMD Opteron 8000 Series quad-core processors (1 Mbyte L2 cache per core)• Processor frequencies: 1.9 GHz and faster
Memory	Up to eight registered ECC DDR2 DIMMs per CPU (up to 128 Gbyte capacity using 4-Gbyte DIMMs)
Service processor	<ul style="list-style-type: none">• Aspeed AST2000 processor providing Baseboard Management Controller (BMC) functions• One 10/100-Mbit management Ethernet port to midplane• Remote keyboard/video/mouse (KVMS) over IP• Integrated Light Out Manager (ILOM) management interface
Midplane I/O	<ul style="list-style-type: none">• Four eight-lane PCI Express: one per Network Express Module (NEM) and one per PCI ExpressModule (PCI EM)• Two 10/100/1000-Mbit Ethernet, one per NEM• 10/100-Mbit Ethernet management port to the chassis management module (CMM)• Optional two eight-lane PCI Express (Gigabit Ethernet and AUX Ethernet) interfaces via the fabric expansion module (FEM)
Front panel I/O	Dongle connector that interfaces to: <ul style="list-style-type: none">• VGA graphics• Serial console to SP• Dual USB ports (keyboard/mouse)
Compact Flash	IDE Compact Flash module interface
IP Security	Optional crypto key storage and system authentication

1.2 Sun Blade X6440 Server Module Orientation

This section contains illustrations that you can use to become familiar with the components of the Sun Blade X6440 server module.

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

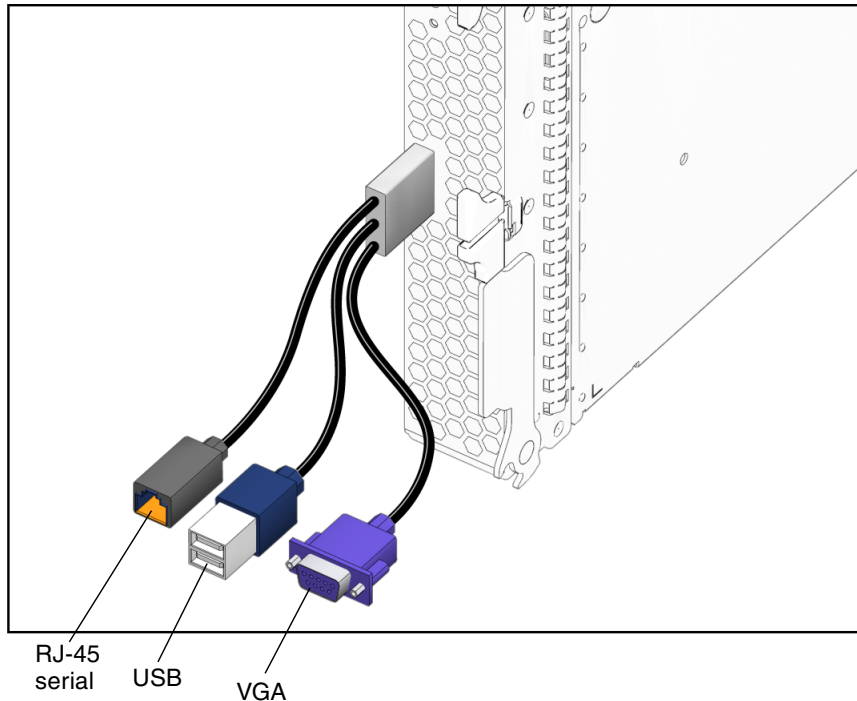
FIGURE 1-1 Sun Blade X6440 Server Module Front Panel



Caution – Do not use the NMI button unless you are instructed to do so by authorized Sun Service personnel. The non-maskable interrupt (NMI) switch sends an NMI order to the CPUs, which is used by Sun Field Service for debugging activities at the request of Sun Service personnel.

FIGURE 1-2 shows how to attach a dongle cable to the Sun Blade X6440 server module universal connection port (UCP). The dongle cable provides the following I/O connections for the server: VGA graphics, RJ-45 serial console to the server module service processor, and dual USB connectors for keyboard/mouse connections.

FIGURE 1-2 Attaching a Dongle Cable to the Server

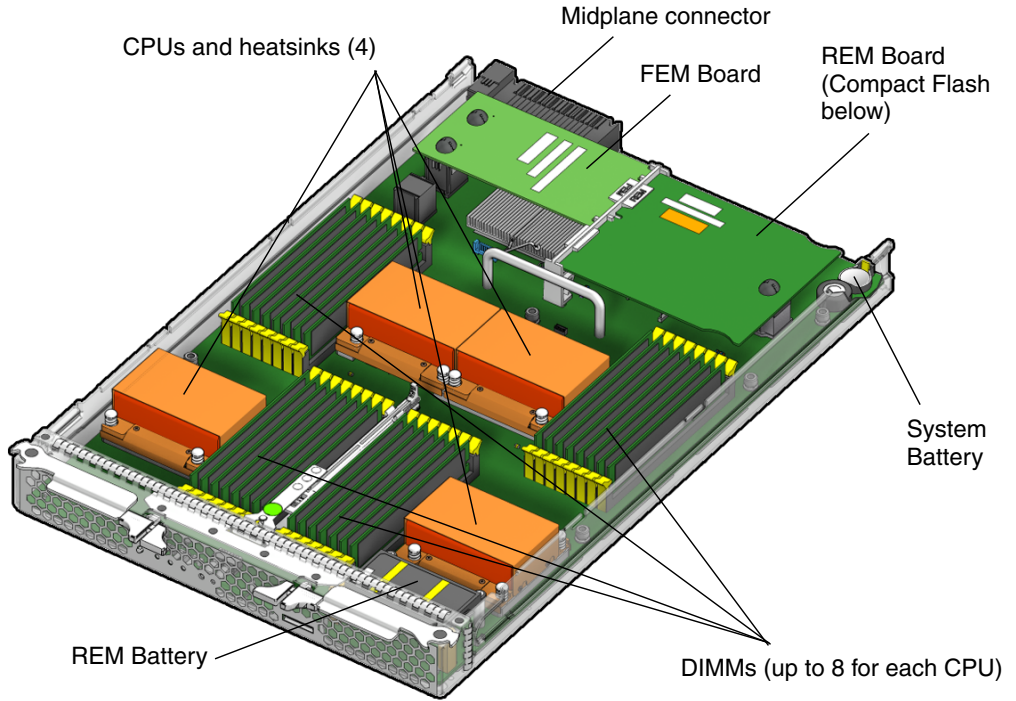


Caution – The dongle cable should be used only for configuration and service purposes. It should be disconnected from the server module when the configuration or servicing operation is completed.

If you have a dongle cable connected to a server module, it must be removed before closing the door of a rack cabinet. The dongle cable may be damaged if it is not removed before the cabinet door is closed.

FIGURE 1-3 shows the locations of the Sun Blade X6440 server module replaceable components, with the top cover removed.

FIGURE 1-3 Sun Blade X6440 Server Module Replaceable Component Locations



1.3 Documentation Kits

TABLE 1-2 lists the contents of the documentation kit, an option that you can order with the server module that includes system installation documentation and CDs.

TABLE 1-2 Accessory Kit

Item	Part Number
Sun Blade X6440 Server Module Tools and Drivers DVD	708-0347
Sun Blade X6440 Server Module Sun Installation Assistant CD	707-0181
Sun Blade X6440 Server Module Installation Guide (printed documentation)	820-3961
Sun Blade X6440 Server Module Getting Started Guide (printed documentation)	820-3960
Additional safety and license documentation	

1.4 Additional Options and Replaceable Components

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

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

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

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

Powering On and Configuring BIOS Settings

You can power on the Sun Blade X6440 server module directly from the front panel. You can power off the server module using one of four different methods. In addition, you can configure or change several BIOS settings.

The following topics are contained in this chapter:

- [Section 2.1, “Powering On the Server” on page 2-2](#)
- [Section 2.2, “Powering Off the Server” on page 2-4](#)
- [Section 2.3, “Configuring BIOS Settings” on page 2-5](#)
- [Section 2.4, “Modifying Settings Using Jumpers” on page 2-27](#)
- [Section 2.5, “Updating the BIOS” on page 2-31](#)
- [Section 2.6, “Power-On Self-Test \(POST\)” on page 2-32](#)

2.1 Powering On the Server

Note – Before powering on your server for the first time, follow the installation instructions provided in the *Sun Blade X6440 Server Module Installation Guide* (820-3961).

1. **Verify that power cords have been connected to the chassis power supplies and that standby power is on.**

Approximately 1 to 2 minutes after initial power is supplied, the service processor will boot and the blue (Ready to Remove) LED on the server module front panel illuminates, indicating that the server module is ready to be fully powered on to main power mode. See [FIGURE 2-1](#) for the LED location.

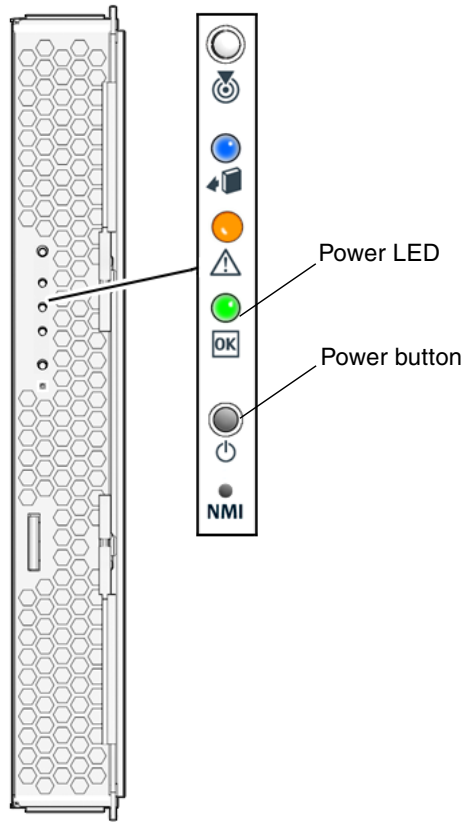
2. **Use a stylus, or other pointed object, to press and release the recessed Power button on the front panel of the server.**

See [FIGURE 2-1](#) for the Power button location.

When main power is applied to all components in the server, the Power LED next to the Power button lights and remains lit.

[FIGURE 2-1](#) shows the location of the Power button.

FIGURE 2-1 Power Button and Power LED Location



2.2 Powering Off the Server

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

- **Graceful shutdown:** Use a stylus, or other pointed object, 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 the main power off and enter standby power mode.
- **ILOM CLI shutdown:** Log in to the SP ILOM CLI and type:
stop /SYS

■ ILOM web GUI shutdown: Log in to the ILOM web GUI and do the following:

a. Select Remote Control => Remote Power Control.

The Server Power Control page appears.

b. Select an action from the drop-down list.

- Immediate Power Off: Select to power off the server.
- Graceful Shutdown and Power Off: Select to gracefully shut down the system operating system before the system is powered off.

Refer to the *Sun Integrated Lights Out Manager 2.0 User's Guide* (820-1188) for more information.

When the main power is off, the blue (Ready to Remove) LED on the server module front panel illuminates, indicating that the server is in standby power mode.

2. To completely power off the server, remove the server module from the chassis.

See [Section 4.2, "Removing the Server Module From the Chassis and Removing the Cover"](#) on page 4-2.

2.3 Configuring BIOS Settings

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

The Basic Input/Output System (BIOS) has a setup utility stored in the BIOS flash memory. The setup utility reports system information and can be used to configure the BIOS settings. The configured data is provided with context-sensitive help and is stored in the system's battery-backed CMOS RAM. If the configuration stored in the CMOS RAM is invalid, the BIOS settings default to optimal values specified in the BIOS.

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 screen's menu. Use the Tab key to move back and forth across columns.

2.3.1 Changing the Configuration of a BIOS Menu Item

You can change the BIOS configuration using several different interfaces:

- Use a USB keyboard and mouse, and a VGA monitor connected directly to the server dongle.
- Use the remote video console of the ILOM service processor and redirect the server's console output. Refer to the *Sun Integrated Lights Out Manager 2.0 User's Guide* (820-1188) for more information.
- Use a terminal (or terminal emulator connected to a computer) through the serial port on the server dongle.

1. To change the system parameters, enter the BIOS Setup Utility by pressing the F2 key while the system is performing the power-on self-test (POST).

POST testing is indicated when the Power LED on the server module front panel goes into slow-blink mode.

2. Highlight the field to be modified using the arrow and Tab keys.

3. Press Enter to select the field.

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

4. Modify the setup field and close the screen.

5. If you need to modify other setup parameters, use the arrow and Tab keys to navigate to the desired screen and menu item, and then repeat Steps 1 through 3. Otherwise, go to Step 6.
6. Press and release the right arrow key until the Exit menu screen is displayed.
7. Follow the instructions on the Exit menu screen to save your changes and exit the Setup Utility.

2.3.2 BIOS Considerations

This section contains information and considerations regarding the system BIOS.

2.3.2.1 PCI Card Slot Booting Priority

The Sun Blade X6440 server module has up to two PCI Express Modules (PCI EMs) per server module installed in the chassis.

The slots for the PCI Express Modules are detected by the BIOS during startup in this order: PCI EM BLx.1 and PCI EM BLx.0. For example, if the server module is in slot 3, the BIOS boot priority is 3.0, 3.1.

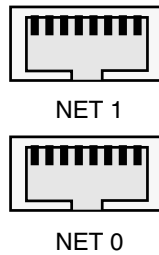
See the chassis documentation for further information on PCI EMs.

2.3.2.2 Ethernet Port Device and Driver Naming

The Sun Blade X6440 server modules have up to two 10/100/1000BASE-T Gigabit Ethernet ports provided by the network express module (NEMs) installed in the chassis. The lower NEM port is NET 0 and the upper NEM port is NET 1, as shown in [FIGURE 2-2](#).

If you have the Infiniband NEM installed, only one Ethernet port per server module will be available.

FIGURE 2-2 Ethernet Port Chassis Labeling Designations



See the chassis documentation for further information on NEMs.

The device naming for the Gigabit Ethernet NEM Ethernet interfaces is reported differently by different interfaces and operating systems. Refer to [FIGURE 2-3](#) for a diagram that explains how various operating systems and interfaces name the two Ethernet ports shown in [FIGURE 2-2](#).

Note – If you have an Infiniband NEM, the Net 0 interfaces only are used.

FIGURE 2-3 Sun Blade X6440 Server Module Gigabit Ethernet NEM Port Naming

	BIOS	Solaris 10	Red Hat Linux	SUSE Linux	Windows 2003/2008
Net 1	slot 8041	igb1	eth1	eth1	net2
Net 0	slot 8400	igb0	eth0	eth0	net

2.3.2.3 Ethernet Port Booting Priority

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

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

2.3.2.4 BIOS Option ROM Size Limitation

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

2.3.3 BIOS Setup Screens

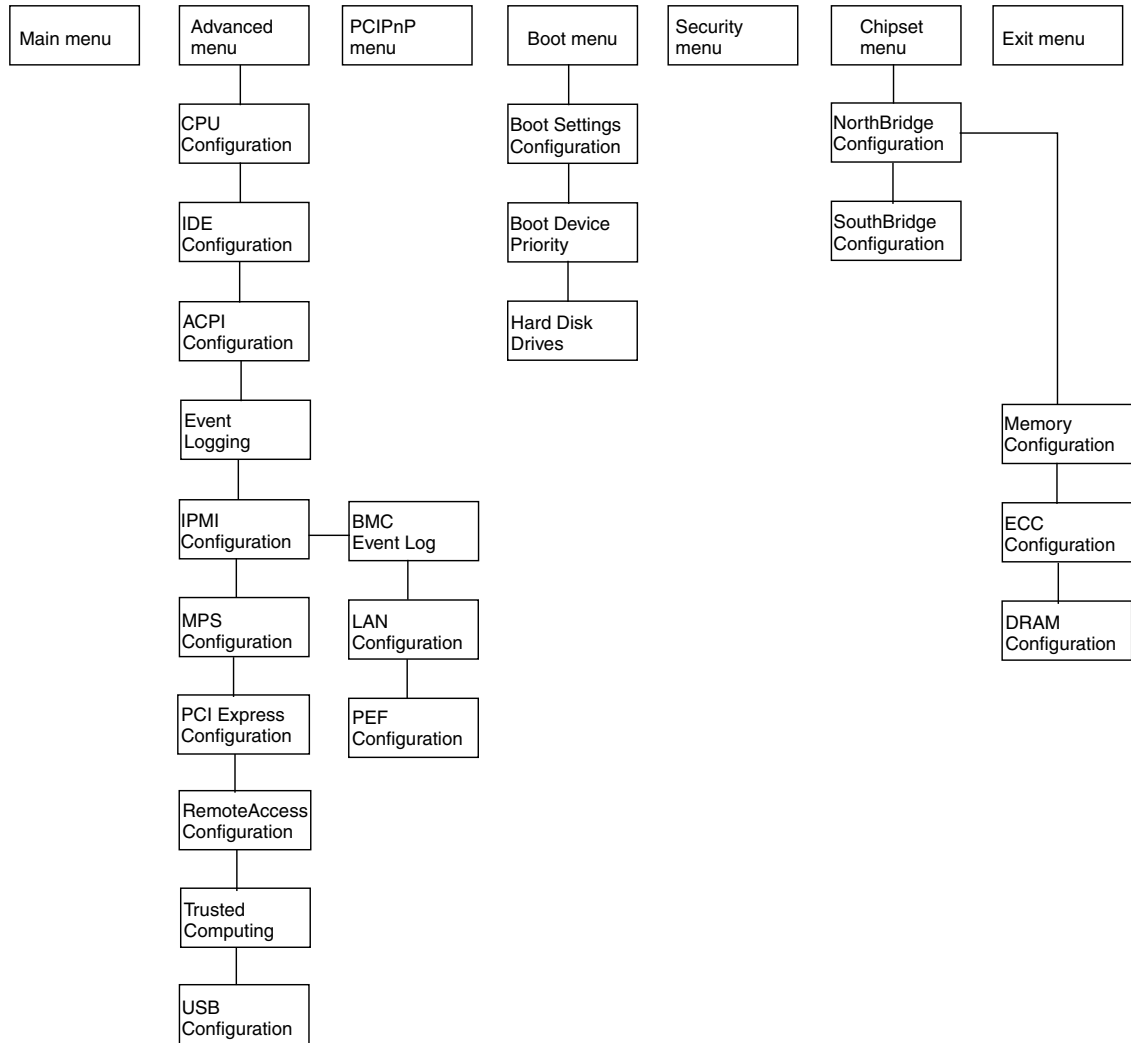
[TABLE 2-1](#) contains summary descriptions of the seven top-level BIOS setup screens and indicates the section that contains examples of the BIOS screens.

TABLE 2-1 BIOS Setup Screens Summary

Screen	Description	Section
Main	General system information.	Section 2.3.4, “BIOS Main Menu Screen” on page 2-10
Advanced	Configuration interface for the CPUs, IDE, SuperIO, ACPI, Event Log, HyperTransport, IPMI, MPS, PCI Express, PowerNow!, Remote Access, and USB.	Section 2.3.5, “BIOS Advanced Menu Screens” on page 2-11
PCIPnP	Plug-and-Play (PnP) devices can be configured by the BIOS (default), or by the operating system (if applicable).	Section 2.3.6, “BIOS PCIPnP Menu Screen” on page 2-18
Boot	Configure the boot device priority (CD/DVD, Removables, Hard Disks, Networks).	Section 2.3.7, “BIOS Boot Menu Screens” on page 2-19
Security	Install or change the user and supervisor passwords.	Section 2.3.8, “BIOS Security Settings Menu” on page 2-21
Chipset	Configuration options for the NorthBridge and SouthBridge devices. Note that the 4-Bit ECC Mode option is enabled by default. Enabling 4-Bit ECC Mode improves system reliability but degrades system performance under specific applications.	Section 2.3.9, “BIOS Chipset Menu Screens” on page 2-22
Exit	Save or discard changes.	Section 2.3.10, “BIOS Exit Option Menu Screen” on page 2-26

[FIGURE 2-4](#) summarizes the BIOS Configuration Utility menu tree. See the following sections for examples of each of these screens.

FIGURE 2-4 Sun Blade X6440 Server Module BIOS Configuration Utility Menu Tree



The following figures show sample BIOS setup menu screens and show optional default settings.

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.

2.3.4 BIOS Main Menu Screen

```

Main    Advanced  PCIPnP  Boot    Security  Chipset  Exit
*****
* System Overview                                     * Use [ENTER], [TAB] *
* *****                                           * or [SHIFT-TAB] to *
* BIOS Version   :0.29                               * select a field.   *
* Build Date    :07/10/08                            *                  *
*               *                                     * Use [+] or [-] to *
* Product Name: SUN BLADE X6440 SERVER MODULE        * configure system Time.*
* Main Board S/N: 0328MSL-0813510030                 *                  *
* SP Firmware Version: 20.01.02.00                   *                  *
* CPLD Revision: 2.0                                 *                  *
* FPGA Revision: 1.7                                 *                  *
*               *                                     *                  *
* Processor                                           *                  *
* Quad-Core AMD Opteron(tm) Processor 8354          * *   Select Screen *
* Speed        :2200MHz                              * **  Select Item   *
* Count        :16                                   * +-  Change Field  *
* System Memory * Tab Select Field                  *
* Size         :16384MB                              * F1  General Help  *
*               *                                     * F10 Save and Exit *
* System Time   [12:38:35]                            * ESC  Exit         *
* System Date   [Thu 07/10/2008]                       *                  *
*****
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```

2.3.5 BIOS Advanced Menu Screens

2.3.5.1 BIOS Advanced Menu Main Screen

```

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 *
* * ACPI Configuration *
* * Event Log Configuration *
* * IPMI 2.0 Configuration *
* * MPS Configuration *
* * PCI Express Configuration *
* * Remote Access Configuration * * Select Screen *
* * Trusted Computing * ** Select Item *
* * USB Configuration * Enter Go to Sub Screen *
* *
* * F1 General Help *
* * F10 Save and Exit *
* * ESC Exit *
* *
*****
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```

2.3.5.2 BIOS Advanced Menu CPU Configuration Screen

```

Advanced
*****
* CPU Configuration * This option should *
* Module Version: 13.33 * remain disabled for *
* AGESA Version: 3.1.9.0 * the normal operation. *
* Physical Count: 4 * The driver developer *
* Logical Count : 16 * may enable it for *
* * * * * testing purpose. *
* Quad-Core AMD Opteron(tm) Processor 8354 *
* Revision: B3 *
* Cache L1: 512KB *
* Cache L2: 2048KB *
* Cache L3: 2MB *
* Speed : 2200MHz, NB Clk: 1800MHz *
* Able to Change Freq. : Yes * * Select Screen *
* uCode Patch Level : 0x1000083 * ** Select Item *
* GART Error Reporting [Disabled] * +- Change Option *
* Microcode Update [Enabled] * F1 General Help *
* Secure Virtual Machine Mode [Enabled] * F10 Save and Exit *
* PowerNow [Enabled] * ESC Exit *
* *
* *
*****
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```

2.3.5.3 BIOS Advanced Menu IDE Configuration Screen

```
Advanced
*****
* IDE Configuration                               * While entering setup, *
* *****                                       * BIOS auto detects the *
* * Primary IDE Master                          : [Hard Disk] * presence of IDE      *
* * Hard Disk Write Protect                      [Disabled] * devices. This displays *
* * IDE Detect Time Out (Sec)                   [35]       * the status of auto    *
* * ATA(PI) 80Pin Cable Detection               [Device]   * detection of IDE      *
* *                                              * devices.              *
* *                                              *                       *
* * * Select Screen                             *                       *
* * * Select Item                               *                       *
* * Enter Go to Sub Screen                       *                       *
* * F1 General Help                             *                       *
* * F10 Save and Exit                           *                       *
* * ESC Exit                                     *                       *
* *                                              *                       *
* *                                              *                       *
*****
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```

2.3.5.4 BIOS Advanced Menu ACPI Configuration Screen

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


2.3.5.7 BIOS Advanced Menu IPMI, LAN Configuration Screen

```
Advanced
*****
* LAN Configuration.                               * Enter channel number *
* *****                                         * for SET LAN Config *
* Channel Number [01]                             * Command.           *
* Channel Number Status: Channel number is OK    * Proper value below 16. *
* *                                               *                   *
* IP Assignment [DHCP]                            *                   *
* *                                               *                   *
* Current IP address in BMC: 129.148.053.105     *                   *
* Current MAC address in BMC: 00.14.4F.4A.AF.91  *                   *
* Current Subnet Mask in BMC: 255.255.255.000   *                   *
* Current Gateway in BMC: 129.148.053.248      *                   *
* *                                               *                   *
* * Select Screen                               *                   *
* IP Address [129.148.053.105]                  * ** Select Item     *
* Subnet Mask [255.255.255.000]                * Enter Update       *
* Default Gateway [129.148.053.248]           * F1 General Help    *
* *                                               * F10 Save and Exit  *
* Commit                                       * ESC Exit           *
* *                                               *                   *
* *                                               *                   *
*****
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```

2.3.5.8 BIOS Advanced Menu IPMI, PEF Configuration Screen

```
Advanced
*****
* Set PEF Configuration Parameters Command.       * Enable or Disable PEF *
* *****                                         * Support.             *
* PEF SUPPORT [Disabled]                         *                   *
* *                                               *                   *
* *                                               *                   *
* *                                               *                   *
* *                                               *                   *
* *                                               *                   *
* *                                               *                   *
* *                                               *                   *
* *                                               *                   *
* *                                               *                   *
* *                                               *                   *
* * Select Screen                               *                   *
* ** Select Item                               *                   *
* +- Change Option                             *                   *
* F1 General Help                              *                   *
* F10 Save and Exit                            *                   *
* ESC Exit                                     *                   *
* *                                               *                   *
* *                                               *                   *
*****
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```


2.3.5.11 BIOS Advanced Menu Remote Access Configuration Screen

```
Advanced
*****
* Configure Remote Access type and parameters * Select Serial Port *
* ***** * type. *
* Serial Port [COM1/IRQ4] * *
* * *
* Remote Access [Enabled] * *
* * *
* Serial Port Mode [9600 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 *
* * * *
*****
v02.61 (C)Copyright 1985-2006, American Megatrends, Inc.
```

2.3.5.12 BIOS Advanced Menu Trusted Computing Screen

```
Advanced
*****
* Trusted Computing * Enable/Disable *
* ***** * TPM TCG (TPM 1.1/1.2) *
* TCG/TPM SUPPORT [Yes] * support in BIOS. *
* * *
* Execute TPM Cmmmand [Don't change] * *
* Clearing the TPM [Press Enter] * *
* TPM Enable/Disable Status [Enabled] * *
* TPM Owner Status [UnOwned] * *
* * *
* * *
* * * * Select Screen *
* * * * Select Item *
* * * * +- Change Option *
* * * * F1 General Help *
* * * * F10 Save and Exit *
* * * * ESC Exit *
* * * *
*****
v02.61 (C)Copyright 1985-2006, American Megatrends, Inc.
```

2.3.5.13 BIOS Advanced Menu USB Configuration Screen

```

Advanced
*****
* USB Configuration                               * Enables support for *
* *****                                         * legacy USB. AUTO  *
* Module Version - 2.24.3-13.4                   * option disables legacy *
*                                                 * support if no USB  *
* USB Devices Enabled :                          * devices are connected.*
*   1 Keyboard, 1 Mouse                          *                   *
*                                                 *                   *
* Legacy USB Support                             [Enabled]           *
* USB 2.0 Controller Mode                       [HiSpeed]         *
* BIOS EHCI Hand-Off                            [Enabled]         *
*                                                 *                   *
*                                                 * *       Select Screen *
*                                                 * **      Select Item  *
*                                                 * +-      Change Option *
*                                                 * F1      General Help  *
*                                                 * F10     Save and Exit *
*                                                 * ESC     Exit          *
*                                                 *                   *
*****
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```

2.3.6 BIOS PCIPnP Menu Screen

```

Main   Advanced  PCIPnP  Boot  Security  Chipset  Exit
*****
* Advanced PCI/PnP Settings                       ** Clear NVRAM during *
* *****                                         * System Boot.       *
* 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 *
* IRQ3                                          [Available]       ** **      Select Item  *
* IRQ4                                          [Available]       ** +-      Change Option *
* IRQ5                                          [Available]       ** F1      General Help  *
* IRQ7                                          [Available]       ** F10     Save and Exit *
* IRQ9                                          [Available]       ** ESC     Exit          *
* IRQ10                                         [Available]       **                *
* IRQ11                                         [Available]       **                *
*****
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```

2.3.7 BIOS Boot Menu Screens

2.3.7.1 BIOS Boot Menu Main Screen

```
Main  Advanced  PCIFnP  Boot  Security  Chipset  Exit
*****
* Boot Settings                                     * Configure Settings *
* *****                                         * during System Boot.*
* * Boot Settings Configuration                       *               *
* *                                                 *               *
* * Boot Device Priority                             *               *
* * Hard Disk Drives                               *               *
* *                                                 *               *
* *                                                 *               *
* *                                                 *               *
* *                                                 *               *
* *                                                 *               *
* *                                                 *               *
* *                                                 *               *
* *                                                 *               *
* *                                                 *               *
* * Select Screen                                   *               *
* ** Select Item                                    *               *
* Enter Go to Sub Screen                            *               *
* F1 General Help                                   *               *
* F10 Save and Exit                                 *               *
* ESC Exit                                          *               *
* *                                                 *               *
*****
v02.61 (C)Copyright 1985-2006, American Megatrends, Inc.
```

2.3.7.2 BIOS Boot Menu Boot Settings Configuration Screen

```
Boot
*****
* Boot Settings Configuration                       * Allows BIOS to skip *
* *****                                         * certain tests while *
* Quick Boot [Enabled]                             * booting. This will *
* Quiet Boot [Disabled]                            * decrease the time *
* Language [English]                               * needed to boot the *
* Bootup Num-Lock [On]                             * system.             *
* Wait For 'F1' If Error [Enabled]                 *                   *
* Interrupt 19 Capture [Enabled]                   *                   *
* *                                                 *                   *
* *                                                 *                   *
* *                                                 *                   *
* *                                                 *                   *
* * Select Screen                                   *                   *
* ** Select Item                                    *                   *
* +- Change Option                                  *                   *
* F1 General Help                                   *                   *
* F10 Save and Exit                                 *                   *
* ESC Exit                                          *                   *
* *                                                 *                   *
*****
v02.61 (C)Copyright 1985-2006, American Megatrends, Inc.
```


2.3.8 BIOS Security Settings Menu

```

Main   Advanced  PCI/PnP  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                                           *
*
*****
v02.61 (C) Copyright 1985-2006, American Megatrends, Inc.

```

2.3.9 BIOS Chipset Menu Screens

2.3.9.1 BIOS Chipset Menu Main Screen

```

Main      Advanced  PCI/PnP  Boot     Security  Chipset   Exit
*****
* Advanced Chipset Settings                                * Options for
* ***** * NorthBridge.
* WARNING: Setting wrong values in below sections
*           may cause system to malfunction.
*
* * NorthBridge Configuration
* * SouthBridge/MCP55 Configuration
*
*
*
*
*
*
*
*
*
* *          Select Screen
* **        Select Item
* Enter    Go to Sub Screen
* F1       General Help
* F10      Save and Exit
* ESC      Exit
*
*
*****
v02.61 (C)Copyright 1985-2006, American Megatrends, Inc.

```

2.3.9.2 BIOS Chipset Menu NorthBridge Configuration Screen

```

Chipset
*****
* 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
* Min Active RAS (Tras) :15 CLK, 15 CLK
* RAS/RAS Delay (Trrd) :3 CLR, 3 CLK
* Row Cycle (Trc) :21 CLK, 21 CLK
* Write Recover Time(Twr):5 CLK, 5 CLK
*
*
* *          Select Screen
* **        Select Item
* Enter    Go to Sub Screen
* F1       General Help
* F10      Save and Exit
* ESC      Exit
*
*
*****
v02.61 (C)Copyright 1985-2006, American Megatrends, Inc.

```

2.3.9.3

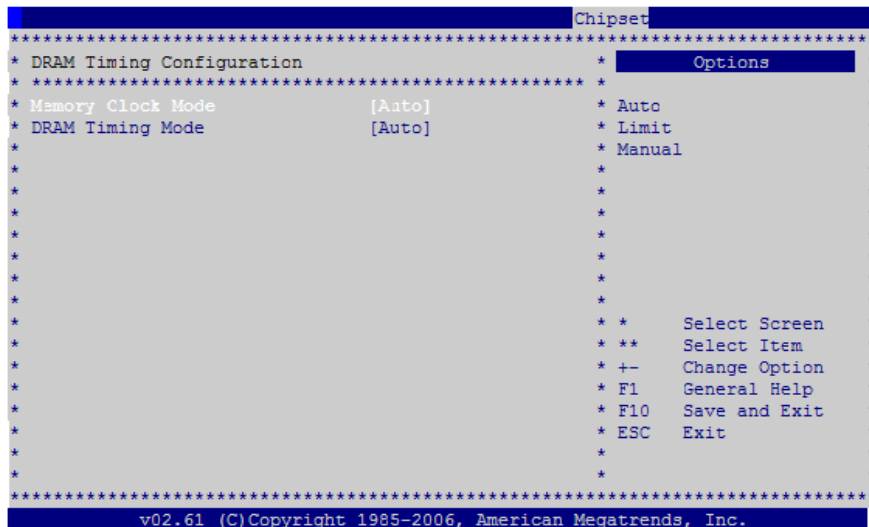
BIOS Chipset Menu NorthBridge Memory Configuration Screen

```
Chipset
*****
* Memory Configuration                               * Enable Bank Memory *
* *****                                           * Interleaving      *
* Bank Interleaving           [Auto]                *                *
* Channel Interleaving        [XCR of Address bit] *                *
* Enable Clock to All DIMMs   [Disabled]            *                *
* MemClk Tristate C3/ATIVID   [Disabled]            *                *
* Memory Hole Remapping       [Enabled]             *                *
* CS Sparing Enable           [Disabled]            *                *
* DCT Unganged Mode           [Disabled]            *                *
* Power Down Enable           [Enabled]             *                *
*   Power Down Mode           [Channel]             *                *
*                *                *
*                * *      Select Screen *
*                * **     Select Item  *
*                * +-    Change Option *
*                * F1    General Help  *
*                * F10   Save and Exit *
*                * ESC   Exit          *
*                *                *
*****
v02.61 (C)Copyright 1985-2006, American Megatrends, Inc.
```

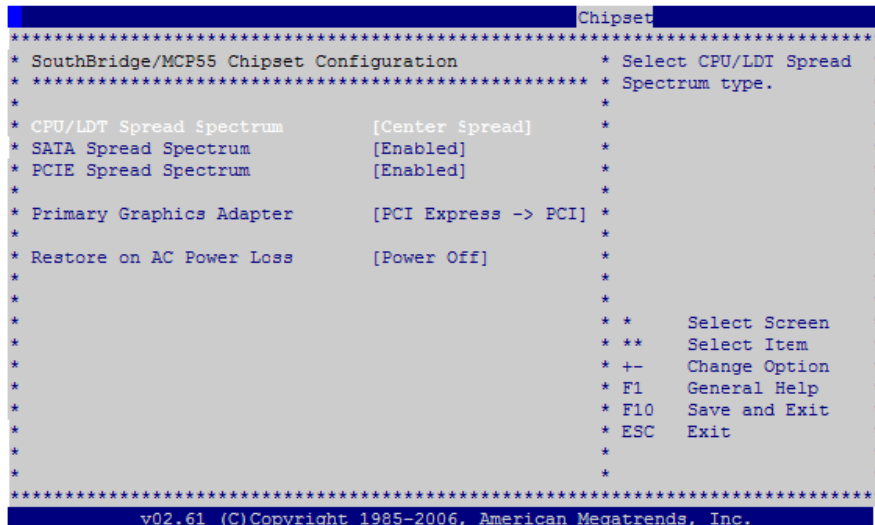

2.3.9.4 BIOS Chipset Menu NorthBridge ECC Configuration Screen

```
Chipset
*****
* ECC Configuration                               * Set the level of ECC *
* *****                                       * protection. Note: The *
* ECC Mode [Basic ]                             * `Super' ECC mode     *
* DFAM ECC Enable [Enabled]                     * dynamically sets the *
* DRAM SCRUB REDIRECT [Disabled]                * DRAM scrub rate so  *
* 4-Bit ECC Mode [Enabled]                     * all of memory is    *
* DRAM BG Scrub [Disabled]                    * scrubbed in 8 hours. *
* Data Cache BG Scrub [ 5.24ms]                *                      *
* L2 Cache BG Scrub [ 1.31ms]                  *                      *
* L3 Cache BG Scrub [655.4us]                  *                      *
*                      *                      *
*                      *                      *
*                      * *      Select Screen *
*                      * **     Select Item  *
*                      * +-     Change Option *
*                      * F1     General Help  *
*                      * F10    Save and Exit *
*                      * ESC     Exit         *
*                      *                      *
*                      *                      *
*****
v02.61 (C)Copyright 1985-2006, American Megatrends, Inc.
```

2.3.9.5 BIOS Chipset Menu NorthBridge DRAM Timing Configuration Screen



2.3.9.6 BIOS Chipset Menu SouthBridge Configuration Screen



2.3.10 BIOS Exit Option Menu Screen

```

Main    Advanced  PCIPnP  Boot    Security  Chipset  Exit
*****
* Exit Options                                     * Exit system setup *
* ****                                     * after saving the  *
* Save Changes and Exit                          * changes.         *
* Discard Changes and Exit                       *                 *
* Discard Changes                                * F10 key can be used *
* Load Optimal Defaults                         * for this operation.*
*                                                *                 *
*                                                *                 *
*                                                *                 *
*                                                *                 *
*                                                *                 *
* *      Select Screen                          *
* **     Select Item                            *
* Enter Go to Sub Screen *
* F1     General Help                           *
* F10    Save and Exit                          *
* ESC    Exit                                    *
*                                                *
*****
v02.61 (C)Copyright 1985-2006, American Megatrends, Inc.
```

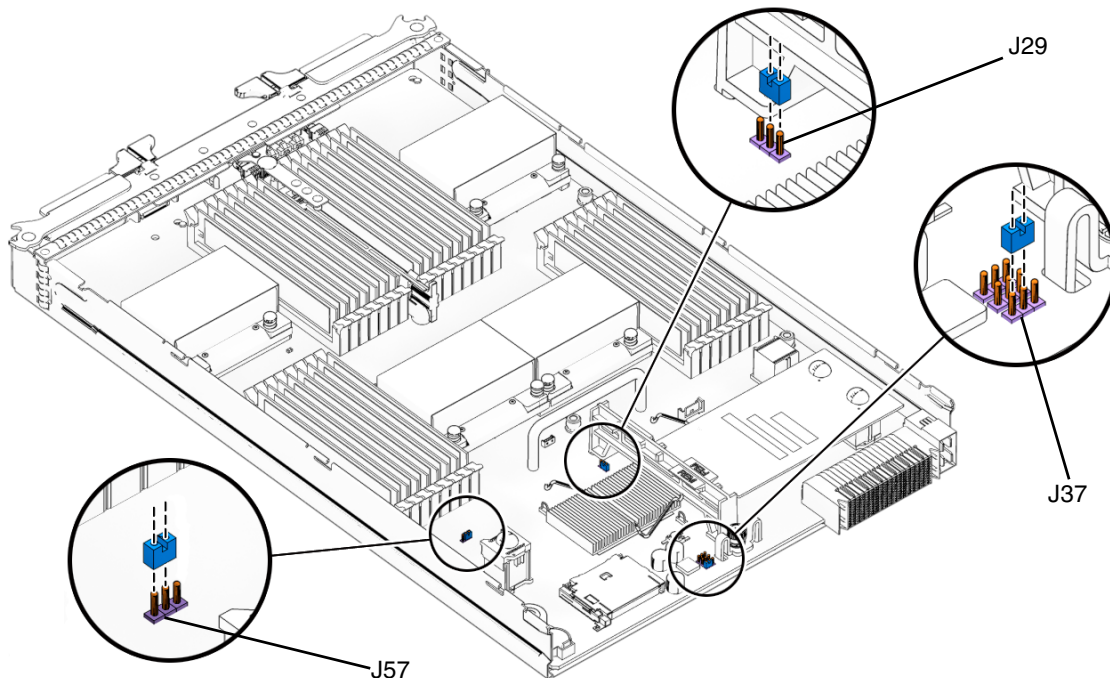
2.4 Modifying Settings Using Jumpers

The following sections show how to modify system settings using jumpers on the server motherboard:

- Section 2.4.1, “Using the Clear CMOS Jumper J29” on page 2-28
- Section 2.4.2, “Resetting the SP Password Using Jumper J37” on page 2-29
- Section 2.4.3, “Recovering the SP Using Jumper J57” on page 2-30

FIGURE 2-5 shows the header pin locations on the Sun Blade X6440 server module that are referenced in the following procedures.

FIGURE 2-5 Header Pin Locations



2.4.1 Using the Clear CMOS Jumper J29

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.

1. **Shut down the server to standby power mode. Use a stylus, or other pointed object, to press and release the recessed Power button on the server module front panel.**

See [Section 2.2, "Powering Off the Server"](#) on page 2-4.



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

2. **Remove the server module from the chassis.**

See [Section 4.2.1, "Removing the Server Module From the Chassis"](#) on page 4-2

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

See [Section 4.2.2, "Removing the Main Cover"](#) on page 4-4.

4. **Install the shorting jumper across the J29 header pins.**

See [FIGURE 2-5](#) for the header pin location.

5. **Wait 10 seconds, and then remove the shorting jumper.**

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

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

7. **Reinstall the server module into the server.**

See [Section 4.2.1, "Removing the Server Module From the Chassis"](#) on page 4-2. The server powers up to standby power mode, indicated when the blue (Read to Remove) LED on the server module front panel is illuminated.

8. **Return the server to main power mode. Use a stylus, or other pointed object, to press and release the recessed Power button on the server module front panel.**

2.4.2 Resetting the SP Password Using Jumper J37

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

1. **Shut down the server to standby power mode. Use a stylus, or other pointed object, to press and release the recessed Power button on the server module front panel.**

See [Section 2.2, “Powering Off the Server”](#) on page 2-4.



Caution – Before handling components, attach an ESD wrist strap to the grounding post that is built into the rear of the chassis. The system’s printed circuit boards and hard disk drives contain components that are extremely sensitive to static electricity.

2. **Remove the server module from the chassis.**

See [Section 4.2.1, “Removing the Server Module From the Chassis”](#) on page 4-2.

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

See [Section 4.2.2, “Removing the Main Cover”](#) on page 4-4.

4. **Install the shorting jumper across the J37 header pins.**

See [FIGURE 2-5](#) for the header pin location.

This jumper’s function is to clear the ILOM SP password.

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

6. **Reinstall the server module into the chassis.**

See [Section 4.2.1, “Removing the Server Module From the Chassis”](#) on page 4-2.

The server powers up to standby power mode, indicated when the blue (Read to Remove) LED on the server module front panel is illuminated.

7. **Return the server to main power mode. Use a stylus, or other pointed object, to press and release the recessed Power button on the server module front panel.**

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

- The ILOM SP password is reset to the default, changeme.

8. Log in to the ILOM web GUI using **root** as the user name and **changeme** as the password.
Refer to the *Sun Integrated Lights Out Manager 2.0 User's Guide* (820-1188).
9. Change the default password to a password of your choice.
10. Repeat Steps 1 through 7 to remove the J37 jumper. (Remove the jumper in Step 4 rather than inserting it.)

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

2.4.3 Recovering the SP Using Jumper J57

You may need to recover the service processor (SP) if it hangs due to an incomplete flash. Use this jumper to hold the SP in reset.

The procedures in this section require you to use:

- The Sun Blade X6440 Server Module Tools & Drivers DVD, which is available in the Sun Blade X6440 Server Module Accessory Kit. See [Section 1.3](#), “Documentation Kits” on page 1-6.
- A bootable USB flash drive
- A dongle cable with USB connectors

1. Load the Tools & Drivers DVD into a DVD-ROM drive.
2. Navigate to the `/SPrecovery` directory and copy the following files to a bootable USB flash drive.
 - `socflash.exe`
 - `spnnnnn.bin`, where `nnnnn` represents the firmware version.
 - `dos4gw.exe`

3. Shut down the server to standby power mode. Use a stylus, or other pointed object, to press and release the recessed Power button on the server module front panel.

See [Section 2.2](#), “Powering Off the Server” on page 2-4.



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

4. **Remove the server module from the chassis.**
See [Section 4.2.1, “Removing the Server Module From the Chassis”](#) on page 4-2
5. **Remove the main cover from the server.**
See [Section 4.2.2, “Removing the Main Cover”](#) on page 4-4.
6. **Install the shorting jumper across the J57 header pins.**
See [FIGURE 2-5](#) for the header pin location.
7. **Reinstall the main cover to the server.**
8. **Reinstall the server module into the server.**
See [Section 4.2.1, “Removing the Server Module From the Chassis”](#) on page 4-2.
The server powers up to standby power mode, indicated when the blue (Read to Remove) LED on the server module front panel is illuminated.
9. **Attach a dongle cable to the server module universal connection port (UCP).**
See [FIGURE 1-2](#) for information on the dongle cable connection.
10. **Insert the bootable USB flash drive into a dongle cable USB connector.**
11. **Return the server to main power mode. Use a stylus, or other pointed object, to press and release the recessed Power button on the server module front panel.**
During system boot, you will receive a BMC not responding message:
12. **When you receive this message, press F8.**
13. **Select the USB flash drive as the boot device and click Enter to continue.**
The system will finish booting from the USB flash drive.
14. **Open a terminal window and type the following command to reflash the server module SP:**

```
socflash.exe -f spnnnnn.bin
```


The server module SP firmware is reflashed.
15. **Repeat Steps 3 through 8 to remove the J57 header pins jumper. (Remove the jumper in Step 6 rather than inserting it.)**

2.5 Updating the BIOS

The 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* (820-1188).

2.6 Power-On Self-Test (POST)

For information about BIOS POST, POST codes, POST code checkpoints, and console redirection, see [Appendix B](#).

Diagnostics Tools

This chapter contains information about diagnostic tools that you can use to determine the status of the Sun Blade X6440 server module and components.

This chapter contains the following topics:

- [Section 3.1, “Service Processor ILOM” on page 3-1](#)
- [Section 3.2, “System Status LEDs” on page 3-2](#)
- [Section 3.3, “BIOS POST” on page 3-6](#)
- [Section 3.4, “Hardware Debug Tool \(HDT\)” on page 3-8](#)
- [Section 3.5, “Pc-Check Diagnostics Overview” on page 3-10](#)

3.1 Service Processor ILOM

The following component information is available through the service processor (SP) Integrated Lights Out Manager (ILOM).

- Viewing replaceable component information
- Viewing sensors and LED indicators
- Viewing indicators (LEDs) and controlling the Locate LED
- Managing alerts
- Viewing and clearing the system event log

See the *Sun Integrated Lights Out Manager 2.0 User’s Guide* (820-1188), for more information.

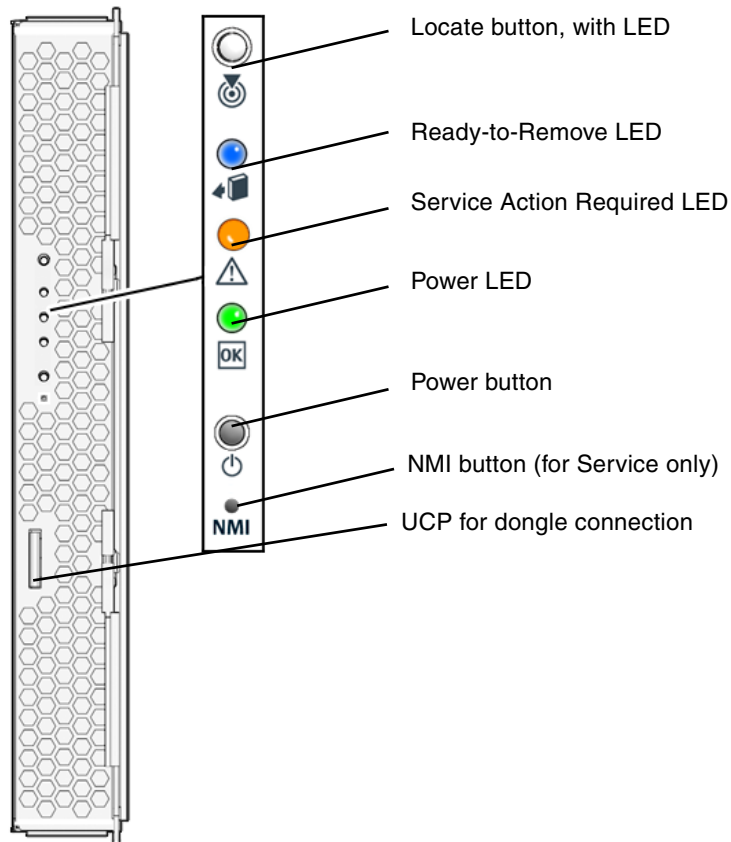
3.2 System Status LEDs

The Sun Blade X6440 server module has external and internal system status LEDs.

3.2.1 External Status Indicator LEDs

FIGURE 3-1 shows the locations of the external status indicator LEDs.

FIGURE 3-1 External LED Locations



Refer to [TABLE 3-1](#) for descriptions of the LED behavior.

TABLE 3-1 Front Panel LED Functions

LED Name	Description
Locate button/LED	This LED helps you to identify which system in the rack you are working on in a rack full of servers. <ul style="list-style-type: none">• Push and release this button to make the Locate LED blink for 30 minutes.• Hold down the button for 5 seconds to initiate a “push-to-test” mode that illuminates all other LEDs both inside and outside the chassis for 15 seconds.
Ready-to-Remove LED	The server module is ready to be removed from the chassis. This LED is switched on by the service processor when the server module main power is off.
Service Action Required LED	This LED has three states: <ul style="list-style-type: none">• Off: Normal operation.• Slow Blinking: A new (unacknowledged) event requiring a service action has been detected.• On: The event has been acknowledged, but the problem still requires attention.
Power LED	This LED has three states: <ul style="list-style-type: none">• Off: Server main power and standby power are off.• Standby Blinking: Standby power is on, but main power is off.• Slow Blinking: POST or diagnostics are running.• On: Server is in main power mode with power supplied to all components.

3.2.2 Internal Status Indicator LEDs

These servers have internal status indicator LEDs for the DIMM slots and the CPUs.

When the board is removed from the chassis, you can press a fault indicator button to view the location of the DIMM or CPU that has failed.

FIGURE 3-2 Fault Indicator Button with DIMM LEDs

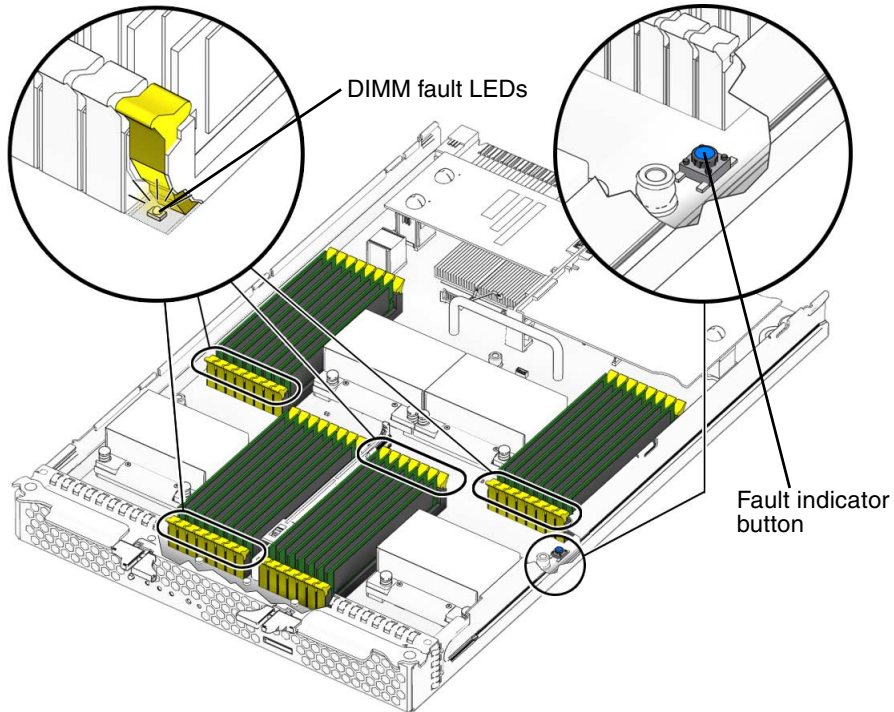
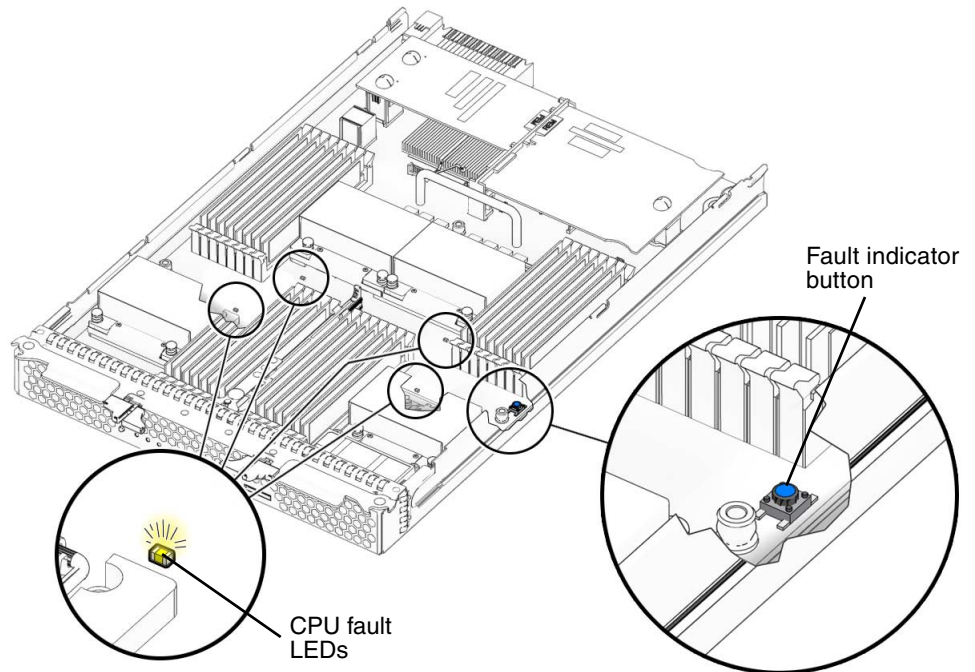


FIGURE 3-3 Fault Indicator Button with CPU LEDs



See [TABLE 3-2](#) for internal LED behavior.

TABLE 3-2 Internal LED Functions

LED Name	Description
DIMM Fault LED (The ejector levers on the DIMM slots are the LEDs.)	This LED has two states: <ul style="list-style-type: none">• Off: DIMM is operating properly.• Lit (amber): The system has detected a fault with the DIMM.
CPU Fault LED (on motherboard)	This LED has two states: <ul style="list-style-type: none">• Off: CPU is operating properly.• Lit (amber): The system has detected a fault with the CPU.

3.3 BIOS POST

The system BIOS provides a rudimentary power-on self-test (POST). The basic devices required for the server to operate are checked, memory is tested, the attached disks are probed and enumerated, and the two dual-gigabit Ethernet controllers are initialized.

The progress of the self-test is indicated by a series of POST codes. Refer to [Appendix B](#) for information on BIOS POST codes.

These codes are displayed at the bottom right corner of the system's VGA screen (once the self-test has progressed far enough to initialize the video monitor). However, the codes are displayed as the self-test runs, and they 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 3.3.2, "Redirecting Console Output"](#) on page 3-7).

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

3.3.1 How BIOS POST Memory Testing Works

The BIOS POST memory testing is performed as follows:

1. The first megabyte of DRAM is tested by the BIOS before the BIOS code is shadowed (that is, copied from ROM to DRAM).
2. Once executing out of DRAM, the BIOS performs a simple memory test (a write/read of every location with the pattern `55aa55aa`).
3. The BIOS polls the memory controllers for both correctable and uncorrectable memory errors and logs those errors into the service processor.

3.3.2 Redirecting Console Output

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

1. **Connect a dongle cable to the server module universal connector port (UCP).**
See [FIGURE 1-2](#).
2. **Connect a monitor to the dongle cable video port and a keyboard to a USB port.**
3. **Power cycle or power on the server.**
4. **Initialize the BIOS setup utility by pressing the F2 key while the system is performing the power-on self-test (POST).**
5. **When the BIOS Main Menu screen is displayed, select Advanced.**
6. **When the Advanced Settings screen is displayed, select IPMI 2.0 Configuration.**
7. **When the IPMI 2.0 Configuration screen is displayed, select the LAN Configuration menu item.**
8. **Select the IP Address menu item.**
The service processor's IP address is displayed in the following format:
Current IP address in BMC: xxx.xxx.xxx.xxx
Copy the service processor IP address. You will need to insert it into a web browser in the next step.
9. **Start a web browser and type the service processor's IP address in the browser's URL field.**
10. **When you are prompted, type a user name and password as follows:**
User name: **root**
Password: **changeme**
11. **When the ILOM service processor web GUI screen is displayed, click the Remote Control tab.**
12. **Click the Redirection tab.**
13. **Set the color depth for the redirection console to either 8 or 16 bits.**
14. **Click the Start Redirection button.**
The Remote Console window appears and prompts you for your user name and password again.

15. When you are prompted, type a user name and password as follows:

User name: **root**

Password: **changeme**

The current POST screen is displayed.

3.4 Hardware Debug Tool (HDT)

The hardware debug tool (HDT) is a diagnostic tool that allows access to all memory spaces and CPU registers of the system.

3.4.1 HDT Functionality

Available functionality includes:

- Access to CPU registers and memory spaces
- Automated diagnostics
- Checking of all HT links for errors at different speeds and widths
- Testing of BIOS flash access and BIOS progress
- Testing of access to other board components

HDT can be used to:

- Check the status and configuration of system
- Diagnose the system with the following symptoms:
 - No video
 - System hang (any bad HT link will cause this)
 - BIOS POST failure before video comes up

Note – HDT diagnostics will stop or reset and power cycle the system. Do not use HDT while the operating system is running.

3.4.2 Accessing HDT

You can access HDT through the server module service processor (SP) as follows:

- **Log in to server module SP with the following login:**

Username: **sunservice**

Password: **changeme**

3.4.3 HDT Commands

- To query HDT, execute:

```
# hdt -q
```

This command does the following:

- Dumps the current system status and configuration.
- Power cycles the system and executes the HyperTransport Link test.
- Dumps the system status and configuration after another clean start.

Note – On a nonresponsive system, run this command before the system is reset or power cycled.

- To log output to the default location (`/coredump/debug.log`), execute:

```
# hdt -l -q
```

- To log output to a specified log file, execute:

```
# hdt -l logfile_name -qa
```

Where *logfile_name* is the path and file location.

3.5 Pc-Check Diagnostics Overview

Pc-Check diagnostics can test and detect problems on all motherboard components, drives, ports, and slots. This program can be accessed and executed only from Integrated Lights Out Manager (ILOM). If you are having a problem with your system, use the diagnostics to troubleshoot and solve the problem.

Normally, if you encounter any hardware-related error message (such as memory errors, hard disk, or compact flash errors) on your server, you will run one of the following selections from the Pc-Check Diagnostics main menu:

- Use *Immediate Burn-In Test* to run a test script. Sun provides three diagnostic scripts designed to test a full range of system resources.
- Use *Advanced Diagnostics Test* to test a specific hardware component, for example, a CPU or a hard disk.

Other selections on the Diagnostics main menu display information about the system, create disk partitions and display test results.

3.5.1 Accessing Pc-Check Diagnostics

1. Shut down the server.

For instructions, see [Section 2.2, “Powering Off the Server”](#) on page 2-4.

2. Start the Integrated LOM and access the GUI.

See the *Sun Integrated Lights Out Manager 2.0 User’s Guide* (820-1158) for details.

3. Select Remote Control => Diagnostics => Run Diagnostics on Boot.

4. From the drop-down menu, select Boot to Manual.

5. Power cycle the platform.

The system boots to the Pc-Check main menu, which offers the following selections:

- System Information Menu ([Section 3.6.1, “System Information Menu”](#) on page 3-11)
- Advanced Diagnostics Tests ([Section 3.6.2, “Advanced Diagnostics”](#) on page 3-13)
- Immediate Burn-In Testing ([Section 3.6.4, “Burn-In Testing”](#) on page 3-16)
- Deferred Burn-In Testing ([Section 3.6.4, “Burn-In Testing”](#) on page 3-16)
- Create Diagnostic Partition ([Section 3.6.5, “Diagnostic Partition”](#) on page 3-18)
- Show Results Summary ([Section 3.6.6, “Show Results Summary”](#) on page 3-18)

- Print Results Report (Section 3.6.7, “Print Results Report” on page 3-20)
- About PC-CHECK (Section 3.6.8, “About Pc-Check” on page 3-20)
- Exit (Section 3.6.9, “Exit” on page 3-20)

Use the arrow keys on the keyboard to navigate through the diagnostics software, the Enter key to select a menu item, and the ESC key to exit a menu. Navigation instructions appear at the bottom of each screen.

To test a specific hardware component, select “Advanced Diagnostics Test.” See Section 3.6.2, “Advanced Diagnostics” on page 3-13 for details.

To run a test script, select “Immediate Burn-In Testing.” Sun provides three scripts that include a full test of all possible devices (`full.tst`), a quick test of devices (`quick.tst`), and a test that requires no user interaction (`noinput.tst`). See Section 3.6.4.1, “Performing Immediate Burn-In Testing” on page 3-16 for details.

To create your own test script, select “Deferred Burn-In Testing.” See Section 3.6.4.2, “Performing Deferred Burn-In Testing” on page 3-18 for details.

3.6 Pc-Check Menus

The following sections in this chapter describe the menu items and tests in detail.

3.6.1 System Information Menu

Clicking System Information in the Diagnostics main menu causes the System Information menu to appear. Select items in this menu to see detailed information.

TABLE 3-3 describes the selections in the System Information menu.

TABLE 3-3 System Information Menu Options

Option	Description
System Information Menu	Includes basic information about your system, motherboard, BIOS, processor, memory cache, drives, video, modem, network, buses, and ports.
Hardware ID Image Menu	Enables you to create an XML or .txt document showing your system's hardware ID.
System Management Info	Provides information about the BIOS type, system, motherboard, enclosure, processors, memory modules, cache, slots, system event log, memory array, memory devices, memory device mapped addresses, and system boot.
PCI Bus Info	Includes details about specific devices from <code>pci-config</code> space within the system, similar to the System Management Information section.
IDE Bus Info	Displays information about the IDE bus.
Interrupt Vectors	Displays a list of interrupt vectors.
IRQ Information	Shows hardware interrupt assignments.
Device Drivers	Shows device drivers loaded under OpenDOS.
APM Information	Enables you to test and configure the Advanced Power Management (APM) capabilities of the system. You can choose to change the power state, view the power status, indicate CPU usage, get a power management event, or change the interface mode.
I/O Port Browser	Shows the I/O port assignment for the hardware devices on the system.
Memory Browser	Enables you to view the mapped memory for the entire system.
Sector Browser	Reads sector information from the hard disks sector by sector.
CPU Frequency Monitor	Tests the processor speed.
CMOS RAM Utilities	Shows the CMOS settings of the system.
Text File Editor	Opens a file editor.
Start-Up Options	Enables you to set up startup options for diagnostics testing.

3.6.2 Advanced Diagnostics

Advanced diagnostics are used to test an individual device on the system. Most of the selections on this menu display information about the corresponding devices, and then offer a menu of testing options. For example, to test CPU 0, you can select Advanced Diagnostics => Processor => CPU0.

Note – If you do not know which device to test, see [Section 3.6.4, “Burn-In Testing” on page 3-16](#).

[TABLE 3-4](#) gives the name and a brief description of the selections in the Advanced Diagnostics Tests menu.

Note – Some of the tests in [TABLE 3-4](#) might be irrelevant for certain systems. Ignore any that are not relevant to your hardware configuration.

TABLE 3-4 Advanced Diagnostics Test Menu Options

Option	Description
Processor	Displays information about the processors and includes a Processor Tests menu.
Memory	Displays information about the memory, and includes tests for the different types of system memory.
Motherboard	Displays information about the motherboard, and includes a Motherboard Tests menu.
Floppy Disks	Not relevant.
Hard Disks	Displays information about the hard disk and includes a Hard Disk Tests menu. Refer to Section 3.6.3, “Hard Disk/Compact Flash Testing” on page 3-14 , for detailed information about scripts and about testing hard disks.
CD-ROM/DVD	Displays a CD-ROM/DVD menu to test DVD devices on the system.
ATAPI Devices	Displays information about devices attached to the IDE controllers on the system other than a DVD or hard disks (for example, zip drives).
ATA	Includes an ATA test menu. Select the parallel ATA driver to test.
USB	Displays information about the USB devices on the system and includes a USB Tests menu.

TABLE 3-4 Advanced Diagnostics Test Menu Options (*Continued*)

Option	Description
Network	Performs network register controller tests.
System Stress Test	Exercises and checks the CPU, memory, and hard drive.
Keyboard	Includes a Keyboard Test menu with options for performing different tests on the keyboard.
Mouse	Displays information about the mouse and includes a menu to test the mouse on the system.
Audio	Displays information about the audio devices on the system and includes an Audio Tests menu to test audio device information. A PCI audio card is required to run this test.
Video	Displays information about the video card. Initially, the monitor might flicker, but then it brings up a Video Test Options menu that enables you to perform various video tests.
Firmware –ACPI	Displays information about Advanced Configurable Power Interface (ACPI) and includes an ACPI Tests menu.

3.6.3 Hard Disk/Compact Flash Testing

Use these tests to select and test a hard drive or compact flash. Before starting the test, you can set the parameters using the Test Settings option.

3.6.3.1 To Select and Test a Hard Drive/Compact Flash

- 1. From the main menu, choose Advanced Diagnostics Tests.**
- 2. From the Advanced Diagnostics Tests menu, choose Hard Disks.**
- 3. From the Select Drive menu, choose the hard disk or compact flash that you need to test.**

The Hard Disk Diagnostics dialog opens. It displays information about the selected hard drive/compact flash and the Hard Disk Tests menu, which includes the following options:

- Select Drive
- Test Settings
- Read Test
- Read Verify Test

- Non-Destructive Write Test
- Destructive Write Test
- Mechanics Stress Test
- Internal Cache Test
- SMART Immediate Test
- View Error Log
- Utilities Menu
- Exit

4. Click Select Drive to select a hard drive/compact flash to test.

5. Click Test Settings, if desired, to select options for that test.

This enables you to change the following parameters:

- Number of Retries
Selects the number of times to retry testing a device before terminating the test.
- Maximum Errors
Selects the number of errors allowed before terminating the test.
- Check SMART First
Selects Smart Monitoring Analysis Reporting Test (SMART).
- HPA Protection
Selects Host Protected Area (HPA) protection.
- Media Test Settings
Selects the test time duration, the percentage of the hard disk to test, and the sectors to be tested on the hard disk.
- Device Test Settings
Selects the test time durations of the devices and the test level.

6. Select a test to begin execution.

The Read Test, Read Verify Test, the Non-Destructive Write Test, and the Destructive Write Test test the actual media on the selected physical disk drive or compact flash.

The Mechanics Stress Test and the Internal Cache Test test non-media-related parts of the hard drive hardware.



Caution – Running the Destructive Write Test destroys any data on the disk.

3.6.4 Burn-In Testing

Burn-In testing enables you to run test scripts and to create new scripts.

The Diagnostics main menu provides two burn-in selections, Immediate Burn-In Testing and Deferred Burn-In Testing.

- Immediate Burn-In enables you to run an existing script and to select configuration options.
- Deferred Burn-In enables you to create a new script.

Sun provides three ready-made scripts designed to test the general health of the devices on your system. These scripts include:

- `quick.tst` – This script performs a series of tests that require you to interact with the test software. When the tests require a user interaction, the tests stop and do not time out. These tests are faster than the `full.tst` but they are less thorough. For example, they do not run all the tests associated with a DIMM.
- `noinput.tst` – This script performs a non-detailed test of most hardware components, excluding those components that require user input (keyboard, mouse, sound, and video). This test does not require user input. It is normally the first test performed for hardware-related problems.
- `full.tst` – This script performs a detailed and comprehensive test on all hardware components, including those that require user input. It includes external port tests and requires loopback connectors on COM ports, parallel ports and USB ports. You must interact with the test utility to progress through these interactive tests.

Tip – Each of these scripts tests the operating status of your entire system. To test specific disk drives independently of the rest of the system, use the procedures in [Section 3.6.3, “Hard Disk/Compact Flash Testing”](#) on page 3-14.

3.6.4.1 Performing Immediate Burn-In Testing

Use Immediate Burn-In Testing to run test scripts.

1. From the Diagnostics main menu, select Immediate Burn-In Testing.

The screen displays a list of settings shown in [TABLE 3-5](#) and a Burn-In menu.

2. From the Burn-In menu, select Load Burn-In Script.

A text box appears.

3. Type the name of the script you want to run.

- `quick.tst`, `noinput.tst`, or `full.tst`

- If you have created and saved your own script, type `d:\testname.tst` where *testname* is the name of the script that you have created.

4. To change any of the options, at the bottom of the screen, select Change Options.

This opens the Burn-In Options menu, which enables you to modify the options listed in [TABLE 3-5](#) for the currently loaded test script.

5. Select Perform Burn-In Tests.

The diagnostics software executes the test script as configured.

TABLE 3-5 Continuous Burn-In Testing Options

Option	Default – General	Default Using quick.tst, noinput.tst, or full.tst Script	All Possible Choices
Pass Control	Overall Time	Overall Passes	Individual Passes, Overall Passes, or Overall Time
Duration	01:00	1	Enter any number to choose the time duration of the test
Script File	N/A	quick.tst, noinput.tst, or full.tst	quick.tst, noinput.tst, or full.tst
Report File	None	None	User defined
Journal File	None	D:\noinput.jrl, D:\quick.jrl, or D:\full.jrl	User defined
Journal Options	Failed Tests	All Tests, Absent Devices, and Test Summary	Failed Tests, All Tests, Absent Devices, and Test Summary
Pause on Error	N	N	Y or N
Screen Display	Control Panel	Control Panel	Control Panel or Running Tests
POST Card	N	N	Y or N
Beep Codes	N	N	Y or N
Maximum Fails	Disabled	Disabled	1–9999

3.6.4.2 Performing Deferred Burn-In Testing

Use Deferred Burn-In Testing to create scripts.

1. From the Diagnostics main menu, select Deferred Burn-In Testing.

The screen displays a list of settings shown in [TABLE 3-5](#) and a Burn-In menu.

2. Use the Burn-In menu to configure the following selections:

■ **Change Options**

Opens the Burn-In Options menu, which enables you to modify the options listed in [TABLE 3-5](#) for the currently loaded test script.

■ **Select Tests**

Opens a listing of the tests available for your workstation configuration and the currently loaded test script.

3. When you are done, select Save Burn-In Script and type the name for the new script.

Enter `d:\testname.tst`

Where *testname* is the name of the script that you have created.

4. To run the newly created script, go to Immediate Burn-In Testing in [Section 3.6.4.1, “Performing Immediate Burn-In Testing”](#) on page 3-16, and run the script *testname.tst*.

3.6.5 Diagnostic Partition

A diagnostic partition is required for the test scripts to write their log files. Without a diagnostic partition, the only output is the display on the diagnostic screens.

The diagnostic partition is preinstalled on the Sun Blade X6440 server module. You do not need to reinstall the diagnostic partition unless you have removed it.

To change partitions, see the instructions for your operating system.

If you have RAID, you can use the instructions in the *Sun StorageTek RAID Manager Software User’s Guide* (820-1177) and the *Uniform Command-Line Interface User’s Guide* (820-2145).

3.6.6 Show Results Summary

Selecting Show Results Summary on the Diagnostics main menu displays the tests that have been run and lists the results, which can be Pass, Fail, or N/A.

The following list describes all the tests that are available with the Tools and Drivers DVD. If your system does not have the corresponding option, the results will show as N/A in the Show Results Summary list.

- Processor

This section shows the following tests conducted against the processor: Core Processor Tests, AMD 64-Bit Core Tests, Math Co-Processor Tests – Pentium Class FDIV and Pentium Class FIST, MMX Operation, 3DNow! Operation, SSE Instruction Set, SSE2 Instruction Set, and MP Symmetry.

- Motherboard

This section shows the following tests conducted against the motherboard: DMA Controller Tests, System Timer Tests, Interrupt Test, Keyboard Controller Tests, PCI Bus Tests, and CMOS RAM/Clock Tests.

- Memory, Cache Memory, and Video Memory

This section shows the following tests conducted against the various types of memory: Inversion Test Tree, Progressive Inv. Test, Chaotic Addressing Test, and Block Rotation Test.

- Input Device

This section shows the following tests conducted against the input device: Verify Device, Keyboard Repeat, and Keyboard LEDs.

- Mouse

This section shows the following tests conducted against the mouse: Buttons, Ballistics, Text Mode Positioning, Text Mode Area Redefine, Graphics Mode Positions, Graphics Area Redefine, and Graphics Cursor Redefine.

- Video

This section shows the following tests conducted against the video: Color Purity Test, True Color Test, Alignment Test, LCD Test, and Test Cord Test.

- ATAPI Devices

This section shows the following tests conducted against ATAPI devices: Linear Read Test, Non-Destructive Write, and Random Read/Write Test.

- Hard Disk

This section shows the following tests conducted against the hard disk or compact flash: Read Test, Read Verify Test, Non-Destructive Write Test, Destructive Write Test, Mechanics Stress Test, and Internal Cache Test.

- USB

This section shows the following tests conducted against the USB: Controller Tests and Functional Tests.

- Hardware ID

The compare test is used to determine the machine ID for the system. This test is not available for the Sun Blade X6440 server module.

3.6.7 Print Results Report

The Print Results Report option enables you to print results of the diagnosis of your system.

Ensure that your server is connected to a printer, and then enter the required information to print the results.

3.6.8 About Pc-Check

The About Pc-Check window includes general information about the Pc-Check software, including resident and nonresident components, such as mouse devices.

3.6.9 Exit

The Exit option exits the Pc-Check software and reboots the server module.

Maintaining the Sun Blade X6440 Server Module

This chapter contains information and procedures for servicing the Sun Blade X6440 server module hardware, including component removal and replacement procedures.

The following topics are covered in this chapter:

- [Section 4.1, “Tools and Supplies Needed” on page 4-1](#)
- [Section 4.2, “Removing the Server Module From the Chassis and Removing the Cover” on page 4-2](#)
- [Section 4.3, “Locations of Replaceable Components” on page 4-5](#)
- [Section 4.4, “Replaceable Component Procedures” on page 4-6](#)

4.1 Tools and Supplies Needed

You can service the server with the following items:

- No. 2 Phillips screwdriver
- Adjustable-setting torque driver (5–20 in.-lbs)
- Antistatic wrist strap
- Stylus, or other pointed object (to press the recessed Power button)

4.2 Removing the Server Module From the Chassis and Removing the Cover

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



Caution – Do not operate the system with empty slots. Always insert a filler into an empty slot to reduce the possibility of system shut down.

4.2.1 Removing the Server Module From the Chassis

To replace components for the Sun Blade X6440 server module, you need to remove the server module from the chassis.

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

See [FIGURE 1-1](#) for the location of the power button.

- **Graceful shutdown:** Use a stylus, or other pointed object, to press and release the recessed Power button on the server module 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 shut down to standby power mode immediately.
- **ILOM shutdown:** Use the ILOM CLI or web GUI to power off the system.

At the ILOM command prompt, type:

```
stop /SYS
```

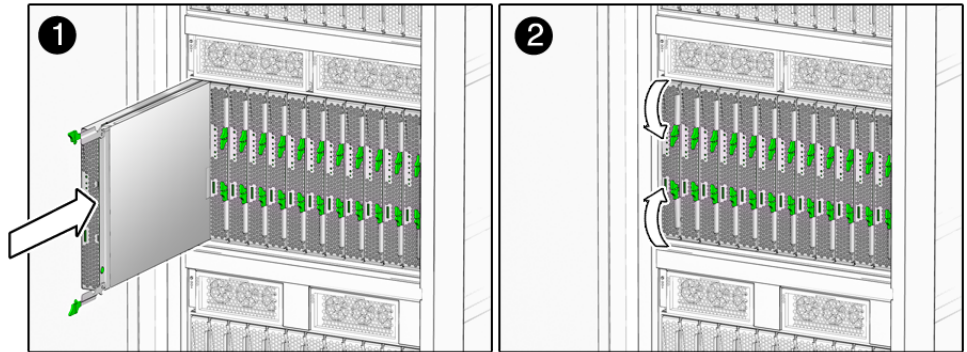
See the *Sun Integrated Lights Out Manager 2.0 User's Guide* (820-1188) for more information.

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.

Note – When you use the Power button to enter standby power mode, power is still directed to the SP board and power supply fans, indicated when the Power LED is flashing. To completely power off the server, you must remove the server module from the midplane.

2. Turn off any peripheral devices connected to the dongle, and disconnect the dongle from the server.

FIGURE 4-1 Removing a Server Module



3. Remove the server module from the chassis. See [FIGURE 4-1](#).
 - a. Press together and hold the green ejector buttons.
 - b. Open the ejector levers by rotating them out from the server module.
 - c. Pull the server module out from the chassis by the ejector levers until you are able to grasp the module with both hands to pull it out of the chassis.
4. Set the server module on an antistatic surface.
5. Install a filler panel into the server module slot if the server module will be out of the chassis for more than one minute.

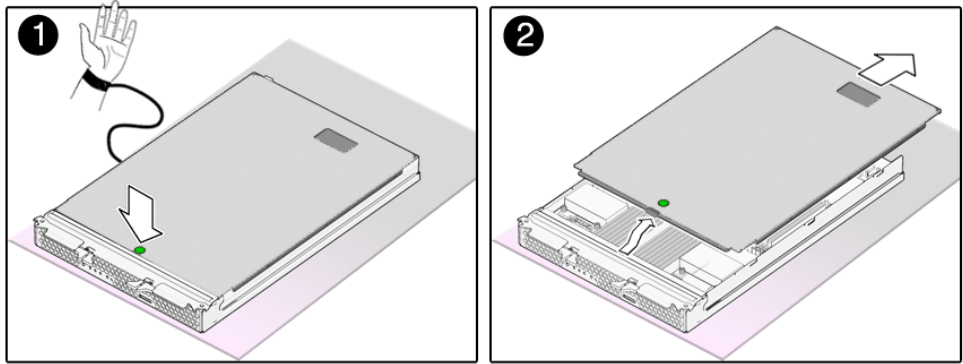


Caution – Before handling internal components of the server module, attach an electrostatic-discharge (ESD) wrist strap to the grounding post that is built into the rear of the chassis. The system’s printed circuit boards and hard disk drives contain components that are extremely sensitive to static electricity.

4.2.2 Removing the Main Cover

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

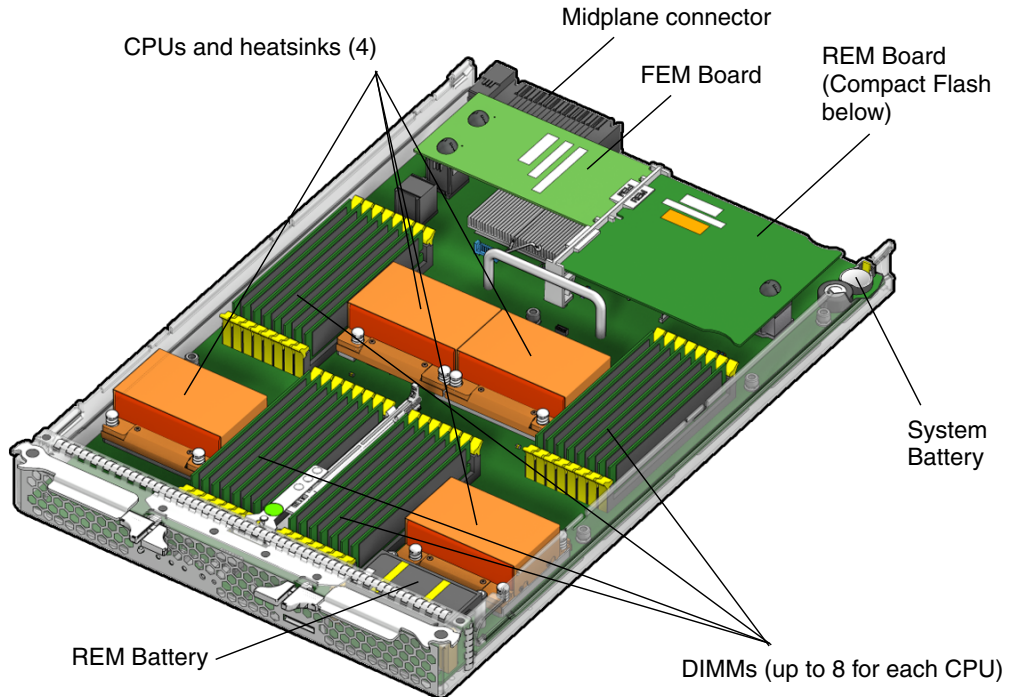
FIGURE 4-2 Removing the Main Cover



4.3 Locations of Replaceable Components

FIGURE 4-3 shows the locations of the replaceable Sun Blade X6440 server module components that are documented in this chapter.

FIGURE 4-3 Sun Blade X6440 Server Module Replaceable Component Locations



4.4 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 list below. FRU components must be replaced *only* by trained Sun service technicians. Contact your Sun Service representative for assistance with FRU replacements.

Supported components and their part numbers are subject to change over time. For the most up-to-date list of replaceable components for the Sun Blade X6440 server module, see the following URL:

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

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

Some Sun Blade X6440 server module components are hot-swappable, which means that you can remove and replace those components without powering off the server module. For other component replacements, you must power off and remove the server module from the chassis.

This section contains procedures for replacing the following components:

- [Section 4.4.1, “Replacing the System Battery” on page 4-7 \(CRU\)](#)
- [Section 4.4.2, “Replacing the Compact Flash Module” on page 4-8\(CRU\)](#)
- [Section 4.4.3, “Replacing Memory Modules \(DIMMs\)” on page 4-10 \(CRU\)](#)
- [Section 4.4.4, “Adding or Replacing a RAID Expansion Module” on page 4-14 \(CRU\)](#)
- [Section 4.4.5, “Changing the REM Battery” on page 4-16 \(CRU\)](#)
- [Section 4.4.6, “Adding or Replacing a Fabric Expansion Module” on page 4-17 \(CRU\)](#)
- [Section 4.4.7, “Replacing a CPU and Heatsink” on page 4-19 \(FRU\)](#)
- [Section 4.4.8, “Replacing the Motherboard” on page 4-25 \(FRU\)](#)



Caution – Before handling components, attach an ESD wrist strap to the grounding post that is built into the rear of the chassis. The system’s printed circuit boards and hard disk drives contain components that are extremely sensitive to static electricity.

4.4.1 Replacing the System Battery

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

Use the following procedure to replace the server module system battery.

1. **Power off the server and remove the server module from the chassis as described in [Section 4.2.1, “Removing the Server Module From the Chassis”](#) on page 4-2.**



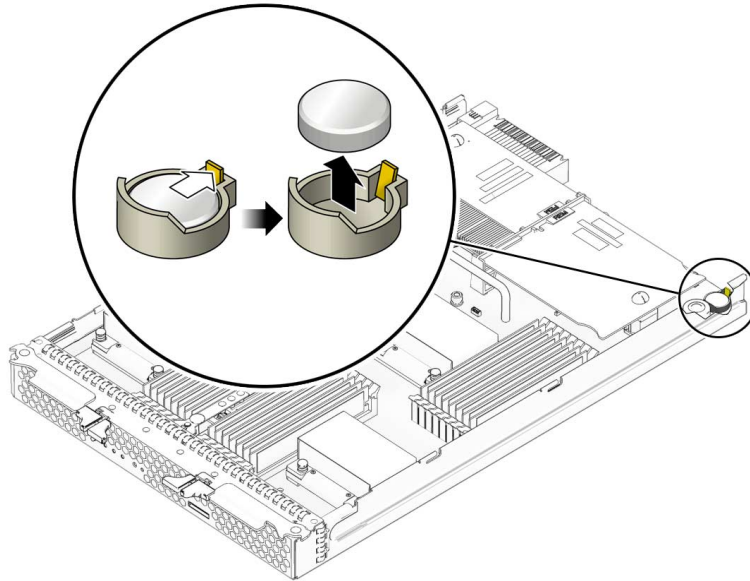
Caution – Do not operate the system with empty slots. Always insert a filler panel into an empty slot to reduce the possibility of system shut down.

2. **Remove the main cover as described in [Section 4.2.2, “Removing the Main Cover”](#) on page 4-4.**
3. **If a RAID expansion module (REM) card is installed in the server module, it must be removed before extracting the system battery. For instructions, see [Section 4.4.4, “Adding or Replacing a RAID Expansion Module”](#) on page 4-14.**

Note – Before removing the system battery from its holder, note the orientation (polarity) of the battery before it is removed. The positive polarity, marked with a “+” symbol, should be facing upward.

4. Remove the system battery by gently pulling the clip away from the side of the battery and lifting the battery from its holder. See [FIGURE 4-4](#).

FIGURE 4-4 Removing the System Battery



Installation is the reverse of these procedures.

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

4.4.2 Replacing the Compact Flash Module

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

Use the following procedure to replace the compact flash module.

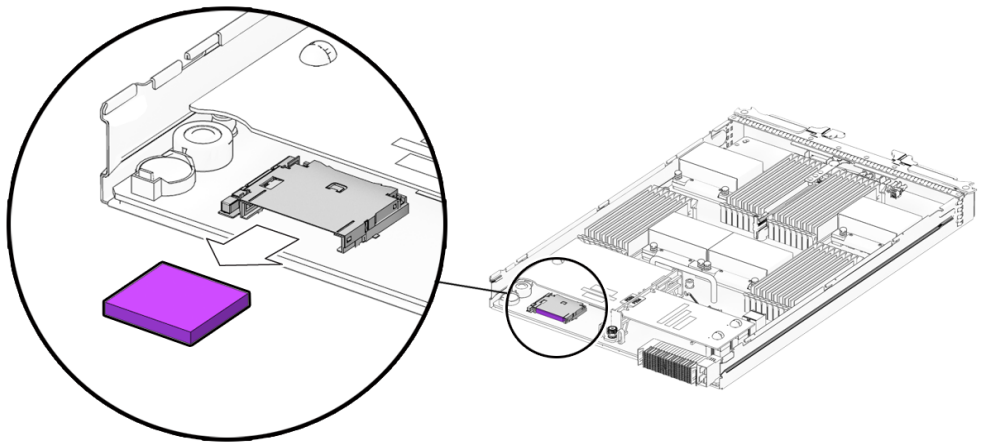
1. If necessary, back up any data that is contained on the Compact Flash module.
2. Power off the server and remove the server module from the chassis as described in [Section 4.2.1, “Removing the Server Module From the Chassis”](#) on [page 4-2](#).



Caution – Do not operate the system with empty slots. Always insert a filler panel into an empty slot to reduce the possibility of system shut down.

3. **Remove the main cover** as described in [Section 4.2.2, “Removing the Main Cover”](#) on page 4-4.
4. **Locate the Compact Flash module underneath the REM board.** See [FIGURE 4-5](#).
You do not need to remove the REM board to remove the Compact Flash module.

FIGURE 4-5 Replacing the Compact Flash Module



5. **Push the compact flash ejector button** to release the module from its holder.
This action causes the spring-loaded card to eject.
6. **Grasp the compact flash module and pull it out from under the REM board.**
Installation is the reverse of this procedure.

4.4.3 Replacing Memory Modules (DIMMs)

Use the procedures in this section to remove and replace the server's dual inline memory modules (DIMMs).

4.4.3.1 DIMM Population Rules

The DIMM population rules for the Sun Blade X6440 server modules are listed here:

- Each CPU can support a maximum of eight DDR2 DIMMs.
- Each pair of DIMMs must be identical (same manufacturer, size, and speed).
- The DIMM slots are paired and the DIMMs must be installed in pairs. The memory sockets are colored black or white to indicate which slots are paired by matching colors.
- Populate the DIMMs in the slots farthest from the CPU first. The first pair to be populated should be D0/D1, then D2/D3, and so on.

4.4.3.2 DIMM Replacement Procedure

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

Use the following procedure to replace a DIMM.

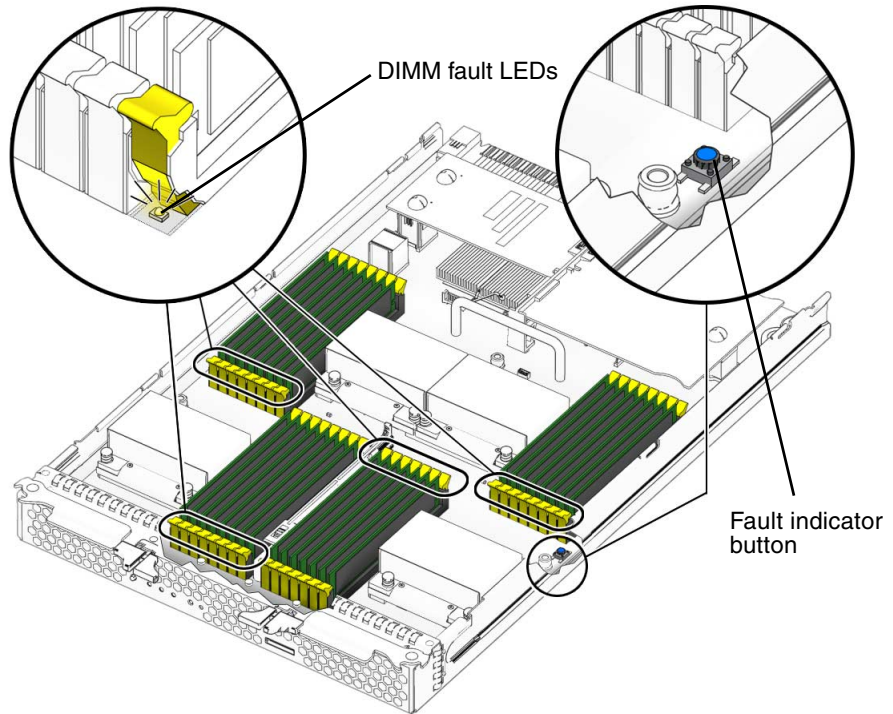
1. **Power off the server and remove the server module from the chassis as described in [Section 4.2.1, “Removing the Server Module From the Chassis”](#) on [page 4-2](#).**



Caution – Do not operate the system with empty slots. Always insert a filler panel into an empty slot to reduce the possibility of system shut down.

2. **Remove the main cover as described in [Section 4.2.2, “Removing the Main Cover”](#) on [page 4-4](#).**
3. **Press the fault indicator button on the motherboard to illuminate the LED for the DIMMs that have failed.**

FIGURE 4-6 Fault Indicator Button Location

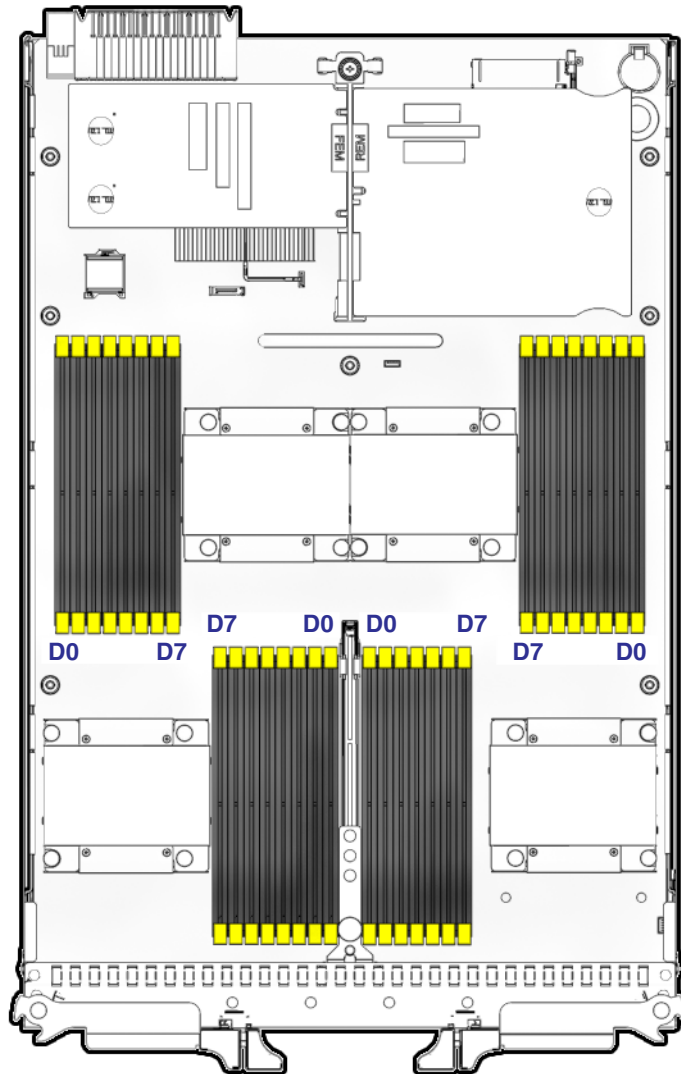


4. Locate the DIMM slot on the motherboard into which you plan to install or replace a DIMM.

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

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

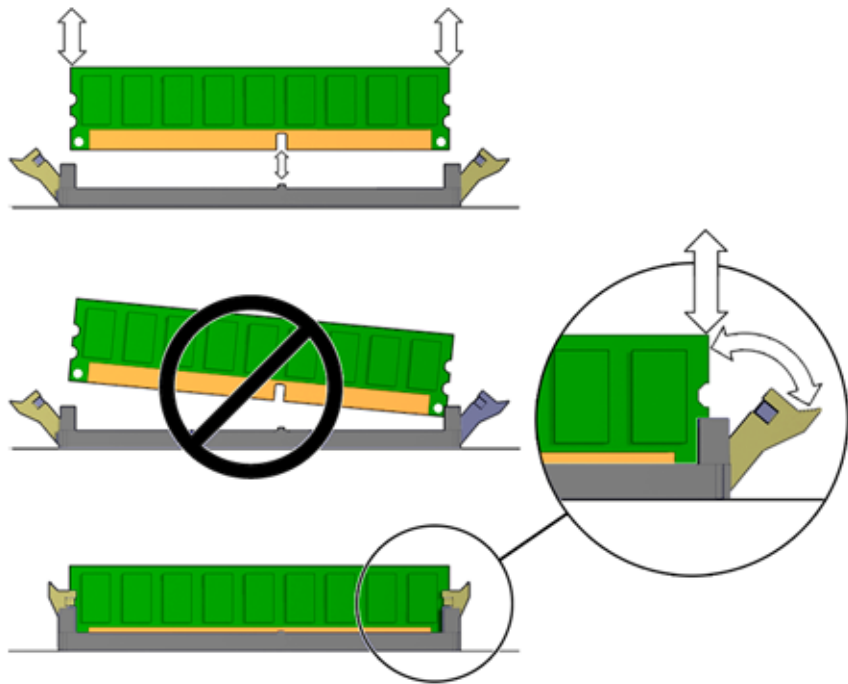
FIGURE 4-7 Sun Blade X6440 Server Module DIMM Slot Numbering



5. Before continuing with the next step, review the guidelines in [Section 4.4.3.1, “DIMM Population Rules”](#) on page 4-10.
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 4-8](#).

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

FIGURE 4-8 Removing a DIMM



7. To install a DIMM:

- 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 4-8](#).
- 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.

4.4.3.3 Error Correction and Parity

The AMD processor on the Sun Blade X6440 server module provides parity protection on its internal cache memories and error-correcting code (ECC) protection of the data. The system can detect and log to the system event log (SEL) the following types of errors:

- Correctable and uncorrectable memory ECC errors
- Correctable and uncorrectable CPU internal errors
- Faults in the chassis shared infrastructure, including fan and power supply faults

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

Refer to the *Sun Integrated Lights Out Manager 2.0 User's Guide* (820-1188) for more information on accessing the error log.

4.4.4 Adding or Replacing a RAID Expansion Module

Follow these steps to remove and replace a RAID expansion module (REM) in a Sun Blade X6440 server module.

The RAID expansion module enables LSI RAID functionality for externally attached RAID arrays and hard disk drives (HDDs).

Note – For information on configuring external RAID arrays and HDDs, see the instructions that shipped with the product.

4.4.4.1 Adding, or Removing and Replacing a REM

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

Use the following procedure to add, or remove and replace the REM.

1. **Power off the server and remove the server module from the chassis as described in Section 4.2.1, “Removing the Server Module From the Chassis” on page 4-2.**



Caution – Do not operate the system with empty slots. Always insert a filler panel into an empty slot to reduce the possibility of system shutdown.

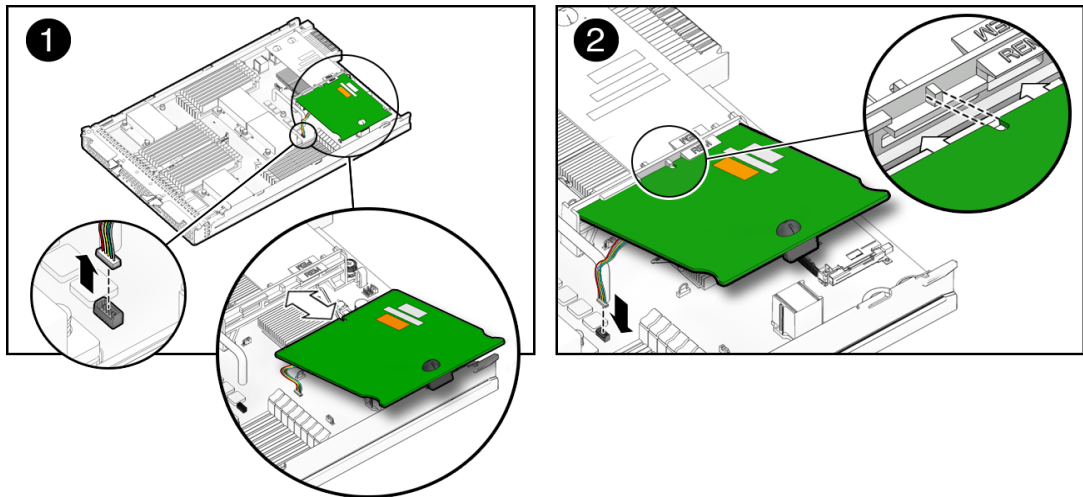
2. Remove the main cover as described in [Section 4.2.2, “Removing the Main Cover”](#) on page 4-4.
3. If the REM board uses a backup battery, (see also [Section 4.4.5, “Changing the REM Battery”](#) on page 4-16) disconnect the jumper cable between the REM board and chassis motherboard.

The Sun Blade X6440 can be populated either with REM board model 4620A, which uses a backup battery to store the system configuration, or REM board model 4607A, which *does not* use a backup battery.
4. Remove the existing REM board or the cap(s) from the REM connector(s) if either is present.

The cap(s) should only be present if you are adding a REM board to a server module without one.
5. Slide the REM board at an angle into the support bracket, then press it carefully into the connector. See [FIGURE 4-9](#).
6. If the REM board uses a backup battery, connect the jumper cable between the REM board and chassis motherboard.

Installation is the reverse of this procedure.

FIGURE 4-9 Inserting the REM



4.4.5 Changing the REM Battery

The REM battery, used with board model 4620A, should be replaced when indicated in the *Sun StorageTek RAID Manager Software User's Guide* (820-1177).



Caution – Follow the instructions in this section to ensure that the REM battery is properly installed. Proper installation is required to ensure adequate cooling of the battery.

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

Use the following procedure to change the REM battery.

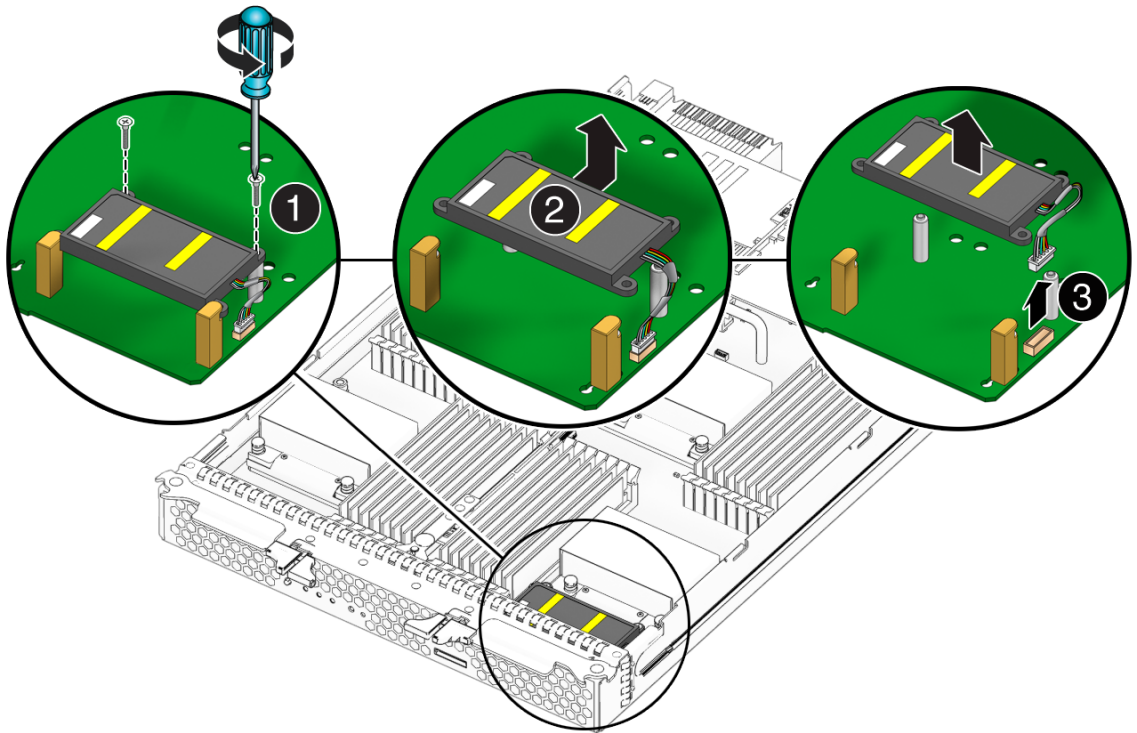
1. **Power off the server and remove the server module from the chassis as described in [Section 4.2.1, “Removing the Server Module From the Chassis”](#) on page 4-2.**



Caution – Do not operate the system with empty slots. Always insert a filler into an empty slot to reduce the possibility of module shutdown.

2. **Remove the main cover as described in [Section 4.2.2, “Removing the Main Cover”](#) on page 4-4.**
3. **Remove the two screws that secure the REM battery to the battery standoff connectors.**
4. **Lift the battery away from the standoff connectors while simultaneously pulling the battery from its slot.**
5. **Disconnect the battery cable from the chassis motherboard. See [FIGURE 4-10](#).**
6. **To install the new battery, reverse [Step 1](#) through [Step 5](#).**

FIGURE 4-10 Replacing the REM Battery



4.4.6 Adding or Replacing a Fabric Expansion Module

Follow these steps to remove and replace a Fabric Expansion Module (FEM) in a Sun Blade X6440 server module.

4.4.6.1 Adding, or Removing and Replacing a FEM

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

Use the following procedure to add, or remove and replace the FEM.

1. **Power off the server and remove the server module from the chassis as described in [Section 4.2.1, “Removing the Server Module From the Chassis”](#) on [page 4-2](#).**

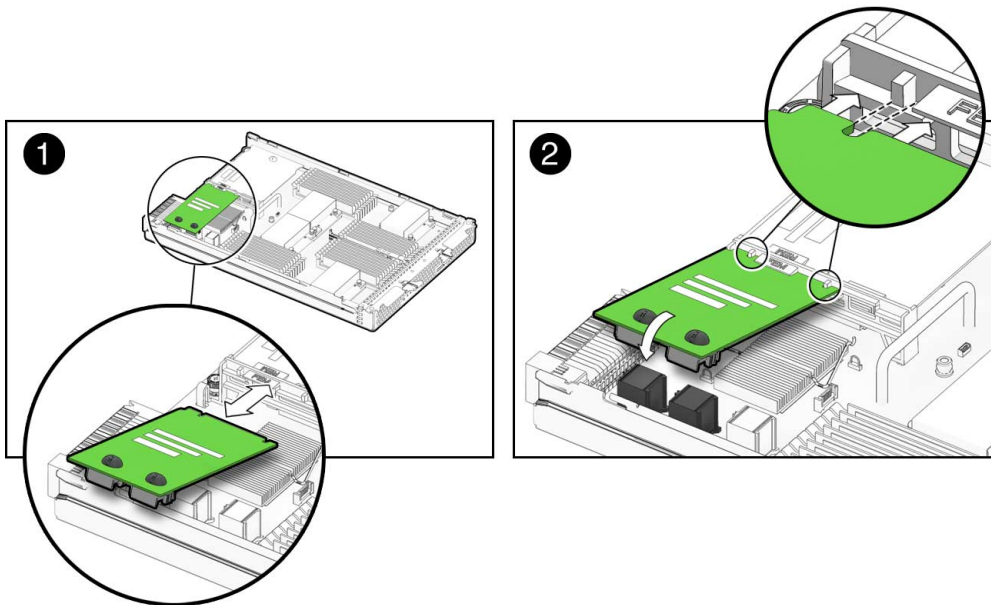


Caution – Do not operate the system with empty slots. Always insert a filler panel into an empty slot to reduce the possibility of system shutdown.

2. Remove the main cover as described in [Section 4.2.2, “Removing the Main Cover”](#) on page 4-4.
3. Remove the existing FEM board or the cap from the FEM connector if either is present.
The cap should only be present if you are adding a FEM board to a server module without one.
4. Slide the FEM board at an angle into the support bracket, then press it carefully into the connector. See [FIGURE 4-11](#).

Installation is the reverse of these procedures.

FIGURE 4-11 Inserting the FEM Board



4.4.7 Replacing a CPU and Heatsink

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

Follow these steps to remove and replace a CPU and its heatsink in a Sun Blade X6440 server module.

1. **Power off the server and remove the server module from the chassis as described in [Section 4.2.1, “Removing the Server Module From the Chassis”](#) on [page 4-2](#).**

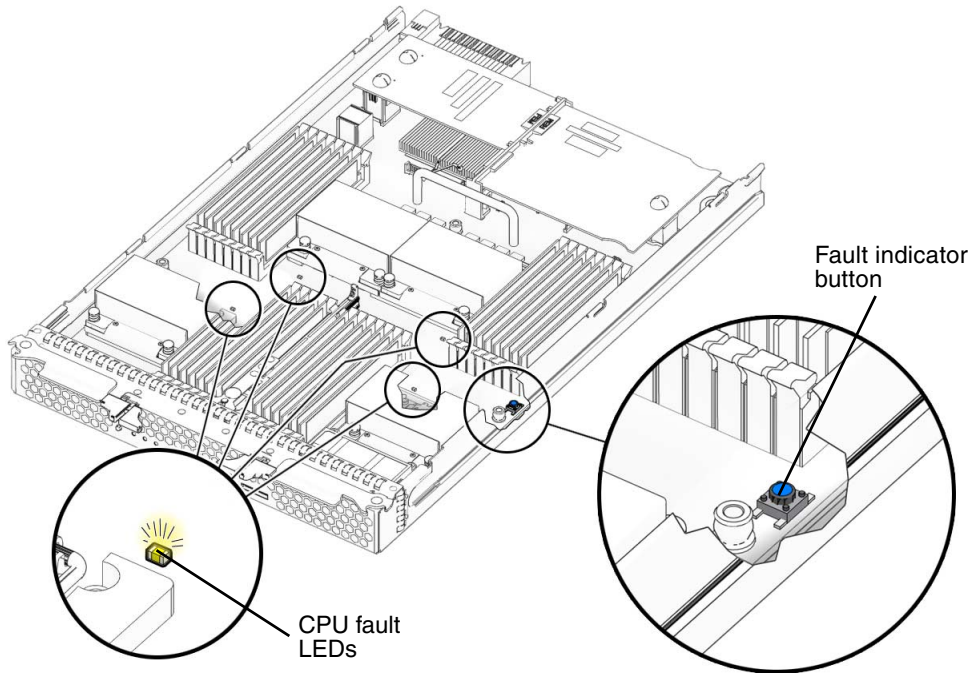


Caution – Do not operate the system with empty slots. Always insert a filler panel into an empty slot to reduce the possibility of system shut down.

2. **Remove the main cover as described in [Section 4.2.2, “Removing the Main Cover”](#) on [page 4-4](#).**

3. Press the fault indicator button on the motherboard to illuminate the LED for the CPU that has failed.

FIGURE 4-12 Fault Indicator Button Location

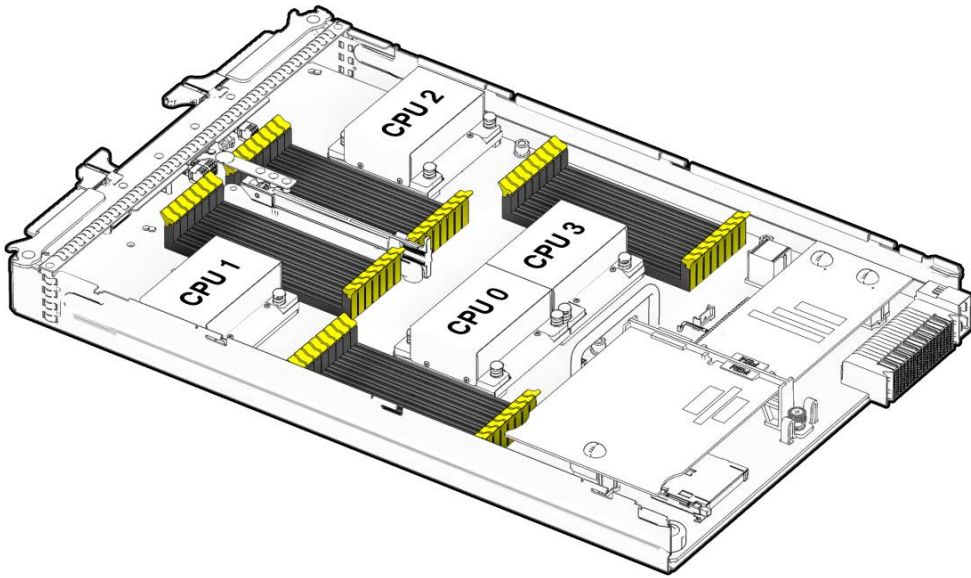


4. Identify which CPU and heatsink you are replacing.

The internal designation of the two CPUs in the server is shown in FIGURE 4-12. There is a fault LED on the motherboard for each CPU:

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

FIGURE 4-13 CPU Locations

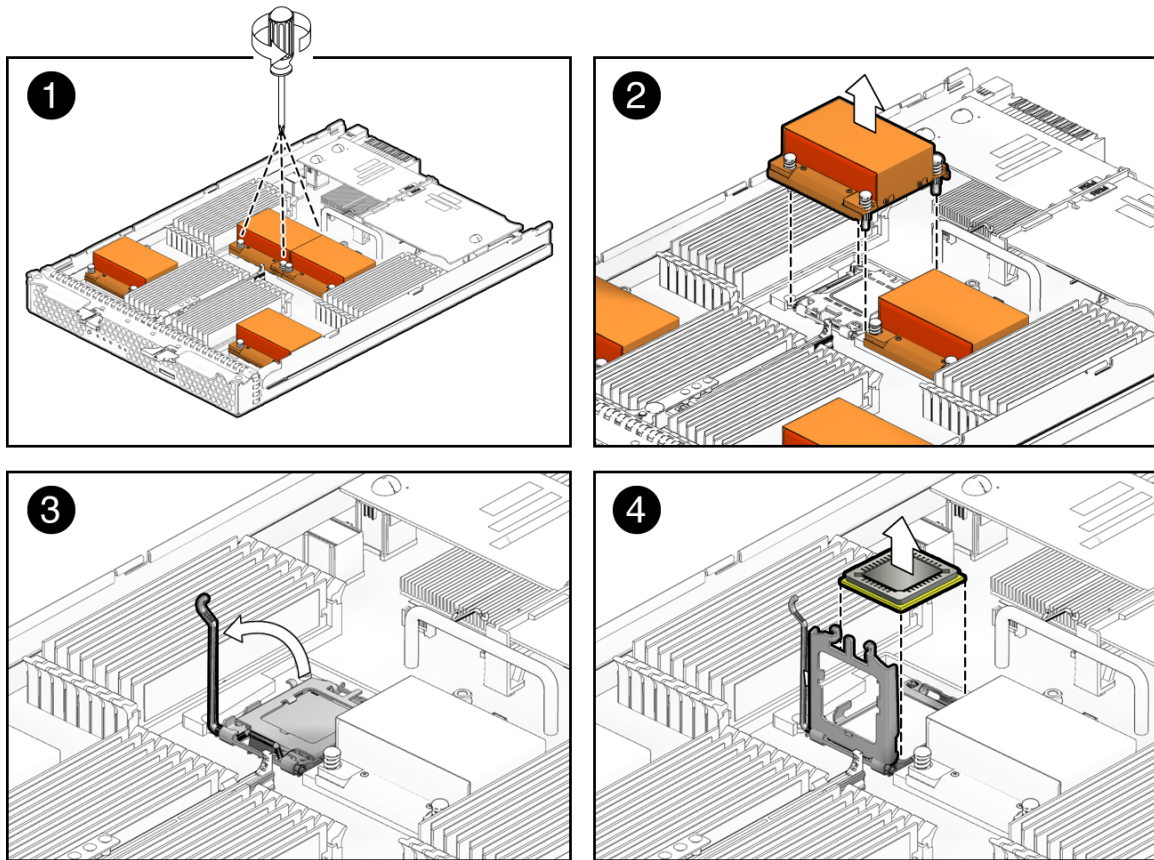


5. Remove the CPU and heatsink from the motherboard:

- a. Hold down on the top of the heatsink to prevent it from tipping unevenly while you alternately loosen the four spring-loaded mounting screws that secure the heatsink to the motherboard.**

Turn the screws 180 degrees at a time, and then remove the screws when they are detached. See FIGURE 4-14.

FIGURE 4-14 Removing the Heatsink and CPU



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

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

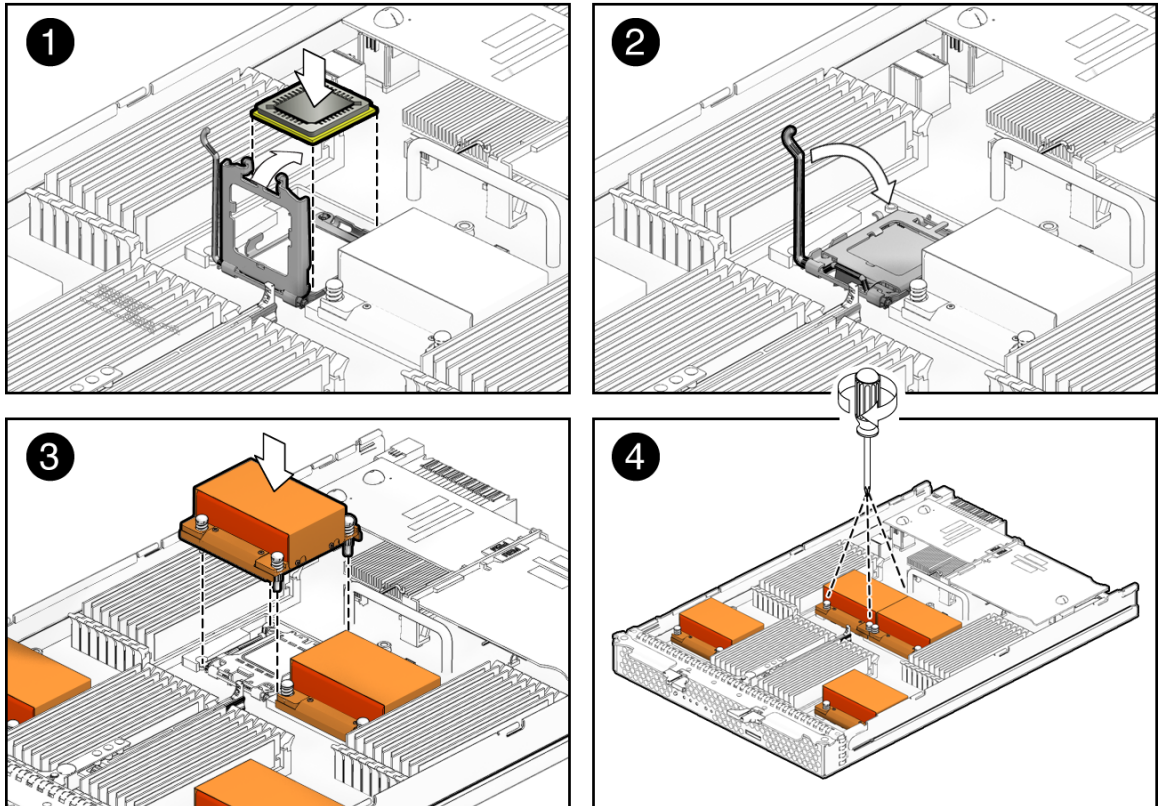
6. Pull the CPU socket lever slightly away from the socket.
 - a. Pivot the lever up, into the fully open position.
 - b. Open the hinged plate that covers the CPU until it is in the fully open position.

c. Lift the CPU out of the socket, leaving the lever and plate in the open position.

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

FIGURE 4-15 shows how to install the CPU and heatsink.

FIGURE 4-15 Installing the Heatsink and CPU



Note – Mixing CPU speeds is not supported. Use two identical CPUs in your server.

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

You will need to apply new thermal grease when you reinstall the heatsink in [Step 8](#).

b. Ensure that the CPU socket release lever and retainer plate are in the fully open position.

- c. Align the CPU in the socket.

Note – Use the alignment keys in the CPU socket to match the alignment notches on the sides of the CPU.

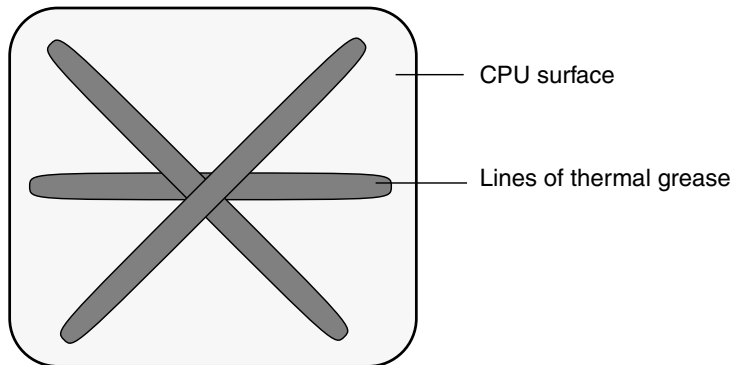
- d. Gently set the CPU onto the pins in the socket.
- e. When the CPU is fully seated in the socket, pivot the hinged retainer plate down onto the top of the CPU.
- f. Pivot the release lever down and into the locked position, at the side of the socket.

The release lever must lock down the retainer plate as you close the lever.

8. Install the heat sink:

- a. 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 4-16.

FIGURE 4-16 Required Pattern for Thermal Grease Application



- b. If you are reinstalling an existing heatsink, use an alcohol pad to clean all the old thermal grease from the component surface. Also, clean the dust from the heatsink fins.

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.

- c. Turn the heatsink upright and reinsert the four springs and mounting screws.



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

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

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

- e. Lower the heatsink onto the CPU, aligning the mounting screws with their holes on the motherboard.
- f. Using an adjustable torque driver, alternately tighten the two heatsink mounting screws, 180 degrees at a time, until each spring is completely compressed.

Tighten the screws to 7 in.-lbs (0.8 Nm).

4.4.8 Replacing the Motherboard

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

Follow these steps to remove and replace the motherboard.

1. Remove the server module from the chassis as described in [Section 4.2.1, “Removing the Server Module From the Chassis”](#) on page 4-2.



Caution – Do not operate the system with empty slots. Always insert a filler panel into an empty slot to reduce the possibility of system shut down.

2. **Remove the main cover as described in [Section 4.2.2, “Removing the Main Cover”](#) on page 4-4.**
3. **Remove the following components from the motherboard and place them on an antistatic surface.**
 - DIMMs: See [Section 4.4.3, “Replacing Memory Modules \(DIMMs\)”](#) on page 4-10.
 - CPU and heatsink: See [Section 4.4.7, “Replacing a CPU and Heatsink”](#) on page 4-19.
 - REM board: See [Section 4.4.4, “Adding or Replacing a RAID Expansion Module”](#) on page 4-14.
 - FEM board: See [Section 4.4.6, “Adding or Replacing a Fabric Expansion Module”](#) on page 4-17.

Note – The server module enclosure, and the motherboard are all part of the motherboard FRU.

Installation is the reverse of this procedure.

System Specifications

This appendix contains physical specifications for the Sun Blade X6440 server module. Refer to the chassis documentation for additional server module specifications.

TABLE A-1 Sun Blade X6440 Server Module Physical Specifications

Specification	Value
Width	12.87 inches (327 mm)
Height	1.7 inches (44 mm)
Depth	20.16 inches (512 mm)
Weight	17 pounds (8 kg)

BIOS POST Codes

This appendix lists the BIOS POST code checkpoints for the Sun Blade X6440 server module.

B.1 POST Code Checkpoints

The POST code checkpoints are the largest set of checkpoints during the BIOS preboot process. [TABLE B-1](#) 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-1 POST Code Checkpoints

Post Code	Description
03	Disable NMI, Parity, video for EGA, and DMA controllers. Initialize BIOS, POST, Runtime data area. Also initialize BIOS modules on POST entry and GPNV area. Initialize CMOS as mentioned in the Kernel Variable "wCMOSFlags."
04	Check the CMOS diagnostic byte to determine if battery power is OK and the CMOS checksum is OK. Verify that CMOS checksum manually by reading storage area. If the CMOS checksum is bad, update CMOS with power-on default values and clear passwords. Initialize status register A. Initializes data variables that are based on CMOS setup questions. Initializes both the 8259 compatible PICs in the system.
05	Initializes the interrupt controlling hardware (generally PIC) and interrupt vector table.
06	Do R/W test to CH-2 count reg. Initialize CH-0 as system timer. Install the POSTINT1Ch handler. Enable IRQ-0 in PIC for system timer interrupt. Traps INT1Ch vector to POSTINT1ChHandlerBlock.
07	Fixes CPU POST interface calling pointer.
08	Initializes the CPU. The BAT test is being done on KBC. Program the keyboard controller command byte is being doen after Auto detection of KB/MS using AMI KB-5.

TABLE B-1 POST Code Checkpoints *(Continued)*

Post Code	Description
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.
C5	Enumerate and set up application processors.
C6	Re-enables cache for boot strap processor.
C7	Early CPU Init Exit.
0A	Initializes the 8042 compatible Keyboard Controller.
0B	Detects the presence of PS/2 mouse.
0C	Detects the presence of Keyboard in KBC port.
0E	Testing and initialization of different input devices. Also, update the kernel variables. Traps the INT09h vector, so that the POST INT09h handler gets control for IRQ1. Decompress all available language, BIOS logo, and Silent logo modules.
13	Early POST initialization of chipset registers.
20	Relocate System Management Interrupt vector for all CPUs in the system.
24	Decompresses and initializes any platform-specific BIOS modules. GNPV is initialized at this checkpoint.
2A	Initializes different devices through DIM.
2C	Initializes different devices. Detects and initializes the video adapter installed in the system that have optional ROMs.
2E	Initializes all the output devices.
31	Allocates memory for ADM module and decompresses it. Gives control to ADM module for initialization. Initializes language and font modules for ADM. Activates ADM module.
33	Initializes the silent boot module. Sets the window for displaying text information.
37	Displays sign-on message, CPU information, setup key message, and any OEM-specific information.
38	Initializes different devices through DIM. USB controllers are initialized at this point.
39	Initializes DMAC-1 and DMAC-2.
3A	Initializes 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	Mid POST initialization of chipset registers.
40	Detect different devices (parallel ports, serial ports, and coprocessor in CPU, etc.) successfully installed in the system and update the BDA, EBDA, etc.

TABLE B-1 POST Code Checkpoints *(Continued)*

Post Code	Description
52	Updates CMOS memory size from memory found in memory test. Allocates memory for Extended BIOS Data Area from base memory. Programming the memory hole or any kind of implementation that needs an adjustment in system RAM size if needed.
60	Initializes NUM-LOCK status and programs the KBD typematic rate.
75	Initialize Int-13 and prepare for IPL detection.
78	Initializes IPL devices controlled by BIOS and option ROMs.
7C	Generate and write contents of ESCD in NVRam.
84	Log errors encountered during POST.
85	Display errors to the user and gets the user's response to the error.
87	Execute BIOS setup if needed/requested. Check boot password if installed.
8C	Late POST initialization of chipset registers.
8D	Build ACPI tables (if ACPI is supported).
8E	Program the peripheral parameters. Enable/Disable NMI as selected.
90	Initialization of system management interrupt by invoking all handlers.
A1	Clean-up work needed before booting to OS.
A2	Takes care of runtime image preparation for different BIOS modules. Fill the free area in F000h segment with 0FFh. Initializes the Microsoft IRQ Routing Table. Prepares the runtime language module. Disables the system configuration display if needed.
A4	Initialize runtime language module. Display boot option popup menu.
A7	Displays the system configuration screen if enabled. Initializes the CPUs before boot, which includes the programming of the MTRRs.
A9	Wait for user input at config display if needed.
AA	Uninstall POST INT1Ch vector and INT09h vector.
AB	Prepare BBS for Int 19 boot. Initialize MP tables.
AC	End of POST initialization of chipset registers. De-initializes the ADM module.
B1	Save system context for ACPI. Prepare CPU for OS boot including final MTRR values.
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.
61h-70h	OEM POST error. This range is reserved for chipset vendors and system manufacturers. The error associated with this value may be different from one platform to the next.

Connector Pinouts

This appendix contains information about the following connector pinouts:

- [Section C.1, “Front I/O Dongle” on page C-2](#)
- [Section C.2, “Compact Flash” on page C-3](#)

C.1 Front I/O Dongle

The front I/O dongle connector pins and their corresponding descriptions are shown in the figure and table in this section.

FIGURE C-1 Front I/O Dongle Connector

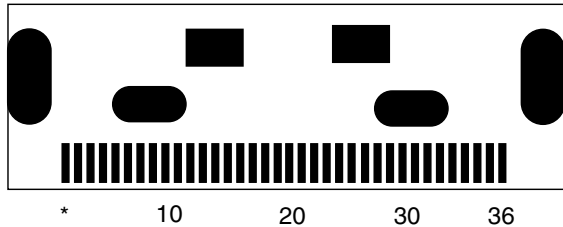


TABLE C-1 Front I/O Dongle Pins

Signal Name	Pin #	Pin #	Signal Name
No Connect	1, 21, 28, 30, 31, 33, 34	15	USB0_FRONT_VCC
DNGL_VGA_RED	2	16	USB1_FRONT_VCC
DNGL_VGA_GRN	3	17	USB1_FRONT_VCC
DNGL_VGA_BLU	4	18	USB1_FRONT_CM_N
GND	5	19	USB1_FRONT_CM_P
DNGL_VGA_MONID2	6	20	GND
GND	7, 11, 20, 29, 32, 36	22	DNGL_RES_SER_RXD
DNGL_VGA_MONID1	8	23	RES_DNGL_SER_RTS_N
DNGL_VGA_HSYNC_BUF	9	24	RES_DNGL_SER_TXD
DNGL_VGA_VSYNC_BUF	10	25	DNGL_RES_SER_CTS_N
GND	11	26	RES_DNGL_SER_DTR_N
USB0_FRONT_CM_N	12	27	DNGL_RES_SER_DCD_N
USB0_FRONT_CM_P	13	35	DONGLE_PRSENT_L
USB0_FRONT_VCC	14		

C.2 Compact Flash

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

FIGURE C-2 Compact Flash Connector

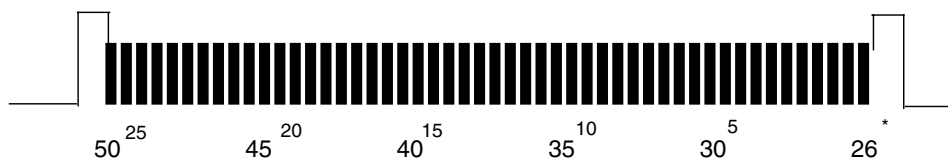


TABLE C-2 Compact Flash Connector Pins

Signal Name	Pin #	Pin #	Signal Name
GND	1	26	PRSNT_N
D03	2	27	D11
D04	3	28	D12
D05	4	29	D13
D06	5	30	D14
D07	6	31	D15
CS1_L	7	32	CS3_L
GND	8	33	No Connect
ATA_SEL	9	34	IOR_L
GND	10	35	IOW_L
GND	11	36	WE
GND	12	37	INT_L
3.3V	13	38	3.3V
GND	14	39	IDE_CSEL
GND	15	40	No Connect
GND	16	41	IDE_RESET_L
GND	17	42	IDE_RDY

TABLE C-2 Compact Flash Connector Pins *(Continued)*

Signal Name	Pin #	Pin #	Signal Name
ADDR2	18	43	DRQ_L
ADDR1	19	44	DACK_L
ADDR0	20	45	No Connect
D00	21	46	No Connect
D01	22	47	D08
D02	23	48	D09
No Connect	24	47	D10
IDE_CD2	15	50	GND

Index

A

- accessory kit contents, 1-6
- Advanced Configurable Power Interface (ACPI), testing, 3-14
- Advanced Menu BIOS screen, 2-8
- ATA, diagnosing, 3-13
- ATAPI devices
 - diagnosing, 3-13
 - display information about, 3-13
 - tests against, 3-19
- audio devices, testing, 3-14
- available options, 1-6

B

- battery replacement, 4-7
- BIOS
 - changing menu settings, 2-5
 - configuring, 2-5
 - Ethernet port booting priority, 2-7
 - menu tree, 2-9
 - Option ROM size, 2-8
 - overview, 2-5
 - PCI ExpressModule slot priority, 2-6
 - POST code checkpoints, B-1
 - redirecting console output for POST, 3-7
 - setup screens summary, 2-8
 - special considerations, 2-6
 - updating, 2-31
- Boot Menu BIOS screen, 2-8
- burn-in testing, 3-11

C

- cache
 - testing, 3-15
- CD-ROM/DVD, 3-13
- Chipset Menu BIOS screen, 2-8
- Clear CMOS jumper, 2-28
- comments and suggestions, -xii
- compact flash
 - testing, 3-14
- Compact Flash connector pinouts, C-3
- component
 - information through ILOM, 3-1
 - overview figure, 1-5
 - replacement procedures, 4-6
- configuring BIOS, 2-5
- connector pinouts
 - Compact Flash, C-3
 - front dongle, C-2
- console output, redirecting, 3-7
- CPU
 - fault indicator button, 4-20
 - fault LED, 3-5
 - replacement, 4-19

D

- data loss, 3-15
- Destructive Write Test, running, 3-15
- diagnostic tools
 - BIOS POST, 3-6
 - external LEDs, 3-2
 - hardware debug tool (HDT), 3-8

- internal LEDs, 3-4
- service processor (SP) ILOM, 3-1
- diagnostics
 - advanced diagnostics option, 3-13
 - compact flash, 3-14
 - hard drive testing, 3-14
 - main menu options, 3-10
 - Pc-Check information, viewing, 3-20
 - print results reports option, 3-20
 - show results summary option, 3-18
 - shut down option, 3-20
 - system information menu options, 3-11

DIMMs

- ECC errors, 4-14
- error correction, 4-14
- fault indicator button, 4-11
- fault LEDs, 3-5
- parity, 4-14
- population rules, 4-10, 4-12
- replacement, 4-10
- supported configurations, 4-10, 4-12

documentation, related, -x

dongle cable

- attaching to the front panel, 1-4
- connector pinouts, C-2
- connectors, 1-4

driver updates, -ix

E

ECC errors DIMM errors, 4-14

Ethernet driver naming, 2-6

Ethernet port

- booting priority, 2-7
- naming, 2-6

Exit Menu BIOS screen, 2-8

external LEDs, 3-2

F

Fabric Expansion Module (FEM)

- board replacement, 4-17

fault indicator button

- CPU, 4-20
- DIMMs, 4-11

feature summary, 1-1

firmware updates, -ix

firmware, testing, 3-14

front panel

- attaching the dongle cable, 1-4

- figure, 1-3

- LED definitions, 3-3

front panel LEDs and buttons, 1-3

full.tst script, 3-16

H

hard drive

- diagnosing, 3-13

- testing, 3-14

- tests against, 3-19

hardware debug tool (HDT)

- access, 3-8

- commands, 3-8

- functionality, 3-8

heatsink replacement, 4-19

I

input device

- testing, 3-19

Integrated Lights Out Manager (ILOM)

- component information, 3-1

- documentation, 3-1

- power off server, 2-4

- redirecting console output, 2-5, 3-7

internal LEDs, 3-4

J

J29 jumper, 2-27, 2-28

J37 jumper, 2-27, 2-29

J57 jumper, 2-27, 2-30

jumpers

- Clear CMOS, 2-28

- header pins location, 2-27

- J29, 2-28

- J37, 2-29

- J57, 2-30

- Recover SP, 2-30

- SP password Clear, 2-29

K

keyboard

- testing, 3-14

L

LEDs

- CPU fault, 3-5
 - DIMM fault, 3-5
 - external, 3-2
 - front panel definitions, 3-3
 - internal, 3-4
 - Locate, 3-3
 - Power/OK, 3-3
 - Service Action Required, 3-3
- limitations of Option ROM size, 2-8
- Locate LED and button, 3-3

M

- main cover removal, 4-4
- Main Menu BIOS screen, 2-8
- memory
- diagnosing, 3-13
 - tests against, 3-19
- memory, See DIMMs
- menu tree, BIOS setup screens, 2-9
- motherboard
- component locations, 1-5, 4-5
 - components
 - testing, 3-10
 - diagnosing, 3-13
 - replacement, 4-25
 - tests against, 3-19
- mouse
- testing, 3-14
 - tests against, 3-19

N

- network
- testing, 3-14
- noinput.tst script, 3-16

O

- Option ROM size, 2-8
- options available, 1-6
- overview figure, 1-5, 4-5

P

- passwords, resetting, 2-29
- Pc-Check
- utility, 3-10

- viewing information on, 3-20
- PCI ExpressModule
- slot BIOS priority, 2-6
- physical specifications, A-1
- pinouts, See connector pinouts
- POST
- code checkpoints, B-1
 - redirecting console output, 3-7
- Power/OK LED, 3-3
- powering off the server, 2-4
- powering on the server, 2-2
- processor
- diagnosing, 3-13
 - tests against, 3-19
- product updates, -ix

Q

- quick.tst script, 3-16

R

- RAID Expansion Module (REM)
- battery replacement, 4-16
 - board replacement, 4-14
- Recover SP jumper, 2-30
- redirecting console output, 2-5, 3-7
- related documentation, -x
- replaceable component locations, 4-5
- replaceable components list, 1-6
- replacement procedures
- battery, 4-7
 - CPU, 4-19
 - DIMMs
 - Fabric Expansion Module (FEM) board
 - replacement, 4-17
 - heatsink, 4-19
 - motherboard, 4-25
 - RAID Expansion Module (REM) battery
 - replacement, 4-16
 - RAID Expansion Module (REM) board
 - replacement, 4-14
- resetting passwords, 2-29

S

- safety guidelines, -ix
- scripts, for testing components, 3-16
- Security Menu BIOS screen, 2-8

- server features list, 1-1
- Service Action Required LED, 3-3
- service processor (SP)
 - ILOM, 3-1
 - password reset, 2-29
- shutting down the server, 2-4
- special considerations, BIOS, 2-6
- specifications, system, A-1
- summary of features, 1-1
- system hang
 - using CMOS jumper to clear, 2-28
- system specifications, A-1

T

- testing
 - ATAPI devices, 3-19
 - burn-in, 3-11
 - cache, 3-15
 - hard drive, 3-19
 - memory, 3-19
 - motherboard, 3-19
 - motherboard components, 3-10
 - mouse, 3-19
 - processor, 3-19
 - USB, 3-19
 - video, 3-19
- thermal grease application, 4-24
- tools required, 4-1
- typographic conventions, -xii

U

- USB
 - devices, diagnosing, 3-13
 - tests against, 3-19

V

- video
 - devices, testing, 3-14
 - memory tests, 3-19
 - tests, 3-19