



# Sun Blade™ 2500 Service, Diagnostics, and Troubleshooting Manual

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# Preface

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The *Sun Blade 2500 Service, Diagnostics, and Troubleshooting Manual* provides a detailed description of the hardware components used in the Sun Blade 2500 workstation. This manual includes information about diagnostics, removing and replacing components, maintenance, hardware theory of operation, and product specifications for the workstation. This book is written for technicians, system administrators, authorized service providers (ASPs), and advanced computer system end users. You must have work experience diagnosing, troubleshooting, and repairing computer hardware before servicing the Sun Blade 2500 workstation.

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## About the Multimedia Links in This Manual

Removal and replacement procedures for selected workstation components are illustrated with interactive audio and video instructions in the *Sun Blade 2500 ShowMe How™* multimedia documentation. This multimedia documentation is available through links to ShowMe How movie files located throughout this manual.

You can access these multimedia video clips wherever you see the following film-clip icon:



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# How This Book Is Organized

This manual is organized into chapters and appendixes. This manual also includes a glossary of terms and an index. The general structure of this document is as follows:

Chapter 1 describes the document structure and diagnostic flowcharts used in the *Sun Blade 2500 Service, Diagnostics, and Troubleshooting Manual*.

Chapter 2 provides a hardware overview and product description of the Sun Blade 2500 workstation.

Chapter 3 introduces basic workstation troubleshooting.

Chapter 4 introduces basic diagnostic and troubleshooting flowcharts used to diagnose workstation malfunctions.

Chapter 5 introduces advanced troubleshooting diagnostics used to diagnose workstation malfunctions.

Chapter 6 discusses NVRAM diagnostics.

Chapter 7 discusses POST diagnostics.

Chapter 8 discusses OpenBoot diagnostics.

Chapter 9 discusses SunVTS diagnostics.

Chapter 10 describes how to prepare your workstation for component removal and replacement.

Chapter 11 describes how to remove, install, and verify the operation of motherboard and associated replaceable components.

Chapter 12 describes how to remove, install, and verify the operation of replaceable workstation storage devices.

Chapter 13 describes how to remove, install, and verify the operation of replaceable chassis hardware.

Chapter 14 describes how to remove, install, and verify the operation of the replaceable cable assemblies.

Chapter 15 describes the finishing procedure for the workstation.

Chapter 16 describes the optional PCI card and component upgrades to customize your workstation.

Appendix A describes the physical, electrical, acoustic, environmental, and operating vibrational specifications for the workstation.

Appendix B describes the pin and signal locations for the power and data cables used in the workstation.

Appendix C is a functional description of the hardware architecture of the Sun Blade 2500 workstation.

Appendix D is description of workstation power management.

---

## Safety and Compliance Information

Read this section before beginning any procedure in the *Sun Blade 2500 Service, Diagnostics, and Troubleshooting Manual*. For your protection, observe the following safety precautions when removing, installing, configuring, and troubleshooting your Sun Blade 2500 workstation.

- Follow all cautions and instructions marked on the equipment.
- Ensure that the voltage and frequency of your power source match the voltage and frequency inscribed on the equipment's electrical rating label.
- Never push objects of any kind through openings in the equipment. Dangerous voltages might be present. Conductive foreign objects could produce a short circuit that could cause fire, electric shock, or damage to your equipment.



**Caution** – Sun products are designed to work with single-phase power systems that have a grounded neutral conductor. To reduce the risk of electric shock, do not connect Sun products to any other type of power system. Contact your facilities manager or a qualified electrician if you are not sure of the type of power supplied to your building.

---



**Caution** – Hazardous voltages are present. To reduce the risk of electric shock and danger to personal health, follow the instructions.

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**Caution** – Do not operate Sun products without the access cover in place. Failure to follow this precaution might result in personal injury or equipment damage.

---



**Caution** – There is a risk of personal injury and equipment damage. Follow the instructions.

---

The book, *Important Safety Information for Sun Hardware Systems*, 816-7190, contains a listing of safety precautions for Sun workstations. The document is located in the packing carton for the Sun Blade 2500 workstation.

The Sun Blade 2500 workstation complies with regulatory requirements of safety and EMC as documented in the *Sun Blade 2500 Safety and Compliance Guide* (816-2061). You can access this guide at:

<http://www.sun.com/products-n-solutions/hardware/docs>

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## Using UNIX Commands

The *Sun Blade 2500 Service, Diagnostics, and Troubleshooting Manual* might not contain all of the information needed to perform basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring workstation devices.

See one or more of the following for additional UNIX commands:

- *Solaris Handbook for Sun Peripherals*
- *Sun Blade 2500 Getting Started Guide* (816-1005-11)
- AnswerBook2™ online documentation for the Solaris™ 8 operating environment

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**Note** – AnswerBook2 is no longer needed to read Solaris 9 documentation. To view Solaris 9 documentation go to: <http://docs.sun.com>

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- *Sun Blade 2500 Workstation Getting Started Troubleshooting Card* (816-1006-11)
- Other software documentation that you received with your Sun Blade 2500 workstation

---

# Typographic Conventions

Typeface or Symbol	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.
<b>AaBbCc123</b>	What you type, when contrasted with on-screen computer output.	% <b>su</b> Password:
<i>AaBbCc123</i>	Book titles, new words or terms, words to be emphasized. Command-line variable; replace with a real name or value.	Read Chapter 6 in the <i>User's Guide</i> . These are called <i>class</i> options. You <i>must</i> be <i>root</i> to do this. To delete a file, type <code>rm filename</code> .

---

# Shell Prompts

Shell	Prompt
C shell	<i>machine-name%</i>
C shell superuser	<i>machine-name#</i>
Bourne shell and Korn shell	\$
Bourne shell and Korn shell superuser	#

---

# Related Documentation

D

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<b>Application</b>	<b>Title</b>	<b>Part Number</b>
Configuration	<i>Solaris Handbook for Sun Peripherals</i>	805-7404
Configuration	<i>Solaris 8 x/xx Sun Hardware Platform Guide</i>	1
Configuration	<i>Solaris 9 x/xx Sun Hardware Platform Guide</i>	1
Diagnostics	<i>SunVTS 5.1 User's Guide</i>	1
Diagnostics	<i>SunVTS 5.1 Patch Set 5 Documentation Supplement</i>	1
Diagnostics	<i>SunVTS 5.1 Test Reference Manual</i>	1
Diagnostics	<i>SunVTS Quick Reference Card</i>	1
Diagnostics	<i>SunPCi III 3.2 User's Guide</i>	817-3630
Installation	<i>14 Gbyte, 8-mm Tape Drive Installation Manual</i>	802-1849
Installation	<i>Sun XVR-100 Graphics Accelerator Installation Guide</i>	816-7560
Installation	<i>Sun XVR-500 Graphics Accelerator Installation Guide</i>	816-3028
Installation	<i>Sun XVR-600 Graphics Accelerator Installation and User's Guide</i>	817-2195
Installation	<i>Sun XVR-1200 Graphics Accelerator Installation and User's Guide</i>	816-7386
Installation/User	<i>12 Gbyte 4-mm DDS-3 Tape Drive Installation and User's Guide</i>	802-7791
Safety Information	<i>Important Safety Information for Sun Hardware Systems</i>	816-7190
Safety and Compliance	<i>Sun Blade 2500 Safety and Compliance Guide</i>	816-2061
Specification	<i>36 GB, 10K rpm, 1-Inch Disk Drive Specifications</i>	816-1112
Specification	<i>73 GB, 10K rpm, 1-Inch Disk Drive Specifications</i>	816-7257

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<b>Application</b>	<b>Title</b>	<b>Part Number</b>
Specification	<i>4-mm, DDS-2 Tape Drive Specifications</i>	802-7790
User	<i>21-Inch Premium (19.8-inch Viewable) Color Monitor Guide</i>	875-1844
User	<i>24-Inch Premium (22.5-inch Viewable) Color Monitor Guide</i>	875-1799

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1 Depends on the version of the Solaris operating environment installed on your workstation.

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## Accessing Sun Documentation

You can view, print, or purchase a broad selection of Sun documentation, including localized versions, at:

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

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## Contacting Sun Technical Support

If you have technical questions about this product that are not answered in this document, go to:

<http://www.sun.com/service/contacting>

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## Sun Welcomes Your Comments

Sun is interested in improving its documentation and welcomes your comments and suggestions. You can submit your comments by going to:

<http://www.sun.com/hwdocs/feedback>

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

*Sun Blade 2500 Service, Diagnostics, and Troubleshooting Manual*, part number 816-0996-11.





# Start Here

---

This chapter describes how to use this manual and its diagnostic and troubleshooting flowcharts when servicing the Sun Blade 2500 workstation.

This chapter contains the following topics:

- Section 1.1, “Diagnostic Tools Available” on page 1-1
- Section 1.2, “Additional Support Resources” on page 1-3
- Section 1.3, “About Troubleshooting Flowcharts” on page 1-5
- Section 1.4, “Start Here Flowchart” on page 1-7

---

## 1.1 Diagnostic Tools Available

The *Sun Blade 2500 Service, Diagnostics, and Troubleshooting Manual* describes system messages, system sounds, diagnostic flowcharts, firmware, and software diagnostic tools to help you identify and repair workstation malfunctions. These tools include but are not limited to:

- System displayed messages (such as flashing LEDs or error messages)
- Workstation sounds (such as beeps)
- Nonvolatile random access memory (NVRAM)
- Power-on self-test (POST) diagnostics
- OpenBoot PROM™ diagnostics
- SunVTS software
- Solaris diagnostic commands
- Sun Install Check
- Software Enhancement Script

TABLE 1-1 is a summary of these diagnostic tools.

**TABLE 1-1** Summary of Diagnostic Tools

<b>Diagnostic Tool</b>	<b>Type of Tool</b>	<b>What the Tool Does</b>	<b>How Tool Is Used</b>
System LEDs	Hardware	Reports status of the system or a specific workstation component.	Power button LED indicates system state. TPE and DVD-ROM drive LEDs indicate activity. Motherboard LED indicates system power.
System sounds	Hardware	Indicates system condition	Beeps heard from workstation internal speaker indicates POST completion, Solaris boot, or system failure.
NVRAM	Firmware	Workstation configuration variables such as <code>diag-switch?</code> , <code>diag-level</code> , and <code>auto-boot?</code> are stored here.	The <code>setenv</code> command typed at the <code>ok</code> prompt or the <code>eeprom</code> command in a terminal window can configure the OpenBoot PROM for POST diagnostics and execution of scripts.
POST diagnostics	Firmware	Workstation core components such as CPU and memory are tested using POST diagnostics.	Upon power up, checks low-level interaction between CPU, caches, memory, JBus, and PCI bridge. Output displayed through serial port.
OpenBoot diagnostics	Firmware	Test workstation motherboard and component interfaces.	Component test are selected from menu. If component is IEEE 1275 compliant, internal self test is executed.
SunVTS	Software	Exercises and stresses workstation components.	Invoked from the Solaris operating environment. SunVTS is run from command line or GUI. SunVTS must be installed on the system under test.

**TABLE 1-1** Summary of Diagnostic Tools (*Continued*)

<b>Diagnostic Tool</b>	<b>Type of Tool</b>	<b>What the Tool Does</b>	<b>How Tool Is Used</b>
Solaris Operating Environment	Software	Runs system commands and displays system information.	Commands <code>iostat</code> , <code>prtdiag</code> , <code>prtconf</code> , <code>netstat</code> , <code>ping</code> , <code>ps</code> , and <code>prstat</code> are run with superuser privileges.
Sun Install Check	Software	Optional hardware and software configuration verification tool	Verifies current workstation hardware and software configuration. <a href="http://www.sun.com/software/installcheck/index.html">http://www.sun.com/software/installcheck/index.html</a>
Solaris Patch Management Tool—PATCH PRO	Software	Automates patch installation process provides a method for simplified future patch updates.	Software enhancement script is downloaded installed from <a href="http://sunsolve.sun.com/">http://sunsolve.sun.com/</a> . PatchPro then automatically installs future patches.

---

## 1.2 Additional Support Resources

This manual contains troubleshooting flowcharts and diagnostic procedures that assist in identifying and replacing faulty components. This manual is written to resolve the most common workstation component failures.

TABLE 1-2 is a list of additional support resources for the Sun Blade 2500 workstation.

**TABLE 1-2** Additional Support Resources

<b>Sun Blade 2500 Workstation Additional Support Resources</b>	<b>URL or Telephone Number</b>
<p>PDF files for all current Sun Blade 2500 documents. Key documents include:</p> <p><i>Sun Blade 2500 Service, Diagnostics, and Troubleshooting Manual, 816-0996</i></p> <p><i>Sun Blade 2500 Getting Started Guide, 816-1005</i></p> <p><i>Sun Blade 2500 Troubleshooting Card 816-1006</i></p> <p><i>Sun Blade 2500 Product Notes, 816-1001</i></p> <p><i>Sun Blade 2500 Safety and Compliance Guide, 816-2061</i></p>	<p><a href="http://www.sun.com/documentation">http://www.sun.com/documentation</a></p> <p>Select the links in the following order:</p> <p>→ Additional Hardware Documentation</p> <p>→ Desktops and Workstations,</p> <p>→ Sun Blade Workstations</p> <p>Select the Sun Blade 2500 link.</p>
<p>Find the Solaris and other software documents here. This is also an alternative web site for some Sun Blade 2500 workstation documents. This web site has full search capabilities.</p>	<p><a href="http://docs.sun.com">http://docs.sun.com</a></p>
<p>Warranty and contract support contacts. Links to other service tools.</p>	<p><a href="http://www.sun.com/service/online">http://www.sun.com/service/online</a></p>
<p>Discussion and troubleshooting forums</p>	<p><a href="http://supportforum.sun.com/">http://supportforum.sun.com/</a></p>
<p>Support, diagnostic tools, and alerts for all Sun products.</p>	<p><a href="http://www.sun.com/bigadmin/">http://www.sun.com/bigadmin/</a></p>
<p>SunSolve: Contains links to software patches. Lists some system specifications, troubleshooting and maintenance information, and other tools.</p>	<p><a href="http://sunsolve.sun.com/handbook_pub/">http://sunsolve.sun.com/handbook_pub/</a></p>
<p>Lists warranties for every Sun product.</p>	<p><a href="http://www.sun.com/service/support/warranty">http://www.sun.com/service/support/warranty</a></p>
<p>Sun Service Support phone number</p>	<p>1-800-872-4786 (1-800-USA-4Sun), select option 1</p>
<p>International telephone numbers for Sun service and support</p>	<p><a href="http://www.sun.com/service/contacting/solution.html">http://www.sun.com/service/contacting/solution.html</a></p>

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**Note** – Access to some Sun proprietary information is restricted to authorized Sun personnel.

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Some low-level hardware and software failures require troubleshooting techniques that are beyond the scope of this document, and are best resolved by those persons with experience and skill in fault analysis. If you have technical questions about this product that are not answered in this document, go to:

<http://www.sun.com/service/contacting>

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## 1.3 About Troubleshooting Flowcharts

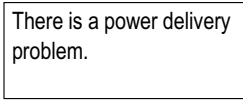
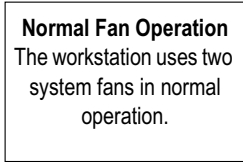
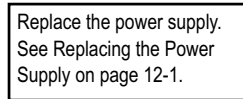
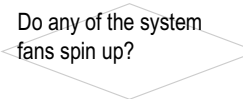
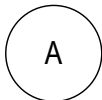
The *Sun Blade 2500 Service, Diagnostics, and Troubleshooting Manual* contains flowcharts that you can use to:

- Identify and repair workstation malfunctions
- Verify workstation operation after completing a service procedure

Each flowchart begins with a problem statement and a description of normal workstation operation.

TABLE 1-3 describes the flowchart elements used in this manual.

**TABLE 1-3** Flowchart Elements

Element	Description	Purpose
 <p>There is a power delivery problem.</p>	<p>Rectangle at the top left of and throughout the flowchart.</p>	<p>Text states action or problem.</p>
 <p><b>Normal Fan Operation</b> The workstation uses two system fans in normal operation.</p>	<p>Rectangle at the top right of the flowchart.</p>	<p>Text describes normal operation or provides details about normal conditions.</p>
 <p>Replace the power supply. See Replacing the Power Supply on page 12-1.</p>	<p>Rectangle drawn with bold lines.</p>	<p>Text gives a cross-reference to another flowchart, table, or procedure. The HTML and PDF formats of this manual provide active links.</p>
 <p>Do any of the system fans spin up?</p>	<p>Diamond shape drawn with light dashed lines.</p>	<p>Text asks questions to be answered Yes or No. If you answer Yes, move down the chart to the next element. If you answer No, move left or right to the next element.</p>
 <p>A</p>	<p>Circle</p>	<p>The letter in the circle directs you to a continuation of the flowchart. Some flowcharts will have more than one continuation path.</p>

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**Note** – Some flowcharts also point to additional diagnostic information in other Sun documents.

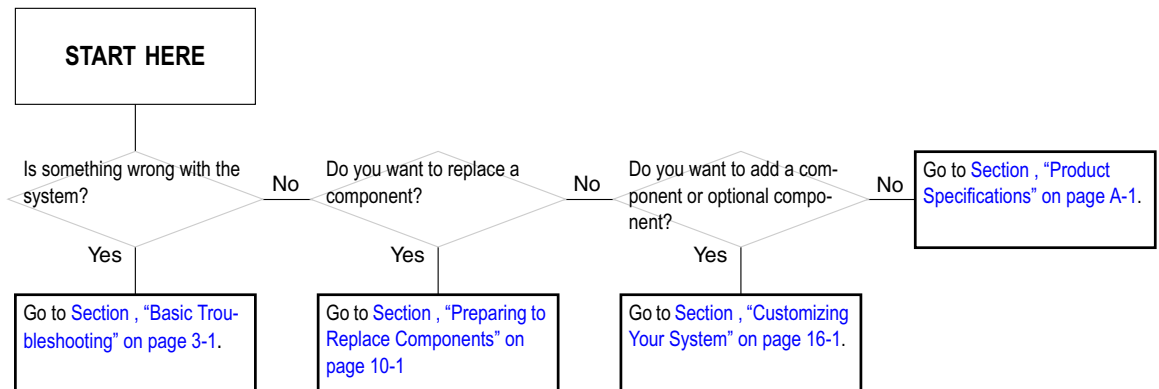
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## 1.4 Start Here Flowchart

When you service the Sun Blade 2500 workstation always begin with the Start Here flowchart (see [FIGURE 1-1](#)). The “Start Here” Flowchart links you to information about:

- Troubleshooting
- Component removal, installation, and verification of workstation operation
- Workstation customization
- Product information



**FIGURE 1-1** Start Here Flowchart





# Product Description

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This chapter gives an overview of the Sun Blade 2500 workstation. This overview includes the following sections:

- [Section 2.1, “Product Overview” on page 2-1](#)
- [Section 2.2, “External System Description” on page 2-3](#)
- [Section 2.3, “Replaceable Hardware Components” on page 2-8](#)
- [Section 2.4, “Supported Sun Monitors” on page 2-10](#)

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## 2.1 Product Overview

Your Sun Blade 2500 workstation is designed to work with one or two UltraSPARC™ IIIi CPUs operating at 1.28 GHz. The workstation uses distributed shared-memory architecture with up to 8 GB of DDR1 SDRAM memory installed.

The workstation uses the latest 64-bit SPARC v9 RISC architecture. This super-scalar processor architecture allows up to four instructions per clock cycle. The SPARC v9 architecture supports high-bandwidth input/output devices, such as UltraSCSI hard drives and the newest generation of Sun 2D and 3D graphics accelerators.

---

**Note** – For additional information about Sun Blade 2500 workstation, see [Section , “Functional Description” on page C-1](#).

---

[TABLE 2-1](#) describes the standard and optional features of the Sun Blade 2500 workstation.

**TABLE 2-1** Sun Blade 2500 Workstation Configured Features

<b>Feature</b>	<b>Description</b>
Processor options	One or two UltraSPARC IIIi 1.28 GHz CPUs with a 1 MB integrated Level 2 cache + CPU fan and heat sink assembly
Operating environment	Preinstalled Solaris 8 HW 4/04 or later, or Solaris 9 HW 4/04 or later operating environment supporting 32- and 64-bit applications
Enclosure	Deskside system enclosure with front-panel access to a smart card reader, optical media, and tape drives.
Memory options	From a minimum of 1 GB to a maximum of 8 GB of ECC DDR1 SDRAM memory, registered DIMMs, using matched pairs of 512 MB or 1 GB DIMMs Maximum of 2 DIMM pairs per CPU (4 DIMMs per CPU) <i>or</i> Maximum of 4 DIMM pairs per system (8 DIMMs total per system)
Power supply	475W
Internal storage	One or two 36 or 73 GB UltraSCSI IV 320 hard disk drives (10,000 RPM)
Optical media	One DVD-ROM drive or optional CD-RW drive
Audio	Internal audio module on riser card with 1 line-in, 1 line-out, 1 microphone-in, 1 headphone-out, and 1 DB9 serial port
Controlled system access	Smart card reader
Graphics accelerator	PCI-based graphics accelerators: Sun XVR-100, up to 3 supported, installed in PCI slots 2, 3, or 5 Sun XVR-500, up to 2 supported, installed in PCI slots 2, 3, or 5 Sun XVR-600, up to 3 supported, installed in PCI slots 2, 3, or 5 Sun XVR-1200, up to 2 supported, installed in PCI slots 1 and 2, 2 and 3, or 4 and 5. (XVR-1200 installation in PCI slots 1 and 2 or 4 and 5 makes available an additional 66 MHz/64Mb slot for other use.)
Keyboard	Sun USB Type-6, AT 101 layout, USB v1.1 compliant

**TABLE 2-1** Sun Blade 2500 Workstation Configured Features (*Continued*)

Feature	Description
Mouse	Sun three-button mouse, USB v1.1 compliant
Expansion slots on the motherboard	Peripheral component interconnect (PCI) slots: Three - 64 bit at 33 MHz connectors (slots 0, 1, 4) Three - 64 bit at 66 MHz connectors (slots 2, 3, 5)
Back panel connectors for external devices	Four universal serial bus (USB) 1.1 ports Two serial connectors (DB-9) One parallel connector (DB-25) One UltraSCSI connector (68-pin LVD/MSE SCSI) One twisted-pair Ethernet (TPE) 10/100/1000BASE-T connector (RJ-45) One audio line-in connector One audio line-out connector One headphone connector One microphone connector One-1394 IEEE/USB v2.0 combination card: 2 IEEE 1394a connectors and 3 USB v2.0 ports (Internal connectors: 1 IEEE 1394a connector, 2 USB v2.0 ports)

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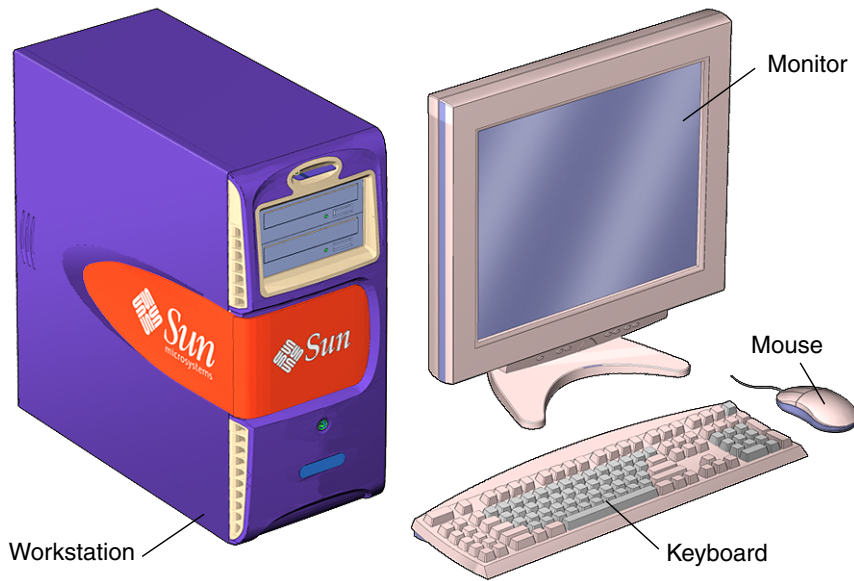
**Note** – If so equipped, do not remove the plastic rivet from the headphone jack on the DVD-ROM drive. Do not use the headphone jack on the CD-RW drive. Instead, use the audio module headphone jack located on the back panel of the workstation.

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## 2.2 External System Description

Use [FIGURE 2-1](#), [FIGURE 2-2](#), and [FIGURE 2-3](#) to identify the external features of the Sun Blade 2500 workstation.

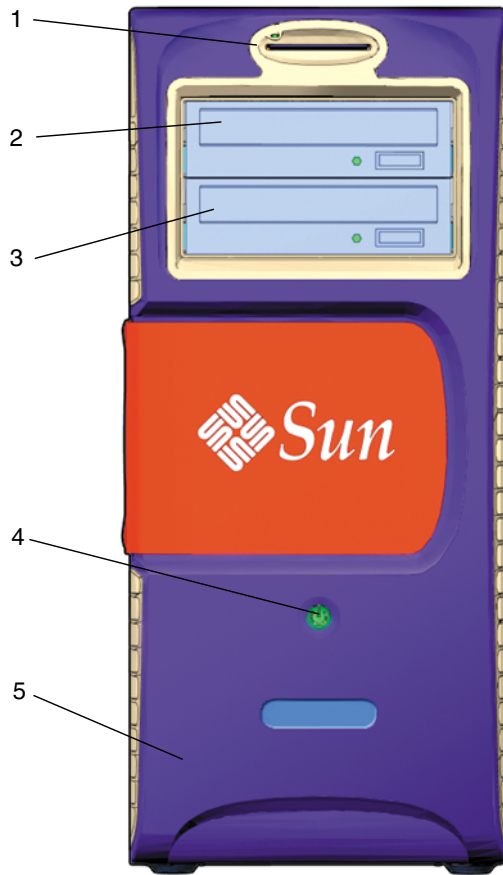


**FIGURE 2-1** Sun Blade 2500 Workstation, Monitor, Keyboard, and Mouse

---

**Note** – Ensure that the keyboard and mouse are connected only to USB v1.1 compliant connectors (USB0 and USB1) on the back panel of the workstation.

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**FIGURE 2-2** Front Panel Overview—Sun Blade 2500 Workstation

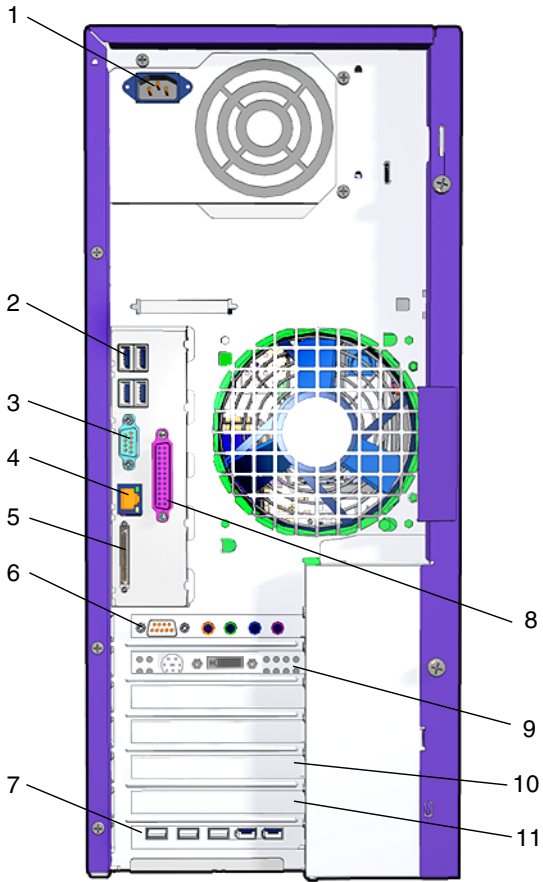
1. Smart card reader
2. DVD-ROM drive (headphone connector not supported—use audio module, headphone connector)

---

**Note** – If so equipped, do not remove the plastic rivet from the headphone jack on the DVD-ROM drive. Do not use the headphone jack on CD-RW drive. Instead, use the audio module headphone jack located on the back panel of the workstation.











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3. 5.25 drive bay (optional CD-RW drive shown)
4. Power button
5. Bezel




**FIGURE 2-3** Back Panel Overview—Sun Blade 2500 Workstation

**TABLE 2-2** Back Panel Overview—Sun Blade 2500 Workstations

Callout in Figure 2-3	Part Description	Back Panel Symbol
1	Power connector - (Note: orientation of power connector may be horizontal or vertical.)	None
2	USB v1.1 connector (4)	
3	Serial connector (DB-9)	
4	Twisted-pair Ethernet (TPE)	
5	External UltraSCSI connector—Low Voltage Differential/Multimode Single Ended (LVD/MSE SCSI)	
6	Audio module, serial (DB-9) connector	None
6	Audio module, headphone connector (orange)	
6	Audio module, line-in connector (green)	
6	Audio module, line-out connector (blue)	
6	Audio module, microphone connector (red)	
7	IEEE 1394/USB v2.0 combination card with 2 IEEE 1394a external connectors, 3 USB v2.0 external ports, 1 IEEE 1394a internal connector, and 2 USB v2.0 internal ports	 
8	Parallel connector (DB-25)	//

**TABLE 2-2** Back Panel Overview—Sun Blade 2500 Workstations (*Continued*)

Callout in Figure 2-3	Part Description	Back Panel Symbol
9	Graphics accelerator (Sun XVR-500 shown)	
10	Blank filler panel shown. Access to PCI connector 2. Sixty-Six MHz PCI card connectors: PCI connector 2, PCI connector 3, and PCI connector 5	<b>PCI 2</b> <b>PCI 3</b> <b>PCI 5</b>
	Note: Sun XVR-1200, up to 2 supported, installed in PCI slots (1 and 2, 2 and 3, or 4 and 5). XVR-1200 installation in PCI slots 1 and 2 or 4 and 5 makes available an additional 66 MHz/64Mb slot for other use.	
11	Blank filler panel shown. Access to PCI connector 1. Thirty-three MHz PCI card connectors: PCI connector 0, PCI connector 1, and PCI connector 4	<b>PCI 0</b> <b>PCI 1</b> <b>PCI 4</b>

---

## 2.3 Replaceable Hardware Components

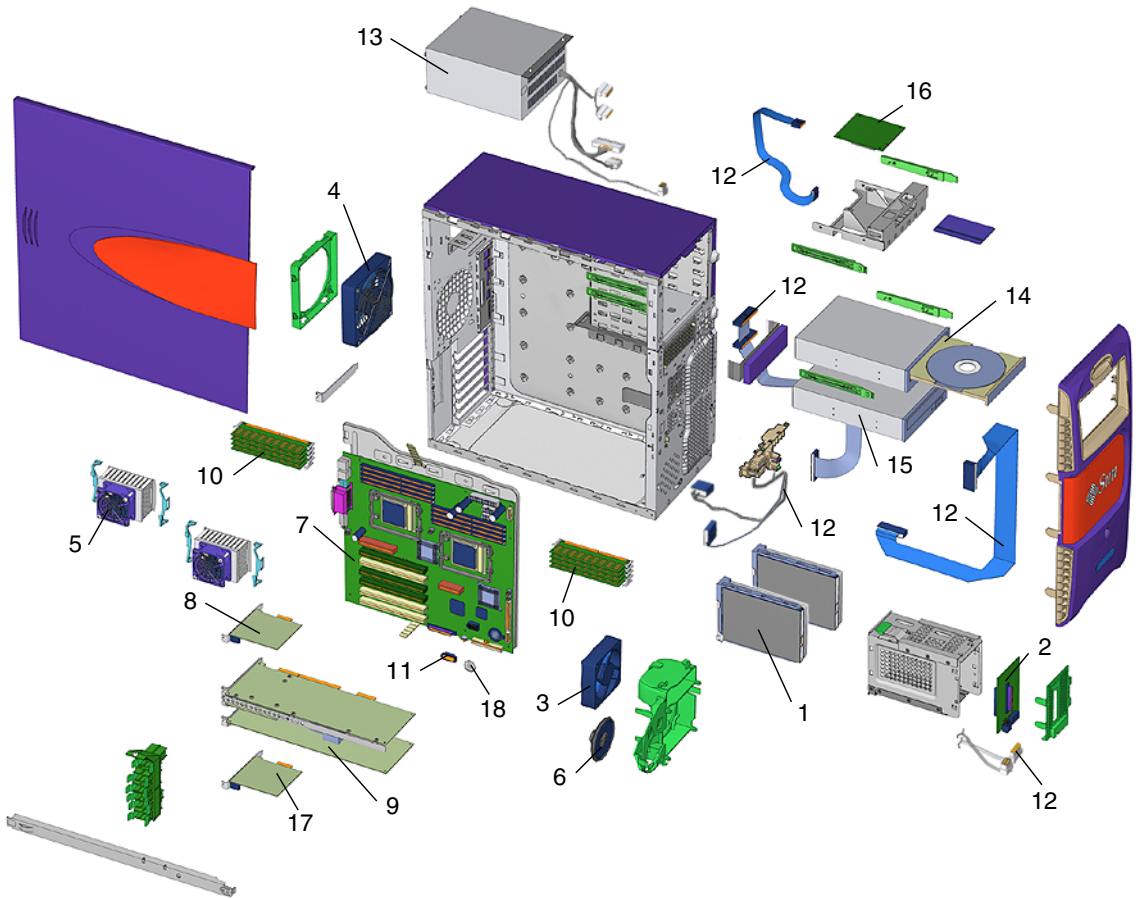
[TABLE 2-3](#) lists the replaceable components for the Sun Blade 2500 workstation. [FIGURE 2-4](#) is an exploded view of each of the components listed in [TABLE 2-3](#).

---

**Note** – The components listed in [TABLE 2-3](#) are subject to change without notice. Consult your authorized Sun sales representative or service provider to confirm a part number prior to ordering a replacement component, or search <http://www.sun.com/ibb/spares>

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**FIGURE 2-4** Exploded View of Sun Blade 2500 Workstation Components

**TABLE 2-3** Replaceable Hardware Components

Item Number	Component	Description
1	Hard drive, 36 or 73 GB	36 or 73 GB, 10,000 RPM UltraSCSI hard drive
2	SCSI backplane	SCSI backplane assembly supporting up to two hard drives
3	Fan, front	80 mm variable speed fan
4	Fan, rear	120 mm variable speed fan
5	CPU fan and heat sink assembly	CPU fan and heat sink assembly with heat transfer pad
6	Speaker	Speaker assembly

**TABLE 2-3** Replaceable Hardware Components (*Continued*)

Item Number	Component	Description
7	1-1.28 GHz CPU and motherboard assembly	Assembly: single 1.28 GHz UltraSPARC IIIi CPU plus motherboard
7	2-1.28 GHz CPU and motherboard assembly	Assembly: dual 1.28 GHz UltraSPARC IIIi CPUs plus motherboard
8	Audio module assembly	Audio module, 16-bit audio, 8 Hz to 48 kHz
9	Graphics accelerator	Sun XVR-100 graphics accelerator
9	Graphics accelerator	Sun XVR-500 graphics accelerator
9	Graphics accelerator	Sun XVR-600 graphics accelerator
9	Graphics accelerator	Sun XVR-1200 graphics accelerator
10	512 MB DIMM	512 MB DDR-1 SDRAM DIMM
10	1 GB DIMM	1 GB DDR-1 SDRAM DIMM
11	NVRAM	64 Kbit nonvolatile random access memory (NVRAM) serial EEPROM
12	Cable kit	Internal system interface cable for DVD-ROM drive (IDE1), SCSI (SCSI0), power switch and LED cable assembly (J15), smart card reader (SCR0), and SCSI to DVD ROM power cable
13	Power supply assembly	Power supply, 475W
14	DVD-ROM drive	DVD-ROM drive—headphone connector not supported, use audio module headphone connected
15	CD-RW drive	CD-RW drive (optional)
16	Smart card reader	Smart card reader assembly
17	1394 IEEE/USB v2.0 combination card	Combination card with two IEEE 1394a external ports and three USB v2.0 ports, and one 1394a internal port and two USB v2.0 internal ports.
18	Battery	Battery

## 2.4 Supported Sun Monitors

The Sun Blade 2500 workstation supports the monitors listed in [TABLE 2-4](#). The Sun XVR-100, Sun XVR-500, Sun XVR-600, and Sun XVR-1200 graphics accelerators can be configured to support multiple displays.

**TABLE 2-4** Monitors Supported by Sun Blade 2500 Workstation

Monitor	Maximum Resolution	Maximum Number of Monitors Supported by ONE XVR-100	Maximum Number of Monitors Supported by ONE XVR-500	Maximum Number of Monitors Supported by ONE XVR-600	Maximum Number of Monitors Supported by ONE XVR-1200
17-inch color	1152 x 900 @ 66 Hz	2	2	2	2
18.1-inch TFT LCD color	1280 x 1024 @ 60 Hz	2	2	2	2
21-inch flat screen AG color	1600 x 1200 @ 75 Hz	2	2	2	2
24.1-inch LCD flat screen color	1920 x 1200 @ 60 Hz	2	2	2	2

For more information about the Sun XVR-100, Sun XVR-500, Sun XVR-600, or Sun XVR-1200 supported graphics accelerators see the *Sun XVR-100 Graphics Accelerator Installation Guide*, 816-7560, the *Sun XVR-500 Graphics Accelerator Installation Guide*, 816-3028, *Sun XVR-600 Graphics Accelerator Installation and User's Guide* 817-2195, or the *Sun XVR-1200 Graphics Accelerator Installation and User's Guide*, 816-7386.

---

**Note** – Additional information about frame-locking multiple display devices can be found in the *Sun XVR-1200 Graphics Accelerator Installation and User's Guide*.

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# Basic Troubleshooting

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This chapter provides basic troubleshooting assistance. Topics include:

- [Section 3.1, “Power-On Sequence” on page 3-1](#)
- [Section 3.2, “Display and Audio Responses” on page 3-5](#)
- [Section 3.3, “Displayed Messages” on page 3-10](#)
- [Section 3.4, “Other Errors” on page 3-17](#)
- [Section 3.5, “Troubleshooting Commands” on page 3-22](#)

---

## 3.1 Power-On Sequence

When you power on the Sun Blade 2500 system, a series of tasks and processes bring the workstation to a user-ready state.

### 3.1.1 Power-On Sequence List

The following is a list of the power-on events that occur when a user powers on the Sun Blade 2500 system.

1. Power button is pressed.
2. OpenBoot PROM initiates System Power-On Reset (SPOR).
3. OpenBoot PROM initiates Power-On Self-Test (POST), if enabled.
4. OpenBoot PROM loads device drivers.
5. OpenBoot PROM loads workstation configuration from NVRAM.
6. OpenBoot PROM initializes bus and PCI card self-test diagnostics.
7. OpenBoot PROM loads and executes boot block.

8. Boot block loads and executes boot strap program.
9. Boot strap loads Solaris kernel.
10. Bus connections and hardware components are probed.
11. `init` program is loaded and executed.
12. `init` program reads `/etc/inittab`.
13. `init` program launches `rc` scripts, which read, check, and mount file systems.
14. `/etc/vfstab` file system is checked and mounted.
15. Additional `rc` script files are executed.

---

**Note** – There is a four-second delay from the time the system is power off or after AC power is applied until the workstation can be powered on.

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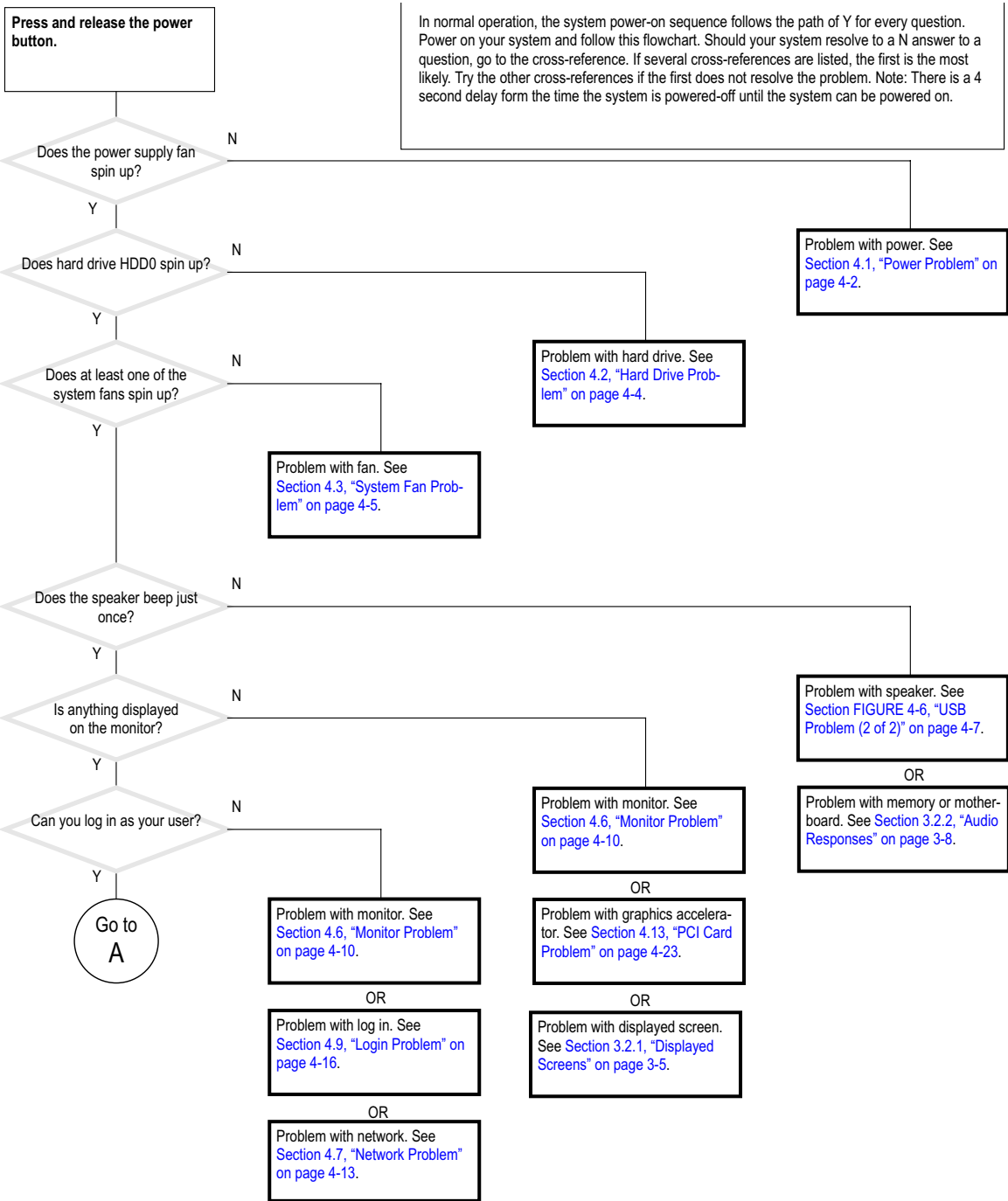
## 3.1.2 Power-On Flowchart

[FIGURE 3-1](#) can help you identify a Sun Blade 2500 system malfunction.

If you suspect a system of malfunction, power on the system and follow the flowchart.

If you answer “No” to a question (conditional), direct your attention to the section indicated or to other flowchart cross-references.

If you complete the flowchart without answering “No” to any questions yet you still suspect a malfunction with the Sun Blade 2500 system, see [Section , “Introduction to Advanced Troubleshooting” on page 5-1](#) for more in-depth troubleshooting procedures.



**FIGURE 3-1** Power-On Flowchart (1 of 2)

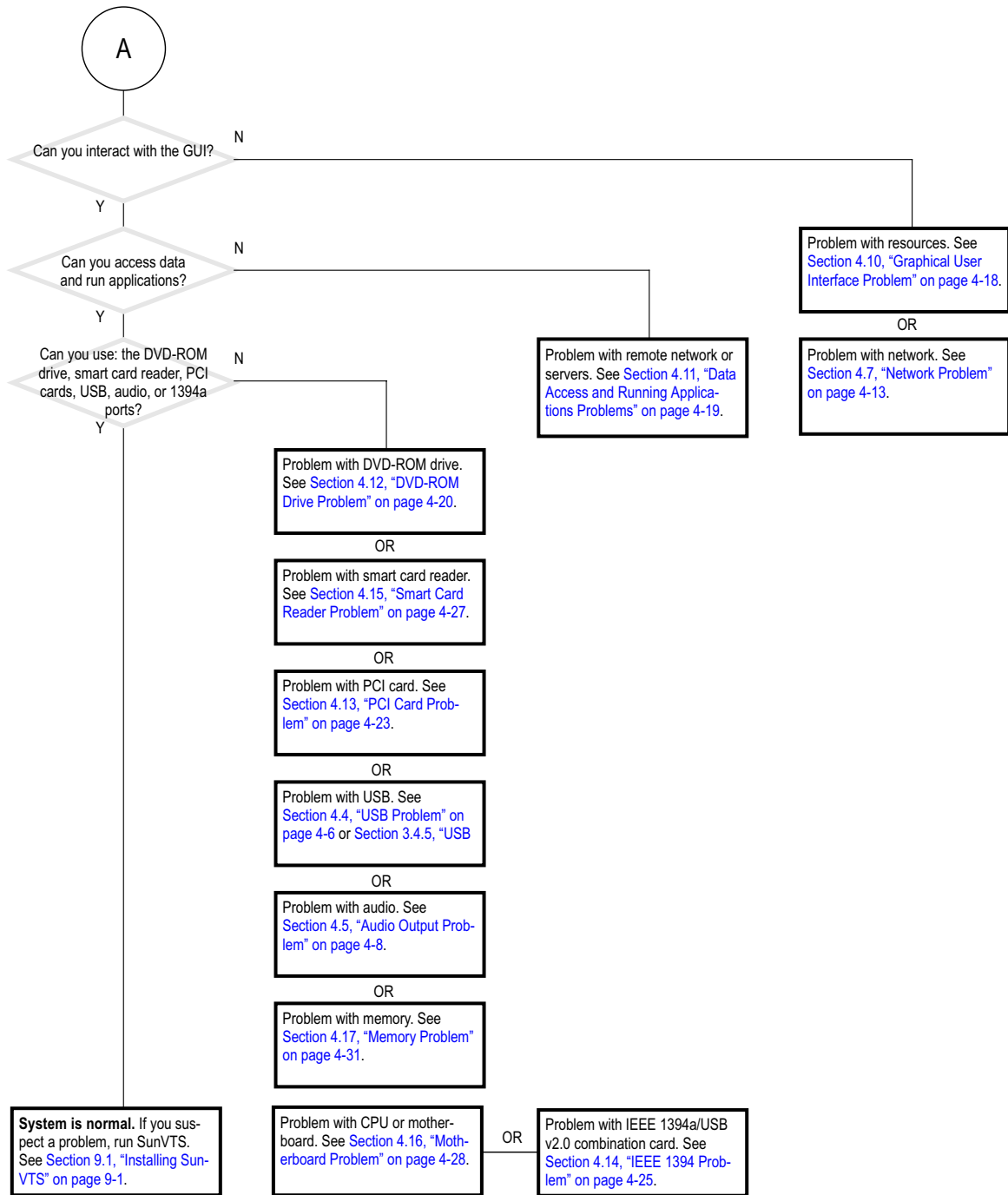


FIGURE 3-2 Power-On Flowchart (2 of 2)



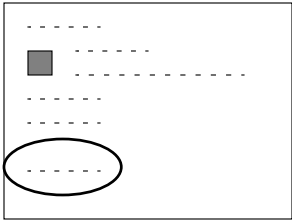
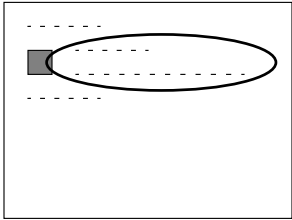
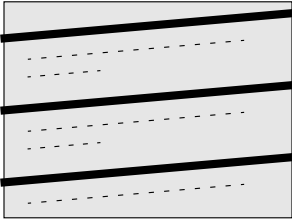
## 3.2 Display and Audio Responses

Component failures can often be diagnosed by looking at the monitor or listening to the system.

### 3.2.1 Displayed Screens

TABLE 3-1 describes what you might see on the monitor, what the images mean, and where to find assistance in this manual to resolve the problem.

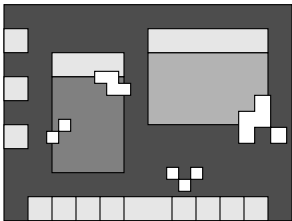
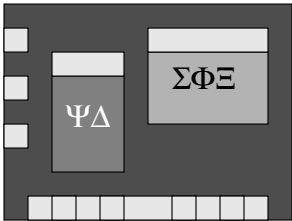
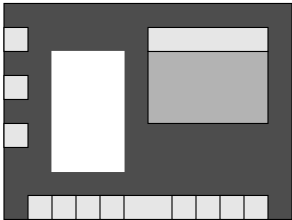

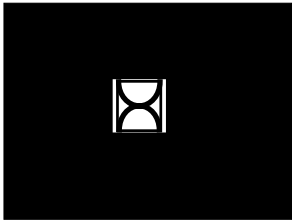
TABLE 3-1 Screen Images and What They Mean

Screen Images	Description	Meaning	Comment
	White screen with banner and text. Error message displayed.	Error from OpenBoot PROM.	See <a href="#">Section 3.3.1, "OpenBoot PROM Messages"</a> on page 3-11.
	White screen with banner and text. Information displayed in banner is incorrect.	Corruption of OpenBoot PROM. Corruption of NVRAM.	See <a href="#">Section 3.3.1, "OpenBoot PROM Messages"</a> on page 3-11. See <a href="#">Section 4.18, "NVRAM Problem"</a> on page 4-33.
	Display has flickering horizontal lines.	Monitor sync problem.	See <a href="#">Section 4.6, "Monitor Problem"</a> on page 4-10. See <a href="#">Section 4.13, "PCI Card Problem"</a> on page 4-23.

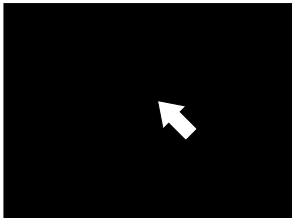
**TABLE 3-1** Screen Images and What They Mean (*Continued*)

Screen Images	Description	Meaning	Comment
	Incorrect colors or color changes	Color depth of graphics accelerator is not correct	See <a href="#">Section 3.4.1, "Colormap Flash Errors"</a> on page 3-17.
	GUI is too small, too large, or not centered.	Monitor settings or sync problem.	Adjust monitor according to monitor manual.  See <a href="#">Section 4.6, "Monitor Problem"</a> on page 4-10.  See <a href="#">Section 4.13, "PCI Card Problem"</a> on page 4-23.
	White bar with black text across GUI.	Error occurred in Solaris kernel.	See <a href="#">Section 3.3.3, "Other Displayed Messages"</a> on page 3-16.
	Error message in terminal window.	Error occurred in process started from that terminal.	See <a href="#">Section 3.3.2, "Solaris Error Messages"</a> on page 3-13.  See <a href="#">Section 3.3.3, "Other Displayed Messages"</a> on page 3-16.  See <a href="#">Section 4.10, "Graphical User Interface Problem"</a> on page 4-18.
	GUI colors are wrong.	Color registers exhausted.  Monitor problem.	Allocate more colors to GUI.  See <a href="#">Section 4.6, "Monitor Problem"</a> on page 4-10.

**TABLE 3-1** Screen Images and What They Mean (*Continued*)

Screen Images	Description	Meaning	Comment
	GUI has artifacts.	Graphics accelerator problem.	See <a href="#">Section 4.13, "PCI Card Problem"</a> on page 4-23.
	GUI is in wrong language.	Locale (language) problem.	<ol style="list-style-type: none"> <li>1. Log out.</li> <li>2. At the login GUI Options pull down, select Language.</li> <li>3. Select your language.</li> <li>4. Log in as usual.</li> </ol>
	Window in GUI is completely white.	Window process is hung.	See <a href="#">Section 4.10, "Graphical User Interface Problem"</a> on page 4-18.
	Display is all one color.	Monitor problem. <hr/> Graphics accelerator problem. <hr/> NVRAM problem.	See <a href="#">Section 4.6, "Monitor Problem"</a> on page 4-10. <hr/> See <a href="#">Section 4.13, "PCI Card Problem"</a> on page 4-23. <hr/> See <a href="#">Section 4.18, "NVRAM Problem"</a> on page 4-33.
	Display is black with hourglass.	Network problem. <hr/> dtlogin problem.	See <a href="#">Section 4.1, "Power Problem"</a> on page 4-2. <hr/> See <a href="#">Section 4.9, "Login Problem"</a> on page 4-16.

**TABLE 3-1** Screen Images and What They Mean (*Continued*)

Screen Images	Description	Meaning	Comment
	Display is black with mouse pointer.	Network problem.	See <a href="#">Section 4.7, “Network Problem”</a> on page 4-13.
		dtlogin problem.	See <a href="#">Section 4.9, “Login Problem”</a> on page 4-16.

## 3.2.2 Audio Responses

[TABLE 3-2](#) describes what sounds you might hear from different areas of the system, what the sounds mean, and where to find assistance in this manual to resolve the problem.

**TABLE 3-2** System Sounds at Locations and What They Mean

Location	Sound	Meaning	Comment
System	Silence	Power delivery problem.	See <a href="#">Section 4.1, “Power Problem”</a> on page 4-2.
Monitor	Ticking	Monitor is searching for video mode or trying to synchronize with the graphics accelerator.	See <a href="#">Section 4.6, “Monitor Problem”</a> on page 4-10. See <a href="#">Section 4.13, “PCI Card Problem”</a> on page 4-23.
	Very high-pitched whine	Monitor cannot synchronize with the graphics accelerator.	See <a href="#">Section 4.6, “Monitor Problem”</a> on page 4-10. See <a href="#">Section 4.13, “PCI Card Problem”</a> on page 4-23.
Monitor or power supply	Low-pitched buzz	Power supply degraded.	Replace the power supply. See <a href="#">Section 13.1, “Replacing the Power Supply”</a> on page 13-2.
		Monitor power supply degraded.	Replace the monitor.

**TABLE 3-2** System Sounds at Locations and What They Mean

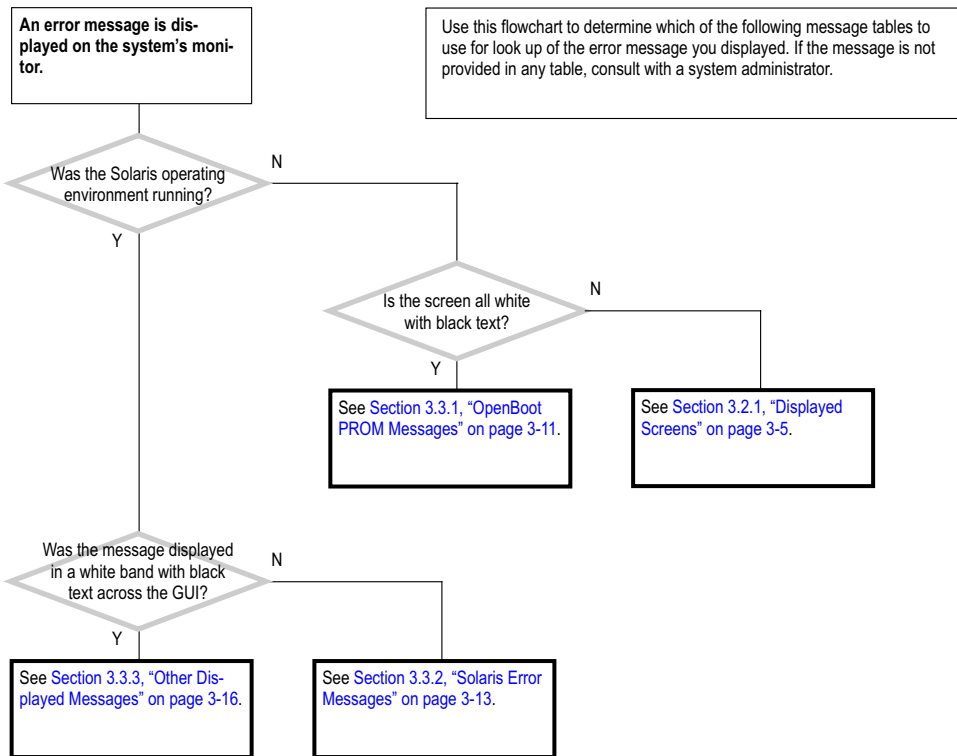
Location	Sound	Meaning	Comment
Front of system chassis	Upon power on, three beeps and the system powers off	Invalid configuration. Memory or CPU does not match requirements.	See <a href="#">Section 4.17, “Memory Problem”</a> on page 4-31 or <a href="#">Section 4.16, “Motherboard Problem”</a> on page 4-28.
	Upon power on, four beeps and the system powers off	FRUID checksum error.	Reset FRUID. Use Stop N equivalent procedure. See <a href="#">Section 6.3, “Stop-N Equivalent Command Procedure”</a> on page 6-9. Replace motherboard. See <a href="#">Section 11.6, “Replacing the Motherboard”</a> on page 11-41.
	Upon power on, five beeps and the system powers off	Internal reset failed.	See <a href="#">Section 4.16, “Motherboard Problem”</a> on page 4-28.
	Continuous beeping	Keyboard key is stuck or connection is bad.	See <a href="#">Section 4.8, “Keyboard Problem”</a> on page 4-15.
	Quiet scratching	Hard disk heads are moving.	Hard drive is normal.
	High-pitched humming	Hard disk bearings are failing.	Replace the hard drive. See <a href="#">Section 12.1, “Replacing a Hard Drive”</a> on page 12-2.
Front or back of system chassis	Low shrill sound	Front fan bearing is failing.	Replace front fan. See <a href="#">Section 13.2, “Replacing the Front Fan”</a> on page 13-11.
		Rear fan bearing is failing.	Replace rear fan. See <a href="#">Section 13.3, “Replacing the Rear Fan”</a> on page 13-16.
		Power supply fan bearing is failing.	Replace the power supply. See <a href="#">Section 13.2, “Replacing the Front Fan”</a> on page 13-11.

**TABLE 3-2** System Sounds at Locations and What They Mean

Location	Sound	Meaning	Comment
	Quiet rumbling sound	Temperature is such that fans are barely turning.	Fans are normal.
	Silence from fans	Front fan is not spinning. Rear fan is not spinning.	See <a href="#">Section 4.3, "System Fan Problem"</a> on page 4-5.
		Power supply fan is not spinning.	See <a href="#">Section 4.1, "Power Problem"</a> on page 4-2.
DVD-ROM	Repetitive quiet clunking	Disc is unbalanced.	Reposition disc.
	Rapid shifting	Laser pickup head is moving.	DVD-ROM drive normal
	Rushing air that is constant or intermittently changes	Disc is spinning properly.	DVD-ROM drive normal
	Rushing air that is constantly changing	Laser pickup head cannot locate tracks on disc.	Try a different disc. If the problem continues, see <a href="#">Section 4.12, "DVD-ROM Drive Problem"</a> on page 4-20.
	Very high-pitched squeaking	Laser pickup head is out of alignment.	Try a different disc. If the problem continues, replace DVD-ROM drive. See <a href="#">Section 12.2, "Replacing a DVD-ROM Drive"</a> on page 12-8.

### 3.3 Displayed Messages

When a failure occurs, a message might be displayed on the system's monitor. Use the following flowchart to determine which message table addresses the error message you see.



**FIGURE 3-3** Displayed Messages Flowchart

## 3.3.1 OpenBoot PROM Messages

**TABLE 3-3** lists some common fault messages or portions of fault messages displayed by the OpenBoot PROM, their meanings, and what to do next.

**TABLE 3-3** OpenBoot PROM Messages and Their Meaning

Message	Meaning	What to Do
The date is displayed as 01/01/2000 00:00:00 GMT	The battery has drained.	Replace the battery. See <a href="#">Section 11.3, "Replacing the Battery"</a> on page 11-23.

**TABLE 3-3** OpenBoot PROM Messages and Their Meaning

Message	Meaning	What to Do
Can't open boot device	The device specified for boot is unavailable.	<ul style="list-style-type: none"> <li>For hard drive, check internal connections. Drive might be corrupted. See <a href="#">Section 4.3, "System Fan Problem"</a> on page 4-5.</li> <li>For DVD-ROM drive, check that disc is bootable. Check internal connections. See <a href="#">Section 4.12, "DVD-ROM Drive Problem"</a> on page 4-20.</li> <li>For network, check network connections. Check boot server. See <a href="#">Section 4.7, "Network Problem"</a> on page 4-13.</li> </ul>
Can't run OBDIAG from the device tree node or with the active instance	Attempt to run OpenBoot Diagnostics from a selected device node.	Type: <b>unselect-dev</b>
NOTICE - CPU <i>x</i> Bank <i>y</i> DIMMs are from different vendors.	A pair of DIMMs are each from different manufacturers.	Install DIMMs in identical pairs. See <a href="#">Section 11.1, "Replacing DIMMs"</a> on page 11-2.
NOTICE - CPU <i>x</i> Bank <i>y</i> DIMMs have different architectures and will not be used.	A pair of DIMMs are each of different architectures. The DIMMs are not used.	Install DIMMs in identical pairs. See <a href="#">Section 11.1, "Replacing DIMMs"</a> on page 11-2.
Searching for self-test methods . . . . Rejecting alloc-mem!	OpenBoot Diagnostics failed to start. Some devices might be tied to other processes.	Type: <b>unselect-dev</b>
Starting XV-500 self-test	Sun XVR-1200 PROM error	Verify the type of graphics accelerator installed in the workstation. See <a href="#">Section 3.4.4, "Sun XVR-1200 Graphics Accelerator PROM Diagnostics Error"</a> on page 3-20.
The process "cs00.sh" has been exited with retcode#256	The battery has drained.	Replace the battery. See <a href="#">Section 11.3, "Replacing the Battery"</a> on page 11-23.



**TABLE 3-3** OpenBoot PROM Messages and Their Meaning

Message	Meaning	What to Do
Time out waiting for ARP/RARP packet	Network connection problem.	Check network connection. See <a href="#">Section 4.7, “Network Problem”</a> on page 4-13.
/usr/bin/ps/getexecname () has failed	The battery has drained.	Replace the battery. See <a href="#">Section 11.3, “Replacing the Battery”</a> on page 11-23.
WARNING: Timed out waiting for NIS to come up	The name service cannot be found.	Check network connection. See <a href="#">Section 4.7, “Network Problem”</a> on page 4-13. Check system name service configuration information.

## 3.3.2 Solaris Error Messages

[TABLE 3-4](#) lists some common error messages or portions of error messages displayed while the Solaris operating environment is functioning, their meanings, and what to do next. These messages are high-level and might be related to operating environment software, rather than hardware failure.

**TABLE 3-4** Solaris Error Messages and Their Meanings

Message	Meaning	What to Do
Arguments too long	Too many arguments follow a C shell command.	Run the command in the Bourne shell.
automountd[int]: server <i>hostname</i> not responding	An NFS server cannot be mounted.	Check the NFS server’s status and network connection.
Bad address	The value of an address is invalid.	Determine and use the correct address.
Bad file number	A program error where the application does not have permission to interact with the file.	Program bug, or change permissions of the file.
BAD TRAP	Faulty hardware or mismatch of hardware and its configuration. Can sometimes indicate a bad or earlier version CPU. Usually precedes a panic.	Check configuration. Check hardware functionality.
Broken pipe	Occurs when a pipe ( ) directs without data.	Check the structure of the command.

**TABLE 3-4** Solaris Error Messages and Their Meanings (*Continued*)

Message	Meaning	What to Do
Bus error	I/O was attempted on a nonexistent device. Might be caused by invalid file descriptors, bad memory allocation, or corrupt boot blocks.	Check for device and its connection.
Command not found	The C shell could not find the command you typed.	Check the command path. Type the command explicitly.
Connection closed (by foreign host)	Time out has occurred or network connection failed from remote host using either <code>rlogin</code> or <code>telnet</code> .	Try again. Check network connection.
Connection refused	Remote host actively refused connection or network security policy was violated.	Try issuing <code>xhost</code> on the local host.
Connection reset by peer	Connection timed out.	Try again.
Device busy	Device is already mounted or there was an attempt to unmount a device while a file was in use. Typically seen when ejecting an optical media disc.	Close all files and quit all applications from that mount point. If it is an optical media disc, stop the volume manager.
Error Host Unknown	Name services have not been set up correctly or an alias is missing from NS maps.	Reconfigure name services or update NS maps.
Exec format error	Software is not compatible with platform. File is not an executable, though identified as such.	Check that the Binary Compatibility Package is installed. Check that the file is truly executable.
File descriptor in bad state	Permissions on file prevent reading	Check and reset file permissions.
File exists	An attempt to overwrite a file occurred.	Rename or remove the existing file.
File name too long	A file name was greater than 256 characters, or a path name was over 1024 characters.	If more characters are required, edit the <code>/usr/include/limits.h</code> file.
giving up	An action has been retried until it has timed out. Can occur when synchronizing SCSI hard drive file systems.	Check cabling to suspect hardware. Check hardware driver.
Illegal Instruction	Application for a different platform was run, there is too little swap space available, or a data file was run as an executable.	Verify the compatibility of the software. Check swap space. Set correct permissions for the file.
Illegal seek	Misuse of the pipe ( <code> </code> ).	Direct the output to a file, then use the file as input.

**TABLE 3-4** Solaris Error Messages and Their Meanings (*Continued*)

Message	Meaning	What to Do
INIT: Cannot create /var/adm/utmpx	The root file system has been mounted as read only, or has become corrupted.	Run <code>fsck</code> on the root file system. If unsuccessful, replace the root file system.
Invalid argument	An invalid parameter was specified that the system cannot interpret.	Check that the actions you are taking make logical sense. For example, don't mount a nonexistent file system.
Invalid null command	Typographical error when using the pipe ( <code> </code> ). For example, a double pipe or no command following a pipe.	Check the format of the command.
I/O error	Hardware error has occurred on storage device.	Check device media. If a hard drive, run <code>fsck</code> .
process killed	Lack of swap space or stack size is too large.	Check swap space. Set stack size to 8192.
ld.so.1	Runtime linker could not find file or symbol. Swap space has been diminished by rogue program. Memory leak.	Check for missing file. Reboot system.
No carrier	Network connection faulty.	Check network connection. See <a href="#">Section 4.7, "Network Problem"</a> on page 4-13.
Network is down	Network connection faulty.	Check network connection. See <a href="#">Section 4.7, "Network Problem"</a> on page 4-13.
Network is unreachable	There is no route to network, or gateways are refusing packets.	Check network security.
NFS read failed for server	File-sharing permissions changed while the file was open.	Close the file and reset the permissions.
NFS server not responding still trying	NFS server is down or slow to respond. NFS server network connection might be down.	Check resource load and network connection of NFS server.
No child process	Application is trying to communicate with subprocess that does not exist.	Restart the parent process.
No default media available	No removable media exists or volume manager is confused.	Insert media or update the volume manager with the <code>volcheck</code> command.
No such device	Device does not exist.	Check hardware connections of suspect device.

**TABLE 3-4** Solaris Error Messages and Their Meanings (*Continued*)

Message	Meaning	What to Do
No utmpx entry	File system is full.	In single-user mode, zero-out the <code>/var/adm/utmp</code> and <code>/var/adm/utmpx</code> files. Bring system up and clean out large files starting in the <code>/var</code> directory.
Not on system console	Security is set so that superuser logins occur only at the console.	Comment out the <code>CONSOLE</code> line in the <code>/etc/default/login</code> file. This action compromises security.
Package not installed	A software package is missing.	Install the package.
RPC: program not registered	Corruption of the <code>rpc.bynumber</code> NIS map.	Check the <code>rpc.bynumber</code> NIS map.
Segmentation fault	A programming error.	The command file <code>core</code> returns the application that caused the fault.
Stale NFS file handle	A file or directory opened by a NFS client was removed from or permissions changed on the NFS server.	Reboot the NFS client.

### 3.3.3 Other Displayed Messages

[TABLE 3-5](#) lists portions of fault messages that might also be displayed while the Solaris software is functioning, their meanings, and what to do next. These messages are mostly related to hardware failures.

**TABLE 3-5** Other Messages and Their Meaning

Message	Meaning	What to Do
Panic in kernel	The Solaris kernel can no longer continue to run. Usually proceeds a core dump.	Message might identify hardware that is at fault. Check memory. See <a href="#">Section 4.17, “Memory Problem”</a> on page 4-31.
xntpd[356]: too many recvbufs allocated (30)	Problem with network time protocol daemon.	Check network. See <a href="#">Section 4.7, “Network Problem”</a> on page 4-13. Check time server. Contact system administrator.

**TABLE 3-5** Other Messages and Their Meaning (*Continued*)

Message	Meaning	What to Do
metainit:hostname: there are no existing databases	The Solstice Disk Suite software is installed, but not configured.	Not a problem. Message can be ignored.
WARNING: time out: reset target chno = 0 targ = 0 WARNING: time out: reset bus chno = 0 targ = 0	Hard drive is not responding to resets. For this example, it is HDD0	Check hard drive and connections. See <a href="#">Section 4.2, “Hard Drive Problem” on page 4-4</a> .
Bad magic number in disk label Can't open disk label package	Partitions are corrupted on hard drive.	Repartition and format hard drive. See Solaris documentation.
starting rpc services: rpcbin keyser	Network problem.	Check network. See <a href="#">Section 4.7, “Network Problem” on page 4-13</a> . Check time server.

## 3.4 Other Errors

### 3.4.1 Colormap Flash Errors

The Sun Blade 2500 workstation ships with its Sun XVR-100 graphics accelerator configured to 24-bit color depth.

If you experience colormap flashing (incorrect colors or color changes) when moving your cursor from window to window, your graphics accelerator might be incorrectly configured. If colormap flashing occurs, perform one of the following procedures to configure your Sun XVR-100 to 24-bit or to 8+24-bit color depth.

#### 3.4.1.1 Setting the `-depth 24` Color Depth

1. Using the `fbconfig` command, type:

```
% fbconfig -dev pfb0 -depth 24
```

2. Log out, then log back in for the change to take effect.

---

**Note** – 24-bit color depth performance might be slower than 8-bit color depth performance.

---

### 3.4.1.2 Setting the 8+24-bit Color Depth

If both 8-bit and 24-bit graphics are to be run simultaneously (8+24-bit color depth), Sun XVR-100 graphics accelerator patch 114537-19 or later must first be installed.

**1. As superuser, download and install patch 114537-19 or later.**

a. Go to the Sun web site <http://sunsolve.sun.com>

b. Select the Patchfinder link.

c. Enter patch ID 114537 and select the Find Patch link.

d. Download the patch.

e. Unzip the patch.

For example:

```
# unzip 114537-19.zip
```

f. Install the patch.

For example:

```
# patchadd 114537-19
```

g. Reboot the system after installing the patch by typing:

```
# reboot -- -r
```

**2. Using the fbconfig command, set the Sun XVR-100 graphics accelerator to 8+24-bit color depth.**

```
% fbconfig -dev pfb0 -fake8 enable
```

---

**Note** – Do not invoke the either of the following commands `fbconfig -dev pfb0a -fake8 enable` or `fbconfig -dev pfb0b -fake8 enable` if patch 114537-19 is not installed, when configuring dual monitors to a single Sun XVR-100 graphics accelerator.

---

---

**Note** – The command `fbconfig -dev pfb0 -fake8 disable` turns off 8+24-bit color depth.

---

3. Log out, then log back in for the change to take affect.

8-bit depth performance is slower in 8+24-bit color depth mode.

## 3.4.2 Fibre Channel Error

The Sun Blade 2500 does not support fibre channel. However, the following message might appear in the `/var/adm/messages` file:

```
WARNING: fcs: _init: Transport Layer driver 'fp' load failed
```

If this message appears, no action is necessary, and you can ignore this message.

## 3.4.3 SunPCi III Reboot Failure

If the Sun Blade 2500 workstation is configured with a SunPCi™ III coprocessor, the following message might appear on the console during boot, or in the `/var/adm/messages` file:

```
Hardware Reboot: X86 failed to respond
```

If this message appears, no action is necessary, and you can ignore this message.

## 3.4.4 Sun XVR-1200 Graphics Accelerator PROM Diagnostics Error

When a Sun XVR-1200 graphics accelerator with PROM v1.10 or earlier installed executes its self-test, the graphics accelerator incorrectly identifies itself to the motherboard as a Sun XV-500 graphics accelerator. For example:

```
ok test screen
Testing screen
Starting XV-500 Selftest
```

---

**Note** – This diagnostic error does not affect the operation of the accelerator or workstation.

---

### 3.4.4.1 Verifying That a Sun XVR-1200 Graphics Accelerator Is Installed

There are several methods for verifying that a Sun XVR-1200 graphics accelerator is installed on your workstation. Two of these methods are described below.

- At the `ok` prompt, type the **show-devs** command and look for the following text in the OpenBoot™ PROM output:

```
/pci@1f, 700000/SUNW,XVR-1200@3
```

---

**Note** – The Sun Blade 2500 workstation can support up to two Sun XVR-1200 graphic accelerators. Your OpenBoot PROM output text might vary to account for the location of the graphics accelerator in your workstation.

---

- At the shell prompt (from a terminal window), type: **/usr/platform/sun4u/sbin/prtdiag** and look for the following text in the output:

```
0 pci 66 3 SUNW,XVR-1200 (display) SUNW,375-3101
```

The text `XVR-1200` confirms that a Sun XVR-1200 graphics accelerator is installed.



---

**Note** – You can verify installation of the Sun XVR-100, Sun XVR-500, or Sun XVR-600 graphics accelerators by using the **show-devs** command or at the shell prompt by typing: **/usr/platform/sun4u/sbin/prtdiag**

---

For additional information see: “Checking Device Configuration” in the *Sun XVR-1200 Graphics Accelerator Installation and User’s Guide*, 816-7386.

## 3.4.5 USB 2.0 Port Errors

If a known good USB device appears inoperable when attached to the IEEE 1394a/USB 2.0 combination card, try the following procedure to resolve the problem.

---

**Note** – Verify that your 1394a/USB 2.0 device is Solaris™ Ready certified or SPARC® verified before performing the following procedure. Get additional information at: [http://www.sun.com/io\\_technologies/USB.html](http://www.sun.com/io_technologies/USB.html)

---

### 3.4.5.1 Resolving a Nonfunctional USB 2.0 Port

1. **Move the USB connection to a different port on the combination card.**

If this does not resolve the problem, continue to Step 2.

---

**Note** – Do not use either a keyboard or mouse as a known good device.

---

2. **Reboot the workstation.**

If this does not resolve the problem, continue to Step 3.

3. **Check the `/var/adm/messages` file for the following text:**

```
ohci_handle_port_power:text that identifies port and address
```

or

```
ehci_handle_port_power:text that identifies port and address
```

---

**Note** – Use the `vi` editor or the `cat`, `more`, `head`, or `tail` commands to view the `/var/adm/messages` file.

---

- a. If either of the text examples appears in the `/var/adm/messages` file, install patch 109896-17 or later.
  - b. If this patch is unavailable, contact Sun Technical Support at:  
<http://www.sun.com/service/contacting>
  - c. If this does not resolve the problem, continue to Step 4.
4. Troubleshoot the problem.

See “4.4 USB Problem” in Chapter 4 of the *Sun Blade 2500 Service, Diagnostics, and Troubleshooting Manual*, 816-0996.

---

## 3.5 Troubleshooting Commands

The section discusses superuser commands that assist in troubleshooting problems with the Sun Blade 2500 system. Commands discussed are:

- Section 3.5.1, “`iostat` Command” on page 3-22
- Section 3.5.2, “`prtdiag` Command” on page 3-25
- Section 3.5.3, “`prtconf` Command” on page 3-34
- Section 3.5.4, “`netstat` Command” on page 3-36
- Section 3.5.5, “`ping` Command” on page 3-37
- Section 3.5.6, “`ps` Command” on page 3-39
- Section 3.5.7, “`prstat` Command” on page 3-41

Most of these commands are located in the `/usr/bin` or `/usr/sbin` directories.

### 3.5.1 `iostat` Command

The `iostat` command iteratively reports terminal, disk, and tape I/O activity, as well as CPU utilization.

### 3.5.1.1 Options

TABLE 3-6 describes options for the `iostat` command and how those options can help troubleshoot the Sun Blade 2500 system.

TABLE 3-6 Options for `iostat`

Option	Description	How It Can Help
No option	Reports status of local I/O devices.	A quick three-line output of device status.
-c	Reports the percentage of time the system has spent in user mode, in system mode, waiting for I/O, and idling.	Quick report of CPU status.
-e	Displays device error summary statistics. The total errors, hard errors, soft errors, and transport errors are displayed.	Provides a short table with accumulated errors. Identifies suspect I/O devices.
-E	Displays all device error statistics.	Provides information about devices: manufacturer, model number, serial number, size, and errors.
-n	Displays names in descriptive format.	Descriptive format helps identify devices.
-x	For each disk, reports extended disk statistics. The output is in tabular form.	Similar to the <code>-e</code> option, but provides rate information. This will help identify poor performance of internal devices and other I/O devices across the network.

### 3.5.1.2 Examples

The following examples show sample output for the `iostat` command and its options.

■ `iostat`

```
# iostat
      tty          sd0          sd1          sd60          nsf1          cpu
tin tout kps tps serv kps tps serv kps tps serv kps tps serv us sy wt id
0      4    3383 39  0    0    0  0    0    0  0    0    0  0    2  4  9  4
```

■ iostat -c

```
# iostat -c
cpu
us sy wt id
0  2  4 95
```

■ iostat -e

```
# iostat -e
---- errors ---
device s/w h/w trn tot
sd0      0  0  0  0
sd1      0  0  0  0
sd60     0  2  0  2
```

■ iostat -x

```
# iostat -x
extended device statistics
device  r/s    w/s    kr/s    kw/s    wait    actv    svc_t    %w    %b
sd0     25.9   1.3    266.1   8.8     0.0     0.2     8.7     0     7
sd1     0.0    0.0    0.0     0.0     0.0     0.0     0.0     0     0
sd60    0.0    0.0    0.0     0.0     0.0     0.0     0.0     0     0
nsf1    0.0    0.0    0.0     0.0     0.0     0.0     0.0     0     0
```

■ `iostat -En`

```
# iostat -En
c0t0d0          Soft Errors: 0 Hard Errors: 0 Transport Errors: 0
Vendor: Seagate Model: ST336607LSUN36G Revision: 0207 Serial No:
3JA0BG8T00002317
Size: 36.42GB <36418595328 bytes>
Media Error: 0 Device Not Ready: 0 No Device: 0 Recoverable: 0
Illegal Request: 0 Predictive Failure Analysis: 0
c0t1d0          Soft Errors: 0 Hard Errors: 2 Transport Errors: 0
Vendor: Seagate Product: ST336605LSUN36G Revision: 0238 Serial No:
3FP1441M00007230 Size: 36.42GB <3641859328 bytes>
Media Error: 0 Device Not Ready: 0No Device: 0 Recoverable: 0
Illegal Request: 0 Predictive Failure Analysis: 0
c1t2d0 Soft Errors: Hard Errors: 2 Transport Errors: 0
Vendor: JLMS Product XJ-HD166S Revision: D354 Serial No:
Size: 18446744073.71GB <-1 byte>
Media Error: 0 Device Not Ready: 2 No Device: 0 Recoverable: 0
Illegal Request: 0 Predictive Failure Analysis: 0
```

---

**Note** – For additional information about `iostat` and other Solaris operating environment commands see the man pages.

---

## 3.5.2 `prtdiag` Command

The `prtdiag` command displays configuration and diagnostic information for a system. The diagnostic information identifies any failed component in the system.

The `prtdiag` command is located in the `/usr/platform/platform-name/sbin/` directory.

## 3.5.2.1 Options

[TABLE 3-7](#) describes options for the `prtdiag` command and how those options can help troubleshoot the Sun Blade 2500 system.

**TABLE 3-7** Options for `prtdiag`

Option	Description	How It Can Help
No option	Lists system components.	Identifies CPU timing and PCI cards installed.
-v	Verbose mode. Displays the time of the most recent AC power failure, the most recent hardware fatal error information, and (if applicable) environmental status.	Provides the same information as no option. Additionally lists ASIC and PROM revisions.

## 3.5.2.2 Examples

The following is sample output for the `prtdiag` command and its options:

**CODE EXAMPLE 8** Troubleshooting Command—prtdiag

```
# /usr/platform/SUNW,Sun-Blade-2500/sbin/prtdiag
System Configuration: Sun Microsystems sun4u Sun Blade 2500
System clock frequency: 160 MHz
Memory size: 8GB

===== CPUs =====
CPU      Freq      E$      CPU      CPU      Temperature
----      ---      ---      ---      ---      ---
0        1280     1MB     US-IIIi   2.4     63C     21C
1        1280     1MB     US-IIIi   2.4     72C     21C

===== IO Devices =====
Brd      Bus#     Freq
----      ---     ---
Type     MHz     Slot      Name
-----
0        PCI     33        0      Network-pci08e, abba.11 (net+
0        PCI     33        0      pci08e, 1000-pci108e,100.1
0        PCI     33        0      SUNW,qfe-pci108e,1001 (netwo+
0        PCI     33        1      network-pci108e,abba.11 (net+
0        PCI     33        1      pci108e,1000-pci108e,1001
0        PCI     33        1      SUNW,qfe-pci108e,1001 (netwo+
0        PCI     33        2      scsi-pci1000,b.7 (scsi-2)
0        PCI     33        2      scsi-pci1000,b.7 (scsi-2)
0        PCI     33        2      pci108e,1000-pci108,1000.1
0        PCI     33        2      SUNW,qfe-pci108,1001 (netwo+
0        PCI     66        2      SUNW,XVR-500(display)
0        PCI     66        3      network-pci14e4,1647.14e4.16+
0        PCI     33        3      pci108e,1000-pci108e,1000.1
0        PCI     33        3      SUNW,qfe-pci108e,1001(netwo+
0        PCI     33        4      scsi-pci 1000,21.1000.1000.1+
0        PCI     33        4      scsi-pci 1000,21.1000.1000.1+
0        PCI     33        7      isa/serial-su16550(serial)
0        PCI     33        7      isa/serial-su16550(serial)
0        PCI     33        7      isa/dma-isadma(dma)
0        PCI     33        8      usb-pci1033,35.1235.35.1043+
0        PCI     33        8      usb-pci1033,35.1235.35.1043+
0        PCI     33        8      usb-pci1033,e0.1235.e0.2004+
0        PCI     33        8      sound-pci10b9.5451.10b9.5451+
0        PCI     33        10     usb-pci10b9,5237.3(usb)
0        PCI     33        11     firewire-pci104c,8024.1235.8+
0        PCI     33        11     usb-pci10b9,5237.3(usb)
0        PCI     33        11     usb-pci10b9,5229.3(usb)
0        PCI     33        13     ide-pci10b9,5229c4(ide)
```

**CODE EXAMPLE 8** Troubleshooting Command—prtdiag (Continued)

```

===== Memory Configuration =====
Segment Table:
-----
Base          Address Size          Interleave Factor          Contains
0x0           4GB                   16                         BankIDs0,1,2,3,4,5,6,7,
                               8,9,10,11,12,13,14,15
0x1000000000  4GB                   16                         16,17,18,19,20,21,22,23,
                               24,25,26,27,28,29,30,31

Bank Table
-----
          Physical Controller
ID        Controller ID Group ID    Size          Interleave Way
-----
0          0          0          256MB         0,1,2,3,4,5,6,7,9,10,
                               11,12,13,14,15
1          0          0          256MB
2          0          1          256MB
3          0          1          256MB
4          0          1          256MB
5          0          0          256MB
6          0          1          256MB
7          0          1          256MB
8          0          1          256MB
9          0          1          256MB
10         0          0          256MB
11         0          0          256MB
12         0          0          256MB
13         0          1          256MB
14         0          0          256MB
15         0          0          256MB
16         1          0          256MB         16,17,18,19,20,21,22,23,
17         1          0          256MB         24,25,26,27,28,29,30,31
18         1          1          256MB
19         1          1          256MB
20         1          0          256MB
21         1          0          256MB
22         1          1          256MB
23         1          1          256MB
24         1          1          256MB
25         1          1          256MB
26         1          0          256MB
27         1          0          256MB
28         1          1          256MB
29         1          1          256MB
30         1          0          256MB
31         1          0          256MB

```



**CODE EXAMPLE 8** Troubleshooting Command—`prtdiag` (Continued)

```
Memory Module Groups:
-----
Controller ID      Group ID          Size             Labels
    0              0                2GB             DIMM0, DIMM1
    0              1                2GB             DIMM2, DIMM3

Memory Module Groups:
-----
Controller ID      Group ID          Size             Labels
-----
    1              0                2GB             DIMM4, DIMM5
    1              1                2GB             DIMM6, DIMM7

===== usb Devices =====
Name              Port#
-----
Keyboard          1
Mouse             2
```

---

**Note** – For additional information about `prtdiag` and other Solaris operating environment commands see the appropriate man pages.

---

**CODE EXAMPLE 9** Troubleshooting Command—prtdiag -v

```
# /usr/platform/SUNW,Sun-Blade-2500/sbin/prtdiag -v
System Configuration: Sun Microsystems sun4u Sun Blade 2500
System clock frequency: 160 MHz
Memory size: 8GB

===== CPUs =====
CPU      E$      CPU      CPU      Temperature
CPU      Freq    Size    Impl.    Mask     Die     Ambient
---      ---     ---     ---     ---     ---     ---
0        1280    1MB     US-IIIi  2.4     63C    21C
1        1280    1MB     US-IIIi  2.4     72C    21C

===== IO Devices =====
Brd      Bus#   Freq
Type     MHz    Slot    Name                                     Model
---      ---    ---     ---     -----
0        PCI    33      0        Network-pci08e, abba.11 (net+         SUNW,pci-ce
0        PCI    33      0        pci108e, 1000-pci108e,100.1
0        PCI    33      0        SUNW,qfe-pci108e,1001 (netwo+       SunNW,pci-qfe
0        PCI    33      1        network-pci108e,abba.11 (net+       SUNw,pci-ce
0        PCI    33      1        pci108e,1000-pci108e,1001
0        PCI    33      1        SUNW,qfe-pci108e,1001 (netwo+       SUNW, pci-qfe
0        PCI    33      2        scsi-pci1000,b.7 (scsi-2)
0        PCI    33      2        scsi-pci1000,b.7 (scsi-2)
0        PCI    33      2        pci108e,1000-pci108,1000.1
0        PCI    33      2        SUNW,qfe-pci108,1001 (netwo+       Sun,pci-qfe
0        PCI    66      2        SUNW,XVR-500(display)               SUNW,375-3069
0        PCI    66      3        network-pci14e4,1647.14e4.16+
0        PCI    33      3        pci108e,1000-pci108e,1000.1
0        PCI    33      3        SUNW,qfe-pci108e,1001(netwo+       SUNW,pci-qfe
0        PCI    33      4        scsi-pci 1000,21.1000.1000.1+
0        PCI    33      4        scsi-pci 1000,21.1000.1000.1+
0        PCI    33      7        isa/serial-su16550(serial)
0        PCI    33      7        isa/serial-su16550(serial)
0        PCI    33      7        isa/dma-isadma(dma)
0        PCI    33      8        usb-pci1033,35.1235.35.1043+
0        PCI    33      8        usb-pci1033,35.1235.35.1043+
0        PCI    33      8        usb-pci1033,e0.1235.e0.2004+
0        PCI    33      8        sound-pci10b9.5451.10b9.5451+
0        PCI    33      10       usb-pci10b9,5237.3(usb)
0        PCI    33      11       firewire-pci104c,8024.1235.8+
0        PCI    33      11       usb-pci10b9,5237.3(usb)
0        PCI    33      11       usb-pci10b9,5229.3(usb)
0        PCI    33      13       ide-pci10b9,5229c4(ide)
```

**CODE EXAMPLE 9** Troubleshooting Command—prtdiag -v (Continued)

```

===== Memory Configuration =====
Segment Table:
-----
Base           Address Size           Interleave Factor           Contains
0x0            4GB                    16                          BankIDs0,1,2,3,4,5,6,7,
                               8,9,10,11,12,13,14,15
0x1000000000  4GB                    16                          16,17,18,19,20,21,22,23,
                               24,25,26,27,28,29,30,31

Bank Table
-----
Physical Controller
ID            Controller ID Group ID           Size           Interleave Way
-----
0             0             0             256MB          0,1,2,3,4,5,6,7,9,10,
                               11,12,13,14,15
1             0             0             256MB
2             0             1             256MB
3             0             1             256MB
4             0             0             256MB
5             0             0             256MB
6             0             1             256MB
7             0             1             256MB
8             0             1             256MB
9             0             1             256MB
10            0             0             256MB
11            0             0             256MB
12            0             0             256MB
13            0             1             256MB
14            0             0             256MB
15            0             0             256MB
16            1             0             256MB          16,17,18,19,20,21,22,23,
17            1             0             256MB          24,25,26,27,28,29,30,31
18            1             1             256MB
19            1             1             256MB
20            1             0             256MB
21            1             0             256MB
22            1             1             256MB
23            1             1             256MB
24            1             1             256MB
25            1             1             256MB
26            1             0             256MB
27            1             0             256MB
28            1             1             256MB
29            1             1             256MB
30            1             0             256MB
31            1             0             256MB

```

**CODE EXAMPLE 9** Troubleshooting Command—prtdiag -v (Continued)

```
Memory Module Groups:
-----
Controller ID      Group ID      Size      Labels
-----
          0          0          2GB      DIMM0, DIMM1
          0          1          2GB      DIMM2, DIMM3

Memory Module Groups:
-----
Controller ID      Group ID      Size      Labels
-----
          1          0          2GB      DIMM4, DIMM5
          1          1          2GB      DIMM6, DIMM7

===== usb Devices =====
Name      Port#
-----
Keyboard   1
Mouse     2

-----Environmental Status-----
Fan Speeds:
-----
Fan Device      Speed
-----
CPU0-fan        3308 rpm
CPU1-fan        3125 rpm
Outtake fan     1480 rpm
Intake fan      1125 rpm

=====HW Revisions=====
ASIC Revisions:
-----
PCI:Rev 4
PCI:Rev 4
PCI:Rev 4
PCI:Rev 4
System PROM Revisions:
-----

OPB 4.9.4 2003/05/14 19:11 Sun Blade 2500
OBDiag 4.9.4 2003/05/14 19:13
```

```
# /usr/platform/sun4u/sbin/prtdiag
```

```
System Configuration: Sun Microsystems sun4u (UltraSPARC-III 440MHz)
System clock frequency: 110 MHz
Memory size: 256 Megabytes
```

```
===== CPUs =====
```

Brd	CPU	Module	Run MHz	Ecache MB	CPU Impl.	CPU Mask
0	0	0	440	2.0	12	9.1

```
===== IO Cards =====
```

Brd	Bus#	Freq	Type	Slot	Name	Model
0	PCI-1	33		1	ebus	
0	PCI-1	33		1	network-SUNW,hme	
0	PCI-1	33		2	SUNW,m64B	ATY,GT-B
0	PCI-1	33		3	ide-pci1095,646	

```
No failures found in System
```

```
=====
```

```
# /usr/platform/sun4u/sbin/prtdiag -v
```

```
System Configuration: Sun Microsystems sun4u (UltraSPARC-III 440MHz)
System clock frequency: 110 MHz
Memory size: 256 Megabytes
```

```
. . .
```

```
No failures found in System
```

```
=====
```

```
===== HW Revisions =====
```

```
ASIC Revisions:
```

```
-----
```

```
Cheerio: ebus Rev 1
```

```
System PROM revisions:
```

```
-----
```

```
OBP 3.19.4 1999/04/28 15:05 POST 3.0.7 1999/04/28 14:24
```

## 3.5.3 prtconf Command

Similar to the `show-devs` command run at the `ok` prompt, the `prtconf` command displays the devices that are configured for the Sun Blade 2500 system.

The `prtconf` command identifies hardware that is recognized by the Solaris operating environment. If hardware is not suspected bad, yet software applications are having trouble with the hardware, the `prtconf` command can indicate if the Solaris software recognizes the hardware, and if a driver for the hardware is loaded.

### 3.5.3.1 Options

[TABLE 3-10](#) describes options for the `prtconf` command and how those options can help troubleshoot the Sun Blade 2500 system.

**TABLE 3-10** Options for `prtconf`

Option	Description	How It Can Help
No option	Displays the device tree of devices recognized by the operating environment.	If a hardware device is recognized, then it is probably functioning properly. If the message “(driver not attached)” is displayed for the device or for a sub-device, then the driver for the device is corrupt or missing.
-D	Similar to the output of no option, however the device driver is listed.	Informs you of the driver needed or used by the operating environment to enable the device.
-p	Similar to the output of no option, yet is abbreviated.	Does not report a (driver not attached) message, only a quick view of the devices.
-V	Displays the version and date of the OpenBoot PROM firmware.	Provides a quick check of firmware version.

### 3.5.3.2 Examples

The following show sample output for the `prtconf` command and its options.

```
# prtconf
System Configuration: Sun Microsystems sun4u
Memory size: 1024 Megabytes
System Peripherals (Software Nodes):

SUNW,Sun-Blade-2500
  packages (driver not attached)
    SUNW,builtin-drivers (driver not attached)
    deblocker (driver not attached)
    disk-label (driver not attached)
    terminal-emulator (driver not attached)
    obp-tftp (driver not attached)
    dropins (driver not attached)
    kbd-translator (driver not attached)
    ufs-file-system (driver not attached)
  chosen (driver not attached)
  openprom (driver not attached)
    client-services (driver not attached)
  options, instance #0
. . .
```

```
# prtconf -D
. . .
options, instance #0 (driver name: options)
  aliases
  memory
  virtual-memory
  SUNW,UltraSPARC-III+, instance #0 (driver name: us)
  memory-controller, instance #0 (driver name: mc-us3)
  SUNW,UltraSPARC-III+, instance #1 (driver name: us)
  memory-controller, instance #1 (driver name: mc-us3)
  pci, instance #0 (driver name: pcisch)
    ebus, instance #0 (driver name: ebus)
    flashprom
    bbc (driver name: bbc)
    ppm, instance #0 (driver name: xcalppm)
    i2c, instance #0 (driver name: pcf8584)
    dimm-fru, instance #1 (driver name: seeprom)
. . .
```

## 3.5.4 netstat Command

The `netstat` command displays the network status.

### 3.5.4.1 Options

[TABLE 3-11](#) describes options for the `netstat` command and how those options can help troubleshoot the Sun Blade 2500 system.

**TABLE 3-11** Options for `netstat`

Option	Description	How It Can Help
<code>-i</code>	Displays the interface state, including packets in/out, error in/out, collisions, and queue.	Provides a quick overview of the system's network health.
<code>-i interval</code>	Providing a trailing number with the <code>-i</code> option repeats the <code>netstat</code> command every interval seconds.	Helps identify intermittent or long duration network events. By piping <code>netstat</code> output to a file, activity overnight is later viewed at once.
<code>-p</code>	Displays the media table.	Provides MAC address for hosts on the subnet.
<code>-r</code>	Displays the routing table.	Provides routing information.
<code>-n</code>	Replaces host names with IP addresses.	When an address is more useful than a host name.

### 3.5.4.2 Examples

The following show sample output for the `netstat` command and its options.

```
# netstat -i 1

input  hme0      output      input (Total)  output
packets errs  packets errs  colls  packets errs  packets errs  colls
14242328 0    9104066 0    0      15280378 0    10142116 0    0
1        0    1        0    0      3        0    3        0    0
0        0    0        0    0      2        0    2        0    0
0        0    0        0    0      2        0    2        0    0
0        0    0        0    0      2        0    2        0    0
17       0    0        0    0      19       0    2        0    0
1        0    0        0    0      3        0    2        0    0
. . .
```



```
# netstat -p
```

```
Net to Media Table: IPv4
```

Device	IP Address	Mask	Flags	Phys Addr
hme0	ns-umpk27-01-46	255.255.255.255		08:00:20:9a:62:a6
hme0	moreair-46	255.255.255.255		08:00:20:8a:e5:03
hme0	fermpk28a-46	255.255.255.255		00:00:0c:07:ac:2e
hme0	fermpk28as-46	255.255.255.255		00:50:e2:61:d8:00
hme0	fermpk28ap-46	255.255.255.255		00:90:2b:71:cc:00
hme0	matlock	255.255.255.255	SP	08:00:20:a7:1e:f3
hme0	224.0.0.0	240.0.0.0	SM	01:00:5e:00:00:00

```
Net to Media Table: IPv6
```

If	Physical Address	Type	State	Destination/Mask
hme0	33:33:00:00:00:00	other	REACHABLE	ff00::
hme0	33:33:00:00:02:02	other	REACHABLE	ff02::202
hme0	08:00:20:a7:1e:f3	local	REACHABLE	fe80::a00:20ff:fea7:1ef3

```
# netstat -r
```

```
Routing Table: IPv4
```

Destination	Gateway	Flags	Ref	Use	Interface
mpk28-046-n	matlock	U	1	10183	hme0
224.0.0.0	matlock	U	1	0	hme0
default	fermpk28a-46	UG	1	19408	
localhost	localhost	UH	48	885595	lo0

```
Routing Table: IPv6
```

Destination/Mask	Gateway	Flags	Ref	Use	If
fe80::/10	fe80::a00:20ff:fea7:1ef3	U	1	0	hme0
ff00::/8	fe80::a00:20ff:fea7:1ef3	U	1	0	hme0
default	fe80::a00:20ff:fea7:1ef3	U	1	0	hme0
localhost	localhost	UH	1	0	lo0

## 3.5.5 ping Command

The ping command sends ICMP ECHO\_REQUEST packets to network hosts. Depending upon how the ping command is configured, the output displayed can identify troublesome network links or nodes. The destination host is specified in the variable *hostname*.

## 3.5.5.1 Options

TABLE 3-12 describes options for the `ping` command and how those options can help troubleshoot the Sun Blade 2500 system.

TABLE 3-12 Options for `ping`

Option	Description	How It Can Help
<i>hostname</i>	The probe packet is sent to <i>hostname</i> and returned.	Verifies that a host is active on the network.
<code>-g hostname</code>	Forces the probe packet to route through a specified gateway.	By identifying different routes to the target host, those individual routes can be tested for quality.
<code>-i interface</code>	Designates which interface to send and receive the probe packet through.	Enables a simple check of secondary network interfaces.
<code>-n</code>	Replaces host names with IP addresses.	Used when an address is more beneficial than a host name.
<code>-s</code>	Ping continuously in one second intervals. Ctrl-C aborts. Upon abort, statistic are displayed.	Helps identify intermittent or long-duration network events. By piping <code>ping</code> output to file, activity overnight is later viewed at once.
<code>-svR</code>	Displays the route the probe packet followed in one second intervals.	Indicates probe packet route and number of hops. Comparing multiple routes can identify bottlenecks.

## 3.5.5.2 Examples

The following show sample output for the `ping` command and its options.

```
# ping -s hostname
PING sky-150: 56 data bytes
64 bytes from sky-150 (129.146.38.150): icmp_seq=0. time=2. ms
64 bytes from sky-150 (129.146.38.150): icmp_seq=1. time=1. ms
64 bytes from sky-150 (129.146.38.150): icmp_seq=2. time=1. ms
^C
----sky-150 PING Statistics----
3 packets transmitted, 3 packets received, 0% packet loss
round-trip (ms)  min/avg/max = 1/1/2
```

```
# ping -svR hostname
PING mmlab: 56 data bytes
64 bytes from sky-106 (129.146.38.106): icmp_seq=0. time=4. ms
  IP options: <record route> fermpk28as-28 (129.146.28.3), sky-rtr
(129.146.38.1), sky-106 (129.146.38.106), flrmpk28aa-28 (129.146.28.17),
fermpk28as-46 (129.146.46.3), matlock (129.146.46.111), (End of record)
^C
----mmlab PING Statistics----
1 packets transmitted, 1 packets received, 0% packet loss
round-trip (ms)  min/avg/max = 4/4/4
```

## 3.5.6 ps Command

The `ps` command lists the status of system processes. Using options and re-arranging the command output can assist in determining the Sun Blade 2500 systems resource allocation.

### 3.5.6.1 Options

[TABLE 3-13](#) describes options for the `ps` command and how those options can help troubleshoot the Sun Blade 2500 system.

**TABLE 3-13** Options for `ps`

Option	Description	How It Can Help
<code>-e</code>	Displays information for every process.	Identifies the process ID and the executable.
<code>-f</code>	Generates a full listing.	Provides the following process information: user ID, parent process ID, system time when executed, and the path to the executable.
<code>-o option</code>	Allows configurable output. The <code>pid</code> , <code>pcpu</code> , <code>pmem</code> , and <code>comm</code> options display process ID, percent CPU consumption, percent memory consumption, and the responsible executable, respectively.	Provides only most important information. Knowing the percentage of resource consumption helps identify processes that are affecting system performance and might be hung.

## 3.5.6.2 Examples

The following show sample output for the `ps` command and its options.

```
# ps -ef
  UID    PID  PPID  C   STIME TTY      TIME CMD
  root     0     0  0   Nov 17 ?        0:14 sched
  root     1     0  0   Nov 17 ?        0:03 /etc/init -
  root     2     0  0   Nov 17 ?        0:00 pageout
  root     3     0  0   Nov 17 ?        8:49 fsflush
  root    332     1  0   Nov 17 ?        0:00 /usr/lib/saf/sac -t 300
. . .
```

```
# ps -eo pcpu,pid,comm|sort -rn
0.5 24471 /usr/openwin/bin/X
0.1 25658 ps
0.1 25657 sort
0.1 25415 /usr/dt/bin/dtterm
0.1      3 fsflush
0.0 25649 more
0.0 25626 sh
0.0 25556 /bin/csh
. . .
```

```
# ps -eo pmem,pid,comm|sort -rn
35.9 24471 /usr/openwin/bin/X
19.9 25518 /usr/local/microsoft/progs/sunos5/iexplorer
14.2 24982 /usr/dt/bin/dtmail
 4.8 24819 dtwm
 2.8 24811 /usr/dt/bin/dtsession
 2.2 25415 /usr/dt/bin/dtterm
 2.2 24827 dtpad
 2.0 25554 /usr/dt/bin/dtterm
. . .
```

---

**Note** – When using `sort` with the `-r` option, the column headings are printed at the bottom of the output

---

## 3.5.7 prstat Command

The `prstat` utility iteratively examines all active processes on the system and reports statistics based on the selected output mode and sort order. The `prstat` command provides output similar to the `ps` command.

### 3.5.7.1 Options

TABLE 3-13 describes options for the `prstat` command and how those options can help troubleshoot the Sun Blade 2500 system.

TABLE 3-14 Options for `prstat`

Option	Description	How It Can Help
No option	Displays a sorted list of the top processes which are consuming the most CPU resources. List is limited to the height of the terminal window and the total number of processes. Output is automatically updated every five seconds. Ctrl-q aborts.	Output identifies process ID, user ID, memory used, state, CPU consumption, and command name. By default, list is sorted by CPU consumption.
-n <i>number</i>	Limits output to number of lines.	Limits amount of data displayed and identifies primary resource consumers.
-s <i>key</i>	Permits sorting list by key parameter.	Useful keys are <code>cpu</code> (default), <code>time</code> , and <code>size</code> .
-v	Verbose mode.	Displays additional parameters.

## 3.5.7.2 Examples

The following examples show sample output for the `prstat` command and its options.

```
# prstat
  PID USERNAME  SIZE  RSS STATE PRI NICE      TIME  CPU PROCESS/NLWP
21311 mm39236    28M   23M sleep  48   0    0:01.23 0.7% maker6X.exe/1
20864 root       141M   78M sleep  59   0    0:03.48 0.2% Xsun/1
  175 root       3808K 2568K sleep  58   0    0:00.00 0.1% automountd/6
22287 mm39236   1528K 1248K cpu0   59   0    0:00.00 0.1% prstat/1
22116 mm39236   6992K 5024K sleep  59   0    0:00.01 0.0% dtterm/1
  206 root       2888K 1904K sleep  55   0    0:00.00 0.0% nscd/8
  266 root       2200K 1264K sleep 100  -    0:06.33 0.0% xntpd/1
  335 root       1776K 1136K sleep  58   0    0:00.00 0.0% ttymon/1
  127 root       2968K  864K sleep  51   0    0:00.00 0.0% keyserv/4
  124 root       2720K 1336K sleep  58   0    0:00.00 0.0% rpcbind/1
  105 root       1648K  552K sleep  58   0    0:00.00 0.0% in.rdisc/1
Total: 78 processes, 171 lwps, load averages: 0.02, 0.02, 0.03
```

```
# prstat -n 5 -s size
  PID USERNAME  SIZE  RSS STATE PRI NICE      TIME  CPU PROCESS/NLWP
20864 root       141M   78M sleep  59   0    0:03.47 0.9% Xsun/1
22082 mm39236    29M   20M sleep  49   0    0:00.09 0.0% netscape/1
21311 mm39236    28M   23M sleep  48   0    0:01.20 0.2% maker6X.exe/1
21334 mm39236    25M   23M sleep  49   0    0:00.00 0.0% dtmail/9
22084 mm39236    20M 4552K sleep  35   0    0:00.00 0.0% netscape/1
Total: 78 processes, 171 lwps, load averages: 0.00, 0.02, 0.02
```

```
# prstat -n 5 -v
  PID USERNAME  USR  SYS TRP  TFL  DFL  LCK  SLP  LAT  VCX  ICX  SCL  SIG PROCESS/NLWP
21311 mm39236    0.2 0.2  -   -   -   -  100  -   13  29  586   1 maker6X.exe/1
20864 root       0.2 0.2  -   -   -   -  100  -  148   0  1K   72 Xsun/1
  206 root       0.0 0.0  -   -   -   -  100  -   11   1  51   1 nscd/8
  49  root       0.0 0.0  -   -   -   -  100  -    0   0   0   0 syseventd/9
  112 root       0.0 0.0  -   -   -   -  100  -    0   0   0   0 in.ndpd/1
Total: 78 processes, 171 lwps, load averages: 0.04, 0.03, 0.03
```

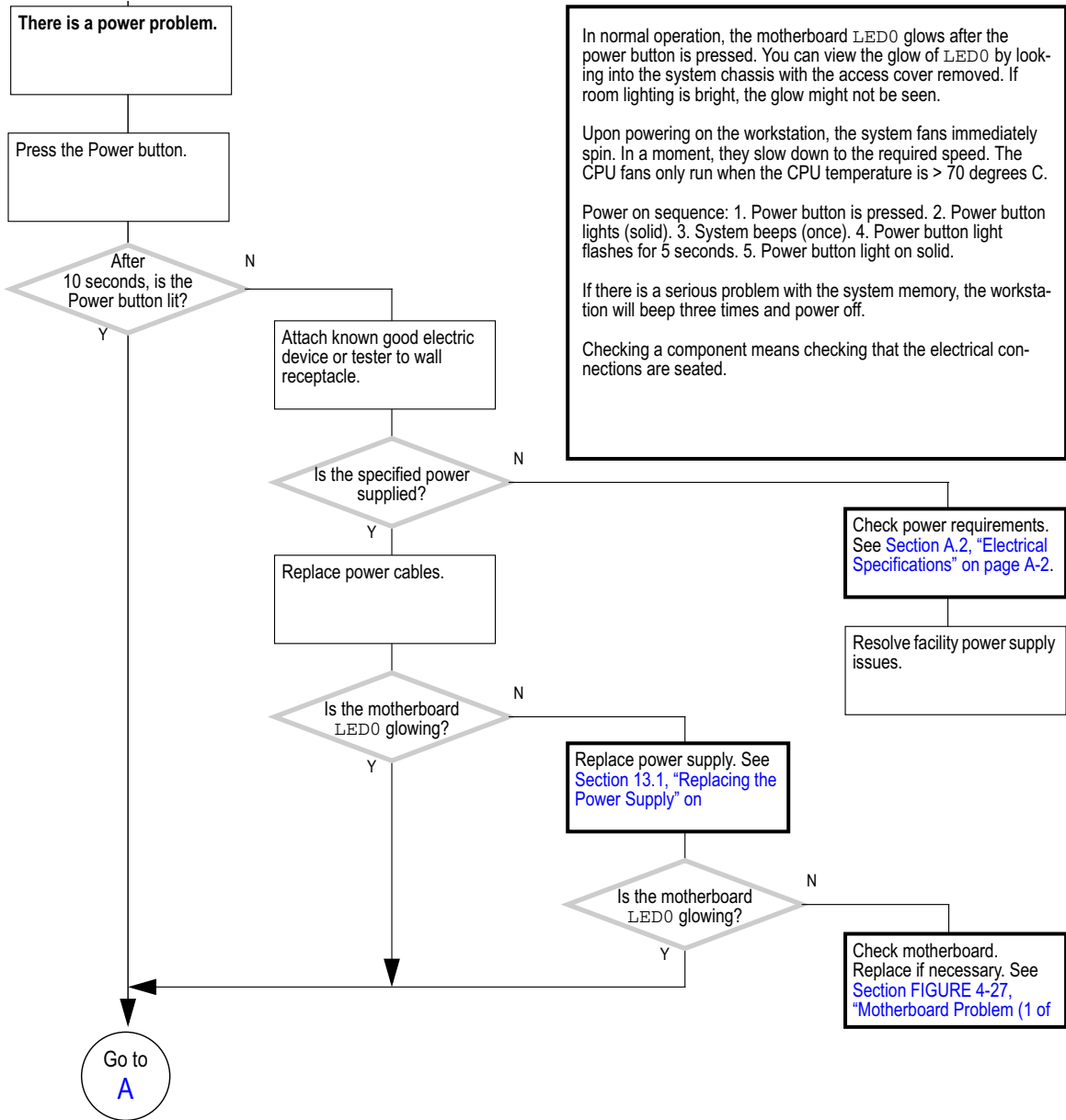
## Troubleshooting Flowcharts

---

This chapter contains flowcharts to help you troubleshoot problems with your Sun Blade 2500 system. The flowcharts are presented in the same order as the workstation power on sequence described in [Section 3.1.2, “Power-On Flowchart”](#) on page 3-2 of this manual.

- [Section 4.1, “Power Problem”](#) on page 4-2
- [Section 4.2, “Hard Drive Problem”](#) on page 4-4
- [Section 4.3, “System Fan Problem”](#) on page 4-5
- [Section 4.4, “USB Problem”](#) on page 4-6
- [Section 4.5, “Audio Output Problem”](#) on page 4-8
- [Section 4.6, “Monitor Problem”](#) on page 4-10
- [Section 4.7, “Network Problem”](#) on page 4-13
- [Section 4.8, “Keyboard Problem”](#) on page 4-15
- [Section 4.9, “Login Problem”](#) on page 4-16
- [Section 4.10, “Graphical User Interface Problem”](#) on page 4-18
- [Section 4.11, “Data Access and Running Applications Problems”](#) on page 4-19
- [Section 4.12, “DVD-ROM Drive Problem”](#) on page 4-20
- [Section 4.13, “PCI Card Problem”](#) on page 4-23
- [Section 4.14, “IEEE 1394 Problem”](#) on page 4-25
- [Section 4.15, “Smart Card Reader Problem”](#) on page 4-27
- [Section 4.16, “Motherboard Problem”](#) on page 4-28
- [Section 4.17, “Memory Problem”](#) on page 4-31
- [Section 4.18, “NVRAM Problem”](#) on page 4-33
- [Section 4.19, “Battery Problem”](#) on page 4-34

# 4.1 Power Problem



In normal operation, the motherboard LED0 glows after the power button is pressed. You can view the glow of LED0 by looking into the system chassis with the access cover removed. If room lighting is bright, the glow might not be seen.

Upon powering on the workstation, the system fans immediately spin. In a moment, they slow down to the required speed. The CPU fans only run when the CPU temperature is > 70 degrees C.

Power on sequence: 1. Power button is pressed. 2. Power button lights (solid). 3. System beeps (once). 4. Power button light flashes for 5 seconds. 5. Power button light on solid.

If there is a serious problem with the system memory, the workstation will beep three times and power off.

Checking a component means checking that the electrical connections are seated.

FIGURE 4-1 Power Problem (1 of 2)



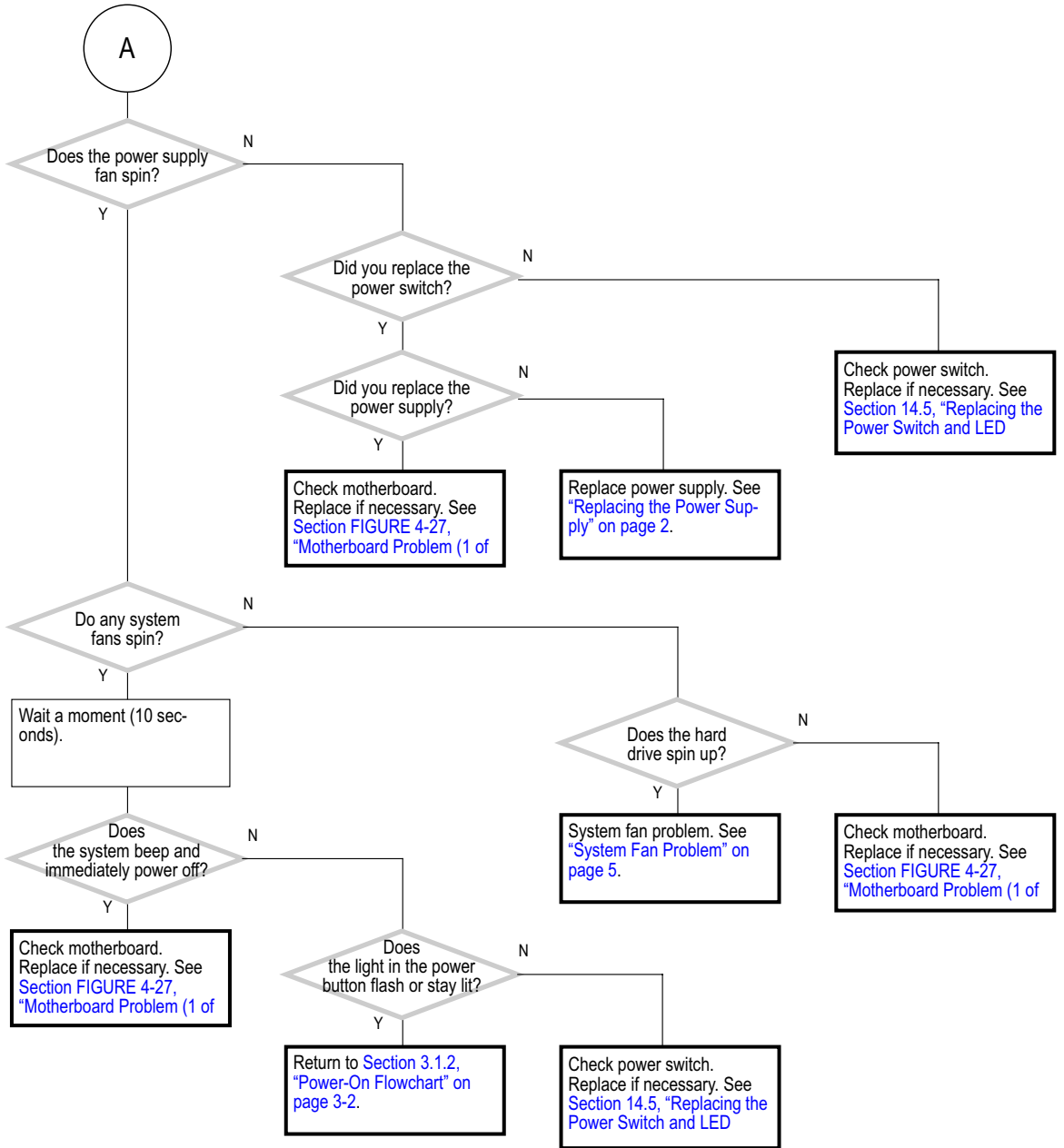


FIGURE 4-2 Power Problem (2 of 2)

## 4.2 Hard Drive Problem

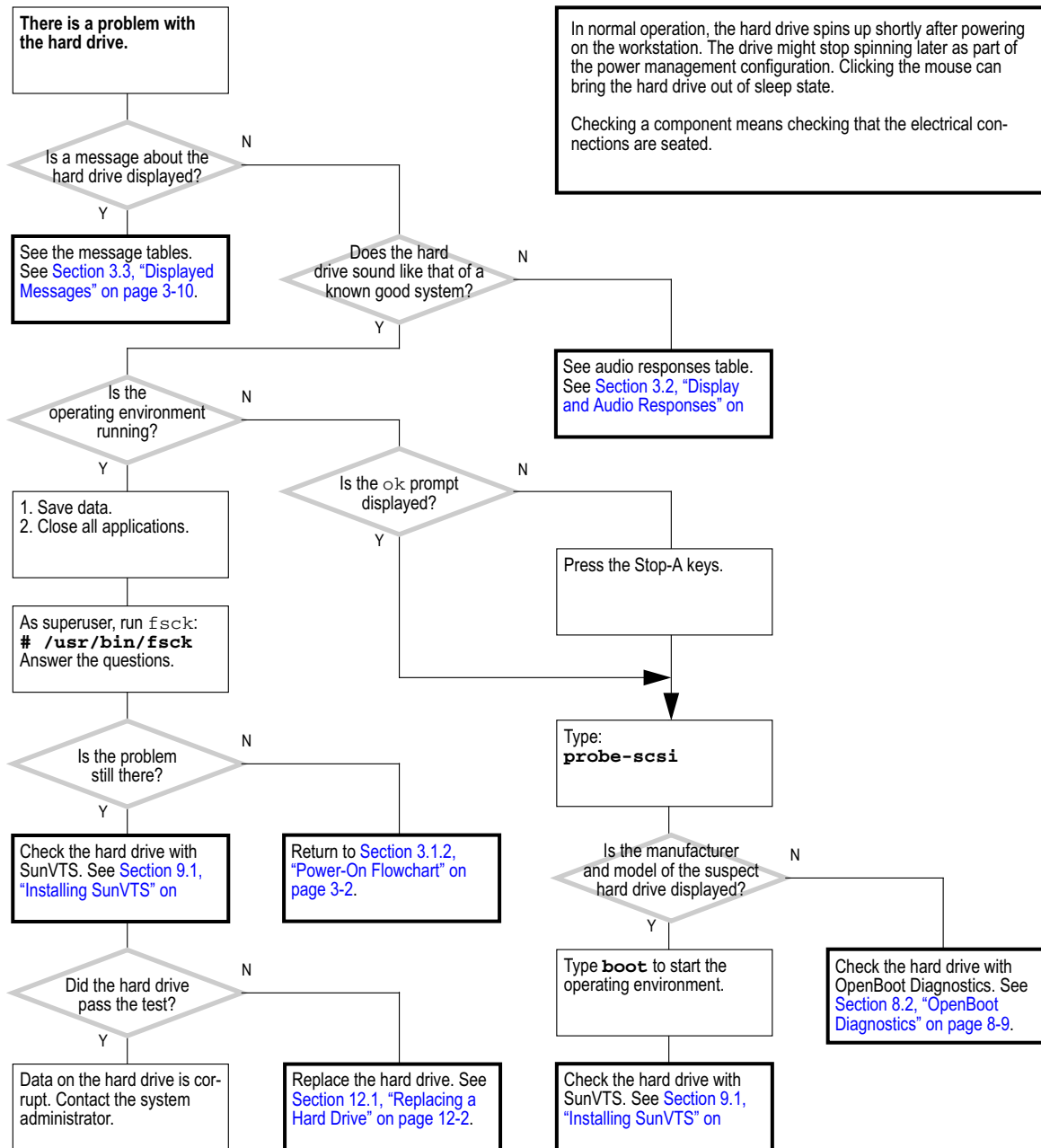


FIGURE 4-3 Hard Drive Problem

## 4.3 System Fan Problem

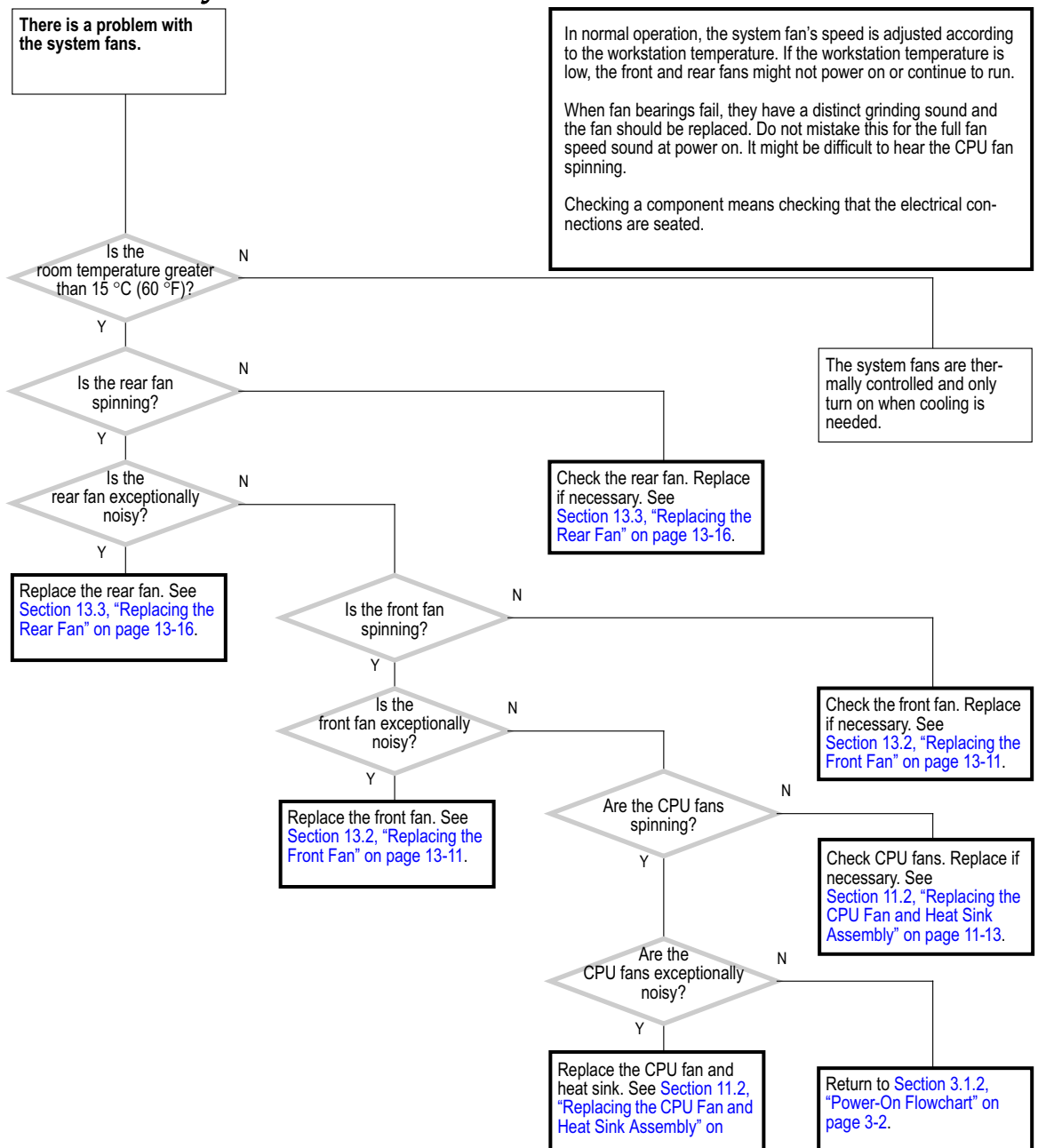
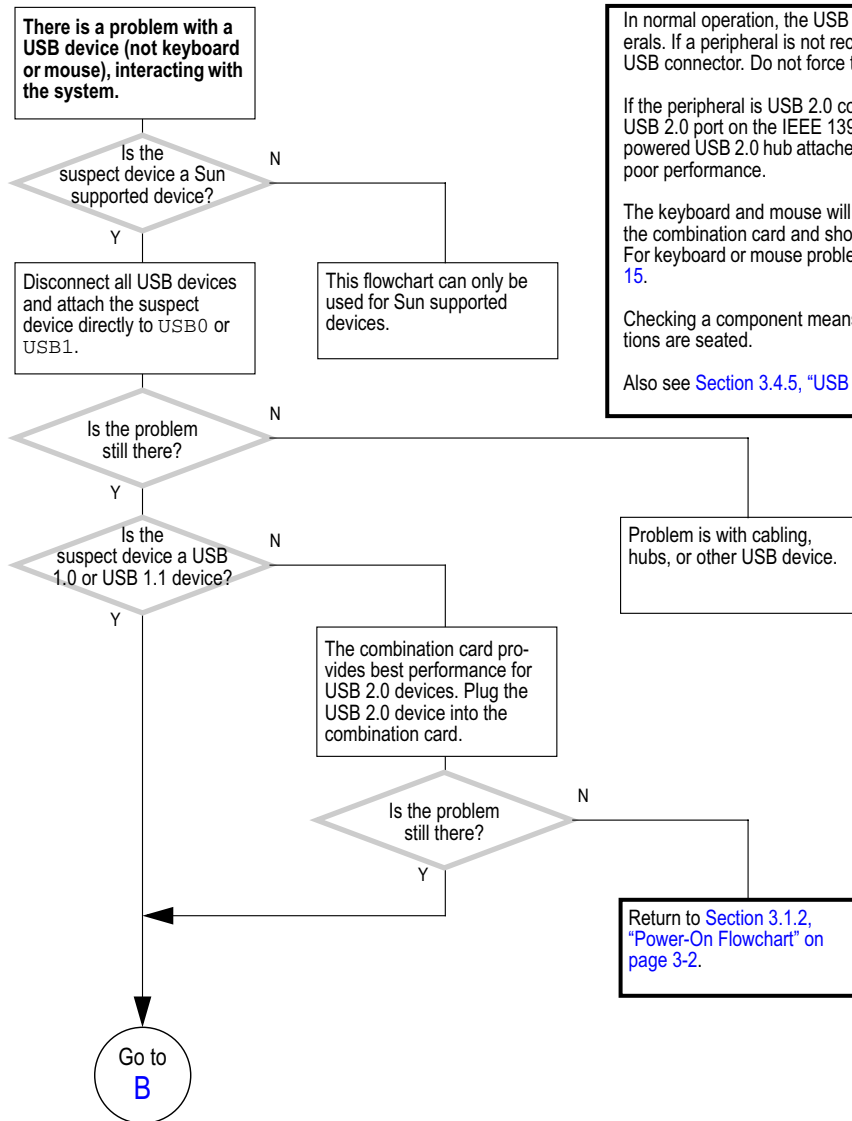


FIGURE 4-4 System Fan Problem

## 4.4 USB Problem



In normal operation, the USB ports allow for hot-plugging of peripherals. If a peripheral is not recognized, try plugging it in to another USB connector. Do not force the connection.

If the peripheral is USB 2.0 compliant, and it is not attached to a USB 2.0 port on the IEEE 1394/USB 2.0 combination card, or to a powered USB 2.0 hub attached to a USB 2.0 port, then it might have poor performance.

The keyboard and mouse will not function in the USB 2.0 ports on the combination card and should be connected to USB0 or USB1. For keyboard or mouse problems, see ["Keyboard Problem" on page 15](#).

Checking a component means checking that the electrical connections are seated.

Also see [Section 3.4.5, "USB 2.0 Port Errors" on page 3-21](#).

**FIGURE 4-5** USB Problem (1 of 2)

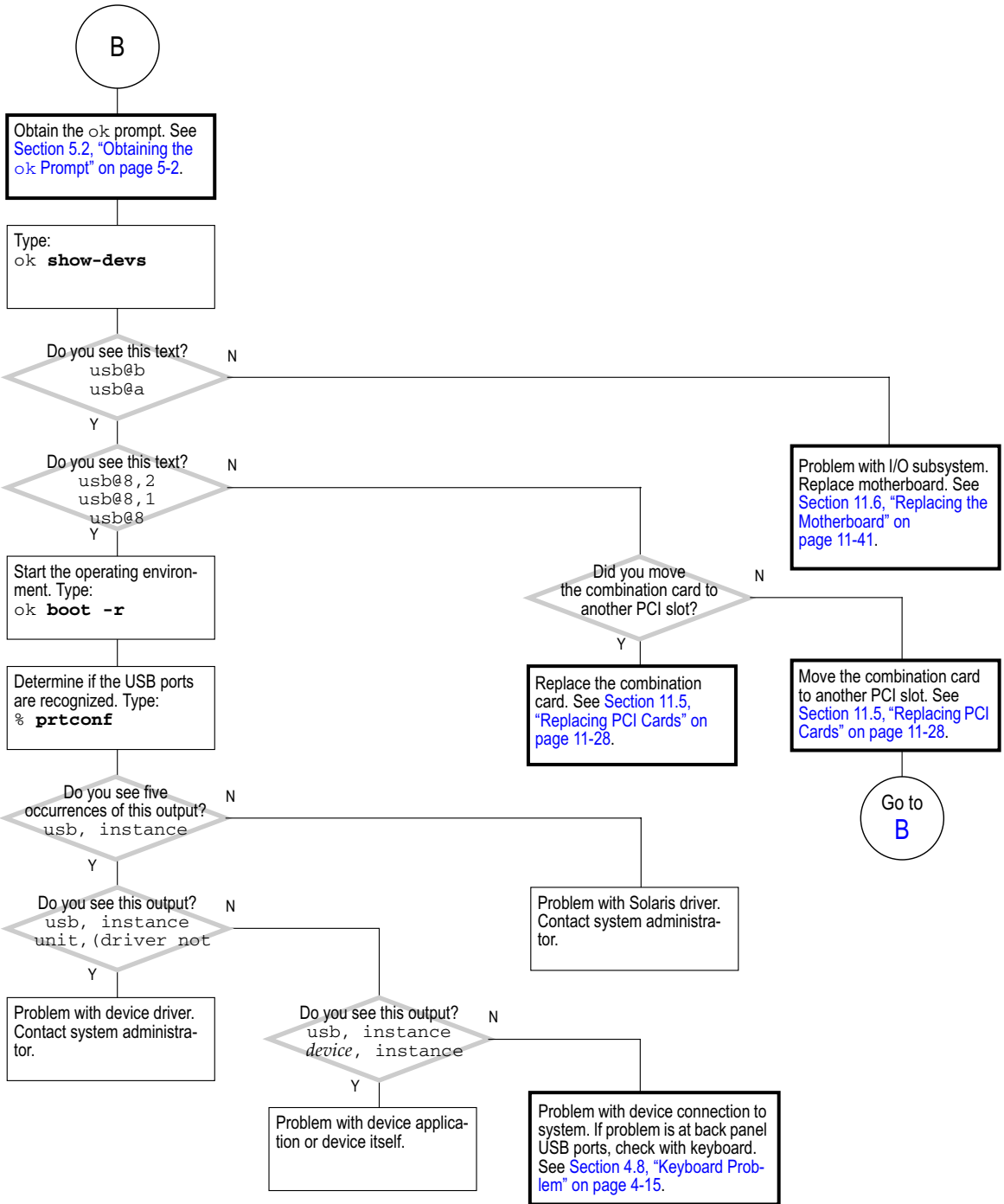


FIGURE 4-6 USB Problem (2 of 2)

# 4.5 Audio Output Problem

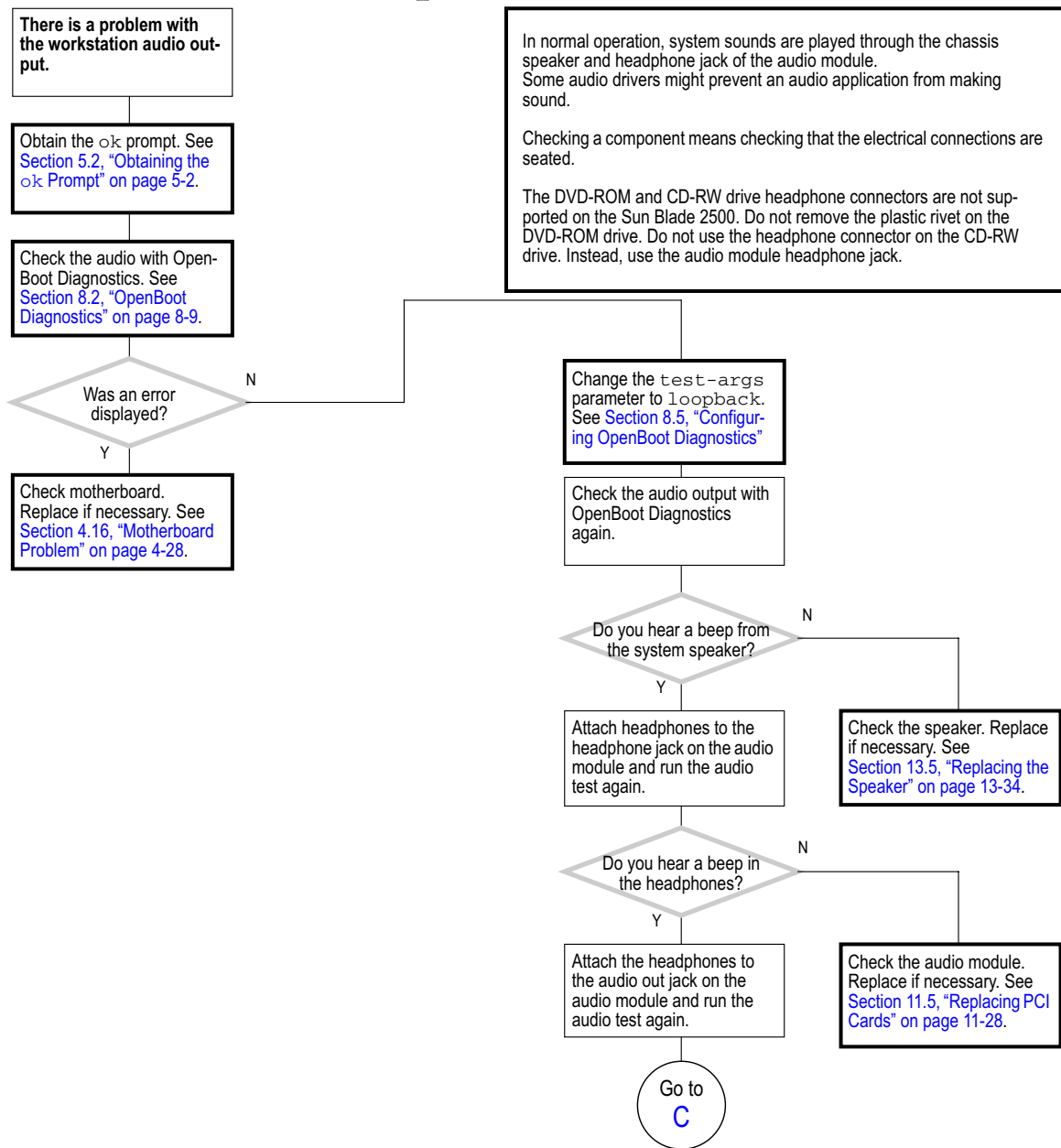
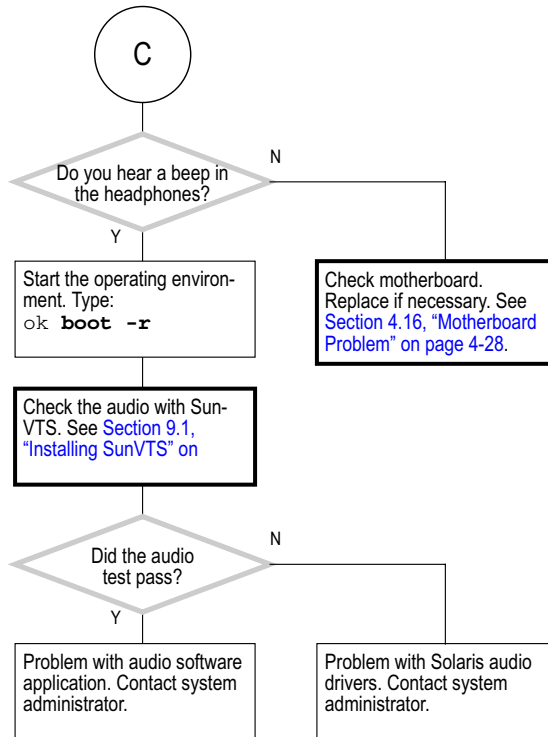
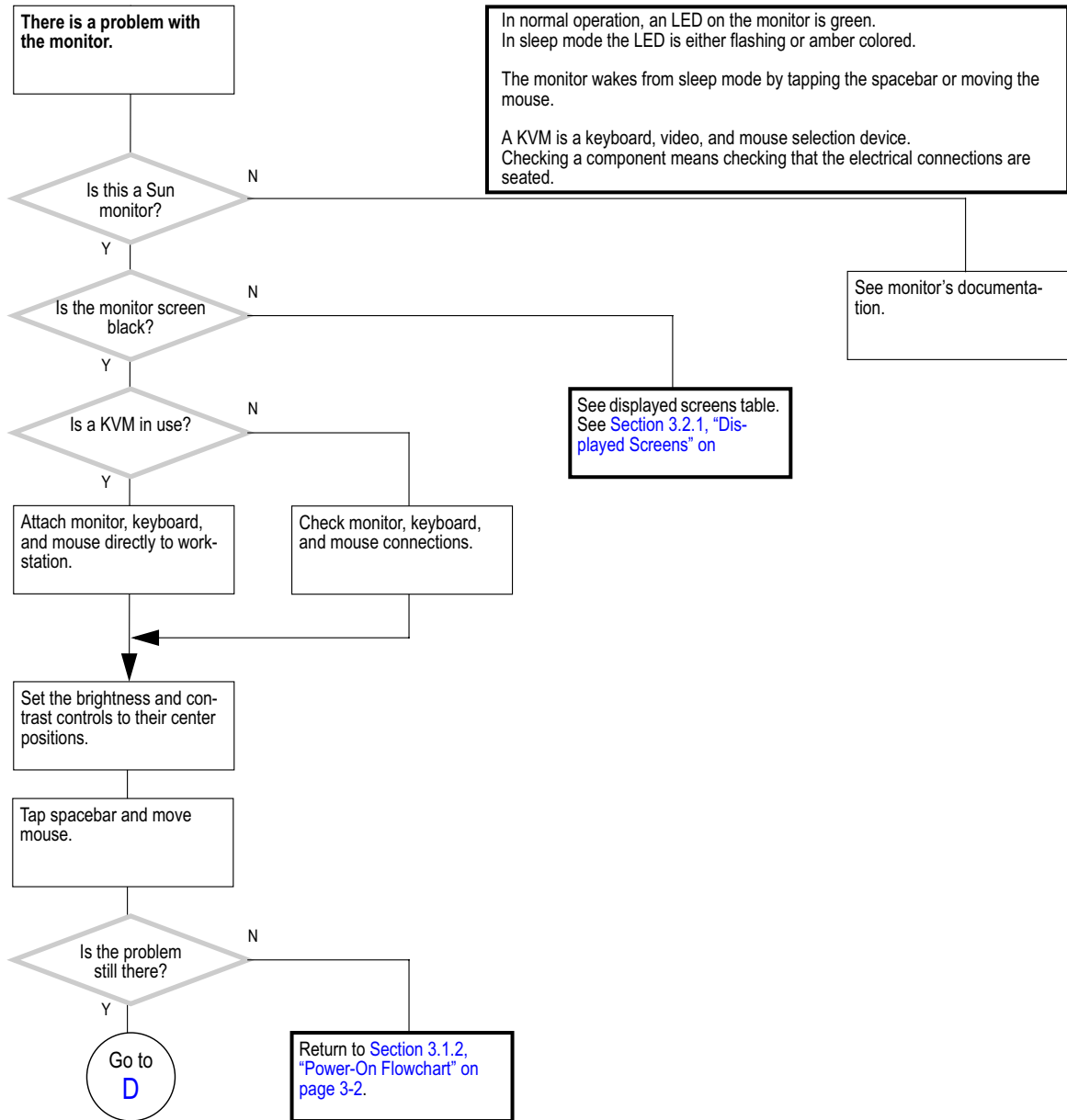


FIGURE 4-7 Audio Output Problem (1 of 2)



**FIGURE 4-8** Audio Output Problem (2 of 2)

## 4.6 Monitor Problem



**FIGURE 4-9** Monitor Problem (1 of 3)



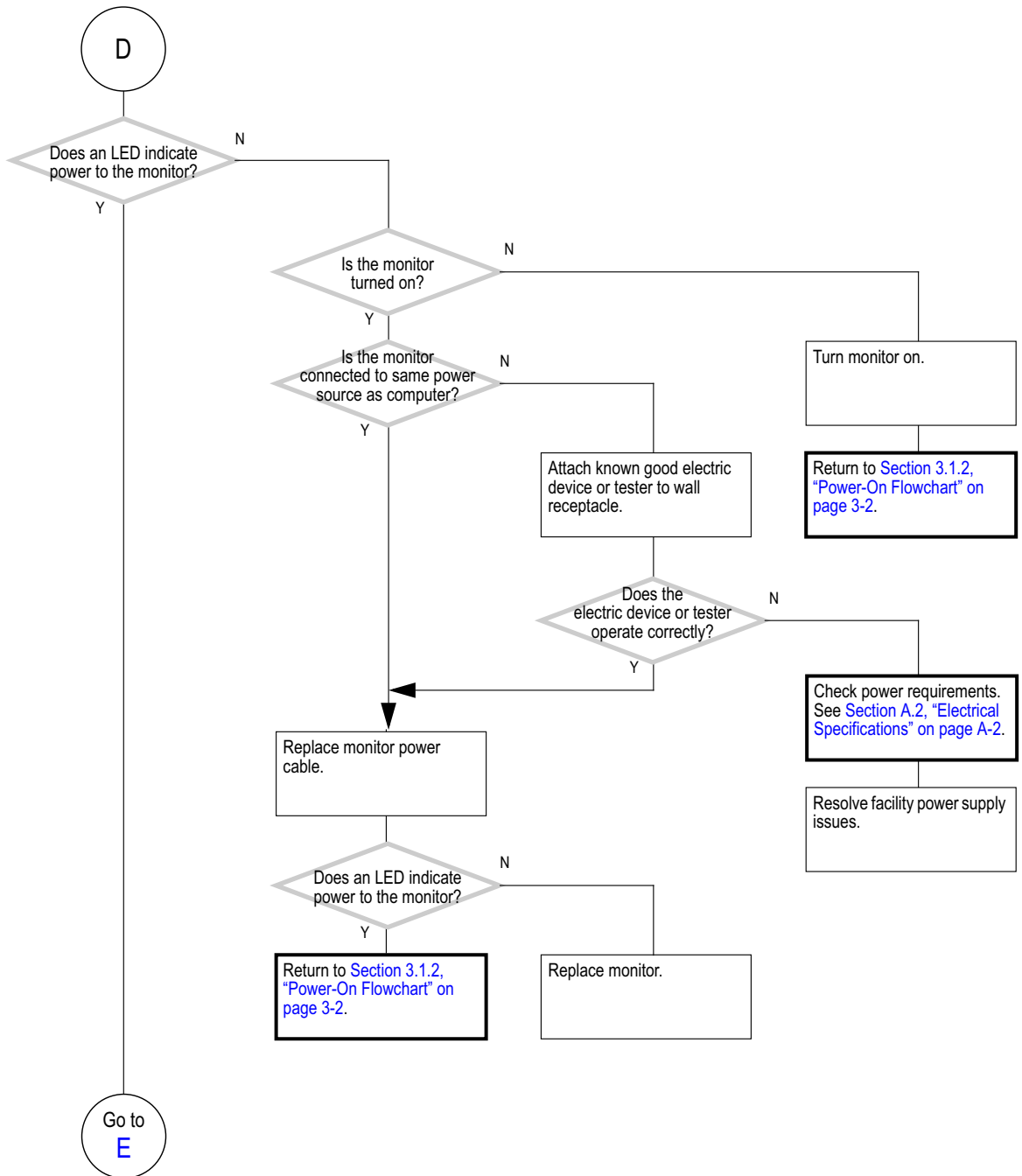
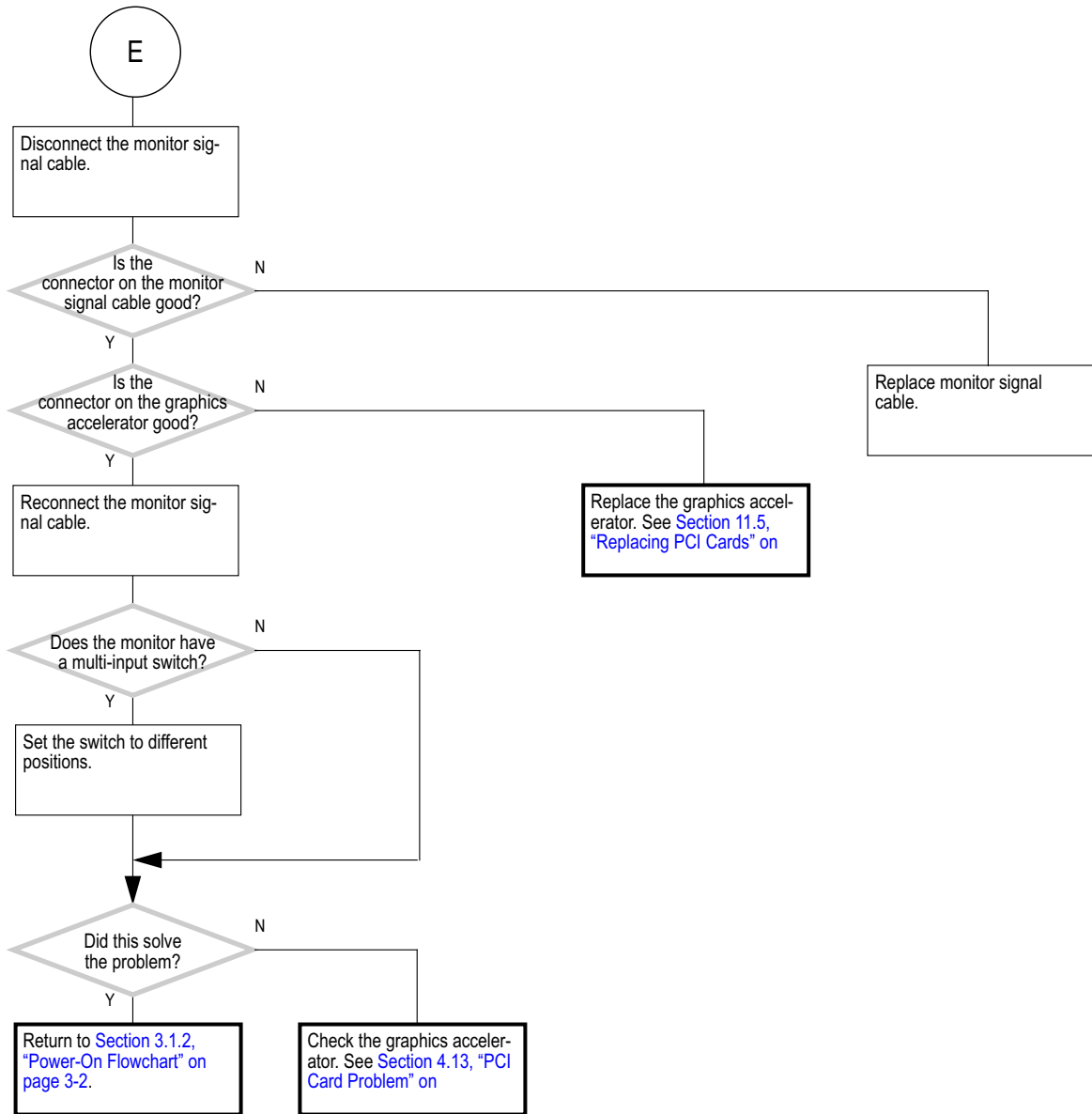
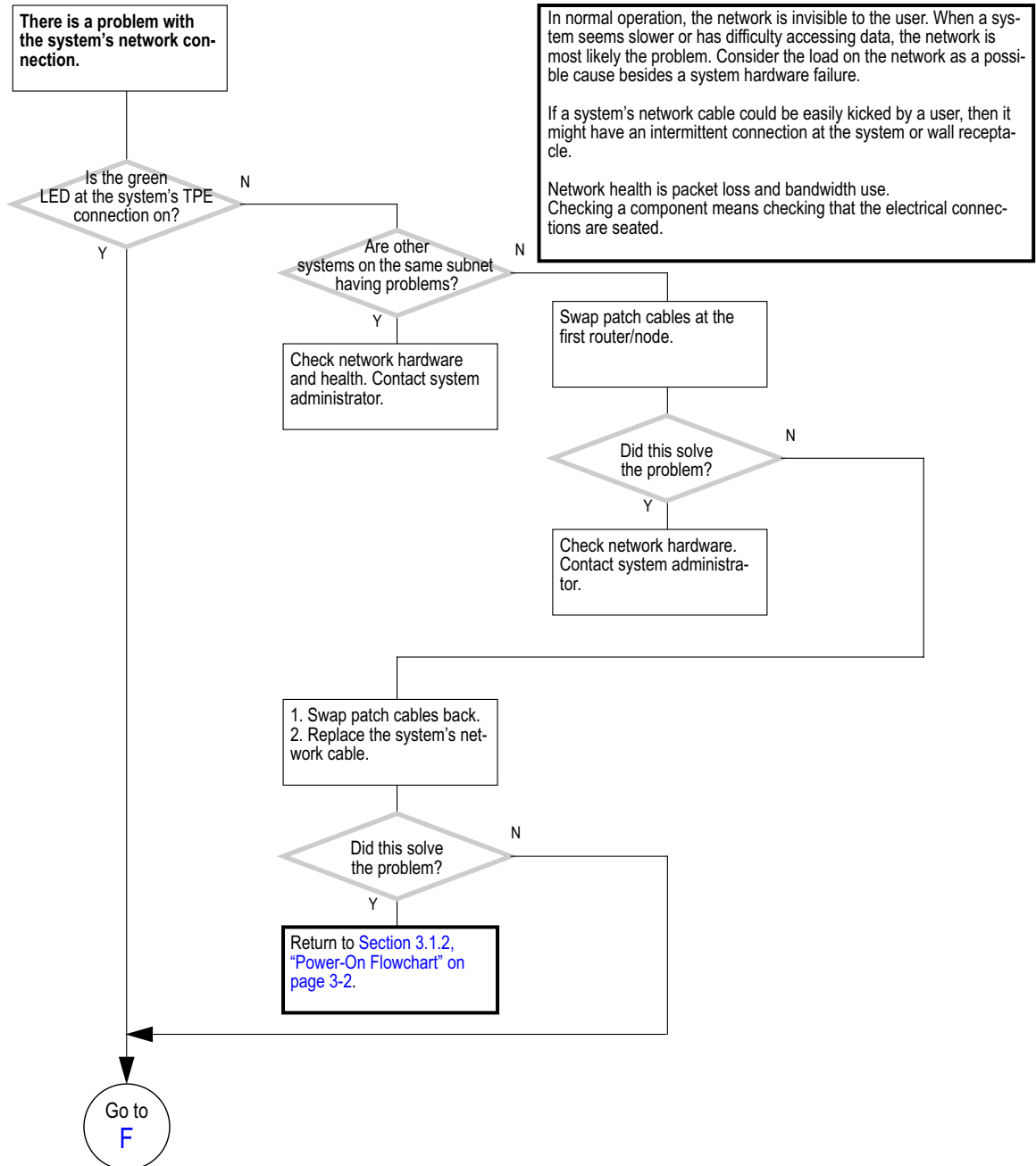


FIGURE 4-10 Monitor Problem (2 of 3)



**FIGURE 4-11** Monitor Problem (3 of 3)

# 4.7 Network Problem



In normal operation, the network is invisible to the user. When a system seems slower or has difficulty accessing data, the network is most likely the problem. Consider the load on the network as a possible cause besides a system hardware failure.

If a system's network cable could be easily kicked by a user, then it might have an intermittent connection at the system or wall receptacle.

Network health is packet loss and bandwidth use. Checking a component means checking that the electrical connections are seated.

FIGURE 4-12 Network Problem (1 of 2)

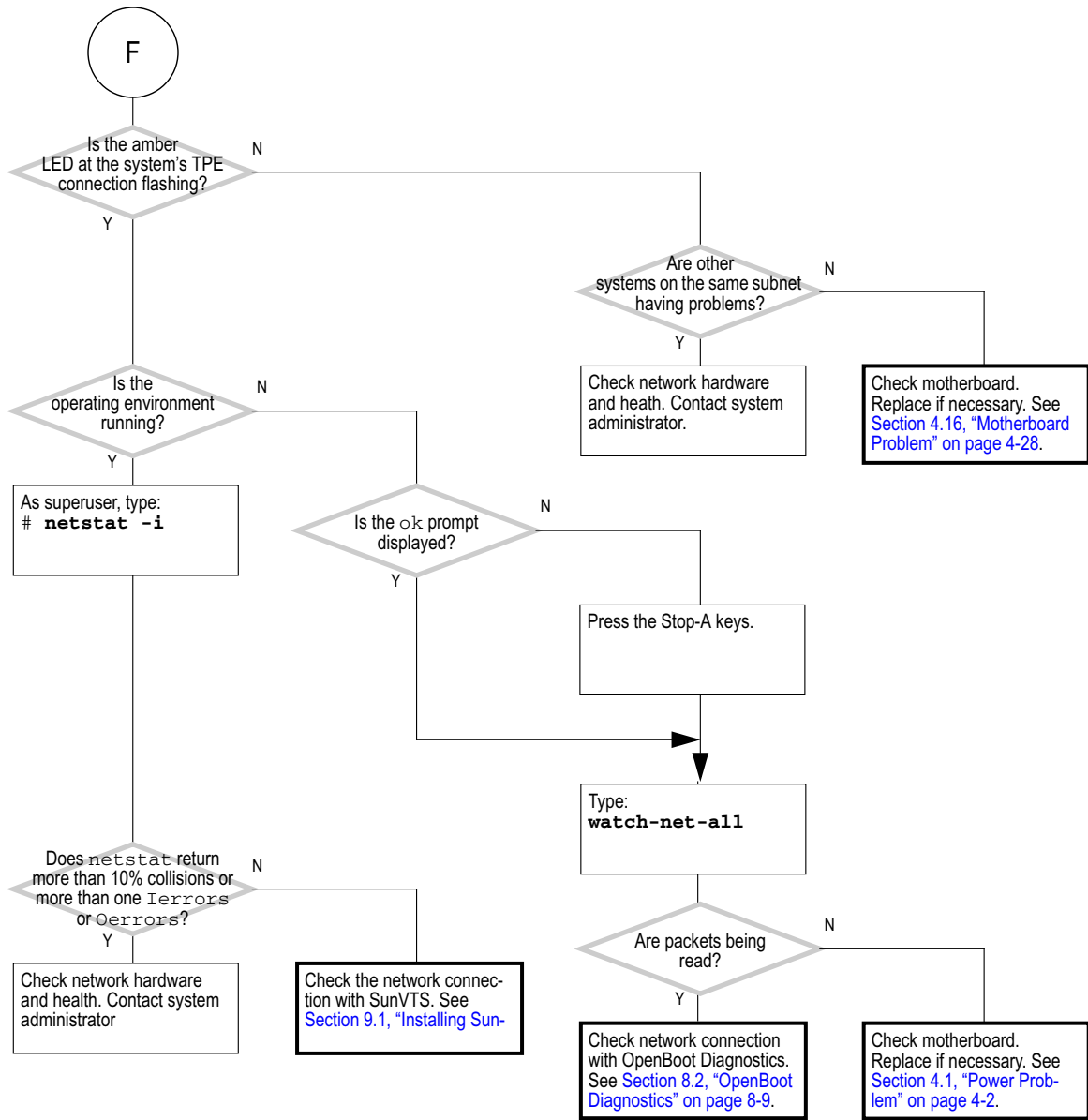


FIGURE 4-13 Network Problem (2 of 2)

## 4.8 Keyboard Problem

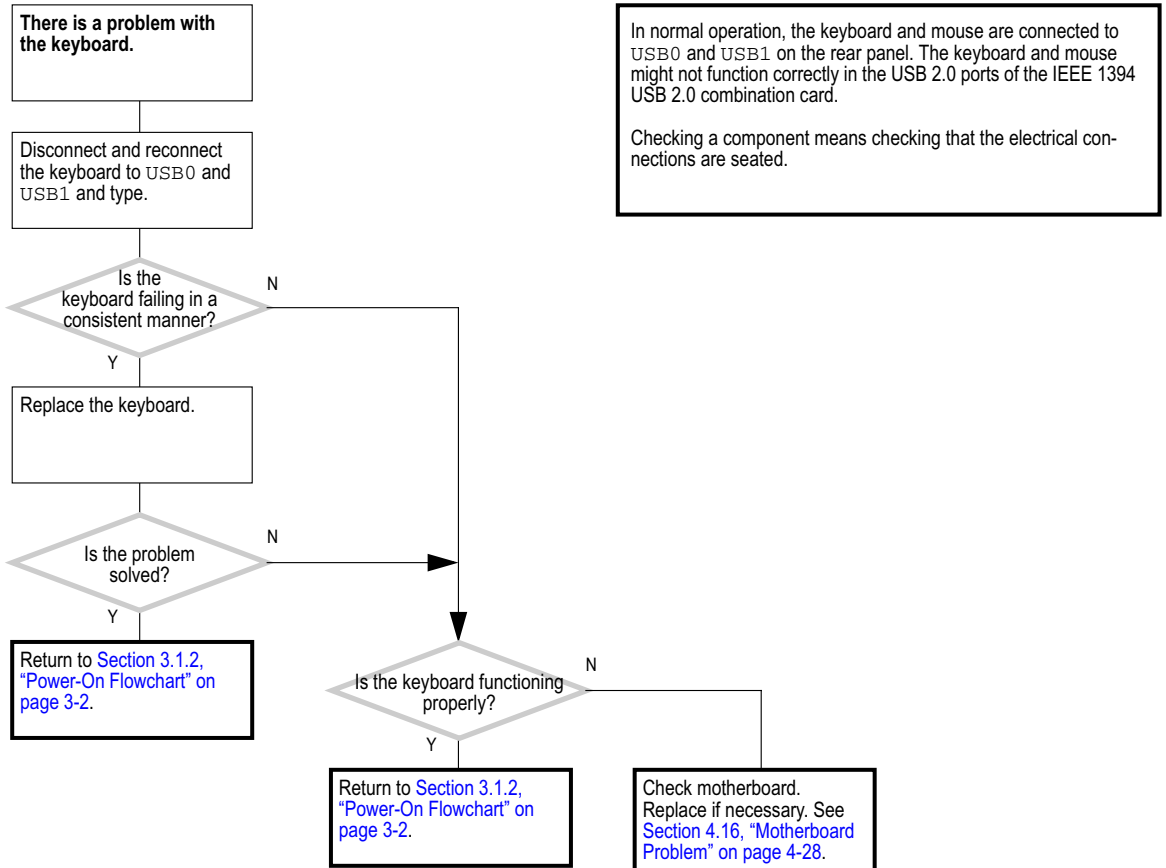
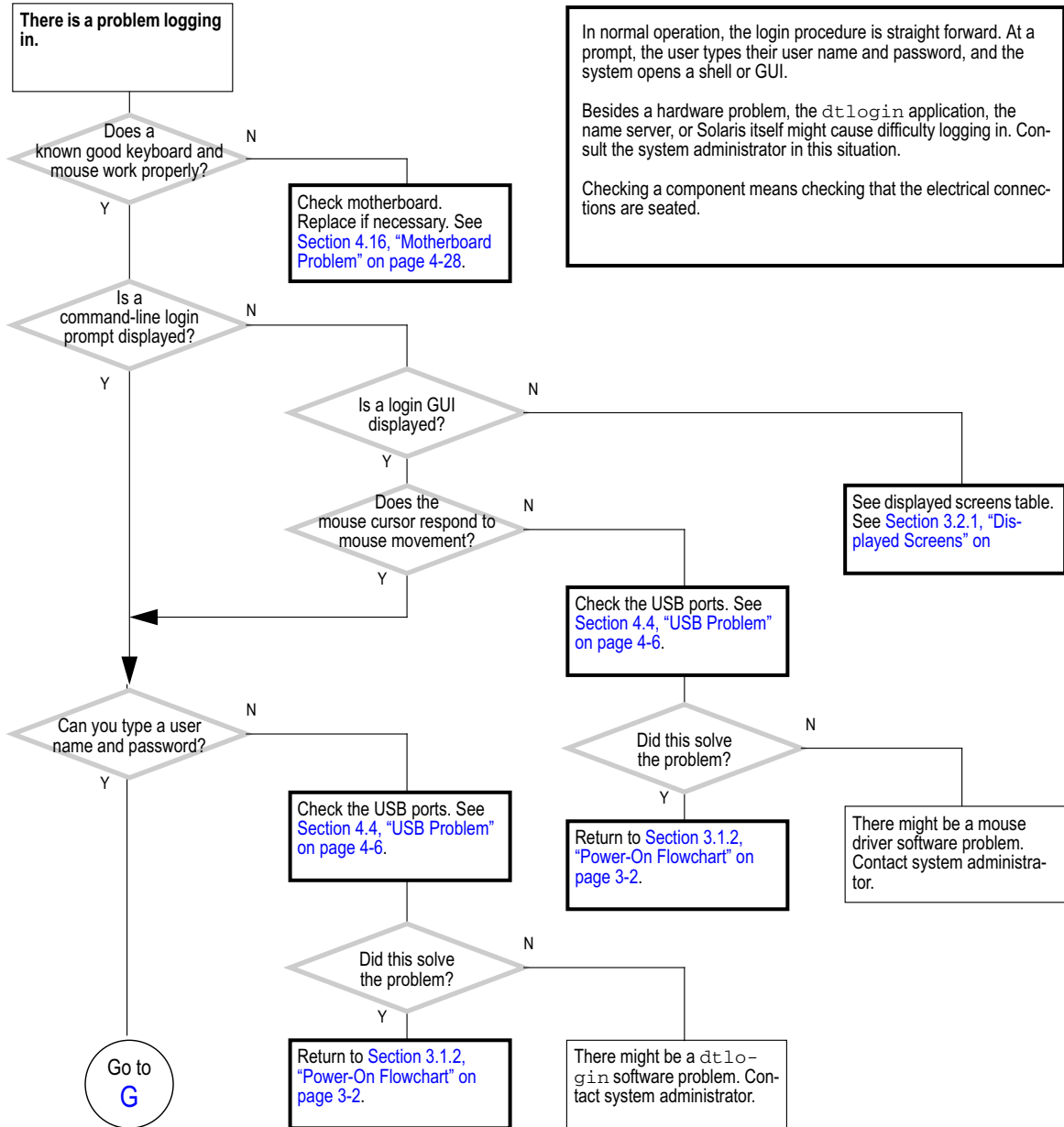


FIGURE 4-14 Keyboard Problem

# 4.9 Login Problem



In normal operation, the login procedure is straight forward. At a prompt, the user types their user name and password, and the system opens a shell or GUI.

Besides a hardware problem, the `dtlogin` application, the name server, or Solaris itself might cause difficulty logging in. Consult the system administrator in this situation.

Checking a component means checking that the electrical connections are seated.

FIGURE 4-15 Login Problem (1 of 2)

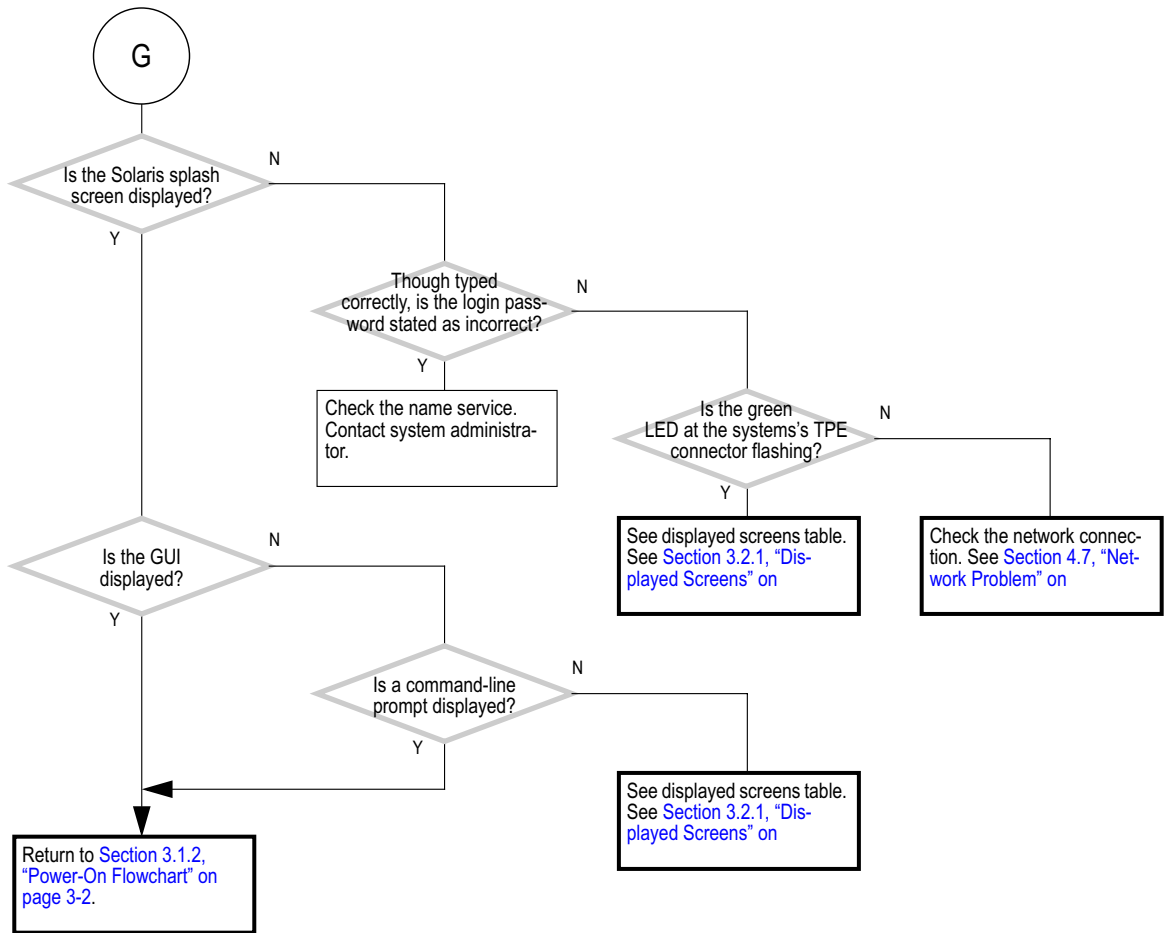


FIGURE 4-16 Login Problem (2 of 2)

## 4.10 Graphical User Interface Problem

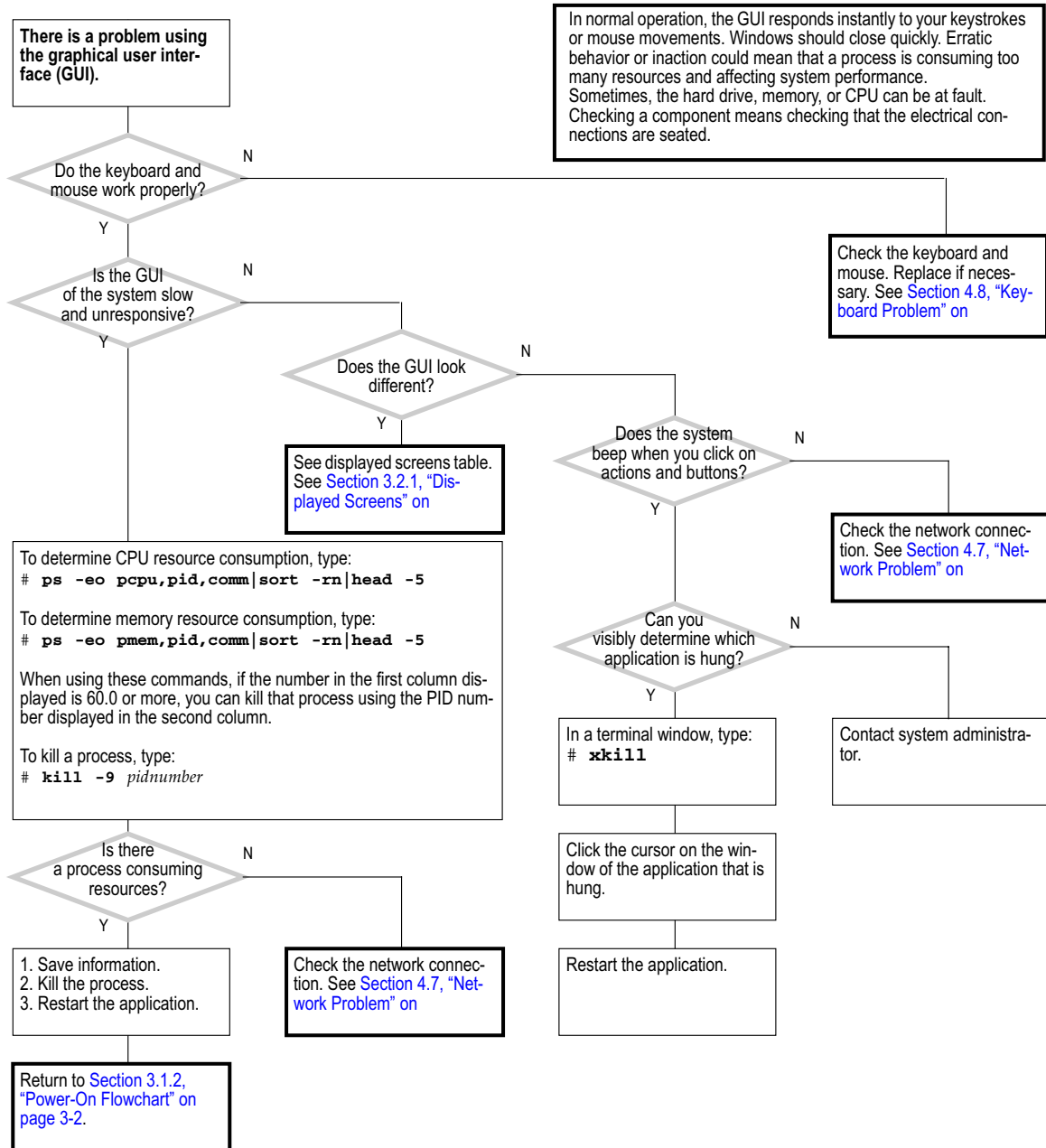


FIGURE 4-17 Graphical User Interface Problem



## 4.11 Data Access and Running Applications Problems

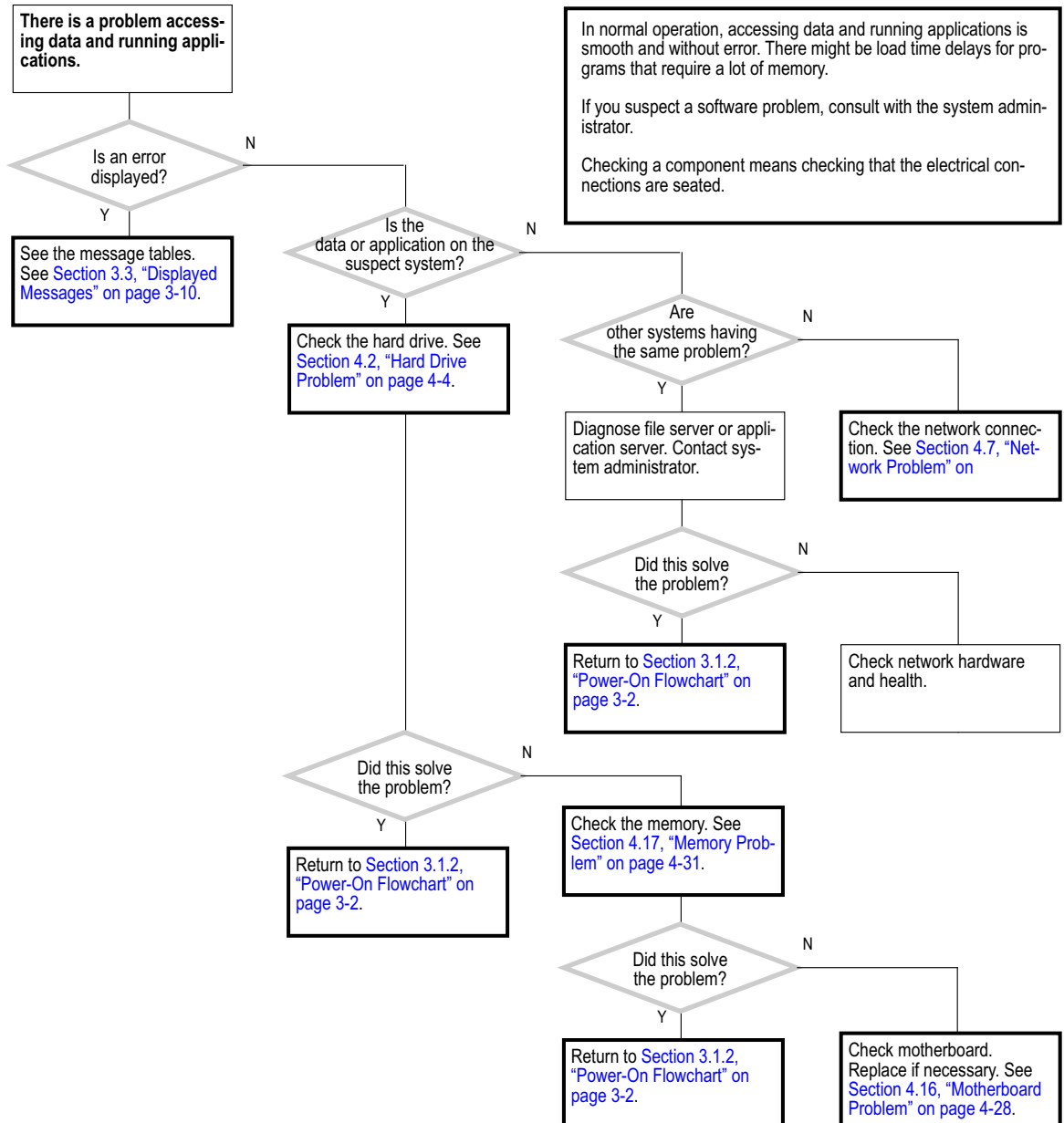


FIGURE 4-18 Data Access and Running Applications Problems

## 4.12 DVD-ROM Drive Problem

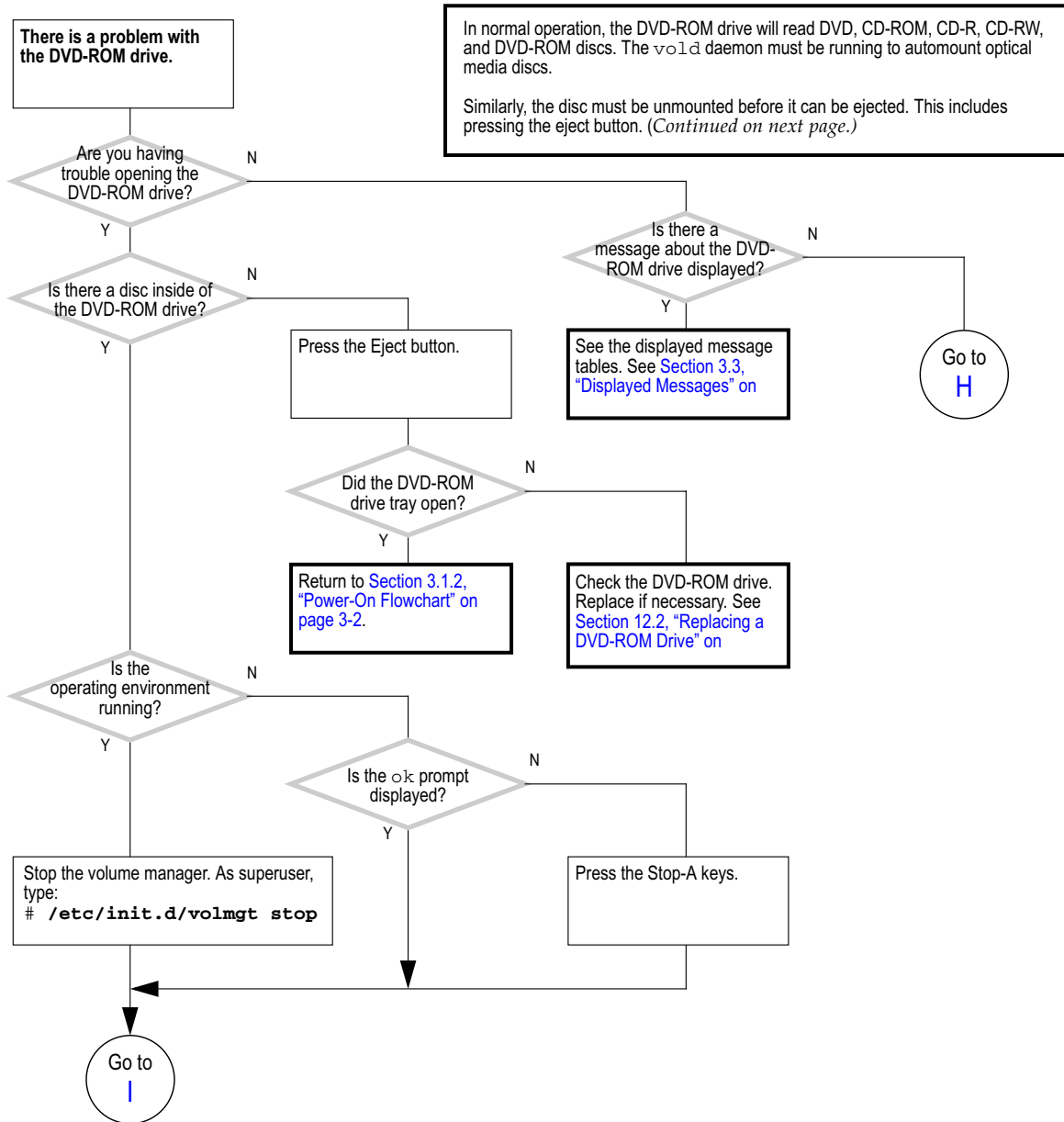


FIGURE 4-19 DVD-ROM Drive Problem (1 of 3)

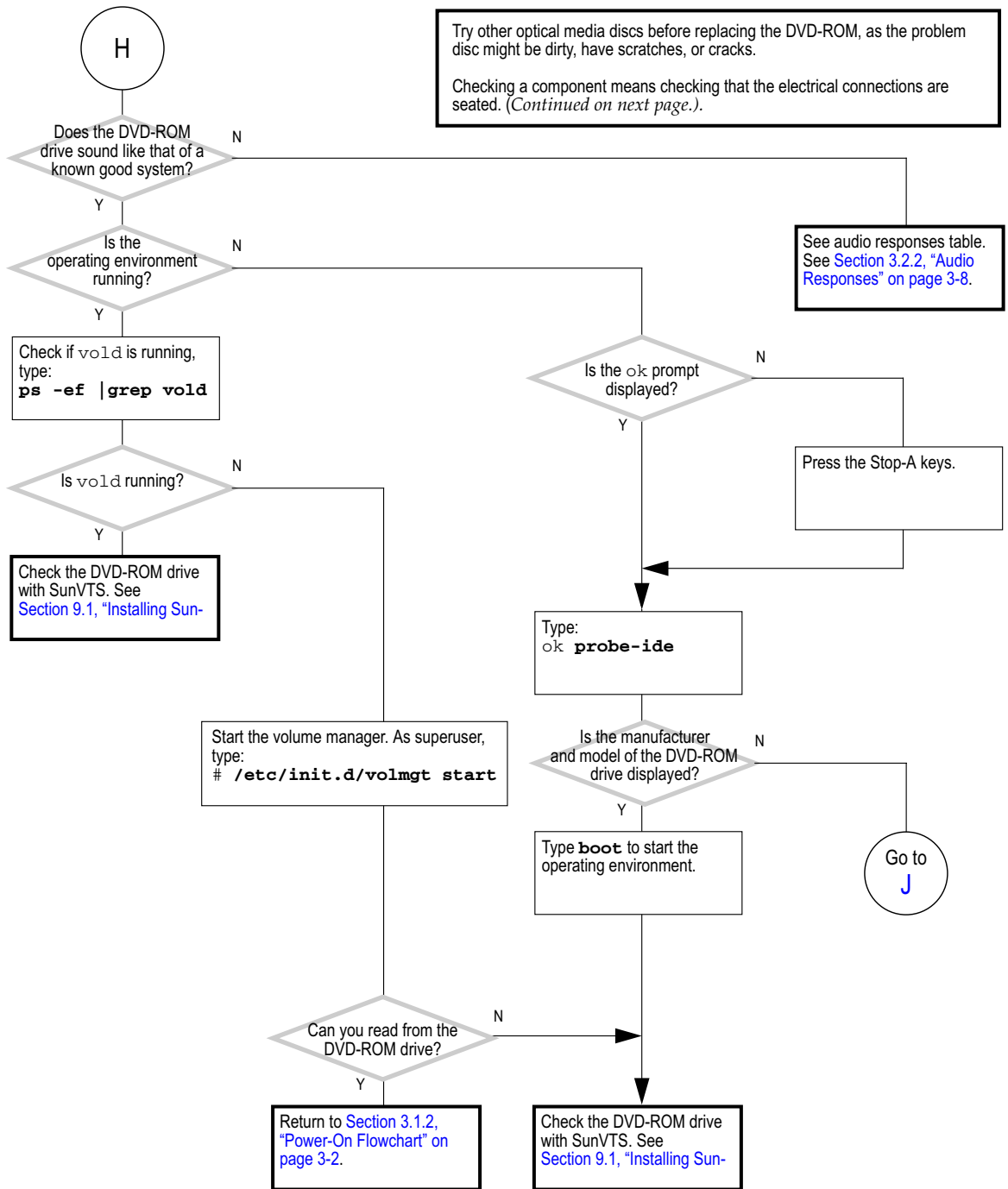


FIGURE 4-20 DVD-ROM Drive Problem (2 of 3)

The DVD-ROM headphone connector is not supported on the Sun Blade 2500. Do not remove the plastic rivet for the headphone connector.

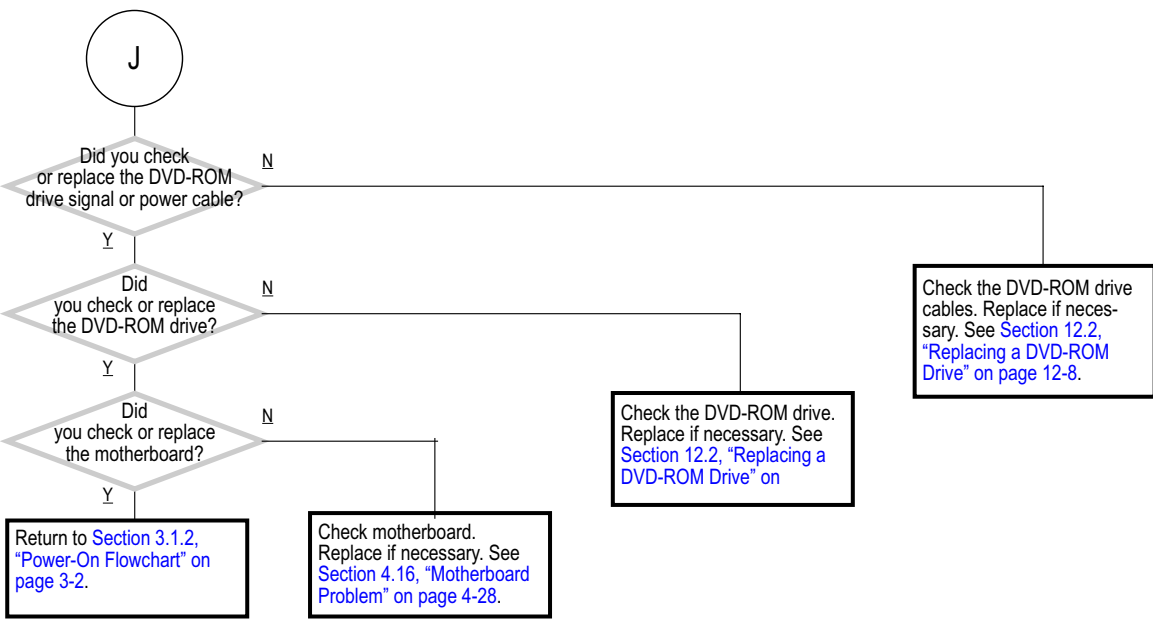
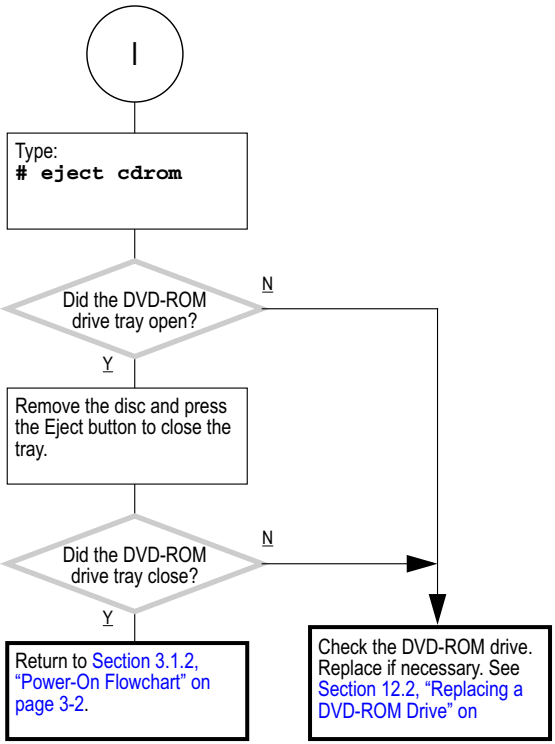


FIGURE 4-21 DVD-ROM Drive Problem (3 of 3)

## 4.13 PCI Card Problem

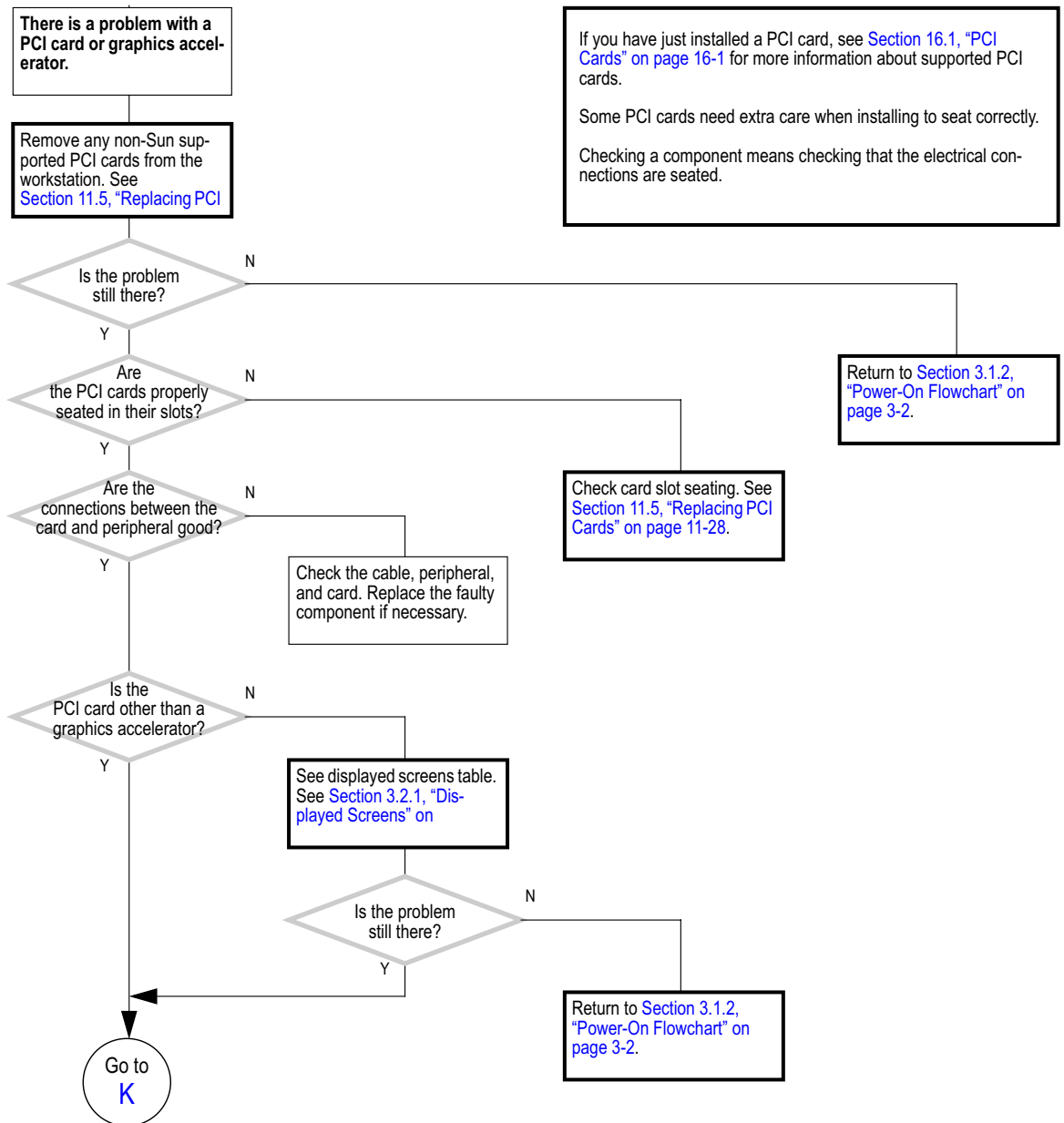
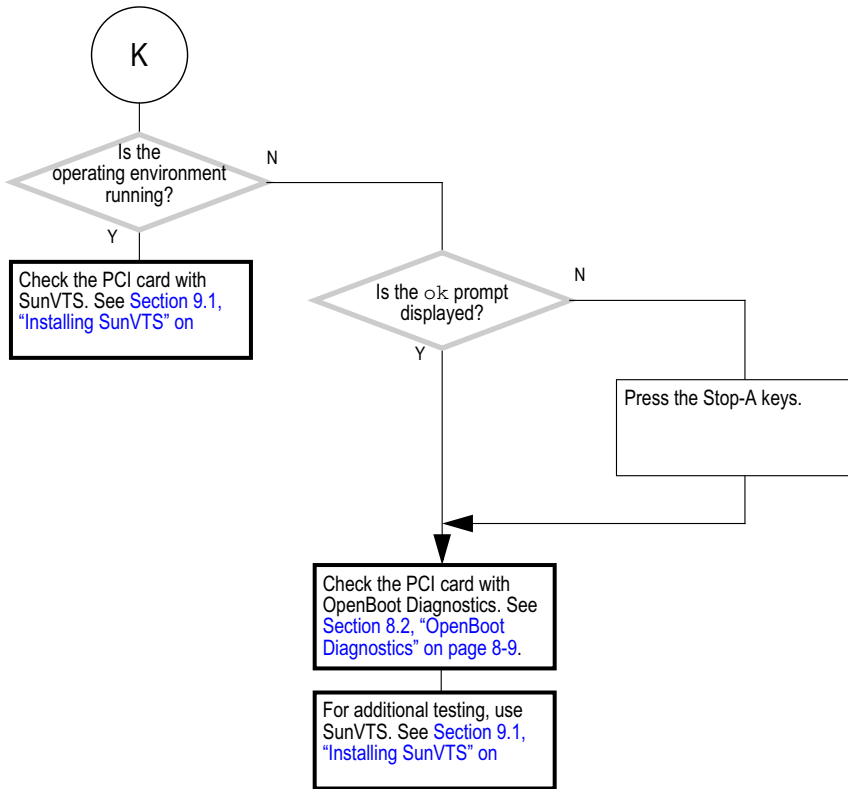


FIGURE 4-22 PCI Card Problem (1 of 2)



**FIGURE 4-23** PCI Card Problem (2 of 2)

## 4.14 IEEE 1394 Problem

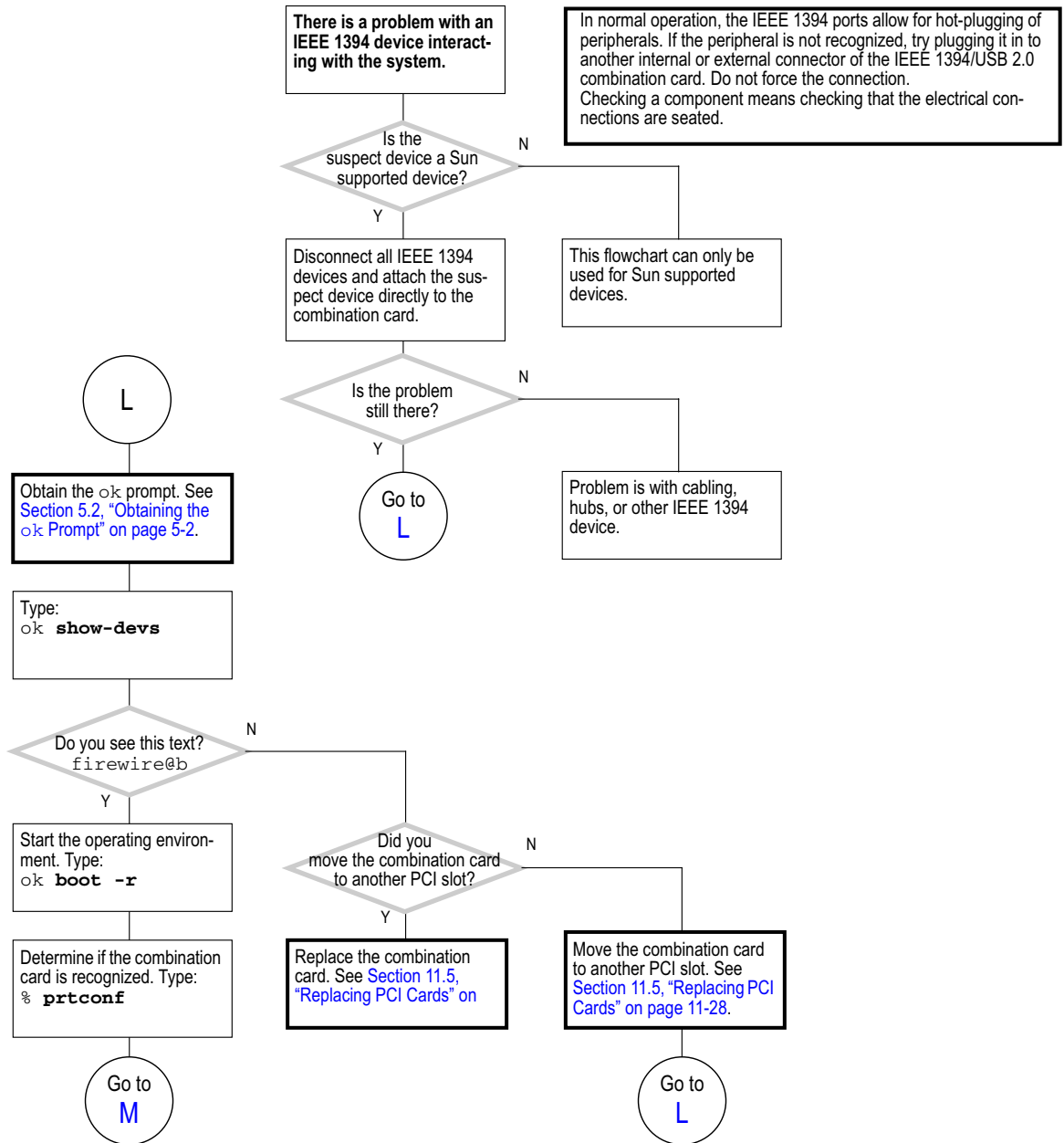
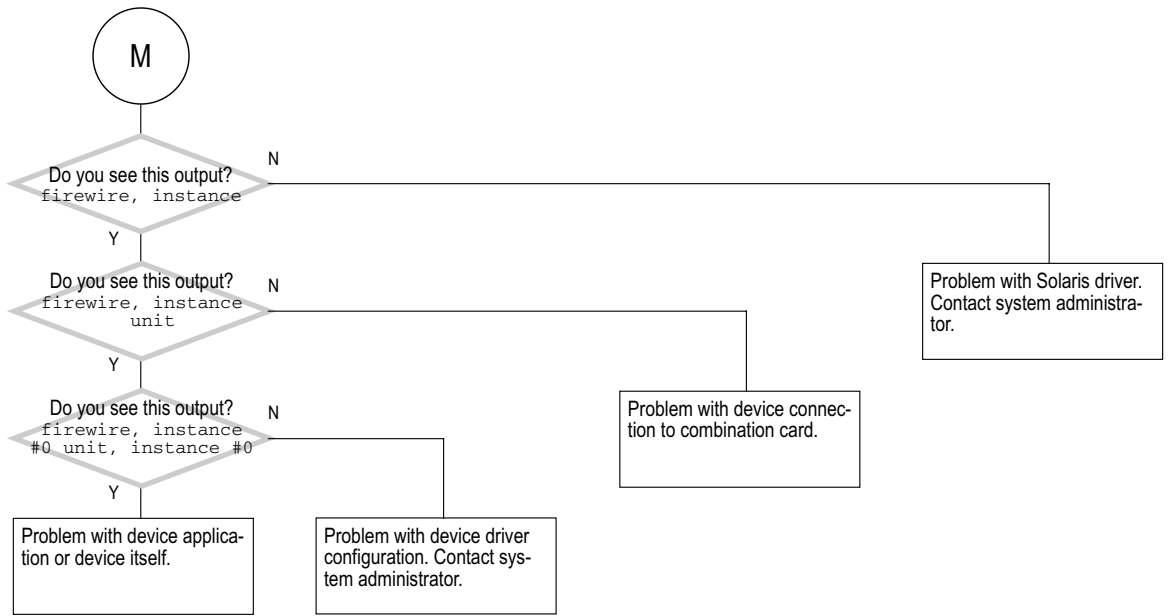


FIGURE 4-24 IEEE 1394 Problem (1 of 2)



**FIGURE 4-25** IEEE 1394 Problem (2 of 2)



## 4.15 Smart Card Reader Problem

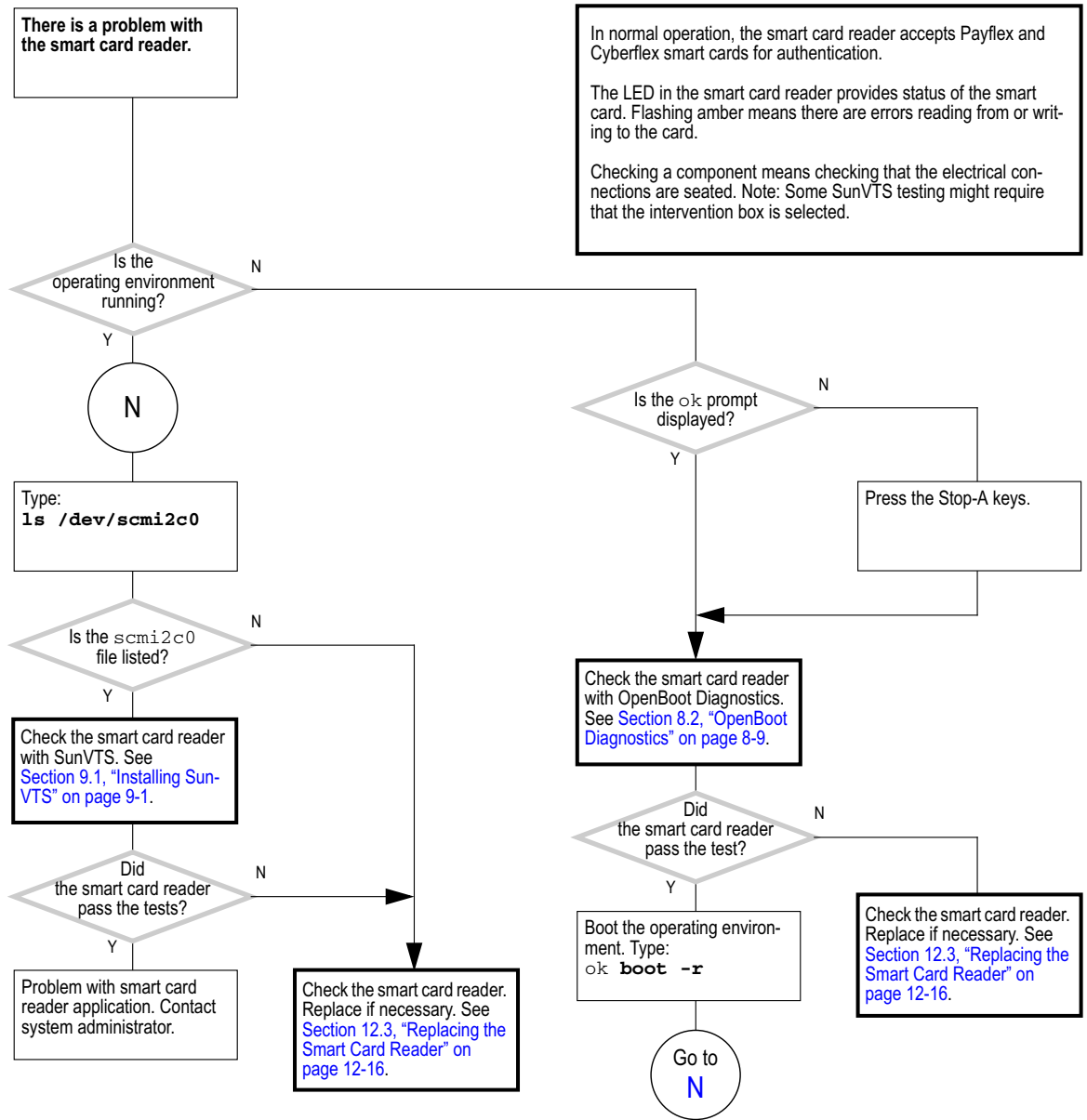


FIGURE 4-26 Smart Card Reader Problem

## 4.16 Motherboard Problem

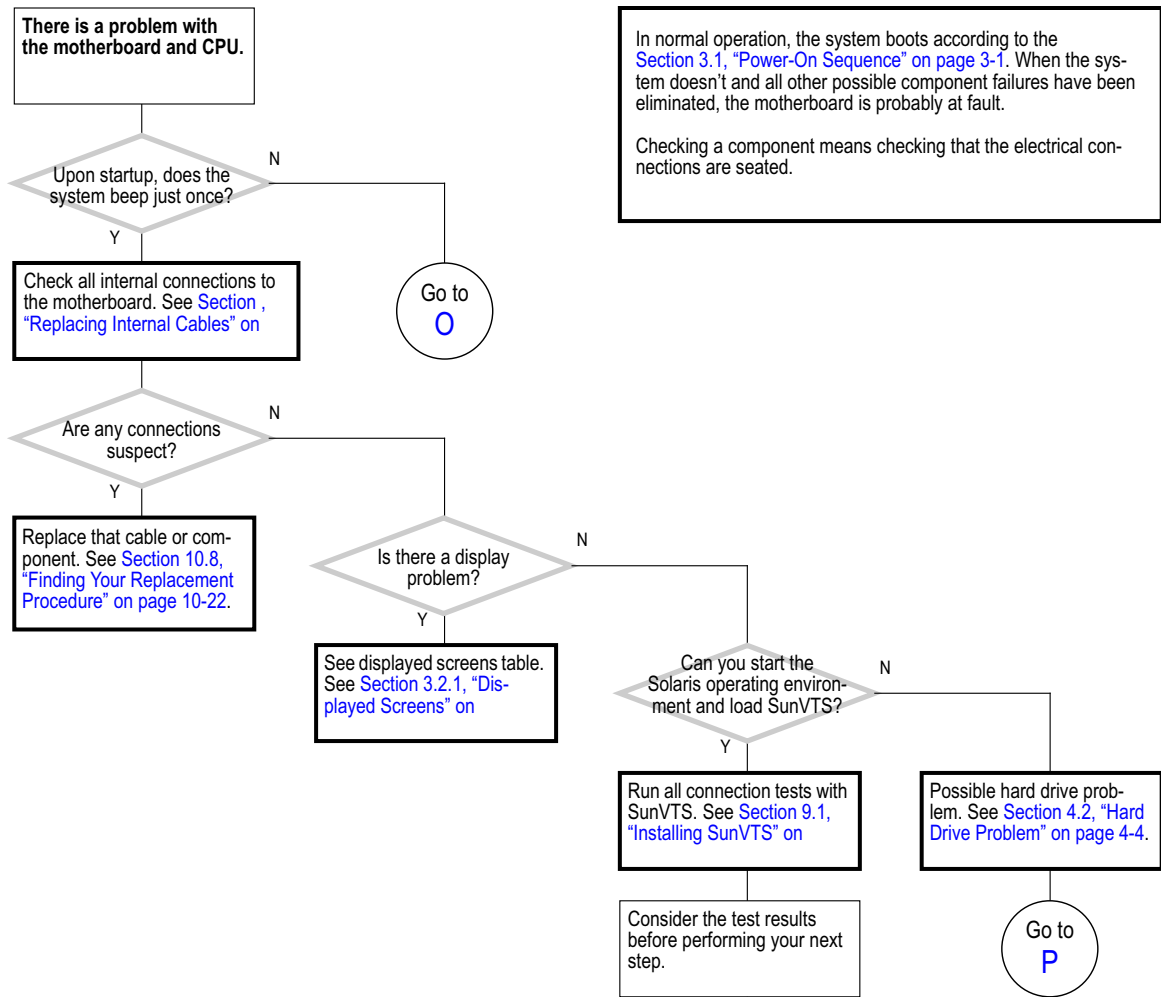
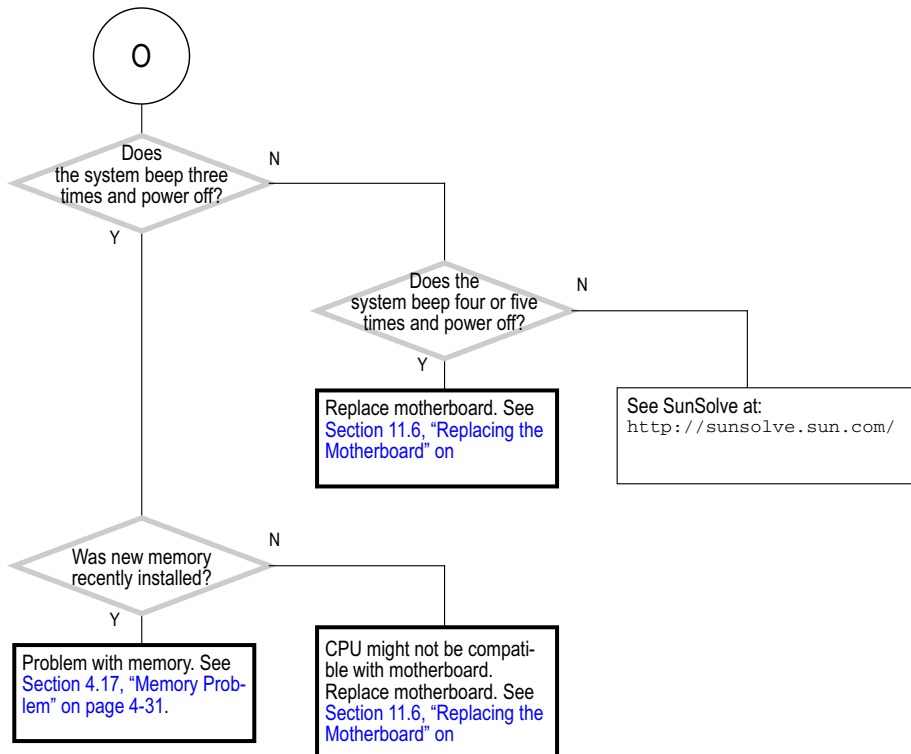


FIGURE 4-27 Motherboard Problem (1 of 3)



**FIGURE 4-28** Motherboard Problem (2 of 3)

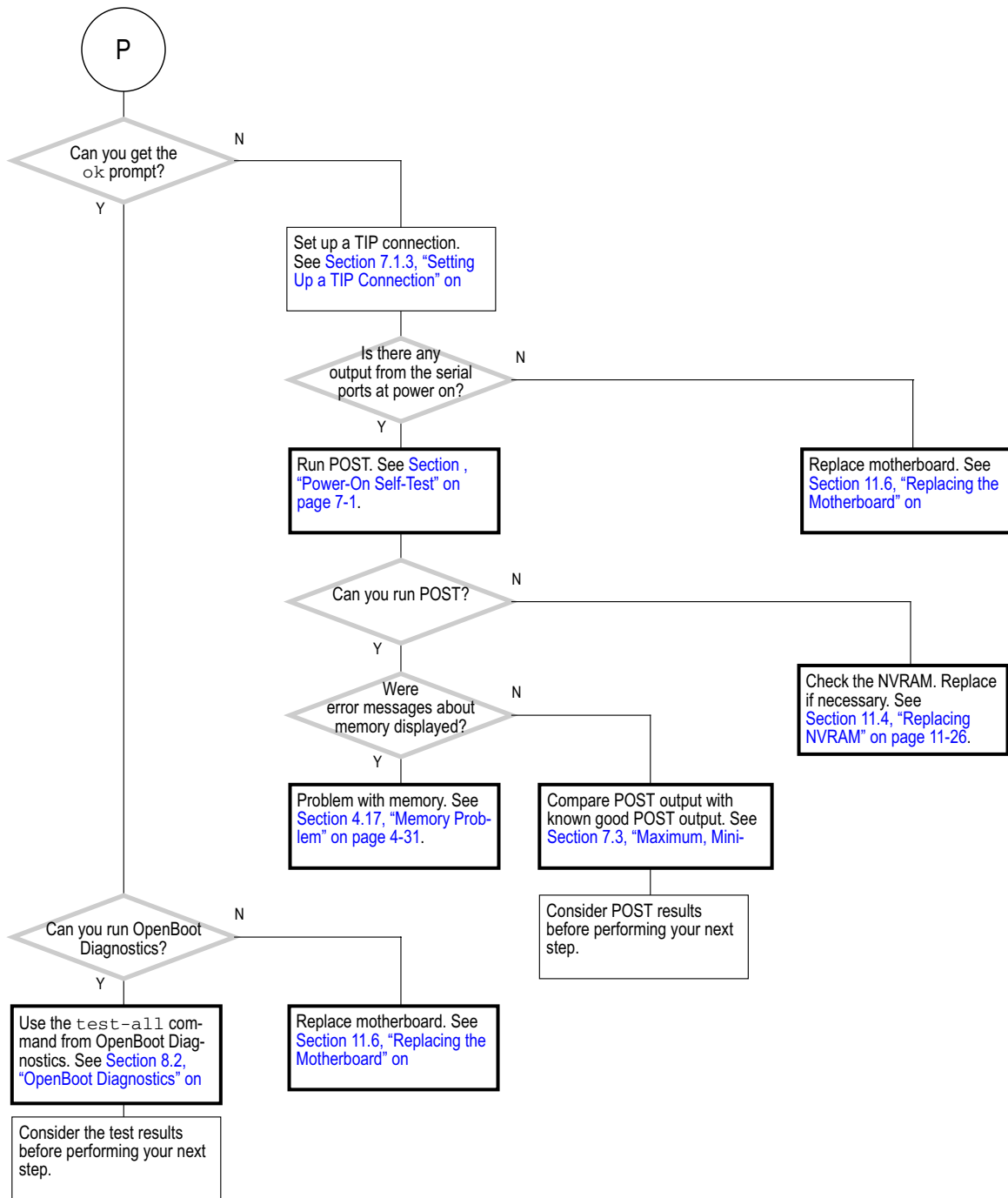


FIGURE 4-29 Motherboard Problem (3 of 3)

## 4.17 Memory Problem

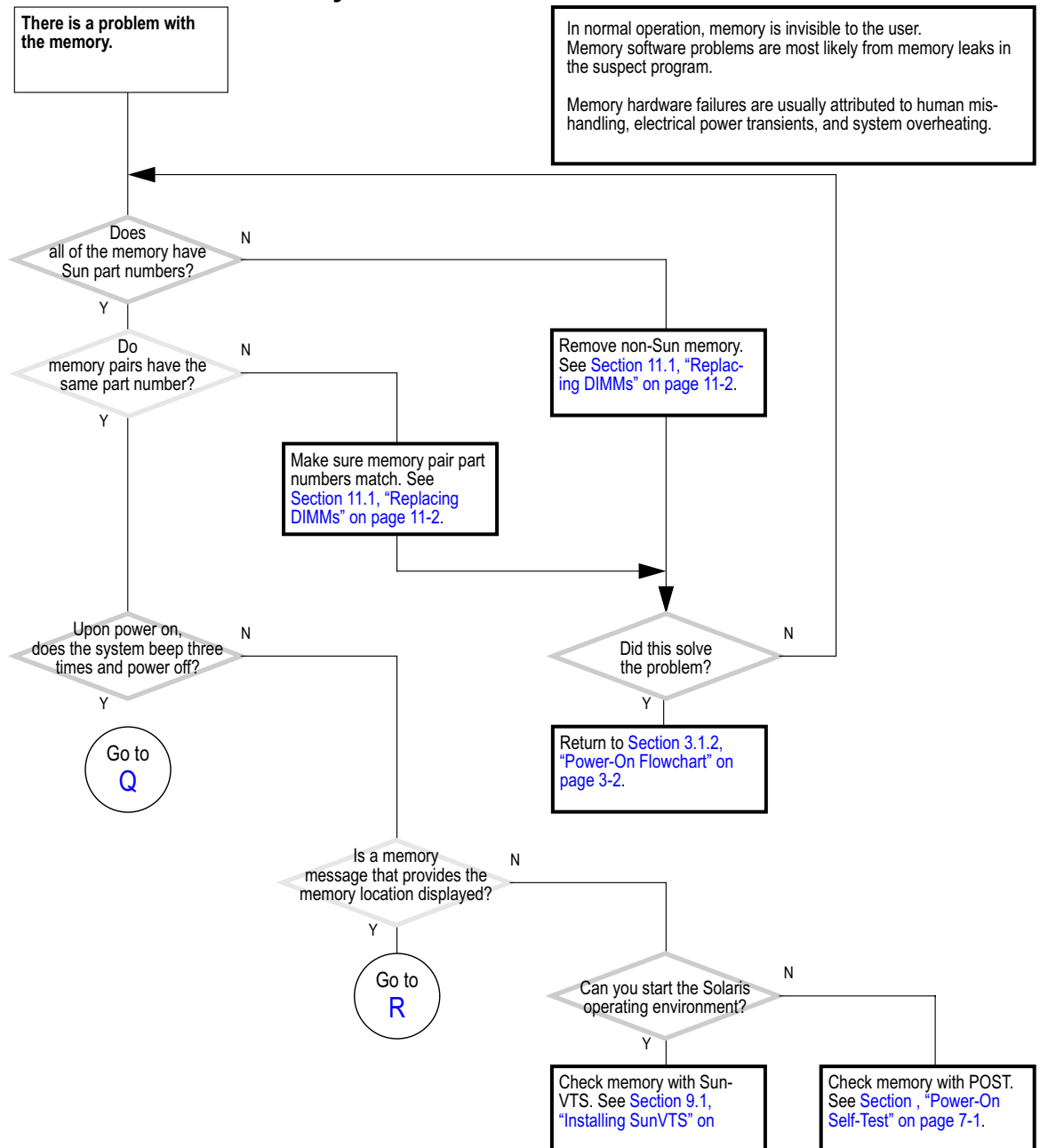


FIGURE 4-30 Memory Problem (1 of 2)

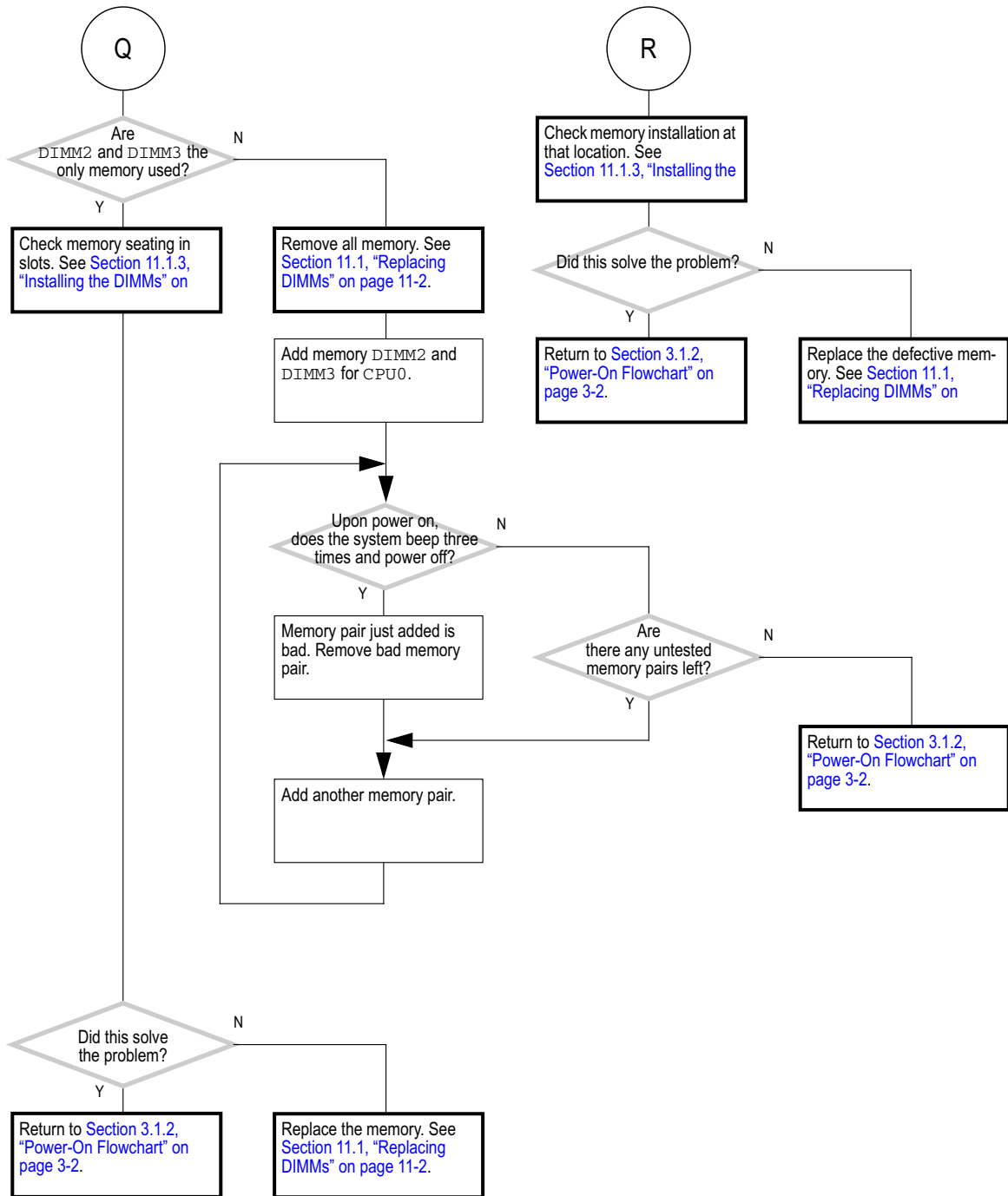


FIGURE 4-31 Memory Problem (2 of 2)

## 4.18 NVRAM Problem

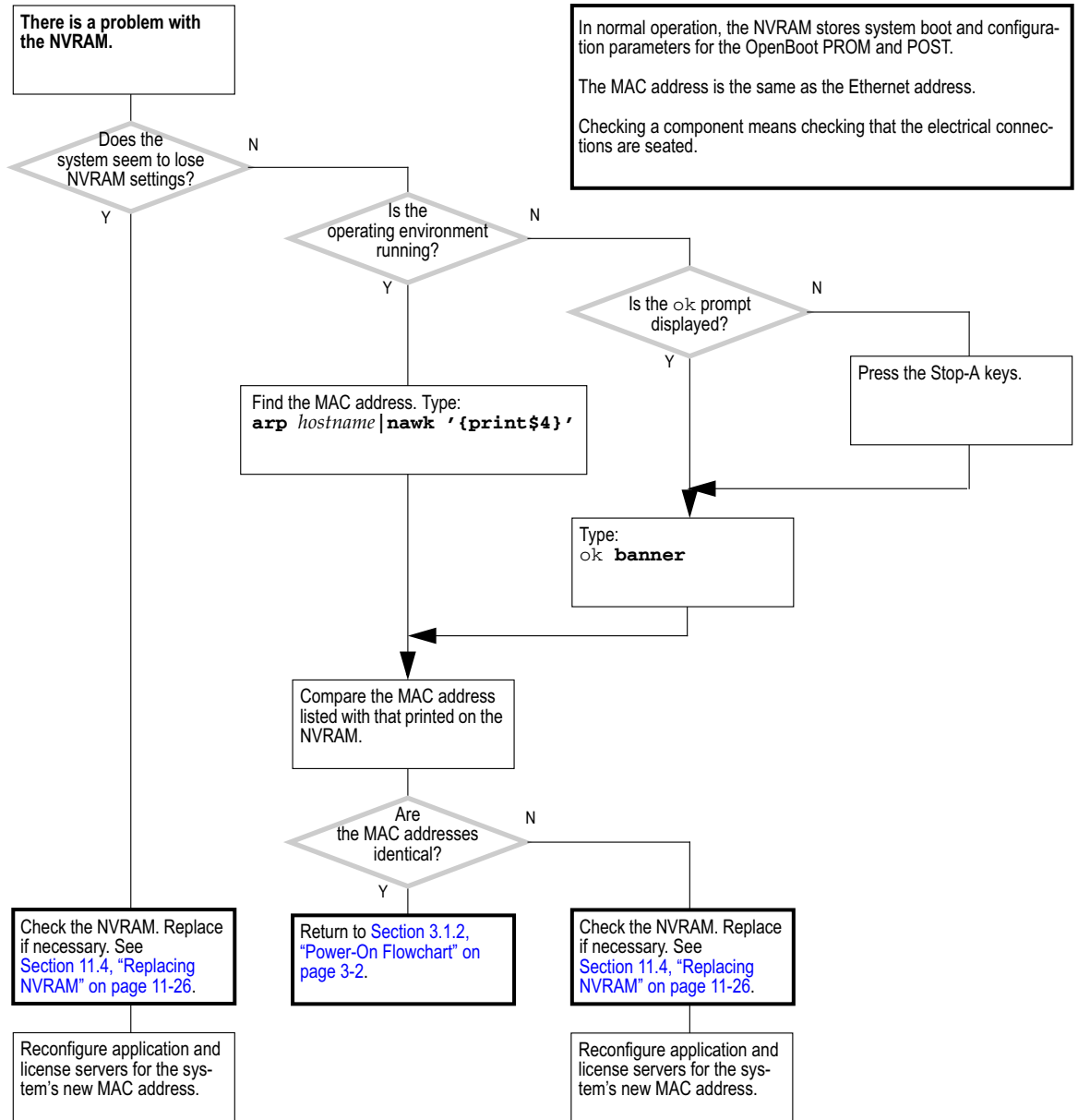


FIGURE 4-32 NVRAM Problem

## 4.19 Battery Problem

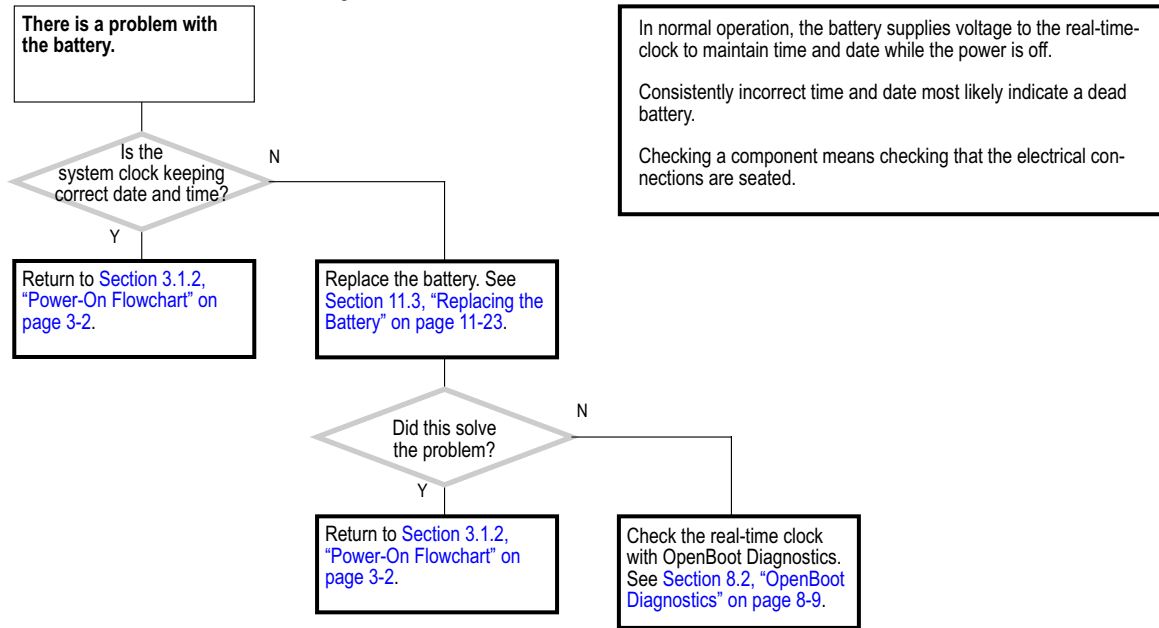


FIGURE 4-33 Battery Problem



# Introduction to Advanced Troubleshooting

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This chapter describes NVRAM, POST, OpenBoot PROM, and SunVTS advanced diagnostic troubleshooting tools.

This chapter contains information about the following topics:

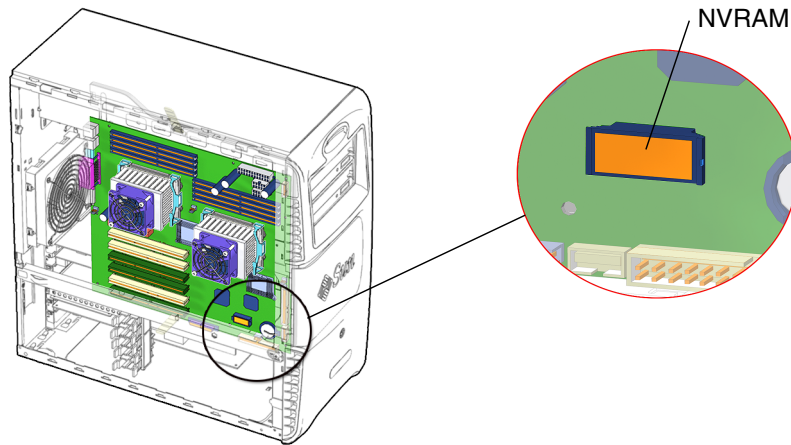
- Section 5.1, “About NVRAM” on page 5-1
- Section 5.2, “Obtaining the ok Prompt” on page 5-2
- Section 5.3, “Diagnostic Tests Summary” on page 5-3
- Section 5.4, “About Power-On Self-Test” on page 5-5
- Section 5.5, “About OpenBoot PROM” on page 5-8
- Section 5.6, “About SunVTS Software” on page 5-9
- Section 5.7, “About Sun Install Check” on page 5-10
- Section 5.8, “About Sun Blade 2500 Software Enhancement Script” on page 5-11

---

## 5.1 About NVRAM

After the Power button is pressed, the boot PROM receives and loads workstation configuration information from NVRAM.

NVRAM for the Sun Blade 2500 workstation is located on the motherboard at location U47. This 64-Kbit nonvolatile random access memory (NVRAM) serial EEPROM can be removed and transferred to another motherboard. NVRAM is a replaceable component and can be ordered.



**FIGURE 5-1** NVRAM Location and Identification

## 5.1.1 System NVRAM Configuration Variables

System configuration variables are stored in the workstation NVRAM. These variables determine the start-up system configuration and related communication characteristics. You can modify the values of the configuration variables, and any changes you make remain in effect even after a power cycle. To permanently change a NVRAM configuration variable you must be at the `ok` prompt.

---

**Note** – Configuration variables should be adjusted cautiously.

---

## 5.2 Obtaining the `ok` Prompt

At the `ok` prompt, you can make changes to NVRAM and conduct OpenBoot PROM tests. The following table lists procedures for obtaining the `ok` prompt, listed from most preferred to least desirable.



---

**Caution** – Using Stop-A causes a system abort which loses the system state and might corrupt file systems. Method 1 is the preferred procedure.

---

**TABLE 5-1** Methods for Obtaining the ok Prompt

Method	Situation	Procedure
1	Operating environment is functioning normally. You have superuser access.	<ol style="list-style-type: none"><li>1. Save all data and close all active applications.</li><li>2. Become superuser of the system.</li><li>3. Type: # <b>init 0</b></li></ol>
2	Operating environment is functioning normally. You do not have superuser access.	<ol style="list-style-type: none"><li>1. Save all data and close all active applications.</li><li>2. Momentarily press and release the front panel power button.</li><li>3. Select Shutdown from the Power Off window. (If a GUI is displayed)</li><li>4. In a few moments, the system will power off.</li><li>5. Momentarily press and release the front panel power button to power the system back on.</li><li>6. When the power LED flashes, press the power button twice quickly. Note: This will restore the NVRAM values to their defaults.</li></ol>
3	System is off.	<ol style="list-style-type: none"><li>1. Momentarily press and release the front panel power button to power the system back on.</li><li>2. When the power LED flashes, press the power button twice quickly.</li></ol>
4	Operating environment is not functioning normally. You can log in as superuser remotely.	Type: # <b>init 0</b>
5	System has just been powered on.	When the power LED flashes, press the power button twice quickly.
6	No other alternatives are available.	Press the Stop and A keys simultaneously. See caution.

---

## 5.3 Diagnostic Tests Summary

POST, OpenBoot PROM, and SunVTS are tools which can help you diagnose workstation malfunctions.

The following table summarizes POST, OpenBoot Diagnostic, and SunVTS component tests for the Sun Blade 2500 workstation.

**TABLE 5-2** POST, OpenBoot Diagnostics, and SunVTS Tests Available for the Sun Blade 2500 Workstation

Component Tested	POST	OpenBoot Diagnostic	SunVTS
CPU modules	Performs cache, memory, CPU, and FPU test.	No testing	cpu-unit0 (cputest) cpu-unit0 (l2cachetest) cpu-unit0 (l1dcachetest) cpu-unit0 (iutest) cpu-unit0 (fputest) cpupm (cpupmtest) ecache (ecachetest) system (systest)
Memory	diag level variable set to max performs tests including block memory and full memory tests.	No testing	mem (pmentest) kmem (vmemtest) ram (ramtest)  seeprom1 (seepromtest)
I/O bridge chip	Performs several tests including register tests (IOMMU, DMA).	No testing	No testing
Assorted motherboard components	No testing	i2c@0,320 pmu@6 rtc@0,70	adm1031 (env3test)
Flash PROM	Verification of POST portion checksum test.	flashprom@2,0	seeprom0 (seepromtest)
Graphics accelerator	No testing	SUNW,XVR-100@2 (No OBDiag test) SUNW,XVR-500@2  SUNW,XVR-600@2 SUNW,XVR-1200@2	pfb0 (pfbtest)  ifb0 (ifbtest)  jfb0 (jfbtest) jfb0 (jfbtest)
PCI cards	No testing	Tests are available if card is IEEE 1275 compliant.	

**TABLE 5-2** POST, OpenBoot Diagnostics, and SunVTS Tests Available for the Sun Blade 2500 Workstation (*Continued*)

Component Tested	POST	OpenBoot Diagnostic	SunVTS
1394 ports on combination card			dccamo (fwcabtest)
Hard drive	No testing	scsi@4	c0t0d0 (disktest)
DVD-ROM drive	No testing	ide@d	c0t2d0 (dvdtest)
Smart card reader	No testing	card-reader@0,40	scmi2c0 (sc2test)
Network	No testing	network@3*	bge0 (nettest) bge0 (net1btest)
USB ports	No testing	usb@a and usb@b	c1t0d0 (disktest) For USB removable media device.
Keyboard and mouse	No testing	keyboard@x (x varies as to which USB port the keyboard is attached.)	kbd (usbkbtest)
Parallel port	No testing	parallel@0,378*	ecpp0 (eccptest)
Serial ports	Used for POST output	serial@0,2e8 and serial@0,3f8*	su0 (sutest)
Audio module	No testing	sound@8*	sound0 (audiotest)

\* Additional test results are possible with a loopback connector installed. For additional information see *OpenBoot 4.x Command Reference Manual*, 816-1177.

## 5.4 About Power-On Self-Test

Power-On Self-Test (POST) is a firmware program used to identify workstation failures. When initiated, POST verifies the core functionality of the workstation.

## 5.4.1 POST Overview

POST diagnostics are used to verify core functionality of the workstation. That is, POST diagnostics are used to check operation of the CPUs, system memory, data switches, I/O bridges, and the PCI bus.

POST diagnostic firmware occupies a section of the motherboard's boot PROM. POST is invoked optionally at power-on by the OpenBoot program and depends on the setting of variables `diag-switch?` and `diag-level`. The values for `diag-switch?` and `diag-level` are stored in nonvolatile RAM (NVRAM).

---

**Note** – POST diagnostic and error message reports are displayed on a separate console terminal.

---

### 5.4.1.1 Controlling POST

The power-on test variables are:

- `diag-switch?`
- `diag-level`

Setting `diag-switch?` to `true` causes the function `diagnostic-mode?` to return `true`. When `diagnostic-mode?` returns `true`, the system:

- Performs more thorough self-tests during any subsequent power-on or system reset process. The coverage of self-tests executed depends on the value of `diag-level`. For maximum coverage, set the `diag-level` value to `max`.
- Might display additional status messages. The details are implementation-dependent.
- Uses different configuration variables for booting (than when POST is disabled).

The Sun Blade 2500 workstation has a factory default of `false` for the `diag-switch`. To set `diag-switch?` to `true`, type:

```
ok setenv diag-switch? true
ok
```

To set `diag-switch?` to `false`, type:

```
ok setenv diag-switch? false
ok
```

---

**Note** – When not in diagnostic mode, the system does not announce the diagnostic tests as they are performed (unless a test fails).

---

## 5.4.2 Using POST

When power is applied to the workstation, POST runs automatically if both of the following conditions apply:

- The `diag-switch?` NVRAM parameter is set to `true`.
- The `diag-level` is set to `min` or `max`.

---

**Note** – In the event of an automatic workstation reset, POST runs if the `diag-switch?` NVRAM parameter is set to `true` and the `diag-level` flag is set to either `max` or `min`.

---

If the `diag-switch?` is set to `false`, POST is disabled.

If `diag-switch?` is set to `true` and `diag-level` is set to `max`, then POST runs in `max` mode. If `diag-switch?` is set to `true` and `diag-level` is set to `min`, then POST runs in `min` mode.

---

## 5.5 About OpenBoot PROM

### 5.5.1 OpenBoot PROM Overview

OpenBoot PROM is the core software installed on the Sun Blade 2500 motherboard. This very basic software enables CPU, memory, I/O bridge, SouthBridge, and other motherboard components to perform minimal communication tasks to initially boot the Sun Blade 2500 to a state where it can load an operating environment from either an installed hard disk, a DVD-ROM, CD-ROM, the network, or from some other external boot device.

As shown in [TABLE 3-3, “OpenBoot PROM Messages and Their Meaning” on page 11](#), OpenBoot PROM plays a major role in system start-up. Should an error occur during the start-up process, an OpenBoot PROM message might be displayed. The error may occur during POST or during a time after POST diagnostics are completed and the OpenBoot PROM brings the Solaris operating environment up.

See [Section , “OpenBoot PROM” on page 8-1](#) for additional information.

### 5.5.2 OpenBoot Diagnostics

OpenBoot PROM has a collection of in-depth testing utilities and programs, available from both the `ok` and `obdiag` prompt.

To use the testing utilities and programs, see [Section , “OpenBoot PROM” on page 8-1](#).



---

## 5.6 About SunVTS Software

### 5.6.1 SunVTS Overview

The Sun Validation Test Suite (SunVTS) software is a comprehensive software diagnostic package that tests and validates hardware by verifying the connectivity and functionality of most hardware controllers, devices, and platforms.

### 5.6.2 Using SunVTS

SunVTS software executes multiple diagnostic tests from one graphical user interface (GUI) that provides test configuration and status monitoring. The user interface can run in the CDE or OPEN LOOK environments or through a TTY-mode interface for situations when running a GUI is not possible.

The SunVTS interface can run on one workstation to display a SunVTS test session of another workstation on the network.

SunVTS software is distributed with each SPARC™ or Solaris release on the Sun Computer Systems Supplement CD.

### 5.6.3 SunVTS Requirements

Your workstation must meet the following requirements to run SunVTS software:

- The SunVTS packages must be installed. The main package is `SUNWvts`. There are additional supporting packages that differ based on the revision of the Solaris operating environment that is installed. For specific details, see the corresponding SunVTS documentation.
- The workstation must be booted to the multiuser level (level 3).
- To run SunVTS software with a GUI, that GUI must be installed. Otherwise, run SunVTS software with the TTY-mode interface.

### 5.6.4 SunVTS References

To find out more information about using SunVTS software see the SunVTS documentation that corresponds to the Solaris release that you are running.

The SunVTS documents are part of the Solaris on Sun Hardware AnswerBook collection. This AnswerBook collection is preinstalled on the hard disk of new systems. It is also distributed on the Software Supplement CD that is part of each Solaris Media Kit release and is also accessible at <http://docs.sun.com>.

The following list describes the contents of each SunVTS document:

- *SunVTS 5.1 User's Guide* (816-5144) describes how to install, configure, and run the SunVTS diagnostic software.
- *SunVTS Quick Reference Card* (816-5146) provides an overview of how to use the SunVTS CDE interface.
- *SunVTS 5.1 Test Reference Manual* (816-5145) provides details about each individual SunVTS test.
- *SunVTS 5.1 Patch Set 5 Documentation Supplement* (817-4350) details new features, tests and test enhancements that were developed for the SunVTS patch set releases.

---

**Note** – Patch Set 5 supports Solaris 8 2/04. Subsequent and compatible versions of Solaris 8 could require patch set 6 or later.

---

For additional information about using SunVTS see [Section , “SunVTS” on page 9-1](#).

---

## 5.7 About Sun Install Check

### 5.7.1 Sun Install Check Overview

The Sun Install Check tool verifies and provides information about your Sun Blade 2500 workstation hardware and software configuration. Before you can run the Sun Install Check tool, you need to download it from the following web site:

<http://www.sun.com/software/installcheck/index.html>

The following procedure describes how to download the Sun Install Check tool. When installed, Sun Install Check occupies 15 MB of disk space.

## 5.7.2 Downloading and Running Sun Install Check

1. As superuser of the Sun Blade 2500 system, open a web browser and go to the Sun Install Check Tool web site:  
<http://www.sun.com/software/installcheck/index.html>
2. Click Get the Software.
3. Click Download Sun Install Check Tool.
4. Log in with your My Sun<sup>SM</sup>, Sun Store, or SunSolve<sup>SM</sup> username and password.

---

**Note** – If you are not a registered user, click Register Now and register.

---

5. Read and accept the licensing agreement.
6. Click Sun Install Check Application, English link and save the `sunic.zip` file to a download directory.
7. Go to the download directory and unzip the `sunic.zip` file.

```
# unzip sunic.zip
```

A `sunic` sub-directory is created, containing a `README` file.

8. Read the `README` file for further instructions to install and run the Sun Install Check tool.

---

## 5.8 About Sun Blade 2500 Software Enhancement Script

### 5.8.1 Software Enhancement Script Overview

The Sun Blade 2500 workstation software is continuously improved throughout the life cycle of the product. To guarantee that your system's software has the latest improvements, install the latest suggested patches for your system.

There are two ways to install patches:

- [“Using the Sun Blade 2500 Software Enhancement Script” on page 12](#)—Optimizes a Sun Blade 2500 system automatically.
- [Section 5.8.3, “Using the patchadd Command” on page 5-14](#)—Helpful when optimizing many Sun Blade 2500 workstations.

A list of the latest suggested patches is available in the *Sun Blade 2500 Product Notes*, 816-1001, available at:

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

## 5.8.2 Using the Sun Blade 2500 Software Enhancement Script

The software enhancement script uses the PatchPro program to simplify and automate the patch installation process.

Approximately 112 MB of temporary disk space is needed to download and install the software enhancement script. After installation, the script provides a method for simplified future patch updates and occupies 55 MB of disk space.

---

**Note** – More information about PatchPro software is available at: <http://patchpro.sun.com>

---

To run the script, you will need to know if a proxy server is used, and if so, its hostname or IP address and port. If the proxy server requires authentication, you also need the user ID and password. See [TABLE 5-3](#).

**TABLE 5-3** Important Proxy Server Information Needed

---

Proxy Server Hostname or IP Address	Proxy Server Port Number	Proxy Server User ID	Proxy Server Password
-------------------------------------	--------------------------	----------------------	-----------------------

---

The following procedure describes how to download and run the Sun Blade 2500 Software Enhancement Script.

1. **Open a web browser and go to the following Sun web site:**  
[http://sunsolve.sun.com/handbook\\_pub/Systems/SunBlade2500/SunBlade2500.html](http://sunsolve.sun.com/handbook_pub/Systems/SunBlade2500/SunBlade2500.html)
2. **Below the Quick Facts table, click the Sun Blade 2500 Software Enhancement Script link.**

3. **Download the `Sun_Blade_1500_2500_update.zip` file to a temporary directory, such as `/tmp`.**
4. **As superuser, unzip the `Sun_Blade_1500_2500_update.zip` file:**

```
# unzip Sun_Blade_1500_2500_update.zip
```

A subdirectory, `Sun_Blade_1500_2500`, is created and files are copied to this directory.

5. **Change to the `Sun_Blade_1500_2500` directory and start the Sun Blade 2500 Software Enhancement Script:**

```
# cd Sun_Blade_1500_2500
# ./sb2500ses
```

6. **The script begins and asks if you want to continue. Answer `y`.**

---

**Note** – If you have run the software enhancement script previously, or have already installed the PatchPro software, the script might skip [Step 7](#) through [Step 9](#).

---

7. **The script states that it will install software and asks you to continue. Answer `y`.**
8. **The script asks if you have a direct internet connection or a proxy server.**
  - If you connect directly to the internet, answer 1. Go to Step 9.
  - If you have a proxy server, answer 2. Provide the hostname or IP address of the proxy server and the appropriate port.
  - If the proxy server does not require authentication, answer n. Go to [Step 9](#).
  - If the proxy server requires authentication, answer `y`. Provide the proxy server user ID and password.
9. **The script displays your responses and requests user verification; answer appropriately.**

If PatchPro is not already installed, the software enhancement script installs the program (installing support and configuration packages), then displays the system configuration.

The script accesses Sun databases to identify the suggested patches for your system. About three minutes later, the script displays the patches to be installed.

For example:

```
/var/spool/pkg/patchpro/xxxxx-x.jar has been validated.  
/var/spool/pkg/patchpro/yyyyy-y.jar has been validated.  
/var/spool/pkg/patchpro/zzzzz-z.jar has been validated.
```

---

**Note** – The variables *xxxxx-x*, *yyyyy-y*, and *zzzzz-z* represent patch ID numbers.

---

The script installs the patches and indicates that they have been applied.

For example:

```
xxxxx-x has been applied  
yyyyy-y has been applied  
zzzzz-z has been applied
```

The script ends:

```
Download and installation of patches completed.
```

**10. If requested by a patch, reboot the system after installing all of the patches.**

For example:

```
# reboot -- -r
```

**11. After completing the software enhancement script, you can verify the system configuration by running the Sun Install Check tool.**

See [Section 5.7, “About Sun Install Check”](#) on page 5-10.

## 5.8.3 Using the patchadd Command

**1. Go to the Sun web site:**

<http://sunsolve.sun.com>

**2. Click the Patchfinder link.**

**3. Enter a patch ID into the field and click Find Patch.**

You can find patch IDs in the *Sun Blade 2500 Product Notes*, 816-1001, available at:  
<http://www.sun.com/documentation>

**4. Download the patch to a temporary location.**

**5. Repeat Step 3 and Step 4 for each patch required.**

**6. Become superuser of the system to receive the patch(es).**

**7. Transfer and unzip each patch.**

For example:

```
# unzip xxxxxx-x
```

---

**Note** – The variable *xxxxxx-x* represents a patch ID number.

---

**8. Install each patch.**

For example:

```
# patchadd xxxxxx-x
```

**9. Repeat Step 7 and Step 8 for each patch required.**

**10. If requested by a patch, reboot the system after installing all of the patches.**

For example:

```
# reboot -- -r
```

**11. You can verify the system configuration by running the Sun Install Check tool.**

See [Section 5.7, "About Sun Install Check"](#) on page 5-10.





# NVRAM

---

The workstation's system configuration variables are stored in NVRAM. These variables determine the startup configuration of your workstation. You can modify the configuration variables stored in NVRAM and change the startup configuration of your workstation by using the `setenv` configuration command at the `ok` prompt.

This chapter describes how to change your NVRAM configuration variables and how to use your USB keyboard to abort or reset NVRAM by using the Stop-A command or the Stop-N equivalent procedure.

---

**Note** – The Stop-A and Stop-N keys are sometimes referred to as “OpenBoot Emergency Procedures”.

---

This chapter contains information about the following topics:

- [Section 6.1, “NVRAM Configuration” on page 6-1](#)
- [Section 6.2, “Stop-A Command” on page 6-8](#)
- [Section 6.3, “Stop-N Equivalent Command Procedure” on page 6-9](#)

---

## 6.1 NVRAM Configuration

System configuration variables are stored in the workstation NVRAM. These variables determine the start-up system configuration and related communication characteristics. You can modify the values of the configuration variables, and any changes you make remain in effect even after a power cycle. Configuration variables should be adjusted cautiously.

## 6.1.1 NVRAM Configuration Variables

TABLE 6-1 lists a typical set of NVRAM configuration variables defined by *IEEE Standard 1275-1994*.

**TABLE 6-1** Standard Sun Blade 2500 NVRAM Configuration Variables

Variable	Typical Default	Description
auto-boot?	true	If true, boots automatically after power on or reset.
boot-command	boot	Command that is executed if auto-boot? is true.
boot-device	disk net	Device from which to boot.
boot-file	empty string	Arguments passed to booted program.
diag-device	net	Diagnostic boot source device.
diag-file	empty string	Arguments passed to booted program in diagnostic mode.
diag-switch?	false	If true, run in diagnostic mode.
diag-script	none	
input-device	keyboard	Console input device (usually keyboard, ttya, or ttyb).
nvrarc	empty	Contents of nvrarc.
oem-banner	empty string	Custom OEM banner (enabled by oem-banner? true).
oem-banner?	false	If true, use custom OEM banner.
oem-logo	no default	Byte array custom OEM logo (enabled by oem-logo? true). Displayed in hexadecimal.
oem-logo?	false	If true, displays custom OEM logo (else, displays Sun logo).
output-device	screen	Console output device (usually screen, ttya, or ttyb).
screen-#columns	80	Number of on-screen columns (characters/line).
screen-#rows	34	Number of on-screen rows (lines).
security-#badlogins	no default	Number of incorrect security password attempts.
security-mode	none	Firmware security level (options: none, command, or full).

**TABLE 6-1** Standard Sun Blade 2500 NVRAM Configuration Variables (*Continued*)

Variable	Typical Default	Description
security-password	no default	Firmware security password (never displayed).
use-nvramrc?	false	If true, executes commands in <code>nvramrc</code> during system start-up.
local-mac-address?	true	If true, network devices use their own MAC addresses.
error-reset-recovery	boot	Recovery action after an error reset CPU trap (options: none, sync, or boot).

**Note** – Different OpenBoot implementations may use different defaults and different configuration variables.

## 6.1.2 Displaying and Changing Configuration Variable Settings

NVRAM configuration variables can be viewed and changed using the commands listed in [TABLE 6-2](#).

**TABLE 6-2** Configuration Variable Commands

Command	Description
<code>printenv</code>	Displays current configuration variables and current default values. <code>printenv variable</code> shows the current value of the named variable.
<code>setenv variable-name value</code>	Sets <i>variable-name</i> to the given numeric or text <i>value</i> . Changes are permanent, but often take effect only after a reset.
<code>set-default variable</code>	Resets the value of <i>variable</i> to the factory default.
<code>set-defaults</code>	Resets all variable values to the factory defaults.
<code>password</code>	Sets <code>security-password</code> .

To display a list of the current variable settings for your workstation, type:

---

**Note** – You must first obtain an ok prompt. See [Section 5.2, “Obtaining the ok Prompt”](#) on page 5-2.

---

**CODE EXAMPLE 6-1** `printenv` Output

```
ok printenv
Variable Name          Value          Default Value
oem-logo
oem-logo?              false          false
oem-banner
oem-banner?            false          false
output-device          ttya           screen
input-device           ttya           keyboard
diag-file
diag-device            net            net
boot-file
boot-device            disk           disk net
auto-boot?             false          true
fcode-debug?           true           false
use-nvramrc?           false          false
nvramrc
screen-#columns        80             80
screen-#rows           34             34
security-mode          none           none
security-password
security-#badlogins    0
diag-switch?          true           false
ok
```

In the displayed, formatted list of the current settings, numeric variables are often shown in decimal format.

To permanently change a variable setting, type:

```
ok setenv variable-name value
```

where *variable-name* is the name of the variable and *value* is a numeric value or text string appropriate to the named variable. A numeric value is interpreted as a decimal number, unless preceded by `0x`, which is the qualifier for a hexadecimal number.

For example, to set the `auto-boot?` variable to `false`, type:

```
ok setenv auto-boot? false  
ok
```

---

**Note** – Many variable changes do not affect the operation of the firmware until the next power cycle or system reset, at which time the firmware uses the variable’s new value.

---

You can reset most of the NVRAM configuration variables to the original defaults using the `set-default variable` and `set-defaults` commands.

For example, to reset the `auto-boot?` variable to its default setting (`true`), type:

```
ok set-default auto-boot?  
ok
```

To reset most variables to their default settings, type:

```
ok set-defaults  
ok
```

## 6.1.3 Selecting Boot Options

You can use the `auto-boot?` configuration variable to determine whether or not the system boots automatically after a power cycle or system reset.

If `auto-boot?` is `true` and if OpenBoot is not in diagnostic mode, the system boots automatically after a power cycle or system reset using the `boot-device` and `boot-file` values.

If `auto-boot?` is `true` and if OpenBoot is in diagnostic mode, the system boots automatically after a power cycle or system reset using the `diag-device` and `diag-file` values.

These variables can also be used during manual booting to select the boot device and the program to be booted. For example, to specify default booting from the network server, type:

```
ok setenv boot-device net
ok
```

Changes to `boot-file`, `boot-device`, `diag-file`, and `diag-device` take effect the next time that `boot` is executed.

## 6.1.4 Setting NVRAM Security Mode

### 6.1.4.1 NVRAM `security-mode`

`NVRAM security-mode` may be used to restrict the set of operations that users are allowed to perform from the user interface. The three security modes, and their available commands, are listed in the following table in the order of most to least secure.

**TABLE 6-3** Commands Available for NVRAM `security-mode` Settings

Setting	Commands
<code>command</code>	All commands except <code>boot</code> and <code>go</code> require the password.
<code>full</code>	All commands except <code>go</code> require the password.
<code>none</code>	No password is required (default).

#### `command` *Security*

With NVRAM `security-mode` set to `command`:

- A password is not required if you type the `boot` command by itself. However, if you use the `boot` command with an argument, a password is required.
- The `go` command does not require a password.
- A password is required to execute any other command.

Examples are shown in the following screen.

```
ok boot                               (password required)
ok go                                 (no password required)
ok boot filename                     (password required)
Password                               (password is not echoed as it is typed)
ok reset-all                         (password required)
Password:                              (password is not echoed as it is typed)
```



---

**Caution** – Remember your security password.

---



---

**Caution** – Always set the security password *before* setting the security mode. If you forget this password, you cannot use your system; you must call customer support service to make your system bootable again.

---

To set the security password and command security mode, type the following at the ok prompt:

```
ok password
ok New password (only first 8 chars are used):
ok Retype new password:
ok setenv security-mode command
ok
```

The security password you assign must be between zero and eight characters. Any characters after the eighth are ignored. You do not have to reset the system; the security feature takes effect as soon as you type the command.

---

**Note** – If you enter an incorrect security password, there is a delay of about 10 seconds before the next boot prompt appears. The number of times that an incorrect security password is typed is stored in the `security-#badlogins` variable.

---

## Full Security

The full security mode is the most restrictive. With `security-mode` set to full:

- A password is required any time you execute the `boot` command.
- The `go` command does not require a password.
- A password is required to execute any other command.

Here are some examples:

```
ok go (no password required)
ok boot (password required)
Password: (password is not echoed as it is typed)
ok boot filename (password required)
Password: (password is not echoed as it is typed)
ok reset-all (password required)
Password: (password is not echoed as it is typed)
```



---

**Caution** – Always set the security password *before* setting the security mode. If you forget this password, you cannot use your system; you must call customer support service to make your system bootable again

---

To set the security password and `full` security mode, type the following at the `ok` prompt:

```
ok password
ok New password (only first 8 chars are used):
ok Retype new password:
ok setenv security-mode full
ok
```

`none` *Security*

With the NVRAM `security-mode` set to `none` a password is not required. This is the default condition for NVRAM.

---

## 6.2 Stop-A Command

Use the Stop-A command to abort an OpenBoot process. When issuing the Stop-A command for the Sun Blade 2500 workstation, press both the Stop and A keys immediately after powering on the workstation. Hold both keys down until the workstation beeps.

---

**Note** – Using Stop-A does not allow the workstation to perform a core dump. This information could be useful to you if the operating environment has crashed.

---



---

**Note** – Before issuing a Stop-A command, ensure that the keyboard is connected to USB0 or USB1.

---

## 6.3 Stop-N Equivalent Command Procedure

The Sun Blade 2500 workstation uses a USB Type-6 keyboard. Workstations that use USB type 6 keyboards cannot use the old Stop-N command to reset workstation configuration variables. Instead, the following Stop-N equivalent procedure must be used to reset your workstation configuration variables.

To reset NVRAM configuration variables temporarily perform the following procedure:

1. **Power on the workstation and wait until the front panel Power button LED begins to blink and you hear an audible beep.**
2. **Quickly press the front panel Power button twice (as you would double-click a mouse).**

A screen similar to the following is displayed to indicate that you have successfully reset NVRAM contents to the default values. If a screen does not appear repeat steps 1 and 2.

### CODE EXAMPLE 6-2 NVRAM Output

```
Sun Blade 2500 (2 X UltraSPARC-IIIi), Keyboard Present
OpenBoot 4.x, 512 MB memory installed, Serial #12134241.
Ethernet address 8:0:20:b9:27:61, Host ID: 80b92761.

Safe NVRAM mode, the following nvram configuration variables have
been overridden:
  'diag-switch?' is true
  'use-nvramrc?' is false
  'input-device', 'output-device' are defaulted
  'ttya-mode', 'ttyb-mode' are defaulted

These changes are temporary and the original values will be restored
after the next hardware or software reset.

ok
```

The Stop-N equivalent command resets some of the NVRAM configuration variables to their defaults (TABLE 6-4). For example, TTYA mode settings are reset to their default values.

When Stop-N is started, the workstation NVRAM settings are only reset to their defaults for a single power cycle.

---

**Note** – If you use the Stop-N equivalent command to reset the system at this point, the NVRAM settings are not permanently changed.

---

Typing **set-defaults** discards any customized NVRAM values and permanently restores the default settings for all NVRAM configuration parameters.

---

**Note** – Once the Power button LED stops blinking and stays lit, pressing the Power button again powers off the system.

---

You can however manually change each NVRAM setting. To view and change NVRAM setting see [“System NVRAM Configuration Variables”](#) on page 2.

**TABLE 6-4** Stop-N Equivalent Configuration Variables

---

Variable	Stop-N Equivalent Reset (Default Setting)	Description
diag-switch?	true	Workstation runs in diagnostic mode
use-nvramrc?	false	Do not use the contents of nvramrc
input-device	keyboard	Console input device
output-device	screen	Console output device screen.
ttya-mode	printenv	Serial0 port default settings. See <a href="#">Section 7.1.3, “Setting Up a TIP Connection”</a> on page 7-3 and <a href="#">Section 7.1.4, “Viewing POST Output From an External Display Device”</a> on page 7-5.
ttyb-mode	printenv	Serial port default settings. See <a href="#">Section 7.1.3, “Setting Up a TIP Connection”</a> on page 7-3 and <a href="#">Section 7.1.4, “Viewing POST Output From an External Display Device”</a> on page 7-5.

---

# Power-On Self-Test

---

This chapter describes how to prepare for and initiate power-on self-test (POST) diagnostics for the Sun Blade 2500 workstation.

This chapter contains the following topics:

- [Section 7.1, “Preparing for POST Diagnostics” on page 7-1](#)
- [Section 7.2, “Setting Up POST” on page 7-6](#)
- [Section 7.3, “Maximum, Minimum, and Menu Levels of POST” on page 7-7](#)
- [Section 7.4, “Analyzing POST Results” on page 7-20](#)

---

## 7.1 Preparing for POST Diagnostics

Before running POST:

- You must also verify baud rates between the workstation and a monitor or the workstation and a terminal.
- You must first configure a terminal interface processor (TIP) connection to another workstation or to an external terminal to view POST progress, error, warning, or information output messages.

## 7.1.1 Verifying the Baud Rate

To verify the baud rate between the workstation under test and a terminal or another Sun workstation monitor:

1. Open a terminal window.
2. Type `eeeprom`

---

**Note** – `eeeprom` is a Solaris command.

---

3. Verify the following serial port default settings as follows:

```
ttyb-mode = 9600,8,n,1,-  
ttya-mode = 9600,8,n,1,-
```

---

**Note** – Ensure that the settings are consistent with TTY-type terminal or system monitor settings.

---

4. If the serial port default settings are not correct see [Section 7.1.2, “Setting the Baud Rate”](#) on page 7-2.

## 7.1.2 Setting the Baud Rate

- From the `ok` prompt of the workstation under test, type:

```
ok setenv ttya-mode=9600,8,n,1,-
```

## 7.1.3 Setting Up a TIP Connection

A TIP connection enables a terminal window in a remote workstation to be used as a terminal for display of workstation diagnostic and test data. Serial0 port of a tested Sun Blade 2500 workstation is used to establish a TIP connection between the Sun Blade 2500 workstation being tested and another Sun workstation monitor or terminal.

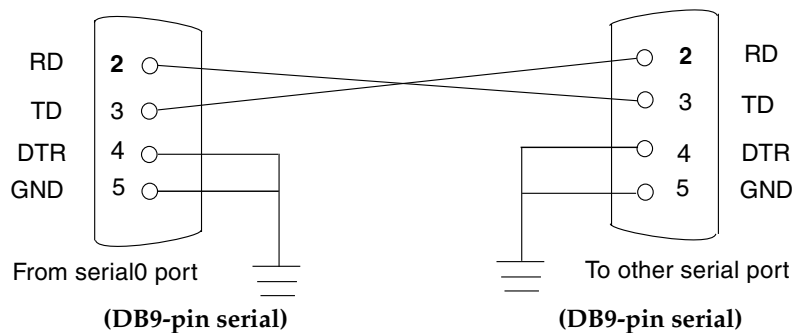
To set up a TIP connection:

1. Use a 3-wire null modem cable to connect serial0 port of the Sun Blade 2500 workstation under test to the serial port of another Sun system (connect cable pins 2-3, 3-2, 4-GND, and 5-GND).

---

**Note** – Not all Sun systems have 3-wire null modem cables shipped with them. These cables are available through your local computer hardware store.

---

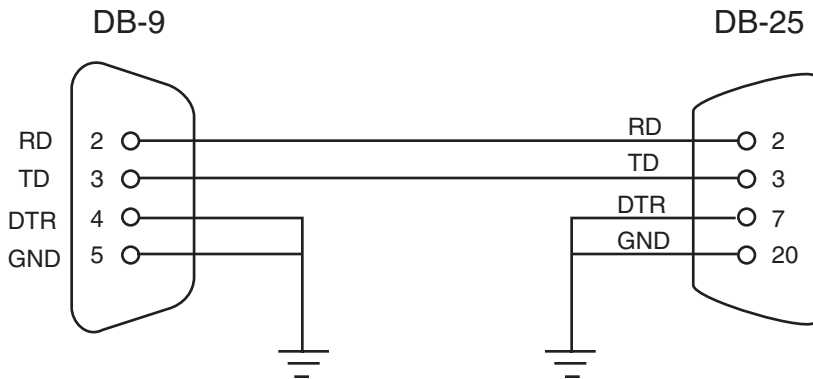


**FIGURE 7-1** Setting Up a TIP Connection—DB9 Connector to DB9 Connector

---

**Note** – With the use of an RJ45 to DB9 adapter, it is possible to use two RJ45 connectors and a length of ethernet cable to establish a TIP connection between workstations. Use [FIGURE 7-1](#) as a guide to connect the DB9 workstation serial connector under test to a second DB9 serial port of another Sun system. It is also possible to use two RJ45 connectors and a length of ethernet cable to establish a TIP connection between workstations with DB9 and DB25 serial ports. Use as a guide to connect the DB9 workstation serial connector to a DB25 serial port.

---



**FIGURE 7-2** Setting Up a TIP Connection—DB9 Connector to DB25 Connector

---

**Note** – Many specialized cables and connectors can be obtained through Sun Solve at:

[http://www.sunsolve.sun.com/handbook\\_pub/Devices/Cables/cables\\_ext\\_data.html](http://www.sunsolve.sun.com/handbook_pub/Devices/Cables/cables_ext_data.html)

---

2. At the other Sun system, check the `/etc/remote` file by changing to the `/etc` directory and then editing the `remote` file:

```
hardware:\
      :dv=/dev/term/b:br#9600:e1=^C^S^Q^U^D:ie=%$:oe=^D:
```

---

**Note** – The example shows connection to the serial port of the other Sun system.

---

3. To use a different serial port, such as `a`, modify the `/etc/remote` file as follows:

```
hardware:\
      :dv=/dev/term/a:br#9600:e1=^C^S^Q^U^D:ie=%$:oe=^D:
```

4. In a shell (terminal) window on the other Sun system, type `tip hardware`.

```
% tip hardware
connected
```

---

**Note** – The shell (terminal) window is now a TIP window directed to the serial port of the Sun Blade 2500 workstation being tested. When power is applied to the Sun Blade 2500 workstation under test, its POST messages will be displayed in this window.

---

5. When POST is completed, disconnect the TIP window as follows:

a. Open a terminal window.

Open the terminal window on the other Sun system.

b. Type **ps -a** to view the active TIP line and process ID (PID) number.

c. Type the following to kill the TIP hardware process.

```
% kill -9 PID#
```

---

**Note** – You can also type ~ in the TIP window to kill the TIP hardware process.

---

## 7.1.4 Viewing POST Output From an External Display Device

POST directs its output to the serial port of the system being tested. You can view this output by connecting a serial terminal or a second system running a TIP connection through a terminal window.

### 7.1.4.1 Serial Terminal

You can view POST output through any RS-232 compatible serial terminal. Use a straight-through cable and connect the workstation to the serial terminal's Data Communications Equipment (DCE) port. Configure the serial terminal to the communication parameters listed in [TABLE 7-1](#).

**TABLE 7-1** Serial Terminal Communication Parameters

Parameter	Value
Baud	9600
Data bits	8
Parity	None

**TABLE 7-1** Serial Terminal Communication Parameters (*Continued*)

Parameter	Value
Stop bits	1
Handshaking	None
Duplex	Full

If a DCE port is not available, then use a crossover cable as described in [FIGURE 7-1](#).

### 7.1.4.2 Second System

Instead of a serial terminal, you can use a second system running a TIP connection through a terminal window.

The second system must have a serial port capable of RS-232 communications. Use a crossover cable with the TIP connection.

[FIGURE 7-1](#) shows the wiring for a crossover cable. If your system does not have a DB-9 connector at its serial port, adapters are available from most computer supply stores.

The following URL provides part numbers for adapters and other Sun cables:

[http://sunsolve.sun.com/handbook\\_pub/Devices/Cables/cables\\_ext\\_data.html](http://sunsolve.sun.com/handbook_pub/Devices/Cables/cables_ext_data.html)

---

## 7.2 Setting Up POST

POST can be run and monitored from an OpenBoot PROM environment using the Sun Blade 2500 workstation. You can also run POST from the Sun Blade 2500 workstation and monitor its operation from an attached dumb terminal.

### 7.2.1 Setting Up POST to Run in an OpenBoot PROM Environment

To run POST in an OpenBoot PROM environment you must:

- Set the `diag-switch?` to `true`
- Set the `diag-level` to `max` or `min`
- Power cycle the workstation.



---

**Note** – The default setting for `diag-switch?` is `false`. The default setting for `diag-level` is normally `min`. However the `diag-level` may have been previously set to `off`.

---

To set the `diag-switch?` to `true`, do the following:

1. At the system prompt, type:

```
ok setenv diag-switch? true
ok setenv diag-level min or max or menu
```

---

**Note** – At the system prompt, type: `setenv diag-level min` or `max`.

---

2. Press and hold the power button for 5 seconds to power cycle the workstation.

After the workstation has powered down wait 4 seconds before pressing the power button to power-on the workstation.

---

## 7.3 Maximum, Minimum, and Menu Levels of POST

Three levels of POST are available for the Sun Blade 2500 workstation:

- maximum (`max`)
- minimum (`min`)
- menu

The Sun Blade 2500 is shipped by default not to run POST. POST is switched off when the workstation is powered on for the first time. If you wish to run POST you must first set the `diag-switch?` and `diag-level`. For additional information see: [Section 6.1.1, “NVRAM Configuration Variables” on page 6-2](#) and [Section 6.1.2, “Displaying and Changing Configuration Variable Settings” on page 6-3](#).

### 7.3.1 Maximum Level of POST

The workstation initiates the selected level of POST based on the `diag-level` setting.

---

**Note** – `diag-level` is an NVRAM configuration variable (see [Section 5.1.1, “System NVRAM Configuration Variables”](#) on page 5-2).

---

When this OpenBoot flag is set to `max`, POST runs the maximum number of tests possible. This `max` mode greatly increases the amount of memory testing performed. These memory tests can run for up to 10 minutes or more depending on the system configuration of the workstation. Multiple CPU configurations combined with different amounts of installed memory also affect the time required for the workstation to complete POST.

The following table lists the approximate amount of time required for a Sun Blade 2500 workstation to complete the maximum and minimum levels of POST with 2 CPUs and 8 Gigabytes of memory installed. These approximate POST completion times are based on 8 Gigabytes of memory installed with the `diag-level` variable set to `max` or the `diag-level` variable set to `min`. The approximate POST completion times also vary with the number of CPUs configured to the system.

**TABLE 7-2** Approximate POST Completion Times

CPU Configuration	Amount of DIMM Memory	diag-level max Setting	diag-level min Setting
2-CPU's	8.0 GB	7 minutes, 37 seconds	2 minutes, 44 seconds

To set the `diag-level` variable to `max`, type:

```
ok setenv diag-level max
```

To return POST to the off setting, type:

```
ok setenv diag-level off
```

---

**Note** – In this example the NVRAM configuration variable `setenv diag-level off` turns POST off. Normally you should type `set-default variable` to restore system variables to their factory defaults. See, [Section 6.1.2, “Displaying and Changing Configuration Variable Settings”](#) on page 6-3.

---

## 7.3.2 Minimum Level of POST

When this OpenBoot PROM flag is set to `min`, POST runs the minimal amount of testing necessary to test the workstation. This minimal mode mostly affects the amount of memory testing performed.

To set the `diag-level` variable to `min`, type:

```
ok setenv diag-level min
```

To return to the default setting, type:

```
ok setenv diag-level off
```

---

**Note** – In this example the NVRAM configuration variable `setenv diag-level off` turns POST off. Normally you should type `set-default variable` to restore system variables to their factory defaults. See, [Section 6.1.2, “Displaying and Changing Configuration Variable Settings” on page 6-3](#).

---

## 7.3.3 Menu Level of POST

When this OpenBoot PROM flag is set to `menu`, POST does not run any test. POST will configure the workstation and stop at the POST menu. From the POST menu, the user can then run selected POST tests in a controlled sequence.

To set the `diag-level` variable to `menu`, type:

```
ok setenv diag-level menu  
ok reset-all
```

To return to the default setting type:

```
ok setenv diag-level off  
ok reset-all
```

### 7.3.3.1 Menu Control of POST

Once the user is at the POST menu, control menus are selected by typing a menu number followed by a return (enter key). The menus are made up of multiple levels. Follow the on-screen selection until you arrive at the desired test menu.

### 7.3.4 `diag-level` Configuration Variable Set to `max`

When the `diag-level` configuration variable is set to `max`, POST enables an extended set of diagnostic-level tests for the workstation. The following tests are performed in this order:

1. All CPUs do full memory test
2. Slave CPUs test IO-Bridge0 and IO-Bridge1
3. Master CPU performs an Init of critical resources
4. Master CPU test
5. Master CPU I2C
6. Master CPU memory test
7. Slave CPU test
8. Slave CPU memory test
9. Master CPU test of Slave CPU's memory
10. Slave CPU executes POST from master memory
11. All CPUs test internal cache
12. All CPUs scrub memory
13. Master CPU tests both IO-Bridge0 and IO-Bridge1

---

**Note** – See [TABLE 7-2](#) for approximate POST completion times.

---

### 7.3.5 `diag-level` Configuration Variable Set to `min`

When the `diag-level` variable is set to `min`, POST enables an abbreviated set of diagnostic-level tests. The following tests are performed in this order:

1. Master CPU performs an Init of critical resources
2. Master CPU test
3. Master CPU I2C
4. Master CPU memory test
5. Slave CPU test
6. Slave CPU memory test
7. Master CPU test of slave CPU's memory
8. Slave CPU executes POST from master memory
9. All CPUs test internal cache
10. All CPUs scrub memory
11. Master CPU tests both IO-Bridge0 and IO-Bridge1

---

**Note** – See [TABLE 7-2](#) for approximate POST completion times.

---

The following post output example is a sample of the serial port POST output with the `diag-level` configuration variable set to `min` for 2-CPU, 4 Gbyte memory workstation configuration:

- `diag-level` configuration variable set to `min` (dual CPU) (see [CODE EXAMPLE 7-1](#))

**CODE EXAMPLE 7-1** Sample POST Output `diag-level` Set to `min` (2 CPU)

```
@(#)OBP 4.9.5 2003/09/15 13:59 Sun Blade 2500
Clearing TLBs Done
Power-On Reset
Executing Power On SelfTest

0>@(#) Sun Blade 2500[TM] POST 4.9.4 2003/06/18 12:25
/export/common-source/firmware_re/post/post-build-
4.9.4/Fiesta/enchilada/integrated(firmware_re)
0>Hard Powerup RST thru SW
0>CPUs present in system: 0 1
0>OBP->POST Call with %o0=00000000.01002000.
0>Diag level set to MIN.
0>MFG scrpt mode set to NONE
0>I/O port set to TTYA.

0>Start selftest...
0>Init SB
0>Init CPU
```

**CODE EXAMPLE 7-1** Sample POST Output diag-level Set to min (2 CPU) (Continued)

```
@(#)OBP 4.9.5 2003/09/15 13:59 Sun Blade 2500 (Continued)
0>DMMU
0>DMMU TLB DATA RAM Access
0>DMMU TLB TAGS Access
0>IMMU Registers Access
0>IMMU TLB DATA RAM Access
0>IMMU TLB TAGS Access
0>Setup Ecache
0>      Size = 00000000.00100000...

0>Scrub and Setup Ecache
0>Setup and Enable DMMU
0>Setup DMMU Miss Handler
0>Test and Init Temp Mailbox
0>Set Timing
0>      UltraSPARC-IIIi[TM] Version 2.4
1>Init CPU
1>      UltraSPARC-IIIi[TM] Version 2.4
1>DMMU
1>DMMU TLB DATA RAM Access
1>DMMU TLB TAGS Access
1>IMMU Registers Access
1>IMMU TLB DATA RAM Access
1>IMMU TLB TAGS Access
1>Init mmu regs
1>Setup Ecache
1>Ecache control = 00000000.02f04400
1>      Size = 00000000.00100000...
1>Scrub and Setup Ecache
1>Setup and Enable DMMU
1>Setup DMMU Miss Handler
1>Test and Init Temp Mailbox
1>Setup Int Handlers
0>Setup Int Handlers
0>Send Int CPU 1
1>Send Int to Master CPU
0>Initialize I2C Controller
0>Set CPU/System Speed
0>MCR Timing index = 00000000.00000006
0>..
0>Send MC Timing CPU 1
0>Probe Dimms
1>Probe Dimms
1>Init Mem Controller Regs
0>Init Mem Controller Regs
1>Set JBUS config reg
0>IO-Bridge unit 0 init test
```

**CODE EXAMPLE 7-1** Sample POST Output diag-level Set to min (2 CPU) (Continued)

```
@(#)OBP 4.9.5 2003/09/15 13:59 Sun Blade 2500 (Continued)
0>IO-Bridge unit 1 init test
0>Do PLL reset
0>Setting timing to 8:1 10:1, system frequency 160 MHz, CPU
frequency 1280 MHz
0>Soft Power-on RST thru SW
0>CPUs present in system: 0
0>
0>Resume selftest...

0>Init SB
0>Init CPU
0>Init mmu regs
0>Setup Ecache
0>Ecache control = 00000000.02f04400
0>      Size = 00000000.00100000...
0>Setup and Enable DMMU
0>Setup DMMU Miss Handler
0>Timing is 8:1 10:1, sys 159 MHz, CPU 1280 MHz, mem 127 MHz.
0>      UltraSPARC-IIIi(TM) Version 2.4

1>Init CPU
1>      UltraSPARC-IIIi(TM) Version 2.4
1>Init mmu regs
1>Setup Ecache
1>Ecache control = 00000000.02f04400
1>      Size = 00000000.00100000...
1>Setup and Enable DMMU
1>Setup DMMU Miss Handler
1>Timing is 8:1 10:1, sys 159 MHz, CPU 1280 MHz, mem 127 MHz
0>Initialize I2C Controller
1>Init Mem Controller Sequence
0>Init Mem Controller Sequence
0>IO-Bridge unit 0 init test
0>IO-Bridge unit 1 init test
0>Select Bank Config
0>Probe and Setup Memory
0>INFO: No memory detected in Bank 0
0>INFO: No memory detected in Bank 1
0>INFO: 1024MB Bank 2, Dimm Type X4
0>INFO: 1024MB Bank 3, Dimm Type X4
0>
0>Data Bitwalk on Master
0>      Test Bank 2.
0>      Test Bank 3.
0>Address Bitwalk on Master
```

**CODE EXAMPLE 7-1** Sample POST Output diag-level Set to min (2 CPU) (Continued)

```
@(#)OBP 4.9.5 2003/09/15 13:59 Sun Blade 2500 (Continued)
0>INFO: Addr walk mem test on CPU 0 Bank 2: 00000002.00000000 to
00000002.40000000.
0>INFO: Addr walk mem test on CPU 0 Bank 3: 00000003.00000000 to
00000003.40000000.
0>Set Mailbox
0>Final mc1 is a0000023.3e681cf9.
0>Setup Final DMMU Entries
0>Post Image Region Scrub
0>Run POST from Memory

0>Verifying checksum on copied image.
0>The Memory's CHECKSUM value is 2ccc.
0>The Memory's Content Size value is 56d8.
1>Waiting for master CPU=0, timeout in 89 seconds...
0>Success... Checksum on Memory Validated.
1>Select Bank Config
1>Probe and Setup Memory
1>INFO: No memory detected in Bank 0
1>INFO: No memory detected in Bank 1
1>INFO: 1024MB Bank 2, Dimm Type X4
1>INFO: 1024MB Bank 3, Dimm Type X4
1>
1>Set Mailbox
1>Final mc1 is a0000023.3e681cf9.
1>Enable mem err handler
0>Data Bitwalk on Slave 1
0>    Test Bank 2.
0>    Test Bank 3.
0>Address Bitwalk on Slave 1
0>INFO: Addr walk mem test on CPU 1 Bank 2: 00000012.00000000 to
00000012.40000000.
0>INFO: Addr walk mem test on CPU 1 Bank 3: 00000013.00000000 to
00000013.40000000.
1>Disable mem err handler
1>Setup Final DMMU Entries
1>Map Slave POST to master memory
1>FPU Registers and Data Path
0>FPU Registers and Data Path
1>FPU Move Registers
0>FPU Move Registers
1>FSR Read/Write
0>FSR Read/Write
1>FPU Branch Instructions
0>FPU Branch Instructions
1>FPU Functional Test
0>FPU Functional Test
```



**CODE EXAMPLE 7-1** Sample POST Output diag-level Set to min (2 CPU) (Continued)

```
@(#)OBP 4.9.5 2003/09/15 13:59 Sun Blade 2500 (Continued)
1>Print Mem Config
1>Caches : Icache is ON, Dcache is ON, Wcache is ON, Pcache is ON.
1>Memory interleave set to 0
1>      Bank 2 1024MB : 00000012.00000000 -> 00000012.40000000.
1>      Bank 3 1024MB : 00000013.00000000 -> 00000013.40000000.
0>Print Mem Config
0>Caches : Icache is ON, Dcache is ON, Wcache is ON, Pcache is ON.
0>Memory interleave set to 0
0>      Bank 2 1024MB : 00000002.00000000 -> 00000002.40000000.

0>      Bank 3 1024MB : 00000003.00000000 -> 00000003.40000000.
1>Scrub Memory
0>Scrub Memory
1>Quick Block Mem Test
0>Quick Block Mem Test
1>Quick Test 4194304 bytes at 00000012.00000000
0>Quick Test 4194304 bytes at 00000002.00600000
1>Quick Test 4194304 bytes at 00000013.00000000
0>Quick Test 4194304 bytes at 00000003.00000000
1>Flush Caches
0>Flush Caches
0>IO-Bridge SouthBridge Remap Devs

0>JBUS quick check
0>      to IO-bridge_0
0>      to IO-bridge_1
0>IO-Bridge unit 0 reg      test
0>IO-Bridge unit 0 mem      test
0>IO-Bridge unit 0 PCI id   test
0>IO-Bridge unit 0 interrupt test
0>IO-Bridge unit 1 reg      test
0>IO-Bridge unit 1 mem      test
0>IO-Bridge unit 1 PCI id   test
0>IO-Bridge unit 1 interrupt test
0>IO-Bridge unit 0 init     test
1>IO-Bridge unit 0 reg      test
1>IO-Bridge unit 0 mem      test
1>IO-Bridge unit 0 PCI id   test
1>IO-Bridge unit 0 interrupt test
1>IO-Bridge unit 1 init     test
1>IO-Bridge unit 1 reg      test
1>IO-Bridge unit 1 mem      test
1>IO-Bridge unit 1 PCI id   test
1>IO-Bridge unit 1 interrupt test
1>INFO:
0>      POST Passed all devices.
```

**CODE EXAMPLE 7-1** Sample POST Output diag-level Set to min (2 CPU) (Continued)

```
@(#)OBP 4.9.5 2003/09/15 13:59 Sun Blade 2500 (Continued)
0>
0>POST: Return to OBP.

Clearing TLBs Done
POST Results: Cpu 0000.0000.0000.0000
%o0 = 0000.0000.0000.0000 %o1 = ffff.ffff.f00c.d3be %o2 =
ffff.ffff.ffff.ffff
POST Results: Cpu 0000.0000.0000.0001
%o0 = 0000.0000.0000.0000 %o1 = ffff.ffff.f00c.d3be %o2 =
ffff.ffff.ffff.ffff
Membase: 0000.0000.0000.0000
MemSize: 0000.0000.0004.0000
Init CPU arrays Done
Init E$ tags Done
Setup TLB (small-footprint mode) Done
MMUs ON
Scrubbing Tomatillo tags... 0 1
Find dropin, Copying Done, Size 0000.0000.0000.56e0
PC = 0000.07ff.f000.4704
Find dropin, Copying Done, Size 0000.0000.0001.0480
ttya initialized

CPU 0 Speed: 1200 Mhz, ratio 8:1 , ECCR: f00c00
CPU 1 Speed: 1200 Mhz, ratio 8:1 , ECCR: f00c00
CPU 0 Memory Configuration: Valid
CPU 0 Bank 0 <empty> Bank 1 <empty> Bank 2 1024 MB Bank 3 1024 MB
CPU 1 Memory Configuration: Valid
CPU 1 Bank 0 <empty> Bank 1 <empty> Bank 2 1024 MB Bank 3 1024 MB
Master CPU 0 Membase: 1300000000 Memsize: 40000000

Clearing TLBs Done
Loading Configuration
Membase: 0000.0013.0000.0000
MemSize: 0000.0000.4000.0000
Init CPU arrays Done
Init E$ tags Done
Setup TLB Done
MMUs ON
Scrubbing Tomatillo tags... 0 1
Block Scrubbing Done
Find dropin, Copying Done, Size 0000.0000.0000.56e0
PC = 0000.07ff.f000.4704
PC = 0000.0000.0000.4778
Find dropin, (copied), Decompressing Done, Size
0000.0000.0006.01a0 ttya initialized
```

**CODE EXAMPLE 7-1** Sample POST Output diag-level Set to min (2 CPU) (Continued)

```
@(#)OBP 4.9.5 2003/09/15 13:59 Sun Blade 2500 (Continued)
System Reset: CPU Reset (SPOR)
JBUS-PCI bridg
master UE AFSR: 1e000000 AFAR: 1000080
master CE AFSR: 1e000000 AFAR: 40060208000
JBUS-PCI bridge
slave UE AFSR: 1c000000 AFAR: 40000000
slave CE AFSR: 1c000000 AFAR: 40000008000

Probing jbus at 0,0 SUNW,UltraSPARC-IIIf (1280 MHz @ 8:1, 1 MB)
memory-controller
Probing jbus at 1,0 SUNW,UltraSPARC-IIIf (1280 MHz @ 8:1, 1 MB)
memory-controller
Probing jbus at 1c,0 pci ppm
Probing jbus at 1d,0 pci
Probing jbus at 1e,0 pci ppm
Probing jbus at 1f,0 pci i2c nvram idprom
Loading Support Packages: kbd-translator obp-tftp SUNW,i2c-ram-
device
SUNW,fru-device
Loading onboard drivers:
Probing /pci@1e,600000 Device 7 isa flashprom rtc i2c i2c-bridge
hardware-monitor hardware-monitor gpio gpio motherboard-fru-
prom
dimm-spd dimm-spd dimm-spd dimm-spd clock-generator power
serial
serial dma parallel
CPU 0 Bank 2 base 200000000 size 1024 MB
CPU 0 Bank 3 base 300000000 size 1024 MB
CPU 1 Bank 2 base 1200000000 size 1024 MB
CPU 1 Bank 3 base 1300000000 size 1024 MB
Probing /pci@1f,700000 Device 2 Nothing there
Probing /pci@1e,600000 Device 6 pmu i2c beep ppm
Probing /pci@1e,600000 Device 8 sound
Probing /pci@1e,600000 Device a usb
Probing /pci@1e,600000 Device b usb
Probing /pci@1e,600000 Device d ide disk cdrom
Probing /pci@1e,600000 Device 2 Nothing there
Probing /pci@1e,600000 Device 3 Nothing th
Probing /pci@1e,600000 Device 4 Nothing there
Probing /pci@1d,700000 Device 3 Nothing there
Probing /pci@1d,700000 Device 4 scsi disk tape scsi disk tape
Probing /pci@1d,700000 Device 2 Nothing there
Probing /pci@1c,600000 Device 3 network
Probing /pci@1c,600000 Device 2 Nothing there screen not found.
keyboard not found
```

**CODE EXAMPLE 7-1** Sample POST Output diag-level Set to min (2 CPU) (Continued)

```
@(#)OBP 4.9.5 2003/09/15 13:59 Sun Blade 2500 (Continued)
Keyboard not present. Using ttya for input and output.
System Reset: CPU Reset (SPOR)
JBUS-PCI bridge
master UE AFSR: 1e000000 AFAR: 1000080
master CE AFSR: 1e000000 AFAR: 40060208000
JBUS-PCI bridge
slave UE AFSR: 1c000000 AFAR: 40000000
slave CE AFSR: 1c000000 AFAR: 40000008000
Probing jbus at 0,0 SUNW,UltraSPARC-IIII (1280 MHz @ 8:1, 1 MB)
memory-controller
Probing jbus at 1,0 SUNW,UltraSPARC-IIII (1280 MHz @ 8:1, 1 MB)
memory-controller
Probing jbus at 1c,0 pci ppm
Probing jbus at 1d,0 pci
Probing jbus at 1e,0 pci ppm
Probing jbus at 1f,0 pci i2c nvram idprom
Loading Support Packages: kbd-translator obp-tftp SUNW,i2c-ram-
device
SUNW,fru-device
Loading onboard drivers:

Probing /pci@1e,600000 Device 7 isa flashprom rtc i2c i2c-bridge
hardware-monitor hardware-monitor gpio gpio motherboard-fru-
prom
dimm-spd dimm-spd dimm-spd dimm-spd clock-generator power
serial
serial dma parallel
CPU 0 Bank 2 base 200000000 size 1024 MB
CPU 0 Bank 3 base 300000000 size 1024 M
CPU 1 Bank 2 base 1200000000 size 1024 MB
CPU 1 Bank 3 base 1300000000 size 1024 MB
Probing /pci@1f,700000 Device 2 Nothing there
Probing /pci@1e,600000 Device 6 pmu i2c beep ppm
Probing /pci@1e,600000 Device 8 sound
Probing /pci@1e,600000 Device a usb
Probing /pci@1e,600000 Device b usb
Probing /pci@1e,600000 Device d ide disk cdrom
Probing /pci@1e,600000 Device 2 Nothing there
Probing /pci@1e,600000 Device 3 Nothing there
Probing /pci@1e,600000 Device 4 Nothing there
Probing /pci@1d,700000 Device 3 Nothing there
Probing /pci@1d,700000 Device 4 scsi disk tape scsi disk tape
Probing /pci@1d,700000 Device 2 Nothing there
Probing /pci@1c,600000 Device 3 network
Probing /pci@1c,600000 Device 2 Nothing there
```

**CODE EXAMPLE 7-1** Sample POST Output diag-level Set to min (2 CPU) (Continued)

```
@(#)OBP 4.9.5 2003/09/15 13:59 Sun Blade 2500 (Continued)

Sun Blade 2500, No Keyboard
Copyright 1998-2002 Sun Microsystems, Inc. All rights reserved.
OpenBoot 4.x.build_18, 4096 MB memory installed, Serial
#52427535.
Ethernet address 0:3:ba:1f:fb:f, Host ID: 831ffb0f.

Skipping diagnostic script because diag-script = none

{0} ok
```

## 7.3.6 POST Progress and Error Reporting

In most cases, POST also attempts to send a failure message to the POST monitoring system. The following code example shows the typical appearance of a failure message.

---

**Note** – The workstation does not automatically boot if a POST error occurs. The workstation halts at the `ok` prompt to alert the user to a failure.

---

**CODE EXAMPLE 7-2** Sample POST Output Error Message

```
{0}ERROR: TEST = * Memory marching Initial area TESTID = 68
{0}H/W under test = MAIN MEMORY
{0}      Fault address 00000000.00000090
{0}      Fault status 00000002.0000004f
{0}      (CE) Correctable system data ECC error
{0}      CPU data bit 6
{0}      Memory data bit 146
{0}      DIMM connector J0406
{0}      Connector pin 124
{0}      CPMS Slice 1
```

## 7.3.7 Controlling POST Diagnostics

You can control POST diagnostics by setting the OpenBoot configuration variables in NVRAM. Changes to OpenBoot configuration variables will take effect only after the workstation is restarted.

---

**Note** – The OpenBoot configuration variables are also known as the system configuration variables. See [Section TABLE 6-1, “Standard Sun Blade 2500 NVRAM Configuration Variables”](#) on page 6-2. These variables affect both POST and OpenBoot Diagnostics.

---

## 7.4 Analyzing POST Results

POST uses the following three categories of message reporting to alert users to workstation malfunctions:

- Error messages
- Warning messages
- Information messages

All three message reporting categories start with tags indicating `ERROR`, `MESSAGE`, or `INFO`.

### 7.4.1 Error Messages

Error messages are enclosed by the `ERROR` and `END_ERROR` tags. The name of the error-generating test is printed on the first line of the error message. Next, a list of potential replaceable components that might have generated the error is listed on the second and subsequent lines of the error message after the `H/W under test= tag` (see [CODE EXAMPLE 7-3](#)). Next, a list of replaceable components potentially causing the error is listed. The replaceable components are listed in order of relevance to the error. That is, the first replaceable component listed has a higher likelihood of causing the specified error than the second, third, or fourth component listed.

---

**Note** – Depending on the error message, the content of the message might span several lines.

---

#### **CODE EXAMPLE 7-3** Sample POST Output Error Message

```
@(#)OBP 4.9.5 2003/09/15 13:59 Sun Blade 2500

Clearing TLBs Done
Power-On Reset
Executing Power On SelfTest

0>@(#) Sun Blade 2500 POST 4.9.4 2003/06/18 12:25
```

**CODE EXAMPLE 7-3** Sample POST Output Error Message (*Continued*)

```
@(#)OBP 4.9.5 2003/09/15 13:59 Sun Blade 2500 (Continued)
```

```
/export/common-source/firmware_re/post/post-build-  
4.9.4/Fiesta/enchilada/integrated (firmware_re)
```

```
0>Hard Powerup RST thru SW
```

```
0>CPUs present in system: 0 1
```

```
0>OBP->POST Call with %o0=00000000.01002000.
```

```
0>Diag level set to MIN.
```

```
0>MFG script mode set to NONE
```

```
0>I/O port set to TTYA.
```

```
0>
```

```
0>Start selftest...
```

```
0>Init SB
```

```
0>Init CPU
```

```
0>DMMU
```

```
0>DMMU TLB DATA RAM Access
```

```
0>DMMU TLB TAGS Access
```

```
0>IMMU Registers Access
```

```
0>IMMU TLB DATA RAM Access
```

```
0>IMMU TLB TAGS Access
```

```
0>Init mmu regs
```

```
0>Setup Ecache
```

```
0>Ecache control = 00000000.02f04400
```

```
0> Size = 00000000.00100000...
```

```
0>Scrub and Setup Ecache
```

```
0>Setup and Enable DMMU
```

```
0>Setup DMMU Miss Handler
```

```
0>Test and Init Temp Mailbox
```

```
0>Set Timing
```

```
0> UltraSPARC-IIIi[TM] Version 2.4
```

```
1>Init CPU
```

```
1> UltraSPARC-IIIi[TM] Version 2.4
```

```
1>DMMU
```

```
1>DMMU TLB DATA RAM Access
```

```
1>DMMU TLB TAGS Access
```

```
1>IMMU Registers Access
```

```
1>IMMU TLB DATA RAM Access
```

```
1>IMMU TLB TAGS Access
```

```
1>Init mmu regs
```

```
1>Setup Ecache
```

```
1>Ecache control = 00000000.02f04400
```

```
1> Size = 00000000.00100000...
```

```
1>Scrub and Setup Ecache
```

```
1>Setup and Enable DMMU
```

```
1>Setup DMMU Miss Handler
```

**CODE EXAMPLE 7-3** Sample POST Output Error Message (*Continued*)

```
@(#)OBP 4.9.5 2003/09/15 13:59 Sun Blade 2500 (Continued)
1>Test and Init Temp Mailbox
1>Setup Int Handlers
0>Setup Int Handlers
0>Send Int CPU 1
1>Send Int to Master CPU

0>Initialize I2C Controller
0>Set CPU/System Speed

0>MCR Timing index = 00000000.00000006
0>..
0>Send MC Timing CPU 1
0>Probe Dimms
0>Probe Dimms
0>
0>ERROR: TEST = Probe Dimms
0>H/W under test = CPU0: Bank2 DIMM2, Motherboard
0>Repair Instructions: Replace items in order listed by 'H/W
under test' above
0>MSG = Dimm Pair incomplete.
0>END_ERROR

1>Probe Dimms
1>Init Mem Controller Regs
0>Init Mem Controller Regs
1>Set JBUS config reg
0>Set JBUS config reg
0>IO-Bridge unit 0 init test
0>IO-Bridge unit 1 init test
0>Do PLL reset
0>Setting timing to 8:1 10:1, system frequency 160 MHz, CPU
frequency 1280 MHz
0>Soft Power-on RST thru SW
0>CPUs present in system: 0 1
0>
0>Resume selftest...
0>Init SB
0>Init CPU
0>Init mmu regs
0>Setup Ecache
0>Ecache control = 00000000.02f04400
0>      Size = 00000000.00100000...
0>Setup and Enable DMMU
0>Setup DMMU Miss Handler
0>Timing is 8:1 10:1, sys 159 MHz, CPU 1280 MHz, mem 127 MHz.
0>      UltraSPARC-IIIi[TM] Version 2.4
```



**CODE EXAMPLE 7-3** Sample POST Output Error Message (*Continued*)

```
@(#)OBP 4.9.5 2003/09/15 13:59 Sun Blade 2500 (Continued)
1>Init CPU
1> UltraSPARC-IIIi[TM] Version 2.4
1>Init mmu regs
1>Setup Ecache
1>Ecache control = 00000000.02f04400

1>      Size = 00000000.00100000...
1>Setup and Enable DMMU

1>Setup DMMU Miss Handler
1>Timing is 8:1 10:1, sys 150 MHz, CPU 1200 MHz, mem 120 MHz.
0>Initialize I2C Controller
1>Init Mem Controller Sequence
0>Init Mem Controller Sequence
0>IO-Bridge unit 0 init test
0>IO-Bridge unit 1 init test
0>Select Bank Config
0>Probe and Setup Memory
0>INFO: No memory on cpu 0
0>
0>ERROR: TEST = Probe and Setup Memory
0>H/W under test = CPU0 Memory
0>Repair Instructions: Replace items in order listed by 'H/W
under test' above
0>MSG =
        *** Test Failed!! ***

0>END_ERROR

0>
0>ERROR: TEST = Probe and Setup Memory
0>H/W under test = CPU0 Memory
0>Repair Instructions: Replace items in order listed by 'H/W
under test' above
0>MSG = ERROR: Memory error on master CPU, rolling over to new
master.
0>END_ERROR

1>Soft Power-on RST thru SW
1>CPUs present in system: 0 1
1>OBP->POST Call with %o0=00000000.01002000.
1>Diag level set to MIN.
1>MFG script mode set to NONE
1>I/O port set to TTYA.
1>
1>Start selftest...
```

**CODE EXAMPLE 7-3** Sample POST Output Error Message (*Continued*)

```
@(#)OBP 4.9.5 2003/09/15 13:59 Sun Blade 2500 (Continued)
1>Init SB
1>Init CPU
1>DMMU
1>DMMU TLB DATA RAM Access
1>DMMU TLB TAGS Access
1>IMMU Registers Access

1>IMMU TLB DATA RAM Access

1>IMMU TLB TAGS Access
1>Init mmu regs
1>Setup Ecache
1>Ecache control = 00000000.02f04400
1>      Size = 00000000.00100000...
1>Scrub and Setup Ecache
1>Setup and Enable DMMU
1>Setup DMMU Miss Handler
1>Test and Init Temp Mailbox
1>Set Timing
1>      UltraSPARC-IIIi(TM) Version 2.1
0>Init CPU
0>      UltraSPARC-IIIi(TM) Version 2.1
0>DMMU
0>DMMU TLB DATA RAM Access
0>DMMU TLB TAGS Access
0>IMMU Registers Access
0>IMMU TLB DATA RAM Access
0>IMMU TLB TAGS Access
0>Init mmu regs
0>Setup Ecache
0>Ecache control = 00000000.02f04400
0>      Size = 00000000.00100000...
0>Scrub and Setup Ecache
0>Setup and Enable DMMU
0>Setup DMMU Miss Handler
0>Test and Init Temp Mailbox
0>Setup Int Handlers
1>Send Int CPU 0
0>Send Int to Master CPU
1>Initialize I2C Controller
1>Set CPU/System Speed
1>MCR Timing index = 00000000.00000006
1>..
1>Send MC Timing CPU 0
1>Probe Dimms
0>Probe Dimms
```

**CODE EXAMPLE 7-3** Sample POST Output Error Message (*Continued*)

```
@(#)OBP 4.9.5 2003/09/15 13:59 Sun Blade 2500 (Continued)
0>
0>ERROR: TEST = Probe Dimms
0>H/W under test = CPU0: Bank2 DIMM2, Motherboard
0>Repair Instructions: Replace items in order listed by 'H/W
under test' above
0>MSG = Dimm Pair incomplete.
0>END_ERROR

0>Init Mem Controller Regs
1>Init Mem Controller Regs
0>Set JBUS config reg
1>Set JBUS config reg
1>IO-Bridge unit 0 init test
1>IO-Bridge unit 1 init test
1>Do PLL reset
1>Setting timing to 8:1 10:1, system frequency 160 MHz, CPU
frequency 1280 MHz
1>Soft Power-on RST thru SW
1>CPUs present in system: 0 1
1>
1>Resume selftest...
1>Init SB
1>Init CPU
1>Init mmu regs
1>Setup Ecache
1>Ecache control = 00000000.02f04400
1>    Size = 00000000.00100000...
1>Setup and Enable DMMU
1>Setup DMMU Miss Handler
1>Timing is 8:1 10:1, sys 150 MHz, CPU 1280 MHz, mem 127 MHz.
1>    UltraSPARC-IIIi(TM) Version 2.4
0>Init CPU
0>    UltraSPARC-IIIi(TM) Version 2.4
0>Init mmu regs
0>Setup Ecache
0>Ecache control = 00000000.02f04400
0>    Size = 00000000.00100000...
0>Setup and Enable DMMU
0>Setup DMMU Miss Handler
0>Timing is 8:1 10:1, sys 159 MHz, CPU 1279 MHz, mem 127 MHz.
1>Initialize I2C Controller
0>Init Mem Controller Sequence
1>Init Mem Controller Sequence
1>IO-Bridge unit 0 init test
1>IO-Bridge unit 1 init test
```

**CODE EXAMPLE 7-3** Sample POST Output Error Message (*Continued*)

```
@(#)OBP 4.9.5 2003/09/15 13:59 Sun Blade 2500 (Continued)
1>Select Bank Config
1>Probe and Setup Memory
1>INFO: No memory detected in Bank 0
1>INFO: No memory detected in Bank 1
1>INFO: 1024MB Bank 2, Dimm Type X4
1>INFO: 1024MB Bank 3, Dimm Type X4
1>

1>Data Bitwalk on Master
1>    Test Bank 2.
1>    Test Bank 3.
1>Address Bitwalk on Master
1>INFO: Addr walk mem test on CPU 1 Bank 2: 00000012.00000000 to
00000012.40000000.
1>INFO: Addr walk mem test on CPU 1 Bank 3: 00000013.00000000 to
00000013.40000000.
1>Set Mailbox
1>Final mc1 is a0000023.3e681cf9.
1>Setup Final DMMU Entries
1>Post Image Region Scrub
1>Run POST from Memory
1>Verifying checksum on copied image.
1>The Memory's CHECKSUM value is 2ccc.
1>The Memory's Content Size value is 56d8.
1>Success... Checksum on Memory Validated.
0>Select Bank Config
0>Probe and Setup Memory
0>INFO: No memory on cpu 0
0>
0>ERROR: TEST = Probe and Setup Memory
0>H/W under test = CPU0 Memory
0>Repair Instructions: Replace items in order listed by 'H/W
under test' above
0>MSG =
    *** Test Failed!! ***

0>END_ERROR

0>Set Mailbox
0>Final mc1 is 00000003.3e481cf9.
0>Enable mem err handler
0>Disable mem err handler
0>Setup Final DMMU Entries
0>Map Slave POST to master memory
0>FPU Registers and Data Path
```

**CODE EXAMPLE 7-3** Sample POST Output Error Message (*Continued*)

```
@(#)OBP 4.9.5 2003/09/15 13:59 Sun Blade 2500 (Continued)
1>FPU Registers and Data Path
0>FPU Move Registers
1>FPU Move Registers
0>FSR Read/Write
1>FSR Read/Write
0>FPU Branch Instructions
1>FPU Branch Instructions
0>FPU Functional Test

1>FPU Functional Test
0>Print Mem Config
0>Caches : Icache is ON, Dcache is ON, Wcache is ON, Pcache is ON.
0>Memory interleave set to 0
1>Print Mem Config
1>Caches : Icache is ON, Dcache is ON, Wcache is ON, Pcache is ON.
1>Memory interleave set to 0
1>      Bank 2 1024MB : 00000012.00000000 -> 00000012.40000000.
1>      Bank 3 1024MB : 00000013.00000000 -> 00000013.40000000.
1>Scrub Memory
1>Quick Block Mem Test
1>Quick Test 4194304 bytes at 00000012.00600000
1>Quick Test 4194304 bytes at 00000013.00000000
0>Flush Caches
1>Flush Caches
1>IO-Bridge SouthBridge Remap Devs
1>JBUS quick check
1>      to IO-bridge_0
1>      to IO-bridge_1
1>IO-Bridge unit 0 reg      test
1>IO-Bridge unit 0 mem      test
1>IO-Bridge unit 0 PCI id   test
1>IO-Bridge unit 0 interrupt test
1>IO-Bridge unit 1 reg      test
1>IO-Bridge unit 1 mem      test
1>IO-Bridge unit 1 PCI id   test
1>IO-Bridge unit 1 interrupt test
1>IO-Bridge unit 0 init     test
0>IO-Bridge unit 0 reg      test
0>IO-Bridge unit 0 mem      test
0>IO-Bridge unit 0 PCI id   test
0>IO-Bridge unit 0 interrupt test
0>IO-Bridge unit 1 init     test
0>IO-Bridge unit 1 reg      test
0>IO-Bridge unit 1 mem      test
0>IO-Bridge unit 1 PCI id   test
0>IO-Bridge unit 1 interrupt test
```

### CODE EXAMPLE 7-3 Sample POST Output Error Message (Continued)

```
@(#)OBP 4.9.5 2003/09/15 13:59 Sun Blade 2500 (Continued)
0>ERROR:
1>      POST toplevel status has the following failures:
1>          CPU0: Bank2 DIMM2, Motherboard
1>END_ERROR

1>
1>POST: Return to OBP.

Clearing TLBs Done
POST Results: Cpu 0000.0000.0000.0000
    %o0 = ffff.ffff.ffff.ffff %o1 = ffff.ffff.f00c.62dc %o2 =
    ffff.ffff.ffff.ffff
POST Results: Cpu 0000.0000.0000.0001
    %o0 = ffff.ffff.ffff.ffff %o1 = ffff.ffff.f00c.62dc %o2 =
    ffff.ffff.ffff.ffff
Membase: 0000.0000.0000.0000
MemSize: 0000.0000.0004.0000
Init CPU arrays Done
Init E$ tags Done
Setup TLB (small-footprint mode) Done
MMUs ON
Scrubbing Tomatillo tags... 0 1
Find dropin, Copying Done, Size 0000.0000.0000.56e0
PC = 0000.07ff.f000.4704
PC = 0000.0000.0000.4778
Find dropin, Copying Done, Size 0000.0000.0001.0480
ttya initialized

CPU 0 Speed: 1200 Mhz, ratio 8:1 , ECCR: f00c00
CPU 1 Speed: 1200 Mhz, ratio 8:1 , ECCR: f00c00
CPU 0 Memory Configuration: InValid
CPU 1 Memory Configuration: Valid
CPU 1 Bank 0 <empty> Bank 1 <empty> Bank 2 1024 MB Bank 3 1024 MB
Master CPU 1 Membase: 1300000000 Memsize: 40000000

Clearing TLBs Done
Loading Configuration
Membase: 0000.0013.0000.0000
MemSize: 0000.0000.4000.0000
Init CPU arrays Done
Init E$ tags Done
Setup TLB Done
MMUs ON
Scrubbing Tomatillo tags... 0 1
Block Scrubbing Done
```

**CODE EXAMPLE 7-3** Sample POST Output Error Message (*Continued*)

```
@(#)OBP 4.9.5 2003/09/15 13:59 Sun Blade 2500 (Continued)
Find dropin, Copying Done, Size 0000.0000.0000.56e0
PC = 0000.07ff.f000.4704
PC = 0000.0000.0000.4778
Find dropin, (copied), Decompressing Done, Size
0000.0000.0006.01a0
ttya initialized
System Reset: CPU Reset (SPOR)
JBUS-PCI bridge

master UE AFSR: 1e000000 AFAR: 1000080
master CE AFSR: 1e000000 AFAR: 40060208400
JBUS-PCI bridge
slave UE AFSR: 1c000000 AFAR: 40000000
slave CE AFSR: 1c000000 AFAR: 40000008000
Probing jbus at 0,0 SUNW,UltraSPARC-IIIi (1200 MHz @ 8:1, 1 MB)
memory-controller
Probing jbus at 1,0 SUNW,UltraSPARC-IIIi (1200 MHz @ 8:1, 1 MB)
memory-controller
Probing jbus at 1c,0 pci ppm
Probing jbus at 1d,0 pci
Probing jbus at 1e,0 pci ppm
Probing jbus at 1f,0 pci i2c nvram idprom
Loading Support Packages: kbd-translator obp-tftp SUNW,i2c-ram-
device
SUNW,fru-device
Loading onboard drivers:
Probing /pci@1e,600000 Device 7 isa flashprom rtc i2c i2c-bridge
hardware-monitor hardware-monitor gpio gpio
motherboard-fru-prom
dimm-spd dimm-spd dimm-spd clock-generator power serial serial
dma
CPU 1 Bank 2 base 1200000000 size 1024 MB
CPU 1 Bank 3 base 1300000000 size 1024 MB
Probing /pci@1f,700000 Device 2 Nothing there
Probing /pci@1e,600000 Device 6 pmu i2c beep ppm
Probing /pci@1e,600000 Device 8 sound
Probing /pci@1e,600000 Device a usb
Probing /pci@1e,600000 Device b usb
Probing /pci@1e,600000 Device d ide disk cdrom
Probing /pci@1e,600000 Device 2 Nothing there
Probing /pci@1e,600000 Device 3 Nothing there
Probing /pci@1e,600000 Device 4 Nothing there
Probing /pci@1d,700000 Device 3 Nothing there
Probing /pci@1d,700000 Device 4 scsi disk tape scsi disk tape
Probing /pci@1d,700000 Device 2 Nothing there
Probing /pci@1c,600000 Device 3 network
```

### CODE EXAMPLE 7-3 Sample POST Output Error Message (Continued)

```
@(#)OBP 4.9.5 2003/09/15 13:59 Sun Blade 2500 (Continued)
Probing /pci@1c,600000 Device 2 Nothing there
screen not found.
keyboard not found.
Keyboard not present. Using ttya for input and output.
System Reset: CPU Reset (SPOR)
JBUS-PCI bridge
master UE AFSR: 1e000000 AFAR: 1000080
master CE AFSR: 1e000000 AFAR: 40060208400

JBUS-PCI bridge
slave UE AFSR: 1c000000 AFAR: 40000000
slave CE AFSR: 1c000000 AFAR: 40000008000
Probing jbus at 0,0 SUNW,UltraSPARC-IIIf (1200 MHz @ 8:1, 1 MB)
memory-controller
Probing jbus at 1,0 SUNW,UltraSPARC-IIIf (1200 MHz @ 8:1, 1 MB)
memory-controller
Probing jbus at 1c,0 pci ppm
Probing jbus at 1d,0 pci
Probing jbus at 1e,0 pci ppm
Probing jbus at 1f,0 pci i2c nvram idprom
Loading Support Packages: kbd-translator obp-tftp SUNW,i2c-ram-
device
SUNW,fru-device
Loading onboard drivers:
Probing /pci@1e,600000 Device 7 isa flashprom rtc i2c i2c-bridge
hardware-monitor hardware-monitor gpio gpio
motherboard-fru-prom
dimm-spd dimm-spd dimm-spd clock-generator power serial serial
dma
parallel
CPU 1 Bank 2 base 1200000000 size 1024 MB
CPU 1 Bank 3 base 1300000000 size 1024 MB
Probing /pci@1f,700000 Device 2 Nothing there
Probing /pci@1e,600000 Device 6 pmu i2c beep ppm
Probing /pci@1e,600000 Device 8 sound
Probing /pci@1e,600000 Device a usb
Probing /pci@1e,600000 Device b usb
Probing /pci@1e,600000 Device d ide disk cdrom
Probing /pci@1e,600000 Device 2 Nothing there
Probing /pci@1e,600000 Device 3 Nothing there
Probing /pci@1e,600000 Device 4 Nothing there
Probing /pci@1d,700000 Device 3 Nothing there
Probing /pci@1d,700000 Device 4 scsi disk tape scsi disk tape
Probing /pci@1d,700000 Device 2 Nothing there
Probing /pci@1c,600000 Device 3 network
Probing /pci@1c,600000 Device 2 Nothing there
```



**CODE EXAMPLE 7-3** Sample POST Output Error Message (*Continued*)

```
@(#)OBP 4.9.5 2003/09/15 13:59 Sun Blade 2500 (Continued)

Sun Blade 2500, No Keyboard
Copyright 1998-2003 Sun Microsystems, Inc. All rights reserved.
OpenBoot 4.9.5, 2048 MB memory installed, Serial #52427535.
Ethernet address 0:3:ba:1f:fb:f, Host ID: 831ffb0f.

Power On Selftest Failed.

CPU: 0 cause: CPU0: Bank2 DIMM2, Motherboard
CPU: 1 cause: CPU0: Bank2 DIMM2, Motherboard
ERROR: POST failed

{1} ok
```

---

**Note** – Depending on the error message, the content of the message might span several lines.

---

## 7.4.2 Warning Messages

Warning messages are identical to error messages in structure and format with the exception of beginning and ending tags. POST warning messages begin with the word `WARNING` and may end with the `END_WARNING`.

The name of the error-generating test is printed on the first line of the warning message. Next, a list of potential replaceable components that might generate the warning message is listed on the second and subsequent lines of the warning message after the `H/W` under `test=` tag (see [CODE EXAMPLE 7-4](#)). Next, a list of potential replaceable components causing the warning is listed. The replaceable components are listed in order of relevance to the error. That is, the first replaceable component listed has a higher likelihood of causing the specified warning than the second, third, or fourth component listed.

**CODE EXAMPLE 7-4** Sample POST Output WARNING Message

```
{0}* Probing Seeprom on DIMMs and CPU modules
{0} Warning: DIMM 0 missing
{0} Warning: DIMM 1 missing
{0} Warning: DIMM 4 missing
{0} CPU0 Sensor package temperature 32 C
{0} CPU1 Sensor package temperature 50 C
```

---

**Note** – Depending on the warning message, the content of the message might span several lines.

---

## 7.4.3 Information Messages

Information messages are preceded by the INFO tag. No additional tags, replaceable components, or test information is displayed.

### CODE EXAMPLE 7-5 Sample POST Output Information Message

```
@(#)OBP 4.x.build_18 2002/11/01 05:51 Sun Blade 2500 (Continued)
1> Test Bank 3.
1>Address Bitwalk on Master
1>INFO: Addr walk mem test on CPU 1 Bank 2: 00000012.00000000 to
00000012.40000000.
1>INFO: Addr walk mem test on CPU 1 Bank 3: 00000013.00000000 to
00000013.40000000.
1>Set Mailbox
1>Final mc1 is a0000023.3e681cf9.
1>Setup Final DMMU Entries
1>Setup Final DMMU Entries
1>Run POST from Memory
1>Verifying checksum on copied image.
1>The Memory's CHECKSUM value is 2ccc.
1>The Memory's Content Size value is 56d8.
1>Success... Checksum on Memory Validated.
```

---

**Note** – Depending on the information message, the content of the message might span several lines.

---

# OpenBoot PROM

---

This chapter describes how to use OpenBoot PROM Utilities and OpenBoot Diagnostics to troubleshoot workstation hardware problems.

This chapter contains the following topics:

- Section 8.1, “OpenBoot PROM Utilities” on page 8-1
- Section 8.2, “OpenBoot Diagnostics” on page 8-9
- Section 8.3, “OpenBoot Diagnostic Tests” on page 8-9
- Section 8.4, “Invoking OpenBoot Diagnostics” on page 8-13
- Section 8.5, “Configuring OpenBoot Diagnostics” on page 8-17
- Section 8.6, “OpenBoot Diagnostics Menu Commands” on page 8-17
- Section 8.7, “OpenBoot Diagnostics Test Messages” on page 8-18

---

## 8.1 OpenBoot PROM Utilities

The following sections describe the OpenBoot PROM utilities. To execute the following OpenBoot PROM utilities, the workstation must be at the `ok` prompt.

- “`banner` Utility” on page 2
- “`date` Utility” on page 2
- “`Graphics Accelerator`” on page 3
- “`probe-scsi` Utility” on page 4
- “`show-devs` Utility” on page 5
- “`test alias-name, device path, -all` Utility” on page 5
- “`watch-clock` Utility” on page 6
- “`watch-net` and `watch-net-all` Utilities” on page 7
- “`.version` Utility” on page 8

## 8.1.1 banner Utility

The `banner` utility displays the banner seen during system startup. The banner includes:

- System model
- Firmware version
- Installed memory
- Serial number
- Ethernet address
- Host ID

For example:

```
ok banner
Sun Blade 2500, Keyboard Present
Copyright 1998-2003 Sun Microsystems, Inc. All rights reserved.
OpenBoot 4.9.5, 2048 MB memory installed, Serial #54843221.
Ethernet address 0:3:ba:44:d7:55, Host ID: 8344d755.
```

---

**Note** – If the banner displays information that is suspect, there might be a problem with the memory, NVRAM, or the motherboard flash PROM.

---

## 8.1.2 date Utility

The `date` utility displays the current date and time stored in the real-time clock. For example:

```
ok date
02/27/2000 21:32:20 GMT
```

---

**Note** – If the real-time clock loses accuracy or the date or time is incorrect after a power cycle, replace the battery.

---

## 8.1.3 Graphics Accelerator

The graphics card contains a built-in utility test that is enabled through the OpenBoot PROM. The graphics accelerator built-in utility test verifies basic graphics functionality without booting the Solaris operating environment software.

To initialize the graphics card utility:

1. At the `ok` prompt, type:

```
ok setenv diag-switch? true
diag-switch? =          true
ok
```

2. At the `ok` prompt, type:

```
ok test screen
Testing screen

Starting XVR-500 Selftest
(This will take an estimated
 2-4 minutes for the full test)

Direct access framebuffer test:
  address test ov10 pass
  address test ov11 pass
  pattern test ov10 00 ff a5 5a pass
  pattern test ov11 00 ff a5 5a pass
passed

Frame buffer color test:
The frame buffer will be painted with:
  red in the top third
  green in the middle third
  blue in the bottom third.

Direct Burst memory test:
  address test db mem pass
  pattern test db mem 00 ff a5 5a pass
ok
```

### 3. When the graphics card on-board diagnostics are completed, type:

```
ok setenv diag-switch? false  
diag-switch? =          false  
ok
```

## 8.1.4 probe-scsi Utility

The `probe-scsi` utility transmits an inquiry command to all SCSI devices connected to the system on-board SCSI interface. If the SCSI device is connected and active, the target address, unit number, device type, and manufacturer name are displayed.

Run the `probe-scsi` utility by typing the `probe-scsi` command at the `ok` prompt.

The following code example shows the `probe-scsi` diagnostic output messages.

#### CODE EXAMPLE 8-1 `probe-scsi` Diagnostic Output Message

```
ok probe-scsi  
  
Target 0  
Unit 0   Disk      SEAGATE ST336605LSUN36G 0238
```

## 8.1.5 show-devs Utility

The show-devs utility displays the devices installed in the Sun Blade 2500 system that are recognized by the OpenBoot PROM. For example:

```
ok show-devs
/i2c@1f,464000
/pci@1f,700000
/ppm@1e,0
/pci@1e,600000
/memory-controller@0,0
/SUNW,UltraSPARC-IIIi@0,0
. . .
/packages/kbd-translator
/packages/dropins
/packages/terminal-emulator
/packages/disk-label
/packages/deblocker
/packages/SUNW,builtin-drivers
```

If an installed device is missing from the list, check the slot or cable connections of the suspect device.

## 8.1.6 test *alias-name, device path, -all* Utility

The test utility, combined with a device alias or device path, enables a device self-test program. If a device has no self-test program, the message No selftest method for device name is displayed.

To run the self-test program for a device, type the test command, followed by the device alias or device path name.

The following code example identifies the test output message. [TABLE 8-1](#) lists test *alias name* selections, their descriptions, and their required preparation.

---

**Note** – The screen is selected as the *alias name* in this example.

---

### CODE EXAMPLE 8-2 test screen Utility Message

```
ok test screen
Testing screen

Starting XV-500 Selftest
```

**CODE EXAMPLE 8-2** test screen Utility Message (Continued)

```
(This will take an estimated
 2-4 minutes for the full test)

Direct access framebuffer test:
address test ovl0 pass
    address test ovl1 pass
    pattern test ovl0 00 ff a5 5a pass
    pattern test ovl1 00 ff a5 5a pass
passed

Frame buffer color test:
The frame buffer will be painted with:
    red in the top third
    green in the middle third
    blue in the bottom third.

Direct Burst memory test:
address test db mem pass
pattern test db mem 00 ff a5 5a pass

ok
```

**TABLE 8-1** An Abbreviated List of Selected OpenBoot PROM On-Board Utility Tests

Type of Test	Description	Preparation
test screen	Tests workstation video graphics hardware and monitor.	diag-switch? NVRAM parameter must be true for the test to execute.
test net	Performs internal loopback test of the workstation auto-selected Ethernet interface. External loopback test can also be run if test-args is set to loopback.	If the external loopback test is selected and an Ethernet loopback connector is not correctly attached, the external loopback test fails.
test-all	Sequentially tests workstation-configured devices containing selftest.	Tests are sequentially executed in device-tree order (viewed with the show-devs command).

## 8.1.7 watch-clock Utility

The `watch-clock` utility displays the register results of the real time clock as a seconds counter. During normal operation, the seconds counter repeatedly increments from 0 to 59. Start the `watch-clock` utility by typing the `watch-clock` command at the `ok` prompt.



The following code example identifies the watch-clock utility output message.

**CODE EXAMPLE 8-3** watch-clock Utility Output Message

```
ok watch-clock
Watching the 'seconds' register of the real time clock chip.
It should be 'ticking' once a second.
Type any key to stop.
53
```

## 8.1.8 watch-net and watch-net-all Utilities

The watch-net and watch-net-all utilities are used to monitor Ethernet packets on all Ethernet networks connected to the workstation. Good packets received by the workstation are indicated by a period (.). Errors such as the framing errors and cyclic redundancy check (CRC) errors are indicated with an X and an associated error description.

Run the watch-net utility by typing the watch-net command at the ok prompt. Run the watch-net-all utility by typing the watch-net-all command at the ok prompt.

---

**Note** – The workstation must be connected to a live network or you will get autonegotiation time out errors.

---

The following code examples identify the watch-net and the watch-net-all output messages.

**CODE EXAMPLE 8-4** watch-net Utility Output Message

```
ok watch-net
100 Mbps FDX Link up
Looking for Ethernet Packets.
'.' is a Good Packet. 'X' is a Bad Packet.
Type any key to stop.
.....
ok
```

**CODE EXAMPLE 8-5** watch-net-all Diagnostic Output Message

```
ok watch-net-all
/pci@1c,600000/network@3
100 Mbps FDX Link up
Looking for Ethernet Packets.
'.' is a Good Packet. 'X' is a Bad Packet.
Type any key to stop.
.....
ok
```

## 8.1.9 .version Utility

The .version utility displays the software version of:

- OpenBoot PROM
- OpenBoot Diagnostics
- POST

For example:

```
ok .version
Release 4.x.build_25 created 2003/02/04 18:45
OBP 4.x.build_25 2003/02/04 18:45 Sun Blade 2500
OBDIAG 4.x.0 2003/02/04 18:46
POST 4.120.0 2003/02/04 22:18
```

---

## 8.2 OpenBoot Diagnostics

OpenBoot Diagnostics are a menu-driven set of diagnostics that reside in OpenBoot PROM. The OpenBoot PROM is located on the motherboard. OpenBoot Diagnostics can isolate errors in the following workstation components:

- Motherboard and interface devices
- DVD-ROM drive
- Hard drive
- Any option card that contains an onboard self-test

OpenBoot Diagnostics can perform failure analysis on referenced devices by testing internal registers, confirming subsystem integrity, and verifying device functionality.

OpenBoot Diagnostics tests not only the motherboard but also interfaces such as:

- PCI buses
- SCSI devices
- Ethernet
- Serial ports
- Parallel port
- USB port

---

## 8.3 OpenBoot Diagnostic Tests

OpenBoot PROM for the Sun Blade 2500 workstation can perform the following tests:

- SUNW, XVR-100
- SUNW, XVR-500
- SUNW, XVR-600
- SUNW, XVR-1200
- i2c@0,320
- ide@d
- parallel@0,378
- pmu@6
- rtc@0,70
- serial@0,3f8
- serial@0,2e8
- sound@8
- usb@a
- usb@b
- card-reader@0,40

- flashprom@2,0
- network@3
- scsi@4
- scsi@4,1
- test-all

TABLE 8-2 provides a description of the OpenBoot Diagnostics tests.

## 8.3.1 OpenBoot Diagnostics Test Usage

The following table lists the OpenBoot Diagnostics test, its purpose, and what an error in the test result might mean.

**TABLE 8-2** OpenBoot Diagnostics Test Usage

OpenBoot Diagnostics Test	Purpose	What Error Results Might Mean
SUNW, XVR-500@2 SUNW, XVR-600@2 SunW, XVR-1200@2	Tests the display and memory of the XVR-500, XVR-600, and XVR-1200 graphics accelerators.	Graphics accelerator not properly seated into PCI slot or graphics memory is bad. Reseat the graphics accelerator in the PCI slot or replace it. See <a href="#">“PCI Card Problem” on page 23</a> or <a href="#">Section 11.5, “Replacing PCI Cards” on page 11-28</a> .
i2c@0,320	Checks for the presence of the I2C devices.	Problem on the I2C bus or controller. Problem with GPIOs on SCSI backplane, workstation environmental monitor, FRU ID SEEPROM, I2C controller, real time clock, or OpenBoot PROM and POST (flash PROM) operation. See <a href="#">“Motherboard Problem” on page 28</a> .
ide@d	Provides the identity of devices attached to the IDE bus.	Problem with hard drive, DVD-ROM drive, IDE cables, or SouthBridge chip. See <a href="#">“Hard Drive Problem” on page 4</a> , <a href="#">“DVD-ROM Drive Problem” on page 20</a> , or <a href="#">“Motherboard Problem” on page 28</a> .
parallel@0,378	Checks for the presence of the parallel port. If loopback tool is used, the status register and status and control lines are checked	Problem with device connected to parallel port or SouthBridge chip. If there is not a problem with the device, check the motherboard. See <a href="#">“Motherboard Problem” on page 28</a> .
pmu@6	Check power management settings.	Problem with the power management unit. Check the motherboard. See <a href="#">“Motherboard Problem” on page 28</a> .
rtc@0,70	Checks the real time clock.	Problem with the battery or the CMOS chip. Check the battery or motherboard. See <a href="#">“Battery Problem” on page 34</a> or <a href="#">“Motherboard Problem” on page 28</a> .

**TABLE 8-2** OpenBoot Diagnostics Test Usage

OpenBoot Diagnostics Test	Purpose	What Error Results Might Mean
serial0@3f8	Cycles through all possible baud rates. Exercises internal loopback of UART for each speed. Performs external loopback test at each baud speed (External loopback connector needed). Checks for the presence of the primary serial port.	Problem with the device connected to the serial port or SouthBridge chip. If there is not a problem with the device, check the motherboard. See <a href="#">“Motherboard Problem” on page 28.</a>
serial1@2e8	Cycles through all possible baud rates. Exercises internal loopback of UART for each speed. Performs external loopback test at each baud speed (External loopback connector needed). Checks for the presence of the serial port on the audio module.	Problem with the device connected to the serial port or SouthBridge chip. If not the device, check the motherboard. See <a href="#">“Motherboard Problem” on page 28.</a>
sound@8	Test audio controller and connector.	Problem with the audio module, speaker, or speaker cable. Check the audio module and motherboard. See <a href="#">“USB Problem (2 of 2)” on page 7.</a>
usb@a	Checks for the presence of the primary USB host controller.	Problem with the device attached to the USB0 ports. If not the device, check cable and motherboard. See <a href="#">“USB Problem” on page 6.</a>
usb@b	Checks for the presence of the primary USB host controller.	Problem with the item attached to the USB1 ports. If not the device, check cable and motherboard. See <a href="#">“USB Problem” on page 6.</a>
card-reader@0,40	Checks for the presence of the smart card reader.	Problem with motherboard, SCRO connector, or cable. See <a href="#">“Smart Card Reader Problem” on page 27.</a>
flashprom@2,0	Calculates the checksum of the PROM and verifies that the computed checksum is equal to the OPB generated checksum stored in the last four bytes of the PROM	The calculated POST or OpenBoot PROM checksum does not match the checksum stored in the flash PROM. A summary line is displayed. See <a href="#">“Motherboard Problem” on page 28.</a>  The POST or OPB image header are not recognized by the flashprom. See <a href="#">“Motherboard Problem” on page 28.</a>

**TABLE 8-2** OpenBoot Diagnostics Test Usage

OpenBoot Diagnostics Test	Purpose	What Error Results Might Mean
network@3	Checks PCI configuration space registers and MAC registers. Performs ethernet tests. Performs 10/100 Mb internal loopback test on PHY BC5703 chip. Performs external loopback tests (loopback connector needed).	Problem with one of the 8 data bits floating high. Problem with one of the parallel port bits not read back as the same value that was written to it. See <a href="#">“Network Problem” on page 13.</a>
scsi@4	Performs 3 tests: global-reg.test scsi timers test dma transfer test	The observed and expected values for the registers is not the same. The SCSI controller chip failed to reset. SCSI handshake did not occur within 10 milliseconds. SCSI timer error Unexpected SCSI interrupt Invalid SCSI scripts issued BIST test failure SCSI drive not ready See <a href="#">“Hard Drive Problem” on page 4.</a>
scsi@4,1	Performs 3 tests: global-reg.test scsi timers test dma transfer test	The observed and expected values for the registers is not the same. The SCSI controller chip failed to reset. SCSI handshake did not occur within 10 milliseconds. SCSI timer error Unexpected SCSI interrupt Invalid SCSI scripts issued BIST test failure SCSI drive not ready See <a href="#">“Hard Drive Problem” on page 4.</a>
Test-All	Test all IEEE 1275 compliant components connected to the motherboard	See individual OpenBoot Diagnostics test.

---

## 8.4 Invoking OpenBoot Diagnostics

This section describes how to invoke OpenBoot Diagnostics.

### 8.4.1 Invoking OpenBoot Diagnostics

OpenBoot Diagnostics are invoked either at the workstation monitor or remotely through an external display device.

---

**Note** – An advantage of running OpenBoot Diagnostics through a tip connection is that long output can be scrolled and saved.

---

To start OpenBoot Diagnostics:

1. **Obtain the ok prompt.**

See [Section 5.2, “Obtaining the ok Prompt”](#) on page 5-2.

2. **At the ok prompt, type:**

```
ok setenv diag-switch? true
diag-switch? = true
```

3. **Type:**

```
ok setenv diag-level max
diag-level = max
```

4. **Type:**

```
ok setenv diag-script normal
diag-script =          normal
```

5. **Type:**

```
ok setenv auto-boot? false
auto-boot? = false
```

## 6. Type:

```
ok reset-all
```

---

**Note** – OpenBoot Diagnostics will not reliably operate after a halt from UNIX occurs. OpenBoot Diagnostics should only be run after a system reset has occurred.

---

## 7. Verify that the platform resets (see the following code example).

### CODE EXAMPLE 8-6 reset all

```
ok reset-all
@(#)OBP 4.9.5 2003/09/15 Sun Blade 2500

Clearing TLBs
Loading Configuration
Membase: 0000.0002.0000.0000
MemSize: 0000.0000.4000.0000
Init CPU arrays Done
Init E$ tags Done
Setup TLB Done
MMUs ON
Scrubbing Tomatillo tags... 0 1
Block Scrubbing Done
Find dropin, Copying Done, Size 0000.0000.0000.56e0
PC = 0000.07ff.f000.4704
PC = 0000.0000.0000.4778
Find dropin, (copied), Decompressing Done, Size
0000.0000.0006.01a0
ttya initialized
System Reset: CPU Reset
JBUS-PCI bridge

master UE AFSR: 9e000000 AFAR: 40000018000

master CE AFSR: 1e000000 AFAR: 408000
JBUS-PCI bridge
Probing jbus at 0,0 SUNW,UltraSPARC-IIIi (1280 MHz @ 8:1, 1 MB)
memory-controller
Probing jbus at 1,0 Nothing there
Probing jbus at 1c,0 pci ppm
Probing jbus at 1d,0 pci
Probing jbus at 1e,0 pci ppm
Probing jbus at 1f,0 pci i2c nvram idprom
```



**CODE EXAMPLE 8-6** reset all (Continued)

```
Loading Support Packages: kbd-translator obp-tftp SUNW,i2c-ram-
device
    SUNW,fru-device
Loading onboard drivers:
Probing /pci@1e,600000 Device 7 isa flashprom rtc i2c i2c-bridge
gpio
    hardware-monitor hardware-monitor gpio gpio motherboard-fru-
prom
    scsi-backplane-fru-prom dimm-spd dimm-spd clock-generator
power
    serial serial dma parallel
CPU 0 Bank 2 base 200000000 size 1024 MB
Probing /pci@1f,700000 Device 2 SUNW,XVR-500
Probing /pci@1e,600000 Device 6 pmu i2c card-reader beep ppm
Probing /pci@1e,600000 Device 8 sound
Probing /pci@1e,600000 Device a usb
Probing /pci@1e,600000 Device b usb
Probing /pci@1e,600000 Device d ide disk cdrom
Probing /pci@1e,600000 Device 2 Nothing there
Probing /pci@1e,600000 Device 3 firewire
Probing /pci@1e,600000 Device 4 Nothing there
Probing /pci@1d,700000 Device 3 Nothing there
Probing /pci@1d,700000 Device 4 scsi disk tape scsi disk tape
Probing /pci@1d,700000 Device 2 Nothing there
Probing /pci@1c,600000 Device 3 network
Probing /pci@1c,600000 Device 2 Nothing there
Sun Blade 2500, No Keyboard
Copyright 1998-2003 Sun Microsystems, Inc. All rights reserved.

OpenBoot 4.9.5, 1024 MB memory installed, Serial #51663415.
Ethernet address 0:3:ba:14:52:37, Host ID: 83145237.

ok
```

8. At the `ok` prompt, type `obdiag`. Verify that the OpenBoot Diagnostics menu is displayed ([CODE EXAMPLE 8-7](#)).

**CODE EXAMPLE 8-7** obdiag Menu

```
obdiag
1 SUNW,XVR-500@2      2 card-reader      3 flashprom@2,0
4 i2c@0,320          5 ide@d            6 network@3
7 parallel@0,378    8 pmu              9 rtc@0,70
10 scsi@4            11 scsi@4,1        12 serial@0,2e8
13 serial@0,3f8     14 sounds@8        15 usb@a
16 usb@b
Commands: test test-all except help what setenv set-default exit
          diag-passes=1 diag-level=max test-args=verbose,
          subtest, loopback, bist
```

## 8.4.2 About the OpenBoot Diagnostics Menu

Once invoked, OpenBoot Diagnostics polls the workstation for device nodes. If a component is IEEE 1275 compliant, then its connection can be tested. If the device has a self-test, its function can be verified. When the poll is finished, OpenBoot Diagnostics lists a menu of the diagnostics which can be executed (see [CODE EXAMPLE 8-7](#)).

The menu of diagnostics displayed is dynamic in that if a device node is not recognized, it is not listed in the menu. For example, if the XVR-500 graphics accelerator were to be removed from the workstation, its test would not be available, and all remaining tests would shift location and drop a digit (see [CODE EXAMPLE 8-8](#)).

**CODE EXAMPLE 8-8** obdiag Menu With XVR-500 Graphics Accelerator Removed

```
obdiag
1 card-reader        2 flashprom@2,0    3 i2c@0,320
4 ide@d             5 network@3        6 parallel@0,378
7 pmu               8 rtc@0,70         9 scsi@4
10 scsi@4,1         11 serial@0,2e8    12 serial@0,3f8
13 sounds@8         14 usb@a           15 usb@b
Commands: test test-all except help what setenv set-default exit
          diag-passes=1 diag-level=max test-args=verbose,
          subtest, loopback, bist
```

---

## 8.5 Configuring OpenBoot Diagnostics

OpenBoot Diagnostics can be configured for running simple tests. To do so, follow this procedure:

1. **At the OpenBoot Diagnostics prompt, set the number of diagnostic passes to 1. Type:**

```
obdiag> setenv diag-passes 1
```

2. **Set the diagnostic level to maximum. Type:**

```
obdiag> setenv diag-level max
```

3. **Set the diagnostics to be verbose and perform subtests for external devices. Type:**

```
obdiag> setenv test-args verbose,subtest,bist
```

---

**Note** – These settings are stored in the NVRAM and survive power cycling.

---

---

## 8.6 OpenBoot Diagnostics Menu Commands

The following menu is displayed when the `help` command is executed.

Command	Description
<code>exit</code>	Exits obdiag tool
<code>help</code>	Prints this help information
<code>setenv</code>	Sets diagnostic configuration variable to new value.
<code>test-all</code>	Tests all devices displayed in the menu.
<code>test 1,2,5</code>	Tests devices 1, 2, and 5.
<code>except 2,5</code>	Tests all devices except devices 2 and 5.
<code>what 1,2,5</code>	Prints some selected properties for devices 1, 2, and 5.

---

## 8.7 OpenBoot Diagnostics Test Messages

### 8.7.1 SUNW, XVR-500@2 Output Message

The following code example shows the SUNW, XVR-500 output message.

**CODE EXAMPLE 8-9** SUNW, XVR-500@2 Output Message

```
obdiag> test 1
Hit the spacebar to interrupt testing
Testing /pci@1c,600000/SUNW,XVR-500@2

Starting XV-500 Selftest
(This will take an estimated
 2-4 minutes for the full test)

Direct access framebuffer test:
  address test ov10 pass
  address test ov11 pass
  pattern test ov10 00 ff a5 5a pass
  pattern test ov11 00 ff a5 5a pass
passed

Frame buffer color test:
  The frame buffer will be painted with:
    red in the top third
    green in the middle third
    blue in the bottom third.

Direct Burst memory test:
  address test db mem pass
  pattern test db mem 00 ff a5 5a pass
Selftest at /pci@1c,600000/SUNW,XVR-500@2..... passed
Pass:1 (of 1) Errors:0 (of 0) Tests Failed:0 Elapsed Time: 0:0:0:16

Hit any key to return to the main menu
```

---

**Note** – Sun XVR-100, Sun XVR-600, and Sun XVR-1200 graphic accelerators have similar out messages.

---

## 8.7.2 card-reader@0,40 Output Message

The following code example shows the `card-reader@0,40` output message.

### CODE EXAMPLE 8-10 card-reader@0,40 Output Message

```
obdiag> test 2
Hit the spacebar to interrupt testing
Testing /pci@1e,600000/pmu@6/i2c@0,0/card-reader@0,40
>> Smartcard Reader is attached
Selftest at /pci@1e,600000/pmu@6/i2c@0,0/card-reader@0,40
..... passed
Pass:1 (of 1) Errors:0 (of 0) Tests Failed:0 Elapsed Time: 0:0:0:0

Hit any key to return to the main menu
```

## 8.7.3 flashprom@2,0 Output Message

The following code example shows the `flashprom` output message.

### CODE EXAMPLE 8-11 flashprom@2,0 Output Message

```
obdiag> test 3
Hit the spacebar to interrupt testing
Testing /pci@1e,600000/isa@7/flashprom@2,0
Subtest crc-subtest
>> Verifying OBP header
>> Verifying POST header
>> Calculating CRC-32 and checksum of the flashprom
>> Flashprom CRC-32 : 891cb163
>> Flashprom checksum : 6d3fd44
Selftest at /pci@1e,600000/isa@7/flashprom@2,0..... passed
Pass:1 (of 1) Errors:0 (of 0) Tests Failed:0 Elapsed Time: 0:0:0:1

Hit any key to return to the main menu
```

## 8.7.4 i2c@0,320 Output Message

The following code example shows the i2c@0,320 output message.

### CODE EXAMPLE 8-12 i2c@0,320 Output Message

```
obdiag> test 4
Hit the spacebar to interrupt testing
Testing /pci@1e,600000/isa@7/i2c@0,320
Testing /pci@1e,600000/isa@7/i2c@0,320/i2c-bridge@0,12
>> Major revision: 1
>> Minor revision: 4
Testing /pci@1e,600000/isa@7/i2c@0,320/audio-card-fru-prom@0,a0
Testing /pci@1e,600000/isa@7/i2c@0,320/motherboard-fru-
prom@0,a2
Testing /pci@1e,600000/isa@7/i2c@0,320/scsi-backplane-fru-
prom@0,a8
Testing /pci@1e,600000/isa@7/i2c@0,320/dimm-spd@0,ba
Testing /pci@1e,600000/isa@7/i2c@0,320/dimm-spd@0,bc
Selftest at /pci@1e,600000/isa@7/i2c@0,320 ..... passed
ass:1 (of 1) Errors:0 (of 0) Tests Failed:0 Elapsed Time: 0:0:0:0

Hit any key to return to the main menu
```

## 8.7.5 ide@d Output Message

The following code example shows the ide@d output message.

### CODE EXAMPLE 8-13 ide@d Output Message

```
obdiag> test 5
Hit the spacebar to interrupt testing
Testing /pci@1e,600000/ide@d
>> Primary interface selected.
Subtest pci-config-reg-tests
Subtest pci-config-reg-tests:vendor-id-test
Subtest pci-config-reg-tests:device-id-test
Subtest pci-config-reg-tests:status-reg-test
Subtest pci-config-reg-tests:rom-expansion-test
>> Secondary interface selected.
Subtest sec-cmd-blk-reg-test4
>> Testing Secondary IDE Command register
>> Make sure IDE device is attached
Subtest reset&check-diag
>> Checking device reset capability
Subtest identify-atapi
>> Checking that an ATAPI device is attached.
```

**CODE EXAMPLE 8-13** ide@d Output Message (*Continued*)

```
>> ATAPI device responds to Identify Packet Device Command
>> Removable ATAPI Model: MATSHITADVD-ROM SR-85889
Selftest at /pci@1e,600000/ide@d ..... passed
Pass:1 (of 1) Errors:0 (of 0) Tests Failed:0 Elapsed Time: 0:0:0:0

Hit any key to return to the main menu
```

## 8.7.6 network@3 Output Message

The following code example shows the network@3 output message.

**CODE EXAMPLE 8-14** network@3 Output Message

```
obdiag> test 6
Hit the spacebar to interrupt testing
Testing /pci@1c,600000/network@3
Subtest reset-tests
Subtest reset-tests:mac-global-reset-test
Subtest reset-tests:tx-risc-reset-test
Subtest reset-tests:rx-risc-reset-test
Subtest reg-tests
Subtest reg-tests:pci-config-regs-test
Subtest reg-tests:mbox-regs-test
Subtest reg-tests:mbox-regs-test:bcm-mbox-int-mbox0-test
Subtest reg-tests:mbox-regs-test:bcm-mbox-gen-mbox1-test
Subtest reg-tests:mbox-regs-test:bcm-mbox-reload-stat-mbox-test
Subtest reg-tests:mbox-regs-test:bcm-mbox-rx-bd-rr1-cidx-test
Subtest reg-tests:mbox-regs-test:bcm-mbox-tx-bd-r1-nic-pidx-
test
Subtest reg-tests:mac-regs-test
Subtest reg-tests:mac-regs-test:bcm-mac-mode-test
Subtest reg-tests:mac-regs-test:bcm-mac-event-en-test
Subtest reg-tests:mac-regs-test:bcm-mac-led-test
Subtest reg-tests:mac-regs-test:bcm-mac-addr-hil-test
Subtest reg-tests:mac-regs-test:bcm-mac-addr-lol-test
Subtest reg-tests:mac-regs-test:bcm-mac-wol-pat-ptr-test
Subtest reg-tests:mac-regs-test:bcm-mac-rx-mtu-size-test
Subtest reg-tests:mac-regs-test:bcm-mac-gbit-pcs-test-test
Subtest reg-tests:mac-regs-test:bcm-mac-tx-auto-nego-test
Subtest reg-tests:mac-regs-test:bcm-mac-rx-auto-nego-test
Subtest reg-tests:mac-regs-test:bcm-mac-mi-comm-test
Subtest reg-tests:mac-regs-test:bcm-mac-mi-mode-test
Subtest reg-tests:mac-regs-test:bcm-mac-tx-mode-test
Subtest reg-tests:mac-regs-test:bcm-mac-rx-mode-test
Subtest reg-tests:mac-regs-test:bcm-mac-hash-reg0-test
```

**CODE EXAMPLE 8-14** network@3 Output Message (Continued)

```
Subtest reg-tests:mac-regs-test:bcm-mac-rx-bd-rules-cntl0-test
Subtest reg-tests:tx-regs-test
Subtest reg-tests:tx-regs-test:bcm-tdi-mode-test
Subtest reg-tests:tx-regs-test:bcm-tdi-statistics-cntl-test
Subtest reg-tests:tx-regs-test:bcm-tdc-mode-test
Subtest reg-tests:tx-regs-test:bcm-tbdrs-mode-test
Subtest reg-tests:tx-regs-test:bcm-tbdi-mode-test
Subtest reg-tests:tx-regs-test:bcm-tbdc-mode-test
Subtest reg-tests:rx-regs-test
Subtest reg-tests:rx-regs-test:bcm-rlp-mode-test
Subtest reg-tests:rx-regs-test:bcm-rlp-rsl-lock-test
Subtest reg-tests:rx-regs-test:bcm-rlp-cfg-test
Subtest reg-tests:rx-regs-test:bcm-rlp-statistics-cntl-test
Subtest reg-tests:rx-regs-test:bcm-rlp-statistics-en-msk-test
Subtest reg-tests:rx-regs-test:bcm-rlp-rsll-head-test
Subtest reg-tests:rx-regs-test:bcm-rlp-rsll-cnt-test
Subtest reg-tests:rx-regs-test:bcm-rdrbdi-mode-test
Subtest reg-tests:rx-regs-test:bcm-rdc-mode-test
Subtest reg-tests:rx-regs-test:bcm-rbdi-mode-test
Subtest reg-tests:rx-regs-test:bcm-rbdc-mode-test
Subtest reg-tests:rx-regs-test:bcm-rls-mode-test
Subtest reg-tests:mcf-regs-test
Subtest reg-tests:mcf-regs-test:bcm-mcf-mode-test
Subtest reg-tests:hc-regs-test
Subtest reg-tests:hc-regs-test:bcm-hc-mode-test
Subtest reg-tests:hc-regs-test:bcm-hc-rx-coalescing-ticks-test
Subtest reg-tests:hc-regs-test:bcm-hc-tx-coalescing-ticks-test
Subtest reg-tests:ma-regs-test
Subtest reg-tests:ma-regs-test:bcm-ma-mode-test
Subtest reg-tests:ma-regs-test:bcm-ma-trap-addr-lo-test
Subtest reg-tests:ma-regs-test:bcm-ma-trap-addr-hi-test
Subtest reg-tests:bm-regs-test
Subtest reg-tests:bm-regs-test:bcm-bm-mode-test
Subtest reg-tests:bm-regs-test:bcm-bm-pool-ba-test
Subtest reg-tests:bm-regs-test:bcm-bm-rdma-lo-water-mrk-test
Subtest reg-tests:bm-regs-test:bcm-bm-rx-risc-req-test
Subtest reg-tests:bm-regs-test:bcm-bm-tx-risc-req-test
Subtest reg-tests:bm-regs-test:bcm-bm-dmad-lo-water-mrk-test
Subtest reg-tests:bm-regs-test:bcm-bm-dmad-hi-water-mrk-test
Subtest reg-tests:dma-regs-test
Subtest reg-tests:dma-regs-test:bcm-rdma-mode-test
Subtest reg-tests:dma-regs-test:bcm-wdma-mode-test
Subtest reg-tests:msi-regs-test
Subtest reg-tests:msi-regs-test:bcm-msi-mode-test
Subtest reg-tests:gen-regs-test
Subtest reg-tests:gen-regs-test:bcm-gen-mode-test
Subtest reg-tests:gen-regs-test:bcm-gen-misc-config-test
```



**CODE EXAMPLE 8-14** network@3 Output Message (Continued)

```
Subtest reg-tests:gen-regs-test:bcm-gen-misc-loc-cntl-test
Subtest reg-tests:gen-regs-test:bcm-gen-seeprom-addr-test
Subtest reg-tests:gen-regs-test:bcm-gen-seeprom-data-test
Subtest reg-tests:gen-regs-test:bcm-gen-seeprom-cntl-test
Subtest reg-tests:gen-regs-test:bcm-gen-mdi-cntl-test
Subtest reg-tests:asf-regs-test
Subtest reg-tests:asf-regs-test:bcm-asf-cntl-test
Subtest reg-tests:asf-regs-test:bcm-asf-smbus-in-test
Subtest reg-tests:asf-regs-test:bcm-asf-smbus-out-test
Subtest mac-loopback-tests
Subtest mac-loopback-tests:mltpkt-mac-10mbit-lpbk-test
>> MAC internal loopback test operates at 10 Mbps.
Subtest mac-loopback-tests:mltpkt-mac-10mbit-lpbk-test
>> MAC internal loopback test operates at 10 Mbps.
>> Loopback buffer checked out okay.
>> Loopback buffer checked out okay.
>> Loopback buffer checked out okay.
Subtest mac-loopback-tests:mltpkt-mac-100mbit-lpbk-test
>> MAC internal loopback test operates at 100 Mbps.
>> Loopback buffer checked out okay.
>> Loopback buffer checked out okay.
>> Loopback buffer checked out okay.
Subtest mac-loopback-tests:mltpkt-mac-1000mbit-lpbk-test
>> MAC internal loopback test operates at 1000 Mbps.
>> Loopback buffer checked out okay.
>> Loopback buffer checked out okay.
>> Loopback buffer checked out okay.
Subtest mltpkt-phy-gmii-lpbk-test
Disabling Autonegotiation
>> Ethernet device set up to perform PHY internal loopback.
>> Loopback buffer checked out okay.
>> Loopback buffer checked out okay.
>> Loopback buffer checked out okay.
>> External loopback tests are not run. Include "loopback" in
TEST-ARGS and
>> connect an RJ-45 termination connector to ethernet ports.
Selftest at /pci@1c,60000/network@3 .....passed
Pass:1 (of 1) Errors:0 (of 0) Tests Failed:0 Elapsed Time: 0:0:0:6

Hit any key to return to the main menu
```

## 8.7.7 parallel@0,378 Output Message

The following code example shows the parallel port output message.

### CODE EXAMPLE 8-15 parallel@0,378 Output Message

```
obdiag> test 8
Hit the spacebar to interrupt testing
Testing /pci@1e,600000/isa@7/dma@0,0/parallel@0,378
>> Parallel Passive Loopback Test not run. To run the test include
>> "loopback" in TEST-ARGS & connect external loopback to
parallel port.
Selftest at /pci@1e,600000/isa@7/dma@0,0/parallel@0,378.. passed
Pass:1 (of 1) Errors:0 (of 0) Tests Failed:0 Elapsed Time: 0:0:0:0

Hit any key to return to the main menu
```

## 8.7.8 pmu@6 Output Message

The following code example shows the pmu@6 output message.

### CODE EXAMPLE 8-16 pmu@6 Output Message

```
obdiag> test 8
Hit the spacebar to interrupt testing
Testing /pci@1e,600000/pmu@6
Subtest pmu-reg-test
Selftest at /pci@1e,600000/pmu@6 ..... passed
Pass:1 (of 1) Errors:0 (of 0) Tests Failed:0 Elapsed Time: 0:0:0:0

Hit any key to return to the main menu
```

## 8.7.9 rtc@0,70 Output Message

The following code example shows the `rtc@0,70` output message.

### CODE EXAMPLE 8-17 rtc@0,70 Output Message

```
obdiag> test 9
Hit the spacebar to interrupt testing
Testing /pci@1e,600000/isa@7/rtc@0,70
Subtest rtc-tick-test
Selftest at /pci@1e,600000/isa@7/rtc@0,70 ..... passed
Pass:1 (of 1) Errors:0 (of 0) Tests Failed:0 Elapsed Time: 0:0:0:0

Hit any key to return to the main menu
```

## 8.7.10 scsi@4 Output Message

The following code example shows the `scsi@4` output message.

### CODE EXAMPLE 8-18 scsi@4 Output Message

```
obdiag> test 10
Hit the spacebar to interrupt testing
Testing /pci@1d,700000/scsi@4
>> SCSI registers
Subtest scsi-reg-test
>> SCSI timers
Subtest scsi-timer-test
>> SCSI DMA transfer
Subtest scsi-dma-test
>> SCSI device BIST test
Subtest scsi-bist-test
>> Starting devices - 0 1
  >> Target 0 Unit 0   Disk      SEAGATE ST373307LSUN72G 0507
  - passed
  >> Target 1 Unit 0   Disk      FUJITSU MAP3735N SUN72G 0401
  - passed
Selftest at /pci@1d,700000/scsi@4 ..... passed
Pass:1 (of 1) Errors:0 (of 0) Tests Failed:0 Elapsed Time:
0:0:0:31

Hit any key to return to the main menu
```

## 8.7.11 scsi@4,1 Output Message

The following code example shows the `scsi@4,1` output message.

### CODE EXAMPLE 8-19 scsi@4,1 Output Message

```
obdiag> test 11
Hit the spacebar to interrupt testing
Testing /pci@1d,700000/scsi@4,1
>> SCSI registers
Subtest scsi-reg-test
>> SCSI timers
Subtest scsi-timer-test
>> SCSI DMA transfer
Subtest scsi-dma-test
>> SCSI device BIST test
Subtest scsi-bist-test
>> Starting devices -
Selftest at /pci@1d,700000/scsi@4,1 .....passed
Pass:1 (of 1) Errors:0 (of 0) Tests Failed:0 Elapsed Time:
0:0:0:14

Hit any key to return to the main menu
```

## 8.7.12 serial@0,2e8 Output Message

The following code example shows the `serial@0,2e8` output message.

### CODE EXAMPLE 8-20 serial@0,2e8 Output Message

```
obdiag> test 12
Hit the spacebar to interrupt testing
Testing /pci@1e,600000/isa@7/serial@0,2e8
Subtest internal-loopback
BAUDRATE=115200
>> External Loopback Test not run. To run the test include
>> "loopback" in TEST-ARGS and connect external loopback to the
device port.
Selftest at /pci@1e,600000/isa@7/serial@0,2e8 ..... passed
Pass:1 (of 1) Errors:0 (of 0) Tests Failed:0 Elapsed Time: 0:0:0:0

Hit any key to return to the main menu
```

## 8.7.13 serial@0,3f8 Output Message

The following code example shows the serial@0,3f8 output message.

### CODE EXAMPLE 8-21 serial@0,3f8 Output Message

```
obdiag> test 13
Hit the spacebar to interrupt testing
Testing /pci@1e,600000/isa@7/serial@0,3f8
>> Port is not tested because it is in use as a console device.
Selftest at /pci@1e,600000/isa@7/serial@0,3f8 ..... passed
Pass:1 (of 1) Errors:0 (of 0) Tests Failed:0 Elapsed Time: 0:0:0:0

Hit any key to return to the main menu
```

## 8.7.14 sound@8 Output Message

The following code example shows the sound@8 output message.

### CODE EXAMPLE 8-22 sound@8 Output Message

```
obdiag> test 14
Hit the spacebar to interrupt testing
Testing /pci@1e,600000/sound@8
Subtest dc97-probe
>> Audio controller detected
Subtest dc97-pci-reg-test
Subtest dc97-reg-test
Subtest dc97-reg-test:dc97-dmar0-1-2-3-reg-test
Subtest dc97-reg-test:dc97-dmar4-5-6-7-reg-test
Subtest dc97-reg-test:dc97-mpur2-reg-test
Subtest dc97-reg-test:dc97-acrdwr-reg-reg-test
Subtest dc97-reg-test:dc97-acgpio-reg-test
Subtest dc97-reg-test:dc97-cir-gc-reg-test
Subtest dc97-reg-test:dc97-global-ctrl-reg-test
Subtest dc97-init
Subtest ac97-probe
>> AC-97 detected
Subtest ac97-reg-test
Subtest ac97-reg-test:ac97-general-purpose-reg-test
Subtest ac97-reg-test:ac97-misc-ctrl-bits-reg-test
Selftest at /pci@1e,600000/sound@8 ..... passed
Pass:1 (of 1) Errors:0 (of 0) Tests Failed:0 Elapsed Time: 0:0:0:0

Hit any key to return to the main menu
```

## 8.7.15 usb@a Output Message

The following code example shows the usb@a output message.

### CODE EXAMPLE 8-23 usb@a Output Message

```
obdiag> test 15
Hit the spacebar to interrupt testing
Testing /pci@1e,600000/usb@a
Subtest usb-pci-reg-test
Subtest usb-pci-reg-test:vendor-id-test
Subtest usb-pci-reg-test:device-id-test
Subtest usb-pci-reg-test:programmer-intf-test
Subtest usb-pci-reg-test:sub-class-code-test
Subtest usb-pci-reg-test:class-code-test
Subtest usb-pci-reg-test:header-type-test
Subtest usb-pci-reg-test:bist-test
Subtest usb-pci-reg-test:status-reg-test
Subtest usb-pci-reg-test:pin-test
Subtest usb-pci-reg-test:cache-line-size-walk1
Subtest usb-pci-reg-test:latency-timer-walk1
Subtest usb-pci-reg-test:interrupt-line-walk1
Subtest usb-pci-reg-test:min-gnt-test
Subtest usb-pci-reg-test:max-lat-test
Subtest usb-ohci-reg-test
Subtest usb-ohci-reg-test:usb-ohci-hccnt-sft-rst-test
>> The USB host controller is in suspended state
Subtest usb-ohci-reg-test:usb-ohci-cnt-reg-test
Subtest usb-ohci-reg-test:usb-ohci-cmdsta-reg-test
Subtest usb-ohci-reg-test:usb-ohci-intena-reg-walk1
Subtest usb-ohci-reg-test:usb-ohci-hccntapt-reg-test
Subtest usb-ohci-reg-test:usb-ohci-prdcur-reg-res-test
Subtest usb-ohci-reg-test:usb-ohci-cnt-hd-reg-test
Subtest usb-ohci-reg-test:usb-ohci-cnt-cur-reg-test
Subtest usb-ohci-reg-test:usb-ohci-blk-hd-reg-test
Subtest usb-ohci-reg-test:usb-ohci-blk-cur-reg-test
Subtest usb-ohci-reg-test:usb-ohci-done-hd-reg-res-test
Subtest usb-ohci-reg-test:usb-ohci-frm-int-reg-test
Subtest usb-ohci-reg-test:usb-ohci-frm-num-reg-test
Subtest usb-ohci-reg-test:usb-ohci-prd-strt-reg-test
Subtest usb-ohci-reg-test:usb-ohci-lspd-thre-reg-test
>> USB ports connectivity Test not run. To run the test, include
"offboard" in
>> TEST-ARGS & connect CATC USB 2.0 Port Tester to USB ports
Selftest at /pci@1e,600000/usb@a ..... passed
Pass:1 (of 1) Errors:0 (of 0) Tests Failed:0 Elapsed Time: 0:0:0:1

Hit any key to return to the main menu
```

---

**Note** – This is output message for USB0.

---

## 8.7.16 usb@b Output Message

The following code example shows the usb@b output message.

### CODE EXAMPLE 8-24 usb@b Output Message

```
obdiag> test 16
Hit the spacebar to interrupt testing
Testing /pci@1e,600000/usb@b
Subtest usb-pci-reg-test
Subtest usb-pci-reg-test:vendor-id-test
Subtest usb-pci-reg-test:device-id-test
Subtest usb-pci-reg-test:programmer-intf-test
Subtest usb-pci-reg-test:sub-class-code-test
Subtest usb-pci-reg-test:class-code-test
Subtest usb-pci-reg-test:header-type-test
Subtest usb-pci-reg-test:bist-test
Subtest usb-pci-reg-test:status-reg-test
Subtest usb-pci-reg-test:pin-test
Subtest usb-pci-reg-test:cache-line-size-walk1
Subtest usb-pci-reg-test:latency-timer-walk1
Subtest usb-pci-reg-test:interrupt-line-walk1
Subtest usb-pci-reg-test:min-gnt-test
Subtest usb-pci-reg-test:max-lat-test
Subtest usb-ohci-reg-test
Subtest usb-ohci-reg-test:usb-ohci-hccnt-sft-rst-test
>> The USB host controller is in suspended state
Subtest usb-ohci-reg-test:usb-ohci-cnt-reg-test
Subtest usb-ohci-reg-test:usb-ohci-cmdsta-reg-test
Subtest usb-ohci-reg-test:usb-ohci-intena-reg-walk1
Subtest usb-ohci-reg-test:usb-ohci-hccntapt-reg-test
Subtest usb-ohci-reg-test:usb-ohci-prdcur-reg-res-test
Subtest usb-ohci-reg-test:usb-ohci-cnt-hd-reg-test
Subtest usb-ohci-reg-test:usb-ohci-cnt-cur-reg-test
Subtest usb-ohci-reg-test:usb-ohci-blk-hd-reg-test
Subtest usb-ohci-reg-test:usb-ohci-blk-cur-reg-test
Subtest usb-ohci-reg-test:usb-ohci-done-hd-reg-res-test
Subtest usb-ohci-reg-test:usb-ohci-frm-int-reg-test
Subtest usb-ohci-reg-test:usb-ohci-frm-num-reg-test
Subtest usb-ohci-reg-test:usb-ohci-prd-strt-reg-test
Subtest usb-ohci-reg-test:usb-ohci-lspd-thre-reg-test
```

**CODE EXAMPLE 8-24** usb@b Output Message (*Continued*)

```
>> USB ports connectivity Test not run. To run the test, include
"offboard" in
>> TEST-ARGS & connect CATC USB 2.0 Port Tester to USB ports
Selftest at /pci@1e,600000/usb@b .....passed
Pass:1 (of 1) Errors:0 (of 0) Tests Failed:0 Elapsed Time: 0:0:0:1

Hit any key to return to the main menu
```

---

**Note** – This is the output message for USB1.

---

## 8.7.17 test-all Output Message

The test-all diagnostic runs all OpenBoot diagnostic tests in sequence.

---

**Note** – You may exclude certain tests by using the `except` command.

---

The following code example shows the test-all output message.

**CODE EXAMPLE 8-25** test-all Output Message

```
obdiag> test-all
Hit the spacebar to interrupt testing
Testing /pci@1c,600000/SUNW,XVR-500@2

Starting XV-500 Selftest
(This will take an estimated
 2-4 minutes for the full test)

Direct access framebuffer test:
  address test ovl0 pass
  address test ovl1 pass
  pattern test ovl0 00 ff a5 5a pass
  pattern test ovl1 00 ff a5 5a pass
passed

Frame buffer color test:
  The frame buffer will be painted with:
  red in the top third
  green in the middle third
  blue in the bottom third.

Direct Burst memory test:
```



**CODE EXAMPLE 8-25** test-all Output Message (Continued)

```
address test db mem pass
pattern test db mem 00 ff a5 5a pass
Selftest at /pci@1c,600000/SUNW,XVR-500@2 ..... passed
Testing /pci@1c,600000/pmu@6/i2c@0,0/card-reader@0,40
Selftest at /pci@1e,600000/pmu@6/i2c@0,0/card-reader@0,40
.....passed
Testing /pci@1e,600000/isa@7/flashprom@2,0
Subtest crc-subtest
Selftest at /pci@1e,600000/isa@7/flashprom@2,0
..... passed
Testing /pci@1e,600000/isa@7/i2c@0,320
Testing /pci@1e,600000/isa@7/i2c@0,320/i2c-bridge@0,12
Testing /pci@1e,600000/isa@7/i2c@0,320/motherboard-fru-
prom@0,a2
Testing /pci@1e,600000/isa@7/i2c@0,320/scsi-backplane-fru-
prom@0,a8
Testing /pci@1e,600000/isa@7/i2c@0,320/dimm-spd@0,ba
Testing /pci@1e,600000/isa@7/i2c@0,320/dimm-spd@0,bc
Selftest at /pci@1e,600000/isa@7/i2c@0,320
..... passed
Testing /pci@1e,600000/ide@d
Subtest pci-config-reg-tests
Subtest pci-config-reg-tests:vendor-id-test
Subtest pci-config-reg-tests:device-id-test
Subtest pci-config-reg-tests:status-reg-test
Subtest pci-config-reg-tests:rom-expansion-test
Subtest sec-cmd-blk-reg-test4
Subtest reset&check-diag
Subtest identify-atapi
Selftest at /pci@1e,600000/ide@d
..... passed
Testing /pci@1c,600000/network@3
Subtest reset-tests
Subtest reset-tests:mac-global-reset-test
Subtest reset-tests:tx-risc-reset-test
Subtest reset-tests:rx-risc-reset-test
Subtest reg-tests
Subtest reg-tests:pci-config-regs-test
Subtest reg-tests:mbox-regs-test
Subtest reg-tests:mbox-regs-test:bcm-mbox-int-mbox0-test
Subtest reg-tests:mbox-regs-test:bcm-mbox-gen-mbox1-test
Subtest reg-tests:mbox-regs-test:bcm-mbox-reload-stat-mbox-test
Subtest reg-tests:mbox-regs-test:bcm-mbox-rx-bd-rr1-cidx-test
Subtest reg-tests:mbox-regs-test:bcm-mbox-tx-bd-r1-nic-pidx-
test
Subtest reg-tests:mac-regs-test
Subtest reg-tests:mac-regs-test:bcm-mac-mode-test
```

**CODE EXAMPLE 8-25** test-all Output Message (*Continued*)

```
Subtest reg-tests:mac-regs-test:bcm-mac-event-en-test
Subtest reg-tests:mac-regs-test:bcm-mac-led-test
Subtest reg-tests:mac-regs-test:bcm-mac-addr-hil-test
Subtest reg-tests:mac-regs-test:bcm-mac-addr-lol-test
Subtest reg-tests:mac-regs-test:bcm-mac-wol-pat-ptr-test
Subtest reg-tests:mac-regs-test:bcm-mac-rx-mtu-size-test
Subtest reg-tests:mac-regs-test:bcm-mac-gbit-pcs-test-test
Subtest reg-tests:mac-regs-test:bcm-mac-tx-auto-nego-test
Subtest reg-tests:mac-regs-test:bcm-mac-rx-auto-nego-test
Subtest reg-tests:mac-regs-test:bcm-mac-mi-comm-test
Subtest reg-tests:mac-regs-test:bcm-mac-mi-mode-test
Subtest reg-tests:mac-regs-test:bcm-mac-tx-mode-test
Subtest reg-tests:mac-regs-test:bcm-mac-rx-mode-test
Subtest reg-tests:mac-regs-test:bcm-mac-hash-reg0-test
Subtest reg-tests:mac-regs-test:bcm-mac-rx-bd-rules-cntl0-test
Subtest reg-tests:tx-regs-test
Subtest reg-tests:tx-regs-test:bcm-tdi-mode-test
Subtest reg-tests:tx-regs-test:bcm-tdi-statistics-cntl-test
Subtest reg-tests:tx-regs-test:bcm-tdc-mode-test
Subtest reg-tests:tx-regs-test:bcm-tbdrs-mode-test
Subtest reg-tests:tx-regs-test:bcm-tbdi-mode-test
Subtest reg-tests:tx-regs-test:bcm-tbdc-mode-test
Subtest reg-tests:rx-regs-test
Subtest reg-tests:rx-regs-test:bcm-rlp-mode-test
Subtest reg-tests:rx-regs-test:bcm-rlp-rsl-lock-test
Subtest reg-tests:rx-regs-test:bcm-rlp-cfg-test
Subtest reg-tests:rx-regs-test:bcm-rlp-statistics-cntl-test
Subtest reg-tests:rx-regs-test:bcm-rlp-statistics-en-msk-test
Subtest reg-tests:rx-regs-test:bcm-rlp-rsl1-head-test
Subtest reg-tests:rx-regs-test:bcm-rlp-rsl1-cnt-test
Subtest reg-tests:rx-regs-test:bcm-rdrbdi-mode-test
Subtest reg-tests:rx-regs-test:bcm-rdc-mode-test
Subtest reg-tests:rx-regs-test:bcm-rbdi-mode-test
Subtest reg-tests:rx-regs-test:bcm-rbdc-mode-test
Subtest reg-tests:rx-regs-test:bcm-rls-mode-test
Subtest reg-tests:mcf-regs-test
Subtest reg-tests:mcf-regs-test:bcm-mcf-mode-test
Subtest reg-tests:hc-regs-test
Subtest reg-tests:hc-regs-test:bcm-hc-mode-test
Subtest reg-tests:hc-regs-test:bcm-hc-rx-coalescing-ticks-test
Subtest reg-tests:hc-regs-test:bcm-hc-tx-coalescing-ticks-test
Subtest reg-tests:ma-regs-test
Subtest reg-tests:ma-regs-test:bcm-ma-mode-test
Subtest reg-tests:ma-regs-test:bcm-ma-trap-addr-lo-test
Subtest reg-tests:ma-regs-test:bcm-ma-trap-addr-hi-test
Subtest reg-tests:bm-regs-test
Subtest reg-tests:bm-regs-test:bcm-bm-mode-test
```

**CODE EXAMPLE 8-25** test-all Output Message (Continued)

```
Subtest reg-tests:bm-regs-test:bcm-bm-pool-ba-test
Subtest reg-tests:bm-regs-test:bcm-bm-rdma-lo-water-mrk-test
Subtest reg-tests:bm-regs-test:bcm-bm-rx-risc-req-test
Subtest reg-tests:bm-regs-test:bcm-bm-tx-risc-req-test
Subtest reg-tests:bm-regs-test:bcm-bm-dmad-lo-water-mrk-test
Subtest reg-tests:bm-regs-test:bcm-bm-dmad-hi-water-mrk-test
Subtest reg-tests:dma-regs-test
Subtest reg-tests:dma-regs-test:bcm-rdma-mode-test
Subtest reg-tests:dma-regs-test:bcm-wdma-mode-test
Subtest reg-tests:msi-regs-test
Subtest reg-tests:msi-regs-test:bcm-msi-mode-test
Subtest reg-tests:gen-regs-test
Subtest reg-tests:gen-regs-test:bcm-gen-mode-test
Subtest reg-tests:gen-regs-test:bcm-gen-misc-config-test
Subtest reg-tests:gen-regs-test:bcm-gen-misc-loc-cntl-test
Subtest reg-tests:gen-regs-test:bcm-gen-seeprom-addr-test
Subtest reg-tests:gen-regs-test:bcm-gen-seeprom-data-test
Subtest reg-tests:gen-regs-test:bcm-gen-seeprom-cntl-test
Subtest reg-tests:gen-regs-test:bcm-gen-mdi-cntl-test
Subtest reg-tests:asf-regs-test
Subtest reg-tests:asf-regs-test:bcm-asf-cntl-test
Subtest reg-tests:asf-regs-test:bcm-asf-smbus-in-test
Subtest reg-tests:asf-regs-test:bcm-asf-smbus-out-test
Subtest mac-loopback-tests
Subtest mac-loopback-tests:mltpkt-mac-10mbit-lpbk-test
Subtest mac-loopback-tests:mltpkt-mac-100mbit-lpbk-test
Subtest mac-loopback-tests:mltpkt-mac-1000mbit-lpbk-test
Subtest mltpkt-phy-gmii-lpbk-test
Subtest ext-loopback-tests
Subtest ext-loopback-tests:mltpkt-ext-10mbit-lpbk-test
Subtest ext-loopback-tests:mltpkt-ext-100mbit-lpbk-test
Selftest at /pci@1c,600000/network@3
..... passed
Testing /pci@1e,600000/isa@7/dma@0,0/parallel@0,378
Subtest sio-passive-lb
Selftest at /pci@1e,600000/isa@7/dma@0,0/parallel@0,378
..... passed
Testing /pci@1e,600000/pmu@6
Subtest pmu-reg-test
Selftest at /pci@1e,600000/pmu@6
..... passed
Testing /pci@1e,600000/isa@7/rtc@0,70
Subtest rtc-tick-test
Selftest at /pci@1e,600000/isa@7/rtc@0,70
..... passed
Testing /pci@1d,700000/scsi@4
Subtest scsi-reg-test
```

**CODE EXAMPLE 8-25** test-all Output Message (*Continued*)

```
Subtest scsi-timer-test
Subtest scsi-dma-test
Subtest scsi-bist-test
Selftest at /pci@1d,700000/scsi@4
..... passed
Testing /pci@1d,700000/scsi@4,1
Subtest scsi-reg-test
Subtest scsi-timer-test
Subtest scsi-dma-test
Subtest scsi-bist-test
Selftest at /pci@1d,700000/scsi@4,1
..... passed
Testing /pci@1e,600000/isa@7/serial@0,2e8
Subtest internal-loopback
Subtest external-loopback
Selftest at /pci@1e,600000/isa@7/serial@0,2e8
..... passed
Testing /pci@1e,600000/isa@7/serial@0,3f8
Selftest at /pci@1e,600000/isa@7/serial@0,3f8
..... passed
Testing /pci@1e,600000/sound@8
Subtest dc97-probe
Subtest dc97-pci-reg-test
Subtest dc97-reg-test
Subtest dc97-reg-test:dc97-dmar0-1-2-3-reg-test
Subtest dc97-reg-test:dc97-dmar4-5-6-7-reg-test
Subtest dc97-reg-test:dc97-mpur2-reg-test
Subtest dc97-reg-test:dc97-acrdwr-reg-reg-test
Subtest dc97-reg-test:dc97-acgpio-reg-test
Subtest dc97-reg-test:dc97-cir-gc-reg-test
Subtest dc97-reg-test:dc97-global-ctrl-reg-test
Subtest dc97-init
Subtest ac97-probe
Subtest ac97-reg-test
Subtest ac97-reg-test:ac97-general-purpose-reg-test
Subtest ac97-reg-test:ac97-misc-ctrl-bits-reg-test
Subtest tone-speaker
Subtest tone-line
Subtest tone-mike
Selftest at /pci@1e,600000/sound@8
..... passed
Testing /pci@1e,600000/usb@a
Subtest usb-pci-reg-test
Subtest usb-pci-reg-test:vendor-id-test
Subtest usb-pci-reg-test:device-id-test
Subtest usb-pci-reg-test:programmer-intf-test
Subtest usb-pci-reg-test:sub-class-code-test
```

**CODE EXAMPLE 8-25** test-all Output Message (Continued)

```
Subtest usb-pci-reg-test:class-code-test
Subtest usb-pci-reg-test:header-type-test
Subtest usb-pci-reg-test:bist-test
Subtest usb-pci-reg-test:status-reg-test
Subtest usb-pci-reg-test:pin-test
Subtest usb-pci-reg-test:cache-line-size-walk1
Subtest usb-pci-reg-test:latency-timer-walk1
Subtest usb-pci-reg-test:interrupt-line-walk1
Subtest usb-pci-reg-test:min-gnt-test
Subtest usb-pci-reg-test:max-lat-test
Subtest usb-ohci-reg-test
Subtest usb-ohci-reg-test:usb-ohci-hcnt-sft-rst-test
Subtest usb-ohci-reg-test:usb-ohci-cnt-reg-test
Subtest usb-ohci-reg-test:usb-ohci-cmdsta-reg-test
Subtest usb-ohci-reg-test:usb-ohci-intsta-reg-test
Subtest usb-ohci-reg-test:usb-ohci-intena-reg-walk1
Subtest usb-ohci-reg-test:usb-ohci-hcntapt-reg-test
Subtest usb-ohci-reg-test:usb-ohci-prdcur-reg-res-test
Subtest usb-ohci-reg-test:usb-ohci-cnt-hd-reg-test
Subtest usb-ohci-reg-test:usb-ohci-cnt-cur-reg-test
Subtest usb-ohci-reg-test:usb-ohci-blk-hd-reg-test
Subtest usb-ohci-reg-test:usb-ohci-blk-cur-reg-test
Subtest usb-ohci-reg-test:usb-ohci-done-hd-reg-res-test
Subtest usb-ohci-reg-test:usb-ohci-frm-int-reg-test
Subtest usb-ohci-reg-test:usb-ohci-frm-num-reg-test
Subtest usb-ohci-reg-test:usb-ohci-prd-strt-reg-test
Subtest usb-ohci-reg-test:usb-ohci-lspd-thre-reg-test
Selftest at /pci@1e,600000/usb@a
..... passed
Testing /pci@1e,600000/usb@b
Subtest usb-pci-reg-test
Subtest usb-pci-reg-test:vendor-id-test
Subtest usb-pci-reg-test:device-id-test
Subtest usb-pci-reg-test:programmer-intf-test
Subtest usb-pci-reg-test:sub-class-code-test
Subtest usb-pci-reg-test:class-code-test
Subtest usb-pci-reg-test:header-type-test
Subtest usb-pci-reg-test:bist-test
Subtest usb-pci-reg-test:status-reg-test
Subtest usb-pci-reg-test:pin-test
Subtest usb-pci-reg-test:cache-line-size-walk1
Subtest usb-pci-reg-test:latency-timer-walk1
Subtest usb-pci-reg-test:interrupt-line-walk1
Subtest usb-pci-reg-test:min-gnt-test
Subtest usb-pci-reg-test:max-lat-test
Subtest usb-ohci-reg-test
Subtest usb-ohci-reg-test:usb-ohci-hcnt-sft-rst-test
```

**CODE EXAMPLE 8-25** test-all Output Message (*Continued*)

```
Subtest usb-ohci-reg-test:usb-ohci-cnt-reg-test
Subtest usb-ohci-reg-test:usb-ohci-cmdsta-reg-test
Subtest usb-ohci-reg-test:usb-ohci-intsta-reg-test
Subtest usb-ohci-reg-test:usb-ohci-intena-reg-walk1
Subtest usb-ohci-reg-test:usb-ohci-hccntapt-reg-test
Subtest usb-ohci-reg-test:usb-ohci-prdcur-reg-res-test
Subtest usb-ohci-reg-test:usb-ohci-cnt-hd-reg-test
Subtest usb-ohci-reg-test:usb-ohci-cnt-cur-reg-test
Subtest usb-ohci-reg-test:usb-ohci-blk-hd-reg-test
Subtest usb-ohci-reg-test:usb-ohci-blk-cur-reg-test
Subtest usb-ohci-reg-test:usb-ohci-done-hd-reg-res-test
Subtest usb-ohci-reg-test:usb-ohci-frm-int-reg-test
Subtest usb-ohci-reg-test:usb-ohci-frm-num-reg-test
Subtest usb-ohci-reg-test:usb-ohci-prd-strt-reg-test
Subtest usb-ohci-reg-test:usb-ohci-lspd-thre-reg-test
Selftest at /pci@1e,600000/usb@b
..... passed
Pass:1 (of 1) Errors:0 (of 0) Tests Failed:0 Elapsed Time:
0:0:1:14

Hit any key to return to the main menu
```

# SunVTS

---

This chapter describes using the SunVTS software to troubleshoot problems with the Sun Blade 2500 workstation. Topics include:

- Section 9.1, “Installing SunVTS” on page 9-1
- Section 9.2, “Exercising System Components Using SunVTS Software” on page 9-2
- Section 9.3, “Further SunVTS Testing” on page 9-13

---

## 9.1 Installing SunVTS

SunVTS software is operating-environment specific. Use only version 5.1 PS2 or later, which supports the Sun Blade 2500 workstation.

You can find the latest version of SunVTS software on the web at:

<http://www.sun.com/oem/products/vts/>

---

**Note** – The web site can also provide you with SunVTS installation instructions. The installation and removal instructions for SunVTS are located in the *SunVTS 5.1ps2 User’s Guide*.

---

You can find the latest revision of the SunVTS documentation on the web at:

<http://diagnostics.sfbay/>

---

## 9.2 Exercising System Components Using SunVTS Software

### 9.2.1 Connection Mode

When configured for connection mode, SunVTS software makes a single testing pass, checking for the existence of the item under test. Regardless of the test result, output messages are displayed.

---

**Note** – Connection mode checks the connectivity to each device, not the device itself.

---

If a component fails a test in connection mode, check that the component is connected to the workstation and check that the connections of the component are correctly seated and not damaged. For example, if the DVD-ROM drive test (`c0t2d0 (dvdtest)`) displays an error, checks that the DVD-ROM signal cable is connected to the motherboard and checks that the cable connections on the DVD-ROM drive are correctly seated and are not damaged.

---

**Note** – You cannot test graphics accelerators in connection mode.

---

---

**Note** – Many of the simplified connection mode tests are described in this section. However, all connection and functional mode testing for your workstation is beyond the scope of this manual. Additional connection, functional, exclusive, online, and auto config mode testing is described in the *SunVTS 5.1 PS2 Test Reference Manual*.

---

### 9.2.2 Connection Mode Component Testing

To test a specific component in connection mode, follow this procedure. If you want to test more than one component, test one component at a time, and restart the procedure from [Step 4](#) for the second and subsequent components.



1. As superuser, open a terminal window and start the SunVTS software:

```
# /opt/SUNWvts/bin/sunvts
```

The SunVTS GUI is displayed.

2. From Select Test Mode, check Connection.
3. From System Map, check Logical.
4. From Select Devices, check None.
5. Use TABLE 9-1 for the next steps, depending upon which component you want to test.

---

**Note** – Before testing connections between the workstation EEPROMs and DIMMs verify that a DIMM occupies the DIMM connector under test. If a DIMM is not present, the component mode test for that component and DIMM is not displayed and the component test is not run.

---



---

**Note** – Between individual connection mode tests it may be necessary to click Reset to clear other workstation errors.

---

**TABLE 9-1** Steps to Test Components in Connection Mode

Component	Steps to Take	Successful Test Results
Hard drive (SCSI)	6. Click the plus sign adjacent to SCSI- Devices(xxxx0).	Connection test starting....
	7. Select c0t0d0 (disktest) for HDD0 or c0t1d0 (disktest) for HDD1.	Connection test complete
	8. Click Reset.	SCSI-Devices (uata0) c0t0d0 Status: Connected
	9. Click Start.	Capacity=10241.84 MB, Mounted= (/), Free=1693.59 MB.
DVD-ROM	6. Click the plus sign adjacent to IDE - Devices(uata0).	Connection test starting....
	7. Select c1t2d0 (dvdtest).	c1t2d0
	8. Insert a known good DVD-ROM into the drive and wait a minute.	Status: Connected
	9. If a GUI window for the DVD-ROM opens, close it.	Connection test complete
	10. From Select Devices, select Intervention.	
	11. Select Options.	
	12. Click Reset.	
13. Click Start.		

**TABLE 9-1** Steps to Test Components in Connection Mode *(Continued)*

Component	Steps to Take	Successful Test Results
DIMM memory	6. Click the plus sign adjacent to Memory.	Connection test starting....
	7. Select mem (pmentest) or (vmemtest). 8. Click Reset. 9. Click Start.	Memory mem Status: "Connected 1024 MB physical memory has been found  Connection test complete
SEEPROM	6. Click the plus sign adjacent to Memory.	Connection test starting....
	7. Select seeeprom0 (seepromtest). 8. Click Reset. 9. Click Start.	Connection test complete  seeeprom0 (example) Status: Connected:  Name - motherboard-fru-prom Size - 0x002000 FullPath - /devices/pci@1e.600000/isa@7/i2c@0.320/motherboard-fru-prom@0.a8
DIMM0 SEEPROM	6. Click the plus sign adjacent to Memory.	Connection test starting....
	7. Select seeeprom1 (seepromtest). 8. Click Reset. 9. Click Start.	seeeprom1 Status: Connected:  Name - dimm-spd Size - 0x000100 FullPath - /devices/pci@1e.600000/isa@7/i2c@0.320/dimm-spd@0,b6:dimm-spd  Connection test complete
DIMM1 SEEPROM	6. Click the plus sign adjacent to Memory.	Connection test starting....
	7. Select seeeprom2 (seepromtest). 8. Click Reset. 9. Click Start.	seeeprom2 Status: Connected:  Name - dimm-spd Size - 0x000100 FullPath - /devices/pci@1e.600000/isa@7/i2c@0.320/dimm-spd@0,b8:dimm-spd  Connection test complete
DIMM2 SEEPROM	6. Click the plus sign adjacent to Memory.	Connection test starting....
	7. Select seeeprom3 (seepromtest). 8. Click Reset. 9. Click Start.	seeeprom3 Status: Connected:  Name - dimm-spd Size - 0x000100 FullPath - /devices/pci@1e.600000/isa@7/i2c@0.320/dimm-spd@0,ba:dimm-spd  Connection test complete

**TABLE 9-1** Steps to Test Components in Connection Mode (*Continued*)

<b>Component</b>	<b>Steps to Take</b>	<b>Successful Test Results</b>
DIMM3 SEEPROM	<ol style="list-style-type: none"> <li>6. Click the plus sign adjacent to Memory.</li> <li>7. Select seeeprom4 (seeepromtest).</li> <li>8. Click Reset.</li> <li>9. Click Start.</li> </ol>	<p>Connection test starting...</p> <pre> seeeprom4 Status: Connected: Name - dimm-spd Size - 0x000100 FullPath - /devices/pci@1e.600000/isa@7/ i2c@0.320/dimm-spd@0,bc:dimm-spd </pre> <p>Connection test complete</p>
DIMM4 SEEPROM	<ol style="list-style-type: none"> <li>6. Click the plus sign adjacent to Memory.</li> <li>7. Select seeeprom5 (seeepromtest).</li> <li>8. Click Reset.</li> <li>9. Click Start.</li> </ol>	<p>Connection test starting...</p> <pre> seeeprom5 Status: Connected: Name - dimm-spd Size - 0x000100 FullPath - /devices/pci@1e.600000/isa@7/ i2c@0.320/dimm-spd@0,c6:dimm-spd </pre> <p>Connection test complete</p>
DIMM5 SEEPROM	<ol style="list-style-type: none"> <li>6. Click the plus sign adjacent to Memory.</li> <li>7. Select seeeprom6 (seeepromtest).</li> <li>8. Click Reset.</li> <li>9. Click Start.</li> </ol>	<p>Connection test starting...</p> <pre> seeeprom6 Status: Connected: Name - dimm-spd Size - 0x000100 FullPath - /devices/pci@1e.600000/isa@7/ i2c@0.320/dimm-spd@0,c8:dimm-spd </pre> <p>Connection test complete</p>
DIMM6 SEEPROM	<ol style="list-style-type: none"> <li>6. Click the plus sign adjacent to Memory.</li> <li>7. Select seeeprom7 (seeepromtest).</li> <li>8. Click Reset.</li> <li>9. Click Start.</li> </ol>	<p>Connection test starting...</p> <pre> seeeprom7 Status: Connected: Name - dimm-spd Size - 0x000100 FullPath - /devices/pci@1e.600000/isa@7/ i2c@0.320/dimm-spd@0,ca:dimm-spd </pre> <p>Connection test complete</p>
DIMM7 SEEPROM	<ol style="list-style-type: none"> <li>6. Click the plus sign adjacent to Memory.</li> <li>7. Select seeeprom8 (seeepromtest).</li> <li>8. Click Reset.</li> <li>9. Click Start.</li> </ol>	<p>Connection test starting...</p> <pre> seeeprom8 Status: Connected: Name - dimm-spd Size - 0x000100 FullPath - /devices/pci@1e.600000/isa@7/ i2c@0.320/dimm-spd@0,cc:dimm-spd </pre> <p>Connection test complete</p>
Graphics accelerator	Connection mode testing is not possible for graphics accelerators.	

**TABLE 9-1** Steps to Test Components in Connection Mode (Continued)

Component	Steps to Take	Successful Test Results
Smart card reader	<ol style="list-style-type: none"> <li>6. Click the plus sign adjacent to Other Devices.</li> <li>7. Select <code>scmi2c0 (sc2test)</code>.</li> <li>8. Insert known good smart card media into the drive.</li> <li>9. From Select Devices, check Intervention.</li> <li>10. Click Reset.</li> <li>11. Click Start.</li> </ol>	<p>Connection test starting...</p> <pre> scmi2c0   Status: "Connected   Device /dev/scmi2c0:     Regs read Test passed  scmi2c0   Status: "Connected   Device /dev/scmi2c0:     Walking 1s Test passed </pre> <p>Connection test complete</p>
Ethernet (TPE)	<ol style="list-style-type: none"> <li>6. Select Network.</li> <li>7. Click Reset.</li> <li>8. Click Start.</li> </ol>	<p>Connection test starting...</p> <pre> Network   bge0   Status: Connected: </pre> <p>Connection test complete</p>
Serial port (Serial port A, TTYA)	<ol style="list-style-type: none"> <li>6. From Select Devices, check Intervention.</li> <li>7. Select Option: internal loopback <code>a_b</code>, Test-type <code>a_b</code>, or apply <code>all</code>.</li> <li>8. Click Reset.</li> <li>9. Click Start.</li> </ol>	<pre> Comm.Ports   su0   Status: Idle:   /dev/term/a:     Idle, current baud = 9600, maximum baud = 115200,   /dev/term/b: </pre> <p>Connection test complete</p>
Serial port (Serial port B, audio module)	<ol style="list-style-type: none"> <li>6. From Select Devices, select Intervention.</li> <li>7. Select Option: internal loopback <code>a_b</code>, Test-type <code>a_b</code>, or apply <code>all</code>.</li> <li>8. Click Reset.</li> <li>9. Click Start.</li> </ol>	<pre> Comm.Ports   su0   Status: Idle:   /dev/term/a:     Idle, current baud = 9600, maximum baud = 115200,   /dev/term/b: </pre> <p>Connection test complete</p>
Parallel port	<ol style="list-style-type: none"> <li>6. Click the plus sign adjacent to Other Devices.</li> <li>7. Select <code>ecpp0 (eccptest)</code>.</li> <li>8. Click Reset.</li> <li>9. Click Start.</li> </ol>	<p>Connection test starting...</p> <pre> OtherDevices   ecpp0   Status: Idle:   /dev/ecpp0:     IEEE 1284 parallel port,     Port mode = ECPP_CENTRONICS (non-IEEE 1284     compliant device mode - Centronics only) </pre> <p>Connection test complete</p>

**TABLE 9-1** Steps to Test Components in Connection Mode (*Continued*)

Component	Steps to Take	Successful Test Results
Speaker	6. Click the plus sign adjacent to Other Devices. 7. Select sound0 (audiotest). 8. Click Reset. 9. Click Start.	<pre> Connection test starting....  audio: Playing 2 second(s) 1 KHz tone through the speaker port...done.   sound0     Status: Idle:     /dev/sound/0:       AC97 Codec, 16-bit Stereo, 48 KHz sample rate  Connection test complete           </pre>
System sensors	6. Click the plus sign adjacent to Other Devices. 7. Select adm1031 (env3test). 8. Click Reset. 9. Click Start.	<pre> Connection test starting....  OtherDevices   adm1031     Status: Found      cpu-fan (fan. 4100000416)     sys-in (fan. 410000041c)       sys-out (fan. 4100000422)         dimm (temperature-sensor. xxxxxxxxx)           cpu (temperature-sensor. 41000003f5)             sys-amb (temperature-sensor. 4100000400)               pci-amb (temperature-sensor. 410000040b)  Connection test complete  Connection test starting....  OtherDevices   adm1031     Status: Found      cpu-fan (fan. 4100000416)     sys-in (fan. 410000041c)       sys-out (fan. 4100000422)         dimm (temperature-sensor. xxxxxxxxx)           cpu (temperature-sensor. 41000003f5)             sys-amb (temperature-sensor. 4100000400)               pci-amb (temperature-sensor. 410000040b)  Connection test complete           </pre>

**TABLE 9-1** Steps to Test Components in Connection Mode *(Continued)*

Component	Steps to Take	Successful Test Results
CPU0 or CPU1	6. Select Processor(s). 7. Click Reset. 8. Click Start.	<pre> Connection test starting...  10/20/02 14:38:28 lefllore SunVTS5.1ps2build2: VTSID 2001 l2cachetcpu-unit0(P0).INFO cpu-unit0: "Connected : CPU Level 1 cache : size 1048576 Kbytes line 64 bytes associativity 4"  10/20/02 14:38:28 lefllore SunVTS5.1ps2build2: VTSID 2001 l1dcachetest(P0).INFO cpu-unit0: "Connected : CPU Level 1 cache : size 65536 Kbytes line 32 bytes associativity 4"  10/20/02 14:38:28 lefllore SunVTS5.1ps2build2: VTSID 2002 iutest(P0).INFO cpu-unit0: "sparcv9 based processor running @ 1062MHz Online"  Processor(s)   cpu-unit0     Status: "Connected     A sparcv9 processor operating at 1062 MHz.  Connection test complete  Connection test starting...  10/20/02 14:38:28 lefllore SunVTS5.1ps2build2: VTSID 2001 l2cachetcpu-unit0(P0).INFO cpu-unit0: "Connected : CPU Level 1 cache : size 1048576 Kbytes line 64 bytes associativity 4"  10/20/02 14:38:28 lefllore SunVTS5.1ps2build2: VTSID 2001 l1dcachetest(P0).INFO cpu-unit1: "Connected : CPU Level 1 cache : size 65536 Kbytes line 32 bytes associativity 4"  10/20/02 14:38:28 lefllore SunVTS5.1ps2build2: VTSID 2002 iutest(P0).INFO cpu-unit1: "sparcv9 based processor running @ 1062MHz Online"  Processor(s)   cpu-unit1     Status: "Connected     A sparcv9 processor operating at 1062 MHz.  Connection test complete </pre>
USB devices	6. Select USB. 7. Click Reset. 8. Click Start.	<pre> Connection test starting...  Connection test complete </pre>

## 9.2.3 Functional Mode

Functional mode checks the operation of each device under test. When configured for functional mode, SunVTS software allows for multiple passes and thorough exercise of each device under test.

---

**Note** – Many simplified functional mode tests are described in this section. However, all functional mode testing for your workstation is beyond the scope of this manual. Additional functional, exclusive, online, and auto config mode testing is described in the *SunVTS 5.1 PS2 Test Reference Manual*.

---

For simplified functional mode tests, output is only displayed upon error. For example:

```
10/25/02 01:41:44 sky-516 SunVTS5.1ps2build1: VTSID 6021 m64test.  
ERROR fbs/m641: RAMDAC test screen CRC signature error.  
Monitor type = 34, Cursor Position = 2, Expected Signature = 0xf6af68, Actual  
Signature = 0x5b0c24  
Probable_Cause(s): <Device failure> Recommended_Actions(s): <Call your  
authorized SUN service provider> (run_on_error message 2)
```

This error is displayed when the graphics accelerator is tested in functional mode. Because the graphics accelerator is being used for the GUI, the error is created and can be ignored.

## 9.2.4 Functional Mode Component Testing

To test a specific component in functional mode, do the following procedure. If you want to test more than one component, restart this procedure from [Step 6](#) for the second and subsequent components.

1. **As superuser, open a terminal window and start the SunVTS software:**

```
# /opt/SUNWvts/bin/sunvts
```

The SunVTS GUI is displayed.

2. **From Select Test Mode, check Functional.**
3. **From System Map, check Logical.**
4. **From the Options menu, select Test Execution and set Max Passes to 1.**

To exercise the component more, set for more passes. Use the time for one pass in [TABLE 9-2](#) to determine your total test time.

5. **Click Apply.**
6. **From Select Devices, check None.**

7. Use [TABLE 9-2](#) for the next steps, depending upon which component you want to test.

---

**Note** – Before testing workstation SEEPROMs and DIMMs, verify that a DIMM occupies the DIMM connector under test. If a DIMM is not present, the component mode test for that component and DIMM is not run.

---



---

**Note** – Between individual functional mode tests it may be necessary to click Reset to clear other workstation errors.

---

**TABLE 9-2** Steps to Test Components in Functional Mode

Component	Steps to Take	Time for One Pass
Hard drive	8. Click the plus sign adjacent to SCSI - Devices. 9. Select c0t0d0 (disktest) for HDD0 or c0t1d0 (disktest) for HDD1. 10. Click Reset. 11. Click Start.	250 seconds
DVD-ROM	8. Click the plus sign adjacent to IDE - Devices. 9. Select c0t2d0 (dvdtest). 10. From Select Devices, check Intervention. 11. Insert a known good DVD-ROM into the drive and wait a minute. 12. If a GUI window for the DVD-ROM opens, close it. 13. Click Reset. 14. Click Start.	1000+ seconds Note: This test is stopped by clicking Stop.
DIMM memory test1	8. Click the plus sign adjacent to Memory. 9. Select kmem (vmemtest). 10. Click Reset. 11. Click Start.	12 seconds
DIMM memory test2	8. Click the plus sign adjacent to Memory. 9. Select mem (pmemtest). 10. Click Reset. 11. Click Start.	10 seconds
SEEPROM	8. Click the plus sign adjacent to Memory. 9. Select seeprom0 (seepromtest). 10. Click Reset. 11. Click Start.	9 seconds



**TABLE 9-2** Steps to Test Components in Functional Mode (*Continued*)

<b>Component</b>	<b>Steps to Take</b>	<b>Time for One Pass</b>
DIMM0 SEEPROM	8. Click the plus sign adjacent to Memory. 9. Select <code>seeprom1</code> ( <code>seepromtest</code> ). 10. Click Reset. 11. Click Start.	4 seconds
DIMM1 SEEPROM	8. Click the plus sign adjacent to Memory. 9. Select <code>seeprom2</code> ( <code>seepromtest</code> ). 10. Click Reset. 11. Click Start.	4 seconds
DIMM2 SEEPROM	8. Click the plus sign adjacent to Memory. 9. Select <code>seeprom3</code> ( <code>seepromtest</code> ). 10. Click Reset. 11. Click Start.	4 seconds
DIMM3 SEEPROM	8. Click the plus sign adjacent to Memory. 9. Select <code>seeprom4</code> ( <code>seepromtest</code> ). 10. Click Reset. 11. Click Start.	4 seconds
DIMM4 SEEPROM	8. Click the plus sign adjacent to Memory. 9. Select <code>seeprom5</code> ( <code>seepromtest</code> ). 10. Click Reset. 11. Click Start.	4 seconds
DIMM5 SEEPROM	8. Click the plus sign adjacent to Memory. 9. Select <code>seeprom6</code> ( <code>seepromtest</code> ). 10. Click Reset. 11. Click Start.	4 seconds
DIMM6 SEEPROM	8. Click the plus sign adjacent to Memory. 9. Select <code>seeprom7</code> ( <code>seepromtest</code> ). 10. Click Reset. 11. Click Start.	4 seconds
DIMM7 SEEPROM	8. Click the plus sign adjacent to Memory. 9. Select <code>seeprom8</code> ( <code>seepromtest</code> ). 10. Click Reset. 11. Click Start.	4 seconds
Graphic accelerator	8. Select Graphics. 9. Click Reset. 10. Click Start.  Note: Because the GUI is using the graphics accelerator while SunVTS is testing it, errors are reported. These errors are ignored.	20 - 60 seconds

**TABLE 9-2** Steps to Test Components in Functional Mode (*Continued*)

<b>Component</b>	<b>Steps to Take</b>	<b>Time for One Pass</b>
Smart card reader	8. Click the plus sign adjacent to Other Devices. 9. Select <code>scmi2c0 (sc2test)</code> . 10.From Select Devices, check Intervention. 11.Insert known good smart card media. 12.Click Reset. 13.Click Start.	10 seconds
Ethernet (TPE)	8. Select Network. 9. Click Reset. 10.Click Start.	34 seconds
Serial port (Serial port A (TTYA))	11.Select Default 12.Select Comm. ports <code>su0 (sutest)</code> . 13.Right click, select test parameters. 14.Select test type. 15.Select loopback type: <code>internal _a_to_a__b_tab</code> . 16.Select apply all. 17.Click Reset. 18.Click Start	
Serial port (Serial port B, audio module)	19.Select Default 20.Select Comm. ports <code>su0 (sutest)</code> . 21.Right click, select test parameters. 22.Select test type. 23.Select loopback type: <code>internal _a_to_a__b_tab</code> . 24.Select apply all. 25.Click Reset. 26.Click Start	
Parallel port	8. Click the plus sign adjacent to Other Devices. 9. Select <code>ecpp0</code> . 10.Click Reset. 11.Click Start.	10 seconds
Speaker	8. Click the plus sign adjacent to Other Devices. 9. Select <code>sound0</code> . 10.Click Reset. 11.Click Start.	37 seconds
System sensors	8. Click the plus sign adjacent to Other Devices. 9. Select <code>adm1031</code> . 10.Click Reset. 11.Click Start.	6 seconds

**TABLE 9-2** Steps to Test Components in Functional Mode (*Continued*)

<b>Component</b>	<b>Steps to Take</b>	<b>Time for One Pass</b>
CPU0 or CPU1	8. Select Processors. 9. Click Reset. 10. Click Start.	1000+ seconds Note: This test is stopped by clicking Stop.
USB devices	8. Select USB 9. Select devices (keyboard or other device). 10. Click Reset. 11. Click Start.	13 seconds

---

## 9.3 Further SunVTS Testing

This chapter provides a brief overview of using the SunVTS software for diagnosing component failures.

Additional connection, functional, exclusive, online, and auto config mode testing is described in the *SunVTS 5.1 Test Reference Manual*.



# Preparing to Replace Components

---

This chapter describes common tasks that are completed prior to performing a remove, replace, or installation procedure on any Sun Blade 2500 workstation.

The procedures described in this chapter are written for workstation service providers and system administrators.



---

**Caution** – To prevent equipment damage, review the safety requirements, safety symbols, and safety precautions in this chapter before you perform any replacement procedure.

---

This chapter contains the following topics:

- [Section 10.1, “Safety Information” on page 10-1](#)
- [Section 10.2, “Required Tools” on page 10-3](#)
- [Section 10.3, “Powering Off the Workstation” on page 10-4](#)
- [Section 10.4, “Removing the Access Panel” on page 10-12](#)
- [Section 10.5, “Removing the Bezel” on page 10-16](#)
- [Section 10.6, “Positioning the Chassis” on page 10-18](#)
- [Section 10.7, “Removing the Hard Drive Assembly” on page 10-20](#)
- [Section 10.8, “Finding Your Replacement Procedure” on page 10-22](#)

---

## 10.1 Safety Information

This section describes the safety precautions to follow when servicing a Sun Blade 2500 workstation.

## 10.1.1 Safety Precautions

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

- Follow all cautions, warnings, and instructions marked on the workstation and described in *Important Safety Information for Sun Hardware Systems* (816-7190-10).
- Follow the cautions, warnings, and instructions in the *Sun Blade 2500 Workstation Safety and Compliance Guide* (816-2061). The document is available at:  
<http://www.sun.com/documentation>
- Ensure that the voltage and frequency of your power source match the voltage and frequency marked on the workstation's electrical rating label.
- Never push objects of any kind through openings in the workstation. Dangerous voltages might be present. Conductive foreign objects could produce a short circuit that could cause fire, electric shock, or damage to your workstation.

## 10.1.2 Safety Symbols

The following symbols appear in this book. Note their meanings:



---

**Caution** – There is a risk of personal injury and equipment damage. To avoid personal injury and equipment damage, follow the instructions.

---



---

**Caution** – Hot surface. Avoid contact. Surfaces are hot and may cause personal injury if touched.

---



---

**Caution** – Hazardous voltages are present. To reduce the risk of electric shock and danger to personal health, follow the instructions.

---

## 10.1.3 Electrostatic Discharge Safety

Devices sensitive to Electrostatic discharge (ESD) such as the motherboard, DIMMs, PCI cards, media drives, and the NVRAM require special handling.



---

**Caution** – The circuit boards and hard drives contain electronic components that are extremely sensitive to static electricity. Ordinary amounts of static electricity from clothing or the work environment can destroy these components. Wear an antistatic wrist strap when handling the media drive assemblies, circuit boards, processors, DIMMs, PCI cards, and NVRAM. When servicing or removing workstation components, attach an antistatic strap to your wrist and then to a metal area on the workstation chassis. Then disconnect the power cord from the workstation and the wall receptacle. Following this caution equalizes all electrical potentials within the workstation.

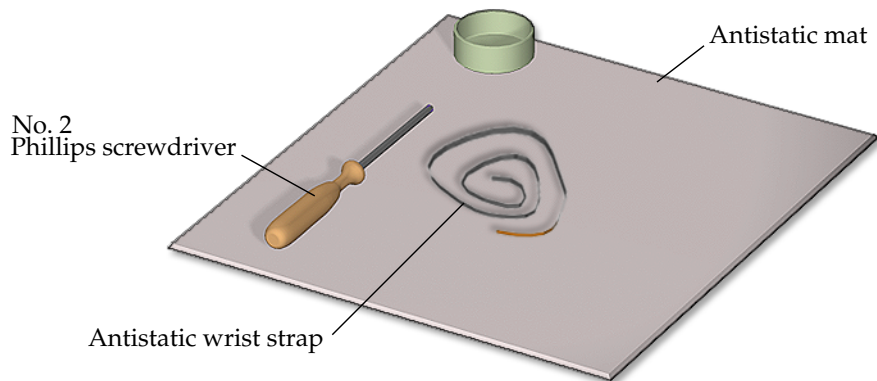
---

---

## 10.2 Required Tools

The workstation was designed to be serviced with the following tools ([FIGURE 10-1](#)):

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



**FIGURE 10-1** Required Tools

Though not required for component replacement, the following tools may prove helpful:

- Needle nose pliers or hemostat
- Large jeweller's screwdriver
- Flashlight
- Digital voltage meter (DVM)

Place ESD-sensitive components such as the motherboard, memory, PCI cards, hard drives, and the NVRAM on an antistatic mat.

---

## 10.3 Powering Off the Workstation

Prior to performing any installation or replacement procedure, power off the workstation and all peripheral units.



---

**Caution** – Prior to powering off the workstation power, save any open files and close any active applications. Notify affected users that you are powering off your workstation.

---

This section describes the following:

- [Section 10.3.2, “Powering Off Methods” on page 10-5](#)
- [Section 10.3.3, “Shutting Down Gracefully” on page 10-5](#)
- [Section 10.3.4, “Performing a Forced Shutdown” on page 10-8](#)

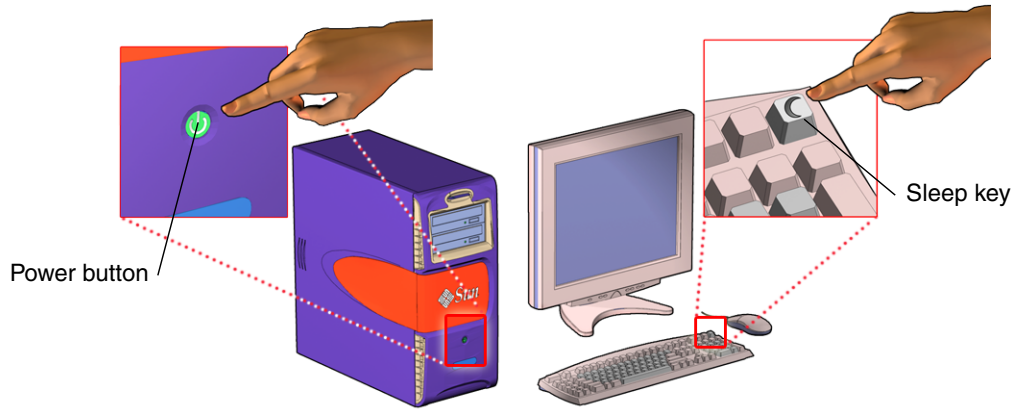


Click this film icon to view an animated version of these instructions.

### 10.3.1 Identifying the Power Button

The Power button is located on the front of the workstation ([FIGURE 10-2](#)). Alternatively, a Sleep key is available for power-off sequences.





**FIGURE 10-2** Power Button and Sleep Key Location and Identification

## 10.3.2 Powering Off Methods

There are two methods for powering off the workstation.

- **Graceful** - This is the normal and preferred method for powering off the workstation.

You are prompted to save all open files and close all applications prior to shutdown. The operating environment halts or terminates all necessary system processes and powers off the workstation.

- **Forced** - Use this only when you cannot shutdown the workstation gracefully.

All open applications and files will be closed abruptly without saving any changes. However the file system might be corrupted.

## 10.3.3 Shutting Down Gracefully

Performing a graceful shutdown ensures all your data is saved and the workstation systems are ready for restart.

To power off the workstation gracefully:

**1. Notify affected users.**

Typically, the system administrator sends an electronic notice to all users of the affected equipment shutdown by using the `write` or `wall` commands. If you are functioning as the system administrator, see your Solaris system administration documentation for additional information about the `write` and `wall` commands.

**2. Save any open files and quit all running programs.**

See your application documentation for specific information on these processes. Typically, this means executing application-specific commands through a GUI menu or command line.

**3. Select a power-off method.**

- Manual
- GUI
- Command line

Powering off the system using any of these methods shuts down all system processes, synchronizes the files, and powers off the system.

**To power off manually:**

**a. Press and release either the:**

Power button on the front panel of the workstation ([FIGURE 10-2](#))

or

Sleep key on the keyboard

**b. At the `ok` prompt, type:**

```
power-off
```

**To power off using the GUI:**

**a. Select the Exit button on the CDE panel.**

This logs out of the CDE workstation system GUI. The CDE GUI is closed and the log on screen is displayed.

Optionally, you can use this method when you want to log out as one user and login again as another user. This method does not take the workstation to a powered-down state.

**b. From the Power Off menu, select:**

Shutdown

To power off using the command line:

a. As superuser, in a terminal window, at the prompt type either of the following:

```
# shutdown
```

or

```
# init 5
```

The `shutdown` command provides options for automatically notifying the users of a scheduled shutdown. See the `shutdown` man page for additional information.

Use the `init` commands to invoke specific restart processes. Some processes apply to the currently running instance, others upon next system boot. See [TABLE 10-1](#) for a brief description of the `init` shutdown options. See the `init` man page for descriptions of the state options and `init` syntax.

**TABLE 10-1** Init Command Shutdown Options

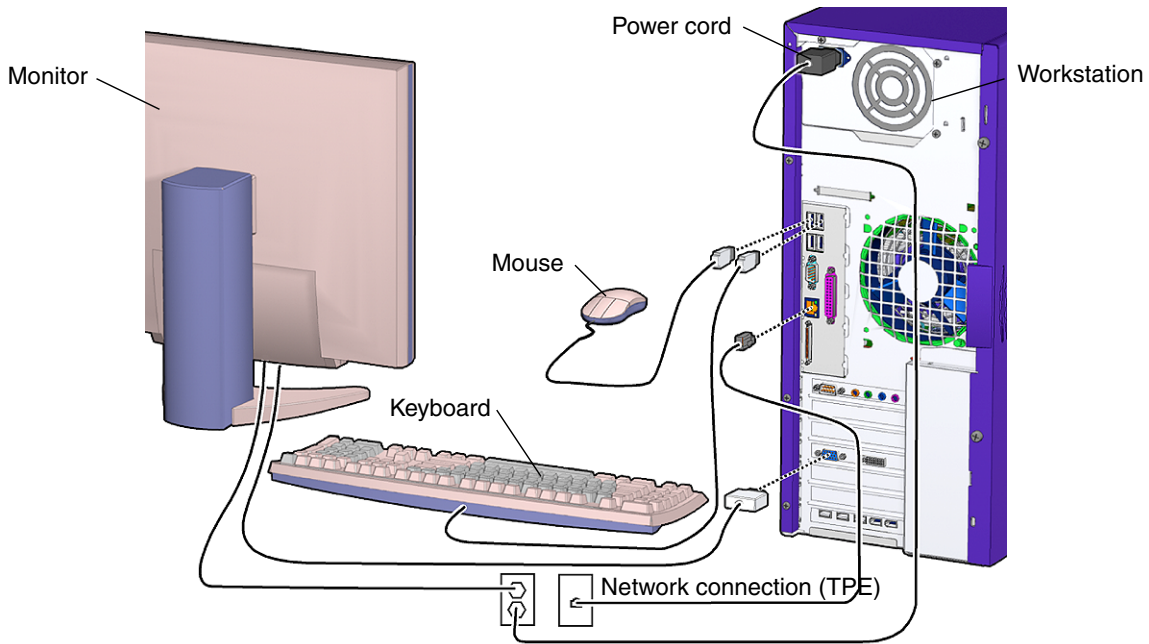
Option	Purpose
0	Reboots the system to the firmware level.
1	Reboots the system to system administrator mode. All files are accessible and no users are logged onto the system.
5	Shuts down the system so that it is safe to remove the power.
6	Stops the operating system and reboots to the state specified in the <code>init</code> default entry in the <code>/etc/inittab</code> file.

**4. Verify that the power is off.**

Check that the system fans are not spinning.

**5. Power off and disconnect all attached external peripherals (FIGURE 10-3).**

Power off and disconnect all external peripherals such as the mouse, keyboard, monitor, and the network.



**FIGURE 10-3** Disconnecting Attached Peripherals



---

**Caution** – Pressing the Power button does not remove all power from the system. Standby power remains until the power cord is removed.

---

**6. Remove all power to the workstation.**

When the system is powered off, it is safe to open the workstation to provide access to internal components. Proceed to [Section 10.4, “Removing the Access Panel” on page 10-12](#) where you will be directed to remove all power to the workstation.

---

**Note** – The power supply power connector may have a vertical or horizontal orientation. This is defined by the vendor of your power supply ([FIGURE 10-3](#)).

---

## 10.3.4 Performing a Forced Shutdown

Use a forced shutdown only when you cannot perform a graceful shutdown. If at any point in these procedures your system becomes able to take direction, return to the graceful shutdown procedure.



---

**Caution** – If you use the forced shutdown method, all unsaved data changes are lost and the file system might be corrupted.

---

To force the workstation to power down:

**1. Identify all workstation hung processes.**

- a. If needed, `rlogin` or `telnet` to the hung system from another system.
- b. From the command line in a terminal window, execute a `ps` command to identify the process ID number.

See the respective man pages for syntax information.

**2. Terminate a hung process, if needed.**

The shutdown commands described here are used to close a system shell or stop an application or process. They do not take the workstation to a powered-down state.

Execute these commands from the command line in a terminal window. See the command man page for syntax information.

- **System Exit** - Use the `exit` command to stop all processes in a specified shell and close out the shell. Use this method when an application or process is frozen in the shell and you have decided to force the shell to stop action and release the system. This typically exits any child process initiated through this shell, but background processes may continue to run. It may be necessary to execute this command from another workstation or another terminal window. If you are in a GUI, click the close box on the terminal window.
- **Process Kill** - Use the `kill` command to shut down a single process. Use this command when an application or process is frozen and you have decided to force it to quit and release the system. It may be necessary to execute this command from another workstation or another terminal window.

If either of these commands releases your system, return to the graceful shutdown procedure. See [Section 10.3.3, “Shutting Down Gracefully”](#) on page 10-5.

**3. Manually synchronize the system.**

As superuser, in a terminal window, type:

```
# sync
```

Use the `sync` command when powering off a workstation to ensure file system integrity. The command flushes all previously unwritten system buffers out to the disk. See the `sync` man page for additional information.

**4. Press and hold the Power button for five seconds.**

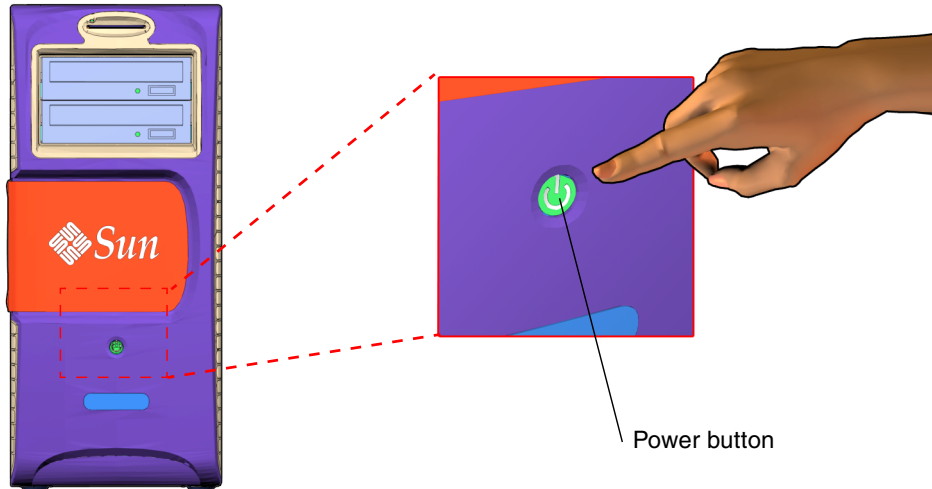
This abruptly stops all applications, tools, system processes. All unsaved data changes are lost and the workstation is powered off.



---

**Caution** – A forced shutdown can corrupt your data and system files if it is performed before the system is synchronized.

---



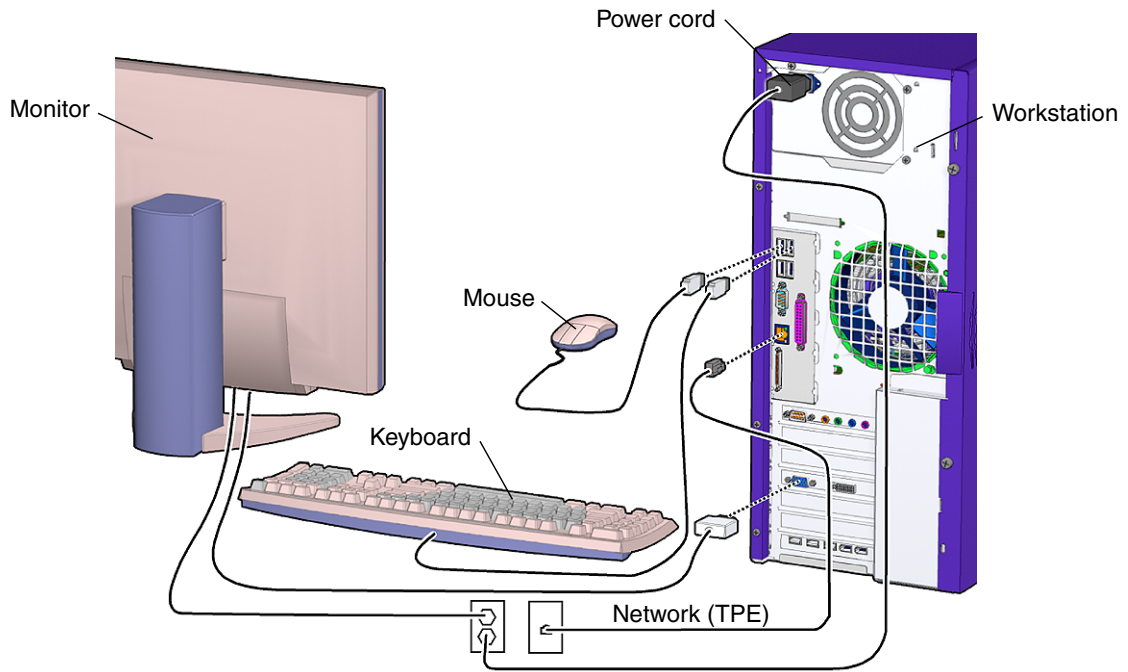
**FIGURE 10-4** Pressing the Power Button

**5. Verify that the power is off.**

Check that the system fans are not spinning.

**6. Power off and disconnect all attached external peripherals and network connections (FIGURE 10-5).**

Disconnect all external peripherals such as the mouse, keyboard, monitor and the network.



**FIGURE 10-5** Disconnecting Attached Peripherals

Once this is complete, you have powered off your workstation. However, you have not removed all power from your workstation.



---

**Caution** – Pressing the Power button does not remove all power from the system. Standby power remains until the power cord is removed.

---

#### 7. Remove all power to the workstation.

When the system is powered off, then it is safe to open the workstation to provide access to internal components. Proceed to [Section 10.4, “Removing the Access Panel” on page 10-12](#), where you will be directed to remove all power to the workstation.

### 10.3.4.1 Workstation Power Cycling

Either one of the following two methods accomplishes a workstation power cycle by shutting down and immediately restarting the workstation:

- **System reboot**

A system reboot shuts down any running applications and the operating system, then restarts the operating system. A system reboot does not take the workstation to a standby power state.

- **Shutdown and Power On**

Powering off the workstation shuts down any running applications and the operating system, and takes the workstation to a standby (power off) state. To restart the workstation, you must manually press the Power button, which initiates the boot process.

---

**Note** – You must wait four seconds after powering off the workstation to power-on the workstation.

---

## 10.4 Removing the Access Panel

1. **Power off the workstation.**

If you have not already done so, complete the procedure in [Section 10.3, “Powering Off the Workstation”](#) on page 10-4.

2. **Locate the access panel.**

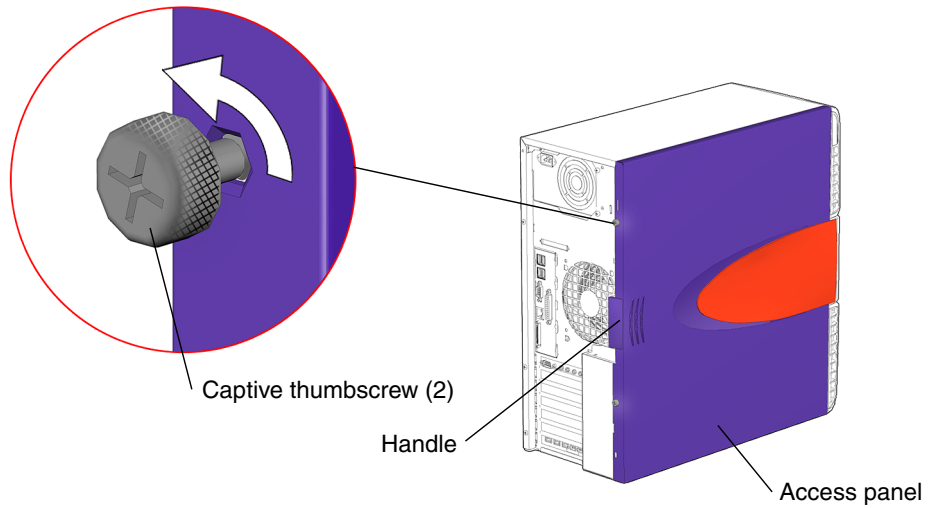
Facing the workstation bezel, the access panel is on the left side of the chassis.

3. **Loosen the captive thumbscrews (FIGURE 10-6).**

Turn the captive thumbscrews, located at the back of the system, counter-clockwise.

If the thumbscrews are very tight, use a No. 2 Phillips screwdriver to loosen them.

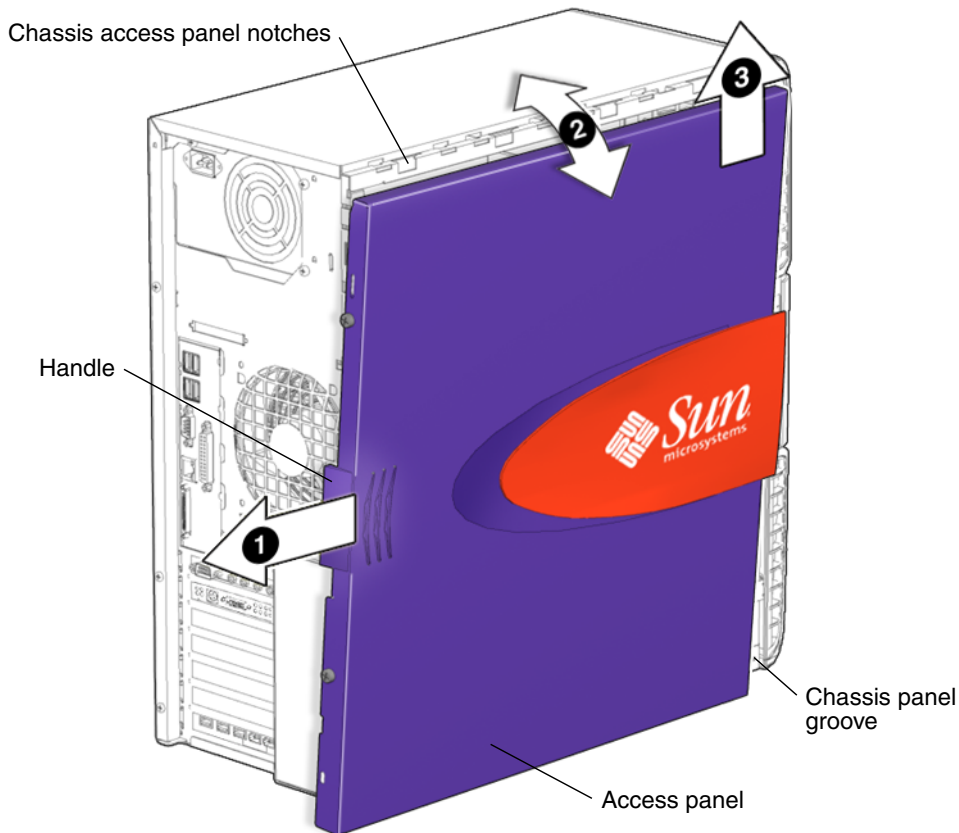




**FIGURE 10-6** Loosening the Screws

**4. Slide and lift the access panel from the chassis (FIGURE 10-7).**

Using the handle, pull the access panel about an inch (2.5 cm) toward the back of the system chassis. Then tilt the access panel to the right, lift it from the chassis, and set it aside.



**FIGURE 10-7** Removing the Access Panel

**5. Attach the antistatic wrist strap (FIGURE 10-8).**

Some components inside the system are sensitive to ESD. To prevent damage to these components, attach an antistatic wrist strap to your wrist.




---

**Caution** – Wear an antistatic wrist strap and use an antistatic mat when handling components such as drive assemblies, boards, or cards. When servicing or removing workstation components, attach an antistatic strap to your wrist and then to a metal area on the chassis. Then disconnect the power cord from the workstation and the wall receptacle. Following this caution equalizes all electrical potentials with the workstation.

---

**a. Wrap the antistatic strap onto your wrist.**

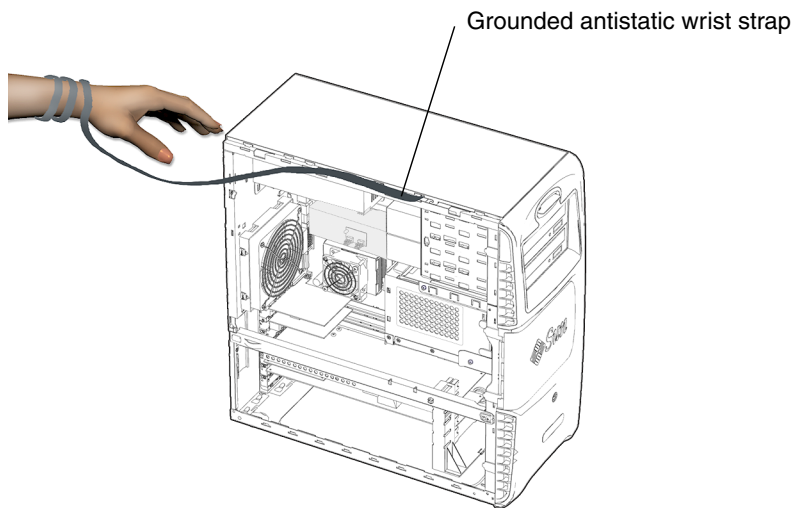
Unwrap the first two folds of the antistatic wrist strap and wrap the adhesive side firmly against your wrist. This is the end of the antistatic strap that does not have a copper strip.

**b. Open the contact portion of the antistatic strap.**

Peel the liner from the copper foil at the opposite end of the antistatic wrist strap.

**c. Attach the antistatic strap to the chassis.**

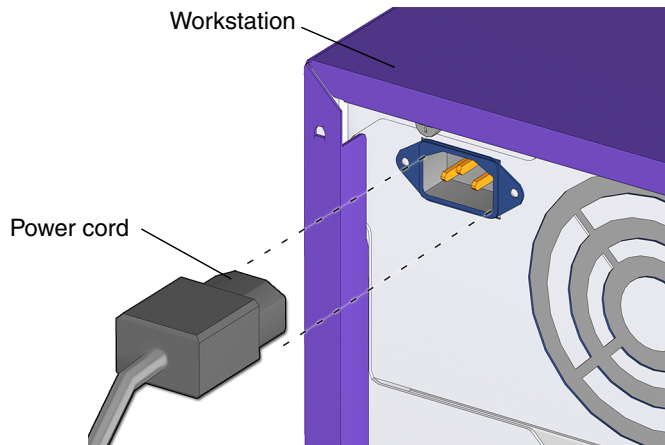
Attach the copper end of the strap to a metal portion of the system chassis. Check its location to ensure it does not fall off and it is out of the way of your replacement procedure.



**FIGURE 10-8** Attaching the Antistatic Wrist Strap

**6. Remove all power from the workstation (FIGURE 10-9).**

Disconnect the power cord from the system to reduce risk of electric shock.



**FIGURE 10-9** Disconnecting the Power Cord

You have completed the process of powering off, opening, and preparing to service internal components of the workstation.

---

## 10.5 Removing the Bezel

This section describes how to remove the bezel. Most replacement procedures do not require bezel removal.

---

**Note** – See the section that describes your replacement procedure before proceeding here.

---

For installing the bezel, see [Section 15.3, “Replacing the Bezel” on page 15-4](#).

The bezel is located on the front of the workstation. Removing it provides access to the chassis front panel.

**1. Power off the system and open the chassis.**

See the following sections:

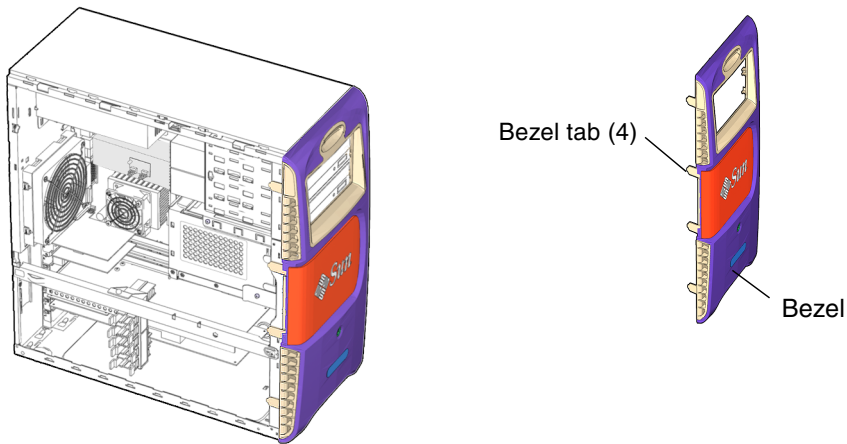
- [Section 10.3, “Powering Off the Workstation” on page 10-4](#)
- [Section 10.4, “Removing the Access Panel” on page 10-12](#)

**2. Locate the bezel (FIGURE 10-10).**

---

**Note** – While you are removing the bezel, keep the workstation in its vertical position.

---

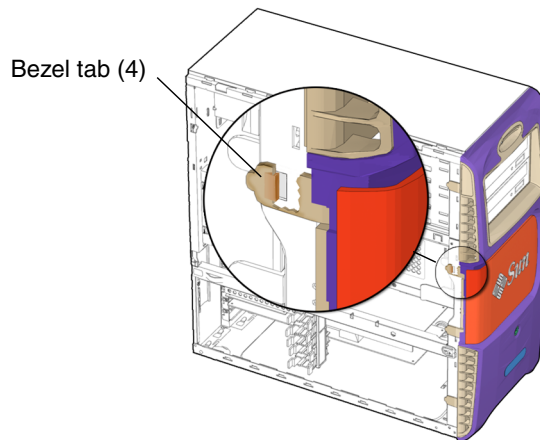


**FIGURE 10-10** Bezel Location and Identification

**3. Loosen the four bezel tabs (FIGURE 10-11).**

Facing the left-front side of the bezel and starting with the topmost tab, carefully pull out each bezel mounting tab about a millimeter, and then forward slightly.

As you do this, you should see the edge of the bezel nearest the tab move slightly away from the front of the chassis.



**FIGURE 10-11** Releasing the Bezel Mounting Tabs

4. Release the bezel (FIGURE 10-12).

Move the left-front side of the bezel slightly forward, disengaging the left-side tabs from the chassis. Then shift the bezel to the right, releasing it from the right-front chassis tabs and chassis. Set the bezel aside.

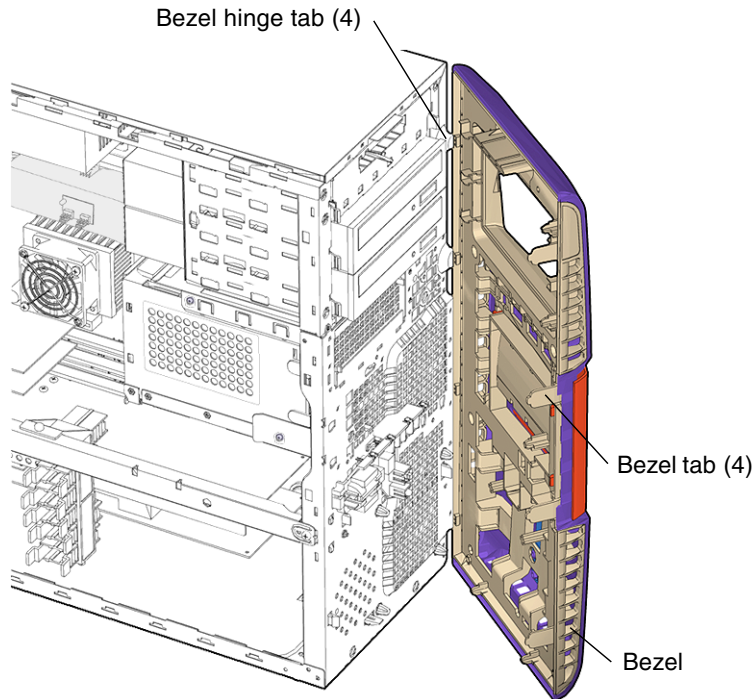


FIGURE 10-12 Removing the Bezel

---

## 10.6 Positioning the Chassis

Before removing the motherboard or one of its components, lay the chassis on its side. You may choose to keep the chassis in its upright position for other removal and installation procedures. Take care that you do not tip over the chassis.

1. Prepare to position the chassis.

---

**Note** – Ensure that your working area is flat, has an antistatic mat, is large enough to accommodate working on the chassis, and is clear of debris and dust.

---

If you have not already done so, complete the procedure in [Section 10.4, “Removing the Access Panel”](#) on page 10-12.

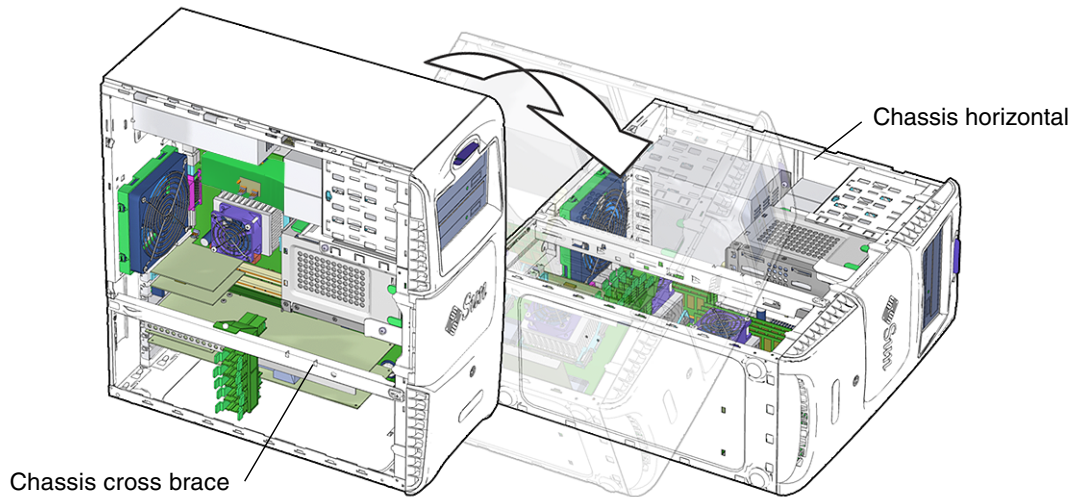
**2. Set the chassis on its side (FIGURE 10-13).**

Using both hands, gently set the system chassis on its side, with the opening facing up.

---

**Note** – Do *not* use the chassis cross brace as a handle.

---



**FIGURE 10-13** Positioning the Chassis Horizontally

**3. Orient the chassis for ease of servicing.**

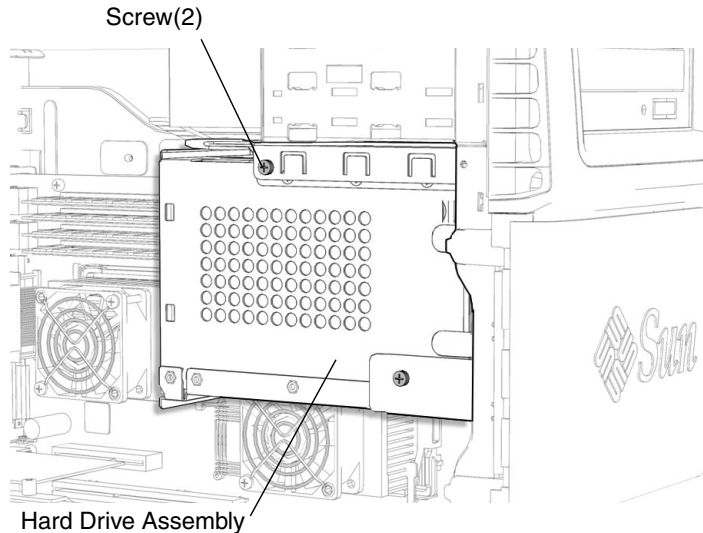
To help with replacement procedures, references to location are relative to the placement of the chassis. Directional terms are described in [TABLE 10-2](#).

**TABLE 10-2** Workstation Chassis Directional Terms

Direction	Chassis Orientation
Bottom	Side with the chassis feet
Top	Side opposite the chassis feet
Back	Side with PCI card ports and IEC power cord connector
Front	Side with the Power button, removable media drives
Left	Side with access panel
Right	Side opposite the access panel

## 10.7 Removing the Hard Drive Assembly

1. Remove the two screws (FIGURE 10-14).



**FIGURE 10-14** Removing the Screws for the Hard Drive Assembly

2. Release the hard drive assembly from the hard drive bay (FIGURE 10-15).



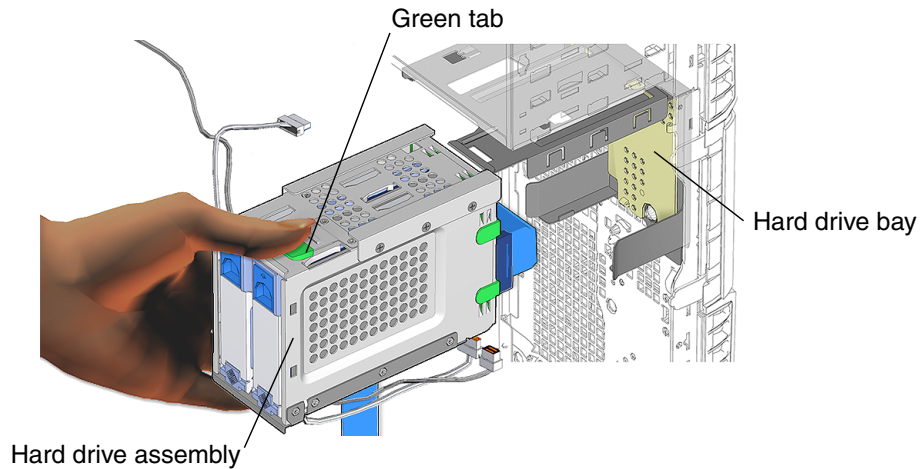
---

**Caution** – The two power cables and the SCSI interface cable are attached to the hard drive assembly

---

Press the green tab on the top of the hard drive assembly and slide the hard drive assembly out of the hard drive bay.





**FIGURE 10-15** Removing the Hard Drive Assembly

**3. Disconnect the two power cables (FIGURE 10-16).**

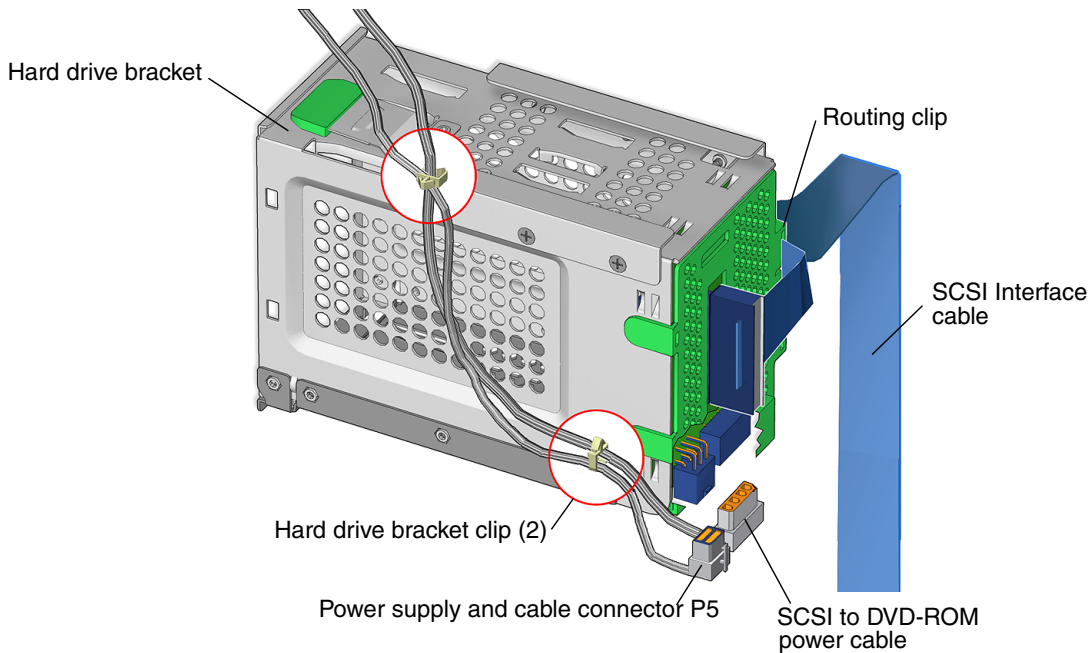
**a. Disconnect the two power cables from the SCSI backplane.**

Two power cables are plugged into the SCSI backplane on the underside of the hard drive assembly:

- 6-pin power supply and cable connector P5
- 4-pin SCSI to DVD-ROM drive power cable

**b. Release the hard drive power cables from the hard drive bracket.**

The hard drive power cables are routed through the hard drive bracket clips, one on the bottom of the hard drive bracket, the other on the back side of the hard drive bracket.



**FIGURE 10-16** Disconnecting the Power Supply Cables

**4. Disconnect the SCSI interface cable.**




---

**Caution** – The routing clip for the SCSI interface cable is fragile.

---

**a. Disconnect the interface cable from the SCSI backplane.**

The interface cable is plugged into the SCSI backplane through the SCSI backplane cover.

**b. Release the interface cable from the routing clip.**

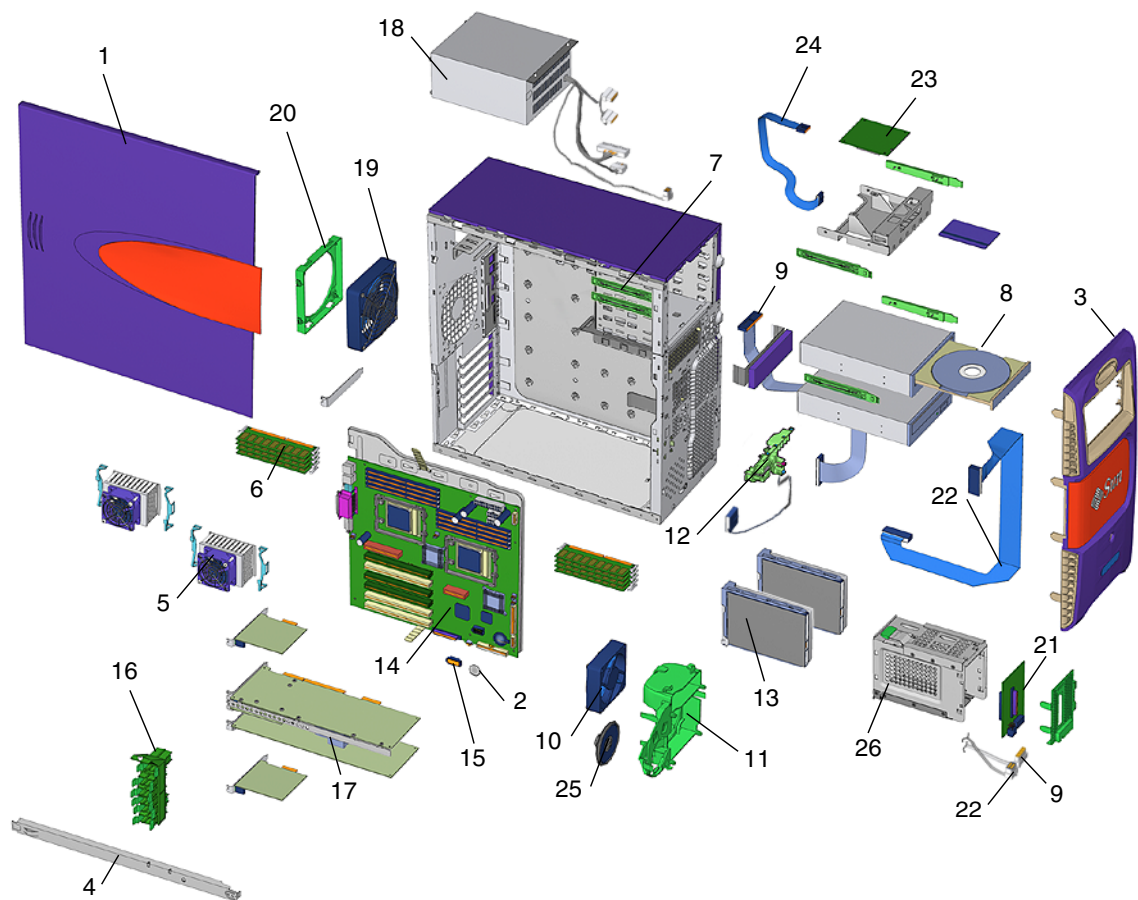
The interface cable is routed through a clip on the bottom of the green plastic SCSI backplane bracket.

**5. Set the hard drive bracket on an antistatic mat.**

---

## 10.8 Finding Your Replacement Procedure

After troubleshooting the problem and determining the component at fault, see [FIGURE 10-17](#) and [TABLE 10-3](#) to find the replacement procedure.



**FIGURE 10-17** Workstation Components

**TABLE 10-3** Component Replacement Procedures

Component	Item Number	Reference Section
Access Panel	1	Section 10.4, "Removing the Access Panel" on page 10-12 and Section 15.4, "Replacing the Access Panel" on page 15-6
Battery	2	Section 11.3, "Replacing the Battery" on page 11-23
Bezel	3	Section 10.5, "Removing the Bezel" on page 10-16 and Section 15.3, "Replacing the Bezel" on page 15-4

**TABLE 10-3** Component Replacement Procedures (*Continued*)

<b>Component</b>	<b>Item Number</b>	<b>Reference Section</b>
Chassis cross brace	4	Section 13.7, "Replacing the PCI Card Support and Chassis Cross Brace" on page 13-42
CPU fan and heat sink assembly	5	Section 11.2, "Replacing the CPU Fan and Heat Sink Assembly" on page 11-13
DIMMs (memory)	6	Section 11.1, "Replacing DIMMs" on page 11-2
Drive rails	7	Section 13.8.2, "Removing System Drive Rails" on page 13-51
DVD-ROM drive (replaceable media drive)	8	Section 12.2, "Replacing a DVD-ROM Drive" on page 12-8
DVD-ROM drive cables	9	Section 14.2, "Replacing the DVD-ROM Drive Cables" on page 14-5
Front fan	10	Section 13.2, "Replacing the Front Fan" on page 13-11
Front fan bracket	11	Section 13.6.2, "Removing the Front Fan Bracket" on page 13-38
Power switch and LED cable assembly	12	Section 14.5, "Replacing the Power Switch and LED Cable Assembly" on page 14-19
Hard drive	13	Section 12.1, "Replacing a Hard Drive" on page 12-2
Motherboard	14	Section 11.6, "Replacing the Motherboard" on page 11-41
NVRAM	15	Section 11.4, "Replacing NVRAM" on page 11-26
PCI card support	16	Section 13.7, "Replacing the PCI Card Support and Chassis Cross Brace" on page 13-42
PCI cards	17	Section 11.5, "Replacing PCI Cards" on page 11-28
Power supply	18	Section 13.1, "Replacing the Power Supply" on page 13-2
Rear fan	19	Section 13.3, "Replacing the Rear Fan" on page 13-16
Rear fan bracket	20	Section 13.3, "Replacing the Rear Fan" on page 13-16
SCSI backplane	21	Section 13.4, "Replacing the SCSI Backplane" on page 13-24
SCSI backplane cables	22	Section 14.4, "Replacing the SCSI Backplane Cables" on page 14-11
Smart card reader	23	Section 12.3, "Replacing the Smart Card Reader" on page 12-16

**TABLE 10-3** Component Replacement Procedures *(Continued)*

<b>Component</b>	<b>Item Number</b>	<b>Reference Section</b>
Smart card reader cable	24	Section 14.1, "Replacing the Smart Card Reader Cable" on page 14-3
Speaker	25	Section 13.5, "Replacing the Speaker" on page 13-34
Hard drive assembly	26	Section 10.7, "Removing the Hard Drive Assembly" on page 10-20 and Section 15.2, "Replacing the Hard Drive Assembly" on page 15-2



# Replacing the Motherboard and Associated Components

---

This chapter describes the remove and replace procedures for the Sun Blade 2500 workstation motherboard and associated components.

The procedures described in this chapter are written for workstation service providers and system administrators.

---

**Note** – Only Sun authorized service providers should perform the procedures described in [Section 11.6, “Replacing the Motherboard” on page 11-41](#).

---

This chapter contains the following topics:

- [Section 11.1, “Replacing DIMMs” on page 11-2](#)
- [Section 11.2, “Replacing the CPU Fan and Heat Sink Assembly” on page 11-13](#)
- [Section 11.3, “Replacing the Battery” on page 11-23](#)
- [Section 11.4, “Replacing NVRAM” on page 11-26](#)
- [Section 11.5, “Replacing PCI Cards” on page 11-28](#)
- [Section 11.6, “Replacing the Motherboard” on page 11-41](#)



---

**Caution** – Follow the cautions, warnings, and instructions in the *Sun Blade 2500 Workstation Safety and Compliance Guide* (816-2061). This document is available at: <http://www.sun.com/documentation>

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**Caution** – The procedures in this chapter are performed with the workstation lying on its side. If you perform any of the procedures in this chapter with the workstation in its upright position, do not tip over the workstation.

---



---

**Caution** – When servicing or removing workstation components, attach an antistatic strap to your wrist and then to a metal area on the chassis. Then disconnect the power cord from the workstation and the wall receptacle. Following this caution equalizes all electrical potentials within the workstation.

---

## 11.1 Replacing DIMMs

This section describes removal and installation of the system Dual Inline Memory Modules (DIMMs). Topics include:

- [Section 11.1.1, “Identifying the DIMMs” on page 11-2](#)
- [Section 11.1.2, “Removing DIMMs” on page 11-4](#)
- [Section 11.1.3, “Installing the DIMMs” on page 11-7](#)



You can also view an animated version of these instructions by clicking on this film icon.

### 11.1.1 Identifying the DIMMs

Sun Blade 2500 memory is installed as matched pairs of DDR1 SDRAM DIMMs. Within a matched pair, DIMMs must be from the same manufacturer with the same type and number of memory devices, the same amount of memory per device, and the same memory speed.

DIMMs must be installed on the motherboard in consecutive connector slots. The workstation requires a minimum of one pair of matching 512 MB or 1 GB DIMMs installed in connector slots DIMM2 and DIMM3.

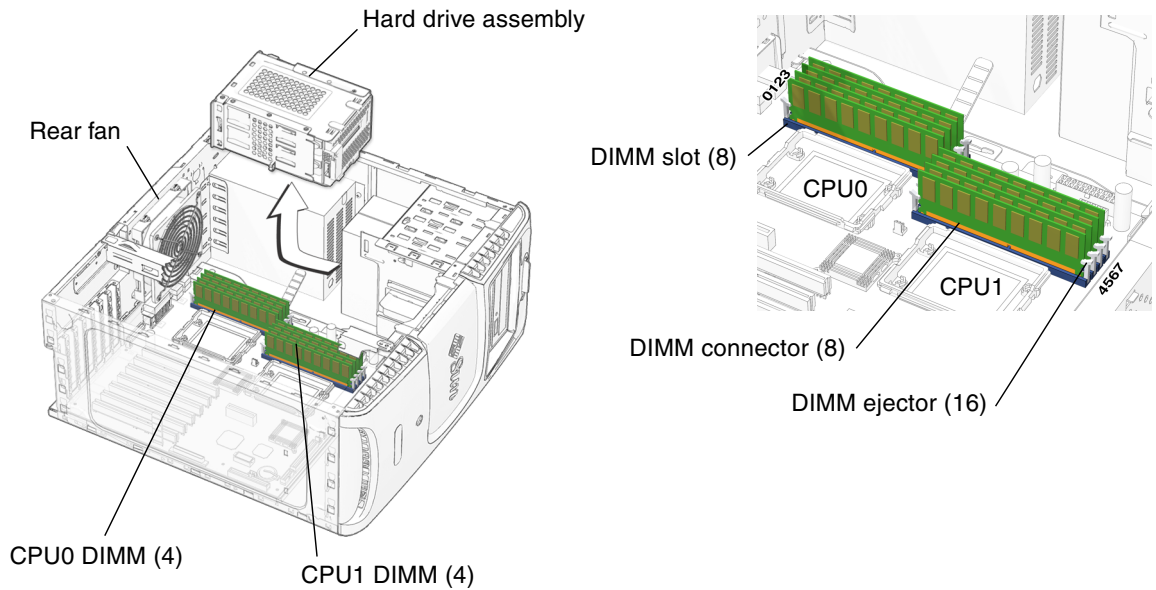
Before replacing Sun Blade 2500 memory, verify that the latest version of OpenBoot PROM, system firmware, and recommended system patches are installed on your system. If necessary, check the Sun System Handbook at SunSolve Online: [http://sunsolve.sun.com/handbook\\_pub/](http://sunsolve.sun.com/handbook_pub/)

---

**Note** – For information about Sun Blade 2500 memory interleaving, see [Section C.3.2.7, “Memory Interleaving” on page C-21](#).

---





**FIGURE 11-1** Memory Location and Identification

Depending upon the configuration of your workstation, you can either add or replace memory. In either case, the new DIMMs must meet the Sun workstation requirements. [TABLE 11-1](#) lists the acceptable DIMM pair configurations.

---

**Note** – Before replacng Sun Blade 2500 DIMMs verify that the latest version of OpenBoot PROM, system firmware, and recommended system patches are installed on your workstation.

---

**TABLE 11-1** DIMM Pair Configuration

Memory	Installed DIMMs	Configuration
1 GB memory	2 x 512 MB DIMMs	Standard
2 GB memory	2 x 1 GB DIMMs	Standard
4 GB memory	4 x 1 GB DIMMs	Optional
8 GB memory	8 x 1 GB DIMMs	Optional

When your workstation boots up, the system utility OpenBoot™ checks for compatible memory modules. See [Section 11.1.4, “OpenBoot PROM Memory Message” on page 11-11](#) for additional information.

If you are not removing an existing DIMM, proceed to [Section 11.1.3, “Installing the DIMMs”](#) on page 11-7.

## 11.1.2 Removing DIMMs

### 1. Power off the workstation and open the chassis.

See:

- [Section 10.3, “Powering Off the Workstation”](#) on page 10-4
- [Section 10.4, “Removing the Access Panel”](#) on page 10-12

### 2. Locate the DIMM slots (FIGURE 11-1).

The DIMM slots are divided into two sets of four slots. One set is adjacent to CPU 0. The other set is adjacent to CPU 1.

### 3. Remove the rear fan, if needed.

If you are removing DIMMs from the CPU 0 bank, remove the rear fan assembly to improve access to the DIMMs (see [Section 13.3.2, “Removing the Rear Fan”](#) on page 13-17).

### 4. Remove the hard drive assembly, if needed.

See [Section 10.7, “Removing the Hard Drive Assembly”](#) on page 10-20.

---

**Note** – You do not need to remove the hard drive(s) or the SCSI backplane from the hard drive assembly in this removal process.

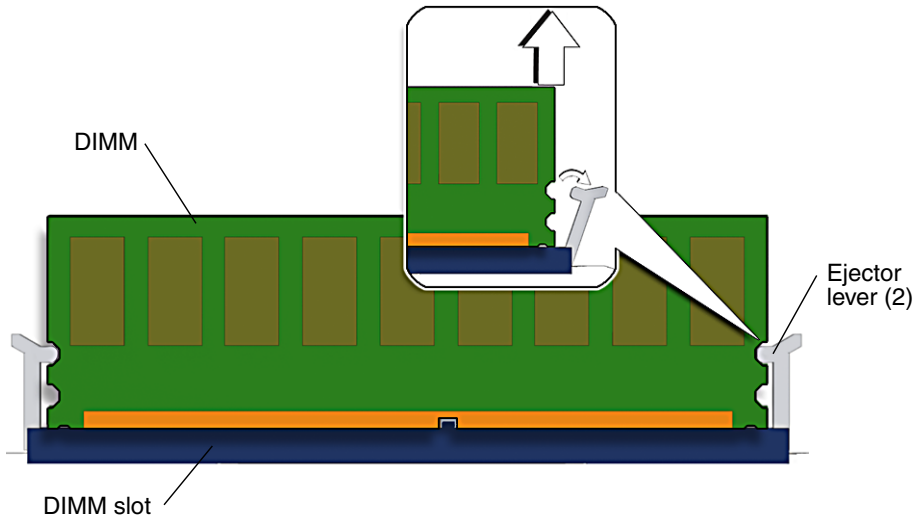
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### 5. Position the chassis.

See [Section 10.6, “Positioning the Chassis”](#) on page 10-18.

### 6. Release the desired DIMM (FIGURE 11-2).

Simultaneously press down on both ejector levers at the ends of the DIMM to unlock the DIMM from the DIMM slot.



**FIGURE 11-2** Releasing the DIMM

7. Lift the DIMM straight out of the DIMM slot ([FIGURE 11-3](#)).



---

**Caution** – Handle the DIMMs along the outside edges. Do not handle DIMMs along the gold edge. Do not touch DIMM components or other metal parts. Always wear an antistatic wrist strap when handling DIMMs.

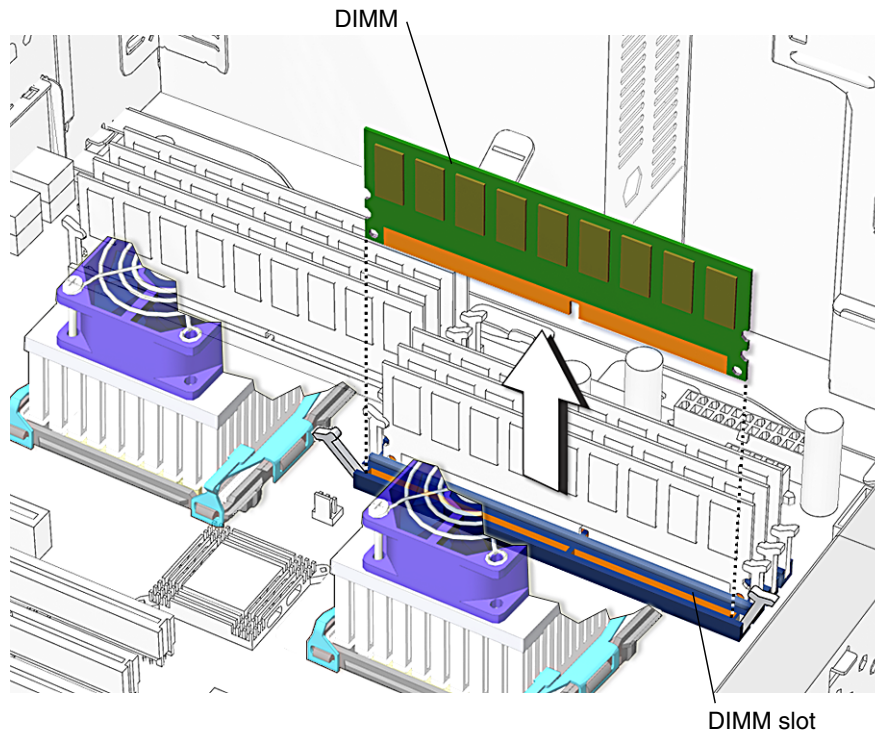
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**Caution** – Do not lift the DIMM out of the DIMM slot at an angle as it might damage the edge connector for the DIMM or the DIMM slot.

---



**FIGURE 11-3** Removing the DIMM

8. Set the DIMM aside on an antistatic mat.
9. Repeat [Step 6](#) through [Step 8](#) until you have removed all relevant DIMMs.

You have completed removing the DIMMs.

- If you removed a DIMM to replace it, proceed to [Section 11.1.3, “Installing the DIMMs”](#) on page 11-7.
- If you removed a DIMM and will not replace it at this time, reposition the chassis, replace the hard drive assembly, replace the rear fan (if needed), replace the access panel, and power on the system.

See:

- [Section 15.1, “Repositioning the Chassis”](#) on page 15-2
- [Section 15.2, “Replacing the Hard Drive Assembly”](#) on page 15-2
- [Section 13.3.3, “Installing the Rear Fan”](#) on page 13-20
- [Section 15.4, “Replacing the Access Panel”](#) on page 15-6
- [Section 15.5, “Powering On the Workstation”](#) on page 15-7

## 11.1.3 Installing the DIMMs

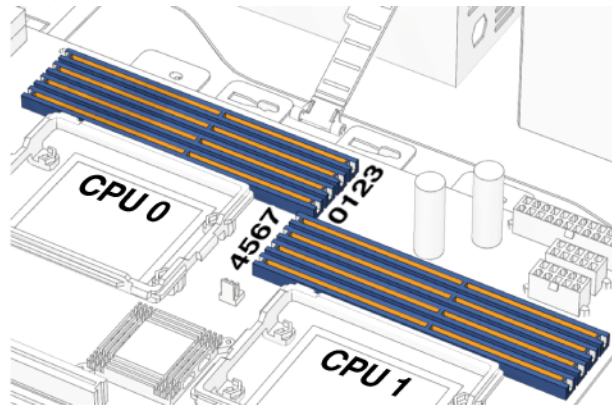


**Caution** – If you are installing additional memory, remember that DIMMs must be installed in matched pairs of DIMMs (FIGURE 11-4). The workstation requires a minimum of one pair of matching DIMMs.

Before replacing Sun Blade 2500 memory, verify that the latest version of OpenBoot PROM, system firmware, and recommended system patches are installed on your system. If necessary, check the Sun System Handbook at SunSolve Online:

[http://sunsolve.sun.com/handbook\\_pub/](http://sunsolve.sun.com/handbook_pub/)

**Note** – Additional pairs of DIMMs can be installed in DIMM0 and DIMM1, and DIMM4 and DIMM5, and DIMM6 and DIMM7.



Install DIMM pairs	CPU 0 only		CPU 0 + CPU 1			
	order → 1st	2nd	1st	2nd	3rd	4th
slot 3						
slot 2						
slot 1						
slot 0						
slot 7						
slot 6						
slot 5						
slot 4						

**FIGURE 11-4** Replacing and Installing Sun Blade 2500 DIMMs



---

**Caution** – Use proper ESD grounding techniques when handling components. Wear an antistatic wrist strap and use an antistatic mat. Store ESD-sensitive components in antistatic bags before placing them on any surface.

---



---

**Caution** – Do not remove any DIMM from its antistatic container until you are ready to install it.

---

1. Power off the system, open the chassis, remove the hard drive assembly (if needed), and position the chassis.

See:

- Section 10.3, “Powering Off the Workstation” on page 10-4
- Section 10.4, “Removing the Access Panel” on page 10-12
- Section 10.7, “Removing the Hard Drive Assembly” on page 10-20
- Section 10.6, “Positioning the Chassis” on page 10-18

2. Locate the DIMM slots (FIGURE 11-5).

---

**Note** – Install DIMMs in consecutive pairs into DIMM slots: DIMM0 and DIMM1, or DIMM2 and DIMM3, or DIMM4 and DIMM5, or DIMM6 and DIMM7.

---

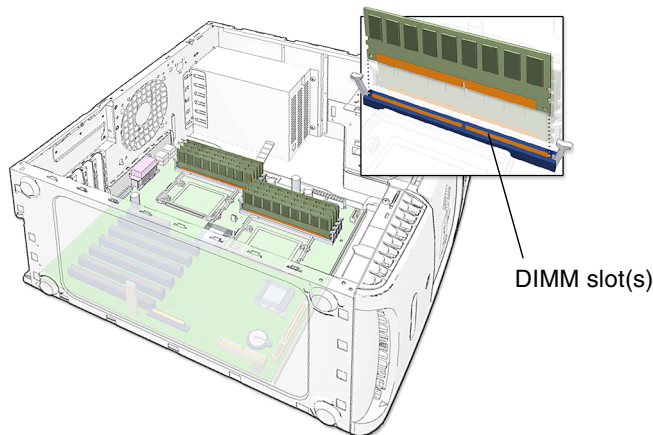


FIGURE 11-5 DIMM Placement on the Motherboard

3. Remove the new DIMM from its antistatic container.



---

**Caution** – Handle DIMMs only by the edges. Do not touch DIMM components or metal parts. Always wear an antistatic wrist strap when handling DIMMs.

---

4. Review the recommended DIMM installation and configurations before installing the DIMM.

See [FIGURE 11-4](#), Section [FIGURE 11-4](#), “Replacing and Installing Sun Blade 2500 DIMMs” on page 11-7.

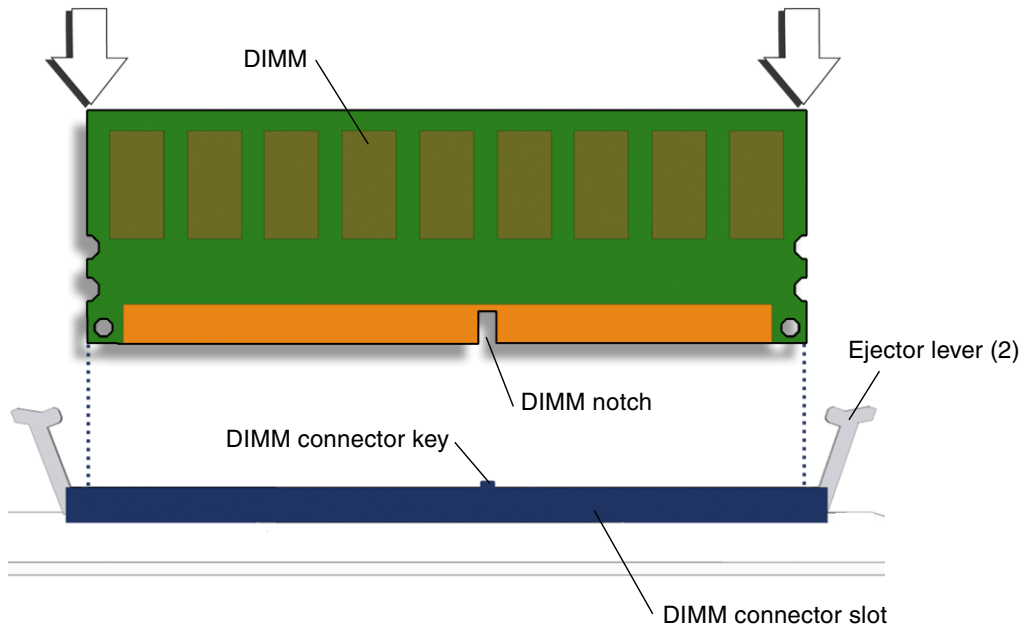
---

**Caution** – If you replace a single DIMM, the replaced DIMM must be identical to the one removed.

---

5. Align the DIMM with the DIMM connector slot ([FIGURE 11-6](#)).

Align the DIMM notch to the DIMM connector key.



**FIGURE 11-6** Aligning the DIMM to the DIMM Connector Slot (View from Top of Motherboard Tray)

6. Insert the DIMM into the connector slot ([FIGURE 11-7](#)).

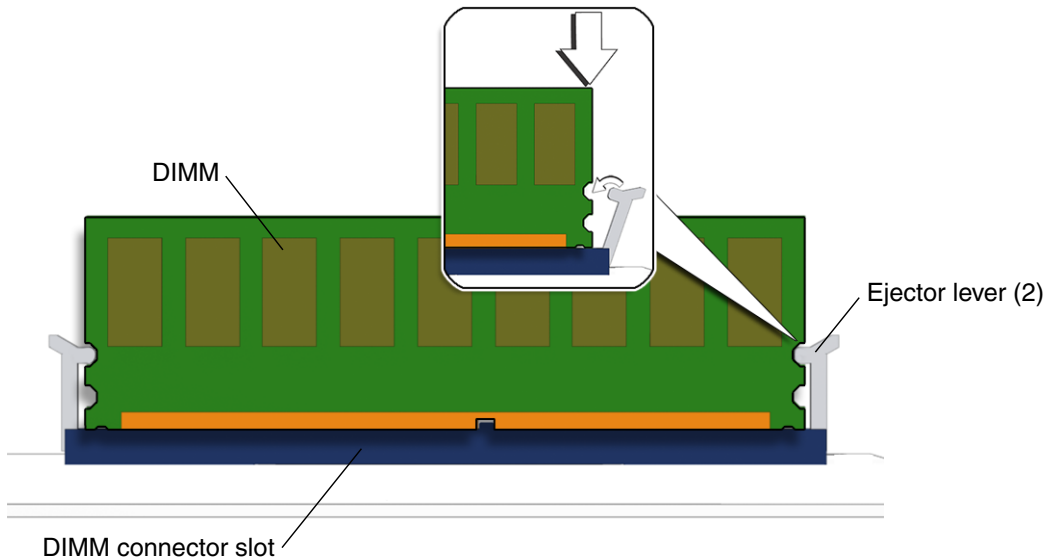
Using both thumbs, press the DIMM straight down into the DIMM connector slot until both ejector levers close, locking the DIMM in the DIMM connector slot.

---

**Note** – The DIMMs must be inserted evenly, straight down into the DIMM connector slot until the ejector levers lock into place.

---

The DIMM is seated when you hear a click and the ejector levers are in the vertical position.



**FIGURE 11-7** Securing the DIMM (View from Top of Motherboard Tray)

7. Repeat [Step 5](#) and [Step 6](#) until all DIMMs are installed.
8. **Inspect the DIMM ejector levers.**  
Verify that the DIMM ejector levers are upright, seated, and tight.
9. **Reposition the chassis.**  
See [Section 15.1, "Repositioning the Chassis"](#) on page 15-2.
10. **Replace the hard drive assembly.**  
See [Section 15.2, "Replacing the Hard Drive Assembly"](#) on page 15-2.
11. **Replace the rear fan and rear fan bracket, if needed.**  
See [Section 13.3, "Replacing the Rear Fan"](#) on page 13-16.
12. **Inspect the rear fan and hard drive assemblies.**  
Confirm the following:
  - The rear fan assembly bracket feet are well seated in the chassis.
  - The hard drive assembly is seated and the screws are installed.



### 13. Inspect the DIMMs and related component cabling.

Confirm the following:

- The rear fan cable is firmly connected to the motherboard.
- The SCSI backplane power cables are plugged into the SCSI backplane.
- The hard drive interface cable is fed through the SCSI backplane bracket, plugged into the SCSI backplane, and plugged into the motherboard.

### 14. Finish up.

Replace the access panel, power on the system, and verify the component installation. See:

- [Section 15.4, “Replacing the Access Panel” on page 15-6](#)
- [Section 15.5, “Powering On the Workstation” on page 15-7](#)
- [Section 15.6, “Verifying an Installation” on page 15-10](#)

## 11.1.4 OpenBoot PROM Memory Message

---

**Note** – Before replacing Sun Blade 2500 DIMMs verify that the latest version of OpenBoot PROM, system firmware, and recommended system patches are installed on your system.

---

During system startup, OpenBoot PROM checks for DIMM type and DIMM manufacturer. [TABLE 11-2](#) shows the result and the action taken by the OpenBoot PROM.

**TABLE 11-2** OpenBoot PROM Memory Check Actions

Check Result	Action Taken
Wrong DIMM type	System beeps three times and powers off.
DIMMs in a pair have different architecture.	System does not use unlike DIMMs. A message is displayed and the system continues to boot, the system will attempt to use the DIMM pair.
DIMMs in a pair are from different manufacturers.	System uses DIMMs from different manufacturers. A message is displayed and the system continues to boot.

---

**Note** – If you only have one DIMM pair installed and the DIMMs have a different architecture, the system beeps three times powers off. No message is displayed.

---

The Sun Blade 2500 workstation has four DIMM connector slots above each CPU.

CPU0 has four memory slots. The two lower slots make up physical Bank 0 and the two upper slots make up physical Bank 2 (FIGURE 11-8).

CPU1 has four memory slots. The two lower slots make up physical Bank 0 and the two upper slots make up physical Bank 2 (FIGURE 11-8).

OpenBoot PROM references memory by bank if a problem is found. For example, if each DIMM of a DIMM pair is from a different manufacturer the following error will be displayed:

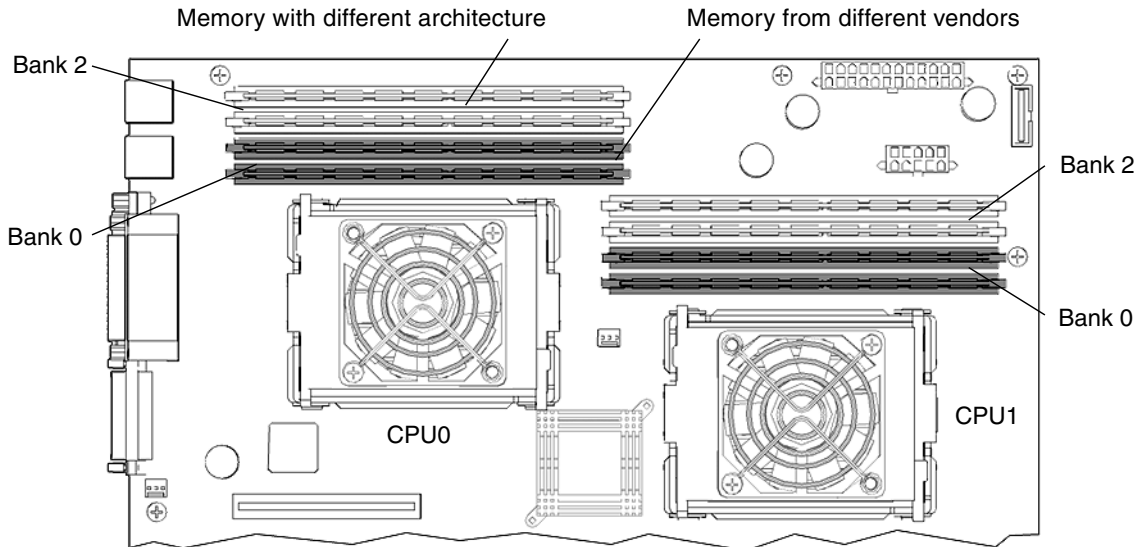
```
NOTICE - CPU0 Bank 0 DIMMS are from different vendors.
```

This message means that each of the two DIMMs in the lower slots comes from a different manufacturer. The system still attempts to use the DIMMs.

```
NOTICE - CPU0 Bank 2 DIMMs have different architectures and will not be used.
```

This message means that each of the two DIMMs in the upper slots has a different internal memory layout. The system will not use the DIMMs.

FIGURE 11-8 identifies the location of the faulty DIMMs in the previous examples.



**FIGURE 11-8** Examples of Faulty DIMM Locations

A system must have at least one functional pair of DIMMs to display a message.

---

**Note** – A system with more than one pair of DIMMs might display more than one message.

---

For additional information about memory interleaving see: [Section C.3.2.7, “Memory Interleaving”](#) on page C-21.

---

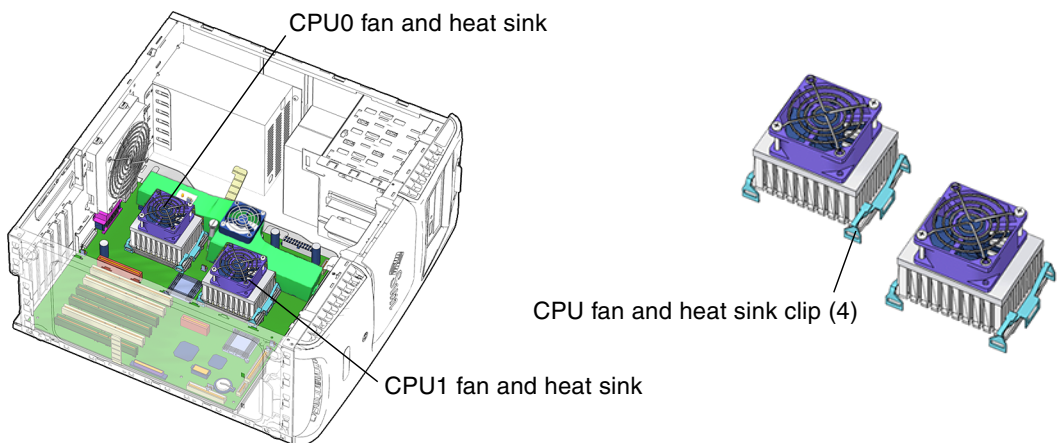
## 11.2 Replacing the CPU Fan and Heat Sink Assembly

This section describes removal and installation of the CPU fan and heat sink assembly. Topics include:

- [Section 11.2.1, “Identifying the CPU Fan and Heat Sink Assembly”](#) on page 11-13
- [Section 11.2.2, “Removing the CPU Fan and Heat Sink Assembly”](#) on page 11-14
- [Section 11.2.3, “Installing the CPU Fan and Heat Sink Assembly”](#) on page 11-18

### 11.2.1 Identifying the CPU Fan and Heat Sink Assembly

The CPU fan and CPU heat sink are attached to each other. Replacing a fan requires replacing the heat sink as well.



**FIGURE 11-9** CPU Fan Locations and Identification

## 11.2.2 Removing the CPU Fan and Heat Sink Assembly

1. Power off the system and open the chassis.

See:

- Section 10.3, “Powering Off the Workstation” on page 10-4
- Section 10.4, “Removing the Access Panel” on page 10-12

2. Locate the CPU fan and heat sink assembly (FIGURE 11-9).

3. If you are replacing the CPU fan and heat sink assembly for CPU 0, remove the rear fan.

See, Section 13.3.2, “Removing the Rear Fan” on page 13-17.

4. If you are replacing the CPU fan and heat sink assembly for CPU 1, remove the hard drive assembly.

See Section 10.7, “Removing the Hard Drive Assembly” on page 10-20.

5. Position the chassis.

See Section 10.6, “Positioning the Chassis” on page 10-18.

6. Disconnect the CPU fan and heat sink assembly fan cable from the motherboard (FIGURE 11-10).

Disconnect the fan cable from the CPU fan cable and heat sink assembly that you are replacing.

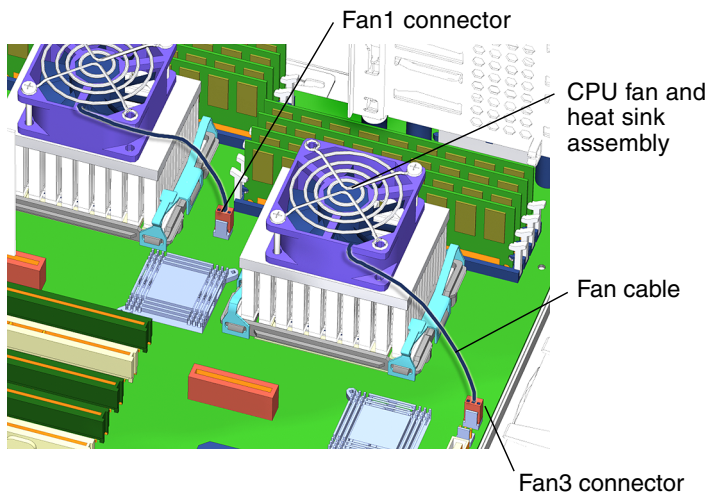


FIGURE 11-10 Disconnecting CPU Fan Cables

7. Remove the right and left clips (FIGURE 11-11).



---

**Caution** – Do not damage the transistors and other sensitive devices around the CPU fan and heat sink assembly.

---

---

**Note** – Check the orientation of the clips before removal. You will need to reinstall the clips in the same orientation later.

---

**a. Press down and release the latch on the right clip.**

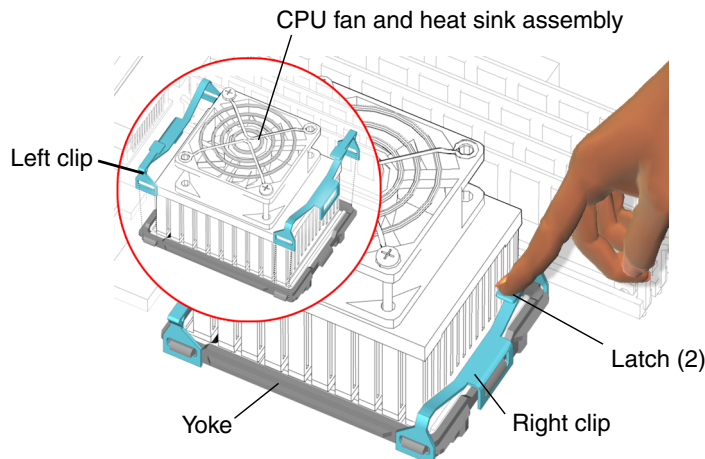
Rotate the clip outward to remove it from the CPU fan and heat sink assembly yoke. As you release the clip, lift it out of the system and set it aside.

**b. Push down on the CPU fan and heat sink assembly with one hand (FIGURE 11-12).**

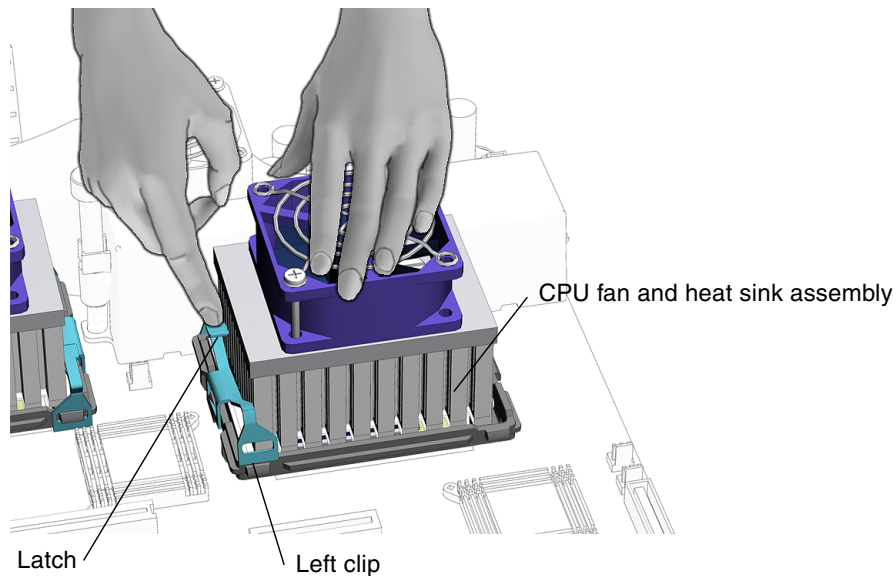
The assembly may lift up on the right side.

**c. Press down and release the latch on the left clip.**

Rotate the clip outward to remove it from the CPU fan and heat sink assembly yoke. As you release the clip, lift it out of the system and set it aside.



**FIGURE 11-11** Removing CPU Fan Assembly Clips



**FIGURE 11-12** Holding the CPU Fan and Heat Sink Assembly

**8. Remove the CPU fan and heat sink assembly (FIGURE 11-14).**

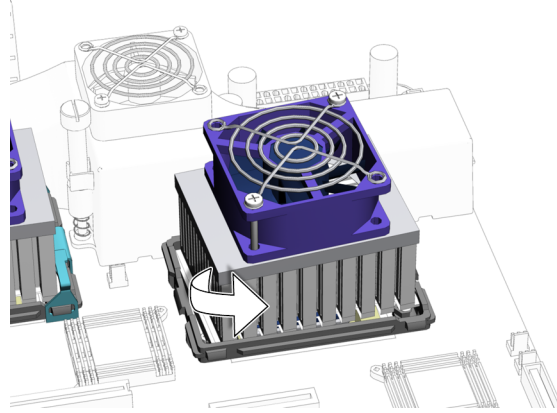
- a. If necessary, rotate the CPU fan and heat sink assembly counterclockwise (FIGURE 11-13).**

This action breaks the seal between the heat sink, thermal pad, and the CPU. It may be necessary to rotate the CPU fan and heat sink counterclockwise and clockwise several times to break the seal.

---

**Note** – If you cannot easily break the seal between the CPU fan and heat sink thermal pad and the CPU, replace the motherboard.

---



**FIGURE 11-13** Rotating the CPU Fan and Heat Sink Assembly Counterclockwise

**b. Lift and remove the CPU fan and heat sink assembly (FIGURE 11-14).**

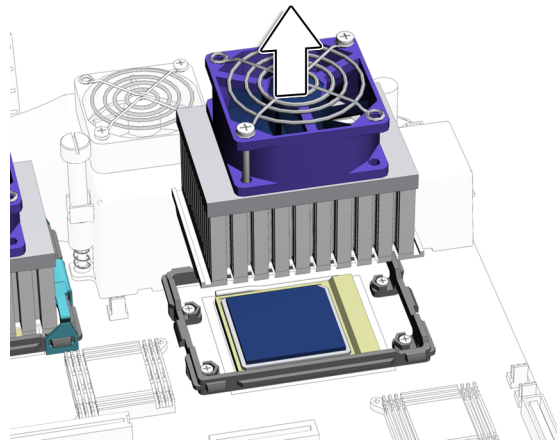
Remove the CPU fan and heat sink assembly, and place it on its side.



---

**Caution** – Do not place the CPU fan and heat sink assembly thermal pad on your antistatic mat. The pad might attract dirt and oil from the antistatic mat to its surface. This dirt and oil might prevent heat transfer from occurring.

---



**FIGURE 11-14** Removing the CPU Fan and Heat Sink Assembly

You have removed one of the CPU fan and heat sink assemblies. If necessary, repeat Step 6, Step 7, and Step 8 of this procedure to remove the second CPU fan and heat sink assembly.

Proceed to [Section 11.2.3, “Installing the CPU Fan and Heat Sink Assembly”](#) on page 11-18.



---

**Caution** – Do not power on the system if the CPU fan and heat sink assembly is not installed.

---

## 11.2.3 Installing the CPU Fan and Heat Sink Assembly

### 1. Open and position the chassis.



---

**Caution** – If the CPU fan and heat sink assembly is not installed, the workstation should not be powered on. If it was powered on, see [Section 10.3, “Powering Off the Workstation”](#) on page 10-4 for information about powering off the workstation.

---

See:

- [Section 10.4, “Removing the Access Panel”](#) on page 10-12
- [Section 10.6, “Positioning the Chassis”](#) on page 10-18

### 2. Identify the CPU fan and heat sink assembly location on the motherboard (FIGURE 11-9).

The CPU fan and heat sink assembly is installed on CPU0 or CPU1.

### 3. Remove the CPU fan and heat sink assembly from its packaging.

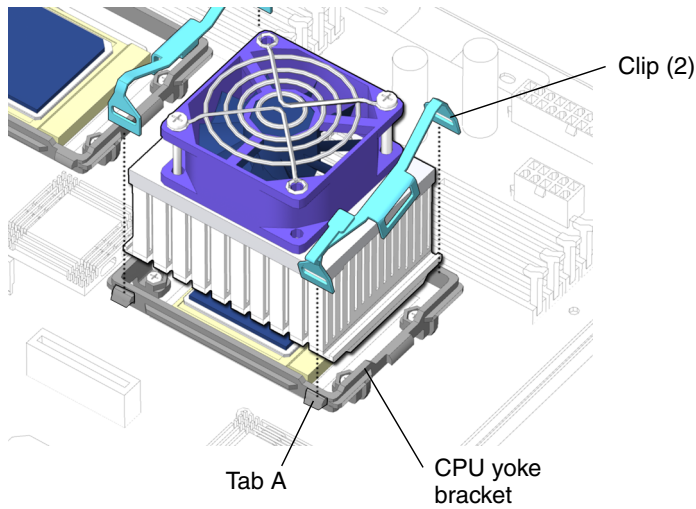
### 4. Place the CPU fan and heat sink assembly onto the CPU (FIGURE 11-15).

Arrange the CPU fan so that the cable is facing the bottom-front corner of the chassis (FIGURE 11-20).

### 5. Fasten the CPU fan and heat sink assembly onto the CPU.

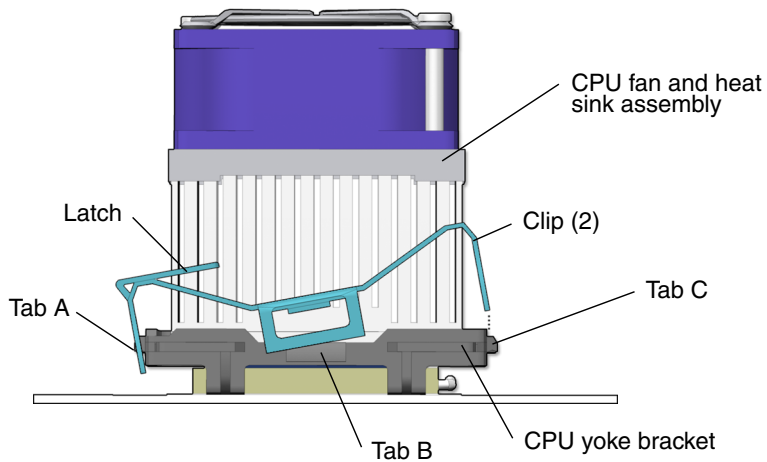
- a. Place the right CPU fan and heat sink assembly clip over CPU yoke bracket tab a (FIGURE 11-15).





**FIGURE 11-15** Installing the Clip on Tab A

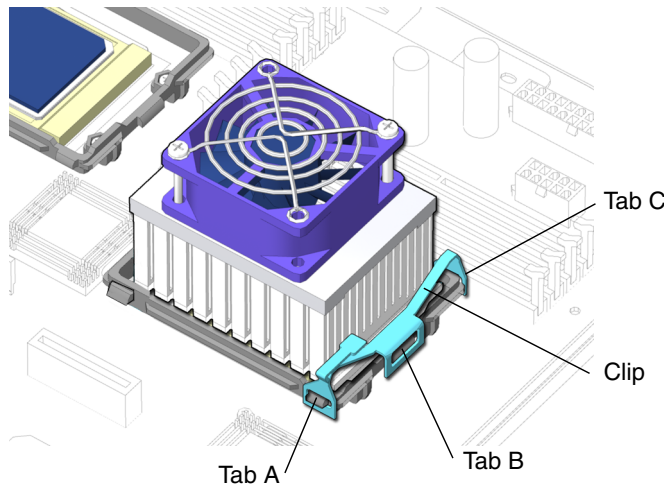
**b. Place the clip over tab b of the CPU yoke bracket (FIGURE 11-16).**



**FIGURE 11-16** Installing the Clip on Tab B

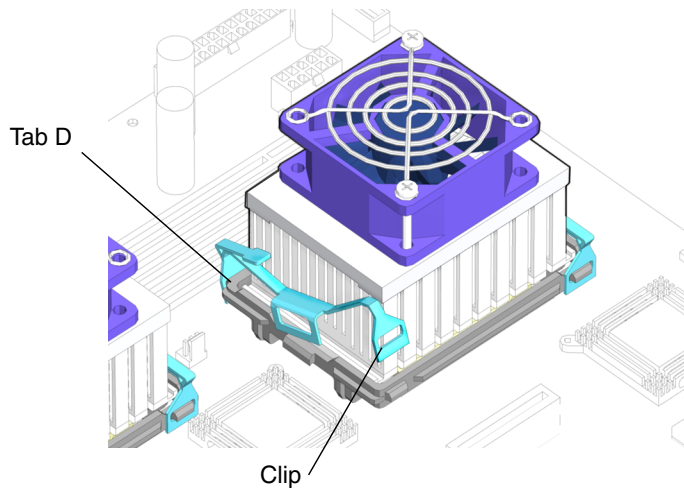
**c. Install the leading edge of the clip (edge without the latch) over tab c.**

Press down on the clip until seats into the lock-down position (FIGURE 11-17).



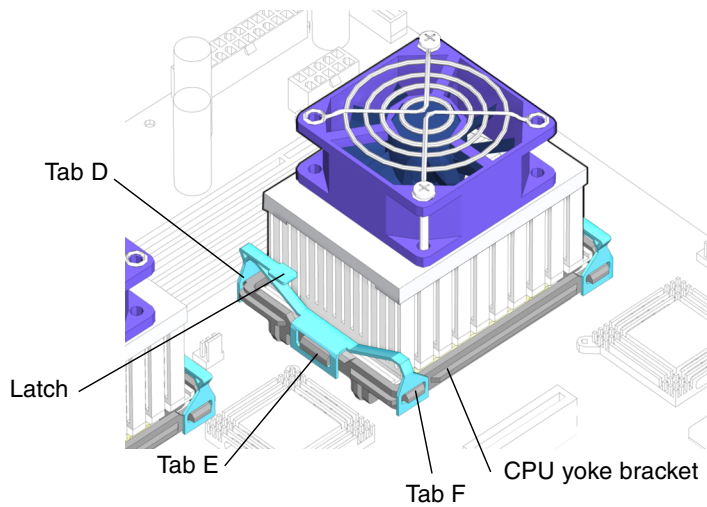
**FIGURE 11-17** Installing the Clip Into the Lock-Down Position

- d. Ensure that the clip is correctly seated on the CPU yoke bracket at tabs a, b, and c.



**FIGURE 11-18** Installing the Clip over Tab D

- e. Place the left CPU fan and heat sink assembly clip over CPU yoke bracket tab d (FIGURE 11-18).

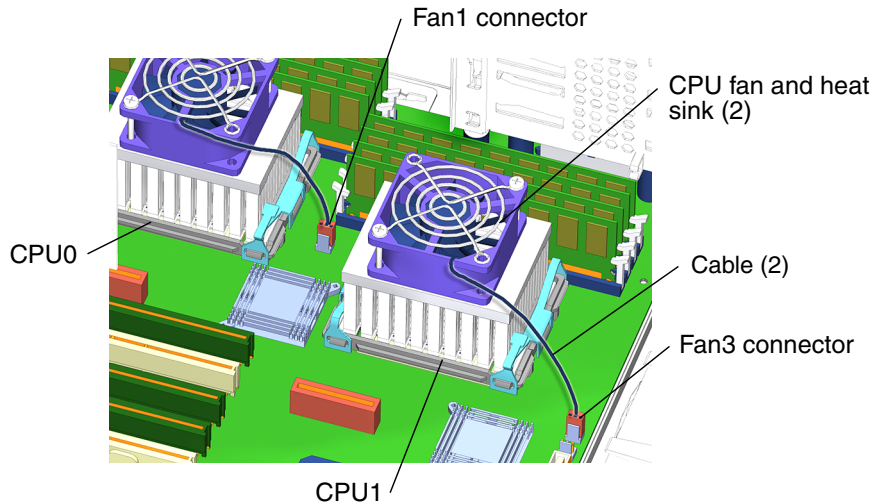


**FIGURE 11-19** Installing the Clip over Tab E

- f.** Place the clip over tab e of the CPU yoke bracket (FIGURE 11-19).
  - g.** Install the leading edge of the clip (edge without the latch) over tab f.
  - h.** Ensure that the clip is correctly seated on CPU connector tabs d, e, and f.  
Press down on the clip until seats into the lock-down position.
- 6. Connect the CPU fan and heat sink assembly cable (FIGURE 11-20).**

Each CPU fan and heat sink assembly cable has a designated connector on the motherboard. Connect the fan cable connector for CPU 0 to FAN1. Connect the fan cable connector for CPU 1 to FAN3.

You have installed one of the CPU fan and heat sink assemblies. If necessary, repeat Step 3 through Step 6 of this procedure to install the second CPU fan and heat sink assembly.



**FIGURE 11-20** Connecting CPU Fan and Heat Sink Assembly Connectors

**7. Reposition the chassis.**

See [Section 15.1, “Repositioning the Chassis”](#) on page 15-2.

**8. If you replaced the CPU fan and heat sink assembly for CPU 1, also reinstall the hard drive assembly.**

See [Section 15.2, “Replacing the Hard Drive Assembly”](#) on page 15-2.

**9. If you replaced the CPU fan and heat sink assembly for CPU 0, also reinstall the rear fan and rear fan bracket.**

Insert all four feet of the rear fan bracket into the matching D-shaped holes in the chassis back panel. Position the rear fan cable facing down and toward the rear of the chassis. Slide the bracket toward the motherboard until the fan bracket latches click. If necessary, see: [Section 13.3.3, “Installing the Rear Fan”](#) on page 13-20.

**10. Inspect the CPU fan and heat sink assembly clips.**

- The CPU fan and heat sink assembly clips are down and both clips for each CPU fan assembly are locked in place.
- The rear fan bracket feet are well seated in the chassis.
- The hard drive bracket is tight in the hard drive bay.

**11. Inspect the CPU fan and heat sink assembly cabling.**

- Each CPU fan and heat sink assembly power cable is securely connected to the motherboard.
- The rear fan cable is firmly securely connected to the motherboard.
- The SCSI backplane power cables are plugged into the SCSI backplane.

- The SCSI interface cable is fed through the SCSI backplane bracket, plugged into the SCSI backplane, and plugged into the motherboard.

## 12. Finish up.

Replace the access panel, power on the system, and verify the component installation.

See:

- [Section 15.4, “Replacing the Access Panel”](#) on page 15-6
- [Section 15.5, “Powering On the Workstation”](#) on page 15-7
- [Section 15.6, “Verifying an Installation”](#) on page 15-10

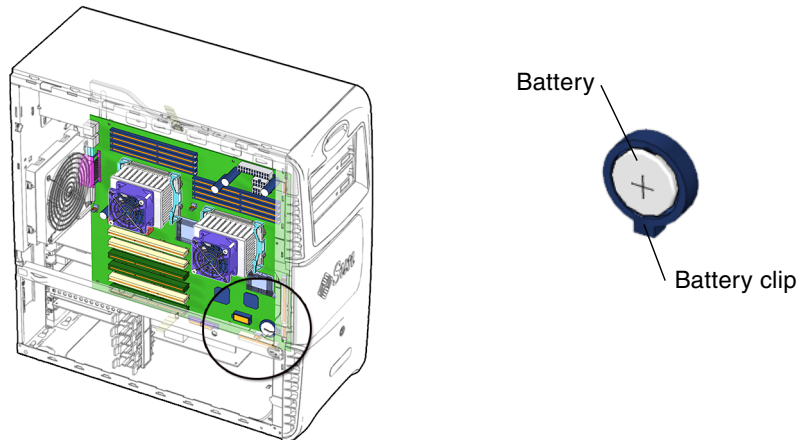
---

# 11.3 Replacing the Battery

This section describes removal and installation of the battery. Topics include:

- [Section 11.3.1, “Identifying the Battery”](#) on page 11-23
- [Section 11.3.2, “Removing the Battery”](#) on page 11-24
- [Section 11.3.3, “Installing the Battery”](#) on page 11-25

## 11.3.1 Identifying the Battery



**FIGURE 11-21** Battery Location and Identification

TABLE 11-3 lists the battery specifications.

TABLE 11-3 Battery Specifications

Specification	Value
Voltage	3 VDC
Form factor	CR 32220
Vendor	Maxell

## 11.3.2 Removing the Battery

### 1. Power off the system, open and position the chassis.

See:

- [Section 10.3, “Powering Off the Workstation”](#) on page 10-4
- [Section 10.4, “Removing the Access Panel”](#) on page 10-12
- [Section 10.6, “Positioning the Chassis”](#) on page 10-18

### 2. Locate the battery (FIGURE 11-21).

### 3. Release the battery (FIGURE 11-22).

Squeeze the battery latch together until the battery shifts out of the motherboard socket. Remove the battery.

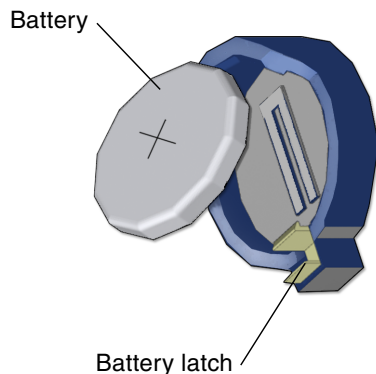


FIGURE 11-22 Releasing the Battery

### 4. Finishing up.

The workstation does not function without the battery. To install the new battery proceed to [Section 11.3.3, “Installing the Battery”](#) on page 11-25.

## 11.3.3 Installing the Battery

The battery installs directly onto the motherboard. There are no additional fasteners or cables.

### 1. Open and position the chassis.

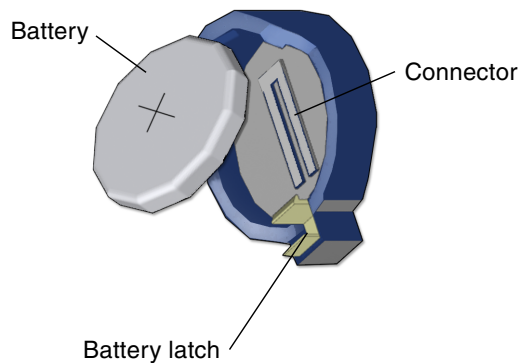
See:

- [Section 10.4, “Removing the Access Panel” on page 10-12](#)
- [Section 10.6, “Positioning the Chassis” on page 10-18](#)

### 2. Identify the battery installation site (FIGURE 11-21).

### 3. Install the battery (FIGURE 11-23).

Tilt the battery into the battery connector, angling under the battery latch. Slide the battery until it clicks into place.



**FIGURE 11-23** Installing the Battery

### 4. Inspect the battery latch.

Ensure the battery latch secures the battery in its connector.

### 5. Finish up.

Reposition the chassis, replace the access panel, power on the system, and verify the component installation.

See:

- [Section 15.1, “Repositioning the Chassis” on page 15-2](#)
- [Section 15.4, “Replacing the Access Panel” on page 15-6](#)
- [Section 15.5, “Powering On the Workstation” on page 15-7](#)
- [Section 15.6, “Verifying an Installation” on page 15-10](#)

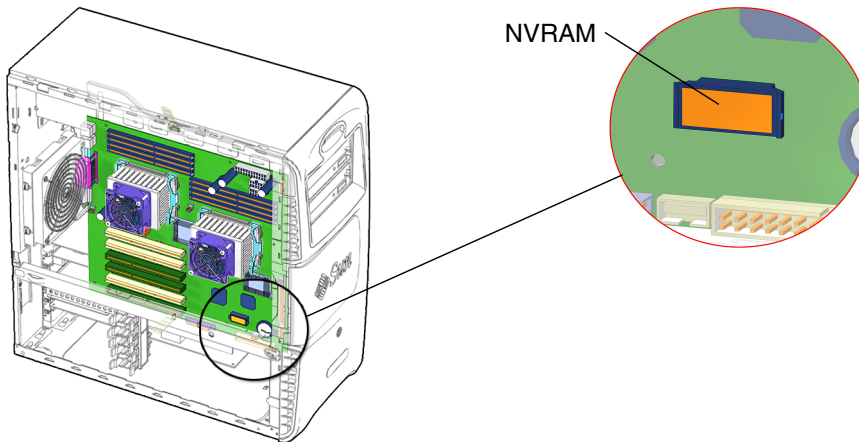
---

## 11.4 Replacing NVRAM

This section describes removal and installation of nonvolatile random access memory (NVRAM). Topics include:

- Section 11.4.1, “Identifying NVRAM” on page 11-26
- Section 11.4.2, “Removing NVRAM” on page 11-26
- Section 11.4.3, “Installing NVRAM” on page 11-27

### 11.4.1 Identifying NVRAM



**FIGURE 11-24** NVRAM Location and Identification

### 11.4.2 Removing NVRAM

1. **Power off the system, open and position the chassis.**

See:

- Section 10.3, “Powering Off the Workstation” on page 10-4
- Section 10.4, “Removing the Access Panel” on page 10-12
- Section 10.6, “Positioning the Chassis” on page 10-18

2. **Locate NVRAM (FIGURE 11-24).**
3. **Remove NVRAM (FIGURE 11-25).**

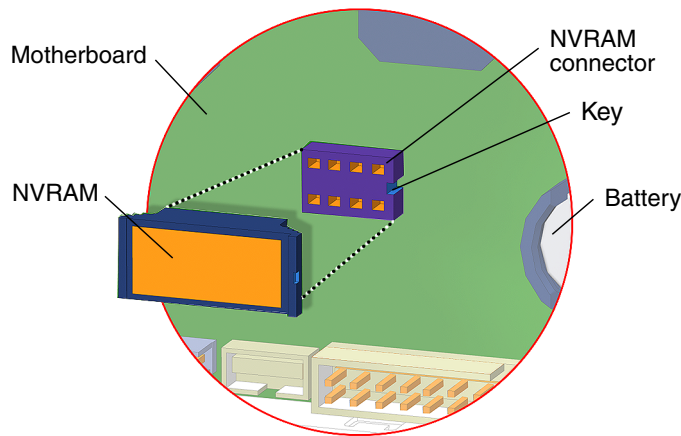
Pull the NVRAM straight up from the connector.



---

**Note** – NVRAM and the NVRAM connector are keyed.

---



**FIGURE 11-25** Removing NVRAM

#### 4. Finishing up.

The workstation does not function without NVRAM. To install new NVRAM, proceed to [Section 11.4.3, “Installing NVRAM”](#) on page 11-27.

## 11.4.3 Installing NVRAM

NVRAM installs directly onto the motherboard. There are no additional fasteners or cables.

#### 1. Open and position the chassis.

See:

- [Section 10.4, “Removing the Access Panel”](#) on page 10-12
- [Section 10.6, “Positioning the Chassis”](#) on page 10-18

#### 2. Locate the NVRAM connector ([FIGURE 11-25](#)).

#### 3. Install NVRAM.

Align the NVRAM key to the NVRAM connector key on the motherboard. Press the NVRAM down until snug.

---

**Note** – NVRAM and the NVRAM connector are keyed.

---

#### 4. Inspect the NVRAM connector.

Ensure the NVRAM is tight in its connector.

#### 5. Finishing up.

Reposition the chassis, replace the access panel, power on the system, and verify the component installation.

See:

- [Section 15.1, “Repositioning the Chassis” on page 15-2](#)
- [Section 15.4, “Replacing the Access Panel” on page 15-6](#)
- [Section 15.5, “Powering On the Workstation” on page 15-7](#)
- [Section 15.6, “Verifying an Installation” on page 15-10](#)

---

## 11.5 Replacing PCI Cards

This section describes removal and installation of interface (PCI) cards in the workstation.

Topics include:

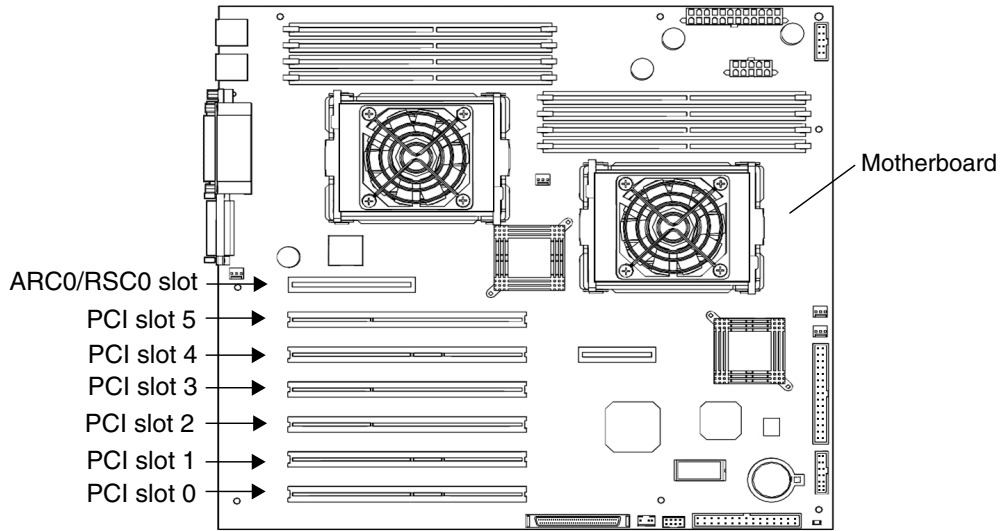
- [Section 11.5.1, “Identifying PCI Cards” on page 11-28](#)
- [Section 11.5.3, “Removing a PCI Card” on page 11-32](#)
- [Section 11.5.4, “Installing a PCI Card” on page 11-35](#)
- [Section 11.5.5, “Special Considerations for Multiple Graphic Accelerators Installed in a Single Workstation” on page 11-38](#)



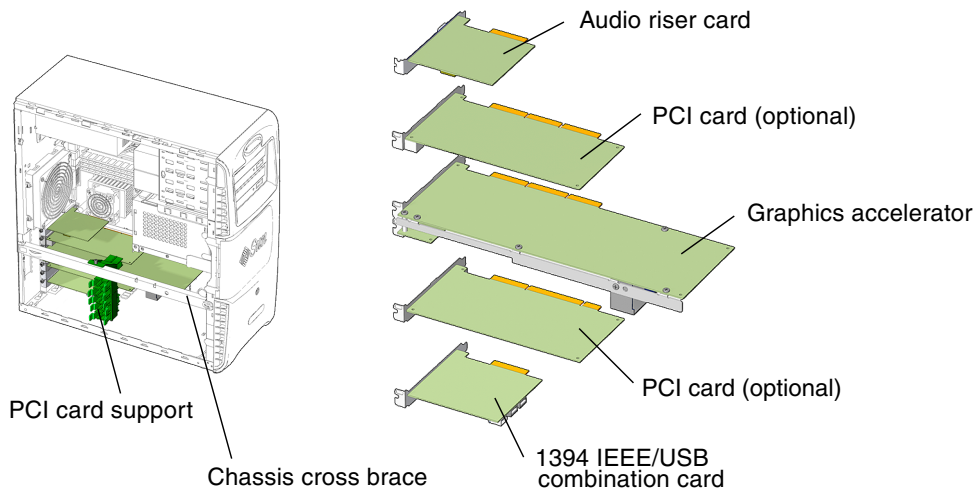
You can also view an animated version of these instructions by clicking on this film icon.

### 11.5.1 Identifying PCI Cards

Peripheral Component Interface (PCI) cards are supported in the six PCI slots (PCI 0 - 5) and one Audio Riser Card 0/Remote System Controller 0 (ARC0/RSC0) slot that reside on the system motherboard ([FIGURE 11-26](#)).



**FIGURE 11-26** Location of PCI and ARC0/RSC0 Slots on the Motherboard



**FIGURE 11-27** PCI Cards Location and Identification

TABLE 11-4 lists PCI card slots, motherboard-supported speeds, and motherboard slot connector colors.

TABLE 11-4 PCI Card Slot Specifications

PCI Card Slots	Motherboard Supported Speed	Motherboard Slot Connector Colors
Slot 0	33 MHz, for IEEE 1394 USB 2.0 combination card slot	White
Slot 1	33 MHz	White
Slot 2 and 3	66 MHz	Green
Slot 4	33 Mhz	White
Slot 5	66 MHz	Green
ARC0/RSC0 Slot	Dedicated audio module	Brown

**Note** – If you are installing or upgrading PCI cards, proceed to [Section 11.5.4, “Installing a PCI Card”](#) on page 11-35.

## 11.5.2 PCI Slot Configurations

Sun Blade 2500 workstations ship configured with the following components:

- One Sun XVR-100, Sun XVR-500, or Sun XVR-600 graphics accelerator installed in PCI slot 5 or with a single Sun XVR-1200 graphics accelerator installed in PCI slots 4 and 5
- One audio module installed in the ARC0/RSC0 slot
- One IEEE 1394a/USB 2.0 combination card installed in PCI slot 0

TABLE 11-5 is a summary of the Sun Blade 2500 workstation PCI slot configurations.

TABLE 11-5 Sun Blade 2500 Workstation PCI Slot Configurations

PCI Slot	PCI Slot Performance	Basic 3D Graphics Configuration	Basic 2D Graphics Configuration	Multihead CAD Configuration	Dual-Platform Interoperability Configuration
ARC0/RSC0		Audio module	Audio module	Audio module	Audio module
PCI5	66 MHz, 64 bit	Sun XVR-500, Sun XVR-600, Sun XVR-1200	Sun XVR-100	Sun XVR-500, Sun XVR-600	SunPCi III coprocessor
PCI4	33 MHz, 64 bit	Sun XVR-600, Sun XVR-1200			

**TABLE 11-5** Sun Blade 2500 Workstation PCI Slot Configurations (*Continued*)

PCI Slot	PCI Slot Performance	Basic 3D Graphics Configuration	Basic 2D Graphics Configuration	Multihead CAD Configuration	Dual-Platform Interoperability Configuration
PCI3	66 MHz, 64 bit	Sun XVR-500, Sun XVR-600, Sun XVR-1200	Sun XVR-100	Sun XVR-500, Sun XVR-600	SunPCi III coprocessor
PCI2	66 MHz, 64 bit	Sun XVR-500, Sun XVR-600, Sun XVR-1200	Sun XVR-100	Sun XVR-500, Sun XVR-600	SunPCi III coprocessor
PCI1	33 MHz, 64 bit	Sun XVR-600, Sun XVR-1200			
PCI0	33 MHz, 64 bit	IEEE 1394a/USB 2.0 combination card	IEEE 1394a/USB 2.0 combination card	IEEE 1394a/USB 2.0 combination card	IEEE 1394a/USB 2.0 combination card

---

**Note** – Up to three Sun XVR-100 graphic accelerators are supported per workstation. Place the accelerators in PCI slots 2, 3, or 5 for maximum system performance. Placement in other PCI slots might reduce system performance. The factory default position is PCI slot 5.

---

---

**Note** – Up to two Sun XVR-500 graphic accelerators are supported per workstation. Place the accelerators in PCI slots 2, 3, or 5 for maximum system performance. Placement in other PCI slots might reduce system performance. The factory default position is PCI slot 5.

---

---

**Note** – Up to three Sun XVR-600 graphic accelerators are supported per workstation. Place the accelerators in PCI slots 2, 3, or 5 for maximum system performance. Placement in other PCI slots might reduce system performance. The factory default position is PCI slot 5.

---

---

**Note** – Up to two Sun XVR-1200 graphics accelerators are supported per workstation. The accelerators can be placed in slots 1 and 2, 2 and 3, or 4 and 5. Installation of the XVR-1200 in PCI slots 1 and 2, or 4 and 5 makes available an additional 66 MHz PCI slot for other use.

---

---

**Note** – If PCI slot 5 is occupied by another graphics card and an additional 66 MHz PCI slot is not needed, you can install a XVR-1200 graphics accelerator in PCI slots 2 and 3. Placement in other PCI slot configurations might reduce system performance. The factory default position for the XVR-1200 graphics accelerator is in PCI slots 4 and 5.

---

## 11.5.3 Removing a PCI Card

### 1. Power off the system and open the chassis.

See:

- [Section 10.3, “Powering Off the Workstation” on page 10-4](#)
- [Section 10.4, “Removing the Access Panel” on page 10-12](#)

### 2. Remove the PCI card support and the chassis cross brace.

See [Section 13.7, “Replacing the PCI Card Support and Chassis Cross Brace” on page 13-42](#).

---

**Note** – Do *not* use the chassis cross brace as a handle.

---

### 3. Position the chassis.

See [Section 10.6, “Positioning the Chassis” on page 10-18](#).

### 4. Locate the PCI card you wish to remove.

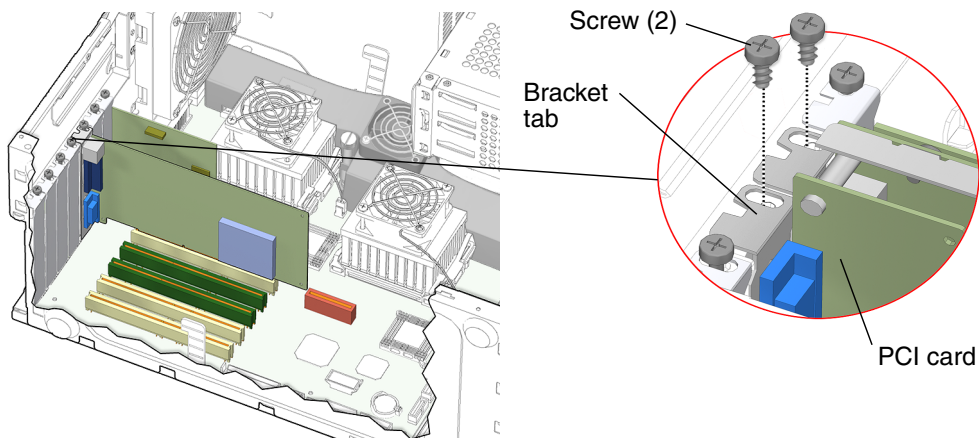
5. Unfasten the screw(s) for the PCI card (FIGURE 11-28).

Using a No. 2 Phillips screwdriver, remove the screw(s) that secure the card bracket tab to the chassis back panel. Set the screw(s) aside in a container.

---

**Note** – The Sun XVR-1200 graphics accelerator shown has two boards and, therefore, two screws.

---



**FIGURE 11-28** Removing the PCI Card Bracket Tab Screw

6. Remove the PCI card (FIGURE 11-29).

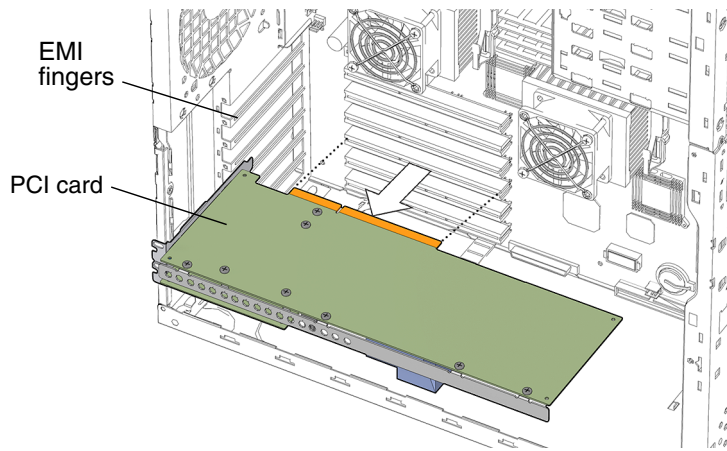
Gently rock the PCI card forward, then lift it straight out of the PCI card slot and set it aside on an antistatic mat.

---

**Note** – Use care not to damage the EMI fingers around the PCI card openings.

---

You have removed the PCI card.



**FIGURE 11-29** Removing the PCI Card

**7. Consider your next step(s):**

- If you removed the PCI card to replace it, install the new PCI card. Proceed to [Section 11.5.4, “Installing a PCI Card” on page 11-35](#), to install the new PCI cards.
- If you removed PCI cards prior to removing the motherboard, return to Step 8 of [Section 11.6.2, “Removing the Motherboard” on page 11-44](#).
- If you are not replacing the PCI card you removed, install a filler panel. Proceed to Step 8 of this procedure.

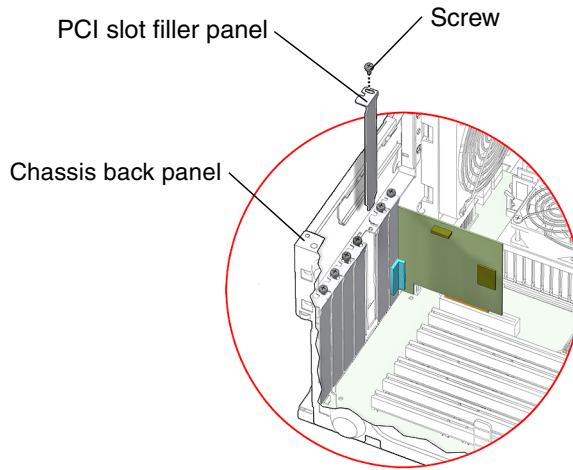
**8. If you are not replacing the PCI card you removed:**

**a. Install a PCI slot filler panel (FIGURE 11-30).**

The back panel opening must be closed with a filler panel for system EMI and airflow requirements.

Insert a filler panel into the chassis back panel slot. Use a No. 2 Phillips screwdriver to replace the screw that secures the filler panel to the chassis back panel.





**FIGURE 11-30** Installing a PCI Slot Filler Panel

**b. Replace the PCI card support and chassis cross brace, reposition the chassis, replace the access panel, and power on the system.**

See:

- [Section 13.7, “Replacing the PCI Card Support and Chassis Cross Brace” on page 13-42](#)
- [Section 15.1, “Repositioning the Chassis” on page 15-2](#)
- [Section 15.4, “Replacing the Access Panel” on page 15-6](#)
- [Section 15.5, “Powering On the Workstation” on page 15-7](#)

## 11.5.4 Installing a PCI Card

**1. Power off the system and open the chassis.**

See:

- [Section 10.3, “Powering Off the Workstation” on page 10-4.](#)
- [Section 10.4, “Removing the Access Panel” on page 10-12.](#)

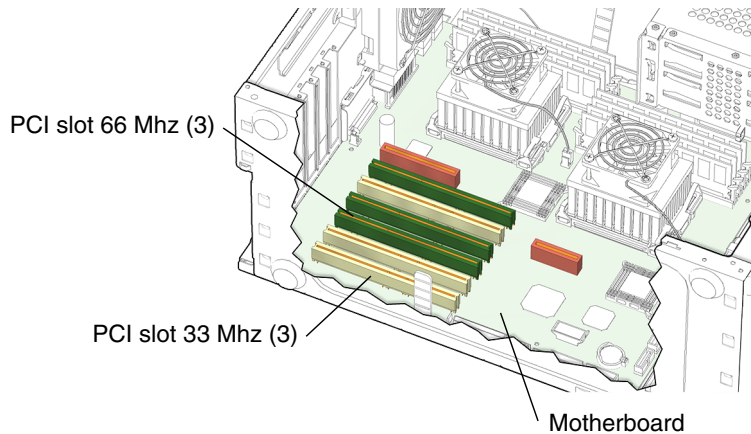
**2. Locate the available PCI card slots (FIGURE 11-31).**

Certain PCI cards must be installed in specific PCI card slots in the motherboard. You might have to remove a second chassis filler panel for some PCI cards that use two PCI card slots. Locate the corresponding chassis filler panel slot and PCI card slot.

---

**Note** – If you are installing a new PCI card and you are not replacing a PCI card, check the PCI card documentation to ensure you install the PCI card into an appropriate PCI card slot. Ensure that the speed of the card matches the speed of the PCI card slot ([TABLE 11-4](#)). The white PCI slots are 33 MHz and the green PCI slots are 66 MHz.

---



**FIGURE 11-31** Locating PCI Slots

**3. Remove the chassis PCI slot filler panel, if needed ([FIGURE 11-30](#)).**

Using a No. 2 Phillips screwdriver, remove the chassis filler panel screw. Slide the filler panel out. Set the filler panel and screw aside.

**4. Remove the PCI card support and the chassis cross brace.**

See [Section 13.7, “Replacing the PCI Card Support and Chassis Cross Brace”](#) on page 13-42.

**5. Position the chassis.**

See [Section 10.6, “Positioning the Chassis”](#) on page 10-18.

**6. Remove the new PCI card from its antistatic container.**



---

**Caution** – Handle the PCI card along the outside edges. Do not handle the PCI card along the connector edge.

---

**7. Align the PCI card with the selected PCI card slot ([FIGURE 11-32](#)).**

Position the PCI card so that the card aligns with the PCI card opening and the PCI card slot.

**8. Insert the PCI card into the PCI card slot.**

Firmly press the PCI card straight down into the PCI card slot until it is fully seated.

---

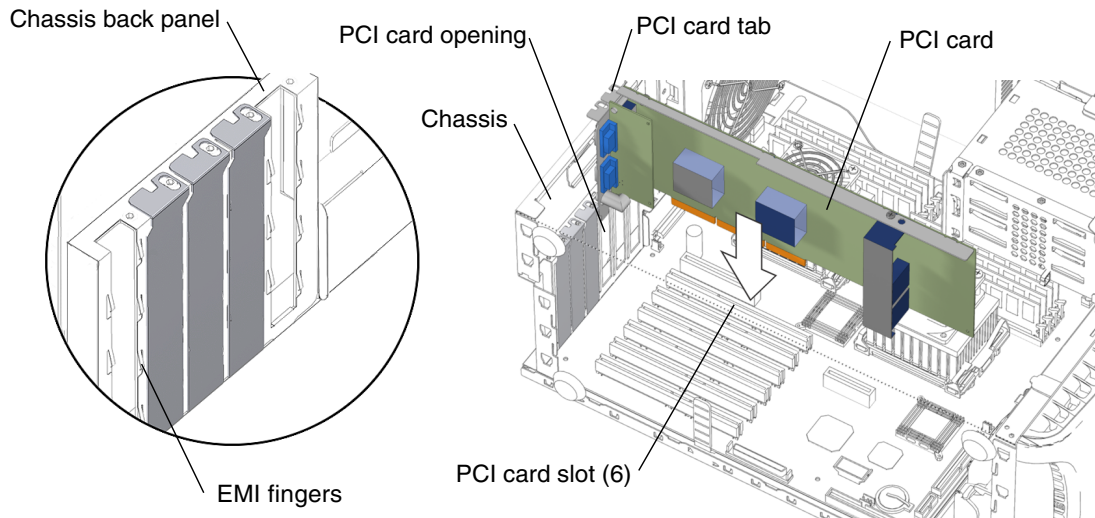
**Note** – If you choose to keep the chassis in its upright position, do not tip over the chassis.

---

---

**Note** – Do not damage the EMI fingers surrounding the chassis back panel opening.

---



**FIGURE 11-32** Inserting a PCI card

**9. Fasten the PCI card tab to the chassis back panel.**

Use a No. 2 Phillips screwdriver to install the screw that secures the PCI card tab to the chassis back panel. Repeat for the second PCI card tab, as needed.

**10. Reposition the chassis.**

See [Section 15.1, “Repositioning the Chassis”](#) on page 15-2.

**11. Replace the PCI card support and chassis cross brace.**

See [Section 13.7, “Replacing the PCI Card Support and Chassis Cross Brace”](#) on page 13-42.

## 12. Inspect the PCI card connectors.

- The PCI card slot screws are tight.
- The PCI card is seated in the PCI card slot.
- If applicable, verify that the second PCI card is well seated in the PCI card slot.

## 13. Finish up.

Replace the access panel, power on the system, and verify the component installation.

See:

- [Section 15.4, “Replacing the Access Panel” on page 15-6](#)
- [Section 15.5, “Powering On the Workstation” on page 15-7](#)
- [Section 15.6, “Verifying an Installation” on page 15-10](#)

## 11.5.5 Special Considerations for Multiple Graphic Accelerators Installed in a Single Workstation

A single Sun Blade 2500 can support multiple Sun XVR-100, Sun XVR-500, Sun XVR-600, and Sun XVR1200 graphics accelerators. [TABLE 11-6](#) describes the recommended PCI slot locations for the recommended Sun graphics accelerators.

**TABLE 11-6** PCI Slot Locations for Sun Blade 2500 Graphics Accelerators

Graphics Accelerator	Number of Graphics Accelerators Supported	PCI Slot Location(s)
Sun XVR-100	3	PCI2, PCI3, or PCI5
Sun XVR-500	2	PCI2, PCI3, or PCI5
Sun XVR-600	3	PCI2, PCI3, or PCI5
Sun XVR-1200	2	PCI2, PCI3, or PCI5

### 11.5.5.1 Visual Inspection

If the firmware does not configure a console display, you can determine the default console display by inspecting the back panel of the workstation. If a single graphics accelerator is installed into the PCI slot 5, then that card is the default console display. If there is no graphics accelerator installed into slot PCI5, consider the probe order described in [TABLE 11-7](#).

## 11.5.5.2 Probe Order

During the boot sequence, device nodes are probed. The PCI slots are probed in the order described in [TABLE 11-7](#):

**TABLE 11-7** PCI Card Probe Order

Probe Order	Slot Identifier	Slot Position on Back Panel	Device Node
1	PCI5	Top slot	/devices/pci@1f,700000 device 3
2	PCI4	Second slot from top	/devices/pci@1e,600000 device 2
3	PCI1	Second slot from the bottom	/devices/pci@1e,600000 device 3
4	PCI0	Bottom slot	/devices/pci@1e,600000 device 4
5	PCI2	Third slot from the bottom	/devices/pci@1e,600000 device 5
6	PCI3	Fourth slot from bottom	/devices/pci@1e,600000 device 1

Unless you reconfigure the default, the first graphics accelerator occurring in the probe order is designated the default console display and assigned the aliases `screen` and `/dev/fb`.

## 11.5.5.3 Identifying the Default Console Display

The `test screen` command issued at the `ok` prompt requests the default console display to execute a self-test, thereby identifying itself. The self-test checks memory and might display color bars on the monitor. If the `ok` prompt is accessed from an external display device like a serial terminal or TIP connection, then test information is output to that connection. For example:

```
ok test screen
Testing screen

Starting XV-100 Selftest
(This will take an estimated
 2-4 minutes for the full test)
. . .
```

This is the beginning of the self-test output for a Sun XVR-100 graphics accelerator. If the device does not have a self-test built in, the following message is displayed.

```
screen device has no selftest method
```

## 11.5.5.4 Changing the Console Display

You can configure the OpenBoot PROM to designate a different graphics accelerator as the console display. Use the `show-displays` utility, the `nvalias` command, and the `output-device` parameter to make this change. For the following example, a Sun XVR-100 graphics accelerator is installed in slot PCI5 and a Sun XVR-1200 graphics accelerator is installed in slots PCI2 and PCI3. Initially, the Sun XVR-100 graphics accelerator is the default console display. This example configures the Sun XVR-1200 graphics accelerator to be the new console display.

**1. Obtain the `ok` prompt.**

See [Section 5.2, “Obtaining the `ok` Prompt”](#) on page 5-2.

**2. Display the device nodes for the installed graphics accelerators. For example:**

```
ok show-displays
a) /pci@1f,700000/SUNW,XVR-100@3
b) /pci@1e,600000/SUNW,XVR-1200@1
q) NO SELECTION
```

**3. Select the graphics accelerator to be the new console display by typing its respective letter. For example:**

```
Enter Selection, q to quit: b
```

The utility ends and the device node path is loaded into a text buffer.

**4. Make an alias for the device node path. For example:**

```
ok nvalias newconsoledisplay (Ctrl + Y)
```

Type a space, then hold down the Control key and press the Y key.

**5. Configure the `output-device` parameter for the new console display. For example:**

```
ok setenv output-device newconsoledisplay
```

## 6. Reset the OpenBoot PROM:

```
ok reset-all
```

The system now uses the Sun XVR-1200 graphics accelerator as the new console display.

---

**Note** – The default console display, the first graphics accelerator found in probe order, is still aliased to `screen`. If you wish to check the new console display, type: **test newconsoledisplay**.

---

---

# 11.6 Replacing the Motherboard

This section describes removal and installation of the motherboard. Topics include:

- [Section 11.6.1, “Identifying the Motherboard” on page 11-41](#)
- [Section 11.6.2, “Removing the Motherboard” on page 11-44](#)
- [Section 11.6.3, “Installing the Motherboard” on page 11-50](#)



You can also view an animated version of these instructions by clicking on this film icon



---

**Caution** – This procedure is intended for Sun authorized service providers only.

---

## 11.6.1 Identifying the Motherboard

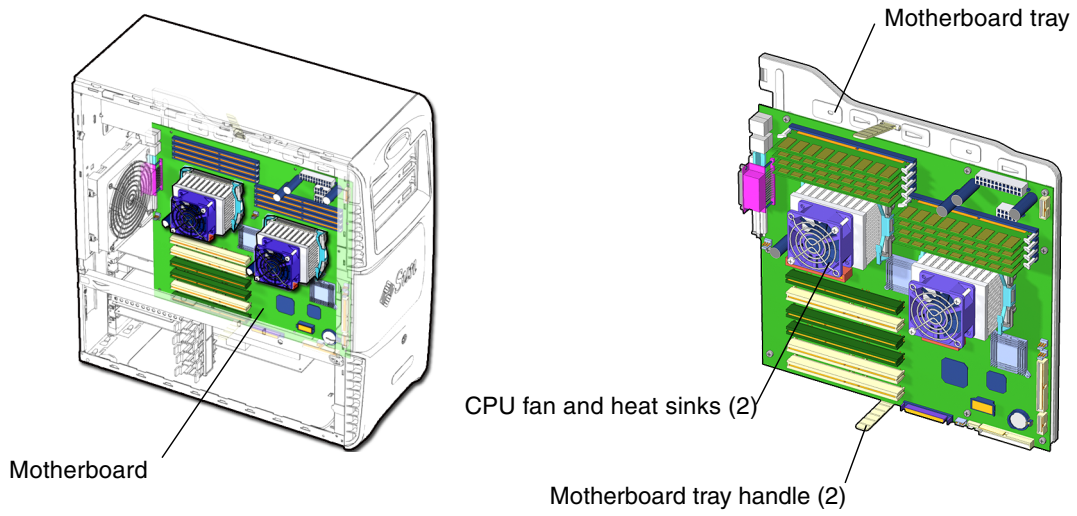
The workstation motherboard and CPU are a single replaceable unit. The motherboard contains the CPU and CPU fan and heat sink assembly ([FIGURE 11-33](#)). The motherboard is attached to the motherboard tray by nine screws. The motherboard tray provides structural reinforcement for the motherboard.



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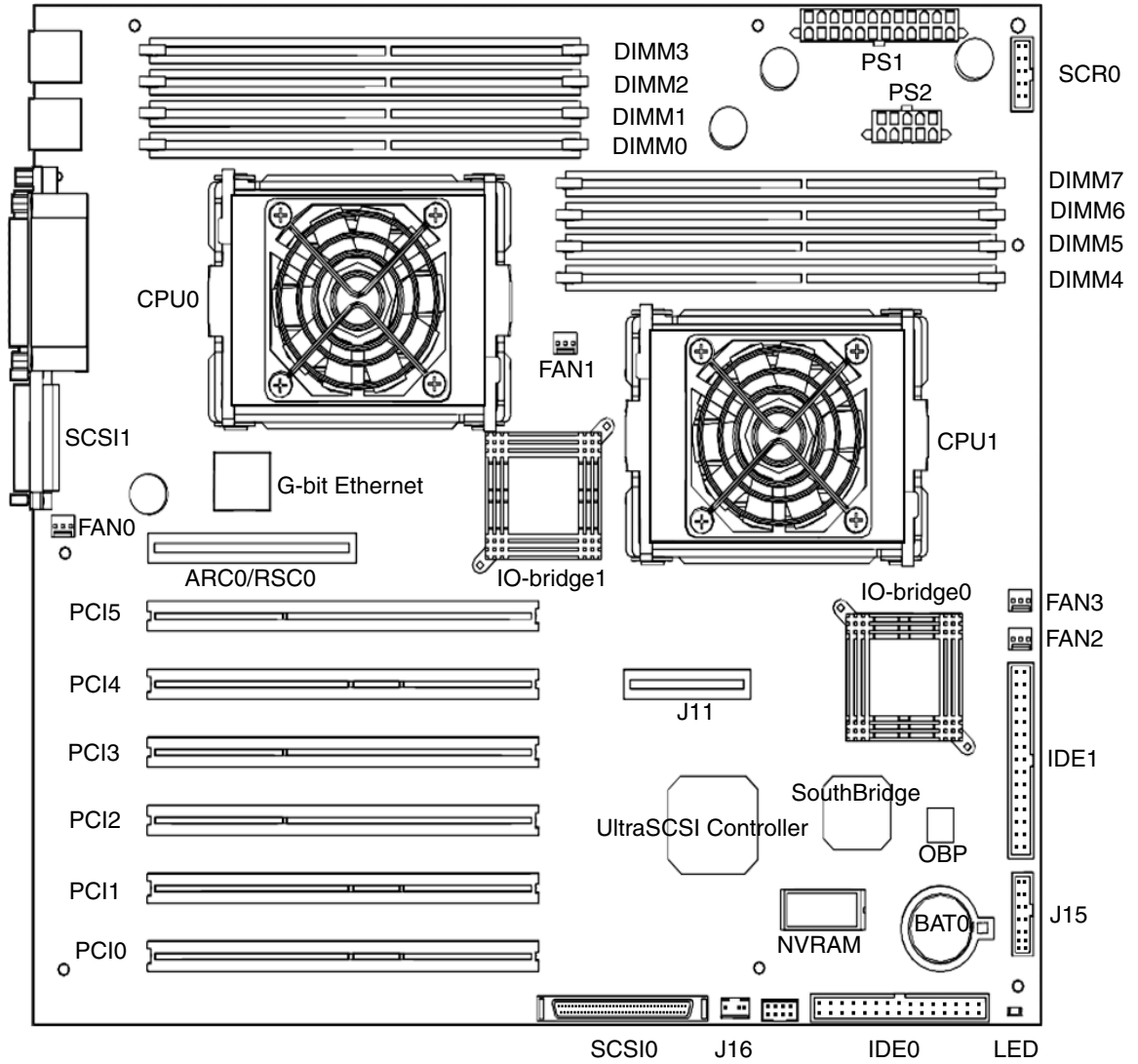
**Caution** – Do not separate the motherboard from the motherboard tray when returning the motherboard for replacement.

---



**FIGURE 11-33** Motherboard Location and Identification





**FIGURE 11-34** Major Motherboard Components and Connectors Identified

TABLE 11-8 describes the major motherboard connectors and components. FIGURE 11-34 identifies the major motherboard connectors and components.

**TABLE 11-8** Major Motherboard Components and Connectors

Location	Description
BAT0	Battery, lithium
FAN1, FAN3	CPU fan connections
CPU0, CPU1	UltraSPARC IIIi processors
DIMM0 - DIMM7	DDR1 SDRAM, 132-pin memory DIMMs
FAN2	Fan, front fan connection
FAN0	Fan, rear fan connection
SCSI0	Internal SCSI connector for hard drives
IDE0	IDE connection, primary (not used)
IDE1	IDE connection, secondary (used for DVD-ROM drive)
LED	Motherboard 5 VDC indicator
NVRAM	Nonvolatile random access memory
PCI0 - PCI5	33 and 66 MHz PCI card slots
ARC0/RSC0	Audio riser card slot
PS1	Power connection from power supply to motherboard
PS2	Power connection from power supply to motherboard
SCR0	Smart card reader connection
J16	Speaker connector
J15	Power connection for the power switch and LED cable assembly

## 11.6.2 Removing the Motherboard

### 1. Power off the system and open the chassis.

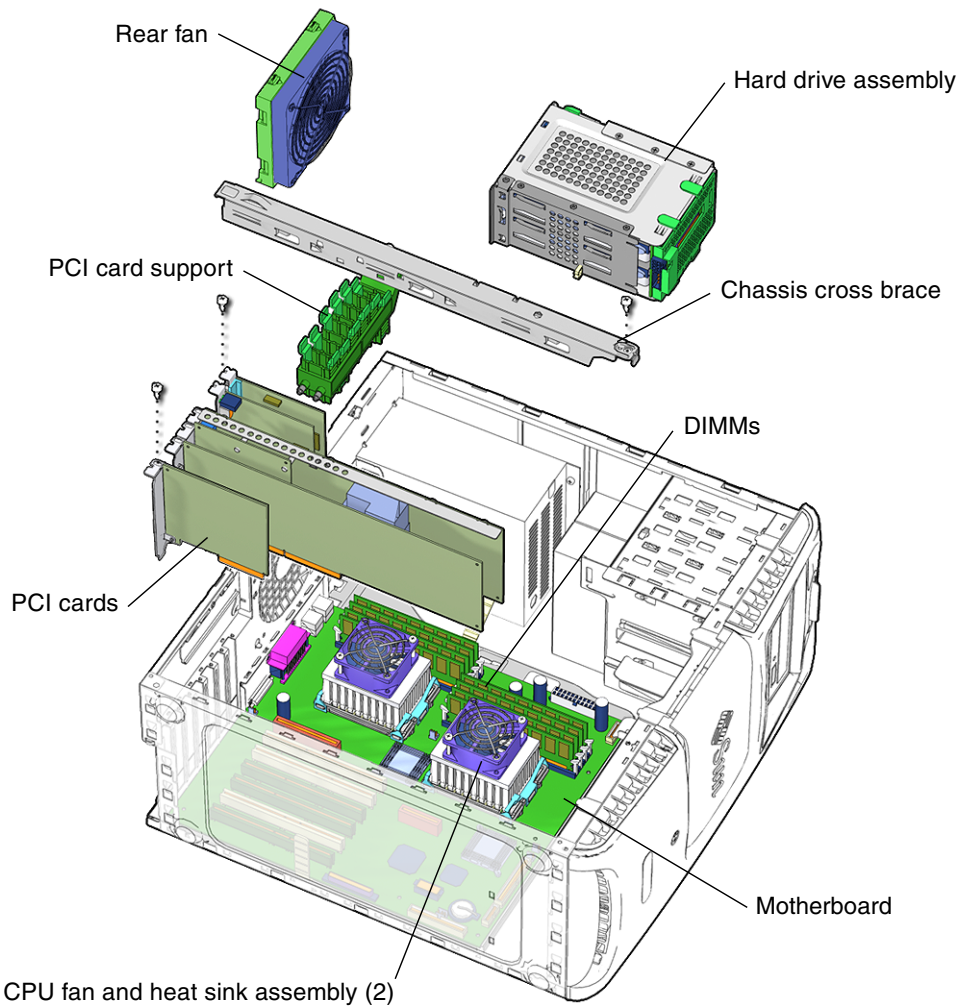
See:

- [Section 10.3, “Powering Off the Workstation” on page 10-4](#)
- [Section 10.4, “Removing the Access Panel” on page 10-12](#)

### 2. Locate the motherboard (FIGURE 11-35).

### 3. Remove the hard drive assembly.

See [Section 10.7, “Removing the Hard Drive Assembly”](#) on page 10-20.



**FIGURE 11-35** Removing Chassis Components

**4. Remove the PCI card support and the chassis cross brace.**

See [Section 13.7, “Replacing the PCI Card Support and Chassis Cross Brace”](#) on page 13-42.

---

**Note** – Do *not* use the chassis cross brace as a handle.

---

**5. Remove the rear fan.**

See [Section 13.3, “Replacing the Rear Fan”](#) on page 13-16.

**6. Position the chassis to access the motherboard.**

See [Section 10.6, “Positioning the Chassis”](#) on page 10-18.

**7. Remove the PCI cards.**

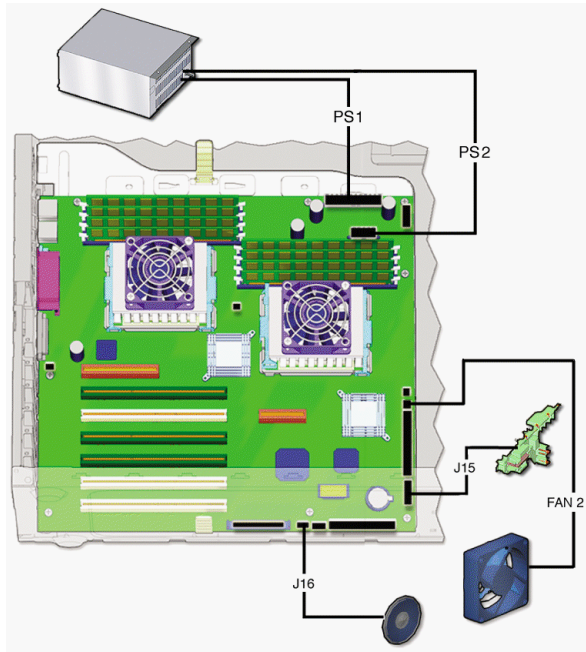
See [Section 11.5.3, “Removing a PCI Card”](#) on page 11-32.

Set the PCI cards on an electrostatic mat.

**8. Disconnect the power cables (FIGURE 11-36).**

Disconnect the power cables from the corresponding component connectors and set them out of the way of the motherboard:

- Power supply cables at connectors (PS1 and PS2)
- Front fan power connector (FAN2)
- Power switch and LED cable assembly connector (J15)
- Speaker (J16)

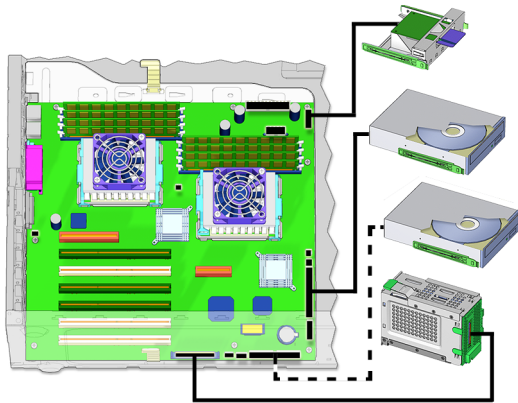


**FIGURE 11-36** Disconnecting Power Cables

**9. Disconnect the interface cables (FIGURE 11-37).**

Disconnect the interface cables from the corresponding component connectors and set them out of the way of the motherboard:

- Smart card reader (SCR0)
- DVD-ROM drive (IDE1)
- SCSI connector (SCSI0)
- CD-RW drive (IDE0) (optional for Sun Blade 2500)



**FIGURE 11-37** Disconnecting Interface Cables

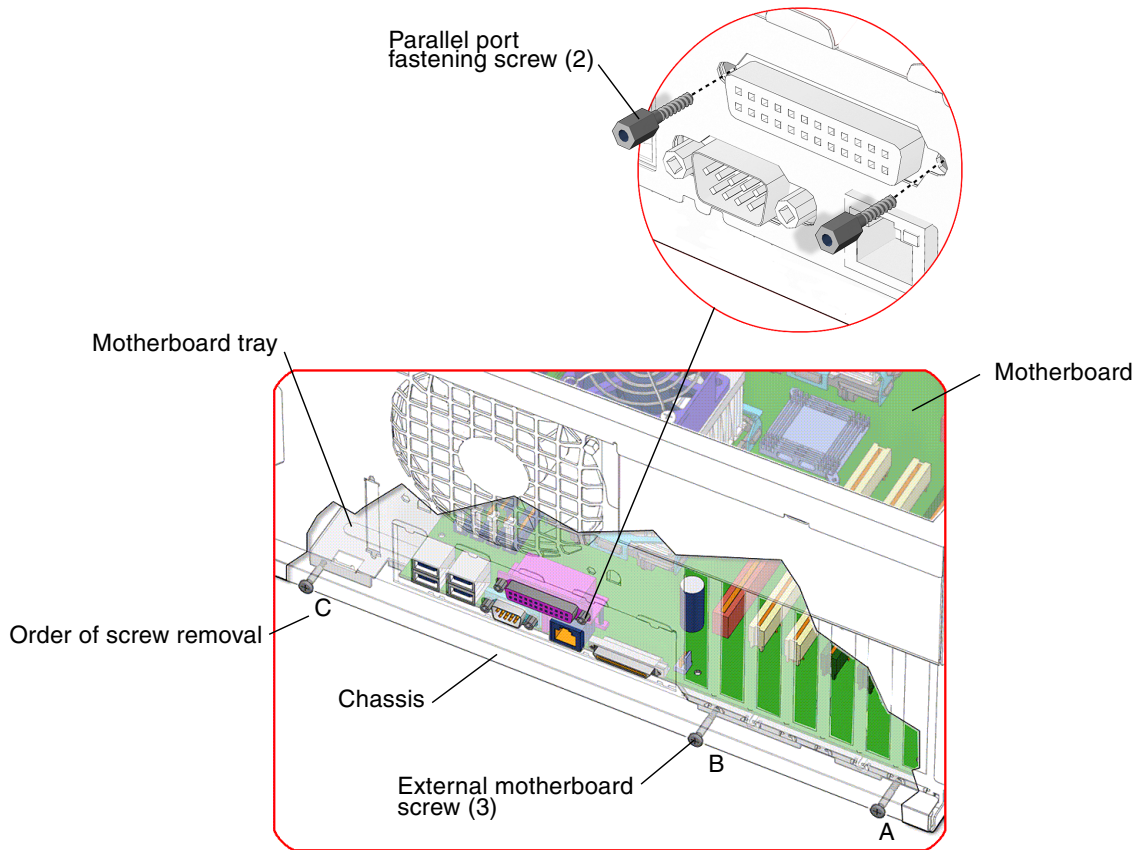
**10. Remove the two parallel port fastening screws (FIGURE 11-38).**

Use a 3/16-inch (5.0 mm) socket and driver to remove the parallel port fastening screws. Set the screws in a container.

**11. Remove the external motherboard screws.**

Use a No. 2 Phillips screwdriver to remove the three screws that secure the motherboard and motherboard tray to the chassis.

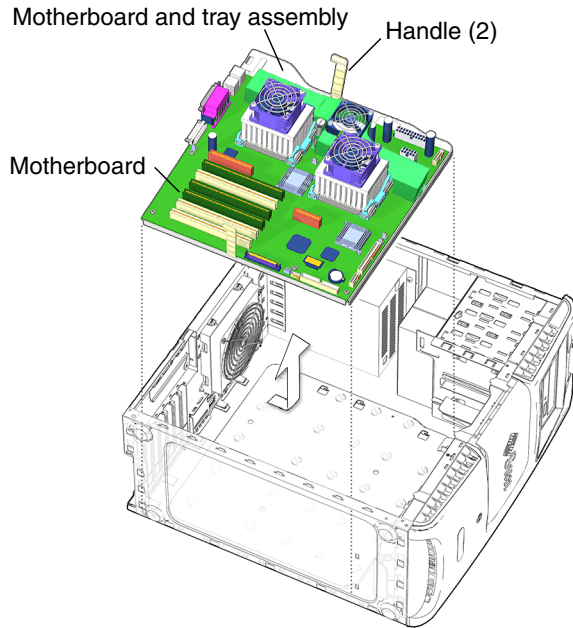
Remove the screws from the chassis starting left to right in order from C, B, and then A. Set the motherboard tray fastening screws in a container.



**FIGURE 11-38** Removing the Parallel Port Fastening and External Motherboard Screws

**12. Remove the motherboard and tray assembly (FIGURE 11-39).**

Grasp both motherboard tray handles and slide the tray sideways toward the front of the chassis to release it from the chassis. Use the handles to lift the tray out of the chassis. Set the motherboard tray assembly on an antistatic mat.



**FIGURE 11-39** Removing the Motherboard and Tray Assembly

**13. Remove the DIMMs.**

See [Section 11.1.2, “Removing DIMMs”](#) on page 11-4. Set the DIMMs on an electrostatic mat.

**14. Remove NVRAM.**

If you wish to use the same ethernet address and system ID for the new motherboard, remove the NVRAM. See [Section 11.4.2, “Removing NVRAM”](#) on page 11-26. Set the NVRAM on an electrostatic mat.

You have removed the workstation motherboard.

Proceed to [Section 11.6.3, “Installing the Motherboard”](#) on page 11-50 to install the new motherboard.

## 11.6.3 Installing the Motherboard

**1. Open and position the chassis.**

See:

- [Section 10.4, “Removing the Access Panel”](#) on page 10-12
- [Section 10.6, “Positioning the Chassis”](#) on page 10-18



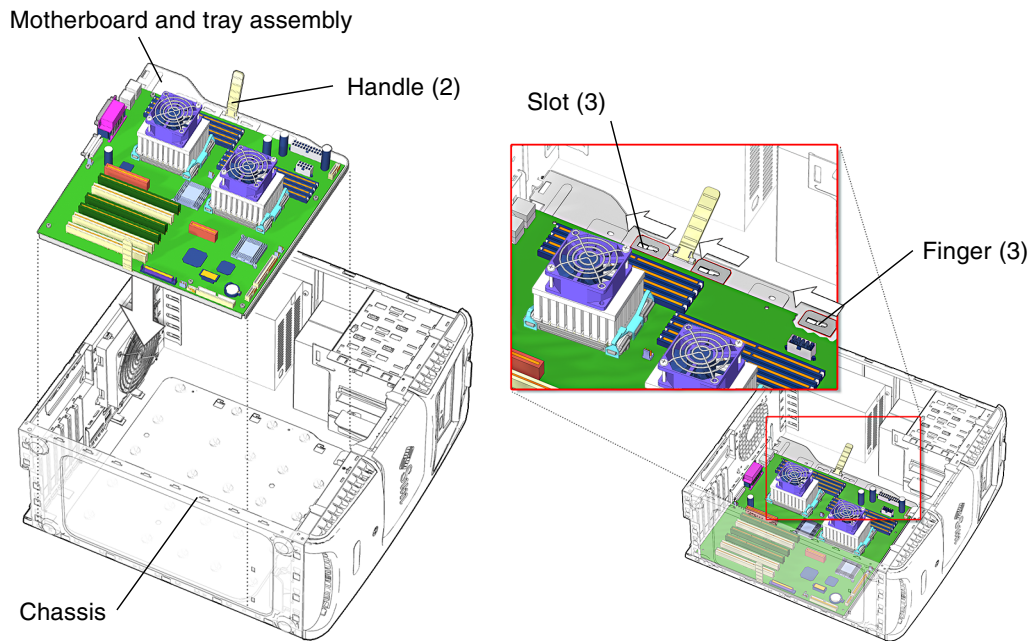
2. Remove the new motherboard from its antistatic package and place it on an antistatic mat.
3. Install NVRAM onto the new motherboard.  
If necessary transfer NVRAM from the old motherboard to the new motherboard. See [Section 11.4.3, “Installing NVRAM”](#) on page 11-27.
4. Install the new CPU fan and heat sink assembly, if necessary.  
See [Section 11.2, “Replacing the CPU Fan and Heat Sink Assembly”](#) on page 11-13.
5. Install the DIMMs on the new motherboard.  
See [Section 11.1.3, “Installing the DIMMs”](#) on page 11-7.
6. Insert the motherboard and tray assembly into the chassis ([FIGURE 11-40](#)).

---

**Note** – Move all cables out of the way. Ensure that the cables are not positioned under the motherboard and tray assembly.

---

Grasping both motherboard tray handles, lower the motherboard into the chassis. Align the motherboard tray slots with their matching chassis fingers. Slide the motherboard tray all the way to the back of the chassis.



**FIGURE 11-40** Inserting the Motherboard and Tray Assembly Into the Chassis

**7. Fasten the motherboard and tray to the outside of the chassis (FIGURE 11-41).**

Using a No. 2 Phillips screwdriver, replace the three external motherboard screws that secure the motherboard and tray to the chassis.

Facing the outside of the chassis, install the middle screw first, then the right, then the left in order A, B, and C.

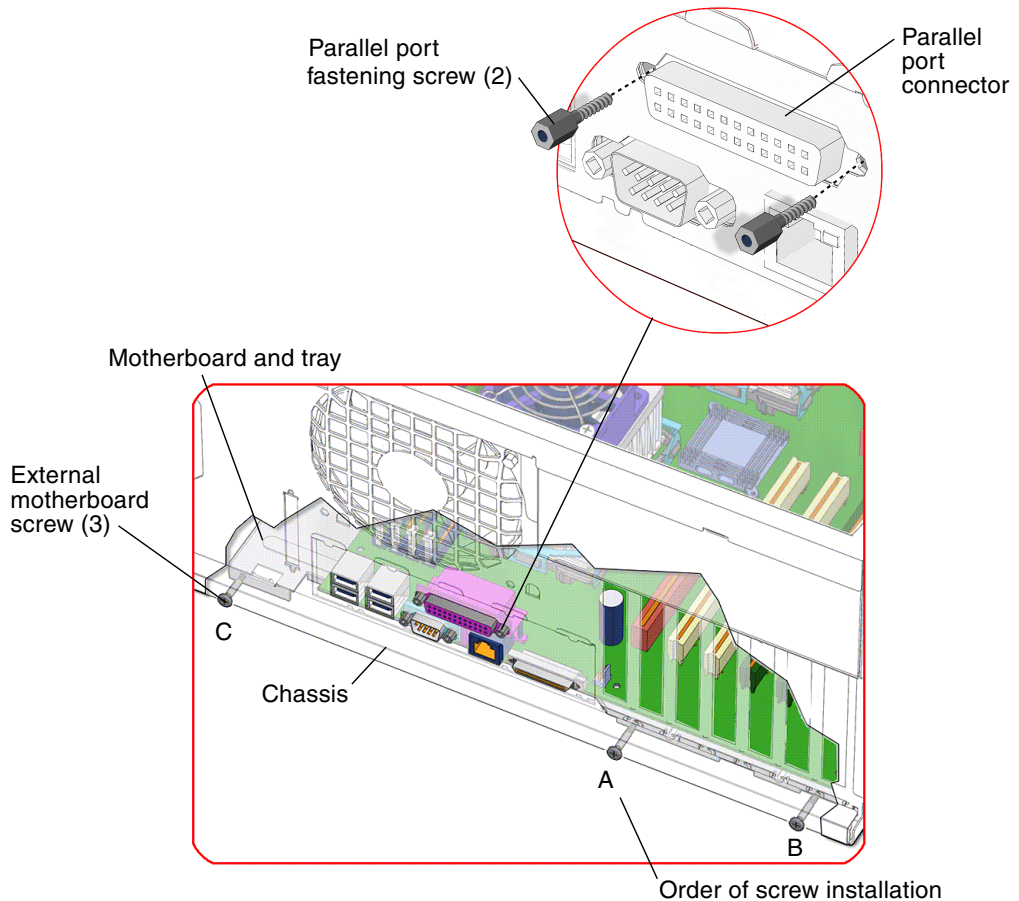
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**Note** – Observe the fastening screw sequence to prevent any unnecessary strain on the parallel port connector (FIGURE 11-41).

---

**8. Install the two parallel port fastening screws.**

Use a 3/16-inch (5.0 mm) socket and driver to install the parallel port fastening screws.

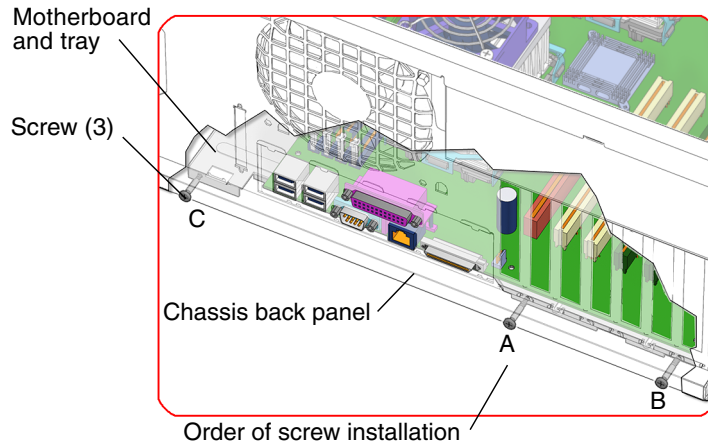


**FIGURE 11-41** Installing the External Motherboard and Parallel Port Fastening Screws

**9. Fasten the motherboard tray to the outside of the chassis (FIGURE 11-42).**

Using a No. 2 Phillips screwdriver, replace the three screws that secure the motherboard to the outside of the chassis.

Tighten the middle screw first (A), then the right screw (B), and then the left screw (C).



**FIGURE 11-42** Fastening the Motherboard and Tray to the Outside of the Chassis

**10. Connect the interface cables to the motherboard (FIGURE 11-43).**

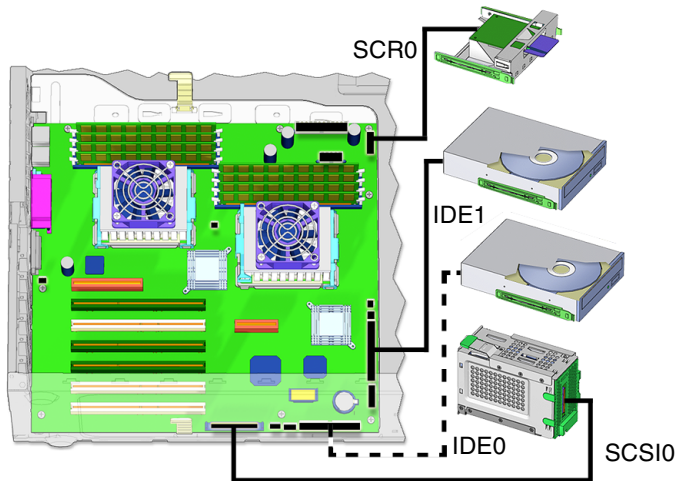
Connect the interface cables to the corresponding component connector:

- SCSI backplane for the hard drive drive(s) (SCSI0)
- DVD-ROM drives (IDE1)
- Smart card reader (SCR0)
- CD-RW (IDE0) (if installed)

---

**Note** – FIGURE 11-43 shows the second optional CD-RW or DVD-ROM drive with interface cable installed.

---

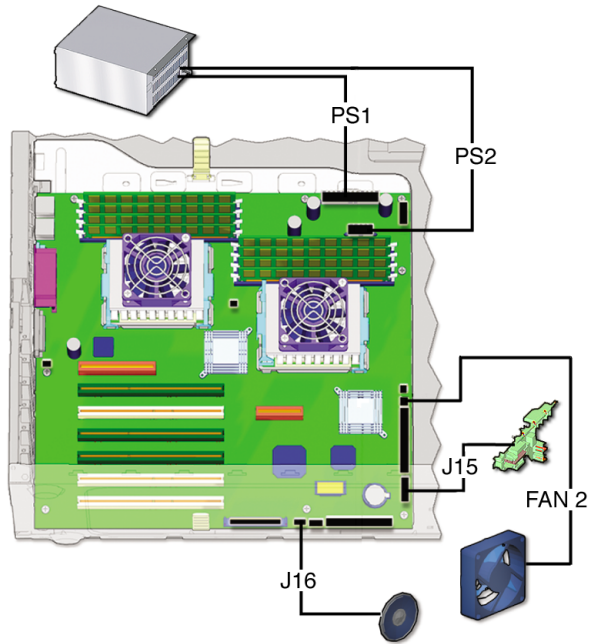


**FIGURE 11-43** Installing Motherboard Interface Cables

**11. Connect power cables to the motherboard (FIGURE 11-44).**

Connect the power and signal cables to the corresponding component connector:

- Power switch and LED cable assembly connector (J15)
- Front fan power connector (FAN2)
- Power supply cables at connectors (PS1, PS2)
- Speaker (J16)



**FIGURE 11-44** Installing Motherboard Power Cables

**12. Replace the PCI cards.**

See [Section 11.5.4, “Installing a PCI Card”](#) on page 11-35.

**13. Replace the PCI card support and the chassis cross brace.**

See [Section 13.7, “Replacing the PCI Card Support and Chassis Cross Brace”](#) on page 13-42.

---

**Note** – Do *not* use the chassis cross brace as a handle.

---

**14. Reposition the chassis.**

See [Section 10.6, “Positioning the Chassis”](#) on page 10-18.

**15. Replace the rear fan assembly.**

See [Section 13.3.3, “Installing the Rear Fan”](#) on page 13-20.

**16. Inspect the memory and related component fasteners.**

- The DIMM ejectors are upright and tight.
- The rear fan and rear fan bracket assembly bracket feet are well seated in the chassis.
- The PCI card support is tight in the chassis brace.

## 17. Replace the hard drive assembly.

See [Section 15.2, “Replacing the Hard Drive Assembly”](#) on page 15-2.



---

**Caution** – The interface and power cables are attached to the SCSI backplane and could be damaged when you slide the drive bracket into the hard drive bay.

---

You have finished replacing the workstation motherboard.

## 18. Inspect the fan and SCSI backplane component cabling.

- The rear fan cable is firmly connected to the motherboard.
- The SCSI backplane power cables are plugged into the SCSI backplane.
- The SCSI interface cable is fed through the SCSI backplane bracket, plugged into the SCSI backplane, and plugged into the motherboard.

## 19. Finish up.

Reposition the chassis, replace the access panel, power on the system, and verify the component installation.

See:

- [Section 15.1, “Repositioning the Chassis”](#) on page 15-2
- [Section 15.4, “Replacing the Access Panel”](#) on page 15-6
- [Section 15.5, “Powering On the Workstation”](#) on page 15-7
- [Section 15.6, “Verifying an Installation”](#) on page 15-10

# Replacing Storage Devices

---

This chapter describes the remove and replace procedures for the Sun Blade 2500 workstation replaceable storage devices.

The procedures described in this chapter are written for workstation service providers and system administrators.

This chapter contains the following topics:

- Section 12.1, “Replacing a Hard Drive” on page 12-2
- Section 12.2, “Replacing a DVD-ROM Drive” on page 12-8
- Section 12.3, “Replacing the Smart Card Reader” on page 12-16



**Caution** – Follow the cautions, warnings, and instructions in the *Sun Blade 2500 Workstation Safety and Compliance Guide* (816-1000). The document is available at: <http://www.sun.com/documentation>

---



**Caution** – The procedures in this chapter are described with the workstation chassis in an upright position. Use care to ensure that you do not tip over the chassis.

---



**Caution** – When servicing or removing workstation components, attach an antistatic strap to your wrist and then to a metal area on the chassis. Then disconnect the power cord from the workstation and the wall receptacle. Following this caution equalizes all electrical potentials within the workstation.

---

## 12.1 Replacing a Hard Drive

This section describes removal and installation of the hard drive. Topics include:

- Section 12.1.1, “Identifying the Hard Drive” on page 12-2
- Section 12.1.2, “Removing the Hard Drive” on page 12-3
- Section 12.1.3, “Installing a Hard Drive” on page 12-5



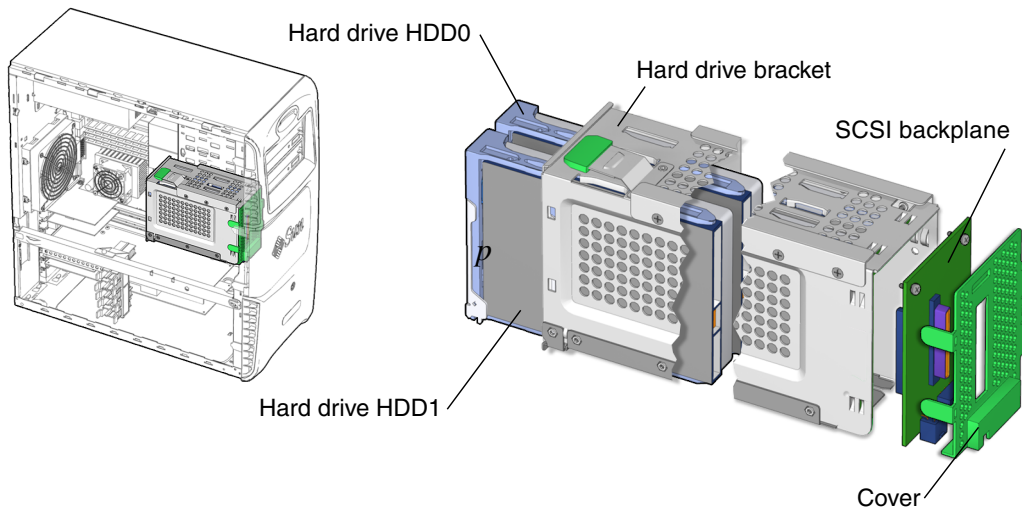
You can also view an animated version of these instructions by clicking on this film icon.

### 12.1.1 Identifying the Hard Drive

The workstation supports up to two hard drives. The hard drive assembly (FIGURE 12-1) consists of the:

- SCSI backplane
- Hard drive(s)
- Hard drive bracket

The hard drive assembly is installed in the hard drive bay (FIGURE 12-2). The hard drives are labeled HDD0 and HDD1, the inner hard drive (HDD0) being the boot drive.



**FIGURE 12-1** Hard Drive Assembly Location and Identification



[TABLE 12-1](#) lists the hard drive specifications.

**TABLE 12-1** Hard Drive Specifications

Specification	Value
Capacity	36 or 73 GByte, UltraSCSI IV 320
Speed	10,000 RPM
Access Time	6 mseconds (36 GB), 5.2 mseconds (73 GB)
Interface	SCSI

---

**Note** – The hard drives are UltraSCSI IV 320 compatible. However, the controller for the drive is a SCSI 160.

---

## 12.1.2 Removing the Hard Drive

---

**Note** – The Sun Blade 2500 workstation can accommodate up to two hard drives. If you are not removing an existing drive, proceed to [Section 12.1.3, “Installing a Hard Drive”](#) on page 12-5.

---

### 1. Power off the system and open the chassis.

See:

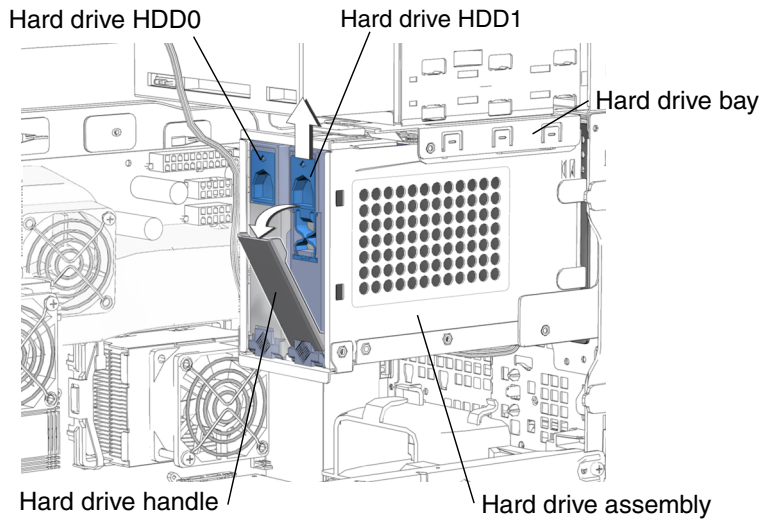
- [Section 10.3, “Powering Off the Workstation”](#) on page 10-4
- [Section 10.4, “Removing the Access Panel”](#) on page 10-12

### 2. Locate the hard drive to be removed ([FIGURE 12-2](#)).

Hard drive 0, the boot drive, is in the hard drive bay farther from the chassis opening. Hard drive 1 (optional drive) is near the chassis opening.

### 3. Unlock the hard drive handle ([FIGURE 12-3](#)).

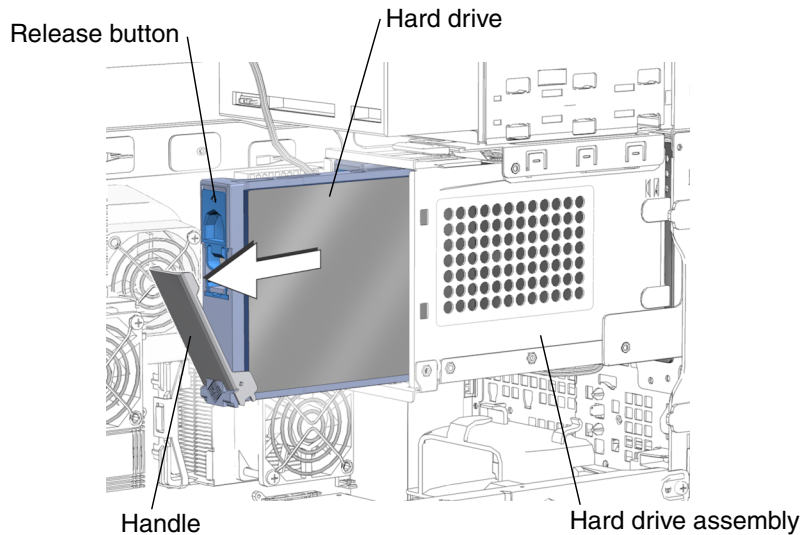
Lift the handle release button upward until the handle pops out.



**FIGURE 12-2** Releasing the Hard Drive From the Hard Drive Assembly

**4. Disconnect the hard drive from the hard drive assembly.**

Pull the hard drive by the handle out from the hard drive (FIGURE 12-3).



**FIGURE 12-3** Removing the Hard Drive From the Hard Drive Assembly

**5. Remove the hard drive from the hard drive assembly.**

Pull the hard drive by the handle and slide the hard drive out of the hard drive assembly. Set the hard drive aside on an antistatic mat.

You have removed the hard drive.

**6. Consider your options:**

- If you removed the hard drive to replace it, proceed to [Section 12.1.3, “Installing a Hard Drive” on page 12-5](#) to install the new hard drive.
- If you removed the hard drive and will not replace it at this time;, replace the access panel, and power on the system.

See:

- [Section 15.4, “Replacing the Access Panel” on page 15-6](#)
- [Section 15.5, “Powering On the Workstation” on page 15-7](#)

## 12.1.3 Installing a Hard Drive

---

**Caution** – Use proper ESD grounding techniques when handling components. Wear an antistatic wrist strap and use an antistatic mat. Store ESD-sensitive components in antistatic bags before placing them on any surface.

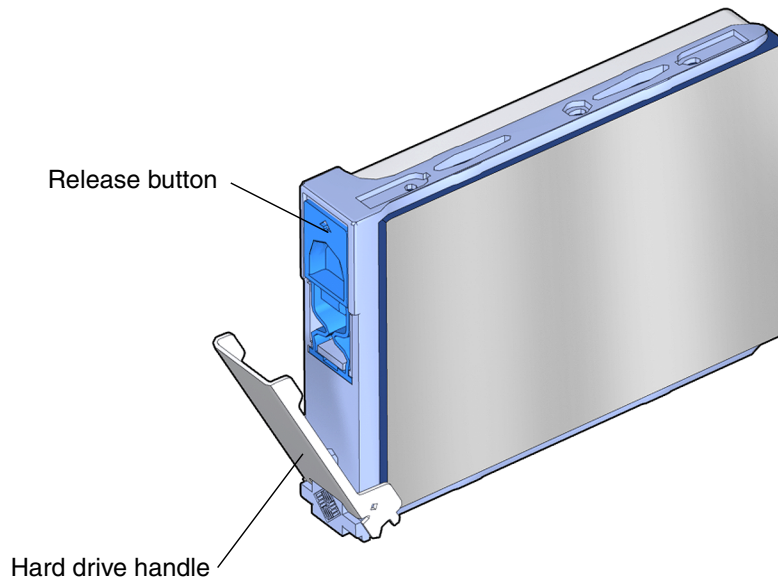
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**1. Power off the system and open the chassis.**

See:

- [Section 10.3, “Powering Off the Workstation” on page 10-4](#)
- [Section 10.4, “Removing the Access Panel” on page 10-12](#)

**2. Remove the hard drive from its antistatic packaging.**



**FIGURE 12-4** Preparing the Hard Drive for Installation

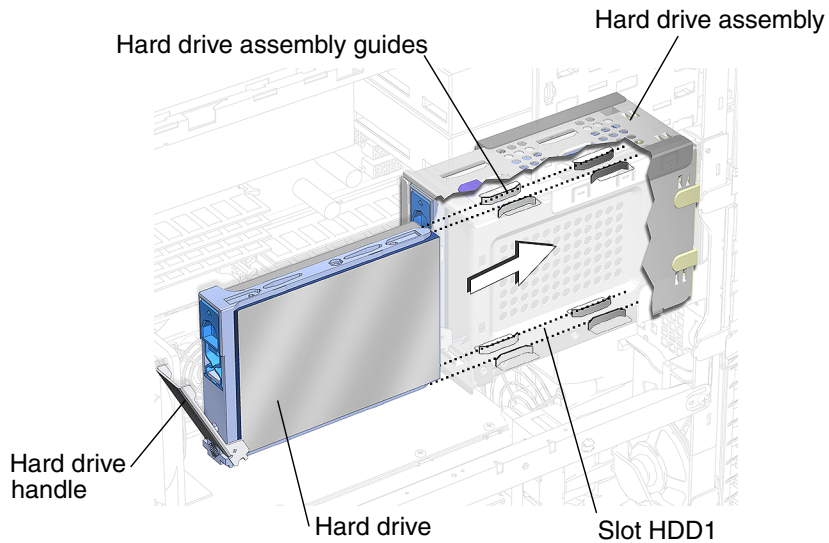
**3. Prepare the hard drive for installation (FIGURE 12-4).**

Lift the handle release button upward until the hard drive handle pops open.

**4. Locate the hard drive assembly and hard drive assembly guides (FIGURE 12-5).**

If you are installing a second hard drive, install it in the remaining free slot in the hard drive assembly. The boot hard drive must be installed in hard drive slot HDD0, the slot farther from the chassis opening. The second hard drive bay is hard drive slot HDD1, the slot closer to the chassis opening.

**5. Align the hard drive with the hard drive assembly guides.**



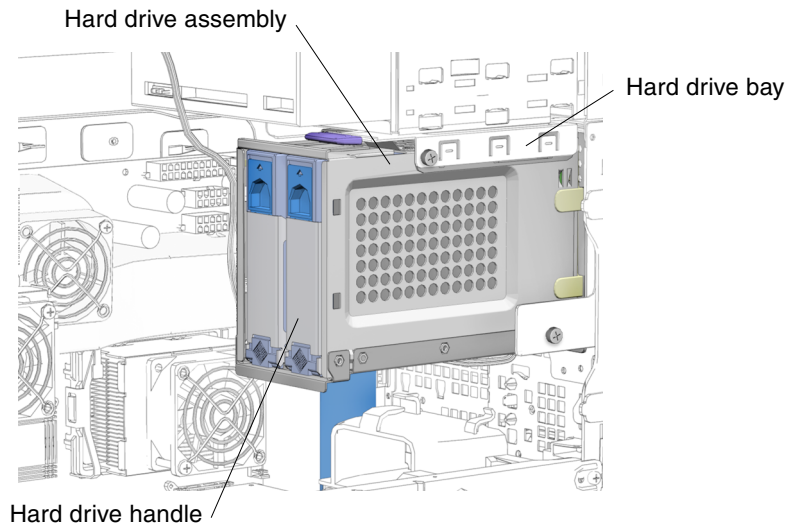
**FIGURE 12-5** Aligning the Hard Drive to the Hard Drive Assembly

**6. Slide the hard drive into the hard drive assembly.**

Slide until the hard drive handle begins to close.

**7. Lock the hard drive into the hard drive assembly (FIGURE 12-6).**

Press the hard drive handle closed until it locks the hard drive in the hard drive assembly. This seats the hard drive connector into the SCSI backplane connector.



**FIGURE 12-6** Installing the Hard Drive in the Hard Drive Assembly

## 8. Inspect the hard drive and related component fasteners.

- The hard drive handle is locked.
- The hard drive assembly is tight in the hard drive bay.

## 9. Finish up.

Replace the access panel, power on the system, and verify the component installation.

See:

- [Section 15.4, “Replacing the Access Panel” on page 15-6](#)
- [Section 15.5, “Powering On the Workstation” on page 15-7](#)
- [Section 15.6, “Verifying an Installation” on page 15-10](#)

---

# 12.2 Replacing a DVD-ROM Drive

This section describes removal and installation of the DVD-ROM drive. The same steps can be used to install or replace other removable media drives, such as a CD-ROM or tape drive. Topics include:

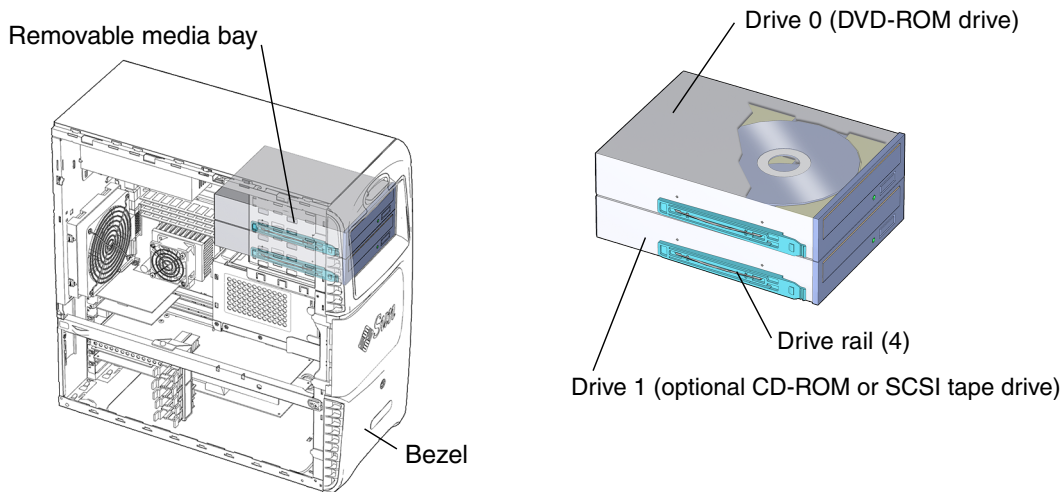
- [Section 12.2.1, “Identifying the DVD-ROM Drive” on page 12-8](#)
- [Section 12.2.3, “Installing the DVD-ROM Drive” on page 12-12](#)



You can also view an animated version of these instructions by clicking on this film icon.

## 12.2.1 Identifying the DVD-ROM Drive

The workstation supports up to two media drives ([FIGURE 12-7](#)). A DVD-ROM drive is installed on drive rails that slide into the removable media bay. The DVD-ROM drive bay is accessible when the bezel is removed.



**FIGURE 12-7** DVD-ROM or Media Drives Location and Identification

[TABLE 12-2](#) lists DVD-ROM drive specifications.

**TABLE 12-2** DVD-ROM Drive Specifications

Specification	Value
Speed	16 X
Buffer	2 MB
Interface	IDE

---

**Note** – If so equipped, do not remove the plastic rivet from the headphone jack on the DVD-ROM drive. Do not use the headphone jack on the CD-RW drive. Instead, use the headphone jack on the audio module located on the rear panel of your workstation.

---

## 12.2.2 Removing the DVD-ROM Drive

---

**Note** – The instructions in this section apply to any removable media drive, such as a CD-RW ROM or tape drive.

---

---

**Note** – The Sun Blade 2500 workstation can accommodate multiple internal media drives such as an additional CD-RW, or tape drive.

---

If you are not removing an existing drive, proceed to [Section 12.2.3, “Installing the DVD-ROM Drive”](#) on page 12-12.

1. **Power off the system, open the chassis, attach the antistatic wrist strap, and remove the bezel.**

See:

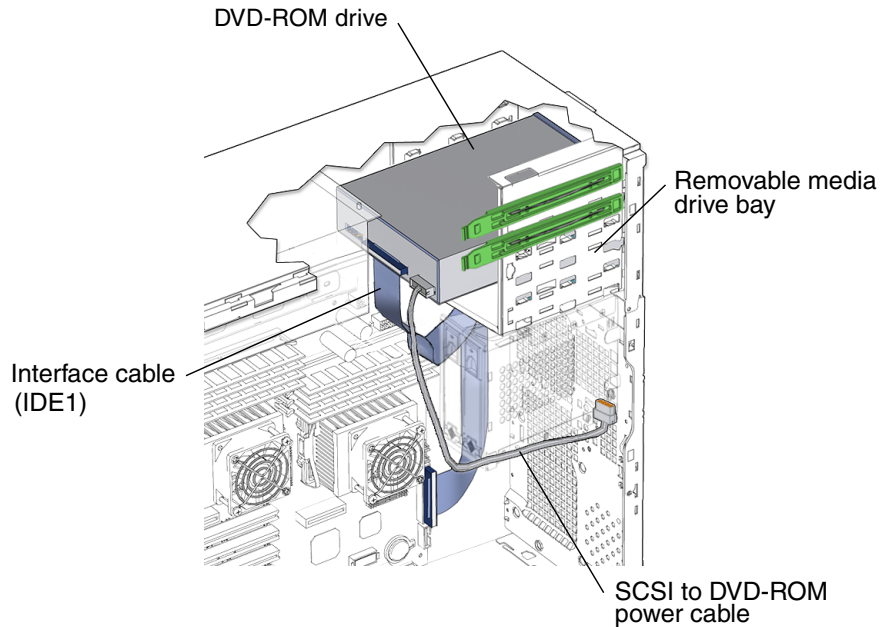
- [Section 10.3, “Powering Off the Workstation”](#) on page 10-4
- [Section 10.4, “Removing the Access Panel”](#) on page 10-12
- [Section 10.5, “Removing the Bezel”](#) on page 10-16

2. **Locate the DVD-ROM or media drive to be removed** ([FIGURE 12-7](#)).

3. **Disconnect the interface cable(s)** ([FIGURE 12-8](#)).

The interface cable is located at the back of the DVD-ROM drive.

If a DVD-ROM along with a CD-RW or a tape drive are installed, disconnect the interface cable only from the media drive you are removing.



**FIGURE 12-8** DVD-ROM Drive Interface and Power Cables



#### 4. Disconnect the power cable(s).

The power cable is located at the back of the DVD-ROM drive and is connected to the SCSI backplane.

---

**Note** – Six-pin power supply and cable connector P5 is routed from the power supply to the SCSI backplane. A four-pin power cable (jumper) is then routed from the SCSI backplane to the DVD-ROM drive. This provides power from the power supply to the DVD-ROM drive.

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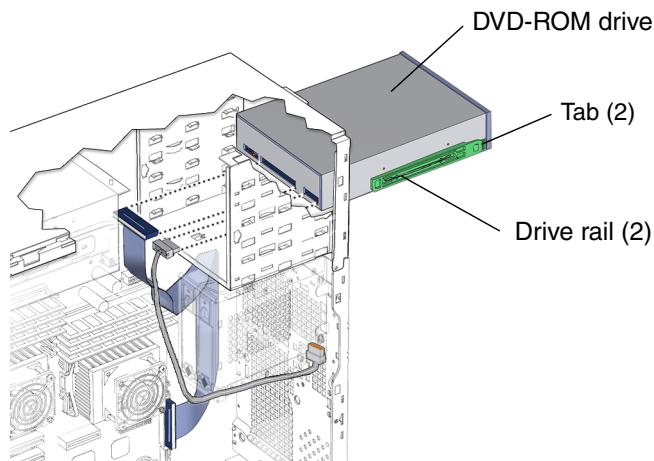
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**Note** – To supply power to an optional CD-RW or tape drive use power supply connector P7, P8, or P9.

---

#### 5. Remove the DVD-ROM drive (FIGURE 12-9).

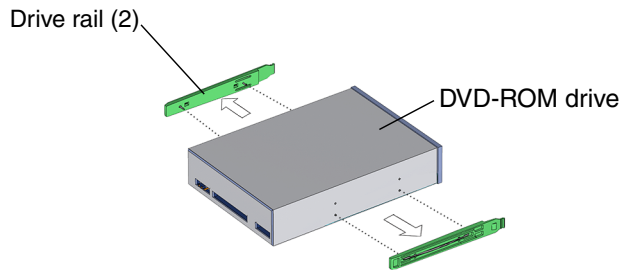
Facing the front of the chassis, squeeze together the two green plastic tabs on the front sides of the DVD-ROM drive and pull the DVD-ROM drive straight out of the removable media bay. Set the DVD-ROM drive down on an antistatic mat.



**FIGURE 12-9** Removing the DVD-ROM Drive and Drive Rails

#### 6. Detach the drive rails (FIGURE 12-10).

Pull the green plastic drive rails off the sides of the DVD-ROM drive. Set them aside.



**FIGURE 12-10** Removing the DVD-ROM Drive Rails

You have removed the DVD-ROM drive.

7. If you removed the hard drive to replace it, install the new hard drive.  
Proceed to [Section 12.1.3, “Installing a Hard Drive”](#) on page 12-5.
8. If you are not replacing the hard drive you removed, close the chassis and install a DVD-ROM drive EMI filler panel to protect the workstation ([FIGURE 12-11](#)).

The front panel slot must be closed with a filler panel for system EMI and airflow requirements.

- a. Facing the front of the chassis, tip the filler panel into the right side of the chassis.
- b. Squeeze the filler panel tab and pull the filler panel into the left side of the chassis.
- c. Release the filler panel tab.

You hear the panel click into place.

9. Replace the bezel and access panel, and power on the system.

See:

- [Section 15.3, “Replacing the Bezel”](#) on page 15-4
- [Section 15.4, “Replacing the Access Panel”](#) on page 15-6.
- [Section 15.6, “Verifying an Installation”](#) on page 15-10

## 12.2.3 Installing the DVD-ROM Drive

1. Power off the system, open the chassis, and remove the bezel.

See:

- [Section 10.3, “Powering Off the Workstation”](#) on page 10-4
- [Section 10.4, “Removing the Access Panel”](#) on page 10-12
- [Section 10.5, “Removing the Bezel”](#) on page 10-16

---

**Note** – If you are installing an additional media drive into the removable media drive bay, it is necessary to remove the plastic filler panel that is enclosed in the bezel.

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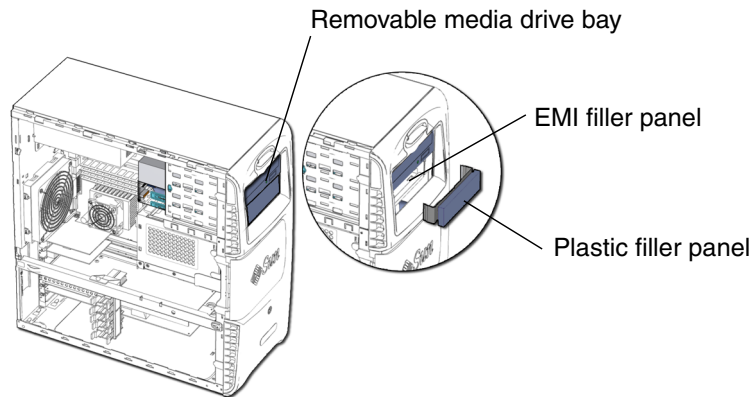
**2. Locate the removable media drive bay (FIGURE 12-11).**

The DVD-ROM drive installs into the removable media bay.

**3. Remove the EMI filler panel, if needed.**

The EMI filler panel protects that drive bay opening.

To remove the EMI filler panel, insert your finger in the round hole on the left side of the EMI filler panel and pull the EMI filler panel straight out from the system chassis. Set the EMI filler panel aside.



**FIGURE 12-11** Removable Media Drive Bay and EMI Filler Panel

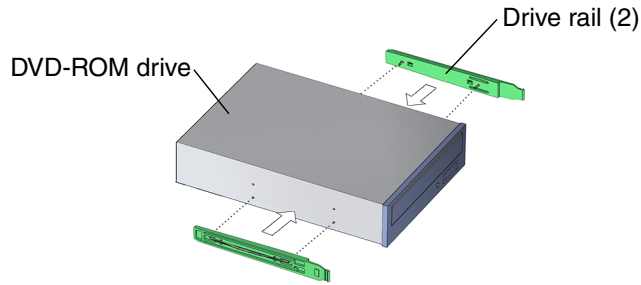
**4. Remove the spare drive rails from their storage position, if needed (FIGURE 12-14).**

The drive rails are stored on the side of the DVD-ROM drive bracket. Unsnap them from their storage location.

**5. Remove the new DVD-ROM from its packaging.**

**6. Snap the drive rails to the DVD-ROM drive, if needed (FIGURE 12-12).**

Snap the drive rails into the lower pair of holes on both sides of the DVD-ROM drive. The flat end of the rails are toward the DVD-ROM drive power and interface connectors. The drive rail squeeze tabs are toward the front of the DVD-ROM drive media slot.



**FIGURE 12-12** Installing Drive Rails

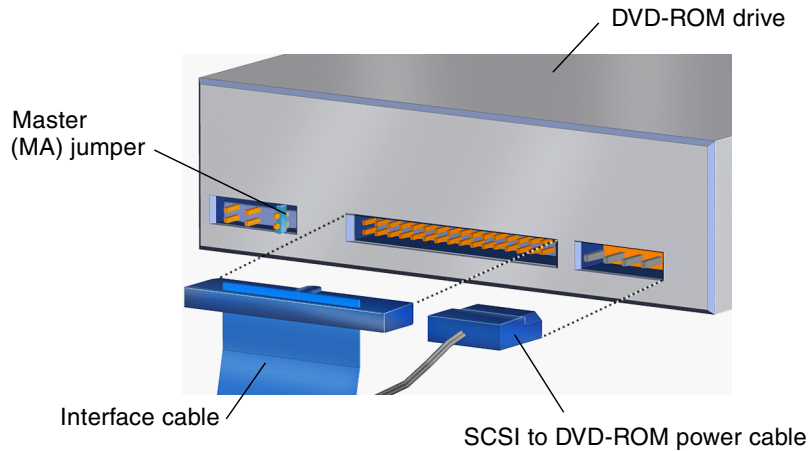
7. **Verify that the DVD-ROM drive is configured for master (MA) mode operation (FIGURE 12-13).**

See the DVD-ROM drive documentation for instructions on setting the master (MA) mode.

---

**Note** – The location of the master (MA) jumper may vary depending on the manufacturer of the DVD-ROM drive.

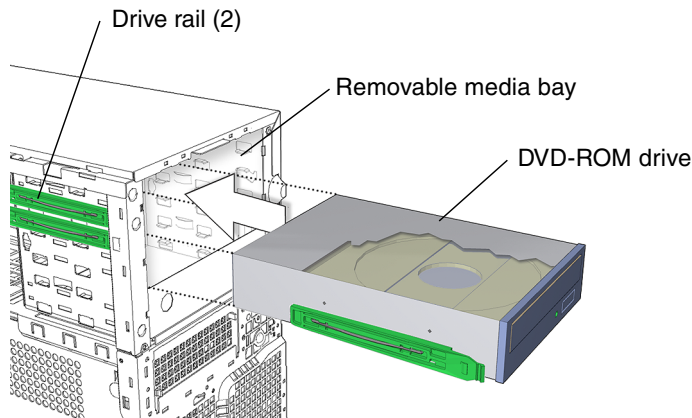
---



**FIGURE 12-13** Location of the DVD-ROM Master Jumper

8. **Slide the DVD-ROM drive into the removable media bay (FIGURE 12-14).**

Slide the DVD-ROM drive into the removable media bay, located below the smart card reader, until the drive rails click.



**FIGURE 12-14** Installing the DVD-ROM Drive

**9. Connect the DVD-ROM drive power cable (FIGURE 12-8).**

The DVD-ROM power cable connects to the DVD-ROM drive and to the SCSI backplane.

**10. Connect the DVD-ROM drive interface cable (FIGURE 12-8).**

The DVD-ROM interface cable connects to the DVD-ROM drive and to the motherboard.

**11. Inspect the DVD-ROM drive and related component fasteners.**

- The DVD-ROM drive rails are well seated on the DVD-ROM drive.
- The DVD-ROM drive assembly is tight in the removable media bay.

**12. Inspect the DVD-ROM drive and related component cabling.**

- The DVD-ROM drive power cable is firmly connected to the SCSI backplane.
- The DVD-ROM drive power cable is firmly connected to the DVD-ROM drive.
- The DVD-ROM drive interface cable is firmly connected to the motherboard.
- The DVD-ROM drive interface cable is firmly connected to DVD-ROM drive.

**13. Finish up.**

Replace the bezel and access panel, power on the system, verify the component installation.

See:

- [Section 15.3, “Replacing the Bezel”](#) on page 15-4
- [Section 15.4, “Replacing the Access Panel”](#) on page 15-6
- [Section 15.5, “Powering On the Workstation”](#) on page 15-7
- [Section 15.6, “Verifying an Installation”](#) on page 15-10

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## 12.3 Replacing the Smart Card Reader

This chapter describes removal and installation of the smart card reader. Topics include:

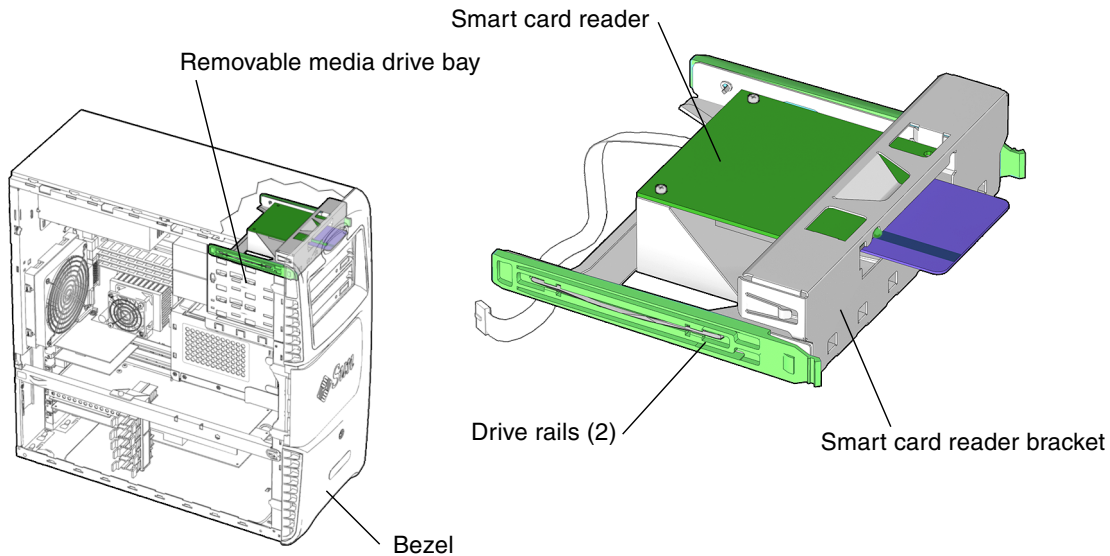
- [Section 12.3.1, “Identifying the Smart Card Reader” on page 12-16](#)
- [Section 12.3.2, “Removing the Smart Card Reader” on page 12-17](#)
- [Section 12.3.3, “Installing the Smart Card Reader” on page 12-18](#)



You can also view an animated version of these instructions by clicking on this film icon.

### 12.3.1 Identifying the Smart Card Reader

The workstation supports one smart card reader ([FIGURE 12-15](#)). The smart card reader is installed on the smart card reader bracket. The smart card reader bracket has drive rails that slide the smart card reader and smart card reader bracket into the removable media drive bay. The removable media drive bay is accessible when the bezel is removed. The smart card reader interface cable is accessible when the access panel is removed ([FIGURE 12-16](#)).



**FIGURE 12-15** Smart Card Reader Location and Identification

## 12.3.2 Removing the Smart Card Reader

1. Power off the system, open the chassis, and remove the bezel.

See:

- Section 10.3, “Powering Off the Workstation” on page 10-4
- Section 10.4, “Removing the Access Panel” on page 10-12
- Section 10.5, “Removing the Bezel” on page 10-16

2. Locate the smart card reader (FIGURE 12-16).

The smart card is installed on a smart card reader bracket that fits into the top slot of the removable media drive bay.

3. Disconnect the smart card reader interface cable from the smart card reader (FIGURE 12-16).

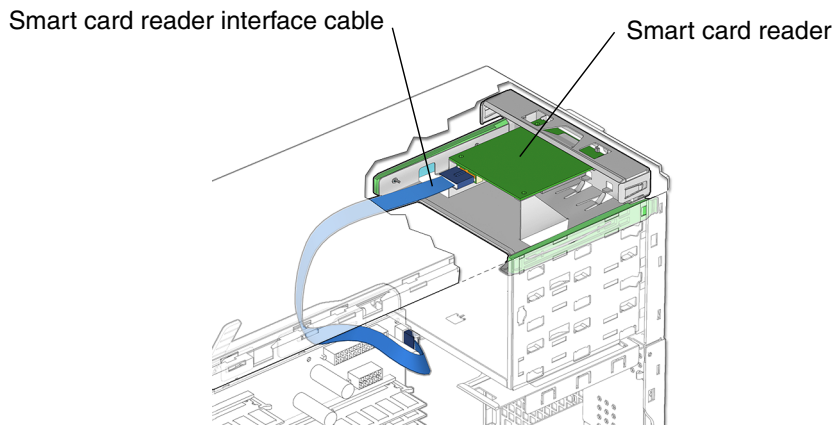


FIGURE 12-16 Removing the Smart Card Reader Cable

4. Remove the smart card reader assembly (FIGURE 12-17).
  - a. Squeeze together the two green plastic tabs at the front sides of the smart card reader assembly.
  - b. Pull the smart card reader assembly straight out of the removable media drive bay. Set the smart card reader assembly down on an antistatic mat.
  - c. Remove the smart card reader bracket screws.

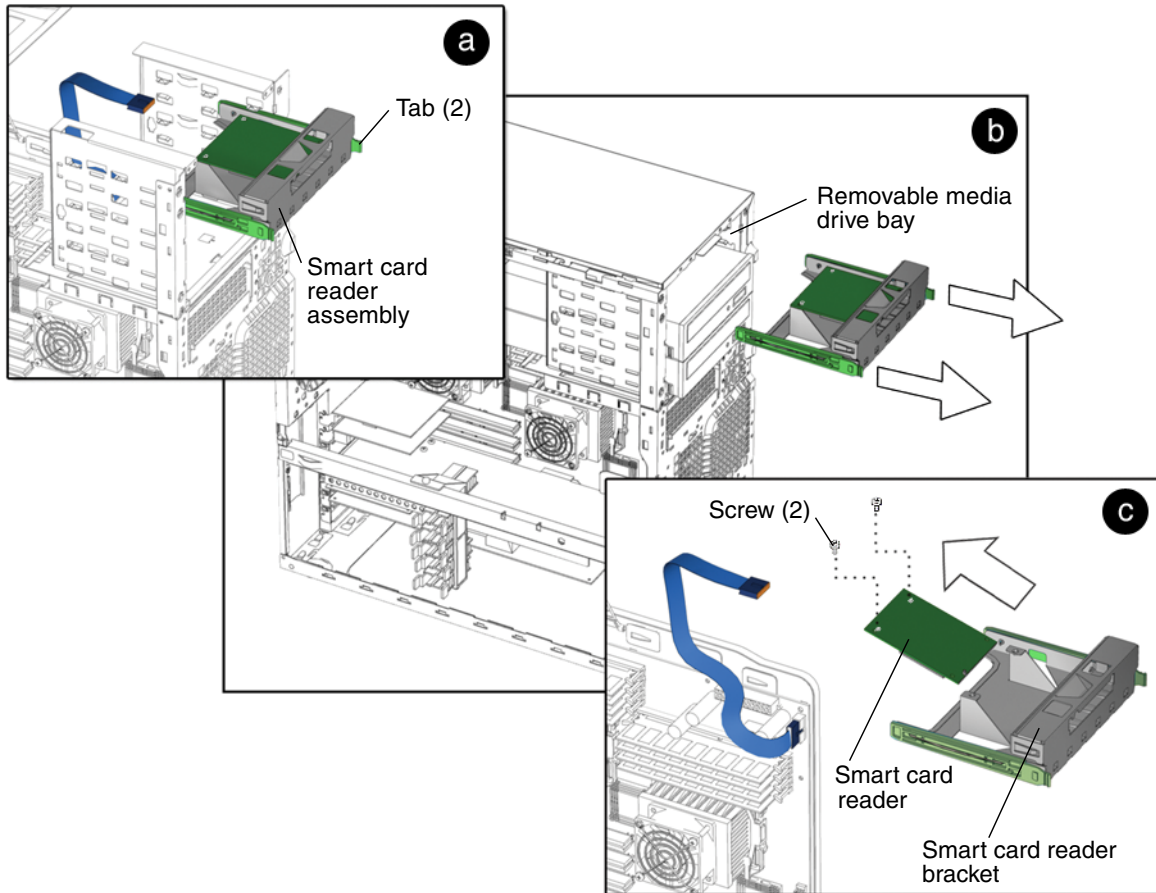
Using a No. 2 Phillips screwdriver, remove the two screws that secure the smart card reader to its bracket. Set the screws aside.

5. Remove the smart card reader from the smart card reader bracket.

Tilt and lift the smart card reader from the bracket. Set the smart card reader aside.

You have removed the smart card reader.

Proceed to [Section 12.3.3, "Installing the Smart Card Reader"](#) on page 12-18.



**FIGURE 12-17** Removing the Smart Card Reader Assembly

## 12.3.3 Installing the Smart Card Reader

### 1. Power off the system, open the chassis, and remove the bezel.

See:

- [Section 10.3, "Powering Off the Workstation"](#) on page 10-4
- [Section 10.4, "Removing the Access Panel"](#) on page 10-12
- [Section 10.5, "Removing the Bezel"](#) on page 10-16



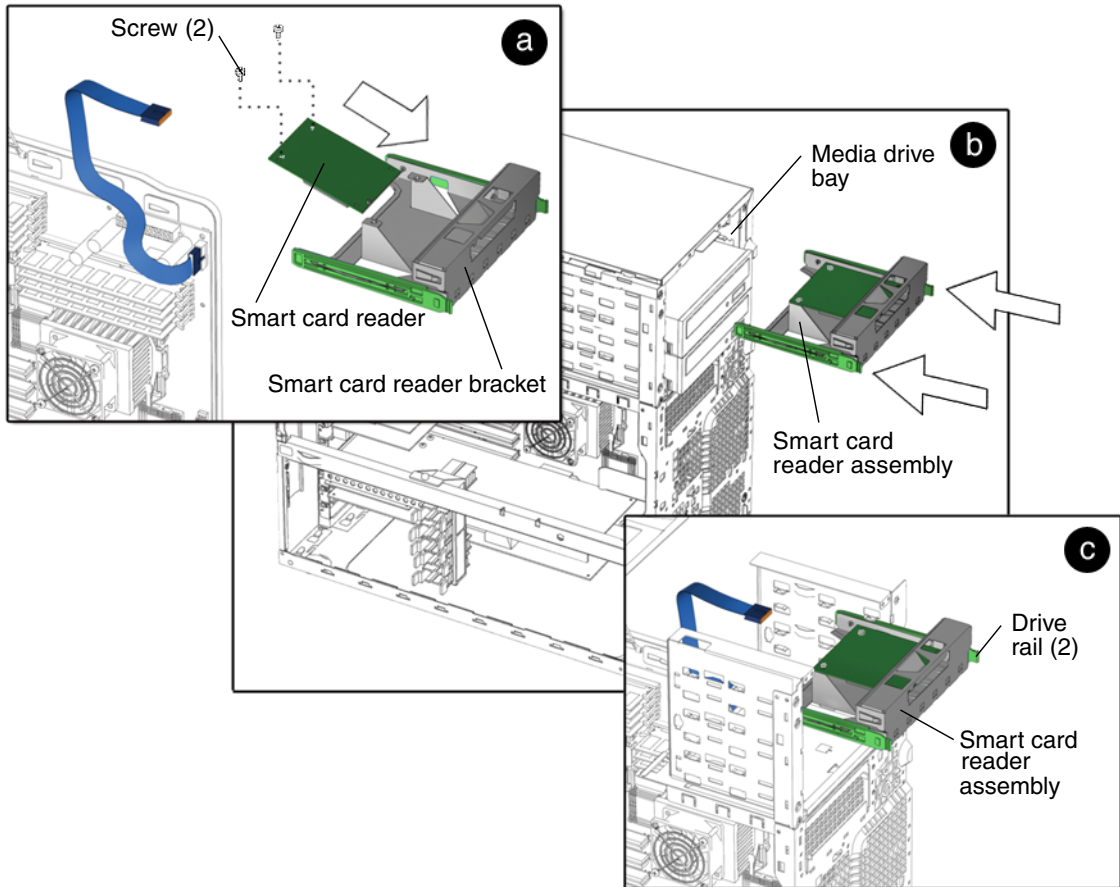
**2. Locate the smart card reader bracket (FIGURE 12-18).**

The smart card reader installs into the smart card reader bracket.

**3. Remove the new smart card reader from its packaging.**

**4. Insert the smart card reader into the smart card reader bracket (FIGURE 12-18).**

Tilt the card into the bracket rails and slide in until it stops.



**FIGURE 12-18** Installing the Smart Card Reader

**5. Install the smart card reader assembly (FIGURE 12-18).**

**a. Fasten the smart card reader to the smart card reader bracket.**

Using a No. 2 Phillips screwdriver, install both screws that secure the smart card reader to the smart card reader bracket.

**b. Install the smart card reader assembly into the removable media drive bay.**

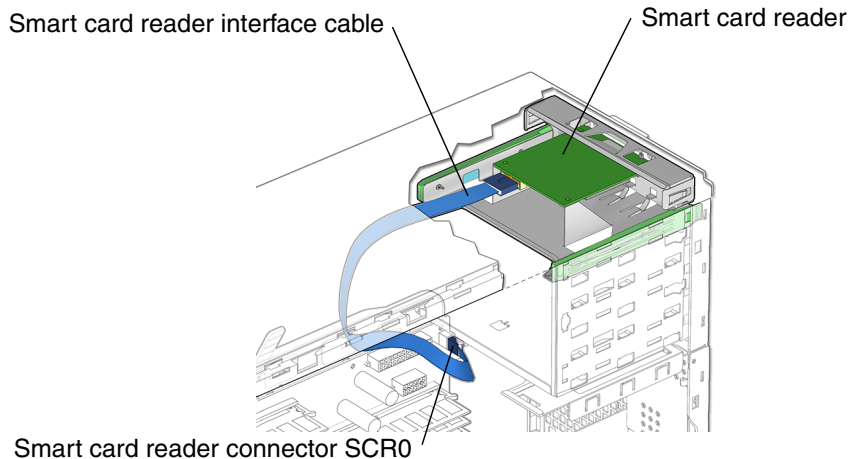
Slide the smart card reader into the smart card reader bay.

**c. Seat the smart card reader assembly into the removable media drive bay.**

Slide the smart card reader assembly into the removable media drive bay until the drive rails click.

**6. Connect the smart card reader interface cable to the smart card reader (FIGURE 12-19).**

Connect smart card reader interface cable to the smart card reader.



**FIGURE 12-19** Connecting the Smart Card Reader Cable

**7. Inspect the smart card reader assembly and related component fasteners.**

- The smart card reader assembly drive rails are seated on the smart card reader assembly.
- The smart card reader assembly is tight in the removable top media bay.

**8. Inspect the smart card reader assembly and related component cabling.**

- The smart card reader interface cable is firmly connected to the motherboard at connector SCR0.
- The smart card reader assembly interface cable is firmly connected to smart card reader assembly.

**9. Finish up.**

Replace the bezel and access panel, power on the system, and verify the component installation.

See:

- [Section 15.3, “Replacing the Bezel” on page 15-4](#)
- [Section 15.4, “Replacing the Access Panel” on page 15-6](#)
- [Section 15.5, “Powering On the Workstation” on page 15-7](#)
- [Section 15.6, “Verifying an Installation” on page 15-10](#)



## Replacing Chassis Components

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This chapter describes the remove and replace procedures for the Sun Blade 2500 workstation replaceable chassis components.

The procedures described in this chapter are written for workstation service providers and system administrators.

This chapter contains the following topics:

- Section 13.1, “Replacing the Power Supply” on page 13-2
- Section 13.2, “Replacing the Front Fan” on page 13-11
- Section 13.3, “Replacing the Rear Fan” on page 13-16
- Section 13.4, “Replacing the SCSI Backplane” on page 13-24
- Section 13.5, “Replacing the Speaker” on page 13-34
- Section 13.6, “Replacing the Front Fan Bracket” on page 13-38
- Section 13.7, “Replacing the PCI Card Support and Chassis Cross Brace” on page 13-42
- Section 13.8, “Replacing the System Drive Rails” on page 13-50



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**Caution** – Follow the cautions, warnings, and instructions in the *Sun Blade 2500 Workstation Safety and Compliance Guide* (816-2061). The document is available at: <http://www.sun.com/documentation>

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**Caution** – Many of the procedures in this chapter are described with the workstation chassis laying on its side. If you perform any of the procedures in this chapter with the chassis in its upright position, use care to ensure you do not tip over the chassis.

---



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**Caution** – When servicing or removing workstation components, attach an antistatic strap to your wrist and then to a metal area on the chassis. Then disconnect the power cord from the workstation and the wall receptacle. Following this caution equalizes all electrical potentials with the workstation.

---

## 13.1 Replacing the Power Supply

This chapter describes removal and installation of the power supply. Topics include:

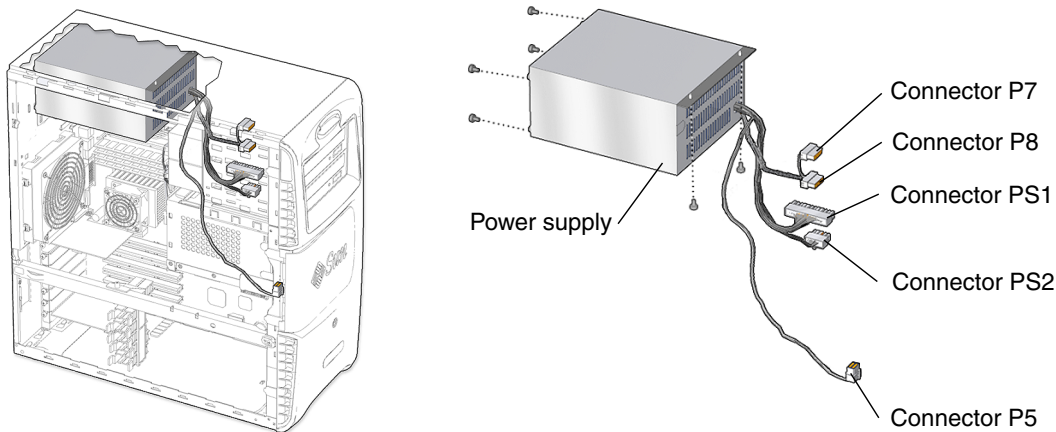
- [Section 13.1.1, “Identifying the Power Supply” on page 13-2](#)
- [Section 13.1.2, “Removing the Power Supply” on page 13-3](#)
- [Section 13.1.3, “Installing the Power Supply” on page 13-7](#)



You can also view an animated version of these instructions by clicking on this film icon.

### 13.1.1 Identifying the Power Supply

A 475W power supply is required for workstation operation ([FIGURE 13-1](#)). Power is supplied from the power supply to connectors P5, P7, P8, P9, PS1, and PS2.



**FIGURE 13-1** Power Supply Location and Identification

---

**Note** – Not all workstation power supplies have connector P9 attached to the wiring harness.

---

[TABLE 13-1](#) lists the power supply specifications.

**TABLE 13-1** Power Supply Specifications

Specification	Value
Input Voltage	100-240 AC
Frequency	50-60 Hz
Current	8A
Wattage	475W maximum

## 13.1.2 Removing the Power Supply

**1. Power off the system, and open and position the chassis.**

See:

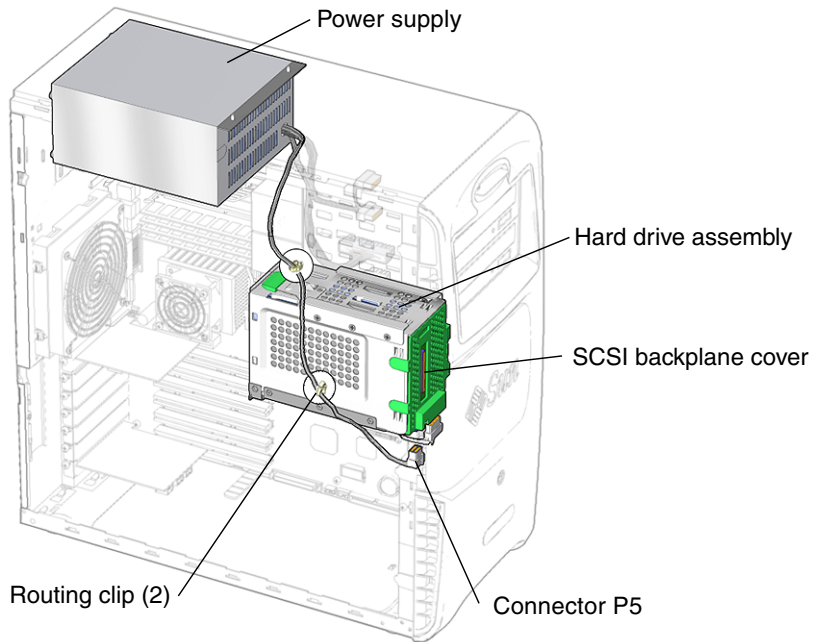
- [Section 10.3, “Powering Off the Workstation” on page 10-4](#)
- [Section 10.4, “Removing the Access Panel” on page 10-12](#)

**2. Locate the power supply ([FIGURE 13-1](#)).**

The power supply is fastened directly to the upper back corner of the workstation chassis.

**3. Disconnect the power supply and cable connector P5 from the hard drive assembly ([FIGURE 13-2](#)).**

Power supply and cable connector P5 is connected to the SCSI backplane, on the underside of the hard drive assembly.



**FIGURE 13-2** Disconnecting Power Supply Cable Connector P5 From the Hard Drive Assembly

**4. Remove the hard drive assembly.**

See [Section 10.7, "Removing the Hard Drive Assembly"](#) on page 10-20.

**5. Position the chassis.**

See [Section 10.6, "Positioning the Chassis"](#) on page 10-18.

**6. Open the power supply cable routing clips (FIGURE 13-2).**

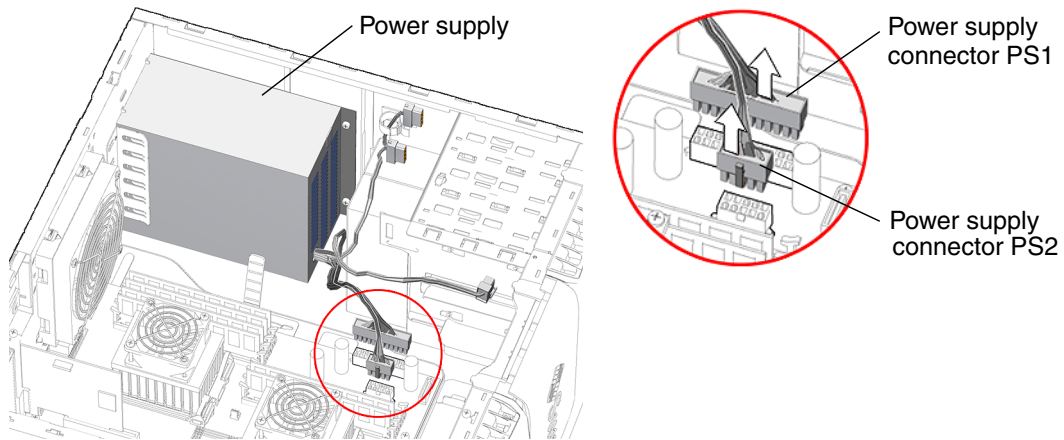
Remove the cables contained within the routing clips.

**7. Disconnect the power supply cables from motherboard (FIGURE 13-3).**

There are two power supply cables connected to the motherboard.

The power supply cables have connectors that fasten to the motherboard at PS1 and PS2. Disconnect connectors PS1 and PS2. Open the cable routing clip(s) and remove the cables.





**FIGURE 13-3** Disconnecting the Power Supply Cables

**8. If necessary, remove the power cable(s) from the chassis routing clip(s).**

---

**Note** – Some workstations have cable routing clips for the power supply cables and connectors. If your workstation has these clips, open the clips and remove the power supply cables.

---

---

**Note** – There may be more than one media drive connected to the power supply. If so, connectors P7, P8, or P9 might be used to supply power to the additional media drives. Disconnect the power cables from those drives.

---

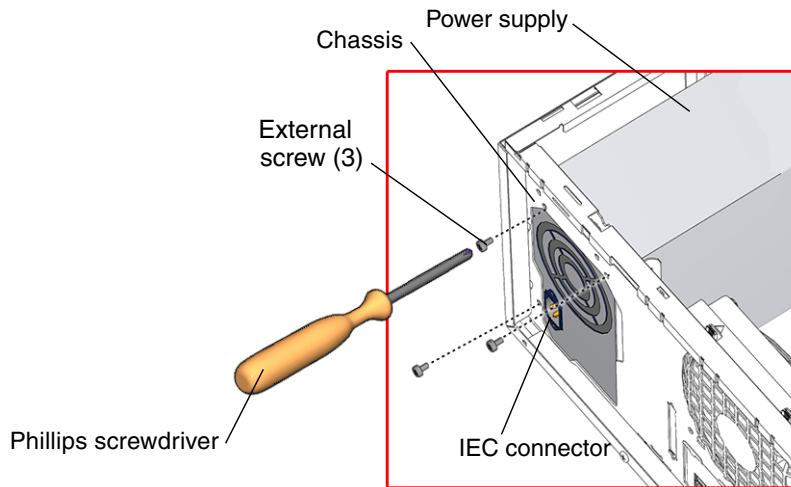
**9. Remove the three external power supply screws (FIGURE 13-4).**

Using a No. 2 Phillips screwdriver, remove the three external screws that secure the power supply to the chassis.

---

**Note** – The IEC connector orientation may vary depending on the manufacturer of the power supply that you have.

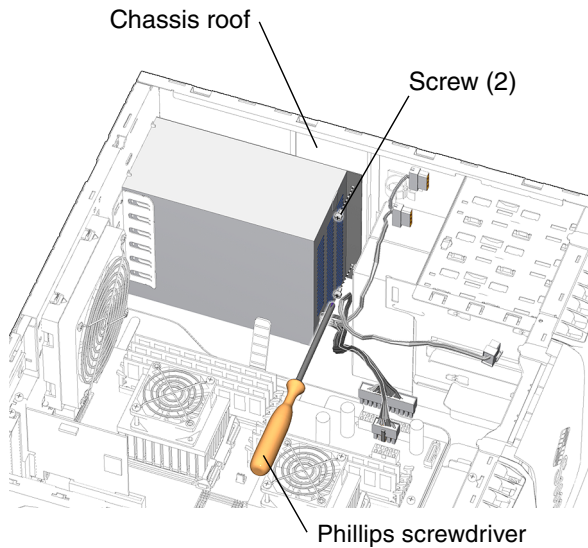
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**FIGURE 13-4** Power Supply External Screws

**10. Remove the two internal power supply screws (FIGURE 13-5).**

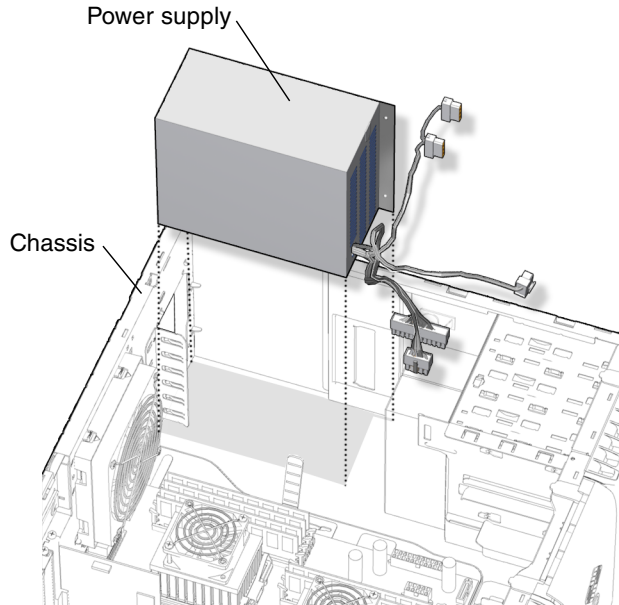
Using a No. 2 Phillips screwdriver, remove both screws that secure the power supply to the system chassis roof.



**FIGURE 13-5** Power Supply Internal Screws

**11. Remove the power supply from the chassis (FIGURE 13-6).**

Shift the power supply toward the front of the chassis. Lift the power supply up and out of the chassis. Set the power supply aside on an antistatic mat. Proceed to: [Section 13.1.3, “Installing the Power Supply” on page 13-7.](#)



**FIGURE 13-6** Removing the Power Supply from the Chassis

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**Note** – The workstation cannot operate without the power supply.

---

## 13.1.3 Installing the Power Supply

**1. Power off the system, open the chassis, and position the chassis.**

See:

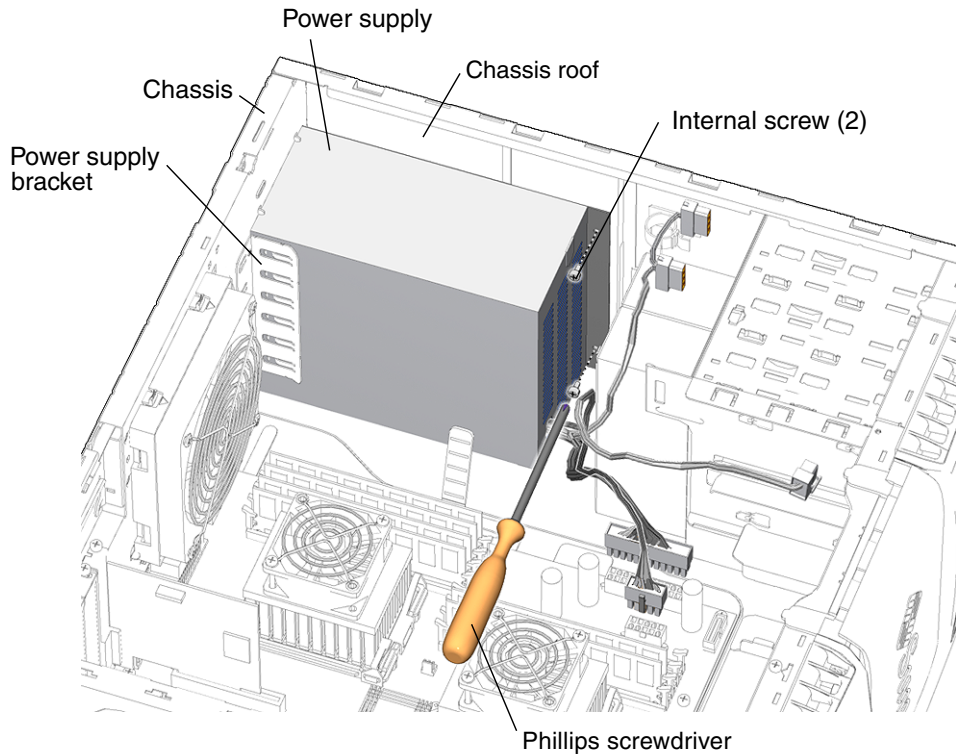
- [Section 10.3, “Powering Off the Workstation” on page 10-4](#)
- [Section 10.4, “Removing the Access Panel” on page 10-12](#)
- [Section 10.6, “Positioning the Chassis” on page 10-18](#)

**2. Remove the new power supply from its packaging.**

**3. Locate where the power supply is to be installed (FIGURE 13-7).**

**4. Place the power supply inside the chassis.**

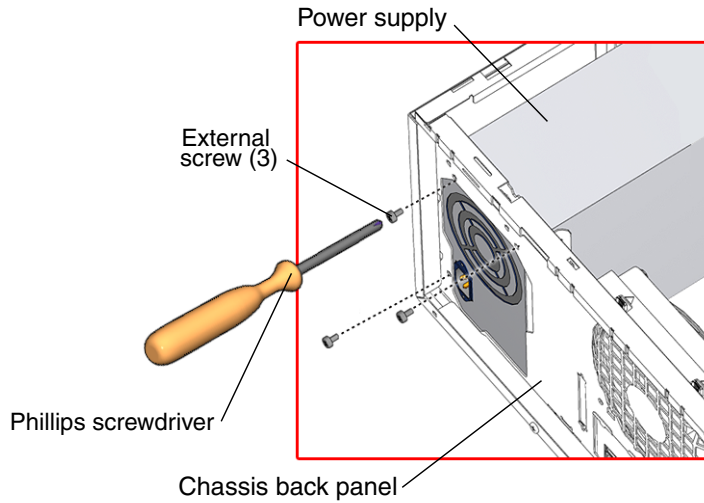
Align the power supply with the chassis power supply bracket. Slide the power supply all the way to the back of the chassis.



**FIGURE 13-7** Aligning the Power Supply to the Chassis

**5. Fasten the power supply to the chassis roof (FIGURE 13-7).**

Using a No. 2 Phillips screwdriver, replace the internal screws that secure the power supply to the chassis.



**FIGURE 13-8** External Screws for the Power Supply

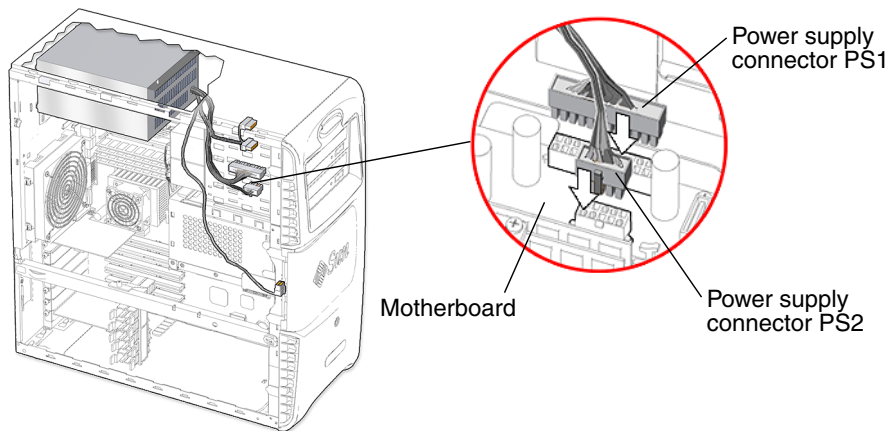
**6. Fasten the power supply to the chassis back panel (FIGURE 13-8).**

Using a No. 2 Phillips screwdriver, install the three external screws that secure the power supply to the chassis back panel.

**7. Connect power supply connectors PS1 and PS2 to the motherboard (FIGURE 13-9).**

There are two power supply cables connected to the motherboard.

The power supply cables might have routing clips that fasten them to the chassis. If so, route the cables through the clips and then connect the connectors PS1 and PS2 to the motherboard.



**FIGURE 13-9** Installing Power Supply Connectors PS1 and PS2 to the Motherboard

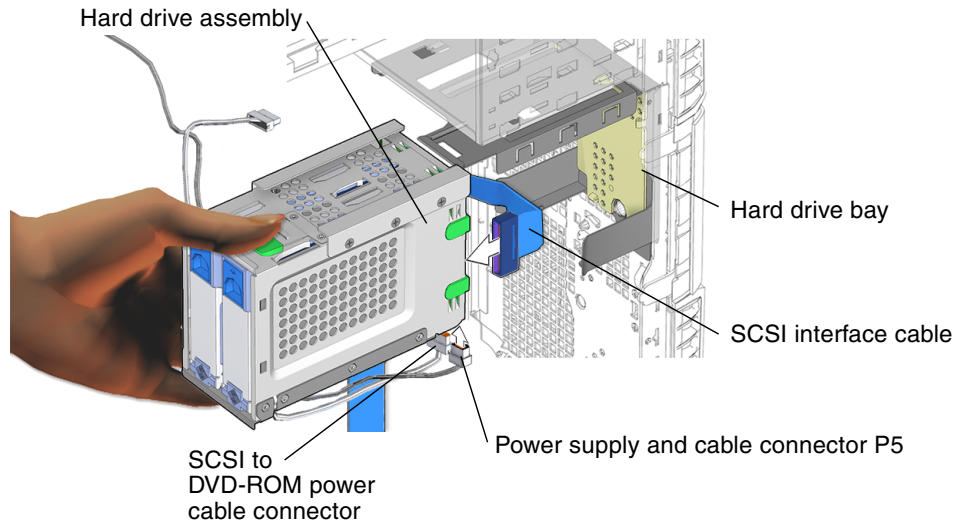
**8. Connect power supply and cable connector P5 to the SCSI backplane (FIGURE 13-10).**

Connect power supply and cable connector P5 to the SCSI backplane and install the power cable into the two routing clips on the bottom and back of the hard drive assembly.

---

**Note** – There maybe more than one media drive connected the power supply. If so, connectors P7, P8, or P9 might be used to supply power to the additional media drives.

---



**FIGURE 13-10** Installing and Verifying Installation of Hard Drive Assembly Cables

**9. Install the hard drive assembly.**

Verify that power supply and cable connector P5 and the SCSI to DVD-ROM power cable connectors are seated to the hard drive assembly. Verify that the SCSI interface cable is also correctly seated before installing the hard drive assembly into the hard drive bay.

You have finished installing the power supply.

**10. Reposition the chassis.**

See [Section 15.1, "Repositioning the Chassis"](#) on page 15-2.

### 11. Inspect the power supply fasteners.

- The power supply screws are in place and tight.
- The power supply is seated on the power supply bracket (FIGURE 13-7).

### 12. Inspect the power supply and related component cabling.

- Power supply connectors PS1 and PS2 are firmly connected to the motherboard.
- Power supply and cable connector P5 is connected to the hard drive assembly.
- The SCSI to DVD-ROM power cable connector is plugged into both the DVD-ROM drive and the hard drive assembly.

### 13. Finish up.

Replace the access panel, power on the system, and verify the component installation.

See:

- [Section 15.4, “Replacing the Access Panel” on page 15-6](#)
- [Section 15.5, “Powering On the Workstation” on page 15-7](#)
- [Section 15.6, “Verifying an Installation” on page 15-10](#)

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## 13.2 Replacing the Front Fan

This section describes removal and installation of the front fan. Topics include:

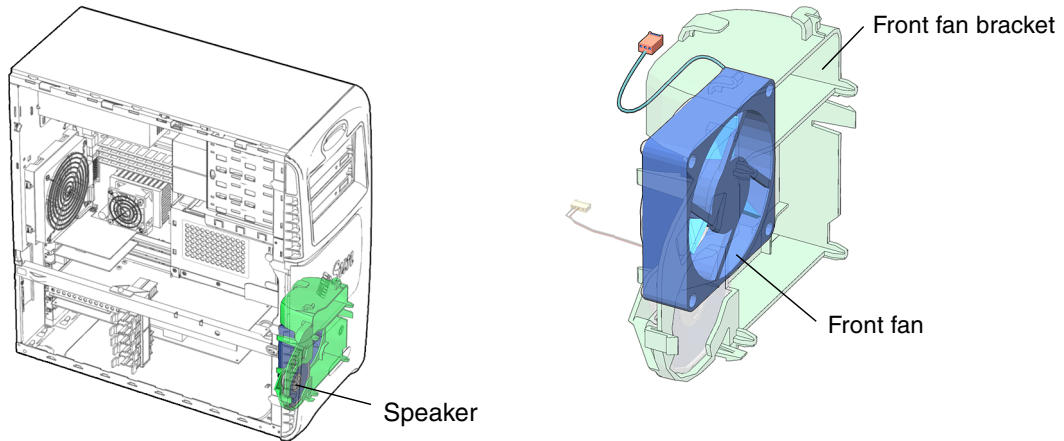
- [Section 13.2.1, “Identifying the Front Fan” on page 13-11](#)
- [Section 13.2.2, “Removing the Front Fan” on page 13-12](#)
- [Section 13.2.3, “Installing the Front Fan” on page 13-14](#)



You can also view an animated version of these instructions by clicking on this film icon.

### 13.2.1 Identifying the Front Fan

The front fan for the Sun Blade 2500 workstation is housed in a green bracket that also contains the speaker (FIGURE 13-11). To adequately cool the workstation, both front and rear fans must correctly operate. The front fan is connected to the motherboard at connector FAN2 (FIGURE 13-12).



**FIGURE 13-11** Front Fan Location and Identification

[TABLE 13-2](#) lists the front fan specifications.

**TABLE 13-2** Front Fan Specifications

Specification	Value
Voltage	8-12 VDC
Current	.016A
Speed	500-3000 RPM
Flow Rate	3-18 CFM

## 13.2.2 Removing the Front Fan

### 1. Power off the system and open the chassis.

See:

- [Section 10.3, “Powering Off the Workstation”](#) on page 10-4
- [Section 10.4, “Removing the Access Panel”](#) on page 10-12

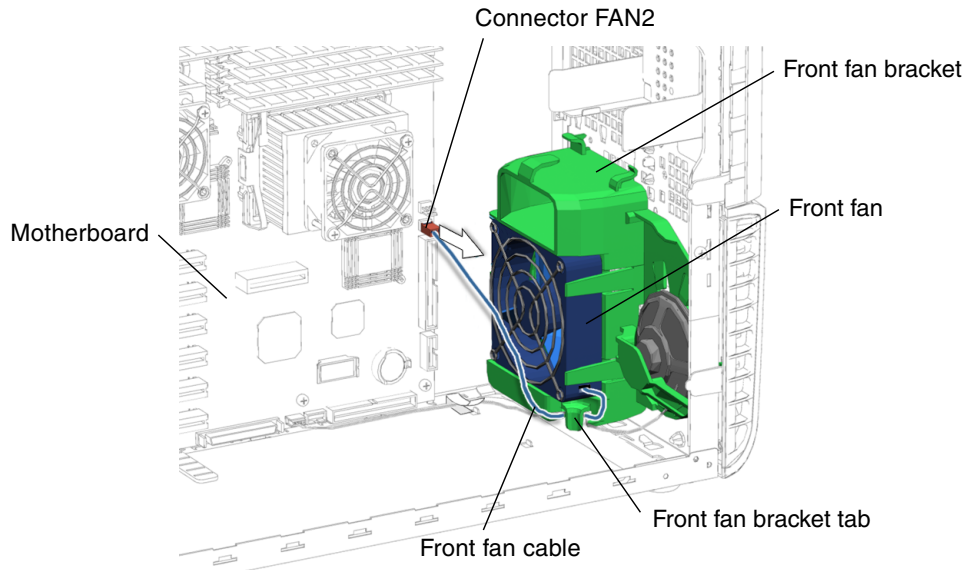
### 2. Locate the front fan ([FIGURE 13-11](#)).

The front fan and speaker are housed in the green front fan bracket.

### 3. Disconnect the front fan cable ([FIGURE 13-12](#)).

Disconnect the front fan cable from the motherboard connector (FAN2).





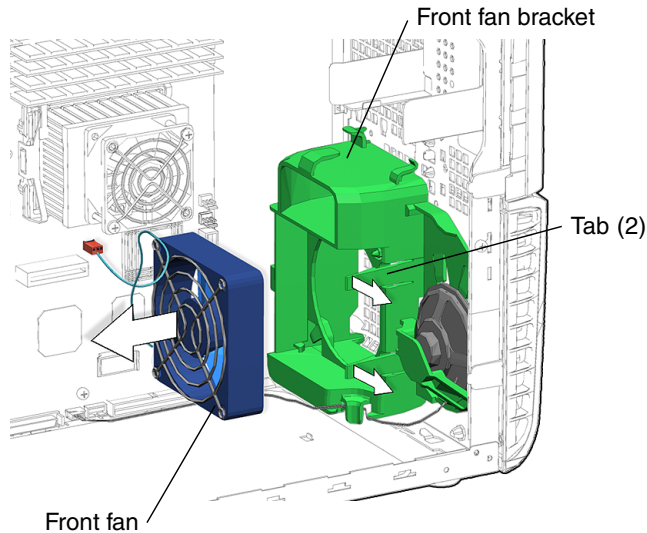
**FIGURE 13-12** Disconnecting the Front Fan Cable

**4. Remove the front fan cable from the front fan bracket (FIGURE 13-12)**

Guide the front fan cable through the front fan bracket tab.

**5. Remove the front fan from the front fan bracket (FIGURE 13-13).**

Pull back slightly on the tabs. Tilt the near edge of the fan away from the near edge of the bracket. Lift the fan out of the front fan bracket chassis and set it aside.



**FIGURE 13-13** Removing the Front Fan

You have removed the front fan.

Proceed to [Section 13.2.3, “Installing the Front Fan”](#) on page 13-14.



---

**Caution** – Do not power on the system if the front fan is not installed.

---

## 13.2.3 Installing the Front Fan

### 1. Power off the system and open the chassis.

See:

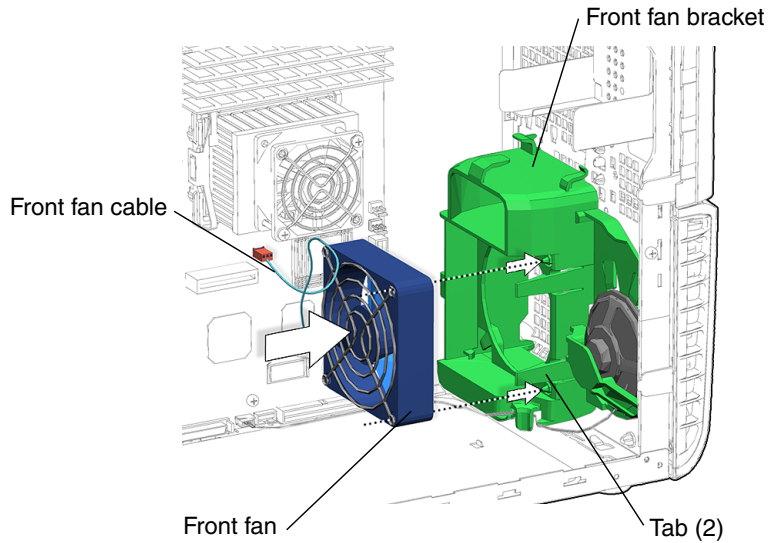
- [Section 10.3, “Powering Off the Workstation”](#) on page 10-4
- [Section 10.4, “Removing the Access Panel”](#) on page 10-12

### 2. Locate the front fan bracket ([FIGURE 13-14](#)).

### 3. Remove the fan from its packaging.

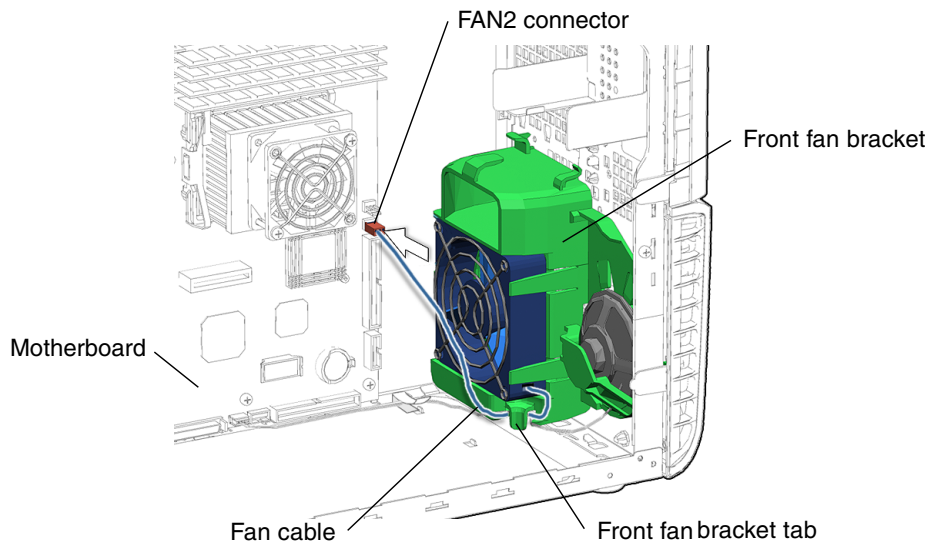
### 4. Insert the front fan into the front fan bracket.

Holding the fan upright, with the fan cable at the bottom corner furthest from you, slide the fan into the fan bracket at an angle so that the far side enters the bracket first.



**FIGURE 13-14** Aligning the Front Fan to the Front Fan Bracket

- 5. Install the front fan into the front fan bracket (FIGURE 13-14).**  
Press the fan into the fan bracket until the two tabs click.
- 6. Guide the fan cable through the front fan bracket tab (FIGURE 13-15).**



**FIGURE 13-15** Routing and Connecting the Front Fan Cable

**7. Connect the front fan cable to connector FAN2 on the motherboard.**

You have installed the front fan.

**8. Inspect the front fan fasteners.**

- The front fan bracket tabs that hold the front fan in place are secure and flat.
- The front fan is seated in the front fan bracket.

**9. Inspect the front fan and related component cabling.**

- The front fan cable is routed through the front fan bracket tab.
- The front fan signal cable is securely plugged into motherboard connector FAN2.

**10. Replace the access panel, power on the system, and verify the component installation.**

See:

- [Section 15.4, “Replacing the Access Panel” on page 15-6](#)
- [Section 15.5, “Powering On the Workstation” on page 15-7](#)
- [Section 15.6, “Verifying an Installation” on page 15-10](#)

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## 13.3 Replacing the Rear Fan

This section describes removal and installation of the rear fan. Topics include:

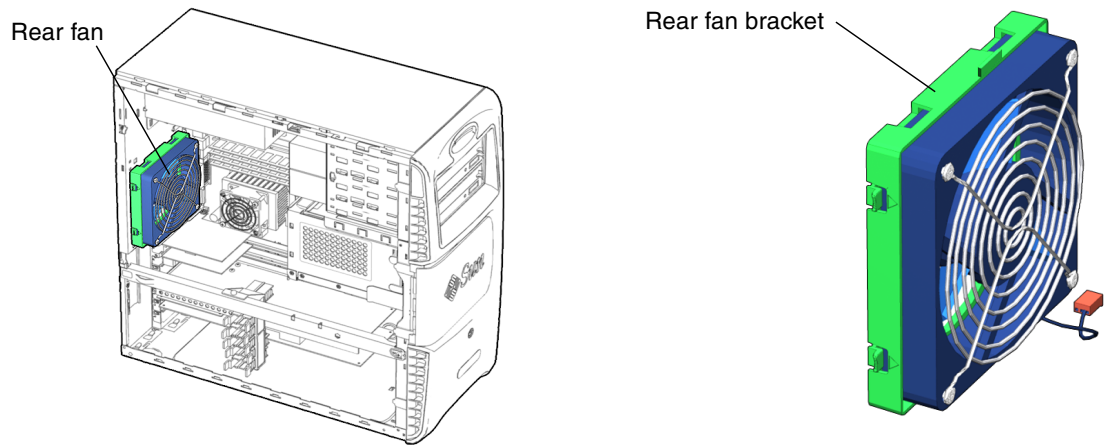
- [Section 13.3.1, “Identifying the Rear Fan” on page 13-16](#)
- [Section 13.3.2, “Removing the Rear Fan” on page 13-17](#)
- [Section 13.3.3, “Installing the Rear Fan” on page 13-20](#)



You can also view an animated version of these instructions by clicking on this film icon.

### 13.3.1 Identifying the Rear Fan

The rear fan for the Sun Blade 2500 workstation is housed in the rear fan bracket ([FIGURE 13-16](#)). To adequately cool the workstation, both front and rear fans must correctly operate. The rear fan is connected to the motherboard at connector FAN0 ([FIGURE 13-17](#)).



**FIGURE 13-16** Rear Fan Location and Identification

[TABLE 13-3](#) lists rear fan specifications.

**TABLE 13-3** Rear Fan Specifications

Specification	Value
Voltage	12 VDC
Current0	0.45A
Speed	500-3000 RPM
Flow Rate	3-18 CFM

## 13.3.2 Removing the Rear Fan

### 1. Power off the system and open the chassis.

See:

- [Section 10.3, “Powering Off the Workstation”](#) on page 10-4
- [Section 10.4, “Removing the Access Panel”](#) on page 10-12

### 2. Locate the rear fan ([FIGURE 13-16](#)).

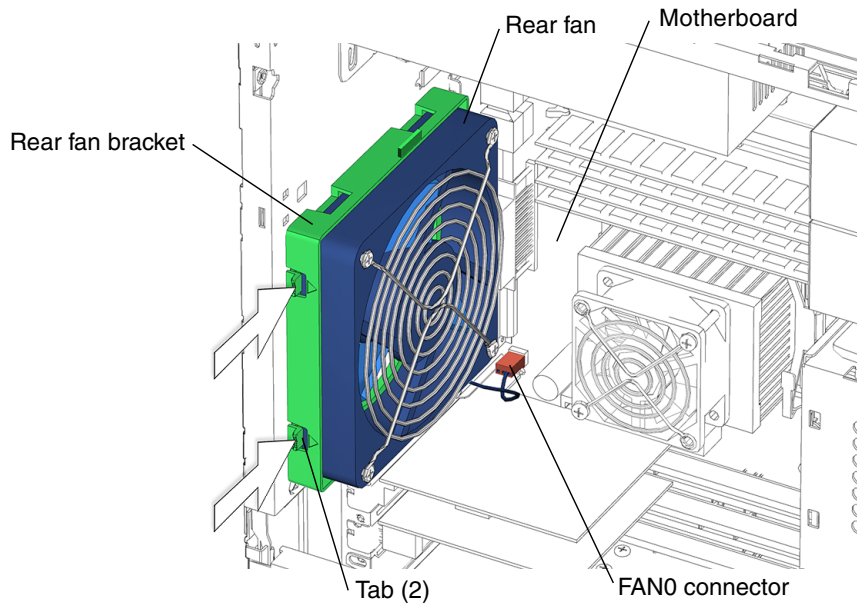
The rear fan does not include the green rear fan bracket plastic bracket.

### 3. Disconnect the rear fan cable ([FIGURE 13-17](#)).

Disconnect the rear fan cable from motherboard connector FAN0.

**4. Release the rear fan assembly.**

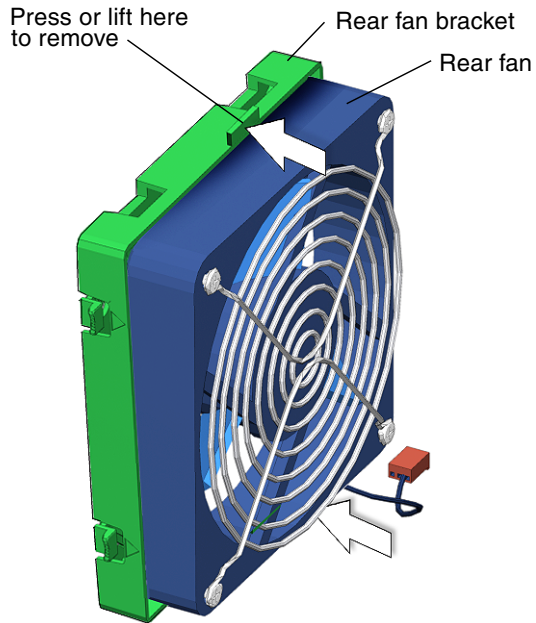
Squeeze and hold both rear fan bracket tabs. Lift while holding the tabs, pull the rear fan bracket toward the chassis opening. Lift the rear fan bracket and rear fan out of the chassis.



**FIGURE 13-17** Releasing the Rear Fan Assembly

**5. Remove the rear fan from the rear fan bracket (FIGURE 13-18).**

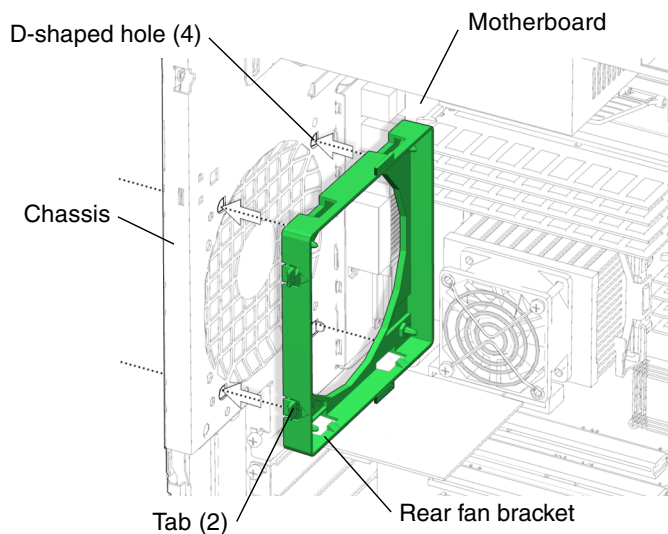
Flex an edge of the fan bracket away from the fan while lifting on the fan. Repeat for all edges until the fan is released from the bracket. Set the fan and bracket aside.



**FIGURE 13-18** Releasing the Rear Fan

**6. Install the rear fan bracket into the workstation chassis (FIGURE 13-19).**

Insert all four tabs of the rear fan bracket into the matching D-shaped holes in the chassis back panel. Slide the bracket toward the motherboard until the fan bracket tabs click.



**FIGURE 13-19** Installing the Rear Fan Bracket

You have removed the rear fan.

Proceed to [Section 13.3.3, “Installing the Rear Fan”](#) on page 13-20 to install the new rear fan.



---

**Caution** – Do not power on the system if the rear fan is not installed.

---

## 13.3.3 Installing the Rear Fan

**1. Open the chassis.**

See [Section 10.4, “Removing the Access Panel”](#) on page 10-12.

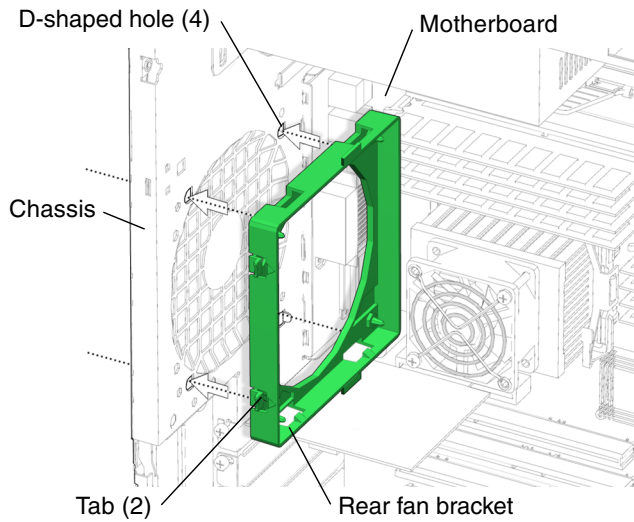
**2. Locate where the rear fan is to be installed (FIGURE 13-21).**

**3. Remove the rear fan from its packaging.**

**4. If necessary, install the rear fan bracket (FIGURE 13-20).**

Insert all four tabs of the rear fan bracket into the matching D-shaped holes in the chassis back panel. Slide the bracket toward the motherboard until the fan bracket latches click.





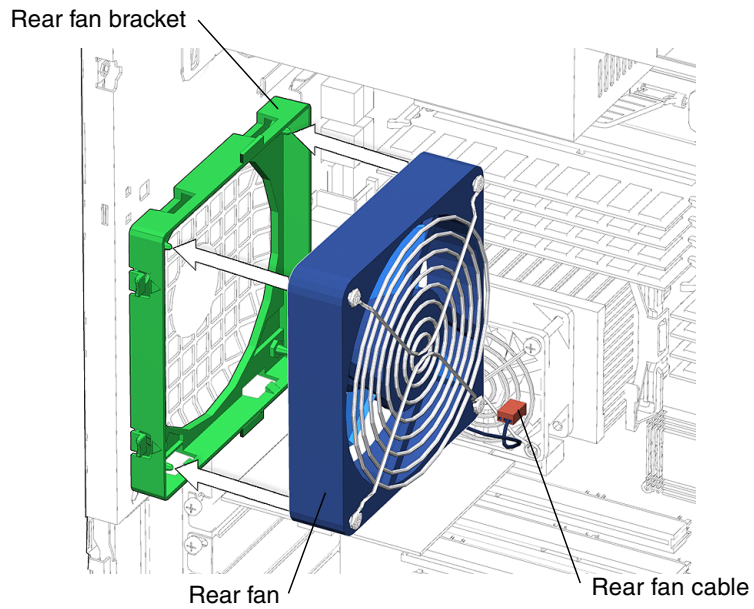
**FIGURE 13-20** Installing the Rear Fan Bracket

**5. Align the rear fan to the rear fan bracket (FIGURE 13-21).**

Align the rear fan cable to the bottom corner of the rear fan bracket.

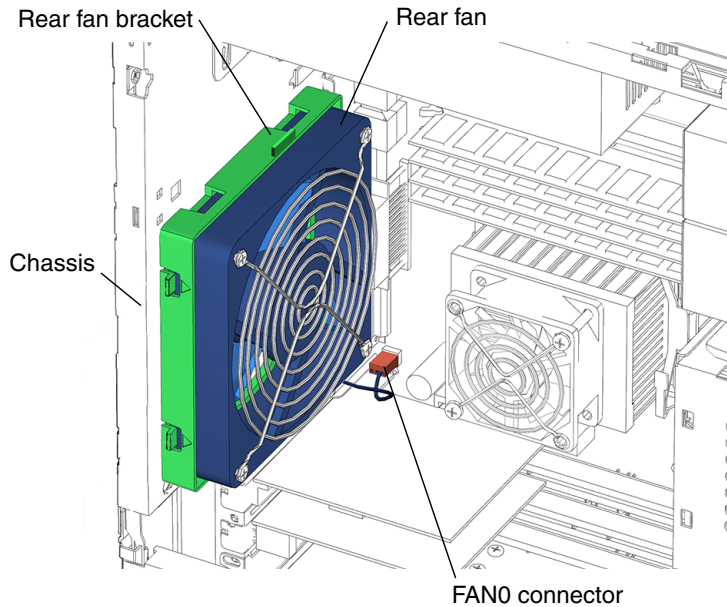
**6. Secure the rear fan.**

Press the rear fan into the rear fan bracket until it clicks in place.



**FIGURE 13-21** Installing the Rear Fan Into the Rear Fan Bracket

- 7. Connect the rear fan cable to the motherboard rear fan connector FAN0 (FIGURE 13-22).**



**FIGURE 13-22** Connecting the FAN0 Connector

- 8. Inspect the rear fan and related component fasteners.**
  - The fan and bracket are securely seated into the chassis.
- 9. Inspect the rear fan and related component cabling.**
  - The rear fan cable is firmly connected to the motherboard.
- 10. Consider your next step(s):**
  - If you removed the rear fan prior to removing motherboard, return to [Section 11.6.2, “Removing the Motherboard” on page 11-44, Step 6](#) to continue the motherboard removal.
  - If you removed the rear fan prior to removing DIMMs for CPU0, return to [Section 11.1.2, “Removing DIMMs” on page 11-4, Step 4](#) to continue the DIMM removal.
  - If you removed the rear fan prior to removing the CPU fan and heat sink assembly, return to [Section 11.2.2, “Removing the CPU Fan and Heat Sink Assembly” on page 11-14, Step 4](#) to continue the CPU fan and heat sink assembly removal.
  - If you are only replacing the rear fan, proceed to [Step 11](#) of this procedure.

## 11. Finish up.

Replace the access panel, power on the system, and verify the component installation.

See:

- [Section 15.4, “Replacing the Access Panel” on page 15-6](#)
- [Section 15.5, “Powering On the Workstation” on page 15-7](#)
- [Section 15.6, “Verifying an Installation” on page 15-10](#)

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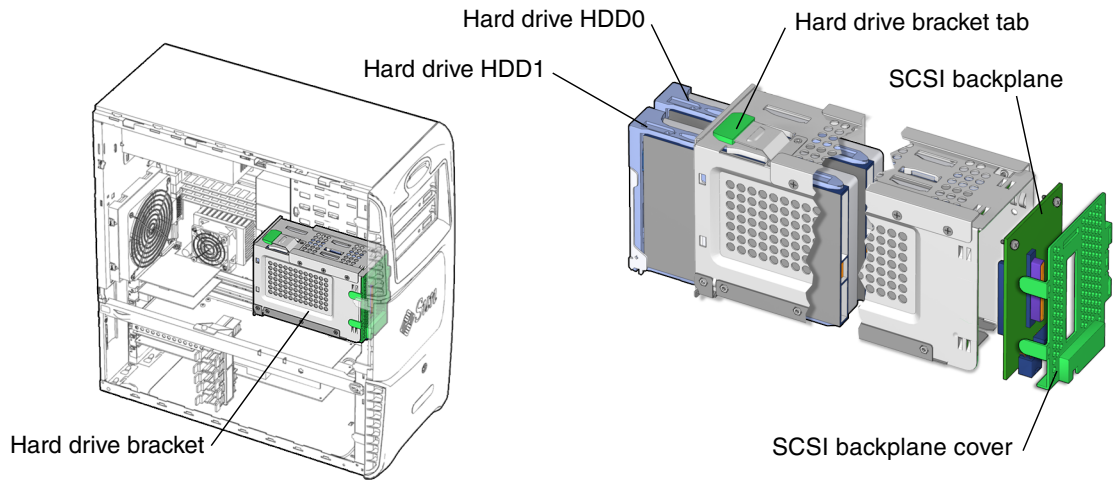
# 13.4 Replacing the SCSI Backplane

This section describes removal and installation of the SCSI backplane. Topics include:

- [Section 13.4.1, “Identifying the SCSI Backplane” on page 13-24](#)
- [Section 13.4.2, “Removing the SCSI Backplane” on page 13-25](#)
- [Section 13.4.3, “Installing the SCSI Backplane” on page 13-29](#)

## 13.4.1 Identifying the SCSI Backplane

The SCSI backplane is located between the hard drives and the green SCSI backplane cover ([FIGURE 13-23](#)). The SCSI backplane, the SCSI backplane cover, the hard drives, and the hard drive bracket are collectively the hard drive assembly. The hard drive assembly is installed in the hard drive bay. The hard drive power and interface cables connect to the hard drives through the SCSI backplane. The power and interface connectors from the SCSI backplane to the motherboard are directly accessible when the access panel is removed.



**FIGURE 13-23** SCSI Backplane Location and Identification

## 13.4.2 Removing the SCSI Backplane

1. **Power off the system and open the chassis.**

See:

- [Section 10.3, “Powering Off the Workstation”](#) on page 10-4
- [Section 10.4, “Removing the Access Panel”](#) on page 10-12

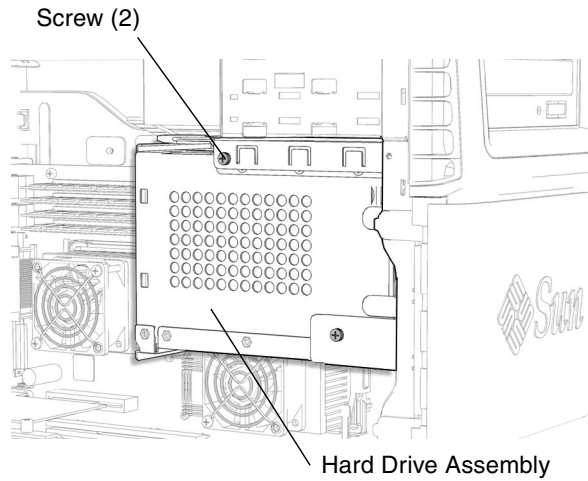
2. **Locate the SCSI backplane** (FIGURE 13-23).

3. **Remove all installed hard drives.**

See [Section 12.1.2, “Removing the Hard Drive”](#) on page 12-3.

Set the hard drive(s) on an antistatic mat.

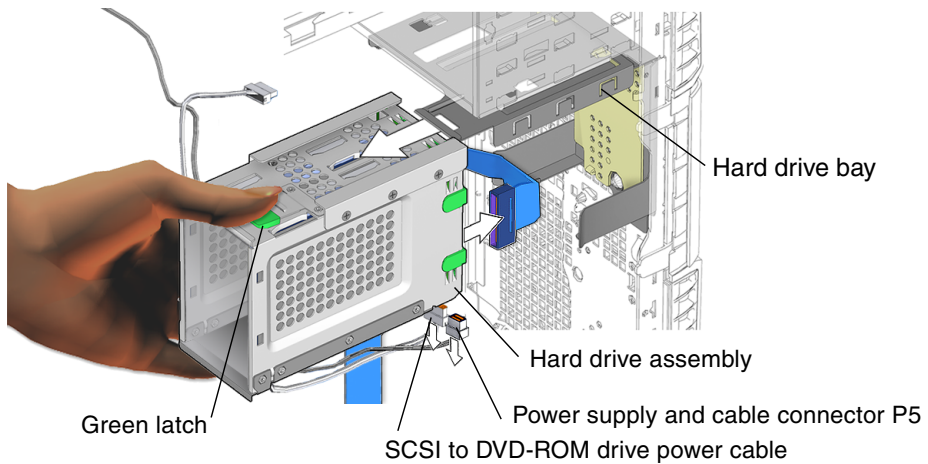
4. **Remove the two screws** (FIGURE 13-24).



**FIGURE 13-24** Removing the Two Screws for the Hard Drive Assembly

**5. Release the hard drive assembly from the hard drive bay (FIGURE 13-25)**

Press the green latch on the top of the hard drive bracket and slide the hard drive assembly out of the hard drive bay.



**FIGURE 13-25** Releasing the Hard Drive Bracket

**6. Disconnect the two power cables (FIGURE 13-26).**

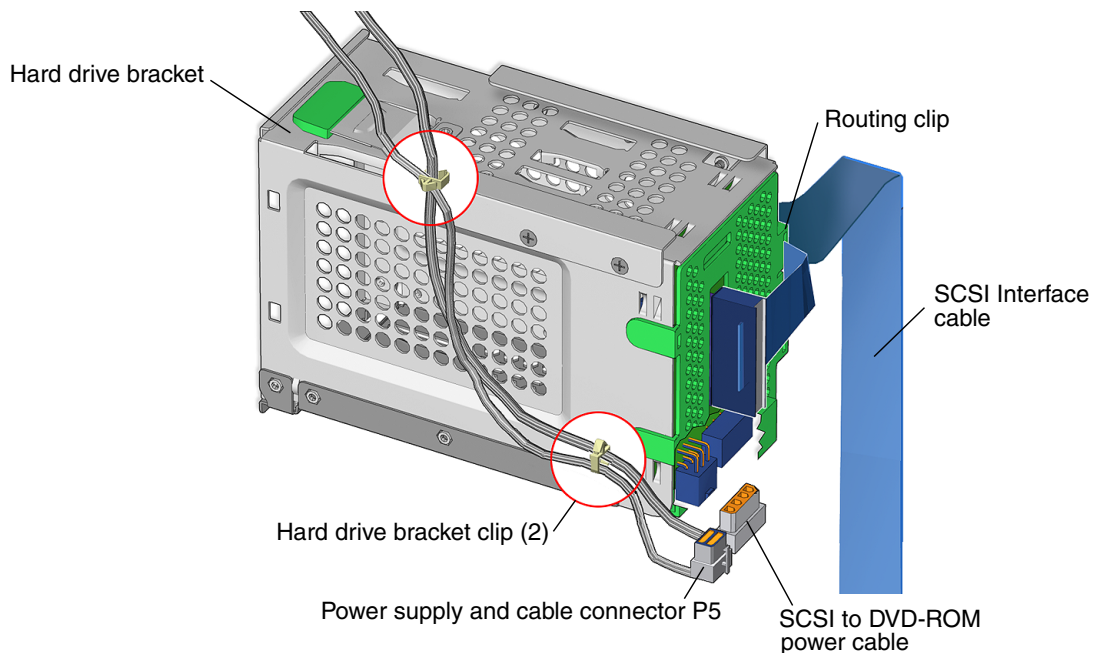
**a. Disconnect the two power cables from the SCSI backplane.**

Two power cables are plugged into the SCSI backplane on the underside of the hard drive assembly:

- 6-pin power supply and cable connector P5
- 4-pin SCSI to DVD-ROM drive power cable

**b. Release the hard drive power cables from the hard drive bracket.**

The hard drive power cables are routed through the hard drive bracket clips, one on the bottom of the hard drive bracket, the other on the back side of the hard drive bracket.



**FIGURE 13-26** Disconnecting the Power Supply Cable

**7. Disconnect the SCSI interface cable.**



---

**Caution** – The routing clip for the SCSI interface cable is fragile.

---

**a. Disconnect the interface cable from the SCSI backplane.**

The interface cable is plugged into the SCSI backplane through the SCSI backplane cover.

**b. Release the interface cable from the routing clip (FIGURE 13-26).**

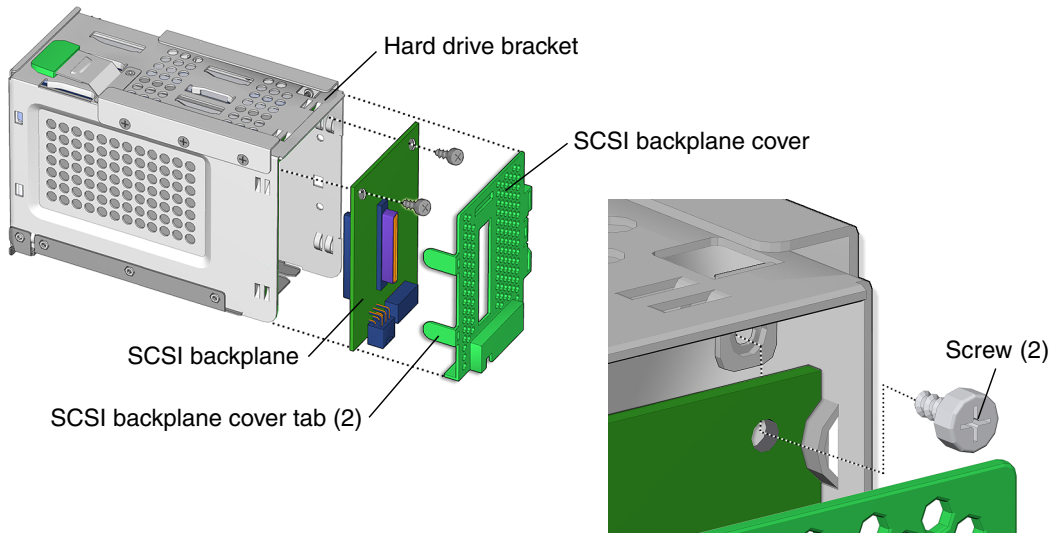
The interface cable is routed through a clip on the bottom of the green plastic SCSI backplane bracket.

**8. Position the hard drive bracket (FIGURE 13-27).**

Set the hard drive bracket on an antistatic mat.

**9. Remove the green plastic SCSI backplane cover from the hard drive bracket (FIGURE 13-27).**

Unclip the SCSI backplane cover tab from the left side of the hard drive bracket. Unclip both tabs from the right side of the hard drive bracket. Lift the backplane cover from the hard drive bracket and set it aside.



**FIGURE 13-27** Removing the SCSI Backplane Cover

**10. Unfasten the SCSI backplane from the hard drive bracket (FIGURE 13-27).**

Using a No. 2 Phillips screwdriver, remove both screws that secure the SCSI backplane to the hard drive bracket. Set the screws aside in a container.



11. **Slide the SCSI backplane out of the hard drive bracket and set it aside** ([FIGURE 13-28](#)).

You have removed the SCSI backplane.

---

**Note** – Do not operate the workstation with the SCSI backplane removed.

---

Proceed to [Section 13.4.3, “Installing the SCSI Backplane”](#) on page 13-29 to install the new SCSI backplane.

## 13.4.3 Installing the SCSI Backplane

1. **Open the chassis.**

See [Section 10.4, “Removing the Access Panel”](#) on page 10-12.

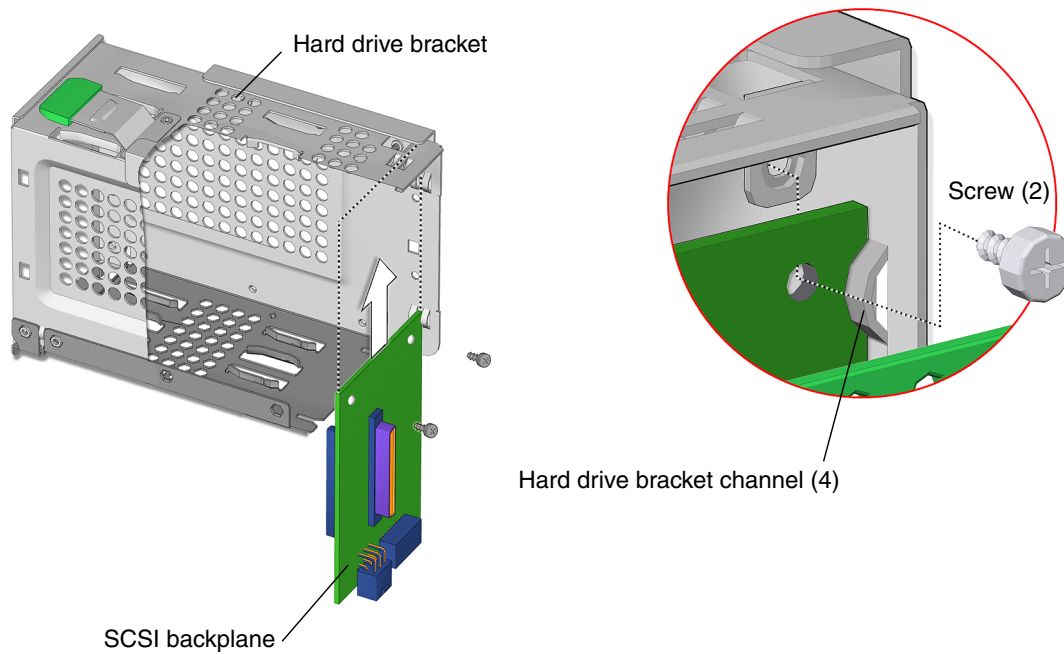
2. **Position the hard drive bracket.**

Set the hard drive bracket on an antistatic mat.

3. **Remove the new SCSI backplane from its packaging.**

4. **Slide the SCSI backplane into the hard drive bracket channels** ([FIGURE 13-28](#)).

The single SCSI connector should face out from the interior of the hard drive bracket. The two SCSI backplane power connectors should face toward the bottom of the hard drive bracket ([FIGURE 13-29](#)).



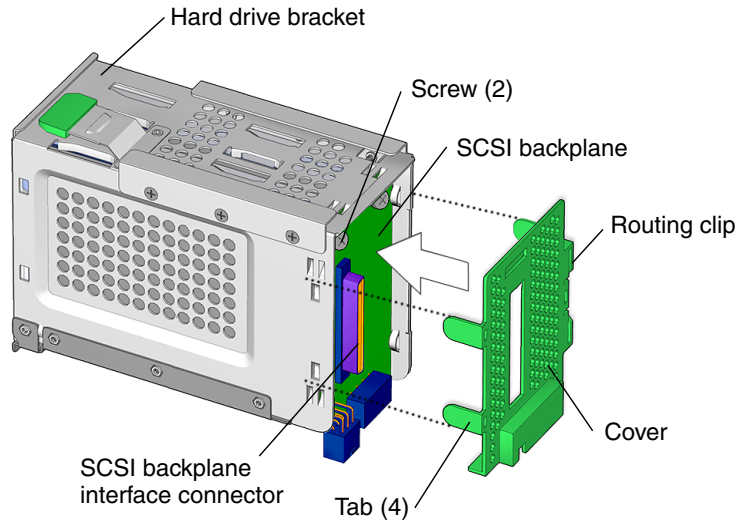
**FIGURE 13-28** Aligning the SCSI Backplane to Hard Drive Bracket

**5. Fasten the SCSI backplane to the hard drive bracket (FIGURE 13-28).**

Using a No. 2 Phillips screwdriver, install the two screws that secure the SCSI backplane to the hard drive bracket.

**6. Replace the green plastic SCSI backplane cover (FIGURE 13-29).**

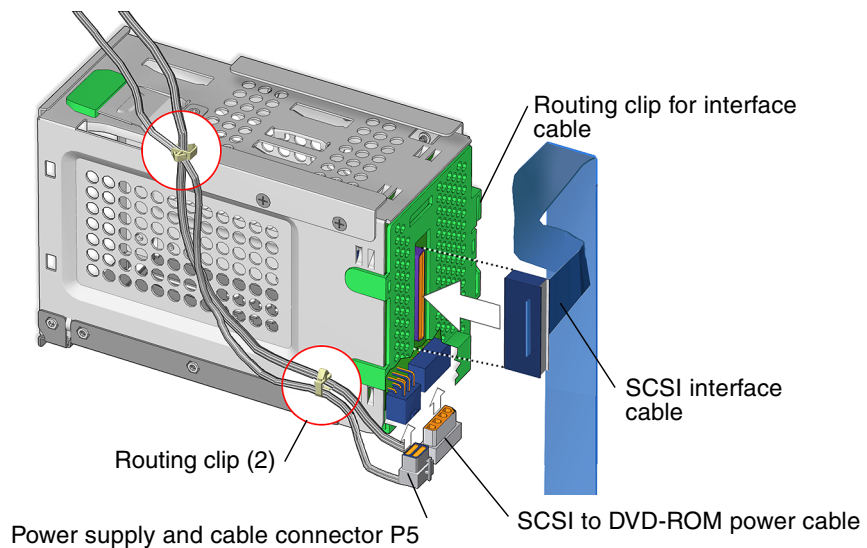
Align the SCSI backplane cover so that, when in place, the SCSI backplane interface connector is accessible. Align the left side SCSI backplane cover tabs with the left side slots on the hard drive bracket. Set the cover over the hard drive bracket. Press until the tabs click on both sides of the SCSI backplane cover.



**FIGURE 13-29** Installing the SCSI Backplane Cover

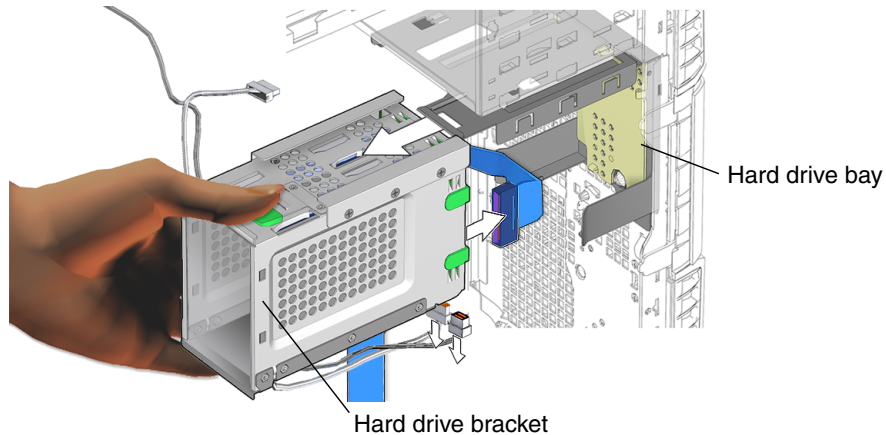
**7. Connect and route the interface cable (FIGURE 13-30).**

Connect the interface cable to the SCSI backplane connector. Route the SCSI interface cable through the routing clip on the green plastic SCSI backplane cover.



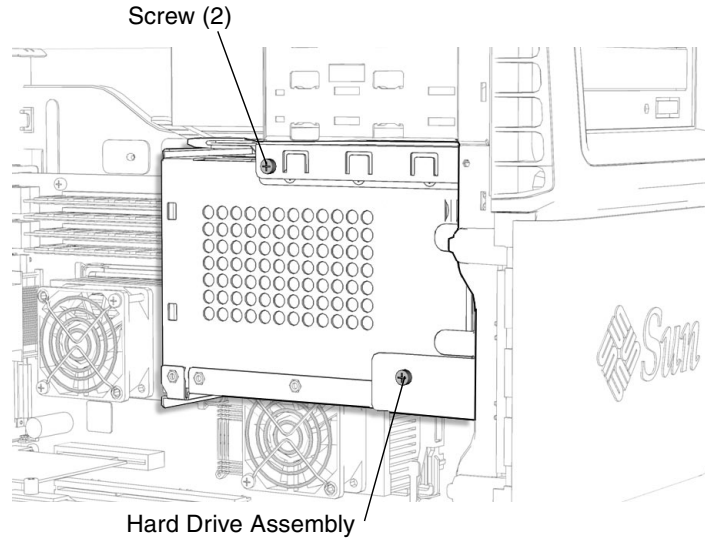
**FIGURE 13-30** Connecting the Hard Drive Assembly Cables

8. Reconnect power cables (FIGURE 13-30).
  - a. Connect power supply power cable connector P5 and the SCSI to DVD-ROM power cable both cables to the SCSI backplane.
  - b. Route the cables through the two routing clips on the back and bottom sides of the hard drive bracket.
9. Slide the hard drive bracket into the hard drive bay until the latch clicks (FIGURE 13-31).



**FIGURE 13-31** Installing the Hard Drive Bracket Into the Hard Drive Bay

10. Install all hard drives into the hard drive bracket.  
See [Section 12.1.3, “Installing a Hard Drive”](#) on page 12-5.
11. Install the two screws for the hard drive assembly (FIGURE 13-32).



**FIGURE 13-32** Installing the Two Screws for the Hard Drive Assembly

You have finished replacing the SCSI backplane.

**12. Inspect the SCSI backplane and related component fasteners.**

- The SCSI backplane tabs are all secure and flat.
- The hard drive handles are flush and locked.
- The hard drives are tight into the SCSI backplane
- The hard drive bracket is locked into the hard drive bay.

**13. Inspect the SCSI backplane and related component cabling.**

- Both power cables are seated in the SCSI backplane.
- The SCSI interface cable is tight into the SCSI backplane.
- The interface cable is routed through the routing clip on the SCSI backplane cover.

**14. Replace the access panel, power on the system, and verify the component installation.**

See:

- [Section 15.4, “Replacing the Access Panel”](#) on page 15-6
- [Section 15.5, “Powering On the Workstation”](#) on page 15-7
- [Section 15.6, “Verifying an Installation”](#) on page 15-10

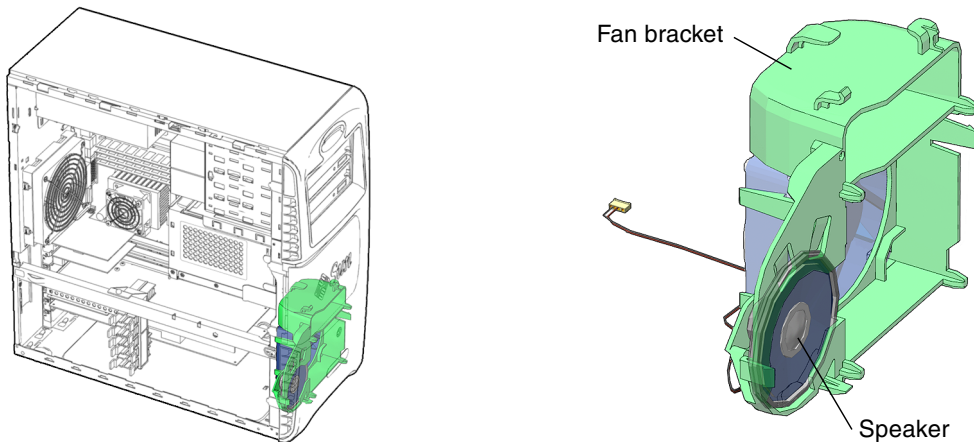
## 13.5 Replacing the Speaker

This section describes removal and installation of the speaker. Topics include:

- Section 13.5.1, “Identifying the Speaker” on page 13-34
- Section 13.5.2, “Removing the Speaker” on page 13-35
- Section 13.5.3, “Installing the Speaker” on page 13-36

### 13.5.1 Identifying the Speaker

The speaker is installed in the front of the chassis in a bracket that also contains the front fan. The speaker cable is connected to the motherboard connector (J16).



**FIGURE 13-33** Speaker Location and Identification

TABLE 13-4 lists speaker specifications.

**TABLE 13-4** Speaker Specifications

Specification	Value
Impedance	8 Ohm
Wattage (maximum power handling)	3.5W

## 13.5.2 Removing the Speaker

### 1. Power off the system and open the chassis.

See:

- Section 10.3, “Powering Off the Workstation” on page 10-4
- Section 10.4, “Removing the Access Panel” on page 10-12

### 2. Locate the speaker (FIGURE 13-33).

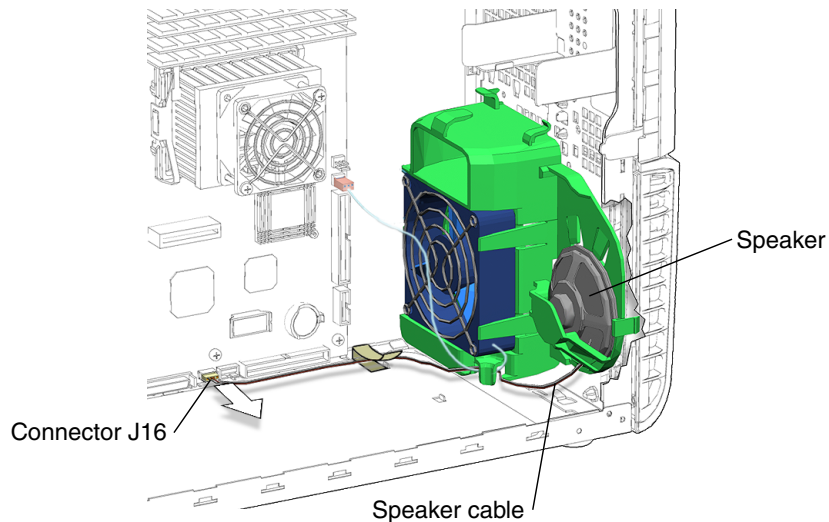
### 3. Disconnect the speaker cable (FIGURE 13-34).

The speaker cable is connected to the motherboard at connector J16.

---

**Note** – Check the speaker cable routing through the fan bracket and chassis. Upon reinstallation it will be necessary to correctly route the cable through the chassis.

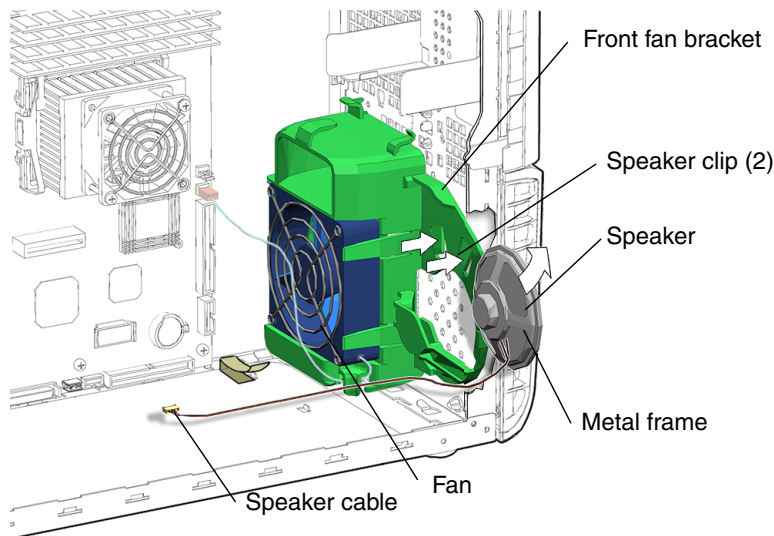
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**FIGURE 13-34** Disconnecting the Speaker Cable

### 4. Release the speaker (FIGURE 13-35).

Press down on the two speaker clips with one hand. Pull the metal frame of the speaker to the right until the speaker comes out of the front fan bracket.



**FIGURE 13-35** Removing the Speaker

You have removed the speaker.

Proceed to [Section 13.5.3, “Installing the Speaker”](#) on page 13-36.

---

**Note** – Do not operate the workstation without the speaker installed.

---

## 13.5.3 Installing the Speaker

**1. Open the chassis.**

See [Section 10.4, “Removing the Access Panel”](#) on page 10-12.

**2. Locate where the speaker is to be installed (FIGURE 13-33).**

**3. Remove the speaker from its packaging.**

**4. Align the speaker for installation (FIGURE 13-36).**

Rotate the speaker so that the speaker signal cable is down and to the left of the speaker.

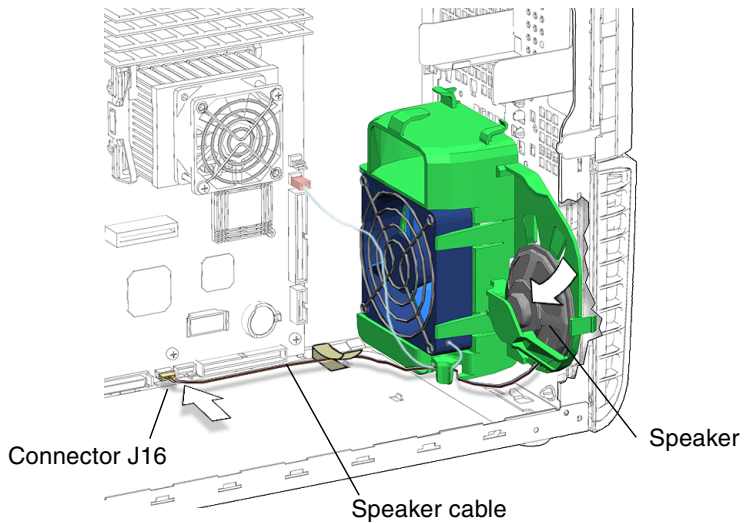
**5. Install the speaker.**

Push sideways on the metal frame of the speaker until it slides into the bracket and seats.



**6. Connect the speaker cable.**

Press the speaker signal cable connector into the speaker connector (J16) on the motherboard.



**FIGURE 13-36** Aligning and Installing the Speaker and Cable

**7. Inspect the speaker and related component fasteners.**

- The speaker is locked into position in the front fan bracket clips.

**8. Inspect the related component cabling.**

- The speaker cable to the motherboard connector is routed through the fan bracket and chassis.

**9. Replace the access panel, power on the system, and verify component installation.**

See:

- [Section 15.4, “Replacing the Access Panel”](#) on page 15-6
- [Section 15.5, “Powering On the Workstation”](#) on page 15-7
- [Section 15.6, “Verifying an Installation”](#) on page 15-10

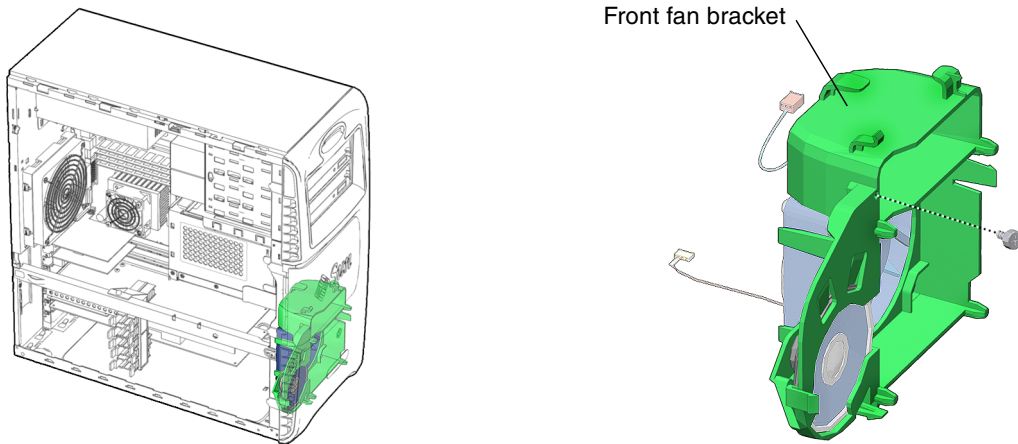
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## 13.6 Replacing the Front Fan Bracket

This section describes removal and installation of the front fan bracket. Topics include:

- [“Identifying the Front Fan Bracket” on page 38](#)
- [“Removing the Front Fan Bracket” on page 38](#)
- [“Installing the Front Fan Bracket” on page 40](#)

### 13.6.1 Identifying the Front Fan Bracket



**FIGURE 13-37** Front Fan Bracket Location and Identification

### 13.6.2 Removing the Front Fan Bracket

1. **Power off the system and open the chassis.**

See:

- [Section 10.3, “Powering Off the Workstation” on page 10-4](#)
- [Section 10.4, “Removing the Access Panel” on page 10-12](#)

2. **Remove the bezel.**

See [Section 10.5, “Removing the Bezel” on page 10-16](#).

3. **Locate the front fan bracket ([FIGURE 13-37](#)).**

4. Remove the front fan and the speaker.

See:

- Section 13.2.2, “Removing the Front Fan” on page 13-12
- Section 13.5.2, “Removing the Speaker” on page 13-35.

5. Remove the power switch and LED cable assembly from the chassis (FIGURE 13-38).

a. Remove the screw.

The screw is located behind front wall of the chassis.

b. Disconnect the power switch and LED cable assembly from the chassis.

Lift the power switch and LED cable assembly up to remove.

---

**Note** – It is not necessary to remove the power switch and LED cable assembly from the chassis. You are only trying to gain access to the screw that attaches the fan bracket to the chassis. See step 6.

---

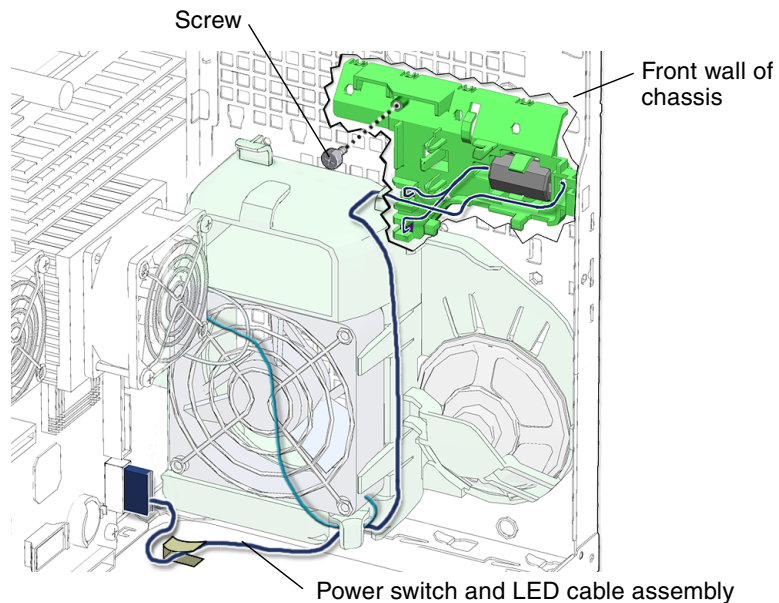
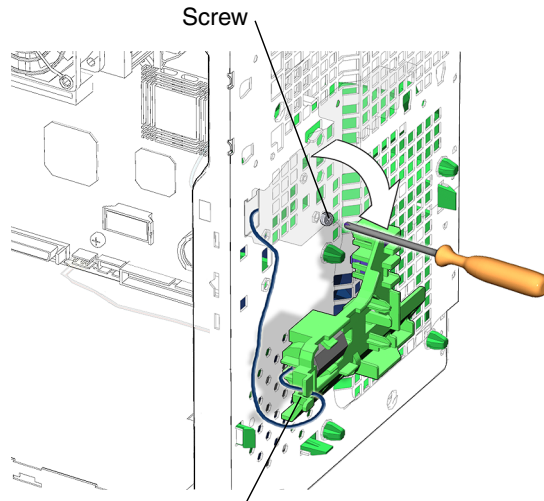


FIGURE 13-38 Removing the Power Switch and LED Cable Assembly from the Chassis

6. Remove the screw (FIGURE 13-39).

Loosen the screw that secures the fan bracket to the chassis.



Power switch and LED cable assembly

**FIGURE 13-39** Removing the Screw that Secures the Fan Bracket to the Chassis

**7. Remove the front fan bracket.**

Squeeze the three tabs that secure the front fan bracket to the chassis. Lift the front fan bracket up and out of the chassis.

You have removed the front fan bracket.

Proceed to [Section 13.6.3, "Installing the Front Fan Bracket"](#) on page 13-40.

## 13.6.3 Installing the Front Fan Bracket

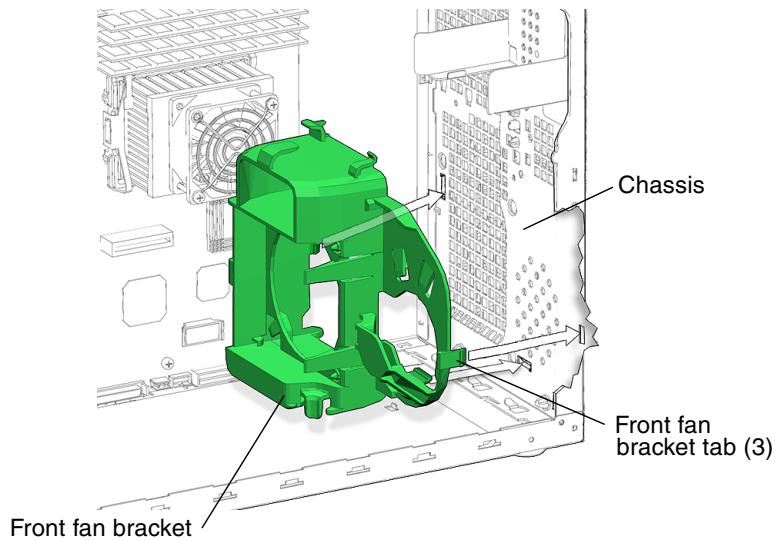
**1. Open the chassis.**

See [Section 10.4, "Removing the Access Panel"](#) on page 10-12.

**2. Locate where the front fan bracket is to be installed (FIGURE 13-37).**

**3. Install the front fan bracket (FIGURE 13-40).**

Align the three front fan bracket tabs with the inside of the chassis front panel. Press on the front fan bracket until it snaps into the chassis.



**FIGURE 13-40** Installing the Front Fan Bracket

**4. Install the screw (FIGURE 13-41).**

Tighten the screw that secures the fan bracket to the chassis.

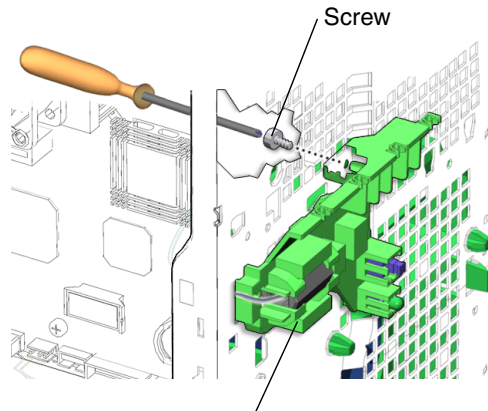
The front fan bracket is located behind the chassis wall.



**FIGURE 13-41** Installing the Screw for the Front Fan Bracket

**5. Install the power switch and LED cable assembly (FIGURE 13-42)**

Align the power switch and LED cable assembly tabs with the chassis cutouts. Press the power switch and LED cable assembly into place.



Power switch and LED cable assembly

**FIGURE 13-42** Installing the Power Switch and LED Cable Assembly

6. **Install the screw for the power switch and LED cable assembly** ([FIGURE 13-42](#))
7. **Install the front fan and the speaker.**  
See:
  - [Section 13.2.3, “Installing the Front Fan”](#) on page 13-14
  - [Section 13.5.3, “Installing the Speaker”](#) on page 13-36
8. **Replace the bezel.**  
See [Section 15.3, “Replacing the Bezel”](#) on page 15-4.
9. **Replace the access panel and power on the system.**  
See:
  - [Section 15.4, “Replacing the Access Panel”](#) on page 15-6
  - [Section 15.5, “Powering On the Workstation”](#) on page 15-7

---

## 13.7 Replacing the PCI Card Support and Chassis Cross Brace

This section describes removal and installation of the PCI card holder. Topics include:

- [“Identifying the PCI Card Support and Chassis Cross Brace”](#) on page 43
- [“Removing the PCI Card Support and Chassis Cross Brace”](#) on page 43
- [“Installing the PCI Card Support and Chassis Cross Brace”](#) on page 47

## 13.7.1 Identifying the PCI Card Support and Chassis Cross Brace

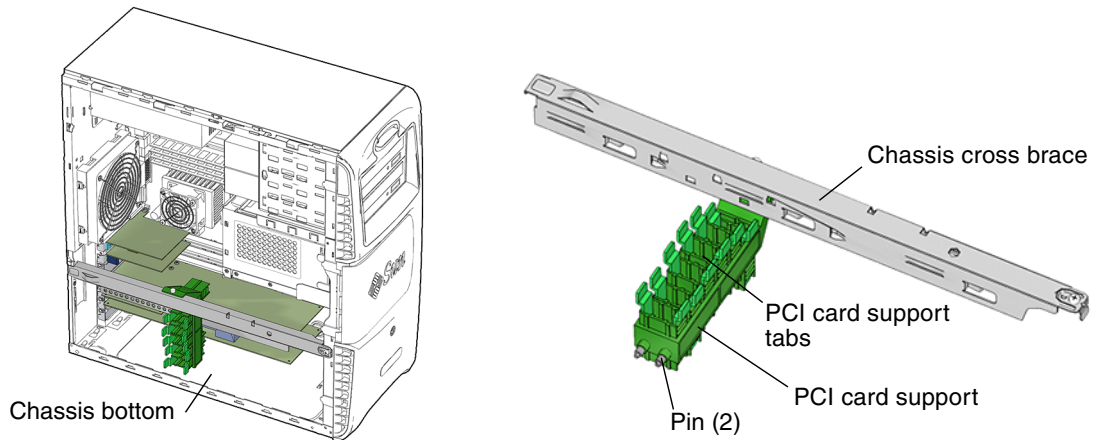
The PCI card support provides shock and vibration protection for long PCI cards. It supports the PCI cards with spring loaded tabs, one for each PCI card. It is fastened to the chassis cross brace.

---

**Note** – The chassis cross brace provides structural support to the chassis. Do *not* use it as a handle.

---

The PCI card support has two pins that are used to align the PCI card support with the bottom of the workstation chassis.



**FIGURE 13-43** PCI Card Support Location and Identification

## 13.7.2 Removing the PCI Card Support and Chassis Cross Brace

1. **Power off the system and open the chassis.**

See:

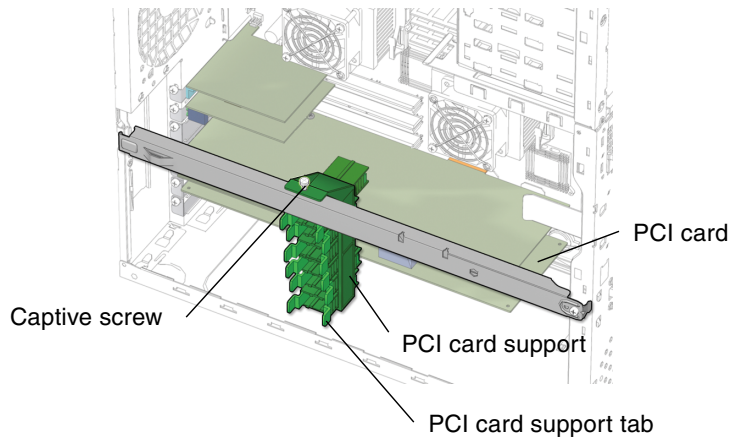
- [Section 10.3, “Powering Off the Workstation”](#) on page 10-4
- [Section 10.4, “Removing the Access Panel”](#) on page 10-12

2. **Locate the PCI card support and the chassis cross brace (FIGURE 13-43).**

The cross brace is the long metal bar that extends the width of the chassis. It is engaged in a slot on the chassis back panel and is fastened to the chassis front panel.

**3. Release the PCI card support fingers (FIGURE 13-44).**

Squeeze and pull the PCI card support tabs away from the PCI cards.



**FIGURE 13-44** Releasing the PCI Card Tabs

**4. Loosen the PCI card support (FIGURE 13-44).**

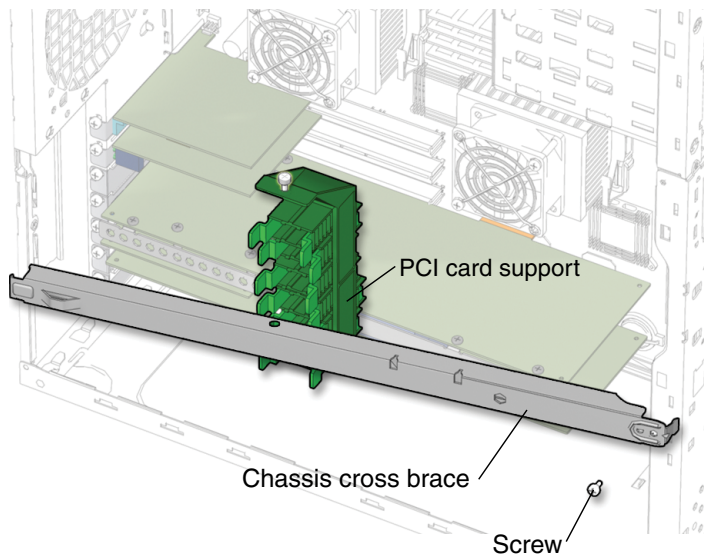
Loosen the captive screw that secures the PCI card support to the chassis cross brace. If necessary, use a No. 2 Phillips screwdriver to loosen the screw.

**5. Remove the screw (FIGURE 13-45).**

The screw is located on the right side of the chassis.

Using a No. 2 Phillips screwdriver, remove the screw that secures the chassis cross brace to the chassis. Set the screw aside in a container.





**FIGURE 13-45** Unfastening the Chassis Cross Brace

**6. Remove the chassis cross brace (FIGURE 13-46).**

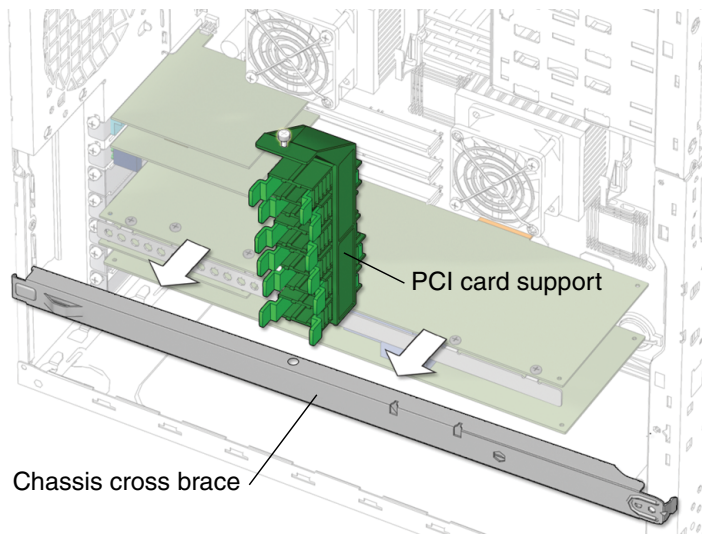
Lift the chassis cross brace up and off of the chassis. Set the chassis cross brace aside.

---

**Note** – Do *not* use the chassis cross brace as a handle.

---

**7. Remove the PCI card support from the chassis.**



**FIGURE 13-46** Removing Chassis Cross Brace and PCI Card Support

You have removed the PCI card support.

**8. Consider your next step(s):**

- If you removed the PCI card support and chassis cross brace prior to removing motherboard to replace it, return to [Section 11.6.2, “Removing the Motherboard” on page 11-44, Step 5](#) to continue the motherboard removal.
- If you removed the PCI card support and chassis cross brace prior to removing a PCI card to replace it, return to [Section 11.5.3, “Removing a PCI Card” on page 11-32, Step 3](#) to continue the PCI card removal.
- If you are reinstalling the PCI card support, proceed to [Section 13.7.3, “Installing the PCI Card Support and Chassis Cross Brace” on page 13-47](#).

---

**Note** – Do not operate the workstation without the PCI card support or chassis cross brace installed.

---

## 13.7.3 Installing the PCI Card Support and Chassis Cross Brace

### 1. Open the chassis.

See [Section 10.4, “Removing the Access Panel”](#) on page 10-12.

### 2. Locate where the PCI card support is to be installed ([FIGURE 13-43](#)).

### 3. Install the chassis cross brace ([FIGURE 13-47](#)).

Insert the cross brace tab into the slot on the left side of the chassis. Set the cross brace across the chassis and firmly seat the cross brace into the chassis. Using a No. 2 Phillips screwdriver, fasten the screw that secures the chassis cross brace to the chassis.

### 4. Align the PCI card support with the PCI cards.

Insert the PCI card support between connected chassis cross brace and the PCI cards. Align the PCI card support pins with the matching holes in the chassis.

---

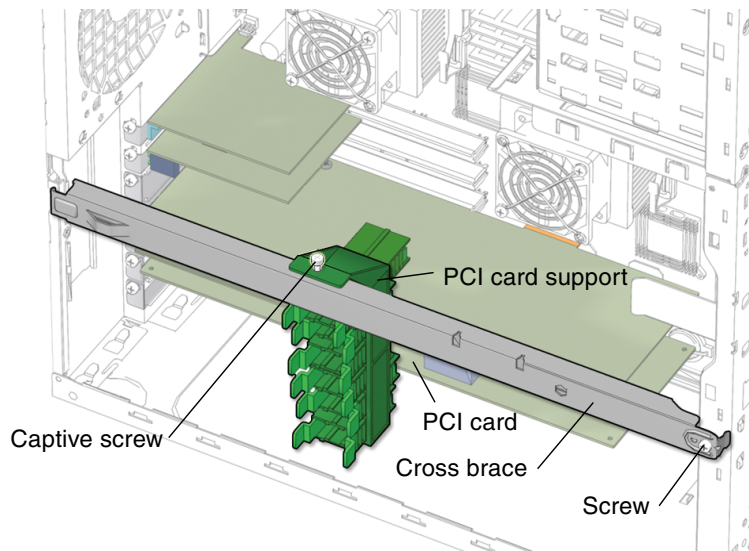
**Note** – There are two pairs of holes in the chassis bottom. These holes are used to align the PCI card support for short or long PCI cards.

---

---

**Note** – Do *not* use the chassis cross brace as a handle.

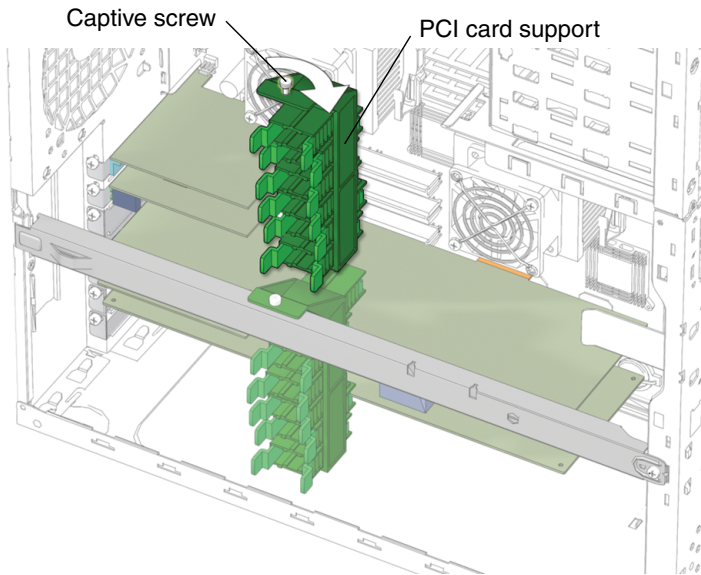
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**FIGURE 13-47** Aligning the PCI Card Support with the PCI Cards

**5. Fasten the PCI card support (FIGURE 13-48).**

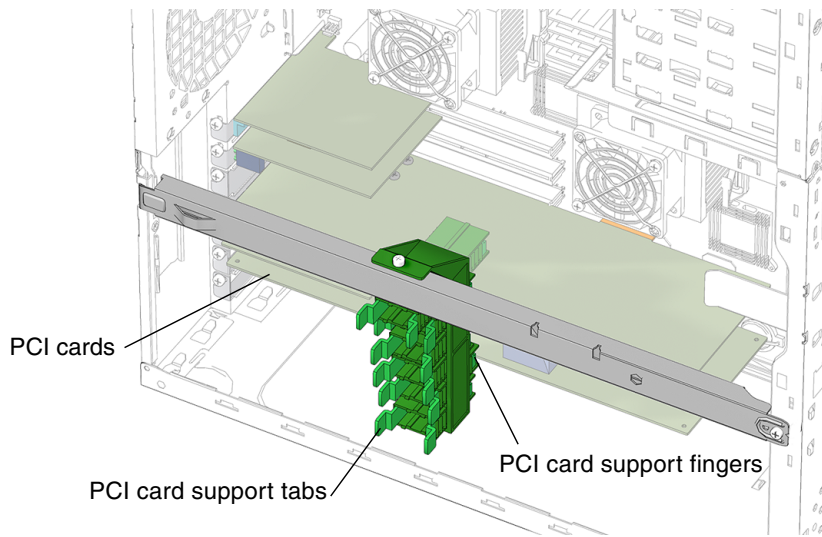
Tighten the captive screw that secures the PCI card support to the chassis cross brace.



**FIGURE 13-48** Fastening the PCI Card Support

**6. Secure the PCI cards with the PCI card support fingers (FIGURE 13-49).**

Squeeze each PCI card support tab and move the tabs toward the installed PCI cards. Align the PCI cards with the appropriate PCI card support fingers.



**FIGURE 13-49** Aligning the PCI Card Support Tabs

**7. Inspect the PCI card support and related component fasteners.**

- The PCI card support is fastened tight to the chassis cross brace.
- The chassis cross brace is fastened tight to the chassis.
- The PCI card support fingers are snug against each respective PCI card.

**8. Consider your next step(s):**

- If you removed the PCI card support and chassis cross brace prior to removing motherboard to replace it, return to [Section 11.6.2, “Removing the Motherboard” on page 11-44, Step 5](#) to continue the motherboard removal.
- If you are only reinstalling the PCI card support and chassis cross brace, proceed to [Step 9](#) of this procedure.

**9. Replace the access panel and power on the system.**

See:

- [Section 15.4, “Replacing the Access Panel” on page 15-6.](#)
- [Section 15.5, “Powering On the Workstation” on page 15-7.](#)

---

## 13.8 Replacing the System Drive Rails

This section describes removal and installation of the drive rails. Topics include:

- Section 13.8.1, “Identifying the System Drive Rails” on page 13-50.
- Section 13.8.2, “Removing System Drive Rails” on page 13-51.
- Section 13.8.3, “Installing System Drive Rails” on page 13-52.

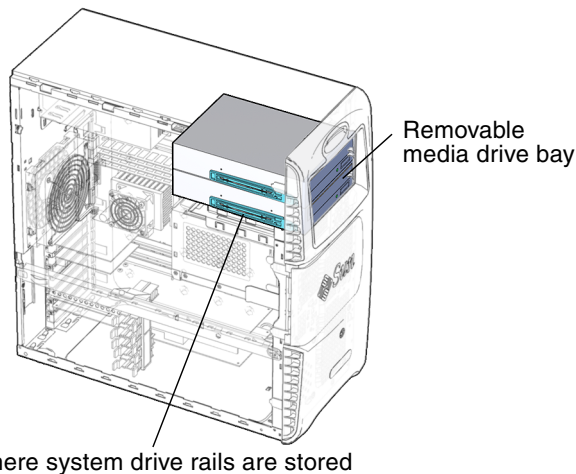
### 13.8.1 Identifying the System Drive Rails

The Sun Blade 2500 workstation supports up to two media drives. The drive rails guide the media drives into the removable media drive bay (FIGURE 13-50). When you are not using a media bay, the corresponding drive rails are stored on the side of the hard drive bay.

---

**Note** – The instructions in this section apply to any removable media drive, such as a CD-ROM, tape, or DVD drive.

---



**FIGURE 13-50** Drive Rails Location and Identification

## 13.8.2 Removing System Drive Rails

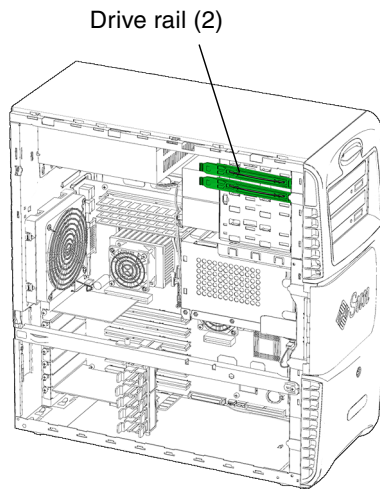
### 1. Power off the system and open the chassis.

See:

- Section 10.3, “Powering Off the Workstation” on page 10-4
- Section 10.4, “Removing the Access Panel” on page 10-12

### 2. Locate the drive rails (FIGURE 13-51).

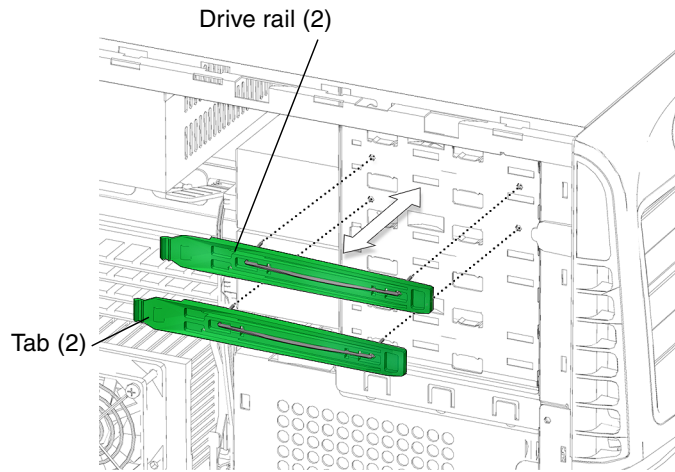
The drive rails are on the side of the removable media drive bay.



**FIGURE 13-51** Location of Drive Rails

### 3. Remove the drive rails (FIGURE 13-52).

Lift the tabs to remove the rail(s).



**FIGURE 13-52** Removing the Drive Rails

You have removed the drive rails from the workstation.

**4. Consider your next step(s).**

- If you removed the workstation drive rails to install them on a new media drive proceed to step 3, [Section 13.8.3, “Installing System Drive Rails” on page 13-52](#).
- If you removed the workstation drive rails to replace them, install the replacement drive rails into their storage position on side of the media bay and advance to step 5 of this procedure.

**5. Replace the access panel, and power on the system.**

See:

- [Section 15.4, “Replacing the Access Panel” on page 15-6](#)
- [Section 15.5, “Powering On the Workstation” on page 15-7](#)

## 13.8.3 Installing System Drive Rails

**1. Power off the system and open the chassis.**

See:

- [Section 10.3, “Powering Off the Workstation” on page 10-4](#)
- [Section 10.4, “Removing the Access Panel” on page 10-12](#)

**2. Remove the spare drive rails from their storage position, if needed (FIGURE 13-52).**

The drive rails are stored on the side of the inside of the removable media drive bay. Unsnap them from their storage location.

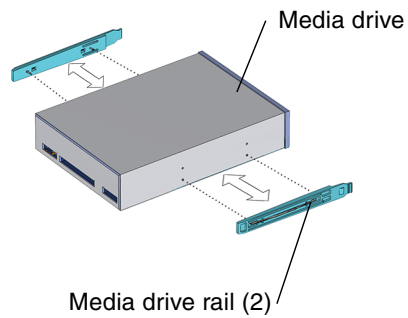


**3. Locate the media drive.**

Whether you are replacing an existing media drive or installing a new second media drive, see the appropriate replacement procedure in this manual.

**4. Install the drive rails (FIGURE 13-53).**

Snap the drive rails, removed from the old media drive, into the lower pair of holes on both sides of the media drive. The drive rail squeeze tabs are toward the front of the media drive slot.



**FIGURE 13-53** Installing Drive Rails on a Media Drive

You have installed the drive rails.



## Replacing Internal Cables

---

This chapter describes the remove and replace procedures for the Sun Blade 2500 workstation replaceable internal cables.

The procedures described in this chapter are written for workstation service providers and system administrators.

This section contains the following topics:

- Section 14.1, “Replacing the Smart Card Reader Cable” on page 14-3
- Section 14.2, “Replacing the DVD-ROM Drive Cables” on page 14-5
- Section 14.4, “Replacing the SCSI Backplane Cables” on page 14-11
- Section 14.5, “Replacing the Power Switch and LED Cable Assembly” on page 14-19



**Caution** – Follow the cautions, warnings, and instructions in the *Sun Blade 2500 Workstation Safety and Compliance Guide* (816-2061). The document is available at: <http://www.sun.com/documentation>

---



**Caution** – The procedures in this chapter are described with the workstation chassis in an upright position. If you perform any of the procedures in this chapter with the chassis in its upright position, use care to ensure you do not tip over the chassis.

---



**Caution** – When servicing or removing workstation components, attach an antistatic strap to your wrist and then to a metal area on the chassis. Then disconnect the power cord from the workstation and the wall receptacle. Following this caution equalizes all electrical potentials with the workstation.

---

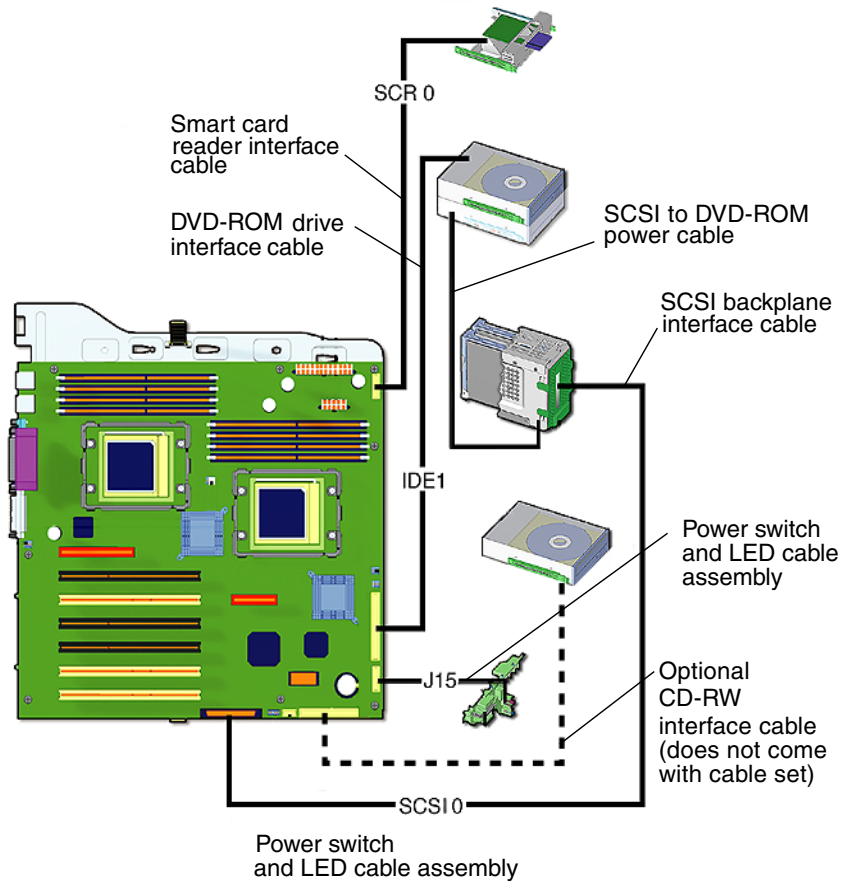
The Sun Blade 2500 replaceable cables come as set (FIGURE 14-1). The replaceable cable set includes:

- DVD-ROM drive interface cable, from IDE1 to the DVD-ROM (media drives)
- SCSI backplane interface cable, from SCSI0 on the motherboard to the SCSI backplane
- Power switch and LED cable assembly, from connector J15 to the power switch and LED
- Smart card reader interface cable, from connector SCR0 to the Smart card reader
- SCSI to DVD-ROM power cable, from SCSI backplane to DVD-ROM drive

---

**Note** – Power for the DVD-ROM drive is provided by a 4-pin power cable from the SCSI backplane to the DVD-ROM.

---



**FIGURE 14-1** Sun Blade 2500 Interface and Power Cables

---

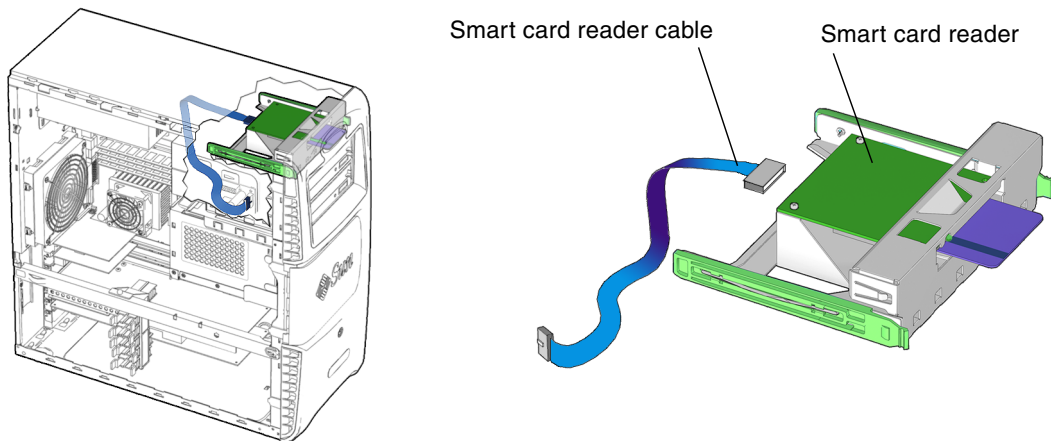
## 14.1 Replacing the Smart Card Reader Cable

This section describes removal and installation of the smart card reader cable. Topics include:

- [Section 14.1.1, “Identifying the Smart Card Reader Cable” on page 14-3](#)
- [Section 14.1.2, “Removing the Smart Card Reader Cable” on page 14-3](#)
- [Section 14.1.3, “Installing the Smart Card Reader Cable” on page 14-5](#)

### 14.1.1 Identifying the Smart Card Reader Cable

The smart card cable connects the smart card reader to the motherboard. It is a 10 conductor, signal (data) ribbon cable ([FIGURE 14-2](#)).



**FIGURE 14-2** Smart Card Reader Location and Identification

### 14.1.2 Removing the Smart Card Reader Cable

1. **Power off the system and open the chassis.**

See:

- [Section 10.3, “Powering Off the Workstation” on page 10-4](#)
- [Section 10.4, “Removing the Access Panel” on page 10-12](#)

**2. Locate the smart card reader interface cable (FIGURE 14-3).**

The smart card reader is located in the front of the chassis. The smart card reader has a single interface cable.

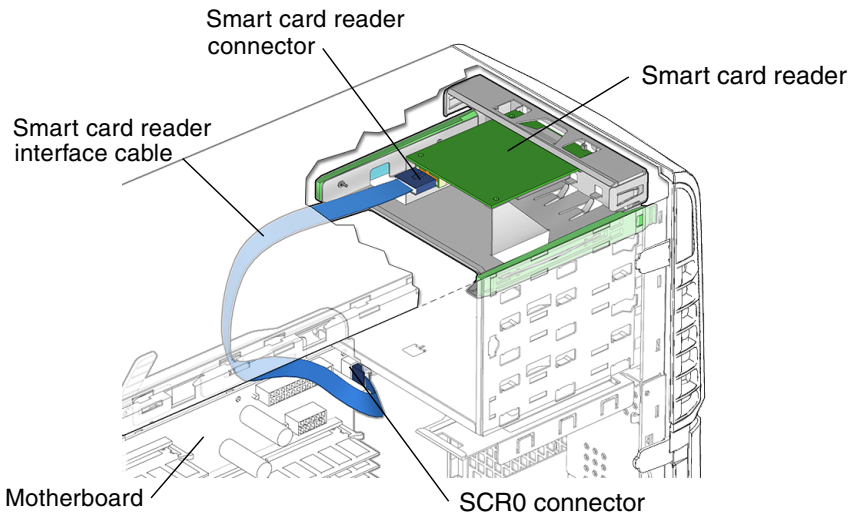
---

**Note** – Before removing the smart card reader cable, note its routing in the chassis.

---

**3. Disconnect the interface cable from the motherboard.**

The smart card reader interface cable is connected to the motherboard at connector SCR0 and at the back of the smart card reader.



**FIGURE 14-3** Removing the Smart Card Reader Cable

**4. Remove the interface cable from the smart card reader and the motherboard.**

Use the connector tab to disconnect the smart card reader interface cable from the connector on the smart card reader. Remove the cable from the chassis and set it aside.

You have removed the smart card reader cable.

Proceed to [Section 14.1.3, “Installing the Smart Card Reader Cable”](#) on page 14-5.

---

**Note** – The smart card reader cannot operate without the interface cable.

---

## 14.1.3 Installing the Smart Card Reader Cable

**1. Open the chassis.**

See [Section 10.4, “Removing the Access Panel”](#) on page 10-12.

**2. Locate where the smart card reader cable is to be installed (FIGURE 14-2).**

The smart card reader cable is connected to the back of the smart card reader and to the motherboard at connector SCR0.

**3. Remove the smart card reader cable from its packaging.**

**4. Connect the interface cable to the smart card reader (FIGURE 14-3).**

Connect the interface cable to the smart card reader connector.

**5. Route the interface cable through the chassis.**

---

**Note** – The interface cable is a flat cable. It can be bent to fit, but use caution not to twist the cable unnecessarily.

---

Route the interface cable to the upper front corner of the motherboard.

**6. Connect the interface cable to the motherboard at connector SCR0.**

**7. Inspect the cabling.**

- The interface cable is routed correctly, with no of kinks.
- The hard interface cable is secure in the smart card reader connector.
- The hard interface cable is secure in the motherboard connector SCR0.

**8. Replace the access panel and power on the system.**

See:

- [Section 15.4, “Replacing the Access Panel”](#) on page 15-6
- [Section 15.5, “Powering On the Workstation”](#) on page 15-7

---

## 14.2 Replacing the DVD-ROM Drive Cables

This section describes removal and installation of the DVD-ROM drive interface and power cables. Topics include:

- [Section 14.2.1, “Identifying DVD-ROM Drive Cables”](#) on page 14-6
- [Section 14.3, “Removing the DVD-ROM Drive Cables”](#) on page 14-7
- [Section 14.3.1, “Installing the DVD-ROM Drive Cables”](#) on page 14-9

## 14.2.1 Identifying DVD-ROM Drive Cables

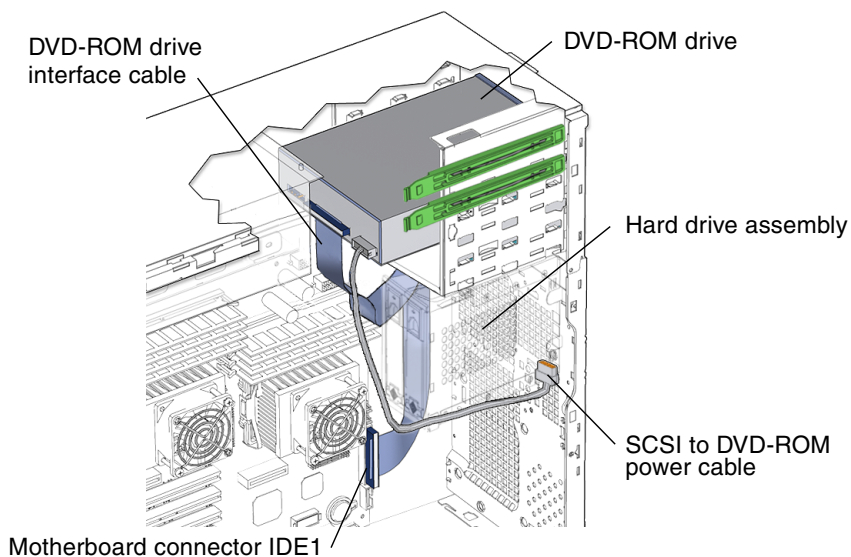
The DVD-ROM drive has separate power and interface cables. The power cable is routed from the 4-pin connector on the SCSI backplane to the DVD-ROM drive (FIGURE 14-4).

The interface cable for the DVD-ROM connects the removable media drive to the motherboard. The interface cable is a 40 conductor ribbon cable that is routed through the chassis from IDE1 to the DVD-ROM drive.

---

**Note** – The instructions in this section apply to any removable media drive, such as a CD-RW, tape, or DVD-ROM drive.

---



**FIGURE 14-4** DVD-ROM Drive Power and Interface Cables Location and Identification



---

## 14.3 Removing the DVD-ROM Drive Cables

1. **Power off the system and open the chassis.**

See:

- [Section 10.3, “Powering Off the Workstation” on page 10-4](#)
- [Section 10.4, “Removing the Access Panel” on page 10-12](#)

2. **Locate the DVD-ROM drive interface cable (FIGURE 14-4).**

The DVD-ROM drive is located in the front of chassis. The DVD-ROM drive interface cable is located to the back of the DVD-ROM drive.

3. **Disconnect the DVD-ROM drive interface cable from the DVD-ROM drive.**

Disconnect the interface cable from the DVD-ROM drive.

---

**Note** – Before removing the DVD-ROM cables, note their routing in the chassis.

---

4. **Remove the front fan bracket.**

See [Section 13.6.2, “Removing the Front Fan Bracket” on page 13-38](#).

5. **Disconnect the DVD-ROM drive interface cable from motherboard connector IDE1 (FIGURE 14-4).**

6. **Remove the interface cable from the chassis.**

---

**Note** – The interface cable is a preformed flat cable. Do not to twist the cable unnecessarily.

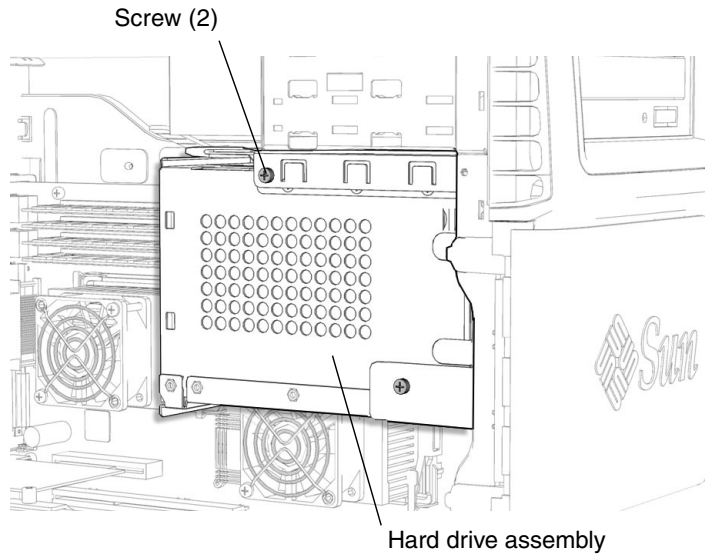
---

The interface cable is routed along the back of the chassis, under the front fan assembly and up into the DVD-ROM drive.

7. **Disconnect the SCSI to DVD-ROM power cable (FIGURE 14-4).**

Disconnect the 4-pin SCSI to DVD-ROM power cable from DVD-ROM.

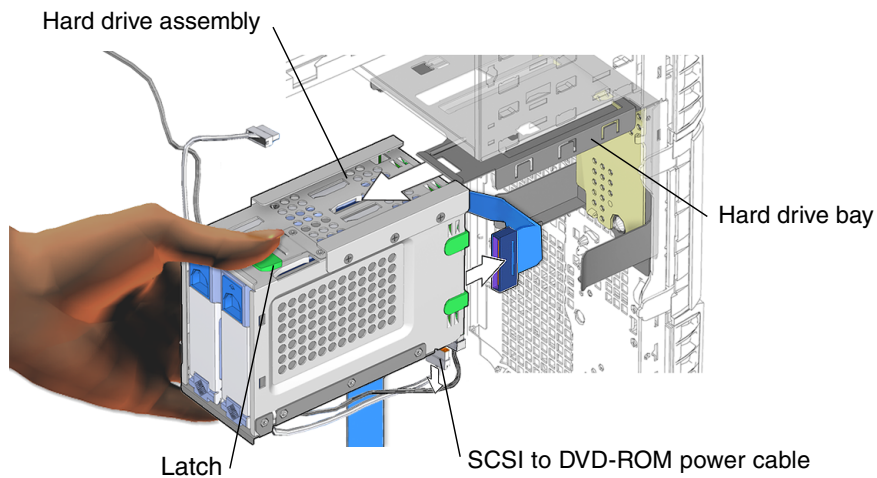
8. **Remove the two screws for the hard drive assembly (FIGURE 14-5).**



**FIGURE 14-5** Removing the Two Screws for the Hard Drive Assembly

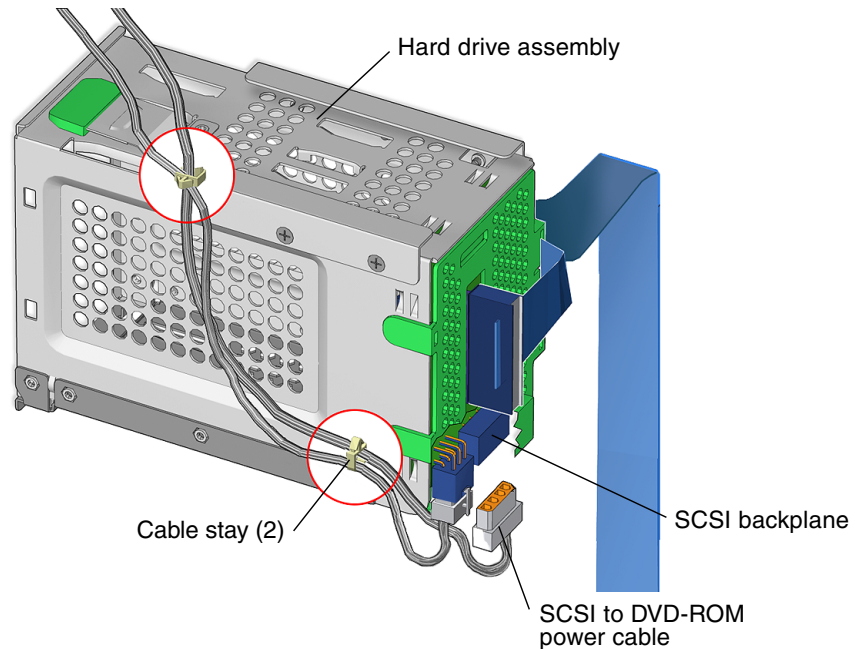
**9. Remove the hard drive assembly from the hard drive bay (FIGURE 14-6).**

Press down on the green plastic latch at the top of the hard drive assembly, and slide the hard drive assembly out of the hard drive bay.



**FIGURE 14-6** Removing the Hard Drive Bracket Assembly

10. Remove the SCSI to DVD-ROM cable assembly from the cable stays (FIGURE 14-7). The SCSI to DVD-ROM power cable is routed through the two cable stays on back of the hard drive assembly.



**FIGURE 14-7** Removing the SCSI to DVD-ROM Cable Assembly from the Cable Stays

11. Disconnect the SCSI to DVD-ROM cable from the SCSI backplane.

You have removed the DVD-ROM interface cable and the SCSI to DVD-ROM drive power cable.

Proceed to [Section 14.3.1, “Installing the DVD-ROM Drive Cables”](#) on page 14-9.

---

**Note** – The DVD-ROM drive cannot operate without the interface cable.

---

## 14.3.1 Installing the DVD-ROM Drive Cables

1. Open the chassis.

See [Section 10.4, “Removing the Access Panel”](#) on page 10-12.

2. **Locate where the DVD-ROM drive interface cable is to be installed (FIGURE 14-4).**  
The DVD-ROM drive has two cables: the interface cable and the power cable.
3. **Connect the interface cable to the DVD-ROM drive (FIGURE 14-4).**  
Connect the interface cable to the DVD-ROM drive interface connector.
4. **Route the interface cable through the chassis.**

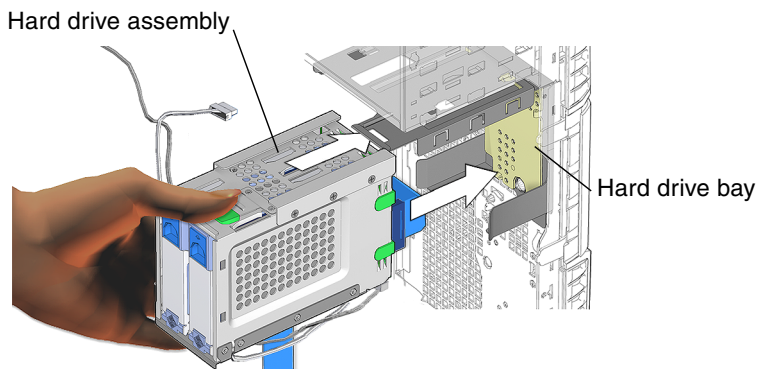
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**Note** – The interface cable is a preformed flat cable. Do not to twist the cable unnecessarily.

---

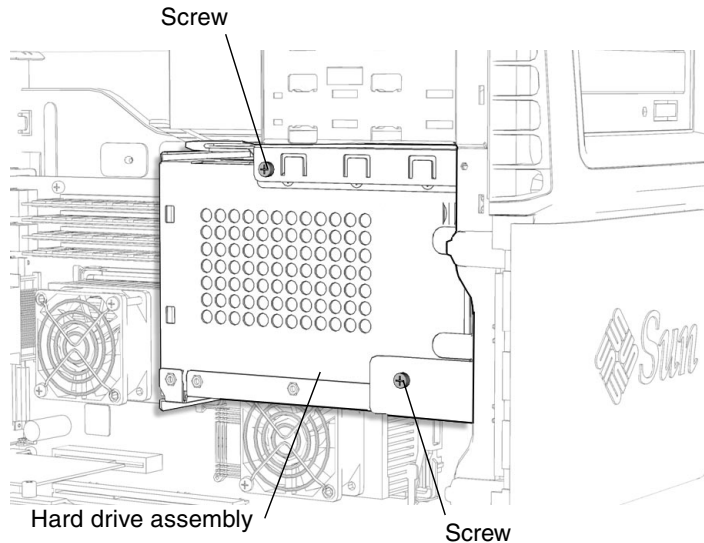
Route the interface cable along the back of the chassis, under the front fan assembly and up to the motherboard connector IDE1.

5. **Connect the interface cable into the motherboard connector IDE1 (FIGURE 14-4).**
6. **Install the fan bracket.**  
See, [Section 13.6.3, “Installing the Front Fan Bracket”](#) on page 13-40.
7. **Connect the 4-pin SCSI to DVD-ROM power cable to the SCSI backplane (FIGURE 14-7).**
8. **Install the SCSI to DVD-ROM power cable assembly into the routing clips (FIGURE 14-7).**  
Route the 4-pin cable assembly through the cable stays on the hard drive assembly.
9. **Install the hard drive assembly into the hard drive bay (FIGURE 14-8)**



**FIGURE 14-8** Installing the Hard Drive Assembly into the Hard Drive Bay

10. **Install the two screws for the hard drive assembly (FIGURE 14-9).**



**FIGURE 14-9** Installing the Hard Drive Assembly Screws

**11. Inspect the cabling.**

- The DVD-ROM interface cable is routed correctly, with no kinks.
- The DVD-ROM interface cable is secure in the DVD-ROM drive connector.
- The DVD-ROM interface cable is secure in motherboard connector IDE1.
- The SCSI to DVD-ROM power cable is routed correctly through the cable stays.
- The SCSI to DVD-ROM power cable is securely attached to the SCSI backplane.
- The SCSI to DVD-ROM power cable is securely attached to the DVD-ROM drive.

**12. Replace the access panel and power on the system.**

See:

- [Section 15.4, “Replacing the Access Panel” on page 15-6](#)
- [Section 15.5, “Powering On the Workstation” on page 15-7](#)

---

## 14.4 Replacing the SCSI Backplane Cables

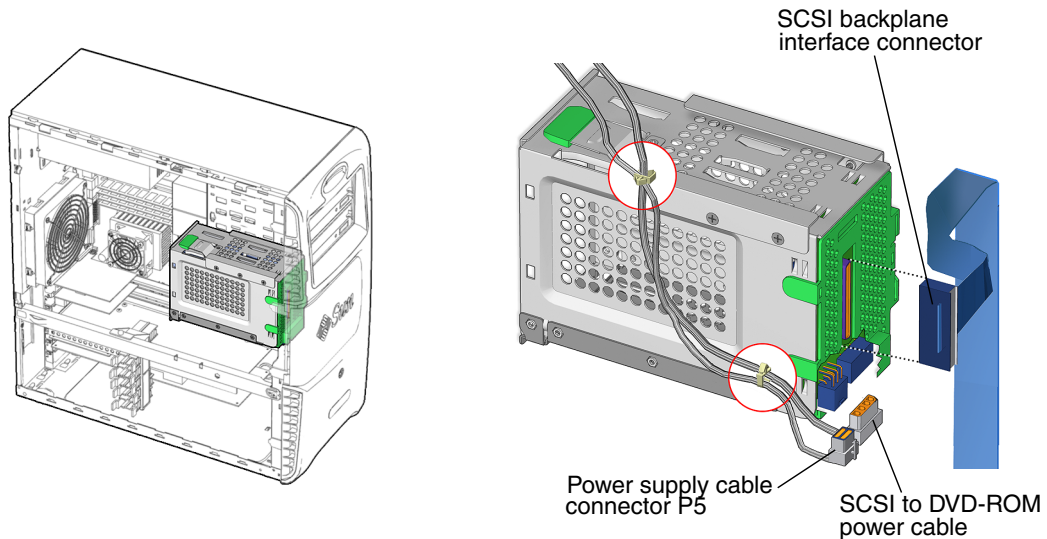
This section describes removal and installation of the SCSI interface and power cables. Topics include:

- [Section 14.4.1, “Identifying the SCSI Backplane Cables” on page 14-12](#)
- [Section 14.4.2, “Removing SCSI Backplane Cables” on page 14-12](#)
- [Section 14.4.3, “Installing the SCSI Backplane Cables” on page 14-16](#)

## 14.4.1 Identifying the SCSI Backplane Cables

The hard drives have separate power and interface cables ([FIGURE 14-10](#)):

- A 68-pin interface cable is used to connect the SCSI0 connector on the motherboard to the SCSI backplane connector. This ribbon cable that is routed from the motherboard through the chassis to the SCSI backplane.
- A 4-pin power cable connects the SCSI backplane to the DVD-ROM drive.
- A second, 6-pin power supply cable and connector P5 is hard wired at the power supply. To replace this power supply and connector cable you must replace the power supply.



**FIGURE 14-10** Hard Drive Cable Location and Identification

## 14.4.2 Removing SCSI Backplane Cables

1. **Power off the system and open the chassis.**

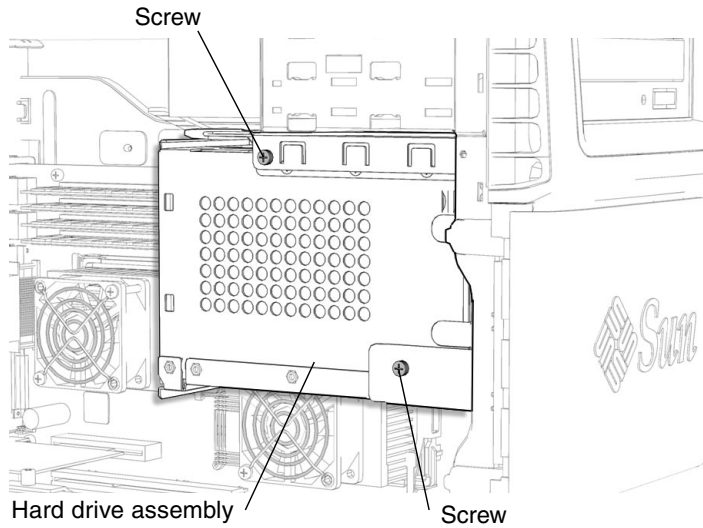
See:

- [Section 10.3, “Powering Off the Workstation” on page 10-4](#)
- [Section 10.4, “Removing the Access Panel” on page 10-12](#)

2. **Remove the hard drive assembly ([FIGURE 14-12](#)).**

To access the SCSI interface cable, the hard drive assembly must be removed from the hard drive bay.

- a. **Remove the two screws ([FIGURE 14-11](#)).**



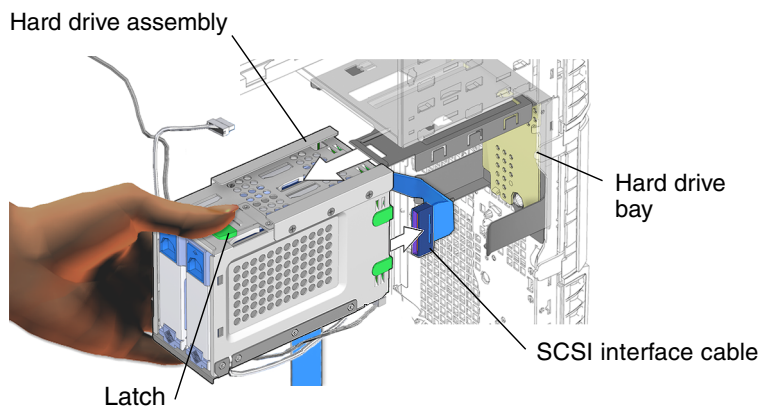
**FIGURE 14-11** Removing the Two Hard Drive Assembly Screws

- b. Press down on the green plastic latch at the top of the hard drive bracket and slide the hard drive bracket out of the bracket mounting rails ([FIGURE 14-12](#)).
- c. Set the bracket aside carefully, ensuring that the power and interface cables are still connected.

---

**Note** – You do not need to remove the hard drive or the SCSI backplane from the hard drive assembly.

---



**FIGURE 14-12** Removing the Hard Drive Assembly



## 14.4.2.1 Removing the SCSI Backplane Interface Cable

### 3. Locate the SCSI interface cable (FIGURE 14-12).

The SCSI interface cable connector is not visible until the hard drive assembly is removed.

### 4. Disconnect the SCSI interface cable from the hard drive assembly.

Disconnect the SCSI interface cable from the SCSI backplane and release the interface cable from the SCSI backplane bracket cable routing clip.

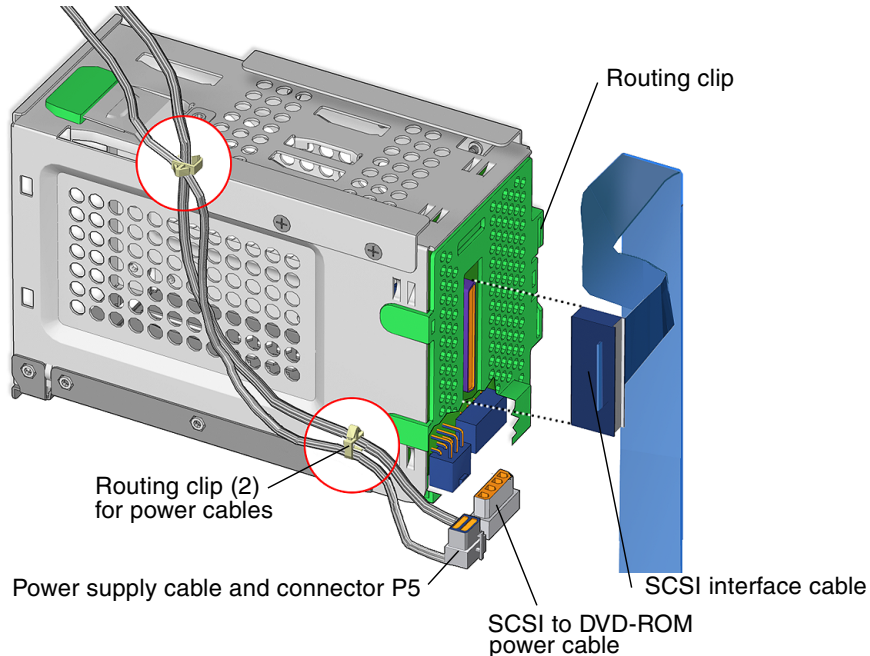


FIGURE 14-13 SCSI Interface and Power Cables

### 5. Release the SCSI interface cable from the routing clip (FIGURE 14-13).

---

**Note** – The interface cable is a preformed flat cable. Do not to twist the cable unnecessarily.

---

---

**Note** – The routing clip is easily damaged.

---

The interface cable is routed from the motherboard, along the bottom of the chassis, under the front fan assembly, and up to the SCSI backplane.



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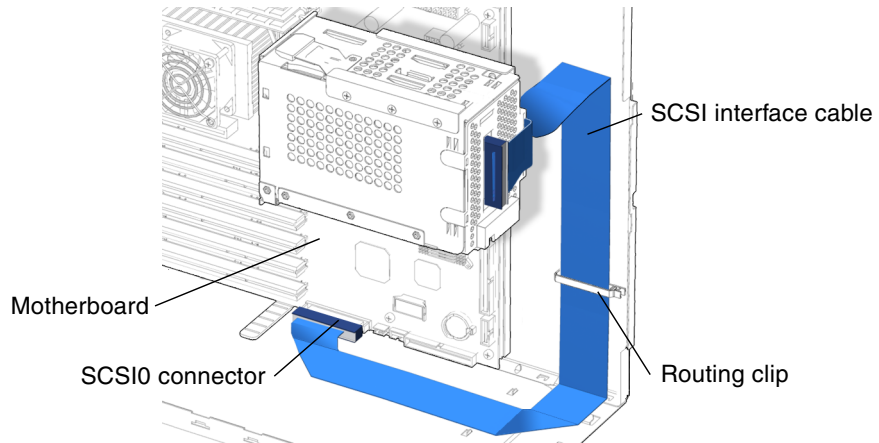
**Note** – Before removing the hard drive cables, note their routing in the chassis.

---

**6. Remove the front fan bracket.**

See, [Section 13.6.2, “Removing the Front Fan Bracket”](#) on page 13-38.

**7. Disconnect the SCSI interface cable from the motherboard (SCSI0 connector).**



**FIGURE 14-14** Disconnecting the SCSI Interface Cable From the Motherboard

### 14.4.2.2 Removing the SCSI to DVD-ROM Power Cable

**8. Disconnect the 4-pin SCSI to DVD-ROM power cable ([FIGURE 14-13](#)).**

**9. Remove the SCSI to DVD-ROM power cable from the routing clips.**

### 14.4.2.3 Removing Power Supply and Cable Connector P5

**10. Disconnect 6-pin power cable P5 from the SCSI backplane ([FIGURE 14-13](#)).**

**11. Remove 6-pin power cable P5 from the routing clips.**

You have removed the interface and SCSI to DVD-ROM power cables and the power supply and cable connector P5 from the hard drive assembly.

Proceed to [Section 14.4.3, “Installing the SCSI Backplane Cables”](#) on page 14-16.

---

**Note** – The hard drive cannot operate without the interface and power cables.

---

## 14.4.3 Installing the SCSI Backplane Cables

---

**Note** – The hard drive interface cable is also known as the SCSI interface cable.

---

### 1. Open the chassis.

See [Section 10.4, “Removing the Access Panel”](#) on page 10-12.

### 2. Locate where the SCSI backplane cables are to be installed ([FIGURE 14-8](#)).

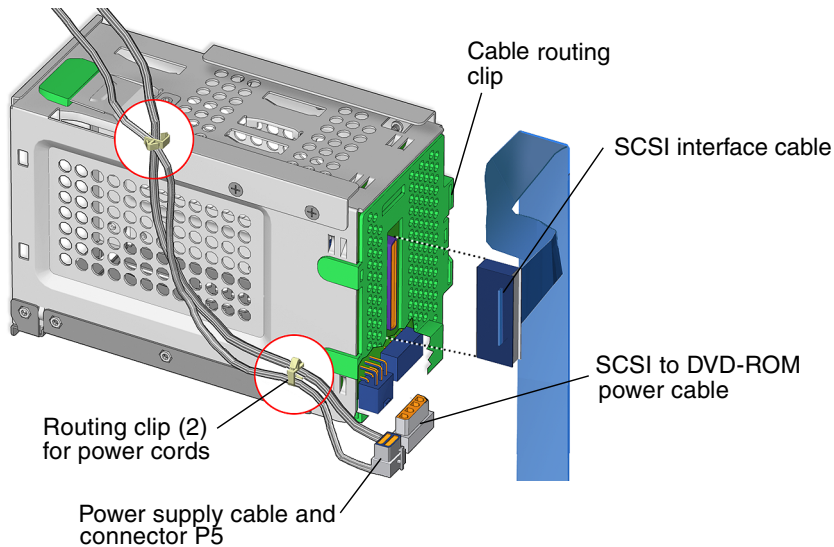
The hard drive assembly has three cables:

- SCSI interface cable
- SCSI to DVD-ROM power cable
- Power supply and cable connector P5

### 14.4.3.1 Installing the SCSI Backplane Interface Cable

#### 1. Connect the interface cable to the SCSI backplane ([FIGURE 14-15](#)).

Connect the SCSI interface cable from the SCSI backplane and route the interface cable through the SCSI backplane cable routing clip.



**FIGURE 14-15** Connecting the SCSI interface cable

#### 2. Route the interface cable through the chassis ([FIGURE 14-16](#)).

---

**Note** – The interface cable is a preformed flat cable. Do not to twist the cable unnecessarily.

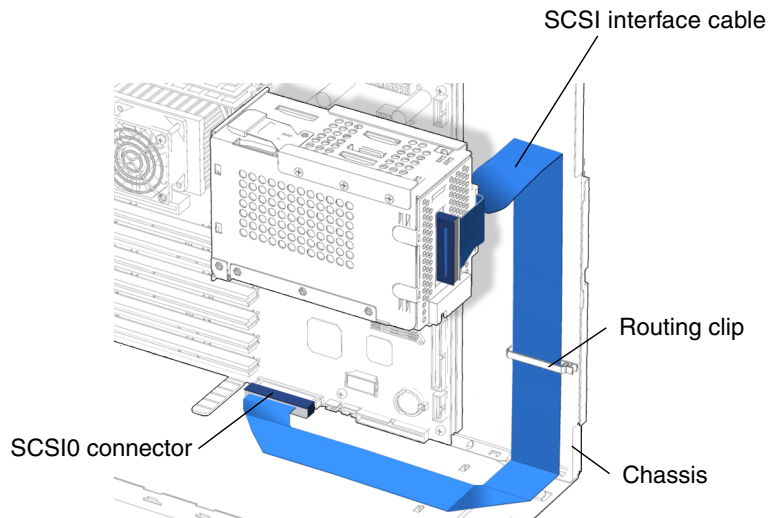
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**Note** – The cable routing clip is easily damaged.

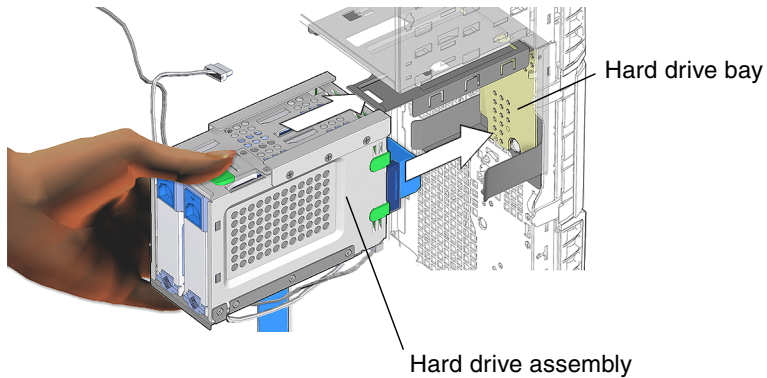
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Route the interface cable along the back of the chassis, under the front fan assembly and up to the motherboard connector (SCSI0).



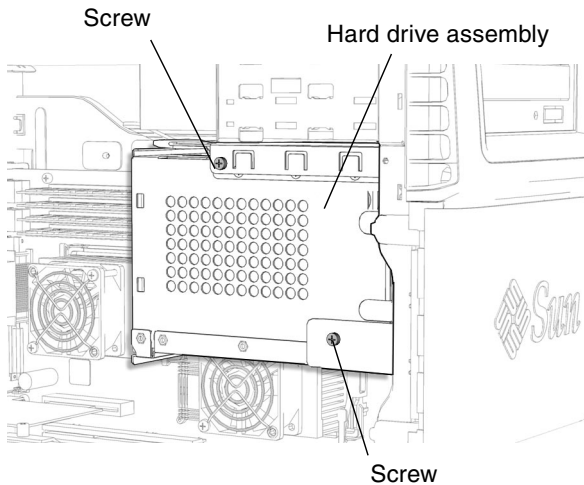
**FIGURE 14-16** Routing the SCSI Interface Cable Through the Chassis

3. **Connect the interface cable to motherboard connector SCSI0.**
4. **Install the hard drive assembly into the hard drive bay (FIGURE 14-17).**  
Slide the hard drive assembly into the hard drive bay until the latch clicks.



**FIGURE 14-17** Installing the Hard Drive Assembly

5. Install the two screws for the hard drive assembly (FIGURE 14-18).



**FIGURE 14-18** Installing the Hard Drive Assembly Screws

6. Install the front fan bracket.

See, [Section 13.6.3, “Installing the Front Fan Bracket”](#) on page 13-40.

### 14.4.3.2 Installing the SCSI to DVD-ROM Power Cable

7. Connect the 4-pin SCSI to DVD-ROM power cable (FIGURE 14-15).
8. Install the SCSI to DVD-ROM power cable into the routing clips.

### 14.4.3.3 Installing Power Supply Cable and Connector P5

9. **Connect 6-pin power cable connector P5 to the SCSI backplane** (FIGURE 14-15).

10. **Install the 6-pin power cable assembly into the routing clips.**

You have installed the interface, SCSI to DVD-ROM power, and power supply cables to the hard drive assembly.

11. **Inspect the cabling and connectors.**

- The interface cable is routed correctly, with no kinks.
  - The interface cable is secure in the routing clip.
  - The interface cable is secure in the SCSI interface connector.
  - The interface cable is secure in the motherboard connector SCSI0.
- The SCSI to DVD-ROM power cable is routed correctly, with no kinks.
  - The SCSI to DVD-ROM power cable is secure in the SCSI backplane connector.
  - The SCSI to DVD-ROM power cable is securely connected to the DVD-ROM drive.
  - The SCSI to DVD-ROM power cable is secure in the routing clips.
- The power supply cable and connector P5 is routed correctly, with no kinks.
  - The power cable is securely connected to the SCSI backplane.
  - The SCSI to DVD-ROM power cables is securely routed in the routing clips.

12. **Replace the access panel and power on the system.**

See:

- [Section 15.4, “Replacing the Access Panel” on page 15-6](#)
- [Section 15.5, “Powering On the Workstation” on page 15-7](#)

---

## 14.5 Replacing the Power Switch and LED Cable Assembly

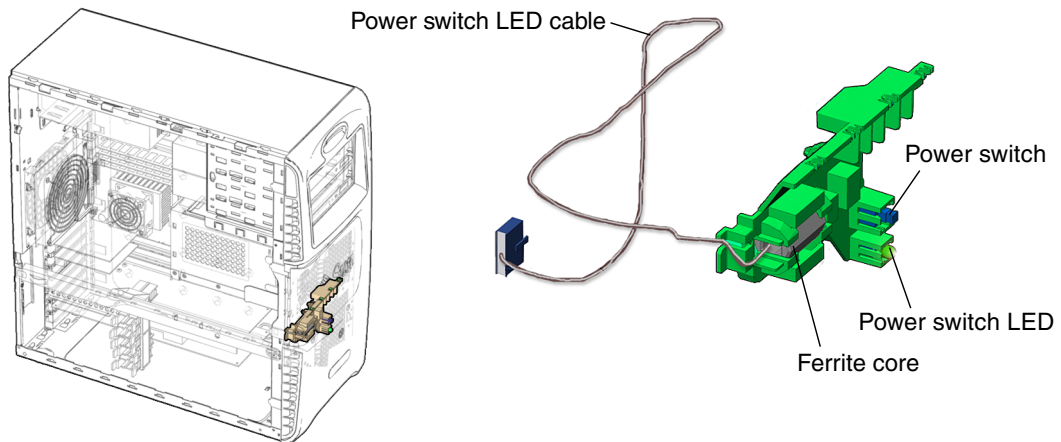
This chapter describes removal and installation of the power switch and LED cable assembly. Topics include:

- [Section 14.5.1, “Identifying the Power Switch and LED Cable Assembly” on page 14-20](#)
- [Section 14.5.2, “Removing the Power Switch and LED Cable Assembly” on page 14-21](#)
- [Section 14.5.3, “Installing the Power Switch and LED Cable Assembly” on page 14-23](#)

## 14.5.1 Identifying the Power Switch and LED Cable Assembly

The power switch and LED cable assembly consists of a ferrite core, a power switch, and a power switch LED (FIGURE 14-19). The power switch and LED cable assembly has a single LED to indicate power status of the system.

Power for the power switch and LED cable assembly is routed through connector J15 on the motherboard.



**FIGURE 14-19** Power Switch and LED Cable Assembly Location and Identification

TABLE 14-1 lists the power switch and LED cable assembly specifications.

**TABLE 14-1** Power Switch and LED Cable Assembly Specifications

Specification	Value
Voltage	1-20V
Current	5A
Type	SPST

## 14.5.2 Removing the Power Switch and LED Cable Assembly

### 1. Power off the system, open the chassis, and remove the bezel.

See:

- Section 10.3, “Powering Off the Workstation” on page 10-4
- Section 10.4, “Removing the Access Panel” on page 10-12
- Section 10.5, “Removing the Bezel” on page 10-16

### 2. Locate the power switch and LED cable assembly (FIGURE 14-19).

The power switch and LED cable assembly is fed through the front of the chassis, just above the front fan, and is fastened to the chassis with a beige bracket.

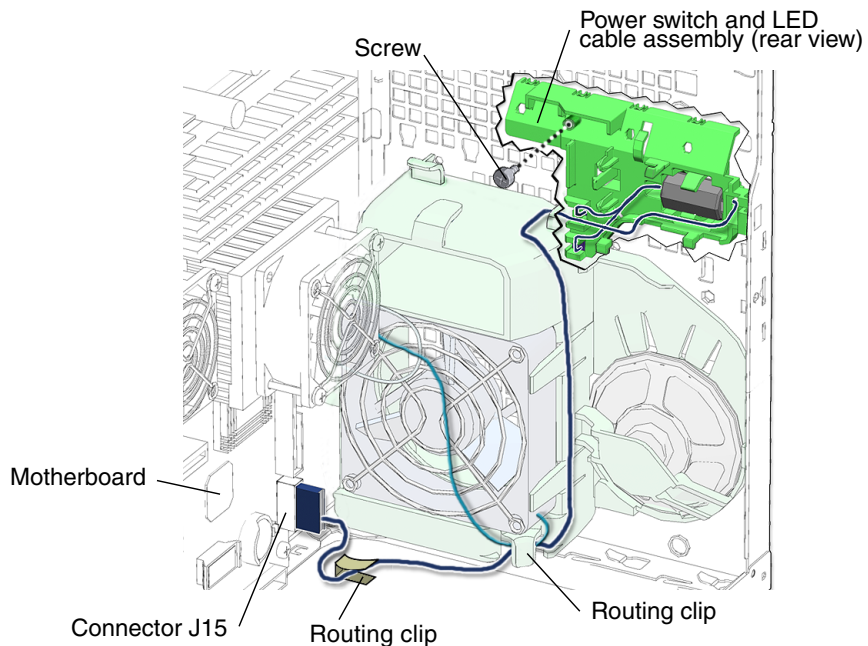
### 3. Disconnect the power switch and LED cable assembly (FIGURE 14-20).

The power switch and LED cable assembly is connected to connector J15 on the motherboard.

---

**Note** – Before removing the power switch and LED cable assembly, note its routing in the chassis.

---



**FIGURE 14-20** Disconnecting the Power Switch and LED Cable Assembly

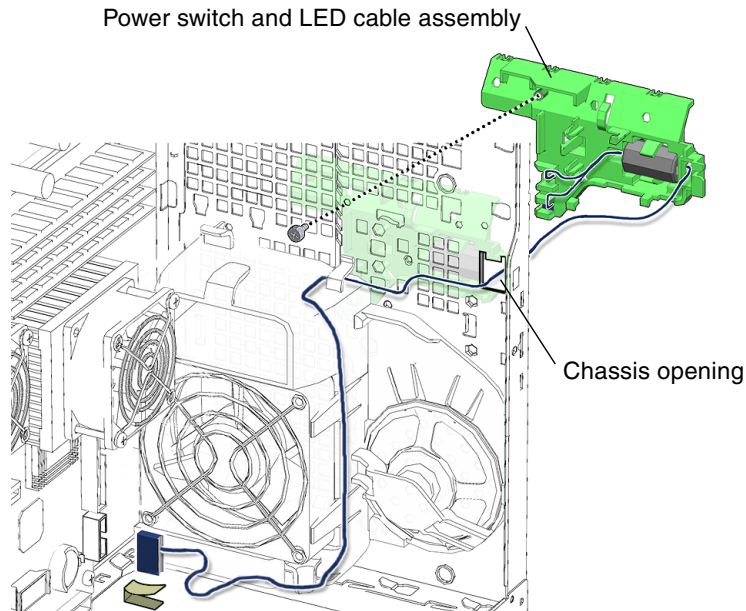
**4. Release the power switch and LED cable.**

Unclip the power switch and LED cable assembly from the routing clips in the front fan bracket.

**5. Remove the screw.**

**6. Release the power switch and LED cable assembly (FIGURE 14-21).**

Lift up on the power switch and LED cable assembly to release the assembly from the chassis.



**FIGURE 14-21** Releasing the Power Switch and LED Cable Assembly

**7. Remove the power switch and LED cable assembly from the chassis.**

Carefully route the cable assembly through the chassis opening.

You have removed the power switch and LED cable assembly.

Proceed to [Section 14.5.3, “Installing the Power Switch and LED Cable Assembly”](#) on page 14-23.

---

**Note** – The workstation cannot operate without the power switch cable assembly.

---



## 14.5.3 Installing the Power Switch and LED Cable Assembly

### 1. Open the chassis and remove the bezel.

See:

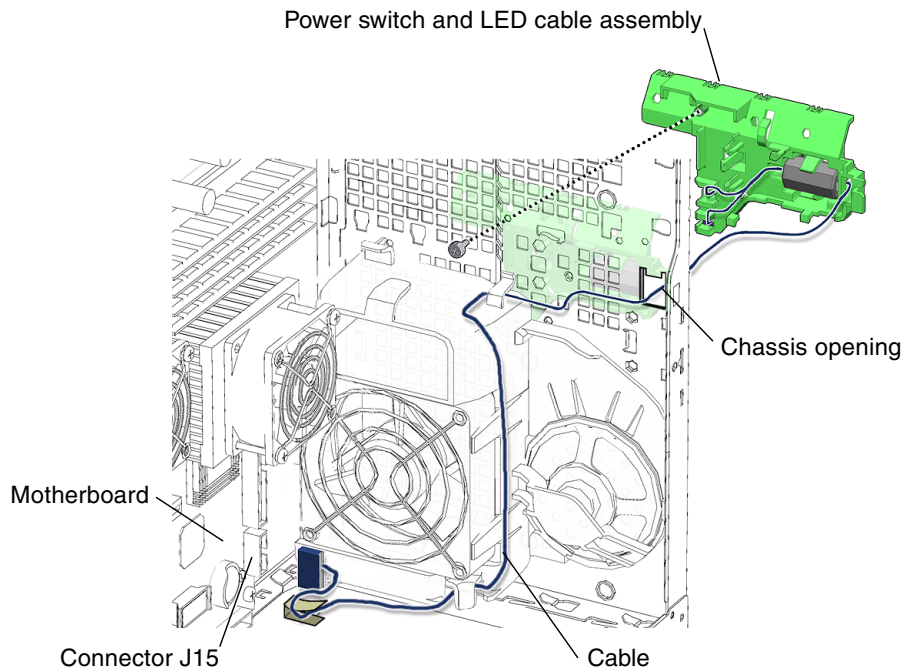
- Section 10.4, “Removing the Access Panel” on page 10-12
- Section 10.5, “Removing the Bezel” on page 10-16

### 2. Locate where the power switch and LED cable assembly is to be installed (FIGURE 14-19).

### 3. Remove the new power switch and LED cable assembly from its packaging.

### 4. Route the power switch and LED cable through the front chassis opening (FIGURE 14-22).

Route the power switch and LED cable assembly connector through the rectangular hole on the front of the chassis.

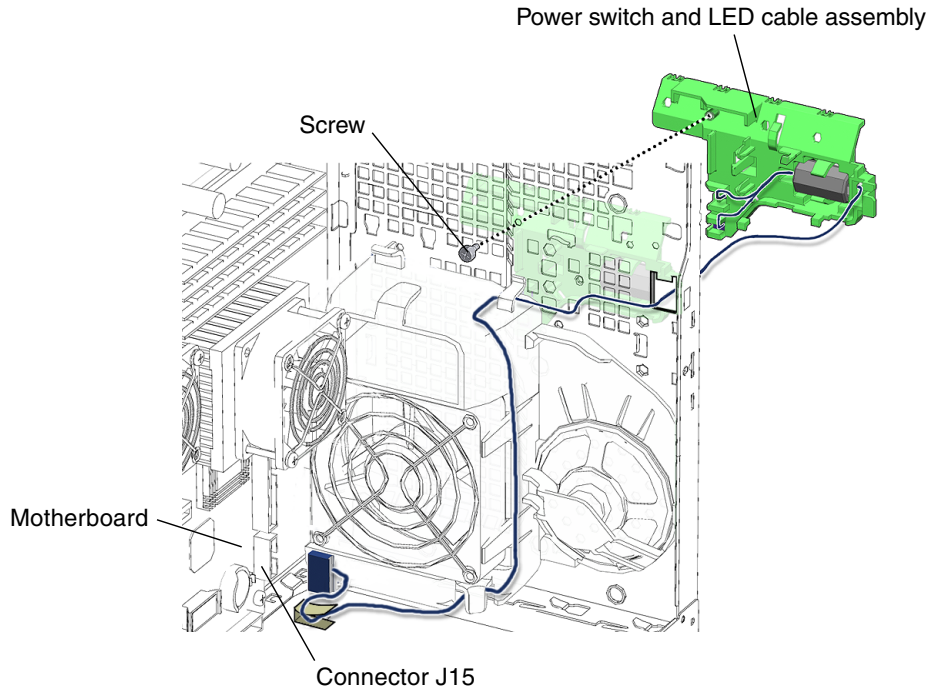


**FIGURE 14-22** Routing the Power Switch and LED Cable Through the Front of the Chassis

**5. Fasten power switch and LED cable assembly to chassis.**

Using your fingers, press the power switch and LED cable assembly into the chassis until the assembly clicks.

**6. Install the screw (FIGURE 14-23).**



**FIGURE 14-23** Routing the Power Switch and LED Cable

**7. Connect the power switch and LED cable assembly connector to connector J15 on the motherboard.**

**8. Inspect the power switch and LED cable assembly and related component fasteners.**

- The power switch and LED cable assembly is seated in the chassis.

**9. Inspect the component cabling.**

- The power switch and LED cable assembly cable is firmly connected to the motherboard.
- The power switch and LED cable assembly cable is routed around the front fan bracket and secure in the front fan bracket routing clips.

## 10. Finish up.

Replace the access panel and the bezel, power on the system, and verify the component installation.

See:

- [Section 15.3, “Replacing the Bezel” on page 15-4](#)
- [Section 15.4, “Replacing the Access Panel” on page 15-6](#)
- [Section 15.5, “Powering On the Workstation” on page 15-7](#)
- [Section 15.6, “Verifying an Installation” on page 15-10](#)



## Finishing Component Replacement

---

This chapter describes how to complete the replacement of internal workstation replaceable components, close the system and prepare it for operation.

The procedures described in this chapter are written for workstation service providers and system administrators.

This chapter contains the following topics:

- Section 15.1, “Repositioning the Chassis” on page 15-2
- Section 15.2, “Replacing the Hard Drive Assembly” on page 15-2
- Section 15.3, “Replacing the Bezel” on page 15-4
- Section 15.4, “Replacing the Access Panel” on page 15-6
- Section 15.5, “Powering On the Workstation” on page 15-7
- Section 15.6, “Verifying an Installation” on page 15-10



**Caution** – Follow the cautions, warnings, and instructions in the *Sun Blade 2500 Workstation Safety and Compliance Guide* (816-2061). The document is available at: <http://www.sun.com/documentation>

---



**Caution** – The procedures in this chapter are described with the workstation chassis in an upright position. If you perform any of the procedures in this chapter with the chassis in its upright position, use care to ensure you do not tip over the chassis.

---



**Caution** – When servicing or removing workstation components, attach an antistatic strap to your wrist and then to a metal area on the chassis. Then disconnect the power cord from the workstation and the wall receptacle. Following this caution equalizes all electrical potentials with the workstation.

---

---

## 15.1 Repositioning the Chassis

After completing any procedures that required the chassis be on its side, reposition the chassis to its normal upright stance.

1. **Set the chassis upright.**
2. **Using both hands, lift the system chassis from its side, with the opening facing out.**

---

**Note** – Do *not* use the chassis cross brace as a handle.

---

---

## 15.2 Replacing the Hard Drive Assembly

1. **Reposition the chassis.**  
See [Section 15.1, “Repositioning the Chassis”](#) on page 15-2.
2. **Connect the SCSI interface cable to the SCSI backplane (FIGURE 15-1).**  
The SCSI interface cable is plugged into the SCSI backplane through the SCSI backplane cover.
3. **Route the SCSI interface cable through the routing clip (FIGURE 15-1).**

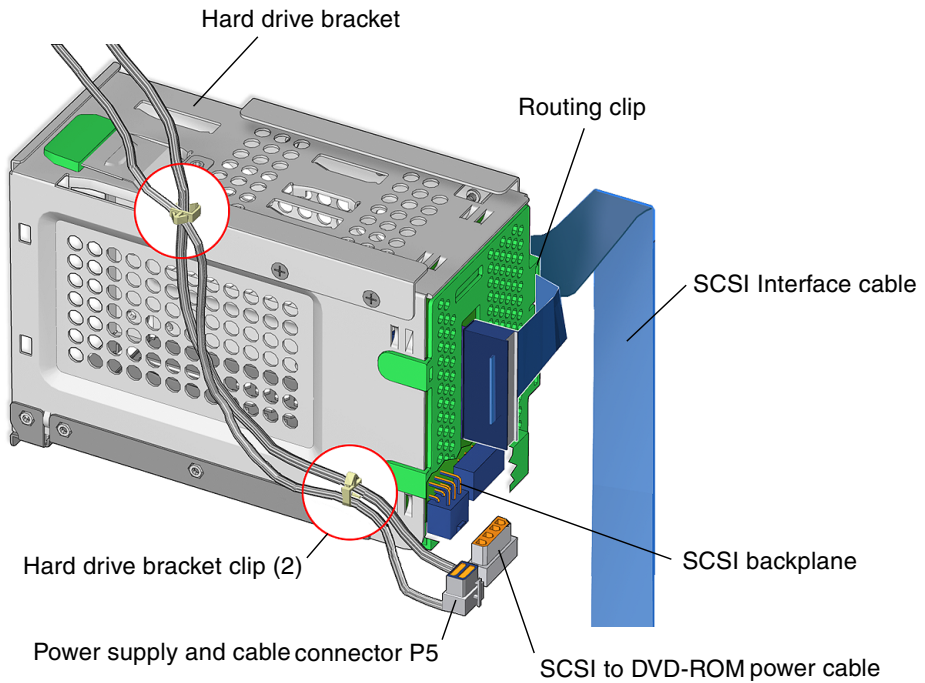


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**Caution** – The routing clip for the SCSI interface cable is fragile.

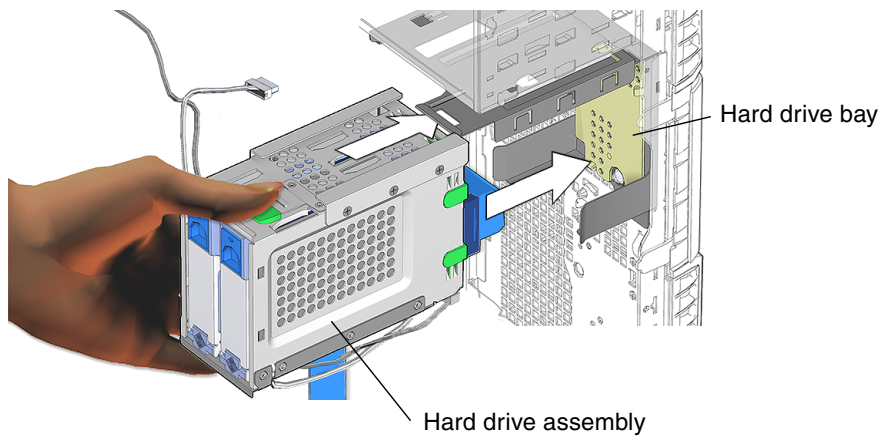
---

4. **Connect the two power cables to the SCSI backplane (FIGURE 15-1).**  
Connect power supply and cable connector P5 and SCSI to DVD-ROM power cable to the SCSI backplane. The two power cables are plugged into the SCSI backplane on the underside of the hard drive assembly.
5. **Route the two power cables through the two hard drive bracket clips.**  
The hard drive bracket clips are located on the bottom of the hard drive bracket and the back side of the hard drive bracket.



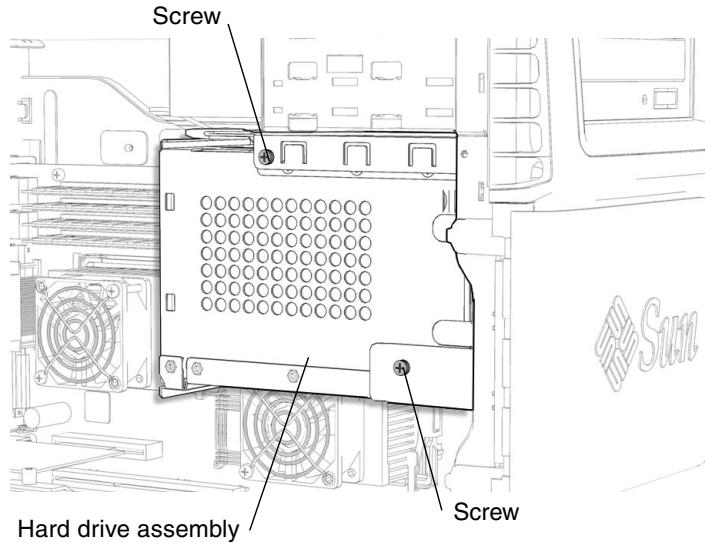
**FIGURE 15-1** Installing the Power and Signal Cables for the Hard Drive Assembly

**6. Install the hard drive assembly into the hard drive bay (FIGURE 15-2).**



**FIGURE 15-2** Installing the Hard Drive Assembly Into the Hard Drive Bay

7. Install the two screws for the hard drive assembly (FIGURE 15-3).



**FIGURE 15-3** Installing the Hard Drive Assembly Screws

---

## 15.3 Replacing the Bezel

1. Place the chassis into its upright position.

See [Section 15.1, “Repositioning the Chassis”](#) on page 15-2.

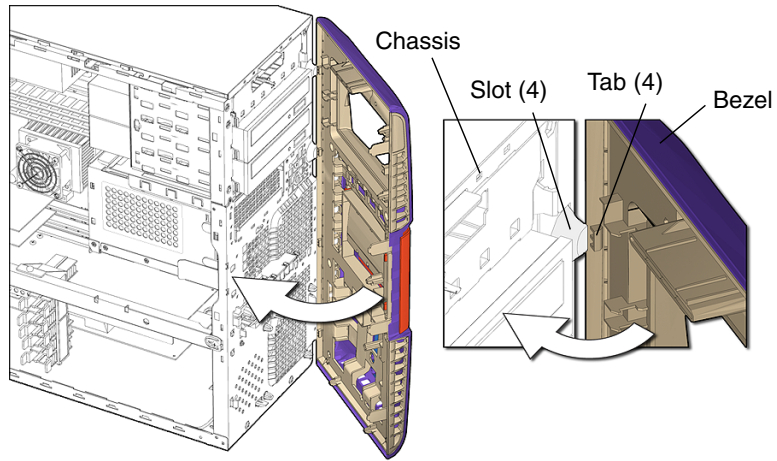
2. Locate where the bezel is to be installed (FIGURE 15-4).

The bezel installs at the front face of the chassis, Sun logo upright.

3. Align the bezel to the chassis.

Align the tabs on the side of the bezel with the matching rectangular slots on the upper front of the chassis. Place the tabs in the slots.

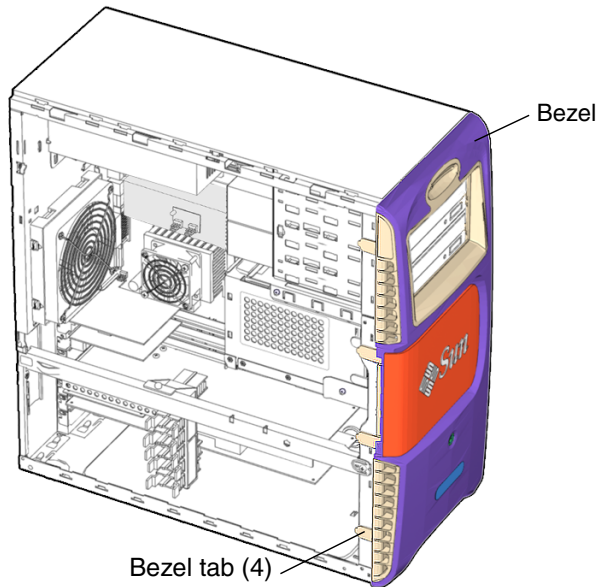




**FIGURE 15-4** Aligning the Bezel

**4. Fasten the bezel to the chassis (FIGURE 15-5).**

Carefully press the middle and bottom tabs of the bezel into the front of the chassis until the bezel tabs click.



**FIGURE 15-5** Bezel and Bezel Tabs

You have finished installing the bezel.

5. **Inspect the bezel tabs.**

- The bezel tabs are tight against the chassis.
- The bezel and chassis sides align.

---

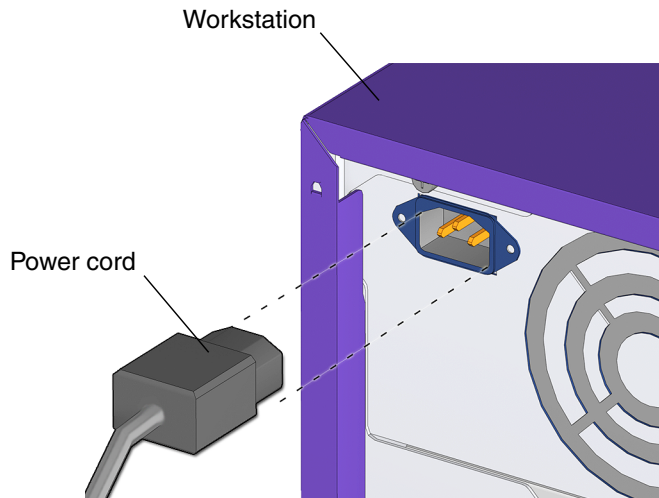
## 15.4 Replacing the Access Panel

1. **Place the chassis into its upright position.**

See [Section 15.1, “Repositioning the Chassis”](#) on page 15-2.

2. **Verify that you have not left any tools, loose screws, or loose components inside the system.**

3. **Reconnect the power cord between the power source and the system power supply connector.**



**FIGURE 15-6** Reconnecting the Power Cord

4. **Remove the antistatic wrist strap.**

- a. Peel the copper foil end of the antistatic wrist strap from the system chassis.
- b. Unwrap the strap from your wrist.
- c. Discard the wrist strap and the antistatic mat.

5. **Align the bottom of the access panel with the chassis (FIGURE 15-7).**

Tilt the access panel so that it fits into the bottom groove of the chassis.

6. Align the top of the access panel with the chassis.

Align the arrows on the access panel with the arrows on the chassis.

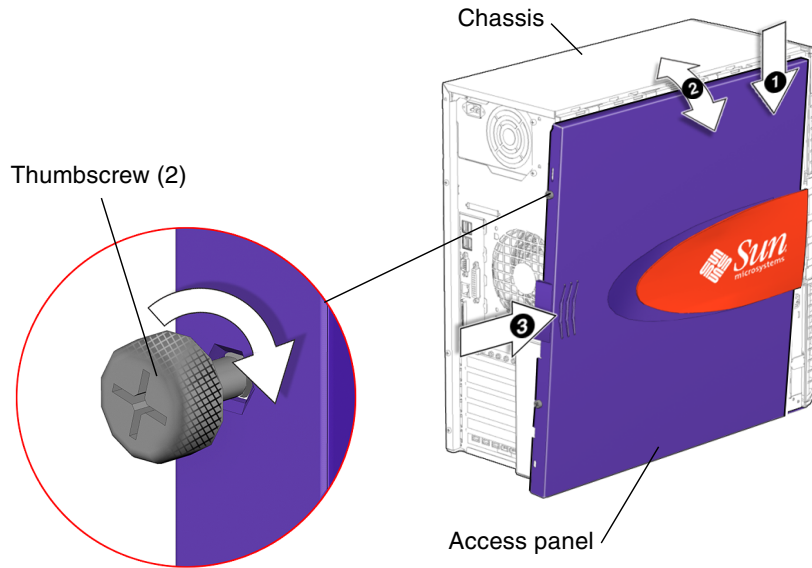


FIGURE 15-7 Installing the Access Panel

7. Slide the access panel toward the front of the system chassis until it stops.

8. Tighten the access panel thumbscrews.

---

**Note** – Do not use a screwdriver to tighten the thumbscrews. Tighten the thumbscrews only finger tight.

---

You have finished installing the access panel.

---

## 15.5 Powering On the Workstation

This section describes powering on the workstation after finishing a service procedure. Topics include:

- Section 15.5.1, “Reconnecting Power and External Peripherals” on page 15-8
- Section 15.5.2, “Choosing the Boot Mode” on page 15-8

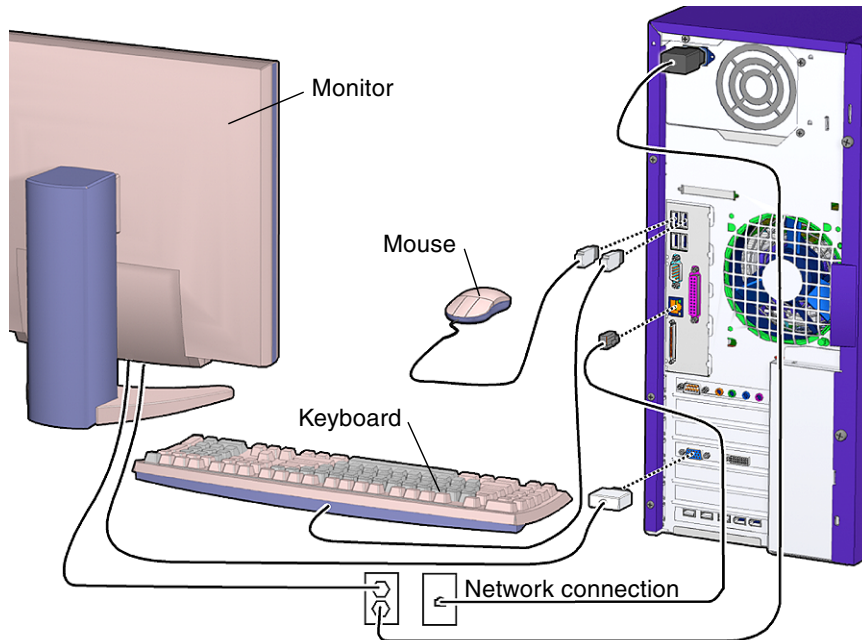


You can also view an animated version of these instructions by clicking on this film icon.

## 15.5.1 Reconnecting Power and External Peripherals

After completing any replacement procedure, the external cabling must be replaced.

1. Reconnect the keyboard, mouse, monitor, and network connections (FIGURE 15-8).



**FIGURE 15-8** Reconnecting the Keyboard, Mouse, Monitor, and Network

2. Reconnect any other external peripherals.

## 15.5.2 Choosing the Boot Mode

When the workstation is powered up, the initial action is the boot sequence. Booting a system is the process for reading the Solaris kernel into system memory and starting it running.

There are several methods for booting the workstation.

- **Booting from the hard drive**

This is the default when an operating environment (system) disk is not in the DVD-ROM drive.

- **Booting from DVD-ROM**

Default when an operating environment (system) disk is in the DVD-ROM drive.

- **Booting in single user mode**

Occurs when an `init1` option was specified during the power-down sequence.

- **Booting in multi user mode**

Default mode when the workstation was shutdown gracefully.

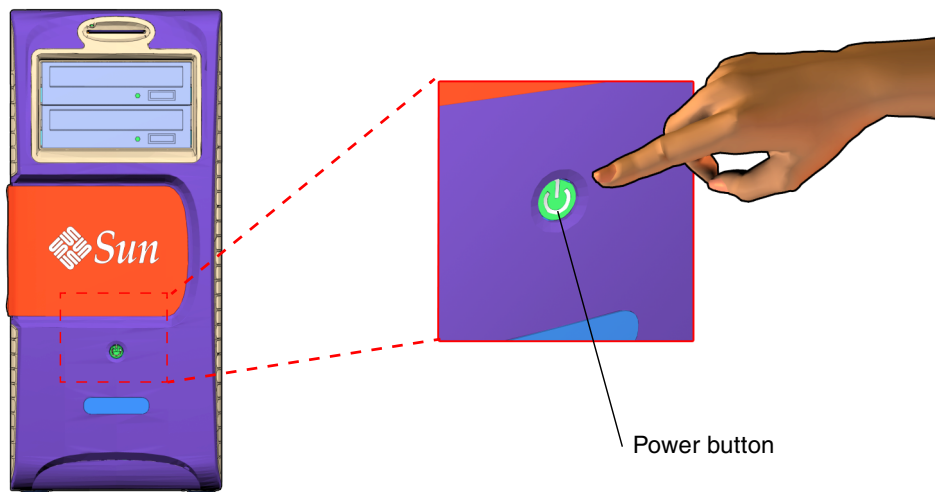
**1. Select the boot source:**

- If from a DVD-ROM, insert an operating environment (system) disk in the DVD-ROM drive.
- If from the hard disk, ensure there is no operating system disk in the DVD-ROM drive.

**2. Press and release the Power button.**

The Power button is located on the front cover of the workstation. Press the Power button until you hear the internal fans or the hard drive in motion.

The system proceeds with its power on sequence until the operating system shell displays or the CDE environment is started, as specified in the `init default` files.



**FIGURE 15-9** Powering Up the Workstation

---

## 15.6 Verifying an Installation

You can verify the functionality of the component you replaced or installed using the following procedure.

**1. Power on the system.**

See [Section 15.5, “Powering On the Workstation”](#) on page 15-7.

**2. Follow the power-on flowchart procedures.**

See [“Basic Troubleshooting”](#) on page 1.

**3. Monitor the boot messages.**

The OpenBoot PROM houses a mini operating system in which POST and OpenBoot PROM firmware instructions reside. OpenBoot PROM must complete successfully before OpenBoot Diagnostics can operate.

If any warning messages are found, see the troubleshooting chapters, [“Basic Troubleshooting”](#) on page 1, [“Troubleshooting Flowcharts”](#) on page 1, and [“Introduction to Advanced Troubleshooting”](#) on page 1, for information on interpreting messages and possible corrective action.

**4. If you are uncertain that the problem has been resolved, see “Troubleshooting Flowcharts” on page 4-1, or consider these alternatives:**

- Configure the NVRAM to enable the Power-On Self-Test (POST).

See [“Maximum, Minimum, and Menu Levels of POST”](#) on page 7 for information on POST output and interpreting the response. This might require rebooting the workstation.

- Run selected OpenBoot Diagnostics tests.

See [“OpenBoot PROM Utilities”](#) on page 1 for information on availability and implementation of tests.

- Run the SunVTS software.

See [“Installing SunVTS”](#) on page 1 for information on running the SunVTS software and interpreting the results.

# Customizing Your System

This chapter describes optional PCI component upgrades to customize your Sun Blade 2500 system.

This chapter contains the following topics:

- [Section 16.1, “PCI Cards” on page 16-1](#)
- [Section 16.2, “Internal Component Upgrades” on page 16-8](#)
- [Section 16.3, “External Peripherals” on page 16-9](#)
- [Section 16.4, “Server Administration Upgrades” on page 16-10](#)

## 16.1 PCI Cards

In its standard configuration, the Sun Blade 2500 system has three 33 MHz PCI slots and three 66 MHz PCI slots. [TABLE 16-1](#) describes the supported PCI slots and supported motherboard speeds.



**Caution** – The audio module uses a special PCI-type connector. This connector is designed for audio module control only and is not an additional PCI slot connector.

**TABLE 16-1** PCI Card Slot Specifications

PCI Card	Motherboard Supported Speed	Motherboard Slot Connector Colors
Slot 0	33 MHz, for IEEE 1394 USB 2.0 combination card slot	White
Slot 1	33 MHz	White
Slot 2	66 MHz/33 MHz	Green
Slot 3	66 MHz/33 MHz	Green

**TABLE 16-1** PCI Card Slot Specifications

PCI Card	Motherboard Supported Speed	Motherboard Slot Connector Colors
Slot 4	33 MHz	White
Slot 5	66 MHz/33 MHz	Green
ARC0/RSC0 Slot	Dedicated audio module	Brown

The top slot, ARC0/RSC0, is preconfigured for the audio module.

The bottom slot, PCI0, is preconfigured with the IEEE 1394 USB v2.0 combination card. Removing this card provides an additional 33 MHz 32-bit slot.

The Sun Blade 2500 comes configured with one of the following graphics accelerators:

- Sun XVR-100
- Sun XVR-500
- Sun XVR-600
- Sun XVR-1200

The standard color depth default value is 24-bit for these graphics accelerators. However it might be necessary to convert from 8-bit to 24-bit to minimize color map flashing errors. To configure the graphics accelerators to 24-bit color depth follow the conditions for installation in [TABLE 16-2](#).



Sun Microsystems provides many other optional PCI cards that are supported by the Sun Blade 2500 system. TABLE 16-2 lists some of the supported cards and conditions to their installation and use.

**TABLE 16-2** Conditions for Installing PCI Cards

Card Type	Product	Conditions for Installation
Graphics accelerators	Sun XVR-100	<p>There are no special conditions for basic installation.</p> <p><b>To configure for 24-bit color depth:</b></p> <ol style="list-style-type: none"> <li>1. Create this directory: % <b>mkdir /etc/dt/config</b></li> <li>2. Copy the Xservers file: % <b>cp /usr/dt/config/Xservers /etc/dt/config</b></li> <li>3. Edit /etc/dt/config/Xservers to have this line: :0 Local local_uid@console root /usr/openwin/bin/Xsun :0 -nobanner -dev /dev/pfb0 defdepth 24</li> <li>4. Save the file.</li> <li>5. Log out, then log in again.</li> </ol>
	Sun XVR-500	<p>There are no special conditions for basic installation.</p> <p><b>To configure for 24-bit color depth:</b></p> <ol style="list-style-type: none"> <li>1. Create this directory: % <b>mkdir /etc/dt/config</b></li> <li>2. Copy the Xservers file: % <b>cp /usr/dt/config/Xservers /etc/dt/config</b></li> <li>3. Edit /etc/dt/config/Xservers to have this line: :0 Local local_uid@console root /usr/openwin/bin/Xsun :0 -nobanner -dev /dev/afb0 defdepth 24</li> <li>4. Save the file.</li> <li>5. Log out, then log in again.</li> </ol>
	Sun XVR-600	<p>There are no special conditions for basic installation.</p> <p><b>To configure for 24-bit color depth:</b></p> <ol style="list-style-type: none"> <li>1. Create this directory: % <b>mkdir /etc/dt/config</b></li> <li>2. Copy the Xservers file: % <b>cp /usr/dt/config/Xservers /etc/dt/config</b></li> <li>3. Edit /etc/dt/config/Xservers to have this line: :0 Local local_uid@console root /usr/openwin/bin/Xsun :0 -nobanner -dev /dev/jfb0 defdepth 24</li> <li>4. Save the file.</li> <li>5. Log out, then log in again.</li> </ol>

**TABLE 16-2** Conditions for Installing PCI Cards (*Continued*)

Card Type	Product	Conditions for Installation
Graphics accelerators	Sun XVR-1200	<p>There are no special conditions for basic installation.</p> <p>To configure for 24-bit color depth:</p> <ol style="list-style-type: none"> <li>1. Create this directory: <b>% mkdir /etc/dt/config</b></li> <li>2. Copy the Xservers file <b>% cp /usr/dt/config/Xservers /etc/dt/config</b></li> <li>3. Edit /etc/dt/config/Xservers to have this line: :0 Local local_uid@console root /usr/openwin/bin/Xsun :0 -nobanner -dev /dev/jfb0 defdepth 24</li> <li>4. Save the file.</li> <li>5. Log out then log in again.</li> </ol>
SCSI host adapters	Sun StorEdge™ PCI Dual Ultra3 SCSI Adapter	<p>Install the following packages:</p> <ul style="list-style-type: none"> <li>• SUNWqus</li> <li>• SUNWqusu</li> <li>• SUNWqusux</li> <li>• SUNWqusx</li> </ul> <p>Install the following qpatches:</p> <ul style="list-style-type: none"> <li>• Q905806</li> <li>• Q905807</li> </ul>
	Dual-Channel Differential Ultra/Wide SCSI PCI adapter Dual-Channel Single-Ended Ultra/Wide SCSI PCI adapter Single-Ended Ultra/Wide SCSI PCI adapter	No restrictions
	Dual Fast Ethernet and Dual SCSI PCI Adapter SunSwift™ PCI	<p>When used with Sun StorEdge Multipacks containing Fujitsu drives having MAA/MAB series identifiers, read/write errors might occur.</p> <p>The SunSwift PCI card might not fit properly upon first insertion into the PCI slot. Recheck installation before powering on.</p>

**TABLE 16-2** Conditions for Installing PCI Cards (*Continued*)

Card Type	Product	Conditions for Installation
Communication interfaces	SunHSI/P™ High Speed Serial Interface - 4 port 2.0	The SunHSI/P card does not fit into the 66 MHz slot, PCI5. Install the following packages from the supplemental software CD-ROM: <ul style="list-style-type: none"> <li>• SUNWhsip</li> <li>• SUNWhsipm</li> <li>• SUNWhsipu</li> </ul>
	SunSAI/P™ Serial Asynchronous Interface - 8 port 3.0	Installing more than one card requires additional considerations and running the saipconfig configuration script. See, <i>SunSAI/P User's Guide</i> , 806-4206, for more information. Install the following packages: <ul style="list-style-type: none"> <li>• SUNWsaip</li> <li>• SUNWsaipu</li> </ul>
Ethernet interfaces	GigaSwift Ethernet	There are no special conditions for basic installation.
	Gigabit Ethernet 3.0	There are no special conditions for basic installation.
	Sun Quad FastEthernet™	PCI card to Sun Blade 2500 system chassis tolerances are tight. Connecting some network cables might require additional effort.
	Sun FastEthernet	There are no special conditions for basic installation.
Fibre network interfaces	SunATM/P-622/MMF 5.0	Install the following packages from the supplemental software CD-ROM: <ul style="list-style-type: none"> <li>• SUNWatm</li> <li>• SUNWatmu</li> <li>• SUNWatma</li> </ul>
	SunATM-155/MMF 5.0	
	Sun ATM155/UTP 5.0	
SunPCi adapters	SunPCi™ III	Optional installation of the serial/parallel port sub-bracket requires an additional adjacent PCI slot. For additional information see: <p><a href="http://www.sun.com/products-n-solutions/hardware/docs/Workstation_Products/Interoperability_Products/SunPCi/">http://www.sun.com/products-n-solutions/hardware/docs/Workstation_Products/Interoperability_Products/SunPCi/</a></p> For Microsoft Windows functionality, a licensed version of Windows must be installed.

**TABLE 16-2** Conditions for Installing PCI Cards (Continued)

Card Type	Product	Conditions for Installation
Cryptographic	Sun Crypto Accelerator 1000	Install the following packages from the supplemental software CD-ROM: <ul style="list-style-type: none"> <li>• SUNWcrypm</li> <li>• SUNWcrypr</li> <li>• SUNWcrypu</li> <li>• SUNWcrysl</li> <li>• SUNWcrysu</li> <li>• SUNWdcamn</li> <li>• SUNWdcar</li> <li>• SUNWdcav</li> </ul>

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**Note** – Instructions for replacing, removing, or installing PCI cards are provided in [Section 11.5, “Replacing PCI Cards”](#) on page 11-28.

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## 16.1.1 PCI Slot Usage

Sun Blade 2500 workstations ship configured with the following components:

- One Sun XVR-100, Sun XVR-500, or Sun XVR-600 graphics accelerator installed in PCI slot 5 or with a single Sun XVR-1200 graphics accelerator installed in PCI slots 4 and 5.
- One audio module installed in the ARC0/RSC0 slot.
- One IEEE 1394a/USB 2.0 combination card installed in PCI slot 0.

[TABLE 16-3](#) is a summary of the Sun Blade 2500 workstation PCI slot configurations.

**TABLE 16-3** Sun Blade 2500 Workstation PCI Slot Configurations

PCI Slot	PCI Slot Performance	Basic 3D Graphics Configuration	Basic 2D Graphics Configuration	Multihead CAD Configuration	Dual-Platform Interoperability Configuration
ARC0/RSC0		Audio module	Audio module	Audio module	Audio module
PCI5	66 MHz, 64 bit	Sun XVR-500, Sun XVR-600, Sun XVR-1200	Sun XVR-100	Sun XVR-500, Sun XVR-600	SunPCi III coprocessor
PCI4	33 MHz, 64 bit	Sun XVR-600, Sun XVR-1200			

**TABLE 16-3** Sun Blade 2500 Workstation PCI Slot Configurations (Continued)

PCI Slot	PCI Slot Performance	Basic 3D Graphics Configuration	Basic 2D Graphics Configuration	Multihead CAD Configuration	Dual-Platform Interoperability Configuration
PCI3	66 MHz, 64 bit	Sun XVR-500, Sun XVR-600, Sun XVR-1200	Sun XVR-100	Sun XVR-500, Sun XVR-600	SunPCi III coprocessor
PCI2	66 MHz, 64 bit	Sun XVR-500, Sun XVR-600, Sun XVR-1200	Sun XVR-100	Sun XVR-500, Sun XVR-600	SunPCi III coprocessor
PCI1	33 MHz, 64 bit	Sun XVR-600, Sun XVR-1200			
PCI0	33 MHz, 64 bit	IEEE 1394a/USB 2.0 combination card	IEEE 1394a/USB 2.0 combination card	IEEE 1394a/USB 2.0 combination card	IEEE 1394a/USB 2.0 combination card

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**Note** – Up to three Sun XVR-100 graphic accelerators are supported per workstation. Place the accelerators in PCI slots 2, 3, or 5 for maximum system performance. Placement in other PCI slots might reduce system performance. The factory default position is PCI slot 5.

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**Note** – Up to two Sun XVR-500 graphic accelerators are supported per workstation. Place the accelerators in PCI slots 2, 3, or 5 for maximum system performance. Placement in other PCI slots might reduce system performance. The factory default position is PCI slot 5.

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**Note** – Up to three Sun XVR-600 graphic accelerators are supported per workstation. Place the accelerators in PCI slots 2, 3, or 5 for maximum system performance. Placement in other PCI slots might reduce system performance. The factory default position is PCI slot 5.

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**Note** – Up to two Sun XVR-1200 graphics accelerators are supported per workstation. The accelerators can be placed in slots 1 and 2, 2 and 3, or 4 and 5. Installation of the XVR-1200 in PCI slots 1 and 2, or 4 and 5 makes available an additional 66 MHz PCI slot for other use.

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**Note** – If PCI slot 5 is occupied by another graphics card and an additional 66 MHz PCI slot is not needed, you can install a XVR-1200 graphics accelerator in PCI slots 2 and 3. Placement in other PCI slot configurations might reduce system performance. The factory default position for the XVR-1200 graphics accelerator is in PCI slots 4 and 5.

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## 16.2 Internal Component Upgrades

You can customize the Sun Blade 2500 system with additional memory and drives. [TABLE 16-4](#) lists upgrades, conditions for installation, and where to find the installation instructions.

**TABLE 16-4** Sun Blade 2500 Internal Component Upgrades

Component	Conditions for Installation	Procedure
1 GB DIMM	Install in pairs.	<a href="#">Section 11.1.3, “Installing the DIMMs” on page 11-7</a>
512 MB DIMM	Install in pairs.	<a href="#">Section 11.1.3, “Installing the DIMMs” on page 11-7</a>
256 MB DIMM	Install in pairs. Customers may purchase and install 256 MB DIMM pairs. However the standard DIMM configuration for the Sun Blade 2500 workstation is two 512 MB DIMMs. Workstations running less than 1 GB of system memory may have degraded system performance. This configuration is not supported by Sun.	See, <a href="#">Section 11.1.3, “Installing the DIMMs” on page 11-7</a>
UltraSCSI IV 320 hard drive	First drive installs in HDD0, second drive installs in HDD1.	See, <a href="#">Section 12.1.3, “Installing a Hard Drive” on page 12-5</a> .
CD-RW drive	Removable media drive is installed into lower bay. Write capabilities with the <code>cdrw</code> command require installation of the <code>SUNwcdrw</code> package from the supplemental CD-ROM.	See, <a href="#">Section 12.2.3, “Installing the DVD-ROM Drive” on page 12-12</a> and your installation procedure for the CD-RW-ROM drive.
DDS-4 tape drive	Tape drive is installed into lower bay. Internal SCSI connection to SCSI host adapter. Configuration checked with Single-Ended Ultra/Wide SCSI PCI adapter. See conditions for use in <a href="#">TABLE 16-5</a> .	See, <a href="#">Section 12.2.3, “Installing the DVD-ROM Drive” on page 12-12</a> and your installation procedure to the DDS-4 tape drive.

## 16.3 External Peripherals

The Sun Blade 2500 system supports external Sun peripherals. [TABLE 16-5](#) lists peripherals and their conditions of use.

**TABLE 16-5** External Peripherals

Peripheral	Product	Conditions for Use
Fibre channel hard drives	Sun StorEdge T3 Array	There are no special conditions for use.
	Sun Multipack FC-AL	Only supported with the Dual Loop PCI FC-AL Host Adapter. Loop with Multipack FC-AL is Multipack FC-AL exclusive.
	Sun StorEdge A5x00	Only supported with the Dual Loop PCI FC-AL Host Adapter. Loop with Sun StorEdge A5x00 is Sun StorEdge A5x00 exclusive.
SCSI hard drives	Sun Multipack SCSI	SunSwift PCI host adapters used in conjunction with Multipack SCSI units containing Fujitsu drives having MAA/MAB series identifiers might cause read/write errors.
	Sun StorEdge A1000	There are no special conditions for use.
	Sun StorEdge D1000	Sun StorEdge D1000 drive assemblies cannot be daisy-chained.
SCSI tape drives	Sun StorEdge L1000 Sun StorEdge L11000	There are no special conditions for use.
	DAT drive	There are no special conditions for use.
	SPARCstorage® DLT™ drive	There are no special conditions for use.
IEEE 1394 devices	Sun Digital Video Camera	Running concurrent instances of the bundled demo program might cause lines to be displayed in video window.
USB devices <sup>1</sup>	ZIP drive	Removable media drives require the volume manager <code>vold</code> to run.
	CD-RW drive	CD-R and CD-RW write capabilities require installation of the <code>SUNwcdrw</code> package from the supplemental CD-ROM.
Network printers	HP Lexmark	There are no special conditions for use.
Smart cards	payflex	There are no special conditions for use.

<sup>1</sup> USB v1.x devices should be connected to USB0 or USB1 on the workstation. USB v2.0 devices should be connected to the USB connectors on the IEEE 1394 v2.0 combination card.

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## 16.4 Server Administration Upgrades

### 16.4.1 Sun Management Center Configuration Reader

Sun Management Center (SunMC) software is supported on the Sun Blade 2500 workstation. However, SunMC was developed specifically for *server* administration. When SunMC is used to administer a Sun Blade 2500 *workstation*, certain *server* status fields in the configuration reader are not applicable to the workstation and these fields remain empty.

If you want your Sun Blade 2500 workstation to be part of a SunMC network, install SunMC software and Sun Blade 2500 supplemental packages. See [TABLE 16-6](#) for additional information.

**TABLE 16-6** Sun Management Center (SunMC) Resources

Item	Location and/or URL
SunMC 3.0 software	SunMC 3.0 Update 4 CD-ROM (705-0089) <a href="http://www.sun.com/software/solaris/sunmanagementcenter/get.html">http://www.sun.com/software/solaris/sunmanagementcenter/get.html</a>
SunMC 3.0 documentation	SunMC 3.0 Update 4 CD 3, in /cdrom/cdrom0/Docs <a href="http://docs.sun.com/db/coll/810.1">http://docs.sun.com/db/coll/810.1</a>
Sun Management Center 3.0 Supplemental packages and documentation for the Sun Blade systems	<a href="http://www.sun.com/servers/entry/sun_management.html">http://www.sun.com/servers/entry/sun_management.html</a>

The additional documentation that you need for installing and configuring SunMC software on your Sun Blade 2500 workstation is:

- *Sun Management Center 3.0 for Sun Fire, Sun Blade, and Netra Systems Release Notes*, 817-2666
- *Sun Management Center 3.0 Supplement for Sun Fire, Sun Blade, and Netra Systems*, 817-1007
- *Sun Management Center Software User's Guide*, 816-5942

Review the SunMC documentation before installing SunMC software on your Sun Blade 2500 workstation.







# Product Specifications

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This appendix provides product specifications for the Sun Blade 2500 workstation including:

- [Section A.1, “Physical Specifications” on page A-1](#)
- [Section A.2, “Electrical Specifications” on page A-2](#)
- [Section A.3, “Acoustic Specifications” on page A-3](#)
- [Section A.4, “Environmental Requirements” on page A-4](#)
- [Section A.5, “Shock and Vibration Specifications” on page A-5](#)

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## A.1 Physical Specifications

**TABLE A-1** Physical Specifications

<b>Specification</b>	<b>English</b>	<b>Metric</b>
Height	19.0 in.	483 mm
Width	8.3 in.	210 mm
Depth	19.3 in.	490 mm
Weight (approximate)	49.6 lbs	22.5 Kg

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## A.2 Electrical Specifications

**TABLE A-2** Electrical Specifications

<b>Parameter</b>	<b>Value</b>
AC input	100 to 240 Vac
DC output	475W
Output 1	+3.3Vdc @ 35A
Output 2	-12Vdc @ 0.5A
Output 3	+5Vdc @ 18A
Output 4	+12Va @ 11A
Output 5	+12Vb @ 13A
Output 6	+5Vsb @ 1.5A

### A.2.1 Current Draw (In Rush)

80A RMS maximum

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## A.3 Acoustic Specifications

**TABLE A-3** Acoustic Specifications

	<b>Operating</b>	<b>Idling</b>	<b>Position</b>
LPAm (Sound Power)	5.2 B	5.1 B	
LPAm (Sound Pressure)	42 dBA	37 dBA	0.50 M
LPAAd (Sound Pressure Mean)	35 dBA	30 dBA	1.0 M

## A.4 Environmental Requirements

**TABLE A-4** Environmental Requirements

<b>Environmental Factor</b>	<b>Operating Parameters</b>	<b>Nonoperating Parameters</b>
Temperature (with tape drive)	41° to 95° F (5° to 35° C)	-40° to 158° F (-40° to 70° C)
Temperature (without tape drive)	32° to 104° F (0° to 40° C)	-40° to 158° F (-40° to 70° C)
Humidity	10 to 93% at 81° F (27° C) noncondensing	93% at 101° F (38° C)
Heat dissipation	E-star mode 232 BTU/hr, workstation + XVR500 graphics accelerator 683 BTU/hr. Heat dissipation 1570 BTU/hr. (maximum)	
Altitude (with tape drive)	9842.5 ft (3 km)	39,370 ft (12 km)
Altitude (without tape drive)	9842.5 ft (3 km)	39,370 ft (12 km)

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## A.5 Shock and Vibration Specifications

**TABLE A-5** Operating Vibration Specifications

<b>Test</b>	<b>Specification</b>
Operating shock	5.0G, 11 msec. half-sine wave, IEC 60068-2-27, Test Ea
Non-operating shock	30.0G, 11 msec. half-sine wave, 60068-2-27, Test Ea
Operating vibration	0.20G, in all axes, 5-500 Hz sine wave, IEC 60068-2-6, Test Fc
Non-operating vibration	1.0G, in all axes, 5-500 Hz sine wave, IEC 60068-2-6, Test Fc
Non-operating drop and topple	50 mm. (1.96 in.) drop height, two face drops per edge, 4 edges, bottom face only. Two corner drops per corner, 4 corners, bottom corners only. IEC60068-2-31.
Operating inclination	±15 degrees wrt gravity, left, right, front, and rear (4 tests total), ETE-1011-01





# Signal Descriptions

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This appendix describes the system external and internal motherboard connectors and pin assignments.

## External connectors:

- Section B.9, “Audio Module Connectors” on page B-29
- Section B.10, “Graphics Card Connectors Sun XVR-100” on page B-31
- Section B.11, “Graphics Card Connectors Sun XVR-500” on page B-34
- Section B.12, “Graphics Card Connector Sun XVR-600” on page B-35
- Section B.13, “Graphics Card Connector Sun XVR-1200” on page B-38
- Section B.7, “IEEE 1394/USB 2.0 Combination Card Connectors” on page B-24
- Section B.5, “Parallel Port Connector Parallel0” on page B-21
- Section B.2, “Serial0-TTYA Port Connector” on page B-12
- Section B.8, “Twisted-Pair Ethernet Connector” on page B-26
- Section B.3, “UltraSCSI Connector SCSI1” on page B-14
- Section B.6, “Universal Serial Bus Connectors USB0 and USB1” on page B-23

## Internal connectors:

- Section B.1.1, “Fan0 Connector” on page B-3
- Section B.1.2, “Fan1 Connector” on page B-4
- Section B.1.3, “Fan2 Connector” on page B-5
- Section B.1.4, “Fan3 Connector” on page B-6
- Section B.1.5, “Power Switch and LED Cable Connector J15” on page B-7
- Section B.1.6, “Power Supply Connector PS2” on page B-8
- Section B.1.7, “Power Supply Connector PS1” on page B-9
- Section B.1.8, “Power Supply and Cable Connector P5” on page B-10
- Section B.1.9, “Power Supply Connectors P7, P8, and P9” on page B-11
- Section B.1.10, “SCSI Backplane to DVD-ROM Power Cable Connector” on page B-12
- Section B.15, “IDE0 Connector” on page B-42
- Section B.16, “Secondary IDE1 Connector” on page B-44
- Section B.14, “Smart Card Reader Connector” on page B-41
- Section B.4, “UltraSCSI Connector SCSI0” on page B-18

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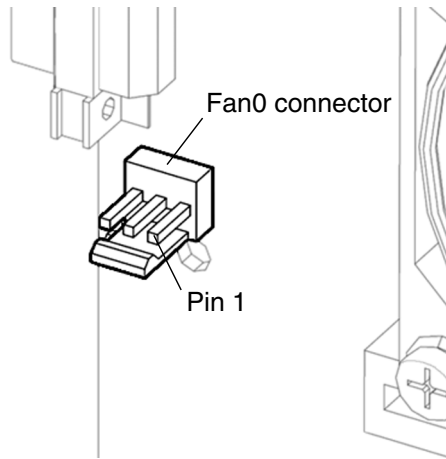
## B.1 Power Connectors

Power distribution from the power supply and motherboard is handled by 12 different power connectors. [TABLE B-1](#) lists these power connectors, the connector use, and the supporting figure and table.

**TABLE B-1** Power Connectors

Connector	Use	Supporting Figure	Supporting Table
Fan 0	Power from motherboard to rear system fan	<a href="#">FIGURE B-1</a>	<a href="#">TABLE B-2</a>
Fan 1	Power from motherboard to CPU 0 fan	<a href="#">FIGURE B-2</a>	<a href="#">TABLE B-3</a>
Fan 2	Power from motherboard to front system fan	<a href="#">FIGURE B-3</a>	<a href="#">TABLE B-4</a>
Fan 3	Power from motherboard to CPU 1 fan	<a href="#">FIGURE B-4</a>	<a href="#">TABLE B-5</a>
J15	Power from connector J15 motherboard to the power switch and LED cable assembly	<a href="#">FIGURE B-5</a>	<a href="#">TABLE B-6</a>
PS2	Power from power supply to motherboard (10-pin connector)	<a href="#">FIGURE B-6</a>	<a href="#">TABLE B-7</a>
PS1	Power from power supply to motherboard (24-pin connector)	<a href="#">FIGURE B-7</a>	<a href="#">TABLE B-8</a>
P5	Power from power supply to the SCSI backplane	<a href="#">FIGURE B-8</a>	<a href="#">TABLE B-9</a>
P7	Power from power supply to optional drive	<a href="#">FIGURE B-9</a>	<a href="#">TABLE B-10</a>
P8	Power from power supply to optional drive	<a href="#">FIGURE B-9</a>	<a href="#">TABLE B-10</a>
P9	Power from power supply to optional drive	<a href="#">FIGURE B-9</a> (Optional on some workstations)	<a href="#">TABLE B-10</a> (Optional on some workstations)
SCSI backplane to DVD-ROM drive cable	Power from SCSI backplane to DVD-ROM drive (power cable)	<a href="#">FIGURE B-10</a>	<a href="#">TABLE B-11</a>

## B.1.1 Fan0 Connector

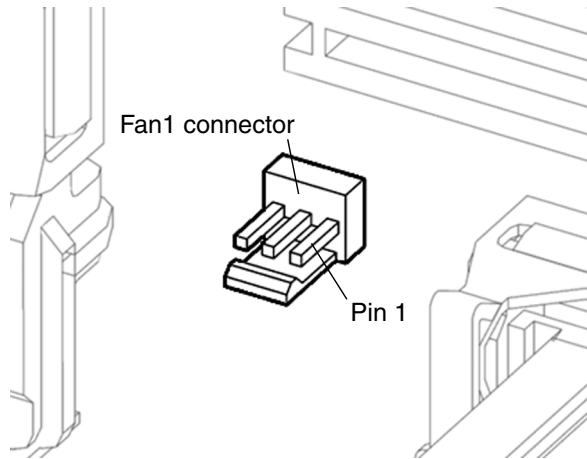


**FIGURE B-1** Fan0 Connector

**TABLE B-2** Fan0 Connector Pin Description

Pin	Signal	Description
1	TACH	Fan tachometer
2	+12 VDC	12 VDC fan power
3	PWM	Fan control

## B.1.2 Fan1 Connector

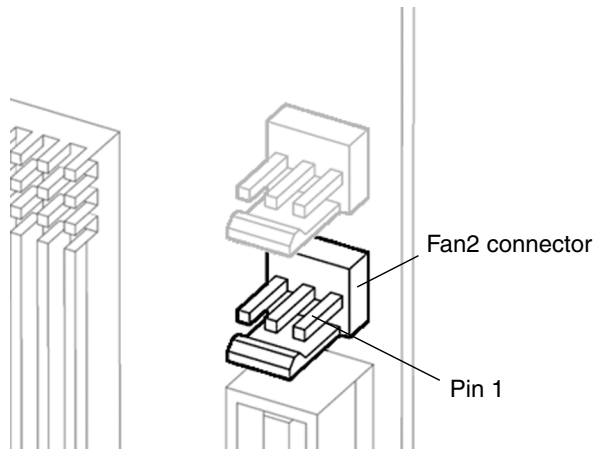


**FIGURE B-2** Fan1 Connector

**TABLE B-3** Fan1 Connector Pin Description

Pin	Signal	Description
1	TACH	Fan tachometer
2	+12 VDC	+12 VDC fan power
3	PWM	Fan control

## B.1.3 Fan2 Connector

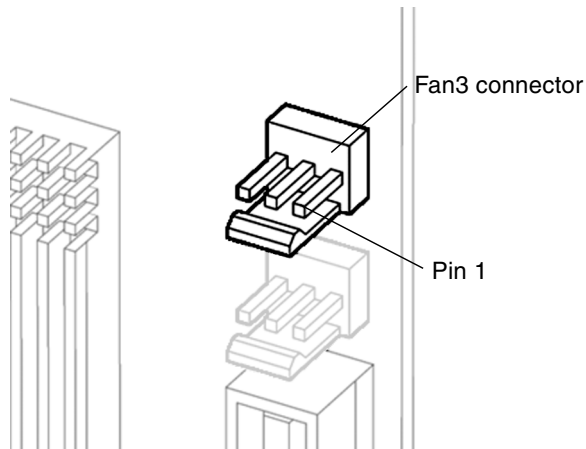


**FIGURE B-3** Fan2 Connector

**TABLE B-4** Fan2 Connector Pin Description

Pin	Signal	Description
1	TACH	Fan tachometer
2	+12 VDC	12 VDC fan power
3	PWM	Fan control

## B.1.4 Fan3 Connector

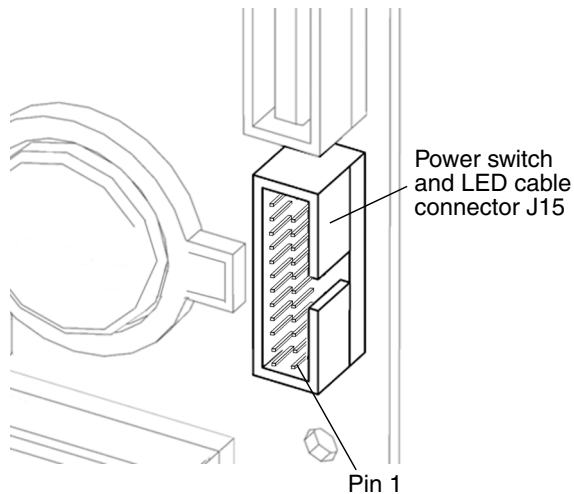


**FIGURE B-4** Fan3 Connector

**TABLE B-5** Fan3 Connector Pin Description

Pin	Signal	Description
1	TACH	Fan tachometer
2	+12 VDC	12 VDC fan power
3	PWM	Fan control

## B.1.5 Power Switch and LED Cable Connector J15



**FIGURE B-5** Power Switch and LED Cable Connector J15

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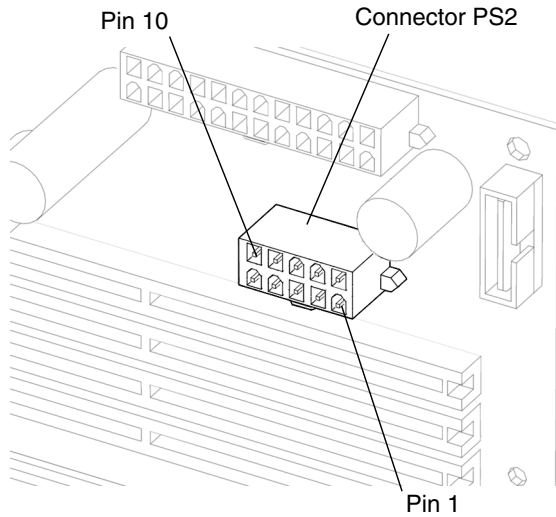
**Note** – Only four pins of connector J15 are used for the power switch and power switch LED.

---

**TABLE B-6** Power Switch and LED Cable Connector J15 Pin Assignments

Pin	Signal	Description
1	FP_PWR_LED#	Front panel power LED
2	+5 VDC	+5 VDC
5	GND	Signal ground
8	FP_PWRBTN	Power switch

## B.1.6 Power Supply Connector PS2



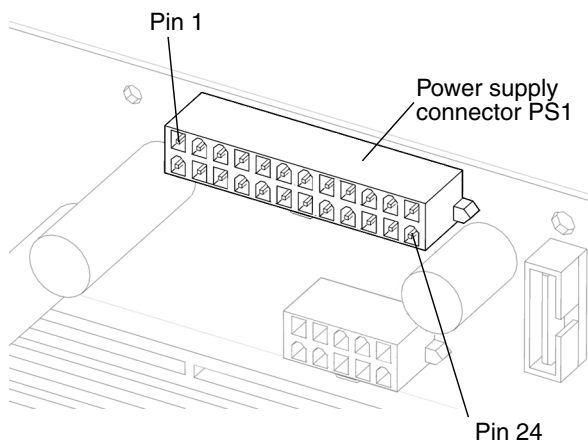
**FIGURE B-6** Power Supply Connector PS2

**TABLE B-7** Power Supply Connector PS2 Pin Description

Pin	Signal	Description
1	GND	Ground
2	GND	Ground
3	GND	Ground
4	GND	Ground
5	GND	Ground
6	+3.3 VDC	
7	+3.3 VDC	
8	+3.3 VDC	
9	+12 VDC	
10	+12 VDC	



## B.1.7 Power Supply Connector PS1



**FIGURE B-7** Power Supply Connector PS1

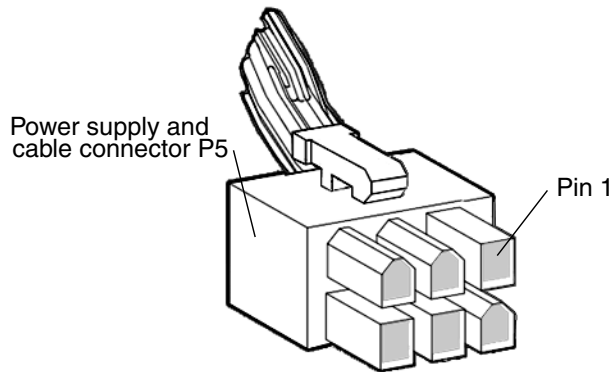
**TABLE B-8** Power Supply Connector PS1 Pin Description

Pin	Signal	Description
1	+3.3 VDC	
2	+3.3 VDC	
3	GND	Ground
4	+5V Sense	
5	GND	Ground
6	+5 VDC	
7	GND	Ground
8	Pwg	Power good
9	+5VSB	
10	+12 VDC	
11	+12 VDC	
12	+3.3 VDC	
13	+3.3 Sense	
14	-12 VDC	

**TABLE B-8** Power Supply Connector PS1 Pin Description (*Continued*)

Pin	Signal	Description
15	GND	Ground
16	PS-ON	
17	GND	Ground
18	GND	Ground
19	GND	Ground
20	NC	No connection
21	+5 VDC	
22	+5 VDC	
23	+5 VDC	
24	GND	Ground

## B.1.8 Power Supply and Cable Connector P5



**FIGURE B-8** Power Supply and Cable Connector P5

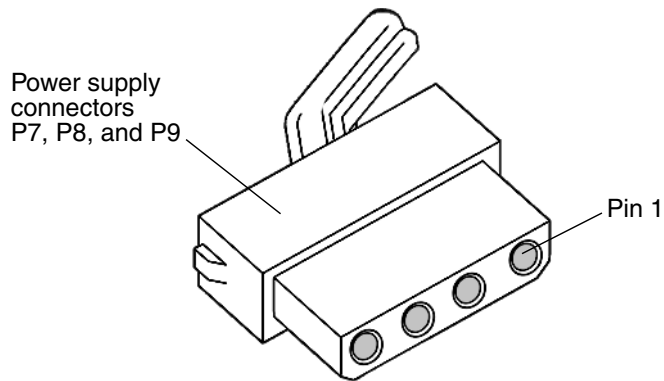
**TABLE B-9** Power Supply and Cable Connector P5 Pin Description

Pin	Signal	Description
1	+12 VDC	
2	+12 VDC	
3	+5 VDC	

**TABLE B-9** Power Supply and Cable Connector P5 Pin Description (*Continued*)

Pin	Signal	Description
4	GND	Ground
5	GND	Ground
6	GND	Ground

## B.1.9 Power Supply Connectors P7, P8, and P9

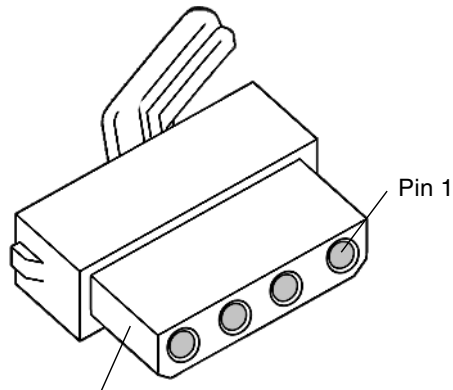


**FIGURE B-9** Power Supply Connectors P7, P8, and P9

**TABLE B-10** Power Supply Connector P7, P8, and P9 Pin Descriptions

Pin	Signal	Description
1	+12 VDC	
2	GND	Ground
3	GND	Ground
4	+5 VDC	

## B.1.10 SCSI Backplane to DVD-ROM Power Cable Connector



SCSI backplane to DVD-ROM power connector

**FIGURE B-10** SCSI Backplane to DVD-ROM Power Cable Connector

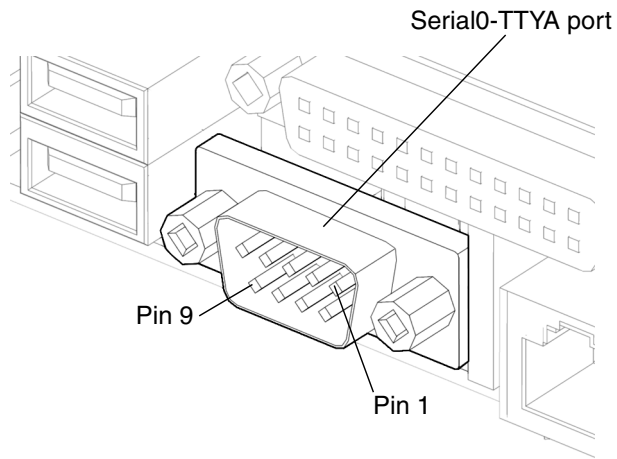
**TABLE B-11** SCSI Backplane to DVD-ROM Power Cable Connector

Pin	Signal	Description
1	+12 VDC	
2	GND	Ground
3	GND	Ground
4	+5 VDC	

---

## B.2 Serial0-TTYA Port Connector

Serial port connector SERIAL0-TTYA is a DB-9 connector located on the motherboard back panel.



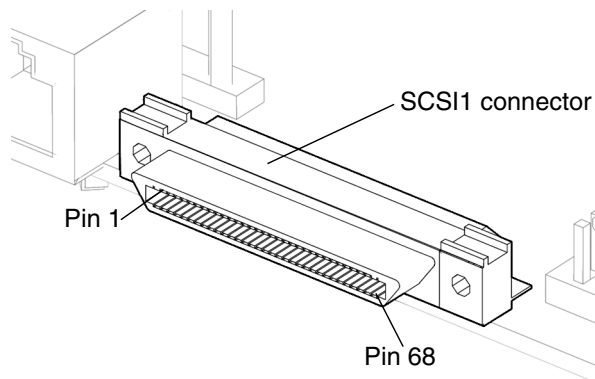
**FIGURE B-11** Serial0-TTYA Port Connector Pin Configuration

**TABLE B-12** Serial0-TTYA Port Connector Pin Assignments

Pin	Signal	Description
1	CD	Carrier detect
2	RD	Receive data
3	TD	Transmit data
4	DTR	Data terminal ready
5	GND	Ground
6	DSR	Data set ready
7	RTS	Request to send
8	CTS	Clear to send
9	RI	Ring indicator

## B.3 UltraSCSI Connector SCSI1

UltraSCSI connector (SCSI1) is located on the motherboard back panel.



**FIGURE B-12** UltraSCSI Connector SCSI1 Pin Configuration

**TABLE B-13** UltraSCSI Connector SCSI1 Pin Assignments

Pin	Signal	Description
1	BSD +12	
2	BSD +13	
3	BSD +14	
4	BSD +15	
5	BSDP +1	
6	BSD +0	
7	BSD +1	
8	BSD +2	
9	BSD +3	

**TABLE B-13** UltraSCSI Connector SCSI1 Pin Assignments (*Continued*)

<b>Pin</b>	<b>Signal</b>	<b>Description</b>
10	BSD +4	
11	BSD +5	
12	BSD +6	
13	BSD +7	
14	BDSP +0	
15	GND	Ground
16	BDIFFSENS	
17	TERMPower_B	Termpower_B
18	TERMPower_B	Termpower_B
19	NC	Not connected
20	GND	Ground
21	BSATN +	
22	GND	Ground
23	BSBSY +	
24	BSBSY +	
25	BSACK +	
26	BSMSG +	
27	BSSEL +	
28	BSCD +	
29	BSREQ +	
30	BSIO +	
31	BSD +8	
32	BSD +9	

**TABLE B-13** UltraSCSI Connector SCSI1 Pin Assignments (*Continued*)

<b>Pin</b>	<b>Signal</b>	<b>Description</b>
33	BSD +10	
34	BSD +11	
35	BSD -12	
36	BSD -13	
37	BSD -14	
38	BSD -15	
39	BADP -1	
40	BSD -0	
41	BSD -1	
42	BSD -2	
43	BSD -3	
44	BSD -4	
45	BSD -5	
46	BSD -6	
47	BSD -7	
48	BSDP -0	
49	GND	Ground
50	GND	Ground
51	TERMPower_B	Terminal B power
52	TERMPower_B	Terminal B power
53	NC	Not connected
54	GND	Ground
55	BSATN -	

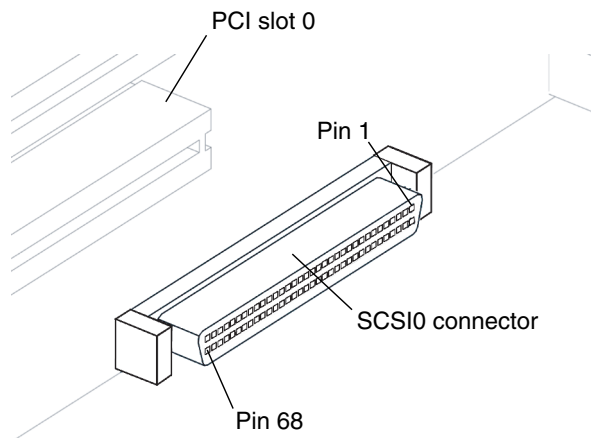


**TABLE B-13** UltraSCSI Connector SCSI1 Pin Assignments (*Continued*)

<b>Pin</b>	<b>Signal</b>	<b>Description</b>
56	GND	Ground
57	BSBSY -	
58	BSACK -	
59	BSRST -	
60	BSMSG	
61	SSSEL -	
62	BSCD -	
63	BSREQ -	
64	BSIO -	
65	BSD -8	
66	BSD -9	
67	BSD -10	
68	BSD -11	

## B.4 UltraSCSI Connector SCSI0

UltraSCSI connector SCSI0 is located on the motherboard.



**FIGURE B-13** UltraSCSI Connector SCSI0 Pin Configuration

**TABLE B-14** UltraSCSI Connector SCSI0 Pin Assignments

Pin	Signal
1	ASD +12
2	ASD +13
3	ASD +14
4	ASD +15
5	ASDP +1
6	ASD +0
7	ASD +1
8	ASD +2
9	ASD +3
10	ASD +4
11	ASD +5

**TABLE B-14** UltraSCSI Connector SCSI0 Pin Assignments (*Continued*)

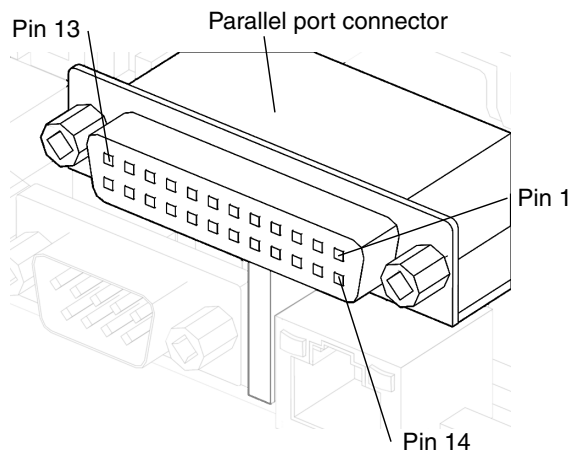
<b>Pin</b>	<b>Signal</b>
12	ASD +6
13	ASD +7
14	ASDP +0
15	GND
16	ADIFFSENS
17	TERMPower_A
18	TERMPower_A
19	3V_SCL1
20	GND
21	ASATN +
22	GND
23	ASBSY +
24	ASACK +
25	ASRST +
26	ASMSG +
27	ASSEL +
28	ASCD +
29	ASREQ +
30	ASIO +
31	ASD +8
32	ASD +9
33	ASD +10
34	ASD +11
35	ASD -12
36	ASD -13
37	ASD -14
38	ASD -15
39	ASDP -1
40	ASD -0
41	ASD -1

**TABLE B-14** UltraSCSI Connector SCSI0 Pin Assignments (*Continued*)

<b>Pin</b>	<b>Signal</b>
42	ASD -2
43	ASD -3
44	ASD -4
45	ASD -5
46	ASD -6
47	ASD -7
48	ASDP -0
49	GND
50	GND
51	TERMPower_A
52	TERMPower_A
53	3V_SDA1
54	GND
55	BSATN -
56	GND
57	ASBSY -
58	ASACK -
59	ASRST -
60	ASMSG
61	ASSEL -
62	ASCD -
63	ASREQ -
64	ASIO -
65	ASD -8
66	ASD -9
67	ASD -10
68	ASD -11

## B.5 Parallel Port Connector Parallel0

The parallel port connector PARALLEL0 is a DB-25 connector located on the motherboard back panel.



**FIGURE B-14** Parallel Port Connector Pin Configuration

**TABLE B-15** Parallel Port Connector Pin Assignments

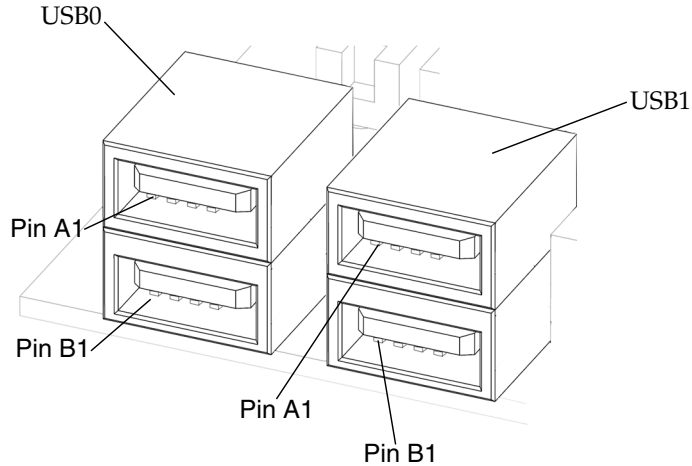
Pin	Signal	Description
1	PTR STB#	
2	PTR D0	
3	PTR D1	
4	PTR D2	
5	PTR D3	
6	PTR D4	
7	PTR D5	
8	PTR D6	
9	PTR D7	

**TABLE B-15** Parallel Port Connector Pin Assignments (*Continued*)

<b>Pin</b>	<b>Signal</b>	<b>Description</b>
10	PTR RACK#	
11	PTR BUSY	
12	PTR PE	
13	PTR SLCT	
14	PTR AFD#	
15	PTR ERR#	
16	PTR INIT#	
17	PTR SLT#	
18	GND	Signal ground
19	GND	Signal ground
20	GND	Signal ground
21	GND	Signal ground
22	GND	Signal ground
23	GND	Signal ground
24	GND	Signal ground
25	GND	Signal ground

## B.6 Universal Serial Bus Connectors USB0 and USB1

The two universal serial bus (USB) connectors USB0 and USB1 are located on the motherboard back panel. The two connectors are USB v1.x compliant.



**FIGURE B-15** USB Connector Pin Configuration

**TABLE B-16** USB0 Connector Pin Assignments

Pin	Signal Name	Description
A1	USB_PWR2	+5 VDC
A2		USBP2-
A3		USBP2+
A4	USB_GND2	Ground
B1	USB_PWR3	+5 VDC
B2		USBP3-
B3		USBP3+
B4	USB_GND3	Ground

**TABLE B-17** USB1 Connector Pin Assignments

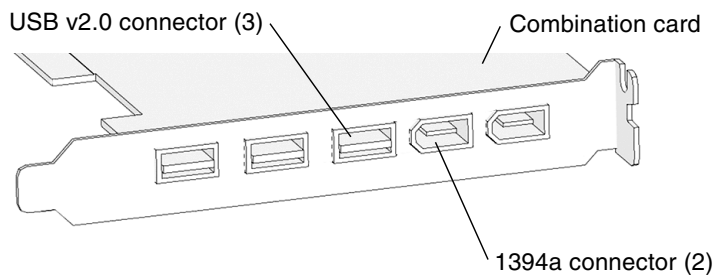
Pin	Signal Name	Description
A1	USB_PWR0	+5 VDC
A2		USBP0-
A3		USBP0+
A4	USB_GND0	Ground
B1	USB_PWR1	+5 VDC
B2		USBP1-
B3		USBP1+
B4	USB_GND1	Ground

**Note** – Three additional USB connectors are located on the IEEE 1394/USB 2.0 combination card. The USB connectors on this card are USB version 2.0 compliant.

## B.7 IEEE 1394/USB 2.0 Combination Card Connectors

Two external IEEE 1394a connectors and three USB v2.0 connectors are located on the IEEE 1394/USB 2.0 combination card.

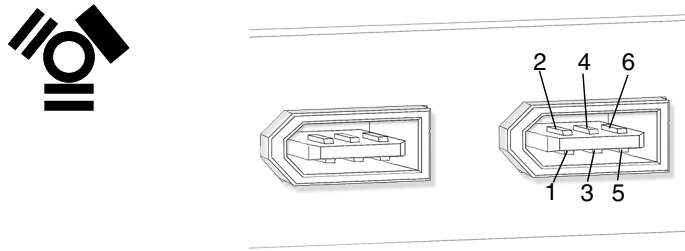
An additional IEEE 1394 internal connector and two additional internal USB v2.0 connectors are located internally on the combination card.



**FIGURE B-16** IEEE 1394a/USB 2.0 Combination Card



The IEEE 1394 connectors have the following pin configuration.

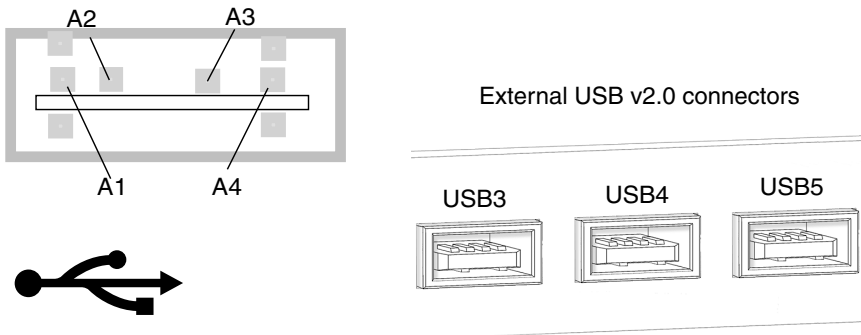


**FIGURE B-17** IEEE 1394a Connector Pin Configuration

**TABLE B-18** IEEE 1394a Connector Pin Assignments

Pin	Signal Name	Description
1	POWER	+12 VDC
2	GND	Ground
3	TPB-	
4	TPB+	
5	TPA-	
6	TPA+	

The external and internal USB v2.0 connectors have the following pin configuration.



**FIGURE B-18** USB v2.0 Connector Pin Configuration

**TABLE B-19** USB3, USB4, USB5, USB6, and USB7 External and Internal Connector Pin Assignments

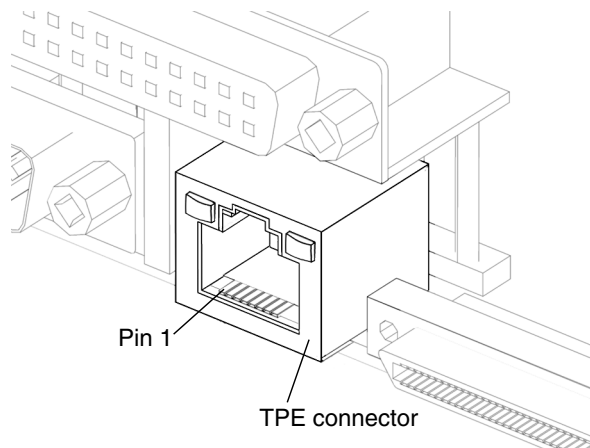
Pin	Signal Name	Description
A1	USB_PWR	+5 VDC
A2	USBP-	
A3	USBP+	
A4	USB_GND	Ground

## B.8 Twisted-Pair Ethernet Connector

The twisted pair Ethernet (TPE) connector TPE0 is an RJ-45 connector located on the motherboard back panel.



**Caution** – Connect only TPE cables to the TPE connector.



**FIGURE B-19** TPE0 Connector Pin Configuration

**TABLE B-20** TPE0 Connector Pin Assignments

<b>Pin</b>	<b>Signal</b>	<b>Description</b>
1	TRD0+	Transmit/receive data
2	TRD0-	
3	TRD1+	
4	TRD2+	
5	TRD2-	
6	TRD1-	
7	TRD3+	
8	TRD3-	

## B.8.1 TPE Cable-Type Connectivity

For 10BASE-T applications, unshielded twisted-pair (UTP) cable, the following types of TPE cables can be connected to the TPE connector.

- Category 3 (UTP-3, voice grade)
- Category 4 (UTP-4)
- Category 5 (UTP-5, data grade)

---

**Note** – For 100BASE-T applications, UTP cable, UTP-5, data grade (requires pairs 0 and 1)

---

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**Note** – For 1000BASE-T applications, UTP cable, UTP-5, data grade (requires all 4 pairs)

---

## B.8.2 External UTP-5 (Data Grade) Cable Lengths

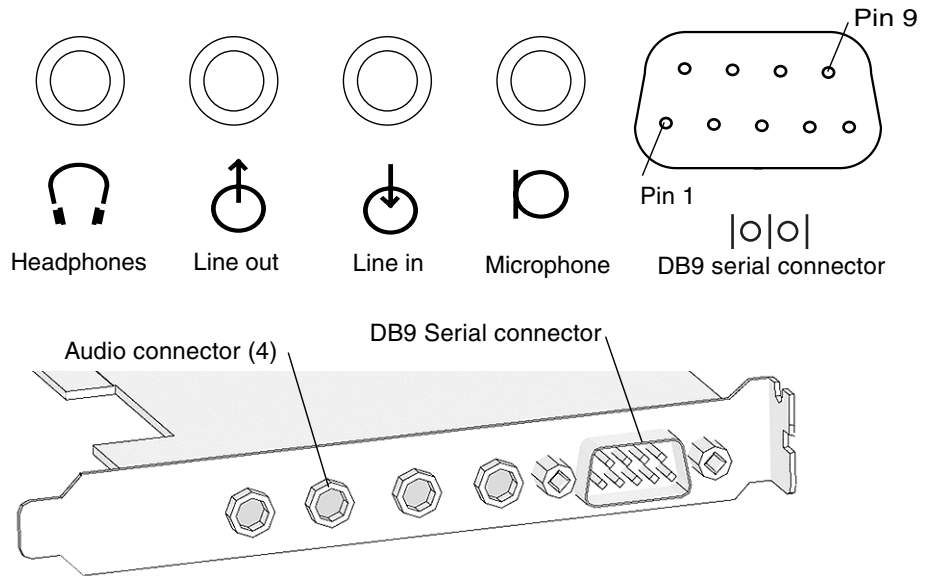
The following table lists TPE UTP-5 types, applications, and maximum lengths.

**TABLE B-21** TPE UTP-5 Cables

Cable Type	Application(s)	Maximum Length (Metric)	Maximum Length (English)
UTP-5, data grade	10BASE-T or 100BASE-T	100 meters	109 yards

## B.9 Audio Module Connectors

The audio connectors are located on the audio module card. The connectors use EIA standard 3.175-mm (0.125-inch) jacks.



**FIGURE B-20** Audio Connector Configuration

**TABLE B-22** Audio Connector Line Assignment

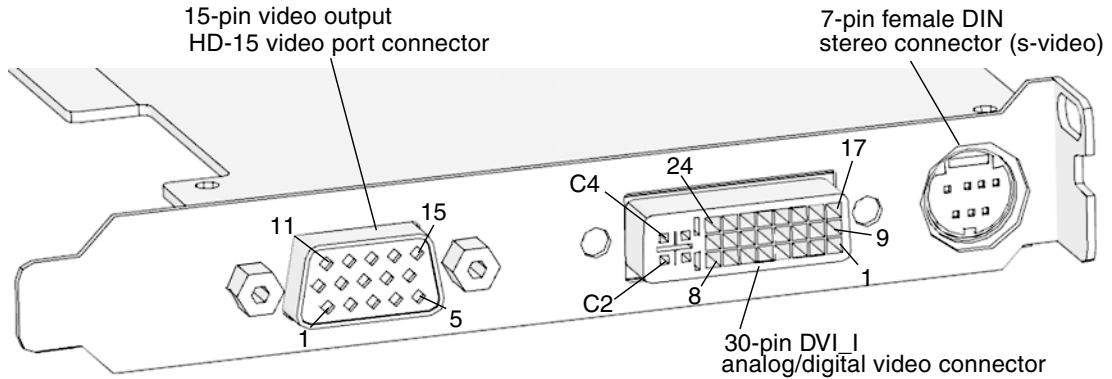
Pin	Headphones	Line Out	Line In	Microphone
Tip	Left channel	Left channel	Left channel	Left channel
Ring (center)	Right channel	Right channel	Right channel	Right channel
Shield	Ground	Ground	Ground	Ground

**TABLE B-23** Audio Module DB9 Connector Pin Assignments

<b>Pin</b>	<b>Signal</b>	<b>Description</b>
1	CD	Carrier detect
2	RD	Receive data
3	TD	Transmit data
4	DTR	Data terminal ready
5	GND	Ground
6	DSR	Data set ready
7	RTS	Request to send
8	CTS	Clear to send
9	RI	Ring indicator

## B.10 Graphics Card Connectors Sun XVR-100

The graphics card connectors are located on the graphics card.



**FIGURE B-21** Sun XVR-100 Video and Stereo Connector Pin Configurations

**TABLE B-24** Sun XVR-100 Graphics Card Video Connector Pin Assignments-HD15

Pin	Signal Name	Description
1	Red analog video	
2	Green analog video	
3	Blue analog video	
4	NC	No connection
5	GND	Ground
6	GND	Ground
7	GND	Ground
8	GND	Ground
9	+5 VDC supply	
10	GND	

**TABLE B-24** Sun XVR-100 Graphics Card Video Connector Pin Assignments-HD15

Pin	Signal Name	Description
11	NC	No connection
12	DDC bi-directional data (SDA)	
13	Horizontal/ composite sync	
14	Vertical sync	
15	DDC data clock (SCL)	

**TABLE B-25** Sun XVR-100 Graphics Card Stereo Connector Pin Assignments

Pin	Signal Name	Description
1	GND	Signal ground
2	+5 VDC fused	300mA nominal-1.0A peak
3	+12 VDC, 300mA limited to 1.0A	300mA nominal-1.0A peak
4	Master stereo field, select out	
5	Slave stereo field, select in	
6	NC	No connection
7	NC	No connection

**TABLE B-26** Sun XVR-100 Graphics Card Video Connector Pin Assignments-DVI-I

Pin	Signal Name	Description
1	TMDS Data 2-	
2	TMDS Data2+	
3	TMDS Data2/4 Shield	
4	TMDS 4-	
5	TMDS 4+	
6	DDC Clock	



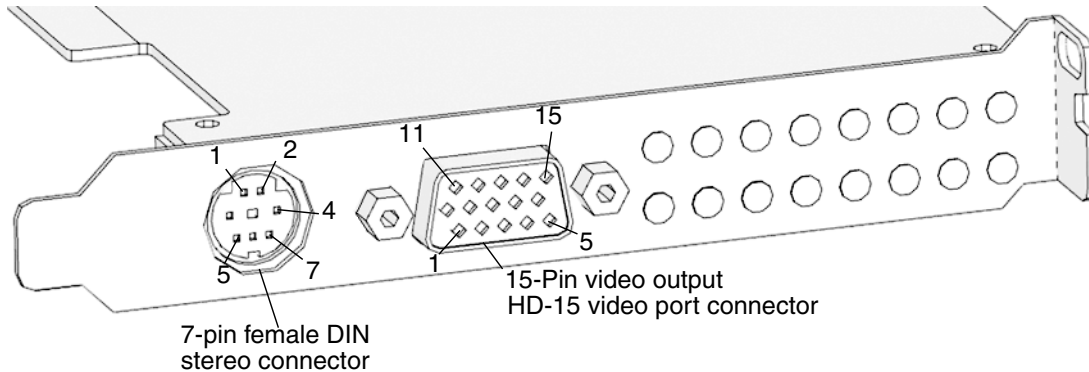
**TABLE B-26** Sun XVR-100 Graphics Card Video Connector Pin Assignments-DVI-I

Pin	Signal Name	Description
7	DDC Data	
8	Analog Vertical Sync	
9	TMDS Data 1-	
10	TMDS Data1+	
11	TMDS Data 1/3 Shield	
12	TMDS 3-	
13	TMDS 3+	
14	+5V power	
15	GND	+5Vdc, analog vertical/horizontal sync
16	Hot Plug Detect	
17	TMDS Data0-	
18	TMDS Data 0+	
19	TMDS Data 0/5 shield	
20	TMDS Data 5-	
21	TMDS Data 5+	
22	TMDS Clock shield	
23	TMDS Clock+	
24	TMDS Clock-C1	
C1	Analog Red Video	
C2	Analog Green Video	
C3	Analog Blue Video	
C4	Analog H Sync	
C5	Analog GND	R,G, and B return

**Note** – For additional information see the *Sun XVR-100 Graphics Accelerator Installation Guide*, 816-7560.

## B.11 Graphics Card Connectors Sun XVR-500

The graphics card connectors are located on the graphics card.



**FIGURE B-22** Sun XVR-500 Graphics Card Video and Stereo Connector Pin Configurations

**TABLE B-27** Sun XVR-500 Graphics Card Video Connector HD-15 Pin Assignments

Pin	Signal Name	Description
1	Red analog video	
2	Green analog video	
3	Blue analog video	
4	NC	No connection
5	GND	Ground
6	GND	Ground
7	GND	Ground
8	GND	Ground
9	+5V supply	
10	GND	Ground
11	NC	No connection
12	DDC bidirectional data (SDA)	

Pin	Signal Name	Description
13	Horizontal/composite sync.	
14	Vertical sync.	
15	DDC Data Clock (SCL)	

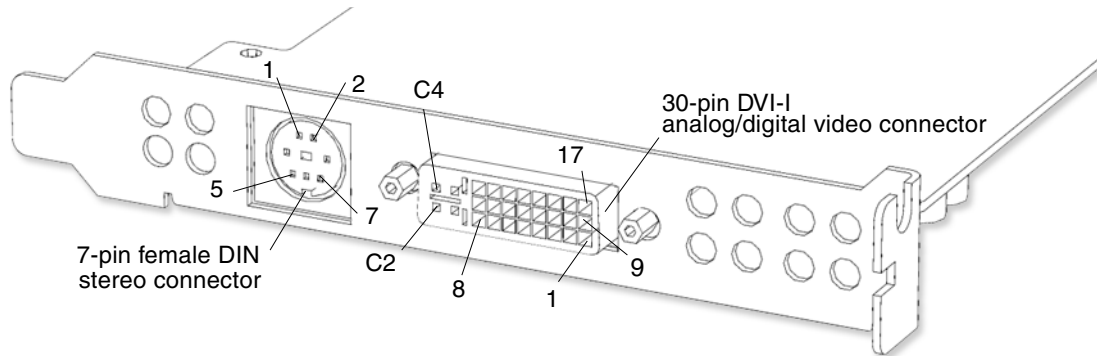
**TABLE B-28** Sun XVR-500 Graphics Card Stereoscopic Imager Pin Assignments

Pin	Signal Name	Description
1	Signal ground	Ground
2	5V	Fused, supplies up to 300 mA, limited to 1.0 A
3	12V	Fused, supplies up to 300 mA, limited to 1.0 A
4	Master stereo field select out	
5	Slave stereo field select in	
6	NC	No connection
7	NC	No connection

**Note** – For additional information about stereoscopic imaging, see the *Sun XVR-500 Graphics Accelerator Installation Guide*, 816-3028.

## B.12 Graphics Card Connector Sun XVR-600

The graphics card connectors are located on the graphics card.



**TABLE B-29** Sun XVR-600 Stereo/FrameLock Connector

Pin	Signal Name	Description
1	Signal ground	Ground
2	5V	Fused, supplies up to 300 mA, limited to 1A
3	12V	Fused, supplies up to 300 mA, limited to 1A
4	Master stereo field Select Out	
5	Slave stereo field Select In	
6	NC	No connection
7	NC	No connection

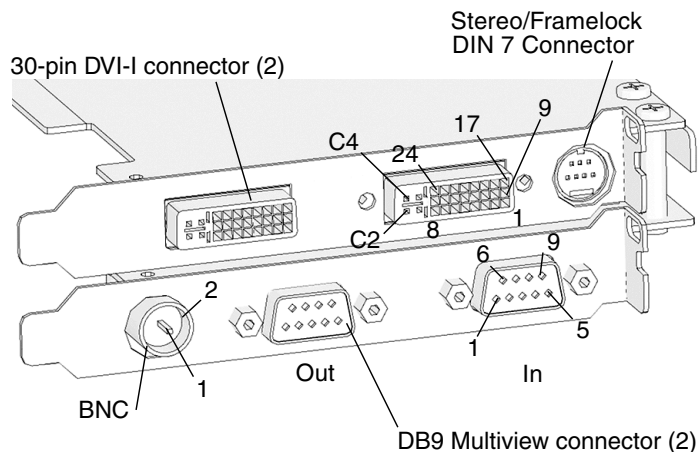
**TABLE B-30** Sun XVR-600 Graphics Card Video Connector Pin Assignments-DVI-I

Pin	Signal Name	Description
1	TMDS Data 2-	
2	TMDS Data2+	
3	TMDS Data2/4 Shield	
4	NC	No connection
5	NC	No connection

**TABLE B-30** Sun XVR-600 Graphics Card Video Connector Pin Assignments-DVI-I

<b>Pin</b>	<b>Signal Name</b>	<b>Description</b>
6	DDC Clock (SCL)	
7	DDC bi-directional data (SDA)	
8	Analog vertical sync	
9	TMDS Data 1-	
10	TMDS Data1+	
11	TMDS Data 1/3 Shield	
12	NC	No connection
13	NC	No connection
14	+5V DC power	
15	GND return	+5Vdc, analog vertical/horizontal sync
16	Hot Plug Detect	
17	TMDS Data0-	
18	TMDS Data 0+	
19	TMDS Data 0/5 shield	
20	NC	No connection
21	NC	No connection
22	TMDS Clock shield	
23	TMDS Clock+	
24	TMDS Clock-	
C1	Analog Red Video	
C2	Analog Green Video	
C3	Analog Blue Video	
C4	Analog H Sync	
C5	Analog GND return	Analog R,G, and B return

## B.13 Graphics Card Connector Sun XVR-1200



**FIGURE B-23** Sun XVR-1200 Graphics Card Showing DVI, Analog Video, Stereo, BNC Connectors

**TABLE B-31** Sun XVR-1200 Graphics Card BNC Connector Pin Assignments

Pin	Signal Name	Description
1	Signal	
2	Ground	

**TABLE B-32** Sun XVR-1200 Graphics Card DVI Connector Pin Assignments

Pin	Signal Name
1	TMDS Data 2 -
2	TMDS Data 2 +
3	TMDS Data 2/4 shield
4	No connect
5	No connect
6	DDC clock (SCL)

**TABLE B-32** Sun XVR-1200 Graphics Card DVI Connector Pin Assignments (*Continued*)

<b>Pin</b>	<b>Signal Name</b>
7	DDC bi-directional data (SDA)
8	Analog vertical sync
9	TMDS data1-
10	TMDS data1+
11	TMDS data1/3 shield
12	No connect
13	No connect
14	+5 VDC power
15	Gnd return: +5V, Hsync, Vsync
16	Hot plug detect
17	TMDS data 0-
18	TMDS data0+
19	TMDS data0/5 shield
20	No connect
21	No connect
22	TMDS clock shield
23	TMDS clock+
24	TMDS clock-
C1	Analog red
C2	Analog green
C3	Analog blue
C4	Analog horizontal sync
C5	Analog gnd return (analog R, G, B)

**TABLE B-33** Sun XVR-1200 Graphics Card DB9 Multiview In Connector Pin Assignments

<b>Pin</b>	<b>Signal Name</b>
1	Slave sense
2	Gnd
3	RefClk input
4	RefClk input
5	Gnd
6	Release input
7	Pixel align input
8	Gnd
9	Done input

**TABLE B-34** Sun XVR-1200 Graphics Card DB9 Multiview Out Connector Pin Assignments

<b>Pin</b>	<b>Signal Name</b>	<b>Description</b>
1	3.3 V	Fuse - 0.5A current limited
2	Gnd	
3	RefClk	
4	RefClk	
5	Gnd	
6	Release output	
7	Pixel align output	
8	Gnd	
9	Done output	

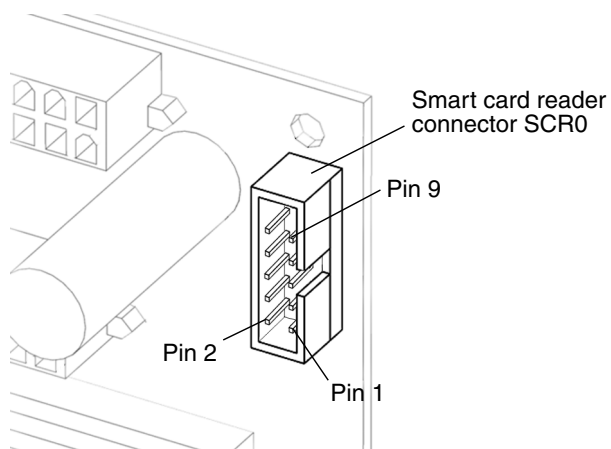


**TABLE B-35** Sun XVR-1200 Graphics Card Stereo/FrameLock DIN 7 Connector Pin Assignments

Pin	Signal Name	Description
1	Signal gnd	
2	5.0 V	Fused, will supply up to 300mA, current limited to 1.0A
3	12.0 V	Fused, will supply up to 300mA, current limited to 1.0A
4	Stereo sync	
5	FrameLock in	
6	No connect	
7	No connection	

## B.14 Smart Card Reader Connector

The smart card reader connector SCR0 is located on the motherboard.

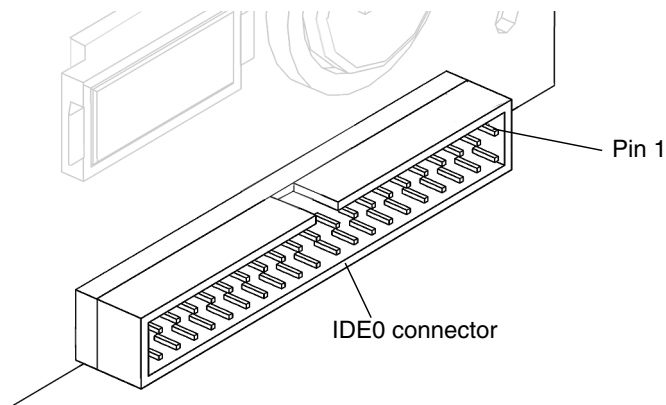


**FIGURE B-24** Pin Assignments for Smart Card Reader Connector SCR0

**TABLE B-36** Pin Assignments for Smart Card Reader Connector SCR0

Pin	Signal Name	Description
1	+12 VDC	+12VDC power
2	GND	Ground
3	GND	Ground
4	SC_SCL	I2C _ clock
5	+5 VDC	+5 VDC power
6	I2C_SDA	I2C _data
7	GND	Ground
8	GND	Ground
9	SMCARD_INT#	
10	NC	No connection

## B.15 IDE0 Connector



**FIGURE B-25** Primary IDE0 Connector

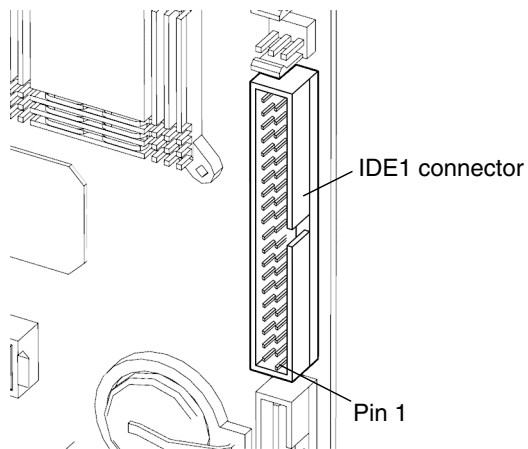
**TABLE B-37** IDE0 Connector Pin Assignments

<b>Pin</b>	<b>Signal</b>
1	HDRST#
2	GND
3	PIDED7
4	PIDED8
5	PIDED6
6	PIDED9
7	PIDED5
8	PIDED10
9	PIDED4
10	PIDED11
11	PIDED3
12	PIDED12
13	PIDED2
14	PIDED13
15	PIDED1
16	PIDED14
17	PIDED0
18	PIDED15
19	GND
20	NC
21	PIEDRQ
22	GND
23	PIDEIOW#
24	GND
25	PIDEIOR#
26	GND
27	PIDEIURDY
28	GND
29	PIDEDACK#

**TABLE B-37** IDE0 Connector Pin Assignments (*Continued*)

Pin	Signal
30	GND
31	PIDEIRQ
32	NC
33	PIDEA1
34	PIDECBLID
35	PIDEA0
36	PIDEA2
37	PIDECS1
38	PIDECS3#
39	NC
40	GND

## B.16 Secondary IDE1 Connector



**FIGURE B-26** IDE Connector ATA1

**TABLE B-38** IDE1 Connector Pin Assignments

<b>Pin</b>	<b>Signal</b>
1	HDRST#
2	GND
3	SIDED7
4	SIDED8
5	SIDED6
6	SIDED9
7	SIDED5
8	SIDED10
9	SIDED4
10	SIDED11
11	SIDED3
12	SIDED12
13	SIDED2
14	SIDED13
15	SIDED1
16	SIDED14
17	SIDED0
18	SIDED15
19	GND
20	NC
21	SIDEDRQ
22	GND
23	SIDEIOW#
24	GND
25	SIDEIOR#
26	GND
27	SIDEIORDY
28	GND
29	SIDEDACK#

**TABLE B-38** IDE1 Connector Pin Assignments (*Continued*)

<b>Pin</b>	<b>Signal</b>
30	GND
31	SIDEIRQ
32	SC
33	SIDEA1
34	SIDECLBID
35	SIDEA0
36	SIDEA2
37	SIDECS1#
38	SIDECS3#
39	NC
40	GND

# Functional Description

---

This appendix provides a functional description of the hardware architecture for the Sun Blade 2500 workstation. This functional description covers the following topics:

- [Section C.1, “Hardware Architecture” on page C-1](#)
- [Section C.2, “Motherboard” on page C-4](#)
- [Section C.3, “UltraSPARC IIIi CPU and Memory Subsystem” on page C-6](#)
- [Section C.4, “JBus and XBus” on page C-25](#)
- [Section C.5, “System Clocks and Interrupt Processing” on page C-33](#)
- [Section C.6, “System Interfaces” on page C-35](#)
- [Section C.7, “General Purpose Input and Output Registers” on page C-42](#)
- [Section C.8, “System Thermal Management” on page C-43](#)
- [Section C.9, “System Power Management” on page C-45](#)

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## C.1 Hardware Architecture

### C.1.1 System Overview

The Sun Blade 2500 is a dual processor desktop workstation that uses the UltraSPARC IIIi CPU. The UltraSPARC IIIi uses its distributed shared-memory multiprocessor architecture with both CPUs installed on a single motherboard. See [FIGURE C-1](#) for a graphic description of the hardware architecture used in the Sun Blade 2500 workstation.

The memory controller is physically part of each UltraSPARC IIIi processor. That is, it is on the chip. Both CPUs have their own local physical address space.

The I/O subsystem is designed around two IO-bridge ASICs that bridge between the system JBus and the PCI buses. Each IO-bridge has two PCI leaves. The master IO-bridge0 supports two PCI buses: 33 MHz on the PCI-A leaf and 66 MHz on the PCI-B leaf. The slave IO-bridge1 supports two 66 MHz PCI buses out of PCI-A leaf and PCI-B leaf.

The leaf for the master IO-bridge0, PCI-2A, connects to the Southbridge. The Southbridge interfaces with IDE (ATA-100), USB, audio module, XBus, and Super I/O functions (for example, serial port, parallel port). The PCI-2A leaf is also part of the boot path. The boot path is:

- CPU
- JBus
- Master IO-bridge0
- PCI-2A leaf
- Southbridge
- XBus
- Flash PROM

The XBus off the Southbridge is used as an interface to the I2C controller and bus.

A single G-bit Ethernet controller is connected to the PCI-A leaf of IO-bridge1 and the SCSI controller is connected to the PCI-B leaf of IO-bridge1.

## C.1.2 System Block Diagram

The following is the system block diagram for Sun Blade 2500 ([FIGURE C-1](#)).



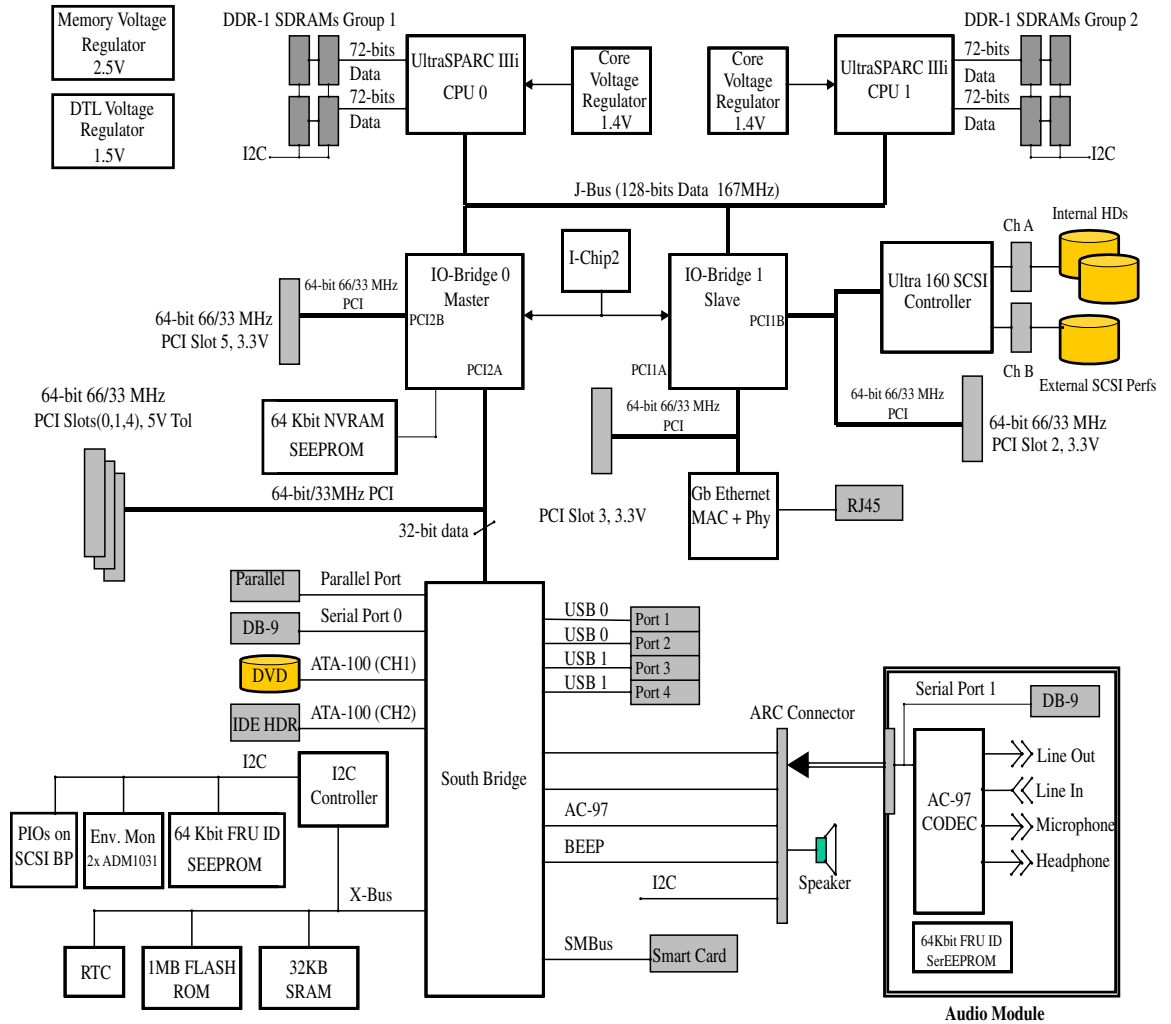


FIGURE C-1 Sun Blade 2500 System Block Diagram

## C.1.3 Enclosure

The Sun Blade 2500 workstation is a vertical tower optimized for ease of installation and service. The overall dimensions and weight of the enclosure are as shown in [TABLE C-1](#).

**TABLE C-1** Overall Dimensions and Weight of the Sun Blade 2500 Workstation

Height	Width	Depth	Weight
19.13 in. (486.00 mm)	8.49 in. (215.88 mm)	19.27 in. (489.52 mm)	49.6 lbs. (22.5 kg max.)

Major components such as CPUs, PCI cards, DIMMs, and hard drives, are easily accessible for improved serviceability. See [Section 10.4, “Removing the Access Panel”](#) on page 10-12.

---

## C.2 Motherboard

### C.2.1 Hardware Features

The motherboard used in the Sun Blade 2500 workstation has the following platform-specific features:

- Extended ATX (12 in.by 13 in.) form factor
- Two Micro PGA 959-pin CPU sockets
- Four 184-pin DDR DIMM sockets for each CPU
- On-board voltage regulators for CPU core, memory, and JBus
- Two input power connectors (PS0 and PS1)
- Six 64-bit PCI connectors
- A Southbridge with integrated ATA100, XBus (ISA), USB, AC97, serial ports, parallel port, and I2C controller
- G-bit (10/100/1000 Ethernet controller)
- Dual-channel UltraSCSI IV 320 controller, channel A for internal drives and channel B for external peripherals
- Audio module connector ARC0/RSC0

### C.2.2 Motherboard Components

[FIGURE C-2](#) and [FIGURE C-3](#) show the location of the major motherboard components and connectors.

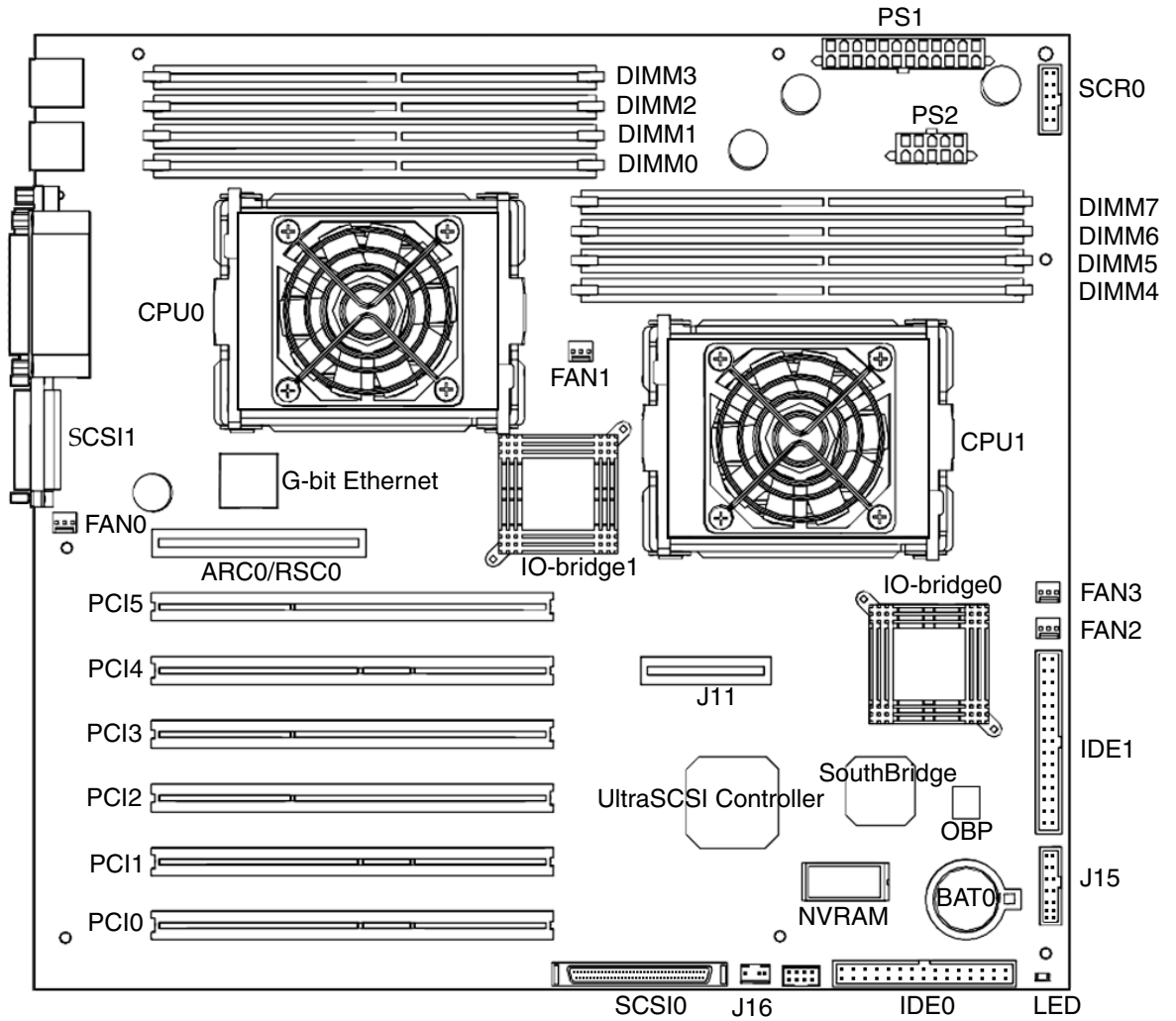
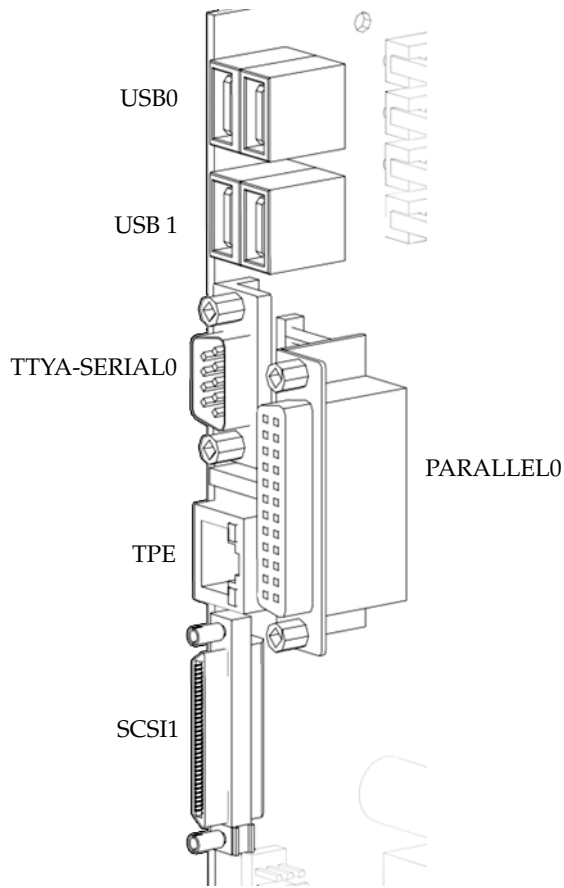


FIGURE C-2 Diagram of Major Motherboard Components



**FIGURE C-3** Motherboard Rear Connectors



## C.3 UltraSPARC IIIi CPU and Memory Subsystem

The Sun Blade 2500 workstation supports two CPUs and up to eight Double Data Rate (DDR) memory DIMMs. Each CPU is connected through a JBus ([FIGURE C-1](#)).

## C.3.1 UltraSPARC IIIi CPU

The UltraSPARC IIIi processor is a high-performance, highly integrated superscalar processor implementing the 64-bit SPARC V9 RISC architecture. It is capable of sustaining the execution of up to four instructions for each cycle, even in the presence of conditional branches and cache misses. Instructions to multiple functional units are issued in program order and executed in parallel. In order to further increase the number of instructions executed for each cycle, instructions from two basic blocks can be issued in the same group.

The UltraSPARC IIIi CPU supports full implementation of the 64-bit SPARC V9 architecture. It supports a 64-bit virtual address space and a 43-bit physical address space. The core instruction set has been extended to include graphics instructions that provide the most common operations used for two-dimensional image processing, two- and three-dimensional graphics, image compression algorithms, and parallel operations on pixel data with 8- and 16-bit components.

### C.3.1.1 UltraSPARC IIIi Key Features

- UltraSPARC IIIi CPU running at 1.28 GHz
- EPIC-7 Cu
- UltraSPARC III-Plus core
- JBus for system bus
- Integrated L1 caches (data, instruction, prefetch)
- Integrated 1 MB L2 data cache
- Integrated DDR-1 memory controller

### C.3.1.2 L1 and L2 Caches

#### *L1 Data Cache*

- 64 Kbytes
- Four-way set associative
- Write-through
- Nonallocating (no write allocate)
- Virtually indexed (does not go through D-TLB), physically tagged (goes through D-TLB)
- Address aliasing as side effect
- 32-byte line size, no sublines
- Parity-protected data and tags
- Not included in L2 cache, but snooped in parallel with L2
- Need to flush if alias is created

### *L1 Instruction Cache*

- 32 Kbytes
- Pseudo four-way set associative
- Physically indexed and physically tagged (goes through I-TLB)
- Write invalidate
- 32-byte line size, no sublines
- Parity-protected data and tags
- Not included in L2 cache, but snooped in parallel with L2
- No flushing required

### *L1 Prefetch Cache*

- Used by software prefetch instruction and autonomous hardware prefetch from L2 cache
- 2 Kbytes
- Four-way set associative
- Physically indexed and tagged through D-TLB
- Write invalidate
- 64-byte line size, two 32-byte sublines
- Not included in L2 cache, but snooped in parallel with L2
- No flushing required

### *L2 Data Cache*

- 1 MB
- Four-way set associative
- Physically indexed and tagged through D-TLB
- Write back, allocating
- 64-byte line size
- Data ECC protected, tag parity protected
- L2 tag address able to cache 16 GBytes of local memory
- Required flushing for stable storing

### *L2 Write Cache*

- Reduces bandwidth to L2 cache by coalescing and bursting stores to L2 cache
- 2 Kbytes
- Four-way set associative
- 64-byte line size, two 32-byte sublines
- Physically indexed and tagged through D-TLB
- Included in L2 cache
- Required flushing for stable storing

### C.3.1.3 UltraSPARC IIIi Memory Controller

The memory system consists of the memory control unit (MCU) in the CPU and two physical banks (1A/1B and 2A/2B) of DDR-1 SDRAM memory (FIGURE C-4). Only registered DIMMS are supported.

---

**Note** – At the time of product development the physical banks were labeled 1A/1B and 2A/2B. This has changed see [“OpenBoot PROM Memory Message” on page 11](#).

---

Clock buffering with a PLL is provided on the DIMMs. Each physical bank consists of two 72-bit DDR-1 SDRAM DIMMs. Both banks share a 16-byte data bus plus ECC data bus. All DIMMs have shared address/control bus. Since each DIMM could be dual sided (upper and lower banks), there are maximum of four data loads for each physical bank. Both banks are controlled by the memory controller.

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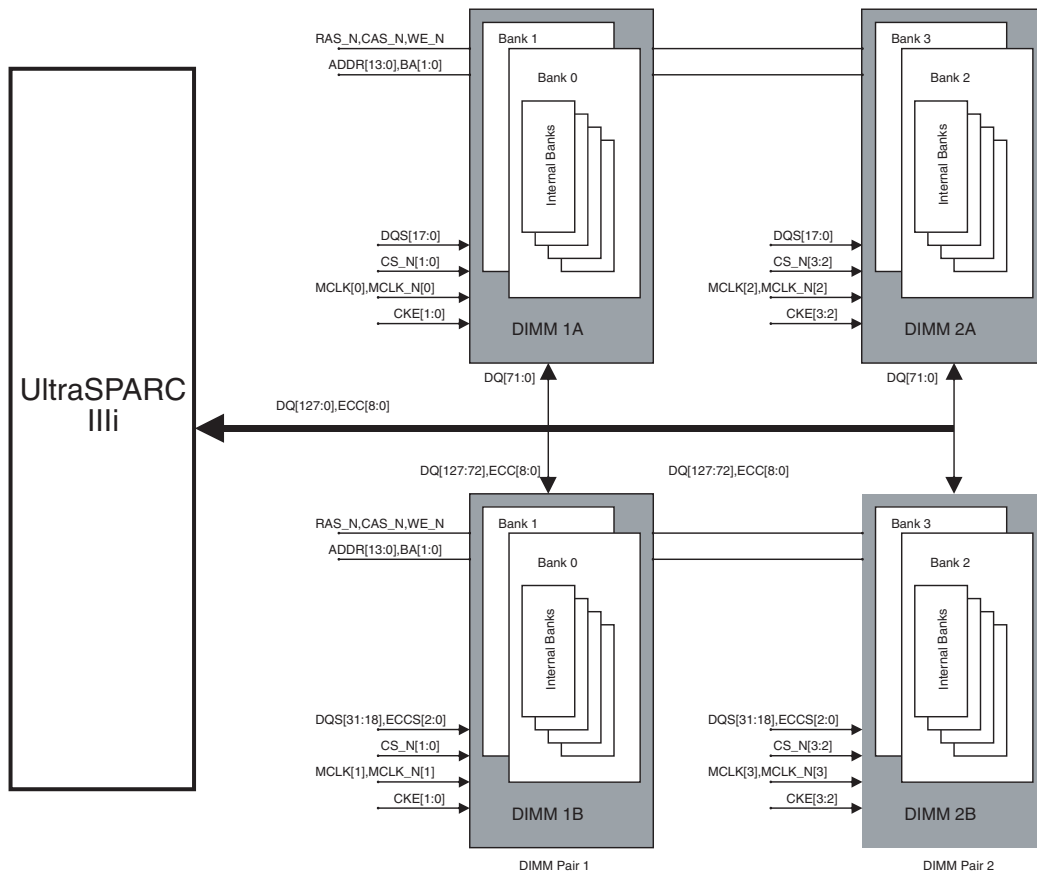
**Note** – DIMMs must always be loaded in pairs. See [Section 11.1.3, “Installing the DIMMs” on page 11-7](#) for detailed DIMM installation information.

---

A memory controller pipelines requests, making use of 16 memory banks when fully loaded.

The key features of the memory controller are:

- Maximum SDRAM clock frequency of 133 MHz
- DDR-1 (Double Data Rate)
- Supports single bank or dual bank SDRAM DIMMs
- Memory controller supports two physical banks of 128 bits of data plus 9 bits of error checking correction (see [“ECC Checking and Generation” on page 11](#))
- Supports 256 MB, 512 MB and 1 GB DDR-1 SDRAMs, x 4 or x 8 concurrently
- Supports four SDRAM DIMM slots
- Supports four internal SDRAM device banks
- Maximum memory capacity is as follows:
  - 4 GB, using four banks of 512 MB (64 MB x 8) or stacked 256 MB (64 MB x 4)
  - 8 GB using four banks of 1 GB (128 MB x 8) or stacked 512 MB (128 MB x 4)
  - 16 GB using four banks of stacked 1 GB (256 MB x 4)
- Supported memory space from 256 MB to 16 GB for each memory controller
- Peak memory bandwidth of 4.2 GB per second @ 133 MHz
- Three interleaving modes:
  - Rank interleaving
  - Bank interleaving
  - DIMM-to-DIMM interleaving
- SSTL\_2 inputs and outputs



**FIGURE C-4** Memory Subsystem Block Diagram

### *UltraSPARC IIIi Clock*

The system clock generator chip generates a 3.3V LVPECL differential clock that is converted to 1.5V HSTL-levels before being sent to the CPU. An AC coupling circuit in conjunction with a bias voltage is used to effect the level shifting.



## *ECC Checking and Generation*

All memory transfers have error checking and correction (ECC). The UltraSPARC IIIi memory controller unit performs ECC generation and checking.

The UltraSPARC IIIi uses the same ECC logic as the UltraSPARC-III. A 9-bit syndrome is generated using the Hsiao's algorithm for each 128 bits of data. This 9-bit syndrome enables single-bit error correction and multiple-bit error detection. The memory controller generates the ECC bits based on the modified Hsiao's algorithm and writes it out to memory along with the 128 bits of data. When data is read from memory, the data and ECC bits generate the syndrome bits to indicate the correctness of the data. A syndrome value of 0 means no errors. A syndrome value of non-zero indicates single- or multiple-bit errors. If the data is for a foreign request, the uncorrectable error and correctable error information is sent along with it on the J\_ADTYPE bus.

## *Core Power Regulators*

The Sun Blade 2500 system uses two core voltage regulators, one for each CPU. Each core voltage regulator has the following requirements:

- Programmable output voltage from 0.80V to 1.550V through VID bits
- 12V input source
- Input voltage tolerance of  $\pm 5\%$
- Maximum output current of 40A @ 1.3V
- Output voltage tolerance of  $\pm 3\%$
- 85% efficiency at full load

The voltage sense line is connected directly from the sense pin of the CPU.

The voltage for each regulator can be set either by a jumper or through software. The table below shows the VRM voltage ID codes for each core regulator ([FIGURE C-5](#)) and ([FIGURE C-6](#)).

---

**Note** – Voltage must be set to 1.4V for normal operation.

---

**TABLE C-2** VRM Voltage ID Codes

VID4	VID3	VID2	VID1	VID0	VDC (Output)
1	1	1	1	1	Off
1	1	1	1	0	0.800
1	1	1	0	1	0.825
1	1	1	0	0	0.850

**TABLE C-2** VRM Voltage ID Codes (*Continued*)

<b>VID4</b>	<b>VID3</b>	<b>VID2</b>	<b>VID1</b>	<b>VID0</b>	<b>VDC (Output)</b>
1	1	0	1	1	0.875
1	1	0	1	0	0.900
1	1	0	0	1	0.925
1	1	0	0	0	0.950
1	0	1	1	1	0.975
1	0	1	1	0	1.000
1	0	1	0	1	1.025
1	0	1	0	0	1.050
1	0	0	1	1	1.075
1	0	0	1	0	1.100
1	0	0	0	1	1.125
1	0	0	0	0	1.150
0	1	1	1	1	1.175
0	1	1	1	0	1.200
0	1	1	0	1	1.225
0	1	1	0	0	1.250
0	1	0	1	1	1.275
0	1	0	1	0	1.300
0	1	0	0	1	1.325
0	1	0	0	0	1.350
0	0	1	1	1	1.375
0	0	1	1	0	1.400
0	0	1	0	1	1.425
0	0	1	0	0	1.450
0	0	0	1	1	1.475
0	0	0	1	0	1.500
0	0	0	0	1	1.525
0	0	0	0	0	1.550

## VID jumpers

There are two VID jumpers, one per CPU core voltage. The following figures show the jumper location and pin names.

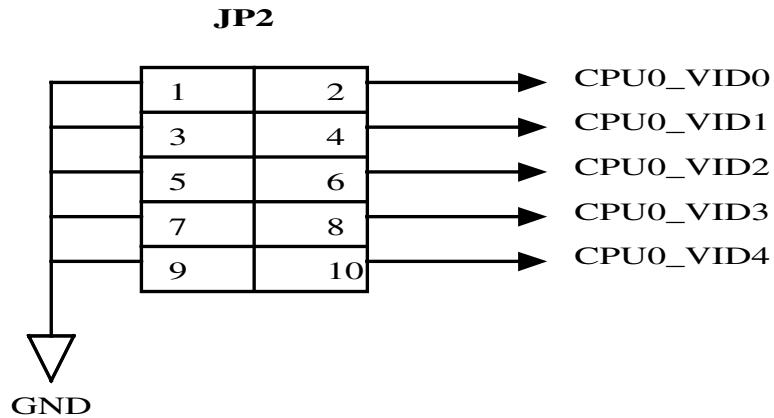


FIGURE C-5 CPU0 VID Jumper

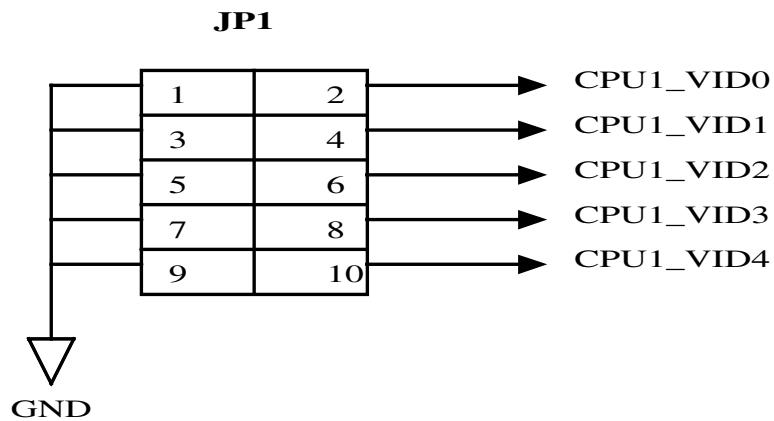


FIGURE C-6 CPU1 VID Jumper

## C.3.2 Memory Subsystem

### C.3.2.1 DDR Memory

The Sun Blade 2500 workstation supports two CPUs and up to eight memory DIMMs. Each CPU is connected through a JBus. Each CPU interfaces directly to memory ([FIGURE C-7](#)). The CPU/memory subsystem consists of the following functions:

- UltraSPARC IIIi CPU
- Four 184-pin DIMMs
- Voltage regulators for core voltage, memory voltage (common for all memory), DDR termination voltage, and DTL voltage (common for both CPUs)

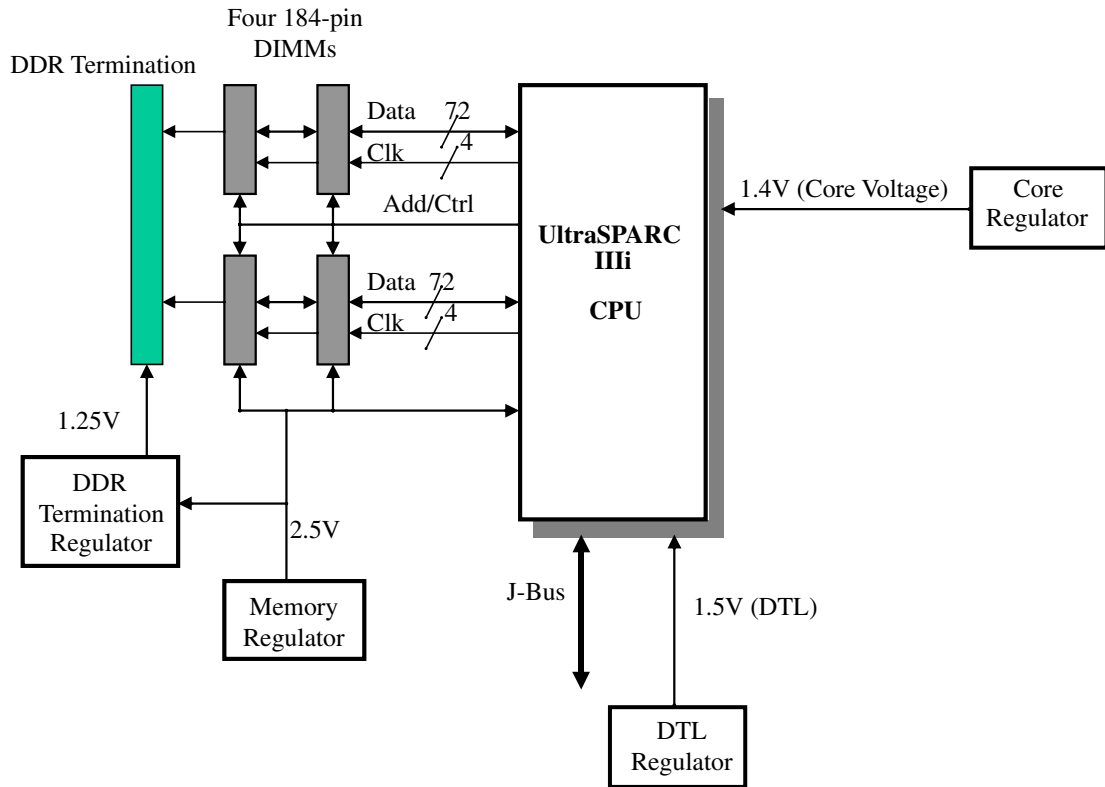
### C.3.2.2 DDR Memory Block Diagram

Each CPU interfaces directly to memory as shown in [FIGURE C-7](#). CPU0 interfaces directly with:

- DIMM0
- DIMM1
- DIMM2
- DIMM3

CPU1 interfaces directly with:

- DIMM4
- DIMM5
- DIMM6
- DIMM7



**FIGURE C-7** CPU/Memory Subsystem Block Diagram

### C.3.2.3 Memory Architecture

The memory controller unit (MCU) is embedded within the UltraSPARC IIIi processor. All address, clock, and control signals originate from the processor. These signals are then transferred to DRAMs on the DIMMs. The data path is 144 bits (2 x 72 bits) wide. Data is directly driven to and from the processor pins.

To minimize latency, the memory controller is integrated on the same chip as the processor. In a single-processor environment, this allows immediate access on a cache miss, without having to forward the address over the JBus interconnect.

[TABLE C-3](#) describes the interface between the UltraSPARC IIIi memory controller unit (MCU) and the DIMMs.

**TABLE C-3** MCU Memory Signal Count

Signal Name	Number of Copies	Signal Count
CLK+/CLK-[3:0]	4	8
Mem_Data[127:0]	1	128
Mem_ECC[8:0]	1	9
RAS_L	1	1
CAS_L	1	1
CS_L[3:0]	1	4
WE_L	1	1
DQS[31:0]	1	32
ECCS[2:0]	1	3
Mem_ADD[13:0]	1	14
BA[1:0]	1	2
CKE[3:0]	1	4
Total MCU signal count		207

DIMMs must be loaded in pairs. Each CPU supports four DIMMs (TABLE C-4). The minimum number of DIMMs required for proper system operation is two. This is true for single- and dual-CPU configurations. The system operates properly if memory is only loaded on one of the CPU's two banks and the second CPU's memory banks are left empty. However, for better system performance, each CPU should have its own local memory. That is, DIMMs should be loaded on both CPUs.

### C.3.2.4 Supported DIMM Configurations

TABLE C-4 Supported DIMM Configurations

SDRAM Organization		Number of DRAMs	Physical Banks for Each DIMM	DIMM Configurations	DIMM Capacity	Minimum Memory for Each CPU (2 DIMMs)	Maximum Memory for Each CPU (4 DIMMs)
512 MB	64 MBx8	9	1	64 MBx72	512 MB	1 GB	2 GB
	128 MBx4	18	1	128 MBx72			
	64 MBx8	18	2	2x(64 MBx72)	2 GB	4 GB	8 GB
	Stacked ** 128 MBx4 (x2)	18 (double dies)	2	2x(128 MBx72)			
1 GB	256 MBx4	18	1	256 MBx72	2 GB	4 GB	8 GB
	128 MBx8	18	2	2x(128 MBx72)			

### C.3.2.5 DIMM Connector Pinout

TABLE C-5 184-Pin DDR1 SDRAM DIMM Pin Assignments\*

Pin No.	Pin Name	Pin No.	Pin Name	Pin No.	Pin Name	Pin No.	Pin Name
1	VREF	47	NC	93	VSS	139	VSS
2	DQ0	48	A0	94	DQ4	140	NC
3	VSS	49	NC	95	DQ5	141	A10
4	DQ1	50	VSS	96	VDDQ	142	NC

**TABLE C-5** 184-Pin DDR1 SDRAM DIMM Pin Assignments\* (Continued)

Pin No.	Pin Name	Pin No.	Pin Name	Pin No.	Pin Name	Pin No.	Pin Name
5	DQS0	51	NC	97	DM0/DQ S9	143	VDDQ
6	DQ2	52	BA1	98	DQ6	144	NC
7	VDD	53	DQ32	99	DQ7	145	VSS
8	DQ3	54	VDDQ	100	VSS	146	DQ36
9	NC	55	DQ33	101	NC	147	DQ37
10	/RESET	56	DQS4	102	NC	148	VDD
11	VSS	57	DQ34	103	A13	149	DM4/DQ S13
12	DQ8	58	VSS	104	VDDQ	150	DQ38
13	DQ9	59	BA0	105	DQ12	151	DQ39
14	DQS1	60	DQ35	106	DQ13	152	VSS
15	VDDQ	61	DQ40	107	DM1/DQ S10	153	DQ44
16	DU(CK1)	62	VDDQ	108	VDD	154	/RAS
17	DU(/CK1)	63	/WE	109	DQ14	155	DQ45
18	VSS	64	DQ41	110	DQ15	156	VDDQ
19	DQ10	65	/CAS	111	CKE1	157	/S0
20	DQ11	66	VSS	112	VDDQ	158	/S1
21	CKE0	67	DQS5	113	BA2	159	DM5/DQ S14
22	VDDQ	68	DQ42	114	DQ20	160	VSS
23	DQ16	69	DQ43	115	A12	161	DQ46
24	DQ17	70	VDD	116	VSS	162	DQ47
25	DQS2	71	NC,/S2	117	DQ21	163	NC,/S3
26	VSS	72	DQ48	118	A11	164	VDDQ
27	A9	73	DQ49	119	DM2/DQ S11	165	DQ52
28	DQ18	74	VSS	120	VDD	166	DQ53
29	A7	75	DU(CK2)	121	DQ22	167	NC,FETEN
30	VDDQ	76	DU(CK2)	122	A8	168	VDD



**TABLE C-5** 184-Pin DDR1 SDRAM DIMM Pin Assignments\* (Continued)

Pin No.	Pin Name	Pin No.	Pin Name	Pin No.	Pin Name	Pin No.	Pin Name
31	DQ19	77	VDDQ	123	DQ23	169	DM6/DQ S15
32	A5	78	DQS6	124	VSS	170	DQ54
33	DQ24	79	DQ50	125	A6	171	DQ55
34	VSS	80	DQ51	126	DQ28	172	VDDQ
35	DQ25	81	VSS	127	DQ29	173	NC
36	DQS3	82	VDDIQ	128	VDDQ	174	DQ60
37	A4	83	DQ56	129	DM3/DQ S12	175	DQ61
38	VDD	84	DQ57	130	A3	176	VSS
39	DQ26	85	VDD	131	DQ30	177	DM7/DQ S16
40	DQ27	86	DQS7	132	VSS	178	DQ62
36	DQS3	82	VDDIQ	128	VDDQ	174	DQ60
37	A4	83	DQ56	129	DM3/DQ S12	175	DQ61
38	VDD	84	DQ57	130	A3	176	VSS
39	DQ26	85	VDD	131	DQ30	177	DM7/DQ S16
40	DQ27	86	DQS7	132	VSS	178	DQ62
36	DQS3	82	VDDIQ	128	VDDQ	174	DQ60

\* NC = No connection, NU = Not usable, DU = Do not use

### C.3.2.6 Memory Clock Ratios

FIGURE C-8 shows the clock ratio for memory and core clocks derived from the JBus.

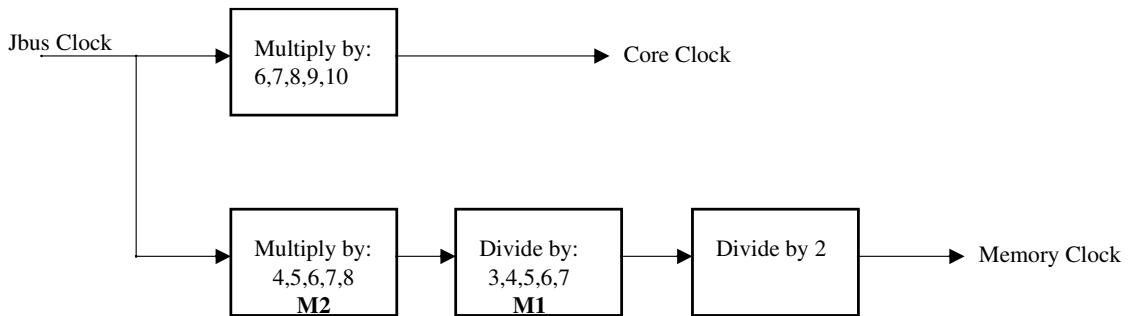


FIGURE C-8 UltraSPARC IIIi Clock

UltraSPARC IIIi supports the following CPU core clock to memory clock ratios: 8, 8.5, 9, 9.5, 10, 10.5, 11, 11.5, 12, 12.5, 13, 13.5, 14, 14.5, and 15

To maximize system performance, the frequency ratios must meet the following criteria:

- JBus frequency of 150MHz or above
- Memory frequency of 120MHz or above

The following table shows the divisors chosen to achieve the correct memory bus clock frequencies:

TABLE C-6 CPU Core and Memory Clock Frequency Possible in Sun Blade 2500<sup>1</sup>

Core Clock MHz	JBus Clock MHz	JBus: Core Ratio	M2	M1	Memory Clock MHz	CPU: Memory Ratio
720	120	6	4*	3*	80	9
960	160	6	6	4	120	8
1064	152	7	7	4	133	8
1280	160	8	8	5	128	10
1333	166.67	8	8	5	133	10

\* CPU core and memory clock frequency possible in Sun Blade 2500 default value of CPU. Not used in system. All ratios must meet the following formula:  $M2/M1 = JBus\_ratio * 2 / memory\_ratio$

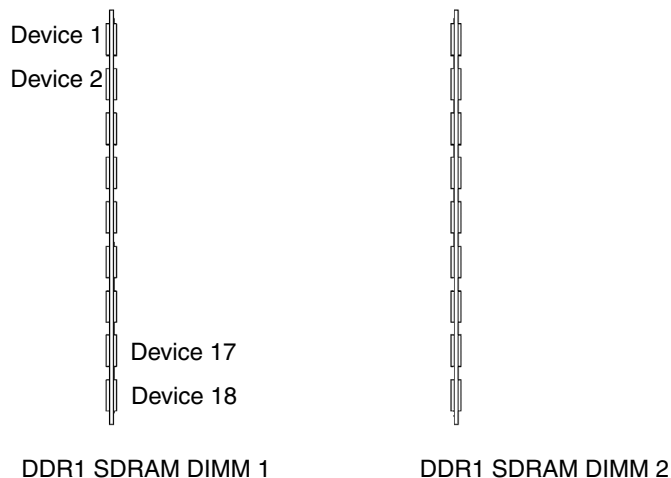
## C.3.2.7 Memory Interleaving

The UltraSPARC IIIi supports four interleaving modes:

- Bank interleaving
- Rank interleaving
- DIMM interleaving
- XOR interleaving

### *Bank Interleaving*

Bank interleaving is interleaving within a single device on a DDR1 SDRAM DIMM. Each DDR1 SDRAM DIMM used by the workstation contains 18 devices (FIGURE C-9). For example, bank interleaving can occur between devices 1 and 2 or devices 17 and 18.



**FIGURE C-9** Bank Interleaving

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**Note** – In this example, 18 memory devices are illustrated. DDR1 SDRAMs may contain 9 or 36 memory devices.

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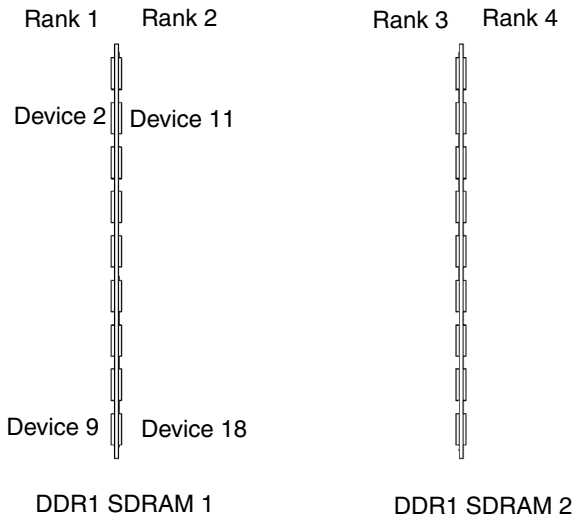
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**Note** – Do not confuse bank interleaving with DIMM interleaving. For an explanation of DIMM interleaving see [“DIMM Interleaving” on page 22](#).

---

## Rank Interleaving

Rank interleaving is interleaving between pairs of memory devices on a single DIMM. Each DDR SDRAM used in the workstation contains 18 devices, nine on one half and nine on the other half. To perform rank interleaving, one discrete device on the left half of the memory module must pair with its adjacent memory module on the right half of the module (FIGURE C-10). For example, rank interleaving can occur between device 2 and device 11 or between device 9 and 18.

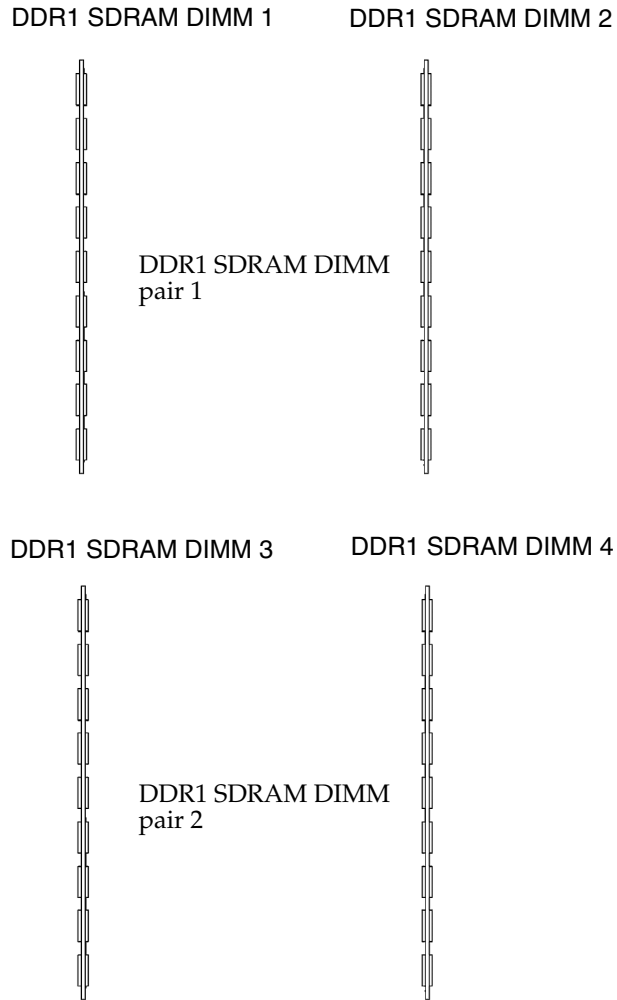


**FIGURE C-10** Rank Interleaving

## DIMM Interleaving

DIMM interleaving is interleaving between pairs of DIMMs. Interleaving between DIMMs can occur only if all four DIMMs are the same. If the pairs are different, it is still possible to interleave external banks (in double bank DIMMs) and internal banks (FIGURE C-11). For example, DIMM interleaving can occur between DDR1 SDRAM pair 1 and DDR1 SDRAM pair 2.

For maximum interleaving performance, all DDR1 SDRAM DIMMs need to be the same.



**FIGURE C-11** DIMM Interleaving

---

**Note** – There are no constraints for bank or rank interleaving within the same pair.

---

[TABLE C-7](#) describes the different interleaving modes supported based on the memory DIMMs used.

## *XOR Interleaving*

The Sun Blade 2500 also supports a fourth interleaving mode called XOR interleaving. This interleaving mode is used to distribute L2 cache conflict misses and L2 cache read/write pairs across more banks. To use XOR interleaving, all DIMMs in a CPU's two banks must be identical. XOR interleaving is a special case not described in [TABLE C-7](#).

**TABLE C-7** Interleaving Modes

<b>DIMM Pairs</b>	<b>DIMM Type</b>	<b>Interleaving Mode Support</b>
1	Single bank	Bank
1	Dual bank	Bank/Rank
2	Different, single-single	Bank
2	Different, single-double	Bank/Rank, Bank/Rank
2	Different, double-double	Bank/Rank, Bank/Rank
2	Same, single-single	Bank/DIMM
2	Same, single-double	Bank/DIMM/Rank (on double)
2	Same, double-double	Bank/DIMM/Rank
1	Single bank	Bank
1	Dual bank	Bank/Rank
2	Different, single-single	Bank

## *Mixing DIMM Types*

Within the same pair (1 or 2) DIMMs need to be exactly the same (same density, x4 or x8, single or double). DIMMs in different pairs can be different. For example:

- pair1 (2 DIMMs): double banks, 512 Mb devices, x4

## *Main Memory Power Regulator*

DDR memory requires a 2.5V voltage source. This voltage is generated through a memory regulator providing power to all the memory banks. The following is a listing of the power requirements for the memory regulator:

- 12V input source
- Input voltage tolerance of  $\pm 5\%$
- 2.5V output
- Maximum output current of 20A at 2.5V
- Output voltage tolerance of  $\pm 3\%$
- 85% efficiency at typical load

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## C.4 JBus and XBus

### C.4.1 JBus

JBus is the system bus developed for the UltraSPARC IIIi series of processors.

### C.4.1.1 JBus Topology

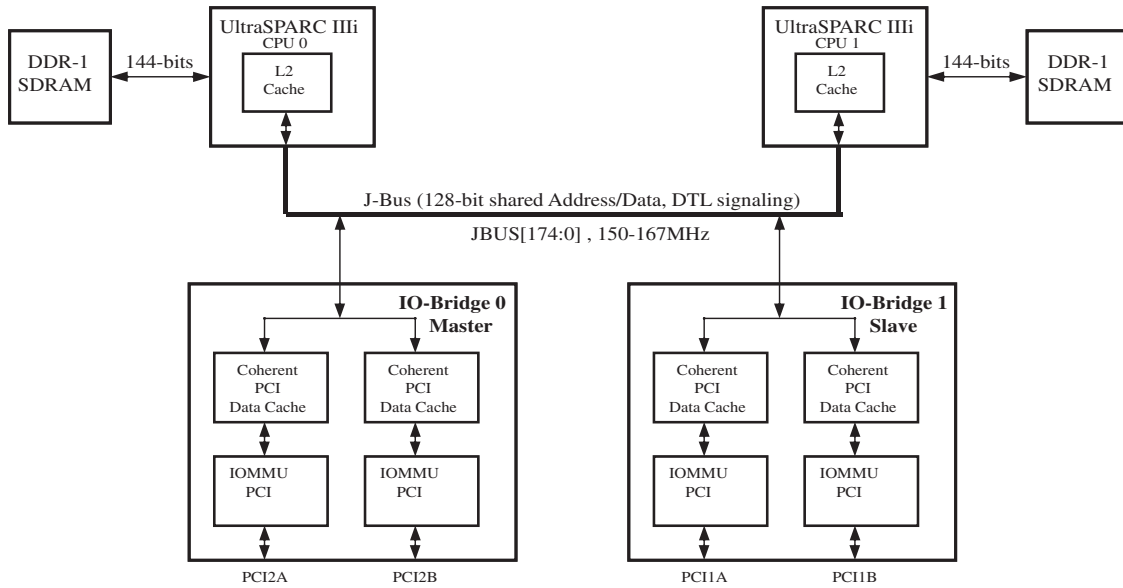


FIGURE C-12 JBus Topology



## *JBus Key Features*

The following are the key features of the JBus (FIGURE C-12):

- Simple SMP protocol that is SPARC V9 and Sun4u correct, resulting in high performance for one to two CPUs
- 128-bit wide bus
- Full-duplex shared multidrop bus for up to four loads
- DTL driver/receiver technology
- Snoopy MOESI protocol
- Separate flow-controlled address and data transaction
- Multiplexed address and data bus
- Variable snoop return delay using sideband signals (no hard latency or throughput requirements in the protocols)
- Distributed arbitration
- Distributed snoop results stalling for resource management
- Pushed writes, split transID-based read returns
  - Out-of-order data return for different cache addresses. In-order data return from single noncacheable port. In-order data return for same cacheable address. Order determined by address bus order.
  - Out-of-order data return values are according to the address bus order.

---

**Note** – Data return implies completion of prior coherency events by the requestor. This is a minimal requirement.

---

- Four transIDs for each device ID

### C.4.1.2 DTL Configuration

DTL is a bus interface scheme that allows both point-to-point (2-node), and multi-drop communication on a common bus. DTL is a low-voltage, high-speed interface with very high signal integrity.

Two types of configurations are possible in DTL: DTL Scheme-1 and DTL Scheme-2. On UltraSPARC IIIi and other JBus devices, two signals (down\_25 and up\_open) are provided to configure DTL IOs of the devices upon power up (TABLE C-8).

Because the Sun Blade 2500 does not use a boot bus, the JBus needs to be ready for transactions (the first PROM fetch) as the processor comes out of reset state. The following table shows the configuration signals for both DTL schemes.

**TABLE C-8** DTL Configuration Control Signals

Scheme	Number of Nodes in the System	Number of Devices	down_2 5	up_open	Description
DTL-1	2-node	2	0	0	50 pull-down, 50 pull-up; pull-up active in rcv mode
	3 or more	End nodes	0	0	50 pull-down, 50 pull-up; pull-up active in rcv mode
		Intermediate node	1	1	25 pull-down, 50 pull-up, high impedance in rcv mode
DTL-2	2	End nodes	0	0	50 pull-down, 50 pull-up; pull-up active in rcv mode
	3	End nodes	1	0	25 pull-down, 50 pull-up; pull-up active in rcv mode
		Intermediate node	1	0	25 pull-down, 50 pull-up; pull-up active in rcv mode

### *DTL Reference Voltage*

DTL reference voltages of 1.125V  $\pm$ 5% are generated on the motherboard from a discrete divider with 1% tolerance.

---

**Note** – There is no current drawn on the reference voltage.

---

## *DTL IO Power*

All DTL IO power is generated on the system board through a DC-DC regulator and is delivered to the UltraSPARC IIIi processor. The IO voltage is 1.5V. The regulation of this regulator is  $\pm 3\%$ .

### C.4.1.3 JBus performance

The peak bandwidth for JBus is 2.56 GB per second at 200 MHz and is 2.13 GB per second on the Sun Blade 2500 system since JBus is clocked at up to 167 MHz. JBus can insert a dead cycle between transaction of 2 different masters however, in a Sun Blade 2500 system no dead cycles are needed.

## C.4.2 IO-Bridge

## C.4.3 I/O Subsystem

The I/O subsystem is designed around two IO-bridges and one Southbridge. The IO-bridge is a bridge between JBus and the PCI buses.

The Southbridge is the bridge between PCI, USB, IDE, XBus, and Super I/O functions.

### C.4.3.1 IO-bridges

The Sun Blade 2500 workstation uses two IO-bridge ASICs as the bridge from JBus to PCI ([FIGURE C-13](#)). One IO-bridge is configured as the master IO-bridge0 (JID[1]=1) supporting a 33 MHz PCI bus (PCI-A leaf) and a 66MHz PCI bus (PCI-B leaf). The other IO-bridge is configured as the slave IO-bridge 1 (JID[1]=0) supporting two 66 MHz PCI buses through PCI-A and the PCI-B leaves. The boot path is through the master IO-bridge0 via the PCI-A leaf. See the following IO-bridge block diagram.

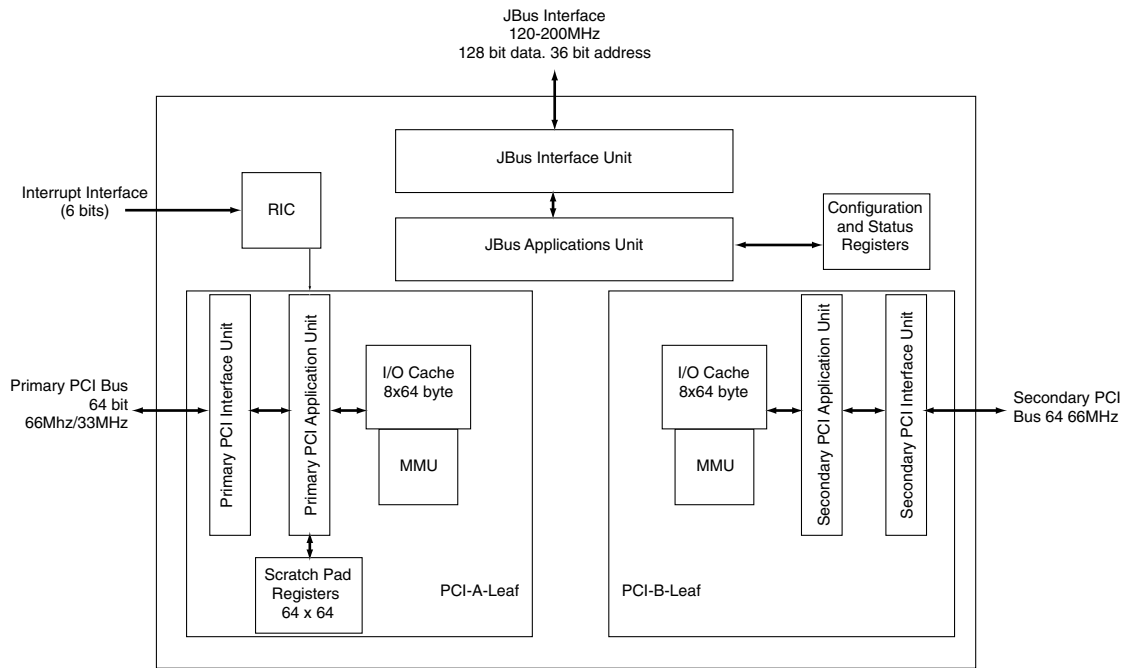


FIGURE C-13 IO-bridge Block Diagram

### C.4.3.2 IO-bridge Key Features

- Bus Interface
- Two 64-bit/66 MHz PCI leaves
- I/O cache (8 x 64 bytes)
  - One for each leaf
  - Fully associative
  - In JBus coherency space
- I/O MMU
  - One for each leaf
  - Fully associative TLB
- Mondo Dispatch Unit
- Byte Twisting

IO-bridge is a companion core-logic ASIC to the UltraSPARC IIIi CPU. The IO-bridge and UltraSPARC IIIi communicate through the JBus. The central task of IO-bridge is to be the point of access to I/O and perform system interrupts. The main system interfaces IO-bridge offers are:

- JBus
- 66 MHz/64 bit or 33 Mhz/64 bit v2.2 PCI, capable of supporting up to eight external masters with internal arbiter.

### C.4.3.3 JBus Interface

The JBus interface detects transactions present on the JBus that are targeted for the IO-bridges. The interface accepts and queues those transactions and coordinates with the destination unit within the IO-bridge.

### C.4.3.4 PCI-A Leaf

The PCI-A leaf on IO-bridge0 is a 64 bit/66 MHz or 64-bit/33 MHz PCI version 2.2 compliant implementation. The interface has an internal arbiter that can support up to eight masters resident on the bus. Support for external arbitration is also present.

---

**Note** – This interface on the IO-bridge is PCI v2.2 compliant.

---

The PCI-A leaf includes an interrupt block that receives system interrupts from the external IChip2. This PCI leaf also controls interrupts generated from any activity within the PCI interface unit itself. The interrupt unit communicates with the JBus cluster to send out interrupts onto the JBus.

### C.4.3.5 PCI-B Leaf

The PCI-B interface is a 64 bit/66 MHz PCI leaf with an internal arbiter. An external arbiter is also supported. This is a fully functional standalone PCI bus.

### C.4.3.6 PCI I/O Cache

Each PCI leaf has an I/O cache to improve performance. The PCI I/O cache has eight entries, each of which contains 64 bytes of data. The I/O cache can also perform data prefetching to aid in minimizing DMA read latency (IO-bridge is sending data out to the PCI bus). This prefetching can be disabled by software through configuration space registers (CSR). In addition, the entire cache can be bypassed or disabled effectively by software.

### C.4.3.7 PCI Configuration and I/O Space

The PCI configuration and I/O space correspond to those defined by the PCI Local Bus Specification Revision 2.2.

The PCI specification defines the configuration space for software initialization and configuration of PCI devices. This space is limited to a maximum size of 16 MB for each device. As accesses in this space generate specific PCI transactions called “configuration cycles”, the PCI configuration spaces are decoded by the IO-bridge.

The PCI specification also defines a 32-bit I/O space for each device. The I/O space is accessed through dedicated transactions. The PCI specification recommends devices be mapped in the memory space and not in the I/O space. The I/O space is provided to support devices that are noncompliant with the intent of the PCI specification. Providing a full 32-bit space for each device is very costly, as such Sun Blade 2500 systems (through IO-bridge) support only 16 MB of I/O space for each device.

The PCI configuration and I/O space in UltraSPARC IIIi-based systems are geographically partitioned through a software/firmware convention in which 32 MB of space is reserved for each PCI bus in the system. These 32 MB correspond to 16 MB (lower) for the PCI configuration space and 16 MB (upper) for the PCI I/O space.

## C.4.4 Multiple Graphic Accelerators Installed in a Single Workstation

A single Sun Blade 2500 system can support multiple Sun XVR-100, Sun XVR-500, Sun XVR-600, and Sun XVR-1200 graphics accelerators. The PCI bus that these accelerators share can be reconfigured to allow the probe order of each console device to be changed. For additional information about multiple graphic accelerators installed in a single workstation See [Section 11.5.5, “Special Considerations for Multiple Graphic Accelerators Installed in a Single Workstation”](#) on page 11-38.

## C.4.5 XBus

### C.4.5.1 PCI-ISA bridge

The ISA bus is an I/O bus that runs at 8 MHz. The Sun Blade 2500 system uses only a subset of this bus called the XBus.

## C.4.5.2 Flash PROM

The Sun Blade 2500 motherboard contains 1 MB of flash memory connected to the XBus of the Southbridge ASIC. The flash PROM has an 8 Mbit, 5.0V flash memory.

The 1 MB of the PROM memory is divided into two halves, the OBP and the power-on self-test (POST). The OBP and POST image are in a separate address space off of the XBus space.

---

# C.5 System Clocks and Interrupt Processing

## C.5.1 IChip2

The Sun Blade 2500 system uses the IChip2 as the interrupt concentrator. The IChip2:

- Processes all 11 major groups of the interrupts comprising a total of 48 different interrupt signals at the same time. The result of processing is a 6-bit code designating the source of the interrupt and its group.
- Supports all three types of interrupts: level high, level low, and pulse low.
- Provides equal priority to all interrupting devices. When two devices need servicing at the same time, the IChip2 prioritizes based on the round-robin scheduling scheme.
- Generates two groups of PCI clocks, Group A and Group B, from a 133 MHz crystal oscillator in PECL form.

---

**Note** – The clock-generation feature of the IChip 2 is not utilized in the Sun Blade 2500 system.

---

### C.5.1.1 PCI Clocks

The PCI clocks are driven by an off-the-shelf PC-style clock generator. The Sun Blade 2500 system turns off the clock to Energy Star capable slots. This is accomplished by having a PCI clock generator with has a serial I2C interface that selectively turns off outputs of the chip.

[TABLE C-9](#) shows the number of PCI clocks needed in the Sun Blade 2500 system.

---

**Note** – Some devices, such as those in PCI slots, might share a single clock, depending on number of copies available from the PCI clock generator.

---

**TABLE C-9** Number of PCI Clocks Needed

Component	33 MHz	66 MHz
IO-bridge0 (master)	1	1
IO-bridge1 (slave)		2
IChip2	1	
33 MHz PCI expansion slots	4	
66 MHz PCI expansion slots		3
Test interface	1	1
G-bit Ethernet		1
SCSI		1
Southbridge	1	
CPLD	1	
Total number of PCI clocks	9	9

### C.5.1.2 Real Time Clock

The Sun Blade 2500 system uses a RTC and a CMOS chip.

### C.5.1.3 SCSI I/O Clock

The UltraSCSI IV 160 SCSI controller uses a 40 MHz clock driven by a discrete oscillator.

### C.5.1.4 G-bit Ethernet Clock

The G-bit Ethernet clock operates at 25 MHz.

### C.5.1.5 System Tick (Stick) Clock

The system clock operates at 12 MHz.



## C.6 System Interfaces

### C.6.0.1 G-bit Ethernet

The Sun Blade 2500 workstation supports one on-board G-bit Ethernet controller (FIGURE C-14). It is based on an integrated MAC/PHY controller. The G-bit Ethernet controller operates at link rates of 10 Mb per second, 100 Mb per second, and 1000 Mb per second.

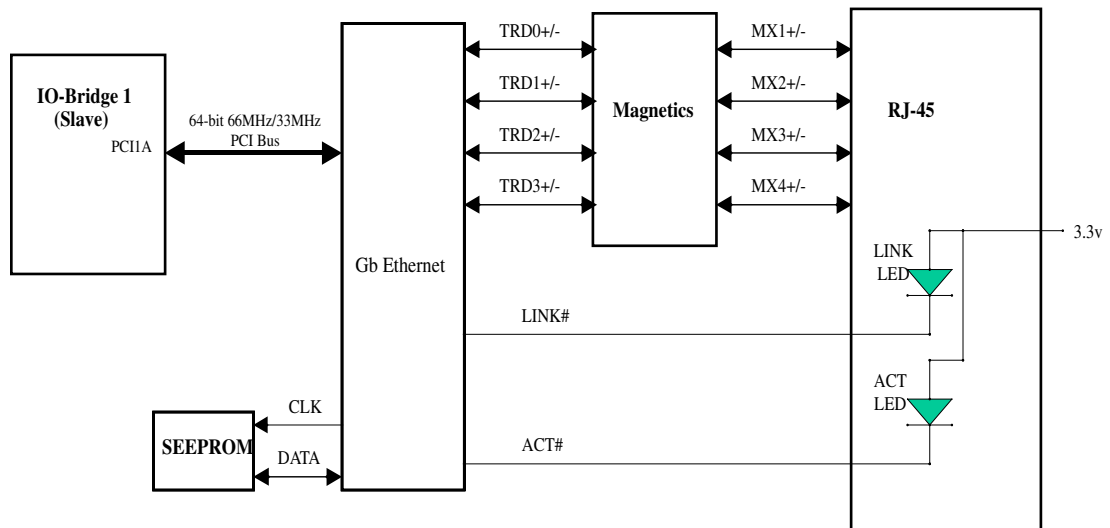


FIGURE C-14 G-bit Ethernet Block Diagram

## *G-bit Ethernet Features*

- Integrated 10BASE-T/100BASE-TX/1000BASE-T transceivers
- Full duplex support in G-Bit mode
- 10/100/1000 tri-speed MAC
- 64 bit/66 MHz PCI 2.2 host interface
- MII/GMII/TBI interfaces for external transceivers
- 96 KB on chip packet buffer
- Dual high-speed RISC cores with 16 KB caches
- Programmable, in-line packet classification
- TCP, IP, UDP checksum
- TCP segmentation
- CPU task off load
- Adaptive interrupts
- Priority queuing-802.1p Layer 2 priority encoding support for four priority queues
- Virtual LANs-802.1q VLAN tagging support for up to 64 VLANs
- Jumbo frames (9 KB)
- 802.3 flow control
- Link aggregation-802.3ad, GEC/FEC, Smart Load Balancing (supports heterogeneous teams)
- 300-pin HBGA package
- 3.3V I/Os

## *G-bit Diagnostic LEDs*

The Sun Blade 2500 workstation supports two LEDs, one indicating that a link is established and another indicating link traffic. The two LEDs are:

- **LINK (Green):** LED is *ON* when link detected for either 10/100/1000.
- **ACT (Amber):** LED *TOGGLES* for each transmit or receive activity.

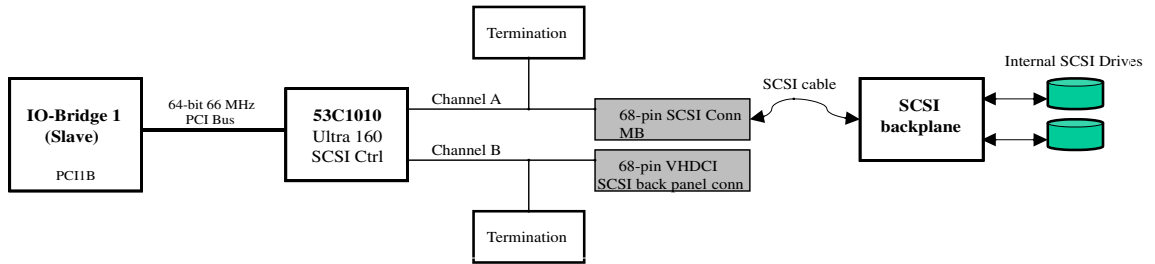
## C.6.0.2 SCSI Subsystem

The Sun Blade 2500 SCSI subsystem supports two UltraSCSI IV 320 drives. The drives are interfaced to the backplane through two SCA-2 SCSI connectors ([FIGURE C-16](#)).

### *SCSI Controller*

The Sun Blade 2500 workstation uses a dual-channel UltraSCSI IV 160 controller. One of the channels is for internal drives. The second channel is for external drives ([FIGURE C-15](#)).

The UltraSCSI IV 160 controller uses a 40 MHz clock driven by a discrete oscillator.



**FIGURE C-15** SCSI Subsystem Block Diagram

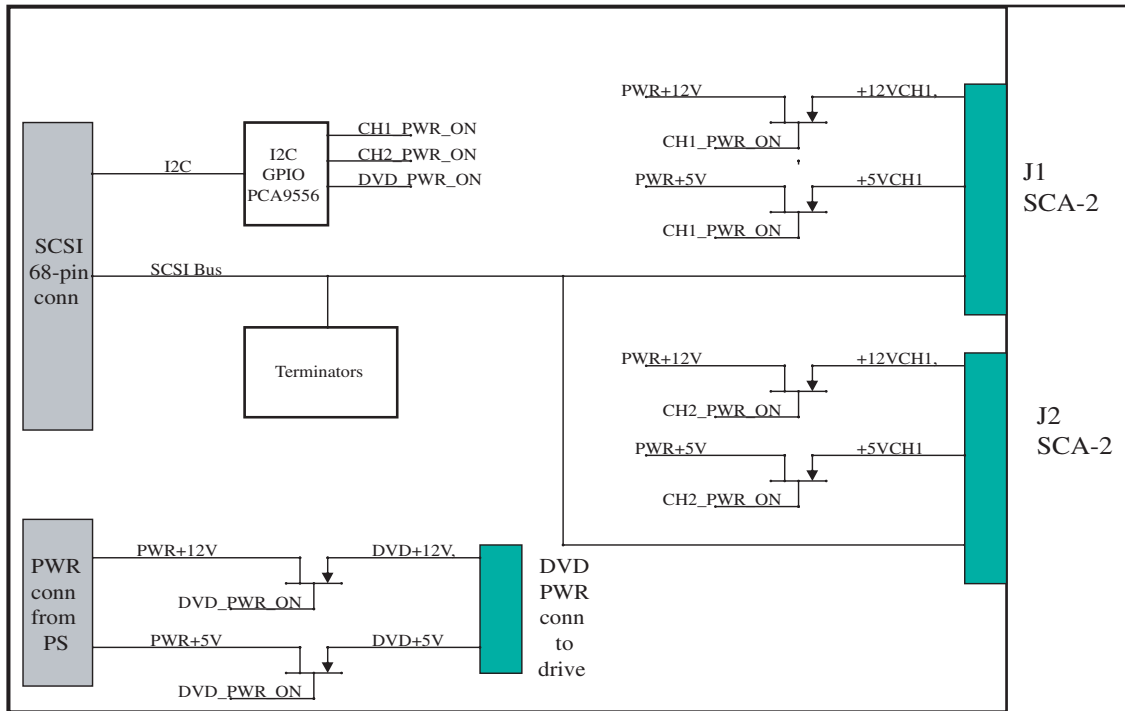
### *SCSI Connector*

The internal SCSI connector is a 68-pin shrouded SCSI connector.

### *SCSI Backplane*

Even though the backplane can electrically support hot-plug SCSI drives, the Sun Blade 2500 workstation does not support this feature. To support Energy Star, each drive can have the power removed by writing to a GPIO bit (See [“PCA GPIO Registers”](#) on page 42).

[FIGURE C-16](#) describes the electrical operation of the backplane.



**FIGURE C-16** SCSI Backplane Block Diagram

### SCSI Cable

[TABLE C-10](#) is a description of the physical characteristics of the SCSI cable used in the Sun Blade 2500 workstation.

**TABLE C-10** Physical Characteristics of the SCSI Cable

Characteristic	Description
Conductors	30 AWG Solid Tinned Copper
Insulation	0.007 TPE
Color Code	First pair blue and white, followed by orange and white and report
Laminate	Polyester
Temperature Rating	80° C

**TABLE C-11** Electrical Characteristics of the SCSI Cable

Characteristic	Value
Impedance	93 Ohms*
	131 Ohms†
Capacitance	15.3 pF/ft. @ 1 MHz <sup>1</sup>
	11.4 pF/ft. @ 1 MHz <sup>2</sup>
Propagation Delay	14.5 ns/ft.
Voltage Rating	150V
Current Rating	0.75A
DC Resistance	105 Ohms/1000 ft. @ 20° C
Approvals	CAS AWM

\* Above values measured single-ended, with one conductor of each pair common to one bus (SCSI mode).

† Above values measured differentially.

### *SCSI Drives*

The SCSI drives have a spin-down mode that is controlled by FET switches. The FET switches are located on the SCSI backplane and are controlled through GPIO pins from the I2C device on the SCSI backplane.

---

**Note** – The Sun Blade 2500 system does not support hot-plugging.

---

## C.6.0.3 Southbridge

The Sun Blade 2500 system uses the Southbridge ASIC. This ASIC is a highly integrated system I/O chipset in a 328-pin BGA package that provides an interface between PCI and the:

- USB
- IDE
- Serial port
- Parallel port
- Audio module
- XBus
- System Management Bus

The Sun Blade 2500 workstation uses 13 general-purpose I/Os on the Southbridge.

#### C.6.0.4 Serial Ports (2)

The system supports two DB-9 serial ports which are 16450/16550 compatible Universal Asynchronous Receiver Transmitter (UARTs) with 16-byte FIFOs. The serial ports have a programmable baud rate generator.

#### C.6.0.5 Parallel Port

The parallel port supports ECP/EPP/PS/2/SPP and IEEE 1284 compliance.

#### C.6.0.6 USB Interface

The USB interface on the Southbridge supports six USB 1.1 ports. The Sun Blade 2500 system has four ports (USB0 and USB1) for the USB keyboard and mouse.

#### *PCI IDE Controller*

There are two channels of IDE within the IDE controller to support a maximum of four devices. Each channel can operate independently at DMA mode-4 speed. The target devices are DVD-ROM or CD-RW drives. The Sun Blade 2500 workstation supports both channels on the motherboard, however, the secondary channel is cabled to the DVD-ROM drive and the primary channel is connected to the CD-RW drive.

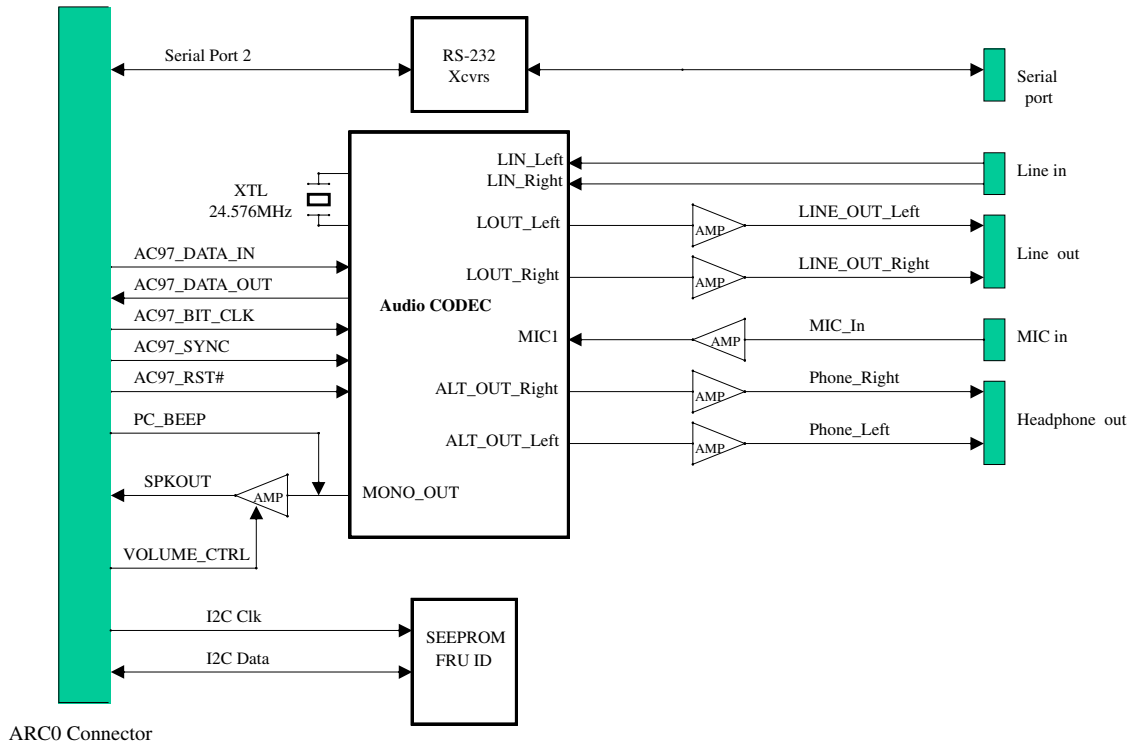
The PCI IDE controller:

- Supports PCI bus mastering at a transfer rate of 132 MB per second.
- Contains two separate IDE channels that support Ultra 100 high performance ATA bus for 100 MB transfer rate and concurrent operation.
- Has dedicated ATA bus pins and buffers for each channel.

#### C.6.0.7 Audio Module

The audio module plugs into the audio module connector. The audio module features (FIGURE C-17):

- Audio CODEC
- Four audio ports: Line-in, Line-out, Headphone, and Microphone
- Speaker output
- DB-9 serial port
- FRU-ID ROM



**FIGURE C-17** Audio Module Block Diagram

### *AC97-Compliant Audio Interface*

The AC link controller provides a cost-effective audio solution with any AC97-compliant Audio CODEC. The CODEC interface is fully compliant to AC97 version 2.1.

An internal speaker is connected to the motherboard through the audio module connector and used by software to make “beep” sounds as well as to provide audio sound output.

## C.6.0.8 System Management Bus Interface

The System Management Bus (SMBus) host controller provides the communication channel with other serial devices through SMBus protocol. In the Sun Blade 2500 system this SMBus is connected to the smart card reader only.

## C.6.0.9 Static Memory

The Sun Blade 2500 workstation provides 32 KB of static memory that is used by POST software.

---

# C.7 General Purpose Input and Output Registers

## C.7.0.1 IO-bridge GPIO Registers

The IO-bridge has four General Purpose Input Output (GPIO) pins. These pins are used as two pseudo-I2C buses in the system. Software mimics I2C protocol through "bit-banging" the GPIO registers. Southbridge GPIO Registers

### *PCA GPIO Registers*

The PCA is an I2C GPIO device physically located on the SCSI backplane and is part of the I2C bus. It controls the power FETs for the SCSI drives and the DVD drive.

**TABLE C-12** PCA9556 @0x30 GPIO Data Register

Bits	Fields	Description	Reset Value	Type
0	GPIO0	Not used		
1	GPIO1	0= HD Slot 0 power is OFF 1= HD Slot 0 power is ON	1	R/W
3:2	GPIO3:2	Not used	1	R/W
4	GPIO4	0= DVD power is OFF 1= DVD power is ON	1	R/W
6:5	GPIO6:5	Not used		
7	GPIO7	0= HD Slot 1 power is OFF 1= HD Slot 1 power is ON	1	R/W



# C.8 System Thermal Management

## C.8.0.1 Fan Speed Control

The Sun Blade 2500 workstation uses two ASICs to monitor CPU and ambient temperature and to control and monitor system fans. FIGURE C-18 shows how the ASICs are used in the system.

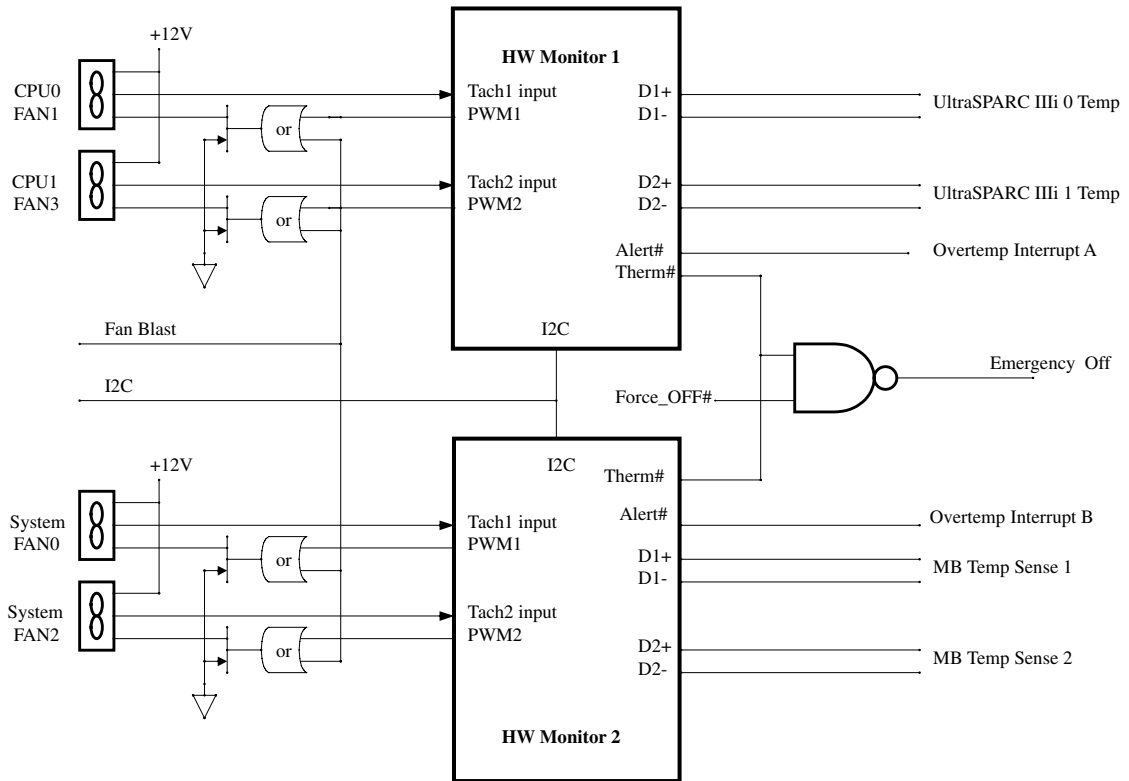


FIGURE C-18 Fan Control and Temperature Sensing Block Diagram

The Sun Blade 2500 system monitors six temperatures:

- UltraSPARC IIIi 0 (internal in CPU)
- UltraSPARC IIIi 1 (internal in CPU)
- Motherboard (MB) temp sense 1
- Motherboard (MB) temp sense 2
- Ambient (monitored internally in the ASIC HW Monitor 1)
- Ambient (monitored internally in the ASIC HW Monitor 2)

All six temperature readings can be read through PICL software.

The Sun Blade 2500 workstation supports four system fans (two fans for CPU0 and CPU1 and two fans for the system). The speed of the four fans is controlled by the PWM outputs of the two ASICs. All four fans are controlled individually. The ASIC controls fan speed according to temperature without intervention from the host processor.

### *Fan Blast*

During OBP boot and before the ADM drivers are loaded, the fans are turned on to their maximum speed by using the fan blast function.

After the ADMs are initialized and the automatic fan speed control bit is set, fan speed control is handed over to the hardware monitors and the Fan Blast bit is cleared to 0.

### *Fan Speed Monitoring*

The Sun Blade 2500 system can monitor the speed of the four system fans through the Tach inputs. These inputs are driven by the Fan Tach outputs of the fan.

### *Thermal Shutdown*

If the temperature exceeds the temperature high limit, the ADM generates an over-temperature interrupt (INT/ALERT) to cause the software to turn off the system. If the temperature exceeds the temperature THERM limit, the ADM generates an emergency off (THERM output) to turn off the power supply without software intervention.

---

## C.9 System Power Management

### C.9.1 Power Management Registers for SCSI and DVD-ROM Drives

The power FETs for the SCSI drives and the DVD-ROM drive are controlled through the GPIO registers on the I2C GPIO device (PCA) on the SCSI backplane as described in [TABLE C-13](#).

**TABLE C-13** PCA @0x30 GPIO Data Register

Bits	Fields	Description	Reset Value	Type
0	GPIO0	Not used		
1	GPIO1	0= HD Slot 0 power is OFF 1= HD Slot 0 power is ON	1	R/W
3:2	GPIO3:2	Not used	1	R/W
4	GPIO4	0= DVD power is OFF 1= DVD power is ON	1	R/W
6:5	GPIO6:5	Not used		
7	GPIO7	0= HD Slot 1 power is OFF 1= HD Slot 1 power is ON	1	R/W



# Power Management

---

This chapter discusses power management. Topics include:

- [Section D.1, “Enabling Power Management” on page D-2](#)
- [Section D.2, “Disabling Power Management” on page D-5](#)

To help conserve energy, the Sun Blade 2500 workstation has power management features that are configured using the Dtpower application. The Dtpower application reads and writes its configuration to the `/etc/power.conf` file. You can configure power management by editing the `power.conf` file, however, use of the Dtpower application is much easier.

---

**Note** – If you have configured the Solaris operating environment and answered that you did not want to use power management, the Dtpower application will produce errors during system configuration until power management is enabled.

---

Dtpower has two preconfigured power management modes: minimal and standard. There is also a customizable and disabled mode. The following table provides information about the different modes.

**TABLE D-1** Dtpower Power Management Modes

Mode	Power Management
Minimal	By default, only displays (monitors) go into low-power mode after 30 minutes of idle time (auto shutdown is not automatically enabled).

---

**TABLE D-1** Dtpower Power Management Modes

Mode	Power Management
Standard	By default, displays (monitors) go into low-power mode and the system shuts down after 30 minutes idle time (auto shutdown is automatically enabled).
Customized	Displays are configured: 15 min, 30 min, 1 hr, 2 hr, or Always On. Disks are configured: 15 min, 30 min, 1 hr, 2 hr, or Always On. Autoshutdown is configured: 15 min, 30 min, 45 min, 1 hr, 2 hr, 3 hr, 4 hr, 6 hr, or 0 hr at any time.
Disabled	No workstation power management.

Before configuring power management, consider the role that the Sun Blade 2500 workstation will perform:

- Is it acting as a server? If so, use only minimal power management or none at all.
- Is it used as a remote host for after hours work? If so, consider the autoshutdown times.
- Is it used in a multiple user environment? If so, weigh the idle time against the expected demand.

---

## D.1 Enabling Power Management

### 1. At the system prompt type:

```
% /usr/dt/bin/dtpower
```

---

**Note** – The popup message, “Scheme Override Confirmation” maybe displayed if system power management for your workstation was edited by means other than this Dtpower procedure. If this occurs, answer the questions in the popup menu and then perform steps 2-6 of the following procedure.

---

The Dtpower window is displayed on your screen.

**2. From the Current Power Saving Scheme pull-down menu, select “Customized”, Minimal, or Standard.**

- If you selected Minimal or Standard, click OK.  
The application exits and you have enabled power management.
- If you selected “Customized” or would like to customize a minimal or standard mode, click More.  
The window expands. Continue with the remaining steps.

**3. Select the Device Idle Time Before Power Saving Starts time.**

Selecting “15 Min” means that after 15 minutes of inactivity, both the display and the disks go to a low-power mode. “Always On” disables power management.

**4. Determine if you want to override the idle time for displays or disks and for what idle time.**

For example, you might want the display to go to low-power mode after 15 minutes, the hard disk after 30 minutes, and the entire system after an hour.

- a. **Set the system Device Idle Time Before Power Saving Starts time to 1 hour.**
- b. **Select Displays and set the Override Device Idle Time to 15 minutes.**
- c. **Select Disks and set the Override Device Idle Time to 30 minutes.**

---

**Note** – The value of the Override Device Idle time takes precedence over the value of the system Device Idle Time. For example, if the Override Device Idle Time for the displays is set to 2 hours and the system Device Idle time is set to 1 hour the displays will not go into power saving mode for 2 hours.

---

**5. Determine if you want to use autoshutdown and for what times of day.**

For example, if the system is idle for more than 15 minutes between the hours of 8:00 pm and 7:00 am, you want the system to shut down completely.

- a. **Select Autoshutdown Enabled and click Edit.**  
The Dtpower (autoshutdown) window is displayed.
- b. **Type the starting (8:00 pm) and ending (7:00 am) times into the fields provided.**
- c. **If you want the system to automatically start at the ending time, select the Restart button.**

For example, the system will be up and ready for use at 7:02 am before the user arrives.

---

**Note** – The time following the Restart at text is dynamic and updates to the ending time after clicking the OK button.

---

- d. Set the Shutdown During This Interval If Idle For time to 15 minutes.
  - e. Click OK.
6. Click OK to close the application.

## D.1.1 Scenarios for the Example Configuration

Use [TABLE D-2](#) and [TABLE D-3](#) to help clarify the behavior of power management by providing a timeline for two scenarios. For these situations, the previously described example configuration is used. The first scenario describes what happens when the user leaves for lunch.

**TABLE D-2** First Scenario Timeline

Time	Event
11:55 am	User is typing at keyboard.
11:59 am	User leaves to go to lunch.
12:14 pm	Display goes to low-power mode.
12:29 pm	Disk goes to low-power mode.
12:59 pm	Entire system goes to low-power mode.
1:01 pm	User returns from lunch and taps keyboard to bring system, disk, and display to a normal state.

The second scenario describes what happens when the user leaves for the day and signs on from home.

**TABLE D-3** Second Scenario Timeline

Time	Event
4:25 pm	User logs out and leaves to go home.
4:40 pm	Display goes to low-power mode.
4:55 pm	Disk goes to low-power mode.
5:20 pm	User logs in remotely. Disk and display return to a normal state.
7:53 pm	User logs out.
8:00 pm	Autoshutdown enabled.



**TABLE D-3** Second Scenario Timeline (*Continued*)

Time	Event
8:08 pm	Display goes to low-power mode.
8:15 pm	System shuts down.
7:00 am	Autoshutdown disabled, system restarts.

## D.1.2 Activating the Workstation From Low-Power Mode

The simplest way to reactivate the Sun Blade 2500 workstation from low-power mode is to tap the spacebar on the keyboard. Additionally, moving the mouse can also bring the system out of low-power mode.

---

## D.2 Disabling Power Management

This section describes how to disable hard drive and system power management.

### D.2.1 Disabling Hard Drive Power Management

When the system goes to low-power mode, the hard drive spins down to conserve power. Later, when you perform a task that accesses the hard drive, the hard drive spins up. You might have to wait a few seconds for the hard drive to reach full speed. If this delay is inconvenient, you can turn off hard drive power management, which prevents the hard drive from entering the low-power mode.

1. **As superuser, edit the `/etc/power.conf` file to include the following line:**

```
device-thresholds /dev/dsk/c0t0d0s0 always-on
```

2. **To initialize power management, type:**

```
# /usr/sbin/pmconfig
```

This procedure configures the power management framework to keep the hard drive spinning all of the time, regardless of system usage. To completely turn off all power-saving features of the Sun Blade 2500 workstation, use the procedure in [“Disabling All System Power Management” on page 6.](#)

## D.2.2 Disabling All System Power Management

You can disable the power management feature by using the Dtpower application.

1. **At the system prompt type:**

```
% /usr/dt/bin/dtpower
```

The Dtpower window is displayed on your screen.

2. **From the Current Power Saving Scheme pull-down menu, select Disabled.**
3. **Click OK.**

The application closes and power management is disabled. The display and disk stay in normal-power mode and autoshtutdown is disabled.

# Glossary

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---

## A

**address** (1) A number used by system software to identify a data storage location.

(2) In networking, a unique code that identifies a node to the network.

**ADM driver** Hardware monitor drivers that control ADM1031 chips (used for temperature sensing and fan control).

**ASIC** Application-specific integrated circuit.

**ASP** Authorized service provider.

---

## B

**bank** A bank can be:  
(1) Interleaving within a single device on a DDR1 SDRAM.

(2) A pair of adjacent DIMMS.  
See interleaving.

**BGA** Ball grid array.

**boot** The process of reading initial software into the computer.

---

## C

- CAS** Column address select. Determines address locations in memory.
- CDE** Common Desktop Environment.
- CD-ROM** Compact disc read-only memory. A CD-ROM drive reads data recorded on the CD-ROM optical disc.
- C-RW** Rewriteable compact disc.
- CODEC** (1) Coder/decoder. A CODEC uses analog-to-digital conversion and digital-to-analog conversion in the same chip.
- (2) compression/decompression An algorithm or computer program for reducing byte consumption in large files and programs

---

## D

- DDC2** Display data channel version 2. DDC2 is the I<sup>2</sup>C interface used to communicate with the monitor. This interface is the same for both the HD15 and DVI-I connectors.
- DDR-1 SDRAM** Double data rate synchronous dynamic random access memory.
- default** A preset value that is assumed to be correct unless changed by the user.
- DIMM** Dual in-line memory module. A printed circuit card that contains dynamic random access memory chips. See Registered DIMM.
- DMA** Direct memory access. The transfer of data directly into memory without supervision of the processor. The data is passed on the bus directly between the memory and another device.
- dpi** Dots per inch.
- DRAM** Dynamic random-access memory. A read/write dynamic memory in which the data can be read or written in approximately the same amount of time for any memory location.
- drive rails** Mounting hardware used to secure hard drives and other peripherals inside the workstation.
- D-TLB** Data translation look-aside buffer.

**DVD-ROM** Digital versatile disc read-only memory.

---

## E

- ECC** Error checking and correction. The detection and correction of all single-bit errors, plus the detection of double-bit and some multiple-bit errors.
- ECP** Extended capabilities port.
- EEPROM** Electrically erasable programmable read only memory.
- EIDE** Enhanced integrated drive electronics. An interface for mass storage devices. The controller is integrated with the disk or CD-ROM drive.
- EMI** Electromagnetic interference. An electrical characteristic that directly or indirectly contributes to a degradation in performance of an electronic system.
- EPIC-7** Texas Instruments Inc. 0.13-micron chip fabrication process.
- EPP** Enhanced parallel port.
- ESD** Electrostatic discharge.
- Ethernet** A type of network hardware that provides communication between systems connected directly together by transceiver taps, transceiver cables, and various cable types such as coaxial, twisted-pair, and fiber-optic.
- 

## F

- FCC** Federal Communications Commission.
- FET** Field effect transistor.
- flash PROM** Flash programmable read-only memory.
- FPU** Floating-point unit. A device (board or integrated circuit) that performs floating-point calculations.

---

## G

- G-bit** (Gb) Gigabit. 1024 megabits. Commonly used term in ethernet: Gigabit Ethernet.
- Gbyte** (GB) Gigabyte. A gigabyte is 1024 megabytes. Usually refers to data transfer speeds or the capacity of a storage device.
- GBps** Gigabytes per second.
- Gbps** Gigabits per second.
- GUI** Graphical user interface.

---

## H

- HBGA** High-density ball grid array. The mechanical connection between a chip and a printed circuit board.

---

## I

- I<sup>2</sup>C** Inter-integrated circuits. A chip-to-chip serial bus.
- Ichip2** Interrupt concentrator chip.
- IDE** Integrated drive electronics. An interface for mass storage devices. The controller is integrated with the disk or CD-ROM drive. See also EIDE.
- IEEE** Institute of Electrical and Electronics Engineers, Inc. The organization establishes standards for some computers and electrical components.
- IEEE 1394** A high-speed communications protocol.

**interleaving** Memory access that alternates between DIMMs and banks based on the lower order address bits.

DIMM interleaving interleaves between pairs of DIMMS.

Bank interleaving is interleaving within a single device on a DDR1 SDRAM.

Rank interleaving interleaves between a pair of memory devices on a single DIMM.

XOR Interleaving. Exclusive-OR interleaving. A DIMM interleaving mode that is used to distribute L2 cache conflict misses and L2 cache read/writeback pairs across more banks than other interleaving modes. To use XOR interleaving, all DIMMS must be identical.

**IOMMU** I/O memory mapping unit.

**I/O** Input/output.

**ISA bus** The ISA bus is an I/O bus that runs at 8MHz and is used in the PCI-ISA bridge.

**I-TLB** Instruction translation look-aside buffer.

---

## J

**JIO** The input/output bridge chip that uses the JBus architecture.

**JBus** The system bus developed for the UltraSPARC IIIi series of processors.

**JTAG** Joint Test Action Group which developed the IEEE standard 1149.1.

---

## K

**Kbyte** (KB) Kilobyte. 1024 bytes of data.

---

## L

**LAN** Local area network.

- leaf** Any node (location in a tree structure) that is farthest from the primary node.
- LED** Light-emitting diode.
- 

## M

- MAC** Media access controller.
- Mbit** (Mb) Megabit. 1,048,576 bits.
- MByte** (MB) Megabyte. One million bytes.
- MBps** Megabytes per second.
- Mbps** Megabits per second.
- MCU** Memory controller unit.
- MHz** Megahertz.
- MII** Media independent interface.
- mondo** Mondo dispatch unit. An interrupt construction on the JBus.
- MUX** Multiplex, multiplexer. A multiplexer merges information from multiple signals to a single channel.
- 

## N

- ns** Nanosecond.  $10^{-9}$  seconds.
- node** An addressable point on a network.
- NVRAM** Nonvolatile random access memory. Stores system variables used by the boot PROM. Contains the system host ID number and Ethernet address. NVRAM retains the data when the workstation is powered off.



---

## O

- OpenBoot PROM** OpenBoot PROM contains the PROM monitor program, a command interpreter used for booting, resetting, low-level configuration, and simple test procedures. OpenBoot software initially boots the system to a state in which the system can further load an operating system.
- OpenGL** OpenGL is an application programming interface (API) for developing portable, interactive 2D and 3D graphics applications.

---

## P

- PCI** Peripheral component interconnect. A high-performance 32- or 64-bit-wide bus with multiplexed address and data lines.
- PCMCIA** Personal Computer Memory Card International Association.
- peripheral** Removable media assembly. A device such as a smart card reader, CD-ROM drive, DVD-ROM drive, 4-mm tape drive, or a diskette drive.
- PHY** Physical access layer. Part of the digital-to-analog connection between the MAC and the physical Ethernet wire.
- PID** Process ID.
- POR** Power-on reset.
- POST** Power-on self-test. A series of tests that verify motherboard components are operating properly. Initialized at system power-on or when the system is rebooted.
- PROM** Programmable read-only memory. After the PROM has been programmed, it cannot be reprogrammed. See flash PROM

---

## R

- RAS** Row address select.
- registered DIMM** A DIMM that includes a register buffer.
- RISC** Reduced instruction set computer. A computer using the RISC architecture.

---

## S

<b>SCSI</b>	Small computer system interface.
<b>SDR</b>	Single data rate. <a href="#">One data transfer per clock cycle?</a>
<b>SDRAM</b>	Synchronous DRAM.
<b>SEEPROM</b>	Serial electrically erasable programmable read only memory.
<b>SMBus</b>	System management bus. The SMBus protocol is a subset of the I <sup>2</sup> C protocol.
<b>smart card</b>	A card used for user authentication or storing individual user preferences.
<b>snoop</b>	A search for the latest data in memory.
<b>snoopy MOESI protocol</b>	Cache coherency protocol. Modified, owned, exclusive, shared, and invalid (MOESI).
<b>Southbridge</b>	M1535D+ highly integrated system I/O chip. One of three I/O subsystem bridge chips.
<b>SPOR</b>	System power-on reset.
<b>SPP</b>	Standard parallel port.
<b>SRAM</b>	Static random access memory.
<b>STP</b>	Shielded twisted-pair.
<b>SunVTS</b>	A diagnostic application designed to test hardware.
<b>super-scalar</b>	A processor that can execute more than one instruction per cycle.
<b>superuser</b>	A privileged account with unrestricted access to all files and commands.

---

## T

<b>tip connection</b>	A connection that enables a remote shell window to be used as a terminal to display test data from a system.
<b>TPE</b>	Twisted-pair Ethernet.
<b>TOD</b>	Time of day. A timekeeping integrated circuit.
<b>TQFP</b>	Thin quad flat package.

**TTL** Transistor-transistor logic.

---

## U

**UARTS** Universal asynchronous transmitter-receiver.

**UltraDMA** Ultra direct memory access. A DMA mode within an IDE controller.

**UltraSPARC IIIi** The high-performance central processing unit used in the Sun workstations. The CPU uses SPARC V9, 64-bit reduced instruction set computer (RISC) architecture.

**USB** Universal Serial Bus. USB 1.1 can transfer data up to 12 Mbps. USB 2.0 can transfer data up to 480 Mbps.

**UTP** Unshielded twisted-pair.

---

## V

**VCC** Voltage at the common collector (positive [+] electrical connection).

**Vrms** Volts root mean square.

---

## X

**XOR** See interleaving.



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