Sun Fire™ V210 and V240 Servers Administration Guide

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Preface

The *Sun Fire V210 and V240 Servers Administration Guide* is intended to be used by experienced system administrators. This guide contains general descriptive information about the Sun Fire™ V210 and V240 servers and it includes detailed instructions on the various server administration tasks.

To use the information in this manual you must have a working knowledge of computer network concepts and terms, and advanced knowledge of the Solaris™ Operating System (Solaris OS).

Before You Read This Document

This document does not cover server installation and rackmounting. For detailed information on those topics, refer to the *Sun Fire V210 and V240 Servers Installation Guide* (819-4209).

Before following any of the procedures described in this document, ensure that you have read the *Sun Fire V210 and V240 Servers Compliance and Safety Manual* (817-4827-12).

How This Document Is Organized

Chapter 1 is an overview of the Sun Fire V210 and V240 server's main features.

Chapter 2 describes how to remove hardware components located behind the bezel.

Chapter 3 describes basic Sun Advanced Lights Out Manager features and functions.

Chapter 4 describes Sun Management Center features and functions.

Chapter 5 describes SunVTS.

Chapter 6 describes diagnostic tools for the Sun Fire V210 and V240 servers.

Using UNIX Commands

This document does not contain information on basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices.

Refer to one or more of the following documents for this information:

- *Solaris™ 10 Sun Hardware Platform Guide* (817-6337)
- Solaris Operating System documentation, which is at:

  `http://docs.sun.com`
- Other software documentation that you received with your system

Shell Prompts

Shell	Prompt
C shell	*machine-name*`%`
C shell superuser	*machine-name*`#`
Bourne shell and Korn shell	`$`
Bourne shell and Korn shell superuser	`#`
ALOM shell	`sc>`
OpenBoot PROM shell	`ok`

Typographic Conventions

Typeface[1]	Meaning	Examples
`AaBbCc123`	The names of commands, files, and directories; on-screen computer output	Edit your `.login` file. Use `ls -a` to list all files. `% You have mail.`
`AaBbCc123`	What you type, when contrasted with on-screen computer output	`%` **`su`** `Password:`
AaBbCc123	Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values.	Read Chapter 6 in the *User's Guide*. These are called *class* options. You *must* be superuser to do this. To delete a file, type `rm` *filename*.

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

Related Documentation

Application	Title	Part Number
Quick set up	*Sun Fire V210 and V240 Servers Getting Started Guide*	819-4206
Installation	*Sun Fire V210 and V240 Servers Installation Guide*	819-4209
Latest information	*Sun Fire V210 and V240 Servers Product Notes*	819-4205
Parts Installation and removal	*Sun Fire V210 and V240 Servers Service Manual*	819-4207
Compliance and safety	*Sun Fire V210 and V240 Servers Compliance and Safety Manual*	817-4827-12
Lights-Out Management	*Advanced Lights Out Manager Software User's Guide*	817-5481

Read *Important Safety Information* (816-7190) and the *Sun Fire V210 and V240 Servers Getting Started Guide* (819-4206) before performing any of the procedures documented in this manual. The documents listed are available online at:

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

Documentation, Support, and Training

Sun Function	URL
Documentation	http://www.sun.com/documentation/
Support	http://www.sun.com/support/
Training	http://www.sun.com/training/

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

Sun Fire V210 and V240 Servers Administration Guide, part number 819-4208-10

CHAPTER 1

Introduction

This chapter describes the Sun Fire V210 and V240 servers and contains an overview of the following main features:

- Section 1.1, “Sun Fire V210 and V240 Servers Overview” on page 1-2
- Section 1.2, “Bezel Features” on page 1-5
- Section 1.3, “Back Panel Features” on page 1-17
- Section 1.4, “System Prompts” on page 1-20

1.1 Sun Fire V210 and V240 Servers Overview

FIGURE 1-1 Sun Fire V210 Server

1.1.1 Sun Fire V210 Server

The Sun Fire V210 server is a commercial grade server in a 1U high package. It uses the UltraSPARC® IIIi processor and can be configured with either one or two processors.

The Sun Fire V210 server is AC powered only. Server depth enables mounting in a standard 800 mm deep rack. Storage is provided by two hot-swappable disk drives, and an optional non-hot-swappable slimline DVD drive. Built-in I/O network functionality is provided by four Gigabit Ethernet channels, one Ultra160 SCSI

multimode port, one general purpose asynchronous serial port and one serial management port, and two independent USB hubs. I/O expansion is provided via one PCI card slot, supporting both 33 MHz and 66 MHz cards.

FIGURE 1-2 Sun Fire V240 Server

1.1.2 Sun Fire V240 Server

The Sun Fire V240 server is a commercial grade server in a 2U high package. It uses the UltraSPARC IIIi processor and can be configured with either one or two processors.

The Sun Fire V240 server is AC powered only with dual redundant, hot-swap PSUs. Server depth enables mounting in a standard 800 mm deep rack. Storage is provided by four hot-swappable disk drives, and an optional non hot-swappable slimline DVD drive. Built-in I/O network functionality is provided by four Gigabit Ethernet channels, one Ultra160 SCSI multimode port, one general purpose asynchronous

serial port and one serial management port, and two independent USB hubs. I/O expansion is provided via one PCI card slot supporting both 33 MHz and 66 MHz cards, and two PCI card slots supporting 33 MHz cards.

1.1.3 Features

The Sun Fire V210 and V240 servers share the following features:

- One or two UltraSPARC IIIi processors
- Four DIMM slots per processor
- Four 10/100/1000BASE-T Ethernet ports
- One Ultra160 SCSI port for connecting external devices
- One general purpose serial port
- One serial management port
- Two USB ports
- One 10BASE-T Ethernet server management port
- PCI expansion
- DVD-ROM drive
- Hot-swappable hard drives
- System configuration card
- Front and rear service indicators

1.1.4 Preinstalled Software

The Solaris 10 OS is preinstalled on the Sun Fire V210 and V240 servers HDI.

To identify which specific version of software is installed on your server, use the `cat /etc/release` command.

When you power on your server for the first time you might be given the option to choose the version of Solaris OS you want installed. If this occurs, when you choose one version, the other one is deleted.

1.1.5 Sun Fire V210 and V240 Servers—Comparison

TABLE 1-1 Sun Fire V210 and V240 Servers—Comparison

	Sun Fire V210 server	Sun Fire V240 server
Height	1U high	2U high
PCI	1x64-bit 33/66 MHz 3.3V PCI slot	1x64-bit 33/66 MHz 3.3V PCI slot 2x64-bit 33 MHz 5V PCI slots
hard drive bays	Two Ultra160 SCSI	Four Ultra160 SCSI
Power supply units	Single AC	Dual redundant AC
Keyswitch	None	Behind bezel

For addition information about the differences between V210 and V240 servers or for information about V210 and V240 server configurations see:
http://www.sun.com/servers/

For detailed service information about the servers, see:
http://sunsolve.sun.com or
http://www.sun.com/hwdocs
Search for *The Sun System Handbook.*

1.2 Bezel Features

The front bezel of the Sun Fire V210 and V240 servers contains the server status LEDs and a space for placing an identification label.

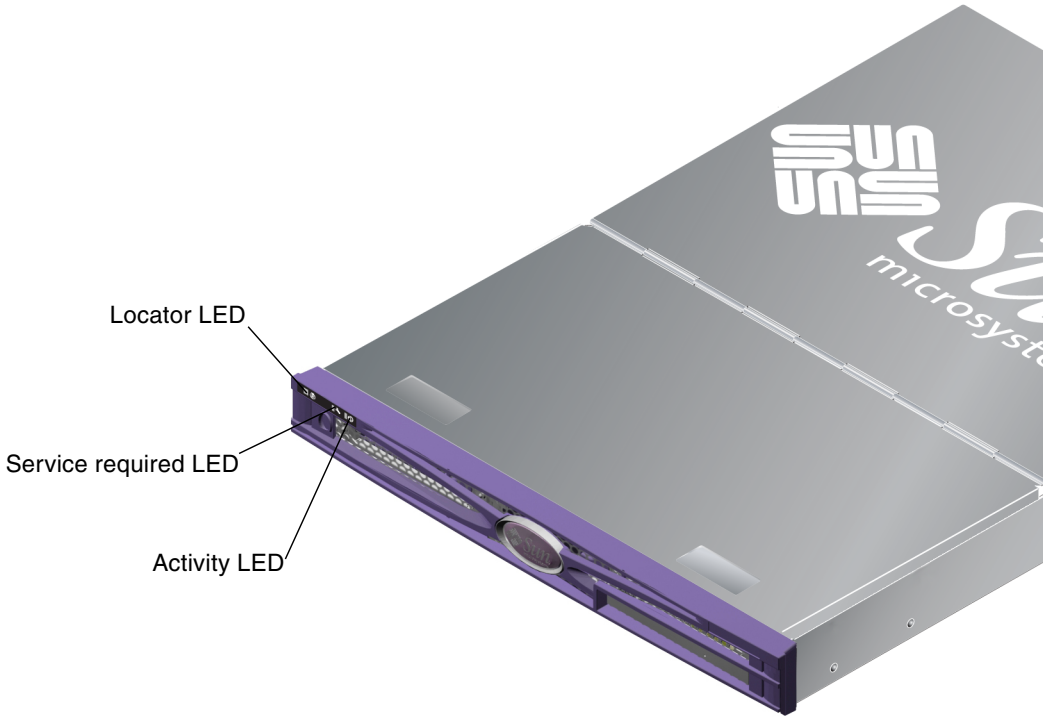


FIGURE 1-3 Location of Status Indicators (Sun Fire V210 Server)

1.2.1 Server Status Indicators

The server has three LED status indicators. They are located on the front bezel, and repeated on the back panel. A summary of the indicators is given in TABLE 1-2.

TABLE 1-2 Server Status Indicators

Indicator	LED color	LED State	Meaning
Activity	Green	On	The server is powered up and running the Solaris OS.
		Off	Either power is not present, or Solaris OS is not running.

TABLE 1-2 Server Status Indicators

Indicator	LED color	LED State	Meaning
Service Required	Yellow	On	The server has detected a problem and requires the attention of service personnel.
		Off	The server has no detected faults.
Locator	White	On	Identifies the server from others in a rack.

You can turn the Locator LED on and off either from the system console or the Sun Advanced Light Out Manager (ALOM) command–line interface (CLI).

1.2.2 To Turn the Locator LED On

- **Do one of the following:**
  - **As root, type:**

```
# /usr/sbin/locator -n
```

  - **At the** ALOM **command-line interface, type:**

```
sc> setlocator on
```

1.2.3 To Turn the Locator LED Off

- **Do one of the following:**
  - **As superuser, type:**

```
# /usr/sbin/locator -f
```

  - **At the** ALOM **command-line interface, type:**

```
sc> setlocator off
```

1.2.4 To Display Locator LED Status

- **Do one of the following:**
  - As superuser, type:

```
# /usr/sbin/locator
```

  - **At the** ALOM **command-line interface, type:**

```
sc> showlocator
```

1.2.5 Front Panel

Access the front panel by opening the bezel, which you do by rotating it forward. It has no clips or locks to hold it closed, only the spring retention built into its hinges.

The front panel contains the following:

- On/Standby switch
- Hard drive
- DVD-ROM drive
- System configuration card
- keyswitch—Sun Fire V240 server

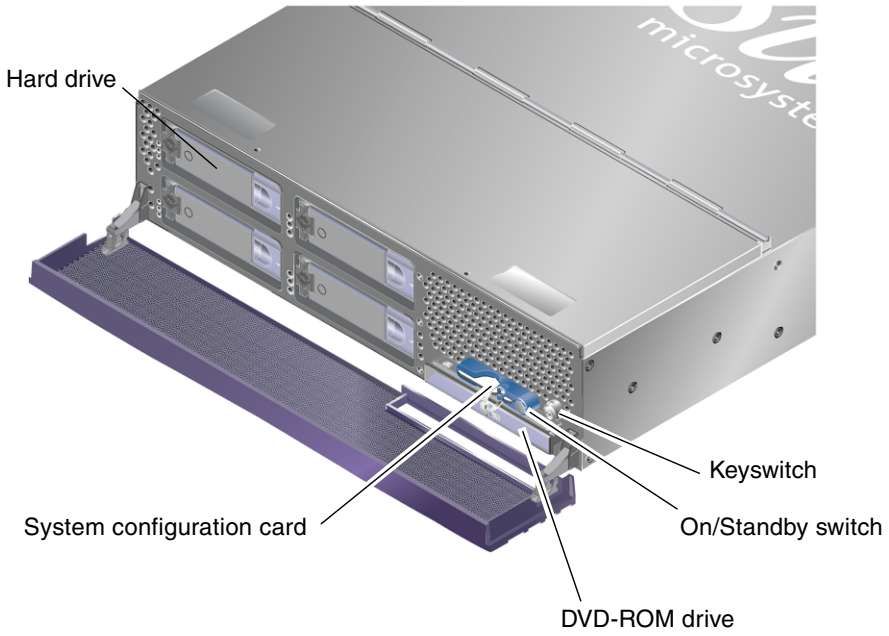


FIGURE 1-4 Location of Front Panel Features (Sun Fire V240 Server)

1.2.6 On/Standby Switch

Access to the On/Standby switch is by opening the front bezel. The On/Standby switch controls only the *power state* of the server, it does not *isolate* the server from its electrical power source.

The On/Standby switch is a momentary switch and has two operation modes:

- Press and immediately release
- Press and hold down for more than 4 seconds

The results of these actions are summarized in TABLE 1-3.

TABLE 1-3 On/Standby Switch Actions and Results

Server Power State	Press and release	Press down for more than 4 seconds
On (with Solaris OS running)	Software performs orderly shutdown. Server enters Standby state.	Server enters Standby state directly.
On (with Solaris OS not running)	No effect.	Server enters Standby state directly.
Standby	Server enters On power state.	Server enters On power state.

1.2.6.1 Controlling Server Power States

For information on connecting the server to a power source and powering on the server, see the *Sun Fire V210 and V240 Servers Getting Started Guide* (819-4206-10).

For information on controlling server power using software see: `http://docs.sun.com`, and search for ALOM version 1.5.4 release notes.

The server immediately goes into Standby mode as soon as it is connected to a power source. As long as it remains connected to the power source, the server stays in either the Standby or On power state. An explanation of the power states is given in TABLE 1-4.

TABLE 1-4 Explanation of Power States

Power State	Description
On	Server is connected to a power source and the power is enabled.
Standby	Server is connected to a power source but power is not enabled.
Off	Server is not connected to a power source. Power cable is disconnected.

Note – The only way to completely remove power from the server is to disconnect the power cable.

1.2.7 Hard Drives

The Sun Fire V210 server has slots for up to two hard drives. The Sun Fire V240 server has slots for up to four. The slots accept any Sun LVD SCSI hard drive conforming to the 1-inch SCA-2 form factor.

Each hard drive has two LED indicators associated with it. See TABLE 1-5 for a summary of what the indicators mean.

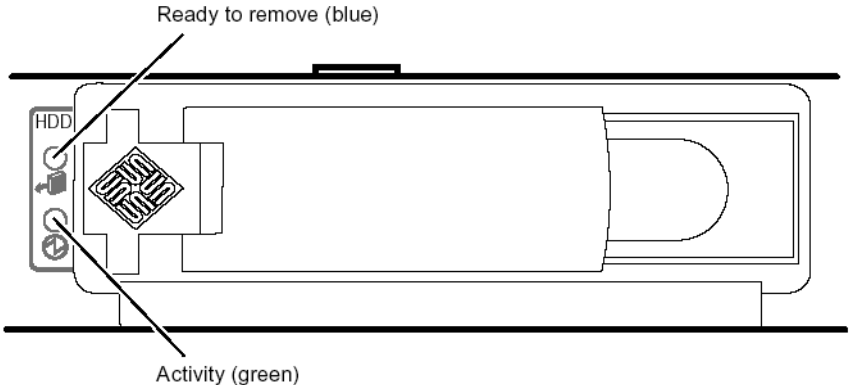


FIGURE 1-5 Location of Hard Drive Service Indicators

TABLE 1-5 Hard Drive Service Indicators

Indicator	LED color	LED State	Component Status
Activity	Green	Flashing	Active SCSI transactions
		Off	No activity
Ready to Remove	Blue	On	Ready to remove
		Off	Not ready to remove

For information on removing and replacing a hard drive, see Section 2.5, “Removing and Replacing Hard Drives” on page 2-7.

1.2.8 DVD-ROM Drive

The Sun Fire V210 and V240 servers contain a bay to accept an optional slimline ATAPI DVD-ROM drive. The bay is located on the front panel and is accessed by opening the bezel.

For information on DVD-ROM drive installation, see Section 2.6, "Removing and Replacing the DVD Drive" on page 2-12.

1.2.9 System Configuration Card

The system configuration card (SCC) is housed in a slot behind the front bezel, next to the On/Standby switch (FIGURE 1-4). The card contains unique network identity information, including the MAC address and host ID (known as the IDPROM), and the OpenBoot™ PROM configuration (also known as NVRAM).

The server attempts to access the SCC while booting.

- If a properly formatted card is not present in the reader, the system does not boot.
- If the content of the NVRAM section is invalid, the system is not initialized with its default NVRAM configuration.

It is essential that you store the SCC safely if you have to remove it from the server, and replace it before restarting the system.

For more information, see Section 2.4, "Swapping a System Configuration Card Between Servers" on page 2-6.

TABLE 1-6 OpenBoot PROM Configuration Parameters Stored on the System Configuration Card

Parameter	Default	Description
`diag-passes`	`1`	Defines the number of times self-test methods are performed.
`loca-mac-address?`	`true`	If `true`, network drivers use their own MAC address, not the server's.
`fcode-debug?`	`false`	If `true`, include name fields for plug-in device FCodes.
`ttyb-rts-dtr-off`	`true`	If `true`, operating system does not assert RTS and DTR on TTYB port.
`ttyb-ignore-cd`	`false`	If `true`, operating system ignores carrier-detect on TTYB

TABLE 1-6 OpenBoot PROM Configuration Parameters Stored on the System Configuration Card

Parameter	Default	Description
ttya-rts-dtr-off	true	If true, operating system does not assert RTS and DTR on TTYA port.
ttya-ignore-cd		If true, operating system ignores carrier-detect on TTYA port.
silent-mode?	false	Suppress all messages if true and diag-switch? is false.
scsi-initiator-id	7	SCSI-ID of the SCSI controller.
oem-logo?	false	If true, use custom OEM logo, otherwise, use Sun logo.
oem-banner?	false	If true, use custom OEM banner.
ansi-terminal?	true	
screen-#columns	80	Sets number of columns on the scree.
screen-#rows	34	Sets number of rows on the screen
ttya-mode	9600,8,n,1,-	TTYA (baud rate, # bits, parity, # stop, handshake).
ttyb-mode	9600,8,n,1,-	TTYB (baud rate, # bits, parity, # stop, handshake).
output-device	ttya	Power-on output device.
input-device	ttya	Power-on input device.
load-base	16384	Address from which data is read from a device.
auto-boot?	true	If true, system boots automatically to OS after power on or reset occurs.
boot-command	boot	Action following a boot command.
diag-file	none	File from which to boot if diag-switch? is true.
diag-device	net	Device to boot from if diag-switch? is true.
boot-file	none	File to boot if diag-switch? is false
boot-device	disk net	Device or devices from which to boot if diag-switch? is false.
use-nvramrc?	false	If true, execute commands stored in NVRAM during server start-up.

TABLE 1-6 OpenBoot PROM Configuration Parameters Stored on the System Configuration Card

Parameter	Default	Description
nvramrc	none	Command script to execute if use-nvramrc? is true.
security-mode	none	Firmware security level (options: none, command, or full).
security-password	none	Firmware security password if security-mode is not none (never displayed) - *do not set this directly.*
security-#badlogins	none	Number of incorrect security password attempts
diag-script	none	OpenBoot Diagnostics test suite is executed automatically after power on if diag-switch is true and POST passes.
diag-level	max	Defines how diagnostic tests are run (options are off, min, menu, and max).
diag-switch?	false	If true: • Run in diagnostic mode. • After a boot request, boot diag-file from diag-device. If false: • Run in non diagnostic mode. • Following a boot request, boot-file from boot-device.
diag-trigger	none	parameter
error-reset-recovery	boot	Command to execute following a system reset generated by an error.
pcia-probe-list		Identifies number and order in which PCI slots are probed.

For additional information about OpenBoot PROM configuration parameters see:
http://docs.sun.com
Search for OpenBoot 4.x, then select Forth Word Reference.

1.2.10 Keyswitch

The Sun Fire V240 server has a keyswitch that provides control over the following aspects of the server's operation:

- Power state
- Security level
- Diagnostics level

Located behind the front bezel is a rotary switch with four positions, operated by a key supplied with the server. The key is shipped in a clip on the back of the bezel.

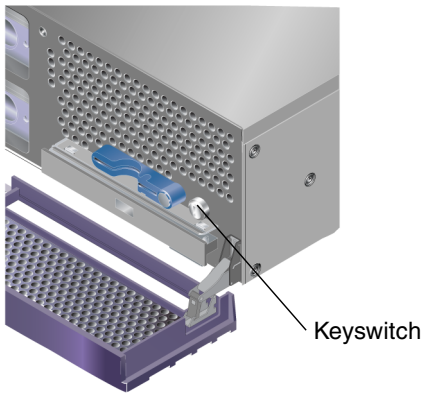


FIGURE 1-6 Location of the Keyswitch (Sun Fire V240 Server)

The keyswitch has four positions, each keyswitch position enables the user to select a different mode of behavior. For a description of the behavior forced by each keyswitch position, see TABLE 1-7.

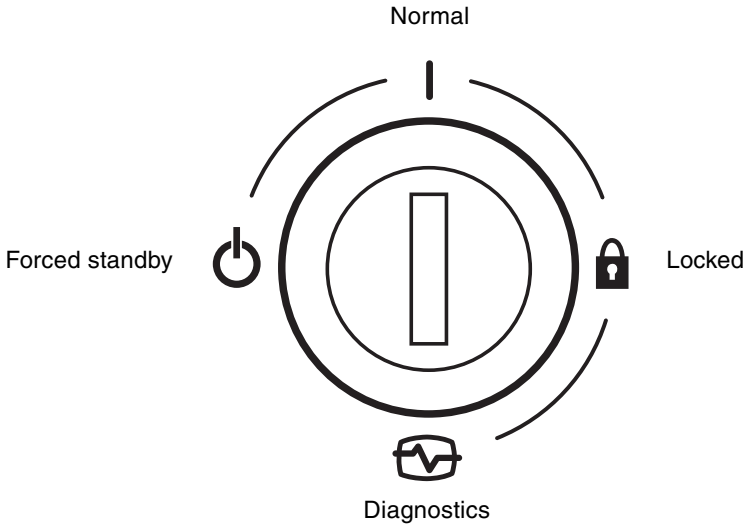


FIGURE 1-7 Keyswitch Positions (Sun Fire V240 Server)

Keyswitch positions and the behaviors they force are given in TABLE 1-7.

TABLE 1-7 Keyswitch Position and Server Behaviors

Keyswitch position	Forced Server behavior
Normal	Normal operation
Diagnostics	Full POST during system boot
Locked	Disable On/Standby switch Write-protect ALOM Flash PROM Write-protect OpenBoot PROM/POST Flash PROM Disable suspension to OpenBoot PROM/Kadb
Forced Standby	Force server into Standby mode Disable On/Standby switch Disable remote power control Write-protect ALOM Flash PROM

1.3 Back Panel Features

The server's I/O ports and power inlets are on the back panel.

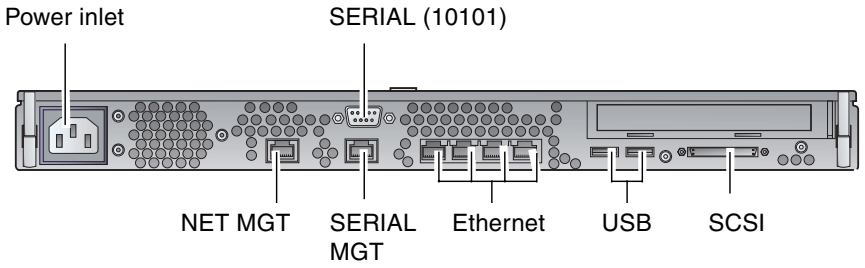


FIGURE 1-8 I/O Ports (Sun Fire V210 Server)

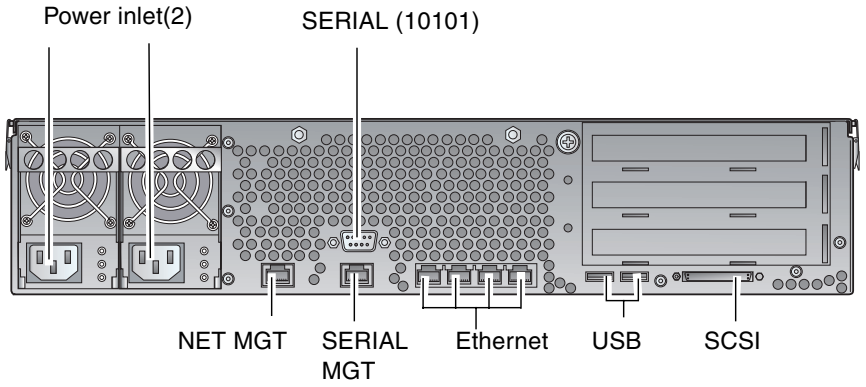


FIGURE 1-9 I/O Ports (Sun Fire V240 Server)

1.3.1 I/O Ports

The I/O ports on the rear of the Sun Fire V210 and V240 servers are arranged as shown in FIGURE 1-8 and FIGURE 1-9. For more information on the I/O ports, refer to the *Sun Fire V210 and V240 Servers Getting Started Guide* (819-4206-10).

1.3.2 Network Status Indicators

Each network connector has two status indicators.

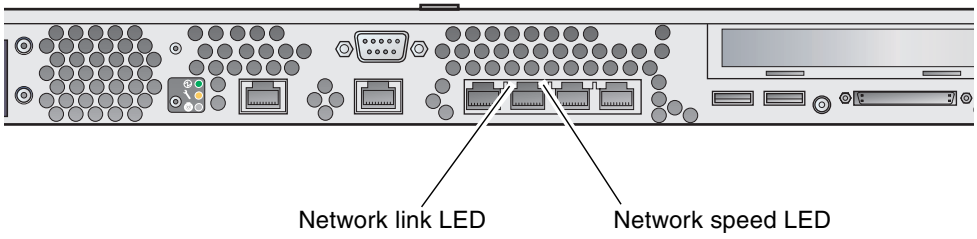


FIGURE 1-10 Location of Network Status Indicators

The network status indicators convey:

- Network link status
- Network speed status (does not apply to the NET MGT port)

For a summary of what the Network Link Status indicators mean, see TABLE 1-8.

TABLE 1-8 Network Link Indicators

LED color	LED State	Network Link Status
Green	On	Link is established.
	Blinking	Link is transferring data.
	Off	Link is not established.

For a summary of what the network speed indicators mean, see TABLE 1-9.

TABLE 1-9 Network Speed Indicators

LED color	LED State	Network Speed Status
Green	On	The network link is established and running at its maximum supported speed.
	Off	• If the network activity indicator is on, the network link is established but not running at its maximum supported speed. • If the network activity indicator is off, network link is not established.

1.3.3 USB Ports

The server has two USB ports for attaching supported USB devices.

The ports are USB 1.1 compliant. They support device speeds of 1.5 Mbit/s and 12 Mbit/s, and a 5V supply is available at each connector to power the external device.

1.3.4 External SCSI Port

The SCSI port is a multimode Ultra160 SCSI interface. To operate at Ultra160 SCSI speeds, it must be in Low Voltage Differential (LVD) mode. If a single-ended device is connected to the server, it automatically switches to single-ended mode.

1.3.5 Power Supply Unit

The Sun Fire V210 server has one PSU and two associated status indicators. A summary of the function of the indicators is given in TABLE 1-10.

TABLE 1-10 Power Supply Unit Indicators

LED color	LED State	Component Status
Green	On	Power is present and PSU is active.
	Off	Either power is not present, or the PSU has shut down due to an internal protection event.
Amber	On	The PSU has shut down due to an internal protection event and requires service attention.
	Off	The PSU is operating normally.

The Sun Fire V240 server has dual redundant PSUs. This server has an additional LED indicator which tells you when a power supply unit is ready to be removed with the server running. (The Sun Fire V210 server has a single PSU and does not support this function.)

A summary of the function of this indicator is given in TABLE 1-11.

TABLE 1-11 Power Supply Unit Ready to Remove Indicator (Sun Fire V240)

LED color	LED State	Component Status
Blue	On	PSU is ready to be removed.
	Off	The PSU *is not* ready for removal.

Caution – As long as AC power is supplied to the server, potentially dangerous voltages might be present within the server.

1.4 System Prompts

The following default server prompts are used by the Sun Fire V210 and V240 servers:

- `ok` — OpenBoot PROM prompt
- `sc` — Advanced Lights Out Manager (ALOM) prompt
- `#` — Solaris OS superuser (Bourne and Korn shell)

FIGURE 1-11 shows the relationship between the three prompts and how to change from one prompt to another.

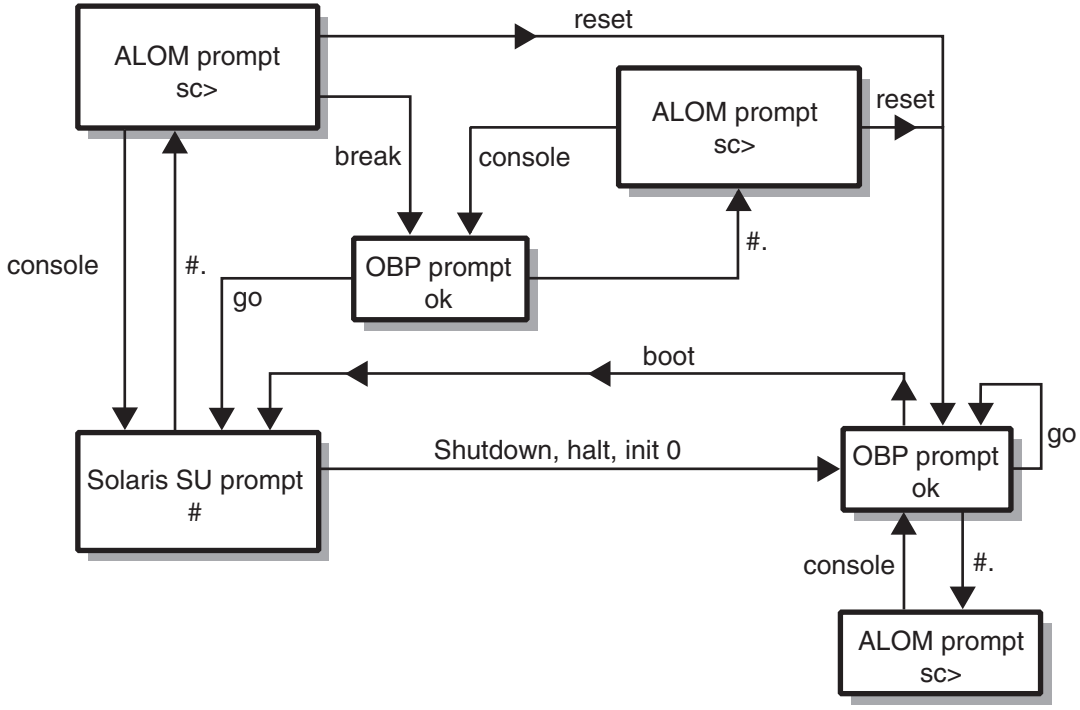


FIGURE 1-11 System Prompt Flow Diagram

For additional information about obtaining switching from OpenBoot PROM to server console (sc) prompts see: Section 3.4, "Basic ALOM Functions" on page 3-5.

CHAPTER 2

Removing and Replacing Components

This chapter tells you how to remove and replace the components that are located behind the server's front bezel. The procedures documented in this chapter do not require the attention of qualified service personnel.

Caution – Read the section, Section 2.2, "Avoiding Electrostatic Discharge" on page 2-2, and wear a properly grounded antistatic strap, before you carry out any of the procedures in this section.

The chapter contains the following sections:

- Section 2.1, "Replaceable Components" on page 2-2
- Section 2.2, "Avoiding Electrostatic Discharge" on page 2-2
- Section 2.4, "Swapping a System Configuration Card Between Servers" on page 2-6
- Section 2.5, "Removing and Replacing Hard Drives" on page 2-7
- Section 2.6, "Removing and Replacing the DVD Drive" on page 2-12

2.1 Replaceable Components

Open the bezel to access these components:

- System Configuration Card
- Hard drives
- DVD-ROM drive

Note – Access to any other component requires the removal of the server's lid, and involves procedures that must be carried out by trained personnel only.

2.2 Avoiding Electrostatic Discharge

2.2.1 Avoiding Electrostatic Discharge While Working on the Front Panel

1. **Attach one end of the antistatic wrist strap to your wrist.**
2. **Attach the other end to a grounding stud on the rack or cabinet.**

2.2.2 Opening the Front Bezel

1. **Ensure that you are properly grounded.**

   See Section 2.2.1, "Avoiding Electrostatic Discharge While Working on the Front Panel" on page 2-2.

2. **Open the bezel by rotating it down on its hinges.**

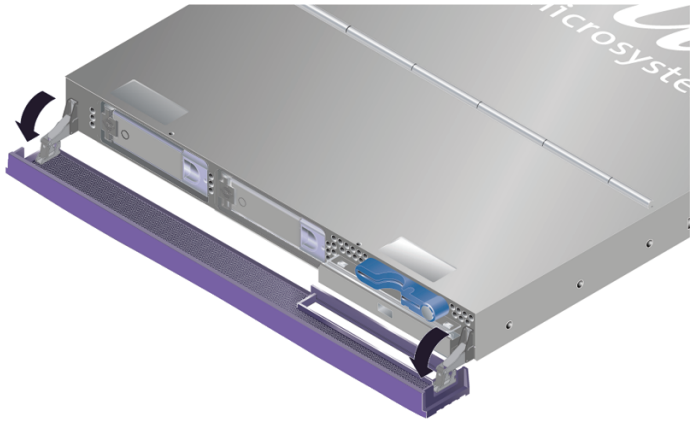
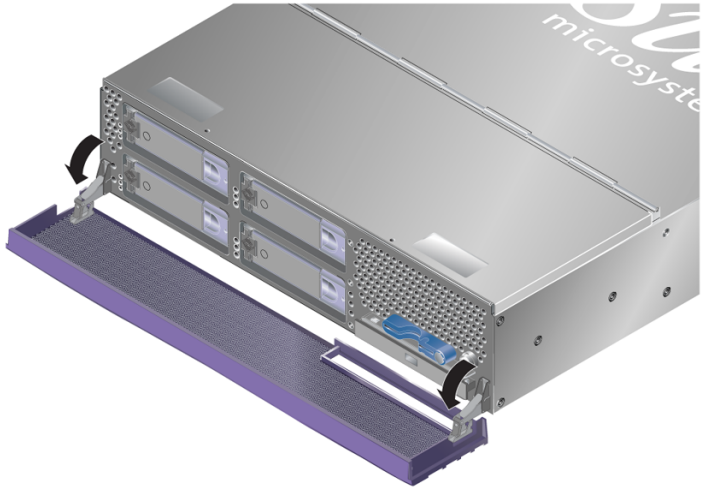


FIGURE 2-1 Opening the Bezel (Sun Fire V210 Server)



.

FIGURE 2-2 Opening The Bezel (Sun Fire V240 Server)

Note – Always grip the bezel at both ends to open it. Do not attempt to open it using a single point of grip.

2.3 Controlling Server Power

Before you remove or replace a system configuration card or DVD-ROM drive, the server must be powered down.

Tip – For detailed information on controlling server power with software, see: http://docs.sun.com, and search for ALOM documentation.

2.3.1 Powering On—Using the On/Standby Switch

Caution – Never move the system when the system power is on. Movement can cause catastrophic disk drive failure. Always power off the system before moving it.

---

1. **Connect the server to an AC power source.**

   Once connected, the server automatically goes into Standby power mode.

2. **Turn on power to any peripherals and external storage devices you have connected to the server.**

   Read the documentation supplied with the device for specific instructions.

3. **Open the front bezel.**

4. **Sun Fire V240 only: insert the system key into the keyswitch and set it to the Normal or Diagnostics position.**

5. **Press the On/Standby switch.**

   Verify that the LED for the On/Standby switch illuminates.

6. **Sun Fire V240 only:**

   a. **Turn the key switch to the Locked position.**

      This prevents anyone from accidentally powering off the system.

   b. **Remove the system key from the keyswitch and store it in the clip on the back of the bezel.**

7. **Close the front bezel.**

2.3.2 Powering Off—Using the On/Standby Switch

Note – Applications running on the Solaris OS can be adversely affected by a poorly executed system shutdown. Make sure you have gracefully shut down any applications before powering off the system.

---

1. **Notify users that the system will be powered down.**
2. **Back up the system files and data, if necessary.**
3. **(Sun Fire V240 only) Ensure that the keyswitch is in the Normal or Diagnostics position.**
4. **Press and release the On/Standby switch behind the front bezel.**

   The system begins an orderly software system shutdown.

Note – Pressing and releasing the On/Standby switch initiates an orderly software shutdown. Pressing and holding the switch for four seconds causes an immediate hardware shutdown. Whenever possible, initiate an orderly shutdown. Forcing an immediate hardware shutdown can corrupt the disk drive and cause loss of data.

---

5. **Wait for the front panel green LED to go out.**
6. **Sun Fire V240 only: remove the system key from the keyswitch and store it in the clip on the back of the front bezel.**
7. **Close the front bezel.**

2.4 Swapping a System Configuration Card Between Servers

2.4.1 Swapping a System Configuration Card Between Servers

Caution – Never remove the system configuration card while the server is booting or running the Solaris OS. Either remove power from the server, or put it into Standby mode, before removing or inserting the system configuration card.

Caution – Do not handle the system configuration card unless you need to transfer it to another system. If you need to handle it for this reason, avoid contact with the gold terminals on the underside of the card.

Caution – If you remove the system configuration card (SCC) and replace it with the SCC from a system of a different platform type, the card will be reconfigured. A message tells you when this has been done, but the system does not request confirmation before reformatting the card.

1. **Power down both servers.**

   See Section 2.3, "Controlling Server Power" on page 2-4.

2. **Open the front bezel on both servers.**

   See Section 2.2.2, "Opening the Front Bezel" on page 2-2.

3. **Remove the cable ties that secure the system configuration cards, and remove the cards.**

4. **Insert the system configuration card from the old server into the new one.**

5. **Replace the cable tie on the new system.**

6. **Power on the new system.**

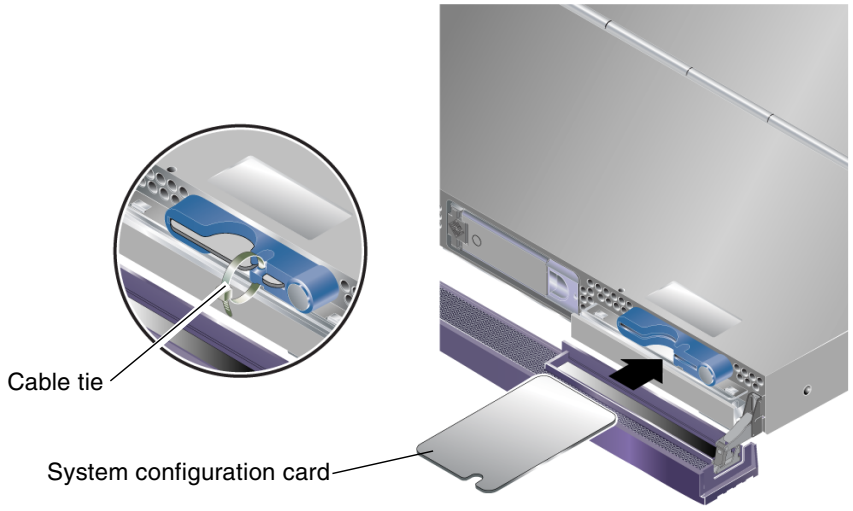


FIGURE 2-3 Inserting a System Configuration Card (Sun Fire V210 Server)

2.5 Removing and Replacing Hard Drives

Caution – The server and hard drives contain electronic parts that are extremely sensitive to static electricity. Wear a grounded antistatic wrist strap when you carry out this procedure.

2.5.1 Removing a Hard Drive

The hard drives are hot-pluggable modules. If more than one is fitted, you can install or remove a hard drive without powering off the server or removing it from the rack.

However, you do need to make sure that no system or application software is using a hard drive when you remove it.

Note – If you intend to remove a hard drive with Solaris running, follow the instructions in Section 2.5.4, "Removing a SCSI Hard Drive With Solaris Running" on page 2-11 before performing the following steps.

1. **Open the front bezel.**

   See Section 2.2.2, "Opening the Front Bezel" on page 2-2.

2. **Check that the blue indicator LED is lit on the hard drive.**

   The blue LED comes on when the hard drive is ready to remove.

3. **Slide the catch at the front of the hard drive to the right.**

   This releases the handle on the front of the hard drive.

4. **Pull the handle and remove the hard drive from the server by sliding it out from its bay.**

2.5.2 Replacing a Hard Drive

Caution – The server and hard drives contain electronic parts that are extremely sensitive to static electricity. Wear a grounded antistatic wrist strap when you carry out this procedure.

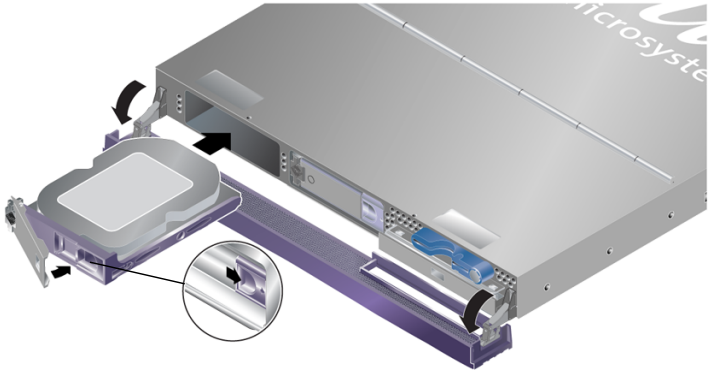


FIGURE 2-4 Installing a Hard Drive (Sun Fire V210 Server)

1. **Slide the catch on the front of the hard disk to the right.**

   This releases a handle on the front of the hard drive. The lever must be open *before* you insert the hard drive. If it is not, the hard drive does not engage with the server correctly.

2. **Slide the hard drive into its bay at the front of the server.**

   Push it in firmly until the metal lever starts to close. This indicates that the hard drive is engaged with its connector attached to the server.

3. **Push the metal lever until the disk drive clicks into place.**

4. **Close the bezel.**

   If you have installed a hard drive with Solaris running, perform the steps in Section 2.5.3, "Installing a SCSI Hard Drive With Solaris Running" on page 2-9.

2.5.3 Installing a SCSI Hard Drive With Solaris Running

Before performing the instructions in this section, install the hard drive by following the instructions in Section 2.5.2, "Replacing a Hard Drive" on page 2-8.

Use the following instructions in conjunction with the `cfgadm(M)` man page.

1. **With the new hard drive physically installed in the drive bay, log into the system as superuser and run the `format` command to make the disk visible to the Solaris OS.**

   Type the following command. The following sample output is from a system containing two hard drives.

```
# format
Searching for disks...done

AVAILABLE DISK SELECTIONS:
       0. c0t0d0 <SUN36G cyl 24427 alt 2 hd 27 sec 107>
          /pci@1f,0/pci@1/scsi@8/sd@0,0
       1. c0t1d0 <SUN36G cyl 24427 alt 2 hd 27 sec 107>
          /pci@1f,0/pci@1/scsi@8/sd@1,0
```

2. **Find the label of the new hard drive, which appears in the `Ap_Id` column of the sample output. Type:**

```
# cfgadm -al
Ap_Id            Type         Receptacle   Occupant      Condition
c0               scsi-bus     connected    configured    unknown
c0::dsk/c0t0d0   CD-ROM       connected    configured    unknown
c1               scsi-bus     connected    configured    unknown
c1::dsk/c1t0d0   disk         connected    configured    unknown
c1::dsk/c1t1d0   unavailable  connected    unconfigured  unknown
c2               scsi-bus     connected    unconfigured  unknown
```

In this sample output, the new drive is Disk 1.

Note – The output text provided is example text only. In the example outputs, the disk identified is not consistent across examples. However, the format of the output is correct. When you type commands, the drive name is consistent in the output you see.

---

3. **Connect the new drive logically to the operating system.**

   Type the following command, specifying the correct `Ap_Id` label for the disk you have installed. In this sample command the `Ap_Id` label is for Disk 1:

```
# cfgadm -c configure c1::dsk/c1t1d0
```

4. **Confirm that the drive is now connected and configured. Type:**

```
# cfgadm -al
Ap_Id            Type         Receptacle   Occupant      Condition
c0               scsi-bus     connected    configured    unknown
c0::dsk/c0t0d0   CD-ROM       connected    configured    unknown
c1               scsi-bus     connected    configured    unknown
c1::dsk/c1t0d0   disk         connected    configured    unknown
c1::dsk/c1t1d0   disk         connected    configured    unknown
c2               scsi-bus     connected    unconfigured  unknown
```

The disk is now available to be mounted for operation.

2.5.4 Removing a SCSI Hard Drive With Solaris Running

If you are removing a hard drive while the operating system is still running, you must remove the drive logically from the operating system before removing it physically. Follow the instructions in this section, then remove the hard drive physically by following the instructions in Section 2.5.1, "Removing a Hard Drive" on page 2-7.

Use the following instructions in conjunction with the `cfgadm(M)` man page.

1. **Check that the hard drive you want to remove is visible to the Operating System.**

   Type:

```
# format
Searching for disks...done

AVAILABLE DISK SELECTIONS:
       0. c0t0d0 <SUN36G cyl 24427 alt 2 hd 27 sec 107>
          /pci@1f,0/pci@1/scsi@8/sd@0,0
       1. c0t1d0 <SUN36G cyl 24427 alt 2 hd 27 sec 107>
          /pci@1f,0/pci@1/scsi@8/sd@1,0
```

2. **Get the correct `Ap_Id` label for the hard drive that you want to remove. Type:**

```
# cfgadm -al
Ap_Id            Type         Receptacle   Occupant      Condition
c0               scsi-bus     connected    configured    unknown
c0::dsk/c0t0d0   CD-ROM       connected    configured    unknown
c1               scsi-bus     connected    configured    unknown
c1::dsk/c1t0d0   disk         connected    configured    unknown
c1::dsk/c1t1d0   disk         connected    configured    unknown
c2               scsi-bus     connected    unconfigured  unknown
```

Note – Before proceeding, you must remove the hard drive from all of its software mount positions and delete any swap areas in use on the drive. If the drive is the system's boot device, do not proceed further with these instructions. Do not attempt to unconfigure the boot disk.

---

3. **Unconfigure the hard drive that you intend to remove.**

   Use the `unconfigure` command and specify the device you intend to remove. For example, if it is Disk 1, type:

```
# cfgadm -c unconfigure c1::dsk/c1t1d0
```

4. **Verify that the device is now unconfigured. Type:**

```
# cfgadm -al
Ap_Id            Type         Receptacle   Occupant      Condition
c0               scsi-bus     connected    configured    unknown
c0::dsk/c0t0d0   CD-ROM       connected    configured    unknown
c1               scsi-bus     connected    configured    unknown
c1::dsk/c1t0d0   disk         connected    configured    unknown
c1::dsk/c1t1d0   unavailable  connected    unconfigured  unknown
c2               scsi-bus     connected    unconfigured  unknown
```

5. **Confirm that the hard drive you want to remove from the server is no longer visible to the operating system. Type:**

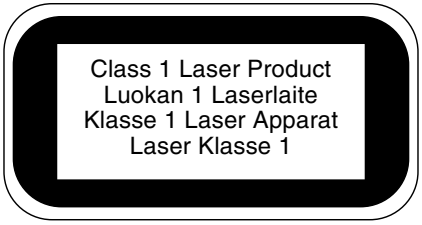
```
# format
Searching for disks...done

AVAILABLE DISK SELECTIONS:
       0. c0t0d0 <SUN36G cyl 24427 alt 2 hd 27 sec 107>
          /pci@1f,0/pci@1/scsi@8/sd@0,0
```

It is now safe to remove the hard drive from the server without shutting down the operating system.

2.6 Removing and Replacing the DVD Drive

The DVD drive is not hot-swappable. The server must be powered down, and the power cable removed from the back panel, before you remove or install a DVD drive.



Caution – Follow the instructions in this section carefully. The DVD-ROM drive contains a laser device. Do not attempt to open the DVD-ROM drive's enclosure or remove a DVD-ROM drive using any procedures other than those contained in this section. If you do, you risk being exposed to radiation.

2.6.1 Removing the DVD Drive

1. **Power down the server.**

   See Section 2.3, "Controlling Server Power" on page 2-4.

2. **Open the bezel.**

   See Section 2.2.2, "Opening the Front Bezel" on page 2-2.

3. **Unclip the catches that fasten the DVD drive to the chassis (**FIGURE 2-5**).**

4. **Pull the DVD drive towards you until it is free of its connectors and out of the chassis.**

2.6.2 Replacing the DVD Drive

1. **Insert the new DVD-ROM drive.**

2. **Press it home firmly until the clips engage with the server's chassis.**

3. **Close the bezel.**

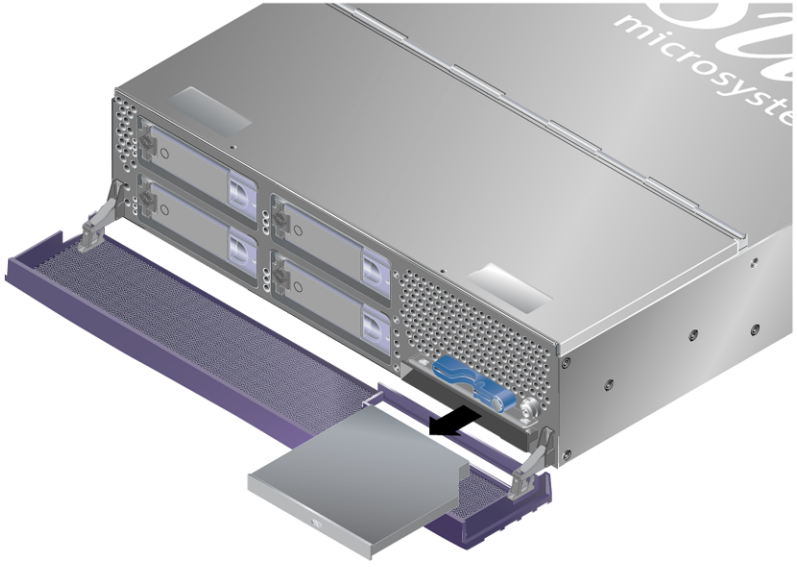


FIGURE 2-5 Removing a DVD-ROM Drive (Sun Fire V240 Server)

2.7 Removing and Replacing a Power Supply Unit

The Sun Fire V240 server has dual-redundant power supplies. You can swap one power supply while the other is still running.

The Sun Fire V210 server has a single power supply. Swapping it requires the attention of qualified service personnel. Refer to the *Sun Fire V210 and V240 Servers Service Manual* (819-4207-10).

2.7.1 Removing a Power Supply Unit

1. **At the ALOM prompt, type:**

```
sc> removefru -y PSx
```

Where *x* is the power supply unit identifier, 0 or 1.

When the blue ok to remove LED lights on the back of the power supply unit, remove it.

2. **Pull down on the PSU lever.**
3. **Withdraw the PSU from the server's chassis.**

2.7.2 Replacing a Power Supply Unit

1. **Slide the PSU into the back of the server until it stops.**

   Do not push the PSU lever closed until the PSU is all the way in.

2. **Press the PSU lever until it clicks home.**

   This engages the PSU with the power distribution board inside the server.

3. **At the ALOM prompt, type:**

```
sc> poweron PSx
```

Where *x* is the power supply unit identifier, 0 or 1.

CHAPTER 3

Sun Advanced Lights Out Manager

This chapter gives an overview of the Sun Advanced Lights Out Manager (ALOM) software. The chapter contains:

- Section 3.1, “Sun Advanced Lights Out Manager (ALOM)” on page 3-2
- Section 3.2, “ALOM Management Ports” on page 3-4
- Section 3.3, “Setting the `admin` Password” on page 3-5
- Section 3.4, “Basic ALOM Functions” on page 3-5

3.1 Sun Advanced Lights Out Manager (ALOM)

Both the Sun Fire V210 server and the Sun Fire V240 server are shipped with Sun Advanced Lights Out Manager (ALOM) 1.5.4 or a subsequently compatible version of ALOM software preinstalled. The system console is directed to ALOM by default and is configured to show server console information on startup.

For the latest up-to-date documentation about ALOM see the following web sites:
http://www.sun.com/server
http://docs.sun.com
Always download and use the latest version of ALOM that is compatible with the version of OpenBoot PROM you are using.

ALOM enables you to monitor and control your server through a serial connection (using the SERIAL MGT port), or Ethernet connection (using the NET MGT port).

Note – The ALOM serial port, labelled SERIAL MGT, is for server management only. If you need a general purpose serial port, use the serial port labeled 10101.

Note – If you use ALOM to reset the server and the `diag-switch?` is set to `true`, the `bootscript` command is not executed when the server reboots. If you use OpenBoot PROM to reset the server, bootscript executes correctly.

ALOM can be configured to send email notification of hardware failures and other events related to the server or to ALOM.

3.1.1 Email Delivery Alerts

If you have alerts configured for email delivery, ALOM waits for success or failure confirmation from email delivery before sending the next alert. This affects event alerts sent to the ALOM shell and to `syslog`. If mail alerts are incorrectly configured, this could result in significant delays. These delays do not occur if email alerts are not configured.

If you are experiencing delays in alerts, check to see that the values you entered for the `mgt_mailhost` and `mgt_mailalert` configuration variables are correct. For more information refer to ALOM online help.

Note – When a mail alert occurs and the mail host is unable to communicate with the network's naming service (for example, NIS), ALOM stops generating and logging messages.

3.1.2 What ALOM Monitors

The ALOM circuitry uses standby power from the server. This means that:

- ALOM is active as soon as the server is connected to a power source, and until power is removed by unplugging the power cable.
- ALOM firmware and software continue to be effective when the server operating system goes offline.

See TABLE 3-1 for a list of components monitored by ALOM and the information it provides for each.

TABLE 3-1 What ALOM Monitors

Component	Information
Hard drives	Presence and status
System and CPU fans	Speed and status
CPUs	Presence, temperature, and any thermal warning or failure conditions
DIMMs	Memory errors
Power supplies	Presence and status
System temperature	Ambient temperature and any thermal warning or failure conditions
Server front panel	Keyswitch position and LED status
Voltage	Status and thresholds
SCSI circuit breakers	Status

Note – When you issue the `showfru` command from the ALOM command shell, the command does not read the layout of the DIMMs.

Note – When OpenBoot PROM reports DIMM errors to ALOM, it sends system concole (SC) alert messages with the incorrect memory slot position for the Sun Fire V210 and V240 servers. However the memory errors are still valid.

3.1.3 Automatic Server Restart

Note – Automatic Server Restart is not the same as Automatic System Recovery (ASR), which the Sun Fire V210 and V240 servers also support. For additional information about Automatic System Recovery see, Section 6.11, "Automatic System Recovery" on page 6-30.

Automatic Server Restart is a component of ALOM. It monitors the Solaris OS while it is running and, by default, synchronizes the file systems and restarts the server if it hangs.

ALOM uses a watchdog process to monitor the kernel *only*. ALOM does not restart the server if a process hangs and the kernel is still running. The ALOM watchdog parameters for the watchdog patting interval and watchdog time-out are not user configurable.

If the kernel hangs and the watchdog times out, ALOM reports and logs the event and performs one of three user-configurable actions.

- xir — This is the default action and does not cause the server to sync the file systems and restart. In the event of the sync hanging, ALOM fallbacks to a hard reset after 15 minutes.
- Reset — This is a hard reset and results in a rapid system recovery but diagnostic data regarding the hang is not stored.
- None — This results in the system being left in the hung state indefinitely after the watchdog time-out has been reported.

For additional information see: `http://docs.sun.com`, search ALOM for the ALOM documentation.

3.2 ALOM Management Ports

The default management port is labeled SERIAL MGT. This port uses an RJ-45 connector and is for server management *only*—it supports only ASCII connections to an external console. Use this port when you first begin to operate the server.

Another serial port—labeled 10101— is available for general purpose serial data transfer. This port uses a DB-9 connector.

In addition, the server has one 10BASE-T Ethernet management domain interface, labelled NET MGT. To use this port, ALOM configuration is required.

Note – If you use the OpenBoot PROM command `setenv ttya-mode` to change the speed of the ALOM serial port (SERIAL MGT) to a value other than the default of 9600 baud, reset the host server. This sets the port speed to the specified value.

For additional information see: `http://docs.sun.com`
Search for ALOM to find the ALOM documentation.

3.3 Setting the `admin` Password

When you switch to the ALOM prompt after initial power on, you are logged in as the admin user and prompted to set a password. You must set this password in order to execute certain commands.

- **If you are prompted to do so, set a password for the admin user.**

  The password must:

  - contain at least two alphabetic characters
  - contain at least one numeric or one special character
  - be at least six characters long

  Once the password is set, the admin user has full permissions and can execute all ALOM CLI commands.

Tip – If you login to ALOM with a 16-character user name and execute the `showusers` command, ALOM enters a loop and refuses all other connection attempts. If you encounter this problem, establish a telenet connection to the host server and use the `scadm resetrsc` command to reset ALOM.

3.4 Basic ALOM Functions

This section covers some basic ALOM functions.

Tip – For additional information see: `http://docs.sun.com`. Search for ALOM to find the ALOM documentation.

3.4.1 To Switch to the ALOM Prompt

- **Type the following:**

```
# #.
```

Note – When you switch to the ALOM prompt, you are logged in with the userid "admin". See Section 3.3, "Setting the `admin` Password" on page 3-5.

3.4.2 To Switch to the Server Console Prompt

- **Type the following:**

```
sc> console
```

More than one ALOM user can be connected to the server console stream, but only one user is permitted to type input characters to the console.

If another user is logged on and has write capability, you will see the following message after issuing the `console` command:

```
sc> Console session already in use. [view mode]
```

To take console write capability away from another user, type:

```
sc> console -f
```

3.4.3 To Set the Serial Port Speed Back to the Default

- **Type the following:**

```
sc> bootmode reset-nvram
sc> reset
```

3.4.4 `scadm resetrsc` Command

If two users are running ALOM at the same time and one user issues the `scadm resetrsc` command for Solaris OS while the other user is updating ALOM firmware using either the `scadm download` command or the ALOM shell command `flashupdate`, the firmware could become corrupted and cause ALOM to be unusable.

- Do not issue the `scadm resetrsc` command until after the firmware update is complete.
- Do not issue the `scadm resetrsc` command within 60 seconds after the firmware update has been completed.

3.4.5 `TTYB` Console Output

If you have your console set to `TTYB` (10101) rather than to `TTYA` (the ALOM serial port, labeled SERIAL MGT), you may not see all the output from the console. This is because both OpenBoot PROM and Power-On Self-Test (POST) send diagnostic output to `TTYA` by default.

CHAPTER 4

Sun Management Center

This chapter describes SunMC. The chapter contains the sections:

- Section 4.1, “Sun Management Center” on page 4-2
- Section 4.2, “Hardware Diagnostic Suite” on page 4-4

4.1 Sun Management Center

Sun Management Center software provides enterprise-wide monitoring of Sun servers and workstations, including their subsystems, components, and peripheral devices. The system being monitored must be up and running, and you need to install all the proper software components on various systems in your network.

Sun Management Center lets you monitor the following on the Sun Fire V210 and V240 Server server (TABLE 4-1).

TABLE 4-1 What Sun Management Center Monitors

Item Monitored	What Sun Management Center Monitors
Disk drives	Status
Fans	Status
CPUs	Temperature and any thermal warning or failure conditions
Power supply	Status
System temperature	Temperature and any thermal warning or failure conditions

4.1.1 How Sun Management Center Works

The Sun Management Center consists of three components:

- Agent
- Server
- Monitor

You install *agents* on systems to be monitored. The agents collect system status information from log files, device trees, and platform-specific sources, and reports that data to the server component.

The *server* component maintains a large database of status information for a wide range of Sun platforms. This database is updated frequently, and includes information about boards, tapes, power supplies, and disks as well as operating system parameters like load, resource usage, and disk space. You can create alarm thresholds and be notified when these are exceeded.

The *monitor* components present the collected data to you in a standard format. Sun Management Center software provides both a standalone Java™ application and a Web browser-based interface. The Java interface affords physical and logical views of the system for highly-intuitable monitoring.

4.1.2 Other Sun Management Center Features

Sun Management Center software provides you with additional tools, which can operate with management utilities made by other companies.

The tools are an informal tracking mechanism and the optional add-on, Hardware Diagnostics Suite.

4.1.2.1 Informal Tracking

Sun Management Center agent software must be loaded on any system you want to monitor. However, the product lets you informally track a supported platform even when the agent software has not been installed on it. In this case, you do not have full monitoring capability, but you can add the system to your browser, have Sun Management Center periodically check whether it is up and running, and notify you if it goes out of commission.

4.1.2.2 Hardware Diagnostic Suite

The *Hardware Diagnostic Suite* is a package which you can purchase as an add-on to Sun Management Center. The suite lets you exercise a system while it is still up and running in a production environment. See Section 4.2, "Hardware Diagnostic Suite" on page 4-4 for more information.

4.1.2.3 Interoperability—Third-Party Monitoring Tools

If you administer a heterogeneous network and use a third-party network-based system monitoring or management tool, you may be able to take advantage of Sun Management Center software's support for Tivoli Enterprise Console, BMC Patrol, and HP Openview.

4.1.3 Using Sun Management Center

Sun Management Center software is aimed at system administrators who have large data centers to monitor or other installations that have many computer platforms to monitor. If you administer a smaller installation, you need to weigh Sun Management Center software's benefits against the requirement of maintaining a significant database (typically over 700 Mbytes) of system status information.

The servers to be monitored must be running, Sun Management Center relies on the Solaris OS for its operation.

Tip – For detailed instructions, see the *Sun Management Center 3.0 Supplement for Sun Fire, Sun Blade, and Netra Systems* (817-1007).

4.1.3.1 Obtaining the Latest Information

For the latest information about this product, go to the Sun Management Center Web site: `http://www.sun.com/sunmanagementcenter`.

4.2 Hardware Diagnostic Suite

The Sun Management Center features an optional Hardware Diagnostic Suite, which you can purchase as an add-on. The Hardware Diagnostic Suite is designed to exercise a production system by running tests sequentially.

Sequential testing means the Hardware Diagnostic Suite has a low impact on the system. Unlike SunVTS™, which stresses a system by consuming its resources with many parallel tests (see "SunVTS" on page 2), the Hardware Diagnostic Suite lets the server run other applications while testing proceeds.

4.2.1 When to run Hardware Diagnostic Suite

The best use of the Hardware Diagnostic Suite is to identify a suspected or intermittent problem with a non-critical part on an otherwise functioning system. Examples might include questionable disk drives or memory modules on a server that has ample or redundant disk and memory resources.

In cases like these, the Hardware Diagnostic Suite runs unobtrusively until it identifies the source of the problem. The machine under test can be kept in production mode until and unless it must be shut down for repair. If the faulty part is hot-pluggable or hot-swappable, the entire diagnose-and-repair cycle can be completed with minimal impact to system users.

4.2.2 Requirements for Using Hardware Diagnostic Suite

Since it is a part of Sun Management Center, you can only run Hardware Diagnostic Suite if you have set up your data center to run Sun Management Center. This means you have to dedicate a master server to run the Sun Management Center server software that supports Sun Management Center software's database of platform status information. In addition, you must install and set up Sun Management Center agent software on the systems to be monitored. Finally, you need to install the console portion of Sun Management Center software, which serves as your interface to the Hardware Diagnostic Suite.

Instructions for setting up Sun Management Center, as well as for using the Hardware Diagnostic Suite, can be found in the *Sun Management Center Software User's Guide*.

CHAPTER 5

SunVTS

This chapter contains information about SunVTS.

5.1 SunVTS

SunVTS is a software suite that performs system, subsystem, and configuration testing. You can view and control a SunVTS session over a network. Using a remote system, you can view the progress of a testing session, change testing options, and control all testing features of another machine on the network.

You can run SunVTS software in three different test modes:

- *Connection mode* verifies the presence of device controllers on all subsystems. This typically takes no more than a few minutes and is a good way to "sanity check" system connections.
- *Functional mode* exercises only the specific subsystems you choose. This is the default mode.
- *Auto Config mode* automatically detects all subsystems and exercises them in one of two ways:
  - *Confidence testing* – performs one pass of tests on all subsystems, and then stops. For typical system configurations, this requires one or two hours.
  - *Comprehensive testing* – tests all subsystems repeatedly for up to 24 hours.

Since SunVTS software can run many tests in parallel and consume many system resources, you should take care when using it on a production system. If you are stress-testing a system using SunVTS software's Comprehensive test mode, do not run anything else on that system at the same time.

A server must be running the Solaris OS for SunVTS software to be able to test it. Since SunVTS software packages are optional, they may not be installed on your system. See "To Find Out Whether SunVTS Is Installed" on page 4 for instructions.

5.1.1 SunVTS Software and Security

During SunVTS software installation, you must choose between Basic or Sun Enterprise Authentication Mechanism™ security. Basic security uses a local security file in the SunVTS installation directory to limit the users, groups, and hosts permitted to use SunVTS software. Sun Enterprise Authentication Mechanism security is based on the standard network authentication protocol Kerberos and provides secure user authentication, data integrity and privacy for transactions over networks.

If your site uses Sun Enterprise Authentication Mechanism security, you must have Sun Enterprise Authentication Mechanism client and server software installed on your network and configured properly in both Solaris and SunVTS software. If your

site does not use Sun Enterprise Authentication Mechanism security, do not choose the Sun Enterprise Authentication Mechanism option during SunVTS software installation.

If you enable the wrong security scheme during installation, or if you improperly configure the security scheme you choose, you may find yourself unable to run SunVTS tests. For more information, see the *SunVTS User's Guide* and the instructions accompanying the Sun Enterprise Authentication Mechanism software.

5.1.2 Using SunVTS

SunVTS, the Sun Validation and Test Suite, is an online diagnostics tool that you can use to verify the configuration and functionality of hardware controllers, devices, and platforms. It runs in the Solaris OS and presents the following interfaces:

- command-line interface
- serial (tty) interface

SunVTS software lets you view and control testing sessions on a remotely connected server. The following is a list of some of the tests that are available:

TABLE 5-1 SunVTS Tests

SunVTS Test	Description
`cputest`	Tests the CPU.
`disktest`	Tests the local disk drives.
`dvdtest`	Tests the DVD-ROM drive.
`fputest`	Tests the floating-point unit.
`nettest`	Tests the Ethernet hardware on the system board and the networking hardware on any optional PCI cards.
`netlbtest`	Performs a loopback test to check that the Ethernet adapter can send and receive packets.
`pmem`	Tests the physical memory (read only).
`sutest`	Tests the server's on-board serial ports.
`vmem`	Tests the virtual memory (a combination of the swap partition and the physical memory).

TABLE 5-1 SunVTS Tests

SunVTS Test	Description
`env6test`	Tests temperature sensors, power supply status, fan speeds, and keyswitch position. Test LEDs by toggling them on and off.
`ssptest`	Tests functionality of ALOM hardware. Test onboard Ethernet, flash ram, SEEPROM, TOD, I^2C connections from ALOM to the host system, and serial ports.
`i2c2test`	Verifies all available I^2C devices and the system bus connections. Performs data checking for SCC and FRU SEEPROM devices.

5.1.3 To Find Out Whether SunVTS Is Installed

- **Type the following:**

```
# pkginfo -l SUNWvts
```

- If SunVTS software is loaded, information about the package is displayed.
- If SunVTS software is not loaded, you see the following error message:

```
ERROR: information for "SUNWvts" was not found
```

5.1.4 Installing SunVTS

By default, SunVTS is not installed on the Sun Fire V210 and V240 servers. However, it is available on the software supplement CD supplied with the Solaris OS. For information about downloading it from this CD, refer to the *Sun Hardware Platform Guide* for the release of the Solaris OS you are using.

To find out more about using SunVTS, refer to the SunVTS documentation that corresponds to the Solaris OS release that you are running.

5.1.5 Viewing SunVTS Documentation

SunVTS documents are included on the Software Supplement CD that is part of each Solaris Media Kit release and is also accessible at `http://docs.sun.com`.

For further information, you can also consult the following SunVTS documents:

- *SunVTS User's Guide* describes how to install, configure, and run the SunVTS diagnostic software.
- *SunVTS Quick Reference Card* provides an overview of how to use the SunVTS CDE interface.
- *SunVTS Test Reference Manual* provides details about each individual SunVTS test.

CHAPTER 6

Diagnostics

This chapter describes the diagnostics tools available to the Sun Fire V210 and V240 servers. The chapter contains the sections:

- Section 6.1, “Overview of Diagnostic Tools” on page 6-2
- Section 6.3, “Sun Advanced Lights Out Manager” on page 6-3
- Section 6.2, “Status Indicators” on page 6-3
- Section 6.4, “POST Diagnostics” on page 6-4
- Section 6.5, “OpenBoot Diagnostics” on page 6-8
- Section 6.6, “OpenBoot Commands” on page 6-13
- Section 6.7, “Operating System Diagnostic Tools” on page 6-17
- Section 6.8, “Recent Diagnostic Test Results” on page 6-25
- Section 6.9, “OpenBoot Configuration Variables” on page 6-26
- Section 6.10, “Additional Diagnostic Tests for Specific Devices” on page 6-27
- Section 6.11, “Automatic System Recovery” on page 6-30

6.1 Overview of Diagnostic Tools

Sun provides a range of diagnostic tools for use with the Sun Fire V210 and V240 servers.

These diagnostic tools are summarized in TABLE 6-1.

TABLE 6-1 Summary of Diagnostic Tools

Diagnostic Tool	Type	What It Does	Accessibility and Availability	Remote Capability
LEDs	Hardware	Indicate status of overall system and particular components.	Accessed from system chassis. Available anytime power is available.	Local, but can be viewed via ALOM
ALOM	Hardware and software	Monitors environmental conditions, performs basic fault isolation, and provides remote console access.	Can function on standby power and without operating system.	Designed for remote access
POST	Firmware	Tests core components of system.	Runs automatically on startup. Available when the operating system is not running.	Local, but can be viewed via ALOM
OpenBoot Diagnostics	Firmware	Tests system components, focusing on peripherals and I/O devices.	Runs automatically or interactively. Available when the operating system is not running.	Local, but can be viewed via ALOM
OpenBoot commands	Firmware	Display various kinds of system information.	Available when the operating system is not running.	Local, but can be accessed via ALOM
Solaris commands	Software	Display various kinds of system information.	Requires operating system.	Local, but can be accessed via ALOM

TABLE 6-1 Summary of Diagnostic Tools *(Continued)*

Diagnostic Tool	Type	What It Does	Accessibility and Availability	Remote Capability
SunVTS	Software	Exercises and stresses the system, running tests in parallel.	Requires operating system functionality. Optional package may need to be installed.	View and control over network
Sun Management Center	Software	Monitors both hardware environmental conditions and software performance of multiple machines. Generates alerts for various conditions.	Requires operating system to be running on both monitored and master servers. Requires a dedicated database on the master server.	Designed for remote access
Hardware Diagnostic Suite	Software	Exercises an operational system by running sequential tests. Also reports failed FRUs.	Separately purchased optional add-on to Sun Management Center. Requires operating system and Sun Management Center.	Designed for remote access

6.2 Status Indicators

For a summary of the server's LED status indicators, see Section 1.2.1, "Server Status Indicators" on page 1-6.

6.3 Sun Advanced Lights Out Manager

Both the Sun Fire V210 server and the Sun Fire V240 server are shipped with Sun™ Advanced Lights Out Manager (ALOM) pre-installed.

ALOM enables you to monitor and control your server through a serial connection (using the SERIAL MGT port), or Ethernet connection (using the NET MGT port).

ALOM can send email notification of hardware failures or other server events.

The ALOM circuitry uses standby power from the server. This means that:

- ALOM is active as soon as the server is connected to a power source, and until power is removed by unplugging the power cable.

- ALOM continues to be effective when the server operating system goes off-line.

See TABLE 3-1 for a list of the components monitored by ALOM and the information it provides for each.

Tip – For additional information see the *Advanced Lights Out Management User's Guide* (817-5481).

6.4 POST Diagnostics

POST is a firmware program that is useful in determining if a portion of the system has failed. POST verifies the core functionality of the system, including the CPU module or modules, motherboard, memory, and some on-board I/O devices. POST generates messages that can be useful in determining the nature of a hardware failure. POST can be run even if the system is unable to boot.

POST detects most system faults and is located in the motherboard OpenBoot™ PROM. POST can be set to run by the OpenBoot firmware at power up by setting two environment variables, the `diag-switch?` and the `diag-level` flag, which are stored on the system configuration card.

POST runs automatically when the system power is applied and all of the following conditions apply:

- diag-switch? is set to true (default is false)
- diag-level is set to min, max or menus (default is min)

POST also runs automatically when the system is reset and all of the following conditions apply:

- diag-switch? is set to false (default is false)
- the current type of system reset matches any of the reset types set in post-trigger
- diag-level is set to min, max or menus (default is min)

If `diag-level` is set to `min` or `max`, POST performs an abbreviated or extended test, respectively.

If `diag-level` is set to `menus`, a menu of all the tests executed at power up is displayed.

POST diagnostic and error message reports are displayed on a console.

6.4.1 To Start POST Diagnostics—Method 1

There are two methods for starting POST diagnostics. In the following procedures both methods are described.

1. **Go to the** `ok` **prompt.**
2. **Type:**

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

3. **Type:**

```
ok setenv diag-level value
```

Where *value* is either `min` or `max` depending on the desired range coverage.

4. **Power cycle the server.**

After you have powered the server off, wait 60 seconds before powering the server on. POST executes after the server is powered on.

Note – Status and error messages could be displayed in the console window. If POST detects an error, it displays an error message describing the failure.

---

5. **When you have finished running POST, restore the value of** `diag-switch?` **to** `false` **by typing:**

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

Resetting `diag-switch?` to `false` minimizes boot time.

6.4.2 To Start POST Diagnostics—Method 2

1. **Go to the** `ok` **prompt.**
2. **Type:**

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

3. **Type:**

```
ok setenv diag-level value
```

Where *value* is either `min` or `max` depending on the desired range of coverage.

4. **Type:**

```
ok setenv diag-trigger user-reset
```

5. **Type:**

```
ok setenv diag-trigger all-resets
```

Note – Status and error messages could be displayed in the console window. If POST detects an error, it displays an error message describing the failure.

6.4.3 Controlling POST Diagnostics

You control POST diagnostics, and other aspects of the boot process by setting OpenBoot configuration variables. Changes to OpenBoot configuration variables generally take effect only after the system is restarted. TABLE 6-2 lists the most important and useful of these variables. You can find instructions for changing OpenBoot configuration variables in Section 6.9, "OpenBoot Configuration Variables" on page 6-26.

TABLE 6-2 OpenBoot Configuration Variables

OpenBoot Configuration Variable	Description and Keywords
`auto-boot`	Determines whether the operating system automatically starts up. Default is `true`. • `true` – Operating system automatically starts once firmware tests finish. • `false` – System remains at `ok` prompt until you type `boot`.
`diag-level`	Determines the level or type of diagnostics executed. Default is `min`. • `off` – No testing. • `min` – Only basic tests are run. • `max` – More extensive tests may be run, depending on the device.
`diag-script`	Determines which devices are tested by OpenBoot Diagnostics. Default is `none`. • `none` – No devices are tested. • `normal` – On-board (centerplane-based) devices that have self-tests are tested. • `all` – All devices that have self-tests are tested.
`diag-switch?`	Toggles the system in and out of diagnostic mode. Default is `false`. • `true` – Diagnostic mode: POST diagnostics and OpenBoot Diagnostics tests may run. • `false` – Default mode: Do not run POST or OpenBoot Diagnostics tests.
`diag-trigger`	Specifies the class of reset event that causes Power-On Self-Test and OpenBoot Diagnostics to run. These variables can accept single keywords as well as combinations of the first three keywords separated by spaces. For details, see "To View and Set OpenBoot Configuration Variables" on page 26. • `error-reset` – A reset caused by certain non-recoverable hardware error conditions. In general, an error reset occurs when a hardware problem corrupts system data. Examples include CPU and system watchdog resets, fatal errors, and certain CPU reset events (default). • `power-on-reset` – A reset caused by pressing the Power button (default). • `user-reset` – A reset initiated by the user or the operating system. • `all-resets` – Any kind of system reset. • `none` – No Power-On Self-Tests or OpenBoot Diagnostics tests run.
`input-device`	Selects where console input is taken from. Default is `TTYA`. • `TTYA` – From built-in SERIAL MGT port. • `TTYB` – From built-in general purpose serial port (10101) • `keyboard` – From attached keyboard that is part of a graphics terminal.
`output-device`	Selects where diagnostic and other console output is displayed. Default is `TTYA`. • `TTYA` – To built-in SERIAL MGT port. • `TTYB` – To built-in general purpose serial port (10101) • `screen` – To attached screen that is part of a graphics terminal.[1]

1 – POST messages cannot be displayed on a graphics terminal. They are sent to `TTYA` even when `output-device` is set to `screen`.

Note – These variables affect OpenBoot Diagnostics tests as well as POST diagnostics.

Once POST diagnostics have finished running, POST reports back to the OpenBoot firmware the status of each test it has run. Control then reverts back to the OpenBoot firmware code.

If POST diagnostics do not uncover a fault, and your server still does not start up, run OpenBoot Diagnostics tests.

6.5 OpenBoot Diagnostics

Like POST diagnostics, OpenBoot Diagnostics code is firmware-based and resides in the OpenBoot PROM.

6.5.1 To Start OpenBoot Diagnostics

1. **Type:**

```
ok setenv diag-switch? true
ok setenv diag-level max
ok setenv auto-boot? false
ok reset-all
```

2. **Type:**

```
ok obdiag
```

This command displays the OpenBoot Diagnostics menu. See TABLE 6-3.

TABLE 6-3 Sample `obdiag menu`

obdiag		
1 flashprom@2,0 4 network@2 7 scsi@2 10 serial@0,3f8	2 i2c@0,320 5 network@2,1 8 scsi@2,1 11 usb@a	3 ide@d 6 rtc@0,70 9 serial@0,2e8 12 usb@b
Commands: test test-all except help what setenv set-default exit		
diag-passes=1 diag-level=max test-args=subtests, verbose		

Note – If you have a PCI card installed in the server, then additional tests are displayed on the `OBDiag menu`.

---

3. **Type:**

```
obdiag> test n
```

Where *n* represents the number corresponding to the test you want to run.

A summary of the tests is available. At the `obdiag>` prompt, type:

```
obdiag> help
```

6.5.2 Controlling OpenBoot Diagnostics Tests

Most of the OpenBoot configuration variables you use to control POST (see TABLE 6-2 on page 7) also affects OpenBoot Diagnostics tests.

- Use the `diag-level` variable to control the OpenBoot Diagnostics testing level.
- Use `test-args` to customize how the tests run.

  By default, `test-args` is set to contain an empty string. You can modify `test-args` using one or more of the reserved keywords shown in TABLE 6-4.

TABLE 6-4 Keywords for the `test-args` OpenBoot Configuration Variable

Keyword	What It Does
`bist`	Invokes built-in self-test (BIST) on external and peripheral devices.
`debug`	Displays all debug messages.
`iopath`	Verifies bus/interconnect integrity.
`loopback`	Exercises external loopback path for the device.
`media`	Verifies external and peripheral device media accessibility.
`restore`	Attempts to restore original state of the device if the previous execution of the test failed.
`silent`	Displays only errors rather than the status of each test.
`subtests`	Displays main test and each subtest that is called.
`verbose`	Displays detailed messages of status of all tests.
`callers=`*n*	Displays backtrace of *n* callers when an error occurs. `callers=0` - displays backtrace of all callers before the error. Default is `callers=1`.
`errors=`*n*	Continues executing the test until *n* errors are encountered. `errors=0` - displays all error reports without terminating testing. Default is `errors=1`.

If you want to customize the OpenBoot Diagnostics testing, you can set `test-args` to a comma-separated list of keywords, as in this example:

```
ok setenv test-args debug,loopback,media
```

6.5.2.1 `test` and `test-all` Commands

You can also run OpenBoot Diagnostics tests directly from the `ok` prompt. To do this, type the `test` command, followed by the full hardware path of the device (or set of devices) to be tested. For example:

```
ok test /pci@x,y/SUNW,qlc@2
```

Knowing how to construct an appropriate hardware device path requires precise knowledge of the hardware architecture of the Sun Fire V210 and V240 servers.

Tip – Use the `show-devs` command to list the hardware device paths.

To customize an individual test, you can use `test-args` as follows:

```
ok test /usb@1,3:test-args={verbose,debug}
```

This affects only the current test without changing the value of the `test-args` OpenBoot configuration variable.

You can test all the devices in the device tree with the `test-all` command:

```
ok test-all
```

If you specify a path argument to `test-all`, then only the specified device and its children are tested. The following example shows the command to test the USB bus and all devices with self-tests that are connected to the USB bus:

```
ok test-all /pci@9,700000/usb@1,3
```

6.5.2.2 What OpenBoot Diagnostics Error Messages Tell You

OpenBoot Diagnostics error results are reported in a tabular format that contains a short summary of the problem, the hardware device affected, the subtest that failed, and other diagnostic information. CODE EXAMPLE 6-1 displays a sample OpenBoot Diagnostics error message.

CODE EXAMPLE 6-1 OpenBood Diagnostics Error Message

```
Testing /pci@1e,600000/isa@7/flashprom@2,0

    ERROR   : There is no POST in this FLASHPROM or POST header is
unrecognized
    DEVICE  : /pci@1e,600000/isa@7/flashprom@2,0
    SUBTEST : selftest:crc-subtest
    MACHINE : Sun Fire V210
    SERIAL# : 51347798
    DATE    : 03/05/2003 15:17:31  GMT
    CONTR0LS: diag-level=max test-args=errors=1

Error: /pci@1e,600000/isa@7/flashprom@2,0 selftest failed, return code = 1
Selftest at /pci@1e,600000/isa@7/flashprom@2,0 (errors=1) .............
failed
Pass:1 (of 1) Errors:1 (of 1) Tests Failed:1 Elapsed Time: 0:0:0:1
```

To change the system defaults and the diagnostics settings after initial boot, refer to the *OpenBoot PROM Enhancements for Diagnostic Operation* (817-6957). You can view or print this document by going to:
http://www.sun.com/documentation

6.6 OpenBoot Commands

OpenBoot commands are commands you type from the `ok` prompt. OpenBoot commands which can provide useful diagnostic information are:

- `probe-scsi`
- `probe-ide`
- `show-devs`

6.6.1 `probe-scsi` Command

The `probe-scsi` command is used to diagnose problems with SCSI devices.

Caution – If you used the `halt` command or the Stop-A key sequence to reach the `ok` prompt, then issuing the `probe-scsi` command can hang the system.

The `probe-scsi` command communicates with all SCSI devices connected to on-board SCSI controllers.

For any SCSI device that is connected and active, the `probe-scsi` command displays its loop ID, host adapter, logical unit number, unique World Wide Name (WWN), and a device description that includes type and manufacturer.

The following is sample output from the `probe-scsi` command.

CODE EXAMPLE 6-2 Sample probe-scsi Command Output

```
{1} ok probe-scsi
Target 0
  Unit 0   Disk     SEAGATE ST336605LSUN36G 0238
Target 1
  Unit 0   Disk     SEAGATE ST336605LSUN36G 0238
Target 2
  Unit 0   Disk     SEAGATE ST336605LSUN36G 0238
Target 3
  Unit 0   Disk     SEAGATE ST336605LSUN36G 0238
```

6.6.2 probe-ide Command

The probe-ide command communicates with all Integrated Drive Electronics (IDE) devices connected to the IDE bus. This is the internal system bus for media devices such as the DVD drive.

Caution – If you used the halt command or the Stop-A key sequence to reach the ok prompt, then issuing the probe-ide command can hang the system.

The following is sample output from the probe-ide command.

CODE EXAMPLE 6-3 sample probe-ide Command Output

```
{1} ok probe-ide
  Device 0  ( Primary Master )
        Removable ATAPI Model: DV-28E-B

  Device 1  ( Primary Slave )
         Not Present

  Device 2  ( Secondary Master )
         Not Present

  Device 3  ( Secondary Slave )
         Not Present
```

6.6.3 show-devs Command

The show-devs command lists the hardware device paths for each device in the firmware device tree. The following code example shows sample output from the show-devs command.

CODE EXAMPLE 6-4 show-devs Command Output

```
ok show devs
/pci@1d, 700000
/pci@1c,600000
/pci@1e,600000
/pci@1f,700000
/memory-controller@1,0
/SUNW,UltraSPARC-IIIi@1,0
/memory-controller@0,0
```

CODE EXAMPLE 6-4 `show-devs` Command Output *(Continued)*

```
/SUNW,UltraSPARC-IIIi@0,0
/virtual-memory
/memory@m0,0
/aliases
/options
/openprom
/chosen
/packages
/pci@1d,700000/network@2,1
/pci@1d,700000/network@2
/pci@1c,600000/scsi@2,1
/pci@1c,600000/scsi@2
/pci@1c,600000/scsi@2,1/tape
/pci@1c,600000/scsi@2,1/disk
/pci@1c,600000/scsi@2/tape
/pci@1c,600000/scsi@2/disk
/pci@1e,600000/ide@d
/pci@1e,600000/usb@a
/pci@1e,600000/pmu@6
/pci@1e,600000/isa@7
/pci@1e,600000/ide@d/cdrom
/pci@1e,600000/ide@d/disk
/pci@1e,600000/pmu@6/gpio@80000000,8a
/pci@1e,600000/pmu@6/i2c@0,0
/pci@1e,600000/isa@7/rmc-comm@0,3e8
/pci@1e,600000/isa@7/serial@0,2e8
/pci@1e,600000/isa@7/serial@0,3f8
/pci@1e,600000/isa@7/power@0,800
/pci@1e,600000/isa@7/i2c@0,320
/pci@1e,600000/isa@7/rtc@0,70
/pci@1e,600000/isa@7/flashprom@2,0
/pci@1e,600000/isa@7/i2c@0,320/gpio@0,70
/pci@1e,600000/isa@7/i2c@0,320/gpio@0,88
/pci@1e,600000/isa@7/i2c@0,320/gpio@0,68
/pci@1e,600000/isa@7/i2c@0,320/gpio@0,4a
/pci@1e,600000/isa@7/i2c@0,320/gpio@0,46
/pci@1e,600000/isa@7/i2c@0,320/gpio@0,44
/pci@1e,600000/isa@7/i2c@0,320/idprom@0,50
/pci@1e,600000/isa@7/i2c@0,320/nvram@0,50
/pci@1e,600000/isa@7/i2c@0,320/rscrtc@0,d0
/pci@1e,600000/isa@7/i2c@0,320/dimm-spd@0,c8
/pci@1e,600000/isa@7/i2c@0,320/dimm-spd@0,c6
/pci@1e,600000/isa@7/i2c@0,320/dimm-spd@0,b8
/pci@1e,600000/isa@7/i2c@0,320/dimm-spd@0,b6
/pci@1e,600000/isa@7/i2c@0,320/power-supply-fru-prom@0,a4
/pci@1e,600000/isa@7/i2c@0,320/power-supply-fru-prom@0,b0
/pci@1e,600000/isa@7/i2c@0,320/chassis-fru-prom@0,a8
```

CODE EXAMPLE 6-4 `show-devs` Command Output *(Continued)*

```
/pci@1e,600000/isa@7/i2c@0,320/motherboard-fru-prom@0,a2
/pci@1e,600000/isa@7/i2c@0,320/12c-bridge@0,18
/pci@1e,600000/isa@7/i2c@0,320/12c-bridge@0,16
/pci@1f,700000/network@2,1
/pci@1f,700000/network@2
/openprom/client-services
/packages/obdiag-menu
/packages/obdiag-lib
/packages/SUNW,asr
/packages/SUNW,fru-device
/packages/SUNW,12c-ram-device
/packages/obp-tftp
/packages/kbd-translator
/packages/dropins
/packages/terminal-emulator
/packages/disk-label
/packages/deblocker
/packages/SUNW,bultin-drivers
{1} ok
```

6.6.4 To Run OpenBoot Commands

Caution – If you used the `halt` command or the Stop-A key sequence to reach the `ok` prompt, then issuing the `probe-scsi` command can hang the system.

1. **Halt the system to reach the `ok` prompt.**

   How you do this depends on the system's condition. If possible, you should warn users before you shut the system down.

2. **Type the appropriate command at the console prompt.**

6.7 Operating System Diagnostic Tools

If a system passes OpenBoot Diagnostics tests, it normally attempts to boot its multiuser operating system. For most Sun systems, this means the Solaris OS. Once the server is running in multiuser mode, you have access to the software-based diagnostic tools, SunVTS, and Sun Management Center. These tools enable you to monitor the server, exercise it, and isolate faults.

Note – If you set the `auto-boot` OpenBoot configuration variable to `false`, the operating system does *not* boot following completion of the firmware-based tests.

In addition to the tools mentioned, you can refer to error and system message log files, and Solaris system information commands.

6.7.1 Error and System Message Log Files

Error and other system messages are saved in the `/var/adm/messages` file. Messages are logged to this file from many sources, including the operating system, the environmental control subsystem, and various software applications.

6.7.2 Solaris System Information Commands

The following Solaris commands display data that you can use when assessing the condition of a Sun Fire V210 and V240 Servers server:

- `prtconf`
- `prtdiag`
- `prtfru`
- `psrinfo`
- `showrev`

This section describes the information these commands give you. More information about using each command is contained in the appropriate man page.

6.7.2.1 prtconf command

The prtconf command displays the Solaris device tree. This tree includes all the devices probed by OpenBoot firmware, as well as additional devices, like individual disks, that only the operating system software can detect. The output of prtconf also includes the total amount of system memory. CODE EXAMPLE 6-5 shows an excerpt of prtconf output.

CODE EXAMPLE 6-5 prtconf Command Output

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

SUNW,Sun-Fire-V240
    packages (driver not attached)
        SUNW,builtin-drivers (driver not attached)
        deblocker (driver not attached)
        disk-label (driver not attached)
        terminal-emulator (driver not attached)
        dropins (driver not attached)
        kbd-translator (driver not attached)
        obp-tftp (driver not attached)
        SUNW,i2c-ram-device (driver not attached)
        SUNW,fru-device (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
    aliases (driver not attached)
    memory (driver not attached)
    virtual-memory (driver not attached)
    SUNW,UltraSPARC-IIIi (driver not attached)
    memory-controller, instance #0
    SUNW,UltraSPARC-IIIi (driver not attached)
    memory-controller, instance #1 ...
```

The prtconf command's -p option produces output similar to the OpenBoot show-devs command. This output lists only those devices compiled by the system firmware.

6.7.2.2 `prtdiag` Command

The `prtdiag` command displays a table of diagnostic information that summarizes the status of system components. The display format used by the `prtdiag` command can vary depending on what version of the Solaris OS is running on your system. Following is an excerpt of the output produced by `prtdiag` on a healthy Sun Fire V240 server running Solaris OS 8, PSR1.

CODE EXAMPLE 6-6 `prtdiag` Command Output

```
# prtdiag
System Configuration: Sun Microsystems  sun4u Sun Fire V240
System clock frequency: 160 MHZ
Memory size: 1GB

==================================== CPUs ====================================
                     E$          CPU     CPU       Temperature         Fan
       CPU  Freq     Size        Impl.   Mask     Die    Ambient   Speed   Unit
       ---  -------- ----------  ------  ----  --------  --------  -----   ----
     MB/P0   960 MHz  1MB         US-IIIi   2.0     -     -
     MB/P1   960 MHz  1MB         US-IIIi   2.0     -     -

================================ IO Devices ================================
     Bus   Freq
Brd  Type  MHz   Slot        Name                            Model
---  ----  ----  ----------  ------------------------------  --------------------
 0   pci    66            2  network-SUNW,bge (network)
 0   pci    66            2  scsi-pci1000,21.1 (scsi-2)
 0   pci    66            2  scsi-pci1000,21.1 (scsi-2)
 0   pci    66            2  network-SUNW,bge (network)
 0   pci    33            7  isa/serial-su16550 (serial)
 0   pci    33            7  isa/serial-su16550 (serial)
 0   pci    33            7  isa/rmc-comm-rmc_comm (seria+
 0   pci    33           13  ide-pci10b9,5229.c4 (ide)

============================ Memory Configuration ============================
Segment Table:
------------------------------------------------------------------------
Base Address       Size       Interleave Factor  Contains
------------------------------------------------------------------------
0x0                512MB              1          GroupID 0
0x1000000000       512MB              1          GroupID 0

Memory Module Groups:
------------------------------------------------
ControllerID   GroupID  Labels
------------------------------------------------
0              0        MB/P0/B0/D0,MB/P0/B0/D1

Memory Module Groups:
------------------------------------------------
ControllerID   GroupID  Labels
------------------------------------------------
1              0        MB/P1/B0/D0,MB/P1/B0/D1
```

In addition to the information in CODE EXAMPLE 6-6, `prtdiag` with the verbose option (`-v`) reports on front panel status, disk status, fan status, power supplies, hardware revisions, and system temperatures.

CODE EXAMPLE 6-7 prtdiag Verbose Output

```
System Temperatures (Celsius):
------------------------------
Device            Temperature                       Status
---------------------------------------
CPU0              59              OK
CPU2              64              OK
DBP0              22              OK
```

In the event of an overtemperature condition, `prtdiag` reports an error in the Status column for that device.

CODE EXAMPLE 6-8 prtdiag Overtemperature Indication Output

```
System Temperatures (Celsius):
------------------------------
Device            Temperature                       Status
---------------------------------------
CPU0              62                             OK
CPU1              102                         ERROR
```

Similarly, if there is a failure of a particular component, `prtdiag` reports a fault in the appropriate Status column.

CODE EXAMPLE 6-9 prtdiag Fault Indication Output

```
Fan Status:
-----------

Bank              RPM    Status
----              -----  ------
CPU0              4166   [NO_FAULT]
CPU1              0000   [FAULT]
```

6.7.2.3 `prtfru` Command

The Sun Fire V210 and V240 servers maintain a hierarchical list of all field-replacable units (FRUs) in the system, as well as specific information about various FRUs.

The `prtfru` command can display this hierarchical list, as well as data contained in the serial electrically-erasable programmable read-only memory (SEEPROM) devices located on many FRUs.

CODE EXAMPLE 6-10 shows an excerpt of a hierarchical list of FRUs generated by the `prtfru` command with the `-l` option.

CODE EXAMPLE 6-10 `prtfru -l` Command Output

```
# prtfru -l
/frutree
/frutree/chassis (fru)
/frutree/chassis/MB?Label=MB
/frutree/chassis/MB?Label=MB/system-board (container)
/frutree/chassis/MB?Label=MB/system-board/SC?Label=SC
/frutree/chassis/MB?Label=MB/system-board/SC?Label=SC/sc (fru)
/frutree/chassis/MB?Label=MB/system-board/BAT?Label=BAT
/frutree/chassis/MB?Label=MB/system-board/BAT?Label=BAT/battery
(fru)
/frutree/chassis/MB?Label=MB/system-board/P0?Label=P0
/frutree/chassis/MB?Label=MB/system-board/P0?Label=P0/cpu (fru)
/frutree/chassis/MB?Label=MB/system-board/P0?Label=
P0/cpu/F0?Label=F0
```

CODE EXAMPLE 6-11 shows an excerpt of SEEPROM data generated by the `prtfru` command with the `-c` option.

CODE EXAMPLE 6-11 `prtfru -c` Command Output

```
# prtfru -c
/frutree/chassis/MB?Label=MB/system-board (container)
   SEGMENT: SD
      /SpecPartNo: 885-0092-02
      /ManR
     /ManR/UNIX_Timestamp32: Wednesday April 10 11:34:49 BST 2002
      /ManR/Fru_Description: FRUID,INSTR,M'BD,0CPU,0MB,ENXU
      /ManR/Manufacture_Loc: HsinChu, Taiwan
      /ManR/Sun_Part_No: 3753107
      /ManR/Sun_Serial_No: abcdef
      /ManR/Vendor_Name: Mitac International
      /ManR/Initial_HW_Dash_Level: 02
      /ManR/Initial_HW_Rev_Level: 01
```

Data displayed by the `prtfru` command varies depending on the type of FRU. In general, it includes:

- FRU description
- Manufacturer name and location
- Part number and serial number
- Hardware revision levels

6.7.2.4 `psrinfo` Command

The `psrinfo` command displays the date and time each CPU came online. With the verbose (`-v`) option, the command displays additional information about the CPUs, including their clock speed. The following is sample output from the `psrinfo` command with the `-v` option.

CODE EXAMPLE 6-12 `psrinfo -v` Command Output

```
# psrinfo -v
Status of processor 0 as of: 09/20/02 11:35:49
  Processor has been on-line since 09/20/02 11:30:53.
  The sparcv9 processor operates at 960 MHz,
        and has a sparcv9 floating point processor.
Status of processor 1 as of: 09/20/02 11:35:49
  Processor has been on-line since 09/20/02 11:30:52.
  The sparcv9 processor operates at 960 MHz,
        and has a sparcv9 floating point processor.
```

6.7.2.5 `showrev` Command

The `showrev` command displays revision information for the current hardware and software. CODE EXAMPLE 6-13 shows sample output of the `showrev` command.

CODE EXAMPLE 6-13 `showrev` Command Output

```
# showrev
Hostname: griffith
Hostid: 830f8192
Release: 5.8
Kernel architecture: sun4u
Application architecture: sparc
Hardware provider: Sun_Microsystems
Domain:
Kernel version: SunOS 5.8 Generic 108528-16 August 2002
```

When used with the `-p` option, this command displays installed patches. CODE EXAMPLE 6-14 shows a partial sample output from the `showrev` command with the `-p` option.

CODE EXAMPLE 6-14 `showrev -p` Command Output

```
# showrev -p
Patch: 109729-01 Obsoletes:  Requires:  Incompatibles:  Packages: SUNWcsu
Patch: 109783-01 Obsoletes:  Requires:  Incompatibles:  Packages: SUNWcsu
Patch: 109807-01 Obsoletes:  Requires:  Incompatibles:  Packages: SUNWcsu
Patch: 109809-01 Obsoletes:  Requires:  Incompatibles:  Packages: SUNWcsu
Patch: 110905-01 Obsoletes:  Requires:  Incompatibles:  Packages: SUNWcsu
Patch: 110910-01 Obsoletes:  Requires:  Incompatibles:  Packages: SUNWcsu
Patch: 110914-01 Obsoletes:  Requires:  Incompatibles:  Packages: SUNWcsu
Patch: 108964-04 Obsoletes:  Requires:  Incompatibles:  Packages: SUNWcsr
```

6.7.3 To Run Solaris System Information Commands

1. **Decide on the of system information you want to display.**

   For more information, see "Solaris System Information Commands" on page 17.

2. **Type the appropriate command at a console prompt.**

   See TABLE 6-5 for a summary of the commands.

TABLE 6-5 Using Solaris Information Display Commands

Command	What It Displays	What to Type	Notes
`prtconf`	System configuration information	`/usr/sbin/prtconf`	—
`prtdiag`	Diagnostic and configuration information	`/usr/platform/sun4u/sbin/prtdiag`	Use the `-v` option for additional detail.
`prtfru`	FRU hierarchy and SEEPROM memory contents	`/usr/sbin/prtfru`	Use the `-l` option to display hierarchy. Use the `-c` option to display SEEPROM data.
`psrinfo`	Date and time each CPU came online; processor clock speed	`/usr/sbin/psrinfo`	Use the `-v` option to obtain clock speed and other data.
`showrev`	Hardware and software revision information	`/usr/bin/showrev`	Use the `-p` option to show software patches.

6.8 Recent Diagnostic Test Results

Summaries of the results from the most recent power-on self-test (POST) and OpenBoot Diagnostics tests are saved across power cycles.

6.8.1 To View Recent Test Results

1. **Go to the `ok` prompt.**
2. **Type the following:**

   To see a summary of the most recent POST results.

```
ok show-post-results
```

6.9 OpenBoot Configuration Variables

Switches and diagnostic configuration variables stored in the IDPROM determine how and when power-on self-test (POST) diagnostics and OpenBoot Diagnostics tests are performed. This section explains how to access and modify OpenBoot configuration variables. For a list of important OpenBoot configuration variables, see TABLE 6-2.

Changes to OpenBoot configuration variables usually take effect upon the next reboot.

6.9.1 To View and Set OpenBoot Configuration Variables

6.9.1.1 To View OpenBoot Configuration Variables

1. **Halt the server to reach the `ok` prompt.**
2. **To display the current values of all OpenBoot configuration variables, use the `printenv` command.**

   The following example shows a short excerpt of this command's output.

```
ok printenv
Variable Name         Value                          Default Value

diag-level            min                             min
diag-switch?          false                           false
```

6.9.1.2 To Set OpenBoot Configuration Variables

1. **Halt the server to reach the `ok` prompt.**
2. **To set or change the value of an OpenBoot configuration variable, use the `setenv` command:**

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

To set OpenBoot configuration variables that accept multiple keywords, separate keywords with a space.

Note – Keywords for the OpenBoot configuration variable `test-args` must be separated by commas.

6.10 Additional Diagnostic Tests for Specific Devices

6.10.1 Using the `probe-scsi` Command to Confirm That Hard Drives are Active

The `probe-scsi` command transmits an inquiry to SCSI devices connected to the system's internal SCSI interface. If a SCSI device is connected and active, the command displays the unit number, device type, and manufacturer name for that device.

CODE EXAMPLE 6-15 `probe-scsi` Output Message

```
ok probe-scsi
Target 0
 Unit 0   Disk     SEAGATE ST336605LSUN36G 4207
Target 1
 Unit 0   Disk     SEAGATE ST336605LSUN36G 0136
```

The `probe-scsi-all` command transmits an inquiry to all SCSI devices connected to both the system's internal and its external SCSI interfaces. CODE EXAMPLE 6-16 shows sample output from a server with no externally connected SCSI devices but containing two 36 GB hard drives, both of them active.

CODE EXAMPLE 6-16 `probe-scsi-all` Output Message

```
ok probe-scsi-all
/pci@1f,0/pci@1/scsi@8,1

/pci@1f,0/pci@1/scsi@8
Target 0
 Unit 0   Disk     SEAGATE ST336605LSUN36G 4207
Target 1
 Unit 0   Disk     SEAGATE ST336605LSUN36G 0136
```

6.10.2 Using `probe-ide` Command to Confirm That the DVD or CD-ROM Drive is Connected

The `probe-ide` command transmits an inquiry command to internal and external IDE devices connected to the system's on-board IDE interface. The following sample output reports a DVD drive installed (as Device 0) and active in a server.

CODE EXAMPLE 6-17 `probe-ide` Output Message

```
ok probe-ide
 Device 0  ( Primary Master )
       Removable ATAPI Model: DV-28E-B

 Device 1  ( Primary Slave )
       Not Present

 Device 2  ( Secondary Master )
       Not Present

 Device 3  ( Secondary Slave )
       Not Present
```

6.10.3 Using `watch-net` and `watch-net-all` Commands to Check the Network Connections

The `watch-net` diagnostics test monitors Ethernet packets on the primary network interface. The `watch-net-all` diagnostics test monitors Ethernet packets on the primary network interface and on any additional network interfaces connected to the system board. Good packets received by the system are indicated by a period (.). Errors such as the framing error and the cyclic redundancy check (CRC) error are indicated with an X and an associated error description.

Start the `watch-net` diagnostic test by typing the `watch-net` command at the `ok` prompt. For the `watch-net-all` diagnostic test, type `watch-net-all` at the `ok` prompt.

CODE EXAMPLE 6-18 `watch-net` Diagnostic Output Message

```
{1} 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.
.............................
```

CODE EXAMPLE 6-19 `watch-net-all` Diagnostic Output Message

```
{1} ok watch-net-all
/pci@1d,700000/network@2,1
Timed out waiting for Autonegotation to complete
Check cable and try again
Link Down

/pci@1f,700000/network@2
100 Mbps FDX Link up
.............................
Looking for Ethernet Packets.
'.' is a Good Packet. 'X' is a Bad Packet.
Type any key to stop.
.............................
{1} ok
```

For additional information about diagnostic tests for the OpenBoot PROM see: *OpenBoot PROM Enhancements for Diagnostic Operation* (817-6957-10).

6.11 Automatic System Recovery

Note – Automatic System Recovery (ASR) is not the same as Automatic Server Restart, which the Sun Fire V210 and V240 servers also support. For additional information about Automatic Server Restart see Section 3.1.3, "Automatic Server Restart" on page 3-4.

Automatic System Recovery (ASR) consists of self-test features and an auto-configuring capability to detect failed hardware components and unconfigure them. By doing this, the server is able to resume operating after certain non-fatal hardware faults or failures have occurred.

If a component is one that is monitored by ASR, and the server is capable of operating without it, the server automatically reboots if that component develops a fault or fails.

ASR monitors memory modules:

- Memory modules

If a fault is detected during the power-on sequence, the faulty component is disabled. If the system remains capable of functioning, the boot sequence continues.

If a fault occurs on a running server, and it is possible for the server to run without the failed component, the server automatically reboots. This prevents a faulty hardware component from keeping the entire system down or causing the system to crash repeatedly.

To support degraded boot capability, OpenBoot firmware uses the 1275 Client interface (via the device tree) to mark a device as either *failed* or *disabled*. This creats an appropriate status property in the device tree node. The Solaris OS does not activate a driver for any subsystem so marked.

As long as a failed component is electrically dormant (not causing random bus errors or signal noise, for example), the system reboots automatically and resumes operation while a service call is made.

Note – ASR is not enabled until you activate it.

6.11.1 Auto-Boot Options

The auto-boot? setting controls whether or not the firmware automatically boots the operating system after each reset. The default setting is true.

The auto-boot-on-error? setting controls whether the system attempts a degraded boot when a subsystem failure is detected. Both the auto-boot? and auto-boot-on-error? settings must be set to true to enable an automatic degraded boot.

- **To set the switches, type:**

```
ok setenv auto-boot? true
ok setenv auto-boot-on-error? true
```

Note – The default setting for auto-boot-on-error? is false. Therefore, the system does not attempt a degraded boot unless you change this setting to true. In addition, the system will not attempt a degraded boot in response to any fatal non-recoverable error, even if degraded booting is enabled. For examples of fatal non-recoverable errors, see "Error Handling Summary" on page 31.

6.11.2 Error Handling Summary

Error handling during the power-on sequence falls into one of the following three cases:

- If no errors are detected by POST or OpenBoot Diagnostics, the system attempts to boot if auto-boot? is true.
- If only non-fatal errors are detected by POST or OpenBoot Diagnostics, the system attempts to boot if auto-boot? is true and auto-boot-on-error? is true.

Note – If POST or OpenBoot Diagnostics detects a non-fatal error associated with the normal boot device, the OpenBoot firmware automatically unconfigures the failed device and tries the next-in-line boot device, as specified by the boot-device configuration variable.

- If a fatal error is detected by POST or OpenBoot Diagnostics, the system does not boot regardless of the settings of auto-boot? or auto-boot-on-error?. Fatal non-recoverable errors include the following:
  - All CPUs failed

- All logical memory banks failed
- Flash RAM cyclical redundancy check (CRC) failure
- Critical field-replaceable unit (FRU) PROM configuration data failure
- Critical application-specific integrated circuit (ASIC) failure

6.11.3 Reset Scenarios

Two OpenBoot configuration variables, `diag-switch?`, and `diag-trigger` control how the system runs firmware diagnostics in response to system reset events.

The standard system reset protocol bypasses POST and OpenBoot Diagnostics unless `diag-switch?` is set to `true` or `diag-trigger` is set to a `reset` event. The default setting for this variable is `false`. Because ASR relies on firmware diagnostics to detect faulty devices, `diag-switch?` must be set to `true` for ASR to run. For instructions, see Section 6.11.4, "To Enable ASR" on page 6-32.

To control which reset events, if any, automatically initiate firmware diagnostics, use `diag-trigger`. For detailed explanations of these variables and their uses, see Section 6.4.3, "Controlling POST Diagnostics" on page 6-6.

6.11.4 To Enable ASR

1. **At the system `ok` prompt, type:**

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

2. **Set the `diag-trigger` variable to `power-on-reset`, `error-reset`, or `user-reset`. For example, type:**

```
ok setenv diag-trigger user-reset
```

3. **Type:**

```
ok setenv auto-boot? true
ok setenv auto-boot-on-error? true
```

4. **Type:**

```
ok reset-all
```

The system permanently stores the parameter changes and boots automatically if the OpenBoot variable `auto-boot?` is set to `true` (its default value).

Note – To store parameter changes, you can also power-cycle the system using the front panel Power switch.

6.11.5 To Disable ASR

1. **At the system `ok` prompt, type:**

```
ok setenv diag-switch? false
ok setenv diag-trigger none
```

2. **Type:**

```
ok reset-all
```

The system permanently stores the parameter change.

Note – To store parameter changes, you can also power-cycle the system using the front panel Power switch.

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