



Sun Fire V250 Server Administration Guide

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Preface

The *Sun Fire V250 Server Administration Guide* is intended to be used by system administrators. As well as general descriptive information about the Sun Fire V250 server, it includes detailed instructions on the following topics:

- Server administration
- Problem diagnosis
- Customer replaceable components

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 environment.

Before You Read This Book

Read the *Sun Fire V250 Server Compliance and Safety Manual* before following any of the procedures described in this book.

Using UNIX Commands

For information about using UNIX®, see one or more of the following:

- *Solaris Handbook for Sun Peripherals*
- Other software documentation that you received with your system

Typographic Conventions

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

Shell Prompts

Shell	Prompt
C shell	<i>machine-name%</i>
C shell superuser	<i>machine-name#</i>
Bourne shell and Korn shell	\$
Bourne shell and Korn shell superuser	#
ALOM shell	sc>
OpenBoot PROM shell	ok

Related Documentation

Application	Title	Part Number
Latest information	<i>Sun Fire V250 Server Product Notes</i>	817-1003-xx
Unpacking	<i>Sun Fire V250 Server Quick Start Guide</i>	817-0898-xx
Installation	<i>Sun Fire V250 Server Compliance and Safety Manual</i>	817-1959-xx
	<i>Sun Fire V250 Server Installation Guide</i>	817-0899-xx
Lights-Out Management	<i>ALOM Online Help</i>	817-3175-xx
Latest information	<i>Sun Fire V250 Server Product Notes</i>	817-1003-xx

Read the *Sun Fire V250 Server Compliance and Safety Manual* before performing any of the procedures documented in this manual.

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Introduction

This chapter describes the Sun Fire V250 server and gives an overview of its main features. It contains the following sections:

- “Overview of the Server” on page 2
- “Door Features” on page 3
- “Back Panel Features” on page 11
- “System Prompts” on page 13

Overview of the Server



FIGURE 1-1 The Sun Fire V250 server

Features

The Sun Fire V250 server has the features listed below.

- UltraSPARC™ IIIi processor(s)
- Four DDR DIMM slots per processor
- One 10/100/1000BASE-T autonegotiating Ethernet port
- One Ultra160 SCSI multimode port
- One RJ-45 serial port for server management

- One 10BASE-T Ethernet port for server management
- One DB-9 general purpose serial port
- Four USB ports
- Six PCI expansion slots
- DVD-ROM drive
- Eight hot swappable SCSI hard disk drives
- System Configuration Card
- Dual redundant power supplies
- Sun™ Advanced Lights-Out Manager

Door Features

The front door of the Sun Fire V250 server is lockable to provide security. Unlock and open the door to gain access to the front-panel features. The door includes two LED indicators, visible when the door is closed, which convey the operating status of the server.

Server Status Indicators

The server has two LED status indicators on the door. A summary of the indicators is given in TABLE 1-1.

TABLE 1-1 Server Status Indicators

Indicator	LED Colour	LED State	Meaning
Activity	Green	On	The server is powered up and running the Solaris operating environment.
		Off	Either power is not present, or Solaris is not running.
Service Required	Yellow	On	The server has detected a problem and requires the attention of service personnel.
		Off	The server has no detected faults.

Front Panel Features

Access to the front panel is made by unlocking and opening the door.

The front panel contains:

- On/Standby button
- System configuration card
- Hard disk drives
- DVD-ROM drive
- Optional tape drive
- Operation mode switch

On/Standby Button

The On/Standby button controls only the *power state* of the server, it does not *isolate* the server from its electrical power source. In other words, it does not turn the server off. The only way to do that is to physically disconnect the server from its power source.

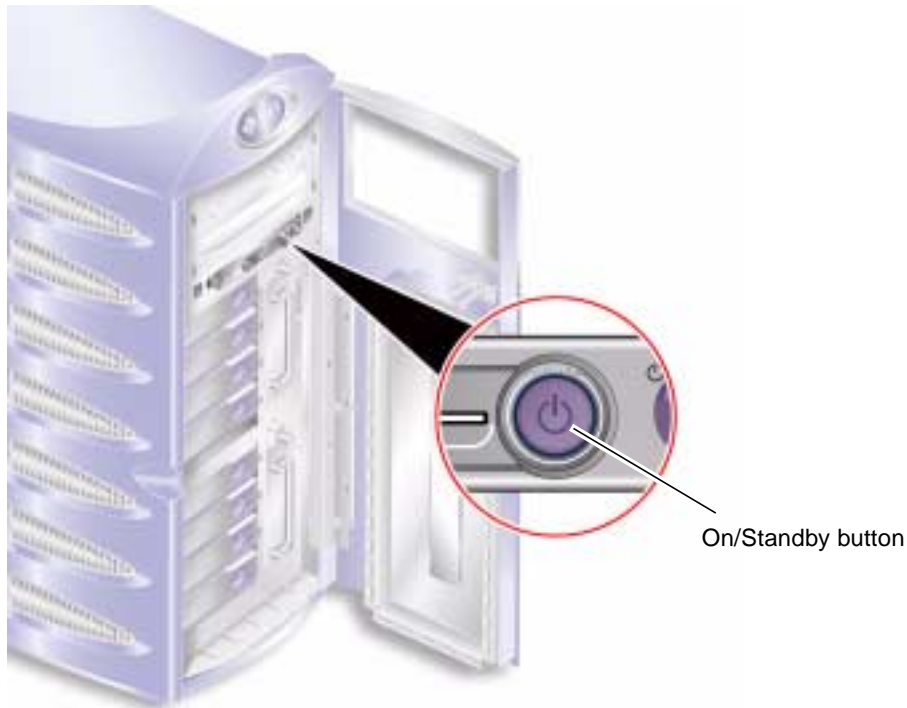


FIGURE 1-2 Location of On/Standby Button

The On/Standby button is a momentary design with two operation modes:

- Press and immediately release

- Press and hold down for more than 4 seconds

The result of these actions is given in TABLE 1-2.

TABLE 1-2 On/Standby Button Actions and Results

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

Controlling Server Power

- For information about connecting the server to a power source and powering on the server, see the *Sun Fire V250 Server Installation Guide*.
- For information about controlling server power using software, see the *ALOM Online Help*.

Power States Explained

The server goes into the Standby power state when it is connected to a power source. And as long as it remains connected to power, it stays in either the Standby or On power state. The only way to remove power from the server is to disconnect the power cable.

Power states are explained in TABLE 1-3.

TABLE 1-3 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(s) are disconnected.

Hard Disk Drives

The Sun Fire V250 server has slots for up to eight hard disk drives. The slots accept Sun 36 GB and 73 GB LVD SCSI hard disk drives conforming to the 1-inch SCA-2 form factor.

Each hard disk drive has two LED indicators associated with it. Indicator states are summarised in TABLE 1-4.

TABLE 1-4 Hard Disk Drive Service Indicators

Indicator	LED Colour	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 about removing and replacing a hard disk drive, see “Removing and Replacing Hard Disk Drives” on page 20.

DVD-ROM Drive

The Sun Fire V250 server contains one ATA DVD-ROM drive.

System Configuration Card

The system configuration card (SCC) is housed in a slot next to the On/Standby button. The card contains unique network identity information, including the MAC address and hostid (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 will not boot.
- If the content of the nvram section is invalid, the system will initialize using the default nvram configuration.
- If the content of the idprom section is invalid, OpenBoot PROM displays a warning message and the system will not auto-boot Solaris. However, you can still boot the system, from the `ok` prompt, using the `boot` command.

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 “Swapping the System Configuration Card Between Servers” on page 19.

TABLE 1-5 OBP Configuration Parameters Stored On The System Configuration Card

Parameter	Default	Description
diag-passes	1	Defines the number of times self-test method(s) 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 ttyb and RTS and DTR
ttyb-ignore-cd	false	If true, operating system ignores carrier-detect on ttyb
ttya-rts-dtr-off	true	
ttya-ignore-cd		If true, operating system ignores carrier-detect on ttya
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 screen
screen-#rows	34	Sets number of rows on 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
asr-policy	normal	
input-device	ttya	Power-on input device
load-base	16384	Address

TABLE 1-5 OBP Configuration Parameters Stored On The System Configuration Card

Parameter	Default	Description
auto-boot?	true	If true, boot automatically after power on or reset
auto-boot-on-error?	false	
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(s) from which to boot if diag-switch? is false
use-nvramrc?	false	If true, execute commands in NVRAMRC during server start-up
nvramrc	none	Command script to execute if use-nvramrc? is true
obdiag-trigger	all-resets	
oem-logo	none	
oem-banner	none	
post-trigger	all-resets	
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) - <i>do not set this directly</i>
security-#badlogins	none	Number of incorrect security password attempts
diag-script	none	
diag-level	max	Defines how diagnostic tests are run (options are off, min, med, max)

TABLE 1-5 OBP Configuration Parameters Stored On The System Configuration Card

Parameter	Default	Description
<code>diag-switch?</code>	<code>false</code>	If true: <ul style="list-style-type: none">• Run in diagnostic mode• After a boot request, boot <code>diag-file</code> from <code>diag-device</code> If false: <ul style="list-style-type: none">• Run in non diagnostic mode• Following a boot request, boot <code>boot-file</code> from <code>boot-device</code>
<code>error-reset-recovery</code>	<code>boot</code>	Command to execute following a system reset generated by an error
<code>pcia-probe-list</code>		Identifies number and order in which pci slots are probed

Operation Mode Switch

The Sun Fire V250 server has an operation mode switch that provides control over the following aspects of the server's operation:

- Power state
- Security level
- Diagnostics level

The operation mode switch has four positions, each of which forces the server into a different mode of behaviour. For a description of each mode, see TABLE 1-6.

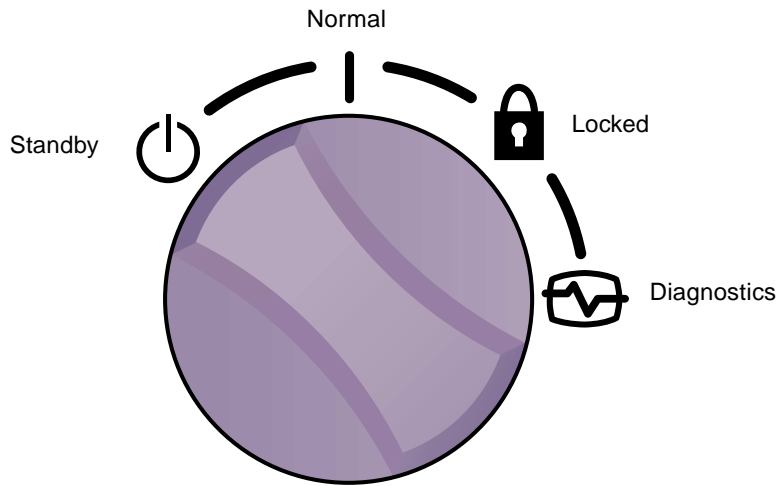





FIGURE 1-3 Operation Mode Switch (shown in Standby Position)

A summary of operation modes is given in TABLE 1-6.

TABLE 1-6 Operation Modes

Operation Mode		Server Behaviour
Normal		Normal operation
Diagnostics		Full POST during system boot
Locked		Disable on/standby button Write-protect ALOM Flash PROM Write-protect OBP/POST Flash PROM Disable suspension to OBP/Kadb
Forced Standby		Force server into Standby mode Disable on/standby button Disable remote power control Write-protect ALOM Flash PROM

Back Panel Features

The server's I/O ports and power inlets are on the back panel. The location of each is shown in FIGURE 1-4.

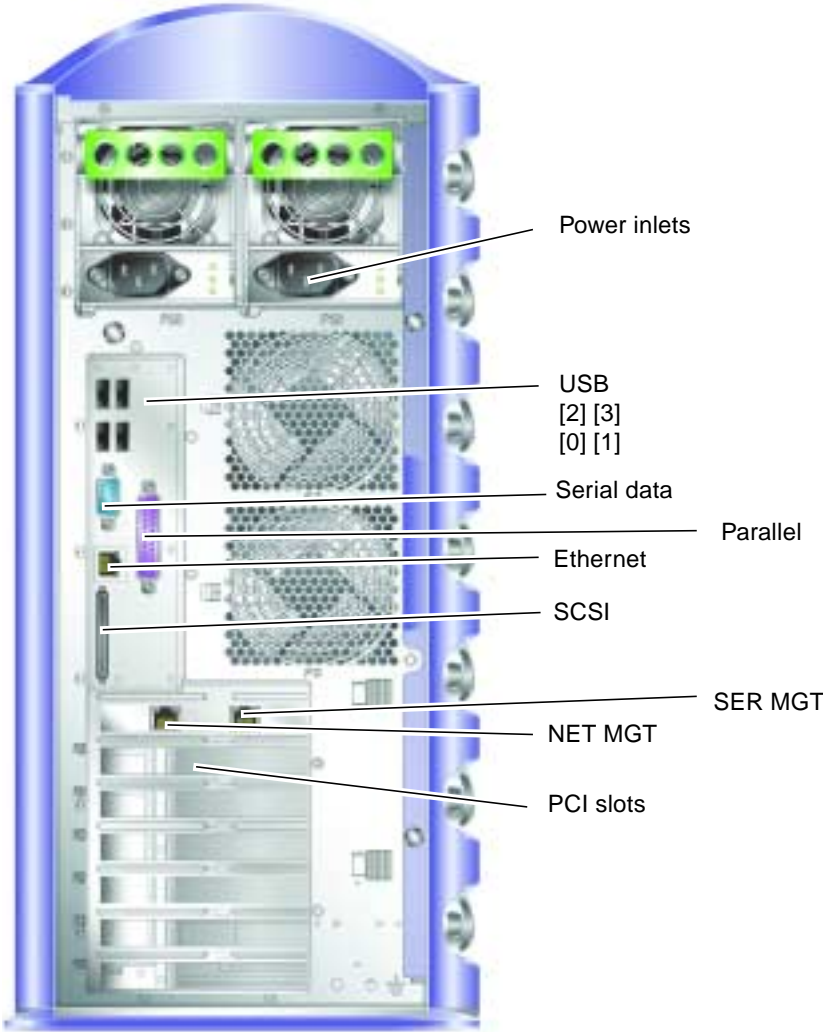


FIGURE 1-4 Location of I/O Ports

Network Connectors

The Sun Fire V250 server has one autonegotiating network port using an RJ-45 connector. The network port has two status indicators, which convey the following:

- Network link
- Network speed

TABLE 1-7 summarises the *network link* indicator.

TABLE 1-7 Network Link Indicators

LED Colour	LED State	Network Link Status
Green	On	Link is established.
	Blinking	Link is transferring data.
	Off	Link is not established.
Orange	On	Activity

Serial Ports

There are two serial ports on the server.

- The RJ-45 connector, labeled SER MGT, is for managing the server using ALOM.
- The DB-9 connector, labeled 10101, is for general purpose serial data transfer.

USB Ports

The server has four USB ports which are USB1.1 compliant. They support device speeds of 1.5 Mbit/s and 12 Mbit/s, and a 5V supply is available at each connector.

External SCSI Port

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

Parallel Port

The parallel port is a female DB-25 connector, conforming to IEEE1284 and SPP, EPP and ECP modes.

Power Supply Unit (PSU)

The Sun Fire V250 server has dual redundant power supply units. Each PSU has three status indicators, summarised in TABLE 1-8.

TABLE 1-8 Power Supply Unit Indicators

LED Colour	LED State	Component Status
Green	On	Power is present and no faults detected.
	Off	Either power is not present, or the PSU has shut down due to an internal protection event.
Amber	On	PSU requires service attention, but is still active if green LED is also on.
	Blinking	PSU not inserted correctly.
	Off	The PSU is operating normally.
Blue	On	OK to remove.
	Off	Do not remove PSU from the server.



Caution – As long as an AC power cord remains connected to the server, potentially dangerous voltages could be present within the server.

System Prompts

The following default server prompts are used by the Sun Fire V250 server:

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

FIGURE 1-5 shows the relationship between the three prompts and how to change from one to the other.

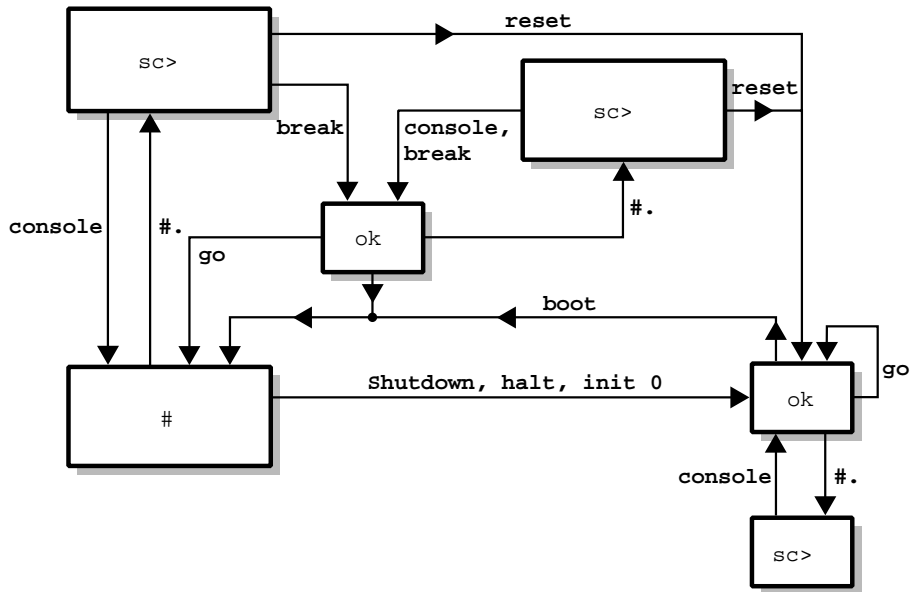


FIGURE 1-5 System Prompt Flow Diagram

Note – For the `reset` and `break` commands, you next need to type `console` to get to the `ok` prompt.

Removing and Replacing Components

This chapter gives parts replacement procedures for components that can be replaced by users. These procedures do not need to be carried out by a service provider.



Caution – Read the section, “Avoiding Electrostatic Discharge” on page 16, and wear a properly grounded antistatic strap, before you carry out any of the procedures in this section.

The chapter contains the following sections:

- “Replaceable Components” on page 16
- “Lifting the Server” on page 16
- “Avoiding Electrostatic Discharge” on page 16
- “Controlling Server Power” on page 17
- “Swapping the System Configuration Card Between Servers” on page 19
- “Removing and Replacing Hard Disk Drives” on page 20
- “Power Supply Unit” on page 26

Replaceable Components

The following components are user-replaceable:

- System configuration card (F370-5155)
- Hard disk drive (F540-5462, 36GB 10,000 RPM or F540-5455, 73GB 10,000 RPM)
- Power supply unit (F300-1588)

Note – Removing and replacing all other components requires the attention of a service provider.

Lifting the Server

Close the door before you lift the server. The server should be lifted by two people, using the top part of the bezel at the front and the PSU handles at the back as gripping points.

Avoiding Electrostatic Discharge

Whenever you carry out service procedures on the server, follow these instructions to prevent static electricity damaging the server's internal components.

You need an antistatic wrist strap, an antistatic mat, or other suitable antistatic surface.

▼ To Avoid Electrostatic Discharge While Working on the Front of the Server

1. Turn system power off.

See “Controlling Server Power” on page 17.

2. Attach one end of the antistatic strap to the grounding point on the server's front panel behind the door, and the other to your wrist.

The server is earthed through the power cable.

See FIGURE 2-1.

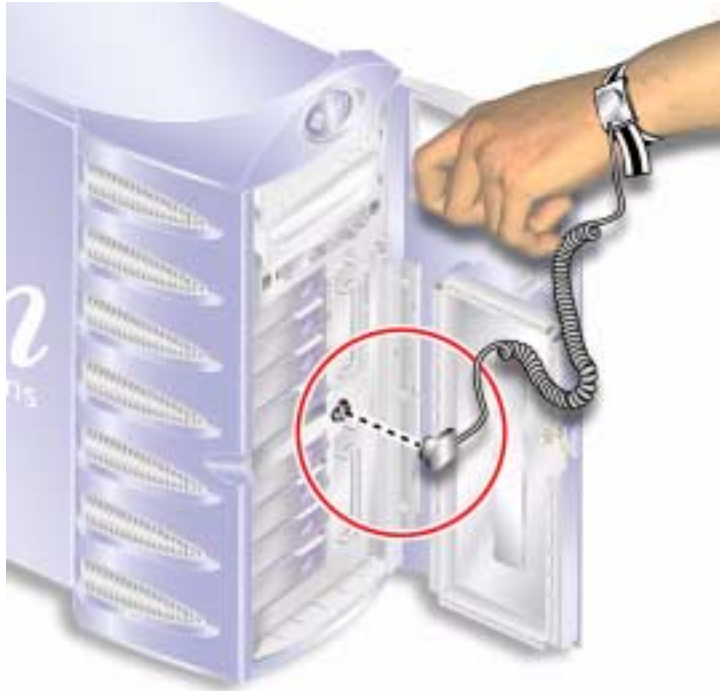


FIGURE 2-1 Front Panel Electrostatic Grounding Point

Controlling Server Power

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

For detailed information on controlling server power using the software, refer to the *ALOM Online Documentation*.

▼ To Turn Server Power On



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

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

When the server is connected to a power source, it immediately enters Standby power mode.

- 2. Turn on the power to any peripherals or external storage devices that are connected to the server.**

If you have connected an external device to the server, read the documentation that was supplied with it for specific instructions.

- 3. Open the door.**

- 4. Set the operation mode switch to the Normal or Diagnostics position.**

- 5. Press the On/Standby button once.**

- 6. Set the operation mode switch to the Locked position.**

This prevents the server from being powered off accidentally.

- 7. Close and lock the door.**

▼ To Turn Server Power Off

- 1. Notify users that the system will be powered down.**

- 2. Back up system files and data.**

- 3. Set the operation mode switch to the Normal or Diagnostics position.**

- 4. Press and immediately release the On/Standby button.**

This action initiates 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 ALOM power off confirmation.**

6. Disconnect the power cable.

This is the only way to remove power from the server. Electrical power is present when the server is in Standby mode.



Caution – As long as the power cord is connected, electrical energy is present inside the server.

Swapping the System Configuration Card Between Servers

▼ To Swap the System Configuration Card Between Servers

1. Power down both servers.

See “Controlling Server Power” on page 17.

2. Open the door on both servers.

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.

Note – If you move system configuration cards, you must also move the root disk to the new system.



Caution – Never remove the system configuration card while the server is booting or running the Solaris operating environment. 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.

Removing and Replacing Hard Disk Drives



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

Removing A Hard Disk Drive

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

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

Note – If you intend to remove a hard disk drive with Solaris running, follow the instructions in “Removing a SCSI Hard Disk Drive With Solaris Running” on page 24 before performing the steps below.

▼ To Remove a Hard Disk Drive

1. **Ensure you are properly grounded.**
See “Avoiding Electrostatic Discharge” on page 16.
2. **Unlock and open the front door.**
3. **Check that the blue “OK to Remove” indicator is lit on the hard disk drive you are going to remove.**

4. Make a note of the hard disk drive bay identification number.

You must put the replacement hard disk drive back into the same bay.

5. Slide the catch at the front of the hard disk drive to the right.

This releases the handle on the front of the hard disk drive. See FIGURE 2-2.



FIGURE 2-2 Removing a Hard Disk Drive

6. Pull the hard disk drive by its handle to remove it from the server.

7. Place the hard disk drive on an antistatic bag or mat.

▼ To Replace a Hard Disk Drive

1. Ensure you are properly grounded.

See “Avoiding Electrostatic Discharge” on page 16.

2. Unlock and open the door.

3. Slide the catch on the front of the hard disk to the right.

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

4. **Make sure you are replacing the hard disk drive into the correct bay.**
Refer to the note you took when you removed the hard disk drive.
5. **Align the hard disk drive with the visual guides printed on both sides of each hard disk drive bay.**
6. **Slide the hard disk drive into the server body, until the metal lever starts to close.**
This indicates that the hard disk drive has engaged with its connector in the server.
7. **Push the handle so that the disk drive clicks into place.**

See FIGURE 2-3



FIGURE 2-3 Inserting a Hard Disk Drive

8. **Close the door and lock it.**

If you have installed a hard disk drive with Solaris running, now perform the steps in “Installing a SCSI Hard Disk Drive With Solaris Running” on page 23.

Installing a SCSI Hard Disk Drive With Solaris Running

Before performing the instructions in this section, install the hard disk drive by following the instructions in “Removing and Replacing Hard Disk Drives” on page 20.

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

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

Type the following command. (The sample output below is from a system containing two Hard Disk 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. **Select a disk and type:**

```
# quit
```

3. **Get the label of the new hard disk drive (this 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::disk/c0t0d0 CD-ROM       connected   configured  unknown
c1             scsi-bus     connected   configured  unknown
c1::disk/c1t0d0 disk         connected   configured  unknown
c1::disk/c1t1d0 unavailable connected unconfigured unknown
c2             scsi-bus     connected   unconfigured unknown
```

In the sample output above, the new disk is Disk 1.

4. Connect the new disk 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
```

5. Confirm that the disk 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.

Removing a SCSI Hard Disk Drive With Solaris Running

If you are removing a hard disk 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 disk drive physically by following the instructions in “Removing A Hard Disk Drive” on page 20.

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

1. Check that the Hard Disk 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 Disk 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 Disk Drive from all of its software mount positions and delete any swap areas in use on the disk. If the disk 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 Disk 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. Check 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 Disk Drive you want to remove from the server is no longer visible to the Operating System.**

Type the following:

```
# 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
```

6. **It is now safe to remove the Hard Disk Drive from the server without shutting down the Operating System.**

Power Supply Unit

▼ To Replace a PSU

1. **Turn server power off.**

See “Controlling Server Power” on page 17.

2. **Disconnect the power cable from the PSU.**

You cannot remove a PSU unless the power cable has been disconnected.

3. **Pull the PSU handle into its down position.**

Inside the server, this action breaks the connection between the PSU and the power distribution board.



FIGURE 2-4 Removing A Power Supply Unit

- 4. Slide the PSU out of the server body by pulling on the green PSU handle.**

See FIGURE 2-4.

- 5. Place the module on an antistatic bag or mat.**
- 6. Locate the replacement PSU in the correct bay.**
- 7. With the handle in its down position, slide the PSU into the server's chassis as far as it will go.**

Ensure that the handle does not return to a vertical position until the PSU is as far into the chassis as it will go, otherwise the PSU will not engage with the power distribution board inside the server.



FIGURE 2-5 Replacing A Power Supply Unit

- 8. Press the handle until it clicks home.** See FIGURE 2-5.
This action engages the PSU with the power distribution board.
- 9. Connect the power cable to the PSU.**

For a summary of the PSU status indicators, see TABLE 2-1.

TABLE 2-1 Power Supply Unit Status Indicators

Indicator status	Meaning
Flashing yellow	PSU not fully inserted; repeat installation procedure.
Green	PSU inserted correctly.
All indicators out	Either input voltage is insufficient to operate the PSU, or a system component is defective.

Sun™ Advanced Lights Out Manager

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

- “Sun™ Advanced Lights Out Manager” on page 30
- “ALOM Management Ports” on page 31
- “Setting the admin Password” on page 31
- “Basic ALOM Functions” on page 31

Sun™ Advanced Lights Out Manager

The Sun Fire V250 server is shipped with Sun™ Advanced Lights Out Manager (ALOM) software installed. By default, console output is directed to SER MGT. On startup, ALOM boot information is displayed and the user is automatically logged in as user `admin`.

ALOM enables you to monitor and control your server over either a serial connection (using the SERIAL MGT port), or Ethernet connection (using the NET MGT port). For information on configuring an Ethernet connection, refer to the *ALOM Online Help*.

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.

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

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's operating system goes offline.

A list of the components monitored by ALOM and the information ALOM provides for each is given in TABLE 3-1.

TABLE 3-1 What ALOM Monitors

Component	Status
Hard disk drives	Presence and status
System and CPU fans	Speed and status
CPUs	Presence, temperature and any thermal warning or failure conditions
Power supplies	Presence and status
System temperature	Ambient temperature and any thermal warning or failure conditions
Server front panel	Operation mode switch position and LED status

ALOM Management Ports

The port labeled SERIAL MGT is the default management port. 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, some configuration of ALOM is required. For information, see the *ALOM Online Help* which is included on the *Sun Fire V250 Server Documentation CD*.

Setting the admin Password

Switching to the ALOM prompt logs you into ALOM with the userid of `admin`. The first time you attempt to execute an ALOM command, you will be prompted to set a password for the `admin` userid. The password you set is permanently stored.

The password must be at least six characters long and contain at least one digit.

Basic ALOM Functions

This section covers basic ALOM functions. For comprehensive documentation, see the *ALOM Online Help*, which is included on the *Sun Fire V250 Server Documentation CD*.

Switching Between Prompts

▼ To Switch to the ALOM Prompt

1. Type the default keystroke sequence:

```
# #.
```

Note – When you switch to the ALOM prompt, you will be logged in with the userid “admin”. Before some ALOM commands execute, you will be prompted to set a password for the “admin” userid. This password must contain at least one digit, and be at least six characters long.

▼ To Switch to the Server Console Prompt

1. Type:

```
sc> console
```

More than one ALOM user can be connected to the server console stream at a time, 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 message below 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
```

Sun Management Center

This chapter describes Sun Management Center. The chapter contains the following sections:

- “Sun Management Center” on page 34
- “Hardware Diagnostic Suite” on page 36

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 V250 server.

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

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 report 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 intuitive monitoring.

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.

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.

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 “Hardware Diagnostic Suite” on page 36 for more information.

Interoperability With 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.

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 operating environment for its operation.

For detailed instructions, see the *Sun Management Center Software User's Guide*.

Obtaining the Latest Information

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

Hardware Diagnostic Suite

The Sun Management Center features the 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 40), the Hardware Diagnostic Suite lets the server run other applications while testing proceeds.

When to Run Hardware Diagnostic Suite

The best use of the Hardware Diagnostic Suite is to disclose a suspected or intermittent problem with a non-critical part on an otherwise functioning machine. Examples might include questionable disk drives or memory modules on a machine 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.

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*.

Sun VTS

This chapter describes SunVTS. The chapter contains the following sections:

- “SunVTS” on page 40

SunVTS

SunVTS is a software suite that performs system and subsystem stress testing. You can view and control a SunVTS session over a network. Using a remote machine, 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 several 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.
- *Connection test mode* provides a low-stress, quick testing of the availability and connectivity of selected devices. These tests are non-intrusive, meaning they release the devices after a quick test, and they do not place a heavy load on system activity.
- *Functional mode* exercises only the specific subsystems you choose. This is the default mode.
- *Functional test mode* provides robust testing of your system and devices. It uses your system resources for thorough testing and it assumes that no other applications are running.
- *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.
- *Auto Config test mode* simplifies the SunVTS configuration process by automatically assigning a predetermined set of test options.
- *Exclusive test mode* enables the performing of tests that require no other SunVTS tests or applications running at the same time.
- *Online test mode* enables users to perform sunvts testing while customer applications are running.

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 operating environment 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 42 for instructions.

SunVTS Software and Security

During SunVTS software installation, you must choose between Basic or Sun Enterprise Authentication Mechanism (SEAM) 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. SEAM 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 SEAM security, you must have the SEAM client and server software installed in your networked environment and configured properly in both Solaris and SunVTS software. If your site does not use SEAM security, do not choose the SEAM 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 SEAM software.

Using SunVTS

SunVTS, the Sun Validation and Test Suite, is an online diagnostics tool which you can use to verify the configuration and functionality of hardware controllers, devices, and platforms. It runs in the Solaris operating environment 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. Below 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
netlbtst	Performs a loopback test to check that the Ethernet adapter can send and receive packets

TABLE 5-1 SunVTS Tests

SunVTS Test	Description
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)

▼ To Find Out Whether SunVTS Is Installed

- Type:

```
# pkginfo -l SUNWvts
# pkginfo -l SUNWvtsx
```

If SunVTS software is loaded, information about the package will be displayed.

If SunVTS software is not loaded, you will see the following error message:

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

Installing SunVTS

By default, SunVTS is not installed on the Sun Fire V250 server. However, it is available on the software supplement CD supplied with Solaris. For information about downloading it from this CD, refer to the *Sun Hardware Platform Guide* for the release of Solaris you are using.

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

Viewing SunVTS Documentation

SunVTS documentation is included on the Software Supplement CD, which is part of each Solaris Media Kit release and available 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.

Diagnostics

This chapter describes the diagnostics tools available to the Sun Fire V250 server. The chapter contains the following sections:

- “Overview Of Diagnostic Tools” on page 46
- “Sun Advanced Lights Out Manager” on page 47
- “POST Diagnostics” on page 48
- “OpenBoot Diagnostics” on page 51
- “OpenBoot Commands” on page 54
- “Operating Environment Diagnostic Tools” on page 59
- “Recent Diagnostic Test Results” on page 67
- “OpenBoot Configuration Variables” on page 67
- “watch-net and watch-net-all” on page 57
- “Automatic Server Restart” on page 69
- “For more information, see the `sys_autorestart` section of the ALOM Online Help that is contained on the Sun Fire V250 Server Documentation CD.” on page 69

Overview Of Diagnostic Tools

Sun provides a range of diagnostic tools for use with the Sun Fire V250 server.

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
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
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
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. 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.

Sun Advanced Lights Out Manager

The Sun Fire V250 Server is shipped with Sun Advanced Lights Out Manager (ALOM) pre-installed.

ALOM enables you to monitor and control your server over either 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 firmware and software continue to be effective when the server operating system goes offline.

See TABLE 6-2 for a list of the components monitored by ALOM and the information it provides for each.

TABLE 6-2 What ALOM Monitors

Item Monitored	What ALOM Reveals
Hard disk drives	Presence and status
System and CPU fans	Speed and status
CPUs	Presence, temperature and any thermal warning or failure conditions
Power supplies	Presence and status
System temperature	Ambient temperature and any thermal warning or failure conditions
Server front panel	Diagnostics switch position and LED status

For more information, see the *ALOM Online Help* which is included on the *Sun Fire V250 Server Documentation CD*.

POST Diagnostics

Power-On Self-Test (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(s), motherboard, memory, and some on-board I/O devices, and 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 program at power up by setting three environment variables, `diag-switch?`, `post-trigger` and the `diag-level` flag, which are stored on the system configuration card.

POST runs automatically when the system power is applied, or following an automatic system reset, or when the operation mode switch is set to Diagnostics position, if both 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`)

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.

▼ To Start POST Diagnostics

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 level of diagnostics you require.

4. Type:

```
ok reset-all
```

The system runs POST diagnostics and displays status and error messages 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`. Type:

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

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

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 machine is restarted. TABLE 6-3 lists the most

important and useful of these variables. You can find instructions for changing OpenBoot configuration variables in “To View And Set OpenBoot Configuration Variables” on page 68.

TABLE 6-3 OpenBoot Configuration Variables

OpenBoot Configuration Variable	Description and Keywords
auto-boot	Determines whether the operating system automatically starts up. Default is <code>true</code> . <ul style="list-style-type: none"> • <code>true</code>—Operating system automatically starts once firmware tests finish. • <code>false</code>—System remains at <code>ok</code> prompt until you type <code>boot</code>.
diag-out-console	Determines whether diagnostic messages are displayed via the ALOM console. Default is <code>false</code> . <ul style="list-style-type: none"> • <code>true</code>—Display diagnostic messages via the ALOM console. • <code>false</code>—Display diagnostic messages via the serial port <code>ttya</code> or a graphics terminal.
diag-level	Determines the level or type of diagnostics executed. Default is <code>min</code> . <ul style="list-style-type: none"> • <code>off</code>—No testing. • <code>min</code>—Only basic tests are run. • <code>max</code>—More extensive tests may be run, depending on the device.
diag-script	Determines which devices are tested by OpenBoot Diagnostics. Default is <code>normal</code> . <ul style="list-style-type: none"> • <code>none</code>—No devices are tested. • <code>normal</code>—On-board (centerplane-based) devices that have self-tests are tested. • <code>all</code>—All devices that have self-tests are tested.
diag-switch?	Toggles the system in and out of diagnostic mode. Default is <code>false</code> . <ul style="list-style-type: none"> • <code>true</code>—Diagnostic mode: POST diagnostics and OpenBoot Diagnostics tests may run. • <code>false</code>—Default mode: Do not run POST or OpenBoot Diagnostics tests.

TABLE 6-3 OpenBoot Configuration Variables (*Continued*)

OpenBoot Configuration Variable	Description and Keywords
post-trigger	Specifies the class of reset event that causes power-on self-tests (or OpenBoot Diagnostics tests) 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 68.
obdiag-trigger	<ul style="list-style-type: none"> • <code>error-reset</code>—A reset caused by certain non-recoverable hardware error conditions. In general, an error reset occurs when a hardware problem corrupts system state data and the machine becomes “confused.” Examples include CPU and system watchdog resets, fatal errors, and certain CPU reset events (default). • <code>power-on-reset</code>—A reset caused by pressing the Power button (default). • <code>user-reset</code>—A reset initiated by the user or the operating system. Examples of user resets include the OpenBoot <code>boot</code> and <code>reset-all</code> commands, as well as the Solaris <code>reboot</code> command. • <code>all-resets</code>—Any kind of system reset. • <code>none</code>—No power-on self-tests (or OpenBoot Diagnostics tests) run.
input-device	<p>Selects where console input is taken from. Default is <code>ttya</code>.</p> <ul style="list-style-type: none"> • <code>ttya</code>—From built-in SERIAL MGT port. • <code>ttyb</code>—From built-in general purpose serial port (10101). • <code>keyboard</code>—From attached keyboard that is part of a graphics terminal.
output-device	<p>Selects where diagnostic and other console output is displayed. Default is <code>ttya</code>.</p> <ul style="list-style-type: none"> • <code>ttya</code>—To built-in SERIAL MGT port. • <code>ttyb</code>—To built-in general purpose serial port (10101) • <code>screen</code>—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.

OpenBoot Diagnostics

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

▼ To Start OpenBoot Diagnostics

1. Type:

```
ok setenv diag-switch? true
ok setenv auto-boot? false
ok setenv obdiag-trigger all-resets
ok reset-all
```

2. Type:

```
ok obdiag
```

This command displays the OpenBoot Diagnostics menu. See TABLE 6-4 for a sample.

TABLE 6-4 Sample obdiag Menu

obdiag		
1 flashprom@2,0	2 i2c@0,320	3 ide@d
4 network@3	5 parallel@0,378	6 pmu@6
7 rmc-comm@0,3e8	8 rtc@0,70	9 scsi@4
10 scsi@4,1	11 serial@0,2e8	12 serial@0,3f8
13 usb@a	14 usb@b	
Commands: test test-all except help what setenv set-default exit diag-passes=1 diag-level=max test-args=		

Note – If you have a PCI card installed in the server, additional tests will appear 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
```

Controlling OpenBoot Diagnostics Tests

Most of the OpenBoot configuration variables you use to control POST (see TABLE 6-3 on page 50) also affect 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 6-5.

TABLE 6-5 Keywords for the `test-args` OpenBoot Configuration Variable

Keyword	What It Does
<code>bist</code>	Invokes built-in self-test (BIST) on external and peripheral devices
<code>debug</code>	Displays all debug messages
<code>iopath</code>	Verifies bus/interconnect integrity
<code>loopback</code>	Exercises external loopback path for the device
<code>media</code>	Verifies external and peripheral device media accessibility
<code>restore</code>	Attempts to restore original state of the device if the previous execution of the test failed
<code>silent</code>	Displays only errors rather than the status of each test
<code>subtests</code>	Displays main test and each subtest that is called
<code>verbose</code>	Displays detailed messages of status of all tests
<code>callers=N</code>	Displays backtrace of <i>N</i> callers when an error occurs <ul style="list-style-type: none">• <code>callers=0</code> - displays backtrace of all callers before the error
<code>errors=N</code>	Continues executing the test until <i>N</i> errors are encountered <ul style="list-style-type: none">• <code>errors=0</code> - displays all error reports without terminating testing

If you want to make multiple customizations to 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
```

The 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,q1c@2
```

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
```

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.

OpenBoot Commands

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

- `probe-scsi` and `probe-scsi-all`
- `probe-ide`

- show-devs
- watch-net
- watch-net-all

probe-scsi and probe-scsi-all

The `probe-scsi` and `probe-scsi-all` commands list the devices available on the SCSI buses.



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

The `probe-scsi` command communicates with all SCSI devices connected to on-board SCSI controllers. The `probe-scsi-all` command additionally accesses devices connected to any host adapters installed in PCI slots.

For any SCSI device that is connected and active, the `probe-scsi` and `probe-scsi-all` commands display 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.

```
{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
```

CODE EXAMPLE 6-1 sample `probe-scsi` Command Output

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

```
{1} ok probe-scsi-all
/pci@1c,600000/scsi@2,1
Target 4
  Unit 0   Removable Read Only device   TOSHIBA
XM6201TASUN32XCD1103

/pci@1c,600000/scsi@2
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
```

CODE EXAMPLE 6-2 sample `probe-scsi-all` Command Output

`probe-ide`

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.

```
{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
```

CODE EXAMPLE 6-3 sample `probe-ide` Command Output

show-devs *Command*

The `show-devs` command lists the hardware device paths for each device in the firmware device tree. CODE EXAMPLE 6-4 shows some sample output.

```
ok show-devs
/i2c@1f,464000
/pci@1f,700000
/ppm@1e,0
/pci@1e,600000
/pci@1d,700000
/ppm@1c,0
/pci@1c,600000
/memory-controller@0,0
/SUNW,UltraSPARC-IIIi@0,0
/virtual-memory
/memory@m0,0
/aliases
/options
/openprom
/chosen
/packages
/i2c@1f,464000/idprom@0,50
/i2c@1f,464000/nvram@0,50
/pci@1e,600000/ide@d
/pci@1e,600000/usb@b
/pci@1e,600000/usb@a
...
```

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

watch-net and watch-net-all

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.

FIGURE 6-1 `watch-net` Diagnostic Output Message

```
{0} ok watch-net
Internal loopback test -- succeeded.
Link is -- up
Looking for Ethernet Packets.
`.` is a Good Packet. `X` is a Bad Packet.
Type any key to stop.....
```

FIGURE 6-2 `watch-net-all` Diagnostic Output Message

```
{0} ok watch-net-all
/pci@1f,0/pci@1,1/network@c,1
Internal loopback test -- succeeded.
Link is -- up
Looking for Ethernet Packets.
`.` is a Good Packet. `X` is a Bad Packet.
Type any key to stop.
```

▼ To Run OpenBoot Commands

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. For more information on how to reach the `ok` prompt, see "System Prompts" on page 13.

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

Operating Environment Diagnostic Tools

If a system passes OpenBoot Diagnostics tests, it normally attempts to boot its multiuser operating environment. For most Sun systems, this means the Solaris operating environment. Once the server is running in multiuser mode, you have access to the software-based diagnostic tools, SunVTS and Sun Management Center. These tools allow 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 above, you can refer to error and system message log files, and Solaris system information commands.

Error and System Message Log Files

Error messages, system messages and ALOM 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.

Solaris System Information Commands

The following Solaris commands display data that you can use when assessing the condition of a Sun Fire V250 server:

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

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

prtconf

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 environment software “knows” about. The output of `prtconf` also includes the total amount of system memory. CODE EXAMPLE 6-5 shows an excerpt of `prtconf` output (truncated to save space).

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

SUNW,Sun-Fire-V250
  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 ...
```

CODE EXAMPLE 6-5 `prtconf` Command Output (truncated)

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.

prtdiag

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 operating environment is running on your system. Following is an excerpt of some of the output produced by `prtdiag` on a correctly functioning Sun Fire V250 server running Solaris 8.

```
# /usr/platform/sun4u/sbin/prtdiag
System Configuration: Sun Microsystems sun4u Sun Fire V250
System clock frequency: 152 MHz
Memory size: 512MB
```

```
===== CPUs =====
      CPU  Freq      E$      CPU      CPU      Temperature      Fan
      CPU  Freq      Size      Impl.  Mask      Die  Ambient      Speed  Unit
-----
MB/CPU0  1064 MHz  1MB      US-IIIi  2.3      -    -
```

```
===== IO Devices =====
      Bus  Freq
      Brd  Type  MHz  Slot      Name      Model
-----
0  pci  66      MB  pci108e,1647 (network)
0  pci  66      MB  scsi-pci1000,21 (scsi-2)
0  pci  66      MB  scsi-pci1000,21 (scsi-2)
0  pci  33      MB  isa/su (serial)
0  pci  33      MB  isa/su (serial)
0  pci  33      MB  isa/rmc-comm-rmc_comm (seria+
0  pci  33      MB  isa/isadma (dma)
0  pci  33      MB  pci10b9,5229 (ide)
```

```
===== Memory Configuration =====
Segment Table:
```

```
-----
Base Address      Size      Interleave Factor  Contains
-----
0x0              512MB      1              BankIDs 0
```

```
Bank Table:
```

```
-----
      Physical Location
      ID      ControllerID  GroupID  Size      Interleave Way
-----
0          0          0      512MB      0
```

```
Memory Module Groups:
```

```
-----
ControllerID  GroupID  Labels
-----
0          0      MB/DIMM0,MB/DIMM1
```

CODE EXAMPLE 6-6 prtdiag Command Output

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

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

CODE EXAMPLE 6-7 `prtdiag` Verbose Output

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

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

CODE EXAMPLE 6-8 `prtdiag` Overtemperature Indication Output

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

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

CODE EXAMPLE 6-9 `prtdiag` Fault Indication Output

`prtfru`

The Sun Fire V250 server system maintains a hierarchical list of all FRUs in the system, as well as specific information about various FRUs.

The `prtfriu` command can display this hierarchical list, as well as data contained in the serial electrically-erasable programmable read-only memory (EEPROM) devices located on many FRUs. CODE EXAMPLE 6-10 shows an excerpt of a hierarchical list of FRUs generated by the `prtfriu` command with the `-l` option.

```
# prtfriu -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 6-10 `prtfriu -l` Command Output (truncated)

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

```
# prtfriu -c
/frutree/chassis/MB?Label=MB/system-board (container)
  SEGMENT: SD
    /SpecPartNo: 885-0092-02
    /ManR
    /ManR/UNIX_Stamp32: 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
```

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

Data displayed by the `prtfriu` 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

psrinfo

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.

```
# 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 1082 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 1082 MHz,
    and has a sparcv9 floating point processor.
```

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

showrev

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

```
# 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
```

CODE EXAMPLE 6-13 `showrev` Command Output

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.

```
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
```

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

▼ To Run Solaris System Information Commands

1. Decide what kind of system information you want to display.

For more information, see “Solaris System Information Commands” on page 59.

2. Type the appropriate command at a console prompt.

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

TABLE 6-6 Using Solaris Information Display Commands

Command	What It Displays	What to Type	Notes
<code>prtconf</code>	System configuration information	<code>/usr/sbin/prtconf</code>	—
<code>prtdiag</code>	Diagnostic and configuration information	<code>/usr/platform/ SUNW,Sun-Fire-V250/ sbin/prtdiag</code>	Use the <code>-v</code> option for additional detail.
<code>prtfru</code>	FRU hierarchy and SEEPROM memory contents	<code>/usr/sbin/prtfru</code>	Use the <code>-l</code> option to display hierarchy. Use the <code>-c</code> option to display SEEPROM data.
<code>psrinfo</code>	Date and time each CPU came online; processor clock speed	<code>/usr/sbin/psrinfo</code>	Use the <code>-v</code> option to obtain clock speed and other data.
<code>showrev</code>	Hardware and software revision information	<code>/usr/bin/showrev</code>	Use the <code>-p</code> option to show software patches.

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.

▼ To View Recent Test Results

1. Go to the `ok` prompt.
2. Do either of the following:
 - To see a summary of the most recent POST results, type:

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

- To see a summary of the most recent OpenBoot Diagnostics test results, type:

```
ok show-obdiag-results
```

This produces a system-dependent list of hardware components, along with an indication of which components passed and which failed POST or OpenBoot Diagnostics tests.

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.

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

- `diag-switch?` disables both POST and OBDIAG
- `diag-level` disables only POST
- `obdiag-trigger` defines qualifying reset types for OBDIAG
- `diag-script` disables only OBDIAG
- `post-trigger` defines qualifying reset types for POST

For a summary of OpenBoot configuration variables and their effect on diagnostics, see TABLE 6-7.

TABLE 6-7 Configuring OpenBoot Diagnostics

diag-switch?	diag-level	obdiag-trigger	diag-script	result
false	ANY	ANY	ANY	No diags or POST for any reset.
true	loff	RST_TYPES	!none	Diagnostics run only for RST_TYPES. POST runs for qualifying resets.
true	off	RST_TYPES	SCRIPTS	Diagnostic SCRIPTS executed on RST_TYPES. POST does not run.
true	max/min	ANY	none	No diagnostics. POST runs on qualifying resets.

▼ To View And Set OpenBoot Configuration Variables

1. Halt the server to reach the `ok` prompt.

- To display the current values of all OpenBoot configuration variables, use the `printenv` command.

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

```
ok printenv
```

Variable Name	Value	Default Value
diag-level	min	min
diag-switch?	false	false

- 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:

```
ok setenv post-trigger power-on-reset error-reset
post-trigger = power-on-reset error-reset
```

Automatic Server Restart

Note – Automatic Server Restart is not the same as Automatic System Recovery (ASR), which the Sun Fire V250 server also supports.

Automatic Server Restart is a component of ALOM. It monitors the Solaris operating environment and, if it hangs, the default action is to synchronize the filesystems and restart the server.

ALOM uses a watchdog process to monitor the kernel *only*. ALOM will 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 timeout 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 will cause the server to sync the filesystems and restart. In the event of the sync hanging, ALOM will fallback 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, and filesystem damage may result.
- **None** - this will result in the system being left in the hung state indefinitely after the watchdog timeout has been reported.

For more information, see the `sys_autorestart` section of the *ALOM Online Help* that is contained on the *Sun Fire V250 Server Documentation CD*.

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