



# Sun Fire™ V20z Server User Guide

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Sun Microsystems, Inc.  
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# Preface

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## How This Book is Organized

Chapter 1 contains an overview of the Sun Fire V20z server.

Chapter 2 contains information on how to power on the server and configure the BIOS.

Chapter 3 contains information on troubleshooting and diagnostics.

Chapter 4 contains information on removing and replacing components.

Appendix A contains information on optimizing system performance.

Appendix B contains a listing of BIOS POST codes.

Appendix C contains reference information on diagnostics commands.

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## Using UNIX Commands

This document might not contain information on basic UNIX<sup>®</sup> commands and procedures such as shutting down the system, booting the system, and configuring devices. See the following for this information:

- Software documentation that you received with your system
- Solaris<sup>™</sup> operating environment documentation, which is at <http://docs.sun.com>

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# 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	#

---

# 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. <code>% You have mail.</code>
<b>AaBbCc123</b>	What you type, when contrasted with on-screen computer output	<code>% su</code> <code>password:</code>
<i>AaBbCc123</i>	Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values.	Read Chapter 6 in the <i>User's Guide</i> . These are called <i>class</i> options. You <i>must</i> be superuser to do this. To delete a file, type <code>rm filename</code> .

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



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## Related Documentation

Application	Title	Part Number
Hardware and system software installation	<i>Sun Fire V20z Server Installation Guide</i>	817-5246-xx
Server management	<i>Sun Fire V20z Server Management Guide</i>	817-5249-xx
Operating system installation	<i>Sun Fire V20z Server Operating System Installation Guide</i>	817-5250-xx
Safety information	<i>Important Safety Information for Sun Hardware Systems</i>	816-7190-xx
Late-breaking information	<i>Sun Fire V20z Release Notes</i>	817-5252-xx

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

*Sun Fire V20z Server User Guide*, part number 817-5248-10

# Introduction to the Sun Fire V20z Server

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The Sun Fire V20z server is an AMD Opteron™ processor-based enterprise-class 1U 2P server. The Sun Fire V20z server provides performance and value to an enterprise environment, offering significantly better performance than current 32-bit Intel-based solutions. The AMD Opteron processor implements the x86-64 architecture, which delivers significant memory capacity and bandwidth with twice the memory capacity and up to three times the memory bandwidth of existing x86 32-bit servers. The balanced server design maximizes overall performance through industry-leading I/O options, and delivers compelling real-world workload performance.

The Sun Fire V20z server includes an embedded service processor, flash memory, RAM, a separate Ethernet interface, and server management software. It comes equipped with superior server management tools for greater control and minimum total cost of ownership. You can use the command line interface or SNMP integration with third party frameworks to configure and manage the platform with the service processor. The dedicated service processor provides complete operating system independence and maximum availability of server management.

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## 1.1 Applications

The Sun Fire V20z server is ideal for the following applications:

- Web or application hosting
- High performance compute clusters
- Offsite/remote server installations
- Database workloads
- Corporate data centers

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## 1.2 Features

TABLE 1-1 shows the main features of the Sun Fire V20z server.

**TABLE 1-1** Sun Fire V20z Server Features

<b>Component</b>	<b>Description</b>
CPU	2 AMD Opteron processors 64-bit x86-64 architecture Processor frequencies: 1.6 GHz, 1.8 GHz, 2.0 GHz, 2.2 GHz
Memory	512 MB–16 GB ECC, registered DDR 333 SDRAM (8 slots, 2 GB DIMM max. per slot, 3.05 cm max. height)
Hard Drives	1 or 2, 36 GB–146 GB, U320 SCSI (only in integrated mirroring configurations)
SCSI Controller	Embedded U320 controller with potential mirroring support
Network I/O	Dual embedded Gigabit Ethernet
PCI I/O	2 PCI-X expansion slots: <ul style="list-style-type: none"><li>• 1 full-length 66 MHz/64-bit or 133 MHz/64-bit</li><li>• 1 half-length 66 MHz/64-bit</li></ul>
Other I/O	Internal CD-ROM and diskette drives Embedded SVGA video, keyboard and mouse connectors
Management Service	PowerPC running embedded server and SSL encryption for secure management from anywhere and a dedicated 10/100 Ethernet port to the service processor.

---

## 1.3 Server Management

Strong server management capabilities are crucial to maintaining mission-critical servers. Advance notification of problems and rapid diagnosis and correction are critical functions to an environment in which a few servers bear most of the workload. The Sun Fire V20z server and its extensive server management capabilities lower costs by reducing failure and potentially eliminating hands-on management.

### 1.3.1 Service Processor

The Sun Fire V20z server includes a dedicated service processor for complete operating system independence and maximum availability of server management. The service processor (SP) is an embedded PowerPC providing the following:

- Environmental monitoring of the platform (such as temperatures, voltages, fan speeds, and panel switches)
- Alert messages when problems occur
- Remote control of server operations (boot, shutdown, and reboot of the server's operating system, turning the server's power on and off, stopping the server's boot process in BIOS, and upgrading the BIOS)

The service processor runs an embedded version of Linux, and all the server management functions are developed as standard Linux applications. Its sole purpose is to support server management; therefore, the full functionality of the Linux platform is not available in the service processor. Many familiar applications, such as ftp and telnet, are not provided as they are not required to support the server management feature set.

## 1.4 Hardware System Orientation

Prior to performing any service procedures, become familiar with the physical orientation and features of your Sun Fire V20z server.

### 1.4.1 Front and Back Panels

FIGURE 1-1 illustrates the front panel of the Sun Fire V20z server.

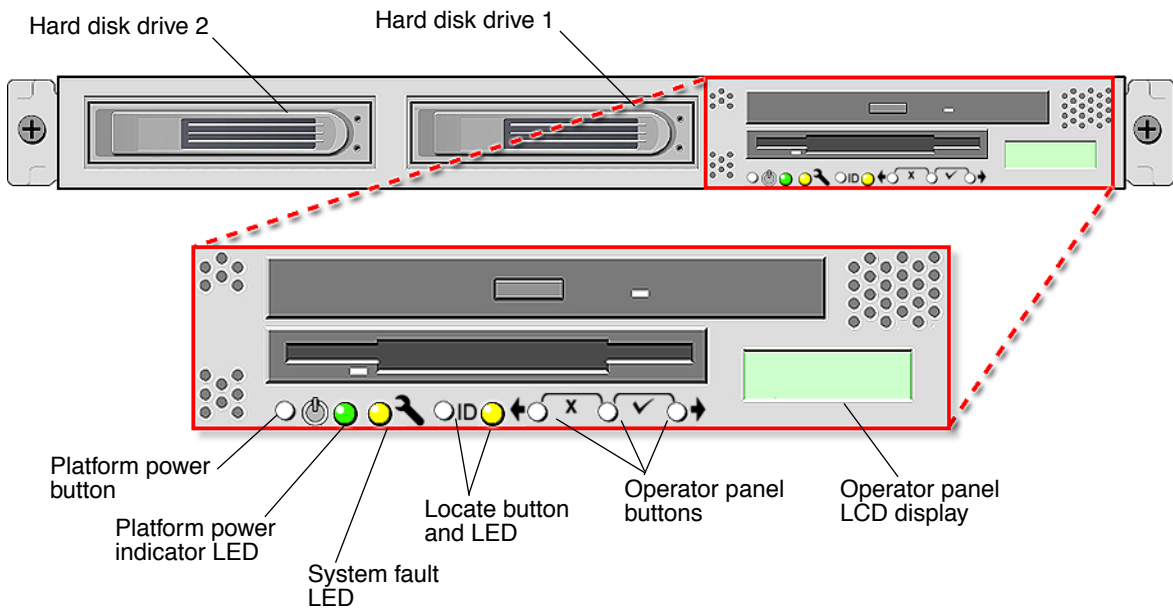


FIGURE 1-1 Front Panel

Refer to "Operator Panel" on page 1-5 for more information about the operator panel.

FIGURE 1-2 depicts the back panel of the Sun Fire V20z server:

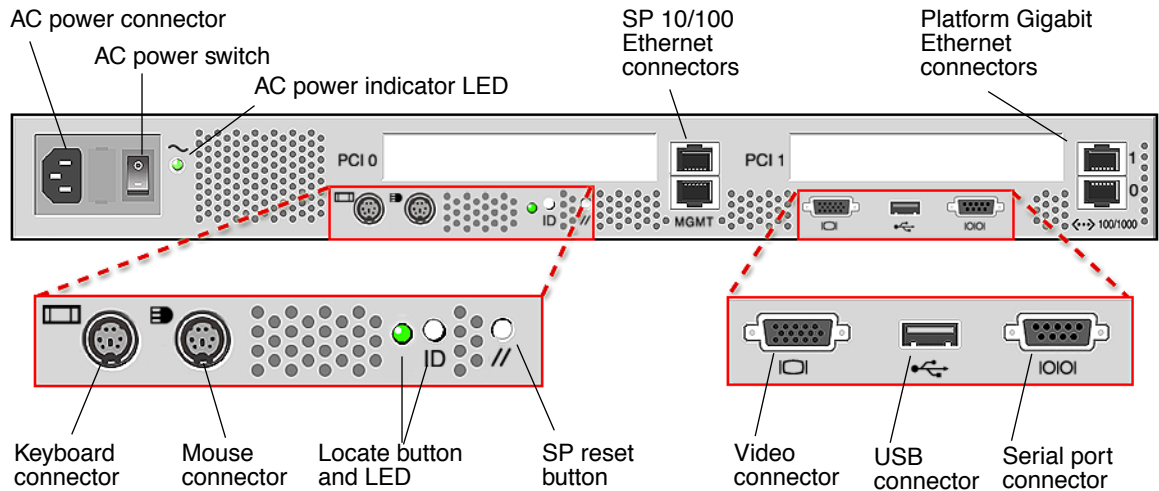


FIGURE 1-2 Back Panel

## 1.4.2 Operator Panel

You can use the operator panel to configure network settings for the service processor. FIGURE 1-1 shows where the operator panel is located on the front panel.

The drivers for the Sun Fire V20z server must be installed to access these menu options. Some operator panel menus are only functional under these conditions:






- An external file system is configured with the Network Share Volume.
- The service processor update server from the Network Share Volume machine is available.
- The machine has Java Runtime Environment 1.4.1 installed on it.

The liquid-crystal display (LCD) panel on the operator panel displays menu options with `Menu:` appearing in the first line and the menu option in the second line. When no menu option is available, the first line displays SP information, such as the IP address, and the second line provides platform information. For example:

```
123.45.67.89  
OS running
```

TABLE 1-2 shows the operator panel buttons that are used to navigate through the menu options.

**TABLE 1-2** Operator Panel Buttons

Button	Function
	Back/No
	Select
	Forward/Yes
	Enter
	Cancel

The Back/No and Forward/Yes buttons automatically scroll, repeating the action as long as the button is held down. After the button is held down a few seconds, auto scrolling begins and rapidly increments or decrements the value.

If a menu or data entry screen displays for more than 30 seconds with no action taken, the menu or data entry is cancelled and the display returns to the idle/background state.



TABLE 1-3 lists the operations you can perform from the operator panel:

**TABLE 1-3** Operator Panel Menu Options

Menu	Menu Options	Description
Server	Shutdown server	Signals the server operating system to shut down and power off. To force the power off in the case where the operating system hangs, the operator must hold the power button for four seconds.
	Reboot server	Signals the server operating system to shut down and reboot.
	Display Port 80	Displays the last ten Port 80 codes (in hex, 5 per line). Press any button to clear the display. The display automatically clears after 30 seconds. This feature only works in BIOS booting state; to see all the post codes run the <code>sp get port80 -m</code> command.
Panel	Use SP hostname	Displays the service processor's networking hostname in the top line instead of its numeric IP address.
	Name for LCD	Displays a custom name for the service processor in the LCD. (For more information, refer to <i>Sun Fire V20z Installation Guide</i> , 817-5246-xx.)
	Clear LCD name	Removes the user-specified name for the service processor. Either the hostname or the IP address displays in the first line.
	Rotate IP/Name	The first line of the LCD alternates every five seconds. For example, the custom name for the LCD or hostname displays, then the IP address, then back, and so on every five seconds. If you set the Name for LCD, it displays in the top line. If you do not set the Name for LCD and you do specify the Use SP hostname, the hostname displays in the top line. If you specify neither the Name for LCD or the Use SP hostname options, the numeric IP address displays.
SP	Set SP IP information	Configures the service processor network using DHCP or a static IP address. (For more information, refer to <i>Sun Fire V20z Installation Guide</i> , 817-5246-xx.)
	Auto Configure	Propagates configuration information to the service processor. (For more information, refer to <i>Sun Fire V20z Installation Server Management Guide</i> , 817-5249-xx.)
	Update SP	Updates service processor software. (For more information, refer to <i>Sun Fire V20z Installation Server Management Guide</i> , 817-5249-xx.)

**TABLE 1-3** Operator Panel Menu Options (Continued)

Menu	Menu Options	Description
	Dump SP	<p>Invokes the Troubleshooting Dump Utility (TDU) which captures the following information and either sends it to stdout or stores it in an output file:</p> <ul style="list-style-type: none"><li>• system state table (SST)</li><li>• hardware and software component versions</li><li>• machine check register values</li><li>• CPU trace buffers</li><li>• CPU configuration space registers (CSR)</li><li>• event log file</li><li>• the last good configuration (LGC)</li></ul> <p>By default, the TDU data is redirected to stdout. If you do not provide a filename, the output is sent to stdout and the log files are not created.</p> <p>Otherwise, you can use this option to specify the name of the output file to which the log files are copied. Storing to a file is only available if you have configured an external file system.</p> <p>You can also invoke the TDU using the <code>sp get tdulog</code> command.</p>
	Use defaults	<p>Restores service processor settings to the default factory configuration. <b>Note:</b> All current data (network, users) is lost and the service processor is rebooted.</p>
	Reboot SP	<p>Forces the service processor to shut down and reboot. <b>Note:</b> The platform operating system is not affected.</p>

## 1.4.3 Front and Back Panel LEDs

TABLE 1-4 describes the LEDs on the front panel of the Sun Fire V20z server, and TABLE 1-5 describes the LEDs on the back panel of the server. Refer to FIGURE 1-1 and FIGURE 1-2 for the locations of these LEDs.

**TABLE 1-4** Front Panel LEDs

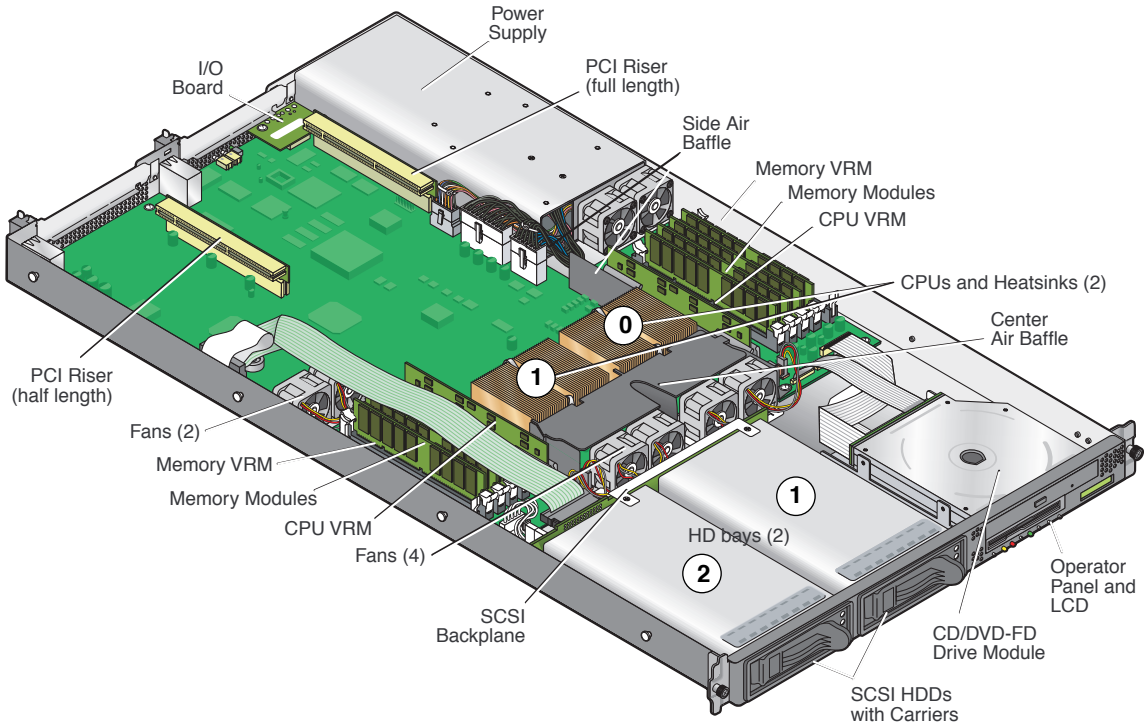
LED	Description
Platform Power	This LED is lit when the platform power is on.
System Fault	This LED blinks when a severe system fault, such as an overvoltage condition or an upper temperature limit, is detected. See “Troubleshooting and Diagnostics” on page 3-1 for information on troubleshooting the system.
Locate	This LED is lit when you press the Locate button on either the front or the back of the server. This LED helps you to identify which system in the rack you are working on.

**TABLE 1-5** Back Panel LEDs

LED	Description
AC Power Indicator	This LED is lit when the AC power is on.
Locate	This LED is lit when you press the Locate button on either the front or the back of the server. This LED helps you to identify which system in the rack you are working on.

## 1.4.4 System Components

FIGURE 1-3 shows the locations of the components inside the Sun Fire V20z server chassis.



**FIGURE 1-3** System Components

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## 1.5 Ship Kit

The Sun Fire V20z server is supplied with the components shown in Table 1-6.

**TABLE 1-6** Contents of the Sun Fire V20z Server Ship Kit

Item	Part Number	Quantity	Delivery
Sun Fire V20z Server Documentation and Resource CD, containing the following documents:	705-0971	1	CD
• <i>Sun Fire V20z Server Installation Guide</i>	817-5246		
• <i>Sun Fire V20z Server Operating System Installation Guide</i>	817-5250		
• <i>Sun Fire V20z Server User Guide</i>	817-5248		
• <i>Sun Fire V20z Server Management Guide</i>	817-5249		
• <i>Sun Fire V20z Server Release Notes</i>	817-5252		
Sun Fire V20z Server Network Share Volume CD	705-0970	1	CD
<i>Sun Fire V20z Server Warranty and Disclaimer</i>	817-5246	1	Printed
<i>Setting Up the Sun Fire V20z Server</i>	817-5336	1	Printed
<i>Important Safety Information for Sun Hardware Systems</i>	816-7190	1	Printed
Sun Fire V20z Server	602-2637-01	1	In box
Power Cord (for USA)	none	1	In box

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## 1.6 Replaceable Components

Sun offers additional hard disk drives and memory modules for the server.

The replaceable components on the Sun Fire V20z server are shown in TABLE 1-7. To order them, contact your local Sun sales representative.

You may have a part that is replaceable under warranty. For specific details regarding your warranty, refer to:

See <http://www.sun.com/service/support/warranty/index.html>

**TABLE 1-7** Sun Fire V60x Server Replaceable Components

<b>Component</b>	<b>Part Number</b>
CPU/Heatsink Kit	
• Opteron 242, 1.6 GHz	595-7376-01
• Opteron 244, 1.8 GHz	595-7336-01
• Opteron 248, 2.2 GHz	595-7337-01
Memory	
• 1 GB ECC DDR/333 (2 x 512 MB DIMMs)	595-7339-01
• 2 GB ECC DDR/333 (2 x 1 GB DIMMs)	595-7340-01
• 4 GB ECC DDR/333 (2 x 2 GB DIMMs)	595-7341-01
Hard disk drives (HDDs)	
• 36 GB, Ultra 320 SCSI, 10K rpm	595-7342-01
• 73 GB, Ultra 320 SCSI, 10K rpm	595-7344-01
Floppy/CD-ROM combo unit	595-7347-01
Floppy/DVD combo unit	595-7348-01
Ultra SCSI 320 dual port PCI-X card, full length card	595-7353-01
FC-AL 2 Gb/s PCI-X card, low profile 133 MHz card	595-7377-01
Single Gigabit Ethernet PCI-X NIC, low-profile 66 or 133 MHz card	595-7359-01
Dual Gigabit Ethernet PCI-X NIC, low-profile 66 or 133 MHz card	595-7360-01
Quad Gigabit Ethernet PCI-X NIC, low-profile 66 or 133 MHz card	595-7361-01
Rail rackmount kit	595-7378-01
478W power supply	F370-6636-01
Fan assembly	F370-6639-01
CPU Voltage Regulator Module (VRM)	F370-6680-01
Memory Voltage Regulator Module (VRM)	F370-6646-01
SCSI backplane	F370-6647-01
Server Super FRU	F370-0979-01
Operator panel	F370-6681-01
Cable assembly	F370-6676-01
I/O board	F370-6678-01
PCI riser card	F370-6679-01

---

## 1.7 Integrated Mirroring

With traditional mirroring (or RAID1), a drive has its data duplicated on two different drives using either a hardware RAID controller or software (generally by means of the operating system). If either drive fails, the other continues to function as a single drive until the failed drive is replaced.

With integrated mirroring enhanced (IME) (also referred to as either Enhanced RAID1 or RAID1E), instead of only being able to use only two drives, you can use two to six drives, including the option of only using an odd number of drives. Instead of mirroring at the disk level, the data is mirrored in stripes across the drives. Thus, IME allows for more flexibility with mirroring data.

Not all operating systems support RAID on the Sun Fire V20z server at this time. Refer to the *Sun Fire V20z Server Release Notes*, 817-5252-xx, for information on which operating systems do not yet support the Sun Fire V20z RAID capabilities.





# Powering On and Configuring the Server

---

This chapter contains instructions on powering up and configuring the server BIOS. Before powering on the server for the first time, follow the instructions in the *Sun Fire V20z Server Installation Guide*, 817-5246-xx, to set up your server.

This chapter contains the following sections:

- “Powering On the Server” on page 2-1
- “Escape Sequences for Remote Console Terminal” on page 2-3
- “BIOS Setup Utility” on page 2-4
- “Booting to a USB Diskette Device” on page 2-16

---

## 2.1 Powering On the Server

Before powering on the server for the first time, follow the setup instructions in the *Sun Fire V20z Server Installation Guide*, 817-5246-xx.

If you do not have an operating system installed on the server, you will need to use a PS/2 keyboard for initial bootup. USB support is disabled in the BIOS by default. See “BIOS Setup Utility” on page 2-4 for more information.

---

**Caution** – Do not operate this server without all fans, component heatsinks, and air baffles installed. Severe damage to server components will occur if the server is operated without adequate cooling mechanisms.

---

Follow these steps to boot the server:

1. **Ensure that the AC power cord is plugged into the power connector on the rear of the server and into a power outlet.**
2. **Turn on the power switch on the back of the system to power on the service processor.**

When the service processor is active, you can perform all configuration tasks without turning on the main power in Step 3.

---

**Note** – If this is the first time you are booting the server, you may have to wait approximately two to five minutes for the service processor to boot.

---

3. **When the Operator Panel LCD shows the message `Main Power Off`, press the platform power button on the front of the server in order to install or access the operating system.**

Refer to the *Sun Fire V20z Server Operating System Installation Guide*, 817-5250-xx, for information on installing the operating system.

When the system begins booting up, the power on self test (POST) will run.

---

**Note** – If the POST encounters any error while it is running, it will pause and you will need to press the F1 key to continue.

---

4. **When prompted, you can press the F2 key to enter the BIOS Setup Utility or press the F12 key to boot from the network. To boot from the default boot device, let the prompt time out and the boot process will continue.**

For further information on the BIOS Setup Utility, refer to “BIOS Setup Utility” on page 2-4. For information on setting up a network PXE installation, see the *Sun Fire V20z Server Operating System Installation Guide*, 817-5250-xx.

---

## 2.2 Powering Off the Server

To perform a graceful shutdown of the server running a Linux or Unix operating environment, type the following command:

```
# power off
```

This command shuts down the operating system. Depending on which operating system you are using, you may also have to manually push the platform power button after the operating system shuts down.

---

## 2.3 Escape Sequences for Remote Console Terminal

If you are accessing your Sun Fire V20z server using a remote console terminal, you may need to use the escape sequences shown in TABLE 2-1. If a regular function key is not working properly, use the escape sequence listed next to it in the table.

You will most likely need to use the escape sequences if you are using a Linux or Solaris operating system.

**TABLE 2-1** Special Keys for Remote Console Terminal

Function Key	Escape Sequence
HOME	<ESC> h
END	<ESC> k
INSERT	<ESC> +
DELETE	<ESC> -
PAGE UP	<ESC> ?
PAGE DOWN	<ESC> /
ALT	<ESC> ^A
CTRL	<ESC> ^C
F1	<ESC> 1
F2	<ESC> 2
F3	<ESC> 3
F4	<ESC> 4
F5	<ESC> 5
F6	<ESC> 6
F7	<ESC> 7
F8	<ESC> 8
F9	<ESC> 9
F10	<ESC> 0
F11	<ESC> !
F12	<ESC> @

---

## 2.4 BIOS Setup Utility

The Basic Input Output System (BIOS) Setup utility is used to configure BIOS settings. When the computer is powered on, it is configured with the values stored in the BIOS ROM by the system BIOS, which gains control at boot time.

To change the system parameters, enter the BIOS Setup utility by pressing the F2 key when prompted as the system is booting up.

To access the BIOS Setup utility remotely, you can log in by means of an SSH client. Refer to the *Sun Fire V20z Server Management Guide*, 817-5249-xx, for more information about managing the server remotely.

---

**Note** – If you are using a USB keyboard, the F2 key may not work properly when entering BIOS Setup unless the F-Lock key is on.

---

From the Main setup screen, you can access other setup screens, such as Security and Power. The tables in the following sections describe each parameter setting in the Setup Utility.

To navigate between items in a menu:

- Use the up and down arrow keys to move among the settings in each menu.
- Use the left and right arrow keys to change the options for each setting.

Items that include submenus begin with a triangle icon. To access a submenu, select the item so that it is highlighted and press Enter.

## 2.4.1 Main Menu

TABLE 2-2 shows the options that are available from the BIOS Main menu.

**TABLE 2-2** BIOS Main Menu

Menu Option	Description	Default
System Time	Enter the system time (hours:minutes:seconds) in the specified fields and press Enter to save the data. Use the Tab key to move to the next field and use Shift+ Tab to move to the previous field.	Current time
System Date	Enter the current date in the month, day, and year fields. Press Enter to save the data. Use the Tab key to move to the next field and use Shift + Tab to move to the previous field.	Current date
Legacy Diskette A	Set the type of floppy disk drive installed as diskette A. Options include: Disabled, 360Kb 5.25 in, 1.2MB 5.25 in, 720Kb 3.5 in, 1.44/1.25MB 3.5 in, and 2.88MB 3.5 in. <i>Note:</i> 1.44/1.25MB 3.5 references a 1024 byte sector Japanese media format. This diskette requires a 3-mode floppy disk drive.	1.44/1.25 MB 3.5 in.
Legacy Diskette B	Sets the type of floppy disk drive installed as diskette B. Options include: Disabled, 360Kb 5.25 in, 1.2MB 5.25 in, 720Kb 3.5 in, 1.44/1.25MB 3.5 in, and 2.88MB 3.5 in. <i>Note:</i> 1.44/1.25MB 3.5 references a 1024 byte sector Japanese media format. This diskette requires a 3-mode floppy disk drive.	Disabled

**TABLE 2-2** BIOS Main Menu (Continued)

Menu Option	Description	Default
Primary Master	Set the parameters of the IDE Primary Master/Slave and IDE Secondary Master slots. Press Enter to activate the submenu screen to configure each of these settings. The submenu options include:	
Primary Slave	<ul style="list-style-type: none"> <li>• <i>Type</i>: The type of IDE hard drive. Options include: Auto (allows BIOS to automatically determine the hard drive's capacity, number of heads, etc.), User, a number from 1 to 39 to select a predetermined type of hard drive, CD-ROM, ATAPI Removable, and IDE Removable.</li> </ul>	Auto Multisector
Secondary Master	<ul style="list-style-type: none"> <li>• <i>Multi-Sector Transfers</i>: The number of transfer sectors. Options include: Disabled, 2, 4, 8, and 16 sectors.</li> <li>• <i>LBA Mode Control</i>: Determines whether BIOS will access the IDE Primary Master Device via LBA mode. Options include: Enabled and Disabled.</li> <li>• <i>32-bit I/O</i>: Selects the 32-bit I/O operation. Options include: Enabled and Disabled.</li> <li>• <i>Transfer Mode</i>: Selects the transfer mode. Options include: Standard, Fast PIO1, Fast PIO2, Fast PIO3, Fast PIO4, FPIO3/DMA1, and FPIO4/DMA2.</li> <li>• <i>Ultra DMA Mode</i>: Selects Ultra DMA Mode. Options include: Disabled, Mode 0, Mode 1, Mode 2, Mode 3, Mode 4, Mode 5, and Mode 6.</li> </ul>	Disabled Disabled Disabled Standard Disabled
HDD Post Write Buffer	Enable or disable HDD Post Write Buffer support.	Enabled
Large Disk Access Mode	For UNIX, Novell Netware, or other operating systems select Other. If you are installing new software and the drive fails, change this selection and try again. Different operating systems require different representations of drive geometries. Options include: DOS and Other.	DOS
Boot Summary	Enable or disable display of the system configuration on boot.	Disabled
System Memory	Displays how much system memory is recognized as present in the system.	Current memory
Extended Memory	Displays how much extended memory is recognized as present in the system.	Current memory

## 2.4.2 Advanced Menu

TABLE 2-3 shows the options that are available from the Advanced menu.

**TABLE 2-3** BIOS Advanced Menu

Menu Option	Description	Default
Reset Configuration Data	Clears the Extended System Configuration Data (ECSD). Options include: Yes and No.	No
Multiprocessor Specification	Configures the MP Specification revision level. Some operating systems require 1.1 for compatibility. Options include: 1.4 and 1.1.	1.4
PCI Interrupts From MP Table	Configures the MP Table with PCI Interrupt entries. Options include: Yes and No.	Yes
Machine Check Stop	If enabled, system stops when a machine check error occurs. If disabled, system reboots when a machine check error occurs. Only applies if your operating system does not have its own machine check handler.	Disabled
QuickBoot Mode	Allows the system to skip tests while booting. Options include: Enabled and Disabled.	Disabled
SRAT Table	Enables the ACPI 2.0 Static Resource Affinity Table for operating systems that support an SRAT and will disable node interleaving. Disabled allows for node interleaving. Options include: Enabled and Disabled.	Enabled
Node Interleave	If set to Auto, node interleaving is enabled if memory sizes match and if SRAT table is disabled. Options include: Auto and Disabled.	Disabled
Bank Interleave	If set to Auto, bank interleaving is enabled if the memory size and type match. Options include: Auto and Disabled.	Auto

**TABLE 2-3** BIOS Advanced Menu (Continued)

Menu Option	Description	Default
Chipset Configuration	Options for advanced chipset features. Options include:	
<p><i>Caution:</i> Don't change the settings unless you are sure of what you are doing. Setting items on this menu to incorrect values may cause your system to malfunction.</p>	<ul style="list-style-type: none"> <li>• <i>ECC:</i> Enable or disable ECC check/correct mode. This is a global enable function for all blocks within the CPU core and North Bridge.</li> </ul>	Enabled
	<ul style="list-style-type: none"> <li>• <i>DRAM ECC:</i> If all memory in the system supports ECC (x72), enabling invokes initial scrub DRAM and enables system requests to DRAM to be checked and/or corrected. Options include: Enabled and Disabled.</li> </ul>	Enabled
	<ul style="list-style-type: none"> <li>• <i>ECC Scrub Redirection:</i> Enable or disable EDD Scrubber to correct errors detected in DRAM during normal CPU requests (foreground scrubbing).</li> </ul>	Enabled
	<ul style="list-style-type: none"> <li>• <i>Chip-Kill:</i> Enabled or disable the ChipKill ECC on nodes with all x4 ECC capable DIMMS.</li> </ul>	Enabled
	<ul style="list-style-type: none"> <li>• <i>DCACHE ECC Scrub CTL:</i> Sets the rate of background scrubbing for DCACHE lines. Options include: 5.12 <math>\mu</math>s, 10.2 <math>\mu</math>s, 20.5 <math>\mu</math>s, 41.0 <math>\mu</math>s, Disabled, 640 nx, 1.28 <math>\mu</math>s, 2.56 <math>\mu</math>s.</li> </ul>	5.12 us
	<ul style="list-style-type: none"> <li>• <i>L2 ECC Scrub CTL:</i> Sets the rate of background scrubbing for L2 cache lines. Options include: 10.2 us, 20.5 <math>\mu</math>s, 41.0 <math>\mu</math>s, 81.9 <math>\mu</math>s, Disabled, 1.28 <math>\mu</math>s, 2.56 <math>\mu</math>s, 5.12 <math>\mu</math>s.</li> </ul>	10.2 us
	<ul style="list-style-type: none"> <li>• <i>DRAM ECC Scrub CTL:</i> Sets the rate of background scrubbing for DRAM (in addition to normal ECC scrubbing from system requests). Background agent works independently of CPU requests and bus masters, but cannot be enabled without first enabling DRAM ECC. Options include: 163.8 us, 327.7 <math>\mu</math>s, 655.4 <math>\mu</math>s, 1.31 ms, Disabled, 20.5 <math>\mu</math>s, 41.0 us, 81.9 <math>\mu</math>s.</li> </ul>	163.8 us
	<ul style="list-style-type: none"> <li>• <i>SRAT Table:</i> Enables the ACPI 2.0 Static Resource Affinity Table for operating systems that support an SRAT and will disable node interleaving. Disabled allows for node interleaving. Options include: Enabled and Disabled.</li> </ul>	Enabled
<ul style="list-style-type: none"> <li>• <i>Node Interleave:</i> If set to Auto, node interleaving will be enabled if memory sizes match and if SRAT table is disabled. Options include: Auto and Disabled.</li> </ul>	Disabled	



**TABLE 2-3** BIOS Advanced Menu (Continued)

Menu Option	Description	Default
	<ul style="list-style-type: none"><li>• <i>Bank Interleave</i>: If set to Auto, bank interleaving is enabled if the memory size and type match. Options include: Auto and Disabled.</li></ul>	Auto
Keyboard Configuration	Options for keyboard feature menu. Options include: <ul style="list-style-type: none"><li>• <i>Numlock</i>: Selects Power-on state for Numlock. Options include: Auto, On, Off.</li><li>• <i>Keyboard Auto-Repeat Rate</i>: Selects the key repeat rate. Options include: 30/sec, 26.7/sec, 21.8/sec, 18.5/sec, 13.3/sec, 10/sec, 6/sec, 2/sec.</li><li>• <i>Keyboard Auto-Repeat Delay</i>: Selects delay before key repeat. Options include: 1/2 sec, 3/4 sec, 1 sec, 1/4 sec.</li></ul>	Auto 30/sec 1/2 sec

**TABLE 2-3** BIOS Advanced Menu (Continued)

Menu Option	Description	Default
I/O Device Configuration	Options for peripheral menu. Options include:	
	<ul style="list-style-type: none"> <li>• <i>PS/2 Mouse</i>: Disabled prevents any installed PS/2 mouse from functioning, but frees up IRQ 12. Enabled forces the PS/2 mouse port to be enabled regardless of whether a mouse is present. Auto Detect enables the PS/2 mouse only if present. OS Controlled only displays if the OS controls the mouse.</li> </ul>	Enabled
	<ul style="list-style-type: none"> <li>• <i>Floppy Disk Controller</i>: Options include: Enabled (user configuration), Disabled (no configuration), Auto (BIOS or OS chooses configuration), and OS Controlled (displayed when controlled by the operating system).</li> </ul>	Enabled
	<i>USB Host Controller</i> : Enables or disables the USB hardware. Disabled resources are freed for other users.	Enabled
	<i>USB BIOS Legacy Support</i> : Enables or disables support for USB devices. Enable for use with a non-USB aware operating system such as DOS, Linux or Solaris.	Disabled
	<ul style="list-style-type: none"> <li>• <i>Onboard PCI IDE</i>: Enables the integrated local bus IDE adapter. Options include: Disabled, Primary, Secondary, Both.</li> </ul>	IDE: Both
	<ul style="list-style-type: none"> <li>• <i>Serial Port A</i>: Assigns control of serial port A. Options include: Enabled, Auto, or Disabled. When enabled, you must also select the Base I/O Address (options are 3F8, 2F8, 3E8, and 2E8) and Interrupt (options are IRQ3 and IRQ4) for serial port A.</li> </ul>	Disabled
	<ul style="list-style-type: none"> <li>• <i>Ethernet Adapter 1 MAC</i>: Displays the Onboard Ethernet Adapter 1 MAC address.</li> </ul>	MAC address
<ul style="list-style-type: none"> <li>• <i>Ethernet Adapter 2 MAC</i>: Displays the Onboard Ethernet Adapter 2 MAC address.</li> </ul>	MAC address	

**TABLE 2-3** BIOS Advanced Menu (Continued)

Menu Option	Description	Default
PCI Configuration	Setup items for configuring the specific PCI device Slot #1 or Slot #2:	
	<ul style="list-style-type: none"> <li>• <i>Option ROM Scan</i>: When disabled, the device is not bootable but still usable under the operating system. When enabled, initializes the device expansion ROM; makes device bootable.</li> </ul>	Enabled
	<ul style="list-style-type: none"> <li>• <i>Enable Master</i>: Enables or disables the selected device as a PCI bus master.</li> </ul>	Enabled
	<ul style="list-style-type: none"> <li>• <i>Latency Timer</i>: Minimum guaranteed time slice allotted for bus master in units of PCI bus clocks. Options include: 0040h, 0060h, 0080h, 00A0h, 00C0h, 00E0h, default, and 0020h.</li> </ul>	0040h
	Setup items for configuring the Embedded Broadcom device GBIT 0 or GBIT 1:	
	<ul style="list-style-type: none"> <li>• <i>Option ROM Scan</i>: When disabled, the device is not bootable but still usable under the operating system. When enabled, initializes device expansion ROM; makes device bootable.</li> </ul>	Enabled
Console Redirection	Reserve specific IRQs for use by legacy ISA devices:	
	<ul style="list-style-type: none"> <li>• <i>PCI/PNP IRQ Exclusion</i>: Reserves the specified IRQ for use by legacy ISA devices.</li> </ul>	Available
	<ul style="list-style-type: none"> <li>• <i>PCI/PNP UMB Exclusion</i>: Reserves the specified block of upper memory for use by legacy ISA devices.</li> </ul>	Available
Console Redirection	Additional setup to configure console. Options include:	
	<ul style="list-style-type: none"> <li>• <i>COM port address</i>: If enabled, the console uses a port on the motherboard. Options include: Disabled, On-board COM A, On-board COM B.</li> </ul>	COM A
	<ul style="list-style-type: none"> <li>• <i>Console connection</i>: Indicates whether the console is connected directly to the system or through a modem. Options include: Direct and Modem.</li> </ul>	Direct
	<ul style="list-style-type: none"> <li>• <i>Baud rate</i>: Enables the specified baud rate. Options include: 300, 1200, 2400, 9600, 19.2K, 38.4 K, 57.6K, 115.2 K.</li> </ul>	9600

**TABLE 2-3** BIOS Advanced Menu (Continued)

Menu Option	Description	Default
	<ul style="list-style-type: none"> <li>• <i>Flow control</i>: Enables flow control. Options include: None, XON/XOFF, CTS/RTS.</li> </ul>	None
	<ul style="list-style-type: none"> <li>• <i>Console type</i>: Enables the specified console type. Options include: VT100, VT100 8 bit, ANSI 7 bit, ANSI VT100 plus, VTF8.</li> </ul>	ANSI
	<ul style="list-style-type: none"> <li>• <i>Continue CR after POST</i>: Normally, console redirection is off before the operating system loads. Set this item to on to troubleshoot the BIOS boot problems. Note: the operating system loader typically interrupts console redirection once it starts. Options include: On and Off.</li> </ul>	Off

## 2.4.3 Security Menu

TABLE 2-4 shows the options that are available from the BIOS Security menu.

**TABLE 2-4** BIOS Security Menu

Menu Option	Description	Default
Supervisor Password Is:	Displays whether a supervisor password has been entered for the system. Clear means such a password has not been used and Set means a supervisor password has been entered for the system.	Clear
User Password Is:	Displays whether a user password has been entered for the system. Clear means such a password has not been used and Set means a user password has been entered for the system.	Clear
Set Supervisor Password	Supervisor password controls access to the Setup Utility. Enter the Supervisor's password to set or change it. Enables access to BIOS.	Enter

**TABLE 2-4** BIOS Security Menu *(Continued)*

Menu Option	Description	Default
Set User Password	Enter the user's password to set or change it. Enables access to the system at boot time.	Enter
Password on Boot	Allows you to require a password to be entered when the system boots. Options include: Enabled (password required) and Disabled (password not required).	Disabled
Fixed Disk Boot Sector	May offer protection against viruses when set to Write Protect, which protects the boot sector on the hard drive from having a virus written to it. Options include: Write Protect and Normal.	Normal

## 2.4.4 Power Menu

TABLE 2-5 shows the options that are available from the BIOS Power menu.

**TABLE 2-5** BIOS Power Menu

Menu Option	Description	Default
Resume on Time	Wakes the system up at the specified time. Options are On or Off.	Off
Resume Time	If turned on, specifies the time you want the system to wake up.	00:00:00
Resume Date	If turned on, specifies the date you want the system to wake up.	00/00/0000
After Power Failure	Sets the mode of operation if an AC power loss occurs. Two modes are available: Stay powered off: returns the system to an off state. Power on: returns the system to a full on state. Last state: returns the server to the state it was at before the power went off.	Stay powered off

## 2.4.5 Boot Menu

TABLE 2-6 shows the options that are available from the BIOS Boot menu. To change the order of the boot items, select an item and press the plus (+) key to move the item up in the order and the minus (-) key to move the item down in the order.

**TABLE 2-6** BIOS Boot Menu

<b>Menu Option</b>	<b>Description</b>	<b>Default Boot Order</b>
Removable Devices (Floppy)	Boot from the floppy drive	First boot device
CD-ROM Drive	Boot from the CD-ROM	Second boot device
Hard Disk	Boot from the hard disk	Third boot device
MBA v7.0.1 Slot 0210	Boot from the on-board NIC #1	Fourth boot device
MBA v7.0.1 Slot 0218	Boot from the on-board NIC #2	Fifth boot device

## 2.4.6 Exit Menu

TABLE 2-7 shows the options that are available from the BIOS Exit menu.

**TABLE 2-7** BIOS Exit Menu

<b>Menu Item</b>	<b>Description</b>
Exit Saving Changes	Exit System Setup and save changes to CMOS.
Exit Discarding Changes	Exit System Setup without saving changes.
Load Setup Defaults	Load defaults for all setup items.
Discard Changes	Load previous values from CMOS for all setup items.
Save Changes	Save setup data to CMOS.

## 2.4.7 Quick Boot Feature

The QuickBoot feature, which disables BIOS memory tests, defaults to disabled, which is the recommended setting.

If you choose to set Quickboot to enabled, you need to perform the following steps to disable the QuickBoot feature whenever you add new memory, so that the new memory configuration can be tested.

- 1. Boot the server and run BIOS Setup by pressing the F2 key during the boot process.**

- 2. From the Advanced menu, disable the QuickBoot option.**

Now the BIOS will run at least one full memory test for your new memory when the server is rebooted.

- 3. Press F10 to save the changes and exit.**

The system will automatically reboot and run the memory configuration tests.

- 4. When all memory passes the tests, press the F2 key to enter BIOS Setup and re-enable the QuickBoot option in the BIOS Advanced menu, if needed.**

---

## 2.5 Booting to a USB Diskette Device

Only one diskette device is bootable on the Sun Fire V20z server. By default, the internal diskette device is the only device from which you can boot.

To change the assignment of the diskette devices so that the server boots from the USB diskette device, rather than the internal diskette device, perform the following steps:

1. **Attach the USB diskette device.**
2. **Power on and reboot the system.**
3. **Press the F2 key to enter the BIOS Setup utility.**
4. **From the Advanced menu, choose I/O Device Configuration.**
5. **Change the USB Host Controller and USB BIOS Legacy Support submenu options to Enable.**
6. **Press the F10 key to save your changes and reboot the server.**
7. **When prompted, press the F2 key to enter the BIOS Setup utility.**
8. **In the Boot menu, select Removable Devices.**
9. **Select USB Floppy from the Removable Devices submenu, and press the plus (+) key to move USB Floppy to the top of the list of devices.**
10. **Press the F10 key to save your changes and reboot.**

The USB diskette device is bootable as drive A. If left enabled, the internal floppy becomes drive B and is not bootable.

---

**Note** – To change the internal diskette device to drive A again, disconnect the USB diskette device and reboot the server. The internal diskette device will be assigned to drive A, and if you reattach the USB diskette device, it will be assigned to drive B.

---



## Troubleshooting and Diagnostics

---

Before troubleshooting your specific server problem, collect the following information:

- What events occurred prior to the failure?
- Was any hardware or software modified or installed?
- Was the server recently installed or moved?
- How long has the server exhibited symptoms?
- What is the duration or frequency of the problem?

The guidelines in “Preventative Troubleshooting” on page 3-2 will help you to prevent problems from occurring and will make troubleshooting easier.

After you have assessed the problem and noted your current configuration and environment, you can choose from several ways to troubleshoot your Sun Fire V20z server:

- Visually inspect your system as described in “Visually Inspecting Your System” on page 3-3.
- Execute the Troubleshooting Dump Utility as described in “Troubleshooting Utility” on page 3-5.
- Execute diagnostics tests as described in “Diagnostics” on page 3-5.

---

## 3.1 Preventative Troubleshooting

Creating and following procedures can help prevent problems and make troubleshooting easier.

Follow these guidelines for preventative troubleshooting:

- Use uniform naming conventions for your servers, such as names that denote server location. Uniform naming conventions help when you try to remember often overlooked details that can hold the key to resolving a crisis.
- Use unique IDs or names for your devices. You can reduce the risk of components competing for the same resource if you have a list. Use the server setup utility to check for conflicts.
- Create a backup plan. Schedule backups based on the needs of your server. If data is changed frequently, frequent backups are required. Maintain a library of backups based on your information restoring needs. Test your backups periodically to be sure that your data is correctly stored.
- Use enterprise systems management tools to automate the following processes, or manually track this information:
  - Check hard disk space periodically. It is recommended that hard drives have a minimum of 15 percent of free space.
  - Keep historical data. You will not know that the CPU utilization has increased 50 percent if you do not know what it was initially. If you have problems, you can use the data to compare before and after scenarios. For example, you might want to know about the user, bus, and power utilization rates.
  - Keep a trend analysis so that you will know what to expect during certain points in time. For example, if the CPU utilization rate always increases by 50 percent during certain hours, you will know that increase is normal for the server you are tracking.
- Create a problem resolution notebook. When problems do occur, keep a log of the actions you took to resolve them. This could help you solve the same problem more quickly in the future. This information can save a great deal of time in the future and ensure accuracy, especially when dealing with future part replacement.
- Keep an updated network topology map in an accessible location. This will help in troubleshooting networking problems.

- Most problems occur when something in the server has changed. When making changes to your server, follow these guidelines:
  - Document the system settings. If the system configuration will change, first obtain a record of the current system configuration settings.
  - If possible, make changes one at a time to isolate problems if they should occur. This enables you to maintain a controlled environment and reduces the scope of any troubleshooting. Record the results of each change, including any errors or informational messages.
  - Check for potential device conflicts before adding a new device. Check for any potential version dependencies, especially with third party software.

---

## 3.2 Visually Inspecting Your System

Improperly set controls and loose or improperly connected cables are common causes of problems with hardware components. When investigating a system problem, first check all the external switches, controls, and cable connections. See “External Visual Inspection” on page 3-3.

If this does not resolve your problem, then visually inspect the system’s interior hardware for problems such as a loose card, cable connector, or mounting screw. See “Internal Visual Inspection” on page 3-4.

### 3.2.1 External Visual Inspection

To visually inspect the external system, follow these steps:

1. **Note the state of the system fault LED on the front of the server.**

The system fault LED blinks when a severe system fault, such as an overvoltage condition or an upper temperature limit, is detected. See FIGURE 1-1 for the location of the system fault LED.
2. **Turn off the system and any attached peripherals (if applicable).**
3. **Verify that all power cables are properly connected to the system, the monitor, and peripherals, and check their power sources.**
4. **Inspect connections to any attached devices including network cables, keyboard, monitor, and mouse, as well as any devices attached to the serial port.**

## 3.2.2 Internal Visual Inspection

To visually inspect the internal system, follow these steps:

---

**Note** – Before proceeding, read the safety instructions in the *Sun Fire V20z Server Safety and Compliance Guide*, 816-7190-xx, for your system.

---

1. **Shut down the operating system, if necessary, and turn off the platform power on the front of the server.**
2. **Turn off the AC power on the back of the server.**
3. **Turn off including any attached peripherals, but do not disconnect the power cables.**
4. **Remove the cover, following the procedures in *Safety Guidelines (Before You Remove the Cover)* on page 4-2.**



---

**Caution** – Some components, such as the heatsink, can become extremely hot during system operations. Allow these components to cool before handling them.

---

5. **Verify that the components are fully seated in their sockets or connectors and that sockets are clean.**
6. **Check all cable connectors inside the system to verify that they are firmly attached to their appropriate connectors.**
7. **Replace the cover.**
8. **Reconnect the system and any attached peripherals to their power sources, and turn them on.**

---

## 3.3 Troubleshooting Utility

You can also use the Troubleshooting Dump Utility (TDU), which captures the following information:

- System state table (SST)
- Hardware and software component version numbers
- Machine check register values
- CPU trace buffers
- CPU configuration space registers (CSRs)
- Event log file
- The last good configuration (LGC)

To run the Troubleshooting Dump Utility, type the following command:

```
# sp get tdulog
```

The Troubleshooting Dump Utility can take up to 15 minutes to run. The system prompt displays when it is completed.

The captured data is gathered and stored on the service processor in a compressed tar file. Refer to the *Sun Fire V20z Server Management Guide*, 817-5249-xx, for more information about the command and its options.

---

## 3.4 Diagnostics

Diagnostics are a set of tests that determine the health of the hardware in your Sun Fire V20z server. Diagnostics tests are used to verify hardware functionality and indicate device failures. You can test your system using the diagnostics tests included with your system to accomplish the following:

- Test and diagnose hardware functionality
- Locate hardware failures
- Isolate hardware and software faults

The diagnostics tests included with your system can help you eliminate the hardware as a potential cause when you experience a server malfunction or when debugging problems. For information about installing the diagnostics tests by means of the Network Share Volume (NSV) software, refer to the *Sun Fire V20z Server Installation Guide*, 817-5246-xx.

## 3.4.1 Mounting the Diagnostics Tests

Before running the Sun Fire V20z diagnostics tests, you need to mount the Network Share Volume (NSV) software from the NFS server on which it is located. If you haven't installed the NSV on an NFS server yet, refer to the instructions on installing the NSV software in the *Sun Fire V20z Server Installation Guide*, 817-5246-xx.

1. **Log in to the Sun Fire V20z server SP via SSH by typing the following command at the NFS server's command prompt:**

```
# ssh -l manager_or_higher_login SSH_hostname
```

2. **Mount the NSV onto the Sun Fire V20z server SP by typing the following command:**

```
# sp add mount -r NFS_server_hostname:/directory_with_NSV_files -l /mnt
```

3. **Update the diagnostics software by typing the following command**

```
# sp update diags -P /mnt/diags/NSV_version#
```

Where *version#* is the version for the NSV software that was mounted in Step 2. For example: NSV\_V2.0.0.42

4. **Continue with "Enabling the Diagnostics Tests" on page 3-6.**

## 3.4.2 Enabling the Diagnostics Tests

Whenever a major component in the system does not function properly, you may have a component failure. As long as the microprocessor and the input and output components of the system (the monitor, keyboard, and diskette drive) are working, you can run diagnostics.

The NSV must be mounted on the service processor in order to run diagnostics commands. Refer to the *Sun Fire V20z Server Installation Guide*, 817-5246-xx, for information on mounting the NSV.

To enable diagnostics, execute one of the following commands:

- When the Sun Fire V20z platform power is off, run the following command to boot the server and enable diagnostics:

```
# diags start
```

- When the Sun Fire V20z platform power is on and the operating system is installed, along with all necessary drivers, use the following command to reboot the server and enable diagnostics:

```
# platform set os state reboot-to-diags start
```

You can begin running diagnostics on the service processor while the platform diagnostics are loading. You can use the **diags get state** command to determine whether the platform diagnostics are loaded. Refer to Appendix C for more information about this command.

### 3.4.3 Listing Available Diagnostics Tests and Modules

To list the available tests and modules, type the following command:

```
# diags get tests
```

Tests are available for the following modules:

- Fans: Fan tests verify that each fan is rotating and the RPM is within the specified ranges.

---

**Note** – The power supply fans are not testable by this diagnostic.

---

- Memory: Memory tests identify memory errors, address decoding faults, and dataline faults.
- Network Controllers: An internal loopback test is available for NIC testing.
- Operator Panel: The operator panel tests verify the memory of the operator panel. The value and location of any errors are indicated.
- Slag: Slag tests are non-interactive tests that verify the correct operation of the LED drive circuitry.
- Storage: Storage tests invoke a self-test on the SCSI drive.
- Temperature: Temperature tests verify that each of the temperature sensors is functional and that the temperature is within the specified ranges.
- Voltage: Voltage tests are derived for power supply and bulk voltages (generated by the VRMs associated with the CPU and memory), to determine whether the voltage sensors are operating within their predefined limited.

TABLE 3-1 lists the diagnostics modules and tests that are associated with each module.

**TABLE 3-1** Diagnostics Modules and Tests

Module	Test	Devices
fan	speed.fan1	CPU 1 memory fan 1
fan	speed.fan2	CPU 1 memory fan 2
fan	speed.fan3	CPU 1 fan 1
fan	speed.fan4	CPU 1 fan 2

**TABLE 3-1** Diagnostics Modules and Tests *(Continued)*

<b>Module</b>	<b>Test</b>	<b>Devices</b>
fan	speed.fan5	CPU 0 fan 1
fan	speed.fan6	CPU 0 fan 2
memory	adjacency.allDimms	All DIMMs
memory	dataline.allDimms	All DIMMs
memory	pattern.allDimms	All DIMMs
nic	phyLoop.Nic.0	Ethernet Port 0
nic	phyLoop.Nic.1	Ethernet Port 1
opPanel	write.opPanel	Operator Panel
slag	toggleLED.CD	CD LED
slag	toggleLED.CPU0	CPU 0 LED
slag	toggleLED.CPU0-DDR-VRM	CPU 0 DDR VRM
slag	toggleLED.CPU0-DIMM0	CPU 0 DIMM 0
slag	toggleLED.CPU0-DIMM1	CPU 0 DIMM 1
slag	toggleLED.CPU0-DIMM2	CPU 0 DIMM 2
slag	toggleLED.CPU0-DIMM3	CPU 0 DIMM 3
slag	toggleLED.CPU0-VRM	CPU 0 VRM
slag	toggleLED.CPU1	CPU 1
slag	toggleLED.CPU1-DDR-VRM	CPU 1 DDR VRM
slag	toggleLED.CPU1-DIMM0	CPU 1 DIMM 0
slag	toggleLED.CPU1-DIMM1	CPU 1 DIMM
slag	toggleLED.CPU1-DIMM2	CPU 1 DIMM 2
slag	toggleLED.CPU1-DIMM3	CPU 1 DIMM 3
slag	toggleLED.CPU1-VRM	CPU 1 VRM
slag	toggleLED.Disk-0	Disk 0 toggle LED
slag	toggleLED.Disk-1	Disk 1 toggle LED
slag	toggleLED.Disk-Backplane	Disk backplane toggle LED
slag	toggleLED.Floppy	Floppy toggle LED
slag	toggleLED.LCD-Indicator	LCD indicator toggle LED
slag	toggleLED.Motherboard	Motherboard toggle LED
slag	toggleLED.PCI-0	PCI 0 toggle LED



**TABLE 3-1** Diagnostics Modules and Tests *(Continued)*

<b>Module</b>	<b>Test</b>	<b>Devices</b>
slag	toggleLED.PCI-1	PCI 1 toggle LED
slag	toggleLED.Power-Supply	Power supply toggle LED
storage	long.ATA0_0	ATA0 0 drive
storage	long.ATA0_1	ATA0 1drive
storage	long.SCSI_0	SCSI 0 drive
storage	long.SCSI_1	SCSI 1 drive
storage	short.ATA0_0	ATA0 0 drive
storage	short.ATA0_1	ATA0 1 drive
storage	short.SCSI_0	SCSI 0 drive
storage	short.SCSI_1	SCSI 1 drive
temp	read.cpu0.dietemp	CPU 0 die
temp	read.cpu0.memtemp	CPU 0 memory
temp	read.cpu0.temp	CPU 0
temp	read.cpu1.dietemp	CPU 1 die
temp	read.cpu1.memtemp	CPU 1 memory
temp	read.cpu1.temp	CPU 1
temp	read.gbeth.temp	GigaBit on Broadcomm
temp	read.golem.temp	HyperTransport tunnel on AMD 8131 chip
temp	read.hddb.temp	Hard disk backplane
temp	read.sp.temp	Service processor
temp	read.thor.temp	South Bridge
voltage	limits.VCC_120_S0	VCC 120 S0
voltage	limits.VCC_50_S0	VCC 50 S0
voltage	limits.VCC_50_S5	VCC 50 S5
voltage	limits.VDDA_CPU0_25_S0	VDDA CPU0 25 S0
voltage	limits.VDD_18_S0	VDD 18 S0
voltage	limits.VDD_18_S5	VDD 18 S5
voltage	limits.VDD_25_S0	VDD 25 S0
voltage	limits.VDD_25_S5	VDD 25 S5
voltage	limits.VDD_33_S0	VDD 33 S0

**TABLE 3-1** Diagnostics Modules and Tests *(Continued)*

<b>Module</b>	<b>Test</b>	<b>Devices</b>
voltage	limits.VDD_33_S3	VDD 33 S3
voltage	limits.VDD_33_S5	VDD 33 S5
voltage	limits.VDD_CPU0_25_S3	VDD CPU0 25 S3
voltage	limits.VDD_CPU0_CORE_S0	VDD CPU0 CORE S0
voltage	limits.VDD_CPU1_25_S3	VDD CPU1 25 S3
voltage	limits.VDD_CPU1_CORE_S0	VDD CPU1 CORE S0
voltage	limits.VLDT_CPU0_LDT1	VLDT CPU0 LDT1
voltage	limits.VLDT_CPU0_LDT2	VLDT CPU0 LDT2
voltage	limits.VLDT_G_LDT1	VLDT G LDT1
voltage	limits.VTT_CPU0_DDR_S3	VTT CPU0 DDR S3
voltage	limits.VTT_CPU1_DDR_S3	VTT CPU1 DDR S3

## 3.4.4 Running Diagnostic Tests

When running tests, you can choose to execute all tests or specify a specific module for which to run tests. The following options are available:

- Run tests individually or collectively
- Choose the type (by module or name) of tests to run
- Determine the sequence in which the tests are run (using scripts)
- View status messages about the success of the tests

You can run these tests on the machine on which you obtained them. You must have the appropriate permissions to run these commands.

To run the diagnostics tests, type the following command:

```
# diags run tests option
```

Where the *option* is one of the following:

Option	Description
<code>-n <i>test_name</i></code>	To run one test at a time, replace <i>test_name</i> with the name of the test. You can specify more than one test by listing test names with a space between them.
<code>-m <i>module</i></code>	To run a batch of tests by module, replace <i>module</i> with the name of the test module.
<code>-a</code>	Use this option to run all available diagnostics tests.

For example, if you suspect that you are having voltage problems, run the voltage module diagnostic tests:

```
# diags run tests -m voltage
```

Refer to Appendix C for more information about using these command options.

You can write scripts for additional control over the sequencing and timing of the tests. For example, you could write a shell script to repeat a test a specified number of times.

## 3.4.5 Viewing Test Results

After a test successfully executes, the status returns. When a test receives an error, it reports the error and continues to run any remaining tests submitted with the command.

The following output is typically generated for all diagnostics tests:

- Submitted Test Name
- Test Handle (a dynamically assigned unique number used by the diagnostics application to identify a running test)
- Test Result (Passed, Failed)
- Details (for example, Failure Details, Tests Details)

Specifying the `-v` | `--verbose` option when running the test displays additional data about a test. See Appendix C for more details.

For example, test details may include high, nominal, and low values.

The following is an example of two passed test cases and one failed test case:

```
Results
Submitted Test Name          Test Handle          Test Result
adjacency.allDimms          P1                   Passed
dataline.allDimms           P2                   Passed
pattern.allDimms            P3                   Failed
Failure Details: FAILED, addr(0xc0000008) CPU 1 - DIMM 3)
Expected [5a5a5a5a5a5a5a5a] Actual [a5a5a5a5a4a5a5a5] Difference
[1000000]
Memory Configuration: Total: 3584Mb
CPU0-2048Mb CPU1-1536Mb
CPU 0: Width[128] Addr 0 - 7fffffff
DIMM 0 512MB Addr 0000000000 - 003fffffff Even Quad Word
DIMM 1 512MB Addr 0000000000 - 003fffffff Odd Quad Word
DIMM 2 512MB Addr 0040000000 - 007fffffff Even Quad Word
DIMM 3 512MB Addr 0040000000 - 007fffffff Odd Quad Word
CPU 1: Width[128] Addr 80000000 - dfffffff
DIMM 0 512MB Addr 0080000000 - 00bfffffff Even Quad Word
DIMM 1 512MB Addr 0080000000 - 00bfffffff Odd Quad Word
DIMM 2 256MB Addr 00c0000000 - 00dfffffff Even Quad Word
*DIMM 3 256MB Addr 00c0000000 - 00dfffffff Odd Quad Word
```

## 3.4.6 Stopping Tests

To cancel one or more individual tests, run the following command:

```
# diags cancel tests [[{ -t | --test} test_handle [{-a|--all}]]
```

Where *test\_handle* is a dynamically assigned unique number used by the diagnostics application to identify a running test. The test handle is displayed in the output of a test after it has been run.

To terminate all diagnostics tests and end the diagnostics session, run the following command:

```
# diags terminate
```

Refer to Appendix C for more information about these commands.

## Maintaining the Server

---

This chapter describes how to add, replace and configure components in the Sun Fire V20z server after it has been set up. It contains the following sections:

- “Tools and Supplies Needed” on page 4-2
- “Safety Guidelines (Before You Remove the Cover)” on page 4-2
- “Locations of Components” on page 4-3
- “Customer Replaceable Unit (CRU) Procedures” on page 4-4

To determine and isolate a faulty component, refer to “Troubleshooting and Diagnostics” on page 3-1.

---

## 4.1 Tools and Supplies Needed

- #2 crosshead screwdriver
- Antistatic wrist strap (recommended)
- Alcohol pads

---

## 4.2 Safety Guidelines (Before You Remove the Cover)

Before removing the system cover, observe these safety guidelines:

1. Turn off all peripheral devices connected to the system.
2. If the system is running, press and release the power button, on the front panel. Then turn off the main power switch, at the rear of the system.
3. Label and disconnect all peripheral cables and all telecommunication lines connected to I/O connectors or ports on the back of the system.

---

**Note** – Do not disconnect the AC power.

---

4. Before handling components, attach a wrist strap to a chassis ground (any unpainted metal surface).

---

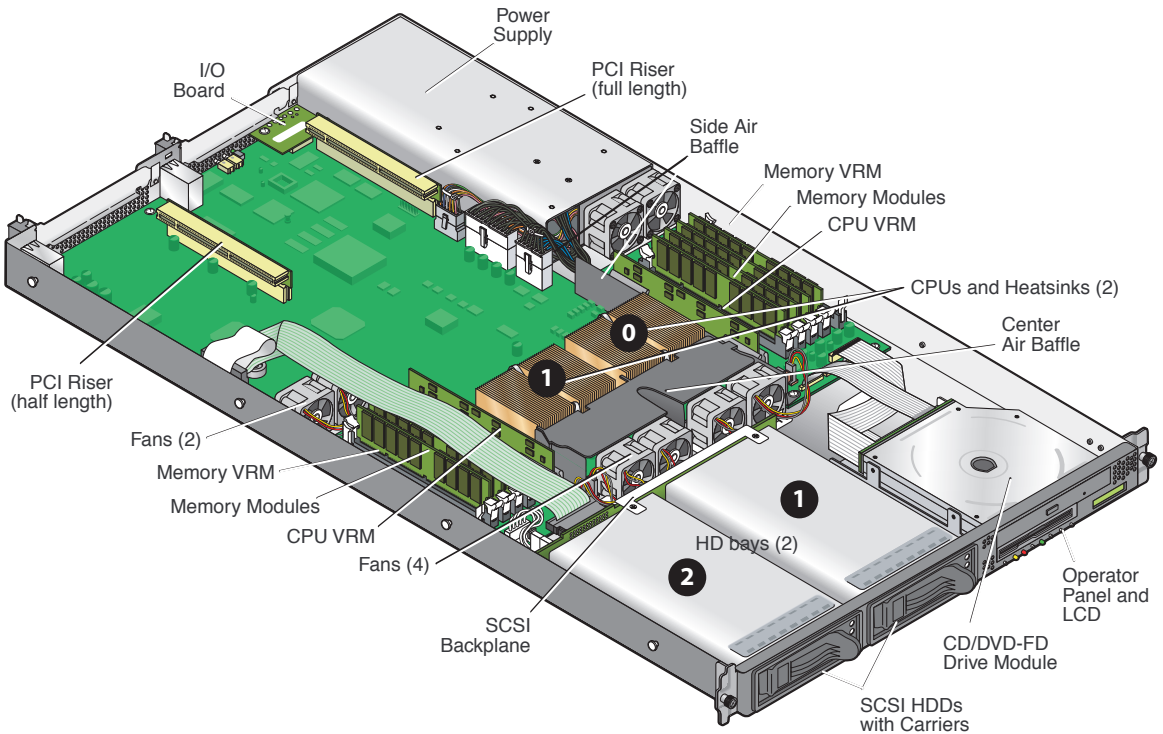
**Caution** – The system's printed circuit boards and hard disk drives contain components that are extremely sensitive to static electricity.

---

## 4.3 Locations of Components

Refer to Figure 4-1 to locate components before performing the remove and replace procedures.

The following figure indicates the location of each of these components:



**FIGURE 4-1** Locations of Components

---

## 4.4 Customer Replaceable Unit (CRU) Procedures

The following components are customer replaceable:

- I/O Board
- PCI Card(s) and Risers
- SCSI Hard Disk Drive(s) and Carriers
- SCSI Backplane
- CD-ROM/DVD/FDD Assembly
- Operator Panel and LCD
- Power Supply
- Fans
- Memory Voltage Regulator Modules
- CPU Voltage Regulator Modules
- Memory
- Battery
- Cable Kit
- CPU(s)
- SuperCRU

---

**Note** – Any configuration changes (CPU, memory, hard disk, add-in PCI cards, etc.) cause the server to revert to the factory default BIOS settings, regardless of how the server boot options have been set up using the System Setup Utility or the BIOS setup.

---

---

**Note** – If a Customer Replaceable Unit (CRU) needs replacement, you can request a replacement part from Sun. All parts replaced under warranty must be returned to Sun within 30 days of receipt of the replacement part.

---



## 4.4.1 I/O Board

Follow these steps to remove and replace the I/O board:

1. Turn off the system, including any attached peripherals.
2. While pressing the cover latch release button with your right thumb (A), slide the cover towards the rear of the chassis until it contacts the stop (B).
3. Lift the cover up and remove it.

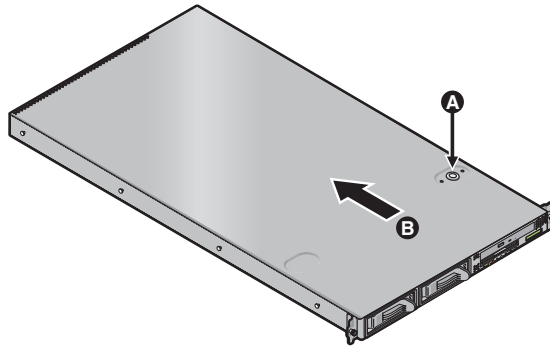


FIGURE 4-2 Removing the Cover

4. Remove the two screws securing the I/O board to the motherboard.

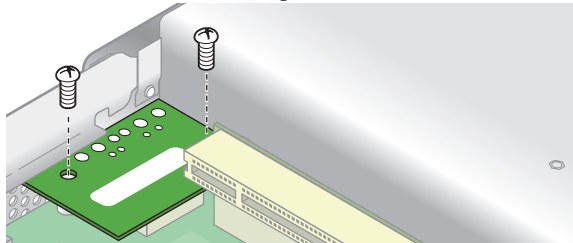


FIGURE 4-3 Removing the I/O Board

5. Lift the board straight up to free it from the connector on the motherboard.

Installation is the reverse of this procedure.

---

**Note** – When reinstalling the I/O board, ensure that the connector on the I/O board is seated in the corresponding connector on the motherboard.

---

---

**Note** – Check the routing of all cables for obstructions before reinstalling the cover.

---

## 4.4.2 PCI Card

The following procedure describes how to add or replace a PCI card.

1. Turn off the system, including any attached peripherals.
2. While pressing the cover latch release button with your right thumb (A), slide the cover towards the rear of the chassis until it contacts the stop (B).
3. Lift the cover up and remove it.

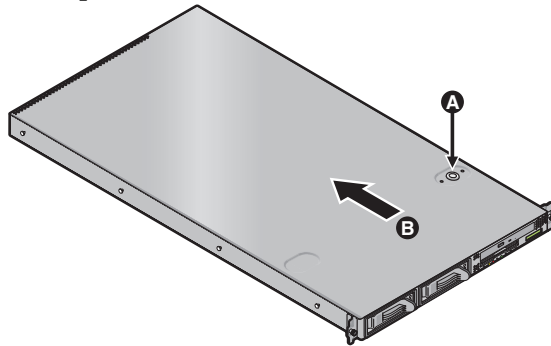


FIGURE 4-4 Removing the Cover

---

**Note – Before installing or replacing a PCI card, refer to the following guidelines:** If you are using the onboard NICs and one PCI card, install the PCI card in the right (full-length) slot.

If you are using the onboard NICs, and two PCI cards, install the faster PCI card in the right (full-length) slot, and the slower card in the left (half-length) slot.

If you are not using the onboard NICs, install a half-length card in the left (half-length) slot and a full-length card in the right (full-length) slot.

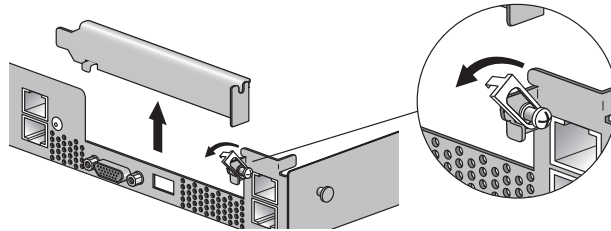
---

**Caution –** Do not use +5 V PCI cards or you may cause damage to the motherboard. Use only +3 V PCI cards in your Sun Fire V20z server.

---

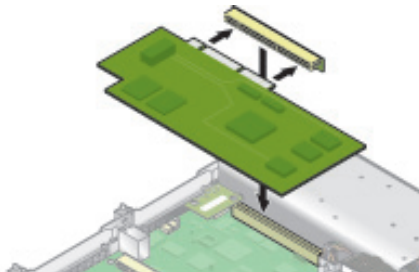
### 4.4.2.1 To Install a New PCI Card

1. Loosen the screw holding the card latch.
2. Raise the latch as far as possible and then pivot it towards the rear of the chassis.
3. Withdraw the PCI card slot cover.



**FIGURE 4-5** PCI Card Slot Cover

4. Remove the card riser assembly from the PCI card connector on the motherboard.
5. Install the PCI card in the riser assembly.
6. Reinstall the riser and card in the connector on the motherboard.



**FIGURE 4-6** PCI Card and Riser

7. Pivot the card latch up and then slide it down until it captures the PCI card bracket. Tighten the screw to secure the latch (refer to Figure 4-5).

---

**Note** – Check the routing of all cables for obstructions before reinstalling the cover.

---

#### 4.4.2.2 To Remove an Existing PCI Card

1. Unfasten all cables connected to the card.
2. Withdraw the card and riser from the PCI card connector on the motherboard.
3. Remove the PCI card from the riser.

Installation is the reverse of this procedure.

---

**Note** – If the PCI card is being removed, but not replaced with another card: Reinstall the empty riser assembly in the empty PCI card connector on the motherboard. Reinstall the PCI card slot cover.

---

## 4.4.3 SCSI Hard Disk Drive and Carrier

The following procedure describes how to remove and replace a SCSI hard disk drive and carrier.

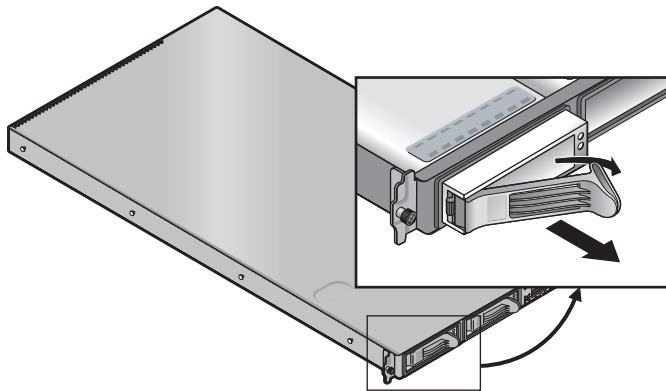
---

**Note** – SCSI hard disk drives are hot pluggable in integrated mirroring (IM) configurations.

---

To withdraw the SCSI hard disk drive and carrier:

1. **Squeeze the release latch and carefully swing the arm to the left as far as it will go.**



**FIGURE 4-7** SCSI Hard Disk Drive Carrier and Latch Release

2. **Grasp the carrier bezel with both hands and carefully pull the carrier out of the drive bay.**

---

**Note** – Avoid using the arm to remove the carrier.

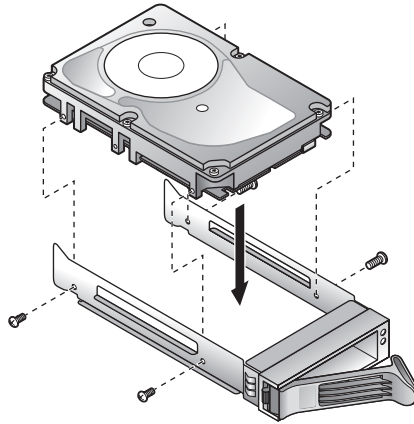
---

To insert the SCSI hard disk drive and carrier:

1. **Squeeze the release latch and carefully swing the arm to the left as far as it will go**
2. **Grasping the body of the drive in both hands, carefully guide the connector end of the SCSI carrier into the drive bay, sliding the carrier into the bay until the arm engages and partially closes itself.**
3. **Push the arm forward and latch it to lock the carrier in place.**

### 4.4.3.1 Replacing a Hard Disk Drive in a Carrier

1. Withdraw the carrier from the server as previously described.
2. Unfasten the four screws attached to the carrier and remove the backing plates.
3. Remove the new hard disk drive from its packaging.
4. Place the hard disk drive in the carrier and secure it with the four mounting screws, as shown in Figure 4-8.



**FIGURE 4-8** Installing a Hard Disk Drive in a Carrier

5. Re-insert the drive and carrier in the server as previously described.

## 4.4.4 SCSI Backplane

The following procedure describes how to replace the SCSI backplane.

1. Turn off the system, including any attached peripherals.
2. While pressing the cover latch release button with your right thumb (A), slide the cover towards the rear of the chassis until it contacts the stop (B).
3. Lift the cover up and remove it.

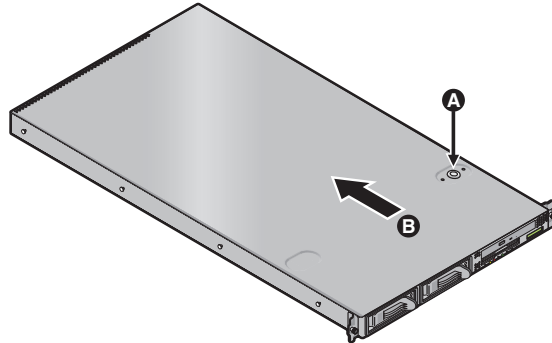


FIGURE 4-9 Removing the Cover

4. Remove all hard disk drive carriers:
  - a. Squeeze the release latch and swing the arm to the left as far as it will go.
  - b. Grasp the carrier bezel with both hands and carefully pull the carrier out of the drive bay.

---

**Note** – Avoid using the arm to remove the carrier.

---

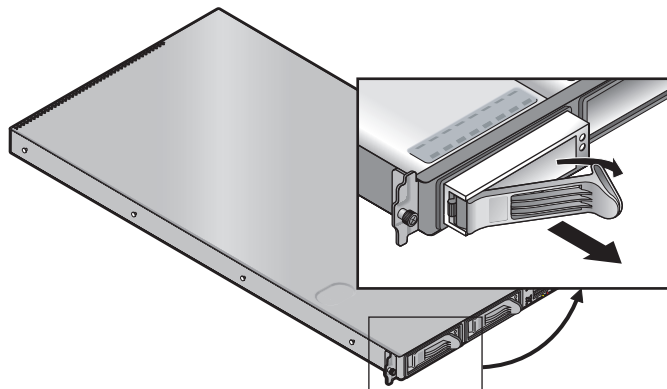


FIGURE 4-10 SCSI Hard Disk Drive Carrier and Release Latch

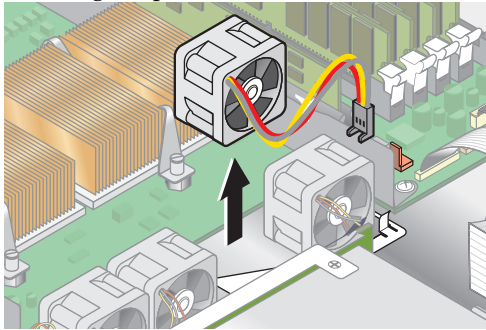
**5. Remove the center air baffle.**



**FIGURE 4-11** Removing the Center Air Baffle

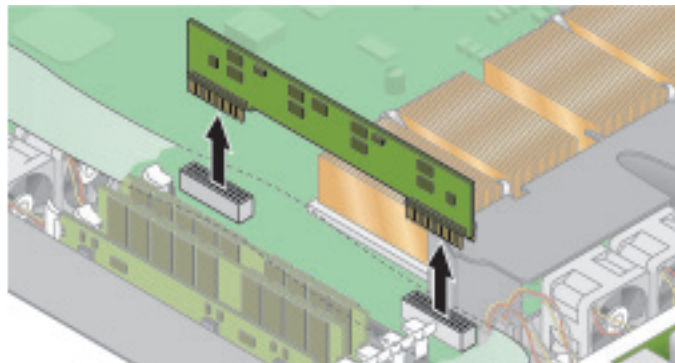
**6. Remove the second processor fan from the right:**

- a. Unplug the fan's power connector from the motherboard.
- b. Pull the fan straight up to remove it from the fan tray.



**FIGURE 4-12** Removing a Cooling Fan

**7. Remove the CPU VRM for CPU 1 (lefthand CPU) by pulling it straight up, out of its sockets.**



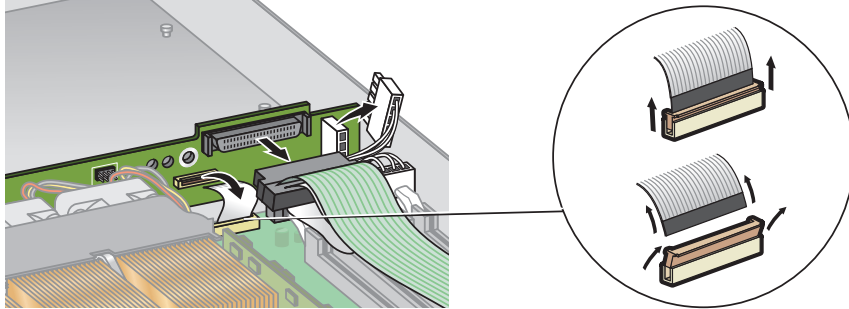
**FIGURE 4-13** Removing the CPU 1 VRM

8. Disconnect the 5-pin power cable, the small flat cable, and the 68-pin ribbon signal cable from the SCSI backplane.

---

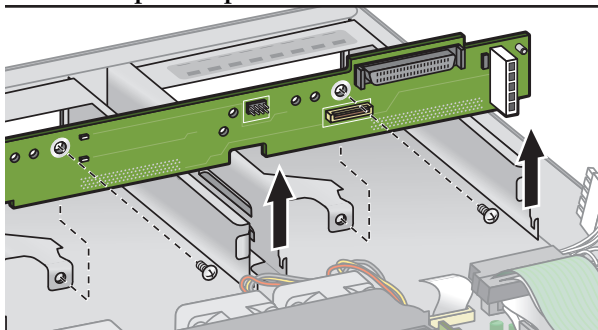
**Caution** – Use care with the small flat cables. They are extremely fragile.

---



**FIGURE 4-14** Uncabling the SCSI Backplane

9. Unfasten the two screws securing the backplane to the chassis.
10. Lift the SCSI backplane up and out of the chassis.



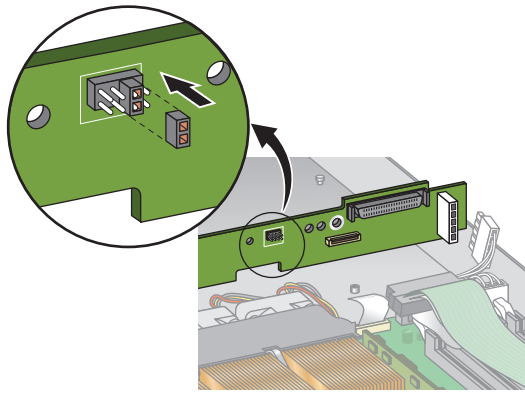
**FIGURE 4-15** Removing the SCSI Backplane



---

**Note** – When reinstalling the SCSI backplane, ensure that the jumper is installed as shown in Figure 4-16.

---



**FIGURE 4-16** SCSI Backplane Jumper

---

**Caution** – Ensure that the fan wires are not pinched when reinstalling the backplane.

---

---

**Note** – Check the routing of all cables for obstructions before reinstalling the cover.

---

## 4.4.5 CD-ROM/DVD/Floppy Disk Drive Assembly

The following procedure describes how to replace the CD-ROM/DVD/Floppy Disk Drive assembly.

1. Turn off the system, including any attached peripherals.
2. While pressing the cover latch release button with your right thumb (A), slide the cover towards the rear of the chassis until it contacts the stop (B).
3. Lift the cover up and remove it.

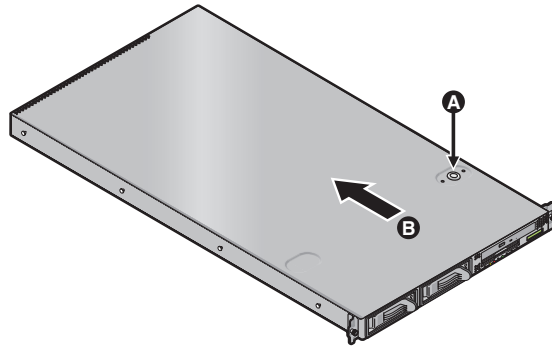


FIGURE 4-17 Removing the Cover

4. Unfasten the CD-ROM/DVD and Floppy disk drive ribbon cables from the motherboard.

---

**Caution** – Use care with the small flat cables. They are extremely fragile.

---

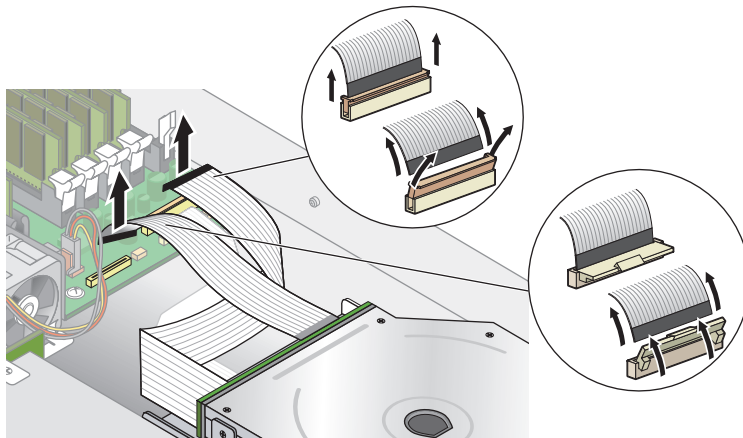
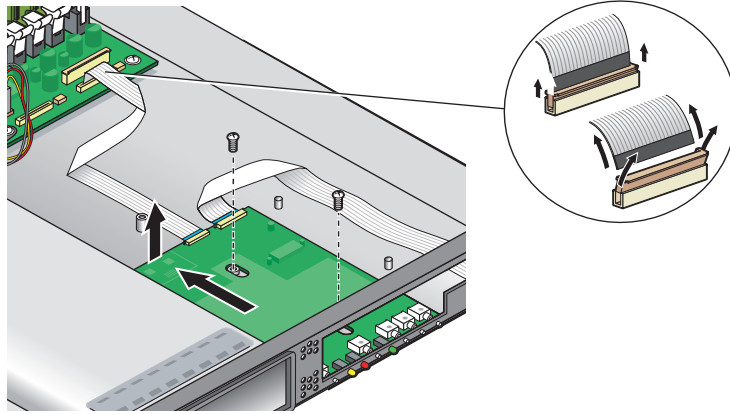


FIGURE 4-18 Uncabbling the CD-ROM/DVD/Floppy Disk Drive Assembly

5. Unfasten the single screw securing the CD-ROM/DVD/Floppy Disk Drive assembly to the chassis (see Figure 4-19).
6. Slide the assembly towards the rear of the chassis approximately 0.5" (12mm).



**FIGURE 4-19** Removing the CD-ROM/DVD/Floppy Disk Drive Assembly

---

**Caution** – Move the assembly by grasping it by its sides. Do not push on the CD-ROM tray.

---

7. **Lift the rear of the assembly slightly, and withdraw it from the chassis.**  
Installation is the reverse of this procedure.

---

**Note** – Check the routing of all cables for obstructions before reinstalling the cover.

---

## 4.4.6 Operator Panel Board and Display

The following procedure describes how to replace the Operator Panel board and LCD. The Operator Panel board is located beneath the CD-ROM/DVD/Floppy Disk Drive assembly.

1. Turn off the system, including any attached peripherals.
2. While pressing the cover latch release button with your right thumb (A), slide the cover towards the rear of the chassis until it contacts the stop (B).
3. Lift the cover up and remove it.

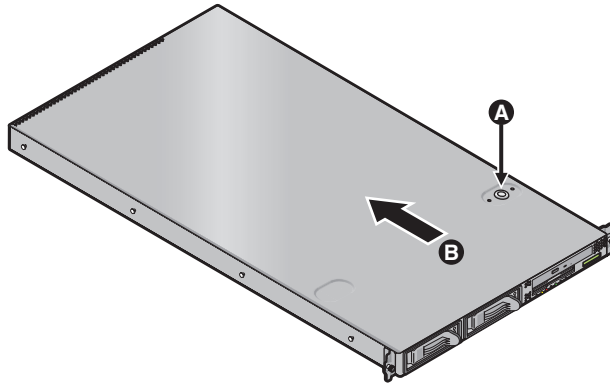


FIGURE 4-20 Removing the Cover

4. Remove the CD-ROM/DVD/Floppy Disk Drive assembly (refer to the appropriate procedure).
5. Remove the two screws securing the LCD to the front panel.

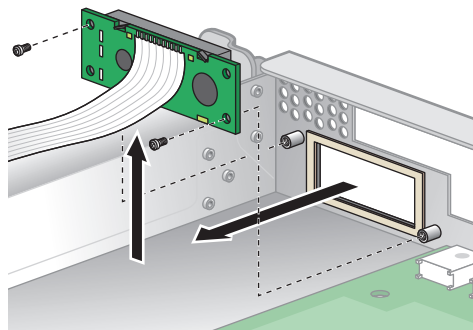


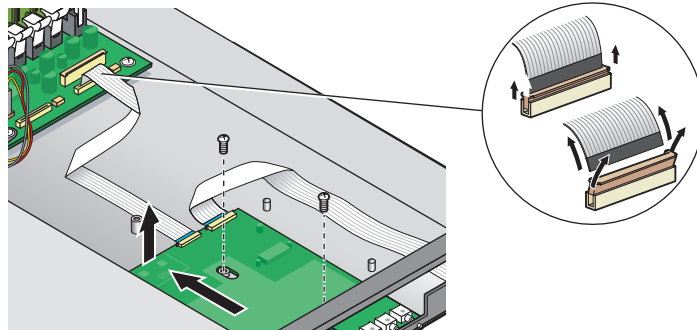
FIGURE 4-21 Removing the LCD

6. Unfasten the ribbon cable connecting the operator panel board to the motherboard.

---

**Caution** – Use care with the small flat cables. They are extremely fragile.

---



**FIGURE 4-22** Uncabling and Removing the Operator Panel Board

7. Remove the two screws and washers mounting the Operator Panel board to the chassis.
8. Carefully slide the operator panel towards the rear of the chassis as far as possible, to avoid damaging the switches. Raise the rear edge of the board first, and then lift the Operator Panel board and LCD out of the chassis.

Installation is the reverse of this procedure.

---

**Note** – Check the routing of all cables for obstructions before reinstalling the cover.

---

## 4.4.7 Power Supply

The following procedure describes how to replace the power supply.

1. Turn off the system, including any attached peripherals.
2. While pressing the cover latch release button with your right thumb (A), slide the cover towards the rear of the chassis until it contacts the stop (B).
3. Lift the cover up and remove it.

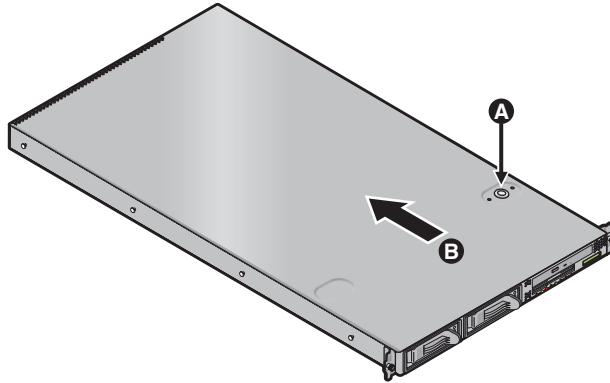


FIGURE 4-23 Removing the Cover

4. Unfasten the three screws securing the center and side air baffles. Lift the baffles straight up to remove them



FIGURE 4-24 Removing the Center and Side Air Baffles

5. Disconnect the three power supply cables from the motherboard.

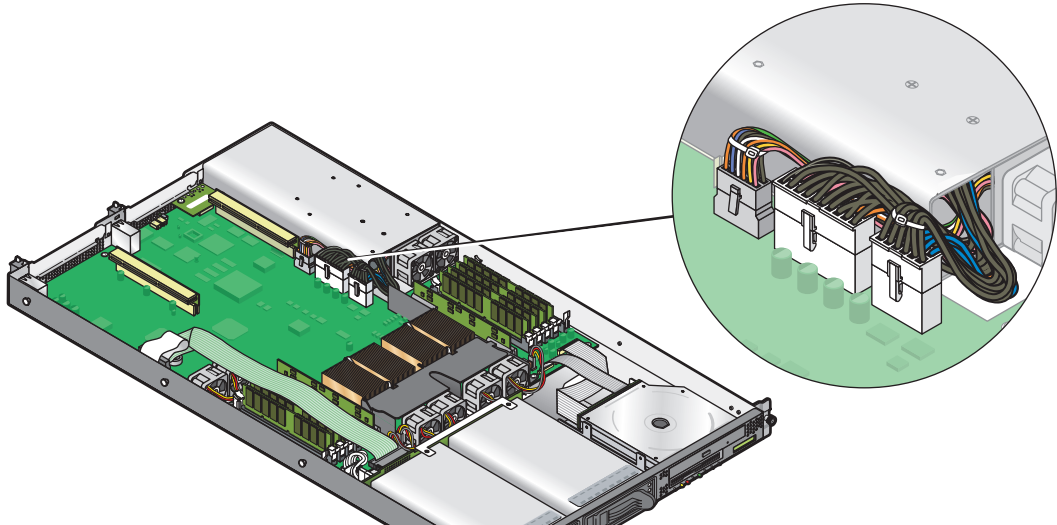


FIGURE 4-25 Disconnecting the Power Supply Cables

6. Unfasten the single screw securing the power supply to the rear of the chassis.

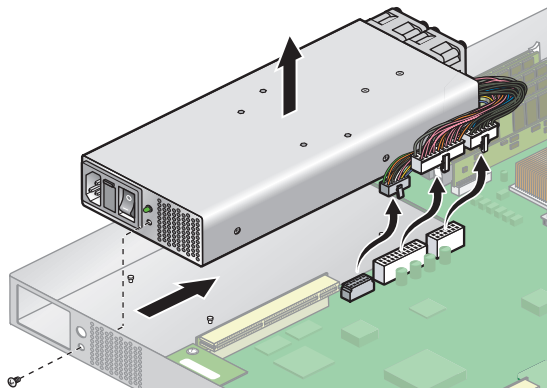


FIGURE 4-26 Removing the Power Supply

7. Slide the power supply toward the front of the chassis, and lift it out of the chassis.

Installation is the reverse of this procedure.

---

**Note** – Check the routing of all cables for obstructions before reinstalling the cover.

---

## 4.4.8 Cooling Fans

The following procedure describes how to replace a cooling fan.

1. Press the power switch, on the Operator Panel, to turn off the power to the server.
2. While pressing the cover latch release button with your right thumb (A), slide the cover towards the rear of the chassis until it contacts the stop (B).
3. Lift the cover up and remove it.

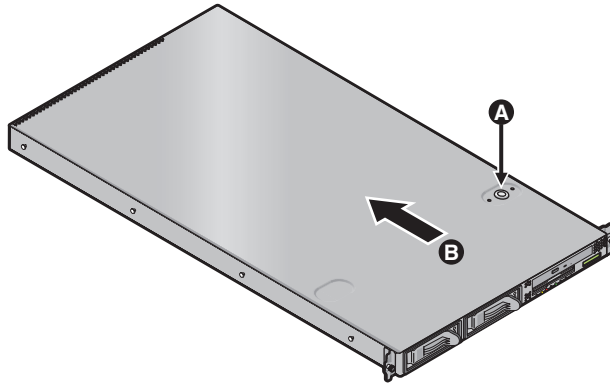


FIGURE 4-27 Removing the Cover

4. Identify the fan(s) to be replaced.
5. If you are replacing a processor cooling fan, unfasten the single screw securing the center air baffle and lift the baffle away from the chassis. Otherwise, continue to Step 6.

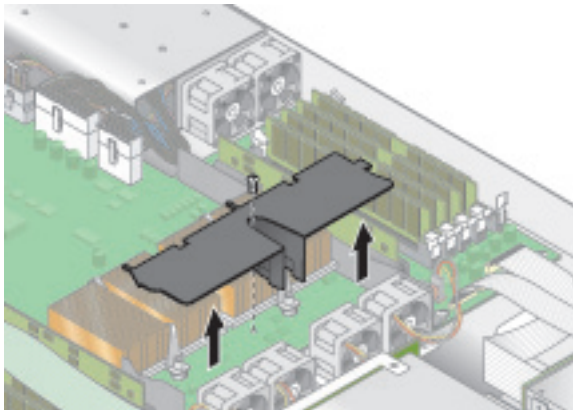
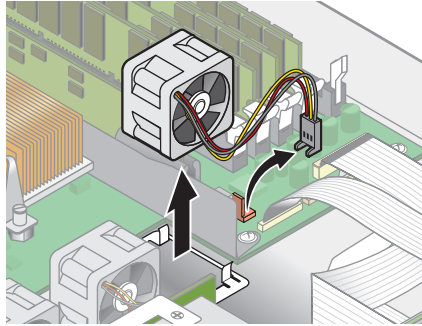


FIGURE 4-28 Removing the Center Air Baffle



6. Unplug the fan's power connector from the motherboard.



**FIGURE 4-29** Removing the Cooling Fans

7. Pull the fan straight up to remove it from the fan tray.

Installation is the reverse of this procedure.

---

**Caution** – Ensure that the fan airflow direction is correct (front to rear) by installing the fan so that the airflow direction arrow points towards the rear of the chassis. After installing a new fan, allow sufficient time for the system to recognize the fan and determine whether it is functioning properly.

---

---

**Note** – Check the routing of all cables for obstructions before reinstalling the cover.

---

## 4.4.9 Memory Voltage Regulator Modules

The following procedure describes how to replace a memory voltage regulator module (VRM).

1. Turn off the system, including any attached peripherals.
2. While pressing the cover latch release button with your right thumb (A), slide the cover towards the rear of the chassis until it contacts the stop (B).
3. Lift the cover up and remove it.

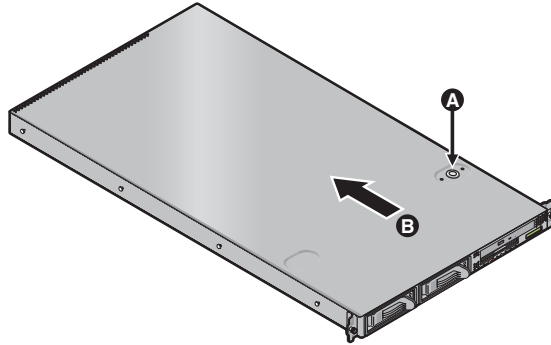


FIGURE 4-30 Removing the Cover

4. Identify the memory VRM that needs to be replaced.
5. Remove a memory VRM by pressing down on the ejector bars at both ends of the socket.

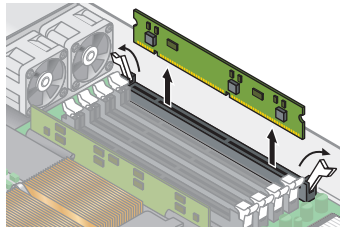


FIGURE 4-31 Removing a Memory VRM

Installation is the reverse of this procedure.

---

**Note** – Check the routing of all cables for obstructions before reinstalling the cover.

---

## 4.4.10 CPU Voltage Regulator Modules

The following procedure describes how to remove and replace a CPU voltage regulator module (VRM).

To remove a CPU VRM:

1. Turn off the system, including any attached peripherals.
2. While pressing the cover latch release button with your right thumb (A), slide the cover towards the rear of the chassis until it contacts the stop (B).
3. Lift the cover up and remove it.

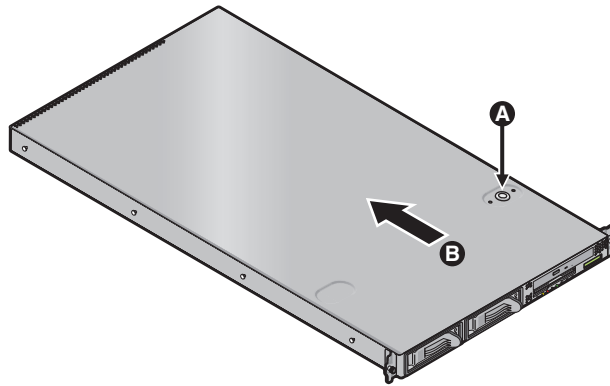


FIGURE 4-32 Removing the Cover

4. Identify the CPU VRM that needs to be replaced.
5. Remove the CPU VRM by pulling it straight up, out of its socket.

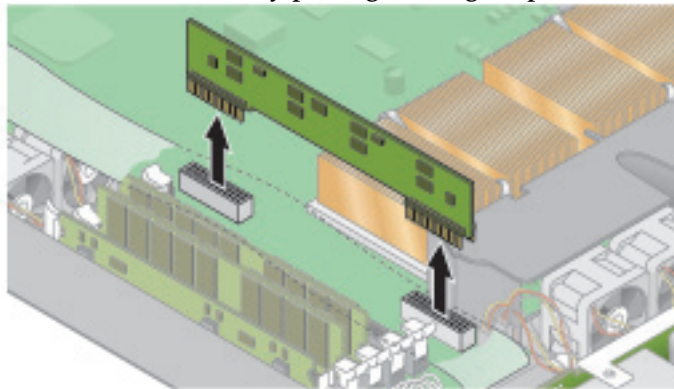


FIGURE 4-33 Removing a CPU VRM

To replace a CPU VRM:

1. **Press the new VRM into the empty socket until it snaps into place, ensuring that the notch in the CPU VRM aligns with the key in the connector.**
2. **When installing a VRM, ensure that pin "A1", on the VRM, is aligned with the "A1" reference designation on the motherboard.**
3. **Check the routing of all cables for obstructions and then reinstall the cover.**

## 4.4.11 Memory Modules

The following procedure describes how to remove and replace memory modules.

To remove a memory module:

1. Turn off the system, including any attached peripherals.
2. While pressing the cover latch release button with your right thumb (A), slide the cover towards the rear of the chassis until it contacts the stop (B).
3. Lift the cover up and remove it.

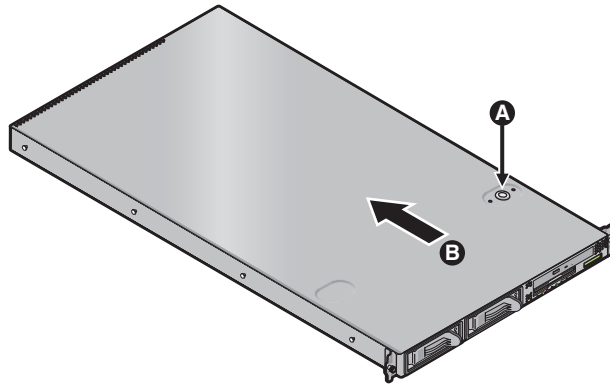


FIGURE 4-34 Removing the Cover

4. Locate the memory module connector in which you will install or replace a memory module.
5. Remove a memory module by pressing down on the ejector bars at both ends of the memory module's socket.

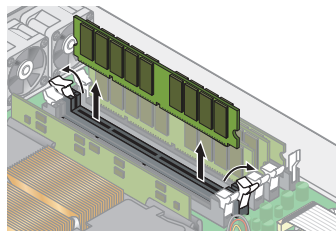


FIGURE 4-35 Removing a Memory Module

To install a memory module:

1. **Ensure that the memory module socket's ejectors are open (rotated outward) to allow the new module to be inserted.**
2. **Align the memory module's edge connector with the alignment key, and insert the memory module into the connector.**

---

**Note** – The manufacturer and capacity of both modules in the same memory bank (Banks 1-4) must be identical.

---

3. **Check the routing of all cables for obstructions and then reinstall the cover.**

## 4.4.12 System Battery

The system battery is a 3.0-volt standard 20 mm Lithium coin-cell battery.

You may need to replace the system battery if you know it is weak or if after any period of AC power loss, the BIOS loses its' CMOS settings or if the time-of-day clock loses time.

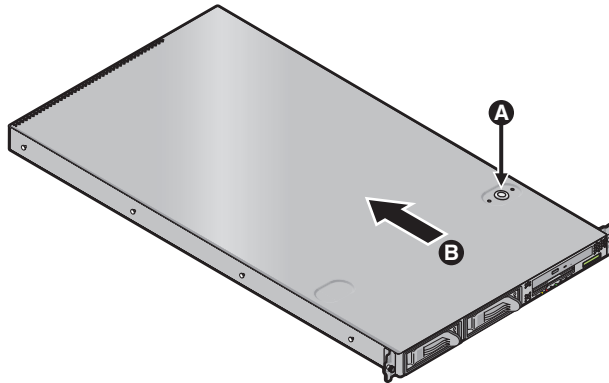
---

**Caution** – Do not attempt to open or service batteries. The battery contains lithium and can explode if not properly used, handled, or disposed of.

---

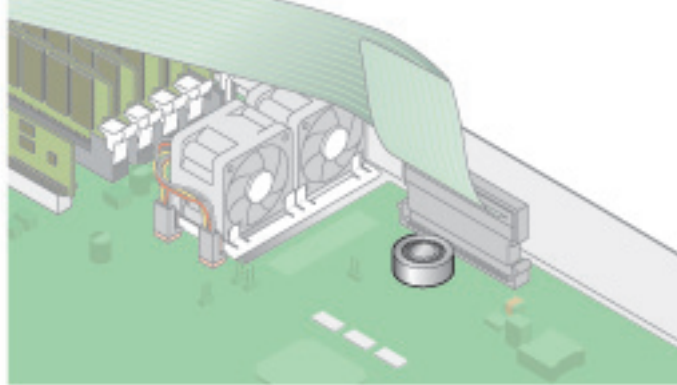
To remove the system battery:

1. Turn off the system, including any attached peripherals.
2. While pressing the cover latch release button with your right thumb (A), slide the cover towards the rear of the chassis until it contacts the stop (B).
3. Lift the cover up and remove it.



**FIGURE 4-36** Removing the Cover

4. Remove the system battery by sliding it back and prying it from the holder.



**FIGURE 4-37** Removing the System Battery

---

**Caution** – Do not dispose of the battery with regular waste. Discard used batteries according to the manufacturer’s instructions or contact your local waste disposal agency for the location of the nearest battery deposit site.

---

To replace the system battery:

1. Install the new system battery into the holder with the side labeled "+" facing up.

---

**Note** – Replace the battery only with the identical model.

---

2. Check the routing of all cables for obstructions and then reinstall the cover.



## 4.4.13 Cable Kit

The following procedure describes how to remove and replace the following cables:

1. Five-pin cable connecting the SCSI backplane to the motherboard.
2. 68-pin ribbon cable connecting the SCSI backplane to the motherboard.
3. Flat cable connecting the SCSI backplane to the motherboard.
4. Flat cable connecting the operator panel board to the LCD.
5. Flat cable connecting the CD-ROM/DVD to the motherboard.
6. Flat cable connecting the Floppy Disk Drive to the motherboard.
7. Flat cable connecting the operator panel board to the motherboard.

1. Turn off the system, including any attached peripherals.
2. While pressing the cover latch release button with your right thumb (A), slide the cover towards the rear of the chassis until it contacts the stop (B).
3. Lift the cover up and remove it.

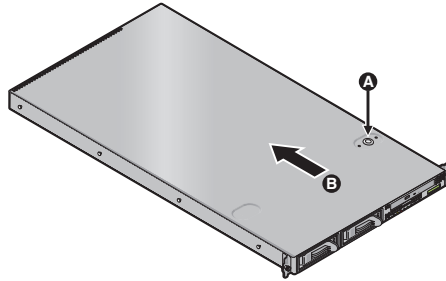


FIGURE 4-38 Removing the Cover

4. Identify the cable to be replaced.

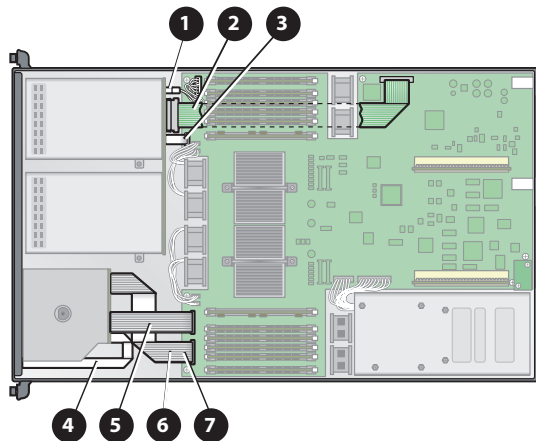


FIGURE 4-39 V20z System Cables

The two halves of the 5-pin SCSI backplane power cable connector (1) are secured with a hook.

The 68-pin SCSI ribbon cable (2) has no locking mechanism.

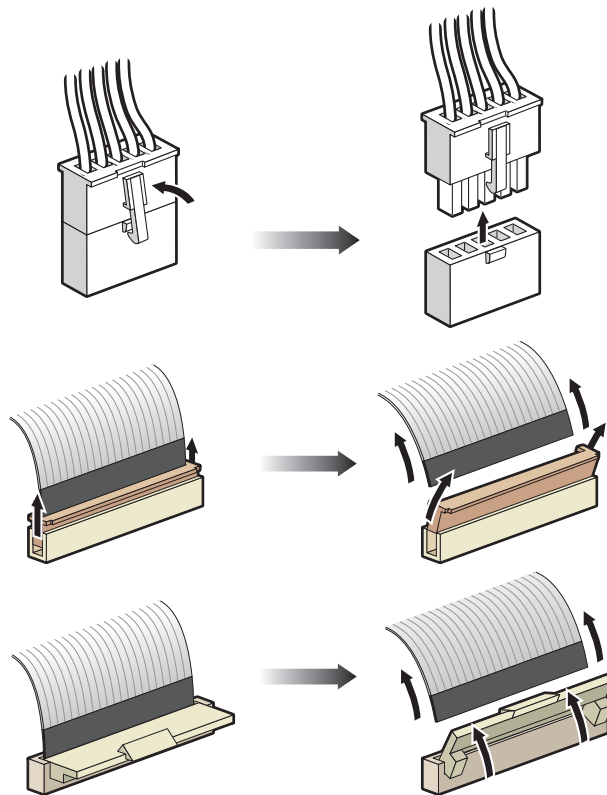
The small flat cables (3-7) are attached using two different types of zero insertion force (ZIF) cable connectors. Because of their small size, it may be difficult to distinguish one connector type from the other.

Refer to Figure 4-40 for the methods used to release cables from the various types of connector.

---

**Caution** – Use caution when removing cables as they are fragile—the small flat flexible cables and cable connectors are extremely sensitive.

---



**FIGURE 4-40** Cable Connectors

---

**Note** – Check the routing of all cables for obstructions before reinstalling the cover.

---

## 4.4.14 CPUs

The following procedure describes how to replace a CPU.

### 4.4.14.1 Removing a Heatsink and CPU

1. Turn off the system, including any attached peripherals.
2. While pressing the cover latch release button with your right thumb (A), slide the cover towards the rear of the chassis until it contacts the stop (B).
3. Lift the cover up and remove it.

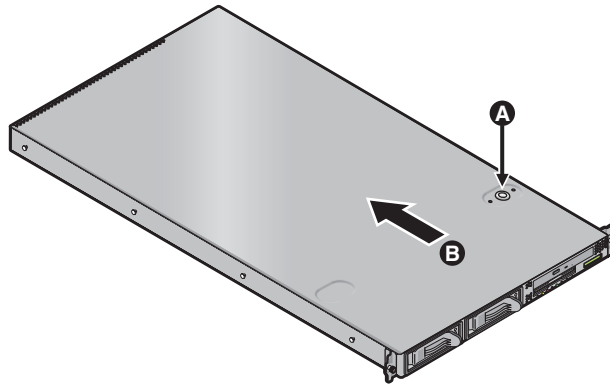


FIGURE 4-41 Removing the Cover

4. Unfasten the single securing and remove the center air baffle.

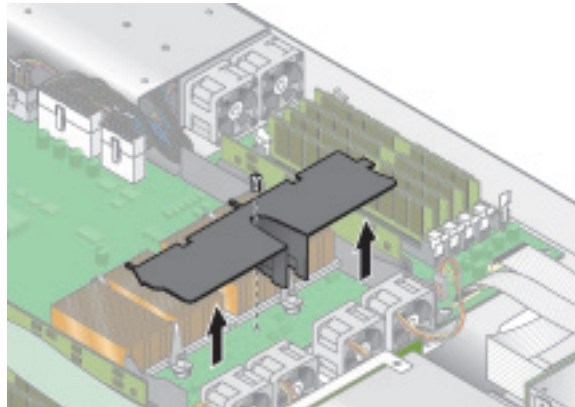
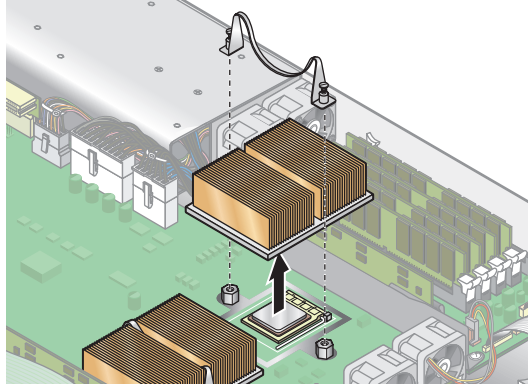


FIGURE 4-42 Removing the Center Air Baffle

5. Unfasten the two securing screws and remove the heatsink securing clip.



**FIGURE 4-43** Removing the Securing Clip and Heatsink

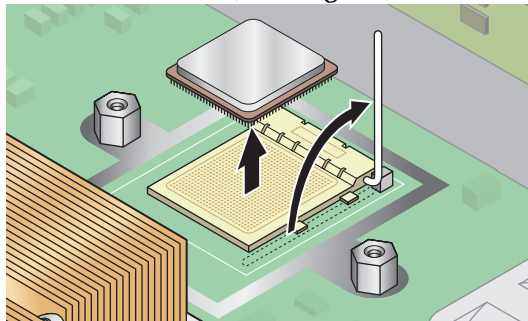
6. Twist the heatsink slightly to the right or left, in order to break the seal with the thermal grease.
7. Lift the heatsink away from the CPU.

---

**Note** – The heatsink can become extremely hot. Be sure it has had sufficient time to cool before handling.

---

8. Place the heatsink upside down on a flat surface to prevent the thermal grease from contaminating other components.
9. Pull the socket release lever up to the fully open, perpendicular position.
10. Lift the CPU out of the socket, leaving the release lever in the open position.



**FIGURE 4-44** Removing a CPU from its Socket

## 4.4.14.2 Installing a CPU and Heatsink

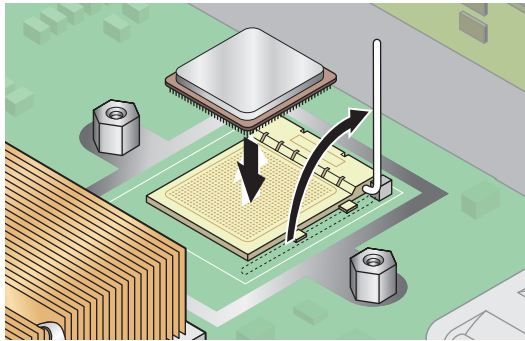
1. Unpack the new CPU.

---

**Caution** – Observe the appropriate ESD precautions.

---

2. Ensure that the socket release lever is in the fully open, perpendicular position.
3. Align the small triangle, on the corner of the CPU, with the triangle on the corner of the socket.



**FIGURE 4-45** Installing a CPU in its Socket

4. Insert the CPU into the socket.

---

**Note** – If correctly aligned, the CPU should easily insert into the socket. If more than minimal resistance is felt, stop and recheck the alignment. Forcing a misaligned CPU into the socket will permanently damage the device.

---

5. When the CPU is fully seated in the socket, rotate the socket release lever until it snaps into place, securing the CPU in the socket.
6. Use the syringe to apply approximately 0.1 ML/CC of thermal grease in a circular pattern to the top of the CPU.
7. Gently distribute the thermal grease and remove any excess so that only an extremely thin, uniform layer remains. If any voids or crevices appear that could lead to air pockets, reapply the grease until you achieve a thin but compact consistency.
8. Use an alcohol pad to remove all thermal grease from the bottom of the heatsink.
9. Inspect the heatsink for dust and lint. Clean if necessary.

10. Ensure the foam strip under the heatsink area is intact and has not been removed, loosened, or damaged. This foam strip is critical to proper air flow.
11. Carefully position the heatsink on the CPU, aligning it with the mounting posts to reduce movement after it makes initial contact with the layer of thermal grease.

---

**Caution** – If the heatsink is moved too much during its installation, the layer of thermal grease may become uneven, leading to component damage.

---

12. After the heatsink is correctly aligned, reinstall the heatsink clips so that the longer tab points toward the fans.
13. Tighten the clip securing screws.
14. Replace the center air duct and the system cover.

---

**Note** – Check the routing of all cables for obstructions before reinstalling the cover.

---

## 4.4.15 Super CRU

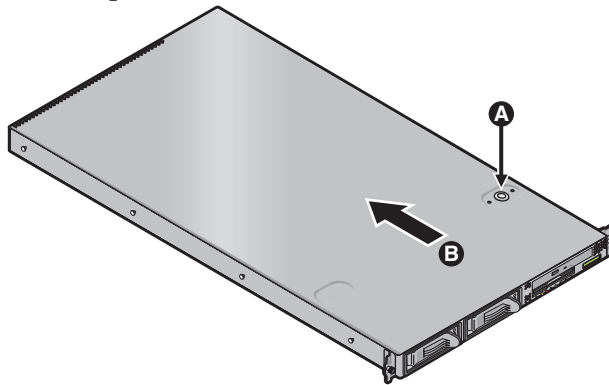
The Super CRU is a chassis containing all of the system components, except those designated as customer replaceable. To install a Super CRU, you must remove all of the CRUs from the system to be replaced. Then, reinstall all of those components in the Super CRU chassis.

---

**Note** – The only customer-replaceable unit that is included in the Super CRU is the Operator Panel board and LCD assembly.

---

1. Turn off the system, including any attached peripherals.
2. While pressing the cover latch release button with your right thumb (A), slide the cover towards the rear of the chassis until it contacts the stop (B).
3. Lift the cover up and remove it.



**FIGURE 4-46** Removing the Cover

**Remove the following components and reinstall them in the Super CRU chassis. (Refer to the appropriate instructions to remove and replace each component):**

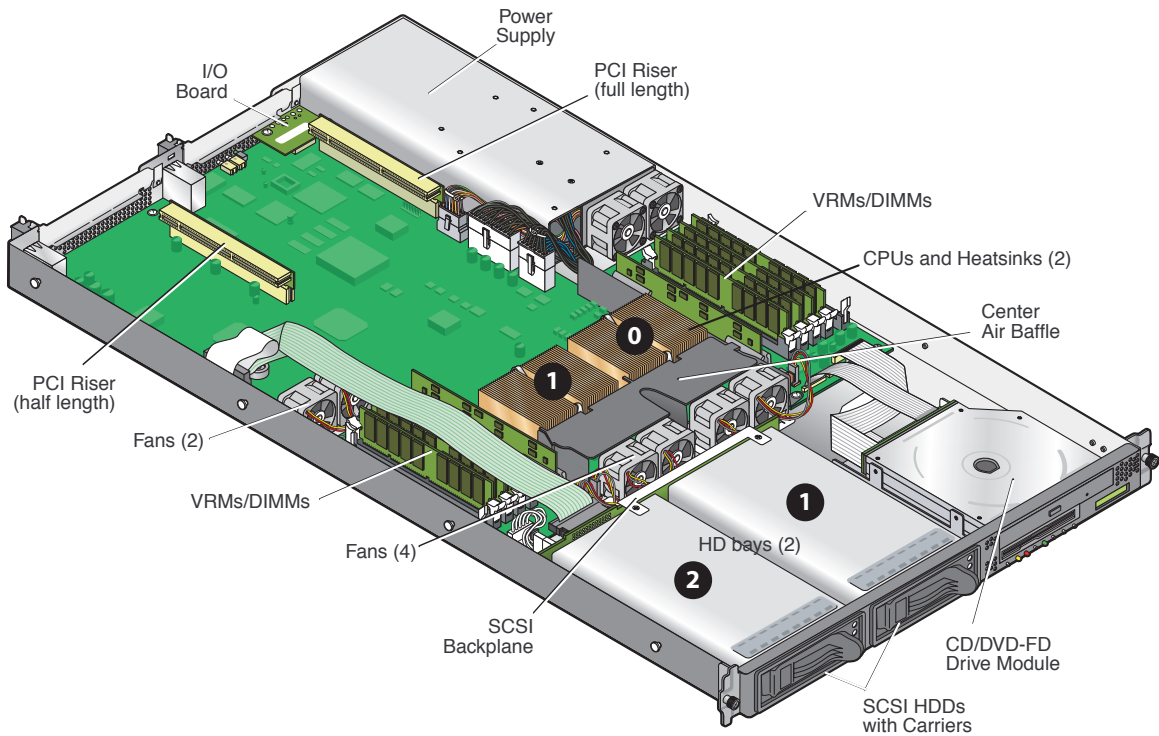
- I/O Board
- PCI Card(s) and Risers (2)
- Hard Disk Drive (1-2) and Carrier (2)
- SCSI Backplane
- CD-ROM/DVD/Floppy Disk Drive Assembly
- Power Supply
- Cooling Fans (6)
- Memory VRMs (1-2)
- CPU VRMs (1-2)

- Memory Modules (1-8)
- CPUs and Heatsinks (1-2)

---

**Note** – You must remove the center air baffle (with the part number label) from the system being repaired and install it in the Super CRU. The part number label contains important information about the components in your particular system.

---



**FIGURE 4-47** Component Locations



# System Specifications

---

To obtain maximum reliability and performance, install your Sun Fire V20z server into a proper environment and ensure correct configuration as discussed in this chapter.

---

## A.1 Physical Specifications

**TABLE A-1** Sun Fire V20z Server Physical Specifications

Specification	English	Metric
Width	16.94 in.	430.276 mm
Depth	28 in.	711.2 mm
Height	1.69 in.	42.93 mm
Weight (max.)	35 lbs	15.88 kg

---

## A.2 Power Specifications

**TABLE A-2** Sun Fire V20z Server AC Input Specifications

Specification	Value
Universal AC Input	100 to 240 VAC, 50/60 Hz
Maximum current	7.0 amps

---

## A.3 Environmental Specifications

**TABLE A-3** Sun Fire V20z Server Unit Level Environmental Specifications

Specification	State	English	Metric
Temperature	Operating	50 to 95 degrees F	10 to 35 degrees C*
	Non-operating	-40 to 149 degrees F	-40 to 65 degrees C
Humidity	Operating	10% to 90% RH at 80.6 degrees F max. wet bulb (non-condensing)	10% to 90% RH at 27 degrees C max. wet bulb (non-condensing)
	Non-operating	10% to 90% RH	10% to 90% RH
Altitude	Operating	Up to 9,800 feet	Up to 3,000 meters
	Non-operating	Up to 39,370 feet	Up to 12,000 meters
Vibration	Operating	.20 G, 5 to 500 Hz sine sweep	
Shock	Operating	5 G, 11 ms half-sine	

\* The temperature specifications in this table are rated for sea level. For each rise of 300 meters in altitude, the maximum temperature drops by 1 degree C.

## BIOS POST Codes

---

Typically, the BIOS displays warning or error messages on the video display in the event of hardware or configuration errors. However, in some cases the error may be so severe that the BIOS halts immediately, or BIOS might be unable to initialize video. In these cases, it can be useful to determine the last Power On Self Test (POST) task that the BIOS was executing. This is indicated by the value written to port 80.

For information about retrieving the last port 80 post code using the **sp get port80** command, refer to the *Sun Fire V20z Server Management Guide*, 817-5249-xx, for details.

You can also retrieve the last 10 port 80 post codes using the operator panel. Refer to the *Sun Fire V20z Server Management Guide*, 817-5249-xx, for more details about using the operator panel menus.

TABLE B-1 lists the POST codes for the Sun Fire V20z BIOS.

**TABLE B-1** BIOS POST Codes

Post Code	Description
02	Verify real mode
03	Disable non-maskable interrupt (NMI)
04	Get CPU type
06	Initialize system hardware
07	Disable shadow and execute code from the ROM
08	Initialize chipset with initial POST values
09	Set IN POST flag
0A	Initialize CPU registers
0B	Enable CPU cache
0C	Initialize caches to initial POST values

**TABLE B-1** BIOS POST Codes *(Continued)*

<b>Post Code</b>	<b>Description</b>
0E	Initialize I/O component
0F	Initialize the local bus IDE
10	Initialize power management
11	Load alternate registers with initial POST values
12	Restore CPU control word during warm boot
13	Initialize PCI bus mastering devices
14	Initialize keyboard controller
16	BIOS ROM checksum
17	Initialize cache before memory autosize
18	8254 programmable interrupt timer initialization
1A	8237 DMA controller initialization
1C	Reset programmable interrupt controller
20	Test DRAM refresh
22	Test 8742 keyboard controller
24	Set ES segment register to 4GB
26	Enable gate A20 line
28	Autosize DRAM
29	Initialize POST memory manager
2A	Clear 512KB base RAM
2C	RAM failure on address line xxxx
2E	RAM failure on data bits xxxx of low byte of memory bus
2F	Enable cache before system BIOS shadow
30	RAM failure on data bits xxxx of high byte of memory bus
32	Test CPU bus clock frequency
33	Initialize Phoenix Dispatch Manager
36	Warm start shut down
38	Shadow system BIOS ROM
3A	Autosize cache
3C	Advanced configuration of chipset registers
3D	Load alternate registers with CMOS values

**TABLE B-1** BIOS POST Codes *(Continued)*

<b>Post Code</b>	<b>Description</b>
41	Initialize extended memory for RomPilot
42	Initialize interrupt vectors
45	POST device initialization
46	Check ROM copyright notice
47	Initialize I20 support
48	Check video configuration against CMOS
49	Initialize PCI bus and devices
4A	Initialize all video adapters in system
4B	QuietBoot start (optional)
4C	Shadow video BIOS ROM
4E	Display BIOS copyright notice
4F	Initialize MultiBoot
50	Display CPU type and speed
51	Initialize EISA board
52	Test keyboard
54	Set key click if enabled
55	Enable USB devices
58	Test for unexpected interrupts
59	Initialize POST display service
5A	Display prompt "Press F2 to enter SETUP"
5B	Disable CPU cache
5C	Test RAM between 512KB and 640KB
60	Test extended memory
62	Test extended memory address lines
64	Jump to UserPatch1
66	Configure advanced cache registers
67	Initialize Multi Processor APIC
68	Enable external and CPU caches
69	Setup system management mode (SMM) area
6A	Display external L2 cache size

**TABLE B-1** BIOS POST Codes *(Continued)*

<b>Post Code</b>	<b>Description</b>
6B	Load custom defaults (optional)
6C	Display shadow area message
6E	Display possible high address for UMB recovery
70	Display error messages
72	Check for configuration errors
76	Check for keyboard errors
7C	Set up hardware interrupt vectors
7D	Initialize Intelligent System Monitoring
7E	Initialize coprocessor if present
80	Disable onboard super I/O ports and IRQ's
81	Late POST device initialization
82	Detect and install external RS232 ports
83	Configure non-MCD IDE controllers
84	Detect and install external parallel ports
85	Initialize PC compatible PnP ISA devices
86	Reinitialize onboard I/O ports
87	Configure motherboard configurable devices (optional)
88	Initialize BIOS data area
89	Enable non-maskable interrupts (NMIs)
8A	Initialize extended BIOS data area
8B	Test and initialize PS/2 mouse
8C	Initialize floppy controller
8F	Determine number of ATA drives (optional)
90	Initialize hard disk controllers
91	Initialize local bus hard disk controllers
92	Jump to UserPatch2
93	Build MPTABLE for multi processor boards
95	Install CD ROM for boot
96	Clear huge ES segment register
97	Fixup multi processor table

**TABLE B-1** BIOS POST Codes *(Continued)*

<b>Post Code</b>	<b>Description</b>
98	Search for option ROMs
99	Check for SMART drive (optional)
9A	Shadow option ROMs
9C	Set up power management
9D	Initialize security engine (optional)
9E	Enable hardware interrupts
9F	Determine number of ATA and SCSI drives
A0	Set time of day
A2	Check key lock
A4	Initialize typematic rate
A8	Erase F2 prompt
AA	Scan for F2 key stroke
AC	Enter setup
AE	Clear boot flag
B0	Check for errors
B1	Inform RomPilot about the end of POST
B2	POST done - prepare to boot operating system
B4	One short beep
B5	Terminate QuietBoot (optional)
B6	Check password
B7	Initialize ACPI BIOS
B9	Prepare boot
BA	Initialize DMI parameters
BB	Initialize PnP option ROMs
BC	Clear parity checkers
BD	Display multiboot menu
BE	Clear screen
BF	Check virus and backup reminders
C0	Try to boot with interrupt 19
C1	Initialize POST Error Manager (PEM)

**TABLE B-1** BIOS POST Codes *(Continued)*

<b>Post Code</b>	<b>Description</b>
C2	Initialize error logging
C3	Initialize error display function
C4	Initialize system error handler
C5	PnP dual CMOS (optional)
C6	Initialize notebook docking (optional)
C7	Initialize notebook docking late
C8	Force check (optional)
C9	Extended checksum (optional)
CA	Redirect Int 15h to enable remote keyboard
CB	Redirect Int 13 to Memory Technologies Devices such as ROM, RAM, PCMCIA, and serial disk
CC	Redirect Int 10h to enable remote serial video
CD	Re-map I/O and memory for PCMCIA
CE	Initialize digitizer and display message
D2	Unknown interrupt

TABLE B-2 shows the POST codes for the boot block in Flash ROM.

**TABLE B-2** Boot Block in Flash ROM

<b>Post Code</b>	<b>Description</b>
E0	Initialize the chipset
E1	Initialize the bridge
E2	Initialize the CPU
E3	Initialize the system timer
E4	Initialize system I/O
E5	Check force recovery boot
E6	Checksum BIOS ROM
E7	Go to BIOS
E8	Set Huge Segment
E9	Initialize Multi Processor
EA	Initialize OEM special code
EB	Initialize PIC and DMA



**TABLE B-2** Boot Block in Flash ROM *(Continued)*

<b>Post Code</b>	<b>Description</b>
EC	Initialize Memory type
ED	Initialize Memory size
EE	Shadow Boot Block
EF	System memory test
F0	Initialize interrupt vectors
F1	Initialize Run Time Clock
F2	Initialize video
F3	Initialize System Management Manager
F4	Output one beep
F5	Clear Huge Segment
F6	Boot to mini DOS
F7	Boot to Full DOS



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# Diagnostics Commands

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You can use the `diags` subcommands shown in TABLE C-1 to manage diagnostics tests:

**TABLE C-1** Diagnostic Subcommands

Subcommand	Description
<code>diags cancel tests</code>	Cancels one or more diagnostic tests, resulting in the deletion of the results data.
<code>diags get state</code>	Returns the state of the platform diagnostics control server.
<code>diags get tests</code>	Returns data describing the diagnostic tests that are available and their requirements and parameters.
<code>diags run tests</code>	Submits one or more diagnostic tests for execution.
<code>diags start</code>	Starts the Service Processor and platform diagnostics framework.
<code>diags terminate</code>	Terminates all diagnostics tests and terminates the diagnostics subsystem.

---

**Note** – Every command returns a return code upon completion.

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## C.1 diags cancel tests

### C.1.1 Command

Access: Administrators

Description: Cancels one or more diagnostic tests, resulting in the deletion of results data.

Command format: `diags cancel tests` [[{ `-t` | `--test`} *test\_handle*] [{`-a`|`--all`}] [{`-H` | `--noheader`}]]

Arguments	Description
{ <code>-t</code>   <code>--test</code> }	Specifies the test to cancel. (Note: The <i>test_handle</i> is the same as the test handle that is output to the screen when you submit the test.)
{ <code>-a</code>   <code>--all</code> }	Cancels all tests.
{ <code>-H</code>   <code>--noheader</code> }	Suppresses header output.

Specifying no arguments cancels all tests for each device in the system.

### C.1.2 Return Codes

Following are the return values for this command:

Return Code	ID	Description
NWSE_Success	0	Command successfully completed.
NWSE_InvalidUsage	1	Invalid usage: bad parameter usage, conflicting options specified.
NWSE_RPCTimeout	2	Request was issued, but was not serviced by the server. RPC procedure timed out and the request may or may not have been serviced by the server.

Return Code	ID	Description
NWSE_RPCNotConnected	3	Unable to connect to the RPC server.
NWSE_InvalidArgument	4	One or more arguments were incorrect or invalid.
NWSE_NoPermission	6	Not authorized to perform operation.
NWSE_MissingArgument	7	Missing argument(s).

## C.1.3 diags get state

### C.1.3.1 Command

Access: Administrators

Description: Returns the state of the platform diagnostics control server.

Command format: `diags get state`

If you get a success text message returned from the command, the platform is up and ready for diagnostics and you can submit platform diagnostic tests for execution.

If you get an error text message, the platform diagnostics are not up, and you will need to wait to run the platform diagnostics tests.

### C.1.3.2 Return Codes

Following are the return values for this command:

Return Code	ID	Description
NWSE_Success	0	Command successfully completed.
NWSE_InvalidUsage	1	Invalid usage: bad parameter usage, conflicting options specified.
NWSE_DeviceError	25	Unable to read or write to the device.

---

## C.2 diags get tests

### C.2.1 Command

Access: Administrators

Description: Returns data describing the diagnostic tests that are available. This data includes the specific test name and the module to which the test applies.

Command format: `diags get tests [{ -a | --all}] [{-H | --noheader}] [{-D | --delim delimiter}]`

Arguments	Description
<code>{-a   --all}</code>	Specifies to return information for all tests in the system. Specifying no arguments also returns all tests available for each device in the system.
<code>{-H   --noheader}</code>	Suppresses header output.
<code>{-D   --delim <i>delimiter</i>}</code>	Delimits columns with the specified delimiter. Headings are also delimited unless suppressed. The <i>delimiter</i> can be any character or string.

### C.2.2 Return Codes

Following are the return values for this command:

Return Code	ID	Description
NWSE_Success	0	Command successfully completed.
NWSE_InvalidUsage	1	Invalid usage: bad parameter usage, conflicting options specified.
NWSE_RPCTimeout	2	Request was issued, but was not serviced by the server. RPC procedure timed out and the request may or may not have been serviced by the server.
NWSE_RPCNotConnected	3	Unable to connect to the RPC server.

Return Code	ID	Description
NWSE_InvalidArgument	4	One or more arguments were incorrect or invalid.
NWSE_NoPermission	6	Not authorized to perform this operation.
NWSE_MissingArgument	7	Missing argument(s).

## C.3 diags run tests

### C.3.1 Command

Access: Administrators

Description: Submits one or more diagnostic tests for execution.

Command format: `diags run tests [ [{ -n | --name} test_name] [{-a | --all}] [-H | --noheader] [-P | --noprogress] [{-m | --module} module] [-v | --verbose]`

Arguments	Description
{ -n   --name <i>test_name</i> }	Specifies the specific test(s) to execute. See TABLE 3-1 for <i>test_name</i> values. Run <code>diags get tests</code> for a list of individual test names.
{-a   --all}	Specifies that all tests are to be executed. Run <code>diags get tests</code> for a list of all available tests. Specifying no arguments also runs all tests for each device in the system.
{-H   --noheader}	Suppresses header output.
{-P   --noprogress}	Suppresses progress dots when waiting for test results.
{-m   --module <i>module</i> }	Specifies that only tests for the specified module are to be executed. See TABLE 3-1 for <i>module</i> values. Run <code>diags get tests</code> for a list of modules.
{-v   --verbose}	If specified, test details display following the test result line.

The following data displays after a test is run:

- Submitted Test Name
- Test Handle
- Test Result (for example, Passed, Failed)
- Details (if you specify the -v option, Test Details displays indicating detailed information about the test such as high, low, and nominal values, actual values, etc. Upon failure, Failure Details displays with a text message indicating the cause of failure.)

## C.3.2 Return Codes

Following are the return values for this command:

Return Code	ID	Description
NWSE_Success	0	Command successfully completed.
NWSE_InvalidUsage	1	Invalid usage: bad parameter usage, conflicting options specified.
NWSE_RPCTimeout	2	Request was issued, but was not serviced by the server. RPC procedure timed out and the request may or may not have been serviced by the server.
NWSE_RPCNotConnected	3	Unable to connect to the RPC server.
NWSE_InvalidArgument	4	One or more arguments were incorrect or invalid.
NWSE_NoPermission	6	Not authorized to perform this operation.
NWSE_MissingArgument	7	Missing argument(s).



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## C.4 diags start

### C.4.1 Command

Access: Administrators

Description: Starts the service processor and platform diagnostics framework. You must execute this command before running any tests.

The platform state must be either off or OS communicating. Refer to the `platform get os state` command in the *Sun Fire V20z Server Management Guide* for details about these states.

Command format: `diags start`

### C.4.2 Return Codes

Following are the return values for this command:

Return Code	ID	Description
NWSE_Success	0	Command successfully completed.
NWSE_InvalidUsage	1	Invalid usage: bad parameter usage, conflicting options specified.
NWSE_RPCTimeout	2	Request was issued, but was not serviced by the server. RPC procedure timed out and the request may or may not have been serviced by the server.
NWSE_RPCNotConnected	3	Unable to connect to the RPC server.
NWSE_InvalidArgument	4	One or more arguments were incorrect or invalid.
NWSE_NoPermission	6	Not authorized to perform this operation.
NWSE_InvalidOpForState	22	Invalid operation for current state.

---

## C.5 diags terminate

### C.5.1 Command

Access: Administrators

Description: Terminates all diagnostics tests and the diagnostics session.

Command format: `diags terminate`

### C.5.2 Return Codes

Following are the return values for this command:

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<b>Return Code</b>	<b>ID</b>	<b>Description</b>
NWSE_Success	0	Command successfully completed.
NWSE_InvalidUsage	1	Invalid usage: bad parameter usage, conflicting options specified.
NWSE_RPCTimeout	2	Request was issued, but was not serviced by the server. RPC procedure timed out and the request may or may not have been serviced by the server.
NWSE_RPCNotConnected	3	Unable to connect to the RPC server.
NWSE_InvalidArgument	4	One or more arguments were incorrect or invalid.
NWSE_NoPermission	6	Not authorized to perform this operation.
NWSE_MissingArgument	7	Missing argument(s).

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