



Sun Fire V60x and Sun Fire V65x Server

User Guide

Sun Microsystems, Inc.
4150 Network Circle
Santa Clara, CA 95054 U.S.A.
650-960-1300

Part Number: 817-2023-11
June 2003 Revision A

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Preface

This User Guide provides information on how to install, configure, and validate the operation of the Sun Fire V60x and Sun Fire V65x servers.

Topics in this chapter include:

- “Safety and Compliance Information” on page -xxi
- “Who Should Use This Book” on page -xxii
- “How This Manual is Organized” on page -xxii
- “Typographic Conventions” on page -xxii
- “Related Documentation” on page -xxiii
- “Ordering Sun Documents” on page -xxiii
- “Shell Prompts in Command Examples” on page -xxiii
- “Notice” on page -xxiv
- “Sun Welcomes Your Comments” on page -xxiv

Safety and Compliance Information

Before you service this product, refer to the important safety and compliance information in the “Sun Fire V60x and Sun Fire V65x Server Safety and Compliance Guide,” 817-2028-10. This document is included on the Documentation CD that was shipped with your server, and is also available online at http://www.sun.com/products-n-solutions/hardware/docs/Servers/Workgroup_Servers/Sun_Fire_V60x-V65x.

Who Should Use This Book

The intended audience for this book is system administrators who are responsible for installing and validating the Sun Fire V60x and Sun Fire V65x servers.

How This Manual is Organized

This manual contains the following chapters:

- Chapter 1, “Introducing the Sun Fire V60x and Sun Fire V65x Servers” on page 1-1
 - Chapter 2, “Installing the Server in a Rack” on page 2-1
 - Chapter 3, “Controls and Indicators” on page 3-1
 - Chapter 4, “Powering Up and Configuring the Server” on page 4-1
 - Chapter 5, “Maintaining the Server” on page 5-1
 - Chapter 6, “Troubleshooting the Server” on page 6-1
 - Chapter 7, “Specifications” on page 7-1
-

Typographic Conventions

The following table describes the typographic conventions used in this book.

TABLE P-1 Typographic Conventions

Typeface or Symbol	Meaning	Example
courier font	Names of commands; Names of files; On-screen computer output;	Use <code>ls -a</code> to list all files. Edit your <code>.login</code> file. <code>machine_name% You have mail.</code>
italics	Book titles, new words; Terms to be emphasized; Variables that you replace with a real value;	Read Chapter 6 in the <i>User's Guide</i> ; These are called <i>class</i> options; You must be <i>root</i> to do this; To delete a file, type <i>rm filename</i> .
boldface courier font	What you type	machine_name% su

Related Documentation

These documents contain information related to the information described in this guide:

Sun Fire V60x and Sun Fire V65x Server Troubleshooting Guide
Sun Fire V60x Setup Poster
Sun Fire V65x Setup Poster

Ordering Sun Documents

The SunDocsSM program provides more than 250 manuals from Sun Microsystems, Inc. If you are in the United States, Canada, Europe, or Japan, you can use this program to purchase documentation sets or individual manuals.

For a list of documents and how to order them, see the catalog section of the SunExpress™ Internet site at <http://store.sun.com>.

Accessing Sun Documentation Online:

The <http://docs.sun.com> Web site enables you to access the Sun technical documentation online. You can browse the docs.sun.com archive or search for a specific book title or subject.

Shell Prompts in Command Examples

The following table shows the default system prompt and superuser prompt for the C, Bourne, and Korn shell.

TABLE P-2 Shell Prompt

Shell	Prompt
Bourne shell and Korn shell prompt	machine name\$
Bourne shell and Korn shell superuser prompt	machine name#

Notice

To better illustrate the process being discussed, this manual contains examples of data that might be used in daily business operations. The examples might include the names of different individuals, companies, brands and products. Only fictitious names are used and any similarity to the names of individuals, companies, brands and products used by any business enterprise is purely coincidental.

Sun Welcomes Your Comments

Sun is interested in improving its documentation and welcomes your comments and suggestions. You can email your comments to Sun at:

`docfeedback@sun.com`

Please include the part number (817-2023-10) of your document in the subject line of your email.

Introducing the Sun Fire V60x and Sun Fire V65x Servers

This chapter gives an overview of the Sun Fire V60x and Sun Fire V65x servers. It lists the features of the servers, the contents of the ship kit, and summarizes the installation process.

This chapter contains the following sections:

- “Overview of the Sun Fire V60x and Sun Fire V65x Servers” on page 1-2
- “System Components” on page 1-7
- “Front Panel and Peripheral Bays” on page 1-9
- “Front Panel Controls and Indicators” on page 1-10
- “Rear Panel Ports and Features” on page 1-12
- “Server Main Board” on page 1-14
- “Contents of the Ship Kit” on page 1-15
- “Replaceable Components” on page 1-18
- “Optional RJ-45 to DB9 Serial Adapter Kit” on page 1-22
- “Installation Quickstart” on page 1-23

1.1 Overview of the Sun Fire V60x and Sun Fire V65x Servers

The Sun Fire V60x and Sun Fire V65x servers are shown in Figure 1-1. The Sun Fire V60x server is a single- or dual-processor server in a 1 rack unit (1U) chassis (1U is 1.75" of vertical rack space). The Sun Fire V65x server is a single- or dual-processor server in a 2 rack unit (2U) chassis (2U is 3.5" of vertical rack space). The bezels shown in the figure are installed by the user.

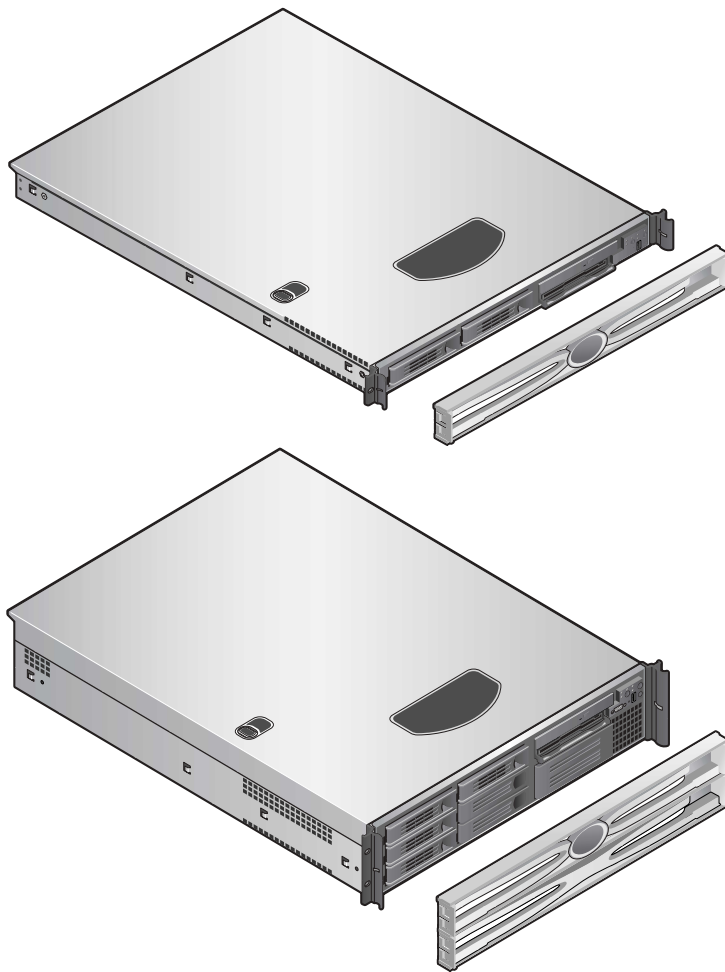


FIGURE 1-1 Sun Fire V60x and Sun Fire V65x Servers

1.1.1 Sun Fire V60x Server

The Sun Fire V60x server is a 1U rack mount server chassis designed for use with the Ultra320 SCSI server board. The Sun Fire V60x server provides the following features:

- Two drive bays dedicated for hard disk drives (HDDs) and one flex bay that can support either a slimline CD ROM drive and floppy disk drive, or a slimline DVD ROM drive and floppy disk drive. A hard drive bay can be substituted for the CD ROM drive/3.5 inch drive or DVD ROM/3.5 inch drive.
- Full integration with the built in management features of the server board.
- Support for one low profile PCI X card and one full-height/full-length PCI X card on two separate riser boards.
- Redundant cooling.
- Front panel support for bootable USB 1.1 devices.
- Integrated dual Gigabit Ethernet

1.1.2 Sun Fire V65x Server

The Sun Fire V65x server is a 2U rack mount server chassis designed for use with the Ultra320 SCSI server board. The Sun Fire V65x server provides the following features:

- Six dedicated hard drive bays.
- One flex bay that can support either a slimline CD ROM drive and floppy disk drive, or a slimline DVD ROM drive and floppy disk drive. A tape drive bay can be substituted for the CD ROM drive/3.5 inch drive or DVD ROM/3.5 inch drive.
- Support for three low-profile PCI X cards and three full-height/full-length PCI X cards on two separate riser boards.
- Optional hot swap, redundant power supply.
- Full integration with the built in management features of the server board.
- Redundant cooling.
- Front panel support for bootable USB 1.1 devices.
- Integrated dual Gigabit Ethernet

1.1.3 Applications

The Sun Fire V60x and Sun Fire V65x servers are high-performance servers built for high-density rack-mount applications.

The Sun Fire V60x server is ideally suited to support:

- Horizontally scalable applications
 - Web services
 - Security services

- Application front-end services
- Proxy and cache services
- Load-balanced server clusters
- High performance computing clusters
- Any application that requires a high-performance, high-density, and highly available server but has limited data storage requirements

The Sun Fire V65x server is ideally suited to support:

- Entry-level business services
- Entry-level database services
- Messaging services
- Any rack-mount application for a general-purpose expandable server

The Sun Fire V60x and Sun Fire V65x servers are primarily intended as building blocks for Internet infrastructure. This includes support for e-Business services as well as network-specific services.

1.1.3.1 e-Business Services

Examples of e-Business services include:

- Web/Horizontally Scalable Services

The Sun Fire V60x and Sun Fire V65x servers can supply both Internet and intranet horizontally scalable services that provide simple, static Web pages, or serve as a portal to more robust dynamic pages or a set of e-Business applications. This scenario typically uses a set of 1U servers configured as members of a load balancing cluster.

- Multimedia Services

The Sun Fire V60x and Sun Fire V65x servers can provide streaming audio and/or video media to intranet and/or Internet users. This scenario typically employs a number of 1U servers connected to a large drive array.

- Messaging Services

You can use the Sun Fire V60x and Sun Fire V65x servers to provide inbound and outbound messaging for intranet and/or Internet users. This scenario can include one or more 1U servers acting as a relay agent for a larger email server where the relay server does not store messages and thus does not require significant storage capacity.

1.1.3.2 Network Infrastructure Services

Examples of network infrastructure services include:

- Security Services

The server provides firewall services, public key processing for secure transactions, and any other applications that provide network security. These services typically run on one or more 1U servers that are positioned between the users (both internal and external) and sensitive data on a secure network.

- Proxy Services and Web Caching Server

One or more servers located close to the edge of the secure network, but behind the firewall, can act as an intermediary between Web clients and Web server and/or cache commonly accessed Web objects (pages, graphics and sound). Proxy services provide a level of security and user control. Caching services typically improve the response times of commonly used Web sites, since the objects can be loaded from the cache over the local area network instead of pulling the objects from a remote site over a slower wide area network connection. These services typically run on a set of clustered 1U servers.

- Network Load Balancing Server

This is a specialized application that balances access requests among a set of servers providing identical services. Such an application is typically used with Web services but can be used for any number of other applications. This type of service can be provided by a dedicated application running on a single server that collects all inbound requests and distributes these requests evenly to a set of servers.

- High Performance Computing Cluster

This is a specialized application designed to pool the processing resources of multiple servers to act as a single server. High performance computing clusters are used in situations where large amounts of processing power are needed, such as rendering of large graphics, video editing and manipulation and calculating large mathematical equations. These clusters are designed around low-profile rack mount servers to maximize processor density in a rack.

1.1.4 Features

The Sun Fire V60x and Sun Fire V65x servers have the following hardware and software features (see Chapter 7, “Specifications,” for more details):

- Hardware Features

- Single or dual Intel® Xeon™ self-terminating processors¹.

1. A single processor server must have a processor installed in processor socket 1 and socket 2 must be empty (no terminator is required). Processor 1 is the processor nearest the center of the board. Processor 2 is located near the edge of the board.

- Redundant processors for Fault Resilient Booting (FRB).
- Six DIMM sockets (a maximum of 12 GB of main memory with 2 GB DIMMs for the Sun Fire V65x server, and a maximum of 6 GB of main memory with 1 GB DIMMs for the Sun Fire V60x server).
- Three independent PCI busses.
- Three USB 1.1 ports.
- COM2 Serial Emergency Management Port (EMP) at rear RJ-45 socket².
- Support for up to three (Sun Fire V60x server) or six (Sun Fire V65x server) tray-mounted SCSI hard disk drives. The drives can be Ultra2, Ultra160, or Ultra 320 SCA2 in a low-profile form factor (3.5" x 1"). One drive bay is flexible and is configured, by default, with a combination floppy drive/CD-ROM module.
- Rear SCSI expansion connector.
- Accommodates two plug-in PCI riser boards (one low-profile and one full-height/full-length).
- Rack mounting with brackets, (or, optional slide-rail mounting).
- Power Supply

Sun Fire V60x server: Single 350 W power supply with redundant fans

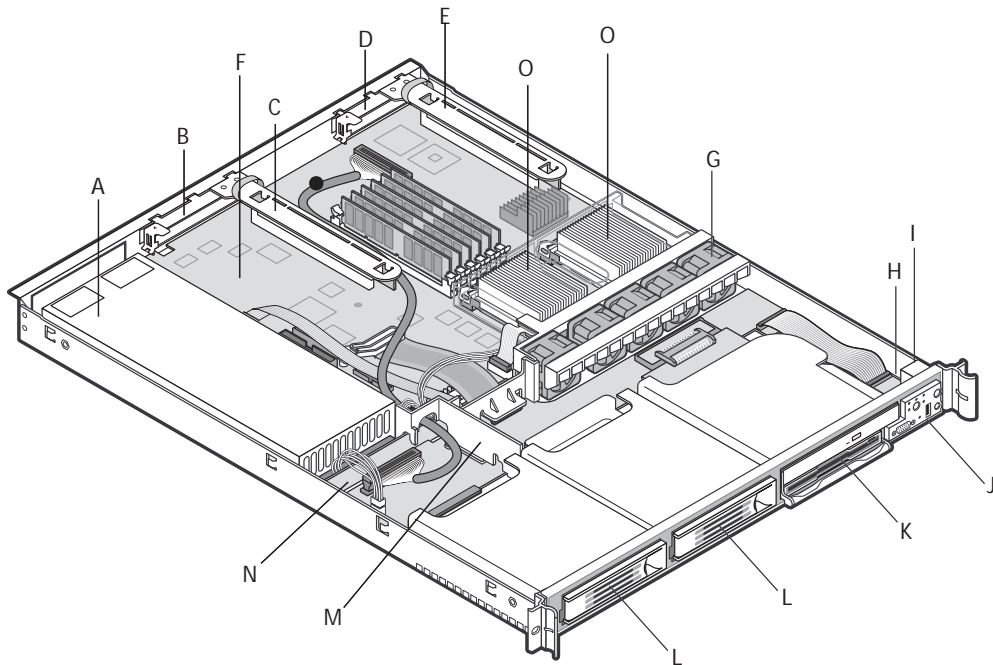
Sun Fire V65x server: Single 500 W power supply or dual 500 W power supplies with redundant 1 + 1 operation (not hot swappable)

- Two Ethernet ports (10/100/1000 Mbps RJ-45 NIC ports on rear panel).
 - PS/2 keyboard/mouse port with Y adapter.
 - Front and rear VGA output ports (one each on front and rear panel).
 - Front panel controls and indicators.
 - Fault and status LEDs throughout the server board.
- Software Features
 - Advanced memory error correction.
 - Advanced Server Management tools, including:
 - Support for a bootable service partition
 - Remote management
 - Full event alerting either over the network or through a serial device
 - Serial over LAN (SOL) support
 - Command Line Interface (CLI)
 - Remote power control (on/off)

2. An internal header is also available on the Sun Fire V65x server that can be used to provide an optional external serial port (COM1).

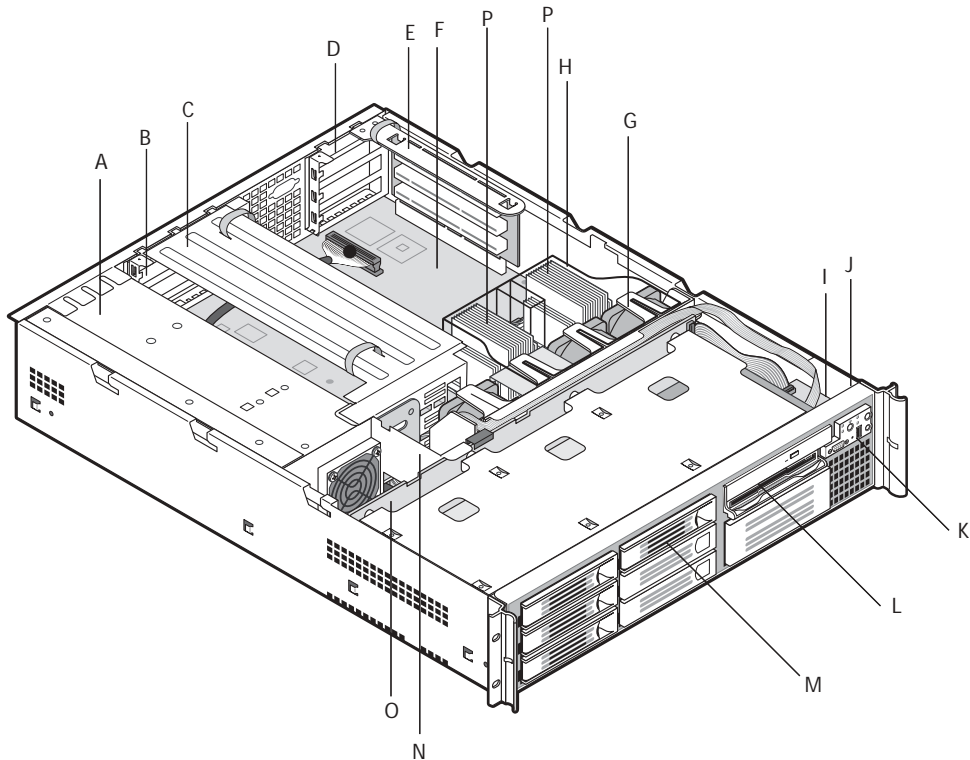
1.2 System Components

Figure 1-2 shows the Sun Fire V60x server system components and Figure 1-3 shows the Sun Fire V65x server system components.



- A. Power supply
- B. PCI card bracket (full-height)
- C. PCI card riser (full-height)
- D. PCI card bracket (low-profile)
- E. PCI card riser (low-profile)
- F. Main board
- G. Fan module
- H. Front panel board
- I. Intrusion switch
- J. Front panel board
- K. Flex bay (CD-ROM drive/floppy drive or DVD drive/floppy drive)
- L. Hard disk drive bays (2)
- M. Air baffle
- N. Power distribution board
- O. CPUs (2 shown)

FIGURE 1-2 Sun Fire V60x Server System Components



- A. Power supply
- B. PCI card bracket (full-height)
- C. PCI card riser (full-height)
- D. PCI card bracket (low-profile)
- E. PCI card riser (low-profile)
- F. Main board
- G. Fan module
- H. Processor air duct
- I. Front panel board
- J. Intrusion switch
- K. Front panel board
- L. Flex bay (CD-ROM drive/floppy drive or DVD drive/floppy drive)
- M. Hard disk drive bays (6)
- N. Air baffle
- O. Power distribution board
- P. CPUs (2 shown)

FIGURE 1-3 Sun Fire V65x Server System Components

1.3 Front Panel and Peripheral Bays

Figure 1-4 shows the Sun Fire V60x server front panel connectors, indicators, and peripheral bays. Figure 1-5 shows the Sun Fire V65x server.

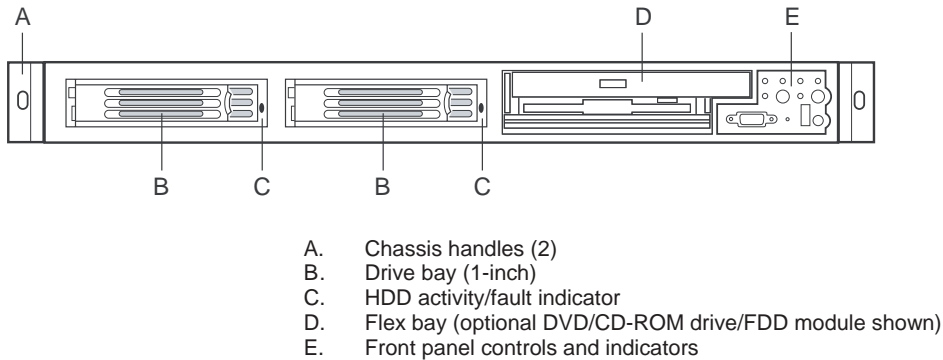


FIGURE 1-4 Sun Fire V60x Server Front Panel and Peripheral Bays

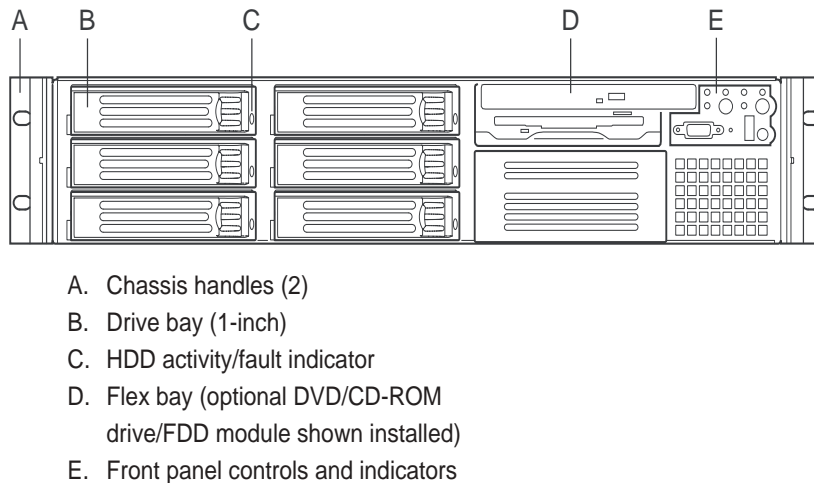
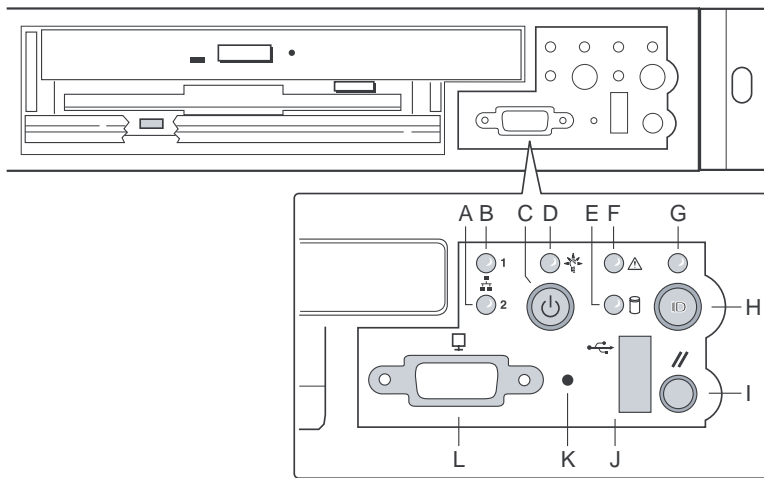


FIGURE 1-5 Sun Fire V65x Server Front Panel and Peripheral Bays

1.4 Front Panel Controls and Indicators

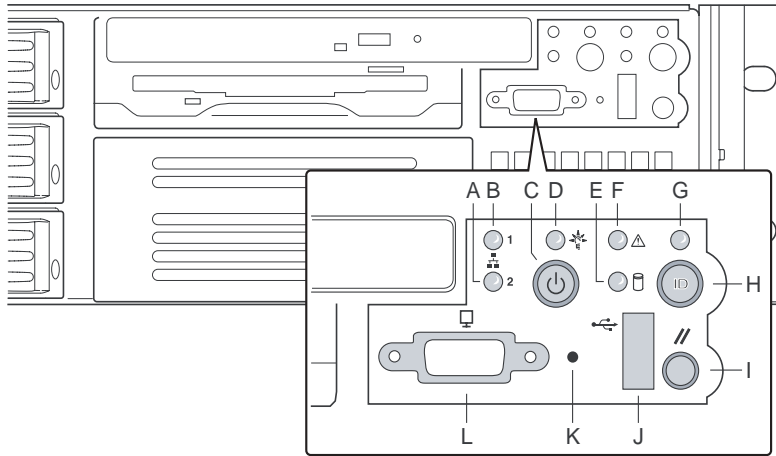
Figure 1-6 shows details of the Sun Fire V60x server front panel controls and indicators. Figure 1-7 shows the Sun Fire V65x server.

Note – The front panels for both servers are identical. The two figures that follow show the physical placement of the front panel in each server. All of the panel buttons, connectors, and indicators are identical.



- A. NIC 2 activity LED
- B. NIC 1 activity LED
- C. Power/sleep button
- D. Power/sleep LED
- E. Hard disk drive status LED
- F. System status LED
- G. ID LED
- H. ID button
- I. Reset button
- J. USB1 connector
- K. Nonmaskable interrupt (NMI) button
- L. Video connector

FIGURE 1-6 Sun Fire V60x Server Front Panel Controls and Indicators

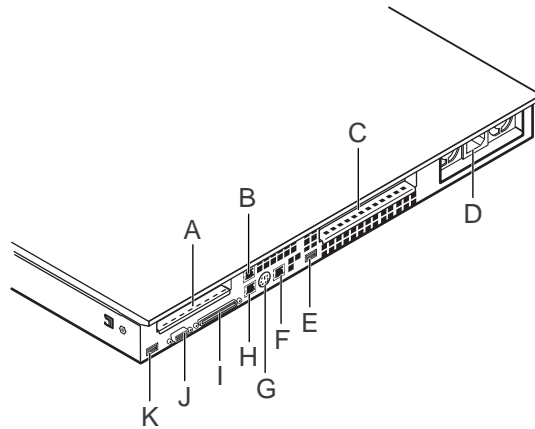


- A. NIC 2 activity LED
- B. NIC 1 activity LED
- C. Power/sleep button
- D. Power/sleep LED
- E. Hard disk drive status LED
- F. System status LED
- G. ID LED
- H. ID button
- I. Reset button
- J. USB1 connector
- K. Nonmaskable interrupt (NMI) button
- L. Video connector

FIGURE 1-7 Sun Fire V65x Server Front Panel Controls and Indicators

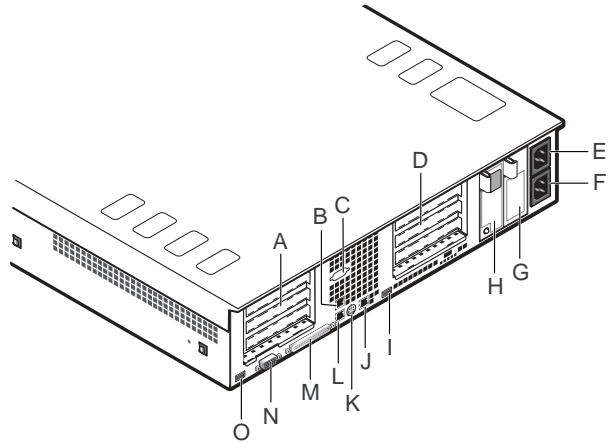
1.5 Rear Panel Ports and Features

Figure 1-8 shows the Sun Fire V60x server rear panel and Figure 1-9 shows the Sun Fire V65x server rear panel.



- | | |
|--|--|
| A. PCI card bracket (low-profile) | G. PS/2 mouse/keyboard connector |
| B. RJ45 NIC 2 connector (Green and Yellow status LEDs) | H. RJ45 NIC 1 connector (Green and Yellow status LEDs) |
| C. PCI card bracket (full-height) | I. SCSI channel A connector |
| D. Power supply | J. Video connector |
| E. USB 2 connector | K. USB 3 connector |
| F. RJ45 serial port (COM2) | |

FIGURE 1-8 Sun Fire V60x Server Rear Panel Ports and Features



- | | |
|---|-------------------------------------|
| A. PCI card bracket (low-profile) | I. USB connector 2 |
| B. RJ45 NIC 2 connector
(Green and Yellow status LEDs) | J. RJ45 serial port (COM2) |
| C. Serial A port mounting hole
(cable not included) | K. PS/2 mouse/keyboard
connector |
| D. PCI card bracket (full-height) | L. RJ45 NIC 1 connector |
| E. AC power input (primary) | M. SCSI channel A connector |
| F. AC power input (redundant) | N. Video connector |
| G. Power supply module
(redundant, system accessory) | O. USB connector 3 |
| H. Power supply module (primary) | |

Note: server is shown with 480W redundant power supplies. Your server may be different.

FIGURE 1-9 Sun Fire V65x Server Rear Panel Ports and Features

1.6 Server Main Board

Figure 1-10 shows the main board layout. The same main board is used for both the Sun Fire V60x and Sun Fire V65x servers.

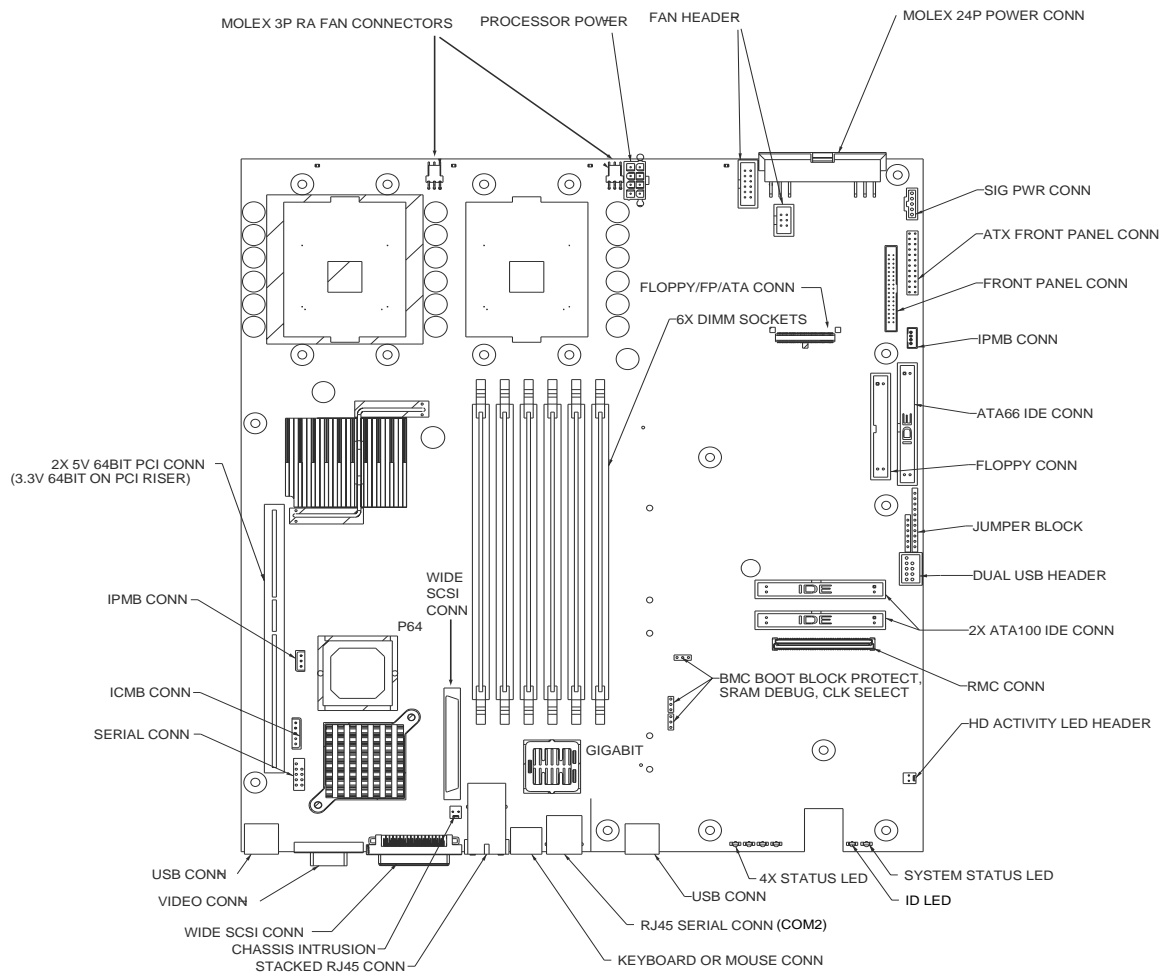


FIGURE 1-10 Server Main Board

1.7 Contents of the Ship Kit

The Sun Fire V60x server is supplied with the components shown in Table 1-1. The components for the Sun Fire V65x server are shown in Table 1-2

TABLE 1-1 Contents of the Sun Fire V60x Server Ship Kit

Item	Part Number	Quantity	Delivery
CD and Floppy Diskette Media			
Sun Fire V60x and Sun Fire V65x Servers Documentation CD:	705-0561	1	on CD
• Read Me for Sun Fire V60x and Sun Fire V65x Server Documentation CD	817-2295		
• Sun Fire V60x and Sun Fire V65x Servers User Guide	817-2023		
• Sun Fire V60x and Sun Fire V65x Servers Troubleshooting Guide	817-2024		
• Sun Fire V60x Server and Sun Fire V65x Server: Server Management Guide	817-2025		
• Sun Fire V60x and Sun Fire V65x Safety and Compliance Guide	817-2028		
• Binary Code License Agreement	817-2029		
Sun Fire V60x and Sun Fire V65x Servers Diagnostics CD	705-0602	1	on CD
Sun Fire V60x and Sun Fire V65x Servers Resource CD	705-0601	1	on CD
Sun Fire V60x and Sun Fire V65x Servers SCSI Driver Disk	702-4540	1	on Floppy Disk
Printed Documentation			
Shrink-wrapped Document Set	825-6052		
• Binary Code License Agreement	817-2029	1	printed
• Important Information for Sun Hardware Systems	816-7190	1	printed
• Warranty and Disclaimer	817-2027	1	printed
• Registration Card	817-2294	1	printed
Sun Fire V60x Server Setup Poster	817-1777	1	printed
Sun Fire V60x and Sun Fire V65x Servers Release Notes: Linux-compatible Version	817-2026	1	printed
Sun Fire V60x and Sun Fire V65x Server Linux Operating System Installation Guide	817-1956	1	printed
Sun Fire V60x and Sun Fire V65x Servers Software Download Information	817-3329	1	printed
Sun Fire V60x and Sun Fire V65x Server Solaris Software Documentation	817-3419	1	printed

TABLE 1-1 Contents of the Sun Fire V60x Server Ship Kit (Continued)

Item	Part Number	Quantity	Delivery
Hardware			
PS/2 Keyboard/Mouse Y Cable	530-3230	1	accessory kit
Bracket Kit	595-6805	1	boxed
Sun Fire V60x Server	N/A	1	boxed
Sun Fire V60x Server Front Bezel	540-5764	1	accessory kit
Power Cord (for USA)	none	1	accessory kit
Power Cord Clip	none	1	accessory kit
Additional documentation for Sun Fire V60x server with the Solaris operating environment preinstalled			
SMI Binary Code License Agreement	816-4835	1	printed
Solaris 9 Operating Environment Supplemental License Terms	871-1801	1	printed
Binary Code License Agreement for Accompanying Applications Software	817-1332	1	printed
Sun Fire V60x and Sun Fire V65x Server Solaris Operating Environment Installation Guide	817-2875	1	printed
Sun Fire V60x and Sun Fire V65x Server Solaris Applications Getting Started Guide	817-2877	1	printed
Sun Fire V60x and Sun Fire V65x Server Release Notes: Solaris Compatible Version	817-2876	1	printed

TABLE 1-2 Contents of the Sun Fire V65x Server Ship Kit

Item	Part Number	Quantity	Delivery
CD and Floppy Diskette Media			
Sun Fire V60x and Sun Fire V65x Servers Documentation CD:	705-0561	1	on CD
• Read Me for Sun Fire V60x and Sun Fire V65x Server Documentation CD	817-2295		
• Sun Fire V60x and Sun Fire V65x Servers User Guide	817-2023		
• Sun Fire V60x and Sun Fire V65x Servers Troubleshooting Guide	817-2024		
• Sun Fire V60x Server and Sun Fire V65x Server: Server Management Guide	817-2025		
• Sun Fire V60x and Sun Fire V65x Safety and Compliance Guide	817-2028		
• Binary Code License Agreement	817-2029		
Sun Fire V60x and Sun Fire V65x Servers Diagnostics CD	705-0602	1	on CD
Sun Fire V60x and Sun Fire V65x Servers Resource CD	705-0601	1	on CD
Sun Fire V60x and Sun Fire V65x Servers SCSI Driver Disk	702-4540	1	on Floppy Disk

TABLE 1-2 Contents of the Sun Fire V65x Server Ship Kit *(Continued)*

Item	Part Number	Quantity	Delivery
Printed Documentation			
Shrink-wrapped Document Set	825-6052		
• Binary Code License Agreement	817-2029	1	printed
• Important Information for Sun Hardware Systems	816-7190	1	printed
• Warranty and Disclaimer	817-2027	1	printed
• Registration Card	817-2294	1	printed
Sun Fire V65x Server Setup Poster	817-2017	1	printed
Sun Fire V60x and Sun Fire V65x Servers Release Notes: Linux-compatible Version	817-2026	1	printed
Sun Fire V60x and Sun Fire V65x Server Linux Operating System Installation Guide	817-1956	1	printed
Sun Fire V60x and Sun Fire V65x Servers Software Download Information	817-3329	1	printed
Sun Fire V60x and Sun Fire V65x Server Solaris Software Documentation	817-3419	1	printed
Hardware			
PS/2 Keyboard/Mouse Y Cable	530-3230	1	accessory kit
Bracket Kit	540-5432	1	boxed
Sun Fire V65x Server	N/A	1	boxed
Sun Fire V65x Server Front Bezel	540-5765	1	accessory kit
Power Cord (for USA)	none	1	accessory kit
Power Cord Clip	none	1	accessory kit
Additional documentation for Sun Fire V65x server with the Solaris operating environment preinstalled			
SMI Binary Code License Agreement	816-4835	1	printed
Solaris 9 Operating Environment Supplemental License Terms	871-1801	1	printed
Binary Code License Agreement for Accompanying Applications Software	817-1332	1	printed
Sun Fire V60x and Sun Fire V65x Server Solaris Operating Environment Installation Guide	817-2875	1	printed
Sun Fire V60x and Sun Fire V65x Server Solaris Applications Getting Started Guide	817-2877	1	printed
Sun Fire V60x and Sun Fire V65x Server Release Notes: Solaris Compatible Version	817-2876	1	printed

1.8 Replaceable Components

The replaceable components on the Sun Fire V60x and Sun Fire V65x servers are shown in Table 1-3 and Table 1-4. Some of the components are considered to be customer-replaceable units (CRUs), and some are considered to be field-replaceable units (FRUs), replaceable only by an authorized Sun Microsystems, Inc. field service technician. Also, some components are extra-cost options that can be ordered from Sun Microsystems.

Note – If a FRU needs replacement, contact your local Sun Sales representative, who will put you in contact with the Sun Enterprise Service branch for your area. You can arrange to return the server to Sun for repair under the terms of your warranty. Or, if the server is under a Sun Service agreement, the FRU will be replaced by a Sun Service engineer. If a CRU needs replacement, you can either request a replacement part from Sun or return the entire unit for repair. All parts replaced under the server warranty must be returned to Sun within 30 days of receipt of the replacement part.

For the Sun Fire V60x server, Table 1-3 lists the components that are customer-replaceable, Sun-replaceable, and extra cost options.

TABLE 1-3 Sun Fire V60x Server Replaceable Components

Component	Part Number	Extra Cost Options	CRU/FRU
Memory ¹			
256MB (single)	XXX-XXXX		CRU
256MB (pair)	595-6937-01	Yes	CRU
512MB (single)	XXX-XXXX		CRU
512MB (pair)	595-6938-01	Yes	CRU
1GB (single)	XXX-XXXX		CRU
1GB (pair)	595-6939-01	Yes	CRU
Hard disk drives (HDDs)			
36 GB, Ultra 320 SCSI, 10K rpm	595-6933-01	Yes	CRU
73 GB, Ultra 320 SCSI, 10K rpm	595-6934-01	Yes	CRU
CPU/Heatsink Kit ²			
2.8 GHz	595-6944-01		FRU
2.8 GHz	595-6943-01	Yes	FRU
Cable Kit (cables inside the server chassis)	F540-5762-01		FRU

TABLE 1-3 Sun Fire V60x Server Replaceable Components

Component	Part Number	Extra Cost Options	CRU/FRU
Optional RJ-45 to DB9 Serial Adapter Kit RJ-45 to DB9 DSR EMP cable adapter RJ-45 to DB9 DCD EMP cable adapter DH10 to DB9 serial port flat cable adapter ³	595-6531-01	Yes	CRU
Fan module (five unitized fans)	F540-5755-01		CRU
Power supply (350 W)	F540-5758-01		CRU
Floppy/CD-ROM combo unit ⁴	F540-5432-01 596-4090-01	Yes	CRU CRU
Floppy/CD-ROM/DVD combo unit ⁵	F540-5757-01 595-6941-01	Yes Yes	CRU CRU
Zero-Channel RAID card	595-6945-01	Yes	CRU
Qlogic Fibre Channel card	595-6946-01	Yes	CRU
Rear Bracket Kit/Slide Rail Kit	595-6805-01	Yes	CRU
Bracket kit	XXX-XXXX		CRU
Front bezel	F540-5764-01		CRU
Lithium battery	CR2032		CRU
Sun Fire V60x Server System FRU ⁶	F540-5746-01		FRU
Main Board ⁷	F540-5745-01		FRU

1 Memory DIMMs must be installed in matched pairs (DIMM 1A with DIMM 1B, DIMM 2A with DIMM 2B, and DIMM 3A with DIMM 3B).

2 When upgrading from one to two CPUs, the CPUs must be of identical revision, core voltage, and bus/core speed. The CPUs must also be no greater than ± 1 stepping apart. If the CPUs do not meet these criteria, the server pauses during the boot process. In addition, the board hardware and baseboard management controller (BMC) must read the processor VID (voltage identification) bits for each processor before turning on the processor voltage regulator module (VRM). If the VIDs of the two processors are not identical, the BMC does not turn on the VRM and a beep code is generated.

3 The DH10 to DB9 flat cable serial port adapter for COM1 is only for use with the Sun Fire V65x server.

4 A third hard disk drive can be substituted for the floppy/CD-ROM unit, if desired.

5 A third hard disk drive can be substituted for the floppy/CD-ROM/DVD unit, if desired.

6 The System FRU is a full server without processors, DIMMs, HDDs, or a floppy/CD-ROM combo unit.

7 The Main Board contains no DIMMs or CPUs, and is packaged in an ESD bag with two foam pads and an ESD wrist strap.

For the Sun Fire V65x server, Table 1-4 lists the components that are customer-replaceable, Sun-replaceable, and extra cost options.

TABLE 1-4 Sun Fire V65x Server Replaceable Components

Component	Part Number	Extra Cost Options	CRU/FRU
Memory ¹			
256MB (single)	XXX-XXXX		CRU
256MB (pair)	595-6937-01	Yes	CRU
512MB (single)	XXX-XXXX		CRU
512MB (pair)	595-6938-01	Yes	CRU
1GB (single)	XXX-XXXX		CRU
1GB (pair)	595-6939-01	Yes	CRU
2GB (single)	XXX-XXXX		CRU
2GB (pair)	595-6940-01	Yes	CRU
Hard disk drives (HDDs)			
36 GB, Ultra 320 SCSI, 10K rpm	595-6933-01	Yes	CRU
73 GB, Ultra 320 SCSI, 10K rpm	595-6934-01	Yes	CRU
CPU/Heatsink Kit ²			
3.06 GHz	XXX-XXXX		FRU
3.06 GHz	595-6944-01	Yes	FRU
Cable Kit (cables inside the server chassis)	F540-5762-01		FRU
Optional RJ-45 to DB9 Serial Adapter Kit	595-6531-01	Yes	CRU
RJ-45 to DB9 DSR EMP cable adapter			
RJ-45 to DB9 DCD EMP cable adapter			
DH10 to DB9 serial port flat cable adapter ³			
Fan module	F540-5755-01		CRU
DIMM fan		Yes	CRU
Power supply (500 W)	F540-5759-01		CRU
	595-6942-01	Yes	CRU
Floppy/CD-ROM combo unit	F540-5432-01		CRU
	596-4090-01		
Floppy/CD-ROM/DVD combo unit	F540-5757-01		CRU
	595-6941-01	Yes	CRU
Zero-Channel RAID card	595-6945-01	Yes	CRU
Qlogic Fibre Channel card	595-6946-01	Yes	CRU
Rear Bracket Kit/Slide Rail Kit	595-6805-01	Yes	CRU
Bracket kit	XXX-XXXX		CRU
Front bezel	F540-5765-01		CRU

TABLE 1-4 Sun Fire V65x Server Replaceable Components *(Continued)*

Component	Part Number	Extra Cost Options	CRU/FRU
Lithium battery	CR2032		CRU
Sun Fire V65x Server System FRU ⁴	F540-574X-01		FRU
Main Board ⁵	F540-5745-01		FRU

- 1 Memory DIMMs must be installed in matched pairs (DIMM 1A with DIMM 1B, DIMM 2A with DIMM 2B, and DIMM 3A with DIMM 3B).
- 2 When upgrading from one to two CPUs, the CPUs must be of identical revision, core voltage, and bus/core speed. The CPUs must also be no greater than ± 1 stepping apart. If the CPUs do not meet these criteria, the server pauses during the boot process. In addition, the board hardware and baseboard management controller (BMC) must read the processor VID (voltage identification) bits for each processor before turning on the processor voltage regulator module (VRM). If the VIDs of the two processors are not identical, the BMC does not turn on the VRM and a beep code is generated.
- 3 The DH10 to DB9 flat cable serial port adapter for COM1 is only for use with the Sun Fire V65x server.
- 4 The System FRU is a full server without processors, DIMMs, HDDs, or a floppy/CD-ROM combo unit.
- 5 The Main Board contains no DIMMs or CPUs, and is packaged in an ESD bag with two foam pads and an ESD wrist strap.

For detailed instructions on how to replace components, see “Customer Replaceable Unit (CRU) Procedures” on page 5-4.

1.9 Optional RJ-45 to DB9 Serial Adapter Kit

The optional RJ-45 to DB9 Serial Adapter Kit consists of the following RJ-45 to DB9 adapter cables:

- DSR Peripherals cable (for rear panel Data Set Ready (DSR) peripherals).
- DCD Modem cable (for rear panel Data Carrier Detect (DCD) modem).

These adapter cables can be used to connect the COM2 Emergency Management Port (EMP) on the back of the server to a device such as a modem or serial concentrator to administer remote server management.

1.9.1 DSR Peripherals Cable

This cable is wired for serial concentrators that use the DSR signal. See “Rear Panel RJ-45 Serial COM2 Connector” on page 2-36 for more information on how to use this adapter cable.

1.9.2 DCD Modem Cable

This cable is wired for serial concentrators that use the DCD signal, and for connecting to a modem. See “Rear Panel RJ-45 Serial COM2 Connector” on page 2-36 for more information on how to use this adapter cable.

1.10 Installation Quickstart

Table 1-5 is a simplified summary of the steps you need to follow to install and configure the Sun Fire V60x and Sun Fire V65x servers.

TABLE 1-5 Installation Quickstart Procedure

Step	Task	Reference
1 - Install the Hardware	Mount server in the rack Connect the cables	See Chapter 2, "Installing the Server in a Rack."
2 - Configure the Server	Power on the server Configure BIOS (optional) Run diagnostics (optional) Install the OS (if necessary) Install applications	See Chapter 4, "Powering Up and Configuring the Server"

Installing the Server in a Rack

This chapter describes how to install the Sun Fire V60x and Sun Fire V65x servers in a rack, using a four-post, two-post, or front-mount rack server. This chapter contains the following sections:

- “Decide Where to Configure the Sun Fire V60x and Sun Fire V65x Servers” on page 2-1
- “Precautions” on page 2-2
- “Mounting Methods” on page 2-3
- “Installing the Server Using the Bracket Kit” on page 2-4
- “Installing the Server Using the Slide Rail Kit (Optional)” on page 2-23
- “Connecting the Cables” on page 2-31

2.1 Decide Where to Configure the Sun Fire V60x and Sun Fire V65x Servers

Before installing the Sun Fire V60x and Sun Fire V65x servers, it is best to decide where you want to configure them:

- In the rack
- On the bench

If you are going to configure the server after it is mounted in the rack, proceed to the section titled “Precautions” on page 2-2. To configure the Sun Fire V60x and Sun Fire V65x servers while they are in the rack, it is best to use a laptop to connect to the server Emergency Management Port (EMP) on the rear panel of the server. See “Configuring an External Serial Console” on page 4-16 for details on hooking up the laptop to the EMP.

If you are going to configure the server in a lab environment before it is installed in a rack, proceed to Chapter 3, “Powering On and Configuring the Server,” then return to the section in this chapter titled “Precautions” on page 2-2.

Note – The preferred method is to configure the server on a lab bench, as all of the server components are much more accessible.

2.2 Precautions

Before beginning the rack installation process, read through the following precautions.

1. Anchor the Equipment Rack

The equipment rack must be anchored to an unmovable support to prevent it from falling over when one or more servers are extended in front of it on slide assemblies. The equipment rack must be installed according to the manufacturer's instructions. You must also consider the weight of any other device installed in the rack.

2. Main AC Power Disconnect

You are responsible for installing an AC power disconnect for the entire rack unit. This main disconnect must be readily accessible, and it must be labeled as controlling power to the entire unit, not just to the server(s).

3. Grounding the Rack Installation

To avoid a potential electrical shock hazard, you must include a third wire safety grounding conductor with the rack installation. If server power cords are plugged into AC outlets that are part of the rack, you must provide proper grounding for the rack itself. If server power cords are plugged into wall AC outlets, the safety grounding conductor in each power cord provides proper grounding only for the server. You must provide additional, proper grounding for the rack and other devices installed in it.

4. Temperature

The ambient operating temperature of the server, when installed in an equipment rack, must not go below 5 °C (41 °F) or rise above 35 °C (95 °F). Extreme fluctuations in temperature can cause a variety of problems in your server.

5. Ventilation

The equipment rack must provide sufficient airflow to the front of the server to maintain proper cooling. It must also include ventilation sufficient to exhaust a maximum of 950 BTUs per hour for fully loaded Sun Fire V60x and Sun Fire V65x servers.

It is important to note that this is the maximum, and a minimum or typical system could be much less. You may want to calculate the BTU/hr more accurately for your configuration. An extra 500 BTUs per hour over many systems would translate into a large error when calculating air-conditioning capacity.

2.3 Mounting Methods

There are two methods for installing the Sun Fire V60x and Sun Fire V65x servers in a rack:

- Bracket Kit (see “Installing the Server Using the Bracket Kit” on page 2-4)

This mounting method is quick and easy, but makes it somewhat difficult to service the server.

There are three mounting methods using the bracket kit:

- Four Post (see “Mounting in a Four-Post Rack System” on page 2-6)
- Mid Mount (see “Mid-Mounting in a Two-Post Rack System” on page 2-13)
- Front Mount (see “Front-Mount-Only in a Two-Post Rack System” on page 2-17)

Four-post mounting is the recommended method. It the most stable and sturdy method. The mid-mount system requires only two posts, but the posts must be adequately strong and stable to support the weight of multiple servers. The front mount method is highly discouraged, as most racks are unable to safely and reliably support the entire weight of a server through the front rack posts.

- Optional Slide Rail Kit (see “Installing the Server Using the Slide Rail Kit (Optional)” on page 2-23)

This mounting method is more complicated, but allows the server to be more easily serviced.

Note – At various points during installation, you must either remove or replace the front bezel. The bezel is held in place by the chassis handles. The instructions for removing and replacing the bezel are given here, to avoid repetition in subsequent sections. You will find the bezel in the accessory compartment of the shipping materials.

To remove the bezel:

1. Use the fingerhole on the left side of the bezel to pull the bezel out.
2. Pull out the left side first, allowing the right side to rotate in the chassis handle until it comes loose.

To replace the bezel:

1. Snap the right side of the bezel into the right chassis handle.
2. Swing the left side of the bezel in, allowing the right side to rotate in the chassis handle.
3. Gently push the left side of the bezel into the left hand chassis handle until it snaps into place.

2.4 Installing the Server Using the Bracket Kit

The bracket kit allows you to install the server chassis into most two- and four-post (open-frame) rack and EIA-310D compliant enclosed cabinets, as well as a Sun Rack 900.

2.4.1 Required Tools

- Phillips screwdriver

2.4.2 Bracket Kit Contents

The bracket kit, included as standard equipment with the server, includes the following items:

- Chassis brackets—qty. 2
- Rear brackets—qty. 2
- L brackets—qty. 2
- Fastener pack—qty. 1 (see Figure 2-1)

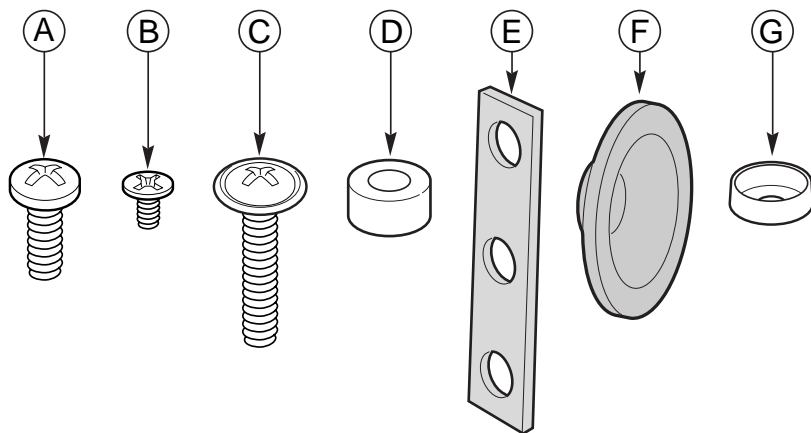


FIGURE 2-1 Fastener Pack Contents

- a. Screw, #10-32 x 1/2-inch—qty. 8 (Sun Rack 900: M6 x 12mm)
- b. Screw, #6-32 x 3/16-inch—qty. 4
- c. Screw, #10-32 x 7/8-inch—qty. 2 (Sun Rack 900: M6 x 20mm)
- d. Handle spacers—qty. 2
- e. Nut bar—qty. 4
- f. Chassis disks—qty. 2
- g. Plastic washers—qty. 10

2.4.3 Mounting in a Four-Post Rack System

The sections that follow give instructions for mounting the Sun Fire V60x and Sun Fire V65x servers in a four-post rack system. This is the most stable and secure mounting method.

2.4.3.1 Remove the Chassis Handles

1. Remove the bezel.
2. Remove two screws (Figure 2-2) from each handle.
3. Set the handles and screws aside for reattachment later.

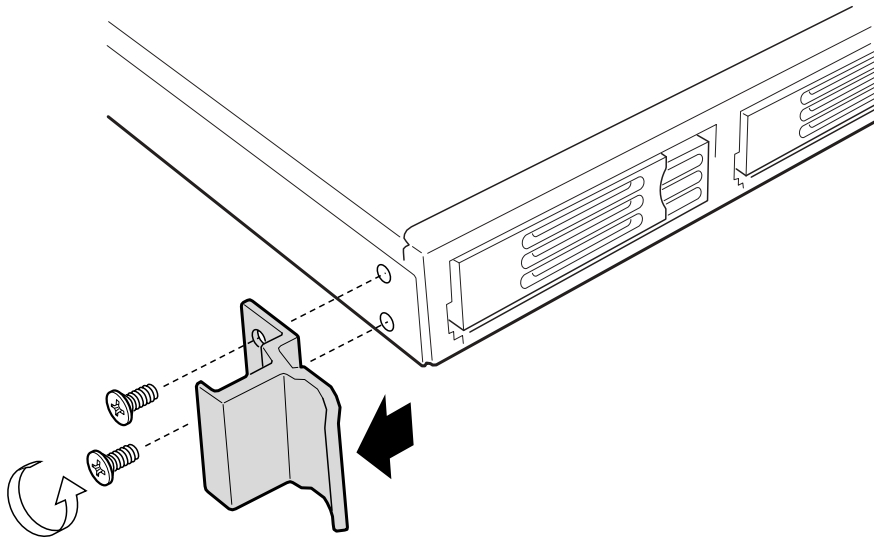


FIGURE 2-2 Removing a Handle from the Chassis

2.4.3.2 Attach Brackets to Chassis

1. Place a chassis bracket along one side of the chassis in the front-mount position (Figure 2-3, A).
2. Align the holes (B) in the bracket with the tabs (C) on the chassis and place the bracket against the chassis.
3. Slide the bracket as far as it will go toward the front of the chassis.
4. Fasten the bracket to the chassis using screw (D).
5. In the same manner, attach a chassis bracket to the other side of the chassis.

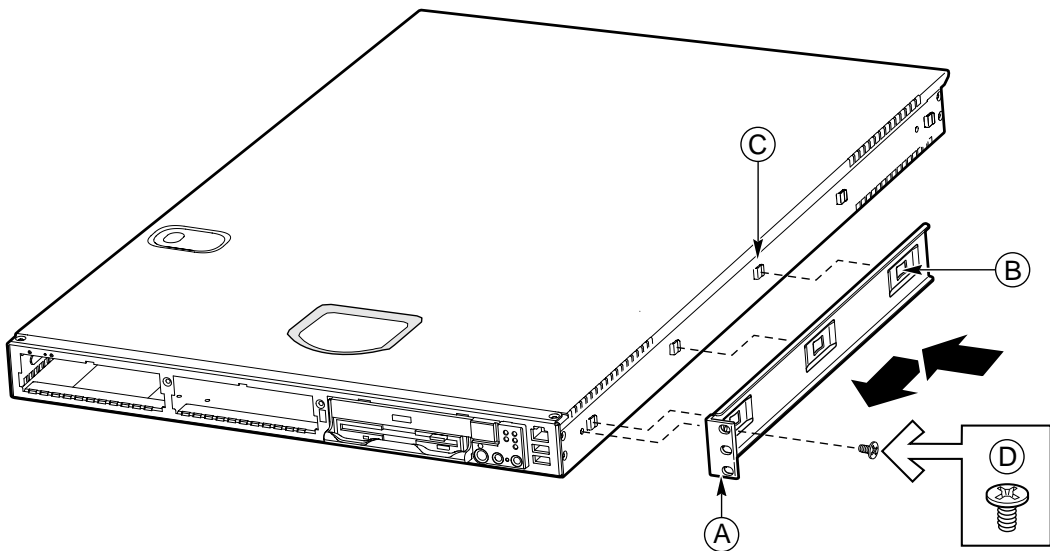


FIGURE 2-3 Installing a Chassis Bracket in the Front-mount Position

- a. Chassis bracket in front-mount position
- b. Bracket holes
- c. Chassis tabs
- d. #6-32 x 3/16-inch screw

2.4.3.3 Attach Chassis Disks to Chassis

1. Place a chassis disk at the side of the chassis towards the rear (see Figure 2-4, A).
2. Install screw (B) and tighten.
3. In the same manner, attach a chassis disk to the opposite side of the chassis.

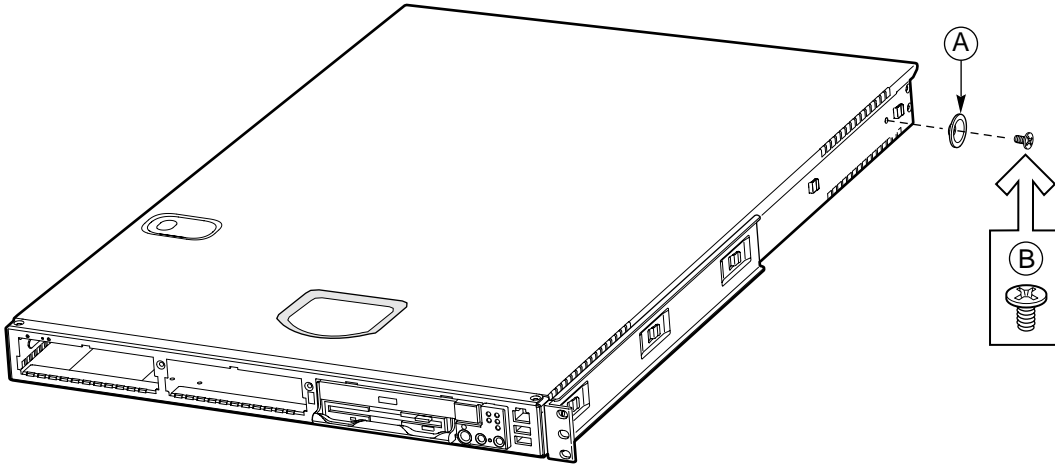


FIGURE 2-4 Attaching a Chassis Disk to the Chassis

- a. Chassis disk
- b. #6-32 x 3/16-inch screw

2.4.3.4 Attach Brackets to Rear Posts

1. Attach a nut bar (Figure 2-5, B) on the inside of the two rear rack posts using screws (A). Do not completely tighten the screws—leave them loose enough to allow insertion of the brackets in step 2.
2. Insert the slotted foot of a rear bracket (C) between each nut bar and post.
3. Align the face of the bracket foot with the edge of the rack post and firmly tighten the screws.

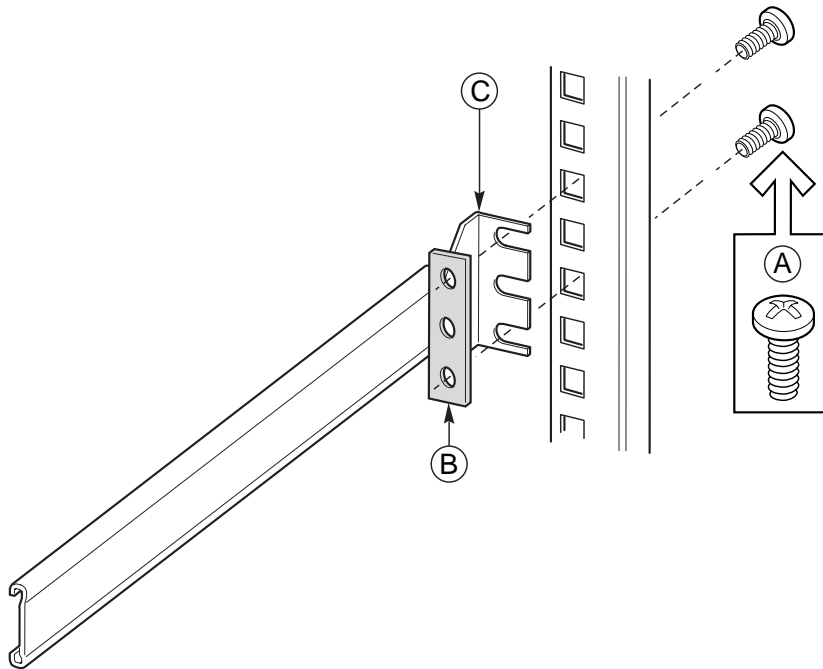


FIGURE 2-5 Attaching a Rear Bracket to a Rear Post

- a. #10-32 x 1/2-inch screw with washers (Sun Rack 900: M6 x 12mm)
- b. Nut bar
- c. Rear bracket

2.4.3.5 Install Chassis in Rack

Caution – Lifting the chassis and attaching it to the rack is a two-person job. If needed, use an appropriate lifting device. A fully loaded Sun Fire V60x server weighs approximately 15.9 kg (35 lbs) and a fully loaded Sun Fire V65x server weighs approximately 25 kg (50 lbs).

1. With the chassis front facing you, lift the chassis and position the chassis disks (Figure 2-6, A) so they fit in the rear brackets (B).

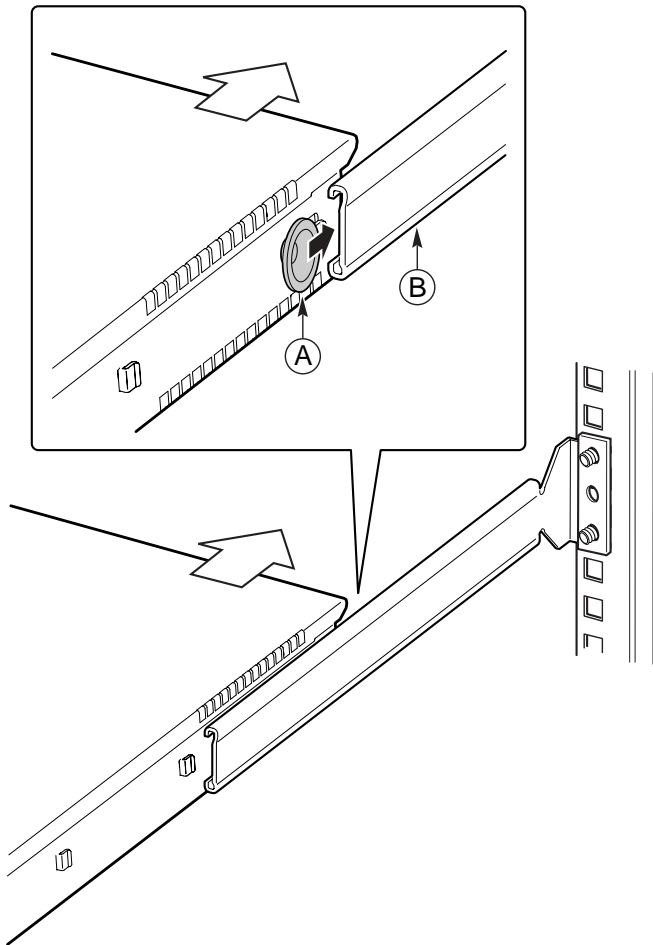


FIGURE 2-6 Installing the Chassis in the Rear Brackets

- a. Chassis disk
- b. Rear bracket

2. Slide the chassis toward the rear of the rack until the front of the chassis brackets contact the front posts.
3. Attach the chassis brackets (Figure 2-7, A) to the front posts (B) using two screws (C) and one nut bar (D) per side.

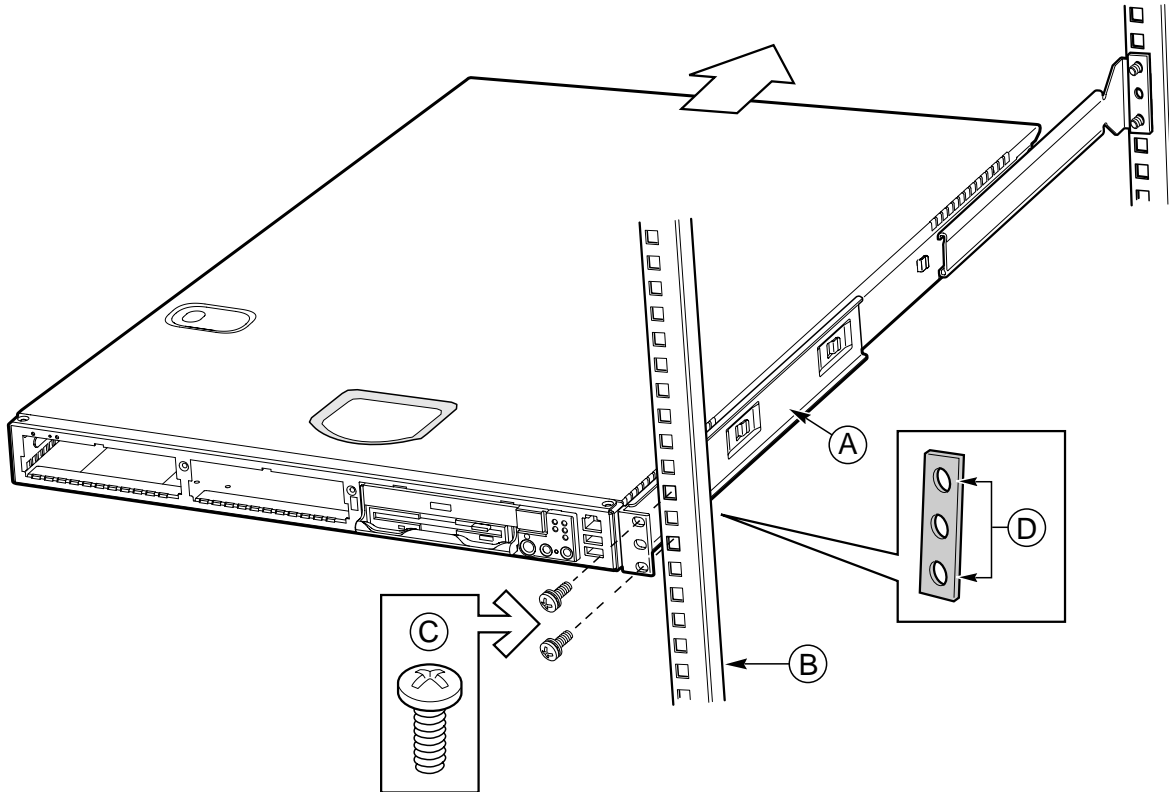


FIGURE 2-7 Attaching a Front Bracket to a Front Post

- a. Chassis bracket
- b. Front post
- c. #10-32 x 1/2-inch screw with washers (Sun Rack 900: M6 x 12mm)
- d. Nut bar (not required for Sun Rack 900)

2.4.3.6 Install Chassis Handles

Note – The handles are required to hold the bezel on. If you will not be installing a bezel, you do not need to install the handles.

1. Slide a handle (Figure 2-8, A) between the chassis and the chassis bracket.
2. Align the hole in the handle with the unused hole in the chassis bracket.
3. Install a spacer (B) between the handle and the chassis bracket.
4. Install and tighten screw (C) to secure the handle.
5. In the same manner, attach the other handle to the opposite side.
6. Replace the bezel.

You have completed the installation of your chassis in a four-post rack system.

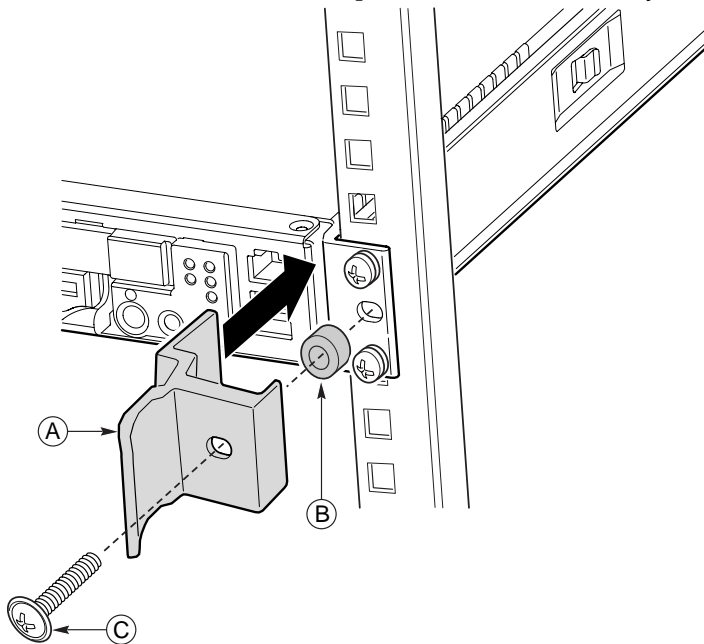


FIGURE 2-8 Attaching a Chassis Handle to a Front Post

- a. Chassis handle
- b. Spacer
- c. #10-32 x 7/8-inch screw with washer (Sun Rack 900: M6 x 20mm)

2.4.4 Mid-Mounting in a Two-Post Rack System

The sections that follow give instructions for mid-mounting the Sun Fire V60x and Sun Fire V65x servers in a two post rack system. This method is acceptable, but it is not as secure as the four-post mounting system.

2.4.4.1 Attach Brackets to Chassis

1. Place a mounting bracket (Figure 2-9, A) along one side of the chassis in the mid-mount position.
2. Align the holes (B) in the bracket with the tabs (C) on the chassis and place the bracket against the chassis.
3. Slide the bracket as far as it will go toward the front of the chassis.
4. Fasten the bracket to the chassis using screw (D).
5. In the same manner, attach a bracket to the other side of the chassis.

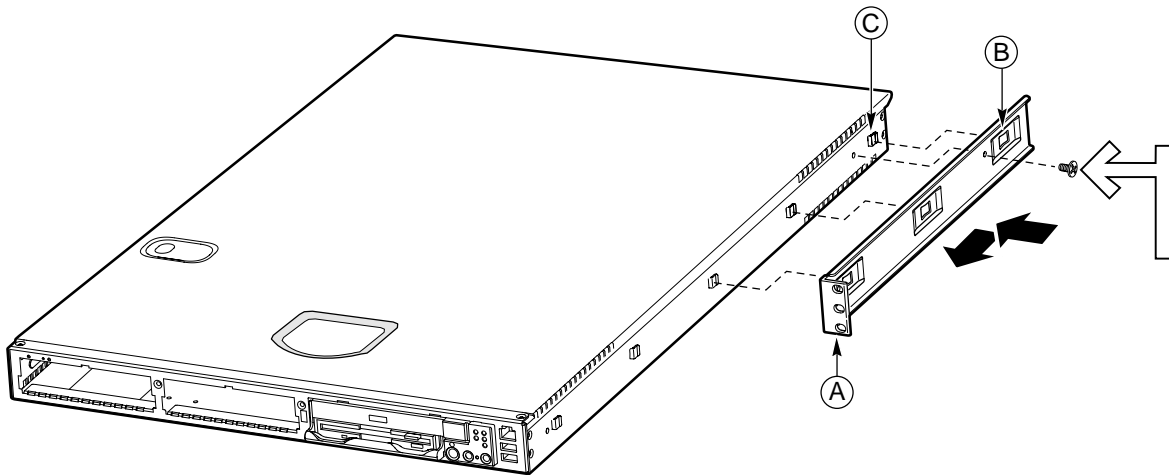


FIGURE 2-9 Installing a Chassis Bracket in the Mid-mount Position

- a. Chassis bracket in mid-mount position
- b. Bracket holes
- c. Chassis tabs
- d. #6-32 x 3/16-inch screw

2.4.4.2 Attach L Brackets to Center Posts

1. Position a supplied L bracket (Figure 2-10, A) on the backside of the center post (C).
2. Attach the L bracket to the center post using the screws (B) supplied with your rack. Do not fully tighten at this time.
3. In the same manner, attach an L bracket to the other center post.

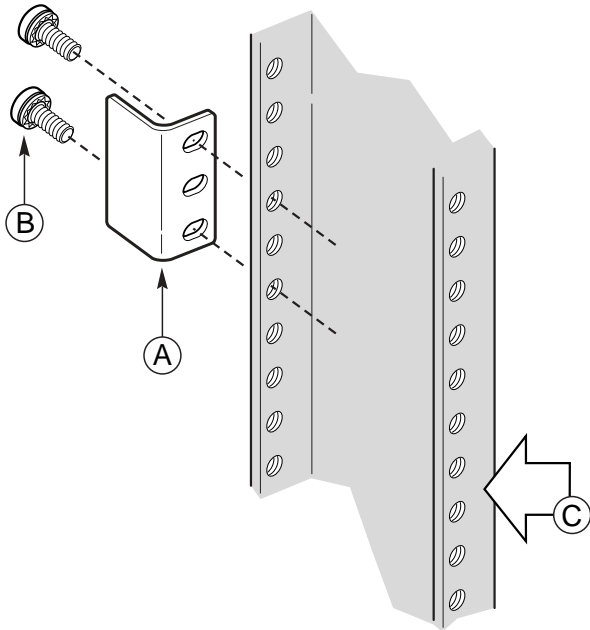


FIGURE 2-10 Attaching an L Bracket to a Center Post

- a. L bracket
- b. Screw (supplied by your rack manufacturer)
- c. Front side of typical right center post

2.4.4.3 Install Chassis in Rack

Caution – Lifting the chassis and attaching it to the rack is a two-person job. If needed, use an appropriate lifting device. A fully loaded Sun Fire V60x server weighs approximately 15.9 kg (35 lbs) and a fully loaded Sun Fire V65x server weighs approximately 25 kg (50 lbs).

1. Locate one person at the front of the rack and one at the rear.
2. Position the chassis so that the L brackets (Figure 2-11, A) are inserted into the chassis mounting brackets (B).
3. While supporting the weight of the chassis, adjust the L brackets to fit tightly into the chassis brackets (C).

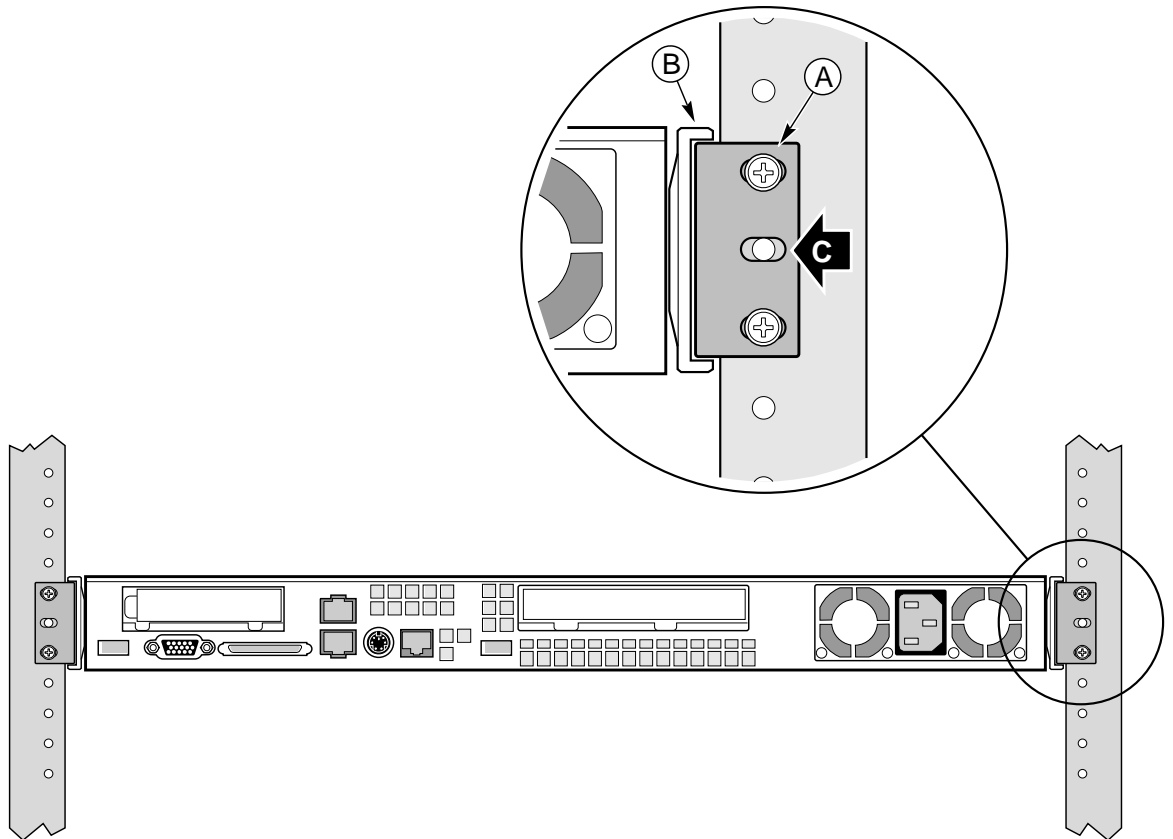


FIGURE 2-11 L Brackets Inserted into Chassis Mounting Brackets (Rear View)

4. Slide the chassis toward the rear of the rack until the front of the chassis mounting brackets contact the front of the center posts.
5. Using the screws (Figure 2-12, C) supplied with your rack, attach the front of the mounting brackets to the front of the center posts.

You have completed the mid-mount installation of your chassis in a two-post rack system.

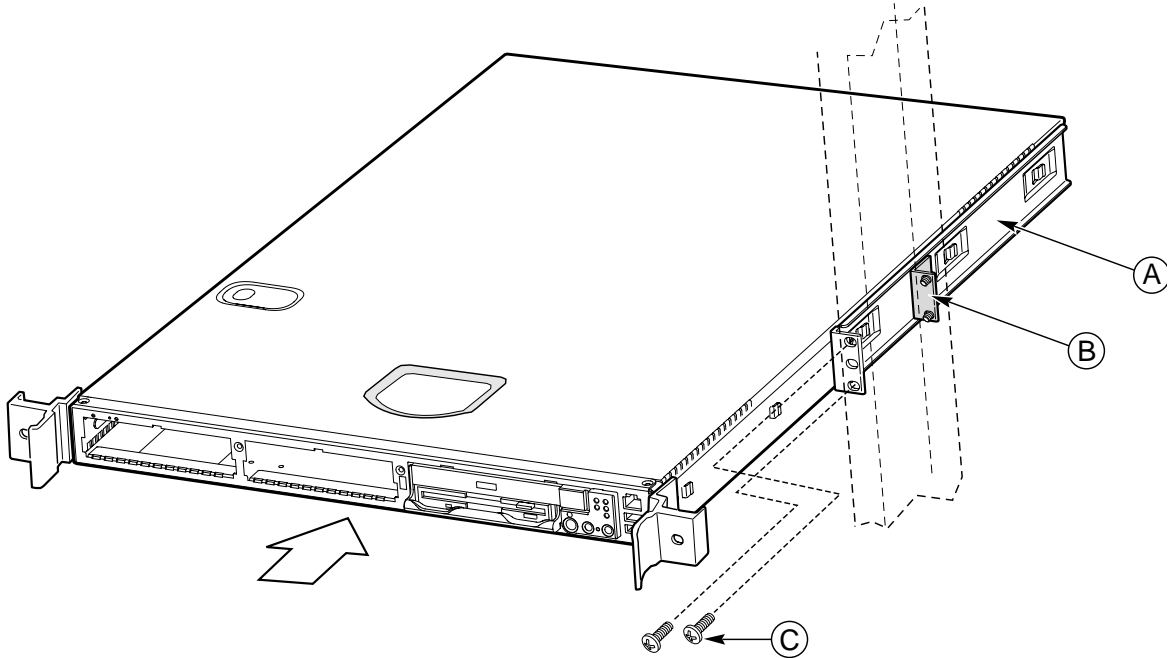


FIGURE 2-12 Installing the Chassis in the Rack

- a. Chassis bracket in mid-mount position
- b. L bracket
- c. Screw (supplied by rack manufacturer)

2.4.5 Front-Mount-Only in a Two-Post Rack System

This section gives instructions for front mounting the Sun Fire V60x and Sun Fire V65x servers in a two-post rack system.

Warning – Your chassis rack-mount kit provides the option for mounting the system in a two-post front-mount-only configuration. However, mounting your chassis using this option is not recommended for use in most rack systems. In fact, the front mount method is highly discouraged, as most racks are unable to safely and reliably support the entire weight of a server through the front rack posts.

2.4.5.1 Remove the Chassis Handles

1. Remove the bezel.
2. Remove two screws from each handle (see Figure 2-13).
3. Set the handles and screws aside for reattachment later.

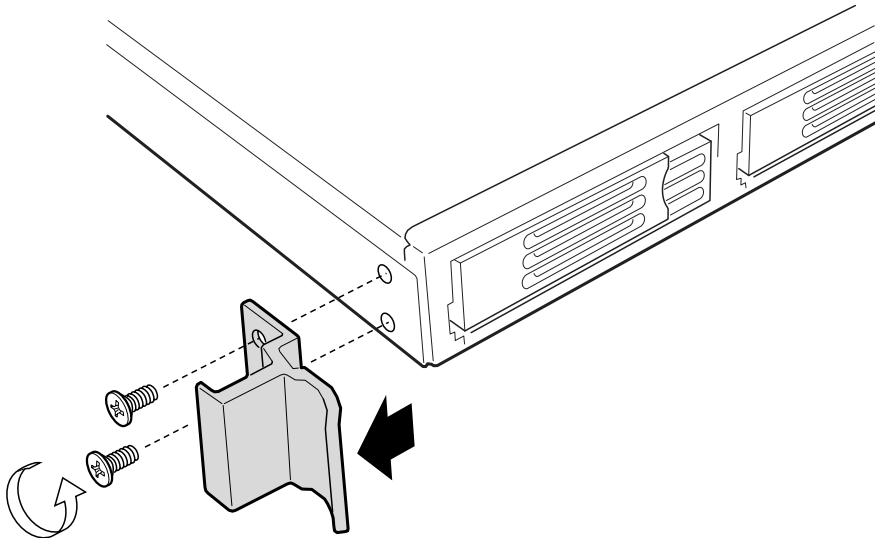


FIGURE 2-13 Removing a Handle from the Chassis

2.4.5.2 Attach Brackets to Chassis

4. Place a mounting bracket (Figure 2-14, A) along one side of the chassis in the front-mount position.
5. Align the holes (B) in the bracket with the tabs (C) on the chassis and place the bracket against the chassis.
6. Slide the bracket as far as it will go toward the front of the chassis.
7. Attach the bracket to the chassis using screw (D).
8. In the same manner, attach a bracket to the other side of the chassis.

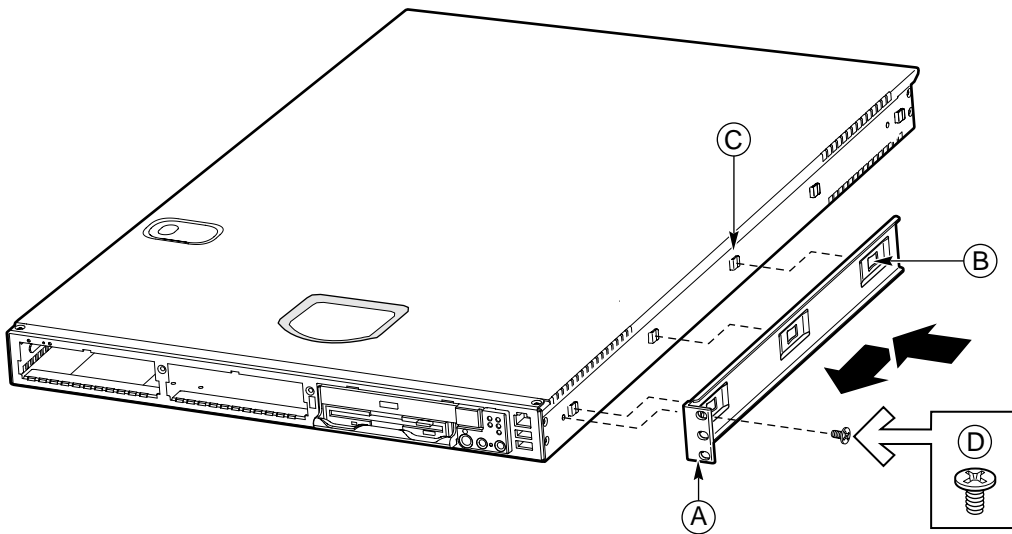


FIGURE 2-14 Installing a Chassis Bracket in the Front-mount Position

- a. Chassis bracket in front-mount position
- b. Bracket holes
- c. Chassis tabs
- d. #6-32 x 3/16-inch screw

2.4.5.3 Attach L Brackets to Front Posts

1. Position an L bracket (Figure 2-15, A) on the backside of the front post (C).
2. Attach the L bracket to the front post using the screws (B) supplied with your rack. Do not fully tighten at this time.
3. In the same manner, attach an L bracket to the other front post.

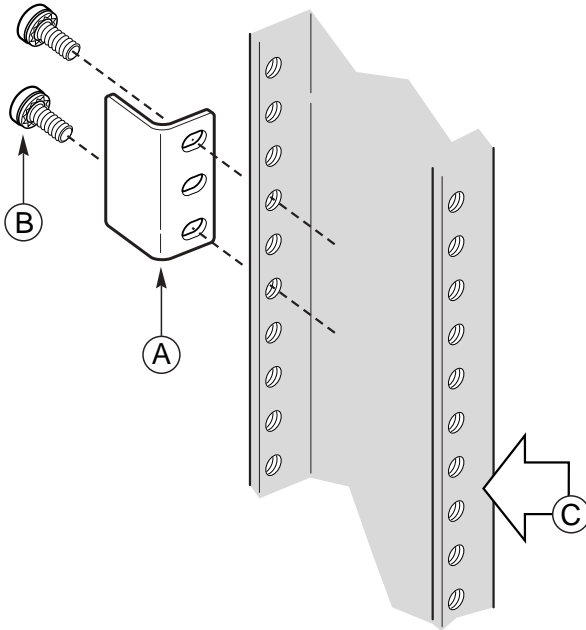


FIGURE 2-15 Attaching an L Bracket to a Front Post

- a. L bracket
- b. Screw (supplied by rack manufacturer)
- c. Front flange of typical right front post

2.4.5.4 Install Chassis in Rack

Caution – Lifting the chassis and attaching it to the rack is a two-person job. If needed, use an appropriate lifting device. A fully loaded Sun Fire V60x server weighs approximately 15.9 kg (35 lbs) and a fully loaded Sun Fire V65x server weighs approximately 25 kg (50 lbs).

1. Locate one person at the front of the rack and one at the rear.
2. Position the chassis so that the L brackets (Figure 2-16, A) are inserted into the chassis mounting brackets (B).
3. While supporting the weight of the chassis, adjust the L brackets to fit tightly into the chassis brackets (C).

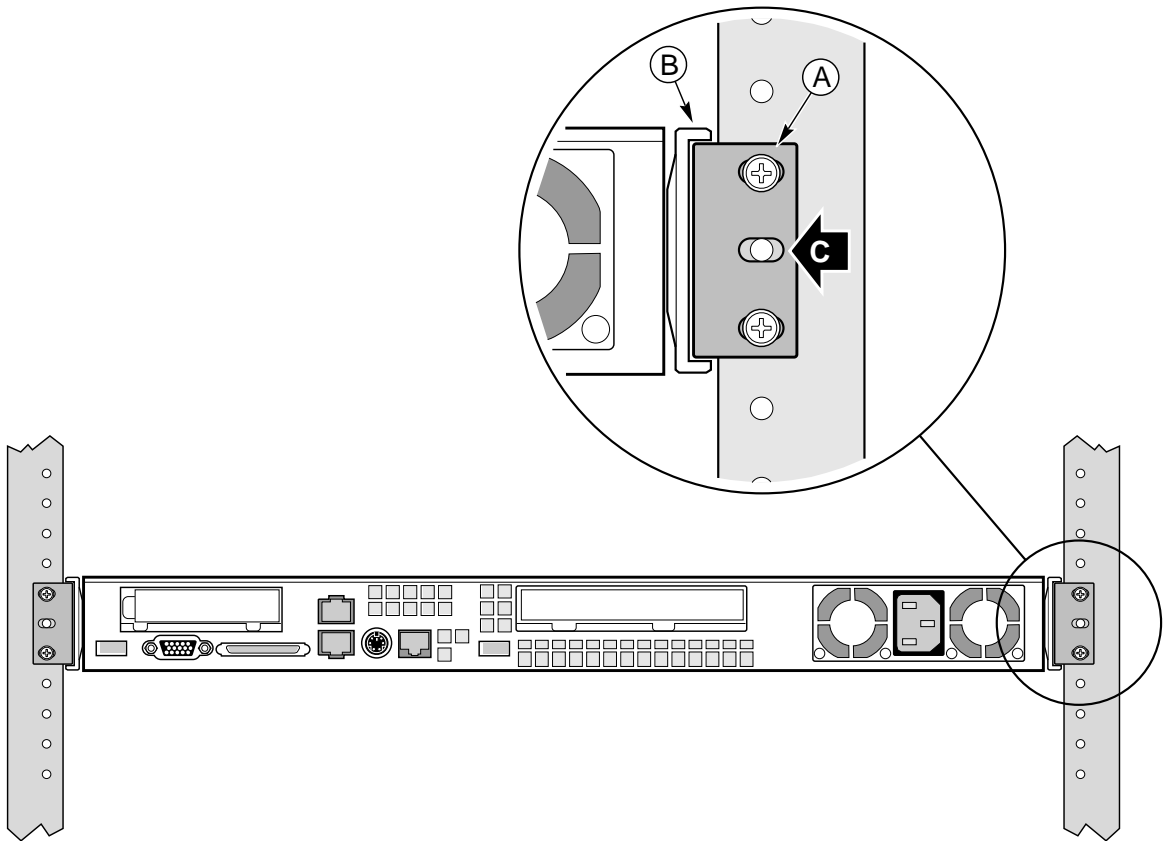


FIGURE 2-16 L Brackets Inserted into Chassis Mounting Brackets (Rear View)

4. Slide the chassis toward the rear of the rack until the front of the chassis brackets contact the front of the front posts.
5. Using the fasteners (Figure 2-17, C) supplied with your rack, attach the front of the mounting brackets to the front of the front posts.

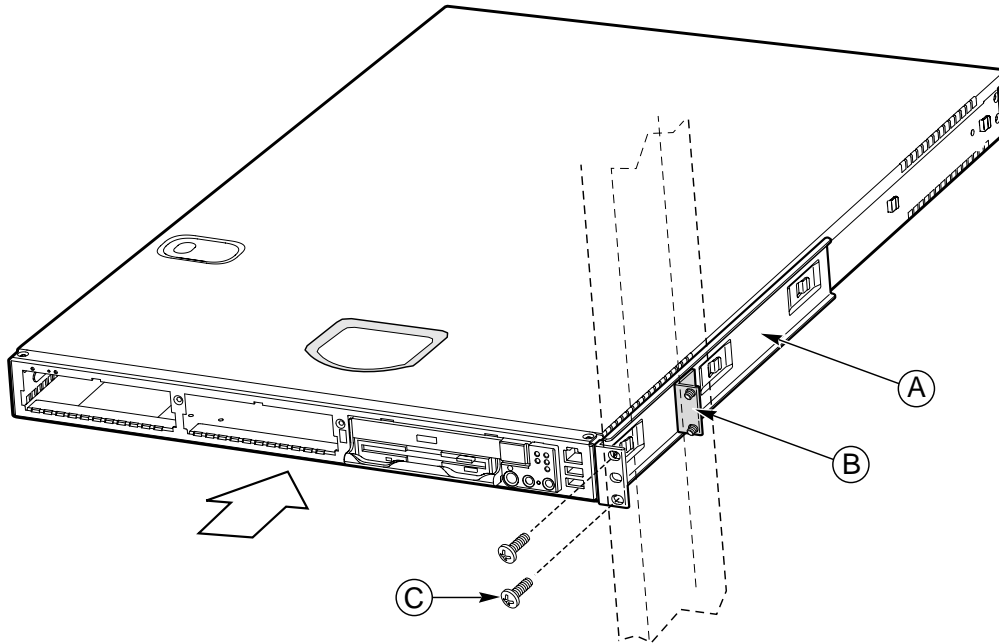


FIGURE 2-17 Installing the Chassis in the Rack

- a. Chassis bracket in front-mount position
- b. L bracket
- c. Screw (supplied by rack manufacturer)

2.4.5.5 Install Chassis Handles

Note – The handles are only required to hold the bezel on. If you will not be installing a bezel, you do not need to install the handles.

1. Slide a handle (Figure 2-18, A) between the chassis and the chassis bracket.
2. Align the hole in the handle with the unused hole in the chassis bracket.

3. Install a spacer (B) between the handle and the bracket.
4. Install and tighten screw (C) to secure the handle.
5. In the same manner, attach the other handle to the opposite side.
6. Replace the bezel.

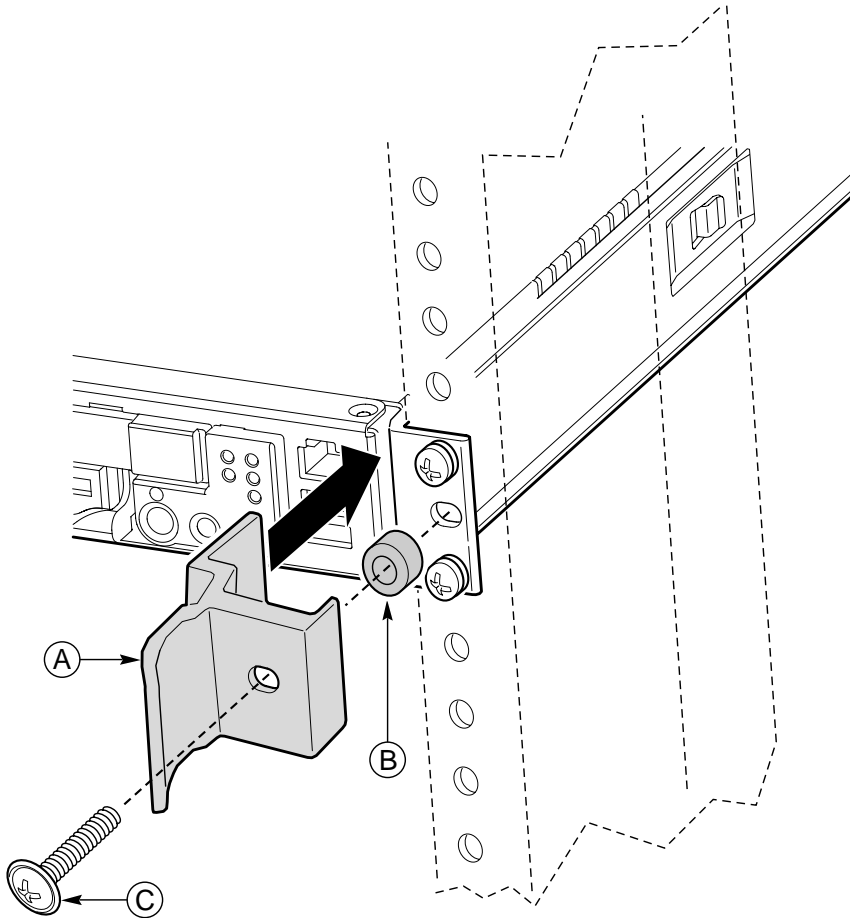


FIGURE 2-18 Attaching a Chassis Handle to a Front Post

- a. Chassis handle
- b. Spacer
- c. #10-32 x 7/8-inch screw with washer

2.5 Installing the Server Using the Slide Rail Kit (Optional)

The rail kit is an extra cost option, and allows you to install the Sun Fire V60x and Sun Fire V65x servers in most four-post rack cabinet systems, Sun Rack 900, and Sun StorEdge racks.

2.5.1 Required Tools

- Phillips screwdriver

2.5.2 Slide Rail Kit Contents

The slide rail kit, available as optional equipment, includes the following items:

- Slide rail assemblies—qty. 2
- Rail brackets—qty. 4
- Fastener pack—qty. 1 (see Figure 2-19)

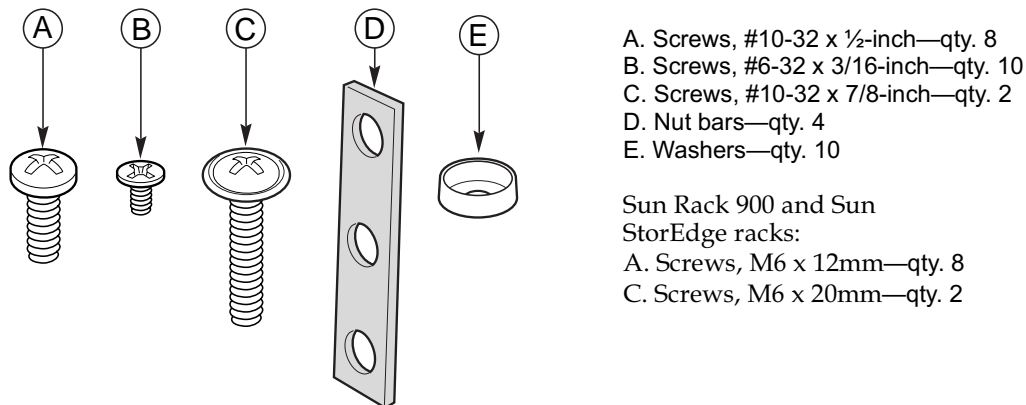


FIGURE 2-19 Fasteners Provided

2.5.3 Remove the Inside Rails

1. Fully extend a rail assembly (Figure 2-20). The finger tab (D) for the extension lock is revealed.
2. Press the finger tab and slide the inside rail (C) from the middle rail (B) until it completely separates.

Note – The middle rail (B) and outer rail (A) cannot be separated.

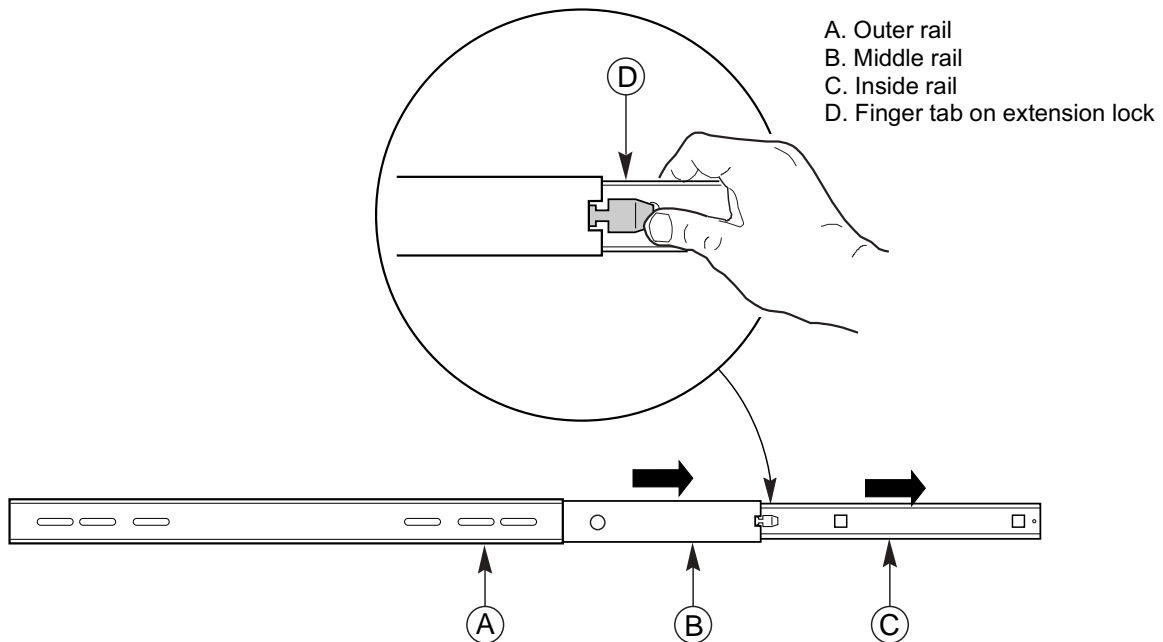


FIGURE 2-20 Fully Extended Rail Assembly

2.5.4 Attach Inside Rails to Chassis

1. Position an inside rail (Figure 2-21, A) along one side of the chassis with the finger tab facing outward and located closer to the rear of the chassis.
2. Align the holes (C) in the rail with the tabs (D) on the chassis and place the rail against the chassis.
3. Slide the rail as far as it will go toward the front of the chassis to engage the tabs.
4. Fasten the rail to the chassis using one screw (B) at the front of the chassis.
5. In the same manner, attach the other inside rail to the other side of the chassis.

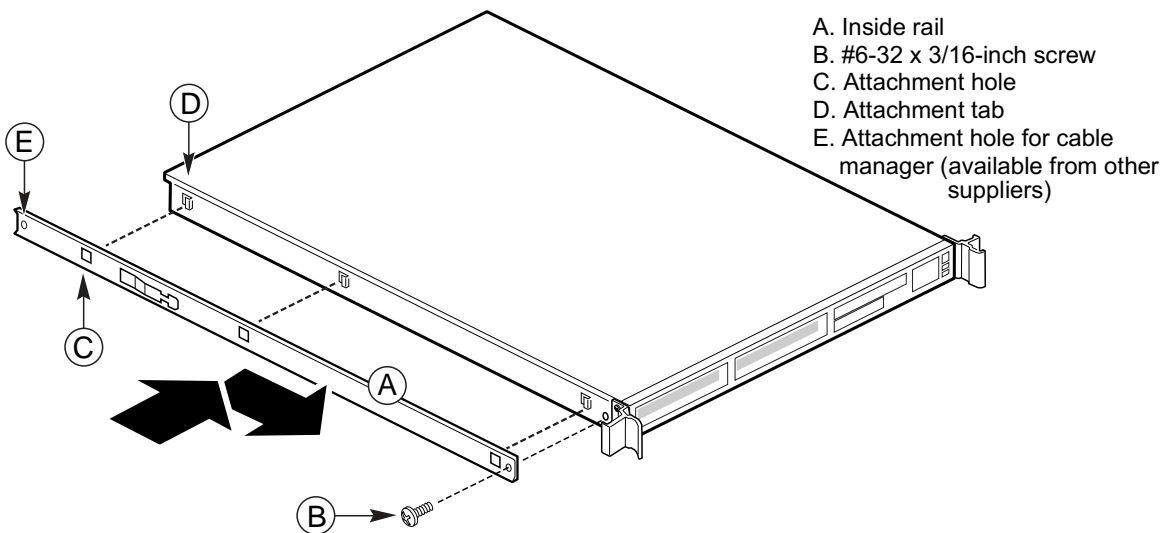


FIGURE 2-21 Attaching an Inside Rail to the Chassis

2.5.5 Attach Rail Brackets to Posts

1. Using two screws (Figure 2-22, A) with washers, attach one nut bar (B) to the inside of the rack post. Do not completely tighten the screws—leave them loose enough to allow insertion of the brackets in the next step.
2. Insert the slotted foot of a rail bracket between each nut bar and post.
3. Align the face of the bracket foot with the inside edge of the rack post and firmly tighten the screws.
4. Repeat steps 1 to 3 above to install the other 3 brackets (2 Front and 2 Back total). Ensure all brackets are at the same height on the rack.

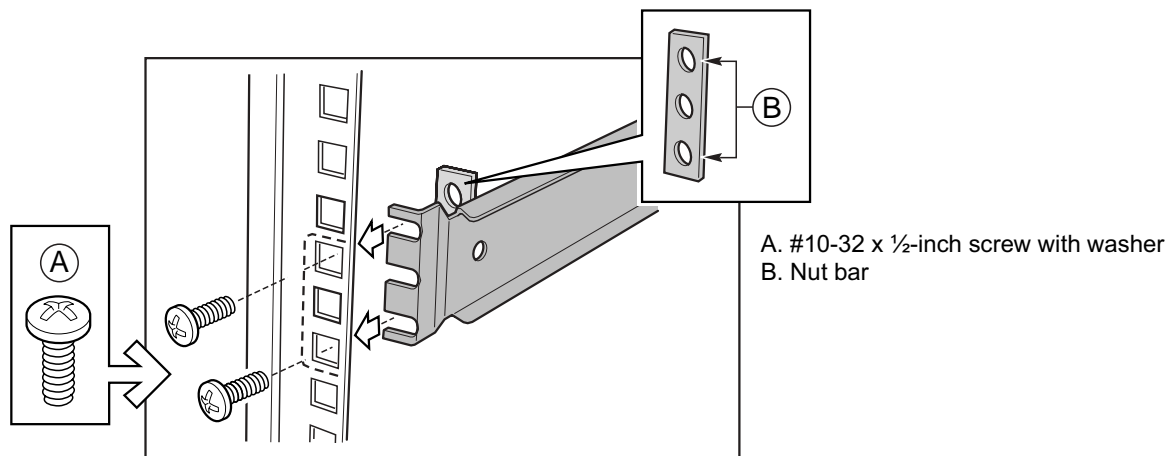


FIGURE 2-22 Attaching a Rail Bracket to a Rack Post

2.5.6 Attach a Rail Assembly to a Front Bracket

1. Position a rail assembly (middle and outer rails) with its black plastic end caps toward the rear of the rack and its outer rail closest to the brackets.
2. Align the front screw hole (Figure 2-23, C) in the outer rail (B) with the threaded hole (D) nearest the front of the front bracket (A) and fit the rail assembly into the front and rear brackets.
3. Slide the middle rail toward the front (E) until the access hole (F) in the middle rail is aligned with the front screw hole (C) in the outer rail.
4. Insert screw (G) through the access hole and loosely attach the outer rail to the front bracket.

5. In a similar manner to steps 2 through 4, install a screw through a slot in the outer rail and into the rear-most threaded hole in the front bracket. Firmly tighten this screw.
6. Firmly tighten the front screw (G) installed loosely in step 4.
7. In the same manner, attach the other rail assembly to the other side.

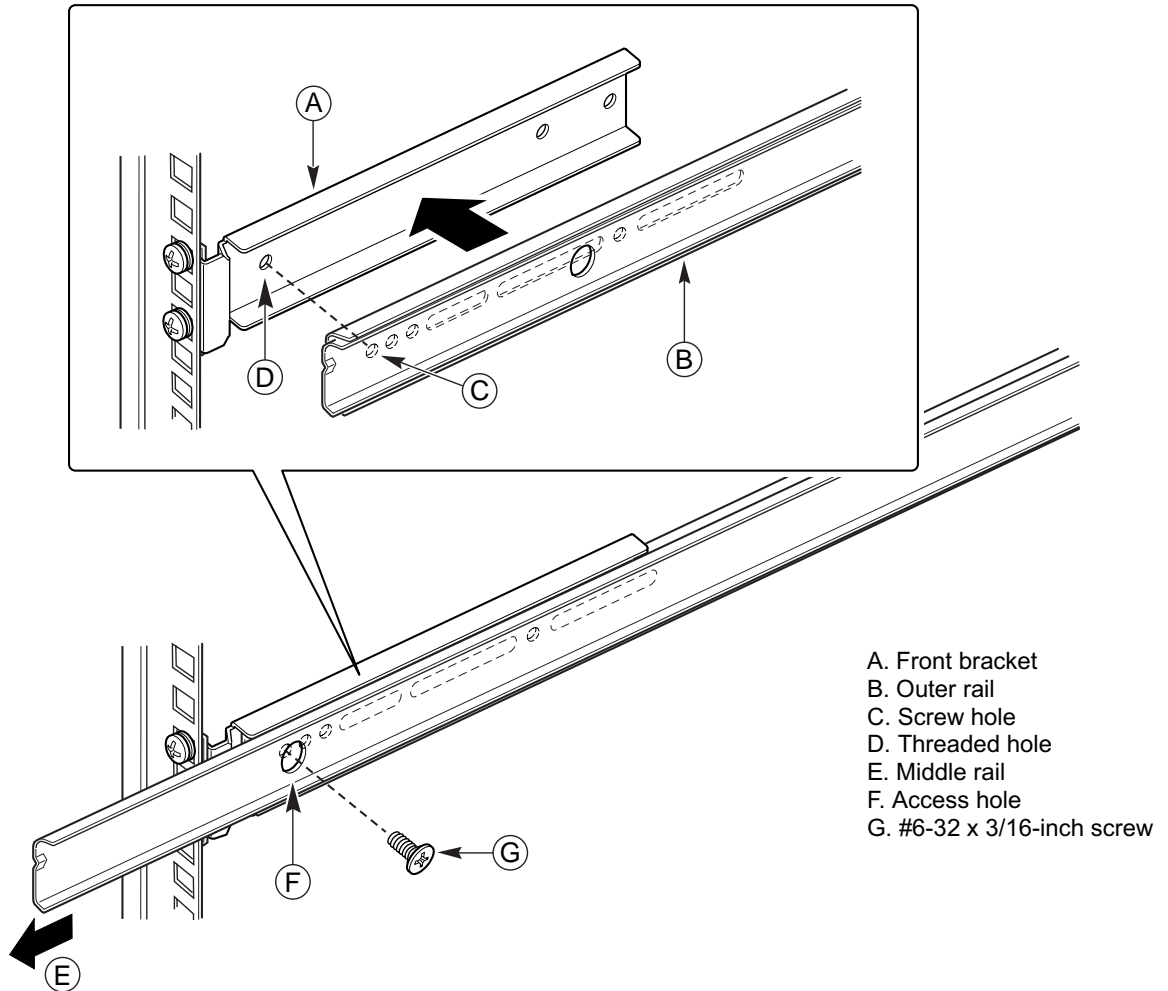


FIGURE 2-23 Attaching a Rail Assembly to a Front Bracket

2.5.7 Attach a Rail Assembly to a Rear Bracket

1. Slide the middle rail toward the front (Figure 2-24) until the rear bracket area is accessible.
2. Attach the rear end of the outer rail (B) to the rear bracket (A) with at least one screw (C). If possible, attach at two places.
3. In the same manner, attach the other rail assembly to the other side.

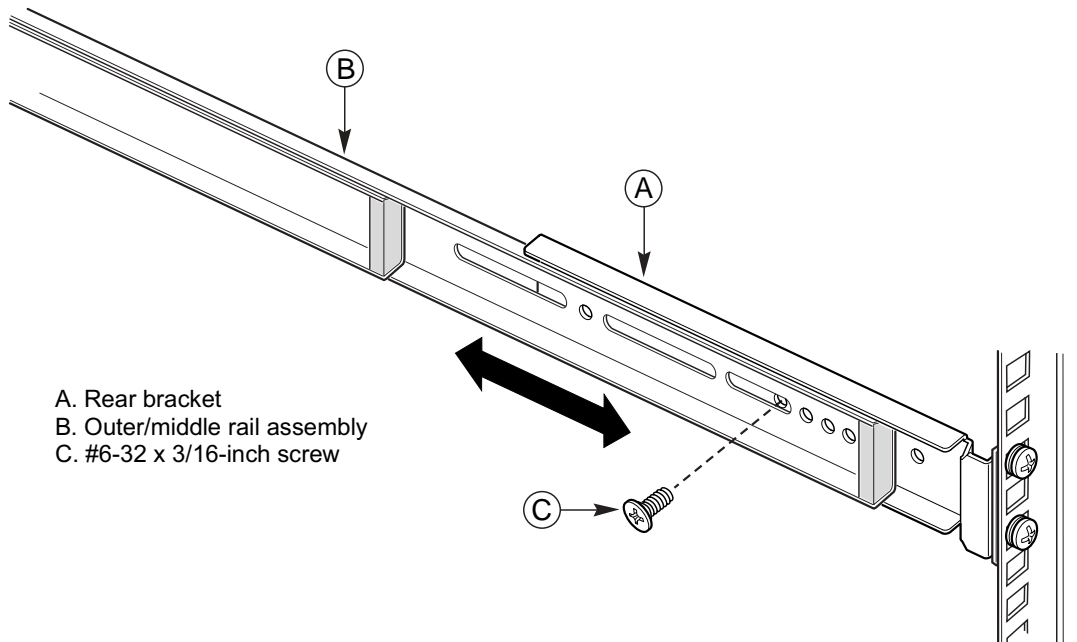


FIGURE 2-24 Attaching a Rail Assembly to a Rear Bracket

2.5.8 Install the Chassis on the Rails

1. Fully extend the left and right rails (Figure 2-25) until the extension locks have engaged and the rails will not push back in. The rail system is now ready to receive the chassis.

Caution – Lifting the chassis and attaching it to the rack is a two-person job. If needed, use an appropriate lifting device. A fully loaded Sun Fire V60x server weighs approximately 15.9 kg (35 lbs) and a fully loaded Sun Fire V65x server weighs approximately 25 kg (50 lbs).

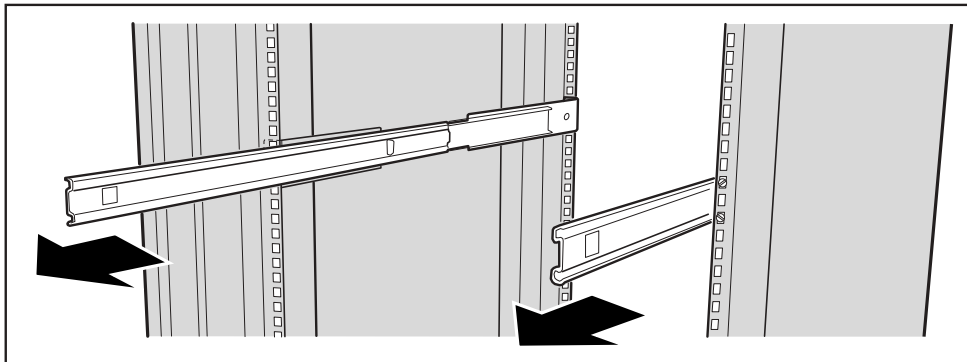


FIGURE 2-25 Rails Fully Extended

2. With the chassis front facing you, lift the chassis and carefully insert the rails attached to the chassis in the extended rails.
3. Slide the chassis toward the rear of the cabinet until the rails lock together.
4. Depress and hold down the finger tabs (Figure 2-26, A) on both extension locks while sliding the chassis toward the rear.

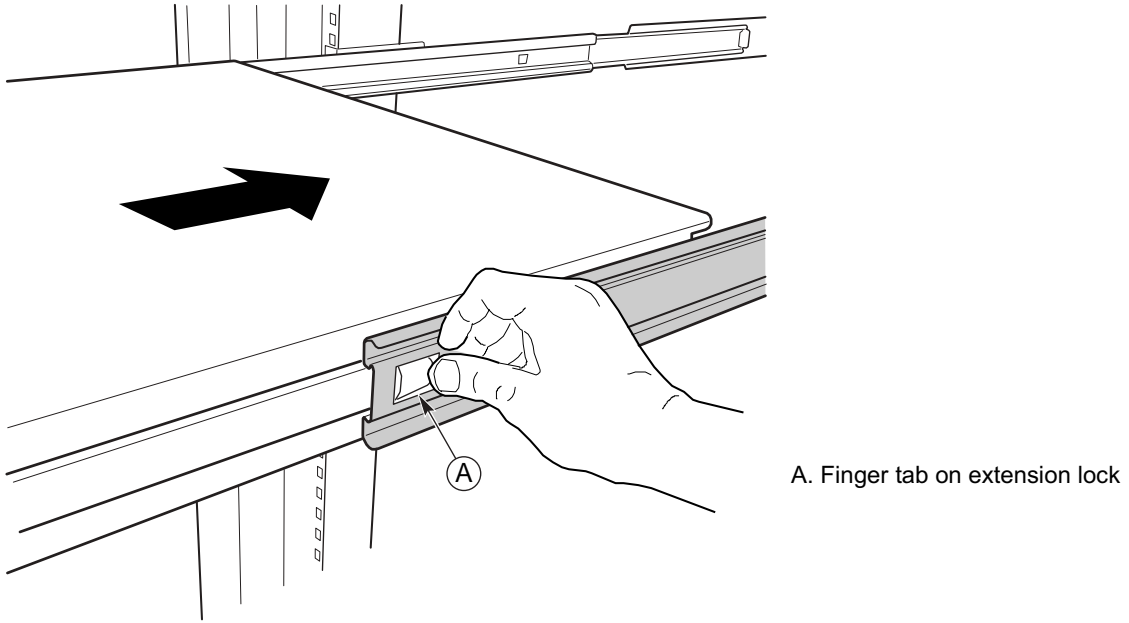


FIGURE 2-26 Releasing the Extension Locks

- 5. Slide the chassis all the way into the rack until the chassis handles are against the front posts.**

2.6 Connecting the Cables

The Sun Fire V60x and Sun Fire V65x servers have a number of connectors. Some are on the front panel; others are located on the rear panel. This section summarizes the usage of each connector.

2.6.1 Front Panel Connectors

To access the front panel connectors when a front bezel is installed, grasp the bezel on the left side at the finger hole and gently pull it towards you, unhinging it at the right until it unsnaps from the chassis. Figure 2-27 shows the front of each of the servers with the bezels removed.

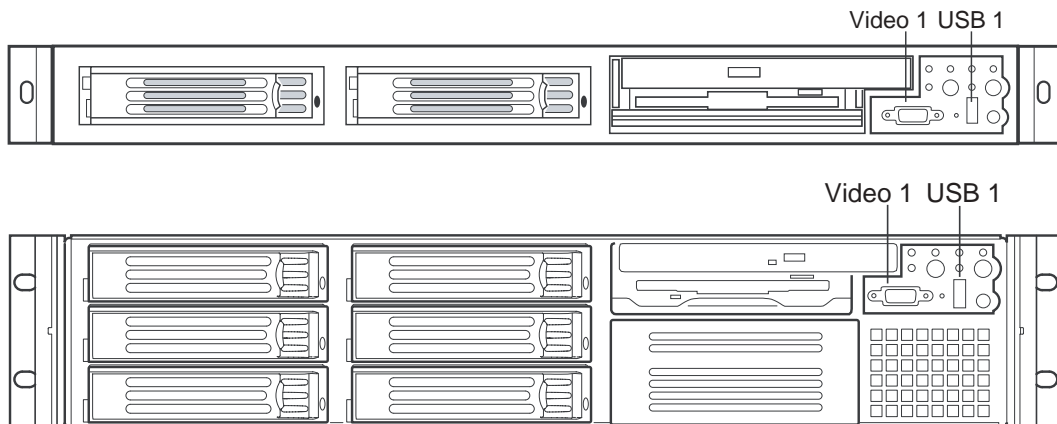


FIGURE 2-27 Front Panel Connectors (bezel removed)

There are two connectors on the front panel (see Figure 2-27):

- USB 1 connector
- Video 1 connector

2.6.1.1 USB 1 Connector

The USB 1 connector provides industry-standard USB v1.1 functionality. The industry-standard USB v1.1 specification defines the pin configuration and operation of this interface. The USB connector pinout is shown in Table 2-1.

TABLE 2-1 Front Panel USB 1 Connector

Pin Number	I/O	Description
1	USBPWR	VREG_FP_USBPWR3
2	I/O	USB_DM3_FP
3	I/O	USB_DP3_FP
4	PWR	GND

Note – The USB port is disabled until an OS and the USB drivers are installed. A PS/2 type keyboard and/or mouse may be required for initial bootup and configuration.

2.6.1.2 Video 1 Connector

The DB15 video 1 connector located on the front panel is designed to access the video of the system from the front panel of the system. Both the front and rear video ports share the same video signals. By default, the rear video 2 port is enabled when there is no monitor connected to the front video port. However, when a monitor is connected to the front video 1 port, logic on the main board disables the rear video 2 port and directs the video signal to the monitor connected to the front panel. If a video controller board is plugged into an internal PCI riser board slot, the video to both front and rear panel connectors is disabled. The video 1 connector pinout is shown in Table 2-2.

TABLE 2-2 Video 1 Connector

Pin Number	I/O	Description
1	O	Red
2	O	Green
3	O	Blue
4	O	No Connect
5	Pwr	GND
6	Pwr	GND

TABLE 2-2 Video 1 Connector *(Continued)*

Pin Number	I/O	Description
7	I	Video Switch
8	Pwr	GND
9		No Connect
10	Pwr	GND
11		No Connect
12		No Connect
13	O	Hsync
14	O	Vsync
15		No Connect

2.6.2 Rear Panel Connectors

Figure 2-28 shows the rear panels of the each of the servers.

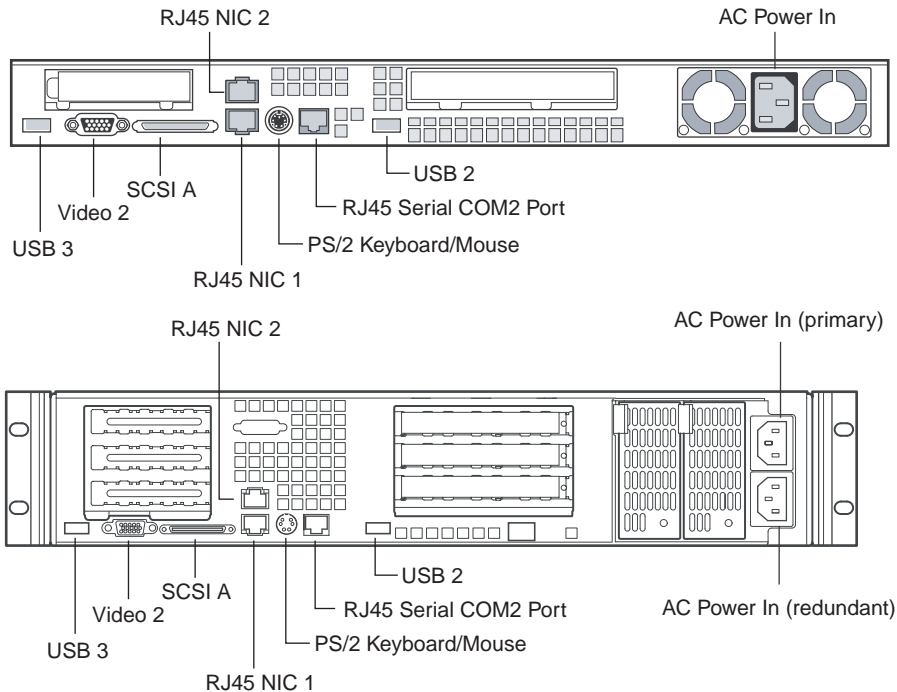


FIGURE 2-28 Rear Panel Connectors

The following connectors are located on the rear panel:

- RJ-45 NIC 1 connector
- RJ-45 NIC 2 connector
- AC Power connector
- Rear RJ-45 Serial COM2 connector
- USB 2 connector
- PS/2 mouse/keyboard connector
- SCSI connector
- Video 2 connector
- USB 3 connector

2.6.2.1 RJ-45 NIC 1 and NIC 2 Connectors

The server provides two 10BASE-T/100BASE-TX/1000BASE-TX Network Interface Controllers (NICs). The NICs support the following features:

- Integrated IEEE 802.3 10BASE-T, 100BASE-TX, and 1000BASE-TX compatible PHY
- IEEE 802.3u AutoNegotiation support
- Full-duplex support at both 10 Mbps and 1000 Mbps operation
- Both ports are PXE Boot capable
- Low power +3.3V device (Wake-On-LAN support on both rear panel Ethernet ports)

Note – The RJ-45 Ethernet Ports (NIC 1 and 2) are recognized and numbered differently depending on the OS running on the server, as follows:

NIC connector 2 (upper port):Solaris = eth1, Linux = eth0

NIC connector 1 (lower port):Solaris = eth0, Linux = eth1

2.6.2.2 AC Power Connector

This connector is where you plug in the AC power cord (a power cord is supplied appropriate to your geographic region).

Warning – Do not attempt to modify or use the supplied AC power cord if it is not the exact type required.

The power supply cord is the main disconnect to AC power. The socket outlet must be installed near the equipment and readily accessible.

Note – On the Sun Fire V65x server, as viewed from the rear, the top AC power connector serves the power supply on the left and the AC power connector on the bottom serves the power supply on the right. In a server with a single supply, the AC cord must be plugged into the upper AC connector. In a server with redundant power supplies, you must plug in two AC power cords¹.

1. For best power redundancy performance, each AC power cord should be plugged into separate AC power sources.

2.6.2.3 Rear Panel RJ-45 Serial COM2 Connector

The use of RJ-45 connectors for the serial interface is widely becoming a standard for use in the high-density server market.

The BIOS can be set to redirect BIOS, bootup, and OS messages to the COM2 serial port (see “Configuring an External Serial Console” on page 4-16 for details). The default communications settings for the serial console port on the server are:

- 9,600 bps
- 8 data bits
- 1 stop bit
- No parity
- No flow control

The intended use for the rear panel RJ-45 serial COM2 port is for remote EMP communication, which is accomplished when the port is connected to a serial terminal concentrator. With the optional RJ-45 to DB9 Serial Adapter Kit, the serial port can also be configured for use with a modem. “Replaceable Components” on page 1-18 gives ordering information for the adapter kit. The rear COM2 serial port is traditionally referred to as COM2 (DOS, Windows), ttyS1 (Linux), or ttyb (Solaris).

Serial terminal concentrators use one of two serial communication standards. Some terminal concentrators require a Data Carrier Detect (DCD) signal, while others require a Data Set Ready (DSR) signal. The server Main Board can be configured to support either of these configurations by setting the jumper appropriately on the jumper block, located directly behind the RJ-45 serial connector on the Main Board.

The rear RJ-45 serial COM2 port can support any standard serial device. An RJ-45 connector was selected to allow for direct support for serial port concentrators, which typically use RJ-45 connectors and are widely used in the high-density server market to access the server management features of the server.

To give support for either of two serial configuration standards used by serial port concentrators, the J5A2 jumper block, located on the Main Board inside the server directly behind the rear RJ-45 serial port, must be jumpered appropriately according to which standard is desired.

Note – By default, as configured in the factory, the server Main Board has the back RJ-45 COM2 serial port configured to support a DSR signal that is compatible with industry-standard serial concentrators. To change the configuration, the J5A2 jumper block must be accessed (the top cover must be removed to access this jumper block).

For serial devices that require a DSR signal (default), the J5A2 jumper block must be configured as follows: place the jumper across positions 3 and 4 (the two middle jumper posts) as shown in Figure 2-29.

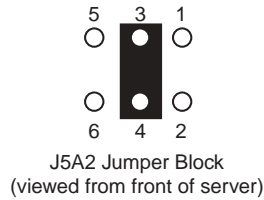


FIGURE 2-29 J5A2 Jumper Block Configured for DSR Signal (pin 7 connected to DSR)

For serial devices that require a DCD signal, the J5A2 jumper block must be configured as follows: place the jumper across positions 1 and 2 as shown in Figure 2-30.

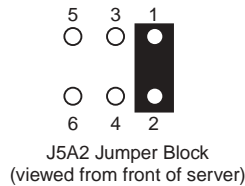


FIGURE 2-30 J5A2 Jumper Block Configured for DCD Signal (pin 7 connected to DCD)

For those serial devices that require a DB9 type of serial connector, an 8-pin RJ-45-to-DB9 adapter must be used. Table 2-3 provides the pinout required for the adapter to provide RS232 support.

TABLE 2-3 Back Serial COM2 Port Adapter Pinout

RJ-45 Pin	Signal	Abbr.	DB9
1	Request to Send	RTS	7
2	Data Terminal Ready	DTR	4
3	Transmit Data	TD	3
4	Signal Ground	SGND	5
5	Ring Indicator	RI	9
6	Receive Data	RD	2
7	Data Carrier Detect/Data Set Ready	DCD/ DSR	1 or 6 ¹
8	Clear To Send	CTS	8

1 The RJ-45-to-DB9 adapter used should match both the signal requirements of the serial device and the external RJ-45 COM2 serial port. The external RJ-45 serial port provides all standard serial port signals. However, because there are only 8 pins, you can manually configure pin 7 to support either a DCD or DSR signal by setting the J5A2 jumper block appropriately.

As an example, when using an external modem to access the server management features of the server Main Board, you must first set the J5A2 jumper to support a DCD signal and make or choose the appropriate RJ-45-to-DB9 adapter.

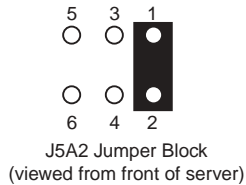


FIGURE 2-31 J5A2 Jumper Block Configured for DCD Signal (pin 7 connected to DCD)

If you choose to develop your own RJ-45-to-DB9 adapter, see Table 2-3 for the appropriate pinout configuration.

Note – Sun Microsystems provides an optional RJ-45 to DB9 Serial Adapter Kit that can be purchased that contains the RJ-45-to-DB9 adapters:

DSR Peripherals cable (for rear panel data set ready (DSR) peripherals)

DCD Modem cable (for rear panel data carrier detect (DCD) modem)

These cables can be used to connect to the Sun Fire V60x and Sun Fire V65x servers rear panel serial COM2 port (also known as the Emergency Management Port).

2.6.2.4 USB Connectors

The USB 1 connector on the front panel, and the USB 2 and USB 3 connectors on the rear panel provide USB v1.1 functionality. All ports function with identical capabilities and with the same bandwidth. The industry-standard USB v1.1 specification defines the external connectors.

Note – The USB port is disabled until an OS and the USB drivers are installed. A PS/2 type keyboard and/or mouse may be required for initial bootup and configuration.

2.6.2.5 PS/2 Keyboard/Mouse Connector

A single PS/2 port located on the back panel is provided to support a standard keyboard or mouse. A PS/2 Y-cable adapter, included with the Sun Fire V60x and Sun Fire V65x servers, allows simultaneous use of the PS/2 keyboard and mouse. Such cable adapters are also commonly available at most computer stores.

Note – The USB port is disabled until an OS and the USB drivers are installed. A PS/2 type keyboard and/or mouse may be required for initial bootup and configuration.

2.6.2.6 SCSI Connector

The Sun Fire V60x and Sun Fire V65x servers include an onboard Adaptec dual channel Ultra-320 SCSI controller capable of controlling up to three internally mounted SCSI drives (for the Sun Fire V60x server), up to six internally mounted SCSI drives (for the Sun Fire V65x server), and up to 15 external SCSI drives. The controller is capable of operations using either 16-bit Single-Ended (SE) or Low-Voltage Differential (LVD) SCSI providing transfer rates of 40 MBps (Ultra-wide SE), 80 MBps (Ultra 2), 160 MBps (Ultra 160/m) or 320 MBps (Ultra 320/m). The onboard SCSI controller is connected to a SCSI backplane board inside the server using a 68-pin SCSI cable. The SCSI backplane provides connections for up to three (Sun Fire V60x server) or six (Sun Fire V65x server) internally mounted SCA LVDS SCSI drives with standard 80-pin SCA connectors. Channel B is used exclusively by internal drives while channel A is used for connecting to external SCSI devices by means of a rear panel high-density SCSI connector. The connector supports a standard high-density 68-pin connector. Use only shielded Ultra-160 LVDS rated cables for connection to external SCSI drives.

2.6.2.7 Video 2 Connector

Video is provided by default to the rear panel DB15 connector. When a monitor is plugged into the front panel DB15 video connector, video is routed to the front panel connector and the rear connector is disabled. This can be done by “hot plugging” the video connector while the system is still running. If a video controller board is plugged into an internal PCI riser board slot, the video to both front and rear panel connectors is disabled. The video 2 connector pinout is shown in Table 2-4.

TABLE 2-4 Video 2 Connector

Pin Number	I/O	Description
1	O	Red
2	O	Green
3	O	Blue
4	O	No Connect
5	Pwr	GND
6	Pwr	GND
7	I	Video Switch
8	Pwr	GND
9		No Connect
10	Pwr	GND

The Sun Fire V60x and Sun Fire V65x servers provide an ATI Rage XL PCI graphics accelerator, along with 8 MB of video SDRAM and support circuitry for an embedded SVGA video subsystem. The SVGA subsystem supports a variety of modes, up to 1600 x 1200 resolution in 8/16/24/32 bpp modes under 2D, and up to 1024 x 768 resolution in 8/16/24/32 bpp modes under 3D. It also supports both CRT and LCD monitors with up to 100 Hz vertical refresh rates. All of these capabilities depend on software support.

The server provides a standard 15-pin VGA connector and supports disabling of the on-board video through the BIOS Setup menu or when a plug-in video card is installed in any of the PCI riser board slots.

Controls and Indicators

This chapter describes the control pushbuttons and LED indicators on the Sun Fire V60x and Sun Fire V65x servers. All of the descriptions in this chapter pertain to buttons and indicators that are usable and visible from the outside of the chassis. For information about the controls and indicators on the server Main Board, see the additional information contained in Chapter 6, “Troubleshooting the Server.”

The pushbuttons and LEDs on the front and rear panels are described in the following sections:

- “Front Panel LEDs and Pushbuttons” on page 3-2
- “Rear Panel LEDs” on page 3-5

3.1 Front Panel LEDs and Pushbuttons

The front panel contains the pushbuttons and LEDs shown in Figure 3-1. Note that the illustration has the bezel removed.

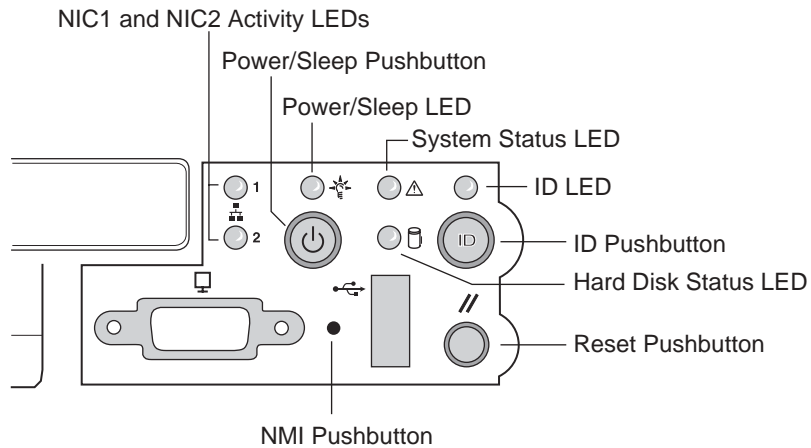


FIGURE 3-1 Front Panel Pushbuttons and LEDs

3.1.1 LEDs

The front panel LEDs are summarized in Table 3-1.

TABLE 3-1 Front Panel LEDs

LED	Color	Function
Power	Green	This LED is controlled by software. It is steady on when the server is powered up. It is off when the system is off or in sleep mode.
NIC1 and NIC2	Green	These LEDs are on when a good network link has been established. They blink green to reflect network data activity.
System Status/Fault	Green/ Amber	<p>This LED can assume different states (green, amber, steady, blinking) to indicate normal, degraded, non-critical fault, or critical fault server operation.</p> <p>Steady green: Indicates the system is operating normally Blinking green: Indicates the system is operating in a degraded condition. Blinking amber: Indicates the system is in a non-critical condition. Steady amber: Indicates the system is in a critical or non-recoverable condition. Off: Indicates POST/system stop.</p> <p>See “Front-Panel System Status LED” on page 6-3 for more details regarding this LED.</p>
Hard Disk Drive Activity	Green	<p>The Drive Activity LED on the front panel is used to indicate drive activity from the onboard SCSI controller. The server Main Board also provides a header, giving access to this LED for add-in IDE or SCSI controllers.</p> <p>Blinking green (random): Hard disk activity Steady amber: Hard disk fault Off: No disk activity nor fault condition (or power is off).</p>
System ID	Blue	The blue System Identification LED is used to help identify a system for servicing when it is installed within a high density rack or cabinet that is populated with several other similar systems. The System ID LED is illuminated when the system ID button, located on the front panel, is pressed. If activated by the front panel pushbutton, the LED remains on until the pushbutton is depressed again. The LED also illuminates when the server receives a remote System Identify command from a remote management console. In this case, the LED turns off after a timeout period. An additional blue System ID LED on the Main Board is visible through the rear panel. It mirrors the operation of the front panel LED.

3.1.2 Pushbuttons

The front panel pushbuttons are summarized in Table 3-2.

TABLE 3-2 Front Panel Pushbuttons

Switch	Function
Power/Sleep	This pushbutton is used to toggle the system power on and off. This button is also used as a sleep button for operating systems that support the ACPI specification (BIOS and OS) and have it enabled. Note that the Solaris OS does not support ACPI.
Reset	Depressing this pushbutton reboots and initializes the system.
NMI	Pushing this recessed pushbutton causes a non-maskable interrupt to occur; however, NMI event trapping may or may not be implemented in your OS. Note that neither the Solaris nor Linux OS supports NMI.
System ID	This pushbutton toggles the state of the front panel ID LED and the server Main Board ID LED. The Main Board ID LED is visible through the rear of the chassis and allows you to locate a particular server from behind a rack of servers.

3.2 Rear Panel LEDs

The rear panel contains the LEDs shown in Figure 3-2.

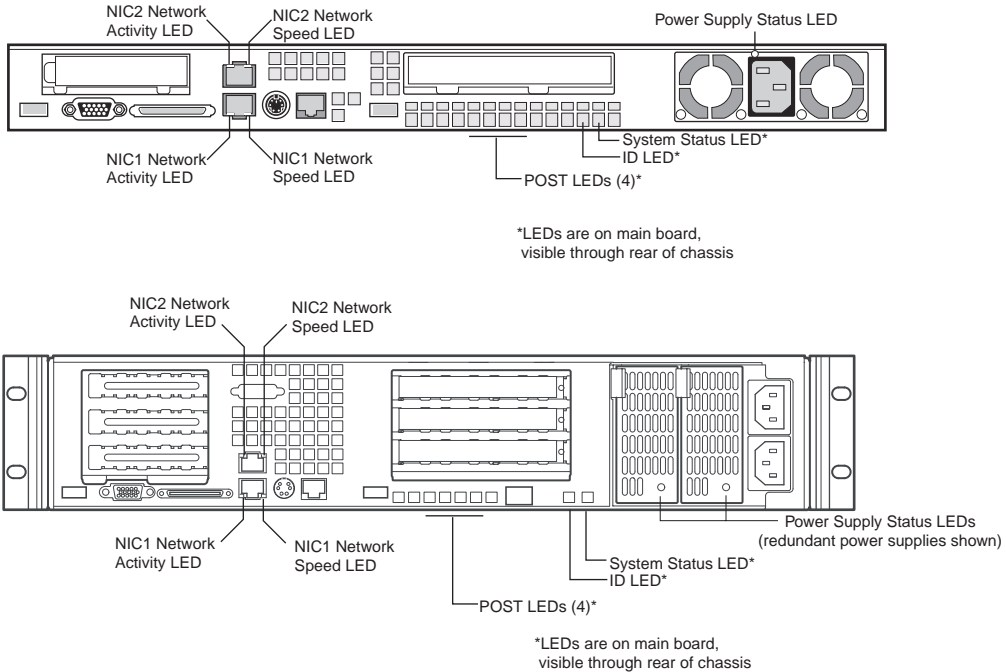


FIGURE 3-2 Rear Panel LEDs

TABLE 3-3 Rear Panel LEDs

LED	Color	Function
Network Connection/ Network Activity	Green	This LED is on the left side of each NIC connector. Green = valid network connection. Blinking = transmit or receive activity.
Network Speed	Amber/Green	This LED is on the right side of the NIC connector. Off = 10 Mbps operation. Green = 100 Mbps operation. Amber = 1000 Mbps operation.
POST LEDs (four)	Multicolor (Red/Green/Amber)	To help diagnose power-on self test (POST) failures, a set of four bi-color diagnostic LEDs is located on the back edge of the server Main Board. These LEDs are visible through holes in the rear panel. Each of the four LEDs can have one of four states: Off, Green, Red, or Amber. For detailed information on these LEDs, see "POST LED Indicators" on page 6-18.
System ID	Blue	This LED is located on the Main Board and is visible through holes in the rear panel. It can provide a mechanism for identifying one system out of a group of identical systems. This can be particularly useful if the server is used in a rack-mount chassis in a high-density, multiple-system application. The LED is activated by depressing the front panel System ID pushbutton or if the server receives a remote System Identify command from a remote management console. If activated by the front panel pushbutton, the LED remains on until the pushbutton is depressed again. When the LED illuminates due to a remote System Identify command, the LED turns off after a timeout period. An additional blue System ID LED is located on the front panel that mirrors the operation of the rear Main Board LED.
System Status/Fault	Green/Amber	This LED reflects the state of the System Status LED on the front panel.
Power Supply	Green/Amber	This is a bi-color LED that can be on, off, green, amber, or blinking, or a combination thereof. See "Rear Panel Power Supply Status LED" on page 6-5 for more detailed information.

Powering Up and Configuring the Server

This chapter explains how to use the Power On switch to apply power to the server, boot to the operating system, use the serial console, update system software, and validate the operation of the Sun Fire V60x and Sun Fire V65x servers. The chapter contains these sections:

- “Jumper Locations” on page 4-2
- “Setting the Serial COM2 Port Jumper” on page 4-4
- “Powering On” on page 4-5
- “Clearing CMOS” on page 4-6
- “Booting Up” on page 4-8
- “Loading the Operating System” on page 4-15
- “Hyper-threading™ CPU Feature” on page 4-15
- “Configuring an External Serial Console” on page 4-16
- “Using the Service Partition Menu” on page 4-19
- “Using the Sun Diagnostics CD” on page 4-40
- “Updating the Server Configuration” on page 4-45
- “Restarting and Shutting Down” on page 4-50

4.1 Jumper Locations

Part of configuring the server involves setting the jumper positions on the main board. The jumper locations are shown in Figure 4-1 and summarized in Table 4-1.

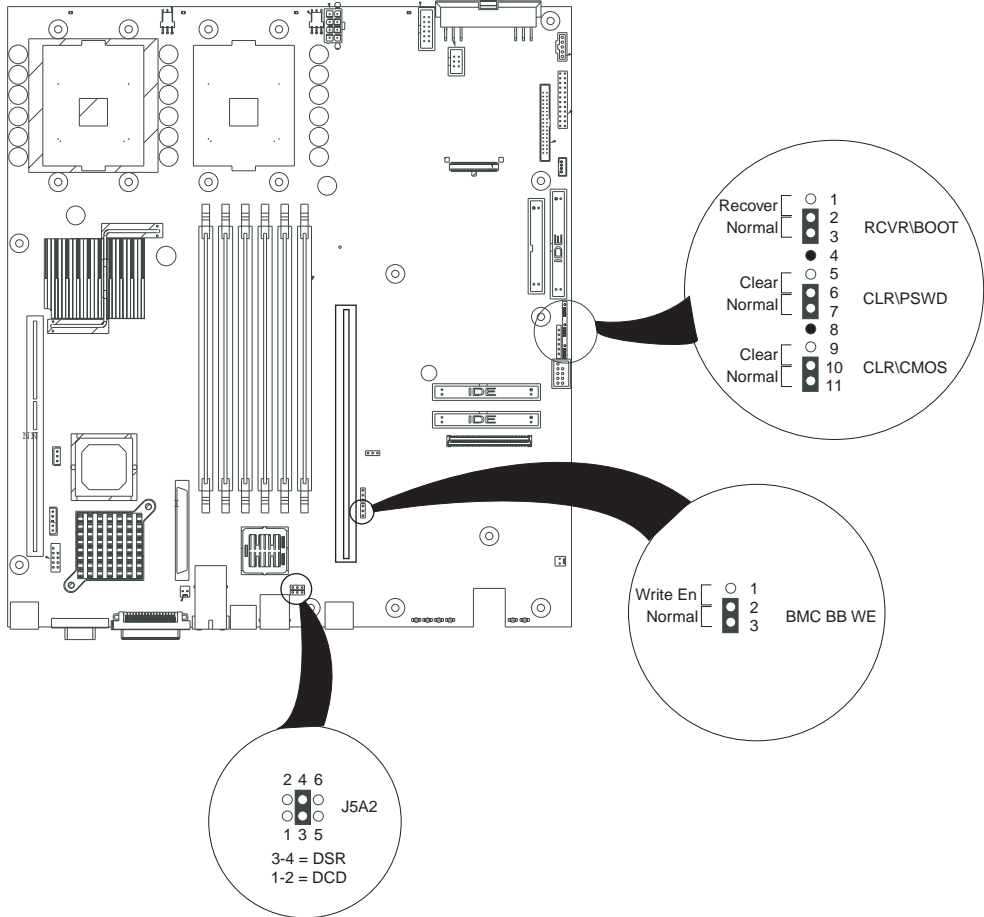


FIGURE 4-1 Main Board Jumper Locations

TABLE 4-1 Jumper Function Summary

Jumper Designator	Jumper Function	Action at System Reset
J5A2	RJ-45 Serial COM2 Port Configuration	Configures either a DSR or a DCD signal to the connector. See “Rear Panel RJ-45 Serial COM2 Connector” on page 2-36 and “Setting the Serial COM2 Port Jumper” on page 4-4.
CLR\CMOS	Clear CMOS	If these pins are jumpered, the CMOS settings are cleared. These pins should not be jumpered for normal operation.
CLR\PSWD	Clear Password	If these pins are jumpered, the password is cleared. These pins should not be jumpered for normal operation.
RCVR\BOOT	BIOS Boot Recovery	If these pins are jumpered, the system will attempt BIOS recovery. These pins should not be jumpered for normal operation.
BMC BB WE	BMC Boot Block Write Enable	If these pins are jumpered, BMC boot block is erasable and programmable at next reset. These pins should not be jumpered for normal operation.

4.2 Setting the Serial COM2 Port Jumper

A serial port jumper on the Main Board is preset by default to the position that satisfies most serial port configurations. The jumper is located at the rear of the server, on the Main Board, next to the rear RJ-45 serial connector. The jumper is on the jumper block labeled J5A2. The top cover of the server must be removed to access the jumper.

For serial devices that require a DSR signal (default), the J5A2 jumper block must be configured as follows: place the jumper across positions 3 and 4 (the two middle jumper posts) as shown in Figure 4-2.

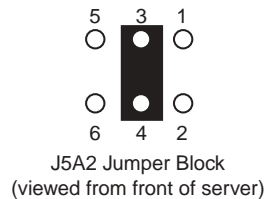


FIGURE 4-2 J5A2 Jumper Block Configured for DSR Signal (pin 7 connected to DSR)

For serial devices that require a DCD signal, the J5A2 jumper block must be configured as follows: place the jumper across positions 1 and 2 as shown in Figure 4-3.

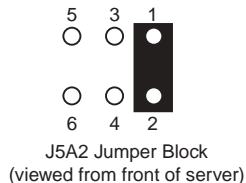


FIGURE 4-3 J5A2 Jumper Block Configured for DCD Signal (pin 7 connected to DCD)

4.3 Powering On

Caution – The power switch on the front of the server is an On/Off switch, but it does not isolate the equipment from the AC power being supplied through the AC power cord.

The location of the switch is shown in Figure 4-4.

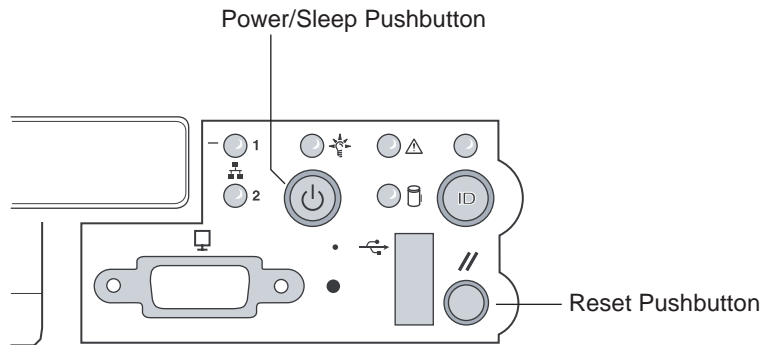


FIGURE 4-4 Power and Reset Switches on the Front Panel

Pushing the power pushbutton sends a signal to monitoring circuitry inside the server. The switch does not directly control high-voltage AC; it controls only low-voltage signals. When the monitoring circuitry detects that the button has been depressed, it activates the power supply and powers up the server. Likewise, when the server is powered up, pushing the switch powers the server down.

The main method for isolating the server from all high voltage is to physically remove the AC power cord. If the power cord is not removed, the only other way to isolate the server from high voltage is to open all external circuit breakers that supply AC voltage to the equipment.

Caution – As shipped, the Sun Fire V60x and Sun Fire V65x servers do not have Advanced Configuration and Power (ACPI) enabled. As a result, the front panel power switch operates as a normal power switch. In this configuration, press the switch once and power comes on; press again and the power goes off. It is recommended that you use the standard shutdown command before you power down the system using the switch. Activate the front panel switch to remove power only when the OS (for example, Linux) has completed the shutdown process and has halted.

Should you elect to use an ACPI-enabled Linux kernel and run the ACPI daemon (acpid), the behavior of the front panel switch will change to support the standard “soft-off” capability. That is, when the server is on and the power switch is pressed, the OS is notified and begins a graceful shutdown.

Additionally, with ACPI enabled and the server on, pressing the power button for longer than four seconds forces an immediate (non-graceful) shutdown.

Note that the Solaris OS does not support ACPI.

4.4 Clearing CMOS

It may be necessary to clear CMOS memory in order to restore the default BIOS passwords required to boot the server (user) or access setup functions (supervisor), as well as the default BIOS settings.

The CMOS configuration RAM may be reset by one of two methods:

- The CMOS clear button sequence from the front panel.
- The Clear CMOS jumper located on the baseboard

The CMOS can also be set to a default setting through the BIOS Setup. It will automatically be reset if it becomes corrupted.

4.4.1 Using the Front Panel

Follow these steps to clear the CMOS using the buttons on the front panel:

1. **Power off the system, but leave the AC power connected so the 5V standby is available.**
2. **Verify that the Clear CMOS jumper is in the “not clear” position.**
3. **Hold down the reset button for at least 4 seconds.**
4. **While the reset button is still depressed, press the power on/off button and hold for at least 2 seconds.**
5. **Simultaneously release both the power on/off and reset buttons.**

Upon completion of these steps, the BMC asserts the clear CMOS signal to emulate the movement of the Clear CMOS jumper. The BIOS clears CMOS as if you had moved the Clear CMOS jumper on the main board. CMOS is cleared only once per front panel button sequence. The BMC releases the CMOS clear line during the next system reset. Removing the Clear CMOS jumper from the main board can disable the Front Panel CMOS reset function. In addition, the jumper should be retained in case the CMOS needs to be cleared using the baseboard header.

4.4.2 Using the Clear CMOS Jumper

Follow these steps to clear the CMOS using the CLR\CMOS jumper on the main board (see Figure 4-5):

1. **Power off the system, but leave the AC power connected so the 5V standby is available.**
2. **Verify that the CLR\CMOS jumper is in the “Clear” position.**
3. **Press the power on/off button.**

When the BIOS detects a reset CMOS request (either through the front panel or with the Clear CMOS jumper), CMOS defaults are loaded during the next POST sequence. Note that non-volatile storage for embedded devices may or may not be affected by the clear CMOS operation depending on the available hardware support.

4. **Place the CLR\CMOS jumper in the “Normal” position.**

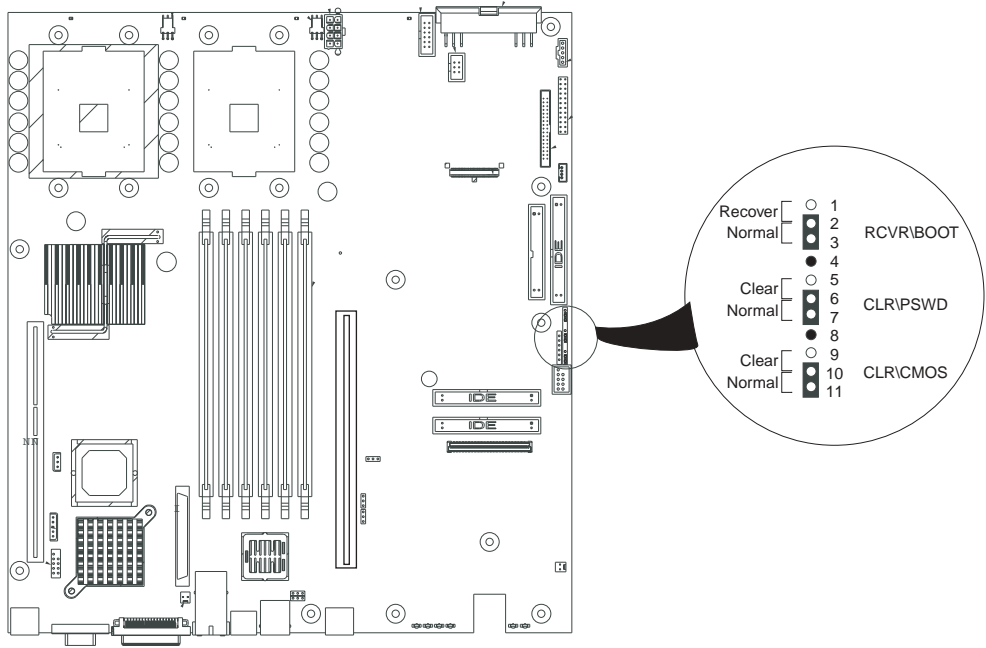


FIGURE 4-5 Location of Clear CMOS Jumper

4.5 Booting Up

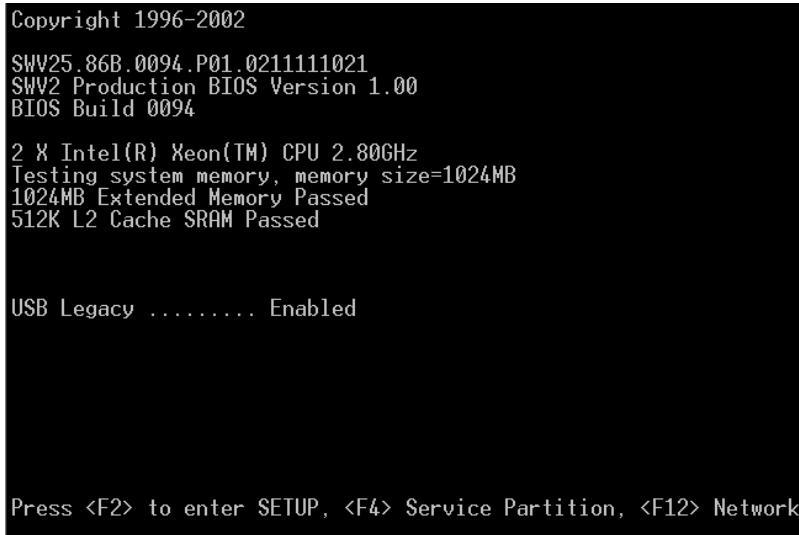
As soon as power is applied to the server, the bootup process begins. Boot messages are sent to either a monitor attached to the video port, or to a serial console attached to the rear RJ-45 serial COM2 port.

The server is configured by default to initially send BIOS and kernel messages to both the serial port and the video port. However, when the boot process reaches the OS load point, the messages and screens are sent only to the video port. After bootup is finished, the configuration can be changed to send all messages to the serial console (see “Configuring an External Serial Console” on page 4-16).

Note – The USB ports may be disabled until the OS is booted and the USB drivers are installed. A PS/2 keyboard is required if a keyboard is necessary for initial bootup and configuration.

4.5.1 Boot Options

The first bootup screen is shown in Figure 4-6.



```
Copyright 1996-2002
SWV25.86B.0094.P01.021111021
SWV2 Production BIOS Version 1.00
BIOS Build 0094

2 X Intel(R) Xeon(TM) CPU 2.80GHz
Testing system memory, memory size=1024MB
1024MB Extended Memory Passed
512K L2 Cache SRAM Passed

USB Legacy ..... Enabled

Press <F2> to enter SETUP, <F4> Service Partition, <F12> Network
```

FIGURE 4-6 First BIOS Bootup Screen

At the bottom of the screen, you are given the option to press the following function keys:

- F2 to enter the BIOS Setup Utility
- If the Service Partition is installed, F4 for the Service Partition (a DOS partition allowing setup configuration and server testing)
- F12 to boot from the Network

4.5.1.1 BIOS Setup Utility <F2>

Press F2 to enter the BIOS Setup Utility. The main BIOS Setup Utility screen shown in Figure 4-7 appears.

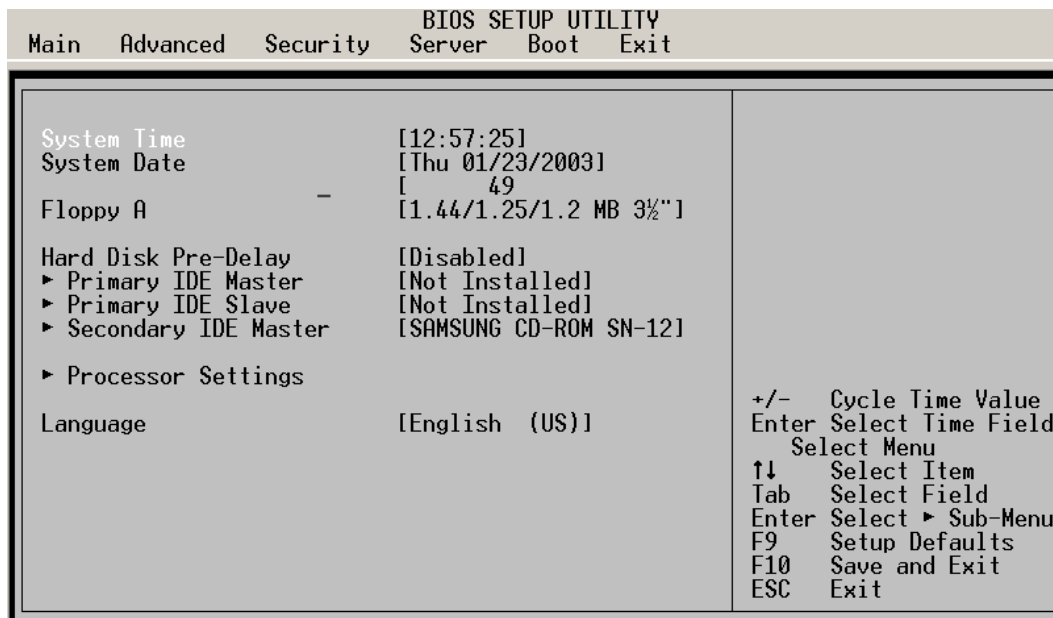


FIGURE 4-7 BIOS Setup Utility Main Screen

Caution – Changing the BIOS settings may cause undesirable effects, and in some cases may disable the server. Be very careful before changing the BIOS configuration.

It is important to note the default boot sequence. The boot sequence is accessed by using the right arrow key to select the Boot menu item on the top of the BIOS screen, then pressing Enter. The boot sequence is then displayed. The default boot sequence is as shown in Figure 4-8.

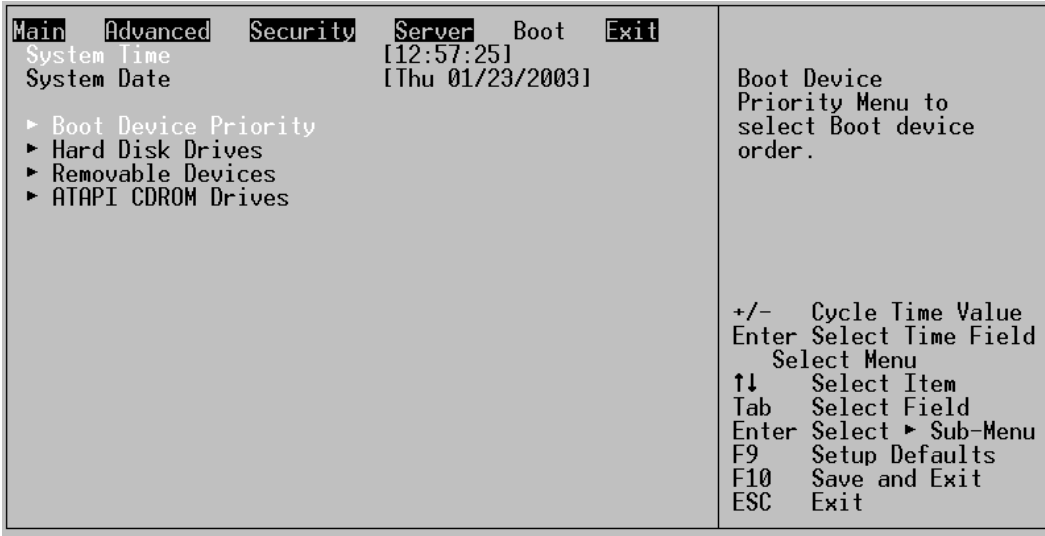


FIGURE 4-8 Default Boot Sequence

You can always restore all of the default BIOS settings by scrolling to the Exit menu item along the top of the screen. The BIOS Setup screen then appears as shown in Figure 4-9.

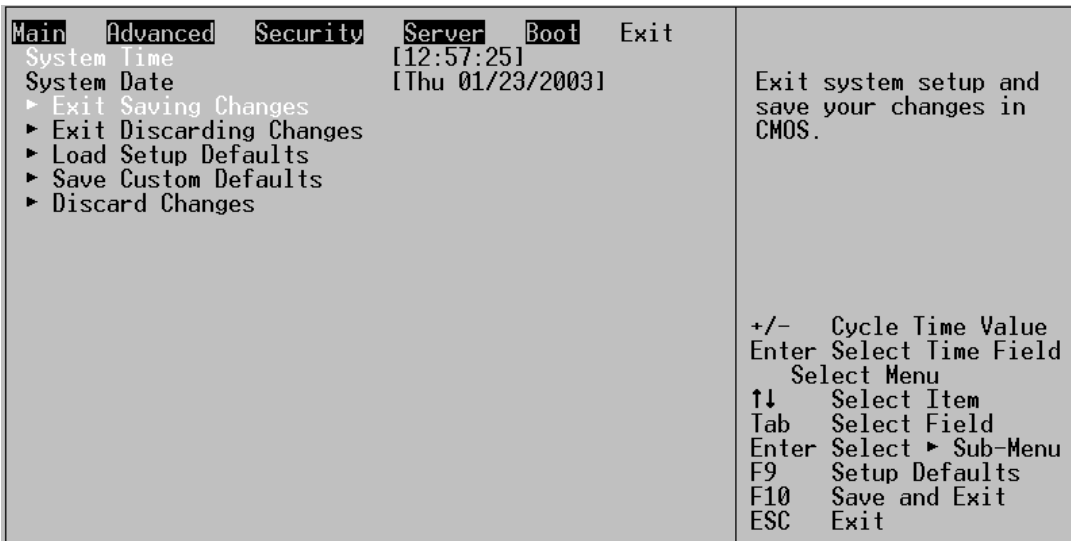


FIGURE 4-9 BIOS Setup Utility Exit Screen

To restore all of the default settings, scroll to “Load Setup Defaults” and press Enter, then select Yes at the prompt and press Enter again. Now press F10 to save the settings and exit.

When you exit the BIOS setup utility, the bootup process continues.

Note – To update the server BIOS, see “Updating the Server Configuration” on page 4-45.

4.5.1.2 Service Partition <F4>

Note – If you have a Sun Fire V60x server or Sun Fire V65x server with the Solaris operating environment preinstalled, the Service Partition is also preinstalled. If your server does not have a preinstalled operating system, the Service Partition is not installed. The Service Partition can be installed as described in “Service Partition” on page 4-42.

The Service Partition is a special partition that contains utilities used to manage and configure the Server. If the Service Partition is installed, press <F4> during bootup to display the Service Partition Menu (see Figure 4-32). If the Service Partition is not installed, you can install it, or you can also run the utilities directly from the Sun Diagnostics CD. Refer to “Service Partition” on page 4-42 for information on installing or restoring the Service Partition, or running the utilities from the Sun Diagnostics CD.

Note – The operations performed with the service partition menus can also be executed from the Sun Fire V60x and Sun Fire V65x servers Diagnostic CD. See “Using the Sun Diagnostics CD” on page 4-40.

When you are finished using the service partition, you must depress the Ctrl-Alt-Delete keys simultaneously to reboot.

4.5.1.3 Network Boot <F12>

If you press F12 to boot from the network, the server software looks for a valid boot file name on the network. If it finds such a file name, it boots from the network. If it cannot find a valid file name, it gives up and continues to boot from the hard disk. Figure 4-10 is an example of how the screen appears when booting from the network fails.

```
Intel(R) Boot Agent Version 4.0.19
Copyright (C) 1997-2001, Intel Corporation

CLIENT MAC ADDR: 00003 47 D5 73 20E GUID: 30743B9C-563C-D611-0080-2073D5470300
PXE-E53: No boot filename received

PXE-M0F: Exiting Intel PXE ROM.
```

FIGURE 4-10 Network Boot Failed Screen

Pre-boot Execution Environment (PXE) is a method by which the server can be booted from a remote server. This allows the system to boot without any knowledge of the Operating System on the server. The PXE environment uses DHCP to obtain network addresses. PXE is primarily used for loading operating systems, configuring the system, or burn-in type testing. PXE booting will only work if a properly configured PXE server is available.

4.5.1.4 Choose Boot Device <ESC>

Press the Esc key to go to the boot device selection menu. This menu, shown in Figure 4-11, allows you to select the device from which the system will boot. To select a boot device, scroll to the desired device and press Enter; otherwise, press Esc to exit without changing the boot device.

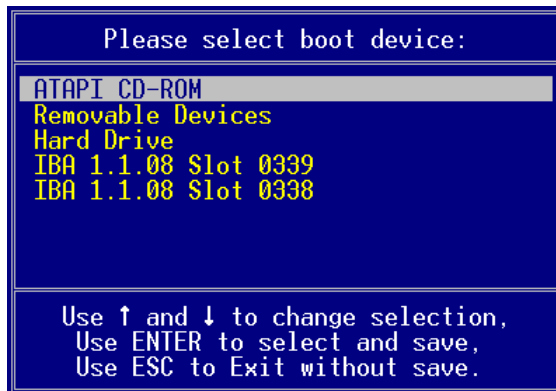


FIGURE 4-11 Boot Device Selection Menu

Note – When you select a boot device with the menu shown in Figure 4-11, it only affects the current boot. Subsequent boots revert to the device access sequence stored in the BIOS default settings.

4.5.2 Other Bootup Items

During the boot process, you will be presented with the choices described in the following sections. Type “N” to keep the current information, “Y” to change the information.

4.5.2.1 Ethernet Port Delay

Ethernet ports may take a short amount of time (less than 1second) to activate after ifconfig brings them up. This has been noted when the Server is running Red Hat Linux v7.2 or v7.3.

4.5.2.2 USB-Connected External CD-ROM Drives

Some USB-connected CD-ROM devices perform unreliably on the Sun Fire V60x server and Sun Fire V65x server. Use the internal CD-ROM device when possible.

4.5.2.3 Booting the Server When an External SCSI Hard Drive is Connected

The external SCSI bus is scanned for disk devices before the internal bus is scanned. As a result, Linux will label external drives before internal drives. Exercise caution when adding and removing external devices because operating system drive device names may change, leaving the system unable to boot because the external SCSI device may not be a boot drive.

4.5.2.4 PS/2 Mouse Misidentification

A PS/2 pointing device (mouse) may be misidentified during OS installation. To correct the mouse configuration for the Linux OS, run the “setup” tool from the command line. Select the “Mouse configuration” option then identify the connected pointing device. Save the change and exit the setup utility. The Solaris OS automatically detects the mouse, and if it finds that it needs to change some information, it starts the kdmconfig on reboot.

4.6 Loading the Operating System

The bootup process eventually takes you to the point where the operating system loads.

Note – If you have a Sun Fire V60x server or a Sun Fire V65x server with the Solaris operating environment preinstalled, the operating system loads during the bootup process. If you have a server without a preinstalled operating system, you need to install the operating system at this time.

In all cases, the serial port on the rear panel is operational and you can redirect boot messages to an external console. See “Configuring an External Serial Console” on page 4-16 for details.

4.7 Hyper-threading™ CPU Feature

The Sun Fire V60x and Sun Fire V65x servers feature Hyper-threading™ capable processors. Enabling Hyper-threading causes each physical CPU to act as two logical CPUs. Enabling Hyper-threading on a dual processor Sun Fire V60x server or Sun Fire V65x server causes the operating system to recognize four distinct processors.

Note – Hyper-threading is disabled, by default, when the Sun Fire V60x and Sun Fire V65x servers are shipped.

Hyper-threading may be enabled or disabled in the system BIOS configuration menu by using the following instructions:

1. Press the F2 key during the power-on self test (POST) while the server is booting to enter the BIOS configuration menu.
2. Using the down arrow key, scroll to “Processor Settings” then press the enter key.
3. Toggle the feature “Hyper-threading using the enter and arrow keys.
4. Press the Esc key once to exit the “Processor Settings” menu.
5. Press the left arrow key to highlight the “Exit” menu.
6. Press the Enter key to select “Exit Saving Changes”.

7. Press the Enter key again to confirm the new BIOS setting.

In most high-performance computing (HPC) environments, it is best to disable the Hyper-threading feature. In some mixed-task compute environments Hyper-threading can improve performance. One example of a mixed-task environment is a web and media server that simultaneously runs HTTP daemons and floating point media encoders.

If Hyper-threading is enabled some benchmarks may report inconsistent results due to the chaotic nature of process scheduling on asymmetric logical processors.

4.8 Configuring an External Serial Console

The RJ-45 serial COM2 port on the Sun Fire V60x and Sun Fire V65x servers rear panel (see Figure 4-12) can be used to direct boot messages to a serial console (for example, a laptop running HyperTerminal).

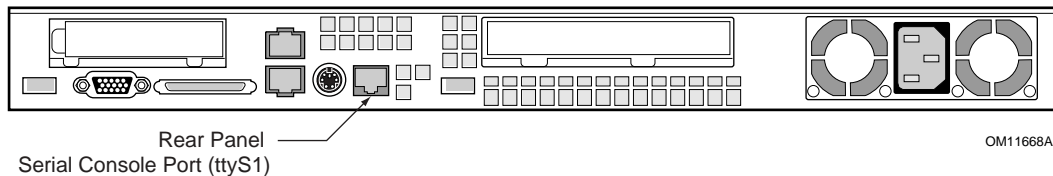


FIGURE 4-12 Rear-Panel Serial Console Port

The server is initially configured to send all the initial BIOS and kernel bootup messages to both the serial console and the VGA port. Use the information in this section only if you need to restore or change the configuration.

The default communications settings for serial COM2 port on the rear panel of the server are:

- 9,600 bps
- 8 data bits
- 1 stop bit
- No parity
- No flow control

You can connect to the serial COM2 port if you have an adapter cable that has an RJ-45 connector at one end and a DB9 connector at the other, wired in accordance with Table 2-3, “Back Serial COM2 Port Adapter Pinout,” on page 2-37. You can then connect the COM1 port of a PC or laptop to the serial COM2 port using the adapter cable and use HyperTerminal (or a similar application) to communicate with the server.

An ANSI 500 terminal emulator is needed to have the display appear properly during BIOS setup and when using the Sun Fire V60x and Sun Fire V65x servers Diagnostics CD or Service Partition tools.

To set up the server to direct messages to an external serial console:

1. On bootup, press F2 to select BIOS setup
2. Select the Security menu on the BIOS Setup Utility window
3. Select Console Redirection
4. Select the options as shown in Figure 4-13.

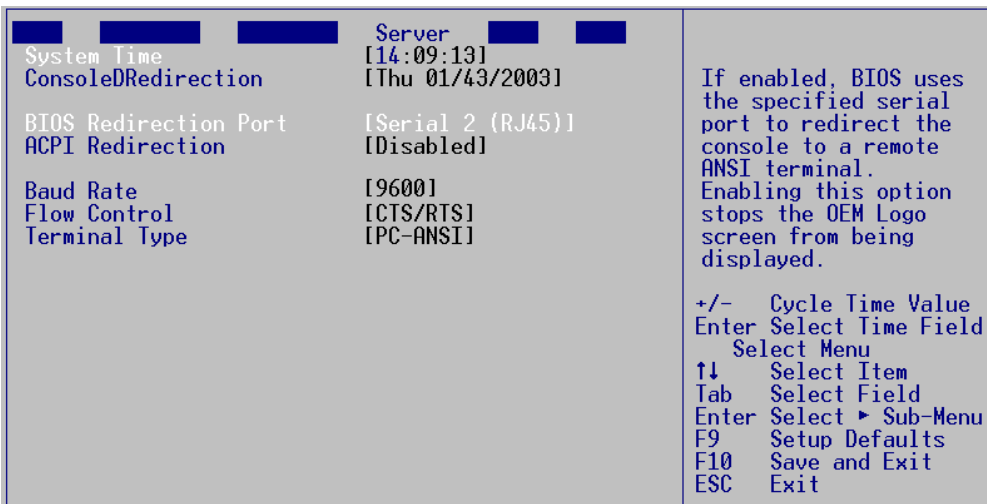


FIGURE 4-13 Console Redirection BIOS Setup

Note – The BIOS supports redirection of both video and keyboard by means of a serial link (rear RJ45 serial COM2 connector). When console redirection is enabled, the local (host server) keyboard input and video output are passed both to the local keyboard and video connections, and to the remote console through the serial link. Keyboard inputs from both sources are valid and video is displayed to both outputs. As an option, the system can be operated without a keyboard or monitor attached to the host system and run entirely from the remote console. Setup and any other text-based utilities can be accessed through console redirection.

5. Press Esc to go back to the main BIOS setup menu.

6. Exit the BIOS setup utility saving the changes you have made.

The boot messages are now directed to your external serial console. In this example, the BIOS setup allows the messages to be directed to COM1 of an external PC running HyperTerminal.

The intended usage model for the RJ-45 serial connector on the back of the server is for use as an interface to a serial port concentrator, allowing for remote access to the server's Emergency Management Port (EMP).

When redirecting the console through a modem, as opposed to a null modem cable, the modem needs to be configured with the following:

- Auto-answer (for example, ATSO=2, to answer after two rings)
- Modem reaction to DTR must be set to return to command state (for example, AT&D1). Failure to provide this option will result in the modem either dropping the link when the server reboots (as in AT&D0) or becoming unresponsive to server baud rate changes (as in AT&D2).
- The Setup/System Setup Utility option for handshaking must be set to CTS/RTS + CD (carrier detect) for optimum performance.
- If the Emergency Management Port shares the serial port with serial redirection, the handshaking must be set to CTS/RTS + CD. In selecting this form of handshaking, the server is prevented from sending video updates to a modem that is not connected to a remote modem. If this is not selected, video update data being sent to the modem inhibits many modems from answering an incoming call. An Emergency Management Port option utilizing CD should not be used if a modem is not used and CD is not connected.

4.9 Using the Service Partition Menu

Note – By default, the Sun Fire V60x and Sun Fire V65x servers are shipped without the Service Partition installed. It can be installed as described in “Service Partition” on page 4-42.

If the Service Partition is installed, when you press F4 at the initial bootup screen, the Service Partition Menu appears (see Figure 4-14).

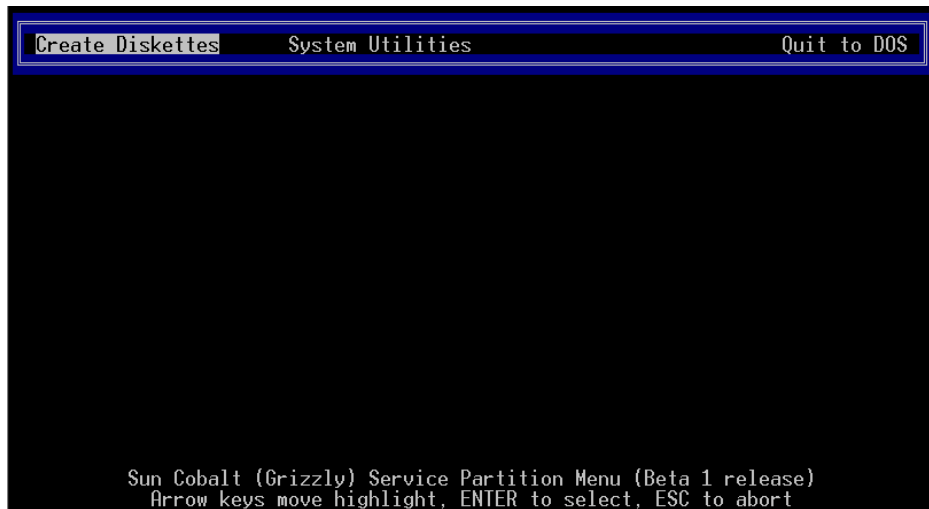


FIGURE 4-14 Service Partition Menu

There are three main menu items across the top of this screen:

- Create Diskettes
- System Utilities
- Quit to DOS

4.9.1 Create Diskettes

Pressing Enter with the Create Diskettes menu item highlighted brings up a submenu that lists the various diskettes you can create (see Figure 4-15).

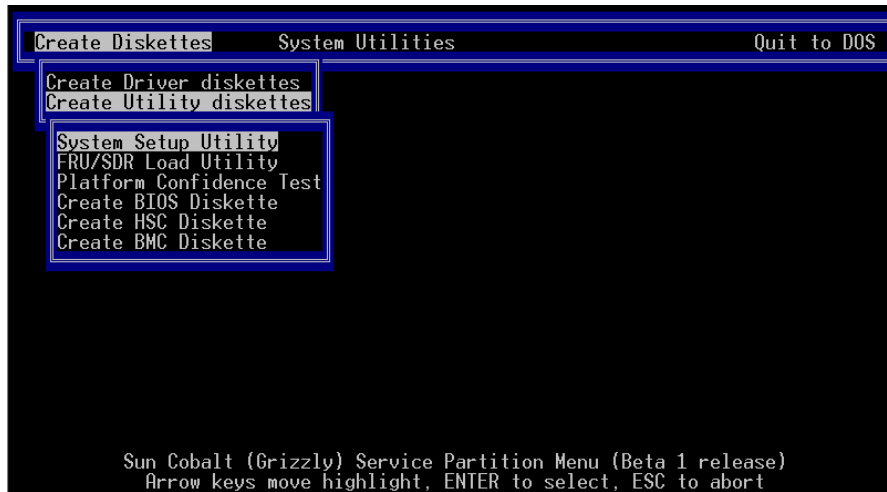


FIGURE 4-15 Create Diskettes Submenu

You can use this submenu to create various types of standalone diskettes that you can use to boot servers and run particular tests, utilities, or Flash the BIOS, independently of using the service partition System Utilities menu.

The following disks can be created:

- **System Setup Utility:** choosing this option creates two diskettes that allow you to run the System Setup Utility (SSU) in the same way that you run it from the service partition or from the Sun Fire V60x and Sun Fire V65x servers Diagnostics CD. With the two diskette set, you can perform the functions described in “Run System Setup Utility” on page 4-22.
- **FRU/SDR Load Utility:** choosing this option creates one diskette that allows you to run the FRU/SDR Load Utility in the same way that you run it from the service partition or from the diagnostics CD. With the diskette, you can perform the functions described in “Run Field Replaceable Unit/Sensor Data Record (FRU/SDR) Update3” on page 4-38.
- **Platform Confidence Test:** choosing this option creates one diskette that allows you to run the Platform Confidence Test in the same way that you run it from the service partition or from the diagnostics CD. With the diskette, you can perform the functions described in “Run Platform Confidence Test (PCT)” on page 4-26.
- **Create BIOS Diskette:** choosing this option creates one diskette. You may use this diskette to update the BIOS of any server.

- Create HSC Diskette: choosing this option creates one diskette that allows you to update the HSC firmware.
- Create BMC Diskette: choosing this option creates one diskette that allows you to update the BMC firmware.

4.9.2 System Utilities

Pressing Enter with the System Utilities menu item highlighted brings up the submenu shown in Figure 4-16.

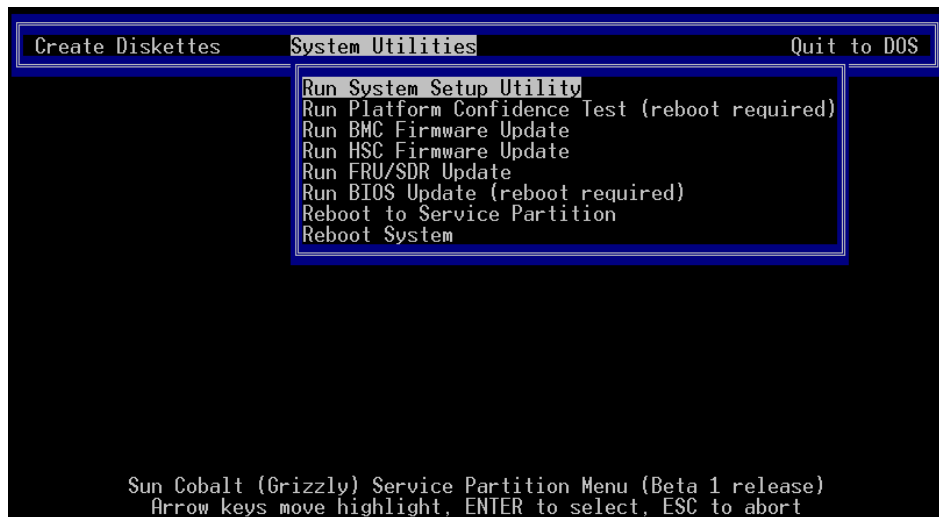


FIGURE 4-16 System Utilities Submenu

The following submenu items are available:

- Run System Setup Utility
- Run Platform Confidence Test (reboot required)
- Run BMC Firmware Update
- Run HSC Firmware Update
- Run FRU/SDR Update
- Run BIOS Update (reboot required)
- Reboot to Service Partition
- Reboot System

4.9.2.1 Run System Setup Utility

If installed, the Service Partition on the hard disk of the Sun Fire V60x and Sun Fire V65x servers allows you to perform server management, configuration and validation testing. To bring up the service partition, reboot and press the <F4> function key when the first BIOS screen appears.

Note – Any configuration change (CPU, memory, hard disk, add-in PCI cards and so forth) causes the server to revert to its factory-default state, regardless of how the server boot options have been set up using the System Setup Utility (SSU) or the BIOS setup.

Select Run System Setup Utility to run system setup. The System Setup Utility main window appears (see Figure 4-17).



FIGURE 4-17 SSU Main Window

The System Setup Utility (SSU) allows you to configure the following:

- User Preferences
- Boot devices
- Security

Setting User Preferences

Because the server supports running the SSU over a serial console, all of the menus work in text mode only.

Configuring Boot Devices

The Multiboot Add-in (MBA) feature of the SSU allows you to select the boot order for all bootable peripheral devices. To select the boot device priority, double-click the MBA Boot Devices menu item in the Available Tasks pane of the SSU main window. The Multiboot Options Add-in window appears (see Figure 4-18).

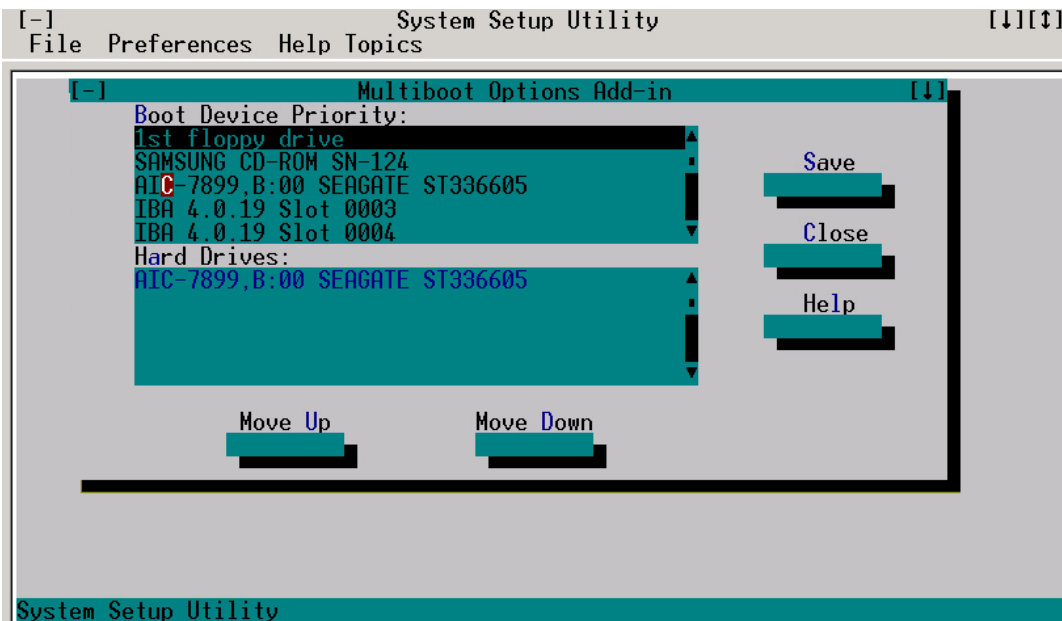


FIGURE 4-18 Multiboot Add-in Window

To change boot priorities, select a boot device and use the Move Down and Move Up buttons to move the device boot priority.

Note – This menu allows you to change the boot order without going into the BIOS setup.

Configuring Security

The Password Authorization feature of the SSU allow you to set BIOS passwords and other security options. To configure server security, double-click the PWA Security menu item in the Available Tasks pane of the SSU main window. The main Security window appears (see Figure 4-19).

Note – This menu allows you to change the security settings without going into the BIOS setup.

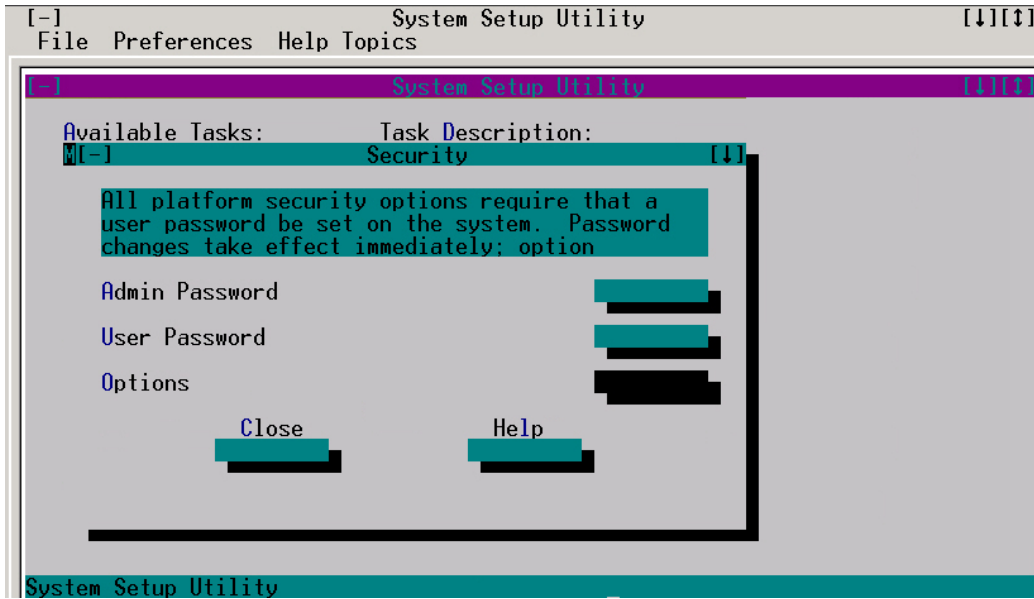


FIGURE 4-19 Security Main Window

Use the Admin Password, User Password, and Options buttons to configure the security options.

4.9.2.2 Using the SSU to Manage Logs, Records, Hardware, and Events

The System Setup Utility (SSU) allows you to manage the following:

- System Event Log (SEL)
- Sensor Data Records (SDR)
- Field Replaceable Units (FRU)
- Platform Events

Managing the System Event Log

The server maintains a system event log (SEL) in non-volatile memory, which holds approximately 3200 SEL entries. The log can be viewed and cleared using the SSU. To manage the log, double-click the SEL Manager menu item on the Available Tasks pane of the main SSU window. The System Event Log appears, and you can use the menu bar at the top of the log window to save the log, open a log, clear the log, or reload the log.

The SEL can also be cleared if you select BIOS setup during bootup (choose <F2>) and go into the Server menu. Choose Event Log Configuration > Clear All Event Logs > Yes. Press the Esc key until you receive the prompt to exit setup. If you choose to save your changes, the System Event Log will be cleared the next time you boot.

In addition, the SEL is cleared automatically each time you run the Platform Confidence Test (PCT). See “Run Platform Confidence Test (PCT)” on page 4-26 for more details on the PCT.

Managing the Sensor Data Records

The Sensor Data Record (SDR) Manager allows you to view the current sensor data for the system, save the SDR data to a file, and view SDR information previously saved to a file. The SDR data is saved in standard SDR format. To manage the SDR data, double-click the SDR Manager menu item on the Available Tasks pane of the main SSU window. The SDR Manager main window appears, and you can use the menu bar at the top of the window to manage SDR data.

Managing the Field Replaceable Units

The Field Replaceable Unit (FRU) Manager allows you to view the FRU information stored in the managed server. The FRU records contain information about the system components, such as manufacturer's name, product name, part number, version number, product and chassis serial number, and asset tags. This information may prove useful when troubleshooting faults in the server.

To manage the FRUs, double-click the FRU Manager menu item on the Available Tasks pane of the main SSU window. The FRU Manager main window appears, and you can use the menu bar at the top of the log window to manage FRU information.

Managing Platform Events

The Platform Event Manager (PEM) allows you to configure and manage Platform Event Paging (PEP), Baseboard¹ Management Controller Local Area Network (BMC-LAN) Configuration, and the Emergency Management Port (EMP).

To use PEM, double-click the Platform Event Manager menu item on the Available Tasks pane of the main SSU window. The Platform Event Manager main window appears. You can click on the buttons in this window to perform platform management.

4.9.2.3 Run Platform Confidence Test (PCT)

The PCT is used to test major subsystems and analog sensors of the system board. To run this test:

1. **Select Run Platform Confidence Test (reboot required) on the System Utilities submenu.**

The prompt shown in Figure 4-20 is displayed:

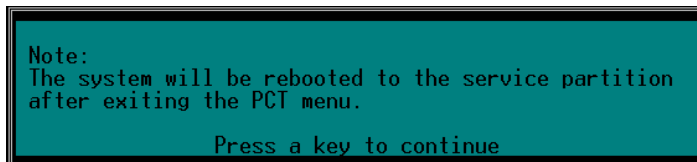


FIGURE 4-20 Reboot Prompt

1. Baseboard refers to the Main Board in the server.

Note – After the PCT is finished, you can view the results of the tests. However, the system will be rebooted to the service partition after you finish PCT.

2. Press any key to bring up the warning screen shown Figure 4-21.

Note that it is advisable to save the System Event Log to a floppy before running the PCT and that it is recommended that testing not be interrupted during the hardware probe or during the BMC test.

```
WARNING: This test utility, as part of its normal test processes,
will automatically clear the System Event Log (SEL) upon exiting.
We strongly urge you to save the SEL to a floppy diskette using
the SSU Utility prior to running this test to maintain a permanent
record of the SEL.

The PCT, when run in continuous loop mode, is sensitive as to when
the test is manually interrupted using the ctrl-break key combination.
We recommend that the tests not be interrupted during the Hardware
Probe or during the BMC test module. Aborting during the Hardware
Probe or the BMC test can cause unpredictable results.

Press ENTER to continue or ESC to exit.
```

FIGURE 4-21 Warning Prompt

3. Press Enter to continue or Esc to exit.

If you press Enter, the screen shown in Figure 4-22 appears.

```
Grizzly BYO Platform Confidence Test v1.03  
(c)Copyright 1997-2003 Intel Corp. All Rights Reserved.
```

Platform Confidence Test Options

Quick Test

Comprehensive Test (DEFAULT)

Comprehensive Test with continuous looping

Display Help Text

EXIT

Highlight selection using Cursor UP/DOWN and press ENTER

FIGURE 4-22 Platform Confidence Test Menu

You can use this menu to perform the following tests:

- Quick Test
- Comprehensive Test (DEFAULT)
- Comprehensive Test With Continuous Looping

All test results are saved in the `RESULT.LOG` file of the current directory, which is normally `C:\PCT`. This file is overwritten for each test.

Quick Test

This test performs a quick test of the CPU(s), DIMM memory, CPU cache memory, and hard disk drives. It is not a complete test of these units.

Quick Test takes from 2 to 5 minutes, depending on the amount of DIMM memory installed. The following test modules are run during Quick Test:

- Power On Self Test (POST)
- CPU Test(s)
- Symmetric Multiprocessing (SMP) Processor 0 Test
- Symmetric Multiprocessing (SMP) Processor 1 Test
- Hard Disk Drive Test(s)
- Cache Memory Test(s)
- DIMM Memory Test
- Sensor Readings (voltage, temperature, fans, and so on)

To run the Quick Test, follow this procedure:

1. Select Quick Test using the arrow keys and press Enter.

The initial testing produces a screen similar to the one shown in Figure 4-23. This phase of the testing determines your server configuration.

```
Probing HARDWARE_CONFIG
Probing POWER_ON_SELF_TEST
Probing CPU
Probing MATH_FPU
Probing SMP
Probing E7501
Probing ADP78XX
Probing KEYBOARD
Probing BMC
Chassis Name:
Searching for Boot Block Device Info in BMC code..
Device Boot Info Block
  Revision: 5
  Build Date: Oct 07 2002 14:35:03
  IMB Device: BMC
  Slave Addr: 20
  Secondary Slave Addr: 00
  FW Revision: 0.12
  Code Range: 00h - 2C0Eh
  Boot Struct Checksum: 6CE3h
  64K block 0 : Range 0h - 2C0Dh

  Boot Code Checksum 0000h
Searching for OpCode Device Info in BMC code..
```

FIGURE 4-23 Platform Confidence Quick Test (start of first screen)

More screen entries appear as the test progresses. Eventually the screen shown in Figure 4-24 appears.

```
Hardware Test Configuration
Base Memory Size: 577 KB
Cpu Type: Intel(R) Xeon(TM) Microprocessor
Cpu Speed: 2791 MHz
NUMBER_OF_PROCESSORS 0x2
PC87417: Found
COM1 at Port Address: 3F8 is enabled
Floppy cfg.Drive A: 1.4Mb (3.5 Inch)
Hard Drive 0 LBA Sectors 71687369 Total Size:35003MB
External Cache size: 512 KB
Video Subsystem: UGA-compatible controller, 256KB RAM
Video Controller : ATI RAGE XL CONFIG_CHIP_ID 0x27004752
Video BIOS : UESA 2.0 ATI MACH64
Video Memory : 8 MB
If configuration is correct press ENTER to continue or CTRL+BREAK to quit
```

FIGURE 4-24 Platform Confidence Quick Test Hardware Test Configuration (end of first screen)

This screen indicates the hardware configuration that has been determined from the initial tests.

2. If the hardware configuration does not match the configuration of your server, press the Ctrl and Break keys simultaneously (Ctrl + Break).

You are prompted to check all the cables and your server configuration, then you are exited to the Platform Confidence Test main menu.

3. If the configuration is correct, press Enter to continue.

Several entries are displayed and scroll past on the screen, showing the test progress (see Figure 4-25).

```
CPU.CPU_TYPE PASSED
CPU.FLOATING_POINT_UNIT <01-30-03 06:34:27>
CPU.FLOATING_POINT_UNIT PASSED
CPU.CLOCK_SPEED <01-30-03 06:34:27>
CPU.CPU_TYPE PASSED
CPU.FLOATING_POINT_UNIT <01-30-03 06:34:27>
CPU.FLOATING_POINT_UNIT PASSED
CPU.FLOATING_POINT_UNIT <01-30-03 06:34:27>
CPU.FLOATING_POINT_UNIT PASSED
CPU.CLOCK_SPEED <01-30-03 06:34:27>
CPU.CLOCK_SPEED PASSED
CPU.MMX_INSTRUCTIONS <01-30-03 06:34:27>
CPU.MMX_INSTRUCTIONS PASSED
CPU.MMX2_INSTRUCTIONS <01-30-03 06:34:27>
CPU.MMX2_INSTRUCTIONS PASSED
HARD_DISK.RESET <01-30-03 06:34:27>
HARD_DISK.RESET PASSED
CACHE.FIND_CACHE_TYPE <01-30-03 06:34:27>
CACHE.FIND_CACHE_TYPE PASSED
CACHE.PAGE_FAULT <01-30-03 06:34:27>
CACHE.PAGE_FAULT PASSED
CACHE.RANDOM_PATTERNS <01-30-03 06:34:28>
CACHE.RANDOM_PATTERNS PASSED
CACHE.ADDRESS_PATTERNS <01-30-03 06:34:28>
```

FIGURE 4-25 Platform Confidence Quick Test Progress

When the testing is done, the results are summarized (see Figure 4-26).

```
Test Result Summary                                     Pass Count=1
FRU= CPU PASSED
PASSED CPU Module
FRU= BASEBOARD PASSED
PASSED Power On Self Test                               PASSED CACHE Controller and Memory
FRU= MEMORY Controller-DIMM PASSED
PASSED MEMORY Controller, DIMM                         PASSED Extended MEMORY <DIMM>
FRU= HARD DISK DRIVES PASSED
PASSED Hard Disk Drive 0
Press Any Key to Continue <DONE>
```

FIGURE 4-26 Platform Confidence Quick Test Results Summary

4. Press any key to see the analog sensor readings (see Figure 4-27).

```

Analog Sensor Reading
Sensor #40h Baseboard Fan 5 Reading BBh -> 9537.00 RPM
Sensor #41h Baseboard Fan 4 Reading BBh -> 9537.00 RPM
Sensor #42h Baseboard Fan 3 Reading BBh -> 9537.00 RPM
Sensor #43h Baseboard Fan 2 Reading B5h -> 9231.00 RPM
Sensor #44h Baseboard Fan 1 Reading BBh -> 9537.00 RPM
Sensor #10h Baseboard 1.25V Reading 80h -> 1.25 Volts
Sensor #11h Baseboard 2.5V Reading 7Eh -> 2.47 Volts
Sensor #12h Baseboard 3.3V Reading C1h -> 3.32 Volts
Sensor #13h Baseboard 3.3VSB Reading DAh -> 3.29 Volts
Sensor #14h Baseboard 5.0V Reading C0h -> 4.99 Volts
Sensor #15h Baseboard 12V Reading BEh -> 11.78 Volts
Sensor #16h Baseboard -12V Reading 35h -> -12.18 Volts
Sensor #17h Baseboard VBAT Reading C5h -> 3.07 Volts
Sensor #B8h Processor VRM Reading 7Bh -> 1.45 Volts
Sensor #30h Baseboard Temp Reading 20h -> 32.00 degrees C
Sensor #33h Basebrd FanBoost Reading 20h -> 32.00 degrees C
Sensor #32h FntPnl Amb Temp Reading 17h -> 23.00 degrees C
Sensor #36h FP Amb FanBoost Reading 17h -> 23.00 degrees C
Sensor #98h Processor1 Temp Reading 28h -> 40.00 degrees C
Sensor #A0h Proc1 FanBoost Reading 28h -> 40.00 degrees C

Press Any Key to Continue <MORE>

```

FIGURE 4-27 Platform Confidence Quick Test Sensor Readings (first screen)

5. Press any key to see the remaining sensor readings (see Figure 4-28).

```

Sensor #99h Processor2 Temp Reading 27h -> 39.00 degrees C
Sensor #A1h Proc2 FanBoost Reading 27h -> 39.00 degrees C

Press Any Key to Continue <DONE>

```

FIGURE 4-28 Platform Confidence Quick Test Sensor Readings (second screen)

6. Press any key to return to the main Platform Confidence Test menu.

To view the test results, follow this procedure:

7. Return to the System Utilities submenu (see Figure 4-16 on page 4-21) and use the Quit to DOS menu selection to exit to DOS.

8. Change directories to:

C:\PCT

9. Type the following command:

Type `RESULT.LOG | more`

A portion of the `RESULT.LOG` file is displayed each time you press a key. In this way, you can see the results, which are divided into the following sections:

- BIOS ID
- Hardware Configuration
- Test Summary
- Analog Sensor Readings

The `RESULT.LOG` file is overwritten each time you run a test. A sample of the `RESULT.LOG` file is shown in Figure 4-29.

```

SUV25-SUV25
***** HARDWARE CONFIGURATION *****
Base Memory Size: = 577 KB
Cpu Type: = Intel(R) Xeon(TM) Microprocessor Cpu Speed: = 2791 MHz
NUMBER_OF_PROCESSORS = 0x2
PC87417: = Found
COM1 at Port Address: = 3F8 is enabled
Floppy cfg.Drive A: = 1.4Mb (3.5 Inch)
Hard Drive 0 = LBA Sectors 71687369 Total Size:35003MB
External Cache size: = 512 KB
Video Subsystem: = VGA-compatible controller, 256KB RAM
Video Controller      : = ATI RAGE XL   CONFIG_CHIP_ID 0x27004752
Video BIOS            : = VESA 2.0    ATI MACH64
Video Memory         : = 8 MB

***** TEST SUMMARY FILE *****

--- test.sum file -----
Pass  Fail  Errors  Last run on/at
HARDWARE_CONFIG.SYSTEM_CONFIGURATI 1    0    0    01-30-03 06:34:27
POWER_ON_SELF_TEST.VALIDITY_CHECK 1    0    0    01-30-03 06:34:27
POWER_ON_SELF_TEST.MEMORY_CHECK 1    0    0    01-30-03 06:34:27
CPU.CPU_TYPE 1    0    0    01-30-03 06:34:27
CPU.FLOATING_POINT_UNIT 1    0    0    01-30-03 06:34:27
CPU.CLOCK_SPEED 1    0    0    01-30-03 06:34:27
CPU.MMX_INSTRUCTIONS 1    0    0    01-30-03 06:34:27
CPU.MMX2_INSTRUCTIONS 1    0    0    01-30-03 06:34:27
HARD_DISK.RESET 1    0    0    01-30-03 06:34:27
CACHE.FIND_CACHE_TYPE 1    0    0    01-30-03 06:34:27
CACHE.PAGE_FAULT 1    0    0    01-30-03 06:34:28
CACHE.RANDOM_PATTERNS 1    0    0    01-30-03 06:34:28
CACHE.ADDRESS_PATTERNS 1    0    0    01-30-03 06:34:28
CACHE.INTENSIVE_LINE 1    0    0    01-30-03 06:34:29
CACHE.INTENSIVE_SET 1    0    0    01-30-03 06:34:34
CACHE.RANDOM_ADDRESS 1    0    0    01-30-03 06:34:36
CACHE.MULTIPLE_LINE_ACCESS 1    0    0    01-30-03 06:34:36
CACHE.OPPOSING_PATTERNS 1    0    0    01-30-03 06:34:37
MEMORY.ADDRESS_PATTERNS 1    0    0    01-30-03 06:34:45
MEMORY.RANDOM_PATTERNS 1    0    0    01-30-03 06:35:15
MEMORY.CACHE_RANDOM_PATTERNS 1    0    0    01-30-03 06:35:15
MEMORY.CACHE_PSEUDO_RANDOM_PATTERN 1    0    0    01-30-03 06:35:16
MEMORY.CACHE_CHECKERBOARD_PATTERNS 1    0    0    01-30-03 06:35:16
MEMORY.CACHE_ADDRESS_PATTERNS 1    0    0    01-30-03 06:35:16
MEMORY.CACHE_32KB_ACCESS 1    0    0    01-30-03 06:35:16
MSDRAM64.RAND_DWORD 1    0    0    01-30-03 06:35:37
MSDRAM64.ADDRESS_LINES 1    0    0    01-30-03 06:35:37

```

FIGURE 4-29 Sample RESULT.LOG file

Comprehensive Test

This test fully exercises and tests the server system. The test takes approximately 15 to 20 minutes to execute, depending on the amount of memory installed. The following test modules are run during the Comprehensive Test:

- Power On Self Test
- CPU Test(s)
- Cache Memory Test(s)
- Math Coprocessor Test(s)
- Symmetric Multiprocessing (SMP) Processor 0
- Symmetric Multiprocessing (SMP) Processor 1
- DIMM Memory Test
- Serverworks HE-SL Chipset Test
- Primary Interrupt Controller Test
- Programmable Interrupt Timer Test
- Keyboard Test
- Hot Swap Controller Test
- Real Time Clock Test
- PCI Bus Controller Test
- Universal Serial Bus Controller Test
- Super I/O Controller Test
- DMA Controller Test
- Baseboard Management Controller Test
- Com Port 1 Controller Test
- Com Port 2 Controller Test
- Adaptec SCSI Controller Test
- Parallel Port Controller Test
- Floppy A Controller Test
- ATI Video Adapter Test
- CD-ROM Controller Test
- Hard Disk Drive Controller and Drives Test
- Sensor Readings (voltage, temperature, fans, and so on)

To run the Comprehensive Test, follow this procedure:

1. Select Comprehensive Test using the arrow keys and press Enter.

The initial testing determines your server configuration, and produces screens similar to those shown in Figure 4-30 and Figure 4-31.

2. When you are prompted about the configuration of the server, if the hardware configuration does not match the configuration of your server, press the Ctrl and Break keys simultaneously (Ctrl+Break).

You are prompted to check all the cables and your server configuration, then you are exited to the Platform Confidence Test main menu.

3. If the configuration is correct, press Enter to continue.

The lines that are displayed and scroll past on the screen show the test progress (see Figure 4-30). The information is much more detailed than that displayed for the Quick Test.

```
.Sensor 32h Threshold Bounds Checking
Testing LNC Threshold
Testing LC Threshold
Testing UNC Threshold
Testing UC Threshold
.Sensor 36h Threshold Bounds Checking
.Sensor 98h Threshold Bounds Checking
Testing UNC Threshold
Testing UC Threshold
.Sensor A0h Threshold Bounds Checking
.Sensor 99h Threshold Bounds Checking
Testing UNC Threshold
Testing UC Threshold
.Sensor A1h Threshold Bounds Checking

BMC.CHECKANALOGSENSORS PASSED
BMC.CHECKANALOGHYST (07-01-02 20:17:53)
.....
BMC.CHECKANALOGHYST PASSED
BMC.CHECKDISCRETESENSORS (07-01-02 20:17:53)
BMC.CHECKDISCRETESENSORS PASSED
BMC.DISPLAYANALOGREADINGS (07-01-02 20:17:53)
Sensor #40h Baseboard Fan 5 Reading BBh -> 9537.00 RPM
Sensor #40h Baseboard Fan 5 Reading BBh -> 9537.00 RPM
```

FIGURE 4-30 Platform Confidence Comprehensive Test Progress

When the testing is done, the results are summarized (see Figure 4-31).

```
Test Result Summary                                     Pass Count=1
FRU= CPU PASSED
PASSED CPU Module                                     PASSED Math (FPU)
PASSED SMP CPU Modules
FRU= BASEBOARD PASSED
PASSED Power On Self Test                             PASSED Primary Interrupt Controller
PASSED Keyboard Controller                           PASSED Real Time Clock
PASSED PCI Bus Controller                             PASSED Programable Interval Timer
PASSED Direct Memory Access Controller               PASSED SNOOP System Cache Coherency
PASSED PC87417 Super IO Controller                   PASSED Adaptec 78XX SCSI Controller
PASSED Baseboard Management Controller               PASSED ATI Rage XL Video Controller
PASSED CACHE Controller and Memory                   PASSED VGA Video Controller
PASSED Serverworks HE-SL chipset                     PASSED Intelligent Chassis Mgmt Bus
FRU= MEMORY Controller-DIMM PASSED
PASSED MEMORY Controller, DIMM                       PASSED Extended MEMORY (DIMM)
PASSED MEMORY stress
FRU= FLOPPY DISK DRIVES PASSED
PASSED Floppy A Disk Drive
Press Any Key to Continue <MORE>
```

FIGURE 4-31 Platform Confidence Comprehensive Test Results

4. Press any key to see the remaining test results.
5. After the remaining test results are displayed, press any key to see the analog sensor readings (similar to the screens shown in Figure 4-27 and Figure 4-28).
6. After the analog sensor readings are displayed, press any key to return to the main Platform Confidence Test menu.
7. You can view the `RESULT.LOG` file in a similar fashion to that previously explained.

Comprehensive Test With Continuous Looping

This test performs the same test as the Comprehensive Test, but runs continuously until stopped. To stop the testing and display the test pass count, press Ctrl + Break. The number of successful test loops executed is shown as “Pass Count = n” at the upper right side of the screen.

The run time for this test is approximately 15 to 20 minutes per pass, depending on the amount of memory installed.

Note – The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component.

4.9.2.4 Run Baseboard² Management Controller (BMC) Firmware Update³

Use this menu selection to update the Baseboard Management Controller (BMC) firmware. The BMC code resides both on the Sun Fire V60x and Sun Fire V65x servers Diagnostics CD and on the Service Partition in the `C: \BMC` directory. The BMC firmware can also be updated from a standalone, bootable floppy diskette

4.9.2.5 Run HSC Firmware Update

Use this menu selection to update the hard disk controller firmware. The hot-swap controller (HSC) code resides both on the Sun Fire V60x and Sun Fire V65x servers Diagnostics CD and on the Service Partition in the `C: \HSC` directory. The HSC firmware can also be updated from a standalone, bootable floppy diskette.

4.9.2.6 Run Field Replaceable Unit/Sensor Data Record (FRU/SDR) Update³

Use this menu item to re-inventory the FRUs and Sensor Data Records (SDR) on the Sun Fire V60x and Sun Fire V65x servers. The FRU/SDR code resides both on the Sun Fire V60x and Sun Fire V65x servers Diagnostics CD and on the Service Partition in the `C: \FRUSDR` directory.

2. The baseboard refers to the server Main Board.

3. The update files are on the hard drive service partition.

Typically, the product and chassis serial numbers are changed only by field service personnel when hardware is changed. The asset tag number is intended for use by customers for their internal tracking system. For example, the asset tag might be updated after a firmware or software update.

4.9.2.7 Run BIOS Update (reboot required)⁴

Use this menu item to update the BIOS Boot block in the event that the boot block becomes corrupted. Use this menu item to also update the BIOS in the event that the BIOS becomes corrupted or if you want to set the BIOS settings back to their defaults. A reboot occurs automatically after the update is complete. The BIOS code resides both on the Sun Fire V60x and Sun Fire V65x servers Diagnostics CD and on the Service Partition in the `C: /BIOS` directory. The BIOS can also be updated from a standalone, bootable floppy diskette. See “Updating the Server Configuration” on page 4-45 for information on how to update the BIOS.

4.9.2.8 Reboot to Service Partition

Selecting this menu item causes a reboot to the service partition.

4.9.2.9 Reboot System

Choosing this menu item causes a reboot, maintaining normal boot device ordering.

4. The update files are on the hard drive service partition.

4.10 Using the Sun Diagnostics CD

The Sun Fire V60x and Sun Fire V65x servers Diagnostics CD provides basic server configuration software through a text-based menu program that runs when the server boots from the CD. After bootup, the CD runs a menu program that allows the user to create driver diskettes, run utilities, update system components, and install and manage service partitions. The CD ships with all Sun Fire V60x and Sun Fire V65x servers and can be used by Sun service personnel as well as end customers.

To begin using the diagnostics CD, follow these steps:

1. **Reboot the Sun Fire V60x and Sun Fire V65x servers with the diagnostics CD inserted in the CD tray.**

Note – You will need to make sure that the boot sequence is such that the diagnostics CD is selected as a boot device before the hard disk. This is normally the case by default. Refer to “BIOS Setup Utility <F2>” on page 4-9 for more information on how to change the boot sequence.

After bootup, verify that a DOS-like menu appears similar to that of the Service Partition menu (see “Service Partition Menu” on page 4-19), except that there is one more item at the top of the screen for managing the service partition, as shown in Figure 4-32. This menu works in both local and remote (console redirection) modes, and allows you to create driver and utilities diskettes, run system utilities, and create, format, or remove a service partition.

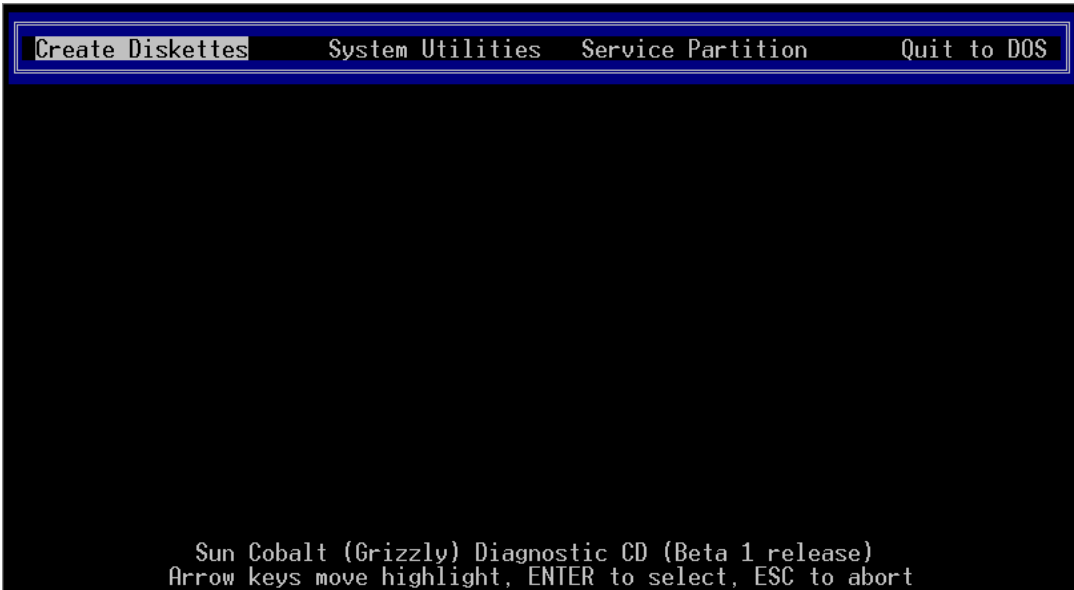


FIGURE 4-32 Boot Complete from the Diagnostics CD

With the diagnostics CD menu, you can perform the operations listed in following sections.

4.10.1 Create Diskettes

For more information on creating diskettes, see “Create Diskettes” on page 4-20.

4.10.2 Run System Utilities

For more information on running system utilities, see “System Utilities” on page 4-21.

4.10.3 Service Partition

This menu item (see Figure 4-32) allows you to find, create, format, or remove a service partition on the hard disk of the Sun Fire V60x and Sun Fire V65x servers.

Caution – If you remove the service partition, it is possible that you may have to reformat the hard disk to create it again. Reformatting the disk removes all partitions and destroys all data on the disk.

If you are just updating the service partition, you should reformat the service partition and install the updated software using option 4 shown in Figure 4-34.

You can create service partitions on any disk you specify, as long as a service partition or any other partition does not already exist. There is only one service partition allowed. Some operating systems automatically create the service partition when they install.

If you want to reformat the service partition and copy the CD contents to the service partition, select Service Partition > Run Service Partition Administrator and use option 4 (Format service partition and install software) from the resulting menu (see Figure 4-34). This updates the service partition only.

If the Sun Fire V60x and Sun Fire V65x servers do not have a service partition installed for some reason (for example, if you are running Red Hat Linux), the Service Partition Administrator tool on the CD will not be able to create a service partition. However, from Linux you can create a type 12 (Compaq Diagnostics) partition, which is the only partition type the CD tool understands.

If you are performing a generic Red Hat install, you should create the service partition first and then install Red Hat Linux using the option to preserve existing partitions. As shipped from the factory, the Sun Fire V60x and Sun Fire V65x servers service partition already exists (sda1 for single drive systems and sdb1 for dual drive systems). Just make sure during Red Hat Linux installation to leave these partitions alone.

If you have a server with preinstalled Solaris 9 software, you do not have to create a service partition. If you are performing a custom Solaris installation and the service partition does not exist on the server, you will need to install the service partition before performing the Solaris installation.

4.10.4 Restoring the Service Partition

If the hard disk service partition is removed, erased, or damaged, you can use the diagnostics CD to restore it, depending on the extent of the problem.

If the contents of the service partition have been removed, erased, or damaged but the sda1 or sdb1 partitions still exist:

1. **Boot from the diagnostics CD.**

After the server has booted, the screen shown in Figure 4-33 appears.

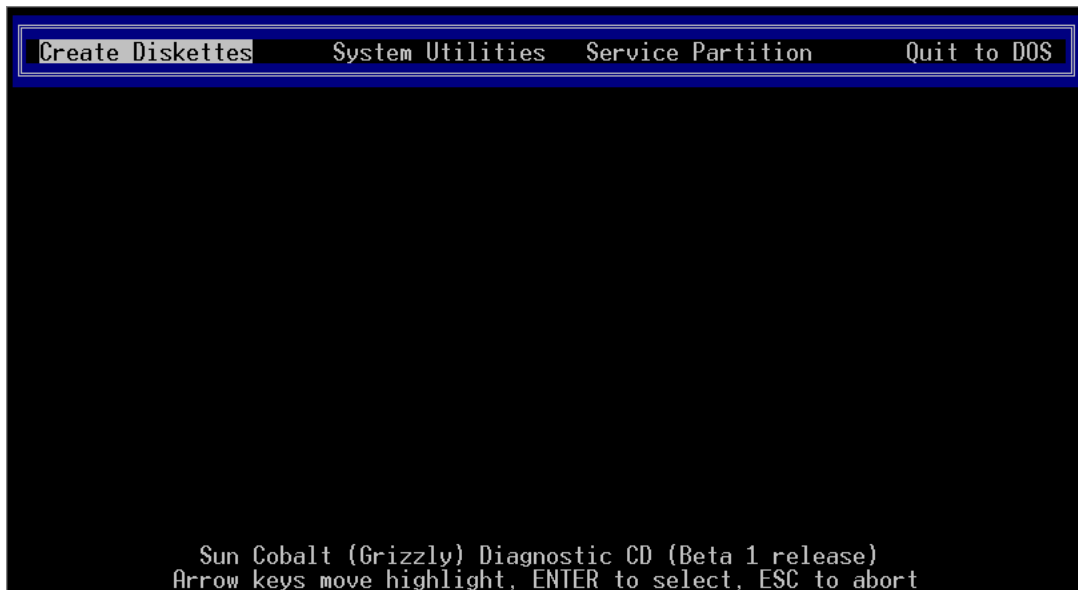


FIGURE 4-33 Boot Complete from the Diagnostics CD

2. **Select Service Partition > Run Service Partition Administrator.**

The Service Partition Administration Menu shown in Figure 4-34 appears.

```
Service Partition Administration Menu
Release 3.2.1.c

Copyright (c) 1998-2002 Intel Corporation. All Rights Reserved.

 1 - View overview of service partition administration
 2 - Scan for existing service partition
 3 - Create service partition (first time)
 4 - Format service partition and install software
 5 - Remove a service partition
ESC - Exit

Choose one [1,2,3,4,5,ESC]?
```

FIGURE 4-34 Service Partition Administration Menu

3. Select option 4 to reformat the partition.

The partition will be reformatted and the diagnostic software will be loaded on the partition.

Note – The service partition is mounted as `/diag` when running Linux

If the service partition was completely removed (intentionally or accidentally) with Linux `fdisk`:

- 1. In Linux, go into `fdisk` and manually create a type 12 partition that is at least 41 MB in size on either `sda1` or `sdb1` (or the `sdc` drive for that matter, if it is installed).**
- 2. Reboot the system from the CD.**
- 3. Select Service Partition > Run Service Partition Administrator and then choose option 4.**

The partition will be reformatted and the diagnostic software will be loaded on the partition.

For instructions on installing the service partition in a the Sun Fire V60x and Sun Fire V65x servers running the Solaris operating environment, refer to the Sun Fire V60x and Sun Fire V65x Server Solaris Operating Environment Installation Guide (817-2875-xx).

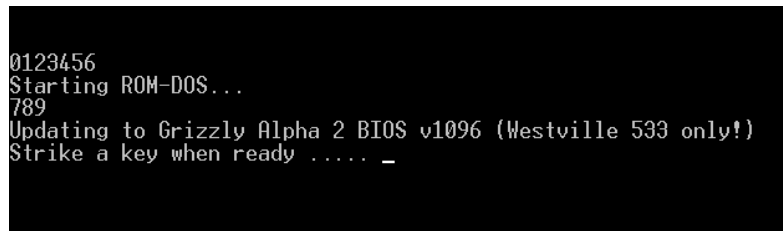
4.11 Updating the Server Configuration

There are several methods for updating the server's configuration. They are explained in the following sections.

4.11.1 Using the Diskette to Update the Server BIOS

1. **Insert the BIOS update diskette into the server and reboot.**

The prompt shown in Figure 4-35 appears.

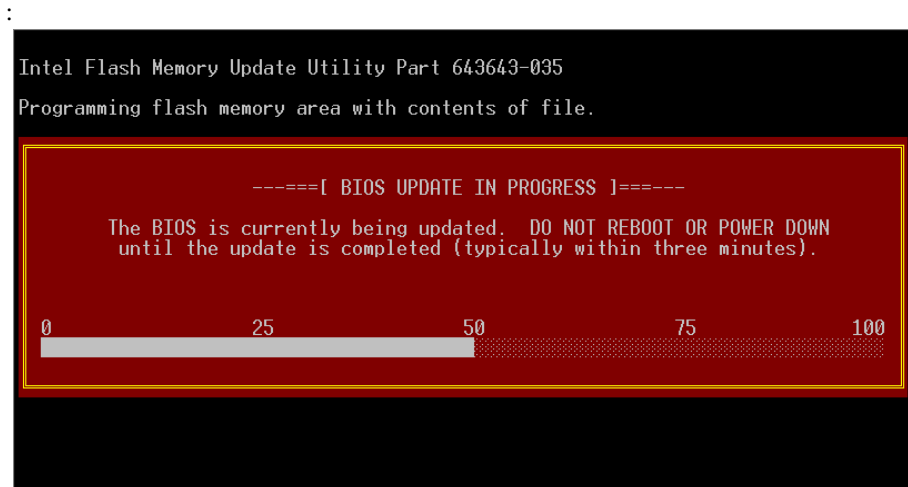


```
0123456
Starting ROM-DOS...
789
Updating to Grizzly Alpha 2 BIOS v1096 (Westville 533 only!)
Strike a key when ready ..... _
```

FIGURE 4-35 Prompt to Begin BIOS Update

2. **Press any key to continue.**

A window appears (see Figure 4-36) indicating that the BIOS update is in progress. The floppy disk activity light is illuminated during the update as the BIOS image is copied to the server's flash memory.



```
Intel Flash Memory Update Utility Part 643643-035
Programming flash memory area with contents of file.

-----[ BIOS UPDATE IN PROGRESS ]-----

The BIOS is currently being updated. DO NOT REBOOT OR POWER DOWN
until the update is completed (typically within three minutes).

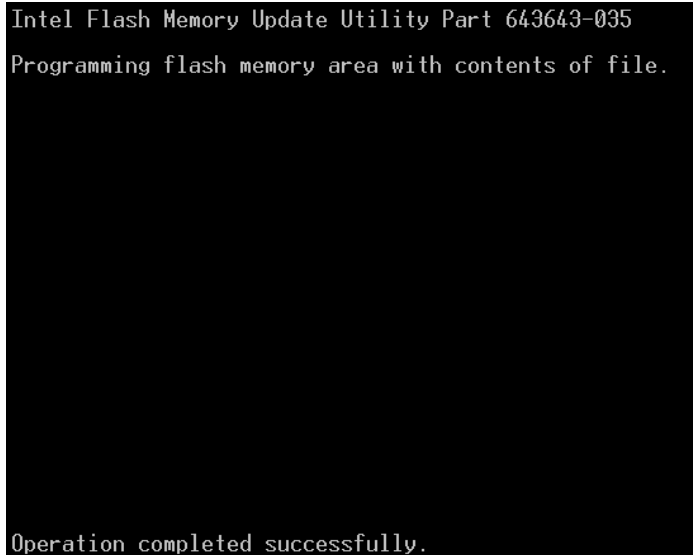
0          25          50          75          100
[Progress bar showing approximately 50% completion]
```

FIGURE 4-36 BIOS Update in Progress Prompt

Caution – Do not attempt to reboot or power down the server while the BIOS is being updated. You may get unpredictable results.

When the first update pass is finished, the screen shown in Figure 4-37 appears.

3.

A screenshot of a terminal window with a black background and white text. The text reads: "Intel Flash Memory Update Utility Part 643643-035", "Programming flash memory area with contents of file.", and "Operation completed successfully." at the bottom.

```
Intel Flash Memory Update Utility Part 643643-035
Programming flash memory area with contents of file.

Operation completed successfully.
```

FIGURE 4-37 First BIOS Update Finished

The next screen appears as the BIOS update continues.

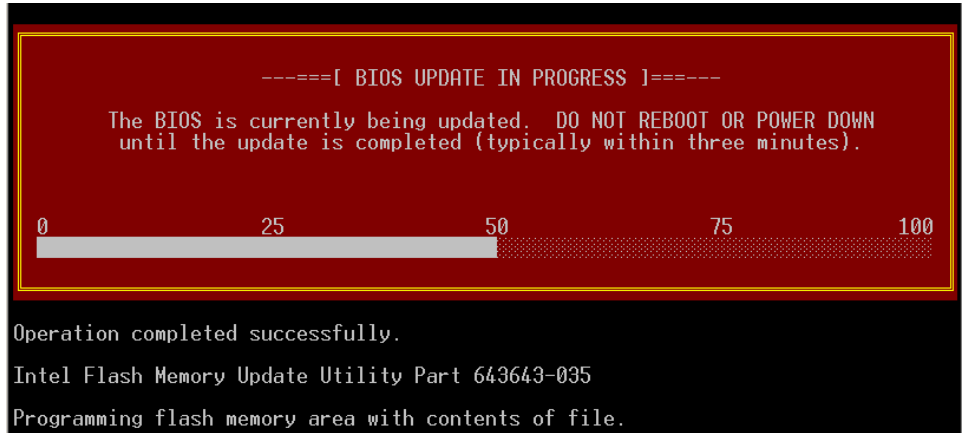


FIGURE 4-38 Second BIOS Update Pass

After the update is complete, the CMOS is cleared and the server reboots. At this point the server boot block and BIOS code have been updated.

4. When the system reboots (the screen clears), power the system off.
5. Remove the floppy diskette.
6. Power the system back on.
7. Press “F2” to enter BIOS setup
8. When you reach the BIOS setup screen, press F10 to save and exit.

As bootup continues, the system may report that the Clear CMOS jumper needs to be returned to its original position. If this is displayed, simply power the server off for 30 seconds and power back up.

This completes the Windows BIOS update procedure.

9. To verify the BIOS has been updated, observe the BIOS Build number as the server boots up (see Figure 4-39).

```
AMIBIOS ( )1985-2003 American Megatrends Inc.,  
Copyright 1996-2003 Intel Corporation  
  
SWV25.86B.1116.B02.0301131037  
SWV2 Beta BIOS Version 3.00  
BIOS Build 1116  
FOR EVALUATION ONLY. NOT FOR RESALE  
  
2 X Intel(R) Xeon(TM) CPU 2.80GHz  
533MHz Front Side Bus  
Testing system memory, memory size=1024MB  
1024MB Extended Memory Passed  
512K L2 Cache SRAM Passed
```

FIGURE 4-39 Verifying the BIOS Version

4.11.2 Recovering the BIOS

If an update to the system BIOS is not successful or if the system fails to complete POST and BIOS is unable to boot an operating system, it may be necessary to run the BIOS recovery procedure.

Note – Recovering the BIOS is the last resort, used only when the main system BIOS will not boot or is corrupt.

Follow these steps to perform a BIOS recovery:

1. Turn off system power.
2. Remove the top cover of the server.
3. Move the RCVR\BOOT jumper located on the baseboard to the Recover position (see Figure 4-40).

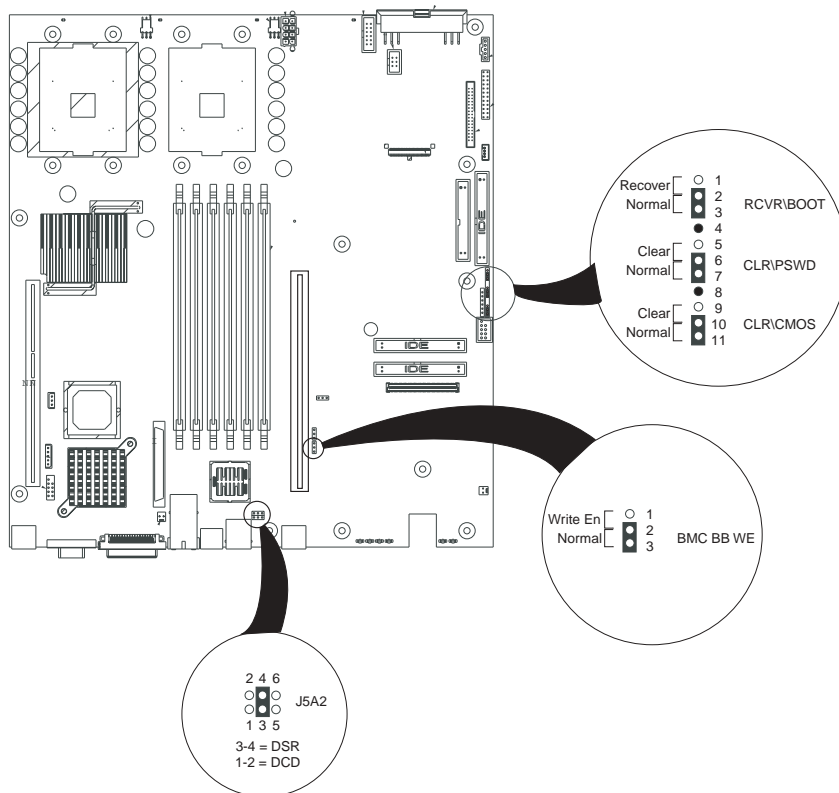


FIGURE 4-40 Location of Recovery Boot Jumper

With the jumper in the recovery position, the BIOS is able to execute the recovery BIOS (also known as the boot block) instead of the normal BIOS. The recovery BIOS is a self-contained image that exists solely as a fail-safe mechanism for installing a new BIOS image.

4. Insert a bootable BIOS recovery diskette containing the new BIOS image files.

5. Turn on the system power.

The recovery BIOS boots from the DOS bootable recovery diskette and the server emits a single beep when it passes control to DOS.

The server also emits a single beep to indicate the beginning of the flash operation.

After a period of time, the BIOS emits two beeps to indicate that the flash procedure was completed successfully.

If the flash procedure fails, the BIOS emits a continuous series of beeps.

Note – During the BIOS recovery mode, video is not initialized. One high-pitched beep announces the start of the recovery process. The entire process takes two to four minutes. A successful update ends with two high-pitched beeps. Failure is indicated by a long series of short beeps.

When the flash update completes:

- 1. Turn off the system power.**
- 2. Remove the floppy diskette.**
- 3. Restore the RCVR\BOOT jumper to its original position.**
- 4. Turn on the system power.**

The system should now boot normally using the updated system BIOS.

4.12 Restarting and Shutting Down

You may restart or shut down the Sun Fire V60x and Sun Fire V65x servers using software or hardware.

4.12.1 Software Mechanisms

This section describes the software shutdown commands supported by Linux and Solaris.

4.12.1.1 Software Shutdown Commands for Linux

The following software mechanisms are available for shutting down a Linux system:

- **Ctrl-Alt-Del key combination:** use this to shut down the operating system and restart the server at any time. This works regardless of whether you are logged in or not when in text mode. When running GNOME or other X Window System desktops, you must log in as root first. The Ctrl-Alt-Del key combination works for both PS/2 and USB keyboards.

Note – The USB port is disabled until an OS and the USB drivers are installed. A PS/2 type keyboard and/or mouse may be required for initial bootup and configuration.

- `shutdown -h now`: type this to initiate an orderly shutdown and halt the server. You may then press the Power button to safely power off the server.
- `shutdown -r now`: type this to initiate an orderly shutdown and reboot of the server.
- `reboot`: type this to initiate a reboot of the server.

4.12.1.2 Software Shutdown Commands for Solaris

The following software mechanisms are available for shutting down a Solaris system:

- `shutdown -g0 -i0`: type this to initiate an orderly shutdown and halt the server. You may then press the Power button to safely power off the server.
- `shutdown -g0 -i6` or `reboot`: type either command to initiate an orderly shutdown and reboot of the server.

4.12.2 Hardware Mechanisms

The following hardware mechanisms are available:

- Press the Reset button: the server is immediately forced to restart. However, you may lose data.
- Press the Power button: the server is immediately forced to power down. However, you may lose data.

Caution – These hardware mechanisms are not recommended and should be used only as a last resort.

Maintaining the Server

This chapter describes how to replace components in the Sun Fire V60x and Sun Fire V65x servers after they have been set up. It contains the following sections:

- “Tools and Supplies Needed” on page 5-2
- “Determining a Faulty Component” on page 5-2
- “Safety Guidelines (Before You Remove the Cover)” on page 5-2
- “Removing and Replacing the Cover” on page 5-3
- “Customer Replaceable Unit (CRU) Procedures” on page 5-4
- “Field Replaceable Unit (FRU) Procedures” on page 5-56

Note – The procedures in this chapter for servicing field replaceable faulty components are for the attention of qualified service engineers only. If a Field Replaceable Unit (FRU) needs replacement, contact your local Sun Sales representative, who will put you in contact with the Sun Enterprise Service branch for your area. You can arrange to return the system to Sun for repair under the terms of your warranty. Or, if the server is covered under a Sun Service agreement, the FRU will be replaced by a Sun Service engineer. If a Customer Replaceable Unit (CRU) needs replacement, you can either request a replacement part from Sun or return the entire unit for repair. All parts replaced under warranty must be returned to Sun within 30 days of receipt of the replacement part.

Note – When working on a server, you may want to turn on the blue System ID LED to identify the server that is being worked on. See “LEDs” on page 3-3 for instructions on how to turn on this LED.

5.1 Tools and Supplies Needed

All that is needed is an antistatic wrist strap (recommended).

5.2 Determining a Faulty Component

To determine and isolate a faulty component, refer to Chapter 6, “Troubleshooting the Server.” This chapter can help you isolate a faulty component using the following methods:

- Status LEDs (see “Front-Panel System Status LED” on page 6-3)
 - Fault LEDs (see “Server Main Board Fault LEDs” on page 6-7)
 - POST LEDs, beep codes, and displayed error messages (see “Diagnosing System Errors” on page 6-1)
 - Platform Confidence Test (see “Platform Confidence Test (PCT)” on page 6-2)
 - System Setup Utility (see “System Setup Utility (SSU)” on page 6-2)
-

5.3 Safety Guidelines (Before You Remove the Cover)

Before removing the system cover to work inside the server, observe these safety guidelines:

1. **Turn off all peripheral devices connected to the system.**
2. **Turn off the system by pressing the power button on the front of the system. Then unplug the AC power cord from the system or wall outlet.**
3. **Label and disconnect all peripheral cables and all telecommunication lines connected to I/O connectors or ports on the back of the system.**
4. **Before handling components, attach a wrist strap to a chassis ground of the system (any unpainted metal surface).**

5.4 Removing and Replacing the Cover

Many of the equipment replacement procedures require that you remove the chassis cover. Before you remove the cover, observe the safety instructions in the section titled “Safety Guidelines (Before You Remove the Cover)” on page 5-2.

To remove the cover, follow these steps:

1. While pressing the blue latch button (A) with your left thumb, push down on the top cover and slide it back using the heel of your right hand on the blue pad (see Figure 5-1).

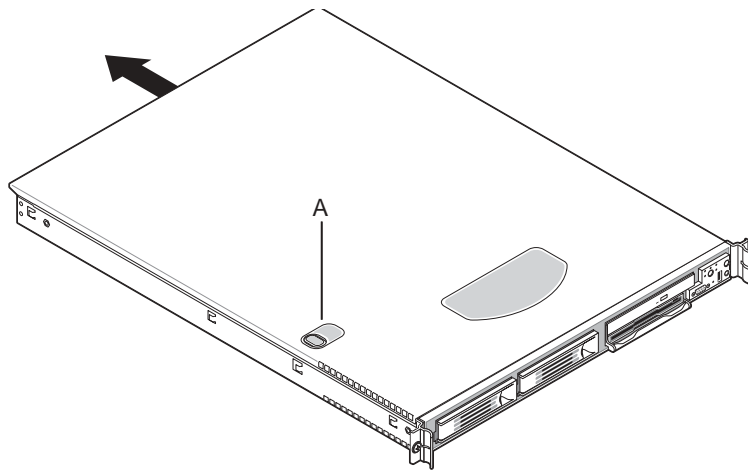


FIGURE 5-1 Removing the Cover

2. Set the cover aside and away from the immediate work area.

Note – A non-skid surface or a stop behind the chassis may be needed if attempting to remove the top cover on a flat surface. Sliding the server chassis on a wooden surface may mar the surface (there are no rubber feet on the bottom of the chassis).

5.5 Customer Replaceable Unit (CRU) Procedures

The following equipment is customer replaceable:

- Front Bezel
- DVD/Floppy or CD-ROM/Floppy Combo Module
- Memory
- CPU and Heatsink
- Power Supply Unit
- Hard Disk Drives
- Fan Module
- PCI Cards
- Battery
- Keyboard/Mouse Adapter
- Emergency Management Port Cable

Note – Any configuration changes (CPU, memory, hard disk, add-in PCI cards, and so forth) 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.

5.5.1 Front Bezel

To access the system controls and peripherals when a front bezel is installed, grasp the bezel at the finger hole on the left side and gently pull it towards you, unhinging it at the right, until it unsnaps from the chassis. Replace the bezel using the reverse process (see Figure 5-2 and Figure 5-3).

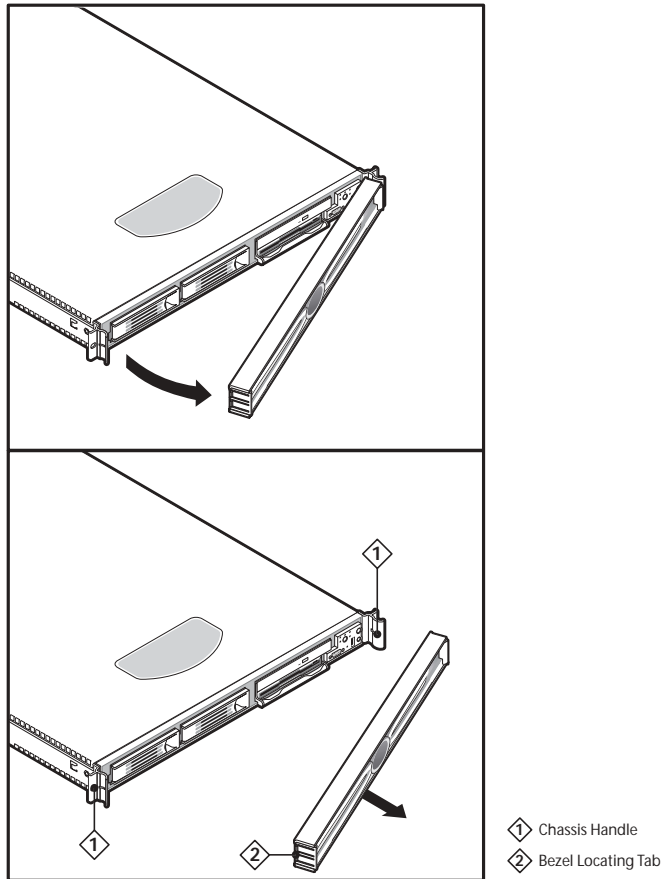


FIGURE 5-2 Sun Fire V60x Server Bezel Replacement

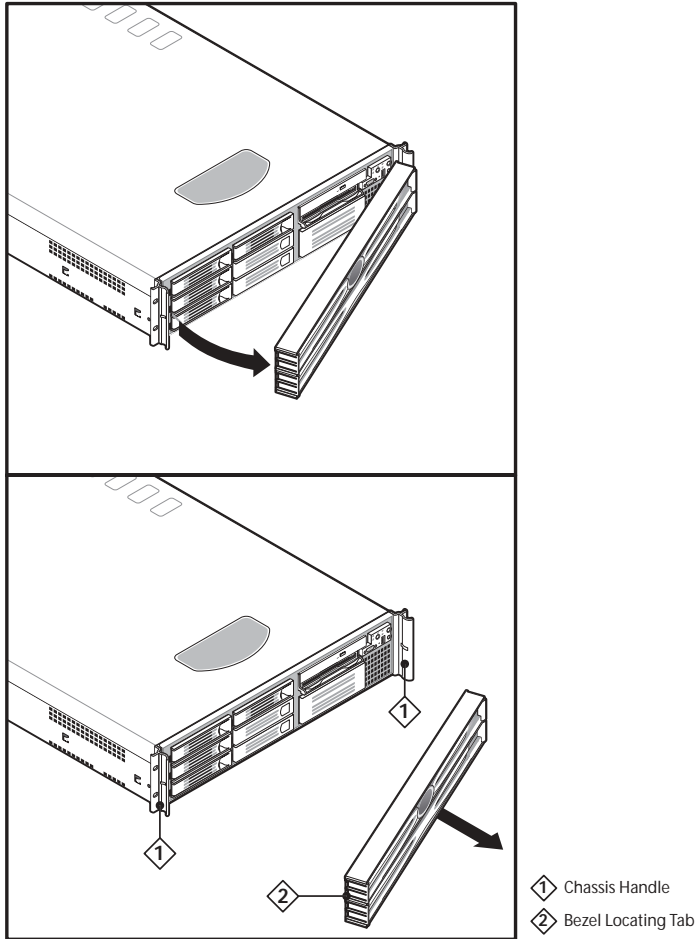


FIGURE 5-3 Sun Fire V65x Server Bezel Replacement

5.5.2 Floppy/DVD/CD-ROM Combo Module

Caution – A floppy/DVD/CD-ROM module is NOT hot swappable. Before replacing it, you must first take the server out of service, turn off all peripheral devices connected to the system, turn off the system by pressing the power button, and unplug the AC power cord from the system or wall outlet.

Note – In the Sun Fire V60x server, the floppy/DVD/CD-ROM module may be replaced with a hard disk drive. If you do this, you need to install a small plastic cover to cover the gap at the right side of the drive that is left by removal of the (larger size) floppy/CD-ROM module. The plastic cover is included in the accessory kit.

To replace the Floppy/CD-ROM module, follow these steps:

1. **Before removing the cover to work inside the system, observe the safety guidelines previously stated.**
2. **Remove the bezel from the front of the chassis.**
3. **As shown in Figure 5-4, rotate the module's handle bar up (A) and pull on the handle bar to remove the module from the flex bay.**
4. **Slide a new module into the flex bay until you feel the connectors touch.**
5. **Push the module in (using the handle bar) about 3/16 of an inch (5mm) more to fully engage the connectors.**
6. **Rotate the handle bar down.**
7. **Reinstall the bezel.**

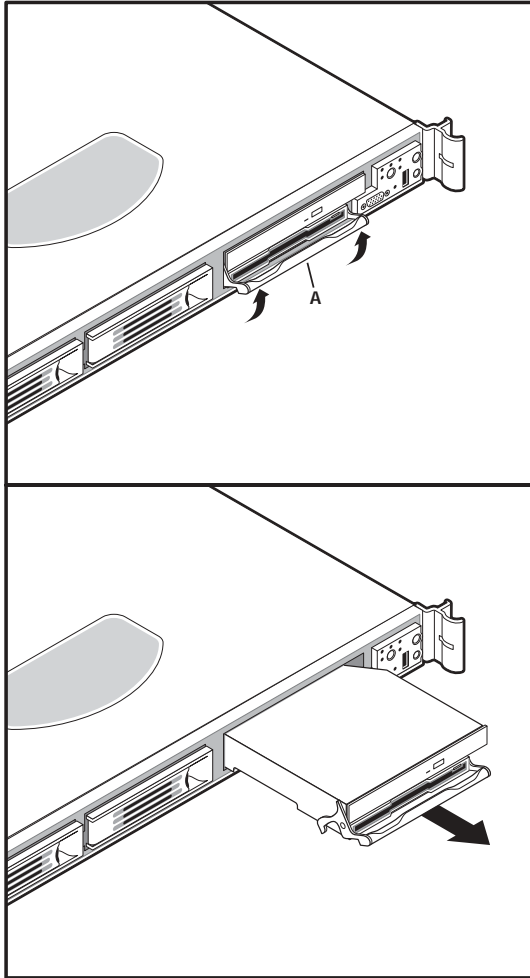


FIGURE 5-4 Floppy/CD-ROM Module Replacement

Note – The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component. See “Run Platform Confidence Test (PCT)” on page 4-26.

5.5.3 Memory

Caution – Before touching or replacing any component inside the server, disconnect all external cables and follow the instructions in “Safety Guidelines (Before You Remove the Cover)” on page 5-2 and “Removing and Replacing the Cover” on page 5-3. Always place the server on a grounded ESD pad and wear a properly grounded antistatic wrist strap.

The main board supports DDR-266 compliant registered¹ ECC DIMMs operating at 266 MHz.

Only tested and qualified DIMMs are supported on the main board. Note that all DIMMs are supported by design, but only fully tested DIMMs are supported.

The minimum supported DIMM size is 128 MB. Therefore, the minimum main memory configuration is 2 x 128 MB or 256 MB. The largest size DIMM supported is a 2 GB stacked registered DDR-266 ECC DIMM based on 512 megabit technology.

The memory system on the main board has the following features:

- The maximum memory capacity is 12 GB on the Sun Fire V65x server and 6 GB on the Sun Fire V60x server.
- The minimum memory capacity is 256 MB
- ECC single-bit errors are corrected and multiple-bit errors are detected.
 - Single bit error correction: If a single bit error is detected, the ECC logic generates a new “recovered” 64 bit QWord with a pattern that corresponds to the originally received 8 bit ECC parity code. The corrected data is returned to the requestor (the processor or PCI master).
 - Multiple-bit error detection: Additional errors within the same QWord constitute a multiple-bit error, which is unrecoverable. When a multiple-bit memory error is detected, a non-maskable interrupt (NMI) is issued that instructs the system to shut down to avoid data corruption. Multiple-bit errors are very rare. Note that neither the Linux nor Solaris operating systems support NMI.
 - Memory scrubbing: Error correction is performed on data being read from memory. The correction is then passed to the requestor and at the same time the error is “scrubbed” (corrected) in main memory. Memory scrubbing prevents the accumulation of single-bit errors in main memory that would then become unrecoverable multiple-bit errors.
 - X4 single device data correction (x4 SDDC): When x4 memory is installed, the ECC function can detect and correct a four-bit error caused by a single failed memory chip and the system continues to function, though system

1. Registered DIMMS are those with an onboard latch that resynchronizes the address/control lines to the DIMM. These latches are also buffers to allow the main board electronics to drive multiple-row devices. It is most common for ECC SDRAM modules to be registered.

performance will be affected. When x8 memory is installed, the ECC function will detect an eight-bit error caused by a single failed memory chip but will not be able to correct the error. In this situation a fatal error will be issued.

For part numbers of optional DIMMs, see Table 1-1 on page 1-15 and Table 1-2 on page 1-16.

Caution – Use of unauthorized DIMM modules may damage the server and may void the warranty.

5.5.3.1 Sun Fire V60x Server DIMM Replacement

To replace DIMMs in a Sun Fire V60x server, follow these steps while referring to Figure 5-5:

1. **Before removing the cover to work inside the system, observe the safety guidelines previously stated.**
2. **Release the DIMM from the connector slot by pressing down on the DIMM module ejector bars at both ends of the connector slot.**
3. **Lift the DIMM up and away from the connector slot**
4. **With the ejector bars in the open position, align the replacement DIMM notch with the connector slot notch and apply even, downward pressure on the DIMM until it slides into the connector slot. The ejector bars will snap inward and lock the memory module in place.**

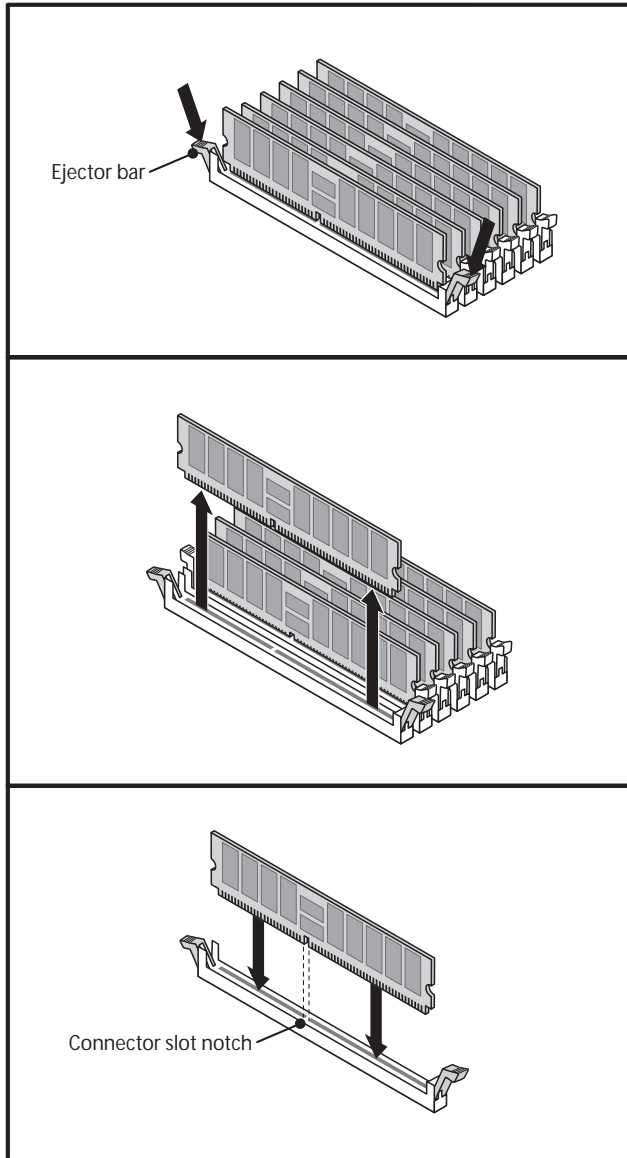


FIGURE 5-5 DIMM Installation

Figure 5-6 shows how the DIMM pairs are to be installed. They must be installed in pairs. There are three banks of DIMMs, labeled 1, 2, and 3. Bank 1 contains DIMM locations 1A and 1B, Bank 2 contains 2A and 2B, and Bank 3 contains 3A and 3B.

DIMM socket identifiers are marked on the silkscreen next to each DIMM socket on the baseboard. Note that the sockets associated with any given bank are located next to each other.

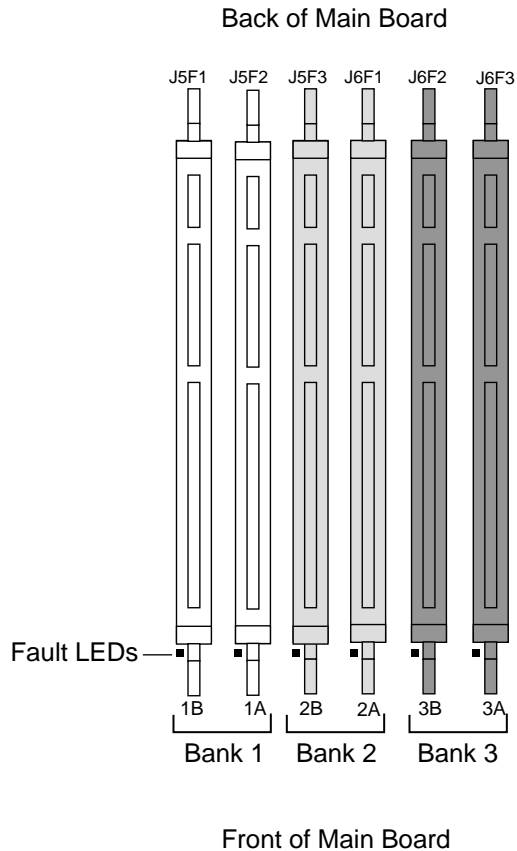


FIGURE 5-6 DIMM Pair Locations

Note – The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component. See “Run Platform Confidence Test (PCT)” on page 4-26.

5.5.3.2 Sun Fire V65x Server DIMM Replacement

1. Observe all safety precautions and remove the server top cover.
2. Remove the DIMM fan assembly by disconnecting the DIMM fan cable from the main fan module, then squeezing the vertical fan support bars to release the DIMM fan (see Figure 5-7).

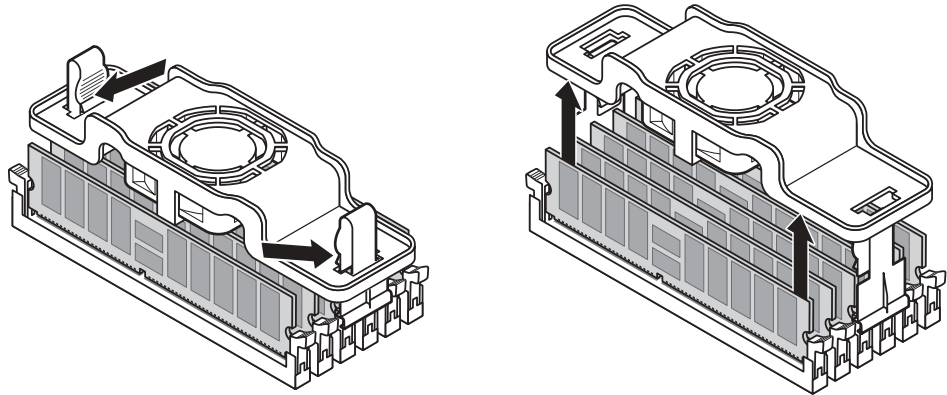


FIGURE 5-7 DIMM Fan Removal

3. If you are replacing DIMMs whose ejector bars are engaged by the DIMM fan vertical support bars:
 - a. Do not remove the vertical fan support bars. Instead, spread apart the DIMM ejector bars using the vertical support bars. This will eject installed DIMMs from the sockets.
 - b. Place the new DIMMs in the sockets but do not press them all the way in, because the socket latches on each side are tied together by the vertical support bars.
 - c. Bring the two vertical support bars together enough to engage the keyed “half-moons” on all the DIMMs.
 - d. Gently press each DIMM, one at a time, to engage its socket, then firmly to fully seat.
4. If you are replacing DIMMs whose ejector bars are not engaged by the DIMM fan vertical support bars:
 - a. Make sure the ejector bars are in the open position.
 - b. Align the replacement DIMM notch with the connector slot notch and apply even, downward pressure on the DIMM until it slides into the connector slot. The ejector bars will snap inward and lock the memory module in place.

5. Replace the DIMM fan assembly as explained in Section 5.5.3.3, “Installing the DIMM Fan (Sun Fire V65x Server Only)” on page 5-15.

Note – The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component. See “Run Platform Confidence Test (PCT)” on page 4-26.

5.5.3.3 Installing the DIMM Fan (Sun Fire V65x Server Only)

Note – The Sun Fire V65x server is shipped with the DIMM fan installed. This installation procedure is provided to enable installation of the assembly if it is completely removed in the process of installing additional DIMM memory.

1. Observe all safety precautions and remove the server top cover.
2. Slide the DIMM fan assembly over the vertical support bars until the assembly snaps into place (see Figure 5-8 and follow steps a through d below).

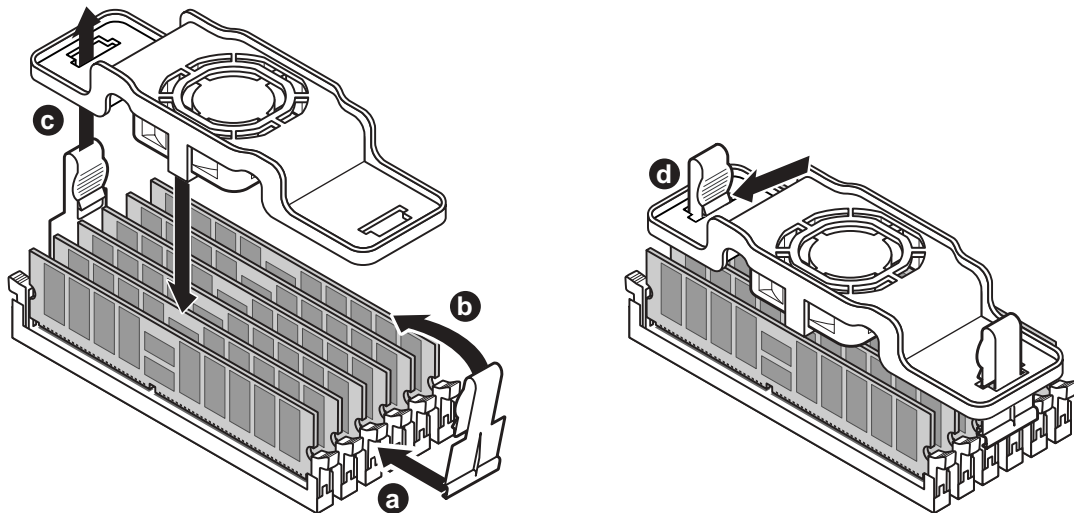


FIGURE 5-8 Vertical Fan Support Bar Location

- a. Orient the support bars so that the curved bottom aligns with the notches in the two middle DIMM ejector bars.
- b. Gently push each support bar onto the two ejector bars until they are held firmly in place. Make sure the DIMMs stay securely seated in their sockets.
- c. Slide the fan assembly down over the two support bars.
- d. The flexible tabs at the top of the support bars lock the fan assembly in place.

3. Connect the DIMM fan cable to the 3-pin header on the server main fan pack (see Figure 5-9).

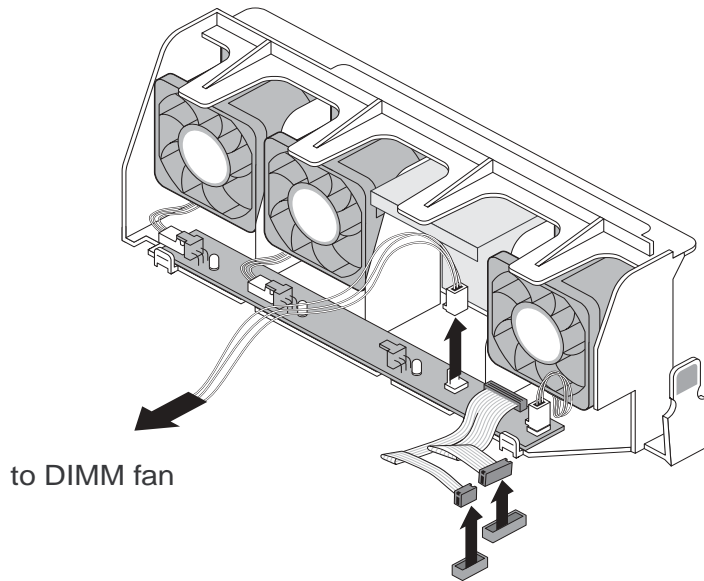


FIGURE 5-9 Connecting the DIMM Fan Power Cable

4. Replace the server cover.

5.5.4 Replacing a Server CPU and Heatsink

Caution – The procedure below is for the attention of qualified service engineers only. Before touching or replacing any component inside the Sun Fire V60x and Sun Fire V65x servers, disconnect all external cables and follow the instructions in “Safety Guidelines (Before You Remove the Cover)” on page 5-2 and “Removing and Replacing the Cover” on page 5-3. Always place the server on a grounded ESD pad and wear a properly grounded antistatic wrist strap.

The server is certified to function properly only with Sun CPUs. Do not mix CPU steppings and speeds or processor family types.

5.5.4.1 Safety Precautions

Warning – If the server has been running, any installed processor and heat sink on the processor board(s) will be hot. To avoid the possibility of a burn, be careful when removing or installing server board components that are located near processors.

Caution – The processor must be appropriate. You may damage the server if you install a processor that is inappropriate for your server. Make sure your server can handle a newer, faster processor (with associated thermal and power considerations). If you are adding a second processor to your system, the second processor must be compatible with the first processor (within one stepping, same voltage, and same speed). For exact information about processor interchangeability, contact your customer service representative.

Caution – Pressing the power button does not turn off power to the server board. Disconnect the server board from its power source and from any telecommunications links, networks, or modems before doing any of the procedures described in this section. Failure to do this can result in personal injury or equipment damage. Some circuitry on the server board may continue to operate even though the front panel power button is off.

Caution – Electrostatic discharge (ESD) can damage server board components. Perform CPU replacement procedures only at an ESD workstation. If no such station is available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to an unpainted metal part of the computer chassis.

Caution – CPU replacement must be performed by trained service personnel only!
An ESD wrist strap must be used for this procedure.

5.5.4.2 Sun Fire V60x Server Heatsink and Processor Removal

To remove the heatsink and processor, follow these steps while referring to Figure 5-10:

1. **Remove the plastic air duct that covers the heatsinks and processors (see Figure 5-10).**
2. **Determine the location of the processor you are going to remove (see Figure 5-10).**
CPU 2 is closest to the outside of the server and CPU 1 is toward the inside.
3. **As shown in panel 1 of Figure 5-10, remove the processor air duct by lifting it up out of the chassis. Remove the air baffle by wiggling to loosen the tab from the backplane board. Lift the air baffle out of the chassis.**
4. **As shown in panel 2 of Figure 5-10, remove the fan module.**
 - a. **Disconnect fan power cable**
 - b. **Push release tab**
 - c. **Slide left and up.**

Note – In the Sun Fire V60x server, the fan module must be removed to access the retention clip nearest the front of the server.

5. **As shown in panel 3 of Figure 5-10, insert the heatsink retention clip removal tool into the hole in the end of one of the retention clips and then:**
 - a. **Use the tool to push the clip down.**
 - b. **Move the top of the tool toward the heatsink to release the clip from the tab on the heatsink retainer.**
 - c. **Release the pressure on the tool and allow the clip to come up so it clears the tab on the retainer.**
 - d. **Release the other end of the clip and slide the clip in a horizontal direction to free it from the middle tab.**
6. **Remove both retention clips and the heatsink as shown in panel 4.**

7. As shown in panel 5:

- a. Grasp the end of the socket lever and raise it to disengage the processor pins.
- b. Lift the processor straight up out of the socket.

Caution – Do not place the thermal-pasted side of the processor or heatsink on any surface, as it may pick up contaminants, causing incorrect processor mating and possible overheating.

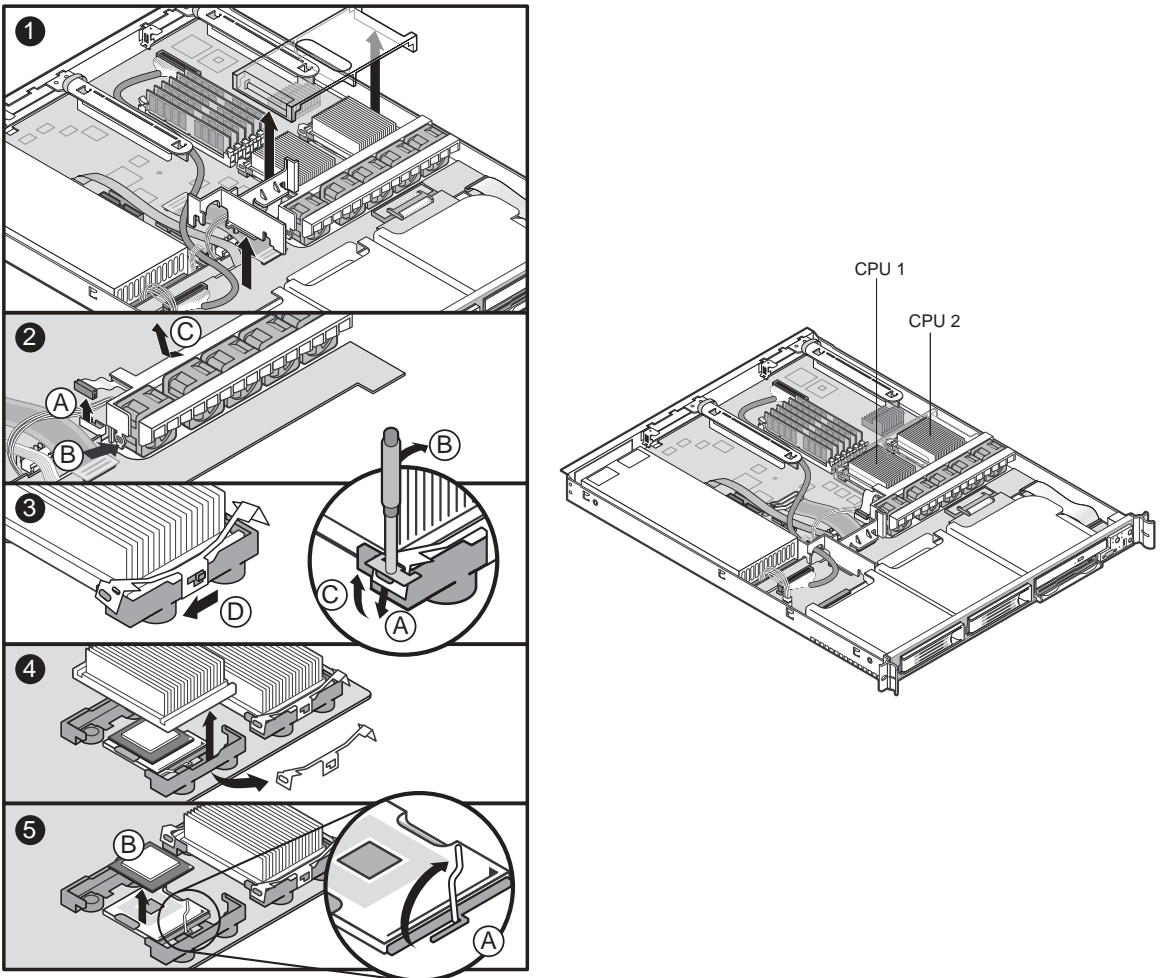


FIGURE 5-10 Sun Fire V60x Server Heatsink and Processor Removal

5.5.4.3

Sun Fire V60x Server Heatsink and Processor Replacement

Installing a replacement heatsink and processor is essentially the reverse of the procedure given in the previous section.

Note – When a processor kit includes new heatsink retention clips, use them in place of the old ones.

Note – When installing a new processor or relocating a processor to a different main board, apply thermal paste as needed to the top of the processor.

Caution – If you are installing a processor removed from a different server, you must prepare the processor and heatsink so that the heatsink properly conducts the heat away from the processor (see Figure 5-23 on page 5-32). If the processor and heatsink are not properly prepared, damage to the processor or socket can result. You should not allow any surface that has thermal interface material to come in contact with any other surface, as surface contamination may occur.

Follow these steps to replace the processor and heatsink:

1. **Make sure the old processor has been removed and placed on an antistatic pad (or, if you are moving the processor from one main board to another, insert the processor directly into the new board as indicated in the next step).**
2. **As shown in Figure 5-11, open the socket lever.**

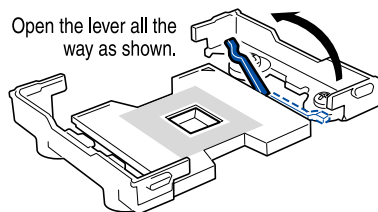


FIGURE 5-11 Opening the Socket Lever

3. **Align the corner mark on the processor with the mark on the socket.**
4. **Insert the processor into the socket as shown in Figure 5-12.**

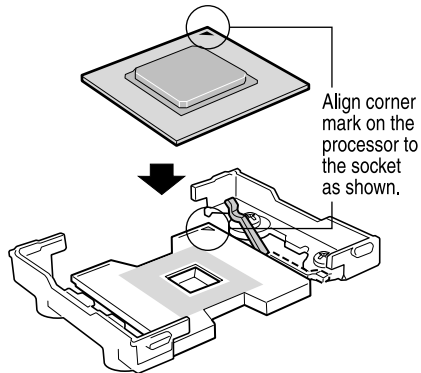


FIGURE 5-12 Inserting the Processor

5. Verify that the processor sits flush and level on the socket.
6. Close the socket lever until it locks and secures the processor in the socket.

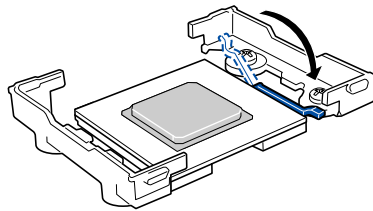


FIGURE 5-13 Closing the Socket Lever

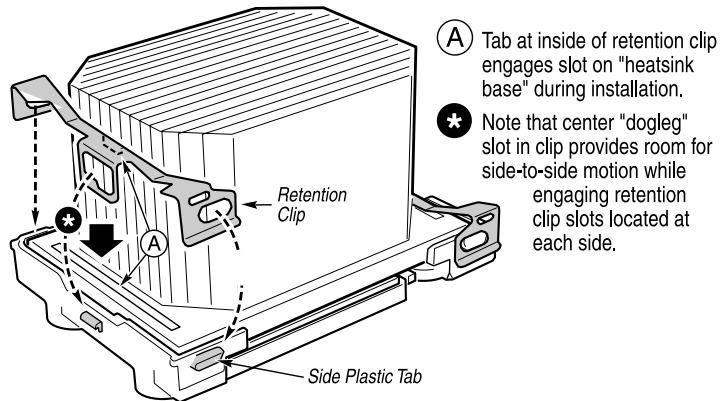
Caution – Move the socket lever slowly and make sure that it is engaged on the locking tab on the side of the socket.

7. Orient the heatsink such that it properly and fully contacts the surface of the processor beneath it.
8. Gently lower the heatsink in place being careful not to damage the thermal interface material (TIM).

Caution – Misorientation of the heatsink will result in poor contact between heatsink and processor. Not only will the processor overheat, but both processor and socket may be damaged when securing the heatsink with the metal retention clips.

9. Install the heatsink retention clips using the retention clip tool.

Note – Make sure to install both retention clips.



NOTE: For ease of installation, BOTH retention clips should be installed simultaneously.

FIGURE 5-14 Installing the Heatsink (Retention Clip Details)

Warning – Incorrect use of the tool can cause the tool to slip from the retention clip and strike the server board, possibly causing severe damage to the board or board components. In addition, if too much force is used, you may bend the heatsink retention clip to a point where it may be difficult to replace it without bending it back to its original position.

- a. Secure each end of the retention clip to the tabs in the processor retainer by aligning the clip holes over the tabs and pushing down.
- a. With the tool in the vertical position, firmly grasp it and insert the middle prong of the tool securely into the hole at the center of the retention clip.
- b. Slowly and carefully push the tool downward, making sure the center prong of the tool stays in the retention clip hole.
- c. As you continue to exert downward pressure, move the top of the handle slightly in a direction away from the heatsink so that the clip is pushed away from the retainer and the hole in the center of the clip is aligned over the retainer tab.

d. Gradually move the top of the tool handle back toward the heatsink in such a manner as to slide the center of the clip over the retainer tab, securing it in place.

10. Replace the air baffle, fan module, and processor air duct.

Note – The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component. See “Run Platform Confidence Test (PCT)” on page 4-26.

5.5.4.4 Sun Fire V65x Server Heatsink and Processor Removal

To remove the heatsink and processor, follow these steps while referring to Figure 5-15:

1. As shown in panel 1 of Figure 5-15, Remove the SCSI cable clipped to the left side of the processor air duct, then remove the processor air duct by sliding it slightly back and then lifting it from the front edge.

Remove the riser card assembly for better access to the CPU/heatsink, if desired.

2. Determine the location of the processor you are going to remove (see Figure 5-15).

CPU 2 is closest to the outside of the server and CPU 1 is toward the inside.

3. As shown in panel 2 of Figure 5-15, insert the heatsink retention clip removal tool into the hole in the end of one of the retention clips and then:

- a. Use the tool to push the clip down.
- b. Move the top of the tool toward the heatsink to release the clip from the tab on the heatsink retainer.
- c. Release the pressure on the tool and allow the clip to come up so it clears the tab on the retainer.
- d. Release the other end of the clip and slide the clip in a horizontal direction to free it from the middle tab.

4. Remove both retention clips and the heatsink as shown in panel 3.

5. As shown in panel 4:

- a. Grasp the end of the socket lever and raise it to disengage the processor pins.
- b. Lift the processor straight up out of the socket.

Caution – Do not place the thermal-pasted side of the processor or heatsink on any surface, as it may pick up contaminants, causing incorrect processor mating and possible overheating.

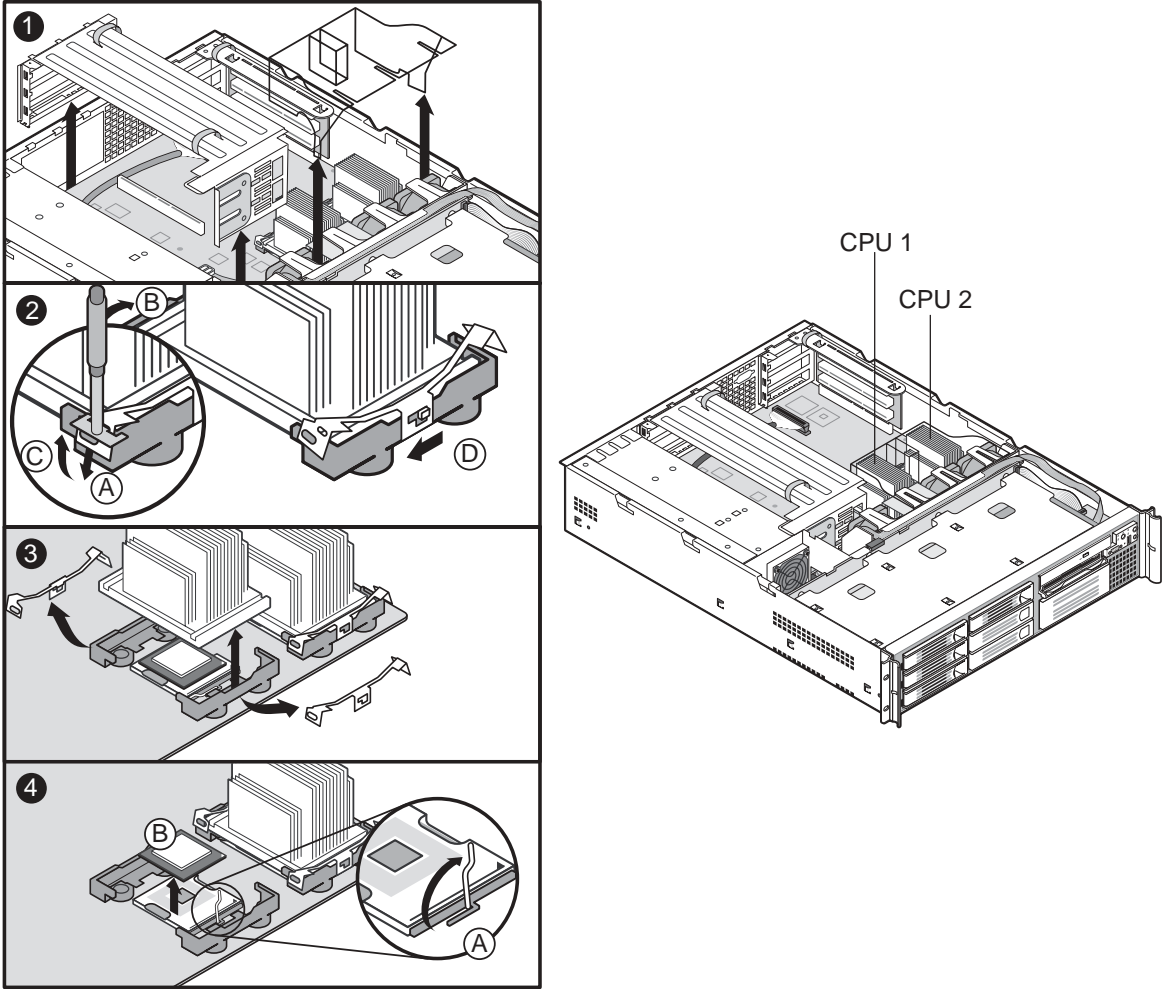


FIGURE 5-15 Sun Fire V65x Server Heatsink and Processor Removal

5.5.4.5 Sun Fire V65x Server Heatsink and Processor Replacement

Installing a replacement heatsink and processor is essentially the reverse of the procedure given in the previous section.

Note – When a processor kit includes new heatsink retention clips, use them in place of the old ones.

Note – When installing a new processor or relocating a processor to a different main board, apply thermal paste as needed to the top of the processor.

Caution – If you are installing a processor removed from a different server, you must prepare the processor and heatsink so that the heatsink properly conducts the heat away from the processor (see Figure 5-23 on page 5-32). If the processor and heatsink are not properly prepared, damage to the processor or socket can result. You should not allow any surface that has thermal interface material to come in contact with any other surface, as surface contamination may occur.

Follow these steps to replace the processor and heatsink:

1. **Make sure the old processor has been removed and place it on an antistatic pad (or, if you are moving the processor from one main board to another, insert the processor directly into the new board as indicated in the next step).**
2. **As shown in Figure 5-16, open the socket lever.**

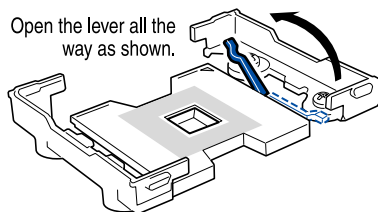


FIGURE 5-16 Opening the Socket Lever

3. **Align the corner mark on the processor with the mark on the socket.**
4. **Insert the processor into the socket as shown in Figure 5-17.**

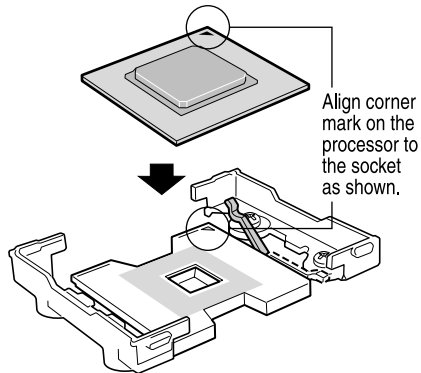


FIGURE 5-17 Inserting the Processor

5. Verify that the processor sits flush and level on the socket.
6. Close the socket lever until it locks and secures the processor in the socket.

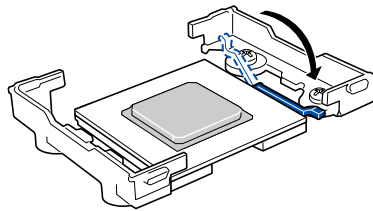


FIGURE 5-18 Closing the Socket Lever

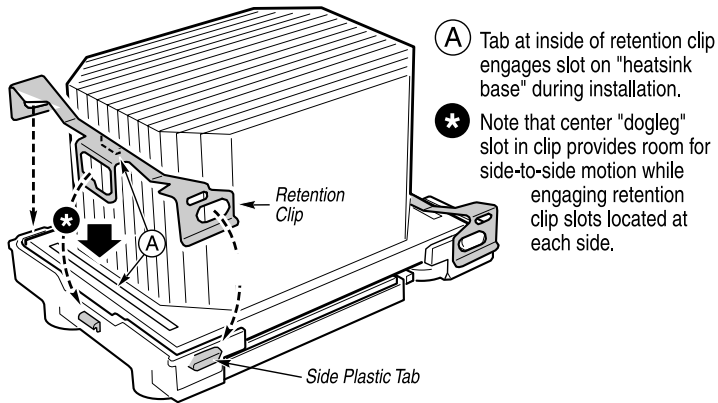
Caution – Move the socket lever slowly and make sure that it is engaged on the locking tab on the side of the socket.

7. Orient the heatsink such that it properly and fully contacts the surface of the processor beneath it.
8. Gently lower the heatsink in place being careful not to damage the thermal interface material (TIM).

Caution – Misorientation of the heatsink will result in poor contact between heatsink and processor. Not only will the processor overheat, but both processor and socket may be damaged when securing the heatsink with the metal retention clips.

9. Install the heatsink retention clips using the retention clip tool.

Note – Make sure to install both retention clips.



NOTE: For ease of installation, BOTH retention clips should be installed simultaneously.

FIGURE 5-19 Installing the Heatsink (Retention Clip Details)

Warning – Incorrect use of the tool can cause the tool to slip from the retention clip and strike the server board, possibly causing severe damage to the board or board components. In addition, if too much force is used, you may bend the heatsink retention clip to a point where it may be difficult to replace it without bending it back to its original position.

- a. Secure each end of the retention clip to the tabs in the processor retainer by aligning the clip holes over the tabs and pushing down.
- a. With the tool in the vertical position, firmly grasp it and insert the middle prong of the tool securely into the hole at the center of the retention clip.
- b. Slowly and carefully push the tool downward, making sure the center prong of the tool stays in the retention clip hole.
- c. As you continue to exert downward pressure, move the top of the handle slightly in a direction away from the heatsink so that the clip is pushed away from the retainer and the hole in the center of the clip is aligned over the retainer tab.

d. Gradually move the top of the tool handle back toward the heatsink in such a manner as to slide the center of the clip over the retainer tab, securing it in place.

10. Replace the air baffle, fan module, and processor air duct.

Note – The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component. See “Run Platform Confidence Test (PCT)” on page 4-26.

5.5.5 Sun Fire V60x and Sun Fire V65x Servers New CPU and Heatsink Installation

Installing a new processor and heatsink is an extra-cost option. This section describes how to install a new CPU and heatsink in a previously unpopulated CPU location.

Caution – The procedure below is for the attention of qualified service engineers only. Before touching or replacing any component inside the Sun Fire V60x and Sun Fire V65x servers, disconnect all external cables and follow the instructions in “Safety Guidelines (Before You Remove the Cover)” on page 5-2 and “Removing and Replacing the Cover” on page 5-3. Always place the server on a grounded ESD pad and wear a properly grounded antistatic wrist strap.

5.5.5.1 Safety Precautions

Warning – If the server has been running, any installed processor and heat sink on the processor board(s) will be hot. To avoid the possibility of a burn, be careful when removing or installing server board components that are located near processors.

Caution – The processor must be appropriate. You may damage the server if you install a processor that is inappropriate for your server. Make sure your server can handle a newer, faster processor (thermal and power considerations). If you are adding a second processor to your system, the second processor must be compatible with the first processor (within one stepping, same voltage, and same speed). For exact information about processor interchangeability, contact your customer service representative.

Caution – Pressing the power button does not turn off power to this board. Disconnect the server board from its power source and from any telecommunications links, networks, or modems before doing any of the procedures described in this guide. Failure to do this can result in personal injury or equipment damage. Some circuitry on the server board may continue to operate even though the front panel power button is off.

Caution – Electrostatic discharge (ESD) can damage server board components. Perform CPU replacement procedures only at an ESD workstation. If no such station is available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the computer chassis.

Caution – CPU installation must be performed by trained service personnel only! An ESD wrist strap must be used for this procedure.

To install a new processor, follow these steps:

1. **Remove any server items necessary to gain access to the CPU socket where you will install the new CPU and heatsink.**
 2. **Following the instructions packaged with your boxed processor, prepare the new processor for installation.**
-

Caution – You should not allow any surface that has thermal interface material to come in contact with any other surface, as surface contamination may occur.

3. **As shown in Figure 5-20, open the socket lever.**

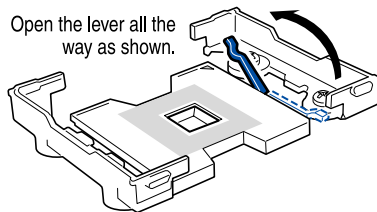


FIGURE 5-20 Opening the Socket Lever

4. **Align the corner mark on the processor with the mark on the socket.**
5. **Insert the processor into the socket as shown in Figure 5-21.**

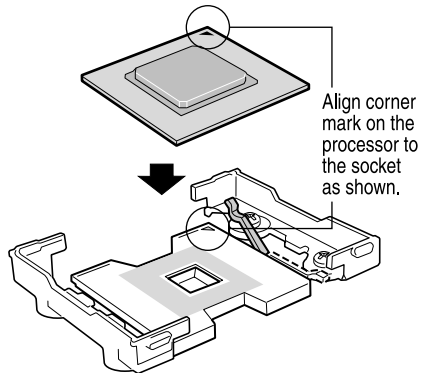


FIGURE 5-21 Inserting the Processor

6. Verify that the processor sits flush and level on the socket.
7. Close the socket lever until it locks and secures the processor in the socket.

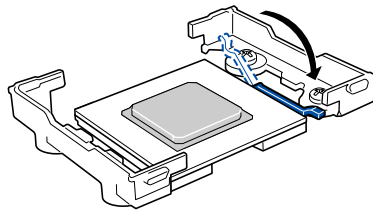


FIGURE 5-22 Closing the Socket Lever

Caution – Move the socket lever slowly and make sure that it is engaged on the locking tab on the side of the socket.

8. If you have not already done so, apply thermal conducting material to the processor now (see Figure 5-23).

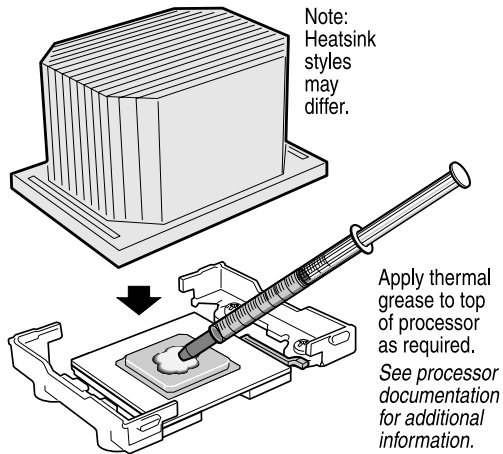


FIGURE 5-23 Applying Thermal Conducting Material

9. Orient the heatsink such that it properly and fully contacts the surface of the processor beneath it.
10. Gently lower the heatsink in place being careful not to damage the thermal interface material (TIM) as shown in Figure 5-24.

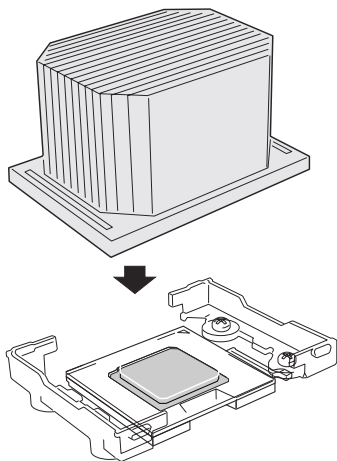
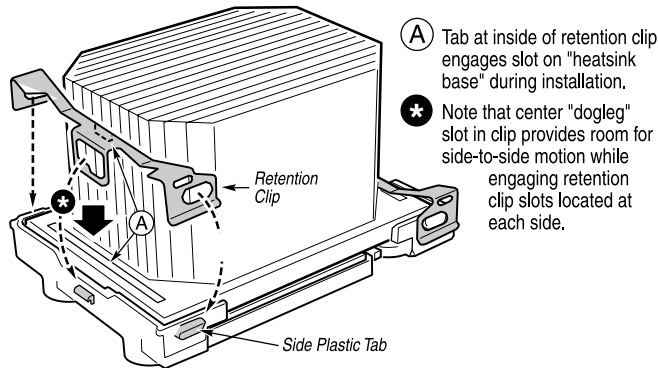


FIGURE 5-24 Installing the Heatsink

Caution – Misorientation of the heatsink will result in poor contact between heatsink and processor. Not only will the processor overheat, but both processor and socket may be damaged when clamping the heatsink down.

11. Install the heatsink retention clips using the retention clip tool.

Note – Make sure to install both retention clips.



NOTE: For ease of installation, BOTH retention clips should be installed simultaneously.

FIGURE 5-25 Installing the Heatsink (Retention Clip Details)

Warning – Incorrect use of the tool can cause the tool to slip from the retention clip and strike the server board, possibly causing severe damage to the board or board components. In addition, if too much force is used, you may bend the heatsink retention clip to a point where it may be difficult to replace it without bending it back to its original position.

- a. Secure each end of the retention clip to the tabs in the processor retainer by aligning the clip holes over the tabs and pushing down.
- a. With the tool in the vertical position, firmly grasp it and insert the middle prong of the tool securely into the hole at the center of the retention clip.
- b. Slowly and carefully push the tool downward, making sure the center prong of the tool stays in the retention clip hole.
- c. As you continue to exert downward pressure, move the top of the handle slightly in a direction away from the heatsink so that the clip is pushed away from the retainer and the hole in the center of the clip is aligned over the retainer tab.

- d. Gradually move the top of the tool handle back toward the heatsink in such a manner as to slide the center of the clip over the retainer tab, securing it in place.

Note – The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component. See “Run Platform Confidence Test (PCT)” on page 4-26.

5.5.6 Power Supply Unit

Caution – The Sun Fire V60x server does not have a redundant power supply. Before replacing the power supply, you must take the server out of service. The Sun Fire V65x server, however, may be optionally equipped with a redundant power supply. In this case, it is possible to replace the defective power supply without powering down the server.

Caution – Before touching or replacing any component inside the server, disconnect all external cables and follow the instructions in “Safety Guidelines (Before You Remove the Cover)” on page 5-2 and “Removing and Replacing the Cover” on page 5-3. Always place the server on a grounded ESD pad and wear a properly grounded antistatic wrist strap.

5.5.6.1 Sun Fire V60x Server Power Supply

Before removing the cover to work inside the system, observe the safety guidelines previously mentioned.

Follow these steps to replace the Sun Fire V60x server power supply:

1. **Unplug the power cord from the power source and the power supply module.**
2. **Lift the rear of the module up (Figure 5-26, panel 2) only enough to clear the raised guides on the chassis floor.**

Caution – As shown in Figure 5-26, lift the rear of the power supply module up only enough to clear the raised guides. Lifting higher may damage the edge connector and power distribution board.

3. Push the module to the rear of the chassis until it disengages from the power distribution board.
4. Lift the module out of the chassis.

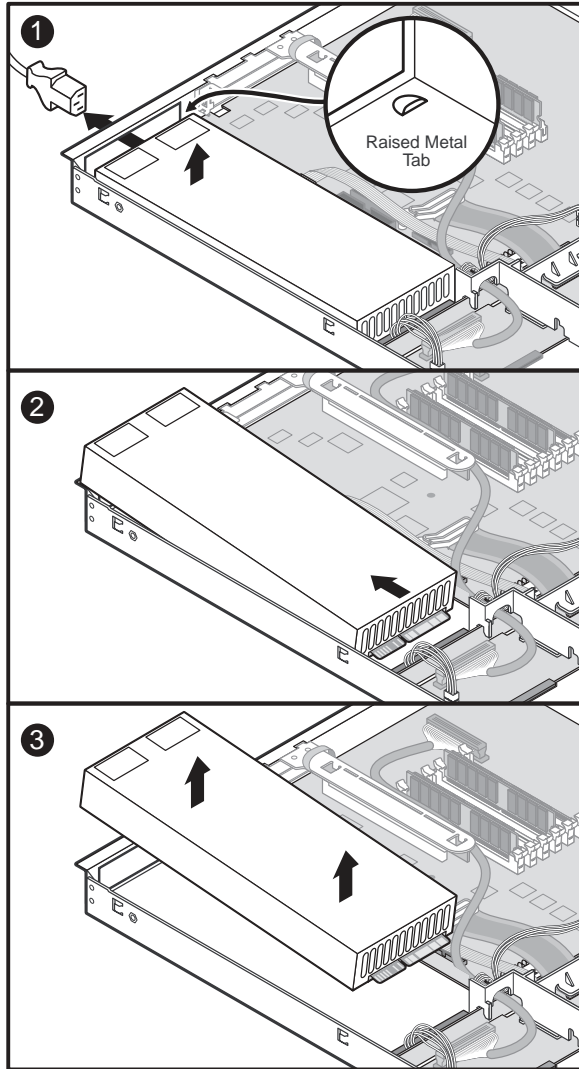


FIGURE 5-26 Removing the Power Supply

5. Place the edge connector end of the replacement module onto the chassis floor and slide it toward the front of the chassis until the edge connector is fully inserted in the power distribution board connector.

6. Make sure that the rear of the power supply is fully seated on the chassis floor and in front of the raised guides.
7. Replace the chassis cover.

Note – The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component. See “Run Platform Confidence Test (PCT)” on page 4-26.

5.5.6.2 Sun Fire V65x Server Power Supply

The default configuration for the Sun Fire V65x server is a single 500-watt power supply. Optionally, you can add a second power supply module to provide a redundant, 1+1 system.

Caution – If you do not have the second, redundant power supply module, you must take the server out of service before replacing the single module.

To replace a power supply:

1. Squeeze the module handle to depress the latch (Figure 5-27, panel 1).
2. Rotate the handle down while pulling the module toward you (Figure 5-27, panel 2).
3. As you pull the module out, support the module with your free hand.
4. Insert a new power supply module in the bay.
5. Grip the module handle, rotate it down, and push the module into the bay.
6. When the module is nearly all of the way in, the handle will rotate up. At this time, push firmly on the front of the handle to lock the latch.

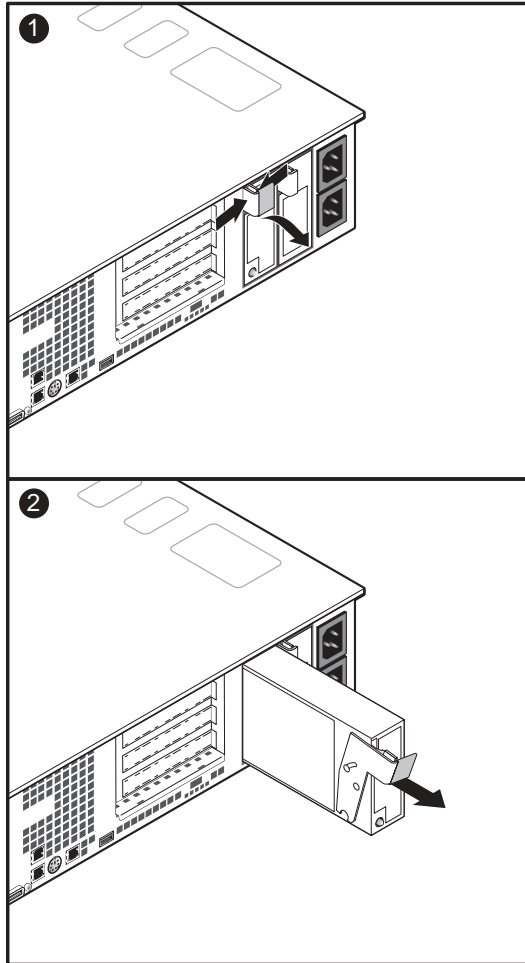


FIGURE 5-27 Replacing the Power Supply

5.5.7 Hard Disk Drives

Caution – Not all SCSI hard disk drives (HDD) are supported by the server. Unsupported drives will not mate mechanically with the connector on the inside of the drive bay. All drives must be LVDS SCA type (80-pin connector). The server does not support internal single-ended (SE) drives.

Unless an approved RAID card is installed in the server, the hard drives cannot be hot swapped.

The use of unauthorized HDDs may damage the system and void the warranty. Only Sun-certified drives should be used. See Table 1-3 on page 1-18 and Table 1-4 on page 1-20 for a list of approved hard disk drives.

Follow these steps to replace a hard disk drive while referring to Figure 5-28:

1. **Before removing the cover to work inside the system, observe the safety guidelines mentioned earlier.**
2. **Remove the bezel from the front of the chassis (see panel 1 of Figure 5-28).**
3. **As shown in panel 2 of Figure 5-28, push the green release tab in the retention lever and pull the HDD retention lever toward you until the tab end (left end) of the lever is free of the housing slot.**
4. **Pull the HDD assembly forward and out of the drive bay.**
5. **Remove the new HDD assembly (hard disk drive mounted on a carrier) from its wrapper and place it on an anti-static surface.**
6. **Install the new HDD assembly into the drive bay by inserting the tab end (left end) of the retention lever into the housing slot and gently closing the lever.**

Note – Closing the lever should seat the HDD into the backplane connector. If the drive does not insert or seat properly, do not force the lever. Instead, check again to make sure the tab of the retention lever is properly inserted into the housing before closing the lever.

7. **Reinstall a carrier in any bays where you are not reinstalling a HDD assembly.**

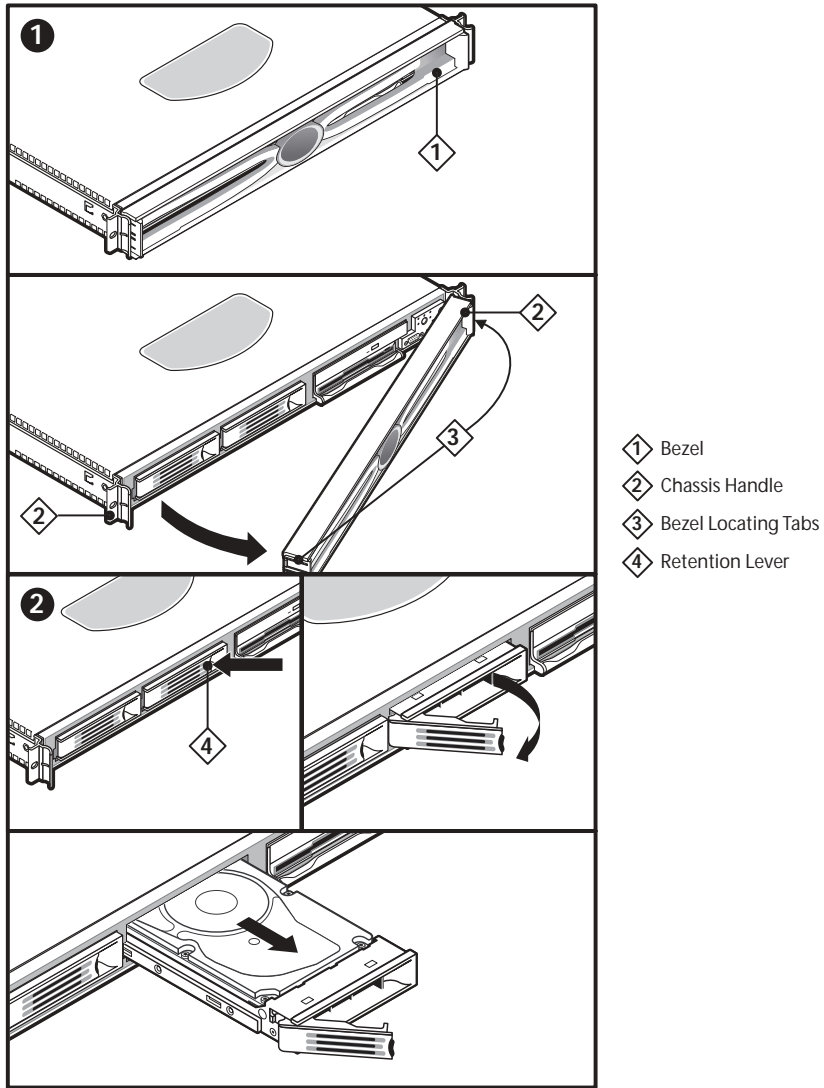


FIGURE 5-28 Removing a HDD Assembly From a Bay

Note – The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component. See “Run Platform Confidence Test (PCT)” on page 4-26.

5.5.8 Air Baffle

This section explains how to remove and replace the air baffles for the servers.

Caution – Before touching or replacing any component inside the Sun Fire V60x and Sun Fire V65x servers, disconnect all external cables and follow the instructions in “Safety Guidelines (Before You Remove the Cover)” on page 5-2 and “Removing and Replacing the Cover” on page 5-3. Always place the server on a grounded ESD pad and wear a properly grounded antistatic wrist strap.

5.5.8.1 Sun Fire V60x Server Air Baffle Removal

Follow the steps in this section to remove the air baffle.

1. Before removing the cover to work inside the system, observe the safety guidelines mentioned earlier.
2. Remove the chassis cover.
3. Gently lift the air baffle until pin (C) is free of the board mounting hole.
4. Remove the baffle from the chassis.

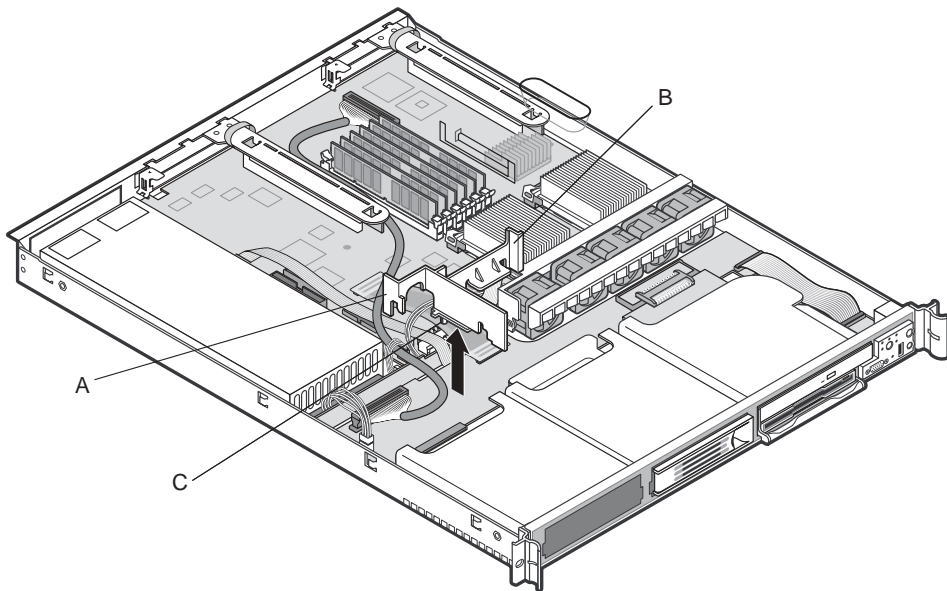


FIGURE 5-29 Removing the Air Baffle

5.5.8.2 Sun Fire V60x Server Air Baffle Installation

Follow these steps to install the air baffle:

1. Ensure the flex cable, auxiliary power cable, USB ribbon cable, and SCSI cables are routed under where you will be installing the air baffle.

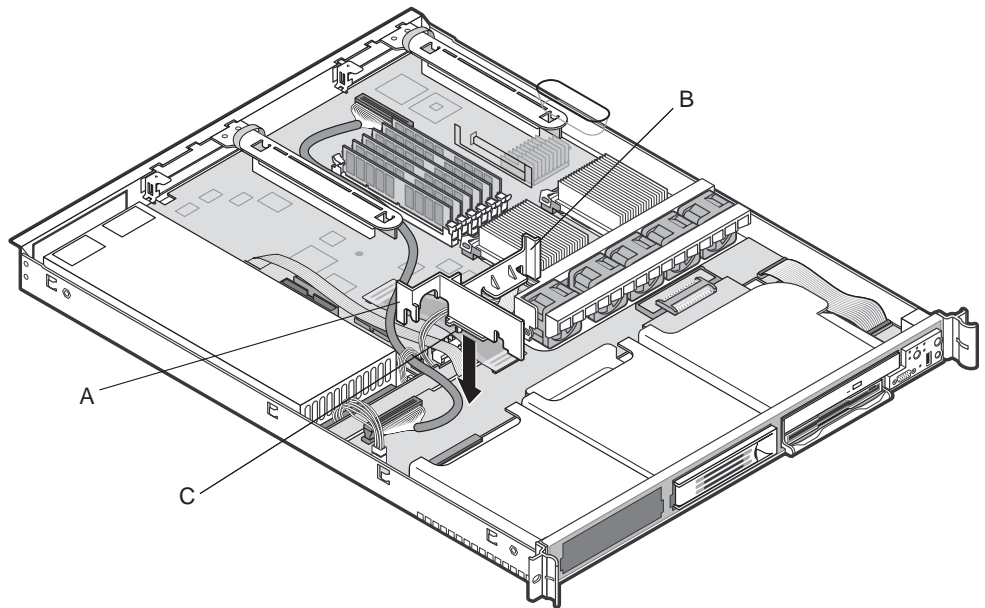


FIGURE 5-30 Installing the Air Baffle

2. Aligning pin (C) with the board's mounting hole, position the air baffle over the white server board power connector.
3. Lower the baffle into position and press it down against the backplane board.
4. Ensure tab (A) aligns with the edge of the power supply and tab (B) aligns with the edge of the fan module.

5.5.8.3 Sun Fire V65x Server Air Baffle Removal

To remove the air baffle, follow these steps:

1. Remove the blue thumbscrew holding the air baffle to the backplane board.
2. Lift the air baffle straight up, moving the SCSI cable out of the way.

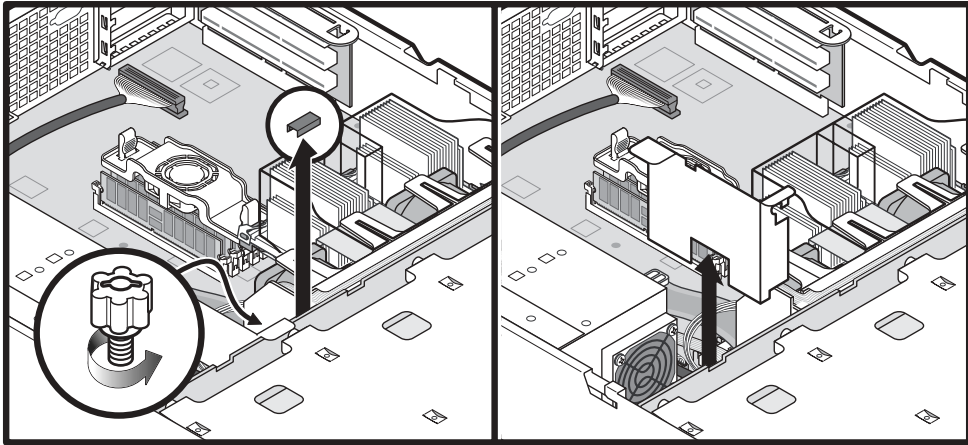


FIGURE 5-31 Removing the Air Baffle

5.5.8.4 Sun Fire V65x Server Air Baffle Installation

To replace the air baffle, follow these steps:

1. Slide the air baffle in place, ensuring that one tab is flat against the top of the power supply and the other tab is resting on top of the backplane board.
2. Route the SCSI cable through the slot on the top of the air baffle.
3. Secure the air baffle to the backplane using the blue thumbscrew.

5.5.9 Fan Module

Caution – Before touching or replacing any component inside the Sun Fire V60x and Sun Fire V65x servers, disconnect all external cables and follow the instructions in “Safety Guidelines (Before You Remove the Cover)” on page 5-2 and “Removing and Replacing the Cover” on page 5-3. Always place the server on a grounded ESD pad and wear a properly grounded antistatic wrist strap.

5.5.9.1 Sun Fire V60x Server Fan Module Removal

The fan assembly is a single component (see Figure 5-32). The individual fans that make up the assembly are not replaceable. Should a fan fail, the entire module will need to be replaced. A tab on the side of the fan module makes replacement of the module tool-less and very simple. The fan module is not hot swappable. The server must be turned off before the fan module can be replaced.

Before removing the cover to work inside the system, observe the safety guidelines previously given.

To replace the fan module, remove the cover and refer to Figure 5-32 when following these steps:

1. **Remove the clear plastic processor air duct.**
2. **Remove the blue plastic air baffle.**
3. **Unplug the fan cable from the server board.**
4. **At the left end of the module, press the release tab.**
5. **While continuing to press the release tab, lift the left side of the fan module and slide it slightly left to free the “L” shaped foot at the right side of the fan module.**
6. **Remove the fan module from the chassis.**

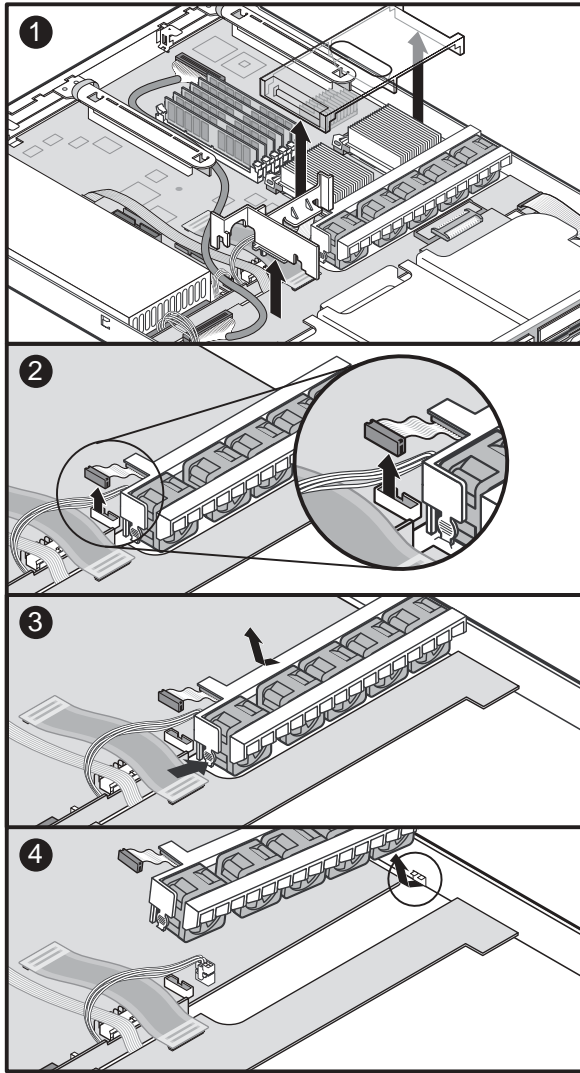


FIGURE 5-32 Removing the Fan Module

5.5.9.2 Sun Fire V60x Server Fan Module Replacement

Replacing the fan module is essentially the reverse of the procedure described in “Sun Fire V60x Server Fan Module Removal” on page 5-43.

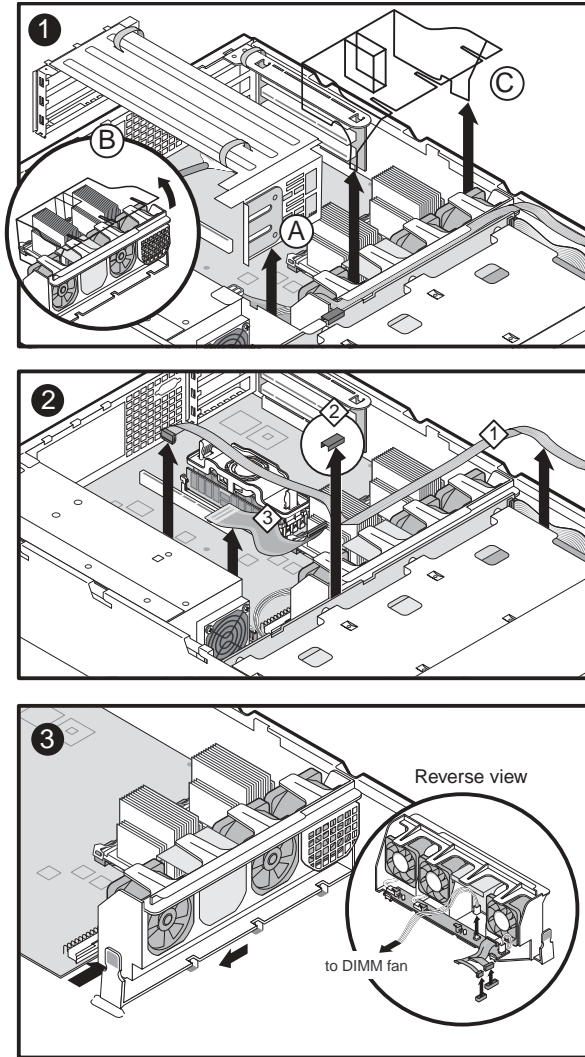
1. Remove the air baffle.
2. Remove the processor air duct.
3. Position the new fan module so that the fan cable is located closest to the center of the chassis.
4. Slide the “L” shaped foot on the chassis sidewall end of the fan module under the chassis tab.
5. Lower the module onto the chassis floor and slide it as far to the right as it will go.
6. Ensure that the fan module is situated between the raised guides, not on top of them.
7. Press down on the left end of the module and press in on the release tab until the tab snaps into the chassis slot.
8. Plug the fan module power cable into the system fan connector on the server board.
9. Install the air baffle.
10. Replace the processor air duct.
11. Replace the chassis cover.

Note – The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component. See “Run Platform Confidence Test (PCT)” on page 4-26.

5.5.9.3 Sun Fire V65x Server Fan Module Removal

Unlike the fan module in the Sun Fire V60x server, the fans in the Sun Fire V65x server are individually replaceable. To replace an individual fan, first remove the fan module according to the instructions below while referring to Figure 5-33.

1. **Remove the full-height PCI riser board.**
2. **Unthread the SCSI cable from the retaining hooks on the plastic processor air duct.**
3. **Push the air duct slightly toward the back of the chassis, then lift it by its front edge and remove it from the chassis.**
4. **Remove the flex circuit cable retention clip.**
5. **Disconnect the flex circuit cable from the backplane.**
6. **Unthread and remove the USB cable from the clips on top of the fan module.**
7. **Unplug the fan cables from the server board system fan connectors.**
8. **At the end of the fan module closest to the chassis centerline, push on the tab to release it from the chassis**
9. **While pushing on the tab, lift up on the module to clear the retention stub.**
10. **Slide the module towards the power supply until it comes free.**
11. **Lift the fan module out of the chassis.**



- ① Front panel USB Ribbon Cable
- ② Cable Retention Clip
- ③ Floppy/FP/IDE Cable

FIGURE 5-33 Removing the Fan Module

5.5.9.4 Sun Fire V65x Server Fan Module Replacement

Replacing the fan module is essentially the reverse of the procedure described in “Sun Fire V65x Server Fan Module Removal” on page 5-46.

1. **Note the raised tabs on the chassis floor and the corresponding notches in the bottom of the fan module.**
2. **Lower the fan module until it is just above the chassis floor.**
3. **Align the notches in the fan module with the raised tabs on the chassis and lower the fan module onto the floor.**
4. **While pressing down on the fan module, slide it to the right until the latch snaps into place.**
5. **Plug the fan cables into the server board system fan connectors.**
6. **Make sure the USB cable is routed along the top of the fan module.**
7. **Connect the flex circuit cable (floppy/FP/IDE) to the backplane.**
8. **Install the flex circuit cable retention clip.**
9. **Install the full-height PCI riser board.**
10. **Replace the plastic processor air duct.**
11. **Thread the SCSI cable through the retaining hooks on the plastic processor air duct.**
12. **Replace the chassis cover.**

Note – The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component. See “Run Platform Confidence Test (PCT)” on page 4-26.

5.5.10 PCI Cards

Note – Add-in cards must be replaced while the riser board is removed from the chassis.

The server supports 3V only and Universal PCI cards. It does not support 5V only cards.

Caution – Before touching or replacing any component inside the Sun Fire V60x and Sun Fire V65x servers, disconnect all external cables and follow the instructions in “Safety Guidelines (Before You Remove the Cover)” on page 5-2 and “Removing and Replacing the Cover” on page 5-3. Always place the server on a grounded ESD pad and wear a properly grounded antistatic wrist strap.

To replace a PCI card, follow these steps while referring to Figure 5-34:

1. **Before removing the cover to work inside the system, observe the previously stated safety guidelines.**
2. **Remove the chassis cover.**
3. **Insert your finger in the plastic loop on the PCI riser assembly.**
4. **Pull straight up and remove the riser assembly from the chassis.**
5. **Open the retainer clip on the riser card retention bracket.**
6. **Pull the PCI card out of the riser board slot.**
7. **Install the new PCI add-in card on the riser assembly.**
8. **Insert the riser assembly connector in the server board slot while aligning the tabs on the rear retention bracket with the holes in the chassis.**
9. **Firmly press the riser assembly straight down until it is seated in the server board slot.**
10. **Replace the chassis cover if you have no additional work to do inside the chassis.**

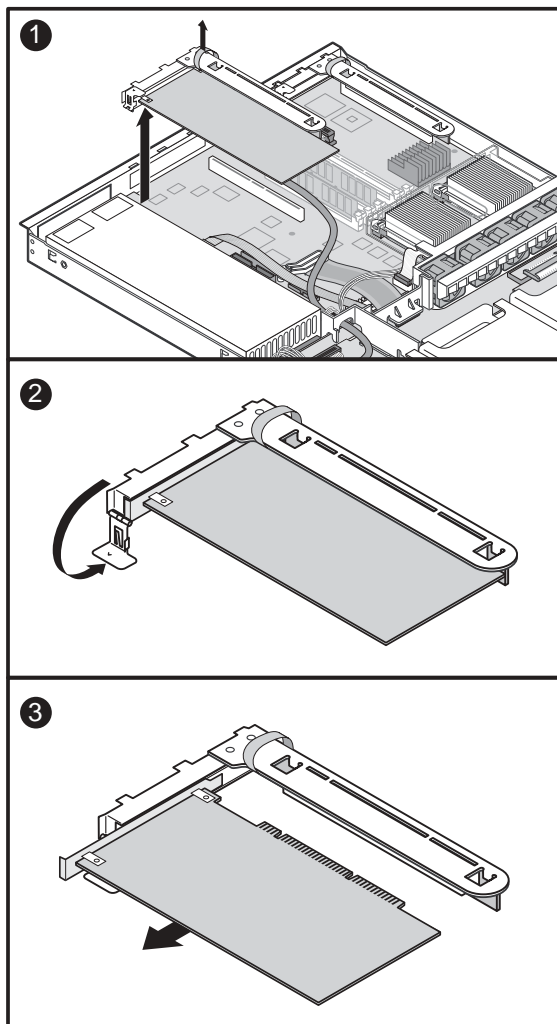


FIGURE 5-34 Removing a PCI Card

Caution – Press the riser assembly straight down into the slot. Tipping it in the slot while installing it may damage the riser card or board slot.

Note – The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component. See “Run Platform Confidence Test (PCT)” on page 4-26.

5.5.11 Battery

Caution – Before touching or replacing any component inside the Sun Fire V60x and Sun Fire V65x servers, disconnect all external cables and follow the instructions in “Safety Guidelines (Before You Remove the Cover)” on page 5-2 and “Removing and Replacing the Cover” on page 5-3. Always place the server on a grounded ESD pad and wear a properly grounded antistatic wrist strap.

The lithium battery on the server board powers the real time clock (RTC) for up to 10 years in the absence of power. A low battery condition is stored in the System Event Log (SEL).

When the battery starts to weaken, it loses voltage, and the server settings stored in CMOS RAM in the RTC (for example, the date and time) may be wrong. Contact your customer service representative or dealer for a list of approved replacement batteries.

Warning – There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer. Discard used batteries according to the manufacturer’s instructions.

To replace the battery:

1. Before proceeding, record your custom BIOS settings.
2. Observe the safety and ESD precautions at the beginning of this chapter.
3. Open the chassis and locate the battery (on the main board, near the left front corner).
4. Push the upper end of the metal retainer away from the battery so that the battery pops up (see Figure 5-35).

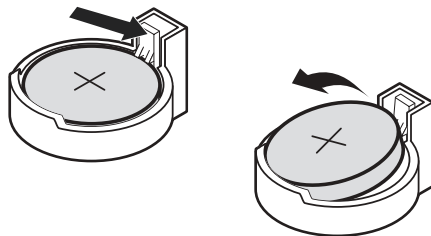


FIGURE 5-35 Replacing the Backup Battery

5. Remove the battery from its socket.

6. Dispose of the battery according to local ordinances.
7. Remove the new lithium battery from its package.
8. Being careful to observe the correct polarity, lay the battery in the socket.
9. Push the battery down so that the metal retainer locks the battery in the socket.
10. Close the chassis.
11. Run the BIOS setup (press F2 when prompted at bootup) to restore the configuration settings to the RTC.
12. Restore your custom BIOS settings.

Note – The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component. See “Run Platform Confidence Test (PCT)” on page 4-26.

5.5.12 Keyboard/Mouse “Y” Adapter

To install the PS/2 keyboard/mouse “Y” adapter, install the adapter into the round keyboard/mouse connector as shown in Figure 5-36.

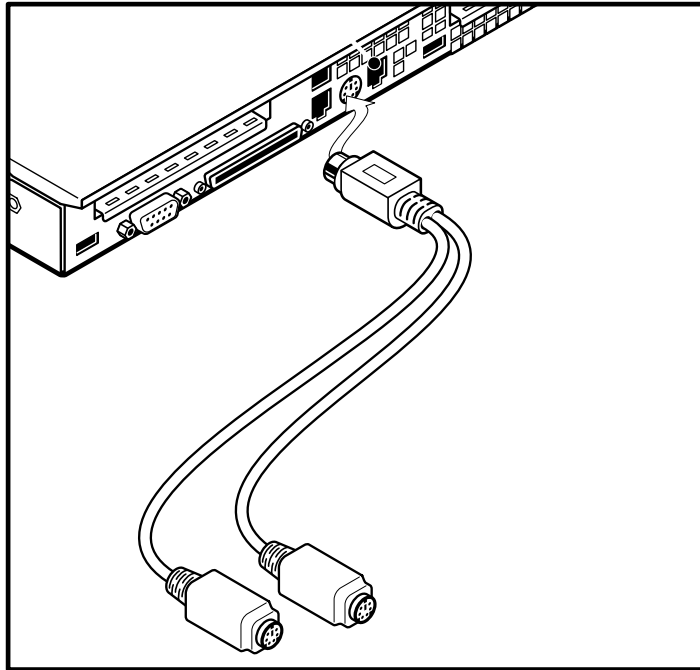


FIGURE 5-36 Installing the PS/2 Keyboard/Mouse “Y” Adapter

5.5.13 Emergency Management Port Cable

Two different serial port adapters may be installed into the rear panel RJ-45 Serial COM2 Emergency Management Port (EMP) connector:

- DSR Peripherals Cable
- DCD Modem Cable

5.5.13.1 Installing the DSR Peripherals Cable

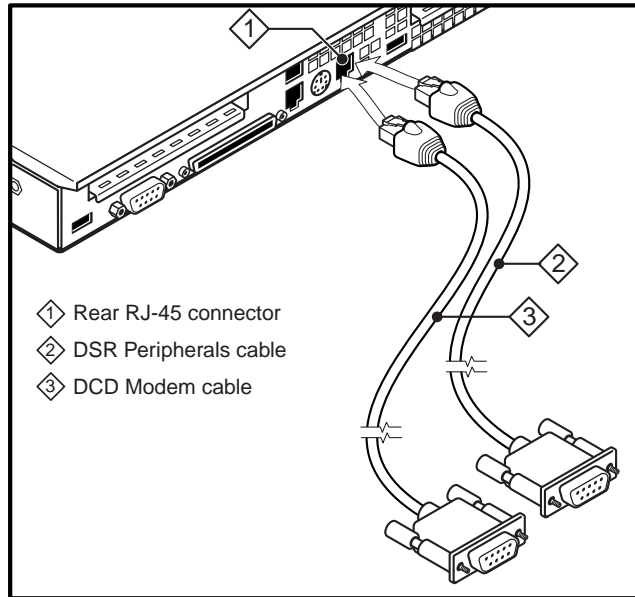
Follow these steps to install the DSR Peripherals cable:

1. **Plug the DSR Peripherals cable into the rear panel RJ-45 Serial COM2 connector as shown in Figure 5-37.**
2. **Configure the J5A2 jumper as shown in Figure 5-37.**

5.5.13.2 Installing the DCD Modem Cable

Follow these steps to install the DCD Modem cable:

1. **Plug the DCD Modem cable into the rear panel RJ-45 Serial COM2 connector as shown in Figure 5-37.**
2. **Configure the J5A2 jumper as shown in Figure 5-37.**



DSR signal configuration
 (RJ-45 pin 7 connected to
 DSR pin 6 of DB9)

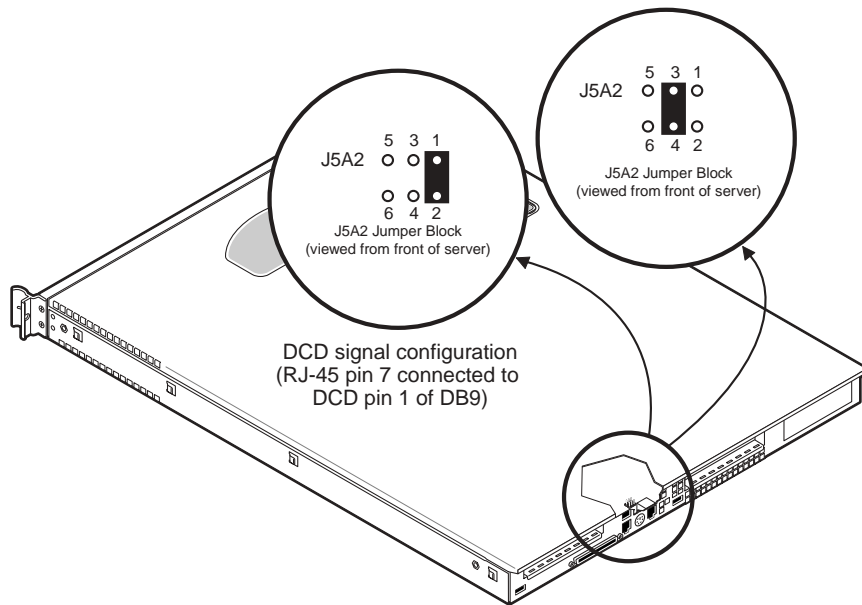


FIGURE 5-37 Installing the EMP Cable

5.6 Field Replaceable Unit (FRU) Procedures

This section explains how to replace the FRUs in the Sun Fire V60x and Sun Fire V65x servers.

5.6.1 Server Main Board

Note – The Main Board contains no DIMMs or CPUs, and is packaged in an ESD bag with two foam pieces and an ESD wrist strap. Be sure to observe all ESD safety guidelines when handling the board.

Caution – The procedure below is for the attention of qualified service engineers only. Before touching or replacing any component inside the Sun Fire V60x and Sun Fire V65x servers, disconnect all cables and follow the instructions in “Safety Guidelines (Before You Remove the Cover)” on page 5-2 and “Removing and Replacing the Cover” on page 5-3. Always place the server on a grounded ESD pad and wear a properly grounded antistatic wrist strap.

5.6.1.1 Sun Fire V60x Server Main Board Replacement

Note – Several assemblies must be removed so that the main board can be replaced. Refer to other sections of this chapter for detailed instructions on how to remove and replace these assemblies.

To replace the Sun Fire V60x server Main Board, follow these steps:

1. **Open the box containing the replacement board and remove one of the two antistatic pads. You will need this pad in step 17 as an ESD-safe place to place the old server board.**
2. **Before removing the cover to work inside the system, observe the previously mentioned safety guidelines.**
3. **Remove the cover and bezel from the chassis.**
4. **Remove all drives from the drive bays and flex bay.**
5. **Remove the PCI riser board assemblies.**

6. Remove the power supply.
7. Remove the air baffle.
8. Unscrew and remove the blue plastic retention clip that holds down the flex cable onto the server board.
9. At the backplane board, disconnect the ribbon cable from the front panel board.
10. Remove the processor air duct.
11. Disconnect the fan cable from the server board and remove the fan module.
12. Disconnect both ends of all remaining cables that connect the main board to other chassis components.

Note – Some cables may be soldered at one end. Remove only the connectorized end.

13. Remove the backplane board.
14. Disconnect the USB ribbon cable from the server board and lay the free end back over the drive bays.
15. Remove the heat sink, processor air dam, and any processors and memory DIMMs that you wish to use with the new board.
16. Remove the eight screws that secure the processor retention mechanisms and the three mounting screws that secure the server board to the chassis (see Figure 5-38).

Caution – Make sure that all 11 screws have been removed before attempting to take out the board. Do not use any tools to try to pry the board out of the server. Attempting to do this could result in severe damage to the board.

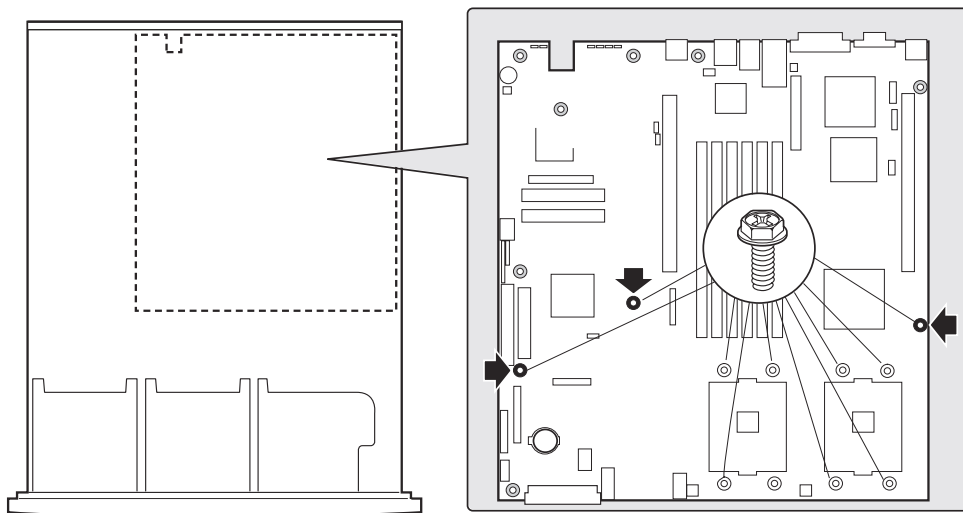


FIGURE 5-38 Location of the Mounting Screws

17. Slide the board toward the front of the chassis until the I/O connectors are clear of the chassis I/O openings, lift the server board from the chassis, and place it on an antistatic pad.
18. Remove the power distribution board from the white 24-pin power connector. Place the server board in an antistatic bag.
19. Remove the replacement server board from its packaging and antistatic bag.
20. Connect the power distribution board to the 24-pin power connector on the new server board.
21. Ensure that the Mylar insulator sheet is seated securely over the standoffs, is laying flat on the chassis floor, and that the edge of the sheet is seated below the studs in the rear chassis wall.
22. Insert the back edge of the board under the three retention pins located at the rear of the chassis.
23. While placing the board on the chassis standoffs, carefully align the board I/O connectors with the rear chassis I/O openings.
24. Adjust the board's position so that the three mounting holes rest securely on the shouldered standoffs.

25. Reattach the board to the chassis using the three mounting screws.

Note – The server board uses three holes to mount the board to the chassis standoffs.

26. Install the processor retention mechanisms using the eight screws you removed earlier, along with the processor(s), heatsink(s), and DIMMs that you wish to use with the new board.
27. If you only have one processor, install the processor air dam in the outer processor location.
28. Lay the USB ribbon cable in the proper position on the chassis floor, under where the backplane board will be installed, and connect it to the USB connector on the server board.
29. Install the backplane board.
30. Install the power supply.
31. Install the cables between the new server board and the other system components.
32. Install the fan module and connect the fan cable to the server board.
33. Install the air baffle.
34. With a screw, install the blue plastic retention clip that holds down the flex cable onto the server board.
35. Install the processor air duct.
36. Install both PCI riser board assemblies.
37. Replace all drives in the drive bays and flex bay.
38. Replace the chassis cover if you have no additional work to do inside the chassis.

Note – The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component. See “Run Platform Confidence Test (PCT)” on page 4-26.

5.6.1.2 Sun Fire V65x Server Main Board Replacement

Note – Several assemblies must be removed so that the main board can be replaced. Refer to other sections of this chapter for detailed instructions on how to remove and replace these assemblies.

To replace the Sun Fire V65x server Main Board, follow these steps:

1. **Open the box containing the replacement board and remove one of the two antistatic pads. You will need this pad in step 17 as an ESD-safe place to place the old server board.**
2. **Before removing the cover to work inside the system, observe the previously mentioned safety guidelines.**
3. **Remove the cover and bezel from the chassis.**
4. **Remove the PCI riser board assemblies.**
5. **Remove the air baffle.**
6. **Unscrew and remove the blue plastic retention clip that holds down the flex cable onto the server board.**
7. **Disconnect the USB ribbon cable from the server board, unthread it from the top of the fan module, and lay the free end back over the drive bays.**
8. **Remove the processor air duct.**
9. **Disconnect the fan cables from the server board and the DIMM fan power cable from the fan module header and remove the fan module.**
10. **Remove the DIMM fan and vertical support bars.**
11. **Disconnect both ends of all remaining cables that connect the main board to other chassis components (including the power supply).**

Note – Some cables may be soldered at one end. Remove only the connectorized end.

12. **Remove the heat sink, processor air dam, and any processors and memory DIMMs that you wish to use with the new board.**
13. **Remove the eight screws that secure the processor retention mechanisms and the three mounting screws that secure the server board to the chassis (see Figure 5-39).**

Caution – Make sure that all 11 screws have been removed before attempting to take out the board. Do not use any tools to try to pry the board out of the server. Attempting to do this could result in severe damage to the board.

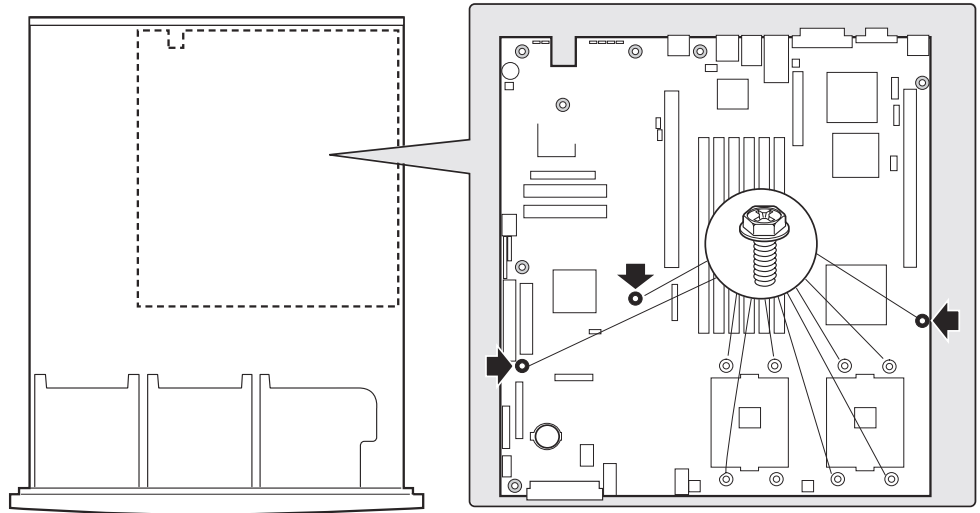


FIGURE 5-39 Location of the Mounting Screws

14. Slide the board toward the front of the chassis until the I/O connectors are clear of the chassis I/O openings, lift the server board from the chassis, and place it on an antistatic pad.
15. Remove the replacement server board from its packaging and antistatic bag.
16. Ensure that the Mylar insulator sheet is seated securely over the standoffs, is laying flat on the chassis floor, and that the edge of the sheet is seated below the studs in the rear chassis wall.
17. Insert the back edge of the board under the three retention pins located at the rear of the chassis.
18. While placing the board on the chassis standoffs, carefully align the board I/O connectors with the rear chassis I/O openings.
19. Adjust the board's position so that the three mounting holes rest securely on the shouldered standoffs.

20. Reattach the board to the chassis using the three mounting screws.

Note – The server board uses three holes to mount the board to the chassis standoffs.

21. Install the processor retention mechanisms using the eight screws you removed earlier, along with the processor(s), heatsink, and DIMMs that you wish to use with the new board.
22. If you only have one processor, install the processor air dam in the outer processor location.
23. Install the fan module and connect the fan cables to the server board.
24. If you are using the DMII fan assembly from the old main board, install the DIMM fan assembly and connect the DIMM power cable to the DIMM fan power connector on the fan module.
25. Rethread the USB ribbon cable through the clips on the top of the fan module and connect the USB cable to the USB connector on the server board.
26. Install the cables between the new server board and the other system components (including the power supply).
27. Install the air baffle.
28. With a screw, install the blue plastic retention clip that holds down the flex cable onto the server board.
29. Install the processor air duct.
30. Install both PCI riser board assemblies.
31. Replace the chassis cover if you have no additional work to do inside the chassis.

Note – The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component. See “Run Platform Confidence Test (PCT)” on page 4-26.

5.6.2 Cable Kit

Caution – The procedure below is for the attention of qualified service engineers only. Before touching or replacing any component inside the Sun Fire V60x and Sun Fire V65x servers, disconnect all external cables and follow the instructions in “Safety Guidelines (Before You Remove the Cover)” on page 5-2 and “Removing and Replacing the Cover” on page 5-3. Always place the server on a grounded ESD pad and wear a properly grounded antistatic wrist strap.

You can use the cable kit to replace one or more internal server cables. The procedures given below assume that you are removing and replacing all of the cables.

5.6.2.1 Sun Fire V60x Server Cable Kit Removal

Before removing the cover to work inside the system, observe the safety guidelines previously given.

To remove cables, remove the cover and refer to Figure 5-40, Figure 5-41, and Figure 5-42 while following these steps:

1. **Remove the air baffle.**
2. **Remove the fan module.**
3. **Unscrew and remove the blue plastic flex cable retention clip from the server board.**
4. **Remove all hard disk drives (including blanks) and the floppy/CD-ROM combo drive.**
5. **Unplug the backplane power cable, server board auxiliary signal cable, and server board auxiliary power cable, shown in Figure 5-40, panel 2.**
6. **Remove the round SCSI cable.**
7. **Remove the flex circuit cable (floppy/FP/IDE) that runs from the connector on the server board to the connector on the backplane.**
8. **Remove the front panel cable that runs from the front panel board to the backplane.**

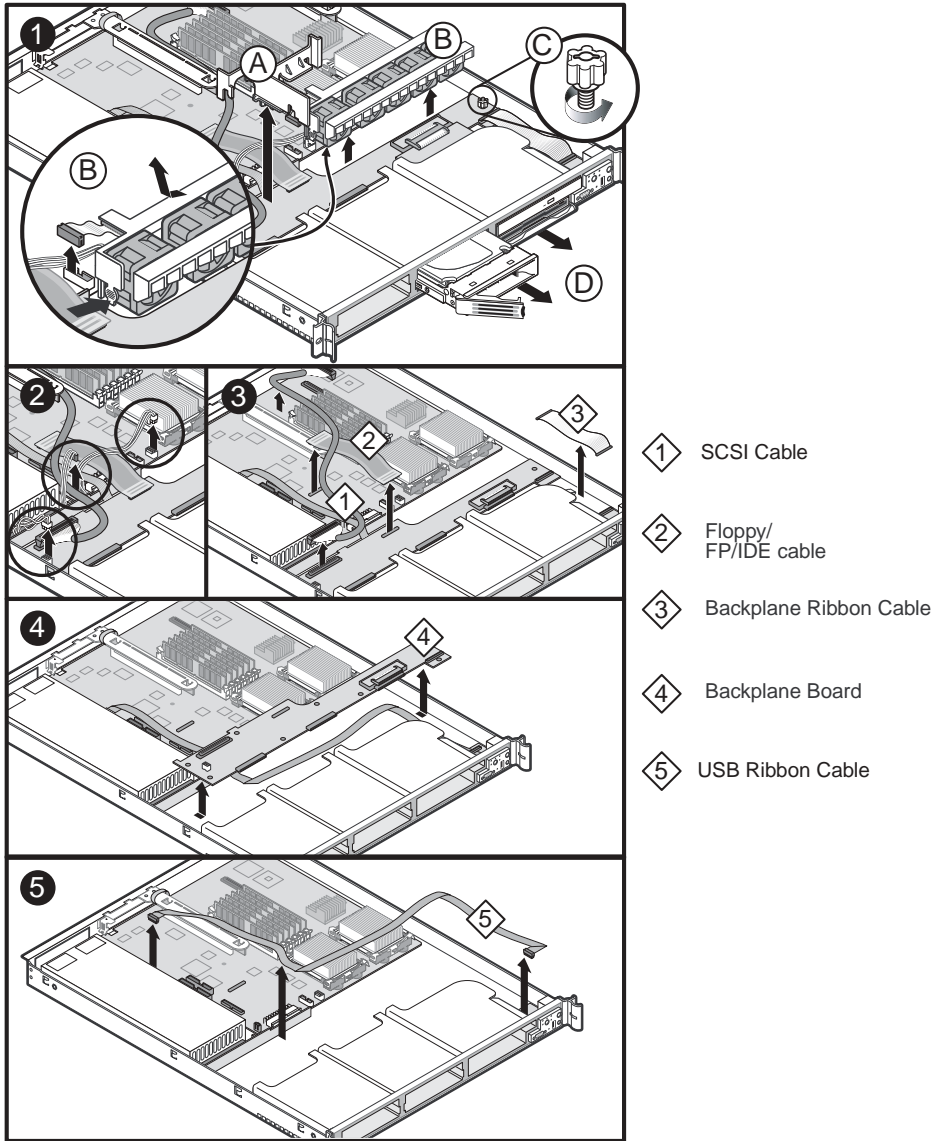
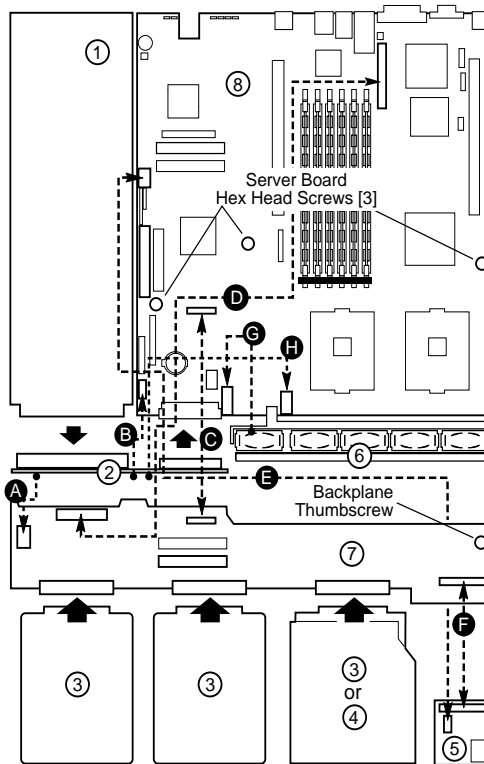


FIGURE 5-40 Sun Fire V60x Server Cable Kit Removal



System Components

1. Power supply
2. Power distribution board
3. Hard disk drive
4. Optional DVD/CD-ROM/FDD module
5. Front panel board
6. Fan module
7. Backplane board
8. Server board

Connections

- A. To the backplane Power connector
- B. To the server board Auxiliary Signal connector
- C. Flex circuit cable from the server board FDD/FP/IDE connector to the backplane
- D. SCSI cable from the server board to the backplane
- E. USB ribbon cable from the server board to the front panel board
- F. Front panel ribbon cable from the front panel board to the backplane
- G. From the fan module to the server board fan connector
- H. To the server board Auxiliary Power connector

FIGURE 5-41 Sun Fire V60x Server Cable Routing

9. Remove the SCSI backplane board (this must be done to access the USB ribbon cable), while referring to Figure 5-42.
 - a. Unplug all cables from the backplane.
 - b. Remove the blue thumbscrew (A) from the right side of the backplane.
 - c. Grasp the backplane and slide it slightly to the right to free it from the round standoff posts (B, C) that protrude up through the mounting holes.
 - d. Gently lift out the backplane board and set it aside.

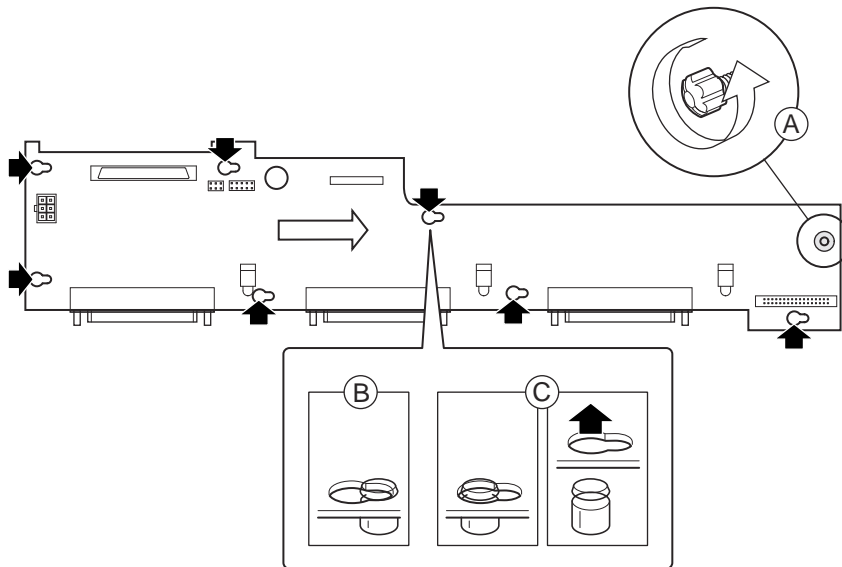


FIGURE 5-42 Removing the SCSI Backplane

10. The full USB cable (Figure 5-41 on page 5-65, E) is now uncovered and may be unplugged and removed from the front panel board and from the server board.

5.6.2.2 Sun Fire V60x Server Cable Kit Installation

To replace cables, remove the cover and refer to Figure 5-40, Figure 5-41, and Figure 5-42 while following these steps:

1. If you previously removed the SCSI backplane board to remove the USB cable:
 - a. Replace the USB cable by connecting it from the front panel board to the USB connector (Figure 5-41, E) on the server board.
 - b. Replace the SCSI backplane board:

- i. Place the board over all six of the round standoff posts.
 - ii. Slide the board to the left until it is fully secured by the standoffs.
 - iii. Install the thumbscrew at the right side of the board.
2. Route the front panel cable (Figure 5-41, F) from the front panel board to the backplane and attach it to the matching connector.
3. Attach one end (P1) of the flex circuit cable (Figure 5-41, C) to the floppy/front panel/IDE connector on the server board.
4. Secure the P1 end of the flex cable with the blue plastic screw-in retention clip.
5. Route the flex cable to the backplane board and attach the opposite cable end to the matching connector on the backplane.

Caution – After connecting the flex cable, ensure that each cable connector is properly seated in the board connector. The connector should be parallel to its board connector and not cocked to one side. If in doubt, remove, reinsert, and recheck it.

6. Connect the auxiliary signal cable (Figure 5-41, B) from the power distribution board to the 5-pin auxiliary signal connector on the server board.
7. Route the power cable (A) from the power distribution board to the backplane board and insert it in the white 6-pin connector.
8. Route the auxiliary power cable (H) from the power distribution board to the server board and insert it in the white 8-pin connector.
9. On the round SCSI cable (D), locate the end that is labeled *server board*. Connect that end to the SCSI connector on the server board. Route the cable between the PCI connector and memory slots on the server board and then to the backplane board. Attach the cable connector to the connector on the backplane board.
10. Replace the air baffle.
11. Replace the fan module.
12. Replace the top cover of the server

Note – The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component. See “Run Platform Confidence Test (PCT)” on page 4-26.

5.6.2.3 Sun Fire V65x Server Cable Kit Removal

Before removing the cover to work inside the system, observe the safety guidelines previously given.

To remove cables, remove the cover and refer to Figure 5-44 and Figure 5-44 when following these steps:

1. **Insert your fingers under the blue plastic loops on the full-height PCI riser card and pull the riser card straight up out of the chassis.**
2. **Unscrew the air baffle screw and remove the floppy/FP/IDE flex cable retention clip.**
3. **Remove the air baffle.**
4. **Unscrew and remove the plastic retention clip that holds the flex cable connector to the SCSI backplane.**
5. **Remove the floppy/FP/IDE flex circuit cable that runs from the connector on the server board to the connector on the backplane.**
6. **Remove the front panel cable that runs from the front panel board to the backplane.**
7. **Remove the USB cable that runs from the connector on the front panel board, through the clips on top of the fan module, to the connector on the server main board.**
8. **Remove the SCSI cable that runs from the SCSI backplane to the server board.**

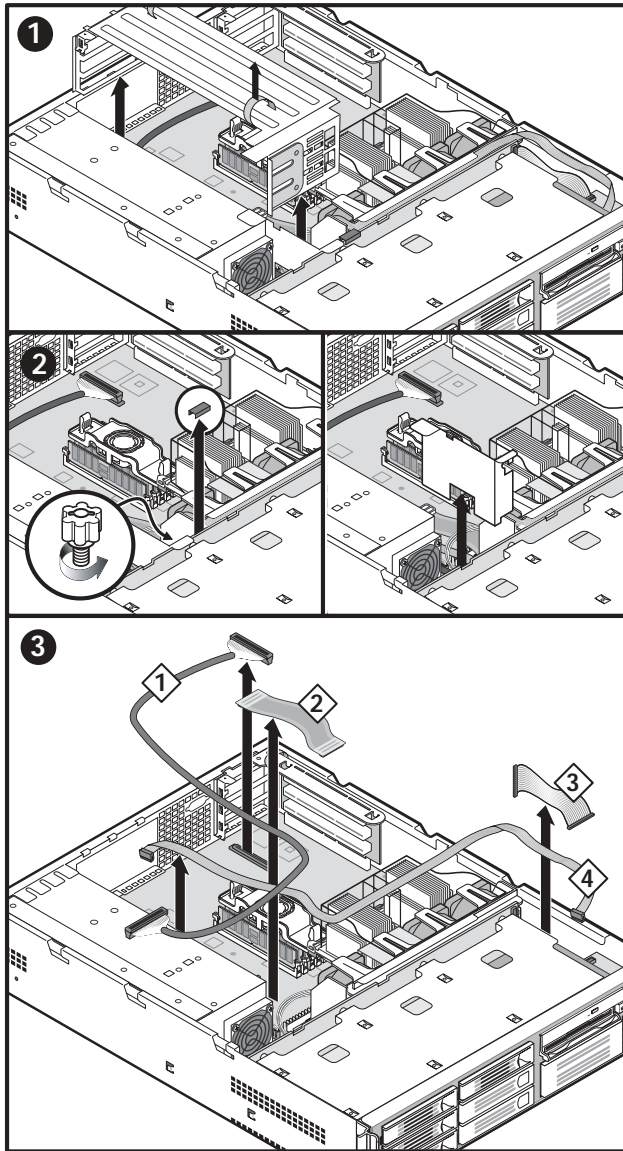
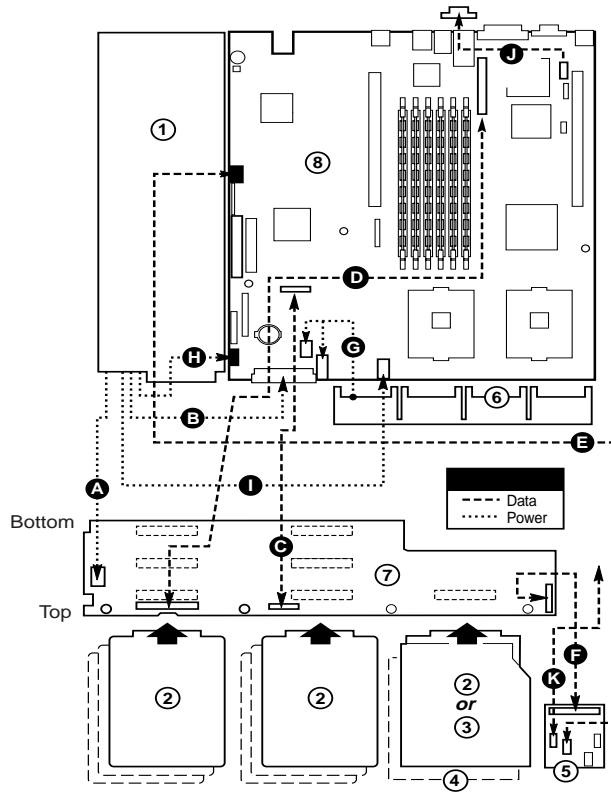


FIGURE 5-43 Sun Fire V65x Server Cable Kit Removal

- ① SCSI Cable
- ② Floppy/FP/IDE cable
- ③ Backplane ribbon cable
- ④ USB ribbon cable



System Components

1. Power Supply
2. SCSI Hard Disk Drives
3. DVD/CD-ROM/FDD module
4. Tape Drive (optional)
5. Front Panel Board
6. Fan Module
7. SCSI Backplane (shown horizontal for clarity)
8. Server Board

Connections

- A. To backplane power connector from power supply
- B. To server board primary power connector from power supply
- C. Floppy/FP/IDE flex circuit cable from server board to backplane
- D. SCSI cable from server board to backplane
- E. USB ribbon cable from front panel board to server board
- F. Ribbon cable from front panel board to backplane
- G. Fan module to server board fan connectors (2)
- H. To server board auxiliary signal connector from power supply
- I. To server board auxiliary power connector from power supply
- J. Serial cable from server board to knockout on back of chassis (optional)

FIGURE 5-44 Sun Fire V65x Server Cable Routing

5.6.2.4 Sun Fire V65x Server Cable Kit Installation

Before removing the cover to work inside the system, observe the safety guidelines previously given.

To replace cables, remove the cover and refer to Figure 5-43 through Figure 5-46 when following these steps:

1. Install the flex cable (A) between the backplane connector (B) and the server board connector (C) (see Figure 5-45).

Make sure the end marked "P1-Serverboard" plugs into the server board.

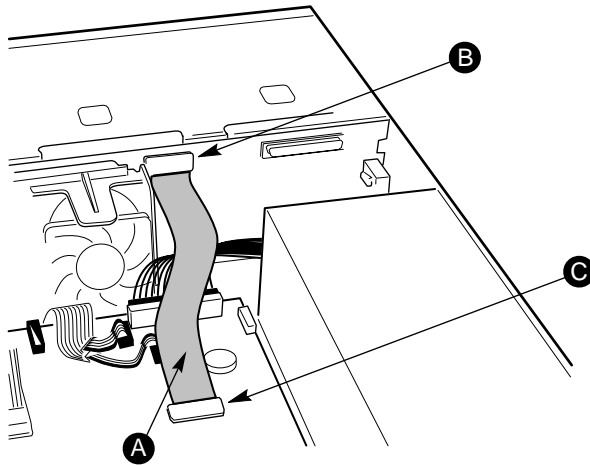


FIGURE 5-45 Installing the Flex Cable.

2. Install the flex cable retention clip on the SCSI backplane as shown in Figure 5-46.

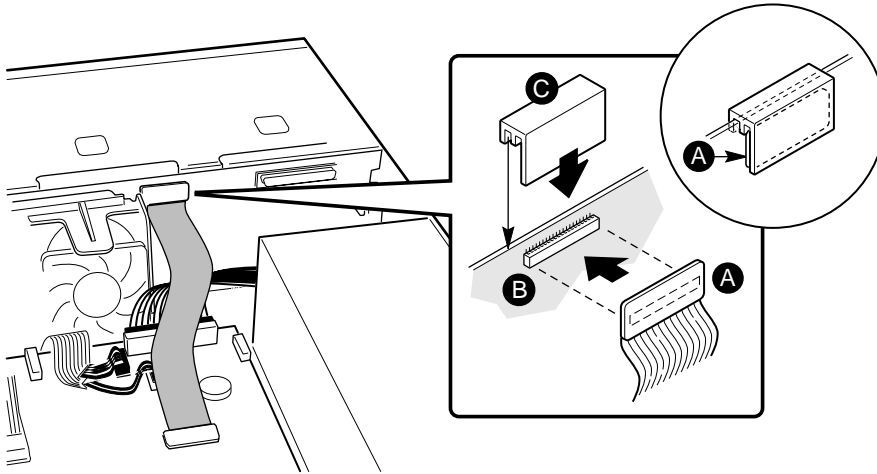


FIGURE 5-46 Installing the Backplane Retention Clip

3. Install the screw-in blue plastic retention clip to hold the flex cable connector in place on the server board.
4. Connect both ends of the SCSI cable (Figure 5-44, D), making sure it routes through the air baffle notch next to the power supply.
5. Install the front panel cable (Figure 5-44, F) between the front panel and the SCSI backplane.
6. Install the USB cable (Figure 5-44, E).
 - a. Connect the USB Cable to the front panel board.
 - b. Connect the USB cable to the main board.
 - c. Route the USB cable under the black plastic flap and hooks at the top of the fan module to keep it securely in place.

Note – The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component. See “Run Platform Confidence Test (PCT)” on page 4-26

5.6.3 System FRU

Caution – The procedure below is for the attention of qualified service engineers only. Before touching or replacing any component inside the server, disconnect all external cables and follow the instructions in “Safety Guidelines (Before You Remove the Cover)” on page 5-2 and “Removing and Replacing the Cover” on page 5-3. Always place the server on a grounded ESD pad and wear a properly grounded antistatic wrist strap.

A System FRU is the Main Board with SCSI backplane, power supply, power supply distribution board (Sun Fire V60x server), front-panel board, fan module and all cables, in a Sun Fire V60x server or Sun Fire V65x server chassis. The System FRU contains no CPU(s), HDDs, Floppy/CD-ROM/DVD combo or DIMMs. The field engineer transfers the customer's CPU(s), HDDs, Floppy/CD-ROM/DVD combo and DIMMs to the new assembly. There are special CPU/heatsink procedures that must be followed when disassembling heatsinks from processors (see “Replacing a Server CPU and Heatsink” on page 5-17).

Note – The Comprehensive Test should be run after changing any FRU, CRU, or adding an optional component. See “Run Platform Confidence Test (PCT)” on page 4-26.

5.6.3.1 Sun Fire V60x and Sun Fire V65x Servers System FRU Installation

Before removing the cover to work inside the system, observe the safety guidelines previously given.

To install the system FRU, follow these steps while referring to Figure 5-47:

1. Install the floppy/CD-ROM combo drive (see “Floppy/DVD/CD-ROM Combo Module” on page 5-7 for details).
2. Install the hard disk drives (see “Hard Disk Drives” on page 5-38 for more details).
3. Install the heatsinks and CPUs (see “Replacing a Server CPU and Heatsink” on page 5-17 for more details).
4. Install the DIMMs (see “Memory” on page 5-9 for more details).

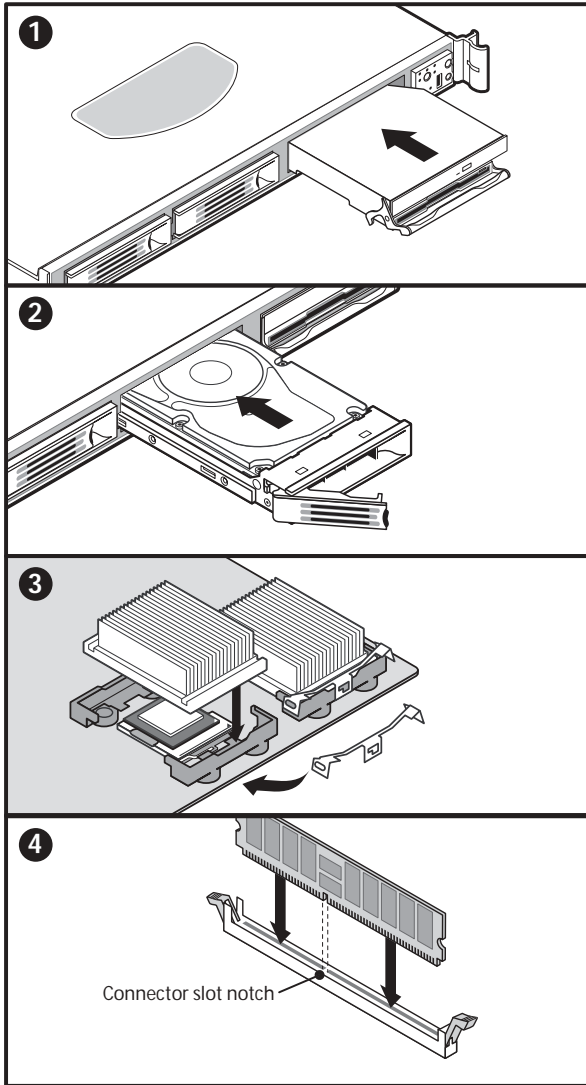


FIGURE 5-47 Sun Fire V60x and Sun Fire V65x Servers System FRU Installation

Troubleshooting the Server

This chapter explains how to detect and isolate faulty components within the Sun Sun Fire V60x and Sun Fire V65x servers. The chapter contains these sections:

- “Diagnosing System Errors” on page 6-1
- “Front and Rear Panel LEDs” on page 6-3
- “Server Main Board Fault LEDs” on page 6-7
- “System ID LEDs” on page 6-9
- “Power-On Self Test (POST)” on page 6-10
- “Contacting Technical Support” on page 6-23

6.1 Diagnosing System Errors

Use the following tools to help you isolate server problems:

- “LEDs” on page 6-1
- “Beep Codes” on page 6-2
- “POST Screen Messages” on page 6-2
- “System Utilities” on page 6-2

6.1.1 LEDs

You can use the diagnostic LED indications to isolate faults. See “Front and Rear Panel LEDs” on page 6-3, “Server Main Board Fault LEDs” on page 6-7, “System ID LEDs” on page 6-9, and “POST LED Indicators” on page 6-18.

6.1.2 Beep Codes

A built-in server speaker indicates failures with audible beeps. See “POST Error Beep Codes” on page 6-14.

6.1.3 POST Screen Messages

For many failures, the BIOS sends error codes and message to the screen. See “POST Screen Messages” on page 6-10

6.1.4 System Utilities

The following utilities are available to help troubleshoot system errors:

- Platform Confidence Test (PCT). The PCT is used to test major subsystems and analog sensors of the system board.
- System Setup Utility (SSU). The SSU is used to read the System Event Log (SEL).

6.1.4.1 Platform Confidence Test (PCT)

The PCT consists of up to 31 tests that test the following subsystems:

- Processor
- Memory
- Input/output
- Management

The PCT supplies three testing levels:

- Quick Test. This runs a subset of available tests and identifies processor, memory, cache and hard drives.
- Comprehensive Tests. This runs Quick Tests and identifies keyboard, mouse, ports and controllers.
- Comprehensive Tests with Looping. This runs Comprehensive Tests, continually loops through tests until stopped, and enables identification of intermittently failing FRUs.

For information on how to run the PCT, see “Run Platform Confidence Test (PCT)” on page 4-26.

6.1.4.2 System Setup Utility (SSU)

The SSU is intended to help with troubleshooting system errors, and can be used to read the System Event log (SEL).

For information on how to run the SSU, see “Using the Service Partition Menu” on page 4-19.

6.2 Front and Rear Panel LEDs

This section describes the front- and rear-panel status LEDs on the Sun Fire V60x and Sun Fire V65x servers.

6.2.1 Front-Panel System Status LED

The front-panel system status LED is located as shown in Figure 6-1.

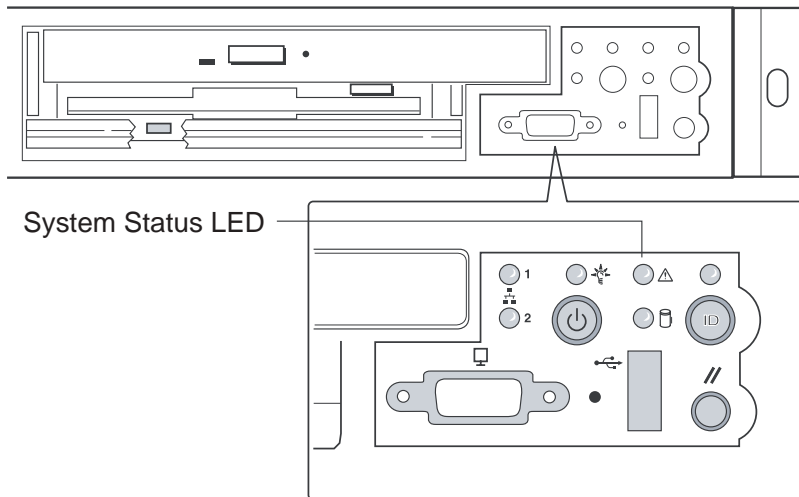


FIGURE 6-1 Location of Front-Panel System Status LED

The front-panel system status LED has the states indicated in Table 6-1.

TABLE 6-1 System Status LED States

System Status LED State	System Condition
CONTINUOUS GREEN	Indicates the system is operating normally.
BLINKING GREEN	Indicates the system is operating in a degraded condition.
BLINKING AMBER	Indicates the system is in a non-critical condition.
CONTINUOUS AMBER	Indicates the system is in a critical or non-recoverable condition.
NO LIGHT	Indicates POST/system stop.

Critical Condition

A critical condition or non-recoverable threshold crossing is indicated with a continuous amber status LED and is associated with the following events:

- Temperature, voltage, or fan critical threshold crossing.
- Power subsystem failure. The Baseboard¹ Management Controller (BMC) asserts this failure condition whenever it detects a power control fault (for example, if the BMC detects that the system power remains on even though the BMC has asserted the signal to turn off power to the system).
- The system is unable to power up due to incorrectly installed processor(s), or processor incompatibility.
- A satellite controller such as the HSC, or another IMPI-capable device, such as an add-in server management PCI card, sends a critical or non-recoverable state, by means of the Set Fault Indication command to the BMC.
- Critical Event Logging errors, including System Memory Uncorrectable ECC error and Fatal/Uncorrectable Bus errors, such as PCI SERR and PERR.

Non-Critical Condition

A non-critical condition is indicated with a blinking amber status LED and signifies that at least one of the following conditions is present:

- Temperature, voltage, or fan non-critical threshold crossing.
- Chassis intrusion.
- Satellite controller sends a non-critical state, through the Set Fault Indication command, to the BMC.
- A Set Fault Indication command from the system BIOS. The BIOS may use the Set Fault Indication command to indicate additional, non-critical status such as system memory or CPU configuration changes.

1. Baseboard refers to the server Main Board.

Degraded Condition

A degraded condition is indicated with a blinking green status LED and signifies that at least one of the following conditions is present:

- Non-redundant power supply operation. This only applies when the BMC is configured for a redundant power subsystem. The power unit configuration is configured via OEM SDR records.
- A processor is disabled by FRB or BIOS.
- BIOS has disabled or mapped out some of the system memory.

Refer to the Sun Fire V60x and Sun Fire V65x Servers Troubleshooting Guide for information on how to isolate the server component responsible for any of the critical, non-critical, or degraded conditions listed above.

6.2.2 Rear Panel Power Supply Status LED

The rear-panel power supply status LEDs are located as shown in Figure 6-2.

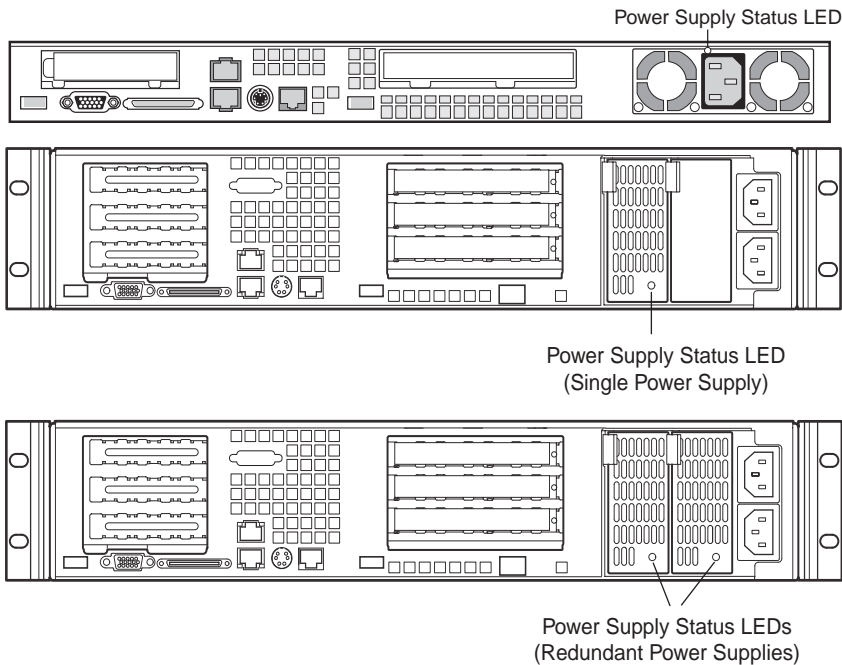


FIGURE 6-2 Location of Sun Fire V60x and Sun Fire V65x Servers Rear-Panel Power Supply Status LEDs

The rear-panel power supply status LED has the states indicated in Table 6-2.

TABLE 6-2 Power Supply Status LED States

Power Supply LED State	Power Supply Condition
OFF	No AC power present to power supply
BLINKING GREEN	AC power present, but only the standby outputs are on
GREEN	Power supply DC outputs on and OK
BLINKING AMBER	PSAlert# signal asserted, power supply on
AMBER	Power supply shutdown due to over current, over temperature, over voltage, or under voltage
AMBER or OFF	Power supply failed and AC fuse open or other critical failure

Note – If redundant power supplies are used in the Sun Fire V65x server, the power supply LEDs have the following meaning:

Both LEDs off = no power to power supplies or both power supplies bad
Both LEDs blinking green = power supplies receiving AC power, but server is off
Both LEDs solid green = server is fully powered on and power supplies are good
One LED solid green and one LED amber = AC power missing from one of the power supplies

6.2.3 Other LEDs

There are several additional LEDs on the front and rear panels that indicate status and activity. See Chapter 3, “Controls and Indicators,” for more details on these LEDs.

6.3 Server Main Board Fault LEDs

There are several fault and status LEDs built into the server board (see Figure 6-3). Some of these LEDs are visible only when the chassis cover is removed. The LEDs are explained in this section.

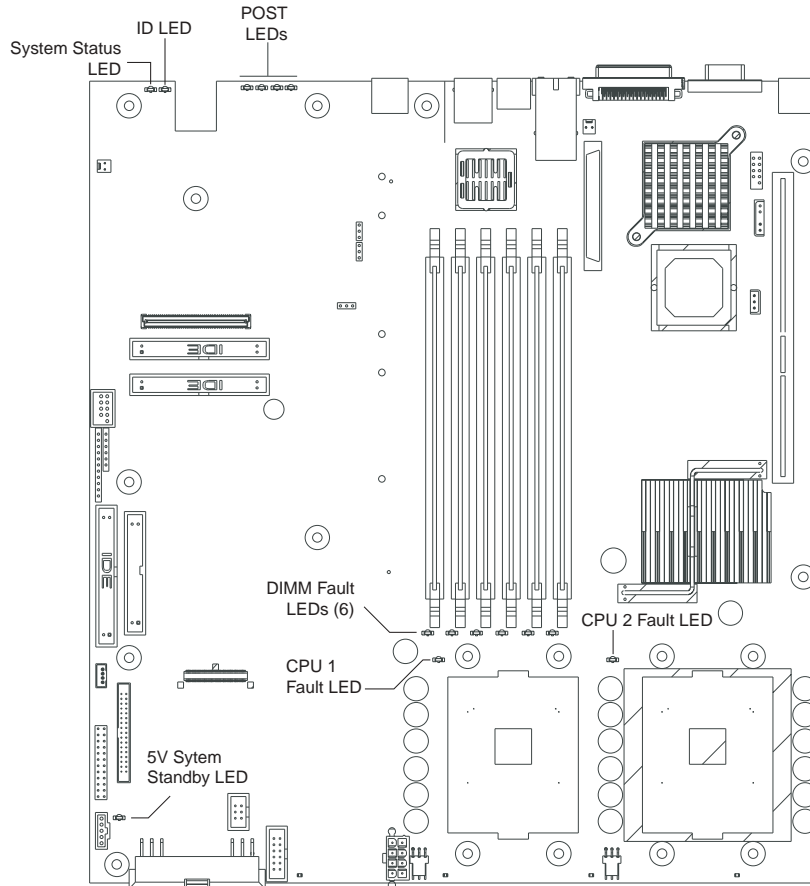


FIGURE 6-3 Fault and Status LEDs on the Server Board

The fault LEDs are summarized below. See the Sun Fire V60x and Sun Fire V65x Servers Troubleshooting Guide for a complete description.

- **POST LEDs:** To help diagnose POST failures, a set of four bi-color diagnostic LEDs is located on the back edge of the main board. Each of the four LEDs can have one of four states:

Off, Green, Red, or Amber. During the POST process, each light sequence represents a specific Post-80 POST code. If a system should hang during POST, the diagnostic LEDs present the last test executed before the hang. When you read the LEDs, they should be observed from the back of the system. The most significant bit (MSB) is the first LED on the left, and the least significant bit (LSB) is the last LED on the right.

See “POST LED Indicators” on page 6-18 for details regarding the POST LED display.

- **CPU Fault LEDs:** A fault indicator LED is located next to each of the processor sockets. If the server Baseboard Management Controller (BMC) detects a processor fault, the corresponding LED illuminates.
- **Memory Fault LEDs:** A fault indicator LED is located next to each of the DIMM sockets. If the BMC detects a fault in a given DIMM, the corresponding LED illuminates.

One LED for each DIMM is illuminated if that DIMM has an uncorrectable or multi-bit memory error. The LEDs maintain the same state across power switches, power down, or loss of AC power.

- **Fan Fault LEDs:** Depending on the server model, the fan header may include a fan fault LED. If the BMC detects a fan fault, the LED illuminates. If the fan fault LED is lit, the entire fan module must be replaced.
- **System Status LED:** Indicates functional status of the server board. Glows green when all systems are operating normally. Glows amber when one or more systems are in a fault status. This LED mirrors the function of the system status LED on the front panel.

See Table 6-1 on page 6-4 for a description of the LED states.

- **+5V Standby LED:** This green LED is on when the server is plugged into AC power, whether or not the server is actually powered on. AC power is applied to the system as soon as the AC cord is plugged into the power supply.
- **System ID LED:** This blue LED can be illuminated to identify the server when it is part of a large stack of servers. See “System ID LEDs” on page 6-9 for details.

6.4 System ID LEDs

A pair of blue LEDs, one at the rear of the server, and one on the front panel, can be used to easily identify the server when it is part of a large stack of servers. A single blue LED located at the back edge of the server board is visible through the rear panel. The two LEDs mirror each other and can be illuminated by the Baseboard Management Controller (BMC) either by pressing a button on the chassis front panel or through server-management software. When the button is pressed on the front panel, both LEDs illuminate and stay illuminated until the button is pushed again. If the LED is illuminated through a remote System Identify command, the LED turns off after a timeout period. See Figure 6-3 on page 6-7 for the location of the rear Main Board LED. The front panel ID LED and the ID activation button are shown in Figure 6-4.

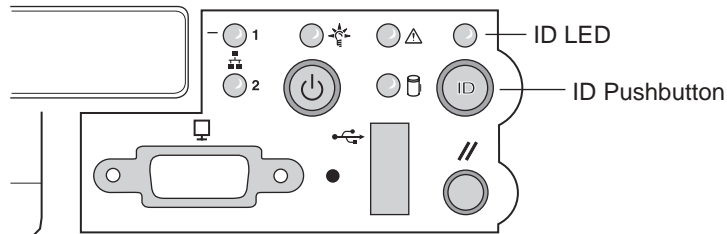


FIGURE 6-4 Location of Front-Panel ID Pushbutton and LED

6.5 Power-On Self Test (POST)

During the power-on self test (POST), the server may indicate a system fault by:

- Displaying error codes and messages at the display screen
- Beeping the speaker in a coded sequence
- Illuminating the POST LEDs, visible from the rear panel, in a coded fashion

6.5.1 POST Screen Messages

During POST, if an error is detected, the BIOS displays an error code and message on the screen. The tables in this section describe the standard and extended POST error codes and their associated messages. The BIOS prompts the user to press a key in case of serious errors. Some of the error messages are preceded by the string “Error” to highlight the fact that the system may be malfunctioning. All POST errors and warnings are logged in the System Event Log (SEL). See “Managing the System Event Log” on page 4-25 for more details on the SEL.

Note – All POST errors are logged to the SEL, which is capable of holding approximately 3200 entries. After the SEL is full, no further errors are logged. The SEL can be cleared using the SSU or the BIOS setup. The SEL is automatically cleared after running the PCT. See “Managing the System Event Log” on page 4-25 for more details.

Table 6-3 and Table 6-4 contain the POST error messages and error codes.

TABLE 6-3 Standard POST Error Messages and Codes

Error Code	Error Message	Pause On Boot
100	Timer Channel 2 error	Yes
101	Master Interrupt Controller	Yes
102	Slave Interrupt Controller	Yes
103	CMOS battery failure	Yes
104	CMOS options not set	Yes
105	CMOS checksum failure	Yes
106	CMOS display error	Yes
107	Insert key pressed	Yes
108	Keyboard locked message	Yes

TABLE 6-3 Standard POST Error Messages and Codes *(Continued)*

Error Code	Error Message	Pause On Boot
109	Keyboard stuck key	Yes
10A	Keyboard interface error	Yes
10B	System memory size error	Yes
10E	External cache failure	Yes
110	Floppy controller error	Yes
111	Floppy A: error	Yes
112	Floppy B: error	Yes
113	Hard disk 0 error	Yes
114	Hard disk 1 error	Yes
115	Hard disk 2 error	Yes
116	Hard disk 3 error	Yes
117	CD-ROM disk 0 error	Yes
118	CD-ROM disk 1 error	Yes
119	CD-ROM disk 2 error	Yes
11A	CD-ROM disk 3 error	Yes
11B	Date/time not set	Yes
11E	Cache memory bad	Yes
120	CMOS clear	Yes
121	Password clear	Yes
140	PCI error	Yes
141	PCI memory allocation error	Yes
142	PCI IO allocation error	Yes
143	PCI IRQ allocation error	Yes
144	Shadow of PCI ROM failed	Yes
145	PCI ROM not found	Yes
146	Insufficient memory to shadow PCI ROM	Yes

TABLE 6-4 Extended POST Error Messages and Codes

Error Code	Error Message	Pause On Boot
8100	Processor 1 failed BIST	No
8101	Processor 2 failed BIST	No
8110	Processor 1 internal error (IERR)	No
8111	Processor 2 internal error (IERR)	No
8120	Processor 1 thermal trip error	No
8121	Processor 2 thermal trip error	No
8130	Processor 1 disabled	No
8131	Processor 2 disabled	No
8140	Processor 1 failed FRB-3 timer	No
8141	Processor 2 failed FRB-3 timer	No
8150	Processor 1 failed initialization on last boot.	No
8151	Processor 2 failed initialization on last boot.	No
8160	Processor 01: unable to apply BIOS update	Yes
8161	Processor 02: unable to apply BIOS update	Yes
8170	Processor P1 :L2 cache failed	Yes
8171	Processor P2 :L2 cache failed	Yes
8180	BIOS does not support current stepping for Processor P1	Yes
8181	BIOS does not support current stepping for Processor P2	Yes
8190	Watchdog timer failed on last boot	No
8191	4:1 core to bus ratio: processor cache disabled	Yes
8192	L2 Cache size mismatch	Yes
8193	CPUID, processor stepping are different	Yes
8194	CPUID, processor family are different	Yes
8195	Front side bus speed mismatch: System halted	Yes, Halt
8196	Processor models are different	Yes
8197	CPU speed mismatch	Yes
8198	Failed to load processor microcode	Yes
8300	Baseboard Management Controller (BMC) failed to function	Yes
8301	Front panel controller failed to function	Yes

TABLE 6-4 Extended POST Error Messages and Codes *(Continued)*

Error Code	Error Message	Pause On Boot
8305	Hotswap controller failed to function	Yes
8420	Intelligent System Monitoring chassis opened	Yes
84F1	Intelligent System Monitoring forced shutdown	Yes
84F2	Server Management Interface failed	Yes
84F3	BMC in update mode	Yes
84F4	Sensor Data Record (SDR) empty	Yes
84FF	System event log full	No
8500	Bad or missing memory in slot 3A	Yes
8501	Bad or missing memory in slot 2A	Yes
8502	Bad or missing memory in slot 1A	Yes
8504	Bad or missing memory in slot 3B	Yes
8505	Bad or missing memory in slot 2B	Yes
8506	Bad or missing memory in slot 1B	Yes
8601	All memory marked as fail: forcing minimum back online	Yes

6.5.2 POST Error Beep Codes

The tables in this section list the POST error beep codes. Prior to system video initialization, the BIOS and BMC use these beep codes to notify users of error conditions.

TABLE 6-5 BMC-Generated POST Beep Codes

Beep Code ¹	Description
1	One short beep before boot (normal, not an error)
1-2	Search for option ROMs. One long beep and two short beeps on checksum failure.
1-2-2-3	BIOS ROM checksum
1-3-1-1	Test DRAM refresh
1-3-1-3	Test 8742 keyboard controller
1-3-3-1	Auto size DRAM. System BIOS stops execution here if the BIOS does not detect any usable memory DIMMs.
1-3-4-1	Base RAM failure. BIOS stops execution here if entire memory is bad.
2-1-2-3	Check ROM copyright notice.
2-2-3-1	Test for unexpected interrupts.
1-5-1-1	FRB failure (processor failure)
1-5-2-2	No processors installed or processor socket 1 is empty
1-5-2-3	Processor configuration error (for example, mismatched VIDs)
1-5-2-4	Front-side bus select configuration error (for example, mismatched BSELs)
1-5-4-2	Power fault: DC power unexpectedly lost (for example, power good from the power supply was deasserted)
1-5-4-3	Chipset control failure
1-5-4-4	Power control failure (for example, power good from the power supply did not respond to power request)

¹ The code indicates the beep sequence; for example, 1-5-1-1 means a single beep, then a pause, then 5 beeps in a row, then a pause, then a single beep, then a pause, and then finally a single beep.

TABLE 6-6 BIOS-Generated Boot Block POST Beep Codes

Beep Code	Error Message	Description
1	Refresh timer failure	The memory refresh circuitry on the motherboard is faulty.
2	Parity error	Parity can not be reset
3	Base memory failure	Base memory test failure. See Table 6-7 on page 6-15 for additional error details.
4	System timer	System timer is not operational
5	Processor failure	Processor failure detected
6	Keyboard controller Gate A20 failure	The keyboard controller may be bad. The BIOS cannot switch to protected mode.
7	Processor exception interrupt error	The CPU generated an exception interrupt.
8	Display memory read/write error	The system video adapter is either missing or its memory is faulty. This is not a fatal error.
9	ROM checksum error	System BIOS ROM checksum error
10	Shutdown register error	Shutdown CMOS register read/write error detected
11	Invalid BIOS	General BIOS ROM error

TABLE 6-7 Memory 3-Beep and LED POST Error Codes

Beep Code	Debug Port 80h Error Indicator	Diagnostic LED Decoder (G = green, R = red, A = amber)				Meaning
		MSB		LSB		
3	00h	Off	Off	Off	Off	No memory was found in the system
3	01h	Off	Off	Off	G	Memory mixed type detected
3	02h	Off	Off	G	Off	EDO is not supported
3	03h	Off	Off	G	G	First row memory test failure
3	04h	Off	G	Off	Off	Mismatched DIMMs in a row
3	05h	Off	G	Off	G	Base memory test failure
3	06h	Off	G	G	Off	Failure on decompressing post module

TABLE 6-7 Memory 3-Beep and LED POST Error Codes

Beep Code	Debug Port 80h Error Indicator	Diagnostic LED Decoder (G = green, R = red, A = amber)				Meaning
3	07h	Off	G	G	G	Generic memory error
	08h	G	Off	Off	Off	
	09h	G	Off	Off	G	
	0Ah	G	Off	G	Off	
	0Bh	G	Off	G	G	
	0Ch	G	G	Off	Off	
	0Dh	G	G	Off	G	
3	0Eh	G	G	G	Off	SMBUS protocol error
3	0Fh	G	G	G	G	Generic memory error

6.5.3 BIOS Recovery Beep Codes

In rare cases, when the system BIOS has been corrupted, a BIOS recovery process must be followed to restore system operability. During recovery mode, the video controller is not initialized. One high-pitched beep announces the start of the recovery process. The entire process takes two to four minutes. A successful update ends with two high-pitched beeps. In the event of a failure, two short beeps are generated and a flash code sequence of 0E9h, 0EAh, 0EBh, 0ECh, and 0EFh appears at the Port 80 diagnostic LEDs (see Table 6-8 on page 6-17).

TABLE 6-8 BIOS Recovery Beep Codes

Beep Code	Error Message	Port 80h LED Indicators	Description
1	Recovery started		Start recovery process.
2	Recovery boot error	Flashing series of post codes: E9h EAh EBh ECh EFh	Unable to boot to floppy, ATAPI, or ATAPI CDROM. Recovery process will retry.
Series of long low-pitched single beeps	Recovery failed	EEh	Unable to process valid BIOS recovery images. BIOS already passed control to OS and flash utility.
Two long high pitched beeps	Recovery complete	EFh	BIOS recovery succeeded, ready for powerdown, reboot.

6.5.4 POST LED Indicators

To help diagnose POST failures, a set of four bi-color diagnostic LEDs is located on the back edge of the server Main Board. Each of the four LEDs can have one of four states: Off, Green, Red, or Amber.

The LED diagnostics feature consists of a hardware decoder and four dual color LEDs. During boot block POST and post boot block POST, the LEDs display all normal Port80 codes representing the progress of the BIOS POST. Each POST code is represented by a combination of colors from the four LEDs. The LEDs are in pairs of green and red. The POST codes are broken into two nibbles, an upper and a lower nibble. Each bit in the upper nibble is represented by a red LED and each bit in the lower nibble is represented by a green LED. If both bits are set in the upper and lower nibble, both red and green LEDs are illuminated, resulting in an amber color. Likewise, if both bits are clear, the red and green LEDs are off.

During the POST process, each light sequence represents a specific Port-80 POST code. If a system should hang during POST, the diagnostic LEDs present the last test executed before the hang. When you read the LEDs, observe them from the back of the system. The most significant bit (MSB) is the leftmost LED, and the least significant bit (LSB) is the rightmost LED.

Note – When comparing a diagnostic LED color string from the server Main Board to those listed in the diagnostic LED decoder in the following tables, the LEDs on the Main Board should be referenced when viewed by looking into the system from the back. Reading the LEDs from left to right, the most-significant bit is located on the left.

TABLE 6-9 Boot Block POST Progress LED Codes (Port 80h Codes)

POST Code	Diagnostic LED Decoder (G = green, R = red, A = amber)				Description
	MSB		LSB		
10h	Off	Off	Off	R	The NMI is disabled. Start power-on delay. Initialization code checksum verified.
11h	Off	Off	Off	A	Initialize the DMA controller, perform the keyboard controller BAT test, start memory refresh, and enter 4 GB flat mode.
12h	Off	Off	G	R	Get start of initialization code and check BIOS header.
13h	Off	Off	G	A	Memory sizing.
14h	Off	G	Off	R	Test base 512K of memory. Return to real mode. Execute any OEM patches and set up the stack.

TABLE 6-9 Boot Block POST Progress LED Codes (Port 80h Codes) *(Continued)*

POST Code	Diagnostic LED Decoder (G = green, R = red, A = amber)				Description
15h	Off	G	Off	A	Pass control to the uncompressed code in shadow RAM. The initialization code is copied to segment 0 and control will be transferred to segment 0.
16h	Off	G	G	R	Control is in segment 0. Verify the system BIOS checksum. If the system BIOS checksum is bad, go to checkpoint code E0h; otherwise, going to checkpoint code D7h.
17h	Off	G	G	A	Pass control to the interface module.
18h	G	Off	Off	R	Decompression of the main system BIOS failed.
19h	G	Off	Off	A	Build the BIOS stack. Disable USB controller. Disable cache.
1Ah	G	Off	G	R	Uncompress the POST code module. Pass control to the POST code module.
1Bh	A	R	Off	R	Decompress the main system BIOS runtime code.
1Ch	A	R	Off	A	Pass control to the main system BIOS in shadow RAM.
E0h	R	R	R	Off	Start of recovery BIOS. Initialize interrupt vectors, system timer, DMA controller, and interrupt controller.
E8h	A	R	R	Off	Initialize extra module if present.
E9h	A	R	R	G	Initialize floppy controller.
EAh	A	R	A	Off	Try to boot floppy diskette.
EBh	A	R	A	G	If floppy boot fails, initialize ATAPI hardware.
ECh	A	A	R	Off	Try booting from ATAPI CD-ROM drive.
EEh	A	A	A	Off	Jump to boot sector.
EFh	A	A	A	G	Disable ATAPI hardware.

TABLE 6-10 POST Progress LED Codes (Port 80h Codes)

POST Code	Diagnostic LED Decoder (G = green, R = red, A = amber)				Description
	MSB			LSB	
20h	Off	Off	R	Off	Uncompress various BIOS modules.
22h	Off	Off	A	Off	Verify password checksum.
24h	Off	G	R	Off	Verify CMOS checksum.
26h	Off	G	A	Off	Read microcode updates from BIOS ROM.
28h	G	Off	R	Off	Initializing the processors. Set up processor registers. Select least featured processor as the BSP.
2Ah	G	Off	A	Off	Go to Big Real mode.
2Ch	G	G	R	Off	Decompress INT13 module.
2Eh	G	G	A	Off	Keyboard controller test: the keyboard controller input buffer is free. Next, the BAT command will be issued to the keyboard controller.
30h	Off	Off	R	R	Swap keyboard and mouse ports, if needed.
32h	Off	Off	A	R	Write command byte 8042: the initialization after the keyboard controller BAT command test is done. The keyboard command byte will be written next.
34h	Off	G	R	R	Keyboard Init: the keyboard controller command byte is written. Next, the pin 23 and 24 blocking and unblocking commands will be issued.
36h	Off	G	A	R	Disable and initialize the 8259 programmable interrupt controller.
38h	G	Off	R	R	Detect configuration mode, such as CMOS clear.
3Ah	G	Off	A	R	Chipset initialization before CMOS initialization.
3Ch	G	G	R	R	Init system timer: the 8254 timer test is over. Starting the legacy memory refresh test next.
3Eh	G	G	A	R	Check refresh toggle: the memory refresh line is toggling. Checking the 15 second on/off time next.
40h	Off	R	Off	Off	Calculate CPU speed.
42h	Off	R	G	Off	Init interrupt vectors: interrupt vector initialization is done.
44h	Off	A	Off	Off	Enable USB controller in chipset.
46h	Off	A	G	Off	Initialize SMM handler. Initialize USB emulation.
48h	G	R	Off	Off	Validate NVRAM areas. Restore from backup if corrupted.

TABLE 6-10 POST Progress LED Codes (Port 80h Codes) *(Continued)*

POST Code	Diagnostic LED Decoder (G = green, R = red, A = amber)				Description
	G	R	A	Off	
4Ah	G	R	G	Off	Load defaults in CMOS RAM if bad checksum or CMOS clear jumper is detected.
4Ch	G	A	Off	Off	Validate date and time in RTC.
4Eh	G	A	G	Off	Determine number of microcode patches present.
50h	Off	R	Off	R	Load microcode to all CPUs.
52h	Off	R	G	R	Scan SMBIOS GPNV areas.
54h	Off	A	Off	R	Early extended memory tests.
56h	Off	A	G	R	Disable DMA.
58h	G	R	Off	R	Disable video controller.
5Ah	G	R	G	R	8254 timer test on channel 2.
5Ch	G	A	Off	R	Enable 8042. Enable timer and keyboard IRQs. Set video mode initialization before setting the video mode is complete. Configuring the monochrome mode and color mode settings next.
5Eh	G	A	G	R	Initialize PCI devices and motherboard devices. Pass control to video BIOS. Start serial console redirection.
60h	Off	R	R	Off	Initialize memory test parameters.
62h	Off	R	A	Off	Initialize AMI display manager module. Initialize support code for headless system if no video controller is detected.
64h	Off	A	R	Off	Start USB controllers in chipset.
66h	Off	A	A	Off	Set up video parameters in BIOS data area.
68h	G	R	R	Off	Activate ADM: the display mode is set. Displaying the power-on message next.
6Ah	G	R	A	Off	Initialize language module. Display splash logo.
6Ch	G	A	R	Off	Display sign on message, BIOS ID, and processor information.
6Eh	G	A	A	Off	Detect USB devices.
70h	Off	R	R	R	Reset IDE Controllers.
72h	Off	R	A	R	Displaying bus initialization error messages.
74h	Off	A	R	R	Display setup message: the new cursor position has been read and saved. Displaying the hit setup message next.
76h	Off	A	A	R	Ensure timer keyboard interrupts are on.
78h	G	R	R	R	Extended background memory test start.
7Ah	G	R	A	R	Disable parity and NMI reporting.

TABLE 6-10 POST Progress LED Codes (Port 80h Codes) *(Continued)*

POST Code	Diagnostic LED Decoder				Description
	(G = green, R = red, A = amber)				
7Ch	G	A	R	R	Test 8237 DMA controller: the DMA page register test passed. Performing the DMA controller 1 base register test next.
7Eh	G	A	A	R	Initialize 8237 DMA controller: the DMA controller 2 base register test passed. Programming DMA controllers 1 and 2 next.
80h	R	Off	Off	Off	Enable mouse and keyboard: the keyboard test has started. Clearing the output buffer and checking for stuck keys. Issuing the keyboard reset command next
82h	R	Off	G	Off	Keyboard interface test: A keyboard reset error or stuck key was found. Issuing the keyboard controller interface test command next.
84h	R	G	Off	Off	Check stuck key enable keyboard: the keyboard controller interface test is complete. Writing the command byte and initializing the circular buffer next.
86h	R	G	G	Off	Disable parity NMI: the command byte was written and global data initialization has completed. Checking for a locked key next.
88h	A	Off	Off	Off	Display USB devices.
8Ah	A	Off	G	Off	Verify RAM size: Checking for a memory size mismatch with CMOS RAM data next.
8Ch	A	G	Off	Off	Lock out PS/2 keyboard/mouse if unattended start is enabled.
8Eh	A	G	G	Off	Initialize boot devices: the adapter ROM had control and has now returned control to the BIOS POST. Performing any required processing after the option ROM returned control.
90h	R	Off	Off	R	Display IDE mass storage devices.
92h	R	Off	G	R	Display USB mass storage devices.
94h	R	G	Off	R	Report the first set of POST errors to Error Manager.
96h	R	G	G	R	Boot password check: the password was checked. Performing any required programming before Setup next.
98h	A	Off	Off	R	Float processor initialize: performing any required initialization before the coprocessor test next.
9Ah	A	Off	G	R	Enable Interrupts 0, 1, 2: checking the extended keyboard, keyboard ID, and NUM Lock key next. Issuing the keyboard ID command next.
9Ch	A	G	Off	R	Initialize FDD devices. Report second set of POST errors to error messenger.
9Eh	A	G	G	R	Extended background memory test end.

TABLE 6-10 POST Progress LED Codes (Port 80h Codes) *(Continued)*

POST Code	Diagnostic LED Decoder (G = green, R = red, A = amber)				Description
A0h	R	Off	R	Off	Prepare and run setup: Error manager displays and logs POST errors. Waits for user input for certain errors. Execute setup.
A2h	R	Off	A	Off	Set base expansion memory size.
A4h	R	G	R	Off	Program chipset setup options, build ACPI Tables, and build INT15h E820h table. Note that the Solaris OS does not support ACPI.
A6h	R	G	A	Off	Set display mode.
A8h	A	Off	R	Off	Build SMBIOS table and MP tables.
AAh	A	Off	A	Off	Clear video screen.
ACh	A	G	R	Off	Prepare USB controllers for operating system.
A Eh	A	G	A	Off	One beep to indicate end of POST. No beep if silent boot is enabled.
000h	Off	Off	Off	Off	POST completed. Passing control to INT 19h boot loader next.

6.6 Contacting Technical Support

For technical support, call the phone numbers listed below, according to your location.

United States 1-800-USA-4SUN (1-800-872-4786)

UK Tel: +44 870-600-3222

France Tel: +33 1 34 03 5080

Germany Tel: +49 1805 20 2241

Italy Tel: +39 02 92595228, Toll Free 800 605228

Spain Tel: +011 3491 767 6000

See the following link for US, Europe, South America, Africa, and APAC local country telephone numbers:

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

For general support and documentation on the servers, see the following link:

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

Specifications

This chapter summarizes the specifications and capabilities of the Sun Fire V60x and Sun Fire V65x servers. The capabilities require software to enable them.

7.1 Single or Dual Intel® Xeon™ Processors

- 2.8 GHz and 3.06 GHz
- INT3/FCPGA sockets
- 604-pin package

7.2 Intel E7501 Chipset

- Supports 533-MHz front side bus (FSB)
- MCH memory controller (Northbridge)
- ICH3-S controller (Southbridge)
- P64H2 64-bit I/O hub

7.3 Memory

Six dual-inline memory modules (DIMMs) slots support:

- DDR266¹-compliant, ECC, registered, 72-bit, 184-pin, DIMMs
- x72 ECC organization
- From 256 MB to 12 GB of memory (Sun Fire V65x server) or 6 GB (Sun Fire V60x server).
- The ECC implementation detects and corrects single-bit errors and detects multiple-bit errors.
- Two DIMMs must be populated in a bank for an x144 wide memory data path.
- Any or all memory banks may be populated.
- A DIMM failure LEDs is provided for each DIMM socket. An illuminated LED indicates a double-bit DIMM error.

7.4 Graphics and Video

- Integrated onboard ATI RAGE XL PCI controller
 - SVGA video controller
 - Clock generator
 - 2D and 3D engine
 - RAMDAC (random access memory digital to analog converter)
- 8 MB SDRAM of video memory
- Video subsystem supports modes up to 1600 x 1200 resolution under 2D, and up to 1024 x 768 resolution under 3D.
- Both CRT and analog LCD monitors are supported up to a 100 Hz vertical refresh rate through an onboard 15-pin VGA connector.
- All standard IBM VGA modes are supported.

1. Only DDR266 is supported with a 533-MHz FSB. DDR200 or DDR266 is supported with a 400-MHz FSB.

7.5 PCI Bus

Two PCI riser board slots are capable of supporting an of the following configurations:

- Sun Fire V60x server configuration: one full-length, full-height 64-bit PCI riser board slot and one Low Profile (LP) 64-bit PCI riser board slot
- Sun Fire V65x server configuration: three full-length, full-height 64-bit PCI riser board slots and three LP 64-bit PCI riser board slots
- Three separate and independent PCI buses:
 - Segment A: 32-bit, 33 MHz, 5V (P32-A) with two embedded devices:
2D/3D graphics controller: ATI Rage* XL Video Controller with 8 MB of memory
 - Segment B: 64-bit, 133 MHz, 3.3V, PCI-X (P64-B) supporting the following configuration:
One PCI I/O riser board slot capable of supporting full length PCI add-in cards
Dual-channel Intel® 10/100/1000 82546EB Gigabit Ethernet Controller
 - Segment C: 64-bit, 133 MHz, 3.3V PCI-X (P64-C) supporting the following devices:
One PCI I/O riser board slot capable of supporting low-profile PCI add-in cards
Dual-channel SCSI with Zero Channel RAID (ZCR) and host RAID support

Note – The slot in the full-height and low-profile PCI riser boards closest to the main board is reserved for zero-channel RAID controller use.

7.6 SCSI

- Dual-channel Ultra320 SCSI with zero-channel RAID support
- Adaptec® AIC-7902W SCSI controller
- Main board provides active terminators, termination voltage, a resettable fuse, and a protection diode for both SCSI channels.

7.7 Network Interface

- Dual on-board 10/100/1000 82546EB Network Interface Controllers (NIC)
- 82546EB controller features:
 - 32-bit, 133-MHz PCI-X bus master interface
 - Integrated IEEE 802.3 10BASE-T, 100BASE-TX and 1000BASE-TX compatible PHY¹
 - IEEE 802.3u AutoNegotiation support
 - Full-duplex support at 10/100/1000 Mbps operation
 - Advanced Network Services (ALS):

Adapter fault tolerance (AFT) provides automatic redundancy for up to eight network adapters.

Preferred primary adapter designates one adapter as the Preferred Primary.

Adaptive load balancing (ALB) balances network traffic between two or more network adapters; AFT occurs automatically.

Cisco Fast EtherChannel* (an implementation of ALB) allows increased transmission rates in both directions.

Note – When implementing adapter teaming and ALB, the preferred configuration is to use the primary onboard NIC (NIC 1)¹ for management functions and to use the secondary onboard NIC (NIC 2) and additional add-in NICs for the team.

Two onboard 8-pin, RJ-45 Ethernet connectors provide physical network connectivity. Each of the RJ-45 connectors includes a pair of status LEDs (link/activity LED and operating speed LED). The state of the individual LED indicates the following:

- Link/activity LED: Solid green indicates an active network connection is present; blinking green indicates data transmit/receive activity
- Speed LED: Off indicates 10 Mbps operation; solid amber indicates 100 Mbps operation

1. If NIC 1 is used for server management, do not aggregate NIC 1 with any other NIC port.

7.8 System I/O

- One PS/2 keyboard/mouse port (6 pin DIN connector).
- Two VGA video port 15-pin connectors available at front or back of server. Only one port can be used at a time.
- Three external USB v1.1 ports (one at the front and two at the back), with an internal connector providing two additional USB ports.
- One external serial COM2 port (RJ-45), and one internal COM 1 header.
- One external SCSI port, and one internal.
- Two RJ45 NIC ports.
- One IDE connector, supporting one or two ATA-100 compatible devices.

7.9 Server Management Features

- Baseboard Management Controller (BMC), which provides monitoring, alerting, and logging of critical system information obtained from embedded sensors on the server board. Also provides in band and out-of-band Lights-out and remote-management capability.
- One rear-mount low-profile RJ-45 serial port connection to support compatible common serial line concentrators (for example, Cisco and Lantronix).
- Variable-speed tachometer fans and thermal sensors throughout the server.
- Fault/Status LEDs located throughout the server board for simple fault isolation.
- Multiple server management headers providing on-board interconnects to server management features.
- SSI-compliant connectors for SSI interface support: front panel, floppy, and ATA-33.
- IPMI 1.5 and DMI 2.0 standard interfaces to management functions.
- Dedicated service partition on hard disk.

7.10 Power Supply

- Sun Fire V60x server power supply: the power supply is rated for 350 watts of power at the following voltages:
 - 100-127 V at 50/60 Hz; 4.96 A max.
 - 200-240 V at 50/60 Hz; 2.48 A maximum
- Sun Fire V65x server power supply: the power supply cage can support up to two TPW 500W SSI power supply modules in a 1+1 configuration or a non-redundant single module configuration (1+0). The cage incorporates dual AC inputs with two EMI filters. The following voltages are supported:
 - 100-127 V at 50/60 Hz; 7.2 A max.
 - 200-240 V at 50/60 Hz; 3.5 A maximum

7.11 Dimensions

- Sun Fire V60x server:
 - Height: 1.693 in. (43 mm)
 - Width 16.93 in. (430 mm)
 - Depth: 23.89 in. (609.2 mm)
- Sun Fire V65x server:
 - Height: 3.504 in. (89 mm)
 - Width 16.93 in. (430 mm)
 - Depth: 25.51 in. (648 mm)

7.12 Mounting Options

- Mid mount
- Four point mount
- Front mount (with limitations)

7.13 Environmental

7.13.1 Ambient Temperature

- Operating Temperature: +10° C to +35° C
- Non-Operating Temperature: -40° C to +70° C

7.13.2 Relative Humidity

- Non-Operating Humidity: 90% at 35° C non-condensing

7.13.3 Shock

- Operating shock: no errors with a half sine wave shock of 2G (with 11 millisecond duration)

7.13.4 Acoustics

- Sound Pressure: 55 dBA (rackmount) in an idle state at typical office ambient temperature (23° C ± 2° C).
- Sound Power: 7.0 dBA in an idle state at typical office ambient temperature (23° C ± 2° C)

7.13.5 ESD

- ±15 kV

7.13.6 Altitude

- Up to 3000 meters (9842 feet)

Installing RAID

This appendix describes how to install and configure the Sun Fire V60x or Sun Fire V65x server Zero-Channel RAID card.

Note – The Solaris Intel Platform Edition operating system does not contain drivers for the Sun Fire V60x or Sun Fire V65x server Zero-Channel RAID card.

This appendix contains the following sections:

- “Quick Installation” on page A-2
- “RAID Background” on page A-11
- “Preparing for Installation” on page A-18
- “OS Support” on page A-19
- “Supported SCSI Technology” on page A-19
- “RAID Array Drive Roaming” on page A-21
- “RAID Controller Drive Limitations” on page A-21

A.1 Quick Installation

This section is intended to allow you to quickly install RAID on your Sun Fire V60x or Sun Fire V65x server. It contains step-by-step instructions for installing an operating system on a single RAID volume using the hard disk drives already installed in the server. If you plan on using a different operating system, need a more advanced RAID configuration, or need safety and regulation information, please contact a Sun representative.

For additional background and details, please refer to the following sections of this appendix:

- “RAID Background” on page A-11
- “Preparing for Installation” on page A-18
- “OS Support” on page A-19
- “Supported SCSI Technology” on page A-19
- “RAID Array Drive Roaming” on page A-21
- “RAID Controller Drive Limitations” on page A-21

A.1.1 What You Will Need

Following is a list of items you need to successfully complete a RAID installation on your server:

- SCSI hard disk drives (see “Replaceable Components” on page 1-18)
- Intel Integrated RAID (IIR) controller board. Model IIRZN0CHXX (SRCZCR), Sun part number 595-6945-01
- RAID software suite CD
- Blank formatted floppy diskette
- Operating system CDs

A.1.2 RAID Installation Procedure

Follow these steps to install a RAID system on your server:

1. **Make an OS installation diskette.**
 - a. **Boot the server from the RAID software CD.**

Select **Make Diskettes from the ROMDOS Startup Menu** that appears (see **Figure A-1**).

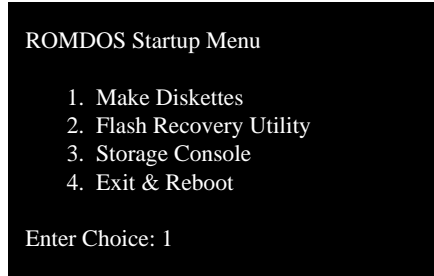


FIGURE A-1 ROMDOS Setup Menu

- b. Create an operating system diskette for the OS you will be installing.
2. Install the zero-channel RAID controller board in the server.
- a. Power down the server.
 - b. Disconnect the server power cord(s).
 - c. Remove the server top cover.
 - d. Unplug and remove the full-height riser board from the server.

Note – The full-height riser board is the one on the left when the server is viewed from the front.

- e. Install the zero-channel RAID controller in the full-height riser board, in the slot closest to the surface of the main board of the server (see Figure A-2).

Note – Figure A-2 shows installation of the controller in a 1U server. Figure A-3 shows installation of the controller in a 2U server. Make sure to install the controller in the slot closest to the server main board.

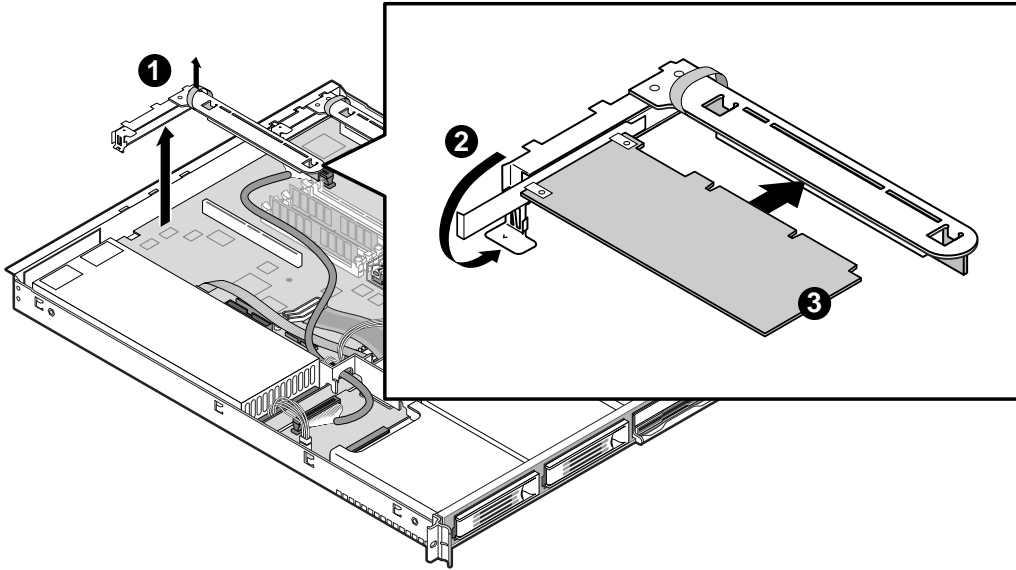


FIGURE A-2 Installing the Zero-Channel RAID Controller Card in a Sun Fire V60x Server

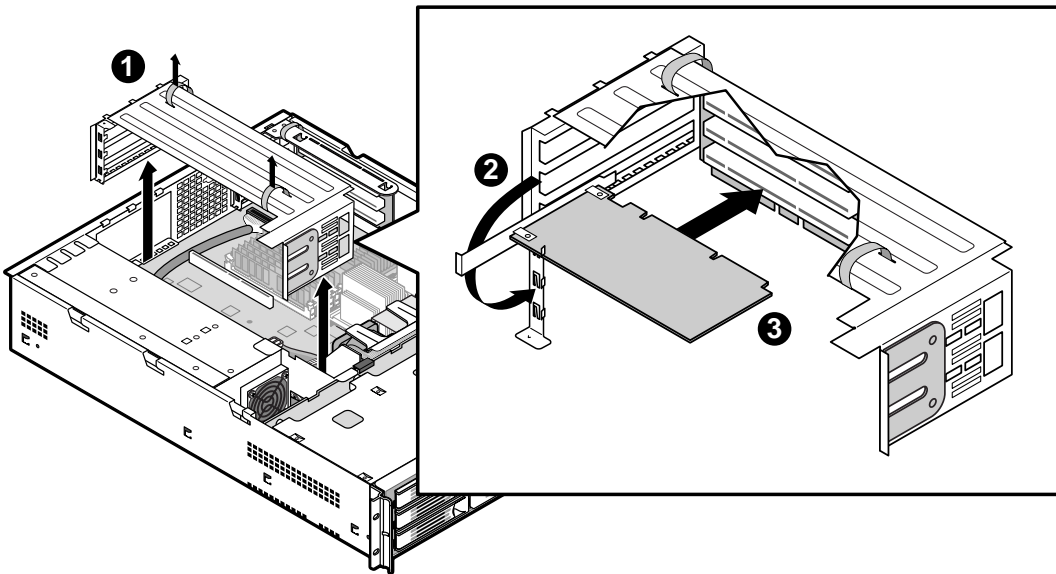


FIGURE A-3 Installing Zero-Channel the RAID Controller Card in a Sun Fire V65x Server

Note – The RAID board is a zero channel RAID controller and thus uses the SCSI controller on the server main board to access the server’s hard drives. Therefore, the board must be plugged into a modular RAID on motherboard (MROMB) enabled PCI slot in the server. This slot is located in the full-height riser board slot closest to the main server board.

f. Replace the riser board, with the RAID controller board in it.

Note – The RAID controller uses the SCSI controller on the server board to communicate with the drives, so no SCSI cables need to be connected to the controller board.

3. Create a bootable host drive (RAID Volume).

Note – Refer to “RAID Levels” on page A-11 as needed to decide on your desired RAID configuration.

- a. Power on the server and press <Ctrl> + <G> when the screen shown in Figure A-4 appears.

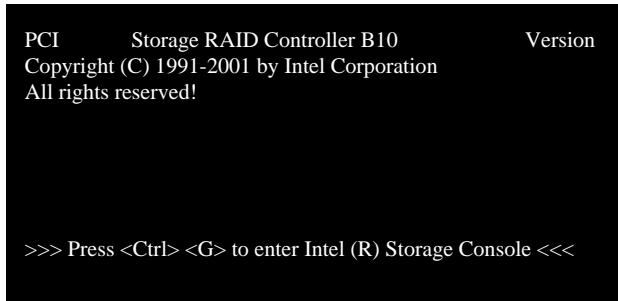
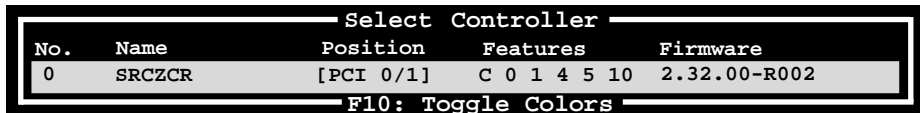


FIGURE A-4 Entering the Storage Console Software

After you press <Ctrl>+<G>, the following two messages appear at the bottom of the screen:

```
Intel (R) Storage Console to start after POST
Please wait to start Intel (R) Storage Console
```

When the Storage Console software starts, it indicates that the RAID controller (SRCZCR) is installed in the server (see Figure A-5).



No.	Name	Position	Features	Firmware
0	SRCZCR	[PCI 0/1]	C 0 1 4 5 10	2.32.00-R002

F10: Toggle Colors

FIGURE A-5 Installed RAID Controller

- b. Press <Enter> to select the SRCZCR controller.
- c. At the Express Setup window, select Configure Host Drives and press <Enter> (see Figure A-6).



FIGURE A-6 Express Setup Window

d. Select Create new Host Drive at the next window (see Figure A-7).

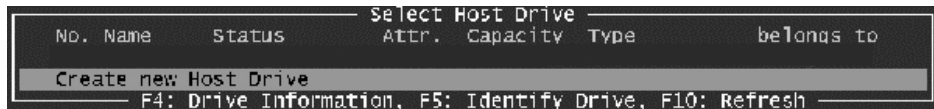


FIGURE A-7 Select Host Drive Window

A list of available hard disk drives is displayed (see Figure A-8). These are drives that do not belong to a logical host drive and can be used for new RAID host drives.

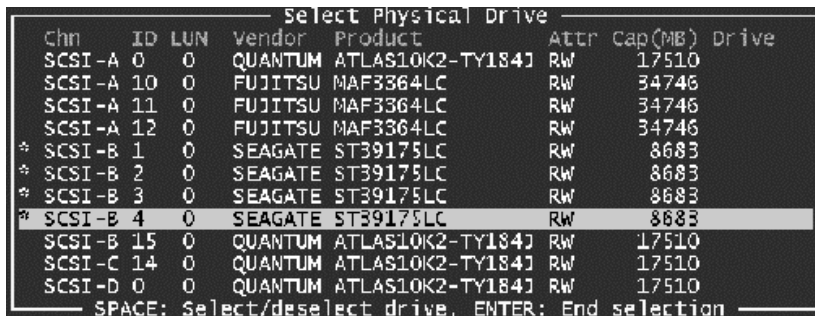


FIGURE A-8 Select Physical Drive Window

- e. Use the arrow keys and the space bar to select the hard drives you wish to include in the RAID system (the ones that are available are marked with an "*").

To select or deselect a drive, move the highlight over the drive with the arrow keys and press the space bar.

- f. Press <Enter> when you are satisfied with your selections.

The Choose Type menu appears, offering various host type drives (see Figure A-9).



FIGURE A-9 Choose Type Window

- g. Select the host drive type (RAID 0, RAID 1, RAID 1 + HotFix, RAID 4, RAID 4 + HotFix, RAID 5, RAID 5 + HotFix, or RAID 10), and press <Enter>.

For security reasons, you are asked if you really want to use the disk(s) you selected in step 3e to create a host drive. A warning is displayed that all data on the disk(s) will be destroyed (see Figure A-10).



FIGURE A-10 Caution Window

- h. Press <Y> to confirm your choice.

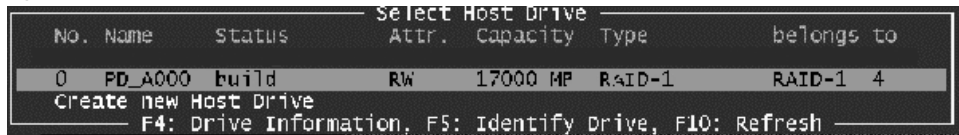
The Storage Console software creates a new host drive, and a window is displayed that asks you to enter the appropriate drive capacity (see Figure A-11).



FIGURE A-11 Capacity Per Drive

- i. Enter the appropriate drive capacity and press <Y>.

A window is displayed that allows you to begin the host drive build process (see Figure A-12).



No.	Name	Status	Attr.	Capacity	Type	belongs to
0	PD_A000	build	RW	17000 MP	RAID-1	RAID-1 4

Create new Host Drive
F4: Drive Information, F5: Identify Drive, F10: Refresh

FIGURE A-12 Building the Drive

- j. Press <F10> to refresh and begin the build process.

The status indicates “build” and does not change to “ready” until the RAID array has been built.

Note – The RAID array build continues as a background task. You can wait for the build to complete before exiting Storage Console or you can exit Storage Console and the array build will continue in the background after BIOS POST after reboot. You can then proceed with OS installation while the array continues the build process in the background.

When leaving Storage Console (by pressing <Esc>), a progress window informs you about the estimated completion time for the build process.

When the build process successfully completes, the disk array changes to “idle” status.

4. Set the BIOS Boot Order.

This step requires that you enter into the server BIOS menu and set up the proper boot priority.

- a. During POST, press <F2> when prompted to enter the BIOS Setup Utility.
- b. Navigate to the Boot menu and select Boot Device Priority.
- c. Set up the following boot order:
 - Removable Devices
 - ATAPI CD-ROM Drive
 - Hard Drive
 - Intel (R) Boot Agent
- d. Press <Esc> to return to the previous screen.
- e. Access the Hard Disk Drives submenu in the BIOS setup and make sure the Intel (R) RAID Host Drive is at the top of the priority list.

f. Press <F10> to save your BIOS changes and exit.

The system reboots.

RAID installation is now complete. At this point, you must install the OS.

A.2 RAID Background

A.2.1 Why RAID?

RAID (redundant array of independent disks; originally redundant array of inexpensive disks) is a way of storing the same data in different places (thus, redundantly) on multiple hard disks. By placing data on multiple disks, I/O operations can overlap in a balanced way, improving performance. Because having multiple disks increases the mean time between failure (MTBF), storing data redundantly also increases fault-tolerance.

A RAID system appears to the operating system to be a single logical hard disk. RAID employs the technique of striping, which involves partitioning each drive's storage space into units ranging from a sector (512 bytes) up to several megabytes. The stripes of all the disks are interleaved and addressed in order.

In a single-user system where large records, such as medical or other scientific images, are stored, the stripes are typically set up to be small (perhaps 512 bytes) so that a single record spans all disks and can be accessed quickly by reading all disks at the same time.

In a multi-user system, better performance requires establishing a stripe wide enough to hold the typical or maximum size record. This allows overlapped disk I/O across drives.

A.2.2 RAID Levels

This section explains the various types of RAID configurations, or levels. Each RAID level has its advantages and disadvantages. Before you decide on the RAID level to set up on your server, you may want to read the following information.

Note – If you are already familiar with RAID systems, you may skip ahead to “Preparing for Installation” on page A-18.

A.2.2.1 RAID 0 (Data Striping)

Data blocks are split into stripes based on the adjusted stripe size (for example, 128 KB) and the number of hard disks. Each stripe is stored on a separate hard disk (see Figure A-13). Significant improvement of the data throughput is achieved using this RAID level, especially with sequential read and write. RAID 0 includes no redundancy. When one hard disk fails, all data is lost.

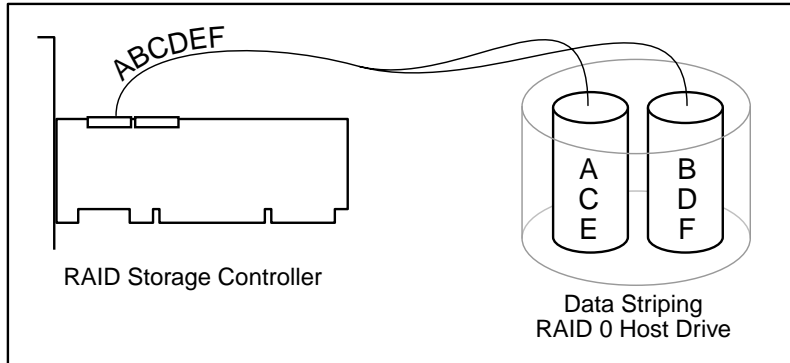


FIGURE A-13 RAID 0 (Data Striping)

A.2.2.2 RAID 1 (Disk Mirroring/Disk Duplexing)

All data is stored twice on two identical hard disks. When one hard disk fails, all data is immediately available on the other without any impact on performance and data integrity.

With Disk Mirroring (Figure A-14), two hard disks are mirrored on one I/O channel. If each hard disk is connected to a separate I/O channel, it is called Disk Duplexing (Figure A-15).

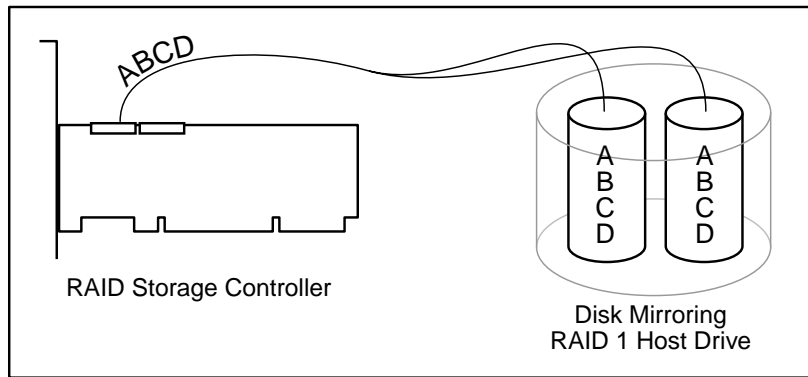


FIGURE A-14 RAID 1 (Disk Mirroring)

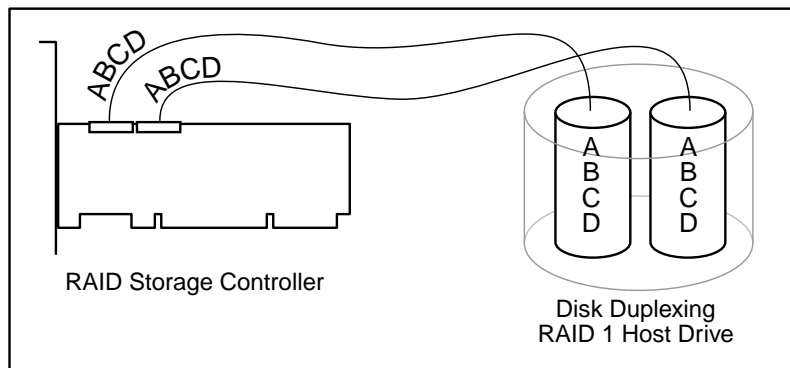


FIGURE A-15 RAID 1 (Disk Duplexing)

RAID 1 represents an easy and highly efficient solution for data security and system availability. It is especially suitable for installations which are not too large (the available capacity is only half of the installed capacity).

A.2.2.3 RAID 4 (Data Striping with a Dedicated Parity Drive)

RAID 4 works in the same way as RAID 0. The data is striped across the hard disks and the controller calculates redundancy data (parity information) that is stored on a separate hard disk (P1, P2, ...), as shown in Figure A-16. Should one hard disk fail, all data remains fully available. Missing data is recalculated from existing data and parity information.

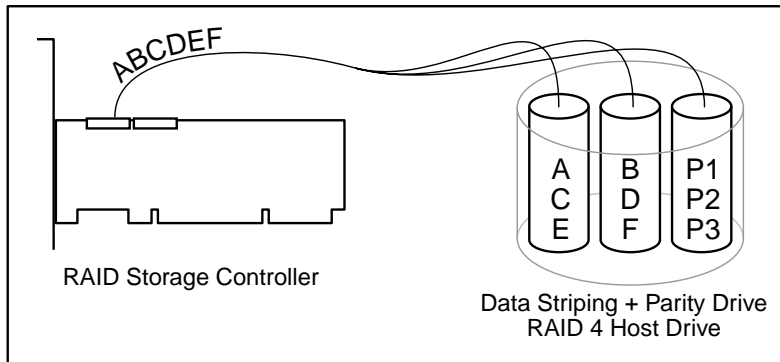


FIGURE A-16 RAID 4 (Data Striping With a Dedicated Parity Drive)

Unlike RAID 1, only the capacity of one hard disk is needed for redundancy. For example, in a RAID 4 disk array with 5 hard disks, 80% of the installed hard disk capacity is available as user capacity, and only 20% is used for redundancy. In systems with many small data blocks, the parity hard disk becomes a throughput bottleneck. With large data blocks, RAID 4 shows significantly improved performance.

A.2.2.4 RAID 5 (Data Striping with Striped Parity)

Unlike RAID 4, the parity data in a RAID 5 disk array is striped across all hard disks (Figure A-17).

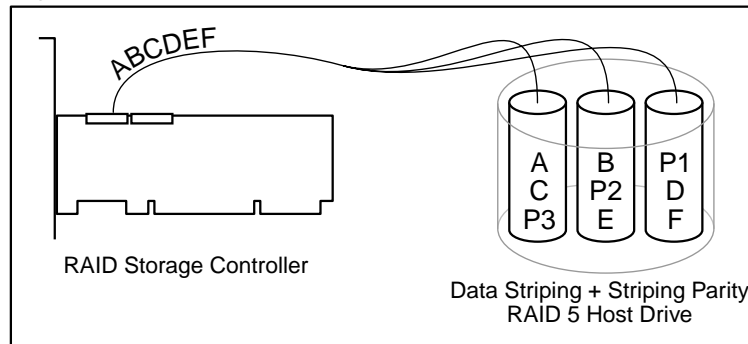


FIGURE A-17 RAID 5 (Data Striping Striped Parity)

The RAID 5 disk array delivers a balanced throughput. Even with small data blocks, which are very likely in a multi-tasking and multi-user environment, the response time is very good. RAID 5 offers the same level of security as RAID 4. When one hard disk fails, all data is still fully available. Missing data is recalculated from the existing data and parity information. RAID 4 and RAID 5 are particularly suitable for systems with medium to large capacity requirements, due to their efficient ratio of installed and available capacity.

A.2.2.5 RAID 10 (Combination of RAID 1 and RAID 0)

RAID 10 is a combination of RAID 0 (Performance) and RAID 1 (Data Security). See Figure A-18.

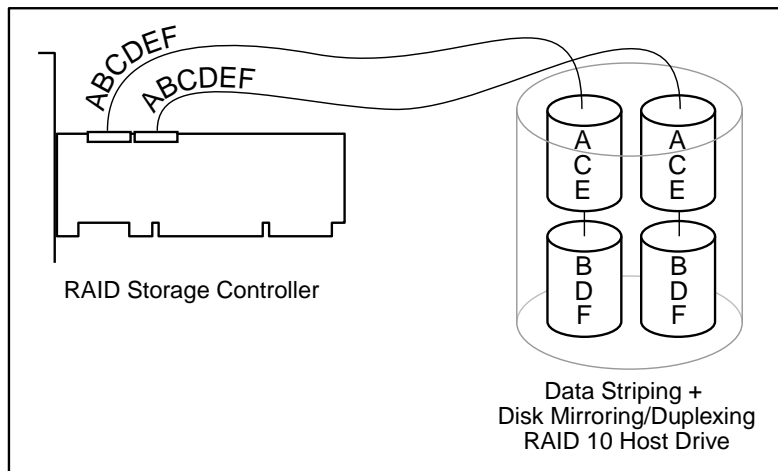


FIGURE A-18 RAID 10 (RAID 1/RAID 0 Combination)

Unlike RAID 4 and RAID 5, there is no need to calculate parity information. RAID 10 disk arrays offer good performance and data security. As in RAID 0, optimum performance is achieved in highly sequential load situations. Identical to RAID 1, 50% of the installed capacity is lost through redundancy.

A.2.2.6 Levels of Drive Hierarchy Within the RAID Firmware

The IIR firmware is based on four fundamental levels of hierarchy. Each level has its "own drives" (components). The basic rule is to build up a "drive" on a given level of hierarchy. The "drives" of the next lower level of hierarchy are used as components.

Level 1

Physical drives are hard disks and removable hard disks. Some Magneto Optical (MO) drives are located on the lowest level. Physical drives are the basic components of all “drive constructions.” However, before they can be used by the firmware, these hard disks must be “prepared” through a procedure called initialization. During this initialization each hard disk receives information that allows an unequivocal identification even if the SCSI ID or the controller is changed. For reasons of data coherency, this information is extremely important for any drive construction consisting of more than one physical drive.

Level 2

On the next higher level are the logical drives. Logical drives are introduced to obtain full independence of the physical coordinates of a physical device. This is necessary to easily change the IIR controller and the channel ID without losing the data and the information on a specific disk array.

Level 3

On this level of hierarchy, the firmware forms the array drives. Depending on the firmware installed, an array drive can be:

- Single Disks: one disk or a JBOD (just a bunch of drives)
- Chaining sets (concatenation of several hard disks)
- RAID 0 array drives
- RAID 1 array drives, RAID 1 array drives plus a hot fix drive
- RAID 4 array drives, RAID 4 array drives plus a hot fix drive
- RAID 5 array drives, RAID 5 array drives plus a hot fix drive
- RAID 10 array drives, RAID 10 array drives plus a hot fix drive

Level 4

On level 4, the firmware forms the host drives. Only these drives can be accessed by the host operating system of the computer. Hard disk drives (for example, C or D) under MSDOS are always referred to as host drives by the firmware. The same applies to NetWare and UNIX drives. The firmware automatically transforms each newly installed logical drive and array drive into a host drive. This host drive is then assigned a host drive number that is identical to its logical drive or array drive number.

The firmware is capable of running several kinds of host drives at the same time. For example, in MSDOS, drive C is a RAID 5 type host drive (consisting of 5 SCSI hard disks), drive D is a single hard disk, and drive E is a CD-ROM communicating with IIR firmware. On this level the user may split an existing array drive into several host drives.

After a capacity expansion of a given array drive, the added capacity appears as a new host drive on this level. It can be either used as a separate host drive, or merged with the first host drive of the array drive. Within RAID, each level of hierarchy has its own menu:

Level 1 - Configure Physical Devices

Level 2 - Configure Logical Drives

Level 3 - Configure Array Drives

Level 4 - Configure Host Drives

Generally, each installation procedure passes through these 4 menus, starting with level 1. Installation includes initializing the physical drives, configuring the logical drives, configuring the array drives (for example, RAID 0, 1, 4, 5, and 10), and configuring the host drives.

A.2.2.7 Transparency of Host Drives

The structure of the host drives installed with StorCon is not known to the operating system. For example, the operating system does not recognize that a given host drive consists of a number of hard disks forming a disk array.

To the operating system, this host drive simply appears as one single hard disk with the capacity of the disk array. This complete transparency represents the easiest way to operate disk arrays under the operating system. Neither operating system nor the computer needs to be involved in the administration of these complex disk array configurations.

A.2.2.8 Using CD-ROMs, DATs, and Tape Drives

A SCSI device that is not a SCSI hard disk or a removable hard disk, or that does not behave like one, is called a Non-Direct Access Device. Such a device is root configured with StorCon and, does not become a logical drive or host drive. SCSI devices of this kind are either operated through the Advanced SCSI programming Interface (ASPI) (MSDOS or Novell NetWare), or are directly accessed from the operating system (UNIX).

Note – Hard disks and removable hard disks are called DirectAccess Devices. However, there are some Non-Direct Access Devices (for example, certain MO drives) that can be operated just like removable hard disks if they have been appropriately configured (for example, by changing their jumper settings).

A.3 Preparing for Installation

This section contains information on what preparations need to be done to ensure a successful RAID installation.

Begin the installation by completing the worksheet in Table A-1 to determine the RAID level, the number of disk drives, and the disk drive size for your system. Refer to “RAID Levels” on page A-11 for more information about RAID levels and to determine the optimum RAID level solution for your needs.

TABLE A-1 Pre-installation Worksheet (Creating a Host Drive for the Operating System)

RAID Level	Number of Disk Drives Supported for this RAID Level (minimum to maximum)	Number of Disk Drives[†] to Include in New Host Drive	Physical Drive Capacity (MB)
RAID 0	2 to 15 per channel		
RAID 1	2		
RAID 4	3 to 15 per channel		
RAID 5	3 to 15 per channel		
RAID 10	4 to 15 per channel*		

* RAID 10 only supports an even total number of disk drives. Additional drives are added in pairs, up to a total of 30 drives over two channels.

† The number of drives cannot be decreased (only increased through the array expansion feature) after the host drive is created.

Follow these steps to fill out the worksheet:

- 1. In column 1 of Table A-1, select a RAID level.**
- 2. In column 2, note the number of disk drives supported for the RAID level you selected.**
- 3. In column 3, record the number of disk drives you will use for the host drive.**
- 4. In column 4, record the capacity, in megabytes (MB), that you will need on each physical drive.**

You will enter this value as the “Used Capacity per Drive” when you are creating the host drive. Based on the physical drive capacity value and the number of disk drives you will use, the RAID configuration software will calculate the total host drive size for your selected RAID level.

Note – The capacity of the smallest drive in the initial RAID array configuration becomes the maximum capacity that the RAID configuration software can use for each hard disk in the host drive. This becomes important when you configure an array with hard disks of potentially varying sizes and you want to ensure that future drives added to the disk array will fit in the array (for example, for replacement purposes). Should a new drive have less than the physical drive capacity used for each disk in the existing disk array, the RAID configuration software cannot accept the new drive.

Caution – The size of the host drive cannot be changed (decreased, increased, or expanded) after the host drive has been created.

A.4 OS Support

Several operating systems have been fully validated with and support the zero-channel RAID controller. However, the only OS that runs on Sun Fire V60x and Sun Fire V65x servers and supports controller operation is Red Hat® Linux® 7.3.

A.5 Supported SCSI Technology

The zero-channel RAID controller supports up to 15 SCSI devices per SCSI channel. It supports up to 15 hard disk drives (or 14 hard disks drives if one of the SCSI IDs is occupied by a SAF-TE processor) per channel of the SCSI controller (30 disk drives total for an MROMB application, using the Adaptec AIC-7902 dual-channel Ultra320 SCSI controller provided on the server main board).

A.5.1 SCSI Hard Disk Drive Support

The RAID controller supports both Single-ended (SE) and Low Voltage Differential (LVD) devices but it is recommended that you use only one type of drive technology (SE or LVD) on any one channel at a time.

The RAID controller supports single-ended drives that operate at up to 40 MB/sec, depending upon the speed of the drives attached.

The RAID controller supports Ultra-2 LVD SCSI devices operating at up to 80MB/sec, Ultra160 LVD SCSI devices operating at up to 160MB/sec, and U1tra320 LVD SCSI devices operating at up to 320MB/sec¹.

Note – If both SE and LVD devices are attached to the same channel/bus, the entire bus will operate at the single ended speed of the slowest device. See Table 3-4 for the maximum cable length distances that apply to each mode.

The RAID controller is designed to use an Ultra160 or U1tra320 SCSI controller implementation on the motherboard and is backward compatible with older SCSI hard drive specifications.

A.5.2 Non-SCSI Hard Disk Drive Support

The RAID controller will pass through to the host operating system direct access to non-direct-access SCSI devices that are connected to a SCSI bus (channel) of the RAID controller. The RAID controller passes through all control of these devices to the host operating system.

Types of supported non-Direct-Access SCSI devices (this does not cover specific vendors and models):

- SAF-TE Processors
- Tape Backups
- CD-ROMs

1. The Sun Fire V60x and Sun Fire V65x servers implement Ultra320 LVD SCSI.

A.6 RAID Array Drive Roaming

Array Roaming allows the user the ability to move a complete RAID array from one computer system to another computer system and preserve the RAID configuration information and user data on that RAID array.

Warning – The zero-channel RAID controller, with firmware 2.34.yy-Rzzz, is not compatible with all previous controllers and firmware versions. Do not attempt RAID Array Drive Roaming between RAID controllers that are not compatible with the controller. Unpredictable behavior may include, but is not limited to, data loss or corruption.

Compatible RAID controllers must control the RAID subsystems of the two different computer systems. The transferred RAID array may be brought online while the target server continues to run if the hard disk drives and disk enclosure support hot plug capabilities; however, not all operating systems support this feature. The hard disk drives are not required to have the same SCSI ID in the target system that they did in the original system that they are removed from. The RAID array drive that is being roamed must not be of type Private. This includes all non-private host, array, and logical drives.

A.7 RAID Controller Drive Limitations

Physical drives are limited by the number of SCSI channels being controlled by the RAID controller. The firmware/software supports a maximum of 15 hard disk drives per channel (or 14 if one SCSI ID is being occupied by an intelligent enclosure processor).

The maximum number of array drives is limited to 35 by the RAID firmware. The actual maximum limit of the SRCZCR RAID controller is 15. The firmware supports channel spanning where an array can consist of physical drives that are attached to either one or to both channels of the RAID controller. An array drive requires a minimum of two hard disk drives (or logical drives). Therefore the maximum array limitation for each RAID controller is the physical drive limit of that RAID controller divided by two. An array drive can contain (or have reside on it) up to a maximum of two host drives.

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