SGI 1100 Server
Maintenance and Upgrade Guide

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About This Guide

This guide contains a detailed description of the SGI 1100 server chassis, and provides information on removing and installing system components.

The following topics are covered:

- Chapter 1, “Chassis Description”
- Chapter 2, “Removing and Replacing System Components”
- Chapter 3, “Troubleshooting”
- Appendix A, “Technical Specifications”
- Appendix B, “Updating the BIOS Firmware”
- Appendix C, “Port Pinouts”

An Index completes this guide.

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Chassis Description

The SGI 1100 server is a 1U, high-density, rackmountable, PCI bus-based dual-processor system built on an extended ATX baseboard. It comes with two socket 370 processor sockets utilizing one or two Intel Pentium III processors integrated with the Server Works LE north and OSB4 south bridge chipsets. The system board integrates two Intel 82559 10 / 100 Mbps PCI Ethernet chipsets that supports WOL (wake on LAN) for better remote site management.

For expandability, the system includes one 64-bit / 66-MHz PCI bus slot and four DIMM slots that allow memory installation to a maximum of 2 GB using four 512-MB SDRAM (synchronous DRAM) DIMMs.

For connectivity, the system supports four USB (Universal Serial Bus) connectors, a video port, two LAN ports, and other standard features such as two serial ports, a diskette drive interface, and two embedded IDE hard disk interfaces.

The system is fully compatible with Redhat Linux 6.2, Windows NT 4.0, and Windows 2000 Advanced Server OS.

This chapter contains a detailed description of the SGI 1100 server system components.

Processors

The Pentium III processor implements Dynamic Execution performance, a multi-transaction system bus, and Intel MMX media enhancement technology. Also, it offers Streaming SIMD (Single Instruction Multiple Data) extensions, which are 70 new instructions enabling advanced imaging, 3D, streaming audio and video, and speech recognition applications. The Pentium III processor delivers higher performance than the previous Pentium processor while maintaining binary compatibility with all previous Intel Architecture processors.

This system board supports 133-MHz GTL+ host bus frequencies for Pentium III processors running at 800 MHz and above.

Memory

The four DIMM sockets on board allow memory upgrade to a maximum of 2 GB using four 512-MB SDRAM (Synchronous DRAM) DIMMs. (The DIMM sockets also allow 1024 MB for a maximum upgrade of 4 GB in future models.) For data integrity, the default setting of the ECC (error-correcting code) function of the memory system in BIOS is enabled.

Note: Only 3.3-volt SDRAM DIMMs should be used. 5-volt memory devices are not supported.

The system board supports 133-MHz registered SDRAM; 66-MHz SDRAM is not supported.

System Chipsets

Server Works LE North and South Bridge

The Server Works LE north chipset incorporated as a north bridge is in charge of the host bus interfacing and memory bus control. The memory bus control supports PC-133 SDRAM registered ECC DIMMs up to a total of 4 GB. The north bridge provides one 64-bit PCI bus running at 66 MHz.

The south bridge subset provides the legacy ISA interface, USB port, ATA33, and System Management Bus (SMB). The BMC (Baseboard Management Control) was embedded on the motherboard and connected with the south bridge to provide the ASM and RDM functions and industry standard IPMI protocol.

LAN Subsystem

Another cost-effective feature for network solution is the integration of Intel's 82559 10/100 Mbps Fast Ethernet controller which supports Advanced Configuration and Power Interface (ACPI) 1.20A-based power management, wake on Magic Packet, wake on interesting packet, advanced SMB-based manageability, Wired for Management (WfM) 2.0 compliance, IP checksum assist, PCI 2.2 compliance, and PC 98 and PC 99 compliance.

Video Subsystem

The ATI Rage XL harbors 2D and 3D display capabilities that bring life to any multimedia and work applications. It also supports hardware DVD decoding. With remarkable color depths and high resolutions of up to 1600x1200, it enhances every visual experience on your system.

The on-board ATI Rage XL chipset comes with 4 MB of video memory.

Expansion Slot

The system board has one 64-bit/66-MHz PCI bus slot with a riser card.

System Block Diagram

Figure 1-1 shows a block diagram of the SGI 1100 system board components.

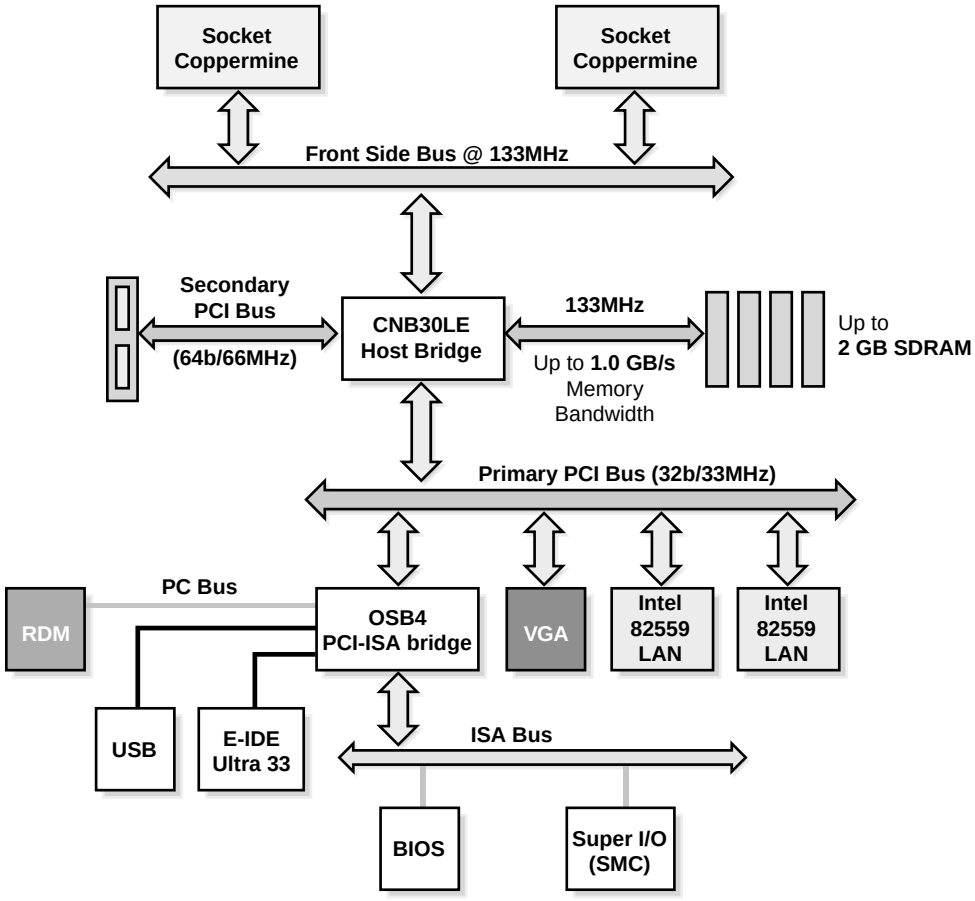

Figure 1-1 System Block Diagram

Chassis Front Controls and Indicators

This section describes the front controls and indicators of the SGI 1100 server, as shown in Figure 1-2.

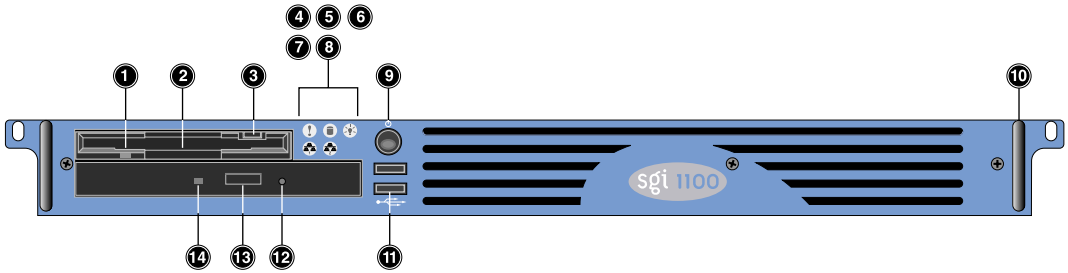

Figure 1-2 Front Controls and Indicators

Table 1-1 describes the front controls and indicators that are indicated in Figure 1-2.

Table 1-1 Front Controls and Indicators

No.	Item
1	Slim-type floppy disk drive LED
2	Slim-type floppy disk drive
3	Slim-type floppy disk drive eject button
4	Event LED
5	Hard disk drive access LED
6	Power LED
7	LAN 2 access LED
8	LAN 1 access LED
9	Power button
10	Metal handle
11	USB ports (2 ports)

Table 1-1 (continued) Front Controls and Indicators

No.	Item
12	Slim-type CD-ROM drive emergency eject hole
13	Slim-type CD-ROM drive eject button
14	Slim-type CD-ROM drive LED

The general event LED indicates the following occurrences:

- Temperature, voltage, system fan, or fuse events.
- CPU IERR and Thermtrip error.
- System fan or power supply unplug.
- Removal of top cover.
- Uncorrectable memory error (multiple ECC errors).
- PCI PERR or SERR error.

If all of the preceding events recover, the Baseboard Management Controller (BMC) should turn off the LED.

Note: The BMC will not turn on the general event LED for BIOS POST, PCI hot plug, and correctable memory error events.

Rear Panel I/O Ports and Features

This section describes the rear panel I/O ports and other features, as shown in Figure 1-3.

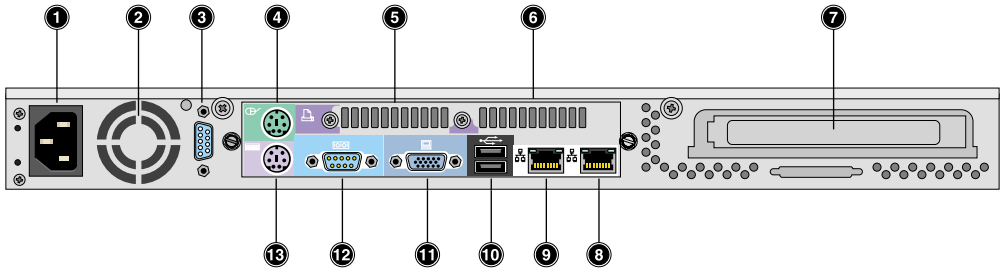

Figure 1-3 Rear Panel I/O Ports and Features

Table 1-2 describes the rear panel I/O ports and features that are indicated in Figure 1-3.

Table 1-2 Rear Panel I/O Ports and Features

No.	Item
1	AC power input
2	Ventilation
3	Serial port 2
4	PS/2 mouse port
5	Ventilation
6	Ventilation
7	Add-on card bracket
8	LAN 2 port (RJ-45)
9	LAN 1 port (RJ-45)
10	USB ports (2 ports)
11	VGA port

Table 1-2 (continued) Rear Panel I/O Ports and Features

No.	Item
12	Serial port 1
13	PS/2 keyboard port

Internal Components

This section describes the location of the main components inside the SGI 1100 server, as shown in Figure 1-4.

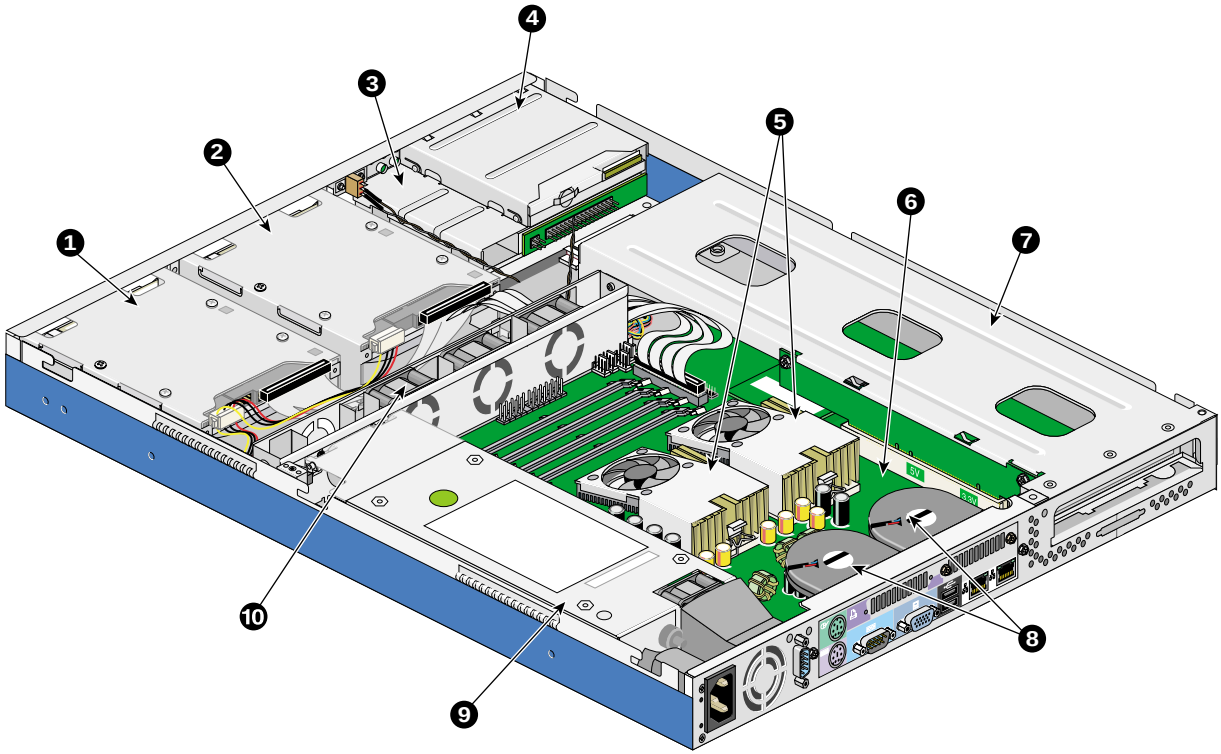

Figure 1-4 SGI 1100 Server Internal Components

Table 1-3 describes the internal components that are indicated in Figure 1-4.

Table 1-3 Internal Components

No.	Item
1	IDE hard disk drive bay
2	IDE hard disk drive bay

Table 1-3 (continued) Internal Components

No.	Item
3	Slim-type CD-ROM drive
4	Slim-type floppy disk drive
5	CPUs and fan/heatsinks
6	System board
7	PCI expansion card slot and link bar
8	Rear blowers
9	Power supply
10	Housing fans

Hardware Management Support

The system supports the power-management function that conforms to the power-saving standards of the U.S. Environmental Protection Agency (EPA) Energy Star program. It also offers Plug-and-Play, which helps users avoid configuration problems and thus makes the system more user-friendly.

Power Management

Table 1-4 lists the power-saving modes and their respective characteristics. These power management features are only available if the operating system running on the system supports them

Table 1-4 Power-Saving Mode Characteristics List

Power-saving mode	Characteristics
Device standby mode	Independent power management timer for HDD devices (0-15 minutes, time step = 1 minute) Hard disk drive goes into STANDBY mode (for ATA standard interface) Disable V-sync to control the VESA DPMS monitor Resume method: device activated (keyboard for DOS, keyboard and mouse for Windows) Resume recovery time: 3-5 seconds

Table 1-4 (continued) Power-Saving Mode Characteristics List

Power-saving mode	Characteristics
Global standby mode	Global power management timer (1-60 minutes) Hard disk drive goes into STANDBY mode (for ATA standard interface) Disable H-sync and V-sync signals to control the VESA DPMS monitor Resume recovery time: 7-10 seconds
System suspend mode	Independent power management timer (1-60 minutes) or pushing external switch button CPU goes into SMM (system management mode) CPU asserts STPCLK# and goes into the stop grant state LED on the panel flashes in amber color Hard disk drive goes into SLEEP mode (for ATA standard interface) Disable H-sync and V-sync signals to control the VESA DPMS monitor Return to original state by pushing external switch button.

IPMI (Intelligent Platform Management Interface)

IPMI is an open standard hardware manageability interface specification. It provides an architecture that defines how unique devices can all communicate with the CPU in a standard way.

With IPMI, the CPU only communicates one event to the IPMI event log. The CPU only "asks" what has changed since the last time it asked. Every device communicates directly, through IPMI, to the event log, which is used to record, in a consistent way, all status events for the unique device. This simplifies the agent-handling routine. The system only needs a single agent, and it does not need to be changed when you change from five devices to manage, for example, to six. And the system does not need to change the way the CPU checks the event log when a new device is added to the system; it always checks in the same way, whether there is one device or 100 devices. With IPMI, use of the CPU is minimized, so overall system performance improves.

The following are the four elements of IPMI, each of which is described in the sections that follow:

- Intelligent Platform Management Interface
- Intelligent Platform Management Bus
- Intelligent Chassis Management Bus
- Baseboard Management Controller

Intelligent Platform Management Interface (IPMI)

IPMI is the specification for the management controller command sets, including command sets for sensors, event logs, and sensor data record access. It is also the specification for the data formats, including sensor data records, event log entries, and FRU inventory information. IPMI is also the name used for the overall standardization effort.

Intelligent Platform Management Bus (IPMB)

IPMB is the I2C-based, multi-master bus used for intra-chassis communication with "satellite" management controllers. Here sensor devices and cards with IPMI bus access can be added to the IPMI standard.

Intelligent Chassis Management Bus (ICMB)

ICMB is the RS-485-based inter-chassis management bus, based on IPMB. It is used for common chassis and emergency management functions, including power and reset control, chassis status, events, and FRU inventory.

Baseboard Management Controller (BMC)

BMC is used to monitor baseboard temperatures and voltages, and to manage the system event log and non-volatile storage for sensor data records. It provides a system software interface to the IPMB.

Features Summary

The system has the following major components:

- **Processor**
  Supports dual Pentium III processors installed in a socket 370 running a 133-MHz Front Side Bus (FSB).
- **Chipset**
  ServerWorks ServerSet III LE chipset consists of CNB30LE (Champ North Bridge) and OSB4 (Open South Bridge) is in charge of the host interfacing, memory system control, PCI interfacing, and data steering.
- **LAN controller**
  Two on-board Intel 82559 10/100-Mb/s PCI LAN controllers.
- **Memory**
  The CNB30LE champ north bridge consists of a system memory controller integrated with four DIMM sockets that support 128-, 512- and 1024-MB (in the future) registered ECC SDRAM DIMMs with a maximum memory upgrade of 4 GB (1024 MB x 4 DIMM modules).
- **Cache**
  256-KB second-level write-back PipeLined-Burst SRAM supported cache on Pentium III processor.
- **Video**
  On board PCI VGA controller (ATI Rage XL) with 4-MB SDRAM graphics memory support.
- **BIOS**
  - 512-KB Flash ROM built-in 28SF040A-90 for system and IPMI BIOS.
  - Y2K NSTL-compliant.
- **Real-time clock (RTC)**
  - 256-byte battery-backed CMOS RAM.
  - Built-in SMC FDC37B787 super I/O controller.
  - System clock/calendar with battery backup.
- **Power supply**
  Standard 200W power supply.

- **Memory interface**
  Four DIMM sockets support four PC 133 registered ECC SDRAM modules.
- **IDE interface**
  - E-IDE controller built-in RCC OSB4 (Open South Bridge).
  - PCI bus master dual-channel E-IDE interface.
  - Provides up to four IDE devices.
  - Supports PIO mode 4 transfers up to 16.7 MB/sec, DMA mode 2, and Ultra DMA33 (33 MB/sec) mode.
- **Diskette drive interface**
  - Compatible with IBM PC AT disk drive system.
  - 16-byte data FIFO.
  - Data rate and drive control register.
  - DMA enable logic.
  - 480 addresses, up to eight IRQs, and seven DMA Options.
  - Supports 3.5-inch diskette drives.
  - Supports 360K-, 720K-, 1.2M-, 1.44M-, 2.88M-byte format, and 250K-, 300K-, 500K-, 1M-, or 2M-bps data transfer rate.
  - Supports 3-mode diskette drive.
- **PCI Slots**
  One 64-bit/66-MHz PCI 2.2-compliant PCI slot with a PCI riser card.
- **BMC interface**
  Two 24-pin BMC (Baseboard Management Controller) interfaces.
- I/O APIC device for SMP interrupt support.
- Server management controller chipset.
- **Serial port**
  Two high-speed NS16C550-compatible UART with send/receive 16-byte FIFO serial ports.
- **USB port**
  Four USB ports support Universal HCI specification for USB 1.0.
- **PS/2 keyboard and mouse port**

- **One external monitor port**
- **LAN connector**
  Two RJ-45 jacks for 10BaseT or 100BaseTX LAN connectors.

Removing and Replacing System Components

This chapter contains step-by-step procedures on how to disassemble the SGI 1100 server system for maintenance and troubleshooting.

Caution: The procedures contained in this chapter should be performed by a qualified service technician. Do not perform the procedures described in the following sections unless you are a qualified technician.

The following sections are covered:

Tools and Supplies Needed

To disassemble the computer, you need the following tools and supplies:

- Wrist grounding strap and conductive mat for preventing electrostatic discharge
- Phillips screwdrivers

Note: The screws for the different components vary in size. During the disassembly process, group the screws with the corresponding components to avoid mismatches when putting back the components.

ESD Precautions

Before proceeding with the disassembly procedure, make sure that you do the following:

1. Turn off the power to the system and all peripherals.
2. Unplug the AC adapter and all power and signal cables from the system.
3. Do not remove a component from its antistatic packaging until you are ready to install it.
4. Wear a wrist grounding strap before handling electronic components. Wrist grounding straps are available at most electronic component stores.

Opening the Chassis

This section covers the removal and installation of the chassis cover and the front panel.

Note: A microswitch is located under the chassis cover. It detects whether the cover is removed or installed.

Removing the Chassis Cover

Follow these steps to remove the chassis cover:

1. Turn off the power to the system unit and unplug all external cables.
2. Place the system unit on a flat, steady surface.
3. Release the two screw knobs at the rear of the chassis, as shown in Figure 2-1.

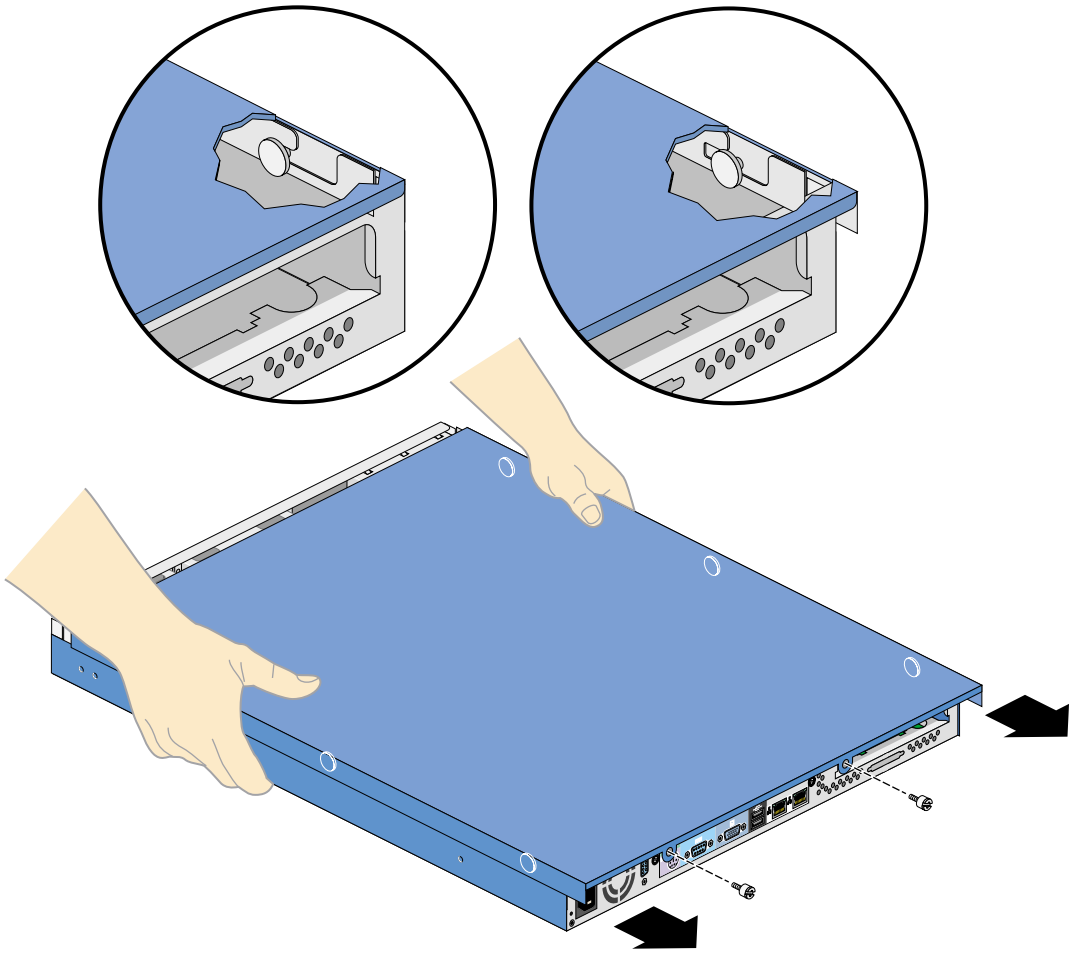

Figure 2-1 Removing the Chassis Cover

4. Slide the chassis cover towards the rear of the chassis about 1 inch (2.5 cm), as shown in Figure 2-1.
5. Lift the cover away from the chassis.

Installing the Chassis Cover

Follow these steps to install the chassis cover:

1. Place the system unit on a flat, steady surface.
2. Place the chassis cover on the chassis, so as to insert each of the six retaining pins into their slots as shown in Figure 2-2.

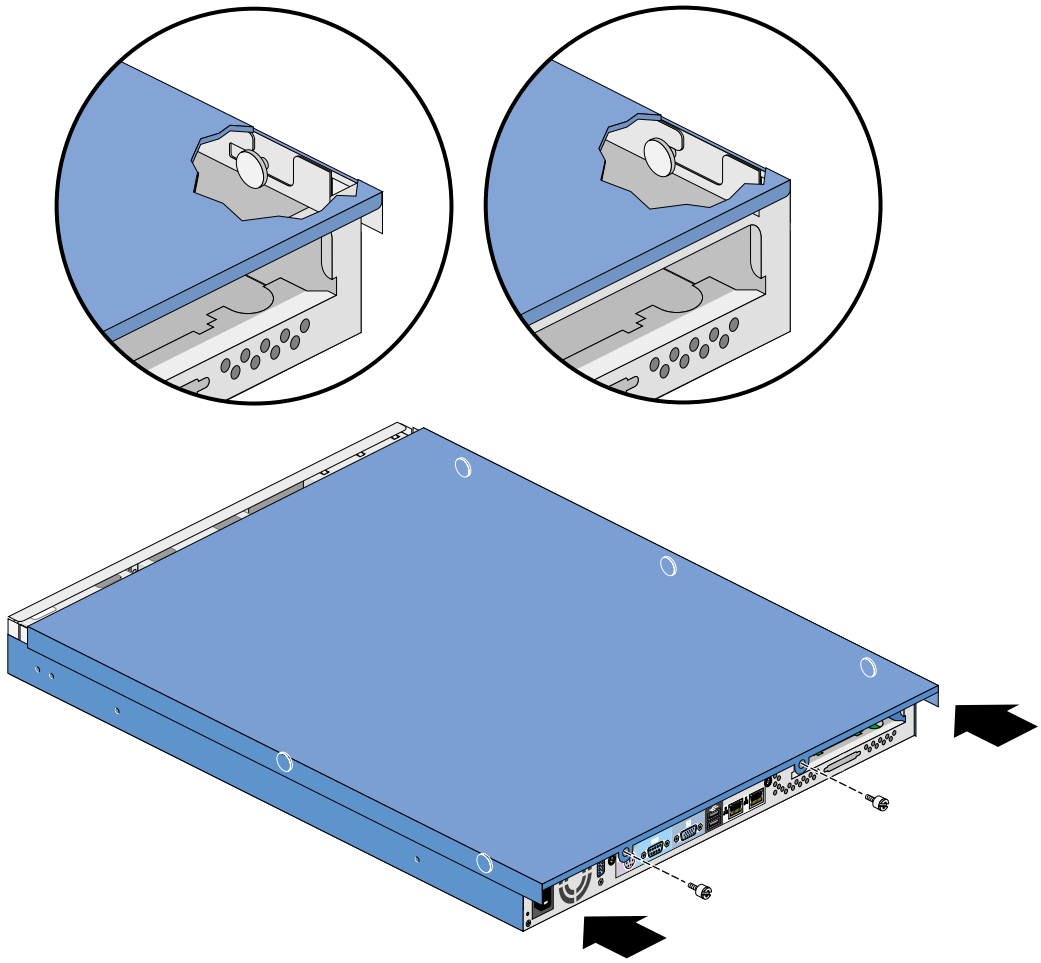

Figure 2-2 Placing the Chassis Cover on the Chassis

3. Ensure that all six retaining pins are fully engaged into their slots, and then slide the chassis cover toward the front of the system, as shown in Figure 2-2.
4. Tighten the two screw knobs to secure the chassis cover into place.

Removing and Installing the Front Panel

To remove the front panel, release the three screws and pull the front panel away from the chassis as shown in Figure 2-3.

To install the front panel, tighten the 3 screws to secure the front panel to the chassis.

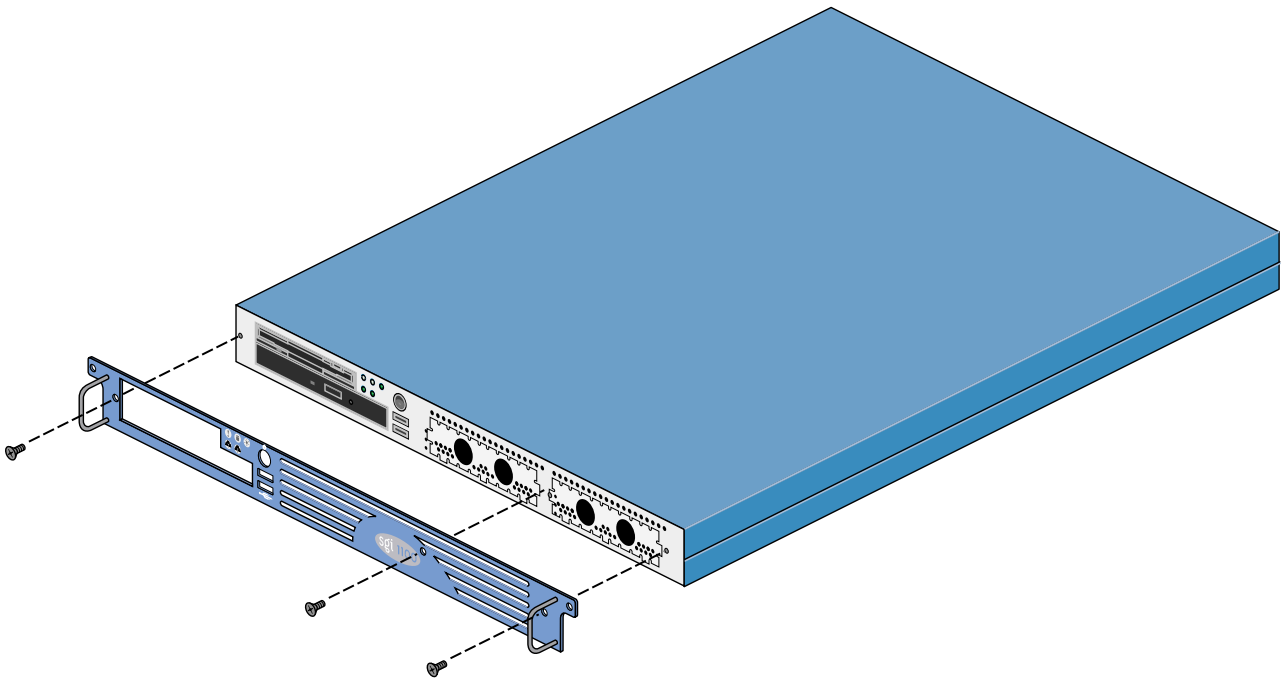

Figure 2-3 Removing the Front Panel

Replacing the Link Bar and the Riser Card

This section covers the removal and installation of the link bar and the riser card.

Removing the Link Bar

Follow these steps to remove the link bar:

1. Remove the chassis cover as described in “Removing the Chassis Cover” on page 21.
2. Remove two screws from the rear panel and pull the link bar away from the chassis as shown in Figure 2-4.

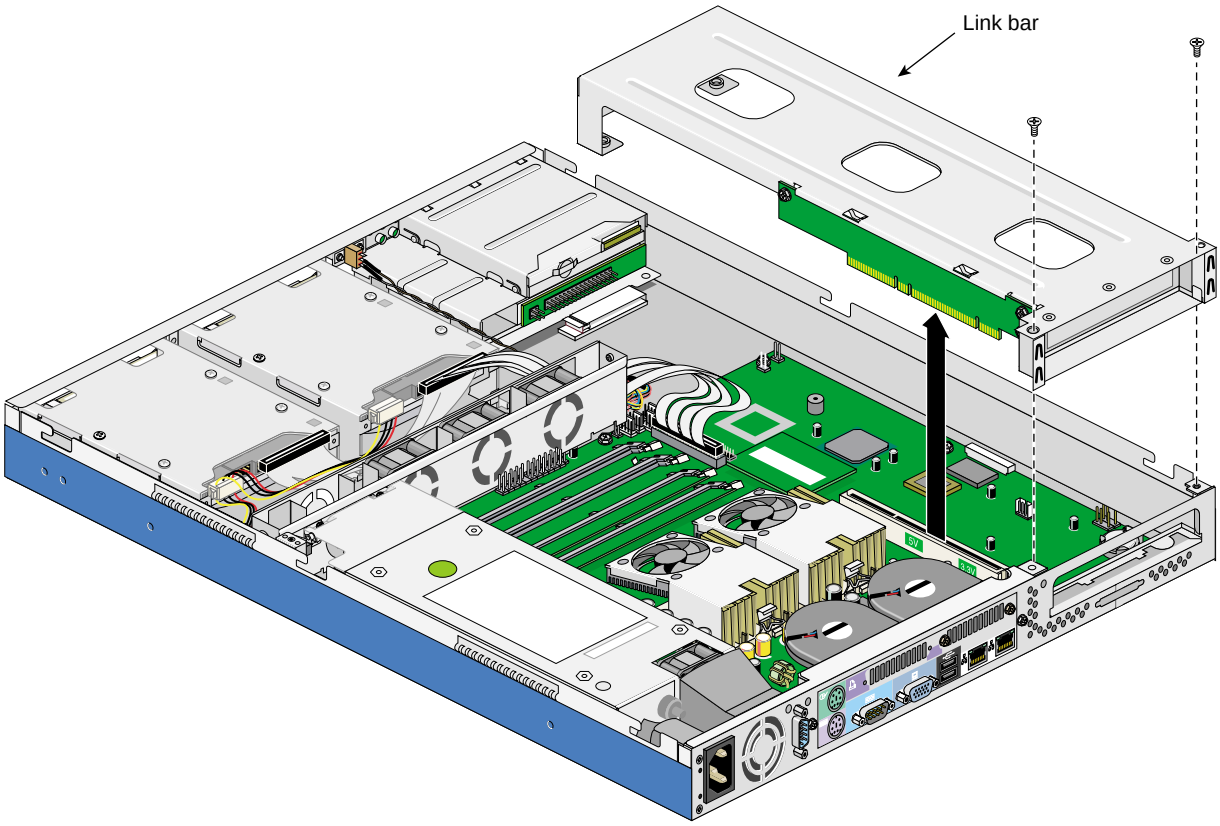

Figure 2-4 Removing the Link Bar

Installing the Link Bar

Follow these steps to install the link bar:

1. Insert the link bar into its slot by pushing the assembly straight into the PCI slot until it is properly seated, as shown in Figure 2-5.
2. Tighten two screws to the rear panel as shown in Figure 2-5.

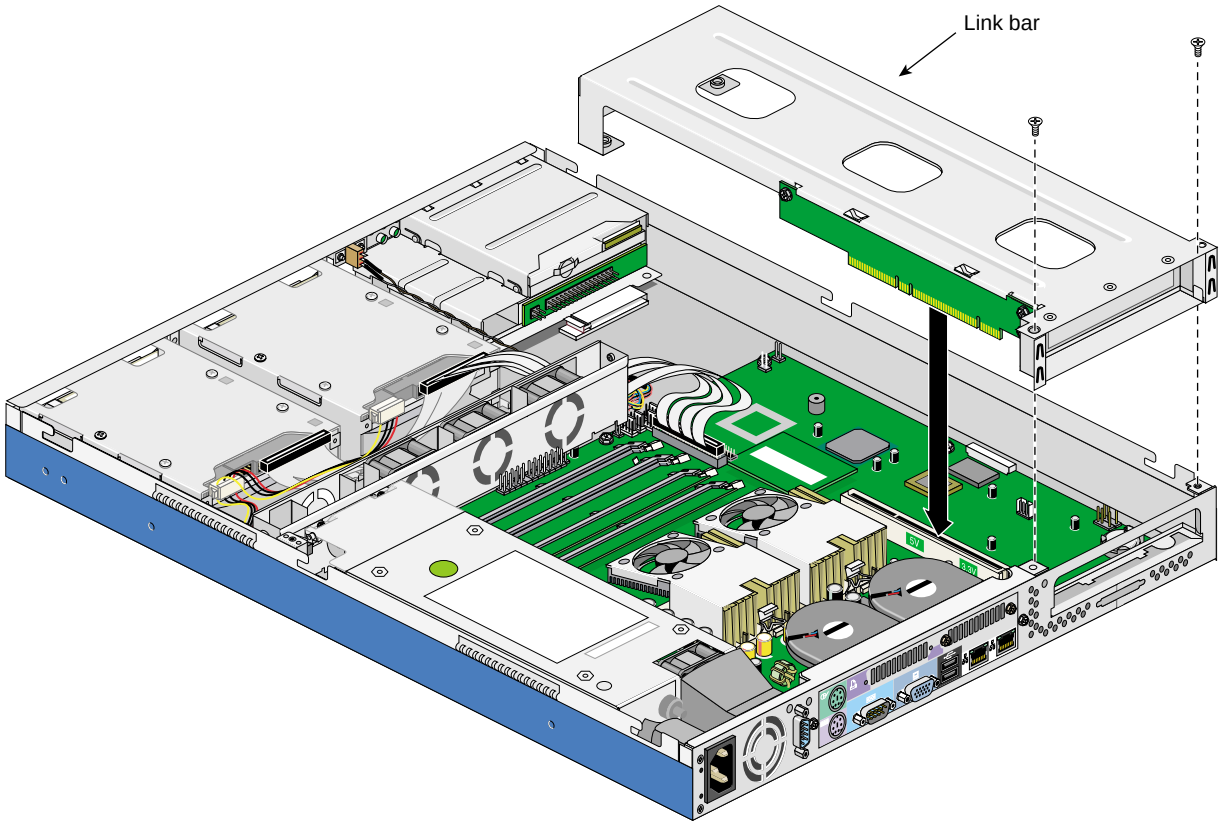

Figure 2-5 Installing the Link Bar

3. Install the chassis cover as described in “Installing the Chassis Cover” on page 23.

Removing the Riser Card

Follow these steps to remove the riser card from the link bar:

1. Remove the link bar as described in “Removing the Link Bar” on page 25.
2. Remove three screws as shown in Figure 2-6.

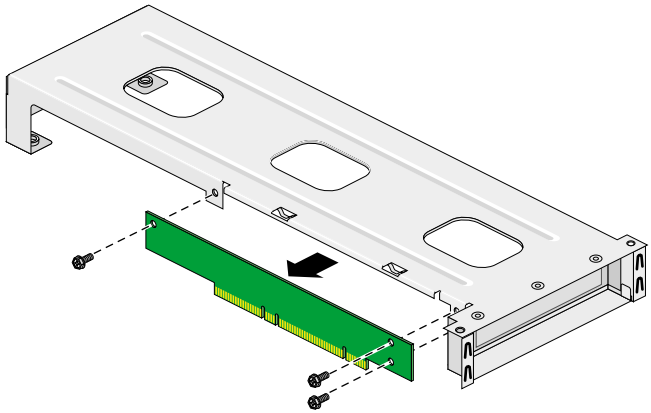

Figure 2-6 Detaching the Riser Card from the Link Bar

3. Separate the riser card from the link bar.

Installing the Riser Card

Follow these steps to install the riser card onto the link bar:

1. Place the riser card on the link bar as shown in Figure 2-7.
2. Tighten three screws to secure the riser card to the link bar.

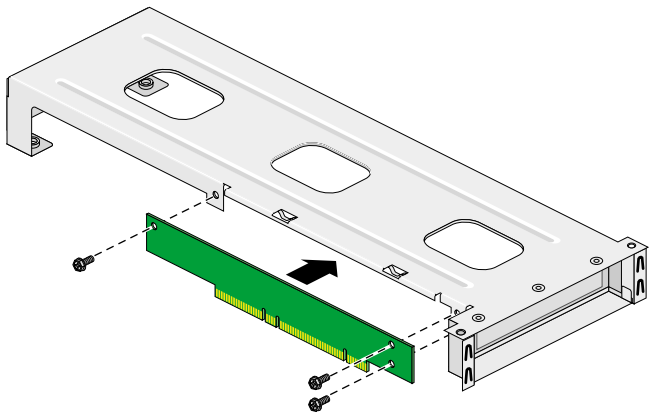

Figure 2-7 Installing the Riser Card on the Link Bar

Installing an Expansion Board

Follow these steps to install an expansion board:

Note: The SGI 1100 server system supports only 3.3V or universal PCI cards. 5V PCI cards are not supported.

1. Remove the chassis cover as described in “Removing the Chassis Cover” on page 21.
2. Remove the link bar as described in “Removing the Link Bar” on page 25.
3. Remove the expansion slot filler plate as shown in Figure 2-8. Save the screw for later use.

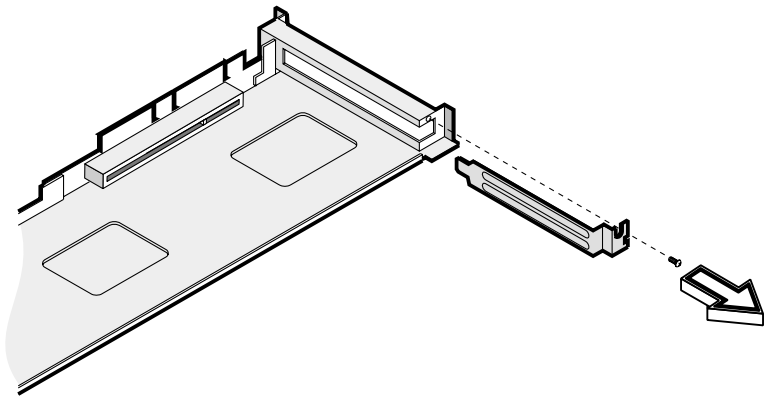

Figure 2-8 Removing the Expansion Slot Filler Plate

4. Insert the expansion card into the riser card PCI slot by pushing the expansion board until it is properly seated. Then secure the expansion board to the metal bracket with a screw, as shown in Figure 2-9.

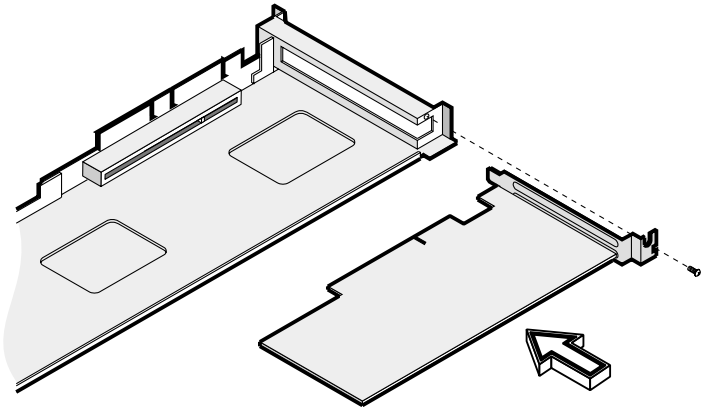

Figure 2-9 Inserting the Expansion Card into the Riser Card

5. Install the link bar assembly into its slot as described in “Installing the Link Bar” on page 27.
6. Install the chassis cover as described in “Installing the Chassis Cover” on page 23.

Replacing the Chassis Fan Subsystem

This section covers the removal and installation of the chassis fan cage and chassis fans.

Removing the Chassis Fan Cage

Follow these steps to remove the chassis fan cage:

1. Remove the chassis cover as described in “Removing the Chassis Cover” on page 21.
2. Disconnect the three fan connectors from the system board as shown in Figure 2-10.
3. Remove two screws and pull the chassis fan cage up, as shown in Figure 2-10.

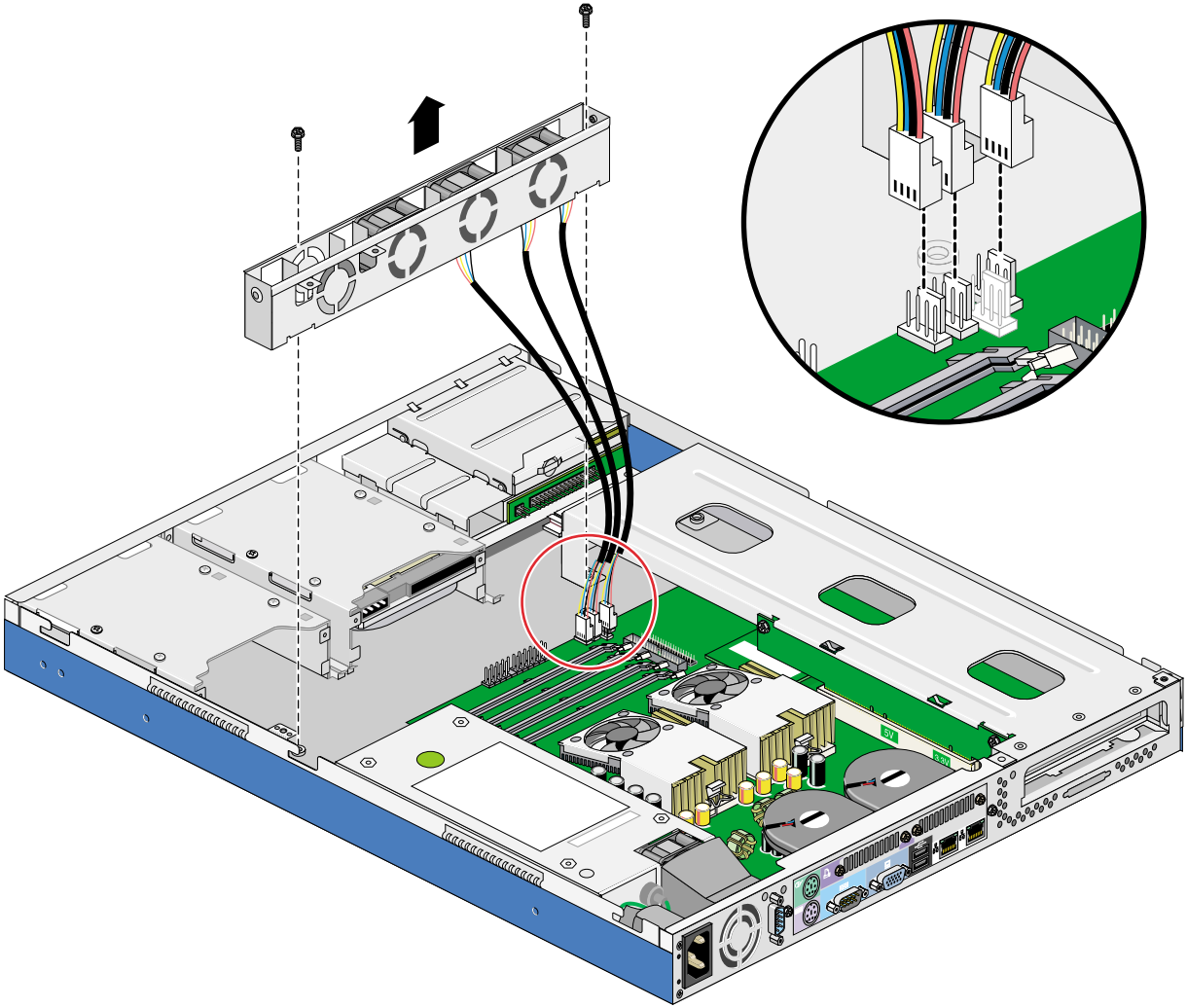

Figure 2-10 Removing the Chassis Fan Cage

Installing the Chassis Fan Cage

Follow these steps to install the chassis fan cage:

1. Place the chassis fan cage into the chassis.

Note: Ensure that no cables are pinched between the chassis fan and the chassis during the installation of the chassis fan cage.

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2. Tighten two screws to secure the fan cage to the chassis.
3. Connect the three fan connectors to the system board connectors CN19, CN20, and CN28, as shown in Figure 2-11.

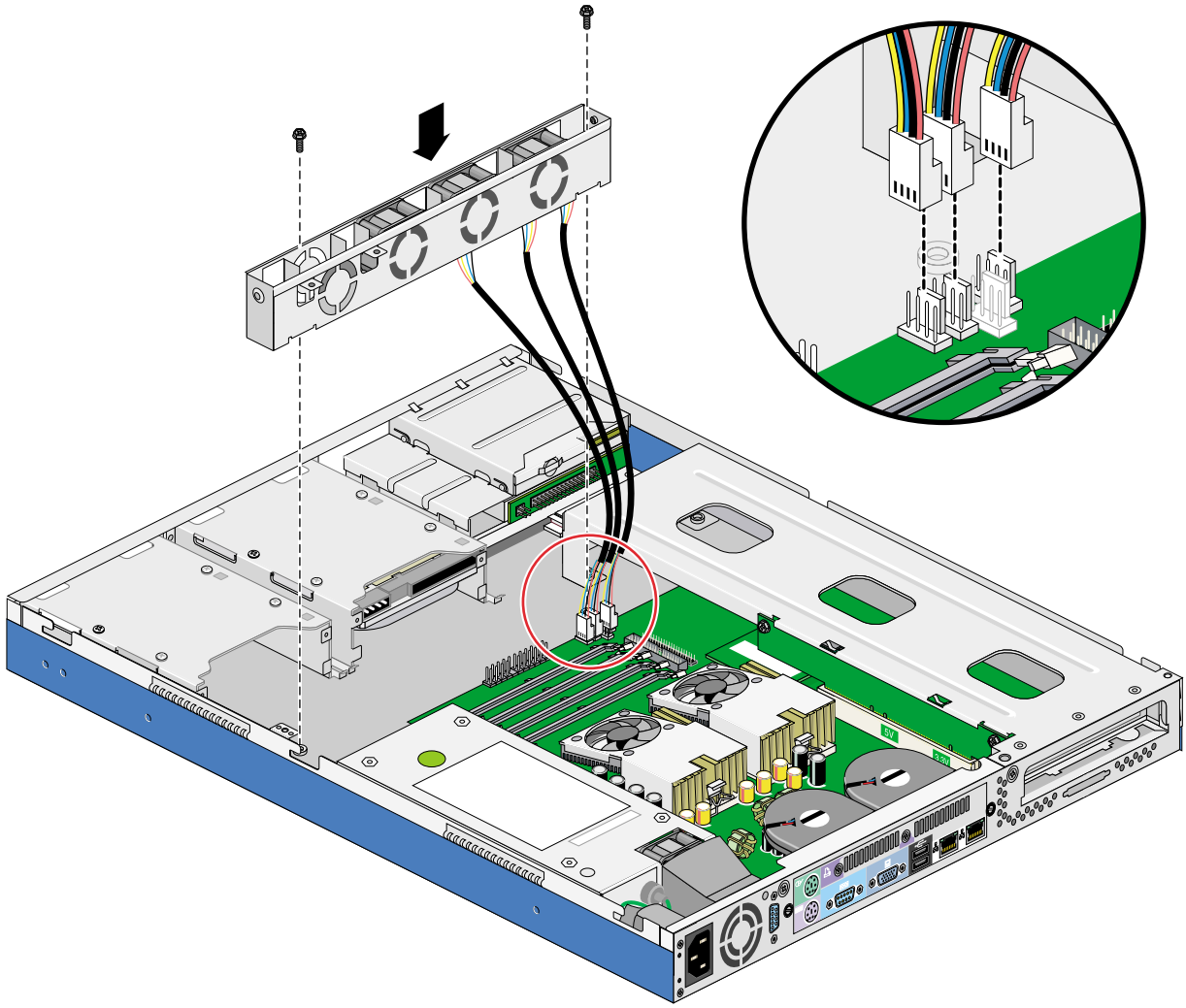

Figure 2-11 Installing the Chassis Fan Cage

4. Install the chassis cover as described in “Installing the Chassis Cover” on page 23.

Replacing Chassis Fans

To remove a chassis fan, gently pull up the chassis fan from the fan cage, as shown in Figure 2-12.

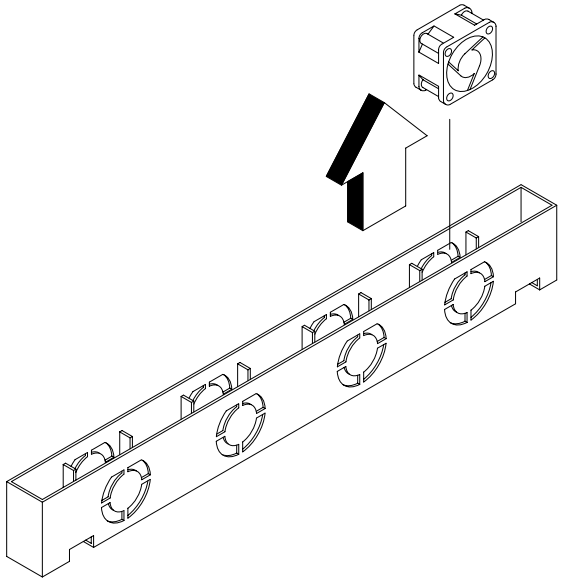

Figure 2-12 Removing the Chassis Fan

To install a chassis fan, insert the chassis fan into the chassis fan cage.

Note: Ensure that the fan you are installing is properly oriented so as to blow air toward the rear of the chassis.

Replacing the Rear Chassis Blowers

This section covers the removal and installation of the rear chassis blowers.

Removing a Rear Chassis Blower

Follow these steps to remove the rear chassis blowers:

1. Remove the chassis cover as described in “Removing the Chassis Cover” on page 21.
2. Release two screws to remove the blower as shown in Figure 2-14.
3. Disconnect the blower cables from the connectors on the system board. See Figure 2-13 for the location of the rear chassis blower cable connectors.

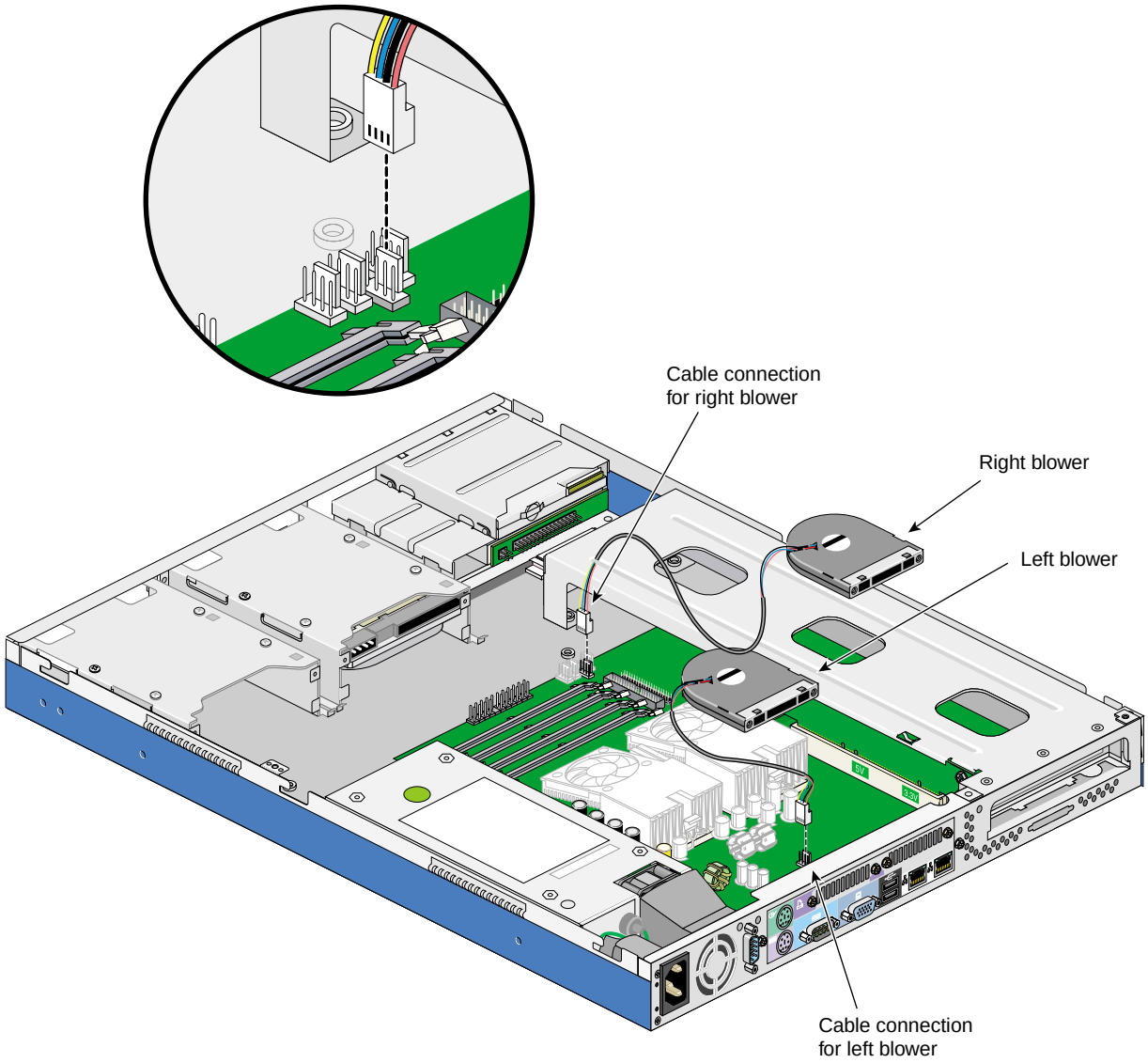

Figure 2-13 Location of the Rear System Blower Cable Connectors

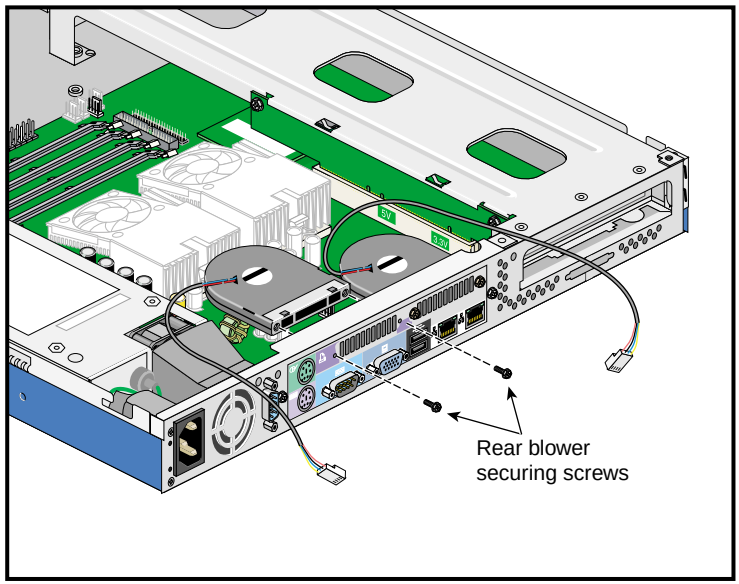

Figure 2-14 Rear System Blower Securing Screws

Installing a Rear System Blower

Follow theses steps to install each of the rear chassis blowers:

1. Place the blower on its opening on the rear panel as shown in Figure 2-14
2. Connect the rear chassis blower cable to its connector on the system board. The left blower (the one closest to the power supply) plugs into connector CN13 (which is underneath the right blower). The right blower plugs into connector CN23 (which is near the front of the system board). See Figure 2-13 for the locations of the rear chassis blower cable connectors.
3. Tighten two screws to secure the blower in place.
4. Install the chassis cover as described in “Installing the Chassis Cover” on page 23.

Replacing the Cable Modules

This section covers the removal and installation of the cable modules.

Replacing the LED Cable Module

Follow these steps to remove the LED cable module:

1. Remove the chassis cover as described in “Removing the Chassis Cover” on page 21.
2. Disconnect all the LED cable connectors from the system board. See Figure 2-15 for the location of the LED cable connectors.

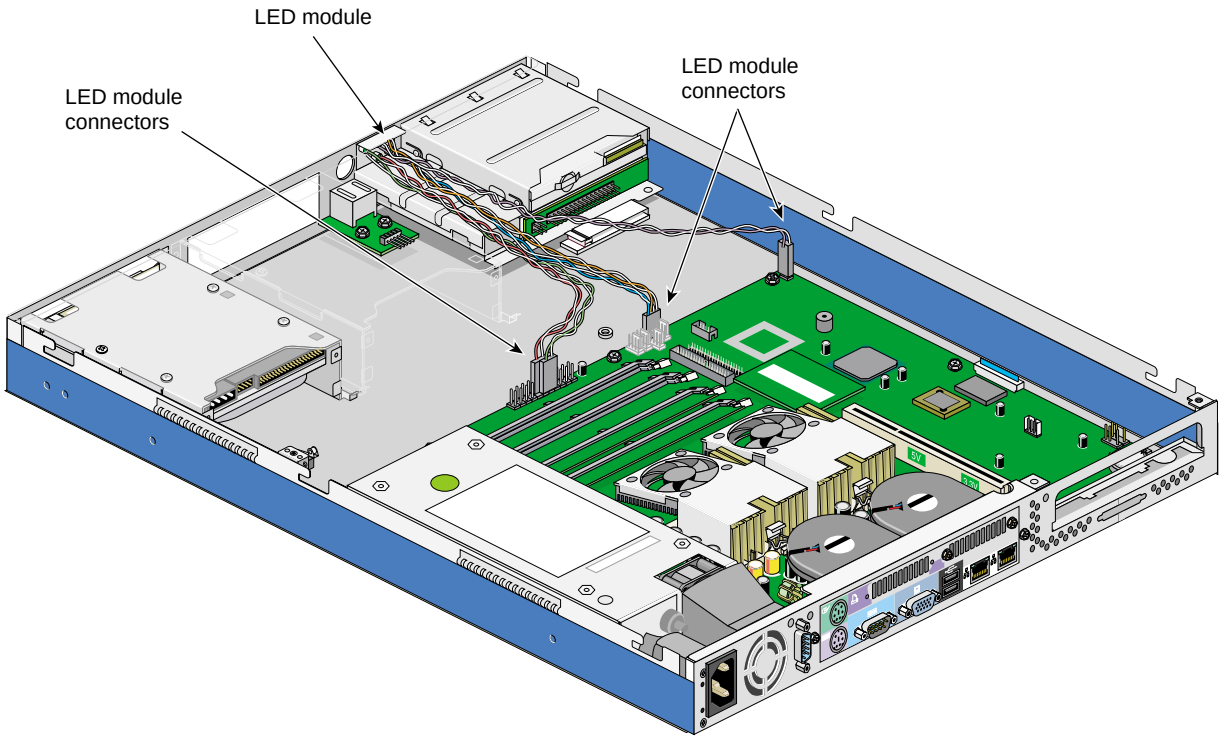

Figure 2-15 Location of the LED Cable Connectors

3. Remove one screw from the LED cable module as shown in Figure 2-16.
4. Remove the LED cable module from the system.

Follow these steps to install the LED cable module:

1. Set the LED cable module in place and secure it with one screw as shown in Figure 2-16.

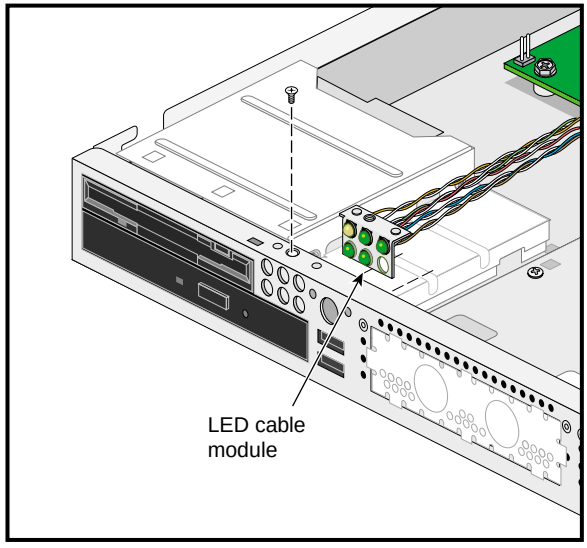

Figure 2-16 Installing the LED Cable Module

2. Connect all the LED cable connectors to the system board. See Figure 2-15 for the location of the LED cable connectors.
3. Install the chassis cover as described in “Installing the Chassis Cover” on page 23.

Replacing the Power Switch Cable Module

Follow these steps to remove the power switch cable module:

1. Remove the chassis cover as described in “Removing the Chassis Cover” on page 21.
2. Disconnect the power switch cable connector from the system board. See Figure 2-17 for the location of the power switch cable connector.

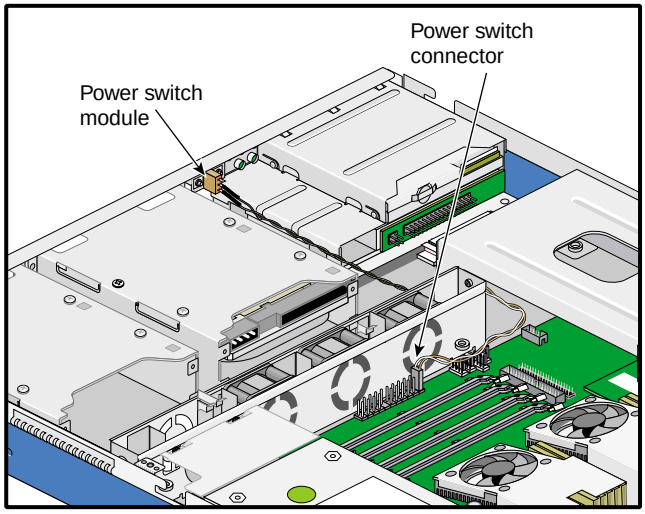

Figure 2-17 Location of the Power Switch Cable Connector

3. Remove two screws from the power switch cable module as shown in Figure 2-18.

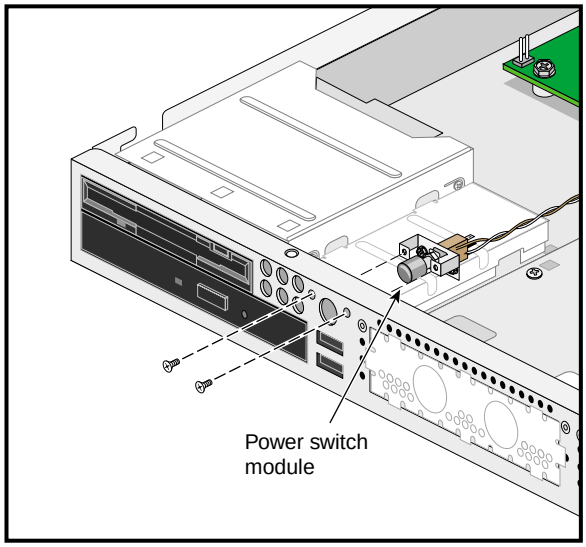

Figure 2-18 Removing the Power Switch Cable Module

4. Remove the power switch cable module from the system.

Follow these steps to install the power switch cable module:

1. Set the power switch cable module in place and secure it with two screws as shown in Figure 2-19.

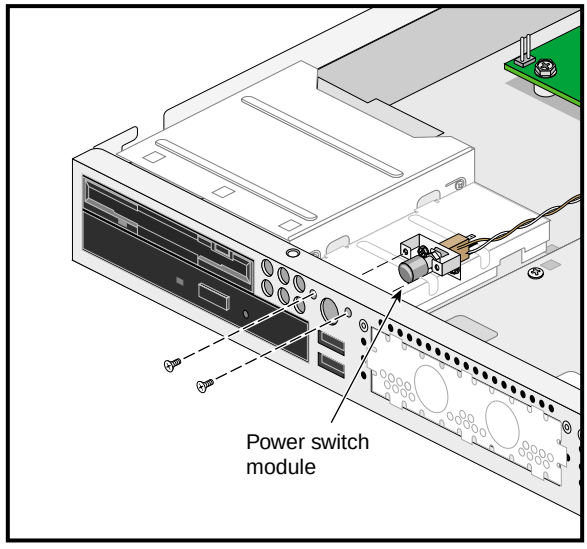

Figure 2-19 Installing the Power Switch Cable Module

2. Connect the power switch cable connector to the system board connector CN15, pins 1 and 2. See Figure 2-17 for the location of the power switch cable connector.
3. Install the chassis cover as described in “Installing the Chassis Cover” on page 23.

Replacing the USB Daughterboard Cable Module

Follow these steps to remove the USB daughterboard cable module:

1. Remove the chassis cover as described in “Removing the Chassis Cover” on page 21.
2. Disconnect the USB daughterboard cable connector from the system board. See Figure 2-20 for the location of the USB daughterboard cable connector.

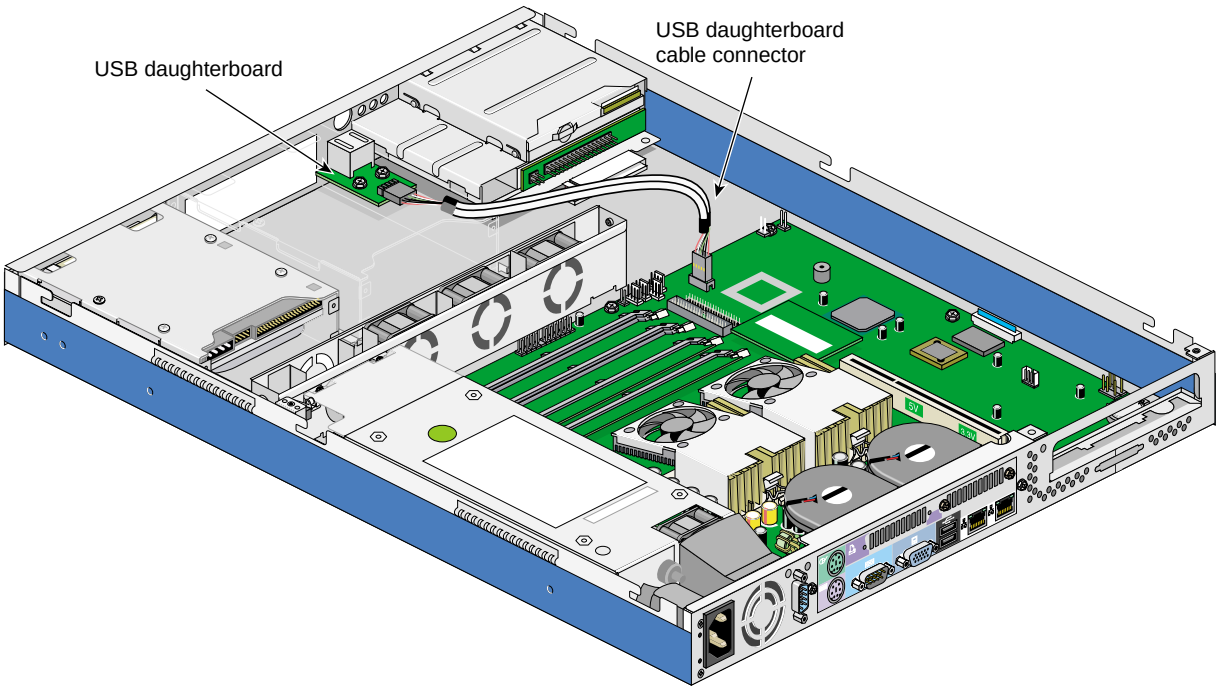

Figure 2-20 Location of the USB Daughterboard Cable Connector

3. Remove two screws from the USB daughterboard cable module as shown in Figure 2-21.

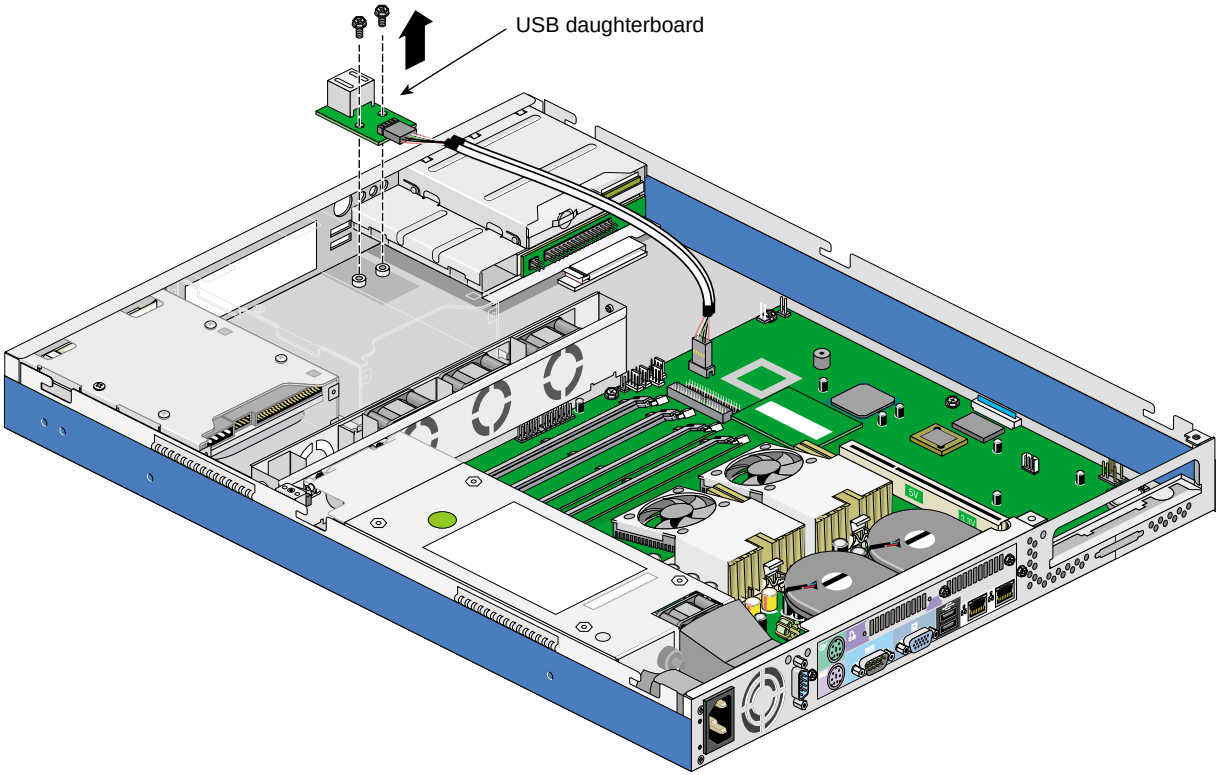

Figure 2-21 Removing the USB Daughterboard Cable Module

4. Remove the USB daughterboard cable module from the system.

Follow these steps to install the USB daughterboard cable module:

1. Set the USB daughterboard cable module in place and secure it with two screws as shown in Figure 2-22.

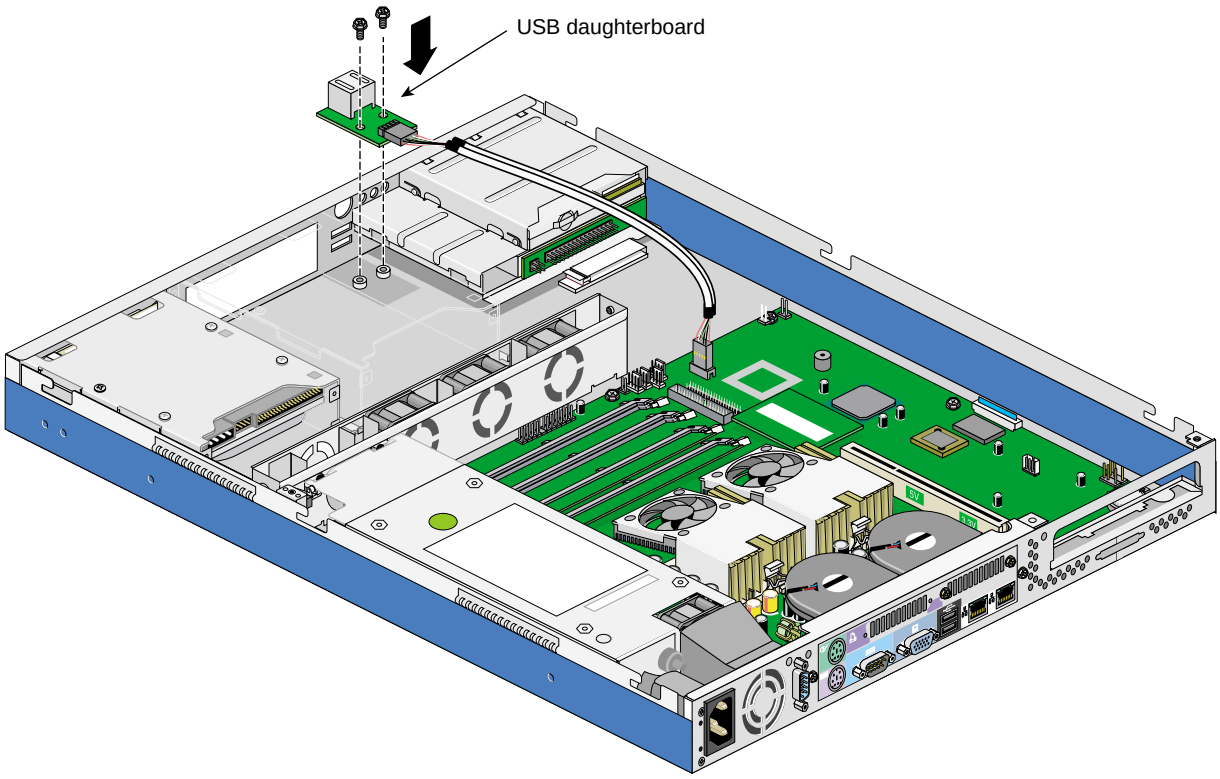

Figure 2-22 Installing the USB Daughterboard Cable Module

2. Connect the USB daughterboard cable connector to the system board connector CN30. See Figure 2-20 for the location of the USB daughterboard cable connector.
3. Install the chassis cover as described in “Installing the Chassis Cover” on page 23.

Replacing the Intrusion Alert Microswitch Cable Module

Follow these steps to remove the intrusion alert microswitch cable module:

1. Remove the chassis cover as described in “Removing the Chassis Cover” on page 21.
2. Disconnect the intrusion alert microswitch cable connector from the system board. See Figure 2-23 for the location of the intrusion alert microswitch cable connector.

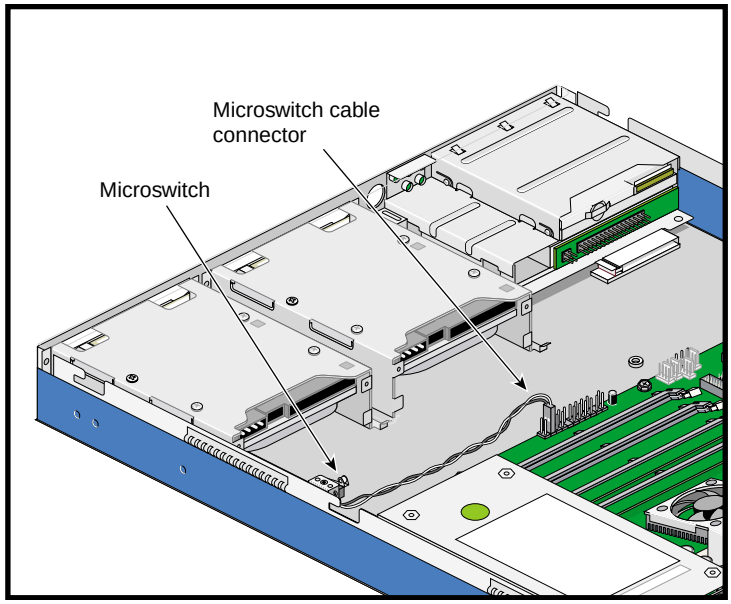

Figure 2-23 Location of the Intrusion Alert Microswitch Cable Connector

3. Remove the screw from the intrusion alert microswitch cable module as shown in Figure 2-24.

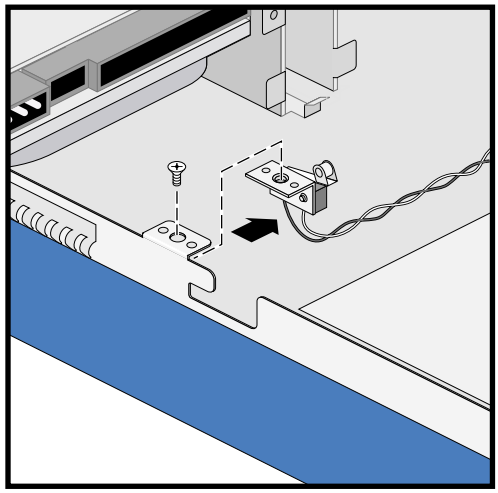

Figure 2-24 Removing the Intrusion Alert Microswitch Cable Module

4. Remove the intrusion alert microswitch cable module from the system as shown in Figure 2-24.

Follow these steps to install the intrusion alert microswitch cable module:

1. Set the intrusion alert microswitch cable module in place and secure it with one screw as shown in Figure 2-25.

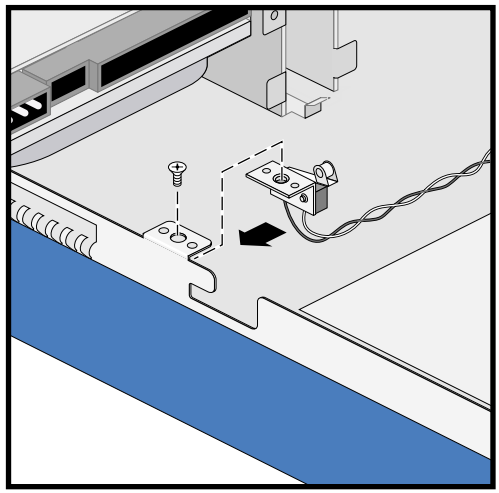

Figure 2-25 Installing the Intrusion Alert Microswitch Cable Module

2. Connect the intrusion alert microswitch cable connector to the system board connector CN15, pins 19 and 20. See Figure 2-23 for the location of intrusion alert microswitch cable connector.
3. Install the chassis cover as described in “Installing the Chassis Cover” on page 23.

Replacing Removable-Media Devices

This section covers the removal and installation of the removable-media devices.

Removing the Diskette Drive/CD-ROM Drive Module

Follow these steps to remove the diskette drive / CD-ROM drive module:

1. Remove the chassis cover as described in “Removing the Chassis Cover” on page 21.
2. Remove the link bar, as described in “Removing the Link Bar” on page 25.
3. Release the signal cable retaining strap, as shown in Figure 2-26.

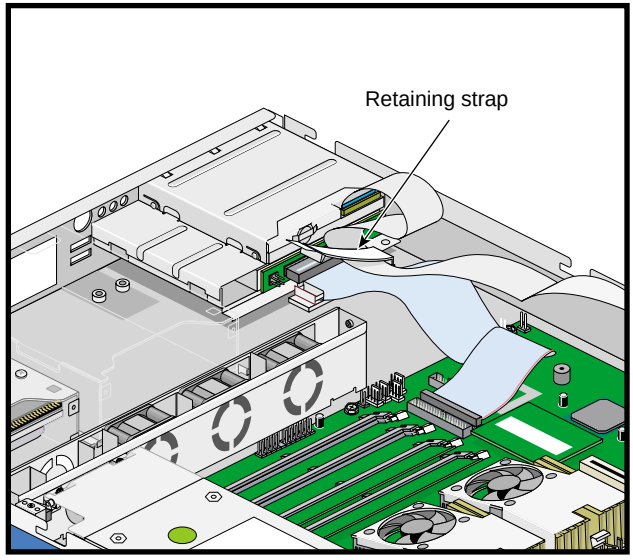

Figure 2-26 Releasing the Signal Cable Retaining Strap

4. Disconnect the CD-ROM drive signal cable from the CD-ROM drive connector as shown in Figure 2-27.

Note: The CD-ROM drive signal cable is not a standard IDE cable. Instead, the CD-ROM drive uses a signal cable with 50 conductors, some of which supply power.

5. Disconnect the diskette drive signal cable from the diskette drive connector. To do so, lift the connector retaining latch and then pull the signal cable out of the connector as shown in Figure 2-27.

Note: If you need to replace the diskette drive signal cable, follow the same procedure to remove the diskette drive signal cable from the connector on the system board.

Note: The diskette drive signal cable is not a standard floppy drive cable. Instead, the diskette drive uses a signal cable with 26 conductors, some of which supply power.

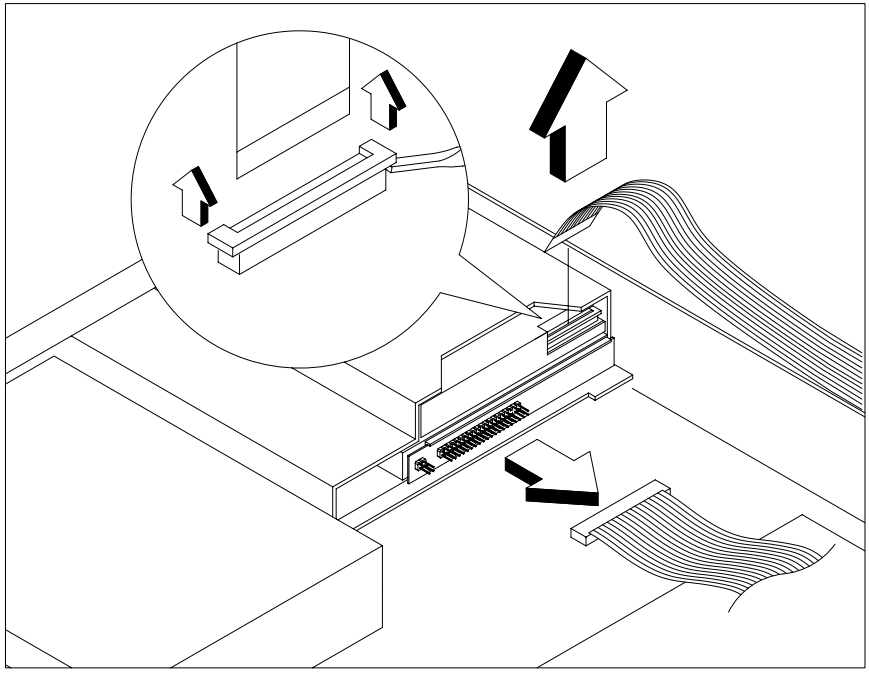

Figure 2-27 Disconnecting the Drive Module Signal Cables

6. Remove two screws that hold the drive module to the chassis as shown in Figure 2-28.
7. Gently slide the drive module back, and then lift it out of the chassis as shown in Figure 2-28.

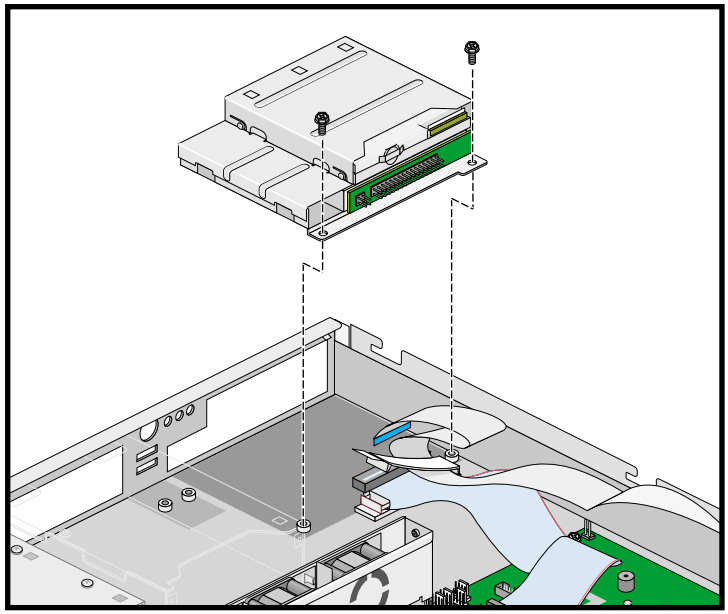

Figure 2-28 Removing the Drive Module

Installing the Diskette Drive/CD-ROM Drive Module

Follow these steps to install the diskette drive/CD-ROM drive module:

1. Insert the drive module into its chassis.
2. Tighten the two screws to secure the drive module to the chassis as shown in Figure 2-29.
3. Connect the CD-ROM drive signal cable to the CD-ROM drive connector as shown in Figure 2-29.

Note: The CD-ROM drive signal cable is not a standard IDE cable. Instead, the CD-ROM drive uses a signal cable with 50 conductors, some of which supply power.

4. Connect the diskette drive signal cable to the diskette drive connector. To do so, follow these steps:
   - Lift the connector retaining latch.
   - Carefully insert the signal cable into the diskette drive connector.
   - Push the retaining latch in on both sides of the connector, using a small flat-head screwdriver. See Figure 2-29 for an illustration of the procedure.

Note: Follow the same procedure to connect the diskette drive signal cable to the connector on the system board.

Note: The diskette drive signal cable is not a standard floppy drive cable. Instead, the diskette drive uses a signal cable with 26 conductors, some of which supply power.

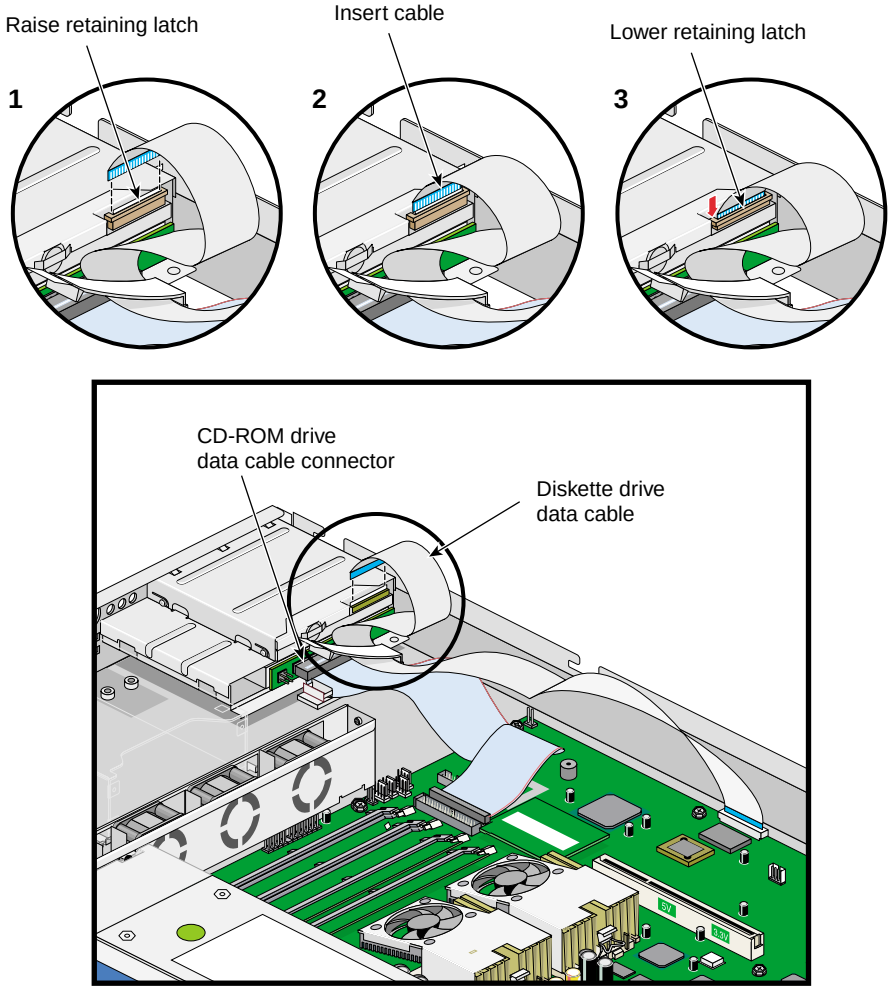

Figure 2-29 Connecting the Drive Module Signal Cables

5. Secure the signal cable retaining strap.
6. Install the link bar, as described in “Installing the Link Bar” on page 27.
7. Install the chassis cover as described in “Installing the Chassis Cover” on page 23.

Replacing the Diskette Drive

Follow these steps to remove the diskette drive:

1. Remove the diskette drive module as described in “Removing the Diskette Drive / CD-ROM Drive Module” on page 51.
2. Remove four screws, two on each side of the disk drive module, as shown in Figure 2-30.
3. Gently pull the drive out of the drive module as shown in Figure 2-30.

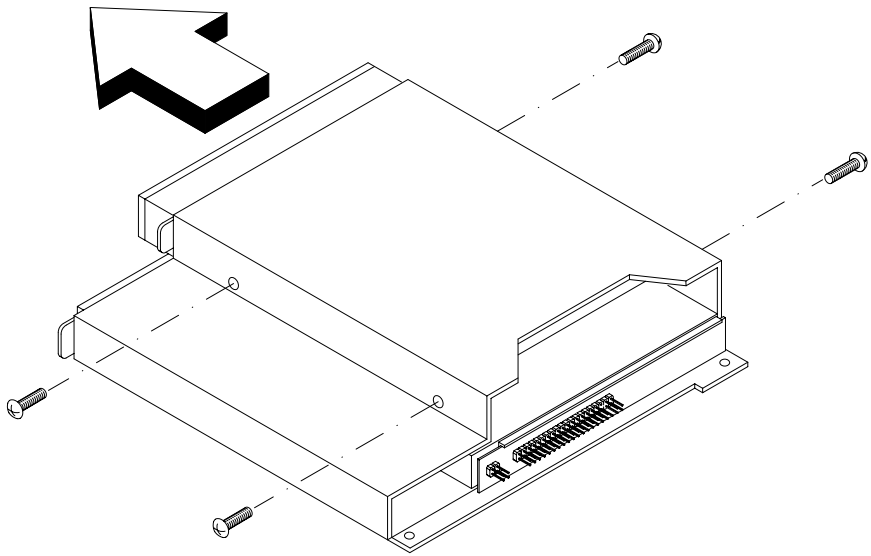

Figure 2-30 Removing the Diskette Drive from the Drive Module

Follow these steps to install the diskette drive:

1. Slide the diskette drive into the drive module as shown in Figure 2-31.
2. Tighten four screws, two on each side of the disk drive module, as shown in Figure 2-31.

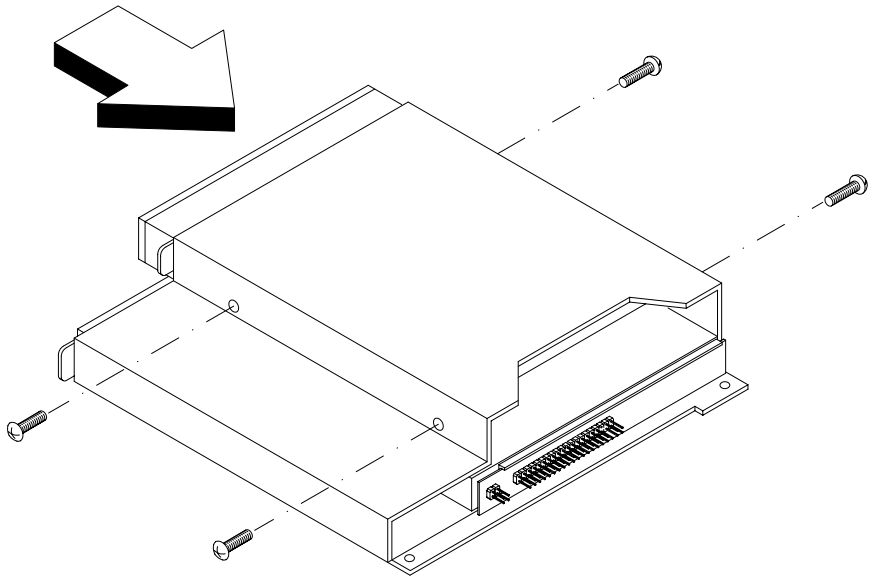

Figure 2-31 Installing the Diskette Drive into the Drive Module

3. Install the diskette drive module as described in “Installing the Diskette Drive / CD-ROM Drive Module” on page 54.

Replacing the CD-ROM Drive

Follow these steps to remove the CD-ROM drive:

1. Remove the diskette drive module as described in “Removing the Diskette Drive / CD-ROM Drive Module” on page 51.
2. Remove two screws to detach the IDE converter board and the plastic plate as shown in Figure 2-32.

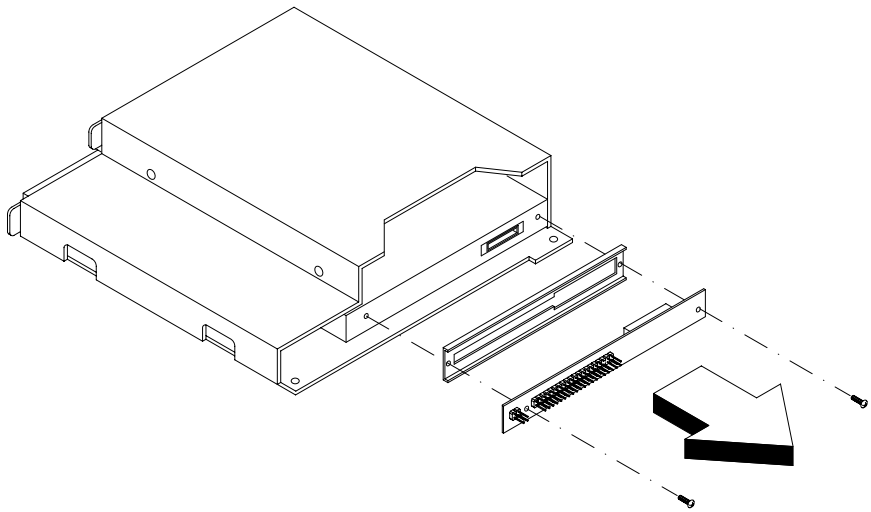

Figure 2-32 Removing the CD-ROM Drive Converter Board

3. Remove four screws, two on each side of the drive module, as shown in Figure 2-33.
4. Gently pull the drive out of the drive module as shown in Figure 2-33.

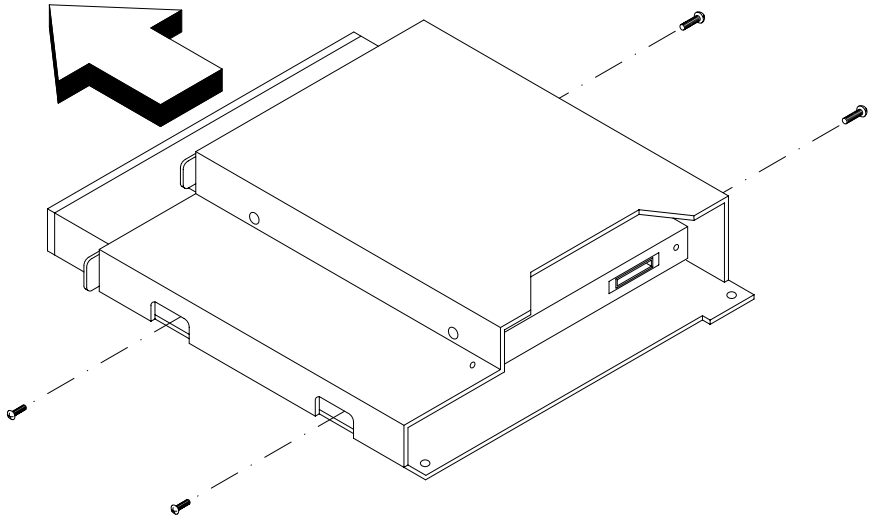

Figure 2-33 Removing the CD-ROM Drive from the Drive Module

Follow these steps to install the CD-ROM drive:

1. Remove the drive module from the chassis as described in “Removing the Diskette Drive / CD-ROM Drive Module” on page 51.
2. Insert the CD-ROM drive into the drive module as shown in Figure 2-34.
3. Tighten the two screws located on the side of the drive module that is in contact with the side of the chassis, as shown in Figure 2-34.

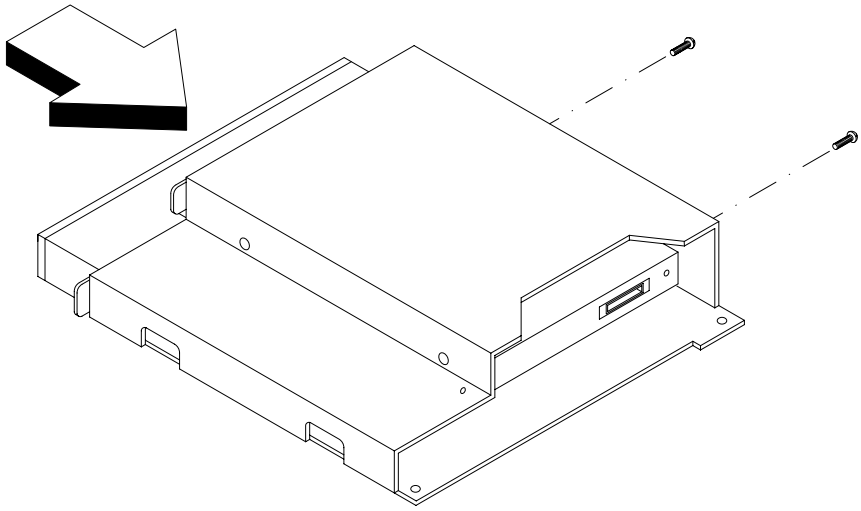

Figure 2-34 Installing the CD-ROM Drive into the Drive Module

4. Follow these steps to tighten the two screws on the other side of the drive module:
   - Hold the drive module vertically with the two empty screw holes pointing down as shown in Figure 2-35.
   - Place a screw on the tip of a small Phillips screwdriver as shown in Figure 2-35.

     Note: If the type of Phillips screwdriver you are using does not allow a screw to stay balanced on the tip of the screwdriver, see step 5 for an alternative procedure.

   - Pass the screw through the drive module opening and tighten the screw.
   - Repeat this procedure for the other screw.

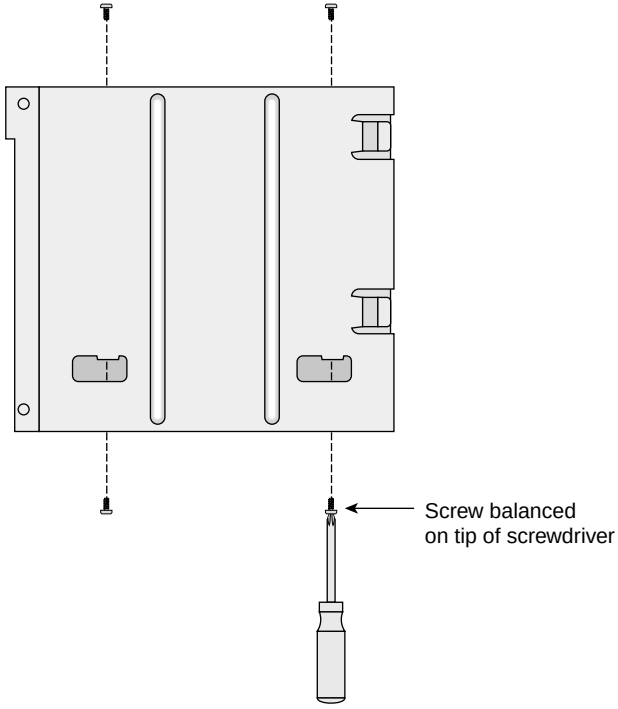

Figure 2-35 Securing the CD-ROM drive to the Drive Module

5. If the type of Phillips screwdriver you are using does not allow you to perform the procedure shown in step 4, follow these alternative steps:
   - Using needle-nose pliers, hold one of the screws through the hole in the drive module.
   - With your other hand, tighten the screw with a small Phillips screwdriver.
   - Repeat this procedure for the other screw.
6. Install the diskette drive module as described in “Installing the Diskette Drive / CD-ROM Drive Module” on page 54.
7. Install the chassis cover as described in “Installing the Chassis Cover” on page 23.

Replacing a Hard Drive

This section covers the removal and installation of a hard drive.

Note: It is recommended that two people be available for some of the hard drive replacement steps.

Removing a Hard Drive

Follow these steps to remove a hard drive:

1. Remove the chassis cover and the front panel as described in “Opening the Chassis” on page 21.
2. Remove the EMI filler panel from in front of the hard drive by pulling it straight away from the chassis.

3. Disconnect the power cable and the data cable from the back of the hard drive as shown in Figure 2-36.

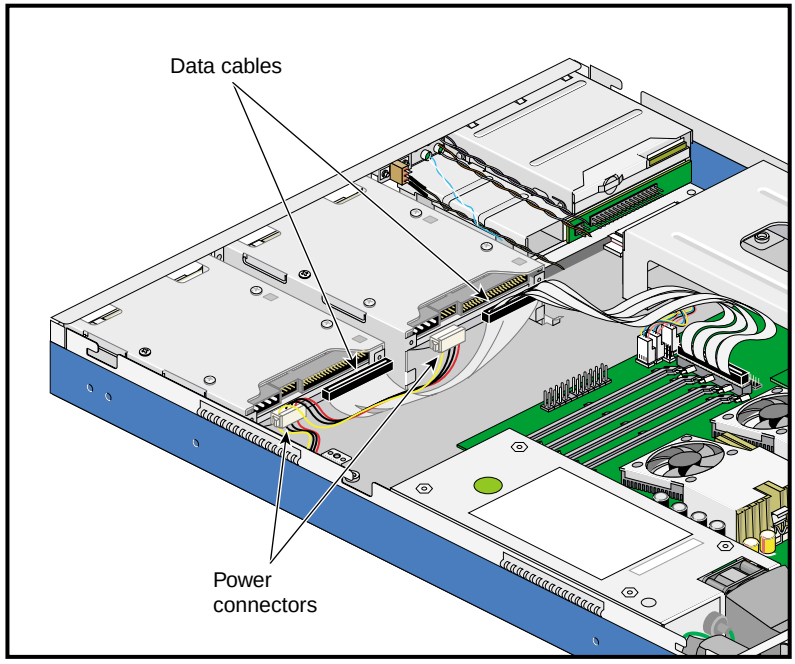

Figure 2-36 Removing Hard Drive Cables

4. Remove two of the four screws that attach the hard drive to the chassis as shown in Figure 2-37. The first two screws that you remove should be diagonally-located.

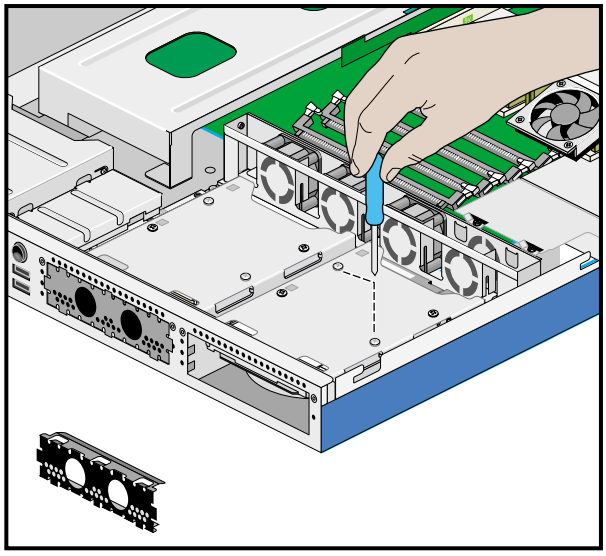

Figure 2-37 Removing Two of Four Hard Disk Drive Screws

5. While another person holds the hard drive in place, remove the remaining two screws, as shown in Figure 2-38.

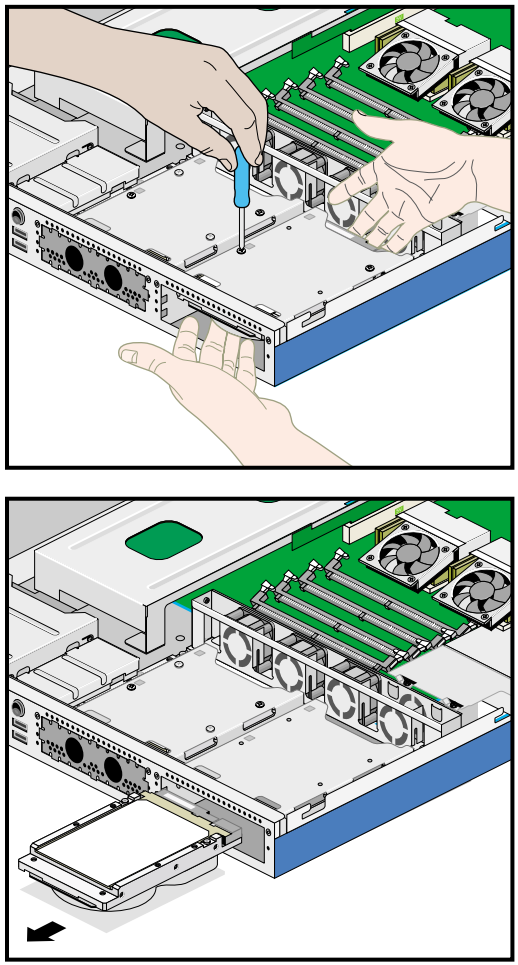

Figure 2-38 Removing the Hard Disk Drive

Note: If the drive is not held in place when the last 2 screws are removed, it will fall. In order to avoid damage to the hard drive, and if there is no other person available to help with this task, place a soft object under the drive to absorb the shock.

6. Pull the drive out of the chassis.
7. Insert the EMI filler panel into the chassis if no other drive is to be installed.

Note: Ensure that the arrow on the EMI filler panel points up.

8. Install the chassis cover as described in “Installing the Chassis Cover” on page 23.

Installing a Hard Disk Drive

Follow these steps to install a hard drive:

1. Remove the chassis cover and the front panel as described in “Opening the Chassis” on page 21.
2. Remove the EMI filler panel by pulling it away from the chassis.
3. Ensure that the master / slave jumper on the hard drive is set correctly.
4. Place the hard drive (with the screw holes and connectors facing up) in the chassis.
5. While another person holds the hard drive up against the frame, tighten two diagonally-located screws to secure the drive in place, as shown in Figure 2-39.

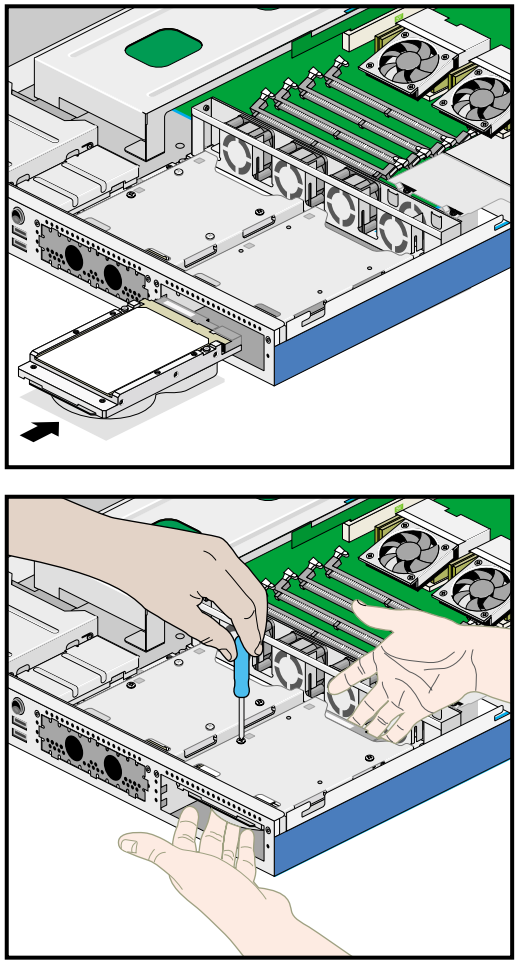

Figure 2-39 Installing the Hard Disk Drive

> **Note:** If there is no other person available to help with this task, place an object under the hard drive to allow you to tighten the first two screws.

6. Tighten the remaining two screws.
7. Connect the power cable and the data cable to the back of the hard drive.

8. Insert the EMI filler panel into the chassis.

   Note: Ensure that the arrow on the EMI filler panel points up.

9. Install the chassis cover as described in “Installing the Chassis Cover” on page 23 and the front panel as described in “Removing and Installing the Front Panel” on page 24.

Replacing the Power Supply Module

This section covers the removal and installation of the power supply module:

Removing the Power Supply Module

Follow these steps to remove the power supply module:

1. Remove the chassis cover as described in “Removing the Chassis Cover” on page 21.
2. Remove the intrusion alert microswitch module as described in “Replacing the Intrusion Alert Microswitch Cable Module” on page 48.
3. Disconnect the power supply cable from the system board. See Figure 2-40 for the location of the system board power supply connector.

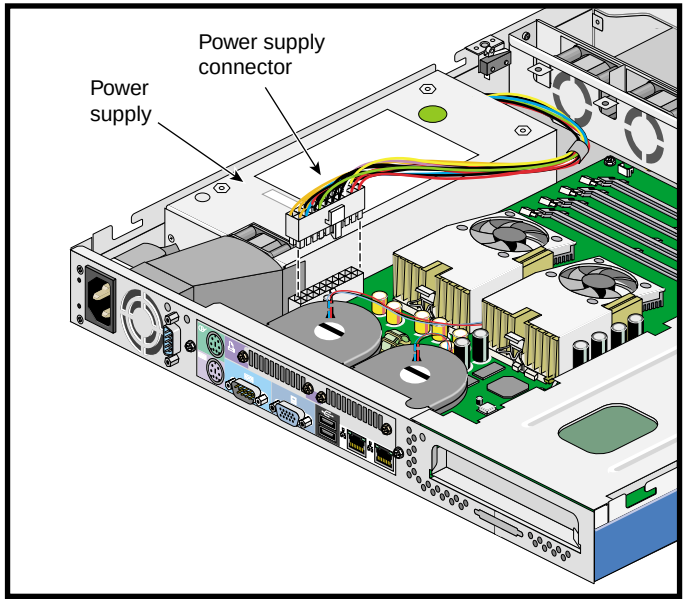

Figure 2-40 Location of the System Board Power Supply Connector

4. Disconnect the power supply cable from the hard drives. See Figure 2-41 for the location of the hard drive power supply connectors.

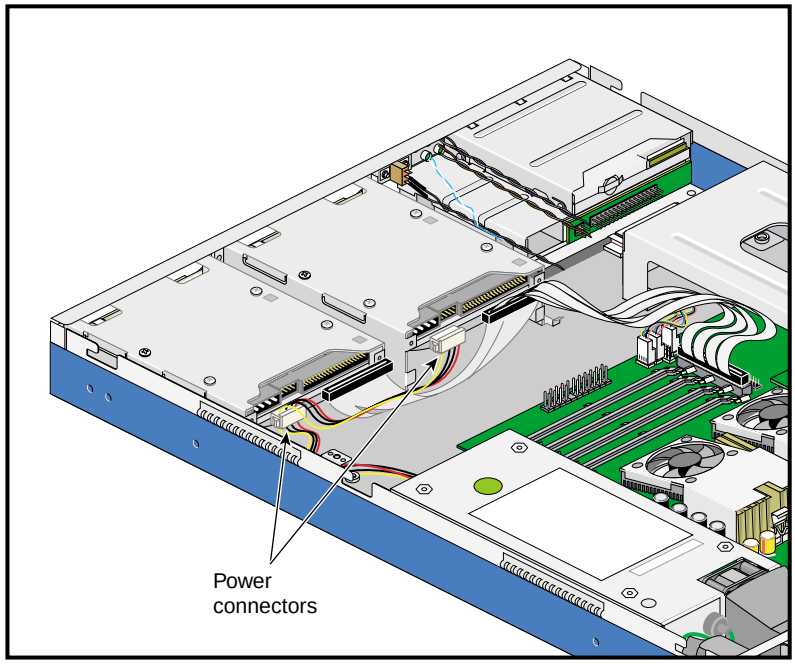

Figure 2-41 Location of the Hard Drive Power Supply Connectors

5. Remove the metal air guide plate by releasing the two screws as shown in Figure 2-42.

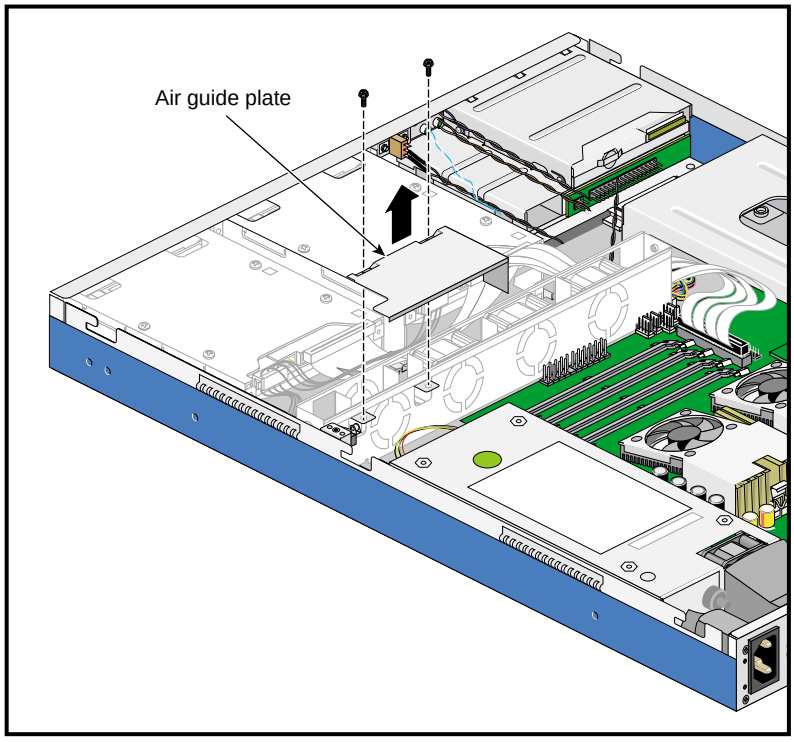

Figure 2-42 Removing the Air Guide Plate

6. Remove the plastic plenum by separating it from the power supply module and gently detaching it from the power socket module, as shown in Figure 2-43.

Note: The plastic plenum adheres to the sides of the power socket module. Proceed with care to free the plenum from the power socket module.

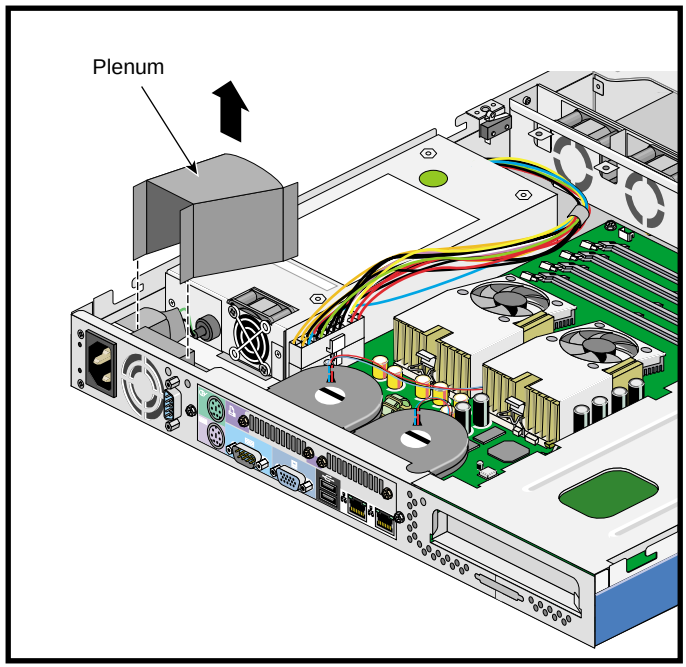

Figure 2-43 Removing the Plastic Plenum

7. Remove the three screws from the power supply module as shown in Figure 2-44.

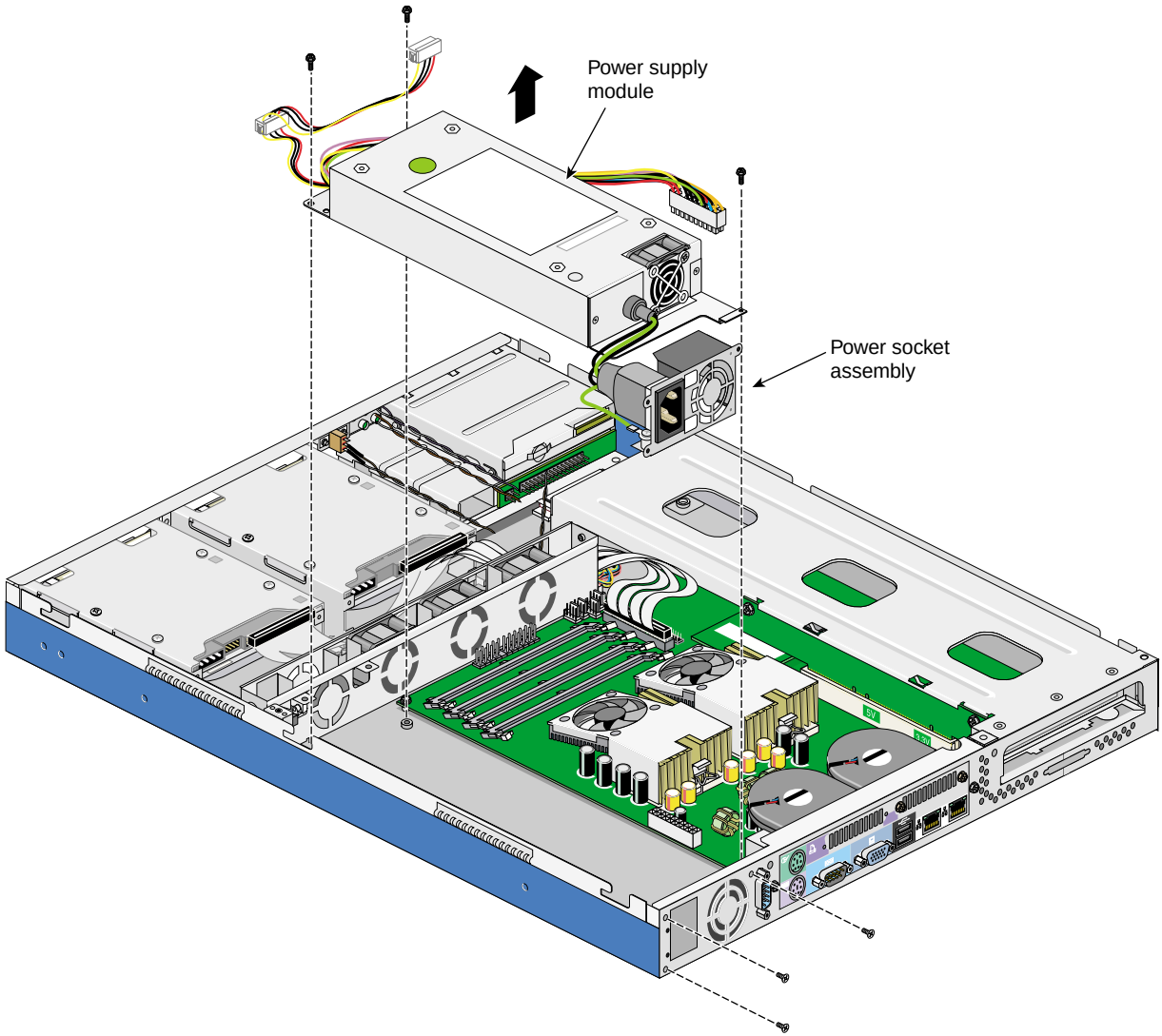

Figure 2-44 Removing the Power Supply Module

8. Remove three screws to release the power socket module as shown in Figure 2-44.
9. Lift up the power supply module from the chassis as shown in Figure 2-44.

Installing the Power Supply Module

Follow these steps to install the power supply module:

1. Place the power supply module in the chassis as shown in Figure 2-45.
2. Tighten three screws to attach the power supply socket module to the rear panel as shown in Figure 2-45.

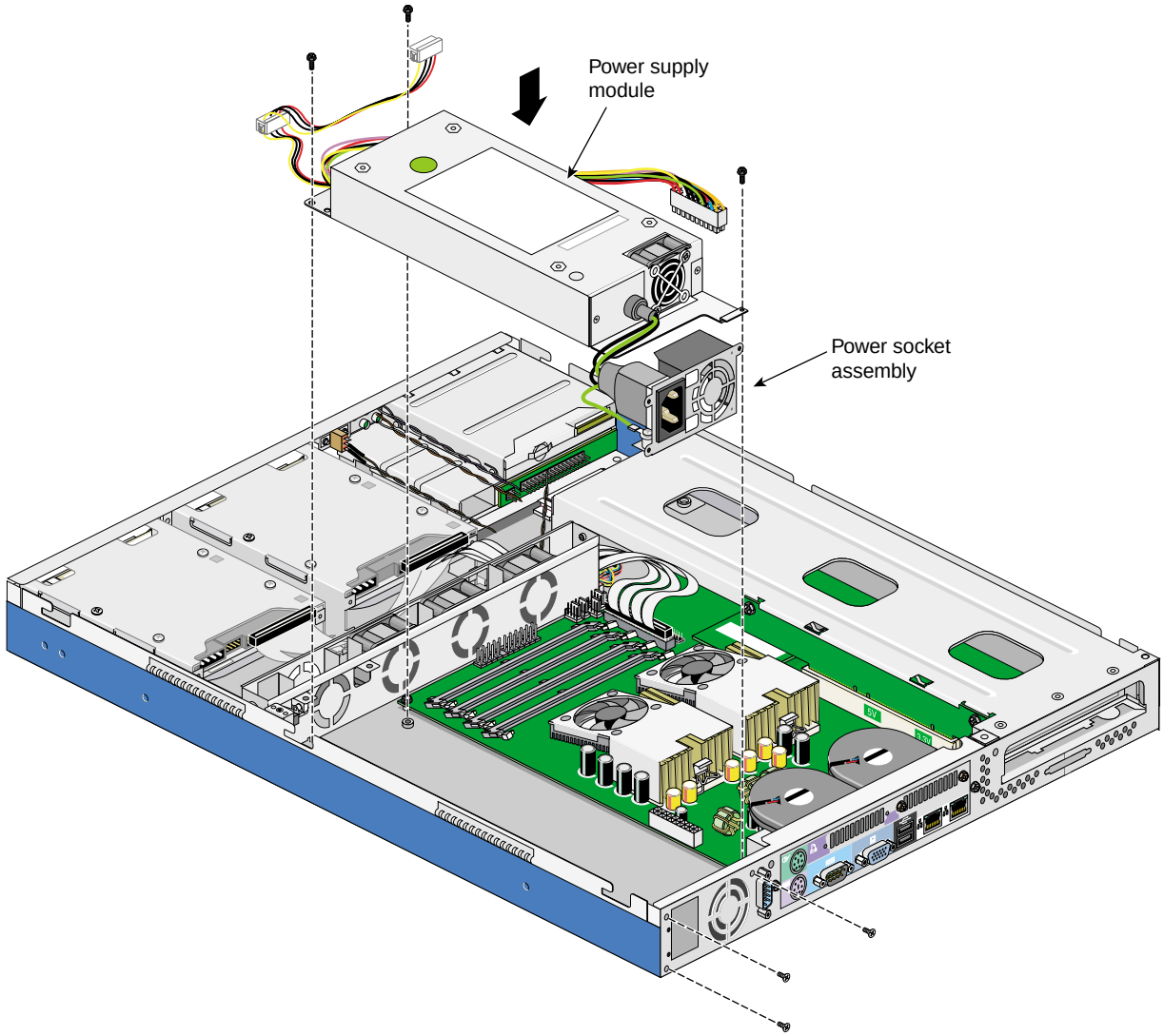

Figure 2-45 Installing the Power Supply Module

3. Follow these steps to install the plastic plenum:
   - Align the narrow part of the plastic plenum with the air vent on the power supply socket module, using the adhesive sides of the plenum to stick it into position, as shown in Figure 2-46.
   - Align the wide part of the plenum with the power supply fan opening.

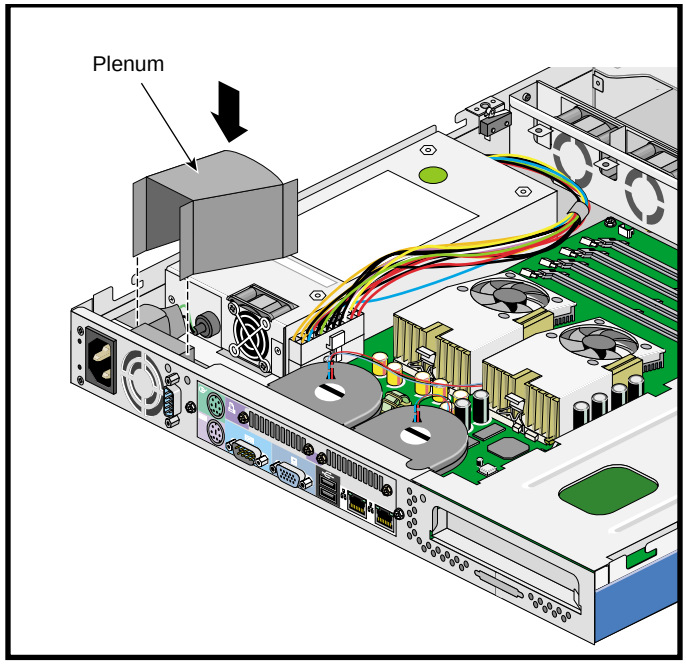

Figure 2-46 Installing the Plastic Plenum

4. Tighten three screws to secure the power supply module to the chassis as shown in Figure 2-45.

5. Install the metal air guide plate and secure it with two screws as shown in Figure 2-47.

Note: Ensure that all cables fit within the metal air guide plate opening, so that no cables are stuck between the air guide plate and the chassis.

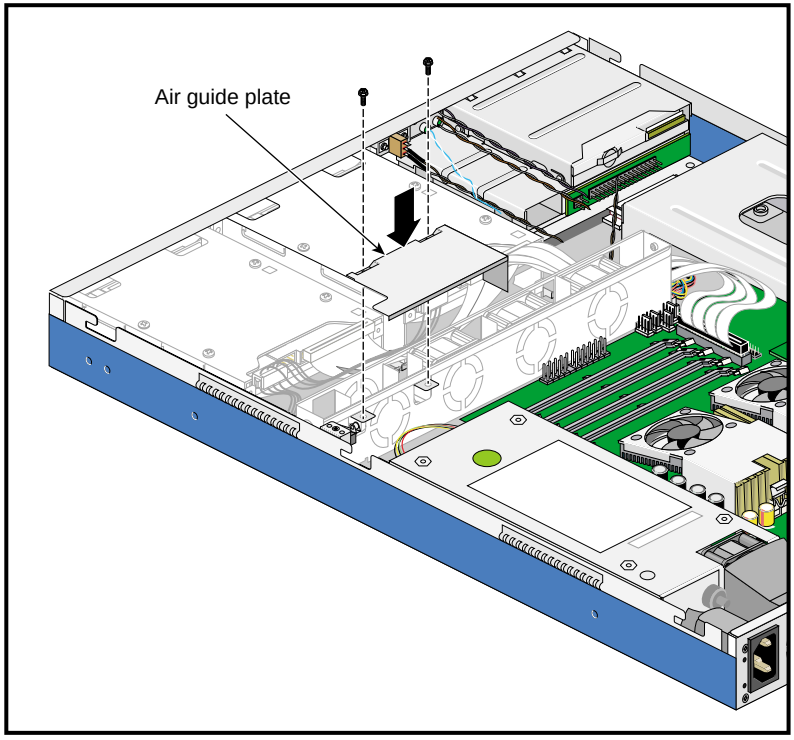

Figure 2-47 Installing the Metal Air Guide Plate

6. Connect the power supply cable to the system board. See Figure 2-40 on page 71 for the location of the system board power supply connector.
7. Connect the power supply cable to the hard drives. See Figure 2-41 on page 72 for the location of the hard drive power supply connectors.
8. Install the intrusion alert microswitch module as described in “Replacing the Intrusion Alert Microswitch Cable Module” on page 48.
9. Install the chassis cover as described in “Installing the Chassis Cover” on page 23.

Removing a Processor

Follow these steps to remove a processor:

1. Remove the chassis cover as described in “Removing the Chassis Cover” on page 21.
2. Disconnect the fan / heatsink cables from the system board.
3. Follow these steps to remove the fan / heatsink assembly from the processor:
   - Disconnect the fan / heatsink cable from the system board. See Figure 2-50 for the location of the cable connection.
   - Push on the releasing tab to unhook the metal bracket that is facing the rear of the system. See steps **A** and **B** in Figure 2-48.
   - Lift the fan / heatsink assembly and unhook the other metal bracket. See step **C** in Figure 2-48.
   - Remove the fan / heatsink assembly from the processor.

   Note: Avoid touching the thermal conductive grease on the bottom of the fan / heatsink and the top of the processor.

4. Pull up the socket lever (see step **D** in Figure 2-48). The processor pins will be automatically released from the socket holes.
5. Lift the processor from the socket as shown in Figure 2-48.

   Caution: Do not touch the pins on the processor, so as to ensure long-term reliable contact.

6. If you will now be using the system as a single-CPU system, this processor must be replaced with a terminator board. See “Installing a Processor Terminator Board” on page 86.
7. Install the chassis cover as described in “Installing the Chassis Cover” on page 23.

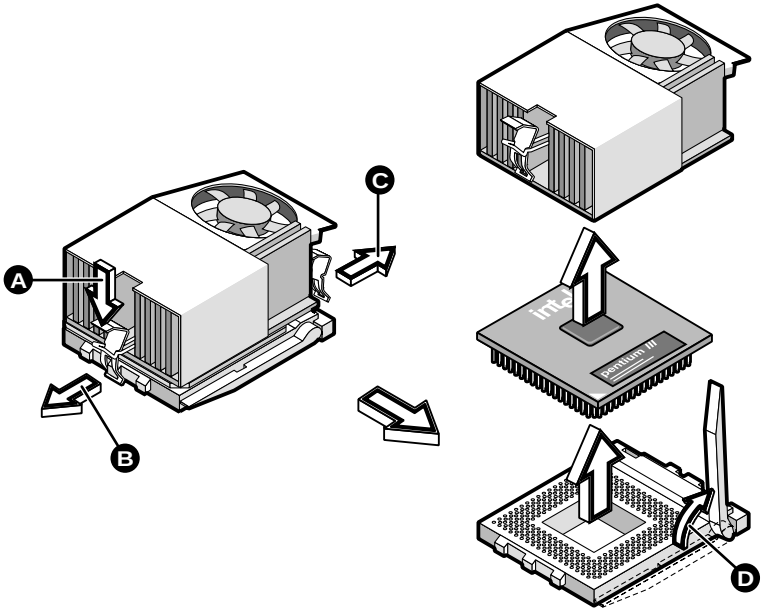

Figure 2-48 Removing a Processor

Installing a Processor

Follow these steps to install a processor:

Warning: Both CPUs must be the same speed and cache size. Do not install CPUs with different speeds or cache sizes; this would cause your system to malfunction.

1. Remove the chassis cover as described in “Removing the Chassis Cover” on page 21.
2. Pull up the socket lever.
3. Remove the terminator board, if present.
4. Insert the processor, making sure that pin 1 (indicated by a triangle at the corner of the processor) connects to hole 1 of the socket, as shown in Figure 2-49.

   Caution: Do not touch the pins on the processor, so as to ensure long-term reliable contact.

5. Pull down the socket lever to lock the processor into the socket. See step **B** in Figure 2-49.

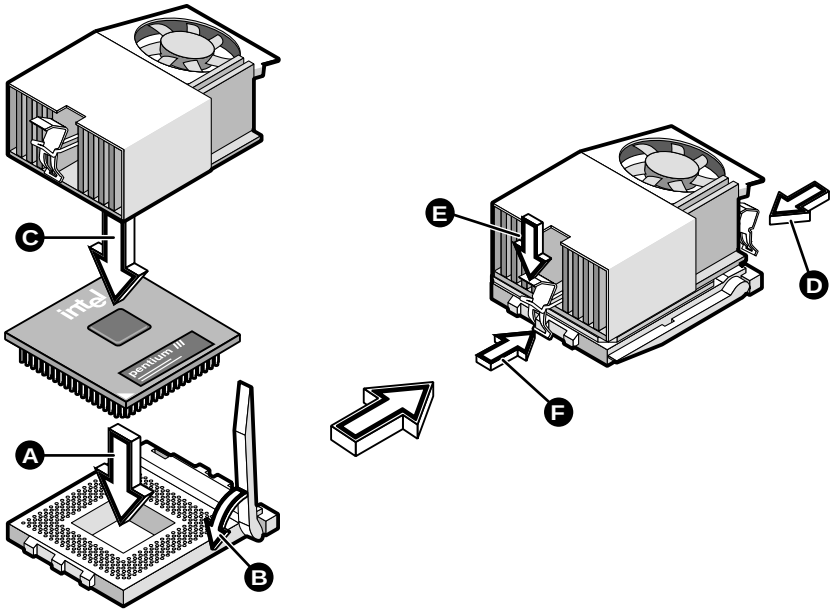

Figure 2-49 Installing the Processor

6. Follow these procedures to attach the heatsink / fan assembly to the processor:

Note: Avoid touching the thermal conductive grease on the bottom of the fan / heatsink and the top of the processor.

- Spread a small amount of thermal conductive grease on the top center of the processor.
- Tilt the heatsink / fan assembly on the processor so as to be able to hook the metal bracket that is facing the front of the chassis over the retaining hook on the CPU socket. See step **D** in Figure 2-49.
- Place the heatsink / fan assembly flat on the processor.
- Push the releasing tab to latch the other metal bracket over the retaining hook on the CPU socket. See steps **E** and **F** in Figure 2-49.

7. Plug the fan / heatsink cables to the system board. See Figure 2-50 for the location of the fan / heatsink cable connectors.

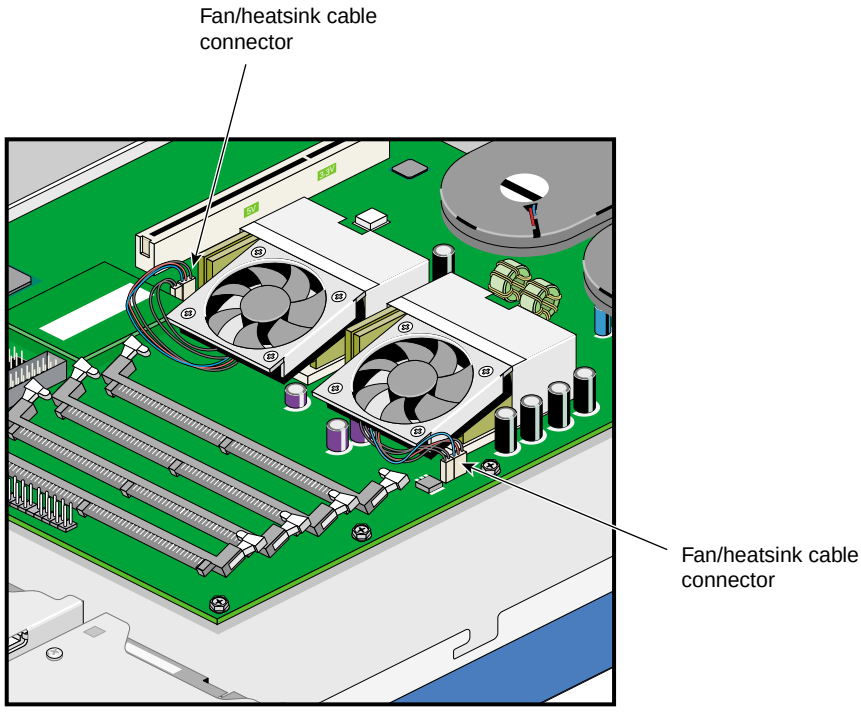

Figure 2-50 Location of the Fan / Heatsink Cable Connector

8. Install the chassis cover as described in “Installing the Chassis Cover” on page 23.

Installing a Processor Terminator Board

If you plan to use the SGI 1100 server with only one processor, that one processor must be installed in the processor socket closer to the power supply. Additionally, the processor socket farther from the power supply must contain a processor terminator board.

Follow these steps to install a processor terminator board in an empty processor socket:

1. Pull up the socket lever.
2. Insert the processor terminator board, making sure that pin 1 (indicated by a triangle at the corner of the processor terminator board) connects to hole 1 of the socket, as shown in Figure 2-51.

Caution: Do not touch the pins on the processor terminator board, so as to ensure long-term reliable contact.

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3. Pull down the socket lever to lock the processor terminator board into the socket.

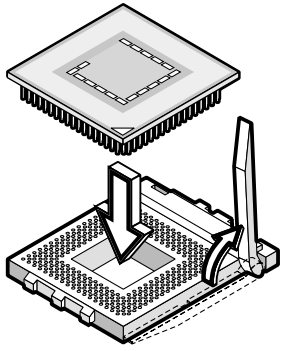

Figure 2-51 Installing a Processor Terminator Board

Removing a DIMM

Follow these steps to remove a DIMM:

1. Remove the chassis cover as described in “Removing the Chassis Cover” on page 21.
2. Press the retaining clips on both sides of the socket outward to release the DIMM, as shown in Figure 2-52.

Note: To gently disengage the DIMM from the socket, place your fingers on the top of the DIMM before you press the retaining clips.

Caution: The DIMM closest to the processors (DIMM 1) may touch the processor fan cages during the removal of the DIMM. Proceed carefully, do not apply excessive lateral pressure on the DIMM socket.

3. Install the chassis cover as described in “Installing the Chassis Cover” on page 23.

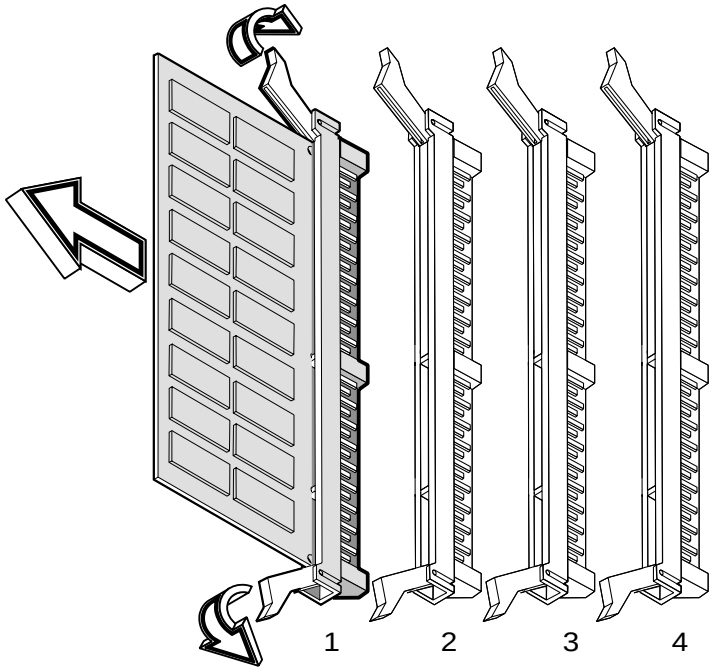

Figure 2-52 Removing a DIMM

Installing a DIMM

The four 168-pin DIMM sockets in the SGI 1100 server support SDRAM-type DIMMs. You may install 128-MB or 512-MB (single density) DIMMs for a maximum of 2 GB of system memory. (the system will also support 1-GB DIMMs, when available, for a maximum of 4 GB of system memory).

Caution: Only 3.3-volt PC-133 SDRAM DIMMs should be used. The SGI 1100 server system does not support 5-volt memory devices, nor does it support PC-100 or PC-66 SDRAM DIMMs. For a list of qualified vendors, contact your reseller.

Each of the DIMM sockets is independent from the others. This independence allows you to install DIMMs with different capacities to form different configurations.

Follow these steps to install a DIMM:

1. Remove the chassis cover as described in “Removing the Chassis Cover” on page 21.
2. Align the DIMM in an empty slot and press it in until the retaining clips secure the DIMM in place, as shown in Figure 2-53.

Caution: The DIMM closest to the processors (DIMM 1) may touch the processor fan cages during the installation of the DIMM. Proceed carefully, do not apply excessive lateral pressure on the DIMM socket.

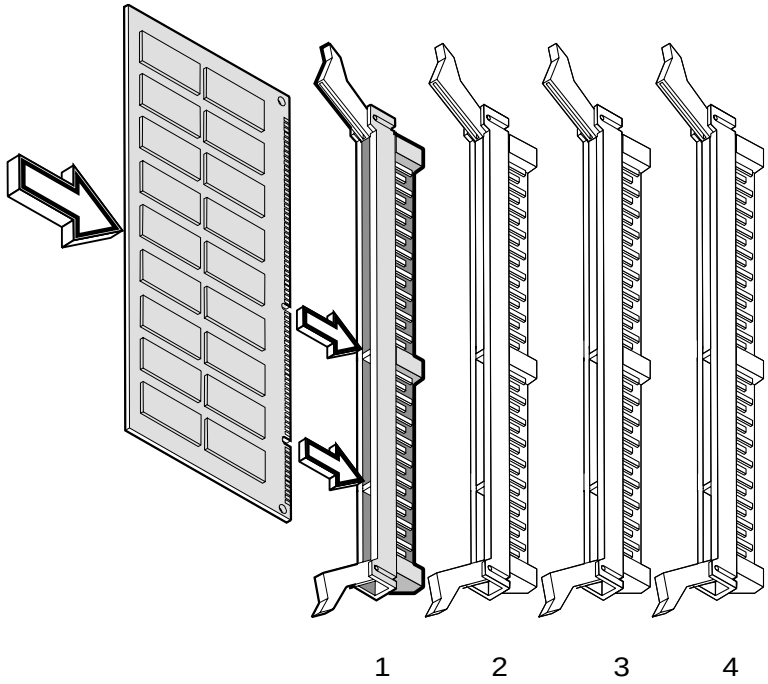

Figure 2-53 Installing a DIMM

Note: The DIMM socket is slotted to ensure proper installation. If you slip in a DIMM but it does not completely fit, you may have inserted it the wrong way. Reverse the orientation of the DIMM.

3. Install the chassis cover as described in “Installing the Chassis Cover” on page 23.

Replacing the CMOS Battery

Follow these steps to replace the CMOS battery:

1. Remove the chassis cover as described in “Removing the Chassis Cover” on page 21.
2. Push on the retaining clip and remove the old battery from its holder, as shown in Figure 2-54.
3. Push the new battery into its holder until the retaining clip snaps into place.
4. Install the chassis cover as described in “Installing the Chassis Cover” on page 23.

Note: The system uses a standard CR2032 3V lithium coin-cell battery.

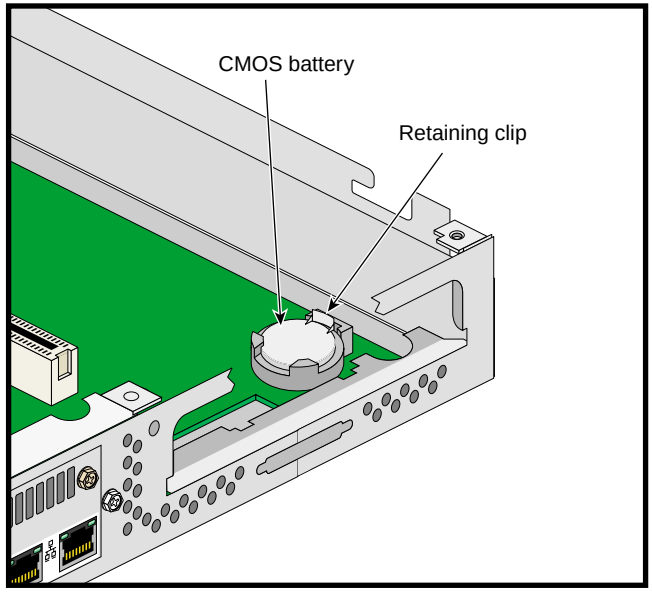

Figure 2-54 Replacing the CMOS Battery

Replacing the System Board

Follow these steps to remove the system board:

1. Remove the chassis cover as described in “Removing the Chassis Cover” on page 21.
2. Remove the link bar, as described in “Removing the Link Bar” on page 25.
3. Remove the two rear system blowers as described in “Replacing the Rear Chassis Blowers” on page 37.
4. Disconnect all cables from the system board.

Note: The diskette drive signal cable is delicate. To disconnect the diskette drive signal cable from the diskette drive connector, lift the connector retaining latch and then pull the signal cable out of the connector as shown in Figure 2-27 on page 52.

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5. Remove 12 screws from the system board, 2 jackscrews from serial port 1, and 2 jackscrews from the VGA port, as shown in Figure 2-55.
6. Gently lift out the system board.

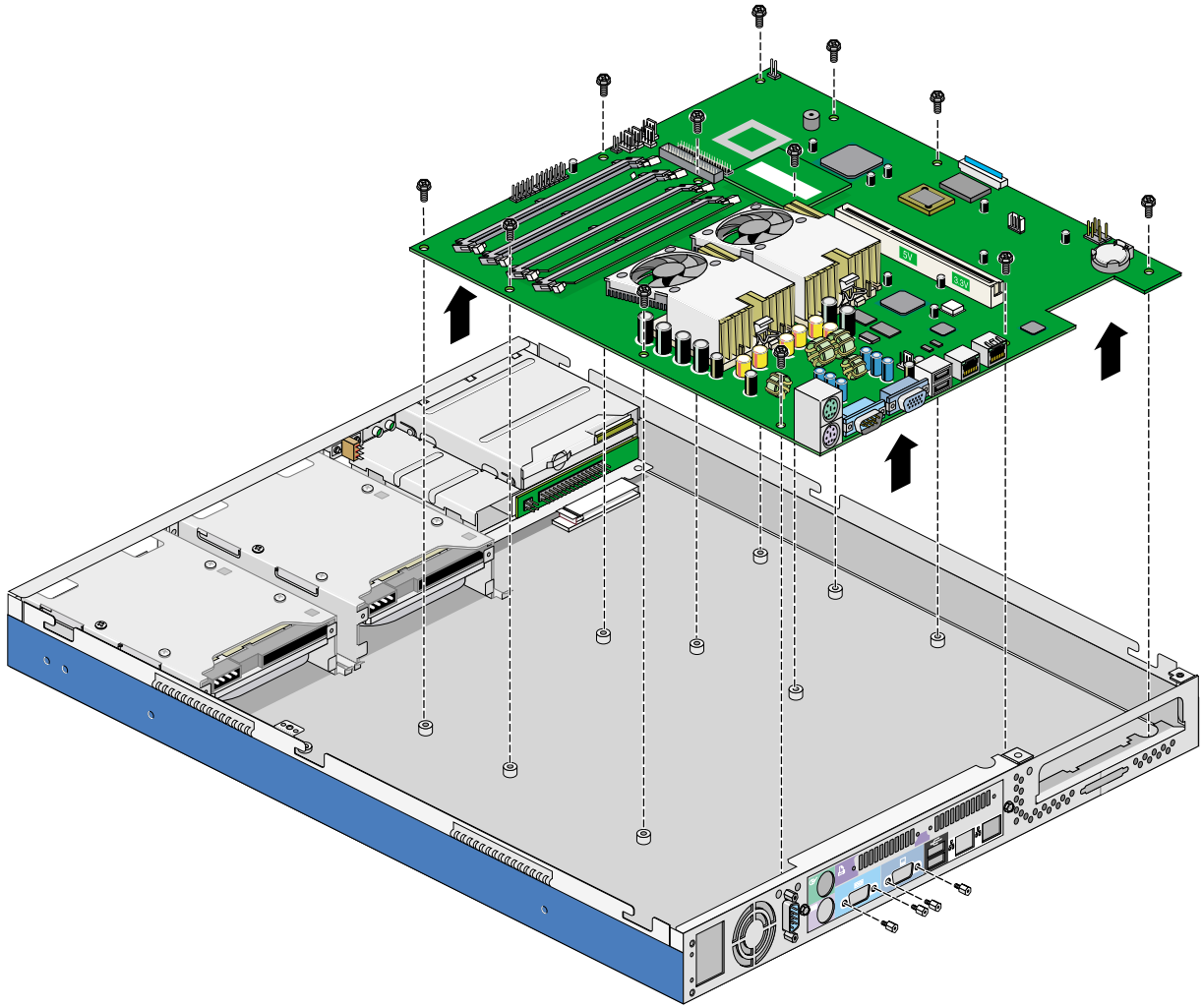

Figure 2-55 Removing the System Board

Follow these steps to install the system board:

1. Place the system board into the chassis so as to align the I/O ports with their corresponding holes on the rear panel.
2. Tighten 12 screws on the system board, 2 jackscrews on serial port 1, and 2 jackscrews on the VGA port, as shown in Figure 2-56.

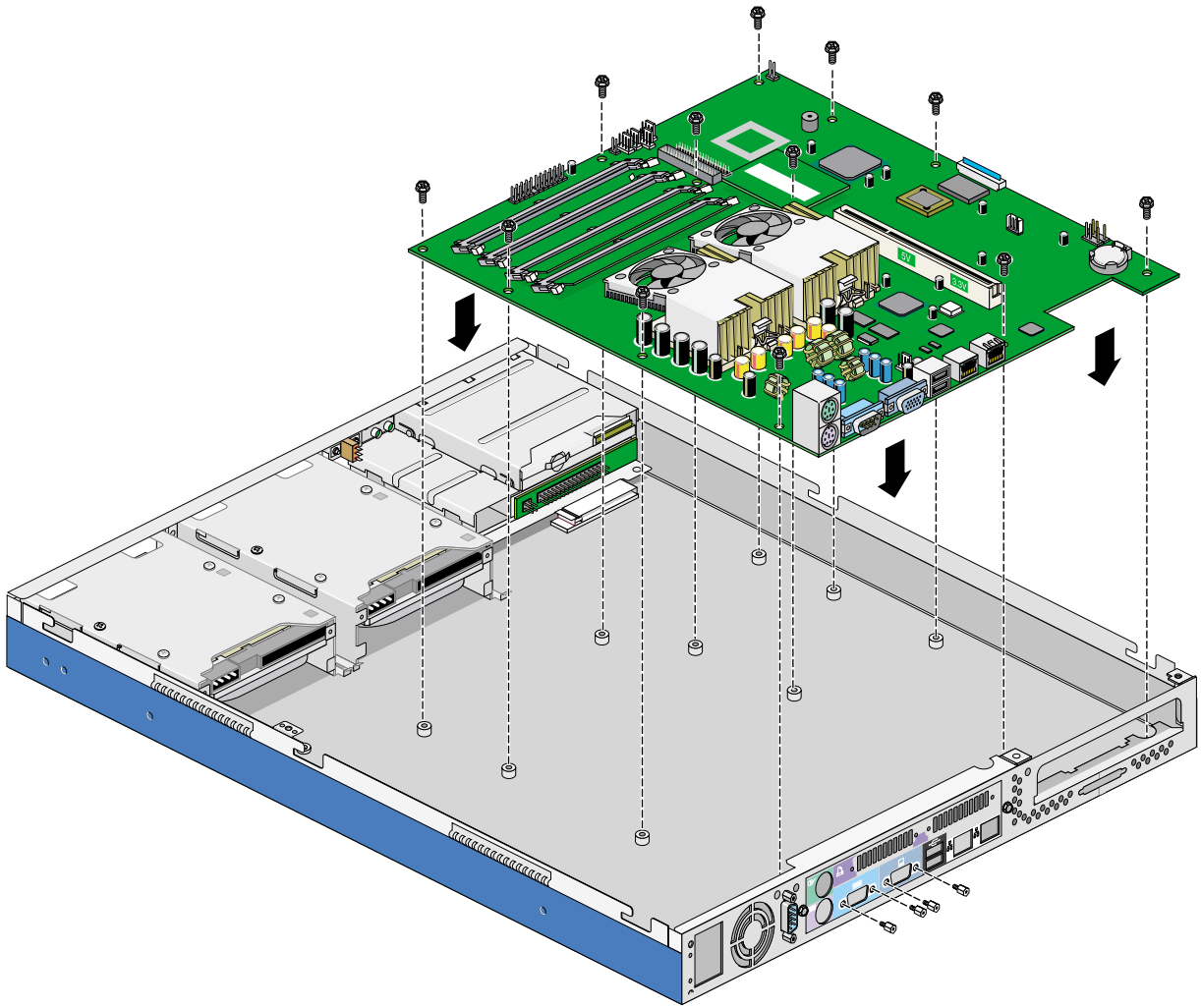

Figure 2-56 Installing the System Board

3. Connect all cables to the system board. See “Jumper and Connector Information” on page 117 for the location of all connectors.

   Note: The diskette drive signal cable is delicate. To connect the diskette drive signal cable to the diskette drive connector, follow the steps shown in “Installing the Diskette Drive / CD-ROM Drive Module” on page 54

4. Install the two rear system blowers as described in “Installing a Rear System Blower” on page 39.
5. Install the link bar, as described in “Installing the Link Bar” on page 27.
6. Install the chassis cover as described in “Installing the Chassis Cover” on page 23.

Troubleshooting

This chapter provides troubleshooting information for the SGI 1100 server. The following topics are covered:

- Error Beep Definitions
- Power-On Self-Test (POST) Checkpoints List
- POST Error Messages
- IPMI Event Log
- Index of Error Symptoms

Error Beep Definitions

Table 3-1 describes the SGI 1100 server error beep definitions. In the beep code sequences, “2” indicates a long beep, and “1” indicates a short beep.

Table 3-1 Error Beep Definitions

Beep Code	Error Description
2-1-2-2	DMA internal register test failure.
2-1-1-1	KBC (keyboard controller) self-test failure or not installed.
2-1-2-1	System DRAM refresh cycle out of specification.
2-1-1-2	Shutdown byte in RTC CMOS R/W failure.
2-2-2-1	First 640KB of base memory R/W test failure.
2-2-1-2	BIOS code in flash ROM is corrupted.
2-1-1	Video buffer failure.
1-1	Console does not exist and message displays to terminal.
2-2-1-1-1	No memory installed.
2-2	SPD revision is prior to Rev. 1.1 or unavailable for 100-MHz memory DIMM.
2-2-2-1-1-1	Unregistered memory DIMM.

Power-On Self-Test (POST) Checkpoints List

The Power-On Self-Test (POST) is a BIOS procedure that boots the system, initializes and diagnoses the system components, and controls the operation of the power-on password option. When POST executes a task, it uses a series of preset numbers called checkpoints to be latched at port 80h, indicating the stages it is currently running. This latch can be read and shown on a debug board.

Table 3-2 describes the common tasks carried out by POST. Each task is denoted by a unique checkpoint number. For other unique checkpoint numbers that are not listed in the table, see the corresponding product service guide.

Table 3-2 POST Checkpoints List

Checkpoint	Descriptions
01H	Initializes chipset point (I)
02H	Determines BSP and counts total number of CPUs
04H	Determines if the current booting procedure is from cold boot (press reset button or turn the system on), from warm boot (press Ctrl-Alt-Del), or from exiting BIOS setup. At the beginning of POST, port 64 bit 2 (8042 system flag) is read to determine whether this POST is caused by a cold or warm boot. If it is a cold boot, a complete POST is performed. If it is a warm boot, the chip initialization and memory test is eliminated from the POST routine.
08H	Disables Non-Maskable Interrupt (NMI), Alarm Interrupt Enable (AIE), Periodical Interrupt Enable (PIE), and Update-ended Interrupt Enable (UIE). These interrupts are disabled in order to avoid the occurrence of problems during the POST routine.
09H	Initializes chipset point (I)
05H	Sets and checks CPU ratio
10H	Tests and initializes DMA controller (8237)
14H	Tests and initializes system timer (8254)
18H	Tests memory refresh; refreshes occurrence verification (IRQ0)

Table 3-2 (continued) POST Checkpoints List

Checkpoint	Descriptions
1CH	Verifies CMOS shutdown byte, battery and checksum Several parts of the POST routine require the system to be in protected mode. When returning to real mode from protected mode, the processor is reset, and therefore POST is re-entered. To prevent re-initialization of the system, POST reads the shutdown code stored in location 0Fh in CMOS RAM. Then it jumps around the initialization procedure to the appropriate entry point. The CMOS shutdown byte verification assures that CMOS 0Fh area is fine to execute POST properly. Initializes CMOS default setting Initializes RTC time base The RTC has an embedded oscillator that generates 32.768 KHz frequency. To initialize RTC time base, turn on this oscillator and set a divisor to 32.768 so that RTC can count time correctly.
1EH	Checks for DRAM and determines DRAM type
2CH	Tests 128K base memory The 128K base memory area is tested for POST execution. The remaining memory area is tested later.
23H	Initializes BSP local APIC
30H	System shadow RAM
25H	BIOS bootable setting. Check F10 key.
31H	Initialize PCI hot-plug controller
20H	Tests keyboard controller (8041 / 8042) Determines keyboard type (AT, XT, or PS / 2)
24H	Tests programmable interrupt controller (8259) Initializes system interrupt
34H	Sizes DRAM
36H	Initializes APIC
3CH	Sets interrupt service for POST
35H	PCI pass 0

Table 3-2 (continued) POST Checkpoints List

Checkpoint	Descriptions
4EH	Scans PnP devices
41H	Initializes PCI (1)
51H	Copies module to F segment
50H	Initializes video display If system has any display card, it should be initialized here via its I/O ROM or corresponding initialization program.
54H	Processes VGA shadow region
4FH	Configures PnP devices
4CH	Checks CPU external frequency
4DH	Records wakeup status
58H	Displays SGI logo (if necessary) Displays SGI copyright message (if necessary) Displays BIOS serial number
64H	Tests keyboard interface The keyboard LEDs should flash once.
5EH	Loads Pentium Pro CPU update code
60H	Initializes SRAM cache capacity Enables cache function
5CH	Tests memory (except the 128K base memory)
5DH	Builds MP system
8DH	Activates application processor
57H	Initializes hardware monitoring Checks NVRAM Initializes IMP card
5AH	Tests SM RAM
5FH	Enables/disables USB function

Table 3-2 (continued) POST Checkpoints List

Checkpoint	Descriptions
70H	Initializes parallel port(s)
74H	Initializes serial port(s)
75H	Initializes RDM
78H	Resets math coprocessor
7CH	Checks & initializes pointing device
80H	Sets security status
82H	Builds BCV / IPL table
84H	Initializes keyboard
6CH	Tests and initializes FDD **Note**: The FDD LED should flash once and its head should be positioned.
8FH	Builds ACPI tables
95H	IOROM initialization manager
88H	Sets HDD type and features (e.g., transfer speed, mode, etc.) Tests HDD controller
90H	Displays POST status
96H	IOROM initialization
13H	Re-hooks INT 13h
97H	Moves boot sequence table to F-segment
A0H	Sets time and day
A4H	Initializes security features
A2H	Initializes setup items
A8H	Sets up SMI parameters
ACH	Enables NMI, checks parity if set, and clears screen
AEH	Reserves RDM buffer

Table 3-2 (continued) POST Checkpoints List

Checkpoint	Descriptions
B0H	Checks power-on password Displays configuration mode table Prepares for booting
B1H	Boots
BDH	Shutdown 5
BEH	Shutdown A
BFH	Shutdown B

POST Error Messages

POST is a BIOS procedure that boots the system, initializes and diagnoses the system components, and controls the operation of the power-on password option. If there is any error during the POST routine, BIOS detects it and shows the corresponding error message on the monitor to guide the technical service engineer on the repair procedure.

Table 3-3 describes the error messages, their possible causes, and corrective actions.

Table 3-3 POST Error Messages

Error Message	Possible Cause	Corrective Action
Memory Error at MMMM:SSSS:OOOOh (R:xxxxh, W:xxxxh)	DIMMs may be defective.	Replace the DIMMs.
System Management Memory Bad	System Management Memory (SMM) is bad. This may be caused by the malfunction of system green function.	Replace the DIMMs.
Battery is Critical Low	For notebook model only.	Recharge the battery.
Keyboard Interface Error	Error in the interface between the system board and the keyboard. The keyboard circuit module may be defective.	Check the keyboard interface circuit or change the keyboard.
Keyboard Error or Keyboard Not Connected	Error in the keyboard, or the keyboard is not connected.	Reconnect or replace the keyboard.
Keyboard Locked	The keyboard lock feature prevents any access to keyboard.	Unlock the keyboard.
Pointing Device Error	The pointing device installed may be bad or the device is improperly connected.	Reconnect or replace the pointing device.
Pointing Device Interface Error	Error in the interface between the system board and the pointing device.	Check the keyboard interface circuit.

Table 3-3 (continued) POST Error Messages

Error Message	Possible Cause	Corrective Action
Pointing Device IRQ Conflict	The IRQ setting of add-on card and / or system board conflicted with on-board pointing device.	Enter Setup and change the setting of IRQ12.
IDE Drive 0 (1, 2, 3) Error	The IDE drive may be bad, its type may be mismatched, or it was not properly installed.	Check the HDD cable connections and CMOS setup configuration. Replace the disk drive or the hard disk drive controller.
IDE Drive 0 (1, 2, 3) Auto Detection Failed	The hard disk drive may be bad, or it was not compatible with IDE industrial specification.	Check the HDD cable connections and CMOS setup configuration. Replace the disk drive or the hard disk drive controller.
Diskette Drive A Error	Diskette drive A may be bad.	Replace the diskette drive.
Diskette Drive Controller Error	This error is caused by any of the following: 1. The diskette drive cable is not plugged into the diskette drive interface on the system board or to the diskette drive. 2. The diskette drive controller is defective.	Check the diskette drive cable and its connections. If the cable is good and properly connected, the diskette drive controller may be the problem. Change the diskette drive controller or disable the on-board controller by installing another add-on card with a controller.
CPU Clock Mismatch	The user has changed CPU frequency.	When the user changes the CPU frequency, this message is shown once. Then the BIOS adjusts CPU clock automatically.

Table 3-3 (continued) POST Error Messages

Error Message	Possible Cause	Corrective Action
On-board Serial Port 1 Conflict(s) On-board Serial Port 2 Conflict(s)	On-board serial port address conflicts with the add-on card serial port.	Change the on-board serial port address in Setup or change the add-on card serial port address.
Real Time Clock Error	Real-time clock error.	Check RTC circuit or replace the RTC.
CMOS Battery Bad	CMOS battery power lost.	Replace the on-board lithium battery.
CMOS Checksum Error	CMOS RAM error.	Run Setup again and reconfigure the system.
On-board xxx...Conflict(s)	On Board device resources (e.g., IRQ, DMA, I/O address) conflict.	Try to reassign or disable on-board device resources.
PCI Device Error	PCI device may be bad.	Check the PCI card. Replace if bad.
System Resource Conflict	Some system resources conflict with the resources required by the PCI device.	Run Setup to reconfigure the system.
IRQ Setting Error	Wrong IRQ setting for the PCI device.	Run Setup to reconfigure the system.
Expansion ROM Allocation Fail	The I/O expansion ROM fails to allocate for the PCI device.	Change the I/O expansion ROM address.

Error Message for NMI and Warning Message

A Non-Maskable Interrupt (NMI) causes the CPU routines to be interrupted and the system to be halted

Figure 3-1 describes the NMI error messages, their possible causes, and corrective actions.

Table 3-4 NMI Error Messages and Warning Messages

Error Message	Possible Cause	Corrective Action
RAM Parity Error	DIMM(s) may be defective.	Replace the DIMM(s), or disable parity check in Setup if the model supports it.
I/O Parity Error	The I/O access is not correct.	Check all I/O related circuits (i.e. system I/O controller, memory controller, interrupt controller, DMA controller, etc.)
Press Ctrl_Alt_Esc key to enter SETUP or F1 key to Continue...	A system configuration error is detected, or the hardware configuration does not match the Setup configuration data in CMOS.	Press Ctrl+Alt+Esc to reconfigure the system.
Press ESC to turn off NMI, or any key to reboot	A Non-Maskable Interrupt (NMI) has occurred.	Press **Esc** to reject NMI error or press any other key to reboot the system.
Insert system diskette and press <Enter> key to reboot	A non-bootable diskette is detected in the diskette drive when the system boots.	Insert a bootable disk in the diskette drive or remove this disk if a hard disk drive is installed.
Equipment Configuration Error	The hardware configuration does not match the Setup configuration data.	Run Setup and reconfigure the system.

IPMI Event Log

In the event of a system crash, **System Event Log** enables the user to track the error or the abnormal functioning of a component that might have caused the crash.

Table 3-5 describes the type of system event and corrective actions.

Table 3-5 IPMI System Event Log

Type	Description	Action
CPU IERR	IERR is issued when internal CPU operation error occurs. BIOS logs the event and identifies which CPU issues it. See Appendix A for the location of CPU.	Check CPU.
CPU Thermal Trip	Thermtrip is issued when internal CPU temperature is too high. BIOS logs this event and identifies which CPU issues it. See Appendix A for location of CPU.	Restart system. Check CPU fan connector. Check CPU fan. Check CPU.
CPU Processor Disabled	CPU was disabled, as detect result shows abnormal result. It could be CPU thermal issue.	Check CPU fan. Check CPU.
CPU Temperature Lower Critical Going Low Lower Critical Going High Upper Non-critical Going Low Upper Non-critical Going High Upper Critical Going Low Upper Critical Going High	CPU temperature is abnormal. See note for threshold setting.	Restart system. Check Fan connection. Check Fan. Check CPU. Check System board.

Table 3-5 (continued) IPMI System Event Log

Type	Description	Action
CPU Voltage Lower Critical Going Low Lower Critical Going High Upper Non-critical Going Low Upper Non-critical Going High Upper Critical Going Low Upper Critical Going High	CPU voltage is abnormal. See note for threshold setting.	Check CPU. Check power supply. Check system board.
CPU Fan Lower Critical Going Low Lower Critical Going High Upper Non-critical Going Low Upper Non-critical Going High Upper Critical Going Low Upper Critical Going High	CPU fan is abnormal. See note for threshold setting.	Check CPU fan connector. Check CPU fan.
System Board Temperature Lower Critical Going Low Lower Critical Going High Upper Non-critical Going Low Upper Non-critical Going High Upper Critical Going Low Upper Critical Going High	System board temperature is abnormal. See note for threshold setting.	Restart system. Check system fans.
Room Temperature Lower Critical Going Low Lower Critical Going High Upper Non-critical Going Low Upper Non-critical Going High Upper Critical Going Low Upper Critical Going High	Room temperature is abnormal. See note for threshold setting.	Adjust room temperature.

Table 3-5 (continued) IPMI System Event Log

Type	Description	Action
System Board Voltage 1.5V / 1.8V / 2.5V / 2.85V for SCSI 1 / 3.3V / 3.3V Standby / 5V / 2.85V for SCSI 2 / 12V / -12V / Cache 1 / 2 / Cache 3 / 4 / 5V Standby Lower Critical Going Low Lower Critical Going High Upper Non-critical Going Low Upper Non-Critical Going High Upper Critical Going Low Upper Critical Going High	System board voltage is abnormal. See note for threshold setting.	Check power supply. Remove some devices which are using voltage to reduce system loading. Check system board.
Keyboard / Mouse Fuse	Current of keyboard / mouse is over the system limit.	Check keyboard / mouse.
USB1 / USB2 / USB3 / USB4 Fuse	Current of devices connected in USB1 / USB2 / USB3 / USB4 is over the system limit.	Check devices connected in the designated USB port.
Power Supply Predictive Failure	Power supply is dead.	Check power supply.
Chassis Fan Assertion	Chassis fan is dead.	Check chassis fan.
Watchdog BIOS / POST	POST is not completed.	Check BIOS checkpoints list.
Watchdog OS / Load	Problem in loading OS.	Check hard disk.
Watchdog SMS / OS	OS hangs, after loaded.	Check BIOS event log. Check OS.
Watchdog No Action	System hangs, setting is No Action.	Revise Watchdog settings, if prefer actions automatically carried out by systems.
Watchdog Hard Reset	System hangs, auto Reset.	Revise Watchdog settings, if prefer actions other than Reset automatically carried out by systems.

Table 3-5 (continued) IPMI System Event Log

Type	Description	Action
Watchdog Power Off	System hangs, auto Power Off.	Revise Watchdog settings, if prefer actions other than Power Off automatically carried out by systems.
Watchdog Power Cycle	System hangs, auto Power Cycle.	Revise Watchdog settings, if prefer actions other than Power Cycle automatically carried out by systems.
NVRAM SDR Checksum Error	NVRAM SDR data was damaged.	Rewrite NVRAM. Replace NVRAM.
NVRAM SEL Checksum Error	NVRAM SEL data was damaged.	Replace NVRAM.
NVRAM FRU Checksum Error	NVRAM FRU data was damaged.	Rewrite NVRAM. Replace NVRAM.
EMP Remote Login Password Fail	Password error.	Get the correct password.
EMP BMC Disable CPU	BMC disables CPU, after detecting abnormal status of CPU.	Reset the system. If the problem remains, replace CPU.
BIOS Post (Event Data 2)	The event data 2 is POST error code. Setup has to find the POST message table for displaying the message.	Check POST message table.
Secure Model Violation	Unauthorized access.	Follow the correct procedure to access units.
Pre-boot Password Violation-User Password	Incorrect user password.	Get the correct user password.
Pre-boot Password Violation-Setup Password	Incorrect setup password.	Get the correct setup password.
DIMM / RIMM Correctable ECC Error	Memory has ECC (error check and correction) error, but system is able to correct it automatically.	No action needed, but if errors reoccur, check the memory.

Table 3-5 (continued) IPMI System Event Log

Type	Description	Action
DIMM / RIMM Uncorrectable ECC Error	Memory has ECC (error check and correction) error, and system is unable to fix it.	Check memory.
PCI PERR (Parity Error)	Error occurs on PCI-related on-board chipset while doing parity checking. This error message indicates the on-board chipset location which is bus 1 device 0 and function 1. See schematics for location of the chipset.	Check system board.
PCI SERR (System Error)	Error occurs on device or add on card of PCI slot.	Check add-on card. Check PCI device.
Hard Disk Drive Fault	Errors occur in hard disk drive.	Check HDD.
Drive Backplane Fan Fault Assertion	Errors occur in drive backplane fan.	Check drive backplane fan.

Note: As shown in Figure 3-1, there are four levels for threshold setting: Lower Critical, Lower Non-Critical, Upper Non-Critical, and Upper Critical. If the value is between Lower Non-Critical and Upper Non-Critical, it is normal. If the value is between Lower Non-Critical and Lower Critical or between Upper Non-Critical and Upper-Critical, it is in a warning area.

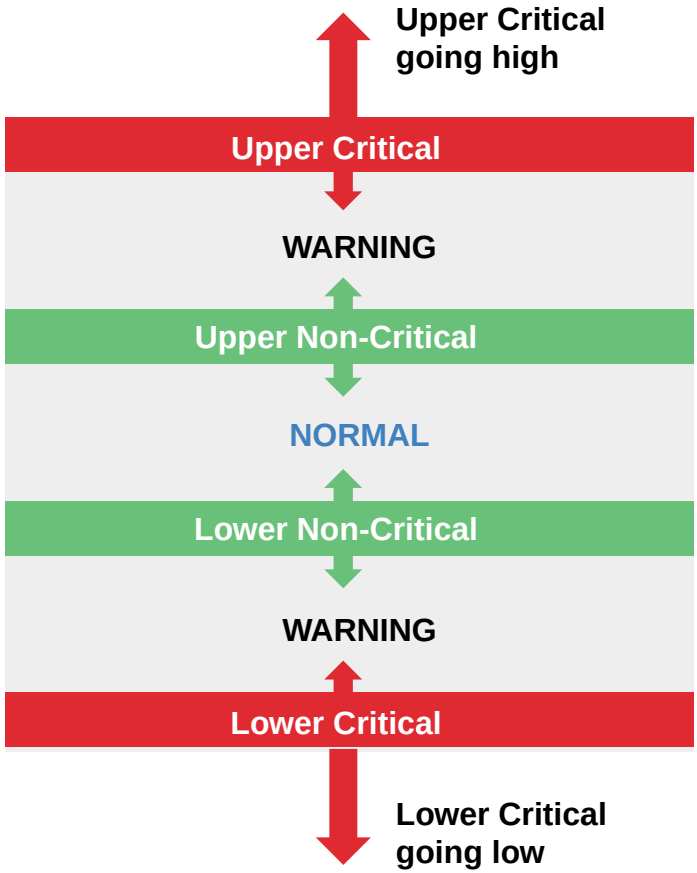

Figure 3-1 Threshold Setting Levels

Index of Error Symptoms

Table 3-6 lists error symptoms and corresponding FRUs and actions.

Table 3-6 Index of Error Symptoms

Error Symptom	FRUs/Actions
CD is not working properly.	Clean the CD. Clean the optical-head lens. CD-ROM Drive.
CD-ROM drive tray is not working.	The server must be powered on for the CD-ROM drive tray eject button to function. If the server is on, and the tray does not eject: Insert the end of a paper clip into the manual tray release opening. Check CD-ROM drive.
CD-ROM drive is not recognized.	Run BIOS Setup and enable the primary IDE channel. Check cables and jumpers. Check for correct device driver.
Diskette drive in-use light stays on, or the system bypasses the diskette drive.	If there is a diskette in the drive, verify the following: The diskette drive is enabled in the BIOS Setup. The diskette is good and not damaged. (Try another diskette if you have one.) The diskette is inserted correctly in the drive. The diskette contains the necessary files to start the server. The software program is okay. If the diskette drive in-use light stays on, or the system continues to bypass the diskette drive, replace the diskette drive.
Monitor problems (general).	Check monitor. Check display adapter / system board.

Technical Specifications

Physical and Environmental Specification

The SGI 1100 server is designed to be mounted in a standard 19-inch rack. For instructions on mounting the SGI 1100 server in a 19-inch rack, see Chapter 2 in the *SGI 1100 User's Guide.*

Table A-1 shows the physical specifications for the SGI 1100 server system

Table A-1 SGI 1100 Server Physical Specification

Height	1u (1.75 in., 4.45 cm)
Width	19.0 in. (48.25 cm)
Depth	21.2 in. (53.85 cm)
Weight	24.2 lbs. (11 kg), maximum configuration 32 lbs (14.5 kg), with rack slides
Temperature	+5 °C (41 °F) to +35 °C (+95 °F) (operating) -10 °C (14 °F) to +60 °C (+149 °F) (non-operating)
Humidity	20% - 80% RH, non-condensing
Vibration: Operating (unpacked)	5 - 16.2 Hz: 0.38 mm (peak to peak) 16.2 - 250 Hz: 0.2 G
Non-operating (packed)	5 - 27.1 Hz: 0.60 G 27.1 - 50 Hz: 0.4 mm (peak to peak) 50 - 500 Hz: 2.0 G

Power Consumption

The server power supply is rated for a maximum of 200W DC output. Maximum AC input power consumption is approximately 307W. Consider the following:

- Using 110V AC power, a fully loaded system can consume up to 2.80A
- Using 220V AC power, a fully loaded system can consume up to 1.40A

The deployment of ultra-dense 1U servers represents a significant power requirement. A simple formula to calculate server power requirements for an installation is:

(Number of servers) x (307W) = maximum power requirements for servers

Thermal Dissipation

The server has the following cooling systems:

- Fan wall with three internal swappable fans
- Fan sink for each of two CPUs
- One internal power supply fan
- Two rear blowers

A fully configured SGI 1100 server under maximum workload can produce approximately 1047 Btu / hr. Air temperature measurements around the server may vary as much as 25 °C (45 °F) from front to back. Deployment of multiple ultra-dense servers will produce a significant amount of heat. For example, 36 servers under maximum workload can generate as much as 37,692 Btu / hr.

Jumper and Connector Information

Figure A-1 shows the jumper and connector locations on the system board.

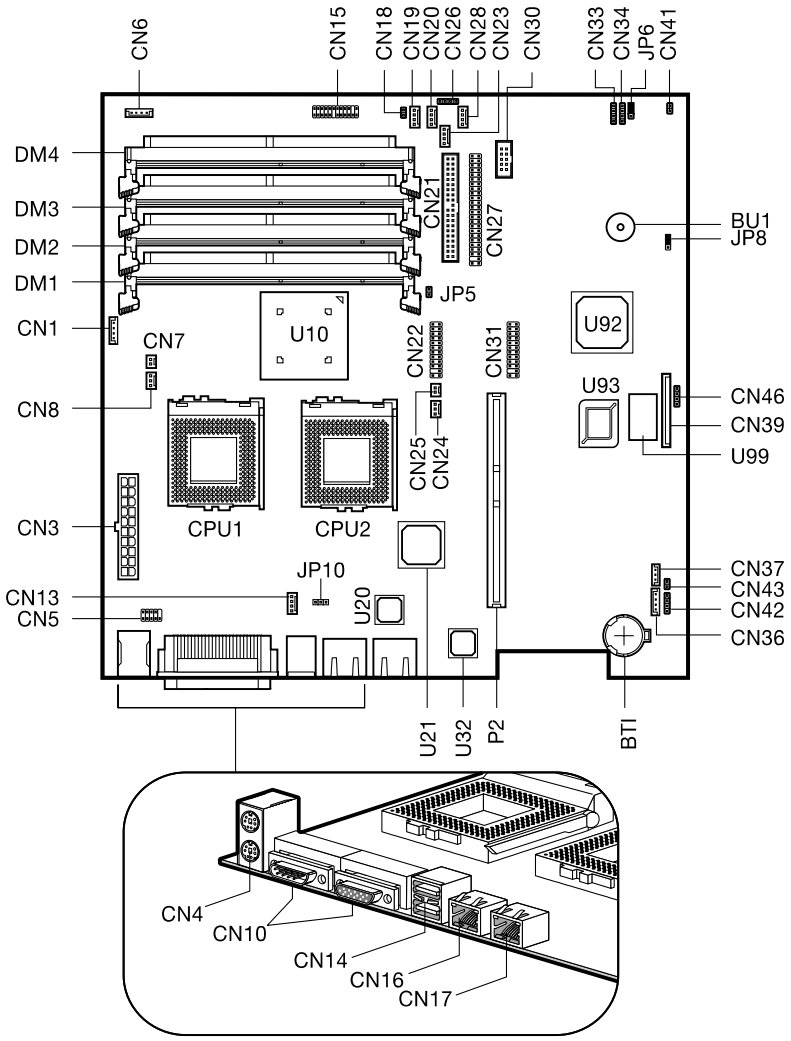

Figure A-1 System Board Layout

Note: Jumpers have the “JP” prefix. Connectors have the “CN” prefix.

Table A-2 describes the items shown in Figure A-1.

Note: Settings in **boldface** are the default settings.

Table A-2 System Board Layout

Item	Description
BT1	Battery
BU1	Buzzer
CN1, CN6, CN36	IPMI connectors
CN3	ATX power supply connector
CN4	Upper: PS/2 mouse connector Lower: PS/2 keyboard connector
CN5	Serial port connector
CN7	CPU 1 thermal connector
CN8	CPU 1 fan connector
CN10	Left: Serial 1 port Right: VGA port
CN13, CN19, CN20, CN23, CN28	Housing fan and blower connectors
CN14	USB 1 and USB 2 connectors
CN15	LED/switchboard connector (see Figure A-2 on page 121)
CN16	LAN 1 jack (RJ45)
CN17	LAN 2 jack (RJ45)
CN18	NMI switch
CN21	Primary IDE connector

Table A-2 (continued) System Board Layout

Item	Description
CN22/CN31	BMC DB connectors
CN24	CPU 2 fan connector
CN25	CPU 2 thermal connector
CN26	LAN1/LAN2 status report connector
CN27	Slim-type CD-ROM connector
CN30	USB connector
CN33/CN34	External hard disk drive LED connectors
CN37	Wake on LAN connector
CN39	Slim-type FDD connector
CN41	Event LED (HDD fail) connector
CN42	1^2C connector
CN43	IOCHRDY (for debug)
CN46	Speaker connector
CPU1	CPU slot 1
CPU2	CPU slot 2
DM1 to DM4	DIMM slots
JP5	Event clear connector
JP7	BIOS POST screen 1-2: No logo is shown **2-3**: SGI logo is shown
JP8	Password check 1-2: Password is not checked at power-up **2-3**: Password is checked at power-up if password is set in BIOS

Table A-2 (continued) System Board Layout

Item	Description
JP10	Second CPU present 1-2: Terminator board is installed in second CPU socket 2-3: Second CPU is installed **Note**: There is no default for this jumper since the setting depends on the system configuration (single or dual CPU).
P2	64-bit 66-MHz PCI slot
U10	ServerWorks LE north bridge
U20	Intel 82559 LAN 1 chipset
U21	ATI Rage XL video chipset
U32	Intel 82559 LAN 2 chipset
U92	ServerWorks LE south bridge (OSB4)
U93	BIOS chipset
U99	SMC 47B277 super I/O chipset

Note: There are two CPU sockets in this system. If you install only one CPU (in socket 1), you need to set JP10 to 1-2 and insert a terminator board in CPU socket 2.

Figure A-2 illustrates the LED / switchboard CN15 connector settings.

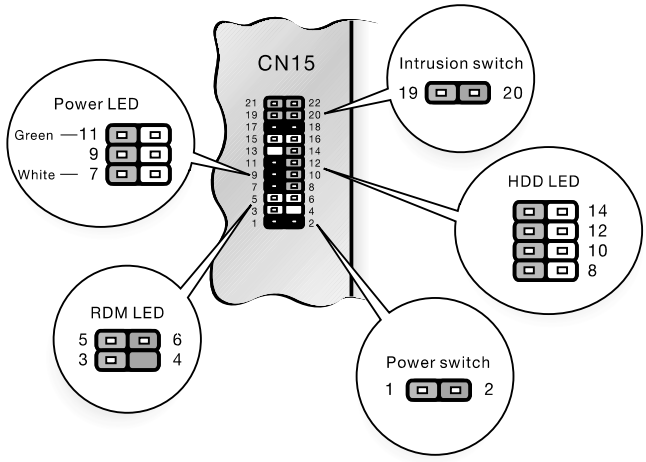

Figure A-2 CN15 Connector Settings

Hardware Specifications and Configurations

Table A-3 lists the major chips on the system board.

Table A-3 Major Chips on System Board

Item	Controller
System core logic	ServerWorks ServerSet III LE Chipset (CNB30LE / OSB4)
Super I / O controller	SMC FDC37B787
LAN controller	Intel 82559
Memory controller	Built-in ServerWorks CNB30LE (Champ North Bridge)
VGA controller	ATI Rage XL
E-IDE controller	Built-in ServerWorks OSB4 (Open South Bridge)
Keyboard controller	Built-in SMC FDC37B787 Super I / O controller
RTC	Built-in SMC FDC37B787 super I / O controller

Table A-4 provides details about the processor.

Table A-4 Processor Specifications

Item	Specification
Type	Dual Intel Pentium III processor in Flip Chip Pin Grid Array (FC-PGA) package
Socket	Socket 370
Speed	800 or 1000 MHz
Bus frequency	133 MHz
Voltage	Processor voltage is automatically detected by the system with no jumpers

Table A-5 provides details about the BIOS.

Table A-5 BIOS Specifications

Item	Specification
BIOS version	A1 S4 or higher
BIOS ROM type	Bulk mode flash ROM with boot block protection
BIOS ROM size	512 KB
BIOS ROM package	32-pin PLCC package
Supported protocol	PCI 2.2, APM 1.2, VESA / DPMS (VBE / PM V1.0), DMI 2.03, E-IDE 1.1, ACPI 1.0, ESCD 1.03, PnP 1.0a, bootable CD-ROM 1.0, USB 1.0, UHCI 1.0, PC97-compliant, ANSI ATA 3.0, ATAPI
Boot from CD-ROM feature	Yes
Supports LS-120 drive	No
Supports BIOS boot block feature	Yes
BIOS password control	Check / bypass with JP8 setting
SGI logo display control during POST	Enable / disable with JP7 setting

Note: The BIOS can be overwritten or upgraded using the AFLASH utility (AFLASH.EXE), as described in Appendix B on page 133.

Table A-6 provides details about the hotkeys.

Table A-6 BIOS Hotkey List

Hotkey	Function	Description
Ctrl-Alt-Esc	Enter BIOS Setup Utility.	Press the hotkey while the system is booting to enter BIOS Setup Utility.

Table A-6 (continued) BIOS Hotkey List

Hotkey	Function	Description
F8	Enable Hidden page of BIOS Setup Utility.	If you press the hotkey in the BIOS Setup Utility main menu screen, the Advanced Options menu appears.
Alt-F4	Enable hidden parameters of BIOS Setup Utility.	If you press the hotkey in the BIOS Setup Utility menu screen, the Advanced Options Chipset menu appears.

Table A-7 details the specifications for first-level and second-level cache configuration.

Table A-7 Cache Memory Specifications

Item	Specification
First-Level Cache Configurations	
Cache function control	
Second-Level Cache Configurations	
(applicable only to systems installed with a Pentium III processor)	
Tag RAM location	On processor
L2 cache RAM location	On processor
L2 cache RAM type	PBSRAM (Pipelined-burst Synchronous RAM)
L2 cache RAM size	256 KB
L2 cache RAM speed	Full speed of the processor core clock frequency (advanced transfer cache)
L2 cache function control	Enable / disable by BIOS Setup
L2 cache scheme	Fixed in write-back

Table A-8 details the VRM specifications.

Table A-8 VRM Specifications

Function	VRM Specification	Typical Voltage	Power Source	Maximum Output
CPU VRM	VRM 8.4	2.0 V	5 V	18.4 A

Table A-9 details the system memory specifications.

Table A-9 System Memory Specifications

Item	Specification
On-board embedded memory size	0 MB
Memory socket number	4 sockets (4 banks)
Supported memory size per socket	128 MB, 512 MB Future: 1024 MB
Supported maximum memory size	4 GB (1024 MB x 4)
Supported memory type	Registered ECC SDRAM
Supported memory speed	133 MHz (PC-133)
Supported memory voltage	3.3 V
Supported memory module package	168-pin DIMM
Support parity check feature	Yes
Support Error Correction Code (ECC) feature	Yes
Memory module combinations	You can install memory modules in any combination as long as it matches the above specifications.

Table A-10 details the memory combinations.

Table A-10 Memory Combinations

DIMM1	DIMM2	DIMM3	DIMM4	Total
128 MB	0 MB	128 MB	0 MB	256 MB
128 MB	128 MB	128 MB	128 MB	512 MB
512 MB	0 MB	512 MB	0 MB	1024 MB
128 MB	512 MB	128 MB	512 MB	1280 MB
512 MB	512 MB	512 MB	512 MB	2048 MB

Table A-11 details the LAN interface specifications.

Table A-11 LAN Interface Specifications

Item	Specification
LAN controller	2 Intel 82559 LAN controllers
LAN controller resident bus	PCI bus
LAN port	2 RJ-45 on board (CN16 / CN17)
Function control	Enable / disable by BIOS setup

Table A-12 details the VGA interface specifications.

Table A-12 VGA Interface Specifications

Item	Specification
VGA controller	ATI Rage XL
VGA controller resident bus	PCI bus
VGA memory	4-MB SDRAM

Table A-13 details the IDE specifications.

Table A-13 IDE Interface Specifications

Item	Specification
IDE controller	Built-in RCC OSB4 (Open South Bridge)
IDE controller resident bus	PCI bus
Number of IDE channel	2 (CN 21, CN 27)
Supported IDE interface	E-IDE (up to PIO mode 4, DMA mode 2 and Ultra DMA-33), ANSIS ATA rev. 3.0, ATAPI
Supports LS-120	No
Supports bootable CD-ROM	Yes
Function control	Enable / disable by BIOS setup

Table A-14 details the diskette drive interface specifications.

Table A-14 Diskette Drive Interface Specifications

Item	Specification
Diskette drive controller	Built-in SMC FDC37B787 super I/O controller
Diskette drive controller resident bus	ISA bus
Supported diskette drive formats	360 KB, 720 KB, 1.2 MB, 1.44 MB, 2.88 MB, 3-mode format and slim type diskette drive
Function control	Enable/disable by BIOS setup

Table A-15 details the serial port specifications.

Table A-15 Serial Port Specifications

Item	Specification
Serial port controller	Built-in SMC FDC37B787 super I/O controller
Serial port controller resident bus	ISA bus
Number of serial ports	2
Serial port locations	CN10, CN5
Supports 16550 UART	Yes
Connector type	9-pin D-type female connector
Optional serial port I/O addresses (via BIOS setup)	3F8h 2F8h 3E8h 2E8h
Optional serial port IRQs (via BIOS setup)	IRQ4 IRQ3

Table A-16 provides details about the memory address map.

Table A-16 Memory Address Map

Address	Size	Function
0000000-009FFFF	640-KB system memory	On-board DRAM
00A0000-00BFFFF	128-KB video RAM	Reserved for graphics display buffer Non-cacheable
00C0000-00C7FFF	32 KB for VGA BIOS	Reserved for on-board VGA
00C8000-00CFFFF	32-KB I/O expansion ROM	Reserved for ROM on I/O adapters
00D0000-00D3FFF	16-KB I/O expansion ROM	Reserved for ROM on I/O adapters
00D4000-00D7FFF	16-KB I/O expansion ROM	Reserved for ROM on I/O adapters
00D8000-00DBFFF	16-KB I/O expansion ROM	Reserved for ROM on I/O adapters
00DC000-00DFFFF	16-KB I/O expansion ROM	Reserved for ROM on I/O adapters
00E0000-00E7FFF	32 KB for SCSI BIOS	Reserved for SCSI BIOS
00E8000-00EFFFF	32 KB	Reserved on-board
00F0000-00FFFFF	64-KB BIOS	System ROM BIOS (ROM) System RAM BIOS (DRAM)
0100000-0F9FFFF	System memory	On-board DRAM
0FA0000-0FFFFFF	384-KB I/O card memory	Reserved for memory map I/O card Non-cacheable
1000000-FFFFFFF	System memory	On-board DRAM

Table A-17 lists the device function for each hex range.

Table A-17 I/O Address Map

Hex Range	Device Function
000-01F	DMA controller-1, 8237
020-027	Interrupt controller-1, 8259

Table A-17 (continued) I/O Address Map

Hex Range	Device Function
030-037	Interrupt controller-1, 8259
040-047	System timer (8254-1)
050-057	System timer (8254-1)
060-06F	Keyboard controller, 8742
070-07F	Real-time clock, NMI mask
080-09F	DMA page register 74LS612
	Speed status register
0A0-0BF	Interrupt controller-2, 8259
0C0-0DF	DMA controller-2, 8237
0F0	CLEAR math co-processor BUSY
0F1	RESET math co-processor
0F8-0FF	Math co-processor
4A0	System I/O port
	Bit 3: On-board VGA enable/disable 1: Disable 0: Enable
	Bit 0: On-board LAN 1 enable/disable Bit 1: On-board LAN 2 enable/disable 1: Disable 0: Enable
	Bit 2: On-board SCSI enable/disable 1: Enable 0: Disable

Table A-17 (continued) I/O Address Map

Hex Range	Device Function
	Bit [4:7]: Host frequency setting [0, 0, 1, 1]: 1/5, reset only [0, 1, 1, 1]: 2/11, 300 MHz [1, 0, 0, 0]: 1/6, 350 MHz [0, 0, 0, 1]: 1/4, 400 MHz [0, 1, 0, 1]: 2/9, 450 MHz [0, 0, 1, 1]: 1/5, 500 MHz
4A1	SMISW, SCISW, SOFTNMI
	BIOS/password check control
0CF8	PCI configuration address reg
0CFC	PCI configuration data reg
1F0-1F7	Fixed hard disk
278-27F	Parallel port 2
2F8-2FF	Serial port 2
378-37F	Parallel port 1
3B0-3BF	Monochrome display
3C0-3CF	EGA, VGA, SVGA
3D0-3DF	CGA, VGA, SVGA
3F0-3F7	Floppy disk controller
3F7-3FF	Serial port 1
000-01F	DMA controller-1, 8237
020-027	Interrupt controller-1 8259

Table A-18 lists the function for each interrupt channel.

Table A-18 IRQ Assignment Map

Interrupt Channel	Function
IRQ0	Timer output 0
IRQ1	Keyboard
IRQ2	Cascade
IRQ3	Serial port 2
IRQ4	Serial port 1
IRQ5	Reserved
IRQ6	Floppy diskette
IRQ7	Parallel port
IRQ8	Real time clock
IRQ9	Reserved
IRQ10	Reserved
IRQ11	Reserved
IRQ12	PS/2 mouse
IRQ13	Numeric processor
IRQ14	Embedded hard disk
IRQ15	Reserved

Table A-19 lists the PCI devices interrupt routing for each PCI slot.

Table A-19 PCI Interrupt Routing 1

PCI Devices	INTA#	INTB#	INTC#	INTD#
Slot 1	PIRQ5	PIRQ11	PIRQ13	PIRQ15
LAN 1	PIRQ1			

Table A-19 (continued) PCI Interrupt Routing 1

PCI Devices	INTA#	INTB#	INTC#	INTD#
LAN 2	PIRQ10			
VGA	PIRQ0			

Table A-20 lists the PCI devices interrupt routing for each PCI slot.

Table A-20 PCI Interrupt Routing 2

PCI Devices	INTA#	INTB#	INTC#	INTD#
Slot 1	INTIN5 / APIC2	INTIN11 / APIC2	INTIN13 / APIC2	INTIN15 / APIC2
LAN 1	INTIN1 / APIC2			
LAN 2	INTIN10 / APIC2			
VGA	INTIN0 / APIC2			

Table A-21 lists the on-board device IDs and IRQs.

Table A-21 On-board Device ID & IRQ Map Table

Device	AD	IDSEL
LAN 1	AD27	14h
PCI slot 1	SAD23	7h
VGA	AD29	0Dh
LAN 2	AD28	0Ch

Updating the BIOS Firmware

This appendix provides information on updating the BIOS firmware.

BIOS Flashing

Follow these instructions to update the BIOS firmware:

1. Obtain a DOS-bootable diskette.
2. Unzip the BIOS flash package.
3. Copy the following files to the diskette, and mark it "SGI 1100 BIOS upgrade, version xxxx":
   - AUTOEXEC.BAT
   - AFLASH.EXE
   - M25xxxx.BIN

   Note: "xxxx" is the version number, such as "A1S4."
4. Enter Setup, and select the **Boot Options** menu. Specify "Floppy Disk A:" as the first boot device. See the *SGI 1100 Server User's Guide* (007-4337-001) for Setup instructions.
5. Insert the previously-prepared diskette into the SGI 1100 floppy drive and reboot the system.
6. Once the system boots into DOS from the diskette it will automatically run the AUTOEXEC.BAT file and then the AFLASH.EXE program. Then, after a brief pause, it will begin flashing the BIOS.

   Caution: Do not interrupt the system while the BIOS is being flashed.

7. When the system indicates that the flash procedure is complete, remove the diskette and reboot the system.
8. Go to BIOS setup, load the default parameters, save them, and exit.
9. Store the diskette in a safe place for future use.

Port Pinouts

This Appendix contains port pinout information for the following ports:

PS/2 Keyboard Port

The SGI 1100 server uses a standard PS/2 keyboard port.

Figure C-1 shows the PS/2 keyboard port.

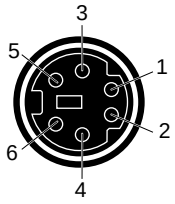

Figure C-1 Keyboard Port Pinout

Table C-1 shows the cable pinout assignments for the keyboard port.

Table C-1 Keyboard Port Pinout

Pin	Assignment
1	Keyboard Data
2	(Reserved)
3	Ground
4	Keyboard Power (+5V)
5	Keyboard Clock
6	(Reserved)

PS/2 Mouse Port

The SGI 1100 server uses a standard PS/2 mouse port.

Figure C-2 shows the PS/2 mouse port.

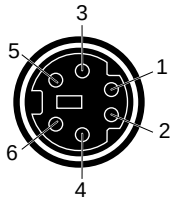

Figure C-2 Mouse Port Pinout

Table C-2 shows the cable pinout assignments for the mouse port.

Table C-2 Mouse Port Pinout

Pin	Assignment
1	Mouse Data
2	Reserved
3	Ground
4	Mouse Power (+5V)
5	Mouse Clock
6	(Reserved)

VGA Port (DB15 HD)

The SGI 1100 server comes with a DB15 HD video port.

Figure C-3 shows the DB15 HD video port.

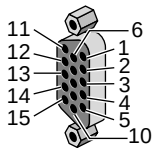

Figure C-3 DB15 HD Port Pinout

Table C-3 shows the cable pinout assignments for the DB15 HD video port.

Table C-3 DB15 HD Port Pinout

Pin	Assignment	Pin	Assignment
1	Red	9	No Connect
2	Green	10	Ground
3	Blue	11	Ground
4	Ground	12	IIC Data
5	Ground	13	Horizontal Sync
6	Red Return	14	Vertical Sync
7	Green Return	15	IIC Clock
8	Blue Return		

Serial Ports

The SGI 1100 server has two PC-compatible serial ports. The serial port supports data rates from 300 bits per second (bps) to 115.2 Kbps.

Figure C-4 shows the serial port.

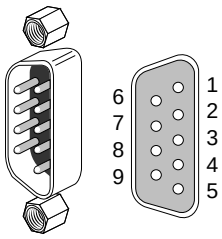

Figure C-4 Serial Port Pinout

Table C-4 shows cable pinout assignments for the serial ports.

Table C-4 Serial Port Pinout

Pin	Assignment	Description
1	DCD	Data Carrier Detect
2	RD	Receive Data
3	TD	Transmit Data
4	DTR	Data Terminal Ready
5	SG	Signal Ground
6	DSR	Data Set Ready
7	RTS	Request to Send
8	CTS	Clear to Send
9	RI	Ring Indicator

USB Ports

The SGI 1100 server has two 4-pin USB ports.

Figure C-5 shows the USB port.

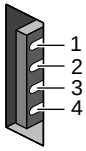

Figure C-5 USB Port Pinout

Table C-5 shows the cable pinout assignments for the USB ports.

Table C-5 USB Port Pinout

Pin	Assignment	Color	Comment
1	VCC	Red	Cable power
2	-Data	White	
3	+Data	Green	
4	Ground	Black	Cable ground

Ethernet Ports (RJ45)

The SGI 1100 server has two RJ45 ports for 10-Base-T or 100-Base-TX twisted-pair Ethernet. The ports autoselect the speed (10 Mbps or 100 Mbps) and type (half duplex or full duplex) at bootup, based on what they are connected to.

Figure C-6 shows the Ethernet port.

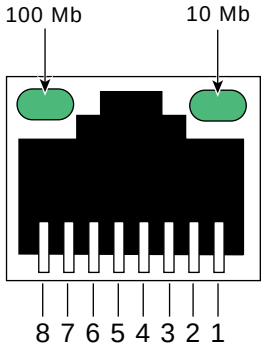

Figure C-6 Ethernet Port Pinout

Table C-6 shows the cable pinout assignments for the Ethernet port.

Table C-6 Ethernet Port Pinout

Pin	Assignment
1	Transmit+
2	Transmit–
3	Receive+
4	(Reserved)
5	(Reserved)
6	Receive–
7	(Reserved)
8	(Reserved)

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