SGI 1450 Server User's Guide

Record of Revision

Version	Description
001	June 2000 Initial Rev

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About This Guide

This guide describes the features of the SGI 1450 server and provides information on installing customer-replaceable components and on configuring software and utilities.

The following topics are covered:

- Chassis Description
- Baseboard Description
- Configuring Software and Utilities
- Removing and Installing User Serviceable Components

Qualified and trained service personnel should refer to the *1450 Sever Maintenance Guide* for a more detailed chassis description and information on removing and installing field replaceable components.

Refer to the *SGI 1450 Server Quick Start Guide* for information on setting up your system.

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Chapter 1

Chassis Description

This chapter provides a description of the external and internal structure of the SGI 1450 server.

The following sections are covered:

- Chassis Features
- Peripherals
- Power Subsystem
- System Cooling
- Chassis Front Controls and Indicators
- Rear Panel I/O Ports and Features

Chassis Features

The SGI 1450 server is designed to be either mounted in a standard 19-inch rack (rack mode) or standing upright (pedestal mode). Table 1-1 shows the physical specifications for the SGI 1450 server in rack mode.

For instructions on mounting the SGI 1450 server in a 19-inch rack, see the *SGI 1450 Server Mounting Instructions*.

Table 1-1   SGI 1450 Server Physical Specifications

Specification	Rack Mode
Height	4u (7 inches)
Width	17.5 inches (44.5 cm)
Depth	26.5 inches (67.3 cm)
Weight	57 lbs. (26 kg), minimum configuration
	88 lbs. (40 kg), maximum configuration
Required front clearance	3 inches (inlet air temperature <35 °C / 95 °F)
Required rear clearance	6 inches (no airflow restriction allowed)
Required side clearance	1 inch

Figure 1-1 shows a SGI 1450 server in rack-mountable configuration.
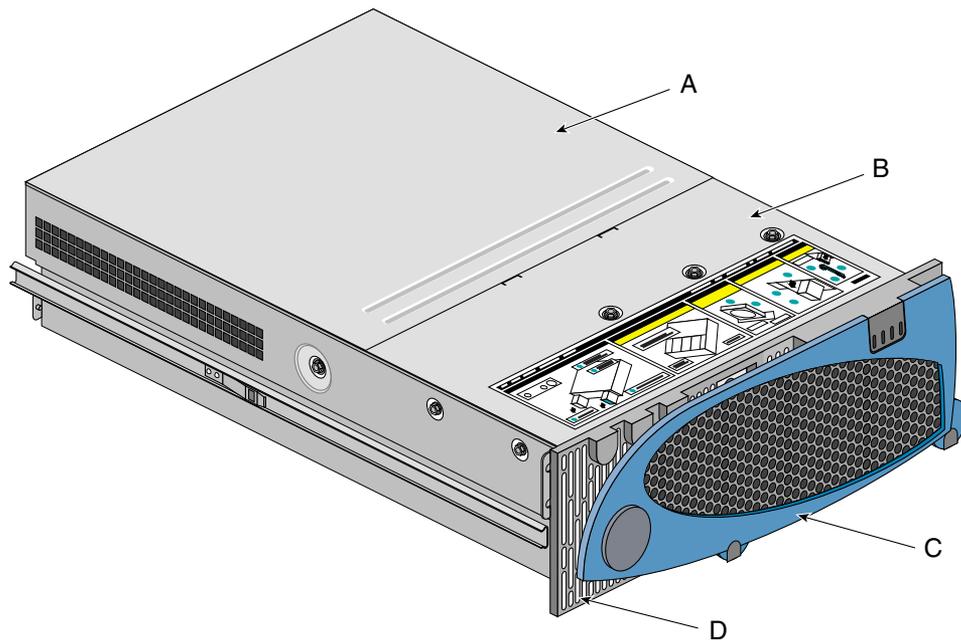
Figure 1-1   Server in Rack-Mountable Configuration

A. Top Cover. The top cover protects the contents of the chassis.

B. Front Cover. The front cover protects the peripheral devices.

C. Front Bezel Door. When this door is open, you can access hard drives and peripheral devices.

D. Front Bezel.

The chassis has two covers: a front cover and a top cover. The front cover is secured by screws and should be removed only by a qualified service technician. The top cover is secured by thumbscrews and provides user access to hot-pluggable PCI components. One of two thumbscrews is noted by "A" in Figure 1-2.

Note: At this time, the Linux operating system does not support use of the PCI Hot-Plug (PHP) feature. If you are running Linux, your system must be turned off before installing or removing PCI boards. Windows 2000 requires drivers that are PHP compatible in order to use the PHP feature.

A
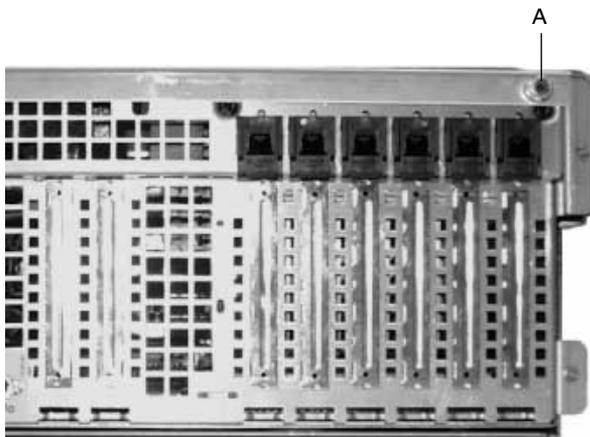
Figure 1-2   Top Cover Thumbscrew

A bezel snaps on to the front of the chassis and allows adequate airflow to cool the system components. The door in the bezel provides user access to hard drives and the peripheral bay.

Figure 1-3 gives an overhead view of the system with the top cover, front cover, and front bezel removed.
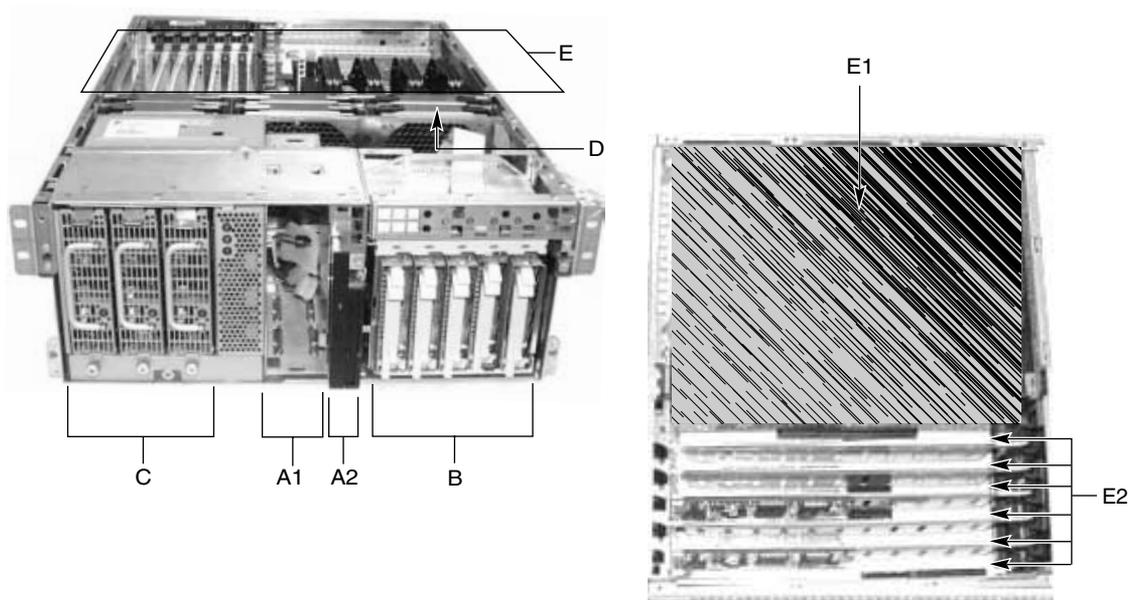
Figure 1-3   Server without Covers and Bezel

Warning: **The total power requirement for the SGI 1450 server exceeds the 240 VA energy hazard limit that defines an operator-accessible area. Only qualified service technicians should access the processor, memory, power subsystem, and non hot-plug/hot-swap areas of the baseboard.**

Table 1-2 summarizes the SGI 1450 server chassis features, using the labels provided in Figure 1-3.

Table 1-2   Chassis Feature Summary

Feature	Description
A. Peripheral Bay [A1 and A2]	A peripheral bay in the front of the system has a 5.25-inch device bay and a media bay.
A1. Peripheral Bay: Device Bay	The device bay can hold a 5.25-inch CD-ROM or DAT device.
A2. Peripheral Bay: Media Bay	The media bay holds a 0.5-inch slim-line floppy drive and a 0.5-inch slim-line CD-ROM drive.
B. Hard Drives	The hard drive bay supports up to five 1.0-inch hot-swap Ultra 160 SCSI hard drives. If the operating system supports hot-swapping of hard drives, these drives can be changed without shutting down the server.
C. Power Subsystem	Installed: A power subsystem bay that supports up to three 350-watt power supply modules in a (2+1) redundant configuration. The power subsystem can only be accessed by qualified service technicians.
D. Cooling	Installed: Fan board assembly and six fans in a redundant (5+1) fan array. The fans cool the baseboard and other components. In a 5+1 configuration, a failed fan may be removed and replaced without shutting down the server. This process is called hot-swapping. Hot-swapping fans should only be performed by a qualified service technician.

Table 1-2   Chassis Feature Summary

Feature	Description
E. Electronics Bay (E-Bay)	The E-Bay contains the baseboard. The baseboard has the following major components:
	Up to four Intel Pentium III Xeon processors
	Server Set III HE chipset
	Up to sixteen PC/100-compliant Registered ECC SDRAM memory modules, allowing up to 16 gigabytes of Error Checking and Correcting (ECC) Synchronous Dynamic RAM
	32-bit, 33 MHz, 5V PCI slots and several embedded devices
	64-bit, 66/33 MHz, 3.3V hot-plug PCI slots and one embedded device
	64-bit, 33 MHz, 5V hot-plug PCI slots and three embedded devices
	ISA bus segment with three embedded devices
	Two externally accessible USB ports
	One IDE connector, supporting up to two ATA33 compatible devices
	With the exception of the hot-plug PCI cards, the E-Bay can only be accessed by qualified service technicians.
E1. E-Bay (Overhead View)	An overhead view of the E-Bay
E2. Hot-plug PCI Slots	Six hot-plug PCI slots located within the E-Bay
	NOTE: At this time, the Linux operating system does not support use of the PCI Hot-Plug (PHP) feature. If you are running Linux, your system must be turned off before installing or removing PCI boards. Windows 2000 requires drivers that are PHP compatible in order to use the PHP feature.

Peripherals

Peripheral Bay

The chassis contains one peripheral bay for CD-ROM, DAT, and floppy drives. The peripheral bay contains two smaller bays: a device bay and a media bay.

Device Bay

The device bay accommodates either a 5.25-inch CD-ROM or a DAT drive. Only qualified service technicians should remove and install components in the device bay.

Media Bay

The media bay accommodates a 0.5-inch slim line floppy drive and 0.5-inch slim line CD-ROM drive. Only qualified service technicians should remove and install components in the media bay.

Hard Drive Bay

The chassis contains one hard drive bay. The hard drive bay can accommodate up to five 3.5-inch by 1.0-inch hot-swap Ultra 160 SCSI SCA hard disk drives

Opening the front bezel door provides user access to the hard drives. As part of the hot-swap implementation, each hard drive requires a hard drive carrier. When you remove a hard drive from the system, you remove both the carrier and the hard drive. The drive is attached to the carrier by four screws. The carrier locks into the hard drive bay by a locking handle. Figure 1-4 shows the orientation of the drive in the carrier. The carrier is upside down in this figure.
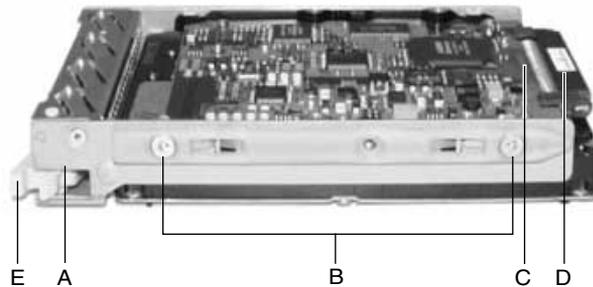
Figure 1-4   Hard Drive in Drive Carrier

A. Hard Drive Carrier

B. Two (of four) Fasteners Used to Attach Drive to Carrier

C. Hard Drive

D. Connector

E. Locking Handle

Each hard drive is connected to an Ultra 160 SCSI hot-swap backplane. The backplane provides industry-standard 80-pin SCA-2 connectors for each hard drive and accepts 10,000 RPM or slower drives that consume up to 23 watts of power. If another type or a slower Ultra 160 SCSI SCA drive is installed, make sure that the drive meets these backplane and carrier requirements.

An LED above each hard drive displays the status of that hard drive. Table 1-3 shows the hard drive LED state status.

Table 1-3   Hard Drive LED State Status

LED State	Status
Solid green	The hard drive is present and powered on.
Flashing green	The hard drive is active.
Solid yellow	There is an asserted fault status on the hard drive.
Flashing yellow	A rebuild of the hard drive is in progress.
Off	The hard drive is not powered on.

Power Subsystem

The SGI 1450 server uses a universal input-switching power subsystem (PSBS). This subsystem provides up to 630 watts DC. The subsystem also minimizes the RMS current drawn from each AC line by providing power-factor corrected AC input. The chassis can be configured with one, two, or three 350-watt power supply modules, where each is designed to minimize electromagnetic interference (EMI) and radio frequency interference (RFI).

Warning: **The total power requirement for the SGI 1450 server exceeds the 240 VA energy hazard limit that defines an operator-accessible area. Only qualified service technicians should access the processor, memory, power subsystem, and non hot-plug/hot-swap areas of the baseboard.**

The power subsystem consists of a power subsystem bay, with up to three power supply modules. The power subsystem bay contains a power distribution board, which manages the power delivered by all functional power supplies.

The power subsystem can operate in either a nonredundant or redundant manner. Nonredundant operation means that you are using only one or two power supply modules. If a power supply module ceases to function normally, the server system cannot function properly, if at all. A minimal configuration supported by one power supply module is one processor, four memory DIMMs, one hard drive slower than 10,000 RPM, one floppy drive, and one CD-ROM.

The SGI 1450 server uses a redundant (2+1) power subsystem. To form a (2+1) redundant power subsystem, the subsystem parallels the DC output of one power supply module with one or two other modules. If one module ceases to function normally, the remaining modules provide power to the server system and the system continues to function properly. Two power supply modules are required to provide power to a fully configured SGI 1450 server. The third module provides redundancy. A fully configured system includes four processors, 8 GB of memory, one floppy drive, one CD-ROM, five hard drives, and eight PCI add-in boards.

System Cooling

The SGI 1450 server uses up to six fans mounted in a fan board assembly in the middle of the chassis between the E-Bay and peripheral device bays. The six fans are noted by "A" in Figure 1-5.

Warning: **The total power requirement for the SGI 1450 server exceeds the 240 VA energy hazard limit that defines an operator-accessible area. Only qualified service technicians should access the processor, memory, power subsystem, and non hot-plug/hot-swap areas of the baseboard.**
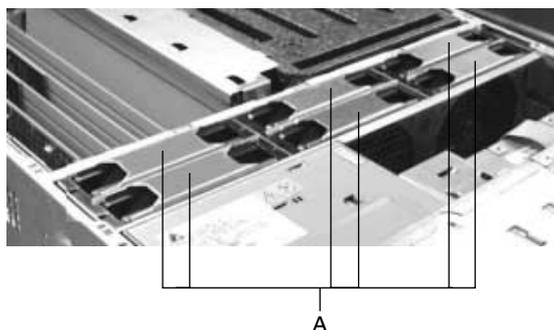
Figure 1-5   Fan Board Assembly

The cooling system can operate in either a non redundant configuration or a redundant configuration. A non redundant configuration includes just three fans. If any one of these three fans ceases to function normally, environmental conditions within the chassis may exceed the environmental regulations in this guide and the chassis may not function normally. Three fans support any system configuration but without fan redundancy.

The SGI 1450 server uses all six fans to form a redundant cooling system. If one of the six fans ceases to function normally, the remaining five fans adequately cool the system. Using six fans supports any configuration up to the maximum configuration.

Air flows in through the front bezel over the power subsystem bay, the peripheral bay, and the hard drive bay. The air then passes through the fan board assembly and to the baseboard. Finally, the air exhausts through the rear and left side of the chassis.

Individual fan status indicators are located on the fan board mounted in the fan board assembly. Fan failure is also indicated by the general fault LED located at the front of the chassis.

Caution: The top cover must be on the system for proper cooling.

Chassis Front Controls and Indicators

Figure 1-6 shows the front panel controls and indicators.
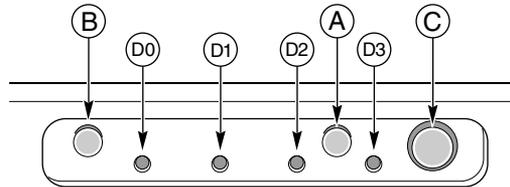
Figure 1-6   Front Panel Controls and Indicators

The following front controls and indicators are shown in Figure 1-6.

A. Power on/off button: If you press this button when the system is off, you turn on the power subsystem. If you press this button when the system is in sleep state, you activate it. If you hold down the button for more than 4 seconds, you override the ACPI mode and the power is turned off.

B. Reset button: If you press this button, you reset the system. If you hold down this button for 4 seconds or more, push on the power button, and then release both the reset and power buttons within one second of each other, the CMOS will be cleared.

Caution: The CMOS should be cleared only if it has been corrupted.

C. Sleep button: If the operating system supports ACPI and you press this button, the operating system goes into sleep state (S1). If you press this button during sleep state, the operating system becomes active. This system does not have a service mode.

D. Front panel LEDs from left to right:

> D0. General System Fault LED: Yellow indicates a system failure.

> D1. NIC activity LED: Green indicates NIC activity.

> D2. HDD activity LED: Green indicates any system hard drive activity.

> D3. Main Power LED: Solid green indicates the presence of DC power in the server. Flashing green indicates that the system is in ACPI sleep mode.

Rear Panel I/O Ports and Features

Figure 1-7 shows a detailed view of the rear panel I/O ports and features.
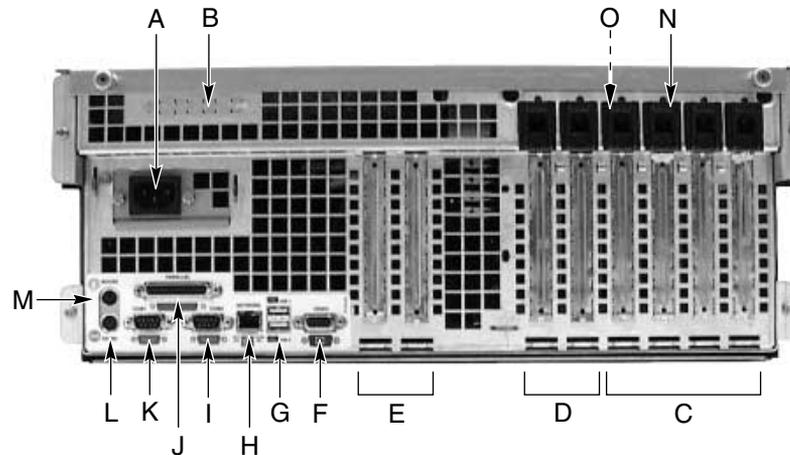
Figure 1-7   Rear Panel I/O Ports and Features

A. AC input power connector

B. External SCSI connector ports

C. Hot-plug 64-bit, 33 MHz PCI add-in board slots

D. Hot-plug 64-bit, 66/33 MHz PCI add-in board slots

E. Non-hot-plug 32-bit, 33 MHz PCI add-in board slots

These slots can also accept an Intelligent Chassis Management Bus (ICMB) SEMCONN 6-pin connector in/out

F. Video connector

G. USB ports 0 (upper) and 1 (lower), 4-pin connectors

H. NIC RJ45 connector

I. Serial port 2 (COM1), 9-pin RS-232 connector

J. IEEE 1284 compliant, 25-pin bi-directional parallel connector

K. Serial port 1 (COM1), 9-pin RS-232 connector

L. PS/2-compatible keyboard connector

M. PS/2-compatible mouse connector

N. HW push button

O. PCI green and amber LEDs inside the chassis

Baseboard Description

This chapter provides a description of the SGI 1450 server baseboard.

The topics covered in this chapter include:

- Baseboard Features
- Baseboard Connector and Component Locations
- Processor
- Memory
- Peripherals
- Add-in Board Slots
- DesotoE2 Hot-Plug PCI Controller
- IDE Interface
- USB Interface
- SCSI Controller
- IDE Controller
- Server Management

Baseboard Features

Table 2-1 provides a summary of the baseboard features.

Table 2-1   Baseboard Features

Feature	Description
Processor	Up to four Intel Pentium III Xeon processors, packaged in single edge contact (S.E.C.) cartridges and installed in 330-pin SC330.1 compliant edge connectors, operating at 1.8 V to 3.5 V. The baseboard's voltage regulator is automatically programmed by the processor's VID pins to provide the required voltage. The baseboard includes connectors for three 8.3-compliant plug-in voltage-regulator modules (VRM).
Memory, dynamic random access (DRAM)	Single plug-in module containing a 64- or 72-bit four-way-interleaved pathway to main memory supporting SDRAM.
	256 MB to 16 GB of error correcting code (ECC) memory. A minimum of four DIMMs must be installed.
Video memory (DRAM)	Installed: 2 MB of video memory.
PCI Segment A bus	Two 184-pin, 3.3 V keyed, 64-bit PCI full-length expansion connectors (66/33 MHz).
	One DesotoE2 Hot-Plug PCI controller.
PCI Segment B bus	Four 184-pin, 5 V keyed, 64-bit PCI full-length expansion connectors (33 MHz).
	One Adaptec AIC-7899 dual channel SCSI-3 Ultra 160 SCSI controller.
	One DesotoE2 Hot-Plug PCI controller.
PCI Segment C bus	Two 120-pin, 32-bit PCI half-length expansion connectors (33 MHz).
	OSB4 I/O APIC.
	PCI network interface controller.
	ATI Rage IIc video controller.
	PCI narrow/wide Adaptec AIC-7880 Ultra SCSI controller.
PCI Bus Master IDE Interface	The baseboard supports Ultra DMA33 Synchronous Direct Memory Access (DMA) mode transfers.
USB Interface	The baseboard provides a dual external USB connector.
Server Management	Thermal/voltage monitoring and error handling.
	Front panel controls and indicators (LEDs).

Table 2-1   Baseboard Features

Feature	Description
Graphics	ATI Rage IIc VGA Graphics Accelerator, along with video SGRAM and support circuitry for an embedded SVGA video subsystem.
SCSI	Two embedded SCSI controllers:
	Adaptec AIC-7899 SCSI controller-dual channel wide Ultra II/Ultra 160 SCSI controller.
	Adaptec AIC-7880 SCSI controller-PCI narrow/wide Ultra SCSI controller.
System I/O	PS/2-compatible keyboard and mouse ports, 6-pin DIN.
	Advanced parallel port, supporting Enhanced Parallel Port (EPP) levels 1.7 and 1.9, ECP, compatible 25-pin.
	VGA video port, 15-pin.
	Two serial ports, 9-pin (serial port A is the top connector).
Form Factor	16 x 13 inches, ATX-style backpanel I/O.

Baseboard Connector and Component Locations

Figure 2-1 shows a detailed view of the baseboard connectors and components.
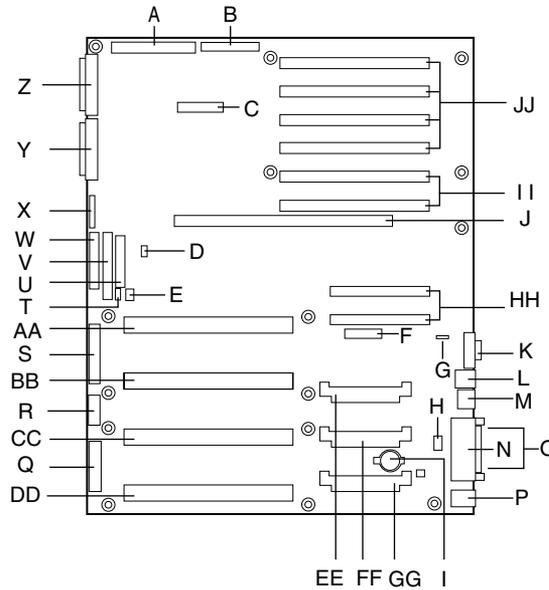
Figure 2-1   Baseboard Connector and Component Locations

A. Legacy Narrow SCSI
B. Legacy Wide SCSI
C. SMM Connector
D. IMB Connector
E. HDD Activity
F. HPIB Connector
G. ICMB Connector
H. Connector not Used
I. Lithium Battery
J. Memory Module Connector
K. Video Connector
L. USB, External Connector
M. Network Connector

N. Parallel Connector
O. COM1, COM2 Connector
P. Keyboard/Mouse
Q. Main Power 1
R. Auxiliary Power
S. Main Power 2
T. SMBus
U. Front Panel
V. IDE Connector
W. Floppy Connector
X. Configuration Jumpers
Y. Ultra 160 SCSI A
Z. Ultra 160 SCSI B
AA. Processor #1
BB. Processor #2
CC. Processor #3
DD. Processor #4
EE. Voltage Regulator Module (VRM) Connector #2
FF. Voltage Regulator Module (VRM) Connector #3
GG. Voltage Regulator Module (VRM) Connector #4
HH. 32-bit, 33 MHz Half-length PCI Slots
II. 64-bit, 66/33 MHz Hot-Plug PCI Slots
JJ. 64-bit, 33 MHz Hot-Plug PCI Slots

Processor

Each Intel Pentium III Xeon processor is packaged in a single edge contact (S.E.C.) cartridge. The cartridge includes the processor core with an integrated 32 KB primary (L1) cache, the secondary (L2) cache, a thermal plate, and a plastic cover.

The processor core and L2 cache components are on a pre-assembled printed circuit board, approximately 5 inches by 6 inches. The L2 cache and processor core L1 cache interface use a private bus isolated from the processor host bus. The L2 cache bus operates at the processor core frequency.

Each S.E.C. cartridge connects to the baseboard through a 330-pin SC330.1 compliant edge connector. A retention module attached to the baseboard secures the cartridge. Depending on configuration, the system supports one to four processors.

The processor external interface is multiprocessor (MP) ready and operates at 100 MHz. The processor contains a local Advanced Configuration and Power Interface (APIC) unit for interrupt handling in multiprocessor (MP) and uniprocessor (UP) environments.

The L2 cache is located on the substrate of the S.E.C. cartridge. The cache:

- Is offered in 1 MB and 2 MB configurations

- Has Error Correcting Code (ECC)

- Operates at the full core clock rate

Memory

Main memory resides on an add-in board, called a memory module. The memory module contains slots for 16 DIMMs, each of which must be at least 64 MB, and is attached to the baseboard through a 330-pin connector, called the Memory Expansion Card Connector (MECC). The memory module supports PC-100 compliant registered ECC SDRAM memory modules. The ECC used for the memory module is capable of correcting single-bit errors (SBEs) and detecting 100 percent of double-bit errors over one code word. Nibble error detection is also provided.

System memory begins at address 0 and is continuous (flat addressing) up to the maximum amount of DRAM installed (exception: system memory is non contiguous in the ranges defined as memory holes using configuration registers). The system supports both base (conventional) and extended memory.

- Base memory is located at addresses 00000h to 9FFFFh (the first 1 MB).

- Extended memory begins at address 0100000h (1 MB) and extends to 3FFFFFFFFh (16 GB), which is the limit of supported addressable memory. The top of physical memory is a maximum of 16 GB (to 3FFFFFFFFh).

Memory amounts from 256 MB to 16 GB of DIMM are supported, with a 64/72-bit four-way-interleaved pathway to main memory, which is also located on the module. Therefore, data transfers between MADPs and DIMMs is in four-way interleave fashion. Each of the four DIMMs must be populated in a bank. The 16 slots are divided into four banks of four slots each. They are labeled A through D. Bank A contains DIMM sockets

A1, A2, A3, and A4. Banks B, C, and D each contain 4 DIMM sockets and are named in the same fashion. There are silk screens on the module next to each DIMM socket to label its bank number. For the best thermal results, populate the banks from A to D. For example, populate bank A and then bank B. For best performance results, populate adjacent banks. For example, populate bank A and then bank C.

Figure 2-2 shows a detailed view of the memory module slots.
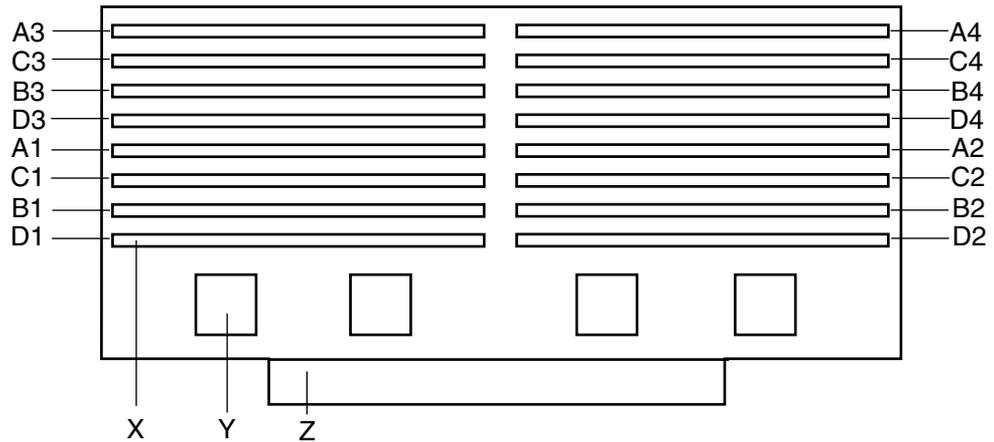
Figure 2-2   Memory Module DIMM Installation Sequence

X. One of sixteen DIMM sockets
Y. One of four Memory Address Data Paths (MADPs)
Z. Memory Expansion Card Connector (MECC)

Each slot is identified by another notation. Sockets A1 through A4 are identified as J1 through J4 respectively. Sockets B1 through B4 are identified as J5 through J8. Sockets C1 through C4 are identified as J9 through J12. Sockets D1 through D4 are identified as J13 through J16.

Some operating systems and application programs use base memory while others use both conventional and extended memory. Examples are:

• Base memory: Microsoft MS-DOS, IBM OS/2, Microsoft Windows NT, and various UNIX systems

- Conventional and extended memory: IBM OS/2, Microsoft Windows NT, and various UNIX systems

MS-DOS does not use extended memory; however, some MS-DOS utility programs like RAM disks, disk caches, print spoolers, and windowing environments use extended memory for better performance.

The BIOS automatically detects, sizes, and initializes the memory array, depending on the type, size, and speed of the installed DIMMs, and reports memory size and allocation to the system via configuration registers.

Peripherals

Super I/O Chip (SIO)

The National PC97317VUL Super I/O Plug and Play Compatible with ACPI Compliant Controller/Extender device supports two serial ports, one parallel port, a diskette drive, and a PS/2-compatible keyboard and mouse. The system provides the connector interface for each port.

Serial Ports

Both serial ports can be relocated. Each serial port can be set to one of four different COMx ports, and each can be enabled separately. When disabled, serial port interrupts are available to add-in boards.

Parallel Port

The baseboard provides a 25-pin Parallel Port connector. The SIO chip provides an IEEE 1284-compliant, 25-pin, bi-directional parallel port. BIOS programming of the SIO registers enable the parallel port and determine the port address and interrupt. When disabled, the interrupt is available to add-in cards.

Add-in Board Slots

The baseboard has eight slots for PCI add-in boards supported by three PCI bus segments called PCI-A, PCI-B, and PCI-C. There are two slots on PCI-A, four slots on PCI-B, and two slots on PCI-C. PCI-C supports half-length boards (5.6 inches to 6.3 inches) only; the other slots support full-length boards.

The two slots for the PCI bus segment PCI-C consume a maximum of 375 mA of standby current on a 3.3 V Aux power line. The remaining six slots do not have any 3.3 V Aux capabilities.

Both PCI segments A and B allow you to add, remove, or replace PCI add-in boards installed in their slots without interrupting normal operation or powering down the system. To use this PCI Hot-Plug (PHP) feature, a server system requires PCI Hot-Plug software and PCI Hot-Plug capable add-in boards. PCI Hot-Plug software usually is a driver loaded for a specific operating system.

Note: At this time, the Linux operating system does not support use of the PCI Hot-Plug (PHP) feature. If you are running Linux, your system must be turned off before installing or removing PCI boards. Windows 2000 requires drivers that are PHP compatible in order to use the PHP feature.

Each Hot-Plug PCI slot has two LEDs. The green LED indicates the state of power on for each slot. The amber LED indicates an error condition with that slot.

The table below summarizes typical LED states that you may encounter during a system's operation.

Table 2-2   Slot State Indicators

LED State	Status
Green On Amber Off	The slot is on and functioning normally.
Green On Amber On	The slot is on and the card requires attention.
Green Off Amber On	The slot is off and the card in the slot requires attention.

Table 2-2   Slot State Indicators

LED State	Status
Green blinking Amber Off	Slot power is transitioning from either ON to OFF or OFF to ON.
Off	The slot is powered off.

PCI features include:

- 33 or 66 MHz bus speed

- 32-bit or 64-bit memory addressing

- 3.3 V or 5 V signaling environment

- Independent bus structure supports transfers up to 1.2 GB/sec.

- 8-, 16-, 32-, or 64-bit data transfers

- Plug-and-Play ready

- Parity enabled

DesotoE2 Hot-Plug PCI Controller

Note: At this time, the Linux operating system does not support use of the PCI Hot-Plug (PHP) feature. If you are running Linux, your system must be turned off before installing or removing PCI boards. Windows 2000 requires drivers that are PHP compatible in order to use the PHP feature.

The DesotoE2 Hot-Plug PCI controller is a 32-bit PCI bus agent that operates at either 33 or 66 MHz. The PCI controller manages PHP functionality for the PCI segment it resides on. There is a DesotoE2 controller on PCI segments A and B. The DesotoE2 PHP controller is:

- ACPI compliant

- Compatible with Compaq's PHP controller design

- Supports either a 3.3 V or 5 V PCI bus

The DesotoE2 is responsible for:

- Managing power application and removal to individual slots

- Properly resetting newly added PCI boards prior to bringing the board online

- Managing connection and disconnection of the PCI signals between the PCI bus and the add-in board

- Managing seamless addition and removal of individual PCI add-in boards without impacting bus functionality

IDE Interface

The Open South Bridge (OSB4) acts as a PCI-based fast IDE controller. The controller supports programmed I/O and bus master transfers. While the OSB4 supports two IDE channels, the baseboard uses only the primary IDE channel and provides a single 40-pin IDE connector.

USB Interface

The baseboard provides a dual external USB connector for the back panel of a server system. The connector is defined by the USB Specification, Revision 1.0. Both ports function identically with the same bandwidth.

Network Interface Controller (NIC)

The baseboard supports a 10BASE-T/100BASE-TX network subsystem based on the Intel 82559 Fast Ethernet Multifunction PCI/CARDBus controller. The Intel 82559 controller is a highly integrated PCI LAN controller in a 196-pin Ball Grid Array (BGA) supporting 10 or 100 Mbps fast Ethernet networks.

Supported network features include:

- Glueless 32-bit PCI Bus Master Interface compatible with the PCI Local bus Specification

- 82596-like chained memory structure with improved dynamic transmit chaining for enhanced performance

- Programmable transmit threshold for improved bus utilization

- Early receive interrupt for concurrent processing of receive data

- On-chip counters for network management

- Auto-detect and auto-switching for 10 or 100 Mbps network speeds

- Support for both 10 and 100 Mbps networks

- Integrated physical interface to TX magnetics

- The magnetics component terminates the 100BASE-TX connector interface and a flash device stores the network ID

Video

The baseboard provides an ATI Rage IIc VGA Graphics Accelerator, along with video Synchronous Graphics RAM (SGRAM) and support circuitry for an embedded Super VGA (SVGA) video subsystem. The ATI Rage IIc chip contains an SVGA video controller, clock generator, BitBLT engine, and a RAM digital-to-analog Converter (RAMDAC) in a 208-pin PQFP. One 256K x 32 SGRAM chip provides 2 MB of 10-ns video memory. The baseboard does not support adding video memory to the system. The SVGA subsystem supports a variety of modes, up to 1600 x 1200 resolution, or up to 16.7 M colors.

The SVGA subsystem also supports analog VGA monitors, single- and multi-frequency, interlaced and non-interlaced, up to 100 Hz vertical retrace frequency. The baseboard provides a standard 15-pin VGA connector and video blanking logic for server management console redirection support.

Depending on the environment, the controller displays up to 16.7 M colors in some video resolutions.

SCSI Controller

The baseboard includes two SCSI controllers. A dual function SCSI controller (Adaptec AIC-7899) is on the PCI-B bus, and a PCI wide SCSI controller (Adaptec AIC-7880) is on the PCI-C bus.

The Adaptec AIC-7899 SCSI controller contains two independent SCSI channels that share a single PCI bus master interface as a multifunction device, packaged in a 352-pin ball grid array (BGA). Internally, each channel is identical, capable of operations using either 16-bit Single-Ended (SE) or Low Voltage Differential (LVD) SCSI providing 40 MBps (Ultra-wide SE), 80 MBps (Ultra 2), or 160 MBps (Ultra 160).

Both channels attach to 68-pin 16-bit differential SCSI connector LVD interfaces. Each channel has its own set of PCI configuration registers and SCSI I/O registers. As a PCI bus master, the AIC-7899 controller supports burst data transfers on PCI up to the maximum rate of 266 MBps using on-chip buffers.

The Adaptec AIC-7880 controller contains a single SCSI channel with full-featured PCI bus master interface in a 160-pin Plastic Quad Flat Pack (PQFP). The controller supports either 8- or 16-bit Fast SCSI providing 10 MBps or 20 MBps (Fast-10) throughput, or Fast-20 SCSI that can burst data at 20 MBps or 40 MBps. As a PCI 2.1 bus master, the AIC-7880 controller supports burst data transfers on PCI up to the maximum rate of 133 MBps using the on-chip 256-byte FIFO.

The AIC-7880 implementation offers 8-bit or 16-bit SCSI connectors and operation at data transfer rates of 10, 20, or 40 MBps. The AIC-7880 controller also offers active negation outputs, controls for external differential transceivers, a disk activity output, and a SCSI terminator power-down control. Active negation outputs reduce the chance of data errors by actively driving both polarities of the SCSI bus, avoiding indeterminate voltage levels and common-mode noise on long cable runs. The SCSI output drivers can directly drive a 48-mA single-ended SCSI bus with no additional drivers. The SCSI segment can support up to 15 devices.

The AIC-7880 controller can be used as an 8-bit controller via the narrow, 50-pin connector and as a 16-bit controller via the wide, 68-pin connector. As a result, the AIC-7880 controller is not always at one end of the SCSI bus, and termination is controlled through some simple circuitry. The circuitry senses whether there is a device attached through the narrow 50-pin connector or the wide 68-pin connector. When there are devices attached to both connectors, the termination is on for the upper 8 bits of data and the parity bit associated with these data lines. All other signals are not terminated on board and are terminated by the devices attached through the connector. When there is a device attached to only one connector (either wide or narrow), all on-board termination is on.

IDE Controller

IDE is a 16-bit interface for intelligent disk drives with AT disk controller electronics onboard. The Open South Bridge (OSB4) acts as a PCI-based fast IDE controller. The device controls:

- PIO and IDE DMA/bus master operations

- Mode 4 timings

- Transfer rates up to 33 MBbs.

- Ultra DMA 33 capacity

- Buffering for PCI/IDE burst transfers

- Master/slave IDE mode

- Up to two drives for one IDE channel

Note: An IDE signal cable can be connected up to the IDE connector on the baseboard. However, the maximum length of the cable is 18 inches. The cable supports up to two devices, one at the end of the cable and the other six inches from the end.

Keyboard and Mouse

The PS/2-compatible keyboard and mouse connectors are mounted in a single-stacked housing with the mouse connector over the keyboard. Externally, they appear as two connectors.

The user can plug in the keyboard and mouse to either connector before powering up the system. The BIOS detects these and configures the keyboard controller accordingly.

The keyboard controller is functionally compatible with the Intel 8042A micro controller. The system can be locked automatically if no keyboard or mouse activity occurs for a predefined length of time, if specified through the SSU. Once the inactivity (lockout) timer has expired, the keyboard and mouse do not respond until the previously stored password is entered.

Server Management

Server management features are implemented using one micro controller called the Baseboard Management Controller (BMC).

The BMC and associated circuitry are powered from 5 V standby, which remains active when system power is switched off. The BMC is IPMI 1.0 compliant.

The primary function of the BMC is to autonomously monitor system platform management events and log their occurrence in the nonvolatile System Event Log (SEL). The BMC is compliant to the Intelligent Platform Management Interface Specification, Version 1.0. These events include over-temperature and over-voltage conditions, fan failure, or chassis intrusion. While monitoring, the BMC maintains the nonvolatile Sensor Data Record Repository (SDRR), from which run-time information can be retrieved. The BMC provides an interface to SDRR information, so software running on the server can poll and retrieve the current status of the platform. A shared register interface is defined for this purpose.

Field service personnel can retrieve SEL contents after system failure for analysis by using system management tools like Intel LANDesk Server Manager, Intel Server Control (ISC), or Direct Platform control (DPC). Because 5 V standby provides power the BMC, SEL (and SDRR) information is also available via the interperipheral management bus (IPMB). During monitoring, the BMC performs the following functions:

- Baseboard temperature and voltage monitoring
- Processor presence monitoring and FRB control
- Baseboard fan failure detection and indicator control
- SEL interface management
- Sensor Data Record Repository (SDRR) interface management
- SDR/SEL timestamp clock
- Baseboard Field Replaceable Unit (FRU) information interface
- System management watchdog timer
- SMI/NMI Status Monitor
- Front panel NMI handling
- Event receiver
- IPMB Management Controller Initialization Agent

- Secure mode control, front panel lock/unlock initiation, and video blank and diskette write protect monitoring and control

- ACPI Support

- Direct Platform Control (DPC) support

- Platform Event Paging (PEP) / Platform Event Filtering (PEF)

- Power distribution board monitoring

- Speaker beep capability. When the system is powered up, this capability is used to indicate conditions such as "empty processor slot"

- Pentium III Xeon processor SEEPROM interface for Processor Information ROM (PIROM) and Scratch EEPROM access

- Processor temperature monitoring

- Hot-Plug PCI slot status reporting

- Processor bus speed setting

- Chassis fan failure light control

- Chassis power fault light control

- Chassis power light control

Software Locks via the SSU or BIOS Setup

The SSU provides a number of security features to prevent unauthorized or accidental access to the system. Once the security measures are enabled, access to the system is allowed only after the user enters the correct password(s). For example, the SSU allows you to:

- Enable the keyboard lockout timer so the server requires a password to reactivate the keyboard and mouse after a specified time-out period of 1 to 120 minutes

- Set and enable administrator and user passwords

- Set secure mode to prevent keyboard or mouse input and to prevent use of the front panel reset and power switches

- Activate a hot key combination to enter secure mode quickly

- Disable writing to the diskette drive when secure mode is set

Using Passwords

If a user password is set and enabled, but an administrator password is not set, a user password must be entered to boot the system and run the SSU.

If both a user and administrator password are set:

• Enter either one to boot the server and enable the keyboard and mouse

• Enter the administrator password to access the SSU or BIOS Setup to change the system configuration

Secure Mode

Configure and enable the secure boot mode by using the SSU. When secure mode is in effect:

• The system can boot and the operating system runs, but the user password must be entered for a user to use the keyboard or mouse

• The system cannot be turned off or reset from the front panel switches

Secure mode has no effect on functions enabled via the Server Manager Module or power control via the real-time clock (RTC).

Taking the system out of secure mode does not change the state of system power. That is, if you press and release the power switch while secure mode is in effect, the system will not power off when secure mode is later removed. However, if the front panel power switch remains depressed when secure mode is removed, the system will power off.

Summary of Software Security Features

Table 2-3 lists the software security features and describes what protection each offers. In general, to enable or set the features listed here, the SSU must be run and configured with the Security Menu (described in this manual in "Security Menu" on page 56.) The table also refers to other SSU menus and to the Setup utility. For greater detail, see Chapter 3.

Table 2-3   Software Security Features

Feature	Description
Secure mode	How to enter secure mode:
	Setting and enabling passwords automatically places the system in secure mode.
	If a hot key combination is set (through the SSU or Setup), the system can be secured simply by pressing the key combination. This means that the user does not have to wait for the inactivity time-out period.
	When the system is in secure mode:
	The server can boot and run the operating system, but mouse and keyboard input is not accepted until the user password is entered.
	At boot time, if a CD is detected in the CD-ROM drive or a diskette in drive A, the system prompts for a password. When the password is entered, the server boots from CD or diskette and disables the secure mode.
	If there is no CD in the CD-ROM drive or diskette in drive A, the server boots from drive C and automatically goes into secure mode. All enabled secure mode features go into effect at boot time.
	To leave secure mode, enter the correct password(s).
Disable writing to diskette	In secure mode, the server will not boot from or write to a diskette unless a password is entered. To set this feature, use the SSU Security Subsystem Group.
	To write protect access to diskette whether the server is in secure mode or not, use the Setup main menu, Floppy Options, and specify Floppy Access as read only.
Disable the power and reset buttons	Power and reset buttons are always disabled when the server is in secure mode.

Table 2-3   Software Security Features

Feature	Description
Set a time out period so that keyboard and mouse input are not accepted.	Specify and enable an inactivity time-out period of from 1 to 120 minutes.
	If no keyboard or mouse action occurs for the specified period, attempted keyboard and mouse input will not be accepted.
Also, screen can be blanked, and writes to diskette can be inhibited	The monitor display will go blank, and the diskette drive will be write protected (if these security features are enabled through Setup or the SSU and using onboard video).
	To resume activity, enter the user password.
Control access to using the SSU: set administrative password	To control access to setting or changing the system configuration, set an administrative password and enable it through Setup or the SSU.
	If both the administrative and user passwords are enabled, either can be used to boot the server or enable the keyboard and/or mouse, but only the administrative password will allow Setup and the SSU to be changed.
	To disable a password, change it to a blank entry or press Ctrl-D in the Change Password menu of the Administrative Password Option menu found in the Security Subsystem Group.
	If you cannot access Setup or the SSU to clear the password, change the Clear Password jumper. See "CMOS Clear Jumper" in the *SGI 1450 Server Maintenance Guide*.
Control access to the system other than SSU: set user password	To control access to using the system, set a user password and enable it through Setup or the SSU.
	To disable a password, change it to a blank entry or press Ctrl-D in the Change Password menu of the User Password Option menu found in the Security Subsystem Group.
	If you cannot access Setup or the SSU to clear the password, change the Clear Password jumper. See "CMOS Clear Jumper" in the *SGI 1450 Server Maintenance Guide*.

Table 2-3 Software Security Features

Feature	Description
Boot without keyboard	The system can boot with or without a keyboard. During POST, before the system completes the boot sequence, the BIOS automatically detects and tests the keyboard if it is present and displays a message. There is no entry in the SSU to enable or disable a keyboard.
Specify the boot sequence	The sequence specified on the menu in the SSU MultiBoot Group will determine the boot order. If secure mode is enabled (a user password is set), then the user is prompted for a password before the server fully boots. If secure mode is enabled and the Secure Boot Mode option is also enabled, the server fully boots but requires a password before accepting any keyboard or mouse input.

Configuring Software and Utilities

This chapter describes the Power-On Self Test (POST) and system configuration utilities. Table 3-1 briefly describes the utilities and refers to the page where the information can be found.

Table 3-1   Configuration Utilities

Utility	Description and brief procedure	Page
BIOS Setup	If the system does not have a diskette drive, or the drive is disabled or misconfigured, use Setup to enable it.	"Using BIOS Setup" on page 38
	Or, you can move the CMOS jumper on the system board from the default setting (Protect CMOS memory) to the Clear setting; this will allow most system configurations to boot. For the procedure to do this, see the *1450 Server Maintenance Guide*.	
Changing Boot Device Priority	Use to change the boot device priority temporarily or permanently.	"Changing the Boot Device Priority Temporarily" on page 63
SCSI*Select* Utility	Use to configure the SCSI controllers in the system.	"Running the SCSISelect Utility" on page 64
Adaptec SCSI Utility	Use to configure or view the settings of the SCSI host adapters and onboard SCSI devices in the system.	"Configuring the Adaptec AIC-7880 SCSI Adapter" on page 66

Table 3-1   Configuration Utilities

Utility	Description and brief procedure	Page
Server Setup Utility (SSU)	Use for extended system configuration of onboard resources and add-in boards, viewing the system event log (SEL), setting boot device priority, or setting system security options. The SSU can be run from either the configuration software CD or from a set of bootable diskettes. You can create the diskettes from the CD. Information entered via the SSU overrides information entered via Setup.	"Using the System Setup Utility (SSU)" on page 68
FRUSDR Load Utility	Use to update the Field Replacement Unit (FRU), Sensor Data Record (SDR), and Desktop Management Interface (DMI) flash components.	"FRU and SDR Load Utility" on page 71
BIOS Update Utility	Use to update the BIOS or recover from a corrupted BIOS update.	"Upgrading the BIOS" on page 75
Firmware Update Utility	Use to update BMC flash ROM.	"Using the Firmware Update Utility" on page 78

Hot Keys

Table 3-2 shows the key combinations used to perform certain operations.

Table 3-2   Hot Keys

To do this:	Press these keys
Clear memory and reload the operating system—this is a system reset.	<Ctrl+Alt+Del>
Secure your system immediately.	<Ctrl+Alt>+hot key (Set your hot key combination using the SSU or Setup.)
Enter the Adaptec SCSI Utility during BIOS POST.	<Ctrl+A>

Table 3-2   Hot Keys

To do this:	Press these keys
Enter BIOS Setup during BIOS POST.	F2
Abort memory test during BIOS POST.	Esc (Press while BIOS is updating memory size on screen.)

Power-On Self Test (POST)

Each time you turn on the system, the BIOS begins execution of the Power-On Self Test (POST). POST discovers, configures, and tests the processors, memory, keyboard, and most installed peripheral devices. The length of time needed to test memory depends on the amount of memory installed. POST is stored in flash memory.

1. Turn on your video monitor and system. After a few seconds, POST begins to run and a splash screen is displayed.

2. While the splash screen is displayed, you can either:

    • Press <F2> to enter the BIOS Setup (see "Using BIOS Setup" on page 38)

    OR

    • press <Esc> to change the boot device priority for this boot only (see "Changing the Boot Device Priority Temporarily" on page 63).

3. After pressing <F2> or <Esc> during POST, you can press <Ctrl+A> to run the SCSI*Select* Utility. For more information, see "Running the SCSISelect Utility" on page 64.

4. If you do not press <F2> or <Esc> and do not have a device with an operating system loaded, the boot process continues and the system beeps once. The following message is displayed:

    ```
    Operating System not found
    ```

5. At this time, pressing any key causes the system to attempt a reboot. The system searches all removable devices in the order defined by the boot priority.

6. If you want to boot from a hard drive loaded with an operating system, make sure that the hard drive is installed and push the Reset button on the front panel.

Using BIOS Setup

This section describes the BIOS Setup options. Use Setup to change the system configuration defaults. You can run Setup with or without an operating system being present. Setup stores most of the configuration values in battery-backed CMOS; the rest of the values are stored in flash memory. The values take effect when the system is booted. POST uses these values to configure the hardware; if the values and the actual hardware do not agree, POST generates an error message. You must then run Setup to specify the correct configuration.

Run Setup: Run Setup to modify any standard PC-AT baseboard feature such as:

- Select diskette drive

- Select parallel port

- Select serial port

- Set time/date (to be stored in RTC)

- Configure hard drive(s)

- Specify boot device sequence

- Enable SCSI BIOS

Run SSU, not Setup: Run the SSU instead of Setup to do the following:

- Enter or change information about a board

- Alter system resources (for example, interrupts, memory addresses, I/O assignments) to user-selected choices instead of choices selected by the BIOS resource manager

Starting Setup

Setup can be entered under several conditions:

- When you turn on the system, after POST completes the memory test.

- When you reboot the system by pressing <Ctrl+Alt+Del> while at the DOS operating system prompt.

- When you have moved the CMOS jumper on the baseboard to the "Clear CMOS" position (enabled); for a step-by-step procedure, see the *1450 Server Maintenance Guide*.

In the preceding three conditions, the following prompt is displayed:

```
Press <F2> to enter SETUP
```

In a fourth condition, when CMOS/NVRAM has been corrupted, the following prompts are displayed, but not the <F2> prompt:

```
Warning: cmos checksum invalid
```

```
Warning: cmos time and date not set
```

In this condition, the BIOS loads default values for CMOS and attempts to boot.

Setup Menus

Setup has six major menus and several submenus:

1. Main Menu

   - Primary IDE Master and Slave Adapters

   - Processor Settings Information

2. Advanced Menu

   - PCI Configuration

   – Embedded Video Controller

   – Embedded Legacy SCSI

   – Embedded Dual Ultra 160 SCSI

   – Embedded NIC

   – PCI Devices, Slots 1 - 8

   – Hot-Plug PCI Control

   - Integrated Peripheral Configuration

   - Advanced Chipset Control

3. Security Menu

    *   Passwords

    *   Lockout Features

4. Server Menu

    *   System Management

    *   Console Redirection

    *   EMP Configuration

    *   PEP Management

5. Boot Menu

    *   Boot Device Priority

    *   Hard Drive

    *   Removable Devices Selections

6. Exit Menu

Table 3-3 shows the keys used to navigate through the Setup menus and submenus.

Table 3-3   Navigation Keys

To:	Press:
Get general help	<F1> or <Alt+H>
Move between menus	← →
Go to the previous item	¦¦↑
Go to the next Item	↓
Change the value of an item	+ or -
Select an item or display a submenu	<Enter>
Leave a submenu or exit Setup	<Esc>
Reset to Setup defaults	<F9>
Save and exit Setup	<F10>

See Table 3-4 if an option is shown but you cannot select or move the option.

Table 3-4   Selecting Options

When you see this:	What it means:
On screen, an option is shown but you cannot select it or move to that field.	You cannot change or configure the option in that menu screen for one of the following reasons:
	The option is auto-configured or auto-detected.
	You must use a different Setup screen to change it.
	You must use the SSU.
On screen, the phrase `Press Enter` appears next to the option.	Press <Enter> to display a submenu that is either a separate full-screen menu or a pop-up menu with one or more choices.

The rest of this section lists the features that display on screen after you press <F2> to enter Setup. Not all of the option choices are described, because (1) a few are not user-selectable but are displayed for your information, and (2) many of the choices are relatively self-explanatory.

Main Menu

Table 3-5 lists the selections you can make on the Main Menu itself. Use the submenus for other selections. Default values are in bold.

Table 3-5   Main Menu

Feature	Choices	Description
System Time	HH:MM:SS	Sets the system time.
System Date	MM/DD/YYYY	Sets the system date.
Legacy Diskette A:	Disabled **1.44/1.25 MB 3.5 in.** 2.88 MB 3.5 in.	Selects the diskette type.
Legacy Diskette B:	**Disabled** 1.44/1.25 MB 3.5 in. 2.88 MB 3.5 in.	Selects the diskette type.

Table 3-5   Main Menu

Feature	Choices	Description
Primary IDE Master	N/A	Enters submenu.
Primary IDE Slave	N/A	Enters submenu.
Processor Settings	N/A	Enters submenu.
Language	**English (US)** French Spanish German Italian Japanese (Kanji)	Selects which language BIOS displays. **NOTE**: Serial redirection does not work with Kanji.

Primary IDE Master and Slave Submenu

In the following table, the features other than "Type" appear only for Type Auto if a drive is detected.

Table 3-6   Primary IDE Master and Slave Submenu

Feature	Choices	Description
Type	User **Auto** CD-ROM ATAPI Removable	User allows the manual entry of all fields described below. Auto allows the system to attempt auto-detection of the drive type. CD-ROM allows the manual entry of fields described below.
Multi-Sector Transfers	**Disabled** 2, 4, 8, or 16 sectors	Determines the number of sectors per block for multisector transfers. For Type Auto, this field is informational only.
LBA Mode Control	**Disabled** Enabled	For Type Auto, this field is informational only.
32 Bit I/O	**Disabled** Enabled	Enabling allows 32-bit IDE data transfers. For Type Auto, this field is informational only.

Table 3-6   Primary IDE Master and Slave Submenu

Feature	Choices	Description
Transfer Mode	**Standard** Fast PIO 1 Fast PIO 2 Fast PIO 3/DMA 1 Fast PIO 4/DMA 2	Selects the method for moving data to and from the drive. For Type Auto, this field is informational only.
Ultra DMA Mode	**Disabled** Enabled	For use with Ultra DMA drives. Ultra DMA is disabled by default to work around a chipset erratum. For Type Auto, this field is informational only.

Processor Settings Submenu

Table 3-7   Processor Settings Submenu

Feature	Choices	Description
Processor Retest	**No** Yes	Select yes for the BIOS to clear historical processor status and retest all processors on the next boot.
Processor Serial Number	**Enabled** Disabled	If enabled, the system records the serial number of each processor.
Memory Cache	**Enabled** Disabled	Controls cacheability. For debugging purposes only.
Measured Processor Speed	N/A	Reports the speed of Processor 1.
Processor 1 CPU ID	N/A	Reports Stepping for Processor 1.
Processor 1 L2 Cache Size	N/A	Reports L2 Cache Size for Processor 1. This feature is hidden if processor 1 is absent or disabled.
Processor 2 CPU ID	N/A	Reports Stepping for Processor 2.
Processor 2 L2 Cache Size	N/A	Reports L2 Cache Size for Processor 2. This feature is hidden if processor 2 is absent or disabled.
Processor 3 CPU ID	N/A	Reports Stepping for Processor 3.
Processor 3 L2 Cache Size	N/A	Reports L2 Cache Size for Processor 3. This feature is hidden if processor 3 is absent or disabled.
Processor 4 CPU ID	N/A	Reports Stepping for Processor 4.
Processor 4 L2 Cache Size	N/A	Reports L2 Cache Size for Processor 4. This feature is hidden if processor 4 is absent or disabled.

Advanced Menu

You can make the following selections on the Advanced Menu itself. See the following submenu tables for information on a particular submenu.

Table 3-8   Advanced Menu

Feature	Choices	Description
PCI Configuration	N/A	Enters submenu.
Integrated Peripheral Configuration	N/A	Enters submenu.
Advanced Chipset Control	N/A	Enters submenu.
Reset Configuration Data	**No** Yes	Select Yes to clear the system configuration data during next boot. System automatically resets to No in next boot.
Enable Sleep Button	**Yes** No	If Yes, the ACPI sleep button is activated.
System Wake-up Feature	Enabled **Disabled**	If enabled, the system will be powered up upon receiving a LAN wake-up event, ring on COM1/COM2, or PME interrupt from a PCI board.
Delay on Option ROMs	Enabled **Disabled**	Enables a short delay after an Option ROM scan.

PCI Configuration Submenu

The PCI Configuration submenu contains selections that access other submenus.

Embedded Video Controller Submenu

Table 3-9   Embedded Video Controller Submenu

Feature	Choices	Description
Embedded Video Controller	**Enabled** Disabled	Enables the embedded video controller.

Embedded Legacy SCSI Submenu

Table 3-10   Embedded Legacy SCSI Submenu

Feature	Choices	Description
Embedded Legacy SCSI	**Enabled** Disabled	Enables or disables embedded legacy SCSI controller hardware.
Option ROM Scan	**Enabled** Disabled	Initializes the device expansion ROM on the device.
Latency Timer	Default 020h **040h** 060h 080h 0A0h 0C0h 0E0h	Minimum guaranteed time, in units of PCI bus clocks, that a device can be master on a PCI bus. Typically, option ROM code overwrites the value set by the BIOS.

Embedded Dual Ultra 160 SCSI Submenu

Table 3-11   Embedded Dual Ultra 160 SCSI Submenu

Feature	Choices	Description
Embedded Legacy SCSI	**Enabled** Disabled	Enables or disables embedded legacy SCSI controller hardware.
Option ROM Scan	**Enabled** Disabled	Initializes the device expansion ROM on the device.
Latency Timer	Default 020h **040h** 060h 080h 0A0h 0C0h 0E0h	Minimum guaranteed time, in units of PCI bus clocks, that a device can be master on a PCI bus. Typically, option ROM code overwrites the value set by the BIOS.

Embedded NIC Submenu

Table 3-12   Embedded NIC Submenu

Feature	Choices	Description
Embedded NIC	**Enabled** Disabled	If enabled, the system uses the embedded NIC.

PCI Device, Slot 1

Table 3-13   PCI Device, Slot 1 Submenu

Feature	Choices	Description
Option ROM Scan	**Enabled** Disabled	Initializes device expansion ROM.
Enable Master	**Enabled** Disabled	Enables the selected device as a PCI bus master.
Latency Timer	Default 020h **040h** 060h 080h 0A0h 0C0h 0E0h	Minimum guaranteed time, in units of PCI bus clocks, that a device can be master on a PCI bus. Typically, option ROM code overwrites the value set by the BIOS.

PCI Device, Slot 2

Table 3-14   PCI Device, Slot 2 Submenu

Feature	Choices	Description
Option ROM Scan	**Enabled** Disabled	Initializes device expansion ROM.

Table 3-14   PCI Device, Slot 2 Submenu

Feature	Choices	Description
Enable Master	**Enabled** Disabled	Enables the selected device as a PCI bus master.
Latency Timer	Default 020h **040h** 060h 080h 0A0h 0C0h 0E0h	Minimum guaranteed time, in units of PCI bus clocks, that a device can be master on a PCI bus. Typically, option ROM code overwrites the value set by the BIOS.

PCI Device, Slot 3

Table 3-15   PCI Device, Slot 3 Submenu

Feature	Choices	Description
Option ROM Scan	**Enabled** Disabled	Initializes device expansion ROM.
Enable Master	**Enabled** Disabled	Enables the selected device as a PCI bus master.
Latency Timer	Default 020h **040h** 060h 080h 0A0h 0C0h 0E0h	Minimum guaranteed time, in units of PCI bus clocks, that a device can be master on a PCI bus. Typically, option ROM code overwrites the value set by the BIOS.

PCI Device, Slot 4

Table 3-16   PCI Device, Slot 4 Submenu

Feature	Choices	Description
Option ROM Scan	**Enabled** Disabled	Initializes device expansion ROM.
Enable Master	**Enabled** Disabled	Enables the selected device as a PCI bus master.
Latency Timer	Default 020h **040h** 060h 080h 0A0h 0C0h 0E0h	Minimum guaranteed time, in units of PCI bus clocks, that a device can be master on a PCI bus. Typically, option ROM code overwrites the value set by the BIOS.

PCI Device, Slot 5

Table 3-17   PCI Device, Slot 5 Submenu

Feature	Choices	Description
Option ROM Scan	**Enabled** Disabled	Initializes device expansion ROM.

Table 3-17 PCI Device, Slot 5 Submenu

Feature	Choices	Description
Enable Master	**Enabled** Disabled	Enables the selected device as a PCI bus master.
Latency Timer	Default 020h **040h** 060h 080h 0A0h 0C0h 0E0h	Minimum guaranteed time, in units of PCI bus clocks, that a device can be master on a PCI bus. Typically, option ROM code overwrites the value set by the BIOS.

PCI Device, Slot 6

Table 3-18 PCI Device, Slot 6 Submenu

Feature	Choices	Description
Option ROM Scan	**Enabled** Disabled	Initializes device expansion ROM.
Enable Master	**Enabled** Disabled	Enables the selected device as a PCI bus master.
Latency Timer	Default 020h **040h** 060h 080h 0A0h 0C0h 0E0h	Minimum guaranteed time, in units of PCI bus clocks, that a device can be master on a PCI bus. Typically, option ROM code overwrites the value set by the BIOS.

PCI Device, Slot 7

Table 3-19   PCI Device, Slot 7 Submenu

Feature	Choices	Description
Option ROM Scan	**Enabled** Disabled	Initializes device expansion ROM.
Enable Master	**Enabled** Disabled	Enables the selected device as a PCI bus master.
Latency Timer	Default 020h **040h** 060h 080h 0A0h 0C0h 0E0h	Minimum guaranteed time, in units of PCI bus clocks, that a device can be master on a PCI bus. Typically, option ROM code overwrites the value set by the BIOS.

PCI Device, Slot 8

Table 3-20   PCI Device, Slot 8 Submenu

Feature	Choices	Description
Option ROM Scan	**Enabled** Disabled	Initializes device expansion ROM.

Table 3-20   PCI Device, Slot 8 Submenu

Feature	Choices	Description
Enable Master	**Enabled** Disabled	Enables the selected device as a PCI bus master.
Latency Timer	Default 020h **040h** 060h 080h 0A0h 0C0h 0E0h	Minimum guaranteed time, in units of PCI bus clocks, that a device can be master on a PCI bus. Typically, option ROM code overwrites the value set by the BIOS.

Hot-Plug PCI Control Submenu

Note: At this time, the Linux operating system does not support use of the PCI Hot-Plug (PHP) feature. If you are running Linux, your system must be turned off before installing or removing PCI boards. Windows 2000 requires drivers that are PHP compatible in order to use the PHP feature.

Table 3-21   Hot-Plug PCI Control Submenu

Feature	Choices	Description
Hot-Plug PCI BIOS Support	Enabled **Disabled**	If enabled, the system uses resource padding and the Hot-Plug resource table.
Resource Padding Level	**Disabled** Minimum Maximum	Determines amount of resources used by each Hot-Plug PCI slot.
Empty Bus Default Speed	**33 MHz** 66 MHz	Unoccupied bus default speed.

Integrated Peripheral Configuration Submenu

Table 3-22   Integrated Peripheral Configuration Submenu

Feature	Choices	Description
COM1:	Disabled **Enabled** Auto OS Controlled	If set to Auto, BIOS configures the port. If set to OS Controlled, the OS configures the port.
Base I/O Address	**3F8h** 2F8h 3E8h 2E8h	Selects the base I/O address for COM port A.
Interrupt	**IRQ 4** IRQ 3	Selects the IRQ for COM port A.
COM2:	Disabled **Enabled** Auto OS Controlled	If set to Auto, BIOS configures the port. If set to OS Controlled, the OS configures the port.
Base I/O Address	3F8h **2F8h** 3E8h 2E8h	Selects the base I/O address for COM port B.
Interrupt	IRQ 4 **IRQ 3**	Selects the interrupt for COM port B.
Parallel Port	Disabled **Enabled** Auto OS Controlled	If set to Auto, BIOS configures the port. If set to OS Controlled, the OS configures the port.
Mode	Output only Bidirectional EPP **ECP**	Selects mode for the parallel port.

Table 3-22   Integrated Peripheral Configuration Submenu

Feature	Choices	Description
Base I/O Address	**378** 278	Selects the base I/O address for parallel port.
Interrupt	IRQ 5 **IRQ 7**	Selects the interrupt for the parallel port.
DMA Channel	DMA 1 **DMA 3**	Selects the DMA channel for the parallel port.
Floppy Disk Controller	**Enabled** Disabled	If enabled, the system enables the floppy disk controller.

Advanced Chipset Control Submenu

Table 3-23   Advanced Chipset Control Submenu

Feature	Choices	Description
Base RAM Step	**1 MB** 1 KB Every location	Selects the size of step to use during Base RAM tests.
Extended RAM Step	**1 MB** 1 KB Every location No Memory Test	Selects the size of step to use during Extended RAM tests.
Remap Memory	Enable **Disable**	Enables or disables remapping some amount of memory lost to PCI devices. This is an advanced feature. Consult the technical product specification before changing this option.

Security Menu

You can make the following selections on the Security Menu. Enabling the Supervisor Password field requires a password for entering Setup. The passwords are not case sensitive.

Table 3-24　　Security Menu

Feature	Choices	Description
User Password is	**Clear** Set	Status only; user cannot modify. Once set, this can be disabled by setting it to a null string or by clearing the password jumper on the baseboard (see the *1450 Server Maintenance Guide*).
Administrator Password is	**Clear** Set	Status only; user cannot modify. Once set, this can be disabled by setting it to a null string or by clearing the password jumper on the baseboard (see the *1450 Server Maintenance Guide*).
Set User Password	Press Enter	When the Enter key is pressed, the user is prompted for a password; press Esc key to abort. Once set, this can be disabled by setting it to a null string or by clearing the password jumper on the baseboard (see the *1450 Server Maintenance Guide*).
Set Administrative Password	Press Enter	When the Enter key is pressed, the user is prompted for a password; press the Esc key to abort. Once set, this can be disabled by setting it to a null string or by clearing the password jumper on the baseboard (see the *1450 Server Maintenance Guide*).
Password on Boot	**Disabled** Enabled	If enabled and the user password is set, the system prompts the user for a password before the system boots.
Fixed Disk Boot Sector	**Normal** Write Protect	Write-protects the boot sector on the hard disk to protect against viruses.
Secure Mode Timer	Disabled **1**, 2, 5, 10, or 20 min. 1 or 2 hr.	Period of keyboard or PS/2 mouse inactivity specified for secure mode to activate. A password is required for secure mode to function. Cannot be enabled unless at least one password is enabled.

Table 3-24   Security Menu

Feature	Choices	Description
Secure Mode Hot Key (Ctrl+Alt+)	[ ] [A, B, ..., Z] [0 - 9]	Key assigned to invoke the secure mode feature. Cannot be enabled unless at least one password is enabled. Can be disabled by entering a new key followed by a backspace or by pressing the delete key.
Secure Mode Boot	**Disabled** Enabled	System boots in secure mode. The user must enter a password to unlock the system. Cannot be enabled unless at least one password is enabled.
Video Blanking	**Disabled** Enabled	Blank video when secure mode is activated. The user must enter a password to unlock the system. Cannot be enabled unless at least one password is enabled.
Floppy Write Protect	**Disabled** Enabled	When secure mode is activated, the diskette drive is write protected. The user must enter a password to re-enable diskette writes. Cannot be enabled unless at least one password is enabled.

Server Menu

You can make the following selections on the Server Menu itself. See the following submenu tables for information on a particular submenu.

Table 3-25   Server Menu

Feature	Choices	Description
System Management	N/A	Enters submenu.
Console Redirection	N/A	Enters submenu.
EMP Configuration	N/A	Enters submenu.
PEP Management	N/A	Enters submenu.
Service Boot	Enable **Disable**	
Service Partition Type	[0 - 999]	

Table 3-25   Server Menu

Feature	Choices	Description
System Event Logging	Disabled **Enabled**	Enabled forces BIOS and BMC to log system events.
Clear Event Log	**No** Yes	If Yes, the System Event log is cleared.
Assert NMI on PERR	**Disabled** Enabled	If enabled, PCI bus parity error (PERR) is enabled and is routed to NMI.
Assert NMI on SERR	Disabled **Enabled**	If enabled, PCI bus system error (SERR) is enabled and is routed to NMI.
FRB-2 CPU Policy	**Disable BSP** Do not disable BSP	What action to take when FRB-2 occurs.

System Management Submenu

Table 3-26   System Management Submenu

Feature	Choices	Description
Board Part Number	N/A	Information field only
Board Serial Number	N/A	Information field only
System Part Number	N/A	Information field only
System Serial Number	N/A	Information field only
Chassis Part Number	N/A	Information field only
Chassis Serial Number	N/A	Information field only
BMC Revision	N/A	Information field only
Primary HSBP Revision	N/A	Information field only

Console Redirection Submenu

Table 3-27   Console Redirection Submenu

Feature	Choices	Description
COM Port Address: Redirection disabled	**Disabled** 3F8 2F8 3E8	When enabled, Console Redirection uses the I/O port specified. When disabled, Console Redirection is completely disabled.
IRQ #	3 or 4	When Console Redirection is enabled, this displays the IRQ assigned per the address chosen in the COM Port Address field.
Baud Rate	9600 **19.2k** 38.4k 115.2k	When Console Redirection is enabled, use the baud rate specified. When the Direct Platform Control (DPC) shares the COM port as console redirection, the baud rate must be set to 19.2k to match DPC baud rate, unless the autobaud feature is used.
Flow Control	No flow control CTS/RTS XON/XOFF **CTS/RTS + CD**	Disallows flow control. CTS/RTS is hardware-based flow control. XON/XOFF is software flow control. CTS/RTS +CD is hardware-based plus carrier-detect flow control. When DPC is sharing the Com port as Console Redirection, the flow control must be set to XON/XOFF or CTS/RTS+CD depending on whether a modem is used.

EMP Configuration Submenu

Table 3-28   EMP Configuration Submenu

Feature	Choices	Description
EMP Password Switch	**Disabled** Enabled	Disables EMP password.
EMP ESC Sequence	**+++ or other text**	Escape string for the modem EMP port.
EMP Hang-up Line String	**ATH** or other text	Hang-up string for the modem EMP port.
Modem Init String	**ATE1Q0V1X4&D 0S0=0 or other text**	20 characters to set up the modem.
EMP Access Mode	**Pre-Boot Only** Always Active Disabled	Establishes EMP access mode.
EMP Restricted Mode Access	Disabled **Enabled**	Enables/Disables EMP Restricted Mode Access.
EMP Direct Connect/Modem Mode	Direct Connect **Modem Mode**	Establishes connection for EMP port.
System Phone Number	[Phone number]	Phone number of system you are dialing into.

PEP Management Submenu

Table 3-29   PEP Management Submenu

Feature	Choices	Description
PEP Filter Events	N/A	Enters Submenu with a single feature listed. If the feature is enabled, all triggers for PEP are enabled.
PEP Enable	Enable **Disable**	Enables PEP.

Table 3-29   PEP Management Submenu

Feature	Choices	Description
PEP Blackout Period	**[0 - 255]**	Time in minutes between consecutive pages. Entering 0 disables paging.
PEP Page String	[Phone number]	
Send Test Page	**<Enter>**	Press <Enter> to send a test page.

Boot Menu

You can make the following selections on the Boot Menu itself.

Table 3-30   Boot Menu

Feature	Choices	Description
Boot-Time Diagnostic Screen	**Disabled** Enabled	If enabled, the system displays the diagnostic screen during the boot process.
Boot Device Priority	N/A	Enters submenu.
Hard Drive	N/A	Enters submenu.
Removable Devices	N/A	Enters submenu.
Maximum umber of I2O Drives	**1** 4	Selects the maximum number of I2O drives assigned a DOS drive letter.

Boot Device Priority Submenu

Use the up or down arrow keys to select a device. Press the <+> or <-> keys to move the device higher or lower in the boot priority list.

Table 3-31   Boot Device Priority Submenu

Boot Priority	Device	Description
1.	Removable Devices	Attempts to boot from a removable media device.
2.	Hard Drive	Attempts to boot from a hard drive device.

Table 3-31   Boot Device Priority Submenu

Boot Priority	Device	Description
3.	ATAPI CD-ROM Drive	Attempts to boot from an ATAPI CD-ROM drive.
4.	UND1, PXE-2.0	Wired for Management WFM 2.0 Specification.

Hard Drive Submenu

For options on this menu, use the up or down arrow keys to select a device. Press the <+> or <-> keys to move the device higher or lower in the boot priority list.

Table 3-32   Hard Drive Submenu

Option	Description
1. Drive #1 (or actual drive string) 2. Other bootable cards (additional entries for each drive that has a PnP header)	Other bootable cards cover all the boot devices that are not reported to the system BIOS through BIOS Boot Specification mechanisms. It may or may not be bootable, and may not correspond to any device.

Removable Devices Selection Submenu

For options on this menu, use the up or down arrow keys to select a device.

Table 3-33   Removable Devices Selection Submenu

Feature	Option	Description
Lists bootable removable devices in the system.	+/-	This list includes legacy 1.44 MB floppy drives and 120 MB floppy drives.

Exit Menu

You can make the following selections on the Exit Menu. Select an option using the up or down arrow keys. Press <Enter> to run the option. Pressing <Esc> does not exit this menu. You must select one of the items from the menu or menu bar to exit.

Table 3-34   Exit Menu

Choices	Description
Exit Saving Changes	Exits and saves changes to CMOS.
Exit Discarding Changes	Exits without saving changes to CMOS. User is prompted if any of the Setup fields were modified.
Load Setup Defaults	Loads default values for all Setup data.
Save Custom Defaults	Loads settings from custom defaults.
Discard Changes	Reads previous values of all Setup data from CMOS.
Save Changes	Saves Setup data to CMOS.

Changing the Boot Device Priority Temporarily

During POST, you can use the following procedure to change the boot device priority for the current boot process. The changes made during this instruction set are not retained for the next boot process.

1. Boot the server.

2. At any time during POST, press <Esc>. When POST completes, a pop-up Boot menu is displayed.

3. Use the arrow keys to highlight the device you want the server system to boot from first. For example, if you want the server system to boot from the CD-ROM first, you select CD-ROM Drive.

    Note: One of the selections on the pop-up Boot menu is Enter Setup. Selecting this option brings you into the BIOS setup. For more information about the BIOS setup, see "Using BIOS Setup" on page 38.

4. Press <Enter>.

5. The bootup process continues. When finished, a system prompt is displayed.

Changing the Boot Device Priority Permanently

You can use the following procedure to change the boot device permanently. Until you change the boot device priority again using this same procedure, the boot device priority does not change.

1. Quickly press the <F2> key. A prompt may or may not appear. After a few bootup tests complete, the main BIOS Setup screen appears.

2. From the Setup screen, select Boot Menu. Press <Enter>.

3. Select Boot Device Priority and press <Enter>.

4. In the Boot Device Priority screen, use the up or down arrow keys to select ATAPI CD-ROM Drive, or the appropriate SCSI CD-ROM drive, then press the <+> key to move it to the top of the list.

5. Now set the second boot device to Diskette Drive and the third boot device to Hard Drive.

6. Press the <F10> key to save your changes and exit Setup.

7. When the Exit prompt appears, press <Enter> again.

8. The bootup process continues. When finished, an operating system prompt is displayed.

9. Make sure the CD is in the drive, and boot the server.

Running the SCSI*Select* Utility

Each host adapter includes an onboard SCSI*Select* configuration utility that allows you to configure, and view the settings of the host adapters and devices in the server.

After pressing <F2> or <Esc> during POST, the splash screen is replaced by text.

The system first finds the Adaptec AIC-7880 SCSI host adapter and displays the message `Adaptec AIC-7880 SCSI BIOS V x.xxx`, where `x.xxx` is the version number of the SCSI*Select* utility. Pressing <Ctrl+A> at this time allows you to configure the Adaptec AIC-7880 SCSI host adapter.

If you do not press <Ctrl+A>, the system finds the Adaptec AIC-7899 SCSI host adapter and displays the message Adaptec `AIC-7899 SCSI BIOS V x.xxx` where `x.xxx` is the version number of the SCSI*Select* utility. Pressing <Ctrl+A> at this time allows you to configure the Adaptec AIC-7899 SCSI host adapter.

Once you enter the configuration menus for one of the host adapters, you cannot switch to the other adapter. For example, once you press <Ctrl+A> to configure the Adaptec AIC-7899 SCSI host adapter, you have to reboot the system to configure the Adaptec AIC-7880 SCSI host adapter.

When to Run the SCSI*Select* Utility

Use the SCSI*Select* utility to:

- Change default values.

- Check and/or change SCSI device settings that may conflict with those of other devices in the server.

- Perform a low-level formatting on SCSI devices installed in the server.

Starting the SCSI*Select* Utility

To start the SCSI*Select* Utility, perform the following steps:

1. When the following message appears on the video monitor, press <Ctrl + A>.

   `<<<Press <Ctrl><A> for SCSISelect(TM) Utility!>>>`

2. When the main menu for the host adapter appears, choose the adapter that you want to configure. Each SCSI bus accepts up to 15 devices.

Use the following keys to navigate through the menus and submenus.

Table 3-35   Navigation Keys

Press	To
Esc	Exit the utility
Enter	Select an option
↓↑	Return to a previous option

Table 3-35   Navigation Keys

Press	To
↓	Move to the next option
F5	Switch between color and monochrome
F6	Reset to host adapter defaults

Configuring the Adaptec AIC-7880 SCSI Adapter

The following menu is displayed when you configure the Adaptec AIC-7880 SCSI adapter.

Table 3-36   Main Menu

Host Adapter	Option	Comment
AIC-7880 Ultra/Ultra W at Bus:Device 00:01h	Configure/View Host Adapter Settings	Press <Enter> to view the Configuration Menu.
	SCSI Disk Utilities	Press <Enter> to view the SCSI Disk Utilities Menu.

Make a selection and press <Enter>.

When you are finished, press <Esc> and make your selection from the following menu.

Table 3-37   Exit Menu

Feature	Option	Comment
Exit Utility?	Yes No	When you finish configuring your SCSI devices, select Yes and press <Enter>. When this message appears: `Please press any key to reboot` Press any key, and your server will reboot.

Configuring the Adaptec AIC-7899 SCSI Adapter

The Adaptec AIC-7880 SCSI adapter has two busses. Select the bus from the following menu.

Table 3-38   Main Menu

Menu Item	Options
You have an AIC-7899 adapter in your system. Move the cursor to the bus:device:channel of the one to be configured and press <Enter>.	Bus:Device:Channel 01:06:A 01:06:B
<F5> - Toggle color/monochrome	

After selecting the bus, the following menu is displayed.

Table 3-39   Menu for each SCSI Channel

Host Adapter	Option	Comment
AIC-7899 at Bus:Device:Channel 01:06:A (or 01:06:B)	Configure/View Host Adapter Settings	Press <Enter> to view the Configuration Menu.
	SCSI Disk Utilities	Press <Enter> to view the SCSI Disk Utilities Menu. This menu allows you to format hard disks and/or verify disk media.

When you are finished, press <Esc> and make your selection from the following menu.

Table 3-40   Exit Menu

Feature	Option	Comment
Exit Utility?	Yes **No**	When you finish configuring your SCSI devices, press <Esc>. Then select Yes and press <Enter>. When this message appears: `Please press any key to reboot` Press any key, and the server reboots.

Using the System Setup Utility (SSU)

The SSU is on the configuration software CD shipped with the server. The SSU provides a graphical user interface (GUI) over an extensible framework for server configuration. The SSU framework supports the following functions and capabilities:

- Assigns resources to baseboard devices and add-in boards before loading the operating system

- Specifies the boot device order and system security options

- Permits viewing and clearing of the system event log (SEL)

- Permits viewing of the system Field Replaceable Unit (FRU) and Sensor Data Record (SDR)

- Allows troubleshooting of the server when the operating system is not operational

- Provides a system-level view of the server's I/O devices

When to Run the SSU

The SSU is a DOS-based utility that supports extended system configuration operations for onboard resources and add-in boards. Use the SSU to:

- Add and remove boards affecting the assignment of resources (ports, memory, IRQs, DMA)

- Modify the server's boot device order or security settings

- Change the server configuration settings

- Save the server configuration

- View or clear the SEL

- View FRU information

- View the SDR table

The SSU is PCI 2.1 compliant and uses the information entered and provided by configuration registers and flash memory to specify a system configuration. The SSU then writes the configuration information to flash memory.

The SSU stores configuration values in flash memory. These values take effect when the server is booted. POST checks the values against the actual hardware configuration; if the

values do not agree, POST generates an error message. You must then run the SSU to specify the correct configuration before the server boots.

The SSU always includes a checksum with the configuration data so the BIOS can detect any potential data corruption before the actual hardware configuration takes place.

What You Need to Do

You can run the SSU directly from the configuration software CD after you have installed a CD-ROM drive, or from a set of diskettes.

If you choose to run the SSU from diskettes, create the SSU diskettes from the CD by following the instructions in "Creating SSU Diskettes" on page 70.

If the diskette drive is disabled or improperly configured, use the flash-resident Setup utility to enable it to use the SSU. If necessary, disable the drive after exiting the SSU. Information entered using the SSU overrides any entered using Setup.

Running the SSU Remotely

Running the SSU remotely requires a remote server with a LAN Desk Server Monitor Module 2 (SMM2) card and a local system with Remote Control software available.

When running the SSU remotely, the client SSU (CSSU) runs on the remote server. The CSSU controls the local server and uses the local server's SSU software.

The SMM2 card provides video memory, keyboard, and mouse redirection support for the remote server. The Remote Control console of the local system displays and sends video memory and user input to the remote server through either a modem or an Ethernet link. Because the CSSU runs exclusively on the remote server, any files required for the CSSU to run must be available on the remote server (on removable or non removable media).

If the local system is connected to the remote server through a network or modem, you can see the console of the local system, control the mouse, and control the keyboard from the remote server.

For more information, see the documentation accompanying your SMM2 card.

Creating SSU Diskettes

When creating SSU diskettes, the system copies the SSU from the CD to the diskettes.

To copy the SSU from the CD to diskettes, perform the following steps:

1. Make sure that the CD-ROM is the first bootable device for the system.

2. Place the CD in the CD-ROM drive and boot the system.

3. Use the arrow keys to highlight "Create Diskettes" and press <Enter>.

4. Make sure "Create Disk Sets by Device/Function" is highlighted and press <Enter>.

5. Make sure "System Setup Utility" is highlighted and press <Enter>.

6. The software prompts you to insert a blank diskette. Insert the diskette into the floppy drive.

7. After the system creates the diskette, remove it from the drive and label it "SSU Disk 1".

8. The software prompts you to insert another blank diskette. Insert the diskette into the floppy drive.

9. After the system creates the diskette, remove it from the drive and label it "SSU Disk 2".

Running the SSU

You can run the SSU from diskettes, a CD-ROM drive, or a hard drive.

Running the SSU from Diskettes

For best results, however, it is recommended that you execute the SSU from diskettes. Place the bootable diskette in the floppy drive. Typically, the floppy drive is recognized by the system as drive A. If the system is not set to boot from the floppy drive, change the boot priority. For more information, see "Changing the Boot Device Priority Temporarily" on page 63. After making sure that the system boots from the floppy drive, restart the system.

Once the system boots, a virtual drive is created. The System Setup Utility files are copied to the virtual drive and invoked.

Running the SSU from a CD

You can also run the SSU from a CD. Place the CD in the CD-ROM drive. If the system is not set to boot from the CD-ROM drive, change the boot priority. For more information, see "Changing the Boot Device Priority Temporarily" on page 63. After making sure that the system boots from the CD-ROM drive, restart the system. Run the file `SSU.BAT`.

Running the SSU from a Hard Drive

To run the SSU from a hard drive, first install the SSU software on the hard drive. To install the SSU software on the hard drive, insert either the diskette or CD into the floppy drive or CD-ROM drive respectively. Run the executable file called `SSIOMAGE.EXE`. If you are using diskettes, the executable file is on disk 1. When prompted, insert disk 2.

Lastly, run the file `SSU.BAT` on the hard disk. Note that the SSU does not function properly in a DOS window under another operating system.

FRU and SDR Load Utility

The Field Replaceable Unit (FRU) and Sensor Data Record (SDR) load utility is a DOS-based program used to update the server management subsystem's product level FRU, SDR, and the Desktop Management Interface (DMI) nonvolatile storage components (EEPROMs). The utility does the following:

- Discovers the product configuration based on instructions in a master configuration file

- Displays the FRU information

- Updates the EEPROM associated with the Baseboard Management Controller (BMC) that holds the SDR and FRU area

- Updates the DMI FRU area located in the BIOS nonvolatile storage device

- Generically handles FRU devices that might not be associated with the BMC

What You Need to Do

Run the utility either directly from the configuration software CD or from diskettes created from the CD.

If you run the FRUSDR Load Utility from a diskette, copy the utility from the CD. Follow the instructions in the included `README.TXT` file.

If the diskette drive is disabled, or improperly configured, use BIOS Setup to enable it. If necessary, disable the drive after you are done with the FRUSDR utility.

How You Use the FRUSDR Load Utility

The FRUSDR Load utility:

- Is compatible with ROM-DOS Ver. 6.22, MS-DOS Ver. 6.22, and later versions
- Accepts CFG, SDR, and FRU load files (the executable file for the utility is `frusdr.exe`)
- Requires the following supporting files
  - One or more `.fru` files describing the system's field replaceable units
  - A `.cfg` file describing the system configuration
  - An `.sdr` file describing the sensors in the system

Command Line Format

The basic command line format is

```
frusdr [-?] [-h] [-d {dmi, fru, sdr}] [-cfg filename.cfg] [-fru
filename.fru]
```

Table 3-41   Command Line Format

Command	Description
-? or -h	Displays usage information
-d {dmi, fru, sdr}	Displays requested area only
-cfg *filename*.cfg	Uses custom CFG file
-p	Pause between blocks of data

Parsing the Command Line

The FRUSDR load utility allows only one command line function at a time. A command line function can consist of two parameters. Example: `-cfg filename.cfg.` Invalid parameters cause an error message and the program to exit. You can use either a slash (/) or a minus sign (-) to specify command line options. The `-p` and flags can be used in conjunction with any of the other options.

Displaying a Given Area

When the utility is run with the `-d DMI`, `-d FRU`, or `-d SDR` command line flag, information about each area is read from memory and printed on the screen. Each area represents one sensor for each instrumented device in the server. If the given display function fails because of an inability to parse the data present or a hardware failure, the utility displays an error message and exits.

Using a Specified CFG File

The utility can be run with the command line parameter of `-cfg filename.cfg`. The filename variable can be any DOS-accepted, 8-character filename string. The utility loads the specified CFG file and uses the entries in that file to probe the hardware and to select the proper SDRs to load into nonvolatile storage.

Displaying Utility Title and Version

The utility displays its title:

```
FRU & SDR Load Utility, Version Y.Y, Revision X.XX
```

`Y.Y` is the version number and `X.XX` is the revision number for the utility.

Configuration File

The configuration file is in ASCII text. The utility executes commands formed by the strings present in the configuration file. These commands cause the utility to run tasks needed to load the proper SDRs into the nonvolatile storage of the BMC and possibly generic FRU devices. Some of the commands may be interactive and require you to make a choice.

Prompting for Product Level FRU Information

Through the use of a configuration file, the utility might prompt you for FRU information.

Filtering Records from the SDR File

The MASTER.SDR file has all the possible SDRs for the system. These records might need to be filtered based on the current product configuration. The configuration file directs the filtering of the SDRs.

Updating the SDR Nonvolatile Storage Area

After the utility validates the header area of the supplied SDR file, it updates the SDR repository area. Before programming, the utility clears the SDR repository area. The utility filters all tagged SDRs depending on the product configuration set in the configuration file. Non-tagged SDRs are automatically programmed. The utility also copies all written SDRs to the SDR.TMP file; it contains an image of what was loaded. The TMP file is also useful for debugging the server.

Updating FRU Nonvolatile Storage Area

After the configuration is determined, the utility updates the FRU nonvolatile storage area. First it verifies the common header area and checksum from the specified FRU file. The internal use area is read out of the specified .FRU file and is programmed into the nonvolatile storage. The chassis area is read out of the specified .FRU file. Finally, it reads the product area out of the specified FRU file, then the area is programmed into the FRU nonvolatile storage. All areas are also written to the FRU.TMP file.

Updating DMI FRU Nonvolatile Storage Area

After programming the BMC FRU area, the utility programs chassis, board, and product FRU information to the DMI fields, if the DMI flag follows each FRUAREA command in the configuration file.

Cleaning Up and Exiting

If an update was successfully performed, the utility displays a single message and then exits.

If the utility fails, it immediately exits with an error message and exit code.

Upgrading the BIOS

Preparing for the Upgrade

Before upgrading the BIOS, prepare for the upgrade by recording the current BIOS settings, obtaining the upgrade utility, and making a copy of the current BIOS.

Recording the Current BIOS Settings

Follow these steps to record the current BIOS settings:

1. Boot the computer and press <F2> when you see the splash screen.

2. Write down the current settings in the BIOS Setup program.

Note: If you are not familiar with BIOS settings for the system, make sure you complete step two. You need these settings to configure your computer at the end of the procedure.

Creating a Bootable Diskette

To create a bootable diskette, do the following:

1. Use a DOS system to create the diskette.

2. Insert a diskette in drive A.

3. At the C:\ prompt, for an unformatted diskette, type:

    ```
    format a:/s
    ```

    or, for a formatted diskette, type:

    ```
    sys a:
    ```

4. Press <Enter>

Creating the BIOS Upgrade Diskette

The BIOS upgrade file is a compressed self-extracting archive that contains the files you need to upgrade the BIOS.

1. Copy the BIOS upgrade file to a temporary directory on the hard disk.

2. From the `C:\` prompt, change to the temporary directory.

3. To extract the file, type the name of the BIOS upgrade file, for example:

    `10006BI1.EXE`

4. Press <Enter>. The extracted file contains the following files:

    `LICENSE.TXT`

    `README.TXT`

    `BIOS.EXE`

5. Read the `LICENSE.TXT` file, which contains the software license agreement, and the `README.TXT` file, which contains the instructions for the BIOS upgrade.

6. Insert the bootable diskette into drive A.

7. To extract the `BIOS.EXE` file to the diskette, change to the temporary directory that holds the `BIOS.EXE` file and type:

    `BIOS A:`

8. Press <Enter>.

9. The diskette now holds the BIOS upgrade and recovery files.

Upgrading the BIOS

1. Boot the computer with the floppy disk in drive A.

2. Type <1> and then press <Enter>.

3. When the utility is done updating the BIOS, the system reboots automatically. Remove the floppy from the floppy drive.

4. Press <F2> while the splash screen is displayed to enter the BIOS Setup program.

5. Load the Setup program defaults. To load the defaults, press <F9>. To accept the defaults, press <Enter>.

6. Clear the CMOS. See the *1450 Server Maintenance Guide*.

7. Turn off the computer and reboot.

8. If you need to change the BIOS settings, press <F2> while the splash screen is displayed to enter the Setup program.

Recovering the BIOS

It is unlikely that anything will interrupt the BIOS upgrade; however, if an interruption occurs, the BIOS could be damaged. The following steps explain how to recover the BIOS if an upgrade fails. The following procedure use recovery mode for the Setup program.

Note: Because of the small amount of code available in the nonerasable boot block area, there is no video support. You will not see anything on the screen during the procedure. Monitor the procedure by listening to the speaker and looking at the floppy drive LED.

1. Turn off all peripheral devices connected to the computer. Turn off the computer.

2. Remove the computer cover.

3. Locate jumper block J9F2.

4. Move the Recovery Boot jumper from pins 9-10 to pins 10-11. See the *1450 Server Maintenance Guide*.

5. Insert the bootable BIOS upgrade floppy disk into floppy drive A.

6. Replace the cover, turn on the computer, and allow it to boot. The recovery process will take a few minutes.

7. Listen to the speaker.

8. Two beeps indicate successful BIOS recovery.

9. A series of continuous beeps indicates failed BIOS recovery.

10. If recovery fails, return to step 1 and repeat the recovery process.

11. If recovery is successful, turn off the computer. Remove the computer cover and continue with the following steps.

12. Move the Recovery Boot jumper back to pins 9-10.

13. Replace the computer cover.

14. Follow the instructions for "Upgrading the BIOS" on page 75.

Changing the BIOS Language

You can use the BIOS upgrade utility to change the language BIOS displays. Use a bootable diskette containing the flash utility and language files (see "Creating a Bootable Diskette" on page 75).

Using the Firmware Update Utility

The Firmware Update Utility is a DOS-based program used to update the BMC's firmware code. You need to run the utility only if new firmware code is necessary.

Running the Firmware Update Utility

1. Create a DOS-bootable diskette. The version of DOS must be 6.0 or higher.

2. Place the firmware update utility (FWUPDATE.EXE) and the *.hex file on the diskette. Make a note of the *.hex file name, because you will need it later.

3. Insert the diskette into the drive and boot to it.

4. At the DOS prompt, run the executable file (FWUPDATE.EXE).

5. The utility displays a menu screen. Select "Upload Flash."

6. The utility asks for a file name. Enter the name of the *.hex file.

7. The program will load the file and then ask if it should upload boot code. Press "N" to continue.

8. The program next asks if it should upload operational code. Press "Y" to continue. The process of uploading operational code takes a few minutes.

9. Once the operational code has been updated and verified, press any key to continue. Then press <Esc> to exit the program.

10. Shut down the system and remove any diskettes in the system.

11. Disconnect the AC power cord from the system and wait 60 seconds.

12. Reconnect the AC power cord and power up the system.

Removing and Installing User Serviceable Components

This chapter describes how to remove and install user-serviceable components.

A user can remove and install hot-swappable SCSI hard drives and hot-pluggable PCI add-in boards. The term *hot-swap* describes the process of removing and installing a system component **without** shutting down the server. The term *hot-plug* describes the same process for PCI components only.

Note: At this time, the Linux operating system does not support use of the PCI Hot-Plug (PHP) feature. If you are running Linux, your system must be turned off before installing or removing PCI boards. Windows 2000 requires drivers that are PHP compatible in order to use the PHP feature.

Warning: **The total power requirement for the SGI 1450 server exceeds the 240 VA energy hazard limit that defines an operator-accessible area. Only qualified service technicians should access the processor, memory, power subsystem, and non hot-plug/hot-swap areas of the baseboard.**

Caution: Electrostatic discharge (ESD) and ESD protection: ESD can damage hard drives, add-in boards, and other components. This server can withstand normal levels of environmental ESD while you are hot-swapping SCSI hard drives. However, we recommend doing all procedures in this manual only at an ESD-protected workstation. If one is not available, provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground of the server—any unpainted metal surface—when handling components.

SCSI Hard drives

The SGI 1450 server supports Ultra 160 SCSI SCA type 10K RPM or slower hard drives that are 3.5 inches wide. Contact a sales representative or dealer for a list of approved SCSI devices.

Mounting a SCSI Hard Drive in a Carrier

1. Remove the 3.5-inch wide hard drive from its wrapper and place it on an antistatic surface.

2. Record the drive model and serial number in your equipment log (see "Equipment Log" on page 90).

3. Remove the carrier filler panel and save the screws. You will need them later in this procedure.

4. Orient the drive so the connector is near the top and rear of the drive carrier. Figure 4-1 shows the orientation of the drive in the carrier. The carrier is upside down in this figure.

5. Using the screws from step 3 or other screws of the correct size and length (not supplied), attach the carrier to the drive.
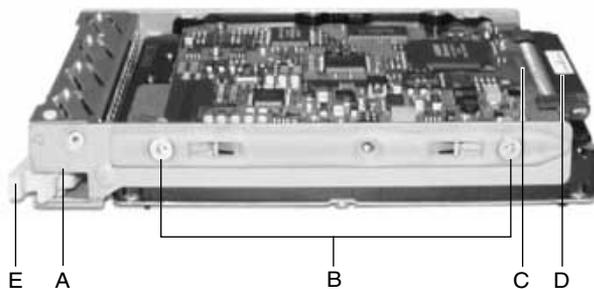
Figure 4-1   Hard Drive in Drive Carrier

A. Hard Drive Carrier

B. Two (of Four) Fasteners Used to Attach Drive to Carrier

C. Hard Drive

D. SCA2 Connector

E. Locking Handle

Removing a SCSI Hard drive

A bank of five LEDs on the front of the hard drive bays monitors the drive status of each drive in the hot-docking bay. Each LED corresponds directly to a drive, so that the left most LED shows activity in the left most drive. The LEDs and corresponding drives are numbered (left to right) zero to four. When a yellow LED for a hard drive is on continuously, you are permitted to hot-swap (replace) a bad drive with a good one. If the operating system installed supports hot-swapping hard drives, the system **does not** need to be powered off.

To remove a SCSI hard drive, perform the following steps:

1. Open the front bezel door by simultaneously pulling on the raised lip of the front bezel door and putting counter pressure on the bezel latch area. See Figure 4-2 for an illustration of the procedure.
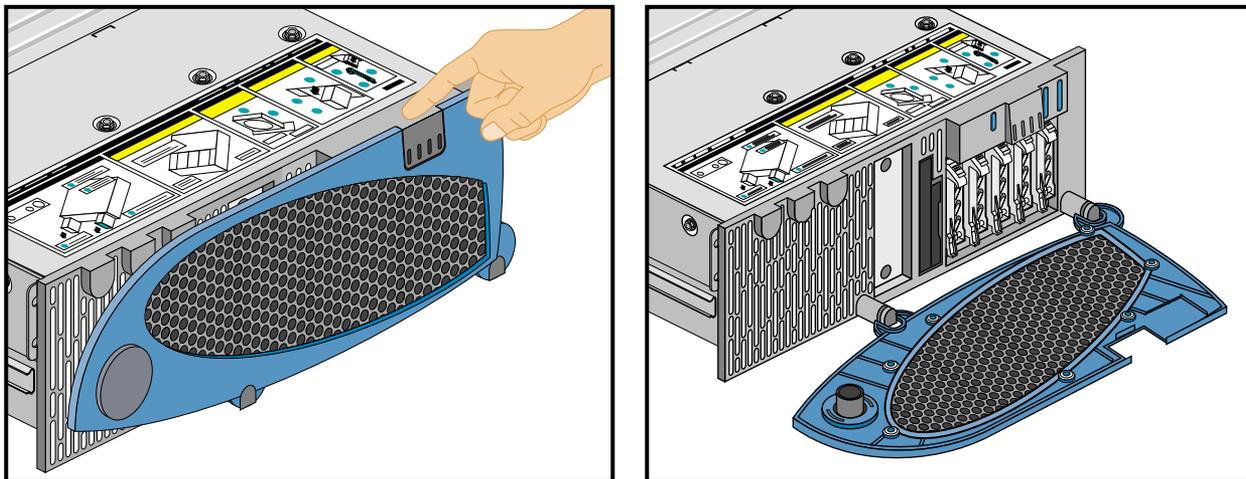
Figure 4-2   Opening the Front Bezel Door

2. Determine which drive needs to be removed. If necessary, use the LED states below to make this determination.

Table 4-1   Hard Drive LED State Status

LED State	Status
Solid green	The hard drive is present and powered on.
Flashing green	The hard drive is active.
Solid yellow	There is an asserted fault status on the hard drive.
Flashing yellow	A rebuild of the hard drive is in progress.
Off	The hard drive is not powered on.

3. Depress the handle lock with your thumb.

4. Gently pull the locking handle away from the chassis until the handle disengages.

5. Grasp the locking handle and pull it toward you to disengage the drive connector from the backplane connector. The locking handle is noted by "A" in Figure 4-3.

A
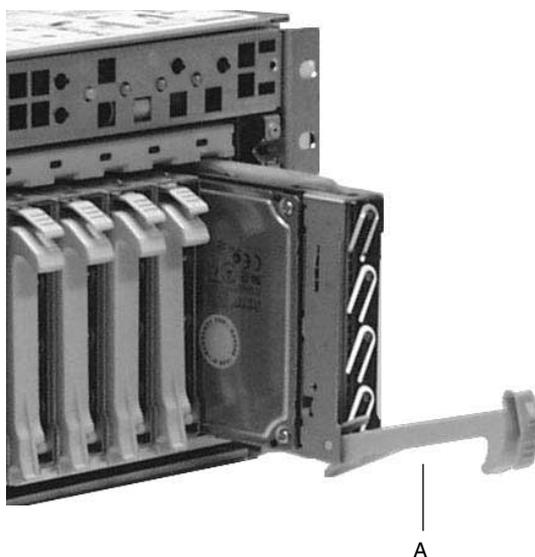
Figure 4-3   Disengaging Drive Carrier from Chassis

6. Carefully slide the drive out of the bay. Place the drive on an antistatic surface.

Installing a SCSI Hard Drive

A bank of five LEDs on the front of the hard drive bays monitors the drive status of each drive in the hot-docking bay. Each LED corresponds directly to a drive, so that the right most LED shows activity in the right most drive. The LEDs and corresponding drives are numbered (left to right) zero to four. When a yellow LED for a hard drive is on continuously, you are permitted to hot-swap (replace) a bad drive with a good one. If the operating system installed supports hot-swapping hard drives, the system **does not** need to be powered off.

To install a SCSI hard drive, perform the following steps:

1. Open the front bezel door by simultaneously pulling on the raised lip of the front bezel door and putting counter pressure on the bezel latch area. See Figure 4-2 on page 81 for an illustration of the procedure.

2. Position the new carrier and drive assembly so that it engages the bay guide rails.

3. Gently push the drive into the bay. Swing the locking handle towards the chassis. The locking handle engages the latch.

4. Close the front bezel door by pressing the door gently into the chassis.

Hot-Plug PCI Add-In Boards

The SGI 1450 server supports six hot-plug PCI add-in boards. The six slot openings (seen from the back of the system) are shown in Figure 1-7 on page 13.

Each hot-plug PCI add-in board is held in place by a PCI Hot-Plug (PHP) Retention mechanism (see Figure 4-4).

Note: At this time, the Linux operating system does not support use of the PCI Hot-Plug (PHP) feature. If you are running Linux, your system must be turned off before installing or removing PCI boards. Windows 2000 requires drivers that are PHP compatible in order to use the PHP feature.
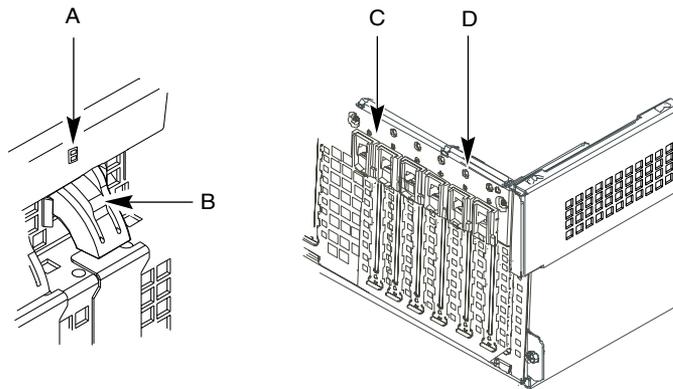
Figure 4-4   PCI Hot-Plug Retention Mechanism

A. Green and Amber LEDs

B. Press here on the inside of the chassis and then rotate to release the PCI board.

C. PCI Hot-plug Retention Mechanism from the outside of the chassis

D. HW push button

The rear of add-in boards is held in place by a rear retention latch only for full-length boards. See Figure 4-5 for an illustration of the rear retention latch.
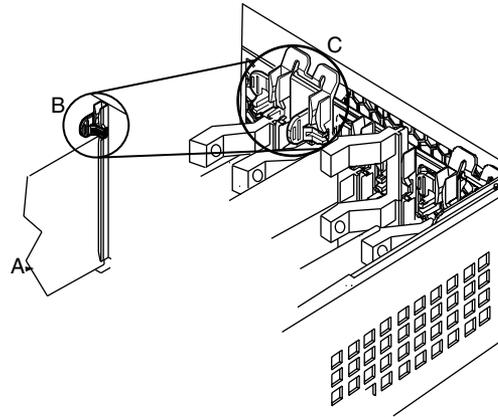
Figure 4-5   Rear Retention Latch

A. Hot-plug PCI add-in board

B. Close up of rear retention latch in the closed position

C. Rear retention latch in the closed position

Removing a Hot-Plug PCI Add-in Board

Warning: **If the system has been running, any installed PCI add-in board on the baseboard will be hot. To avoid the possibility of a burn, be careful when removing or installing baseboard components, especially those that are located near processors.**

Caution: Slot covers must be installed on all vacant expansion slots. This maintains the electromagnetic emissions characteristics of the system and ensures proper cooling of system components.

Note: At this time, the Linux operating system does not support use of the PCI Hot-Plug (PHP) feature. If you are running Linux, your system must be turned off before installing or removing PCI boards. Windows 2000 requires drivers that are PHP compatible in order to use the PHP feature.

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1. Observe the safety and ESD precautions at the beginning of this chapter.

2. Release the two thumbscrews located on the top rear of the chassis. One of two thumbscrews is noted by "A" in Figure 4-6.
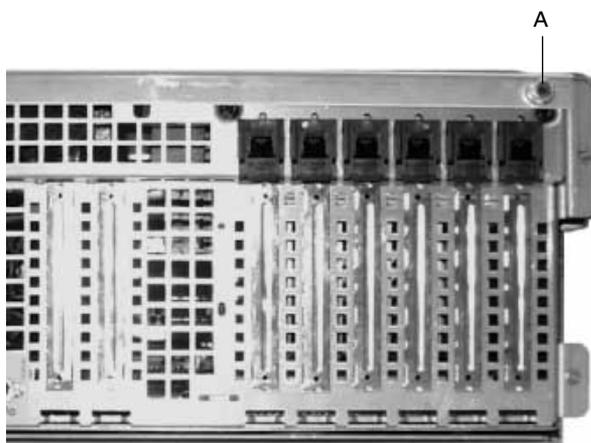
Figure 4-6   Top Cover Thumbscrew

3. Using an even pull, press lightly on the top cover and slide it back until it stops.

4. Lift the entire top cover upward away from the chassis.

5. Make sure that the slot is powered off. If the slot is powered on, turn the power to the slot off through the PCI Hot-Plug application on your system or through the HW push button.

6. Disconnect any cables attached to the board you are removing.

7. Press down on the PCI Hot-Plug (PHP) retention mechanism from inside the chassis. Rotate the mechanism outside the chassis and towards the bottom of the chassis. This action frees the card's faceplate. See Figure 4-4 on page 84.

8. If you are removing a full-length board, release the rear retention latch. See Figure 4-5 on page 85.

9. Remove the PCI board by pulling straight up.

10. Store board in an antistatic protective wrapper.

11. If you are not reinstalling a board in the same slot, install a slot cover over the vacant slot. The tapered foot of the cover must fit into the mating slot in the expansion slot frame.

12. Before replacing the top cover, check that no loose tools or parts were left inside the system.

13. Position the cover over the chassis so that the rows of tabs align with slots in the chassis. Slide the cover toward the front of the system until the tabs on the cover firmly engage in the chassis.

14. Attach the top cover to the chassis with the two thumbscrews released earlier and tighten them firmly.

15. Connect any external cables.

16. Running the SSU is optional after you remove a PCI add-in board.

Installing a Hot-Plug PCI Add-in Board

Warning: **If the system has been running, any installed PCI add-in board on the baseboard will be hot. To avoid the possibility of a burn, be careful when removing or installing baseboard components, especially those that are located near processors.**

Caution: Do not overload baseboard: Do not draw too much current from the baseboard by installing add-in boards that draw excessive current.

Caution: ESD and handling boards: Add-in boards can be extremely sensitive to ESD and always require careful handling. After removing the board from its protective wrapper or from the baseboard, place it component-side up on a grounded, static-free surface or conductive foam pad, if available. Do not slide the board over any surface.

Note: At this time, the Linux operating system does not support use of the PCI Hot-Plug (PHP) feature. If you are running Linux, your system must be turned off before installing or removing PCI boards. Windows 2000 requires drivers that are PHP compatible in order to use the PHP feature.

1. Observe the safety and ESD precautions at the beginning of this chapter and this procedure.

2. Release the two thumbscrews located on the top rear of the chassis. One of two thumbscrews is noted by "A" in Figure 4-6 on page 86.

3. Using an even pull, press lightly on the top cover and slide it back until it stops.

4. Lift the entire top cover upward away from the chassis.

5. Remove add-in board from its protective wrapper. Be careful not to touch the components or gold edge connectors. Place board component-side up on an antistatic surface.

6. Record the serial number of the add-in board in your equipment log (see "Equipment Log" on page 90).

7. Make sure that the slot is powered off. If the slot is powered on, turn the power to the slot off through the PCI Hot-Plug application on your system or through the HW push button.

8. Set jumpers or switches on the board according to the manufacturer's instructions.

9. Remove and save the expansion slot cover, if one was present.

10. Hold the add-in board by its top edge or upper corners. Firmly press it into an expansion slot on the baseboard. The tapered foot of the board-retaining bracket must fit into the mating slot in the expansion slot frame.

11. Press in the PCI Hot-plug (PHP) retention mechanism toward the back panel. This action locks the add-in board into place. See Figure 4-4 on page 84.

12. If you are installing a full-length board, lock the rear retention latch. See Figure 4-5 on page 85.

13. Use the screw removed earlier to fasten the new board to the chassis. Tighten the screw firmly (6.0 inch-pounds).

14. Attach cables if necessary.

15. Power on the add-in board through the PCI Hot-Plug application on your system or through the HW push button.

16. Check that no loose tools or parts were left inside the system.

17. Position the top cover over the chassis so that the rows of tabs align with slots in the chassis. Slide the cover toward the front of the system until the tabs on the cover firmly engage in the chassis.

18. Attach the top cover to the chassis with the two thumbscrews released earlier and tighten them firmly.

19. Connect any external cables.

Equipment Log

Use the blank equipment log provided here to record information about the system. Some of this information may be required when running the System Setup Utility (SSU).

Table 4-2   Equipment Log

Item	Manufacturer Name	Model Number	Serial Number	Date Installed
System				
Baseboard				
Processor speed and cache				
Processor speed and cache				
Processor speed and cache				
Processor speed and cache				
Video display				
Keyboard				
Mouse				
Diskette drive A				
Diskette drive B				
Tape drive				
CD-ROM drive				
Hard drive 1				
Hard drive 2				
Hard drive 3				
Hard drive 4				
Hard drive 5				

Table 4-2   Equipment Log

Item	Manufacturer Name	Model Number	Serial Number	Date Installed

Regulatory Specifications

This appendix presents information that may be important to the operation of your SGI server.

Manufacturer's Regulatory Declarations

The SGI 1450 server products conform to several national and international specifications and European Directives listed on the "Manufacturer's Declaration of Conformity." The CE insignia displayed on each device is an indication of conformity to the European requirements.

Caution: Each SGI server system has several governmental and third-party approvals, licenses, and permits. Do not modify this product in any way that is not expressly approved by Silicon Graphics. If you do, you may lose these approvals and your governmental agency authority to operate this device.

For a copy of the Manufacture's Declaration of Conformity, or questions related to regulatory matters, contact:

SGI
Product compliance Group
1600 Amphitheater Pkwy
Mountain View, CA 94043
(650) 933 1594

Server Model Number

The CMN (model) number for each server is shown on the system label on the unit.

Class A Compliance

This equipment complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help.

Caution: Users should note that changes or modifications to the equipment not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Electromagnetic Emissions

This device complies with Class A electromagnetic emissions limits of C.I.S.P.R. Publication 22, Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment.

VCCI Notice Class A (Japan Only)

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

Chinese Class A Regulatory Notice

警告使用者：

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策．

Industry Canada Notice (Canada Only)

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique német pas de perturbations radioélectriques dépassant les normes applicables aux appareils numériques de Classe A préscrites dans le Règlement sur les interferences radioélectriques établi par le Ministère des Communications du Canada.

CE Notice

Marking by the "CE" symbol indicates compliance of the device to directives of the European Community. A "Declaration of Conformity" in accordance with the standards has been made and is available from Silicon Graphics upon request.

Shielded Cables

The SGI 1450 server is FCC-compliant under test conditions that include the use of shielded cables between the server and its peripherals. Your server and any peripherals you purchase from Silicon Graphics have shielded cables. Shielded cables reduce the possibility of interference with radio, television, and other devices. If you use any cables that are not from Silicon Graphics, make sure they are shielded. Telephone cables do not need to be shielded.

Optional monitor cables supplied with your server system use additional filtering molded into the cable jacket to reduce radio frequency interference. Always use the cable supplied with your system. If your monitor cable becomes damaged, a replacement cable should be obtained from Silicon Graphics.

Electrostatic Discharge

Silicon Graphics designs and tests its products to be immune to the effects of electrostatic discharge (ESD). ESD is a source of electromagnetic interference and can cause problems ranging from data errors and lockups to permanent component damage.

It is important that while you are operating the server system you keep all the covers and doors, including the plastics, in place. The shielded cables that came with the server and its peripherals should be installed correctly, with all thumbscrews fastened securely.

An ESD wrist strap may be included with some products, such as memory or PCI upgrades. The wrist strap is used when installing these upgrades to prevent the flow of static electricity, and it should protect your system from ESD damage.

Physical Environment Specifications

Table B-1 details the environmental specifications for the SGI 1450 server.

Table B-1   Environmental Specifications

Temperature:	
Non-operating	-40° to 70 °C (-104° to 158 °F)
Operating	5° to 35 °C (41° to 95 °F)
Altitude	5,000 ft. max
Humidity	95% relative humidity (non condensing) at 25 °C (77 °F) to 30 °C (86 °F)
Shock:	
Operating	2.0 g, 11 msec, 1/2 sine, 100 pulses in each direction
Packaged	Trapezoidal, 30 g, 170 inches/sec. delta V, 3 drops in each direction on each of the three axes
Acoustic noise	< 55 dBA with three power supplies at 28 °C +/- 2 °C
Electrostatic discharge (ESD)	Tested to 15 kilovolts (kV) air discharge and up to 8 kV contact discharge
System AC Input Power:	
100-120 V~	6 A, 50/60 Hz
200-240 V~	4 A, 50/60 Hz

Safety Precautions

The power supply in this product contains no user-serviceable parts. There may be more than one supply in this product. Refer servicing only to qualified personnel.

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

The DC push button on/off switch on the system does not turn off system AC power. To remove AC power from the system, you must unplug each AC power cord from the wall outlet or power supply.

SAFETY STEPS: Whenever you remove the top and front covers in a non hot-swap or non hot-plug operation, follow these steps:

1. Turn off all peripheral devices connected to the system.

2. Turn off the system by using the push button on/off power switch on the system.

3. Unplug the AC power cord from the system or from wall outlets.

4. Label and disconnect all cables connected to I/O connectors or ports on the back of the system.

5. Provide some electrostatic discharge (ESD) protection by wearing an antistatic wrist strap attached to chassis ground of the system-any unpainted metal surface-when handling components.

6. Do not operate the system with the covers removed.

After you have completed the preceding six safety steps, any user can remove the top cover. However, only qualified service personnel can remove the front cover.

For proper cooling and airflow, always reinstall the chassis covers before turning on the system. Operating the system without the covers in place can damage system parts. To install the covers:

1. Check first to make sure you have not left loose tools or parts inside the system.

2. Check that cables, add-in boards, and other components are properly installed.

3. Attach the covers to the chassis with the screws removed earlier and tighten them firmly.

4. Connect all external cables and the AC power cord to the system.

A microprocessor and heat sink may be hot if the system has been running. Also, there may be sharp pins and edges on some board and chassis parts. Contact should be made with care. Consider wearing protective gloves.

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

The system is designed to operate in a typical office environment. Choose a site that is:

• Clean and free of airborne particles (other than normal room dust).

• Well ventilated and away from sources of heat including direct sunlight.

• Away from sources of vibration or physical shock.

• Isolated from strong electromagnetic fields produced by electrical devices.

• In regions that are susceptible to electrical storms, we recommend you plug your system into a surge suppressor and disconnect telecommunication lines to your modem during an electrical storm.

• Provided with a properly grounded wall outlet.

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