SGI® Altix® XE310 System User's Guide

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About This Guide

This guide provides an overview of the installation, architecture, general operation, and descriptions of the major components in the SGI® Altix® XE310 server. It also provides basic troubleshooting and maintenance information, BIOS information, and important safety and regulatory specifications.

Audience

This guide is written for owners, installers, system administrators, and users of SGI Altix XE310 computer systems. It is written with the assumption that the reader has a good working knowledge of computers and computer systems.

Important Information

Warning: **To avoid problems that could void your warranty, your SGI or other approved system support engineer (SSE) should perform any replacement of parts or service of your SGI Altix XE310 system not covered in the following list of items that you can perform yourself:**

- Install the server into system rack(s).

- Replace the power supply, power distribution board, or fans in the server chassis.

- Replace disk drives or SATA backplane in the server chassis.

- Replace processors, memory, or processor heatsinks on the node board.

- Add or replace PCIe cards or the SIM baseboard management controller (BMC)

- Replace cables

Chapter Descriptions

The following topics are covered in this guide:

- Chapter 1, "Introduction," provides a checklist of the main components included with the system and describes the main features of the SGI Altix XE310 and its node boards.

- Chapter 2, "Server Installation," describes the steps necessary to install the system into a rack and check out the server configuration prior to powering up the system. If your server was ordered without the processor and memory components, this chapter will refer you to the appropriate sections of the manual for their installation.

- Chapter 3, "Controls and Indicators," provides details on the system interface, which includes the functions and information provided by the control panel on the chassis, as well as other LEDs located throughout the system.

- Chapter 4, "Advanced Node Board Setup," provides detailed information on the 1U rackmount server chassis. Follow the procedures in this chapter when you install, remove, or reconfigure SAS/SATA or peripheral drives and when you replace system power supply units and cooling fans.

- Chapter 5, "Advanced Chassis Setup," provides detailed information about the components inside the server chassis, such as the node board connectors and jumper settings, disk drive information, and power supply replacement.

- Chapter 6, "BIOS Settings," includes an introduction to BIOS and provides detailed information on running the CMOS Setup Utility.

- Appendix A, "BIOS Power-on Self Test," provides information about BIOS POST self-test messages and codes.

- Appendix B, "IPMI 2.0 Management Utility," provides information about how to start the baseboard management controller (BMC) intelligent platform management interface (IPMI 2.0 management utility).

- Appendix C, "Regulatory Specifications and Safety Information," lists regulatory information that may be important to the operation of your system.

- Appendix D, "System Specifications," provides physical, environmental, and power specifications for your system.

- Appendix E, "System Safety," provides a general overview of safety precautions that should be followed when installing and servicing the SGI Altix XE310.

Related Publications

The following SGI documents are relevant to the SGI Altix XE310 server:

- *SGI ProPack 5 for Linux Start Here*, publication number 007-4837-00*x*

- *SGI InfiniteStorage* series documentation

- *SGI Altix XE310 SIM User's Guide*, publication number 860-0472-00*x*

- Man pages (online)

You can obtain SGI documentation, release notes, or man pages in the following ways:

- Refer to the SGI Technical Publications Library at http://docs.sgi.com. Various formats are available. This library contains the most recent and most comprehensive set of online books, release notes, man pages, and other information.

- You can also view man pages by typing **man** <*title*> on a command line.

SGI systems include a set of Linux® man pages, formatted in the standard UNIX® "man page" style. Important system configuration files and commands are documented on man pages. These are found online on the internal system disk (or DVD-ROM) and are displayed using the man command. For example, to display the man page for the xscsidisktest command, type the following on a command line:

man xscsidisktest

References in the documentation to these pages include the name of the command and the section number in which the command is found.

For additional information about displaying man pages using the man command, see man(1).

In addition, the apropos command locates man pages based on keywords. For example, to display a list of man pages that describe disks, type the following on a command line:

apropos disk

For information about setting up and using apropos, see apropos(1).

Conventions

The following conventions are used throughout this document:

Convention	Meaning
`Command`	This fixed-space font denotes literal items such as commands, files, routines, path names, signals, messages, and programming language structures.
variable	The italic typeface denotes variable entries and words or concepts being defined. Italic typeface is also used for book titles.
user input	This bold fixed-space font denotes literal items that the user enters in interactive sessions. Output is shown in nonbold, fixed-space font.
[ ]	Brackets enclose optional portions of a command or directive line.
...	Ellipses indicate that a preceding element can be repeated.
`man page(`*x*`)`	Man page section identifiers appear in parentheses after man page names.
GUI element	This font denotes the names of graphical user interface (GUI) elements such as windows, screens, dialog boxes, menus, toolbars, icons, buttons, boxes, fields, and lists.

Product Support

SGI provides a comprehensive product support and maintenance program for its products. SGI also offers services to implement and integrate Linux applications in your environment.

* Refer to http://www.sgi.com/support/

* If you are in North America, contact the Technical Assistance Center at +1 800 800 4SGI or contact your authorized service provider.

* If you are outside North America, contact the SGI subsidiary or authorized distributor in your country.

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Sunnyvale, CA 94085–4602

SGI values your comments and will respond to them promptly.

Introduction

The SGI Altix XE310 server is a 1U rackmount server (refer to Figure 1-1) that contains two node boards in a single chassis. Each node supports dual Intel® Xeon® processors.
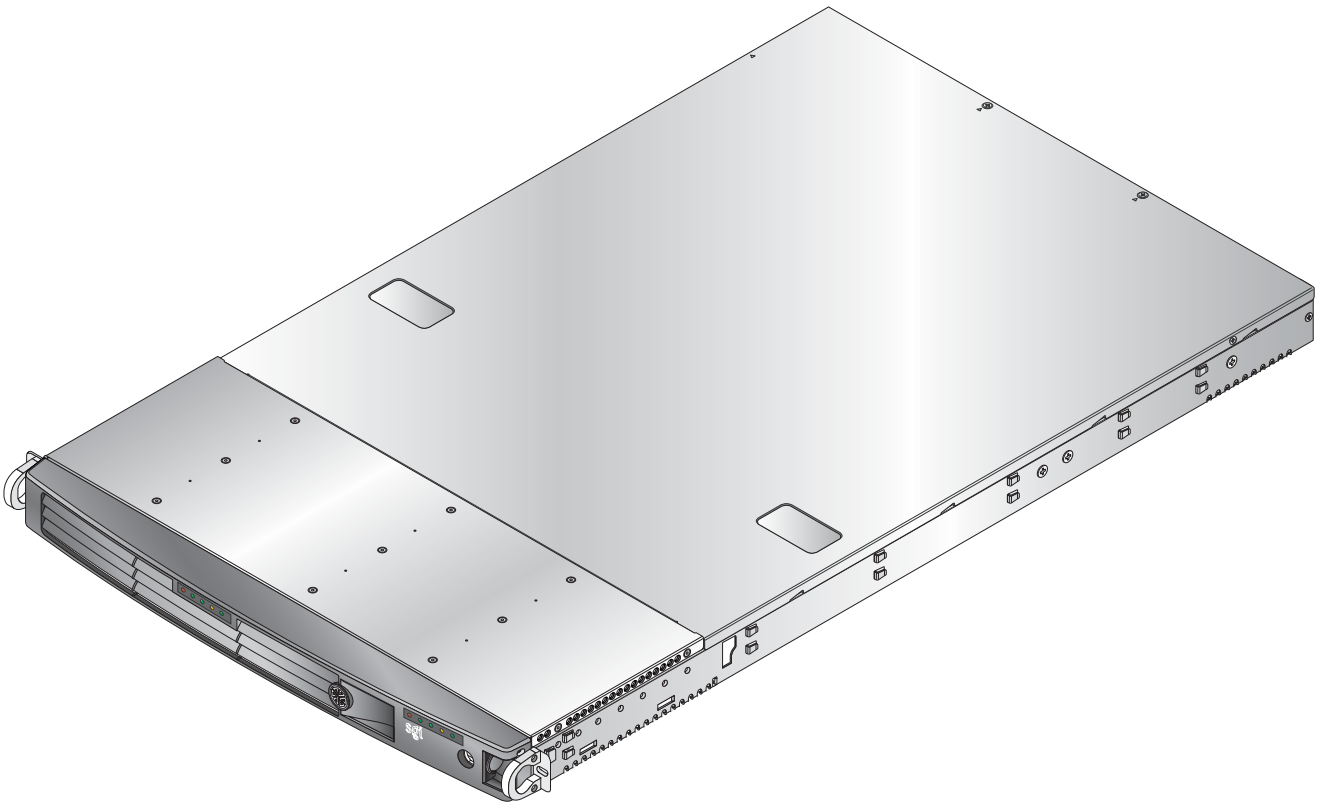
Figure 1-1   SGI Altix XE310 Server

In addition to the node and chassis, the following hardware components are included (refer to Figure 1-2):

- Two dual-core or quad-core processors per node board

- Two processor heatsinks

- Four SATA hard drive carriers

- One internal SATA backplane

- One SATA cable set

- Two PCIe x8 riser cards

- Two IPMI 2.0 baseboard management cards (BMCs)

- Six 4-cm high-performance fans

- One air shroud for 1U chassis

- Rackmount hardware with screws

    - Two rack rail assemblies

    - Six brackets for mounting the rack rails in a rack/telco rack
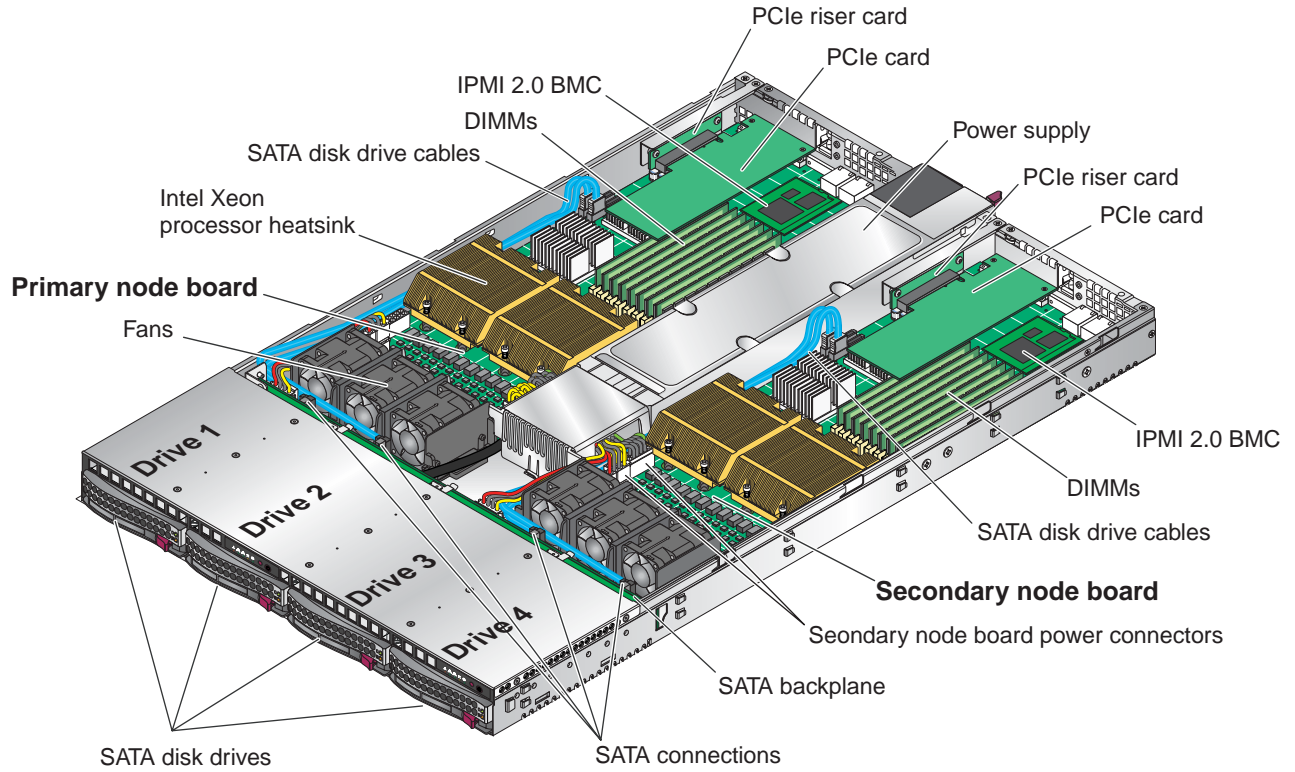
Figure 1-2   Chassis Components

Node Board Features

At the heart of the SGI Altix XE310 lies two dual-processor node boards, which are based on the Intel 5000P chipset (refer to Figure 1-3). Below are the main features of the node board.

Note: The features on each node board are doubled for the server (refer to Appendix D, "System Specifications").

Processors

Each node board supports dual Intel Xeon processors.

Memory

Each node board has eight 240-pin DIMM sockets (refer to Figure 1-2) that can support up to 32 GB of ECC fully buffered DIMM (FBDIMM) DDR2-667/533 SDRAM. Memory can be installed in both interleaved (dual-channel) and non-interleaved (single-channel) configurations. All memory modules used to populate the system should be the same size, type, and speed.

The node board memory controller supports memory mirroring to prevent data loss in case of DIMM failure. The system maintains two copies of all the data in memory; therefore, a mirrored system uses only half of the installed DIMMs. If a DIMM fails, the system recovers the second copy of data from the mirrored DIMM in the opposite channel. If both the primary and the mirrored copy of the data become corrupt, the system will fail. Configure memory mirroring with the Memory Branch Mode BIOS setting (refer to "Memory Branch Mode" on page 101.

Serial ATA

The southbridge (ESB2 chip) of the 5000P chipset includes a Serial ATA controller for 3-Gb/s SATA drives. The hot-swappable SATA drives are connected to a backplane (refer to Figure 1-2) that provides power, bus termination, and configuration settings. The SGI Altix XE310 server supports RAID 0 and RAID 1 disk configurations.
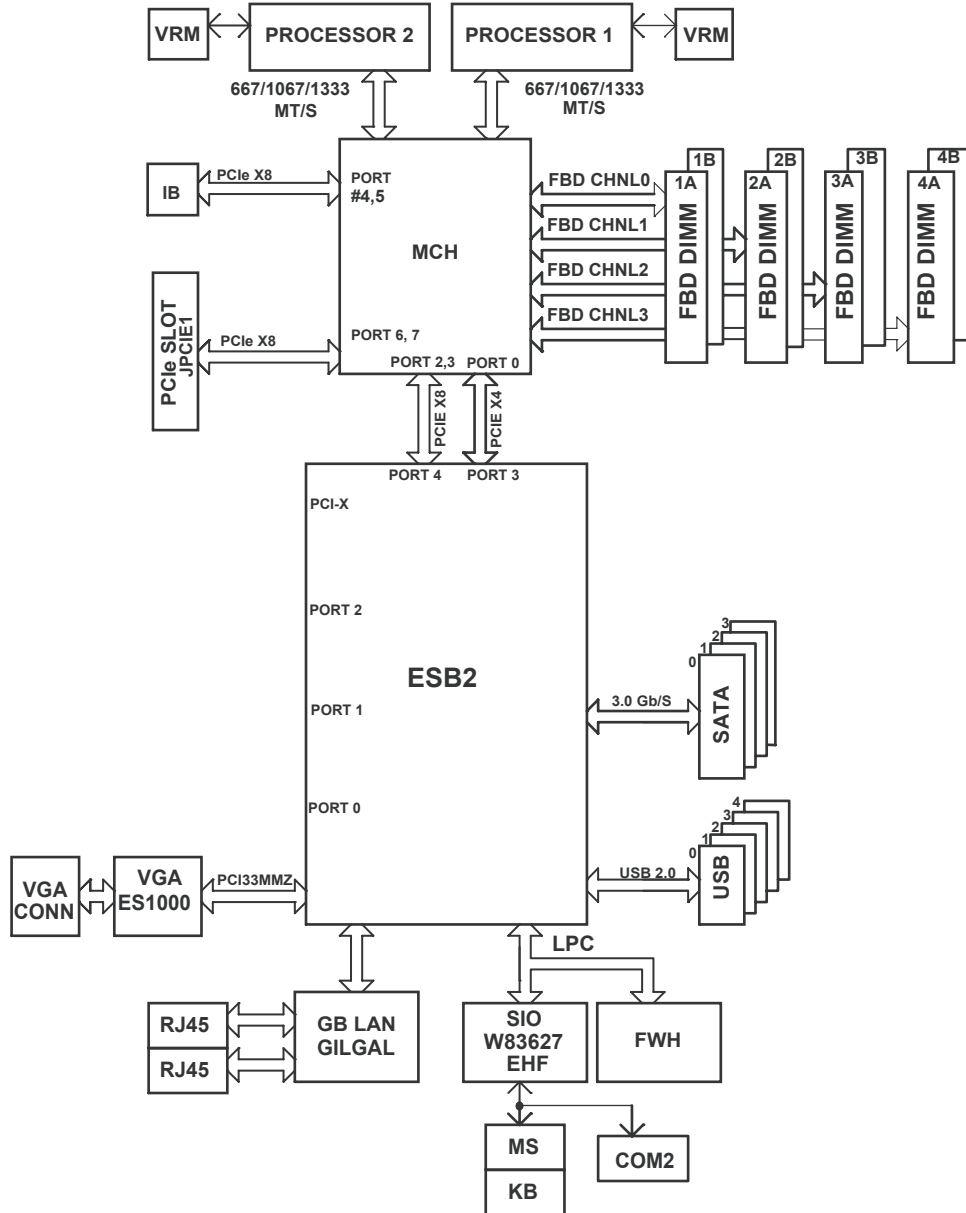
Figure 1-3   Node Board Block Diagram

PCIe Expansion Slots

Each node board supports one PCIe x8 slot. Two PCIe slots are available in the server chassis.

Ethernet Ports

Two Intel 82563EB network controllers are integrated into the 5000P chipset on each of the node boards to support a total of four Gigabit LAN ports (100/1000 Base-T/1000 BaseTX, RJ45 output).

Onboard Controllers/Ports

The node board IDE controller supports Ultra ATA 100 hard drives or ATAPI devices. Each node board I/O panel ports includes one COM port, a VGA port, two USB ports, two Gigabit Ethernet LAN (NIC) ports, and one optional InfiniBand® port.

ATI Graphics Controller

The SGI Altix XE310 features an integrated ATI video controller based on the ES1000 graphics chip. The ES1000 was designed specifically for servers, featuring low-power consumption, high reliability, and superior longevity.

Other Features

Other onboard features that enable reliable service include voltage monitors, a chassis intrusion header, auto-switching voltage regulators, chassis and CPU overheat sensors, virus protection, and BIOS rescue.

Server Chassis Features

This section describes the main features of the SGI Altix XE310 1U chassis. Refer to Chapter 5, "Advanced Chassis Setup." for more detailed information.

Note: For more detail on the chassis, refer to Chapter 5, "Advanced Chassis Setup."

System Power

A single power supply (refer to Figure 1-2) provides the power for both node boards. Each node board however, can be shut down independently of the other with the power button on its own control panel.

Although they share a common power supply, the I²C signals used for power supply monitoring are received by the primary node board only. (When viewed from the front of the chassis, the node board on the left is the primary board and the node board on the right is the secondary node board.)

SATA Backplane/Drives

As a system, the SGI Altix XE310 supports four SATA disk drives (refer to Figure 1-2). The SATA backplane is divided into two sections. A single power connector is used for the entire SATA backplane, but other functions, such as circuit board overtemperature monitoring, apply to both sections. Each pair of SATA disk drives is logically connected to its own node board. Consequently, the RAID configuration is limited to a two-drive scheme (RAID 1 or RAID 0). The RAID configuration cannot be set up across all four drives.

Server Installation

This chapter provides a quick setup checklist to get the SGI Altix XE310 operational.

Unpack the System

Inspect the shipping container that the SGI Altix XE310 was shipped in and note if it was damaged in any way. If the server shows damage, file a damage claim with the carrier who delivered it.

Decide on a suitable location for the rack that supports the weight, power requirements, and environmental requirements of the SGI Altix XE310 server. It should be situated in a clean, dust-free environment that is well ventilated. Avoid areas where heat, electrical noise, and electromagnetic fields are generated. Place the server rack near a grounded power outlet. Refer to "Warnings and Precautions" on page 10.

Prepare for Setup

The shipping container should include two sets of rail assemblies, two rail mounting brackets and the mounting screws that you will use to install the system into a rack.

Read this section in its entirety before you begin the installation procedure.

Choose a Setup Location

- Leave enough clearance in front of the rack to enable you to open the front door completely, approximately 25 in. (65 cm).

- Leave approximately 30 in. (76 cm) of clearance in the back of the rack to allow for sufficient airflow and ease in servicing.

Warnings and Precautions

Rack Precautions

Warning: The SGI Altix XE310 server weighs 40 lb (18 kg). Always use proper lifting techniques when your move the server. Always get the assistance of another qualified person when you install the sever in a location above your shoulders. Failure to do so may result in serious personal injury or damage to the equipment.

Warning: Extend the leveling jacks on the bottom of the rack to the floor with the full weight of the rack resting on them. Failure to do so can result in serious injury or death.

Warning: Attach stabilizers to the rack in single rack installations. Failure to do so can result in serious injury or death.

Warning: Couple racks together in multiple rack installations. Failure to do so can result in serious injury or death.

Warning: Be sure the rack is stable before extending a component from the rack. Failure to do so can result in serious injury or death.

Warning: Extend only one component at a time. Extending two or more components simultaneously may cause the rack to tip over and result in serious injury or death.

Server Precautions

- Review the electrical and general safety precautions in Appendix E, "System Safety."

- Determine the placement of each component in the rack before you install the rails.

- Install the heaviest server components in the bottom of the rack first, and then work up.

- Use a regulating uninterruptible power supply (UPS) to protect the server from power surges and voltage spikes and to keep your system operating in case of a power failure.

- Allow the hot plug SATA drives and power supply modules to cool before touching them.

- Always keep the rack's front door and all panels and components on the servers closed when not servicing to maintain proper cooling.

Rack Mounting Considerations

Ambient Operating Temperature

If installed in a closed or multi-unit rack assembly, the ambient operating temperature of the rack environment may be greater than the ambient temperature of the room. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature.

Reduced Airflow

Equipment should be mounted into a rack so that the amount of airflow required for safe operation is not compromised.

Mechanical Loading

Equipment should be mounted into a rack so that a hazardous condition does not arise due to uneven mechanical loading.

Circuit Overloading

Consideration should be given to the connection of the equipment to the power supply circuitry and the effect that any possible overloading of circuits might have on overcurrent protection and power supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

Reliable Ground

A reliable ground must be maintained at all times. To ensure this, the rack itself should be grounded. Particular attention should be given to power supply connections other than the direct connections to the branch circuit (i.e. the use of power strips, etc.).

Install the System into a Rack

This section provides information on installing the SGI Altix XE310 into a rack unit with the rack rails provided. If the system has already been mounted into a rack, refer to "Check the Node Board Setup" on page 21. There are a variety of rack units on the market, which may mean the assembly procedure will differ slightly. You should also refer to the installation instructions that came with the rack unit you are using.

Identify the Sections of the Rack Rails

You should have received two rack rail assemblies in the rack mounting kit. Each assembly consists of two sections: an inner fixed chassis rail that secures directly to the server chassis and an outer fixed rack rail that secures directly to the rack itself (refer to Figure 2-1). Two pairs of short brackets to be used on the front side of the outer rails are also included.

Install the Rails

Perform the following procedure to install the inner rails:

1. If both the left and right side inner rails (refer to Figure 2-1) have been pre-attached to the chassis, proceed to step 2 on page 14 to installed the outer rails.

Outer rail (attaches to rack)

Inner rail (pre-installed)

Locking tab
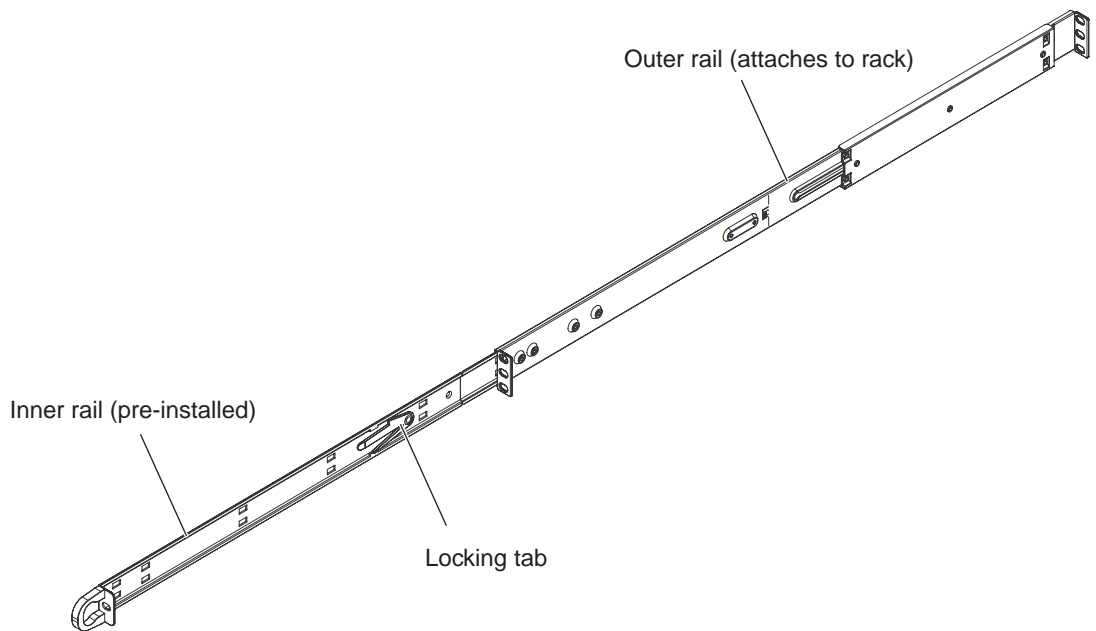
Figure 2-1   Identify Sections of the Rack Rails (right side rail shown)

Perform the following procedure to install the outer rails in the rack (refer to Figure 2-2 and Figure 2-3):

2. Measure the distance from the front to the rear of the rack rail.

3. Attach a short bracket to the front side of the right outer rail

4. Attach a long bracket to the rear side of the right outer rail.

5. Adjust both the short and long brackets to the proper distance so that the rail fits snugly into the rack.

6. Secure the short bracket to the front side of the outer rail with two M4 screws.

7. Secure the long bracket to the rear side of the outer rail with three M4 screws.

8. Repeat these steps for the left outer rail.

Locking Tabs

Both chassis rails have a locking tab (refer to Figure 2-1 and Figure 2-2), which serves two functions. The first is to lock the server into place when it is installed in the rack. The second is to lock the server in place when it is fully extended from the rack. The locking tab prevents the server from being removed from the rack accidentally when you pull it out for service.
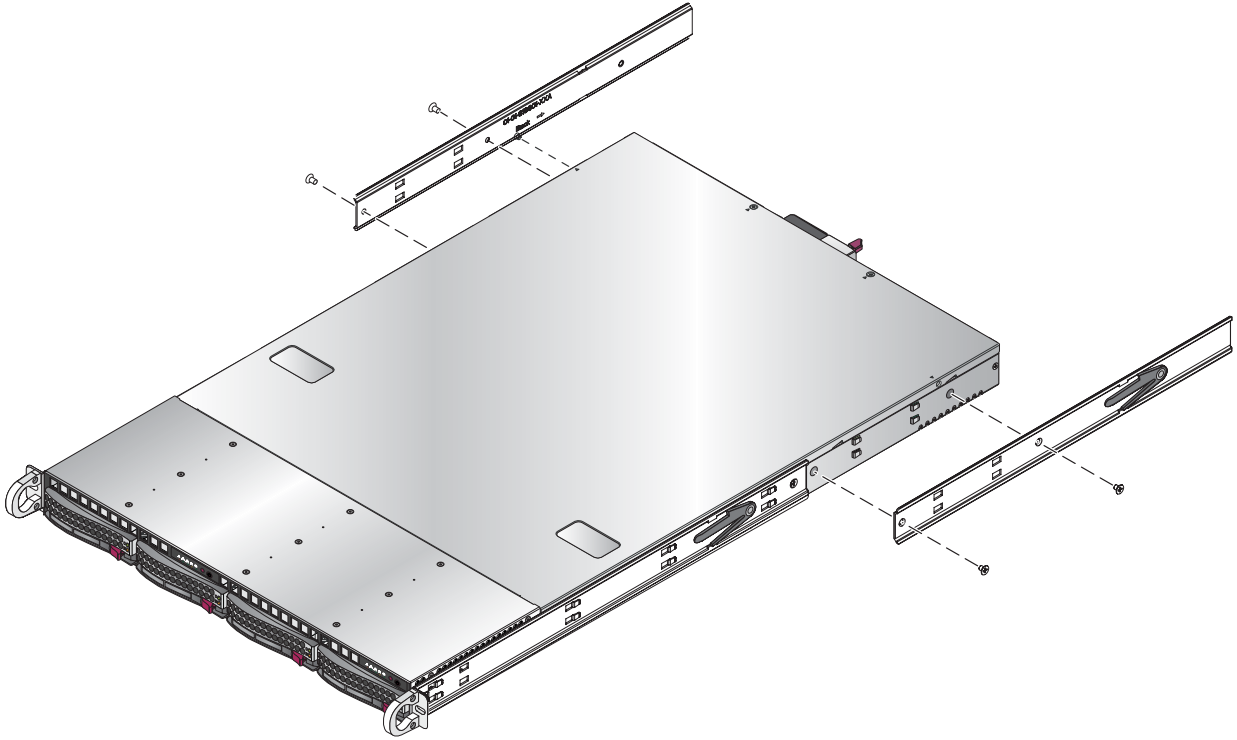
Figure 2-2   Install the Rack Rails

Install the Server in a Rack

Warning: **The SGI Altix XE310 server weighs 40 lb (18 kg). Always use proper lifting techniques when your move the server. Always get the assistance of another qualified person when you install the sever in a location above your shoulders. Failure to do so may result in serious personal injury or damage to the equipment.**

You should now have rails attached to both the chassis and the rack unit. The next step is to install the server into the rack (refer to Figure 2-3).

1. Line up the rear of the chassis rails with the front of the rack rails.

2. Slide the chassis rails into the rack rails, keeping the pressure even on both sides (you may have to depress the locking tabs when inserting).

3. When the server has been pushed completely into the rack, you should hear the locking tabs "click."

4. Install and tighten the thumbscrews that hold the front of the server to the rack.
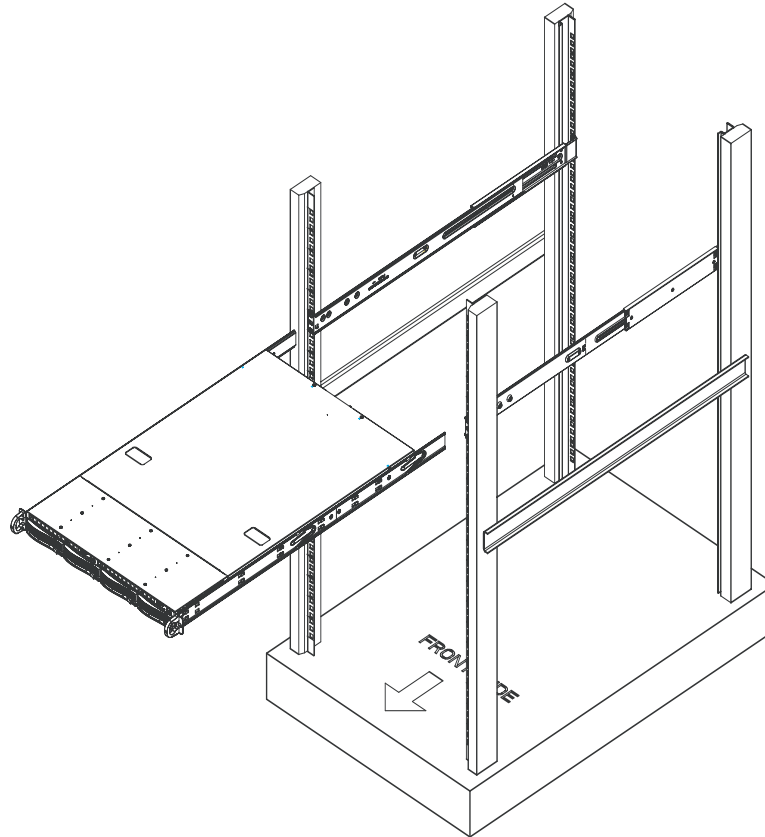
Figure 2-3   Install the Server in a Rack

Install the Server in a Third-party Rack

⚡ **Warning:** **The SGI Altix XE310 server weighs 40 lb (18 kg). Always use proper lifting techniques when your move the server. Always get the assistance of another qualified person when you install the sever in a location above your shoulders. Failure to do so may result in serious personal injury or damage to the equipment.**

1. Slide the server onto the outer rack rails (refer to Figure 2-4).
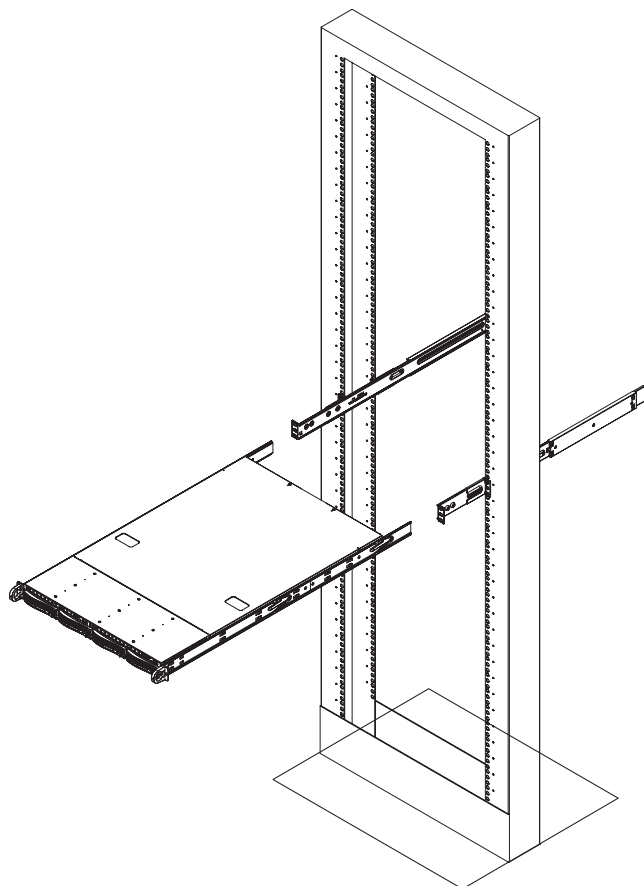
Figure 2-4 Install the Server in a Third-party Rack (1)

2. Using three screws each, attach the outer rail assembly onto the right angle brackets.

M4.0 × 4MM (TRUSS HEAD)
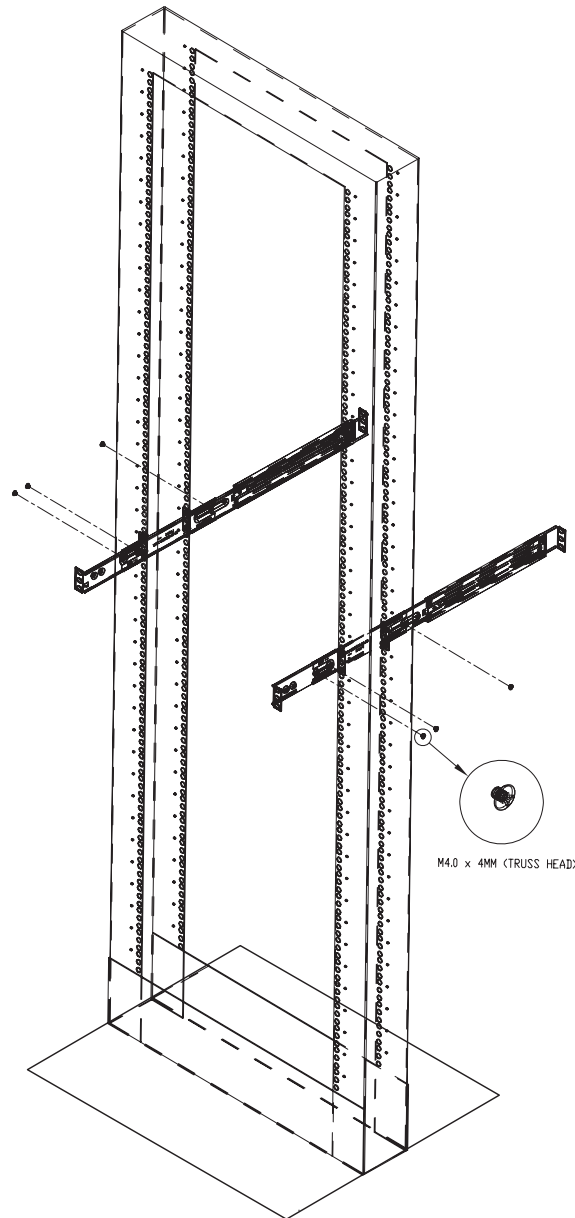
Figure 2-5   Install the Server in a Third-party Rack (2)

3. Install the right angle brackets onto the two-post rack, using two screws on each end.

M5.0 x 12MM (FLAT HEAD)
(OR FASTENER PROVIDED WITH 2-POST RACK)
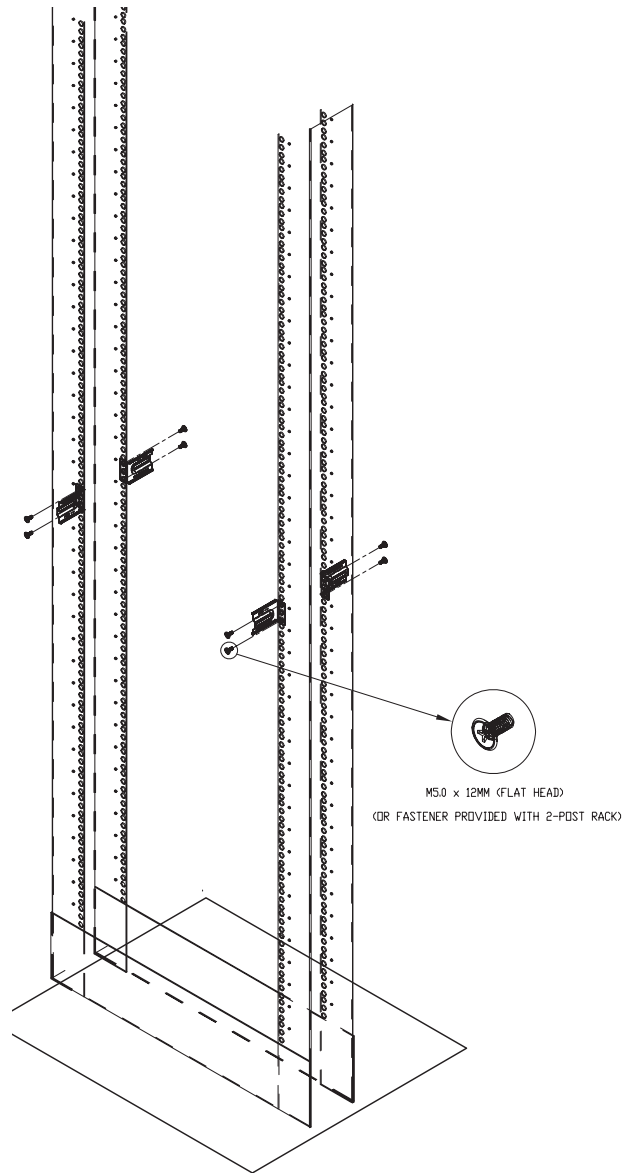
Figure 2-6   Install the Server in a Third-party Rack (3)

Check the Node Board Setup

Use the following sections to open the top cover and check that each node board is properly installed and all the connections have been made.

Access the Inside of the Chassis

Refer to Figure 2-7 when using the following procedure.

1. Remove the screws that secure the system to the rack.

2. Grasp the two handles on either side and pull the system straight out until it locks (you will hear a "click").

3. Press the locking tabs to release the system from the rack and place it on a stable ESD-safe work surface.

4. Remove the rack rails (Figure 2-2) from the chassis so that you can gain access to the top cover screws.

5. Remove the four screws (two on the sides and two on the top) that secure the top cover to the chassis.

6. Place your thumbs in the two rectangular recesses and push the cover away from you (toward the rear of the chassis) until it stops.

7. Lift the top cover from the chassis to gain access to the inside of the server.

Note: To remove the system from the rack completely, depress the locking tabs in the chassis rails (push the right-side tab down and the left-side tab up) to continue to pull the system out past the locked position.
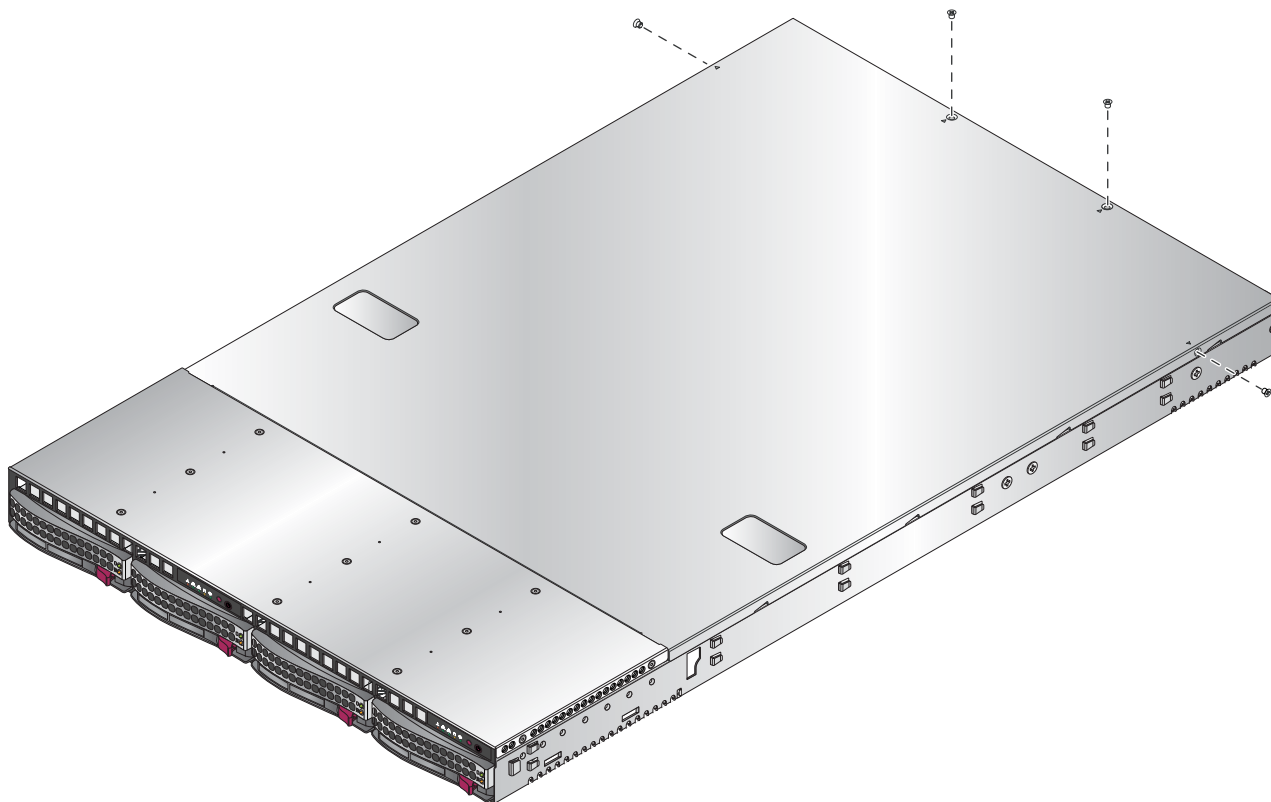
Figure 2-7   Remove the Top Cover

Check the CPUs (processors)

You may have one or two processors installed on each node board. Each processor needs its own heatsink. Refer to Chapter 4, "Advanced Node Board Setup," for instructions on how to install processors and heatsinks.

Check the System Memory

Your server system is shipped with system memory installed. Make sure all DIMMs are fully seated in their slots. For details on adding system memory, refer to Chapter 4.

Install Expansion PCIe Cards

You can install two expansion PCIe cards in the system. Refer to Chapter 4 for details on installing PCIe expansion cards.

Check all Cable Connections and Airflow

Make sure all power and data cables are properly connected and not blocking the chassis airflow. Refer to Chapter 4 for details on cable connections.

Check the Drive Bay Setup

Next, you should check to make sure the SATA drives and SATA backplane have been properly installed and all connections have been made.

Check the SATA Drives

Depending upon your system configuration, your system may have one or more drives installed. For detailed information about how to install SATA drives, refer to Chapter 5, "Advanced Chassis Setup."

Check the Airflow

Airflow is provided by six sets of 4-cm fans (each set of fans consists of two fans that are mounted back to back). The system component layout was carefully designed to direct sufficient airflow to cool the components that generate the most heat. Note that all power and data cables have been routed in such a way that they do not block the airflow generated by the fans. An air shroud is also installed to focus the airflow to areas where the most heat is generated.

Supply Power to the System

If necessary, install the system in a rack (refer to "Install the System into a Rack" on page 12), and connect the power cord from the power supply module into a power strip or power distribution unit (PDU). The PDU offers protection from electrical noise and power surges. SGI also recommends that you use an uninterruptible power supply (UPS) source.

Controls and Indicators

This chapter describes the functions of the controls and indicators (light emitting diodes, or LEDs) on the SGI Altix XE310 server. There are several LEDs on the two control panels (refer to Figure 3-1) as well as others on the SATA drive carriers that inform you of the overall system status, as well as the activity and status of specific components. There are also two switches (buttons) on each control panel.

Note: The server has two control panels, one for each node board installed in the system. This allows each node board to be controlled independently of the other.

Controls

There are two push-button switches located on each control panel: a reset switch and a power on/off switch (refer to Figure 3-1).

- RESET: Press the reset button to reboot only the node board controlled by that control panel.

- POWER: Press power button to apply or remove power only to the node board controlled by that control panel. Pressing this button removes the main power but keeps standby power supplied to the node board.
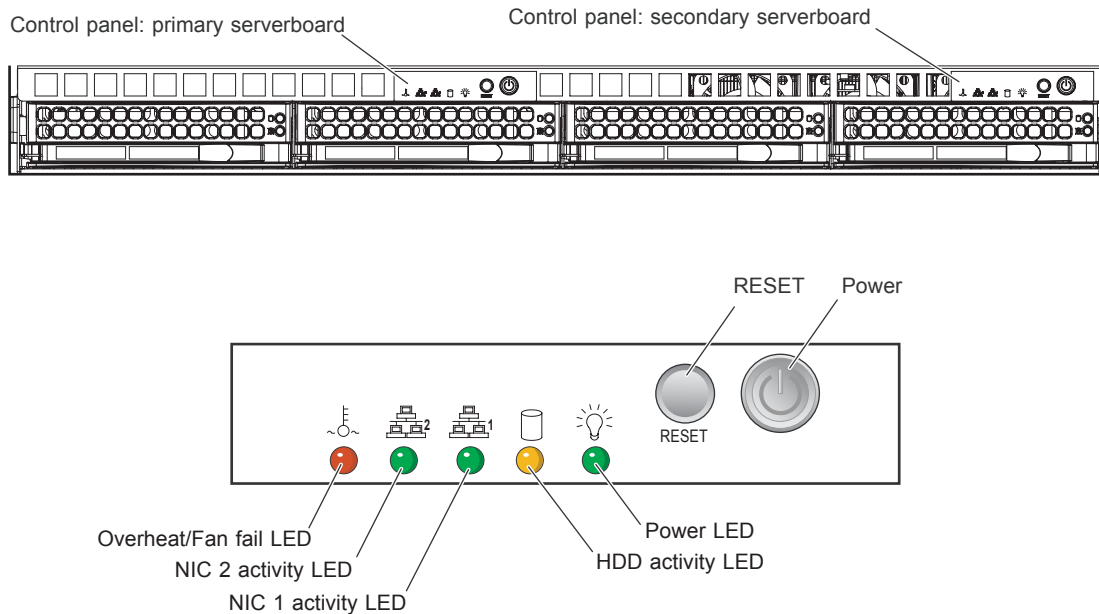
Figure 3-1   Front Panel Controls and Indicators

Indicators

Each control panel is located on the front of the SGI Altix XE310 system and has five LED indicators (refer to Figure 3-1). Each LED provides you with critical information related to its own specific node board.

The following items explain the node board LED indicators and the corrective action that you should take when the LED illuminates:

- Overheat/Fan fail: When the Overheat/Fan Fail LED flashes, it indicates that a fan has failed. When the Overheat/Fan Fail LED is on continuously, it indicates that an overheat condition has occurred, which may be caused by cables obstructing the airflow in the system or the ambient room temperature being too warm.

> **Note:** Check the routing of the cables and make sure all fans are present and operating normally. Check that the chassis covers are installed properly.
>
> Verify that the processor heatsinks are installed properly (refer to Chapter 4). Verify that the overhead/fan fail LED remains flashing. It will remain flashing as long as the overheated or fan fail condition exists.

- NIC2: Indicates network activity on LAN2 when flashing.

- NIC1: Indicates network activity on LAN1 when flashing.

- HDD: Channel activity for the hard disk drive (HDD). This light indicates SATA drive activity on the node board when flashing.

- Power: Indicates power is being supplied to the system's power supply unit. This LED should normally be illuminated when the system is operating.

SATA Drive Carrier Indicators

Each SATA drive carrier has two LED indicators.

- **Green**

  - When illuminated, the green LED on the front of the SATA drive carrier indicates drive activity. A connection to the SATA backplane enables this LED to blink on and off when that particular drive is being accessed.

- **Red**

  - The red LED indicates two states. When blinking, it indicates the drive is rebuilding. When solid, it indicates a drive failure.

  - If a SATA drive fails, you should be notified by your system management software. Refer to Chapter 5 for instructions about how to replace a failed SATA disk drive.

Advanced Node Board Setup

This chapter includes procedures to install a node board into the SGI Altix XE310 chassis, connect the data and power cables, and install expansion cards. All node board jumpers and connections are also discussed.

A layout and quick reference chart is included in this chapter for your reference.

⚠ **Caution:** Install the chassis cover after you have completed accessing the components inside the server to maintain proper airflow and cooling for the system.

Handling the Node Board

⚠ **Caution:** Electrostatic discharge (ESD) can damage electrostatic-sensitive devices inside the SGI Altix XE310 server. Use the ESD precautions described below when you handle printed circuit boards or other components in the system. To prevent the node board from bending, keep one hand under the center of the board to support it when handling it. The following measures are generally sufficient to protect your equipment from electric static discharge.

ESD Precautions

- Use a grounded wrist strap designed to prevent electrostatic discharge.

- Touch a grounded metal object before removing any board from its antistatic bag.

- Handle each printed circuit board (PCB) by the edges; do not touch the components, peripheral chips, memory modules, or gold contacts on the PCB.

- When handling chips or modules, avoid touching the pins.

- Place the node board, expansion PCI cards, or other boards and components into antistatic bags when not in use.

- Make sure your computer chassis provides a conductive path between the power supply, the case, the mounting fasteners, and the node board to chassis ground.

Unpacking

Caution: The node board is shipped in antistatic packaging to avoid electrostatic discharge damage. Be sure to use ESD precautions when you unpack replacement components for the SGI Altix XE310 server. Failure to do so can result in damage to the equipment.

Node Board Installation

This section explains how to mount the node board into the SGI Altix XE310 chassis. To remove the node board, follow this procedure in reverse order.

1. Access the inside of the system (refer to Figure 4-1):

    a. Remove the rack rails so that you can gain access to the top cover screws.

    b. The top cover of the chassis is secured with four screws: two at the top rear of the cover and one on each side lip, also near the back. Remove all four screws, then place both thumbs in the indentations and push the cover back until it slides off. You can then lift the top cover from the chassis to gain full access to the inside of the server.

    Note: If already installed in a rack, you must first release the retention screws that secure the unit to the rack. Then grasp the two handles on either side and pull the unit straight out until the rails lock into place.)
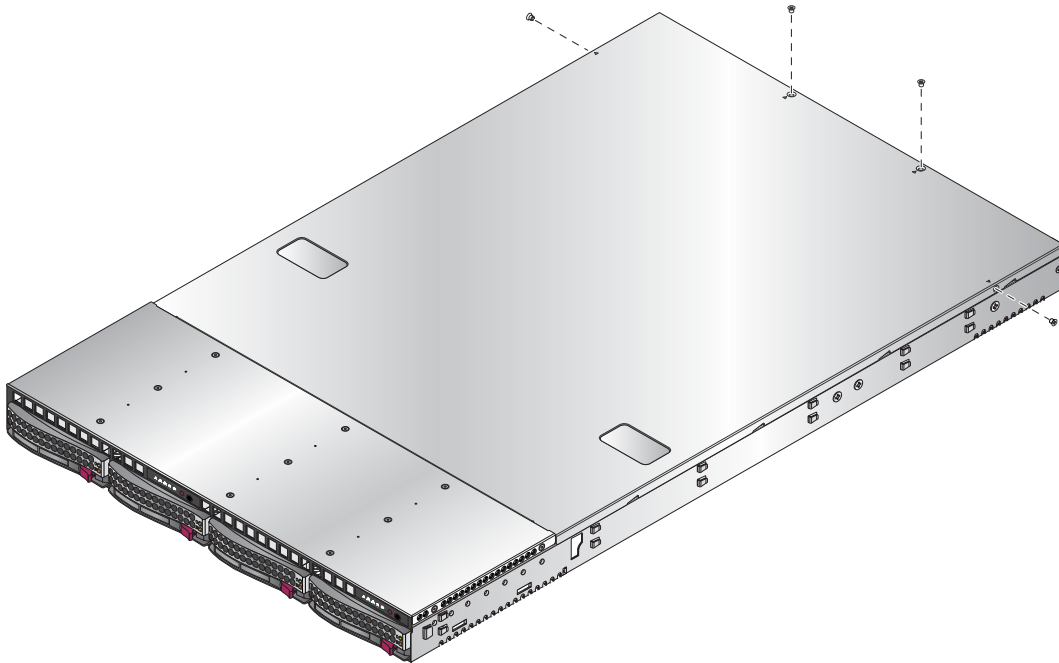
Figure 4-1   Remove the Top Cover

2.   Check compatibility of node board ports and I/O shield:

> **Note:** Make sure that the I/O ports on the node boards align properly with their respective holes in the I/O shield on the back of the SGI Altix XE310 chassis.

3.   Remove the PCI card riser card and bracket.

4.   Mount the node board onto the node board tray:

a.   Carefully mount the node boards by aligning the board holes with the raised metal standoffs that are visible in the chassis (refer to Figure 4-2).

> ⚠ **Caution:** Do not overtighten the screws in step b. Overtightening the screws will damage the equipment.

b.   Install 5 screws into all the mounting holes on the node board that line up with the standoffs and tighten until snug. The metal screws provide an electrical contact to the node board ground to provide a continuous ground for the system.

5.   Install the PCI riser card and bracket.

Connect the Power Cables

A node board has two 20-pin ATX power supply connectors (refer to Figure 4-2) that can be connected to the ATX power supply. Only one of these connectors is used when the node board is installed in the chassis. Each node board also provide a 4-pin auxiliary power connector used to connect disk drive power to the SATA backplane.

For the primary node board (installed on the left side of the chassis):

1.   Connect the power cable to the primary ATX power header on the right side of the node board.

2.   Connect the auxiliary power cable to the power connector on left side of the SATA backplane.

For the secondary node board (installed on the right side of the chassis):

1. Connect the power cable to the secondary ATX power header on the left side of the node board.

2. Connect the auxiliary power cable to the power connector on right side of the SATA backplane.
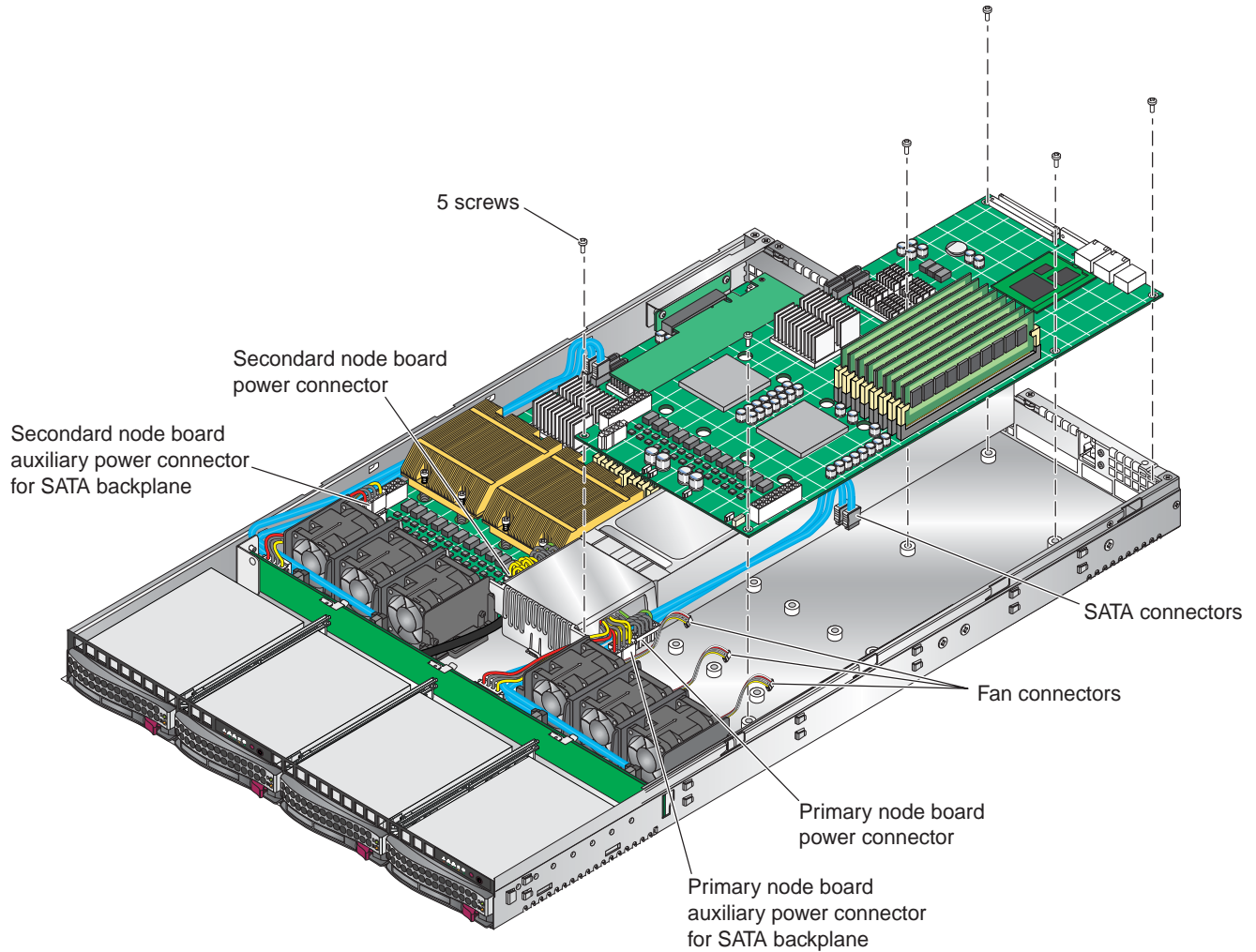
Figure 4-2   Node Board Installation

Connecting the Control Panel

The JF1 connector (refer to Figure 4-3) contains header pins for various front control panel connectors, switches, and LED indicators.

All of the JF1 connector wires are bundled into a single ribbon cable to simplify this connection. Make sure the red wire plugs into pin 1 as marked on the board. The other end connects to the control panel PCB, located just behind the system status LEDs on the chassis.

	20	19	
Ground	○	○	NMI
x (Key)	○	○	x (Key)
Power On LED	○	○	Vcc 5V Stby
IDE/SATA LED	○	○	Vcc 3V
NIC1 LED	○	○	Vcc 3V Stby
NIC2 LED	○	○	Vcc 3V Stby
OH/Fan Fail LED	○	○	Vcc 3V
Reserved	○	○	Reserved
Ground	○	○	Reset (Button)
Ground	○	○	Power (Button)
	2	1	
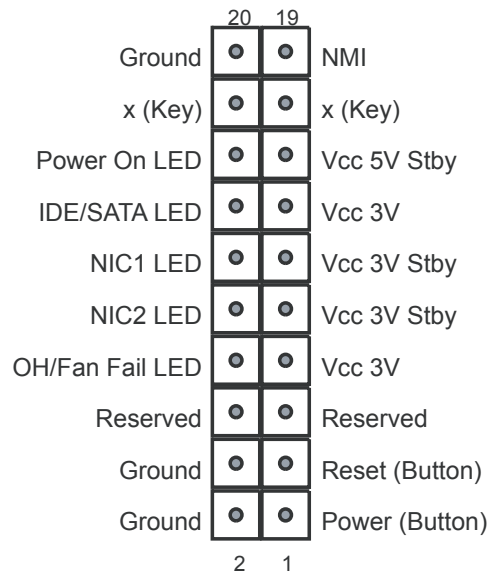
Figure 4-3   Control Panel Connector (JF1) Pin Definitions

I/O Ports

The I/O ports are color coded. Figure 4-4 shows the color and location of the various I/O ports on the I/O panel.

| USB 0/1 Ports | LAN 1 | LAN 2 | **COM2 Port (Turquiose)** | **VGA Port (Blue)** | **InfiniBand Port** |
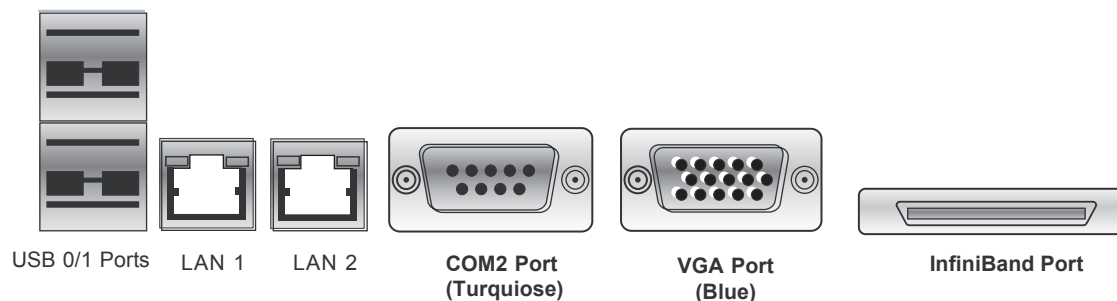
Figure 4-4   I/O Port Locations

Processor and Heatsink Installation

⚠ **Caution:** When handling the processor, avoid placing direct pressure on the label area of the fan.

⚠ **Caution:** Do not place the node board on a conductive surface. A conductive surface can damage the BIOS battery and prevent the system from booting. Always place the node board on an ESD-safe worksurface.

⚠ **Caution:** Always disconnect the power before adding, removing or changing any hardware components. Make sure that you install the processor into the CPU socket before you install the heatsink and fan. The node board can support either one or two processors. If installing one processor only, install it into CPU socket #1.

Note: SGI's replacement Xeon CPU package contains a heatsink assembly. Make sure that the black pick-and-place (PnP) cap is in place; otherwise, contact the SGI immediately.

Important!: When you install only a single CPU on each node board, install the single CPU in socket 2 (refer to Figure 4-9 on page 46) on both node boards. Install the air shroud in accordance with "Install or Remove the Air Shroud" on page 45.

Install a Processor

Note: A black pick-and-place (PnP) cap is attached to the load plate to protect the CPU socket.

1. Press the load lever down and away from the retention clasp to release the load plate from its locked position.
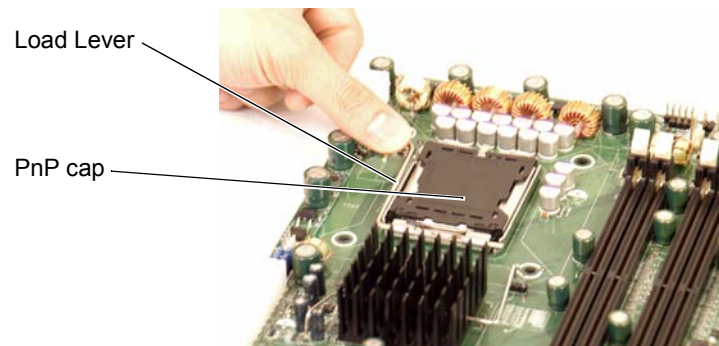
2.   Gently lift the load lever to open the load plate.
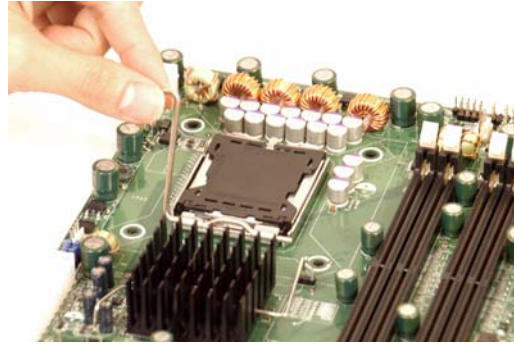
Load plate
released
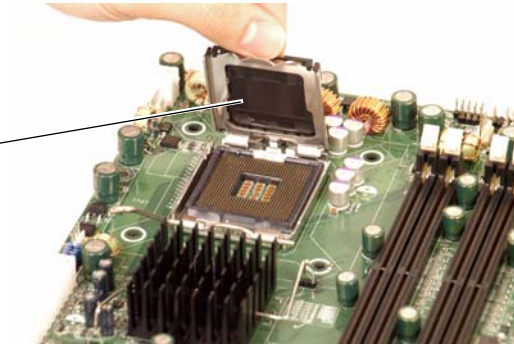
3.   Use your thumb and your index finger to hold the CPU at opposite sides.
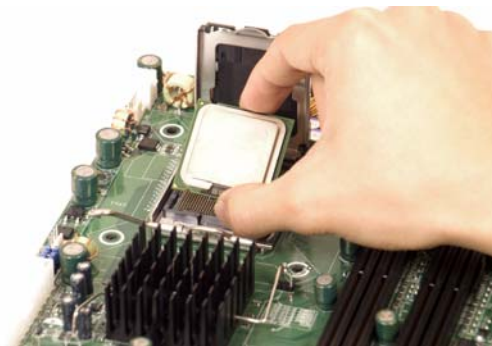
4. Align pin 1 of the CPU (the corner marked with a triangle) with the notched corner of the CPU socket.

⚠ **Caution:** In step 5, do not drop the CPU on the socket, do not move the CPU horizontally or vertically, and do not rub the CPU against any surface or any of the contacts, which may damage the CPU and/or contacts.

5. Once aligned, carefully lower the CPU straight down into the socket.

6. Find the corner of the CPU that has a semi-circle cutout below a gold dot (CPU key). This corner should be aligned with the cutout on the socket (socket key).
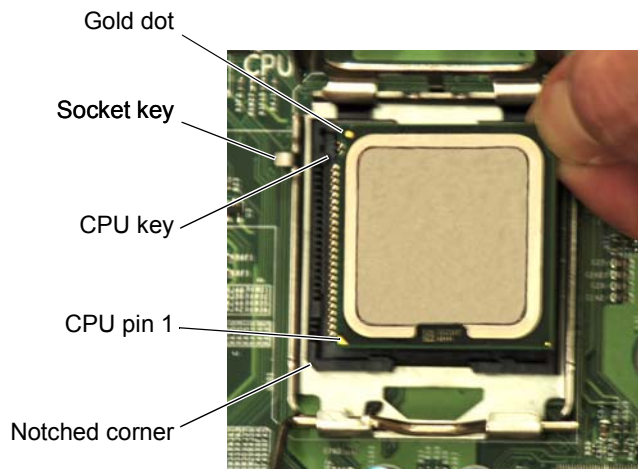
7. With the CPU in the socket, inspect the four corners of the CPU to make sure that it is properly installed.

8. Use your thumb to gently push the load lever down until it snaps into the retention clasp.

Load lever
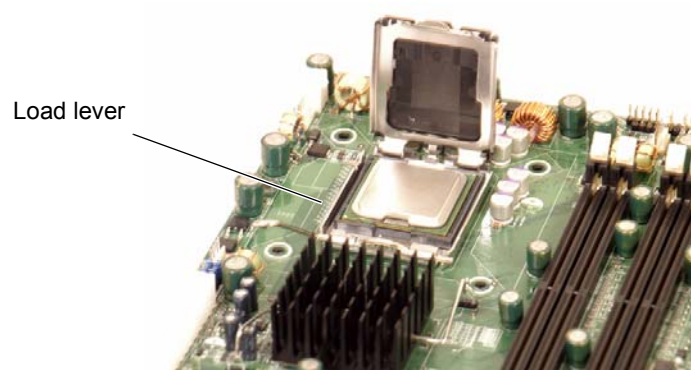
9. If the CPU is properly installed into the socket, the PnP cap is automatically released from the load plate when the lever locks.

Caution: Retain the plastic PnP cap for shipping. The node board must be shipped with the PnP cap properly installed to protect the CPU socket. Shipment without the PnP cap properly installed may void the warranty.
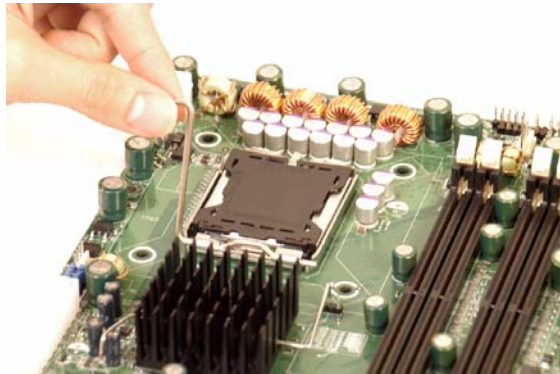
10. Remove the PnP cap.

PnP cap released
from load plate
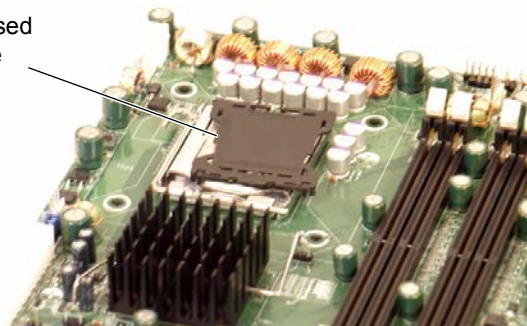
11. Repeat these steps to install a second CPU if desired.

Install a Heatsink

1. Do not apply thermal interface material (TIM) to the heatsink or the CPU die; the required amount of TIM is applied at the factory.

⚠️ **Caution:** Use caution when you unpack the heat sink so you do not damage the TIM.

2. Place the heatsink on top of the CPU so that the four mounting holes are aligned with those on the (preinstalled) heatsink retention mechanism.

⚠️ **Caution:** Do not tighten the screws in step 3 or you may damage the CPU.

3. Install two screws (screw 1 and screw 2, shown in Figure 4-5) and tighten until just snug.

⚠️ **Caution:** Do not overtighten tighten the screws in step 4 or you may damage the CPU.

4. Install the two remaining screws (screw 3 and screw 4, shown in Figure 4-5); then, gently tighten all four screws.
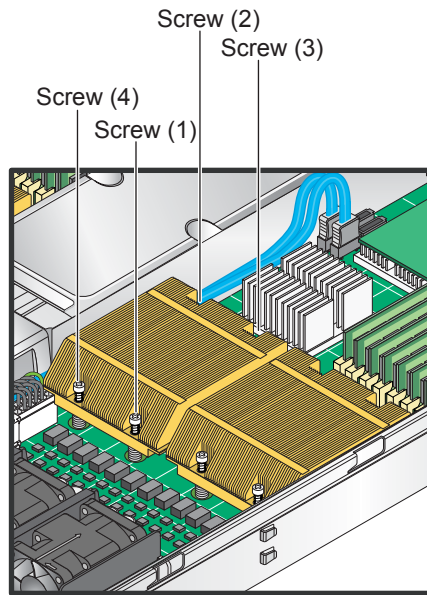
Figure 4-5   Install a CPU Heatsink

Remove the Heatsink

SGI does not recommend that the CPU or the heatsink be removed from the node board. However, if you do need to remove the heatsink, use the instructions below to prevent damage to the CPU or the CPU socket.

1. Unscrew and remove the heatsink screws from the node board in the sequence as shown in Figure 4-5.

⚠ **Caution:** Do not use excessive force when loosening the heatsink. Using excessive force can damage the heatsink, CPU, or node board.

2. Grasp the heatsink and gently loosen it from the CPU.

3. When the heatsink is loose, remove it from the CPU.

4. Clean the surface of the CPU and the heatsink to remove the old thermal grease.

5. Apply a small amount of thermal interface material (TIM) on the surface of the CPU before you install the heatsink.

Install Memory

Caution: Exercise extreme care when installing or removing DIMM modules to prevent damage to the node board or DIMM module.

The node board provides eight 240-pin DIMM sockets that can support up to 32 GB of error correction code (ECC) fully buffered DIMM (FBD) DDR2-667/533 SDRAM (for a total of 64 GB in the system). The memory scheme is interleaved, so you must always add memory to two memory DIMM slots. Table 4-1 lists how to optimize your DIMM installation. Figure 4-9 shows the DIMM slot designations and bank locations on the node board.

Install DIMMs

Align the DIMM so that the notch along the bottom of the DIMM module (refer to Figure 4-6 and Figure 4-7) aligns with the notch in the DIMM slot. Insert DIMMs vertically and gently press down on the DIMM until it snaps into place.

Note: Refer to "Install or Remove the Air Shroud" on page 45 for a procedure on how to remove and install the air shrouds.

An "X" in the slot number (refer to Table 4-1) indicates that a DIMM slot is populated; "----" indicates a DIMM slot is not populated. Both FBD 533 MHz and 667 MHz DIMMs are supported, however, you need to use memory modules of the same speed and of the same type. Interleaved memory is supported only when pairs of DIMMs are installed in both Bank 1 and Bank 2.

Note: The node board memory controller supports memory mirroring to prevent data loss in case of DIMM failure. The system maintains two copies of all the data in memory; therefore, a mirrored system uses only half of the installed DIMMs. If a DIMM fails, the system recovers the second copy of data from the mirrored DIMM in the opposite channel. If both the primary and the mirrored copy of the data become corrupt, the system will fail. Configure memory mirroring with the Memory Branch Mode BIOS setting (refer to "Memory Branch Mode" on page 101.

Top View of DIMM Slot
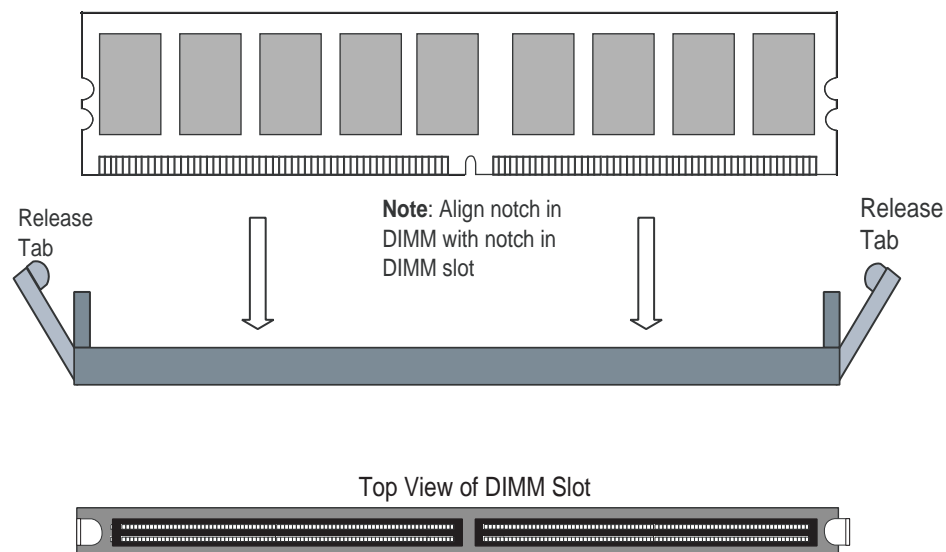
Figure 4-6   Install DIMMs

Table 4-1 lists the order in which you should install DIMMs to optimize your memory configuration. Figure 4-9 shows the DIMM slot designations and bank locations on the node board.

Table 4-1   DIMM Configurations

Number of DIMMs	Bank 1		Bank 2		Bank 3		Bank 4	
	Slot A	Slot B	Slot A	Slot B	Slot A	Slot B	Slot A	Slot B
2 DIMMs	X	----	X	----	----	----	----	----
4 DIMMs	X	----	X	----	X	----	X	----
6 DIMMs	X	X	X	X	X	----	X	----
8 DIMMs	X	X	X	X	X	X	X	X
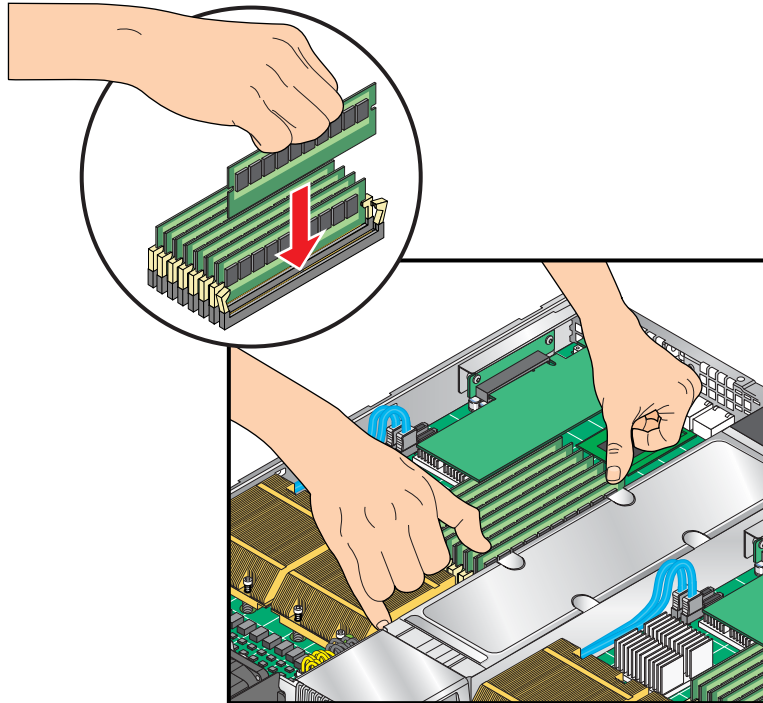
Figure 4-7   Replace DIMMs

Install or Remove the Air Shroud

1. Position each air shrouds as shown in Figure 4-8.

2. Gently place the air shrouds over the node boards and just over the fan assemblies.

3. Slide the air shroud towards the rear of the chassis making sure the L-tabs lock beneath the heat sink ribs.

4. Position the front tab between the fan tray and 20-pin ATX power connector.

5. Press down on the front of the air shroud to secure it to the fan assemblies.
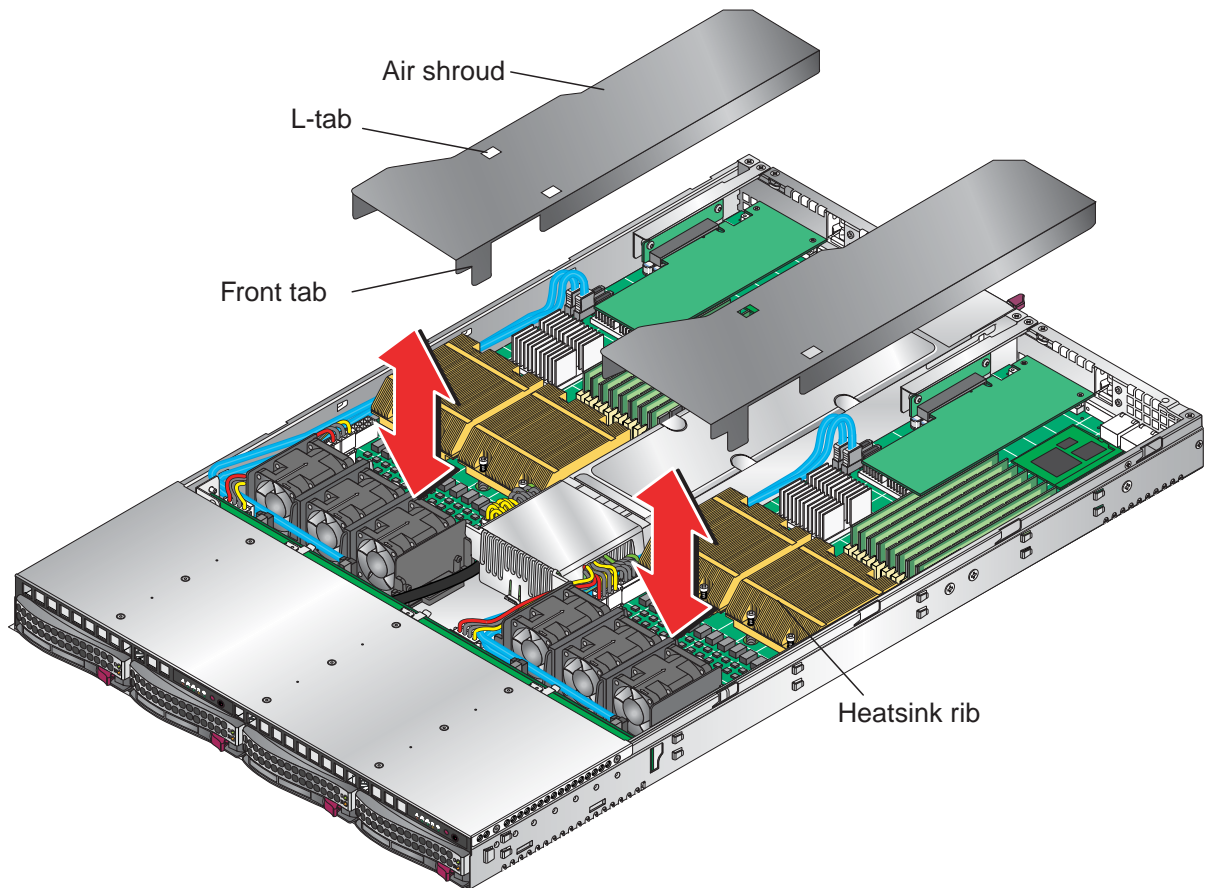
Figure 4-8   Install Air Shrouds

Node Board Component Locations
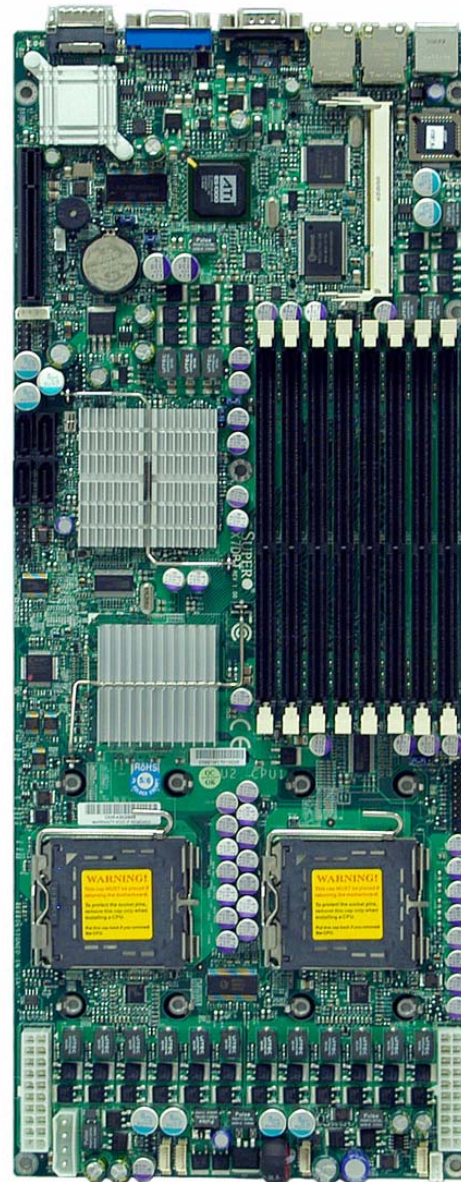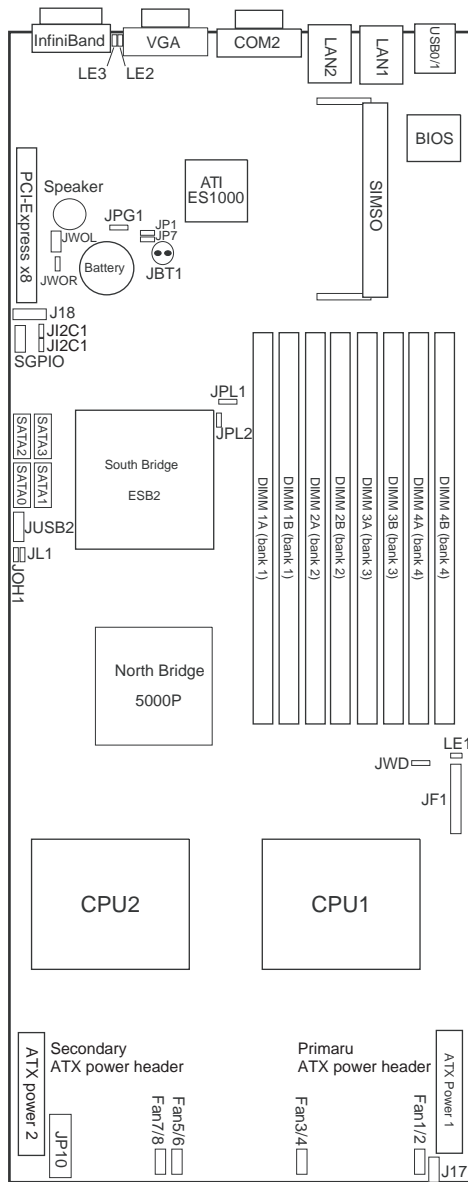
Figure 4-9 Node Board Component Locations

Add PCIe Expansion Cards

The SGI Altix XE310 includes two preinstalled riser boards in the 1U rackmount chassis (refer to Figure 4-10). These riser cards support two low-profile PCIe x8 cards.

Note: Use only SGI approved PCIe x8 cards in the SGI Altix XE310 server.

Install a PCIe Expansion Card

Perform the following steps to install a PCIe expansion card:

1. Remove the to cover in accordance with "Access the Inside of the Chassis" on page 21.

2. Remove the air shrouds in accordance with "Install or Remove the Air Shroud" on page 45.

3. Remove the PCIe slot EMI shield on the chassis by releasing the locking tab.

4. Insert the expansion PCIe card into the riser card and slide the bracket under the tab.

5. Secure the PCIe expansion card with the locking tab.

6. Install the air shrouds in accordance with "Install or Remove the Air Shroud" on page 45.

7. Install the top cover in accordance with "Access the Inside of the Chassis" on page 21.
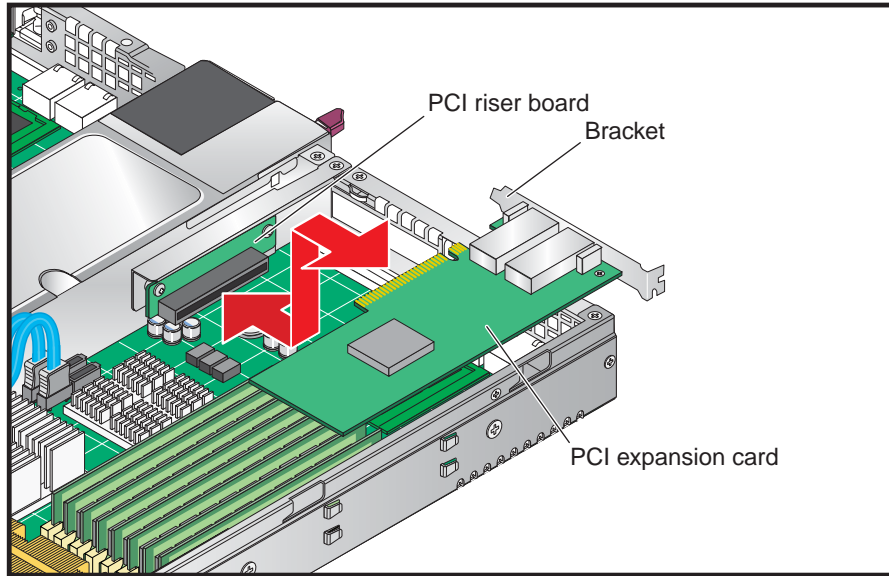
Figure 4-10   Install a PCI Card

Node Board Jumpers and Connectors

Refer to Figure 4-9 when using Table 4-2, Table 4-3 and Table 4-4.

Table 4-2   Node Board Default Jumper Settings

Jumper	Description	Default Setting
JBT1	CMOS Clear	Refer to "CMOS Memory Clear (JBT1)" on page 63.
JI²C1 / JI²C2	I²C to PCIe Slot	Open (Disabled)
JPG1	VGA Enable	Pins 1-2 (Enabled)
JPL1/ JPL2	LAN1/LAN2 Enable/Disable	Pins 1-2 (Enabled)
JWD	Watch Dog	Pins 1-2 (Reset)
IB, JIB, JWOL, JWOR, JP1,JP7,J18,SGPIO	N/A	No connection

Table 4-3   Node Board Connector Descriptions

Connector	Description
ATX Power 1 [a]	20-Pin ATX PWR Connector (for Primary Board)
ATX Power 2	20-Pin ATX PWR Connector (for Secondary Board)
COM2	COM2 Serial Port Connector
FAN 1/2 - 7/8	Chassis and CPU Fan Connectors
InfiniBand	InfiniBand Connector
J17	System Management Power (I²C) Connector
J18	System Management Bus Connector
JF1	Front Control Panel Connector
JL1	Chassis Intrusion Connector (not used)
JOH1	Overheat LED Connector
JPI2C	System Management Power (I²C) Connector

Table 4-3   Node Board Connector Descriptions **(continued)**

Connector	Description
JP10	4-pin Auxiliary Power Connector (for HDDs)
JWOL	Wake-on-LAN Connector
JWOR	Wake-on-Ring Connector
LAN1/2	Gigabit Ethernet Ports
SATA0 – SATA3	Intel SATA 0 – 3 Ports
SGPIO	Serial ATA General Purpose Input/Output Connector
SIMSO IPMI	SIMSO IPMI Socket
USB0/1	USB0/1 Ports

a. The Primary ATX Power Header is used to supply power to the primary node board and the Secondary ATX Power Header is used to supply power to the secondary node board. Connect the power supply to only one of these on both boards (primary is the left node board and secondary is the right node board when viewed from front of server).

Table 4-4   Node Board LED Descriptions

LED Indicator	Description
LE1	Onboard Power LED Indicator
LE2	InfiniBand Link LED (green)
LE3	InfiniBand Activity LED (yellow)

Node Board Connector Pin Definitions

Use Table 4-5 to locate the page number for the node board connector or jumper.

ATX Power Connector Pin Definitions

Table 4-6   ATX Power Connector Pin Definitions

Notes	ATX Power 20-pin Connector Pin Definitions ATX Power 1/2			
	Pin#	Definition	Pin#	Definition
The main ATX power supply connectors on the node board meet the SSI (Superset ATX) 24-pin specification. **Note**: Only one of the two ATX power connectors from each node board should be connected to the power supply.	11	PS On	1	Ground
	12	5VSB	2	Ground
	13	Ground	3	Ground
	14	Ground	4	Ground
	15	Ground	5	Ground
	16	NC2	6	NC1
	17	12V	7	12V
	18	12V	8	12V
	19	12V	9	12V
	20	12V	10	12V

Auxiliary Power Connector Pin Definitions (JP10)

Table 4-7   Auxiliary Power Connector Pin Definitions (JP10)

Notes	Auxiliary Power Pin Definitions JP10	
	Pin#	Definition
A 4-pin 12V auxiliary power connector is included to provide power to hard drive disks.	1	+12V
	2	Ground
	3	Ground
	4	+5V

PW_ON Switch Pin Definitions (JF1)

Table 4-8   PW_ON Switch Pin Definitions (JF1)

Notes	PW_ON Button Pin Definitions JF1	
	Pin#	Definition
The PW_ON connector is on pins 1 and 2 of JF1 (refer to Figure 4-14 on page 66). This header should be connected to the chassis power button.	1	PW_ON
	2	Ground

Reset Switch Pin Definitions (JF1)

Table 4-9   Reset Switch Pin Definitions (JF1)

Notes	Reset Button Pin Definitions JF1	
	Pin#	Definition
The reset connector is located on pins 3 and 4 of JF1 (refer to Figure 4-14 on page 66) and attaches to the reset switch on the computer chassis.	3	Reset
	4	Ground

Overheat/Fan Pin Definitions (JF1)

Table 4-10   Overheat/Fan Fail LED Pin Definitions (JF1)

Notes	OH/Fan Fail LED Pin Definitions JF1	
	Pin#	Definition
The overheat (OH) fan fail LED connection is on pins 7 and 8 of JF1(refer to Figure 4-14 on page 66), which provides advanced warning of chassis overheating.	7	Vcc
	8	Ground

NIC2 LED Pin Definitions (JF1)

Table 4-11   NIC2 LED Pin Definitions (JF1)

Notes	NIC2 LED Pin Definitions JF1	
	Pin#	**Definition**
The NIC2 LED connection (LAN2) is on pins 9 and 10 of JF1 (refer to Figure 4-14 on page 66) and displays network activity on LAN 2.	9	Vcc
	10	Ground

NIC1 LED Pin Definitions (JF1)

Table 4-12   NIC1 LED Pin Definitions

Notes	NIC2 LED Pin Definitions JF1	
	Pin#	**Definition**
The NIC1 LED connection is on pins 11 and 12 of JF1 (refer to Figure 4-14 on page 66) and displays network activity on LAN 1.	11	Vcc
	12	Ground

HDD LED Pin Definitions (JF1)

Table 4-13   HDD LED Pin Definitions (JF1)

Notes	HDD LED Pin Definitions JF1	
	Pin#	**Definition**
The HDD LED connection is located on pins 13 and 14 of JF1 (refer to Figure 4-14 on page 66). Attach the hard drive LED cable here to display disk activity (for any disk drives in the system, including SAS, serial ATA and IDE disk drives).	13	Vcc
	14	HD Active

Power On LED Pin Definitions (JF1)

Table 4-14   Power On LED Pin Definitions (JF1)

Notes	Power On LED Pin Definitions JF1	
	Pin#	Definition
The Power On LED connector is located on pins 15 and 16 of JF1. Use this connection is used to indicate that power is supplied to the system.	15	5V Standby
	16	Control

NMI Switch Pin Definitions (JF1)

Table 4-15   NMI Button Pin Definitions (JF1)

Notes	Power On LED Pin Definitions JF1	
	Pin#	Definition
The non-maskable interrupt button header is located on pins 19 and 20 of JF1.	19	Vcc
	20	Ground

Fan Connector Pin Definitions (Fan1/2 - Fan7/8)

Table 4-16   Fan Header Pin Definitions (Fan1/2 - Fan7/8)

Notes	Fan Header Pin Definitions Fan1/2 - Fan7/8			
	Pin#	Definition	Pin#	Definition
The node board has four 6-pin proprietary fan headers. Each fan header supports two 3-pin fans. **Note**: The onboard fan speed is controlled by the CPU die temperature.	1	PWR (DC Speed CTRL)	4	Ground
	2	Tachometer for Fan 1/3/5	5	Tachometer for Fan 2/4/6
	3	Ground	6	PWR (DC Speed CTRL)

Chassis Intrusion Connector Pin Definitions (JL1)

Table 4-17   Chassis Intrusion Pin Definitions (JL1)

Notes	Chassis Intrusion Pin Definitions JL1	
	Pin#	Definition
The Chassis Intrusion connector is designated JL1 (refer to Figure 4-13 on page 65).	1	Intrusion Input
	2	Ground

USB Connector Pin Definitions (USB0/USB1)

Table 4-18   Universal Serial Bus (USB) Pin Definitions

Notes	USB Ports USB0/1	
	Pin#	**Definition**
There are two Universal Serial Bus ports located on the I/O panel and two additional USB headers located on the node board. The headers, labeled USB2 and USB3, can be used to provide front side USB access (cables not included).	1	+5V
	2	PO-
	3	PO+
	4	Ground
	5	N/A

	USB Headers USB1, USB2			
	USB3/5		**USB2/4**	
	Pin#	**Definition**	**Pin#**	**Definition**
	1	+5V	1	+5V
	2	PO-	2	PO-
	3	PO+	3	PO+
	4	Ground	4	Ground
	5	Key	5	NC

Ethernet Port (LAN1/LAN2)

Table 4-19   Ethernet Ports (LAN1/LAN2)

Notes	Ethernet Ports LAN1/LAN2
Two gigabit Ethernet ports (designated LAN1 and LAN2) are located on the I/O panel. These ports accept RJ45 type cables.	

Wake on LAN Connector Pin Definitions (JWOL)

Table 4-20   Wake on LAN Connector Pin Definitions (JWOL)

Notes	Wake-On-LAN Pin Definitions JWOL	
	Pin#	Definition
The Wake-On-LAN (JWOL) connector (refer to Figure 4-12) enables the wake-on-LAN feature. You must enable the LAN Wake-Up setting in BIOS and also have a LAN card with a wake-on-LAN connector and cable installed to use this feature.	1	+5V Standby
	2	Ground
	3	Wake-up

Wake on Ring Connector Pin Definitions (JWOR)

Table 4-21   Wake on Ring Connector Pin Definitions

Notes	Wake-On-Ring Pin Definitions JWOR	
	Pin#	Definition
The Wake-On-Ring connector (JWOR) connector (refer to Figure 4-12) enables the system to receive and be "awakened" by an incoming call when in the suspend state. You must also have the WOR card and cable installed to use this feature.	1	Ground (Black)
	2	Wake-up

Serial Port Pin Definitions (COM2)

Table 4-22   Serial Port Pin Definitions (COM2)

Notes	Serial Port Pin Definitions COM2			
	Pin#	Definition	Pin#	Definition
One serial port is included on the node board: COM2 is a port located beside the VGA port.	1	DCD	6	DSR
	2	RXD	7	RTS
	3	TXD	8	CTS
	4	DTR	9	RI
	5	Ground	10	NC

Serial General Purpose I/O Connector Pin Definitions (SGPIO)

Table 4-23   Serial General Purpose I/O Connector Pin Definitions (SGPIO)

Notes	SGPIO Headers Pin Definitions SGPIO			
	Pin#	Definition	Pin#	Definition
The Serial General Purpose Input/Output (SGPIO) connector (refer to Figure 4-12) is used to communicate with the system monitoring circuitry and monitor SATA activity.	1	NC	2	NC
	3	Ground	4	DATA Out
	5	Load	6	Ground
	7	Clock	8	NC

System Management Bus Power Connector Pin Definitions (J17)

Table 4-24   SMB Power Connector Pin Definitions (J17)

Notes	SMB Power (I²C) Pin Definitions J17	
	Pin#	Definition
The system management bus (SMB) power connector (J17) is used to support the I2C bus.	1	Clock
	2	Data
	3	Power Fail
	4	Ground
	5	+3.3V

System Management Bus Connector Pin Definitions (J18)

Table 4-25   SMB Header Pin Definitions (J18)

Notes	SMB Header Pin Definitions J18	
	Pin#	Definition
A SMB bus connector (J18) monitors the status of the system's power supply, fan speed, and temperature (refer to Figure 4-12 on page 63).	1	Data
	2	Ground
	3	Clock
	4	NC

Node Board Jumper Settings

Table 4-26   Node Board Jumper Descriptions

Connector Description	Page		Jumper Name	Page
CMOS Memory Clear (JBT1)	page 63		JBT1	page 63
I2C to PCIe Slot Jumper Settings (JPI2C1/JPI2C2)	page 64		JPG1	page 64
LAN1/LAN2 Jumper Settings (JPL1/JPL2)	page 65		JPI2C1/JPI2C2	page 64
VGA Jumper Settings (JPG1)	page 64		JPL1/JPL2	page 65
Watch Dog Timer Jumper Settings (JWD)	page 66		JWD	page 66

Explanation of Jumper Settings

To modify the operation of the node board, jumpers (refer to Figure 4-11) can be used to choose between optional settings. Jumpers create shorts between two pins to change specific functions or features on the node board. Pin 1 is identified with a square solder pad on the printed circuit board. Refer to Figure 4-9 on page 46 for jumper locations.

Note: On a two-pin jumper, "Closed" means the jumper is on both pins and "Open" means the jumper is either on only one pin or completely removed.
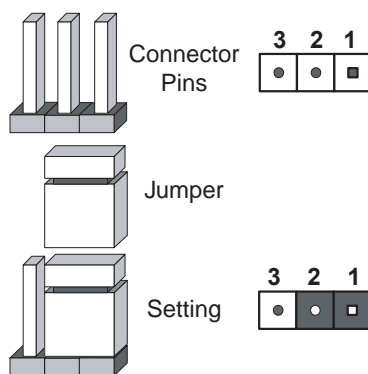
Figure 4-11 Explanation of Jumper Pins

CMOS Memory Clear (JBT1)

Jumper pad JBT1 (refer to Figure 4-12) is used to clear CMOS memory (which also clears passwords). Instead of pins, this jumper consists of contact pads to prevent you from accidentally clearing the contents of CMOS memory. To clear CMOS memory:

1. Power down the system and unplug the power cord(s).

⚠ **Caution:** Do not use the PW_ON connector to clear CMOS memory. Using the PW_ON connector may damage the equipment.

2. Short the JBT1 pads with a metal object such as a small screwdriver.

3. Remove the screwdriver (or shorting device).

4. Reconnect the power cord(s) and power on the system.
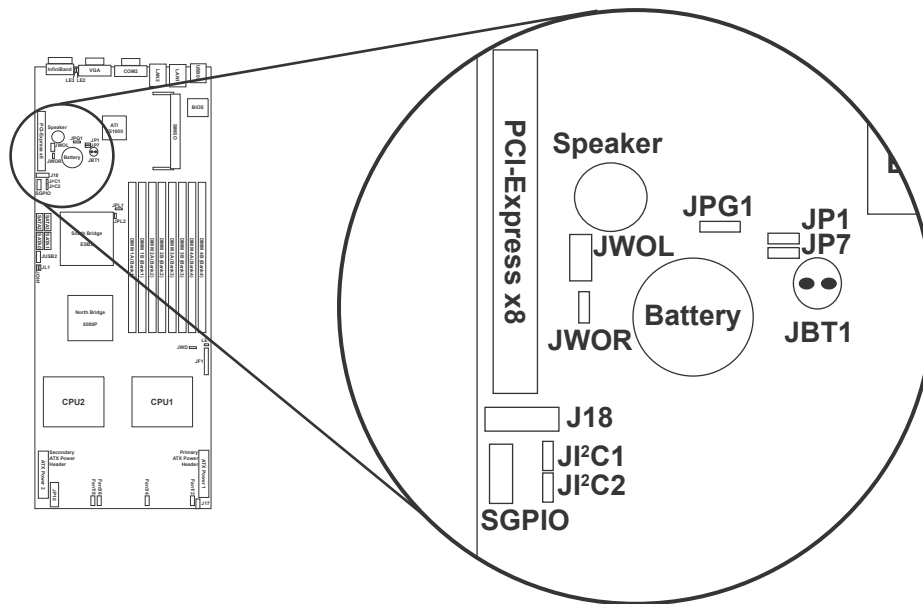
Figure 4-12   CMOS Memory Jumper Location (JBT1)

VGA Jumper Settings (JPG1)

Table 4-27 VGA Jumper Settings (JPG1)

Notes	VGA Enable/Disable Jumper Settings JPG1	
	Jumper	Definition
Jumper JPG1 (refer to Figure 4-12) enables or disables the VGA port. The default position is pins 1 and 2 jumpered, which enables VGA port.	1-2	Enabled
	2-3	Disabled

I²C to PCIe Slot Jumper Settings (JPI2C1/JPI2C2)

Table 4-28 I²C to PCIe Slot Jumper Settings

Notes	I²C to PCIe Slot Jumper Settings JPI2C1/JPI2C2	
	Jumper	Definition
Jumpers JI2C1 and JI2C2 (refer to Figure 4-12) enable or disable I²C bus communication with the PCIe slot. Always set both jumpers to the same setting. If enabled, both jumpers must be enabled. If disabled, both jumpers must be disabled.	Closed	Enabled
	Open	Disabled

LAN1/LAN2 Jumper Settings (JPL1/JPL2)

Table 4-29   LAN1/LAN2 Jumper Settings (JPL1/JPL2)

Notes	LAN1/LAN2 Enable/Disable Jumper Settings JPL1/JPL2	
	Jumper	Definition
Jumper JPL1 (refer to Figure 4-13) enables or disables the LAN1 port and JPL2 to enable or disable the LAN2 port on the node board. The default setting is enabled.	1-2	Enabled
	2-3	Disabled
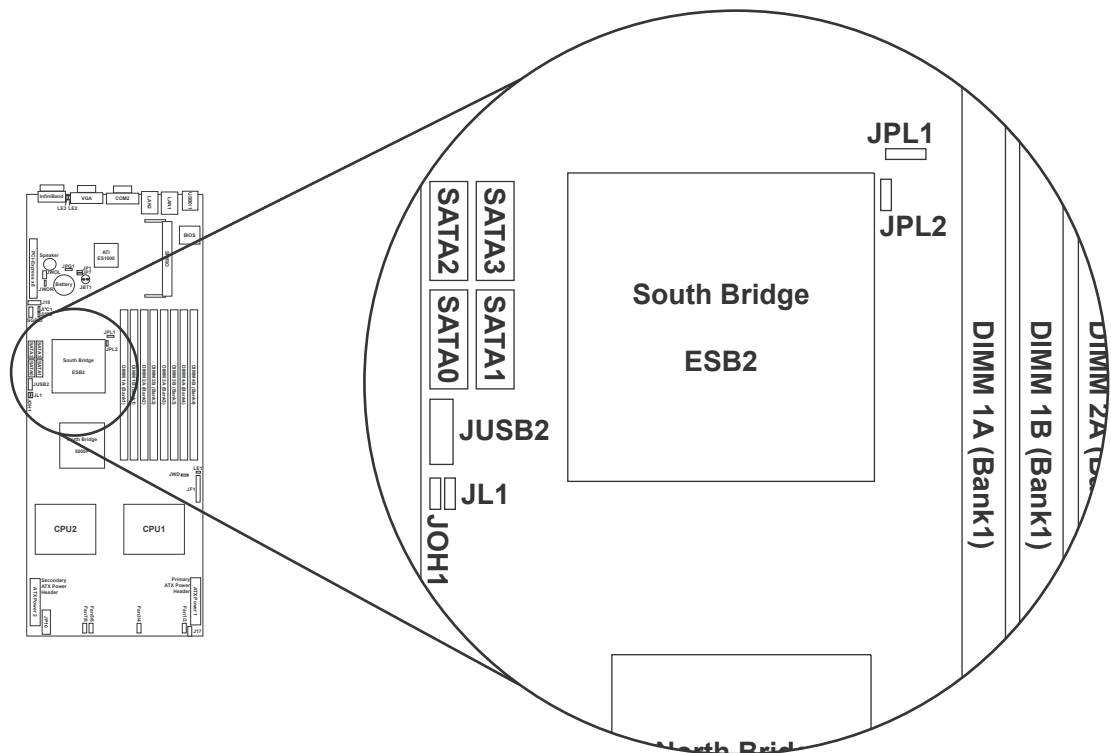
Figure 4-13   LAN 1 and LAN 2 Jumper Locations (JPL1/JPL2)

Watch Dog Timer Jumper Settings (JWD)

Users must write their own application software to disable the watch dog timer when it is enabled.

Table 4-30   Watch Dog Timer Jumper Settings (JWD)

Notes	Watch Dog Jumper Settings JWD	
	Jumper	Definition
Jumper JWD (refer to Figure 4-14) enables or disables the watch dog timer, a system monitor that takes action when a software application freezes or hangs. Jumping pins 1-2 causes the watch dog timer to reboot the system if a program freezes. Jumping pins 2-3 generates a non-maskable interrupt for the program that has frozen. The watch dog timer must also be enabled in BIOS.	Pins 1-2	Reset
	Pins 2-3	NMI
	Open	Disabled
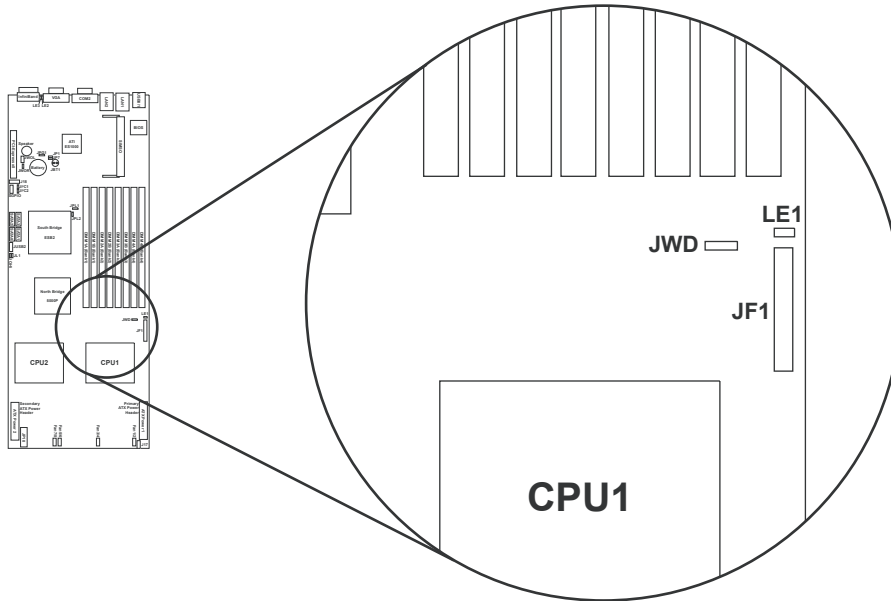
Figure 4-14   Watch Dog Timer Jumper Location (JWD)

Node Board LED Descriptions

LAN1 and LAN2 (Ethernet Ports)

Table 4-31   LAN1 and LAN 2 LED Descriptions

Notes	LAN LED Speed Indicators LAN1/LAN2	
	LED Color	**Description**
The Ethernet ports (located beside the serial COM2 port) have two LEDs. On each Gigabit LAN port, one LED indicates activity when blinking while the other LED may be green, amber, or off to indicate the speed of the connection.	Off	10 MHz
	Green	100 MHz
	Amber	1 GHz

Power LED (LE1)

Table 4-32   Power LED Description (LE1)

Notes	Power LED LE1	
	LED Color	**Description**
The Onboard Power LED (LE1) is located near connector JF1 (refer to Figure 4-14 on page 66). When the LED is green and flashing, power is connected.	Green (solid)	Power is on and system is on
	Green (flashing)	Power in standby, power cable connected, or system is off
	Off	Power off or power cable not connected
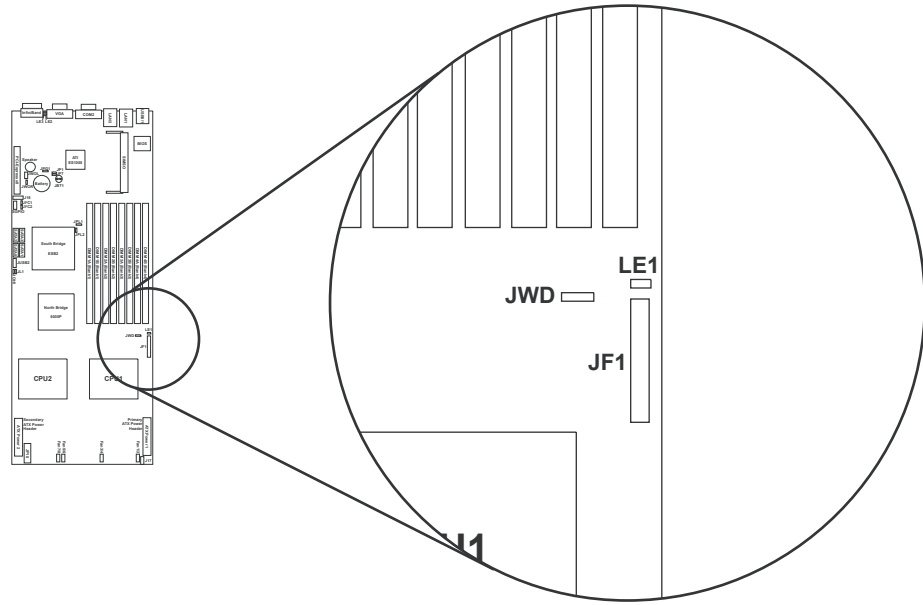
Figure 4-15   InfiniBand Link LED Location (LE1)

InfiniBand Link/Activity LEDs (LE2/LE3)

Table 4-33   InfiniBand Link/Activity LED Descriptions (LE2/LE3)

Notes	InfiniBand Link/Activity LEDs LE2/LE3	
	LED Color	Description
Two InfiniBand LED Indicators (LE2/LE3) are located near the InfiniBand connector (refer to Figure 4-16). The green LED (LE2) is the InfiniBand Link LED while the yellow LED (LE3) indicates activity.	LE2 Green (solid)	InfiniBand connected
	LE2 (Off)	No connection
	LE3 Yellow (solid)	InfiniBand active
	LE3 Yellow (dim)	InfiniBand connected but idle
	Off	No connection
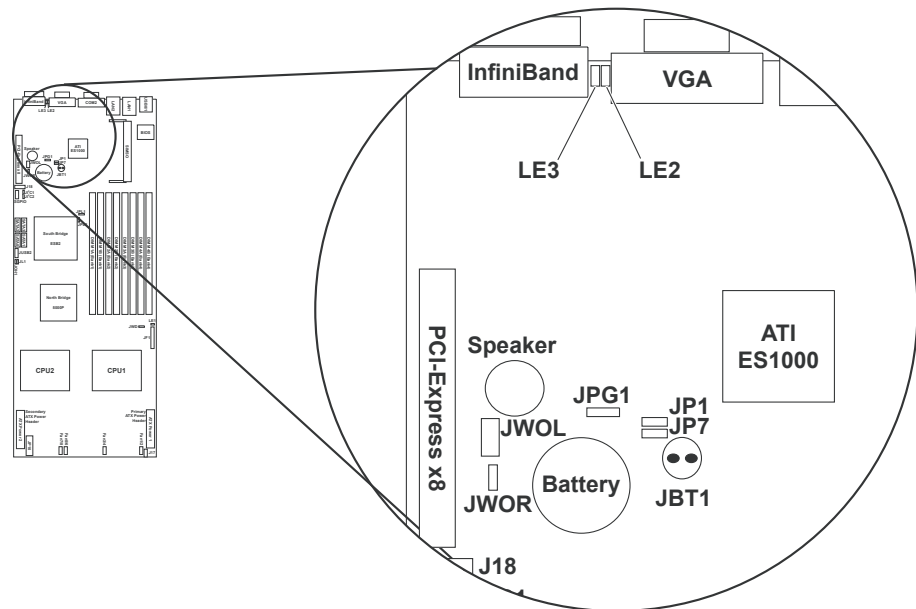
Figure 4-16   InfiniBand Link LED Location (LE2)

Advanced Chassis Setup

This chapter covers the steps required to install components and perform maintenance on the SGI Altix XE310 chassis (refer to Figure 5-1 and Figure 5-2).

ESD Precautions

Electrostatic Discharge (ESD) can damage electronic components. To prevent damage to any printed circuit boards (PCBs), it is important to handle them very carefully. The following measures are generally sufficient to protect your equipment from ESD discharge.

- Use a grounded wrist strap designed to prevent static discharge.

- Touch a grounded metal object before removing any board from its antistatic bag.

- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules, or gold contacts.

- When handling chips or modules, avoid touching their pins.

- Put the node board, add-on cards, and peripherals back into their antistatic bags when not in use.

- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners, and the node board.

- The node board is shipped in antistatic packaging to avoid static damage. When unpacking the board, make sure the person handling it is static protected.

Chassis Components

Control panel: primary serverboard

Control panel: secondary serverboard

SATA drives
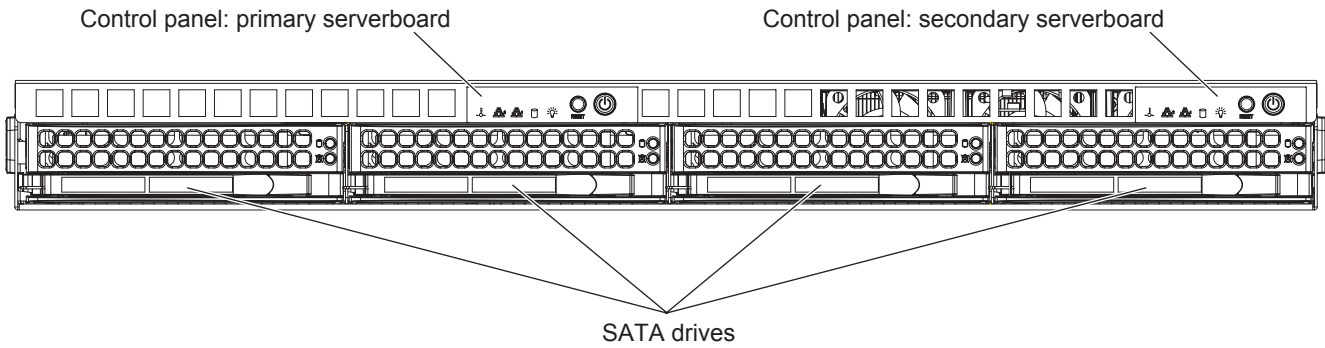
Figure 5-1   Chassis Front View

PCIe x8 slot

Power supply

PCIe x8 slot

USB ports

COM2 port

InfiniBand port

LAN ports

VGA port

USB ports

COM2 port

InfiniBand port

LAN ports

VGA port
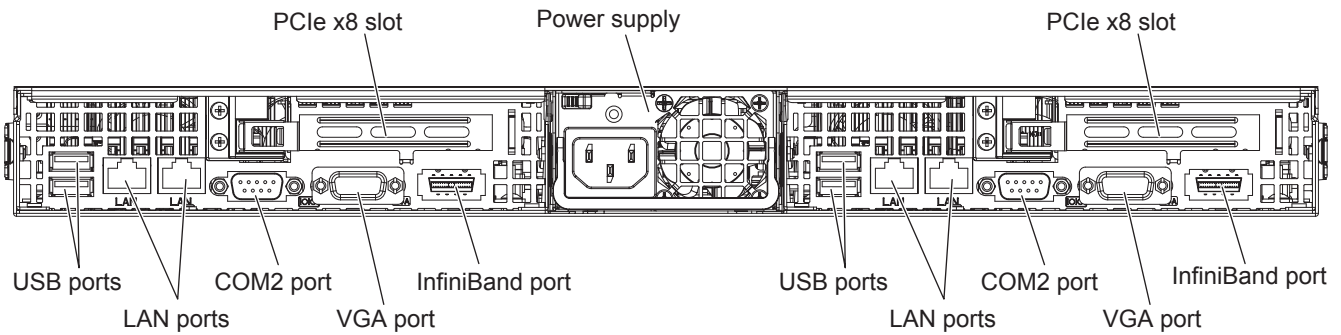
Figure 5-2   Chassis Rear View

Control Panel

Each control panel on the front of the chassis must be connected to the JF1 connector on its associated node board to provide you with system control buttons and status indicators. When viewed from the front of the chassis, the node board on the left is referred to as the primary node board and the node board on the right as the secondary.

These wires have been bundled together in a ribbon cable to simplify the connection. Refer to Table 4-5 on page 51. Connect the cable from JF1 (refer to Figure 5-3) on the node board to the control panel printed circuit board (PCB). Make sure the red wire plugs into pin 1 on both connectors. Pull all excess cabling out of the airflow path. The LEDs inform you of the node board status.
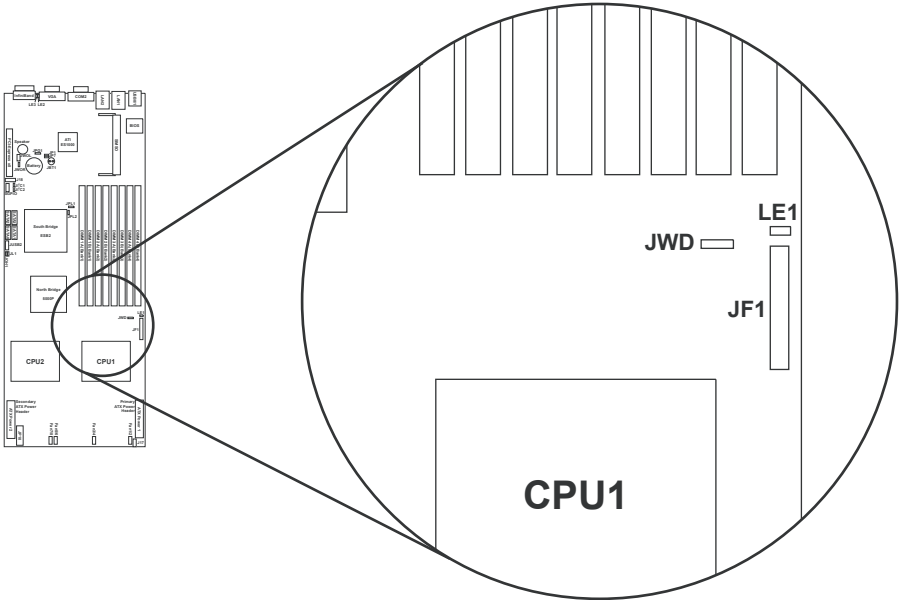
Figure 5-3   JF1 Connector Location

Part Numbers and Marketing Codes

Table 5-1 lists the marketing codes and part numbers for the SGI Altix XE310 server.

Table 5-1   Part Numbers and Marketing Codes

Description	SGI Part number/Marketing Code
1U dual server with InfiniBand on node board	SYS-6015T-INFB
1U dual server without InfiniBand on node board	SYS-6015T-TB
500 GB SATA disk drive	064-0320-001
250 GB SATA disk drive	064-0299-001
Disk drive trays	9470878
PCA, node board (Green creek chipset), with InfiniBand	030-2230-001
PCA, SAS Backplane	030-2232-001
PCA, riser card, 1U	030-2233-001
PCA, AOC-SIMSO, BMC IPMI2.0	030-2234-001
Power supply, 980+ watts	060-0262-001
Fan, 1U, 4mm x 40mm x 56mm, 6-pin with 5cm cable	9310221
Power cable, 4-pin	018-1355-001
SATA cables, set of 4	018-1356-001
Ribbon cable, round 16-pin to 16-pin	018-1354-001
Rackmount chassis	013-5425-001
System rail mounting kit	026-1598-001
Heat Sink 1U passive	7262257
Front panel LED board	9071049
Power Distribution Board	030-2229-001

System Fans

Each node board has its own set of three 4-cm high-performance fans (for a total of six in the chassis) to provide the cooling for the SGI Altix XE310. The fan speed can be controlled by a setting in BIOS.

Note: Refer to Chapter 6, "BIOS Settings" for more information.

System Fan Failure

If a fan fails, the remaining fans ramp up to full speed and the overheat/fan fail LED on the control panel blinks on and off. Replace any failed fan at your earliest convenience with a replacement fan from SGI (the system can continue to run with a failed fan). Remove the top chassis cover while the system is still running to determine which of the fans has failed. Then, power down the system and remove the power cord before replacing a fan.

Disk Drive Replacement

Note: SATA drives can be removed during operation (hot swapped) only if you are running an operating system that supports RAID.

Caution: Use caution when working with the SATA backplane. Do not touch the backplane with any metal objects, and make sure that ribbon cables do not touch the backplane. Also, regardless of how many SATA drives are installed, all four drive carriers must remain in the chassis to maintain proper airflow. Failure to follow these precautions can damage the equipment.

Disk Drive Installation

Mounting a SATA Drive in a Drive Carrier

The SATA drives are mounted in drive carriers (refer to Figure 5-4) to simplify their installation and removal from the chassis. These carriers also help promote proper airflow for the system. For this reason, even empty carriers without drives installed must remain in the chassis. To add a new drive, install it into the carrier with the printed circuit board side facing down so that the mounting holes align with those in the carrier. Secure the drive to the carrier with four screws, as shown in Figure 5-4.

Screws
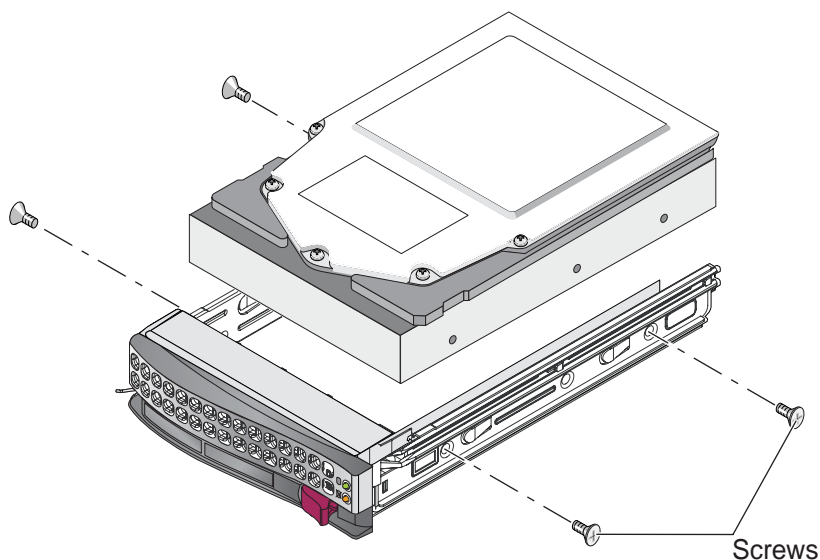
Figure 5-4   SATA Disk Drive Carrier

SATA Drive Replacement

The drive carriers are all easily accessible at the front of the chassis. These are (with RAID enabled) hot-swap drives. To remove a carrier, push the release button located beside the drive LEDs. Then, swing the handle fully out and use it to pull the unit straight out (refer to Figure 5-5).
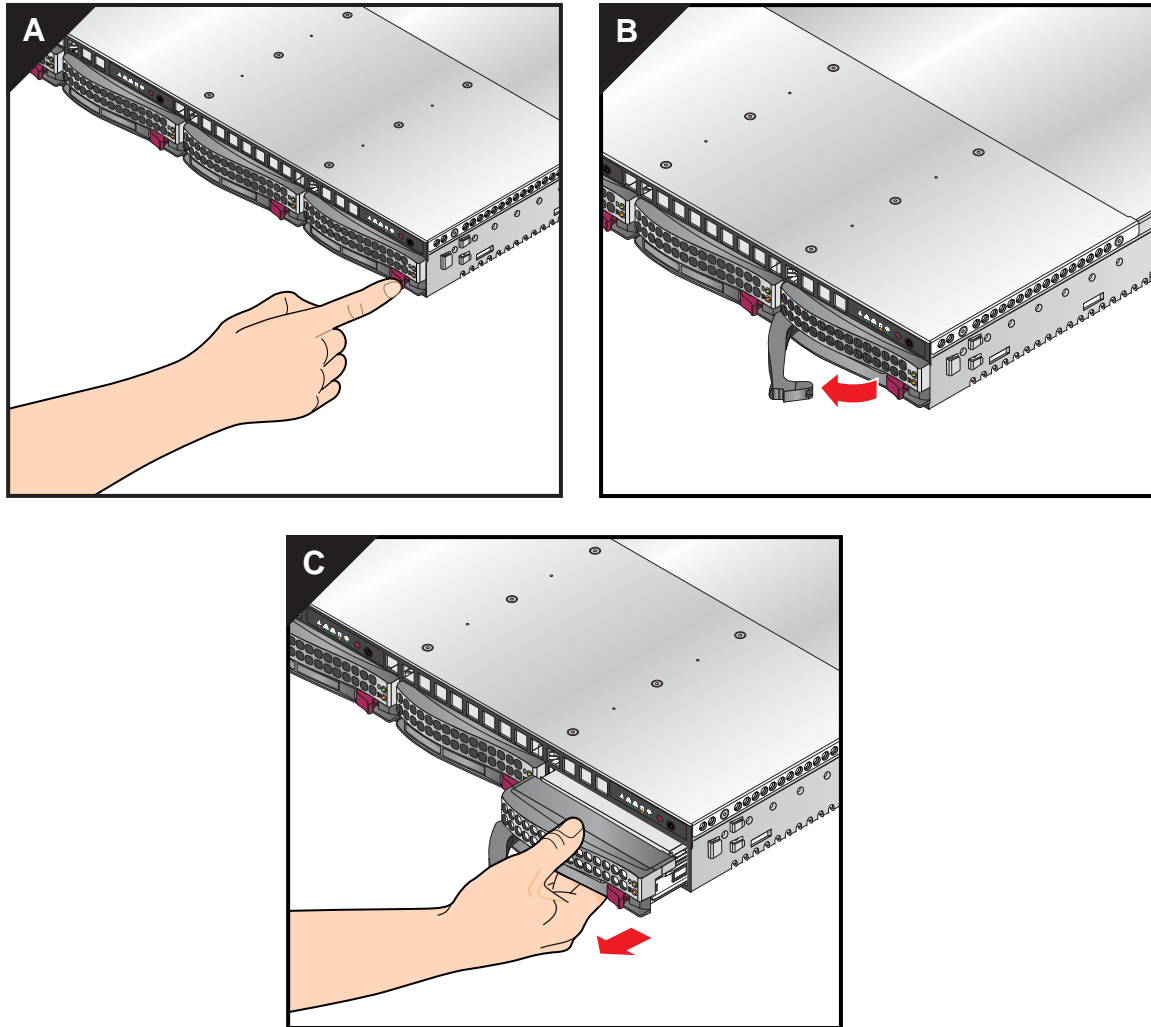
Figure 5-5   SATA Drive Removal

Power Supply

The SGI Altix XE310 has a single 980 watt power supply. This power supply has the capability of operating at 100 - 240 input volts. Depress both main power buttons on the front of the chassis and then unplug the AC power cord to completely remove power from the system before removing the power supply.

Power Supply Failure

If the power supply unit fails, the system shuts down and you must replace the power supply. Replacement power supplies can be ordered directly from SGI customer service.

Power Supply Replacement

To replace a power supply (refer to Figure 5-6):

1. Unplug the power cord from the system.

2. Use the handle to grasp the power supply

3. Move the lever to the right to unseat the power supply connector from the chassis.

4. Slide the power supply straight out of the chassis.
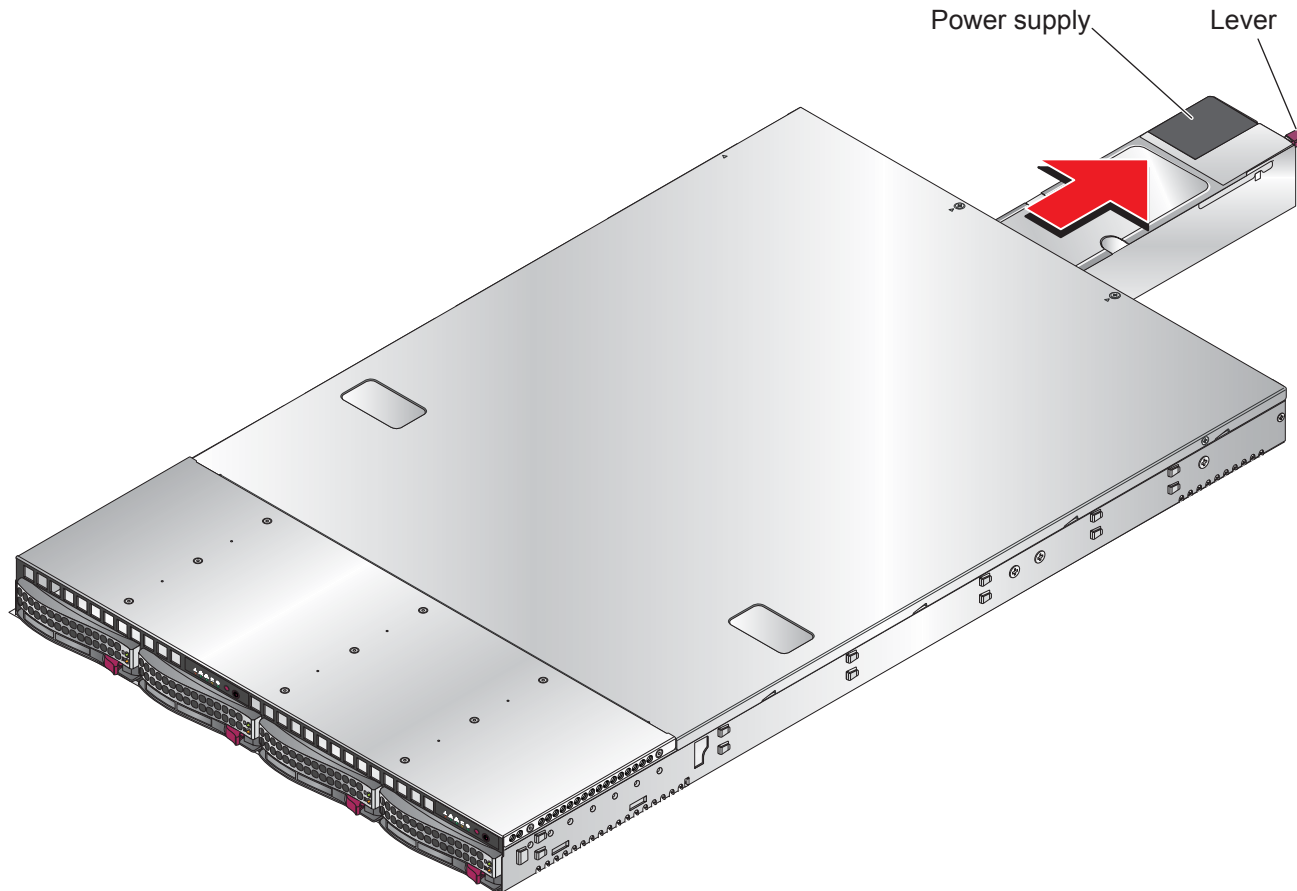
Figure 5-6   Power Supply Replacement

BIOS Settings

This chapter lists the BIOS default settings and describes the setup utility for the node board. The BIOS is stored in a flash chip and can be easily upgraded using a utility program.

Note: Due to periodic changes to the BIOS, some settings may have been added or deleted and might not yet be recorded in this manual.

Default Settings

Note: Some of the settings in Table 6-1 are reported by the system and stored in flash memory as a BIOS setting and cannot be changed. Examples are Extended Memory, CPU Speed, Fan RPM, etc.

Table 6-1 BIOS Default Settings

Menu Item	Setting	Page
Main		
System Time	[08:36:58]	92
System Date	[01/17/2007]	92
BIOS Date	12/28/06	92
> SATA Port 0	[None]	
> SATA Port 1	[None]	
> SATA Port 2	[None]	
> SATA Port 3	[None]	

Table 6-1 BIOS Default Settings **(continued)**

Menu Item	Setting	Page
Serial ATA	[Enabled]	93
Native Mode Operation	[Serial ATA]	94
SATA Controller Mode Option	[Enhanced]	94
SATA RAID	[Disabled]	95
SATA AHCI	[Enabled]	95
System Memory	634 KB	95
Extended Memory	2047 MB (*varies*)	95
MAIN / SATA Port		
Type	[Auto]	93
Multi-Sector Transfers	[16 Sectors]	94
LBA Mode Control	[Enabled]	94
32 Bit I/O	[Disabled]	94
Transfer Mode	[FPIO 4 / DMA 2]	94
Ultra DMA Mode	[Mode 5]	94
Advanced / Boot Features		
QuickBoot Mode	[Enabled]	96
QuietBoot Mode	[Enabled]	96
POST Errors	[Disabled]	97
ACPI Mode	[Yes]	97
Power Button Behavior	[Instant-Off]	97
Resume On Modem Ring	[Off]	97
Power Loss Control	[Last State]	97
Watch Dog	[Disabled]	97
Summary screen	[Enabled]	97

	Table 6-1	BIOS Default Settings **(continued)**	

Menu Item	Setting	Page
Advanced / Memory Cache		
Cache System BIOS area	[Write Protect]	98
Cache Base 0-512k	[Write Back]	98
Cache Base 512k-640k	[Write Back]	98
Cache Extended Memory Area	[Write Back]	98
Advanced / PCI Configuration		
Onboard G-LAN1 OPROM Configure	[Enabled]	99
Onboard G-LAN2 OPROM Configure	[Enabled]	99
Default Primary Video Adapter	[Onboard]	99
Emulated IRQ Solution	[Disabled]	99
PCIe I/O Performance	[Payload 256B]	99
PCI Parity Error Forwarding	[Disabled]	99
ROM Scan Ordering	[Onboard First]	100
Reset Configuration Data	[No]	100
> SLOT1 PCI-Exp x8		100
Large Disk Access Mode	[Other]	100
Advanced / PCI Configuration / SLOT1 PCI-Exp x8		
Option ROM Scan	[Enabled]	100
Enable Master	[Enabled]	100
Latency Timer	[Default]	100
Advanced /Advanced Chipset Control		
SERR signal condition	[Single bit]	101
4GB PCI Hole Granularity	[256 MB]	101

Table 6-1 BIOS Default Settings **(continued)**

Menu Item	Setting	Page
Memory Branch Mode	[Interleave]	101
Branch 0 Rank Interleave	[4:1]	101
Branch 0 Rank Sparing	[Disabled]	101
Branch 1 Rank Interleave	[4:1]	101
Branch 1 Rank Sparing	[Disabled]	101
Enhanced x8 Detection	[Enabled]	102
High Bandwidth FSB	[Enabled]	102
High Temp DRAM OP	[Disabled]	102
AMB Thermal Sensor	[Disabled]	102
Thermal Throttle	[Disabled]	102
Global Activation Throttle	[Disabled]	102
Snoop Filter	[Enabled]	103
Crystal Beach Feature	[Enabled]	103
Route Port 80h cycles to	[LPC]	103
Clock Spectrum Feature	[Enabled]	103
High Precision Event Timer	[Yes]	103
USB Function	[Enabled]	104
Legacy USB Support	[Enabled]	104
Advanced / Advanced Processor Options		
CPU Speed	2.33 GHz (*varies*)	104
Frequency Ratio	[Default]	104
Core Multi-Processing	[Enabled]	104
Machine Checking	[Enabled]	104

<p align="center">**Table 6-1** BIOS Default Settings **(continued)**</p>

Menu Item	Setting	Page
Thermal Management 2	[Enabled]	104
C1 Enhanced Mode	[Disabled]	105
Execute Disable Bit	[Enabled]	105
Adjacent Cache Line Prefetch	[Disabled]	105
Hardware Prefetcher	[Enabled]	105
Direct Cache Access	[Disabled]	105
Intel(R) Virtualization Technology	[Disabled]	106
Intel EIST support	[Disabled]	106
Advanced / I/O Device Configuration		
Serial port A	[Enabled]	106
Base I/O address	[3F8]	106
Interrupt	[IRQ 4]	106
Serial port B	[Enabled]	107
Mode	[Normal]	107
Base I/O address	[2F8]	107
Interrupt	[IRQ 3]	107
Advanced / DMI Event Logging		
Event log validity	Valid	107
Event log capacity	Space Available	107
View DMI event log	[Enter]	107
Event Logging	[Enabled]	107
ECC Event Logging	[Enabled]	108
Mark DMI events as read	[Enter]	108
Clear all DMI event logs	[No]	108

Table 6-1   BIOS Default Settings **(continued)**

Menu Item	Setting	Page
Advanced / Console Redirection		
Com Port Address	[On-board COM B]	108
Baud Rate	[115.2K]	108
Console Type	[VT100+]	108
Flow Control	[CTS ⁄ RTS]	108
Console connection	[Direct]	109
Continue C.R. after POST	[On]	109
Advanced / Hardware Monitor		
CPU Temperature Threshold	[75C]	109
PECI Agent 1	24 C	
PECI Agent 2	17 C	
System Temperature	26 C	
FAN1 =	10629 RPM	
FAN2 =	9060 RPM	
FAN3 =	10546 RPM	
FAN4 =	9375 RPM	
FAN5 =	10975 RPM	
FAN6 =	9000 RPM	
FAN7 =	N ⁄ A	
FAN8 =	N ⁄ A	
Fan Speed Control Modes	[1) disable (full speed)]	110
VcoreA	1.198 V	110
VcoreB	1.218 V	110
P1V5	1.504 V	110

<p style="text-align:center">Table 6-1   BIOS Default Settings (continued)</p>

Menu Item	Setting	Page
+3.3V	3.296 V	110
+12V	11.904 V	110
5Vsb	4.872 V	110
5VDD	4.968 V	110
P_VTT	1.200 V	110
Vbat	3.296 V	110
Advanced / IPMI		
IPMI Specification Version	2.0	111
Firmware Version	1.25	111
System Event Logging	[Enabled]	111
Clear System Event Log	[Disabled]	112
Existing Event Log number	40	112
SYS Firmware Progress	[Disabled]	112
BIOS POST Errors	[Enabled]	112
BIOS POST Watchdog	[Disabled]	112
OS boot Watchdog	[Disabled]	112
Timer for loading OS (min)	[10]	112
Time out action	[No Action]	112
> System Event Log	Data	113
> System Event Log (list mode)	Data	113
> Realtime Sensor Data	Data	115
Security		
Supervisor Password Is	Clear	116
User Password Is	Clear	116

Table 6-1   BIOS Default Settings **(continued)**

Menu Item	Setting	Page
Set Supervisor Password	[Enter]	116
Set User Password	[Enter]	116
Password on boot	[Disabled]	116
Boot		117
1: USB FDC		117
2: IDE CD		117
3: USB CDROM		117
4: USB KEY		117
5: ALL PCI BEV		117
6: ALL PCI SCSI		117
7:		117
8:		117
: IDE 0:		117
: IDE 1:		117
: IDE 4:		117
: IDE 5:		117
: USB HDD:		117
: PCI SCSI:	HDT722525DLA380-(S0)	117
: PCI SCSI:	HDS725050KLA360-(S1) (If installed)	117
: USB ZIP:		117
: USB LS120:		117
: Other USB:		117

System BIOS

The BIOS is the Basic Input Output System used in nearly all computers. The BIOS stores the system parameters, types of disk drives, video displays, etc. in the CMOS. The CMOS memory requires very little electrical power. When the computer is turned off, a backup battery provides power to the CMOS logic, enabling it to retain system parameters. Each time the computer is powered on, the computer is configured with the values stored in the CMOS by the system BIOS, which gains control at boot up.

How To Change the Configuration Data

The CMOS information that determines the system parameters may be changed by entering the BIOS Setup utility. This Setup utility can be accessed by pressing the <Delete> key at the appropriate time during system boot.

Starting the Setup Utility

Normally, the only visible power-on self-test (POST) routine is the memory test. As the memory is being tested, press the <Delete> key to enter the main menu of the BIOS Setup utility. From the main menu, you can access the other setup screens, such as the Security and Power menus. Detailed descriptions are provide in the section for each parameter setting in the Setup utility.

⚠ **Caution:** To prevent possible boot failure, do not shut down or reset the system while updating BIOS.

Running Setup

The BIOS setup options described in this section are selected by choosing the appropriate text from the main BIOS Setup screen. All displayed text is described in this section, although the screen display is often all you need to understand how to set the options.

When you first power on the computer, the BIOS is immediately activated.

While the BIOS is in control, the Setup program can be activated in one of two ways:

1. By pressing <Delete> immediately after turning the system on.

2. When the message shown below is displayed briefly at the bottom of the screen during the power-on self-test (POST), press the <Delete> key to activate the main Setup menu:

```
Press the <Delete> key to enter Setup
```

Main BIOS Setup

The main BIOS Setup screen is displayed in Figure 6-1. All main setup options are described in this section.

- Use the Up/Down arrow keys to move among the different settings in each menu.

- Use the Left/Right arrow keys to change the options for each setting.

- Press the <Esc> key to exit the CMOS Setup Menu. The next section describes in detail how to navigate through the menus.

- Items that use submenus are indicated triangle icon. With the item highlighted, press the <Enter> key to access the submenu.
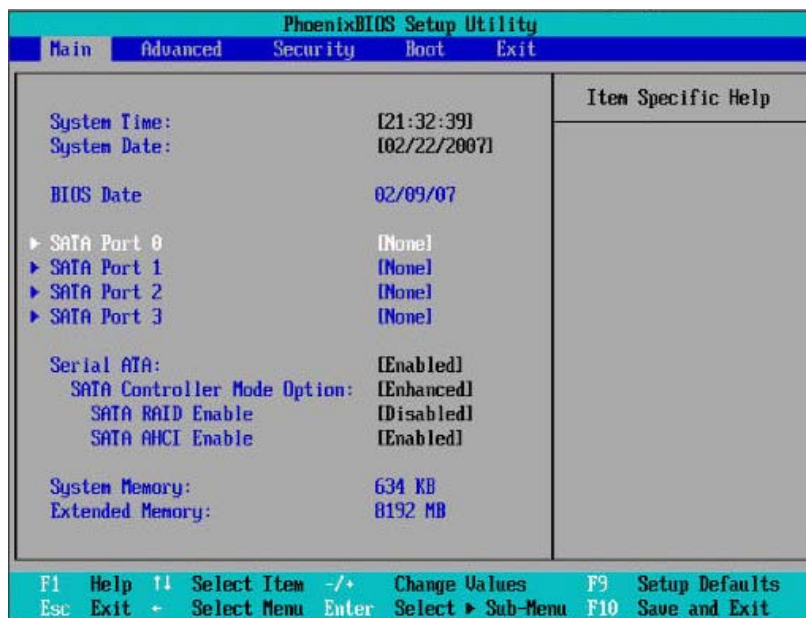
Figure 6-1   Main BIOS Setup Menu

Main Setup Features

System Time

> To set the system date and time, type the correct information into the appropriate fields. Then, press the <Enter> key to save the data.

System Date

> Using the arrow keys, highlight the month, day, and year fields, and enter the correct data. Press the <Enter> key to save the data.

BIOS Date

> This field displays the date when this version of BIOS was built.

Serial ATA Ports

These settings allow the user to set the parameters of the SATA ports. Press <Enter> to activate the following submenu screen for detailed options of these items. Set the correct configurations accordingly.

```
                        PhoenixBIOS Setup Utility
   Main

         SATA Port 0            [None]              Item Specific Help

   Type:                       [Auto]           User = you enter
                                                parameters of hard-disk
   Multi-Sector Transfers:    [Disabled]        drive installed at this
   LBA Mode Control:          [Disabled]        connection.
   32 Bit I/O:                [Disabled]        Auto = autotypes
   Transfer Mode:             [Standard]        hard-disk drive
   Ultra DMA Mode:            [Disabled]        installed here.
                                                CD-ROM = a CD-ROM drive
                                                is installed here.
                                                ATAPI Removable =
                                                removable disk drive is
                                                installed here.



   F1   Help   ↑↓  Select Item  -/+   Change Values   F9   Setup Defaults
   Esc  Exit   ←   Select Menu   Enter Select ▶ Sub-Menu  F10  Save and Exit
```

Type

This option enables you to select the type of IDE hard drive. The option Auto enables the BIOS to automatically configure the parameters of the hard disk drive (HDD) installed at the connection. Enter a number between 1 to 39 to select a predetermined HDD type. Select User to allow the user to enter the parameters of the HDD installed.

Multi-Sector Transfers

This item enables you to specify the number of sectors per block to be used in multi-sector transfer. The options are Disabled, 4 Sectors, 8 Sectors, and 16 Sectors.

LBA Mode Control

This item determines whether the BIOS accesses the IDE Channel 0 Master Device via the LBA mode. The options are Enabled and Disabled.

32 Bit I/O

This option enables you to enable or disable the function of 32-bit data transfer. The options are Enabled and Disabled.

Transfer Mode

This option allows the user to set the transfer mode. The options are Standard, Fast PIO1, Fast PIO2, Fast PIO3, Fast PIO4, FPIO3/DMA1 and FPIO4/DMA2.

Ultra DMA Mode

This option allows the user to select Ultra DMA Mode. The options are Disabled, Mode 0, Mode 1, Mode 2, Mode 3, Mode 4, and Mode 5.

Native Mode Operation

Select the native mode for ATA. The options are: Serial ATA and Auto.

SATA Controller Mode

Select Compatible to allow the SATA and PATA drives to be automatically-detected and be placed in the Legacy Mode by the BIOS. Select Enhanced to allow the SATA and PATA drives to be to be automatically-detected and be placed in the Native IDE Mode.

When the SATA Controller Mode is set to Enhanced, the following items are displayed:

Serial ATA (SATA) RAID Enable

Select Enable to enable Serial ATA RAID Functions. (For the Windows OS environment, use the RAID driver if this feature is set to Enabled. When this item is set to Enabled, the item: "ICH RAID Code Base" is available for you to select Intel or Adaptec Host RAID firmware to be activated. If this item is set to Disabled, the item-SATA AHCI Enable is available.) The options are Enabled and Disabled.

ICH RAID Code Base (Available when SATA RAID is Enabled)

Select Intel to enable the Intel SATA RAID firmware. Select Adaptec to use the Adaptec HostRAID firmware. The options are Intel and Adaptec.

SATA AHCI (Available when SATA RAID is Disabled)

Select Enable to enable the function of Serial ATA Advanced Host Interface. (**Use caution when using this function. This feature is for advanced programmers only**.) The options are Enabled and Disabled.

System Memory

This display informs you how much system memory is recognized as being present in the system.

Extended Memory

This display informs you how much extended memory is recognized as being present in the system.

Advanced Setup

Choose Advanced from the BIOS Setup Utility main menu with the arrow keys. The items with a triangle beside them have submenus that can be accessed by highlighting the item and pressing <Enter>.
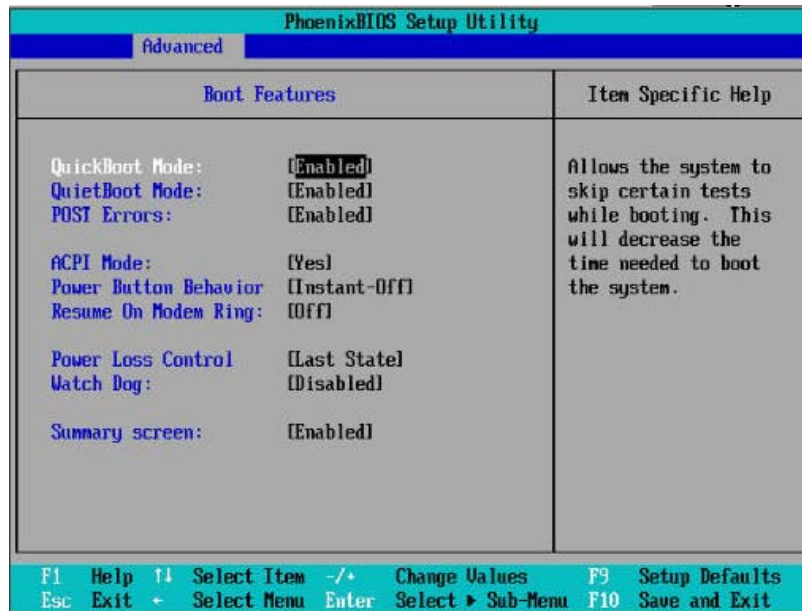
Boot Features

Access the submenu to make changes to the following settings.

QuickBoot Mode

If enabled, this feature speeds up the POST routine by skipping certain tests after the computer is turned on. The settings are Enabled and Disabled. If Disabled, the POST routine will run at normal speed.

QuietBoot Mode

This setting enables you to Enable or Disable the graphic logo screen during boot-up.

POST Errors

Set to Enabled to display POST Error Messages if an error occurs during bootup. If set to Disabled, the system will continue to boot without displaying any error message even when a boot error occurs.

ACPI Mode

Use this setting to determine if you want to employ ACPI (Advanced Configuration and Power Interface) power management on your system. The options are Yes and No.

Power Button Behavior

If set to Instant-Off, the system will power off immediately as soon as the user hits the power button. If set to 4-sec., the system will power off when the user presses the power button for 4 seconds or longer. The options are instant-off and 4-second override.

Resume On Modem Ring

Select On to "wake your system up" when an incoming call is received by your modem. The options are On and Off.

Power Loss Control

The feature allows the user to set the power state after a power outage. You can select Stay Off for the system power to remain off after a power loss. Select Power On for the system power to be turned on after a power loss. Select Last State to allow the system to resume its last state before the power loss.

Watch Dog

If enabled, this option automatically resets the system if the system is not active for more than 5 minutes. The options are Enabled and Disabled.

Summary Screen

This setting enables you to Enable or Disable the summary screen, which displays the system configuration during bootup.

Memory Cache

Cache System BIOS Area

This setting enables you to designate a reserve area in the system memory to be used as a System BIOS buffer to allow BIOS to write (cache) its data into it. Select Write Protect to enable the function and reserve this area for system BIOS ROM access only. Select Uncached to disable this function and make this area available for other devices.

Cache Base 0-512K

If enabled, this feature will allow the data stored in the base memory area: block 0-512K to be cached (written) into a buffer, a storage area in the Static DROM (SDROM), or to be written into L1 or L2 cache inside the CPU to speed up CPU's operations. Select Uncached to disable this function. Select Write Through to allow data to be cached into the buffer and written into the system memory at the same time. Select Write Protect to prevent data from being written into the base memory area of Block 0-512K. Select Write Back to allow the CPU to write data back directly from the buffer without writing data to the system memory in order to speed up CPU's operation. The options are Uncached, Write Through, Write Protect, and Write Back.

Cache Base 512K-640K

If enabled, this feature will allow the data stored in the memory area: 512K-640K to be cached (written) into a buffer, a storage area in the SDRAM or written into L1, L2, or L3 cache inside the CPU to speed up CPU operations. Select Uncached to disable this function. Select Write Through to allow data to be cached into the buffer and written into the system memory at the same time. Select Write Protect to prevent data from being written into the base memory area of Block 512-640K. Select Write Back to allow the CPU to write data back directly from the buffer without writing data to the system memory to speed up CPU's operation. The options are Uncached, Write Through, Write Protect, and Write Back.

Cache Extended Memory

If enabled, this feature will allow the data stored in the extended memory area to be cached (written) into a buffer, a storage area in the Static DROM (SDROM), or written into L1, L2, or L3 cache inside the CPU to speed up CPU's operations. Select Uncached to disable this function. Select Write Through to allow data to be cached into the buffer and written into the system memory at the same time. Select Write Protect to prevent data

from being written into the base memory area of Block 0-512K. Select Write Back to allow the CPU to write data back directly from the buffer without writing data to the system memory to speed up CPU's operation. The options are Uncached, Write Through, Write Protect and Write Back.

PCIe Configuration

Access the submenu to make changes to the following settings for PCIe devices.

Onboard GLAN1/Onboard GLAN2 (Gigabit- LAN) OPROM Configure

Enabling this option provides the capability to boot from GLAN Port 1 or GLAN Port 2. The options are Disabled and Enabled.

Default Primary Video Adapter

This feature allows the user to specify which video adapter is to be used as the default primary video adapter: the onboard video adapter or others. The options are Other and Onboard Video.

Emulated IRQ Solutions

The options are Disabled and Enabled.

PCIe I/O Performance

Some add-on cards perform faster with the coalesce feature, which limits the payload size to 128 bytes, while others perform faster with a payload size of 256 bytes, which inhibits coalesce features. Please refer to your add-on card user guide for the desired setting. The options are Payload (256 bytes) and Coalesce Enabled (128 bytes).

PCIe Parity Error Forwarding

The feature allows SERR and PERR errors detected in PCIe slots to be sent (forwarded) to the BIOS DMI Event Log for the user to review. The options are Enabled and Disabled.

ROM Scan Ordering

This feature allows the user to decide which Option ROM should be activated first. The options are Onboard first and Add-On first.

Reset Configuration Data

If set to Yes, this setting clears the Extended System Configuration Data- (ESCD) area. The options are Yes and No.

Slot1 PCIe x8

Access the submenu for each of the settings above to make changes to the following:

Option ROM Scan

When enabled, this setting will initialize the device expansion ROM. The options are Enabled and Disabled.

Enable Master

This setting enables you to enable the selected device as the PCI bus master. The options are Enabled and Disabled.

Latency Timer

This setting enables you to set the clock rate for Bus Master. A high-priority, high throughout device may benefit from a greater clock rate. The options are Default, 0020h, 0040h, 0060h, 0080h, 00A0h, 00C0h, and 00E0h. For Unix, Novell and other Operating Systems, please select the option: other. If a drive fails after the installation of a new software, you might want to change this setting and try again. A different OS requires a different Bus Master clock rate.

Large Disk Access Mode

This setting determines how large a hard drive is to be accessed. The options are DOS or Other (for Unix, Novell NetWare, and other operating systems).

Advanced Chipset Control

Access the submenu to make changes to the following settings.

⚠️ **Caution:** Use caution when changing the Advanced settings. Incorrect values entered may cause a system to malfunction. Also, a very high DRAM frequency or incorrect DRAM timing may cause system to become unstable. When this occurs, revert the item to the default setting.

SERR Signal Condition

This setting specifies the ECC Error conditions. The options are None, Single Bit, Multiple Bit, and Both.

4GB PCIe Hole Granularity

This feature enables you to specify the size of PCIe hole. The options are: 256 MB, 512 MB, 1GB and 2GB.

Memory Branch Mode

This option determines how the two memory branches operate. System address space can either be interleaved between the two branches or Sequential from one branch to another. Mirror mode allows data correction by maintaining two copies of data in two branches. Single Channel 0 allows a single DIMM population during system manufacturing. The options are Interleave, Sequential, Mirroring, and Single Channel 0.

Branch 0/1 Rank Interleaving

Select Enabled to enable the feature of memory Interleaving for Branch 0 Rank/ Branch1 Rank. The options are 1:1, 1:2 and 1:4.

Branch 0/1 Rank Sparing

Select Enabled to enable the sparing feature for Branch 0 Rank/Branch 1 Rank. The options are Enabled and Disabled.

Enhanced x8 Detection

Select Enabled to enable Enhanced x8 DRAM UC Error Detection. The options are Disabled and Enabled.

High Bandwidth FSB

The front side bus (FSB) is the physical bi-directional data bus that carries signals between the central processing unit (CPU) and other devices within the system, such as random access memory (RAM), AGP video cards, PCI expansion cards, hard disks, the memory containing the system BIOS, etc. A higher bandwidth FSB improves performance of the system. The options are Enabled and Disabled.

High Temperature DRAM Operation

When set to Enabled, the BIOS will refer to the SPD table to set the maximum DRAM temperature. When set to Disabled, the BIOS sets the maximum DRAM temperature based on a predefined value. The options are Enabled and Disabled.

AMB Thermal Sensor

Select Enabled to enable the thermal sensor embedded in the Advanced Memory Buffer on a fully buffered memory module for thermal monitoring. The options are Disabled and Enabled.

Thermal Throttle

Select Enabled to enable the function of closed-loop thermal throttling on a fully buffered (FBD) memory module. In the closed-loop thermal environment, thermal throttling will be activated when the temperature of the FBD DIMM device exceeds a predefined threshold. The options are Enabled and Disabled.

Global Activation Throttle

Select Enabled to enable open-loop global thermal throttling on a fully buffered (FBD) memory module to make it active whenever the number of activate control exceeds a predefined number. The options are Enabled and Disabled.

Snoop Filter

Select Enabled to eliminate snoop traffic to the graphics port to improve system performance when running graphics intensive applications. The options are Enabled and Disabled.

Crystal Beach Features

This feature was designed to implement Intel's I/O AT (Acceleration Technology) to accelerate the performance of TCP offload engine (TOE) devices.

Note: A TOE device is a specialized, dedicated processor that is installed on an add-on card or a network card to handle some or all packet processing of the add-on card. For this motherboard, the TOE device is built inside the ESB2 southbridge chip. The options are Enabled and Disabled.

Route Port 80h Cycles to

This feature allows the user to decide which bus to send debug information to. The options are Disabled, PCI, and LPC.

Clock Spectrum Feature

If Enabled, the BIOS will monitor the level of Electromagnetic Interference caused by the components and will attempt to decrease the interference whenever needed. The options are Enabled and Disabled.

High Precision Event Timer

This is a replacement timer for the 8254 Programmable Interval Timer and the Real-time clock's (RTC) periodic interrupt function. The high-precision event timer (HPET) can produce periodic interrupts at much higher resolutions than the RTC interrupt function. The HPET is used to synchronize multimedia streams and provide smooth playback which reduces the need to use other timestamp calculations such as the Intel x86 RDTSC instruction.

USB Function

Select Enabled to enable the function of USB devices specified. The settings are Enabled and Disabled.

Legacy USB Support

This setting enables you to enable Legacy USB device support. The settings are Enabled and Disabled.

Advanced Processor Options

CPU Speed

This is a display that indicates the speed of the installed processor.

Frequency Ratio

This feature enables you to set the internal frequency multiplier for the CPU. The options are: Default, x12, x13, x14, x15, x16, x17 and x18.

Core-Multi-Processing

Set to Enabled to use a processor's second core and beyond. (Please refer to Intel's web site for more information.) The options are Disabled and Enabled.

Machine Checking

Set to Enabled to activate the function of Machine Checking and allow the CPU to detect and report hardware (machine) errors via a set of model-specific registers (MSRs). The options are Disabled and Enabled.

Thermal Management 2

Set to Enabled to use Thermal Management 2 (TM2), which will lower CPU voltage and frequency when the CPU temperature reaches a predefined overheat threshold. Set to Disabled to use Thermal Manager 1 (TM1), allowing CPU clocking to be regulated via

CPU Internal Clock modulation when the CPU temperature reaches the overheat threshold.

C1 Enhanced Mode

Select Disable to disable the Standard C1 Halt State, which will partially turns off the CPU internal clocks to conserve energy and prevent system overheating when the OS is idle. Select Enable to use the Enhanced C1 Halt State to lower the CPU clock frequency and the supply voltage before turning off the clocks.

Execute Disable Bit

Set to Enabled to enable Execute Disable Bit and allow the processor to classify areas in memory where an application code can be executed and where it cannot, and thus preventing a worm or a virus from inserting and creating a flood of codes to overwhelm the processor or damage the system during an attack. The options are Disabled and Enabled.

Adjacent Cache Line Prefetch

The CPU fetches the cache line for 64 bytes if this option is set to Disabled. The CPU fetches both cache lines for 128 bytes as comprised if Enabled. The options are Disabled and Enabled.

Hardware Prefetch

Set this option to Enabled to enable the hardware components that are used in conjunction with software programs to prefetch data in order to shorten execution cycles and maximize data processing efficiency. The options are Disabled and Enabled.

Direct Cache Access

Set to Enable to route inbound network IO traffic directly into processor caches to reduce memory latency and improve network performance. The options are Disabled and Enabled.

DCA Delay Clocks

> This feature allows the user to set the clock delay setting from snoop to prefetch for Direct Cache Access. Select a setting from 8 (bus cycles) to 120 (bus cycles) (in 8-cycle increment). The default setting is 32 (bus cycles).

Intel Virtualization Technology

> Select Enabled to use the Intel Virtualization Technology and enable one platform to run multiple operating systems and applications in independent partitions, creating multiple "virtual" systems in one physical computer. The options are Enabled and Disabled.

> **Note:** If there is any change to this setting, you must power off and restart the system for the change to take effect.

Intel EIST Support

> Select Enabled to use the Enhanced Intel SpeedStep Technology and enable the system to automatically adjust processor voltage and core frequency in an effort to reduce power consumption and heat dissipation. The options are Enabled and Disabled.

I/O Device Configuration

> Access the submenu to make changes to the following settings.

Serial Port A

> This setting enables you to assign control of serial port A. The options are Enabled (user defined), Disabled, Auto (BIOS controlled), and OS Controlled.

> **Base I/O Address**
> This setting enables you to select the base I/O address for serial port A. The options are 3F8, 2F8, 3E8, and 2E8.

> **Interrupt**
> This setting enables you to select the IRQ (interrupt request) for serial port B. The options are IRQ3 and IRQ4.

Serial Port B

This setting enables you to assign control of serial port B. The options are Enabled (user defined), Disabled, Auto (BIOS controlled), and OS Controlled.

Mode
This setting enables you to set the type of device that will be connected to serial port B. The options are Normal, IR (for an infrared device), and ASK_IR.

Base I/O Address
This setting enables you to select the base I/O address for serial port B. The options are 3F8, 2F8, 3E8, and 2E8.

Interrupt
This setting enables you to select the IRQ (interrupt request) for serial port B. The options are IRQ3 and IRQ4.

DMI Event Logging

Access the submenu to make changes to the following settings.

Event Log Validity

This is a display to inform you of the event log validity. It is not a setting.

Event Log Capacity

This is a display to inform you of the event log capacity. It is not a setting.

View DMI Event Log

Highlight this item and press <Enter> to view the contents of the event log.

Event Logging

This setting enables you to Enable or Disable event logging.

ECC Event Logging

This setting enables you to Enable or Disable ECC event logging.

Mark DMI Events as Read

Highlight this item and press <Enter> to mark the DMI events as read.

Clear All DMI Event Logs

Select Yes and press <Enter> to clear all DMI event logs. The options are Yes and No.

Console Redirection

Access the submenu to make changes to the following settings.

COM Port Address

This item enables you to specify which COM port to direct the remote console to: Onboard COM A or Onboard COM B. This setting can also be Disabled.

BAUD Rate

This item enables you to set the BAUD rate for console redirection. The options are 300, 1200, 2400, 9600, 19.2K, 38.4K, 57.6K, and 115.2K.

Console Type

This item enables you to set console redirection type. The options are VT100, VT100,8bit, PC-ANSI, 7bit, PC ANSI, VT100+, VT-UTF8, and ASCII.

Flow Control

This item enables you to select the flow control option for console redirection. The options are None, XON/XOFF, and CTS/RTS.

Console Connection

This item enables you to decide how console redirection is to be connected: either Direct or Via Modem.

Continue CR after POST

Choose whether to continue with console redirection after the POST routine. The options are On and Off.

Hardware Monitor

Note: The BIOS automatically detects the type of CPU(s) and hardware monitoring chips that are used on the motherboard and displays the Hardware Monitoring Screen accordingly. The Hardware Monitoring Screen may look different than one shown on the following pages.

CPU Temperature Threshold

This option allows the user to set a CPU temperature threshold that will activate the alarm system when the CPU temperature reaches this pre-set temperature threshold. The options are 70°C, 75°C, 80°C, and 85°C.

Highlight this and press <Enter> to view monitor data for the following items:

- CPU1 Temperature
- CPU1 Second Core
- CPU2 Temperature
- CPU2 Second Core
- System Temperature
- Fan1-Fan8 Speeds: If the feature of Auto Fan Control is enabled, the BIOS will automatically display the status of the fans indicated in this item.

Fan Speed Control Modes

This feature allows the user to decide how the system controls the speeds of the onboard fans. The CPU temperature and the fan speed are correlative. When the CPU on-die temperature increases, the fan speed will also increase, and vice versa. Select Workstation if your system is used as a Workstation. Select Server if your system is used as a Server. Select 3-pin if your chassis uses 3-pin fans. Select 4-pin if your chassis uses 4-pin fans. Select "Disable" to disable the fan speed control function and allow the onboard fans to constantly run at the full speed (12V). The Options are: 1. Disable, 2. Optimized Server w/3-pin, 3. Optimized Workstation w/3-pin, 4. Optimized Server w/4-pin, and 5. Optimized Workstation w/4-pin.

Voltage Monitoring

The following items are monitored and displayed:

- Vcore A
- Vcore B
- P1V5
- +3.3V
- +12V
- 5Vsb
- 5VDD
- P_VTT
- Vbat

IPMI

```
                    PhoenixBIOS Setup Utility
        Advanced

                    IPMI                      Item Specific Help

    IPMI Specification Version   2.0          Enable/Disable IPMI
    Firmware Version             1.25         event logging. Disabling
                                              will still log events
    System Event Logging        [Enabled]     received via the system
    Existing Event Log number   0             interface.
    Event Log Control
      SYS Firmware Progress     [Disabled]
      BIOS POST Errors          [Enabled]

    BIOS POST Watchdog          [Disabled]
    OS boot Watchdog            [Disabled]
      Timer for loading OS (min) [ 10]
      Time out action           [No Action]

    ▶ Realtime Sensor Data                ▼

    F1   Help  ↑↓  Select Item  -/+    Change Values   F9   Setup Defaults
    Esc  Exit  ←   Select Menu  Enter  Select ▶ Sub-Menu  F10  Save and Exit
```

IPMI Specification Version

This item displays the current IPMI Version.

Firmware Version

This item displays the current Firmware Version.

System Event Logging

Select Enabled to enable IPMI Event Logging. When this function is set to Disabled, the system will continue to log events received via system interface. The options are Enabled and Disabled.

Clear System Event Logging

Enable this function to force the BIOS to clear the system event logs during the next cold boot. The options are Enabled and Disabled.

Existing Event Log Number

This item displays the number of the existing event log.

Event Log Control

System Firmware Progress
Enable this function to log POST progress. Options are Enabled and Disabled.

BIOS POST Errors
Enable this function to log POST errors. Options are Enabled and Disabled.

BIOS POST Watch Dog
Set to Enabled to enable POST Watch Dog. Options are Enabled and Disabled.

OS Boot Watch Dog
Set to Enabled to enable OS Boot Watch Dog. The options are Enabled and Disabled.

Timer for Loading OS (Minutes)
This feature allows the user to set the time value (in minutes) for the previous item: OS Boot Watch Dog by keying-in a desired number in the blank. The default setting is 10 minutes. **Ignore this option when OS Boot Watch Dog is set to Disabled.**

Time Out Option
This feature allows the user to determine what action to take in an event of a system boot failure. The options are No Action, Reset, Power Off, and Power Cycles.

System Event Log/System Event Log (List Mode)

> These options display the System Event (SEL) Log and System Event (SEL) Log in List Mode. Items include: SEL (System Event Log) Entry Number, SEL Record ID, SEL Record Type, Time Stamp, Generator ID, SEL Message Revision, Sensor Type, Sensor Number, SEL Event Type, Event Description, and SEL Event Data.
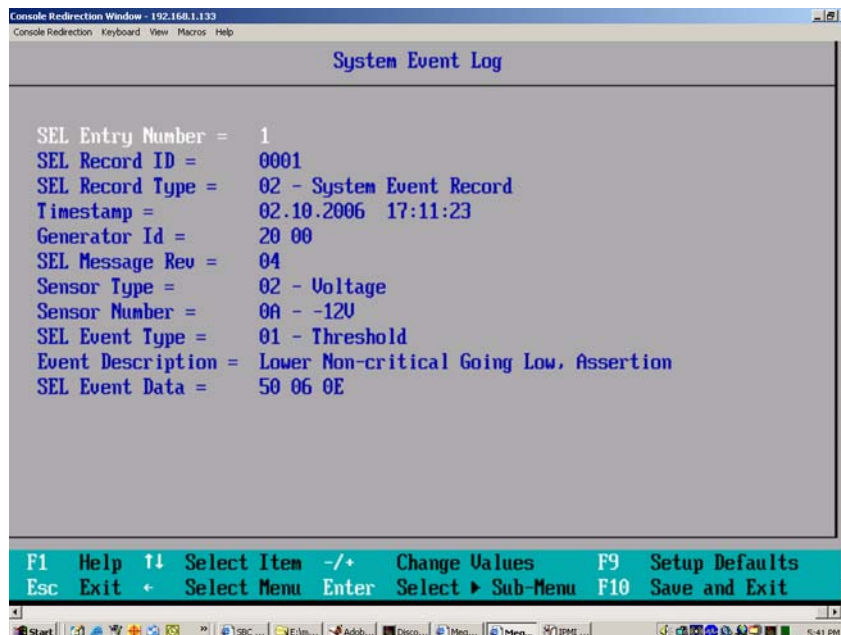
Realtime Sensor Data

This feature display information from motherboard sensors, such as temperatures, fan speeds, and voltages of various components.

Security

Choose Security from the BIOS Setup Utility main menu with the arrow keys. Security setting options are displayed by highlighting the setting using the arrow keys and pressing <Enter>. All Security BIOS settings are described in this section.

```
       PhoenixBIOS Setup - Copyright 1985-2004 Phoenix Technologies Ltd.
  Main   Advanced   Security   Boot   Exit

                                                    Item Specific Help
   Supervisor Password Is:
   User Password Is:

   Set Supervisor Password
   Set User Password

   Password on boot:            [Disabled]














 F1  Help   ↑↓ Select Item   -/+    Change Values    F9  Setup Defaults
 Esc Exit   ↔ Select Menu   Enter Select ▶ Sub-Menu  F10 Previous Values
```
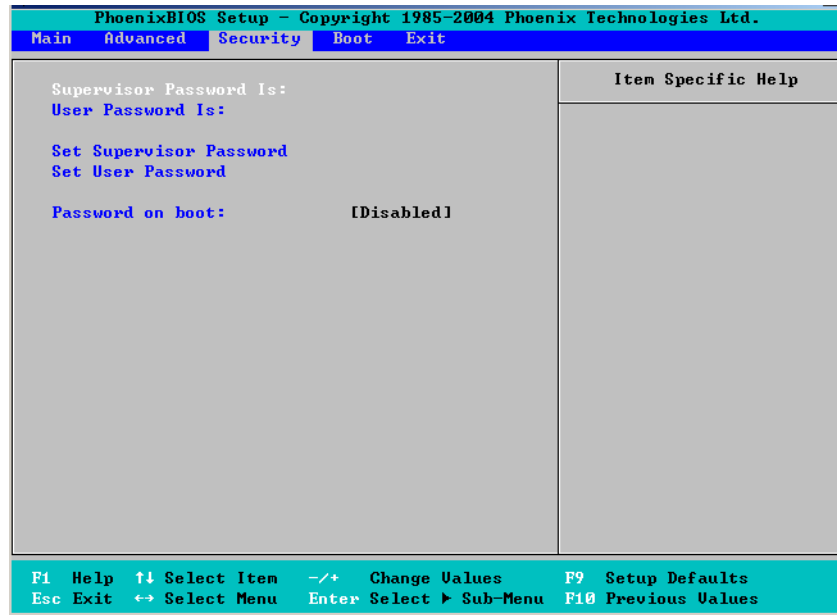
Supervisor Password Is

This displays whether a supervisor password has been entered for the system. Clear means such a password has not been used, and Set means a supervisor password has been entered for the system.

User Password Is

This displays whether a user password has been entered for the system. Clear means such a password has not been used, and Set means a user password has been entered for the system.

Set Supervisor Password

When the item "Set Supervisor Password" is highlighted, press the <Enter> key. When prompted, type the Supervisor's password in the dialogue box to set or to change the supervisor's password, which allows access to the BIOS.

Set User Password

When the item "Set User Password" is highlighted, press the <Enter> key. When prompted, type the user's password in the dialogue box to set or to change the user's password, which allows access to the system at boot-up.

Password on Boot

This setting enables you to require a password to be entered when the system boots up. The options are Enabled (password required) and Disabled (password not required).

Boot

Choose Boot from the BIOS Setup Utility main menu with the arrow keys. For details on how to change the order and specs of boot devices, refer to the Item Specific Help window. All Boot BIOS settings are described in this section.
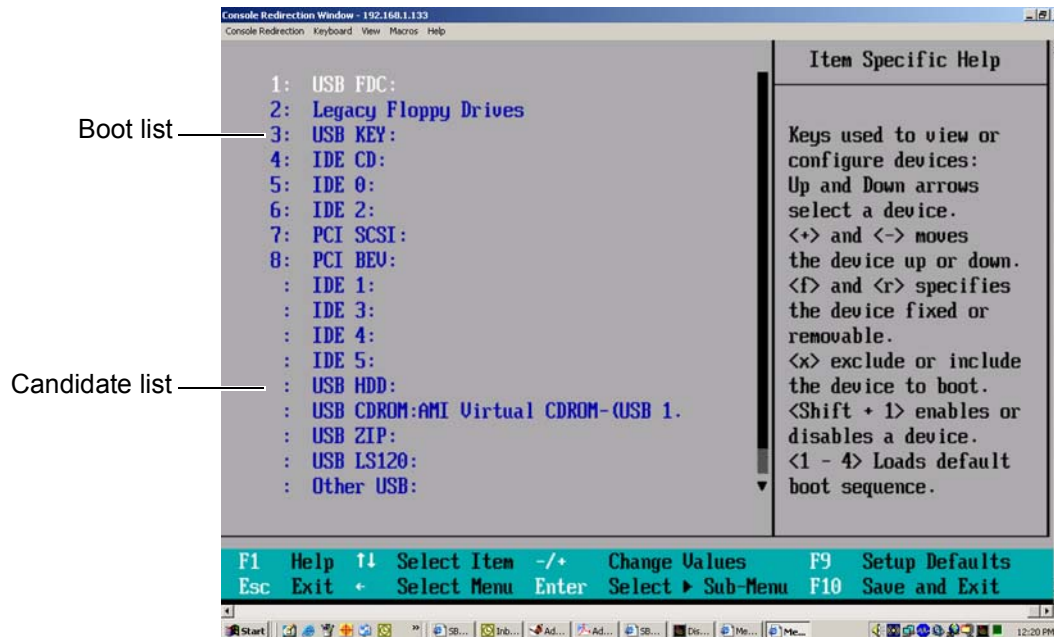
Boot Priority Order/Excluded from Boot Orders

The devices included in the boot list section (above) are bootable devices listed in the sequence of boot order as specified. The boot functions for the devices included in the candidate list (above) are currently disabled. Use a <+> key or a <-> key to move the device up or down. Use the <f> key or the <r> key to specify the type of an USB device, either fixed or removable. You can select one item from the boot list and press the <x> key to remove it from the list of bootable devices (to make its resource available for other bootable devices). Subsequently, you can select an item from the candidate list and press the <x> key to remove it from the candidate list and put it in the boot list. This item will then become a bootable device. For details on changing the boot priority order of a device, refer to the "Item Specific Help" window.

Exit

Choose Exit from the BIOS Setup Utility main menu with the arrow keys. All Exit BIOS settings are described in this section.

```
        PhoenixBIOS Setup - Copyright 1985-2004 Phoenix Technologies Ltd.
   Main    Advanced    Security    Boot    Exit

                                                     Item Specific Help
     Exit Saving Changes
     Exit Discarding Changes
                                              Exit System Setup and
     Load Setup Defaults                      save your changes to
     Discard Changes                          CMOS.
     Save Changes








   F1   Help   ↑↓ Select Item    -/+   Change Values    F9   Setup Defaults
   Esc  Exit   ↔  Select Menu    Enter Select ▶ Sub-Menu F10  Previous Values
```
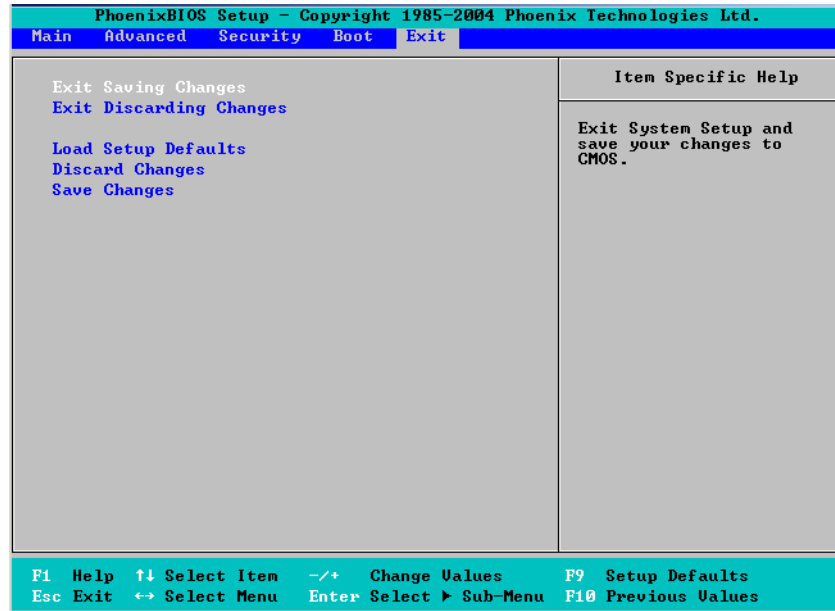
Exit Saving Changes

Highlight this item and press <Enter> to save any changes you have made and to exit the BIOS Setup utility.

Exit Discarding Changes

Highlight this item and press <Enter> to exit the BIOS Setup utility without saving any changes you may have made.

Load Setup Defaults

Highlight this item and press <Enter> to load the default settings for all items in the BIOS Setup. These are the safest settings to use.

Discard Changes

Highlight this item and press <Enter> to discard (cancel) any changes you've made. You will remain in the Setup utility.

Save Changes

Highlight this item and press <Enter> to save any changes you've made. You will remain in the Setup utility.

BIOS Power-on Self Test

This appendix lists and describes the BIOS power-on self-test (POST) messages and codes.

BIOS POST Messages

During POST, the BIOS checks the hardware and software systems for problems. If a problem is found, the BIOS activates an alarm or displays a message. The following is a list of the BIOS messages from the POST sequence.

`Failure Fixed Disk`

> Fixed disk is not working or not configured properly. Verify that the fixed disk is attached properly. Run BIOS Setup. Find out if the fixed-disk type is correctly identified.

`Stuck key`

> Stuck key on keyboard.

`Keyboard error`

> Keyboard not working.

`Keyboard Controller Failed`

> Keyboard controller failed test. May require replacing keyboard controller.

`Keyboard locked - Unlock key switch`

> Unlock the system to proceed.

`Monitor type does not match CMOS - Run SETUP`

> Monitor type not correctly identified in Setup

Shadow Ram Failed at offset: *nnnn*

> Shadow RAM failed at offset *nnnn* of the 64k block at which the error was detected.

System RAM Failed at offset: *nnnn*

> System RAM failed at offset *nnnn* of in the 64k block at which the error was detected.

Extended RAM Failed at offset: *nnnn*

> Extended memory not working or not configured properly at offset *nnnn*.

System battery is dead - Replace and run SETUP

> The CMOS clock battery indicator shows the battery is dead. Replace the battery and run Setup to reconfigure the system.

System CMOS checksum bad - Default configuration used

> System CMOS has been corrupted or modified incorrectly, perhaps by an application program that changes data stored in CMOS. The BIOS installed Default Setup Values. If you do not want these values, enter Setup and enter your own values. If the error persists, check the system battery or contact SGI technical support.

System timer error

> The timer test failed. Requires repair of system board.

Real time clock error

> Real-Time Clock fails BIOS hardware test. May require board repair.

Check date and time settings

> BIOS found date or time out of range and reset the Real-Time Clock. May require setting legal date (1991-2099).

Previous boot incomplete - Default configuration used

> Previous POST did not complete successfully. POST loads default values and offers to run Setup. If the failure was caused by incorrect values and they are not corrected, the next boot will likely fail. On systems with

control of wait states, improper Setup settings can also terminate POST and cause this error on the next boot. Run Setup and verify that the waitstate configuration is correct. This error is cleared the next time the system is booted.

`Memory Size found by POST differed from CMOS`

Memory size found by POST differed from CMOS.

`System cache error - Cache disabled`

RAM cache failed and BIOS disabled the cache. On older boards, check the cache jumpers. You may have to replace the cache. Contact SGI customer service. A disabled cache slows system performance considerably.

`CPU ID:`

CPU socket number for Multi-Processor error.

`EISA CMOS not writeable`

ServerBIOS2 test error: Cannot write to EISA CMOS.

`DMA Test Failed`

ServerBIOS2 test error: Cannot write to extended DMA (Direct Memory Access) registers.

`Software NMI Failed`

ServerBIOS2 test error: Cannot generate software NMI (Non-Maskable Interrupt).

`Fail-Safe Timer NMI Failed`

ServerBIOS2 test error: Fail-Safe Timer takes too long for specified device.

`Address Conflict`

Address conflict for specified device.

`Allocation Error for:` *device*

> Run ISA or EISA Configuration Utility to resolve resource conflict for the specified device.

`CD ROM Drive`

> CD ROM drive identified.

`Entering SETUP ...`

> Starting Setup program

`Failing Bits:` *nnnn*

> The hex number *nnnn* is a map of the bits at the RAM address which failed the memory test. Each 1 (one) in the map indicates a failed bit. Refer to "Shadow Ram Failed at offset: nnnn" error descriptions on page 122 for offset address of the failure in System, Extended, or Shadow memory.

`Fixed Disk` *n*

> Fixed disk *n* (0-3) identified.

`Invalid System Configuration Data`

> Problem with NVRAM (CMOS) data.

`I/O device IRQ conflict`

> I/O device IRQ conflict error.

`PS/2 Mouse Boot Summary Screen:`

> PS/2 Mouse installed.

nnnn `kB Extended RAM Passed`

> Where *nnnn* is the amount of RAM in kilobytes successfully tested.

nnnn `Cache SRAM Passed`

> Where *nnnn* is the amount of system cache in kilobytes successfully tested.

nnnn `kB Shadow RAM Passed`

> Where *nnnn* is the amount of shadow RAM in kilobytes successfully tested.

nnnn `kB System RAM Passed`

> Where *nnnn* is the amount of system RAM in kilobytes successfully tested.

`One or more I2O Block Storage Devices were excluded from the Setup Boot Menu`

> There was not enough room in the IPL table to display all installed I2O block-storage devices.

`Operating system not found`

> Operating system cannot be located on either drive A: or drive C:. Enter Setup and verify that the fixed disk and drive A: are properly identified.

`Parity Check 1` *nnnn*

> Parity error found in the system bus. BIOS attempts to locate the address and display it on the screen. If it cannot locate the address, it displays ????. Parity is a method for checking errors in binary data. A parity error indicates that some data has been corrupted.

`Parity Check 2` *nnnn*

> Parity error found in the I/O bus. BIOS attempts to locate the address and display it on the screen. If it cannot locate the address, it displays ????.

`Press <F1> to resume, <F2> to Setup, <F3> for previous`

> Displayed after any recoverable error message. Press <F1> to start the boot process or <F2> to enter Setup and change the settings. Press <F3> to display the previous screen (usually an initialization error of an Option ROM-- i.e., an add-on card). Write down and follow the information shown on the screen.

`Press <F2> to enter Setup`

> Optional message displayed during POST. Can be turned off in Setup.

```
PS/2 Mouse:
```

> PS/2 mouse identified.

```
Run the I2O Configuration Utility
```

> One or more unclaimed block storage devices have the Configuration Request bit set in the LCT. Run an I2O configuration program; for example, the system address controller (SAC) utility.

```
System BIOS shadowed
```

> System BIOS copied to shadow RAM.

```
UMB upper limit segment address: nnnn
```

> Displays the address *nnnn* of the upper limit of Upper Memory Blocks, indicating released segments of the BIOS which can be reclaimed by a virtual memory manager.

```
Video BIOS shadowed
```

> Video BIOS successfully copied to shadow RAM.

BIOS POST Codes

This section lists the power on self test (POST) codes for the BIOS. The POST codes are divided into two categories: recoverable and terminal.

Recoverable POST Errors

When a recoverable type of error occurs during POST, the BIOS will display a POST code that describes the problem. BIOS may also issue one of the following beep codes:

- 1 long and two short beeps - video configuration error
- 1 repetitive long beep - no memory detected

Terminal POST Errors

If a terminal type of error occurs, BIOS shuts down the system. Before doing so, BIOS writes the error to port 80h, attempts to initialize video, and writes the error in the top left corner of the screen. Table A-1 lists the codes that may be written to port 80h.

Table A-1   BIOS Post Codes

POST Code	Description
01	PMI Initialization
02	Verify Real Mode
03	Disable Non-Maskable Interrupt (NMI)
04	Get CPU type
06	Initialize system hardware
07	Disable shadow and execute code from the ROM
08	Initialize chipset with initial POST values
09	Set IN POST flag
0A	Initialize CPU registers
0B	Enable CPU cache

Table A-1   BIOS Post Codes **(continued)**

POST Code	Description
0C	Initialize caches to initial POST values
0E	Initialize I/O component
0F	Initialize the local bus IDE
10	Initialize Power Management
11	Load alternate registers with initial POST values
12	Restore CPU control word during warm boot
13	Reset PCI Bus Mastering devices
14	Initialize keyboard controller
16	1-2-2-3 BIOS ROM checksum
17	Initialize cache before memory Auto size
18	8254 timer initialization
1A	8237 DMA controller initialization
1C	Reset Programmable Interrupt Controller
20	1-3-1-1 Test DRAM refresh
22	1-3-1-3 Test 8742 Keyboard Controller
24	Set ES segment register to 4 GB
28	Auto size DRAM
29	Initialize POST Memory Manager
2A	Clear 512 KB base RAM
2C	1-3-4-1 RAM failure on address line *xxxx**
2E	1-3-4-3 RAM failure on data bits *xxxx** of low byte of memory bus
2F	Enable cache before system BIOS shadow
32	Test CPU bus-clock frequency
33	Initialize Phoenix® Dispatch Manager

Table A-1 BIOS Post Codes **(continued)**

POST Code	Description
36	Warm start shut down
38	Shadow system BIOS ROM
3A	Auto size cache
3C	Advanced configuration of chipset registers
3D	Load alternate registers with CMOS values
41	Initialize extended memory for RomPilot (optional)
42	Initialize interrupt vectors
45	POST device initialization
46	2-1-2-3 Check ROM copyright notice
48	Check video configuration against CMOS
49	Initialize PCI bus and devices
4A	Initialize all video adapters in system
4B	QuietBoot start (optional)
4C	Shadow video BIOS ROM
4E	Display BIOS copyright notice
4F	Initialize MultiBoot
50	Display CPU type and speed
51	Initialize EISA board (optional)
52	Test keyboard
54	Set key click if enabled
55	Enable USB devices
58	2-2-3-1 Test for unexpected interrupts
59	Initialize POST display service
5A	Display prompt "Press <ESC> to enter SETUP"

Table A-1   BIOS Post Codes **(continued)**

POST Code	Description
5B	Disable CPU cache
5C	Test RAM between 512 and 640kB
60	Test extended memory
62	Test extended memory address lines
64	Jump to UserPatch1
66	Configure advanced cache registers
67	Initialize Multi Processor APIC
68	Enable external and CPU caches
69	Setup System Management Mode (SMM) area
6A	Display external L2 cache size
6B	Load custom defaults (optional)
6C	Display shadow-area message
70	Display error messages
72	Check for configuration errors
76	Check for keyboard errors
7C	Set up hardware interrupt vectors
7D	Initialize Intelligent System Monitoring (optional)
7E	Initialize coprocessor if present
80	Disable onboard Super I/O ports and IRQs (optional)
81	Late POST device initialization
82	Detect and install external RS232 ports
83	Configure non-MCD IDE controllers
84	Detect and install external parallel ports
85	Initialize PC-compatible PnP ISA devices

Table A-1   BIOS Post Codes **(continued)**

POST Code	Description
86	Re-initialize onboard I/O ports.
87	Configure Motherboard Configurable Devices (optional)
88	Initialize BIOS Data Area
89	Enable Non-Maskable Interrupts (NMIs)
8A	Initialize Extended BIOS Data Area
8B	Test and initialize PS/2 mouse
8C	Initialize floppy controller
8F	Determine number of ATA drives (optional)
90	Initialize hard-disk controllers
91	Initialize local-bus hard-disk controllers
92	Jump to UserPatch2
93	Build MPTABLE for multi-processor boards
95	Install CD ROM for boot
96	Clear huge ES segment register
97	Fix up Multi-processor table
98	1-2 Search for option ROMs and shadow if successful. (One long, two short beeps on checksum failure)
99	Check for SMART Drive (optional)
9C	Set up Power Management
9D	Initialize security engine (optional)
9E	Enable hardware interrupts
9F	Determine number of ATA and SCSI drives
A0	Set time of day
A2	Check key lock

Table A-1   BIOS Post Codes **(continued)**

POST Code	Description
A4	Initialize typematic rate
A8	Erase <ESC> prompt
AA	Scan for <ESC> key stroke
AC	Enter SETUP
AE	Clear Boot flag
B0	Check for errors
B1	Inform RomPilot about the end of POST (optional)
B2	POST done - prepare to boot operating system
B4	One short beep before boot
B5	Terminate QuietBoot (optional)
B6	Check password (optional)
B7	Initialize ACPI BIOS and PPM Structures
B9	Prepare Boot
BA	Initialize SMBIOS
BC	Clear parity checkers
BD	Display MultiBoot menu
BE	Clear screen (optional)
BF	Check virus and backup reminders
C0	Try to boot with INT 19
C1	Initialize POST Error Manager (PEM)
C2	Initialize error logging
C3	Initialize error display function
C4	Initialize system error flags
C6	Console redirection init.

Table A-1   BIOS Post Codes **(continued)**

POST Code	Description
C7	Unhook INT 10h if console redirection enabled
C8	Force check (optional)
C9	Extended ROM checksum (optional)
CD	Reclaim console redirection vector
D2	Unknown interrupt
D4	Check Intel Branding string
D8	Alert Standard Format initialization
D9	Late init for IPMI
DE	Log error if micro-code not updated properly
The following POST codes pertain to the boot block in Flash ROM	
E0	Initialize the chipset
E1	Initialize the bridge
E2	Initialize the CPU
E3	Initialize system timer
E4	Initialize system I/O
E5	Check force recovery boot
E6	Checksum BIOS ROM
E7	Go to BIOS
E8	Set Huge Segment
E9	Initialize Multi Processor
EA	Initialize OEM special code
EB	Initialize PIC and DMA
EC	Initialize Memory type
ED	Initialize Memory size

Table A-1   BIOS Post Codes **(continued)**

POST Code	Description
EE	Shadow Boot Block
EF	System memory test
F0	Initialize interrupt vectors
F1	Initialize Run Time Clock
F2	Initialize video
F3	Initialize System Management Manager
F4	Output one beep
F5	Clear Huge Segment
F6	Boot to Mini DOS
F7	Boot to Full DOS

If BIOS detects error 2C, 2E, or 30 (base 512K RAM error), it displays an additional word-bitmap (xxxx) indicating the address line or bits that failed. For example, "2C 0002" means address line 1 (bit one set) has failed. "2E 1020" means data bits 12 and 5 (bits 12 and 5 set) have failed in the lower 16 bits. The BIOS also sends the bitmap to the port-80 LED display. It first displays the checkpoint code, followed by a delay, the high-order byte, another delay, and then the loworder byte of the error. It repeats this sequence continuously.

IPMI 2.0 Management Utility

This section describes the baseboard management controller (BMC) intelligent platform management interface (IPMI) 2.0 management utility. It provides basic overview information for the application that supports remote access (KVM-over-LAN).

IPMI defines the protocols used for interfacing with an embedded service processor. This service processor - also known as a baseboard management controller (BMC) - resides on the node board. The BMC links to a main processor and other onboard elements using a serial bus.

The Intelligent Management add-on card, (AOC-SIMSO+), monitors onboard instrumentation such as temperature sensors, power status, voltages and fan speed, and provides remote power control capabilities to reboot and/or reset the server. It also includes remote access to the BIOS configuration and operating system console information via serial-over-LAN (SOL) or embedded KVM capabilities. Because the controller is a separate processor, the monitoring and control functions work regardless of CPU operation or system power-on status.

An administrator accesses the BMC by using an IPMI-compliant management application loaded on a PC or via a web interface on a management appliance that includes IPMI management and KVM. The IPMI protocol leverages an out-of-band network (typically dedicated for server monitoring and management), which provides a a secure path for mission-critical applications when regular in-band connectivity is lost or is unresponsive. IPMI messages follow the same format whether they are received through an operating system or are sent and received out-of-band.

Note: Refer to Chapter 3 of the *AOC-SMSO User's Guide*, Publication number 860-0472-001, for more information.

The SIM card supports the functionality of IPMI Version 2.0. The key features include the following:

- Supports IPMI 2.0
- Supports Serial over LAN
- Supports KVM over LAN
- Supports LAN Alerting-SNMP trap
- Supports Event Log
- Offers operating system (OS) independency
- Provides remote hardware health monitors.
  Key features include the following:
    - Temperature monitor
    - Fan speed monitor
    - Voltage monitor
    - Power status monitor
    - Chassis intrusion monitor
    - Remote power control to power-on, power-off or reboot a system
    - Remote access to text-based, graphic-based system information, including BIOS configurations and OS operation information (KVM)
    - Remote management of utility/software applications
- Provides Network Management Security via remote access/console redirection.
  Key features include:
    - User authentication enhancement
    - Encryption support enhancement, allowing for password configuration security to protect sensitive data transferring via Serial over LAN
- Supports the following Management tools:
    - IPMIView
    - CLI (Command Line Interface)
- Supports RMCP & RMCP protocols

A BMC card (AOC-SIMSO+) is installed on each of the node boards in the SGI Altix XE310 system. An independent I/O processor in the BMC card enables you to access, monitor, manage and interface with systems that are in remote locations using the local area network (LAN). The following system administration functions are available through the BMC interface:

- Remote Control
  Click on this icon for remote access and management of video console redirection.

- Virtual Media
  Click on this icon to use virtual remote media devices.

- System Health
  Click on this icon to view and manage health monitoring for remote systems.

- User Management
  Click on this icon for User Management.

- KVM Settings
  Click on this icon to configure keyboard, Video and mouse settings.

- Device Settings
  Click on this icon to configure device settings.

- Maintenance
  Click on this icon to access, diagnose and manage hardware devices.

Network Connection

1. Enter the IP address of the server in the address bar of your browser.

2. Once the connection is made, the Log In screen displays.

3. Enter the user name "admin" in the Username field.

4. Enter the password "admin" in the Password field and click on Login. The following menu is displayed:

Note: Click on the refresh button to refresh the remote console preview.
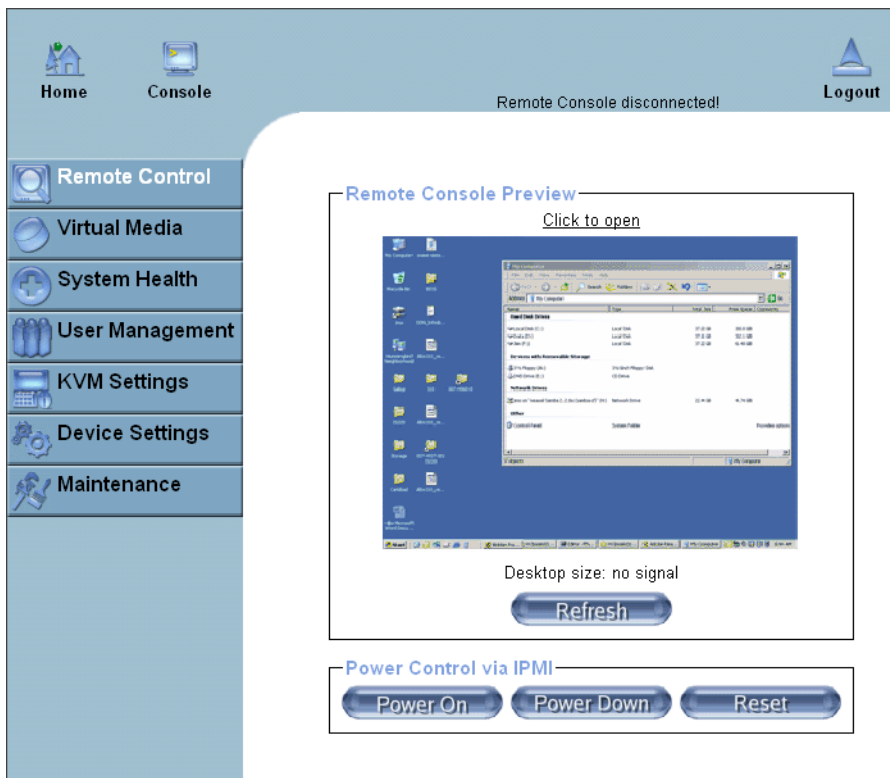
Figure B-1   BMC Remote Console

Remote Console

Note: In the Single ⁄ Synchronized Mouse Mode, the cursor icon at the bottom of the window indicates the system that is currently active. For the Double Mouse mode, this is the cursor for the remote host. A second mouse cursor is displayed only when you are in Double Mouse Mode.

After you have entered the correct IP address for your remote console and typed in user name and password, you should be connected to the remote console. When the remote console is connected, the Remote Console window displays (refer to Figure B-1). To open the remote console screen, you can do one of the following:

1. Click on the console icon on the upper left corner.

2. Select the link **Click to Open** (refer to Figure B-1).

The functions of the icons for this home page are listed below:

- Home
  Click this icon to return to the Home Page.

- Console
  Click this icon to open the remote console screen.

- Click to Open
  Click this link to open the remote console screen.

- Log-Out
  Click this icon to log out.

- Refresh
  Click this icon to refresh the remote console preview screen.

- Power On
  Click this icon to power on the remote server.

- Power down
  Click this icon to power down the remote server.

- Reset
  Click this icon to reset the remote server.

- Remote Console Preview Screen
  This window displays the preview of the remote console screen. Click on this
  window to go to the remote console screen.

Note: For more information about the functions of the BMC interface, refer to the
SGI Altix XE310 SIM User's Guide, SGI publication number 860-0472-001, available from
SGI's technical publications library at docs.sgi.com.

Regulatory Specifications and Safety Information

This appendix presents regulatory information that may be important to the operation of your SGI Altix XE310 server.

Manufacturer's Regulatory Declarations

The SGI Altix XE310 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 SGI. If you do, you may lose these approvals and your governmental agency authority to operate this device.

Server Model Number

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

CE Notice and Manufacturer's Declaration of Conformity

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 SGI upon request.

Electromagnetic Emissions

This section provides the contents of electromagnetic emissions notices for various countries.

FCC Notice (USA Only)

This equipment complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.

- 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 you will be required to correct the interference at your 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, you are encouraged to try to correct the interference by using one or more of the following methods:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment to 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: Changes or modifications to the equipment not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

Shielded Cables

The SGI Altix XE310 product is FCC compliant under test conditions that include the use of shielded cables between the server and its peripherals. Your server and any peripherals that you purchase from SGI 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 SGI, ensure that they are shielded. Telephone cables do not require shielding.

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 that is supplied with your system. If your monitor cable becomes damaged, obtain a replacement cable from SGI.

Electrostatic Discharge

SGI designs and tests its products to be resistant 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 you keep all the covers and doors, including the plastics, in place while you are operating the server system. 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. Use the wrist strap when you install these upgrades to prevent the flow of static electricity; it is designed to protect your system from ESD damage.

System Specifications

Note: Unless noted, specifications apply to entire system (both nodes).

Table D-1   SGI Altix XE310 System Specifications

Specification	Description
Compute nodes	Two compute nodes per chassis
Processors	Up to four Dual or Quad-Core Intel® Xeon® Processors, (two per node) Front Side Bus: 1333 or 1066 MHz CPU clock rates: (3.00 GHz - Woodcrest), (2.66, 2.33, 2.0 GHz - Clovertown) L2 Cache: 4.0 MB for Dual-core, 8.0 MB for Quad-core
Chipset	Intel 5000P
BIOS	Phoenix BIOS® in 8 MB Flash EEPROM (per node)
Memory	16 DIMM slots to support a maximum up to 64 GB of ECC fully buffered DIMM (FBDIMM) DDR2-667533 SDRAM (32 GB per node) **Note**: Interleaved memory requires DIMMs to be installed in pairs. Refer to "Install Memory" on page 42 for more information.
SATA controller	Intel ESB2 on-chip controller to support four 3 Gb/s serial ATA (SATA) RAID 0 and 1
SATA drive bays	Four SATA drive bays (two per node) 3.5-in. SATA drive - 250 GB, 7200 rpm - 500 GB, 7200 rpm
PCI expansion	Two low-profile PCIe x8 cards with pre-installed riser cards (1 per node)

Table D-1	SGI Altix XE310 System Specifications **(continued)**
Specification	**Description**
Integrated I/O	2 x InfiniBand® ports (1 per node), optional 2 x COM ports (1 per node) 2 x VGA ports (1 per node) 2 x Gigabit Ethernet ports (1 per node) 2 x USB ports (1 per node)
Cluster interconnects	InfiniBand or Gigabit Ethernet Two external 4X DDR InfiniBand port (optional) Two external Gigabit Ethernet ports (one per node)
Node board dimensions	6.5 in. x 16.4 in. (165 mm x 417 mm)

Chassis	1U rackmount
	Dimensions:
	   Width: 17.2 in. (437 mm)
	   Height: 1.7 in. (43 mm)
	   Depth: 27.75 in. (705 mm)

Weight	Weight: 40 lb (18.2 kg)
System cooling	Six high performance 4-cm fans
System input requirements	AC Input Voltage: 200 - 240 VAC (North America/Japan/International) Rated Input Current: 12A - 5A max Rated Input Frequency: 50 to 60 Hz
Power supply	Rated Output Power: 980 Watts Rated Output Voltages: +12V @ 81A, +5V @ 4A
BTU rating	5173 BTUs/hr (for rated output power of 980 Watts)
Rack power requirements	Short rack: 8 kW Tall rack: 32 kW

Table D-1	SGI Altix XE310 System Specifications **(continued)**
Specification	**Description**
Operating environment	Operating Temperature: 10º to 35º C (50º to 95º F) Non-operating Temperature: -40º to 70º C (-40º to 158º F) Operating Relative Humidity: 8% to 90% (non-condensing) Non-operating Relative Humidity: 5% to 95% (non-condensing)
Regulatory compliances	Electromagnetic Emissions: FCC Class A, EN 55022 Class A, EN 61000-3-2/-3-3, CISPR 22 Class A Electromagnetic Immunity: EN 55024/CISPR 24, (EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11) Safety: EN 60950/IEC 60950-Compliant UL Listed (USA) CUL Listed (Canada) TUV Certified (Germany) CE Marking (Europe)

System Safety

Electrical Safety Precautions

⚠ **Caution:** Follow these basic electrical safety precautions to protect yourself from harm and the SGI Altix XE310 from damage.

- Be aware of the locations of the power on/off switch on the chassis, as well as the room's emergency power-off switch, disconnection switch or electrical outlet. If an electrical accident occurs, you can then quickly remove power from the system.

- Do not work alone when working with high voltage components. Power should always be disconnected from the system when removing or installing main system components, such as the node boards, memory modules and processors (not SATA drives). When disconnecting power, you should first power down the system with the operating system first and then unplug the power cord from the power supply unit.

- When working around exposed electrical circuits, another person who is familiar with the power-off controls should be nearby to switch off the power if necessary.

- Use only one hand when working with powered-on electrical equipment. This is to avoid making a complete circuit, which will cause electrical shock.

- Use extreme caution when using metal tools, which can easily damage any electrical components or circuit boards they come into contact with.

- Do not use mats designed to decrease static electrical discharge as protection from electrical shock. Instead, use rubber mats that have been specifically designed as electrical insulators.

- The power supply power cord must include a grounding plug and must be plugged into a grounded electrical outlet.

Node Board Battery

⚠ **Caution:** There is a danger of explosion if the onboard battery is installed upside down, which reverses its polarity (refer to Figure E-1). This battery must be replaced only with the same or an equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

LITHIUM BATTERY

BATTERY HOLDER

OR

LITHIUM BATTERY

BATTERY HOLDER
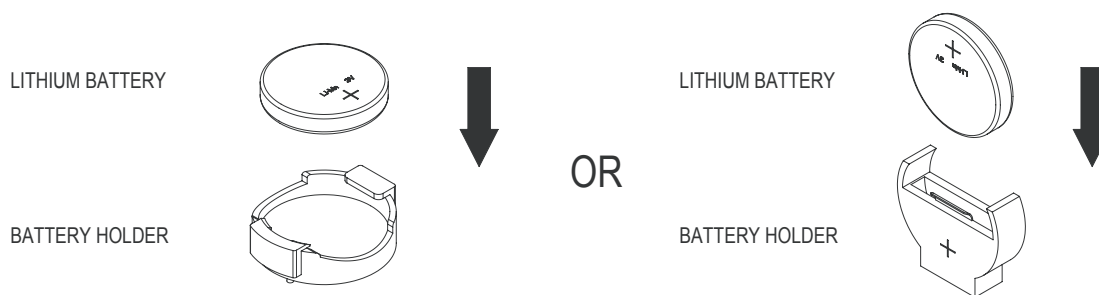
Figure E-1   Install the Battery

General Safety Precautions

⚠️ **Caution:** Follow these general safety precautions to protect yourself from harm and the SGI Altix XE310 from damage.

- Keep the area around the SGI Altix XE310 clean and free of clutter. Failure to do so may cause the system to become overheated and damage the equipment.

- The SGI Altix XE310 weighs approximately 40 lbs (18.2 kg) when fully loaded. When lifting the system, two people at either end should lift slowly with their feet spread out to distribute the weight. Always keep your back straight and lift with your legs. Failure to use proper lifting techniques may result in personal injury or equipment damage.

- Place the chassis top cover and any system components that you remove on a sturdy ESD-safe table. Failure to do so may result in equipment damage from electrostatic discharge.

- Do not wear loose clothing such as neckties or unbuttoned shirt sleeves which can come into contact with electrical circuits or be pulled into a cooling fan. Failure to do so may result in personal injury or equipment damage.

- Remove any jewelry or metal objects from your body, which are excellent conductors of electricity and can create short circuits. Failure to do so may result in personal injury or equipment damage.

- After accessing the inside of the system, close the system back up and secure it to the rack unit with the retention screws after ensuring that all connections have been made.

ESD Safety Precautions

⚠ **Caution:** Follow these general ESD precautions to protect the electrostatic-sensitive devices (ESD) inside SGI Altix XE310 from damage.

Electrostatic discharge is generated by two objects with different electrical charges coming into contact with each other. An electrical discharge is created to neutralize this difference, which can damage electronic components and printed circuit boards. The following measures are generally sufficient to neutralize this difference before contact is made to protect your equipment:

- Use a grounded wrist strap designed to prevent static discharge.
- Keep all components and printed circuit boards (PCBs) in their antistatic bags until ready for use.
- Touch a grounded metal object before removing the board from the antistatic bag.
- Do not let components or PCBs come into contact with your clothing, which may retain a charge even if you are wearing a wrist strap.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules, or contacts.
- When handling chips or modules, avoid touching their pins.
- Put the node board and peripherals back into their antistatic bags when not in use.
- Make sure your computer chassis provides an excellent conductivity path between each of the system components and chassis ground.

Operating Precautions

⚠ **Caution:** Never operate the SGI Altix XE310 server with the chassis cover removed. The cover must be in place to maintain proper airflow and cooling of the system components. Operating the SGI Altix XE310 without the chassis cover in place can damage the equipment.

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