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SGI® Altix® XE340 User's Guide

Record of Revision

Version	Description
-001	July, 2009 First Release

Contents

007-5536-001

Introduction and Overview

This chapter provides an overview of your server's main features.

Operating precautions are provided in this chapter, followed by a general overview of the product.

Before operating your system, familiarize yourself with the safety information in the following section:

ESD and Safety Precautions

Caution: Observe all ESD precautions. Failure to do so can result in damage to the equipment.

Wear an SGI approved wrist strap when you handle an ESD-sensitive device to eliminate possible ESD damage to equipment. Connect the wrist strap cord directly to earth ground.

Warning: **Before operating or servicing any part of this product, read the safety precautions.**

Danger: **Keep fingers and conductive tools away from high-voltage areas. Failure to follow these precautions will result in serious injury or death. The high-voltage areas of the system are indicated with high-voltage warning labels.**

Caution: Power off the system only after the system software has been shut down in an orderly manner. If you power off the system before you halt the operating system, data may be corrupted.

> **Warning:** If a lithium battery is installed in your system as a soldered part, only qualified SGI service personnel should replace this lithium battery. For a battery of another type, replace it only with the same type or an equivalent type recommended by the battery manufacturer, or an explosion could occur. Discard used batteries according to the manufacturer's instructions.

Overview

The Altix XE340 is a "1U Twin" server comprised of a 1U chassis and two (twin) "motherboards" known as serverboards. Check with your sales or service representative before loading any operating system on your server not provided by the SGI factory or service organization.

In addition to the two serverboards and chassis, various hardware components may be included as part of your Altix XE340 configuration as listed below:

* SATA Accessories: Four (4) hard disk drive carriers - a minimum of one disk drive (per serverboard) is required for operation.One (1) internal SATA backplane per serverboard. One (1) SATA cable set per serverboard. SAS hard drive options are also available.

> **Note:** When the Altix XE340 is used in a "diskless" cluster environment the minimum requirement of one disk drive per serverboard is not applicable.

* Two (2) PCI Express x16 riser cards (RSC-R1U-E16R) (one per serverboard).

* Rackmount hardware with screws (CSE-PT51L):
  Two (2) rack rail assemblies and (6) brackets for mounting the rack rails in a rack/telco rack.

* One (1) CD containing drivers and utilities plus optional CDs depending on order configuration.

* One1200-Watt chassis power supply is shared by both serverboards; if the power supply is offline both serverboards will be non-operational.

Serverboard Features

At the heart of the Altix XE340 server lies two (twin) quad-core processor based serverboards, which are based on Intel Xeon chipsets. The following subsections describe the main features of the serverboards. Note that the features on each board are doubled for the server, which includes two nodes. See Figure 1-1 on page 5 for a functional block diagram of a system serverboard.

Processors

Each serverboard supports two Intel® Xeon quad-core processors in LGA1366 sockets (a total of 4 quad-core processors per chassis). The exact type of processors provided with your system depends on the specific configuration you ordered. Check with your sales or service representative for information on processor upgrades.

Memory

Each of the two serverboards has twelve 240-pin DIMM sockets that can support up to 96 GB of registered ECC DDR3-1333/1066/800 SDRAM (192 GB total for the system). See Chapter 4 for more details on installing memory into the system.

Serial ATA/SAS

The ICH10R on each serverboard includes a Serial ATA controller that supports up to six 3.0-Gb/s SATA drive channels (note that the XE340 serverboard uses only two of the six channels). The hot-swappable SATA drives are connected to a backplane that provides power, bus termination and configuration settings. Optional SAS or SATA RAID 0, 1, and 10 are supported. Contact your sales or service provider to order a specific RAID upgrade if your system was not ordered with that option.

PCI Expansion Slots

Each serverboard within the system has one low-profile PCI Express 2.0 x16 slot, so two PCI Express 2.0 x16 slots are provided in the server. Riser cards are pre-installed to support two low-profile add-on PCIe cards (one per serverboard).

Ethernet Ports

An Intel® network controller is integrated into each of the serverboards to support two Gigabit LAN ports (100/1000Base-T/1000BaseTX, RJ45 output).

On-board Controllers/Ports

On-board I/O backpanel ports on each serverboard include one COM port, a VGA port, two USB ports, a dedicated IPMI LAN port and two Gigabit LAN (NIC) ports. An (optional) InfiniBand port is also included on specific models of the server. There are two sets of I/O ports included in the server (one set for each serverboard).

Graphics Controller

The system features an integrated Matrox G200eW graphics chip, which includes 8 MB of DDR2 memory.

Other Features

Other on-board features that promote system health include voltage monitors, auto-switching voltage regulators, chassis and CPU overheat sensors, virus protection and BIOS rescue.

InfiniBand

The Altix XE340 server is available with an (optional) InfiniBand port at DDR (double-data rate) or QDR (quad-data rate) speeds, respectively. InfiniBand is a scalable serial communications link intended for connecting processors with high-speed peripherals or other systems. Additional PCIe-based InfiniBand interconnects are also available for your server. Check with your sales or service representative for available options and upgrades.
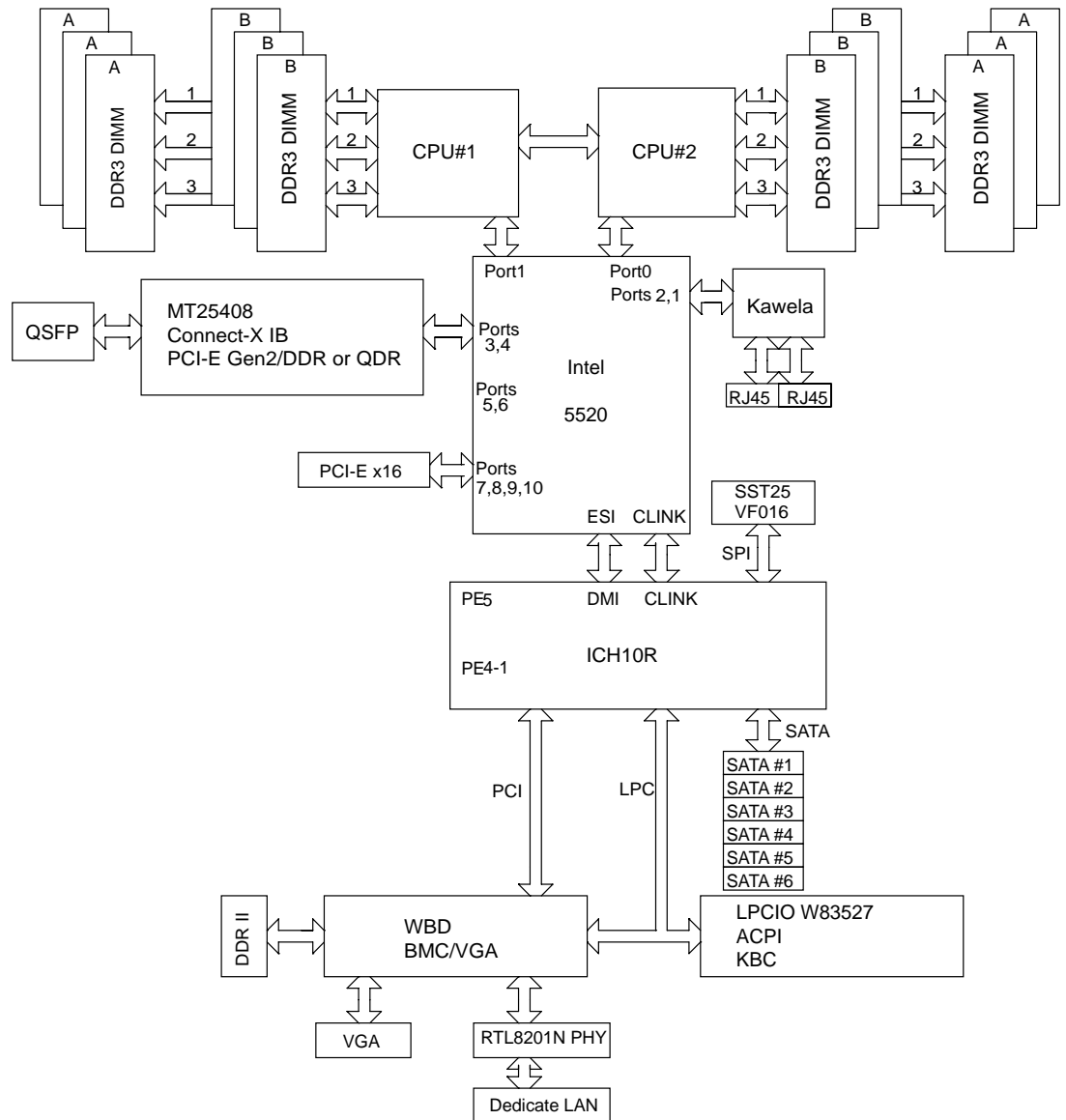
Figure 1-1   Functional Block Diagram of an XE340 System Server Board

Server Chassis Features

The following sections provide a general outline of the main features of the 1U system chassis.

Figure 1-2 shows the rear panel of the SGI Altix XE340 server.
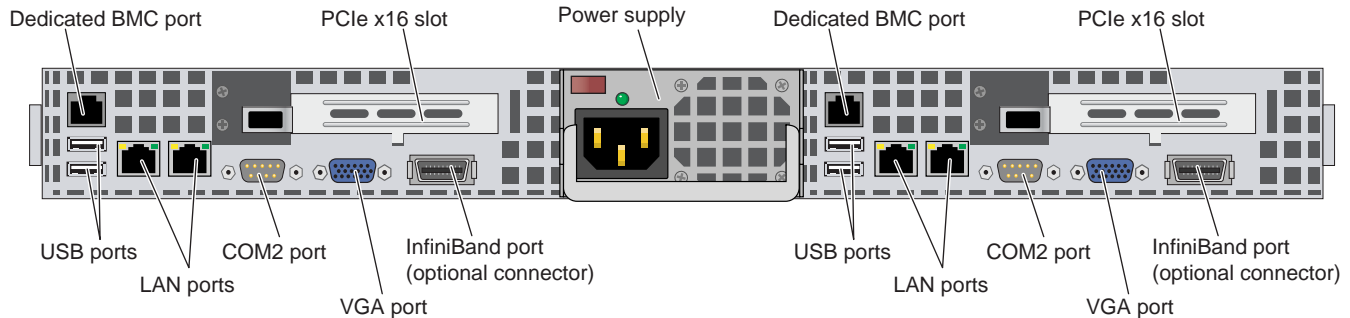
Figure 1-2   Altix XE340 Rear Panel and I/O Ports

System Power

Your Altix XE340 server uses a single high-efficiency 1200W cold-swap power supply, which provides the power to both serverboards housed in the unit.

Disk Drive Subsystem

The Altix XE340 chassis was designed to support up to four SATA or SAS hard disk drives, which can be optionally configured as hot-swappable units.

Note that the standard XE340 only supports SATA disk drives. However by adding a SAS HBA the XE340 will support SAS disk drives. The SAS HBA will also support RAID 0 and 1 on both SAS and SATA disk drives. One HBA is added to each node of the XE340 server.

Control Panel

The Altix XE340 features two independent control panels associated with each node (serverboard). Each control panel has LEDs to indicate power on, network activity, hard disk drive

activity and system overheat conditions. Each control panel also includes a main power button and a system reset button.

Rear I/O Panel

The system is a 1U rackmount chassis. Its I/O panel provides slots for two low-profile PCI-E x16 expansion cards, two COM ports, four USB ports, two VGA ports and four Gb Ethernet ports. Two optional InfiniBand ports are available (one per serverboard).

Cooling System

The server chassis has an innovative cooling design that features an air shroud and three sets of 4-cm counter-rotating fans per node (configured as six fans placed back-to-back in pairs). A fan speed control setting in BIOS allows fan speed to be determined by system temperature.

1U Twin: System Notes

As a 1U Twin configuration, the Altix XE340 is different from a traditional single-motherboard server system. With two nodes incorporated into a single chassis, there are several functional points you should keep in mind as listed in the following subsections.

System Power

A single power supply is used to provide the power for both serverboards. Each serverboard 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 serverboard only. (When viewed from the front of the chassis, the serverboard on the right is referred to as the primary board and the serverboard on the left as the secondary.) See Figure 1-3 on page 8 for a top-down view of the power supply and other major components.

System Backplane and Drives

As a system, the Altix XE340 server supports the use of four hard disk drives. The disk-drive backplane works as a single backplane divided into two sections. This means that while a single power connector is used and functions such as overheating apply to both sections together, each pair of hard drives is logically connected to its own serverboard. Consequently, RAID setup is limited to a two-drive scheme, (RAID cannot be spread across all four drives).
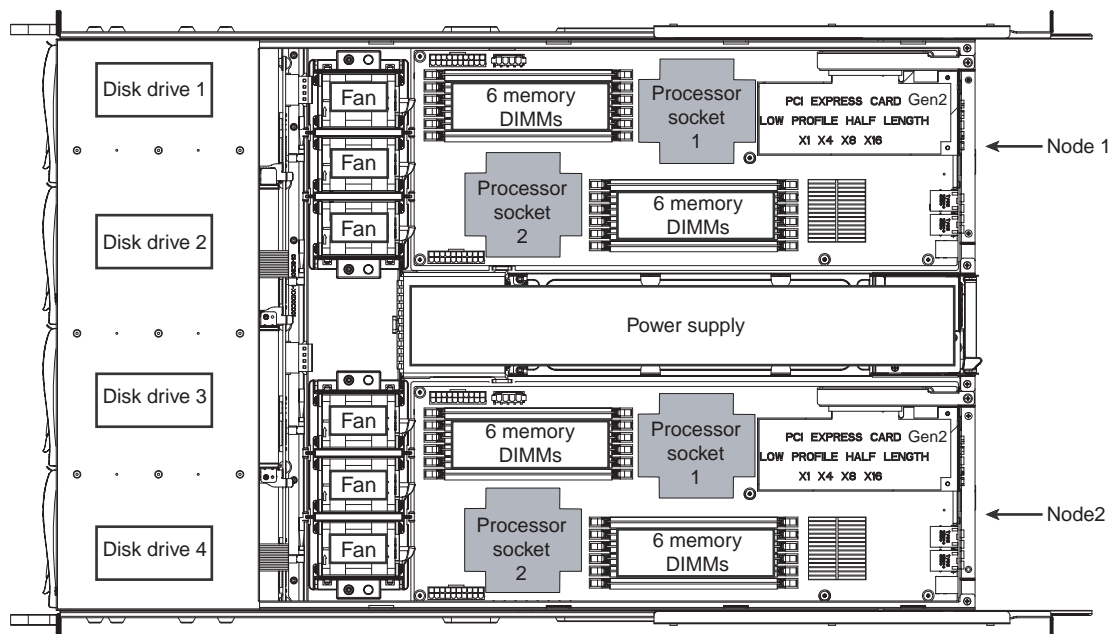
Figure 1-3   Server Top View (Cover Removed)

Note: The disk drives are hot-pluggable; however, the standard (non-RAID) hardware/software does not seamlessly support hot-plugging. If you add a disk to a non-RAID system, you need to reboot the system to see it. If you remove a disk from a non-RAID system and do not replace it, then system I/O time-outs will occur when you attempt to access it.

System Operation

This chapter describes the basic steps needed to get your Altix XE340 up and running. Following these steps in the order given should enable you to have the system operational within a minimum amount of time.

Unpacking the System and Choosing an Operating Location

You should inspect the box the system was shipped in and note if it was damaged in any way. If the server itself shows damage you should file a damage claim with the carrier who delivered it.

When you decide on a suitable location for the rack unit that will hold the system, it should be situated in a clean, dust-free area that is well ventilated. Avoid areas where heat, electrical noise and electromagnetic fields are generated. You will also need it placed near a grounded power outlet. Be sure to read the Rack and Server Precautions in the next section.

Preparing for Setup

The box the system was shipped in should include two sets of rail assemblies, two rail mounting brackets and the mounting screws you will need to install the system into the rack. Follow the steps in the order given to complete the installation process in a minimum amount of time. Please read this section in its entirety before you begin the installation procedure outlined in the sections that follow.

Choosing a Setup Location

Leave enough clearance in front of the rack to enable you to open the front door completely 10 cm (~25 inches).

Leave approximately 30 inches of clearance in the back of the rack to allow for sufficient airflow and ease in servicing.

This product is for installation only in a Restricted Access Location (dedicated equipment rooms, service closets and the like).

This product is not suitable for use with visual display work place devices according to the German Ordinance for Work with Visual Display Units.

Rack Precautions

Ensure that the leveling jacks on the bottom of the rack are fully extended to the floor with the full weight of the rack resting on them.

In single rack installation, stabilizers should be attached to the rack.

In multiple rack installations, the racks should be coupled together.

Always make sure the rack is stable before extending a component from the rack.

You should extend only one component at a time - extending two or more simultaneously may cause the rack to become unstable.

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

Server Precautions

Review the electrical and general safety precautions in Chapter 4.

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

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

For extra protection, use a regulating uninterruptible power supply (UPS) to protect the server from power surges, voltage spikes and to keep your system operating in case of a power failure. This is an optional device not provided by SGI with your system.

Allow the hot plug disk drives and power supply modules to cool before touching them. Always keep the server closed when not servicing to maintain proper cooling.

Make sure all power and data cables are properly connected and not blocking the chassis airflow.

Rack Mounting Considerations

Use the guidelines in the following subsections to properly install, use and maintain a server in a rack.

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 (Tmra).

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.).

Installing the System into a Rack

This section provides information on installing the Altix XE340 server into a rack unit with the rack rails provided. If the system has already been mounted into a rack, you can skip ahead to the next section.

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.

Identifying 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 (see Figure 2-1). Two pairs of short brackets to be used on the front side of the outer rails are also included.

Outer rail (attaches to rack)

Inner rail (pre-installed)

Locking tab
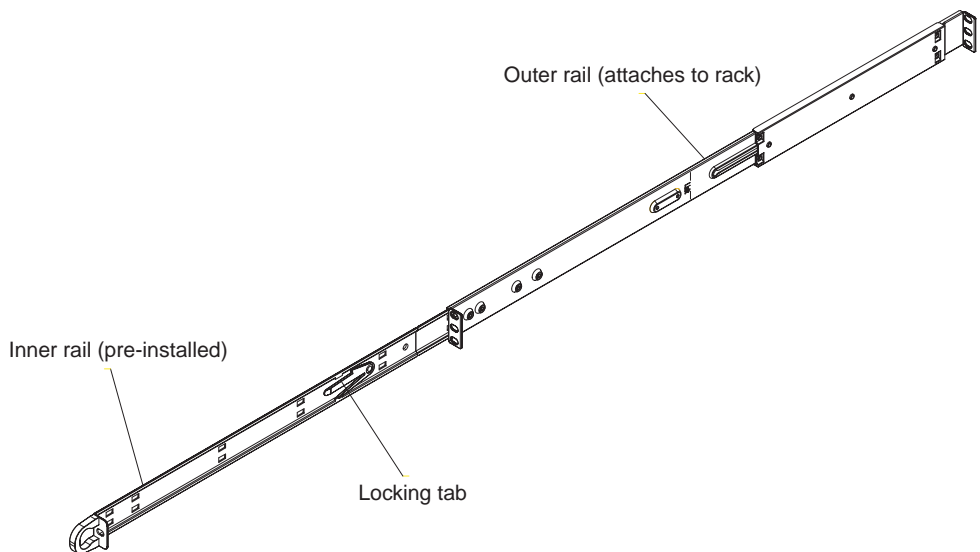
Figure 2-1   SGI Altix XE340 Server Rack Rail Example

Installing the Inner Rails

Both the left and right side inner rails have been pre-attached to the chassis. Proceed to the next step.

Installing the Outer Rails

Begin by measuring the distance from the front rail to the rear rail of the rack. Attach a short bracket to the front side of the right outer rail and a long bracket to the rear side of the right outer rail. Adjust both the short and long brackets to the proper distance so that the rail can fit snugly into the rack. Secure the short bracket to the front side of the outer rail with two M4 screws and the long bracket to the rear side of the outer rail with three M4 screws. Repeat these steps for the left outer rail.
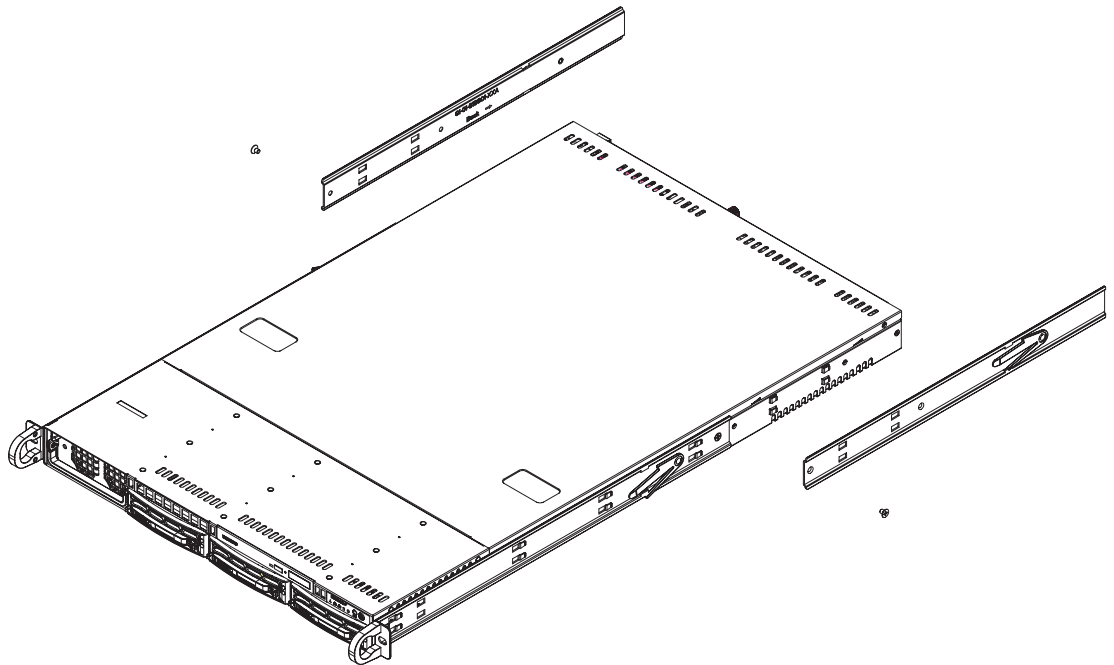
Figure 2-2   Chassis Attachment to Rack Rails

Locking Tabs

Both chassis rails have a locking tab, which serves two functions. The first is to lock the server into place when installed and pushed fully into the rack, which is its normal position. Secondly, these tabs also lock the server in place when fully extended from the rack. This prevents the server from coming completely out of the rack when you pull it out for servicing.

Installing the Server into the Rack

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. Do this by lining up the rear of the chassis rails with the front of the rack rails. 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 the unit). See Figure 2-3 on page 15 for an example. When the server has been pushed completely into the rack, you should hear the locking tabs "click".

Installing the Server into a Telco Rack

To install the server into a Telco type rack, use two L-shaped brackets on either side of the chassis (four total). First, determine how far the server will extend out the front of the rack. Larger chassis should be positioned to balance the weight between front and back. If a bezel is included on your server, remove it. Then attach the two front brackets to each side of the chassis, then the two rear brackets positioned with just enough space to accommodate the width of the rack. Finish by sliding the chassis into the rack and tightening the brackets to the rack.
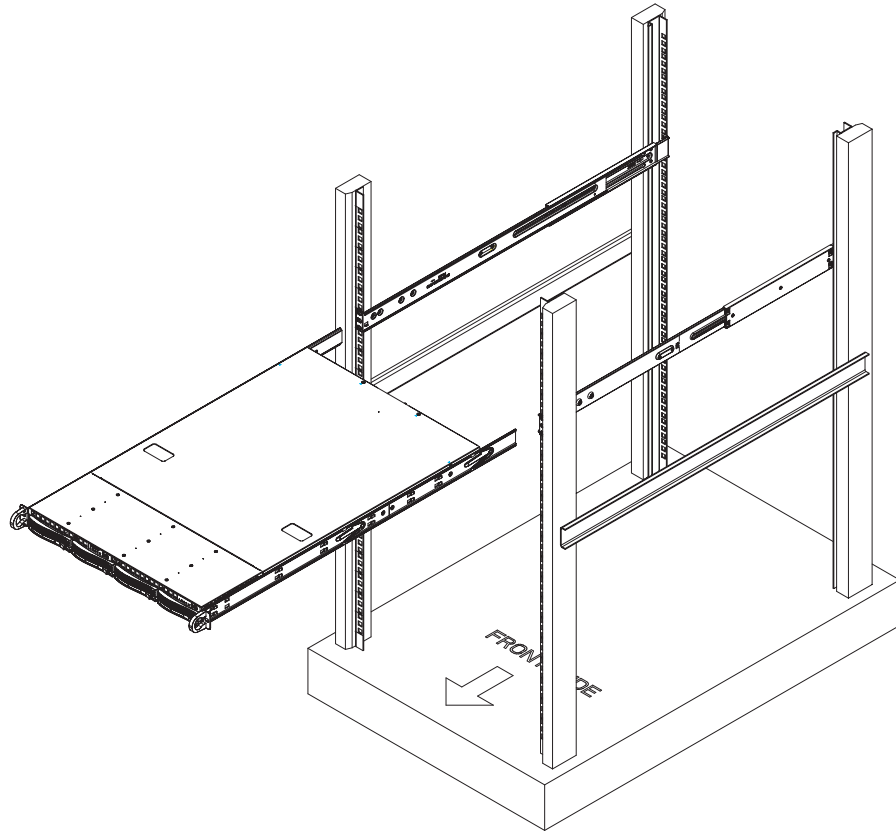
Figure 2-3   Sliding the Server into a Rack

Server Access After Rack Installation

After you install the unit in the rack, you will need to open the top cover to make sure the serverboard is properly installed and all the connections have been made.

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

Remove the four screws (two on the sides and two on the top) that secure the top cover to the chassis. Place your thumbs in the two rectangular recesses and push the cover away from you

(toward the rear of the chassis) until it stops. You can then lift the top cover from the chassis to gain full access to the inside of the server (see Figure 2-4).

To remove the system completely from the rack, 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.

Checking the Components and Setup Before Power On

If any internal modifications have been made to the server prior to installation in the rack, you may wish to recheck the server's interior.

You may have one or two processors already installed on each of the two serverboards. Each processor needs its own heatsink.

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

You can install two add-on cards to the system.

Make sure all power and data cables are properly connected and not blocking the chassis airflow.

Checking the Hard Disk Drives

The system disk drives are accessable from the front of the server and can be installed and removed from the front of the chassis without removing the top chassis cover.

Depending upon your system's configuration, your system will have one or more drives already installed.

Checking the Airflow

Airflow through the server is provided by an air shroud and three sets (six fans back to back) of 4-cm counter-rotating PWM fans per node board [for a total of two air shrouds and six sets of fans (12 total) in the system]. The system component layout was carefully designed to direct sufficient cooling airflow to the components that generate the most heat.

Note that all power and data cables should be routed in such a way that they do not block the airflow generated by the fans.

Providing Power

Plug the power cord from the server power supply unit into a rack power distibution unit (PDU) or high-quality power strip that offers protection from electrical noise and power surges.

For higher availability it is recommended that you use an optional uninterruptible power supply (UPS) with the server.

Finally, press the power-on button on the front-left node of the chassis and then the power button on the front-right node, see Figure 2-4 on page 17 for an example.

Note: The Overheat/Fan fail LED is a bi-color (Red/Blue) that can indicate unit identification (UID) when activated by an IPMI tool command, or manually by a switch on the chassis rear.

Control panel:
Node board 1

Control panel:
Node board 2

RESET   Power

RESET

Overheat/Fan fail/Unit ID (bi-color) LED

NIC 2 activity LED

NIC 1 activity LED

Power LED

HDD activity LED
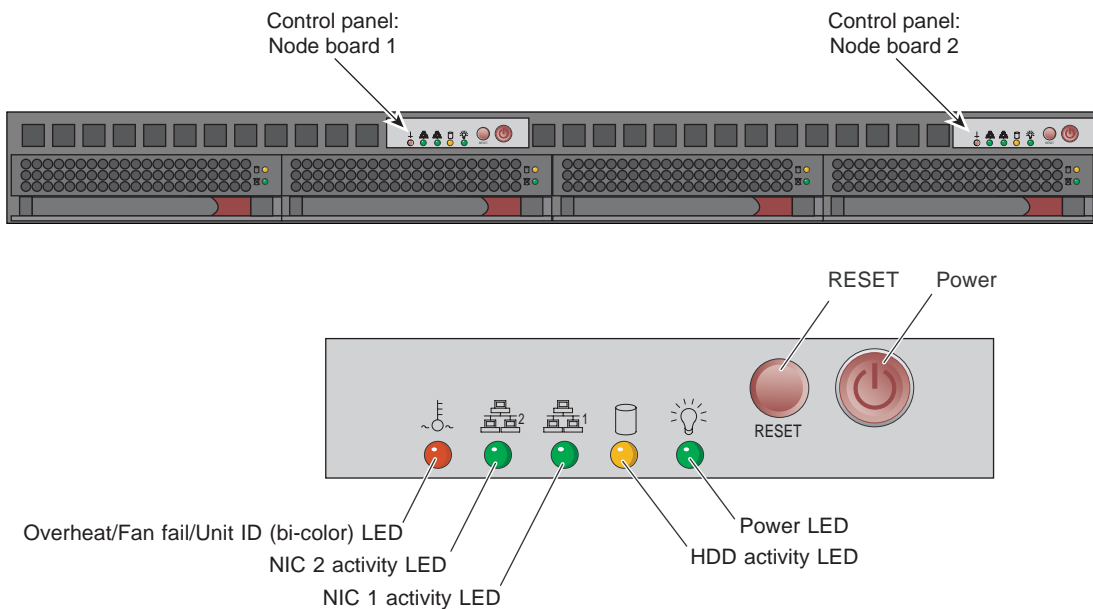
Figure 2-4   Serverboard Front Control Panel Example

System Interfaces Overview

This chapter provides an overview of the standard and optional interfaces available on your SGI Altix XE340 system. The major components of the system are described and illustrated.

System Interface Overview

There are several LEDs on the two control panels as well as others on the disk drive carriers to keep you constantly informed of the overall status of the system as well as the activity and health of specific components. There are also two buttons on each control panel. This chapter explains the meanings of all LED indicators and the appropriate response you may need to take. Note that the server has two control panels, one for each node in the system. This allows each node (serverboard) to be controlled independently of the other.

Control Panel Buttons

There are two push-buttons located on each control panel: a reset button and a power on/off button.

- **Reset** - Pressing the reset button will reboot only the serverboard it is associated with.

- **Power** - This is the main power button, which is used to apply or turn off the main system power only to the node (serverboard) it is associated with. Depressing this button removes the main power but keeps standby power supplied to the serverboard, see Figure 3-1 on page 20.

Control Panel LEDs

Each of the two control panels located on the front of the server chassis has five LEDs. Each LED provides you with critical information related its own specific serverboard. This section explains what each LED indicates when illuminated and any corrective action you may need to take.
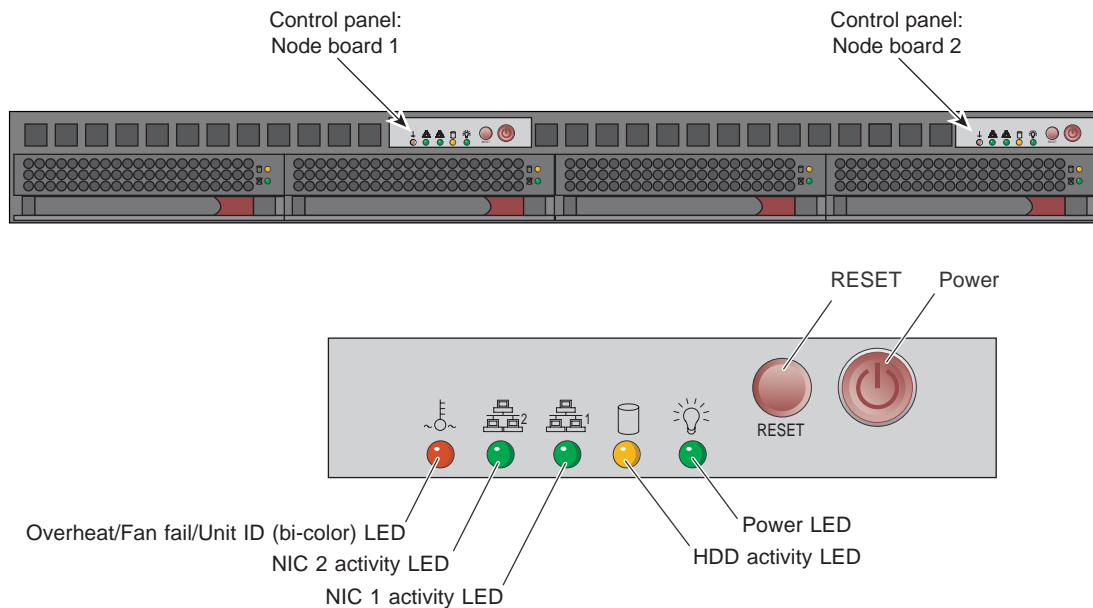
Figure 3-1   Serverboard Control Panel Example

Overheat/Fan Fail/UID

When this LED flashes, it indicates a fan failure. When on continuously it indicates an overheat condition, which may be caused by cables obstructing the airflow in the system or the ambient room temperature being too warm. Check the routing of the cables and make sure all fans are present and operating normally. You should also check to make sure that the chassis covers are installed. Finally, verify that the heatsinks are installed properly. This LED will remain flashing or on as long as the indicated condition exists.

Note: The Overheat/Fan fail /Unit ID LED is a bi-color (Red/Blue) that can indicate unit identification (UID) when activated by an IPMI tool command, or manually by a switch on the rear of the chassis.

NICs 1 and 2

- **NIC1** - Indicates network activity on LAN1 when flashing.

- **NIC2** - Indicates network activity on LAN2 when flashing.

HDD

Channel activity for the hard disk drives. This light indicates disk drive activity on the server when flashing.

Power

The LED indicates power is being supplied to the system's power supply unit. This LED should normally be illuminated when the system is operating.

Disk Drive Carrier LEDs

Each disk drive carrier has two LEDs.

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

- **Red:** There is no function associated with the red LED.

Chapter 4

Internal Component Replacement and Upgrades

This chapter describes basic component replacement and upgrades for the SGI Altix XE340 server.

General Precautions

Care must be taken to assure that the chassis cover is in place when the server is operating to assure proper cooling. Out of warranty damage to the system can occur if this practice is not strictly followed.

Caution: 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.

Installing System DIMM Memory

Exercise extreme care when installing or removing DIMM modules to prevent electrostatic or any other possible damage.

Each serverboard has twelve 240-pin DIMM slots that can support up to 96 GB of registered ECC DDR3-1333/1066/800 SDRAM (for a total of 192 GB in the system).

Note: Check with your SGI sales or service representative for approved replacement or upgrade DIMM memory modules.

Installing Memory Modules

Insert each memory module vertically into a slot using the information and illustrations in this section. Pay attention to the notch along the bottom of the module to prevent inserting it incorrectly.

To install a DIMM: Insert the module vertically and gently press down until it snaps into place. Pay attention to the alignment notch at the bottom.

Repeat for all DIMMs.

To remove a DIMM: Use your thumbs to gently push the release tabs near both ends of the memory module. This should release it from the slot.
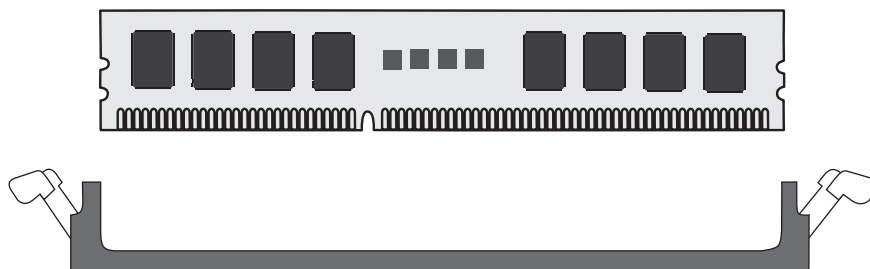
Figure 4-1   DIMM Installation Example

Due to the memory allocation to system devices, the amount of memory that remains available for operational use will be reduced when 4 GB of RAM is used. The reduction in memory availability is disproportional.

Adding PCIe Cards

The server includes two pre-installed riser cards designed specifically for use in the 1U rackmount server chassis. These riser cards support two low-profile PCI Express (PCIe) x16 cards that install inside the chassis.

A riser card has already been preinstalled into each serverboard. The PCIe card cannot be "hot installed". Perform the following steps to add a PCIe add-on card:

1. Grasp the two handles on either side and pull the unit straight out of the rack until it locks (you will hear a "click").

2. 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, then place both thumbs in the indentations and push the cover back until it slides off.

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

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

5. Insert the add-on card into the riser card.

6. Secure the add-on card with the locking tab.

System Fans

Each node has three sets of 4-cm high-performance PWM fans to provide the cooling for the system (each set consists of two back-to-back counter-rotating fans). Fan speed may be controlled by a setting in BIOS (see Chapter 5).

System Fan Failure

If a fan fails, the red overheat/fan fail LED on the control panel will blink on and off.

Replace any failed fan at your earliest convenience with the same type and model (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 before replacing a fan. Removing the power cord is also recommended as a safety precaution.

Drive Bay Installation/Removal

Hard Disk Drives: Because of their hot-swap capability, you do not need to access the inside of the chassis or power down the system to install or replace SATA drives. Proceed to the next step for instructions. Note that the operating system you use must have RAID support to enable the hot-swap capability of the SATA/SAS drives.

Use caution when working around the disk drive backplane. Do not touch the backplane with any metal objects and make sure no cables touch the backplane. Also, regardless of how many drives are installed, all four drive carriers must remain in the chassis to maintain proper airflow.

Disk Drive Removal and Installation

The system disk drives are mounted in drive carriers 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.

Mounting a Drive in a Carrier

Check with your SGI sales or service representative to obtain new or replacement hard disk drives for the server.

Install the drive 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 4-2.
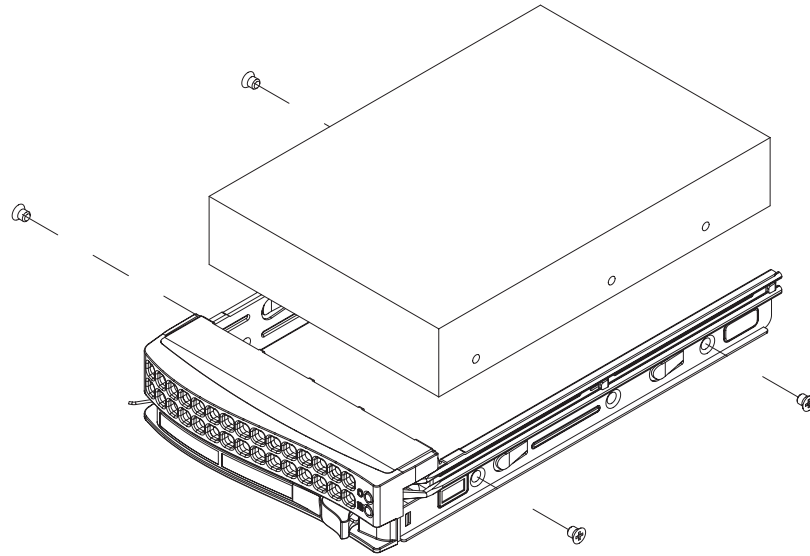
Figure 4-2   Mounting a Drive in a Carrier

Installing/Removing Hot-swap Drives

To remove a carrier, push the release button located beside the drive LEDs.

Swing the handle fully out and use it to pull the unit straight out (see Figure 4-3).
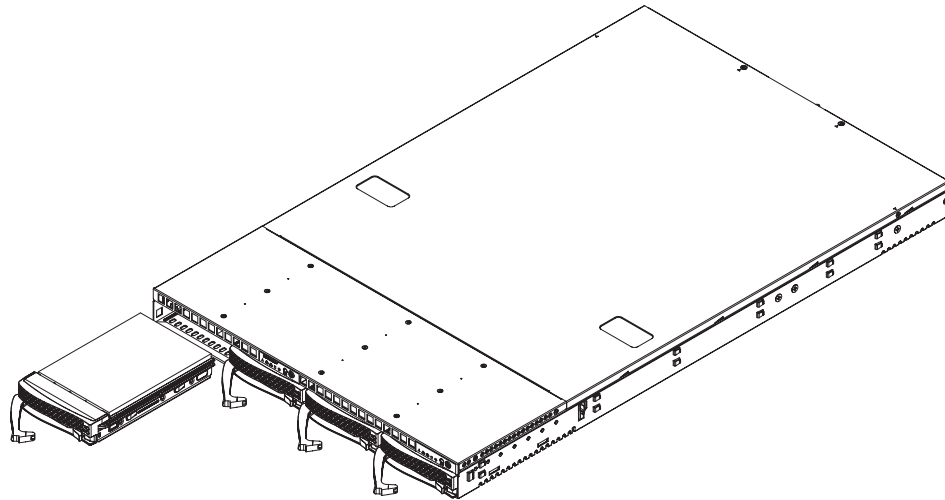
Figure 4-3   Server Disk Drive Remove/Replace Example

Power Supply

The SGI Altix XE340 server has a single 1200-Watt, cold-swap 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.
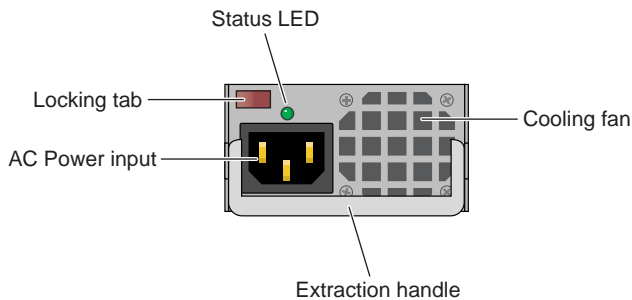
Figure 4-4   Altix XE340 Power Supply Rear View

The LED located directly above the power connector on the supply has three states:

- Dark - no AC power is available to the supply

- Yellow - AC power available to the supply but the server is not powered on

- Green - AC power is applied and the system is on (front panel power button pushed to on)

Power Supply Failure

If the power supply unit fails, the system will shut down and you will need to replace the power supply unit. Replacement units can be ordered directly from your SGI sales or service representative.

If the power supply has failed, the LED located directly above the AC power connector should be off (unlit). Be sure the system power cord is fully plugged in to a power distribution unit that is turned on before replacing the supply.

Removing the Power Supply

Use the following steps to remove a failed power supply from the server:

1. Power off both nodes and unplug the power cord from the system.

2. The power supply may be hot if the system has been running - make sure the server has at least 5 minutes to cool down.

3. Use the power-supply handle (located at the rear of the system) to grasp the power supply.

4. Grasp the power supply handle (see Figure 4-4 on page 28), move the lever to the right and pull the supply straight out the back of the chassis.

5. Lift the unit away from the chassis.
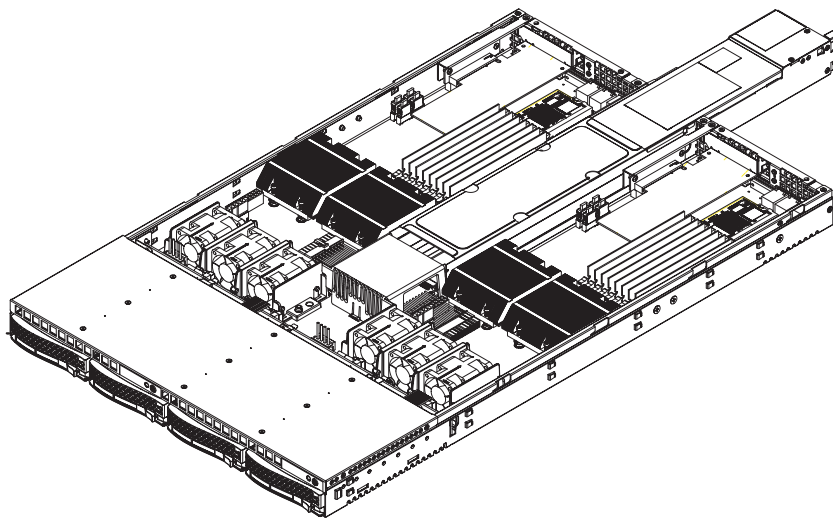
Figure 4-5   Power Supply Removal Example (System Top Cover Removal Not Required)

Installing a New Power Supply

Use the following steps to replace a failed power supply in the server:

1. Replace the failed power supply with the exact same model from SGI or another approved vendor, contact your sales or service representative for more information.

2. Insert the new unit into the chassis and push it in until seated. This may require some moderate force but you should hear an audible "click" as the power supply is seated.

3. Reconnect the AC power cord and then press the power buttons on the front of the chassis to resupply power to both nodes.

Server BIOS Information

This chapter describes the functions and features of the AMI BIOS Setup Utility for the SGI Altix XE340 server. The AMI ROM BIOS is stored in a Flash EEPROM and can be easily updated; check with your SGI sales or service representative for information on updates. This chapter covers basic navigation of the AMI BIOS Setup Utility screens.

Starting the BIOS Setup Utility

To enter the AMI BIOS Setup Utility screens, press the `<Delete>` key while the system is booting up.

Note: In most cases, the `<Delete>` key is used to launch the AMI BIOS setup screen. There are a few cases when other keys are used, such as `<F1>`, `<F2>`, etc.

Each main BIOS menu option is described in this manual. The Main BIOS setup menu screen has two main frames. The left frame displays all the options that can be configured. Note that grayed-out options cannot be configured. Options in blue can be configured by the user. The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it. Note that the AMI BIOS has default text messages built in. SGI retains the option to include, omit, or change any of these text messages.

The AMI BIOS Setup Utility uses a key-based navigation system called "hot keys". Most of the AMI BIOS setup utility "hot keys" can be used at any time during the setup navigation process. These keys include `<F1>`, `<F10>`, `<Enter>`, `<ESC>`, arrow keys, etc.

Note: Options printed in Bold are default settings.

How To Change the Configuration Data

The configuration data that determines the system parameters may be changed by entering the AMI BIOS Setup utility. This Setup utility can be accessed by pressing `<Del>` 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 AMI BIOS Setup Utility. From the main menu, you can access the other setup screens. An AMI BIOS identification string is displayed at the left bottom corner of the screen below the copyright message.

Warning: **Do not upgrade the BIOS unless your system has a BIOS-related issue and you have instructions to do the upgrade from your SGI sales or service representative. Flashing the wrong BIOS can cause irreparable damage to the system and may void your warranty. Your warranty may not cover direct, indirect, special, incidental, or consequential damages arising from a BIOS update. If you have to update the BIOS, do not shut down or reset the system while the BIOS is updating. This is to avoid possible boot failure.**

Main Setup Screen

When you first enter the AMI BIOS Setup Utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab on the top of the screen. The Main BIOS Setup screen has information similar to that shown below.

```
System Overview:
```

The following BIOS information will be displayed:

```
System Time/System Date:
```

Use this option to change the system time and date. Highlight System Time or System Date using the arrow keys. Enter new values through the keyboard. Press the `<Tab>` key or the arrow keys to move between fields. The date must be entered in Day MM/DD/YY format. The time is entered in HH:MM:SS format. (Note that the time is in the 24-hour format. For example, 5:30 P.M. appears as 17:30:00.)

```
BIOS Build Version:
```

This item displays the BIOS revision used in your system.

```
BIOS Build Date:
```

This item displays the date when this BIOS was completed.

```
AMI BIOS Core Version:
```

This item displays the revision number of the AMI BIOS Core upon which your BIOS was built.

```
Processor:
```

The AMI BIOS will automatically display the status of the processor used in your system:

```
CPU Type:
```

This item displays the type of CPU used in the system motherboard.

```
Speed:
```

This item displays the speed of the CPU detected by the BIOS.

```
Physical Count:
```

This item displays the number of processors installed in your system as detected by the BIOS.

```
Logical Count:
```

This item displays the number of CPU **Cores** installed in your system as detected by the BIOS.

```
Micro_code Revision:
```

This item displays the revision number of the BIOS Micro_code used in your system.

```
System Memory:
```

This displays the size of memory available in the system:

```
Size:
```

This item displays the memory size detected by the BIOS.

Advanced Setup Configurations

Use the arrow keys to select Boot Setup and hit `<Enter>` to access the submenu items:

Boot Features

`Quick Boot`

If enabled, this option will skip certain tests during POST to reduce the time needed for system boot. The options are Enabled and Disabled.

`Quiet Boot`

This option allows the bootup screen options to be modified between POST messages or the OEM logo. Select **Disabled** to display the POST messages. Select **Enabled** to display the OEM logo instead of the normal POST messages. The options are Enabled and Disabled.

`Add-On ROM Display Mode`

This sets the display mode for Option ROM. The options are **Force BIOS** and **Keep Current**.

`Bootup Num-Lock`

This feature selects the Power-on state for Numlock key. The options are Off and On.

`Wait For 'F1' If Error`

This forces the system to wait until the 'F1' key is pressed if an error occurs. The options are Disabled and Enabled.

`Hit 'Del' Message Display`

This feature displays "Press DEL to run Setup" during POST. The options are Enabled and Disabled.

`Interrupt 19 Capture`

Interrupt 19 is the software interrupt that handles the boot disk function. When this item is set to Enabled, the ROM BIOS of the host adaptors will "capture" Interrupt 19 at boot and allow the drives that are attached to these host adaptors to function as bootable disks. If this item is set to Disabled, the ROM BIOS of the host adaptors will not capture Interrupt 19, and the drives attached to these adaptors will not function as bootable devices. The options are Enabled and Disabled.

Power Configurations

```
Power Button Function
```

If set to Instant_Off, the system will power off immediately as soon as the user hits the power button. If set to 4_Second_Override, 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.

```
Restore on AC Power Loss
```

Use this feature to set the power state after a power outage. Select Power-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 a power loss. The options are Power-On, Power-Off and Last State.

```
Watch Dog Timer
```

If enabled, the Watch Dog Timer will allow the system to reboot when it is inactive for more than 5 minutes. The options are Enabled and Disabled.

Processor and Clock Options

This submenu allows the user to configure the Processor and Clock settings.

```
Ratio CMOS Setting
```

This option allows the user to set the ratio between the CPU Core Clock and the FSB Frequency. (Note: if an invalid ratio is entered, the AMI BIOS will restore the setting to the previous state.) The default setting depends on the type of CPU installed on the motherboard. The default setting for the CPU installed in your motherboard is [18]. Press "+" or "-" on your keyboard to change this value.

```
C1E Support
```

Select Enabled to use the feature of Enhanced Halt State. C1E significantly reduces the CPU's power consumption by reducing the CPU's clock cycle and voltage during a "Halt State." The options are Disabled and Enabled.

`Hardware Prefetcher` (Available when supported by the CPU)

If set to Enabled, the hardware pre-fetcher will pre-fetch streams of data and instructions from the main memory to the L2 cache in a forward or backward manner to improve CPU performance. The options are Disabled and Enabled.

`Adjacent Cache Line Prefetch` (Available when supported by the CPU)

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.

`Intel® Virtualization Technology` (Available when supported by the CPU)

Select Enabled to use the feature of Virtualization Technology to allow 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: Check with your SGI sales or support representative for information before trying to use the Virtualization option. If there is any change to this setting, you will need to power off and restart the system for the change to take effect.

`Execute-Disable Bit Capability` (Available when supported by the OS and the CPU)

Set to Enabled to enable the Execute Disable Bit which will allow the processor to designate areas in the system memory where an application code can execute and where it cannot, thus preventing a worm or a virus from flooding illegal codes to overwhelm the processor or damage the system during an attack. The default is Enabled. (Check with your SGI sales or service representative for more information before modifying this setting.)

`Simultaneous Multi-Threading` (Available when supported by the CPU)

Set to Enabled to use the Simultaneous Multi-Threading Technology, which will result in increased CPU performance. The options are Disabled and Enabled.

`Active Processor Cores`

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 All, 1 and 2.

`Intel® EIST Technology`

EIST (Enhanced Intel SpeedStep Technology) allows the system to automatically adjust processor voltage and core frequency in an effort to reduce power consumption and heat dissipation. Check with your SGI sales or service representative for more information on using this option in SGI systems and clusters. The options are Disable (Disable GV3) and Enable (Enable GV3).

`Intel® TurboMode Technology`

Select Enabled to use the Turbo Mode to boost system performance. The options are Enabled and Disabled.

`Intel® C-STATE Tech`

If enabled, C-State is set by the system automatically to either C2, C3 or C4 state. The options are Disabled and Enabled.

`C-State package limit setting`

If set to Auto, the AMI BIOS will automatically set the limit on the C-State package register. The options are Auto, C1, C3, C6 and C7.

`C1 Auto Demotion`

When enabled, the CPU will conditionally demote C3, C6 or C7 requests to C1 based on un-core auto-demote information. The options are Disabled and Enabled.

`C3 Auto Demotion`

When enabled, the CPU will conditionally demote C6 or C7 requests to C3 based on un-core auto-demote information. The options are Disabled and Enabled.

`Clock Spread Spectrum`

Select Enable to use the feature of Clock Spectrum, which will allow the BIOS to monitor and attempt to reduce the level of Electromagnetic Interference caused by the components whenever needed. The options are Disabled and Enabled.

Advanced Chipset Control

The items included in the Advanced Settings submenu are listed below:

CPU Bridge Configurations/QPI Links Speed

`QPI Links Speed`

This feature selects QPI's data transfer speed. The options are Slow-mode, and Full Speed.

`QPI Frequency`

This selects the desired QPI frequency. The options are Auto, 4.800 GT, 5.866GT, 6.400 GT.

`QPI L0s and L1`

This enables the QPI power state to low power. L0s and L1 are automatically selected by the motherboard. The options are Disabled and Enabled.

`Memory Frequency`

This feature forces a DDR3 frequency slower than what the system has detected. The available options are Auto, Force DDR-800, Force DDR-1066, Force DDR-1333.

`Memory Mode`

The options are Independent, Channel Mirror, Lockstep and Sparing.

- Independent - All DIMMs are available to the operating system.

- Channel Mirror - The motherboard maintains two identical (redundant) copies of all data in memory.

- Lockstep - The motherboard uses two areas of memory to run the same set of operations in parallel.

- Sparing - A preset threshold of correctable errors is used to trigger fail-over. The spare memory is put online and used as active memory in place of the failed memory.

`Demand Scrubbing`

A memory error-correction scheme where the Processor writes corrected data back into the memory block from where it was read by the Processor. The options are Enabled and Disabled.

`Patrol Scrubbing`

A memory error-correction scheme that works in the background looking for and correcting resident errors. The options are Enabled and Disabled.

`Throttling - Closed Loop/Throttling - Open Loop`

Throttling improves reliability and reduces power in the processor by automatic voltage control during processor idle states. Available options are Disabled and Enabled. If Enabled, the following items will appear:

`Hysteresis Temperature` (For the Closed Loop only)

Temperature Hysteresis is the temperature lag (in degrees Celsius) after the set DIMM temperature threshold is reached before Closed Loop Throttling begins. The options are Disabled, 1.5^{o}C, 3.0^{o}C, and 6.0^{o}C.

`Guardband Temperature` (For the Closed Loop only)

This is the temperature which applies to the DIMM temperature threshold. Each step is in 0.5^{o}C increment. The default is [006]. Press "+" or "-" on your keyboard to change this value.

`Inlet Temperature`

This is the temperature detected at the chassis inlet. Each step is in 0.5^{o}C increment. The default is [070]. Press "+" or "-" on your keyboard to change this value.

`Temperature Rise`

This is the temperature rise to the DIMM thermal zone. Each step is in 0.5^{o}C increment. The default is [020]. Press "+" or "-" on your keyboard to change this value.

`Air Flow`

This is the airflow speed to the DIMM modules. Each step is one mm/sec. The default is [1500]. Press "+" or "-" on your keyboard to change this value.

`Altitude`

This feature defines how many meters above or below sea level the system is located. The options are Sea Level or Below, 1~300, 301~600, 601~900, 901~1200, 1201~1500, 1501~1800, 1801~2100, 2101~2400, 2401~2700, 2701~3000.

```
DIMM Pitch
```

This is the physical space between each DIMM module. Each step is in 1/1000 of an inch. The default is [400]. Press "+" or "-" on your keyboard to change this value.

North Bridge Configuration

This feature allows the user to configure the settings for the Intel North Bridge chip.

```
Crystal Beach/DMA
```

This feature works with the Intel I/O AT (Acceleration Technology) to accelerate the performance of 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 this add-on card.) When this feature is set to Enabled, it will enhance overall system performance by providing direct memory access for data transferring. The options are Enabled and Disabled. Check with your SGI sales or service representative for information on the availability of this option.

```
Intel VT-d
```

Select Enabled to enable Intel's Virtualization Technology support for Direct I/O VT-d by reporting the I/O device assignments to VMM through the DMAR ACPI Tables. This feature offers fully-protected I/O resource-sharing across the Intel platforms, providing the user with greater reliability, security and availability in networking and data-sharing. The settings are Enabled and Disabled.

```
IOH PCIE Port1 Bifurcation
```

This feature allows the user to set IOH Bifurcation configuration for the PCI-E Port

The options are X4X4X4X4, X4X4X8, X8X4X4, X8X8.

```
IOH PCIE Max Payload Size
```

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

SouthBridge Configuration

This feature allows the user to configure the settings for the Intel ICH South Bridge chipset.

```
USB Functions
```

This feature allows the user to decide the number of onboard USB ports to be enabled. The Options are: Disabled, 2 USB ports, 4 USB ports, 6 USB ports, 8 Ports, 10 Ports and 12 USB ports.

```
Legacy USB Support
```

Select Enabled to use Legacy USB devices. If this item is set to Auto, Legacy USB support will be automatically enabled if a legacy USB device is installed on the motherboard, and vise versa. The settings are Disabled, and Enabled.

```
USB 2.0 Controller
```

Select Enabled to activate the onboard USB 2.0 controller. The options are Enabled and Disabled.

```
USB 2.0 Controller Mode
```

This setting allows you to select the USB 2.0 Controller mode. The options are Hi-Speed (480 Mbps) and Full Speed (12 Mbps).

```
BIOS EHCI Hand-Off
```

Select Enabled to enable BIOS Enhanced Host Controller Interface support to provide a workaround solution for an operating system that does not have EHCI Hand-Off support. When enabled, the EHCI Interface will be changed from the BIOS-controlled to the OS-controlled. The options are Disabled and Enabled.

```
XIDE/SATA Configuration
```

When this submenu is selected, the AMI BIOS automatically detects the presence of the IDE devices and displays the following items:

• SATA#1 Configuration

If Compatible is selected, it sets SATA#1 to legacy compatibility mode, while selecting Enhanced sets SATA#1 to native SATA mode. The options are Disabled, Compatible and Enhanced.

• Configure SATA#1 as

This feature allows the user to select the drive type for SATA#1. The options are IDE, RAID and AHCI.

- SATA#2 Configuration

Selecting Enhanced will set SATA#2 to native SATA mode. The options are Disabled, and Enhanced.

```
Primary IDE Master/Slave, Secondary IDE Master/Slave, Third IDE
Master, and Fourth IDE Master
```

These settings allow the user to set the parameters of Primary IDE Master/Slave, Secondary IDE Master/Slave, Third and Fourth IDE Master slots. Hit <Enter> to activate the following submenu screen for detailed options of these items. Set the correct configurations accordingly. The items included in the submenu are:

- Type

Select the type of device connected to the system. The options are Not Installed, Auto, CD/DVD and ARMD.

- LBA/Large Mode

LBA (Logical Block Addressing) is a method of addressing data on a disk drive. In the LBA mode, the maximum drive capacity is 137 GB. For drive capacities over 137 GB, your system must be equipped with a 48-bit LBA mode addressing. If not, contact your manufacturer or install an ATA/133 IDE controller card that supports 48-bit LBA mode. The options are Disabled and Auto.

- Block (Multi-Sector Transfer)

Block Mode boosts the IDE drive performance by increasing the amount of data transferred. Only 512 bytes of data can be transferred per interrupt if Block Mode is not used. Block Mode allows transfers of up to 64 KB per interrupt. Select Disabled to allow data to be transferred from and to the device one sector at a time. Select Auto to allow data transfer from and to the device occur multiple sectors at a time if the device supports it. The options are Auto and Disabled.

- PIO Mode

The IDE PIO (Programmable I/O) Mode programs timing cycles between the IDE drive and the programmable IDE controller. As the PIO mode increases, the cycle time decreases. The options are Auto, 0, 1, 2, 3, and 4.

Select Auto to allow the AMI BIOS to automatically detect the PIO mode. Use this value if the IDE disk drive support cannot be determined. Select 0 to allow the AMI BIOS to use PIO mode 0. It has a data transfer rate of 3.3 MBs. Select 1 to allow the AMI BIOS to use PIO mode 1. It has a data transfer rate of 5.2 MBs.

Select 2 to allow the AMI BIOS to use PIO mode 2. It has a data transfer rate of 8.3 MBs. Select 3 to allow the AMI BIOS to use PIO mode 3. It has a data transfer rate of 11.1 MBs. Select 4 to allow the AMI BIOS to use PIO mode 4. It has a data transfer bandwidth of 32-Bits. Select Enabled to enable 32-Bit data transfer.

- DMA Mode

Select Auto to allow the BIOS to automatically detect IDE DMA mode when the IDE disk drive support cannot be determined.

Select SWDMA0 to allow the BIOS to use Single Word DMA mode 0. It has a data transfer rate of 2.1 MBs.

Select SWDMA1 to allow the BIOS to use Single Word DMA mode 1. It has a data transfer rate of 4.2 MBs.

Select SWDMA2 to allow the BIOS to use Single Word DMA mode 2. It has a data transfer rate of 8.3 MBs.

Select MWDMA0 to allow the BIOS to use Multi Word DMA mode 0. It has a data transfer rate of 4.2 MBs.

Select MWDMA1 to allow the BIOS to use Multi Word DMA mode 1. It has a data transfer rate of 13.3 MBs.

Select MWDMA2 to allow the BIOS to use Multi-Word DMA mode 2. It has a data transfer rate of 16.6 MBs.

Select UDMA0 to allow the BIOS to use Ultra DMA mode 0. It has a data transfer rate of 16.6 MBs. It has the same transfer rate as PIO mode 4 and Multi Word DMA mode 2.

Select UDMA1 to allow the BIOS to use Ultra DMA mode 1. It has a data transfer rate of 25 MBs.

Select UDMA2 to allow the BIOS to use Ultra DMA mode 2. It has a data transfer rate of 33.3 MBs.

Select UDMA3 to allow the BIOS to use Ultra DMA mode 3. It has a data transfer rate of 66.6 MBs.

Select UDMA4 to allow the BIOS to use Ultra DMA mode 4. It has a data transfer rate of 100 MBs. The options are Auto, SWDMAn, MWDMAn, and UDMAn.

`S.M.A.R.T. For Hard disk drives`

Self-Monitoring Analysis and Reporting Technology (SMART) can help predict impending drive failures. Select Auto to allow the AMI BIOS to automatically detect hard disk drive support. Select Disabled to prevent the AMI BIOS from using the S.M.A.R.T. Select Enabled to allow the AMI BIOS to use the S.M.A.R.T. to support hard drive disk. The options are Disabled, Enabled, and Auto.

`32Bit Data Transfer`

Select Enable to enable the function of 32-bit IDE data transfer. The options are Enabled and Disabled.

`IDE Detect Timeout (sec)`

Use this feature to set the time-out value for the BIOS to detect the ATA, ATAPI devices installed in the system. The options are 0 (sec), 5, 10, 15, 20, 25, 30, and 35.

`Clear NVRAM`

This feature clears the NVRAM during system boot. The options are No and Yes.

`Plug & Play OS`

Selecting Yes allows the OS to configure Plug & Play devices. (This is not required for system boot if your system has an OS that supports Plug & Play.) Select No to allow the AMI BIOS to configure all devices in the system.

`PCI Latency Timer`

This feature sets the latency Timer of each PCI device installed on a PCI bus. Select 64 to set the PCI latency to 64 PCI clock cycles. The options are 32, 64, 96, 128, 160, 192, 224 and 248.

`PCI IDE BusMaster`

When enabled, the BIOS uses PCI bus mastering for reading/writing to IDE drives. The options are Disabled and Enabled.

```
Load Onboard LAN1 Option ROM/Load Onboard LAN2 Option ROM
```

Select Enabled to enable the onboard LAN1 or LAN2 Option ROM. This is to boot the computer using a network interface. The options are Enabled and Disabled.

```
Serial Port1 Address/ Serial Port2 Address
```

This option specifies the base I/O port address and the Interrupt Request address of Serial Port 1 and Serial Port 2. Select Disabled to prevent the serial port from accessing any system resources. When this option is set to Disabled, the serial port physically becomes unavailable. Select 3F8/IRQ4 to allow the serial port to use 3F8 as its I/O port address and IRQ 4 for the interrupt address. The options for Serial Port1 are Disabled, 3F8/IRQ4, 3E8/IRQ4, 2E8/IRQ3. The options for Serial Port2 are Disabled, 2F8/IRQ3, 3E8/IRQ4, and 2E8/IRQ3.

Remote Access Configuration

```
Remote Access
```

This allows the user to enable the Remote Access feature. The options are Disabled and Enabled. If Remote Access is set to Enabled, the following items will display:

- Serial Port Number

  This feature allows the user decide which serial port to be used for Console Redirection. The options are COM 1 and COM 2.

- Serial Port Mode

  This feature allows the user to set the serial port mode for Console Redirection. The options are 115200 8, n 1; 57600 8, n, 1; 38400 8, n, 1; 19200 8, n, 1; and 9600 8, n, 1.

- Flow Control

  This feature allows the user to set the flow control for Console Redirection. The options are None, Hardware, and Software.

```
Redirection After BIOS POST
```

Select Disabled to turn off Console Redirection after Power-On Self-Test (POST). Select Always to keep Console Redirection active all the time after POST.

Note: This setting may not be supported by some operating systems.

Select Boot Loader to keep Console Redirection active during POST and Boot Loader. The options are Disabled, Boot Loader, and Always.

`Terminal Type`

This feature allows the user to select the target terminal type for Console Redirection. The options are ANSI, VT100, and VT-UTF8.

`VT-UTF8 Combo Key Support`

A terminal keyboard definition that provides a way to send commands from a remote console. Available options are Enabled and Disabled.

`Sredir Memory Display Delay`

This feature de.nes the length of time in seconds to display memory information. The options are No Delay, Delay 1 Sec, Delay 2 Sec, and Delay 4 Sec.

Hardware Health Monitor

This feature allows the user to monitor system health and review the status of each item as displayed.

`CPU Overheat Alarm`

This option allows the user to select the CPU Overheat Alarm setting which determines when the CPU OH alarm will be activated to provide warning of possible CPU overheat.

Warning: **Any temperature that exceeds the CPU threshold temperature predefined by the CPU manufacturer may result in CPU overheat or system instability. When the CPU temperature reaches this predefined threshold, the CPU and system cooling fans will run at full speed.**

The options are:

- The Early Alarm: Select this setting if you want the CPU overheat alarm (including the LED and the buzzer) to be triggered as soon as the CPU temperature reaches the CPU overheat threshold as predefined by the CPU manufacturer.

- The Default Alarm: Select this setting if you want the CPU overheat alarm (including the LED and the buzzer) to be triggered when the CPU temperature reaches about 5° C above the threshold temperature as predefined by the CPU manufacturer to give the CPU and system fans additional time needed for CPU and system cooling. In both the alarms above, please take immediate action as shown below.

```
CPU Temperature/System Temperature
```

This feature displays current temperature readings for the CPU and the System.

The following items will be displayed for your reference only:

```
CPU Temperature
```

The CPU thermal technology that reports absolute temperatures (Celsius/Fahrenheit) has been upgraded to a more advanced feature by Intel in its newer processors. The basic concept is each CPU is embedded by unique temperature information that the motherboard can read. This 'Temperature Threshold' or 'Temperature Tolerance' has been assigned at the factory and is the baseline on which the motherboard takes action during different CPU temperature conditions (i.e., by increasing CPU Fan speed, triggering the Overheat Alarm, etc.). Since CPUs can have different 'Temperature Tolerances', the installed CPU can now send information to the motherboard regarding what its 'Temperature Tolerance' is, and not the other way around. This results in better CPU thermal management.

The manufacturer has leveraged this feature by assigning a temperature status to certain thermal conditions in the processor (Low, Medium and High). This makes it easier for the user to understand the CPU's temperature status, rather than by just simply seeing a temperature reading (i.e., 25° C). The CPU Temperature feature will display the CPU temperature status as detected by the BIOS:

Low – This level is considered as the 'normal' operating state. The CPU temperature is well below the CPU 'Temperature Tolerance'. The motherboard fans and CPU will run normally as configured in the BIOS (Fan Speed Control).

User intervention: No action required.

Medium – The processor is running warmer. This is a 'precautionary' level and generally means that there may be factors contributing to this condition, but the CPU is still within its normal operating state and below the CPU 'Temperature Tolerance'. The motherboard fans and CPU will run normally as configured in the BIOS. The fans may adjust to a faster speed depending on the Fan Speed Control settings.

User intervention: No action is required. However, consider checking the CPU fans and the chassis ventilation for blockage.

High – The processor is running hot. This is a 'caution' level since the CPU's 'Temperature Tolerance' has been reached (or has been exceeded) and may activate an overheat alarm.

User intervention: If the system buzzer and Overheat LED has activated, take action immediately by checking the system fans, chassis ventilation and room temperature to correct any problems.

Note: The system may shut down if it continues for a long period to prevent damage to the CPU. The information provided above is for your reference only. For more information on processor thermal management, reference Intel's Web site at www.Intel.com or contact your support representative.

System Temperature: The system temperature will be displayed (in degrees in Celsius and Fahrenheit) as it is detected by the BIOS.

`Fan Speed Control Monitor`

This feature allows the user to decide how the system controls the speeds of the on-board 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 "Disabled, (Full Speed @12V)" to disable the fan speed control function and allow the on-board fans to constantly run at the full speed (12V). The Options are: 1. Disabled (Full Speed), 2. Server Mode, 3. Workstation Mode.

`Fan1 ~ Fan 4 Reading`

This feature displays the fan speed readings from fan interfaces Fan1 through Fan5.

CPU1 Vcore, CPU2 Vcore, +5Vin, +12Vcc (V), VPI DIMM, VP2 DIMM, 3.3Vcc (V), and Battery Voltage

```
ACPI Configuration
```

Use this feature to configure Advanced Configuration and Power Interface (ACPI) power management settings for your system.

```
ACPI Version Features
```

The options are ACPI v1.0, ACPI v2.0 and ACPI v3.0. Please refer to ACPI's website for further explanation: http://www.acpi.info/.

```
ACPI APIC Support
```

Select Enabled to include the ACPI APIC Table Pointer in the RSDT pointer list. The options are Enabled and Disabled.

```
APIC ACPI SCI IRQ
```

When this item is set to Enabled, APIC ACPI SCI IRQ is supported by the system. The options are Enabled and Disabled.

```
USB Device Wakeup from S3/S4
```

Select to Enabled to allow USB devices to wakeup from S3/S4 state. The options are Enabled and Disabled.

```
High Performance Event Timer
```

Select Enabled to activate the High Performance Event Timer (HPET) that produces periodic interrupts at a much higher frequency than a Real-time Clock (RTC) does in synchronizing multimedia streams, providing smooth playback and reducing the dependency on other timestamp calculation devices, such as an x86 RDTSC Instruction embedded in the CPU. The High Performance Event Timer is used to replace the 8254 Programmable Interval Timer. The options are Enabled and Disabled.

IPMI Configuration

Intelligent Platform Management Interface (IPMI) is a set of common interfaces that IT administrators can use to monitor system health and to manage the system as a whole. For more information on the IPMI specifications, please visit Intel's website at www.intel.com.

```
Status of BMC
```

Baseboard Management Controller (BMC) manages the interface between system management software and platform hardware. This is an informational feature which returns the status code of the BMC micro controller.

`View BMC System Event Log`

This feature displays the BMC System Event Log (SEL). It shows the total number of entries of BMC System Events. To view an event, select an Entry Number and press `<Enter>` to display the information as shown in the example below:

• **Total Number of Entries**

SEL Entry Number

SEL Record ID

SEL Record Type

Timestamp, Generator ID

Event Message Format User

Event Sensor Type

Event Sensor Number

Event Dir Type

Event Data

`Clear BMC System Event Log`

This feature is used to clear the BMC System Event Log.

Caution: Any cleared information is unrecoverable. Make absolutely sure that you no longer need any data stored in the log before clearing the BMC Event Log.

```
Set LAN Configuration
```

Set this feature to configure the IPMI LAN adapter with a network address.

Channel Number - Enter the channel number for the SET LAN Configuration command. This is initially set to [1]. Press "+" or "-" on your keyboard to change the Channel Number.

Channel Number Status -This feature returns the channel status for the Channel Number selected above: "Channel Number is OK" or "Wrong Channel Number".

```
IP Address Configuration
```

Enter the IP address for this machine. This should be in decimal and in dotted quad form (i.e., 192.168.10.253). The value of each three-digit number separated by dots should not exceed 255.

```
Parameter Selector
```

Use this feature to select the parameter of your IP Address configuration.

```
IP Address
```

The BIOS will automatically enter the IP address of this machine; however it may be over-ridden. IP addresses are 6 two-digit hexadecimal numbers (Base 16, 0 ~ 9, A, B, C, D, E, F) separated by dots. (i.e., 00.30.48.D0.D4.60).

```
Current IP Address in BMC
```

This item displays the current IP address used for your IPMI connection.

```
MAC Address Configuration
```

Enter the Mac address for this machine. This should be in decimal and in dotted quad form (i.e., 192.168.10.253). The value of each three-digit number separated by dots should not exceed 255.

```
Parameter Selector
```

Use this feature to select the parameter of your Mac Address configuration.

```
Mac Address
```

The BIOS will automatically enter the Mac address of this machine; however it may be over-ridden. Mac addresses are 6 two-digit hexadecimal numbers (Base 16, 0 ~ 9, A, B, C, D, E, F) separated by dots. (i.e., 00.30.48.D0.D4.60).

```
Current Mac Address in BMC
```

This item displays the current Mac address used for your IPMI connection.

```
Subnet Mask Configuration
```

Subnet masks tell the network which subnet this machine belongs to. The value of each three-digit number separated by dots should not exceed 255.

```
Parameter Selector
```

Use this feature to select the parameter of your Subnet Masks configuration.

```
Subnet Masks
```

This item displays the current subnet masks setting for your IPMI connection.

SEL PEF Configuration

```
Set PEF Configuration
```

Set this feature to configure the Platform Event Filter (PEF). PEF interprets BMC events and performs actions based on pre-determined settings or 'traps' under IPMI 1.5 specifications. For example, powering the system down or sending an alert when a triggering event is detected.

The following will appear if PEF Support is set to Enabled. The default is Disabled.

PEF Action Global Control -These are the different actions based on BMC events. The options are Alert, Power Down, Reset System, Power Cycle, OEM Action, Diagnostic Interface.

Alert Startup Delay - This feature inserts a delay during startup for PEF alerts.

The options are Enabled and Disabled.PEF Alert Startup Delay -This sets the pre-determined time to delay PEF alerts after system power-ups and resets. Refer to Table 24.6 of the IPMI 1.5 specification for more information at www.intel.com. The options are No Delay, 30 sec, 60 sec, 1.5 min, 2.0 min. Startup Delay - This feature enables or disables startup delay. The options are Enabled and Disabled.

PEF Startup Delay -This sets the pre-determined time to delay PEF after system power-ups and resets. Refer to Table 24.6 of the IPMI 1.5 Specification for more information at www.intel.com. The options are No Delay, 30 sec, 60 sec, 1.5 min, 2.0 min.

Event Message for PEF Action - This enables of disables Event Messages for PEF action. Refer to Table 24.6 of the IPMI 1.5 Specification for more information at www.intel.com. The options are Disabled and Enabled.

```
BMC Watch Dog Timer Action
```

Allows the BMC to reset or power down the system if the operating system hangs or crashes. The options are Disabled, Reset System, Power Down, Power Cycle.

```
BMC Watch Dog TimeOut [Min:Sec]
```

This option appears if BMC Watch Dog Timer Action (above) is enabled. This is a timed delay in minutes or seconds, before a system power down or reset after an operating system failure is detected. The options are [5 Min], [1 Min], [30 Sec], and [10 Sec].

The DMI Event Log

```
View Event Log
```

Use this option to view the System Event Log.

```
Mark all events as read
```

This option marks all events as read. The options are OK and Cancel.

```
Clear event log
```

This option clears the Event Log memory of all messages. The options are OK and Cancel.

Security Settings

The AMI BIOS provides a Supervisor and a User password. If you use both passwords, the Supervisor password must be set first.

```
Supervisor Password
```

This item indicates if 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:

This item indicates if 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.

Change Supervisor Password

Select this feature and press <Enter> to access the submenu, and then type in a new Supervisor Password.

User Access Level (Available when Supervisor Password is set as above)

Available options are Full Access: grants full User read and write access to the Setup Utility, View Only: allows access to the Setup Utility but the fields cannot be changed, Limited: allows only limited fields to be changed such as Date and Time, No Access: prevents User access to the Setup Utility.

Change User Password

Select this feature and press <Enter> to access the submenu, and then type in a new User Password.

Clear User Password (Available only if User Password has been set)

This item allows you to clear a user password after it has been entered.

Password Check

This item allows you to check a password after it has been entered. The options are Setup and Always.

Boot Sector Virus Protection

When Enabled, the AMI BOIS displays a warning when any program (or virus) issues a Disk Format command or attempts to write to the boot sector of the hard disk drive. The options are Enabled and Disabled.

Boot Configuration

Use this feature to configure boot settings.

```
Boot Device Priority
```

This feature allows the user to specify the sequence of priority for the Boot Device. The settings are 1st boot device, 2nd boot device, 3rd boot device, 4th boot device, 5th boot device and Disabled.

1st Boot Device - [USB: XXXXXXXXX]

2nd Boot Device - [CD/DVD: XXXXXXXXX]

```
Hard Disk Drives
```

This feature allows the user to specify the boot sequence from all available hard disk drives. The settings are Disabled and a list of all hard disk drives that have been detected (i.e., 1st Drive, 2nd Drive, 3rd Drive, etc.).

• 1st Drive - [SATA: XXXXXXXXX]

```
Removable Drives
```

This feature allows the user to specify the boot sequence from available Removable Drives. The settings are 1st boot device, 2nd boot device, and Disabled.

1st Drive - [USB: XXXXXXXXX]

2nd Drive

```
XCD/DVD Drives
```

This feature allows the user to specify the boot sequence from available CD/DVD Drives (i.e., 1st Drive, 2nd Drive, etc.).

Exit Options

Select the Exit tab from the AMI BIOS Setup Utility screen to enter the Exit BIOS Setup screen.

```
Save Changes and Exit
```

When you have completed the system configuration changes, select this option to leave the BIOS Setup Utility and reboot the computer, so the new system configuration parameters can take effect. Select Save Changes and Exit from the Exit menu and press <Enter>.

```
Discard Changes and Exit
```

Select this option to quit the BIOS Setup without making any permanent changes to the system configuration, and reboot the computer. Select Discard Changes and Exit from the Exit menu and press <Enter>.

```
Discard Changes
```

Select this option and press <Enter> to discard all the changes and return to the AMI BIOS Utility Program.

```
Load Optimal Defaults
```

To set this feature, select Load Optimal Defaults from the Exit menu and press <Enter>. Then, select OK to allow the AMI BIOS to automatically load Optimal Defaults to the BIOS Settings. The Optimal settings are designed for maximum system performance, but may not work best for all computer applications.

```
Load Fail-Safe Defaults
```

To set this feature, select Load Fail-Safe Defaults from the Exit menu and press <Enter>. The Fail-Safe settings are designed for maximum system stability, but not for maximum performance.

BIOS Error Beep Codes

During the POST (Power-On Self-Test) routines, which are performed each time the system is powered on, errors may occur.

Non-fatal errors are those which, in most cases, allow the system to continue the boot-up process. The error messages normally appear on the screen.

Fatal errors are those which will not allow the system to continue the boot-up procedure. If a fatal error occurs, you should consult with your system manufacturer for possible repairs.

BIOS Error Beep Code List

The following list of error codes my be helpful in diagnosing certain system problems.

BIOS Error Beep Codes		
Beep Code	**Error Message**	**Description**
1 beep	Refresh	Circuits have been reset. (Ready to power up)
5 short beeps + 1 long beep	Memory error	No memory detected in the system
8 beeps 1 continuous beep (with the front panel OH LED on)	Display memory read/write error System Overheat	Video adapter missing or with faulty memory 1 continuous beep with the front panel OH LED on

Technical Specifications

This appendix contains technical specification information about your system.

Server Specifications and Features

Table A-1 shows the physical specifications of the Altix XE340 server system.

Table A-1 Altix XE340 Physical Specifications

System Features	Specification
Height	1.7 in. (43 mm)
Width	17.2 in. (43.7 cm)
Depth	27.75 in. (70.5 cm)
Weight (full) maximum	~40 lbs. (18.2 kg) approximate
Voltage range	100-240 VAC
Cycles per second	50 or 60 Hz
System Cooling	Six (6) 4-cm Pulse Width Modulated (PWM) fans
Phase required	Single-phase
Power supply	1200 Watts (single supply)
Hard drive bays	Four (removable)
Power cable	Single pluggable cord
PCIe slots	Two low-profile (x16) PCI-Express slots per server
System server board dimensions	6.5 in. (165 mm) x 16.4 in (417 mm). Two serverboards per system.

Environmental Specifications

Table A-2 lists the environmental specifications of the system.

Table A-2   Environmental Specifications

Feature	Specification
Temperature tolerance (operating)	+5 °C (41 °F) to +35 °C (95 °F) (up to 1500 m / 5000 ft.) +5 °C (41 °F) to +30 °C (86 °F) (1500 m to 3000 m /5000 ft. to 10,000 ft.)
Temperature tolerance (non-operating)	-40 °C (-40 °F) to +60 °C (140 °F)
Relative humidity	10% to 80% operating (no condensation) 8% to 95% non-operating (no condensation)
Cooling requirement	Ambient air or optional water cooling
Maximum altitude	10,000 ft. (3,049 m) operating 40,000 ft. (12,195 m) non-operating
Acoustical noise level	Less than 65 dBa maximum

SGI Altix XE System Drivers

SGI Altix XE systems may sometimes require driver versions that are not included in the original operating system release.

The SGI Altix XE Driver CD and Linux Updates

SGI provides these required drivers on the SGI Altix XE Driver CD, which ships with all SGI Altix XE systems, and on systems that are pre-installed in the factory.

Novell and Red Hat also provide driver updates for supported operating system releases. Red Hat makes driver updates for Red Hat Enterprise Linux available on the Red Hat Network (RHN). Novell makes SGI Altix XE specific driver updates available at the following location:

http://forgeftp.novell.com/sgi/SGI-Altix-XE/

SGI also makes the SGI Altix XE Driver CD available on Supportfolio Online at:

http://www.sgi.com/support/

Simply search for "SGI Altix XE Driver CD" to find the latest version of the CD.

The ISO image is available here:

dist.engr:/released/ProPack6SP2/ISO/812-1235-002/sgi-xe-drivers-20090306.iso