



SGI® Altix® XE500 System User's Guide

007-5572-001

COPYRIGHT

© 2009 SGI. All rights reserved; provided portions may be copyright in third parties, as indicated elsewhere herein. No permission is granted to copy, distribute, or create derivative works from the contents of this electronic documentation in any manner, in whole or in part, without the prior written permission of SGI.

LIMITED RIGHTS LEGEND

The software described in this document is “commercial computer software” provided with restricted rights (except as to included open/free source) as specified in the FAR 52.227-19 and/or the DFAR 227.7202, or successive sections. Use beyond license provisions is a violation of worldwide intellectual property laws, treaties and conventions. This document is provided with limited rights as defined in 52.227-14.

The electronic (software) version of this document was developed at private expense; if acquired under an agreement with the USA government or any contractor thereto, it is acquired as “commercial computer software” subject to the provisions of its applicable license agreement, as specified in (a) 48 CFR 12.212 of the FAR; or, if acquired for Department of Defense units, (b) 48 CFR 227-7202 of the DoD FAR Supplement; or sections succeeding thereto. Contractor/manufacturer is SGI, 46600 Landing Parkway, Fremont, CA 94538.

TRADEMARKS AND ATTRIBUTIONS

Altix, SGI, and the SGI logo are registered trademarks and SGI ProPack is a trademark of SGI in the United States and/or other countries worldwide.

Fusion-MPT, Integrated RAID, MegaRAID, and LSI Logic are trademarks or registered trademarks of LSI Logic Corporation. InfiniBand is a registered trademark of the InfiniBand Trade Association. Intel, Itanium, and Xeon are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries. Internet Explorer and MS-DOS are registered trademarks of Microsoft Corporation. Java and Java Virtual Machine are trademarks or registered trademarks of Sun Microsystems, Inc. Linux is a registered trademark of Linus Torvalds, used with permission by SGI. Novell and Novell Netware are registered trademarks of Novell Inc. PCIe and PCI-X are registered trademarks of PCI SIG. Phoenix and PhoenixBIOS are registered trademarks of Phoenix Technologies Ltd. Red Hat and all Red Hat-based trademarks are trademarks or registered trademarks of Red Hat, Inc. in the United States and other countries. SUSE LINUX and the SUSE logo are registered trademarks of Novell, Inc. UNIX is a registered trademark in the United States and other countries, licensed exclusively through X/Open Company, Ltd.

All other trademarks mentioned herein are the property of their respective owners.

Contents

	About This Guide	.xvii
1	Introduction and System Components Overview	1
	Racks	3
	Componets	4
	Chassis and Hard Drive Bays	4
	Fans	4
	Mounting Rails	4
	Power Supply	5
	Air Shroud	5
	QuickPath Interconnect	5
	Memory Subsystem	7
	PCI Subsystem	8
	Disk RAID Support	8
	RAID 0 (Striping)	9
	RAID 1 (Mirrored)	9
	RAID 5 (Parity)	9
	RAID 6 (Dual Parity)	9
	RAID 10 (Mirrored Stripes)	9
2	Installing the Altix XE500 System in a Rack.	11
	Unpack the System	11
	Prepare for Setup	11
	Choose a Setup Location	11
	Warnings and Precautions	12
	Rack Precautions	12
	Server Precautions	13
	Rack Mounting Considerations	13

	Ambient Operating Temperature	13
	Reduced Airflow	13
	Mechanical Loading	13
	Circuit Overloading	14
	Reliable Ground	14
	Install the System into a Rack	14
	Separate the Sections of the Rack Rails	14
	Outer Rack Rails.	15
	Install the Outer Rails to the Rack	16
	Install the Inner Rail Extension	17
	Install the Inner Rails	17
	Install the Server in a Rack	18
	Check the Node Board Setup.	19
	Access the Inside of the Chassis.	19
	Check the CPUs (processors)	20
	Check the System Memory	21
	Install Expansion PCI Cards.	21
	Check all Cable Connections and Airflow	21
	Check the Drive Bay Setup	21
	Check the System Disk Drives	21
	Check the Airflow	22
	Supply Power to the System	22
3	System Safety	23
	Electrical Safety Precautions.	23
	General Safety Precautions	24
	ESD Precautions	25
4	System Interface.	27
	Overview	27
	Control Panel.	27
	Control Panel LEDs	28
	Power Fail	29
	Overheat/Fan Fail	29

	NIC1	29
	NIC2	30
	HDD	30
	Power	30
	SATA Drive Carrier LEDs	31
5	Chassis Setup and Maintenance	33
	Static-Sensitive Device	33
	Precautions	33
	Unpacking	34
	Removing the Chassis Cover	34
	Installing the Hard Drives	36
	Removing the Hard Drive Carriers from the Chassis	38
	Installing a Hard Drive into the Hard Drive Carrier	38
	PCI Expansion Slots	40
	Installing an Add-On or Expansion Card	41
	Chassis Maintenance	41
	System Fans.	42
	Replacing a Front Fan	42
	Replacing a Rear Fan	43
	Checking the System Air Flow	44
	Power Supply	44
	Replacing the Power Supply	45
	Replacing the Slim DVD-ROM Drive	46
6	BIOS.	47
	Starting BIOS Setup Utility	47
	How To Change the Configuration Data	48
	Starting the Setup Utility	48
	Main Setup	48
	System Time/System Update	49
	Serverboard	49
	Processor	50
	System Memory	50

Advanced Setup Configurations	50
Boot Features	51
Quick Boot	51
Quiet Boot	52
AddOn ROM Display Mode	52
Bootup Num-Lock	52
Wait For 'F1' If Error	52
Hit 'Del' Message Display	52
Interrupt 19 Capture	52
Power Configuration	52
Power Button Function	53
Restore on AC Power Loss	53
Watch Dog Timer	53
Processor and Clock Options	53
Ratio CMOS Setting	53
C1E Support	53
Hardware Prefetcher (Available when supported by the CPU)	54
Adjacent Cache Line Prefetch (Available when supported by the CPU)	54
Intel Virtualization Technology (Available when supported by the CPU).	54
Execute-Disable Bit Capability (Available when supported by the OS and the CPU).	54
Simultaneous Multi-Threading (Available when supported by the CPU)	54
Active Processor Cores	54
Intel EIST Technology	55
Intel TurboMode Technology (Available when Intel EIST Technology is enabled)	55
Intel C-STATE Tech	55
C-State package limit setting (Available when Intel® C-State Tech is enabled)	55
C1 Auto Demotion	55
C3 Auto Demotion	55
Clock Spread Spectrum.	55
Advanced Chipset Control	56
CPU Bridge Configuration	56
Serial Debug Message Level	58
North Bridge Configuration	58

Crystal Beach/Direct Memory Access (DMA)	58
Crystal Beach/ Direct Cache Access (DCA)	59
Intel VT-d	59
SouthBridge Configuration	59
USB Functions	59
Legacy USB Support	59
USB 2.0 Controller	59
USB 2.0 Controller Mode	60
BIOS EHCI Hand-Off	60
Intel PCI-X Hub Configuration	60
PCI Bus A0/B0 Frequency	60
I/O Port Decode	60
RAS Sticky Error Handling	60
VGA 16-Bit Decode	60
IDE and SATA Configuration	61
SATA#1 Configuration	61
Primary IDE Settings	61
Hot Plug	64
IDE Detect Timeout (sec)	64
PCI/PnP Configuration	64
Clear NVRAM	64
Plug & Play OS	64
PCI Latency Timer	65
PCI IDE BusMaster	65
Load Onboard LAN1 Option ROM/Load Onboard LAN2 Option ROM	65
Super IO Device Configuration	65
Serial Port1 Address/ Serial Port2 Address	65
Remote Access Configuration	65
Remote Access	65
Hardware Health Monitor	67
CPU Overheat Alarm	67
CPU Temperature/System Temperature	67
ACPI Configuration	69

ACPI Version Features . . . . .	. 69
ACPI APIC Support . . . . .	. 69
APIC ACPI SCI IRQ . . . . .	. 70
Headless Mode . . . . .	. 70
High Performance Event Timer . . . . .	. 70
Trusted Computing . . . . .	. 70
TCG/TPM Support . . . . .	. 70
IPMI Configuration . . . . .	. 71
Status of BMC . . . . .	. 71
View BMC System Event Log . . . . .	. 71
Clear BMC System Event Log . . . . .	. 71
Set LAN Configuration . . . . .	. 72
IP Address Configuration . . . . .	. 72
Parameter Selector . . . . .	. 72
IP Address . . . . .	. 72
Current IP Address in BMC . . . . .	. 72
MAC Address Configuration . . . . .	. 73
Parameter Selector . . . . .	. 73
Mac Address . . . . .	. 73
Current Mac Address in BMC . . . . .	. 73
Subnet Mask Configuration . . . . .	. 73
Parameter Selector . . . . .	. 73
Subnet Mask . . . . .	. 73
SEL PEF Configuration . . . . .	. 74
PEF Support . . . . .	. 74
PEF Action Global Control . . . . .	. 74
Alert Startup Delay . . . . .	. 74
PEF Alert Startup Delay . . . . .	. 74
Startup Delay . . . . .	. 74
PEF Startup Delay . . . . .	. 75
BMC Watch Dog Timer Action . . . . .	. 75
DMI Event Log . . . . .	. 75
View Event Log . . . . .	. 75

	Mark all events as read	76
	Clear event log	76
	Security Settings	76
	Boot Configuration	77
	Boot Device Priority	78
	Hard Disk Drives	79
	Removable Drives	79
	Exit Options	79
	Save Changes and Exit	80
	Discard Changes and Exit	80
	Discard Changes	81
	Load Optimal Defaults	81
	Load Fail-Safe Defaults	81
A	BIOS Error Codes	83
B	SGI Altix XE System Drivers	85

Figures

Figure 1-1	SGI Altix XE500 Server	1
Figure 1-2	Altix XE500 Serverboard Block Diagram	3
Figure 1-3	QuickPath Interconnect Links	6
Figure 1-4	Memory Layout	7
Figure 2-1	Separating and Installing the Rack Rails.	15
Figure 2-2	Square-to-round Hole Adapter for 2U Quick Attach Rails	16
Figure 2-3	Square-to-round Hole Adapter Clipped onto the Rail Set	16
Figure 2-4	Installing the Inner Rail Extensions	17
Figure 2-5	Installing the Server in a Rack	18
Figure 2-6	Accessing the Inside of the System	20
Figure 3-1	Installing the Onboard Battery	24
Figure 4-1	Control Panel Interface	27
Figure 4-2	System Reset Button	28
Figure 4-3	System Power On Button	28
Figure 4-4	Power Fail LED	29
Figure 4-5	Overheat/Fan Fail LED	29
Figure 4-6	LAN1 Network Activity NIC1 LED	30
Figure 4-7	LAN2 Network Activity NIC2 LED	30
Figure 4-8	Hard Drive Activity LED	30
Figure 4-9	Power On LED	31
Figure 5-1	Removing the Chassis Cover.	35
Figure 5-2	Removing the Hard Drive Carriers	37
Figure 5-3	Removing the Dummy Drive from the Carrier	39
Figure 5-4	Installing a Drive into a Hard Drive Carrier	40
Figure 5-5	PCI Slot Location	41
Figure 5-6	Chassis Fans	42
Figure 5-7	Installing the Front Fan	43
Figure 5-8	Installing a Rear Fan	44

Figure 6-1	System Overview Main BIOS Setup Screen . . . . .	. 49
Figure 6-2	Advanced Settings Screen . . . . .	. 51
Figure 6-3	Security Settings Screen . . . . .	. 76
Figure 6-4	Boot Settings Screen . . . . .	. 78
Figure 6-5	Exit Options Screen . . . . .	. 80

Tables

Table A-1	BIOS Error Codes	83
-----------	----------------------------	----

Record of Revision

Version	Description
001	August 2009 Original printing.

About This Guide

This guide provides an overview of the installation, architecture, general operation, and descriptions of the major components in the SGI Altix XE500 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 XE500 computer systems. It is written with the assumption that the reader has a good working knowledge of computers and computer systems.

Related Publications

The following SGI and LSI documents are relevant to the SGI Altix XE500 server:

- *MegaRAID SAS Software User's Guide*, publication number, 860-0488-00x
- *MegaRAID 1078-based SAS RAID Controllers User's Guide*, publication number 860-0489-00x
- *LSI Integrated SAS for RAID User's Guide*, publication number 860-0476-00x
- *SGI ProPack 6 for Linux Start Here*, publication number 007-5482-00x
- *SGI InfiniteStorage* series documentation
- Man pages (online)

You can obtain SGI documentation (as well as the pertinent LSI books), 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-CD) 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
```

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.
<i>variable</i>	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.

Reader Comments

If you have comments about the technical accuracy, content, or organization of this document, contact SGI. Be sure to include the title and document number of the manual with your comments. (Online, the document number is located in the front matter of the manual. In printed manuals, the document number is located at the bottom of each page.)

You can contact SGI in any of the following ways:

- Send e-mail to the following address: techpubs@sgi.com
- Contact your customer service representative and ask that an incident be filed in the SGI incident tracking system.
- Send mail to the following address:

SGI
Technical Publications
46600 Landing Parkway
Fremont, CA 94538

SGI values your comments and will respond to them promptly.

Introduction and System Components Overview

Important: SGI Altix XE systems may sometimes require driver versions that are not included in the original operating system release. 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. For more information, see [Appendix B, “SGI Altix XE System Drivers”](#).

The SGI Altix XE500 server is a 3U rackmount server (see [Figure 1-1](#)). It features a unique and highly-optimized design for dual-core Xeon platforms. The chassis is equipped with a redundant 1200W high-efficiency power supply. High-performance fans provide ample optimized cooling for FB-DIMM memory modules and 8 hot-swappable drive bays offer maximum storage capacity.

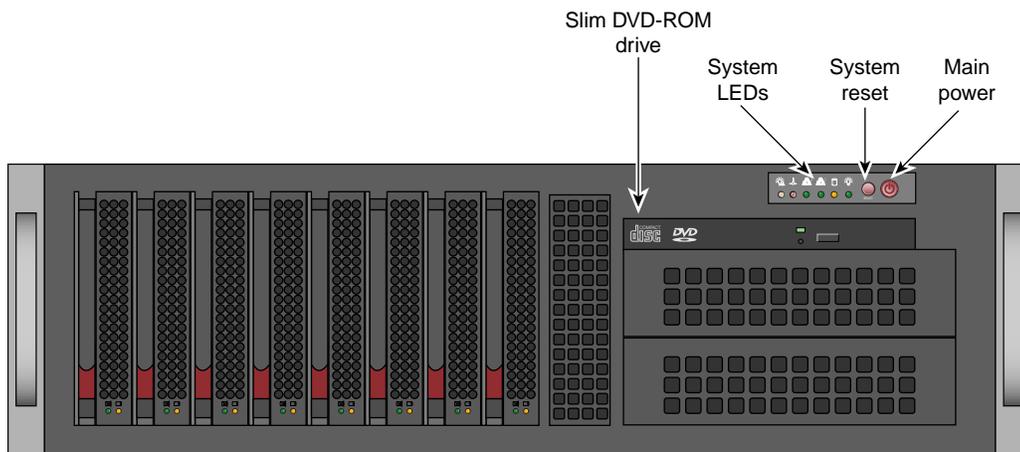


Figure 1-1 SGI Altix XE500 Server

The Altix XE500 server has the following configuration options:

- One or two 64-bit Intel Xeon Quad-core (Nehalem-EP) processors
- One to 18 memory DDR3 DIMMs
- Two full-height PCIe x16 slots (Slots 2 and 6) Gen 2.0

- Four full-height PCIe x8 slot (Slots 1, 3, 4, and 7)
- One PCIe UIO x4 slot (Slot 5 is a dedicated system RAID card slot)
- One Slimline DVD-ROM
- Eight hot-swappable SATA/SAS hard disk drives

The Altix XE500 serverboard chipset is made up of two main components: the Tylersburg IOH and the ICH10 controller hub See [Figure 1-2](#).

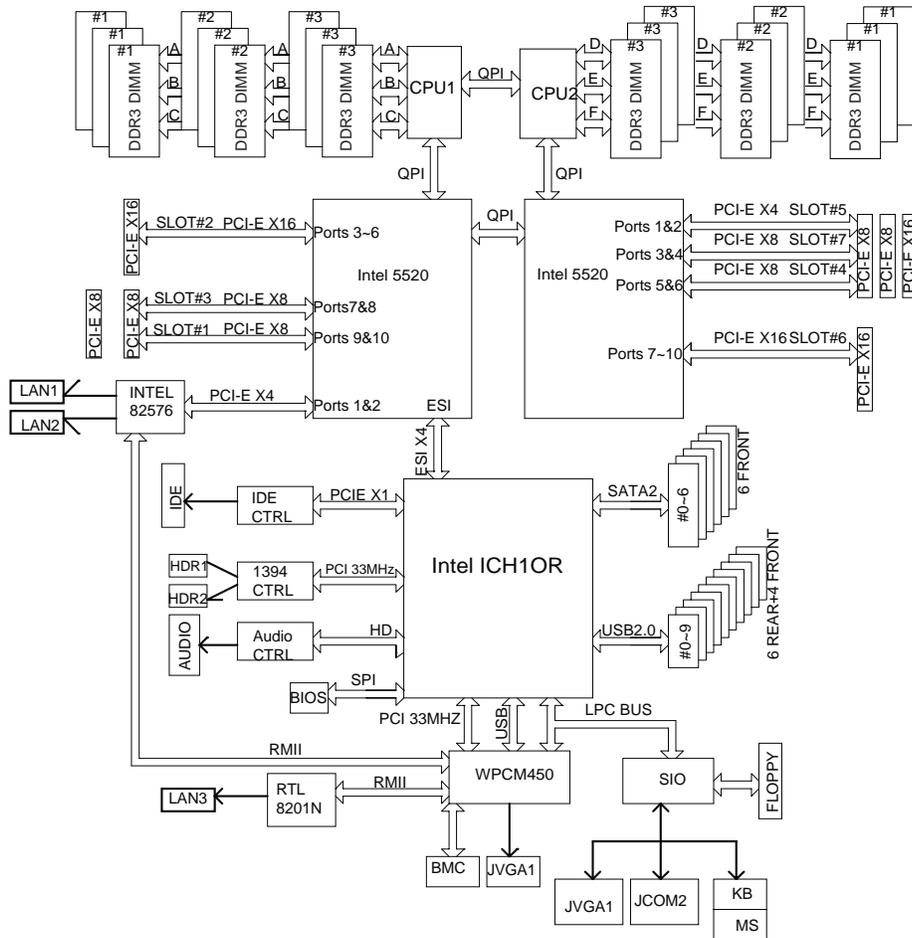


Figure 1-2 Altix XE500 Serverboard Block Diagram

Racks

The following rack assemblies are available:

- Short rack
The 20U-high deskside rack holds a maximum of six 3U-high enclosures.
- 39U tall rack
The 39U-high rack holds a maximum of 13 3U-high enclosures.
- 42U water-cooled tall rack
The 42U-high water-cooled rack holds a maximum of 13 3U-high enclosures. Only 40U of the 42U is water cooled. There is 40U in the main section of the rack and the 2U is located between the top plate and the top cover.

Note: Adding switches to the rack configuration will reduce the maximum number of XE500 servers supported in a rack.

Componets

This section describes the major components of the SGI Altix XE500 system.

Chassis and Hard Drive Bays

The SGI Altix XE500 system has one slim 8x DVD and includes eight hard drive bays.

Fans

The SGI Altix XE500 system accepts three 8cm hot-swappable fans and two 8cm rear exhaust fans. System fans for SGI Altix XE500 chassis are powered from the serverboard. These fans are 3U compatible and are powered by 3-pin connectors.

Mounting Rails

The SGI Altix XE500 system is shipped with mounting rails. See [Chapter 2, “Installing the Altix XE500 System in a Rack.”](#), to setup your rack.

Power Supply

Each SGI Altix XE500 system includes two redundant high-efficiency hot-swappable power supplies rated at 1200 Watts. In the unlikely event of a failure in one of the power supplies, you can remove and replace the faulty power supply without powering down the system.

Air Shroud

Air shrouds are shields, usually plastic, that funnel air directly to where it is needed.

Important: Always use the air shroud included with your system.

QuickPath Interconnect

The Intel Nehalem-EP processor has two QuickPath Interconnect (QPI) links (see [Figure 1-3](#)). The QPI link consists of two point to point 20 bit channels - one send channel and one receive channel. The QPI link has a theoretical maximum aggregate bandwidth of 25.6 GB/s.

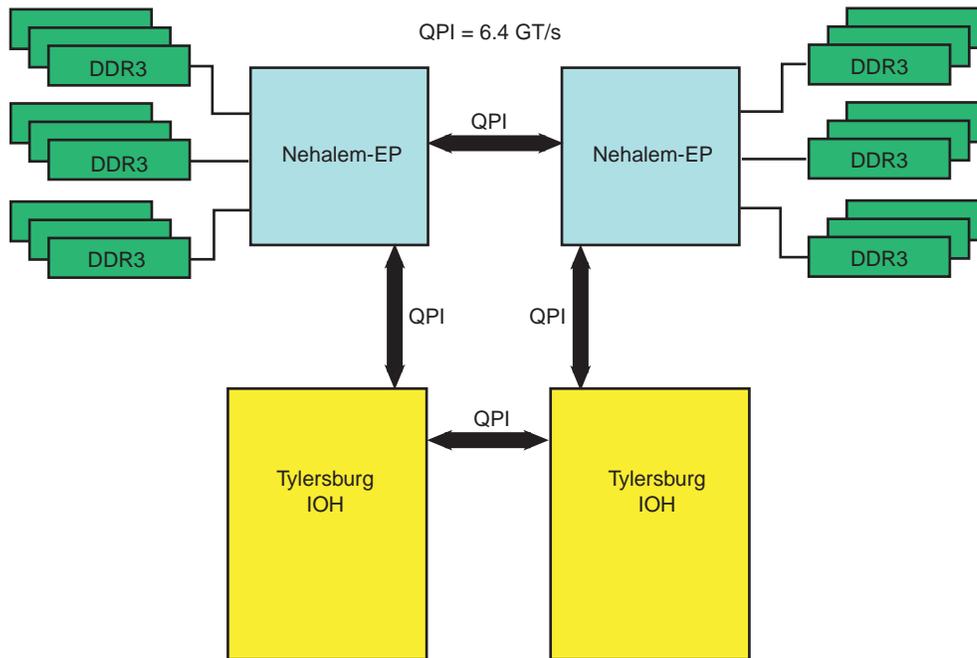


Figure 1-3 QuickPath Interconnect Links

The maximum bandwidth of a single QPI link is calculated as follows:

- The QPI channel uses a 3.2 GHz clock, but the effective clock rate is 6.4 GHz because two bits are transmitted at each clock period -once on the rising edge of the clock and once on the falling edge (DDR).
- Of the 20 bits in the channel, 16 bits are data and 4 bits are error correction.
- 6.4 GHz times 16 bits equals 102.4 bits per clock period.
- Convert to bytes: 102.4 divided by 8 equals 12.8 GB/s (the maximum single direction bandwidth)
- The total aggregate bandwidth of the QPI channel is 25.6 GB/s: (12.8 GB/s times 2 channels)

The Tylersburg chip set supports two Nehalem-EP processors. Each processor is connected to one of the Tylersburg chips with a QPI channel. The two processors and the Tylersburg chips are also connected together with a single QPI channel.

Memory Subsystem

The Nehalem-EP memory controller supports three DDR3 memory channels. Each channel can support up to three DDR3 SDRAM DIMMs for a total of nine memory DIMMs. The node board can support up to 18 DIMMs or a maximum memory size of 144 GB physical memory. A total of 72 bits of data are transferred each clock period: 64 bits of data and 8 bits for error correction

See [Figure 1-4](#) for the memory layout.

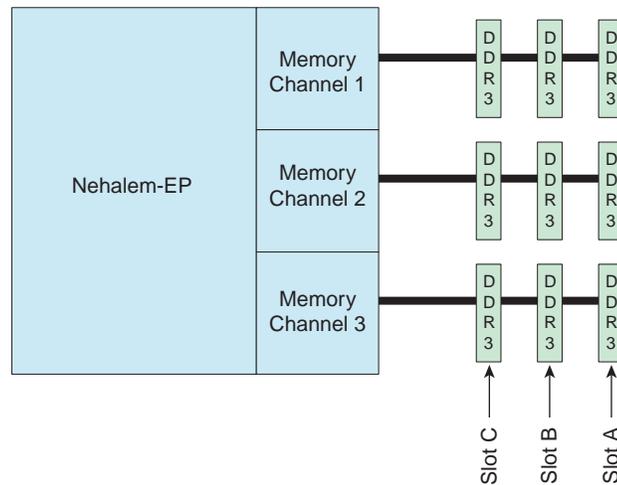


Figure 1-4 Memory Layout

The memory bandwidth is determined by three key factors:

- The processor speed - different processor SKUs support different DIMM speeds. Current processors support either 1066 or 1333.
- The DIMM speed - the DIMM itself has a maximum operating frequency or speed. Currently there are two DIMM speeds: 1066 and 1333.
- The number of DIMMs per channel - the maximum memory channel speed is as follows:
 - One DIMM per channel - 1333 MT/s maximum
 - Two DIMMs per channel - 1066 MT/s maximum
 - Three DIMMs per channel - 800 MT/s maximum

Note: The DIMM must be rated for the maximum speed to be able to run at the maximum speed. Example: a single 1066 MT/s DIMM on a channel will only operate at 1066 MT/s - not 1333 MT/s.

Populating one 1333 MT/s DIMM on each channel delivers a maximum of 10.66 GB/s per channel or 31.99 GB/s total memory bandwidth.

PCI Subsystem

The primary I/O buses for the server board is PCI Express.

Disk RAID Support

The Altix XE500 supports both software and hardware RAID. One of two SAS RAID HBAs are added to the configuration to support a maximum of eight disk drives with RAID.

In the standard RAID configuration (LSX-BASE-500), the SAS3081e-r HBA is installed in the chassis. This HBA supports RAID 0, 1E, and 10E.

The optional configuration is selected by ordering LSX-BASE-500-RAID5. The SAS3081e-r HBA is replaced with MegaRAID 8708ELP. This HBA supports all of the RAID levels in the standard configuration with the addition of RAID 5 and RAID 6.

RAID is defined as an array of multiple independent hard disk drives that provides high performance and fault tolerance. Disk performance is improved because more than one disk can be accessed simultaneously. Fault tolerance is improved because data loss caused by a hard drive failure can be recovered by rebuilding missing data from the remaining data or parity drives.

The Altix XE500 supports the following RAID levels:

- RAID 0 Striping
- RAID 1 Mirrored
- RAID 5 Parity
- RAID 6 Parity

- RAID 10 Mirrored Stripes

RAID 0 (Striping)

Disk striping allows the writing of data across multiple physical disks instead of just one physical disk. It involves partitioning each disk drive storage space into stripes that can vary in size from 8KB to 128KB.

RAID 1 (Mirrored)

Disk mirroring has two disks, data is written simultaneously to both disks. If one disk fails, the contents of the disk can be used to run the system and reconstruct the failed disk.

RAID 5 (Parity)

RAID 5 stripes both data and parity information across three or more drives. Fault tolerance is maintained by ensuring that the parity information for any given block of data is placed on a drive separate from those used to store the data itself. The performance of a RAID 5 array can be “adjusted” by trying different stripe sizes until one is found that is well-matched to the application being used.

RAID 6 (Dual Parity)

Striped set with dual distributed parity. Provides fault tolerance from two drive failures; array continues to operate with up to two failed drives. With dual parity, it gives time to rebuild the array without the data being volatile while the failed drive is being recovered.

RAID 10 (Mirrored Stripes)

RAID 10 is a combination of RAID 1 and RAID 0. RAID 10 is a stripe across a number of mirrored sets. It combines the best features of striping and mirroring to yield large arrays with high performance in most uses and superior fault tolerance.

Installing the Altix XE500 System in a Rack

This chapter provides a quick setup checklist to get the SGI Altix XE500 operational.

Unpack the System

Inspect the shipping container that the SGI Altix XE500 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 XE500 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 12](#).

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 (~25 inches) and approximately 30 inches 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 XE500 server weighs 57 lbs (26 kg). Always use proper lifting techniques when you 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.

- 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.
- Attach stabilizers to the rack in single rack installations. Failure to do so can result in serious injury or death.
- Couple racks together in multiple rack installations. Failure to do so can result in serious injury or death.
- Be sure the rack is stable before extending a component from the rack. Failure to do so can result in serious injury or death.
- 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.
- 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-pluggable SAS/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 (35° C or 95° F).

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 (for example, the use of power strips, and so on).

Install the System into a Rack

This section provides information on installing the SGI Altix XE500 into a rack. If the system has already been mounted into a rack, refer to [“Check the Node Board Setup” on page 19](#). 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.

Separate the Sections of the Rack Rails

The chassis package includes two 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.

To separate the inner and outer rails, perform the following steps:

1. Locate the rail assembly in the chassis packaging as shown in [Figure 2-1](#).
2. Extend the rail assembly by pulling it outward.
3. Press the quick-release tab
4. Separate the inner rail from the outer rail assembly.

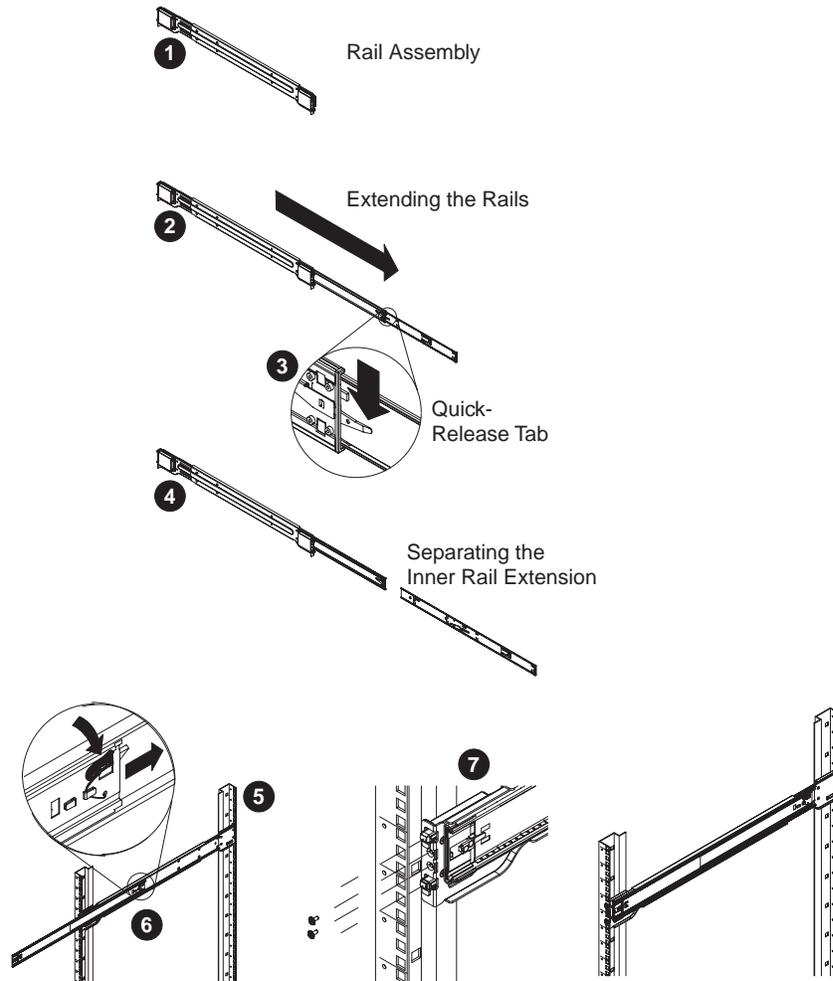


Figure 2-1 Separating and Installing the Rack Rails

Outer Rack Rails

Outer rails attach to the rack and hold the chassis in place. The outer rails for the chassis extend between 30 inches and 33 inches. You need to add the square-to-round hole adapters that attach

to the ends of the 2U quick attach rails. [Figure 2-2](#) shows the rail adapter and the end of the quick attach rail.

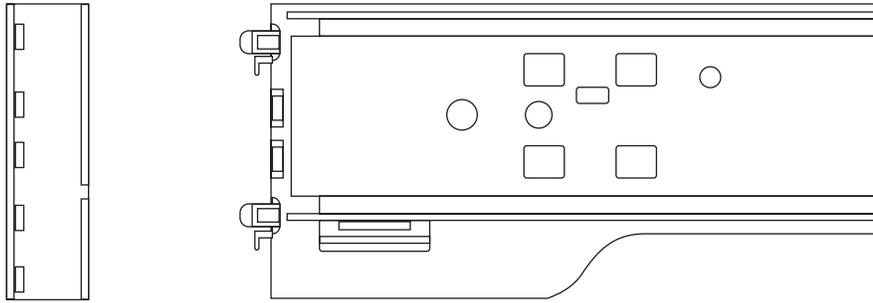


Figure 2-2 Square-to-round Hole Adapter for 2U Quick Attach Rails

[Figure 2-3](#) shows the adapter clipped onto the rail set. Use the flat head M5 screws supplied with the rails kit to bolt the rails set into the rack.

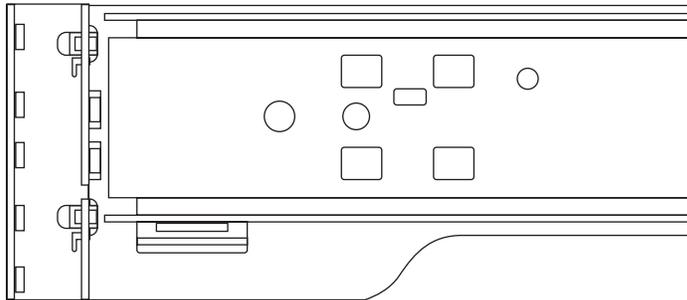


Figure 2-3 Square-to-round Hole Adapter Clipped onto the Rail Set

Install the Outer Rails to the Rack

5. Secure the back end of the outer rail to the rack, using the screws provided (see [Figure 2-1](#)).
6. Press the button where the two outer rails are joined to retract the smaller outer rail.
7. Hang the hooks of the rails onto the rack holes and if desired, use screws to secure the front of the outer rail onto the rack.
8. Repeat steps 1-3 for the remaining outer rail.

Install the Inner Rail Extension

The SGI Altix XE500 chassis includes a set of inner rails in two sections: inner rails and inner rail extensions. The inner rails are pre-attached to the chassis, and do not interfere with normal use of the chassis if you decide not to use a server rack. The inner rail extension is attached to the inner rail to mount the chassis in the rack.

Install the Inner Rails

Perform the following steps to install the inner rails:

1. Place the inner rail extensions on the side of the chassis aligning the hooks of the chassis with the rail extension holes. Make sure the extension faces "outward" just like the pre-attached inner rail (see [Figure 2-4](#))
2. Slide the extension toward the front of the chassis.
3. Secure the chassis with 2 screws as illustrated. Repeat steps for the other inner rail extension.

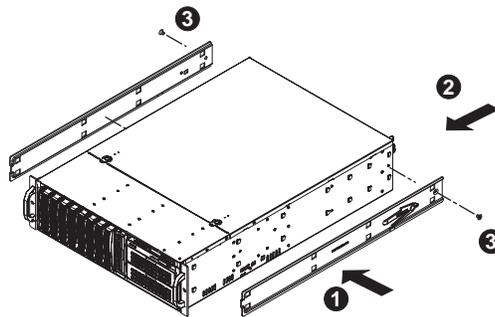


Figure 2-4 Installing the Inner Rail Extensions

Install the Server in a Rack



Warning: The SGI Altix XE500 server weighs 57 lbs (26 kg) Always use proper lifting techniques when you 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 server chassis and the rack unit. The next step is to install the server into the rack (refer to [Figure 2-5](#)).

1. Extend the outer rails as shown in [Figure 2-5](#).
2. Align the inner rails of the chassis with the outer rails on the rack.
3. Slide the inner rails into the outer rails, keeping the pressure even on both sides. When the chassis has been pushed completely into the rack, it should click into the locked position.
4. Optional screws may be used to secure the to hold the front of the chassis to the rack.

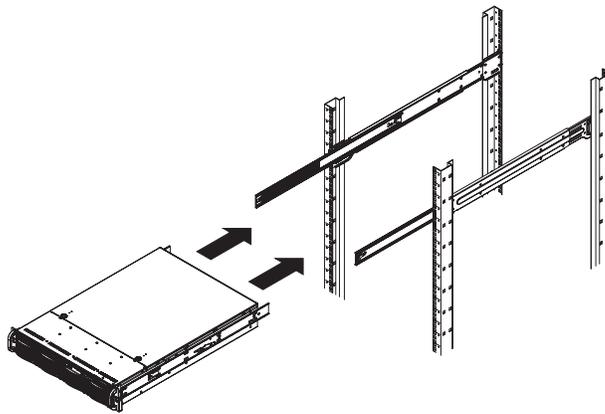


Figure 2-5 Installing the Server in a Rack

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

1. Grasp the two handles on either side and pull the unit straight out until it locks (you will hear a “click”).
2. Depress the two buttons on the top of the chassis to release the top cover as shown in [Figure 2-6](#).
3. Lift the top cover from the chassis.

Note: To remove the system from the rack completely, depress the locking tabs on 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.

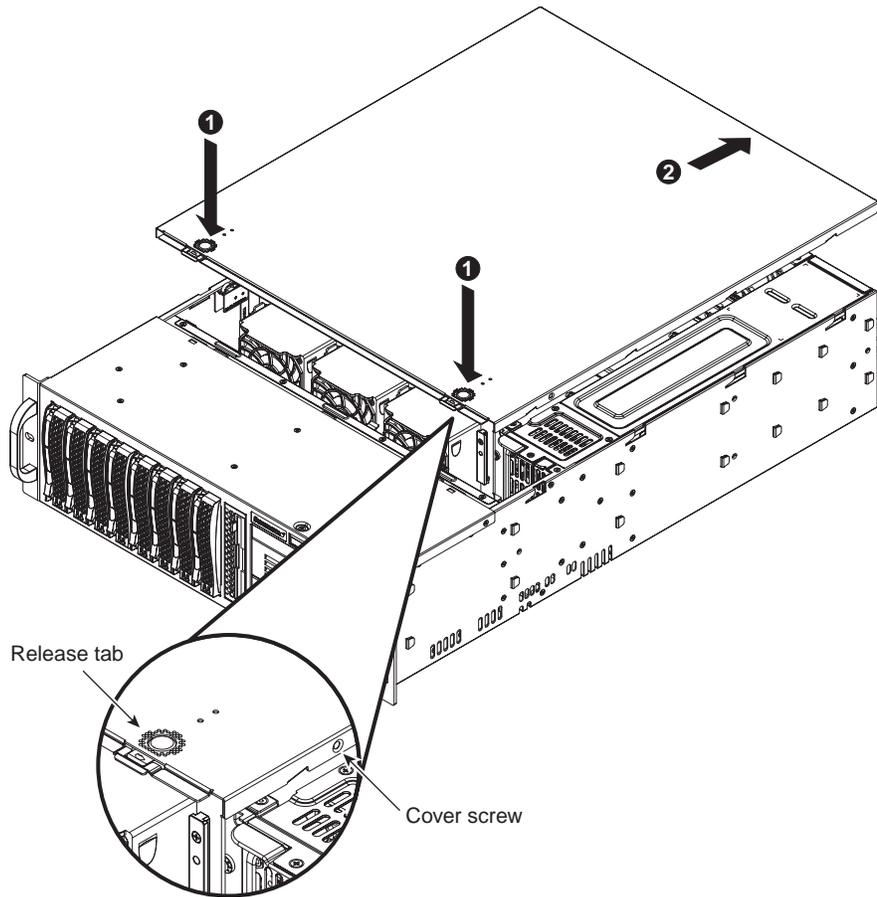


Figure 2-6 Accessing the Inside of the System

Check the CPUs (processors)

You may have one or two processors installed into the serverboard. Each processor needs its own heatsink.

Check the System Memory

Your server system is shipped with system memory installed. Make sure all DIMMs are fully seated in their slots.

Install Expansion PCI Cards

You can install six expansion PCI cards in the system.

Check all Cable Connections and Airflow

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

Check the Drive Bay Setup

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

Check the System Disk Drives

All drives are accessible from the front of the server. For servicing the DVD-ROM, you will need to remove the top chassis cover. The hard drives can be installed and removed from the front of the chassis without removing the top chassis cover. Depending upon your system configuration, your system may have one or more drives installed.

If you have more than 4TB of storage, you must create multiple volumes to fully utilize your RAID disks.

Refer to the *MegaRAID SAS Software User's Guide*, SGI publication number 860-0488-00x and the *MegaRAID 1078-based SAS RAID Controllers User's Guide*, SGI publication number 860-0489-00x for more information about configuring your system disks.

A slim DVD-ROM may be preinstalled in your server.

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

Check the Airflow

Airflow is provided by five hot-swappable 8-cm chassis cooling fans. The system component layout was carefully designed to direct sufficient cooling airflow to the components that generate the most heat.

Note: Make sure that all power and data cables have been routed in such a way that they do not block the airflow generated by the fans.

Supply Power to the System

If necessary, install the system in a rack (refer to [“Install the System into a Rack”](#) on page 14), and connect the power cord from the power supply module into a power strip or power distribution unit (PDU). SGI also recommends that you use an uninterruptible power supply (UPS) source.

System Safety

This chapter describes basic safety precautions.

Electrical Safety Precautions

Basic electrical safety precautions should be followed to protect yourself from harm and the SGI Altix XE500 system from damage, as follows:

- 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 serverboard, memory modules and SATA drives. When disconnecting power, you should first power down the operating system first and then unplug the power cords. The unit has more than one power supply cord. Disconnect two power supply cords before servicing to avoid electrical shock.
- 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 cords must include a grounding plug and must be plugged into grounded electrical outlets.

• Serverboard Battery



Caution: There is a danger of explosion if the onboard battery is installed upside down, which will reverse its polarities (see [Figure 3-1](#)). 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.

• DVD-ROM Laser



Caution: This server may have come equipped with a DVD-ROM drive. To prevent direct exposure to the laser beam and hazardous radiation exposure, do not open the enclosure or use the unit in any unconventional way.

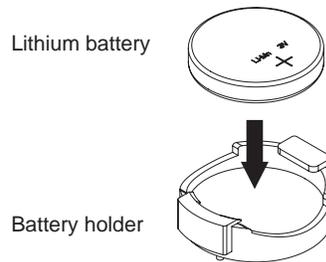


Figure 3-1 Installing the Onboard Battery

General Safety Precautions

Follow these rules to ensure general safety:

- Keep the area around the SGI Altix XE500 system clean and free of clutter.
- Place the chassis top cover and any system components that have been removed away from the system or on a table so that they won't accidentally be stepped on.
- While working on the system, do not wear loose clothing such as neckties and unbuttoned shirt sleeves, which can come into contact with electrical circuits or be pulled into a cooling fan.

- Remove any jewelry or metal objects from your body, which are excellent metal conductors that can create short circuits and harm you if they come into contact with printed circuit boards or areas where power is present.
- 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 Precautions



Caution: Electrostatic discharge (ESD) 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 from ESD:

- 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 serverboard 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 serverboard.

System Interface

Overview

There are several LEDs on the control panel (see [Figure 4-1](#)) as well as others on the SATA drive carriers (see “[SATA Drive Carrier LEDs](#)” on page 31) 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 the chassis control panel.

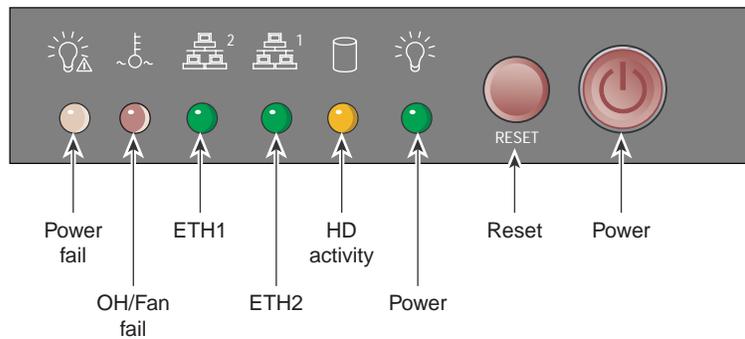


Figure 4-1 Control Panel Interface

Control Panel

There are two buttons located on the front of the chassis: a reset button and a power on/off button. Use the reset button to reboot the system as shown in [Figure 4-2](#).

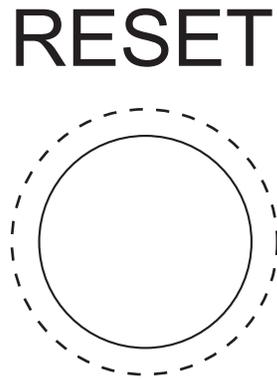


Figure 4-2 System Reset Button

Figure 4-3 shows the the main power button, which is used to apply or turn off the main system power. Turning off system power with this button removes the main power but keeps standby power supplied to the system.

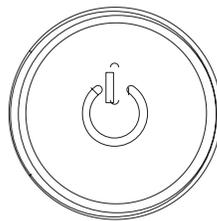


Figure 4-3 System Power On Button

Control Panel LEDs

The control panel located on the front of the chassis has several LEDs. These LEDs provide you with critical information related to different parts of the system. This section explains what each LED indicates when illuminated and any corrective action you may need to take.

Power Fail

The red power fail LED indicates a power supply module has failed as shown in [Figure 4-4](#). The second power supply module will take the load and keep the system running but the failed module will need to be replaced. Refer to Chapter 6 for details on replacing a power supply. This LED should be off when the system is operating normally.



Figure 4-4 Power Fail LED

Overheat/Fan Fail

When the red overheat/fan LED flashes (shown in [Figure 4-5](#)), 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. This LED will remain flashing or on as long as the indicated condition exists.



Figure 4-5 Overheat/Fan Fail LED

NIC1

When flashing, the green NIC1 LED indicates network activity on the LAN1 port (see [Figure 4-6](#)).

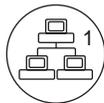


Figure 4-6 LAN1 Network Activity NIC1 LED

NIC2

When flashing, the green NIC2 LED indicates network activity on the LAN2 port (see [Figure 4-7](#)).



Figure 4-7 LAN2 Network Activity NIC2 LED

HDD

The amber HDD LED indicates hard drive drive activity when flashing (see [Figure 4-8](#)).

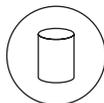


Figure 4-8 Hard Drive Activity LED

Power

The green power LED indicates power is being supplied to the system's power supply units is shown in [Figure 4-9](#). This LED should normally be illuminated when the system is operating.



Figure 4-9 Power On LED

SATA Drive Carrier LEDs

Each SATA drive carrier has two LEDs, as follows:

- **Green:** When illuminated, the green LED on 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. Please refer to Chapter 5 for instructions on replacing failed drives.
- **Red:** The red LED indicates a SATA drive failure. If one of the drives fails, you should be notified by your system management software. Please refer to Chapter 5 for instructions on replacing failed drives.

Chassis Setup and Maintenance

This chapter covers the steps required to install components and perform maintenance on the SGI Altix XE500 chassis. For component installation, follow the steps in the order given to eliminate the most common problems encountered. If some steps are unnecessary, skip ahead to the step that follows.

Tools Required: The only tool you will need to install components and perform maintenance is a Phillips screwdriver.



Warning: Review the warnings and precautions listed in the manual before setting up or servicing this chassis. These include information in Chapter 2: System Safety and the warning/precautions listed in the setup instructions.

Static-Sensitive Device

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 damage.

Precautions

- 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 serverboard, 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 serverboard.

Unpacking

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

Removing the Chassis Cover

To remove the chassis cover, perform the following steps:

1. Press the release tabs to release the cover from the locked position. Press both tabs at the same time. It may also be necessary to remove the chassis cover screw (see [Figure 5-1](#)).
2. Once the top cover is released from the locked position, slide the cover toward the rear of the chassis and lift the cover off the unit.

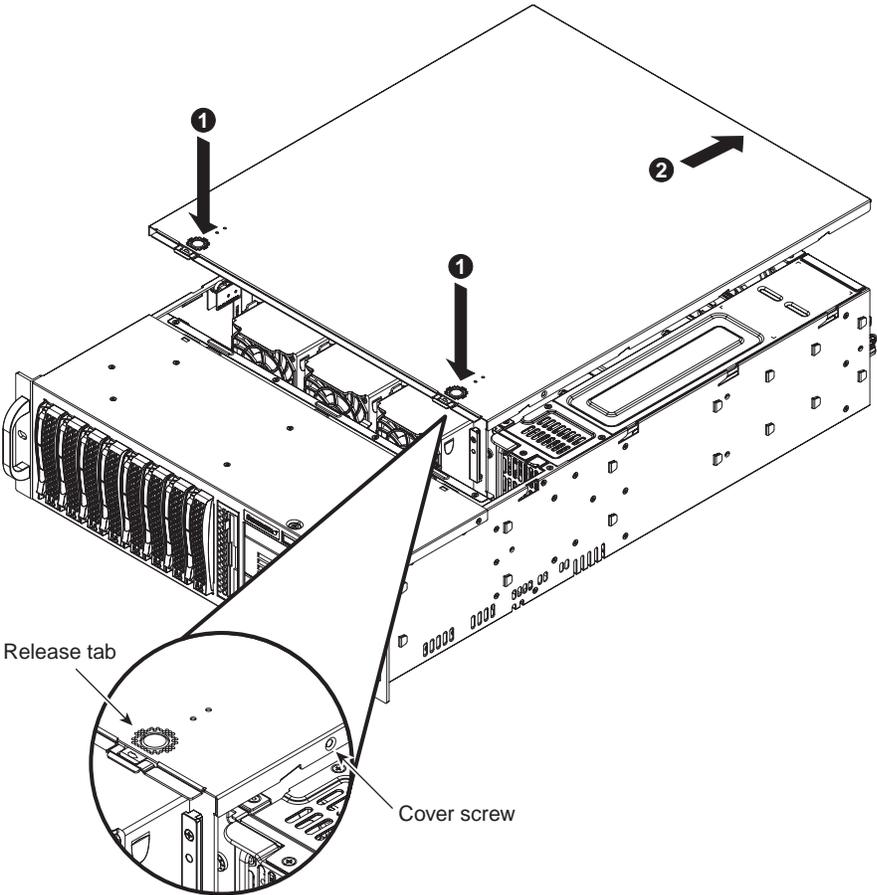


Figure 5-1 Removing the Chassis Cover



Warning: Except for short periods of time, do NOT operate the server without the cover in place. The chassis cover must be in place to allow proper airflow and prevent overheating.

Installing the Hard Drives

The Altix XE500 has three disk storage configurations:

- **LSX-BASE-500** and **LSX-BASE-500-H** - support RAID 0, 1E, and 10E for both SAS and SATA drives
- **LSX-BASE-500-RAID5** and **LSX-BASE-500-RAID5-H** - support RAID 0, 1, 5, 6, 10, 50, and 60 for both SAS and SATA drives

The LSX-BASE-500 configuration includes an SAS3801e-r HBA card in slot 5. This HBA supports eight SAS/SATA disk drives. The SAS3801e-r HBA supports RAID levels 0, 1E, and 10E.

The LSX-BASE-RAID5 configuration includes an MegaRAID 8708ELP PCIe card in slot 5. This HBA supports eight SAS/SATA disk drives. The MegaRAID 8708ELP card supports RAID levels 0, 1, 5, 6, 10, 50, and 60.

The Chassis can support up to eight 3.5" x 1" hot-swap SAS or SATA hard disk drives. The actual number of supported disk drives is configuration dependent. The disk drives are mounted to hot swap drive trays (see [Figure 5-2](#)).

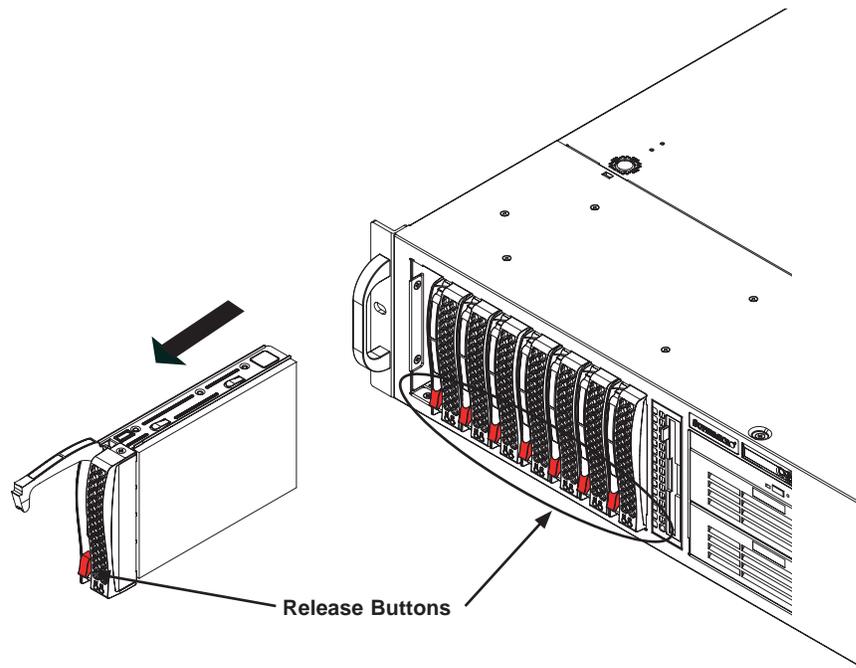


Figure 5-2 Removing the Hard Drive Carriers

The drives are mounted in driver carriers to simplify their installation and removal from the chassis.

Note: Drive blanks must be used when no disk drive is used in a hard drive bay. This is necessary to maintain proper cooling of the chassis.

If the MegaRAID 8708ELP RAID Controller option is configured in the XE500, an Intelligent Battery Backup Unit is included. The Battery Backup Unit will initiate a charge cycle automatically as normal operation. The charge cycle will disable cache and reduce transfer performance. Once the Charge cycle is completed, optimum performance will be returned automatically.

The Intelligent Battery Backup Unit (IBBU) protects the integrity of the cached data on the megaRAID controller for up to 72 hours in the event of a complete AC power failure or a brief power outage.

Note: Your operating system must have RAID support to enable the hot-plug capability of the drives.



Important: Regardless of how many hard drives are installed, all drive carriers must remain in the drive bays to maintain proper airflow.



Caution: Use caution when working around the SATA backplane. Do not touch the backplane with any metal objects and make sure no ribbon cables touch the backplane or obstruct the holes, which aid in proper airflow.

Removing the Hard Drive Carriers from the Chassis

To remove the hard drive carriers, perform the following steps (see [Figure 5-2](#)):

1. Press the release button on the drive carrier. This extends the drive carrier handle.
2. Use the handle to pull the drive carrier out of the chassis.

Installing a Hard Drive into the Hard Drive Carrier

To install a hard drive into the hard drive carrier, perform the following steps:

1. Remove the two screws securing the dummy drive to the drive carrier (see [Figure 5-3](#)).
2. Lift the dummy drive out of the drive carrier (see [Figure 5-3](#)).

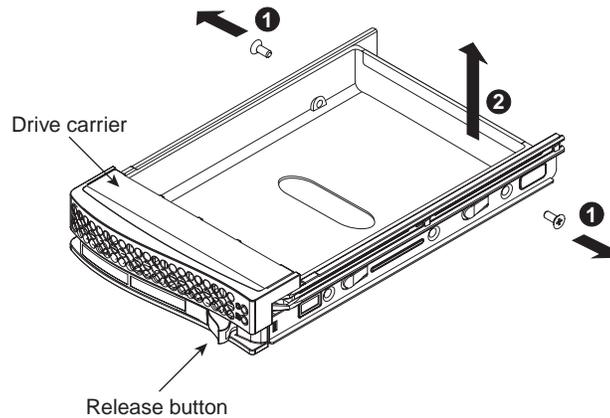


Figure 5-3 Removing the Dummy Drive from the Carrier

3. Place the hard drive carrier on a flat, stable surface such as a desk, table, or work bench.
4. Slide the hard drive into the carrier with the printed circuit board side facing down (see [Figure 5-4](#)).
5. Carefully align the mounting holes in the hard drive and the carrier. Make sure the bottom of the hard drive and bottom of the hard drive carrier are flush.
6. Secure the hard drive using all six screws (see [Figure 5-4](#)).
7. Replace the drive carrier into the chassis. Make sure to close the drive carrier using the drive carrier handle.

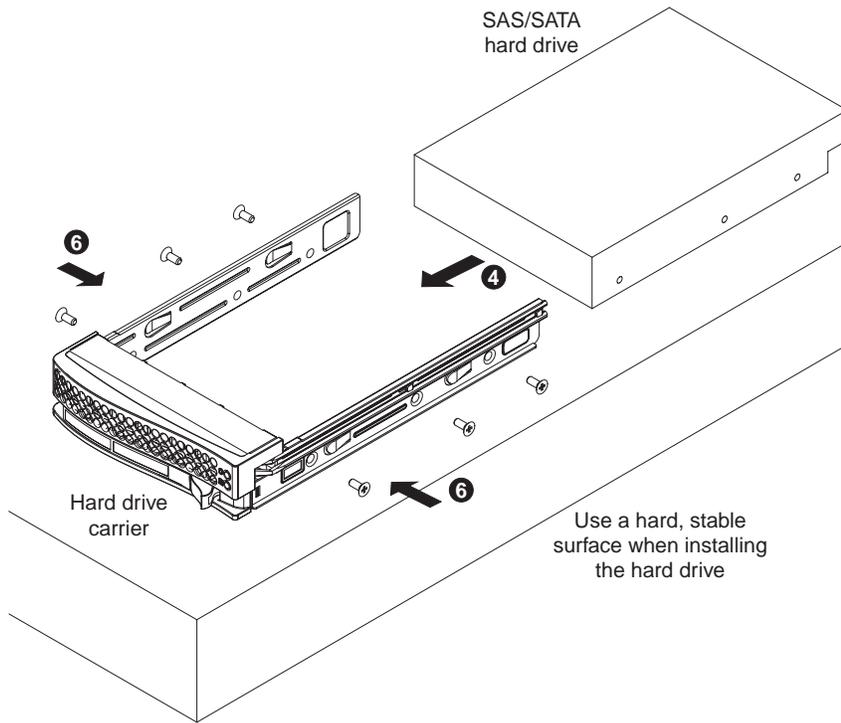


Figure 5-4 Installing a Drive into a Hard Drive Carrier

PCI Expansion Slots

There are seven PCI slot bays in the rear of the chassis. The PCI slots are located at the rear of the chassis - on the far right side. The slots are numbered from right to left (1 thru 7). All of the slots support full-height PCI cards. The following PCI slots are available:

- Two PCIe x16 Gen 2.0 card slots (slots 2 and 6)
- Four PCIe x8 Gen 2.0 card slots (slots 1, 3, 4, and 7)
- One PCIe x4 Gen 2.0 card slot (slot 5 is dedicated to the system RAID card)

See [Figure 5-5](#) slot locations in the rear of the chassis.

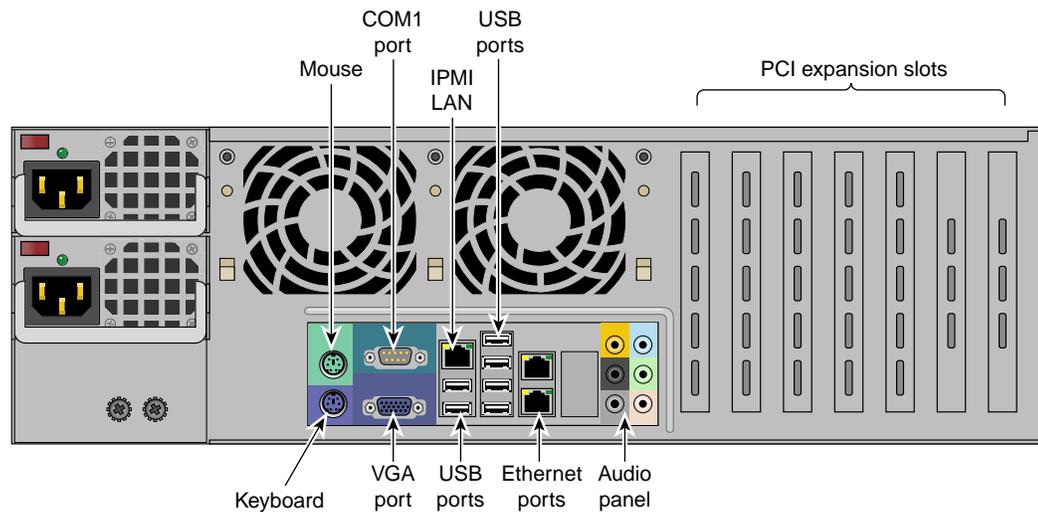


Figure 5-5 PCI Slot Location

Installing an Add-On or Expansion Card

1. To install add-on or expansion cards, perform the following steps:
2. Remove the chassis cover.
3. Locate the motherboard port aligned with the card slot you want to install,
4. Each slot is secured by one screw located on the top (inside) the chassis. Remove this screw.
5. Gently slide the expansion/add-on card into the correct motherboard slot. If the add-on card requires a riser card, install it at this time. If necessary, slide the card into the PCI card guide and lock it. Never force a component into a motherboard or the chassis.
6. Secure the expansion/add-on card with the screw from the I/O panel.

Chassis Maintenance

This section describes basic chassis maintenance.

System Fans

Five heavy-duty fans provide cooling for the chassis. These fans circulate air through the chassis as a means of lowering the internal temperature of the chassis. The SGI Altix XE500 chassis includes three front fans and two rear fans (see [Figure 5-6](#)).

The SGI Altix XE500 chassis fans are fully hot-swappable. In other words, fans may be removed and replaced without having to power down the server.

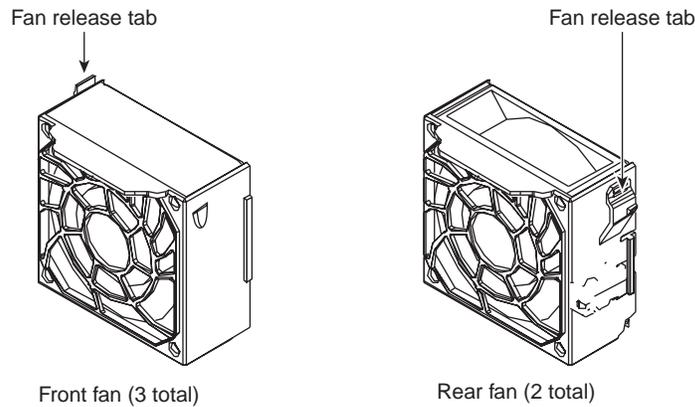


Figure 5-6 Chassis Fans

Replacing a Front Fan

To replace a front fan, perform the following steps:

1. Remove the top cover and locate the faulty fan. Never run the server for an extended period of time with the chassis open.
2. Press the release tab on the fan and pull the fan upward.
3. Slide the new fan into the fan housing. Make sure the power connectors are correctly aligned. The new fan will be immediately active.

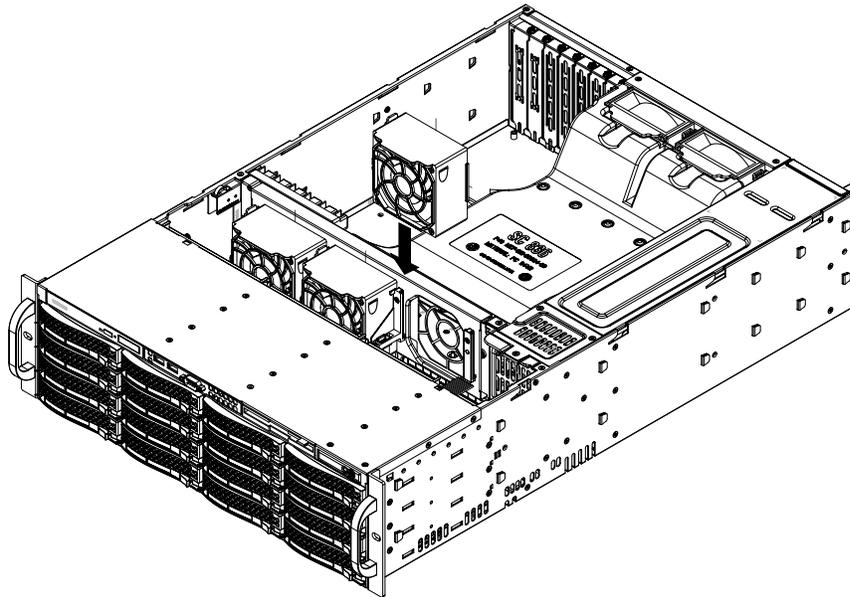


Figure 5-7 Installing the Front Fan

Replacing a Rear Fan

To replace a rear fan, perform the following steps:

1. Remove the top cover and locate the faulty fan and remove it. Never run the server for an extended period of time with the chassis open.
2. Confirm that the air shroud is correctly placed.
3. Slide the rear fan into the slot as illustrated. The fan release tab should be on the side closest to the power supply.
4. Make sure that the fan is secure in the fan housing and the housing is correctly connected to the power supply.

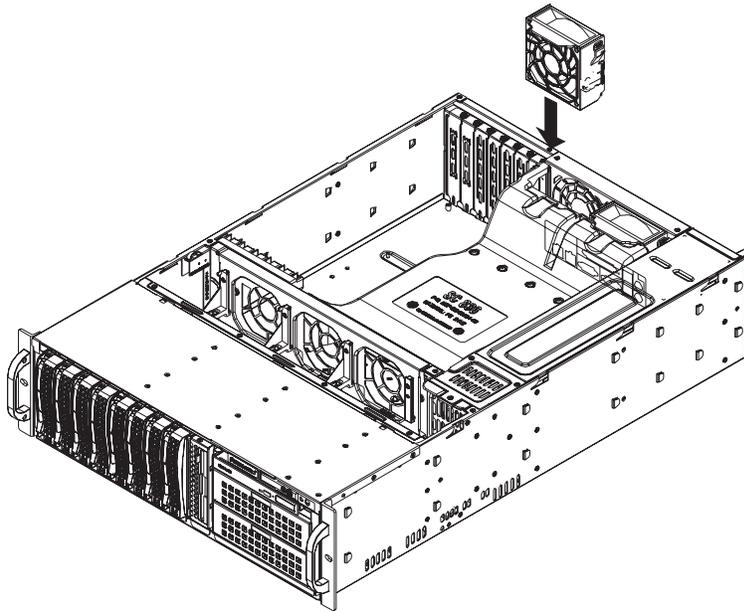


Figure 5-8 Installing a Rear Fan

Checking the System Air Flow

To check the SGI Altix XE500 system air flow, perform the following steps:

1. Make sure there are no objects to obstruct airflow in and out of the server.
2. Do not operate the server without drives or drive trays in the drive bays.
3. Make sure no wires or foreign objects obstruct air flow through the chassis. Pull all excess cabling out of the airflow path or use shorter cables.

Power Supply

The SGI Altix XE500 system has a 1200 watt switching power supply that operates from 100 - 240 volts AC and 50 - 60 Hz.

The power subsystem of the SGI Altix XE500 server consists of an integrated power distribution module, a power module enclosure, and support for up to two power supply modules. The system can be configured with a single (1+0 non-redundant configuration) or dual power supply (N+1 configuration). Either configuration will support a maximum of 1200 watts of power.

The two power supplies are located in the left rear of the chassis.

In a single power supply configuration, the power supply is populated in the upper power supply slot. The non-operating slot must be filled with a power supply blank.

Note: The XE500 will operate normally with a single power supply in either the top or bottom power supply bay. The top power supply bay is filled in systems configured with a single power supply.

Replacing the Power Supply

The power supply for the SGI Altix XE500 system is redundant and hot-swappable. If you have this option (an additional power supply), you can replace the power supply with the system powered up, otherwise, the system must be powered off to replace the power supply.

To replace the power supply, perform the following steps:

1. The SGI Altix XE500 system includes a redundant power supply (at least two power modules). The server may continue running if only one power supply module is removed at a time.
2. Unplug the power supply that will be replaced.
3. Push the release tab on the back of the power supply.
4. Pull the power supply out using the handle.
5. Replace the failed power module with another of the same model.
6. Push the new power supply module into the power bay until it clicks into the locked position.
7. Plug the AC power cord back into the module and power up the server.

Replacing the Slim DVD-ROM Drive

To replace the slim 8x DVD-ROM, perform the following steps:

1. Power down and unplug the system.
2. Remove the chassis cover.
3. If a new front port panel is **not** being installed, remove the mini-bezel from the drive bay. The mini-bezel is the small grating that covers the drive bay. Remove this by simply pulling it out of the bay. If a new front port panel is being installed, remove the old drive by depressing the release tab, then pulling the drive out of the chassis.
4. Insert the new drive unit in the slot until the tab locks into place.
5. Connect the data and power cables to the backplane and, if necessary, the motherboard.

BIOS

This chapter describes the AMI BIOS Setup Utility for the SGI Altix XE500 serverboard. The AMI ROM BIOS is stored in a Flash EEPROM and can be easily updated. This chapter describes the basic navigation of the AMI BIOS Setup Utility setup screens.

Starting 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 invoke 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. 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: The AMI BIOS has default text messages built in. These text messages may be included, omitted, or changed across BIOS releases.

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 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. Flashing the wrong BIOS can cause irreparable damage to the system. In no event shall SGI be liable for 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

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 is shown in [Figure 6-1](#).

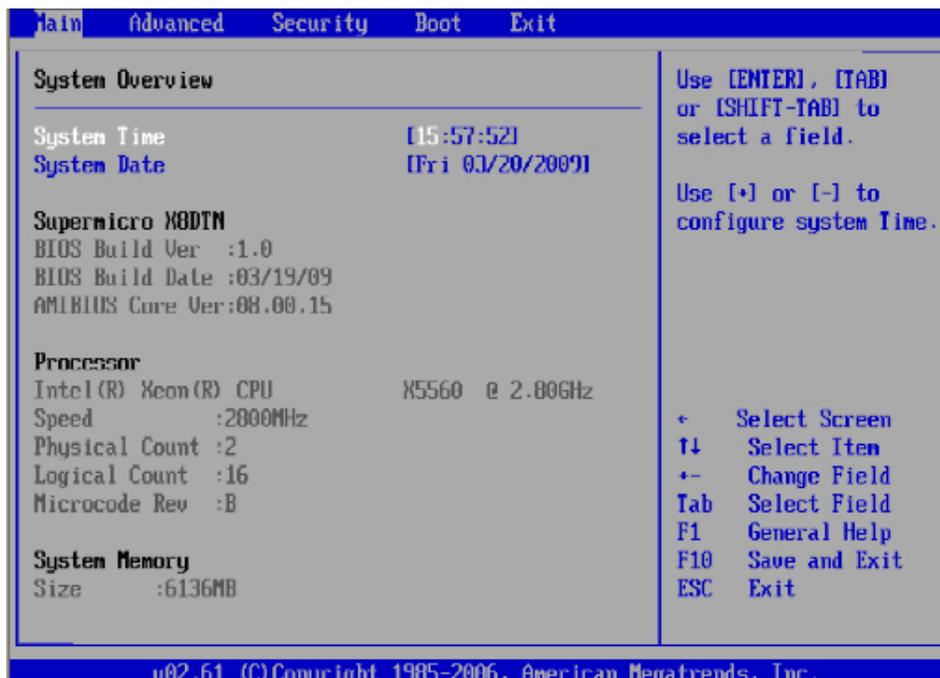


Figure 6-1 System Overview Main BIOS Setup Screen

System Time/System Update

Use this option to change the system time and date. Highlight System Time or System. Date using the arrow keys. Key in new values through the keyboard and press <Enter>. Press the <Tab> key 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: The time is in the 24-hour format. For example, 5:30 P.M. appears as 17:30:00.

Serverboard

- **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 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 shown in [Figure 6-2](#).

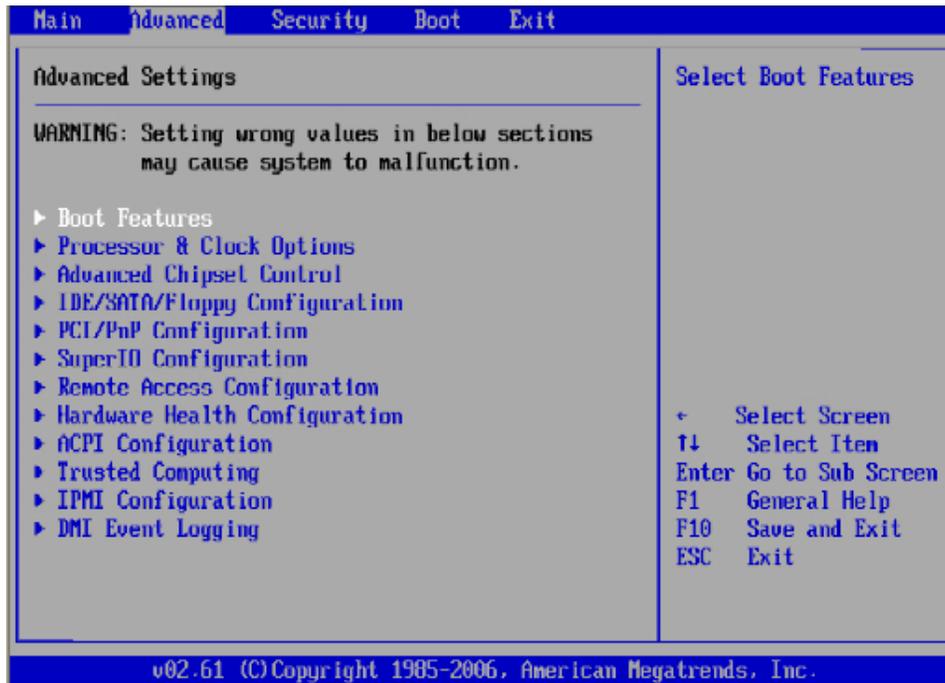


Figure 6-2 Advanced Settings Screen

Boot Features

This section describes the **Boot Features** options.

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.

Note: The default option is highlighted in bold face throughout this chapter.

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.

AddOn 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 Configuration

This section describes power configuration options.

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 **[21]**. 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 prefetcher will pre fetch streams of data and instructions from the main memory to the L2 cache in the 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: If there is any change to this setting, you will need to power off and restart the system for the change to take effect. Please refer to Intel's web site for detailed information.

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**. (Refer to Intel and Microsoft Web Sites for more information.)

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

Enhanced Intel SpeedStep Technology (EIST) allows the system to automatically adjust processor voltage and core frequency in an effort to reduce power consumption and heat dissipation. Please refer to Intel's web site for detailed information. The options are **Disable (Disable GV3)** and **Enable (Enable GV3)**.

Intel TurboMode Technology (Available when Intel EIST Technology is enabled)

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 (Available when Intel® C-State Tech is enabled)

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 Configuration

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, and 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 copies of all data in memory for redundancy.

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**.

Memory ECC Error Threshold

This feature allows the user to set the correctable memory ECC error limit for AMI BIOS to handle it. The Default setting is 255.

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 (Available for 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** degrees C, 3.0 degrees C, and 6.0 degrees C.

Guardband Temperature (Available for Closed Loop only)

This is the temperature which applies to the DIMM temperature threshold. Each step is in 0.5 degrees 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 degrees 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 0.5oC increment. The default is **[020]**. Press "+" or "-" on your keyboard to change this value.

Air Flow

This is the air flow 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.

Serial Debug Message Level

This feature allows the user to set the level of debug messages to be displayed. The options are **None**, MIN, MAX and Test.

North Bridge Configuration

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

Crystal Beach/Direct Memory Access (DMA)

This feature works with the Intel I/O Acceleration Technology (AT) 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**.

Crystal Beach/ Direct Cache Access (DCA)

This feature is available when Crystal Beach/DMA is enabled. This feature works in conjunction with the Intel I/O AT to accelerate the performance of the TOE device. When this feature set to Enabled, it will enhance overall system performance by providing direct cache access for data transferring. The options are Enabled and **Disabled**.

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**.

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 vice versa. The settings are Disabled, **Enabled** and Auto.

USB 2.0 Controller

This item indicated if the USB 2.0 controller is activated. 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**.

Intel PCI-X Hub Configuration

PCI Bus A0/B0 Frequency

This option allows the user to set the maximum PCI speed to be used in the PCI slot specified. Select Auto to allow the BIOS to automatically detect the capability of the device installed on the bus. The options are **Auto**, 33 MHz PCI, 66 MHz PCI, 66 MHz PCI-X MI, 100 MHz PCI-X MI, and 133 MHz PCI-X MI.

I/O Port Decode

This option allows the user to select the decode range for the I/O connections. The options are **4K Decode** and 1K Decode.

RAS Sticky Error Handling

This option allows the user to decide how to handle Sticky RAS errors. The options are **Clear Errors** and Leave Errors (unchanged).

VGA 16-Bit Decode

Select Enabled to enable the function of decoding VGA for the devices installed behind the PXH PCI Controller Hub. The options are **Enabled** and Disabled.

IDE and 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. (When the option-RAID is selected, the item-ICH RAID Code Base will appear. When the option-AHCI is selected, the item-SATA AHCI will be available.)

ICH RAID Code Base (This feature is available when the option-RAID is selected)

Select Intel to enable Intel's SATA RAID firmware to configure Intel's SATA RAID settings. Select Adaptec to enable Adaptec's SATA RAID firmware to configure Adaptec's SATA RAID settings. The options are **Intel** and Adaptec.

SATA AHCI (This feature is available when the option-AHCI is selected)

Select Enable to enable the function of Serial ATA Advanced Host Interface. (Take caution when using this function. This feature is for advanced programmers only.) The options are Enabled and Disabled. If the option-Enabled is selected, the following item will display.

SATA#2 Configuration (This feature is available when the option-IDE is selected)

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

Primary IDE Settings

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.

Select UDMA5 to allow the BIOS to use Ultra DMA mode 5. It has a data transfer rate of 133 MBs.

Select UDMA6 to allow the BIOS to use Ultra DMA mode 6. It has a data transfer rate of 133 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

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

Hot Plug

This feature is available when the option-AHCI Under "Configure SATA#1 as" is selected.

Select Enable to enable the hot plug function for the SATA devices. 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**.

PCI/PnP Configuration

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 computer using a network interface. The options are Enabled and **Disabled**.

Super IO Device Configuration

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.

Base Address, IRQ

This item displays the based address and IRQ of the serial port specified above. 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 defines 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. To avoid possible system overheating, please be sure to provide adequate airflow to your system.

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 degrees 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 (for example, 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 what its ‘Temperature Tolerance’ is, and not the other way around. This results in better CPU thermal management.

The SGI Altix XE500 system leverages 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 (for example, 25 degrees 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 thermal management, please refer to Intel’s web site at www.intel.com.

System Temperature

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

Fan Speed Readings

This feature displays the fan speed readings from Fan1 through Fan8.

Fan Speed Control Monitor

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 “Disabled, (Full Speed @ 12V)” to disable the fan speed control function and allow the onboard fans to constantly run at the full speed (12V). The Options are: 1. **Disabled (Full Speed)**, 2. Server Mode, 3. Workstation Mode.

Voltages Readings

The following voltage readings will be displayed.

CPU1 Vcore, CPU2 Vcore, +5Vin, +12V, -12V 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 (Root System Description Table) 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**.

Headless Mode

This feature is used to enable system to function without a keyboard, monitor or mouse attached. 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**.

Trusted Computing

TCG/TPM Support

Select Yes on this item and enable the TPM jumper on the motherboard to enable TCG (TPM 1.1/1.2)/TPM support in order to improve data integrity and network security. The options are **No** and **Yes**.

If this feature is set to Yes, the following items will display:

TPM Enable/Disable Status

This item displays the status of TPM Support to indicate if TPM is currently enabled or disabled.

TPM Owner Status

This item displays the status of TPM Ownership.

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 pressing <Enter> to display the information as shown in the screen.

- 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

Select OK and press the <Enter> key to clear the BMC system log. Select Cancel to keep the BMC System log. The options are OK and Cancel.



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 as shown in the following graphics.

Channel Number - Enter the channel number for the SET LAN Config 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 as shown in the screen below.

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-written. IP addresses are 6 two-digit hexadecimal numbers (Base 16, 0 ~ 9, A, B, C, D, E, F) separated by dots. (for example, 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 (for example, 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 Mask

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

SEL PEF Configuration

PEF Support

Select Enabled to enable the function of Platform Event Filter (PEF) which will interpret BMC events and perform actions based on pre-determined settings or 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 default is **Disabled**.

PEF Action Global Control

Note: Available if the item-PEF Support is enabled.

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

Note: Available if the item-PEF Support is enabled.

This feature inserts a delay during startup for PEF alerts. The options are Enabled and **Disabled**.

PEF Alert Startup Delay

Note: Available if the item-PEF Support is enabled.

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

Note: Available if the item-PEF Support is enabled.

This feature enables or disables startup delay. The options are Enabled and **Disabled**.

PEF Startup Delay

Note: Available if the item-PEF Startup is enabled.

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

Note: Available if the item-PEF Support is enabled.

This enables or 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].

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 AMIBIOS Setup Utility provides a Supervisor and a User password. If you use both passwords, the Supervisor password must be set first. See Figure 6-3.

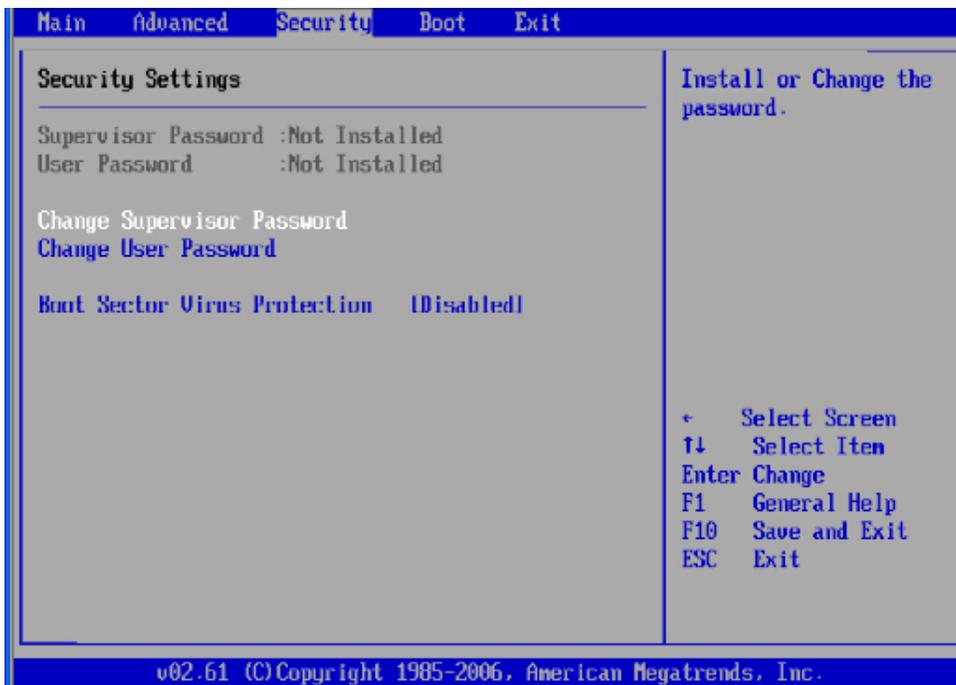


Figure 6-3 Security Settings Screen

This feature indicates if a supervisor's password has been entered (installed).

User Password

This feature indicates if a user's password has been entered (installed).

Change Supervisor Password

Select this option and press <Enter> to access the submenu, and then enter the password.

Change User Password

Select this option and press <Enter> to access the submenu, and then enter the password.

Clear User Password

Note: 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 BIOS 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 (see [Figure 6-4](#)).

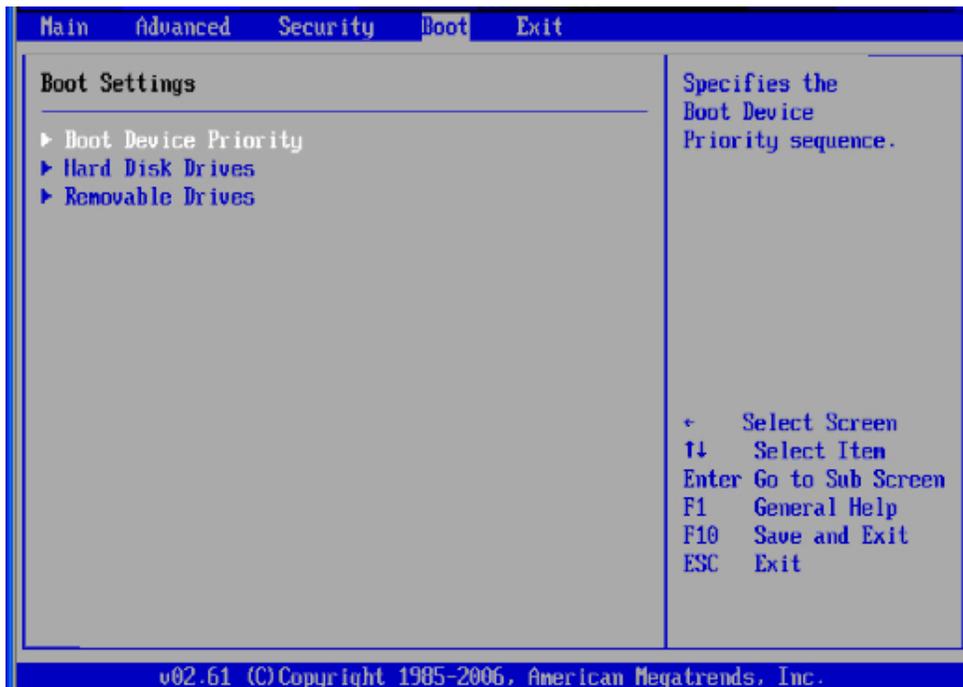


Figure 6-4 Boot Settings Screen

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

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 (for example, 1st Drive, 2nd Drive, 3rd Drive, etc).

- 1st Drive - [SATA: XXXXXXXXXXX]

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: XXXXXXXXXXX]
- 2nd Drive

Exit Options

Select the Exit tab from the AMI BIOS Setup Utility screen to enter the Exit BIOS Setup screen. See [Figure 6-5](#).

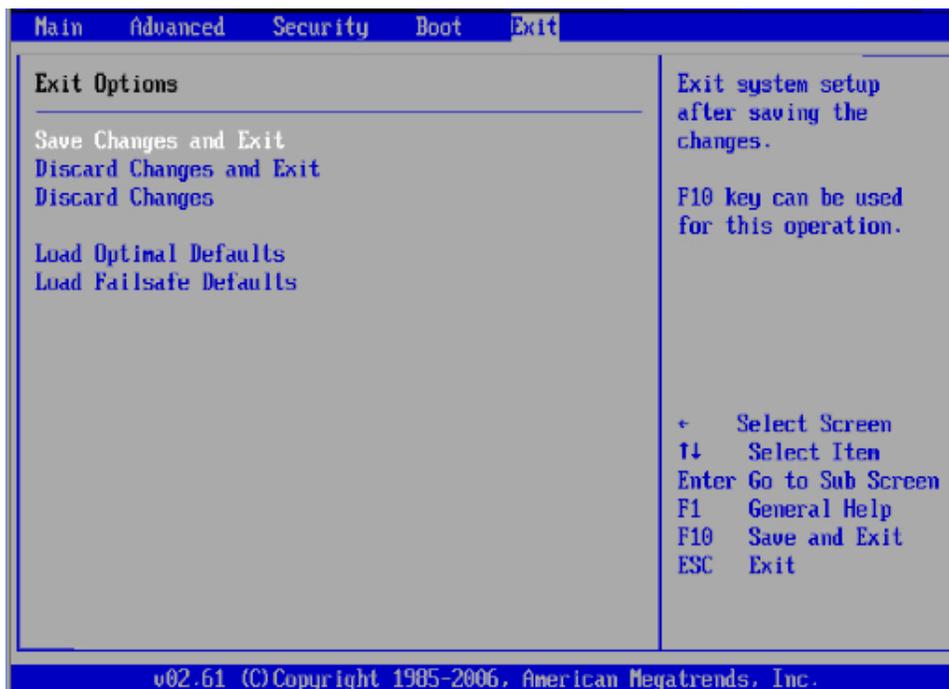


Figure 6-5 Exit Options Screen

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 Codes

During Power-On Self-Test (POST) 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.

These fatal errors are usually communicated through a series of audible beeps. The numbers on the fatal error list correspond to the number of beeps for the corresponding error.

Table A-1 BIOS Error 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	Display memory read/write error	Video adapter missing or with faulty memory
1 continuous beep with the front panel OH LED on	System Overheat	1 continuous beep with the front panel OH LED on

SGI Altix XE System Drivers

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

