SGI® Altix® UV 10 System User's Guide

007-5645-002

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Record of Revision

Version	Description
001	April 2010 Original printing.
002	August 2010 Updated Appendix B, “Power Supply Modules Safety Instructions”

About This Guide

This guide provides an overview of the installation, architecture, general operation, and descriptions of the major components in the SGI Altix UV 10 system. 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 the SGI Altix UV 10 computer system. It is written with the assumption that the reader has a good working knowledge of computers and computer systems.

Safety and Regulatory Information

Important Safety Instructions

Read all caution and safety statements in this document before performing any of the instructions.

Warnings

Heed safety instructions: Before working with your server product, whether you are using this guide or any other resource as a reference, pay close attention to the safety instructions. You must adhere to the assembly instructions in this guide to ensure and maintain compliance with existing product certifications and approvals. Use only the described, regulated components specified in this guide. Use of other products / components will void the UL listing and other regulatory approvals of the product and will most likely result in noncompliance with product regulations in the region(s) in which the product is sold.

System power on/off: The power button **DOES NOT** turn off the system AC power. To remove power from system, you must unplug the AC power cord from the wall outlet. Make sure the AC power cord is unplugged before you open the chassis, add, or remove any components.

Hazardous conditions, devices and cables: Hazardous electrical conditions may be present on power, telephone, and communication cables. Turn off the server and disconnect the power cord, telecommunications systems, networks, and modems attached to the server before opening it. Otherwise, personal injury or equipment damage can result.

Electrostatic discharge (ESD) and ESD protection: ESD can damage drives, boards, and other parts. We recommend that you perform all procedures in this chapter only at an ESD workstation. If one is not available, provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground any unpainted metal surface on your server when handling parts.

ESD and handling boards: Always handle boards carefully. They can be extremely sensitive to ESD. Hold boards only by their edges. After removing a board from its protective wrapper or from the server, place the board component side up on a grounded, static free surface. Use a conductive foam pad if available but not the board wrapper. Do not slide board over any surface.

Related Publications

The following SGI and LSI documents are relevant to the SGI Altix UV 10 server:

- *MegaRAID SAS Software User's Guide*, publication number, 860-0488-00*x*
- *MegaRAID 1078-based SAS RAID Controllers User's Guide*, publication number 860-0489-00*x*
- *LSI Integrated SAS for RAID User's Guide*, publication number 860-0476-00*x*
- *SGI ProPack 7 for Linux Service Pack 1 Start Here*, publication number 007-5640-00*2*
- *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.
variable	The italic typeface denotes variable entries and words or concepts being defined. Italic typeface is also used for book titles.
`user input`	This bold fixed-space font denotes literal items that the user enters in interactive sessions. Output is shown in nonbold, fixed-space font.
[ ]	Brackets enclose optional portions of a command or directive line.
...	Ellipses indicate that a preceding element can be repeated.
`man page`(*x*)	Man page section identifiers appear in parentheses after man page names.
GUI element	This font denotes the names of graphical user interface (GUI) elements such as windows, screens, dialog boxes, menus, toolbars, icons, buttons, boxes, fields, and lists.

Product Support

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

- Refer to http://www.sgi.com/support/
- If you are in North America, contact the Technical Assistance Center at +1 800 800 4SGI or contact your authorized service provider.
- If you are outside North America, contact the SGI subsidiary or authorized distributor in your country.

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.
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SGI values your comments and will respond to them promptly.

Introduction and System Components Overview

The SGI Altix UV 10 system, as shown in Figure 1-1 and see Figure 1-3, is a 4U, high-density, rack-mount server system with support for one to four Intel® Xeon® 7500 series processor (Nehalem-EX) or Intel® Xeon® Processor 7600 series (Westmere-EX) processors and up to 64 DDR3 RDIMMs / 512GB DDR3 RDIMM memory. Features include the following:

- Up to four hot swap PCIe add-in cards, or eleven total PCIe add-in cards
- Up to eight hot swappable memory risers carrying up to eight DIMMs each
- Support for up to four multi-core Intel® Xeon® Processor 7500 series (Nehalem-EX) or Intel® Xeon® Processor 7600 series (Westmere-EX)
- SAS Riser
- Four hot swap redundant power supply modules
- Eight hot swap redundant cooling fans
- Up to eight hot swap SAS/SATA hard drives

Figure 1-1 SGI Altix UV 10 Front View

Dimensions and Clearance Requirements

The SGI Altix UV 10 systems has the following dimensions (see Figure 1-2):

- Height: 4U / 6.8 inches (173.8 mm)
- Depth: 27.7 inches (704 mm)
- Width: 16.7 inches (424 mm)
- Weight: 110.23 lbs (50 kg) – estimated

Clearance requirments are, as follows:

- Front Clearance: 3 inches (76 mm)
- Side Clearance: 1 inch (25 mm)
- Rear Clearance: 6 inches (152 mm)

Figure 1-2 SGI Altix UV 10 Angle View

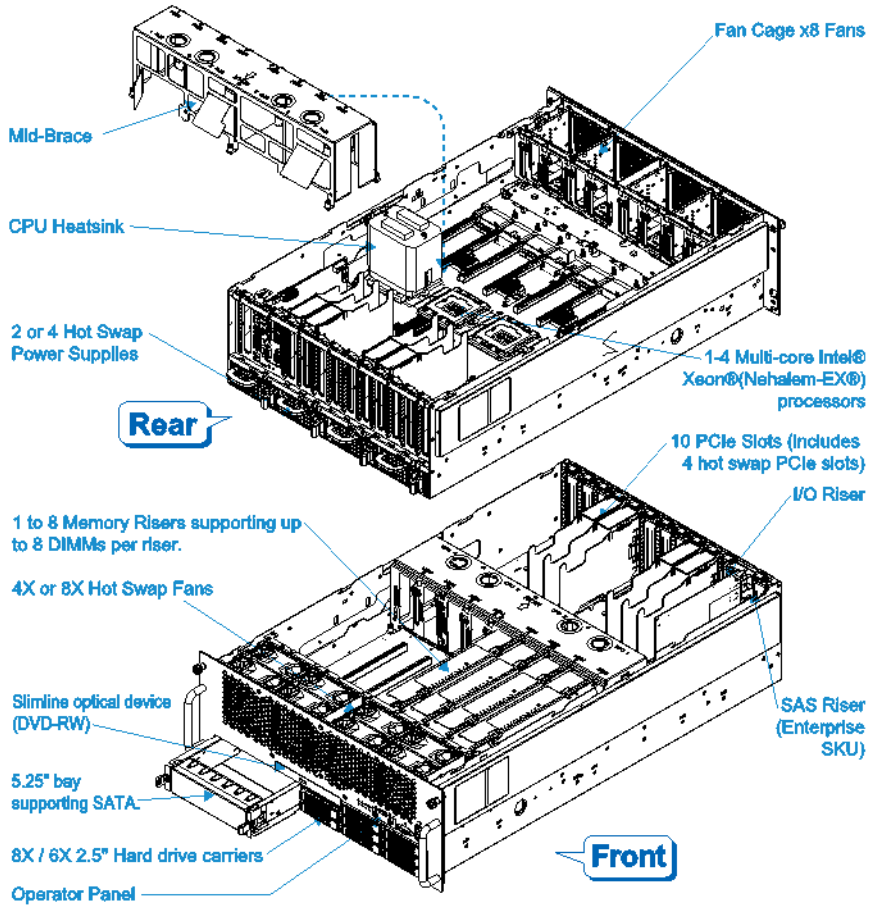


Figure 1-3 SGI Altix UV 10 System

System Features Overview

This section provides an overview of the SGI Altix UV 10 system features and components.

System Scalability

System scalability features are, as follows:

- One to four processors are supported.
- Supports two generations of processors; Intel® Xeon® 7500 series processors (Nehalem-EX and Westmere-EX)
- SAS Riser: 6 Gb SAS RAID card
- Up to eight 2.5 inch SAS/SATA hard drives
- Up to eleven PCIe adapters (Including the SAS Riser)
- Up to 512GB DDR3 RDIMM memory support (16GB/QRx4 RDIMM x 32 or 8GB/DRx4 RDIMM x 64)

System Serviceability

System sericeability features are, as follows:

- Front access to hot swap hard disk drives
- Easily maintained hot swap fans with individual LED indicators
- Rear access hot swap power supplies with LED indicators
- System power and system status LEDs
- System ID buttons and LEDs on front panel and rear of system
- LED indicators for PCIe hot-swap operations
- Memory configuration and status LEDs, located on memory riser modules
- Color-coded parts to identify both hot swap and non-hot swap serviceable components

System Availability

System availability features are, as follows:

- Eleven PCIe slots (including one SAS riser slot), with four slots supporting hot-swap
- Four 850W high efficiency power supplies in a redundant (2+2 or 3+1) configuration

- Eight hot swap system fans in a redundant (7+1) configuration or four hot swap fans in a non-redundant configuration
- Eight hot swap 2.5-inch SAS/SATA hard disk drives
- Eight memory risers
- SAS Riser supporting RAID with optional battery backup for storing buffer data.

System Manageability

System manageablity features are, as follows:

- Remote management
- Intelligent Platform Management Interface (IPMI) 2.0 compliant
- Wired for Management (WfM) 2.0 compliant
- Remote diagnostics support
- iBMC baseboard management controller

Front Control Panel and Operator Panel

Front control panel and operator panel features are, as follows:

- System power button and LED
- System reset button
- NMI button
- System ID button and LED
- System status LED
- Hard drive status LED
- LAN1, LAN2, LAN3 and LAN4 status LEDs
- Video connector
- Three USB 2.0 ports
- Fan status / fault LED

Rear I/O

Rear I/O features are, as follows:

- Four GbE LAN ports
- One I/O riser Management Ethernet Port via Intel® RMM3 (optional in Value SKU)
- Video connector
- Serial port connector
- System status LED
- Fan status / Fault LED
- CSS LED
- System ID button and LED
- Two USB 2.0 ports
- POST code LEDs

System Front Panel

Figure 1-4 shows the front view of the system. The front panel provides access to the following components described in Table 1-1:

Table 1-1 System Front Panel Componets

IItem	Description
A	Optical drive
B	Rear LAN LEDs (from I/O Riser)
C	Operator panel
D	Video Connector
E	USB 2.0 ports
F	5 ¼ - inch peripheral bay (SATA cable included)
G	Hot swap hard drive bays

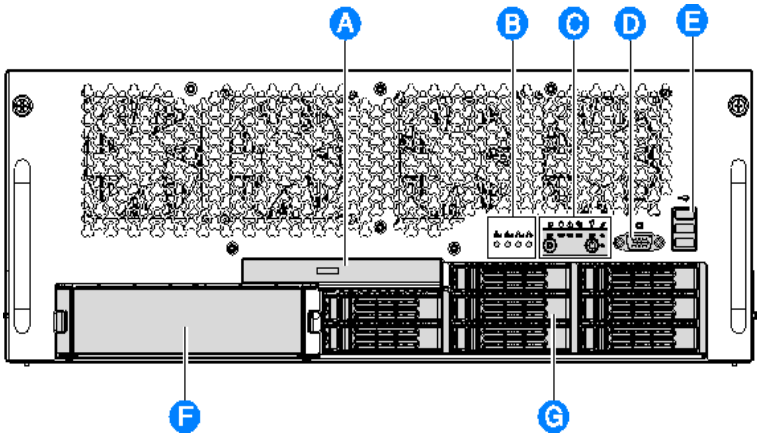


Figure 1-4 SGI Altix UV 10 System Front Panel

Operator Panel/Front Control Panel

The front panel contains the following controls and indicators as shown in Figure 1-5 and described in Table 1-2.

- Operator Panel with system control buttons and LED status indicators
- Four LED status indicators for the rear LAN ports
- One video connector supporting 1280 x 1024 resolution
- Three USB 2.0 ports

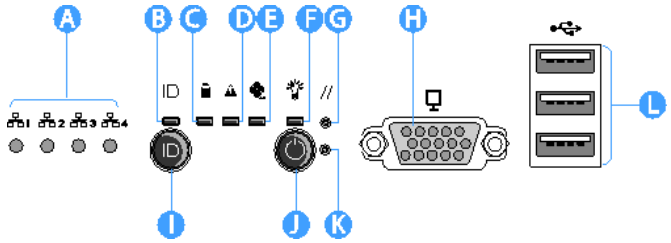


Figure 1-5 Operator Panel Controls and Indicators

Table 1-2 System Status LED s and Operator Panel Controls

IItem	Description
A	LAN1, LAN2, LAN3, LAN4 status LEDs (green)
B	System ID LED (blue) Blue ID that identifies the system through server management or locally
C	Hard drive status LED (green) - Indicates hard drive activity and fault stats
D	System status/fault LED (green/amber)
E	Fan fault LED (amber)
F	System power LED (green) - Indicates system power status
G	System reset button - Resets the system
I	System ID button - Toggles ID LED
J	System power button - Toggles system power
K	NMI button - Asserts NMI

Table 1-3 describes the front panel connectors.

Table 1-3 Front Panel Connectors

Item	Description
H	Video port, standard VGA compatible, 15-pin connector (1280 x 1024 resolution support)
L	Three USB 2.0 ports, 4-pin connectors

System Status LED States

This section describes the front panel LED states.

LAN Activity Status

Table 1-4 shows the front panel LAN LEDs activity status. See item A in Figure 1-5.

Table 1-4 LAN1 LAN2, LAN3, LAN4 status LEDs (green)

Color	LED Behavior	Description
	Off	Idle
Green	Blinking	LAN access
Green	On	LAN link/no access

Hard Drive Status LED

Table 1-5 shows the hard drive LED activity status. See intem C in Figure 1-5.

Table 1-5 Hard Drive Activity and Fault Status LED (green)

Color	LED Behavior	Description
Green	Blinking	HDD access or spin up/down
	Off	No access and no fault

System Status/Fault LED

Table 1-6 shows the system LED activity status/fault. See item D in Figure 1-5.

Table 1-6 System Status/Fault LED (green/amber)

Color	LED Behavior	Descriptions
Off	Not ready	AC power off, POST error
Green - On	Ready	System booted and ready

Table 1-6 System Status/Fault LED (green/amber) **(continued)**

Color	LED Behavior	Descriptions
Green - Blinking	Non-critical Alarm	Non-critical temperature threshold asserted. Non-critical voltage threshold asserted. Non-critical fan threshold asserted. Fan redundancy lost, sufficient system cooling maintained. (This does not apply to non-redundant systems.) Power supply predictive failure. Power supply redundancy lost. (This does not apply to non-redundant systems.)
Amber - Blinking	Non-Fatal Alarm	CATERR asserted. Critical temperature threshold asserted. Critical voltage threshold asserted. Critical fan threshold asserted. VRD hot asserted. SMI Timeout asserted.
Amber - On	Critical alarm	NMI asserted. CPU Missing. Thermtrip asserted. Non-recoverable temperature threshold asserted. ·Non-recoverable voltage threshold asserted.

System Power LED

Table 1-7 shows the system power LED activity status. See item F in Figure 1-5.

Table 1-7 System Power LED (green)

Color/LED Behavior	State	ACPI
Off	Power off	No
Green - On	Power on	No
Off	S5	Yes

Table 1-7 System Power LED (green)

Color/LED Behavior	State	ACPI
Green - Blinking	S1	Yes
Green - On	S0	Yes

System Rear

Figure 1-6 and Figure 1-7 shows the rear view of the system with the componets described in Table 1-8.

Figure 1-6 SGI Altix UV 10 Rear View

User-accessible connectors, PCIe slots, and power supply modules are located at the rear of the system. These components are described in the following ‘sections.

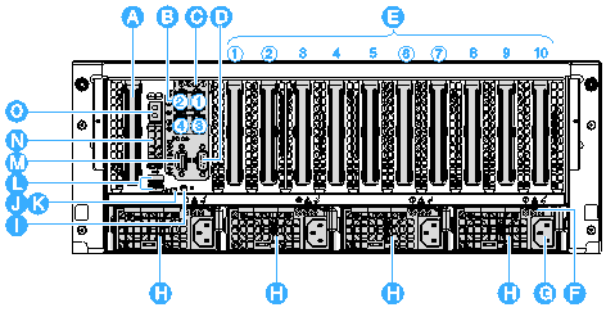


Figure 1-7 SGI Altix UV 10 System Rear

Table 1-8 System Rear Items and Descriptions

Item	Description
A	SAS Riser Slot - PCIe Gen-2x8, ½ length, x8 connector
B	I/O Riser Quad Gigabit Ethernet Ports: Four LAN ports, RJ45 connector. From upper left: LAN 2 and 1; and LAN 4 and 3 at the bottom For information on LAN port LED status, see Table 1-9
C	I/O Riser module
D	Serial Port connector
E	PCIe Gen-2x8 slots (See Table 1-10.)
F	Power Supply Unit Status LEDs. See “Power Subsystem” on page 15 and “Power Supply Modules” on page 17 for details.
G	AC input power connector (4 bays, from right to left: PSU#1, PSU#2, PSU#3, PSU#4)
H	Hot swap power supply
I	System ID button
J	System Status/Fault LED
K	System ID LED: Blue ID that identifies the system through server management or locally
L	USB 2.0 ports (x2)

Table 1-8 System Rear Items and Descriptions **(continued)**

Item	Description
M	VGA video port - standard VGA compatible, 15-pin connector supporting up to 1600X1200 resolution
N	8x POST code LEDs. See Appendix A, “POST Codes” for details.
O	I/O Riser Management Ethernet Port (Intel RMM3)

Rear Status LEDs

Table 1-9 shows LAN port LED status activity.

Table 1-9 Rear LAN Port LED Status Activity

LED Color	State
Status LED - Green	On – Ethernet link is detected Off – no Ethernet connection Blinking – Ethernet link is active
Speed LED - Green/Amber (dual color)	Off – 10 Mbps Green On – 100 Mbps Amber On – 1000 Mbps

Rear PCIe Slots

Table 1-10 shows rear PCIe slot descriptions.

Table 1-10 PCIe Slots

PCIe Slot Number	Description
1	PCIe Gen-2x8, ¾ in. x8 conn., hot swap
2	PCIe Gen-2x8, ¾ in. x8 conn., hot swap
3	PCIe Gen-2x4, ½ in., x8 conn.

Table 1-10 PCIe Slots

PCIe Slot Number	Description
4	PCIe Gen-2x4, ½ length, x8 conn.
5	PCIe Gen-2x16, ¾ in., x16 conn.
6	PCIe Gen-2x8, ¾ in., x8 conn., hot swap
7	PCIe Gen-2x8, ¾ in., x8 conn., hot swap
8	PCIe Gen-2x4, ¾ in., x8 conn
9	PCIe Gen-1x4, ½ in., x8 conn.
10	PCIe Gen-1x4, ½ in., x8 conn.

Note: Legacy I/O devices, such as, video cards are only supported on slot #1, 2, 3, 4 or 10.

Processors

One to four 64-bit Intel® Xeon® Processor 7500 series (Nehalem-EX) or 64-bit Intel® Xeon® Processor 7600 series (Westmere-EX) are supported.

System Memory

The memory risers connect to the main board through 8 PCI Express (PCIe) connectors. One to eight memory risers can be installed via PCIe x16 card edge connectors. Memory air baffles are needed to restrict airflow to empty memory riser slots. Key features of the memory risers are discussed in “Memory Riser” on page 19.

Power Subsystem

Warning: For the initial release of the SGI Altix UV 10 system, power supply modules must be connected to separate AC power sources or have a grounding wire installed for standalone systems. This only applies to systems with a grounding warning label shown in Figure B-1. See Appendix B, "Power Supply Modules Safety Instructions" and shipped with a grounding wire. If your system serial number is UV10-00000053 or greater, Appendix B information does NOT apply.

There are four power bays providing space for up to four power supply modules that connect to the power distribution board (PDB). The dimensions of the power supply module is 3.72-inches (W) x 15.75-inches (D) x 1.57-inches (H). There are two dual-motor fans located within each power supply module drawing air through the hard drives and across the power distribution board. Each power supply module has a handle to assist insertion and extraction without tools.

The PDB distributes the power in two ways. There are connectors on the back edge of the board that mate to the power supplies. In addition, there are cables that route power up to the main board and to the hot-swap backplane.

The SGI Altix UV 10 system power subsystem supports up to four 850W high efficiency power supplies. The hot swap power supply modules are rated at 850W over an input range of 100-127VAC@10A or 200-240 VAC@5A.

The total power requirement for the SGI Altix UV 10 system exceeds the 240 VA energy hazard limit that defines an operator-accessible area. As a result, only qualified technical personnel should access the processor, memory, and non-hot swap areas while the system is energized.

The power subsystem can be configured as follows:

- With four power supply modules installed, a fully configured system has (2+2 or 3+1) power redundancy
- With three, two or one power supply module installed, the system does not have redundant power at 200-240 VAC input, three power supply module is capable of handling the maximum power requirements for a fully configured SGI Altix UV 10 system, which includes the following:
  - Four processors
  - 512GB of memory

- Eleven PCIe add-in cards (including the SAS RAID riser)
- Eight hard disk drives
- One optical drive
- One tape drive

System Configuration

Table 1-11 shows the maximum system configuration support.

Table 1-11 Maximum System Configuration Support

System Components	Description
Processors	4
Memory risers	8
DIMM rank/DIMM quantiy	8 Memory Risers with 8 DIMMs on each riser
I/O riser	Yes
SAS riser	Yes
Hot Swap/Total PCIe*	7 + 1
System fans	Yes
2.5” HDDs	8
Optical device	Yes
5.25” tape device	Yes
Power supply	2 + 2
12V available power	2316
Power redundancy	AC/DC
	*Exclude SAS riser slot.

When the system is configured with four power supply modules, the hot swap feature allows the user to replace a failed power supply module without affecting the system functionality.

The power subsystem receives AC power through four power cords. When four power supply modules and four power cords are installed, the system supports 2+2 or 3+1 power cord redundancy.

This feature allows the system to be powered by four separate AC sources. In this configuration, the system continues to function without interruption if two or one of the AC sources fails.

A 3-volt lithium battery provides power to the RTC when the Main Board is powered down. The expected battery life is greater than 5 years.

Power Supply Modules

Warning: For the initial release of the SGI Altix UV 10 system, power supply modules must be connected to separate AC power sources or have a grounding wire installed for standalone systems. This only applies to systems with a grounding warning label shown in Figure B-1. See Appendix B, "Power Supply Modules Safety Instructions".

The output rating of each power supply is 850 watts when operated between 200 VAC and 240 VAC. Modules are current-sharing and have auto-ranging input. Each power supply is 7.75 inches wide, 14.5 inches deep, and 1.47 inches high. The power supply modules have universal AC input with Power Factor Correction (PFC) Distributed Power Supplies (DPS). The AC input receptacle is an IEC-320 C14 15A rated for a 250 VAC minimum.

The power supply operates over the range and limits shown in Table 1-12.

Table 1-12 AC Input Rating

Parameter	Minimum	Nominal	Maximum	Start Up VAC	Power Off VAC
Voltage (115)	90 Vrms	100-127 Vrms	140 Vrms	85 VAC +/-4 VAC	75 VAC +/-5 VAC
Voltage (220)	180 Vrms	200-240 Vrms	264 Vrms		
Frequency	47 Hz	50/60	63 Hz		

When input power is applied to the power supply, any initial current surge or spike of 10 ms or less should not exceed 55A. Any additional inrush current surges or spikes in the form of AC cycles or multiple AC cycles greater than 10 ms, and less than 150 ms, must not exceed 25A.

The power supply has DC outputs of 12 V and 3.3 VSB. The 12 V main power is distributed through the server and is converted locally at the point-of-load using embedded Voltage Regulator Module (VRM) converters. The power supply is capable of power-safe monitoring.

The DC output voltages remain within the ranges shown in Table 1-13 when operating at steady state and dynamic loading conditions. These limits include the peak-peak ripple/noise.

Table 1-13 DC Output Voltage

Parameter	Tolerance	Minimum	Nominal	Maximum	Units
+12V	-5%/+5%	+11.40	+12.00	+12.60	VDC
+3.3V standby	-3%/+5%	+3.20	+3.30	+3.46	VDC

The combined continuous output power for all outputs does not exceed 850W. Each output has the maximum and minimum current rating shown in Table 1-14.

Table 1-14 850W Power Suppy Load Ratings

Output Level	Minimum*	Nominal*	Maximum*	Peak*
+12V	0A		69A	88A
+3.3V standby	0A		6.0A	

Note: *Values are at the system level. For 2+2/or 3+1 redundant systems, the load each power supply provides is based on its current sharing accuracy.

Figure 1-8 shows the the locations of the power supply indicators.

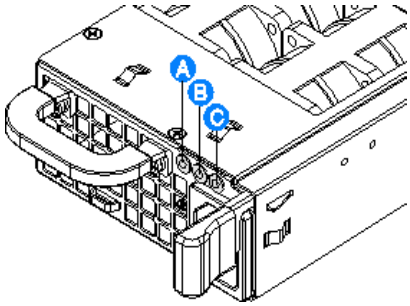


Figure 1-8 Power Supply Indicators

Caution: Power supplies must be hot swapped within three minutes to prevent overheating. This time period applies only to the time that the power supply is physically removed, not from the time of failure.

Table 1-15 shows power supply LED status activity.

Table 1-15 Power Supply Indicators

Power Supply Condition	Staus LED (A)	Fail LED (B)	AC LED (C)
No AC power to any of the power supplies	Off	Off	Off
AC Cord Unplugged	0.5 Hz blinking green	Off	Off
AC Present but only 3.3VSB on (PS off (or power supply in cold redundant state.	1 HZ blinking green	Off	Solid green
Output On and OK	Solid green	Off	Solid green
Power supply warning events where the power supply continues to operate: High temperature, high power, high current, slow fan	1 Hz blinking amber	Off	Solid green
Power supply critical event causing a shutdown: failure, overcurrent, overvoltage, or fan failure.	Off	Amber	Solid green

Cooling Subsystem

The SGI Altix UV 10 system contains two cooling fan zones comprising a total of eight system fans located at the upper front of the system and two dual-motor fans located within each power supply module. The basic chassis structure is divided into a lower section of 1U height and upper section of 3U height.

The upper section is cooled with up to eight 80 mm fans positioned in front of the system exhausting into the memory, CPU, and PCIe regions. The lower section is cooled by fans located within the PSUs drawing air through the hard drives and across the power distribution board.

The eight hot swap fan modules that are located at the upper front of the chassis can be removed from the chassis when the chassis cover is removed (See Figure 1-9). The fans are docked on the front panel fan board (FPFB).

The fan modules have following features:

- Form factor: 80x80x38mm
- Hot swap blind-mate connector
- Fan presence, PWM, tachometer, and fault signals
- Support Fault LED
- RV isolation
- Tool-less service at the module level
- Keying feature to prevent incorrect installation

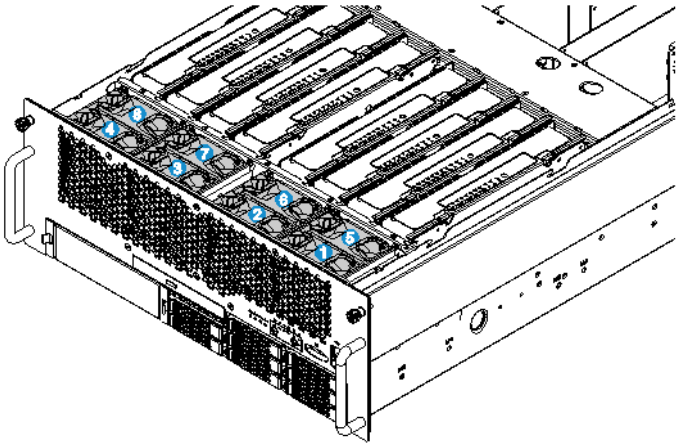


Figure 1-9 Cooling Fan Locations

In addition, there are two dual-motor fans located within each power supply drawing air through the hard drives and across the power distribution board.

Note: The cooling system is non redundant in a non-redundant power supply system configuration.

The zones are designed to be redundant in order to maintain system cooling in the event of fan failure. To maintain system performance, only one of the eight fans can fail at any one time.

Each fan assembly has a single LED to indicate its status. In the event of a fan failure, the LED illuminates amber. Failed system fans can be hot swapped out inside of the chassis with the cover removed. The maximum time limit to perform a fan hot swap operation is three minutes before affecting system performance.

Each fan (or pair of redundant fans in series) provides cooling for a zone of the mainboard that includes two memory riser slots and one CPU socket. Dividers separate the memory risers to allow for proper airflow for each riser. If only one memory riser is installed for a fan, a memory air baffle must be installed over the adjacent opening in the fan cage. The memory air baffle restricts airflow to the area where no memory riser is present, ensuring proper airflow over installed DIMMS. Memory air baffles are not needed for parts of the mainboard where no memory risers are present.

The system thermal design maintains an operating ambient temperature between 0°- 55°C delivered to the board. This may result in internal local ambient temperatures greater than 55°C. It is not required that the maximum internal temperature be less than 55°C in all locations.

The ambient air temperature inside the chassis may exceed 55°C in certain locations such as directly behind the Boxboro chipset, in close proximity to VR components, and at the exhaust of the PCIe cards. This is not a violation of the board specification and is normal and expected in those locations.

Hot Swap PCI Express Slots

The four hot swap PCIe slots have power and attention LEDs. The attention button is used to invoke a hot swap sequence to remove or add an adapter without using the software interface. The green arrow on the PCIe divider label identifies the LEDs. Table 1-16 shows hot swap PCIe slot power LEDs..

Table 1-16 Hot Swap PCEe Power LEDs

Green Power LED State	Definition
Off	Power off: Power has been removed from the slot. A card can be inserted or removed
On	Power on: The slot is powered on. A card cannot be inserted or removed.
Blinking	Power transition: The slot is powering up or down. A card cannot be inserted or removed.

Table 1-17 shows attention LEDs

Table 1-17 Hot Swap PCIe Attention LEDs

Amber Attention LED State	Definition
Off	Normal: Normal operation.
On	Attention: Power fault or operational problem has occurred with this slot.
Blinking	Locate: The slot is being identified.

Peripherals

The following peripheral devices are supported:

- Hard Disk Drives
- Slim-line SATA DVD-RW drive
- One 5.25” device bay

A hot swap backplane (HSBP) provides power and I/O for the hard disk drives and slimline optical drive. A separate 4-pin 12V molex power connector is provided for powering the 5.25” device. I/O for the 5.25” device can be accomplished via one of the SATA connectors on the mainboard. Figure 1-10 shows the periperal device area.

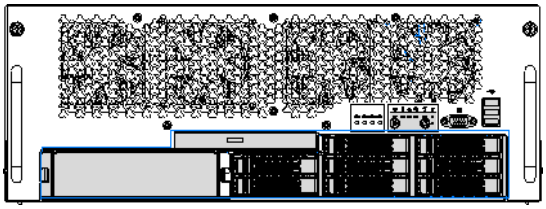


Figure 1-10 Peripheral Area

Hot-Swap Hard Drive

The hard drive carrier is an assembly that provides guidance for hot swapping. It contains two integrated light pipes to transfer the LED indicator light driven by the SGPIOs, and an insertion/extraction mechanism that includes a hard drive bezel. Figure 1-11 shows the hot-swap hard drive carrier. Item A points to the carrier latch. Item B points to the green LED. Item C points to the Amber LED. Table 1-18 shows the LED status activity.

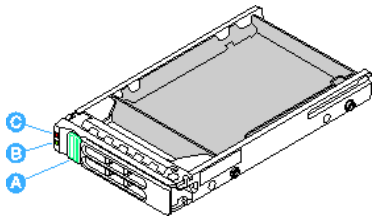


Figure 1-11 Hard Drive Carrier

Table 1-18 Hard Drive Carrier LED Indicators

Hard Drive Carrier LED State	Description
Green Blinking	HDD access or spin up/down
Amber - On	HDD fault
Amber - Blinking	Predictive failure, rebuild, identify
Off	No access and no fault

Optical Drive Bay

Figure 1-12 shows the optical drive bay.

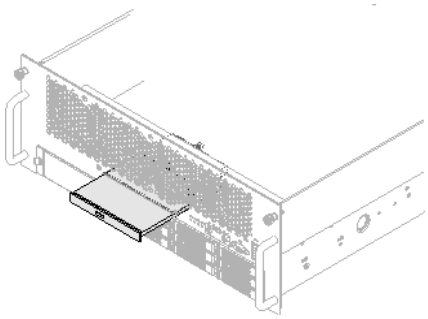


Figure 1-12 Optical Drive

Half-height Drive Bay (5 1/4-inch)

The system includes a bay that can support a half height 5.25” tape device as shown in Figure 1-13. The system includes a 5.25” device blank for the 5.25” device opening. It matches the shape and interface of a 5.25” device. The blank includes the 5.25” device rails such that field upgrade to 5.25” device is possible.

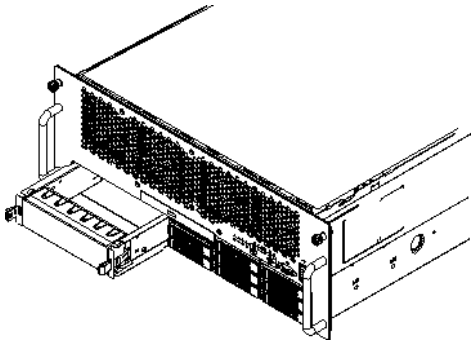


Figure 1-13 Half-height Drive (5 1/4-inch)

System Boards

The board set consists of the following (see Figure 1-14):

- Main board
- Memory riser
- I/O riser
- Hot swap backplane
- Front panel fan board
- Power distribution board
- Operator panel board
- SAS Riser: 6 Gb SAS RAID card

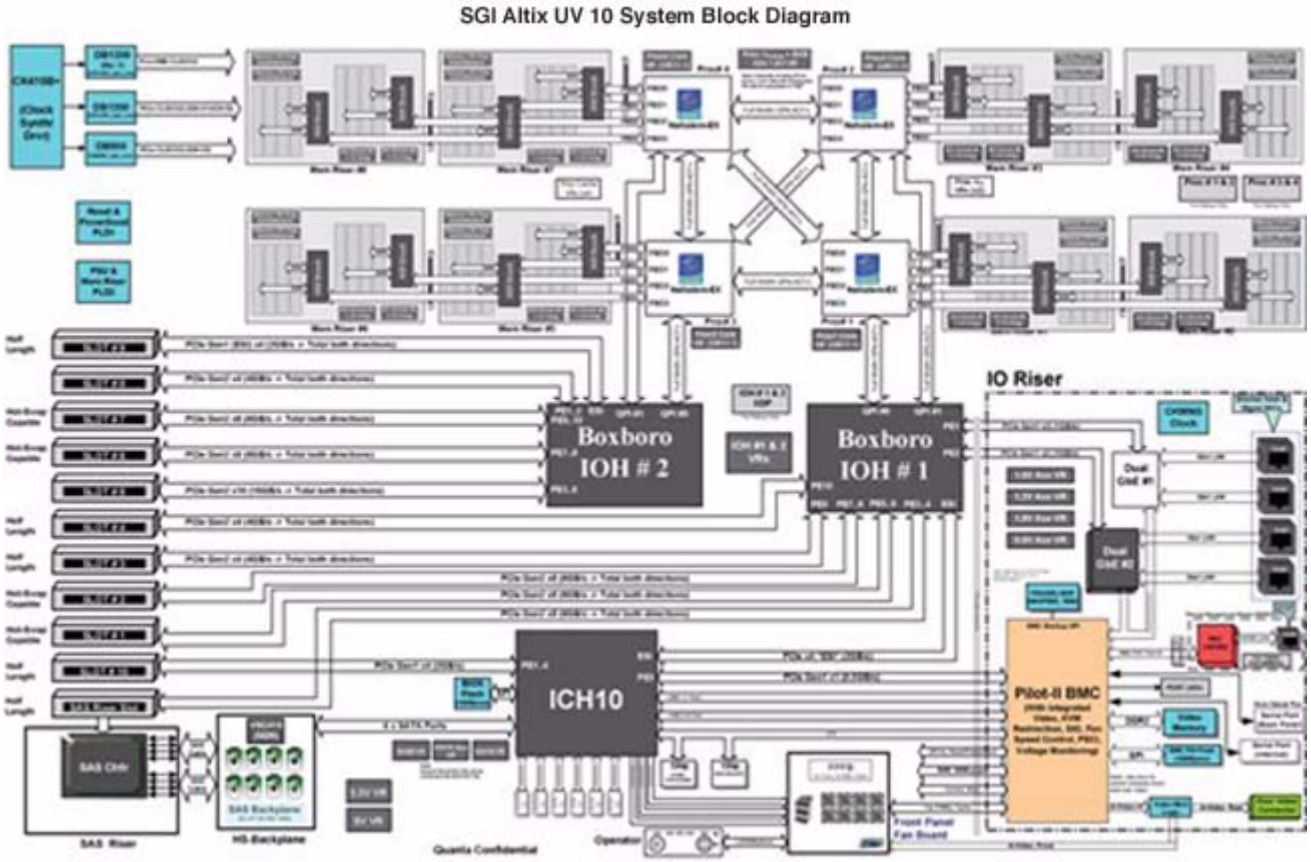


Figure 1-14 SGI Altix UV 10 System Block Diagram

I/O Configuration Rules

The Altix UV 10 has two Intel IOH (Boxboro) parts (IOH1 and IOH2) that enable PCI-E devices (see Figure 1-14).

IOH1 drives slots 1, 2, 3, 4 and 10.
IOH2 drives slots 5, 6, 7, 8 and 9.

Slots 1, 2, 6 and 7 are hot plug capable. All slots except 9 and 10 are PCI-E Gen2; therefore, slots 9 and 10 should be reserved for the lowest performance devices or unused unless all other slots are filled.

The Altix UV 10, along with all other I/O rich platforms, has 64K bytes of I/O space. The 64k bytes is divided between the two IOHs in a fixed manner, as follows:

- IOH1 has 40kB
- IOH2 has 24kB.

The allocation of I/O space can be changed in the PCI Config screen of the BIOS setup. In addition, all four hot plug slots are pre-allocated with extra PCI I/O space to accommodate the potential addition of a card after the system is booted.

The following table describes the features of each PCIe slot.

Slot	Source	Gen	PCIe Connector	PCIe Width	PCIe Card Length	PCIe Card Height	Hot Pluggable
1	IOH1	2	x8	x8	3/4	Full	Yes
2	IOH1	2	x8	x8	3/4	Full	Yes
3	IOH1	2	x8	x4	1/2	Full	No
4	IOH1	2	x8	x4	1/2	Full	No
5	IOH2	2	x16	x16	3/4	Full	No
6	IOH2	2	x8	x8	3/4	Full	Yes
7	IOH2	2	x8	x8	3/4	Full	Yes
8	IOH2	2	x8	x4	3/4	Full	No
9	IOH2	1	x8	x4	1/2	Full	No
10	IOH1/ ICH10	1	x8	x4	1/2	Full	No

The suggested location for various cards is impacted by the card's performance, lane width requirements, and its use of I/O space.

The following table defines the recommended PCIe card slot placements for typical systems:

Card Type	Suggested Slot Order (in order of populating more than one)
PCIE-GFX-1800	5
PCIE-FC8-4P-G2	1, 6, 2, 5, 7
PCIE-FC8-2P-G1	1, 6, 2, 7, 5
PCIE-FC-2P-LS-D	1, 6, 2, 7, 5
PCIE-SCSI-U4-2P-L	Any
LSU-ER-SASRAID	1, 6, 2, 7, 5
PCIE-6G-SAS-8E	1, 6, 2, 7, 5
PCIE-SAS-LS-2P4X	1, 6, 2, 7, 5
PCIE-10G-OR-RDMA	5, 6, 1, 7, 2
PCIE-GENET-C-4P-LP	Any
PCIE-GENET-C-2P	Any
PCIE-IB-HCA-CONNX	5, 6, 1, 7, 2
PCIE-IB-HCA-QDR-2P	5, 6, 1, 7, 2
PCIE-IB-HCA-QDR-1P	5, 6, 1, 7, 2

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 UV 10 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 polarites . 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.

Lifting Precautions

When installing an SGI Altix UV 10 system in a rack, two people are required. With a person on each side of the chassis, lift it and move it into the equipment rack, as shown in Figure 2-1.

Figure 2-1 Lifting the SGI UV 10 System Into a Rack

Warning: **Two people are required to lift an SGI Altix UV 10 System.**

General Safety Precautions

Follow these rules to ensure general safety:

- Keep the area around the SGI Altix UV 10 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.

Starting Up and Shutting Down the System

This chapter describes how to power up and shut down your system.

Powering On the System

Press the power button on the front control panel. The fans start and POST begins.

Note: It might take two minutes or longer for video to be displayed, depending on the amount of memory installed.

The server attempts to boot from the first device on the list of available devices in the boot manager. If this device is not available, it moves to the second device. It continues down the list until it reaches the first available device.

Shutting Down the System

To shut down the system, perform the following steps:

1. Exit the operating system if applicable.
2. Press and hold the power button until the system shuts down.

Caution: Powering down the server with the power button **does not** remove all power. The +3.3V standby power is available even when the system is not running. To remove standby power, unplug all power cords from the system.

System Utilities

Using the BIOS Setup Utility

The BIOS Setup Utility is a text-based utility that allows you to configure the system and view and change device settings and view environmental information for the system. The interface consists of several screens, called pages, each of which contains information or links to other pages. The first page in Setup displays links for general categories. These links lead to pages containing specific configuration settings.

The BIOS Setup Utility is functional through console redirection over various terminal emulation standards. This may limit some functionality due to compatibility. For example, colors, some keys or key sequences, and mouse support may be limited.

To enter the BIOS Setup Utility press <F2> when prompted during POST to access the Systems Options Menu.

For additional information on navigating and using the BIOS utility, see Chapter 6, “BIOS.”

System Configuration Reset

You can restore the system configuration to the default values. When you reset the system to the default values, The BIOS loads default system configuration values during the next POST. Use one of these methods if you want to return to the defaults:

- Use <F9> in the BIOS Setup Utility.
- In the BIOS Setup Utility Exit menu, select “Load Default Values”.
- Power down the system but do not remove the AC power cords.
- Power on the system

Note: The SGI Altix UV 10 system does not support any other mechanisms to clear NVRAM.

Console Redirection

The BIOS supports keyboard and video redirection through a serial link (serial port). When console redirection is enabled, local (host server) keyboard input and video output are passed to both the local keyboard and video connections and to the remote console through the serial link. Keyboard inputs from both sources are valid and video is displayed to both outputs.

With console redirection, the system can be operated without a host keyboard or monitor and run entirely from a remote console. Setup and any other text-based utilities can be accessed through console redirection.

Serial Configuration Settings

For optimal configuration of Serial Over LAN (SOL) or EMP, see the *Intel® Server System Integrated Baseboard Management Controller Core External Product Specification*.

The BIOS does not require that the splash logo be turned off for console redirection to function. The BIOS supports multiple consoles, some of which are in graphics mode and some in text mode. The graphics consoles can display the logo while the text consoles receive the redirected text.

Console redirection ends at the beginning of the Legacy OS boot (INT 19h).

Keystroke Mappings

During console redirection, the remote terminal, which may be a dumb terminal or a system with a modem running a communication program, sends keystrokes to the local server. The server passes video back over this same link. The keystroke mappings follow VT-UTF8 format with the extensions defined in the following sections.

Setup Alias Keys

The <Del> and <Ctrl>-<function key> combinations are synonyms for the <F2> or “Setup” key. These are not prompted for in screen messages. These hot keys are defined only for console redirection support, and are not used on locally attached keyboards.

Standalone <Esc> Key for Headless Operation

The Microsoft Headless Design Guidelines describes a specific implementation for the `<Esc>` key as a single standalone keystroke:

- `<Esc>` followed by a two-second pause must be interpreted as a single escape.
- `<Esc>` followed within two seconds by one or more characters that do not form a sequence described in this specification must be interpreted as <Esc> plus the character or characters, not as an escape sequence.

The escape sequence in Table 4-1 is an input sequence. This means it is sent to the BIOS from the remote terminal.

Table 4-1 Console Redirection Escape Sequences

Escape Sequence	Description
<Esc>R<Esc>r<Esc>R Defaults to “disabled”.	Remote console reset

Limitations

- BIOS console redirection terminates after an EFI-aware operating system calls EFI Boot Service ExitBootServices. The operating system is responsible for continuing the Console Redirection after that point.
- BIOS console redirection is a text console. Graphical data, such as a logo, are not redirected.

Interface to Server Management

If the BIOS determines that console redirection is enabled, it passes the baud rate through the Intelligent Platform Management Bus (IPMB) to the appropriate management controller.

Platform Confidence Test

The Platform Confidence Test (PCT) diagnostic utility is included on the SGI Altix UV 10 System Resource CD. It probes for the hardware at the start of each test and reports the identified components. In this way, the PCT indirectly identifies many assembly and cabling errors (broken

or improperly seated cables) when installed components are not reported. The test displays results for field replaceable units, such as the processor modules, the server board, drives, and memory.

Three Platform Confidence Tests (PCT) are available. The duration of each test depends on the number of processors and the amount of memory installed. On completion of each test and after the test results are displayed, the program returns to the main menu.

Quick Test

The quick test checks the core components of the system to ensure they are functioning properly. The test modules that are run during the quick test include:

- Cache
- Processor
- Real-time clock
- Memory
- I/O Hub
- QuickPath Interconnect

Comprehensive Test

The comprehensive test performs a thorough test of the system components. The test modules that are run during the comprehensive test include:

- Processor
- Cache
- Graphics
- Memory
- Keyboard
- I/O Hub
- Real-time clock
- PCI Bus (including PCI, PCIX, PCIe)
- Universal serial bus

- Super I/O
- SAS
- ICHx
- Hard drives
- NIC
- Baseboard management controller
- QuickPath Interconnect
- HSC
- RMM3

The processor floating-point unit (FPU) is tested and more extensive tests are run on the memory and cache. Extensive tests are run on the onboard peripheral controllers, integrated components, and the chipset.

Comprehensive Test with Continuous Looping

This is identical to the comprehensive test, but it runs continuously until the operator interrupts the test cycle by pressing the `<F10>` key. The system transfers to the test menu screen with the pass / fail status displayed, along with the number of test loops completed.

Running the Platform Confidence Test

To run the platform confidence test, perform the following steps:

1. Insert the Resource CD into a Windows*-based system.
2. Allow the autorun feature to launch the graphical user interface. If `autorun` does not launch the GUI, launch it manually by double-clicking the CD-ROM drive.
3. From the Drivers and Utilities menu, choose "**EFI**" and then "**Platform Diagnostics Utility**".
4. Choose an appropriate option:
   - If you want to run the Platform Diagnostics Utility from a CD, burn the *.iso image to a CD.

- If you want to run the Platform Diagnostics Utility from a USB flash drive, install the flash drive onto your system, open the *.zip file and copy the files to the root of your USB flash drive.

5. Install the USB flash drive or the CD that contains the Platform Diagnostics utility into the Server System to be tested. Boot the system.
6. Press <F2> when prompted to enter the BIOS Setup utility.
7. From the BIOS Setup utility, go to the Boot Manager menu and choose "**EFI Shell**."
8. The Platform Diagnostics Utility starts to load and prompts you to respond to the licensing agreement. Upon your agreement, the utility starts and you see the menu of test options.

System Setup and Configuration Utilities

Setup and configuration utilities are either on the Server Deployment Toolkit CD or the Server Management Software CD. Table 4-2 shows system configuration tools and supported operating systems.

Table 4-2 System Configuration Tools and Supported Operating Systems

Utility	Windows	Windows Server 2003	EFI	Linux
SELViewer	x		x	
Save and Restore System Configuration (SysConfig)	x		x	x
FWPIAUPD Firmware Load utility	x		x	
iFlash32 BIOS Load utility	x		x	
FRUSDR Load utility	x		x	
One-Boot Flash Update (OFU)		x		x

Save and Restore Configuration (SYSCFG)

You can use the command-line utility to perform the following:

- Save a subset of BIOS and firmware settings to a file.
- Write BIOS and firmware settings from a file to a server.

- Configure selected firmware settings.
- Configure selected BIOS CMOS settings.
- Change BIOS boot order.·
- Display selected firmware settings.
- Display selected BIOS settings.

FWPIAUPD Firmware Load Utility

The Firmware Update utility updates these server management controllers:

- Baseboard management controller (BMC)
- Hot swap controller (HSC)
- ME Firmware
- RMM3

One-boot Flash Update Utility (OFU)

The One-Boot Flash Update (OFU) utility is an OS-present command-line utility that uses configuration (CFG) files to allow users to update

- System BIOS
- Server management firmware of the baseboard management controller (BMC)
- Hot swap controller (HSC) firmware
- Field replaceable units (FRU). Existing FRU data can also be modified.
- Sensor data records (SDR)
- ME Firmware
- RMM3

FRUSDR Load Utility

The FRUSDR Load utility updates and modifies the server management subsystem's product level field replacement unit data and sensor data record repository, and displays the System Management BIOS (SMBIOS) non-volatile storage components.

The FRU is initially factory-programmed and can be updated later by using the FRUSDR utility to update specific FRU areas and fields. You cannot change the size of any FRU area from the size defined in the original FRU Header.

Run the FRUSDR Load utility each time you upgrade or replace the hardware in your server; excluding add-in cards, hard drives, fans, and RAM. The FRUSDR Load utility programs the sensors that the server management software monitors.

With the FRUSDR Load Utility, you can:

- Discover the product configuration based on instructions in a master configuration file.
- Display the FRU information.
- Update the non-volatile storage device associated with the baseboard management controller (BMC) that holds the SDR and FRU information.
- Generically handle FRU devices that might not be associated with the BMC.
- Supply command lines and interactive input through the standard input device.
- View and direct results to the standard output device.

Extensible Firmware Interface (EFI) Shell

The EFI shell application allows other EFI applications to be launched, EFI device drivers to be loaded, and operating systems to be booted. The combination of the EFI firmware and the EFI Shell provides an environment that can be modified and adapted to many hardware configurations.

The EFI shell provides a set of basic commands to manage files and EFI NVRAM shell and boot variables. Table 4-3 shows a list of these basic commands.

Table 4-3 EFI Commands

Command	Description
<drive_name>:	Change drives. For example, entering fs0: and pressing the <Enter> key changes the drive to the LS-240 drive
alias [-bdv] [sname] [value]	Sets or gets alias settings
attrib [-b] [+/- rhs] [file]	Views or sets file attributes
cd [path]	Changes the directory

Table 4-3 EFI Commands **(continued)**

Command	Description
cls [background color]	Clears the screen
comp file1 file2	Compares two files
connect [-r] [-c] Handle#1/2DeviceHandle# DriverHandle#	Binds the EFI driver to a device and starts the driver
cp [-r] file [file] ... [dest]	Copies files and directories, [-r] = recursive
date [mm/dd/yyyy]	Gets or sets the date
dblk device [Lba] [Blocks]	Performs a hex dump of BlkIo Devices
devices [-b] [-1XXX]	Displays devices
devtree [-b] [-d]	Displays device tree
dh [-b] [-p prot_id] | [handle]	Dumps handle information
disconnect DeviceHandle# [DriverHandle# [ChildHandle#]	Disconnects device from driver
dmem {address] [size] [;MMIO]	Displays the contents of memory
dmpstore	Dumps the variable store
drivers [-b] [-lXXX]	Displays drivers
drvcfg [-c] [-lXXX] [-f] [-v] [-s]	Invokes the driver configuration protocol
drvdiag [-c] [-lXXX] [-s] [-e] [- m]	Invokes the driver diagnostics protocol
echo [[-on | -off] | [text]	Echoes text to the standard output device or toggles script echo
edit [filename]	Opens the text editor allowing you to create or edit a file
eficompress infile outfile	Compresses an EFI file
Efidecompress infile outfile	Decompresses an EFI file
endfor	Provides a delimiter for loop constructs (scripts only)
endif	Provides a delimiter for IF THEN constructs (scripts only)
for var in <set>	Display or Modifies EFI shell environment variables

Table 4-3 EFI Commands **(continued)**

Command	Description
guid [-b] [sname]	Dumps known guide ids
goto label	Goto Force batch file execution to jump to specified location
help [-b] [internal_command]	Displays help information
hexedit [[-f]FileName|[-d DiskName Offset Size]|[-m Offset Size]]	Edits in HEX mode
if [not] condition then	Provides conditional constructs (scripts only)
load driver_name	Loads a driver
loadpcirom romfile	Loads a PCIe option ROM
ls [-b] [dir] [dir] ...	Obtains directory listings
map [-bdvr] [sname[:]] [handle]	Maps sname to device path
mem [address] [size] [;MMIO]	Dumps Memory or Memory Mapped IO
memmap [-b]	Dumps memory map
mkdir dir [dir]	Creates a new directory
mm address [Width] [;Type] [n]	Memory Modify: type = Mem, MMIO, IO, PCIe, [n] for non interactive mode when inside a .nsh file
mode [col row]	Sets or gets the current graphics mode
mount BlkDevice [sname[:]]	Mounts a file system on a block device
mv [src?] [dst]	Move one or more files/directories to destination
pause	Prompts to quit or continue (scripts only)
pci [bus_dev] [func]	Displays PCIe device information
reconnect DeviceHandle# [DriverHandle# [ChildHandle#]] | [-r]	Reconnects one or more drivers from a device
reset [reset_string]	Performs a cold reset
rm file/dir [file/dir]	Removes files or directories
stall microseconds	Delays for the specified number of microseconds

Table 4-3 EFI Commands **(continued)**

Command	Description
time [hh:mm:ss]	Gets or sets the time
type [-a] [-u] [-b] file	Displays the contents of a file
ver	Displays version information
vol fs [volume_label]	Sets or displays a volume label

Maintenance and Upgrade Procedures

This chapter covers the steps required to install components and perform maintenance on the SGI Altix UV 10 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 and Supplies Required:

- Phillips (cross head) screwdriver, #2 bit
- Flat-head screwdriver
- Antistatic wrist strap and conductive foam pad (recommended)

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.

Lifting Precautions

When installing an SGI Altix UV 10 system in a rack, two people are required. With a person on each side of the chassis, lift it and move it into the equipment rack, as shown in Figure 5-1.

Figure 5-1 Lifting the SGI UV 10 System Into a Rack

Warning: Two people are required to lift an SGI Altix UV 10 System.

Removing and Installing the Rack Rails

Rack rails are provided to allow for easy access to the top cover and internal components when the system is mounted on a rack.

Warning: **The rail racks are designed to carry only the weight of the server system. Do not use rail-mounted equipment as a workspace. Do not place additional load onto any rail-mounted equipment.**

Removing the Rack Rails

When it is necessary to service the rack or remove the system from a rack mounting, remove the rack rails, as follows:

1. Press the release latch on the inner rail and remove the server system with inner rails from the rack mounting.
2. Detach the slide rails from the rack mounting system.
3. Lift the leaf lock and slide the inner rail along the server sides to lift the inner rail off.
4. Slide the inner rails back into the slide rails for storage.

Installing the Rack Rails

When the server is to be installed into a rack, it is necessary to install two rack mount rails onto the server chassis prior to installing the server into the rack. Follow the procedures below to install your rack mount rails onto your server. Before you proceed, check the parts list for all parts.

1. Remove the slide rail from the inner rail by pressing on the latch on the inner rail and sliding the rack rail free, as shown in Figure 5-2.

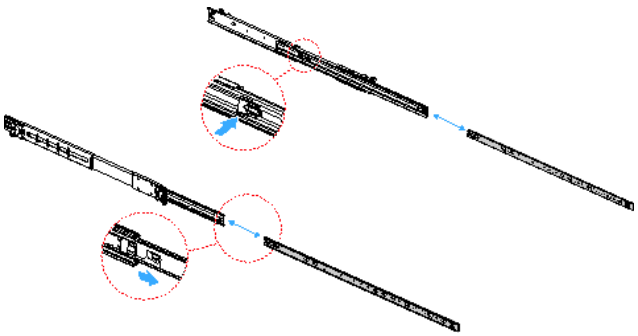


Figure 5-2 Removing the Inner Rack Rail from the Slide Rails

2. Locate and position the inner rail on the system chassis, sliding the inner rail into place, as shown in Figure 5-3.

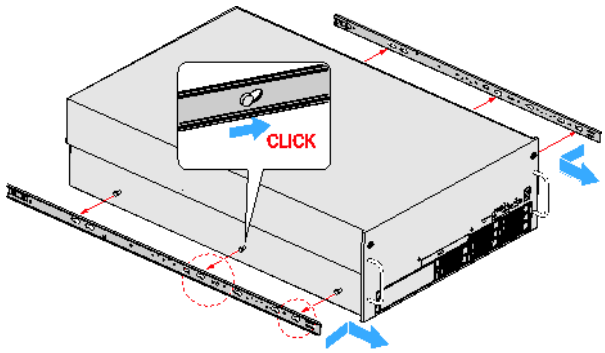


Figure 5-3 Installing the Inner Rail on the Server

3. Secure the slide rails in place on the rack mounting system, as shown in Figure 5-4.

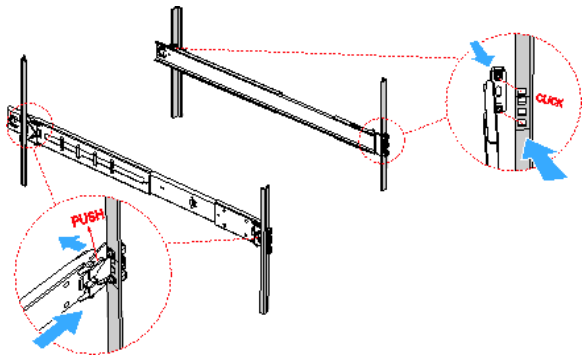


Figure 5-4 Installing the Slide Rails on the Rack Mounting

4. Align the slide rail with the inner rail and slide the server forward until the rails' latches lock, as shown in Figure 5-5.

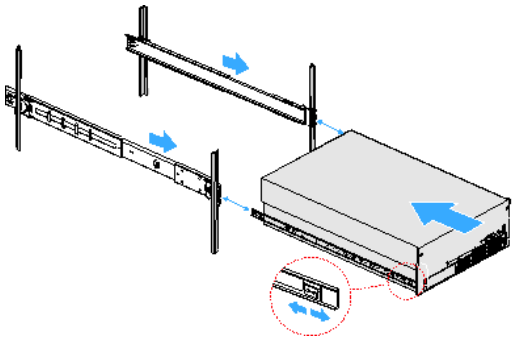


Figure 5-5 Installing the Server onto the Rack Mounting

Removing the Cable Management Arm

To remove the cable management arm (CMA), perform the following steps:

1. Press the latch to release and remove the cable management arm from the cable management extension on the left outer rail, as shown in Figure 5-6.

Note: By orientation from the rear of the system this rail is on the right. This is the left rail according to the system designation of defining left and right from the front, and all descriptions follow the system designation.

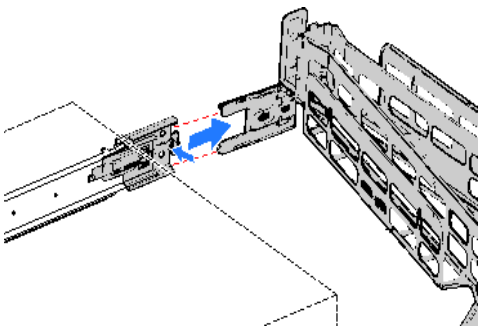


Figure 5-6 Removing the Cable Management Arm from the Extension

2. Press the latch to release and remove the CMA connector of the outer arm of the cable management arm from the right outer rail, item 1, as shown in Figure 5-7.

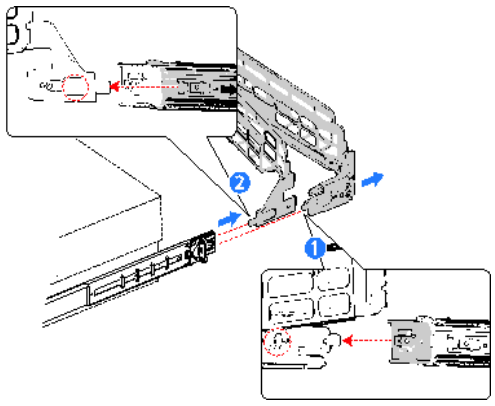


Figure 5-7 Removing the Inner and Outer Rail Right CMA Connector

3. Press the latch to release and remove the CMA connector of the inner arm of the cable management arm from the right inner rail, item 2, as shown in Figure 5-7.
4. Press the latch and remove the cable management arm extension from the left outer rail, as shown in Figure 5-8.

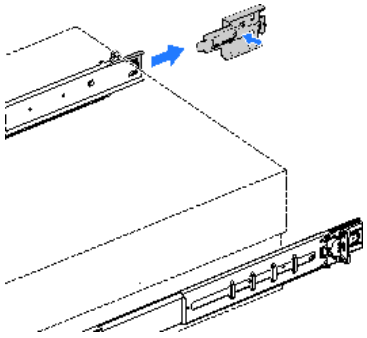


Figure 5-8 Removing the Cable Management Arm Extention

Installing the Cable Management Arm

To install the cable management arm (CMA), perform the following steps:

1. Connect the cable management arm extension into the left outer rail, as show in Figure 5-9.

Note: By orientation from the rear of the system this rail is on the right. This is the left rail according to the system designation of defining left and right from the front, and all descriptions follow the system designation.

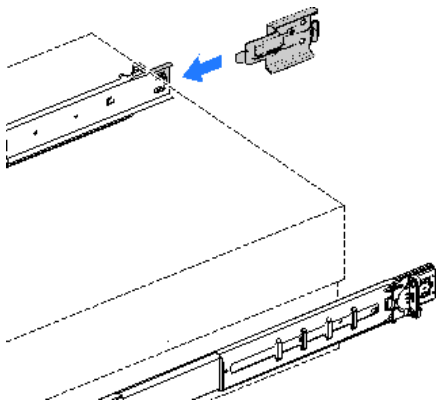


Figure 5-9 Installing the Cable Management Arm Extension

2. Connect the CMA connector of the inner arm of the cable management arm into the right inner slide rail, item 1, as shown in Figure 5-10.

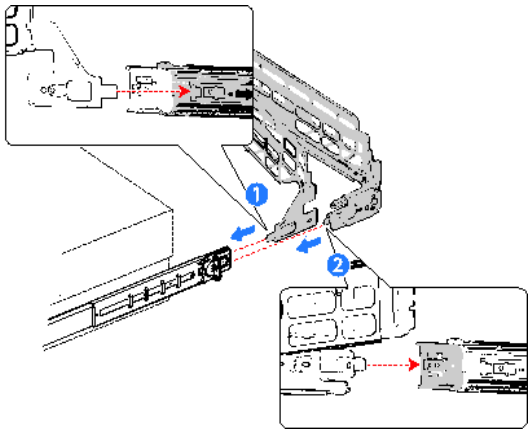


Figure 5-10 Installing the Inner Rail CMA Connector

3. Connect the CMA connector of the outer arm of the cable management arm into the right outer rail, item 2, as shown in Figure 5-10.
4. Connect the extension connector of the cable management arm into the extension placed in the left outer rail in step 1, as shown in Figure 5-11.

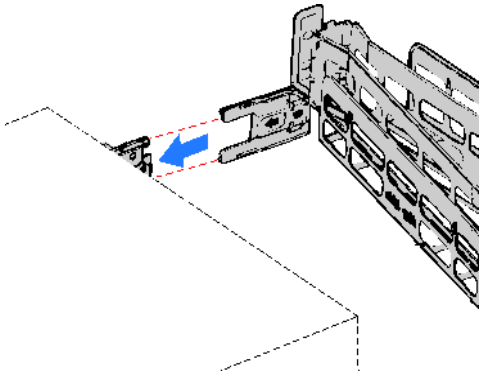


Figure 5-11 Installing the Cable Management Art to the Extension

Removing and Installing the Chassis Cover

Warning: Make sure the rack is anchored securely so it does not tilt forward when the server is extended. A crush hazard exists if the rack tilts forward. This could cause serious injury.

Follow these precautions:

Caution: For proper cooling and airflow, do not operate the server for more than three minutes with the cover removed. Do not leave the chassis cover open or a system fan removed any longer than necessary; system cooling could be reduced.

Caution: The server comes with a removable top cover that allows the PCIe cards, memory risers, and the system fans to be hot swapped, and other system components to be serviced. Except for components described in this chapter, a qualified service technician must perform all servicing.

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

Removing the Top Cover

Before removing the top cover, observe the safety guidelines in step 1.

To remove the top cover, follow the steps 2 through 5.

1. If you are not replacing a hot swap component:
   - Turn off and disconnect all peripheral devices connected to the server.
   - Power down the system by pressing and holding the power button on the front of the chassis for several seconds.
   - After the server shuts down, unplug all AC power cords to remove standby power from the system.

2. If the system is mounted in a rack, slide it out far enough to expose the entire top cover.
3. Remove the one screw in the top cover. See letter “A” in Figure 5-12.
4. Press down on the two latch buttons on the top cover and slide the top cover off the latches. See letter “B” in Figure 5-12.
5. Slide the top cover toward the rear until it stops, and then lift the cover to remove it. See letter “C” in Figure 5-12.

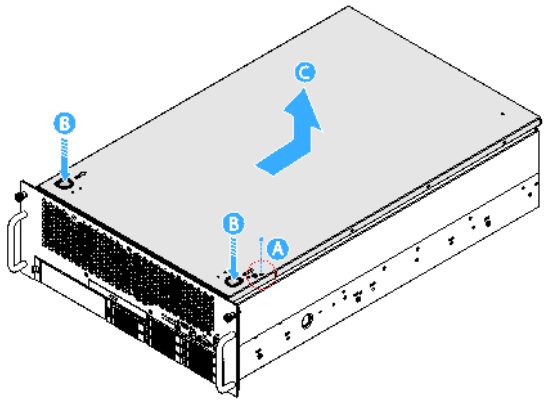


Figure 5-12 Removing the Chassis Cover

Installing the Top Cover

To install the top cover, perform the following steps:

1. Place the cover over the chassis so that the side edges of the cover sit just inside the chassis sidewalls and the tabs on the cover align with the slots in the chassis.
2. Slide the cover forward until it clicks into place. See letter “A” in Figure 5-13.
3. Replace the one screw in the top cover. See letter “B” in Figure 5-13.
4. Reconnect all peripheral devices and the AC power cords.
5. Slide the system back into the rack.

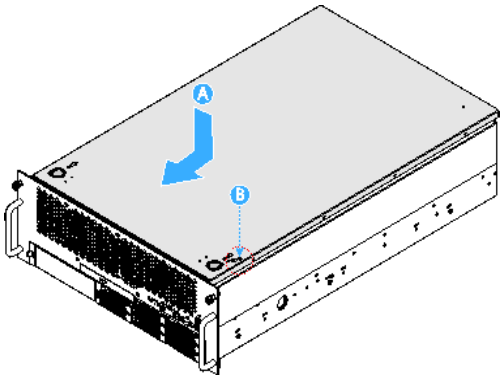


Figure 5-13 Installing the Chassis Cover

Hot Swapping a Hard Drive

The SGI Altix UV 10 system supports eight hot swap drive carriers. Each carrier holds a standard 2.5-inch SATA or SAS hard drive.

The procedures in this section describe how to determine drive status, remove a faulty drive, and install a new drive. If a drive is in a redundant configuration, you can install or replace a hot swap hard drive without powering down the server.

Caution: To ensure proper airflow and server cooling, all drive bays must contain either a carrier with a hard drive installed in it or a carrier with a HDD blank installed.

Item A in Figure 5-14 points to the hard drive latch. The drive carriers contain light-pipes that allow LED indicators to display the hard drive status (see itmes B and C in Figure 5-14). Table 5-1 describes the the HDD LED activity status.

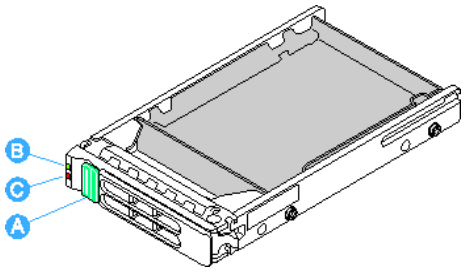


Figure 5-14 Hard Driver Carrier

Table 5-1 HDD LED Activity Status

HDD LED	State	Description
LED (B)	Green – Blinking	HDD access or spin up/down
LED (C)	Amber – On	HDD fault
	Amber – Blinking	Predictive failure, rebuild, identify
	Off	No access and no fault

Removing a Hard Drive Carrier

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

1. Press the green drive carrier latch. See “A” in Figure 5-15.
2. Open the bezel fully. See “B” in Figure 5-15.
3. Pull the bezel to remove the drive carrier from the chassis. See “C” in Figure 5-15.
4. Place the drive carrier on a clean, static-free work surface.

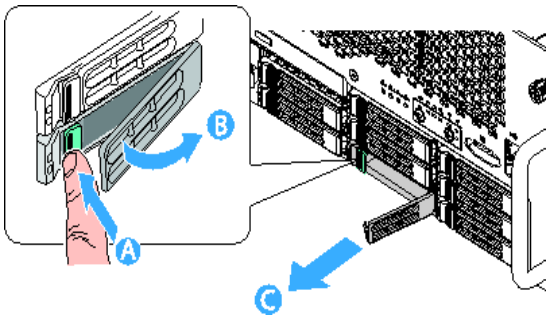


Figure 5-15 Removing a Hard Drive Carrier

Mounting a Hard Drive in a Carrier

To mount a hard drive in a carrier, perform the following steps:

1. Remove the hard drive from the protective wrapper and place it on a clean ESD protected work surface.
2. Set any jumpers and/or switches on the drive according to the drive manufacturer's instructions.
3. If the drive carrier is installed in the chassis, remove it and place it on a clean static-free work surface. For instructions, see “Removing a Hard Drive Carrier” on page 61.
4. Remove the four screws that hold the HDD blank in place. See letter “A” in Figure 5-16.
5. Remove the HDD blank from the carrier. See letter “B” in Figure 5-16.
6. Store the HDD blank for future reinstallation.

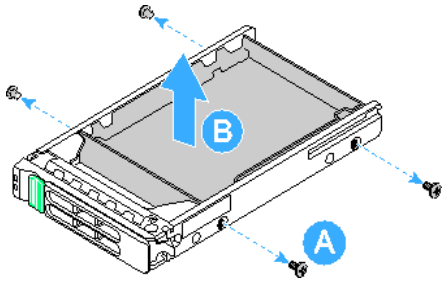


Figure 5-16 Removing the HDD Blank from the Hard Drive Carrier

7. Position the drive in the carrier with the label-side up and the connector end of the drive facing the back of the carrier. See letter “A” in Figure 5-17.
8. Align the holes in the drive to the holes in the drive carrier slide track and replace the four screws that were attached to the blanks. See letter “B” in Figure 5-17.

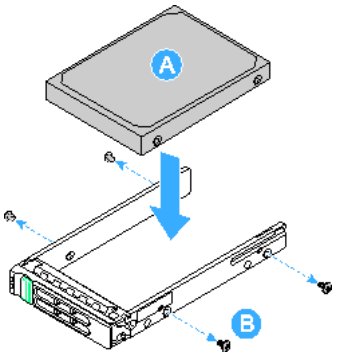


Figure 5-17 Attaching the Hard Drive to the Carrier

Installing a Hard Drive Carrier

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

1. With the drive carrier handle fully open, slide the drive carrier all the way into the drive bay in the chassis. See letter “A” in Figure 5-18.
2. 2. Close the drive carrier handle to lock the hard drive carrier in position. See letter “B” in Figure 5-18.

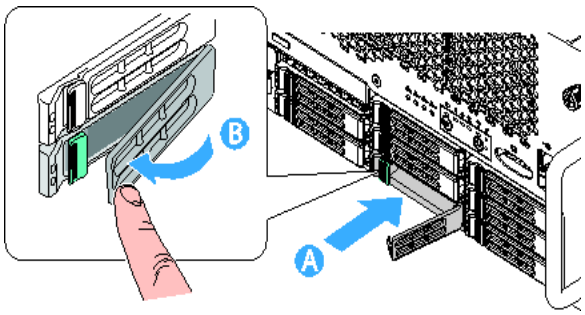


Figure 5-18 Installing the Hard Drive into the Altix UV 10 System

Hot Swapping a Power Supply

Warning: For the initial release of the SGI Altix UV 10 system, power supply modules must be connected to separate AC power sources for standalone systems. See Appendix B, “Power Supply Modules Safety Instructions”.

If your SGI Altix UV 10 system is configured with four power supplies, you can replace a failed or failing power supply without powering down the server. Use the LEDs at the front of the power supply as shown in Figure 5-19 to determine the power supply status. Each power supply module has three status LEDs above the input connector. If the center LED is lit, the power supply needs to be replaced.

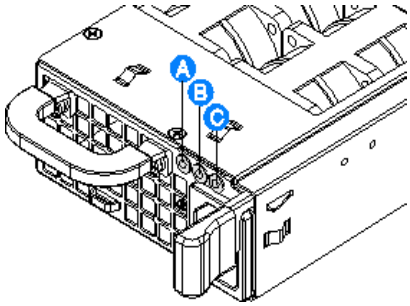


Figure 5-19 Power Supply Indicators

Table 5-2 shows the power supply LED indicators status activity. See Figure 5-19 for the location of the LEDs.

Table 5-2 Power Supply Indicators

LED Loccation	Purpose	Description
A (left)	Power Good LED (green)	This LED is lit whenever the power is turned on.
B (center)	Fault LED (amber)	This LED is lit when a power fault occurred within the power supply.
C (right)	AC OK LED (green)	This LED is lit whenever the AC power cord is plugged in to an active AC power source.

To remove a power supply, perform the following steps:

Caution: Because of chassis airflow disruption, a power supply bay should never be vacant for more than three minutes when the server power is on. Exceeding five-minutes might cause the system to exceed the maximum acceptable temperature and possibly damage system components.

1. Remove the AC power cord from the power supply to be removed. See letter “A” in Figure 5-20.
2. Press in the latch to release the power supply module. See letter “B” in Figure 5-20.
3. Pull the power supply from the chassis and set it on a clean, ESD-protected work surface. See letter “C ” in Figure 5-20.

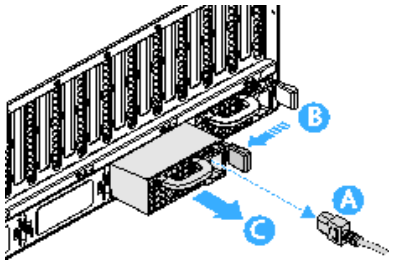


Figure 5-20 Removing a Power Supply

Note: Power supply redundancy is available if four power supplies are installed.

4. Remove the new power supply from the protective packaging and place it on a clean ESD protected work surface.
5. Slide the new power supply module into the power supply bay, with the AC inlet connector on the right side, until it clicks and latches in place. See letter “A” in Figure 5-21.
6. Plug the power cord into the AC receptacle on the power supply. See letter “B” in Figure 5-21. Use the LEDs on the power supply to confirm the power supply is functioning.

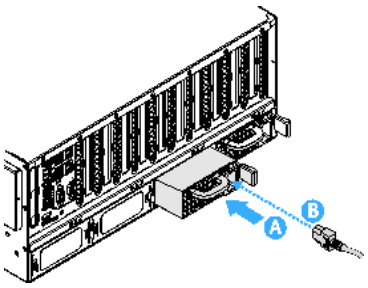


Figure 5-21 Installing a Power Supply

Removing and Installing Hot-Swap PCI Express Add-in Cards

Note: Cards can be hot swapped only in PCIe slots 1, 2, 6, and 7. The server must be powered down to install or remove a card from PCIe slots 3 through 5, 8 through 10 and the SAS riser slot. When looking at the system from the front, slot 1 is on the right.

Removing a Hot-Swap PCIe Card

To remove a hot-swap PCIe card, perform the following steps:

1. Remove the top cover. For instructions, see “Removing the Top Cover” on page 58.
2. Disconnect any cables attached to the card.
3. Press the LED light pipe switch on the PCIe card cover, and wait for the LED to turn off. See letter “A” in Figure 5-22.
4. Rotate the green retention latch at the top front of the card slot into the up position. See letter “B” in Figure 5-22.

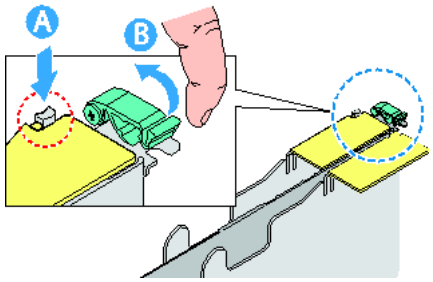


Figure 5-22 Removing a Hot-swap PCIe Card

5. Lift the flap on the PCIe divider. See letter “C” in Figure 5-23.
6. Pull up on the card to remove it. See letter “D” in Figure 5-23.

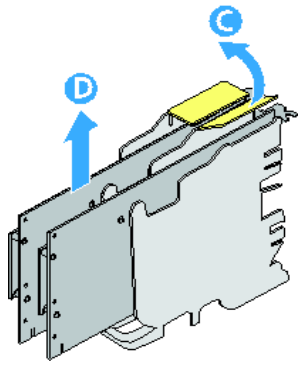


Figure 5-23 Removing a PCIe Card

7. Store the card in an antistatic protective wrapper.
8. To install a replacement PCIe card: see .
9. Install an expansion slot cover by sliding it down to cover the opening if no PCIe replacement card is installed.
10. Install the top cover. For instructions, see “Installing the Top Cover” on page 59.

Installing a Hot-Swap PCIe Card

Caution: Only PCIe add-in cards in PCIe slots 1, 2, 6, and 7 can be hot swapped. If you are removing a PCIe card in PCIe slots 3 through 5 or 8 through 10, see “Installing and Removing Non-Hot Swap PCI Express Add-in Cards” on page 70. When looking at the system from the front, slot 1 is on the right.

To install a hot-swap PCIe card, perfomr the following steps:

1. If your operating system supports it, use your operating system or GUI application to power down the PCIe slot.
2. Remove the top cover. For instructions, see “Removing the Top Cover” on page 58.
3. Being careful not to touch the components or gold edge-connectors on the add-in card, remove the card from the anti-static bag and place it on a clean, ESD protected work surface.

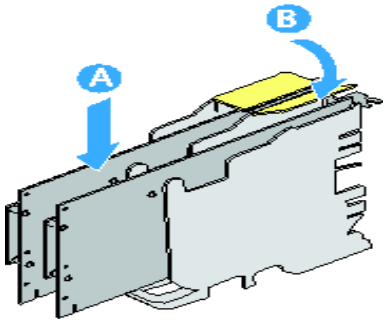


Figure 5-24 Installing a PCIe Add-in Card

4. Rotate the green retention latch at the rear of the card slot into the up position.
5. Remove the expansion slot cover by sliding it up.
6. Lift the flap on the PCIe divider.
7. Align and slide the adapter board down until it seats in its connector.
8. Press the card down firmly until it seats into the slot. See letter “A” in Figure 5-24.
9. Close the flap on the PCIe divider. See letter “B” in Figure 5-24.

To install a hot-swap PCIe add-in card, perform the following steps:

Caution: Some accessory/option board outputs exceed Class 2 or limited power source limits. Use appropriate interconnecting cabling in accordance with the national electrical code

1. Rotate the green retention latch at the rear of the card slot into the down position. See letter “C” in Figure 5-25.
2. Connect any required cabling to the PCIe add-in card.

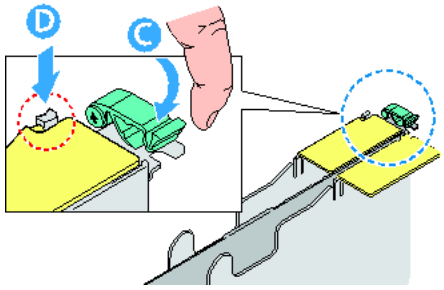


Figure 5-25 Adding a Hot-swap PCIe Add-in Card

3. If using the operating system hot-plug interface:
   - Wait for the software user interface to appear on your monitor and then confirm the device to be enabled.
   - Wait for the power LED to turn on.

   If using the hardware hot-plug interface:
   - Press the attention button for the slot. See letter “D” in Figure 5-25. If you need to abort the hot-plug operation, press the attention button again within five seconds.
   - Wait for power LED to turn on.

Note: For either the operating system interface or the hardware hot-plug interface, if the amber attention LED is on, a power fault has occurred. You may need to remove the adapter, wait for the LED to turn off, and re-start the hot insertion.

4. Install the top cover. For instructions, see “Installing the Top Cover” on page 59.

Installing and Removing Non-Hot Swap PCI Express Add-in Cards

This section describes how to reomove or install non-hot swap PCIe add-in cards.

Removing a Non-Hot Swap PCIe Card

PCIe cards in slots 1, 2, 6 and 7 can be hot swapped. If you want to hot swap a card in one of these slots, see “Removing and Installing Hot-Swap PCI Express Add-in Cards” on page 67.

Caution: AC power must be removed from the system before servicing a non-hot swap PCIe card. You might damage your system if you do not power it down before removing or installing a card in slots 3 through 5 and 8 through 10.

1. Remove the top cover. For instructions, see “Removing the Top Cover” on page 58.
2. Disconnect any cables attached to the PCIe card.
3. Rotate the retention latch into the up position, as shown in Figure 5-26.

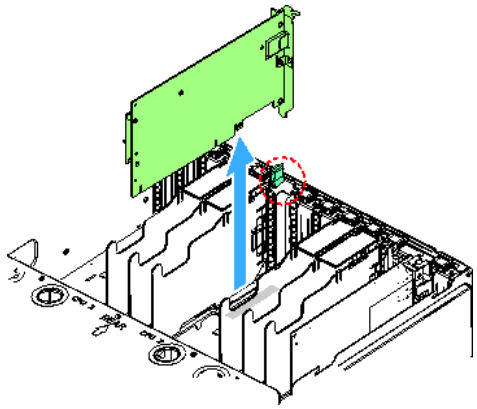


Figure 5-26 Removing a Non-Hot Swap PCIe Card

4. Pull up on the card to remove it.
5. Place the PCIe card on a clean, static-free work surface or inside a static-free plastic bag.
6. To install a replacement PCIe card, see “Installing a Non-Hot Swap PCIe Card” on page 72, otherwise, install a PCIe expansion slot cover.
7. Install the top cover. For instructions, see “Installing the Top Cover” on page 59.

Installing a Non-Hot Swap PCIe Card

PCIe cards in slots 1, 2, 6 and 7 can be hot swapped. If you want to hot swap a card in one of these slots, see “Installing a Hot-Swap PCIe Card” on page 68.

Caution: AC power must be removed from the system before servicing a non-hot swap PCIe card. You might damage your system if you do not power it down before removing or installing a card in slots 3 through 5 and 8 through 10.

1. Remove the top cover. For instructions, see “Removing the Top Cover” on page 58.
2. Being careful not to touch the components or the gold edge connectors on the PCIe card, remove it from its protective wrapper. Place the card component-side up on a clean, static-free work surface.
3. Rotate the retention latch into the up position, item 1, as show in Figure 5-27.

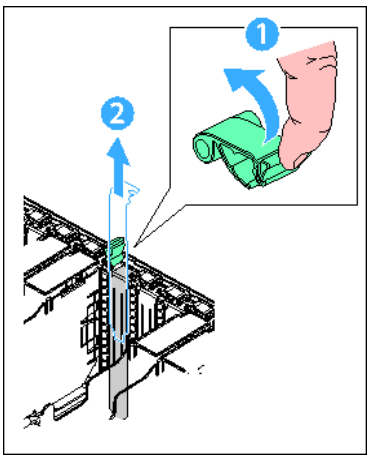


Figure 5-27 Removing a PCIe Expansion Slot Cover

4. If necessary, remove the expansion slot cover in the slot you are using by sliding it up from inside the chassis, item 2, as shown in Figure 5-27.
5. Align and slide the adapter board down until it seats in its connector, item 1, as shown Figure 5-28.

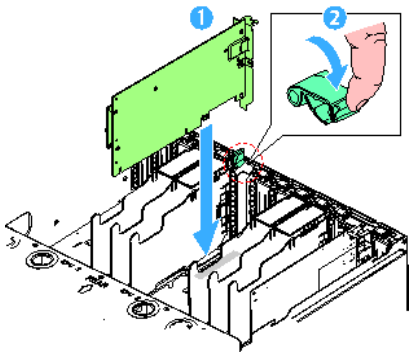


Figure 5-28 Installing a Non-Hot Swap PCIe Card

6. Rotate the retention latch at the rear of the card slot into the down position, item 2, as shown in Figure 5-28.
7. Attach any required cables to the PCIe card.
8. Install the top cover. For instructions, see "Installing the Top Cover" on page 59.

Removing and Installing System Fans

On the SGI Altix UV 10 system, eight cooling fans are located at the front of the chassis; seven for normal operation, with an additional one for redundant operation in the event of fan failure. The top cover must be removed before these fans can be serviced. You can replace a failed cooling fan assembly without turning off the power to the server only if the remaining system fans are fully functional. Each fan assembly uses an amber LED to indicate a failed fan condition. If the amber LED is on, the fan assembly needs to be replaced. The LED remains off during normal operation.

Caution: System cooling is reduced during the fan replacement process. Do not leave a system fan removed for longer than three minutes. Do not touch the fan blades while they are turning.

Removing the Hot-Swap Fan Modules

To remove a hot-swap fan module, perform the following steps:

1. Remove the top cover. For instructions, see “Removing the Top Cover” on page 58.
2. Locate the fan assembly you are replacing. If a fan in the assembly has failed, the amber LED on the fan model lights.
3. Grasp the fan by the finger latches and squeeze together.
4. Lift the fan upward as shown in Figure 5-29.

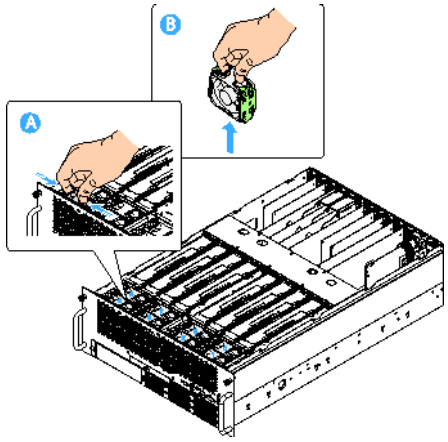


Figure 5-29 Removing a System Fan Module

Installing the Hot-Swap Fan Modules

To install a hot-swap fan module, perform the following steps:

1. Lower the replacement fan into the fan bay as shown in Figure 5-30.
2. Push down on the fan until it clicks into place.

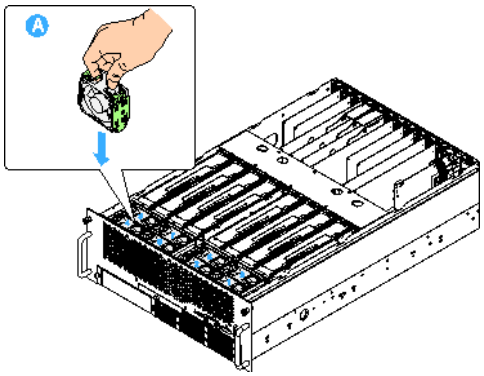


Figure 5-30 Installing a System Fan Module

3. Install the top cover. For instructions, see “Installing the Top Cover” on page 59.

Removing System Fan Modules (non Hot-Swap)

To remove a system fan module, perform the following steps:

1. Power down the system.
2. Remove the top cover. For instructions, see “Removing a Hard Drive Carrier” on page 61.
3. Locate the fan assembly you are replacing. If a fan in the assembly has failed, the amber LED on the fan model lights.
4. Grasp the fan by the finger latches and squeeze together.
5. Lift the fan upward as shown in Figure 5-31.

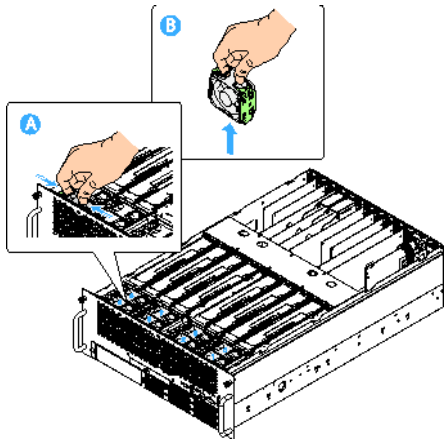


Figure 5-31 Removing the System Fans

Installing the System Fan Modules (non Hot-Swap)

To install a system fan module, perform the following steps:

1. Lower the replacement fan into the fan bay.
2. Push down on the fan until it clicks into place as shown in Figure 5-32.

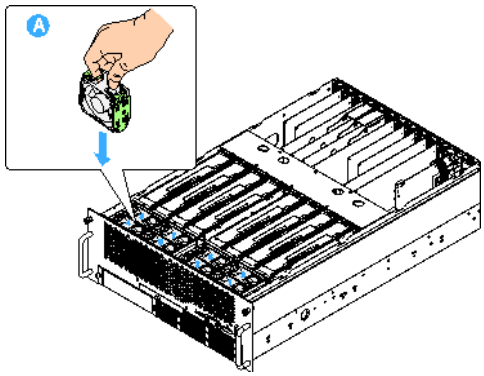


Figure 5-32 Installing the System Fans

3. Install the top cover. For instructions, see “Installing the Top Cover” on page 59.
4. Power up the system.

Hot Swapping Memory Risers

At least one memory riser with two DIMMs must be installed for the system to function. Each of the four CPUs can support one or two memory risers. Each installed CPU must have at least one memory riser present for it to function.

If two memory risers are installed for a CPU, one of the risers may be removed while the system is operating. This allows for the replacement of faulted DIMMs while ensuring continuous operation of the system.

Warning: The CPU must have at least two DIMMS supporting it during hot swap operations.

Removing a Memory Riser

Warning: Memory dividers must be installed at all times during operation for proper airflow

To remove a memory riser, perform the following steps:

1. Remove the top cover. For instructions, see “Removing the Top Cover” on page 58.

Warning: Defective memory risers removed should be directly replaced in exactly the original configuration. Do not hot swap defective memory in a new configuration.

2. Press the Attention button on the Memory Riser. See letter “A” in Figure 5-33. The attention LED blinks for 5 seconds then turns off. Then the power button starts blinking. The power button blinks until all memory has been flushed from the riser. When the power button turns off the Memory Riser is safe to remove.

Note: Pressing the attention button again while the attention LED is flashing cancels the operation.

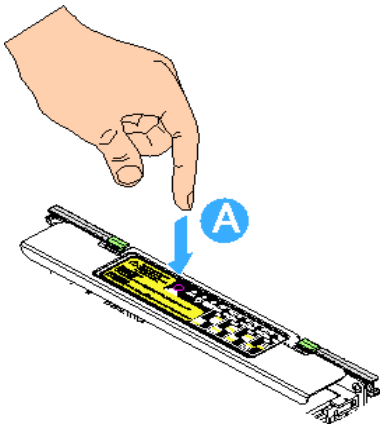


Figure 5-33 Pressing the Memory Riser Attention Button

3. Press the left and right green latches on the memory bracket downward to release the memory bracket levers. See letter “B” in Figure 5-34.
4. Rotate the levers upward to disengage the memory riser from the main board. See letter “C” in Figure 5-34.

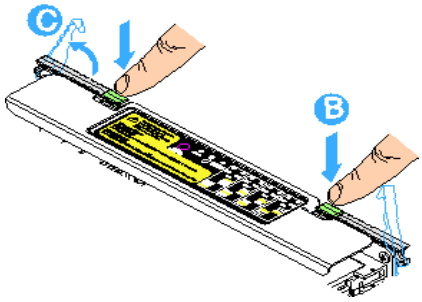


Figure 5-34 Releasing a Memory Riser

5. Lift the memory riser by the levers of the memory bracket to pull it from the server as shown in Figure 5-35.
6. Ensure the fan zone airflow configuration is correct, install or remove a memory air baffle if necessary. For instructions, see “Installing and Removing Memory Air Baffles” on page 80.

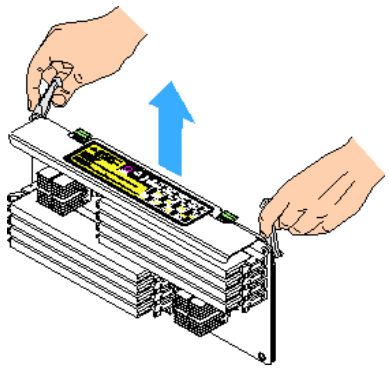


Figure 5-35 Removing a Memory Riser

Installing a Memory Riser

To remove a memory riser, perform the following steps:

Warning: When adding new memory, obey the memory population rules. See “Supported Memory Configurations” on page 83.

1. Ensure the levers on the memory bracket are in the open / up position.
2. Align the edges of the bracket in the bracket guides and slide the memory riser into the main board as shown in Figure 5-36.

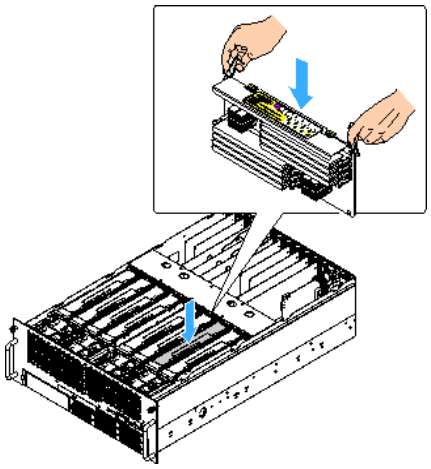


Figure 5-36 Installing a Memory Riser

3. Once the board is lowered as far as possible, rotate the levers downward so they latch into place to firmly engage the board into the memory riser slot.
4. Press the attention button. The attention LED and the power LED start blinking. When the attention LED turns off and the power LED turns solid the system has finished adding the memory riser.
5. Ensure the fan zone airflow configuration is correct, installing or removing a memory airflow baffle if necessary. For instructions, see “Installing and Removing Memory Air Baffles” on page 80.
6. Install the top cover. For instructions, see “Installing the Top Cover” on page 59.

Installing and Removing Memory Air Baffles

Each front fan has an internal fan zone comprising of two memory slots. See Figure 5-37. For proper airflow each fan zone must have one of three configurations:

- Two memory risers
- One memory riser and one memory air baffle
- Two air baffles

Installing a Memory Air Baffle

Install a memory air baffle when a fan zone has one memory riser (only). To install a memory air baffle, perform the following steps:

1. Remove the top cover. For instructions, see “Removing the Top Cover” on page 58.
2. Place the bottom of the memory air baffle into the slot.as shown in Figure 5-37.
3. Push the top of the air baffle into the slot till it latches in place.

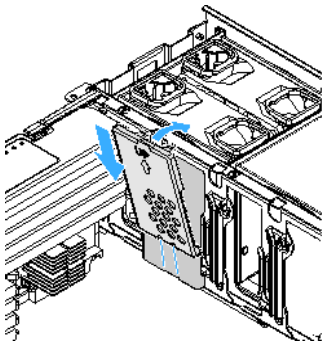


Figure 5-37 Installing a Memory Air Baffle

4. Install the top cover. For instructions, see “Installing the Top Cover” on page 59.

Removing a Memory Air Baffle

Remove a memory air baffle when a fan zone has two memory risers installed. To remove a memory air baffle, perform the following steps:

1. Remove the top cover. For instructions, see “Removing the Top Cover” on page 58.
2. Press down on the tab at the top of the memory air baffle to release it as shown in Figure 5-38.
3. Lift the memory air baffle out of the system.
4. Install the top cover. For instructions, see “Installing the Top Cover” on page 59.

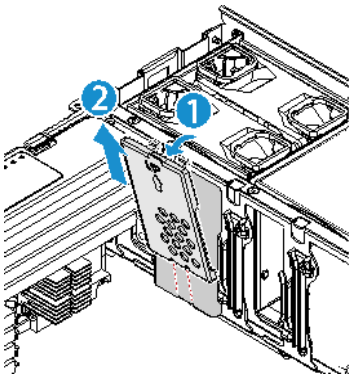


Figure 5-38 Removing a Memory Air Baffle

Installing and Removing DIMMs

Memory is contained on memory risor cards that are called in-line memory modules (DIMMs). DIMMs are installed one per DIMM slot.

Memory Riser DIMM Slot Locations

Each memory riser contains 8 DIMM slots with the designations shown Figure 5-39.

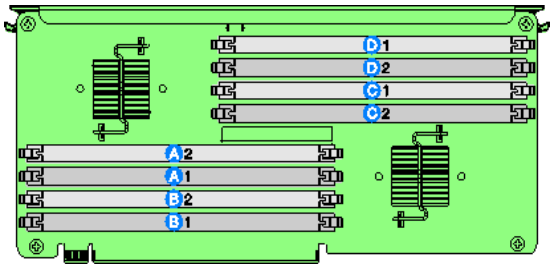


Figure 5-39 Memory Riser DIMM Locations

Supported Memory Configurations

The SGI Altix UV 10 system ships with two memory risers and can have 16, 32, or 64 total DIMMs.

Installing DIMMs

Caution: Use extreme care when installing a DIMM. Applying too much pressure can damage the connector. DIMMs are keyed and can be inserted in only one way.

- Hold DIMMs only by the edges. Do not touch the components or gold edge connectors.
- Install DIMMs with gold-plated edge connectors only.
- The maximum allowable DIMM height is 3 cm; do not install DIMMs that exceed this height

To install DIMMs, perform the following steps:

1. Remove the top cover. For instructions, see “Removing the Top Cover” on page 58.
2. Remove the memory riser. For instructions, see “Removing a Memory Riser” on page 77.
3. Open the plastic levers on each end of the DIMM socket(s) as shown in Figure 5-40.

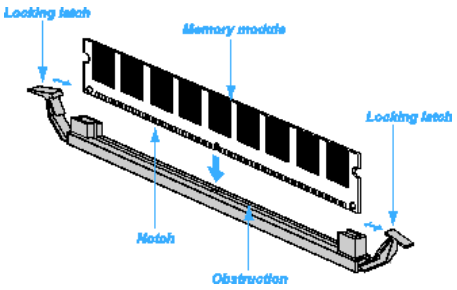


Figure 5-40 Install a DIMM

4. Remove the DIMM from its antistatic container. Hold the DIMM only by the edges. Do not touch the components or gold edge connectors.
5. Install DIMMs in the correct order.

6. Position the DIMM above the socket. Align the notch on the bottom edge of the DIMM with the key in the DIMM socket.
7. Insert the bottom edge of the DIMM into the socket.
8. Push down on the top edge of the DIMM. The levers at each end of the DIMM socket close. Make sure the levers close securely.
9. Install the top cover. For instructions, see “Installing the Top Cover” on page 59.

Removing DIMMs

Caution: Use extreme care when removing DIMMs. Too much pressure can damage the connector. Apply only enough pressure on the plastic levers to release the DIMM.

1. Remove the top cover. For instructions, see “Removing the Top Cover” on page 58.
2. Remove the memory riser. For instructions, see “Removing a Memory Riser” on page 77
3. Open the plastic levers on each end of the DIMM socket(s) as shown in Figure 5-40. The DIMM lifts from the socket.
4. Remove the DIMM holding the DIMM only by the edges. Do not touch the DIMM components or the gold edge connectors. Store it in an antistatic bag.
5. Install replacement DIMMs if necessary. For instructions, see “Installing DIMMs” on page 83.
6. Install the memory riser. For instructions, see “Installing a Memory Riser” on page 79.

Warning: Warning Memory riser dividers must be installed at all times during operation for proper airflow.

7. Install the top cover. For instructions, see “Installing the Top Cover” on page 59

BIOS

This chapter describes the AMI BIOS Setup Utility for the SGI Altix UV 10 system.

Splash Logo / Diagnostic Screen

The Logo / Diagnostic Screen appear in one of two forms:

- If Quiet Boot is enabled in the BIOS setup, a logo splash screen is displayed. By default, Quiet Boot is enabled in the BIOS setup. If the logo is displayed during POST, press <Esc> to hide the logo and display the diagnostic screen.
- · If a logo is not present in the flash ROM, or if Quiet Boot is disabled in the system configuration, the summary and diagnostic screen is displayed.

The diagnostic screen displays the following information:

- ·BIOS ID.
- Platform name.
- Total memory detected (Total size of all installed DDR3 DIMMs).
- Processor information (Intel branded string, speed, and number of physical processors identified).
- Keyboards detected, if plugged in.
- Mouse devices detected, if plugged in.

BIOS Boot Popup Menu

The BIOS Boot Specification (BBS) provides a Boot pop-up menu that can be invoked by pressing the <F6> key during POST. The BBS pop-up menu displays all available boot devices. The list order in the pop-up menu is not the same as the boot order in BIOS setup; the pop-up menu simply

lists all of the bootable devices from which the system can be booted, and allows a manual selection of the desired boot device.

When an Administrator password is installed in the Setup, the Administrator password will be required in order to access the Boot pop-up menu using the <F6> key. If a User password is entered, the Boot pop-up menu will not even appear – the user will be taken directly to the Boot Manager in the Setup, where a User password allows only booting in the order previously defined by the Administrator.

BIOS Setup Utility

The BIOS Setup utility is a text-based utility that allows the user to configure the system and view current settings and environment information for the platform devices. The Setup utility controls the platform's built-in devices, the boot manager, and error manager.

The BIOS Setup interface consists of a number of pages or screens. Each page contains information or links to other pages. The advanced tab in Setup displays a list of general categories as links. These links lead to pages containing a specific category‘s configuration.

The following sections describe the look and behavior for the platform setup.

Operation

The BIOS Setup has the following features:

- Localization - The BIOS Setup uses the Unicode standard and is capable of displaying setup forms in all languages currently included in the Unicode standard. The Intel® Server Board BIOS is only available in English.
- Console Redirection - The BIOS Setup is functional via console redirection over various terminal emulation standards. This may limit some functionality for compatibility, for example, usage of colors or some keys or key sequences or support of pointing devices.

Page Layout

The setup page layout is sectioned into functional areas. Each occupies a specific area of the screen and has dedicated functionality. The following table lists and describes each functional area.

Table 6-1 BIOS Setup Page Layout

Functional Area	Description
Title Bar	The title bar is located at the top of the screen and displays the title of the form (page) the user is currently viewing. It may also display navigational information.
Setup Item List	The Setup Item List is a set of controllable and informational items. Each item in the list occupies the left column of the screen. A Setup Item may also open a new window with more options for that functionality on the board.
Item Specific Help Area	The Item specific Help area is located on the right side of the screen and contains help text for the highlighted Setup Item. Help information may include the meaning and usage of the item, allowable values, effects of the options, etc.
Keyboard Command Bar	The Keyboard Command Bar is located at the bottom right of the screen and continuously displays help for keyboard special keys and navigation keys.

Entering BIOS Setup

To enter the BIOS Setup, press the <F2> function key during boot time when the OEM or Intel logo is displayed. The following message is displayed on the diagnostics screen and under the Quiet Boot logo screen:

Press <F2> to enter setup

When the Setup is entered, the Main screen is displayed. However, serious errors cause the system to display the Error Manager screen instead of the Main screen.

Keyboard Commands

The bottom right portion of the Setup screen provides a list of commands that are used to navigate through the Setup utility. These commands are displayed at all times.

Each Setup menu page contains a number of features. Each feature is associated with a value field, except those used for informative purposes. Each value field contains configurable parameters. Depending on the security option chosen and in effect by the password, a menu feature‘s value may or may not be changed. If a value cannot be changed, its field is made inaccessible and appears grayed out.

Table 6-2 BIOS Setup—Keyboard Command Bar

Key	Option	Description
<Enter>	Execute Command	The <Enter> key is used to activate submenu when the selected feature is a submenu, or to display a pick list if a selected option has a value field, or to select a subfield for multi-valued features like time and date. If a pick list is displayed, the <Enter> key selects the currently highlighted item, undoes the pick list, and returns the focus to the parent menu.
<Esc>	Exit	The <Esc> key provides a mechanism for backing out of any field. When the <Esc> key is pressed while editing any field or selecting features of a menu, the parent menu is re-entered. When the <Esc> key is pressed in any submenu, the parent menu is re-entered. When the <Esc> key is pressed in any major menu, the exit confirmation window is displayed and the user is asked whether changes can be discarded. If No is selected and the <Enter> key is pressed, or if the <Esc> key is pressed, the user is returned to where they were before <Esc> was pressed, without affecting any existing settings. If Yes is selected and the <Enter> key is pressed, the setup is exited and the BIOS returns to the main System Options Menu screen.
-	Select Item	The up arrow is used to select the previous value in a pick list, or the previous option in a menu item's option list. The selected item must then be activated by pressing the <Enter> key.
-	Select Item	The down arrow is used to select the next value in a menu items option list, or a value fields pick list. The selected item must then be activated by pressing the <Enter> key.
´	Select Menu	Te left and right arrow keys are used to move between the major menu pages. The keys have no effect if a sub-menu or pick list is displayed.
<Tab>	Select Field	The <Tab> key is used to move between fields. For example, <Tab> can be used to move from hours to minutes in the time item in the main menu.
-	Change Value	The minus key on the keypad is used to change the value of the current item to the previous value. This key scrolls through the values in the associated pick list without displaying the full list.

Table 6-2 BIOS Setup—Keyboard Command Bar **(continued)**

Key	Option	Description
+	Change Value	The plus key on the keypad is used to change the value of the current menu item to the next value. This key scrolls through the values in the associated pick list without displaying the full list. On 106-key Japanese keyboards, the plus key has a different scan code than the plus key on the other keyboards, but will have the same effect.
<F9>	Setup Defaults	Pressing the <F9> key causes the following to display: Load Optimized Defaults? Yes No If Yes is highlighted and <Enter> is pressed, all Setup fields are set to their default values. If No is highlighted and <Enter> is pressed, or if the <Esc> key is pressed, the user is returned to where they were before <F9> was pressed without affecting any existing field values.

Menu Selection Bar

The Menu selection bar is located at the top of the BIOS Setup Utility screen. It displays the major menu selections available to the user. By using the left and right arrow keys, the user can select the listed menus. Some menus are hidden and become available by scrolling to the left or right of the current selection.

BIOS Setup Utility Screens

The following sections describe the screens available for the configuration of a server platform.

In these sections, tables describe the contents of each screen. These tables follow the following guidelines:

- The text and values in the Setup Item, Options, and Help Text columns displayed on the BIOS Setup screens.
- In the Options column, the default values are displayed in bold. These values do not appear in bold on the BIOS Setup screen. The bold text in this document is to serve as a reference point.
- The Comments column provides additional information where it may be helpful. This information does not appear on the BIOS Setup screens.

- Information enclosed in angular brackets (< >) in the screen shots identifies text that can vary, depending on the option(s) installed. For example <Current Date> is replaced by the actual current date.
- Information enclosed in square brackets ([ ]) in the tables identifies areas where the user must type in text instead of selecting from a provided option.
- Whenever information is changed (except Date and Time), the system requires a save and reboot to take place. Pressing <ESC> discards the changes and boots the system according to the boot order set from the last boot.

Main Screen

The Main screen is the first screen that appears when the BIOS Setup is entered, unless an error has occurred. If an error has occurred, the Error Manager screen appears instead.

Figure 6-1 Setup Utility—Main Screen

Table 6-3 Setup Utility—Main Screen Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Logged in as:			Information only. Displays password level that setup is running in: Administrator or User. With no passwords set, Administrator is the default mode.
Platform ID			Information only. Displays the Platform ID.
System BIOS			
Version			Information only. Displays the current BIOS version. xx = major version yy = minor version zzzz = build number
Build Date			Information only. Displays the current BIOS build date.
Memory			
Size			Information only. Displays the total physical memory installed in the system, in MB or GB. The term physical memory indicates the total memory discovered in the form of installed DDR3 DIMMs.
Quiet Boot	**Enabled** Disabled	[Enabled] Display the logo screen during POST. [Disabled] Display the diagnostic screen during POST.	

Table 6-3 Setup Utility—Main Screen Fields **(continued)**

Setup Item	Options (Default in Boldface)	Help Text	Comments
POST Error Pause	Enabled **Disabled**	[Enabled] Go to the Error Manager for critical POST errors. [Disabled] Attempt to boot and do not go to the Error Manager for critical POST errors.	If enabled, the POST Error Pause option takes the system to the error manager to review the errors when major errors occur. Minor and fatal error displays are not affected by this setting.
System Date	[Day of week MM/DD/YYYY]	System Date has configurable fields for Month, Day, and Year. Use [Enter] or [Tab] key to select the next field. Use [+] or [-] key to modify the selected field.	
System Time	[HH:MM:SS]	System Time has configurable fields for Hours, Minutes, and Seconds. Hours are in 24-hour format. Use [Enter] or [Tab] key to select the next field. Use [+] or [-] key to modify the selected field.	

Advanced Screen

The Advanced screen provides an access point to configure several options. On this screen, you can select the option to be configured. Configurations are performed on the selected screen, and not directly on the Advanced screen.

To access this screen from the Main screen, press the right arrow until the Advanced screen is selected.

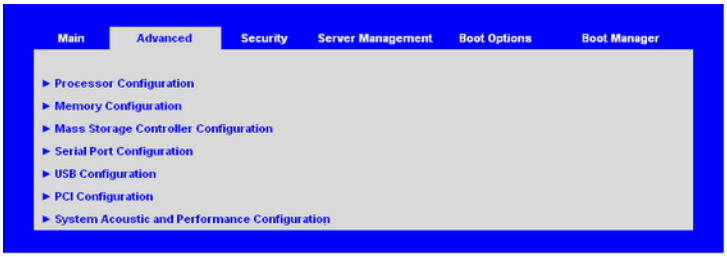


Figure 6-2 Setup Utility—Advanced Screen

Table 6-4 Setup Utility—Advanced Screen Fields

Setup Item	Options	Help Text	Comments
Processor Configuration		View/Configure processor information and settings.	
Memory Configuration		View/Configure memory information and settings.	
Mass Storage Controller Configuration		View/Configure mass storage controller information and settings.	
Serial Port Configuration		View/Configure serial port information and settings.	
USB Configuration		View/Configure USB information and settings.	
PCI Configuration		View/Configure PCI information and settings.	
System Acoustic and Performance Configuration		View/Configure system acoustic and performance information and settings.	

Processor Configuration Screen

The Processor configuration screen allows you to view the processor core frequency and system bus frequency and to enable or disable several processor options. This screen also allows the user to view information about a specific processor.

To access this screen from the Main screen, select **Advanced** > **Processor**.

Figure 6-3 Setup Utility—Processor Configuration Screen

Table 6-5 Setup Utility—Processor Configuration Screen Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Processor ID			Information only. Processor CPUID
Processor Frequency			Information only. Current frequency of the processor.
Core Frequency			Information only. Frequency at which the processors are currently running.
Microcode Revision			Information only. Revision of the loaded microcode.

Table 6-5 Setup Utility—Processor Configuration Screen Fields **(continued)**

Setup Item	Options (Default in Boldface)	Help Text	Comments
L1 Cache RAM			Information only. Size of the Processor L1 Cache.
L2 Cache RAM			Information only. Size of the Processor L2 Cache
L3 Cache RAM			Information only. Size of the Processor L3 Cache.
CPU Status			Information only. Indicates whether this CPU is online, or selected as spare.
Processor 1 Version			Information only. ID string from the Processor.
Processor 2 Version			Information only. ID string from the Processor.
Processor 3 Version			Information only. ID string from the Processor.
Processor 4 Version			Information only. ID string from the Processor.
Current Intel QPI Link Speed			Information only. Current speed that the QPI Link is using.
IntelQPI Link Frequency			Information only. Current frequency that the QPI Link is using.

Table 6-5 Setup Utility—Processor Configuration Screen Fields **(continued)**

Setup Item	Options (Default in Boldface)	Help Text	Comments
Intel QPI Frequency Select	**Auto Max** 4.8 GT/s 5.866 GT/s 6.4 GT/s	Allows for selecting the IOH Intel(R) QuickPath Interconnect Frequency. Recommended to leave in [Auto Max] so that BIOS can match the processor and IOH Intel QuickPath Interconnect frequencies. Set to [Auto Strap] to force processor to force processor to the IOH strapped frequency. If not strapped, then [Auto Max] frequency will be used.	
Intel Turbo Boost Technology	**Enabled** Disabled	Intel Turbo Boost Technology allows the processor to automatically increase its frequency if it is running below power, temperature, and current specifications.	This option is only visible if all processors in the system have Intel Turbo Boost Technology available.
Enhanced Intel SpeedStep Technology	**Enabled** Disabled	Enhanced Intel SpeedStep Technology allows the system to dynamically adjust processor voltage and core frequency, which can result in decreased average power consumption and decreased average heat production. Contact your OS vendor regarding OS support of this s feature.	
CPU C State	Enabled **Disabled**	Significantly reduces the power of the processor during idle periods. Contact your OS vendor regarding OS support of this feature.	
Intel Hyper-Threading Technology	**Enabled** Disabled	Intel Hyper-Threading Technology allows multithreaded software applications to execute threads in parallel within each processor. Contact your OS vendor regarding OS support of this feature.	

Table 6-5 Setup Utility—Processor Configuration Screen Fields **(continued)**

Setup Item	Options (Default in Boldface)	Help Text	Comments
Actice Processor Cores	1,..,255	Each bit position represents a core to be enabled in each processor package.	
Execute Disable Bit	**Enabled** Disabled	Execute Disable Bit can help prevent certain classes of malicious buffer overflow attacks. Contact your OS vendor regarding OS support of this feature.	
Intel Virtualization Technology	Enabled **Disabled**	Intel Virtualization Technology allows a platform to run multiple operating systems and applications in independent partitions. Note: A change to this option requires the system to be powered off and then back on before the setting takes effect.	
Intel Virtualization Technology for Directed I/O	Enabled **Disabled**	Enable/Disable Intel Virtualization Technology for Directed I/O (Intel VT-d). Report the I/O device assignment to VMM through DMAR AC Tables.	
Interrupt Remapping	**Enabled** Disabled	Enable/Disable Intel VT-d Interrupt Remapping support.	This option only appears when Intel Virtualization Technology for Directed I/O is enabled.
Coherency Support	Enabled **Disabled**	Enable/Disable Intel VT-d Coherency support.	This option only appears when Intel Virtualization Technology for Directed I/O is enabled.
ATS Support	**Enabled** Disabled	Enable/Disable Intel VT-d Address Translation Services (ATS) support.	This option only appears when Intel Virtualization Technology for Directed I/O is enabled.

Table 6-5 Setup Utility—Processor Configuration Screen Fields **(continued)**

Setup Item	Options (Default in Boldface)	Help Text	Comments
Pass-through DMA Support	**Enabled** Disabled	Enable/Disable Intel VT-d Pass-through DMA support.	This option only appears when Intel Virtualization Technology for Directed I/O is enabled.
Hardware Prefetcher	**Enabled** Disabled	Hardware Prefetcher is a speculative prefetch unit within the processor(s). Note: Modifying this setting may affect system performance.	
Adjacent Cache Line Prefetch	**Enabled** Disabled	[Enabled] - Cache lines are fetched in pairs (even line + odd line). [Disabled] - Only the current cache line required is fetched. Note: Modifying this setting may affect system performance.	
Direct Cache Access (DCA)	**Enabled** Disabled	Allows processors to increase the I/O performance by placing data from I/O devices directly into the processor cache.	
NMI on Fatal Errors	**Disabled** Enabled	When enabled, causes NMI to be the preferred mode of halting OS instead of the default Machine Check mode.	

Memory Configuration Screen

The Memory configuration screen allows you to view details about the system memory DDR3 DIMMs that are installed. This screen also allows you to open the Configure Memory RAS and Performance screen.

To access this screen from the Main screen, select **Advanced** > **Memory**.

Figure 6-4 Setup Utility—Memory Configuration Screen

Table 6-6 Setup Utility—Memory Configuration Screen Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Total Memory			Information only. The amount of memory available in the system in the form of installed DDR-3 DIMMs, in units of MB or GB.
Effective Memory			Information only. The amount of memory available to the OS in MB or GB. The Effective Memory is the difference between Total Physical Memory and the sum of all memory reserved for internal usage, RAS redundancy and SMRAM. This difference includes the sum of all DDR-3 DIMMs that failed Memory BIST during POST, or were disabled by the BIOS during memory discovery phase in order to optimize memory configuration.
Current Configuration	**Maximum Performance** Mirroring Sparing		Information only. Displays one of the following: - Max Performace Mode: System memory is configured for max performance. - Mirror Mode: System memory is configured for maximum reliability in the form of memory mirroring. - Sparing Mode: System memory is configured for RAS with optimal effective memory.

Table 6-6 Setup Utility—Memory Configuration Screen Fields **(continued)**

Setup Item	Options (Default in Boldface)	Help Text	Comments
Current Memory Speed			Information only. Displays speed the memory is running at.
Memory RAS and Performance Configuration		Configure memory RAS (Reliability, Availability, and Serviceability) and view current memory performance information and settings.	Select to configure the memory RAS and performance. This takes the user to a different screen.

Configure Memory RAS and Performance Screen

The Configure Memory RAS and Performance screen allows you to customize several memory configuration options, such as whether to use Memory Mirroring or Memory Sparing.

To access this screen from the Main screen, select **Advanced** > **Memory** > **Configure Memory RAS and Performance**.

Figure 6-5 Setup Utility—Configure Memory and RAS and Performance Screen

Table 6-7 Setup Utility—Configure Memory RAS and Performance Screen Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Memory Mirroring Possible	Yes / No		Information only. Specifies if mirroring is possible.
Memory DIMM Sparing Possible	Yes / No		Information only: Specifies if DIMM sparing is possible.

Table 6-7 Setup Utility—Configure Memory RAS and Performance Screen Fields **(continued)**

Setup Item	Options (Default in Boldface)	Help Text	Comments
Select Memory RAS Configuration	**Maximum Performance** Mirroring Sparing	Available modes depend on the current memory population. [Maximum Performance] - Optimizes system performance. [Mirroring] - Optimizes reliability by using half of physical memory as a backup. Sparing] - Improves reliability by reserving memory for use as a replacement in the event of DIMM failure.	
Mirroring Mode	**Inter-Socket Mirroring** Intra-Socket Mirroring	Mirroring is supported across Integrated Memory Controllers where one memory riser is mirrored with another. [Inter-Socket Mirroring] - IMC is mirrored across two sockets. [Intra-Socket Mirroring] - IMC is mirrored with the other IMC in the same socket.	Appears when Mirroring is selected in RAS configuration. And Hemisphere mode is disabled.
Sparing Mode	**DIMM Sparing** Rank Sparing	Select Sparing Mode to use spare DIMM or Rank within the Integrated Memory Controller on a memory riser.	Appears when Sparing is selected in RAS configuration.
NUMA Optimized	Enabled **Disabled**	If enabled, BIOS includes ACPI tables that are required for NUMA aware Operating Systems.	
Memory Interleaving	none **2 Way** 4 Way 8 Way	Enable/Disable memory interleaving. NUMA setting is required for Memory RAS.	
Hemisphere	Enabled **Disabled**	Enable/Disable Hemisphere Mode.	

Table 6-7 Setup Utility—Configure Memory RAS and Performance Screen Fields **(continued)**

Setup Item	Options (Default in Boldface)	Help Text	Comments
Memory Hot Plug	Enabled **Disabled**	Enable/Disable Memory Hot Plug.	
Memory Hot Plug Base	Auto 512G **1024G**	Set memory hot plug mapping base in system.	
Memory Hot Plug Length	64G **128G**	Set memory hot plug mapping length for each board.	
SRAT Memory Hot Plug	**Enabled** Disabled	Fix for OS that does not support memory hot plug. Ex: SuSE SLES10 SP2. Enable by default. Disable will clear all hot plug bits and remove the hot plug entries in SRAT table.	

Memory Board Information Screens

The Memory Board Information screen allows you to view the status of each memory riser in the system.

When a DIMM fails during BIST (Early POST - MRC) all four DIMMs in the lock-step DDR3 Channel Pair will be disabled. This is due to DDR3 Channel Failure & Lock-step.

Figure 6-6 Setup Utility—Memory Board Information Screens

Table 6-8 Setup Utility—Memory Board Information Screen Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Board Status			Note: X denotes the Board ID from A-H. Indicates the status of the board.
DIMM_ XY			Displays the state of each DIMM socket present on the board. Each DIMM socket field reflects one of the following possible states: - Installed: There is a DDR3DIMM installed in this slot. - Not Installed: There is no DDR3 DIMM installed in this slot. - Disabled: The DDR3 DIMM installed in this slot has been disabled by the BIOS in order to optimize memory configuration. - Failed: The DDR3 DIMM installed in this slot is faulty /malfunctioning. - Spare Unit: The DDR3 DIMM is functioning as a spare unit for memory RAS purposes. - Mirror Unit: The DDR3 DIMM is functioning as a mirror unit for memory RAS purposes. Note: X denotes the Board identifier <A-H>.

Mass Storage Controller Configuration Screen

The Mass Storage configuration screen allows you to configure the SATA/SAS controller when it is present on the baseboard, midplane or backplane of an Intel system.

To access this screen from the Main menu, select **Advanced** > **Mass Storage**.

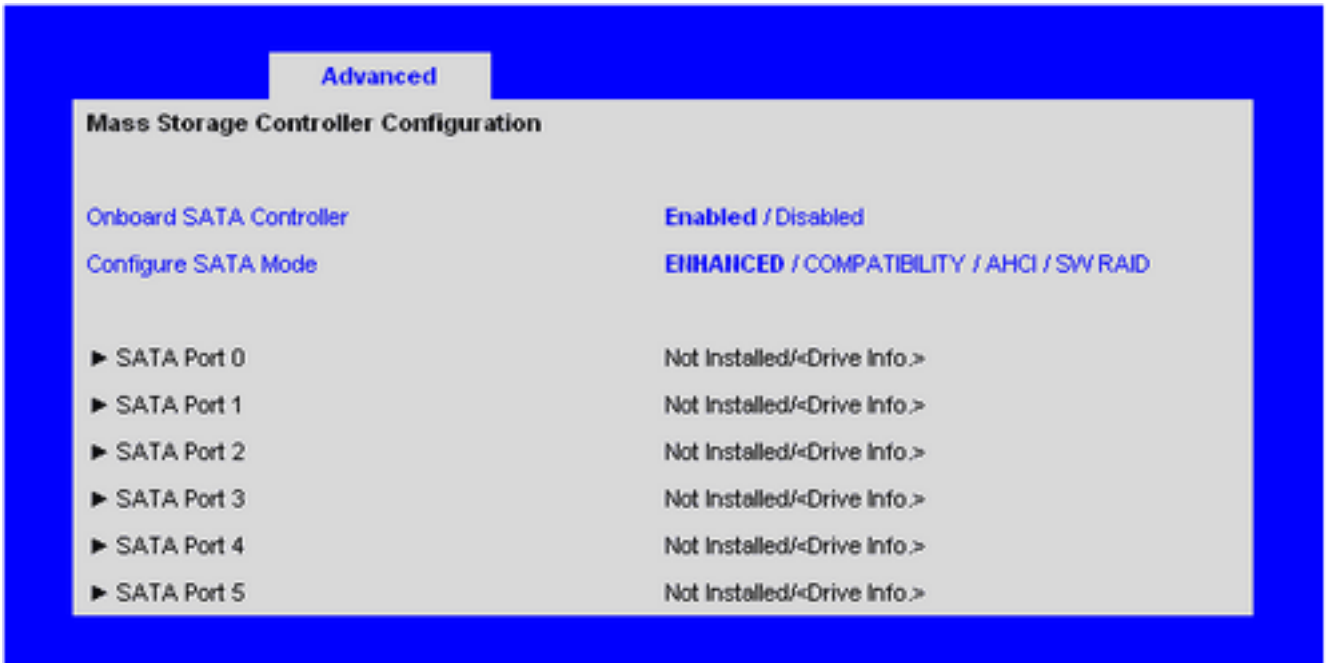


Figure 6-7 Setup Utility—Mass Storage Controller Configuration Screen

Table 6-9 Setup Utility—Mass Storage Controller Configuration Screen Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Onboard SATA Controller	**Enabled** Disabled	On-board Serial ATA (SATA) controller.	
SATA Mode	**ENHANCED** COMPATIBILITY AHCI SW RAID	[ENHANCED] - Supports up to six SATA ports with IDE Native Mode. [COMPATIBILITY] - Supports up to four SATA ports[0/1/2/3] with IDE Legacy mode and two SATA ports[4/5] with IDE Native Mode. [AHCI] - Supports all SATA ports using the Advanced Host Controller Interface. [SW RAID] - Supports configuration of SATA ports for RAID via RAID configuration software.	This field does not appear when the Onboard SATA Controller is disabled. Changing this setting requires a reboot before HDD boot order can be set. [SW RAID] option is unavailable when EFI Optimized Boot is enabled, since SW RAID can only be used in Legacy Boot mode.
SATA Port 0	< Not Installed / Drive information>		Information only. This field is unavailable when RAID Mode is enabled.
SATA Port 1	< Not Installed / Drive information>		Information only. This field is unavailable when RAID Mode is enabled.
SATA Port 2	< Not Installed / Drive information>		Information only. This field is unavailable when RAID Mode is enabled.
SATA Port 3	< Not Installed / Drive information>		Information only. This field is unavailable when RAID Mode is enabled.

Table 6-9 Setup Utility—Mass Storage Controller Configuration Screen Fields **(continued)**

Setup Item	Options (Default in Boldface)	Help Text	Comments
SATA Port 4	< Not Installed / Drive information>		Information only. This field is unavailable when RAID Mode is enabled.
SATA Port 5	< Not Installed / Drive information>		Information only. This field is unavailable when RAID Mode is enabled.

Serial Port Configuration Screen

The Serial Ports Configuration screen allows you to configure the Serial A [COM 1] and Serial B [COM2] ports.

To access this screen from the Main screen, select **Advanced** > **Serial Port**.

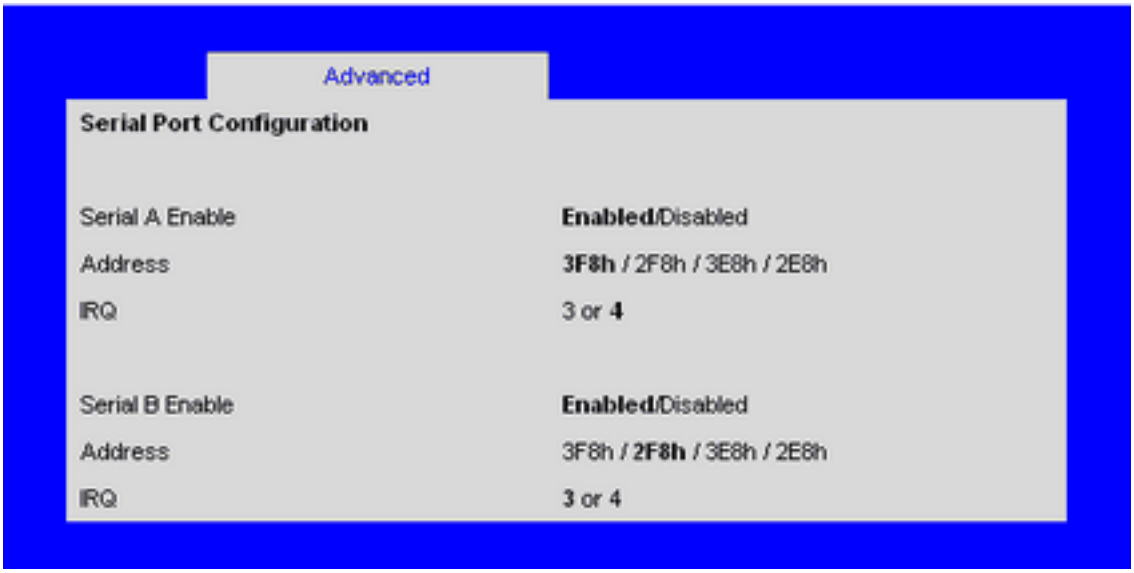


Figure 6-8 Setup Utility—Serial Port Configuration Screen

Table 6-10 Setup Utility—Serial Port Configuration Screen Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Serial A Enable	**Enabled** Disabled	Enable or Disable Serial port A.	
Address	**3F8h** 2F8h 3E8h 2E8h	Select Serial port A base I/O address.	
IRQ	3 **4**	Select Serial port A interrupt request (IRQ) line.	
Serial B Enable	**Enabled** Disabled	Enable or Disable Serial port B.	

Table 6-10 Setup Utility—Serial Port Configuration Screen Fields **(continued)**

Setup Item	Options (Default in Boldface)	Help Text	Comments
Address	3F8h **2F8h** 3E8h 2E8h	Select Serial port B base I/O address.	
IRQ	**3** 4	Select Serial port B interrupt request (IRQ) line.	

USB Configuration Screen

The USB Configuration screen allows you to configure the USB controller options.

To access this screen from the Main screen, select **Advanced** > **USB Configuration**.

Figure 6-9 Setup Utility—USB Configuration Screen

Table 6-11 Setup Utility—USB Controller Configuration Screen Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Detected USB Devices			Information only. This field displays number of USB devices in the system.
USB Controller	**Enabled** Disabled	[Enabled] - All on-board USB controllers are turned on and accessible by the OS. [Disabled] - All on-board USB controllers are turned off and inaccessible by the OS.	
Legacy USB Support	**Enabled** Disabled	Auto USB device boot support and PS/2 emulation for USB keyboard and USB mouse devices. [Auto] - Legacy USB support is enabled if a USB device is attached.	This field is grayed out if the USB Controller is disabled.

Table 6-11 Setup Utility—USB Controller Configuration Screen Fields **(continued)**

Setup Item	Options (Default in Boldface)	Help Text	Comments
Port 60/64 Emulation	**Enabled** Disabled	I/O port 60h/64h emulation support. Note: This may be needed for legacy USB keyboard support when using an OS that is USB unaware.	This field is grayed out if the USB Controller is disabled.
Make USB Devices Non-Bootable	Enabled **Disabled**	Exclude USB in Boot Table. [Enabled] - This removes all USB Mass Storage devices as Boot options. [Disabled] - This allows all USB Mass Storage devices as Boot options.	This field is grayed out if the USB Controller is disabled.
Device Reset timeout	10 sec **20 sec** 30 sec 40 sec	USB Mass Storage device Start Unit command timeout. Setting to a larger value provides more time for a mass storage device to be ready, if needed.	This field is grayed out if the USB Controller is disabled.
<One line per device>	**Auto** Floppy Forced FDD Hard Disk CD-ROM	[Auto] - USB devices less than 530 MB are emulated as floppies. [Forced FDD] - HDD formatted drive are emulated as a FDD (for example, ZIP drive).	This field is hidden if no USB Mass storage devices are installed. This field is grayed out if the USB Controller is disabled. This setup screen can show a maximum of eight devices on this screen. If more than eight devices are installed in the system, the USB Devices Enabled will show the correct count, but only the first eight devices can be displayed here.
USB 2.0 controller	**Enabled** Disabled	On-board USB ports are enabled to support USB 2.0 mode. Contact your OS vendor regarding OS support of this feature.	This field is grayed out if the USB Controller is disabled.

PCI Configuration Screen

The PCI Configuration Screen allows you to configure the PCI add-in cards, onboard NIC controllers, and video options.

To access this screen from the Main screen, select **Advanced** > **PCI**.

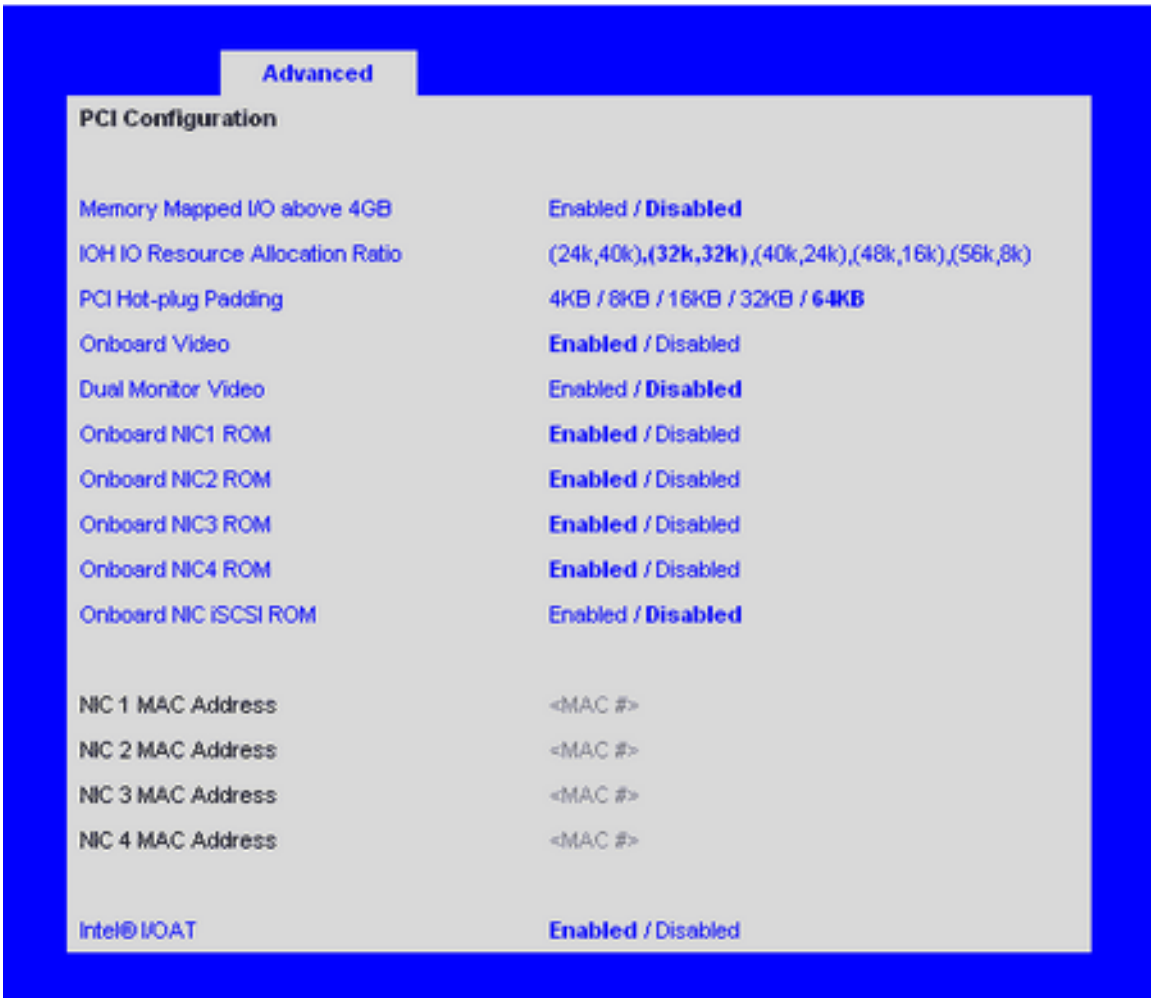


Figure 6-10 Setup Utility—PCI Configuration Screen

Table 6-12 Setup Utility—PCI Configuration Screen Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Memory Mapped I/O above 4GB	Enabled **Disabled**	Enable or disable memory mapped I/O of64-bit PCI devices to 4 GB or greater address space.	
IOH IO Resource Allocation Ratio	IOH0:24k,IOH1:40k IOH0:32k,IOH1:32k IOH0:40k,IOH1:24k IOH0:48k,IOH1:16k IOH0:56k,IOH1:8k	Distribute IO resource (of total 64k) between IOH0 and IOH1 as per your system requirement.	Value of IO resource (of total 64k) between IOH0 and IOH1 will be 40k: 24k in Manufacturing Mode.
PCI Hot-plug Padding	4KB 8KB 16KB 32KB **64KB**	Select the amount of space pre-initialized and reserved for PCI Express Hot-added devices.	
Onboard Video	**Enabled** Disabled	On-board video controller. Warning: System video is completely disabled if this option is disabled and an add-in video adapter is not installed.	When disabled, the system requires an add- in video card in order for the video to be seen.
Dual Monitor Video	Enabled **Disabled**	If enabled, both the onboard video controller and an add-in video adapter are enabled for system video. The on-board video controller becomes the primary video device.	
Onboard NIC1 ROM	**Enabled** Disabled	If enabled, loads the embedded option ROM for the on-board network controllers. Warning: If [Disabled] is selected, NIC1 cannot be used to boot or wake the system.	
Onboard NIC2 ROM	**Enabled** Disabled	If enabled. loads the embedded option ROM for the on-board network controllers. Warning: If [Disabled] is selected, NIC2 cannot be used to boot or wake the system.	

Table 6-12 Setup Utility—PCI Configuration Screen Fields **(continued)**

Setup Item	Options (Default in Boldface)	Help Text	Comments
Onboard NIC3 ROM	**Enabled** Disabled	If enabled, loads the embedded option ROM for the on-board network controllers. Warning: If [Disabled] is selected, NIC3 cannot be used to boot or wake the system.	
Onboard NIC4 ROM	**Enabled** Disabled	If enabled, loads the embedded option ROM for the on-board network controllers. Warning: If [Disabled] is selected, NIC4 cannot be used to boot or wake the system.	
Onboard NIC iSCSI ROM	Enabled **Disabled**	If enabled, loads the embedded option ROM for the on-board network controllers. Warning: If [Disabled] is selected, NIC1 and NIC2 cannot be used to boot or wake the system.	This option is grayed out and not accessible if either the NIC1 or NIC2 ROMs are enabled.
NIC 1 MAC Address	No entry allowed.		Information only. 12 hex digits of the MAC address.
NIC 2 MAC Address	No entry allowed.		Information only. 12 hex digits of the MAC address.
NIC 3 MAC Address	No entry allowed.		Information only. 12 hex digits of the MAC address.
NIC 4 MAC Address	No entry allowed.		Information only. 12 hex digits of the MAC address.
Intel I/OAT	**Enabled** Disabled	Intel I/O Acceleration Technology (I/OAT) accelerates TCP/IP processing for onboard NICs, delivers data-movement efficiencies across the entire server platform, and minimizes system overhead.	

System Acoustic and Performance Configuration

The System Acoustic and Performance Configuration screen allows you to configure the thermal characteristics of the system.

To access this screen from the Main screen, select **Advanced** > **System Acoustic and Performance Configuration**.

Figure 6-11 Setup Utility—Acoustic and Performance Configuration

Table 6-13 Setup Utility—Acoustic and Performance Configuration Screen Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Altitude	300m or less 301m-900m 901m-1500m Higher than 1500m	[300m or less] (980ft or less) Optimal performance setting near sea level. [301m - 900m] (980ft - 2950ft) Optimal performance setting at moderate elevation. [901m 1500m] (2950ft 4920ft) Optimal performance setting at high elevation. [Higher than 1500m] (4920ft or greater) Optimal performance setting at the highest elevations.	

Security Screen

The Security screen allows you to enable and set the user and administrative password. This is done to lock out the front panel buttons so they cannot be used. This screen also allows the user to enable and activate the Trusted Platform Module (TPM) security settings.

To access this screen from the Main screen, select **Security**.

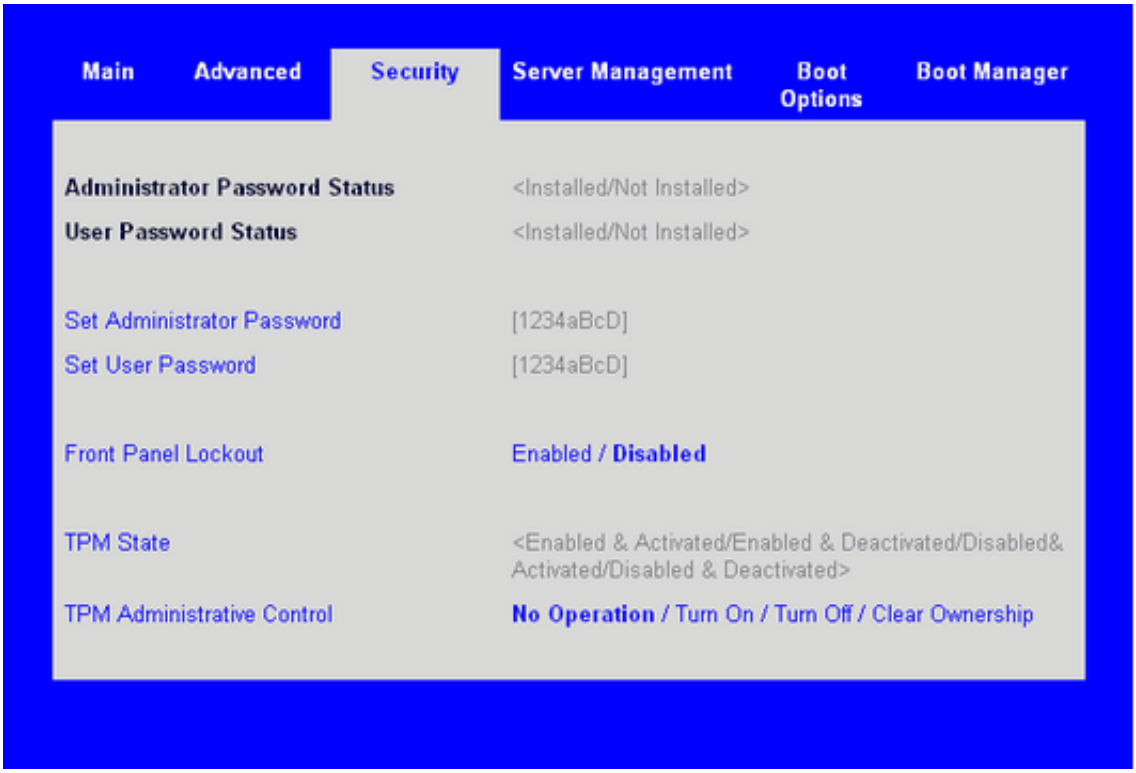


Figure 6-12 Setup Utility—Security Screen

Table 6-14 Setup Utility—Security Screen Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Administrator Password Status	<Installed Not Installed>		Information only. Indicates the status of the administrator password.
User Password Status	<Installed Not Installed>		Information only. Indicates the status of the user password.

Table 6-14 Setup Utility—Security Screen Fields **(continued)**

Setup Item	Options (Default in Boldface)	Help Text	Comments
Set Administrator Password	[123aBcD]	Administrator password is used to control change access to the BIOS Setup Utility. Only alphanumeric characters can be used. Maximum length is 7 characters. It is case sensitive. Note: Administrator password must be set in order to use the user account.	This option is only to control access to the setup. Administrator has full access to all the setup items. Clearing the Administrator password also clears the user password.
Set User Password	[123aBcD]	User password is used to control entry access to BIOS Setup Utility. Only alphanumeric characters can be used. Maximum length is 7 characters. It is case sensitive. Note: Removing the administrator password also automatically removes the user password.	This option is available only if the administrator password is installed. This option only protects the setup. User password only has limited access to the setup items.
Front Panel Lockout	Enabled **Disabled**	If enabled, locks the power button and reset button on the system's front panel. If [Enabled] is selected, power and reset must be controlled via a system management interface.	

Table 6-14 Setup Utility—Security Screen Fields **(continued)**

Setup Item	Options (Default in Boldface)	Help Text	Comments
TPM State	Enabled and Activated Enabled and Deactivated Disabled and Activated Disabled and Deactivated		Information only. Shows the current TPM device state. A disabled TPM device does not execute commands that use the TPM functions and TPM security operations are not available. An enabled and deactivated TPM is in the same state as a disabled TPM except setting of the TPM ownership is allowed if not present already. An enabled and activated TPM executes all commands that use the TPM functions and TPM security operations are also available.
TPM Administrative Control	**No Operation** Turn On Turn Off Clear Ownership	[No Operation] - No changes to current state. [Turn On] - Enables and activates TPM. [Turn Off] - Disables and deactivates TPM. [Clear Ownership] - Removes the TPM ownership authentication and returns the TPM to a factory default state. Note: The BIOS setting returns to [No Operation] on every boot cycle by default.	

Server Management Screen

The Server Management screen allows you to configure several server management features. This screen also provides an access point to the screens for configuring console redirection and displaying system information.

To access this screen from the Main screen, select **Server Management**.

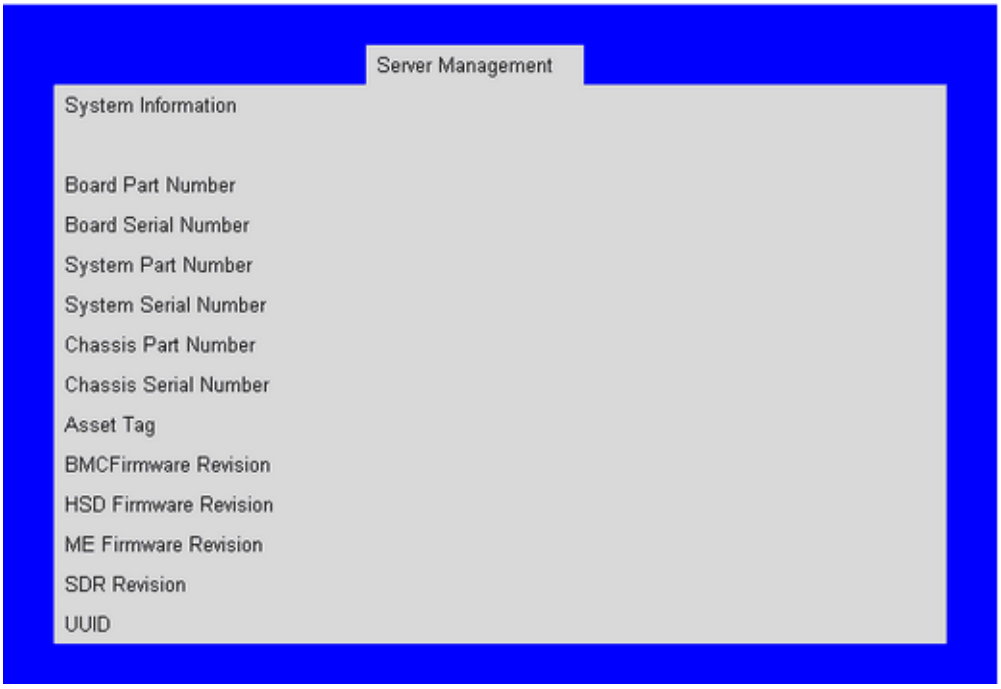


Figure 6-13 Setup Utiltiy—Server Management Configuration Screen

Table 6-15 Setup Utility—Server Management Configuration Screen Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Assert NMI on SERR	**Enabled** Disabled	On SERR, generate an NMI and log an error. Note: [Enabled] must be selected for the Assert NMI on PERR setup option to be visible.	
Assert NMI on PERR	**Enabled** Disabled	On PERR, generate an NMI and log an error. Note: This option is only active if the Assert NMI on SERR option is [Enabled] selected.	

Table 6-15 Setup Utility—Server Management Configuration Screen Fields **(continued)**

Setup Item	Options (Default in Boldface)	Help Text	Comments
Resume on AC Power Loss	**Stay Off** Last state Reset	System action to take on AC power loss recovery. [Stay Off] System stays off. [Last State] System returns to the same state before the AC power loss. [Reset] System powers on.	
Clear System Event Log	Enabled **Disabled**	If enabled, clears the System Event Log. All current entries will be lost. Note: This option is reset to [Disabled] after a reboot.	
FRB-2 Enable	**Enabled** Disabled	Fault Resilient Boot (FRB). If enabled, the BIOS programs the BMC watchdog timer for approximately 6 minutes. If the BIOS does not complete POST before the timer expires, the BMC resets the system.	
O/S Boot Watchdog Timer	Enabled **Disabled**	If enabled, the BIOS programs the watchdog timer with the timeout value selected. If the OS does not complete booting before the timer expires, the BMC resets the system and an error is logged. Requires OS support or Intel Management Software.	
O/S Boot Watchdog Timer Policy	**Power Off** Reset	If the OS boot watchdog timer is enabled, this is the system action taken if the watchdog timer expires. [Reset] System performs a reset. [Power Off] System powers off.	Grayed out when O/S Boot Watchdog Timer is disabled.

Table 6-15 Setup Utility—Server Management Configuration Screen Fields **(continued)**

Setup Item	Options (Default in Boldface)	Help Text	Comments
O/S Boot Watchdog Timer Timeout	5 minutes **10 minutes** 15 minutes 20 minutes	If the OS watchdog timer is enabled, this is the timeout value used by the BIOS to configure the watchdog timer.	Grayed out when O/S Boot Watchdog Timer is disabled.
Plug & Play BMC Detection	Enabled **Disabled**	If enabled, the BMC is detectable by Oss that support plug and play loading of an IPMI driver. Do not enable if your OS does not support this driver.	
ACPI 1.0 Support	Enabled **Disabled**	[Enabled] Publish ACPI 1.0 version of FADT in Root System Description Table. May be required for compatibility with OS versions that only support ACPI 1.0.	Needs to be [Enabled] for Windows 2000 support.
Console Redirection		View/Configure console redirection information and settings.	Takes the user to the Console Redirection screen.
System Information		View system information.	Takes the user to the System Information screen.
BMC LAN Configuration		View/Configure BMC LAN channel and User settings.	Takes the user to the BMC configuration screen. Note: This item does not appear on some models.

Console Redirection Screen

The Console Redirection screen allows you to enable or disable console redirection and to configure the connection options for this feature.

To access this screen from the Main screen, select **Server Management** > **Console Redirection**.

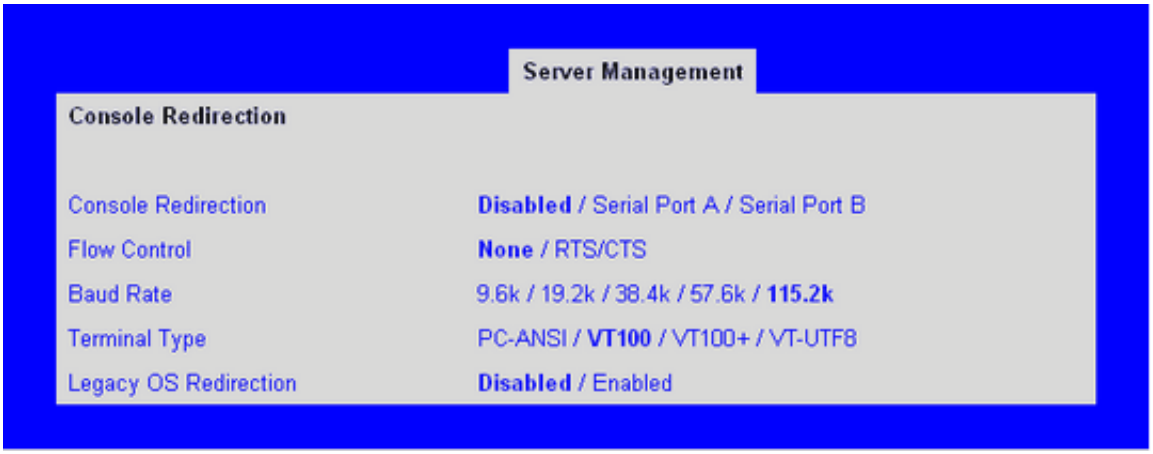


Figure 6-14 Setup Utility—Console Redirection Screen

Table 6-16 Setup Utility—Console Redirection Screen Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Console Redirection	**Disabled** Serial Port A Serial Port B	Console redirection allows a serial port to be used for server management tasks. [Disabled] - No console redirection. [Serial Port A] - Configure serial port A for console redirection. [Serial Port B] - Configure serial port B for console redirection. Enabling this option disables the display of the Quiet Boot logo screen during POST.	
Flow Control	**None** RTS/CTS	Flow control is the handshake protocol. Setting must match the remote terminal application. [None] - Configure for no flow control. [RTS/CTS] - Configure for hardware flow control.	

Table 6-16 Setup Utility—Console Redirection Screen Fields **(continued)**

Setup Item	Options (Default in Boldface)	Help Text	Comments
Baud Rate	9600 19.2K 38.4K 57.6K **115.2K**	Serial port transmission speed. Setting must match the remote terminal application.	
Terminal Type	PC-ANSI **VT100** VT100+ VT-UTF8	Character formatting used for console redirection. Setting must match the remote terminal application.	
Legacy OS Redirection	**Disabled** Enabled	This option enables legacy OS redirection (i.e., DOS) on serial port. If it is enabled, the associated serial port is hidden from the legacy OS.	

Server Management System Information Screen

The Server Management System Information screen allows you to view part numbers, serial numbers, and firmware revisions.

To access this screen from the Main screen, select **Server Management** > **System Information**.

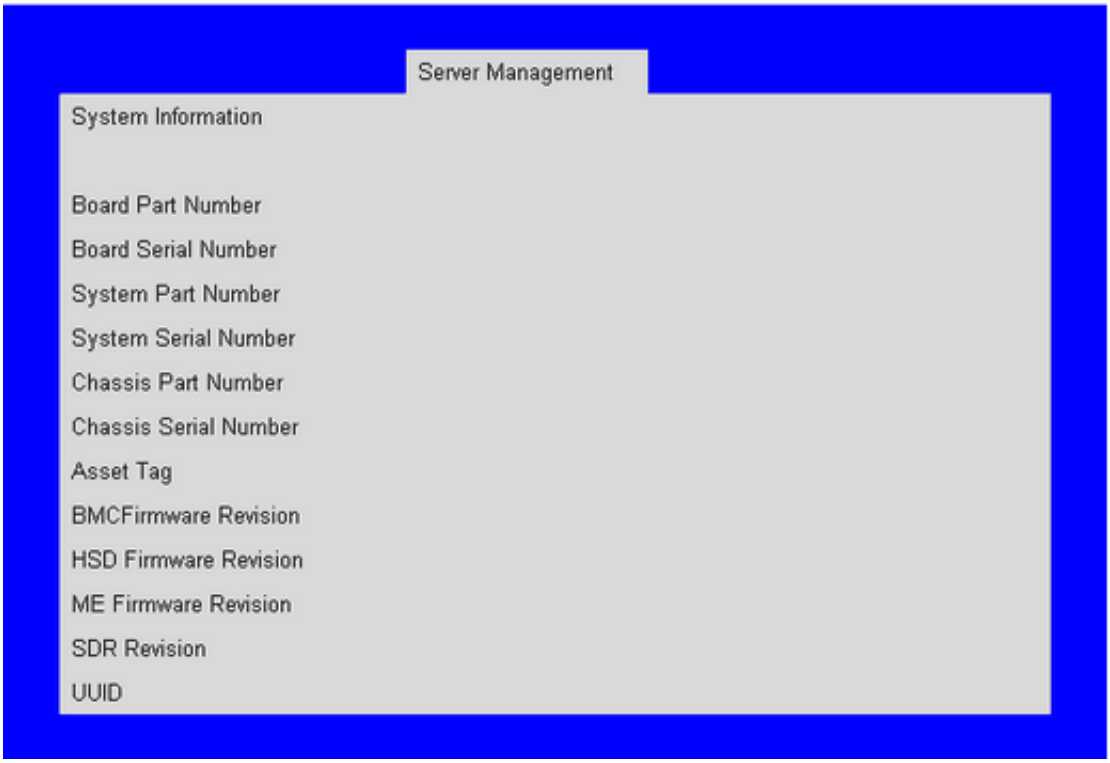


Figure 6-15 Setup Utility—Server Management System Information Screen

Table 6-17 Setup Utility—Server Management Information Screen Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Board Part Number			Information only
Board Serial Number			Information only
System Part Number			Information only
System Serial Number			Information only
Chassis Part Number			Information only

Table 6-17 Setup Utility—Server Management Information Screen Fields **(continued)**

Setup Item	Options (Default in Boldface)	Help Text	Comments
Chassis Serial Number			Information only
Asset Tag			Information only
BMC Firmware Revision			Information only
HSC Firmware Revision			Information only
ME Firmware Revision			Information only
SDR Revision			Information only
UUID			Information only

Boot Options Screen

The Boot Options screen displays any bootable media encountered during POST, and allows you to configure desired order in which boot devices are to be tried. The first boot device in the specified boot order will be used to boot the system.

To access this screen from the Main screen, select **Boot Options**.

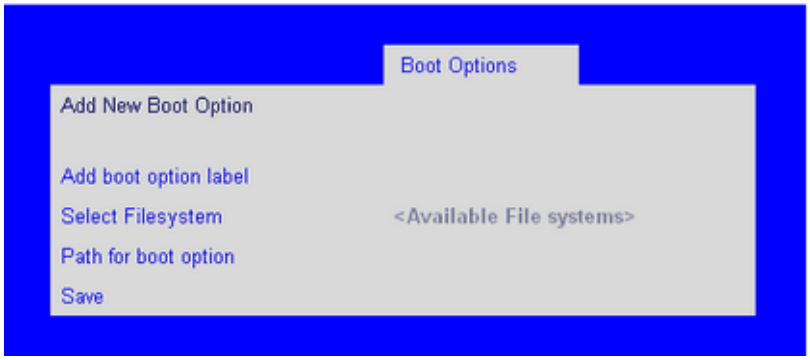


Figure 6-16 Setup Utility—Boot Options Screen

Table 6-18 Setup Utility—Boot Options Screen Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Boot Timeout	**0** - 65535	The number of seconds the BIOS should pause at the end of POST to allow the user to press the [F2] key for entering the BIOS Setup utility. Valid values are 0-65535. Zero is the default. A value of 65535 causes the system to go to the Boot Manager menu and wait for user input for every system boot.	After entering the desired timeout, press the Enter key to register that timeout value to the system. These settings are in seconds.
Boot Option #x	Available boot devices.	Set system boot order by selecting the boot option for this position.	
Hard Disk Order		Set the order of the legacy devices in this group.	This field appears when 1 or more hard disk drives are in the system.
CDROM Order		Set the order of the legacy devices in this group.	This field appears when 1 or more CDROM drives are in the system.

Table 6-18 Setup Utility—Boot Options Screen Fields **(continued)**

Setup Item	Options (Default in Boldface)	Help Text	Comments
Floppy Order		Set the order of the legacy devices in this group.	This field appears when one or more floppy drives are in the system.
Network Device Order		Set the order of the legacy devices in this group.	This field appears when 1 or more of these devices are available in the system.
BEV Device Order		Set the order of the legacy devices in this group.	This field appears when 1 or more of these devices are available in the system.
Add New Boot Option		Add a new EFI boot option to the boot order.	This option is only displayed if an EFI bootable device is available to the system, i.e., an USB drive.
Delete Boot Option		Remove an EFI boot option from the boot order.	If the EFI shell is deleted, it is restored on the next system reboot. It cannot be permanently deleted.
EFI Optimized Boot	Enabled Disabled	If enabled, the BIOS only loads modules required for booting EFI- aware Operating Systems.	This field is grayed out when [SW RAID] SATA Mode is Enabled. SW RAID can only be used in Legacy Boot mode.
Use Legacy Video for EFI OS	Enabled Disabled	If enabled, the BIOS use the legacy video ROM instead of the EFI video ROM.	This field appears only when EFI Optimized Boot is enabled.

Table 6-18 Setup Utility—Boot Options Screen Fields **(continued)**

Setup Item	Options (Default in Boldface)	Help Text	Comments
Boot Option Retry	Enabled Disabled	If enabled, this continually retries non- EFI-based boot options without waiting for user input.	
USB Boot Priority	Enabled Disabled	If enabled, newly discovered USB devices are moved to the top of their boot device category. If disabled, newly discovered USB devices are moved to the bottom of their boot device category.	This option enables or disables the USB Reorder functionality.

If all types of bootable devices are installed in the system, then the default boot order is as follows:

- CD/DVD-ROM
- Floppy Disk Drive
- Hard Disk Drive
- PXE Network Device
- BEV (Boot Entry Vector) Device
- EFI Shell and EFI Boot paths

To force the system to boot to EFI Shell, add the line `#FORCE_EFI_BOOT` to the beginning of the file `startup.nsh`.

Add New Boot Option Screen

The Add Boot Option screen allows you to add an EFI boot option from the boot order.

To access this screen from the Main screen, select Boot Options > **Add New Boot Option**.

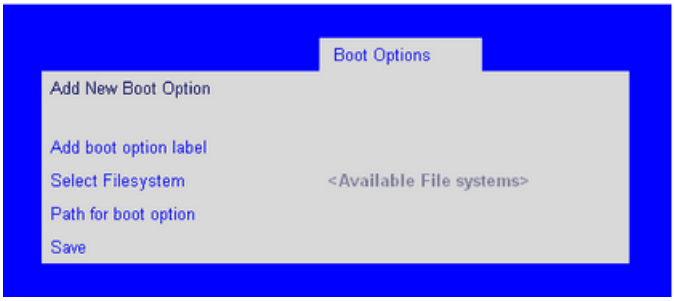


Figure 6-17 Setup Utility—Add New Boot Option Screen

Table 6-19 Setup Utility—Add New Boot Option Screen Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Add boot option label		Create the label for the new bootoption.	
Select Filesystem	Select one from the list.	Select a filesystem from the list.	
Path for boot option		Enter the path to the boot option in the format `\path\filename.efi`	
Save		Save the boot option.	

Delete Boot Option Screen

The Delete Boot Option screen allows you to remove an EFI boot option from the boot order. Note that while the Internal EFI Shell can be deleted in this screen, it is restored to the Boot Order on the next reboot. The Internal EFI Shell cannot be permanently deleted.

To access this screen from the Main screen, select **Boot Options** > **Delete Boot Options**.

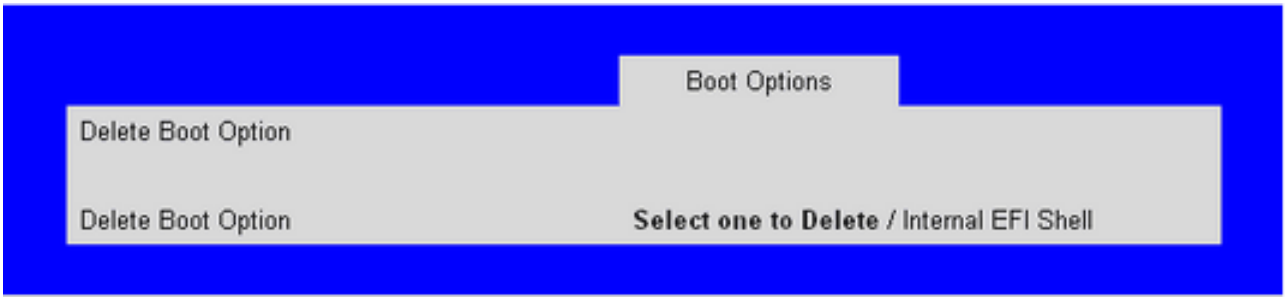


Figure 6-18 Setup Utility—Delete Boot Option Screen

Table 6-20 Setup Utility—Delete Boot Option Screen Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Delete Boot Option	Select one to Delete Internal EFI Shell.	Remove an EFI boot option from the boot order.	If the EFI shell is deleted, it is restored on the next system reboot. It cannot be permanently deleted.

Hard Disk Order Screen

The Hard Disk Order screen allows you to control the hard disks.

To access this screen from the Main screen, select **Boot Options** > **Hard Disk Order**.

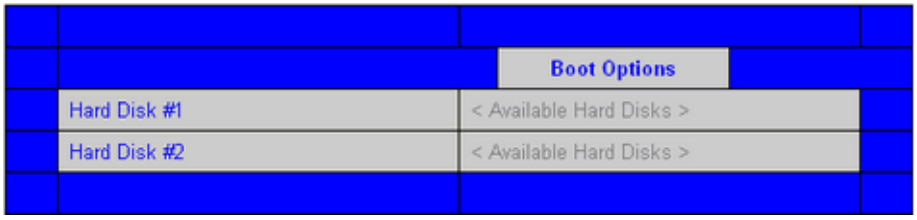


Figure 6-19 Setup Utility—Hard Disk Order Screen

Table 6-21 Setup Utiliity—Hard Disk Order Screen Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Hard Disk #1	Available Legacy devices for this device group.	Set the system boot order by selecting a boot option for this position.	
Hard Disk #2	Available Legacy devices for this device group.	Set the system boot order by selecting a boot option for this position.	

CDROM Order Screen

The CDROM Order screen allows you to control the CDROM devices.

To access this screen from the Main screen, select **Boot Options** > **CDROM Order**.

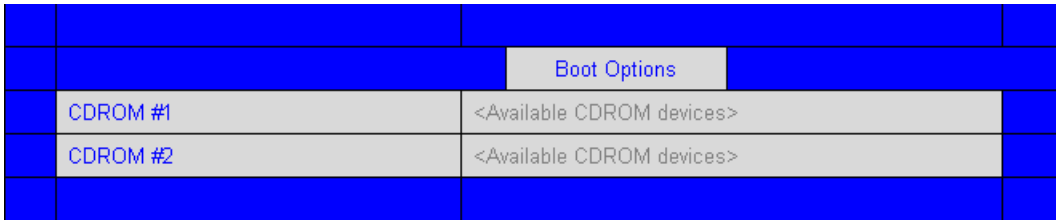


Figure 6-20 Setup Utility—CDROM Order Screen

Table 6-22 Setup Utility—CDROM Order Screen Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
CDROM #1	Available Legacy devices for this device group.	Set the system boot order by selecting a boot option for this position.	
CDROM #2	Available Legacy devices for this device group.	Set the system boot order by selecting a boot option for this position.	

Floppy Order Screen

The Floppy Order screen allows you to control the floppy devices.

To access this screen from the Main screen, select **Boot Options** > **Floppy Order**.

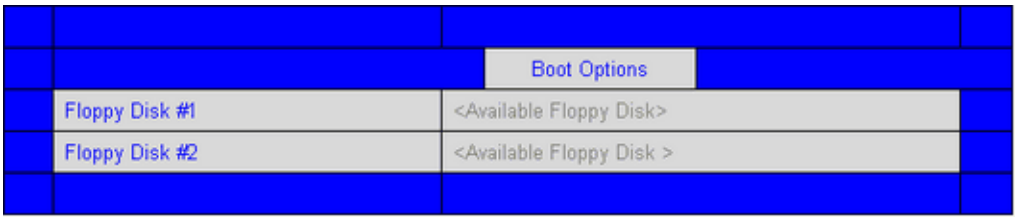


Figure 6-21 Setup Utility—Floppy Order Screen

Table 6-23 Setup Utility—Floppy Order Screen Fields

Setup Item	Options	Help Text	Comments
Floppy Disk #1	Available Legacy devices for this device group.	Set the system boot order by selecting a boot option for this position.	
Floppy Disk #2	Available Legacy devices for this device group.	Set the system boot order by selecting a boot option for this position.	

Network Device Order Screen

The Network Device Order screen allows you to control the network bootable devices.

To access this screen from the Main screen, select **Boot Options** > **Network Device Order.**

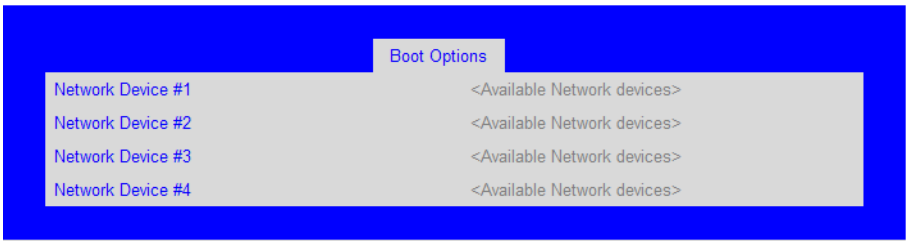


Figure 6-22 Setup Utility—Network Device Order Screen

Table 6-24 Setup Utility—Network Device Order Screen Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Network Device #1	Available Legacy devices for this device group.	Set the system boot order by selecting a boot option for this position.	
Network Device #2	Available Legacy devices for this device group.	Set the system boot order by selecting a boot option for this position.	
Network Device #3	Available Legacy devices for this device group.	Set the system boot order by selecting a boot option for this position.	
Network Device #4	Available Legacy devices for this device group.	Set the system boot order by selecting a boot option for this position.	

BEV Device Order Screen

The BEV Device Order screen allows you to control the BEV bootable devices.

To access this screen from the Main screen, select **Boot Options** > **BEV Device Order**.

Figure 6-23 Setup Utility—BEV Device Order Screen

Table 6-25 Setup Utility—BEV Device Order Screen Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
BEV Device #1	Available Legacy devices for this device group.	Set the system boot order by selecting a boot option for this position.	
BEV Device #2	Available Legacy devices for this device group.	Set the system boot order by selecting a boot option for this position.	

Boot Manager Screen

The Boot Manager screen allows you to view a list of devices available for booting, and to select a boot device for immediately booting the system.

To access this screen from the Main screen, select **Boot Manager**.

Figure 6-24 Setup Utility—Boot Manager Screen

Table 6-26 Setup Utility—Boot Manager Screen Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Internal EFI Shell		Select this option to boot now. Note: This list is not the system boot option order. Use the Boot Options menu to view and configure the system boot option order.	
Boot Device #x		Select this option to boot now. Note: This list is not the system boot option order. Use the Boot Options menu to view and configure the system boot option order.	

Error Manager Screen

The Error Manager screen displays any errors encountered during POST.

Figure 6-25 Setup Utility—Error Manager Screen

Table 6-27 Setup Utility—Error Manager Screen Fields

Setup Item	Options (Default in Boldface)	Help Text	Comments
Displays System Errors			Information only. Displays errors that occurred during the POST.

Exit Screen

The Exit screen allows you to choose whether to save or discard the configuration changes made on the other screens. It also allows you to restore the server to the factory defaults or to save or restore them to a set of user-defined default values. If **Load Default Values** is selected, the factory default settings (noted in bold in the tables in this chapter) are applied. If **Load User Default Values** is selected, the system is restored to previously saved user-defined default values.

Figure 6-26 Setup Utility—Exit Screen

Table 6-28 Setup Utility—Exit Screen Fields

Setup Item	Help Text	Comments
Save Changes and Exit	Exit the BIOS Setup utility after saving changes. The system reboots if required. The [F10] key can also be used.	For confirmation only if any of the setup fields were modified.
Discard Changes and Exit	Exit the BIOS Setup utility without saving changes. The [Esc] key can also be used.	For confirmation only if any of the setup fields were modified.

Table 6-28 Setup Utility—Exit Screen Fields **(continued)**

Setup Item	Help Text	Comments
Save Changes	Save changes without exiting the BIOS Setup Utility. Note: Saved changes may require a system reboot before taking effect.	For confirmation only if any of the setup fields were modified.
Discard Changes	Discard changes made since the last Save Changes operation was performed.	For confirmation only if any of the setup fields were modified.
Load Default Values	Load factory default values for all BIOS Setup utility options. The [F9] key can also be used.	A confirmation prompt appears.
Save as User Default Values	Save current BIOS Setup utility values as custom user default values. If needed, the user default values can be restored via the Load User Default Values option below. Note: Clearing the CMOS or NVRAM does not cause the User Default values to be reset to the factory default values.	A confirmation prompt appears.
Load User Default Values	Load user default values.	A confirmation prompt appears.

Loading BIOS Defaults

Different mechanisms exist for resetting the system configuration to the default values. When a request to reset the system configuration is detected, the BIOS loads the default system configuration values during the next POST. The request to reset the system to the defaults can be sent in the following ways:

Pressing <F9> from within the BIOS Setup utility.

- Moving the BIOS Recovery jumper.
- Issuing an IPMI command (set System Boot options command)
- Choosing Load User Defaults from the Exit page of the BIOS Setup loads user set defaults instead of the BIOS factory defaults.

The recommended steps to load the BIOS defaults are:

1. Power down the system (Do not remove AC power).
2. Move the BIOS Recovery jumper (J6D1) (from pins 1-2 to pins 2-3.
3. Move the Clear CMOS jumper from pins 2-3 to pins 1-2.
4. Power up the system.

Clearing the BIOS Password

If the administrator password to the BIOS has been misplaced, a hardware reset may be performed to allow access to the BIOS and Operating System.

To clear the BIOS Password:

1. Power down the system
2. Move the BIOS Recovery jumper (J6D1) from pins 1-2 to pins 2-3.
3. Move the Clear CMOS jumper from pins 2-3 to pins 1-2.
4. Power up the system.

POST Codes

The system BIOS displays error messages on the video screen. Before video initialization, beep codes inform you of errors. POST error codes are logged in the event log. The BIOS displays POST error codes on the video monitor.

Eight light-emitting diodes indicate the raw binary output of port 80 values. These LEDs are arranged so you can see a direct correlation to the binary equivalent. Table A-1 shows the correlation of port 80 post code bit to LED reference designator.

Table A-1 Port 80 POST Code LEDs

Port 80 POST Code Bit	LED Reference Designator
7 (MSB)	DS4E8
6	DS4E7
5	DS4E6
4	DS4E5
3	DS4E4
2	DS4E3
1	DS4E2
0 (LSB)	DS4E1

POST Progress Codes and Messages

During the system boot process, the BIOS executes several platform configuration processes, each of which is assigned a specific hex POST code number. As each configuration routine is started, the BIOS displays the POST code on the POST code diagnostic LEDs found on the back edge of the server board. To assist in troubleshooting a system hang during the POST process, the

diagnostic LEDs can be used to identify the last POST process to be executed. Table A-2 shows POST progress codes and messages.

Table A-2 POST Progress Codes and Messages

Progress Code	Progress Code Definition
Host Processor	
0x10	Power-on initialization of the host processor (Boot Strap Processor)
0x11	Host processor cache initialization (including AP)
0x12	Starting application processor initialization
0x13	SMM initialization
Chipset	
0x21	Initializing a chipset component
Memory	
0x22	Reading configuration data from memory (SPD on DIMM)
0x23	Detecting presence of memory
0x24	Programming timing parameters in the memory controller
0x25	Configuring memory parameters in the memory controller
0x26	Optimizing memory controller settings
0x27	Initializing memory, such as ECC init
0x28	Testing memory
PCIe Bus	
0x50	Enumerating PCIe buses
0x51	Allocating resources to PCIe buses
0x52	Hot-plug PCIe controller initialization
0x53-0x57	Reserved for PCIe Bus
USB	

Table A-2 POST Progress Codes and Messages **(continued)**

Progress Code	Progress Code Definition
0x58	Resetting USB bus
0x59	Reserved for USB devices
ATA / ATAPI / SATA	
Progress Code	Progress Code Definition
0x5A	Resetting SATA bus and all devices
0x5B	Reserved for ATA
SMBUS	
0x5C	Resetting SMBUS
0x5D	Reserved for SMBUS
Local Console	
0x70	Resetting the video controller (VGA)
0x71	Disabling the video controller (VGA)
0x72	Enabling the video controller (VGA)
Remote Console	
0x78	Resetting the console controller
0x79	Disabling the console controller
0x7A	Enabling the console controller
Keyboard (only USB)	
0x90	Resetting the keyboard
0x91	Disabling the keyboard
0x92	Detecting the presence of the keyboard
0x93	Enabling the keyboard
0x94	Clearing keyboard input buffer

Table A-2 POST Progress Codes and Messages **(continued)**

Progress Code	Progress Code Definition
0x95	Instructing keyboard controller to run Self Test (PS2 only)
Mouse (only USB)	
0x98	Resetting the mouse
0x99	Detecting the mouse
0x9A	Detecting the presence of mouse
0x9B	Enabling the mouse
Fixed Media	
0xB0	Resetting fixed media device
0xB1	Disabling fixed media device
0xB2	Detecting the presence of a fixed media device (hard drive detection, etc.)
0xB3	Enabling/configuring a fixed media device
Removable Media	
0xB8	Resetting the removable media device
0xB9	Disabling the removable media device
0xBA	Detecting the presence of a removable media device (CDROM detection, etc.)
0xBC	Enabling/configuring a removable media device
Boot Device Selection	
0xDy	Trying boot selection y (where y = 0 to F)
Progress Code	Progress Code Definition

Table A-2 POST Progress Codes and Messages **(continued)**

Progress Code	Progress Code Definition
Pre-EFI Initialization (PEI) Core (not accompanied by a beep code)	
0xE0	Started dispatching early initialization modules (PEIM)
0xE2	Initial memory found, configured, and installed correctly
0xE1, 0xE3	Reserved for initialization module use (PEIM)
Driver eXecution Environment (DXE) Core (not accompanied by a beep code)	
0xE4	Entered EFI driver execution phase (DXE)
0xE5	Started dispatching drivers
0xE6	Started connecting drivers
DXE Drivers (not accompanied by a beep code)	
0xE7	Waiting for user input
0xE8	Checking password
0xE9	Entering the BIOS Setup
0xEA	Flash Update
0xEE	Calling Int 19. One beep unless silent boot is enabled.
0xEF	Unrecoverable Boot failure
Runtime Phase / EFI Operating System Boot	

Table A-2 POST Progress Codes and Messages **(continued)**

Progress Code	Progress Code Definition
0xF4	Entering the sleep state
0xF5	Exiting the sleep state
0xF8	Operating system has requested EFI to close boot services ExitBootServices() has been called
0xF9	Operating system has switched to virtual address mode SetVirtualAddressMap() has been called
0xFA	Operating system has requested the system to reset ResetSystem () has been called
Pre-EFI Initialization Module (PEIM) / Recovery	
0x30	Crisis recovery has been initiated because of a user request
0x31	Crisis recovery has been initiated by software (corrupt flash)
0x34	Loading crisis recovery capsule
0x35	Handing off control to the crisis recovery capsule
0x3F	Unable to complete crisis recovery
Memory Error Codes (Accompanied by a beep code)	
0xE1	No Usable Memory Error: No memory in the system, or SPD bad so no memory could be detected.
0xEB	Memory Test Error: memory failed Hardware BIST.
0xED	Population Error: RDIMMs and UDIMMs cannot be mixed in the system.
0xEE	Mismatch Error: more than 2 Quad Ranked DIMMS in a channel

POST Error Messages and Handling

The POST Error Manager displays error messages reported by the system BIOS during POST. The system BIOS truncates the 32-bit EFI POST Progress Code associated with the error to 16-bit values for display in the POST Error Manager.

The POST Error Manager behavior in response to the error is defined by the error severity reported by the BIOS. Errors are categorized in one of three severity levels. The system behavior in response to severity level of: the following:

Fatal:

- The BIOS logs an error to the POST Error Manager.
- The BIOS logs an error message to the BMC System Event Log (SEL).
- The BIOS unconditionally enters POST Error Manager to display error message.
- The BIOS halts the system to prevent boot.
- The user needs to replace the faulty part and restart the system

Major.

- The BIOS logs an error to the POST Error Manager.
- The BIOS logs an error message to the BMC System Event Log (SEL).
- The BIOS continues booting in a degraded state by default (i.e. BIOS does not automatically enter the POST Error Manager to display the error message)
- The user can override this default behavior by configuring the BIOS Setup POST Error Pause option to Enabled. This forces the system to enter the POST Error Manager and display the error message before booting.
- The user can choose to take immediate corrective action or continue booting.

Minor

- The BIOS logs an error to the POST Error Manager.
- The BIOS continues booting with a degraded state (i.e. BIOS does not automatically enter the POST Error Manager to display the error message).
- The user may want to replace the erroneous unit.

The POST Error Manager reports a maximum of 500 errors on any single boot cycle. Errors are automatically cleared from the Error Manager on each boot. Table A-3 shows POST error manager messages and handling.

Table A-3 POST Error Manager Messages and Handling

Error Code	Error Message	Response
0x0012	CMOS Date/Time not set.	Major
0x0048	Password check failed.	Major
0x0108	Keyboard locked error.	Minor
0x0109	Keyboard stuck key error.	Minor
0x0113	The SAS RAID firmware cannot run properly. The user should attempt to reflash the firmware.	Major
0x0140	PCIe Parity Error (PERR).	Fatal
0x0141	PCIe resource conflict error.	Major
0x0146	PCIe out of resources error.	Major
0x0192	Processor cache size mismatch detected.	Fatal
0x0193	Processor stepping mismatch.	Minor
0x0194	Processor family mismatch detected.	Fatal
0x0195	Processor Intel(R) QPI speed mismatch.	Major
0x0196	Processor model mismatch.	Fatal
0x0197	Processor speeds mismatched.	Fatal
0x0198	Processor family is not supported.	Fatal
0x019F	Processor and chipset stepping configuration is unsupported. By continuing to boot, you acknowledge you are operating in an unsupported configuration.	Major
0x5220	CMOS/NVRAM configuration cleared.	Major
0x5221	Passwords cleared by jumper.	Major
0x5224	Password Clear jumper is set.	Major
0x8120	Processor Thermal Trip error.	Major

Table A-3 POST Error Manager Messages and Handling **(continued)**

Error Code	Error Message	Response
0x8130	Processor Disabled	Major
0x8140	Processor FRB-3 timeout.	Major
0x8160	Processor unable to apply microcode update.	Major
0x8170	Processor Built-In Self Test (BIST) failure.	Major
0x8180	Processor microcode update not found.	Minor
0x8190	Watchdog Timer failed on last boot.	Major
0x8198	OS boot watchdog timer failure.	Major
0x8300	Baseboard Management Controller failed self test.	Major
0x84F2	Baseboard Management Controller failed to respond.	Major
0x84F3	Baseboard Management Controller in Update Mode.	Major
0x84F4	Baseboard Management Controller Sensor Data Record empty.	Major
0x84FF	Baseboard Management Controller System Event Log full.	Minor
0x8604	Chipset Reclaim of non critical variables complete.	Minor
0xA000	TPM device not detected.	Major
0xA001	TPM device is missing or not responding.	Major

POST Error Beep Codes

Table A-4 lists POST error beep codes. Prior to system video initialization, the BIOS uses beep codes to inform users about error conditions. The beep code is followed by a user visible code on POST Progress LEDs.

Table A-4 Beep Codes

Beeps	Error Message	POST Progress Code	Description
3	Memory error		System halted because a fatal error related to the memory was detected.

BMC Beep Codes

The BMC may generate beep codes upon detection of failure conditions. Beep codes are sounded each time the problem is discovered (for example, on each power-up attempt), but are not sounded continuously. supported codes are listed in Table A-5. Each digit in the code is represented by a sequence of beeps whose count is equal to the digit.

Table A-5 BMC Beep Codes

Code	Reason for Beep	Associated Sensors	Supported
1-5-2-1	No CPUs installed or first CPU socket is empty.	CPU Missing Sensor	Yes
1-5-4-2	Power fault: DC power unexpectedly lost (power good dropout).	Power unit - power unit failure offset.	Yes
1-5-4-4	Power control fault (power good assertion timeout).	Power unit - soft power control failure offset.	Yes

Power Supply Modules Safety Instructions

For the initial release of the SGI Altix UV 10 system, the power supply modules require separate AC power sources, as shown in Figure B-1, and a protective ground wire installed, as shown in Figure B-2, to prevent the power supply module leakage current (touch current) from exceeding the safety specification. If your system serial number is UV10-00000053 or greater, Appendix B information does **NOT** apply.

Note: This appendix applies to standalone systems. If your SGI Altix UV 10 system is installed in a rack with SGI power distribution units (PDUs), this appendix does **not** apply.

Power Supply Configuration

Warning: For the initial release of the SGI Altix UV 10 system, the power supply modules must be connected to separate AC power sources for standalone systems. This applies to systems shipped with a grounding wire as shown in Figure B-2.

Figure B-1 shows the power supply modules connected to separate AC power sources.

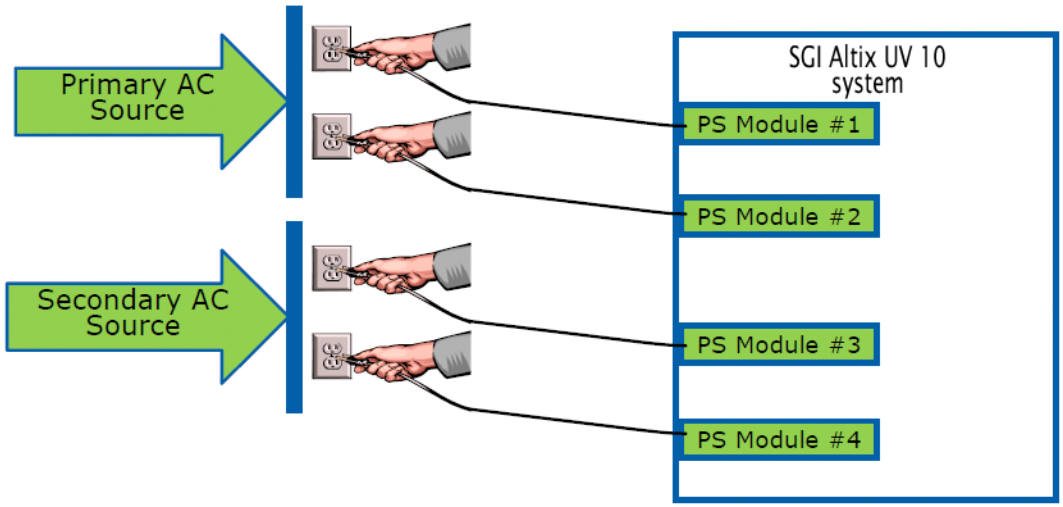


Figure B-1 Power Supply Modules Configuration

Installing the Protective Ground Wire

A bond wire of at least 18 AWG copper stranded wire and at least 1 meter (3.28 feet) long is required to ground the server system (see Figure B-2). To install the protective grounding wire, follow the steps below.

1. Locate the grounding bolt on the chassis rear left side wall designated by the ground symbol.

2. Remove the outer nut from the bolt. See item 1 in Figure B-2.

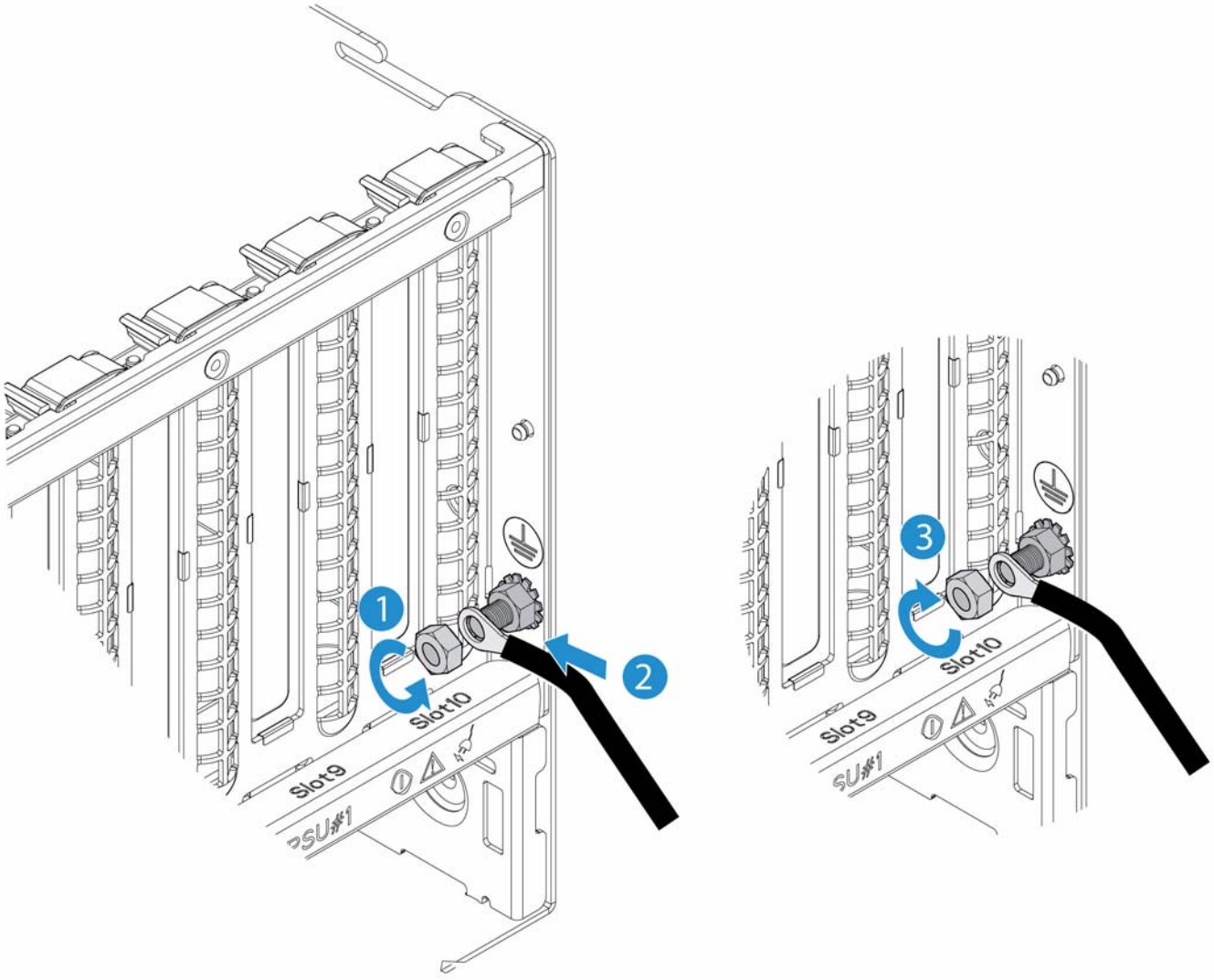


Figure B-2 Installing the Ground Wire

3. Attach the bond wire ring terminal with the lug on the inner nut. See item 2 in the Figure B-2.

4. Replace the outer nut. See item 3 in Figure B-2.

   Note: The grounding wire lug goes between the two nuts on the bolt.

5. Adjust the bond wire to fit into the cable management arm.

Installation and Maintenance Safety Instructions

This appendix provides a summary of safety instructions for system installation, assembly, or maintenance. Table C-1 shows common sense system safety guidelines.

Table C-1 System Safety Guidelines

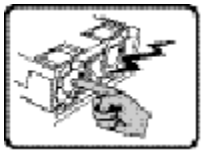
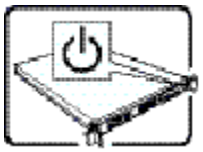
Symbol	Description
	The power supply in this product contains no user-serviceable parts. Refer servicing only to qualified personnel.
	Do not attempt to modify or use the supplied AC power cord if it is not the exact type required. A product with more than one power supply will have a separate AC power cord for each supply.
	The power button on the system does not turn off system AC power. To remove AC power from the system, you must unplug each AC power cord from the wall outlet or power supply. The power cord(s) is considered the disconnect device to the main (AC) power. The socket outlet that the system plugs into shall be installed near the equipment and shall be easily accessible.

Table C-1 System Safety Guidelines **(continued)**

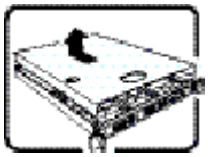
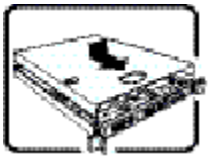
Symbol	Description
	SAFETY STEPS: Whenever you remove the chassis covers to access the inside of the system, follow these steps: 1. Turn off all peripheral devices connected to the system. 2. Turn off the system by pressing the power button. 3. Unplug all AC power cords from the system or from wall outlets. 4. Label and disconnect all cables connected to I/O connectors or ports on the back of the system. .5. Provide some electrostatic discharge (ESD) protection by wearing an antistatic wrist strap attached to chassis ground of the system-any unpainted metal surface-when handling components. 6. Do not operate the system with the chassis covers removed.
	After you have completed the six SAFETY steps above, you can remove the system covers. To do this: 1. Unlock and remove the padlock from the back of the system if a padlock has been installed. 2. Remove and save all screws from the covers. 3. Remove the cover(s).
	For proper cooling and airflow, always reinstall the chassis covers before turning on the system. Operating the system without the covers in place can damage system parts. To install the covers: 1. Check first to make sure you have not left loose tools or parts inside the system. 2. Check that cables, add-in cards, and other components are properly installed .3. Attach the covers to the chassis with the screws removed earlier, and tighten them firmly. 4. Insert and lock the padlock to the system to prevent unauthorized access inside the system. 5. Connect all external cables and the AC power cord(s) to the system.

Table C-1 System Safety Guidelines **(continued)**

Symbol	Description
	A microprocessor and heat sink may be hot if the system has been running. Also, there may be sharp pins and edges on some board and chassis parts. Contact should be made with care. Consider wearing protective gloves.
	Danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer. Dispose of used batteries according to manufacturer's instructions.
	The system is designed to operate in a typical office environment.Choose a site that is: Clean and free of airborne particles (other than normal room dust) Well ventilated and away from sources of heat including direct sunlight Away from sources of vibration or physical shock. Isolated from strong electromagnetic fields produced by electrical devices. In regions that are susceptible to electrical storms, we recommend you plug your system into a surge suppressor and disconnect telecommunication lines to your modem during electrical storms. Provided with a properly grounded wall outlet. Provided with sufficient space to access the power supply cord(s), because they serve as the product's main power disconnect.

Table C-1 System Safety Guidelines **(continued)**

Symbol	Description
	The rail racks are designed to carry only the weight of the server system. Do not use rail-mounted equipment as a work space. Do not place additional load onto any rail-mounted equipment.
	Heavy object. Indicates two people are required to safely handle the system.