

# SGI® Altix™ 330 System User's Guide

007-4790-001

---

## CONTRIBUTORS

Written by Mark Schwenden

Illustrated by Chrystie Danzer

Contributions by Rich Altmaier, Dick Brownell, Mike Brown, Dave Collins, Dan Gragert, Steve Hein, Tom Hotle, Jim Passint, Paul Pedersen, Hao Pham, Paul Kinyon, Keith Schilling, and Lyle Stoll.

---

## COPYRIGHT

© 2005, Silicon Graphics, Inc. All rights reserved; provided portions may be copyright in third parties, as indicated elsewhere herein. No permission is granted to copy, distribute, or create derivative works from the contents of this electronic documentation in any manner, in whole or in part, without the prior written permission of Silicon Graphics, Inc.

---

## LIMITED RIGHTS LEGEND

The electronic (software) version of this document was developed at private expense; if acquired under an agreement with the USA government or any contractor thereto, it is acquired as "commercial computer software" subject to the provisions of its applicable license agreement, as specified in (a) 48 CFR 12.212 of the FAR; or, if acquired for Department of Defense units, (b) 48 CFR 227-7202 of the DoD FAR Supplement; or sections succeeding thereto. Contractor/manufacturer is Silicon Graphics, Inc., 1500 Crittenden Lane, Mountain View, CA 94043.

---

## TRADEMARKS AND ATTRIBUTIONS

Silicon Graphics, SGI, IRIX, Onyx and the SGI logo are registered trademarks, and Altix, Silicon Graphics Fuel, NUMAflex, NUMAlink, Origin, ProPack, SGIconsole, Tezro and Supportfolio are trademarks of Silicon Graphics, Inc., in the United States and/or other countries worldwide.

Intel and Itanium are trademarks or registered trademarks of Intel Corporation and its subsidiaries in the United States and other countries.

Linux is a registered trademark of Linus Torvalds.

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

---

## Record of Revision

<b>Version</b>	<b>Description</b>
001	August 2005 First release



# Contents

<b>Figures</b>	xi
<b>Tables</b>	xv
Important Information	xviii
Chapter Descriptions	xix
Related Publications	xx
Conventions	.xxii
Product Support	.xxii
Reader Comments	xxiii
<b>1. Quick Start and Installation</b>	<b>1</b>
System Installation Overview	2
Safety Precautions	3
Hazard Statements	4
ESD Precautions	4
Safety Measures	5
Checking Your Shipment	6
Lifting the System	6
Getting Acquainted	6
Front Panel Items	7
Rear Panel Items	8
Unpacking and Inspecting Modules	8
Setting the Server System on a Table Top	9
Cabling a Basic System	10
Installing a Rack System	11

Preinstallation Activities . . . . .	. 12
Site Plan Verification . . . . .	. 12
Rack Tools Required . . . . .	. 12
Rack Power Receptacle Verification . . . . .	. 13
Unloading and Moving System Equipment . . . . .	. 17
Unloading the Equipment from the Truck . . . . .	. 17
Inspecting the Shipping Crate . . . . .	. 19
Transporting the Shipping Crate . . . . .	. 20
Removing a Short Rack from the Shipping Crate . . . . .	. 21
Removing a Tall Rack from the Shipping Crate . . . . .	. 23
Positioning and Leveling a Single-rack System. . . . .	. 25
Positioning and Leveling Multiple Racks . . . . .	. 27
Installing the Modules in a Rack . . . . .	. 29
Rackmounting Altix 330 Modules with Rails . . . . .	. 29
Determining Space Requirements . . . . .	. 30
Determining Where to Attach the Slide Rails in the Rack . . . . .	. 31
Checking the Slide-rail Hardware . . . . .	. 32
Preparing the Rack Mounting Rail Assemblies . . . . .	. 32
Attaching the Rails to the Rack. . . . .	. 34
Installing the Module in the Rack . . . . .	. 36
Removing a Module from the Rack . . . . .	. 38
Cabling the System Modules. . . . .	. 39
Optional Router System Cabling . . . . .	. 41
Cabling the System Modules to a Power Source. . . . .	. 42
Connecting System Modules to a Power Source (No Rack) . . . . .	. 42
Connecting System Modules to a Rack Power Source . . . . .	. 43
Connecting the System Console . . . . .	. 44
Overview . . . . .	. 44
Console Connection Parts Required. . . . .	. 44
Configuring a PC or Laptop as DHCP Client . . . . .	. 45
Establishing a Console Connection . . . . .	. 45
Operating Your System . . . . .	. 47

	L1/L2 Modes of Operation Overview . . . . .	47
	Viewing Information, Warnings, and Error Messages . . . . .	47
	Powering On, Powering Off, and Resetting the System From the L2 Emulator . . . . .	47
	Console Mode from the L2 Emulator . . . . .	48
	Powering the System On and Off Manually . . . . .	49
	Preparing to Power On. . . . .	49
	Powering On Manually . . . . .	50
	Powering Off Manually . . . . .	51
	Operating the System Modules Using Front Panel Controls . . . . .	52
<b>2.</b>	<b>System Overview . . . . .</b>	<b>53</b>
	Physical Features . . . . .	54
	Functional Architecture . . . . .	57
	Main System Components . . . . .	59
	System Configurations . . . . .	60
	Optional Router Configurations . . . . .	61
	Storage Expansion . . . . .	62
	<b>SGI TP900 Storage Module . . . . .</b>	<b>62</b>
	InfiniteStorage S330 Options . . . . .	63
	Optional Tape Drives . . . . .	64
	Power Components . . . . .	64
	Rack. . . . .	66
<b>3.</b>	<b>Base Compute Module . . . . .</b>	<b>69</b>
	System Features . . . . .	70
	System Node Board. . . . .	75
	Processors (CPUs) . . . . .	76
	Local Memory (DIMMs) . . . . .	78
	SHub ASIC . . . . .	79
	Additional Internal Components . . . . .	79
	DVD-ROM . . . . .	79
	Internal System Disk Drives . . . . .	79
	Power Supply . . . . .	80
	External Components . . . . .	81

Front Panel . . . . .	. 81
Rear Panel . . . . .	. 82
Module Configuration . . . . .	. 84
Technical Specifications . . . . .	. 85
<b>4. PCI and PCI-X Option Module . . . . .</b>	<b>. 87</b>
System Features . . . . .	. 87
External Components. . . . .	. 88
Front Panel Items . . . . .	. 89
Rear Panel Items. . . . .	. 90
External Configurations . . . . .	. 91
<b>5. Optional Router . . . . .</b>	<b>. 93</b>
Overview . . . . .	. 93
External Components. . . . .	. 96
Front Panel Components . . . . .	. 96
Rear Panel Components . . . . .	. 97
Router Module Technical Specifications. . . . .	. 98
<b>6. Installing and Removing Customer-replaceable Units . . . . .</b>	<b>. 99</b>
Safety Instructions . . . . .	. 99
Accessing the System’s Internal Components . . . . .	100
Removing the Top Cover . . . . .	101
Replacing the Top Cover . . . . .	102
PCI and PCI-X Cards. . . . .	103
Rules for Card Installation and Removal . . . . .	104
Installing or Replacing a PCI or PCI-X Card . . . . .	104
Disk Drives . . . . .	107
Installing or Replacing a Disk Drive . . . . .	108
Replacing a DVD Drive . . . . .	110
Memory DIMM Group Placement and Guidelines . . . . .	114
Installing or Replacing a DIMM Group. . . . .	115
<b>7. Troubleshooting . . . . .</b>	<b>121</b>
Troubleshooting Chart . . . . .	122
L1/L2 Controller Error Messages . . . . .	123



	SGI Electronic Support . . . . .	.127
<b>H.</b>	<b>Technical Specifications . . . . .</b>	<b>.131</b>
	Environmental System Specifications . . . . .	.132
	Compute Module Specifications . . . . .	.133
	Rack Specifications . . . . .	.135
	SGI TP900 Storage Module Specifications . . . . .	.136
	Non-proprietary I/O Port Specifications . . . . .	.136
	Compute Module . . . . .	.137
	SGI TP900 Storage Module . . . . .	.137
	RJ-45 Connector . . . . .	.138
	External SAS/SATA Port Connector . . . . .	.139
	USB Type A Connector . . . . .	.140
<b>I.</b>	<b>Regulatory Specifications and Safety Information . . . . .</b>	<b>.141</b>
	Manufacturer's Regulatory Declarations . . . . .	.141
	Server Model Number . . . . .	.141
	CE Notice and Manufacturer's Declaration of Conformity. . . . .	.141
	Electromagnetic Emissions . . . . .	.141
	FCC Notice (USA Only) . . . . .	.142
	Industry Canada Notice (Canada Only) . . . . .	.142
	VCCI Notice (Japan Only). . . . .	.143
	Chinese Class A Regulatory Notice . . . . .	.143
	Korean Class A Regulatory Notice . . . . .	.143
	Shielded Cables. . . . .	.144
	Electrostatic Discharge . . . . .	.144
	Laser Compliance Statements . . . . .	.144
	Lithium Battery Statement . . . . .	.146
	<b>Index . . . . .</b>	<b>.147</b>



# Figures

<b>Figure 1-1</b>	Basic System Shipment Contents . . . . .	6
<b>Figure 1-2</b>	Front View of the System . . . . .	7
<b>Figure 1-3</b>	System Rear Panel Items. . . . .	7
<b>Figure 1-4</b>	Example of Table-mounting Feet . . . . .	9
<b>Figure 1-5</b>	Connecting the Ethernet Cable . . . . .	10
<b>Figure 1-6</b>	Attaching the NUMAlink-4 Cable . . . . .	10
<b>Figure 1-7</b>	Connecting the Altix 330 to an AC Power Source . . . . .	11
<b>Figure 1-8</b>	30-amp Single-phase Power Receptacle for North American Sites . . . . .	14
<b>Figure 1-9</b>	32-amp Single-phase Power Plug for International Sites . . . . .	16
<b>Figure 1-10</b>	Dimensions of Tall Rack Shipping Crate . . . . .	18
<b>Figure 1-11</b>	Dimensions of Short Rack Shipping Crate . . . . .	19
<b>Figure 1-12</b>	Removing a Short Rack from the Shipping Crate . . . . .	22
<b>Figure 1-13</b>	Removing a Tall Rack from the Shipping Crate. . . . .	24
<b>Figure 1-14</b>	Leveling Bolts . . . . .	25
<b>Figure 1-15</b>	Seismic Tie-down Attachment Points . . . . .	26
<b>Figure 1-16</b>	Leveling Bolts . . . . .	27
<b>Figure 1-17</b>	Joining Locations. . . . .	28
<b>Figure 1-18</b>	Mounting Hole Pattern of Rack Vertical Rails . . . . .	31
<b>Figure 1-19</b>	Adjusting the Length of the Altix 330 Slide Rails . . . . .	33
<b>Figure 1-20</b>	Placing the Rack Rails . . . . .	35
<b>Figure 1-21</b>	Placing the Module on the Rack Rails . . . . .	36
<b>Figure 1-22</b>	Securing the Module to the Front of the Rack . . . . .	37
<b>Figure 1-23</b>	Removing the Unit from a Rack . . . . .	38
<b>Figure 1-24</b>	Hooking NUMAlink Cabling from a Base Compute Module to an Expansion Module . . . . .	39

<b>Figure 1-25</b>	Cabling Multiple Modules Example . . . . .	41
<b>Figure 1-26</b>	Connecting a Dual-module System to a Power Source . . . . .	42
<b>Figure 1-27</b>	Example of Multiple Modules Connected to a Power Source in a Rack . . . . .	43
<b>Figure 1-28</b>	Cabling a PC/Laptop to an Altix 330 . . . . .	46
<b>Figure 1-29</b>	Location of the L1 USB Console Port . . . . .	46
<b>Figure 1-30</b>	Location of the Power Button. . . . .	50
<b>Figure 1-31</b>	Front Panel Functions. . . . .	52
<b>Figure 2-1</b>	Altix 330 System Front View. . . . .	54
<b>Figure 2-2</b>	Altix 330 Rear View . . . . .	55
<b>Figure 2-3</b>	Example of SGI Altix 330 Rack Systems. . . . .	56
<b>Figure 2-4</b>	Module-to-Module Connection Topology Block Diagram Example. . . . .	58
<b>Figure 2-5</b>	Optional Single-Plane Router Configuration Block Diagram . . . . .	59
<b>Figure 2-6</b>	SGI TP900 Storage Module . . . . .	63
<b>Figure 2-7</b>	Power Connection Example for Altix 330 System . . . . .	65
<b>Figure 2-8</b>	Unit Numbering Within Racks . . . . .	66
<b>Figure 2-9</b>	Altix 330 Slide Rails Example . . . . .	67
<b>Figure 2-10</b>	Shelf Rails Example . . . . .	67
<b>Figure 2-11</b>	Front Views of Short and Tall Racks . . . . .	68
<b>Figure 3-1</b>	Front View of a Base Compute Module . . . . .	72
<b>Figure 3-2</b>	Rear View of the Base Compute Module. . . . .	72
<b>Figure 3-3</b>	Functional Logic Diagram of Base Compute Module . . . . .	74
<b>Figure 3-4</b>	Node Board Block Diagram . . . . .	76
<b>Figure 3-5</b>	Local Memory Layout . . . . .	78
<b>Figure 3-6</b>	Front-panel Items . . . . .	81
<b>Figure 3-7</b>	Altix 330 Rear-panel Items . . . . .	83
<b>Figure 4-1</b>	Front and Side View of PA Module . . . . .	88
<b>Figure 4-2</b>	Front Panel Items on PA Module . . . . .	89
<b>Figure 4-3</b>	Rear Panel Items on PA Module . . . . .	90
<b>Figure 5-1</b>	Front View of the Optional R-Brick . . . . .	94
<b>Figure 5-2</b>	Router Functional Block Diagram . . . . .	95
<b>Figure 5-3</b>	Rear View of Router . . . . .	97
<b>Figure 6-1</b>	Opening the System Cover . . . . .	101
<b>Figure 6-2</b>	Closing the System Cover. . . . .	102

<b>Figure 6-3</b>	PCI or PCI-X Card Slot in the Base Compute Module . . . . .	.103
<b>Figure 6-4</b>	Removing an Installed Optional PCI/PCI-X Card . . . . .	.105
<b>Figure 6-5</b>	Installing a PCI/PCI-X Card . . . . .	.105
<b>Figure 6-6</b>	Disk Drive Installation . . . . .	.107
<b>Figure 6-7</b>	Replacing a Disk Drive . . . . .	.109
<b>Figure 6-8</b>	Removing the DVD Drive . . . . .	.112
<b>Figure 6-9</b>	Replacing a DVD Drive . . . . .	.113
<b>Figure 6-10</b>	Layout of Slots and DIMM Memory Groups . . . . .	.115
<b>Figure 6-11</b>	Removing a DIMM . . . . .	.117
<b>Figure 6-12</b>	Inserting a DIMM . . . . .	.118
<b>Figure 7-1</b>	Full Support Sequence . . . . .	.127
<b>Figure H-1</b>	Non-proprietary Connectors on Rear Panel of TP900 Module . . . . .	.137
<b>Figure H-2</b>	RJ-45 Connector Pin Assignments . . . . .	.138
<b>Figure H-3</b>	Pin Number Locations for External SAS/SATA Port . . . . .	.139
<b>Figure H-4</b>	Pin Number Locations for USB Type A Connector . . . . .	.140



## Tables

<b>Table 1-1</b>	Installation Tools . . . . .	12
<b>Table 1-2</b>	Module Space Requirements . . . . .	30
<b>Table 1-3</b>	Rackmounting Hardware. . . . .	32
<b>Table 2-1</b>	Altix 330 Configuration Ranges . . . . .	60
<b>Table 3-1</b>	Bandwidth Characteristics of the Base Compute Module . . . . .	85
<b>Table 3-2</b>	General Features of the Base Compute Module . . . . .	85
<b>Table 5-1</b>	Router Technical Specifications . . . . .	98
<b>Table 5-2</b>	Router Port Specifications . . . . .	98
<b>Table 7-1</b>	Troubleshooting Chart . . . . .	122
<b>Table 7-2</b>	L1/L2 Controller Messages . . . . .	124
<b>Table A-1</b>	Environmental Specifications . . . . .	132
<b>Table A-2</b>	Bandwidth Characteristics of the Compute Module . . . . .	133
<b>Table A-3</b>	General Features of the Compute Module . . . . .	133
<b>Table A-4</b>	Compute Module Specifications . . . . .	134
<b>Table A-5</b>	Short Rack Specifications (with Skins) . . . . .	135
<b>Table A-6</b>	Tall Rack Specifications . . . . .	135
<b>Table A-7</b>	TP900 Storage Module Specifications . . . . .	136
<b>Table A-8</b>	Compute Module Connectors . . . . .	137
<b>Table A-9</b>	Ethernet Connector Pin Assignments . . . . .	138
<b>Table A-10</b>	SAS/SATA Pin Assignments . . . . .	139
<b>Table A-11</b>	Pin Assignments for USB Type A Connector . . . . .	140





---

## About This Guide

This guide provides an overview of the Altix 330 system components, and it describes how to set up and operate this system.

The Altix 330 system is either a standalone base compute module, or a base compute module that is rackmounted and connected to one or more of the following optional modules:

- A CPU expansion compute module provides one or two additional 64-bit Intel processors and up to 16 GB of memory. One PCI and two hard disk options are available in this module. See Chapter 4, “CPU Expansion Module,” for information about this module.
- A 2U high PCI expansion module that provides additional PCI/PCI-X expansion slots for the Altix 330 server system. For detailed information about this module see the *SGI Altix PA Expansion Module User’s Guide*, (007-4712-00x).
- Systems using three to eight modules (with a single operating system) must be interconnected using an optional 2U high router module. The router module or “R-brick” is an eight-port 2U high module that functions as a high-speed switch to route network packets between Altix 330 units and any option modules within a system.
- Systems requiring optional RAID mass storage can use Silicon Graphics InfiniteStorage S330 products. For detailed information on this mass storage solution, see the *SGI InfiniteStorage S330 RAID User’s Guide*, (007-4798-00x).
- The SGI TP900 storage module provides additional non-RAID storage to the system. A short overview of this storage module is provided in “Storage Expansion” on page 62. For detailed information about this module, see the *SGI Total Performance 900 Storage System User’s Guide* (007-4428-00x).

This guide is written for owners, system administrators, and users of the Altix 330 system. It is written with the assumption that the reader has a good general knowledge of computers and computer operations.

## Important Information

Your SGI system support engineer (SSE) should perform the addition or replacement of parts, cabling, and service of your Altix 330 system, with the exception of the following tasks that you may perform yourself:

- Installing your system in a rack.
- Cabling the system modules to each other.
- Connecting a system console to your server system.
- Using your system console to enter commands and perform system functions such as powering on and powering off.
- Using the On/Off switches on the front panel of your system.
- Installing and removing PCI and PCI-X cards.
- Installing and removing disk drives and the DVD-ROM drive.
- Installing and removing memory DIMMs.

## Chapter Descriptions

The following topics are covered in this guide:

- Chapter 1, “Quick Start and Installation,” provides instructions for rack mounting, cabling, and operating the Altix 330 system.
- Chapter 2, “System Overview,” provides a general overview of the Altix 330 system and its topology. This chapter also includes a quick description of the various components and modules that can be part of an Altix 330 system.
- Chapter 3, “Base Compute Module,” describes the Altix base compute module and provides details about its internal and external components.
- Chapter 4, “PCI and PCI-X Option Module,” describes the PCI/PCI-X expansion module and provides information about its internal and external components.
- Chapter 5, “Optional Router,” provides a description of the optional router module used with larger systems (up to 16 processors). The chapter provides information on all connectors and front and rear external components.
- Chapter 6, “Installing and Removing Customer-replaceable Units,” describes how to install and remove the following customer-replaceable units (CRUs):
  - PCI and PCI-X cards
  - Disk drives
  - DVD-ROM drive
  - Memory (DIMMs)
- Chapter 7, “Troubleshooting,” describes how to troubleshoot your system by using the L1 controller and your system LEDs.
- Appendix A contains environmental and physical specifications for the Altix 330 system, as well as pin assignments for non-proprietary connectors on the Altix 330 system.
- Appendix B, “Regulatory Specifications and Safety Information,” contains regulatory specifications and safety information related to the Altix 330 system.

An index completes this guide.

## Related Publications

This section lists various information sources and explains how to access them. The following SGI publications relate to the Altix 330 system:

- *SGI Altix 330 User's Guide* (this manual) (hard copy shipped with the system and available online) (007-4790-00x). Use this guide to become acquainted with your system and to learn how to operate and monitor the system. In addition, this guide contains information on installing the system in a 19-inch rack, cabling the system, and replacing PCI and PCI-X cards, disk drives, memory DIMMs, and the L1 display.



---

**Warning:** To ensure your safety and protect your system, do not add or replace any components that this guide does not designate as customer replaceable. Contact your SGI system support engineer (SSE) to install any hardware components that are not designated as customer replaceable in this guide.

---

- *SGI Altix PA Expansion Module User's Guide* (007-4712-00x) (optional). This document provides information on the features and functionality of the PCI/PCI-X optional module that can be used with Altix 330 servers.
- *SGI L1 and L2 Controller Software User's Guide* (007-3938-00x) (available online). This guide describes the L1 and L2 controller functions, commands, and error messages that you may need to operate and maintain your system.
- *SGI Total Performance 900 Storage System User's Guide* (007-4428-00x) (optional). This guide describes the SGI TP900 storage module, which provides optional additional storage for the Altix 330 system.
- *SGI InfiniteStorage S330 RAID User's Guide* (007-4798-001) (optional). This user's guide describes SGI's price competitive RAID solution that supports high availability mass storage for Altix 330 and other SGI server products.
- *SGIconsole Hardware Connectivity Guide* (007-4340-00x) (optional). This guide describes how to connect an SGIconsole to SGI server systems. You can use an optional SGIconsole to manage and monitor your system.

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

- See 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.
- SGI ProPack for Linux documentation, and all other documentation included in the RPMs on the distribution CDs can be found on the CD titled "SGI ProPack vX.X for Linux - Documentation CD." To access the information on the documentation CD, open the `index.html` file with a web browser. Because this online file can be updated later in the release cycle than this document, you should check it for the latest information.
- The release notes, which contain the latest information about software and documentation in this release, are on the SGI ProPack for Linux Documentation CD in the root directory, in a file named `README.TXT`.

---

**Note:** There are no command line `grelnotes` or `relnotes` available on an SGI Linux system. The **InfoSearch** tool is not available with Linux.

---

## Conventions

The following conventions are used throughout this document:

<b>Convention</b>	<b>Meaning</b>
Command	This fixed-space font denotes literal items such as commands, files, routines, path names, signals, messages, and programming language structures.
<i>variable</i>	The italic typeface denotes variable entries and words or concepts being defined. Italic typeface is also used for book titles.
<b>user input</b>	This 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.
<b>GUI element</b>	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, as follows:

- 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
- Use the Feedback option on the Technical Publications Library website:  
<http://docs.sgi.com>
- Contact your customer service representative and ask that an incident be filed in the SGI incident tracking system.
- Send mail to the following address:  
Technical Publications  
SGI  
1500 Crittenden Lane, M/S 535  
Mountain View, California 94043

SGI values your comments and will respond to them promptly.





## Quick Start and Installation

This chapter describes how to install and operate your Altix 330 system. Specifically, the following topics are covered:

- “System Installation Overview” on page 2
- “Safety Precautions” on page 3
- “Unpacking and Inspecting Modules” on page 8
- “Setting the Server System on a Table Top” on page 9
- “Installing a Rack System” on page 11
- “Installing the Modules in a Rack” on page 29
- “Cabling the System Modules” on page 39
- “Cabling the System Modules to a Power Source” on page 42
- “Connecting the System Console” on page 44
- “Operating Your System” on page 47

## System Installation Overview

In this chapter, different installation instructions are provided for different types of system installations. Follow the instructions for your type of installation, as follows:

---

**Note:** Information is referenced in each case for connecting an optional system console to your server.

---

- If you have ordered one or two system modules for table-top use or with the intention of rackmounting and cabling your own server system, follow the quick start instructions in these sections:
  - “Safety Precautions” on page 3
  - “Unpacking and Inspecting Modules” on page 8
  - “Installing a Rack System” on page 11
  - “Installing the Modules in a Rack” on page 29
  - “Cabling the System Modules” on page 39
  - “Cabling the System Modules to a Power Source” on page 42
  - “Connecting the System Console” on page 44
- If you have ordered a server system that is already rackmounted, which means that the modules that compose your system are also already cabled together, follow the instructions in these sections:
  - “Safety Precautions” on page 3
  - “Installing a Rack System” on page 11
  - “Cabling the System Modules to a Power Source” on page 42
  - “Connecting the System Console” on page 44

- If you have ordered either a single- or dual-module system that you intend to install on a table top, follow the instructions in these sections:
  - “Safety Precautions” on page 3
  - “Unpacking and Inspecting Modules” on page 8
  - “Cabling the System Modules” on page 39
  - “Cabling the System Modules to a Power Source” on page 42
  - “Connecting the System Console” on page 44
- If you have your own rack, and have ordered system modules with the intention of rackmounting and cabling your own system, follow the instructions in these sections:
  - “Safety Precautions” on page 3
  - “Unpacking and Inspecting Modules” on page 8
  - “Installing the Modules in a Rack” on page 29
  - “Cabling the System Modules” on page 39
  - “Cabling the System Modules to a Power Source” on page 42
  - “Connecting the System Console” on page 44

## Safety Precautions

Before you install an Altix 330 system, you should familiarize yourself with the safety precautions discussed in the following subsections:

- “Hazard Statements” on page 4
- “ESD Precautions” on page 4
- “Safety Measures” on page 5

## Hazard Statements

During the installation of your Altix 330 system, be alert for hazard advisory statements with icons, which signify the following:

- **Caution** indicates a potentially hazardous situation that, if not avoided, can result in minor or moderate injury. A caution statement also alerts you to unsafe practices that can result in equipment damage and/or data corruption. A caution message is accompanied by an icon as shown in the following example:



---

**Caution:**

---

- **Warning** indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury. A warning message is accompanied by icon as shown in the following example:



---

**Warning:**

---

- **Danger** indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. A danger message is accompanied by the same icon as a warning.

## ESD Precautions

Observe electrostatic discharge (ESD) precautions during the entire installation process to eliminate possible ESD damage to the equipment. Wear an SGI-approved wrist strap when you handle an ESD-sensitive device. Connect the wrist strap cord directly to earth ground.



---

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

---

## Safety Measures

Observe the following safety measures when you install the system:

- Use caution when you remove the system from the shipping crate. Failure to handle the system carefully can result in personal injury or property damage.



---

**Caution:** Ensure that the shipping crate is positioned close to its destination before you unpack the crate.

---



---

**Warning:** Employ a minimum of two people to lift a module, to move the module(s) from one location to another, and to install the module(s) in a rack. Otherwise, someone could be seriously injured.

---

- Do not move the system while it is connected to power.



---

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

---

- Ensure that a qualified electrician has properly installed the power receptacles.
- Set all circuit breakers to the OFF (O) position before you plug in the system power cord.



---

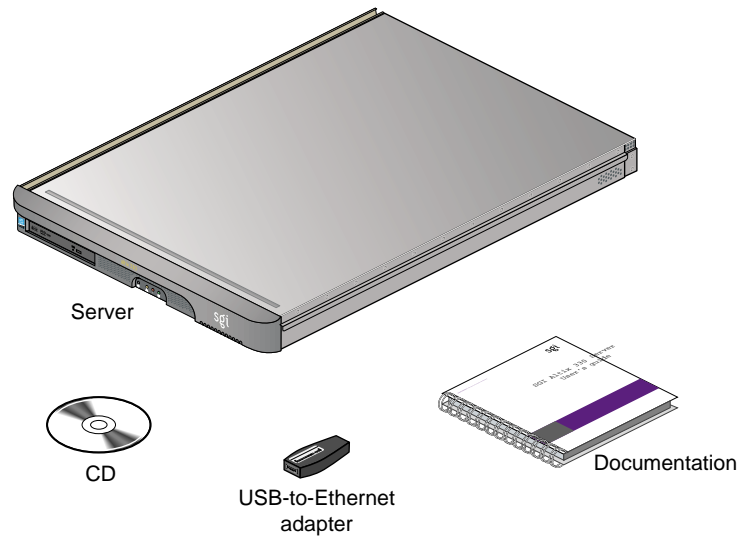
**Warning:** Use the following guidelines to prevent the rack from toppling over. Otherwise, people could be seriously injured and/or equipment could be damaged.

---

- Follow these guidelines to prevent the rack from toppling over:
  - Make sure that only one module is extended out of the rack at one time.
  - Install all equipment in the lowest available position in the rack.
  - Ensure that the tip tray is bolted to the front of the rack.

## Checking Your Shipment

Figure 1-1 shows the basic components that ship with your System. If parts of your shipment are damaged or missing, contact your support provider. Note that the figure shows only the basic system components.



**Figure 1-1** Basic System Shipment Contents

## Lifting the System

The base system server weighs approximately 31 lb. (14.1 kg). Exercise care when you lift the unit to move or install the server. Lift the unit by placing your hands under the bottom edges of the chassis, do **not** lift the unit by the front bezel. Use two people to lift the unit whenever possible.

## Getting Acquainted

To become familiar with your system, refer to the following figures:

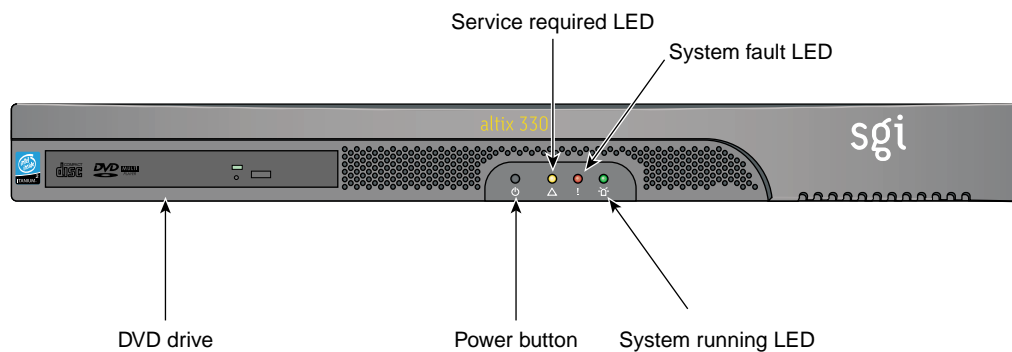
- Figure 1-2 on page 7, which shows the front view of the system.
- Figure 1-3 shows the rear panel items on the system.

## Front Panel Items

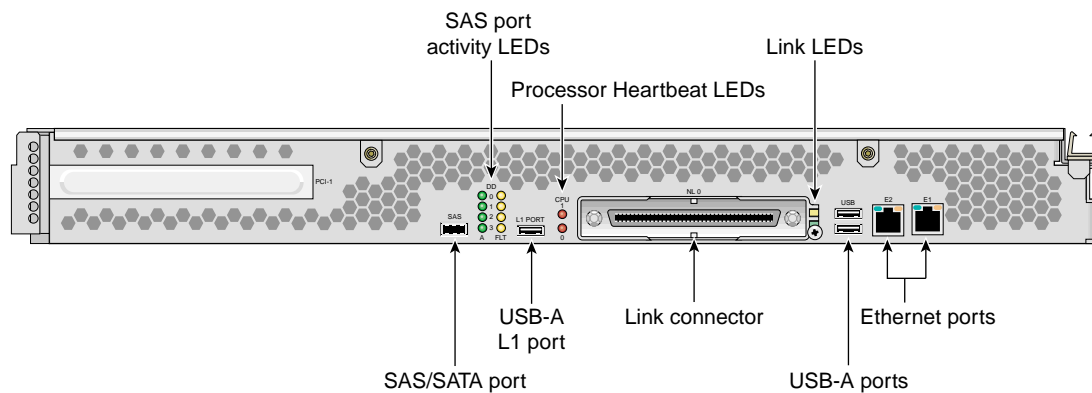
Items on the front panel include

- Power button
- Three status LEDs
- DVD-ROM drive

For more information on front panel controls, see “Powering the System On and Off Manually” on page 49 and “Operating the System Modules Using Front Panel Controls” on page 52.



**Figure 1-2** Front View of the System



**Figure 1-3** System Rear Panel Items

## Rear Panel Items

The rear panel of the SGI Altix 330 has the following items:

- **Standard PCI/PCI-X slot.** This full-length PCI card slot supports a number of PCI/PCI-X option cards.
- **Serial Attached SCSI and Serial Advanced Technology Attachment (SAS/SATA) connector.** Provides external SAS/SATA hard disk and removable media device support.
- **Six SAS/SATA activity LEDs.** Located next to the SAS/SATA port reflect the activity on the port when an external device is present. If an amber LED in the right column is lit, it indicates that no device is present. The green LEDs on the left column will flash to indicate device activity.
- **L1 (USB A) port.** Provides a connection to the module's L1 system controller.
- **NUMAlink LEDs.** The NUMAlink connector has two LEDs. These LEDs are located next to the NUMAlink connector. One LED lights yellow to indicate that the base compute module and the module to which it is connected are powered on. The other LED lights green when the link between the base compute module and the module to which it is connected is established.

## Unpacking and Inspecting Modules

This section describes how to unpack and inspect individual modules. Follow these instructions if you need to install individual modules in a rack or on a table top. Go to “Installing a Rack System” on page 11 if your system came pre-mounted in a rack.

Before unpacking your modules, inspect the packaging container for evidence of mishandling during transit. If the packaging container is damaged, photograph it for reference. After you remove the contents, keep the damaged container and the packing materials.

Remove the module or modules from the packaging container and ensure that all accessories are included. Inspect the module(s) and accessories for damage. If the contents appear damaged, file a damage claim with the carrier immediately. In addition, notify your local Customer Support Center (CSC) for any missing, incorrect, or damaged items. For CSC contact information, see <http://www.sgi.com/support/supportcenters.html>.



## Setting the Server System on a Table Top

If your system is a single module system (the base compute module) or a dual-module system (a base compute module cabled to a diskless module, for example), and you choose to operate it on a table top, you need to install the self-adhesive feet that are supplied with the module(s). To install the feet, follow these steps:

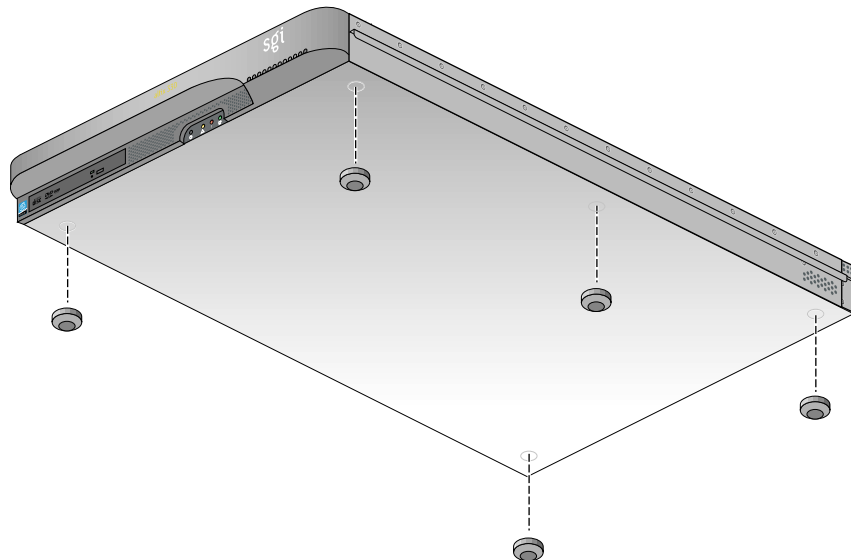
1. Place the module upside down on a flat, stable surface.
2. Peel off the protective film from the feet and place them on the circular marks on the bottom of the unit, as shown in Figure 1-4.
3. If you have a dual-module system, repeat steps 1 and 2 to put feet on the second module. (If you have a dual-module system, it is recommended that you place the base compute module on the bottom, and that you place the other module on top.)

---

**Note:** If you mount the system in a rack at a later date, you will need to remove the feet.

---

For instruction on cabling the Altix 330 modules go on to “Cabling a Basic System” on page 10.

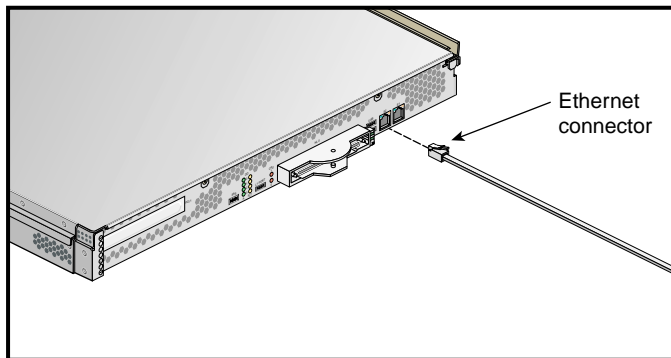


**Figure 1-4** Example of Table-mounting Feet

## Cabling a Basic System

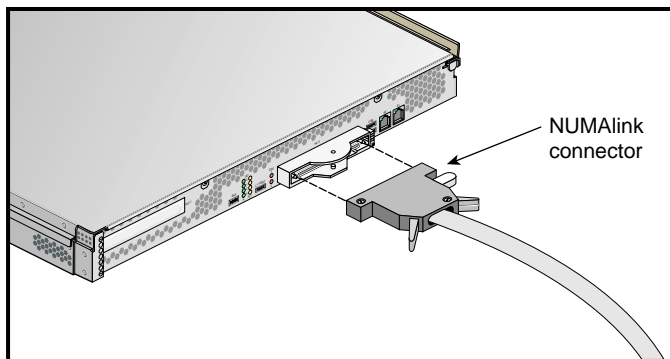
To set up the system, follow these steps:

1. Connect the Ethernet cable to an Ethernet port on the back, as shown in Figure 1-5.



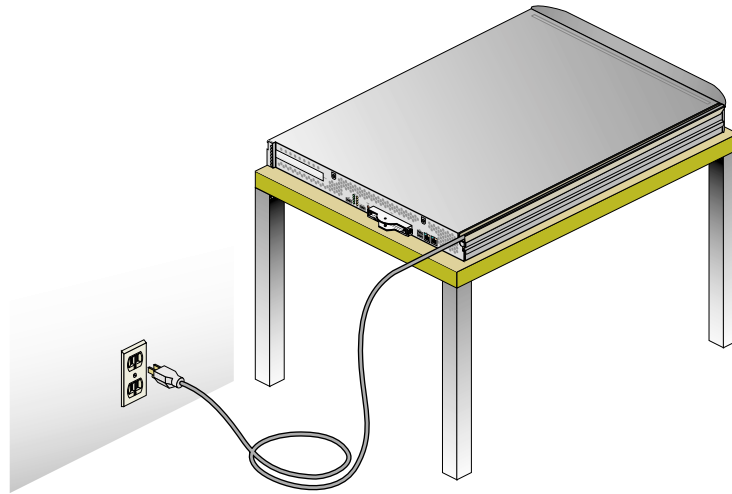
**Figure 1-5** Connecting the Ethernet Cable

2. If you are connecting the base enclosure to another Altix 330 module or other optional module, attach the NUMAlink-4 cable to the back, as shown in Figure 1-6 otherwise, go on to the next step.



**Figure 1-6** Attaching the NUMAlink-4 Cable

3. Plug the module's AC power cable into an approved outlet or the power distribution unit (PDU) of the rack (as applicable), see Figure 1-7 for an example. Note that the green LED on the front of the system lights up after the unit is fully powered on.



**Figure 1-7** Connecting the Altix 330 to an AC Power Source

## Installing a Rack System

This section describes how to install a rack that already has your system modules installed, rackmounted and cabled together. The following information is provided:

- “Preinstallation Activities” on page 12
- “Unloading and Moving System Equipment” on page 17
- “Removing a Short Rack from the Shipping Crate” on page 21
- “Removing a Tall Rack from the Shipping Crate” on page 23
- “Positioning and Leveling a Single-rack System” on page 25
- “Positioning and Leveling Multiple Racks” on page 27

After you have completed installing your rack, proceed to “Cabling the System Modules to a Power Source” on page 42 to continue your installation.

If your system components were not shipped in a rack, skip this section and proceed to “Unpacking and Inspecting Modules” on page 8 to begin your installation.

## Preinstallation Activities

Perform the following preinstallation activities:

- Perform site verifications (see “Site Plan Verification” on page 12)
- Gather appropriate tools to complete the installation (see “Rack Tools Required” on page 12)
- Ensure that the correct power receptacle is installed and properly wired (see “Rack Power Receptacle Verification” on page 13)

---

**Note:** You can perform the preinstallation activities days or weeks before you receive your system.

---

## Site Plan Verification

Ensure that all site requirements are met before your system arrives. If you have questions about the site requirements or you would like to order full-size floor templates for your site, contact a site planning representative by e-mail ([site@sgi.com](mailto:site@sgi.com)) or by telephone (+1 715 726 2820).

## Rack Tools Required

Table 1-1 lists the tools that you need to complete the installation.

**Table 1-1** Installation Tools

<b>Tool</b>	<b>Part Number</b>	<b>Purpose</b>
13-mm wrench	7260744	Adjust the leveling pads.
13-mm socket (3/8-in. drive)	7260726	Remove bracket bolts from tall rack shipping crate.
19-mm socket (3/8-in. drive)	9470618	Remove bolts from short rack shipping crate.
Extension, 6-in. (3/8-in. drive)	7260655	Used with ratchet and sockets.
Ratchet, reversible (3/8-in. drive)	7260755	Used with extension and sockets.
Level, 9-in.	9470556	Level the rack.

## Rack Power Receptacle Verification

Ensure that a qualified technician installs the correct power receptacles. Your Altix 330 system uses one or two single-phase power receptacles. For North American sites, the single-phase receptacle is a 30-amp, 200- to 240-volt receptacle that has two phase sockets and one ground socket. For international sites, the single-phase receptacle is a 32-amp, 200-volt receptacle that has one phase socket, one neutral socket, and one ground socket. Note that the ground pin is slightly longer than the other two pins on the North American plug.

For North American sites, follow these steps to ensure that a single-phase power receptacle is properly wired:

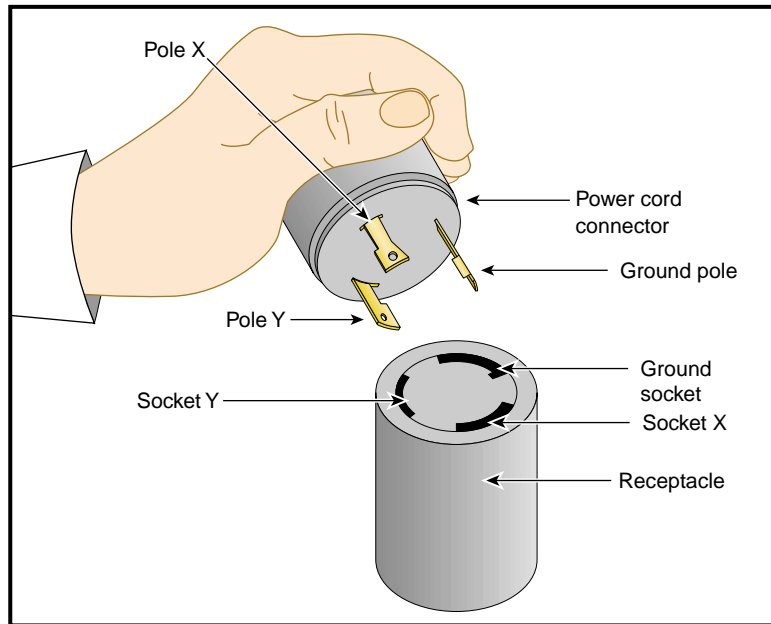
4. Set the voltmeter to a high AC voltage range.
5. Check the voltage between socket X and socket Y (see Figure 1-8). The meter should read between 200 and 240 VAC.
6. Check the voltage between socket X and the ground socket. The meter should read approximately 120 VAC.
7. Check the voltage between socket Y and the ground socket. The meter should read approximately 120 VAC.
8. Check the voltage between the ground socket and an earth-ground location. The meter should read 0 VAC.
9. Change the voltmeter to a low-resistance setting.
10. Measure between the ground socket and an appropriate earth-ground location and ensure that resistance is less than 1 ohm.
11. Repeat steps 1 through 7 for any additional single-phase power receptacles.



---

**Caution:** If a voltage reading is incorrect, or if the resistance measured in step 7 is more than 1 ohm, contact a site-approved electrician. Do not proceed with the installation.

---



**Figure 1-8** 30-amp Single-phase Power Receptacle for North American Sites

For international sites, follow these steps to ensure that a single-phase power receptacle is properly wired:

1. Set the voltmeter to a high AC voltage range.
2. Check the voltage between socket 1 and socket 2 (see Figure 1-9). The meter should read between 200 and 240 VAC.
3. Check the voltage between socket 1 (line) and the ground socket. The meter should read between 200 and 240 VAC.

---

**Note:** The ground pin is slightly larger in diameter than the other two pins.

---

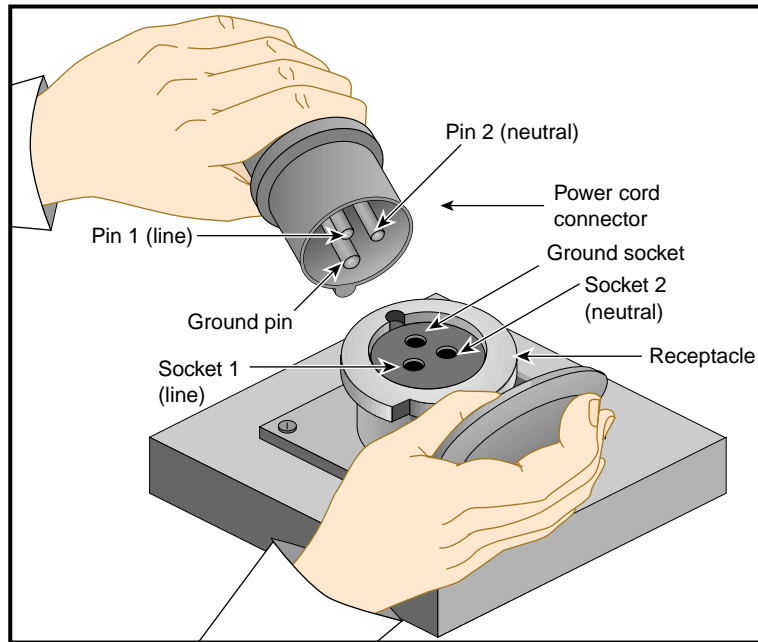
4. Check the voltage between socket 2 (neutral) and the ground socket. The meter should read approximately 0 VAC.
5. Check the voltage between the ground socket and an earth-ground location. The meter should read 0 VAC.
6. Change the voltmeter to a low-resistance setting.
7. Measure between the ground socket and an appropriate earth-ground location and ensure that resistance is less than 1 ohm.
8. Repeat steps 1 through 7 for any additional single-phase power receptacles.



---

**Caution:** If a voltage reading is incorrect, or if the resistance measured in step 7 is more than 1 ohm, contact a site-approved electrician. Do not proceed with the installation.

---



**Figure 1-9** 32-amp Single-phase Power Plug for International Sites



## Unloading and Moving System Equipment

Your Altix 330 system arrives at the site in cardboard shipping crates.

For a short rack system, the documentation carton and the accessories carton are packed with the system. The documentation carton contains the system manuals as well as warranty and licensing information. The accessories carton contains the I/O, peripheral, and system cables, and any additional connectors or tools that are required for a specific configuration. The PC, workstation, or terminal is shipped in a separate carton.

For a tall rack system, the system documentation; accessories; and PC, workstation, or terminal arrive in separate cartons.

This section describes how to unload and transport the system to its designated location, as follows:

- “Unloading the Equipment from the Truck” on page 17
- “Inspecting the Shipping Crate” on page 19
- “Transporting the Shipping Crate” on page 20

### Unloading the Equipment from the Truck

If your loading dock is the same height as the transportation vehicle, use a pallet jack to unload the system from the transportation vehicle. The pallet jack should have 48-in. tines or forks. Follow any instructions that are printed on the packing crates.

If the loading dock is not the same height as the vehicle, you must provide a forklift or another approved method to unload the system. You can use a platform or ramp to obtain the desired level as long as the ramp incline does not exceed a ratio of one unit vertical to six units horizontal. For more information on site requirements, contact site planning by e-mail ([site@sgi.com](mailto:site@sgi.com)) or by telephone (+1 715 726 2820).



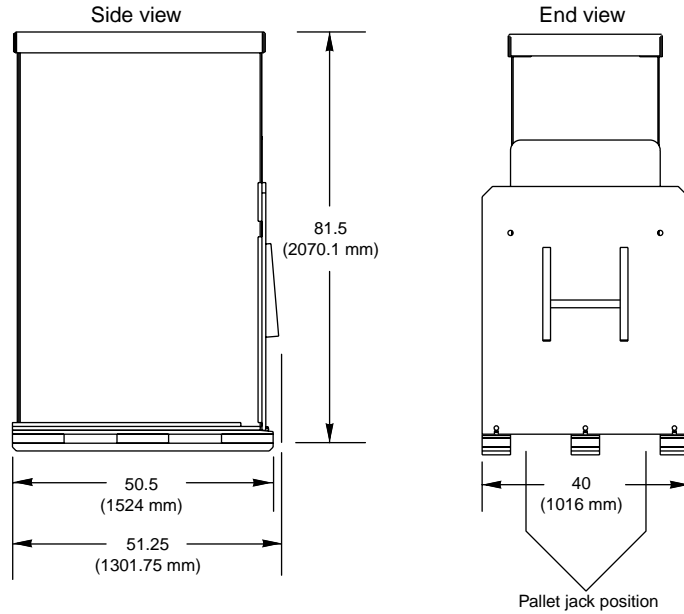
---

**Warning:** Use two or more people to prevent computer equipment from rolling off the transportation vehicle. Failure to do so could result in serious damage to the computer equipment.

---

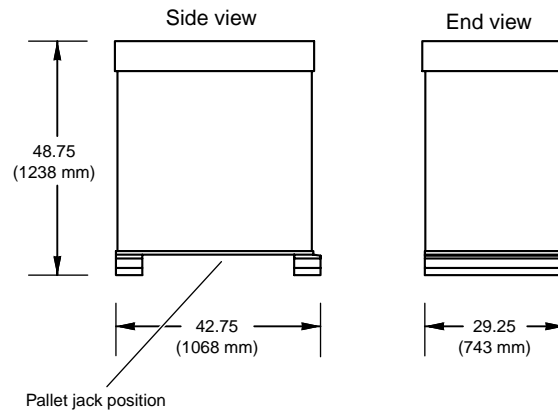
If your site does not have a loading dock, arrange for a forklift to unload the system from the transportation vehicle. Ensure that two or three people are available to help unload the equipment. Move all crates slowly and carefully.

Figure 1-10 shows the lift openings and dimensions of a tall rack shipping crate. This figure also shows where to position the pallet jack.



**Figure 1-10** Dimensions of Tall Rack Shipping Crate

Figure 1-11 shows the lift openings and dimensions of a short rack shipping crate. This figure also shows where to position the pallet jack.



**Figure 1-11** Dimensions of Short Rack Shipping Crate

### Inspecting the Shipping Crate

After the system is unloaded from the truck, follow these steps before you unpack it:

1. Ensure that the crates and cartons arrive unopened.
2. Inspect the shipping crate for signs of external damage such as dents, holes, crushed corners, and water marks.
3. Ensure that the tilt watch has not been tripped.
4. If the crate is damaged, file a damage claim with the carrier immediately. In addition, notify your local Customer Support Center (CSC) for any missing, incorrect, or damaged items. For CSC contact information, see <http://www.sgi.com/support/supportcenters.html>.

## Transporting the Shipping Crate

Use a pallet jack with forks that are 48 in. (122 cm) long or longer to transport the shipping crate to the designated location. See Figure 1-10 and Figure 1-11 for the crate dimensions and location to position the pallet jack. For system weight and dimensions, contact site planning by e-mail (site@sgi.com) or by telephone (+1 715 726 2820).

If the crate does not fit through all access doors, you may need to partially disassemble the crate.



---

**Caution:** If the system shipping or storage environment is significantly colder than the environment in which it will be installed [40 °F (22 °C) or greater disparity], leave the rack in its shipping crate for at least 24 hours at room temperature before you start the installation. This acclimation prevents damage to the equipment that could result from thermal shock and condensation.

---

## Removing a Short Rack from the Shipping Crate



---

**Warning:** Be careful when you unpack and move the short rack system. Ensure that the rack remains on a level surface and that the rack weight remains evenly distributed across the four casters. If you must lift the casters over an obstacle, such as a door threshold, use proper lifting techniques and employ a minimum of two people.

---



---

**Caution:** Do not subject the rack to any unnecessary shocks or vibration while you unpack and install the system.

---

See Figure 1-12 as you follow these steps; the numbered illustrations correspond to the numbered steps.

1. Ensure that the temperature of the rack is acclimated to the environment in which you are installing it.
2. Remove the crate cover.
3. Lift the ramp out of the crate and set it aside.
4. Remove the documentation carton, accessories carton, and cardboard packing material.
5. Lift the sidewalls of the crate up and over the system.
6. Remove the four bolts that secure the rack to the crate. You must reach underneath the crate and feel for the bolts.
7. Align the holes in the edge of the ramp with the pegs in the base of the crate. Ensure that the ramp is secure.
8. Remove the gate pins from the left and right ends of the gate. Then remove the gate.
9. Pull the rack down the ramp.



---

**Warning:** The maximum weight of the short rack is 488 lb (221 kg). Use caution when you roll the rack down the ramp.

---

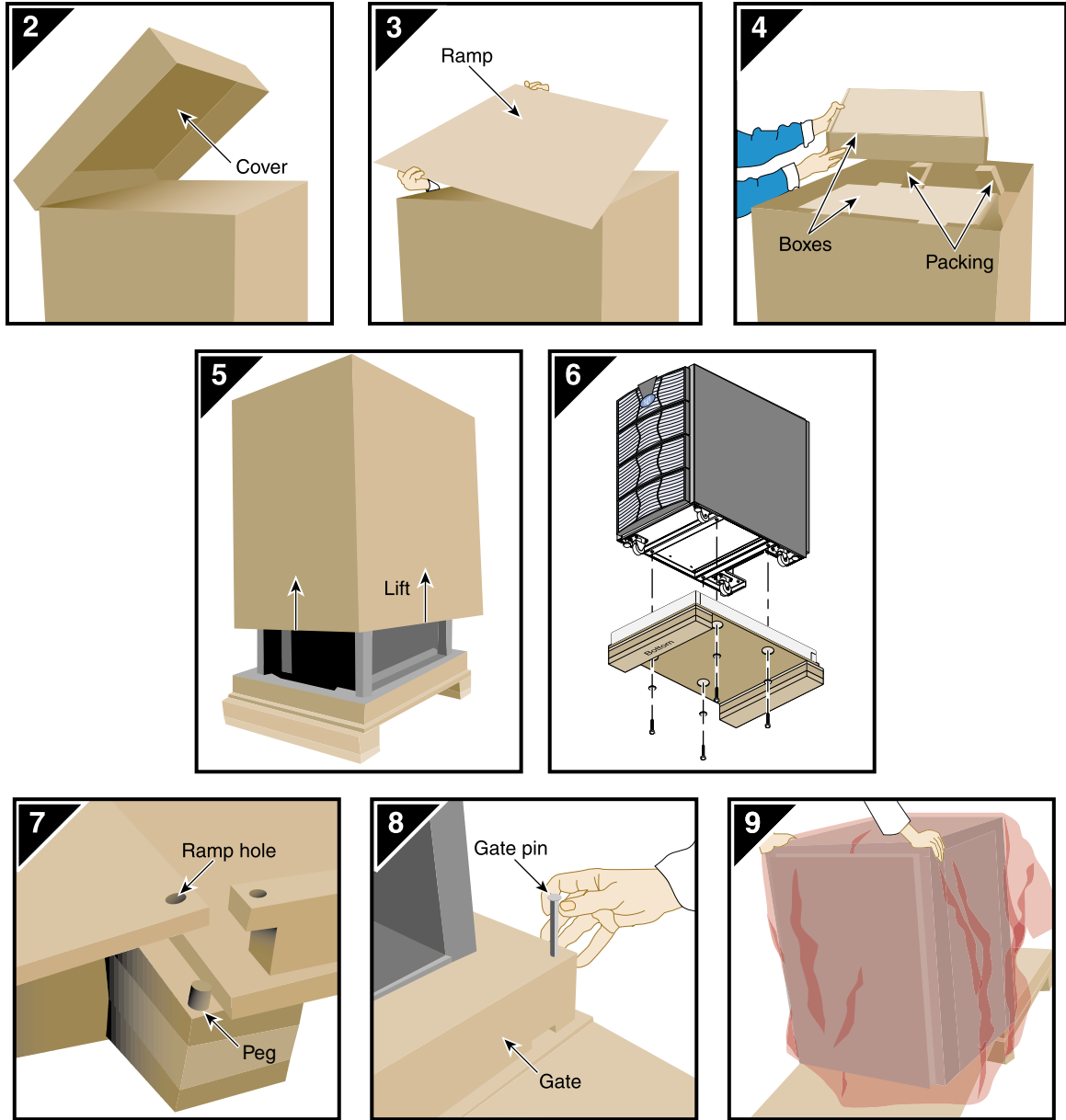


Figure 1-12 Removing a Short Rack from the Shipping Crate

## Removing a Tall Rack from the Shipping Crate



---

**Warning:** In its maximum configuration, a tall rack system can weigh approximately 1,366 lb (620 kg). Use caution when you unpack and move this rack. Ensure that the rack remains on a level surface and that the rack weight remains evenly distributed across the four casters.

---

To unpack a tall rack, you will need the following tools:

- Extension, 6-inch, 3/8-in. drive
- 13-mm standard 3/8-in. drive socket
- Ratchet, reversible, 3/8-in. drive

See Figure 1-13 as you follow these steps; the numbered illustrations correspond to the numbered steps.

1. Ensure that the temperature of the rack is acclimated to the environment in which you are installing it and that the system crate is in a stable, upright position.
2. Remove the bands that secure the crate.

---

**Note:** Brace the wooden ramp as you remove the horizontal band that surrounds the crate and the wooden ramp. The ramp moves freely after you remove this band.

---

3. Place the ramp so that the three holes in the edge of the ramp align with the pegs in the base of the pallet deck.
4. Remove the cardboard cover, the two cardboard sidewalls, and the foam cushion.
5. Remove the bolts that secure the rack to the pallet deck, as follows:
  - a. Remove the top four bolts from the rear mounting bracket; do not remove the bottom bolts.
  - b. Remove the four bolts that secure the front mounting bracket and tip tray to the bottom of the pallet deck. Set the tip tray aside.
  - c. Remove the top four bolts from the front mounting bracket. Set the mounting bracket aside.
6. Use two people to roll the rack out of the crate and down the ramp.

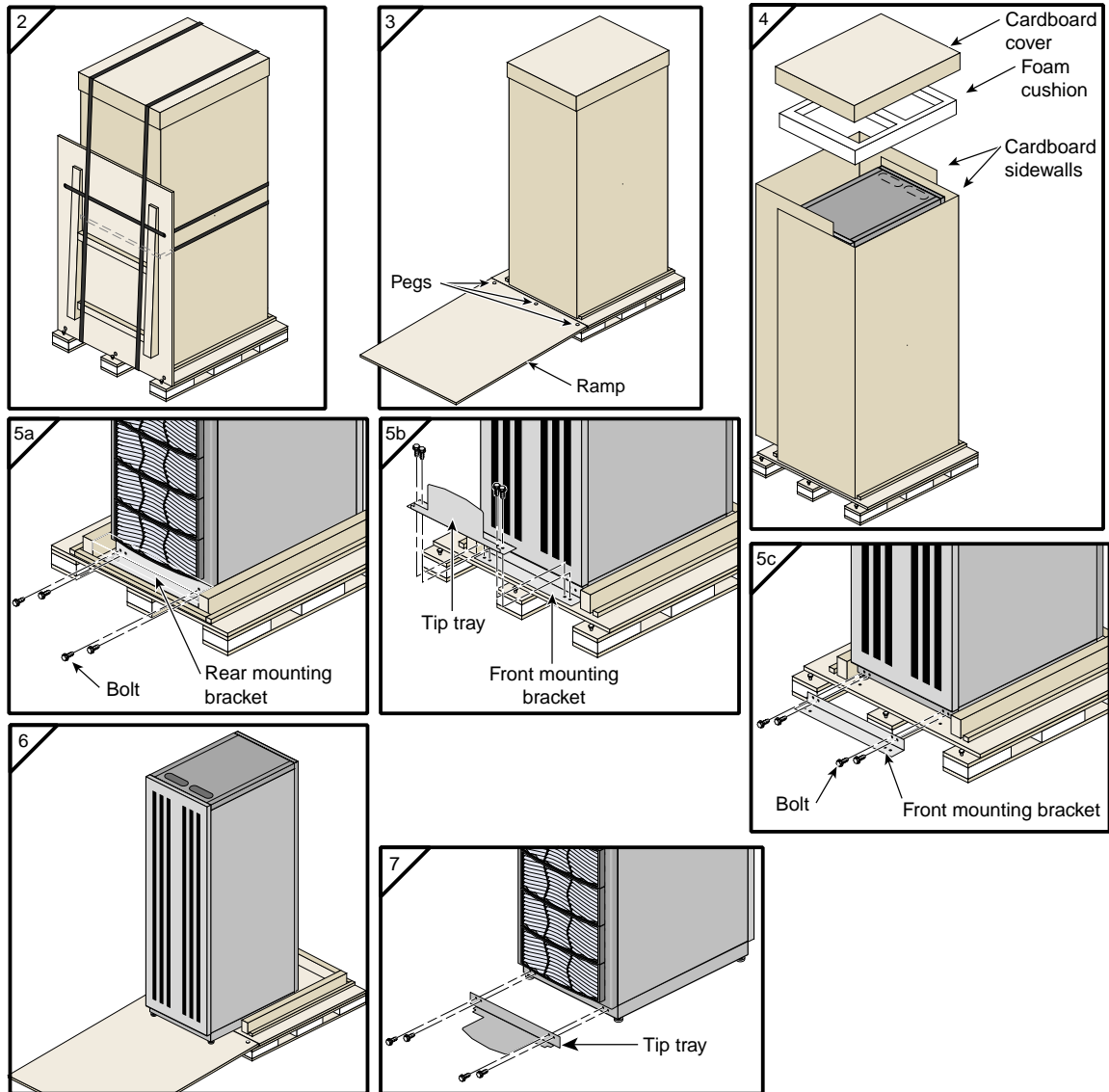


---

**Warning:** Use extreme caution when you roll the tall rack down the ramp. Personal injury and system damage could result if the rack becomes unbalanced or gains too much momentum when it rolls down the ramp.

---

7. Bolt the tip tray to the front of the rack before you move the rack to its designated location. This tray prevents the rack from tipping while you move the rack.



**Figure 1-13** Removing a Tall Rack from the Shipping Crate



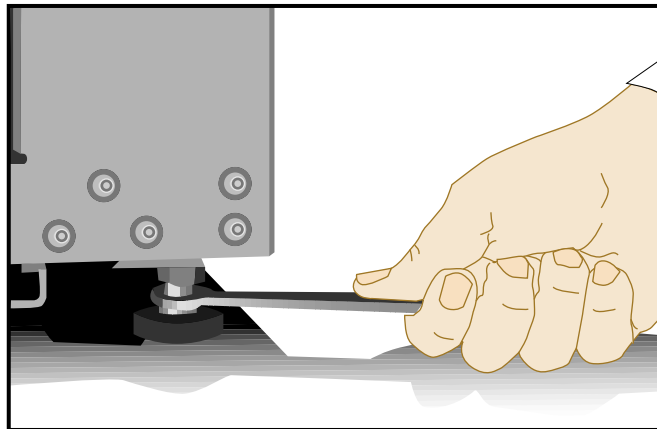
## Positioning and Leveling a Single-rack System



**Caution:** To avoid ESD damage to the electronic components, be sure to position the rack before you remove the ESD bag that covers the rack assembly.

To position and level a single-rack system, follow these steps:

1. Grasp the rear of the rack and roll the rack to its designated location.
2. Remove the ESD bag.
3. If you are installing a tall rack, adjust the leveling bolts, as shown in Figure 1-14, until the rack is level.



**Figure 1-14** Leveling Bolts

4. Ensure that the circuit breaker on the power distribution unit is in the OFF (○) position. Then connect the power cord to a grounded power outlet. Plugging in the power cord grounds the rack.

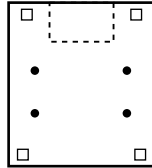
5. Secure the rack with seismic tie-downs if you are installing the system in an earthquake zone.

---

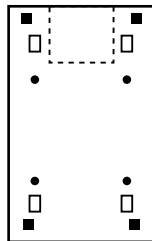
**Note:** Tall and short racks have four threaded holes that are located at the bottom of the rack (see Figure 1-15). Use these holes to secure the seismic tie-downs. SGI does not supply the seismic tie-downs.

---

Top view of short rack



Top view of tall rack



- Seismic tie-down attachment points
- Casters
- Leveling pads

**Figure 1-15** Seismic Tie-down Attachment Points

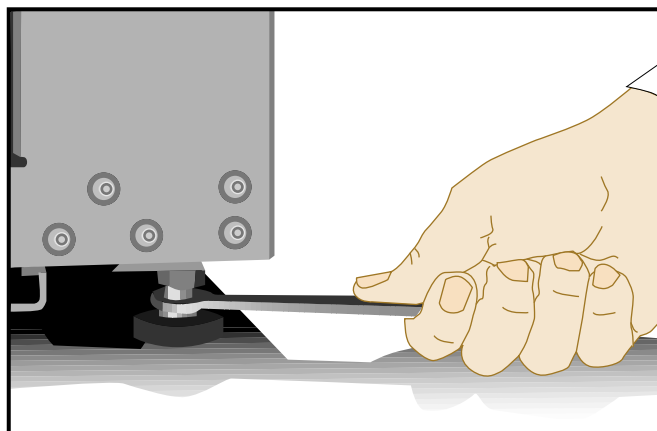
## Positioning and Leveling Multiple Racks



**Caution:** To avoid ESD damage to the electronic components, be sure to position the racks before you remove the ESD bags that cover the rack assemblies.

To position and level multiple racks, follow these steps:

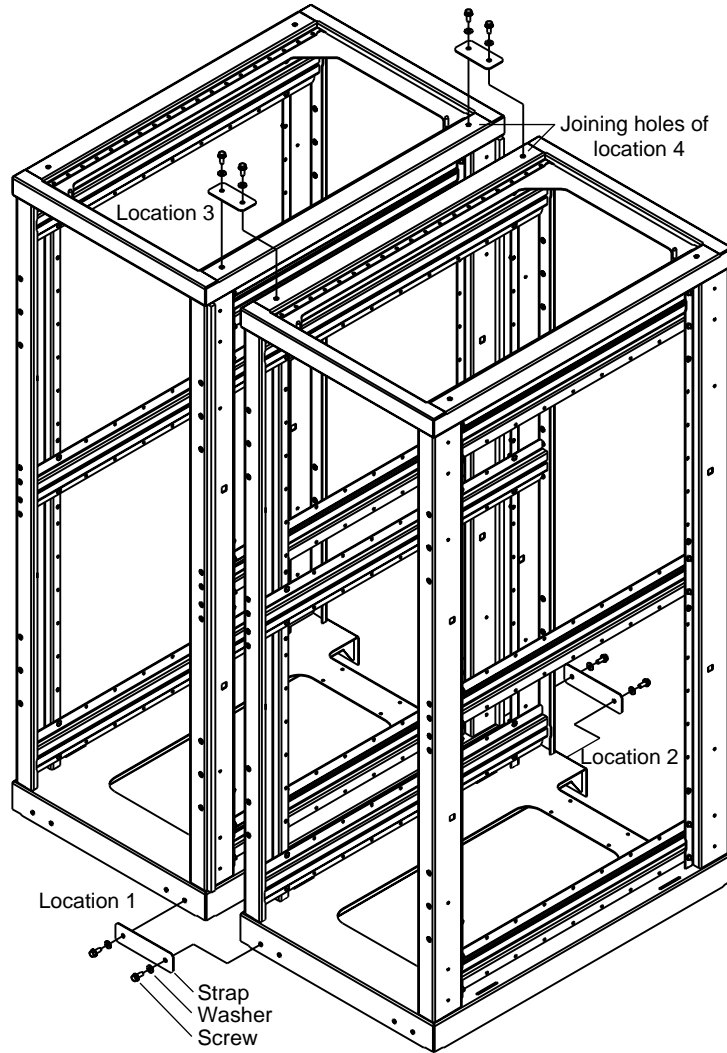
1. Grasp the rear of each rack and roll the rack to its designated location.
2. Remove the ESD bags.
3. Adjust the leveling bolts of rack 001, as shown in Figure 1-16, until the rack is level.



**Figure 1-16** Leveling Bolts

4. Using the leveling bolts of rack 002, adjust rack 002 so that the joining holes of rack 002 align with the joining holes of rack 001. See Figure 1-17.
5. Using the provided straps, screws, and washers, bolt the racks together in the four designated locations shown in Figure 1-17.
6. If your system has additional racks, repeat steps 4 and 5 until all of the racks are bolted together.
7. Ensure that the circuit breakers on the power distribution units are in the OFF (●) position. Then connect the power cords to grounded power outlets. Plugging in the power cords grounds the racks.
8. Secure the racks with seismic tie-downs if you are installing the system in an earthquake zone.

**Note:** Tall racks have four threaded holes that are located at the bottom of the rack (see Figure 1-15 on page 26). Use these holes to secure the seismic tie-downs. SGI does not supply the seismic tie-downs.



**Figure 1-17** Joining Locations

## Installing the Modules in a Rack

This section describes how to install the modules that compose an Altix 330 system in a rack with a rail assembly. For example, the base compute module, and any CPU expansion compute modules, are rackmounted with rails designed specifically for the Altix 330.

Other optional system modules such as an SGI storage system module, use different style shelf mounting rails. Always reference the documentation shipped with any optional rackmount module to identify the proper mounting rail hardware.

This section also describes how to remove the modules from a rack.

This rackmounting information is found in the following sections:

- “Rackmounting Altix 330 Modules with Rails” on page 29
- “Removing a Module from the Rack” on page 38

## Rackmounting Altix 330 Modules with Rails

This section describes how to rackmount modules with slide-rail assemblies. You can use the instructions to rackmount all Altix 330 compute and expansion modules. Optional storage or PCI expansion modules may use different mounting techniques. This section includes the following topics:

- “Determining Space Requirements” on page 30
- “Preparing the Rack Mounting Rail Assemblies” on page 32
- “Checking the Slide-rail Hardware” on page 32
- “Preparing the Rack Mounting Rail Assemblies” on page 32
- “Attaching the Rails to the Rack” on page 34
- “Installing the Module in the Rack” on page 36
- “Removing a Module from the Rack” on page 38

## Determining Space Requirements

Table 1-2 specifies the space requirements when rackmounting Altix 330 modules in a 19-inch rack.

**Table 1-2** Module Space Requirements

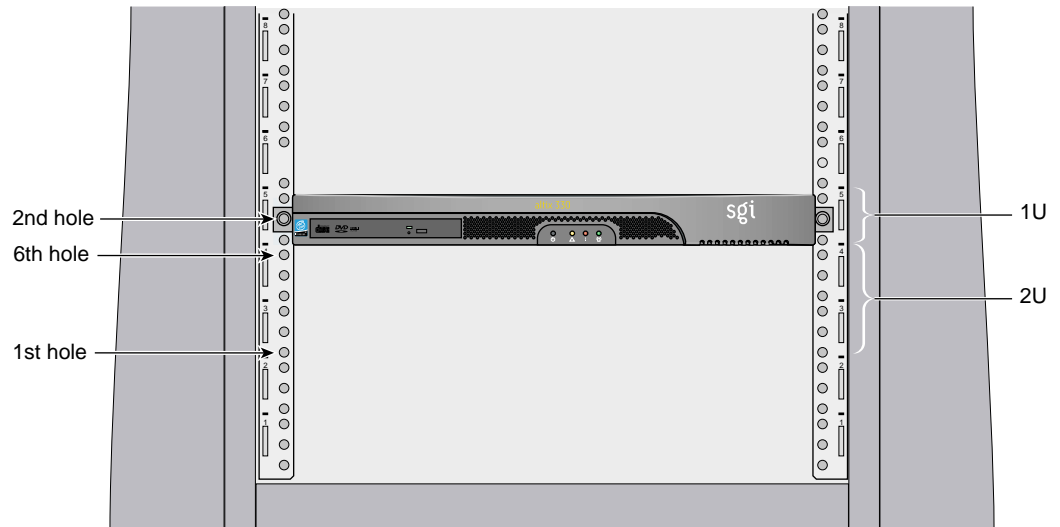
Height	1.7 inches (4.3 cm)
Width	17.5 inches (44 cm)
Depth	31.75 inches (80.6 cm) (with bezel)
Weight	31 lbs (14.1 kg) maximum configuration <sup>a</sup>
Required front clearance for module	8.25 in. (20.96 cm)
Required rear clearance for module	10 in. (25.40 cm)
Required front clearance for rack	36 in. (91 cm)
Required rear clearance for rack	36 in. (91 cm)

a. Weight will vary slightly depending on the number of DIMMs installed (four or eight), the number of processors (one or two), and on whether you have one or two disk drives in your system.

## Determining Where to Attach the Slide Rails in the Rack

The base compute module and any additional CPU expansion compute modules each require one unit (1U) of space within the rack (one unit is equivalent to 1.75 inches [44.5 cm]). To determine where you should install the rails in the rack, you must count mounting holes. Each U contains three mounting holes; therefore, in the 1U of space that the module occupies, there are three mounting holes. The bottom hole of the 1U space is hole 1. The top mounting hole in the 1U space is hole 3. See Figure 1-18 for a description.

**Note:** A module in the rack is identified by the lowest U number that it occupies regardless of the height of the enclosure. A 2U option module, such as the PA would be identified by the U number its bottom half occupies. In Figure 1-18 the module resides in U5 (the fifth unit within the rack).



**Figure 1-18** Mounting Hole Pattern of Rack Vertical Rails

To determine how many mounting holes you must count, use the following formula: **3 x (the U number that the module will occupy) - 2**. For example, when you want to install the module in location U9, count 25 mounting holes (3 x 9 - 2) starting from the bottom of the rack. The 25th hole is the first (lowest) mounting hole of the U9 location.

## Checking the Slide-rail Hardware

Table 1-3 lists the hardware that you will use to mount the module in a 19-inch rack.

**Table 1-3** Rackmounting Hardware

Hardware Type	Qty	Usage
Rail assembly (includes length adjustment hardware)	2	Allows the module to slide in and out of the rack and holds it locked vertically.
Tx 20 length adjustment screws	4	Four Tx 20 screws in each rail make length adjustment of the rails possible to fit 19-inch racks with different depths.
2 front retention mounting brackets	2	Holds the system in place and prevents any horizontal movement of the unit. (The left and right retention brackets are identical.)
M5 x 10mm screw (torx head)	10	Secures the chassis rails to the rack at front and rear.

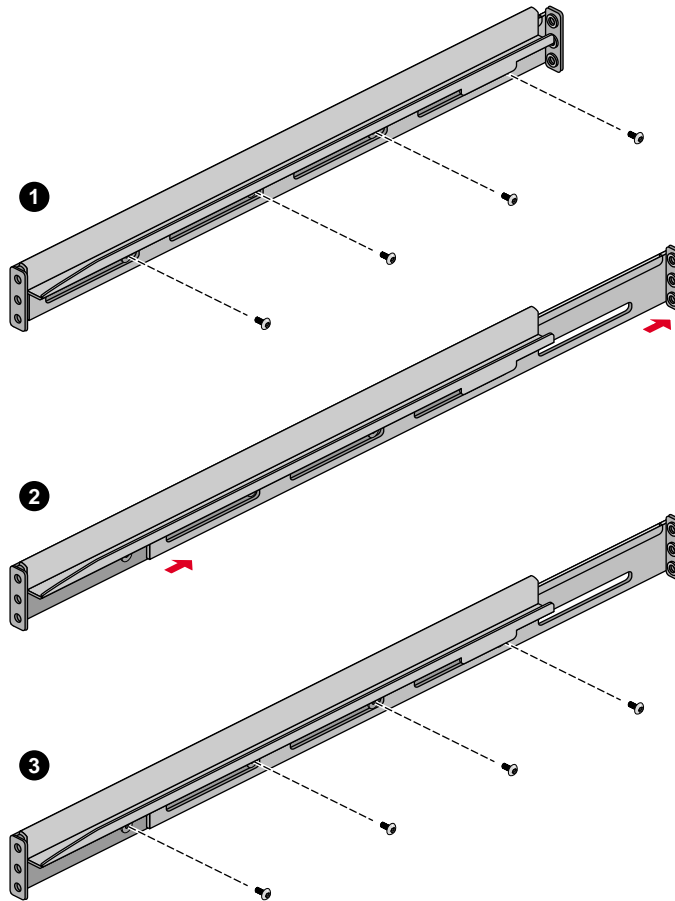
## Preparing the Rack Mounting Rail Assemblies

The rack mounting rail assembly consists of a pair of length-adjustable mounting rails, ten rack-mounting screws and two front retention brackets that hold the Altix 330 in place at the front of the rack. You need a Tx 20 screw driver to adjust and mount the rack rails. The Altix 330 rail mounting design requires that you install the rails and then slide the unit on.

If you need to adjust the length of the mounting rails, follow these steps:

1. Remove the two rail assemblies and the front mounting brackets from the shipping container. Check the depth of the rack to confirm that you need to extend the rail length. If not, go on to the next section and install the rails. Be sure to keep the retention brackets.
2. Remove the single screw that stops the extension of each rack rail.
3. Extend each rail assembly by loosening the three remaining screws with the Tx 20 screw driver until the rails slide easily, see Figure 1-19 on page 33.
4. Fit the depth of each rail to the exact depth of the rack and then tighten the Tx 20 extension screws to that length.
5. Reinstall the single extension screw in its original hole in each rail before mounting the rails.





**Figure 1-19** Adjusting the Length of the Altix 330 Slide Rails

## Attaching the Rails to the Rack

To attach the mounting rails to the rack, follow these steps:

---

**Tip:** The rack rails must be level in the rack. To ensure that you install the two rails correctly, carefully count the mounting holes on all of the rack rails (two front rails and two rear rails). Mark the top mounting hole in each case if needed.

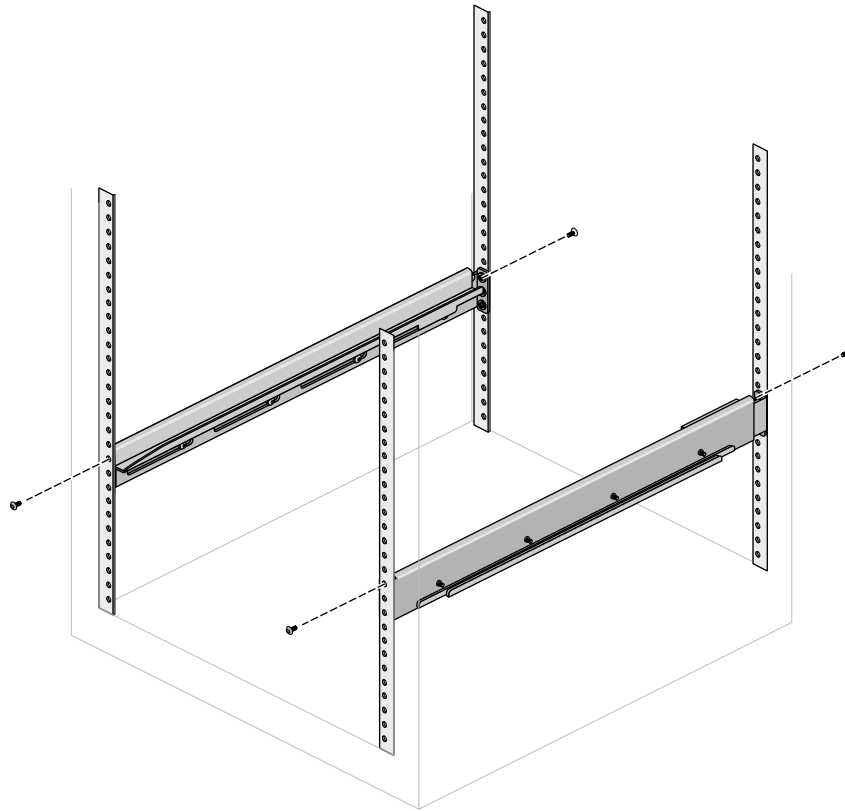
---

1. Locate eight M5 x 10mm screws and the two front retention brackets.
2. Place the right-hand rack rail in the location selected and secure it with a screw through the top hole on the front of the rail (see Figure 1-20).
3. Insert and tighten two screws in the rear of the rail to hold it in place.
4. Repeat this process for the left-side rack rail.

---

**Note:** Install the front retention brackets after the Altix 330 is installed on the rails.

---



**Figure 1-20** Placing the Rack Rails

## Installing the Module in the Rack

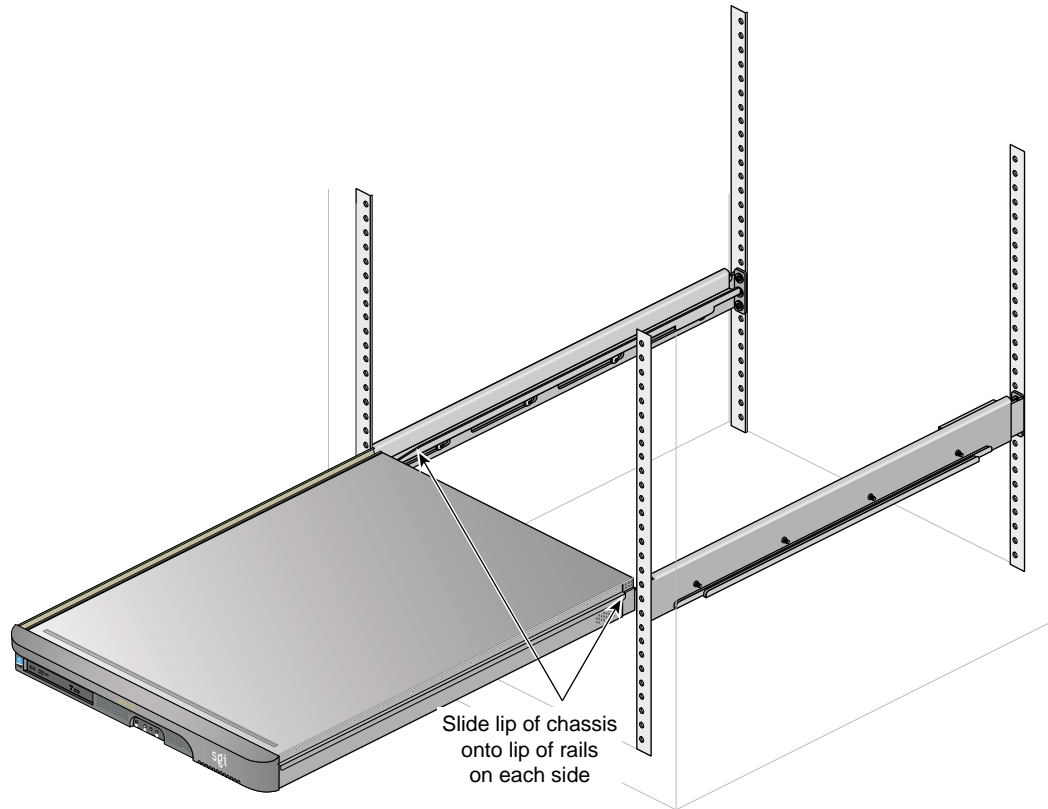
To install the module in the rack, follow these steps:

---

**Note:** Two people are highly recommended for this installation.

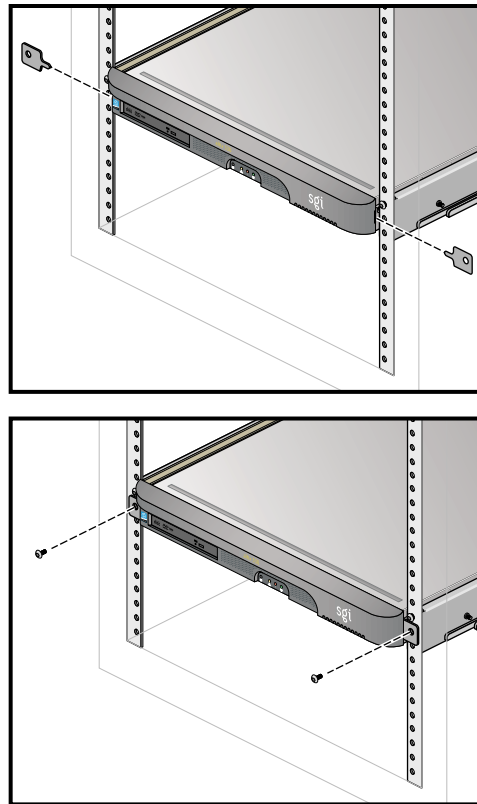
---

1. With one person holding each side of the module, align the inner lip on each side to fit over the rack rails. Note that the left side rail must be placed under the inner lip or the unit will not fit.
2. Slide the unit onto the rails until the module is stopped by the rear retention bracket at the back of the right rail. The front bezel of the Altix 330 should be flush with the front of the rack.



**Figure 1-21** Placing the Module on the Rack Rails

3. Insert the first front retention bracket tongue into the sheetmetal slot directly behind the plastic bezel (see Figure 1-22).
4. Align one of the front retention bracket's hole with the middle hole of the rail and secure it using a Tx 20 screw. Repeat this procedure on the other side of the module.

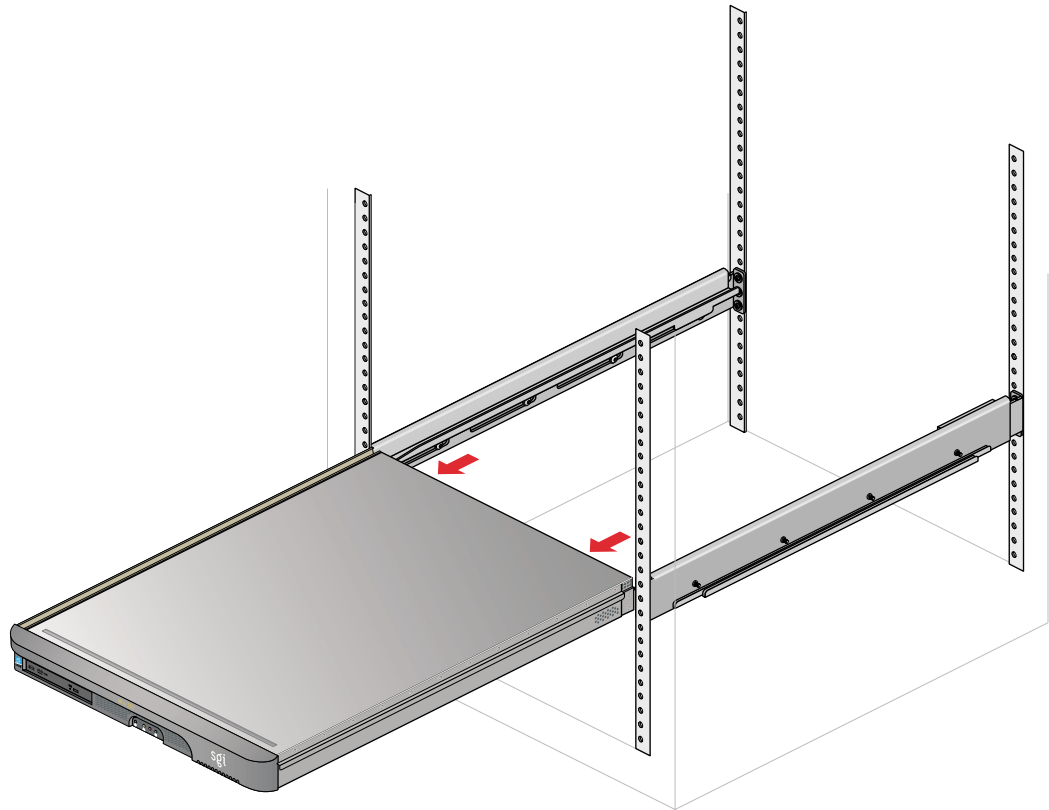


**Figure 1-22** Securing the Module to the Front of the Rack

## Removing a Module from the Rack

To remove a rackmounted Altix 330 module, follow these steps:

1. Power off the module. For instructions on how to power off the module, see “Powering the System On and Off Manually” on page 49.
2. Disconnect all of the cables at the rear of the module. Be sure the power cable is disconnected and able to pull free from the rack along with the server.
3. Remove the two screws and brackets that secure the module to the front rails of the rack.
4. Carefully pull the module from the rack (two people are recommended for this procedure) until it is clear of the rails, (see Figure 1-23) and place it on a stable work surface.



**Figure 1-23** Removing the Unit from a Rack

## Cabling the System Modules

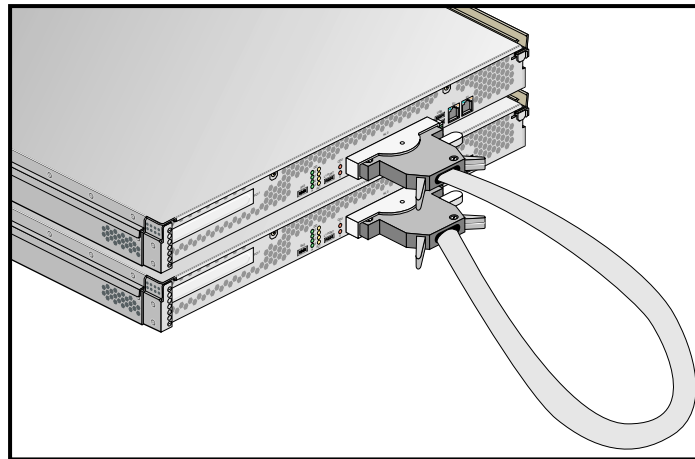
Many configurations of an Altix 330 system will consist of either two or more modules. This section describes how to cable together these multiple modules.

---

**Note:** If your system is made up of a single module, you can skip this section and proceed to “Cabling the System Modules to a Power Source” on page 42 for instructions to connect your system to power.

---

The Altix 330 base compute module, and one additional expansion module can connect via the module’s NUMAlink connectors. Figure 1-24 shows an example cabling of a base compute module to an expansion module using the NUMAlink cable.



**Figure 1-24** Hooking NUMAlink Cabling from a Base Compute Module to an Expansion Module

---

**Note:** Before you connect two Altix 330 compute modules to each other, you must assign unique system ID numbers to the compute modules, using the following steps:

---

1. Designate one of the compute modules as the master server and the other compute module as the slave.
2. Connect a console to the slave compute module (see “Connecting the System Console” on page 44), and power on the compute module (see “Powering the System On and Off Manually” on page 49).
3. Use the `brick slot <slotnumber> L1` command to set the slave system ID number to a higher number than the master system ID number. For example, if the master compute module’s L1 prompt indicates that its ID number is 01 (`001c01-L1>`), then the slave system ID number should be 02 or higher (`001c02-L1>`).

```
001c01-L1>brick slot 02  
brick slot set to 02.
```

See the *SGI L1 and L2 Controller Software User’s Guide* (007-3938-00x) for more information on L1 commands.

To connect two Altix 330 compute modules to each other with a NUMALink cable, follow these steps:

1. Power off both compute modules (see “Powering the System On and Off Manually” on page 49).
2. Connect the NUMALink-4 cable to the NUMALink connectors on both compute modules.
3. Connect a system console to the master compute module, as described in “Connecting the System Console” on page 44.
4. Power on both compute modules as described in “Powering the System On and Off Manually” on page 49.

The console output should indicate that the processors and memory on both compute modules have been discovered. If the slave compute module has not been discovered, use the `reset L1` command to perform a reset of the system.

---

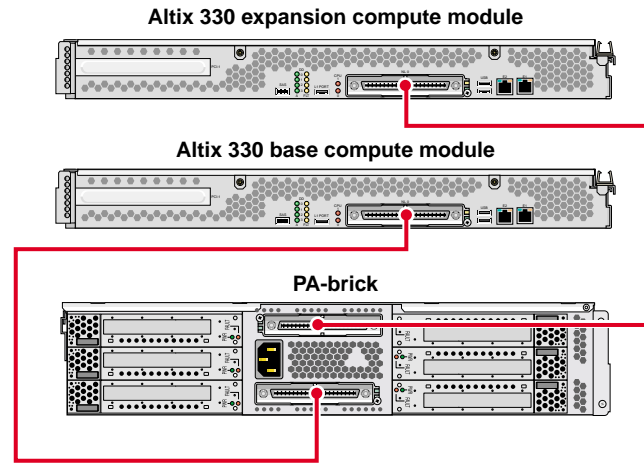
**Note:** See the *SGI L1 and L2 Controller Software User’s Guide* (007-3938-00x) for more information on L1 and L2 commands.

---



Figure 1-25 shows the cabling of an Altix 330 compute system module to the following components:

- Altix 330 expansion compute module (disk drives optional).
- PA-brick PCI/PCI-X option module.



**Figure 1-25** Cabling Multiple Modules Example

## Optional Router System Cabling

If you have a larger (greater than 4 processor) Altix 330, your system will use an optional router module. The router-based systems use a different cabling scheme than those that are connected in a point-to-point topology.

Figure 2-5 on page 59 illustrates the cabling of an optional router system using block diagrams. The section “Optional Router System Cabling” on page 41 details the cable connection points used in an optional router system.

The router module or R-brick is an eight-port 2U high module that functions as a high-speed switch to route network packets between Altix 330 modules within a system. Chapter 5, “Optional Router” describes this module in detail.

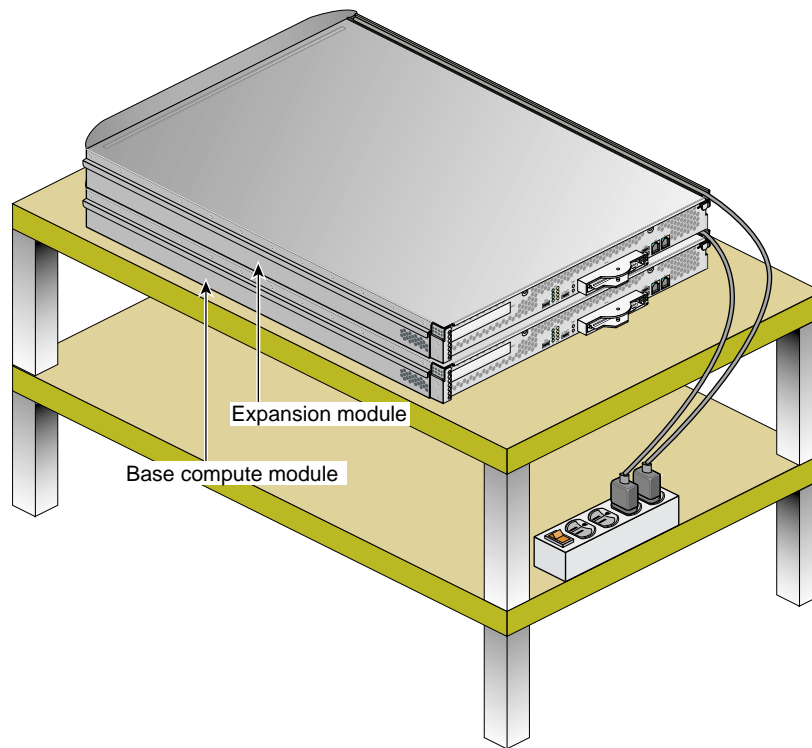
## Cabling the System Modules to a Power Source

This section describes how to make the following connections to a power source:

- “Connecting System Modules to a Power Source (No Rack)” on page 42
- “Connecting System Modules to a Rack Power Source” on page 43

### Connecting System Modules to a Power Source (No Rack)

If you are operating a small (one or two module) system on a table top, connect the system modules to a wall-mounted or other approved power receptacle. Figure 1-26 shows the connecting of a dual-module server system (an expansion module and a base compute module), located on either a tabletop or desktop, to a power source.

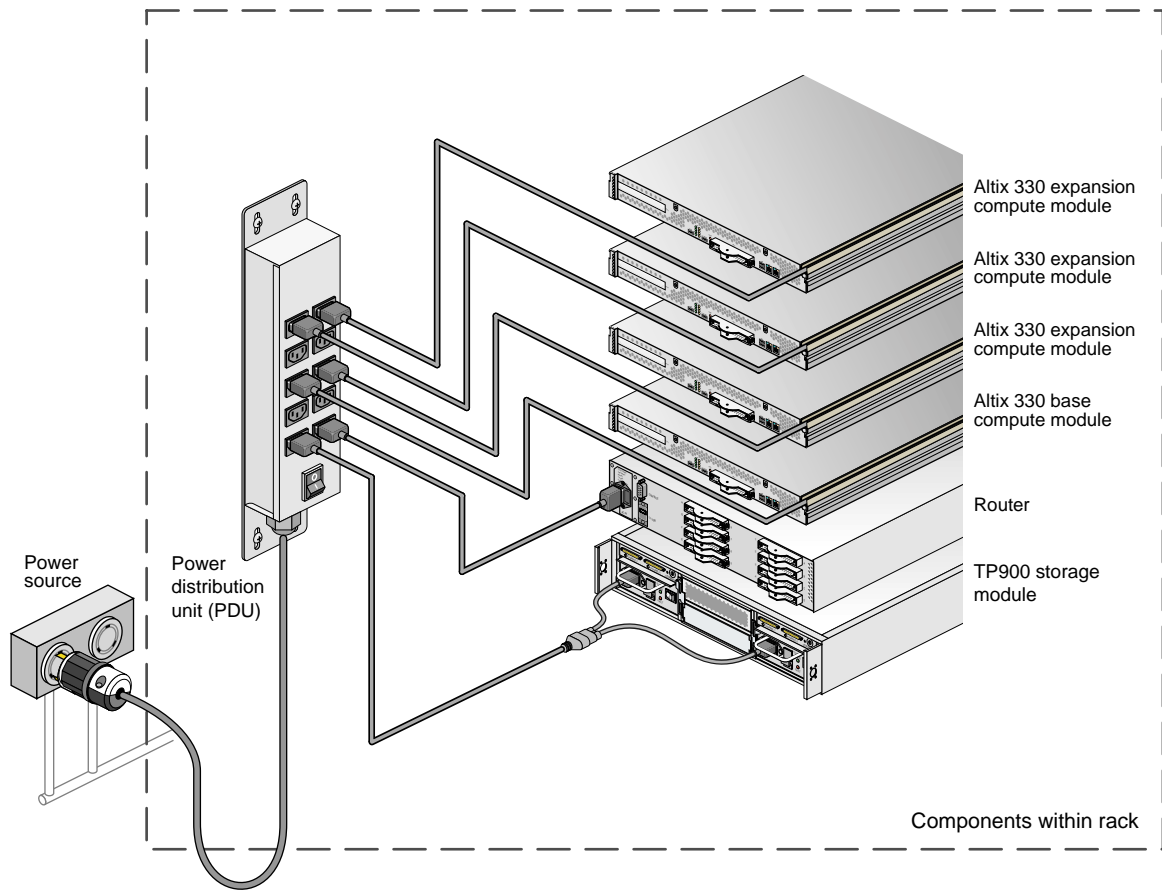


**Figure 1-26** Connecting a Dual-module System to a Power Source

## Connecting System Modules to a Rack Power Source

This section describes how to cable the system modules that reside in a rack to a power source. Figure 1-27 shows an example of a system that consists of the following components:

- Altix 330 base compute module (contains disk(s) and operating system)
- Altix 330 expansion compute modules (disks optional)
- An optional Router (R-brick) and an optional TP900 mass storage module
- Power distribution unit (PDU)/Power adapter



**Figure 1-27** Example of Multiple Modules Connected to a Power Source in a Rack

## Connecting the System Console

This section describes how to establish a console connection to an Altix 330 server.

Note that in the Altix 330 systems when a USB-to-Ethernet adapter is connected to the L1 system controller, that brick emulates an L2 controller and becomes an L1/L2 controller. Separate physical L2 controllers are not used with the Altix 330 systems. Access to the L2 functionality is made by way of an Ethernet connection to a PC or Laptop.

The Altix 330 modules communicate with each other and share L1/L2 commands and information through their NUMALink-4 connections using low voltage differential signaling (LVDS). There is no L1/L2 system control in the optional mass storage modules sold with the Altix 330.

### Overview

The Altix 330 server does not have a serial console port connection. The console port is supported through the USB L1 port. Because the updated design of the L1 controller in the Altix 330 shares both Level 1 and (emulates) Level 2 (L1/L2) control functions, it will be referred to as the L1/L2.

When the L1/L2 system controller in the Altix 330 initially powers up, it will function as a DHCP client, that is, it attempts to obtain an IP address from a DHCP server. If it cannot obtain an IP address from a DHCP server, then the L1/L2 controller itself will function as the DHCP server. It will assign its own static IP address (10.x.x.x, netmask 255.0.0.0), which is based on its own Media Access Control (MAC) address.

The MAC address will be different on each Altix 330 module.

The L1/L2 controller also configures a static IP address alias of 10.0.0.1 (netmask 255.0.0.0). This allows L3's, laptops, PCs, etc. to initially communicate with the L1/L2 controller via telnet to a known static IP address.

### Console Connection Parts Required

The following parts are required:

- Laptop/PC running Linux or Windows OS that is configured as a DHCP client.
- Ethernet crossover cable
- USB to Ethernet adaptor cable

## Configuring a PC or Laptop as DHCP Client

When running Linux, to configure a PC or Laptop as a DHCP client you need to change the `/etc/sysconfig/network-script/ifcfg-eth0` back to the DHCP client settings:

Change the `BOOTPROTO=static` line to `---> BOOTPROTO=dhcp`  
Remove the `IPADDR` and `NETMASK` lines

Example of `ifcfg-eth0` file:

```
DEVICE=eth0
```

```
ONBOOT=yes
```

```
BOOTPROTO=dhcp
```

Reboot PC/laptop to implement changes.

Check the `/etc/sysconfig/network-script/ifcfg-eth0` file to ensure that it contains the lines:

```
BOOTPROTO=dhcp
```

```
ONBOOT=yes
```

## Establishing a Console Connection

The following procedure will work with PC/laptops running Linux or Windows.

To establish a connection to the L1/L2 controller in an A330 server (see Figure 1-28), follow these steps:

1. Connect a PC/laptop that is functioning as a DHCP client from the Ethernet port of the PC/laptop to the USB to Ethernet dongle on the A330 server. The USB side of the dongle is plugged into the USB-A L1 port on the back of the Altix 330.

---

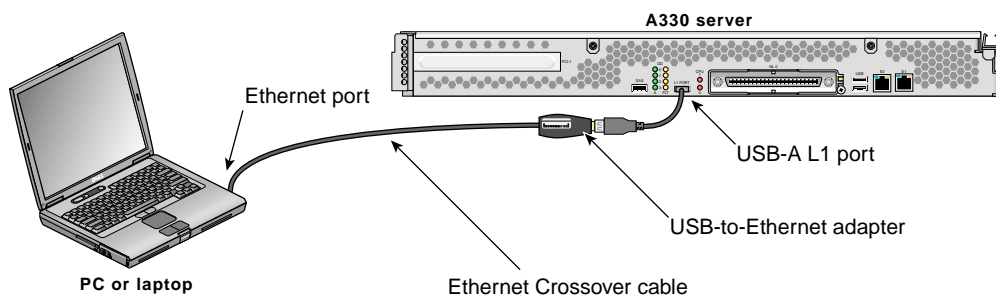
**Note:** This procedure will only work if the laptop is configured as a DHCP client. See “Configuring a PC or Laptop as DHCP Client” on page 45.

---

2. Apply power to the A330 server and wait at least 15 seconds before completing step 3.

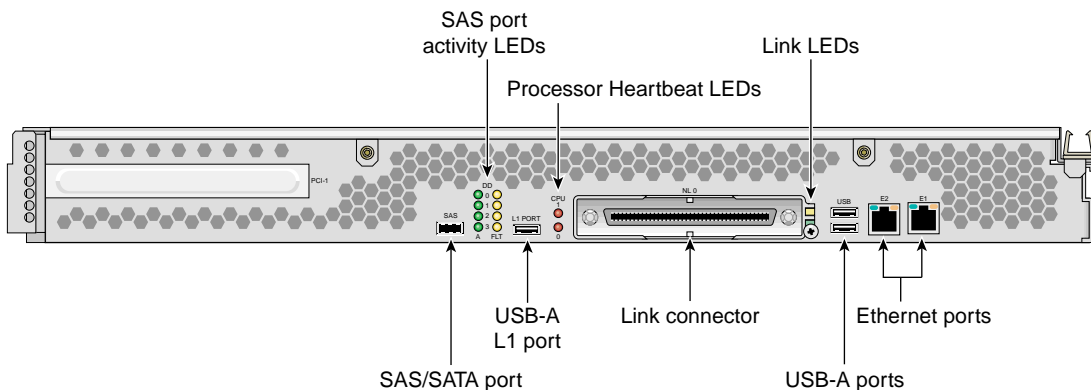
3. The Altix 330 does not have to be powered on. The L1/L2 controller will boot up as soon as the A330 is plugged into 120/220V power.
4. Power on the PC/laptop.
5. The PC/laptop will automatically get a 10.x.x.x address from the Altix 330.
6. On the PC/laptop, open a telnet connection to IP address 10.0.0.1.

The Altix 330 system will respond with an "L2" prompt: **L2>**



**Figure 1-28** Cabling a PC/Laptop to an Altix 330

See the *SGI L1 and L2 Controller Software User's Guide* (007-3938-00x) for descriptions of the L1/L2 controller commands that you can use.



**Figure 1-29** Location of the L1 USB Console Port

## Operating Your System

This section describes how to operate your Altix 330 system, as follows:

- “L1/L2 Modes of Operation Overview” on page 47
- “Powering the System On and Off Manually” on page 49
- “Operating the System Modules Using Front Panel Controls” on page 52

### L1/L2 Modes of Operation Overview

The Altix 330 system L1 operates in (emulated) L2 mode. Need for a separate optional hardware L2 system controller has been eliminated from the system control network.

### Viewing Information, Warnings, and Error Messages

All information, warnings, and error messages generated by any of the system controllers are in the following form:

```
001c05 ERROR: invalid arguments for `ver' command, try "help ver"
```

The general format includes a module identification and the type of message, followed by the message. A message may be the result of an invalid command, as shown in the example, or the result of tasks running on the L1/L2, such as the environmental monitor.

Each L1 has a log of local events. Use the L1 command log to view events on any of the L1s.

### Powering On, Powering Off, and Resetting the System From the L2 Emulator

To power off your system using the system console, follow these steps:



---

**Caution:** If you power off the system before you halt the operating system, you can lose data.

---

1. Shut down the operating system by entering the following command:

```
L2> init 0
```

2. You can power on and power off the system with the `power` command. This command is interpreted by the L2 emulator, because the modules must be powered on in a specific order.

```
L2> power up
```

L2>

The power command may require several seconds to execute. In the example, all Altix 330 modules NUMALinked to the L1/L2 would be powered up.

3. To power on or power off a specific brick, specify a current destination:

```
L2> r 1 s 5 power up
```

L2>

4. To power on or power off all bricks in a partition, enter the following:

```
L2> partition <partition number> <power up or power down>
```

5. To reset the system, enter the following:

```
L2> reset
```

L2>

This command restarts the system by resetting all registers to their default settings and rebooting the system controllers.

---

**Important:** Resetting a running system will cause the operating system to reboot and all memory will be lost.

---

Note that the L1/L2 controller(s) is still powered on.

6. To power down an L1/L2 controller, (and remove any input voltage from the module) you must unplug the module from the PDU or other power source.

## Console Mode from the L2 Emulator

In console mode, all output from the system is visible and all input is directed to the system. To enter console mode from L2, press Ctrl+D at the L2 prompt and observe the response:

```
L2> Ctrl+D
```

```
entering system console mode (001c05 console0),
```

```
<CTRL_T> to escape to L2
```

```
.
```

```
<system output appears here>
```

```
.
```



To return to L2 mode from console mode, press Ctrl+T:

### **Ctrl+T**

```
escaping to L2 system controller
```

```
L2>
```

At this point, you can enter any L2 or L1 command. When the command completes, the L2 returns to console mode:

```
Re-entering system console mode (002c05 console0),
```

```
<CTRL_T> to escape to L2
```

## **Powering the System On and Off Manually**

This section describes how to power on and power off your system (or an individual module) manually, as follows:

- “Preparing to Power On” on page 49
- “Powering On Manually” on page 50
- “Powering Off Manually” on page 51
- “Powering Off Manually” on page 51

### **Preparing to Power On**

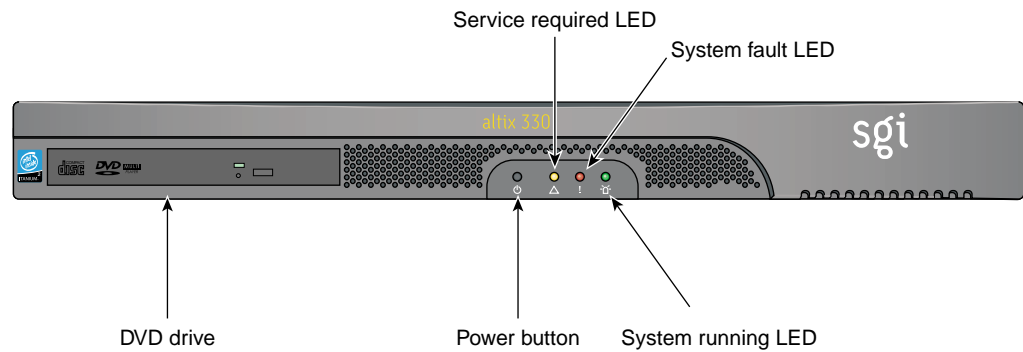
To prepare to power on your system, follow these steps:

1. Confirm that all the cable connections between the modules and between the modules and other system items are connected securely. If necessary, see “Cabling the System Modules” on page 39 for information.
2. Confirm that all the power cables are plugged in securely to a power source. If necessary, see “Cabling the System Modules to a Power Source” on page 42 for information.

## Powering On Manually

If your system does not have a local system console nearby, you can manually power on and power off the server by using the power button(s). To power on your system or an individual module manually, follow these steps:

1. If the monitors and other peripherals are equipped with voltage select switches, verify that they are set for the appropriate AC voltage and plug them in. Note that they are normally plugged into power sources outside the rack system.
2. Turn on the circuit breaker switch of the PDU.
3. Press the power buttons on each of the modules that you want to power on in the following order:
  - a. For the TP900 storage module, press the rear-panel power button to ON (I).
  - b. For the Altix 330 compute and expansion modules, press the power button on the front panel of each module (see Figure 1-30).



**Figure 1-30** Location of the Power Button

## Powering Off Manually

To power off your system manually, follow these steps:



---

**Caution:** If you power off the system before you halt the operating system, you can lose data.

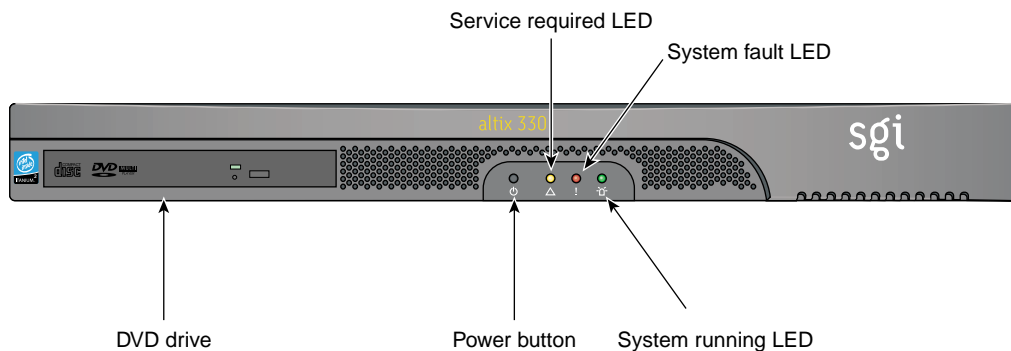
---

1. Shut down the operating system by entering the following command:  
`init 0`
2. Press the power buttons or power switches on each of the modules that you want to power off. You may power off the modules in any order:
  - To power off the TP900 storage module, press the power button on its rear panel to the OFF (O) position.
  - To power off the Altix 330 compute modules, press the power button with the LED on the front panel of each module (see Figure 1-30 on page 50).

## Operating the System Modules Using Front Panel Controls

The front panel of the Altix 330 module provides the following control features, as shown in Figure 1-31:

- **Power button.** Press this button to either power-on or power-off the Altix 330 module. Alternatively, you can power on the module at the system console.
- **Status LEDs.** The front panel has the following LEDs:
  - **Service-required LED.** This LED illuminates yellow to indicate that an item is not functioning properly (for example, a fan is off), but the module is still operating.
  - **System fault (failure) LED.** This LED illuminates red to indicate that a failure has occurred and the module is down.
  - **System running LED.** This LED illuminates green when the internal components are on.



**Figure 1-31** Front Panel Functions

**Note:** If your system includes a TP900 storage module, see the *SGI Total Performance 900 Storage System User's Guide* (007-4428-00x) for operating instructions.

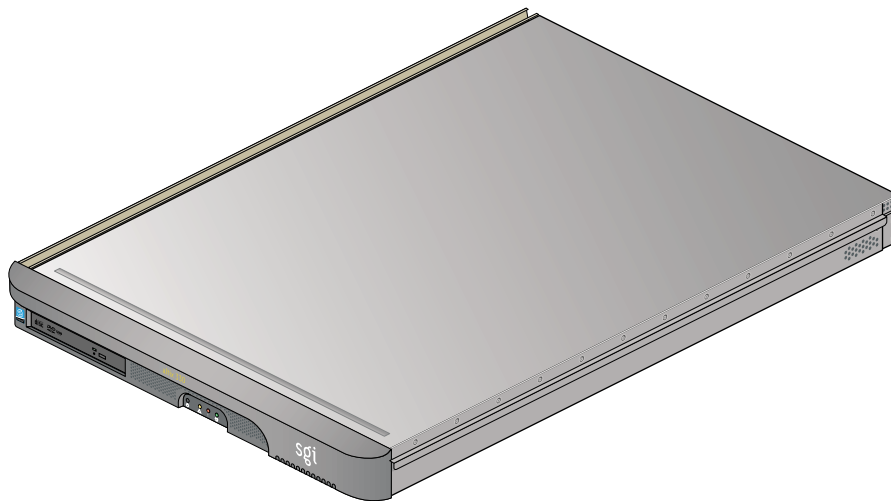
## System Overview

This chapter provides an overview of the physical and architectural aspects of your Altix 330 system. System configurations and components are described and illustrated. This chapter includes the following sections:

- “Physical Features” on page 54
- “Functional Architecture” on page 57
- “System Configurations” on page 60

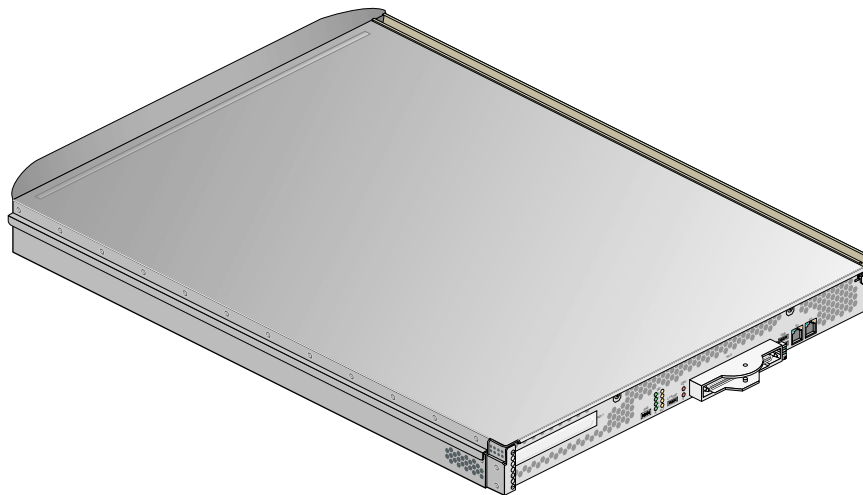
## Physical Features

The Altix 330 system is the latest advancement in the SGI NUMAflex approach for low to mid-range NUMAlink modular computing. It is designed to deliver maximum sustained performance in a compact system footprint. Independent scaling of computational power, I/O bandwidth, and in-rack storage lets you configure a system to meet your unique computational needs. The small footprint and highly modular design of the Altix 330 system makes it ideal for computational throughput, media streaming, or complex data management. See Figure 2-1 and Figure 2-2 for external views of the Altix 330 server.



**Figure 2-1** Altix 330 System Front View

The Altix 330 system can be expanded from a standalone single-module system with 2GB of memory and one PCI/PCI-X slot, to a high-performance system that contains 16 processors, a NUMAlink router module, up to 128 GB of memory, and eight standard PCI/PCI-X slots. For most configurations, the Altix 330 system is housed in one 17U rack or one 39U rack as shown in Figure 2-3; however, for small system configurations, the Altix 330 system can be placed on a table top.

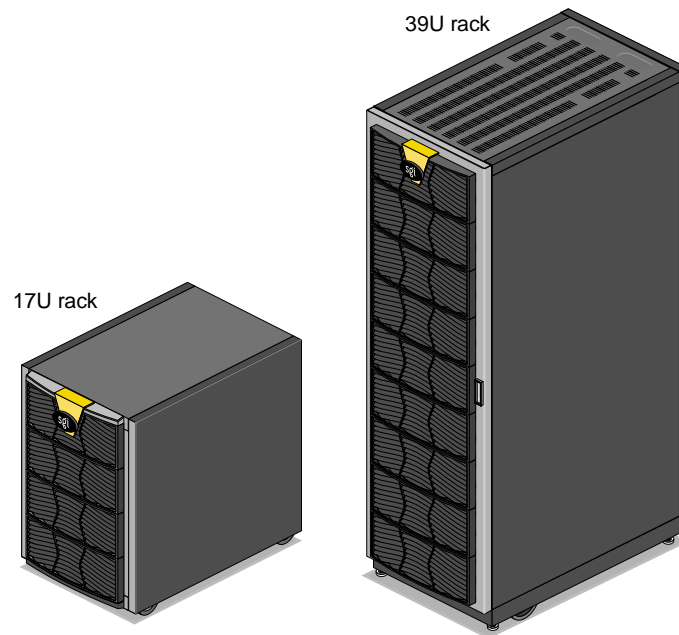


**Figure 2-2** Altix 330 Rear View

Larger systems are housed in 17U racks or 39U racks, see Figure 2-3 on page 56. The racks have casters that enable you to remove the system from the shipping container and roll it to its placement at your site.

See Chapter 1, “Quick Start and Installation,” for more information about installing your system. Check with your SGI service representative for additional physical planning documentation that may be available.

For information about the technical specifications of your system, see Appendix A in this manual.



**Figure 2-3** Example of SGI Altix 330 Rack Systems



## Functional Architecture

The Altix 330 system is based on the SGI NUMAflex architecture, which is a shared-memory system architecture that is the basis of SGI HPC servers and supercomputers. The NUMAflex architecture is specifically engineered to provide technical professionals with superior performance and scalability in a design that is easy to deploy, program, and manage. It has the following features:

**Shared access of processors, memory, and I/O.** The Super Hub (SHub) ASICs and the NUMALink-4 interconnect functions of the NUMAflex architecture enable applications to share processors, memory, and I/O devices.

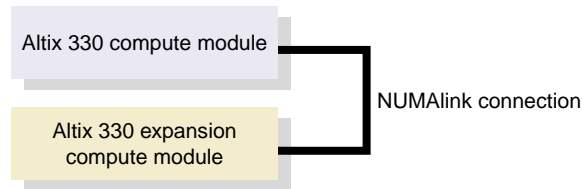
- Each SHub ASIC in the system acts as a memory controller between processors and memory for both local and remote memory references.
- The NUMALink interconnect channels information between all the modules in the system to create a single contiguous memory in the system that enables every processor in a system direct access to every I/O slot in the system.

Together, the SHub ASICs and the NUMALink interconnect enable efficient access to processors, local and remote memory, and I/O devices without the bottlenecks associated with switches, backplanes, and other commodity interconnect technologies.

**System scalability.** The NUMAflex architecture incorporates a low-latency, high-bandwidth interconnect that is designed to maintain performance as you scale system computing, I/O, and storage functions. For example, the computing dimension in an Altix 330 server system can range from 1 to 16 processors in a single system image (SSI).

**Efficient resource management.** The NUMAflex architecture is designed to run complex models and, because the entire memory space is shared, large models can fit into memory with no programming restrictions. Rather than waiting for all of the processors to complete their assigned tasks, the system dynamically reallocates memory, resulting in faster time to solution.

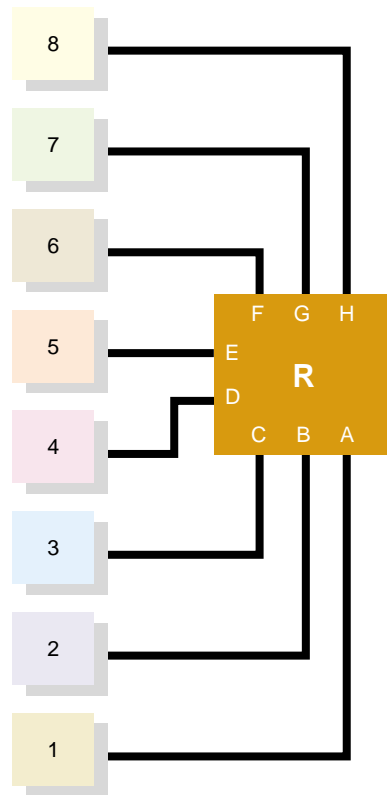
The Altix 330 system can be configured using a module-to-module connection topology, as described in Figure 2-4. For more detailed information about this type of configuration, see the section “System Configurations” on page 60.



**Figure 2-4** Module-to-Module Connection Topology Block Diagram Example

The Altix 330 system can be optionally configured using a NUMalink-4 router. This is also referred to as single-plane router configuration. Using the router, up to eight Altix 330 modules can be interconnected for a system with up to 16 processors using a single system image.

In a single-plane router configuration a single NUMalink-4 connection is made to the NUMalink connector on the back of (up to) eight Altix 330 modules. See Figure 2-5 on page 59 for an example diagram of a maximum configuration single-plane router connection.



**Figure 2-5** Optional Single-Plane Router Configuration Block Diagram

## Main System Components

The components shown in Figure 2-4 are 1U modules that can be configured as one system using the following devices:

- **Base compute module.** All Altix 330 systems contain at least one base compute module that contains the following components:
  - One or two Intel Itanium 2 processors; each processor has integrated L1, L2, and L3 caches
  - Up to 16 GB of local memory

- One PCI/PCI-X slot
- One DVD-ROM removable media drive
- One or two hard disk drives
- One SHub ASIC (the crossbar between the processors, local memory, the network interface, and the I/O interface).

For more information about the base compute module, see Chapter 3, “Base Compute Module,”.

- **CPU Expansion module.** The only difference between the base compute module and the CPU expansion module is that the CPU expansion module does not contain any standard disk drives. For more information about the CPU expansion module, see Chapter 4, “CPU Expansion Module,”.

When the system consists of a base compute module only, the maximum number of processors is 2 and the maximum amount of memory is 16 GB. To increase the number of processors and/or memory in the system, the base compute module can connect to an additional CPU expansion module or multiple modules using an optional router module.

## System Configurations

Table 2-1 lists the minimum and maximum ranges of the configurable items for the Altix 330 system.

**Table 2-1** Altix 330 Configuration Ranges

	<b>Configuration Minimum</b>	<b>Configuration Maximum</b>
Compute modules	1	8
Processors	1	16
Memory capacity	2 GB	128 GB
Internal disk storage	One disk drive	16 disk drives
Internal PCI/PCI-X slots	1	8
External storage devices	None	Customer-configurable
Compute rack	None	1

## Optional Router Configurations

Altix 330 systems with three to eight modules must be connected using one (single-plane) optional router module.

The router module or R-brick is an eight-port 2U high module that functions as a high-speed switch to route network packets between Altix 330 modules within a system. This creates a NUMAlink interconnect fabric (as opposed to a module-to-module topology which is used in two-module system configurations). For more information on router module features, see Chapter 5, “Optional Router,”.

Figure 2-5 on page 59 shows the Altix 330 router configuration concept from a block diagram perspective.

## Storage Expansion

Each base compute module contains standard I/O connectors and two disk-drive bays. You can add additional storage to the system as follows:

- For a SCSI (small computer system interface) JBOD (just a bunch of disks) solution, SGI offers the TP900 storage module, that can be added to an Altix 330 (with optional SCSI PCI card).
- For a Fibre Channel solution that supports RAID configurations, SGI offers an optional Fibre Channel PCI card and the InfiniteStorage S330 storage system.
- The server system also supports a number of tape devices; check with your SGI sales or support representative for available options.

Optional storage devices are discussed in the subsections that follow.

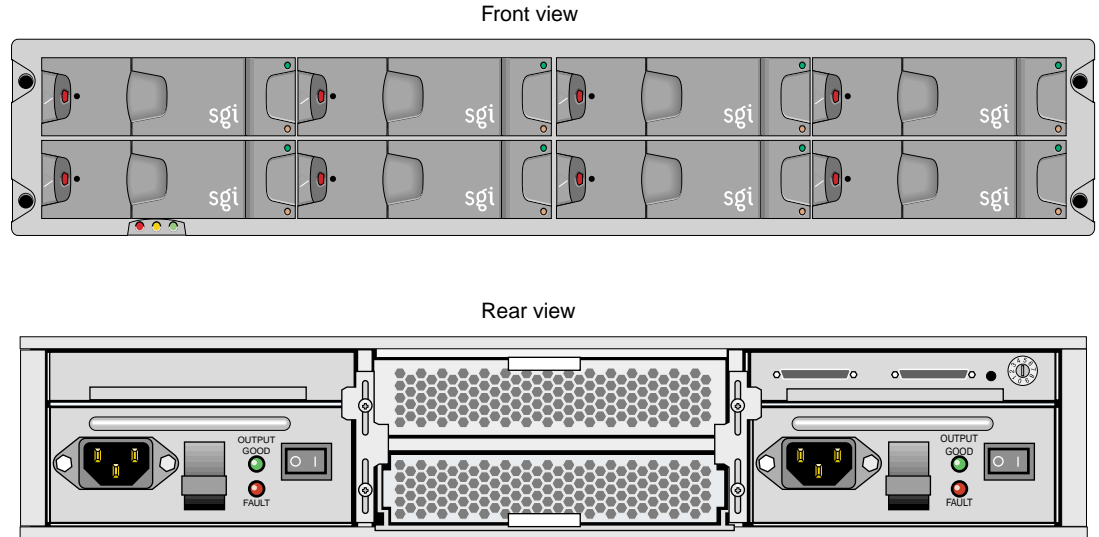
### SGI TP900 Storage Module

The TP900 storage module, shown in Figure 2-6, is a 2U-high 8-drive storage system that provides compact, high-capacity, high-availability JBOD storage. The enclosure backplane connects the 8 drives on one SCSI bus. As an option, the storage module can also be configured on two SCSI buses (2 strings of 4 drives).

This storage module has the following features:

- It mounts in a standard 19-inch rack; it is available in factory-installed configurations.
- It uses SCSI Parallel Interface 3 (SPI-3) capable Low Profile (1-inch high) 3.5-inch disk drives.
- Its drive carriers accept SGI-qualified 10,000- or 15,000-RPM SCSI disk drives.

For more information about the TP900 storage module, see *SGI Total Performance 900 Storage System User's Guide* (007-4428-00x).



**Figure 2-6** SGI TP900 Storage Module

### InfiniteStorage S330 Options

The SGI InfiniteStorage S330 is a high-bandwidth RAID Fibre Channel storage system. It uses fibre channel attached Serial Advanced Technology Attachment (SATA) disk drives exclusively. The SGI S330 RAID storage system has the following basic features:

- Outstanding performance, built on multi-channel end-to-end Fibre Channel technology.
- Support for Serial ATA drive array technology.
- Continuous availability, with constant monitoring and optional redundancy of all active components.
- Dynamic scalability, making it easy to grow all subsystem resources without disruption.
- Superior connectivity, allowing simultaneous connections to multiple servers directly or by way of storage area networks (SANs). Support for optical host connections.
- Vast storage capacity with support for large numbers of drives.
- Storage management facilities for installation, configuration, expansion, and monitoring.
- Redundant power supplies and hot-swappable components.
- Easily upgradeable to meet a variety of performance requirements.

- Integrated RAID controllers.
- Battery backup for cache data.

For more information on this optional product, see the *SGI InfiniteStorage S330 RAID User's Guide*, (007-4798-00x).

### Optional Tape Drives

The Altix 330 system supports optional or third-party tape drives. For current tape solutions for your server visit:

<http://sales.corp.sgi.com/products/storage/tape.html>

or check with your SGI sales or service representative.

### Power Components

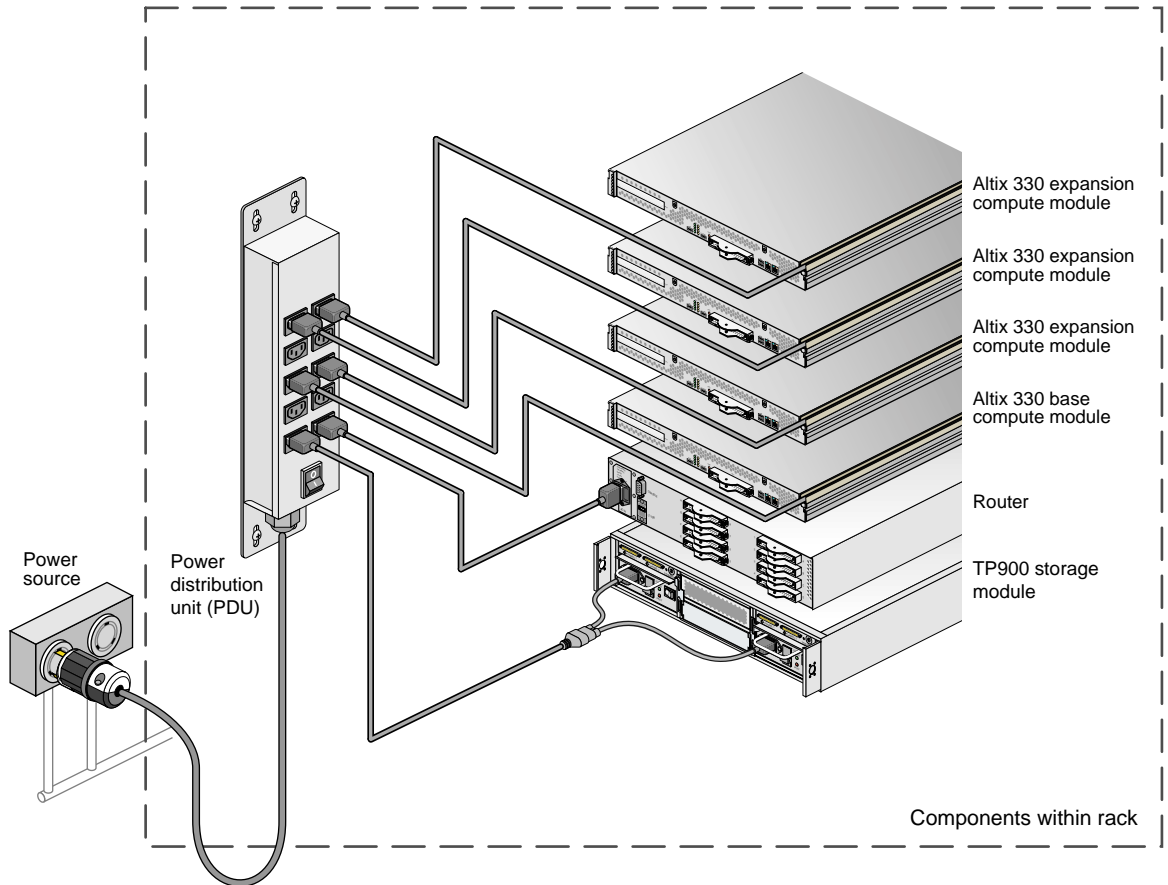
The Altix 330 system can consist of the following power components:

- **One or more power distribution units (PDUs)** (see Figure 2-7). An additional PDU is added to the system when more than 10 AC power receptacles are needed within the rack.

The PDU inputs AC voltage from an external power receptacle and it can output AC voltage to the base compute modules, CPU expansion modules, TP900 storage and other optional modules.

Figure 2-7 shows the power connections for a sample Altix 330 system.



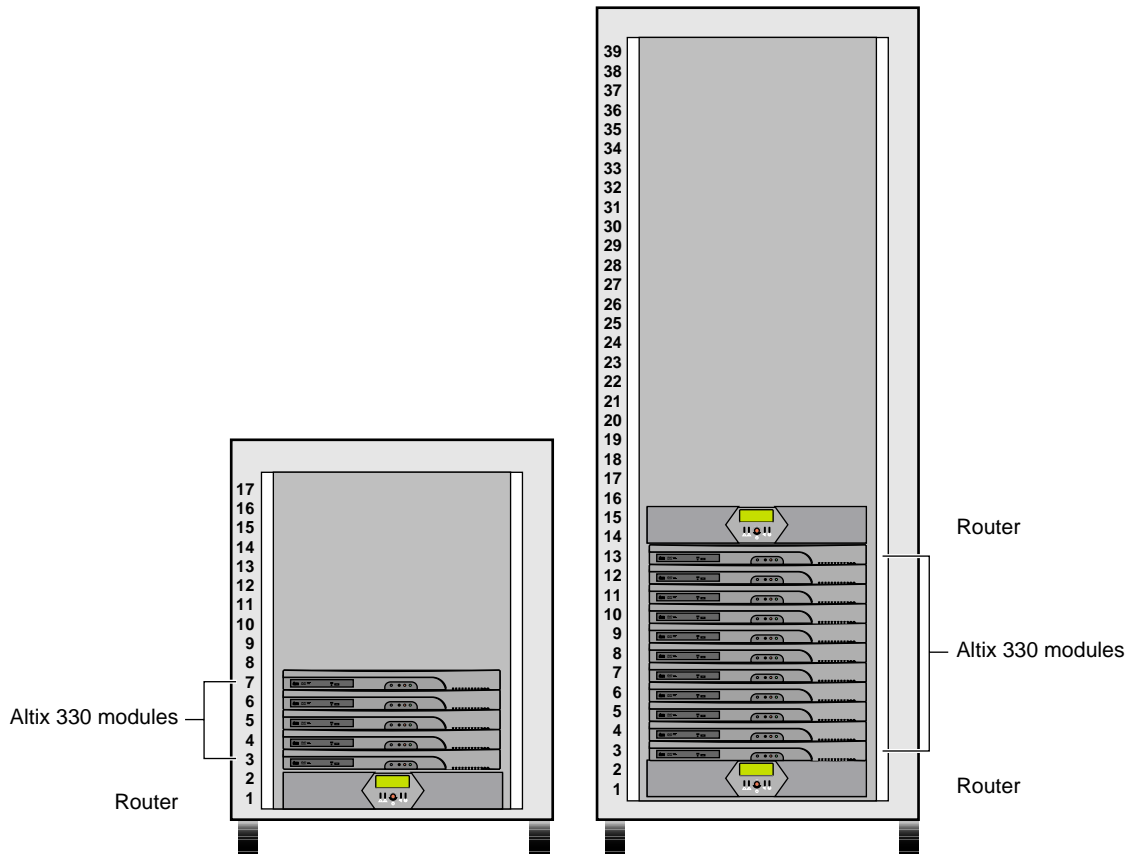


**Figure 2-7** Power Connection Example for Altix 330 System

## Rack

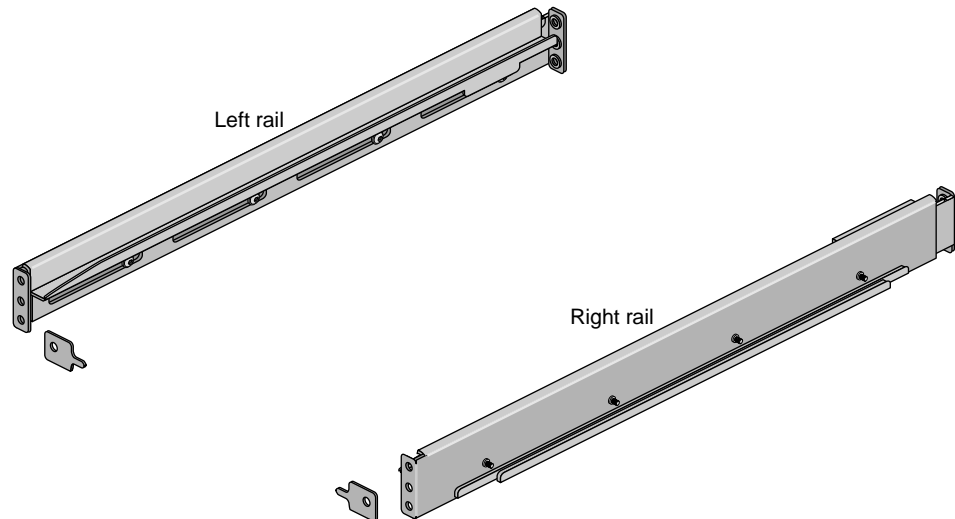
The Altix 330 system supports two rack types: a short rack and a tall rack. The racks are measured in standard units (U); one U is equal to 1.75 in. (4.45 cm). The short rack is a 17U rack and the tall rack is a 39U rack (see Figure 2-8).

The components within the rack are identified by the lowest U number that they occupy. For example, the top module shown in Figure 2-8 is identified as U7 in the short rack and U14 in the tall rack.

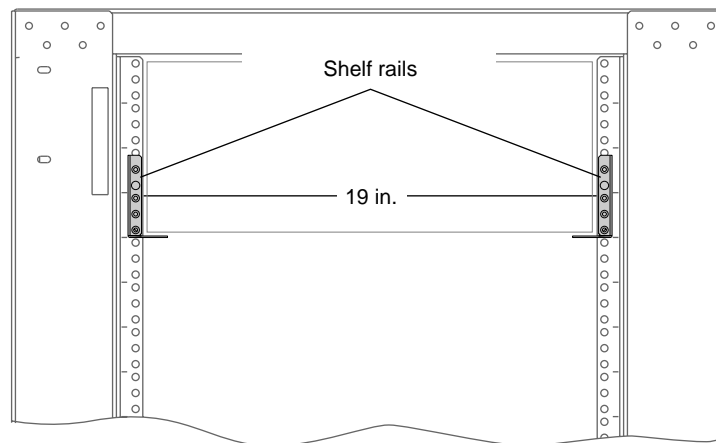


**Figure 2-8** Unit Numbering Within Racks

Both rack types are industry-standard 19-inch racks, and they support two types of mounting rails (slide rails and shelf rails) that hold the modules within the rack. For example, the Altix 330 modules use slide-mounting rails (see Figure 2-9). The TP900 storage and other optional modules use shelf rails, which are two parallel L-shaped mounting rails within the rack (see Figure 2-10).



**Figure 2-9** Altix 330 Slide Rails Example

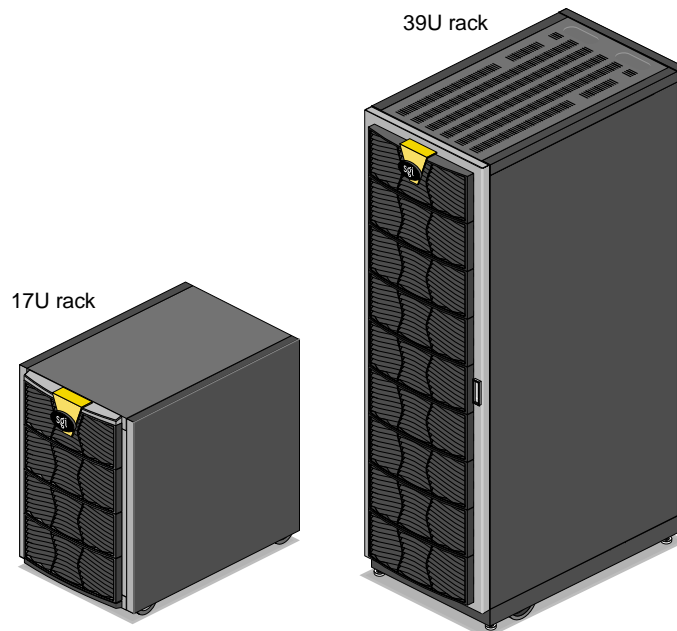


**Figure 2-10** Shelf Rails Example

Both rack types (see Figure 2-11), have front doors, but no rear doors. The racks also have cable entry/exit areas at the bottom of the racks. The 39U racks have cable management hardware in the rear.

Both rack types are mounted on four casters, two of which are swivel casters. The casters enable the rack to be rolled out of a shipping crate and to its placement at your site.

The base of the racks have seismic tie-down attachment points. The base of the tall rack also has leveling pads.



**Figure 2-11** Front Views of Short and Tall Racks

## Base Compute Module

This chapter describes the function and physical components of the Altix 330 base compute module. It also describes the possible configurations and the technical specifications for this module. All the features of the base compute module are present in the expansion module with the exception of the hard disk drives.

Specifically, this chapter includes the following information.

- “System Features” on page 70
- “External Components” on page 81
- “Module Configuration” on page 84
- “Technical Specifications” on page 85

## System Features

The 1U base compute module can serve as a standalone Altix 330 system, or it can be cabled to other optional modules to create an Altix 330 system with more functionality. A base compute module consists of 1 or 2 Intel Itanium 2 processors, and up to 16 GB of local memory available on 4, or 8 dual inline memory modules (DIMMs), and one PCI/PCI-X slot.

Your system can contain from 1 to 8 base compute modules. One of the base compute modules provides the base I/O functionality for the system; it is the module where the operating system resides. (Every system must have at least one base compute module.) This module has a factory-installed disk drive(s), base I/O, and memory.

The base compute module includes the following features:

- L1 controller that manages and monitors functions of the base compute module such as temperature.
- Internal read-only slim-line DVD-ROM drive.
- One or two hard disk drives.
- One autoranging power supply.
- One NUMALink-4 port that can connect your base compute module to a CPU expansion module, and/or other option modules.
- One full-length PCI/PCI-X card slot. The 64-bit slot can contain 33-MHz or 66-MHz PCI cards, or 66-MHz, 100-MHz, or 133-MHz PCI-X cards.
- One L1 USB port that enables you to connect another system to the L1 controller of the base compute module and monitor the Altix 330 system's status remotely.
- External SAS/SATA connector for optional mass storage
- Two Ethernet ports
- Two USB Type A ports

The base compute module can connect the following optional modules:

- Other base compute modules to add processors, disks, memory, and PCI/PCI-X slots.
- CPU expansion modules to add processors and memory to your system. See Chapter 4, “CPU Expansion Module,” for more information about this module.
- Altix PA Expansion modules used to add PCI/PCI-X slots via NUMALink-4 connection to the base compute module(s).
- Router modules or “R-bricks” can be used in larger (3 to 8 module) systems to provide a NUMALink-4 interconnect fabric. See Chapter 5, “Optional Router,” for additional information on this module.
- The optional SGI InfiniteStorage S330 RAID storage system provides the Altix 330 with high-availability storage in a compact form factor. See the *SGI InfiniteStorage S330 RAID User’s Guide* (007-4798-001) for more information about this product.
- The SGI TP900 storage module to provide additional storage for the system. See *SGI Total Figure 3-2 Performance 900 Storage System User’s Guide* (007-4428-00x) for information about this module.

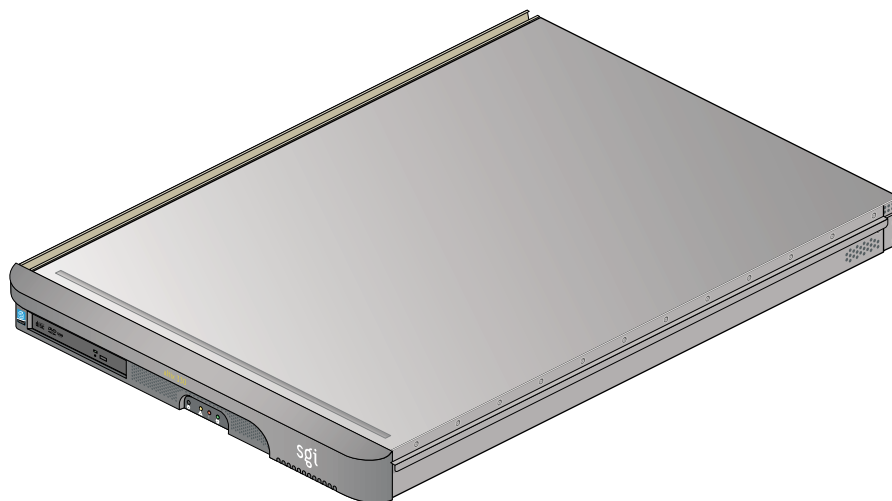
---

**Note:** The Altix 330 system also supports other storage systems not listed in this document. Contact your sales or service representative for information on additional options.

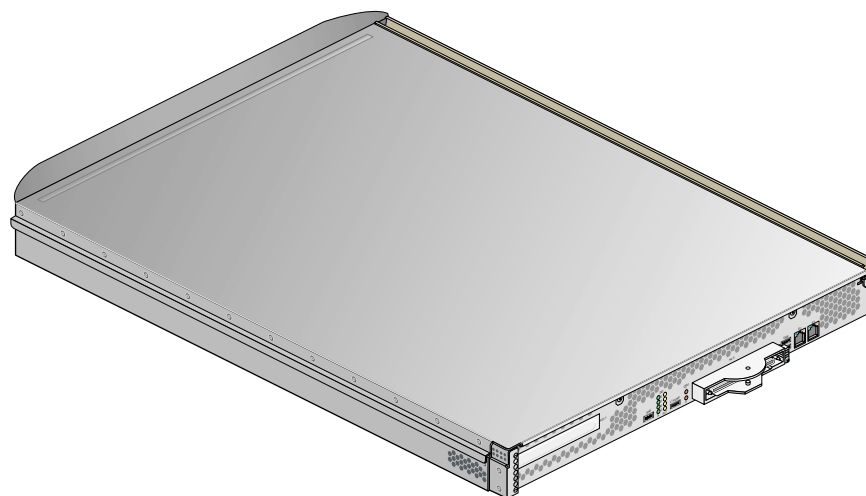
---

Figure 3-1 shows the front panel and side view of the Altix 330 base compute module.

Figure 3-2 shows the rear and side panel of the Altix 330.



**Figure 3-1** Front View of a Base Compute Module

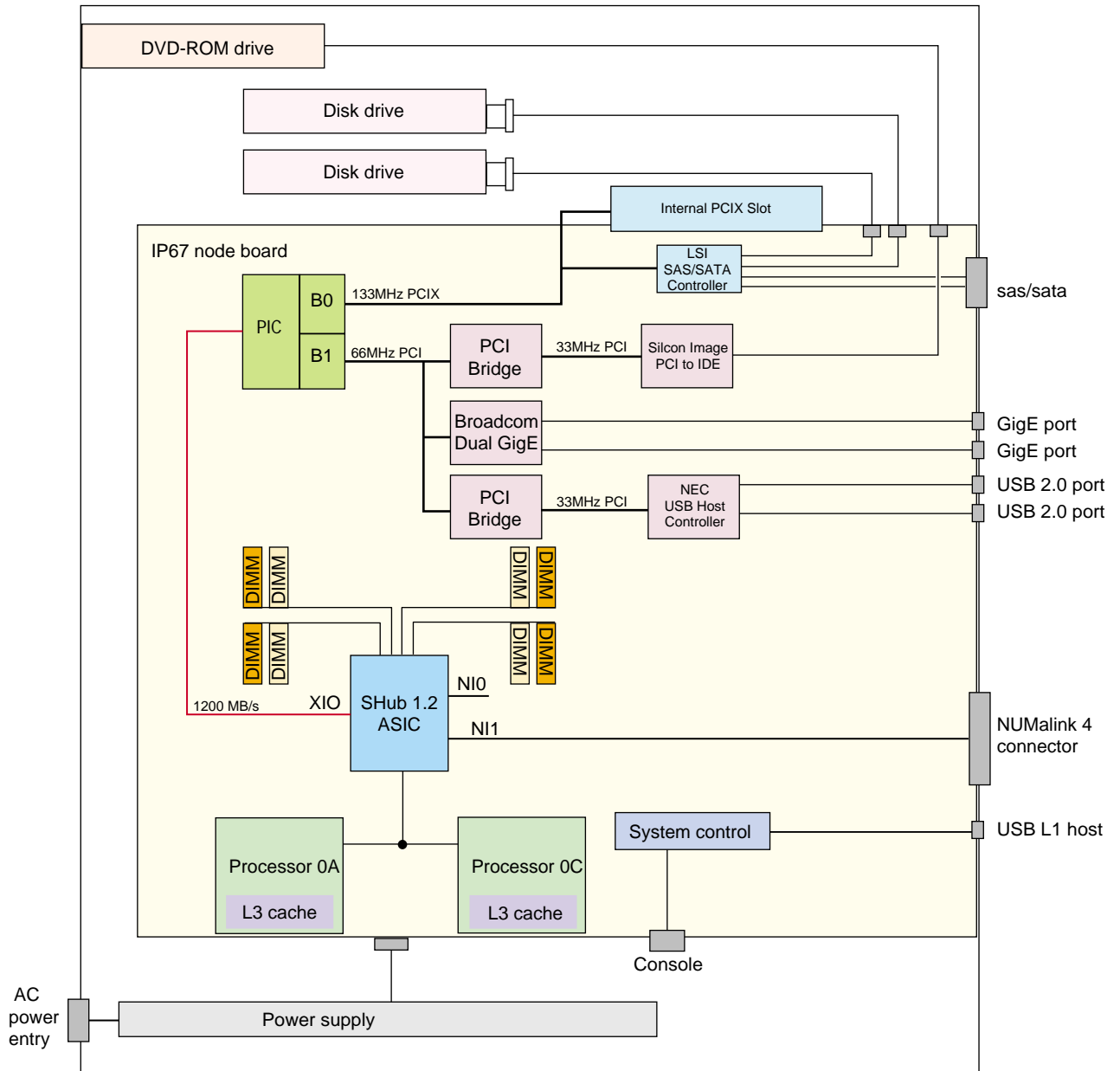


**Figure 3-2** Rear View of the Base Compute Module



The compute module architecture includes the following components, which are shown in Figure 3-3 on page 74 and discussed in the following subsections:

- “Additional Internal Components” on page 79
- “DVD-ROM” on page 79
- “Internal System Disk Drives” on page 79
- “Power Supply” on page 80

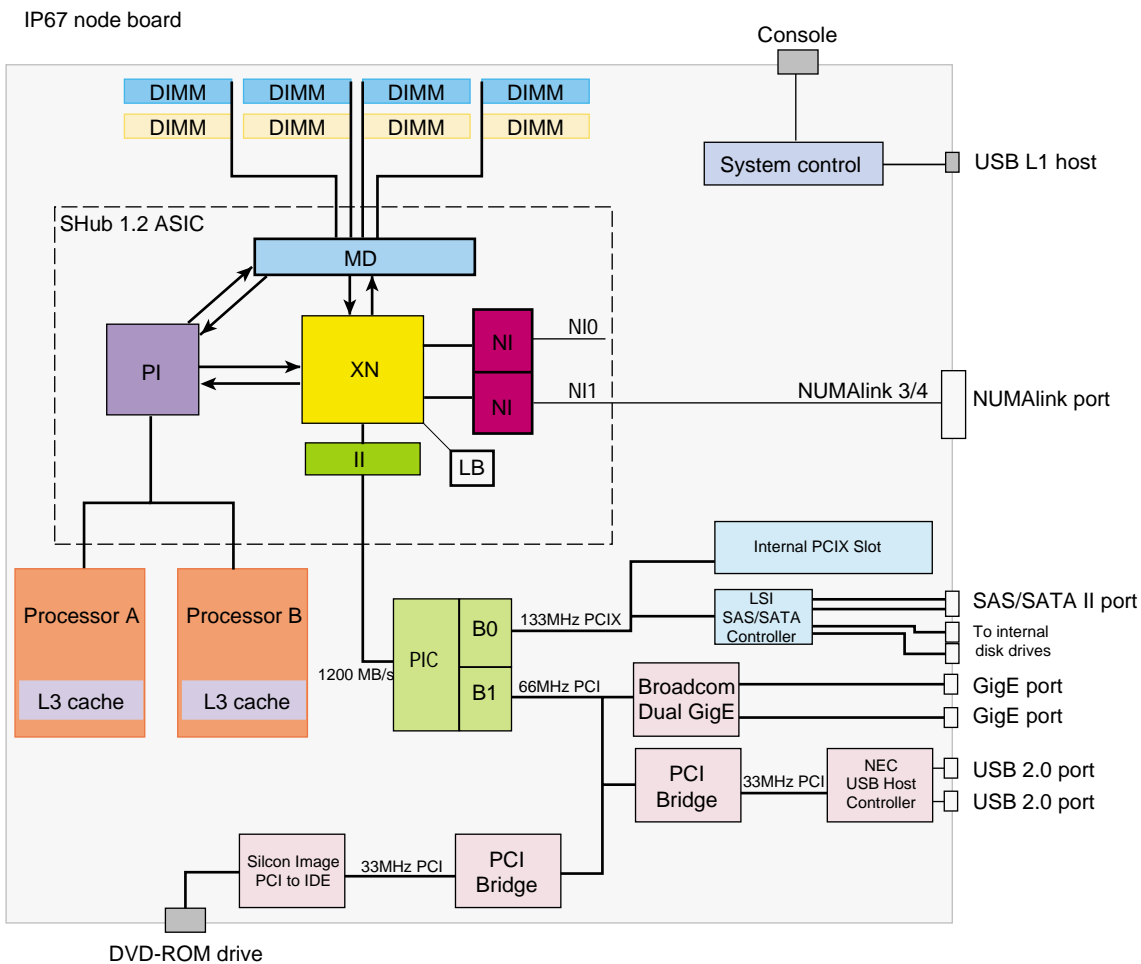


**Figure 3-3** Functional Logic Diagram of Base Compute Module

## System Node Board

The system node boards consist of the following components, which are discussed in the subsections that follow.

- One or two Intel Itanium 2 processors (labeled CPU in Figure 3-4). Each processor has integrated L1, L2, and L3 caches.
- Eight dual inline memory module (DIMM) slots that provide up to 16 GB of memory. See “Local Memory (DIMMs)” on page 78, for more information about DIMMs.
- SHub ASIC that enables communication between the processors, memory, and I/O devices.
- Serial ID EEPROM that contains component information.
- Two voltage regulators convert incoming voltages to voltages required by components.
- Internal hard drives can be either SAS or SATA disks.
- A single SAS/SATA control port on the rear of the system supports additional point-to-point drive connection capability.



**Figure 3-4** Node Board Block Diagram

### Processors (CPUs)

The Intel Itanium 2 processors, which are socketed components (not soldered), employ Explicitly Parallel Instruction Computing (EPIC) architecture. This architecture provides fast online transaction processing, the capability to execute multiple instructions simultaneously, and fast calculations and data analysis.

The processors operate at core clock rates from 1.3 GHz and up. Note that 1.3 GHz systems are sold as 2-processor (maximum) single system image machines, and not available with larger systems.

Each processor has the following integrated (on-chip) caches:

- Two 32-KB L1 caches: one cache is for data and the other cache is for instructions.
- One 256-KB L2 cache.
- One L3 cache; the size of the L3 cache depends on the version of the processor selected. Note that several processor speeds and cache sizes may be available. Check with your SGI sales or service representative for the latest information.

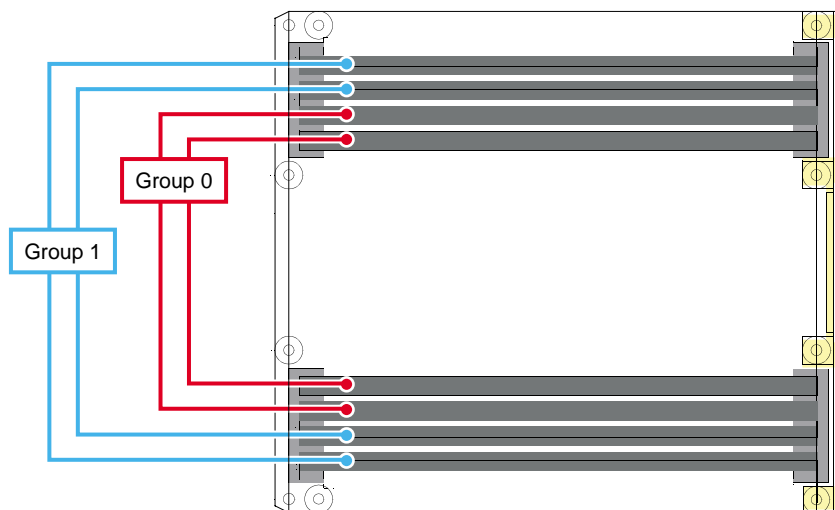
The system node boards use SECDED ECC to protect data when transferred to and from secondary cache, main memory, and directory memory.

The node boards use parity to protect data when transferred between a processor and primary cache, and to protect system commands sent between the SHub ASIC and a processor.

### Local Memory (DIMMs)

Each module's node board has up to 16 GB of local memory, which includes main memory and directory memory for cache coherence. Local memory can consist of 4, or 8 dual-inline memory modules (DIMMs) that contain double data rate synchronous dynamic random-access memory (DDR1 SDRAM). See Figure 3-5.

You can increase or decrease the size of memory by adding or removing the four DIMMs that compose group one on the node board. The four DIMMs that compose a group must be the same size; however, each group can be a different memory size.



**Figure 3-5** Local Memory Layout

---

**Note:** The four group 0 DIMMs must always be present in the base server module.

---

The four DIMMs that compose a group must all be the same size (memory capacity), however each group of four DIMMs may be a different total size.

## **SHub ASIC**

The Super Hub (SHub) ASIC enables communication among the processors, memory, network, and I/O devices. It controls all activity within the node board (for example, error correction and cache coherency). The SHub ASIC also supports page migration.

The SHub ASIC consists of the following:

- One central crossbar (XN) provides connectivity between the SHub ASIC interfaces.
- One processor interface (PI) communicates directly with one or two processors.
- One memory/directory interface (MD) controls all memory access.
- Two network interfaces (NI) interfaces between the crossbar unit and NUMALinks.
- One I/O interface (II) allows I/O devices to read and write memory (direct memory access [DMA] operations) and allows the processors within the system to control the I/O devices (PIO operations).
- One local block (LB) services processor I/O (PIO) requests local to the SHub ASIC.

## **Additional Internal Components**

The Altix 330 system will have some or all of the internal components listed in the following subsections, depending on the type of module and options you order.

### **DVD-ROM**

A base compute module can contain an optional slim-line DVD-ROM that has CD-ROM capabilities. It is located at the front left side of the module.

### **Internal System Disk Drives**

A base compute module contains one or two bracket-mounted disk drives. The Altix 330 supports one or two Serial Advanced Technology Attachment (SATA) or Serial Attached SCSI (SAS) system disk drives. The disk drives are located near the center of the module (next to the DVD-ROM). The master drive is the drive closest to the front of the rack. The SAS/SATA drive lines are point-to-point and support only one device per line.

## **Power Supply**

The base compute module contains one power supply. The power supply can input 110/220 VAC and output (12 VDC, 5 VDC, and -12 VDC). Power consumption is 490 Watts.



# External Components

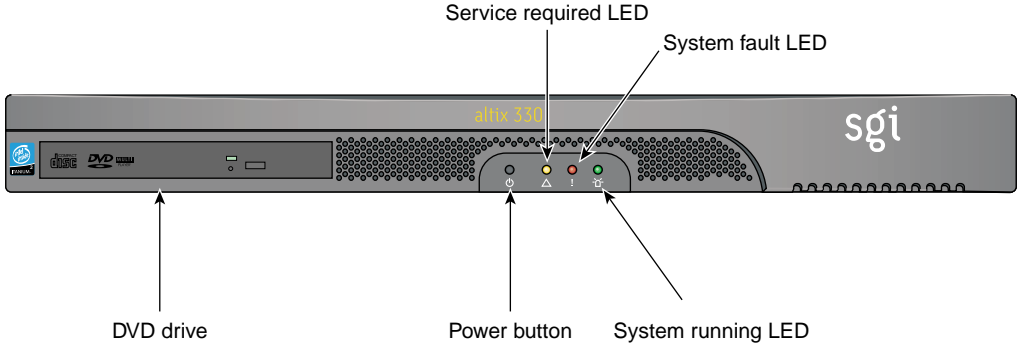
This section describes the external components of a base compute module, which are located in the front and rear panels.

## Front Panel

This section describes the front-panel controls and indicators of a base compute module, as shown in Figure 3-6.

The standard DVD drive occupies the left side of the front panel.

- **Power button.** Press this button to power on the internal components. Alternatively, you can power on the internal components at a system console.



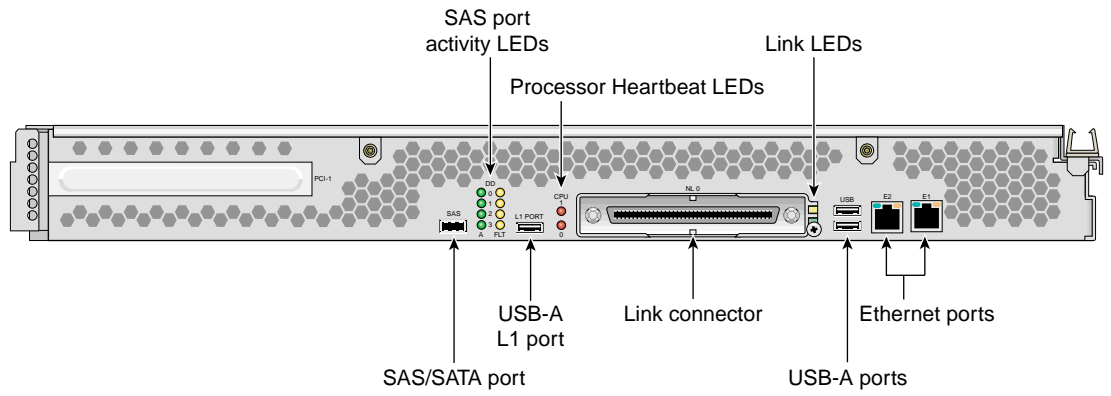
**Figure 3-6** Front-panel Items

- **Service-required LED.** This LED illuminates yellow to indicate that an item has failed or is not operating properly, but the base compute module is still operating.
- **Fault (system failure) LED.** This LED illuminates red to indicate that a failure has occurred and that the base compute module is not operating.
- **System operating LED.** This LED illuminates green to show that the system is receiving power and all monitored subsystems are operational.
- **Power connector.** The module’s power connector is attached to the unit behind the front bezel on the right side of the system. It attaches to an AC power outlet or power distribution unit (PDU).

## Rear Panel

This section describes the rear panel connectors, PCI/PCI-X slot, and LEDs of the base compute module, as shown in Figure 3-7.

- **Serial ATA/Serial Attached SCSI connector.** This external SATA/SAS port enables you to connect to one SAS or SATA mass storage device. The connector has a set of status LEDs. For an updated list of SGI supported SATA and SCSI devices, see the SGI Supportfolio at <http://support.sgi.com>.
- **Serial ATA/Serial Attached SCSI connector LEDs.** Green (left column) indicates disk activity, amber (right column) is off when a drive is attached to the port.
- **L1 port (USB type A).** This universal serial bus (USB) type A connector connects to the base compute module's L1 controller as an optional interface.
- **Two USB 2.0 connectors.** The connectors support attaching USB devices to the Altix 330.
- **One NUMAlink connector.** The NUMAlink-4 connector connects the base compute module to another Altix 330 base compute module, or other option module. This connection is made with a NUMAlink-4 cable at 3.2 GB/s in each direction.
- **NUMAlink LEDs.** Each NUMAlink connector has two LEDs. These LEDs are located to the right of the NUMAlink connector. The upper LED lights yellow to indicate that the base compute module and the module to which it is connected are powered on. The lower LED lights green when the link between the base compute module and the module to which it is connected is established.
- **PCI/PCI-X slot.** This 133 MHz slot can support a variety of SGI approved PCI and PCI-X cards. (For an updated list of supported cards, see SGI Supportfolio at <http://support.sgi.com>).
- **Two Ethernet ports (10/100/1000 Mbits).** These autonegotiating 10BaseT/100BaseT/1000BaseT twisted-pair Ethernet ports connect the base compute module to an Ethernet network, switch, or other Ethernet interfaces.



**Figure 3-7** Altix 330 Rear-panel Items

## Module Configuration

The base compute module contains the following major configurable components:

- Processors
- PCI and PCI-X cards
- Disk drives
- Memory (DIMMs)



---

**Warning:** Only trained SGI system support engineers (SSEs) can install and remove the processors, and system mother board. Upgrading the mother board from one to two processors is a field service procedure. To prevent personal injury or damage to your system, only trained SGI system support engineers (SSEs) can service or configure internal components of the base compute module that are not specifically listed as serviceable and configurable by customers.

---

As a customer, you can add or remove PCI and PCI-X cards, disk drives, and DIMM memory. See Chapter 6, “Installing and Removing Customer-replaceable Units,” for information about installing and removing these items.

The base compute module can be configured with the following optional modules to expand its functionality:

- The CPU expansion module, which is interconnected to the base compute module via a NUMAlink cable, adds processors, memory and one PCI/PCI-X slot. See Chapter 4, “CPU Expansion Module,” for more information about this module.
- The PA-brick 2U high PCI/PCI-X expansion module provides up to six additional PCI/PCI-X slots. It can be connected directly to the Altix 330 compute module via a NUMAlink-4 cable or indirectly through an optional NUMAlink-4 router brick. See the *SGI Altix PA Expansion Module User's Guide*, (007-4712-001) for information about this module.
- The optional NUMAlink-4 router brick connects three to eight Altix 330 modules together. Chapter 5, “Optional Router,” provides information on this 2U optional module.
- The TP900 storage module provides additional storage to the system. See *SGI Total Performance 900 Storage System User's Guide*, 007-4428-00x, for information about this module. The Altix 330 system also supports other storage modules. See “Storage Expansion” on page 62 for information.

## Technical Specifications

Table 3-1 lists the bandwidth characteristics of the base compute module.

**Table 3-1** Bandwidth Characteristics of the Base Compute Module

Characteristic	Peak Bandwidth	Sustainable Bandwidth
NUMALink-4 channel	6.4 GB/s full duplex 3.2 GB/s each direction	~2.8 GB/s each direction
Main memory	Up to 10.8 GB/s	Up to 10.8 GB/s
Front side bus (FSB)	6.4 GB/s	~6.4 GB/s

Table 3-2 summarizes the general features of a base compute module.

**Table 3-2** General Features of the Base Compute Module

Feature	Description
Intel Itanium 2 processor	1 or 2
DIMM Memory	Up to 16 GB (8 DIMM slots)
PCI expansion slot	1 PCI/PCI-X
L1 Console port	1 USB L1 connector
NUMALink-4 port	1 (3.2 GB/s port)
USB 2.0, type A	2 external ports
Ethernet ports	2 external 10BaseT/100BaseT/1000BaseT connectors
SAS/SATA internal port	Two Serial Attached SCSI or Serial ATA internal drives port
Serial Attached SCSI or Serial ATA Connector	One external connector supports SAS or SATA mass storage



## PCI and PCI-X Option Module

This chapter describes the function and physical components of the 2U PCI/PCI-X option module, (known as the PA expansion module). This module adds up to six additional PCI/PCI-X card slots to your system. Specifically, this chapter includes the following information:

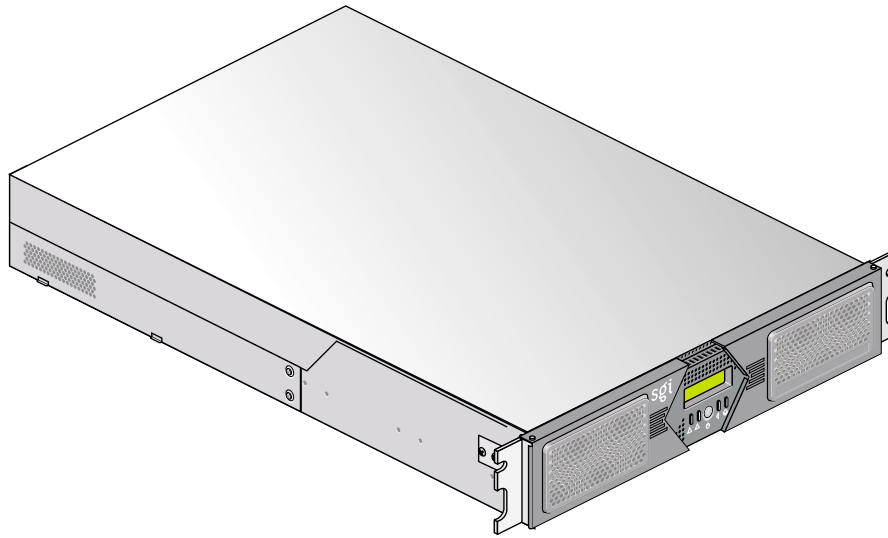
- “System Features” on page 87
- “External Components” on page 88

### System Features

The PA module includes the following features:

- Six PCI/PCI-X slots controlled by four separate buses.
- The L1 controller manages and monitors the functions of the module, such as system temperature. The system includes an L1 controller display system that processes error messages.
- The module can have one or (optionally) two power supplies. The second power supply is redundant to assure that your PA module will always have power.
- The NUMALink ports connect the PA module directly to a single or dual Altix 330 compute module system. An optional router module is required when connecting the PA module to an Altix 330 system with three or more modules. See Chapter 5, “Optional Router,” for additional information on the router.
- The console port is an RS-232 DB-9 serial connector used to connect an optional system console, which is used to monitor and manage your system.

Figure 4-1 shows a front panel and side view of the module.



**Figure 4-1** Front and Side View of PA Module

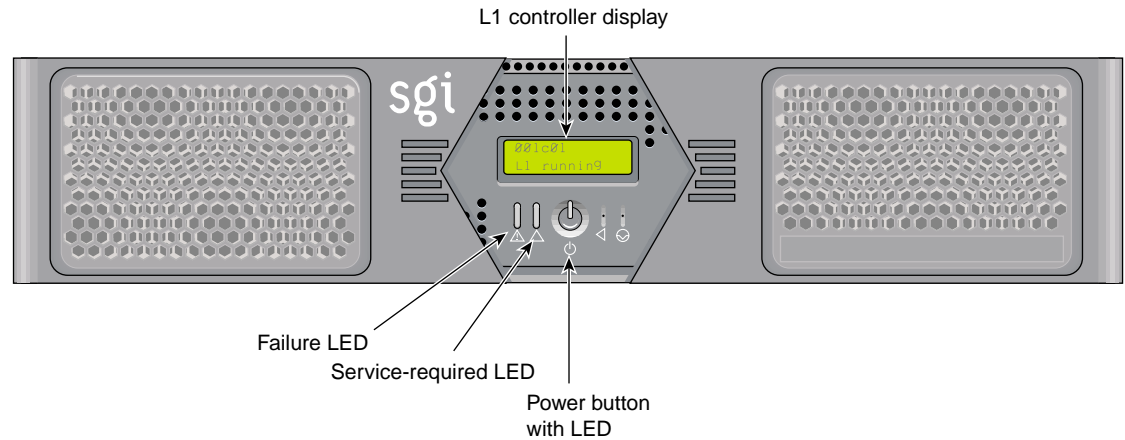
## External Components

The following subsections describe the external components of the optional PA module. All controls, indicators and connectors are located on the front or rear panels of the module.



## Front Panel Items

This section describes the front panel controls and indicators, as shown in Figure 4-2.



**Figure 4-2** Front Panel Items on PA Module

The front panel of the module has the following items:

- **L1 controller display.** A liquid crystal display (LCD) displays status and error messages that the L1 controller generates.

---

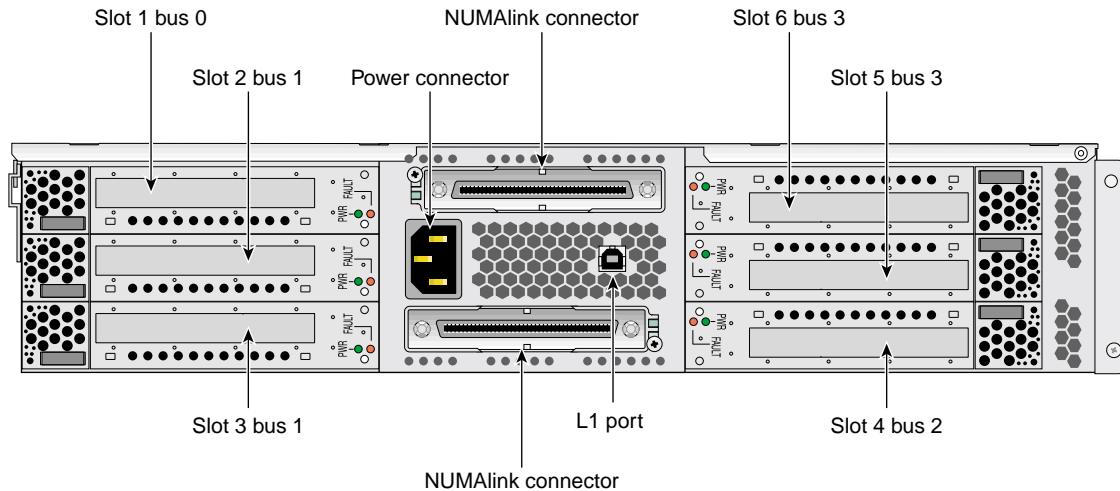
**Note:** See the *SGI L1 and L2 Controller Software User's Guide* (007-3938-00x) for details.

---

- **Power button with LED.** Press this button to power on the internal components. Alternatively, you can power on the internal components at a system console. The LED illuminates green when the internal components are on.
- **Service-required LED.** This LED illuminates yellow to indicate that an item has failed or is not operating properly, but the module is still operating.
- **Failure LED.** This LED illuminates red to indicate that a failure has occurred and that the module is down.

## Rear Panel Items

This section describes the rear panel connectors, PCI/PCI-X slots, and LEDs of the module, as shown in Figure 4-3.



**Figure 4-3** Rear Panel Items on PA Module

The rear panel of the option module has the following items:

- **Power connector.** This connector connects the module to an AC power outlet.
- **L1 port (USB type B).** This Universal Serial Bus (USB) type B connector connects the module's L1 controller to an optional controller.
- **Two NUMalink-4 connectors.** The NUMalink connectors attach the module to one of the following modules: base compute module, expansion compute module, or router. This connection is made with a NUMalink cable at 3.2 GB/s in each direction.
  - **NUMalink LED.** The NUMalink connector has two LEDs. These LEDs are located to the right of the NUMalink connector. One LED lights yellow to indicate that the CMPX module and the module to which it is connected are powered on. The other LED lights green when the link between the CMPX module and the module to which it is connected is established.
- **PCI/PCI-X slots.** Bus 0 and 2 support one slot each, bus 1 and 3 support two slots each. Each slot can run at speeds up to 133 MHz. PCI-X protocol enables I/O devices to operate at clock speeds of up to 133 MHz, or 1 Gigabyte per second. Any bus serving two PCI/PCI-X

cards is limited to a maximum transfer rate of 1064 MB per second. (For an updated list of supported PCI/PCI-X cards, see SGI Supportfolio at <http://support.sgi.com>.)

---

**Note:** If you run PCI and PCI-X cards on the same bus at the same time, the PCI-X card will run on PCI mode. And if you run cards of different speeds on the same bus, the highest speed card will run at the speed of the slower card. Placing a 100 MHz card in one slot of a bus, and a card running at 33 MHz in the second slot of the same bus, forces both cards to default to 33 MHz operation.

---

## External Configurations

The module can be configured together with the following items to expand the function of your server system:

- Every system must include a base compute module. The base compute module can have 1 or 2 processors, up to 16 GB of local memory, an optional DVD-ROM, one or (optionally) two system disk drives, and one PCI/PCI-X slot.
- The system expansion compute module, which can be interconnected to the base compute module via a NUMALink-4 connection to the PA module, adds processors and memory.
- The TP900 storage module provides additional storage to the system. An optional SCSI controller is required for this unit. See *SGI Total Performance 900 Storage System User's Guide* (007-4428-00x), for information about this module. The server system supports other storage modules. For information, see “Storage Expansion” on page 62.
- The optional NUMALink-4 router module connects three to eight Altix 330 modules and allows for maximum expansion of the system.



## Optional Router

This chapter describes the function and physical components of the optional router module (also known as an R-brick) in the following sections:

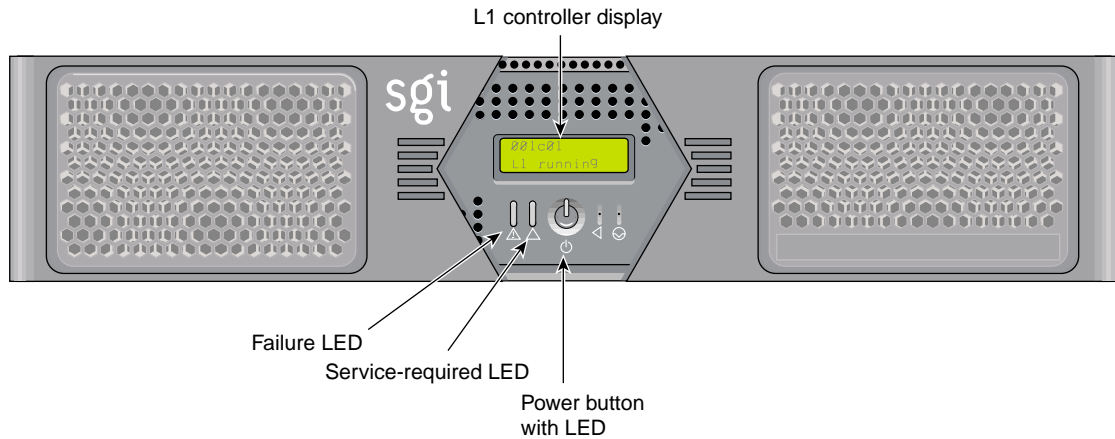
- “Overview” on page 93
- “External Components” on page 96
- “Router Module Technical Specifications” on page 98

### Overview

The router module or R-brick is an eight-port 2U high option module that functions as a high-speed switch to route network packets between Altix 330 modules within a system. This creates a NUMALink-4 interconnect fabric (as opposed to a module-to-module topology which is used in two-unit linked system configurations). The optional router is generally only used when there are three to eight modules interconnected as a single system image (up to 16 processors). Figure 5-1 shows a front view of the router.

Figure 2-5 on page 59 illustrates the cabling of an optional router system using a block diagram. The section “Optional Router Configurations” in Chapter 2 details the cable connection points used in an optional router system.

The key component within the module is the router chip, an SGI custom-designed ASIC. The router chip is an eight-port crossbar that connects any input-link channel to any of the seven possible output-link channels (ports).

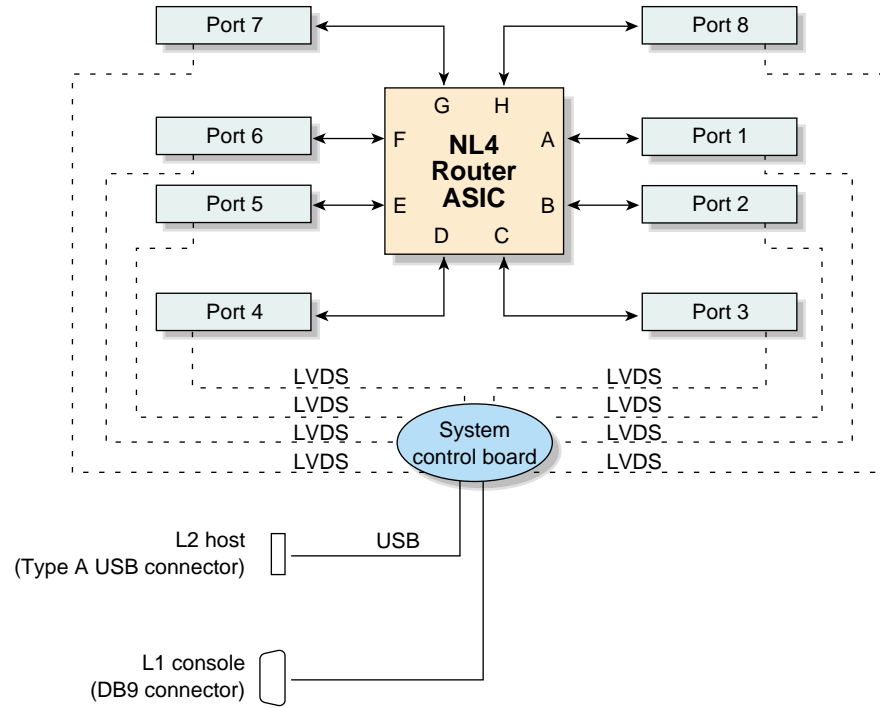


**Figure 5-1** Front View of the Optional R-Brick

The router has the following features:

- Eight NUMALink-4 channels
- One USB port for system controller support
- One L1 controller and LCD display
- One 9-pin console connector
- Two hot-pluggable cooling fans (not customer replaceable)

Figure 5-2 shows a block diagram of the router.



**Figure 5-2** Router Functional Block Diagram

## External Components

This section describes the external components that are located on the front and rear panels of the router.

### Front Panel Components

The router contains the following front panel items (as shown in Figure 5-1 on page 94):

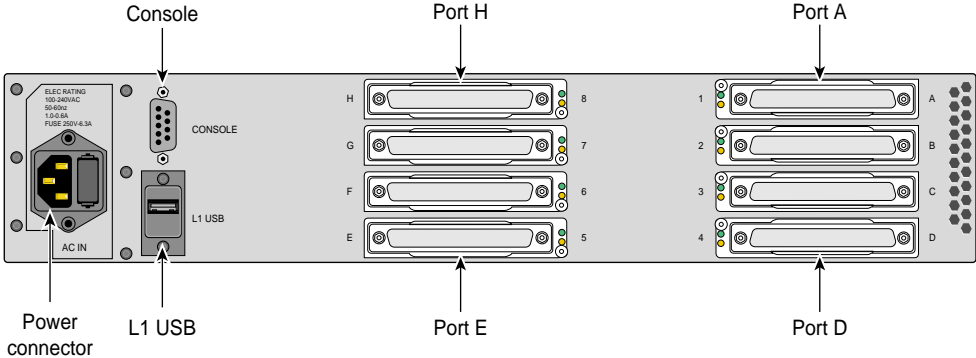
- **L1 display.** The L1 display is a 55.7 mm X 32 mm backlit liquid crystal display (LCD) that displays system messages. It displays two lines with a maximum of 12 characters on each line.
- **On/Off switch with LED.** Press this button to turn on the router internal components. You can also turn on the router internal components at a system console.
- **Three LEDs:**
  - On/Off switch LED. This LED illuminates green when the router internal components are on and turns off when they are off.
  - Service required LED. This LED illuminates orange to indicate that an item is broken or not operating properly (for example, a fan is off), but the router is still operating.
  - Failure LED. This LED illuminates red to indicate that a system failure has occurred and the router is down.
- **Fans.** Two hot-pluggable fans provide N+1 redundant cooling.



## Rear Panel Components

The router has the following rear panel items (see Figure 5-3):

- **PWR (power) connector.** This connects the router to the power outlet, (120 or 220V autosensing).
- **Links Altix 330 to NUMAlink connectors (A through H or 1 through 8).** These link connectors connect the router to the Altix 330 compute or option modules to form an interconnect fabric.
- **L1 port connector.** This connects the internal USB hub of the router to an optional console/controller. The internal USB hub can receive the USB signals from the controller via this port and distribute these signals to the L1 of the router.
- **Console connector.** This serial port provides optional connection to a terminal for system control purposes.



**Figure 5-3** Rear View of Router

- **Link connector LEDs.** Each NUMAlink connector has two LEDs, as follows:
  - The yellow LED illuminates to indicate that both the router and the brick to which it is connected are powered on.
  - The green LED illuminates when a link has been established between the router and the brick to which it is connected.

## Router Module Technical Specifications

Table 5-1 lists the technical specifications of the router.

**Table 5-1** Router Technical Specifications

<b>Characteristic</b>	<b>Specification</b>
Height	3.3 in. (83.82 mm)
Width	17.38 in. (441.45 mm)
Depth	27.5 in. (698.50 mm)
Weight	20 lb (9.1 kg)
Heat dissipation	205 Btu/hr maximum
Input power	(~ 60 W)

Table 5-2 lists the specifications of the router ports.

**Table 5-2** Router Port Specifications

<b>Port</b>	<b>Quantity</b>	<b>Peak Transfer Rate</b>
link	8	3.2 GB/s each direction
L1	1	12 Mbits/s

## Installing and Removing Customer-replaceable Units

This chapter provides safety instructions to follow when using and maintaining your system. It also describes how to install and remove a module's customer-replaceable units (CRUs). This information is covered in the following sections:

- “Safety Instructions” on page 99
- “PCI and PCI-X Cards” on page 103
- “Disk Drives” on page 107
- “Memory DIMM Group Placement and Guidelines” on page 114

### Safety Instructions

Before you perform any type of maintenance to your system, read the following safety instructions:

- Follow all warnings and instructions marked on the product and noted in this and other documentation included with the product.
- Unplug this product from the wall outlet before you clean it. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning. Do not use this product near water.
- Never operate the system with the top cover removed, overheating and failure will result.
- Do not place this product or components of this product on an unstable cart, stand, or table. The product may fall, causing serious damage to the product. Slots and openings on the cabinet and components are provided for ventilation, reliable operation, and protection from overheating of the product. These slots and openings must not be blocked or covered.
- This product should never be placed near or over a radiator or heat register, or in a built-in installation unless proper ventilation is provided.
- This product should be operated with the type of power indicated on the marking label. If you are not sure of the type of power available, consult your dealer or local power company.

- Do not allow anything to rest on the power cord. Do not locate this product where people will walk on the cord.
- Do not use extension cords with your SGI system.
- Never push objects of any kind into this product through cabinet slots because they may touch dangerous voltage points or short out parts that could result in a fire or electric shock.
- Never spill liquid of any kind on the product.
- Do not attempt to service this product yourself except as noted in this guide. Opening or removing covers of internal components may expose you to dangerous voltage points or other risks. Refer all servicing to qualified service personnel.
- Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
  - If the power cord or plug is damaged or frayed.
  - If the product has been exposed to rain, water, or other type of liquid.
  - If the product does not operate normally when the operating instructions are followed.

---

**Note:** Adjust only those controls that are covered by the operating instructions, because improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal condition.

---

- If the product has been dropped or if the cabinet has been damaged.
- If the product exhibits a distinct change in performance, which indicates a need for service.
- Only qualified service personnel should replace a soldered lithium battery (or batteries) in the SGI Altix 330 server system.
- Use only the proper type of power supply cord set (provided with the system) for this unit.

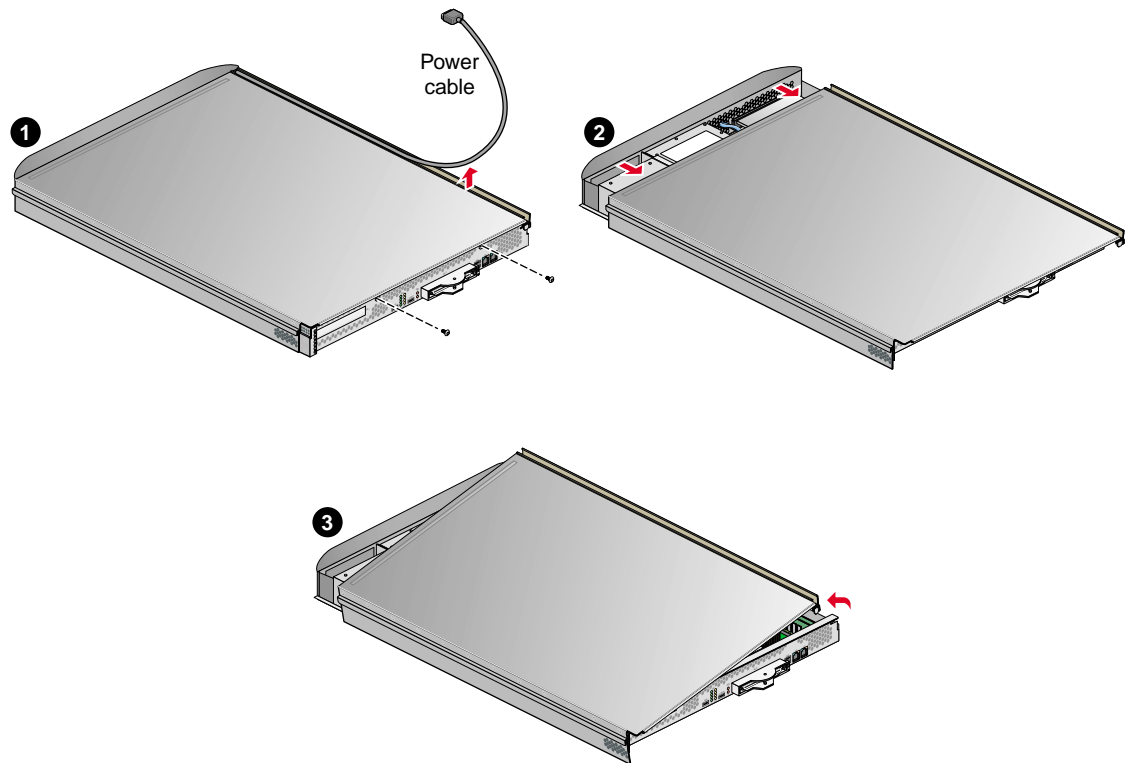
## Accessing the System's Internal Components

All of the procedures in this chapter require the removal and replacement of the top cover to access the internal component(s) you are adding, removing, or replacing. You will need torx (Tx 10) and (Tx 20) screw drivers to complete the procedures.

## Removing the Top Cover

Use the following steps and Figure 6-1 to open the cover:

1. To remove the module's top cover and access the internal system components, remove the two torx (Tx 20) screws holding the top to the back of the unit as shown in Figure 6-1.
2. Remove the system power cord from the top cover channel and adjust it so that it does not interfere with the top cover removal process.
3. Working from the rear of the system, pull the cover back about two inches (5 cm) then lift it up and to the left into a fully open position.
4. Set the cover aside and go to the remove/replace instructions for the component.



**Figure 6-1** Opening the System Cover

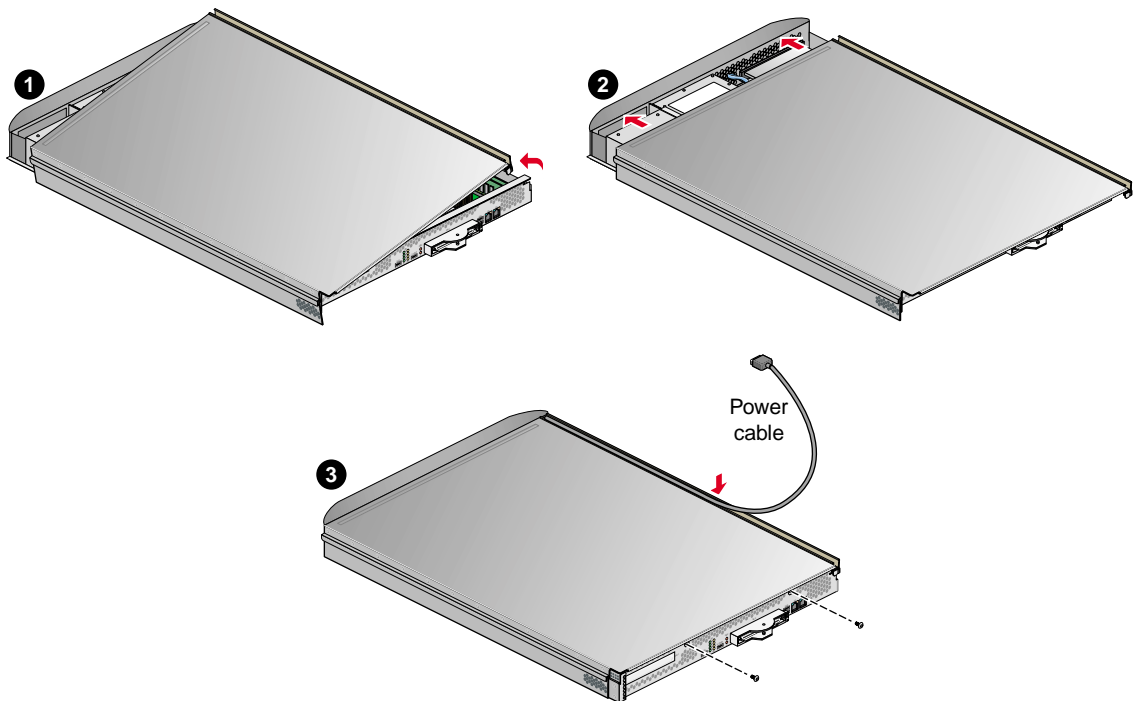
Always replace the system top cover before operating the system. Running the system without the cover may result in overheating and system failure.

## Replacing the Top Cover

Running the system without the cover may result in overheating and system failure.

To properly replace the system top cover, reference Figure 6-2 and use the following steps:

1. Adjust the system power cord so that it is clear of the top cover placement area.
2. Working from the rear of the system, place the left side of the top cover under the lip on the system's left side.
3. With the top cover positioned about two inches (5 cm) from the front panel, lower the cover down and to the right until it is fully seated.
4. Push the cover forward until it locks in place under the front panel sheetmetal.
5. Replace the system power cord in the channel on the left side of the top cover.
6. Secure the cover to the system using the two torx (Tx 20) retention screws at the rear.



**Figure 6-2** Closing the System Cover

## PCI and PCI-X Cards

Your system module and various optional modules in your system support optional PCI and PCI-X cards.

The following instructions, which describe how to install and remove a PCI or PCI-X card from the system base compute module, can also be used to install and remove a PCI or PCI-X card from an expansion compute module.

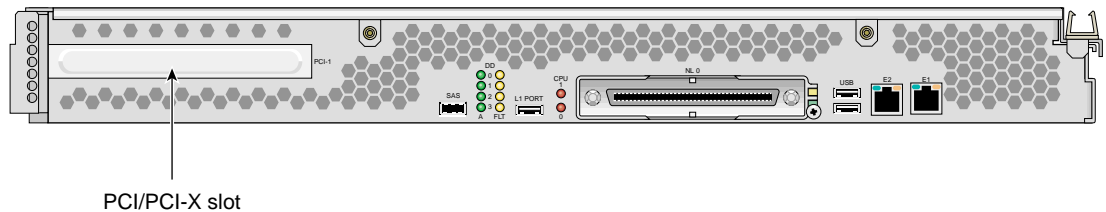
Figure 6-3 shows the rear of the module. The PCI and PCI-X card slot is located on the left-rear side in the base compute module.

For an updated list of supported PCI and PCI-X cards, see the SGI Supportfolio at:

<http://support.sgi.com>.

This section describes the following:

- “Rules for Card Installation and Removal” on page 104
- “Installing or Replacing a PCI or PCI-X Card” on page 104
- “Disk Drives” on page 107



**Figure 6-3** PCI or PCI-X Card Slot in the Base Compute Module

## Rules for Card Installation and Removal

When installing or removing a PCI or PCI-X card from your system, be aware of the following precautionary rules:



---

**Caution:** Electronic equipment can be irreparably damaged by electrostatic discharge (ESD). Always follow these preventive measures when you handle a system component:

- Remove a component from its antistatic bag only when you are ready to install it.
  - If you handle a component before installation, do not place it on surfaces that produce ESD (carpeting, for example) or near devices that create static electricity.
  - Attach a static wrist strap to a grounded connection on your system when you install or remove a component.
- 

Each Altix 330 module supports one PCI/PCI-X option card.

## Installing or Replacing a PCI or PCI-X Card

To remove, replace, or install a PCI or PCI-X card, follow these steps:

1. Power off the server system. For power off instructions, see “Powering the System On and Off Manually” on page 49.
2. Disconnect all of the cables at the rear of the module. The module power cable should be disconnected from the power source and freed from any obstructions.



---

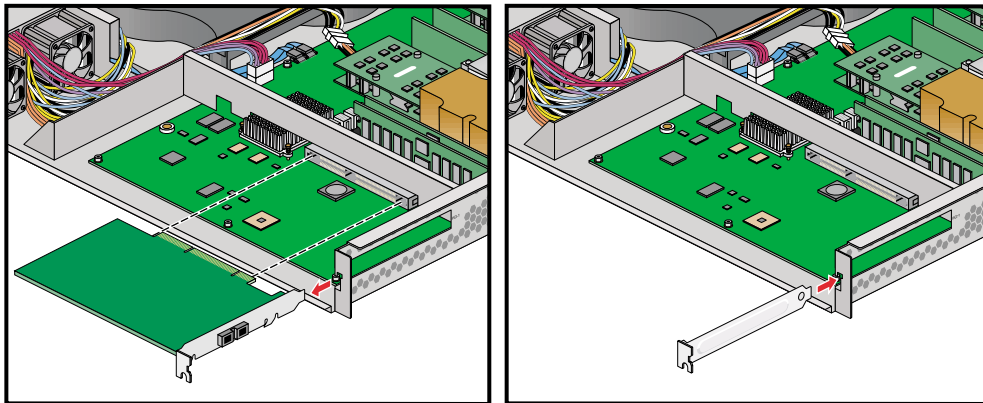
**Warning:** Components may be hot. To avoid injury, allow the components to cool for approximately five minutes before you proceed with these instructions.

---

3. If your module is rackmounted, remove the two screws that secure the module retaining brackets to the front rails of the rack. If your module is not rackmounted, proceed to step 5.
4. Preferably using two people, pull the module from the rack carefully (do not pull on the plastic front panel). Support the unit from below and place it on a stable work surface. The power cable will come out with the module.
5. Open the top cover as described in “Accessing the System’s Internal Components” on page 100.

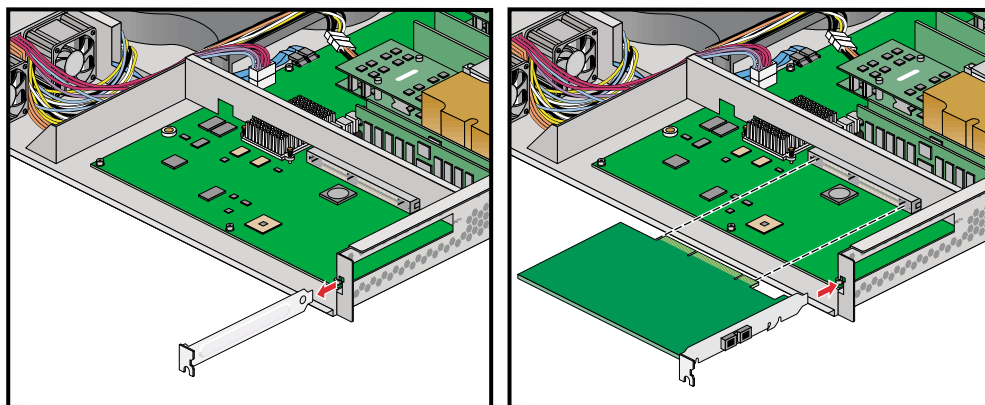


6. Make sure that you read “Safety Instructions” on page 99, and “Rules for Card Installation and Removal” on page 104 before beginning your card installation.
7. If you are replacing an existing PCI/PCI-X card remove it as shown in Figure 6-4. If there is only a blank panel in the slot, go on to the next step and remove it.



**Figure 6-4** Removing an Installed Optional PCI/PCI-X Card

8. If a blanking plate covers the PCI/PCI-X slot, slide the blank cover to the left and remove it.
9. If you are installing a card, slide the PCI card into the connector slot as shown in Figure 6-5.

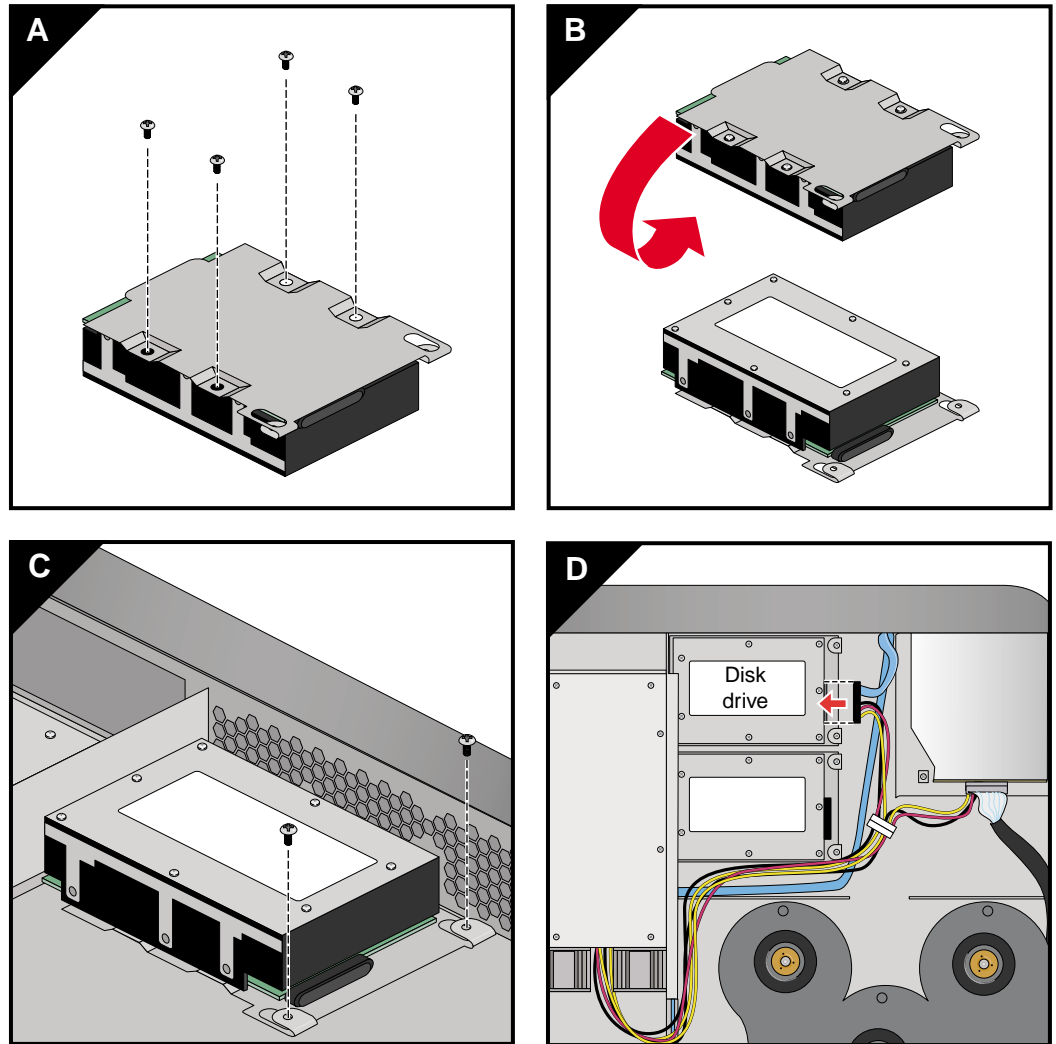


**Figure 6-5** Installing a PCI/PCI-X Card

10. Insert the card into the slot by pushing the card into the connector until it is properly seated. There is no retention screw, the cover acts as a retaining piece for the PCI board.
11. If you have no other internal services to perform, go to “Replacing the Top Cover” on page 102 and follow the directions to reinstall the top cover.
12. If you removed the module from a rack, perform the following substeps. (If you have not removed the module from a rack, go on to the next step.)
  - a. With one person holding each side of the module, align the inner lip on each side to fit over the rack rails. Note that the left side rail must be placed under the inner lip or the unit will not fit.
  - b. Slide the unit onto the rails until the module is stopped by the rear retention bracket at the back of the right rail. The front bezel of the Altix 330 should be flush with the front of the rack.
  - c. Install the two retention brackets that secure the module to the front rails of the rack by aligning the screw holes and attaching them with screws.
13. Install all of the cables at the rear of the module.
14. Power on the server system, see “Powering the System On and Off Manually” on page 49.

## Disk Drives

Each base compute module contains one or two hard disk drives (see Figure 6-6 and “Installing or Replacing a Disk Drive” for installation). Note that a CPU expansion module may or may not contain disk drives. The expansion modules have a disk drive(s) as optional components.



**Figure 6-6** Disk Drive Installation

## Installing or Replacing a Disk Drive

You will need both torx Tx 10 and Tx 20 screwdriver for these procedures. These steps can also be used if you want to remove an already installed drive.

---

**Important:** The system disk (disk 0) is located nearest the impellers (fans). The data disk (disk 1) is the disk that is located nearest the front of the chassis, (see panel A in Figure 6-7).

---

To install/replace a disk drive, follow these steps:

1. Power off the server system. For power off instructions, see “Powering the System On and Off Manually” on page 49.
2. Disconnect all of the cables at the rear of the module. The module power cable should be disconnected from the power source and freed from any obstructions.



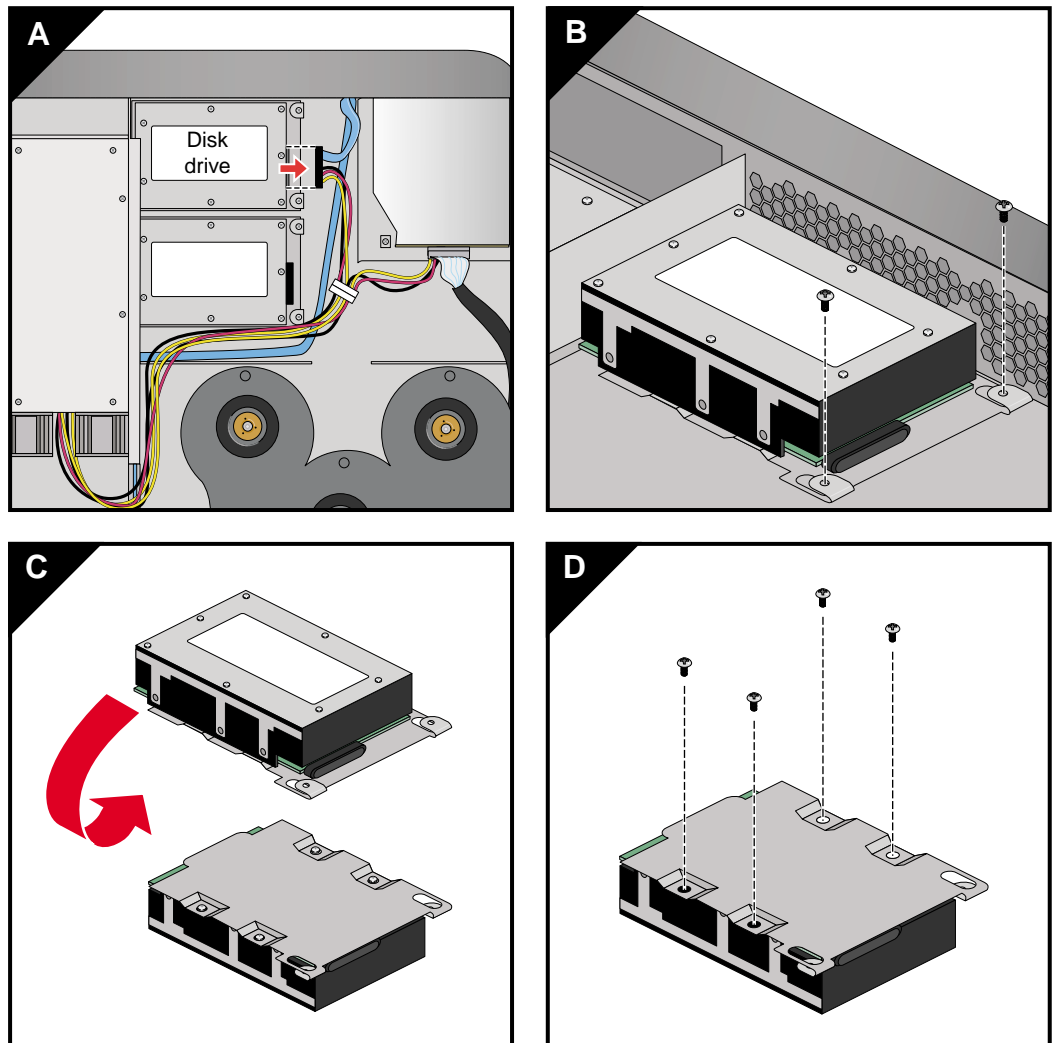
---

**Warning:** Components may be hot. To avoid injury, allow the components to cool for approximately five minutes before you proceed with these instructions.

---

3. If your module is rackmounted, remove the two screws that secure the module retaining brackets to the front rails of the rack. If your module is not rackmounted, proceed to step 5.
4. Preferably using two people, pull the module from the rack carefully (do not pull on the plastic front panel). Support the unit from below and place it on a stable work surface. The power cable will come out with the module.
5. Open the top cover as described in “Accessing the System’s Internal Components” on page 100.
6. Locate the drive you want to replace, or identify the drive carrier you will be installing the new drive on. See panel A in Figure 6-7.
7. Locate and remove the power and data cables from any existing drive you want to replace.
8. Remove the two Tx 20 screws that hold the drive carrier in place on the chassis. See panel B in Figure 6-7.
9. Turn the assembly over carefully and remove the four Tx 10 screws that connect the drive to the sheetmetal carrier. See panel C in Figure 6-7.
10. Place the new drive on the disk carrier, align the screw holes and secure the drive using the four Tx 10 screws. See panel D in Figure 6-7.
11. Orient the disk/carrier assembly on the chassis and secure it with the Tx 20 screws.

12. Connect the power and data cables to the new drive.



**Figure 6-7** Replacing a Disk Drive

13. Close the system cover, see “Replacing the Top Cover” on page 102.

14. If you removed the module from a rack, perform the following substeps. (If you have not removed the module from a rack, go on to the next step.)

- a. With one person holding each side of the module, align the inner lip on each side to fit over the rack rails. Note that the left side rail must be placed under the inner lip or the unit will not fit.
  - b. Slide the unit onto the rails until the module is stopped by the rear retention bracket at the back of the right rail. The front bezel of the Altix 330 should be flush with the front of the rack.
  - c. Install the two retention brackets that secure the module to the front rails of the rack by aligning the screw holes and attaching them with screws.
15. Install all of the cables at the rear of the module.
  16. Power on the server system, see “Powering the System On and Off Manually” on page 49.

## Replacing a DVD Drive

You will need a torx Tx 20 screwdriver for these procedures. To install/replace a DVD drive in the Altix 330, follow these steps:

1. Power off the server system. For power off instructions, see “Powering the System On and Off Manually” on page 49.
2. Disconnect all of the cables at the rear of the module. The module power cable should be disconnected from the power source and freed from any obstructions.



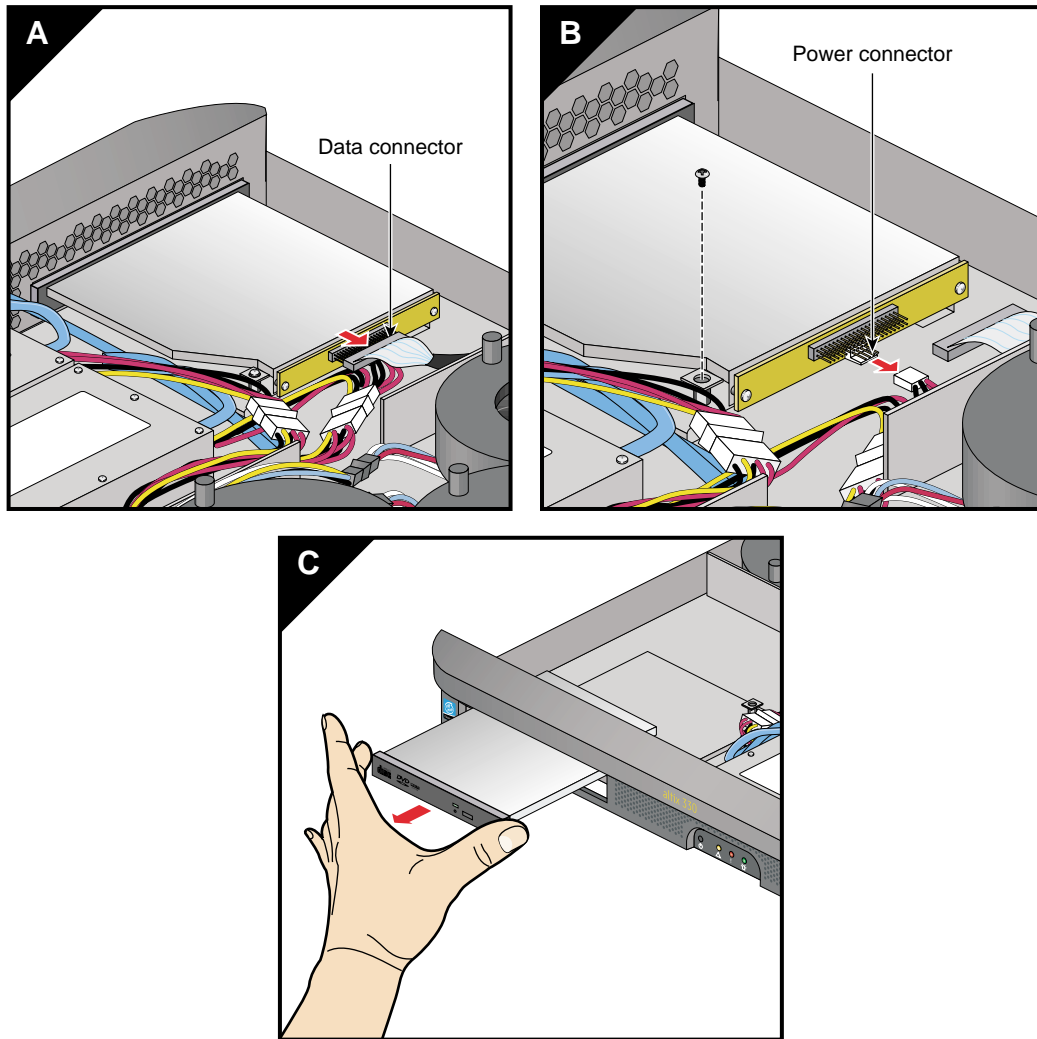
---

**Warning:** Components may be hot. To avoid injury, allow the components to cool for approximately five minutes before you proceed with these instructions.

---

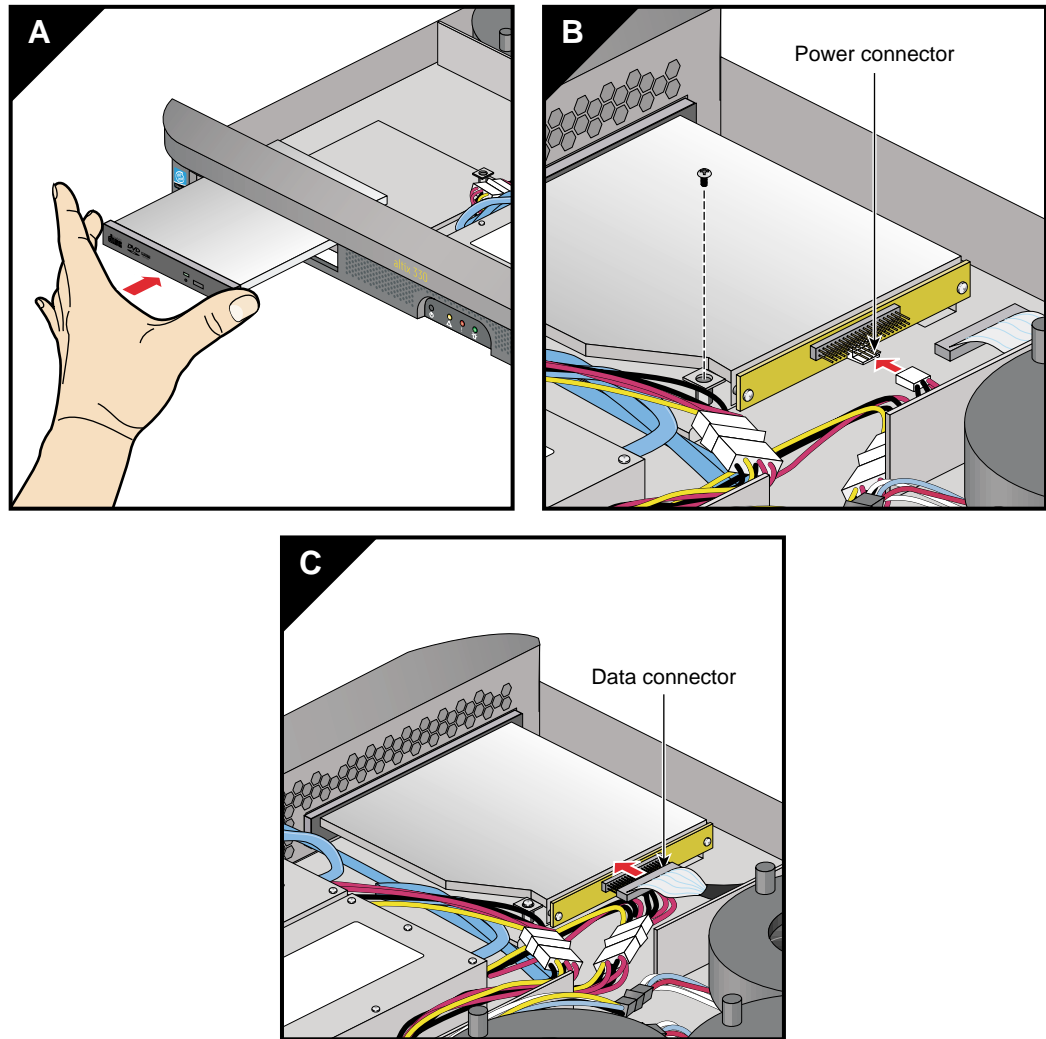
3. If your module is rackmounted, remove the two screws that secure the module retaining brackets to the front rails of the rack. If your module is not rackmounted, proceed to step 5.
4. Preferably using two people, pull the module from the rack carefully (do not pull on the plastic front panel). Support the unit from below and place it on a stable work surface. The power cable will come out with the module.
5. Open the top cover as described in “Accessing the System’s Internal Components” on page 100.
6. Working from the front of the unit, remove the Tx 20 retention screw at the right-rear of the DVD drive, (see Figure 6-8 on page 112).
7. Remove the DVD data and power cable connectors.
8. Slide the DVD drive forward and out of the chassis.

9. Replace a new DVD drive in the chassis by reversing the previous three steps, (see Figure 6-8 on page 112).
10. Close the system cover, see “Replacing the Top Cover” on page 102.
11. If you removed the module from a rack, perform the following substeps. (If you have not removed the module from a rack, go on to the next step.)
  - a. With one person holding each side of the module, align the inner lip on each side to fit over the rack rails. Note that the left side rail must be placed under the inner lip or the unit will not fit.
  - b. Slide the unit onto the rails until the module is stopped by the rear retention bracket at the back of the right rail. The front bezel of the Altix 330 should be flush with the front of the rack.
  - c. Install the two retention brackets that secure the module to the front rails of the rack by aligning the screw holes and attaching them with screws.
12. Install all of the cables at the rear of the module.
13. Power on the server system, see “Powering the System On and Off Manually” on page 49.



**Figure 6-8** Removing the DVD Drive





**Figure 6-9** Replacing a DVD Drive

## Memory DIMM Group Placement and Guidelines

Memory is contained on cards that are referred to as DIMMs (dual inline memory modules). Each server system base compute module and system expansion compute module can contain four, or eight DIMMs installed in DIMM slots located on the module's mother board.

These eight DIMM slots are organized into two groups of (4 DIMMs each) as shown in Figure 6-10 on page 115.

DIMMs are installed one per DIMM slot, and four at a time (group of four).

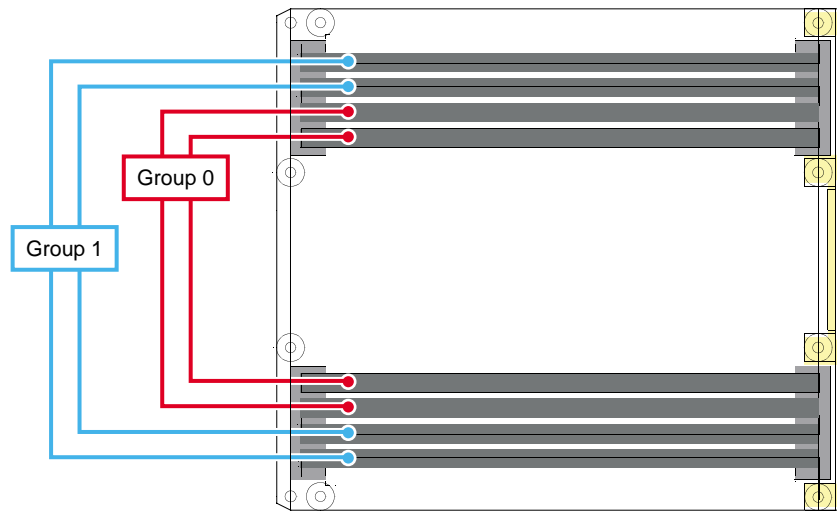
You must note these guidelines when installing DIMM groups:

- Memory is increased or decreased in four-DIMM group increments only.
- Each of the four DIMMs that make up a DIMM group must be the same memory size and speed; however, the two 4-DIMM groups can differ in memory size.
- The first four DIMMs (group 0) **must** be in place for the base module to operate properly.
- Mixing DIMM groups with different access speeds will cause the memory bus to default to the speed used for the slowest group.
- The DIMMs used in the Altix 330 server system base compute module, or expansion compute module, are not compatible with DIMMs used in the Origin 200, Origin 300, Origin 350 series, SGI 3000 series, SGI 2000 series, Onyx systems, Fuel, Octane or Tezro systems.

---

**Note:** Installation of DIMMs not certified or approved by SGI for use in the Altix 330 may impair the functionality or performance of your system. Installation of DIMMs not approved by SGI may also violate your warranty and/or support contract. Check with your SGI sales or service representative before installing any DIMMs not specifically designated for the Altix 330.

---



**Figure 6-10** Layout of Slots and DIMM Memory Groups



**Caution:** Electronic equipment can be irreparably damaged by electrostatic discharge (ESD). Always follow these preventive measures when you handle a system component:

- Remove a component from its antistatic bag only when you are ready to install it.
- If you handle a component before installation, do not place it on surfaces that produce ESD (carpeting, for example) or near devices that create static electricity.
- Attach a static wrist strap to a grounded connection on your system when you install or remove a component.

## Installing or Replacing a DIMM Group

To install or replace a DIMM group, follow these steps:

1. Power off the server system. For powering off instructions, see “Powering the System On and Off Manually” on page 49.
2. Disconnect all of the cables at the rear of the module.



---

**Warning:** Components may be hot. To avoid injury, allow the components to cool for approximately five minutes before you proceed with these instructions.

---

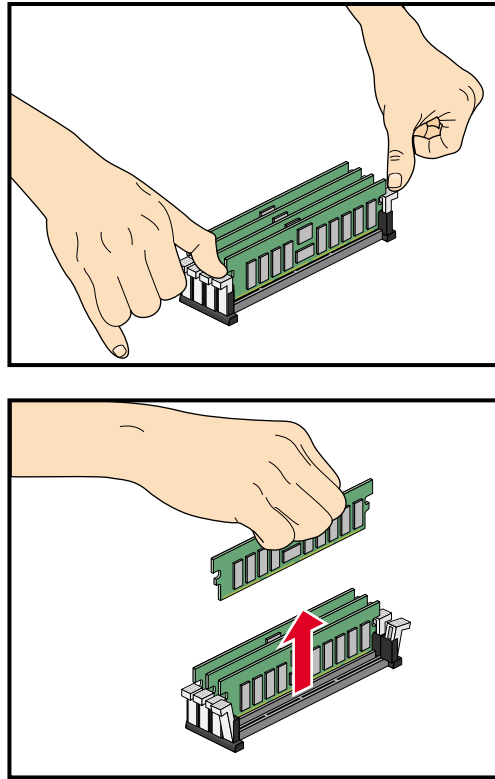
3. If your module is rackmounted, remove the two screws that secure the module retaining brackets to the front rails of the rack. If your module is not rackmounted, proceed to step 5.
4. Preferably using two people, pull the module from the rack carefully (do not pull on the plastic front panel). Support the unit from below and place it on a stable work surface. The power cable will come out with the module.
5. Open the top cover as described in “Accessing the System’s Internal Components” on page 100.
6. If you need to remove a DIMM or DIMM group, use the following substeps:
  - a. Push out and down on the two ejector latches (located at each end of the DIMM socket) to disengage the DIMM from its connector, see Figure 6-11 on page 117.
  - b. Carefully grasp the DIMM and pull it up and out of the guide rails.

---

**Note:** Hold the DIMM only by its edges. Be careful not to touch its components or gold edge connectors.

---

- c. Place the DIMM on an ESD-safe surface or in an anti-static bag.
7. If you are installing a new DIMM(s), proceed to the next steps.



**Figure 6-11** Removing a DIMM

Install the DIMMs, as follows (see Figure 6-12):

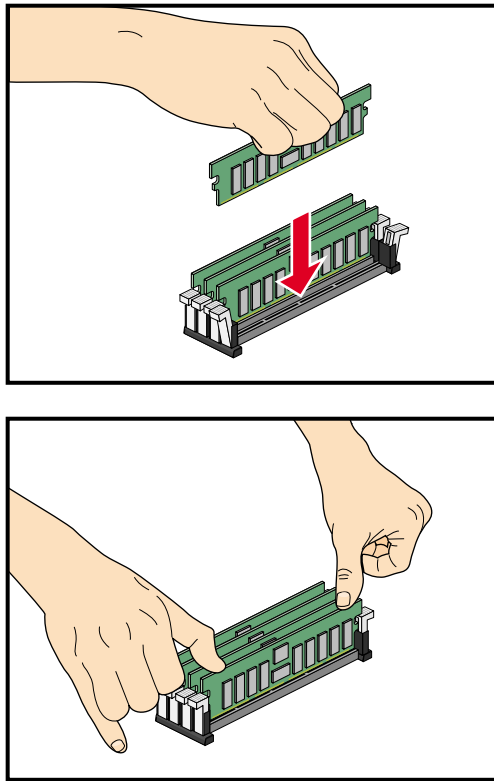
---

**Note:** If you need to find the correct locations in which to install the DIMMs, make sure to read the introductory material in “Memory DIMM Group Placement and Guidelines” on page 114.

---

- a. Ensure the ejector latches are in the open position (leaning away from the slot).
- b. Hold the DIMM only by its edges and remove it from its antistatic package.
- c. Align the bottom edge of the DIMM with the keyed socket.

- d. Insert the bottom edge of the DIMM into the socket, and then press down evenly on the DIMM until it seats correctly. Use extreme care when you install a DIMM. If you apply too much pressure, you can damage the socket.
- e. When the DIMM is fully seated in the connector, the ejector latches snap into place flush with each end of the DIMM, see Figure 6-12. Repeat until all DIMMs are installed.



**Figure 6-12** Inserting a DIMM

- 8. Close the system cover, see “Replacing the Top Cover” on page 102.
- 9. If you removed the module from a rack, perform the following substeps. (If you have not removed the module from a rack, go on to the next step.)

- a. With one person holding each side of the module, align the inner lip on each side to fit over the rack rails. Note that the left side rail must be placed under the inner lip or the unit will not fit.
  - b. Slide the unit onto the rails until the module is stopped by the rear retention bracket at the back of the right rail. The front bezel of the Altix 330 should be flush with the front of the rack.
  - c. Install the two retention brackets that secure the module to the front rails of the rack by aligning the screw holes and attaching them with screws.
10. Install all of the cables at the rear of the module.
  11. Power on the server system as described in “Powering the System On and Off Manually” on page 49.





## Troubleshooting

This chapter provides the following sections to help you troubleshoot your system:

- “Troubleshooting Chart” on page 122
- “L1/L2 Controller Error Messages” on page 123
- “SGI Electronic Support” on page 127

## Troubleshooting Chart

Table 7-1 lists recommended actions for problems that can occur on your system. For problems that are not listed in this table, use the SGI Electronic Support system to help solve your problem or contact your SGI system support engineer (SSE). More information about the SGI Electronic Support system is provided later in this chapter.

**Table 7-1** Troubleshooting Chart

<b>Problem Description</b>	<b>Recommended Action</b>
The system will not power on.	<p>Ensure that the power cord of the PDU is seated properly in the power receptacle.</p> <p>Ensure that the PDU circuit breaker is on.</p> <p>If the power cord is plugged in and the circuit breaker is on, contact your SSE.</p>
An individual module will not power on.	<p>View the module's L1 messages from the system console if possible; see Table 7-2 if an error message is present.</p> <p>If the L1 controller is not running, contact your SSE.</p> <p>Check the connection between the module and its power source.</p>
The system will not boot the operating system.	Contact your SSE.
The service-required LED illuminates on a module.	View the L1 log of the failing module via the console; see Table 7-2 for a description of the error message.
The failure LED illuminates on a module.	View the L1 log of the failing module via the console; see Table 7-2 for a description of the error message.
The green or yellow LED of a NUMAlink port is not illuminated.	Ensure both ends of the NUMAlink cable are seated properly and the destination module is powered on.
The PWR LED of a populated PCI slot is not illuminated.	Reseat the PCI card.
The fault LED of a populated PCI slot is illuminated (on).	Reseat the PCI card. If the fault LED remains on, replace the PCI card.
The system status LED of the TP900 is amber.	Contact your SSE.

**Table 7-1** Troubleshooting Chart **(continued)**

Problem Description	Recommended Action
The power status LED of the TP900 is amber.	Contact your SSE to replace the power supply module. The power supply module also has an amber LED that indicates a fault.
The cooling status LED of the TP900 is amber.	Contact your SSE to replace the cooling module. The cooling module also has an amber LED that indicates a fault.

## L1/L2 Controller Error Messages

Table 7-2 lists error messages that the L1/L2 controller generates and displays on the console display. This display is output from the module(s) to the system console window. For serial number related errors, check with your service provider for prevention and solution information.

---

**Note:** The Altix 330 system uses automatic fan control. The L1/L2 adjusts the fan speed in small increments continually (every 10 seconds) to maintain a target temperature.

---

The serial number error messages listed at the end of Table 7-2 are messages that will come across the system console (at the L1/L2 or optional L3 prompt). The log being referenced is the L1 log. Users can get the contents by using the `log` command from an L1 prompt, or `l1 log` command from an L2 prompt or optional L3 prompt.

Actions that could cause serial number error messages include:

- Moving a base compute, or expansion module from one system to another.
- Replacing the interface board of an Altix 330 module.
- L1 NVRAM memory failure.
- Incorrect serial number setting on an optional L3 system controller.

---

**Note:** In Table 7-2, a voltage warning occurs when a supplied level of voltage is below or above the nominal (normal) voltage by 10 percent. A voltage fault occurs when a supplied level is below or above the nominal voltage by 20 percent.

---

**Table 7-2** L1/L2 Controller Messages

System Controller Message	Message Meaning and Action Needed
<b>Internal voltage messages:</b>	
ATTN: x.xV high fault limit reached @ x.xxV	30-second power-off sequence for the module.
ATTN: x.xV low fault limit reached @ x.xxV	30-second power-off sequence for the module.
ATTN: x.xV high warning limit reached @ x.xxV	A higher than nominal voltage condition is detected.
ATTN: x.xV low warning limit reached @ x.xxV	A lower than nominal voltage condition is detected.
ATTN: x.xV level stabilized @ x.xV	A monitored voltage level has returned to within acceptable limits.
<b>Fan messages:</b>	
(T>target && fans>=80%)	Advisory only - the system fans are at 80% of max
(T>target+5 && fans=100%)	Avisory only - the system fans are at maximum
(T>target+10 && fans=100%)	Fault - the system fans have been at maximum too long. Check ambient temperature and system.
Cooling system stabilized	All zones have returned to stable temperatures and fan speeds
zone advisory limit reached xxC/ xxF Fan: xx%	Zone is above the target temperature and the fans are at 80% or more of maximum speed
zone critical limit reached xxC/ xxF Fan: xx%	Zone is above target temperature and the fans are at 100% of maximum speed
zone fault limit reached xxC/ xxF Fan: xx%	Zone has reached maximum temperature above target and fans are at 100% of maximum speed
zone fan failure	One or more fans in the zone have fallen below minimum speed
ATTN: FAN # x fault limit reached @ xx RPM	A fan has reached its maximum RPM level. The ambient temperature may be too high. Check to see if a fan has failed.

**Table 7-2** L1/L2 Controller Messages **(continued)**

<b>System Controller Message</b>	<b>Message Meaning and Action Needed</b>
ATTN: FAN # x warning limit reached @ xx RPM	A fan has increased its RPM level. Check the ambient temperature. Check to see if the fan stabilizes.
ATTN: FAN # x stabilized @ xx RPM	An increased fan RPM level has returned to normal.

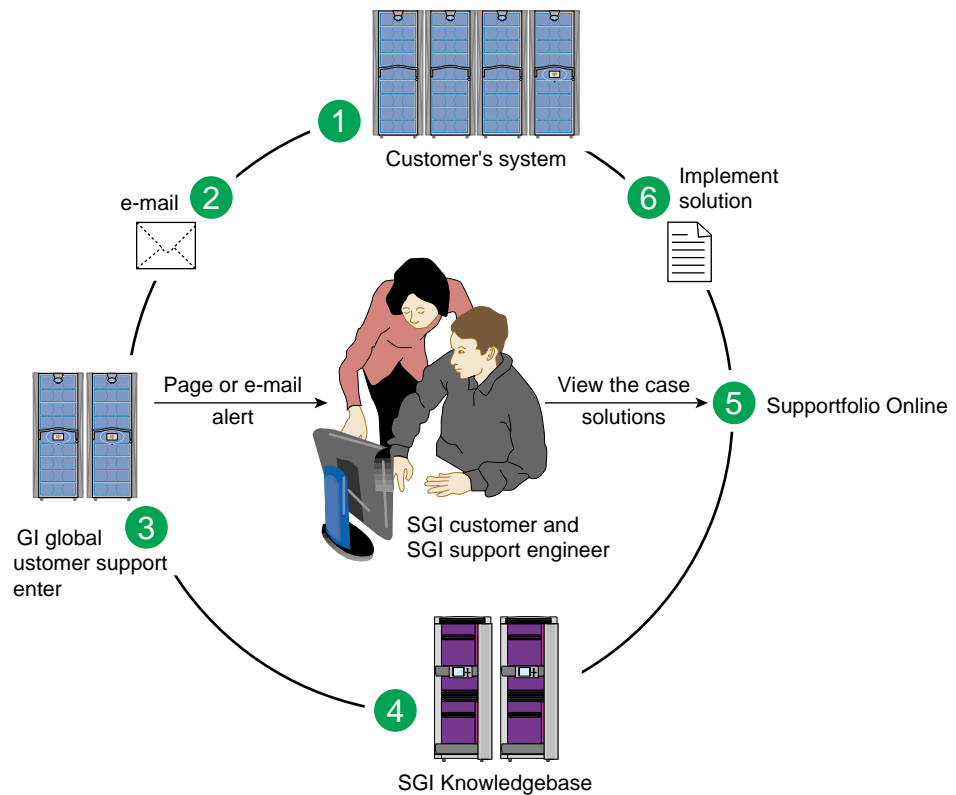
**Table 7-2** L1/L2 Controller Messages (continued)

<b>System Controller Message</b>	<b>Message Meaning and Action Needed</b>
<b>Temperature messages: low alt.</b>	
ATTN: TEMP # advisory temperature reached @ xxC xxF	The ambient temperature at the module's air inlet has exceeded 30 °C.
ATTN: TEMP # critical temperature reached @ xxC xxF	The ambient temperature at the module's air inlet has exceeded 35 °C.
ATTN: TEMP # fault temperature reached @ xxC xxF	The ambient temperature at the module's air inlet has exceeded 40 °C.
<b>Temperature messages: high alt.</b>	
ATTN: TEMP # advisory temperature reached @ xxC xxF	The ambient temperature at the module's air inlet has exceeded 27 °C.
ATTN: TEMP # critical temperature reached @ xxC xxF	The ambient temperature at the module's air inlet has exceeded 31 °C.
ATTN: TEMP # fault temperature reached @ xxC xxF	The ambient temperature at the module's air inlet has exceeded 35 °C.
<b>Temperature stable message:</b>	
ATTN: TEMP # stabilized @ xxC/xxF	The ambient temperature at the module's air inlet has returned to an acceptable level.
<b>Power off messages:</b>	
Auto power down in xx seconds	The L1/L2 system controller has registered a fault and is shutting down. The message displays every five seconds until shutdown.
Base module appears to have been powered down	The L1/L2 system controller has registered a fault and has shut down.
<b>Serial number messages:</b>	
Brick Serial Number mismatch	See L1 log for details.
System Serial Number mismatch	See L1 log for details.
Invalid System Serial Number format	See L1 log for details.
No assigned System Serial Number	See L1 log for details.

## SGI Electronic Support

SGI Electronic Support provides system support and problem-solving services that function automatically, which helps resolve problems before they can affect system availability or develop into actual failures. SGI Electronic Support integrates several services so they work together to monitor your system, notify you if a problem exists, and search for solutions to the problem.

Figure 7-1 shows the sequence of events that occurs if you use all of the SGI Electronic Support capabilities.



**Figure 7-1** Full Support Sequence

The sequence of events can be described as follows:

1. Embedded Support Partner (ESP) monitors your system 24 hours a day.
2. When a specified system event is detected, ESP notifies SGI via e-mail (plain text or encrypted).
3. Applications that are running at SGI analyze the information, determine whether a support case should be opened, and open a case if necessary. You and SGI support engineers are contacted (via pager or e-mail) with the case ID and problem description.
4. SGI Knowledgebase searches thousands of tested solutions for possible fixes to the problem. Solutions that are located in SGI Knowledgebase are attached to the service case.
5. You and the SGI support engineers can view and manage the case by using Supportfolio Online as well as search for additional solutions or schedule maintenance.
6. Implement the solution.

Most of these actions occur automatically, and you may receive solutions to problems before they affect system availability. You also may be able to return your system to service sooner if it is out of service.

In addition to the event monitoring and problem reporting, SGI Electronic Support monitors both system configuration (to help with asset management) and system availability and performance (to help with capacity planning).



The following three components compose the integrated SGI Electronic Support system:

**SGI Embedded Support Partner (ESP)** is a set of tools and utilities that are embedded in the IRIX operating system. ESP can monitor a single system or group of systems for system events, software and hardware failures, availability, performance, and configuration changes, and then perform actions based on those events. ESP can detect system conditions that indicate potential problems, and then alert appropriate personnel by pager, console messages, or e-mail (plain text or encrypted). You also can configure ESP to notify an SGI call center about problems; ESP then sends e-mail to SGI with information about the event.

**SGI Knowledgebase** is a database of solutions to problems and answers to questions that can be searched by sophisticated knowledge management tools. You can log on to SGI Knowledgebase at any time to describe a problem or ask a question. Knowledgebase searches thousands of possible causes, problem descriptions, fixes, and how-to instructions for the solutions that best match your description or question.

**Supportfolio Online** is a customer support resource that includes the latest information about patch sets, bug reports, and software releases.

The complete SGI Electronic Support services are available to customers who have a valid SGI Warranty, FullCare, FullExpress, or Mission-Critical support contract. To purchase a support contract that allows you to use the complete SGI Electronic Support services, contact your SGI sales representative. For more information about the various support contracts, see the following website:

<http://www.sgi.com/support/customerservice.html>

For more information about SGI Electronic Support, see the following website:

<http://www.sgi.com/support/es>



## **Technical Specifications**

This appendix contains technical specification information about your system, as follows:

- “Environmental System Specifications” on page 132
- “Compute Module Specifications” on page 133
- “Rack Specifications” on page 135
- “SGI TP900 Storage Module Specifications” on page 136
- “Non-proprietary I/O Port Specifications” on page 136

## Environmental System Specifications

Table A-1 lists the environmental specifications of the Altix 330 server system.

**Table A-1** Environmental Specifications

---

<b>Characteristic</b>	<b>Specification</b>
Temperature, operating	+5 °C (+41 °F) to +35 °C (+95 °F) (up to 1500 m [5,000 ft]) +5 °C (+41 °F) to +30 °C (+86 °F) (1500 m to 3000 m [5,000 ft to 10,000 ft])
Temperature, non-operating	-40 °C (-40 °F) to +60 °C (+140 °F)
Humidity	10% to 95% RH, noncondensing
Altitude	Sea level to 40,000 ft (nonoperating) Sea level to 10,000 ft (3000 m) (operating)

---

## Compute Module Specifications

Table A-2 lists the bandwidth characteristics of the compute module.

**Table A-2** Bandwidth Characteristics of the Compute Module

Characteristic	Peak Bandwidth	Sustainable Bandwidth
NUMALink channel	6.4 GB/s full duplex 3.2 GB/s each direction	~2.8 GB/s each direction
Main memory	Up to 10.8 GB/s	Up to 10.8 GB/s
Front Side Bus (FSB)	6.4 GB/s	~6.4 GB/s

Table A-3 summarizes the general features of the compute module.

**Table A-3** General Features of the Compute Module

Feature	Base Compute Module	Expansion Compute Module
NUMALink-4 port	1 (3.2 GB/s each direction)	1 (3.2 GB/s each direction)
L1 port	1 USB type A	1 USB type A
External SAS/SATA port	1 Dual function connector	1 Dual function connector
Ethernet ports	Two 10BaseT/100BaseT/1000BaseT	
Internal SAS/SATA drive	One or two SAS or Serial ATA drives	
3.5-in. drive bay	1 or 2	
64-bit Intel processor	1 or 2	1 or 2
Memory	up to 16GB	up to 16GB
Expansion slot	1 PCI/PCI-X	1 PCI/PCI-X

Table A-4 lists the specifications for the compute module.

**Table A-4** Compute Module Specifications

<b>Characteristic</b>	<b>Specification</b>
Height	1.7 in. (4.45 cm)
Width	17.5 in. (44.5 cm)
Depth	31.75 in. (80.6 cm) (with bezel)
Weight	31 lb (14.1 kg) maximum configuration <sup>a</sup>
Noise	6.0 Bells sound power, up to 30 °C
Heat dissipation	1617 Btu/hr maximum
Input power	120 - 240 VAC

a. Weight will vary slightly depending on whether the system has one or two processors, on the amount of DIMMs installed, and on whether you have one or two disk drives in your system.

## Rack Specifications

The server system can be housed in short (17U) or tall (39U) racks. Weights will vary based on optional storage or other modules installed.

---

**Note:** One U is 1.75 in. (4.45 cm).

---

Table A-5 lists the specifications of the short rack.

**Table A-5** Short Rack Specifications (with Skins)

Characteristic	Specification
Height	36.06 in. (916 mm)
Width	25.38 in. (645 mm)
Depth	40.63 in. (1032 mm)
Weight (maximum)	385 lb (212 kg) approximate
Shipping weight (maximum)	610 lb (277 kg) approximate

Table A-6 lists the specifications of the tall rack.

**Table A-6** Tall Rack Specifications

Characteristic	Specification
Height	75.82 in. (1925.83 mm)
Width	23.62 in. (599.95 mm)
Depth	41.25 in. (1048 mm)
Weight (maximum)	1,366 lb (620 kg)
Shipping weight (maximum)	1,547 lb (702 kg)

## SGI TP900 Storage Module Specifications

Table A-7 lists the specifications of the SGI TP900 storage module.

**Table A-7** TP900 Storage Module Specifications

<b>Characteristic</b>	<b>Specification</b>
Height	3.37 in. (85.7 mm)
Width	17.6 in. (447 mm)
Depth	21.46 in. (545 mm)
Input power	100 - 254 VAC (~175 W)
Weight:	
Maximum configuration	48.5 lb (22 kg)
Empty enclosure	14.3 lb (6.5 kg)

## Non-proprietary I/O Port Specifications

This section provides pin assignment information for the non-proprietary connectors on the following components:

- Compute module (base and expansion)
- TP900 storage module



## Compute Module

Table A-8 lists the non-proprietary connectors that are located on the rear panel of the compute module (see Figure A-1 on page 137). The third column of the table indicates where you can find the pin assignments for these connectors.

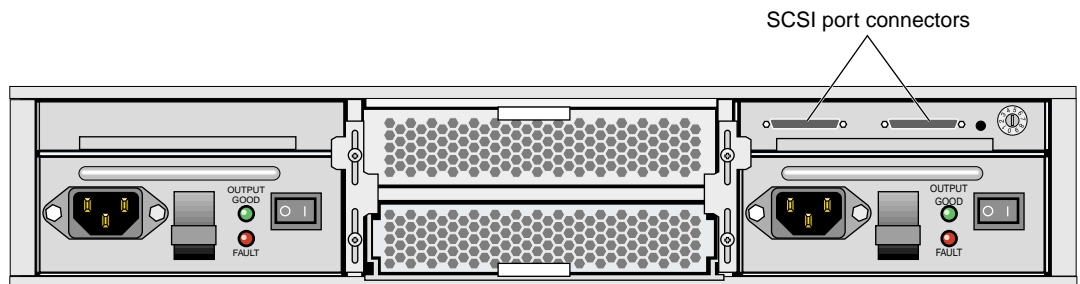
**Table A-8** Compute Module Connectors

Port	Connector	Pin Assignments
Ethernet ports	RJ-45	See Figure A-2 on page 138 and Table A-9 on page 138
External SAS/SATA port <sup>a</sup>	14-pin	See Figure A-3 on page 139 and Table A-10 on page 139
L1 port	USB type A	See Figure A-4 on page 140 and Table A-11 on page 140

a. Supports both Serial Attached SCSI and SATA drive options.

## SGI TP900 Storage Module

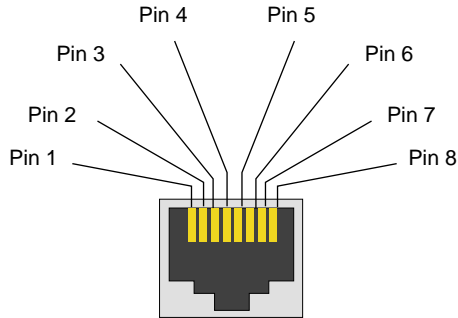
Figure A-1 shows the two SCSI port connectors on the rear panel of the TP900 storage module. Figure A-3 on page 139 shows how the pin numbers are distributed on the SCSI connector, and Table A-10 on page 139 lists the pin assignments.



**Figure A-1** Non-proprietary Connectors on Rear Panel of TP900 Module

## RJ-45 Connector

Figure A-2 shows the pin locations for the RJ-45 connectors on the back of the compute module. Table A-9 shows the pin assignments for the RJ-45 connector.



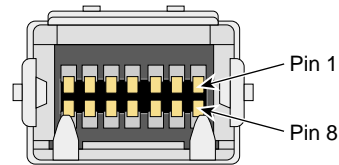
**Figure A-2** RJ-45 Connector Pin Assignments

**Table A-9** Ethernet Connector Pin Assignments

10/100BaseT Ethernet Pinouts		1000BaseT Ethernet Pinouts	
Pin	Assignment	Pin	Assignment
1	Transmit +	1	Transmit/Receive 0+
2	Transmit -	2	Transmit/Receive 0-
3	Receive +	3	Transmit/Receive 1+
4	Not used	4	Transmit/Receive 2+
5	Not used	5	Transmit/Receive 2-
6	Receive -	6	Transmit/Receive 1-
7	Not used	7	Transmit/Receive 3+
8	Not used	8	Transmit/Receive 3-

## External SAS/SATA Port Connector

Figure A-3 shows the connector pin locations for the external Serial Attached SCSI (SAS) and Serial Advanced Technology Attachment (SATA) connector. This combined technology connector is used to support optional external storage. Table A-10 lists the pin assignments for this SAS/SATA connector.



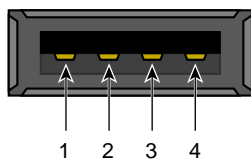
**Figure A-3** Pin Number Locations for External SAS/SATA Port

**Table A-10** SAS/SATA Pin Assignments

Pin Number	Signal Name	Pin Number	Signal Name
1	Gnd	8	Gnd
2	2tx_h	9	3tx_h
3	2tx_1	10	3tx_1
4	Gnd	11	Gnd
5	2rx_1	12	3rx_1
6	2rx_h	13	3rx_h
7	Gnd	14	Gnd

## USB Type A Connector

Figure A-4 shows the USB type A connector that is used for the L1 connection on the left side of the unit's rear panel. The USB ports 1 and 2 on the right-rear of the Altix 330 compute and/or compute expansion modules are for general USB applications. Table A-11 lists the pin assignments.



**Figure A-4** Pin Number Locations for USB Type A Connector

**Table A-11** Pin Assignments for USB Type A Connector

Signal	Color	Pin Number
VCC	Red	1
-Data	White	2
+Data	Green	3
Ground	Black	4

## Regulatory Specifications and Safety Information

This appendix presents regulatory information that may be important to the operation of your SGI Altix 330 server system.

### Manufacturer's Regulatory Declarations

The Altix 330 server system products conform to several national and international specifications and European Directives listed on the “Manufacturer’s Declaration of Conformity.” The CE insignia displayed on each device is an indication of conformity to the European requirements.



---

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

---

### Server Model Number

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

### CE Notice and Manufacturer's Declaration of Conformity

The “CE” symbol indicates compliance of the device to directives of the European Community. A “Declaration of Conformity” in accordance with the standards has been made and is available from SGI upon request.

### Electromagnetic Emissions

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

### FCC Notice (USA Only)

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

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

---

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

---

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

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.

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



---

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

---

### Industry Canada Notice (Canada Only)

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

Cet appareil numérique n'émet pas de perturbations radioélectriques dépassant les normes applicables aux appareils numériques de Classe A prescrites dans le Règlement sur les interférences radioélectriques établi par le Ministère des Communications du Canada.

#### VCCI Notice (Japan Only)

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

#### Chinese Class A Regulatory Notice

警告使用者：

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

#### Korean Class A Regulatory Notice

이 기기는 업무용으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며 만약 잘못 판매 또는 구입하였을 때에는 가정용으로 교환하시기 바랍니다.

## Shielded Cables

The Altix 330 server system product is FCC compliant under test conditions that include the use of shielded cables between the server and its peripherals. Your server and any peripherals that you purchase from SGI have shielded cables. Shielded cables reduce the possibility of interference with radio, television, and other devices. If you use any cables that are not from SGI, ensure that they are shielded. Telephone cables do not require shielding.

Optional monitor cables supplied with your server system use additional filtering molded into the cable jacket to reduce radio frequency interference. Always use the cable that is supplied with your system. If your monitor cable becomes damaged, obtain a replacement cable from SGI.

## Electrostatic Discharge

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

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

An ESD wrist strap may be included with some products, such as memory or PCI upgrades. Use the wrist strap when you install these upgrades to prevent the flow of static electricity; it is designed to protect your system from ESD damage.

## Laser Compliance Statements

The DVD-ROM drive in this computer is a Class 1 laser product. The DVD-ROM drive-classification label is located on the drive.



---

**Warning:** Invisible laser radiation when open. Avoid exposure to beam.

---



---

**Warning:** Attention: Radiation du faisceau laser invisible en cas d'ouverture. Eviter toute exposition aux rayons.

---





---

**Warning:** **Vorsicht: Unsichtbare Laserstrahlung, Wenn Abdeckung geöffnet, nicht dem Strahl aussetzen.**

---



---

**Warning:** **Advertencia: Radiación láser invisible al ser abierto. Evite exponerse a los rayos.**

---



---

**Warning:** **Advarsel: Laserstråling vedåbning se ikke ind i strålen**

---



---

**Warning:** **Varo! Lavattaessa Olet Alttina Lasersäteilylle**

---



---

**Warning:** **Varning: Laserstrålning når denna del år öppnad ålå tuijota såteeseenstirra ej in i strålen.**

---



---

**Warning:** **Varning: Laserstrålning nar denna del år öppnadstirra ej in i strålen.**

---



---

**Warning:** **Advarsel: Laserstråling nar deksel åpnesstirr ikke inn i strålen.**

---

## Lithium Battery Statement



---

**Warning:** Only qualified service personnel should replace the soldered lithium battery (or batteries) in the SGI Altix 330 server system.

---



---

**Warning: Advarsel!: Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtering.** Udskiftning må kun ske med batteri af samme fabrikat og type. Léver det brugte batteri tilbage til leverandøren.

---



---

**Warning: Advarsel: Eksplosjonsfare ved feilaktig skifte av batteri. Benytt samme batteritype eller en tilsvarende type anbefalt av apparatfabrikanten. Brukte batterier kasseres i henhold til fabrikantens instruksjoner.**

---



---

**Warning: Varning: Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.**

---



---

**Warning: Varoitus: Pärisko voi räjähtää, jos se on virheellisesti asennettu. Vaihda parisko ainoastaan laitevalmistajan suositteluun tyypin. Hävitä käytetty parisko valmistajan ohjeiden mukaisesti.**

---



---

**Warning: Vorsicht!: Explosionsgefahr bei unsachgemäßen Austausch der Batterie. Ersatz nur durch denselben oder einen vom Hersteller empfohlenem ähnlichen Typ. Entsorgung gebrauchter Batterien nach Angaben des Herstellers.**

---

# Index

## Numbers

17U rack install, 21-22  
39U rack install, 23-24

## A

adding or replacing disk drives, 107  
adding or replacing memory, 114  
adding or replacing PCI cards, 100  
ASIC  
  Super Hub (SHub), 79

## B

bandwidth  
  compute node, 133  
battery statements, 146

## C

cable  
  ethernet, 10  
Chinese Class A regulatory notice, 143  
compute module  
  general features, 85, 133

compute node  
  bandwidth, 133  
connector  
  LINK, 82, 90  
connector pin assignment  
  model 330 compute module, 137  
  RJ-45, 138  
  SAS/SATA, 139  
  TP900 storage module, 137  
  USB type A, 140  
customer service, xxii

## D

DIMM installation, 115-118  
DIMMs  
  adding or replacing, 114  
  configuration, 78  
  memory bank layout, 78  
disk drive installation, 108  
disk drives  
  adding or replacing, 107  
disk storage  
  TP900, 62  
dual-inline memory modules  
  memory bank layout, 78

## E

electromagnetic emissions, 141  
electrostatic discharge  
  regulatory notice, 144  
Embedded Support Partner (ESP), 129  
ESP, 129  
Ethernet connector, 82  
expansion  
  storage

TP900, 62

external SAS/SATA connector, 82

## F

FCC notice (USA only), 142

feet, installation, 9

front panel LEDs, 52

front view, workstation, 7

## I

Industry Canada Notice (Canada only), 142

install

disk drive, 108

memory, 115-118

short rack, 21-22

tall rack, 23-24

installation

PCI/PCI-X card, 104

I/O ports, 8, 90

IP53 node board

memory layout, 78

## K

Knowledgebase, 129

Korean Class A regulatory notice, 143

## L

laser compliance statements, 144-145

LEDs, front panel, 52

lifting, system, 6

LINK connector, 82, 90

## M

manufacturer's declaration of conformity, 141

manufacturer's regulatory declarations, 141

memory

adding or replacing, 114

installation, 115-118

model 330 compute module

connector pin assignments, 137

## P

PCI/PCI-X card

installation, 104

PCI/PCI-X card slots, 82, 90

ports, rear panel, 8, 90

power receptacle, 13-16

product support, xxii

## R

rack, 66-68

17U, 66-68

39U, 66-68

short install, 21-22

tall install, 23-24

rack mounting

hardware kit, 32

rack, short

specifications, 135

rack, tall

specifications, 135

R-brick

front panel components, 96

overview, 93

port specifications, 98

rear panel components, 97

- technical specifications, 98
- regulatory declarations
  - manufacturer, 141
- regulatory specifications, 141
  - CE notice and Manufacturer's declaration of conformity, 141
  - Chinese Class A regulatory notice, 143
  - electromagnetic emissions, 141
  - electrostatic discharge, 144
  - FCC notice (USA) only, 142
  - Industry Canada notice (Canada only), 142
  - Korean Class A regulatory notice, 143
  - manufacturer's regulatory declarations, 141
  - shielded cables, 144
  - VCCI notice (Japan only), 143
- remove a DIMM or DIMM group, 116
- RJ-45
  - connector pin assignments, 138
- Router
  - block diagram, 95
  - features, 94

**S**

- safety, 99-100
- SAS/SATA
  - external connector pin assignments, 139
- SAS/SATA connector, external, 82
- self-adhesive feet, installation, 9
- server model number, 141
- SGI Knowledgebase. See Knowledgebase
- shielded cables
  - regulatory notice, 144
- shipment contents, 6
- short rack install, 21-22
- Single R-brick topology
  - overview, 61

- site requirements, 12
- space requirements, 30
- specifications
  - environmental, 132
  - short rack, 135
  - tall rack, 135
  - TP900, 136
  - TP900 storage module, 136
- storage expansion
  - TP900, 62
- Supportfolio Online, 129
- system
  - cabling, 10
  - front view, 7

## T

- tall rack install, 23-24
- technical specifications
  - R-brick, 98
- technical support, xxii
- TP900 specifications, 136
- TP900 storage module, 62
  - connector pin assignments, 137
  - specifications, 136
- troubleshooting
  - problems and recommended actions, 122

## U

- USB type A
  - connector pin assignments, 140

## V

- VCCI notice (Japan only), 143

