

**SGI™ Origin™ 300 System with NUMALink™
Module User's Guide**

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About This Guide

This guide provides an overview of the components that make up the SGI Origin 300 system with NUMALink module. It also describes how to install, set up, and operate this system. Specifically, it provides the following information:

- Chapter 1, “Introduction”
- Chapter 2, “Installation Procedures”
- Chapter 3, “System Operation”
- Chapter 4, “System Configurations”
- Chapter 5, “Troubleshooting”
- Appendix A, “Technical Specifications”
- Appendix B, “System Controller Commands”
- Appendix C, “Regulatory Specifications”

An index completes this guide.

Audience

This guide is written for owners, system administrators, and users of the SGI Origin 300 system with NUMAlink module. It is written with the assumption that the reader has general knowledge of computers and computer operations.

Your SGI system support engineer (SSE) should perform the addition or replacement of parts and service of your SGI Origin 300 system, with the exception of the following tasks that you may perform yourself:

- Installing your system.
- Connecting a system console to your server.
- Using your system console to enter commands and perform system functions such as powering on and powering off, as described in this guide.
- Installing and removing disk drives as described in this guide.
- Installing and removing PCI option cards as described in this guide.
- Installing and removing DIMMs as described in this guide.
- Using the On/Off, reset, and non-maskable interrupt (NMI) switches on the front panel of an SGI Origin 300 server.

Information Sources

This section lists SGI documents that are relevant to the setup and use of the SGI Origin 300 system with NUMAlink module, as follows:

- *SGI Origin 300 System with NUMAlink Module User's Guide* (this manual) (hard copy shipped with system)
- *SGI Origin 300 User's Guide*
- *PCI Expansion Module User's Guide*
- *SGI Total Performance 900 Storage System User's Guide*
- *IRIX Admin Software Installation and Licensing Guide*
- Other SGI documentation
- Man pages (online)
- IRIX Release Notes (on CD)

SGI Origin 300 System with NUMALink Module User's Guide

Use this guide to become familiar with your system and to learn how to operate, monitor, maintain, and troubleshoot the system. This guide contains information on installing the system, and installing and replacing the following components: PCI cards, disk drives, and memory (DIMMs).



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 Origin 300 User's Guide

This guide provides additional information about the SGI Origin 300 server. Use it to learn how to operate, monitor, maintain, and troubleshoot your server. This guide contains information on installing the server, and installing and replacing the following components: PCI cards, disk drives, and memory (DIMMs).

PCI Expansion Module User's Guide

This guide provides information about how to operate, monitor, maintain, and troubleshoot the PCI expansion module. This module is an optional component of the SGI Origin 300 system with NUMALink module that provides additional I/O capabilities for the Origin 300 servers. This guide also contains information on installing the module, and installing and replacing PCI cards.

SGI Total Performance 900 Storage System User's Guide

This guide provides information about how to operate and maintain the SGI Total Performance 900 (TP900) storage system. This system is an optional component of the SGI Origin 300 system with NUMALink module that provides a SCSI (small computer system interface) JBOD (just a bunch of disks) storage solution for the Origin 300 servers.

IRIX Admin: Software Installation and Licensing Guide

This is the complete reference guide on using the installation program, *inst*, to install software. For information on using the Software Manager to install software, refer to the online *Personal System Administration Guide*.

Other SGI Documentation

You can access other SGI documentation in either of the following two ways:

- SGI manuals are available in various formats at:
<http://techpubs.sgi.com>
- If you have an SGI workstation running IRIX software, you can use the online documentation package called *IRIS InSight*. Select **Online Books** from the Help toolchest. You will see bookshelves for end-user, developer, and administration manuals. Double-click the name of a book to open it. For descriptions of hard-copy manuals that are available for purchase, double-click **Documentation Catalog**.

Online Man Pages

Your system includes a set of IRIX online manual pages, which are formatted in the standard UNIX “man page” style. These man pages are located online on the internal system disk (or CD-ROM) and are displayed using the `man` command. For example, to display the man page for the `Add_disk` command, enter the following command at a shell prompt:

```
man Add_disk
```

Man pages document important system configuration files and commands. References in SGI documentation to these pages include the name of the command and the section number in which the command is located. For example, “`Add_disk(1)`” refers to the `Add_disk` command and indicates that it is located in section 1 of the IRIX reference.

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

In addition, the `apropos` command locates man pages based on keywords. For example, to display a list of man pages that describe disks, enter the following command at a shell prompt:

apropos disk

For information about setting up and using `apropos`, see the `apropos(1)` and `makewhatis(1M)` man pages.

Release Notes

You can view the release notes for various SGI products and software subsystems by using one of two utilities:

`relnotes` Text-based viewer for online release notes.

`grelnotes` Graphics viewer for online release notes.

To see a list of available release notes, type the following command at a shell prompt:

```
relnotes
```

For more information, see the `relnotes(1)` and `grelnotes(1)` man pages.

Product Support

SGI provides a comprehensive product support and maintenance program for its products:

- If you are in North America and want support for your SGI-supported products, contact the Technical Assistance Center at +1 800 800 4SGI or your authorized service provider.
- If you are outside North America, please contact the SGI subsidiary or authorized distributor in your country.

Conventions

The following conventions are used throughout this document:

Convention	Meaning
<code>command</code>	This fixed-space font denotes literal items such as commands, files, routines, path names, signals, messages, and programming language structures.
<i>variable</i>	Italic typeface denotes variable entries and words or concepts being defined.
user input	This bold, fixed-space font denotes literal items that the user enters in interactive sessions. Output is shown in nonbold, fixed-space font.
[]	Brackets enclose optional portions of a command or directive line.
...	Ellipses indicate that a preceding element can be repeated.
manpage(<i>x</i>)	Man page section identifiers appear in parentheses after man page names.

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SGI values your comments and will respond to them promptly.

Introduction

The SGI Origin 300 system with NUMalink module is a distributed shared memory (DSM) and distributed I/O system. As a DSM system, each Origin 300 server (2 or 4 processors) has local memory that it shares with the other servers in the system. Similar to DSM, the interfaces of the I/O devices are distributed among the Origin 300 servers and are accessible by all servers.

The key component that makes the distributed shared memory and I/O possible is the NUMalink 3 interconnect. In this system, the NUMalink 3 interconnect consists of a NUMalink module that transfers messages between the Origin 300 servers (refer to Figure 1-1). In an Origin 300 system that does not have a NUMalink module, the NUMalink 3 interconnect consists of a cable that connects two Origin 300 servers.

Note: The maximum number of servers in an Origin 300 system that does not contain a NUMalink module is two. In an Origin 300 system that does contain a NUMalink module, the maximum number of processors is eight.

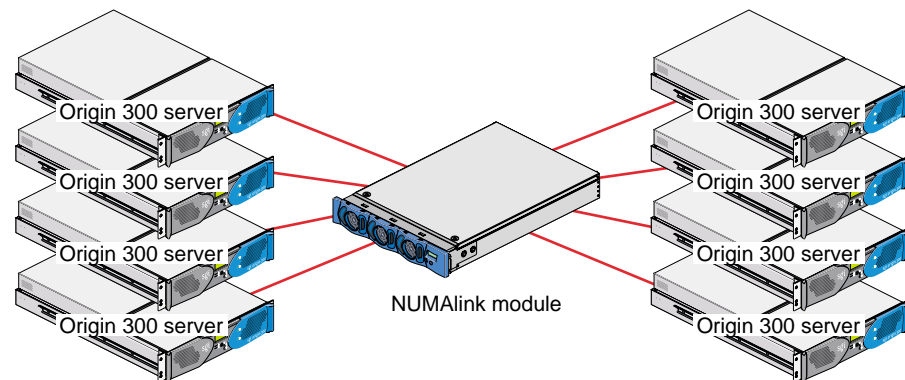


Figure 1-1 Connecting Origin 300 Servers via a NUMalink Module

The Origin 300 system with NUMAlink module is based on SGI NUMA (formerly ccNUMA), a cache-coherent non-uniform memory access architecture, which ensures that the caches of the processors contain valid data. For example, if a processor alters the data in a cache location and another processor has a copy of that data in its cache, the processor that holds the copy will be notified that the memory location no longer contains valid data. SGI NUMA architecture also supports varied access times for local and remote memory references.

The SGI Origin 300 system with NUMAlink module is a scalable system, which means that you can scale the system in independent dimensions: computing, I/O, and storage (refer to Table 1-1). For example, the computing dimension can range from 4 to 32 processors in a single system image (SSI).

Table 1-1 Minimum and Maximum System Configurations

Dimension	Minimum	Maximum
Computing:		
Servers	2	8
Processors	4 (two 2-processor Origin 300 servers)	32 (eight 4-processor Origin 300 servers)
Memory	1 GB (two Origin 300 servers)	32 GB (eight Origin 300 servers)
I/O	4 PCI slots (two Origin 300 servers)	56 PCI slots (four Origin 300 servers and four PCI expansion modules)
Storage	2 disk drives (one drive per Origin 300 server; the second disk drive of a server is optional)	16 disk drives (eight Origin 300 servers); however, additional storage can be added to the system. The maximum amount of storage depends on the type of storage expansion device.

The Origin 300 system has many of the same features that are available in the Origin 3000 product line to increase the reliability, availability, and serviceability (RAS) of the system.

- Internal power and temperature are monitored via the L1 controller; the L1 controller automatically shuts down the server to prevent overheating when necessary.
- Memory and secondary cache are protected by single-bit error correction and double-bit error detection (SECDED).
- Primary cache is protected by parity.
- Memory can be scrubbed when a single-bit error occurs.

-
- The IRIX operating system can be recovered on some kernel double-bit errors.
 - Automatic testing occurs after you power on the system and disables processors and memory that fail these self-tests.
 - Boot times are minimized.
 - Remote console and maintenance activities are supported.
 - System control network for system maintenance and monitoring is supported.
 - LED values are readable via the system controller network.

Figure 1-2 shows the Origin 300 system with NUMAlink module.

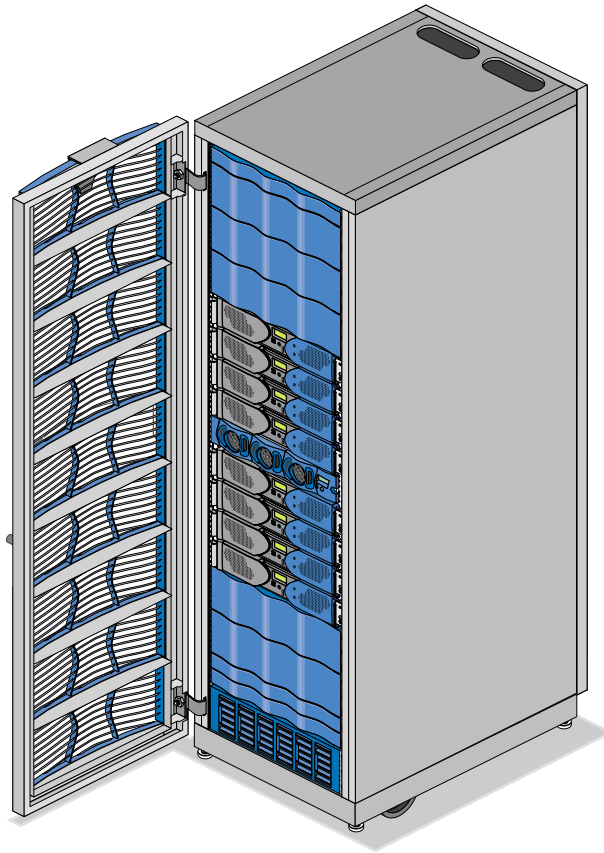


Figure 1-2 SGI Origin 300 System with NUMAlink Module

Base System Components

The SGI Origin 300 system with NUMAlink module consists of the following base components, as shown in Figure 1-3. This section provides a brief overview of the base components; detailed information is provided in Appendix A.

- One rack
- Two to eight SGI Origin 300 base modules (also referred to as servers)
- One NUMAlink module
- One USB hub
- One L2 controller
- One power bay
- One or two power distribution units (PDUs)

Note: The modules of the SGI Origin 300 system with NUMAlink module are not interchangeable with the SGI Origin 3000 series bricks.

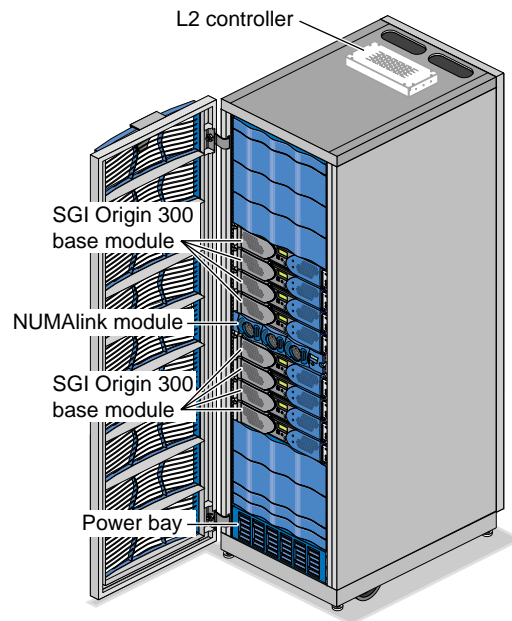


Figure 1-3 Base System Components

Rack

The SGI Origin 300 system with NUMAlink module supports two rack types: a short rack and a tall rack. The racks are measured in standard units (U); one unit is equal to 1.75 in. (4.445 cm). The short rack is a 17U rack and the tall rack is a 39U rack (refer to Figure 1-4).

The components within the rack are identified by the lowest unit number that they occupy. For example, the NUMAlink modules shown in Figure 1-4 are identified as U8 in the short rack and U20 in the tall rack.

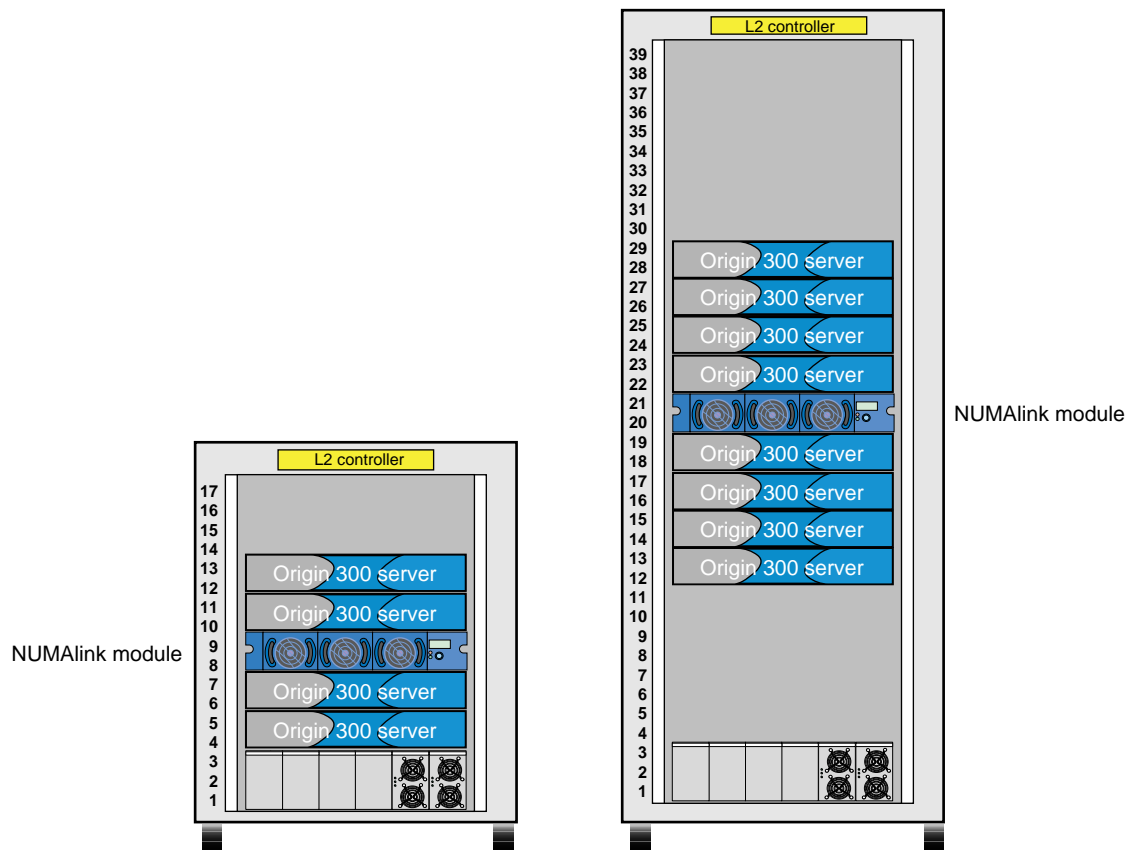


Figure 1-4 Unit Numbering within Rack

Both rack types have the following characteristics:

- 19-in. mounting rails to support the components within the rack.
- Front and rear doors.
- Cable management hardware in the rear of the rack.
- Mounted on four castors, two of which are swivel castors.
- Seismic tie-down attachment points.

Note: Tall racks also have leveling pads; short racks do not have leveling pads.

Figure 1-5 shows the front view of the short rack.

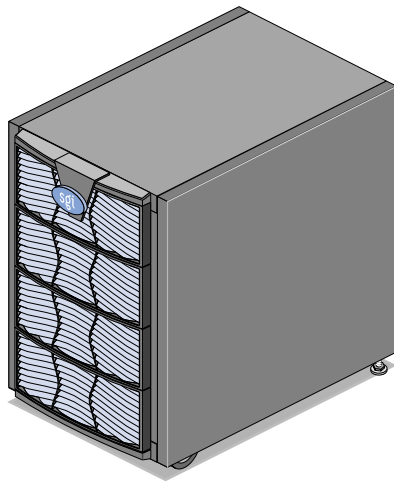


Figure 1-5 Front View of the Short Rack

Figure 1-6 shows the front view of the tall rack.

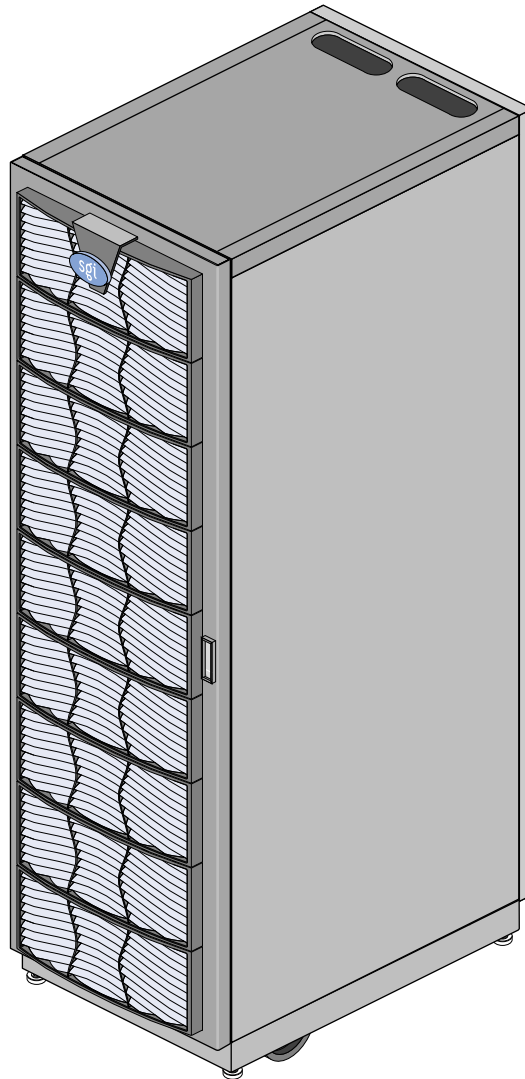


Figure 1-6 Front View of the Tall Rack

SGI Origin 300 Base Modules

The SGI Origin 300 system with NUMALink module consists of two to eight Origin 300 base modules that provide the compute functionality for the system. These base modules, or servers, communicate with each other via the NUMALink 3 interconnect.

Each server consists of:

- Two or four 64-bit MIPS R14000 processors
- 2 MB of secondary cache per processor
- 512 MB to 4 GB of memory
- One or two sled-mounted Ultra3 SCSI disk drives
- Zero to two PCI cards

Note: A server is not limited to two disk drives or two PCI slots. The server can connect to external devices that expand the I/O and storage capabilities. Information about these devices is provided in “Optional System Components” on page 16.

Each server also contains an L1 controller that provides the following services:

- Controls and sequences power
- Controls and monitors the environment
- Initiates a reset
- Stores identification and configuration information

Figure 1-7 shows the front and rear views of an SGI Origin 300 base module.

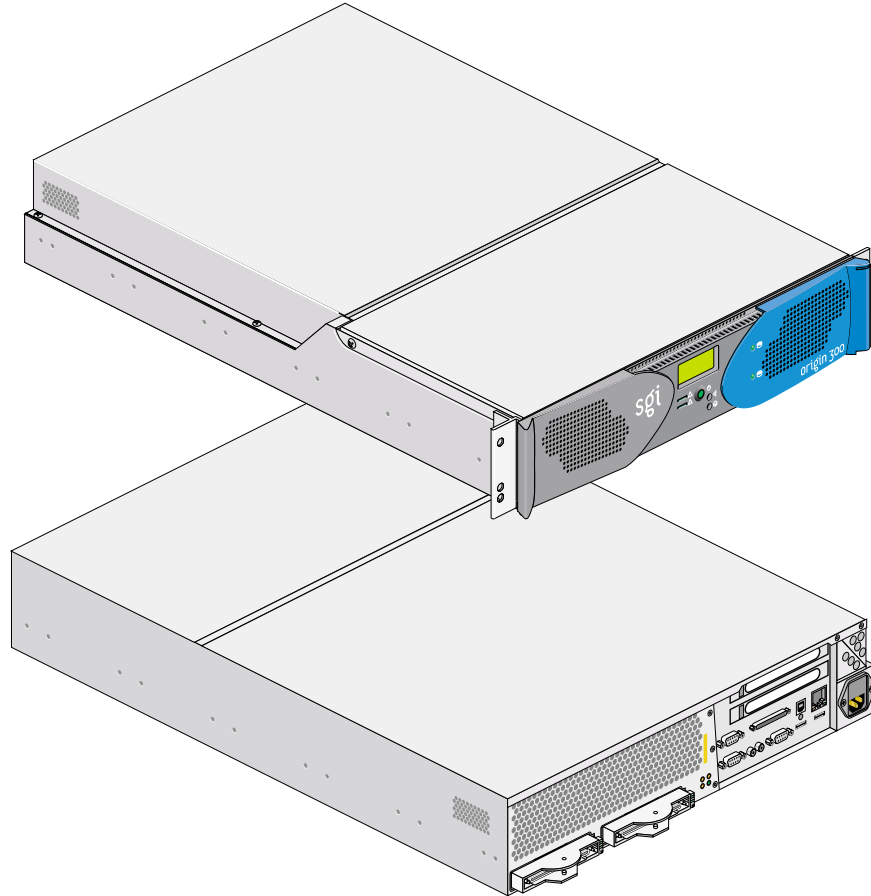


Figure 1-7 Front and Rear Views of an SGI Origin 300 Base Module

NUMAlink Module

The NUMAlink module, shown in Figure 1-8, is an air-cooled device that transfers messages between the Origin 300 servers via the NUMAlink 3 interconnect. The NUMAlink module consists of eight ports; four ports can connect to four Origin 300 servers. The other four ports, which carry USB signals, can connect to Origin 300 servers or PCI expansion modules.

Note: The USB signals enable the Origin 300 servers and the PCI expansion modules to communicate with the L2 controller. The Origin 300 servers that connect to the four ports that do not carry USB signals communicate with the L2 controller via a USB hub.

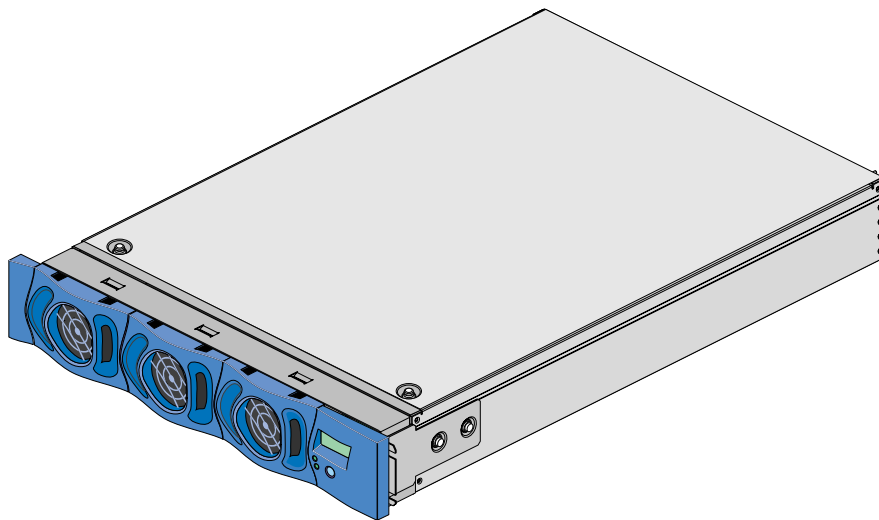


Figure 1-8 NUMAlink Module

USB Hub

The USB hub, shown in Figure 1-9, routes information between the L2 controller and the four Origin 300 servers that connect to NUMALink module ports 1, 6, 7, and 8 (the ports that do not carry USB signals).

Note: The USB hub might look different than the one shown in Figure 1-9.

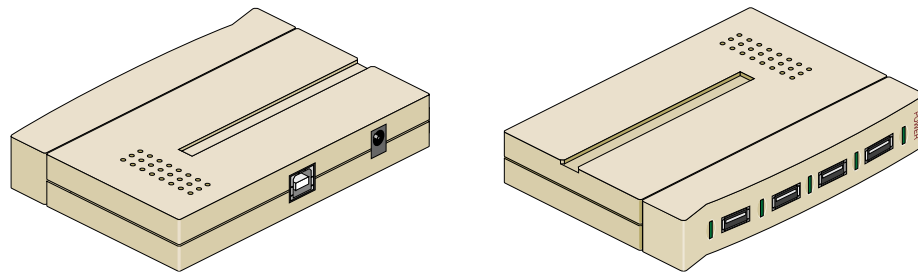


Figure 1-9 USB Hub

L2 Controller

The L2 controller, shown in Figure 1-10, is a rack-level controller that performs the following functions:

- Controls resource sharing.
- Controls L1 controllers.
- Maintains controller configuration and topology information.
- Enables remote maintenance.
- Routes data between upstream and downstream devices, as follows:

Upstream devices (for example, the system console) provide control for the system, initiate commands for the downstream devices, and act on the messages that they receive from downstream devices.

Downstream devices (for example, L1 controllers) perform the actions specified by the L2 controller commands, send responses to the L2 controller that indicate the status of the commands, and send error messages to the L2 controller.

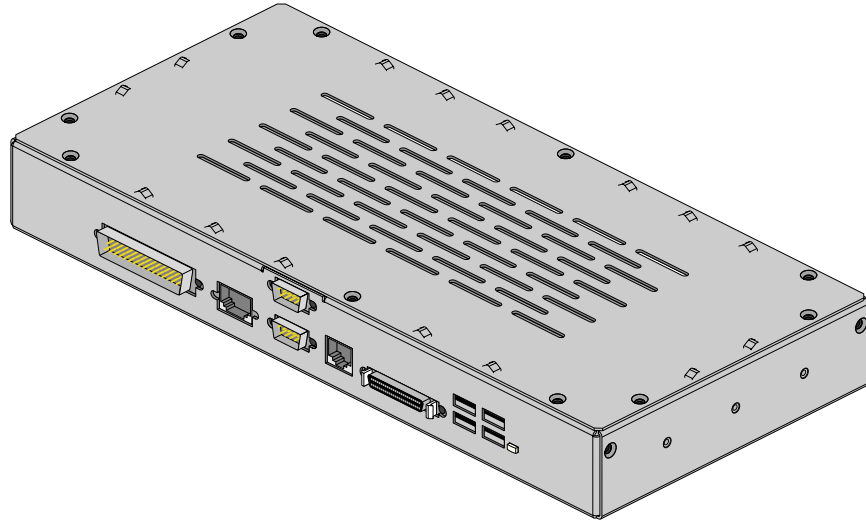


Figure 1-10 L2 Controller

Power Bay Module and Power Distribution Units (PDUs)

The power components of the SGI Origin 300 system with NUMAlink module consist of one or two power distribution units (PDUs) (refer to Figure 1-11) and one power bay module (refer to Figure 1-12). The number of PDUs depends on the number of modules within the rack. The PDU inputs AC voltage from an external power receptacle and outputs AC voltage to the Origin 300 base modules, optional TP900 storage modules, USB hub, and power bay module.

The power bay module converts the AC voltage to 48 Vdc and 12 Vdc standby voltage and outputs this voltage to the NUMAlink module, the L2 controller, and optional PCI expansion modules. The 48 Vdc powers on the NUMAlink module, the PCI expansion modules, and the L2 controller. The 12 Vdc standby voltage powers on the L1 controller logic within the NUMAlink module and the PCI expansion modules.

The power bay module can house up to six power supplies; however, this system requires only two power supplies. Each power bay inputs single-phase AC power and outputs 950 W at 48 Vdc and 42 W at 12 Vdc standby. The outputs are bused together to provide the following power in an N+1 redundant configuration: 1840 W at 48 Vdc and 90 W at 12 Vdc standby.

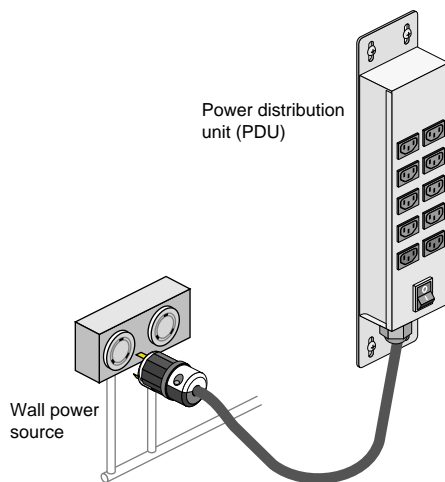


Figure 1-11 Power Distribution Unit

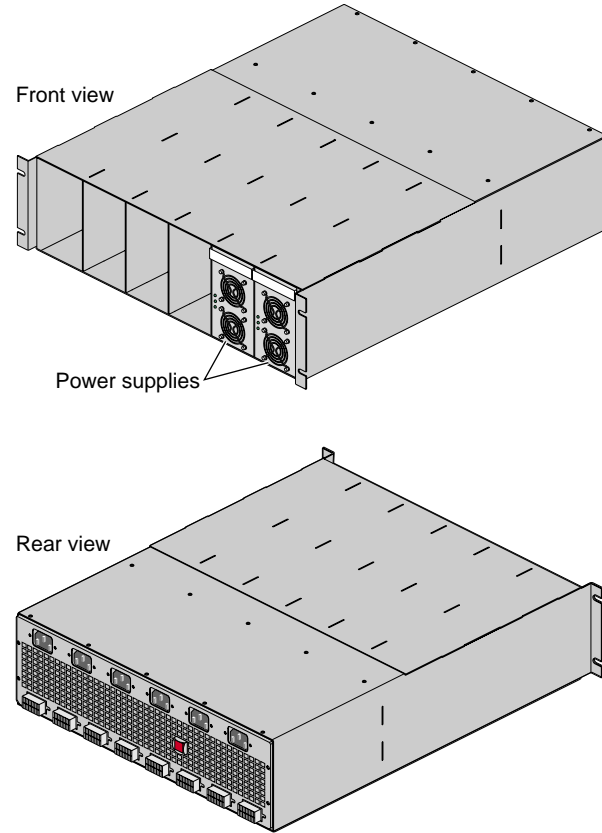


Figure 1-12 Power Bay Module

Optional System Components

The Origin 300 system can contain the following optional components, which are discussed in the subsections that follow.

- PCI expansion modules
- Storage expansion modules
- Tape devices
- CD-ROM

PCI Expansion Modules

Each Origin 300 server contains two PCI slots; however, you can expand your I/O capabilities by adding one to four PCI expansion modules to your system. The following rules indicate how many PCI expansion modules you can add to your system:

- You can add one PCI expansion module to a system that contains two to seven servers.
- You can add two PCI expansion modules to a system that contains two to six servers.
- You can add three PCI expansion modules to a system that contains three to five servers.
- You can add four PCI expansion modules to a system that contains four servers.

The PCI expansion module, shown in Figure 1-13, contains six buses (buses 1 through 6) that can seat as many as twelve 3.3-V or universal PCI cards. Each bus has two PCI slots (refer to Figure 1-14) that are labeled 1 and 2 and support either two 33-MHz PCI cards or two 66-MHz PCI cards.

The PCI expansion module connects to an Origin 300 server via the NUMALink module.

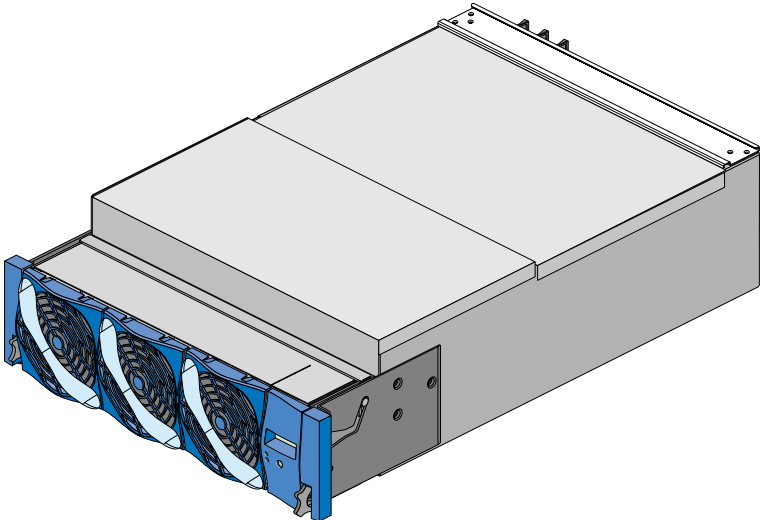


Figure 1-13 PCI Expansion Module

Figure 1-14 shows the PCI card slot numbering on the PCI expansion module.

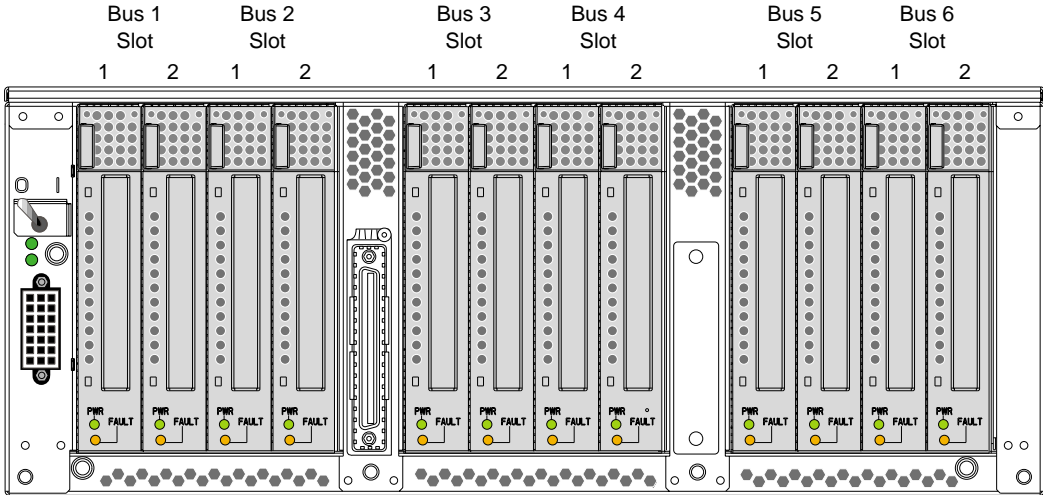


Figure 1-14 PCI Expansion Module PCI Card Slot Numbering

Storage Expansion

Each Origin 300 server contains two disk-drive bays; however, 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 SGI Total Performance 900 (TP900) storage module.
- For a Fibre Channel solution that supports both JBOD and RAID configurations, SGI offers the SGI Total Performance 9100 (TP9100) storage system.
- For a Fibre Channel RAID solution, SGI offers the SGI Total Performance 9400 (TP9400) storage system.

These solutions are discussed in the subsections that follow.

SGI TP900 Storage Module

The SGI TP900 storage module, shown in Figure 1-15, is a 2U-high 8-drive storage system that provides compact, high-capacity, high-availability JBOD storage for supported SGI servers. 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 (two strings of 4 drives).

This storage module has the following features:

- Low cost.
- Mounts in a standard 19-in. rack; available in factory-installed configurations with the Origin 300 servers.
- Uses SCSI Parallel Interface 3 (SPI-3) capable Low Profile (1-inch high) 3.5-inch disk drives.
- Drive carriers accept SGI-qualified 10,000 or 15,000 RPM U160 SCSI disk drives.

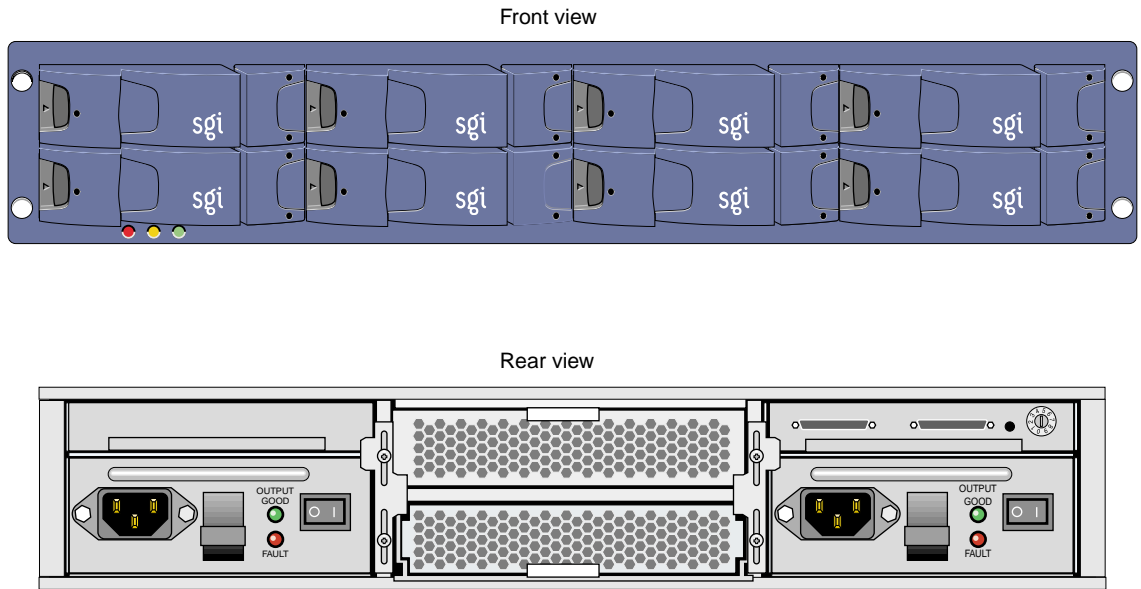


Figure 1-15 SGI TP900 Storage Module

SGI TP9100 Storage System

The SGI Total Performance 9100 (TP9100), shown in Figure 1-16, is an affordable, entry-level RAID storage array that is easily expandable and comes in either a desktide tower or a rackmounted configuration. You can start with a basic JBOD configuration and later add RAID controllers or you can start with a RAID configuration. By purchasing a desktide model, you can start small and scale to a multi-terabyte environment. The drives within the desktide tower can easily slide into a rack to increase storage capacity. The compact design of the TP9100 enables as many as 108 drives to fit in a single floor tile.

This storage system has the following features:

- Converts easily from JBOD to RAID.
- Supports RAID levels 0, 1, 1+0, 3, and 5.
- The base unit comes with one RAID controller and can be upgraded to two controllers, allowing no single point of failure.
- Supports the latest in high-performance 18-GB, 36-GB, or 73-GB 10,000 RPM FC-AL (fibre channel-arbitrated loop) drives.
- Can be configured with as many as 60 drives per controller.
- Support for multi-platform OS-based servers: IRIX, Linux, Microsoft Windows NT, and Microsoft Windows 2000.
- Fully tested in SAN and switch environments.
- Nine TP9100 arrays can be rackmounted into a single cabinet, for a maximum of 108 drives per cabinet.
- Uninterrupted data access with automatic failover capability and hot-swappable, redundant components.

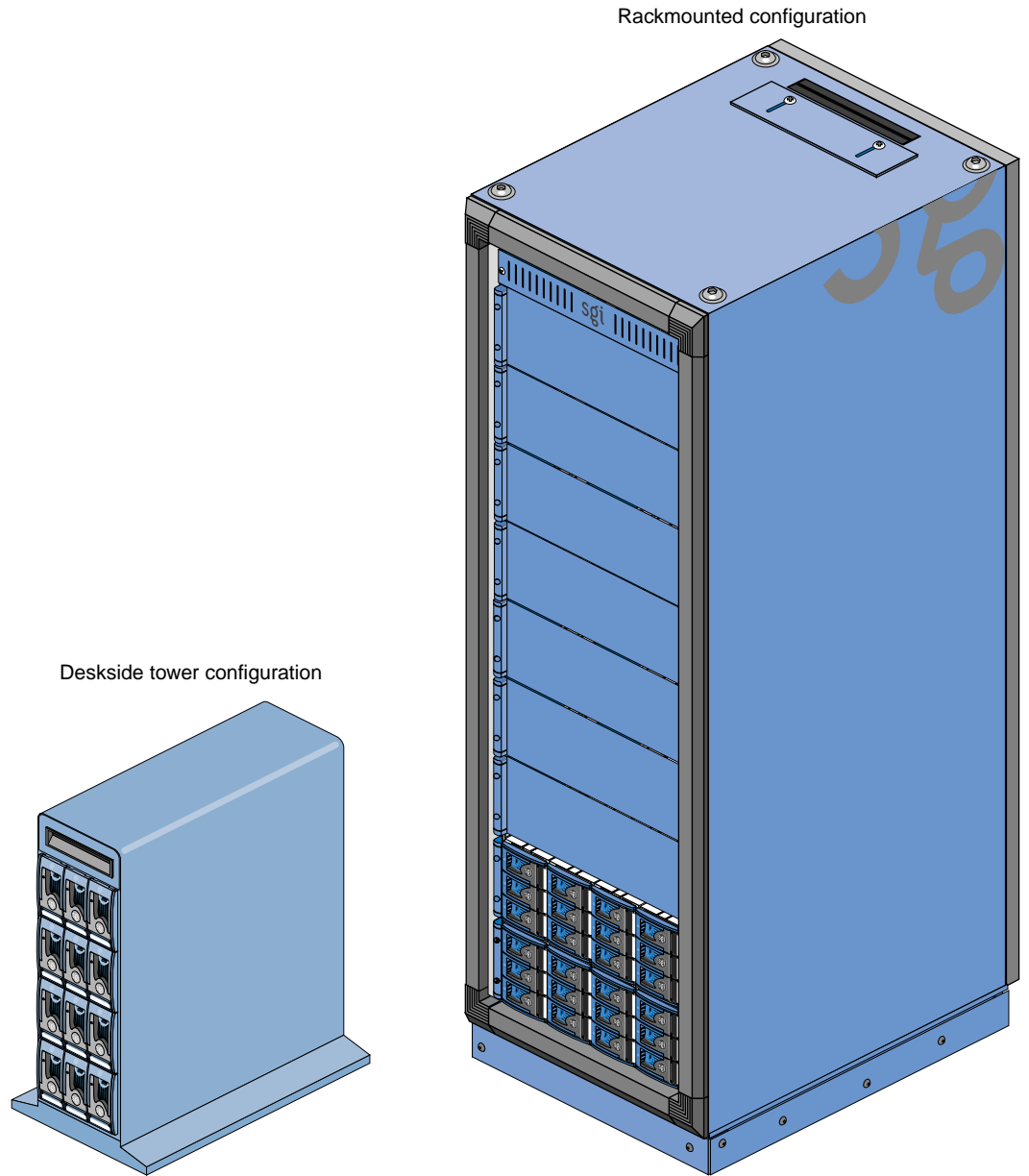


Figure 1-16 SGI TP9100 Storage System

SGI TP9400 Storage System

The SGI Total Performance 9400 (TP9400), shown in Figure 1-17, is a highly scalable RAID storage subsystem. It supports more than 8 TB of fast storage in a 19-inch rack enclosure and can grow from as few as 72 GB of storage to whatever size you require without disruption to normal processing activities. The TP9400 has continuous availability; all active components may be configured redundantly and installed “hot” as customer replaceable or expansion units.

This storage system has the following features:

- Full RAID support, implemented in hardware with custom ASICs for performance.
- Total fibre channel design, including all-fibre dual-ported disk drives.
- As many as eight internal optical fibre hubs for online expansion and connectivity.
- Four fibre channel loops support I/O reads as fast as 357 MB/s and writes as fast as 239 MB/s.
- Direct attachment of up to eight host systems using optical fibre cables.
- Full support for all SAN topologies.
- Dual active controllers with as much as 1 GB redundant cache and dual battery backup.
- User-friendly GUI or command line interface software for installation and management.
- In-band and out-of-band management, including e-mail event notification.
- As many as 110 drives in each rack (36- or 73-GB 10,000-RPM drives).
- Support for system and file clustering.
- Host failover software supports logical volume management and load balancing.

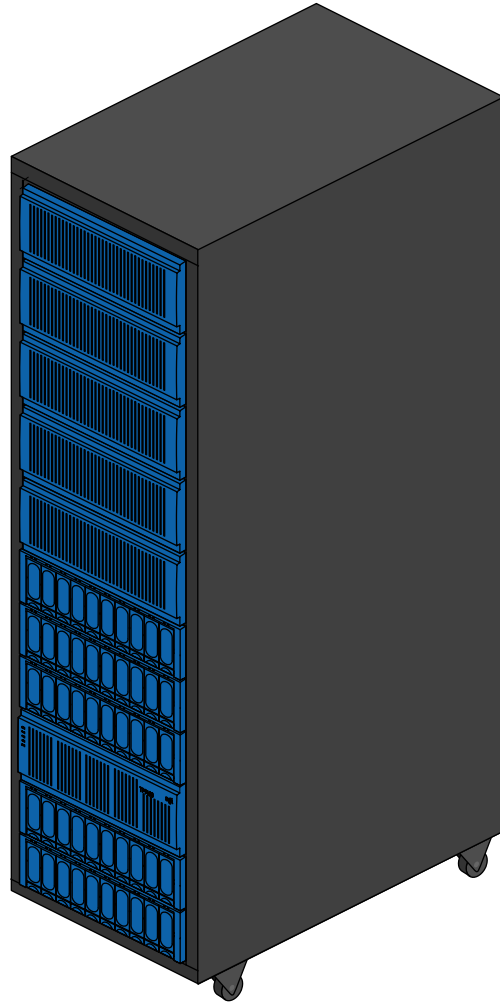


Figure 1-17 SGI TP9400 Storage System

Tape Devices

The Origin 300 server supports the following DAT (digital audio tape) option:

- **4mm DAT.** Offers a storage capacity of 20 GB (native) and a data transfer rate of 2.36 MB/s. This drive is the least expensive media and is a viable solution for small file sizes and instances when backup time is not an issue.

All of the following tape devices have faster transfer rates, can store larger amounts of data, and in general terms, are more reliable and more scalable than the DAT option. The main differences between these devices is the mode of operation; they are either start/stop devices or streaming devices. Start/stop devices are better suited for HSM (hierarchical storage management) applications where access to the first byte of data is critical and heavy start and stop activity takes place. Streaming devices are better suited for backup and restore applications where massive amounts of data are being written and read in one operation.

The start/stop devices are:

- **9840.** Offers SCSI and native fibre channel connectivity, storage capacity of 20 GB (native), and a data transfer rate of 10 MB/s.
- **9840B.** Offers SCSI and native fibre channel connectivity, storage capacity of 20 GB (native), and a data transfer rate of 20 MB/s.
- **9940.** Offers SCSI and native fibre channel connectivity, storage capacity of 60 GB (native), and a data transfer rate of 10 MB/s.



The streaming devices are:

- **DLT (digital linear tape) 8000 (7000 emulation).** Offers SCSI connectivity, storage capacity of 35 GB, and a data transfer rate of 5.0 MB/s.
- **DLT 8000 (native mode).** Offers SCSI connectivity, storage capacity of 40 GB, and a data transfer rate of 6.0 MB/s.
- **LTO ULTRIUM.** Offers SCSI connectivity, storage capacity of 100 GB (native), and a data transfer rate of 15 MB/s.
- **SDLT.** Offers SCSI connectivity, storage capacity of 110 GB, and a data transfer rate of 11 MB/s. The SDLT is backward read compatible (BRC) with DLT 4000, DLT 7000, and DLT 8000 drives; however, SDLT performance is affected when reading legacy media.

The 4mm DAT can be mounted in the Origin 300 rack or placed on a table. All other supported tape devices are housed within one of the following libraries: L20, L40, L80, L180, or L700 (refer to Table 1-2).

Note: In Table 1-2, device transfer rates are dictated by the profile of the data being transferred and are likely to be less than the rated speed, depending on the size of files and the block size.

Table 1-2 Tape Drive Libraries

Library	Specifications	Illustration
L20	<p>Number of cartridge slots: 10 or 20</p> <p>Number of drives: 1 or 2</p> <p>Supported drives: DLT 8000 (native mode), LTO ULTRIUM, and SDLT</p> <p>Cartridge capacity:</p> <p>DLT 8000: 800 GB (20 slots, UNC) - 1.6 TB (20 slots, COM)</p> <p>LTO ULTRIUM: 2.0 TB (20 slots, UNC) - 4.0 TB (20 slots, COM)</p> <p>SDLT: 2.2 TB (20 slots, UNC) - 4.4 TB (20 slots, COM)</p> <p>Drive data rate:</p> <p>DLT 8000: 43.2 GB/hr (2 drives, UNC) - 86.4 GB/hr (2 drives, COM)</p> <p>LTO ULTRIUM: 108 GB/hr (2 drives, UNC) - 216 GB/hr (2 drives, COM)</p> <p>SDLT: 79.2 GB/hr (2 drives, UNC) - 158.4 GB/hr (2 drives, COM)</p>	
L40	<p>Number of cartridge slots: 20 or 40</p> <p>Number of drives: 1 to 4</p> <p>Supported drives: DLT 8000 (native mode), LTO ULTRIUM, and SDLT</p> <p>Cartridge capacity:</p> <p>DLT 8000: 1.6 TB (40 slots, UNC) - 3.2 TB (40 slots, COM)</p> <p>LTO ULTRIUM: 4.0 TB (40 slots, UNC) - 8.0 TB (40 slots, COM)</p> <p>SDLT: 4.4 TB (40 slots, UNC) - 8.8 TB (40 slots, COM)</p> <p>Drive data rate:</p> <p>DLT 8000: 86.4 GB/hr (4 drives, UNC) - 172.8 GB/hr (4 drives, COM)</p> <p>LTO ULTRIUM: 216 GB/hr (4 drives, UNC) - 432 GB/hr (4 drives, COM)</p> <p>SDLT: 158.4 GB/hr (4 drives, UNC) - 316.8 GB/hr (4 drives, COM)</p>	

Key: UNC = uncompressed, COM = compressed

Table 1-2 (continued) Tape Drive Libraries


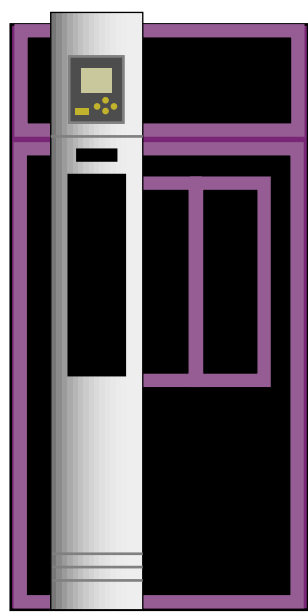
Library	Specifications	Illustration
L80	<p>Number of cartridge slots: 40, 60, or 80</p> <p>Number of drives: 1 to 8</p> <p>Supported drives: DLT 8000 (native mode), LTO ULTRIUM, and SDLT</p> <p>Cartridge capacity:</p> <p>DLT 8000: 3.2 TB (80 slots, UNC) - 6.4 TB (80 slots, COM)</p> <p>LTO ULTRIUM: 8.0 TB (80 slots, UNC) - 16.0 TB (80 slots, COM)</p> <p>SDLT: 8.8 TB (80 slots, UNC) - 17.6 TB (80 slots, COM)</p> <p>Drive data rate:</p> <p>DLT 8000: 172.8 GB/hr (8 drives, UNC) - 345.6 GB/hr (8 drives, COM)</p> <p>LTO ULTRIUM: 432 GB/hr (8 drives, UNC) - 864 GB/hr (8 drives, COM)</p> <p>SDLT: 316.8 GB/hr (8 drives, UNC) - 633.6 GB/hr (8 drives, COM)</p>	
L180	<p>Number of cartridge slots: 84, 140, or 174</p> <p>Number of drives: 1 to 10</p> <p>Supported drives: DLT 8000 (native mode), DLT 8000 (7000 emulation), LTO ULTRIUM, and SDLT</p> <p><i>or</i></p> <p>Number of drives: 1 to 6</p> <p>Supported drives: 9840 and 9840B</p> <p>Cartridge capacity:</p> <p>DLT 8000 (native): 6.96 TB (174 slots, UNC) - 13.92 TB (174 slots, COM)</p> <p>DLT 8000 (7000 em): 6.09 TB (174 slots, UNC) - 12.18 TB (174 slots, COM)</p> <p>LTO ULTRIUM: 17.4 TB (174 slots, UNC) - 34.8 TB (174 slots, COM)</p> <p>SDLT:- 19.14 TB (174 slots, UNC) - 38.28 TB (174 slots, COM)</p> <p>9840: 3.48 TB (174 slots, UNC) - 6.96 TB (174 slots, COM)</p> <p>Drive data rate:</p> <p>DLT 8000 (native): 216 GB/hr (10 drives, UNC) - 432 GB/hr (10 drives, COM)</p> <p>DLT 8000 (7000 em): 180 GB/hr (10 drives, UNC) - 360 GB/hr (10 drives, COM)</p> <p>LTO ULTRIUM: 540 GB/hr (10 drives, UNC) - 1.08 TB/hr (10 drives, COM)</p> <p>SDLT: 396 GB/hr (10 drives, UNC) - 792 GB/hr (10 drives, COM)</p> <p>9840: 216 GB/hr (6 drives, UNC) - 432 GB/hr (6 drives, COM)</p> <p>9840b: 432 GB/hr (6 drives, UNC) - 864 GB/hr (6 drives, COM)</p>	

Table 1-2 (continued) Tape Drive Libraries

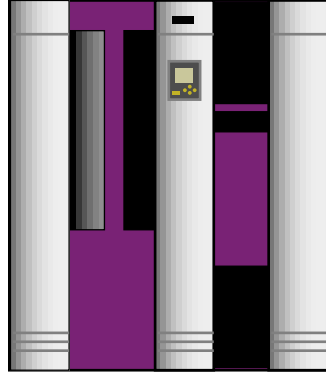
Library	Specifications	Illustration
L700	<p>Number of cartridge slots: 216, 384, or 678</p> <p>Number of drives: 1 to 20</p> <p>Supported drives: DLT 8000 (native mode), DLT 8000 (7000 emulation), LTO ULTRIUM, and SDLT</p> <p><i>or</i></p> <p>Number of drives: 1 to 12</p> <p>Supported drives: 9840, 9840B, and 9940</p> <p>Cartridge capacity:</p> <p>DLT 8000: 27.1 TB (678 slots, UNC) - 54.2 TB (678 slots, COM)</p> <p>DLT 8000 (7000 em): 23.7 TB (678 slots, UNC) - 47.4 TB (678 slots, COM)</p> <p>LTO ULTRIUM: 67.8 TB (678 slots, UNC) - 135.6 TB (678 slots, COM)</p> <p>SDLT: 74.5 TB (678 slots, UNC) - 149 TB (678 slots, COM)</p> <p>9840: 13.6 TB (678 slots, UNC) - 40.8 TB (678 slots, COM)</p> <p>9940: 40.68 TB (678 slots, UNC) - 89.5 TB (678 slots, COM)</p> <p>Drive data rate:</p> <p>DLT 8000:- 432 GB/hr (20 drives, UNC) - 864 GB/hr (20 drives, COM)</p> <p>DLT 8000 (7000 em): 360 GB/hr (20 drives, UNC) - 720 GB/hr (20 drives, COM)</p> <p>LTO ULTRIUM: 1.08 TB/hr (20 drives, UNC) - 2.16 TB/hr (20 drives, COM)</p> <p>SDLT: 792 GB/hr (20 drives, UNC) - 1.58 TB/hr (20 drives, COM)</p> <p>9840: 432 GB/hr (12 drives, UNC) - 864 GB/hr (12 drives, COM)</p> <p>9840b: 864 GB/hr (12 drives, UNC) - 1.73 TB/hr (12 drives, COM)</p> <p>9940: 432 GB/hr (12 drives, UNC) - 864 GB/hr (12 drives, COM)</p>	
<p>Key: UNC = uncompressed, COM = compressed, em = emulation</p>		

Table 1-3 lists the supported tape options and their specifications.

Table 1-3 Tape Drive Comparison Chart

Tape Device	Interface	Media Capacity	Transfer Rate	Mount Location
4mm DAT	SCSI	20 GB	2.36 MB/s	Origin 300 rack or table
9840	SCSI and fibre channel	20 GB	10 MB/s	L180 or L700
9840B (when available)	SCSI and fibre channel	20 GB	20 MB/s	L180 or L700
DLT 8000 (7000 emulation)	SCSI	35 GB	5 MB/s	L180 or L700
DLT 8000 (native mode)	SCSI	40 GB	6 MB/s	All libraries
9940	SCSI and fibre channel	60 GB	10 MB/s	L700
LTO ULTRIUM	SCSI	100 GB	15 MB/s	All libraries
SDLT (when available)	SCSI	110 GB	11 MB/s	All libraries

CD-ROM Drive

The 48X CD-ROM drive is a half-height, high capacity (approximately 600 MB, formatted), high-performance device that is packaged in a custom external enclosure designed to match other SGI external peripherals. It is capable of transferring data at up to 6.0 MB/s. It can connect to the Origin 300 server via the SCSI port connector or a SCSI PCI card.

Installation Procedures

This chapter describes the steps you must perform to unload and move the equipment and to install your tall-rack or short-rack system. Specifically, it describes the following:

- “Safety Considerations” on page 32
- “Unloading and Moving System Equipment” on page 40
- “Installing Your System” on page 44

Note: Read this entire chapter before you install your system.

Safety Considerations

Before you install an SGI Origin 300 system with NUMALink module, you should familiarize yourself with the following items, which are discussed in the subsections that follow.

- Hazard statements
- ESD precautions
- Safety precautions
- Preinstallation activities

Hazard Statements

During the installation of the computer system, be alert for hazard advisory statements. The following list describes the hazard statement signal words:

- **Danger** indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.
- **Warning** indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.
- **Caution** indicates a potentially hazardous situation that, if not avoided, can result in minor or moderate injury. This signal word is also used to alert personnel against unsafe practices that can result in equipment damage and/or data corruption.

ESD Precautions

Observe electrostatic discharge (ESD) precautions during the entire installation process to eliminate possible ESD damage to the equipment.



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

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

Safety Precautions

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.
- Ensure that the shipping crate is positioned close to its destination before you unpack the crate.
- Do not move the system while it is connected to power.



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

- Ensure that a qualified electrician has properly installed the power receptacles.
- Set all circuit breakers to the OFF (0) position before you plug in the system power cord.
- Power off the system only after the system software has been shut down in an orderly manner.



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

Preinstallation Activities

Perform all of the preinstallation activities before you receive your system. You can complete the following preinstallation activities days or weeks before the installation:

- Verify the site plans.
- Ensure that you have the appropriate tools necessary to complete the installation process.
- Ensure that the correct power receptacle is installed and properly wired.

These activities are explained in the subsections that follow.

Site Plan Verification

Ensure that all site requirements are met before your system arrives. If you have questions about the site requirements or would like to order full-size floor templates for your site, send an e-mail message to site@sgi.com. You can also contact a site planning representative by telephone at +1 715 726 2820.

Tools Required

Table 2-1 lists the tools that you need to complete the installation:

Table 2-1 Installation Tools

Tool	Part Number	Purpose
13-mm wrench	7260744	Adjust the leveling pads.
17-mm socket (3/8-in. drive)	9470575	Remove bracket bolts in tall-rack wooden shipping crate.
13-mm socket (3/8-in. drive)	7260726	Remove bracket bolts in tall-rack cardboard 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.

Power Receptacle Verification

Ensure that a qualified technician installs the correct power receptacles. The SGI Origin 300 system with NUMALink module 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.

For North American sites, use the following procedure 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 X and socket Y (refer to Figure 2-1). The meter should read between 200 and 240 Vac.
3. Check the voltage between socket X and the ground socket. The meter should read approximately 120 Vac.
4. Check the voltage between socket Y and the ground socket. The meter should read approximately 120 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 that is measured in step 7 is more than 1 ohm, contact a site-approved electrician. Do not proceed with the installation procedure.

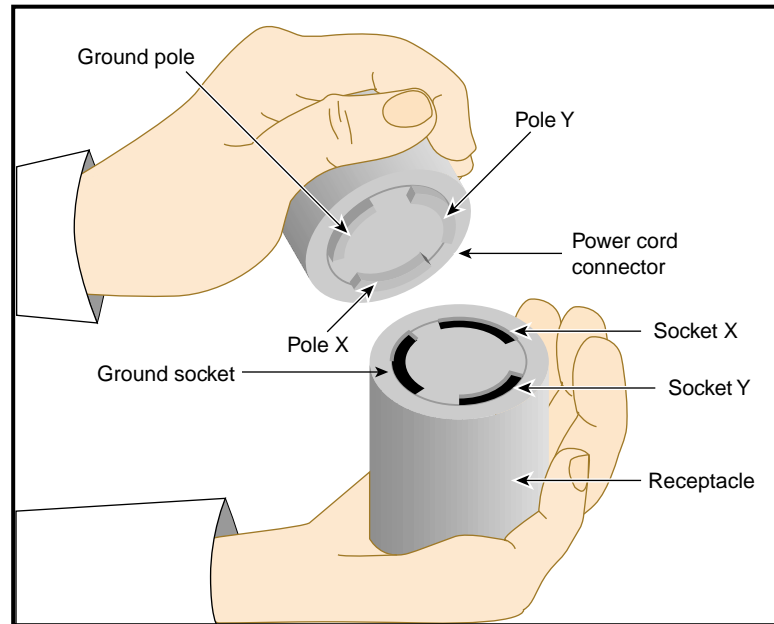


Figure 2-1 30-amp Single-phase Power Receptacle for North American Sites

For international sites, use the following procedure 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 (refer to Figure 2-2). 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.
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 that is measured in step 7 is more than 1 ohm, contact a site-approved electrician. Do not proceed with the installation procedure.

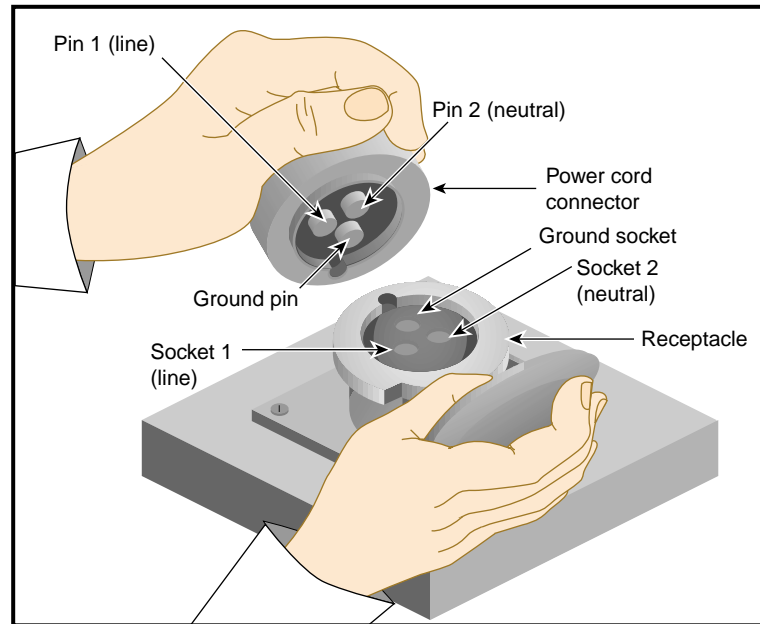


Figure 2-2 32-amp Single-phase Power Plug for International Sites

Unloading and Moving System Equipment

SGI Origin 300 short-rack systems arrive at the site in cardboard shipping crates. 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.

SGI Origin 300 tall-rack systems arrive at the customer site in wooden or cardboard crates. The system documentation; accessories; and PC, workstation, or terminal arrive in separate cartons.

This section describes how to unload and transport the Origin 300 system with NUMAlink module to its designated location, as follows:

- Unloading the equipment from the truck
- Inspecting the shipping crate
- Transporting the shipping crate

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. A platform or ramp may be used 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) 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 2-3 shows the lift openings and dimensions of a tall-rack wooden shipping crate. This figure also shows where to position the pallet jack.

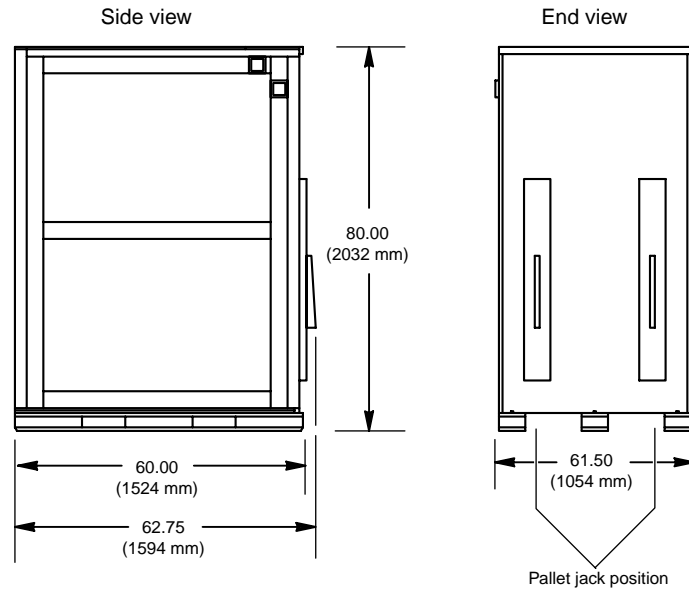


Figure 2-3 Tall-rack Wooden Shipping Crate Dimensions

Figure 2-4 shows the lift openings and dimensions of a tall-rack cardboard shipping crate. This figure also shows where to position the pallet jack.

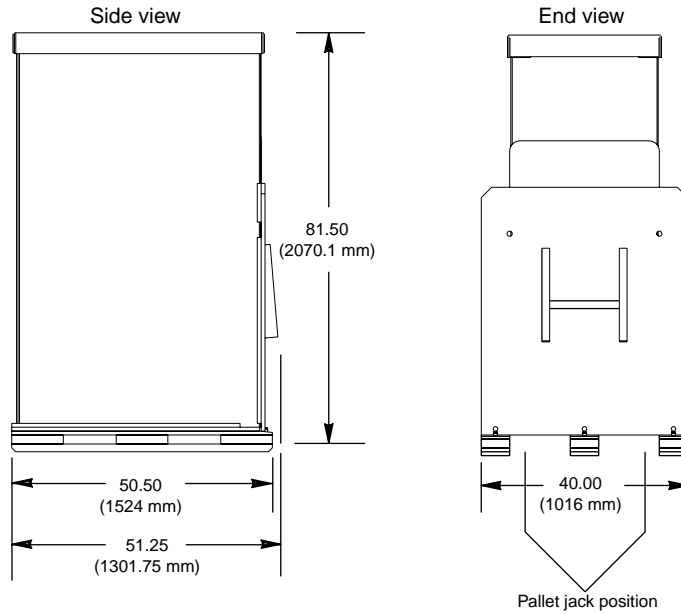


Figure 2-4 Tall-rack Cardboard Shipping Crate Dimensions

Figure 2-5 shows the lift openings and dimensions of a short-rack shipping crate. This figure also shows where to position the pallet jack.

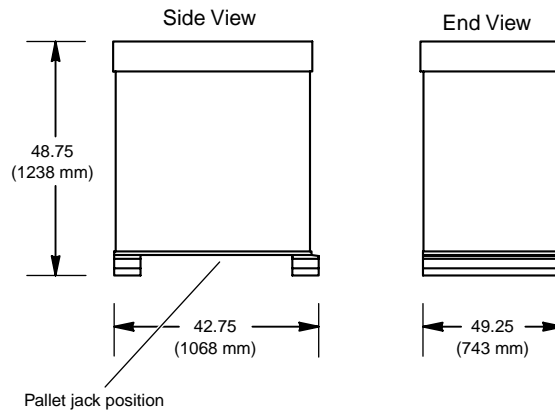


Figure 2-5 Short-rack Shipping Crate Dimensions

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 or there are missing parts, send an e-mail message to ships@sgi.com.

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. Refer to Figure 2-3, Figure 2-4, and Figure 2-5 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 degrees F (22 degrees 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.

Installing Your System

Now that you have unloaded the system from the truck and have transported it to its designated location, you are ready to remove the system from the shipping crate. This section provides installation instructions for short-rack and tall-rack systems.

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.

Refer to Figure 2-6 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 lbs (221 kg). Use caution when you roll the rack down the ramp.

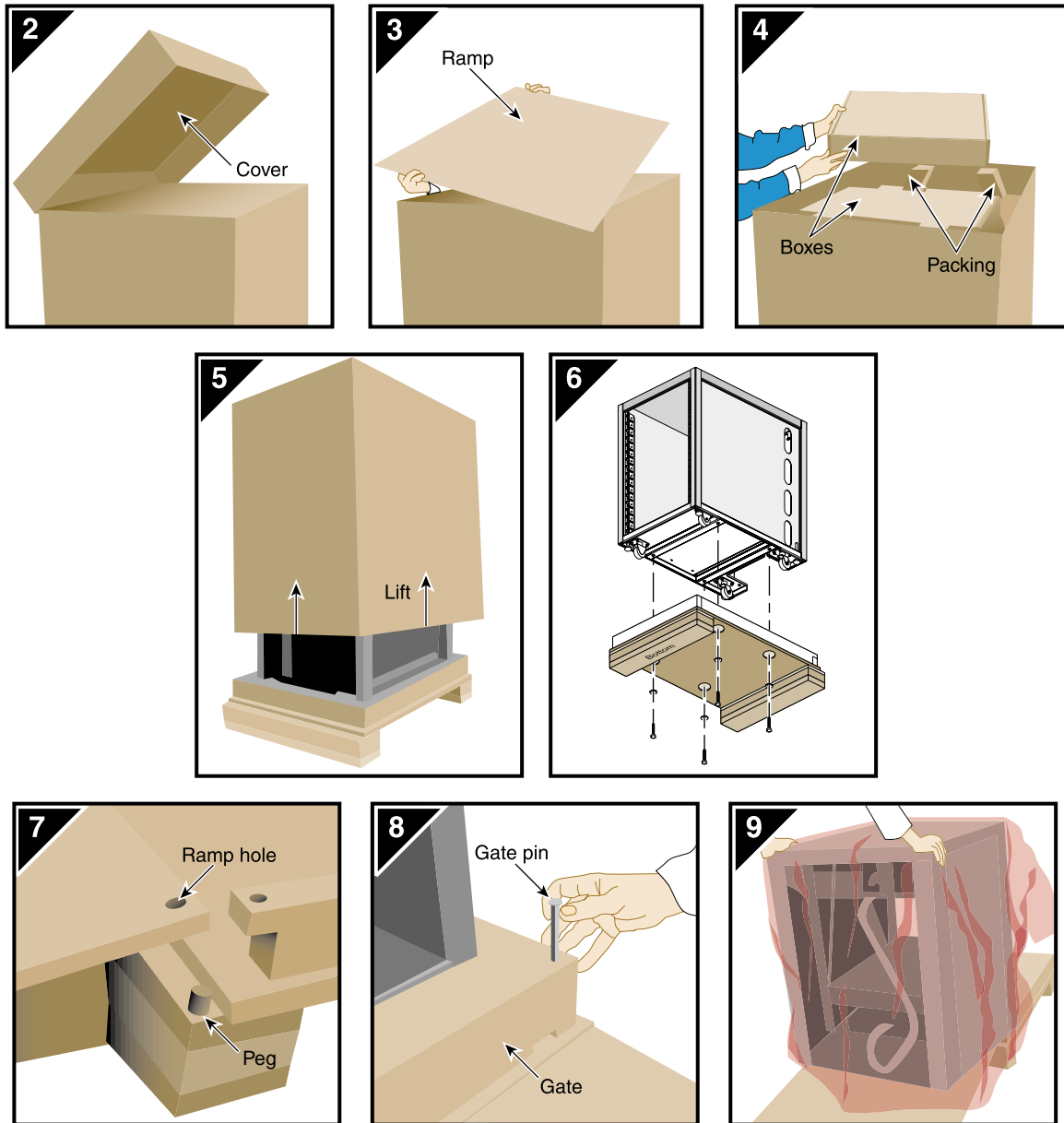


Figure 2-6 Removing a Short Rack from the Shipping Crate

Removing a Tall Rack from the Wooden Shipping Crate



Warning: In its maximum configuration, a tall-rack system weighs approximately 976 lb (443 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.



Caution: Steps 1 through 8 require two people to ensure personal safety and to protect the equipment. Failure to use two people can result in injury to personnel or damage to the equipment.

To unpack a tall rack, you will need the following tools from the system tool kit: 13-mm wrench; extension, 6-inch, 3/8-in. drive; 17-mm standard 3/8-in. drive socket; and ratchet, reversible, 3/8-in. drive. The tool kit is shipped with the system in a separate carton.

Refer to Figure 2-7 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. Ensure that the system crate is in a stable, upright position.
3. Release the two latches that secure the top panel of the shipping crate.
4. Brace the front panel of the shipping crate with one hand as you open the front part of the top panel with your other hand. The front panel, which is also the ramp, moves freely after you open the top panel.
5. Lower the door/ramp to the floor.
6. Pull out the two gate pins (refer to 6a and 6b).
7. Remove the gate and set it aside.
8. Remove the two bracket bolts and bracket that secures the rack to the crate.
9. 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.

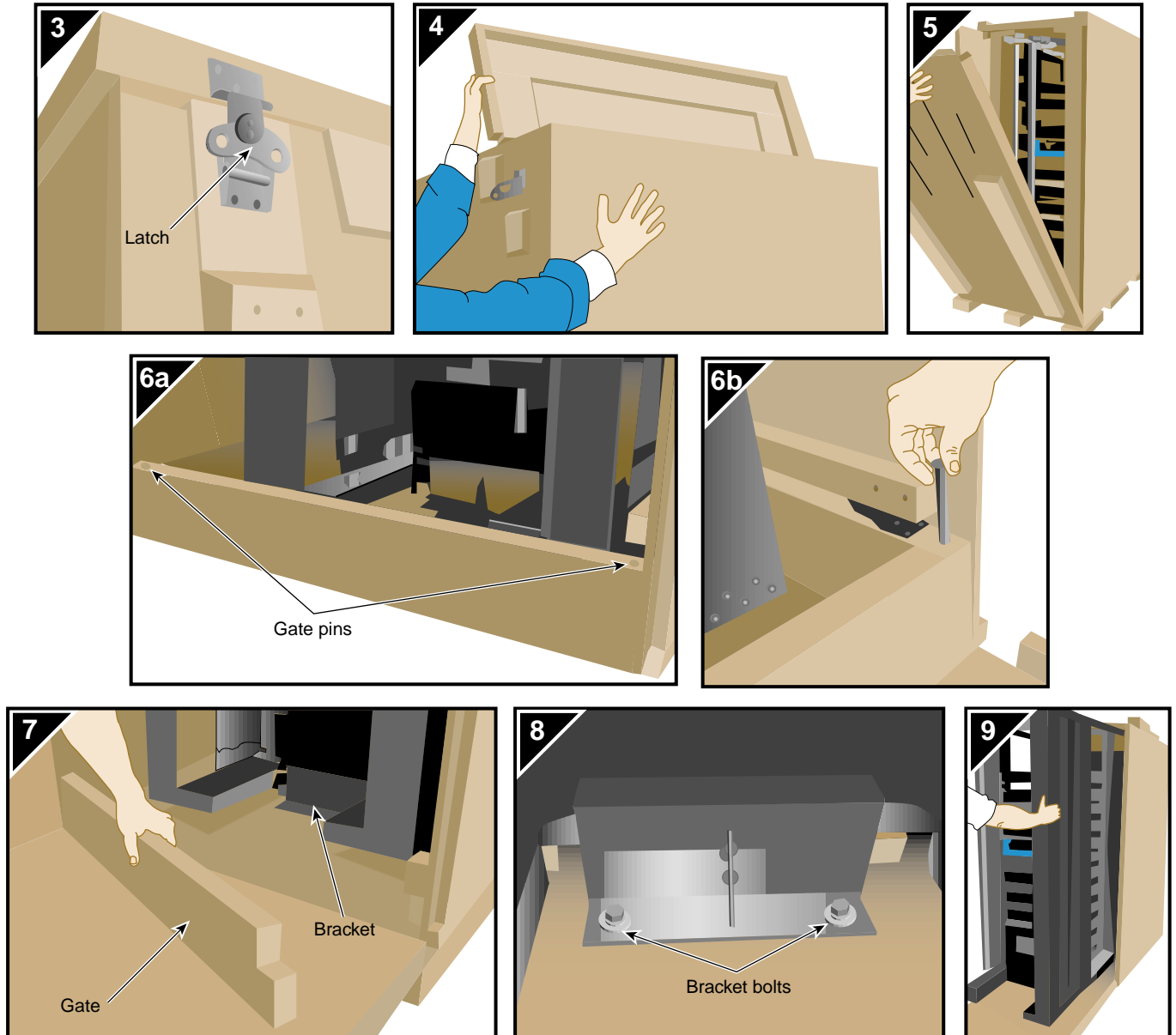


Figure 2-7 Removing a Tall Rack from the Wooden Shipping Crate

Removing a Tall Rack from the Cardboard Shipping Crate



Warning: In its maximum configuration, a tall-rack system weighs approximately 1,130 lb (512.56 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; and ratchet, reversible, 3/8-in. drive.

Refer to Figure 2-8 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.
 - 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 that rack.

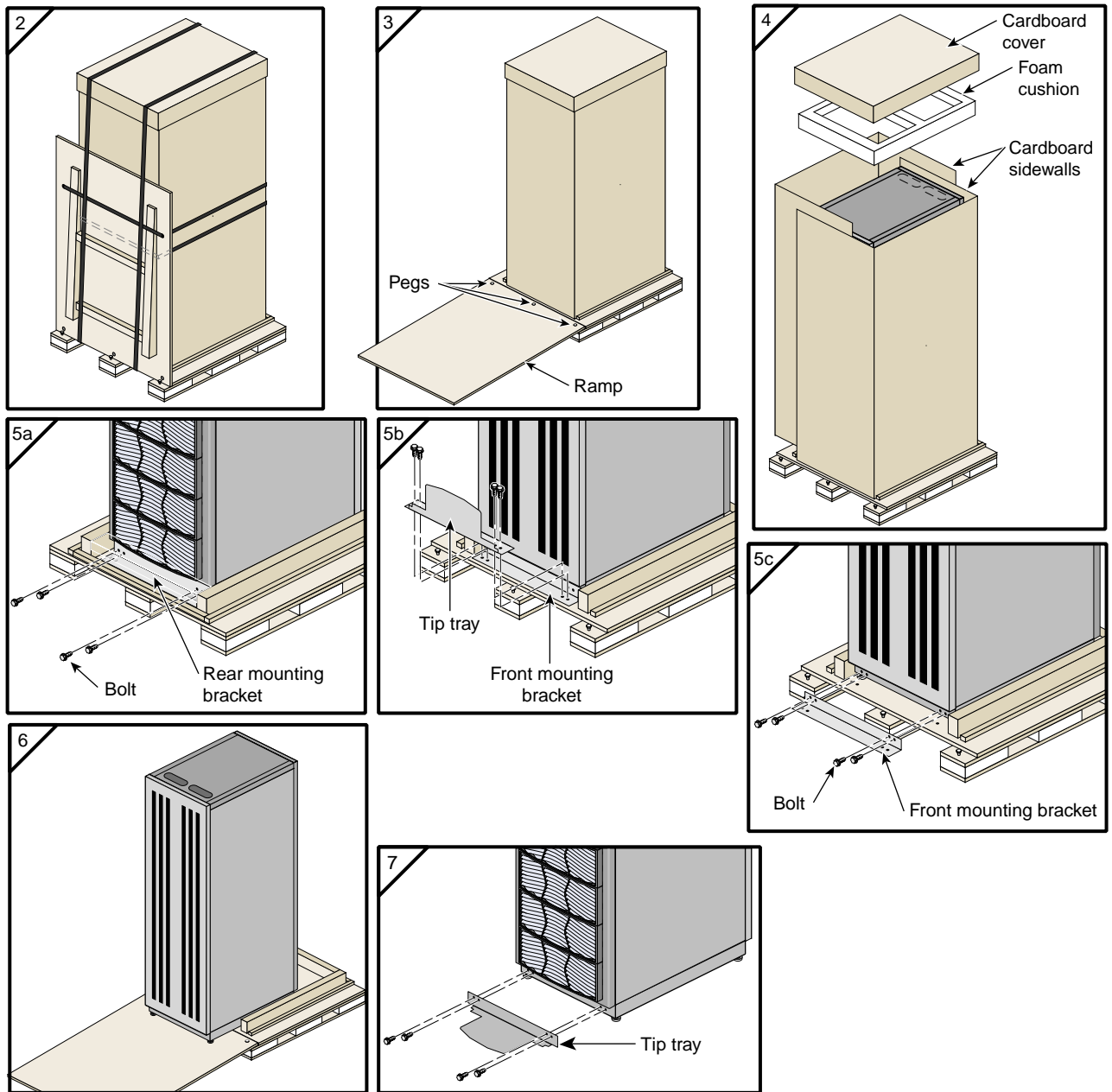


Figure 2-8 Removing a Tall Rack from the Cardboard Shipping Crate

Positioning and Leveling the Rack



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.

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 2-9, until the rack is level.

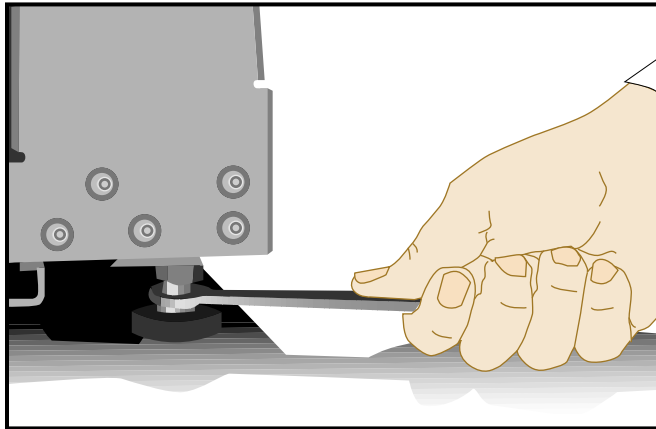
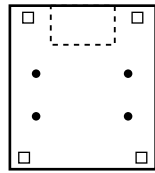


Figure 2-9 Leveling Bolts

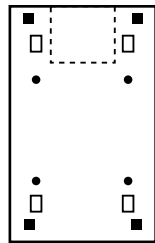
4. Ensure that the circuit breaker on the power distribution unit is in the OFF (0) position. Then connect the power cord to a grounded power outlet. Plugging in the power cord grounds the rack.
5. Secure the rack with seismic tie-downs if you are installing the system in an earthquake zone.

Note: Tall and short racks have four threaded holes that are located at the bottom of the rack (refer to Figure 2-10). 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
- Castors
- Leveling pads

Figure 2-10 Seismic Tie-down Attachment Points

System Operation

This chapter describes how to operate your SGI Origin 300 system with NUMALink module. Specifically, it explains how to perform the following procedures:

- “Connecting a System Console to Your System” on page 53
- “Installing or Removing PCI Cards, Disk Drives, and Memory” on page 56
- “Powering Your System On and Off” on page 72
- “Monitoring Your System” on page 76

Connecting a System Console to Your System

The system console enables you to perform the following activities:

- Monitor your system by reading the status and error message information that the L1 and L2 controllers generate.
- Enter L1 and L2 controller commands to monitor or change particular system functions. You can, for example, monitor the speed of fans for a particular module.
- Power on or power off individual modules or all modules (except for the storage modules) in your system.
- If you connect a console that contains SGIconsole software, you can perform the functions listed above and have boundary scan capabilities. Boundary scan capabilities enable an SGI system support engineer (SSE) to test the functionality of your system.

To attach a system console that runs the SGIconsole software to your system, connect the system console to the L2 controller Ethernet port connector as shown in Figure 3-1. Optionally, you can connect a dumb terminal to the L2 controller console (RS-232) connector as shown in Figure 3-2.

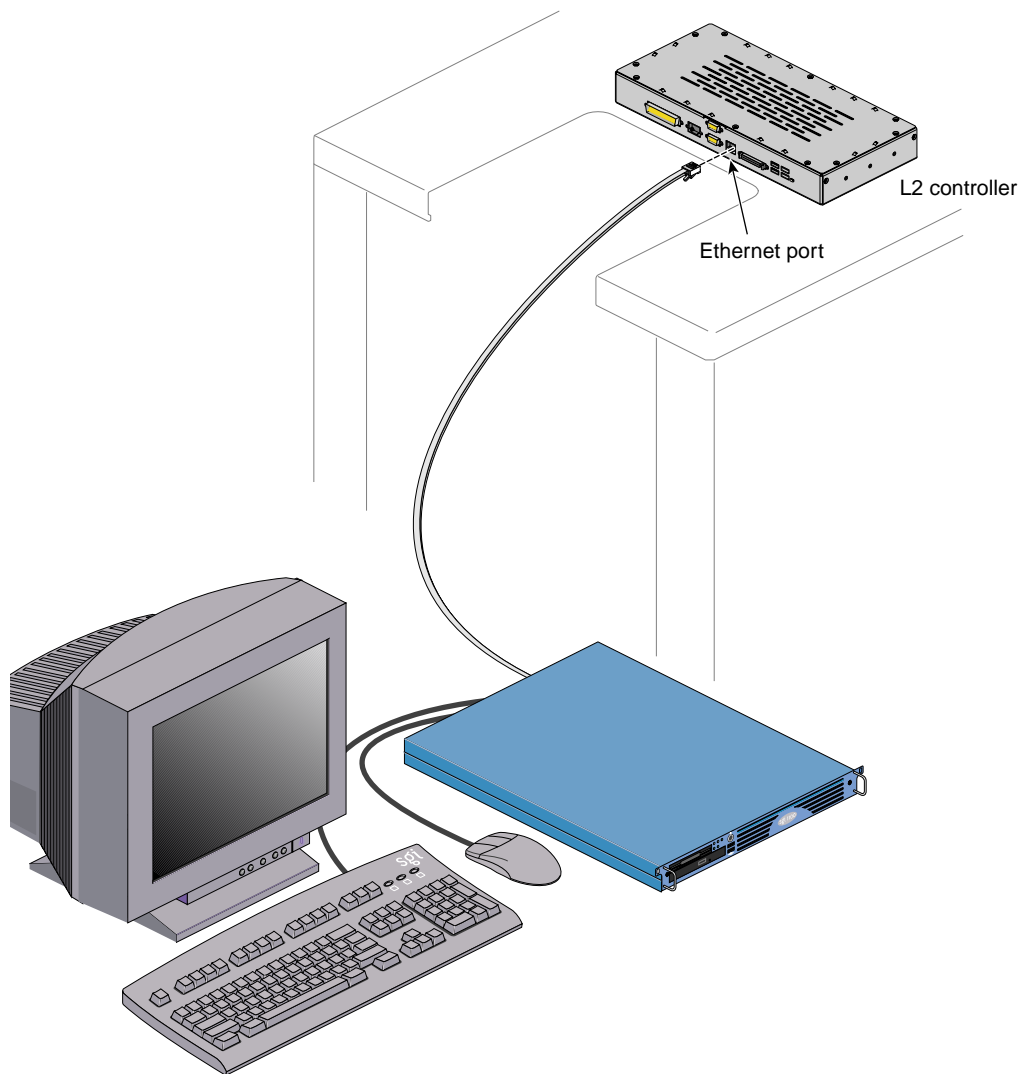


Figure 3-1 Connecting the System Console to the L2 Controller Ethernet Port

Figure 3-2 shows how to connect a dumb terminal to the L2 controller console port.

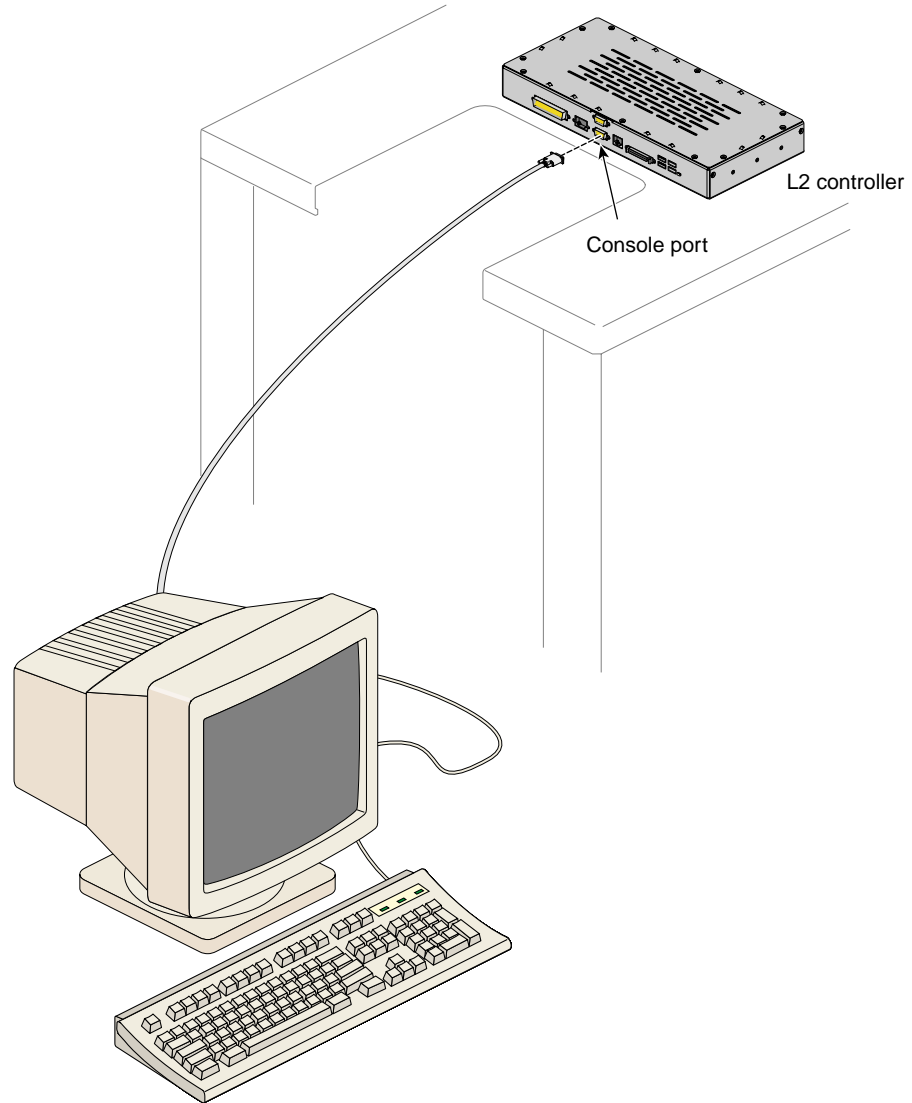


Figure 3-2 Connecting the System Console to the L2 Controller Console Port

Installing or Removing PCI Cards, Disk Drives, and Memory

You can install or remove peripheral component interface (PCI) cards, disk drives, and memory that reside in the servers in your system. This section explains how to perform the following procedures:

- Installing or removing a PCI card
- Installing or removing a disk drive
- Installing or removing memory



Warning: For your safety and the protection of your system, contact your SGI system support engineer (SSE) to install or remove any other hardware components.

Installing or Removing a PCI Card

Each Origin 300 server has two Universal PCI 2.2-compliant option card slots that are configured on one bus (refer to Figure 3-3). The PCI bus supports both 32- and 64-bit addressing modes at 33 or 66 MHz. Refer to the SGI Supportfolio Online home page for an updated list of supported PCI cards: <http://support.sgi.com>

Note: The PCI slots of the Origin 300 server can seat 3.3-V or Universal PCI cards. The Origin 300 server does not support 5-V only PCI cards.

This section explains how to perform the following procedures:

- Installing a PCI card
- Installing a full-height PCI card in slot 2
- Removing a PCI card

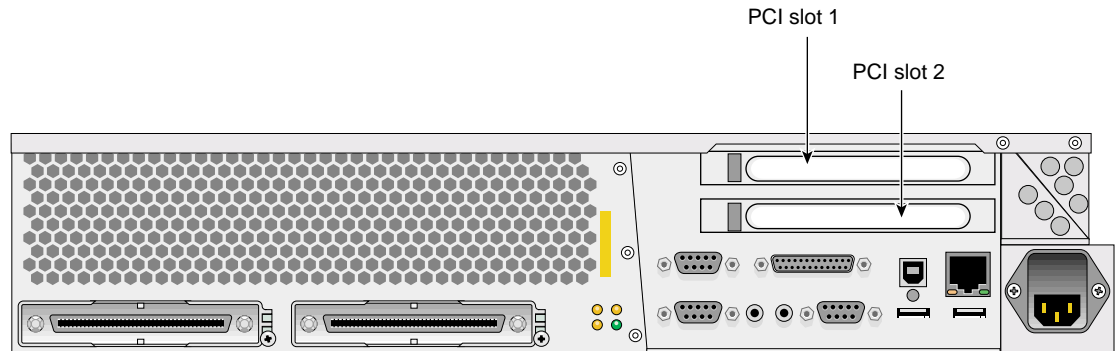


Figure 3-3 PCI Slots Located in the Rear View of Origin 300 Base Module



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.

Tools/Parts Required:

- PCI card
- T10 ballpoint Torx driver P/N 7260650
- T20 ballpoint Torx driver P/N 7260422

Installing a PCI Card

Follow these steps to install a PCI card.

Note: If you plan to install a full-length PCI expansion card into PCI slot 2, you must remove the rackmounting chassis rail that is adjacent to the I/O assembly. If you install a full-length card in PCI slot 1, you do not have to remove the rackmounting rail. For instructions on how to remove the rackmounting chassis rail, refer to “Installing a Full-height PCI Card in PCI Slot 2” on page 60.

1. Power off the system.
2. Disconnect all of the cables at the rear of the server.



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

3. Remove the two screws that secure the server to the front rails of the rack.
4. Pull the server from the rack until it is stopped by the safety latches.
5. Open the server by removing the two screws and lifting the cover as shown in Figure 3-4.
6. If a blanking plate covers the slot that is needed for the installation, remove the retaining screw as shown in Figure 3-5 and the blanking plate.
7. Insert the PCI expansion card into the slot by pushing the card into the connector until it is properly seated.
8. Install the retaining screw as shown in Figure 3-5.
9. Close the server cover and install and tighten the two screws.
10. Press the safety latches on both sides of the server and slide the server into the rack.
11. Install the two screws that secure the server to the front rails of the rack.
12. Install all of the cables at the rear of the server.
13. Power on the system.

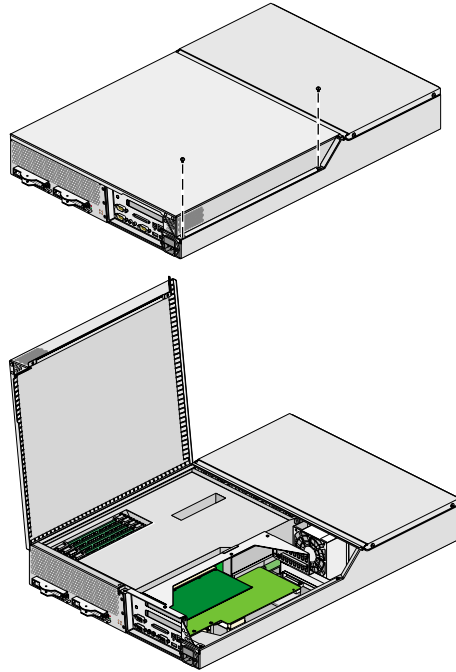


Figure 3-4 Opening the Chassis

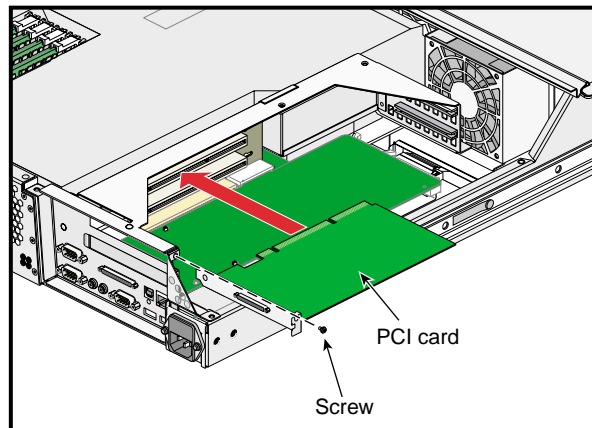


Figure 3-5 PCI Card Installation

Installing a Full-height PCI Card in PCI Slot 2

To install a full-height PCI card on PCI slot 2, follow these steps:

1. Power down the system.
2. Disconnect all of the cables at the rear of the server.



Warning: Components may be hot. To avoid injury, allow the components to cool for approximately 5 minutes before you proceed with these instructions.

3. Remove the server from the rack
 - a. Remove the two screws that secure the server to the front rails of the rack.
 - b. Pull the server from the rack until it is stopped by the safety latches.
 - c. With one person holding each side, release the safety latches on both sides of the server and pull the server out of the slide rail assembly (refer to Figure 3-6).
 - d. Place the server on a flat stable surface.
4. Remove the five 10-24 x 1/4 in. screws that attach the rail to the chassis (refer to Figure 3-7).
5. Open the server by removing the two screws and lifting the cover as shown in Figure 3-4 on page 59.
6. If a blanking plate covers PCI slot 2, remove the retaining screw and the blanking plate.
7. Insert the full-height PCI expansion card into PCI slot 2 by pushing the card into the connector until it is properly seated (refer to Figure 3-5 on page 59).
8. Install the retaining screw as shown in Figure 3-5.
9. Close the server cover and install and tighten the two screws.
10. Install the five 10-24 x 1/4 in. screws that attach the rail to the server.
11. Align the server rails with the rack slide rails and slide the server into the rack until the safety latches stop the server (refer to Figure 3-6).
12. Press the safety latches on both sides of the server and slide the server into the rack.
13. Install the two screws that secure the server to the front rails of the rack.
14. Install all of the cables at the rear of the server.
15. Power on the system.

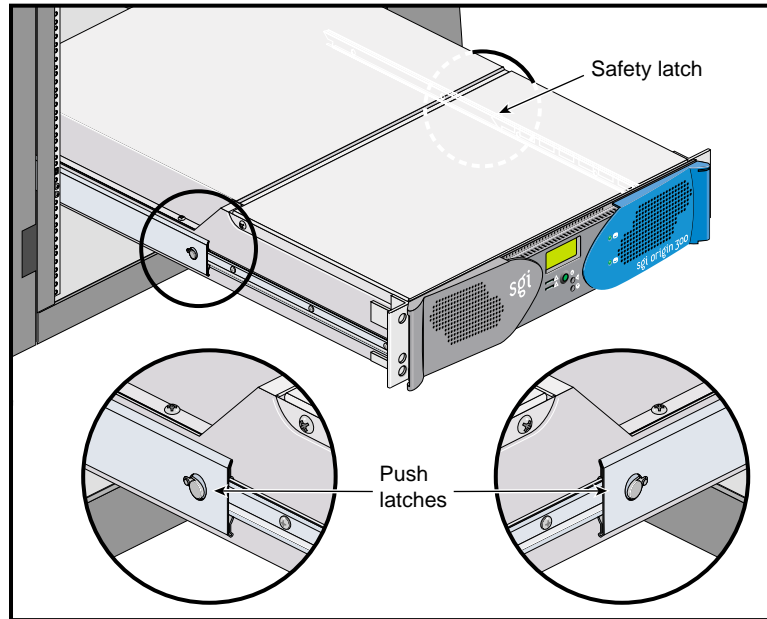


Figure 3-6 Safety Latches

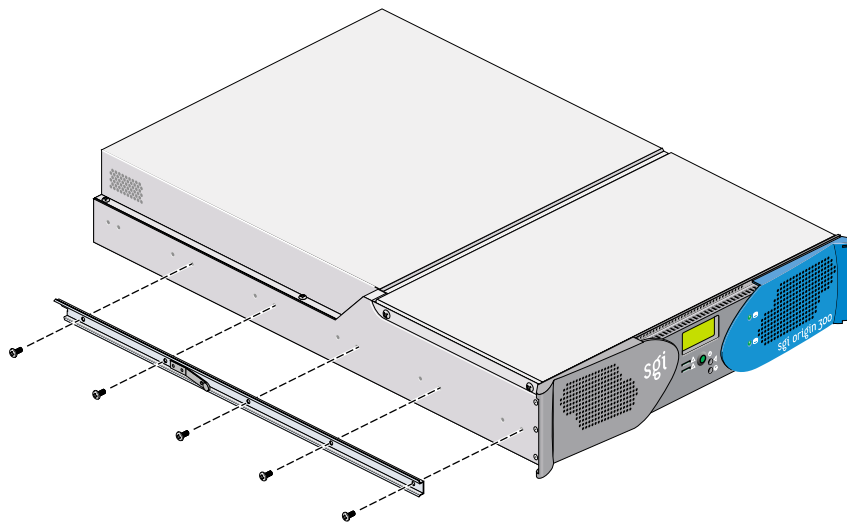


Figure 3-7 Removing the Chassis Rail

Removing a PCI Card

To remove a PCI card, follow these steps:

1. Power off the system.
2. Disconnect all of the cables at the rear of the server.



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

3. Remove the two screws that secure the server to the front rails of the rack.
4. Pull the server from the rack until it is stopped by the safety latches.
5. Open the server by removing the two screws and lifting the cover as shown in Figure 3-4 on page 59.
6. Release the retaining screw of the card as shown in Figure 3-8.
7. Gently pull the card straight out of the slot.
8. Install a new PCI card or a blanking plate as described in “Installing a PCI Card” on page 58.
9. Close the server cover and install and tighten the two screws.
10. Press the safety latches on both sides of the server and slide the server into the rack.
11. Install the two screws that secure the server to the front rails of the rack.
12. Install all of the cables at the rear of the server.
13. Power on the system.

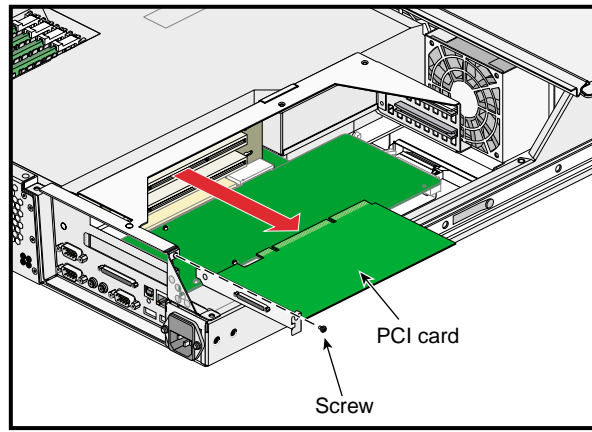


Figure 3-8 Removing a PCI Card

Installing or Removing a Disk Drive

Each Origin 300 server can contain one or two sled-mounted Ultra3 SCSI disk drives (refer to Figure 3-9).

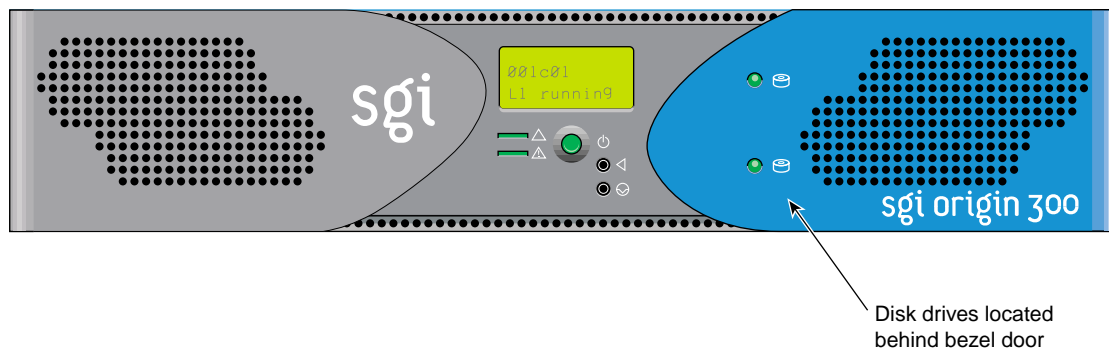


Figure 3-9 Disk Drive Location

Tools/Parts Required:

One or more of the following disk drives/blanks:

- 18-GB disk drive P/N 013-3485-00x
- 73-GB disk drive P/N 013-3486-00x

Installing a Disk Drive

To install a disk drive, follow these steps:

1. Open the bezel door as shown in Figure 3-10a
2. Position the drive assembly so that it engages the bay guide rails and gently push the drive into the bay (refer to Figure 3-10b).
3. Swing the locking handle towards the chassis until the locking handle engages the latch (refer to Figure 3-10c).
4. Close the bezel door as shown in Figure 3-10d.

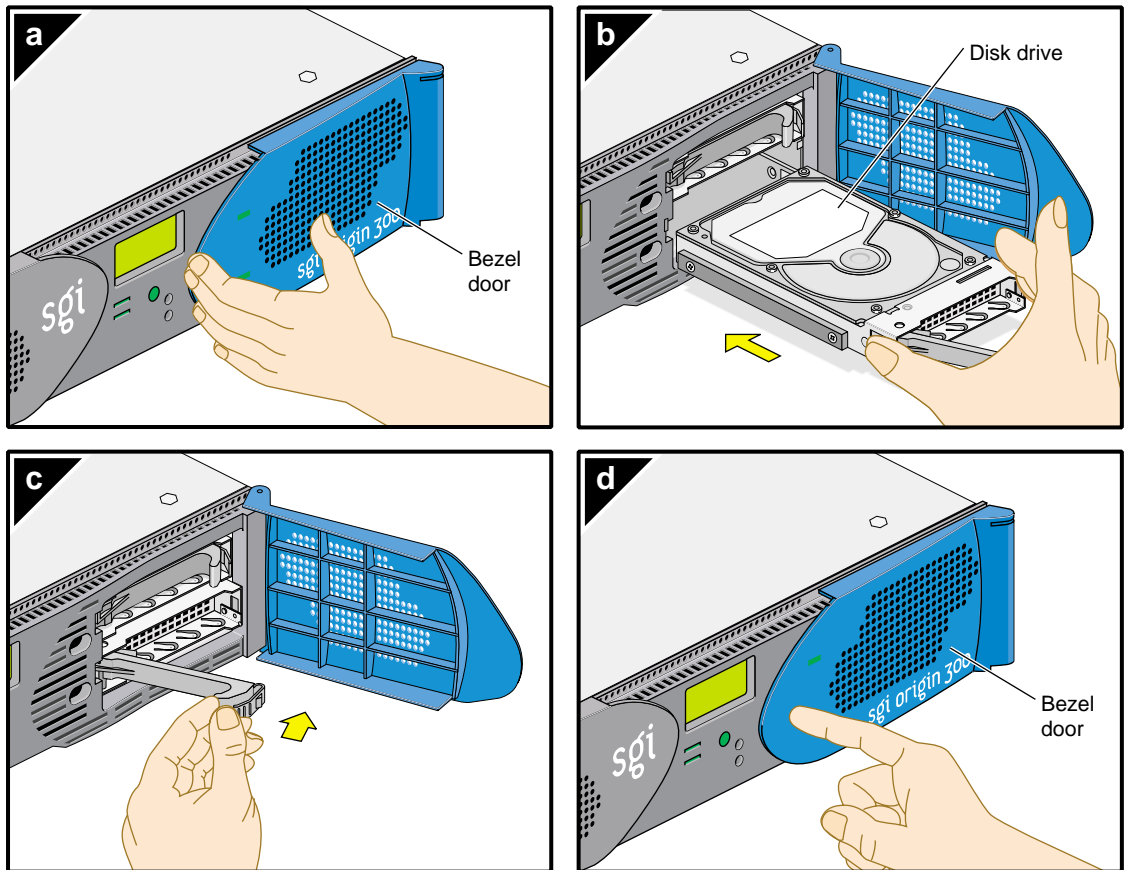


Figure 3-10 Installing a Disk Drive

Removing a Disk Drive

To remove a disk drive, follow these steps:

1. To replace a data drive, ensure that the drive has spun down before you remove it.
2. Open the bezel door as shown in Figure 3-11a.
3. Remove a drive by depressing its handle lock with your thumb and pulling the handle away from the chassis until the handle disengages the drive connector from the backplane connector (refer to Figure 3-11b).
4. Carefully slide the drive out of the bay (refer to Figure 3-11c) and place it on an ESD-safe surface. Do not use the handle to pull the drive out of the bay.
5. Close the bezel door as shown in Figure 3-11d.

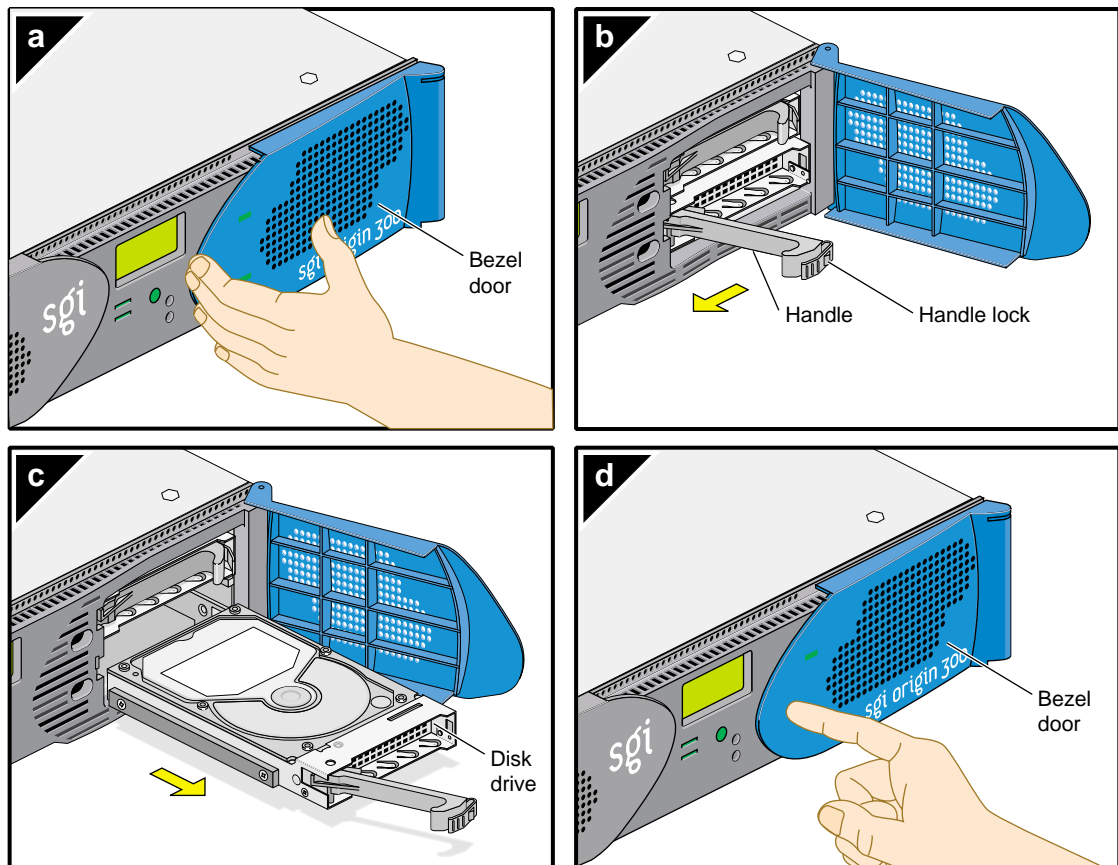


Figure 3-11 Removing a Disk Drive

Installing or Removing Memory

Memory is contained on cards that are referred to as DIMMs (dual-inline memory modules). Each Origin 300 server can contain two or four DIMMs. If you are adding memory to your system, populate the DIMM slots in the following order (refer to Figure 3-12):

1. Slots 1 and 3
2. Slots 2 and 4

The DIMMs that reside in slots 1 and 3 or slots 2 and 4 must be the same memory size; however, the DIMMs in slots 1 and 3 may be a different memory size than the DIMMs in slots 2 and 4.

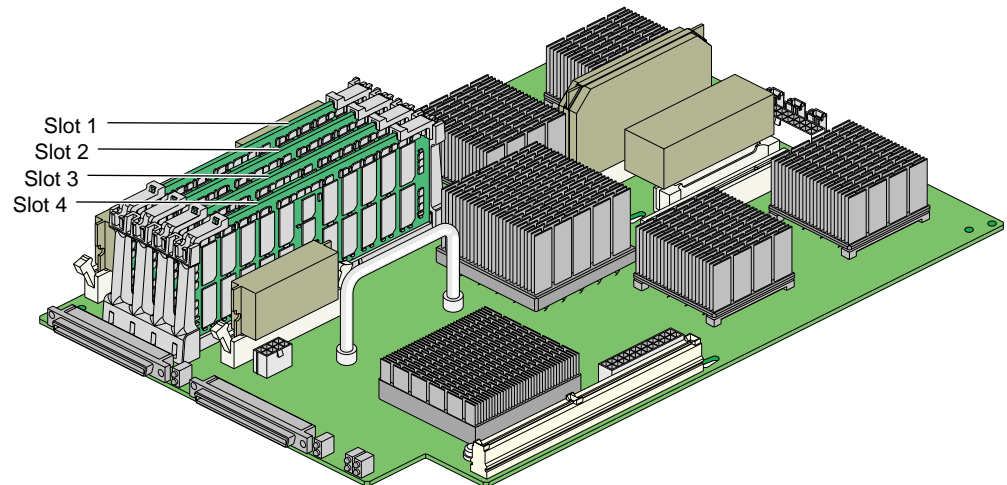


Figure 3-12 DIMM Slots



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

Tools/Parts Required:

One or more of the following DIMMs:

- DIMM 256-MB P/N 030-1018-00x
- DIMM 512-MB (Standard) P/N 030-1044-00x
- DIMM 512-MB (Premium) P/N 030-1042-00x
- DIMM 1-GB P/N 030-1060-00x
- T20 ballpoint Torx driver P/N 7260422

Installing a DIMM

To install a DIMM, follow these steps:

1. Power off the system.
2. Disconnect all of the cables at the rear of the server.



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

3. Remove the two screws that secure the server to the front rails of the rack.
4. Pull the server from the rack until it is stopped by the safety latches.
5. Open the server by removing the two screws and lifting the cover as shown in Figure 3-4 on page 59.

6. Install the DIMM, as follows (refer to Figure 3-13):

Note: You do not have to remove the air baffle to install a DIMM.

- a. Ensure that the ejector latches are open.
 - b. Align the DIMM and carefully slide it into the guide rails.
 - c. Close the ejector latches until they snap into place. This ensures that the DIMM is fully seated in the connector.
7. Close the server cover and install and tighten the two screws.
 8. Press the safety latches on both sides of the server and slide the server into the rack.
 9. Install the two screws that secure the server to the front rails of the rack.
 10. Install all of the cables at the rear of the server.
 11. Power on the system.

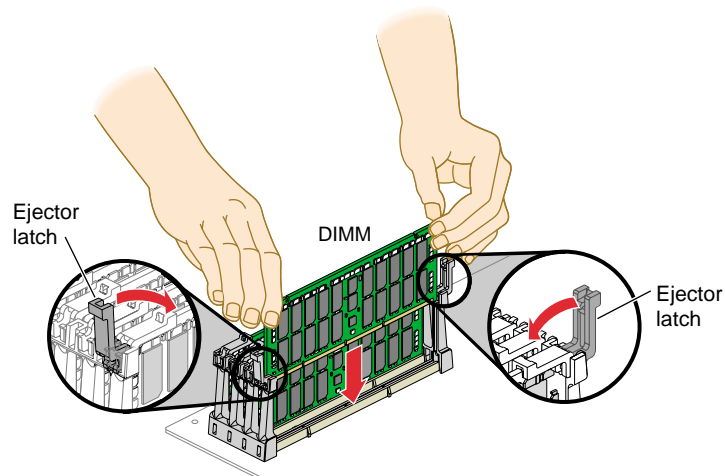


Figure 3-13 Inserting a DIMM

Removing a DIMM

To remove a DIMM, follow these steps:

1. Power off the system.
2. Disconnect all of the cables at the rear of the server.



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

3. Remove the two screws that secure the server to the front rails of the rack.
4. Pull the server from the rack until it is stopped by the safety latches.
5. Open the server by removing the two screws and lifting the cover as shown in Figure 3-4 on page 59.
6. Remove the DIMM, as follows (refer to Figure 3-14):

Note: You do not have to remove the air baffle to remove a DIMM.

- a. Lift the two ejector latches simultaneously to disengage the DIMM from its connector.
 - b. Carefully grasp the DIMM and pull it up and out of the guide rails.
 - c. Place the DIMM on an ESD-safe surface.
7. Insert a new DIMM as described in “Installing a DIMM” on page 68.
 8. Close the server cover and install and tighten the two screws.
 9. Press the safety latches on both sides of the server and slide the server into the rack.
 10. Install the two screws that secure the server to the front rails of the rack.
 11. Install all of the cables at the rear of the server.
 12. Power on the system.

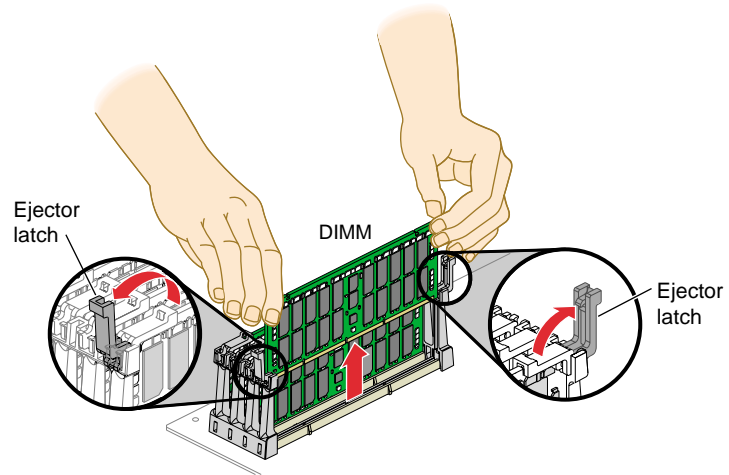


Figure 3-14 Removing a DIMM

Powering Your System On and Off

The following sections describe how to power on and power off individual modules or your entire SGI Origin 300 system.

- “Powering On” on page 72
- “Powering Off” on page 74

You can power on and power off individual modules and the entire system via the system console.

Note: The following information applies to the Origin 300 base modules, the NUMAlink module, and PCI expansion modules. You must manually power on a TP900 storage module by placing the power switch(es) in the 1 position. Refer to Figure 3-15.

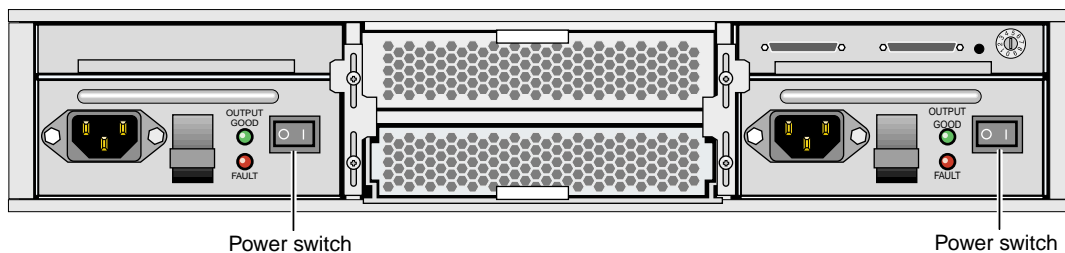


Figure 3-15 TP900 Power Switch (1 Position)

Powering On

This section describes how to perform the following procedures:

- Preparing to power on
- Powering on at the system console

Preparing to Power On

Ensure that the L1 controllers for each server, the NUMAlink module, and PCI expansion modules that you want to power on are running; the L1 displays should display “L1 running.” If any L1 controllers are not running, contact your SGI SSE.

Powering On at the System Console

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

1. Access the L2 controller by entering the following command:

```
$> /stand/sysco/bin/l2
```

2. From the L2 prompt (L2>), power on an individual module by entering the following command. (If you want to power on the entire system, proceed to step 3.)

```
L2> r <rack#> s <slot#> pwr u
```

For example, to power on an Origin 300 server in rack 1, slot 18, enter the following command:

```
L2> r 1 s 18 pwr u
```

The slot number is the unit number of the module within the rack. For more information about unit numbers, refer to Chapter 1 of this document. Also, the Origin 300 system with NUMAlink module is a single-rack system; therefore, the rack number is always 1.

If you want to power on several selected modules of a rack at the same time, you must enter the rack number followed by the slot numbers of the modules that you want to power on. For example, to power on the modules in slots 18, 20, and 22, enter the following command:

```
L2> r 1 s 18,20,22 pwr u
```

3. If you want to power on the entire system, enter the following command:

```
L2> pwr u
```

(The default setting for the `pwr u` command is all slots.)

4. From the L2 prompt, display the system configuration by entering the following command:

```
L2> config
```

This command lists the modules in the system and their system controller addresses.

Powering Off

This section explains how to power off individual modules or your entire system from the system console.

Note: The following information applies only to Origin 300 base modules, the NUMAlink module, and PCI expansion modules. You must manually power off the TP900 storage module by placing the power switch(es) in the 0 position. Refer to Figure 3-16.

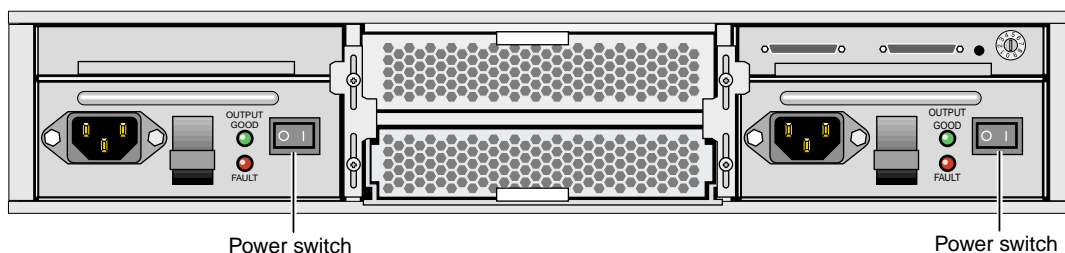


Figure 3-16 TP900 Power Switch (0 Position)

Powering Off at the System Console

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

1. Access the L2 controller by entering the following command:
2. From the L2 prompt (L2>), power off an individual module by entering the following command. (If you want to power off the entire system, proceed to step 3.)

```
$> /stand/sysco/bin/l2
```

```
L2> r <rack#> s <slot#> pwr d
```

For example, to power off an Origin 300 server in rack 1, slot 18, enter the following command:

```
L2> r 1 s 18 pwr d
```

The slot number is the unit number of the module within the rack. For more information about unit numbers, refer to Chapter 1 of this document. Also, the Origin 300 system with NUMAlink module is a single-rack system; therefore, the rack number is always 1.

If you want to power off several selected modules from the rack at the same time, enter the rack number followed by the slot numbers of the modules that you want to power off. For example, to power off the modules in slots 18, 20, and 22, enter the following command:

```
L2> r 1 s 18,20,22 pwr d
```

3. If you want to power off all of the modules within the rack, enter the following command:

```
L2> pwr d
```

(The default setting for the `pwr d` command is all slots.)

4. From the L2 prompt, display the configuration information by entering the following command:

```
L2> config
```

This command lists all of the modules in the system and their system controller addresses.

The L1 controller display for each module should display "L1 running" during the power-off procedure.

Monitoring Your System

You can monitor your SGI Origin 300 system from the following sources:

- You can view individual module (base, NUMALink, and PCI expansion) status and error messages via the module's L1 controller display. For example, you can determine whether the fans of a particular module are operating properly.
- The system console enables you to view the status and error messages that are generated by both the L1 and L2 controllers. Refer to Appendix B for L1 and L2 commands.
- You can monitor the status of the TP900 storage modules by viewing the LEDs on the front and the rear of the storage modules.
- You can use the Embedded Support Partner (ESP) system, which is discussed in the next section.

Using Embedded Support Partner (ESP)

Embedded Support Partner (ESP) automatically detects system conditions that indicate potential future problems and then notifies the appropriate personnel. This enables you and SGI system support engineers (SSEs) to proactively support systems and resolve issues before they develop into actual failures.

ESP enables users to monitor one or more systems at a site from a local or remote connection. ESP can perform the following functions:

- Monitor the system configuration, events, performance, and availability.
- Notify SSEs when specific events occur.
- Generate reports.

ESP also supports:

- Remote support and on-site troubleshooting.
- System group management, which enables you to manage an entire group of systems from a single system.

For more information about ESP, refer to Chapter 5, "Troubleshooting."

System Configurations

This chapter describes the following system configurations:

- “Compute” on page 77
- “System Control” on page 80
- “I/O” on page 82
- “Storage” on page 84
- “Power” on page 86

Compute

In a tall rack, the SGI Origin 300 system with NUMAlink module consists of two to eight Origin 300 base modules (also referred to as servers). A short rack can consist of two to six servers. When only two servers are present in the system, they reside in the locations that are directly above and below the NUMAlink module. For example, when the NUMAlink module resides in location U20 (tall rack), the two servers reside in locations U18 and U22. When the NUMAlink module resides in location U8 (short rack), the two servers reside in locations U6 and U10.

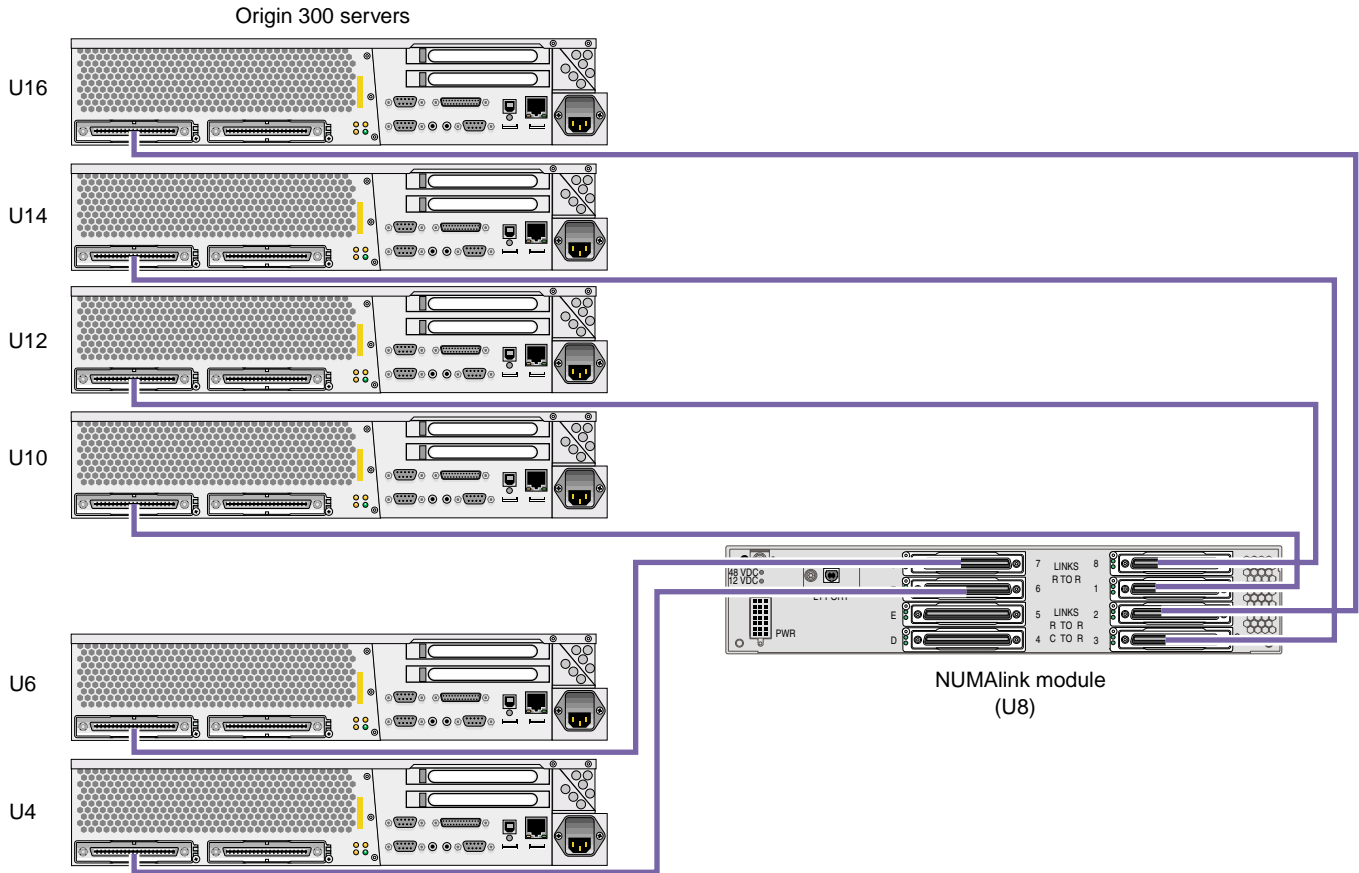
Note: The global master is the Origin 300 server that resides in the lowest location in the rack.

Additional servers are added to the rack by alternating between the top and bottom portions of the rack. For example, the additional servers can be added to the rack in the following order:

- The third server is placed in location U16 (tall rack) or U4 (short rack).
- The fourth server is placed in U24 (tall rack) or U12 (short rack).
- The fifth server is placed in U14 (tall and short racks).
- The sixth server is placed in U26 (tall rack) or U16 (short rack).
- The seventh server is placed in U12 (tall rack).

- The eighth server is placed in U28 (tall rack).

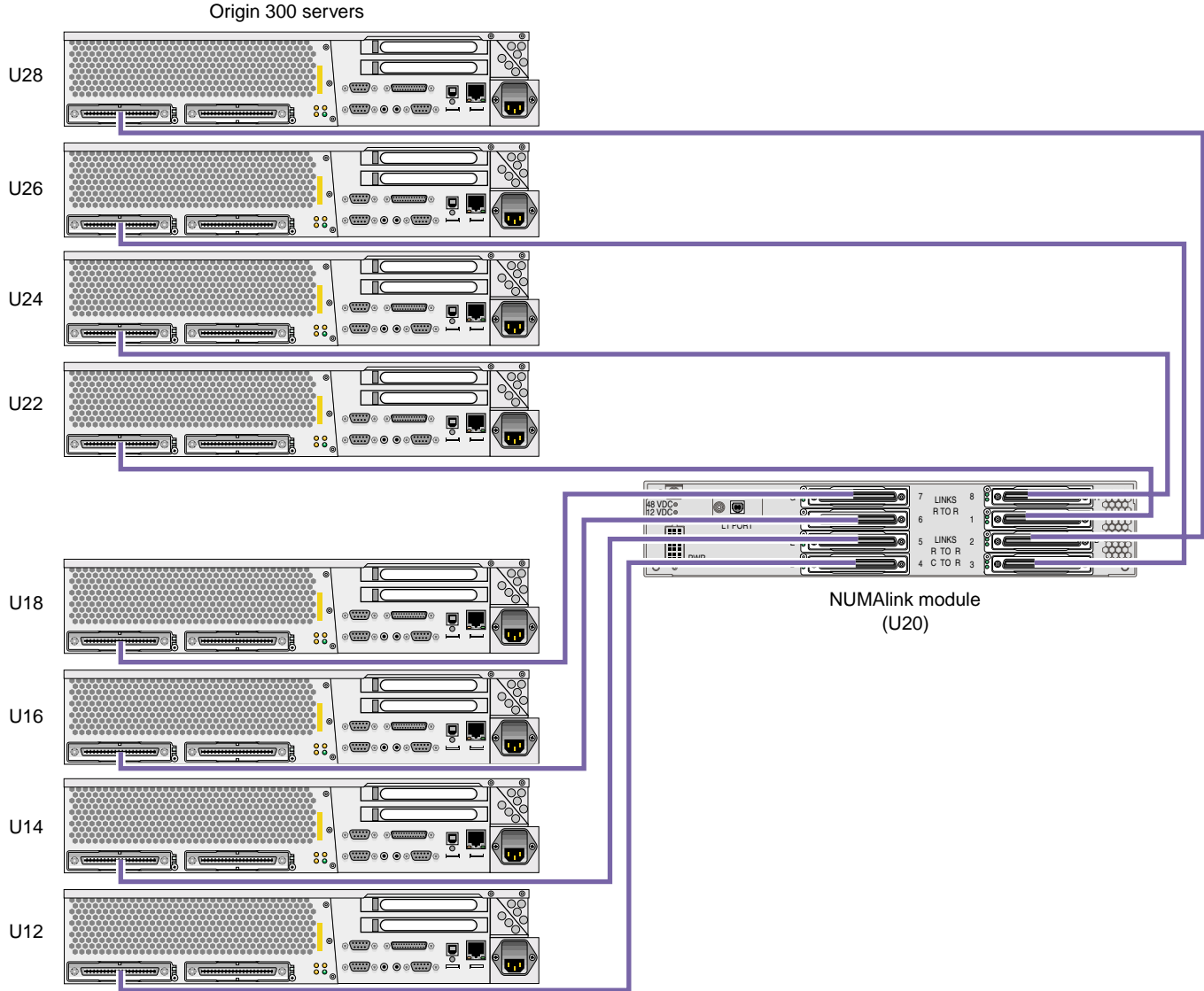
The Origin 300 servers communicate with each other via the NUMalink module. Figure 4-1 shows the compute configuration for the short rack.



Uxx indicates the location of the module within a rack.

Figure 4-1 Short-rack Compute Configuration

Figure 4-2 shows the compute configuration for the tall rack.



Uxx indicates the location of the module within a rack.

Figure 4-2 Tall-rack Compute Configuration

System Control

The control systems for the SGI Origin 300 system with NUMALink module manage power control and sequencing, provide environmental control and monitoring, initiate system resets, and store identification and configuration information. The SGI Origin 300 system with NUMALink module has two levels of control:

- **L1: module-level controller.** The L1 controller is designed into all modules except the TP900 storage module; controller function varies slightly by module. The L1 controllers are not configurable.
- **L2: rack-level controller.** The L2 controller enables remote maintenance. It controls resource sharing and the L1 controllers in the system, and maintains controller configuration and topology information. The L2 controller resides in the top portion of the rack.

The L1 controllers within the system communicate with the L2 controller via the NUMALink module or via a USB hub (refer to Figure 4-3). The Origin 300 servers and/or PCI expansion modules that connect to ports 2, 3, 4, and 5 of the NUMALink module communicate with the L2 controller via the USB signals of these NUMALink ports. The Origin 300 servers that connect to ports 1, 6, 7, and 8 of the NUMALink module communicate with the L2 controller via a USB hub.

You can access the L1 and L2 controllers via the system console. Refer to Appendix B for L1 and L2 controller commands.

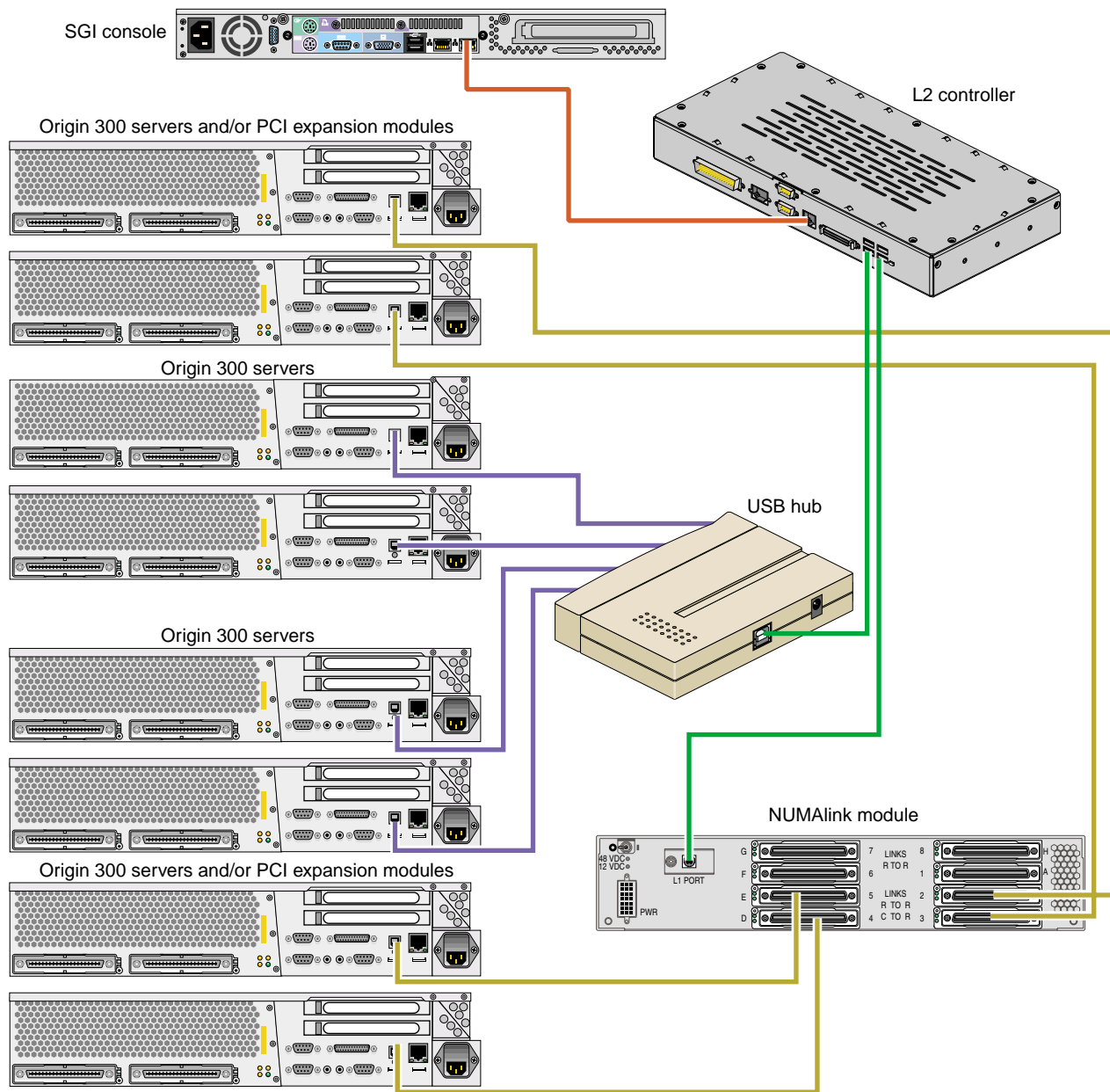


Figure 4-3 System Control Configuration

I/O

Each Origin 300 server has two PCI slots; however, you can increase the number of PCI slots by adding PCI expansion modules to the system. The Origin 300 system with NUMAlink module supports one or two PCI expansion modules in a short rack and as many as four PCI expansion modules in a tall rack. The following rules indicate how many PCI expansion modules you can add to your tall-rack system:

- You can add one PCI expansion module to a system that contains two to seven servers.
- You can add two PCI expansion modules to a system that contains two to six servers.
- You can add three PCI expansion modules to a system that contains three to five servers.
- You can add four PCI expansion modules to a system that contains four servers.

In a tall rack, the PCI expansion modules reside directly above and below the NUMAlink module and the Origin 300 servers. For example, two PCI expansion modules reside in the highest available locations in the bottom section of the rack (U8 and U12). The other two PCI expansion modules reside in the first available locations in the top portion of the rack (for example, U26 and U30).

The following rules indicate how many PCI expansion modules you can add to your short-rack system:

- You can add one PCI expansion module to a system that contains two to four servers. Valid locations for this module are U10, U12, or U14.
- You can add one or two PCI expansion modules to a system that contains two servers. These modules reside in locations U10 and U14.

The Origin 300 servers and L2 controller communicate with the PCI expansion modules via the NUMAlink module. The PCI expansion modules connect to the NUMAlink module via ports 2, 3, 4, and 5, which are the ports that carry NUMAlink and USB signals (refer to Figure 4-4).

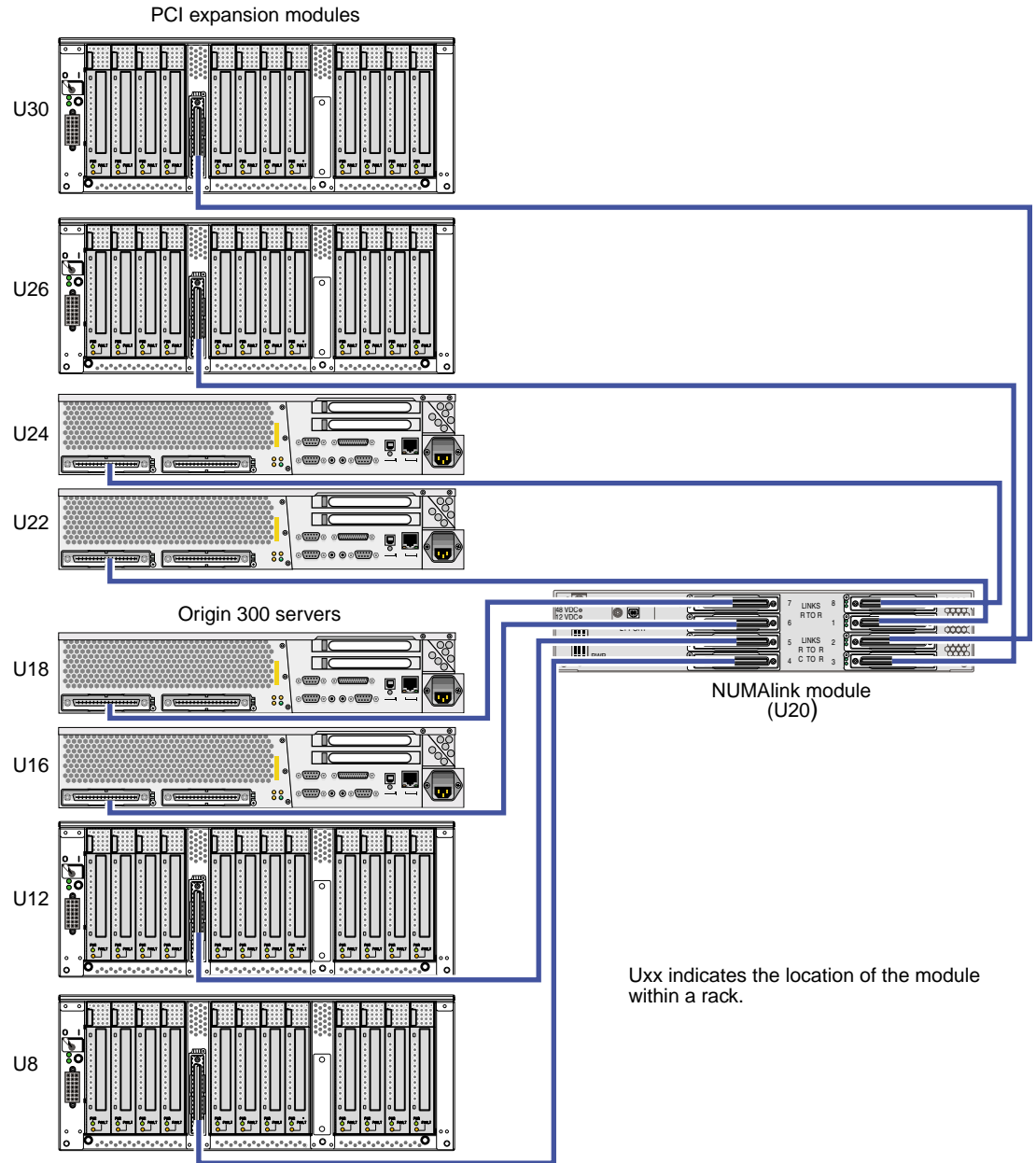


Figure 4-4 I/O Configuration

Storage

Each Origin 300 server contains two disk-drive bays; however, you can add additional storage to the system. The TP900 storage module provides a SCSI JBOD solution for the Origin 300 system with NUMAlink module. The TP900 can be configured as follows:

- For a single-port configuration (eight drives), one I/O module is required (bay 1/1).
- For a dual-port configuration (four drives per port), use two I/O modules.
- Populate all disk drive bays with a disk drive or a filler plate.
- Install the drives in the following order:

1	3	5	7
2	4	6	8

The TP900 storage module resides in the Origin 300 rack. The placement of the storage modules within the rack depends on the number of other modules in the rack. The following rules apply:

- In the short rack, place the TP900 in the highest available location of the rack. For example, if the short-rack system contains two base modules (servers), one NUMAlink module, and one PCI expansion module, place the TP900 storage module in U16. If you want to add another storage module to the system, place it in U14.
- In the tall rack, the placement of the TP900 storage module alternates between the top and bottom portions of the rack; the storage modules do not have to be grouped together.

In the bottom portion of the rack, place the first TP900 module in location U10. If this location is not available, place the TP900 in the next available location in the bottom portion of the rack (for example, U8).

Place the second TP900 in location U30. If this location is not available, place the TP900 in the next available location in the top portion of the rack (for example, U32).

Continue to alternate between the top and bottom portions of the rack as you place the TP900 modules in the system.

Note: Locations U12 through U29 are reserved for the NUMAlink module, Origin 300 base modules, and PCI expansion modules. If you need additional rack space for storage modules and space is available within U12 through U29, you may place additional TP900 modules within this reserved space.

The Origin 300 servers can connect to the TP900 storage module via the SCSI port connector on the rear of the Origin 300 server or via a PCI card (refer to Figure 4-5).

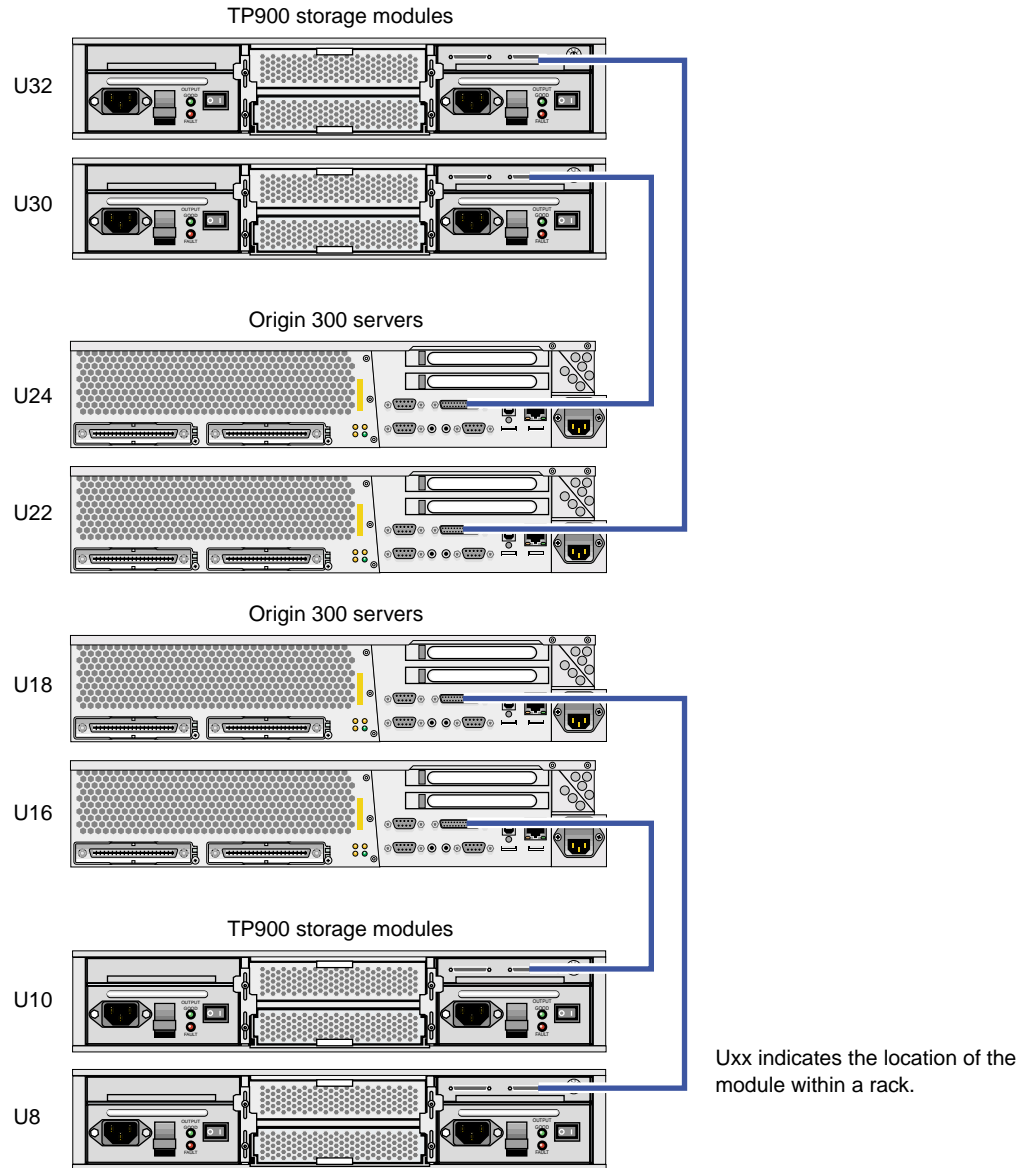


Figure 4-5 Storage Configuration

Power

The power components of the SGI Origin 300 system with NUMAlink module consist of one or two power distribution units (PDUs) and a power bay (refer to Figure 4-6). The number of PDUs depends on the number of modules within the rack. The PDU inputs AC voltage from an external power receptacle and outputs AC voltage to the Origin 300 base modules, TP900 storage modules, power adapter of the USB hub, and power bay module.

The power bay module converts the AC voltage to 48 Vdc and 12 Vdc standby voltage and outputs this voltage to the NUMAlink module, the PCI expansion modules, and the L2 controller.

The power bay, which resides in U1 of the short and tall racks, contains two power supplies. The power supplies reside in locations 5 and 6 of the power bay.

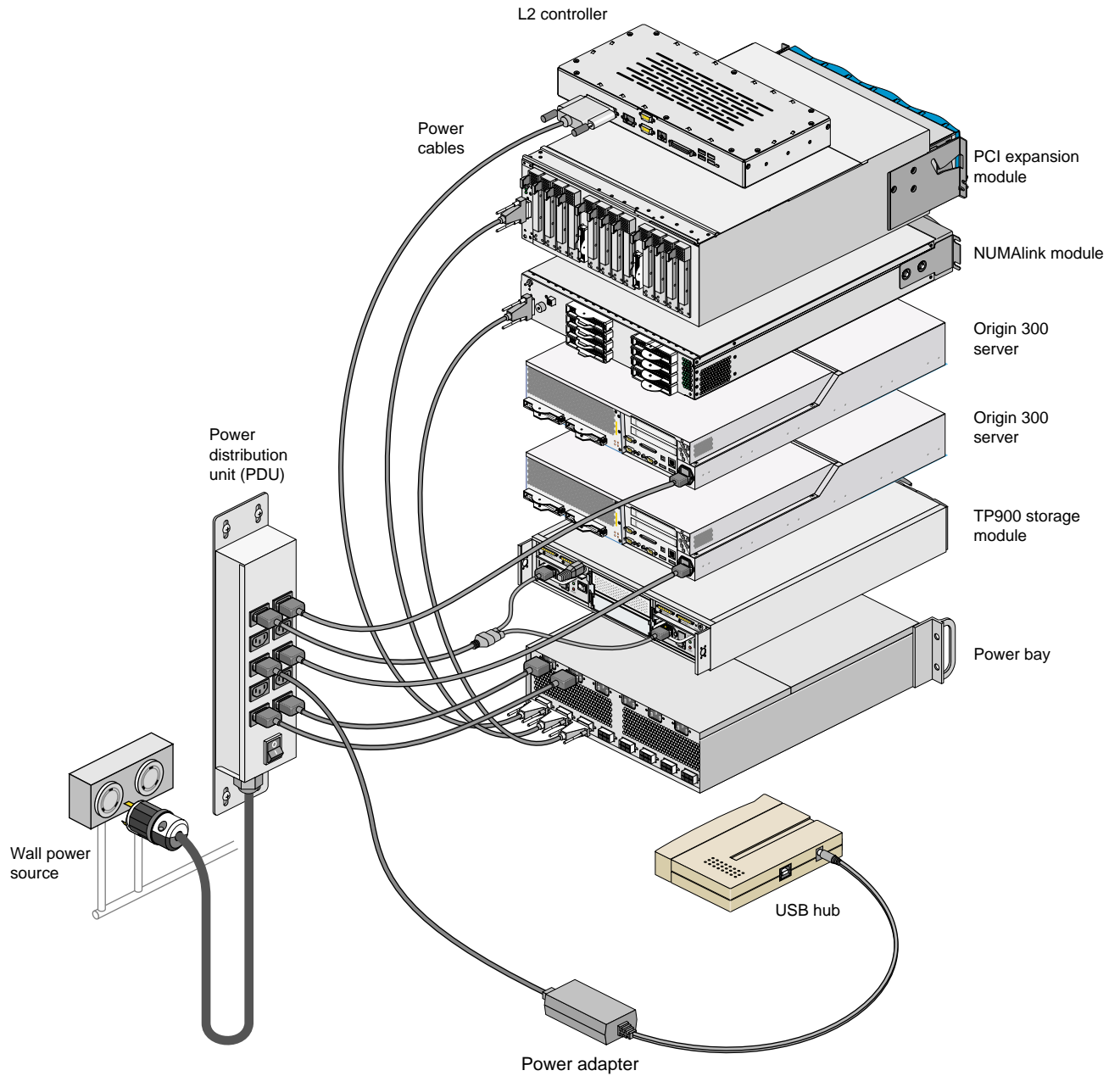


Figure 4-6 Power Configuration

Troubleshooting

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

- “Troubleshooting Chart” on page 90
- “L1 Controller Error Messages” on page 92
- “SGI Electronic Support” on page 94

Troubleshooting Chart

Table 5-1 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 in this chapter.

Table 5-1 Troubleshooting Chart

Problem Description	Recommended Action
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>Ensure that the power switch at the rear of the module is on (1 position).</p> <p>View the L1 display; refer to Table 5-2 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 an Origin 300 base, NUMAlink, or a PCI expansion module.	View the L1 display of the failing module; refer to Table 5-2 for a description of the error message.
The Failure LED illuminates on an Origin 300 base, NUMAlink, or a PCI expansion module.	View the L1 display of the failing module; refer to Table 5-2 for a description of the error message.
The green or yellow LED of a NUMAlink port (rear of NUMAlink module) is not illuminated.	Ensure that the NUMAlink cable is seated properly on the NUMAlink module and the destination module.
The PWR LED of a populated PCI slot is not illuminated.	Reseat the PCI card.

Table 5-1 (continued) Troubleshooting Chart

Problem Description	Recommended Action
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.
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.
The amber LED of a disk drive is on.	Replace the disk drive.

L1 Controller Error Messages

Table 5-2 lists error messages that the L1 controller generates and displays on the L1 display. This display is located on the front of the Origin 300 base modules, the NUMAlink module, and the PCI expansion modules.

Note: In Table 5-2, 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 5-2 L1 Controller Messages

L1 System Controller Message	Message Meaning and Action Needed
Internal voltage messages:	
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.
Fan messages:	
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.
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 5-2 (continued) L1 Controller Messages

L1 System Controller Message	Message Meaning and Action Needed
Temperature messages: low alt.	
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.
Temperature messages: high alt.	
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.
Temperature stable message:	
ATTN: TEMP # stabilized @ xxC/xxF	The ambient temperature at the module's air inlet has returned to an acceptable level.
Power off messages:	
Auto power down in xx seconds	The L1 controller has registered a fault and is shutting down. The message displays every 5 seconds until shutdown.
Server appears to have been powered down	The L1 controller has registered a fault and has shut down.

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 5-1 shows the sequence of events that occurs if you use all of the SGI Electronic Support capabilities.

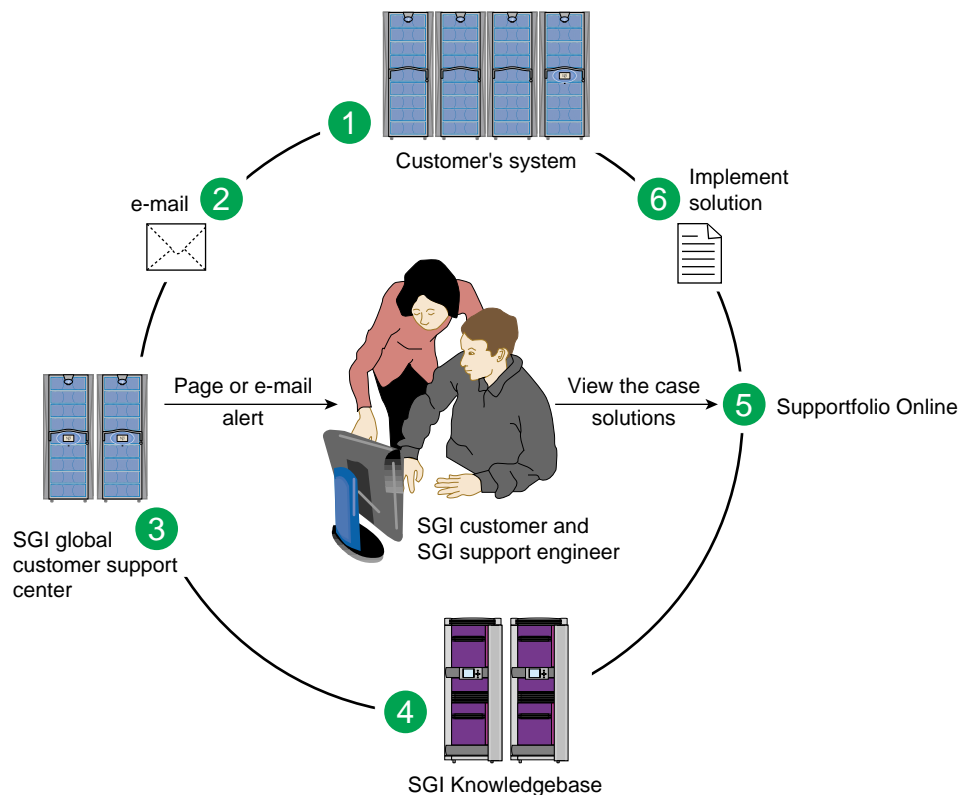


Figure 5-1 Full Support Sequence

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 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, refer to the following Web page:

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

For more information about SGI Electronic Support, refer to the following Web page:

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

The following sections describe the three components of the integrated SGI Electronic Support system.

- SGI Embedded Support Partner (ESP)
- SGI Knowledgebase
- Supportfolio Online

SGI Embedded Support Partner (ESP)

The SGI Embedded Support Partner (ESP) is a set of tools and utilities that are embedded in the IRIX operating system that provide an integrated support environment. ESP monitors system events, availability, and configuration and includes the capability to perform actions based on those events. ESP can detect system conditions that indicate potential problems and notify the appropriate personnel, which helps to resolve issues before they develop into actual failures. ESP also can monitor system performance if you install the optional Performance Co-Pilot application.

SGI released the first version of Embedded Support Partner (ESP 1.0) in the IRIX 6.5.5 release. This section describes features of the ESP 2.0 release, which was introduced with the IRIX 6.5.11 release. ESP 2.0 is available to warranty and service contract customers only.

ESP software includes the following two main parts:

- A base package that provides the capabilities to monitor a single system. You can configure the base package to specify what types of events it should monitor and whom it should notify when events occur.
- The system group manager lets you use one system to monitor and report on events on multiple systems.

The base package includes the functionality necessary to perform the following tasks:

- Configure ESP.
- Monitor a single system for system events, configuration changes, and availability.
- Determine the action to perform.
- Notify support personnel when events occur.
- Store data about the system.
- Generate basic reports.

ESP includes the following components:

- System Event Manager (SEM), which is the control center of ESP.
- System Support Database (SSDB), which is the central repository for all system support data. The SSDB archiving feature minimizes the use of system disk space; the typical database size is only a few megabytes.
- The System Group Manager (SGM), which provides an efficient, consistent, and centralized way to support and service multiple systems. A support management console provides the benefits of a central operator console through which you can perform all ESP support activities. This console provides facilities to connect to multiple member systems at the same time and perform multiple support activities. You can use SGM to centralize the following functions:

Event monitoring. SGM can monitor events from member systems. In addition, SGM can monitor services on the member systems to ensure that they are running, monitor the availability of group members, and monitor hardware and software configuration automatically (current and history).

Automated response and notification. SGM can perform actions in response to events on member systems. For example, a configuration change event on a member system triggers the group manager to update itself automatically and perform a notification action.

Site reporting. SGM provides a variety of reports both for member systems and the site. These reports include system event reports, system hardware configuration (current and history), system software configuration (current and history, including patches), system metrics, site metrics, and action taken reports.

Table 5-3 provides more detail about the functionality of ESP.

Table 5-3 ESP Functions

Function	Description
Event monitoring	<p>Events are system conditions that ESP monitors. Events include messages to syslog, panics, hangs, and so on. ESP includes many default events, and you can add custom events. Default events include parity errors, disk full conditions, and nonmaskable interrupts (NMIs). The ESP modules that monitor events report to the System Event Manager (SEM). ESP modules work independently on a specific function; some modules run as daemons and others run as stand-alone applications that are invoked by events. The design enables modules to evolve independently of one another if they conform to the published communication standard (API) required by ESP.</p> <p>Events are organized into event classes, which enable you to view and update similar events quickly. Each class can have multiple event types. An example of a class is SCSI, and SCSI hardware error and SCSI controller initialization failure are examples of event types.</p> <p>In addition to the packaged suite of ESP standard events and actions, you can create custom events and actions. If you use ESP to monitor multiple systems, you can install custom events and actions from one system onto multiple systems.</p> <p>Event monitoring has only a minimal effect on system performance.</p>
Availability monitoring	<p>ESP captures availability information every time the system restarts. This information is used to generate various availability metrics.</p>
Configuration monitoring	<p>ESP includes configuration monitoring capabilities that track system hardware and software configurations. Each time your system is started, ESP determines the system configuration and compares it to the configuration stored in the ESP database. Any differences are archived and an event is logged into the database. The event triggers an action to perform notification. ESP also can transmit the system information changes to SGI support databases so that your supported configurations are updated automatically. (By default this feature is not enabled; you must enable this feature if you want to use this capability.)</p>

Table 5-3 (continued) ESP Functions

Function	Description
Performance monitoring	Performance monitoring is available through the pmie application, which is included in the Performance Co-Pilot Execution Only Environment (pcp_eoe subsystem). The pmie application is an inference engine for performance metrics. It evaluates a set of performance rules at specified time intervals. You can use a separate utility to customize and extend the rules and their attributes. Refer to <i>Performance Co-Pilot IRIX Base Software Administrator's Guide</i> for more information about pmie and the pcp_eoe subsystem.
Actions	<p>Actions are commands that ESP performs in response to an event or a specific number of events. Actions usually are notifications that you configure, and notifications include ASCII console messages or dialog boxes on the local system, e-mail, and paging.</p> <p>You can also configure ESP 2.0 to notify an SGI call center about problems; ESP then sends e-mail to SGI with information about the event.</p>
Reports	<p>ESP provides a variety of reports, including the following types:</p> <ul style="list-style-type: none"> - Hardware configuration (current and history) - Software configuration (installed software, patches, and history) - System changes - Part changes - Event reports (all events, by specific events, by class of events) - Action taken reports - Availability metrics (single and site)

More information is available for ESP in man pages and *Embedded Support Partner User Guide*. You may access this guide from the SGI Technical Publications Library at the following URL: <http://techpubs.sgi.com>

SGI Knowledgebase

SGI Knowledgebase is a sophisticated, comprehensive, self-service database from which you can search for answers to difficult problems. Instead of telephoning the support center, you can type in a specific phrase or question via the Web, and you are quickly offered access to any solution ever written for that problem. Because the database is based on Primus associative search technology and is linked to SGI's call-tracking system, every solution written during every support call is captured and published on SGI Knowledgebase for all customers to access. The service is free to customers who have an existing support relationship with SGI, such as a warranty or a service contract.

The SGI Knowledgebase is available on the Supportfolio Online website:

<http://support.sgi.com>

SGI Knowledgebase is a database of solutions to problems and answers to questions that can be searched by sophisticated knowledge management tools. This section provides an overview of SGI Knowledgebase and basic instructions on how to use it.

SGI Knowledgebase consists of problem description statements or how-to questions and their related solutions. Each problem (or question) includes environment statements (information about the product and the system on which it runs), symptoms, possible causes, and fixes (or how-to instructions). You can search SGI Knowledgebase for solutions to problems you may have or to find information about performing tasks or procedures. Unlike a typical support case, if the problem or question is in SGI Knowledgebase, the solution also exists in SGI Knowledgebase.

You can describe as fully as possible a problem's symptoms and the environment in which the problem occurred. SGI Knowledgebase uses knowledge management tools in which an associative search engine provides matches of similar items. Unlike standard text search engines, the more detailed information you can provide about the symptoms and the environment in which they occurred, the more accurate the search results will be.

After you initiate a search, solutions to problems with similar symptoms and environments are listed. The more closely the match between symptoms and environment, the more likely it is that the solution will solve the problem. After the initial search results are displayed, you can further refine your search by adding additional symptom and environment information or by selecting from additional symptom and environment information that is displayed.

Solutions that are created in response to customer support cases are captured and published in SGI Knowledgebase, so SGI Knowledgebase grows as cases are resolved and solutions are generated. Also, user feedback helps SGI improve our solutions, so you are encouraged to indicate whether a solution was helpful and to provide comments.

SGI Knowledgebase offers you the following options:

- Quick Search... (Find answers fast by creating your own query)
- Interview Me... (Help me search for a solution)
- How Do I... (Find out how to perform a task)
- Top Solutions...

To begin a search, select one of the first three options. The “Top Solutions” option provides a list of the most recent solutions that solved problems effectively.

After you select a search option, provide a descriptive statement about your problem or ask a question. Keywords are less effective; they are too general and do not provide enough information for the search engine.

If no solutions exist to your problem or question, SGI Knowledgebase will still try to match the information that you have provided. Therefore, if no solution exists, unrelated symptoms and environments may be listed. If so, it is unlikely that the solution exists in SGI Knowledgebase.

Table 5-4 describes SGI Knowledgebase options.

Table 5-4 SGI Knowledgebase Options

Option	Description
Quick Search...	After you enter a problem statement, this search returns the best matches. Possible solutions are displayed in a list at the bottom of the screen, and you can view any of the solutions or refine your search by entering more text in the search field or by selecting matching systems, associated environment, or associated symptoms.
Interview Me...	After you enter a problem statement, this search presents a list of problems or a set of matching symptoms (to help further define the problem). If any solutions match your query, you can view any of those solutions or refine your search by entering more text or selecting from the options displayed.
How Do I...	This option is similar to Quick Search, except that you describe what you want to do.
Top Solutions...	These are the top solutions that have solved customer problems (as indicated in the feedback mechanism) during the previous seven days.

Supportfolio Online

You can use Supportfolio Online to open and manage support cases, download and install patches, initiate SGI Knowledgebase searches, and search and browse man pages, release notes, issues of *Pipeline*, and technical publications. Supportfolio e-mail notification informs you about new patch sets, bug reports, issues of *Pipeline*, and other services.

All customers can use Supportfolio Online. To use all of the Supportfolio features, you must have an appropriate support contract. You can access Supportfolio Online at the following URL: <http://support.sgi.com>

Technical Specifications

This appendix provides detailed information about the following base components of the SGI Origin 300 system with NUMALink module.

- “Rack” on page 104
- “SGI Origin 300 Base Module” on page 108
- “NUMALink Module” on page 119
- “USB Hub” on page 127
- “L2 Controller” on page 128
- “Power Bay Module” on page 130

This appendix also includes detailed information about the following optional components:

- “PCI Expansion Module” on page 135
- “SGI TP900 Storage Module” on page 142

Rack

The SGI Origin 300 system with NUMAlink module supports two rack types: a short rack and a tall rack. Both rack types are industry-standard 19-inch racks, and they support two types of mounting rails that support the modules within the rack. For example, the Origin 300 servers use slide rails (refer to Figure A-1), which enable you to slide the server from the rack to access PCI cards and memory.

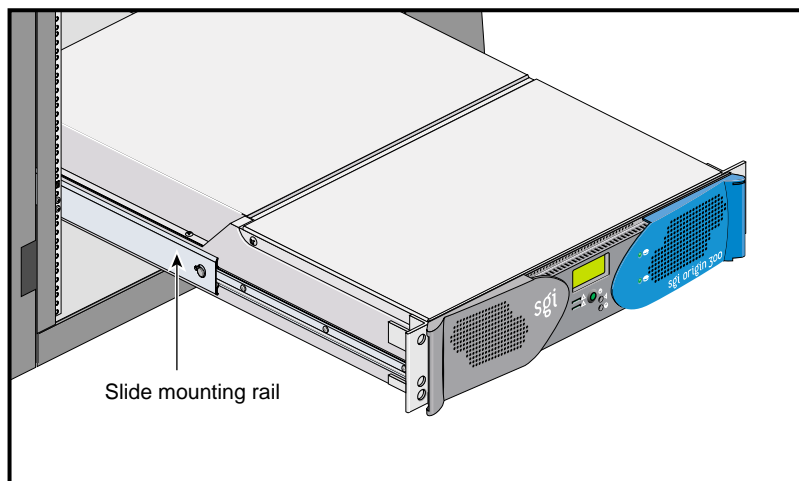


Figure A-1 Slide Mounting Rails

The NUMAlink module, PCI expansion module, and TP900 storage module are supported by two parallel L-shaped mounting rails within the rack (refer to Figure A-2).

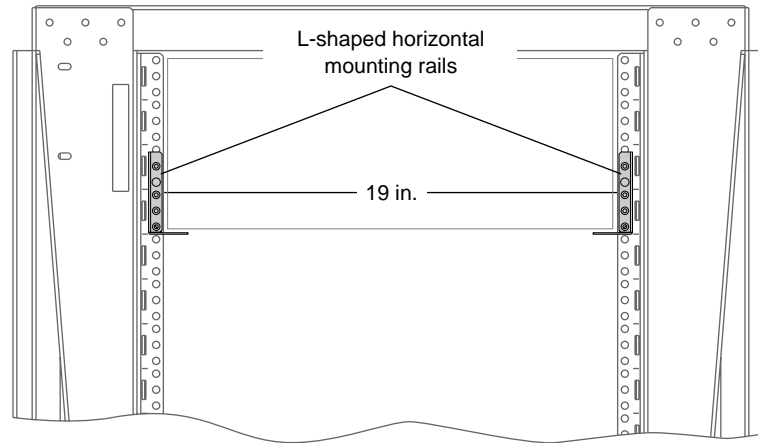


Figure A-2 L-shaped Mounting Rails

Specifications

The SGI Origin 300 system can be housed in one short (17U) rack or one tall (39U) rack (refer to Figure A-3). The number of Origin 300 base modules, storage modules, and PCI expansion modules in the system determines which rack is used.

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

Table A-1 lists the specifications of the short rack.

Table A-1 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)	488 lb (221 kg)
Shipping weight (maximum)	563 lb (255 kg)

Table A-2 lists the specifications of the tall rack.

Table A-2 Tall-rack Specifications

Characteristic	Specification
Height	75.82 in. (1925.83 mm)
Width	23.62 in. (599.95 mm)
Depth	41.28 in. (1048.51 mm)
Weight (maximum)	1,130 lb (512.56 kg)
Shipping weight (maximum)	1,320 lb (598.74 kg)

Components

Both rack types, as shown in Figure A-3, have front and rear doors that have keylocks to prevent unauthorized access of the system. The racks also have cable entry/exit areas at the bottom of the rack and cable management hardware in the rear of the racks.

Both rack types are mounted on four casters, two of which are swivel castors. The castors enable the racks 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.

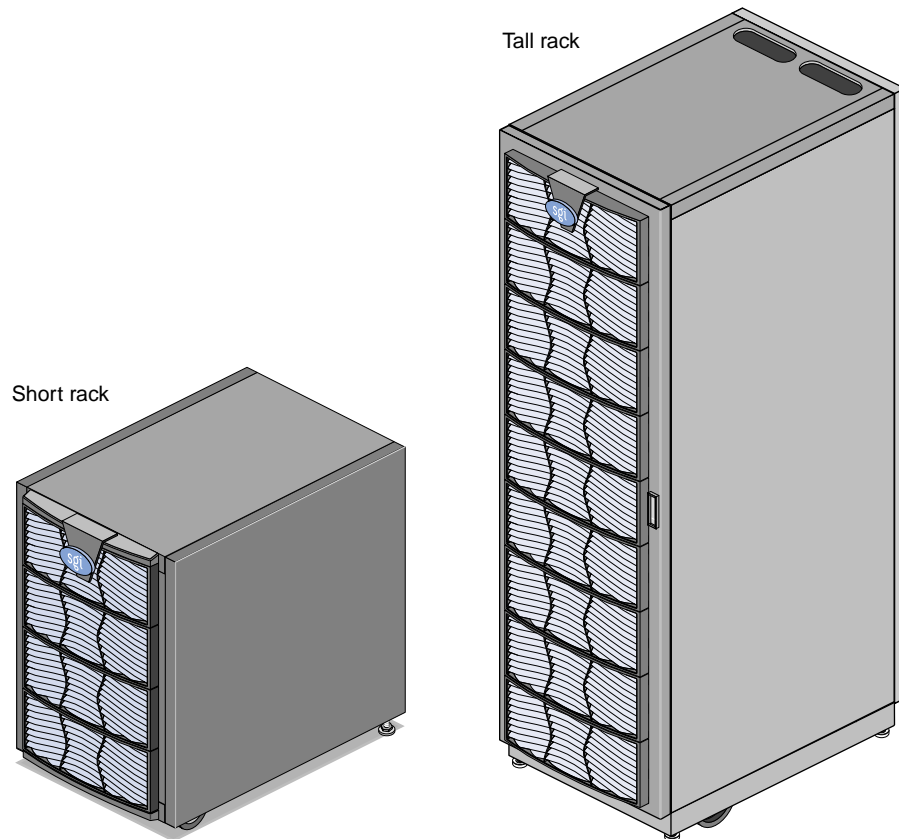


Figure A-3 Front Views of Short and Tall Racks

SGI Origin 300 Base Module

Table A-3 summarizes the general features of the SGI Origin 300 base module, or server. Additional information is provided in the subsections that follow.

Table A-3 General Features of the SGI Origin 300 Base Module

Feature	Specification
MIPS RISC R14000 processors	2 or 4
Memory	512 MB to 4 GB
Expansion slots	Two 32- or 64-bit (33- or 66-MHz) PCI slots
Serial ports	Two DB-9 RS-232 or RS-422
Ethernet	One 10BaseT and 100BaseT
SCSI channels (internal)	One Ultra3 SCSI, 160 MB/s
SCSI channels (external)	One Ultra3 SCSI (VHDCI)
3.5-in. drive bays	Two
USB ports	Two
RT interrupt input	One
RT interrupt output	One
L1 console port	One
NUMAlink 3 port	One (1.6 GB/s each direction)
XIO port	One (1.2 GB/s each direction) This port is reserved for future use.

Specifications

Table A-4 shows the physical and environmental specifications for the SGI Origin 300 base module.

Table A-4 Physical and Environmental Specifications

Feature	Specification
Height	3.46 in. (8.8 cm)
Width	19 in. (48.3 cm) (front panel width) 17.07 in. (43.36 cm) (chassis width)
Depth	26 in. (66 cm) (without bezel) 26.8 in. (68 cm) (with bezel)
Weight	36 lb (16.4 kg)
Temperature, operating	+5 °C (+41 °F) to +35 °C (+95 °F) (up to 1500 m / 5000 ft) +5 °C (+41 °F) to +30 °C (+86 °F) (1500 m to 3000 m / 5000 ft to 10000 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)
Noise	50 dB(A) maximum
Heat dissipation	938 Btu/hr maximum
Input power	110/220 Vac autosensing (~275 W)

Front Chassis Components

Figure A-4 illustrates the front controls and indicators of the SGI Origin 300 base module.

- **L1 controller display** is a liquid crystal display (LCD) that displays status and error messages that the L1 controller generates.
- **Power button with LED** enables you to manually power on and power off the Origin 300 base module. Alternatively, you can power on and off the base module at a system console. The LED illuminates green when the internal components are on.
- **Reset button** resets the internal processors, ASICs, and memory.

Note: This reset causes memory loss. (Refer to the non-maskable interrupt [NMI] to perform a reset without losing memory.)

- **Non-maskable interrupt (NMI) button** resets the internal processors and ASICs without losing memory. Register data and memory are stored in a `/var/adm/crash` file.
- **Service required LED** illuminates yellow to indicate that an item has failed or is not operating properly, but the system is still operating.
- **Failure LED** illuminates red to indicate that a failure has occurred and the server is down.
- **Drive LEDs** illuminate green to indicate drive activity.

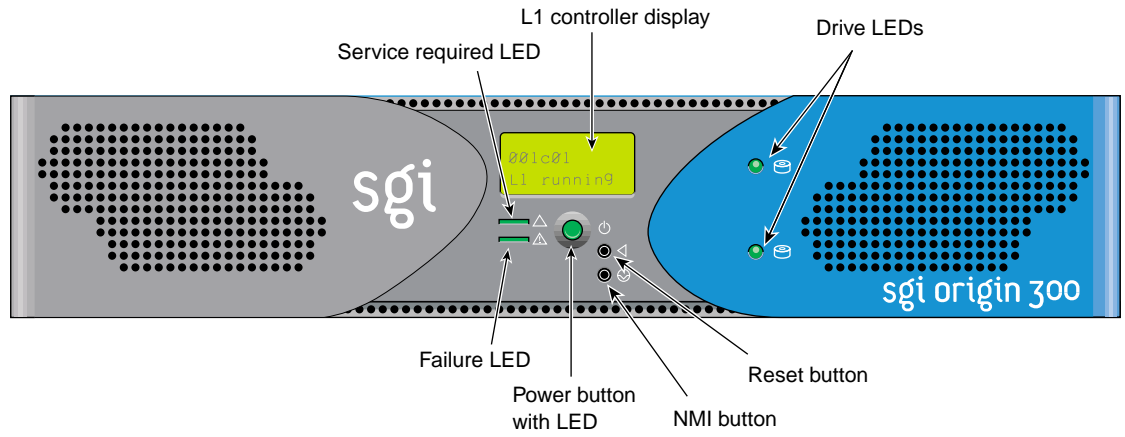


Figure A-4 Front Controls and Indicators

Rear Chassis Components

Figure A-5 illustrates the rear panel I/O ports and features of the SGI Origin 300 base module.

- **Power connector** connects to an AC power outlet.
- **LINK connector** (NUMAlink connector) connects the server to a NUMAlink module. This connection is made with a NUMAlink 3 cable at 1.6 GB/s in each direction.
- **XIO connector** is not used at this time.
- **L1 console port** (DB-9, RS-232, console and diagnostic port) connects the server's L1 controller to a system console or to a system running the SGIconsole software.
- **USB L1 port** (universal serial bus) connects the server's L1 controller to a system console.
- **PCI slots 1 and 2** house PCI cards. The two PCI 2.2-compliant slots are configured on one bus. The PCI bus supports both 32- and 64-bit modes at 33 or 66 MHz. Refer to the SGI Supportfolio Online home page at <http://support.sgi.com> for an updated list of supported PCI cards.
- **Serial ports 1 and 2** (DB-9, RS-232, or RS-422 connectors) can be used as COM ports to connect modems or other serial devices.
- **USB ports 1 and 2** connect auxiliary equipment such as a keyboard or a mouse.
- **RT interrupt input and output** (real-time interrupts) are used by the graphics cards to keep the graphics synchronized.
- **Ethernet port** (autonegotiating 10BaseT or 100BaseT Ethernet port) connects the server to an Ethernet network.
- **External SCSI connector** (68-pin VHDCI external SCSI port) connects to SCSI devices (for example, TP900 storage module). Refer to the SGI Supportfolio Online home page at <http://support.sgi.com> for an updated list of supported SCSI devices.
- **Heartbeat LEDs** (four, one for each processor) indicate processor activity.

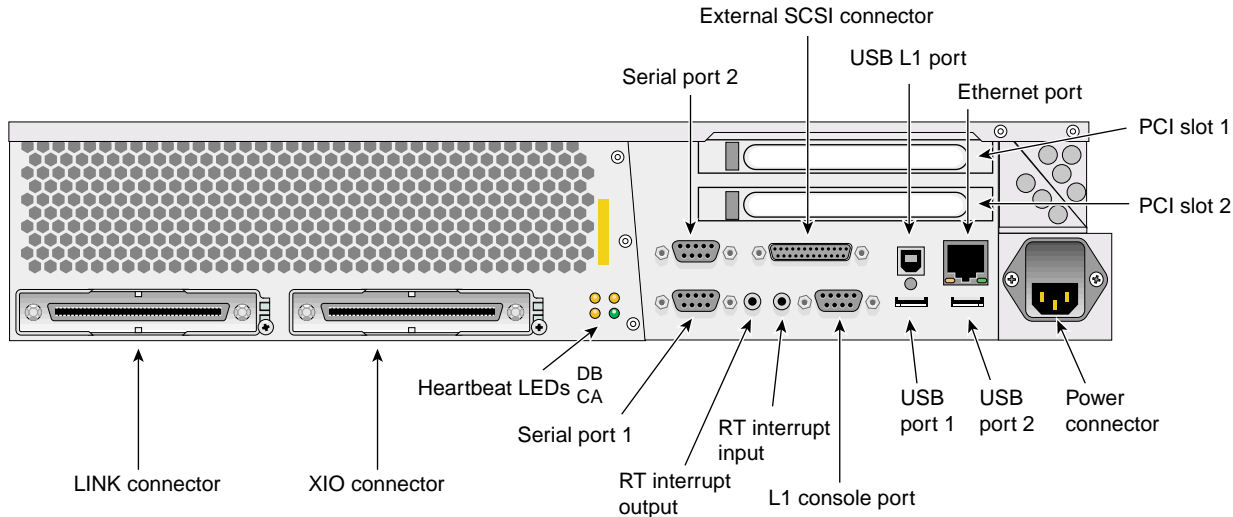


Figure A-5 Rear I/O Ports and Features

Internal Components and Features

The internal components of the SGI Origin 300 server are shown in Figure A-6 and described in the following subsections:

- “IP45 Motherboard” on page 115
- “Dual-inline Memory Modules (DIMMs)” on page 116
- “I/O-8 Board Assembly” on page 117
- “SCSI Backplane Board and Drive Options” on page 118
- “Power Supply” on page 118
- “Fans” on page 118

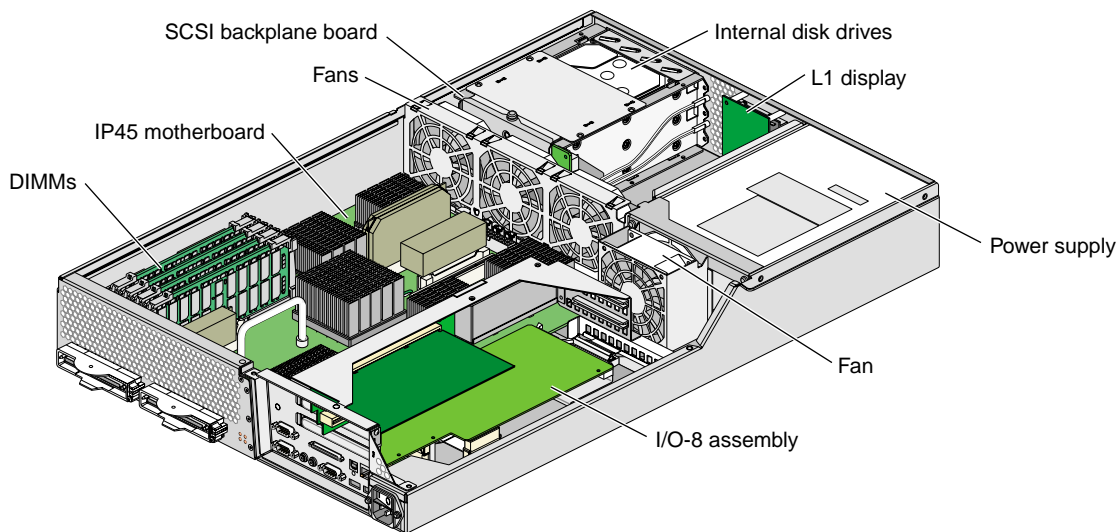


Figure A-6 Internal Components

IP45 Motherboard

The IP45 motherboard houses the following components:

- **Two or four MIPS R14000 processors** (2-MB L2 cache per processor).
- **Four dual-inline memory module (DIMM) slots** that are organized as two banks of memory per two DIMM slots (four banks total), configurable from 512 MB to 4 GB of main memory. Refer to “Dual-inline Memory Modules (DIMMs)” on page 116 for more information on DIMMs.
- **Bedrock ASIC** (or hub ASIC) that enables communication between the processors, memory, and I/O devices.
- **Xbridge ASIC** that is the interface between the Bedrock ASIC and the PCI slots.
- **Serial ID EEPROM** that contains component information.
- **L1 controller logic** that monitors and controls the environment of the server (for example, fan speed, operating temperature, and system LEDs).
- **VRMs** that convert the incoming voltages to the voltage levels required by the internal components.
- **Light-emitting diodes (LEDs)** that provide information about the NUMALink port and the processors:
 - Two NUMALink LEDs, controlled by the L1 controller.
 - Four heartbeat LEDs (one for each processor), controlled by the Bedrock ASIC.
- **Ports** that provide connection to external components.

Note: Ports and LEDs are described in detail in “Rear Chassis Components” on page 112.

Dual-inline Memory Modules (DIMMs)

Each SGI Origin 300 server has from 512 MB to 4 GB of local memory, which includes main memory and directory memory for cache coherence.

Local memory can consist of two to four banks, which are referred to as banks 0, 1, 2, and 3. The four banks are arranged as two DIMM pairs; DIMM pair 0 and DIMM pair 1. DIMM pair 0 consists of banks 0 and 1; DIMM pair 1 consists of banks 2 and 3. Each pair of banks consists of two dual-inline memory modules (DIMMs) that contain double data rate synchronous dynamic random-access memory (DDR SDRAM) chips.

Memory is increased or decreased in two-DIMM increments only. The two DIMMs that make up a bank pair must be the same memory size; however, each pair of DIMMs can be a different memory size. Figure A-7 shows the layout of the memory banks.

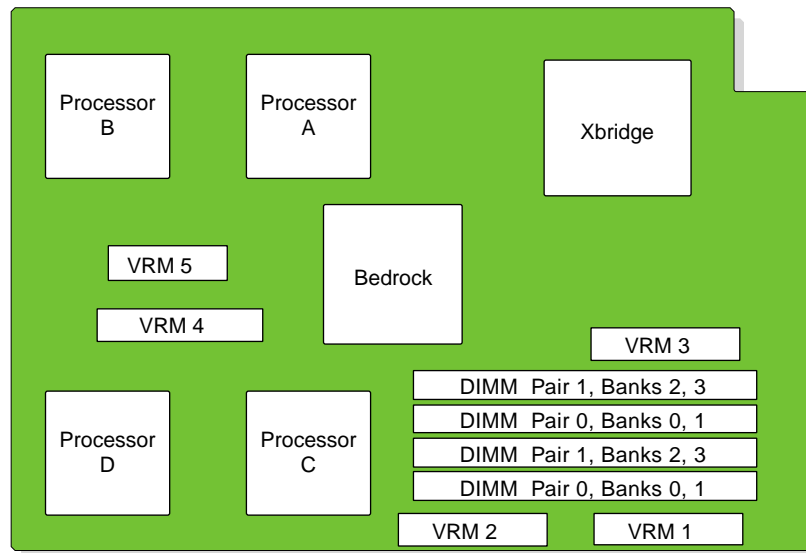


Figure A-7 Memory Bank Layout

The SGI Origin 300 server supports three types of memory kits:

- 512-MB kit with integrated directory memory.
- 1-GB kit with integrated directory memory.
- 2-GB kit with integrated directory memory.

I/O-8 Board Assembly

The I/O-8 board assembly consists of a main I/O-8 printed circuit assembly (PCA), an I/O-8 daughter card, and a PCI riser (refer to Figure A-8). The assembly provides I/O interface functions, the I/O connectors to the system back panel, and the L1 controller functions.

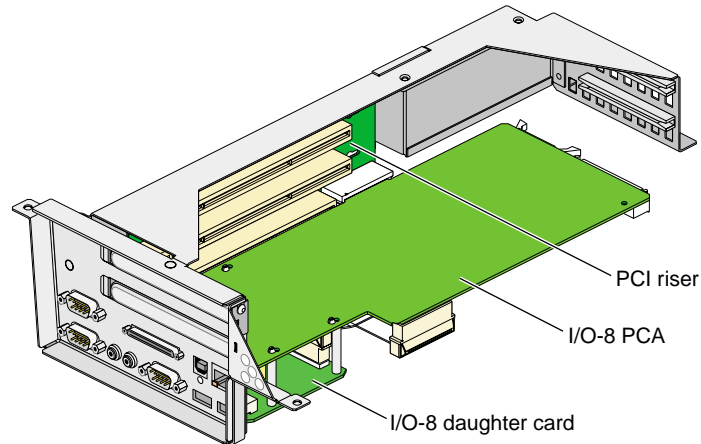


Figure A-8 I/O-8 Board Assembly

The I/O-8 PCA has the following connectors at the bulkhead:

- One 68-pin VHDCI external SCSI connector
- One 10BaseT/100BaseT auto-selecting Ethernet connector
- One DB9 RS-232 L1 console connector
- Two USB 4-pin ports
- One USB L1 port
- Two RS-232 or RS-422 115.2 Kbaud-capable DB9 async ports with modem control
- One real-time (RT) interrupt output
- One RT interrupt input

Note: Ports and LEDs are described in detail in “Rear Chassis Components” on page 112.

The PCI riser provides a connection between the IP45 motherboard and the I/O-8 board assembly while also providing two PCI card slots. The PCI riser, which plugs into a connector on the IP45 motherboard, has two 64-bit universal PCI connectors, a third nonstandard PCI connector that connects to the I/O-8 board assembly, and one 50-pin AMP connector into which the I/O-8 board is plugged.

Note: Refer to the SGI Supportfolio Online home page at <http://support.sgi.com> for a list of supported PCI option cards.

SCSI Backplane Board and Drive Options

The SCSI backplane provides a connection between the internal SCSI interface on the I/O-8 board and up to two disk drives. The SCSI backplane supports Ultra3 SCSI LVD disks with a peak transfer rate of 160 MB/s. Refer to the SGI Supportfolio Online home page at <http://support.sgi.com> for an updated list of supported drives.

The chassis accommodates up to two sled-mounted 3.5-in. by 1.0-in. Ultra3 SCSI LVD drives. The backplane supports 10,000 RPM and 15,000 RPM drives.

Power Supply

The SGI Origin 300 server uses a nonredundant modified WTX power supply with an input of 110/220V AC (auto-sensing) and a maximum output of 460W DC (3.3/5/12V). The DC power from the power supply is delivered via a cable harness, which has multiple connectors for power delivery.

Fans

The Origin 300 server is cooled by three fans in an N+1 redundant configuration. The power supply also uses an N+1 redundant cooling configuration; it is cooled by two fans. The direction of the airflow is front to back through the enclosure.

NUMALink Module

The NUMALink module routes information between the Origin 300 servers via the NUMALink 3 interconnect. The NUMALink module consists of eight ports. Four ports can connect to four Origin 300 servers. The other four ports, which carry USB signals, can connect to Origin 300 servers or PCI expansion modules.

Specifications

The NUMALink module requires 2U of space within the rack and has the specifications that Table A-5 lists.

Table A-5 NUMALink Module Specifications

Characteristic	Specification
Height	3.3 in. (83.82 mm)
Width	17.38 in. (441.45 mm)
Depth	27.5 in. (609.60 mm)
Weight	20 lb (9 kg)
Input power	+48 Vdc (~60 W)

Front Components

The NUMAlink module contains the following front panel items (refer to Figure A-9):

- **L1 display** is a 2-line by 12-character liquid crystal display (LCD) that displays status and error messages that the L1 controller generates.
- **On/Off switch with LED** enables you to manually power on and power off the module.
- **L1 controller LEDs:**
 - **On/Off switch LED** illuminates green when the internal components are powered on.
 - **Service required LED** illuminates orange to indicate that an item is not functioning properly (for example, a fan is off), but the NUMAlink module is still operating.
 - **Failure LED** illuminates red to indicate that a failure has occurred and the NUMAlink module is down.
- **Fans** that provide N+1 redundant cooling for the module.

Note: The front of the NUMAlink module looks as though there are three cooling fans; however, only the middle and right fans are present.

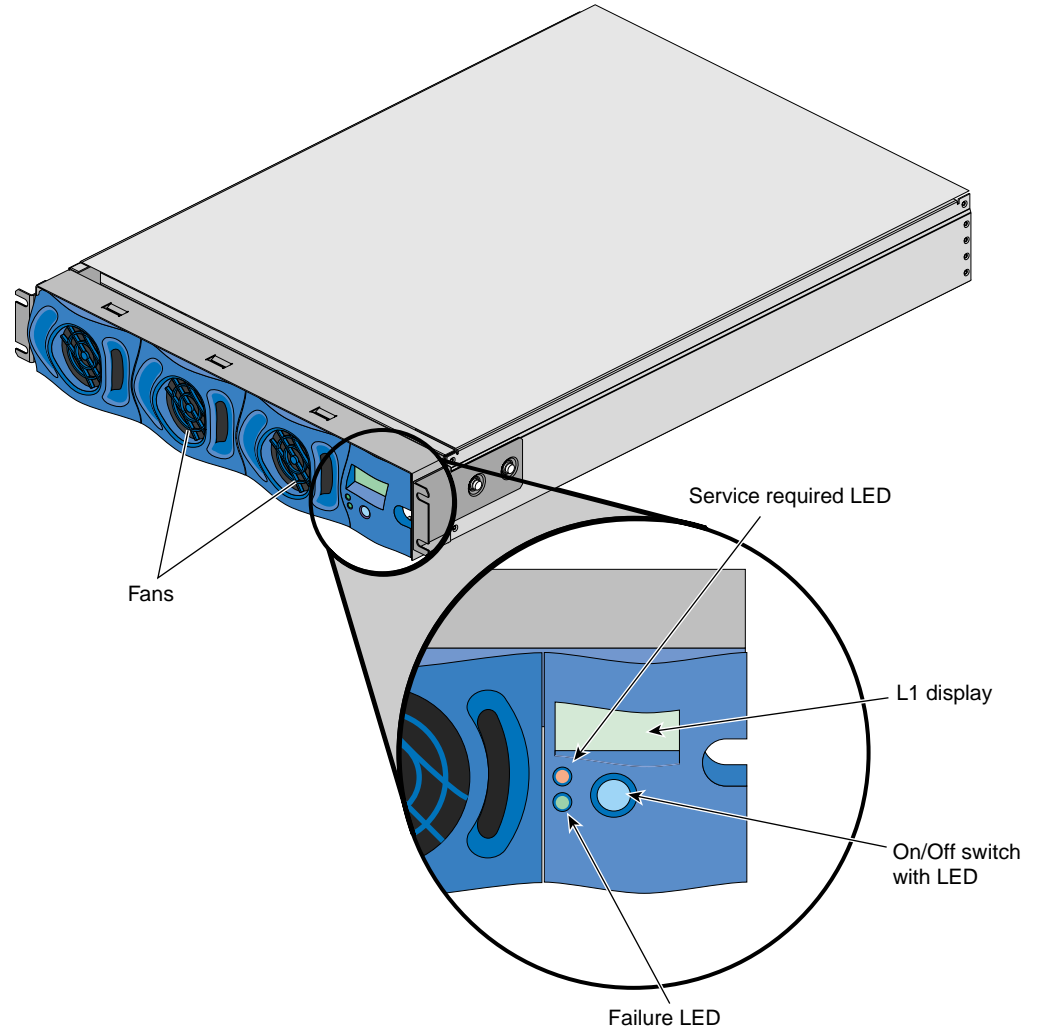


Figure A-9 Front View of the NUMAlink Module

Rear Components

The NUMAlink module has the following rear panel items (refer to Figure A-10):

- **Power switch** powers on the L1 controller when moved to the **1** position; moving it to the **0** position powers off the L1 controller.
- **12 VDC LED** illuminates green when the L1 controller is powered on and operating.
- **48 VDC LED** illuminates green when the internal components (excluding the L1 controller) are powered on and operating.
- **PWR (power) connector** attaches to the power bay module via a DC power cable.
- **L1 port connector** connects the NUMAlink module to the L2 controller. The USB hub receives the USB signals from the L2 controller via this port and distributes these USB signals to the L1 controllers of the attached Origin 300 servers and PCI expansion modules.
- **LINKS R TO R connectors** (also referred to as ports 1, 6, 7, and 8 or A, F, G, and H) connect Origin 300 servers to the NUMAlink module.
- **LINKS R TO R and C TO R connectors** (also referred to as ports 2, 3, 4, and 5 or B, C, D, and E) connect Origin 300 servers and/or PCI expansion modules to the NUMAlink module.

Besides NUMAlink signals, ports 2, 3, 4, and 5 transfer USB signals between the USB hub of the NUMAlink module and the L2 controller.

- **LINK connector LEDs.** Each NUMAlink connector has two LEDs:
 - The green LED illuminates to indicate that a cable is connected properly between the NUMAlink module and another module.
 - The yellow LED illuminates to indicate that the L1 controller detected the “Remote Power OK” signal from the module on the other end of the cable.

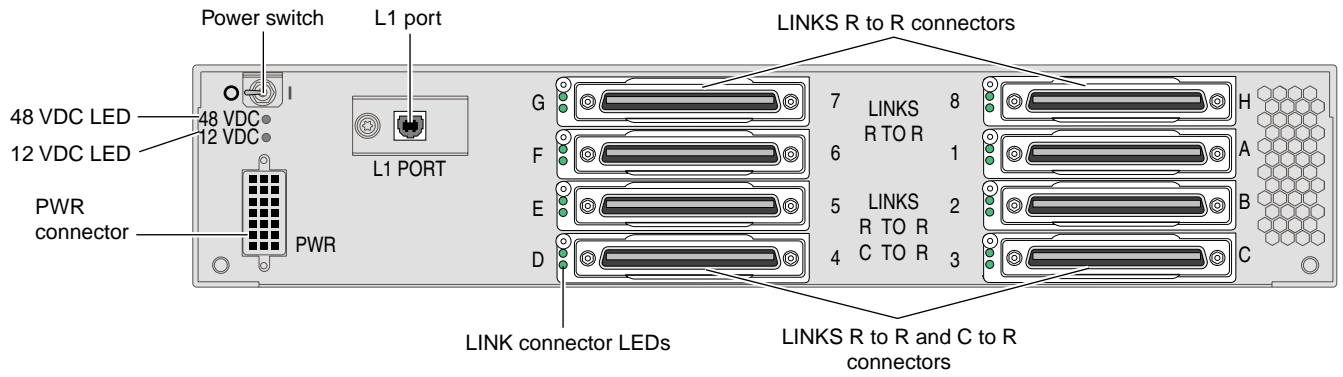


Figure A-10 Rear View of the NUMAlink Module

Internal Components

The NUMAlink module contains the following internal components, which are shown in Figure A-11 and described in the subsections that follow.

- Router printed circuit board (PCB)
- Power board
- L1 controller

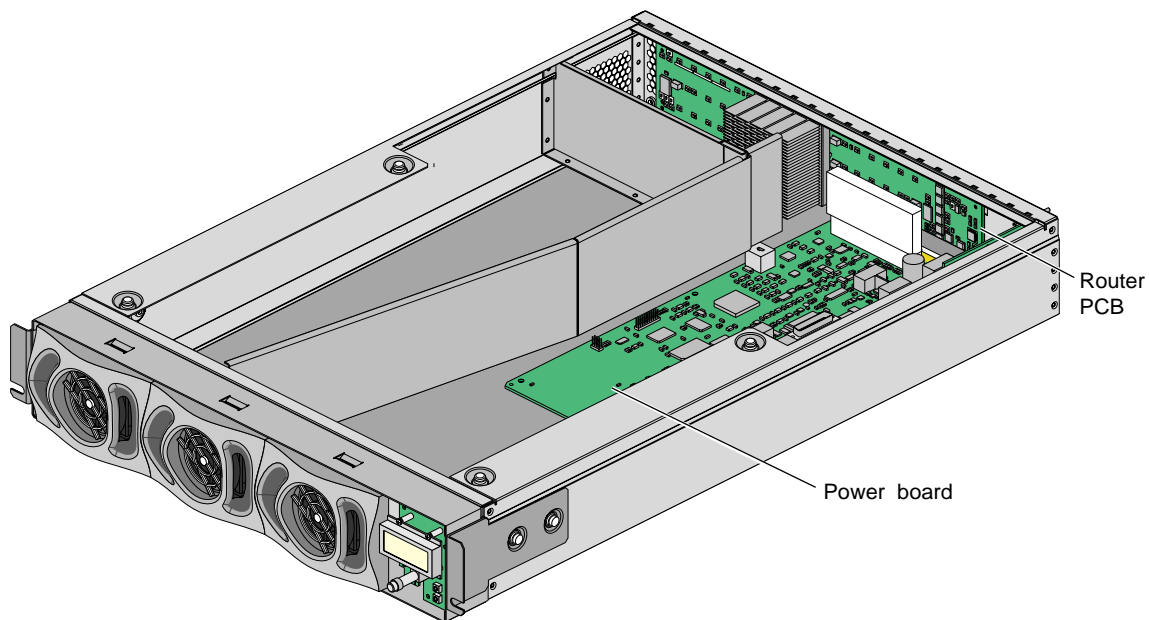


Figure A-11 Internal View of the NUMAlink Module

Router PCB

A router PCB contains a router ASIC, a USB hub, and NUMALink ports and LEDs. The router ASIC arbitrates for NUMALink port access and has a crossbar unit that provides connection between the ports.

The USB hub is the interface between the L2 controller and the L1 controllers of the four modules that connect to ports 2, 3, 4, and 5. It receives the USB signals from the L2 controller via a USB port (labeled **L1 Port**). The USB hub is also the interface between the NUMALink module L1 controller and the L2 controller.

The NUMALink ports and LEDs are described in “Rear Components” on page 122.

Power Board

The power board connects to the router PCB via the power connector. It contains the following VRM and voltage regulators that convert the incoming 48 Vdc to voltage levels that the components within the module require:

- 2.5-V, 30-A voltage regulator module (VRM 1)
- 5-V, 3-A voltage regulator
- 3.3-V, 3-A voltage regulator

The power board also contains a serial ID EEPROM and the L1 controller logic.

L1 Controller

The L1 controller monitors and controls the following environments:

- Operating temperature
- Voltage margins
- System LEDs

The L1 controller also reads component information from serial ID EEPROMs, provides a console connection, and interfaces with its own 2-line x 12-character LCD. The NUMAlink module L1 controller connects to the L2 controller via a USB hub and a 4-pin USB port connector.

The L1 controller consists of the display, logic components, and a display cable. The display is located at the front of the module. The logic components are located on the power board. The cable connects the display to the logic components.

USB Hub

The four-port USB hub connects the L2 controller to the Origin 300 servers that connect to ports 1, 6, 7, and 8 of the NUMALink module.

Specifications

Table A-6 lists the specifications of the USB hub.

Table A-6 USB Hub Specifications

Characteristic	Specification
Height	0.875 in. (22.23 mm)
Width	4.25 in. (107.95 mm)
Depth	2.75 in. (69.85 mm)

Components

Figure A-12 illustrates the USB hub. It consists of five ports (four ports connect to Origin 300 servers and one port connects to the L2 controller) and a power adapter that connects the hub to a power distribution unit (PDU).

Note: The USB hub might look different than the one shown in Figure A-12.

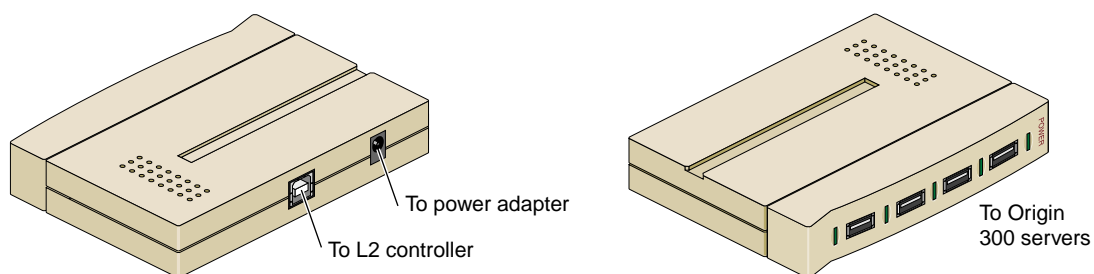


Figure A-12 Side Views of the USB Hub

L2 Controller

The L2 controller is a rack-level controller; it communicates with all of the L1 controllers within the rack. For example, it receives status and error messages from the L1 controllers. The L2 controller is housed in a sheet metal box that is 1U high and is located at the top rear of the rack.

You can access the L2 controller via the system console.

Specifications

Table A-7 lists the specifications of the L2 controller.

Table A-7 L2 Controller Specifications

Characteristic	Specification
Height	1.75 in. (44.45 mm)
Width	14.0 in. (355.60 mm)
Depth	6.5 in. (165.10 mm)
Input power	+48 Vdc (~30 W)

Components

The L2 controller has the following connectors (refer to Figure A-13):

- Power connector that connects the L2 controller to the power bay module.
- RS-485 connector that is not used.
- Two RS-232 ports (DB-9) that connect the L2 controller to the system console (dumb terminal) and a modem.
- 10BaseT Ethernet port that connects the L2 controller to an Ethernet hub (system console that contains SGIconsole software).
- Rack display port that is not used.
- Four USB ports; two of these ports connect the L2 controller to the L1 port of the NUMAlink module and to the USB hub.

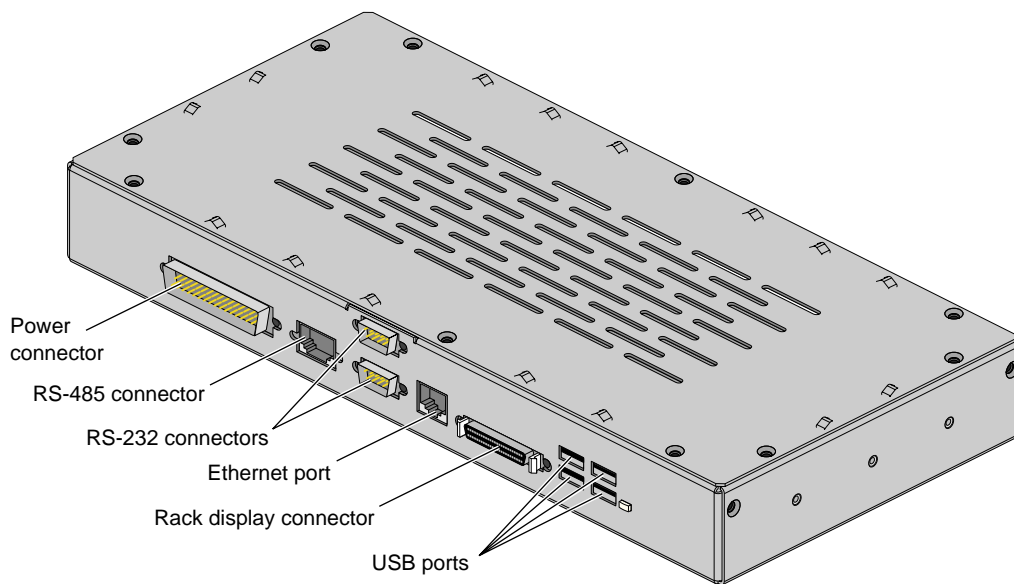


Figure A-13 Front View of the L2 Controller

Power Bay Module

The power bay can monitor, control, and supply AC power to as many as six power supplies; however, in this system, the power bay contains two power supplies.

Each power supply inputs single-phase AC voltage and outputs 950 W at 48 Vdc and 42 W at 12 Vdc standby. The outputs are bused together to provide 1,840 W at 48 Vdc and 90 W at 12 Vdc standby of available power in an N+1 redundant configuration.

Specifications

The power bay requires 3U of space within the rack and has the specifications that are listed in Table A-8.

Table A-8 Power Bay Module Specifications

Characteristic	Specification
Height	5.118 in. (130.0 mm)
Width	17.5 in. (443.0 mm)
Depth	22.008 in. to 23.898 in. (559.0 mm to 607.0 mm)
Weight (with two power supplies)	42 lb (19.05 kg)

Table A-9 lists the specifications of the power supplies.

Table A-9 Power Supply Specifications

Characteristic	Specification
Height	4.86 in. (123.5 mm)
Width	2.74 in. (69.5 mm)
Depth	13.67 in. (347.3 mm)
Weight	7.5 lb (3.38 kg)

Front Components

The front of the power bay seats the distributed power supplies (refer to Figure A-14). For this system, the power supplies reside in locations 5 and 6.

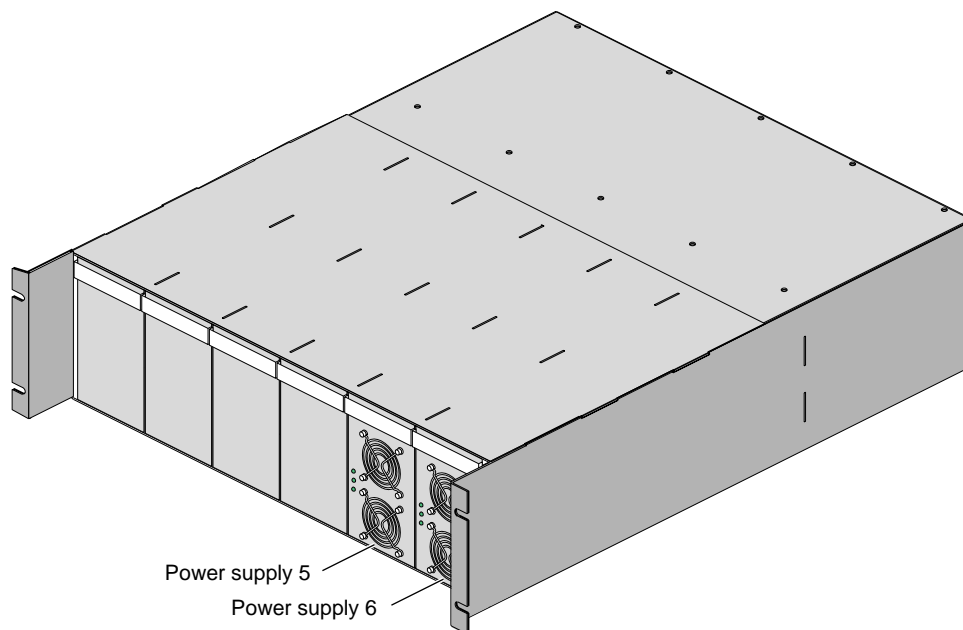


Figure A-14 Front View of Power Bay Module

The power supplies are air-cooled devices; each power supply has two fans that move air from the front of the rack to the rear of the rack.

Each power supply has the following LEDs:

- Power
- Predictive fail (PFAIL)
- Power supply fail (FAIL)

Table A-10 lists conditions of the power supplies and the corresponding states of the LEDs.

Table A-10 Power Supply LED States

Power Supply Condition	LED States		
	Power (Green)	PFAIL (Amber)	FAIL (Amber)
AC voltage not applied to all power supplies	Off	Off	Off
AC voltage not applied to this power supply	Off	Off	On
AC voltage present; standby voltage on	Blinking	Off	Off
Power supply DC outputs on	On	Off	Off
Power supply failure	Off	Off	On
Current limit reached on 48-Vdc output	On	Off	Blinking
Predictive failure	On	Blinking	Off

Each power supply also contains a serial ID EEPROM that identifies the model and serial number of the supply. The L1 controller of a connecting module reads this information via the DC power cable.

Rear Components

The power bay module has eight output connectors (refer to Figure A-15). A power cord connects one output connector to a NUMAlink module, PCI expansion module, or L2 controller. This connection provides 12 Vdc standby, 48 Vdc, and monitoring signals.

Note: The L1 controller of a connecting module can monitor the status of the power bay; however, it cannot control the power bay.

The power bay module also has six AC input connectors; one for each power supply location. For this system, only slots 5 and 6 connect to the power distribution unit.

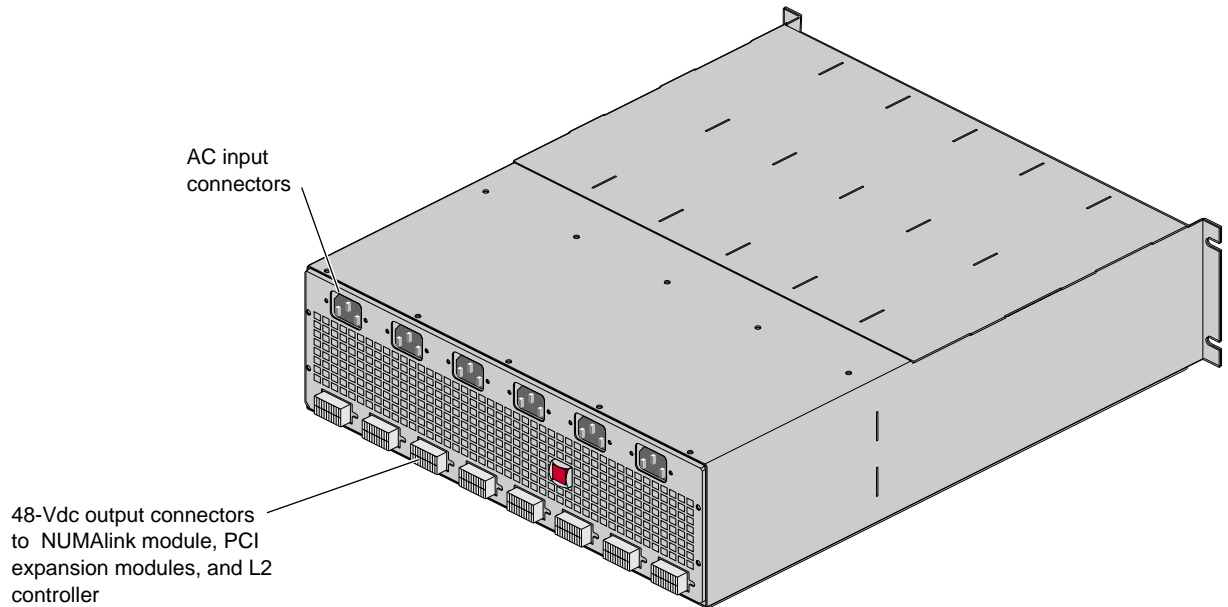


Figure A-15 Rear View of Power Bay Module

Internal Components

The power bay contains a motherboard that connects the power supplies to the connectors at the rear of the power bay; it serves as the power bus that buses the two power supplies together to produce 48 Vdc and 12 Vdc standby. The power bay motherboard also:

- Contains overcurrent protection circuits for each power port.
- Filters the DC voltage.
- Contains a serial ID EEPROM that indicates the model and serial number of the power bay.
- Seats the system management card.

The system management card is the control system for the power bay. It contains the logic that powers the power supplies and ports on and off and a serial ID EEPROM that indicates the model and serial number of the unit. The L1 controller uses the RS-485 signals of the DC power cables to read this PROM.

The system management card also performs the following functions:

- Interfaces with the L1 controllers.
- Provides a communication link between the power supplies and the power bay.
- Monitors faults.
- Provides access to data for the power bay and power supplies.

PCI Expansion Module

The PCI expansion module is an optional device that provides an additional twelve PCI slots for the Origin 300 system. As many as four PCI expansion modules can reside in this system; the number of PCI expansion modules depends on the number of servers in the system (refer to Table A-11).

Table A-11 Number of Supported PCI Expansion Modules

Number of Servers	Supported PCI Expansion Modules
Two	Two
Three	Three
Four	Four
Five	Three
Six	Two
Seven	One
Eight	Zero

The PCI expansion module contains 6 buses; each bus can seat one or two 3.3-V or universal PCI cards that mount on PCI carriers. Each bus supports either two 33-MHz PCI cards or two 66-MHz PCI cards.

The PCI expansion module communicates with the Origin 300 servers and the L2 controller via the NUMAlink module. The PCI expansion modules connect to the NUMAlink module via ports 2, 3, 4, and 5.

Note: For more information about the PCI expansion module, refer to the *PCI Expansion Module User's Guide*.

Specifications

Table A-12 lists the specifications of the PCI expansion module.

Table A-12 PCI Expansion Specifications

Characteristic	Specification
Height	7 in. (177.80 mm)
Width	17.5 in. (444.50 mm)
Depth	27.5 in. (698.50 mm)
Weight	70 lb (31.50 kg)
Input power	+48 Vdc (~250 W)

Front Components

The PCI expansion module contains the following front panel items (refer to Figure A-16):

- **L1 display** is a 2-line by 12-character liquid crystal display (LCD) that displays status and error messages that the L1 controller generates.
- **On/Off switch with LED** enables you to manually power on and power off the module.
- **L1 controller LEDs:**
 - **On/Off switch LED** illuminates green when the internal components are powered on.
 - **Service required LED** illuminates orange to indicate that an item is not functioning properly (for example, a fan is off), but the PCI expansion module is still operating.
 - **Failure LED** illuminates red to indicate that a failure has occurred and the PCI expansion module is down.
- **Three fans** that provide N+1 redundant cooling for the module.

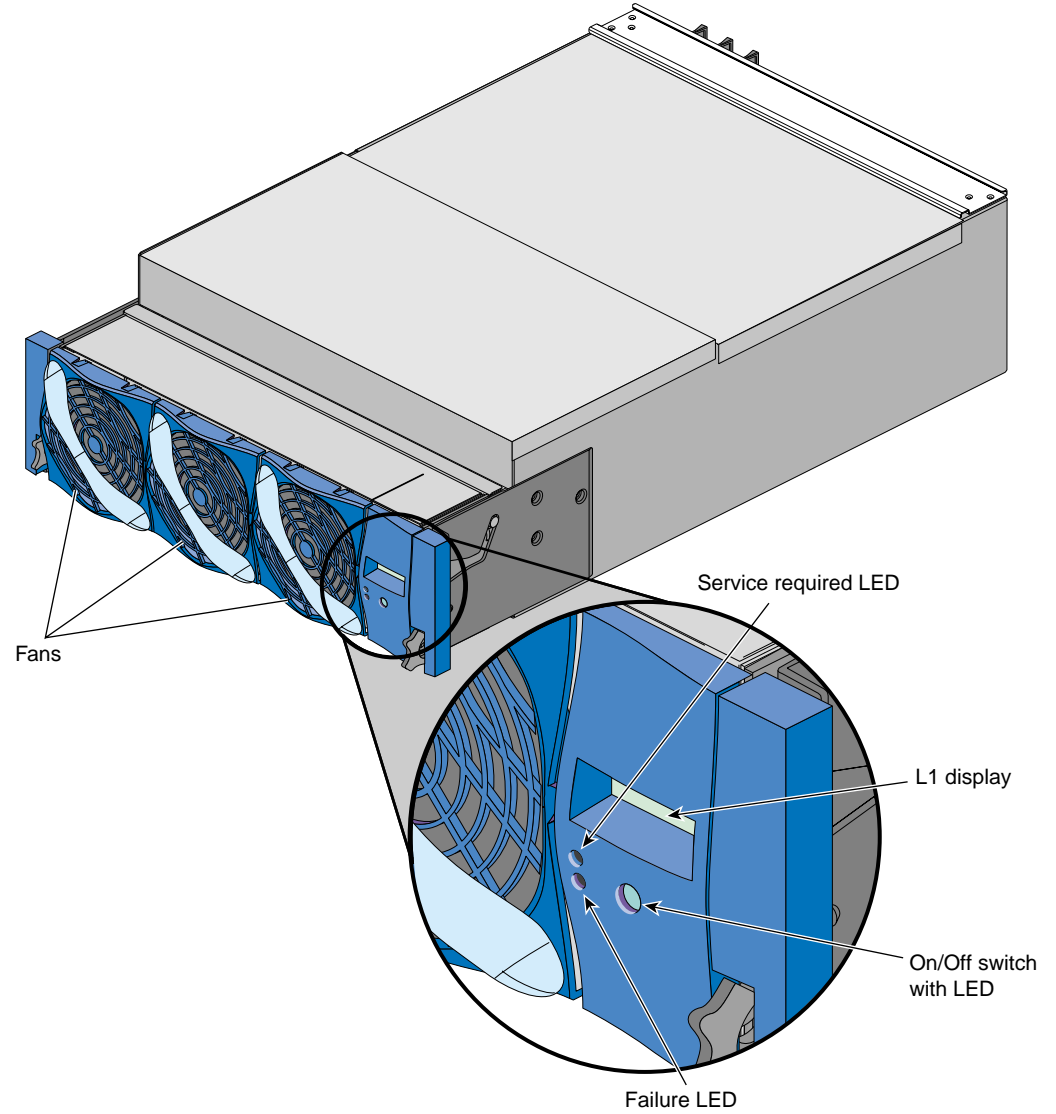


Figure A-16 Front View of PCI Expansion Module

Rear Components

The PCI expansion module has the following rear panel items (refer to Figure A-17):

- **Power switch** powers on the L1 controller when moved to the **1** position; moving it to the **0** position powers off the L1 controller.
- **12 Vdc LED** illuminates green when the L1 controller is powered on and operating.
- **48 Vdc LED** illuminates green when the rest of the internal components are powered on and operating.
- **PWR (power) connector** attaches to the power bay via a DC power cable.
- **PCI slots** seat the PCI cards. Each slot has two LEDs:
 - **PWR (power) LED** illuminates green when the PCI card carrier is installed securely and is receiving power.
 - **Fault LED** illuminates orange when a fault occurs with the PCI card.
- **NUMAlink connector** attaches the PCI expansion module to the NUMAlink module via a NUMAlink cable.
- **Bulkhead filler plate** covers the unused connector slot so that air flows properly through the module.

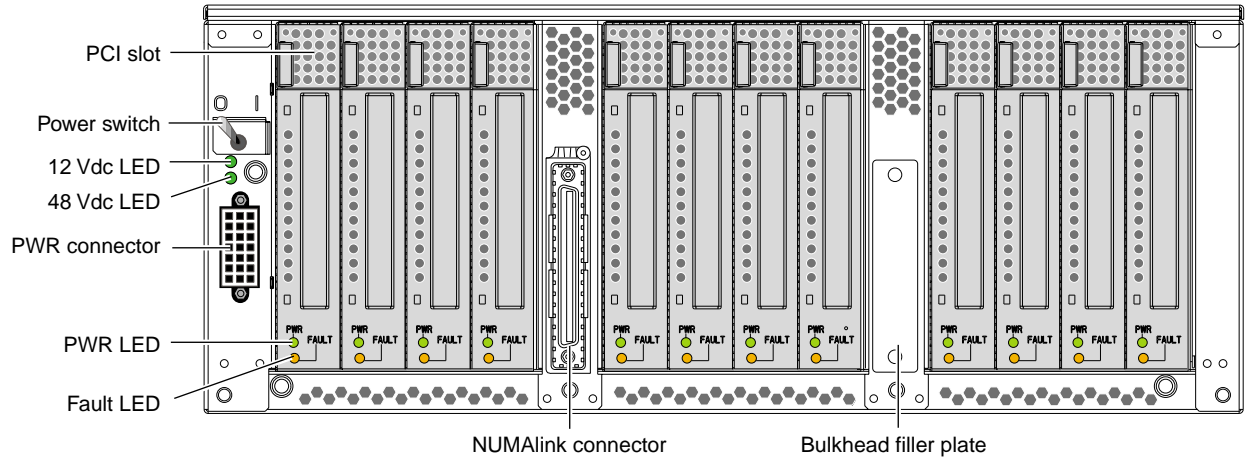


Figure A-17 Rear View of PCI Expansion Module

Internal Components

The PCI expansion module contains the following components, which are shown in Figure A-18 and discussed in the subsections that follow:

- Bedrock interface card
- PCI motherboard
- Power board
- L1 controller

Bedrock Interface Card (BIC)

The PCI expansion module houses one Bedrock interface card (BIC) that contains a Bedrock ASIC, a NUMALink 3 connector, a power connector, and a connector that connects to the PCI motherboard.

The Bedrock ASIC enables this card to transfer signals between an Origin 300 server and the PCI expansion module via the NUMALink 3 module; the Bedrock ASIC passes these signals to the Xbridge ASICs that are located on the PCI motherboard. The Bedrock ASIC receives power from the PCI motherboard via the power connector.

The NUMALink 3 connector of the BIC is the left connector when you face the rear of the PCI expansion module. The right connector contains a bulkhead filler plate to maintain proper airflow through the module.

PCI Motherboard

The PCI motherboard contains 12 PCI slots and three Xbridge ASICs. The Xbridge ASICs are the interface between the Bedrock ASIC on the BIC and the PCI cards. The PCI motherboard also contains a serial ID EEPROM that contains component information.

Power Board

The power board contains the logic components of the L1 controller, voltage regulator modules (VRMs), and a DC-to-DC converter. The VRMs and the DC-to-DC converter convert the incoming 48 Vdc to voltage levels required by the components within the module.

L1 Controller

The L1 controller monitors and controls the environment of the PCI expansion module. It consists of a display, logic components, and an internal cable. The display is located on the front of the module. The L1 controller logic components are on the power board. The internal cable connects the display to the logic components.

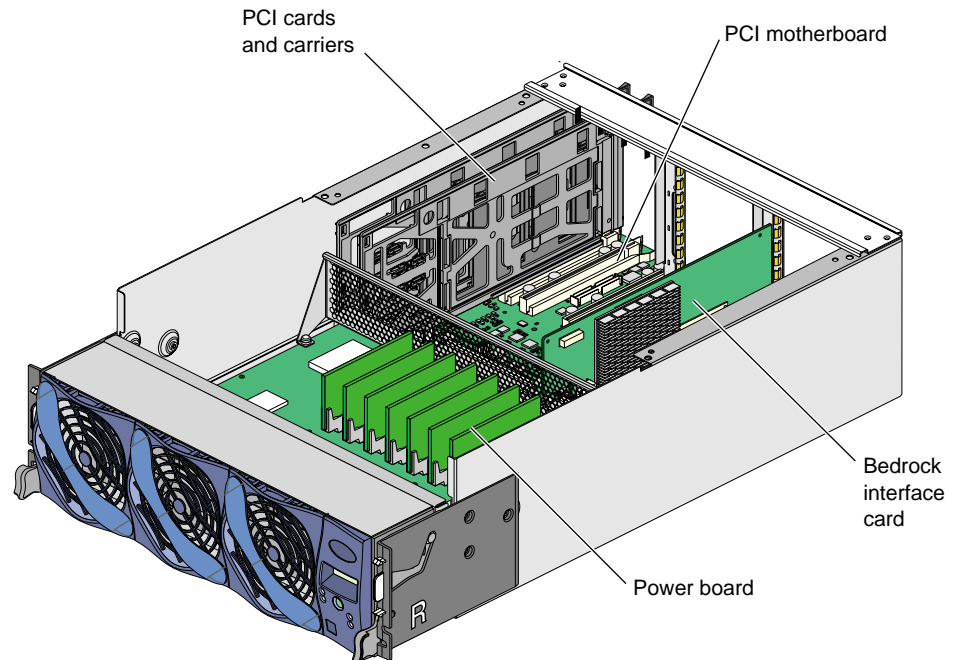


Figure A-18 Internal View of PCI Expansion Module

SGI TP900 Storage Module

The SGI TP900 storage module is a rackmountable, 2U-high, 8-drive storage system that provides JBOD (just a bunch of disks) storage for the Origin 300 server. The drive backplane connects the 8 drives on one SCSI bus. As an option, the storage system can also be configured on two SCSI buses (2 strings of 4 drives).

Note: For more information about the TP900 storage module, refer to *SGI Total Performance 900 Storage System User's Guide*.

Specifications

Table A-13 lists the specifications of the TP900 storage module.

Table A-13 TP900 Storage Module Specifications

Characteristic	Specification
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)

Front Components

The front of the SGI TP900 chassis consists of eight drive bays that contain either disk drive carrier modules or dummy carrier modules, which are discussed in the subsections that follow. The front of the TP900 is four bays wide by two bays high. The bays are numbered 1 and 2 from top to bottom and 1 to 4 from left to right. Refer to Figure A-19.

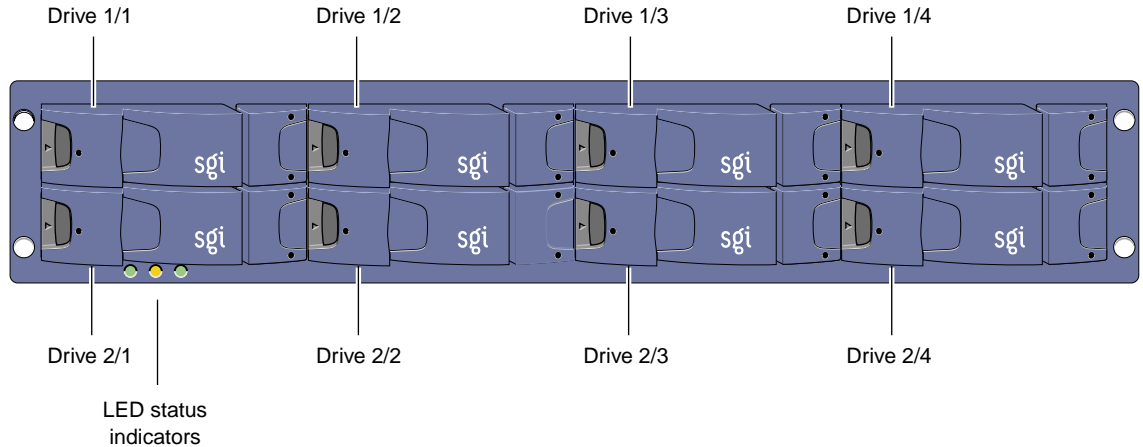


Figure A-19 Front View of TP900 Storage Module

The front of the chassis also contains three LED status indicators. Table A-14 provides more information about these LEDs.

Table A-14 Status LEDs

LED	Status
System status	Green signifies that power is applied to the enclosure. Amber signifies that the ESI processor has failed.
Power status	Green signifies that the power supplies are functioning normally. Amber signifies a power supply failure.
Cooling status	Green signifies that all fans are functioning normally. Amber signifies a fan failure.

Disk Drive Carrier Module

The disk drive carrier module is a die-cast aluminum carrier that houses a single 1.0-in. high, 3.5-in. disk drive.

Each drive carrier has two LEDs: a green LED and an amber LED. In normal operation, the green illuminates and flickers as the drive operates. The amber LED illuminates when a fault occurs.

This carrier has a handle that enables you to insert and remove the carrier from the drive bay. The handle also has an anti-tamper lock that locks the handle in place; therefore, the carrier cannot be removed from the drive bay. When the handle is locked, a red indicator is visible in the handle. When carrier is unlocked, a white indicator is visible.

Dummy Carrier Module

All unused drive bays require a dummy carrier module to maintain proper airflow in the system. The dummy carrier module consists of a drive module front cap that contains a handle.

Rear Components

The rear of the TP900 storage module contains six bays that house power supply, cooling, and SCSI I/O modules. Refer to Figure A-20. The rear of the TP900 storage module is three bays wide by two bays high. The bays are numbered 1 and 2 from top to bottom and 1 to 3 from right to left.

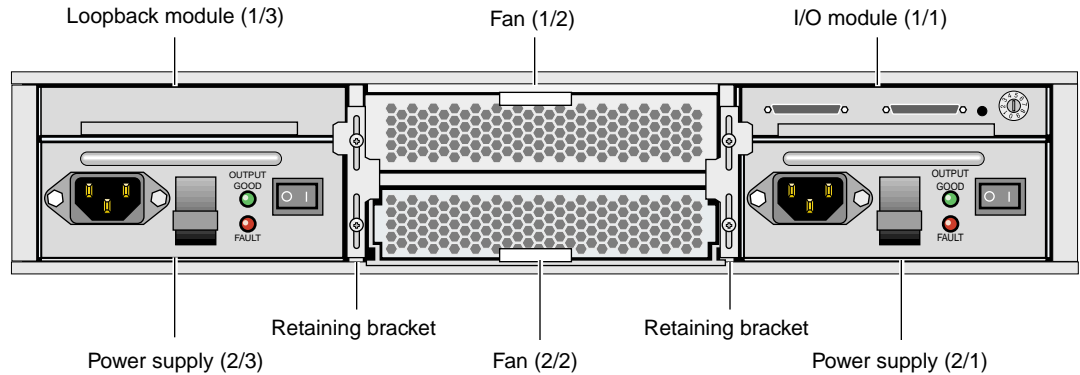


Figure A-20 Rear View of TP900 Storage Module

The TP900 rear bays house the following components, which are discussed in the subsections that follow.

- Power supply module
- Input/output (I/O) module
- Cooling module
- Blank modules

Power Supply Module

The SGI TP900 storage system requires one 350-W power supply module, which is mounted in the rear of the system. Power supply voltage operating ranges are nominally 115 V or 230 V and are selected automatically.

Optionally, a second power supply module can be added to the TP900 system to provide redundant power. In this redundant configuration, the power supply modules operate together; if one power supply module fails, the other module supplies power until the faulty unit is replaced.

The power supply module contains two LEDs that are located on the front panel of the power supply. The green LED indicates power output. The amber LED indicates a power supply failure.

Input/Output (I/O) Module

The I/O module contains two VHDCI connectors and a switch to set the SCSI ID range. The SGI TP900 storage module supports one I/O module for a 1 x 8 configuration and two I/O modules for a 2 x 4 configuration. The 1 x 8 configuration creates a SCSI bus structure with 1 string of 8 drives. The 2 x 4 configuration creates a SCSI bus structure with 2 strings of 4 drives.

Note: When only one I/O module is present in the system, the other I/O module location contains a loopback module that has no external connectors.

Cooling Module

The cooling module consists of fans that pull warm air from a plenum behind the drive backplane and exhaust the warm air at the rear of the enclosure. The cooling modules connect to the backplane for power and status signal connections.

The TP900 system requires one cooling module, which is mounted in the rear of the system. Optionally, a second cooling module can be added to the system to provide redundant cooling. In this redundant configuration, the cooling modules operate together; if one module fails, the other module adequately cools the system until the faulty unit is replaced.

The cooling module has two LEDs that are located on the front panel of the cooling module. The green LED indicates that the cooling module is functioning properly. The amber LED indicates a fan failure.

Blank Modules

Blank modules are placed in all vacant power supply and cooling module bays to maintain proper airflow through the system.

System Controller Commands

This appendix lists L1 and L2 commands for the SGI Origin 300 system with NUMALink module:

- “L1 Controller Command Set” on page 149
- “L2 Controller Command Set” on page 178

Note: Online information is available for the L1 and L2 command sets. To view a list of L1 commands, enter `help` at the L1 prompt. To view a list of L2 commands, enter `help` at the L2 prompt. To view information about an individual command, enter `help` and the command name at the appropriate prompt.

L1 Controller Command Set

Using the system console, you may issue L1 controller commands that read status from the controller or set variables that the controller uses. The subsections that follow describe the L1 controller command set. The commands are listed alphabetically.

* (asterisk character)

Use the asterisk character (*) to broadcast a command. A command that is broadcast is sent to the modules that are attached to the SGI Origin 300 server that issued the command. Example B-1 shows sample output from the * version command.

Example B-1 *version Command Output

```
001c20-L1>* version
001c20:
L1 1.8.1 (Image A), Built 09/21/2001 13:06:33
001c22:
L1 1.7.17 (Image B), Built 09/12/2001 12:24:28
```

autopower

The following autopower set of commands enable, disable, and abort the feature that enables the system to automatically power up if power is lost. This command also displays the current autopower setting (refer to Example B-2).

- autopower
- autopower on
- autopower off
- autopower abort

Example B-2 autopower Command Output

```
001c20-L1>autopower
auto power on is disabled.
```

brick

The following brick set of commands provides the status of modules and sets the module location.

- brick
- brick slot <slotnumber>

Use the `brick` command to determine the module location. Example B-3 shows sample output from this command.

Example B-3 `brick` Command Output

```
001c20-L1>brick  
rack: 001 slot: 20 partition:none,type: C (IP45), serial MHE132,  
source: EEPROM
```

Use `brick slot <slotnumber>` to set the module position (slot number) in the rack. The variable `<slotnumber>` is a unit number from 01 to 39. Example B-4 shows sample output from the `brick slot 22` command.

Example B-4 `brick slot 22` Command Output

```
001c20-L1>brick slot 22  
brick slot set to 22 (takes effect on next L1 reboot/power cycle)
```

Use `brick rack <racknumber>` to set the module rack number. The variable `<racknumber>` is the number of a valid rack. For this system, the rack number is 1. Example B-5 shows sample output from the `brick rack 01` command.

Example B-5 `brick rack <racknumber>` Command Output

```
001c20-L1>brick rack 1  
brick rack set to 001 (takes effect on next L1 reboot/power cycle)
```

config

Use the `config` command to view the L1 controller configuration information. Example B-7 shows sample output from the `config` command.

Example B-6 `config` Command Output

```
001c20-L1>config  
0: - 001c20
```

ctc <cmd>

Use the `ctc <cmd>` command to send a command to an attached module. Example B-7 shows sample output from the `ctc version` command.

Example B-7 ctc version Command Output

```
001c20-L1>ctc version
002c20:
L1 1.8.1 (Image A), Built 09/21/2001 14:59:42 [P1 support]
```

date

Use the following `date` set of commands to view and set the current date and time used by the L1 controller.

- `date`
- `date <value>`
- `date tz`
- `date tz <value>`

Use the `date` command to view the current date and time value used by the L1 controller. Example B-8 shows sample output from this command.

Example B-8 date Command Output

```
001c20-L1>date
10/17/2001 22:47:07 CDT
```

Use `date <value>` to set the date and time value used by the L1 controller. The variable `<value>` is a time value in the form `mmddHHMMYYYY.SS` (where `mm` is a two-digit month, `dd` is a two-digit day, `HH` is a two-digit hour, `MM` is a two-digit minute, `YYYY` is the four-digit year, and `SS` is a two-digit second).

Use `date tz` to display the time zone offset used by the L1 controller. Use `date tz <value>` to set the time zone offset. The variable `<value>` is a maximum of +12 (for 12 hours ahead of GMT) and a minimum of -12 (for 12 hours behind GMT).

debug

The following debug set of commands provides the status of and sets the virtual debug switches.

- debug
- debug <switches>

Use the debug command to determine the current settings for the virtual debug switches. Example B-9 shows sample output from this command.

Example B-9 debug Command Output

```
001c20-L1>debug
debug switches set to 0x0000
```

Use debug <switches> to set the virtual debug switches. The variable <switches> is a hexadecimal value for the switches.

display

Use the display command to view the front panel display status. Example B-10 shows sample output from this command.

Example B-10 display Command Output

```
001c20-L1>display
firmware revision: 2.0
line 1: "001c20 /2Powered Up"
line 2: "Powered Up"
```

eeeprom

Use the eeeprom command to view the eeeprom data. Example B-11 shows sample output from this command.

Example B-11 eeeprom Command Output

```
001c20-L1>eeeprom
NODE (CH)
00 20 01 06 00 00 00 d9
```

```

NODE (CIA)
00 02 17 c2 4e 41 c2 4e 41 c1 00 00 00 00 00 84
NODE (BIA)
00 09 00 44 c9 2c c9 43 45 4c 45 53 54 49 43 41
c9 49 50 34 35 5f 34 43 50 55 c6 4d 47 59 39 30
39 cc 30 33 30 5f 31 37 32 38 5f 30 30 32 00 c2
5f 42 01 02 c2 30 30 04 00 00 97 6f 04 00 00 00
02 04 00 00 2b 05 c1 bf
NODE (IUA)
00 01 85 01 01 01 02 04 00 00 01 08 04 00 0b 02
13 0a 17 02 2b 04 2f 01 3b 01 3b 01 4a 01 4a 01
4a 01 4a 01 4a 01 4a 01 4a 01 4a 01 4a 01 4a 01
55 01 76 00 2c a0 00 2d a0 00 2e a0 00 2f a0 04
44 01 00 00 00 0f 00 01 01 01 70 00 01 70 04 03
01 01 20 07 01 00 44 00 44 0a 45 01 03 00 20 1f
00 01 02 03 4a 00 03 4a 06 50 26 06 3f fc 06 3f
b7 06 08 88 06 02 46 06 00 ec 04 43 01 03 00 20
07 00 01 02 02 73 00 02 73 00 00 00 00 00 00 48
IO8 (CH)
00 20 01 06 00 00 00 d9
IO8 (CIA)
00 02 17 c2 4e 41 c2 4e 41 c1 00 00 00 00 00 84
IO8 (BIA)
00 0a 00 8f aa 2c c9 43 45 4c 45 53 54 49 43 41
c3 49 4f 38 c6 4d 48 45 35 34 39 cc 30 33 30 5f
31 36 37 33 5f 30 30 33 00 c2 5f 45 01 02 c2 30
30 04 00 00 24 17 04 00 00 00 02 04 00 00 1c 75
cc 30 38 30 30 36 39 31 33 44 30 35 43 c1 00 6c
IO8 (IUA)
00 02 33 01 01 01 01 04 01 06 03 00 09 02 0f 01
13 01 16 01 19 01 24 00 00 00 00 00 00 04 03 01
01 20 07 01 05 ff 00 ff 04 42 01 01 00 20 03 00
01 02 01 4f 00 01 4f f3
DIMM 0 (JEDEC)
80 08 07 0c 0a 02 48 00 04 a0 80 02 80 08 08 01
0e 04 0c 01 02 26 00 00 00 00 00 50 3c 50 30 20
b0 b0 60 60 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 39
ce 00 00 00 00 00 00 00 01 4d 33 20 34 36 4c 33
33 31 33 42 54 31 2d 43 41 30 20 30 42 06 01 26
49 76 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
DIMM 2 (JEDEC)
80 08 07 0c 0a 02 48 00 04 a0 80 02 80 08 08 01
0e 04 0c 01 02 26 00 00 00 00 00 50 3c 50 30 20

```

```

b0 b0 60 60 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 39
ce 00 00 00 00 00 00 00 01 4d 33 20 34 36 4c 33
33 31 33 42 54 31 2d 43 41 30 20 30 42 06 01 26
48 76 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
DIMM 1 (JEDEC)
80 08 07 0c 0a 02 48 00 04 a0 80 02 80 08 08 01
0e 04 0c 01 02 26 00 00 00 00 00 50 3c 50 30 20
b0 b0 60 60 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 39
ce 00 00 00 00 00 00 00 01 4d 33 20 34 36 4c 33
33 31 33 42 54 31 2d 43 41 30 20 30 42 06 01 26
4a 76 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

DIMM 3 (JEDEC)
80 08 07 0c 0a 02 48 00 04 a0 80 02 80 08 08 01
0e 04 0c 01 02 26 00 00 00 00 00 50 3c 50 30 20
b0 b0 60 60 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 39
ce 00 00 00 00 00 00 00 01 4d 33 20 34 36 4c 33
33 31 33 42 54 31 2d 43 41 30 20 30 42 39 00 27
ae 5f 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

```

env

The following `env` set of commands provides the status of environmental conditions or turns environmental monitoring on and off. This set comprises the following commands:

- `env`
- `env altitude <high|low>`
- `env reset`

Use the `env` command to view the status of the voltage, fan speed, and internal temperature. The output of this command is divided into four areas: environmental monitoring and auto start status, voltage status, fan status, and temperature status (refer to Example B-12).

Example B-12 env Command Output

001c20-L1>env

Environmental monitoring is enabled and running.

Description	State	Warning Limits	Fault Limits	Current
12V IO	Enabled	10% 10.80/ 13.20	20% 9.60/ 14.40	12.31
12V DIG	Enabled	10% 10.80/ 13.20	20% 9.60/ 14.40	12.12
5V	Enabled	10% 4.50/ 5.50	20% 4.00/ 6.00	4.99
3.3V	Enabled	10% 2.97/ 3.63	20% 2.64/ 3.96	3.34
5V aux	Enabled	10% 4.50/ 5.50	20% 4.00/ 6.00	4.99
3.3V aux	Enabled	10% 2.97/ 3.63	20% 2.64/ 3.96	3.41
2.5V	Enabled	10% 2.25/ 2.75	20% 2.00/ 3.00	2.50
Speedo2 CPU	Enabled	10% 1.35/ 1.65	20% 1.20/ 1.80	1.49
1.5V	Enabled	10% 1.35/ 1.65	20% 1.20/ 1.80	1.48

Description	State	Warning RPM	Current RPM
FAN 0 Left	Enabled	2160	3400
FAN 1 Center	Enabled	2160	3543
FAN 2 Right	Enabled	2160	3543
FAN 3 PS	Enabled	2160	3088
FAN 4 PS'	Enabled	2160	3869

Description	State	Advisory Temp	Critical Temp	Fault Temp	Current Temp
NODE 0 TEMP 0	Enabled	30C/ 86F	35C/ 95F	40C/104F	26c/ 78F
NODE 1 TEMP 1	Enabled	30C/ 86F	35C/ 95F	40C/104F	26c/ 78F

The environmental monitoring and auto start status area has two statements. The first statement describes the current state of environmental monitoring, which is one of the following states:

- disabled - initialization error
- disabled - configuration error
- disabled - start error
- disabled
- disabled - unknown error (0x00)
- running

The second statement describes the current state of the auto start. The auto start state is enabled or disabled.

The voltage status contains five columns, as follows:

- The Description column provides the name of the supply voltage (2.5 V, 3.3 V, 5 V, etc.).
- The State column provides the current state of the supply voltage (Enabled, Fault, Warning, Waiting, or Disabled).
- The Warning Limits column provides the range of voltages that, when exceeded, causes a supply voltage to be in a Warning state.
- The Fault Limits column provides the range of voltages that, when exceeded, causes a supply voltage to be in a Fault state.
- The Current column provides the current value of the supply voltage.

The fan status contains four columns, as follows:

- The Description column provides the name of each fan.
- The State column provides the current state of the fan (Warning, Enabled, Waiting, or Disabled).
- The Warning RPM column provides the lowest revolutions-per-minute allowed before a fan enters a Warning state.
- The Current RPM column provides the current value of the revolutions-per-minute for the fan.

The temperature status contains six columns, as follows:

- The Description column provides the name of a temperature sensor.
- The State column provides the current state of the temperature sensor (Fault, Warning, Enabled, or Disabled).
- The Advisory Temp column provides the temperature that, when exceeded, causes a temperature advisory state.
- The Critical Temp column provides the temperature that, when exceeded, causes a critical temperature state.
- The Fault Temp column provides the temperature that, when exceeded, causes the temperature sensor to be in a Fault state.

- The Current Temp column provides the current temperature reading from the temperature sensor.

Use `env altitude <high|low>` to enable a high- or low-altitude setting for the environmental monitoring. The variable `<high|low>` is high or low.

Use `env reset` to reset all current warnings and faults that are set.

Note: For this command, you can use the mnemonic `rst` instead of the word `reset`.

fan

Use the `fan` command to determine whether the fans are on or off and to read the fan speeds. In the `fan` command output, the number in parentheses is the counter reading for the fan. The counter reading is a value provided by the fan tachometer. The L1 controller converts the counter reading into a revolutions-per-minute value. Example B-13 shows sample output from the `fan` command.

Example B-13 fan Command Output

```
001c20-L1>fan
fans are on.
fan 0 LEFT rpm 3619(93).
fan 1 CENTER rpm 3619 (93).
fan 2 RIGHT rpm 3619 (93).
fan 3 PS rpm 3116 (108).
fan 4 PS' rpm 3914 (86).
```

flash

The following `flash` set of commands provides status of the firmware images stored in flash memory:

- `flash status`
- `flash default <a|b>`
- `flash default current`
- `flash default new`

- `flash default old`
- `flash default reset`

Use the `flash status` command to view the status of the two firmware images stored in flash memory. Example B-14 shows sample output from the `flash status` command. Each image has a checksum value that indicates whether an image is valid.

Example B-14 `flash status` Command Output

```
001c20-L1>flash status
Flash image B currently booted
```

Image	Status	Revision	Built
A	default	1.8.1	09/21/2001 16:41:43
B	valid	1.7.17	09/12/2001 12:24:28

Use `flash default <a|b>` to set firmware image A or firmware image B as the default image that the system controller uses when booting. The variable `<a|b>` is A or B. Use `flash default current` to set the current image as the default flash image. Use `flash default new` to set the new image as the default flash image. Use `flash default old` to set the old image as the default flash image.

Use `flash default reset` to set the firmware image with the latest time stamp as the default image that the system controller uses when booting. If the selected firmware image is not valid, the flash default commands will return the following message:
cannot set default--image A (or B) is invalid!

help

The following `help` set of commands provides helpful information on the system controller commands.

- `help`
- `help <command>`

Use the `help` command to generate a list of all of the system controller commands. Use the `help <command>` command to display more information on a single command. The variable `<command>` is the name of a command.

history

Use the `history` command to create a list of commands that have been issued. In the `history` command output, the first number in the history length is the number of commands stored in the history array. The second number is the maximum number of commands that can be stored in the history array. Example B-15 shows sample output from this command.

Example B-15 `history` Command Output

```
001c20-L1>history
History length: 3/20

2: fan speed 4
1: fan
0: env
```

istat

Use the following `istat` set of commands to view the status of the memory, queues, tasks, and memory allocation.

- `istat memory`
- `istat queues`
- `istat tasks`
- `istat pmalloc`

Use the `istat memory` command to view the status of the memory. Example B-16 shows sample output from this command.

Example B-16 `istat memory` Command Output

```
001c20-L1>istat memory
SYSMEM   [0x30002cec]   Size: 41024      Avail: 17620
SMLPOOL  [0x30002cb0]   Size: 8704/ 272  Avail: 29
BIGPOOL  [0x30002c74]   Size: 16640/1040 Avail: 15
```

Use `istat queues` to view the status of the queues. Example B-17 shows sample output from this command.

Example B-17 `istat queues` Command Output

```
001c20-L1>istat queues
CMD_REQQ [0x300062f8]   Size: 10   Avail: 10   Msgs: 0
CMD_RSPQ [0x30006340]   Size: 10   Avail: 10   Msgs: 0
SMP_RQUE [0x3000cd48]   Size: 10   Avail: 10   Msgs: 0
SMP_WQUE [0x3000cd90]   Size: 10   Avail: 10   Msgs: 0
SMP_IQUE [0x3000cdd8]   Size: 10   Avail: 10   Msgs: 0
BDR_WQUE [0x3000c974]   Size: 20   Avail: 20   Msgs: 0
B2BQ_CTC [0x30009fc4]   Size: 10   Avail: 10   Msgs: 0
B2BQ_CTI [0x3000a054]   Size: 10   Avail: 10   Msgs: 0
USB_WQUE [0x300098cc]   Size: 10   Avail: 10   Msgs: 0
SCAN_QUE [0x30002534]   Size: 20   Avail: 20   Msgs: 0
FLASH_Q  [0x3000f738]   Size: 5    Avail: 5    Msgs: 0
```

Use `istat tasks` to view the status of the tasks. Example B-18 shows sample output from this command.

Example B-18 `istat tasks` Command Output

```
001c20-L1>istat tasks
MAIN_TSK [0x30001a34] (SLEEP      ) PRI=000 TS=010 STACK: 2048 @
0x30001234 ( 576 used, 1472 free)
USB_CTL0 [0x300050b8] (DRV_SUSP  ) PRI=010 TS=010 STACK: 1536 @
0x30005160 ( 324 used, 1212 free)
DSP_STSK [0x30002a58] (SEM_SUSP  ) PRI=010 TS=010 STACK: 512 @
0x30016d94 ( 208 used, 304 free)
DSP_RTSK [0x30002b28] (SEM_SUSP  ) PRI=010 TS=010 STACK: 512 @
0x30016fa4 ( 304 used, 208 free)
CMD_ITSK [0x30007388] (READY     ) PRI=020 TS=010 STACK: 4096 @
0x30006388 (2160 used, 1936 free)
SMP_RTSK [0x3000e670] (DRV_SUSP  ) PRI=020 TS=010 STACK: 2048 @
0x3000ce70 ( 660 used, 1388 free)
SMP_WTSK [0x3000e718] (QUEUE_SUSP) PRI=020 TS=040 STACK: 2048 @
0x3000d670 ( 584 used, 1464 free)
SMP_ITSK [0x3000e7c0] (QUEUE_SUSP) PRI=020 TS=010 STACK: 2048 @
0x3000de70 ( 932 used, 1116 free)
ENV_PITK [0x30007714] (SEM_SUSP  ) PRI=010 TS=010 STACK: 1024 @
0x30007b04 ( 436 used, 588 free)
ENV_FITK [0x300077bc] (SEM_SUSP  ) PRI=010 TS=010 STACK: 1024 @
0x30007f04 ( 312 used, 712 free)
ENV_TITK [0x30007864] (SEM_SUSP  ) PRI=010 TS=010 STACK: 1024 @
0x30008304 ( 312 used, 712 free)
ENV_PMTK [0x3000790c] (SEM_SUSP  ) PRI=010 TS=010 STACK: 1024 @
0x30008704 ( 304 used, 720 free)
```

```
ENV_FMTK [0x300079b4] (SEM_SUSP ) PRI=010 TS=010 STACK: 1024 @
0x30008b04 ( 320 used, 704 free)
ENV_TMTK [0x30007a5c] (SEM_SUSP ) PRI=010 TS=010 STACK: 1024 @
0x30008f04 ( 480 used, 544 free)
BDR_RTK0 [0x3000c77c] (DRV_SUSP ) PRI=025 TS=010 STACK: 2048 @
0x3001738c (1156 used, 892 free)
BDR_WTSK [0x3000c8cc] (QUEUE_SUSP) PRI=025 TS=010 STACK: 2048 @
0x30017b9c ( 644 used, 1404 free)
B2BR_CTC [0x30009b8c] (DRV_SUSP ) PRI=025 TS=010 STACK: 2048 @
0x30018444 ( 372 used, 1676 free)
B2BW_CTC [0x3000a21c] (DRV_SUSP ) PRI=025 TS=010 STACK: 2048 @
0x30018c54 ( 380 used, 1668 free)
B2BR_CTI [0x30009cdc] (DRV_SUSP ) PRI=025 TS=010 STACK: 2048 @
0x3001949c ( 372 used, 1676 free)
B2BW_CTI [0x3000a36c] (DRV_SUSP ) PRI=025 TS=010 STACK: 2048 @
0x30019cac ( 380 used, 1668 free)
USB_WTSK [0x3000993c] (QUEUE_SUSP) PRI=025 TS=010 STACK: 1500 @
0x3001a524 ( 668 used, 832 free)
USB_RTK0 [0x30009778] (READY ) PRI=025 TS=010 STACK: 1800 @
0x3001ab10 ( 936 used, 864 free)
SCAN_TSK [0x3000248c] (QUEUE_SUSP) PRI=025 TS=010 STACK: 2048 @
0x30001c8c ( 784 used, 1264 free)
I2C_HIGH [0x300043a4] (SEM_SUSP ) PRI=005 TS=010 STACK: 1500 @
0x3000444c ( 380 used, 1120 free)
I2C_LOW [0x30003c7c] (SEM_SUSP ) PRI=010 TS=010 STACK: 1500 @
0x30003d24 ( 560 used, 940 free)
FLASH_T [0x3000f690] (QUEUE_SUSP) PRI=025 TS=020 STACK: 1024 @
0x3000f290 ( 480 used, 544 free)
```

Use the `istat pmalloc` command to view the status of the memory allocation. Example B-19 shows sample output from this command.

Example B-19 `istat pmalloc` Command Output

```
001c20-L1>istat pmalloc

small pool size: 272
small pool avail: 29
small pool used: 2
small pool max: 14

big pool size: 1040
big pool avail: 15
big pool used: 0
big pool max: 3
```

```

pmalloc calls:      0
prealloc calls:    0

history:

```

l1

Use the `l1` command to engage the L1 controller command processor. Press **Ctrl+D** to disengage the command processor.

leds

Use the `leds` command to read the value of the group 0 and group 1 status LEDs. These LEDs connect to I/O expanders that monitor group 0 status LEDs 0 through 15 and group 1 status LEDs 0 through 15. In the output of this command, the CPUs correspond to the status LEDs as follows:

- CPU A corresponds to I/O expander A_0100001x - group 0 status LEDs 0 through 7.
- CPU B corresponds to I/O expander A_0100010x - group 0 status LEDs 8 through 15.
- CPU C corresponds to I/O expander A_0100011x - group 1 status LEDs 0 through 7.
- CPU D corresponds to I/O expander A_0100100x - group 1 status LEDs 8 through 15.

The number next to the CPU letter is a hexadecimal value that represents the value of the status LEDs that connect to the I/O expander (a bit set to 1 indicates the LED is on, and a bit set to 0 indicates the LED is off). Example B-20 shows sample output from the `leds` command.

Example B-20 leds Command Output

```

001c20-L1>leds
CPU A: 0x00: PLED_RESET: Slave loop (0x00/0x45=okay, solid 0x00=possibly hung)
        0x45: PLED_LAUNCHLOOP:(0x00/0x45=okay, solid 0x45=possibly hung)
CPU B: 0x00: PLED_RESET: Slave loop (0x00/0x45=okay, solid 0x00=possibly hung)
        0x45: PLED_LAUNCHLOOP:(0x00/0x45=okay, solid 0x45=possibly hung)
CPU C: 0x01: PLED_INITCPU: init the processor FP, and COP0 registers.
CPU D: 0xb8: unknown LED status

```

log

The following `log` set of commands displays the contents of the log, resets the log, and writes an entry into the log.

- `log`
- `log reset`
- `log <entry>`

Use the `log` command to view the contents of the log. If the log is empty, the output from the `log` command is `log is empty`.

Use `log reset` to empty the log. Use `log <entry>` to write a line in the log. The variable `<entry>` is text to enter in the log. Example B-21 shows sample output from the `log Start the Test` command.

Example B-21 `log Start the Test` Command Output

```
001c20-L1>log Start the Test
log entry made.
```

margin

The `margin` set of commands displays the state of the supply margins or sets the state of the supply margins. There are three commands in the `margin` command set: `margin`, `margin default`, and `margin <low|norm|high>`. For the `margin` command set, the mnemonic `mgn` may replace the word `margin`.

Use the `margin` command to view the current state of the margin values for the supplies in a module. Example B-22 shows sample output from the `margin` command.

Example B-22 `margin` Command Output

```
001c20-L1>margin
Supply          State Voltage      Margin  Value
-----
          2.5V      on      2.483V   normal    3
Speedo2 CPU      on      1.495V   normal   19
          1.5V      on      1.480V   normal    5
```

Use the `margin default` command to set the margin values for the supplies to their default values. Use the `margin <low|norm|high>` command to set the margin values for the supplies to the low-margin, normal-margin, or high-margin values. In this command, the variable `<low|norm|high>` is low (low-margin), norm (normal margin), or high (high margin). Example B-23 shows sample output from the `margin default` command.

Example B-23 `margin default` Command Output

```
001c20-L1>margin default
```

network

The following `network` set of commands displays and sets the mode for the network communication interface.

- `network`
- `network usb`
- `network 422`
- `network autodetect|auto on`
- `network autodetect|auto off`

Use the `network` command to view the current mode of the network communication interface. Example B-24 shows sample output from this command.

Example B-24 `network` Command Output

```
001c20-L1>network  
network interface communication is 422  
network autodetection is enabled
```

Use `network usb` to set the network communication interface mode to Universal Serial Bus (USB). Use `network 422` to set the network communication interface mode to the RS-422 protocol. Example B-25 shows sample output from the `network usb` command.

Example B-25 `network usb` Command Output

```
001c20-L1>network usb  
nvram parameter changed, reset required to affect change.
```

Use `autodetect | auto on` to turn on the autodetection. Use `autodetect | auto off` to turn off the autodetection.

nmi

Use the `nmi` command to issue a non-maskable interrupt (NMI). After the system controller receives an `nmi` command, it displays `NMI . . .` on the front-panel display and asserts the NMI signal in I/O expander B_0100001x. If no errors occur while the system controller issues the NMI, it displays `NMI done` on the front-panel display (refer to Example B-26 and Figure B-1). If an error occurs, the system controller displays `NMI Fail` on the front panel display.

Example B-26 `nmi` Command Output

```
001c20-L1>nmi  
001c20-L1>
```

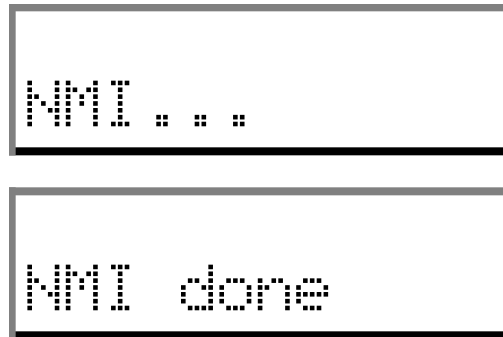



Figure B-1 Example of nmi Front Panel Display Output

nvr_{am} reset

The `nvram reset` command returns the NVRAM settings of the L1 controller to the factory default settings.

pbay

The `pbay` set of commands displays information about the power bay, distributed power supplies (DPSs), DC output ports, and FRUs:

- `pbay`
- `pbay version`
- `pbay dps`
- `pbay dps <dps number 1 - 6>`
- `pbay dcport`
- `pbay dcport <DC port number 1 - 8>`
- `pbay fru`
- `pbay fru <0 for power bay, 1 - 6 for DPS>`
- `pbay reset`
- `pbay env`
- `pbay env on|off`
- `pbay init`

Use the `pbay` command to view the status of the power bay (refer to Example B-27).

Example B-27 `pbay` Command Output

```
001r28-L1>pbay
Total current: 16.5 Amps (+/-11%)
```

Use the `pbay version` command to view the firmware version of the power bay (refer to Example B-28).

Example B-28 `pbay version` Command Output

```
001r28-L1>pbay version
PBay FW Version 00.18, Built 09/29/2001 14:00:00
```

Use the other `pbay` commands as follows:

- Use the `pbay dps` command to view the status of all distributed power supplies or an individual supply. The distributed power supplies are identified by a number ranging from 1 to 6.
- Use the `pbay dcport` command to view the status of all DC output ports or an individual DC port. The ports are identified by a number ranging from 1 to 8.
- Use the `pbay fru` command to view information about the power bay and DPS FRUs. To view information about the power bay FRUs, use the number 0. To view information about a distributed power supply FRU, use the numbers 1 through 6.
- Use the `pbay reset` command to reset the power bay and the power supplies.
- Use the `pbay env` command to view the status of the environmental monitoring and to enable or disable environmental monitoring.
- Use the `pbay init` command to initialize communication with the power bay.

pci

The `pci` set of commands displays the status of the PCI cards in an Origin 300 server or a PCI expansion module. For the PCI expansion module, this command set also powers up, powers down, or resets a PCI card:

- `pci`
- `pci <u|d>`
- `pci reset`
- `pci <bus> <u|d>`
- `pci <bus> reset`
- `pci <bus> <slot> <u|d>`
- `pci <bus> <slot> reset`

In the `pci` command set, the mnemonic `rst` may replace the word `reset`.

Use the `pci` command to view the power for each PCI card in an Origin 300 server (refer to Example B-29). For a PCI expansion module, the output of the `pci` command contains eight columns. The Bus column lists the number of the bus for each PCI card. The Slot column lists the slot value for each PCI card. The Stat column lists the hexadecimal value

of the status register for each PCI card. The Card Type column lists the card type (7.5 W, 15 W, 25 W, or none) for each slot. The Power column lists the value (error & off, error & on, okay & off, or okay & on) of the Power OK and Power On bits. The Attn LED column lists the value (off or on) of the Attention LED for the PCI card. The Enable column lists the value (off or on) of the Bus Enable bit for the PCI card. The Reset column lists the value (off or on) of the Reset bit for the PCI card.

Example B-29 pci Command Output

```
001c20-L1>pci
Slot      Power
----      -
Slot 1    7.5
Slot 2    7.5
```

Note: The following commands apply only to the PCI expansion module.

Use the `pci <u|d>` command to power up or power down all of the PCI cards. In this command, the variable `<u|d>` is `u` (power up) or `d` (power down).

Use the `pci reset` command to reset all of the PCI cards.

Use the `pci <bus> <u|d>` command to power up or power down all of the PCI cards on a bus. In this command, the variable `<u|d>` is `u` (power up) or `d` (power down). The variable `<bus>` is the bus number.

Use the `pci <bus> reset` command to reset all of the PCI cards on a bus. In this command, the variable `<bus>` is the bus number.

Use the `pci <bus> <slot> <u|d>` command to power up or power down an individual PCI card. In this command, the variable `<u|d>` is `u` (power up) or `d` (power down). The variable `<bus>` is the bus number and the variable `<slot>` is the slot number.

Use the `pci <bus> <slot> reset` command to reset an individual PCI card. In this command, the variable `<bus>` is the bus number and the variable `<slot>` is the slot number.

port

Use the `port` command to view the value of the status register for each port. As shown in Example B-30, the output of the `port` command contains six columns, as follows:

- The Port column lists the name of each port.
- The Stat column lists the hexadecimal value of the status register for each port.
- The Remote Pwr column lists the value, “okay” or “none,” of the remote power OK bit (bit 0) for each port.
- The Local Pwr column lists the value, “okay” or “none,” of the local power OK bit (bit 1) for each port.
- The Link LED column lists the value, “on” or “off,” of the link LED bit (bit 2) for each port.
- The SW LED column lists the value, “on” or “off,” of the software LED bit (bit 3) for each port.

Note: For this command, you can use the mnemonic `prt` instead of the word `port`.

Example B-30 port Command Output

```
001c20-L1>port
Port Stat Remote Pwr Local Pwr Link LED SW LED
-----
A 0x0f         none         okay         on          on
B 0x02         none         okay         off         off
```

power

The following `power` set of commands displays the status of the supplies and powers on and powers off the supplies.

- `power`
- `power check`
- `power <up | down>`
- `power vrm`

Note: For the `power` command set, you can use the mnemonics `pwr`, `u`, and `d` instead of the words `power`, `up`, and `down`.

Use the `power` command to view the detailed current state of the power and margin values for the supplies in a system. Example B-31 shows sample output from this command.

Example B-31 `power` Command Output

```
001c20-L1>power
Supply          State Voltage      Margin  Value
-----
      12V        on         N/A      N/A
    12V IO       NC    12.312V    N/A
   12V DIG       NC    12.125V    N/A
        5V       NC     4.992V    N/A
      3.3V       NC     3.337V    N/A
     5V aux      NC     4.992V    N/A
   3.3V aux      NC     3.406V    N/A
      2.5V       on     2.496V  normal 3
Speedo2 CPU     on     1.480V  normal 19
      1.5V       on     1.480V  normal 5
```

Use `power check` to view the summary of the current state of the power and margin values for the supplies in a system. Example B-32 shows sample output from this command.

Example B-32 `power check` Command Output

```
001c20-L1>power check
power appears on
```

Use `power <up|down>` to power on or power off all of the modules in the system. The variable `<up|down>` is on or off. Use `power vrm` to check the VRM status.

reboot_l1

The `reboot_l1` set of commands reboots the L1 controller. The following commands compose this set:

- `reboot_l1`
- `reboot_l1 <a|b|old|new>`

Use the `reboot_l1` command to reboot the L1 controller using the newest firmware image (firmware image A or firmware image B). Use `reboot_l1 <a|b>` to reboot the L1 controller using the specified firmware image. The variable `<a|b>` is a (firmware image A) or b (firmware image B). Use `reboot_l1 <new>` to reboot the L1 controller with a new A or B image. Use `reboot_l1 <old>` to reboot the L1 controller with an old image.

reset

Use the `reset` command to perform a reset of the system. After the L1 controller receives a `reset` command, it sets various control and status signals back to their default values and reboots the operating system. Example B-33 shows sample output for this command.

Example B-33 `reset` Command Output

```
001c20-L1>reset
001c20-L1>
```

router

The `router` set of commands displays information about the NUMAlink module and enables you to set the router type of this module. The NUMAlink module is an ordinary router type. This command is valid for the NUMAlink module only.

- `router`
- `router ordinary`

Example B-34 shows sample output from the `router` command.

Example B-34 `router` Command Output

```
001r28-L1>router  
router type is ordinary
```

select

The following `select` set of commands displays and sets the mode of console I/O.

- `select`
- `select <rack> <slot>`
- `select local`
- `select ctc`
- `select console`
- `select <a|b|c|d>`
- `select <subchannel>`
- `select filter <on|off>`

Use the `select` command to view the current mode of console I/O. Example B-35 shows sample output from this command.

Example B-35 `select` Command Output

```
001c20-L1>select  
console input: 001c20 console  
console output: not filtered.
```

Use the other `select` commands as follows:

- Use `select <rack> <slot>` to set the rack and slot for console I/O.
- Use `select local` to set the system console to the local server. The L1 controller will then identify the system to which to send console input. If filtering is enabled, the L1 controller identifies the system for which to display output.
- Use `select ctc` to set the attached server for console I/O.
- Use `select console` to set the mode of console I/O to console.
- Use `select <a|b|c|d>` to set the mode of console I/O to a CPU name (a, b, c or d).

- Use `select <subchannel>` to set the mode of console I/O to a specified subchannel (0, 1, 2, 3, or 4).
- Use `select filter <on|off>` to enable (on) or disable (off) the console output filter.

serial

Use the following `serial` set of commands to view or set the system serial number that is stored in each module.

- `serial`
- `serial all`
- `serial dimm`

Use the `serial` command to view the system serial number (SSN) settings stored in the NVRAM. Use `serial all` to show the brick serial number (BSN) and the SSN settings in NVRAM. Use `serial dimm` to show the dual-inline memory module (DIMM) serial number.

softreset

Use the `softreset` command to issue a software reset. After receiving a `softreset` command, the L1 controller displays `Sft rst . . .` on the front panel display and asserts the soft reset signal in I/O expander B_0100001x. If no errors occur while the L1 controller issues the soft reset, it displays `Sft rst done` on the front panel display (see Example B-36 and Figure B-2). If an error occurs while the L1 controller issues the soft reset, it displays `Sft rst fail` on the front panel display.

Note: For this command, you can use the mnemonic `softrst` instead of the word `softreset`.

Example B-36 `softreset` Command Output

```
001c20-L1>softreset
001c20-L1>
```

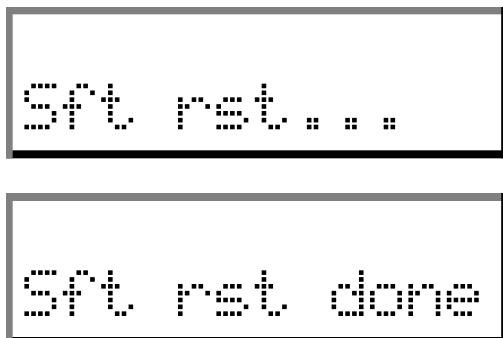


Figure B-2 Example of `softreset` Command Output

uart

The `uart` set of commands displays the status of the following UARTs (universal asynchronous receivers/transmitters): CTI, CTC, SMP, and Bedrock. This command also enables you to reset the UART of the Bedrock ASIC.

- `uart`
- `uart bedrock reset`

Example B-37 shows sample output from the `uart` command.

Example B-37 `uart` Command Output

```
001c20-L1>uart
      Baud   Read   Read   Read   Read   Read   Write  Write  Write
UART  Rate   State  Status Timeouts Breaks Errors State  Status Timeouts
----  ----  -----
CTI   107142  Discon Ready  0       0       0     Discon Ready  0
CTC   107142  Discon Ready  0       0       0     Discon Ready  0
SMP   37500   Discon Ready  0       0       1     Discon Ready  0
BED   57692   Connect Suspend 0       0       13    Connect Ready  0
```

usb

The `usb` command displays status information for the USB (universal serial bus) L1 port. SSEs use this port to access L1 controllers in systems that do not have L2 controllers. Example B-38 shows sample output from the `usb` command.

Example B-38 usb Command Output

```
001c20-L1>usb
Device: 0 Disconnects: 2 Bus Resets: 13
Endpoint State      Status      Stalls Errors Timeouts
-----
Control Active    Suspended  43      0      0
Read   Active    Ready     0      0      0
Write  Active    Ready     0      0      0
```

version

Use the `version` command to view the version of the firmware that is running in the L1 controller. Example B-39 shows sample output from this command.

Example B-39 version Command Output

```
001c20-L1>version
L1 1.8.1 (Image A), Built 09/21/2001 12:24:28 [P1 support]
```

L2 Controller Command Set

The subsections that follow describe the L2 controller command set. The commands are listed alphabetically and include examples of output where applicable.

autopower

The following `autopower` set of commands enable, disable, and abort the feature that enables the system to automatically power up if power is lost. This command also displays the current autopower setting (refer to Example B-40).

- `autopower`
- `autopower on`
- `autopower off`
- `autopower abort`

Example B-40 `autopower` Command Output

```
L2> autopower  
auto power up appears disabled
```

config

The `config` set of commands displays the L2 controller configuration information. There are five commands in the `config` command set:

- `config`
- `config devices`
- `config rescan`
- `config auto`
- `config manual`

Note: For these commands, the mnemonic `cfg` may replace the word `config`.

Use the `config` command to view the L2 controller configuration information (refer to Example B-41). In the `config` command output, the first number is the IP address of the L2 controller (137.38.82.155 in the output below). The number that follows the IP address, after the first colon, is the USB port number.

Example B-41 `config` Command output

```
L2> config
L2 137.38.82.155: - 003 (LOCAL)
L1 137.38.82.155:2:0 - 001c36
L1 137.38.82.155:0:0 - 001c34
L1 137.38.82.155:3:0 - 001c32
L1 137.38.82.155:1:0 - 001c30
L1 137.38.82.155:4:0 - 001r28
L1 137.38.82.155:8:0 - 001c26
L1 137.38.82.155:7:0 - 001c24
L1 137.38.82.155:6:0 - 001c22
L1 137.38.82.155:5:0 - 001c20
```

The number that follows the USB port number, after the second colon, is the L1 index, which for the Origin 300 system with NUMAlink module is 0.

The number that follows the L1 index, after the dash, is the brick identification number (for example, 001c22). The first three digits of the brick identification indicate the rack that the module resides in. The fourth digit of the brick identification indicates the type of module (refer to Table B-1). The last two digits of the brick identification indicate the slot position in which the module resides.

Table B-1 Valid Module Types

Type	Description
c	Origin 300 base module
p	PCI expansion module
r	NUMAlink module
?	Unknown module type

Use the `config rescan` command to force an L1 controller configuration update. Use the `config auto` command to enable automatic configuration updates for the L1 controller. Use the `config manual` command to disable automatic configuration updates for the L1 controller.

Note: For these commands, the mnemonics `re` and `man` may replace the words `rescan` and `manual`.

destination

The `destination` set of commands displays the brick identification numbers of modules that are the destination of L2 commands, or it sets the modules that are the destination for L2 commands. There are four commands in the `destination` command set:

- `destination`
- `r <racks> destination`
- `r <rack> s <slots> destination`
- `destination reset`

Note: For these commands, the mnemonic `dest` may replace the word `destination`. Also, the words `rack` and `slot` may replace the mnemonics `r` and `s`.

Use the `destination` command to view the brick identification numbers of the modules that are the destination of L2 commands. Example B-42 shows sample output from the `destination` command.

Example B-42 `destination` Command Output

```
L2> destination
all racks, all slots
```

Use the `r <racks> destination` command to set the racks that are the destination for L2 commands (this command selects all of the modules in a rack as the destination modules). In this command, the variable `<racks>` is a rack number, a comma separated list of rack numbers, or a range of rack numbers indicated by a dash character. Example B-43 shows sample output from the `r <racks> destination` command.

Example B-43 `r <racks> destination` Command Output

```
L2> r 1 destination
9 default destination(s) set
L2> destination
001r28 (137.38.82.155:4:0)
001c34 (137.38.82.155:0:0)
001c30 (137.38.82.155:1:0)
001c36 (137.38.82.155:2:0)
001c32 (137.38.82.155:3:0)
001c20 (137.38.82.155:5:0)
001c22 (137.38.82.155:6:0)
001c24 (137.38.82.155:7:0)
001c26 (137.38.82.155:8:0)
```

Use the `r <rack> s <slots> destination` command to set individual modules that are the destination for L2 commands. In this command, the variable `<rack>` is a rack number. The variable `<slots>` is a slot number, a comma separated list of slot numbers, or a range of slot numbers indicated by a dash character. Example B-44 shows sample output from the `r <rack> s <slots> destination` command.

Example B-44 `r <rack> s <slots> destination` Command Output

```
L2> r 1 s 24 destination
1 default destination(s) set
L2> destination
001c24 (137.38.82.155:7:0)
```

Use the `destination reset` command to reset the destination modules to all racks and all slots. Example B-45 shows sample output from the `destination reset` command.

Note: For this command, the mnemonic `rst` may replace the word `reset`.

Example B-45 `destination reset` Command Output

```
L2> destination reset
default destination reset to all bricks and slots
```

dhcpserver

The `dhcpserver` set of commands displays the setting for the current DHCP server (refer to Example B-46). This command set also enables and disables the DHCP server.

- `dhcpserver`
- `dhcpserver on|enable`
- `dhcpserver off|disable`

Example B-46 `dhcpserver` Command Output

```
L2>dhcpserver  
DHCP server startup enabled (if no other DHCP server is found).
```

env summary

The `env summary` command displays environmental warnings and faults that are reported by the L1 controllers.

help

The `help` set of commands provides helpful information on the system controller commands. There are two commands in the `help` command set:

- `help`
- `help <command>`

Use the `help` command to generate a list of all of the system controller commands. Use the `help <command>` command to display more information on a single command. In this command, the variable `<command>` is the name of a command.

ip

The `ip` set of commands displays the following static IP (internet protocol) settings: address, netmask, and broadcast address (refer to Example B-47). This command set also enables you to set and clear the settings.

- `ip`

- `ip <addr> <netmask>`
- `ip <addr> <netmask> <broadcast>`
- `ip clear|reset`

Example B-47 ip Command Output

```
L2>ip
addr: 137.38.82.155    netmask: 255.255.255.0    broadcast addr:
137.38.82.255
```

l1

The l1 set of commands enters L1 mode or sends an L1 controller command to a specified L1 controller. There are three commands in the l1 command set:

- `r <rack> s <slot> l1`
- `r <rack> s <slot> l1 <cmd>`
- `:<port>:<l1> l1 <cmd>`

Note: For these commands, the words `rack` and `slot` may replace the mnemonics `r` and `s`.

Use the `r <rack> s <slot> l1` command to engage the L1 command processor for the specified rack and slot. In this command, the variable `<rack>` is a rack number and the variable `<slot>` is a slot number. Example B-48 shows sample output from the `r <rack> s <slot> l1` command.

Example B-48 r <rack> s <slot> l1 Command Output

```
L2> r 1 s 30 l1
entering L1 mode 001c30, <CTRL-T> to escape to L2

001c30-L1>
```

Use the `r <rack> s <slot> l1 <cmd>` command to send a command to a destination module without changing the default destination value. In this command, the variable `<rack>` is a rack number, the variable `<slot>` is a slot number, and the variable `<cmd>` is an L1 controller command. Example B-49 shows sample output from the `r <rack> s <slot> l1 config` command.

Example B-49 r <rack> s <slot> l1 config Command Output

```
L2> r 1 s 28 l1 config
001r28:
:0 - 001r28
```

Use the :<port>: l1 <cmd> command to send a command to a destination module that does not have a brick identification number assigned to it yet. In this command, the variable <port> is the port number, and the variable <cmd> is an L1 controller command.

l2

Use the l2 command to engage and lock the L2 command processor. Example B-50 shows sample output from the l2 command.

Example B-50 l2 Command Output

```
L2> l2
L2 command processor engaged, <CTRL-D> for console mode.
```

l2find

The l2find command lists all of the L2 controllers that are connected together (refer to Example B-51).

Example B-51 l2find Command Output

```
L2>l2find
13 L2's discovered:
```

IP	SSN	NAME	RACK	FIRMWARE

[L2's with System Serial Number NOT set]				
137.38.82.101			000	L3 controlle
137.38.82.102			000	L3 controlle
[L2's with different System Serial Numbers]				
137.38.82.156	L1000625		001	1.8.0
137.38.82.51	N1000405	itsys1	111	1.7.7
137.38.82.58	L0000002	klsys2	002	1.7.7
137.38.82.159	L0000138	klsys4	004	1.7.9
137.38.82.162	L0000005	klsys5	005	1.7.7
137.38.82.57	L0000007	klsys7	007	1.8.0

```
137.38.82.55 L0000123 perch          009 1.7.7
137.38.82.158 L0000018 shrimp       018 1.7.7
137.38.82.50 N00000001 sn2-dbg2     022 1.7.7
137.38.82.52 M0000114 snapper       015 1.7.7
137.38.82.157 L0000119 whale        008 1.7.7
```

log

The following `log` set of commands displays the contents of the log, resets the log, and writes an entry into the log.

- `log`
- `log reset`
- `log <entry>`

Use the `log` command to view the contents of the log. If the log is empty, the output from the `log` command is `log is empty`.

Use `log reset` to empty the log. Use `log <entry>` to write a line in the log. The variable `<entry>` is text to enter in the log. Example B-52 shows sample output from the `log Start the Test` command.

Example B-52 `log Start the Test` Command Output

```
L2>log Start the Test
log entry made.
```

loopback

Use the `r <rack> s <slot> loopback <bytes> <count>` command to test the L2-to-L1 connection. In this command, the variable `<rack>` is a rack number, the variable `<slot>` is a slot number, the variable `<bytes>` is the number of bytes to send, and the variable `<count>` is the number of times to run the test.

Note: For these commands, the words `rack` and `slot` may replace the mnemonics `r` and `s`.

multisys

The `multisys` set of commands displays the current setting for multiple-system network sharing, enables communication between L2 controllers that have the same system serial number, and enables communication between all L2 controllers.

- `multisys`
- `multisys on` (enables communication between L2 controllers with the same system serial number)
- `multisys off` (enables communication between all L2 controllers)

Example B-53 shows sample output from the `multisys` command.

Example B-53 `multisys` Command Output

```
L2>multisys
L2 multiple system network support enabled.
L2's will only connect to L2's with same system SN
```

nvramp reset

The `nvramp reset` command returns the NVRAM settings of the L2 controller to the factory default settings.

power

The `power` set of commands displays the status of the supplies or powers up and powers down the supplies:

- `power`
- `power up`
- `power down`
- `r <rack> s <slot> power`
- `r <rack> s <slot> power up`
- `r <rack> s <slot> power down`

For the `power` command set, the mnemonics `pwr`, `u`, and `d` may replace the words `power`, `up`, and `down`.

Use the `power` command to view the power status of each module identified by the destination set of commands. Use the `power up` and `power down` commands to power up or power down each module identified by the destination set of commands. Example B-54 shows sample output from the `power` command.

Example B-54 `power` Command Output

```
L2> power
001c20:
power appears on
001c22:
power appears on
001c24:
power appears on
001c26:
power appears on
001r28:
power appears on
001c30:
power appears on
001c32:
power appears on
001c34:
power appears on
001c36:
power appears on
```

Use the `r <rack> s <slot> power` command to view the power status of a specified brick. Use the `r <rack> s <slot> power up` and `r <rack> s <slot> power down` command to power up or power down specified modules. In these commands, the variable `<rack>` is a rack number, and the variable `<slot>` is a slot number. Example B-55 shows sample output from the `r <rack> s <slot> power` command.

Example B-55 `r <rack> s <slot> power` Command Output

```
L2> r 1 s 22 power
power appears on
```

quit

Use the `quit` command to exit the L2 command processor.

rackid

The `rackid` set of commands enables you to display and set the rack identification number for the L2 controller. In Example B-56, the rack ID number of the L2 controller is 3.

- `rackid`
- `rackid <decimal exp>`

Example B-56 `rackid` Command Output

```
L2>rackid  
rack ID is 3
```

reboot_l2

The `reboot_l2` command reboots the L2 controller using the newest firmware image. The `reboot_l2 force` command reboots the L2 controller even if the firmware image is invalid.

- `reboot_l2`
- `reboot_l2 force`

select

The `select` set of commands displays the brick ID number and subchannel that receives console input or sets the brick ID number and subchannel that will receive console input:

- `select`
- `select <rack> <slot>`
- `select subchannel <subchannel>`
- `select filter and select syscon <value>`

In this command set, the mnemonic `sel` may replace the word `select`.

Use the `select` command to view the brick ID number and subchannel that receives console input. Example B-57 shows sample output from the `select` command. In this example, the brick ID is an Origin 300 server in rack 1, slot 20 (001c20) and the subchannel is the console channel.

Example B-57 `select` Command Output

```
L2> select
known system consoles (non-partitioned)

001c20 - L2 detected
current system console

console input: 001c20 console
console output: not filtered
```

Use the `select <rack> <slot>` command to set the brick ID number that receives console input. Example B-58 shows sample output from the `select <rack> <slot>` command. In this command, the variable `<rack>` is a rack number, and the variable `<slot>` is a slot number. In the example, the brick ID is an Origin 300 server in rack 1, slot 32 (001c32).

Example B-58 `select <rack> <slot>` Command Output

```
L2> select 1 32
INFO: default system console override, changed to: 001c32 console
console input: 001c32 console (CAUTION: default overrode!)
console output: not filtered
```

Use the `select subchannel <subchannel>` command to set the subchannel for the module that receives console input. Example B-59 shows sample output from the `select <subchannel>` command. In this command, the variable `<subchannel>` is the subchannel number (a, b, c, d or console).

Example B-59 `select subchannel <subchannel>` Command Output

```
L2> select subchannel c
INFO: system console changed to:001c30 CPU2
console input: 001c30 CPUc (CAUTION: default overrode!)
console output: not filtered
```

Use the `select filter <value>` command to turn the console output filter on or off. Example B-60 shows sample output from the `select filter on` command. In this command, the variable `<value>` is on or off.

Example B-60 `select filter` Command Output

```
L2> select filter on
console input: 001c30 console
console output: filtered
```

serial

Use the `serial` set of commands to view the system serial number and to set the system serial number. There are two commands in the `serial` command set:

- `serial`
- `serial <snum>`

Use the `serial` command to view the system serial number. Example B-61 shows sample output from the `serial` command.

Example B-61 `serial` Command Output

```
L2> serial
system serial number: M0000010.
```

Use the `serial <snum>` command to set the system serial number. In this command, the variable `<snum>` is the system serial number. Example B-62 shows sample output from the `serial <snum>` command.

Example B-62 `serial <snum>` Command Output

```
L2> serial L0000010
system serial number set to L0000010.
L2> serial
system serial number: L0000010.
```

shell

Use the `shell` command to escape to the L2 operating system. In this command, the character `!` may be used instead of the word `shell`. Example B-63 shows sample output from the `shell` command.

Example B-63 shell Command Output

```
L2> shell
bash$ rm core
bash$ exit
exit
L2>
```

smp

The `smp` command shows the status of the system maintenance port (SMP) network connection. Example B-64 shows sample output from the `smp` command.

Example B-64 smp Command Output

```
L2>smp
Session Who          Group Mode          Console
-----
>>> 1 modem port      1    L2             001c20 console (default)
>>> 0 console port   0    L1 (escaped)    001c20 console (default)
```

sysname

The `sysname` set of commands enables you to display and set the name of the system.

- `sysname`
- `sysname <name>`

Example B-65 shows sample output from the `sysname` command.

Example B-65 sysname Command Output

```
L2>sysname
L2 system name: smelt.
```

version

Use the `version` command to view the version of the firmware running in the L2 controller. In this command, the mnemonic `ver` may replace the word `version`. Example B-66 shows sample output from the `version` command.

Example B-66 version Command Output

```
L2> version  
L2 version 1.8.0
```

Regulatory Specifications

This appendix presents regulatory information that may be important to the operation of your SGI Origin 300 system with NUMALink module.

Manufacturer's Regulatory Declarations

The SGI Origin 300 server 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 shown 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 from 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 SGI Origin 300 server 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 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 immune 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 come or “ship” 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. The wrist strap is used during the installation of these upgrades to prevent the flow of static electricity, and it should protect your system from ESD damage.

Laser Compliance Statements

The CD-ROM drive in this system is a Class 1 laser product. The CD-ROM drive's 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 när denna del är öppnad ålå tuijota säteeseenstirra ej in i strålen.



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



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

Lithium Battery Statement



Warning: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.



Warning: Advarsel!: Lithiumbatteri - Eksplosjonsfare ved feilagtig 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: Päristö voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristö ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristö 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.

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