

SGI® UV 300 System User Guide

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Record of Revision

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About This Guide

This guide provides an overview of the architecture, general operation and descriptions of the major components that compose the SGI® UV 300 family of servers. It also provides the standard procedures for powering on and powering off the system, basic troubleshooting and maintenance information, and important safety and regulatory specifications.

Audience

This guide is written for owners, system administrators, and users of SGI UV 300 computer systems. It is written with the assumption that the reader has a good working knowledge of computers and computer systems.

Important Information



Warning: To avoid problems that could void your warranty, your SGI or other approved installation or service provider should perform all the set up, addition, or replacement of parts, cabling, and service of your SGI UV 300 system, with the exception of the following items that you can perform yourself as needed:

- Using your system console/server to enter commands and perform system functions such as powering on and powering off, as described in this guide.
- Adding or replacing PCIe or GPU cards, as described in this guide.
- Adding and replacing disk and SSD drives in the UV 300 chassis.
- Removing and replacing the UV chassis power supplies.
- Removing and replacing a chassis cooling fan assembly.

Chapter Descriptions

The following topics are covered in this guide:

- Chapter 1, “Operation Procedures,” provides instructions for powering on and powering off your system.
- Chapter 2, “System Control,” describes the function of the overall system control network interface and provides basic instructions for operating the controllers.
- Chapter 3, “System Overview,” provides technical overview information needed to understand the basic functional architecture of the SGI UV 300 systems.
- Chapter 4, “Rack Information,” describes the rack sizes and general features.
- Chapter 5, “Add or Replace Procedures,” provides instructions for installing or removing the customer-replaceable components of your system.
- Chapter 6, “Troubleshooting Tips,” provides recommended actions if problems occur on your system.
- Appendix A, “Technical Specifications and Pinouts,” provides physical, environmental, and power specifications for your system. Also included are the pinouts for the non-proprietary connectors.
- Appendix B, “Safety Information and Regulatory Specifications,” lists regulatory information related to use of the UV 300 system in the United States and other countries. It also provides a list of safety instructions to follow when installing, operating, or servicing the product.

Related Publications

The following SGI documents are relevant to the UV 300 series system:

- *SGI UV RMC Software User Guide*
(P/N 007-6361-00x)

This guide describes how to use the system console controller commands to monitor and manage your SGI UV 300 system via line commands. Coverage of control includes descriptions of the interface and usage of the commands. Note that it does **not** cover controller command information for the SGI UV 10, UV 20 or UV 30.

- *SGI Rackable C1104-GP2 and C1110-GP2 System User Guide*, (P/N 007-6388-00x)

This guide discusses the use, maintenance and operation of the 1U server primarily used as an optional “in-rack” IPMI 2.x-enabled server node. This stand-alone 1U compute node interconnects to the UV 300 system RMC (WAN) connector via RJ-45 LAN Ethernet cabling. The user can then interact with the system via a rack-mounted console connected to the C1104-GP2 server.

- *SGI UV System Software Installation and Configuration Guide*
(P/N 007-5948-00x)

In UV systems that come with pre-installed Linux software operating systems; this document describes how to re-install it when necessary. Also, this guide is a reference document for people who manage the operation of SGI UV 300 systems. It explains how to perform general system configuration and operation under Linux for SGI UV. For a list of manuals supporting SGI Linux releases and SGI online resources, see the SGI Performance Suite documentation.

- *Linux Application Tuning Guide for SGI X86-64 Based Systems*
(P/N 007-5646-00x)

This guide includes a chapter that covers advanced tuning strategies for applications running on SGI UV systems as well as other SGI X86 based systems.

- *MegaRAID SAS Software User’s Guide*, publication number (860-0488-00x)

This document describes the LSI Corporation’s MegaRAID Storage Manager software.

- *LSI Integrated SAS for RAID User’s Guide*, publication number (860-0476-00x)

This user guide explains how to configure and use the software components of the LSI Integrated RAID software product used with LSI SAS controllers.

- Man pages (online)

Man pages locate and print the titled entries from the online reference manuals.

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

- See the SGI Technical Publications Library at <http://docs.sgi.com>
Various formats are available. This library contains the most recent and most comprehensive set of online books, release notes, man pages, and other information.
- The release notes, which contain the latest information about software and documentation in this release, are in a file named README.SGI in the root directory of the SGI ProPack for Linux Documentation CD.
- You can also view man pages by typing **man** *<title>* on a command line.

SGI systems shipped with Linux include a set of Linux man pages, formatted in the standard UNIX “man page” style. Important system configuration files and commands are documented on man pages. These are found online on the internal system disk (or DVD) and are displayed using the **man** command. References in the documentation to these pages include the name of the command and the section number in which the command is found. For example, to display a man page, type the request on a command line:

```
man commandx
```

For additional information about displaying man pages using the **man** command, see **man (1)**. In addition, the **apropos** command locates man pages based on keywords. For example, to display a list of man pages that describe disks, type the following on a command line:

```
apropos disk
```

For information about setting up and using **apropos**, see **apropos (1)**.

Conventions

The following conventions are used throughout this document:

Convention	Meaning
Command	This fixed-space font denotes literal items such as commands, files, routines, path names, signals, messages, and programming language structures.
<i>variable</i>	The italic typeface denotes variable entries and words or concepts being defined. Italic typeface is also used for book titles.
user input	This bold fixed-space font denotes literal items that the user enters in interactive sessions. Output is shown in nonbold, fixed-space font.

[]	Brackets enclose optional portions of a command or directive line.
...	Ellipses indicate that a preceding element can be repeated.
man page(x)	Man page section identifiers appear in parentheses after man page names.
GUI element	This font denotes the names of graphical user interface (GUI) elements such as windows, screens, dialog boxes, menus, toolbars, icons, buttons, boxes, fields, and lists.

Product Support

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

- If you are in North America, contact the Technical Assistance Center at +1 800 800 4SGI or contact your authorized service provider.
- If you are outside North America, contact the SGI subsidiary or authorized distributor in your country. International customers can visit <http://www.sgi.com/support/>. Click on the “Support Centers” link under the “Online Support” heading for information on how to contact your nearest SGI customer support center.

Reader Comments

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

You can contact SGI in any of the following ways:

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

SGI values your comments and will respond to them promptly.

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Operation Procedures

This chapter provides an overview on how to operate your new system in the following sections:

- “Precautions” on page 1
- “System Controller Network” on page 3
- “Powering the System On and Off” on page 6
- “Optional SGI Remote Solutions (SGI RS)” on page 20

Precautions

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

- “ESD Precaution” on page 1
- “Safety Precautions” on page 2

ESD Precaution

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

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

Safety Precautions



Warning: Before operating or servicing any part of this product, read the “Safety Information” on page 105.



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



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



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

System Controller Network

All SGI UV 300 enclosures - (UV chassis) use a rack chassis management controller (RMC) node which communicates with the chassis board level BMCs within each software system image (SSI). These components in concert are generically known as the system control network.

The SGI UV 300 system control network provides control and monitoring functionality for each motherboard, power supply, and fan assembly in each UV chassis in the system.

The RMC network provides the following functionality:

- Powering the entire system on and off.
- Powering individual UV chassis on and off.
- Monitoring the environmental state of the system, including voltage levels.
- Monitors and controls status LEDs on the enclosure.
- Supports entry of controller commands to monitor or change particular system functions within a particular UV chassis. See the *SGI UV RMC Software User Guide* (P/N 007-6361-00x) for a complete list of command line interface (CLI) commands.
- Provides access to the system OS console allowing you to run diagnostics and boot the system.
- Provides the ability to flash system BIOS.

System Controller Access

Access to the SGI UV 300 system controller network is accomplished by the following methods:

- A LAN connection to the RJ-45 **WAN** port on the RMC node, (see Figure 1-1).
- A USB-to-micro-USB serial connection to the “Console” port (see **CNSL** in Figure 1-1) on the RMC front panel example.

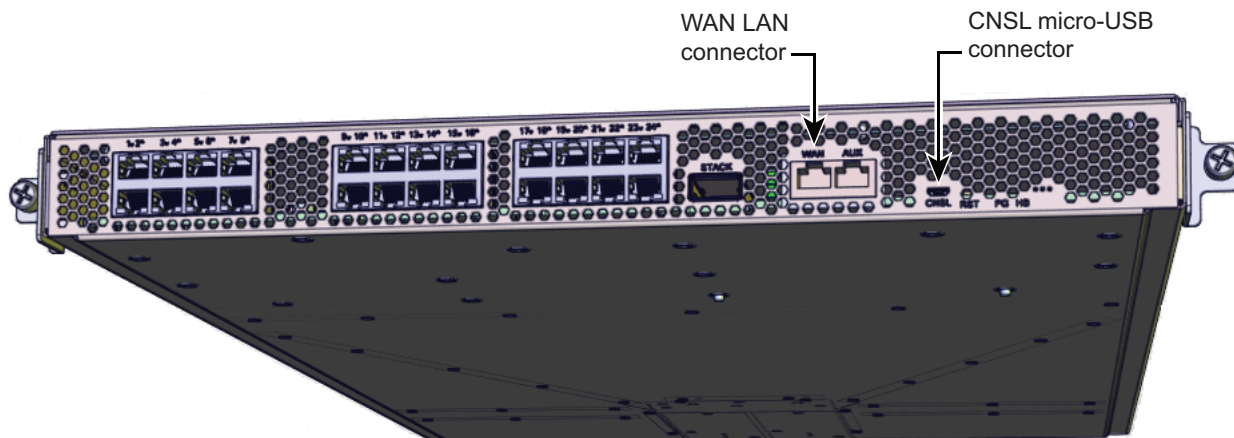


Figure 1-1 SGI UV 300 RMC Front Panel Connections Example

Connecting to the UV System Control Network

The Ethernet connection is the preferred method of accessing the system console.

Administrators can perform one of the following options for connectivity:

- An in-rack or portable system console can be directly connected to the RMC micro-USB connect port, (labeled **CNSL**- see Figure 1-1 on page 4). This requires connecting from a laptop or workstation that is physically located near the system.
- A LAN connection is used to communicate directly with the RMC, using the IPMI 2.x protocols. This LAN connection must be made to the RJ-45 **WAN** port on the RMC. This connection can be used with a local or remote IPMI-enabled console device.

Communicating with the System

The two primary ways to communicate with and administer the SGI UV 300 system are through the RMC interface/UV command line interface (CLI) or through an IPMI 2.x LAN interface.

The Command Line Interface

The UV command line interface is accessible by logging directly into a rack management controller (RMC).

Log in as `root`, (default password **root**) when logging into the RMC. As in this example:

```
asylum$ ssh root@uv300-rmc
root@uv300-rmc's password: root
SGI UV300 RMC, Rev. 1.1.xx [Bootloader 1.1.x]
RMC:r001i01c> help
```

Once a connection to the RMC is established, system control commands can be entered. See the following subsection for some examples.

See “Powering On and Off from the Command Line Interface” on page 11 for additional specific examples of using the CLI commands.

Example CLI Commands Used

The following is a list of some available UV CLI commands:

```
auth    authenticate SSN/APPWT change
bios    perform bios actions
bmc     access BMC shell
rmc     access RMC shell
config  show system configuration
console access system consoles
help    list available commands
hel     access hardware error logs
hwcfg   access hardware configuration variable
leds    display system LED values
log     display system controller logs
power   access power control/status
```

Type '`<cmd> --help`' for help on individual commands.

Powering the System On and Off

This section explains how to power on and power off individual rack units, or your entire SGI UV 300 system, as follows:

- “Preparing to Power On” on page 7
- “Powering On and Off from the Command Line Interface” on page 11
- “Booting Directly From an RMC” on page 11

Using an RMC connection, you can power on and power off an individual UV 300 chassis, or the entire system.

Preparing to Power On

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

1. Check to ensure that the power connector on the cable between the rack's power distribution units (PDUs) and the wall power-plug receptacles are securely plugged in.
2. For each individual UV chassis that you want to power on, make sure that the power cables are plugged into all the chassis power supplies correctly, see the example in Figure 1-2. Setting the circuit breakers on the PDUs to the "On" position will apply power to the individual UV 300 chassis and will start the RMC node if it is plugged into the same PDU. Turn off the PDU breaker switch on the PDU(s) that supply voltage to the chassis or RMC power supplies if you want to remove all power from a particular unit.

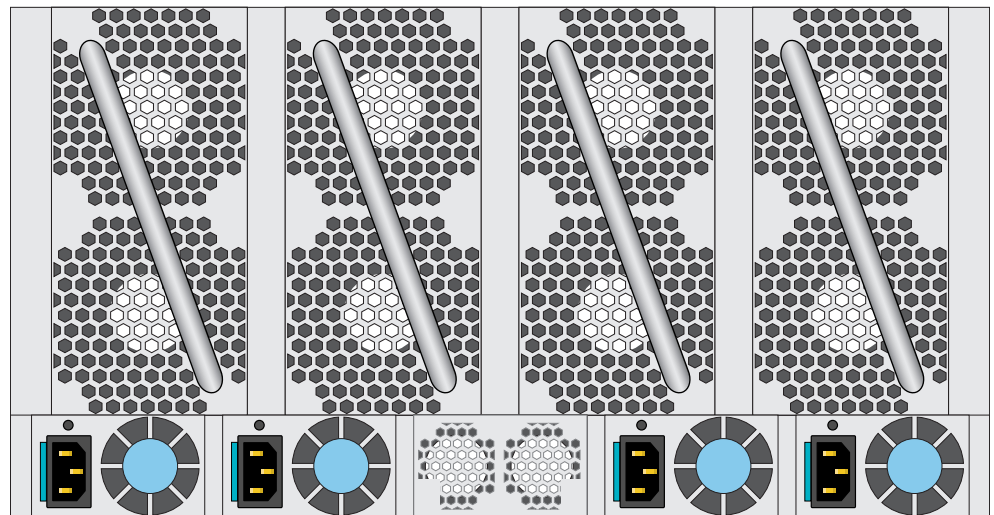


Figure 1-2 UV 300 Chassis Power Supply Cable Location Example

3. If you plan to power on a UV 300 system that includes optional mass storage enclosures, make sure that the power switch on the rear of each PSU/cooling module (one or two per enclosure) is in the **1** (on) position.

4. Make sure that all PDU circuit breaker switches (see the examples in the following subsection) are turned on to provide power to the server when the system is powered on.

SGI UV 300 PDUs

The SGI eight-outlet 220V single-phase PDU has eight IEC 320 C13 220-VAC 10-Amp receptacles for power distribution. This is the PDU that is used to distribute power to the server chassis and other enclosures when the system is configured with single-phase power.

The eight output receptacles on the PDU are split into two, four-outlet groups. Each group of four outlets is limited to a maximum of 20 Amps. North-American and European PDUs look and function in a similar manner but have different SGI marketing codes and the following additional differences:

North American 8-outlet PDU:

- Power cord (12 ft. [3.66 m]) with a NEMA L6-30 plug, 30A, 250V
- 24 Amps maximum current at 200 - 240 VAC (4.8kVA maximum)

European 8-outlet PDU:

- Power cord (12 ft. [3.66 m]) with IEC60309 plug, 32A, 250V
- 32 Amps maximum current at 200 - 240 VAC (6.4kVA maximum)

Note: SGI PDUs are designed to fit into SGI racks. The use of SGI PDUs in 3rd-party racks may require custom mounting hardware. If SGI PDUs are not used, the installer needs to connect each power supply to a 20-Amp certified circuit breaker with properly rated C13/C14 cordage.

Figure 1-3 on page 9 shows an example of an eight-plug single-phase PDU that can be used in the SGI UV 300 rack system. This unit may also be used to support auxiliary equipment in the rack.

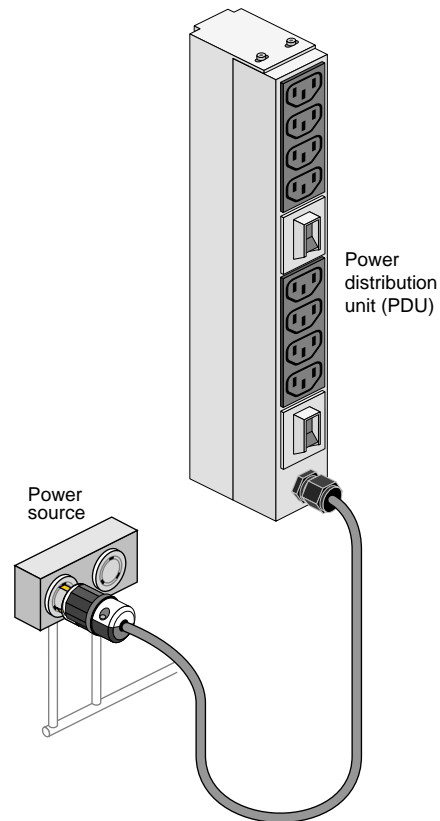


Figure 1-3 Single-Phase 8-Outlet PDU Example

There are two three-phase PDUs available for use with the UV 300 rack: one for North American use and one for international use. The 21-outlet, 3-phase PDUs are the central distribution point for AC power within each rack.

The North American PDU uses a 60 amp IEC60309 plug, 220-VAC input with a 4-wire, delta-connected construction. The 21 IEC320 type C13 outlets are arranged as six 2-receptacle outlet banks and three 3-outlet backs. Each receptacle bank supports a maximum of 20 amps at 230 VAC. There are nine 20-Amp thermal circuit breakers - one circuit breaker for each receptacle bank.

The PDU for international use is nearly identical, with the exception that it uses a 5-wire, 415V, 32A IEC60309 plug with a WYE construction. These PDUs are used to distribute power to each UV 300 chassis when the system is configured with three-phase power.

Figure 1-4 shows an example of the three-phase PDU that can be used in the SGI UV 300 system.



Figure 1-4 Three-Phase SGI PDU Example

Powering On and Off from the Command Line Interface

The SGI UV 300 command line interface is accessible by logging into the RMC as **root**.

Instructions issued at the command line interface of a local console prompt typically only affect the local SSI or a part of the system. Depending on the directory level you are logged in at, you may power up an entire SSI, a single rack, or a single UV 300 enclosure. In CLI command console mode, you can obtain only limited information about the overall system configuration. An RMC has information about all the UV 300 enclosures in its rack or SSI. Each UV 300 chassis has information about its internal motherboard and options, and also (if other enclosures are attached via NUMALink to the unit) information about those UV 300s.

Booting Directly From an RMC

Use a USB-to-micro USB cable to administer your system locally from the RMC.

Connect the cable from your administrative laptop or other device directly to the port labeled **CNSL** on the RMC. Note that the RMC will not (by default) require a password when you login via the **CNSL** port.

The console type and how these console types are connected to the SGI UV 300 systems is determined by what console option is chosen. Establish either a serial connection and/or network/Ethernet LAN connection to the RMC.

USB-Connected Console Hardware Requirements

The local USB-connected terminal should be set to the following functional modes:

- Baud rate of 115,200
- 8 data bits
- One stop bit
- No parity
- No hardware flow control (RTS/CTS)

Note that RMC serial console administration is limited to a maximum of 16 UV 300 enclosures and these enclosures must all be localized. The physical console is located on the UV 300 system chassis that has the BaseIO board installed. Check with your SGI service or support provider for additional details on these limitations.

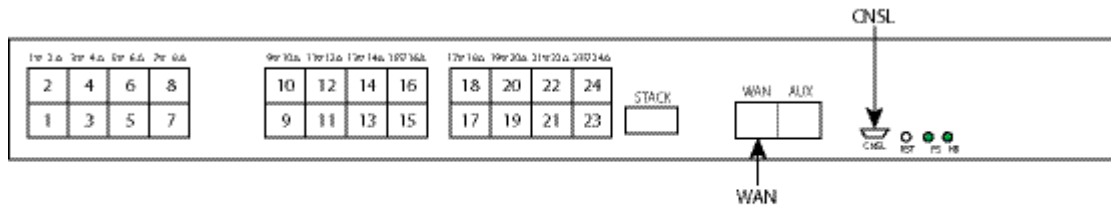


Figure 1-5 RMC Ethernet LAN (**WAN** Port) Location Example

Remote LAN Connection to the RMC

If you have an SGI UV 300 system and wish to use a remote or local system to administer the UV system via LAN, you can connect via Ethernet cable to the RMC node's **WAN** port (identified in Figure 1-5).

- The terminal should be set to the operational modes described in the previous subsection.
Note that a USB serial console is generally connected to the RMC in any configuration not using an optional “in-rack” or remote server/console device.
- If you intend to use a LAN-connected administrative server to communicate with the RMC, the RMC will either need to be assigned a DHCP IP address, or you will need to configure it with a static IP address. See the following subsections for more information.

Establishing RMC IP Hardware Connections

For IP address configuration, there are two options: DHCP or static IP. The following subsections provide information on the setup and use of both.

Note: Both options require the use of the RMC’s micro-USB serial port, refer to Figure 1-1 on page 4.

LAN Network (LAN RJ-45) connections to the SGI UV 300 RMC are always made via the **WAN** port.

For DHCP, you must determine the IP address that the RMC has been assigned; for a static IP, you must also configure the RMC to use the desired static IP address.

To use the serial port connection, you must attach and properly configure a micro-USB interface cable to the RMC's **CNSL** port. Configure the serial port as described in "USB-Connected Console Hardware Requirements" on page 11.

When the serial port session is established, the console will show an RMC login, and the user can login to the RMC as user "root". Note that there is not (by default) a password required to access the RMC via the **CNSL** port.

Using DHCP to Establish an IP Address

To obtain and use a DHCP generated IP address, plug the RMC's external RJ-45 network port (**WAN**) into a network that provides IP addresses via DHCP; the RMC can then acquire an IP address.

To determine the IP address assigned to the RMC, you must first establish a connection to the RMC serial LAN port (as indicated in the section "USB-Connected Console Hardware Requirements" on page 11), and run the command "ifconfig eth1". This will report the IP address that the RMC is configured to use.

Running the RMC with DHCP is not recommended as the preferred option for SGI UV 300 systems. The nature of DHCP makes it difficult to determine the IP address of the RMC, and it is possible for that IP address to change over time, depending on the DHCP configuration usage. The exception would be a configuration where the system administrator is using DHCP to assign a "permanent" IP address to the RMC.

To switch from a static IP back to DHCP, the configuration file `/etc/sysconfig/ifcfg-eth1` on the RMC must be modified (see additional instructions in the "Using a Static IP Address" section). The file must contain the following line to enable use of DHCP:

```
BOOTPROTO=dhcp
```

Using a Static IP Address

To configure the RMC to use a static IP address, the user/administrator must edit the configuration file `/etc/sysconfig/ifcfg-eth1` on the RMC. The user can use the "vi" command (i.e. "vi /etc/sysconfig/ifcfg-eth1") to modify the file.

The configuration file should be modified to contain these lines:

```
BOOTPROTO=static
IPADDR=<IP address to use>
NETMASK=<netmask>
GATEWAY=<network gateway IP address>
HOSTNAME=<hostname to use>
```

Note that the "GATEWAY" and "HOSTNAME" lines are optional.

After modifying the file, save and write it using the vi command ":w!", and then exit vi using ":q". Then reboot the RMC (using the "reboot" command); after it reboots, it will be configured with the specified IP address.

Power On the System Using the RMC Network Connection

You can use a network connection to power on your UV 300 system as described in the following steps:

1. You can use the IP address of the RMC to perform an SSH login, as follows:

```
ssh root@<IP-ADDRESS>
```

Typically, the default LAN password for the RMC set out of the SGI factory is **root**.

The following example shows the RMC prompt:

```
SGI UV300 RMC, Rev. 1.1.xx [Bootloader 1.1.x]
RMC:r001i01c>
```

This refers to rack 1, RMC 1.

2. Power up your UV 300 system using the power on command, as follows:

```
RMC:> power on
```

The system will take time to fully power up (depending on size and options). Larger systems take longer to fully power on. Information on booting Linux from the shell prompt is included at the

end of the next subsection (“Monitoring Power On” on page 15). The following command options may be used with the RMC CLI:

Power On Example

usage: **power [-vcow] on|up [TARGET]**...turns power on

-v, --verbose	verbose output
-c, --clear	clear EFI variables (system and partition targets only)
-o, --override	override partition check
-w, --watch	watch boot progress

Power Down Example

usage: **power [-vo] off |down [TARGET]**...shuts power down

Reset System Example

usage: **power [-vchow] reset [TARGET]**...resets the system power

Power Status Check Example

usage: **power [-vl0ud] status [TARGET]**...checks power-on status

To monitor the power-on sequence during boot, see the next section “Monitoring Power On”, the `-uvpower` option must be included.

Monitoring Power On

Establish another connection to the RMC and use the `uvcon` command to open a system console and monitor the system boot process. Use the following steps:

```
RMC:> uvcon
uvcon: attempting connection to localhost...
uvcon: connection to RMC (localhost) established.
uvcon: requesting baseio console access at r001i01b00...
uvcon: tty mode enabled, use 'CTRL-]' 'q' to exit
uvcon: console access established
uvcon: RMC <--> BASEIO connection active
```

```
*****  
***** START OF CACHED CONSOLE OUTPUT *****  
*****  
***** [20100512.143541] BMC r001i01b10: Cold Reset via NL  
broadcast reset  
***** [20100512.143541] BMC r001i01b07: Cold Reset via NL  
broadcast reset  
***** [20100512.143540] BMC r001i01b08: Cold Reset via NL  
broadcast reset  
***** [20100512.143540] BMC r001i01b12: Cold Reset via NL  
broadcast reset  
***** [20100512.143541] BMC r001i01b14: Cold Reset via NL  
broadcast reset  
***** [20100512.143541] BMC r001i01b04: Cold Reset via NL....
```

Note: Use CTRL-] q to exit the console when needed.

Depending on the size of your system, it can take 5 to 10 minutes for the UV 300 system to boot to the EFI shell. When the `shell>` prompt appears, enter `fs0:` as in the following example:

```
shell> fs0:
```

At the `fs0:` prompt, enter the Linux boot loader information, as follows:

```
fs0:> /efi/suse/elilo.efi
```

The ELILO Linux Boot loader is called and various SGI configuration scripts are run and the SUSE Linux Enterprise Server 12 Service Pack *x* installation program appears.

Power off an SGI UV 300 System

To power down the UV 300 system, use the `power off` command, as follows:

```
RMC:> power off  
==== r001i01c (PRI) ====
```

You can also use the `power status` command, to check the power status of your system

```
RMC:> power status  
==== r001i01c (PRI) ====
```

```
on: 0, off: 16, unknown: 0, disabled: 0
```

Optional In-Rack Console Server

For end users who require an in-rack server/console as part of their UV 300 system, a 1U server node is offered in combination with a rack-mounted flat-panel console (see “Optional In-Rack Flat-Panel Console” on page 19).

The in-rack IPMI 2.x-enabled server (Figure 1-6) is a dual-processor serverboard based on the Intel C612 chipset. The serverboard supports two Intel Xeon E5-2600 series processors. Separate QPI link pairs connect the two processors and the I/O hub in a network on the board.

For more information on the in-rack server option, see the *SGI Rackable C1104-GP2 and C1110-GP2 System User Guide*, (P/N 007-6388-00x). This guide discusses the use, maintenance and operation of the 1U server.

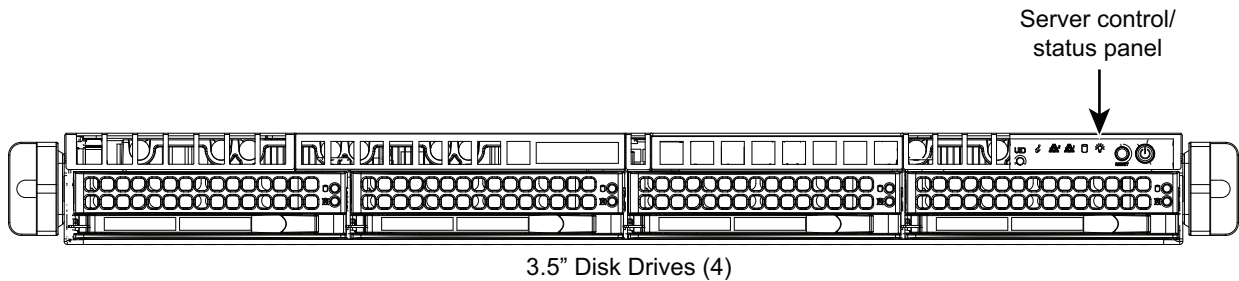


Figure 1-6 Optional In-Rack Console Server Example (Front View)

UV 300 IPMI 2.x Administration Overview

IPMI 2.x protocols can be used to monitor and/or administer a UV 300 system remotely using system management software available at the customer site. An optional integrated (in-rack) server with a separate flat-panel console is also available with the UV 300. Administrators can use the server/console to monitor UV platform status such as:

- System temperatures
- Chassis and board voltage levels
- Fan and power supply operation
- Chassis intrusion events

IPMI 2.x commands can be used to query inventory information, to review hardware logs of out-of-range conditions, or to perform recovery procedures such as issuing requests from a local or remote console via LAN for system power-up, power-down or rebooting. The IPMI 2.x default username and password are `ADMIN` and `ADMIN`.

Administrative systems can also communicate with the UV 300 using serial over LAN and the console output can be remotely viewed over the LAN. Systems implementing IPMI 2.x often include KVM over IP or remote virtual media capability, as well as out-of-band embedded web-server interface functionality. Availability of these functions will vary based on end user hardware/software options and configurations. Check with your SGI sales or service representative for available options.

As mentioned in “Remote LAN Connection to the RMC” on page 12, the server/console LAN connection should be physically connected to the (**WAN**) RJ-45 port on the UV 300 system RMC. See Figure 1-5 on page 12 for an example location of the RMC’s **WAN** connector port.

Optional In-Rack Flat-Panel Console

The flat-panel console option (see Figure 1-7) has the following listed features:

1. **Slide Release** - Move this tab sideways to slide the console out. It locks the drawer closed when the console is not in use and prevents it from accidentally sliding open.
2. **Handle** - Used to push and pull the module in and out of the rack.
3. **LCD Display Controls** - The LCD controls include On/Off buttons and buttons to control the position and picture settings of the LCD display.
4. **Power LED** - Illuminates blue when the unit is receiving power.

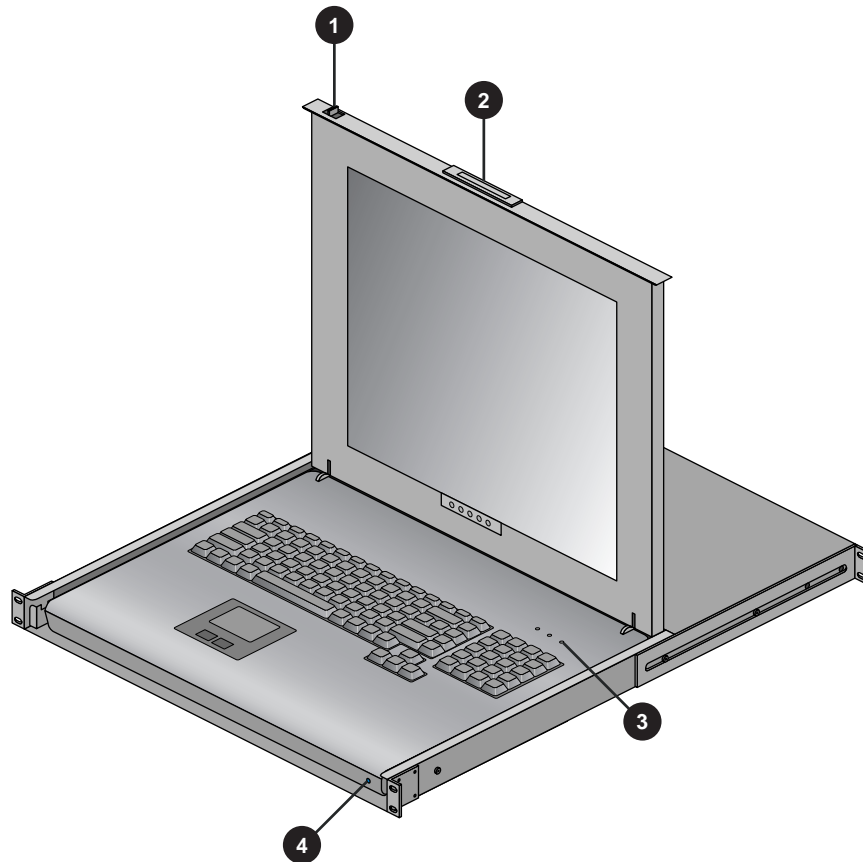


Figure 1-7 Flat Panel Rackmount Console Option

A console is defined as a connection to the RMC (via an IPMI 2.x-enabled server) that provides IPMI access to the UV system. SGI offers a rackmounted flat panel console option that attaches to the console server's USB and video connectors.

A console can also be a LAN-attached personal computer, laptop or workstation (RJ45 Ethernet connection). Serial-over-LAN is enabled by default on the IPMI 2.x-enabled console server and normal output through the RS-232 port is disabled. In certain limited cases, a dumb (RS-232) terminal could be used to communicate directly with the IPMI 2.x administrative server. This connection is typically used for service purposes or for system console access in smaller systems, or where an external LAN connection is not used or available. Check with your service representative if use of an RS-232 terminal is required for your system.

The flat panel rackmount or other optional VGA console connects at the rear of the IPMI 2.x-enabled console server shown in Figure 1-8.

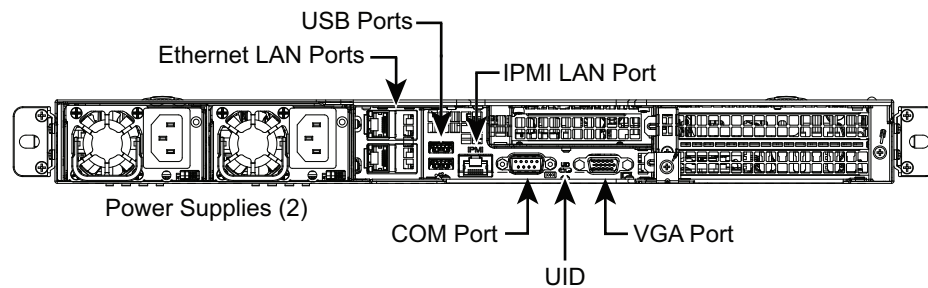


Figure 1-8 Optional (In-Rack) Console Server Rear View Example

Optional SGI Remote Solutions (SGI RS)

The optional SGI RS system automatically detects system conditions that indicate potential future problems and then notifies the appropriate personnel. This enables you and SGI global support teams to proactively support systems and resolve issues before they develop into actual failures.

SGI Remote Services provides a secure connection to SGI Customer Support - on demand. This can ensure business continuance with SGI systems management and optimization.

SGI Remote Solutions Primary Capabilities

- 24x7 remote monitoring and data gathering of SGI UV customer systems
- Alerts and notification on changes, failures and potential failures
- Log files immediately available
- Configuration fingerprint
- Secure file transfer
- Optional secure remote access to customer systems

SGI Remote Solutions Benefits

- Improved uptime and system availability
- Proactive identification of issues before they create an outage
- Increase system stability by monitoring hardware and software version compatibility
- Reduced time to resolve support cases
- Greater operational efficiency
- Less involvement of customer staff during troubleshooting
- Faster support case resolution
- Improved productivity

Proactive potential problem identification can result in higher system availability

Automated Alerts and, in some instances, Case Opening results in faster problem resolution time and less direct involvement required by Customer Support Teams. SGI Remote Services is available for all UV systems and also other specific SGI systems.

SGI Remote Service Operations Overview

An SGI Support Services Software Agent runs on each SGI system at your location, enabling remote system monitoring and secure communication to SGI Support staff. Your basic hardware and software configuration as well as system health information is captured and stored in the Cloud. Figure 1-9 shows an example visual overview of the monitoring and response process.

Cloud intelligence automatically reviews select Event Logs around the clock (every five minutes) to identify potential failure information. If the Cloud intelligence detects a critical Event, it notifies SGI support personnel.

This monitoring requires no changes to customer systems or firewalls as long as the SGI Agent can send HTTPS messages to highly secure Cloud and Global Access Servers. It will also have no impact on customer network or system performance. All communication between SGI global support and customer systems is kept secure using Secure Socket Layer (SSL) encryption. All communication with SGI is initiated from the customer site using HTTPS protocol on port 443.

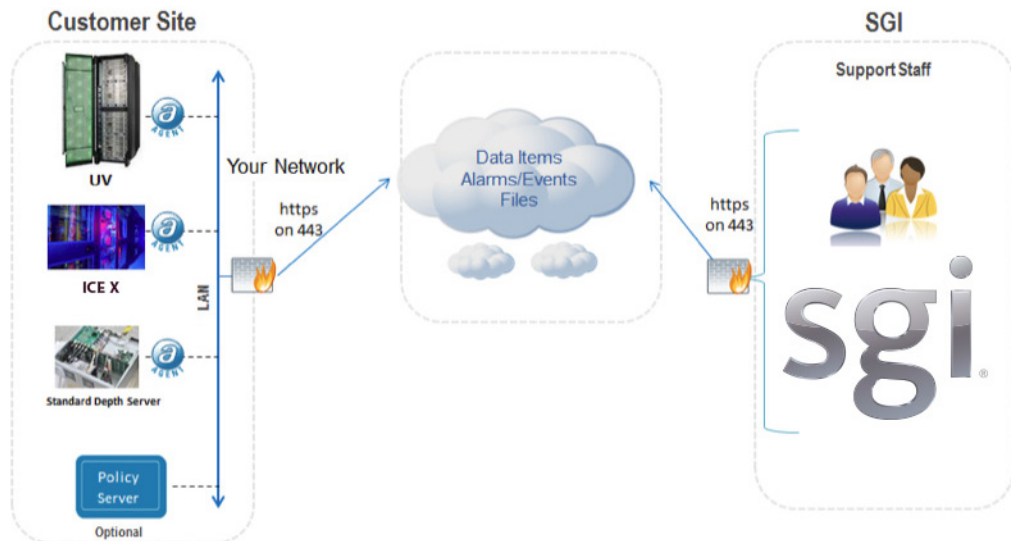


Figure 1-9 SGI Remote Solutions Process Overview

System Control

This chapter describes the general interaction and functions of the overall UV 300 system control. System control parameters depend somewhat on the overall size and complexity of the SGI UV 300 but will generally include the following three areas:

- The administrative LAN-to-RMC server (IPMI 2.x-enabled) and connects to the RMC's **(WAN)** RJ-45 Ethernet port
- The rack management controller (RMC) node - (one in each UV 300 system)
- The individual chassis-based board management controllers (BMCs) - report to the RMC

Note: SGI offers a rack-mounted flat panel console option that attaches to a rack-mounted administrative server node's video, keyboard and mouse connectors. These two hardware options each require 1U of space within the rack (2U total). This combination acts as an "in-rack" console/server option for users who want localized system administration.

Levels of System Control

The system control network configuration of your server will depend on the size of the system and control options selected. Typically, an Ethernet LAN connection to the system controller network is used. This Ethernet connection is made from a local or remote PC, server or workstation connected to the rack management controller node (RMC). Use of IPMI 2.x inquiries requires that the software be available on the administrative system.

The RMC is a separate stand-alone 1U controller installed in the SGI UV 300 rack. The RMC acts as a gateway and buffer between the UV system control network and any other public or private local area networks or systems used to communicate with the UV 300 SSI.

Important: The SGI UV system control network is a private, closed network. It should not be reconfigured in any way to change it from the standard SGI UV factory installation. It should not be directly connected to any other network. The UV system control network is not designed for and does not accommodate additional network traffic, routing, address naming (other than its own schema), or DHCP controls (other than its own configuration). The UV system control network also is not security hardened, nor is it tolerant of heavy network traffic, and is vulnerable to Denial of Service attacks.

System Management Overview

An Ethernet connection directly from the RMC node (Figure 2-1 on page 25) to a local private or public LAN allows the system to be administered directly from a local or remote console. Note that there is no direct inter-connected system controller function in any optional expansion or storage modules.

The system controller network is designed into all UV 300 chassis motherboards. Controllers within the system report and share status information via the RMC Ethernet interconnect cables. This maintains controller configuration and topology information between all controllers in an SSI. Figure 2-2 on page 26 shows an example system control network using an optional and separate (remote) workstation to monitor a single-rack SGI UV 300 system. It is also possible to connect an optional PC or server directly to the RMC via USB, see Figure 2-2 on page 26 for an example diagram of RMC system management.

Note: Mass storage option enclosures are not specifically monitored by the system controller network. Most optional mass storage enclosures have their own internal microcontrollers for monitoring and controlling all elements of the disk array. See the user guide for your mass storage option for more information on this topic.

For information on software commands used for administering network connected SGI UV 300 systems using the SGI RMC node, see the *SGI RMC Software User's Guide* (P/N 007-6361-00x).

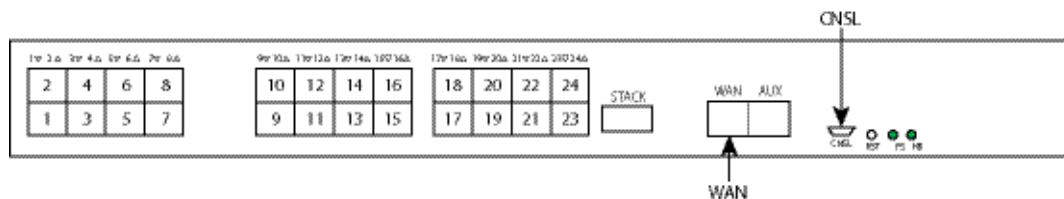


Figure 2-1 RMC Front Panel Diagram

Rack Management Controller (RMC) Overview

The RMC system for the SGI UV 300 servers manages power control and sequencing, provides environmental control and monitoring, initiates system resets, stores identification and configuration information, and provides console/diagnostic and scan interface.

The Rack Management Controller (RMC) provides the top layer of system control for the UV 300 system. This controller is a stand alone 1U high rack mount chassis.

Note: Physical placement of the 1U RMC enclosure is above or between the UV 300 enclosures in a rack. The RMC slides out the front of the rack only.

The RMC uses an internal 24-port Ethernet switch, which can provide system control for up to a two rack (16 chassis) UV 300 system. The RMC accepts direction via IPMI 2.x-enabled protocol software and supports powering-up and powering-down individual motherboards and environmental monitoring of all units within the UV 300 chassis.

The RMC sends operational requests to the Baseboard Management Controller (BMC) on each compute/memory motherboard installed. The RMC and the BMC are active whenever power is applied to the system. The RMC and BMC are not dependent on the UV 300 system having the operating system booted and operational.

The RMC provides data collected from the motherboard within each VU 300 chassis to the IPMI 2.x-enabled node upon request. The RMC in a system distributes its inquiries and information to all the UV 300 motherboards within the SSI. Note that any racks dedicated exclusively to optional mass storage units do not have an RMC installed.

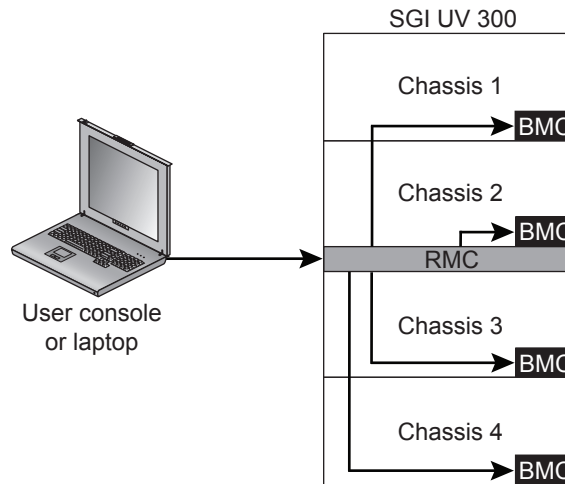


Figure 2-2 SGI UV 300 Rack Management Control Functionality Example

BMC Overview

Each system motherboard has a baseboard management controller (BMC). The BMC is a built-in specialized microcontroller hardware component that monitors and reports on the functional “health” status of the motherboard. The BMC provides a key functional element in the overall Intelligent Platform Management Interface (IPMI) architecture.

The BMC acts as an interface to the higher levels of system control such as the RMC node and the higher level control system used in the optional system management node. The BMC can report any on-board sensor information that it has regarding temperatures, power status, operating system condition and other functional parameters that may be reported by the motherboard. When any of the preset limits fall out of bounds, the information will be reported by the BMC and an administrator can take some corrective action. This could entail a chassis shutdown, reset (NMI) or power cycling of the UV 300 enclosure.

The individual motherboard BMCs do not have information on the status of other motherboards within the SSI. This function is handled by the RMC and reported to an administrative console/server. Note that motherboards equipped with an optional BaseIO riser board have a dedicated BMC Ethernet port.

System Controller Interaction

In all UV 300 servers the system controller types (RMCs and BMCs) communicate with each other in the following ways:

- System control commands and communications are passed between the administration node and the RMC via LAN or a local USB interface cable.
- The RMCs communicate directly with the BMC in each installed UV 300 chassis via a dedicated “internal” Gigabit Ethernet network.
- Each UV 300 chassis has a dedicated RMC interface connector on the front of the system chassis.

Controllers

Each SGI UV 300 system must have at least one RMC node installed. The following subsections describe the basic features of the controllers:

Note: For additional information on controller commands, see the *SGI UV RMC Software User Guide* (P/N 007-6361-00x).

Rack Management Controller Functions

The following list summarizes the control and monitoring functions that the RMC performs:

- Supports a Gigabit Ethernet interface
- Supports a limited (IPMI 2.x) interface for power control
- Controls powering up/down of the UV 300 chassis' in the system
- Supports Time Sync by providing synchronous Ethernet to each node BMC
- Provides a platform from which system data can be captured on failure (uv3dump operation)
- Provides a platform from which various firmware updates can be initiated
- Provides inventory of system components as well various firmware revisions currently flashed
- Monitors and reports issues with the RMC related to power, fans, temperature, free memory and disk space
- Provides RJ45 ports for connections to UV 300 BMCs

The following connectors and LEDs are also located on the front panel of the RMC:

- Stack connector - This 38 circuit ipass connector is used to expand the system management network by connecting to a second RMC
- WAN port - this RJ45 port is used to connect to the customer's LAN or an "in-rack" administration node
- AUX port - this RJ45 port currently is non-functional (reserved for future use)
- CNSL port - this micro USB B port is used for a local console/server connection

- RST switch - this is a recessed push button switch used for reset of the RMC. The switch is accessed by inserting a small screw driver or similar device through an opening in the front panel.
- PG LED - the green power good LED is illuminated when the correct power levels are present in the RMC.
- HB LED - the green heart beat LED flashes when the RMC is functioning normally

System Overview

This chapter provides an overview of the physical and architectural aspects of your SGI UV 300 series system. The major components of the SGI UV 300 series systems are described and illustrated.

The SGI UV 300 series is a family of advanced symmetric multiprocessing (SMP) computer systems that initially scale from 4 to 32 Intel processor sockets as a cache-coherent single system image (SSI). Each processor socket in the system houses multiple compute “cores”. Future releases may scale to larger processor counts for single system image (SSI) applications. Contact your SGI sales or service representative for the most current information on this topic.

In an SMP system, each chassis contains memory that it shares with all other processors in the system. Because the UV system is modular, it combines the advantages of lower entry-level cost with global scalability in processors, memory, and I/O. You can install and operate the SGI UV 300 series system in your lab or server room. Each 42U SGI rack holds up to eight 5U-high enclosures that each support one four-processor motherboard. The chassis contains boards, ASICS, processors, memory components and I/O chip sets. The motherboard is physically placed near the bottom of the SGI UV 300 chassis.

This chapter consists of the following sections:

- “System Models” on page 32
- “System Architecture” on page 34
- “System Features” on page 36
- “System Components” on page 40

Figure 3-1 on page 32 shows the front view of a single-rack SGI UV 300 system.

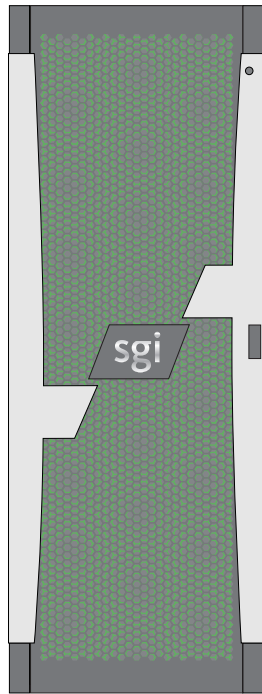


Figure 3-1 SGI UV 300 System Rack Example

System Models

The basic enclosure within the SGI UV 300 system is the 5U-high compute chassis. The UV chassis contains one four-socket motherboard connected to support up to 28 NUMALink 7 ports (each with a maximum bi-directional bandwidth communication rate of up to 7.47 GB/sec.)

Each chassis has ports that are brought out to external NUMALink 7 connectors located on the front of each chassis. The rack for this server houses all UV enclosures, option modules, and other components in a single rack. The SGI UV 300 server system can expand up to 32 Intel processors per SSI; at time of publication, a minimum of one BaseIO riser board is required for every 32 processors. Higher processor counts in an SSI may be available in future releases, check with your SGI sales or service representative for the most current information.

Figure 3-2 on page 33 shows an example of a UV 300 chassis prior to mounting in a rack.

The system requires a minimum of one rack with enough power distribution units (PDUs) to support the chassis and any optional equipment installed in the rack. Each single-phase PDU has eight outlets.

The three-phase PDU has 21 outlets used to support the UV chassis and any optional equipment that may be installed in a rack.

You can also add additional PCIe expansion cards or RAID and non-RAID disk storage to your server system.

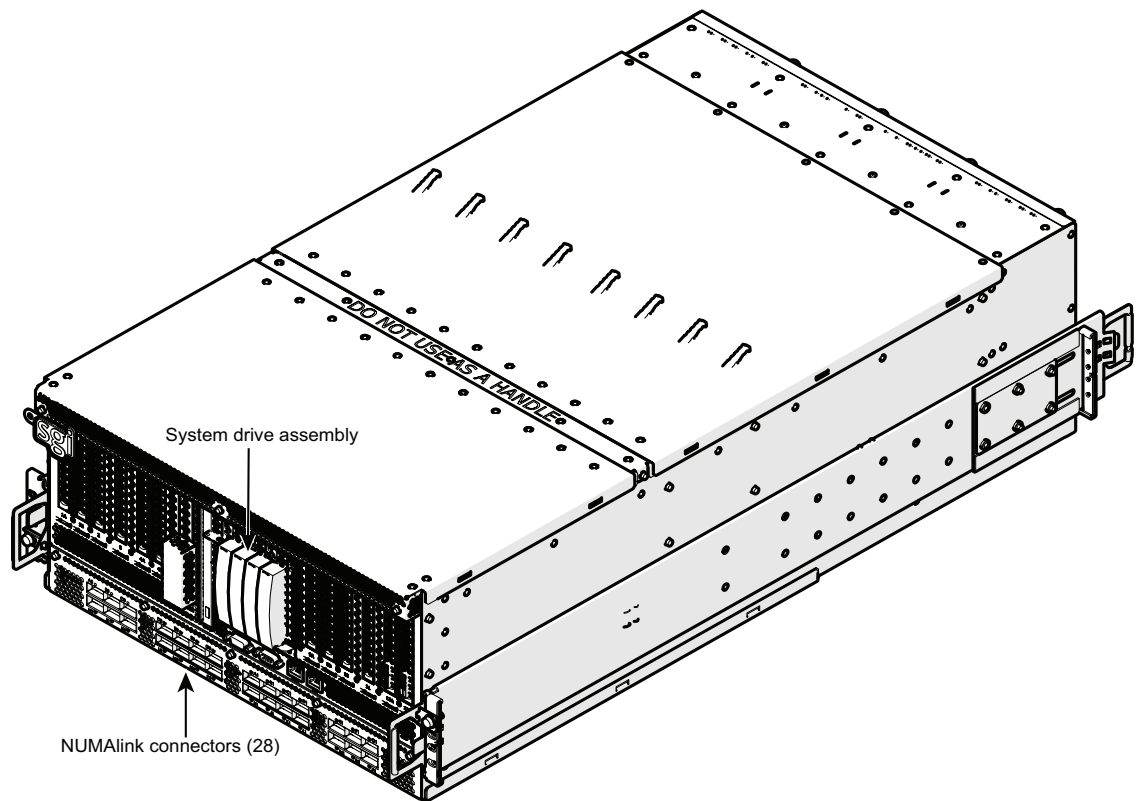


Figure 3-2 SGI UV 300 Chassis Example

About the UV 30EX Model of the UV 300 Server

The UV 30EX server is a single-chassis version of the UV 300 system. It consists of a base-enabled UV 300 chassis (similar to the example in Figure 3-2 on page 33), an RMC and the administrative cables to interconnect the two units. The NUMALink channels in a UV 30EX are disabled.

Important: The UV 30EX system can only be expanded into a multi-chassis (UV 300) system through the purchase of an upgrade package. To interconnect and communicate with expansion chassis', a software authentication key, additional NUMALink cables (as needed) and a service visit by an SGI authorized installer are required. Contact your SGI sales or service representative for additional information on upgrading an SGI UV 30EX system.

System Architecture

The SGI UV 300 computer system is based on a cache-coherent non-uniform memory access architecture. The system uses a global-address-space that scales up to 576 processor cores in a single rack. Because it is modular, the UV 300 architecture combines the advantages of lower entry cost with the ability to scale processors, memory, and I/O independently to a maximum of 576 cores on a single-system image (SSI). Larger SSI configurations may be offered in the future, contact your SGI sales or service representative for the most current information.

The system interconnect architecture for the SGI UV 300 system is a seventh-generation NUMALink symmetric multiprocessing (SMP) architecture known as NUMALink 7. In the NUMALink 7 architecture, all processors and memory can be tied together into a single logical system. This combination of processors, memory, and internal switches constitute the interconnect fabric called NUMALink within each UV 300 SSI.

The basic expansion building block for the NUMALink interconnect is the UV 300 chassis; each chassis uses two HARP ASICs and four Intel processors with multiple cores and on-chip secondary caches. Each HARP ASIC supports two internal communication Hubs and each of the chassis' Intel processors are connected to a Hub via one 8.0GT/s quick path interconnect channel.

The HARP ASIC is the heart of the UV 300 chassis technology. This specialized ASIC acts as a crossbar between the processors and remote DRAM memory. The ASIC enables any processor to access the memory of all processors in the SSI. Figure 3-3 on page 35 shows a functional block diagram of the SGI UV 300 series system chassis.

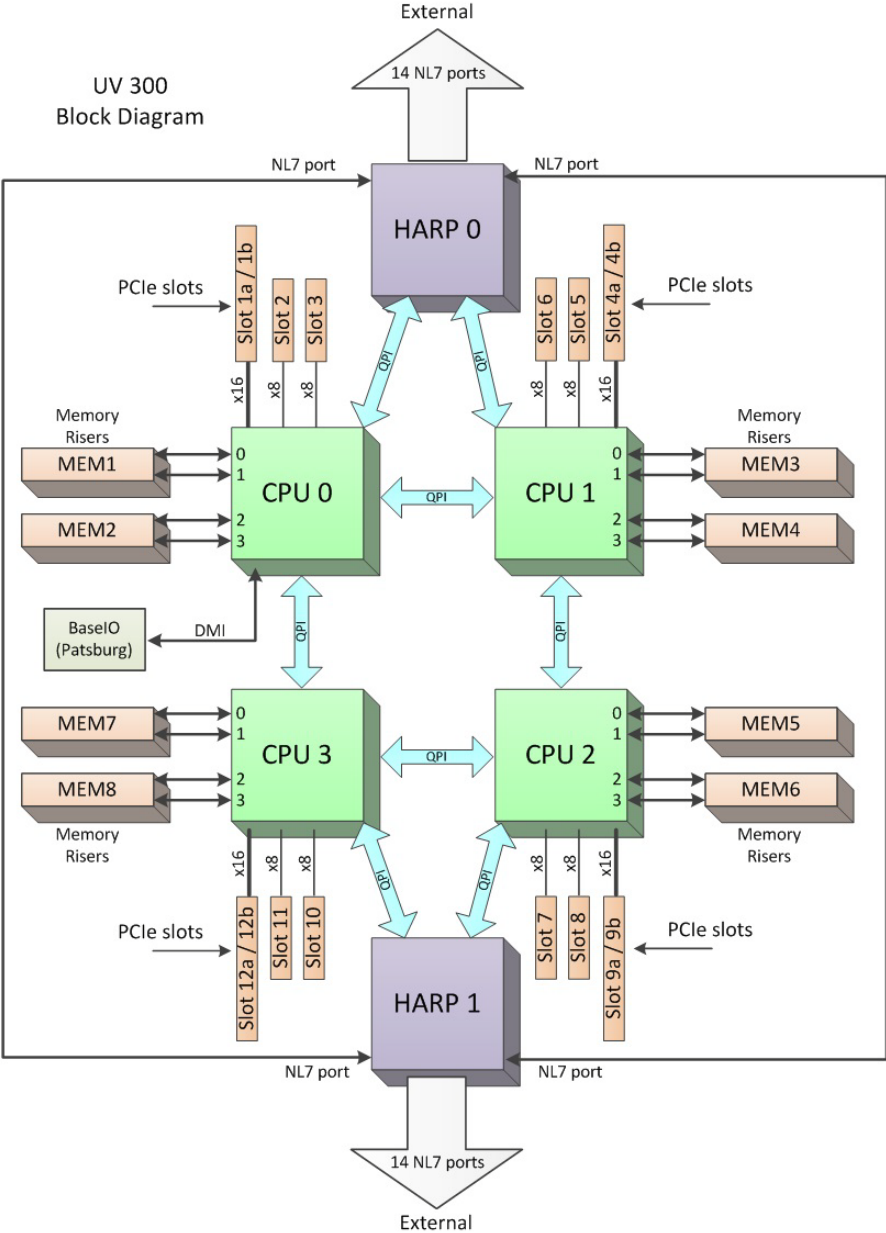


Figure 3-3 Functional Block Diagram of the UV 300 Chassis Motherboard

System Features

The main features of the SGI UV 300 series server systems are discussed in the following sections:

- “Modularity and Scalability” on page 36
- “Distributed Shared Memory (DSM)” on page 36
- “1U Rack Management Controller (RMC) Node” on page 38
- “Distributed Shared I/O” on page 38
- “Reliability, Availability, and Serviceability (RAS)” on page 39

Modularity and Scalability

The SGI UV 300 series systems are modular systems. The compute/memory/PCIe components are housed in a 5U chassis. Additional optional mass storage may be added to the system along with additional UV chassis. You can add different types of PCIe board options to a system chassis to achieve the desired system configuration. You can easily configure systems around processing capability, I/O capability, memory size, or storage capacity. Each air-cooled UV 300 chassis has redundant, hot-swap fans and redundant, hot-swap power supplies.

Distributed Shared Memory (DSM)

In the SGI UV 300 series server, memory is physically distributed both within and among the UV enclosures (compute/memory/I/O); however, it is accessible to and shared by all NUMAlinked devices within the single-system image (SSI). This means all NUMAlinked components sharing a single Linux operating system, operate and share the memory “fabric” of the system. Memory latency is the amount of time required for a processor to retrieve data from memory. Memory latency is lowest when a processor accesses local memory. Note the following sub-types of memory within a system:

- If a processor accesses memory that it is connected to on a UV 300 motherboard, the memory is referred to as the processor’s *local memory*. Figure 3-4 on page 37 shows a conceptual block diagram of the motherboard’s memory riser board pathways.
- If processors access memory located in other NUMAlinked chassis motherboards within the system, the memory is referred to as *remote memory*.
- The total memory within the NUMAlinked UV system is referred to as *global memory*.

Physical Memory Riser

Physical memory nodes are “memory risers” and each is made up of two board assemblies: memory riser board and power board. Eight memory riser assemblies plug into each UV 300 motherboard. The memory riser power board receives power directly from the motherboard. A maximum of 12 memory DIMMs are supported in each memory riser.

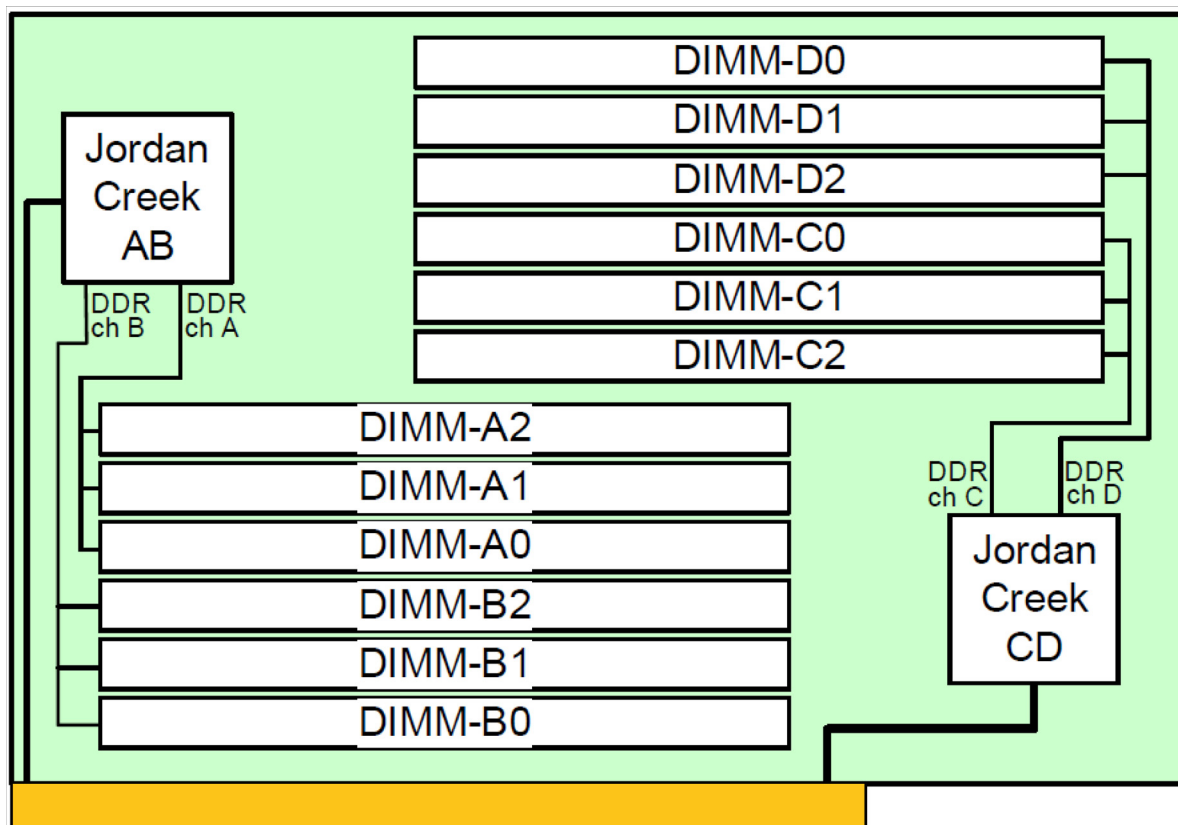


Figure 3-4 UV 300 Node Memory Riser Block Diagram Example

Distributed Shared I/O

Like DSM, I/O devices are distributed within the UV 300 chassis. Each BaseIO riser node is accessible by all compute nodes within the SSI through the NUMALink interconnect fabric.

1U Rack Management Controller (RMC) Node

Each UV 300 rackmounted system has a 1U rack management controller (RMC) node generally located directly above (or between) the UV 300 enclosures in a rack. The RMC supports powering up and down of the system motherboards and environmental monitoring of all UV 300 units within the SSI. In addition, the 1U rackmounted controller node provides the top layer of system control for UV 300 system. Through the use of an internal 24-port Ethernet switch, a single RMC can provide system control for up to a two-rack (16 chassis) UV 300 system.

One GigE port from each UV 300 compute chassis motherboard connects to the RMC node via Cat-5 cable.

ccNUMA Architecture

As the name implies, the cache-coherent non-uniform memory access (ccNUMA) architecture has two parts, *cache coherency* and *nonuniform memory access*, which are discussed in the sections that follow.

Cache Coherency

The SGI UV 300 server series use caches to reduce memory latency. Although data exists in local or remote memory, copies of the data can exist in various processor caches throughout the system. Cache coherency keeps the cached copies consistent.

To keep the copies consistent, the ccNUMA architecture uses directory-based coherence protocol. In directory-based coherence protocol, each block of memory (128 bytes) has an entry in a table that is referred to as a directory. Like the blocks of memory that they represent, the directories are distributed among the compute/memory blade nodes. A block of memory is also referred to as a cache line.

Each directory entry indicates the state of the memory block that it represents. For example, when the block is not cached, it is in an unowned state. When only one processor has a copy of the memory block, it is in an exclusive state. And when more than one processor has a copy of the block, it is in a shared state; a bit vector indicates which caches may contain a copy.

When a processor modifies a block of data, the processors that have the same block of data in their caches must be notified of the modification. The SGI UV 300 server series uses an invalidation method to maintain cache coherence. The invalidation method purges all unmodified copies of the

block of data, and the processor that wants to modify the block receives exclusive ownership of the block.

Non-uniform Memory Access (NUMA)

In DSM systems, memory is physically located at various distances from the processors. As a result, memory access times (latencies) are different or “non-uniform.” For example, it takes less time for a processor blade to reference its locally installed memory than to reference remote memory.

Reliability, Availability, and Serviceability (RAS)

The SGI UV 300 server series components have the following features to increase the reliability, availability, and serviceability (RAS) of the systems.

- **Power and cooling:**
 - UV chassis power supplies are redundant and can be hot-swapped under most circumstances.
 - UV chassis have overcurrent protection at the motherboard and power supply level.
 - Fans are redundant and can be hot-swapped.
 - Fans run at multiple speeds in the UV chassis. Speed increases automatically when temperature increases or when a single fan fails.
- **System monitoring:**
 - System controllers monitor the internal power and temperature of the UV chassis components, and can automatically shut down an enclosure to prevent overheating.
 - All main memory has Intel Single Device Data Correction, to detect and correct 8 contiguous bits failing in a memory device. Additionally, the main memory can detect and correct any two-bit errors coming from two memory devices (8 bits or more apart).
 - All high speed links including Intel Quick Path Interconnect (QPI), Intel Scalable Memory Interconnect (SMI), and PCIe have CRC check and retry.
 - The NUMAlink interconnect network is protected by cyclic redundancy check (CRC).
 - Each UV 300 chassis installed has status LEDs that indicate the enclosure’s operational condition; LEDs are readable at the front of the unit.

- The UV 300 systems support the optional SGI Remote Solutions (SGI RS), a software tool that monitors the system; when a condition occurs that may cause a failure, SGI RS notifies the appropriate SGI personnel and on-site administrators.
- Systems support optional remote console and maintenance activities.
- **Power-on and boot:**
 - Automatic testing occurs after you power on the system. (These power-on self-tests or POSTs are also referred to as power-on diagnostics or PODs).
 - Processors and memory are automatically de-allocated when a self-test failure occurs.
 - Boot times are minimized.
- **Further RAS features:**
 - Systems can report status inventory information, provide hardware logs of out-of-range conditions, or perform recovery procedures via remote commands.
 - All system faults are logged in files.
 - Memory can be scrubbed using error checking code (ECC) when a single-bit error occurs.

System Components

The SGI UV 300 series system features the following major components:

- **42U rack.** These racks are used for both the compute and I/O rack in the SGI UV 300 system. Up to eight UV enclosures can be installed in each 42U rack. There is also space reserved for an optional IPMI-enabled management node or other optional 1U components.
- **Individual UV Chassis.** This 5U-high enclosure contains four power supplies, one four-processor compute/memory board, BaseIO and other optional riser enabled drives and boards for the SGI UV 300. Figure 3-5 on page 41 shows the SGI UV 300 base chassis front components. Note that an expansion chassis will not have the drive options installed.
- **Motherboard.** Holds four processor sockets and 8 memory risers with up to 12 DIMMs per memory riser for a maximum of 96 DIMMs per motherboard. Each motherboard can be ordered with risers that enable the UV enclosure to support up to four full-height x16 PCIe boards and up to eight full-height x8 PCIe cards.

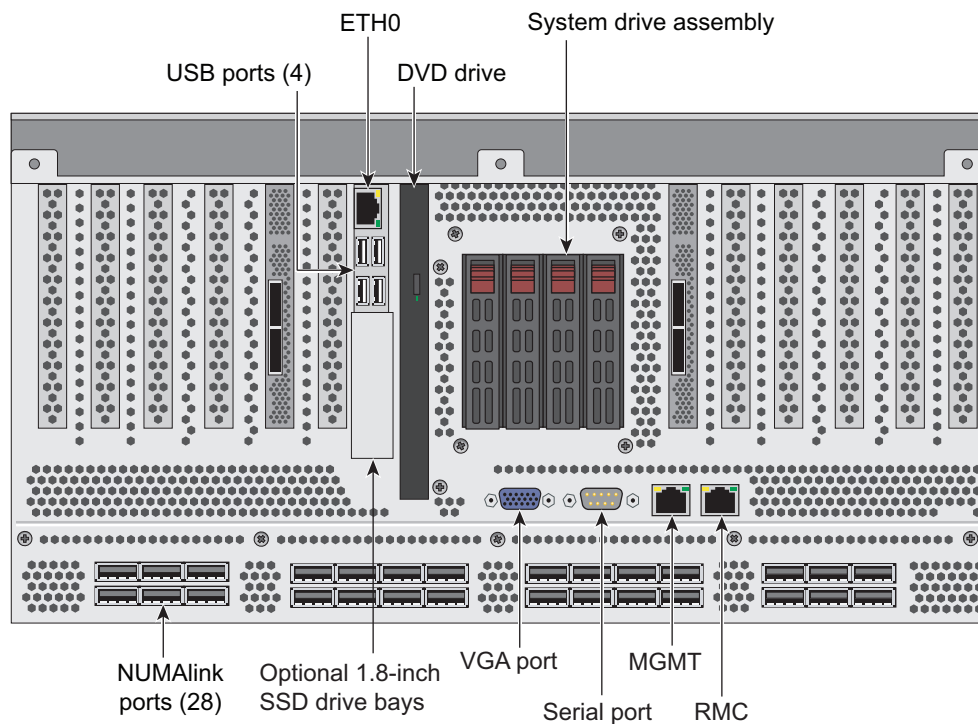


Figure 3-5 SGI UV 300 Chassis Front Components (Base Chassis With Drives)

- **Drives.** Each UV 300 base chassis has a drive tray that supports one optional slim-line SATA DVD drive and four 2.5-inch hard disk (or solid state) drives. A UV 300 expansion chassis does not require a drive assembly and can accommodate four additional PCIe cards.
- **Internal PCIe enabled slots.** The UV 300 chassis and motherboard support the following types of PCIe option boards:
 - Four full-height, double-wide, 10.5-inch length, Gen3 x16 PCIe slots

Note: The x16 PCIe slots support cards with a maximum power consumption of 300 watts.

- Four full-height, half-length, Gen3 x8 PCIe slots
- Four full-height, 10.5-inch length, Gen3 x8 PCIe slots

Note: PCIe card options may be limited, check with your SGI sales or support representative.

- **NUMalink Connectors.** The external NUMalink connectors are located on the lower-front portion of each UV 300 chassis.
- **BaseIO enabled board.** Optional I/O riser board (connected directly to the motherboard) that supports base system I/O functions including one Gbit Ethernet connector (top), four USB ports, and bays for two optional external 1.8-inch solid state drives (SSDs).

Internally - the BaseIO board supports:

- Four internal 3GB/s SATA ports (for the four 2.5-inch disk drives in the UV chassis)
- Two internal 6GB/s SATA ports (for the two optional “mini” 1.8-inch SSDs)
- One internal USB 2.0 port (for the internal DVD)

Note: Each system (or SSI within a system) requires one BaseIO board. Figure 3-6 on page 43 shows the front components of the BaseIO board. The SSD drives (bottom) are enclosed with a metal cover.

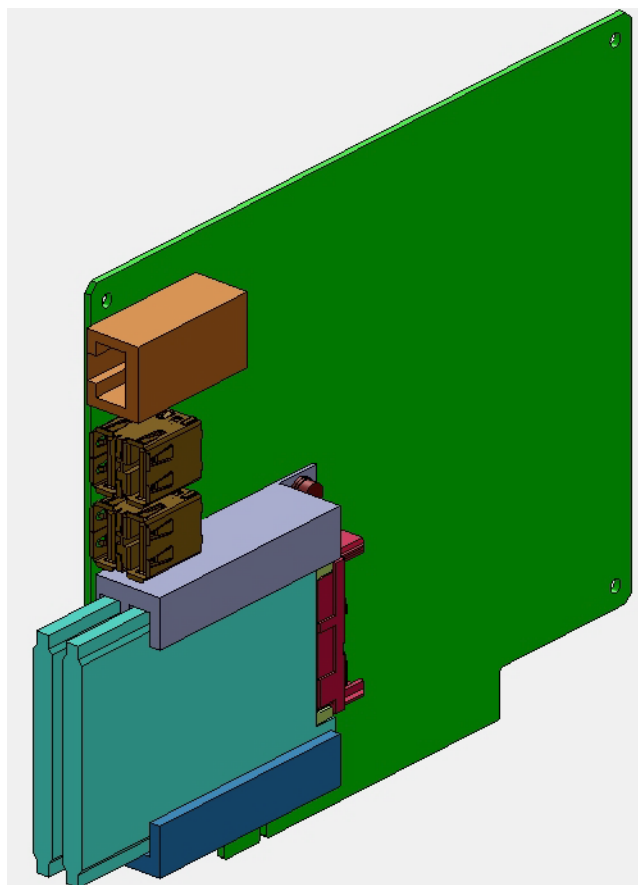


Figure 3-6 BaseIO Board Front Panel Components Example

Bay (Unit) Numbering

Bays in the racks are numbered using standard units. A standard unit (SU) or unit (U) is equal to 1.75 inches (4.445 cm). Because the chassis occupy multiple standard units, locations within a rack are identified by the bottom unit (U) in which the chassis resides. For example, in a 42U rack, a UV chassis positioned in U01 through U05 is identified as U01.

Rack Numbering

Each rack is numbered with a three-digit number sequentially beginning with 001. A rack contains UV enclosures, optional mass storage enclosures, an RMC, optional system management node (SMN) and potentially other options. In a single compute rack system, the rack number is always 001.

Optional System Components

Availability of optional components for the SGI UV 300 systems may vary based on new product introductions or end-of-life components. Some options are listed in this manual, others may be introduced after this document goes to production status. Check with your SGI sales or support representative for current information on available product options not discussed in this manual.

Rack Information

This chapter describes the physical characteristics of the UV 300 racks in the following sections:

- “Overview” on page 45
- “SGI UV 300 Series Racks” on page 46

Overview

At the time this document was published the 42U SGI racks (example shown in Figure 4-1 on page 47), were available from the SGI factory for use with UV 300 systems. Other racks may be available to house the system UV chassis, see the section “Third-Party Rack Mounting Information” in Chapter 7 for general rules on using 3rd-party racks with UV 300 systems.

Check with your SGI sales or service representative for more information.

SGI UV 300 Series Racks

The SGI system racks (described in this chapter) have the following features and components:

- **Front and rear door.** The front door is opened by grasping the outer end of the rectangular-shaped door piece and pulling outward. It uses a key lock for security purposes that should open all the front doors in a multi-rack system (see Figure 4-2 on page 48).

Note: The front door and rear door locks are keyed differently on all racks. The optional water-chilled rear door panels on the 42U rack (see Figure 4-3 on page 49) do not use a lock.

The standard rear door has a push-button key lock to prevent unauthorized access to the system. The rear doors have a master key that locks and unlocks all rear doors in any system made up of multiple racks. You cannot use the rear door key to secure the front door lock.

- **Cable entry/exit area.** Cable access openings are located primarily in the bottom of the racks. Multiple cables are attached to the front of the UV chassis; therefore, a significant part of the internal cable management occurs in the front part of the rack. The optional stand-alone system management node has cables that attach at the rear of the rack. Rear cable connections will also be required for optional storage modules installed in the same rack with the UV chassis. I/O and power cables normally pass through the bottom of each rack.
- **Rack structural features.** The rack is mounted on four casters; the two rear casters swivel. There are four leveling pads available at the base of the rack. The base of the rack also has attachment points to support an optional ground strap, and/or seismic tie-downs.
- **Power distribution units in the rack.** Four outlets minimum are required for a single UV 300 system chassis as follows:
 - Allow four outlets for the first UV 300 chassis
 - Two outlets are required for an optional system management node (server)
 - The UV 300 system rack management controller (RMC) uses two outlets
 - Optional storage expansion units require two outlets each
 - Allow four more outlets for each additional UV 300 chassis in the system

The number and type of power distribution units (PDUs) your system rack uses is dependent on how many UV chassis and other types of equipment are installed in the rack. Single phase PDUs are available in 8-outlet versions. Three phase PDUs have 21 outlets each.

Figure 4-1 shows an example of the 42U SGI rack used with the SGI UV 300 systems. Figure 4-2 on page 48 shows the front lock location for the 42U rack. Figure 4-3 on page 49 shows an example of the optional water-chilled cooling units on the 42U rack.

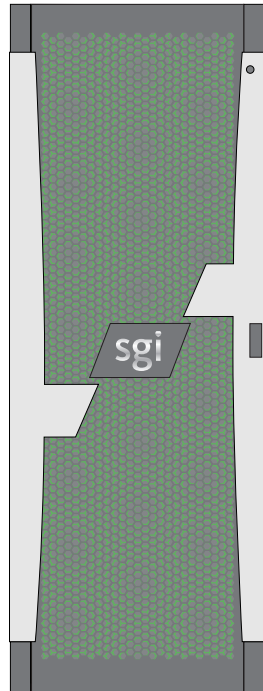


Figure 4-1 SGI UV 300 42U Rack Example

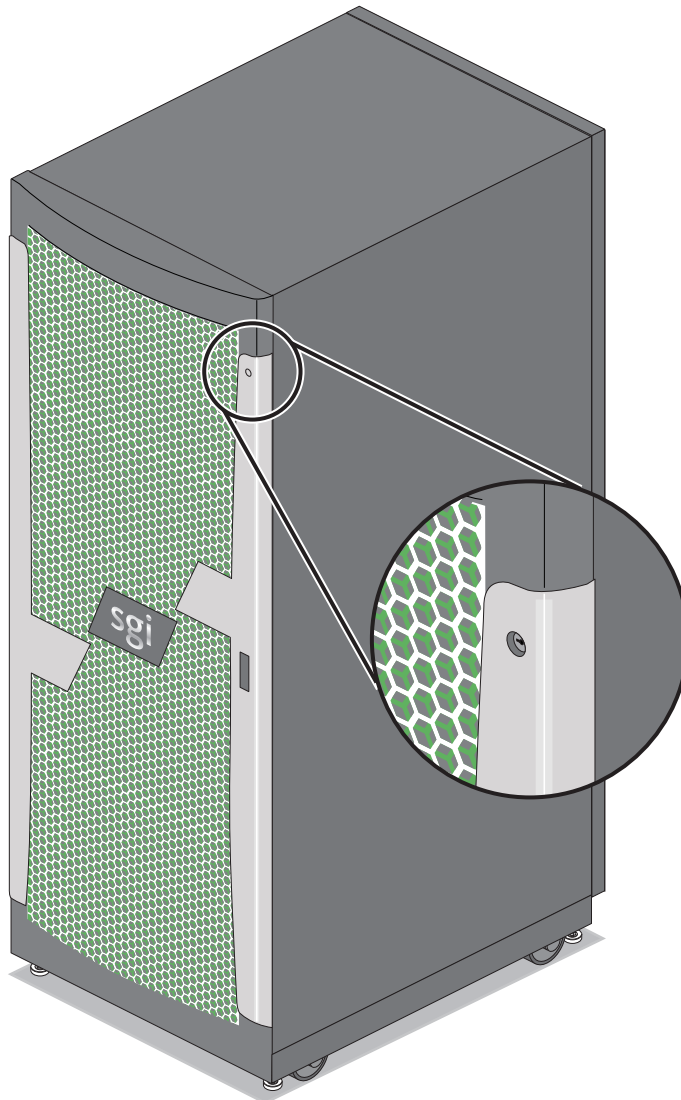


Figure 4-2 Front Lock on Tall (42U) SGI 300 Rack Example

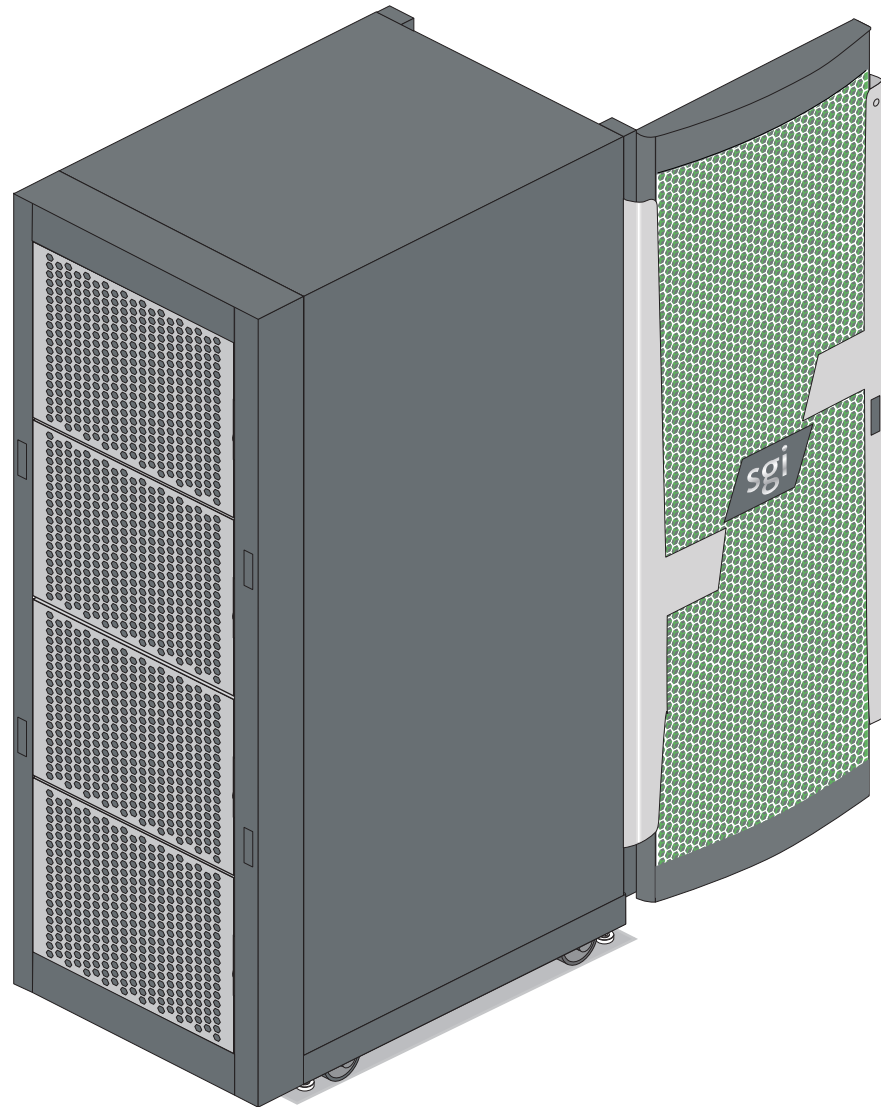


Figure 4-3 Optional Water-Chilled Doors on Rear of 42U Rack

42U System Rack Technical Specifications

Table 4-1 lists the technical specifications of the UV 300 series (42U) tall rack. See also Table A-2 on page 94 for additional 42U-rack information.

Table 4-1 Tall (42U) Rack Technical Specifications

Characteristic	Specification
Height	78.75 inches (200 cm)
Width	28 inches (71.1 cm)
Depth	45.5 inches (115.6 cm)
Shipping height	88.88 inches (2.25 m)
Shipping width	44 inches (1.12 m)
Shipping depth	62.75 inches (1.59 m)
One-rack shipping weight	Approximately 2,070 lbs. (939 kg) air cooled
Access requirements	Front: 48 in. (1.21 m) Rear: 48 in. (1.21 m) Top: 18 in. (45.7 cm)
Voltage ranges	North America/International
Nominal	200-240 VAC /230 VAC (Single Phase)
Tolerance range	180-264 VAC
Nominal	200-240 VAC/400 VAC (Three Phase)
Tolerance	180-264 VAC/312-457 VAC
Frequency	North America/International
Nominal	60 Hz /50 Hz
Tolerance range	47-63 Hz
Phase required	Single-phase or 3-phase
Power requirements (max)	Configuration dependent
Hold time	16 ms
Rack power cable	8 ft. (2.4 m) pluggable cords
SGI PDU power cables	12 ft. (3.66 m) pluggable cords

Add or Replace Procedures

This chapter provides information about installing and removing PCIe cards, chassis fans and system disk drives from your SGI system, as follows:

- “Maintenance Precautions and Procedures” on page 51
- “Removing the Chassis Top Cover” on page 53
- “Adding or Replacing PCIe or GPU Cards” on page 55
- “Installing or Replacing a Drive” on page 58

Maintenance Precautions and Procedures

This section describes how to open the system for maintenance and upgrade, protect the components from static damage, and return the system to operation. The following topics are covered:

- “Preparing the System for Maintenance or Upgrade” on page 52
- “Returning the System to Operation” on page 52
- “Installing Cards in the Chassis” on page 55
- “Remove or Replace a 2.5-inch Hard Drive” on page 59



Warning: To avoid problems that could void your warranty, your SGI or other approved service provider should perform all the setup, addition, or replacement of parts, cabling, and service of your SGI UV 300 system, with the exception of the following items that you can perform yourself:

- Using your system console or network access workstation to enter commands and perform system functions such as powering on and powering off, as described in this guide.
- Installing, removing or replacing PCIe or GPU cards in the chassis

- Installing or replacing hard disk or SSD drives in the UV 300 chassis
- Remove and replace a chassis fan assembly
- Remove and replace a chassis power supply
- Remove and replace a system BaseIO card

Preparing the System for Maintenance or Upgrade

To prepare the system for maintenance, follow these steps:

1. If you are logged on to the system, log out. Follow standard procedures for gracefully halting the operating system.
2. Go to the section “Powering the System On and Off” on page 6 if you are not familiar with power down procedures.
3. After the system is powered off, locate the power distribution unit(s) (PDUs) in the rack and turn off the circuit breaker switches on each PDU.

Returning the System to Operation

When you finish installing or removing components, return the system to operation as follows:

1. Turn each of the PDU circuit breaker switches to the “on” position.
2. Power up the system. If you are not familiar with the proper power-on procedure, review the section “Powering the System On and Off” on page 6.
3. Verify that the LEDs on the system power supplies and system front components turn on and illuminate green which indicates that the power-on procedure is proceeding properly.

If your system does not boot correctly, see Chapter 6, for troubleshooting procedures.

Removing the Chassis Top Cover

Important: The chassis cover should not be removed while the UV 300 system is powered on.

As shown in Figure 5-1 on page 54, the chassis top is a two-piece “bifurcated” front and rear chassis cover. There is no requirement to remove the top cover for system disk replacement, power supply maintenance or system fan remove/replace. Other service actions require that you remove the front chassis cover, detailed below.

To remove a chassis cover, use (a T10 Torx driver) with the following instructions:

1. Power off the chassis by turning off the PDU(s) providing voltage to the unit or by disconnecting all power supply cords from the chassis rear (or both).
2. Remove the front panel (bezel) by grasping at either end and pulling it off.
3. In a multi-chassis system, you may need to remove the NUMALink connector cables from the front of the unit. Be sure they are labeled for proper re-installation.
4. Ensure that all other rack-mounted enclosures are in place and pull the chassis out the front.
5. Using the Torx driver, remove the three front retaining screws from the top cover and carefully set them aside for re-installation after completion of the procedure.
6. Grasp the front cover and slide it forward and upward from the chassis.



Caution: Always re-install the chassis cover after you have accessed any internal components to ensure proper airflow and cooling for the system. Failure to re-install the cover may cause thermal over-temperature conditions and automatic shut-down of the chassis.

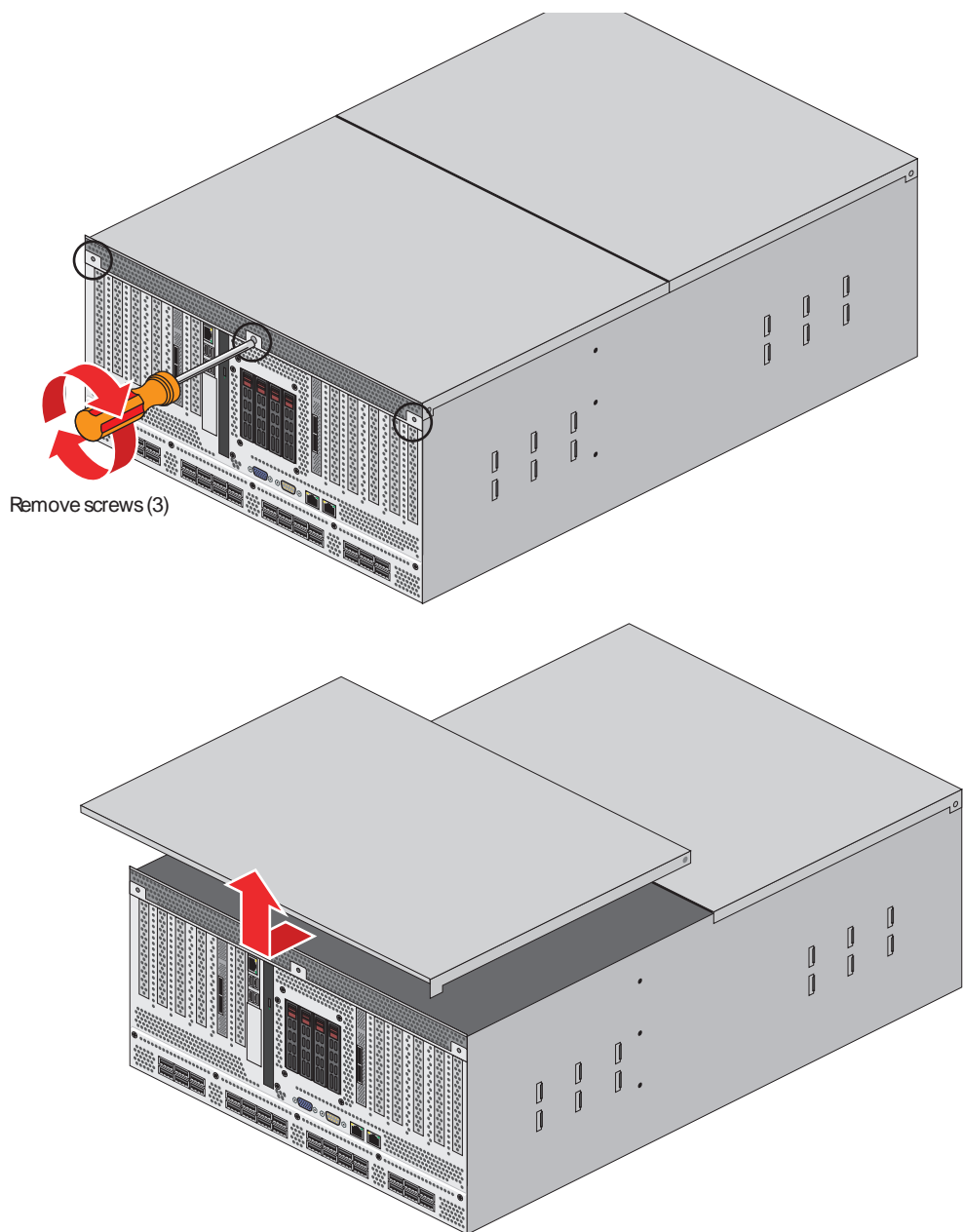


Figure 5-1 Chassis Cover Removal Example

Adding or Replacing PCIe or GPU Cards



Warning: Before installing, operating, or servicing any part of this product, read the “Safety Precautions” in Chapter 1.

This section provides instructions for adding or replacing a PCIe or GPU-based PCIe card in your UV 300 system. To maximize the operating efficiency of your cards, be sure to read all the introductory matter before beginning the installation.



Caution: To protect the PCIe cards from ESD damage, SGI recommends that you use a grounding wrist strap while installing a PCIe card.

Installing Cards in the Chassis

Always follow the manufacturer’s instructions or restrictions for installing their card.

Important: Addition of a new PCIe/GPU card requires a reboot to initiate recognition and functionality. Removal (without replacement) of an existing PCIe card may cause system error messages. When installing PCIe cards, ensure that the input current rating specified on the AC input label is not exceeded.

The PCIe slots available in the UV 300 chassis consist of the following:

- Four full-height, double-wide, 10.5-inch length, Gen3 x16 PCIe slots

Note: The x16 PCIe slots support cards with a maximum power consumption of 300 watts.

- Four full-height, half-length, Gen3 x8 PCIe slots
- Four full-height, 10.5-inch length, Gen3 x8 PCIe slots

The procedure requires a T-10 Torx driver and Phillips-head screwdriver to complete. Before installing the PCIe expansion cards, be sure to remove each respective slot cover and use its screw to secure your expansion card in place. Shut down the operating system and remove all power from the chassis before starting.

1. Working from the front of the chassis, grasp the front panel on either side and pull it off the enclosure. Use the Torx driver to remove the three screws that secure the front top cover. See the section “Removing the Chassis Top Cover” on page 53 for additional detail. Remove any NUMAlink cables and label for replacement.
2. Push the two rail-release latches in and slide the chassis forward. Remove the chassis cover as detailed in “Removing the Chassis Top Cover” on page 53.
3. Select an available slot based on the size of your PCIe card.
4. If replacing an existing PCIe card, disconnect any cables from the old card and remove its top retaining screw. If using an empty PCIe slot, remove the metal slot cover from the selected slot and retain its screw.
5. Fit the new PCIe card into the slot connector with the connector(s) extending out the front of the chassis (making sure the card’s upper tab is flush with the chassis front), then secure the board with the screw that previously held the metal slot cover.
6. Reinstall the front top cover, push the chassis back into the rack until it latches and reconnect all cables, (note that each NUMAlink cable should be labeled with source/destination information).

Important: After installation of a new card, be sure to re-boot your system.

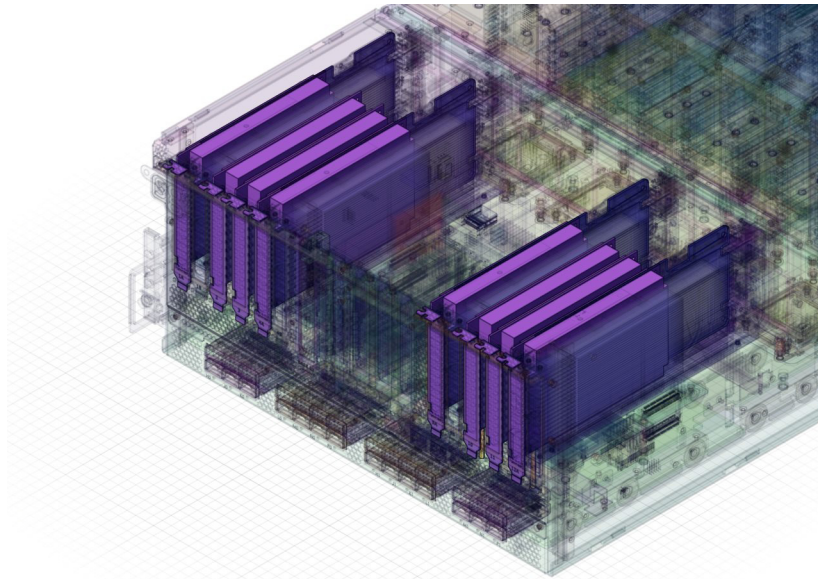


Figure 5-2 PCIe Full-height x8 and x16 Card Slot Locations Example

Installing or Replacing a Drive

The SGI UV 300 chassis holds up to four hard disk drives in a tray assembly at the front of the chassis. The disk riser assembly occupies the riser card 1 position on the UV 300 motherboard. It is located between the two side PCIe risers at the front of the chassis. The disk riser assembly supports both 2.5-inch solid state (SSD) and 2.5-inch spinning disks, see Figure 5-3. Note that the riser also supports one optional DVD that should be installed or replaced by a trained service person. Instructions for installing/removing/replacing the DVD drive are not in this document.

The drive-tray riser interface supports five devices total. You can operate the DVD and hard drives at the same time. Note that the tray assembly is not configured to support five 2.5-inch hard drives if the DVD drive slot is unused. Figure 5-3 calls out the location of the 2.5-inch system drive assembly on the front of the chassis as well as showing the location of the two 1.8-inch SSD option drives. Note that a UV 300 expansion chassis does not include a standard drive/riser card assembly.

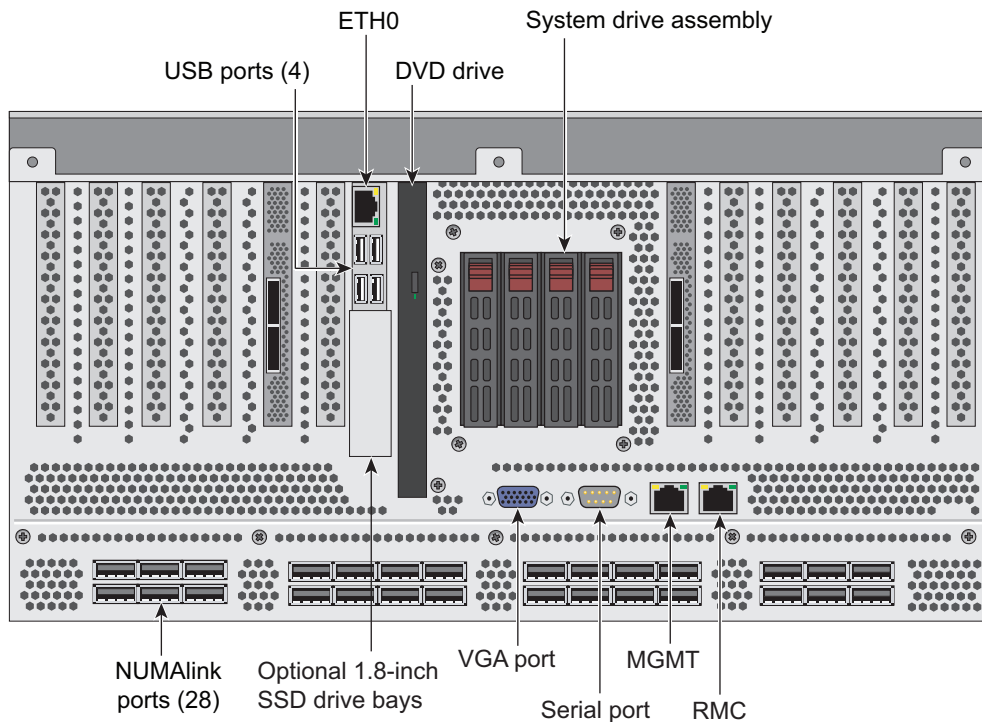


Figure 5-3 UV 300 Front Drive Array Location

Remove or Replace a 2.5-inch Hard Drive

Each 2.5-inch hard disk drive in the UV 300 drive tray is secured in a drive “sled” that slides in and out of the drive tray assembly and locks in place.

Use the following steps and illustrations to add or replace a hard disk drive in the SGI UV 300:

1. Shut down the UV 300’s operating system. Use the instructions in Chapter 1 of this manual if you are unfamiliar with the procedure.
2. To remove power from the chassis, unplug all the UV 300 chassis power supply cords.
3. Grasp the perforated front chassis cover at either end and pull it off the front of the unit.
4. Locate the drive you need to remove and push in its top release switch, see Figure 5-4 on page 60 for an example.
5. Pull the drive retention handle outward to completely unlock the drive-sled assembly.
6. Pull the drive-sled assembly straight out and lift it away from the chassis.
7. Select the tray location for the new hard disk drive. If the new drive is not equipped with a UV 300 style mounting bracket (sled), remove the old drive’s sled and install the hardware on the replacement drive. Check with your support provider if you do not have the appropriate sled hardware to install additional drives in the tray.
8. If you have disconnected power, reconnect all the chassis power supplies and restart the system. Use the instructions in Chapter 1 of this manual if you are unfamiliar with the power-on procedure.

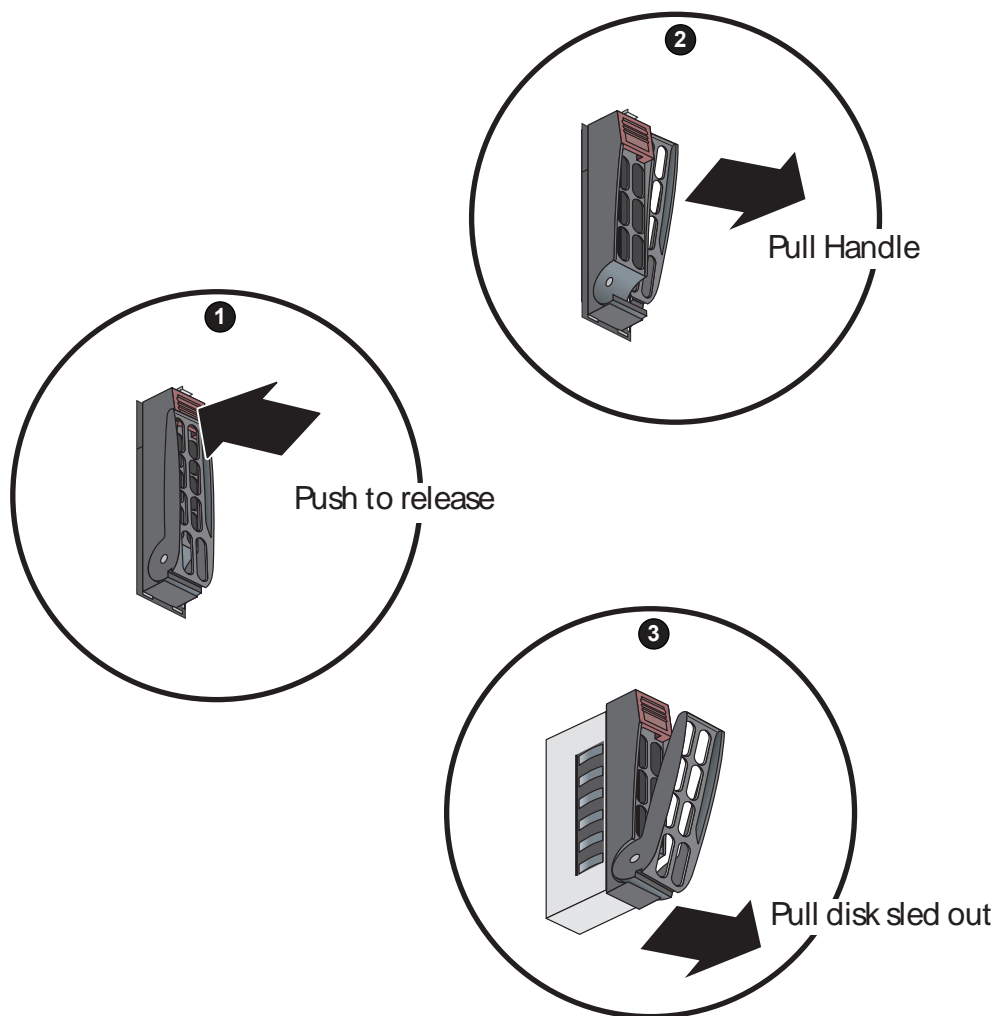


Figure 5-4 Hard Drive Remove/Replace Example

Remove or Replace a 1.8-inch SSD Option Drive

The BaseIO card supports two optional “mini” 1.8-inch SATA solid-state-drives (SSDs) which are accessible from the front of the chassis. The two SSD slots are located directly below the BaseIO board’s USB ports. The two SSDs connect internally via a cable to two 6GB/s SATA ports. The SSDs are accessible from the front of the chassis. A metal cover used to protect the SSDs is held

in place by a single T10 Torx screw. An SSD may be hot-swapped only if it is part of a RAIDed drive-pair. In this case you may leave the operating system running and the UV chassis in the rack. Use the following information to remove or replace a 1.8-inch SSD in the BaseIO:

1. Access the front of the rack and remove the UV 300 front panel (bezel) by grasping at either end and pulling it off.
2. Use a T10 Torx driver to unscrew and remove the outer metal cover that protects the SSDs.
3. Extract a drive by grasping the front of the drive and pulling straight out.
4. Insert a new drive by sliding the SSD into the empty slot until it fully engages the connector.
5. Replace the BaseIO board's SSD cover and secure it with the T10 Torx screw.

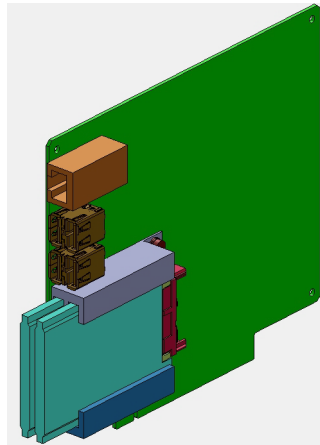


Figure 5-5 Optional 1.8-inch Solid State Drives

Replacing a UV 300 Chassis Power Supply

To remove and replace power supplies in an SGI UV 300, you do not need any tools. Under most circumstances a single power supply can be replaced without shutting down the enclosure or the complete system. In the case of a fully configured (loaded) UV 300 chassis, this may not be possible.

Caution: The body of the power supply may be hot; allow time for cooling and handle with care.

Use the following steps to replace a power supply in the UV 300 chassis:

1. Open the rear door of the rack and locate the power supply that needs replacement. The power supplies are located along the bottom section of each UV 300 chassis, see Figure 5-6 for an example.
2. Disengage the power-cord retention clip and disconnect the power cord from the power supply that needs replacement.
3. Press the retention latch of the power supply toward the power connector to release the supply from the enclosure.
4. Using the power supply handle, pull the power supply straight out until it is partly out of the chassis. Use one hand to support the bottom of the supply as you fully extract it from the enclosure. Note that each supply is 10.4-inches (26.4 cm) long and weighs 2.65 lbs (1.2 kg).
5. Align the rear of the replacement power supply with the chassis opening.
6. Slide the power supply into the chassis until the retention latch engages - you should hear an audible click.
7. Reconnect the power cord to the supply and engage the retention clip.

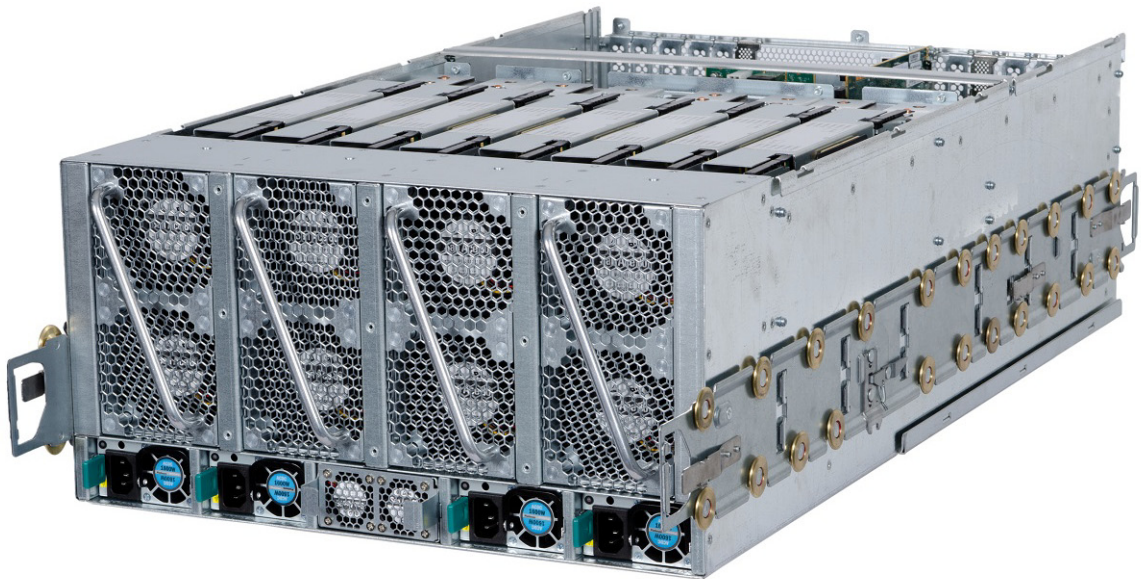


Figure 5-6 UV 300 Power Supply and Fan Locations

Replacing a Chassis Fan Assembly

Chassis cooling for each UV 300 chassis is provided by four rear-mounted fan assemblies (as seen in Figure 5-6 on page 62). Each chassis cooling fan unit is made up of two stacked 80mm fans.

If one fan assembly fails, the remaining fans will ramp up to full speed and the overheat/fan fail/info LED on the front control panel will illuminate (the system can continue to run with a single failed fan assembly).

Note that each power supply in the system is cooled by an individual internal cooling fan.

You will need to access the rack from the back to remove and replace a fan assembly.

Note that under most circumstances a fan can be replaced while the system is operating. You will not need any tools to complete the replacement procedure.

Use the following steps to replace a UV 300 chassis fan assembly:

1. Open the rack's rear door and identify the fan assembly that has failed.
2. Grasp the handle of the failed cooling fan assembly and pull the unit straight out. See Figure 5-7 on page 64 for an example of the chassis fan assembly.
3. Slide a new fan assembly completely into the open slot until the fan-interconnect engages and the new unit is flush with the rear of the chassis.
4. Confirm that the new fan assembly is operational and close the rack's rear door.

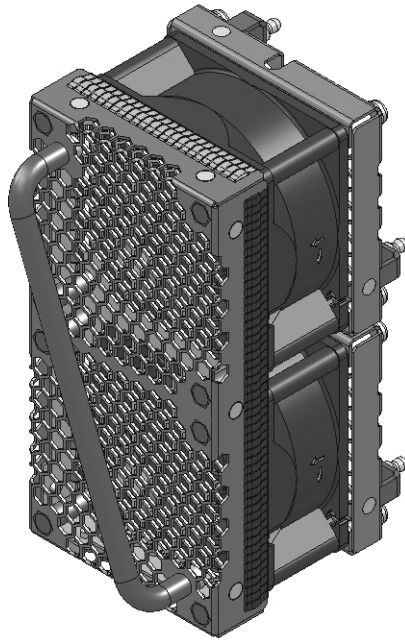


Figure 5-7 UV 300 Chassis Rear Fan Assembly Example

Troubleshooting Tips

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

- “Troubleshooting Chart” on page 66
- “LED Status Indicators” on page 67
- “SGI Electronic Support” on page 69

Troubleshooting Chart

Table 6-1 lists recommended actions for problems that can occur. To solve problems that are not listed in this table, use the SGI Electronic Support system or contact your support organization. For more information about the SGI Electronic Support system, see the “SGI Electronic Support” on page 69.

Table 6-1 Troubleshooting Chart

Problem Description	Recommended Action
The system will not power on.	<p>Ensure that the power cords of the UV 300 chassis are seated properly in all power receptacles.</p> <p>Ensure that the PDU circuit breakers are on and properly connected to the wall source.</p> <p>If the power cords are plugged in and the circuit breaker is on, contact your support provider.</p>
An individual chassis will not power on.	<p>Ensure all the power cables of the chassis are plugged in.</p> <p>Confirm the PDU(s) supporting the chassis are on.</p>
The system will not boot the operating system.	Contact your authorized support organization.
An amber LED illuminates on a motherboard.	See Table 6-2 on page 67 for a description of the status message.
The amber (yellow) status LED of a power supply is lit or the LED is not lit at all. See Table 6-2 on page 67.	Ensure the power cable to the supply is firmly connected at both ends and that the PDU is turned to on. Check and confirm the supply is fully plugged into its slot. If the green LED does not light, contact your support engineer.
The PWR LED of a populated PCIe slot is not illuminated.	Reseat the PCIe card.
The Fault LED of a populated PCIe slot is illuminated (on).	Reseat the card. If the fault LED remains on, replace the card.
The amber or red LED of a disk drive is on.	Replace the disk drive.

LED Status Indicators

There are a number of LEDs on the UV 300 chassis that can help you detect, identify and potentially correct functional interruptions in the system. The following subsections describe these LEDs and ways to use them to understand potential problem areas.

Power Supply LEDs

Each power supply installed in a UV 300 chassis has a bi-color status LED. The LED will either light green or amber (yellow), or flash green or yellow to indicate the status of the individual supply. See Table 6-2 for a complete list of the UV 300 chassis power supply LED states.

Table 6-2 UV 300 Chassis Power Supply LED States

Power supply status	Green LED	Amber LED
No AC power to the supply	Off	Off
Power supply has failed	Off	On
Power supply problem warning	Off	Blinking
AC available to supply (standby) but chassis system power is off	Blinking	Off
Power supply on (system is on)	On	Off

The system RMC unit uses two power supplies and two cables. Each supply in the RMC uses a blue LED to indicate normal function and a red LED for errors. See Table 6-3 for RMC power supply status indicators.

Table 6-3 RMC Power Supply LED States

Power supply status	Blue LED	Red LED
No AC power to either supply	Off	Off
A power supply has failed	Off	On
No AC power to one supply	Off	Blinking
Power supply on (system is on)	On	Off

System Motherboard Status LEDs

Each UV 300 motherboard installed in a chassis has a total of 23 LED indicators visible from the front of the unit. Note that the LEDs are located behind the perforated front-panel sheetmetal and may not be clearly visible except when lit:

Starting from the left side of the motherboard:

- There is a single red over-current LED
- A 4-stack of green 12V power good LEDs
- A 4-stack of green CPU (0-3) power good LEDs
- One green 3.3V auxiliary power LED and one 3.3V power good LED
- One green 5V auxiliary power LED and one green 5V power good LED
- 12V auxiliary power and 12V main power green LEDs
- Power supply OK and system power OK green LEDs
- An amber sleep state and platform reset LEDs
- Power good for HARP ASIC 0 and 1 green LEDs

On the far right side of the board are:

- Unit identifier blue/white LED
- A green BMC heartbeat LED

If the system motherboard is powered on and there is no LED activity showing on the unit, it must be replaced. Figure 6-1 on page 69 shows the locations of the motherboard LEDs.

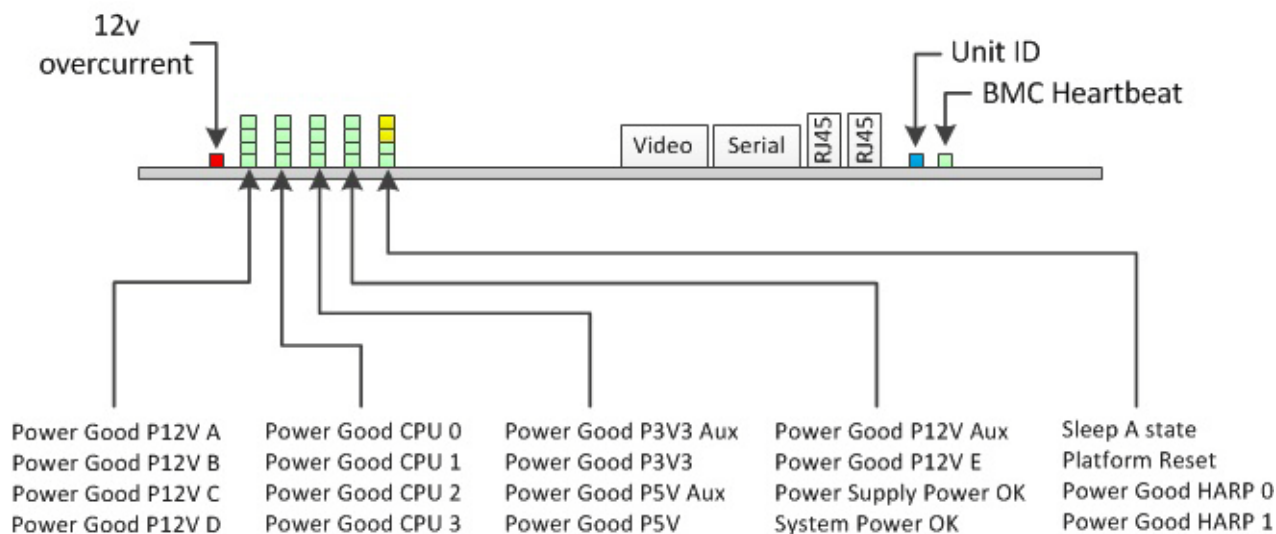


Figure 6-1 UV 300 System Motherboard Status LED Locations and Functions

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 problems.

You may be able to determine 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.

See the information in “Optional SGI Remote Solutions (SGI RS)” in Chapter 1 for an overview of the optional remote solutions package offered by SGI global support. Other support options from SGI include:

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

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

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

<http://www.sgi.com/services/>

For more general information about SGI support, see the following Web page:

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

Rackmounting the SGI UV 300

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

- “Unpack the System” on page 71
- “Rackmounting Safety Considerations” on page 73
- “Install the UV 300 System into a Rack” on page 75
- “Required Tools” on page 77
- “Installing the UV 300 Chassis” on page 77
- “Third-Party Rack Mounting Information” on page 89

Unpack the System

Inspect the shipping container that the SGI UV 300 was shipped in and note if it was damaged in any way. If the enclosure shows damage, file a damage claim with the carrier who delivered it.

Decide on a suitable location for the rack that supports the weight, power requirements, and environmental requirements of the UV enclosure. It should be situated in a clean, dust-free environment that is well ventilated. Avoid areas where heat, electrical noise, and electromagnetic fields are generated. Place the enclosure rack near a grounded power outlet. Refer to “Additional Precautions” on page 73.

Inspecting a Shipment

It is important that you inspect all equipment received from a shipping carrier before signing for the shipment. Be sure to do the following when you arrive at a site to install equipment and when you receive equipment directly from a shipping carrier:

1. Inspect the shipment.
 - Does the number of pieces received match the bill of lading?

- Have boxes been opened or is there damage to the packaging?
 - Has the Tiltwatch indicator been triggered, indicating that the shipment was tipped?
 - Has the Tiltwatch indicator been removed?
 - After removing the packaging, is there any visible damage?
2. Record any issues/problems (if applicable):
 - Use the bill of lading to record any issues discovered during the inspection.
 - Sign for the shipment after making notes on the bill of lading.
 3. Report any issues to SGI:

Contact the SGI Customer Support Center (CSC) at 1-800-800-4744 (in the United States) Refer to http://www.sgi.com/company_info/contact_us.html for international numbers. Use the information supplied to begin the replacement process. Take photos of any damage and in your message, please send a brief description of the problem to ships@sgi.com. A coordinator will contact you about the problem.

Prepare for Setup

The shipping container should include a special D-Rack “Stiffener bracket,” two sets of rail assemblies, two rail mounting brackets and the mounting screws that you will use to install the system into a rack. Read the Warnings and Precautions section in its entirety before you begin the installation procedure.

Choose a Setup Location

Leave enough clearance in front of the rack to enable you to open the front door completely (~25 inches) and approximately 30 inches of clearance in the back of the rack to allow for sufficient airflow and ease in servicing.

Rackmounting Safety Considerations

Read all the introductory matter before beginning the installation.

The rackmount rail hardware in this kit enables you to mount the UV 300 chassis in many standard 19-inch equipment racks. Note that installation in such racks may require submittal to an approved safety agency for evaluation, certification, or licensing of the new rack-system combination. The primary emphasis of the instructions in this chapter is on mounting in an approved SGI rack. See “Third-Party Rack Mounting Information” on page 89 for information on non-SGI racks.

When used with the mounting rails provided, each UV 300 chassis uses 5U of vertical rack space, which is 8.75 inches or 22.23 cm. (One “U” is equal to 1.75 inches or 4.445 cm.).



Caution: Each UV 300 chassis weighs up to 136 lbs. (61.8 kg). To protect personnel and equipment, always use two or more installers when rackmounting a UV 300 chassis. Always install the UV 300 chassis in the lowest available position within the rack. Note that use of a mechanical lifting device may be necessary, depending on the placement of the chassis and type of rack used. Never use the rear fan handles as lift points when mounting or moving the enclosure.

Additional Precautions



Important: More information on moving large objects, requiring a two-person team, is available in the Centers for Disease Control’s, “Ergonomic Guidelines for Manual Material Handling” (<http://www.cdc.gov/niosh/docs/2007-131/pdfs/2007-131.pdf>)



Warning: Extend the leveling jacks on the bottom of the rack to the floor with the full weight of the rack resting on them. Failure to do so can result in serious injury or death.



Warning: Attach stabilizers to the rack in single rack installations. Failure to do so can result in serious injury or death.



Warning: Couple racks together in multiple rack installations. Failure to do so can result in equipment damage, serious injury or death.



Warning: Be sure the rack is stable before extending a component from the rack. Extend only one component at a time. Extending two or more components simultaneously may cause the rack to tip over and could result in serious injury or death.

General Enclosure Precautions

- Never use the fan handles at the rear of the UV 300 chassis to lift, move or carry the unit.
- Review the electrical and general safety precautions.
- Determine the placement of each component in the rack before you install the rails.
- Install the heaviest enclosure components in the bottom of the rack first, and then work up.
- Use a regulating uninterruptible power supply (UPS) to protect the server from power surges and voltage spikes and to keep your system operating in case of a power failure.
- Allow the drives and power supply modules to cool before touching them.
- Always keep the rack's front door and all panels and components on the systems closed when not servicing to maintain proper cooling.

Ambient Operating Temperature

If installed in a closed or multi-unit rack assembly, the ambient operating temperature of the rack environment may be greater than the ambient temperature of the room. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature (35° C or 95° F).

Reduced Airflow

Equipment should be mounted into a rack so that the amount of airflow required for safe operation is not compromised.

Mechanical Loading

Equipment should be mounted into a rack so that a hazardous condition does not arise due to uneven mechanical loading.

Circuit Overloading

Consideration should be given to the connection of the equipment to the power supply circuitry and the effect that any possible overloading of circuits might have on overcurrent protection and power supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

Reliable Ground

A reliable ground must be maintained at all times. To ensure this, the rack itself should be grounded. Particular attention should be given to power supply connections other than the direct connections to the branch circuit (for example, the use of power strips, and so on).

Install the UV 300 System into a Rack

This section provides information on installing the SGI UV 300 into a rack.

To reduce the chassis weight for installation purposes, you may want to remove the drives, fans and/or power supplies from the chassis prior to rackmounting. You will need to re-install the drives, fans and power supplies into their original locations after the chassis is installed in the rack.

The rail kit that ships with the system must be used to support the product. This rail kit enables the system to slide forwards and backwards in the rack for service access.

The procedures required to install a system will depend on which configuration is ordered:

If a configuration without a rack is ordered, the chassis, rail kit and other options may ship in separate boxes. Install the rail kit in the customer's rack and use at least two people to install each chassis. See the subsections that follow for more information.

Caution: Ensure that any third party rack used is certified to hold up to 1,100 lbs (500 kg) of rack-mounted computer equipment. Damage to flooring or the third-party rack equipment structure may occur if weight carrying capacity is exceeded.

Important: There are a variety of rack units on the market, which may mean the assembly procedure will differ slightly or require special equipment or shelving. Refer to the installation instructions that came with the rack unit you are using. SGI cannot guarantee rail compatibility with all rack equipment. See the section “Third-Party Rack Mounting Information” on page 89.

Acclimatization

If the equipment has been in transit for more than 24 hours to reach the install site, wait **4 to 8 hours** for the equipment to acclimate to the data center or lab environment before proceeding with the installation.

Caution: Failure to let equipment acclimate may cause condensation damage to the equipment.

Preparing to Install

Uncrate the rack and inspect the shipment for any damage. (Refer to “Inspecting a Shipment” on page 71).

Be aware that the increased weight and size of the tall racks can cause the racks to tip over if the racks are improperly handled. To minimize your own personal risk of injury, use extra care and allow extra time when moving racks.

Be sure to evaluate the path you will be moving a rack along before moving the rack. Plan the move by anticipating any issues and removing any obstacles. Use extra caution during the actual move and roll the rack on to the data center floor.

Required Tools

The following tools are required:

- #1 and #2 Phillips screwdrivers,
- Long #2 Phillips screwdriver,
- Flat-head screwdriver,
- Thin-tipped flat-head screwdriver
- 10mm hexagonal socket wrench,
- A wheeled cart with brakes, sturdy enough to hold the chassis, and on which to work.

Note: Screwdrivers with magnetic tips are recommended.

Installing the UV 300 Chassis

After a shipment has been inspected see “Inspecting a Shipment” and acclimated - reference “Acclimatization” to the operation location, use one of the following scenarios for installation:

- Install the chassis into a rack that is already on location (D-Rack or other supported rack)
- Use information provided with a non-SGI rack to configure and mount the UV 300 chassis

To install a UV 300 chassis into a rack that is already on location, first locate all boxes in the shipment. There should be a single box that holds each chassis and other boxes with standard or optional components for each chassis.

Next, the rolling rails that support the UV chassis in the rack must be installed, and the chassis placed into the rack. These procedures requires two people.

Once the chassis is installed into the rack, the chassis can be secured in the rack in the stowed position. When that is complete, the system can be cabled and powered on. Reference the instructions for “Sliding the Chassis Forward/Backwards” on page 89, and continue following the instructions from there.

D-Rack Stiffener

Note: The following procedure is for installing into a D-Rack *already on location*, where the installer is required to install the outer rails into the SGI D-Rack. **These instructions are specific to SGI D-Racks on location ONLY. This hardware is not applicable to 3rd-party racks.**

If you are installing rails into an SGI D-Rack on location, it will require installation of the D-Rack Stiffener (Figure 7-1). This item is two brackets with a wedge-shaped cut-out and interlocking tabs. These two pieces come together to form a single unit, held together by a top bolt. Orient the two pieces together so that the tabs of both pieces will eventually face outward, towards the sides of the rack. The brackets combine with a vertical 6x16 metric hex flange bolt to make the D-Rack Stiffener assembly.

Note: Installation and use of the D-Rack Stiffener assembly is important because of the extremely heavy system weights that can occur with SGI UV 300 configurations.

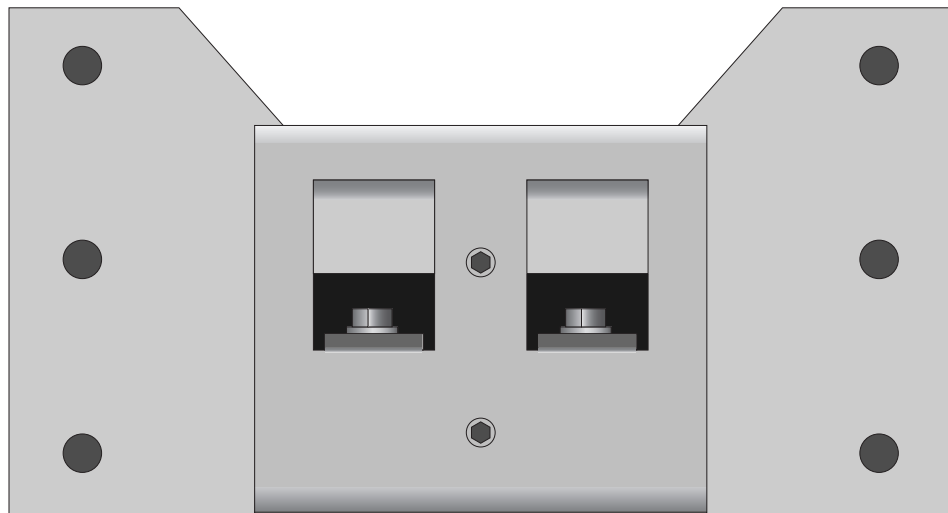


Figure 7-1 D-Rack Stiffener Example

Due to their construction, it is easiest to attach the outer bracket to the rack first, before joining with the inner bracket to make the D-Rack Stiffener.

1. Choose the lowest available 5-U space within the rack. If there are other UV 300 enclosures already mounted in the rack, leave two vertical rack-rail screw holes between the top rail of the already installed unit and the bottom of the new rail.
2. Attach the outer bracket of the D-Rack Stiffener to the D-Rack using the four support screws. There are six holes available for the screws, but two will be blocked. Use the remaining four holes.

Note: The screws that attach the D-Rack Stiffener to the rack can be tightened all the way.

3. Attach the inner bracket to the outer bracket using the vertical bolt and socket wrench (Figure 7-2 on page 80). Do **not** tighten these bolts all the way. They will be used later for altering rail aligning using the alignment tool.

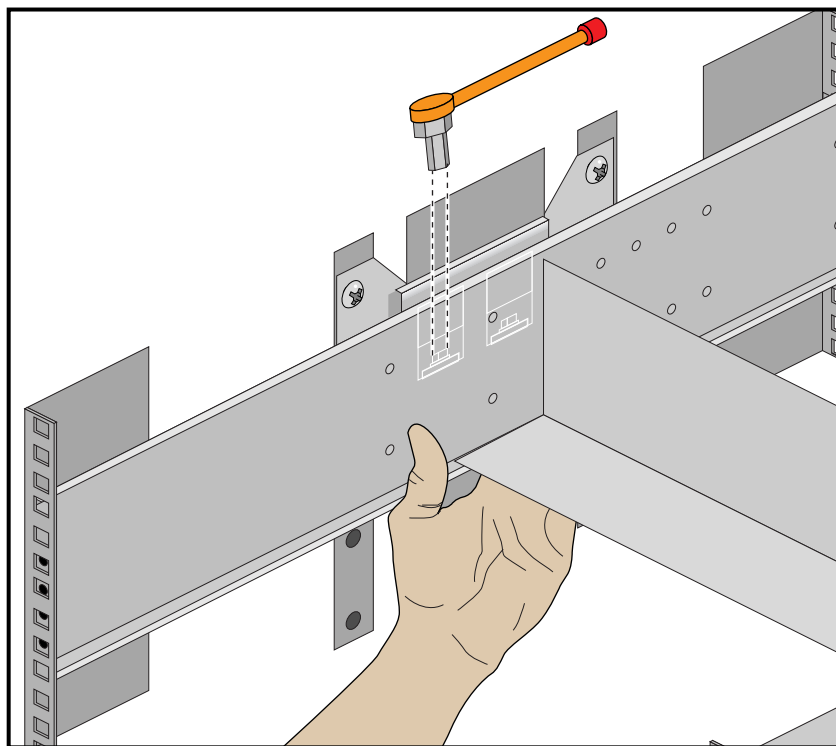


Figure 7-2 Alignment with the D-Rack Stiffener Vertical Bolt

Installing the Rolling Rails

These instructions are for installing the rolling rails on a UV 300 chassis shipped separately (i.e., not in a rack).

The rolling rails are used to support the chassis in the rack and provide ease of movement out the front and back of the rack, for easier and safer serviceability (see detail in Figure 7-3 on page 81).

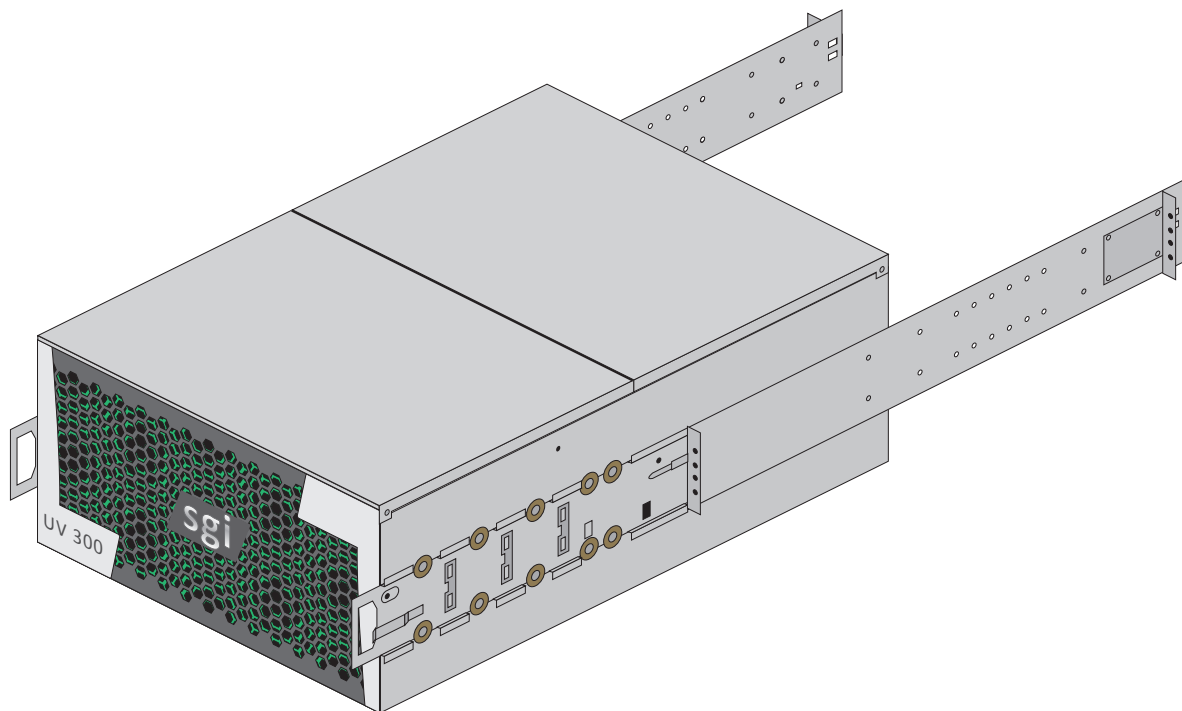


Figure 7-3 Rolling Rails Example

Installing the Outer Rails

1. Hold up the outer rails to the rack to determine if the depth is correct.
2. If the rail cannot be secured to the rack at the front and rear, perform the following steps.
 - a. Adjust the rack rail front-to-rear spacing to match the chassis depth.
 - b. If necessary, remove the four screws that hold the rear mounting plate to the rail.
 - c. Move the rear mounting plate until the depth of the rail is correct for the depth of the rack.
 - d. Secure the screws on the adjustment plate firmly in place.

For these next steps, it is helpful to use two people.

Note: If installing in a D-Rack with the D-Rack Stiffener (see Figure 7-1 on page 78), leave the vertical bolts loose. Then, using the small screws provided, attach the outer rail to the D-Rack Stiffener and secure the screws firmly. Make sure the screw heads are counter-sunk, so as not to catch on anything rolling in the rack. The vertical bolts in the D-Rack Stiffener will allow the rails to be adjusted later using the alignment tool.

3. Use the long Phillips screwdriver to fasten the rear screws of the rail to the rack. Keep the screws loose for later adjustment.
4. Attach the rail to the rack at the front using the screws provided, keeping them loose for later adjustment.

Aligning the Outer Rails



Important: These steps must be taken or the wheels of the inner rail can get bound to the outer rail, causing the chassis to get stuck.

1. Tighten the screws on the left rail *completely*: middle bolts first (for D-racks), then the front screws, and lastly, the rear.
2. Using the included alignment tool, insert it into the rails so that it rests on the inner track of the outer rails, just as a chassis would.
3. Adjust the right rail until it is flush with the alignment tool and the left rail. Insure that the tool can be slid smoothly from the front to rear of the rack. This step is also best accomplished with two people, as shown in Figure 7-4 on page 83.

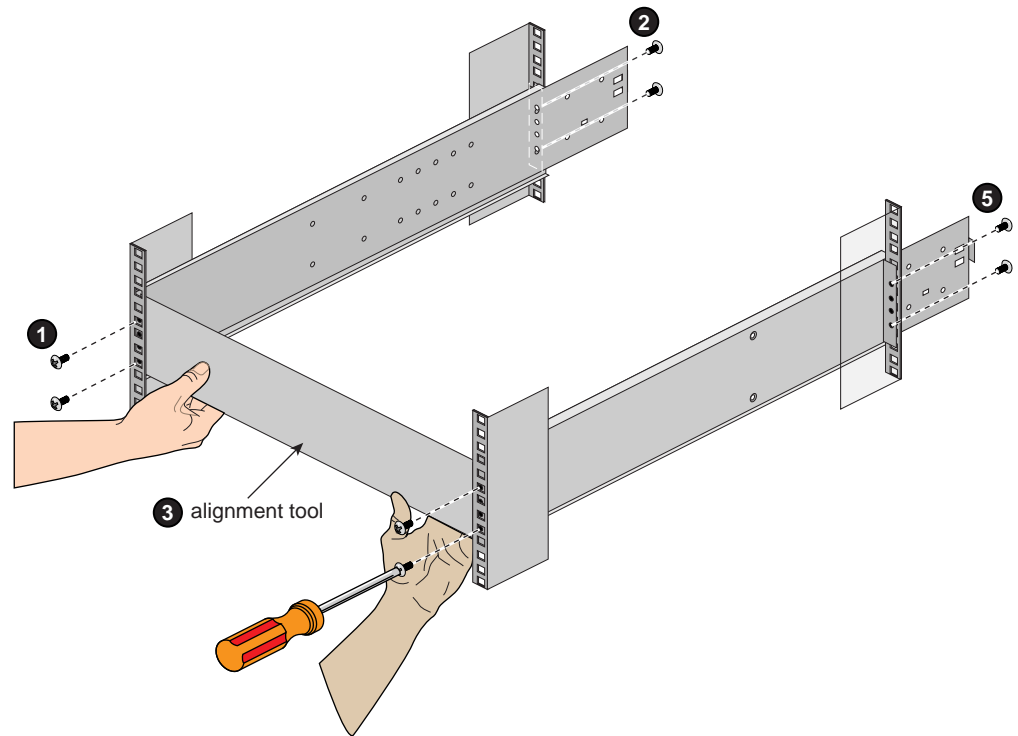


Figure 7-4 Adjustment Using Alignment Tool

4. Tighten the screws on the right rail in order of front then back, leaving the middle bolts last (for D-Racks), so as to keep as straight an alignment as possible.
5. Double-check the alignment by moving the alignment tool through the rack. There should be no play between the alignment tool and the rails, see Figure 7-5 on page 84 for an example.

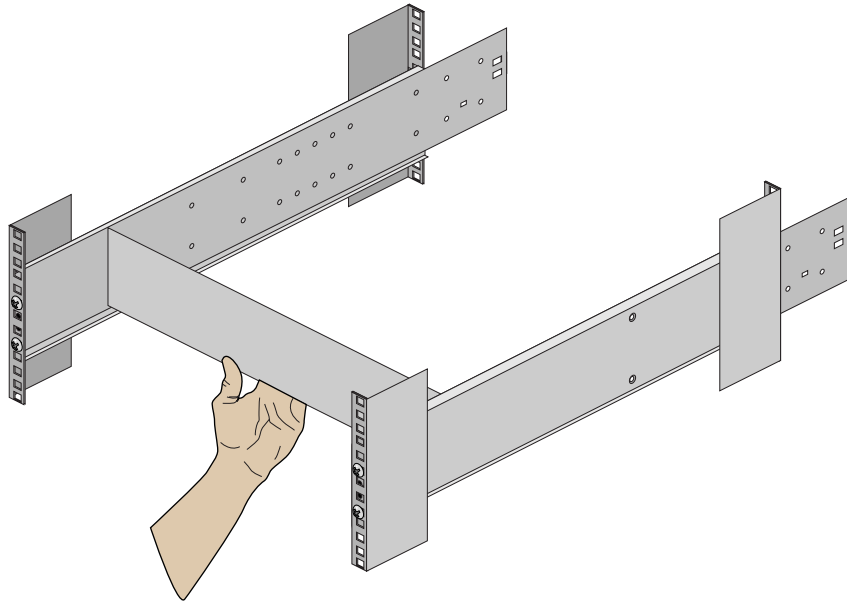


Figure 7-5 Slide the Alignment Tool from Front to Back

6. When satisfied, remove the alignment tool from the rack.

Installing the Inner Rolling Rails

1. Align the rolling rails to the chassis so that the word “**FRONT**” is at the front of the chassis

Note: The word “**FRONT**” will be upside-down on one side of the chassis, reference Figure 7-6.

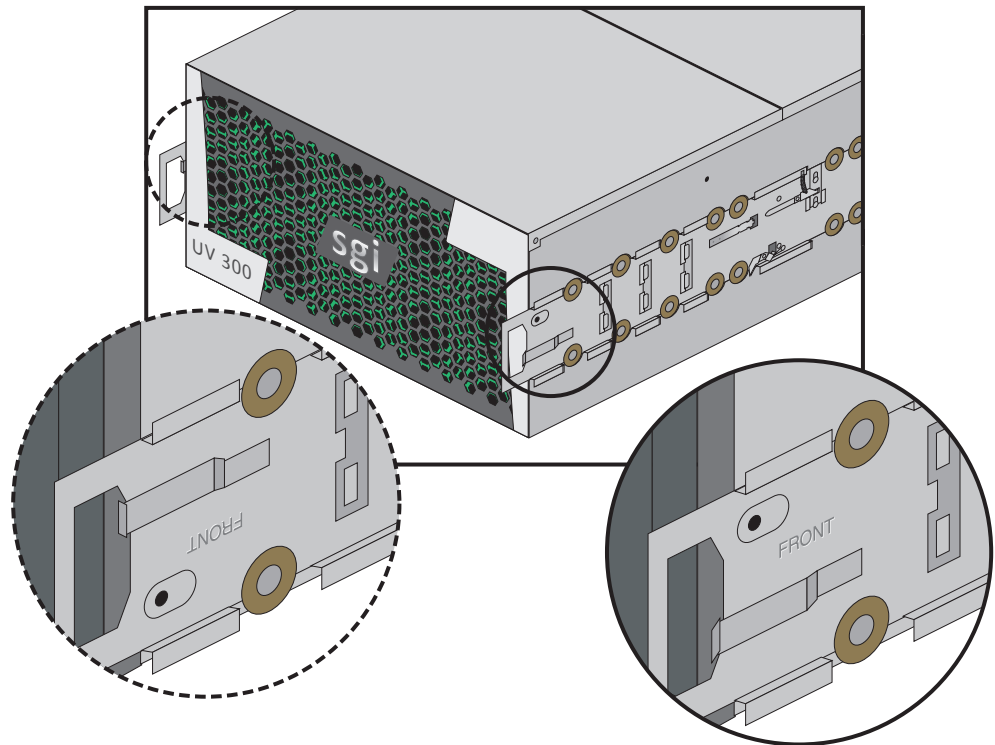


Figure 7-6 Align Rails to the Front of the Chassis

2. Locate the six support tabs along the side of the chassis (see Figure 7-7 on page 86).

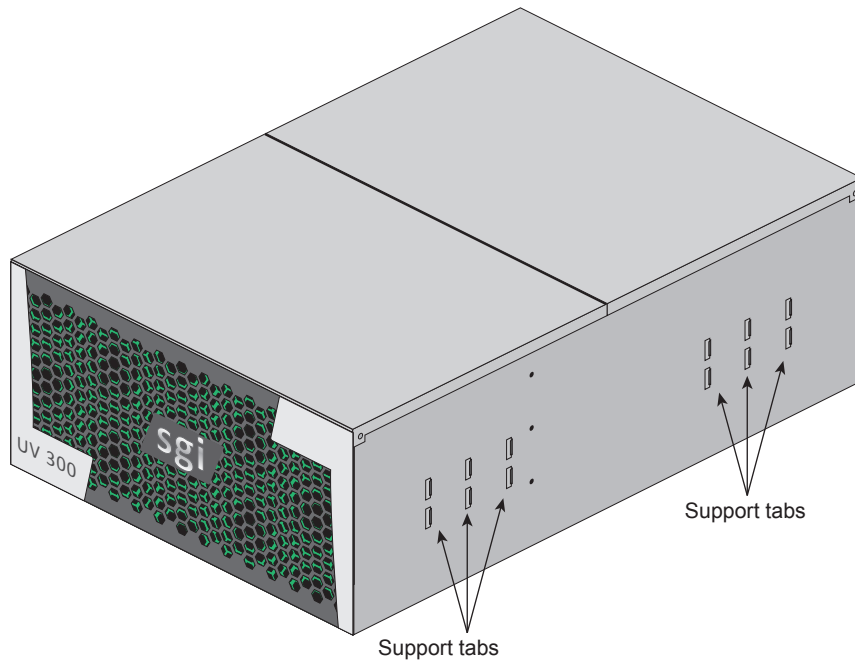


Figure 7-7 Support Tabs

3. Slide the rolling rail beneath the support tabs on the side of the chassis until it locks firmly into place (see Figure 7-8 on page 87).

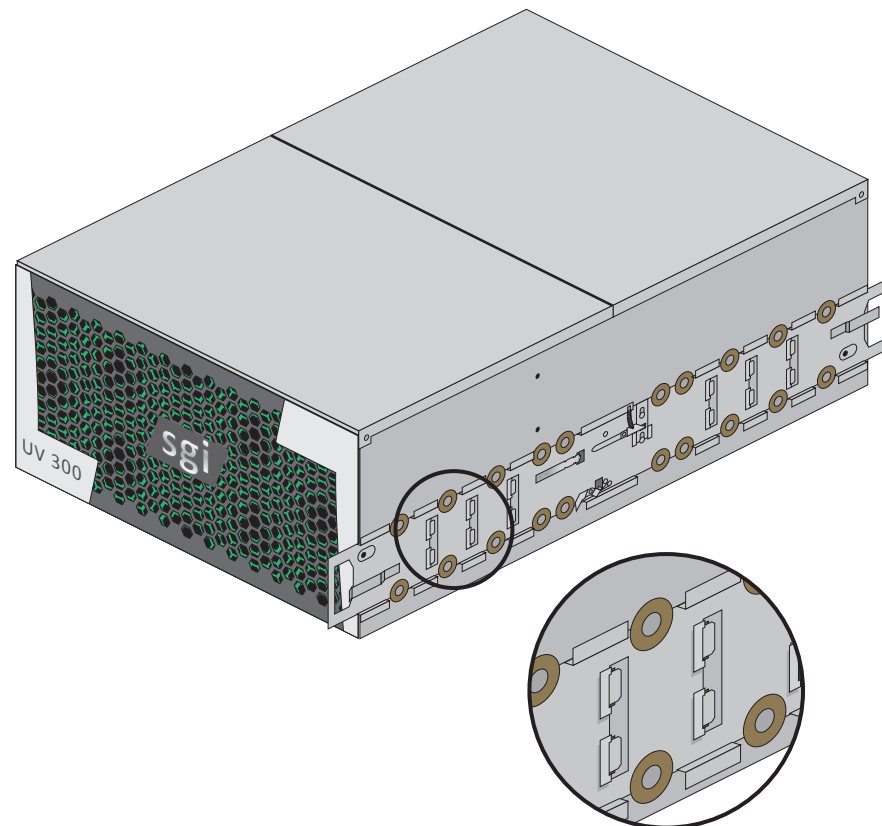


Figure 7-8 Lock on to Support Tabs

4. Using the included screws, attach the rolling rail to the chassis. Make sure the screw heads are counter-sunk, so as not to catch on anything when rolling in the rack.
5. You may have to move aside a safety latch in order to install some rolling rail screws. Be sure to set the safety latches back to their home positions after rolling rail installation is complete (see Figure 7-9 on page 88).
6. Do this for both sides.

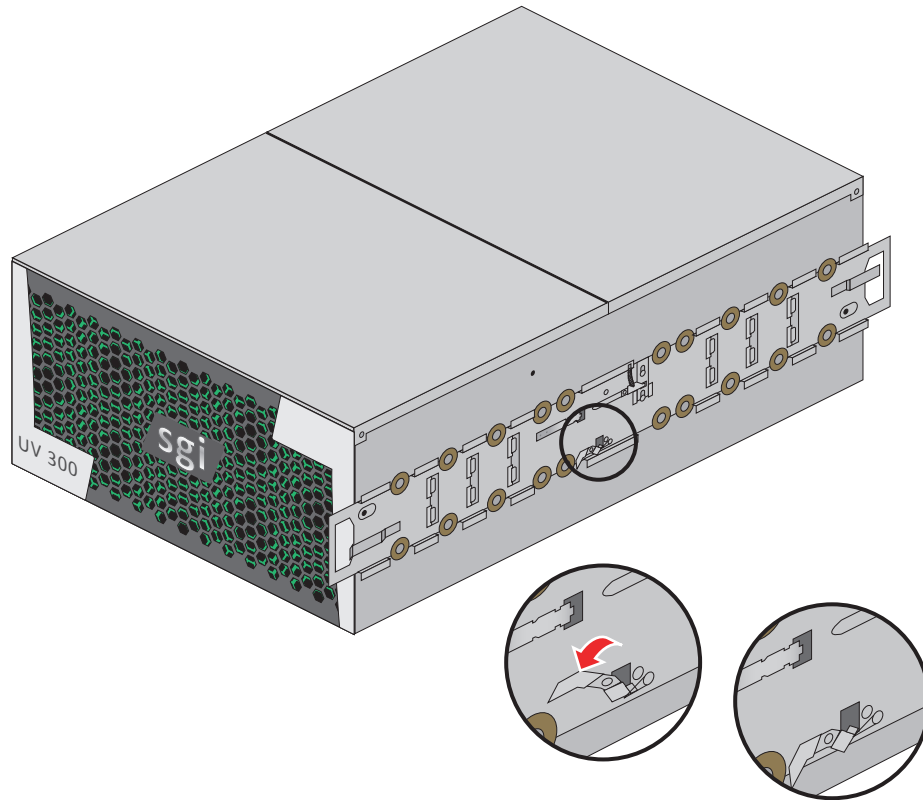


Figure 7-9 Return Latch to Home Position Example

Install the Chassis Into the Rack

1. Using two people, line up the inner rails on the chassis with the outer rails in the rack. Slide the chassis into the rack.
2. Motion into the rack will stop, by design, when the first set of safety latches on the inner rails catch in position on the outer rails. Move the safety latches to the unlatched position and continue to place the chassis into the rack.

3. Test the motion of the chassis in the rack by moving it forward and backwards in the rack, see the next subsection. It should only require one person to roll the chassis forwards or backwards. The chassis should catch and stop at 20-inches (51-cm) out from either side of the rack.

Sliding the Chassis Forward/Backwards

To slide the chassis out in either direction, follow these steps:

1. Push the two release latches in, at the left and right sides and in the center of the rail mounts, towards the center of the chassis.
2. Pull the chassis out using the handles. The chassis will stop at the 20-inch (51-cm) limit.
3. To slide the chassis back in, push the unit back into its home position until it latches in place.

Note that the chassis may only be completely removed from the front of the rack.

Caution: Make sure that only *one* person moves the chassis at any given time. It is possible to get your fingers caught in the latches on either end if, while you're trying to push the chassis back into a locked position, someone else accidentally *pulls* from the other side. This can trap your finger between the metal edges of the rail mount and the rack (potentially resulting in injury).

Third-Party Rack Mounting Information

The following subsections provide key information for anyone installing an SGI UV 300 system in a rack not supplied by SGI (a 3rd-party rack). Always review all of the rack-mounting safety information provided in Chapter 7 of the *SGI UV 300 System User Guide* (SGI P/N 007-6351-00x) prior to installing the chassis.

Important: Installers should note that the fan handles at the rear of each UV 300 enclosure are never used for lifting, moving or carrying the product.

Cable Management Requirements

NUMALink 7 cable and SAS cable management structure must be provided in 3rd-party racks to adequately support cable mass, and to provide strain relief for the cable connections to the UV 300 chassis. If the UV 300 chassis bezel is used, cables can be tied to the bezel support brackets. Additional cable mass to support may include cables routed between the UV 300 chassis and any optional storage chassis.

At least 6-inches (152mm) of room in the front part of the rack (between the front door and chassis) is needed to allow for SGI bezel and/or cable clearance. The bezel (trim) panel brackets, (two per UV 300 chassis), use M5 clip nuts on the EIA rail and M5 screws for attachment.

SAS cables connect to the front of the UV 300 chassis and must route to the rear of each storage chassis. There must be room provided for a pathway for these cables in the 3rd-party rack.

Chassis Mounting Requirements

The UV 300 5U chassis fits into a standard EIA 4 post 19-inch rack using SGI designed slides and fasteners. Slide width must be set correctly using Slide/Rack Gauge SGI part number CPR03915001, to insure the chassis moves freely. Front EIA to rear EIA rail spacing must fall between 26" to 29.5" for slides to mount. The rack must be capable of supporting the total weight of all UV 300 enclosure installed ~135 lbs [61.4 kg] (maximum) each, pending chassis configuration. The weight of all optional storage enclosures (~60 lbs [27.3 kg]) each must also be calculated. The RMC weight is ~20 lbs (9.1 kg) each. See Chapter 7 of the *SGI UV 300 System User Guide* (SGI P/N 007-6351-00x) for additional information on mounting rails.

Four M5x14 fasteners secure each end of the UV 300 chassis slide to the EIA rail and are provided with the system. A shoulder washer is available for 0.375" square hole EIA rails. SGI's racks use 0.375" square hole EIA rails, with M5 fasteners and shoulder washers for slide attachment.

Two M5x14 fasteners secure each end of the RMC chassis shelf to the EIA rail and are provided with each system. A shoulder washer is available for 0.375" square hole EIA rails.

Two M5x14 fasteners secure each end of the storage chassis shelf to the EIA rail and are provided with each system. A shoulder washer is available for 0.375" square hole EIA rails.

UV 300 air flow rate is 400 to 650 cfm per UV 300 chassis depending on inlet air temperatures and chassis power load, rack front and rear doors must support these air flow rates, with minimal air flow restriction. Open areas within the rack should be blocked off to prevent warm air recirculation. Air flow is front to rear.

Service Access Requirements

Provisions to access the rear of the chassis to service power supplies and cooling fans must be provided.

The UV 300 chassis is mounted in the rack using SGI slides, which extend 20-inches (51-cm) both front and rear directions allowing better access to PCIe option cards, disk drives, chassis power supplies and system fans.

System Power Requirements in 3rd-Party Racks

The main PDU power feed cords, all PDUs and other components must not interfere with rearward chassis movement. When slid out, there needs to be room above and below the extracted chassis for access, this includes the front and rear of the rack.

SGI PDUs are designed to fit SGI racks. Customers should provide PDUs when using a 3rd-party rack. Usage of SGI PDUs in 3rd-party racks will require a fit determination and custom mounting hardware. Upon request, SGI will provide PDU drawings the customer can review. The PDU main feed power cord must be routed in the rack and not interfere with the UV 300 chassis front and rear slide movement needed for service or upgrades.

All 3rd-party PDUs must provide a connection to each power supply, (four power supplies per UV 300 chassis). Power supply has auto range input of 47 to 63 Hz. Power supply nameplate input is 200 – 240VAC, 10A, properly rated C13/C14 cordage must be used between the power supplies and all PDUs. Each individual chassis power supply has a C14 connector and the power cord to the supply requires a C13 connector. Power supplies are located in the rear of the UV 300 chassis. SGI may not provide power supply power cords to customers unless used with SGI PDU.

The RMC chassis has two power supplies, input is 200 – 240VAC, 50/60 Hz, will not exceed 0.5A. The RMC power supply has a C14 connector.

Each storage chassis has two power supplies, input is 200 – 240VAC, 50/60 Hz, will not exceed 2.5A. Each storage unit power supply uses a C14 connector.

Estimating Power Usage and Rack Placement for the System

The power numbers listed here are meant to be guidelines for decision making; actual numbers are available through SGI site planning MUS, and vary with configuration.

PDU placement relative to our equipment placed in 3rd-party racks will likely drive C13 power whips to be different compared to a standard SGI rack/PDU solution. The end user is required to determine cord length and provide properly rated power cords from a PDU to a power supply.

A lift, or adequate personnel are required to install and remove chassis from the rack due to chassis weight. Chassis located in the first 10U rack space will need to be removed from the rack, if service access to the chassis bottom is required. Chassis locations higher in the rack require a lift for installation.

All enclosures must be placed low enough in the rack to prevent the rack from tipping when a UV 300 chassis is extended on slides. This must be verified once the chassis are installed, or racks must be bolted to the floor.

End users should communicate with their SGI sales or service representative in order to understand the safest and most efficient placement of the RMC and UV 300 chassis (as a block) within their rack. SGI will also need to understand and provide advice on where the customer intends to place any optional storage arrays within their rack (as a block). Each of these starting "U" positions needs to be fed back to SGI manufacturing for correct configuration and appropriate cable label identification for NUMALink 7 and SAS cables.

Important: There are going to be limits on distance between the RMC and UV 300 block of equipment and any storage units due to SAS cable lengths that are qualified. Follow pre-sales SGI racking recommendations for this limit.

Technical Specifications and Pinouts

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

- “System-level Specifications” on page 93
- “Physical Specifications” on page 94
- “Environmental Specifications” on page 95
- “Power Specifications” on page 96
- “I/O Port Specifications” on page 98

System-level Specifications

Table A-1 summarizes the UV 300 system configuration ranges. Note that while each chassis motherboard houses four processor sockets; each socket holds multiple processor “cores”. The number of cores supported will change based on customer selection and processor availability.

Table A-1 UV 300 System Configuration Ranges

Category	Minimum	Maximum
Processors per chassis	4 processors (1 motherboard) ^a	4 processors
Individual chassis	1 per rack	8 per rack (with 42U rack)
Motherboards per rack	1 per rack	8 per rack
Memory risers on motherboard	2 per motherboard	8 per motherboard
Motherboard DIMM capacity	32 DIMMs per board	96 DIMMs per board
RMC units	1 per system	1 per system
Number of BaseIO riser boards	One per SSI	One per SSI

a. The quad-socket UV 300 chassis motherboard supports 4 processors using multi-processor cores.

Physical Specifications

Table A-2 shows the physical specifications of the rack-mounted UV 300 system.

Table A-2 UV 300 and 42U Rack Physical Specifications

Feature	Specification
Height of UV 300 chassis	5U 8.64 inches (22 cm)
Width of UV 300 chassis	17.5 inches (44.5 cm)
Depth of UV 300 chassis	31.8 inches (80.8 cm)
UV 300 chassis weight	136 lbs. (62 kg) each
Dimensions for a single 24-inch wide tall (42U) rack, including doors and side panels	Height: 78.75 in. (200 cm) Width: 28 in. (70.1 cm) Depth: 45.5 in. (115.6 cm)
Shipping dimensions (single rack)	Height: 88.8 in. (225.8 cm) Width: 44 in. (111.8 cm) Depth: 62.75 in. (159.4 cm)
Single-rack max shipping weight	2,070 lbs. (939 kg) air cooled (approximate)
Single-rack max system weight installed (approximate)	1,579 lbs. (716 kg) air cooled *Empty rack weight is approximately 391 lbs. (177 kg)
42U rack access requirements:	
Front	48 in. (121.9 cm)
Rear	48 in. (121.9 cm)
Top	18 in. (45.7 cm)

Environmental Specifications

Table A-3 lists the environmental specifications of the system.

Table A-3 Environmental Specifications

Feature	Specification
Temperature tolerance (operating)	+5 °C (41 °F) to +35 °C (95 °F) (up to 1500 m / 5000 ft.) +5 °C (41 °F) to +30 °C (86 °F) (1500 m to 3000 m / 5000 ft. to 10,000 ft.) De-rate max ambient temperature by 1.8 °F (1 °C) per 1000 ft. (305 m) of altitude above 5000 ft. (1525 m)
Temperature tolerance (non-operating)	-40 °C (-40 °F) to +60 °C (140 °F)
Relative humidity	20% to 80% operating (no condensation) 8% to 80% non-operating (no condensation)
Heat dissipation to air	Approximately 17.74 kBTU/hr (1.48 tons)
Cooling requirement	Ambient air or optional water cooling
Single chassis air-flow: intake (front), exhaust (rear)	650 CFM Max (1104 m ³ /hr) 475 CFM typical (407 m ³ /hr)
Maximum altitude	10,000 ft. (3,049 m) operating 40,000 ft. (12,195 m) non-operating
Acoustic sound pressure	Approximately 77 dBA (at rear of rack)

Power Specifications

Table A-4 shows the power specifications for the UV 300 chassis.

Table A-4 UV 300 Chassis Power Specifications

Feature	Specification
Chassis power supply (4 per chassis)	12-Volt, 1600 Watt (Platinum) [200-240 VAC] 12-Volt, 1000 Watt (Platinum) [100-120 VAC]
Chassis power cords	Four 8-ft (2.4 m) drop cables
Chassis power requirements	
Voltage	100-120V (90-140 VAC min/max) 200-240V (180-264 VAC min/max)
Frequency	50-60 Hz (47-63 Hz min/max)
Power (maximum per UV 300 chassis)	5.33 kVA (5.22kW) per chassis
Hold-up time	10 ms
Rack power: single-phase 200-240 VAC	180-264 VAC N. America/Japan & international
Rack power: three-phase 208 or 400 VAC	180-264 VAC N. America/Japan & 312-457 VAC all others
Three-phase power requirements	
Voltage	US/Japan 208V (180-264 VAC) International 400V (312-457 VAC)
Frequency	50-60 Hz
Total harmonic distortion	Less than 10% at full load

The UV 300 system rack management controller (RMC) power and technical specifications are provided in Table A-5 on page 97.

Table A-5 UV 300 Rack Management Controller Power and Technical Specifications

Feature	Specification
Height	1.72 inches (44 mm)
Width	17.2 inches (43.7 cm)
Depth	29.84 inches (75.8 cm)
Weight	20 lbs (9.1 kg)
Chassis power supply	Two per RMC
Chassis power cords	Two 8-ft (2.4 m) drop cables
Chassis power requirements	
Voltage	100-120V (90-132 VAC min/max) 200-240V (180-264 VAC min/max)
Frequency	50-60 Hz (47-63 Hz min/max)
Power	(50W) per supply
Hold-up time	20 ms
RMC power: single-phase 100-120 VAC	NEMA 5-15R (x2) N. America/Japan
RMC power: single-phase 200-240 VAC	IEC320-213 (x2) N. America/Japan & International
Air flow (front to back)	Maximum = 35 CFM (60 m ³) per hour
Acoustical noise	Approximately 68 dBA
Heat dissipation to air	Approximately 171 BTU (0.02 tons) per hour

I/O Port Specifications

This section contains specifications and port pinout information for the base I/O ports of your system, as follows:

- “Motherboard VGA Port Information”
- “Ethernet Port” on page 100
- “Serial Port” on page 101
- “USB Type A Connector” on page 103

Motherboard VGA Port Information

The 15-pin VGA port on the motherboard (see Figure A-1) has the following features:

- Server-class 2D hardware acceleration support with integrated 24-bit RAMDAC
- Display resolution up to 1600 x 1200 @ 60Hz
- Up to 128 Mbytes DDRII memory interface support
- A USB keyboard/mouse can be supported by the BaseIO blade connectors

The motherboard VGA interface (see Table A-6 on page 99) can be used for all basic interaction with your UV 300 system. Note that it does **not** provide a direct interconnect to the system RMC.

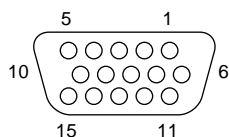


Figure A-1 VGA Port Pinouts

Table A-6 VGA Pin Functions

Pin Number	Function
1	Red
2	Green
3	Blue
4	N/C
5	Ground
6	Ground
7	Ground
8	Ground
9	Ground
10	Ground
11	N/C
12	DDCDAT
13	HSYNC
14	VSYNC
15	DDCCLK

Ethernet Port

The system auto-selects the Ethernet port speed and type (duplex vs. half-duplex) when the server is booted, based on what it is connected to. Figure A-2 shows the Ethernet port.

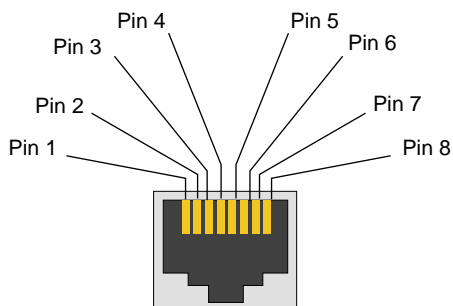


Figure A-2 Ethernet Port

Table A-7 shows the cable pinout assignments for the Ethernet port operating in 10/100-Base-T mode and also operating in 1000Base-T mode.

Table A-7 Ethernet Pinouts

Ethernet 10/100Base-T Pinouts		Gigabit Ethernet Pinouts	
Pins	Assignment	Pins	Assignment
1	Transmit +	1	Transmit/Receive 0 +
2	Transmit –	2	Transmit/Receive 0 –
3	Receive +	3	Transmit/Receive 1 +
4	NU	4	Transmit/Receive 2 +
5	NU	5	Transmit/Receive 2 –
6	Receive –	6	Transmit/Receive 1 –
7	NU	7	Transmit/Receive 3 +
8	NU	8	Transmit/Receive 3 –

NU = Not used

Serial Port

The system motherboards have 9-pin serial interface connectors. These ports provide serial access to the individual chassis and are capable of transferring data at rates as high as 230 kbps. Other features of the ports include the following:

- Programmable data, parity, and stop bits
- Programmable baud rate and modem control

Figure A-3 shows a serial port.

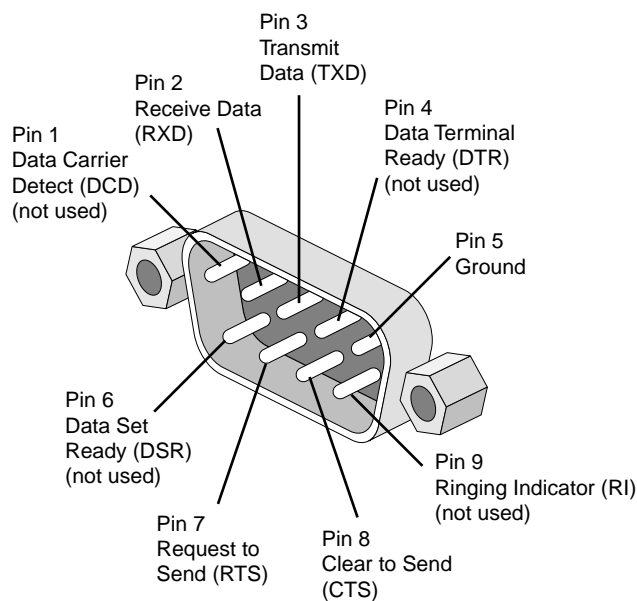


Figure A-3 Serial Port Connector Example

Table A-8 shows pinout assignments for the 9-pin male DB-9 connector.

Table A-8 Serial Port Pinout

Pin	Assignment	Description
1	DCD	Data carrier detect
2	RXD	Receive data
3	TXD	Transmit data
4	DTR	Data terminal ready
5	GND	Signal ground
6	DSR	Data set ready
7	RTS	Request to send
8	CTS	Clear to send
9	RI	Ring indicator

USB Type A Connector

Figure A-4 shows the USB type A connector provided on the BaseI/O that supports general USB applications and optional keyboard and mouse configurations.

Table A-9 lists the pin assignments for the USB type A connector.

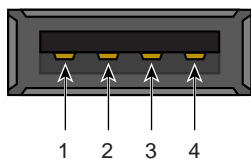


Figure A-4 Pin Number Locations for USB Type A Connector

Table A-9 Pin Assignments for USB Type A Connector

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

Safety Information and Regulatory Specifications

This appendix provides safety information and regulatory specifications for your system in the following sections:

- “Safety Information” on page 105
- “Regulatory Specifications” on page 107

Safety Information

Read and follow these instructions carefully:

1. Follow all warnings and instructions marked on the product and noted in the documentation included with this product.
2. Unplug this product before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning. Do not use this product near water.
3. Do not place this product or components of this product on an unstable cart, stand, or table. The product may fall, causing serious damage to the product.
4. Slots and openings in the system are provided for ventilation. To ensure reliable operation of the product and to protect it from overheating, these openings must not be blocked or covered. This product should never be placed near or over a radiator or heat register, or in a built-in installation, unless proper ventilation is provided.
5. This product should be operated from the type of power indicated on the marking label. If you are not sure of the type of power available, consult your dealer or local power company.
6. Do not allow anything to rest on the power cord. Do not locate this product where people will walk on the cord.
7. Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a fire or electric shock. Never spill liquid of any kind on the product.
8. Do not attempt to service this product yourself except as noted in this guide. Opening or removing covers of node and switch internal components may expose you to dangerous voltage points or other risks. Refer all servicing to qualified service personnel.

9. Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
- When the power cord or plug is damaged or frayed.
 - If liquid has been spilled into the product.
 - If the product has been exposed to rain or water.
 - If the product does not operate normally when the operating instructions are followed. Adjust only those controls that are covered by the operating instructions. Improper adjustment of other controls may result in damage.
 - If the product has been dropped or the cabinet has been damaged.
 - If the product exhibits a distinct change in performance, indicating a need for service.

Caution: Slide/rail mounted equipment is **not** to be used as a shelf or a workspace.



Figure B-1 Slide Rail Equipment Warning

10. If a lithium battery is a soldered part, only qualified SGI service personnel should replace this lithium battery. For other types, replace it only with the same type or an equivalent type recommended by the battery manufacturer, or the battery could explode. Discard used batteries according to the manufacturer's instructions.
11. Use only the proper type of power supply cord set (provided with the system) for this unit.
12. Do not attempt to move the system alone. Moving a rack requires at least two people.
13. Keep all system cables neatly organized in the cable management system. Loose cables are a tripping hazard that cause injury or damage the system.

Regulatory Specifications

The following topics are covered in this section:

- “CMN Number” on page 108
- “CE Notice and Manufacturer's Declaration of Conformity” on page 108
- “Electromagnetic Emissions” on page 108
- “Shielded Cables” on page 110
- “Electrostatic Discharge” on page 110
- “Laser Compliance Statements” on page 111
- “Lithium Battery Statements” on page 112

This SGI system conforms to several national and international specifications and European Directives listed on the “Manufacturer's Declaration of Conformity.” The CE mark insignia displayed on each device is an indication of conformity to the European requirements.



Caution: This product 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.

CMN Number

The UV 300 Chassis CMN model number is: CMN061

The RMC Chassis CMN model number is: CMN062

Each model number listed above is marked on the Regulatory label which is affixed to each chassis during the production process. The regulatory labels are placed as near as possible to the power supply AC inputs.

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。

Figure B-2 VCCI Notice (Japan Only)

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.

Figure B-3 Korean Class A Regulatory Notice

Shielded Cables

This SGI system is FCC-compliant under test conditions that include the use of shielded cables between the system and its peripherals. Your system and any peripherals 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 need to be shielded.

Optional monitor cables supplied with your 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 system. The shielded cables that came with the unit 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 DVD drive in this computer is a Class 1 laser product. The DVD drive's classification label is located on the drive.



Warning: Avoid exposure to the invisible laser radiation beam when the device is open.



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



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



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



Warning: Advarsel: Laserstråling vedåbning se ikke ind i strålen



Warning: Varo! Lavattaessa Olet Alttina Lasersäteilylle



Warning: Varning: Laserstrålning når denna del är öppnad åå tuijota såteeseenstirra ej in i strålen.



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



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

Lithium Battery Statements



Warning: There is danger of explosion if a lithium battery is incorrectly replaced in this product. Replace a battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.
