Origin200™ Owner's Guide

Document Number 007-3415-003

CONTRIBUTORS

Written by Kameran Kashani and Carolyn Curtis
Illustrated by Francesca Angelesco, Cheri Brown, Dan Young, Kwong Liew, and Kameran Kashani
Production by Kirsten Pekarek
Engineering contributions by Jim Gath, Jeffrey Heller, Dave Parry, Ken Hibbard, Eric Williams, Demick Boyden, Steve Smithson, Dilip Amin, Richard Wright, Brad Morrow, Tim Wong, Tom Jackman, and Carl Strasen
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This equipment has been tested and found compliant 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 the user will be required to correct the interference at his own expense.

Attention

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About This Guide

This guide describes how to set up and operate a Silicon Graphics Origin200 server. It contains the following chapters:

- Chapter 1, “Overview of the Origin200 System,” lists the main system features, and describes its internal components, external connectors, and physical specifications.
- Chapter 2, “Setting Up an Origin200 System,” describes how to set up a one-module or two-module Origin200 system. It shows how to open and close the chassis, how to attach a system console, how to connect two Origin200 modules together, how to turn on the system, how to log in for the first time, and how to turn the system off.
- Chapter 3, “Installing an Origin200 System in a Rack,” describes how to install a one-module or two-module Origin200 system in a rack cabinet.
- Chapter 4, “Operating an Origin200 System,” documents common tasks in operating the server, including turning the system on and off, using the front panel buttons (reset, nonmaskable interrupt), using the AUX port and the system controller, and how to open the system chassis for servicing.
- Chapter 5, “Origin200 Cosmetic Features and Covers,” describes how to open the various covers of the system, lock the chassis, remove and reattach the front door, and adjust the system’s feet.
- Chapter 6, “Installing and Removing Memory,” describes how to install and remove dual-inline memory modules (DIMMs) in an Origin200 module.
- Chapter 7, “Installing and Removing PCI Option Boards,” shows how to install peripheral component interconnect (PCI) option boards in an Origin200 module.

- Chapter 8, “Installing and Configuring Peripherals,” describes how to attach various internal and external peripherals to an Origin200 module. These include disk drives, tape drives, CD-ROM drives, and serial devices.
- Chapter 9, “Troubleshooting and Maintenance,” lists the message codes for the system status LED, Ethernet port LEDs, and drive status LEDs, and describes how to check the power supply.
- Chapter 10, “Removing and Replacing Internal Components,” shows how to remove components from an Origin200 module, order replacement parts, and install replacement parts.

In addition, this guide contains the following appendices:

- Appendix A, “Connector Pinout Assignments,” shows the pinouts of the various connectors available on the Origin200 system.
- Appendix B, “Cable Descriptions,” describes various cables that can be used with the Origin200 system, including serial, Ethernet, SCSI, parallel, and CrayLink Interconnect.
- Appendix C, “Supported Terminals,” lists some common terminal types that are supported by IRIX on the Origin200 system.

A glossary and index complete this guide.

Where to Find More Information

Figure i illustrates sources of additional information about your Origin200 system:

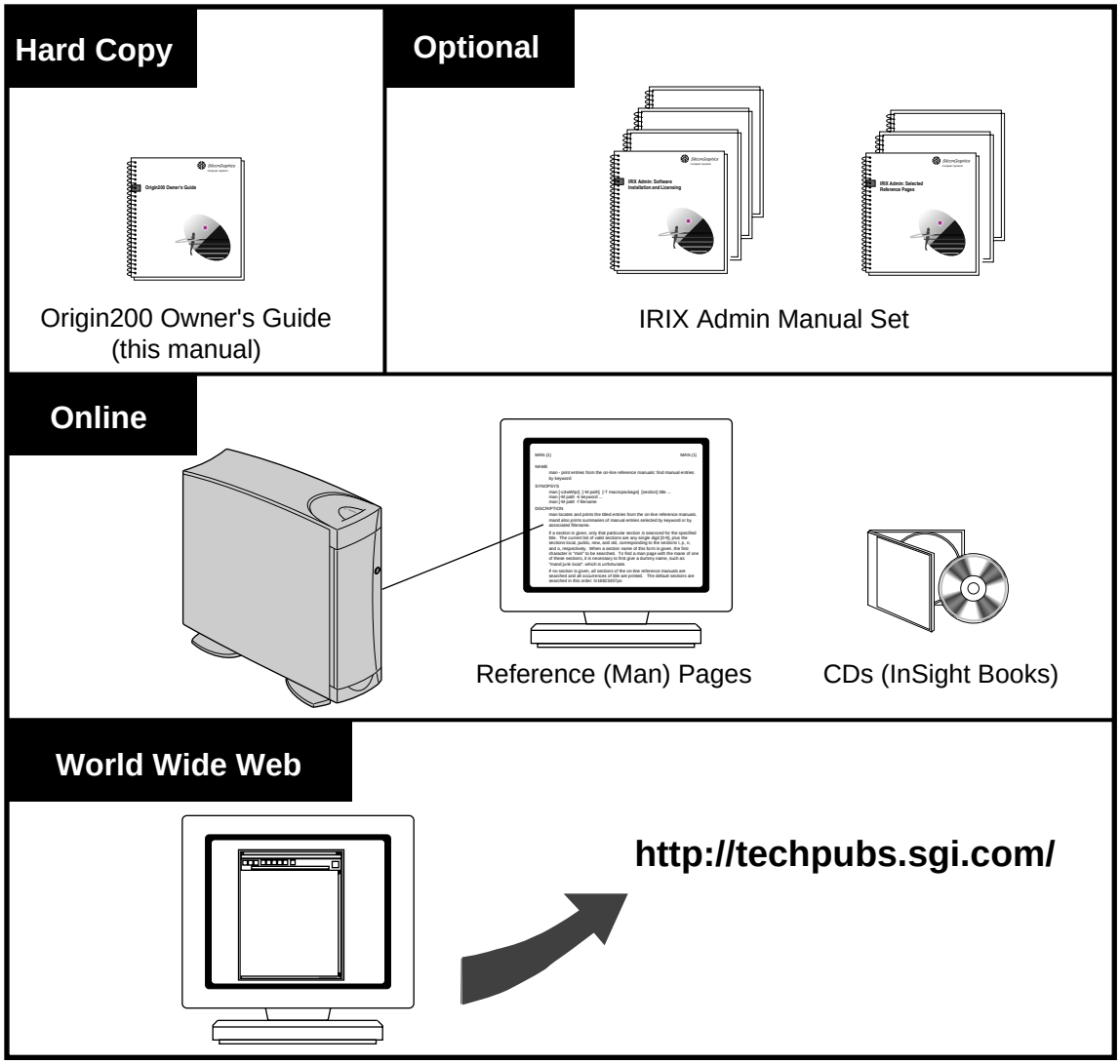

Figure i Sources of Additional Information About Origin200

The following sections describe each of the sources of information previously illustrated.

- "Origin200 Owner's Guide"
- "Optional Documentation"
- "Online Reference (Manual) Pages"
- "World Wide Web-Accessible Documentation"

You may also wish to read these sections:

- "Release Notes"
- "InfoSearch"

Origin200 Owner's Guide

Refer to the *Origin200 Owner's Guide* (this manual) to set up the system, use the system, install hardware options, and whenever you suspect there is a hardware problem. In addition, you can refer to this guide when you install or remove optional software.

The system and all the procedures in this guide are designed so that you may maintain many of the components of the system without the help of a trained technician. However, do not feel that you *must* work with the hardware yourself. You can always contact your maintenance provider to have an authorized service provider work with the hardware instead.

Optional Documentation

The *IRIX Admin* manual set is recommended as a reference for system administration tasks. This set of manuals contains the following books:

- *IRIX Admin: Software Installation and Licensing*—This book explains how to install and license software that runs under IRIX, the Silicon Graphics implementation of the UNIX operating system. It contains instructions for performing miniroot and live installations using Inst, the command-line interface to the IRIX installation utility. It also identifies the licensing products that control access to restricted applications running under IRIX and refers readers to licensing product documentation.

- *IRIX Admin: System Configuration and Operation*—This book lists good general system administration practices and describes system administration tasks, including configuring the operating system; managing user accounts, user processes, and disk resources; interacting with the system while in the PROM monitor; and tuning system performance.
- *IRIX Admin: Disks and Filesystems*—This guide explains disk, filesystem, and logical volume concepts. It provides system administration procedures for SCSI disks, XFS and EFS filesystems, XLV and *lv* logical volumes, and guaranteed-rate I/O.
- *IRIX Admin: Networking and Mail*—This book describes how to plan, set up, use, and maintain the networking and mail systems, including discussions of *sendmail*, UUCP, SLIP, and PPP.
- *IRIX Admin: Backup, Security, and Accounting*—This guide describes how to back up and restore files, how to protect your system's and network's security, and how to track system usage on a per-user basis.
- *IRIX Admin: Peripheral Devices*—This book describes how to set up and maintain the software for peripheral devices such as terminals, modems, printers, and CD-ROM and tape drives. It also includes specifications for the associated cables for these devices.
- *IRIX Admin: Selected Reference Pages* (not available in IRIS InSight)—This book provides concise reference (manual) page information on the use of commands that may be needed while the system is down. Generally, each reference page covers one command, although some reference pages cover several closely related commands. Reference pages are also available online through the *man* command.

Except where noted, the optional books listed above are included online with the appropriate version of IRIX, either preinstalled on the system disk or available on CD-ROM. You can display these books from a graphics workstation using the IRIS InSight viewer.

If you cannot use InSight, you can obtain these optional books in one of the following ways:

- Visit the Silicon Graphics Technical Publications Library on the World Wide Web (http://techpubs.sgi.com/library); you can view the books online via your Web browser, download PostScript and PDF versions of the books, and purchase printed copies.
- Contact your sales representative for information about obtaining printed copies of these books.

Online Reference (Manual) Pages

The Origin200 server comes with a set of IRIX reference (manual) pages, formatted in the standard UNIX "man page" style. These are found online on the main system disk, and are displayed using the *man* command. For example, to display the reference page for the *Add_disk* command, enter the following command at a shell prompt:

```
man Add_disk
```

Important system configuration files as well as commands are documented in reference pages. Citations in the documentation to these reference pages include the name of the command and the section number in which the command is found. For example, "Add_disk(1)" refers to the *Add_disk* command and indicates that it is found in section 1 of the IRIX reference.

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

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

```
apropos disk
```

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

World Wide Web-Accessible Documentation

Silicon Graphics makes its manuals available in a variety of formats via the World Wide Web (WWW). Using your Web browser, open the following URL:
http://techpubs.sgi.com/library

Release Notes

You can view the release notes for a variety of Silicon Graphics products and software subsystems using one of two utilities:

relnotes	Text-based viewer for online release notes.
grelnotes	Graphical viewer for online release notes.

To see a list of available Release Notes, type the following at a shell prompt:

```
relnotes
```

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

InfoSearch

InfoSearch is a unified system for retrieving and viewing online information, providing you with quick and easy access to online information available on Silicon Graphics computers. With InfoSearch, you can search or browse through release notes, reference pages, application help cards, online books, and other forms of online information.

There are two ways to use InfoSearch:

- The *infosearch* utility, which runs on Silicon Graphics workstations.
- A World Wide Web interface, *infosrch.cgi*, that you can access through any Web browser.

Your Origin200 system can be configured as an InfoSearch server so that other workstations on your network can use it to retrieve information. However, you must have a graphical workstation in order to use InfoSearch, either with the *infosearch* command or via a Web browser.

For basic information about getting started with InfoSearch, see the infosearch(1), sgindexAdmin(1), booksAdmin(1), and infosrch.cgi(1) reference pages.

Conventions

This *Origin200 Owner's Guide* uses these conventions:

- References to document titles are in *italics*.
- References to other chapters and sections within this guide are in quotation marks.
- IRIX commands and names of files appear in text as *italics*.
- Anything that you type on your keyboard is in **`Courier bold`**.
- Anything displayed on the screen is in `Courier`.
- Names of IRIX reference (manual) pages are in the default font and are followed by the section number of the reference page. For example "who(1)" refers to the *who* command, which is found in section 1 of the IRIX reference.
- Steps to perform tasks are in numbered sentences. When a numbered step needs more explanation, the explanation follows the step and is preceded by a square bullet.
- Words that are found in the glossary are in *italics*.

About the CD Software Media

You received one or more compact discs (CDs) with your Origin200 server. The CDs include optional software that you might find useful, and a copy of the operating system and software installation tools that are already on your system disk. If your server was shipped with a Silicon Graphics system disk, you don't need the CDs to set up and use your system. Store them in a safe and convenient place so you can find them when you need to install new software, or in case of a system failure.

Where to Go From Here

To learn about the Origin200, turn to Chapter 1, "Overview of the Origin200 System."

To set up the Origin200 in a tower configuration and start using the system, turn to Chapter 2, "Setting Up an Origin200 System."

To install the Origin200 in an equipment rack, turn to Chapter 3, "Installing an Origin200 System in a Rack."

Chapter 1

Overview of the Origin200 System

This chapter provides an overview of the Origin200 server. It describes the basic components of the system, summarizes its features, and lists physical and environmental specifications for the server.

Chapter 1

Overview of the Origin200 System

This chapter provides an overview of the Origin200 server, and includes the following sections:

- "Installation Options: Tower and Rackmounting" on page 4
- "Feature Summary" on page 7
- "Logic Carrier" on page 8
- "Memory" on page 14
- "Internal Drive Options and SCSI Channels" on page 15
- "Serial Ports" on page 18
- "AUX Port" on page 19
- "Parallel Port" on page 19
- "Ethernet Port" on page 20
- "External Interrupt Ports" on page 20
- "Power Supply" on page 21
- "Air Flow and Fans" on page 22
- "Physical and Environmental Specifications" on page 25

Installation Options: Tower and Rackmounting

The Origin200 server is a multiprocessor system that consists of one or two chassis, which are called *module*s. Each Origin200 system ships from Silicon Graphics in either a tower (free-standing) or rackmountable configuration.

The tower configuration provides extra cosmetic “skins” (side panels and top-cap) and feet. The rackmountable configuration does not have these cosmetic features and feet, but does provide a mounting shelf, mounting ears, a different front bezel, and two pairs of end-caps (for use in 19-inch and 21-inch equipment racks).

If you wish to change your system from a tower configuration to a rack mountable configuration, contact Silicon Graphics or your local support provider for information about obtaining a conversion kit (P-S-RM-KIT).

Figure 1-1 shows a two-module system in a tower configuration.

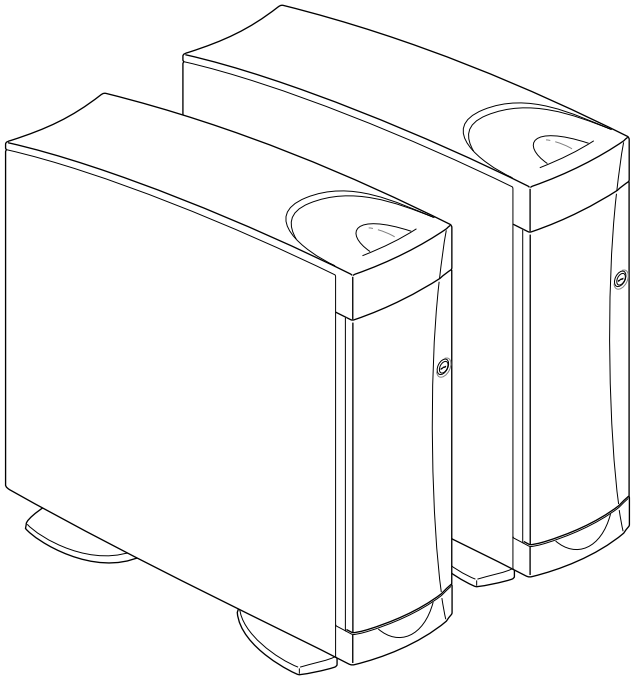

Figure 1-1 Two-Module Origin200 System, Front View

Figure 1-2 shows a rear view of a two-module Origin200 system.

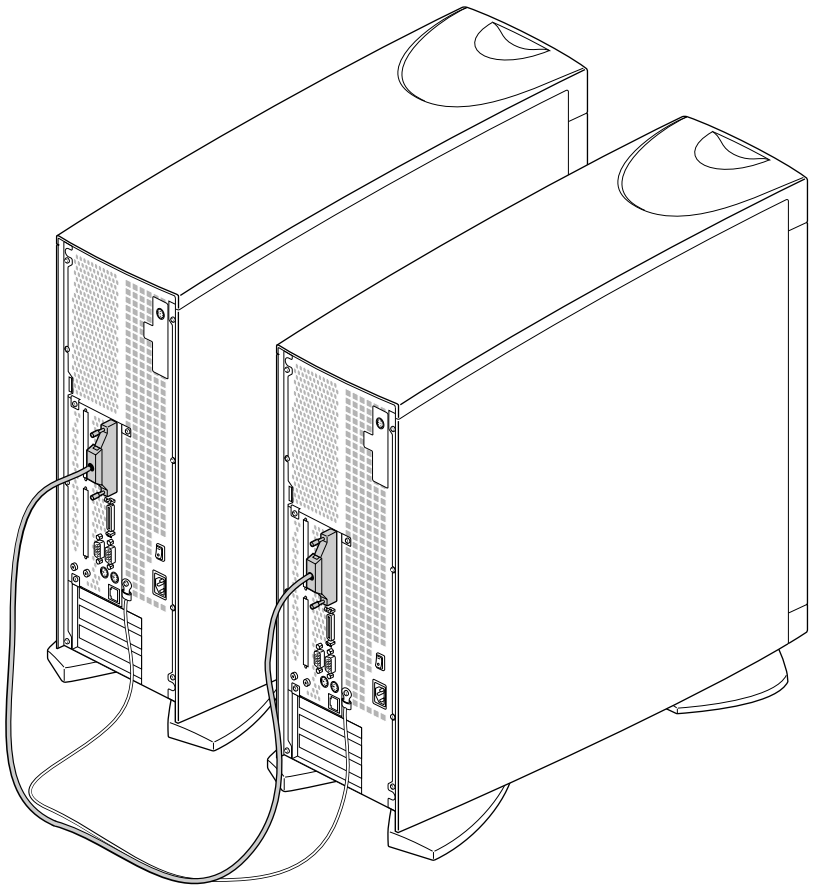

Figure 1-2 Two-Module Origin200 System, Rear View

The Origin200 server can be mounted in a 21-inch Silicon Graphics rack or a standard 19-inch rack. Figure 1-3 shows an example of a two-module system in a 19-inch rack.

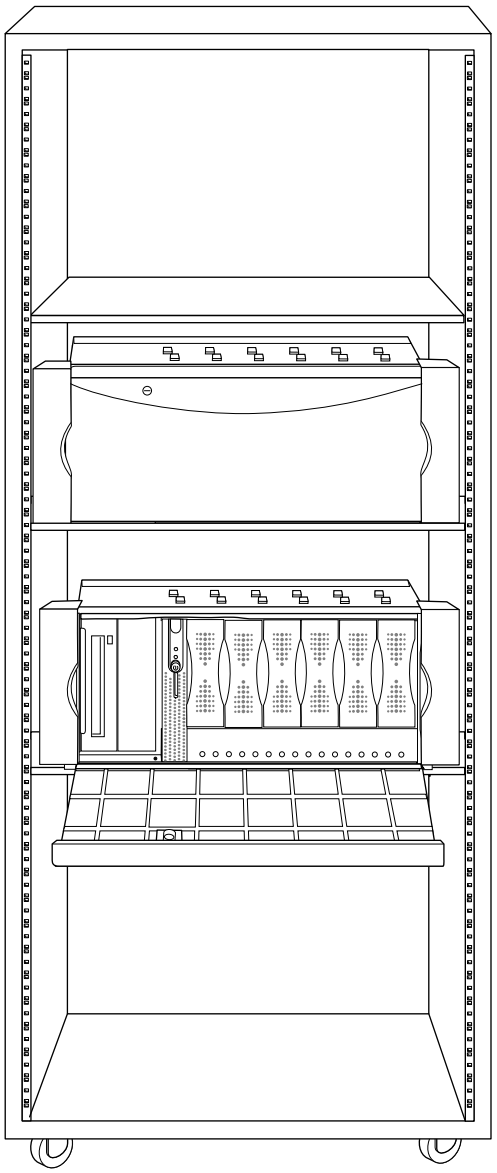

Figure 1-3 Two-Module Origin200 Server in a Rack

Feature Summary

Table 1-1 summarizes the general features of Origin200 systems:

Table 1-1 General Features of Origin200 Systems

Feature	One-Module System	Two-Module System
R10000 processors and cache	1 or 2 processors, each with separate on-chip instruction and data caches (32 KB, two-way set-associative) 1 MB or 2 MB secondary cache per processor, mounted on CPU module	2 to 4 processors
Memory	32 MB to 2 GB	64 MB to 4 GB
Module system controller (MSC)	One	Second controller inactive in a two-module system.
SCSI channels (internal)	One single-ended Ultra SCSI One single-ended Fast narrow	Two single-ended Ultra SCSI Two single-ended Fast narrow
5.25-inch drives	One full-height, two half-height, or two 1-inch	Two full-height, four half-height or two 1-inch
3.5-inch drives	Six 3.5-inch, Fast-20, wide	Twelve 3.5-inch, Fast-20, wide
Serial ports	Two RS-232 50 baud to 460 Kbaud	Four RS-232 50 baud to 460 Kbaud
Parallel port	One	Two
Ethernet	One 10-Base-T and 100-Base-TX	Two 10-Base-T and 100-Base-TX
AUX port	Serial interface to the module system controller	(Second AUX port inactive in a two-module system.)
Expansion slots	Three 32- or 64-bit full-size PCI With Origin XBOX: four additional 32- or 64-bit full-size PCI; five XIO	Six 32- or 64-bit full-size PCI With Origin XBOX: four additional 32- or 64-bit full-size PCI; five XIO
Power supply Standard	1 (480 watt)	2 (480 watts each)

For additional information about power requirements, see “Power Supply” on page 21. For environmental specifications, including operating and nonoperating conditions, see “Physical and Environmental Specifications” on page 25.

Logic Carrier

The Origin200 logic carrier is a sheet-metal tray that holds:

- the main system board
- CPU daughter card
- PCI backplane

Together, the logic carrier sheet metal, the main system board, CPU daughter card, and the PCI backplane form a single, field-replaceable unit.

The logic carrier may be serviced only by Silicon Graphics trained personnel.

Figure 1-4 shows the complete logic carrier.

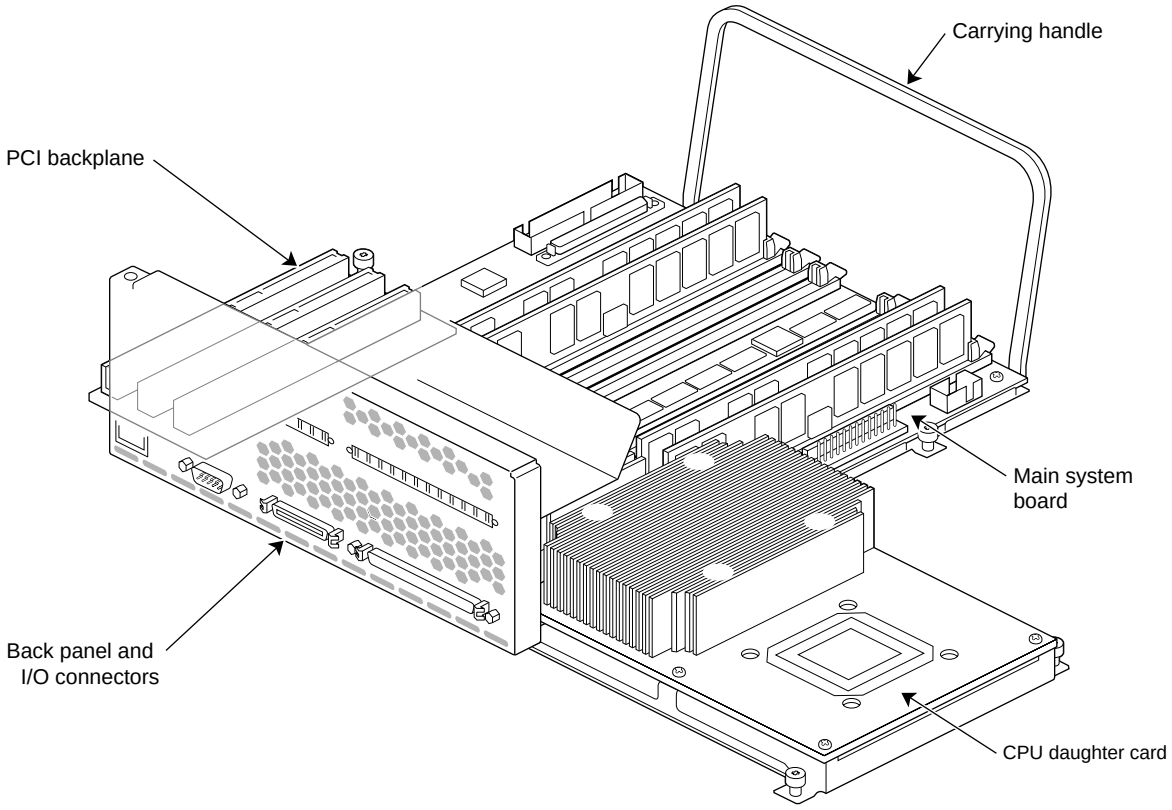

Figure 1-4 Logic Carrier

Main System Board

The main system board contains

- two SCSI controllers for internal drives
- Ethernet controller
- two serial port interfaces (UARTs)
- parallel port interface
- three PCI expansion slots
- four banks of two dual-inline memory module (DIMM) sockets (eight total DIMM sockets)
- CrayLink Interconnect connector

External connectors for the serial, Ethernet, and parallel interfaces, and the CrayLink Interconnect are all mounted directly to the main system board. See Figure 1-5.

CPU Daughter Card

Figure 1-5 shows the main system board, the CPU daughter card, and points out the locations of various components.

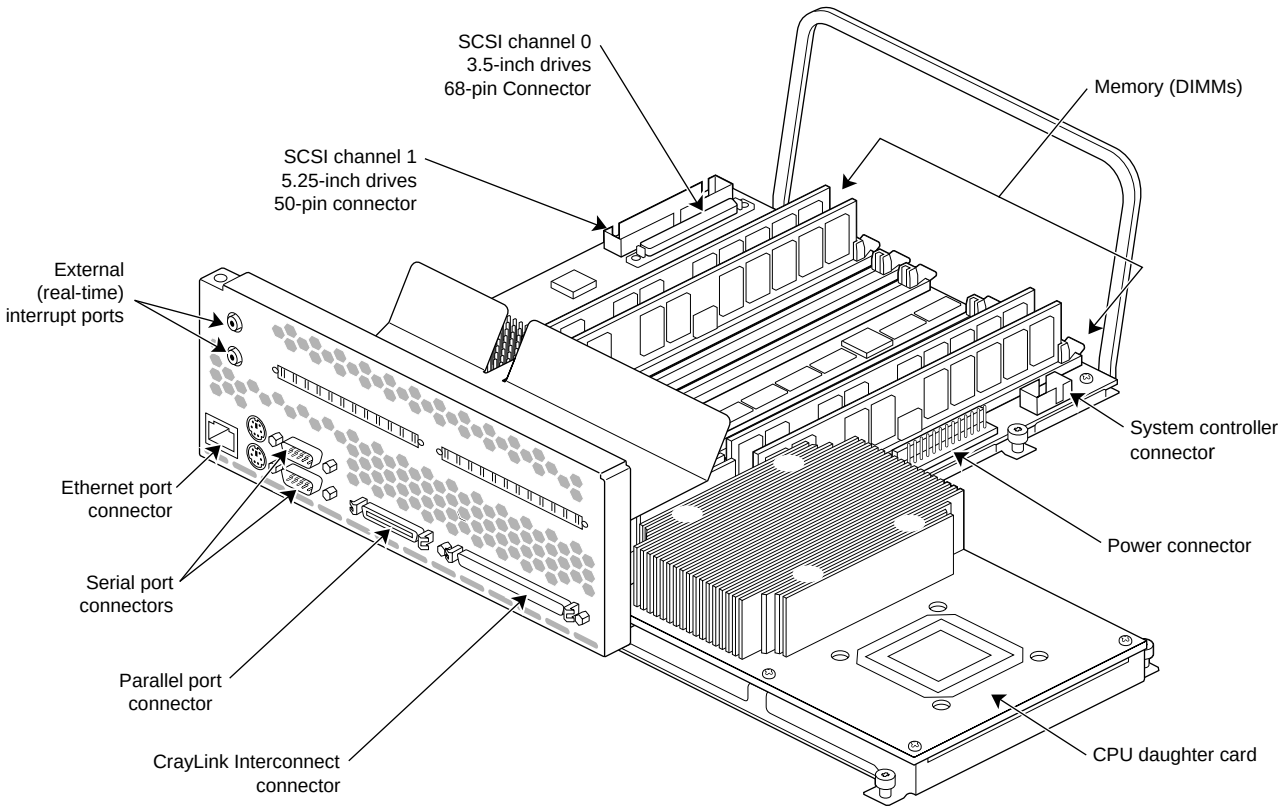

Figure 1-5 The Origin200 Main System Board and CPU Daughter Card

Module System Controller (MSC)

The module system controller (MSC), located behind the front power switch and status LED, performs the following functions:

- holds the system serial number on a device called the *number in a can (NIC)*
- provides power on, power off, reset, and other low-level functions
- displays system status information using a tricolor LED

Power-on, power-off, reset, and nonmaskable interrupts are performed by pressing buttons on the front panel. You can also perform these and other functions by issuing commands to the MSC via a terminal or modem connected to the AUX port at the rear of the system.

See "Front Panel Functions: Status LED, Power, Reset, NMI" in Chapter 4 for a description of the front panel.

See "Using the AUX Port and Module System Controller Commands" in Chapter 4 for a description of the commands that the MSC can accept.

PCI Backplane and Expansion Slots

There are three expansion slots available for peripheral component interconnect (PCI) bus cards. The slots provide PCI IDs 5, 6, and 7. See Figure 1-6.

Boards can be full-size, 32-bit or 64-bit. In addition to providing 5V, the PCI backplane also accommodates 3.3V PCI cards with a total of up to 30 watts of 3.3V power.

Figure 1-6 shows the location and slot numbers of the PCI backplane.

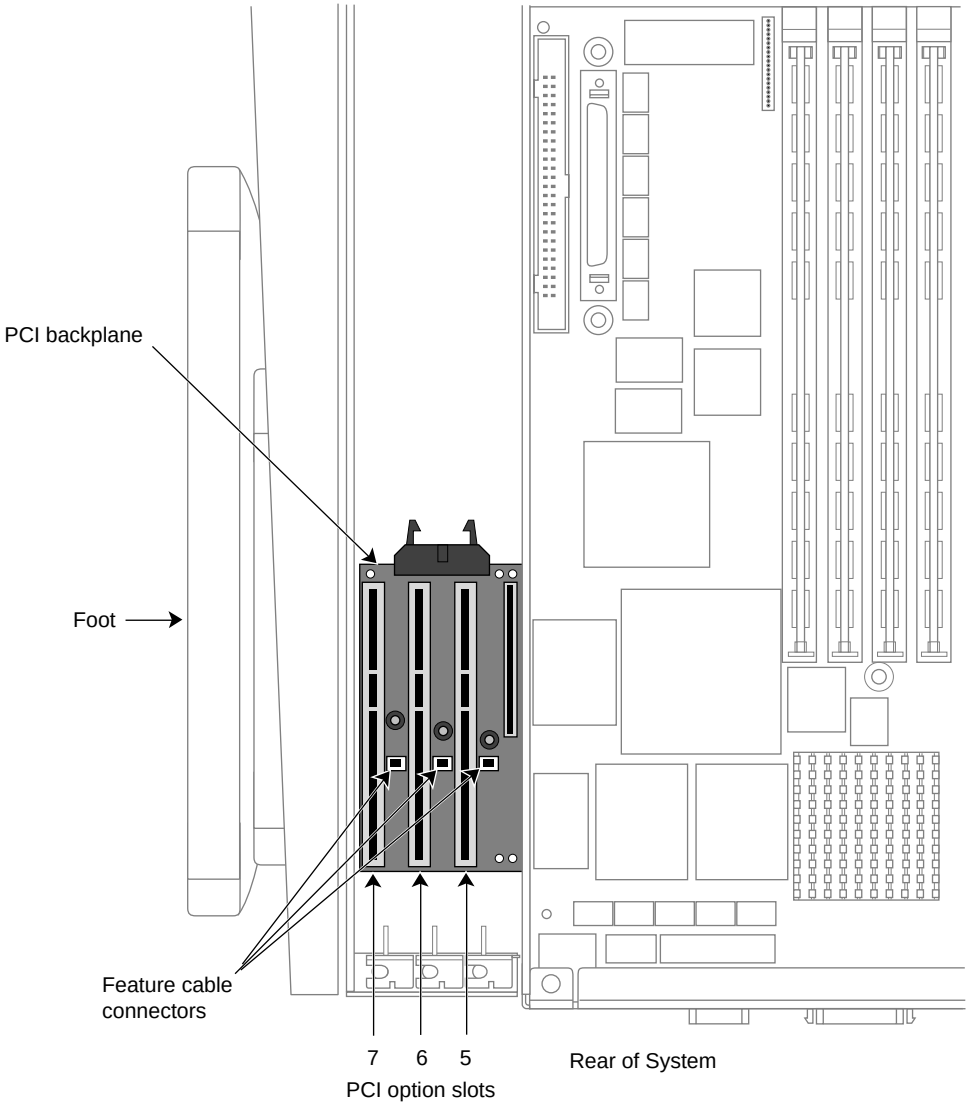

Figure 1-6 PCI Backplane and Slot IDs

Memory

Each Origin200 module can have between 32 MB and 2 GB of memory, depending upon the type of dual in-line memory module (DIMM) that you install. DIMMs are installed in sockets that are grouped into two banks of four sockets each. Figure 1-7 shows the layout of the DIMM sockets on the main system board.

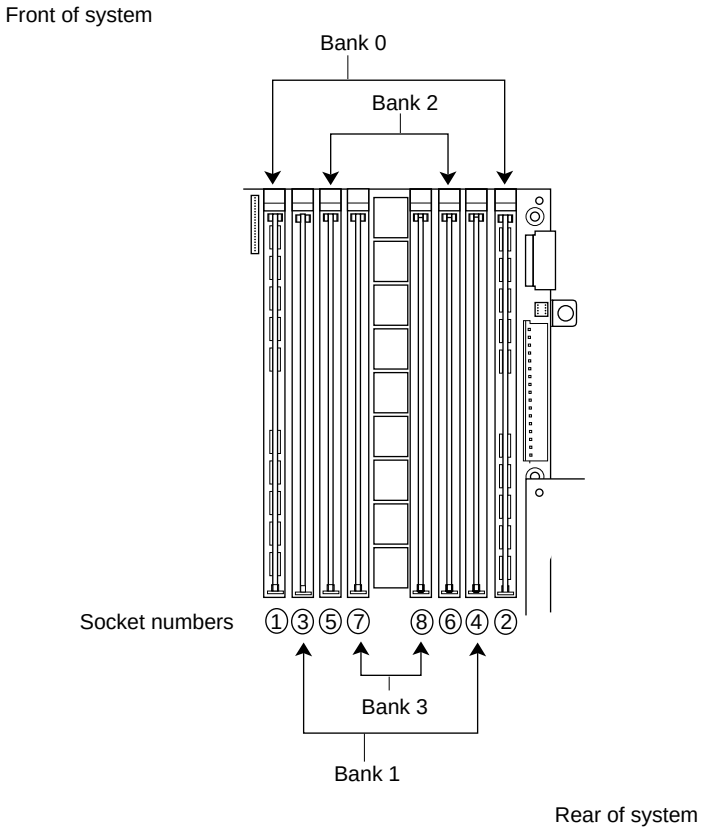

Figure 1-7 Layout of DIMM Sockets on the Origin200 Main System Board

Note the following about installing DIMMs in an Origin200 module:

- DIMMs are installed in pairs, with one pair per bank.
- DIMM sockets are numbered, left to right in Figure 1-7: 1, 3, 5, 7, 8, 6, 4, 2.
- All modules must have at least one DIMM pair installed in Bank 0.
- DIMMs in each bank must be of the same type, but each bank may have a different type of DIMM.
- Interleaving between banks and DIMMs is designed into the memory architecture; you cannot alter the interleaving factors. Maximum interleaving is achieved with a single bank.

Internal Drive Options and SCSI Channels

The Origin200 server provides bays for two sizes of internal drive options: 5.25-inch drives and 3.5-inch drives.

5.25-Inch Drives and Drive Bay

The 5.25-inch drive bay can be used for two combinations of drive form-factor:

- one full-height drive
- two half-height drives or two 1-inch drives

The 5.25-inch drives are controlled by SCSI channel 1, and drive IDs are set by jumpers on the drives. Drives are mounted in a removable peripheral carrier, shown in Figure 1-8.

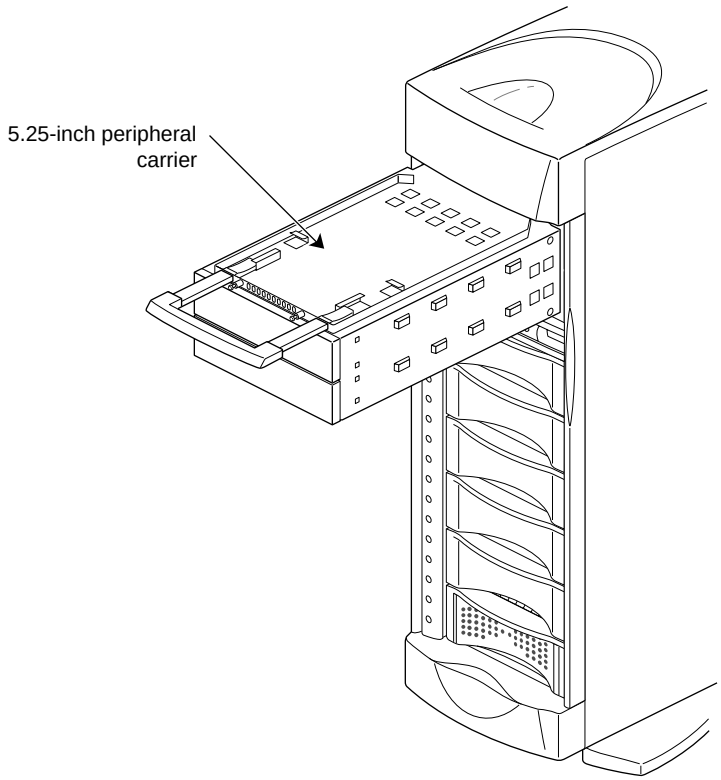

Figure 1-8 Origin200 5.25-inch Peripheral Carrier and Drive Bay

3.5-Inch Drives and Drive Bay

The 3.5-inch drive bay has room for six drives, mounted individually on sleds. The 3.5-inch drives are attached to SCSI channel 0.

Each sled attaches to the 3.5-inch SCSI midplane with SCA connectors. Drive IDs are set by the position of the drive in the drive bay, with ID 1 at the bottom of the drive bay and ID 6 at the top of the drive bay. Figure 1-9 shows a 3.5-inch drive, sled, and drive bay.

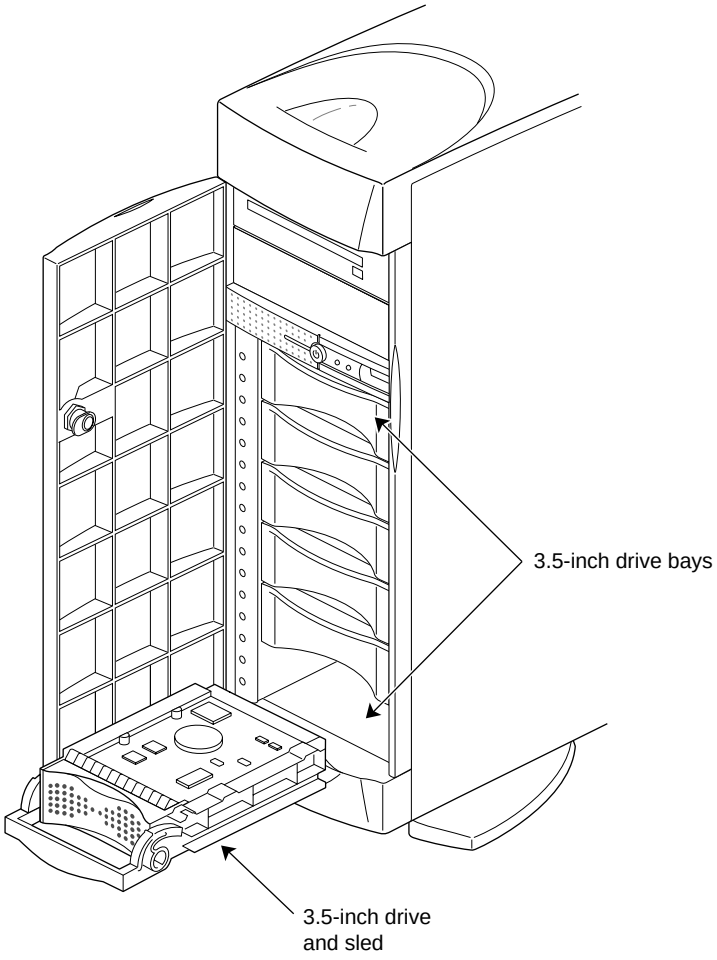

Figure 1-9 Origin200 3.5-inch Drive, Sled, and Bay

SCSI Channels and Channel Numbering

There are two SCSI channels in each Origin200 module. Table 1-2 lists the channels in each module and their characteristics.

Table 1-2 SCSI Channel Numbers and Characteristics

First Module	Second Module	Drives	Description
0	2	3.5-inch	Fast-20 SCSI-II, 16-bit (wide), running at 20 MHz, and capable of transferring 40 MB per second
1	3	5.25-inch	Fast SCSI-II, 8-bit (narrow), running at 10 MHz, and capable of transferring 10 MB per second

Note: SCSI channels in a one-module system are fixed at 0 and 1. The master module in a two-module server also uses channels 0 and 1. However, the slave module channel numbers may vary depending upon the order in which they are detected the first time the system is powered on. Table 1-2 shows typical channel numbers for a second module in a two-module system. See "Determining the Devices Installed on Your Server" in Chapter 4 for an explanation of device detection and numbering.

Serial Ports

Each Origin200 module provides two serial ports capable of transferring data at speeds ranging from 50 baud to 460 Kbaud in RS-232 mode. The default serial port configuration is RS-232, but the serial ports can be opened programmatically in RS-422 mode.

The serial port connectors are DB9, male, and are designed to be IBM-compatible. Because of this, they do not use the same pinouts as prior Silicon Graphics DB9 serial ports. See Appendix A, "Connector Pinout Assignments" for a description of the serial port pin assignments.

Table 1-3 lists the serial ports and their correspondence to IRIX device files.

Table 1-3 IRIX Device Files for Serial Port Numbers

Module	Serial Port Number	IRIX Device File (RS-232 Mode)	IRIX Device File (RS-432 Mode)	IRIX Device File (Midi Mode)
First	1 (system console)	*/dev/tty[c,d,f,m]1*	*/dev/tty4[d,f,m]1*	*/dev/ttymidi1*
	2	*/dev/tty[c,d,f,m]2*	*/dev/tty4[d,f,m]2*	*/dev/ttymidi2*
Second	3	*/dev/tty[c,d,f,m]3*	*/dev/tty4[d,f,m]3*	*/dev/ttymidi3*
	4	*/dev/tty[c,d,f,m]4*	*/dev/tty4[d,f,m]4*	*/dev/ttymidi4*

Serial ports in a single-module system, and in the master module are fixed at 1 and 2, with port 1 being the system console. See "Determining the Devices Installed on Your Server" in Chapter 4 for an explanation of device detection and numbering.

AUX Port

The AUX port is a DIN-8 connector that provides access to the module system controller. See "Using the AUX Port and Module System Controller Commands" in Chapter 4. For a description of the pin assignments of the AUX port, see Appendix A, "Connector Pinout Assignments."

Parallel Port

The parallel port is a 36-pin, high-density connector that meets the IEEE-1284 specification. See Appendix A, "Connector Pinout Assignments" for a description of the pin assignments.

Ethernet Port

Each Origin200 module contains a single RJ-45 connector for 10-Base-T or 100-Base-TX Ethernet. The connector has two integral LEDs that provide basic status. Network speed is automatically negotiated. For a description of the pin assignments of the Ethernet port, see Appendix A, "Connector Pinout Assignments."

Note: Category 5 wiring is required for proper 100-Base-TX operation.

External Interrupt Ports

The Origin200 server has two connectors for use with the external interrupt interface. This interface allows separate systems to send and receive interrupts over a dedicated wire for purposes of inter-system synchronization. Using this device, a user process may generate outgoing interrupts to other systems, or receive interrupts from other machines in a variety of ways.

The connectors are 1/8-inch (3.5 mm) stereo jacks: one jack to send interrupts and one jack to receive interrupts. For more information on using the external interrupt interface and specifics about the jacks, see the ei(7) reference page. The wiring and voltages of the jacks are also described in Appendix A, "Connector Pinout Assignments."

Power Supply

Specifications of the Origin200 power supply are as follows:

Table 1-4 Origin200 Server Power Supply Specifications (per Module)

Specification	Value
Input volts	100 to 120 VAC, and 200 to 240 VAC, autoranging
Input watts	805 watts (for a fully configured module)
Input amps	8 amps at 100 VAC 4 amps at 240 VAC
Input volt-amps	800 VA
Inrush current	140 amps maximum
Frequency	47 Hz to 63 Hz
Output volts	+5 VDC +12 VDC -12 VDC +3.45 VDC
Output watts	483 watts (for a fully configured system)
Power factor	Unity power-factor corrected (0.98)
Efficiency	60%

Warning: When using an uninterruptable power supply (UPS) with an Origin200 server, be sure that the UPS can supply up to 140 A of inrush current. Each Origin200 module can draw up to 140 A of current briefly when you power it on, even though the sustained current drawn is only a fraction of that. Some UPS units cannot supply that much inrush current and will be damaged if you use them with an Origin200 server. In addition, there is the possibility of fire or other hazard if these UPS units are unable to supply sufficient current.

Air Flow and Fans

Air flows through the Origin200 from the front of the system to the rear, and is drawn by three DC fans located just behind the internal drive bays. The maximum flow rate is 100 cfm (0.047 m^3/sec). Figure 1-10 shows the direction of air flow through an Origin200 server.

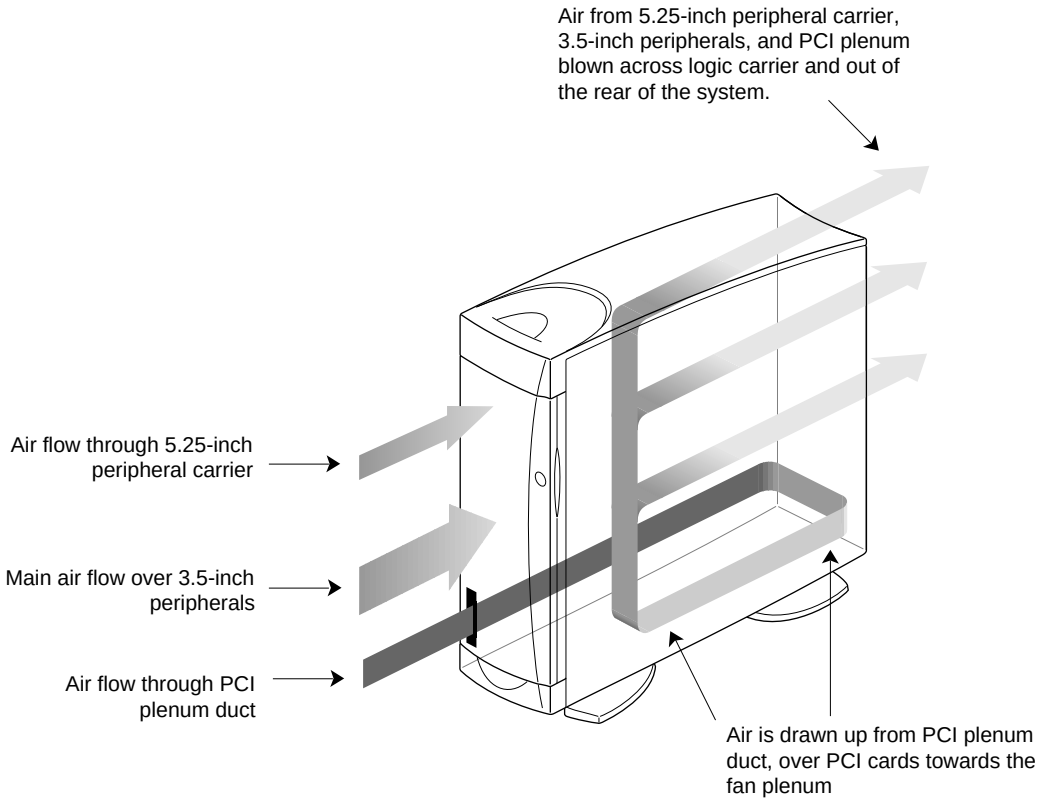

Figure 1-10 Air Flow Through the Origin200 Server

Air is drawn through the system in the following way:

- Fan 1, directly behind the 5.25-inch peripheral carrier, draws air from the front of the system through the 5.25-inch peripheral carrier.
- Fans 2 and 3 draw air from a common plenum just behind the SCSI backplane. This in turn draws air from the front of the system through the 3.5-inch peripherals.
- The lower pressure in the fan plenum behind the SCSI backplane also draws air from a duct located at the front of the system next to drive 1 to the rear of the PCI plenum, where it is channeled forward through the PCI plenum, cooling any PCI boards that are installed.

Figure 1-11 shows the locations and numbering of the fans.

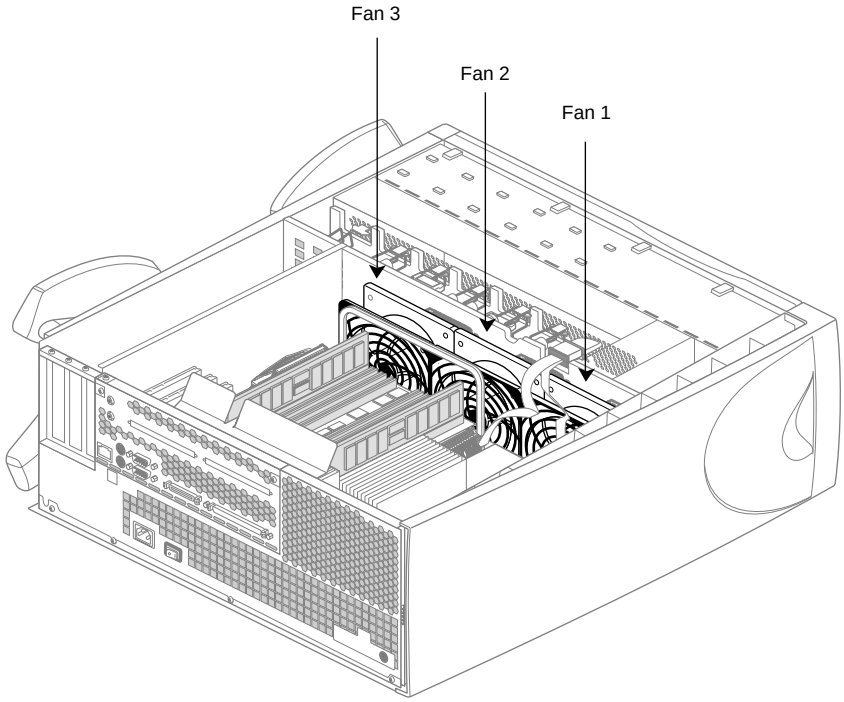

Figure 1-11 Locations and Numbering of Fans in the Origin200 Server

Caution: Because of the way that air is drawn through the PCI plenum, make sure PCI blanking plates cover any unused PCI slots.

Temperature and Fan Speed

Fan speeds adjust automatically depending upon the outside air temperature. A sensor inside the chassis monitors the temperature of the air being drawn into the system. Depending upon the air temperature and the number of fans working, the module system controller (MSC) operates the fans at one of two speeds: low or high. Table 1-5 describes the relationship of the air temperature to fan speed.

Table 1-5 Relationship of Air Temperature to Fan Speed in an Origin200 Server

Air Temperature	Action
Less than 83.3° F (28.5° C)	Fans run at normal speed.
83.3° F (28.5° C) to 104° F (40° C)	Fans run at high speed.

You can check the fan speed using the module system controller via the AUX port. See "Using the AUX Port and Module System Controller Commands" on page 98.

If a Fan Fails

If one of the three fans fails, the status LED displays solid amber. Also, the MSC automatically adjusts the speed of the remaining two fans, or shuts down the system if the temperature is too high. See Table 1-6.

Table 1-6 How Fan Speed Is Adjusted When One Fan Fails

Air Temperature	Action If One Fan Fails
Less than 83.3° F (28.5° C)	Fans run at high speed. Status LED displays solid amber.
83.3° F (28.5° C) to 104° F (40° C)	System shuts down.

You can use the MSC to determine which fan has failed. See "Using the AUX Port and Module System Controller Commands" in Chapter 4 for more information. For information about replacing fans, see Chapter 10, "Removing and Replacing Internal Components."

Physical and Environmental Specifications

Table 1-7 lists the various physical and environmental specifications of the Origin200 server.

Table 1-7 Origin200 Physical and Environmental Specifications

Specification	Value
Dimensions	
Tower	23″ H x 26.5″ D x 9″ W (58.4 cm H x 67.3 cm D x 22.8 cm W)
Rack	6.8″ H x 25″ D x 17.4″ W (17.3 cm H x 63.5 cm D x 44.2 cm W)
Weight	
Minimum	40 lbs (18 kg)
Maximum	75 lbs (34 kg)
Environmental (Operating)	
Temperature	+41° F to +104° F (+5° C to +40° C)
Humidity	10% to 80% noncondensing
Altitude	10,000 MSL
Noise	55 dBa
Heat dissipation	2737 BTU per hour maximum
Air conditioning load	0.23 tons maximum
Vibration:	
max. sustained, oper.	5-10 Hz @ .01″ total excursion, 10-500 Hz @ 0.1g
max. peak, operating	5-10 Hz @ .02″ total excursion, 10-500 Hz @ 0.1g
sensitive freq., oper.	8-33 Hz (varies with configuration)

Multiple Modules and Power Sources

If you are installing a two-module system, both modules must be connected to the same, grounded power source (for example, to the same electrical service entrance or breaker box). See "Power Supply" on page 21 for the amount of current each power supply draws.

Modules may be on separate circuits, but the circuits must be connected to the same power source and ground. See Figure 2-1 in the section "Providing Correct Electrical Grounding (Earthing)" on page 30 for examples of correct and incorrect power and grounding configurations.

Caution: If you do not connect both modules of a two-module system to the same, grounded power source, resulting differences in ground potential (current) can damage components on the Origin200 main system board.

Chapter 2

Setting Up an Origin200 System

This chapter describes how to unpack and set up a free-standing (Tower) Origin200 system. It also describes how to attach peripherals, install drives, and start an Origin200 server in both tower or rackmount configurations.

Chapter 2

Setting Up an Origin200 System

This chapter describes how to set up a one- or two-module Origin200 system. It includes the following sections:

- "Choosing a Location for the Server," which includes information on the weight of the system, minimum space requirements, and requirements for proper grounding (earthing)
- "Putting the Pieces Together," which includes:
  - "Overview of the System Connectors and Ports" on page 36
  - "Safety Considerations" on page 37
  - "Assembling the Server" on page 37
  - "Installing 3.5-Inch Drives" on page 38
  - "Installing 5.25-Inch Drives" on page 41
  - "Attaching an Ethernet Networking Cable" on page 50
  - "Attaching the System Console" on page 51
  - "Connecting Two Origin200 Modules" on page 52
- "Turning On the System" on page 57
- "Logging In for the First Time" on page 59

Specific information about mounting an Origin200 module in an equipment rack is provided in Chapter 3, "Installing an Origin200 System in a Rack."

Caution: When installing a two-module system, all chassis must be connected to the same grounded power supply. If the chassis are not all connected to the same power supply, resulting differences in ground potential (current) can damage components on the Origin200 main system board.

Choosing a Location for the Server

When choosing a location for your Origin200 server, follow the guidelines in the next sections:

- "Providing Correct Electrical Grounding (Earthing)"
- "Supporting the Weight of the System"
- "Providing Space Around the System"

Providing Correct Electrical Grounding (Earthing)

Proper electrical grounding is critical. With a two-module system, both modules *must* be on the same grounded power supply. Otherwise, the Origin200 system board will be damaged. Modules may be connected to different electrical circuits, but those circuits must originate at the same power supply (electrical service entrance or breaker box).

Figure 2-1 shows four possible power and grounding configurations for a two-module Origin200 server:

- Configuration A is valid. Note that both modules are connected to the same branch circuit, and such a circuit would be required to supply 30 A.
- Configuration B is also valid. Although the modules are on separate branch circuits, both circuits are grounded at a service entrance.
- Configuration C *is not valid*. Each module is grounded in a different location, which could result in differences in ground potential and possible damage to the modules.
- Configuration D is valid. Both modules are grounded at a subpanel.

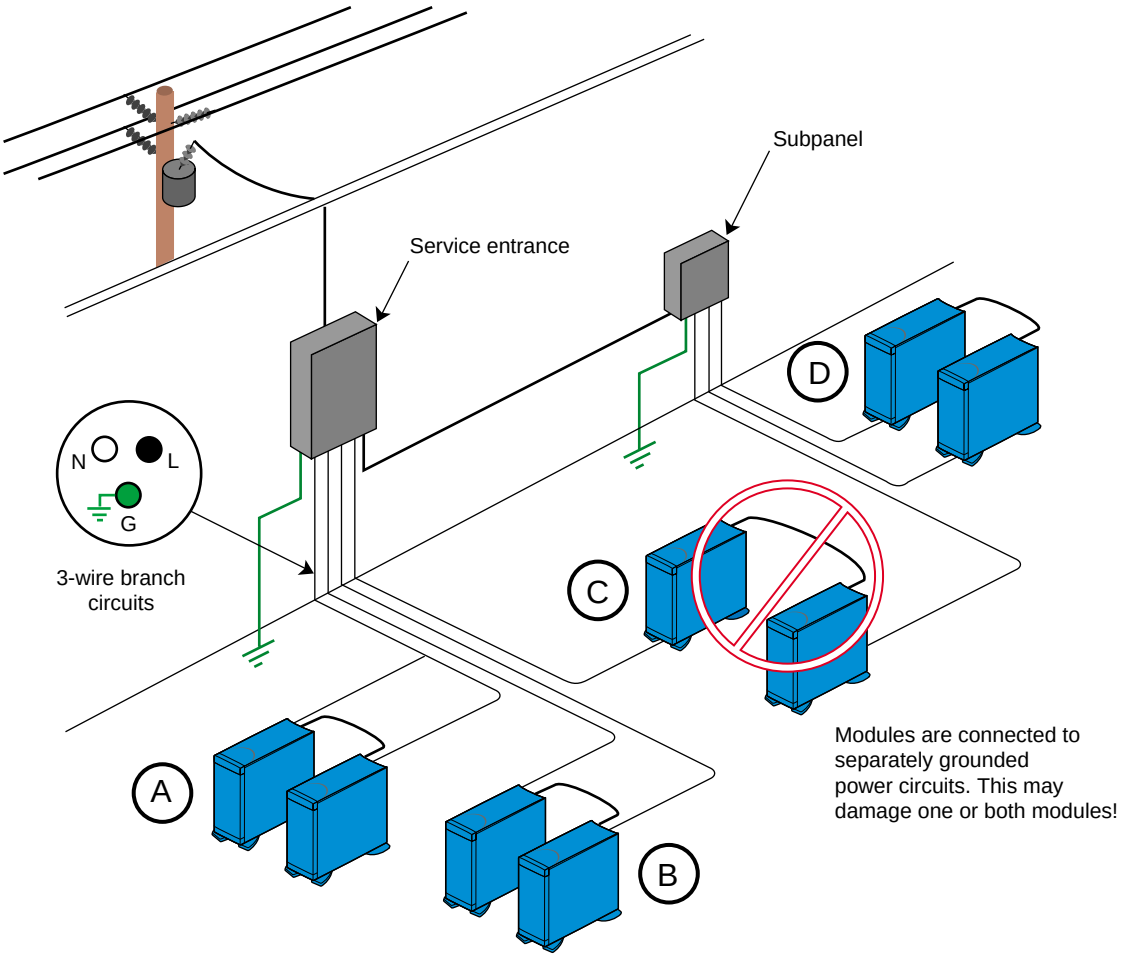

Figure 2-1 Origin200 Power and Grounding (Earthing) Overview

Supporting the Weight of the System

For a tower (free-standing) system, make sure the surface on which you place the server is capable of supporting at least 40 pounds (18 kg) per module. Be aware that a fully configured Origin200 module can weigh up to 75 pounds (34 kg) per module.

Rackmounted Origin200 servers ship with a mounting shelf that can support the weight of a fully loaded system.

Note: The rackmounting shelf does not isolate the server from mechanical shock and vibration. If you plan to use a rackmount Origin200 server in an environment that will subject the system to excess vibration, you should obtain a mounting system capable of dampening the vibration. See “Physical and Environmental Specifications” on page 25 for information on mechanical shock and vibration.

Providing Space Around the System

Be sure to provide adequate space for proper airflow and cooling. Refer to Table 1-7 in Chapter 1, "Overview of the Origin200 System" for a complete list of environmental specifications. Also, see "Air Flow and Fans" on page 22 for a description of the air flow through the Origin200 server.

Figure 2-2 shows the minimum distances required around the chassis.

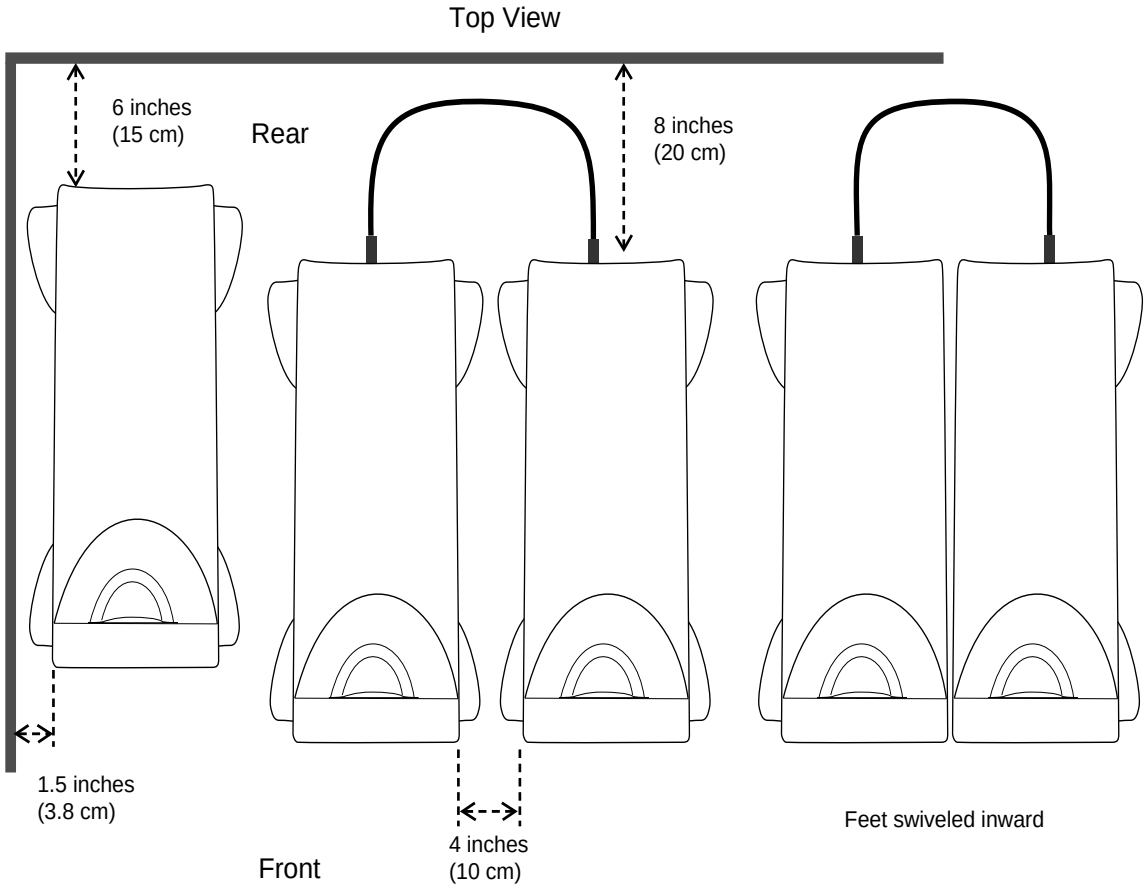

Figure 2-2 Minimum Clearances for the Origin200 Server, Tower Configuration

Putting the Pieces Together

Figure 2-3 shows the items packed with a basic Origin200 server in a tower configuration.

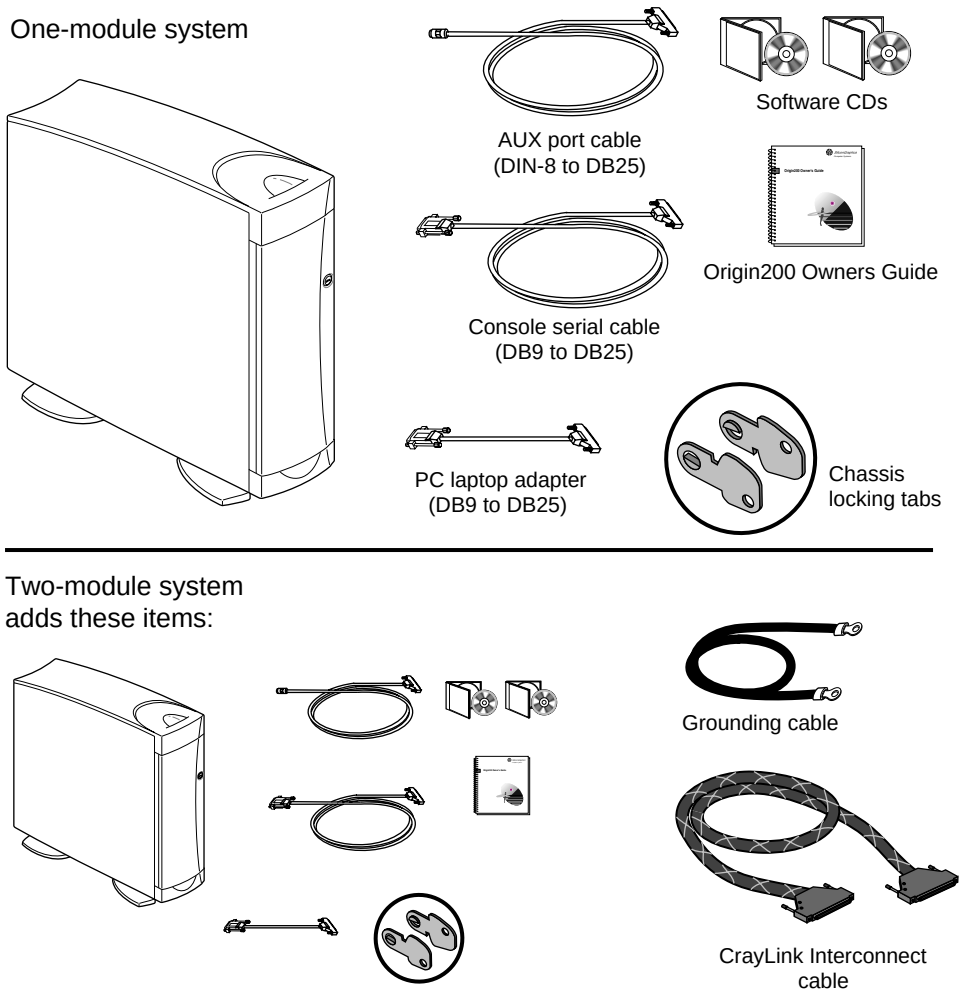

Figure 2-3 Items Included With the Origin200 Server, Tower Configuration

Figure 2-4 shows the various items shipped with an Origin200 server in a rackmountable configuration.

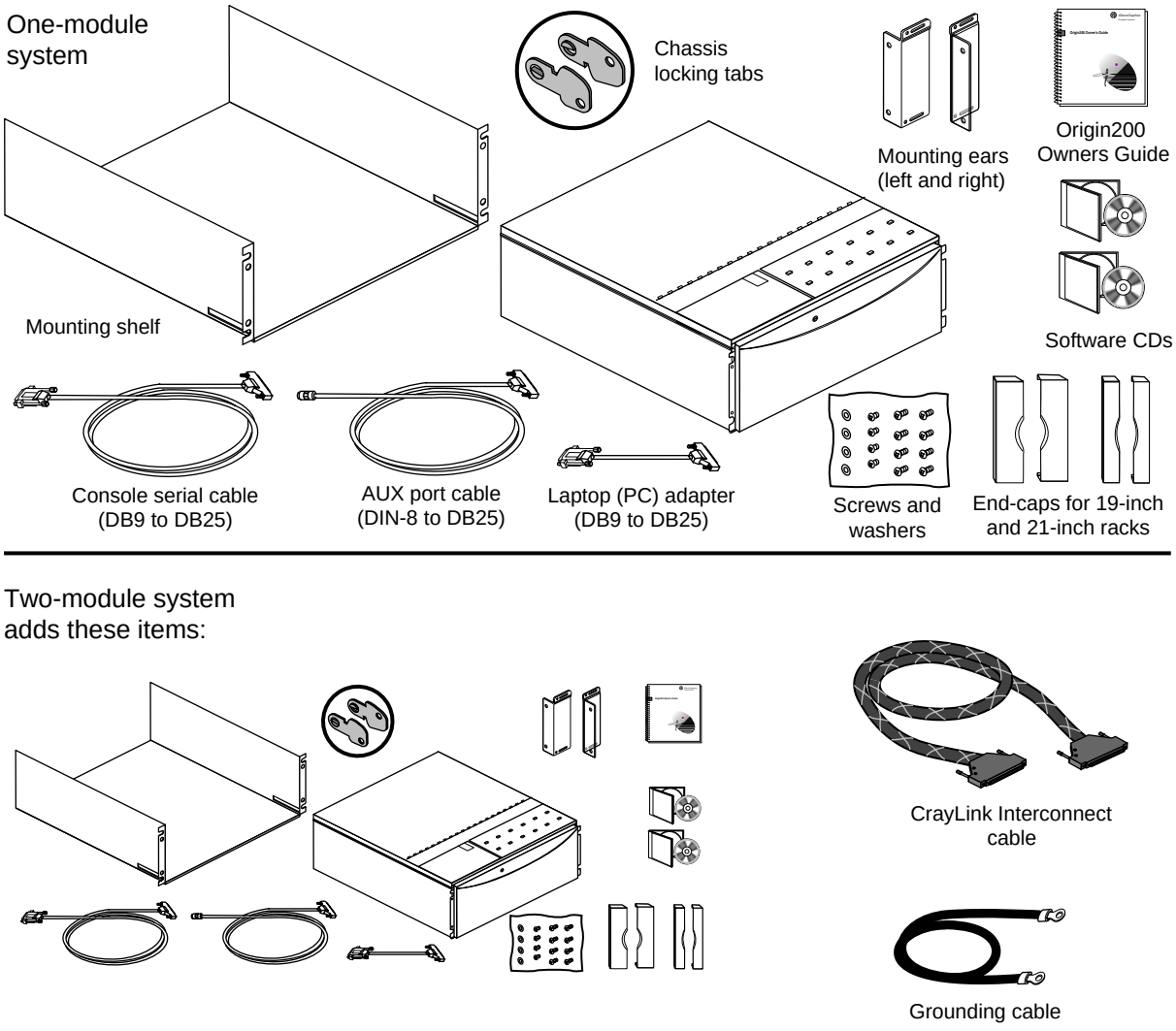

Figure 2-4 Basic Items Included With the Origin200 Server, Rackmountable Configuration

Overview of the System Connectors and Ports

When you assemble an Origin200 server you attach various cables (system console, power, Ethernet network, ground, and CrayLink) to the rear of the system. Figure 2-5 provides an overview of the various connectors that are available.

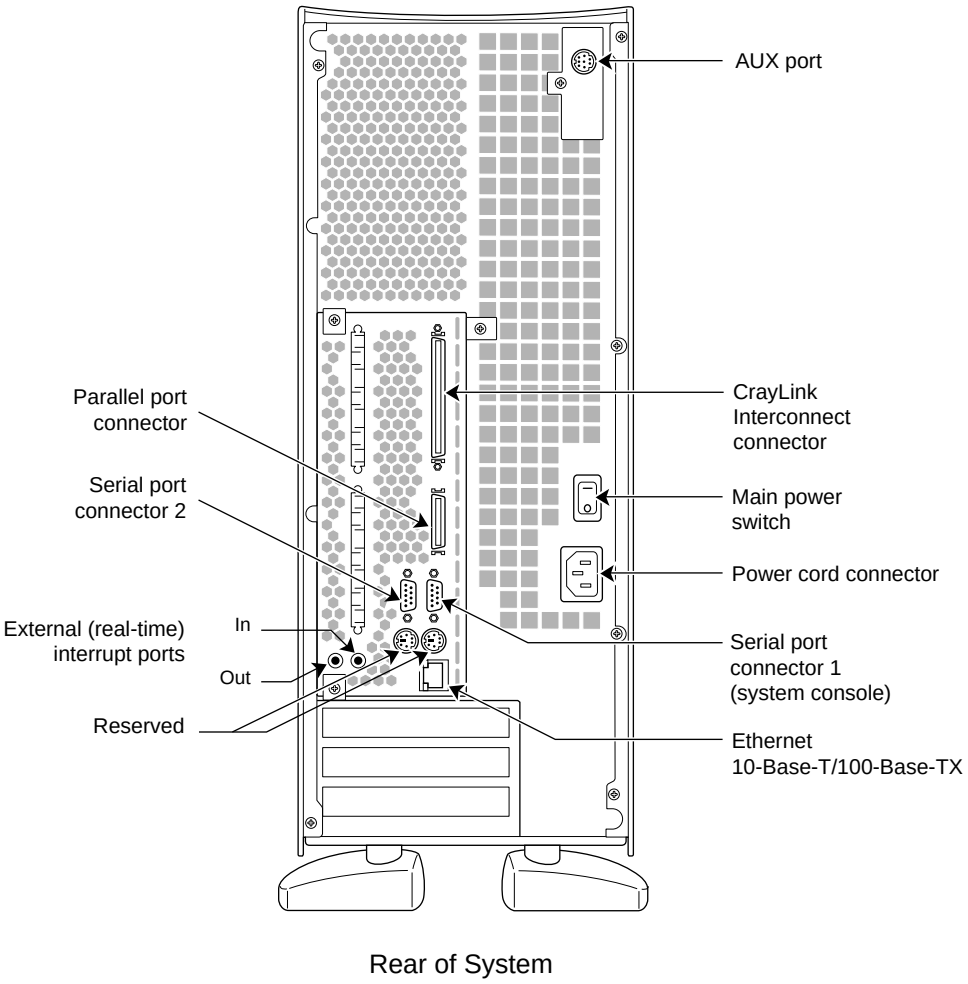

Figure 2-5 Origin200 Connectors

For a complete description of these connectors, see Chapter 1, “Overview of the Origin200 System” and Appendix A, “Connector Pinout Assignments.”

Safety Considerations

When working on an Origin200 server, follow these safety precautions:

- Place the chassis on a surface capable of supporting a minimum of 40 lbs (about 18 kg) per module. A fully configured Origin200 module can weigh up to 75 lbs (34 kg).
- Before opening the chassis, turn off the master power switch at the rear of the system. This disconnects power to the power supply. The software-power switch at the front of the chassis shuts off the server, but does not disconnect the power supply.
- When opening the chassis, for example to install and remove additional peripherals and memory, always observe proper electrostatic discharge (ESD) procedures. Make sure you are properly grounded with a wrist or heel strap before handling sensitive boards and drives. All Silicon Graphics peripheral, memory, and upgrade options are shipped with wrist straps.

Assembling the Server

Follow these steps to assemble the Origin200 module:

1. Unpack each module that was shipped as part of your complete Origin200 system.
2. Make sure you have all the parts. See Figure 2-3 and Figure 2-4.
3. If you have additional memory or PCI option boards that you wish to install in the modules, do so now.
    - For instructions on removing the system cover, see "Removing the System Cover and Chassis Access Door" in Chapter 5.
    - For instructions on installing memory, see Chapter 6, "Installing and Removing Memory."
    - For instructions on installing PCI option boards, see Chapter 7, "Installing and Removing PCI Option Boards."
    - *Do not* install disk drives yet. These make the modules heavier and more difficult to move as you continue to set up the system.

4. If you are installing the Origin200 modules in an equipment rack, turn now to Chapter 3, “Installing an Origin200 System in a Rack.”
   - Follow the instructions for installing the Origin200 module in an equipment rack.
   - When you are finished installing the module in the equipment rack, return to “Attaching an Ethernet Networking Cable,” in this chapter.
5. If you are installing a tower (free-standing) Origin200 server, place it in the location you determined earlier (see “Choosing a Location for the Server” on page 30).

Installing 3.5-Inch Drives

After you have placed the server in the desired location (either in a free-standing, tower configuration or mounted in an equipment rack), install any option drives.

All 3.5-inch drives shipped from Silicon Graphics for use in Origin200 systems are attached to mounting sleds. The SCSI ID of the drive is set automatically when it is installed in the system. The bottom 3.5-inch drive slot (rightmost slot in a rack system) is drive ID 1, and the top 3.5-inch drive slot (leftmost slot in a rack system) is drive ID 6. See Figure 2-6.

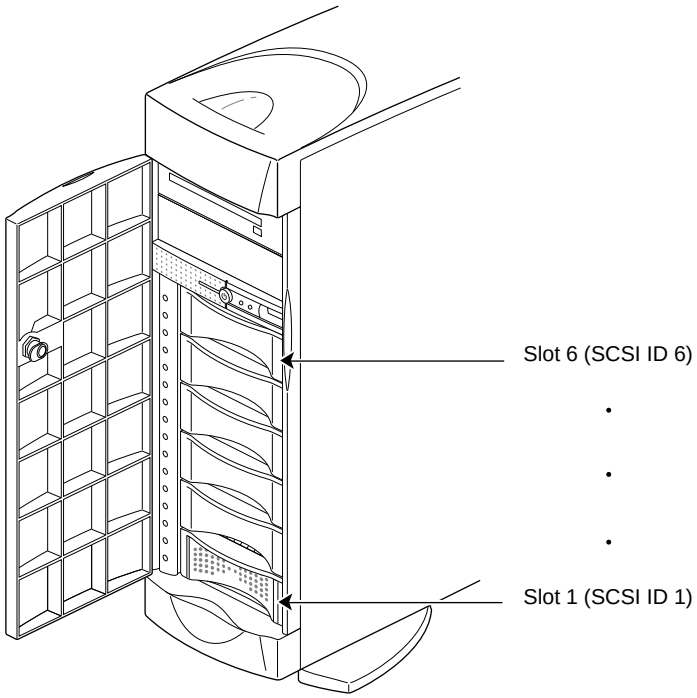

Figure 2-6 SCSI Drive ID Numbering for 3.5-Inch Drives

Install any 3.5-inch drives as shown in Figure 2-7.

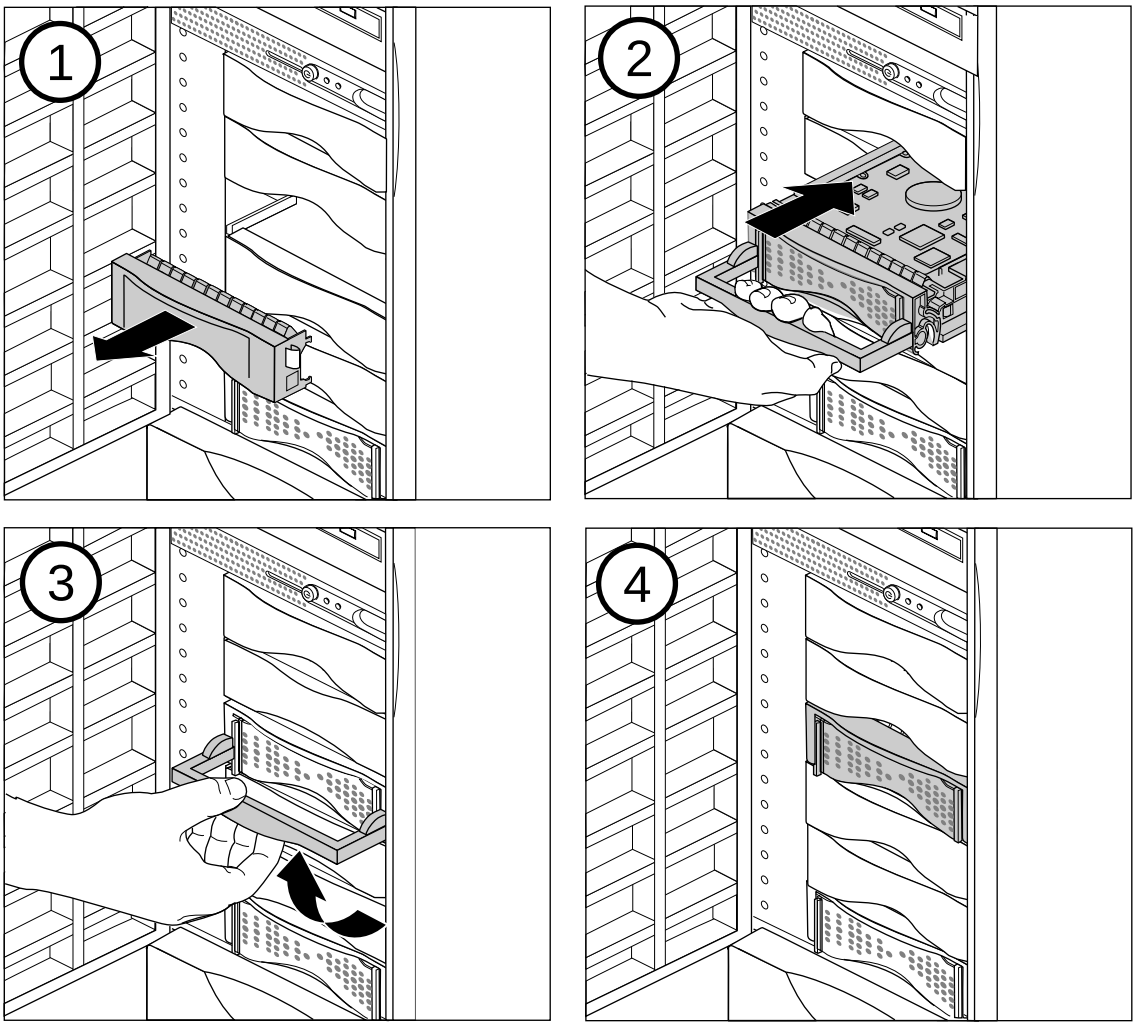

Figure 2-7 Installing 3.5-Inch Drives in the Origin200 Server

Save any blanking plates you remove in case you remove the drives later. For more information about using 3.5-inch drives, see Chapter 8, "Installing and Configuring Peripherals."

Installing 5.25-Inch Drives

Note: If you are installing a non-Silicon Graphics 5.25-inch drive, see "Configuring a 5.25-Inch Peripheral" on page 161.

5.25-inch drives are installed in a removable carrier. Follow these step to remove the carrier:

1. Remove the door.
   - Pull the door open.
   - If your system is in a tower configuration, push down on the top, outer edge of the door, as shown in Figure 2-8. The door pops off its hinges.

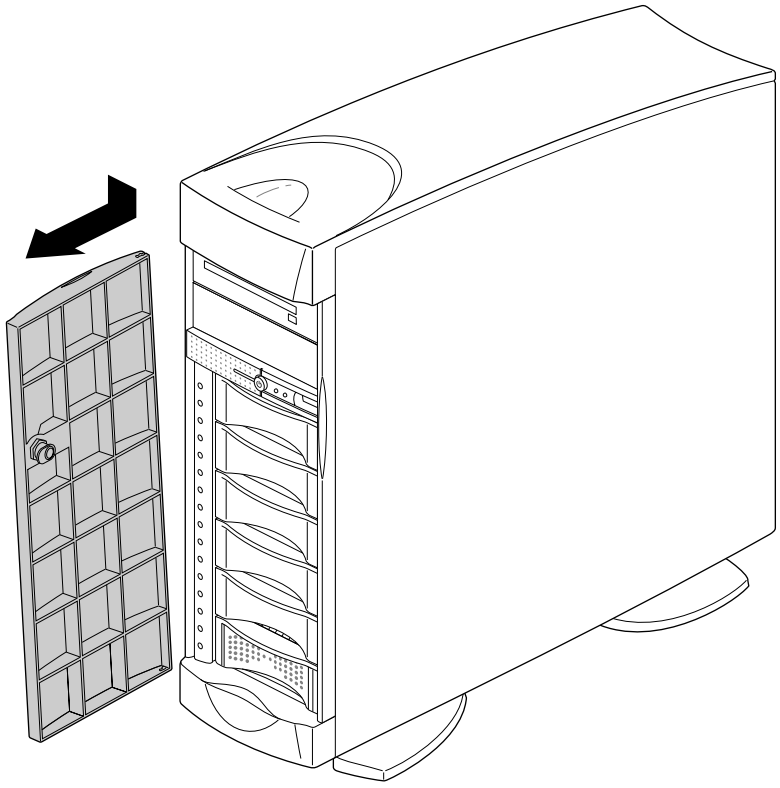

Figure 2-8 Removing the Front Door, Tower Configuration

- If the system is in a rackmount configuration, lift the door assist tab and pull the door off, as shown in Figure 2-9.

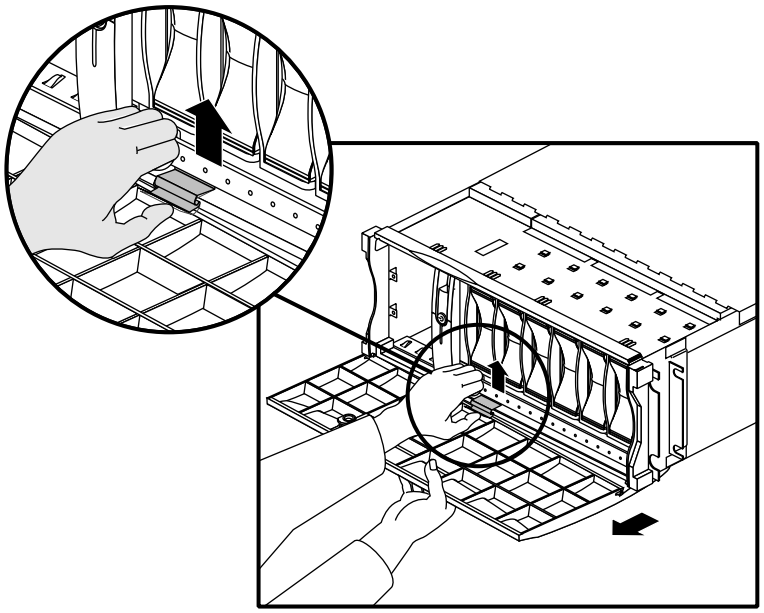

Figure 2-9 Removing the Front Door, Rackmount Configuration

2. Remove the carrier, as shown in Figure 2-10.
   - Pull out the carrier handle.
   - Using a #2 Phillips screwdriver, release the captive screws that attach the carrier to the system.
   - Pull the carrier out of the system by the handle.

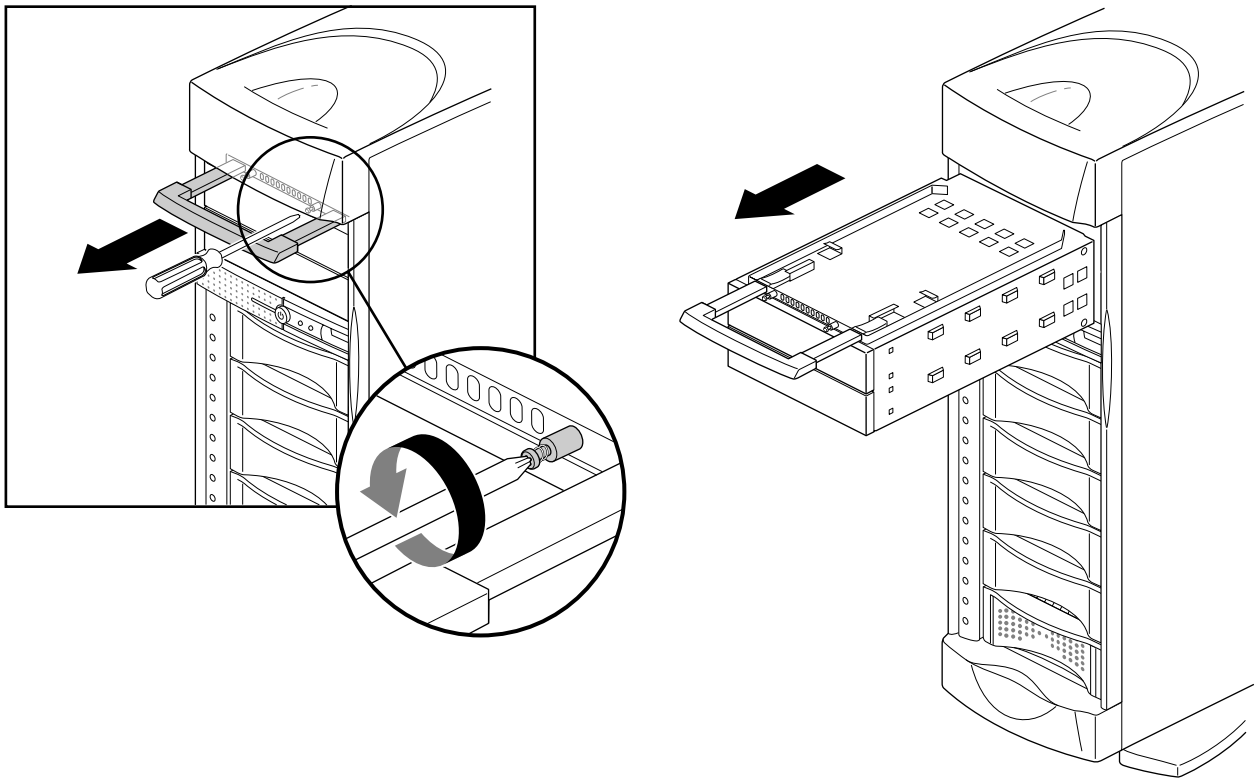

Figure 2-10 Removing the 5.25-Inch Peripheral Carrier

3. Install the 5.25-inch drive in the carrier. The carrier can hold one full-height drive or two half-height drives.
   - Remove one or two of the blanking plates from the front of the carrier, depending upon whether you are installing a half-height or a full-height drive.
   - Using a #2 Phillips screwdriver, remove the screws that hold the access plate to the rear of the carrier, then remove the access plate. See Figure 2-11.

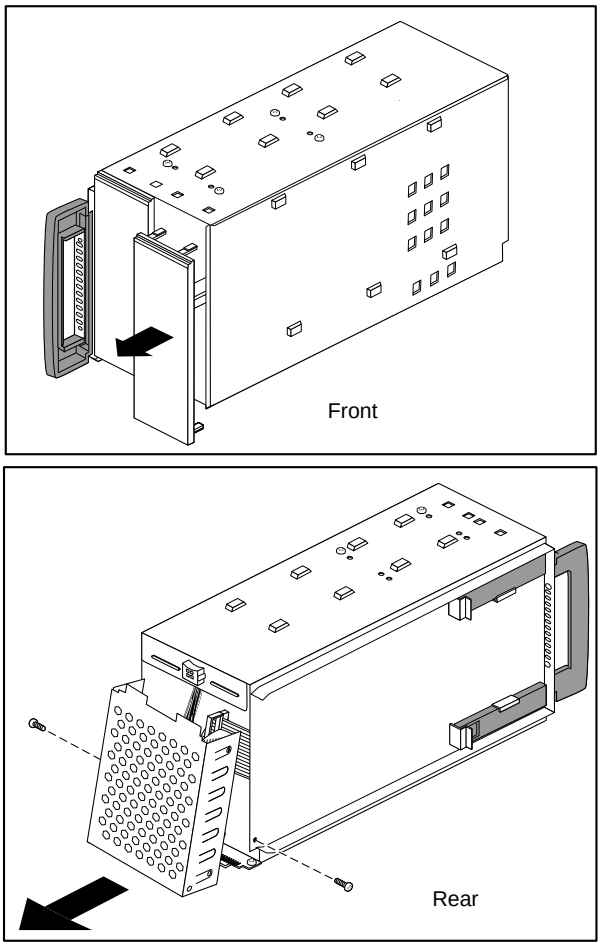

Figure 2-11 Removing a Blanking Plate and the Rear Access Plate From the Peripheral Carrier

4. Slide the drive into the peripheral carrier and attach it with four screws through the side of the carrier, as shown in Figure 2-12.
   - When installing the drive, be careful to keep track of its orientation in the carrier so that you do not install the drive upside down.

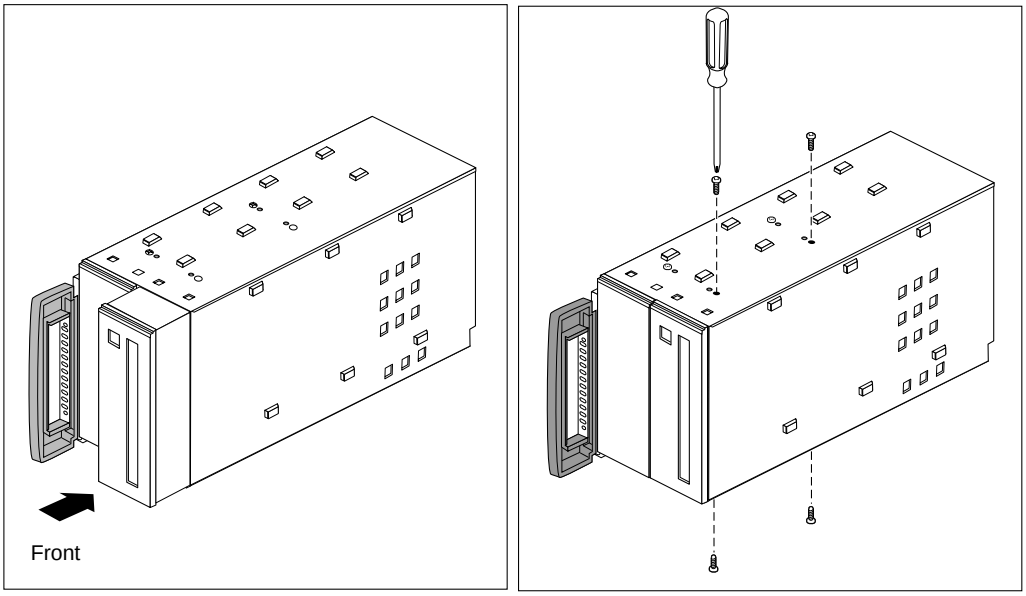

Figure 2-12 Inserting a 5.25-Inch Drive in the Peripheral Carrier

5. Attach one of the power connectors at the rear of the carrier to the drive. Use whichever connector fits conveniently for the position of the drive's power receptacle. See Figure 2-13.

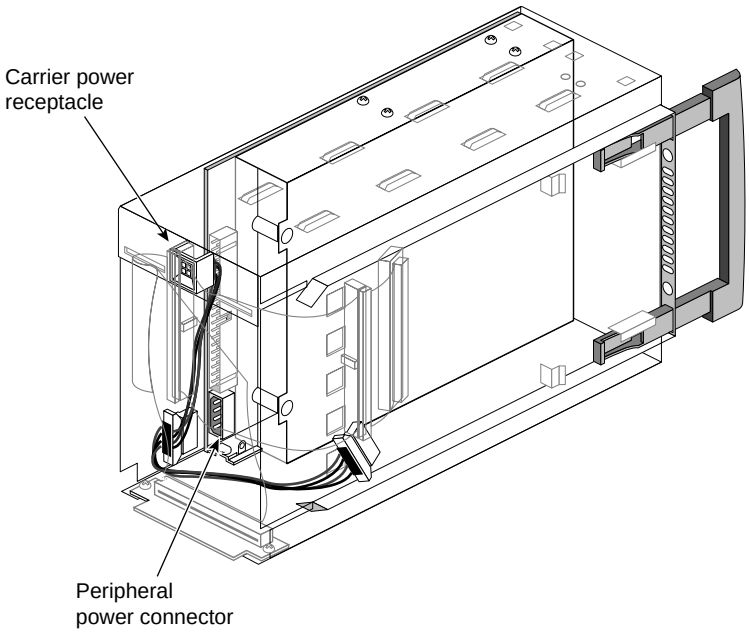

Figure 2-13 Attaching a Power Connector to a 5.25-inch Drive

6. Attach one of the connectors on the SCSI cable to the drive. Use whichever connector fits conveniently for the position of the drive's SCSI connector. See Figure 2-14.
   - Tuck the unused connector and terminator inside the carrier.

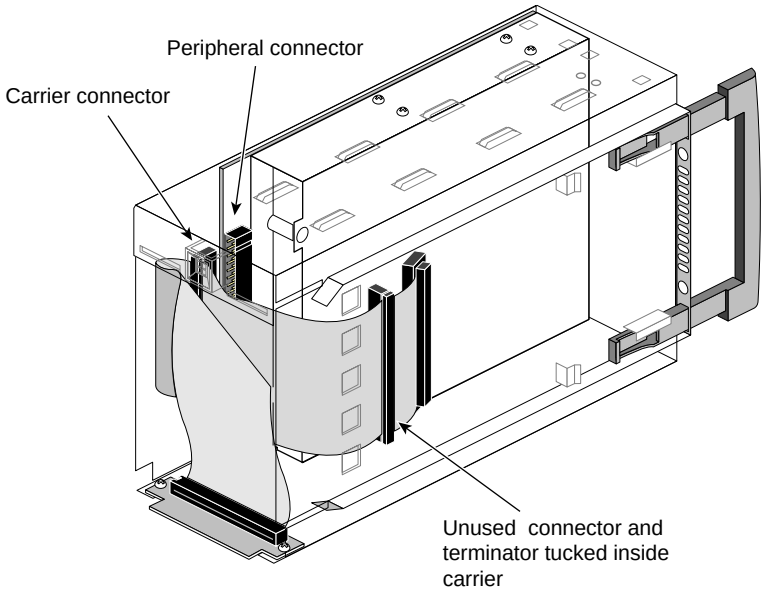

Figure 2-14 Attaching the SCSI Cable to a 5.25-Inch Drive

7. Replace the access plate. See Figure 2-15.
   - The plate should cover all of the loose wires (power and SCSI) at the rear of the carrier.

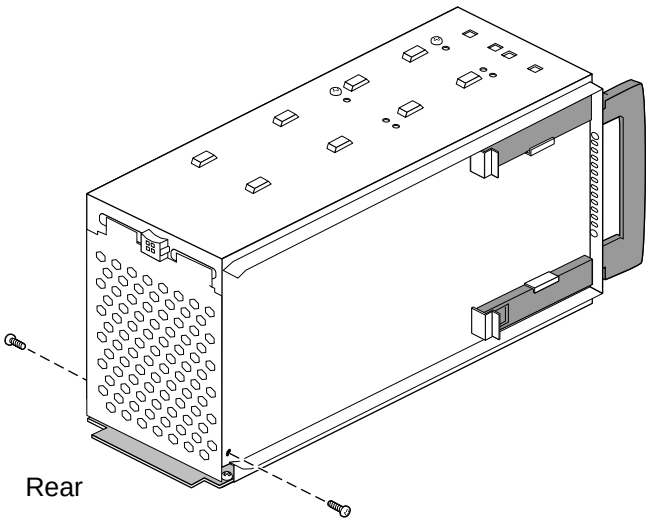

Figure 2-15 Replacing the Rear Access Plate on the Peripheral Carrier

Note: Be sure to reinstall the access plate on the rear of the carrier. The plate protects the power and SCSI cables from damage when you slide the carrier into the system.

8. Slide the carrier into the system, secure it with the captive screws, and push in the retractable handle. See Figure 2-16.

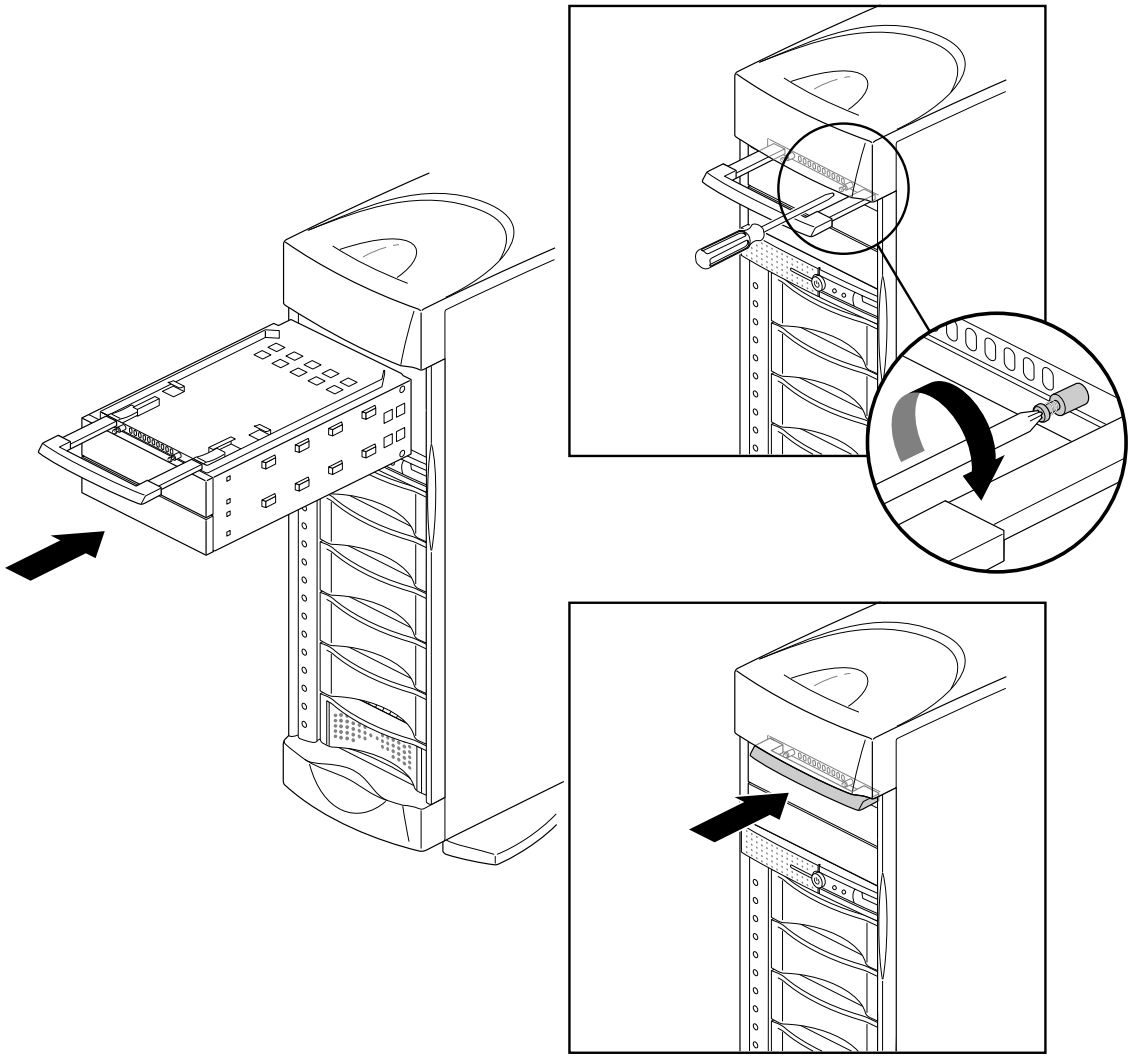

Figure 2-16 Replacing the 5.25-Inch Peripheral Carrier

Attaching an Ethernet Networking Cable

Figure 2-17 shows how to attach an Ethernet 10-Base-T or 100-Base-TX cable to an Origin200 module.

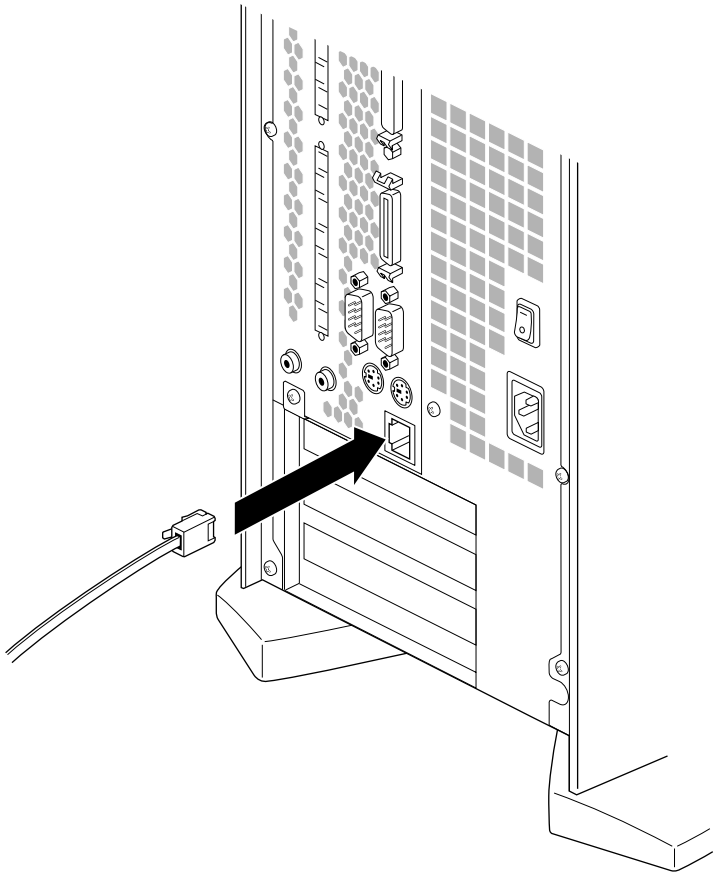

Figure 2-17 Attaching an Ethernet Networking Cable to an Origin200 Module

Note: Category 5 wiring is required for proper 100-Base-TX operation.

Attaching the System Console

Connect the RS-232 serial cable (provided) to an ASCII terminal. The cable is approximately 10 feet (3 meters) long. Plug the D-shaped, 9-pin connector into serial port 1 on the back of the system, as shown in Figure 2-18.

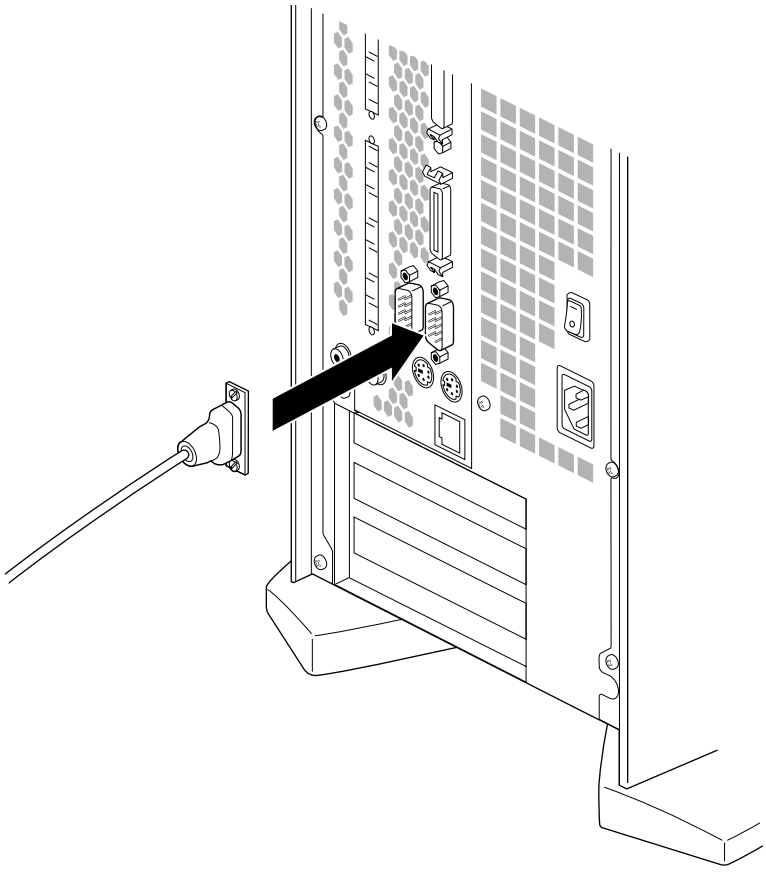

Figure 2-18 Attaching the Serial Cable

Connect the other end of the serial cable, which has a D-shaped, 25-pin connector, to a serial (ASCII) terminal.

You can use a computer, such as an IBM-compatible or Macintosh, or a workstation, such as a Silicon Graphics O2 or Indy, as the system console instead of an ASCII terminal. For more information, see "Using Another Computer or Workstation as the System Console" in Chapter 4.

Connecting Two Origin200 Modules

When you connect two Origin200 modules together using a CrayLink cable, one module becomes the master and the other becomes the slave. This relationship is set by a DIP switch located on the module system controllers (MSC) of each chassis, and has the following features:

- Only the master module can have a system console.
- The master module controls the power-on and power-off sequence.
- You can communicate with the module system controller (through the AUX port) in the master, but not in the slave module.
- Both master and slave modules must have memory (DIMMs) installed in them.
- The slave module does not require any disk drives.

When connecting power to the two modules, you may use different electrical circuits (circuits protected by individual fuses or breakers). However, both circuits must be connected to the same grounded power source (service entrance or breaker box).

Caution: If the chassis are not connected to the same grounded power supply, resulting differences in ground potential (current) can damage components on the Origin200 main system board.

Follow these steps to connect two Origin200 modules:

1. If the slave system is in a tower configuration, remove the side panel as shown in Figure 2-19.
   - Remove the two screws at the top rear and bottom rear of the side panel.
   - Lift the side panel slightly away from the chassis, then slide it back towards the rear of the system and away.

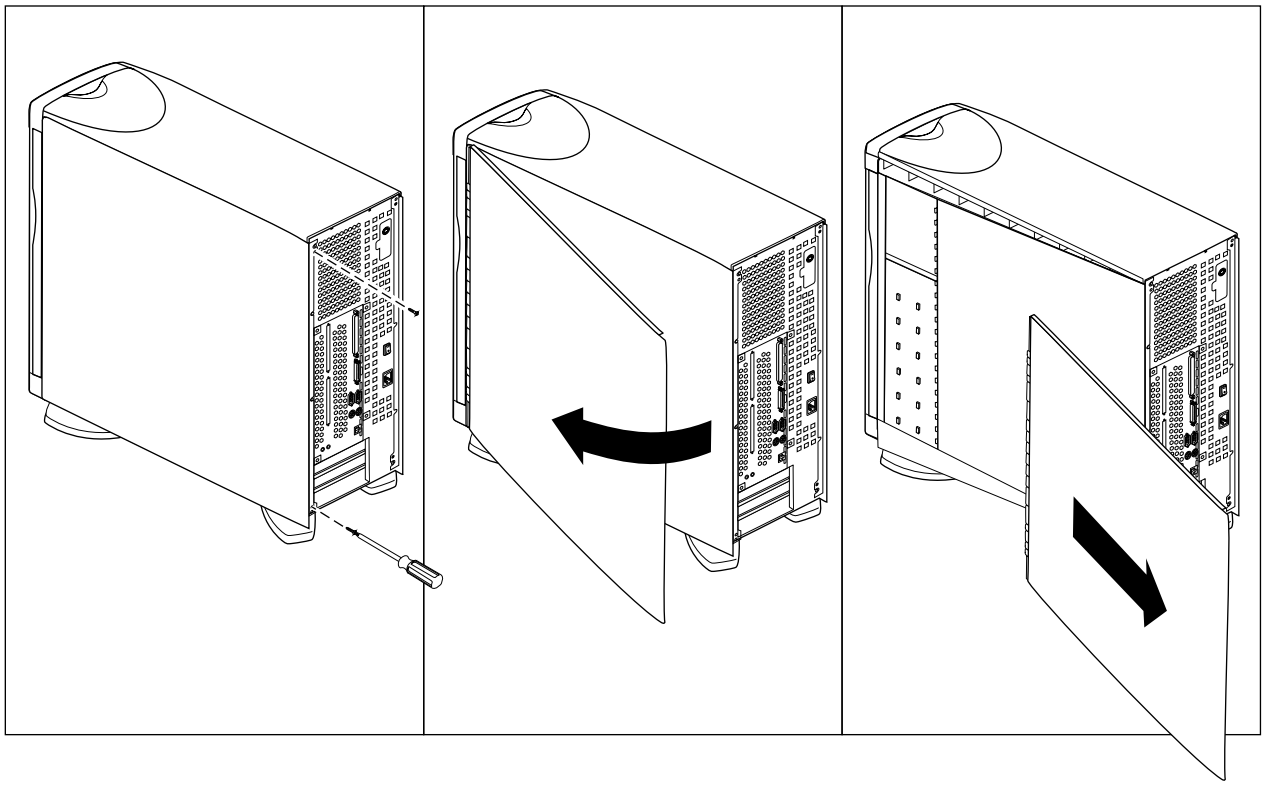

Figure 2-19 Removing the Side Panel of the Second (Slave) Module

2. Remove the module system controller (MSC) access plate, as shown in Figure 2-20
   - Remove the single screw that attaches the plate to the chassis.
   - Swing the plate out and away.

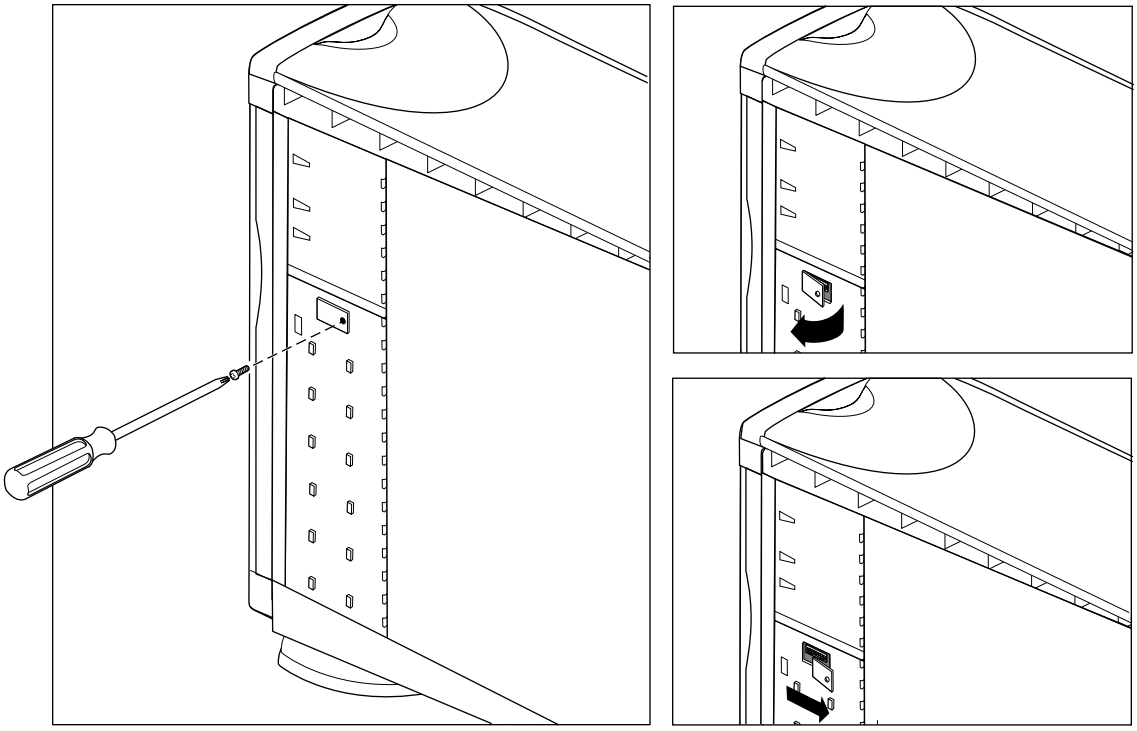

Figure 2-20 Removing the Module System Controller (MSC) Access Plate

3. Locate the MSC DIP switch, as shown in Figure 2-21.

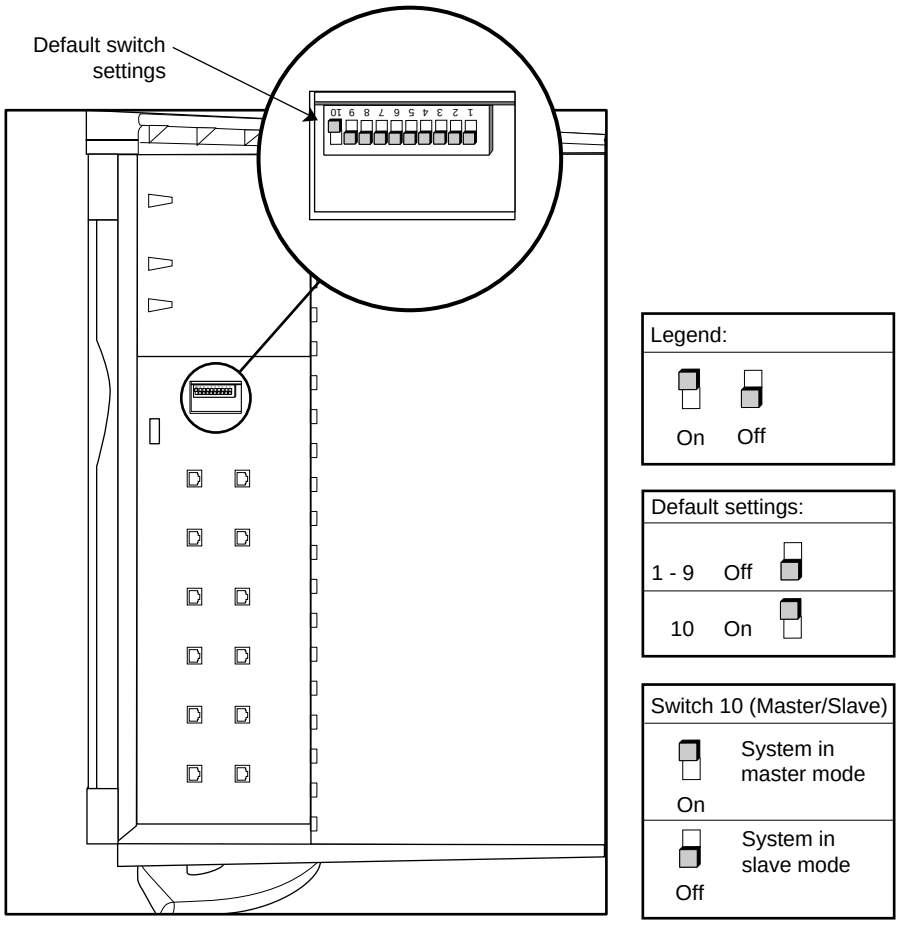

Figure 2-21 MSC DIP Switch Location and Settings

4. Using a ballpoint pen or similar object, change switch 10 to "off" to place this module in slave mode. See Figure 2-21.
5. Replace the MSC access plate and, if this is a tower system, replace the side panel.
6. Connect the grounding cable and CrayLink cable between the two chassis, as shown in Figure 2-22.
   - Connect the ground cable first.
   - Connect the CrayLink cable and tighten the thumbscrews. Be sure to tighten the thumbscrews on the connectors for proper CrayLink operation.

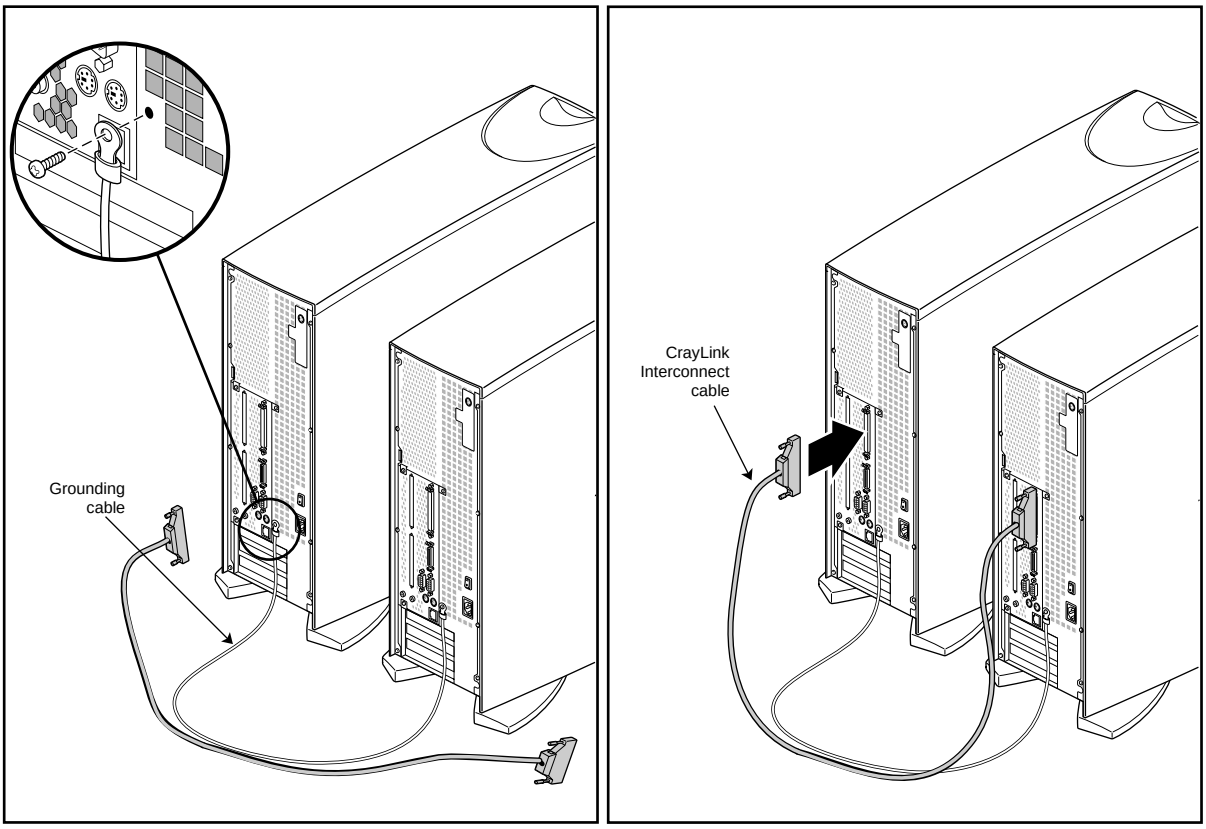

Figure 2-22 Attaching the Grounding and CrayLink Cables

Caution: You must attach the grounding cable before you attach the CrayLink cable. Also, do not attempt to run a two-module system without the grounding cable, or serious damage to the system will occur.

7. Connect the power cables.
    - You may attach the modules to different electrical circuits or a power distribution unit (PDU) of sufficient amperage.

Caution: You must connect the power cables to the same grounded power supply or the system will be damaged.

You are finished connecting the modules. You can now turn on the system.

Turning On the System

Follow these steps to turn on the system:

1. At the rear of the system, turn the master power switch on, as shown in Figure 2-23.

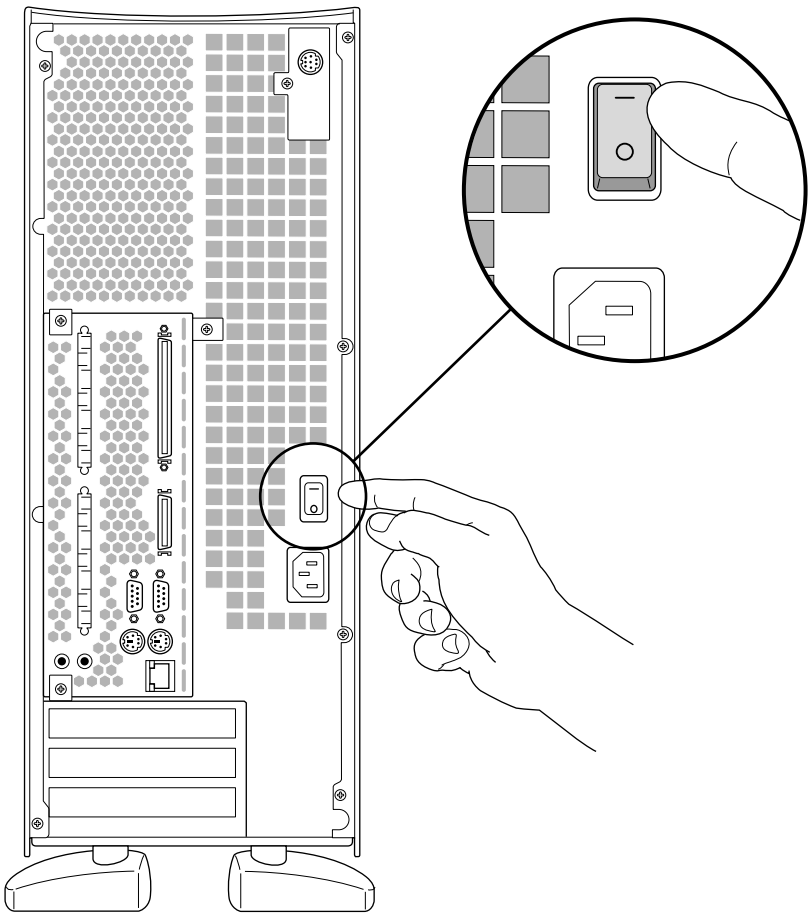

Figure 2-23 Turning On the Master Power Switch

- If you have a two-module system, turn on the master power switches for both modules. It does not matter which you turn on first.
- When you turn on the master power switch, the status LED on the front panel flashes green momentarily.

2. At the front of the system, press the power button, as shown in Figure 2-24.

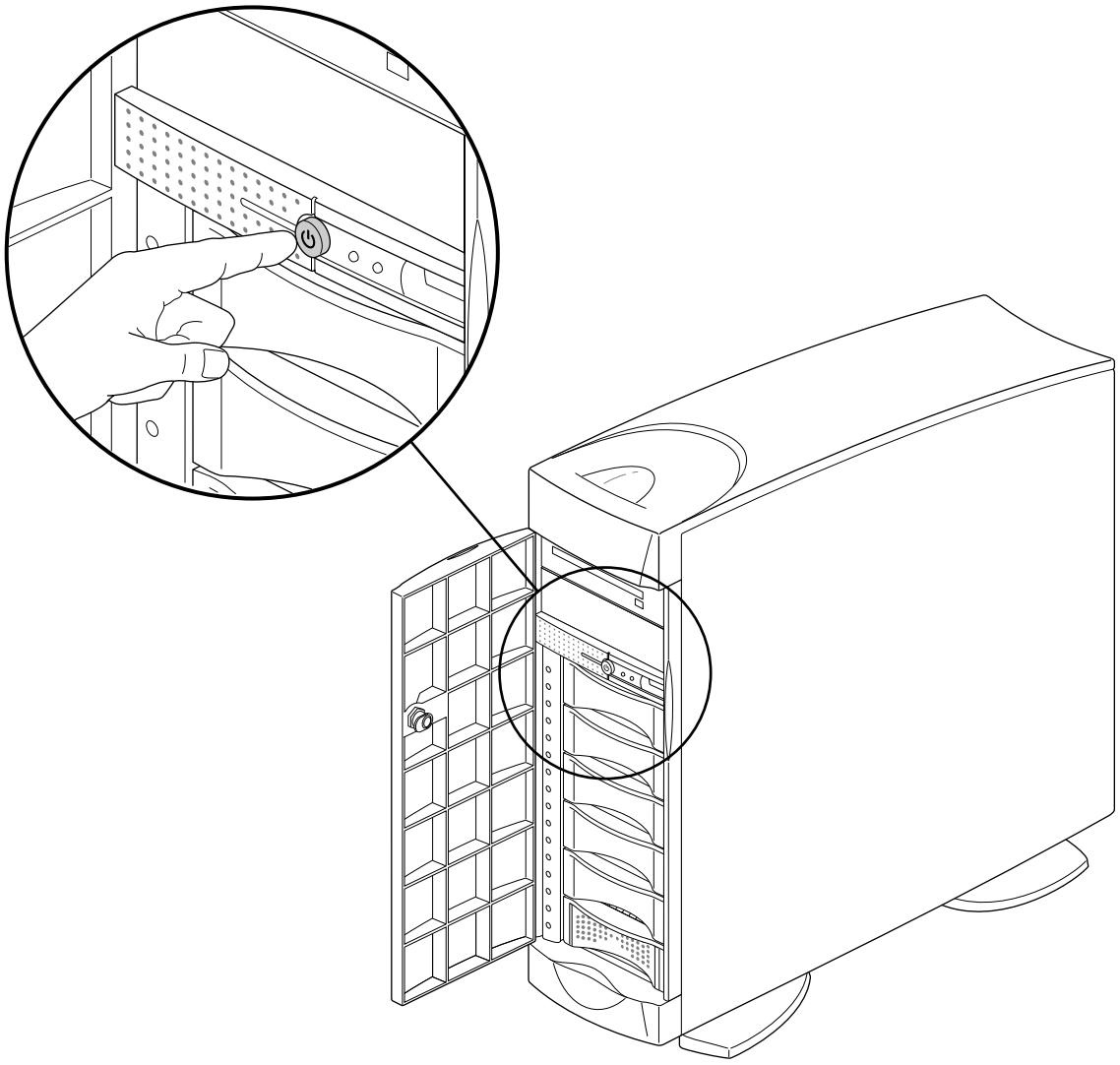

Figure 2-24 Turning On the Front Power Switch

- In a two-module system, press the front power switch on the master module.
- Press the button far enough to feel a slight "click."
- After you press the button, the status LED blinks green, then turns solid green as the system boots.
- As the system boots, power is applied to the 3.5-inch drives in order, starting with the drive in slot 1 (the system disk) and proceeding to slot 6. After the 3.5-inch drives have power, power is applied to the 5.25-inch drives.

Logging In for the First Time

When you log into the system for the first time, you perform the following tasks:

- Name the system (so it can be identified on a network)
- Assign an internet protocol (IP) address to the system (so that it can communicate on the network)
- *Optional:* Assign passwords to critical system accounts (such as root and httpd).
- *Optional:* Allow or deny access to network services available on your Origin200 server (such as finger, ftp, telnet, and so forth.)

You can perform these basic tasks from the system console (for example, an ASCII terminal) that you attached to serial port 1. Once the server is available on the network, you can access various system administration features from other computers and workstations on your network using a World Wide Web browser.

After the system boots, you see the following prompt on the console:

```
IRIS login:
```

Follow these steps:

1. At the `IRIS login:` prompt, type **`root`** and press **`Enter`**.
2. You see a prompt similar to the following:

   ```
   IRIS 1#
   ```

3. Enter the following command:

   `start-gateway`

This command starts the Internet Gateway setup program, which allows you to configure the system for network access. You see a series of screens with various prompts and information. Make whatever changes you wish to your system configuration.

Part of the process of making those changes includes rebooting the system. After the system has rebooted, you can modify your system's configuration over the network using a World Wide Web browser. See "Accessing Your Server Over the Web" in Chapter 4.

Chapter 3

Installing an Origin200 System in a Rack

This chapter describes how to install an Origin200 server in an equipment rack.

Chapter 3

Installing an Origin200 System in a Rack

This chapter describes how to install an Origin200 server in a third-party (non-Silicon Graphics) equipment rack. It contains the following sections:

- "Overview" on page 64
- "Installing the Mounting Hardware on the Chassis" on page 64
- "Installing the Rackmounting Shelf" on page 68
- "Installing a Chassis in the Rack" on page 69
- "Removing a Server From an Equipment Rack" on page 71

For complete instructions about configuring an Origin200 system, including adding drives, attaching cables, turning on the system, and logging in, see Chapter 2, "Setting Up an Origin200 System."

If you have an Origin200 server in a tower configuration, and you wish to convert it to a rackmount configuration, a conversion kit is available from Silicon Graphics (P-S-RM-KIT). This kit provides items that are not included in tower configurations: rackmounting ears, a rackmounting shelf, a door-assist tab, mounting screws, and cosmetic end-caps to cover the mounting screws. Contact Silicon Graphics or your local service provider to obtain this kit.

Caution: When installing a two-module system, or attaching an Origin ™Vault expansion box, all chassis must be connected to the same grounded power supply. If the chassis are not all connected to the same power supply, resulting differences in ground potential (current) can damage components on the Origin200 main system board. See Figure 2-1 in the section "Providing Correct Electrical Grounding (Earthing)" on page 30.

Overview

Origin200 systems that are configured for rackmounting are shipped from Silicon Graphics with these components:

- mounting ears and screws to attach them to the Origin200 chassis
- end-caps to cover the mounting ears
- mounting shelf that installs in the equipment rack and supports the weight of the server

Your equipment rack should provide access to the rear of the server. The rear of the server is where the main power switch is located, as well as all of the connectors (power, networking, serial ports, diagnostic port, parallel port, and CrayLink Interconnect port). Connectors for any PCI options are also at the rear of the server.

See Chapter 1, "Overview of the Origin200 System" for a general description of both tower and rackmountable installation methods and converting between them.

Caution: If you are installing a two-module Origin200 server, be extremely careful with the CrayLink Interconnect cable. Do not allow it to become kinked or bent excessively inside the rack. Be careful not to catch and smash it between the system and other parts of the equipment rack when sliding the Origin200 chassis in and out.

Installing the Mounting Hardware on the Chassis

Each rackmountable Origin200 ships with two mounting ears and 6-32 x 1/4-inch screws to attach the ears to the server. These ears provide a mechanism to secure the server in the rack and prevent it from sliding out. The ears do not bear any of the server's weight.

Follow these steps to install the mounting ears on the chassis:

1. Place the Origin200 chassis on a flat, sturdy work surface capable of supporting at least 40 pounds (18 kg) and up to 75 pounds (34 kg).
   - Do not install any option drives in the system yet. Drives make the chassis heavier and more difficult to lift and move.
   - The system should be flat on the work surface, as shown in Figure 3-1.

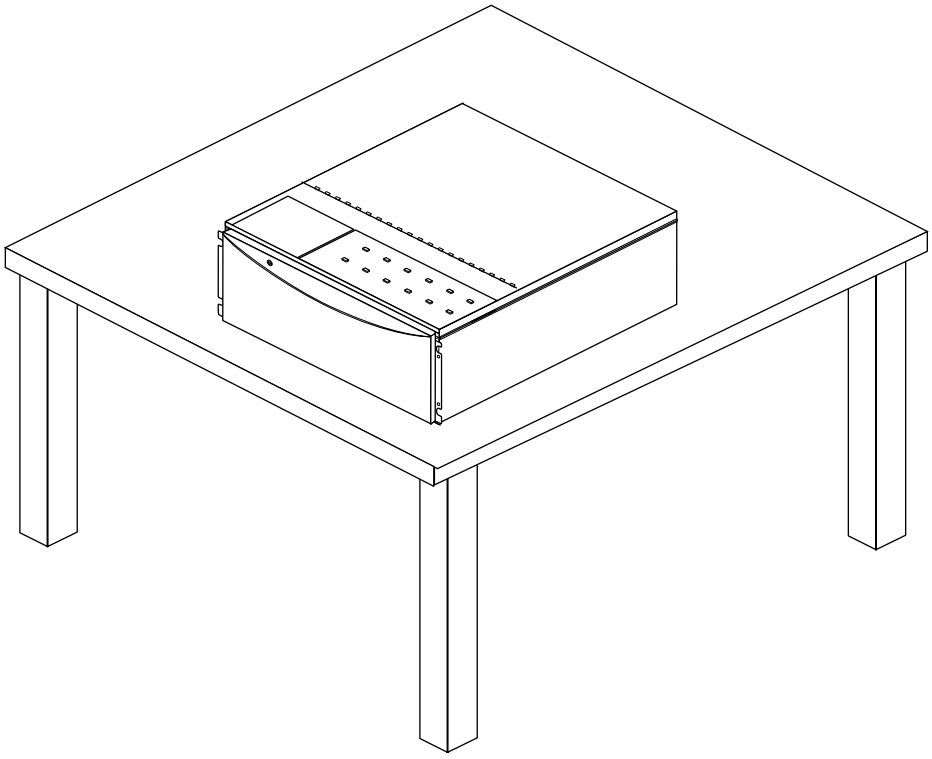

Figure 3-1 Placing the Origin200 on a Work Surface

2. Attach the ears.
   - There are two ears, one for the left side and one for the right side. See Figure 3-2.

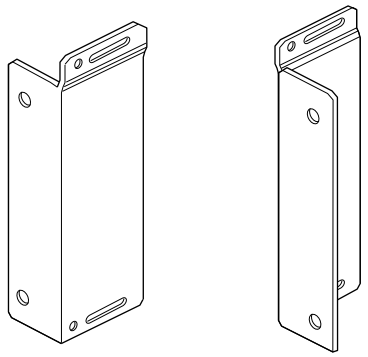

Figure 3-2 Origin200 Rackmounting Ears

- Using a #2 Phillips screwdriver and the 6-32 x 1/4-inch screws provided with the Origin200 system, fasten each ear to the side of the chassis, behind the front flange, as shown in Figure 3-3. Use two screws for each mounting ear.

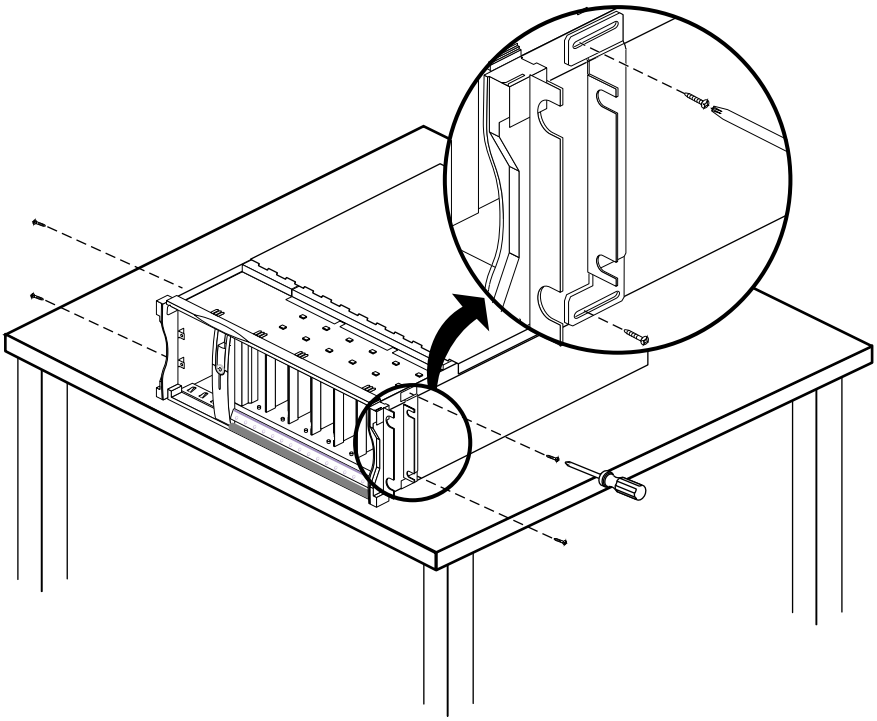

Figure 3-3 Attaching the Rackmounting Hardware (Ears)

You are finished attaching the mounting ears.

If you wish to install internal options, such as additional memory and PCI cards, do so now.

- For instructions about opening the system, see "Removing the System Cover and Chassis Access Door" in Chapter 5.
- For information on installing memory, see Chapter 6, "Installing and Removing Memory."
- For information on installing PCI options, see Chapter 7, "Installing and Removing PCI Option Boards."

Do not install drive options yet. Proceed to the next section to install the rackmounting shelf.

Installing the Rackmounting Shelf

The mounting shelf provided with the Origin200 server takes up 4 U (7 inches, or 17.8 cm) of space in the rack and supports the weight of the server.

Follow these steps to install the mounting shelf in your equipment rack:

1. Locate four 10-32 x 1/2-inch screws and the four washers (#10, .203 ID x .562 OD x .040 inch thick) included with the system.
2. Install the mounting shelf in the rack, attaching it with the four screws.
   - Place a washer between each screw head and the mounting shelf, as shown in Figure 3-4.

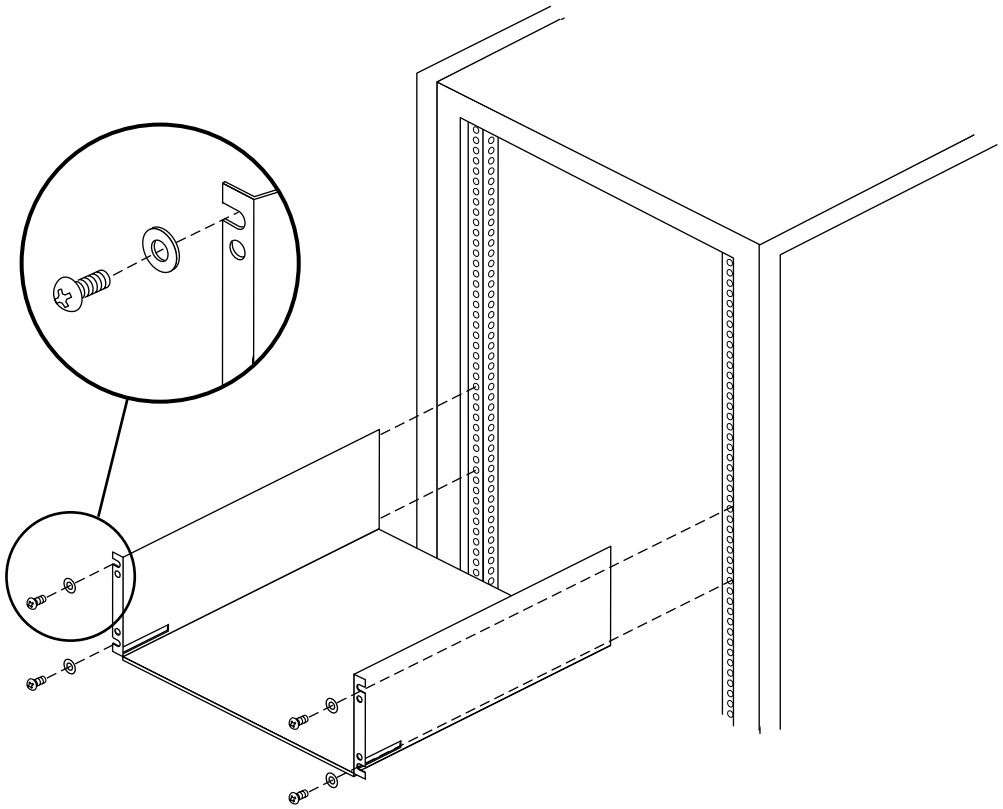

Figure 3-4 Installing the Rackmounting Shelf

Installing a Chassis in the Rack

Follow these steps to install the Origin200 chassis in an equipment rack.

1. *Recommended*: Lock the front door with the key. This prevents the door from being pulled open accidentally while you install the server.
2. With a person on each side of the chassis, lift the server and move it to the equipment rack, as shown in Figure 3-5.

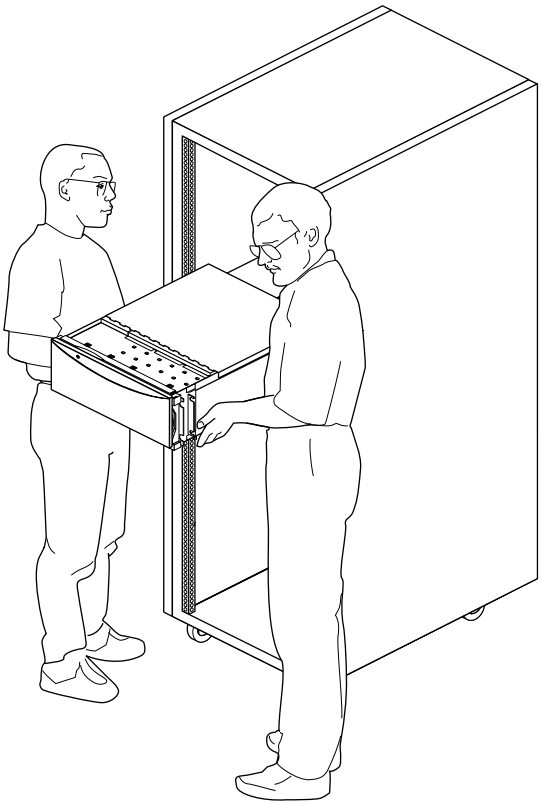

Figure 3-5 Lifting the Origin200 Server Into a Rack

Warning: **Two people are required to lift an Origin200 system.**

3. Slide the server back into the rack.
4. Secure the server to the rack from the front, using four of the .
5. Attach the plastic end caps to the front of the server to conceal the mounting flange, as shown in Figure 3-6.

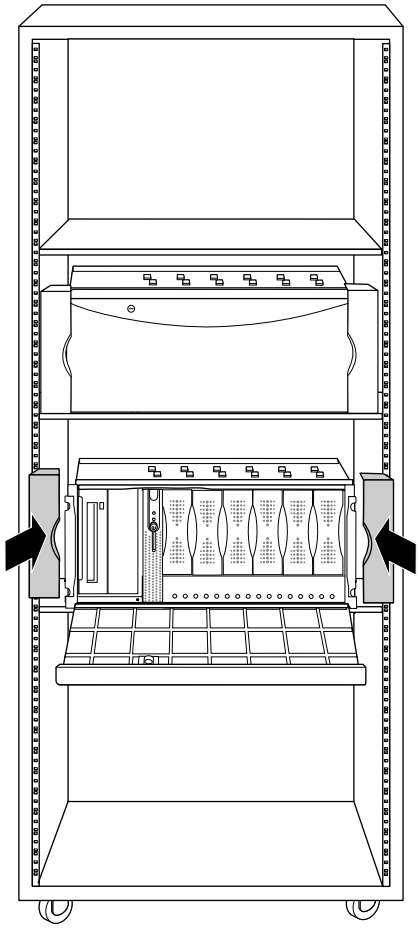

Figure 3-6 Attaching the Plastic End Caps to a Rackmounted Server

- The system is shipped with two pairs of end caps: one for 19-inch racks and one for 21-inch racks. Use whichever is appropriate for your installation.

You are finished installing the server in a rack.

- If you have additional drives, you can install them in the system.
- If you are installing the server for the first time, turn to Chapter 2, “Setting Up an Origin200 System” for information about attaching cables and the system console, and starting the server for the first time.

Removing a Server From an Equipment Rack

If you have a two-module Origin200 system, be extremely careful with the CrayLink Interconnect cable. Do not bend or pull on it while removing the server from the equipment rack.

Follow these instructions to remove an Origin200 system from an equipment rack:

1. *Optional*: Depending upon how far out of the rack you plan to pull the server, the length of your cables, and what you are planning to do to the server, you may wish to unplug the cables attached to the rear of the system before you begin removing the chassis.
2. *Recommended*: Lock the front door with the key. This prevents the door from being pulled open accidentally while you are installing the server.
3. *Recommended*: Remove all drives from the system to make the chassis lighter and easier to carry.
4. Remove the plastic end caps.
5. Remove the screws that secure the mounting ears to the equipment rack.
6. With two people, slide the server out of the rack.
7. If you are servicing the Origin200, place it on a flat, sturdy work surface capable of supporting at least 40 pounds (18 kg), or up to 75 pounds (34 kg) for a fully configured module.

You are finished removing the server from a rack.

Chapter 4

Operating an Origin200 System

This chapter describes how to operate an Origin200 server, including how to turn the system on and off, how to reset the system, how to use the nonmaskable interrupt (NMI) feature, and how to use the module system controller (MSC) features.

Chapter 4

Operating an Origin200 System

This chapter describes how to operate an Origin200 system. It covers these topics:

- "Front Panel Functions: Status LED, Power, Reset, NMI" on page 76
- "Turning the System On and Off" on page 79
- "Accessing Your Server Over the Web" on page 87
- "Separating Two Modules" on page 88
- "Using Another Computer or Workstation as the System Console" on page 89
- "Using the AUX Port and Module System Controller Commands" on page 98
- "Determining the Devices Installed on Your Server" on page 107

Front Panel Functions: Status LED, Power, Reset, NMI

The front panel provides the following features:

- status LED
- front power switch
- reset button
- nonmaskable interrupt (NMI) button

Figure 4-1 shows the locations of these features.

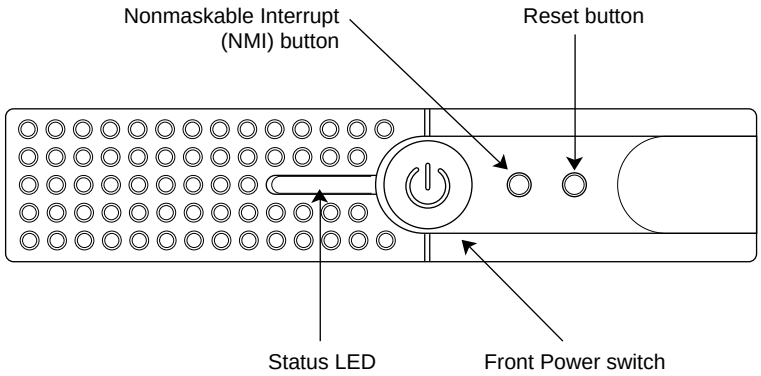

Figure 4-1 The Origin200 Front Panel

Status LED

The actual status LED is part of the system controller assembly, which is located behind the front panel. A piece of light-conductive plastic (light pipe) channels the light from the LED to the front panel.

When the master power switch is turned on, the status LED flashes green briefly, but does not stay illuminated. When the system boots, the LED flashes red momentarily, then turns green.

For a complete list of status LED codes, see "Status LED Messages" in Chapter 9.

Front Power Switch

The front power switch causes the module system controller to either turn on or turn off power to the system. The master power switch at the rear of the system must be on in order for the front power switch to work.

When you press the front power switch to turn the system on, the module system controller signals the power supply to shut off power to the drive bays, PCI backplane, and main system board and CPU daughter card.

The module system controller itself remains active until the master power switch is turned off.

Using the Reset Button

Use the reset button if the system is completely unresponsive (you cannot type commands to it) and you want to reboot the server without shutting it off. The reset button skips the automatic power-on diagnostic tests.

To reset the system, press the reset button. (See Figure 4-1). After you press the reset button, the system status LED on the front panel turns red briefly, then green, and the system reboots.

Using the Nonmaskable Interrupt (NMI) Button

The nonmaskable interrupt is similar to reset, except that the system's current state is saved. When you press the nonmaskable interrupt button, this is referred to as "generating a nonmaskable interrupt" or "NMI."

Generating an NMI is can be useful when attempting to solve application and system problems that cause the system to halt. If you experience problems with your system or an application, your support provider may instruct you to generate an NMI in order to recover data or examine the system.

To generate an NMI, press the NMI button. (See Figure 4-1). What happens when you generate an NMI depends upon the state of the system at the time:

- If the system was running in PROM mode, the CPU immediately enters power-on diagnostics (POD) mode.
- If a kernel debugging facility (such as *symmon*) is available, the system may start that utility.
- If the kernel debugging facility fails due to data corruption, you can generate a second NMI and force the system into POD mode.

You can also generate an NMI using a module system controller command. See "Using the AUX Port and Module System Controller Commands."

Occasionally, a system may not respond to an NMI. If this happens, you can either press the reset button or turn the system off and on again.

Turning the System On and Off

This section describes the functions of the two power switches and how to turn the system on and off.

About the Master Power Switch and Front Power Switch

The Origin200 server has two power switches: the master power switch and the front power switch.

The master power switch is located at the rear of the system. This switch controls whether or not current flows into the power supply.

- When the master power switch is on, the power supply sends power (5 VDC) to the system controller at all times. Because of this, you should turn the master power switch off before servicing the Origin200, even if the system appears to be off otherwise.
- When the master power switch is off, no current flows to the power supply and the system is completely off.

The front power switch is located on the front panel, between the 3.5-inch and 5.25-inch drive bays.

- When you press the switch to turn the system on, the module system controller signals the power supply to send power to the other components of the server, thus causing the system to boot.
- When you press the switch to turn the system off, the module system controller signals the power supply to immediately shut off current to the various parts of the system (disk drives, CPU, PCI boards, and so forth). The system controller remains active until the master power switch is turned off.

By default, to power the system on you must switch both the master power switch and the front panel switch on. However, you can cause the system to power on automatically when only the master power switch is turned on. See “Using the AUX Port and Module System Controller Commands” on page 98.

Caution: Wait at least 7 seconds between the time you turn the master power switch off to when you turn it on again. If you do not wait at least 7 seconds, the system controller may fail to initialize properly.

Turning On the System

Follow these steps to turn on the system:

1. At the rear of the system, turn the master power switch on, as shown in Figure 4-2.

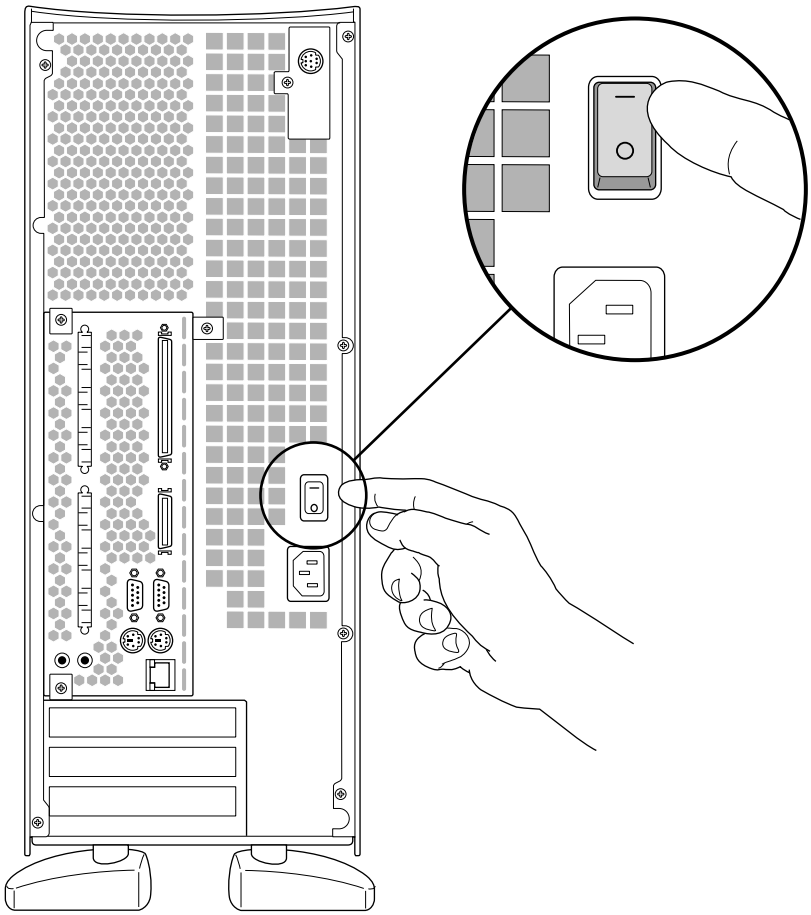

Figure 4-2 Turning On the Master Power Switch

- If you have a two-node system, turn on the master power switches for both nodes. It does not matter which you turn on first.
- When you turn on the master power switch, the status LED at the front of the system flashes green momentarily.

2. At the front of the system, press the power button, as shown in Figure 4-3.

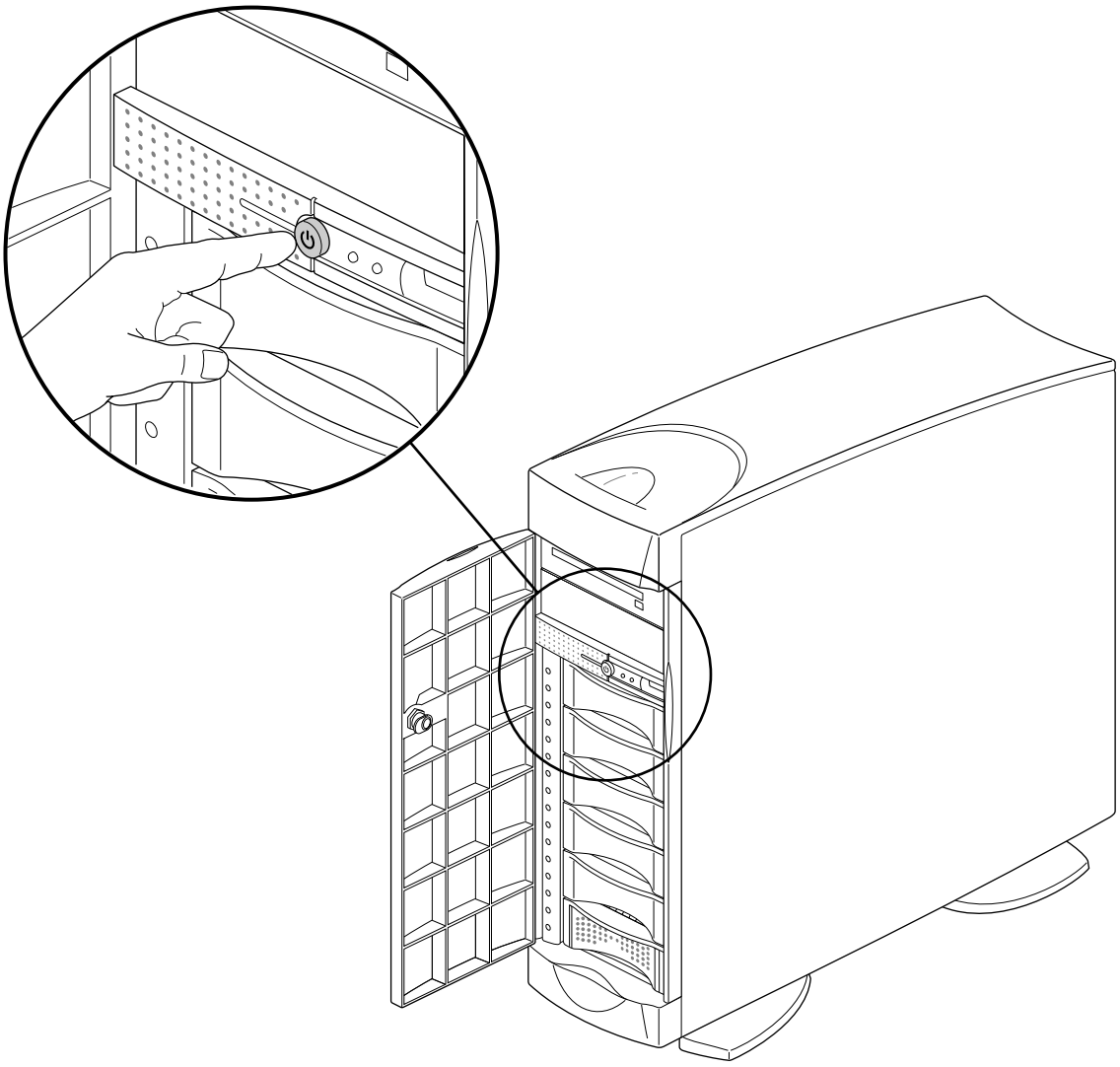

Figure 4-3 Turning On the Front Power Switch

- In a two-module system, press the front power switch on the master node. (The front power switch on the slave node is inactive.)
- Press the button far enough to feel a slight "click."
- After you press the button, the status LED turns red, then green as the system boots.
- As the system boots, power is applied to the 3.5-inch peripherals in order, starting with the drive in slot 1 (the system disk) and proceeding to slot 6. After the 3.5-inch peripherals have power, power is applied to the 5.25-inch peripherals.
- If the LED does not change colors, and the system does not appear to power on, switch the main power switch off, wait 7 seconds, turn the main power back on, and press the front panel switch again.

Note: By default, the module system controller does not apply power until you press the front power switch. However, you can set it to automatically power on using the *aut* module system controller command. See "Using the AUX Port and Module System Controller Commands" on page 98.

3. You see several screens of diagnostic messages as the system performs various self-tests.

   Be aware that the more memory that is installed in the system, the longer the tests may take. For example, a system with 512 MB of memory may take over 2 minutes to complete its diagnostics.

   When the diagnostics finish, you see the System Maintenance Menu:

```
Running power-on diagnostics...
System Maintenance Menu
1) Start System
2) Install Software
3) Run Diagnostics
4) Recover System
5) Enter Command Monitor

   Option?
```

   Note: The system waits at the System Maintenance Menu by default. However, you can cause the system to load IRIX automatically by entering the Command Monitor (press **5**) and setting the AutoLoad environment variable to "yes" (**`setenv AutoLoad yes`**). See prom(1) for more information.

4. At the System Maintenance Menu, type **1** and press **Enter**.
   - The Origin200 server starts booting IRIX.
   - You should see various messages, followed by the login prompt:

     ```
     IRIS login:
     ```

   - When you see the "login" prompt, the system is finished booting and it is ready to use.

Turning Off the System

When you turn off the system, you can either:

- turn the system off, but leave the system controller active (for example, if you want to turn the system on remotely through the AUX port)
- turn off all power to the system (for example, if you are servicing internal components, replacing drives, or moving the system)

Follow these steps to turn off the system:

1. Log in to the system as *root*.
2. Verify that no one is using the system, or that it is not in the middle of a critical task.
3. At a shell prompt, enter this command:

   /etc/shutdown -g0

   This causes the system to begin shutting down immediately. See shutdown(1M) for more information.

   You see various messages about the system shutting down, then you see the System Maintenance Menu:

   ```
   Running power-on diagnostics...
   System Maintenance Menu
   1) Start System
   2) Install Software
   3) Run Diagnostics
   4) Recover System
   5) Enter Command Monitor
      Option?
   ```

4. Once you see the System Maintenance Menu, locate the power button at the front of the chassis (the master chassis in a two-module system) and press it once. See Figure 4-4.

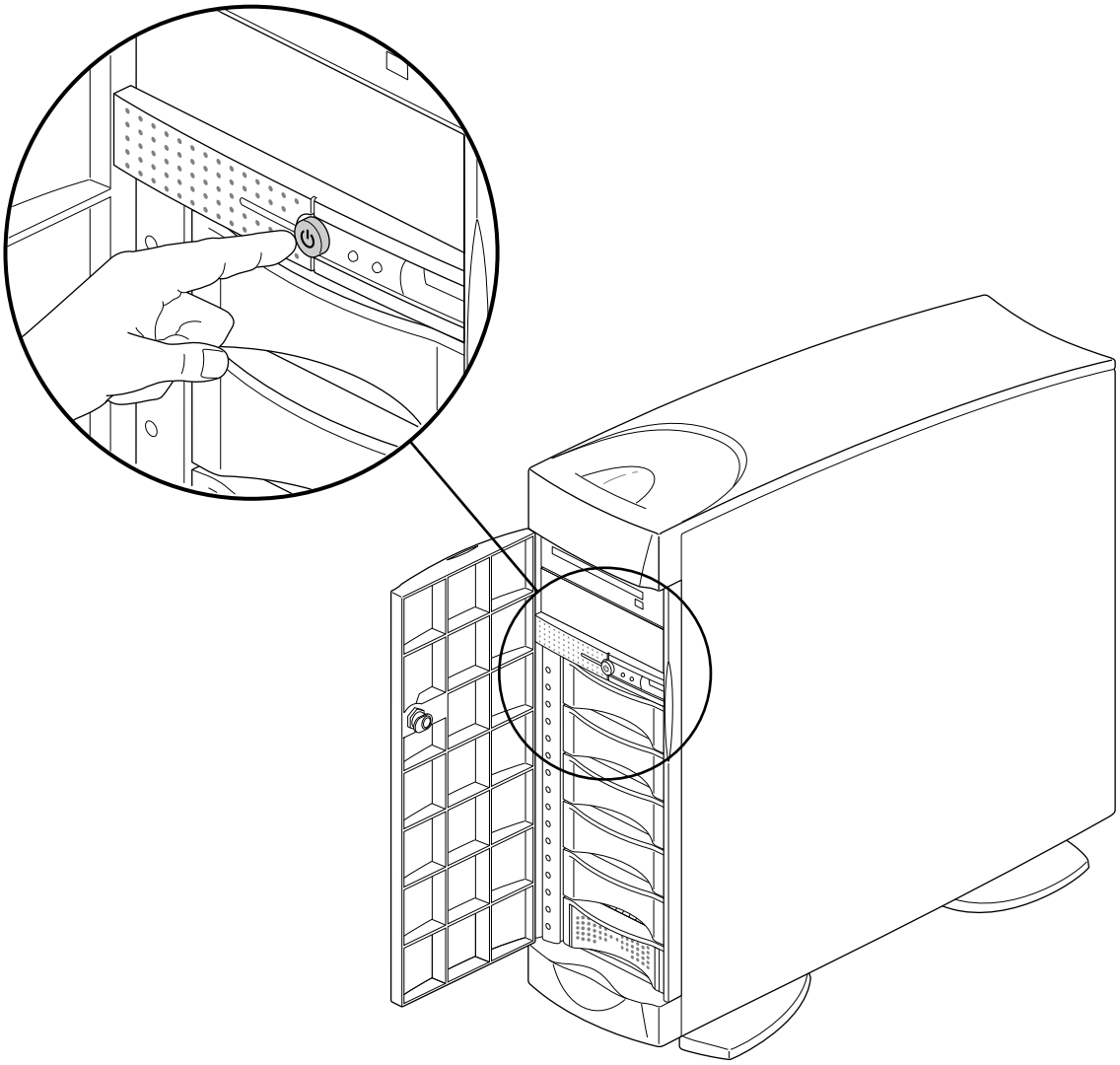

Figure 4-4 Turning Off the Front Power Switch

- The status LED on the front of the system blinks, then goes out when the system is powered off.
- If you are going to move the system, wait a few more seconds to allow the internal disks to stop spinning.
- If you wish to leave the system controller active (so that you can turn the system on remotely through the AUX port), do not continue to the next step (turning off the master power switch).

5. If you wish to turn off all power to the system (for example, to service it), turn off the master power switch at the rear of the server, as shown in Figure 4-5.
   - If you are power-cycling the system, wait 7 seconds after turning off the main power switch before you turn it back on again. Otherwise, the module system controller may not initialize properly.

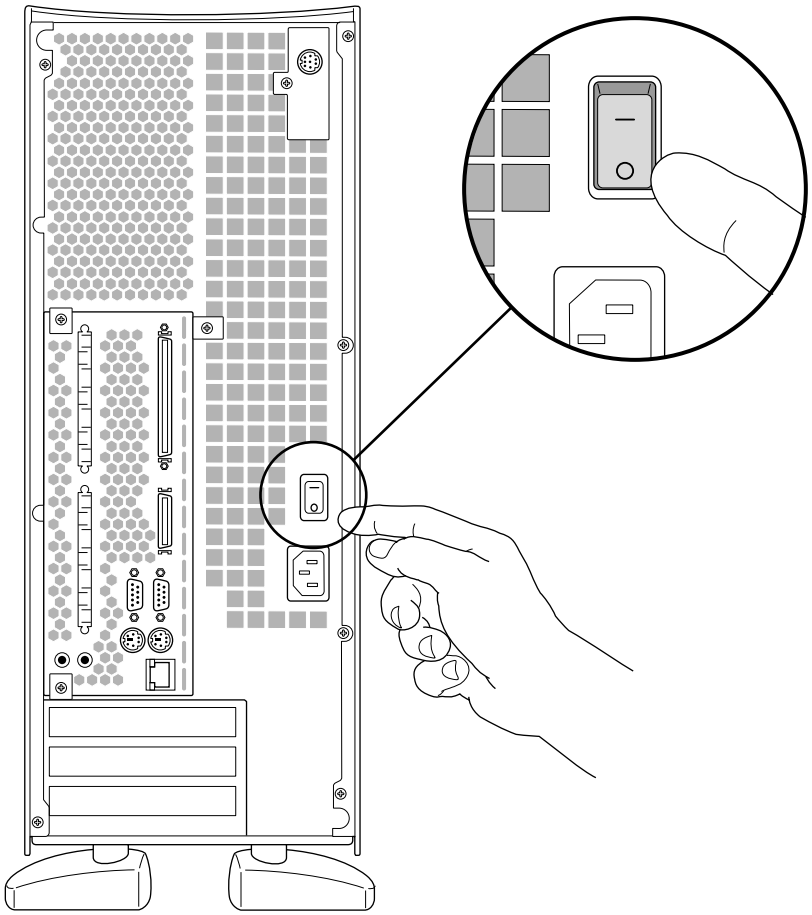

Figure 4-5 Turning Off the Master Power Switch

Note: Once you turn off the master power switch, the system controller is no longer active and you cannot boot the system remotely through the AUX port.

Accessing Your Server Over the Web

Your Origin200 server is bundled with World Wide Web server software that allows you to access the system with a browser from any other computer on your network. In order to do this, your Origin200 server:

- must be attached to the network; see "Putting the Pieces Together" in Chapter 2
- must be configured to access the network; see "Logging In for the First Time" in Chapter 2

Once your server is attached to the network and properly configured, follow these steps to access the server with a Web browser:

1. Start the Web browser on a computer attached to your network.
2. Open the URL that corresponds to your server's name and domain, using port 2077.

   For example, if your server is atlas, and your domain is donut.com, you open the following URL:

   ```
   http://atlas.donut.com:2077/
   ```

   You can use this URL to administer various aspects of your server that relate to networking and file (ftp, World Wide Web) access.

Your server is also shipped with a default system home (Web) page. Using the above example of a server called atlas in the domain donut.com, you access this page with the following URL:

```
http://atlas.donut.com/
```

The HTML source for this page is stored in the directory */var/www/htdocs/index.html*.

Separating Two Modules

If you wish to separate a two-module system into two individual servers, follow these steps:

1. Shut down the dual-module system completely. See "Turning the System On and Off" on page 79.
   - Be sure to turn off the main power switch at the rear of the system in order to properly reset the module system controller.
2. Disconnect the CrayLink Interconnect cable from each chassis. See Figure 2-22.
3. Detach the grounding cable from each chassis. See Figure 2-22.
4. Reset the system controller DIP switch on the slave system so that it is a master module. See Figure 2-21.
5. Reassemble the individual chassis.
6. Attach a system console to the former slave module and boot the system.

The former slave system may not display any output on the system console for up to 5 minutes. This is normal. Allow the system to run through its normal process of determining what components are installed on the system. Eventually, you will see output on the system console.

Using Another Computer or Workstation as the System Console

As an alternative to a character-based (ASCII) terminal, you can use another computer (such as a laptop, IBM-compatible computer, or Macintosh computer) or UNIX-based workstation as the system console. The following sections provide basic information.

Using an IBM-Compatible or Macintosh Computer as the System Console

To use an IBM-compatible or Macintosh computer as the system console, you need the following:

- a serial adapter cable with proper connectors and wiring to connect your computer with the Origin200 server
- a terminal emulation program (such as Term, HyperTerm, TERMINAL.EXE, Bitcom, ProComm, ZTerm, SITcomm, or Macterm)

The basic steps to using a computer as a system console for your Origin200 server are:

- Connect a serial port of the computer to serial port 1 of the Origin200 server.
- Start your terminal emulator software and log in to the Origin200 server.

The next sections describe this process.

Obtaining and Connecting the Correct Serial Adapter Cable

Silicon Graphics has adapter cables that you can attach to the serial cable provided with your Origin200 server. Using these adapter cables and the serial cable provided, you can connect your computer to the Origin200 server. Table 4-1 lists the adapter cables and part numbers.

Table 4-1 Serial Adapter Cables for Connecting IBM-Compatible and Macintosh Computers to an Origin200 Server

Computer Type	Description	Length	Silicon Graphics Part Number
IBM-Compatible	DB25 Female to DB9 Female	6 feet (2 meters)	9290134
Macintosh	DB25 Female to DIN-8 Male	6 feet (2 meters)	9290135

Contact Silicon Graphics or your local service provider for information on obtaining these adapters. If you wish, you can build your own serial cables using the information in Appendix B, “Cable Descriptions.”

Once you have obtained the correct adapter cable, follow these steps to connect the computer and the Origin200 server:

1. Make sure the Origin200 server is turned off.
2. Locate the serial cable that was shipped with your Origin200 server.
3. Attach the DB9 connector to serial port 1, as shown in Figure 4-6.

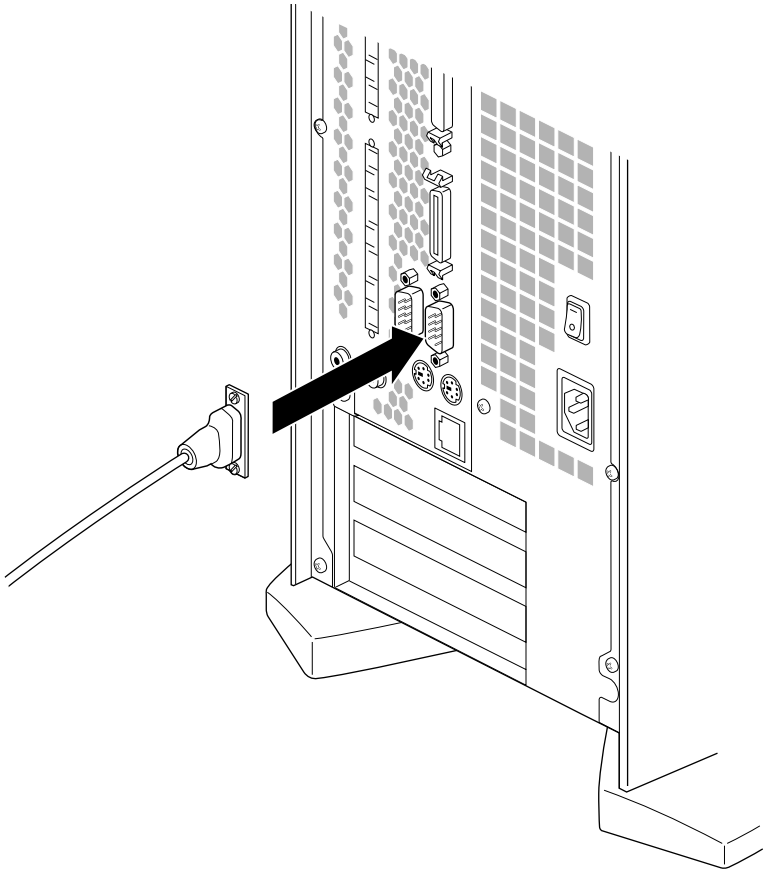

Figure 4-6 Attaching a Serial Cable to Port 1 of the Origin200 Server

4. Attach the DB25 connector of the serial cable to the DB25 connector of the adapter cable.
5. Attach the other end of the adapter cable to one of the serial ports on your computer.

   You can use any available serial port on your IBM-compatible or Macintosh computer.
6. Make a note of which serial port you use. You may need this information later when you set up your terminal emulator.

Setting Up and Starting the Terminal Emulator

To communicate with the Origin200 server, you need a terminal emulator for your IBM compatible or Macintosh computer. Many operating systems, such as Microsoft® Windows®, ship with a terminal emulator package (also known as modem or communications software.) Some examples of terminal emulator software are:

- Term
- HyperTerm
- TERMINAL.EXE
- Bitcom
- ProComm
- ZTerm
- SITcomm
- Macterm

Regardless of the type of terminal emulator you use, make sure it has the following settings:

Table 4-2 Terminal Emulator Settings

Setting	Value
Baud rate	9600
Data bits	8
Stop bits	1
Parity	None
Local echo	off
Terminal type	DEC V100, VT102, Wyse 60, ANSI, or dumb
Flow Control	None or XON/XOFF

To configure your terminal emulator, follow these general steps:

1. Power on your IBM compatible or Macintosh computer.
   - Do not turn on the Origin200 server yet.
2. When the system has booted, locate and start the terminal emulator.
3. Adjust the settings for your terminal emulator as indicated in Table 4-2.
   - Be sure the terminal emulator software is configured to use the serial port on your computer to which you attached the serial cable.
   - Note which terminal type (such as VT100 or ANSI) you choose to emulate. You will need this information when you log in to the Origin200 server.
   - Other settings, such as upload and download protocol, initialization strings, and file transfer settings do not matter for this procedure. You can leave them set to their defaults.

Logging In to the Server

Follow these steps to log in to the server using your computer as a system console:

1. Turn on the Origin200. (See "Turning On the System" on page 80.)
2. Press **Enter** once or twice on your computer. You should see a power-on diagnostics message, followed by a menu similar to the following:

```
Running power-on diagnostics...
System Maintenance Menu
1) Start System
2) Install Software
3) Run Diagnostics
4) Recover System
5) Enter Command Monitor

   Option?
```

   - If you do not see the System Maintenance Menu, and nothing happens when you press **Enter**, make sure the cables are correctly attached. The DB9 connector on the long serial cable (shipped with the Origin200 server) must be in port 1 of the server.
   - Make sure you have configured the terminal emulator to use the correct serial port on your computer.
   - Make sure the baud rate and other emulator settings are correct. See Table 4-2. If you see strange characters on your screen (such as xx``x`) when you press the return key, you may not have set the baud rate correctly

3. Type **1** and press **Enter**.
   - The Origin200 server starts booting IRIX.
   - You should see various messages, followed by the login prompt:

```
IRIS login:
```

4. At the login: prompt, enter **root**, **setup**, **guest**, or another account name (if you have already created one) as appropriate, and press **Enter**.
   - If you have already assigned a password to the account you are logging in to, enter the password when prompted.
5. You see some brief messages and the following prompt:

```
TERM = (vt100)
```

6. Enter the appropriate terminal type for your emulator and press **Enter**. (See Table 4-2.) If you are using the VT100 terminal type, you can simply press **Enter**.

Using a Silicon Graphics Workstation as the System Console

You can use another workstation, such as a Silicon Graphics O2, Indy, Indigo^2, or Onyx2 as the system console for your server. To do this, connect the workstation and the Origin200 server together using a serial cable, then use terminal emulation software (such as *cu*) to log in to the Origin200 server.

The procedures in the following sections assume you are connecting your Origin200 server to a Silicon Graphics workstation. They describe how to:

- obtain the correct serial cable
- make sure the *eoe.sw.uucp* subsystem is installed on the workstation
- configure the workstation, which includes modifying some configuration files
- connect a serial cable between port **1** of the Origin200 server and another serial port on the workstation
- use the *cu* command on the workstation to connect to the Origin200 server and log in

Obtaining the Correct Serial Cable

If you are connecting the Origin200 to a Silicon Graphics workstation, you need one of three RS-232 serial cables:

- DB9 to DIN-8, null modem (has a D-shaped, nine-pin connector on one end and a small, round connector on the other end); use this cable to connect the Origin200 server to a Silicon Graphics Indy, Indigo^2, Indigo , Personal IRIS 4D/30, or Personal IRIS 4D/35 workstation
- DB9 to DB9, null modem (has a D-shaped, nine-pin connector on each end) with older cable wiring; use this cable to connect the Origin200 server to a Silicon Graphics Onyx®, Personal IRIS, or POWER Series workstation.
- DB9 to DB9, null modem with IBM-compatible wiring; use this cable to connect the Origin200 server to a Silicon Graphics O2 or Onyx2 workstation.

Appropriate DB9 to DIN-8 and DB9 to DB9 cables are available from Silicon Graphics, or your local service provider. You can also make the necessary cable using the pin-to-pin descriptions provided in the sections “Origin200 to Indy and Indigo^2 Cable (DB9 to DIN-8)” and “Origin200 to O2, Onyx2, and IBM Compatible (DB9 to DB9)” in Appendix B.

Checking for the Correct Software

The UUCP subsystem contains the program *cu* and several configuration files necessary for checking for the correct software. To make sure the UUCP subsystem is installed, enter the following command at a shell prompt:

```
versions | grep uucp
```

If the UUCP subsystem is installed, a line like this appears:

```
I eoe.sw.uucp 11/26/96 UUCP Utilities
```

If you do not see the above line, the UUCP subsystem is not installed on your workstation. You should install or *eoe.sw.uucp* now.

Once the UUCP subsystem is installed, continue with the next section, "Configuring the Workstation."

Configuring the Workstation

Follow these steps to configure the workstation:

1. Log in as root (or use *su* to invoke superuser privileges) on the workstation that you will connect to the Origin200 server.
2. Use a text editor (such as *vi*, *jot*, or *emacs*) to edit the file */etc/inittab*.
   - Find the line that corresponds to the serial port you wish to use on the workstation. For example, this line corresponds to port 2:

     ```
     t2:23:off:/sbin/getty -N ttyd2 co_9600 # port 2
     ```

     Note: You can use any port you wish on the workstation, but keep in mind that port **1** is the workstation's alternate console port.

   - If the third field in the line is the word "off" (as in the example above), exit the file and continue with step 3.
   - If the third field is the word "on," change it to "off." Then save the file, exit, and at the shell prompt enter this command:

     ```
     telinit q
     ```

3. Using a text editor, open the file */etc/uucp/Devices*.
   - Locate the following line:

     ```
     # Direct ttyd2 - 9600 direct
     ```

   - Remove the number sign (#) and subsequent space at the beginning of the line:

     ```
     Direct ttyd2 - 9600 direct
     ```

     This change allows you to use port 2 on the workstation to connect to the Origin200 server. If you are using a different serial port, replace `ttyd2` in the line above with the name of the actual port you are using, for example, `ttyd3` or `ttyd4`.

   - Save the file and exit.
4. Edit the file */etc/uucp/Systems*.
   - At the end of the file, add this line:

     ```
     Direct Any Direct 9600 -
     ```

   - Save the file and exit.
5. Test the configuration on the workstation:
   - Enter this command at a shell prompt:

     ```
     cu Direct
     ```

     You should see this message:

     ```
     Connected
     ```

     This message means that *cu* has successfully opened the serial port. You are ready to proceed to the next section, "Connecting the Serial Cable." Enter the following command to exit from *cu* and return to the shell prompt:

     ```
     ~.
     ```

     (This command is the tilde character, followed by a period.)

   - If you do not see the message `Connected`, you may have made an error in one of the previous steps. Repeat this procedure, starting from step 2. In particular, make sure that you reference the same port in each of the files */etc/inittab* and */etc/uucp/Devices*.

Connecting the Serial Cable

Connect one end of the cable to port **1** of the Origin200 server, and the other end of the cable (either DB9 or DIN-8) to the appropriate port on the workstation, for example port **2**.

Logging In to the Server

On the workstation, enter this command at a shell prompt:

```
cu Direct
```

You should see this message:

```
Connected
```

Press **Enter** once or twice. You should see a login prompt from the Origin200 server:

```
IRIS login:
```

At the `IRIS login:` prompt, enter **root**, **guest**, or another account name (if you have already created one) as appropriate You see some brief messages and the following prompt:

```
TERM = (vt100)
```

Enter the following terminal type:

```
iris-ansi
```

Using the AUX Port and Module System Controller Commands

The AUX port is an 8-pin mini-DIN connector at the rear of the Origin200 server that connects to the module system controller (MSC). Figure 4-7 shows the location of the AUX port.

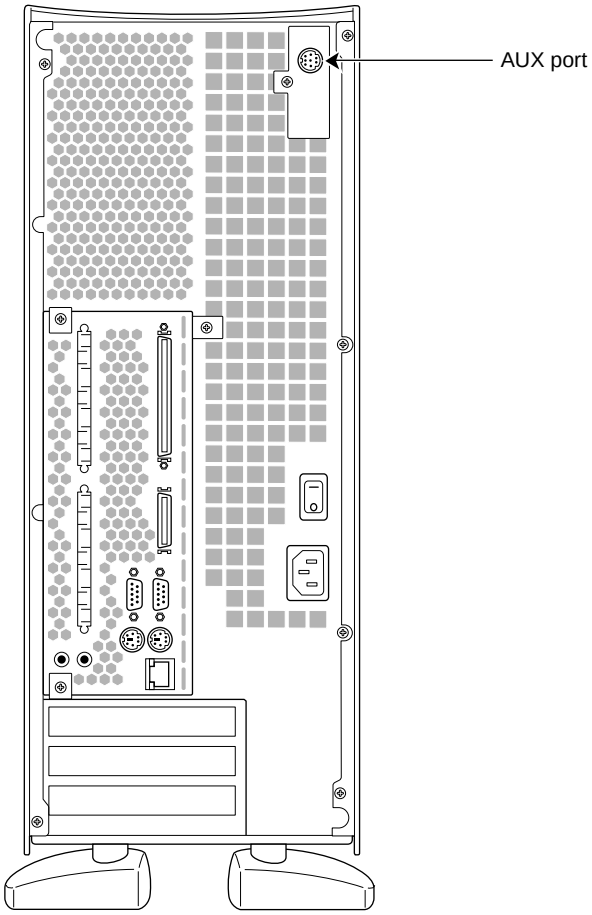

Figure 4-7 Location of the AUX Port

The AUX port uses a standard, RS-232 interface, and the pin assignments are identical to those used on Silicon Graphics Indy and Indigo^2 workstations and the CHALLENGE® S server. (See Appendix A, "Connector Pinout Assignments.") However, you cannot use the Origin200 AUX port to log in to IRIX.

Attaching a Terminal or Modem to the AUX Port

To attach a terminal or modem to the AUX port, you need a serial cable with a DIN-8 connector at one end (for the AUX port) and an appropriate connector for the terminal or modem (typically a DB25 connector) at the other end. Silicon Graphics has DIN-8 to DB25 terminal and modem cables, and these are listed in Appendix B, "Cable Descriptions." You can also use the descriptions provided in that appendix to construct your own cables. Note that the cables are the same as the ones used for Silicon Graphics Indy, Indigo, and Indigo^2 workstations, and the CHALLENGE S server.

Follow these steps to attach the cable:

1. Plug the DIN-8 connector into the AUX port at the back of the system. See Figure 4-7 for the location of the AUX port.
2. Attach the other end of the cable to your input device, for example a terminal, modem, or other computer.
3. Use the following settings with your terminal (or modem or other input device):
   - 9600 baud
   - 8 data bits
   - 1 stop bit
   - no parity
   - None, or XON/XOFF flow control
4. Test the connection by typing **`Ctrl+t`** and pressing **`Enter`**. You should see the module system controller prompt:

   ```
   MSC>
   ```

   If you do not see any response, check your cable and communications settings for your input device (terminal, modem, and so on). If this is a two-module system, be sure to plug the cable into the AUX port of the master module. Be sure there is power to the module system controller; the master power switch at the rear of the system should be on. (See Figure 4-2.)

Once you are able to see the MSC prompt, you are ready to use the module system controller.

The first task you should perform with the MSC is to reset the MSC password. See the next section, "Using the Module System Controller."

Using the Module System Controller

Once you have attached a terminal or other input device to the AUX port, you use the module system controller by typing **Ctrl+t**, followed by a command. If you type **Ctrl+t** and press **Enter**, you should see the MSC prompt:

```
MSC>
```

The following sections describe various common tasks you can perform with the MSC. In all cases, you enter commands and see the indicated responses on a terminal or other input device connected to the AUX port of the Origin200 server.

Entering Supervisor Mode

To use many of the MSC functions (such as power on and power off), you must be in Supervisor mode, and a four-character password is required to enter that mode. If you attempt to use a protected function and are not in Supervisor mode, you see the following error message:

```
err perm
```

(See "MSC Error Messages" below for a list of all the possible messages.)

To enter Supervisor mode, type the following command:

Ctrl+t pas *xxxx*

In the above example, *xxxx* is the four-character password. The default for all Origin200 servers shipped from Silicon Graphics is the word "none." To enter Supervisor mode on an Origin200 system with the default Supervisor mode password, type:

```
Ctrl+t pas none
```

Silicon Graphics recommends that you change this password to a different one. See the next section, "Setting the MSC Password."

Setting the MSC Password

Supervisor Mode on the MSC is protected by a four-character password. By default, every Origin200 server ships with an MSC password, which is the word "none." To change the password, enter:

Ctrl+t pas s *xxxx*

In the above example, *xxxx* is the new four-character password. The password must be exactly four characters long.

Checking the System Temperature

The Origin200 server contains a temperature sensor, located on the module system controller. To check the system temperature, enter this command:

Ctrl+t tmp

If you see the letter `n`, the system is running at a normal temperature. If you see the letter `o`, the system is running at over the normal temperature. You should verify that all the fans are working properly and that airflow into and out of the system is not blocked. If there are no problems with airflow, check the ambient air temperature. When the ambient air temperature is between 83.3˚ F (28.5˚ C) to 104˚ F (40˚ C), this can cause the system to run at over the normal temperature. Be aware that the fan speed is automatically increased if the system is over normal temperature. See the sections "Checking the Fans" and "Checking and Setting the Fan Speed."

If you see the letter `h`, the system is running at a dangerously high temperature and should be shut down immediately (if it has not already shut itself down automatically) until the cause of the problem is determined. Ambient air temperature higher than 104˚ F (40˚ C) causes a high system temperature.

Checking the Fans

To check the fans, enter this command:

```
Ctrl+t fan
```

If the fans are all functioning normally, the letter `n` or the letter `h` appears, indicating the fans are running at normal speed or high speed, respectively. See "Checking and Setting the Fan Speed" for more information.

If a fan has failed, you see the following response:

`ok f` *xxx*

The letter `f` indicates a fan failure. The letters *xxx* represent a three-digit error code that indicates which fans have failed. Table 4-3 shows how to interpret the error code:

Table 4-3 Fan Failure Error Codes

Code	Meaning
001	Fan 1 has failed
010	Fan 2 has failed
100	Fan 3 has failed
011	Fans 1 and 2 have failed
101	Fans 1 and 3 have failed
111	All fans have failed

The fans are numbered in order 1, 2, and 3, with fan 1 directly behind the 5.25-inch drive bay, fan 2 in the middle, and fan 3 closest to the PCI backplane. See "Air Flow and Fans" on page 22 for a diagram of the fan locations.

Checking and Setting the Fan Speed

To check the fan speed, enter this command:

```
Ctrl+t fan
```

If you see the letter `n`, the fans are running at their normal speed. If you see the letter `h`, the fans are running at high speed. Be aware that if the fans are running at high speed it could be because one of the fans has failed or the ambient air temperature is over 83.3˚ F (28.5˚ C) and the MSC has automatically increased the speed of the fans to compensate. You should inspect the system to make sure all the fans are running properly, that airflow through the system is not blocked, and that the temperature of the air where the Origin200 server is installed is within proper specifications. To determine the proper ambient air temperature, see "Physical and Environmental Specifications" in Chapter 1.

To run the speed the fans at high speed, enter this command:

```
Ctrl+t fan h
```

To run the speed the fans at low speed, enter this command:

```
Ctrl+t fan n
```

Checking If the System Is On or Off

To check if the system is on or off, enter this command:

```
Ctrl+t pwr
```

If you see the letter `u`, the power supply is on (sending power to the drives, PCI boards, fans, and logic carrier). If you see the letter `d`, the power supply is sending only 5 V to the MSC and the reset of the system is off.

Powering the System On and Off

To turn on power to the system (drive, CPU, memory, PCI cards, and so forth), enter this command:

```
Ctrl+t pwr u
```

To turn off power to the system, enter this command:

```
Ctrl+t pwr d
```

Be aware that the power-off command does not halt the operating system (IRIX) and applications gracefully. To shut the system down gracefully, first shut down the operating system, then turn off power. See "Turning the System On and Off."

Causing the System to Power-On Automatically

You can set the MSC to turn on power to the system automatically when the master power switch is turned on. (By default, the MSC does not turn on power to the system until you either press the front power switch, or issue a *pwr u* command through the AUX port.)

To cause the system to power on automatically, enter this command:

```
Ctrl+t aut 1
```

To cause the MSC to wait for you to press the front panel switch (or issue a *pwr u* command), enter this command:

```
Ctrl+t aut 0
```

To find out the current setting (automatic power on or not), enter this command:

```
Ctrl+t aut
```

You see `0` if the system is not set to power on automatically, and `1` if the system is set to power on automatically.

Note: Setting the system to automatically power on does not cause it to boot to IRIX. To cause the system to automatically load IRIX, set the PROM environment variable AutoLoad to "yes." See prom(1) for complete information about the system PROM.

Resetting the System

To reset the system, use this command:

```
Ctrl+t rst
```

MSC Error Messages

Many of the commands display the text `ok` if they succeed. If there is a problem, the MSC prints the error messages shown in Table 4-4 when you enter incorrect commands:

Table 4-4 Module System Controller (MSC) Error Messages

Message	Meaning
err perm	You do not have permission to use this command. You must enter Supervisor mode with *pas* in order to use this command.
err cmd	The command you entered is not valid, or you typed the command incorrectly.
err arg	The argument you gave with a command is not valid, or you typed it incorrectly.

MSC Command Reference

The module system controller (MSC) accepts the commands: shown in Table 4-5.

Table 4-5 Module System Controller (MSC) Commands

Command	Function
aut	Displays `0` if the system is not set to automatically power on and `1` if the system is set to automatically power on. The default is 0.
aut 0	Do not power on automatically when the master power switch is turned on. The MSC waits for an explicit power-on command (either from the front panel or via the *pwr* command) when the master power switch is turned on. This is the default setting.
aut 1	Automatically powers on the system (applies power to the logic carrier, PCI backplane, fans, SCSI devices) after the master power switch is turned on. Does not wait for the front panel switch to be pressed or for a *pwr* command via the AUX port.

Table 4-5 (continued) Module System Controller (MSC) Commands

Command	Function
clr	Resets all MSC options to their power-on defaults. This includes echo mode, no heartbeats, and so forth.
ech 0	Turns off echoing as MSC commands are entered; what you type does not appear onscreen.
ech 1	Turns on echoing. You see what you type.
ech	Toggles the echoing. (Echoing is on by default after the system is reset.)
fan	Checks the speed of the fans. The command displays an `n` if the fans are operating at a normal speed, and an `h` if the fans are operating at a high speed. Note that the MSC automatically switches the fan speed to high if one of the fans fails or if the ambient air temperature is between 83.3˚ F (28.5˚ C) and 104˚ F (40˚ C).
fan n	Sets the fans to run at normal speed.
fan h	Sets the fans to run at high speed.
nmi	Sends a hardware nonmaskable interrupt (NMI) to the system.
pas *xxxx*	Enters Supervisor mode; *xxxx* is the four-character password for your system. All Origin200 servers ship with the word “none” as the default password.
pas s *xxxx*	Sets the password to *xxxx*. Note that the password must be exactly 4 characters long.
pwr	Displays `u` if the power is on and `d` if the power is off.
pwr u	Turns on power to the drives, logic carrier, fans, and PCI boards.
pwr d	Turns off power to the drives, logic carrier, fans, and PCI boards.
pwr d *N*	Waits *N* seconds and then powers the system off. *N* is a hexadecimal value from 5 to 258 (5 to 600 decimal).
pwr c *N*	Waits *N* seconds and then powers the system on. *N* is a hexadecimal value from 5 to 258 (5 to 600 decimal).
rst	Sends a hardware reset to the system.
sel cpu	Selects the CPU to receive input from the MSC. Anything typed on the MSC that is not an escaped command is sent through to the selected CPU. CPUs are named by module and slice. For example, **`sel 1a`** selects CPU A in module 1 for input, and **`sel 2b`** selects CPU B in a second (slave) module.

Table 4-5 (continued) Module System Controller (MSC) Commands

Command	Function
sel	Displays which CPU is currently selected to receive MSC input. Prints `none` if no CPU is selected.
sel auto	The last CPU to have output anything is automatically selected to receive MSC input (this is the power-on default).
see cpu	No CPU is selected to receive MSC input.
see	Discards output from all CPUs other than a specific CPU (ordinarily, the output from all CPUs is displayed intermixed by line). CPUs are named by module and slice. For example, **`see 2a`** shows only CPU 2A's output.
see all	Displays output from all CPUs (this is the power-on default).
tmp	Displays `n`, `o`, or `h`, indicating whether the system is running at a normal temperature, over-temperature, or dangerously high temperature, respectively.
ver	Reports the MSC firmware revision number.

Determining the Devices Installed on Your Server

Because the Origin200 server, like the rest of the Origin product line, is a highly configurable multimodule system, there are some differences in the way that devices are identified and configured from prior Silicon Graphics workstations and servers.

You can still use the *hinv* command to list devices installed in the system. However, there is a new tool available, the */hw* filesystem, and some things to be aware of regarding the way devices are detected and numbered.

How Devices Are Detected and Numbered

When the system boots, it probes all of the attached hardware. As it enters multiuser mode, it runs the *ioconfig* utility, which examines the */hw* filesystem (described in the next section, "How to Use the Hardware Graph") to assign unique controller numbers for each device it finds. The results of this process are stored in the file */etc/ioconfig.conf*, which maps logical controller numbers to device names.

Be aware of the following:

- When the system boots and probes hardware, there is no guarantee that it will detect devices in a particular order (except for certain fixed devices in the master module, such as the console serial port, SCSI controllers 0 and 1, and the primary Ethernet port).
- When you remove devices from the system, the logical controller numbers are not automatically removed from */etc/ioconfig.conf*.

You can change the way that devices are numbered by editing the file */etc/ioconfig.conf*. See ioconfig(1M) for more information.

How to Use the Hardware Graph

The hardware graph is a tool for inventorying the I/O devices on all Silicon Graphics Origin and Onyx2 systems. Unlike *hinv*, the hardware graph is an IRIX filesystem, whose branching character accommodates the possibility of multiple nodes, each with multiple I/O devices of several types. The hardware graph keeps track of information in the kernel that is associated with the hardware.

Most of the hardware graph directories are much like their */dev* counterparts, but module numbers are persistent across reboots and hardware changes (until you change the module numbers).

To see the hardware graph, use the *ls* command. For example:

```
# ls /hw
console       input2        mmem          scsi          zero
cpunum        kmem          module        scsi_ctlr
disk          machdep       nodenum       tape
external_int  mem           null          ttys
input         midi          rdisk         unknown
```

The contents of the directories can be either IRIX special device files or subdirectories. In this output, for example, `ttys`, `scsi`, `rdisk`, and `scsi_ctrl` are subdirectories containing files:

```
# ls /hw/ttys
tty4d1   tty4f1   tty4m1   ttyc1   ttyd1   ttyf1   ttym1   ttymidi1
tty4d2   tty4f2   tty4m2   ttyc2   ttyd2   ttyf2   ttym2   ttymidi2
tty4d3   tty4f3   tty4m3   ttyc3   ttyd3   ttyf3   ttym3   ttymidi3
tty4d4   tty4f4   tty4m4   ttyc4   ttyd4   ttyf4   ttym4   ttymidi4
```

```
# ls /hw/scsi
sc0d1l0  sc0d2l5  sc0d4l2  sc0d5l7  sc1d3l4  sc2d2l1  sc2d3l6  sc2d5l3
sc0d1l1  sc0d2l6  sc0d4l3  sc1d1l0  sc1d3l5  sc2d2l2  sc2d3l7  sc2d5l4
sc0d1l2  sc0d2l7  sc0d4l4  sc1d1l1  sc1d3l6  sc2d2l3  sc2d4l0  sc2d5l5
sc0d1l3  sc0d3l0  sc0d4l5  sc1d1l2  sc1d3l7  sc2d2l4  sc2d4l1  sc2d5l6
sc0d1l4  sc0d3l1  sc0d4l6  sc1d1l3  sc2d1l0  sc2d2l5  sc2d4l2  sc2d5l7
sc0d1l5  sc0d3l2  sc0d4l7  sc1d1l4  sc2d1l1  sc2d2l6  sc2d4l3  sc2d6l0
sc0d1l6  sc0d3l3  sc0d5l0  sc1d1l5  sc2d1l2  sc2d2l7  sc2d4l4  sc2d6l1
sc0d1l7  sc0d3l4  sc0d5l1  sc1d1l6  sc2d1l3  sc2d3l0  sc2d4l5  sc2d6l2
...
```

```
# ls /hw/rdisk
dks1d2s0       dks1d2vh       root           volume_header
dks1d2s1       dks1d2vol      swap
```

```
# ls /hw/scsi_ctlr
0  1  3  4
```

To determine the number of nodes present in the system, enter

```
# ls /hw/module
1  2
```

This indicates two nodes.

Modules and slots are numbered with base 1; PCI slots are numbered with base 0. Nodes are numbered 1 and 2. The hardware graph lists only devices actually present, skipping the numbers of unfilled slots.

To determine I/O devices of the module, follow the directory structure. Figure 4-8 shows a simplified example of a */hw/module* filesystem with two nodes (modules); in the second module, there are two CPUs and one XIO board.

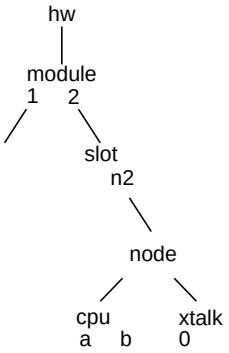

Figure 4-8 Example */hw* Filesystem

For example:

```
# ls /hw/module/1/slot/n2/node/link/cpu
0  1
# ls /hw/module/1/slot/n2/node/link/xtalk
0
```

To see connectivity of an I/O device, use *ls* in the */link* subdirectory with the **-l** flag. For example, determine the links present in the system:

```
# ls -l /hw/module/1/slot/n1/node/link
1  2  3  5  6
```

Chapter 5

Origin200 Cosmetic Features and Covers

This chapter describes the various covers and doors on an Origin200 system and how to use them. It also describes how to remove various exterior components.

Chapter 5

Origin200 Cosmetic Features and Covers

This chapter describes the covers, doors, and other cosmetic features of the Origin200 server:

- "Locking the System" on page 113
- "Adjusting the Feet" on page 115
- "Removing the Front Door" on page 116
- "Removing the System Cover and Chassis Access Door" on page 118
- "Removing the Side Panel, Feet, and Exterior Plastic Parts of a Tower System" on page 121

Locking the System

The Origin200 provides two mechanisms to physically lock the system:

- a key lock on the front door
- removable tabs to lock the chassis cover

Both of these mechanisms are designed to provide enough security for your system that, if it is locked, the only way to remove components from the server, or to move it, is to destroy some part of the server.

Locking the Front Door

To lock the front door, follow these steps:

1. Insert one of the keys (provided with the system) into the lock on the front door.
2. Turn it 1/4 turn (90-degrees) to the right (clockwise).
3. Remove the key.

Locking the Chassis

To lock the chassis, use the two metal tabs that are provided with the system. Figure 5-1 provides an overview of the process.

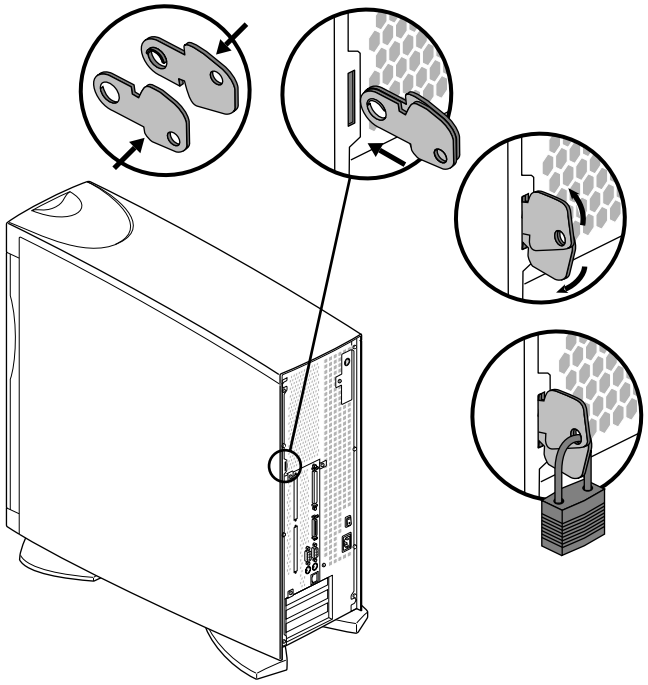

Figure 5-1 Locking the Chassis With the Locking Tabs

Follow these steps to lock the chassis (refer to Figure 5-1).

1. Place the two locking tabs together, flat, so that the pivot points join.
2. Insert the two tabs into the tab slot at the rear of the chassis.
3. Spread tabs apart in a scissor-like fashion so that the two exposed holes in the tabs align.
4. Insert a lock, cable, or other device through the holes in the tabs.

Adjusting the Feet

Both the front and rear feet on an Origin200 server in a tower configuration can be swiveled in or out. See Figure 5-2.

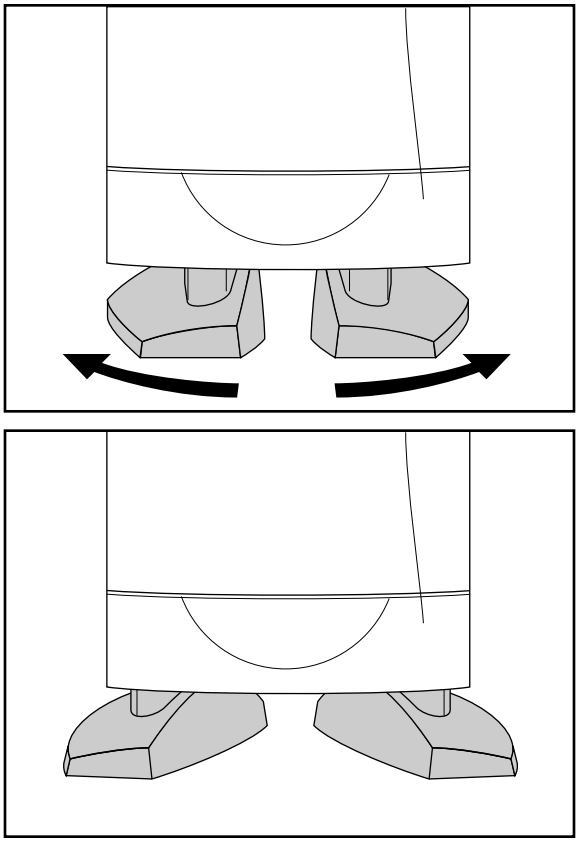

Figure 5-2 Adjusting the Feet

To adjust the feet:

1. Raise the server slightly, or tilt it to one side.
2. Rotate the feet inward or outward, as desired.

Removing the Front Door

The front door of an Origin200 server has several features:

- In a tower configuration, the door is designed to release from its hinges if it is struck while open, or otherwise forced too far open.
- In a rackmount configuration, an additional spring-steel catch, called the door assist tab, holds the door in place when it is open.
- In both rackmount and tower configurations, the door can be removed and reattached easily without tools.

To remove the front door in a tower configuration, press down on the top of the door and pull outward, as shown in Figure 5-3:

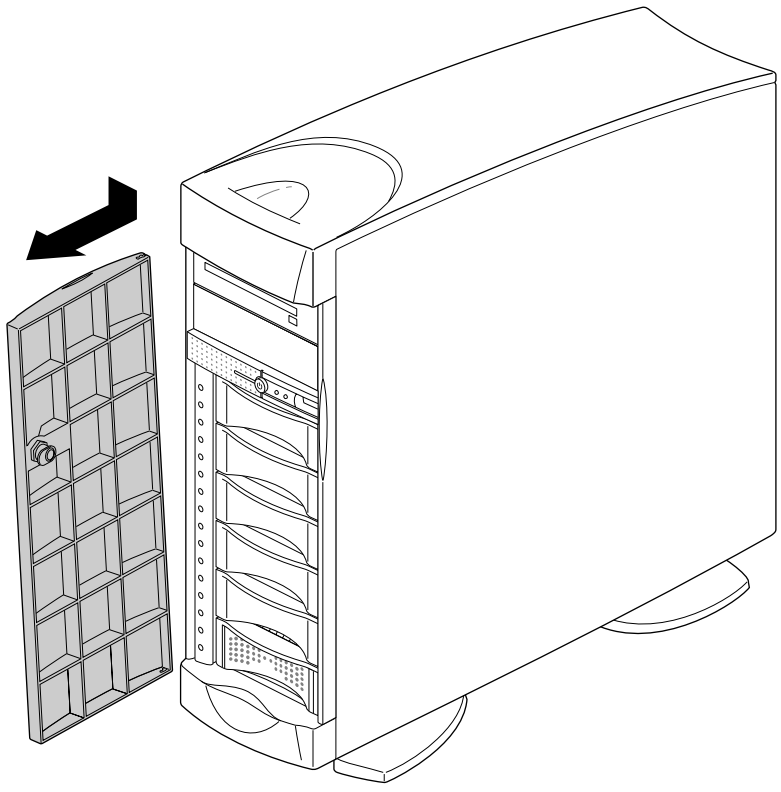

Figure 5-3 Removing the Front Door, Tower Configuration

To remove the front door in a rackmount configuration, follow these steps:

1. Lift the door assist tab (catch), as shown in Figure 5-4.
2. Pull one side of the door off its hinge.

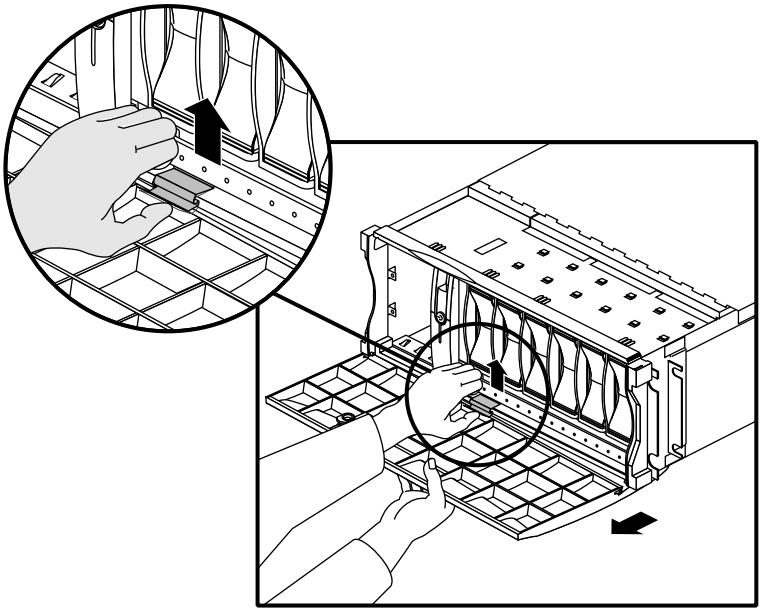

Figure 5-4 Removing the Front Door, Rackmount Configuration

Removing the System Cover and Chassis Access Door

Caution: Because of the weight of an Origin200 system, two people are required to lift and move the chassis.

To remove the system cover and chassis access panel of an Origin200 server, follow these steps:

1. Power off the system. See "Turning Off the System" on page 83.
2. Remove the system cover, as shown in Figure 5-5.
   - Using a #2 Phillips screwdriver, remove the two screws that secure the side panel to the chassis.
   - Pull the rear edge of the side panel away from the rear of the system.
   - Slide the system cover back and off the system.

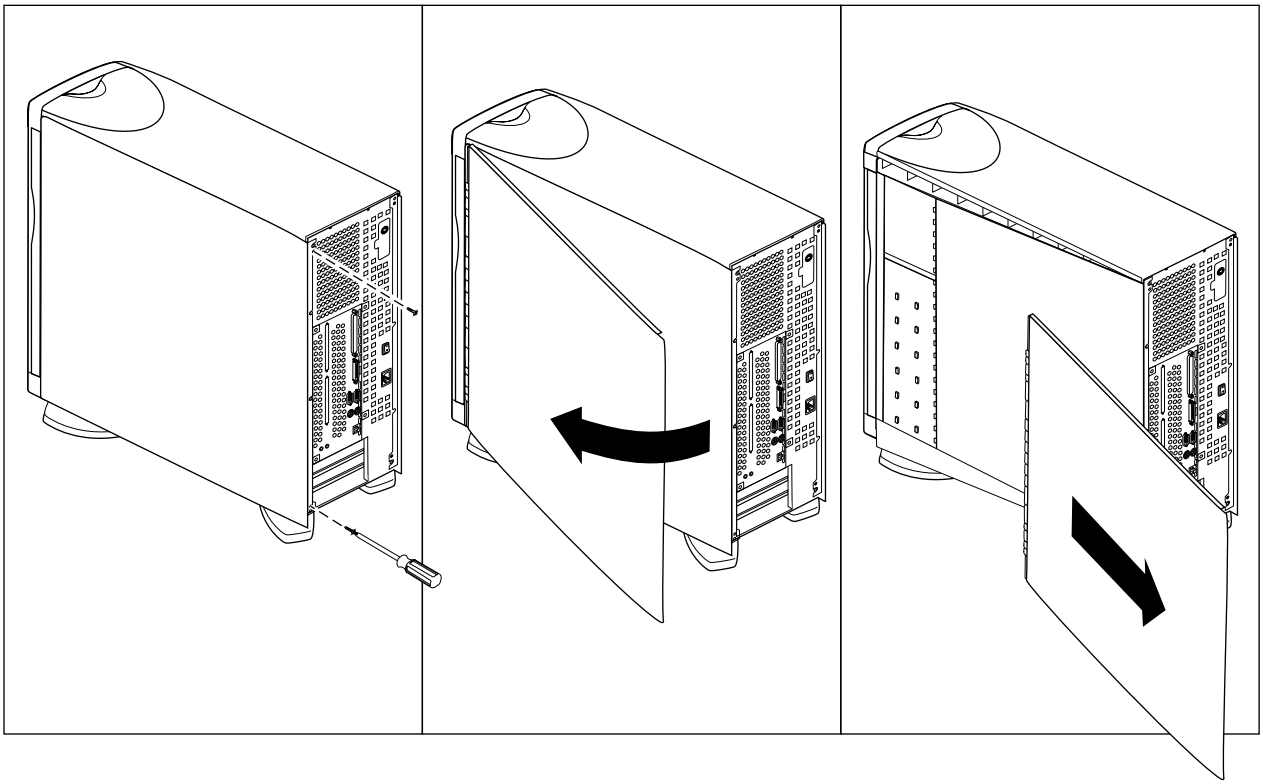

Figure 5-5 Removing the System Cover, Tower Origin200 System

3. Open the chassis access door, as shown in Figure 5-6.
   - Using a #2 Phillips screwdriver, remove the four screws that secure the door to the chassis (two at the rear of the door and two near the door hinge).
   - Swing the door out, away from the chassis.
   - *Optional*: You can remove the door by lifting it up slightly and away from the chassis. In some cases, it may be easier to service the Origin200 if you remove the chassis access door.

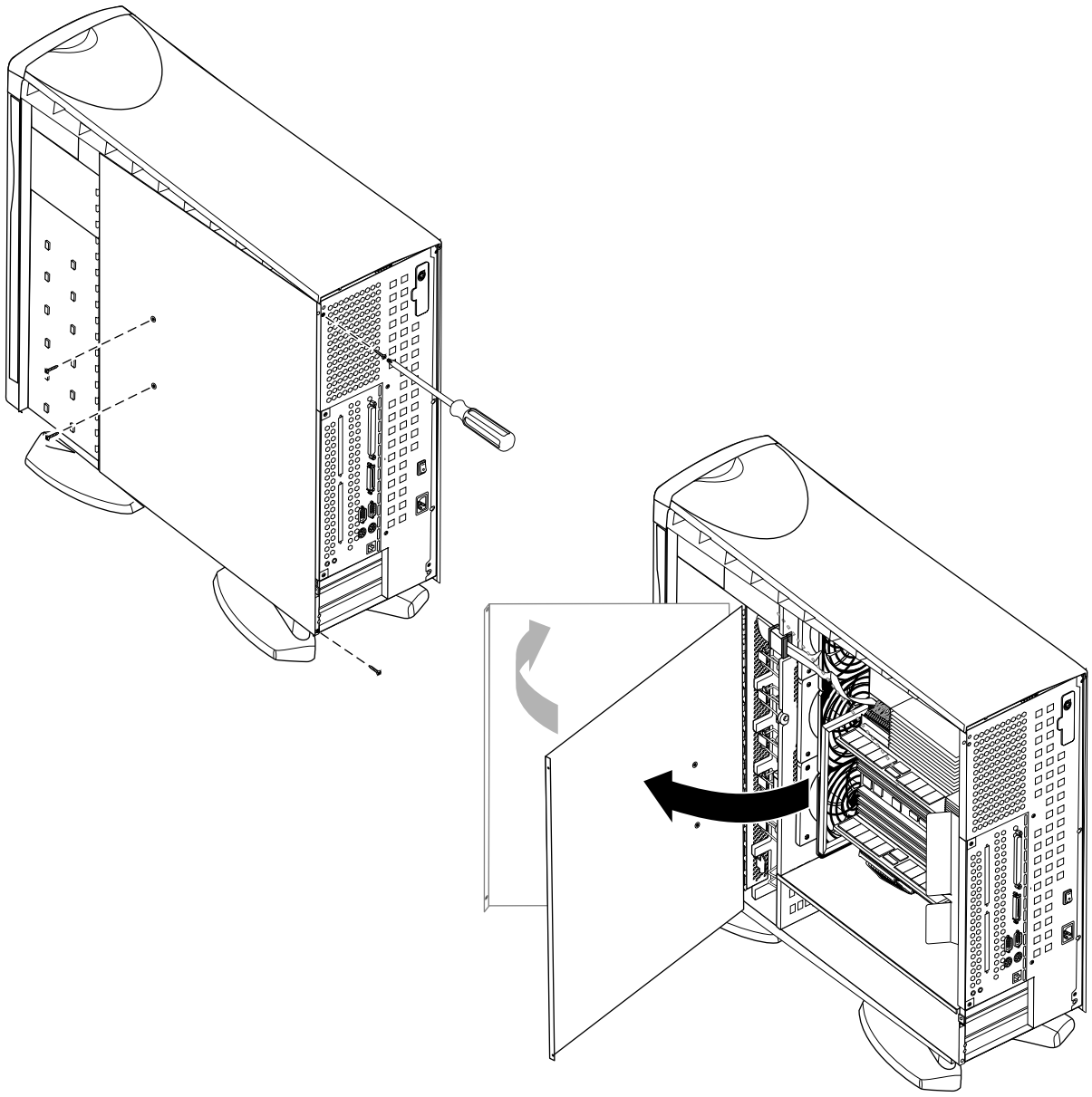

Figure 5-6 Opening the Chassis Access Door, Tower Origin200 System

Removing the Side Panel, Feet, and Exterior Plastic Parts of a Tower System

If desired, you can remove the feet, system cover, side panel, and most of the exterior plastic parts from an Origin200 server in a tower configuration. With the addition of rackmounting ears, you can then mount the server in a standard, 19-inch equipment rack.

A kit is available from Silicon Graphics (P-S-RM-KIT) that converts a tower configuration to a rackmount configuration. This kit provides rackmounting ears, a rackmounting shelf, a door-assist tab, mounting screws, and cosmetic end-caps to cover the mounting screws. Contact Silicon Graphics or your local service provider to obtain this kit.

The following sections describe how to remove various exterior parts of an Origin200 server in a tower configuration.

Preparing to Remove Components

Before you remove exterior components:

- Remove the front door; see "Removing the Front Door" on page 116.
- Remove all drives from the system to make it easier to move and lift; see Chapter 8, "Installing and Configuring Peripherals."
- Remove the system cover and side panel. The side panel is removed in the same way as the system cover; see "Removing the System Cover and Chassis Access Door" on page 118. (Do not remove the chassis access door.)

Removing the Feet and Exterior Plastic Parts

Follow these steps to remove the feet, top cap, and lower bezel:

1. Remove the top cap, as shown in Figure 5-7.
   - Insert a flat-blade screwdriver between the top cap and sheet metal, as shown in Figure 5-7.
   - Twist the screwdriver while pulling the top cap forward. The top cap should move forward slightly as one side disengages from the sheet metal.
   - Repeat this step on the opposite side of the top cap, as shown in Figure 5-7.
   - When the second side of the top cap disengages from the sheet metal, pull the top cap forward, then lift it up and off of the chassis.

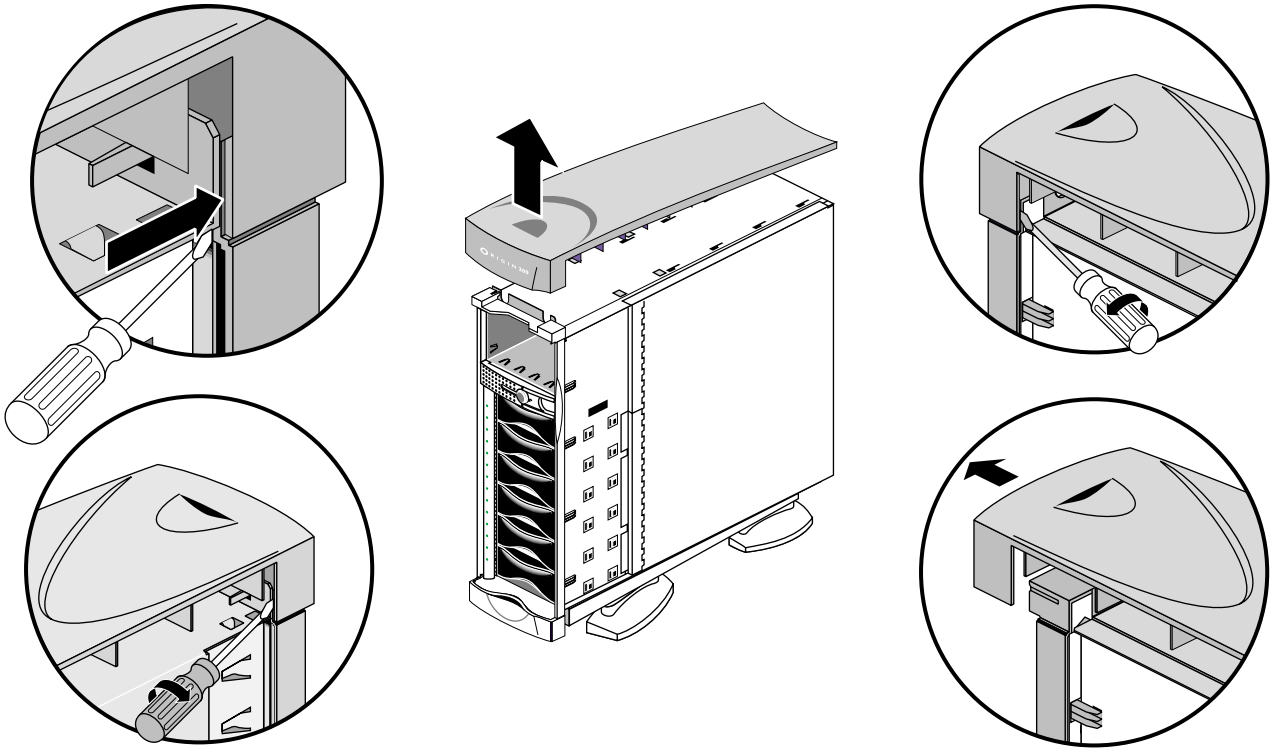

Figure 5-7 Removing the Top Cap

2. Remove the lower bezel.
   - Insert a flat-blade screwdriver between one side of the lower bezel and the sheet metal, as shown in Figure 5-8.
   - Twist the screwdriver to disengage the lower bezel from the sheet metal.
   - Pull off the lower bezel.

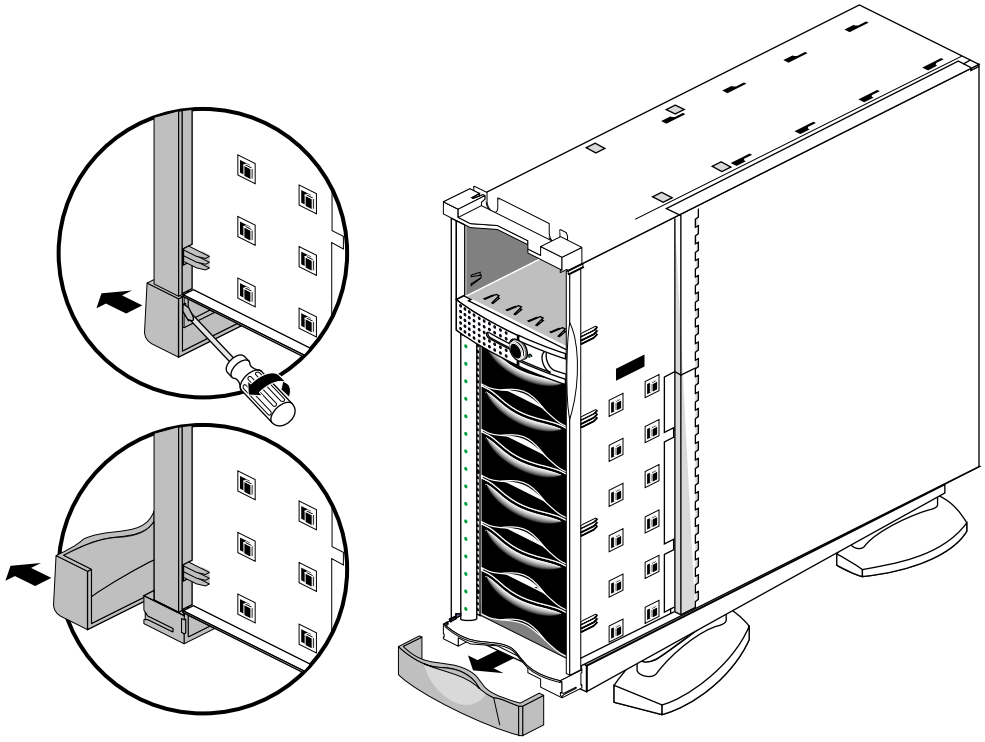

Figure 5-8 Removing the Lower Bezel

3. Remove the pedestal assembly (to which the feet are attached). See Figure 5-9.
   - Place the system on its side on a sturdy work surface capable of supporting at least 40 pounds (18 kg) and up to 75 pounds (34 kg). Be careful not to scratch or damage the front bezel.
   - Using a #2 Phillips screwdriver, remove the four screws that hold the pedestal assembly to the chassis and remove the pedestal assembly.

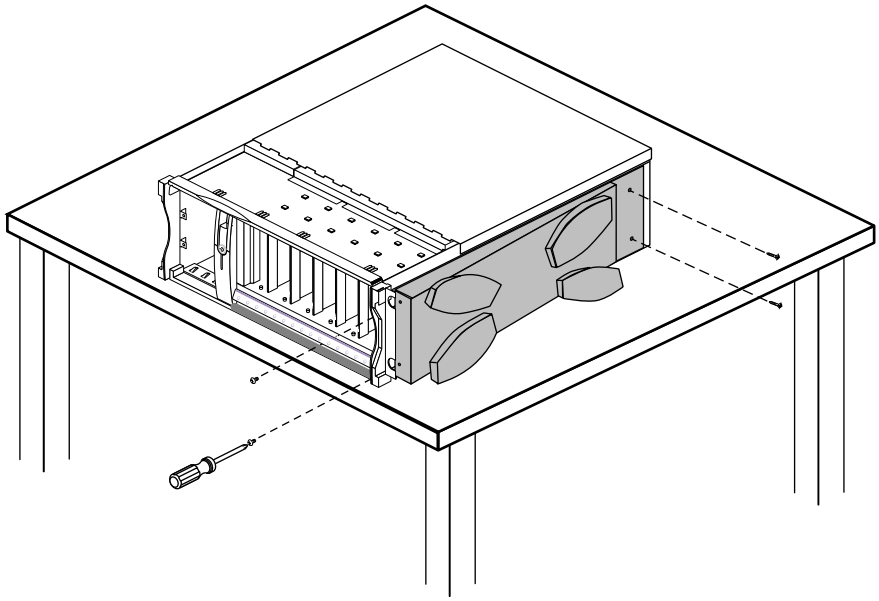

Figure 5-9 Removing the Pedestal Assembly (Feet)

Chapter 6

Installing and Removing Memory

This chapter describes how to install and remove memory.

Chapter 6

Installing and Removing Memory

This chapter describes how to install and remove dual in-line memory modules (DIMMs) in a Origin200 server:

- "Handling Precautions" on page 127
- "About Origin200 Memory" on page 128
- "Installing Memory" on page 128
- "Verifying That Installed Memory Is Recognized by the System" on page 133
- "Removing Memory" on page 134

Handling Precautions

Memory is extremely sensitive to electrostatic discharge (ESD). Observe the following precautions when installing and removing memory:

- Handle the DIMMs by their edges only and do not touch the gold connector pads.
- Handle DIMMs with care. Do not toss them roughly onto hard surfaces, such as tables or other equipment.
- Do not leave DIMMs loose inside the chassis while you work.
- When you are not handling DIMMs for installation or removal, always keep them in ESD containers, such as conductive bags or foam.
- Save the ESD bags or containers in which the memory option was shipped in case you need to remove the DIMMs from the system.

About Origin200 Memory

Observe these rules about installing DIMMs:

- DIMMs must be installed in pairs.
- Each DIMM of a pair must be the same size (for example, 32 MB, 64 MB, and so on).
- You can mix memory sizes between banks. In other words, bank 1 can have a pair of 32 MB DIMMs while bank 2 has a pair of 64 MB DIMMs and bank 3 has another pair of 32 MB DIMMs.
- Each module must have memory installed (32 MB minimum per module).

Installing Memory

Follow these steps to install memory in an Origin200 server.

1. Shut down the system completely. See "Turning Off the System" in Chapter 4.

   Be sure to turn off the master power switch.

2. Prepare the system for servicing.
   - Disconnect any cables from the rear of the chassis.
   - If you have to move the system, you may find it easier to lift and carry if you remove the disk drives first.
   - If the system is mounted in an equipment rack, remove it from the rack and place it on a sturdy work surface. See "Removing a Server From an Equipment Rack" in Chapter 3.
3. Open the system.
   - If the system is in a tower configuration, remove the side panel. See "Removing the System Cover and Chassis Access Door" on page 118.
   - Remove the chassis access panel (tower and rack systems). See "Removing the System Cover and Chassis Access Door" on page 118.
   - If the system is in a tower configuration, place it on its side on a sturdy work surface.

4. Attach a grounding strap to your wrist as shown on the wrist-strap package, and in Figure 6-1.

   All Silicon Graphics options, including memory, are shipped with wrist straps to help prevent damage to components from static electricity.

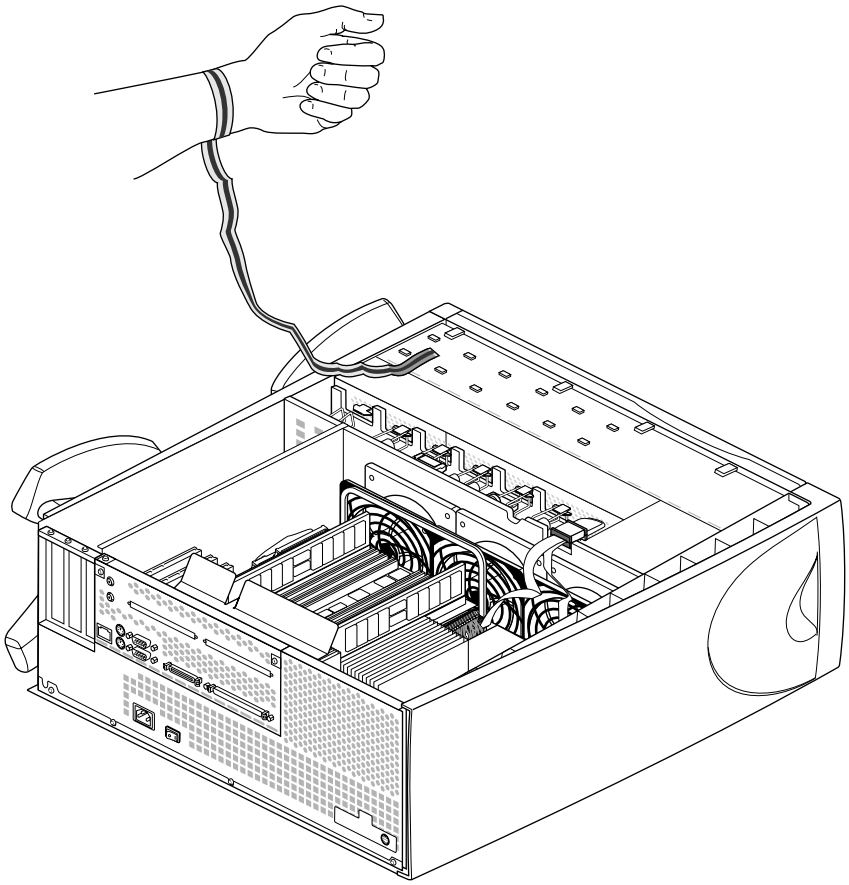

Figure 6-1 Attaching a Grounding Wrist Strap

5. Locate the DIMM slots. See Figure 6-2.

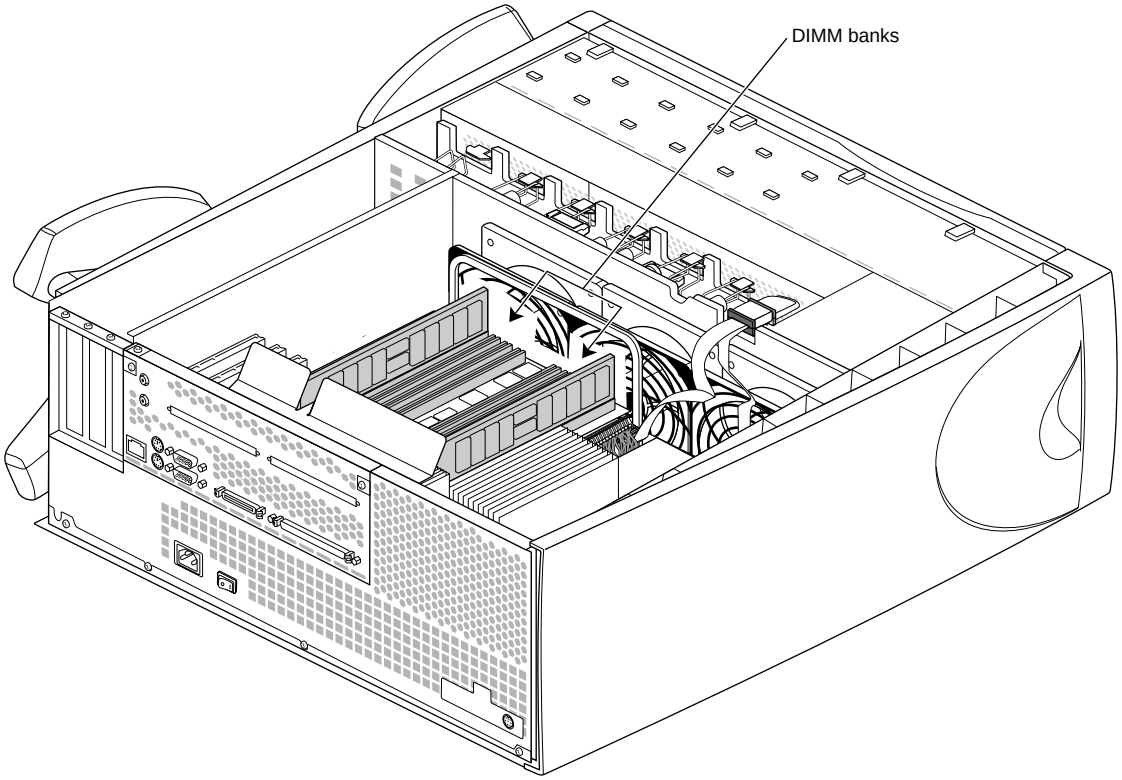

Figure 6-2 Locating DIMMs in the Origin200 Server

6. Install DIMMs in pairs, starting with the pair farthest away from the center of the banks and working inward. Figure 6-3 shows the grouping of DIMM pairs:

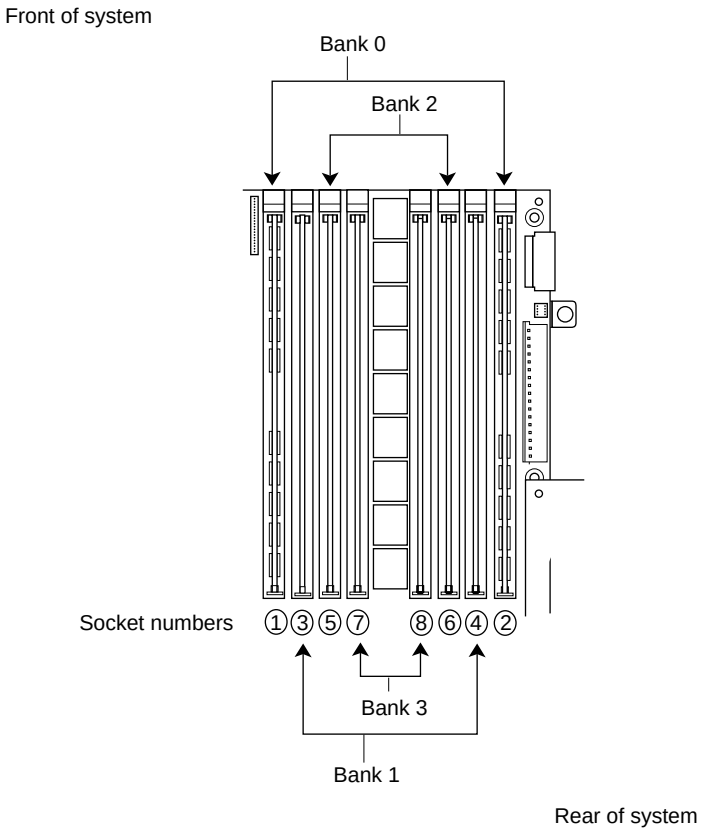

Figure 6-3 How DIMM Pairs Are Grouped in the Origin200 Server

- Figure 6-3 shows one pair of DIMMs installed in bank 0 (all modules must have memory in bank 0; if you have a two-module system, both must have memory in bank 0).
- If you are installing one additional pair of DIMMs, install them in bank 1.
- Install a third pair of DIMMs in bank 2.
- Install a fourth pair of DIMMs in bank 3.

- Figure 6-4 shows how to insert a DIMM into its socket.

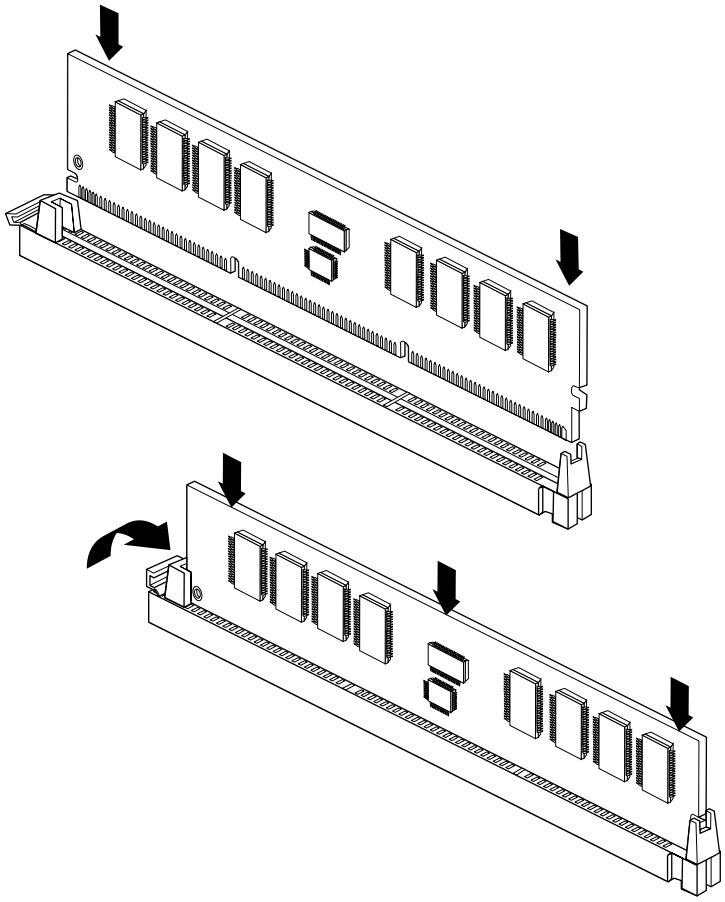

Figure 6-4 Installing a DIMM

- As you lower the DIMM into its socket, press down first on one side then the other to seat the DIMM (upper drawing).
- Press straight down across the entire top to make sure the DIMM is firmly seated. Avoid placing sideways pressure on the DIMM. The DIMM-release lever should move upward and towards the edge of the DIMM when it is completely seated.

7. After you have finished installing DIMMs, remove your wrist strap and reassemble the system.
   - Replace the chassis access door and side panel (the reverse of removing them).
   - Reattach the cables to the back of the system.

You are now ready to verify that the memory is recognized by the system.

Verifying That Installed Memory Is Recognized by the System

After you have installed memory, you can verify that it is recognized by the system. Follow these steps:

1. Log in to the server (as root, guest, or any account you wish).
2. At a shell prompt, enter the following command:

   ```
   hinv -t memory
   ```

   You should see a message similar to this:

   ```
   Main memory size: 128 Mbytes
   ```

   If you originally had 64 MB of memory and you installed an additional 64 MB, *hinv* should report that the system has 128 MB of memory.

If *hinv* does not report the correct amount of memory, it may be because one or more of the DIMMs you installed is not seated correctly. Shut down the system and reseat the DIMMs.

Removing Memory

Follow these steps to remove memory from an Origin200 server.

1. Shut down the system completely. See “Turning Off the System” in Chapter 4.
   - Be sure to turn off the master power switch.
2. Prepare the system for servicing.
   - Disconnect any cables from the rear of the chassis.
   - If you have to move the system, you may find it easier to lift and carry if you remove the disk drives first.
   - If the system is mounted in an equipment rack, remove it from the rack and place it on a sturdy work surface. See “Removing a Server From an Equipment Rack” in Chapter 3.
3. Open the system.
   - If the system is in a tower configuration, remove the side panel. See “Removing the System Cover and Chassis Access Door” on page 118.
   - Remove the chassis access panel (tower and rack systems). See “Removing the System Cover and Chassis Access Door” on page 118.
   - If the system is in a tower configuration, place it on its side on a sturdy work surface.

4. Attach a grounding strap to your wrist. Figure 6-5 shows an example of a disposable grounding strap.

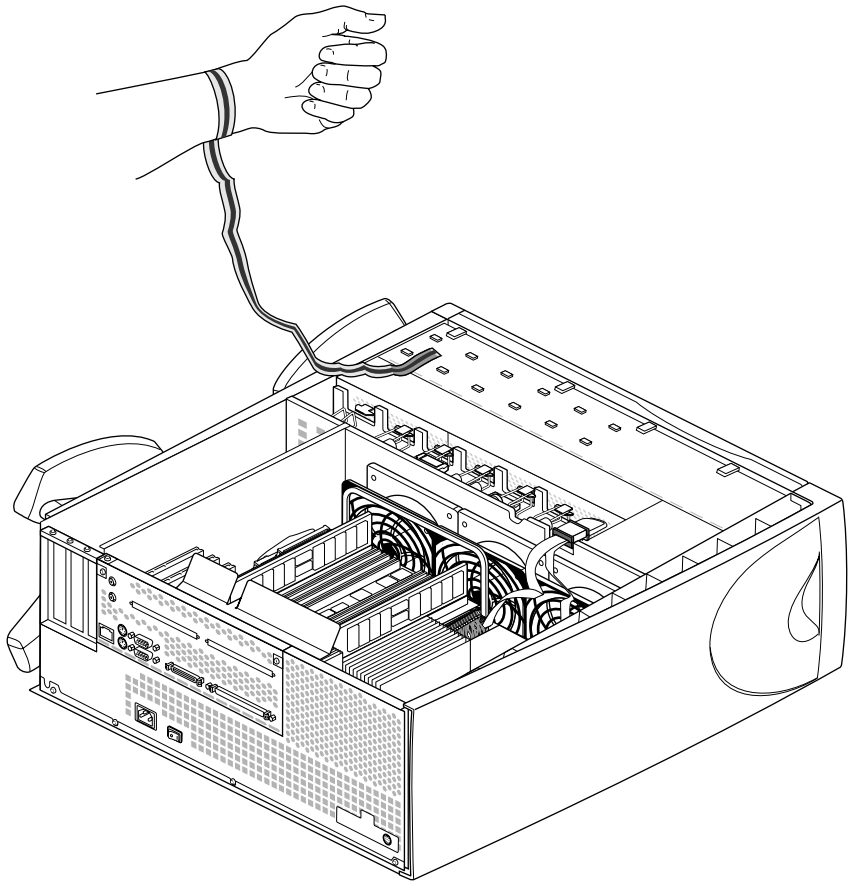

Figure 6-5 Attaching a Grounding Wrist Strap

5. Locate the DIMMs. See Figure 6-6.

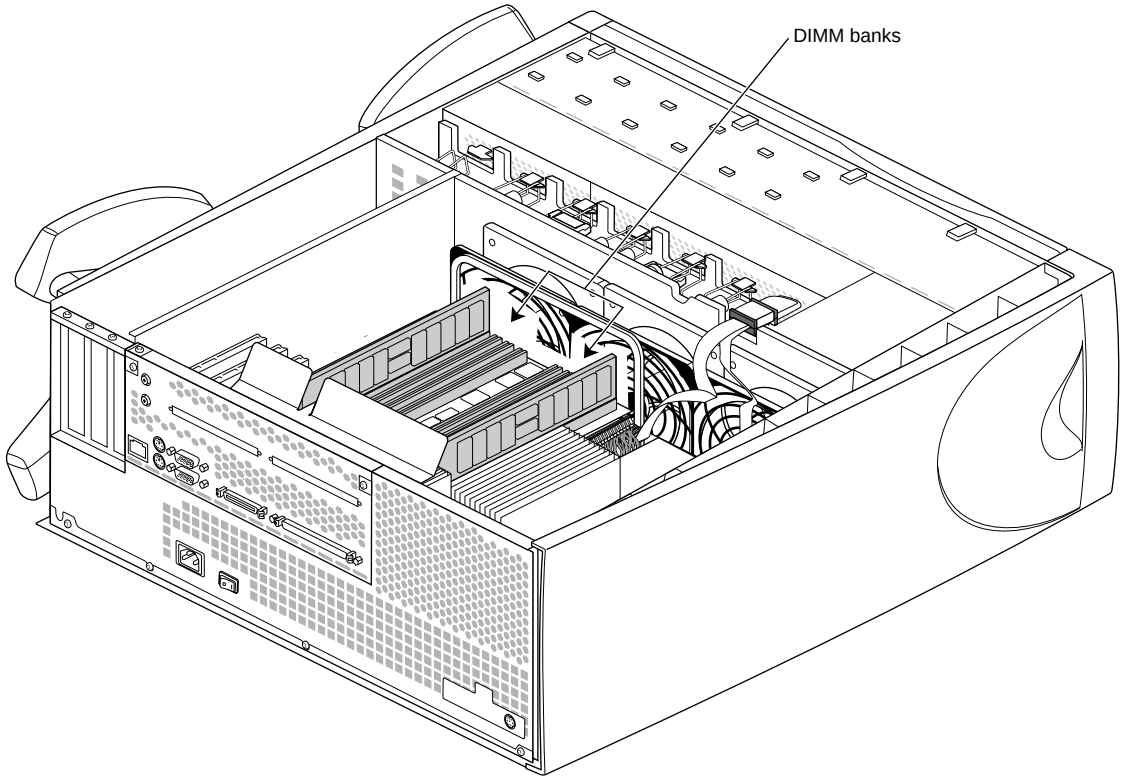

Figure 6-6 Locating DIMMs in the Origin200 Server

6. Always remove DIMMs in pairs. starting with the pair closest to the center of the banks (bank 3). See Figure 6-7.

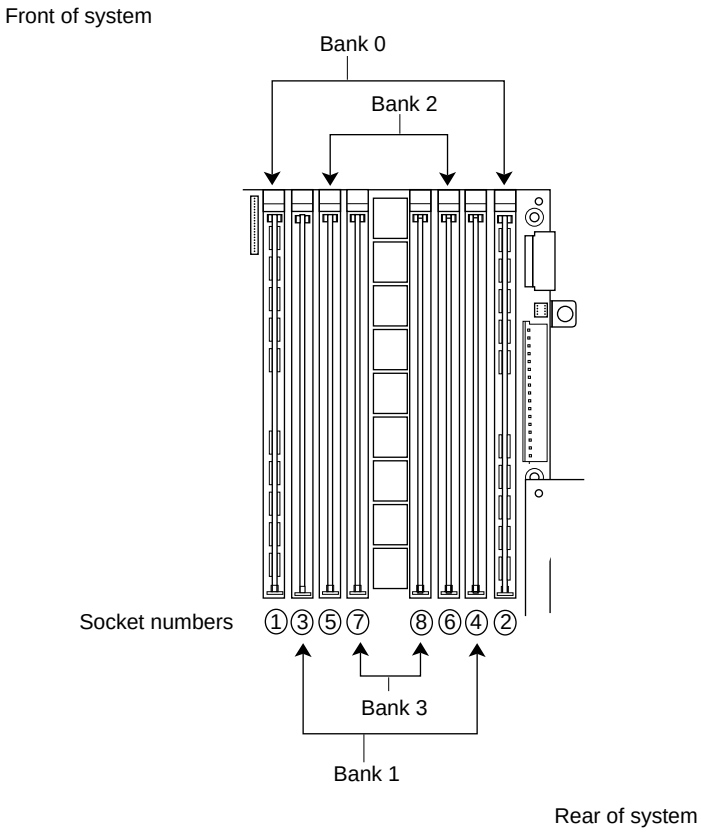

Figure 6-7 How DIMM Pairs Are Grouped In Origin200

- Start by removing bank 3, then bank 2, then bank 1. Do not skip banks.
- You must have at least one bank of memory installed in both modules in order for the system to operate. You cannot operate a two-module system unless there are DIMMs installed in both modules.
- Figure 6-8 shows how to remove the DIMMs from their sockets.

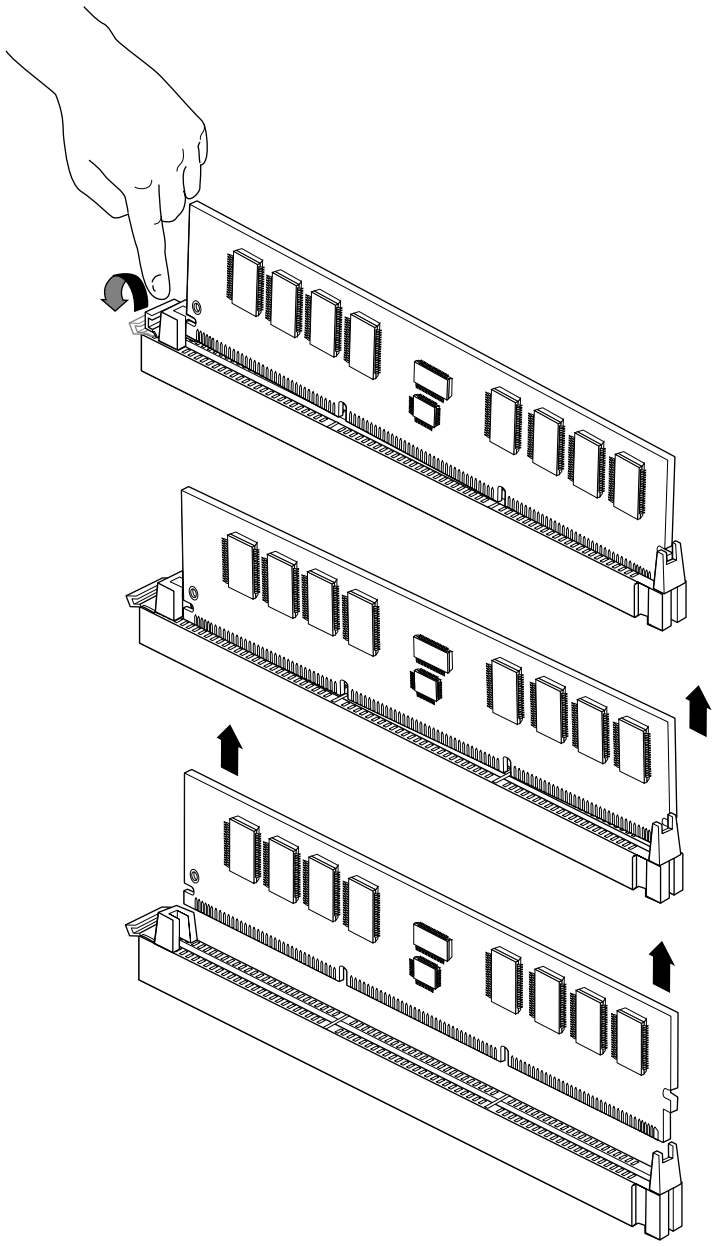

Figure 6-8 Removing DIMMs

- Press down on the release lever for the DIMM you want to remove.
- The lever raises the DIMM out of that side of its socket.
- Grasp the DIMM along the edges and pull it up out of its socket with an end-to-end rocking motion. (Avoid excess side-to-side motion, as this may damage the socket.)

7. After you have finished removing DIMMs, remove your wrist strap and reassemble the system.
   - Replace the chassis access door and side panel (the reverse of removing them).
   - Reattach the cables to the back of the system.

Chapter 7

Installing and Removing PCI Option Boards

This chapter describes how to install and remove PCI option boards.

Chapter 7

Installing and Removing PCI Option Boards

This chapter describes how to install and remove PCI option boards in an Origin200 server:

- "Handling Precautions" on page 143
- "Installing a PCI Option Board" on page 144
- "Removing a PCI Option Board" on page 152

Handling Precautions

Option boards are sensitive to electrostatic discharge (ESD). Observe the following precautions when installing and removing memory:

- Handle the boards by their edges only and do not touch the gold edge-connectors and components on the board.
- Handle boards with care. Do not toss them roughly onto hard surfaces, such as tables or other equipment. Many boards have fragile, surface-mount components on their undersides; these components can break off with rough handling.
- Do not leave the option boards loose inside the chassis while you work.
- When you are not handling them for installation or removal, always keep the option boards in ESD containers, such as conductive bags or foam.
- Save the ESD bags and containers in which the PCI option was shipped in case you need to remove the board from the system.

Installing a PCI Option Board

The following steps describe how to install a PCI option board into an Origin200 server.

1. Shut down the system completely. See "Turning Off the System" in Chapter 4.
   - Be sure to turn off the master power switch.
2. Prepare the system for servicing.
   - Disconnect any cables from the rear of the chassis.
   - If you have to move the system, you may find it easier to lift and carry if you remove the disk drives first.
   - If the system is mounted in an equipment rack, remove it from the rack and place it on a sturdy work surface. See "Removing a Server From an Equipment Rack" in Chapter 3.
3. Open the system.
   - If the system is in a tower configuration, remove the side panel. See "Removing the System Cover and Chassis Access Door" on page 118.
   - Remove the chassis access panel (tower and rack systems). See "Removing the System Cover and Chassis Access Door" on page 118.
   - If the system is in a tower configuration, place it on its side on a sturdy work surface.

- Attach a grounding strap to your wrist as shown on the wrist-strap package, and in Figure 7-1.

  All Silicon Graphics options, including PCI boards, are shipped with wrist straps to help prevent damage to components from static electricity.

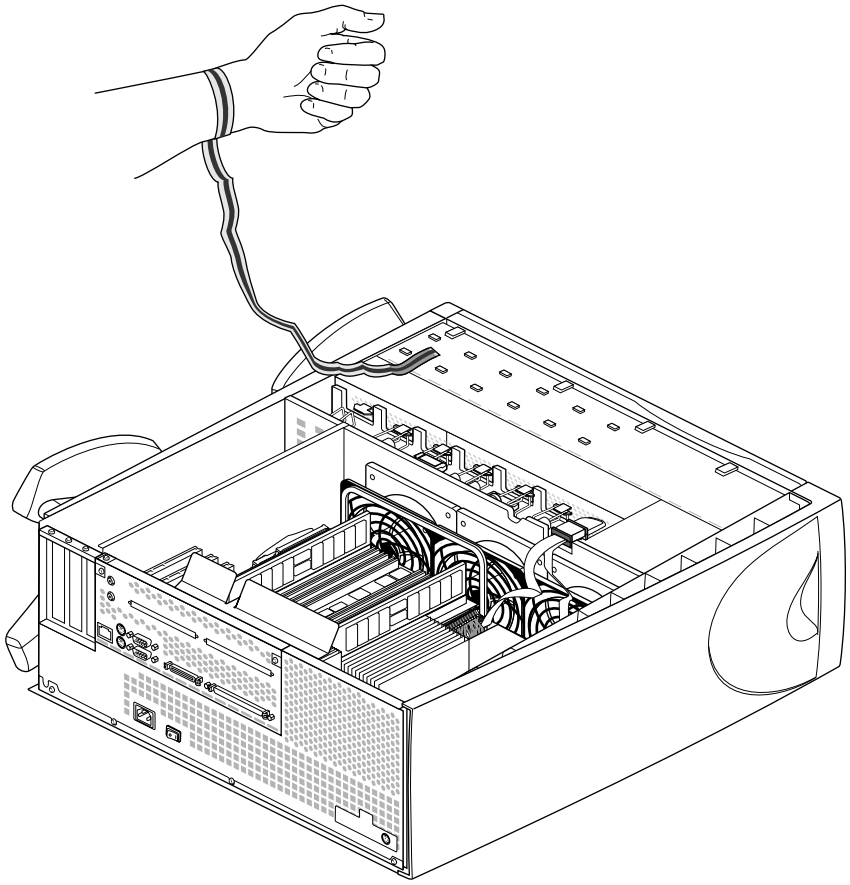

Figure 7-1 Attaching a Grounding Wrist Strap

4. Locate an available PCI option slot. See Figure 7-2.
   - Although you can install a PCI board in any open slot, you may observe better I/O performance if you install boards starting in order with slot 5, particularly if the PCI board you are installing can perform prefetching.

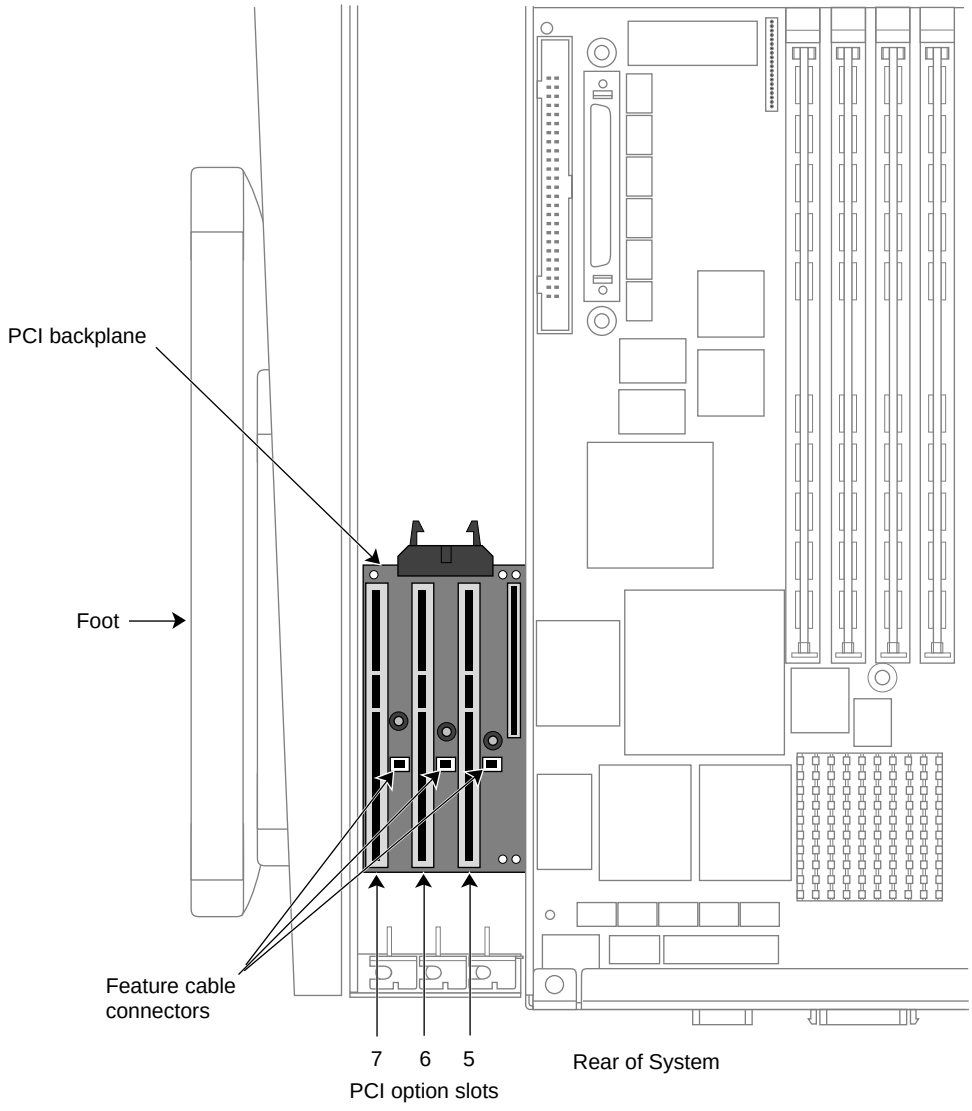

Figure 7-2 Locating the PCI Option Slots

5. Remove the blanking plate from the slot.
   - Using a #2 Phillips screwdriver, remove the single screw that secures the blanking plate to the chassis. See Figure 7-3.
   - Remove the blanking plate by lifting it straight up, as shown in Figure 7-3.

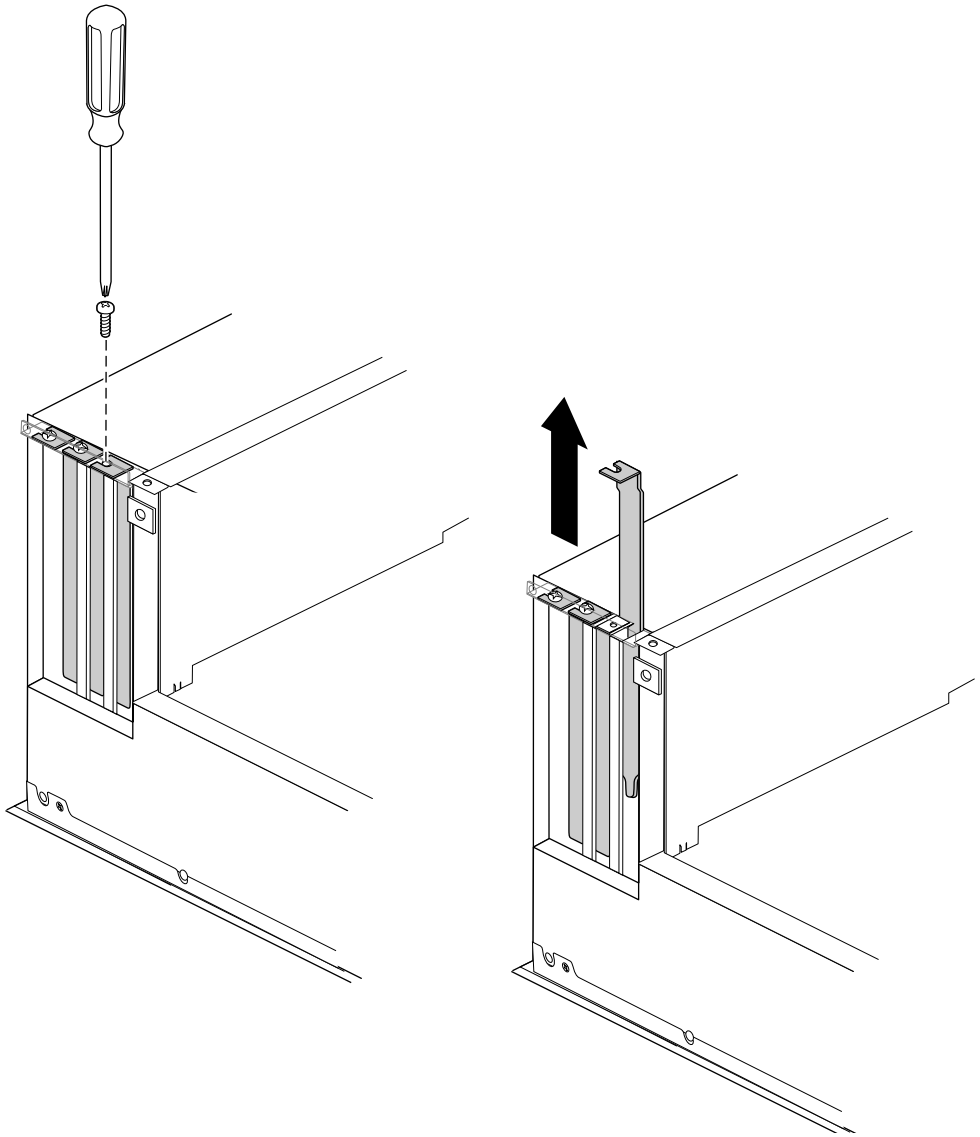

Figure 7-3 Removing a PCI Slot Blanking Plate

6. *For PCI boards with feature connectors only.* Some PCI boards from Silicon Graphics provide an extra connector for additional signals used for multimedia applications. To install such a board in an Origin200 server, you must install a cable from a connector on the board to the feature connector on the PCI backplane. If you are not sure if the PCI board you are installing uses a feature connector, refer to Figure 7-4.

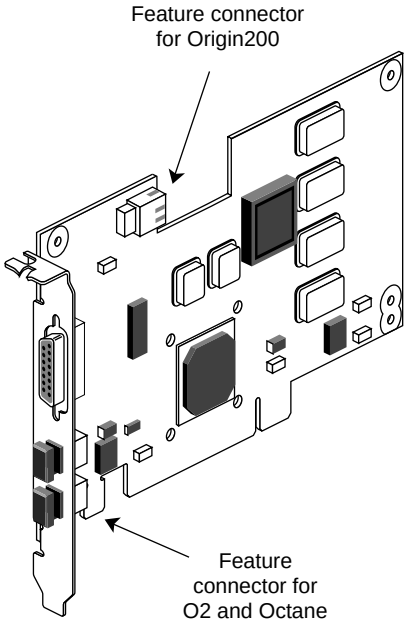

Figure 7-4 Example PCI Board With Feature Connectors

- Locate the feature-connector cable in the PCI board shipment. See Figure 7-5.
- Attach one end of the feature-connector cable to the connector next to the desired PCI slot on the Origin200 PCI backplane, as shown in Figure 7-5.

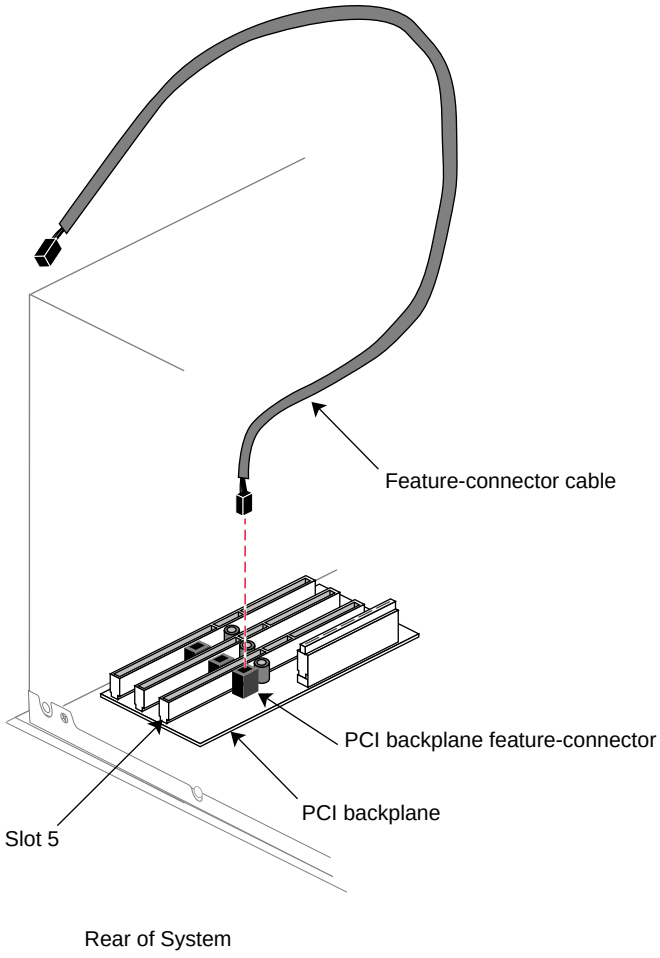

Figure 7-5 Attaching a Feature Connector Cable to the PCI Backplane

- Connect the other end of the cable to the Origin200 feature connector, as shown in Figure 7-6.

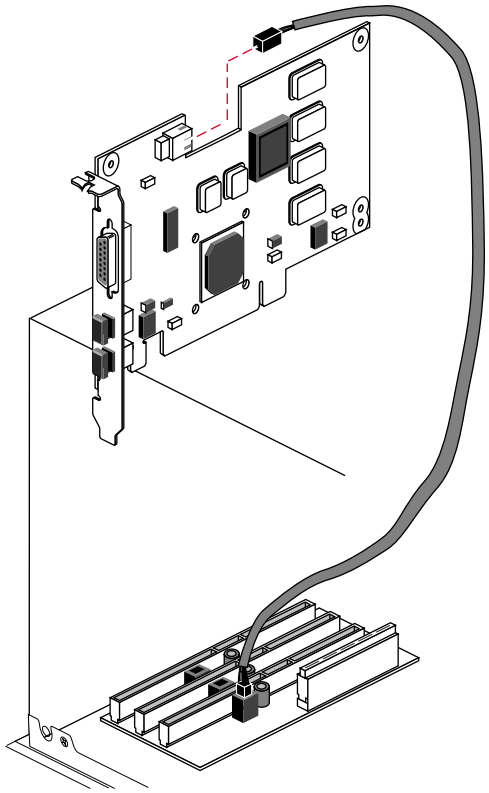

Figure 7-6 Attaching a Feature Connector Cable to the PCI Board

7. Install the PCI option board in the PCI slot.
   - Align the connector on the base of the PCI card with the PCI slot, as shown in Figure 7-7.
   - Press the card down into the slot until it engages. See Figure 7-7.
   - Be sure the tab at the bottom of the PCI card plate slides into the slot on the rear chassis wall.
   - Press firmly until the board is seated. You may find that a slight front-to-back rocking motion helps seat the board more easily.

- Be careful not to kink or damage the flexible EMI gasket that surrounds the inside of the rear chassis wall.
- Attach the screw that secures the PCI option board to the chassis, as shown in Figure 7-7.

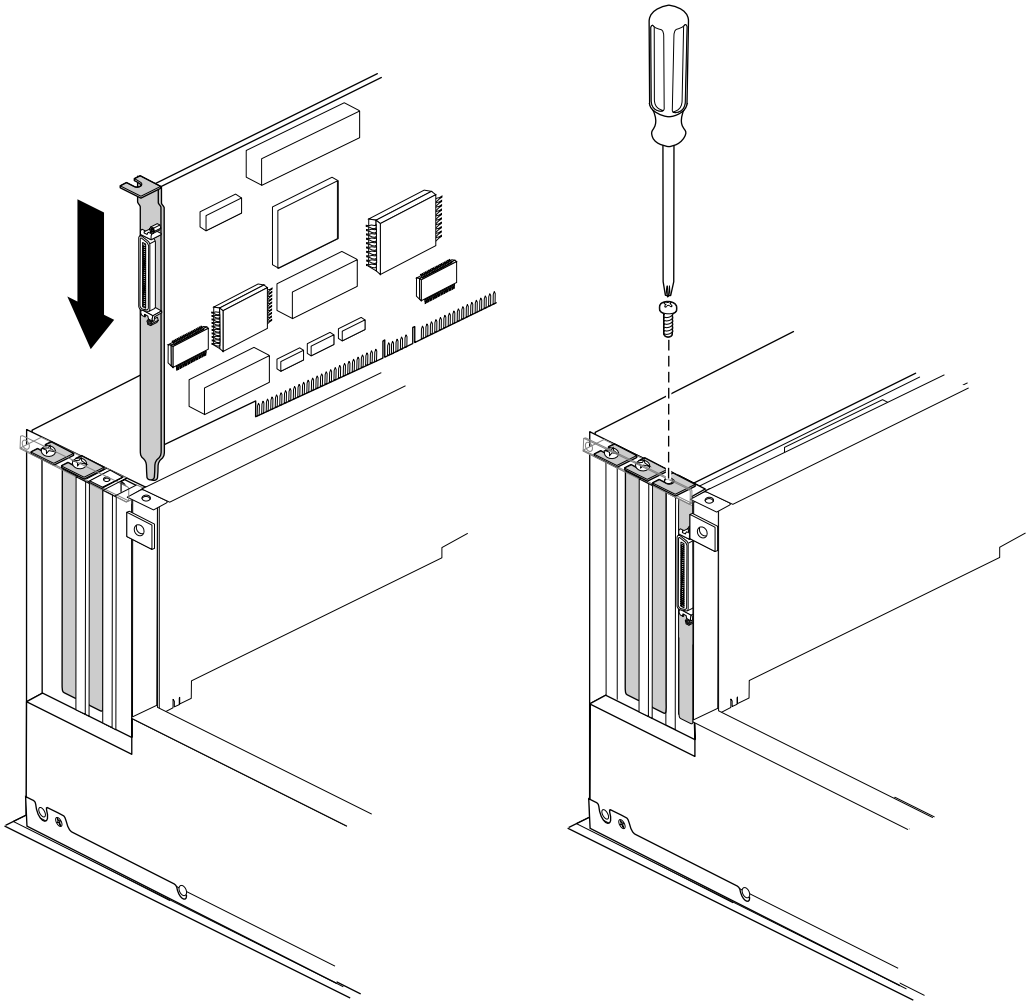

Figure 7-7 Securing the PCI Option Board to the Chassis

8. After you have finished installing the PCI board, remove your wrist strap and reassemble the system.
   - Replace the chassis access door and side panel (the reverse of removing them).
   - Reattach the cables to the back of the system.

Note: Do not discard the blanking plate that you removed from the Origin200 chassis. If you ever decide to remove the PCI option board, you must replace this blanking plate to ensure proper airflow through the Origin200 chassis.

Removing a PCI Option Board

The following steps describe how to remove a PCI option board from an Origin200 server.

1. Shut down the system completely. See "Turning Off the System" in Chapter 4.
   - Be sure to turn off the master power switch.
2. Prepare the system for servicing.
   - Disconnect any cables from the rear of the chassis.
   - If you have to move the system, you may find it easier to lift and carry if you remove the disk drives first.
   - If the system is mounted in an equipment rack, remove it from the rack and place it on a sturdy work surface. See "Removing a Server From an Equipment Rack" in Chapter 3.
3. Open the system.
   - If the system is in a tower configuration, remove the side panel. See "Removing the System Cover and Chassis Access Door" on page 118.
   - Remove the chassis access panel (tower and rack systems). See "Removing the System Cover and Chassis Access Door" on page 118.
   - If the system is in a tower configuration, place it on its side on a sturdy work surface.

4. Attach a grounding strap to your wrist. Figure 7-8 shows an example of a disposable grounding strap.

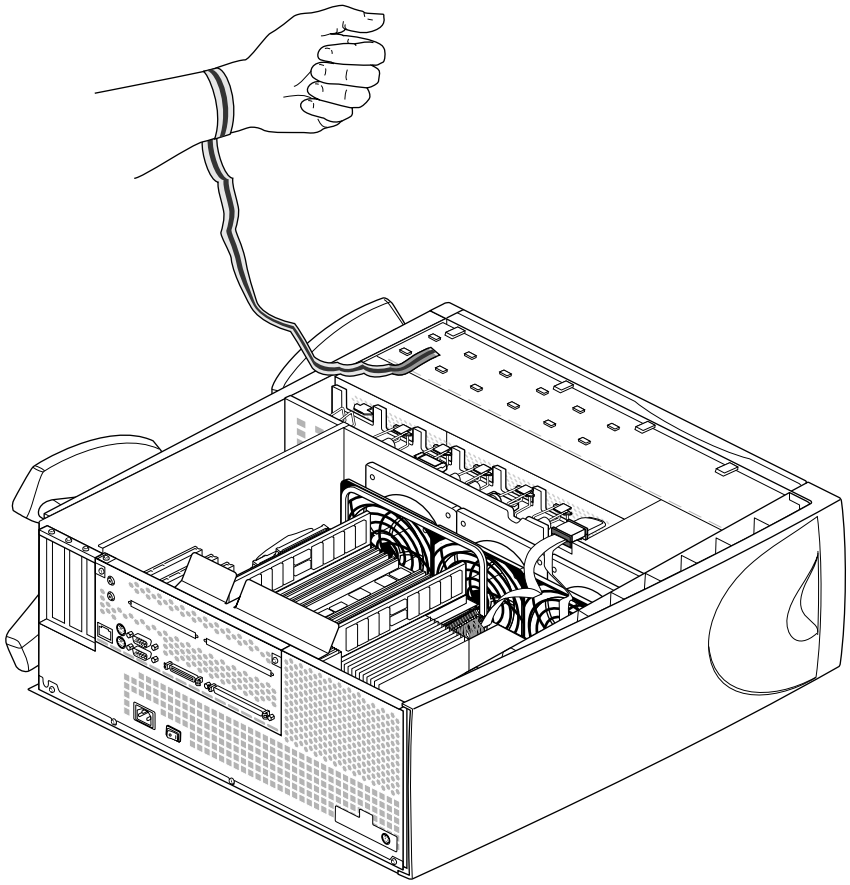

Figure 7-8 Attaching a Grounding Wrist Strap

5. Locate the PCI option board you wish to remove.
6. Remove the board.
   - Using a #2 Phillips screwdriver, remove the screw that secures the PCI option board to the Origin200 chassis, as shown in Figure 7-9.

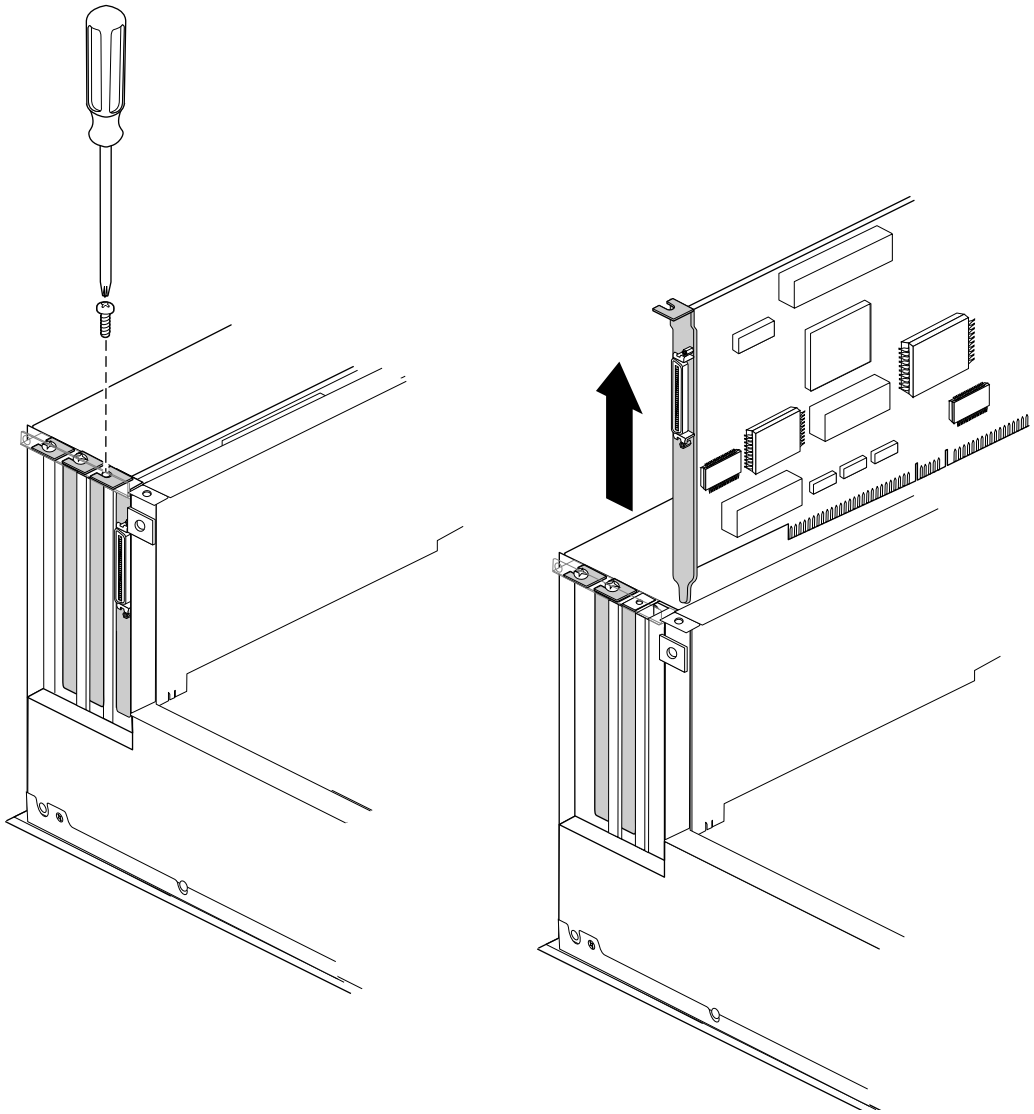

Figure 7-9 Removing a PCI Option Screw and Board

- Grasp the PCI option board at the front and rear of the board and pull it straight up and out of the system, as shown in Figure 7-9.
- Be careful not to kink or damage the flexible EMI gasket that surrounds the inside of the rear chassis wall.
- Place the PCI option board in an antistatic bag, preferably the bag in which the board was originally packaged.

7. Replace the blanking plate.
   - Align the blanking plate and slide it in place, as shown in Figure 7-10.
   - Attach the screw that secures the blanking plate to the Origin200 chassis, as shown in Figure 7-10.

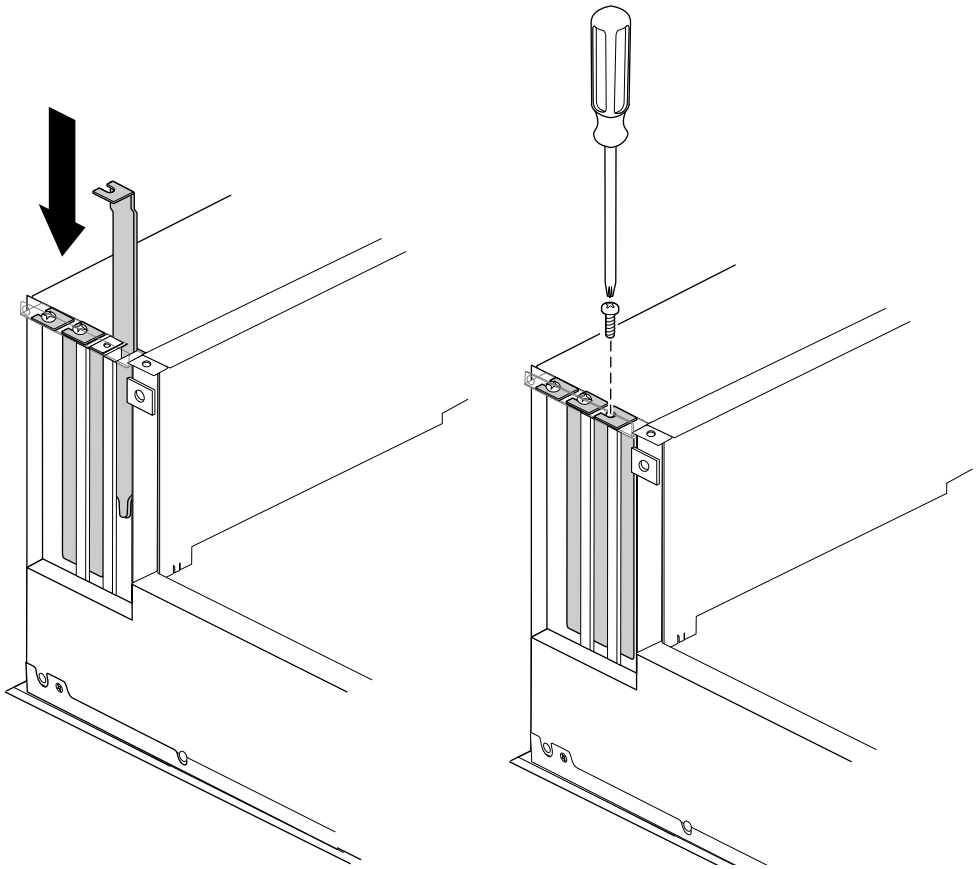

Figure 7-10 Replacing a PCI Option Blanking Plate and Screw

8. After you have replaced the blanking plate, remove your wrist strap and reassemble the system.
   - Replace the chassis access door and side panel (the reverse of removing them).
   - Reattach the cables to the back of the system.

Note: You must replace the blanking plate to cover the gap in the rear of the Origin200 chassis in order to ensure proper airflow through the chassis.

Chapter 8

Installing and Configuring Peripherals

This chapter describes how to install and configure internal and external peripherals. These include 5.25-inch and 3.5-inch drives and serial devices.

Chapter 8

Installing and Configuring Peripherals

This chapter describes how to install and configure peripherals, including 5.25-inch and 3.5-inch drives and serial devices:

- "Installing, Removing, and Configuring 5.25-Inch Peripherals" on page 159
- "Installing, Removing, and Configuring 3.5-Inch Peripherals" on page 171
- "Verifying That a Drive Is Installed Correctly" on page 179
- "Using Drives In the Origin200 Server" on page 179
- "Attaching Serial Devices" on page 181

This chapter also directs you to additional documentation about using peripherals with your Origin200 system.

Installing, Removing, and Configuring 5.25-Inch Peripherals

The following sections describe how to configure, install, and remove peripherals from the 5.25-inch drive bay:

- "About the 5.25-Inch Peripheral Bay" on page 160
- "Configuring a 5.25-Inch Peripheral" on page 161
- "Installing a 5.25-Inch Peripheral" on page 161
- "Removing 5.25-Inch Peripherals" on page 166

About the 5.25-Inch Peripheral Bay

The 5.25-inch drive bay is located at the top of the Origin200 in a tower configuration, or on the left-hand side in a rackmount configuration. Figure 8-1 shows the location of the 5.25-inch drive bay.

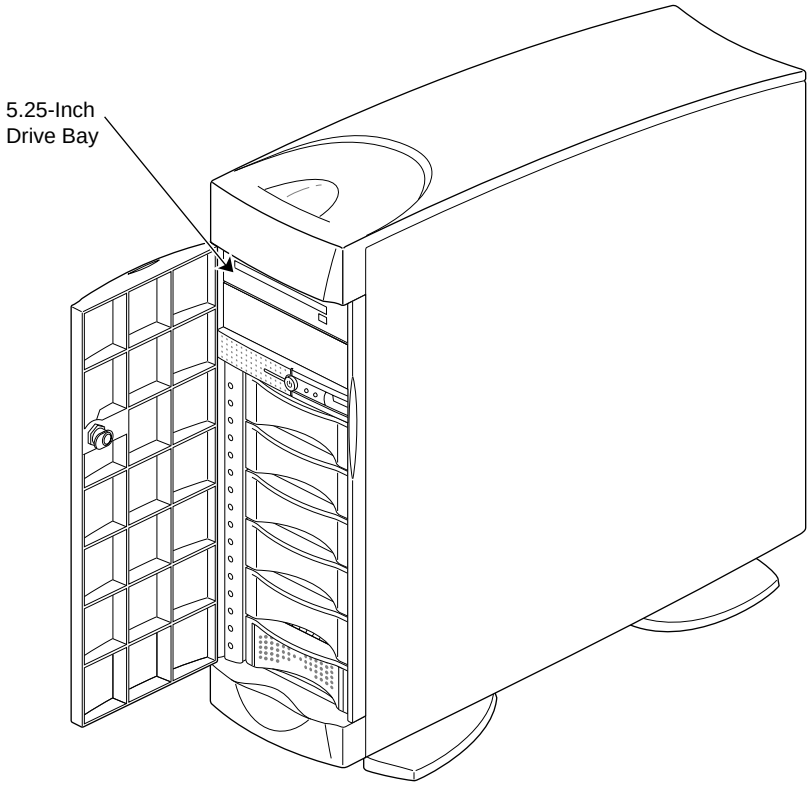

Figure 8-1 Location of the 5.25-Inch Drive Bay

The 5.25-inch drive bay holds a peripheral carrier (mounting frame) to which you attach peripherals. The carrier is open at the front to accept peripherals, and has blind-mating connectors at the rear for power and SCSI data.

Drives in the 5.25-inch bay are connected to SCSI channel 1, which is single-ended, fast and narrow, running at 10 MHz, and is capable of transferring 10 MB per second.

The next sections describe how to configure drives, install them in the 5.25-inch drive bay, remove them from the drive bay, and test that drives are installed correctly.

Configuring a 5.25-Inch Peripheral

Peripherals obtained from Silicon Graphics are preconfigured. You can install them in the 5.25-inch drive bay with no additional configuration.

However, if you are installing third-party peripherals, or wish to change the configuration of a Silicon Graphics-supplied drive, follow these guidelines:

- Set the SCSI ID between 1 and 7. Do not use SCSI ID 0, since that is reserved for the controller.
- Set the drive (motor) start jumper to start on command from the controller. Do not configure the drive to start as soon as power is applied, since this may draw too much current when the system is first turned on.
- Set the drive termination jumper to "off" or remove the drive terminators.
- Configure the drive to supply termination power.

SCSI drives are typically formatted by the manufacturer, so no further formatting is necessary. All Silicon Graphics-supplied SCSI drives are preformatted.

Installing a 5.25-Inch Peripheral

Follow these steps to install a 5.25-inch peripheral:

1. Remove the front door. See "Removing the Front Door" on page 116.
2. Remove the peripheral carrier, as shown in Figure 8-2.
   - Pull out the peripheral carrier handle. The handle flexes downward, allowing access to two captive screws.
   - Using a #2 Phillips screwdriver, undo the two captive screws that secure the peripheral carrier to the Origin200 chassis.
   - Grasp the handle of the peripheral carrier and pull the carrier out of the 5.25-inch drive bay.

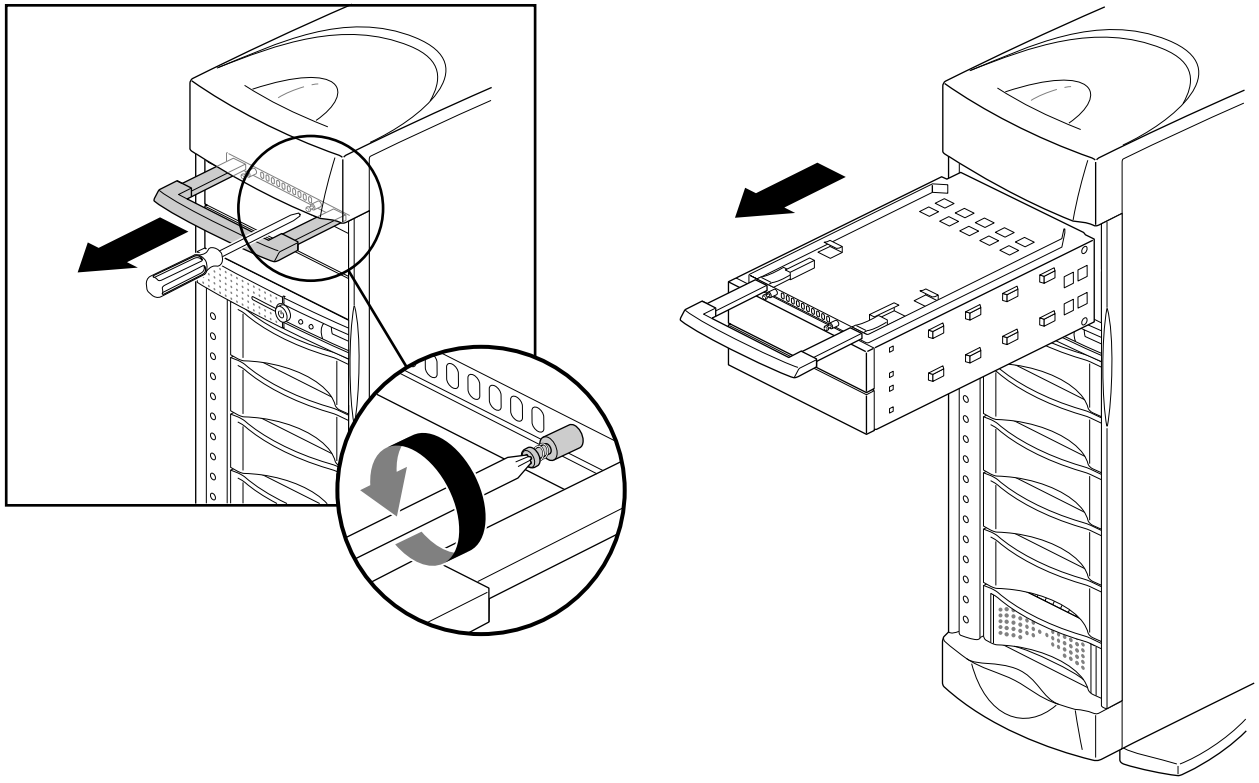

Figure 8-2 Removing the 5.25-Inch Peripheral Carrier

3. Prepare the peripheral carrier, as shown in Figure 8-3.
   - Remove one or two of the blanking plates from the front of the carrier, depending upon the height of the drive you are installing.
   - Using a #2 Phillips screwdriver, remove the screws that hold the access plate to the rear of the carrier, then remove the access plate.

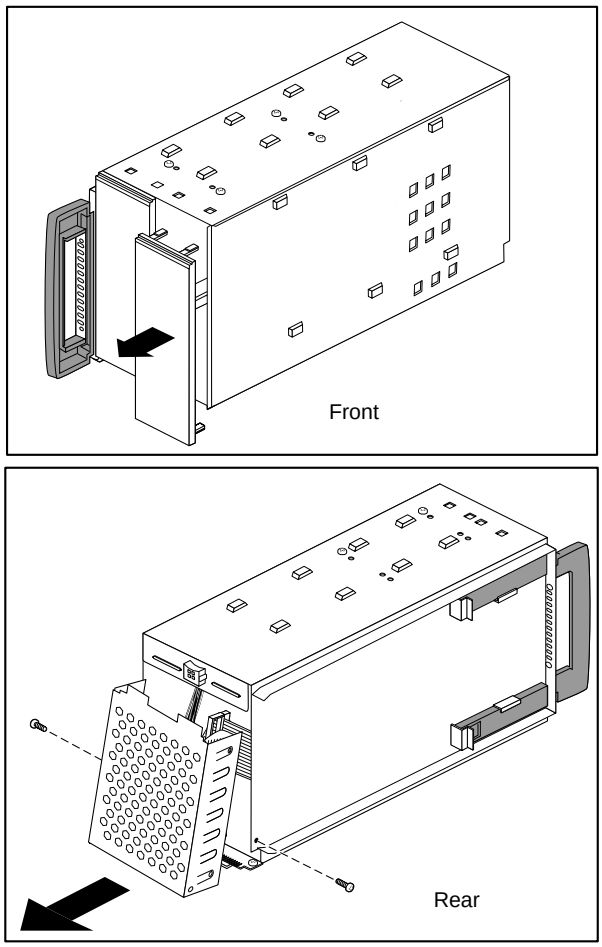

Figure 8-3 Removing a Blanking Plate and the Rear Access Plate From the Peripheral Carrier

4. Slide the drive into the peripheral carrier and attach it with four screws through the side of the carrier, as shown in Figure 8-4.
5. Attach the power and SCSI connectors at the rear of the carrier to the drive. Use whichever connectors fit conveniently for the position of the drive in the carrier.
6. Replace the access plate. See Figure 8-4.

   Note: Be sure to reinstall the access plate on the rear of the carrier. The plate protects the power and SCSI cables from damage when you slide the carrier into the system.

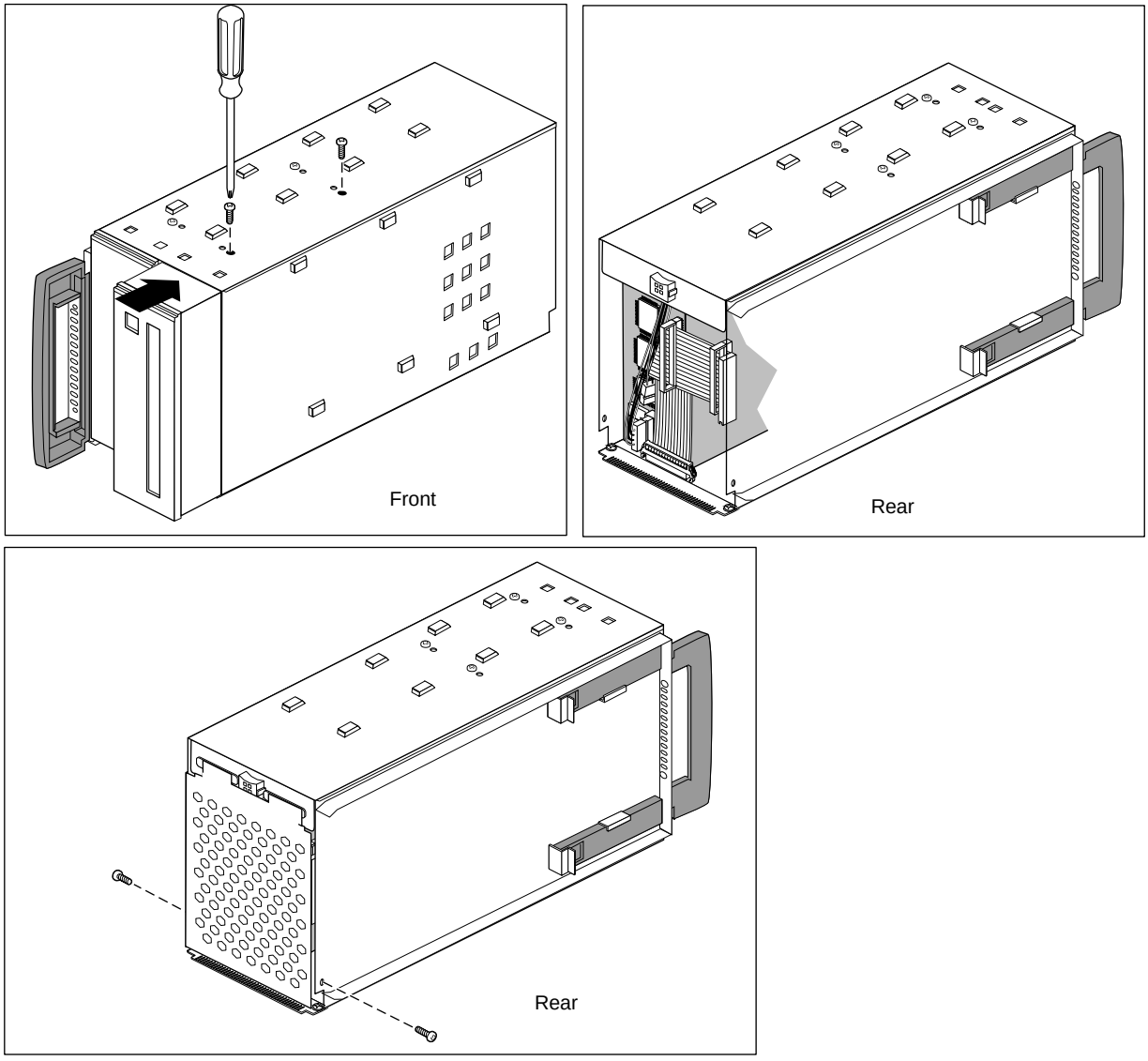

Figure 8-4 Installing a 5.25-Inch Drive in the Peripheral Carrier

7. Slide the carrier into the system and secure it with the two captive screws. See Figure 8-5.

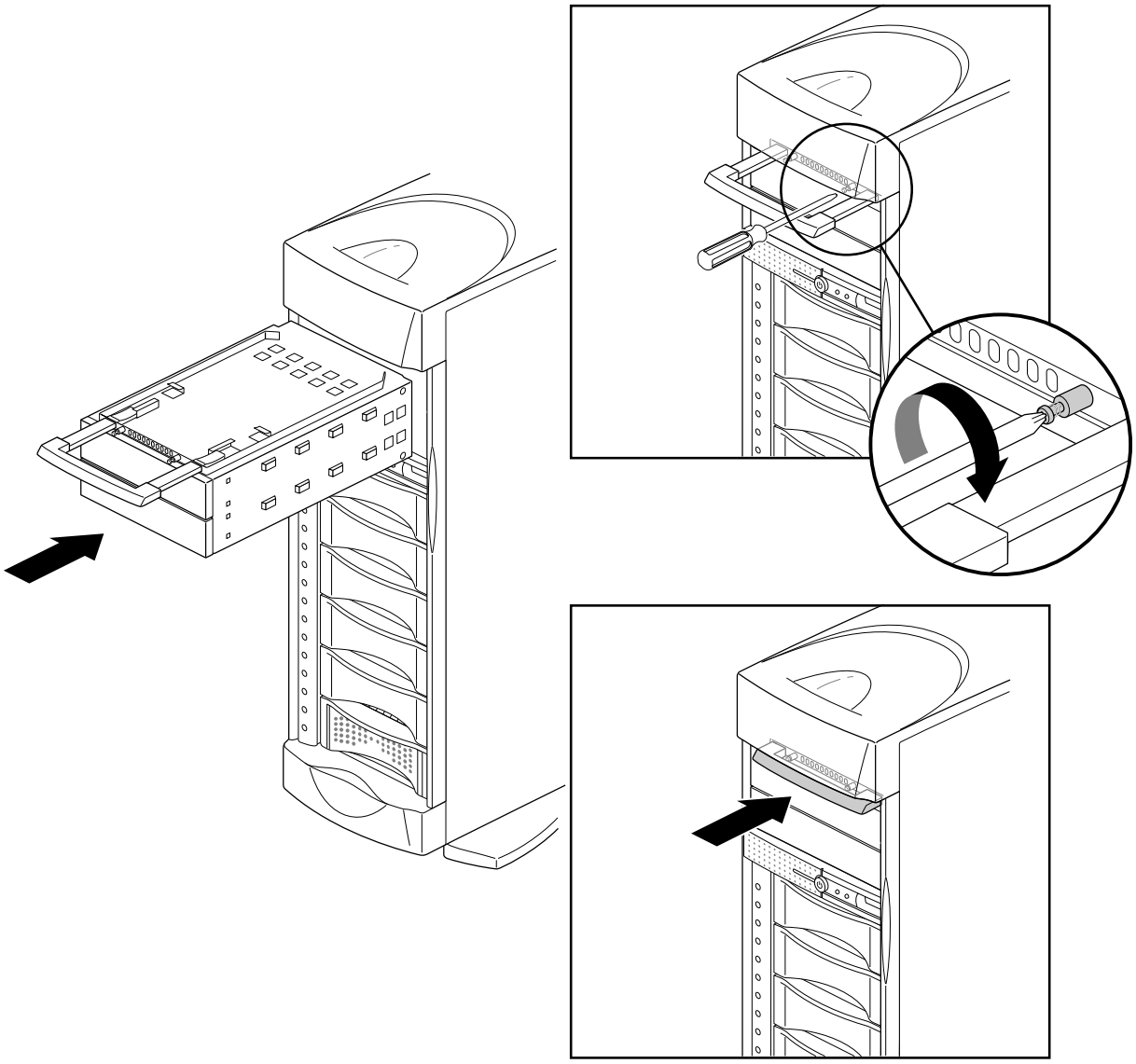

Figure 8-5 Replacing the 5.25-Inch Peripheral Carrier

8. Replace the front door.

You are finished installing the 5.25-inch peripheral.

Removing 5.25-Inch Peripherals

Follow these steps to remove a 5.25-inch peripheral:

1. Remove the front door. See "Removing the Front Door" on page 116.
2. Remove the peripheral carrier, as shown in Figure 8-6.
   - Pull out the peripheral carrier handle. The handle flexes downward, allowing access to two captive screws.
   - Using a #2 Phillips screwdriver, undo the two captive screws that secure the peripheral carrier to the Origin200 chassis.
   - Grasp the handle of the peripheral carrier and pull the carrier out of the 5.25-inch drive bay.

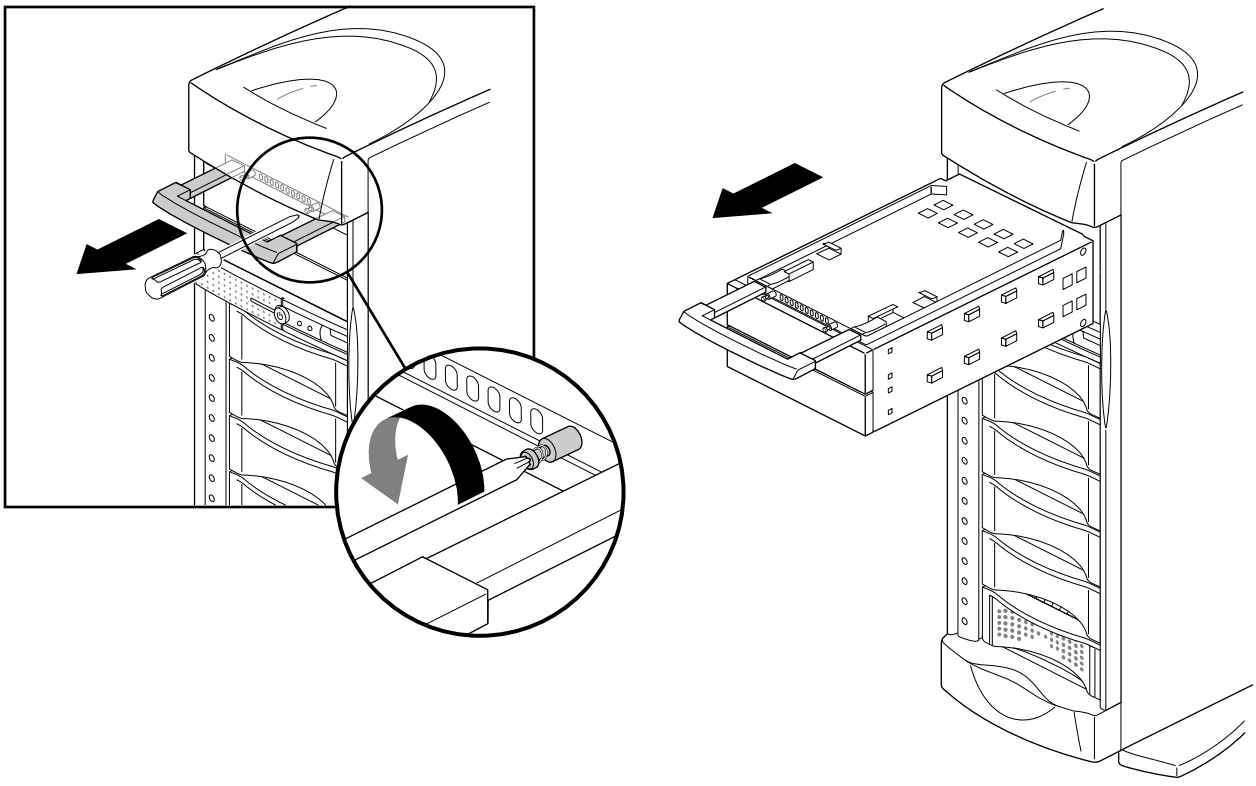

Figure 8-6 Removing the Peripheral Carrier

3. Remove the rear access plate from the peripheral carrier, as shown in Figure 8-7.
   - Using a #2 Phillips screwdriver, remove the screws that hold the access plate to the rear of the carrier, then remove the access plate.

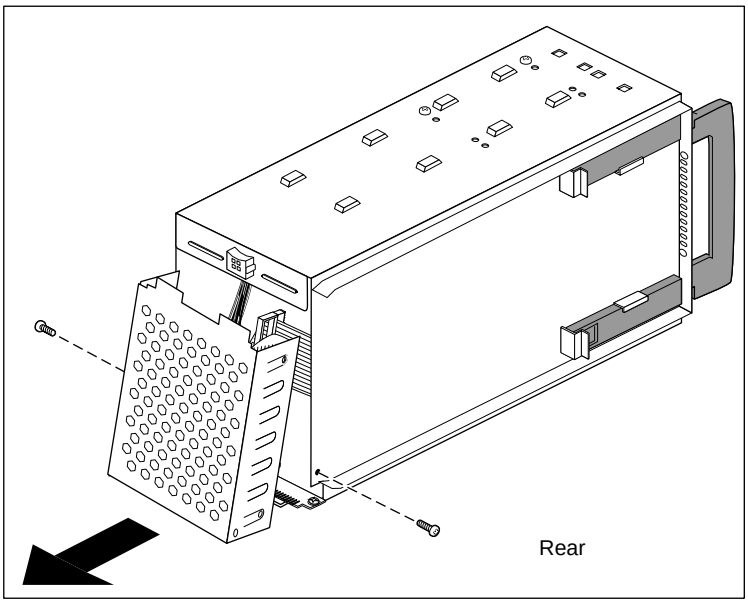

Figure 8-7 Removing the Rear Access Plate From the Peripheral Carrier

4. Disconnect the power and SCSI cables from the drive.

5. Remove the screws that hold the drive to the peripheral carrier and remove the drive from the carrier, as shown in Figure 8-8.

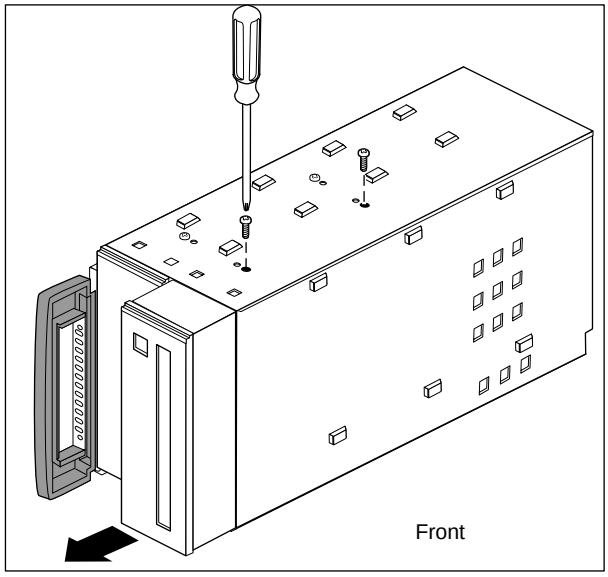

Figure 8-8 Removing a Drive From the Peripheral Carrier

6. Replace the blanking and access plates on the peripheral carrier. See Figure 8-9.
   - The front blanking plate ensures proper airflow through the system.
   - The rear access plate protects the cables in the peripheral carrier from damage when installing and removing the carrier.

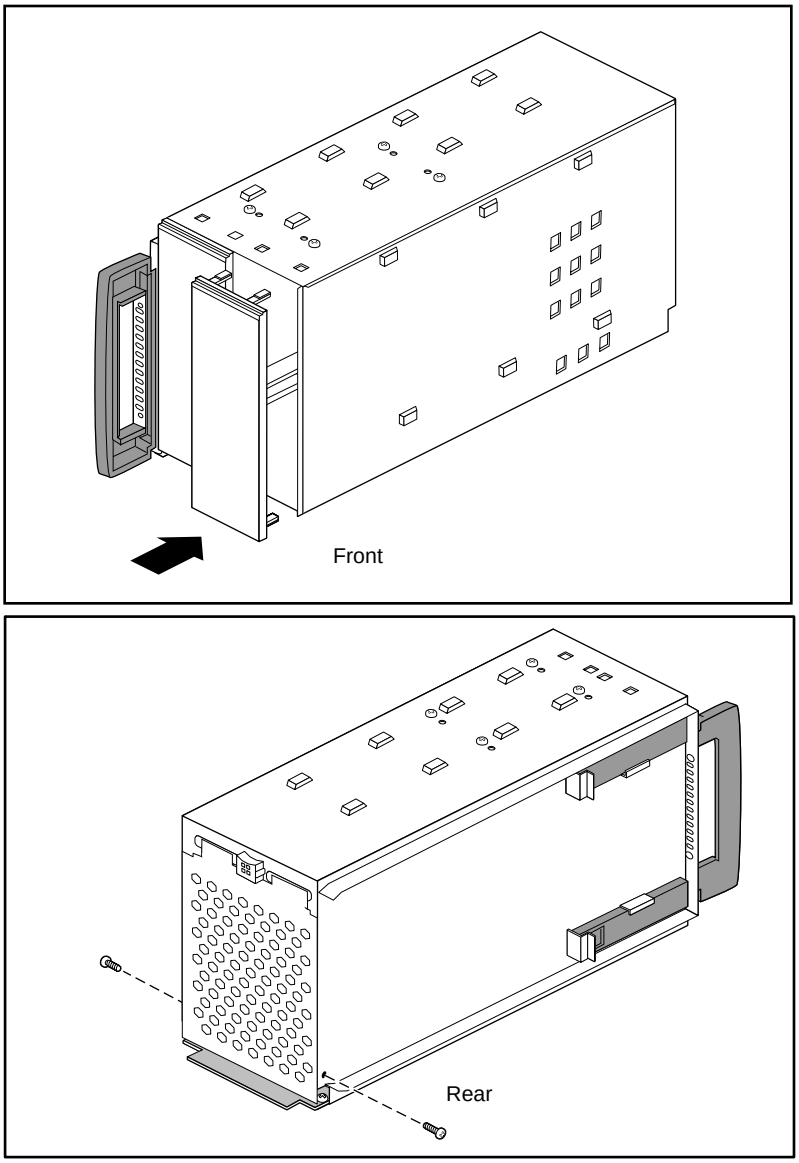

Figure 8-9 Replacing the Front Blanking Plate and Rear Access Plate

7. Slide the carrier into the system and secure it with the two captive screws. See Figure 8-10.

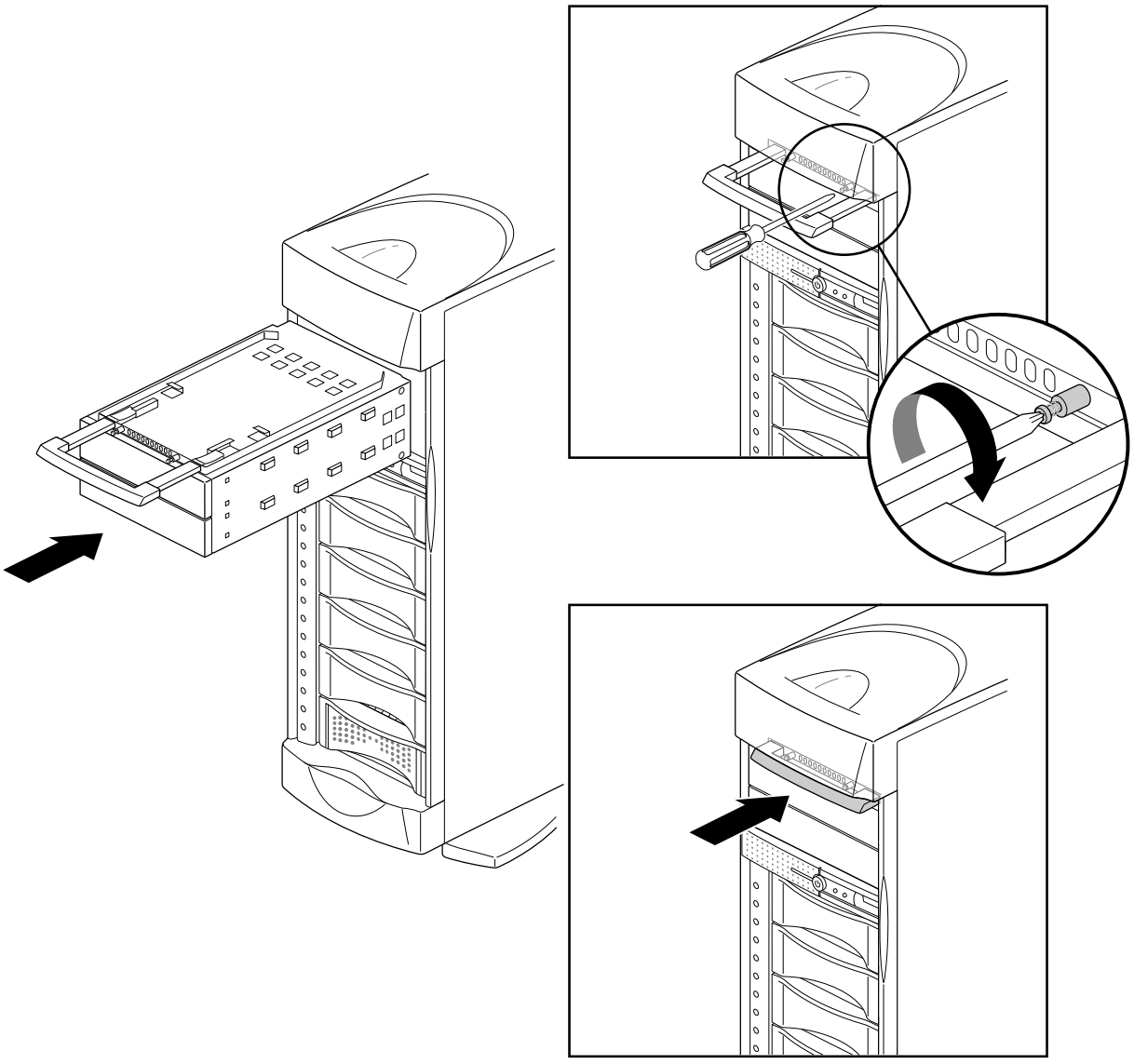

Figure 8-10 Replacing the 5.25-Inch Peripheral Carrier

8. Replace the front door.

You are finished removing the 5.25-inch peripheral.

Installing, Removing, and Configuring 3.5-Inch Peripherals

The Origin200 chassis has room for six 3.5-inch peripherals. Each peripheral is mounted on a sled to make it convenient to install and remove, and set their SCSI ID numbers.

The next sections describe how to configure, install, and remove 3.5-inch peripherals.

About the 3.5-Inch Peripheral Bay

The 3.5-inch peripheral bay holds up to six drives mounted on sleds. The SCSI ID of each drive is determined by the slot into which it is installed. The system (boot) disk must be installed in slot 1. Figure 8-11 shows how the slots correspond to SCSI IDs.

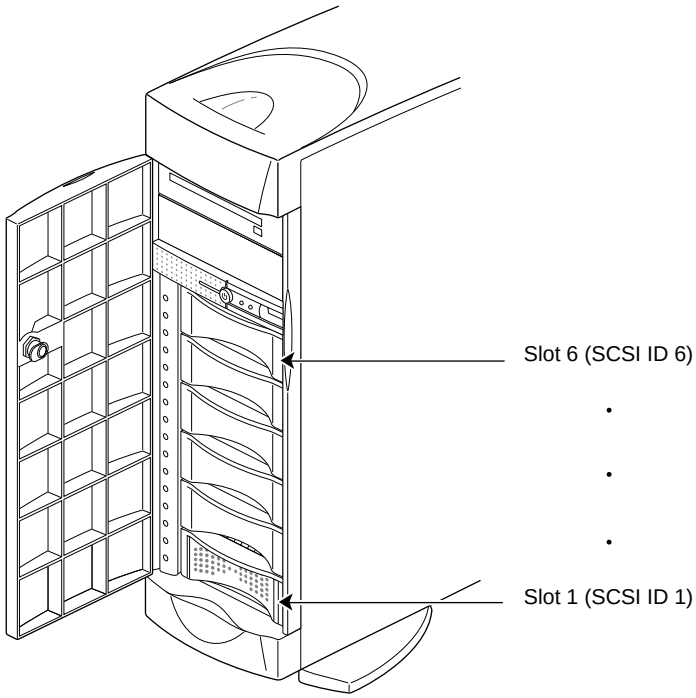

Figure 8-11 The 3.5-Inch Drive Bay and Correspondence of SCSI IDs to Drive Sots

Drive bays that do not contain peripherals are covered by blanking plates. Figure 8-12 shows a blanking plate for the 3.5-inch drive bay. These plates provide for proper airflow through the system as well as EMI shielding.

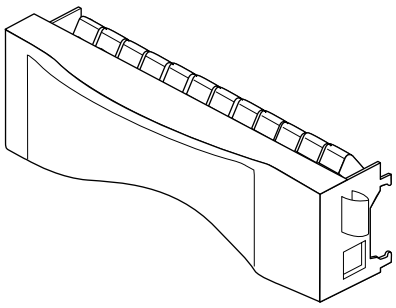

Figure 8-12 Example 3.5-Inch Drive Slot Blanking Plate

Configuring 3.5-Inch Peripherals

3.5-inch peripherals obtained from Silicon Graphics are preconfigured and installed on drive sleds. You can install them in the 3.5-inch drive bay with no additional configuration.

Installing a 3.5-Inch Peripheral

Follow these steps to install a 3.5-inch peripheral:

1. Open the front door of the chassis as shown in Figure 8-13.

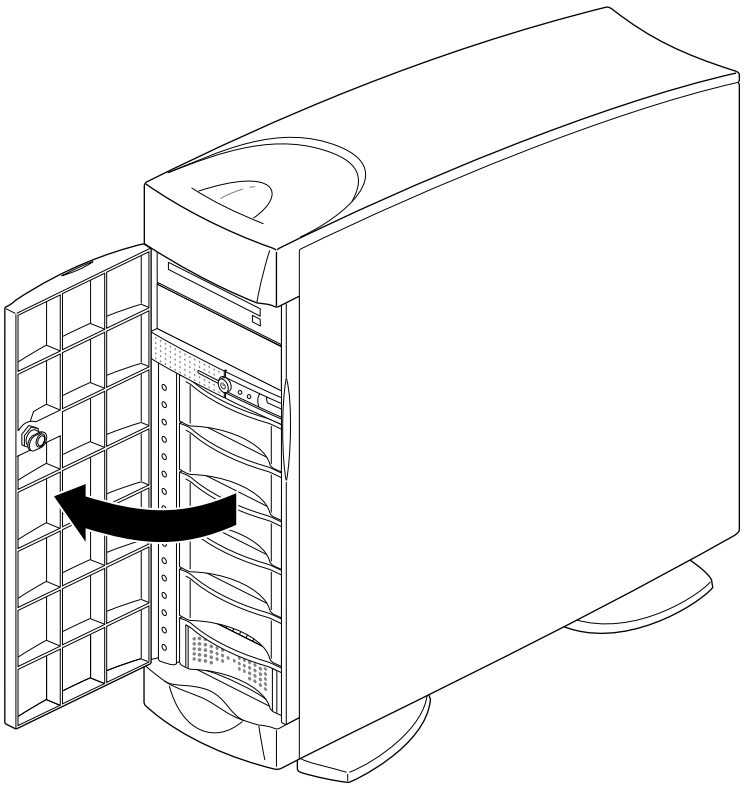

Figure 8-13 Opening the Front Door of the Origin200 System

2. Locate an available slot for the peripheral.
   - Figure 8-14 shows how the drives are numbered.

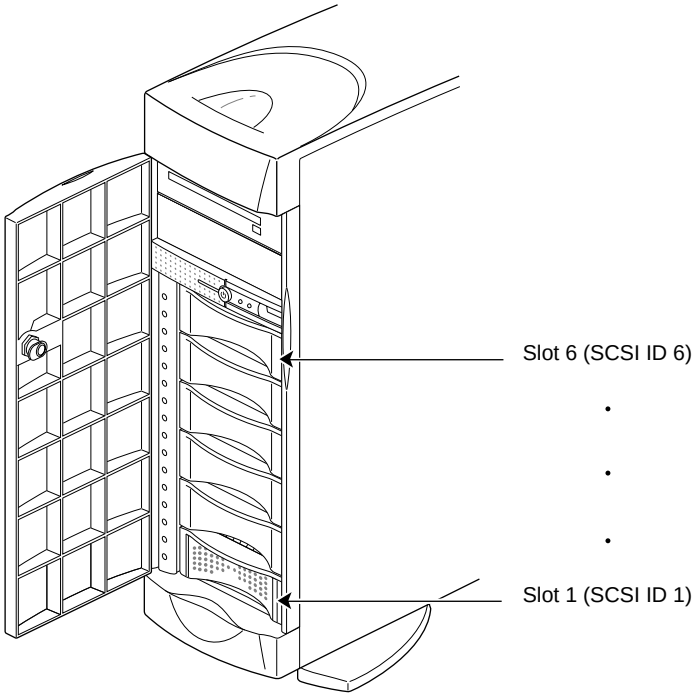

Figure 8-14 How the 3.5-inch Drives are Numbered in an Origin200 System

3. Install the peripheral.
   - If there is a plastic blanking plate covering the slot, remove it as shown in Figure 8-15.
   - Line up the drive on the sled and slide the drive forward until it is almost flush with the edge of the drive bay.
   - Fold the locking lever up to latch the drive in place, as shown in Figure 8-15.

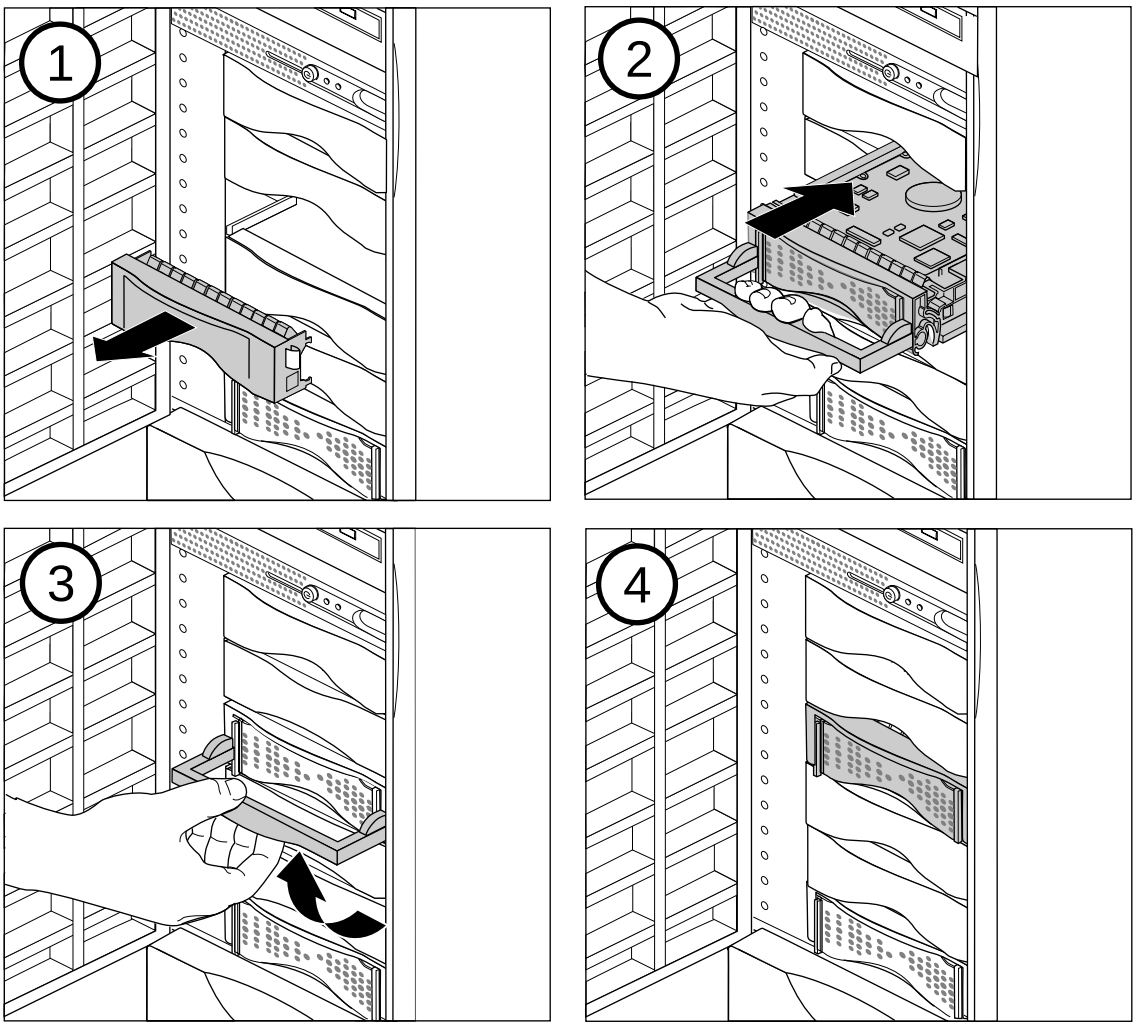

Figure 8-15 Installing a 3.5-Inch Peripheral in an Origin200 System

Note: Save the blanking plates you remove. If you ever remove a peripheral and do not replace it with another one, you should reinstall the blanking plate to ensure proper cooling air flow and electromagnetic interference (EMI) shielding in the Origin200 chassis.

Removing a 3.5-Inch Peripheral

Follow these steps to remove a 3.5-inch peripheral:

1. Open the front door of the chassis, as shown in Figure 8-16.

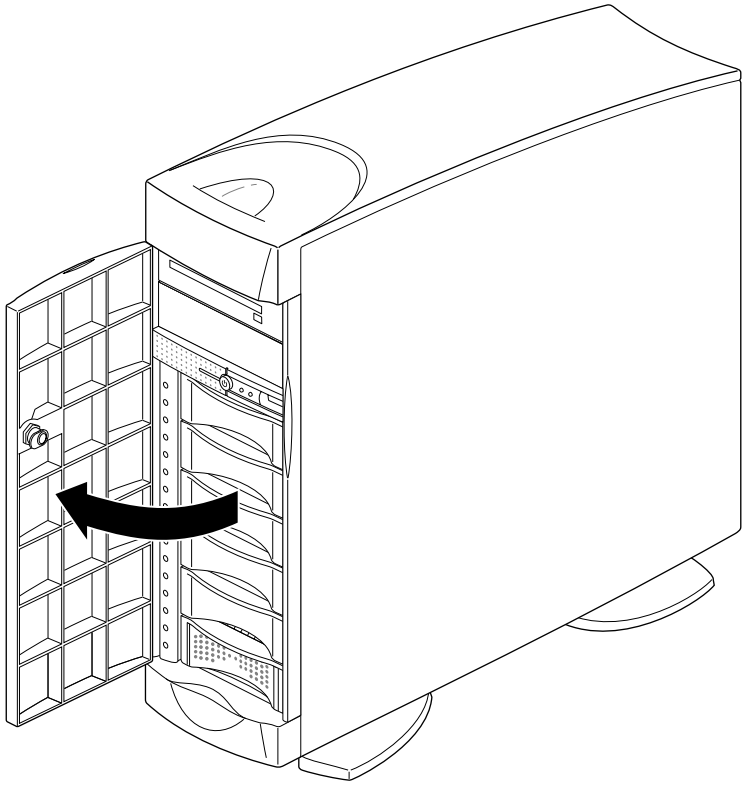

Figure 8-16 Opening the Front Door of an Origin200 System

2. Locate the drive you want to remove.
   - The drives are numbered as shown in Figure 8-17.

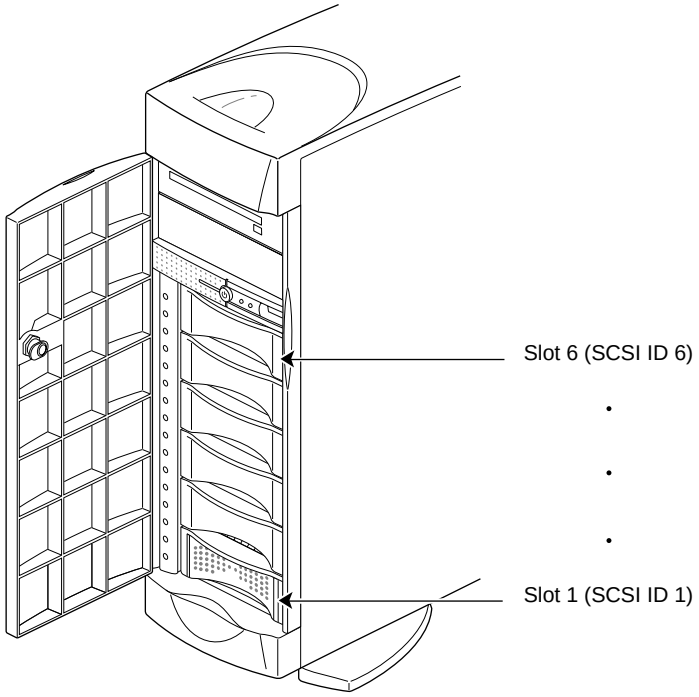

Figure 8-17 How the 3.5-inch Drives Are Numbered in an Origin200 System

3. Remove the drive, as shown in Figure 8-18.
   - Pull the locking lever down.
   - Grasp the lever and pull the drive straight out of the chassis.

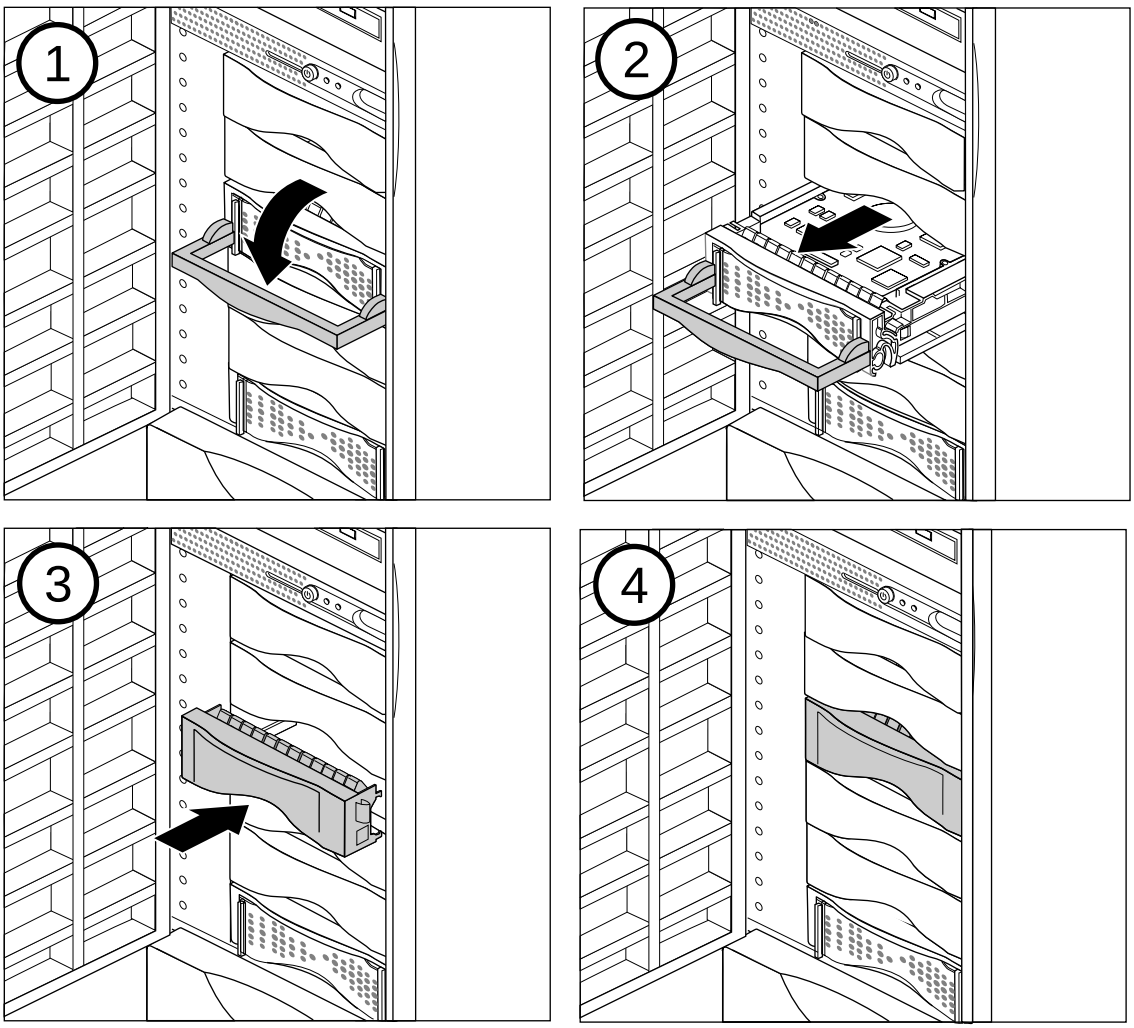

Figure 8-18 Removing a 3.5-inch Drive from an Origin200 Server

4. If you are not replacing the drive with another peripheral, cover the open slot with a plastic blanking plate, as shown in Figure 8-18.

   Note: Always cover an open peripheral slot with a plastic blanking plate to ensure proper cooling air flow and electromagnetic interference (EMI) shielding in the Origin200 chassis.

Verifying That a Drive Is Installed Correctly

Use the following checklist to determine if a drive is installed correctly:

- Power on the system and watch drive lights. Drives should blink as they are accessed sequentially from drive 1 at the bottom of the 3.5-inch drive bay (right-hand side in a rack-mounted server) up to the top drive in the 5.25-inch peripheral carrier.
- Check the system console; malfunctioning drives cause the operating system to print an error message on the system console as the system boots.
- When the system boots (either single-user mode, or multiuser mode), use *hinv* to see what drives the system recognizes. Log in to the system using any account (root, guest, and so on) and at a shell prompt type:

  ```
  hinv -c disk
  ```

  You should see messages similar to this:

  ```
  Integral SCSI controller 0: Version QL1040B
    Disk drive: unit 1 on SCSI controller 0
    Disk drive: unit 3 on SCSI controller 0
  Integral SCSI controller 1: Version QL1040B
  Integral SCSI controller 4: Version QL1040B
    Disk drive: unit 1 on SCSI controller 4
    Disk drive: unit 2 on SCSI controller 4
  Integral SCSI controller 5: Version QL1040B
  ```

  This indicates the system recognizes two disk drives on SCSI channel 0 (the system drive in slot 1 and a second drive installed in slot 3) and no drives on channel 1. The second module of this system also has two drives installed on channel 0 (in slots 1 and 2) and no drives installed in channel 1.

Using Drives In the Origin200 Server

Once installed, Silicon Graphics-provided peripherals are all recognized by the operating system (IRIX) and are ready to be configured for use with the system. Table 8-1 indicates where to turn for more information about configuring drives, depending upon how you want to use the drives in your system (for example, as mounted filesystems, logical volumes spanning multiple disks, striped across multiple disks, EFS filesystems, or XFS filesystems).

In addition to the reference pages described in Table 8-1, refer to *IRIX Admin: Disks and Filesystems.* See "About This Guide" in this manual for information about obtaining additional manuals and documentation.

Table 8-1 Sources of Information for Drive Configuration

Type of Configuration/Operation	Man Pages or Tools
Changing controller numbers	ioconfig(1M)
Device files, creating	MAKEDEV(1M)
Disks, formatting and initializing	fx(1M)
Disks, files in the volume header, adding and removing	dvhtool(1M)
Disks, displaying partitions	prtvtoc(1M) fx(1M)
Disks, repartitioning	fx(1M) The xdkm graphical tool
Disks, creating a system (boot) disk	PROM monitor (from the System Maintenance Menu) fx(1M), mkfs(1M), MAKEDEV(1M) dump(1M), xfsdump(1M)
Disks, adding as a mounted filesystem	Add_disk(1)
Disks, use quotas	quota(1)
Filesystem, creating an EFS or XFS	mkfs(1M)
Filesystem, spanning across multiple disks	xlv(7M)
Filesystems, mounting and unmounting	mount(1M), umount(1M) fstab(4)
Filesystems, automatically mounting (automount)	automount(1M) exports(4) chkconfig(1M)
Guaranteed-rate I/O	grio(5)

Attaching Serial Devices

Each Origin200 module provides connectors for two serial ports at the rear of the chassis. Figure 8-19 shows the locations of the connectors for these ports.

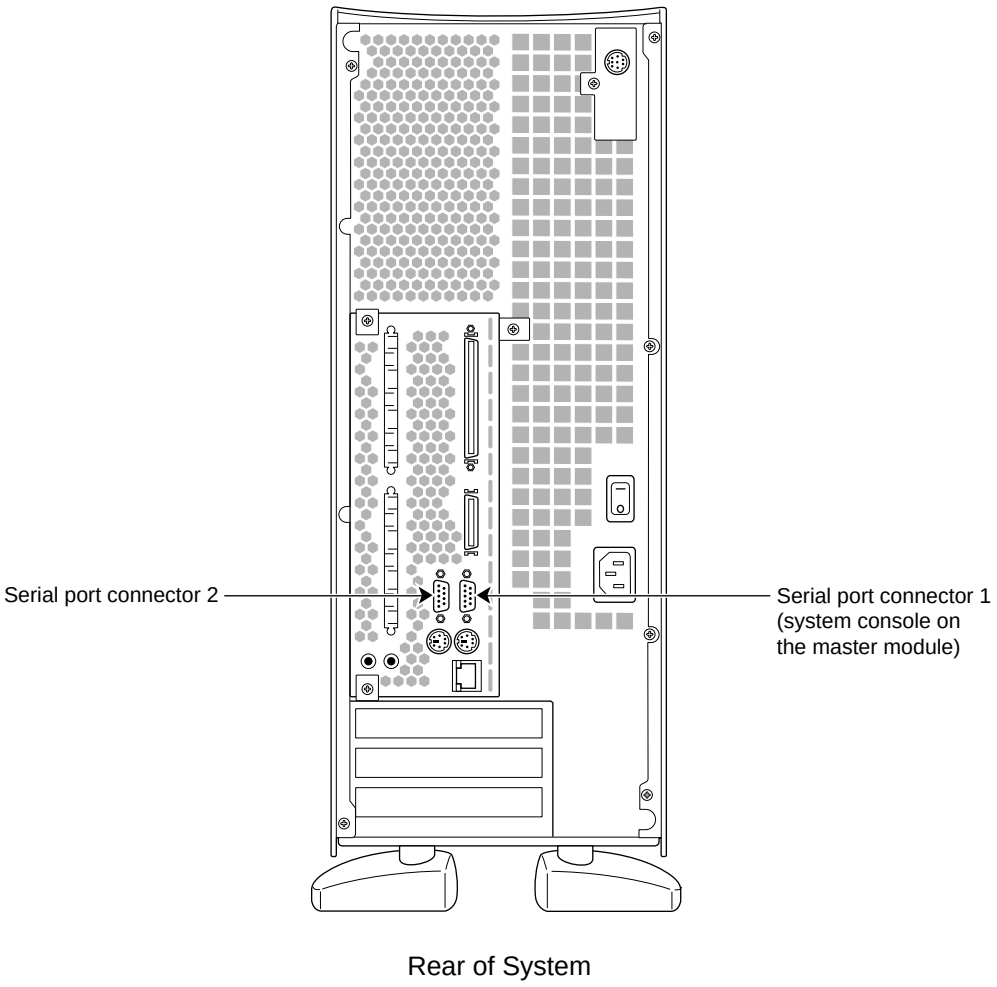

Figure 8-19 Location of the Serial Port Connectors on an Origin200 System

In a one-module system, the ports are numbered 1 and 2. In a two-module system, the ports on the first module are numbered 1 and 2, and the ports on the second module are numbered 3 and 4. See "How Devices Are Detected and Numbered" in Chapter 4.

Common types of serial devices you can attach to these ports are:

- serial (ASCII) terminals
- modems
- printers
- other computers (using terminal emulation or other serial protocols)

The serial ports are capable of transferring data at speeds ranging from 50 baud to 460 Kbaud in RS-232 mode. The default serial port configuration is RS-232, but the serial ports can be opened programmatically in RS-422 mode.

Like those found on the O2 and the rest of the Origin product line, the serial port connectors are DB9, male, and are designed to be IBM-compatible. Because of this, they do not use the same pinouts as DB9 serial ports on older Silicon Graphics systems.

Table 8-2 shows the correspondence of ports to IRIX device files and protocols.

Table 8-2 Serial Port Numbers and Correspondence to IRIX Device Files

Module	Serial Port Number	IRIX Device File (RS-232 Mode)	IRIX Device File (RS-432 Mode)	IRIX Device File (Midi Mode)
First	1 (system console)	*/dev/tty[c,d,f,m]1*	*/dev/tty4[d,f,m]1*	*/dev/ttymidi1*
	2	*/dev/tty[c,d,f,m]2*	*/dev/tty4[d,f,m]2*	*/dev/ttymidi2*
Second	3	*/dev/tty[c,d,f,m]3*	*/dev/tty4[d,f,m]3*	*/dev/ttymidi3*
	4	*/dev/tty[c,d,f,m]4*	*/dev/tty4[d,f,m]4*	*/dev/ttymidi4*

Note: For more information on how devices are detected and configured, see "Determining the Devices Installed on Your Server" in Chapter 4.

For serial port pinouts, see Appendix A, "Connector Pinout Assignments." For information on specific serial cables, see Appendix B, "Cable Descriptions."

Attaching Serial Cables

The serial port connectors are D-shell, 9-pin, male. Use a a cable with a DB9 female connector to attach serial devices to the Origin200 server. The Origin200 serial port connectors provide threaded hex-nuts so that you can fasten the cable connector to the port.

Attaching Serial (ASCII) Terminals

You can connect an optional ASCII terminal to your Origin200 by using the serial cable shipped with your server. It has a DB9 connector on one end and a 25-pin serial connector on the other. See Appendix B, "Cable Descriptions" for information on this cable.

Be sure to read the documentation that comes with the terminal. Always connect your system console terminal to serial port 1. You can connect an additional terminal to ports 2, 3, and 4. Set the terminal with the following operational characteristics:

- 9600 baud
- 8 bits
- 1 stop bit
- no parity

Use the following steps to properly connect a terminal:

1. Attach the keyboard (if applicable) and power connectors to the terminal.

   Caution: Before plugging the terminal into either a 110-VAC or 220-VAC outlet, be sure that the electrical rating on the UL-CSA label is in either the 100–120 VAC or 200–240 VAC range, whichever applies.

2. Connect the end of the serial cable that has the 25-pin connector to the back of the terminal. (Some terminals have more than this connector on the back; if this is the case, choose the connector marked Modem or COMM. Consult your terminal's documentation if you are not sure which connector to use.)
3. Attach the end of the serial cable that has the DB9 connector to either port 1 (if the terminal will be the system console) or one of the other ports.
4. Power on the terminal.
5. Restart the system or continue with other peripheral connections as needed.

In some cases the terminal may need special recognition from the system software. You can check or set up the system software to work under specific parameters by following these steps:

1. Log in to the system as root.
2. Edit the file */etc/gettydefs* to choose the proper baud rate, prompt, and line conditioning.

   `vi /etc/gettydefs`
3. Modify the file */etc/inittab*, if necessary, to enable *getty* on the appropriate port at the desired baud rate:

   `vi /etc/inittab`

   The following lines are for the system console and the second serial port:

   ```
   t1:23:respawn:/etc/getty ttyd1 co_9600          # alt console
   t2:23:off:/sbin/getty -N ttyd2 co_9600          # port 2
   ```

   These lines are for ports 3 and 4 on a second module:

   ```
   t5:23:off:/sbin/getty -N ttyd3 co_9600          # port 3
   t6:23:off:/sbin/getty -N ttyd4 co_9600          # port 4
   ```

   Notice that ports 2, 3, and 4 are marked "off." This means that you cannot log in on those ports. To allow logging in on, for example, port 3, change the line for port 3 to the following:

   ```
   t5:23:respawn:/sbin/getty -N ttyd3 co_9600      # port 3
   ```

   To use a higher baud rate, for example, 38400, change the line to the following:

   ```
   t5:23:respawn:/sbin/getty -N ttyd3 dx_38400     # port 3
   ```
4. After modifying the */etc/inittab* file, inform *init* of any changes by entering

   `telinit q`

5. Look in */etc/ttytype* for the listed console port information. You should see lines similar to this:

```
?iris-tp console
iris-tp tport
?vt100 ttyd1
?vt100 ttym1
?vt100 ttyf1
?vt100 ttyd2
?vt100 ttym2
?vt100 ttyf2
?vt100 ttyd3
?vt100 ttym3
?vt100 ttyf3
...
```

6. The default terminal type for all terminals is VT100, and the system prompts you to confirm this. To keep the system from asking you what type of terminal you are using when you log in, remove the question marks from all lines in the file that correspond to the serial port 1, 2, 3, and 4). For example, to prevent the system from prompting for a terminal type on port 3, change these lines in */etc/ttytype*:

```
...
vt100 ttyd3
vt100 ttym3
vt100 ttyf3
...
```

   You can also change the terminal type designated for the particular serial port by changing "vt100" to another shorthand terminal name. See Appendix C, "Supported Terminals" for a list of some terminals and shorthand names.

7. Add the following line to your *~/.login* or *~/.profile* file. This sets the terminal type, syntax, erase, and kill parameters automatically when you log in:

```
eval 'tset -s -Q'
```

8. Check terminal connection and function using the following commands:

```
echo Hello, this is a test > /dev/ttyd3
```

   This command should cause the sentence "Hello, this is a test" to appear on the terminal attached to port 3. If nothing appears on the terminal, check that you are using the correct serial port and that the terminal is configured correctly. If gibberish appears on the terminal screen, it probably means the terminal is not set to the same baud rate as the serial port.

If the test sentence appears on the terminal screen, but you do not see a "login:" prompt when you press the terminal's Enter key, verify that there is a *getty* process running on the serial port.

```
ps -def | grep getty
```

You should see output similar to this:

```
root  844  1  0 23:16:27 ttyd3 0:00 /sbin/getty -N ttyd3 dx_38400
root  843  1  0 23:16:27 ttyd1   0:00 /sbin/getty ttyd1 co_9600
```

This indicates that a *getty* process is running on both the system console (port 1) and on port 3. If you do not see a *getty* process running on the desired serial port, verify the serial port settings in */etc/inittab* and rerun *telinit*.

Connecting a Modem

To attach a modem to your server, connect it to ports 2, 3, or 4 using a serial modem cable. The serial cable must be appropriate for data communications equipment (DCE): The data transmit and data receive pins are opposite those in a DTE cable. Also, the cable must provide full flow control. See Appendix B, "Cable Descriptions" for information about this type of cable.

See the */etc/uucp/fix-hayes* or */etc/uucp/fix-telebit* files for information on specific modems supported (see step 5, below).

The following general procedures are used when connecting a modem:

1. Make sure that the power switch on the modem is turned off.
2. Attach the serial cable to the modem.
3. Attach the connector on the other end of the cable to the desired serial connector on the server's I/O panel (port 2 in a single-module system, or ports 2, 3, or 4 in a dual-module system).
4. Attach the modem power cord and turn on the modem.
5. Install the UUCP subsystem (*eoe.sw.uucp*), if it is not already installed.

   Note: The UUCP subsystem is shipped with the IRIX operating system, but is not installed by default. Confirm that the UUCP subsystem is installed by using the versions(1M) command. If it is not installed, see *IRIX Admin: Software Installation and Licensing* for instructions.

6. Read the documentation that comes with your modem to determine model-specific connection and configuration procedures.

For additional information about configuring modems, see *IRIX Admin: Peripheral Devices*. You may need to modify entries in the files */etc/inittab* and */etc/uucp/Devices*.

Additional useful information on modem operation and configuration is available on the cu(1) reference page.

Useful Serial Commands

To show the standard settings on a particular serial port, become superuser and enter

stty < /dev/ttyd*x*

Where *x* is the number of the tty port on which you want information (for example, 1, 2, 3, or 4).

To show the various settings on a particular serial port, enter

stty -a < /dev/ttyd*x*

To change the baud rate (the example is 2400) on a particular serial port, enter

stty 2400 < /dev/ttyd*x*

For additional useful information on serial ports and configuration, see the man pages for the following:

- cu
- inittab
- gettydefs
- ttytype
- terminfo
- stty
- termio

The following files are commonly used to configure serial port operation for the Origin200 server:

- */etc/inittab*
- */etc/gettydefs*
- */etc/ttytype*
- */usr/lib/terminfo*
- */etc/uucp/Devices*
- */etc/uucp/Systems*

Chapter 9

Troubleshooting and Maintenance

This chapter describes the various LED codes displayed by an Origin200 server, how to check the power supply, and what regular maintenance is required.

Chapter 9

Troubleshooting and Maintenance

This chapter contains the following sections:

- "Status LED Messages" on page 191
- "Ethernet Status LED Messages" on page 193
- "Regular Maintenance" on page 193

Status LED Messages

The status LED on the front panel can display three colors: green, amber, red. (See "Front Panel Functions: Status LED, Power, Reset, NMI" on page 76 for the location of the status LED.)

Table 9-1 lists the messages displayed by the status LED.

Note: Only the status LED of the master module of a two-module system displays messages. The status LED of a slave module is inactive.

Table 9-1 Status LED Messages

LED Code	Meaning	Corrective Action
Red briefly, then amber, then green, then off (about 1/2 second per color)	If you have just turned on the master power switch, this indicates the system controller is OK.	N/A
Green, blinking	The system is booting.	N/A
Green on solid	The system is on.	N/A
Amber, blinking	Normal power-off sequence.	N/A
Amber on solid	One of the fans has failed.	Replace the fan. See "If a Fan Fails" on page 24 and "Replacing Fans" on page 202.
Red, blinking (during power-off sequence)	A problem with the power supply was detected.	Replace the power supply. See "Replacing the Power Supply" on page 215.
Red, blinking (followed by system shutdown)	The system temperature is too high, and the server is shutting down.	Check ambient air temperature. If the ambient air temperature is below 104° F (40° C), verify there is no debris or other obstruction preventing the flow of air into and through the system. Also, see "Checking the Fans" in Chapter 4 to verify that the fans are working. If the ambient air temperature is above 104° F (40° C), the system shuts down automatically. Reduce the ambient air temperature.
Red on solid (followed by system shutdown)	The system became too hot.	Check the system temperature: see "Using the AUX Port and Module System Controller Commands" in Chapter 4.
	The power supply failed during booting.	Replace the power supply. See "Replacing the Power Supply" on page 215.

Ethernet Status LED Messages

The Ethernet 10-Base-T/100-Base-TX port contains two integral LEDs: the transmit LED (green) and the packet detect LED (yellow). Figure 9-1 shows their locations.

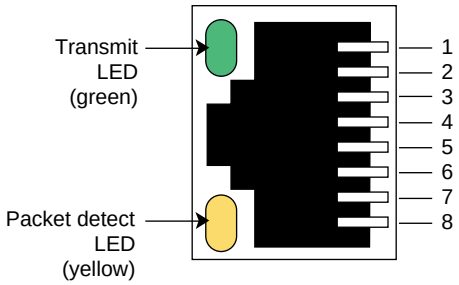

Figure 9-1 Ethernet 10-Base-T/100-Base-TX Port LEDs

The transmit LED (green) flashes whenever the Origin200 is transmitting data through the Ethernet port.

The packet detect LED (yellow) flashes whenever the server detects network traffic, even if the data detected is not destined for the server.

To test the power supply, press the button. If the green LED lights, the power supply is OK. If the green LED fails to light, there may be a problem with the power supply.

The power supply is not customer-replaceable. Contact Silicon Graphics or your local service provider for information about replacing the power supply.

Regular Maintenance

The only regular maintenance that the Origin200 server requires is periodic cleaning to remove any dust accumulation. Because the server is designed to be operated in a typical office computing environment that is relatively dust-free, there are no air filters in the system. Therefore, depending upon the amount of dust in the operating environment, you may have to periodically vacuum parts of the server.

Caution: Do not use an ordinary vacuum cleaner to clean computer equipment. Use only a data vacuum cleaner. Data vacuum cleaners are specially designed to prevent damage to sensitive electronic components from electrostatic discharge (ESD).

Use the following cleaning guidelines:

- *With the system running:* Examine the exterior of the chassis for dust accumulation and remove it as necessary with a data vacuum. Air flows from the front of the system to the rear, so most dust accumulation should be at the front of the system. See "Air Flow and Fans" on page 22.
- *With the system off:* Remove and examine the 3.5-inch drives, blanking plates, and drive slots for dust. Vacuum off any dust you find and replace the drives and blanking plates. See Chapter 8, "Installing and Configuring Peripherals," for information on removing the drives and blanking plates.
- *With the system off:* Remove and examine the peripheral carrier and the bay into which it slides. If dust has accumulated on the rear of the carrier, remove the access plate on the rear of the carrier and examine the interior of the carrier for dust. Vacuum off any dust you find and replace any components you removed. See Chapter 8, "Installing and Configuring Peripherals," for information on removing the peripheral carrier.
- *With the system off:* Open the system cover and chassis access door. Examine the interior of the system, starting with the front areas of the system and proceeding towards the rear. Vacuum off any visible dust, then replace the chassis access door and side panel. See Chapter 5, "Origin200 Cosmetic Features and Covers," for information about removing the system cover and chassis access door. See Chapter 10, "Removing and Replacing Internal Components," for information about removing the fans.

Chapter 10

Removing and Replacing Internal Components

This chapter describes how to remove and replace internal components of an Origin200 server.

Chapter 10

Removing and Replacing Internal Components

This chapter describes how to remove and replace internal components of an Origin200 system:

- "Tools Required to Remove and Replace Components" on page 197
- "Miscellaneous Fasteners" on page 198
- "Removing and Replacing Internal Parts" on page 198, which contains
  - "Replacing the SCSI Backplane" on page 200
  - "Replacing Fans" on page 202
  - "Replacing the Logic Carrier" on page 205
  - "Replacing the Power Supply" on page 215
  - "Replacing the Module System Controller" on page 218

Tools Required to Remove and Replace Components

These tools are required to service parts inside the Origin200 server:

- #2 Phillips screwdriver
- grounding (wrist) strap
- needlenose pliers or large tweezers (when servicing the fans)

Miscellaneous Fasteners

The following miscellaneous fasteners are used in the Origin200 server:

- plastic rivets to attach the fans to the fan bulkhead; spare rivets are included with replacement fans from Silicon Graphics
- screws, Phillips, 6-32 x 1/4-inch, for internal components and attaching rack ears to a rackmount system
- screws, Phillips, 10-32 x 1/2-inch, for attaching a rackmount system to an equipment rack
- washers, #10 (.203 ID x .562 OD x .040 inch thick), for use with 10-32 x 1/2-inch screws in rackmounting

Removing and Replacing Internal Parts

This section describes how to remove and install the following internal parts of the Origin200 server:

- SCSI backplane
- fans
- logic carrier
- power supply
- system controller

Procedures to remove and replace the following components are described in other chapters in this guide:

- Memory is described in Chapter 6, “Installing and Removing Memory.”
- PCI boards are described in Chapter 7, “Installing and Removing PCI Option Boards.”
- 3.5-inch and 5.25-inch peripherals are described in Chapter 8, “Installing and Configuring Peripherals.”

Preparing the Origin200 for Servicing

This procedure applies to all subsequent service instructions in this chapter, except for replacing the module system controller.

Follow these steps to prepare the Origin200 for servicing:

1. Shut down the system.
2. Turn off the main power switch.
3. Disconnect all of the cables that are attached to the rear of the system (power, CrayLink Interconnect, Ethernet, and so on).
4. Place the system on its side on a flat work surface.

   Caution: Two people are required to lift and move the Origin200 server.

   - If the system is mounted in an equipment rack, remove it according to the instructions in "Removing a Server From an Equipment Rack," in Chapter 3, "Installing an Origin200 System in a Rack."
   - If the system is in a tower configuration, you may wish to place a thin, soft pad (such as a cloth or piece of cardboard) under the top edge of the system to keep the top-cap from becoming marred or scratched.
5. Remove the chassis access cover, as shown in Figure 10-1.

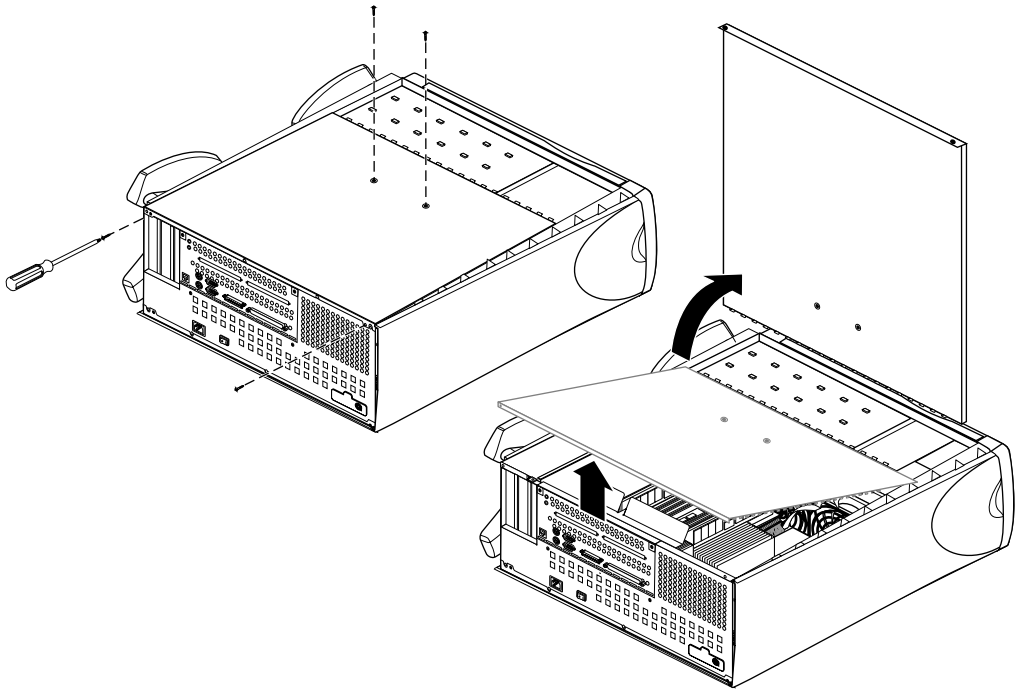

Figure 10-1 Removing the Chassis Access Cover

6. Attach one end of a grounding strap to your wrist and the other to a metal portion of the Origin200 chassis.

Warning: Whenever you work on internal components, always use a grounding (wrist) strap to prevent the flow of potentially damaging static electricity.

You are now finished preparing the system for servicing. Proceed with the next appropriate section, depending upon which component you are replacing.

Replacing the SCSI Backplane

If you have not done so already, follow the procedures in "Preparing the Origin200 for Servicing" to make sure the system is opened up and ready to work on.

1. Remove any 3.5-inch drives from the drive bays.
2. Detach the power cables from the SCSI backplane.
   - Note that the power cable plugs differ from each other. Figure 10-2 shows their locations.
   - If you are able, detach the SCSI cable from its connector; otherwise, wait until the backplane is partway out of the chassis.

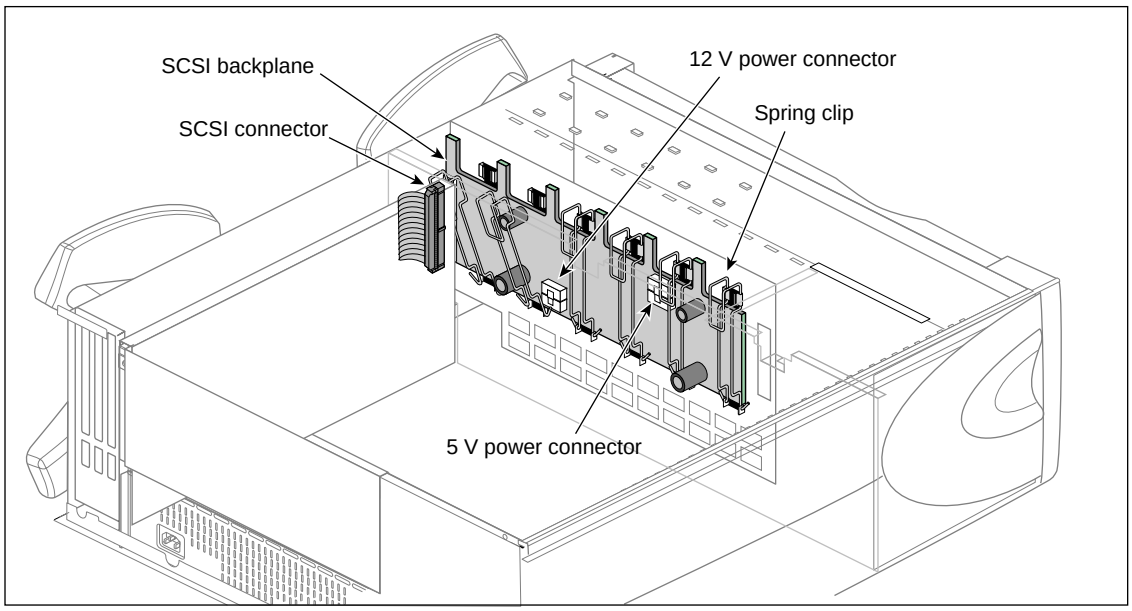

Figure 10-2 Cable Connections and Spring Clips on the SCSI Backplane

3. Snap down the six spring clips on the SCSI backplane. The spring clips are shown in Figure 10-2.
4. Grasping the SCSI backplane by the edges, tilt it out. The backplane hangs on two pins; pull the backplane up off the pins.
5. With the board partway out of the chassis, unhook the SCSI cable at the left side of the SCSI backplane, if you have not already done so. Remove the backplane from the chassis and set it aside.

Installing a New SCSI Backplane

Follow these steps to install a new SCSI backplane:

1. Hang the new SCSI backplane over the guide pins on the sheet metal wall (the one towards the front of the chassis).
2. As you lower the board in place, gently press in at the bottom of the board.
3. Push the top of the SCSI backplane towards the sheet metal wall, being careful not to damage the LEDs as you guide them through their respective holes.
4. Reattach the cables.
5. Snap the six spring clips back up into place.

Replacing Fans

If you have not done so already, follow the procedures in "Preparing the Origin200 for Servicing" to make sure the system is opened up and ready to work on. Once you have opened the Origin200 chassis, follow these steps to remove a fan:

1. Unplug the power connector from the fan to the power supply, as shown in Figure 10-3.
2. Remove the two plastic rivets that hold the fan to the sheet metal, as shown in Figure 10-3. Push them out from behind the sheet metal with your fingertip.
   - Fan 1 is directly behind the 5.25-inch drive bay.
   - Fan 2 is in the middle, between fans 1 and 3.
   - Fan 3 is closest to the PCI backplane.

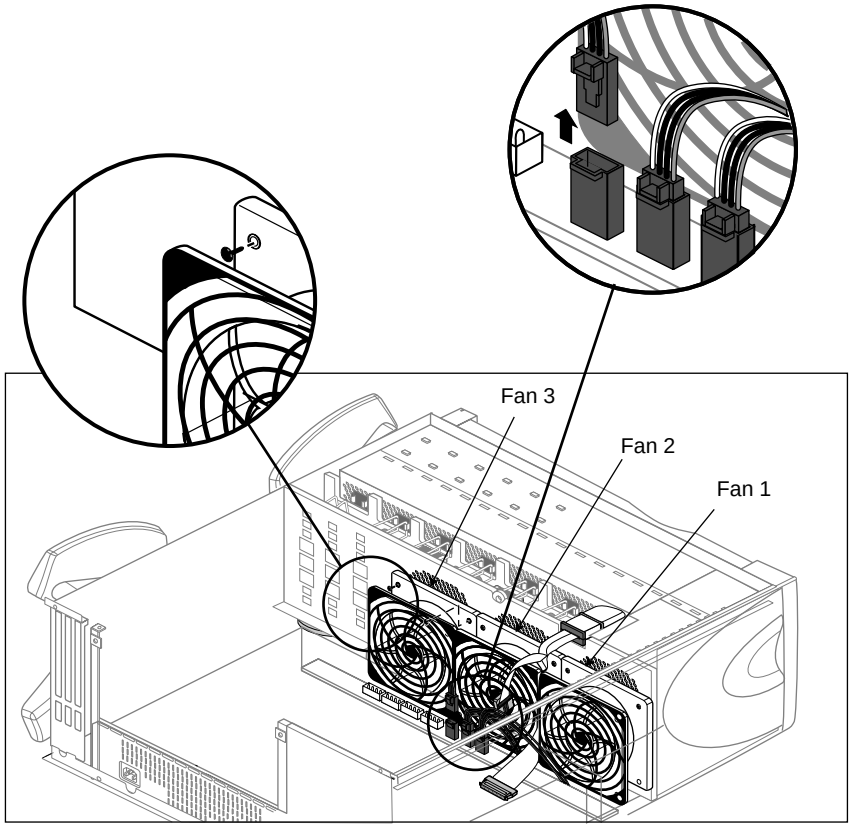

Figure 10-3 Disconnecting the Fan and Fan Power Cable (Other Components Removed for Clarity)

3. Lift the fan out of the system, as shown in Figure 10-4.

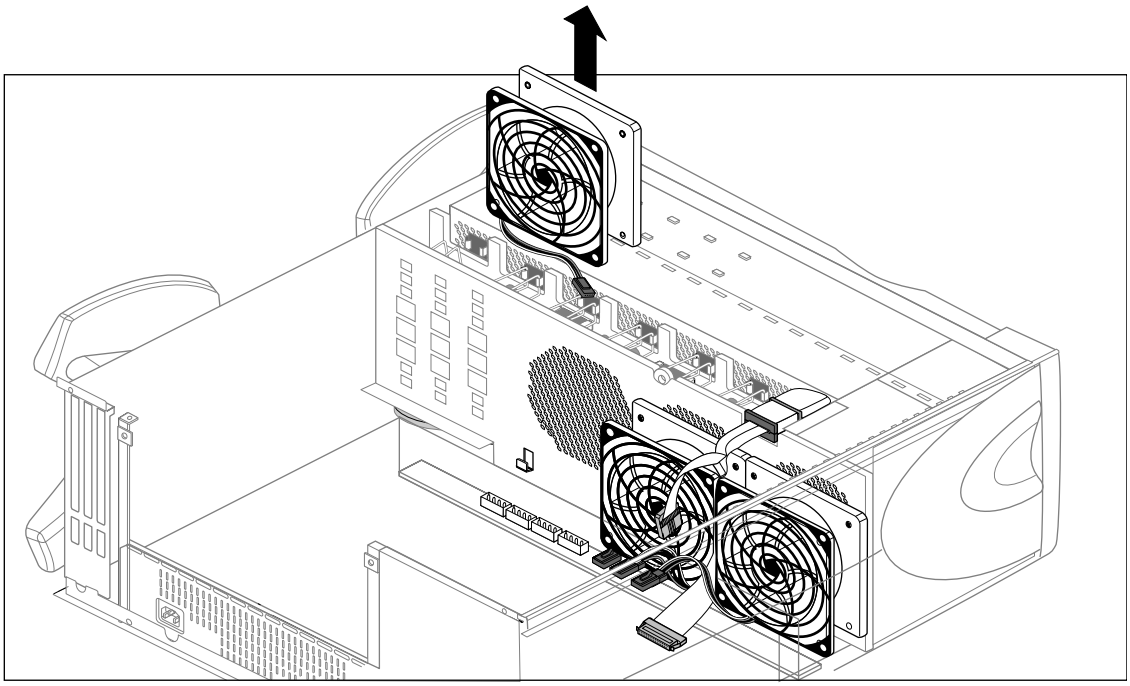

Figure 10-4 Removing the Fan From the System

Installing a New Fan

Follow these steps to install a fan:

1. Lower the new fan into the system.
2. Snap a plastic rivet in the top corners of the fan to secure it to the sheet metal.
   - The rivet has two parts: a sleeve and a pin.
   - Place the pin partway inside the sleeve, then slide both through the hole in the fan.
   - Press the pin and sleeve together towards the sheet metal. The pin and sleeve will slide into place with the ends of both protruding through the sheet metal.
   - If you have large hands or fingers, you may find it easier to handle the rivets with needlenose pliers or large tweezers.

Replacing the Logic Carrier

If you have not done so already, follow the procedures in "Preparing the Origin200 for Servicing" to make sure the system is opened up and ready to work on. Once you have opened the Origin200 chassis, follow these steps to remove the logic carrier:

1. If there are any PCI boards in the system, remove them.
2. Using a #2 Phillips screwdriver, remove the sheet metal screw and captive fastener that secure the PCI plenum divider and lift the divider out of the system. See Figure 10-5.

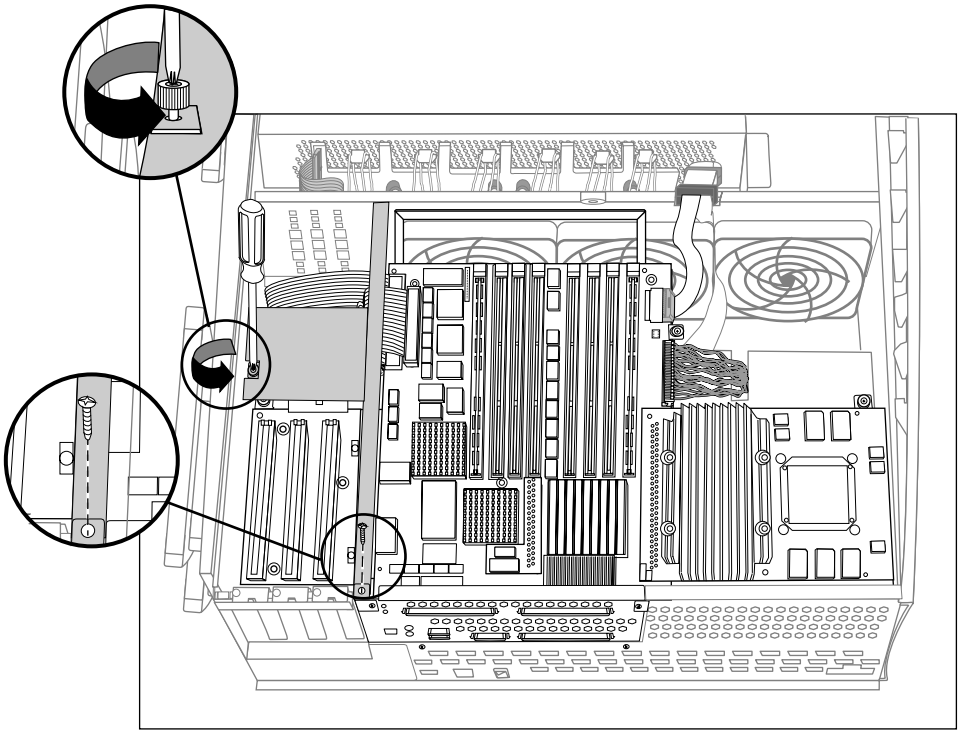

Figure 10-5 Unfastening the PCI Plenum Divider Sheetmetal

3. Lift the PCI plenum divider sheetmetal out of the system, as shown in Figure 10-6.

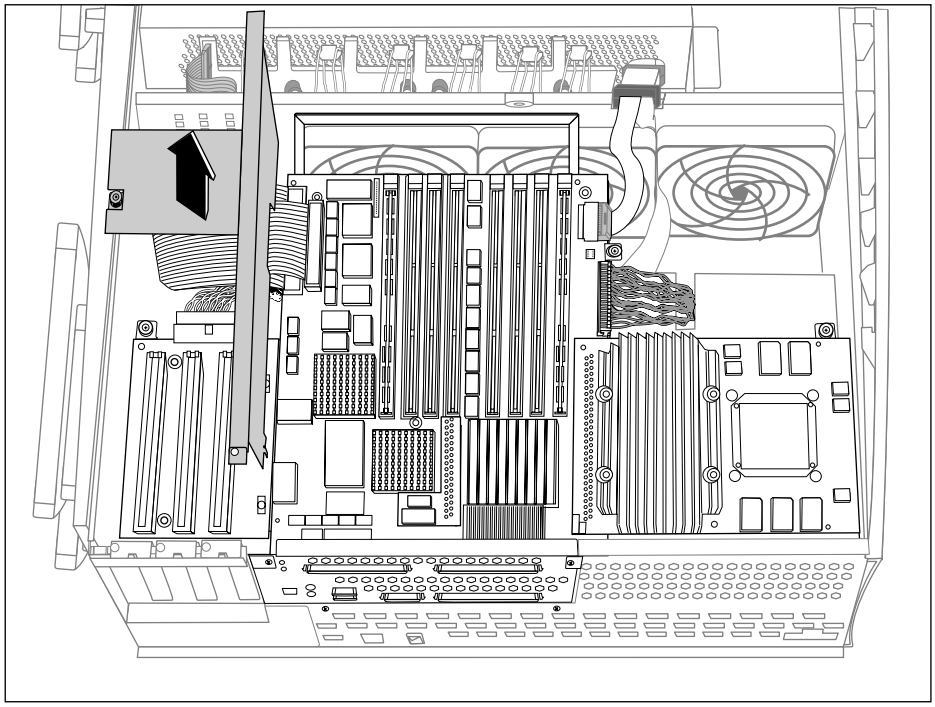

Figure 10-6 Removing the PCI Plenum Divider

4. Disconnect the cables that are attached to the logic carrier, as shown in Figure 10-7.
   - Detach the two SCSI cables.
   - Disconnect the power connector.
   - Remove the system controller cable.
   - Disconnect the PCI power cable.

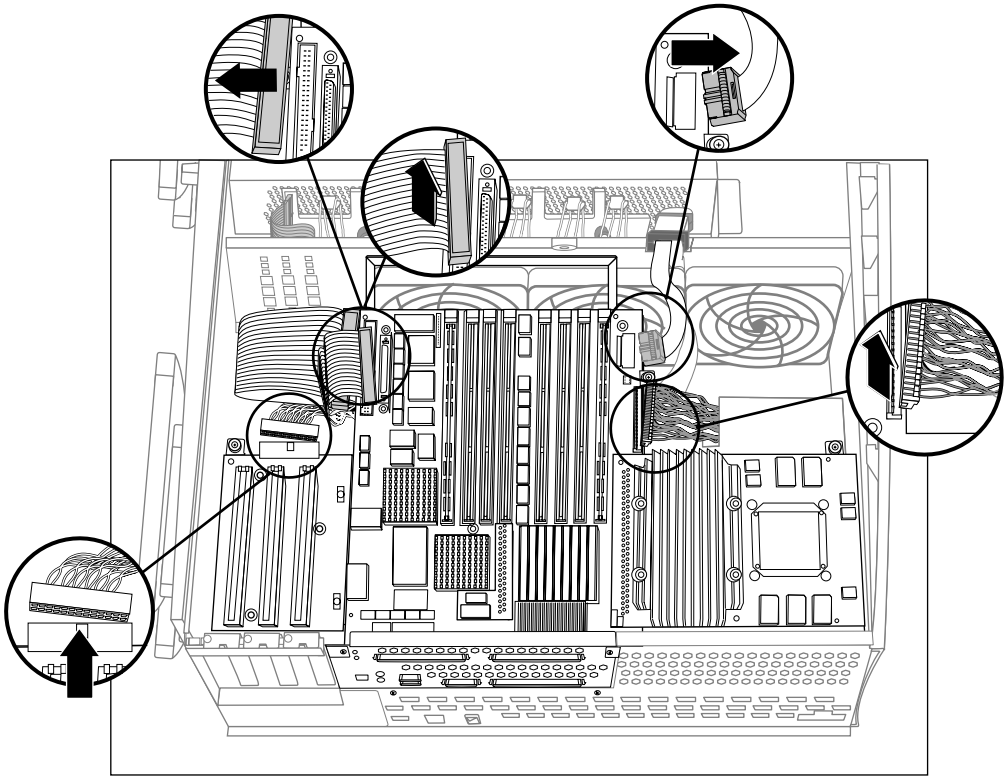

Figure 10-7 Disconnecting Cables from the Logic Carrier

5. Unfasten the captive screws and sheet metal screws that secure the logic carrier. See Figure 10-7.

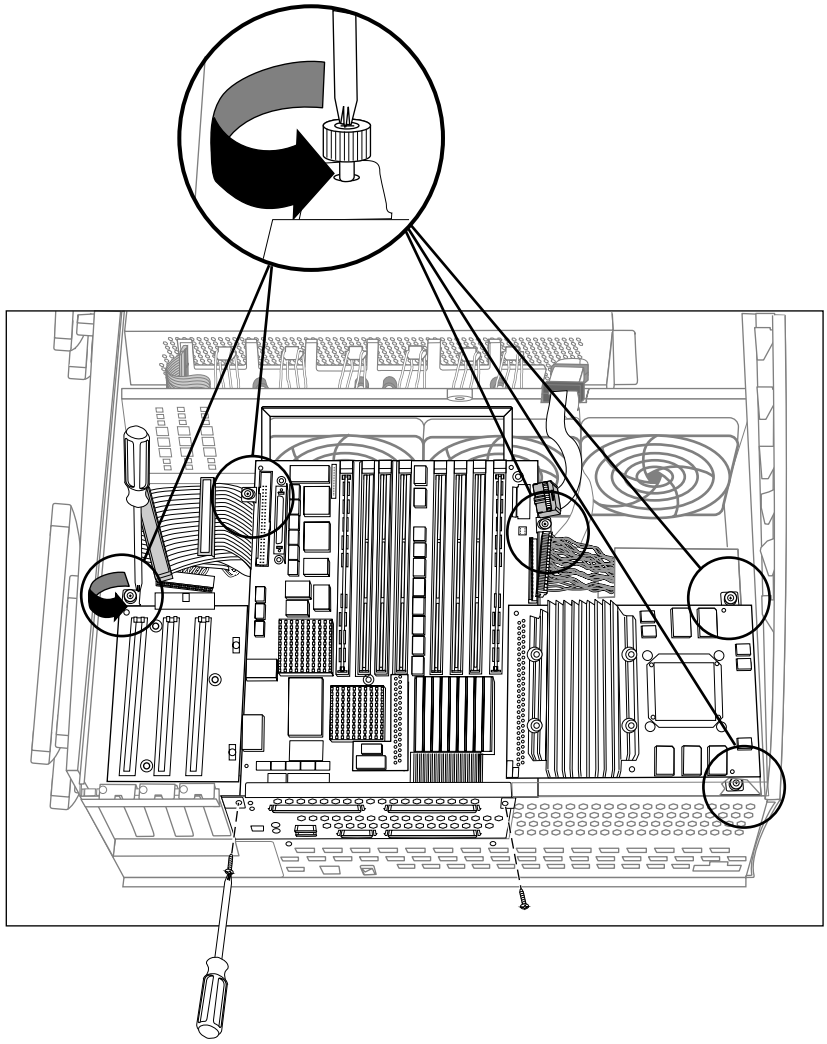

Figure 10-8 Unfastening the Logic Carrier

6. Lift the logic carrier out of the system, as shown in Figure 10-9.
   - Grasp the logic carrier handle with one hand and the connector panel with the other.
   - As you lift the logic carrier, tilt the side with the CPU daughter card up slightly higher than the side with the PCI backplane. Angling the logic carrier in this way makes it easier remove.

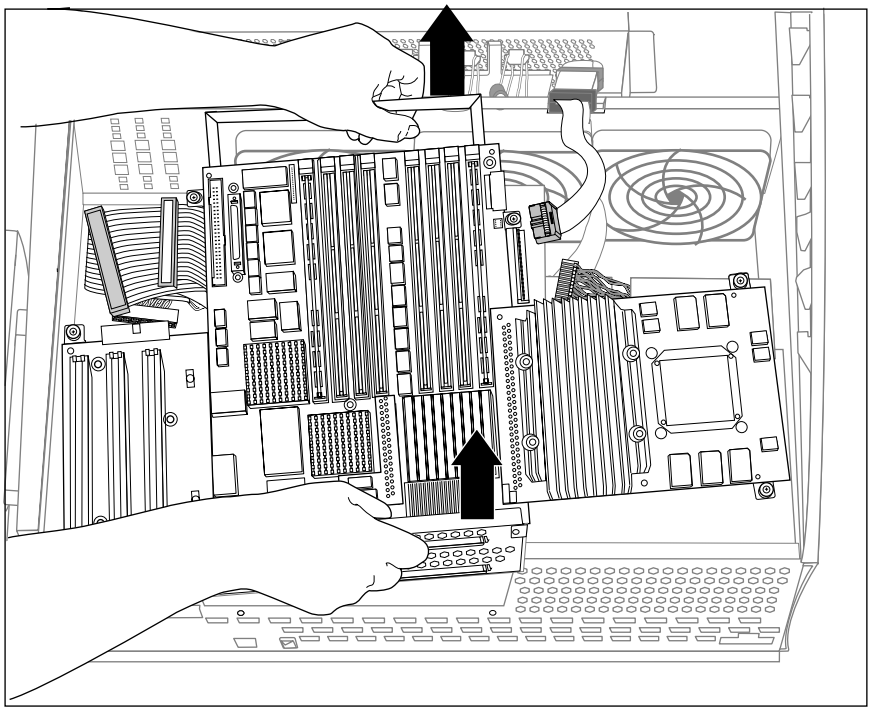

Figure 10-9 Removing the Logic Carrier

Installing a New Logic Carrier

Follow these steps to replace the logic carrier.

1. Lower the new logic carrier into the system, as shown in Figure 10-10.

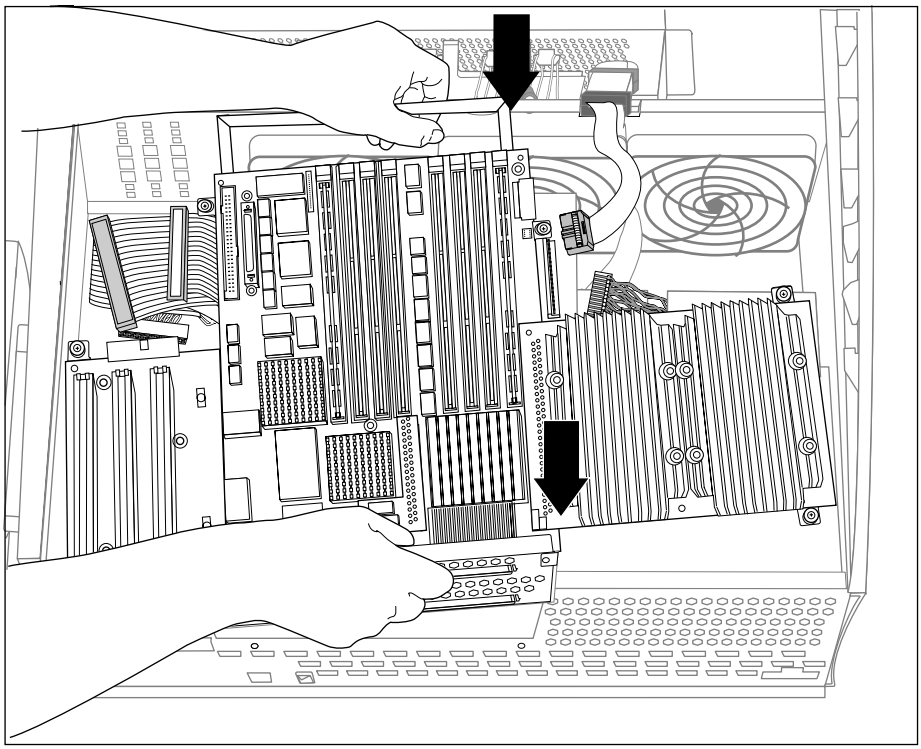

Figure 10-10 Lowering A Logic Carrier Into the System

2. Secure the logic carrier by tightening the captive fasteners and installing the sheet metal screws, as shown in Figure 10-11.

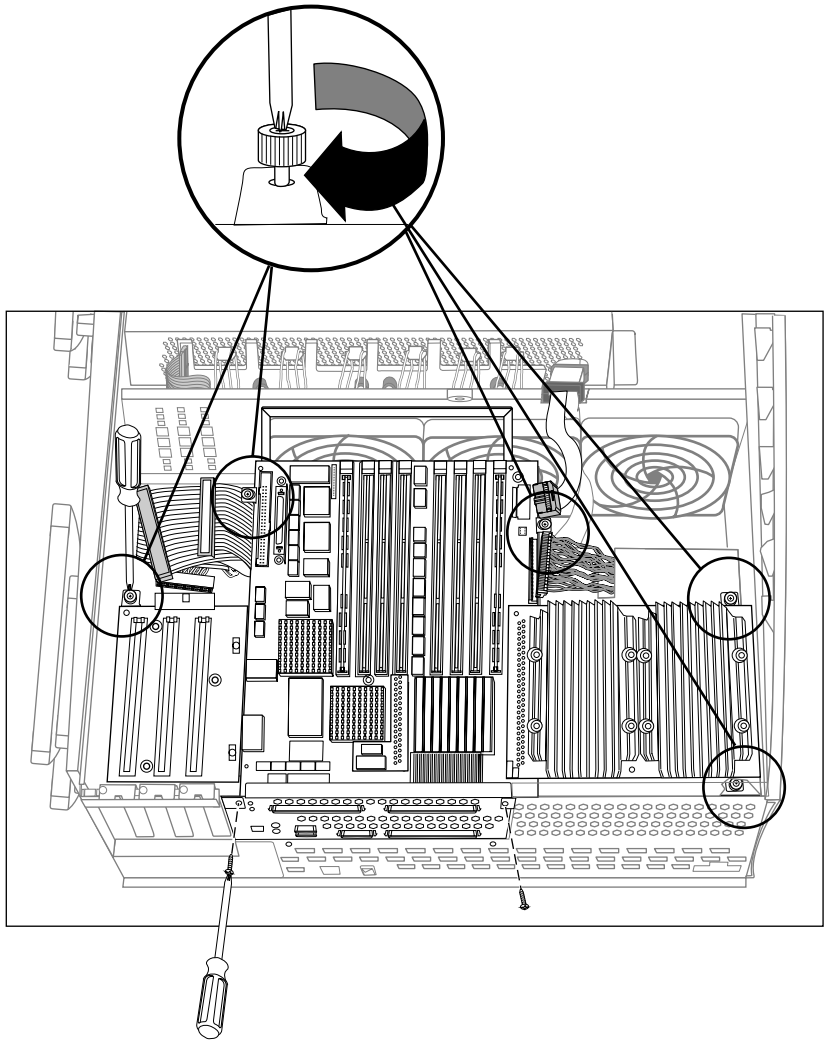

Figure 10-11 Fastening the Logic Carrier

3. Attach the power, SCSI, and system controller cables to the logic carrier, as shown in Figure 10-12.

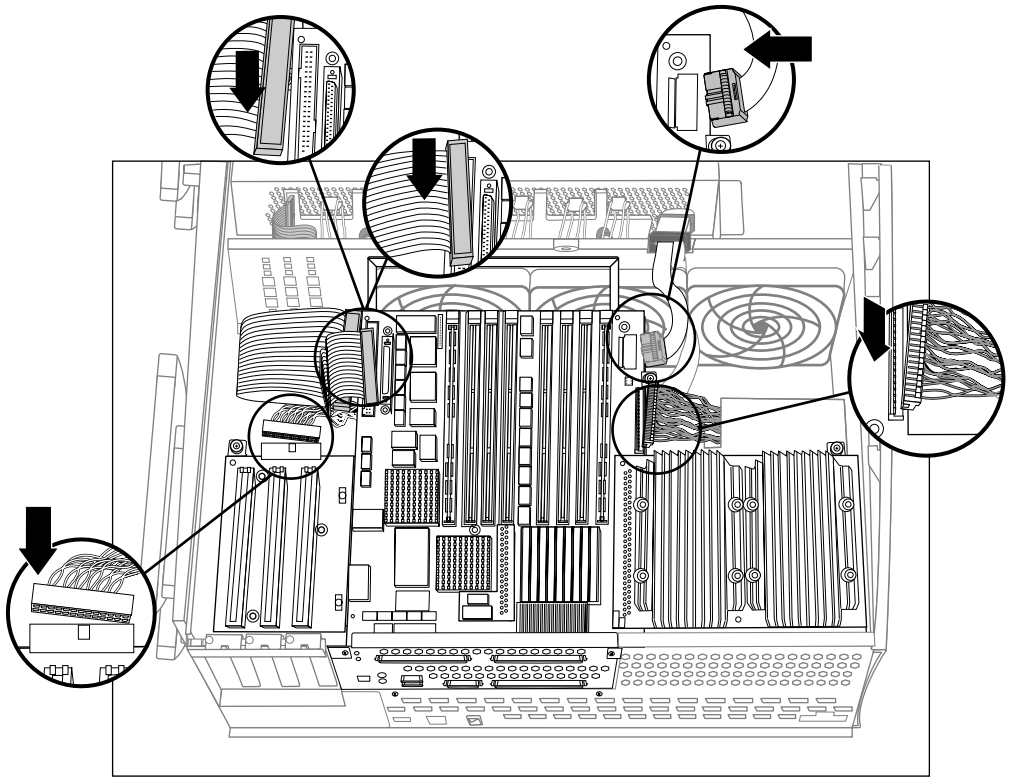

Figure 10-12 Attaching the Logic Carrier Cables

4. Install the PCI plenum divider sheet metal as shown in Figure 10-13.
   - Be extremely careful not to pinch the SCSI cables when installing the PCI plenum divider.
   - Make sure that the SCSI cables are not underneath the plenum divider captive screw.

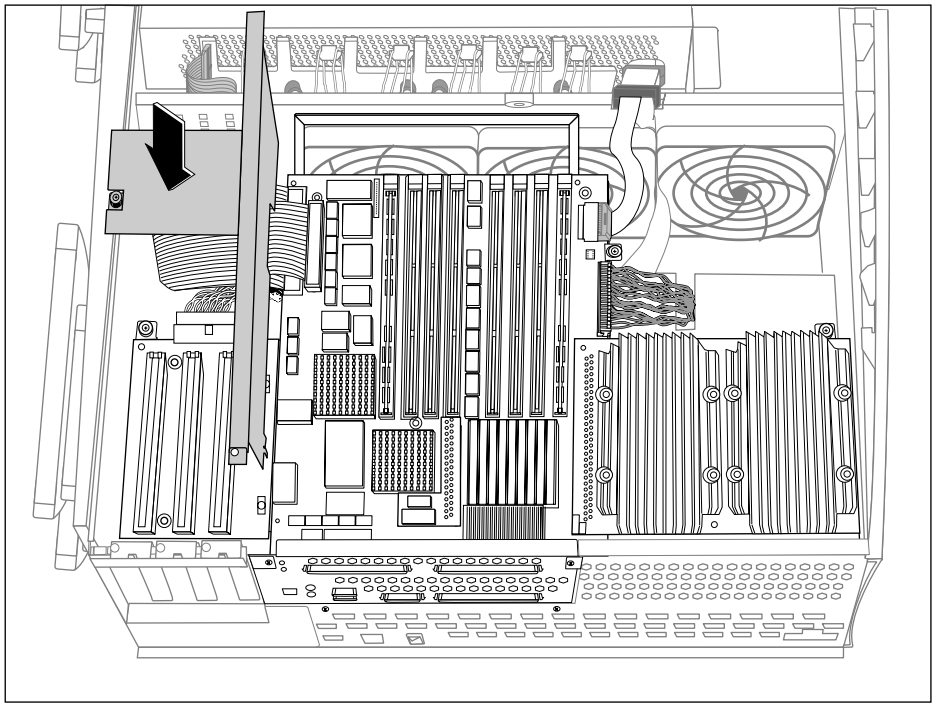

Figure 10-13 Installing the PCI Plenum Divider

5. Fasten the PCI plenum divider by tightening the captive screw and installing the sheet metal screw, as shown in Figure 10-14.

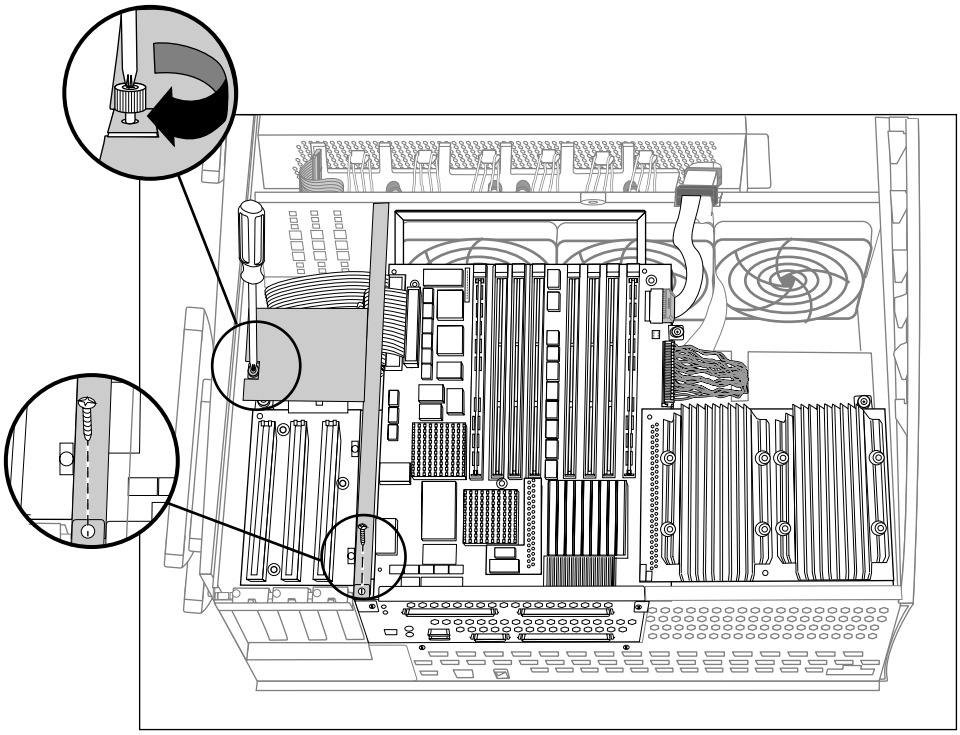

Figure 10-14 Fastening the PCI Plenum Divider

You are finished replacing the logic carrier. You can now reinstall any PCI option boards that were present in the system, and return the system to working order.

Replacing the Power Supply

If you have not done so already, follow the procedures in "Preparing the Origin200 for Servicing" to make sure the system is opened up and ready to work on.

Once you have opened the Origin200 chassis, follow these steps to remove the power supply:

Follow these steps to replace the power supply.

1. Remove any PCI boards that are in the system.
2. Remove the logic carrier as described in "Replacing the Logic Carrier" on page 205.
3. Disconnect all cables from the power supply: fan power, the combined SCSI backplane and 5.25-inch drive power connector, and module system controller cable.
4. Using a #2 Phillips screwdriver, remove the screws that secure the power supply to the chassis, as shown in Figure 10-15.
   - There are six screws at the rear of the power supply.

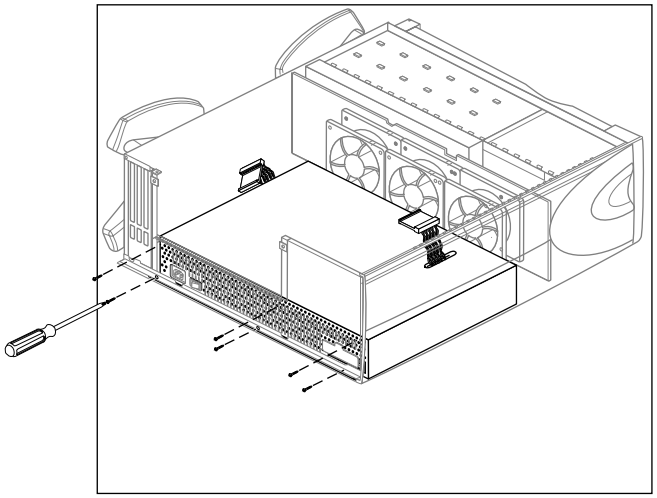

Figure 10-15 Removing the Power Supply Screws

5. Remove the power supply, as shown in Figure 10-16.
   - Slide the power supply forward (towards the fans) until it unlatches from the chassis.
   - Lift the power supply out of the system.

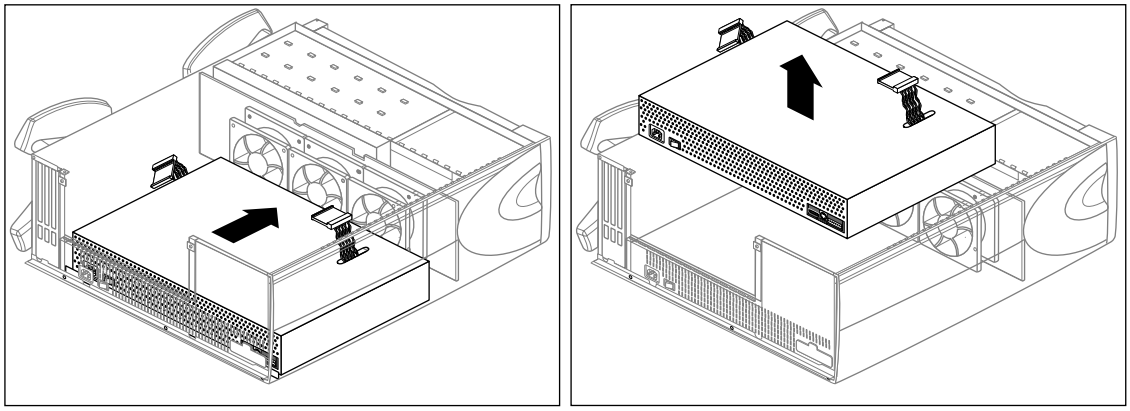

Figure 10-16 Removing the Origin200 Server Power Supply

Installing a New Power Supply In the Origin200 Server

Follow these steps to install a new power supply in an Origin200 server:

1. Lower the power supply into the chassis with the power switch and receptacle towards the rear of the system.
2. Slide the power supply back until it latches on the underside and the power switch and receptacle are flush with the back of the chassis.

3. Install the screws at the rear of the system, as shown in Figure 10-17.
   - Six screws secure the power supply to the chassis.

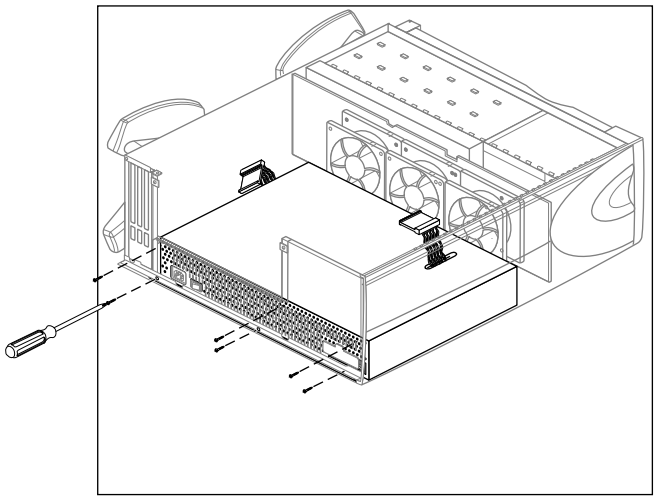

Figure 10-17 Location of Origin200 Server Power Supply Screws

4. Reconnect some of the cables: fan power cables, SCSI drive power cable, module system controller cable.
5. Install the logic carrier and any PCI boards.
6. Replace the chassis access cover.
7. If the system is in a tower configuration, replace both side panels.

Replacing the Module System Controller

Note: For this procedure, you do not have to follow the instructions in "Preparing the Origin200 for Servicing." The module system controller can be removed with the system in place and fully assembled.

The module system controller (MSC) is mounted on a sheet-metal carrier to form a single, assembly. This assembly is housed behind the plastic bezel crossbar that forms the system front panel (where the status LED is located).

Follow these steps to remove the MSC:

1. Power the system off and turn off the master power switch.
2. Open the front door.
3. Remove the front panel.
   - With your index finger, press against the catch on the inside of the recess in the crossbar, on the outside (right or top) of the recess. This recess is where the door lock fits. See Figure 10-18.
   - The crossbar swings out, hinging on the far side from the catch. Pull the crossbar out and set it aside.

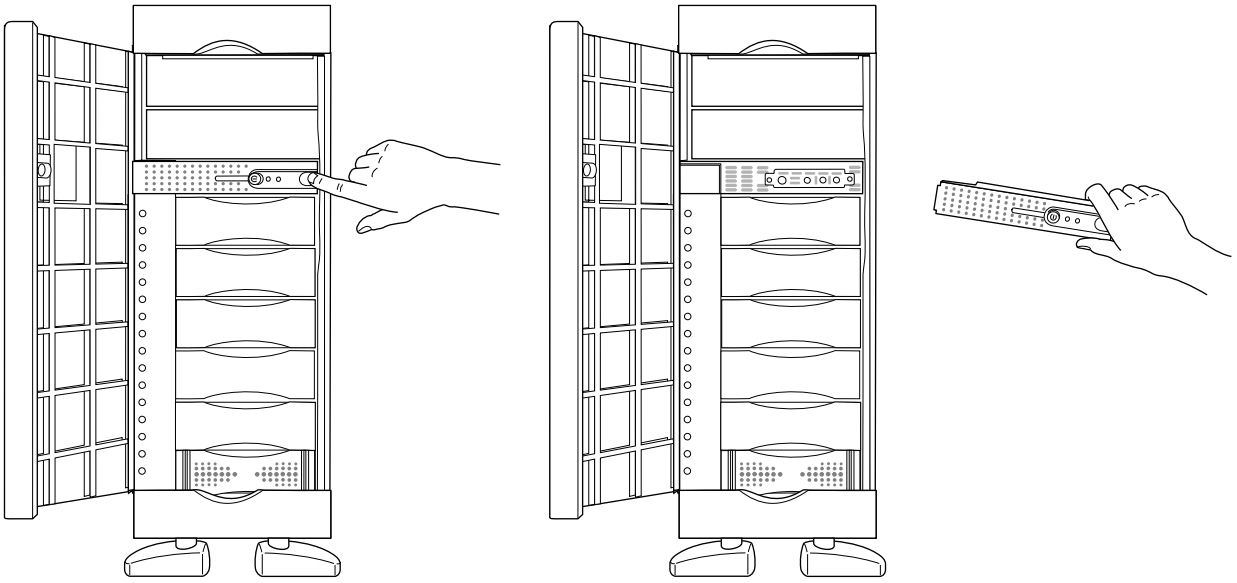

Figure 10-18 Removing the Front Bezel Crossbar

4. Using a #2 Phillips screwdriver, remove the two screws that fasten the system controller assembly to the chassis, as shown in Figure 10-19.

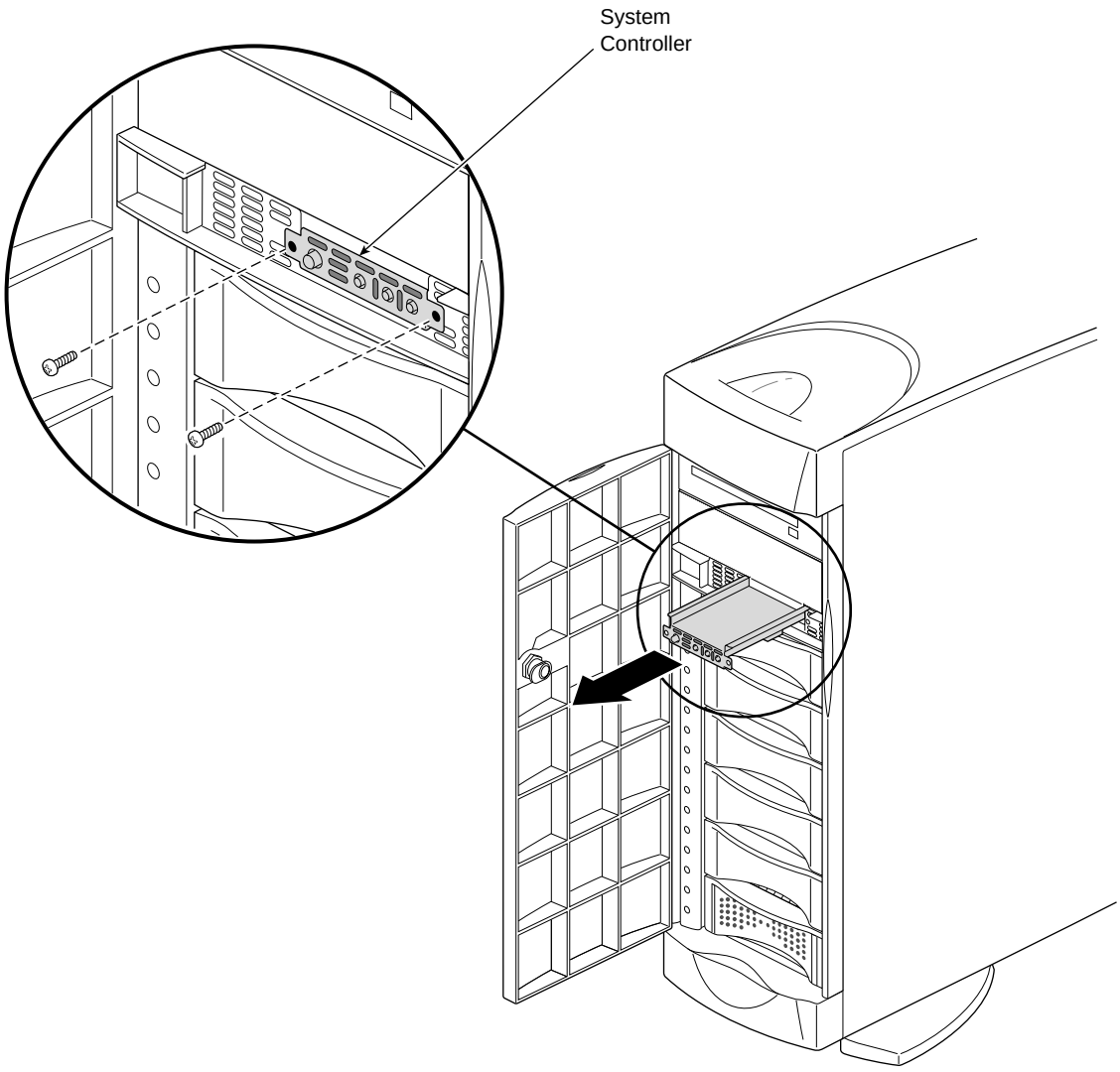

Figure 10-19 Removing the System Controller Assembly From the Chassis

5. Pull out the system controller assembly and lay it on a flat worksurface.

   Caution: To prevent ESD damage to the module system controller, be careful not to touch the board's edge connectors (gold fingers).

6. Remove the system controller board from its carrier; it is secured by a screw and two pins, as shown in Figure 10-20.
   - Using a #2 Phillips screwdriver, remove the screw.
   - Slide the board on the carrier until you can lift the board off the pins.

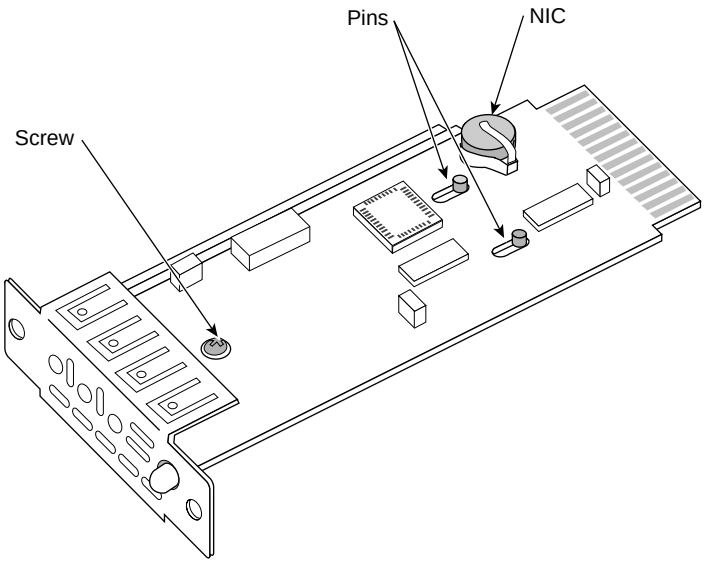

Figure 10-20 Removing the Module System Controller Board From Its Carrier

7. Remove the NIC (number in a can) package from the controller board. The NIC is a silver-colored device located at the rear of the controller board. It looks like a very large watch battery. See Figure 10-21.
   - The NIC stores the system serial number and should stay with your original Origin200 server.
   - Slide the NIC out of its socket and put it aside. You will install the NIC in the replacement module system controller.

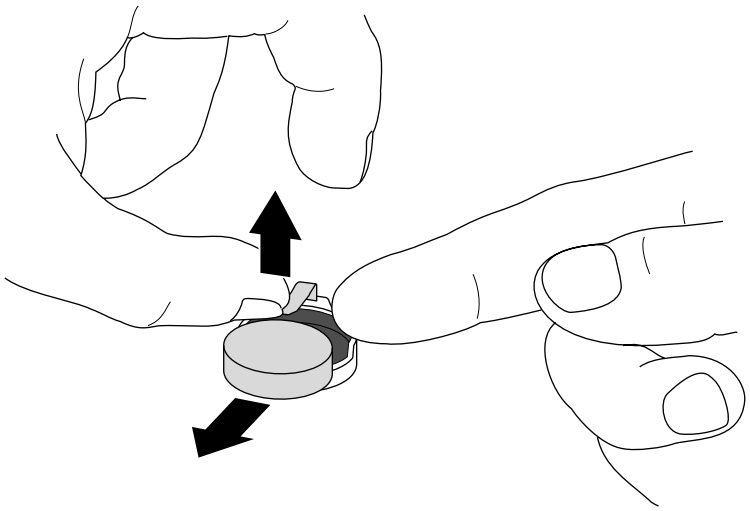

Figure 10-21 Removing the NIC From the Module System Controller

Installing a New Module System Controller

Follow these steps to attach a new module system controller board to the sheet metal carrier and install it in the system:

1. Install the NIC from the original module system controller on the replacement controller board.
2. Position the replacement controller board over the pins in the carrier; grasping the board by its sides, slide it so that the pins lock, making sure that the LED and button go through
the proper holes. Screw in the reserved screw (shown in Figure 10-20).
3. Remove the disks (or blanking plates if no disks are installed) from slots 5 and 6 of the Origin200 server. Removing the disks (or blanking plates) allows you to see how the edge connector on the module system controller board aligns with its socket inside the chassis.
4. Slide the system controller assembly into the chassis.
   - The assembly only installs in one direction.
   - If necessary, guide the edge connector into its socket.
   - When the edge connector is fully seated, the front of the carrier assembly should be flush with the chassis.

Caution: To prevent ESD damage to the module system controller, be careful not to touch the board's edge connectors (gold fingers).

5. Replace the two Phillips screws that hold the carrier in place.
6. Replace the crossbar bezel.

Appendices

These appendices include information about connector pinouts, cables, and supported terminals.

Appendix A

Connector Pinout Assignments

This appendix describes the pinouts of the following external connectors on an Origin200 server:

- "Serial Ports" on page 227
- "Parallel Port" on page 229
- "Ethernet Port" on page 231
- "AUX Port" on page 232 (module system controller)
- "External Interrupt Ports" on page 233

For a description of cables that can be used with the serial and diagnostic ports, see Appendix B, "Cable Descriptions."

Serial Ports

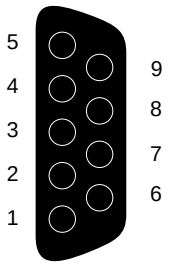

Figure A-1 Origin200 Serial Port Pinout Assignments

Table A-1 shows the connector pin assignments for the serial ports in RS-232 mode.

Table A-1 Origin200 Serial Port Pin Assignments, RS-232 Mode

Pin	Assignment
1	Data Carrier Detect (DCD)
2	Receive Data (RXD)
3	Transmit Data (TXD)
4	Data Terminal Ready (DTR)
5	Ground (GND)
6	Data Set Ready (DSR)
7	Request To Send (RTS)
8	Clear To Send (CTS)
9	(Not Connected)

Table A-2 shows the connector pin assignments for the serial ports in RS-422 mode:

Table A-2 Origin200 Serial Port Pin Assignments, RS-422 Mode

Pin	Assignment
1	(Reserved)
2	Receive Data– (RXD–)
3	Transmit Data– (TXD–)
4	Transmit Data+ (TXD+)
5	Signal Ground (GND)
6	Receive Data+ (RXD+)
7	Output Handshake (HSKo)
8	Input Handshake (HSKi)
9	(Reserved)

Parallel Port

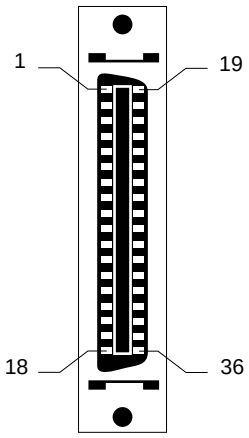

Figure A-2 Origin200 Parallel Port Pinout Assignments

The Origin200 parallel port uses a 36-pin Centronics connector (IEEE 1284-C). Table A-3 shows the connector pinout assignments for the parallel port.

Table A-3 Origin200 Parallel Port Pin Assignments

Pin	Assignment
1	STB
2	DATA1
3	DATA2
4	DATA3
5	DATA4
6	DATA5
7	DATA6
8	DATA7
9	DATA8
10	ACK

Table A-3 (continued) Origin200 Parallel Port Pin Assignments

Pin	Assignment
11	BUSY
12	PE
13	ONLINE
14	PR/SC
15	NOPAPER
16	(Not Connected)
17	NOINK
18	(Not Connected)
19–30	Signal Ground (GND)
31	RESET
32–36	(Not Connected)

Ethernet Port

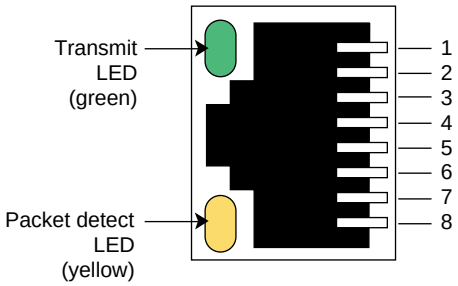

Figure A-3 Origin200 Ethernet 10-Base-T/100-Base-TX Port Pinout Assignments

Table A-4 shows the connector pinout assignments for the Ethernet 10-Base-T/100-Base-TX port.

Table A-4 Origin200 Ethernet 10-Base-T/100-Base-TX Port Pin Assignments

Pin	Assignment
1	Transmit +
2	Transmit –
3	Receive +
4	(Reserved)
5	(Reserved)
6	Receive –
7	(Reserved)
8	(Reserved)

AUX Port

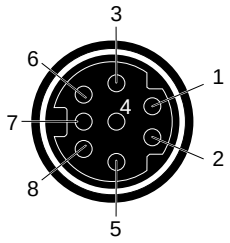

Figure A-4 Origin200 AUX Port Pinout Assignments

The AUX port is used to communicate with the module system controller (MSC). You can attach a serial (ASCII) terminal to the port, or attach a modem for remote access. Table A-5 shows the connector pin assignments for the port.

Table A-5 Origin200 AUX Port Pin Assignments

Pin	Assignment	Description
1	DTR	Data Terminal Ready
2	CTS	Clear to Send
3	TXD	Transmit Data
4	GND	Ground
5	RXD	Receive Data
6	RTS	Request to Send
7	DCD	Data Carrier Detect
8	GND	Ground

Note: These pin assignments are the same as the ones for the serial ports on the Silicon Graphics Indy and Indigo^2 workstations and the CHALLENGE S server. Cables that are appropriate for the serial ports of those systems can be used with the AUX port as well.

External Interrupt Ports

The external interrupt interface uses two 1/8″ (3.5 mm) stereo jacks: one to generate interrupts and one to receive interrupts. The jacks are located on the back of the Origin200 server and are wired as indicated in Table A-6:

Table A-6 External Interrupt Port Conductors

Conductor	Function
Tip	Interrupt (active low)
Ring	+5 V
Sleeve	Chassis ground and cable shield

When constructing interrupt cables, use two-conductor, shielded cable, wired straight through (tip-to-tip, ring-to-ring, sleeve-to-sleeve using the shield). For more information on the external interrupt interface, see the ei(7) man page.

Appendix B

Cable Descriptions

This appendix describes cables that can be used with an Origin200 system, including:

- "Serial Cables" on page 235
- "AUX Port Cables" on page 242

Serial Cables

The following sections contain descriptions of various types of serial cables that you can use to attach devices to Origin200.

Printer/Character (ASCII) Terminal Cable

The cable described in this section attaches a printer or a character (ASCII) terminal to the Origin200 server. The server ships with a cable of this type, and you can purchase an additional or replacement cable from Silicon Graphics or your local service provider.

Table B-1 shows the cable connector pin assignments.

Table B-1 Connector Pin Assignments for Printer/Character (ASCII) Terminal Serial Cable

Pin Number (DB9 Female)	Pin Number (DB25)	Signal
1	N/C (not connected)	N/C
2	2	Receive Data (RXD)
3	3	Transmit Data (TXD)
4	N/C	N/C
5	7	Ground (GND)
6	N/C	N/C
7	N/C	N/C
8	N/C	N/C
9	N/C	N/C

Modem Cable (Full-Handshake)

This modem cable provides request-to-send (RTS) and clear-to-send (CTS) connections, and is appropriate for a modem with RTS/CTS flow control. This cable also works with other serial devices (except printers and terminals) that do not need RTS/CTS flow control, and you can use it with a null modem adapter to attach printers and character terminals. You can purchase this full-handshake serial cable from Silicon Graphics or from your local service provider.

Table B-2 shows the cable connector pin assignments.

Table B-2 Connector Pin Assignments for a Modem Cable

Pin Number (DB9 Female)	Pin Number (DB25)	Signal
1	8	Data Carrier Detect (DCD)
2	3	Receive Data (RXD)
3	2	Transmit Data (TXD)
4	20	Data Terminal Ready (DTR)
5	7	Ground (GND)
6	6	Data Set Ready (DSR)
7	4	Request To Send (RTS)
8	5	Clear To Send (CTS)
9	N/C	N/C

Origin200 to Indy and Indigo^2 Cable (DB9 to DIN-8)

This serial cable connects Silicon Graphics Indy and Indigo^2 workstations to an Origin200 system.

Table B-3 shows the cable connector pin assignments.

Table B-3 Connector Pin Assignments for an Origin200 to Indy and Indigo^2 Serial Cable

Pin Number (DB9 Female)	Signal	Pin Number (DIN-8 Male)	Signal
1	Data Carrier Detect (DCD)	1	DTR
2	Receive Data (RXD)	3	TXD
3	Transmit Data (TXD)	5	RXD
4	Data Terminal Ready (DTR)	7	DCD
5	Ground (GND)	4	GND
6	Data Set Ready (DSR)	N/C	N/C
7	Request To Send (RTS)	2	CTS
8	Clear To Send (CTS)	6	RTS
9	N/C	N/C	N/C

Origin200 to O2, Onyx2, and IBM Compatible (DB9 to DB9)

This serial cable connects an Origin200 to Silicon Graphics O2 and Onyx2 workstations, and IBM compatibles with a DB9 serial port.

Table B-4 shows the cable connector pin assignments.

Table B-4 Connector Pin Assignments for an Origin200 to O2, Onyx2, and IBM Compatible Serial Cable

Pin Number (DB9 Female)	Signal	Pin Number (DB9 Female)	Signal
1	Data Carrier Detect (DCD)	4	DTR
2	Receive Data (RXD)	3	TXD
3	Transmit Data (TXD)	2	RXD
4	Data Terminal Ready (DTR)	1	DCD
5	Ground (GND)	5	GND
6	Data Set Ready (DSR)	N/C	N/C
7	Request To Send (RTS)	8	CTS
8	Clear To Send (CTS)	7	RTS
9	N/C	N/C	N/C

Origin200 to Onyx (DB9 to DB9)

This serial cable connects an Onyx to the Origin200. Notice that the Onyx DB9 pin assignments are different from the Origin200 DB9 pin assignments.

Table B-5 shows the cable connector pin assignments.

Table B-5 Connector Pin Assignments for an Origin200 to Onyx Serial Cable

Pin Number (DB9 Female)	Signal	Pin Number (DB9 Male)	Signal
1	Data Carrier Detect (DCD)	9	DTR
2	Receive Data (RXD)	2	TXD
3	Transmit Data (TXD)	3	RXD
4	Data Terminal Ready (DTR)	8	DCD
5	Ground (GND)	7	GND
6	Data Set Ready (DSR)	N/C	N/C
7	Request To Send (RTS)	5	CTS
8	Clear To Send (CTS)	4	RTS
9	(Not Connected)	N/C	N/C

Origin200 to Macintosh Cable (DB9 to DIN-8)

This cable connects any Macintosh computer to an Origin200 system.

Table B-6 shows the cable connector pin assignments.

Table B-6 Connector Pin Assignments for an Origin200 to Macintosh Serial Cable

Pin Number (DB9 Female)	Signal	Pin Number (DIN-8 Male)	Signal
1	Data Carrier Detect (DCD)	8	RXD+
2	Receive Data (RXD)	3	TXD–
3	Transmit Data (TXD)	5 7	RXD– GPi
4	Data Terminal Ready (DTR)	6	TXD+
5	Ground (GND)	4	GND
6	Data Set Ready (DSR)	N/C	N/C
7	Request To Send (RTS)	2	HSKi
8	Clear To Send (CTS)	1	HSKo
9	(Not Connected)	N/C	N/C

AUX Port Cables

The Origin200 AUX port is an 8-pin mini-DIN connector that uses the standard RS-232 serial protocol. The next sections describe cables you can use to connect a terminal or modem to the AUX port. Table B-7 summarizes marketing codes for ordering Silicon Graphics cables described in this section.

Table B-7 SIlicon Graphics AUX Port Cables for Origin200 System

Cable	Connector Type	Marketing Code
Terminal cable	DIN-8 male to DB25 male	018-8114-001
Modem cable	DIN-8 male to DB25 male	018-8109-001

AUX Port Terminal Cable

The cable described in this section connects the Origin200 AUX port to a terminal. Note that this cable is identical to the one used to attach a terminal to a Silicon Graphics Indy, Indigo, or Indigo^2 workstation and CHALLENGE S server. The cable is available as Silicon Graphics part number 018-8114-001.

Table B-8 shows the cable connector pin assignments.

Table B-8 Connector Pin Assignments for an AUX Port Terminal Cable

Pin Number (DIN-8 Male)	Pin Number (DB25 Male)	Signal
1	N/C	N/C
2	N/C	N/C
3	3	Transmit Data (TXD)
4	7	Ground (GND)
5	2	Receive Data (RXD)
6	N/C	N/C
7	N/C	N/C
8	7	Ground (GND)

AUX Port Modem Cable

The cable described in this section connects the Origin200 AUX port to a modem. Note that this cable is identical to the one use to attach a modem to a Silicon Graphics Indy, Indigo, or Indigo^2 workstation and CHALLENGE S server. The cable is available as Silicon Graphics part number 018-8109-001.

Table B-9 shows the cable connector pin assignments.

Table B-9 Connector Pin Assignments for an AUX Port Modem Cable

Pin Number (DIN-8 Male)	Pin Number (DB25 Male)	Signal
1	20	Data Terminal Ready (DTR)
2	5	Clear To Send (CTS)
3	2	Transmit Data (TXD)
4	7	Ground (GND)
5	3	Receive Data (RXD)
6	4	Request To Send (RTS)
7	8	Data Carrier Detect (DCD)
8	7	Ground (GND)
N/C	1	N/C
N/C	6	N/C

Appendix C

Supported Terminals

The *terminfo* terminal description database provides support for over 1600 variations of character-based terminals from a wide variety of manufacturers. This appendix lists a few of the terminals supported under IRIX. For a complete list of supported terminals, examine the subdirectories of */usr/lib/terminfo*. Also, see the terminfo(4) man page for more information on the *terminfo* database.

Table C-1 shows some supported terminals and their shorthand names. When prompted for a terminal type at a `TERM=` prompt, enter the shorthand name shown in the far right column of this table.

Note: This list does not constitute an endorsement of any particular terminal or manufacturer.

Table C-1 Some Supported Terminals

Terminal Name	Vendor	Shorthand Name
Adds Viewpoint	Adds	viewpoint
Adm3a	Lear-Siegler	adm3a
AT&T 4410/5410	AT&T	4410
HP 2621	Hewlett-Packard	hp2621
IBM 3101-10	IBM	ibm
Qume Sprint 11	Qume	qume
TVI 912	Televideo	tvi912
Visual 50	Visual	vi50
VT-100	DEC	vt100
Wyse 60	Wyse Corporation	wy60

Glossary

100-Base-TX

Twisted-pair variant of 100BASE-X. Uses the physical characteristics of FDDI's TP-PMD, but uses Ethernet framing and CSMA/CD. Used in Silicon Graphics Origin and Onyx2 systems.

100-Base-X

100Mbps CSMA/CD 802.3/Ethernet-like LAN also known as Fast Ethernet. There are two types: 100BASE-TX (used in Silicon Graphics Origin and Onyx2 systems) and 100BASE-T4.

byte

A measure of data. 8 bits. *See also* kilobyte, megabyte, and gigabyte.

cache

Memory used exclusively by the CPU for temporary storage and calculations.

channel

A specific I/O bus; typically used to describe SCSI bus numbers (for example, SCSI channel 1). *See also* controller.

chassis

The mechanical framework to which components of a computer are attached.

controller

Literally the circuitry (typically an ASIC) that controls a bus or device. Also used to describe a SCSI bus as a synonym for "channel." *See also* channel.

CrayLink Interconnect

A Silicon Graphics bus technology for linking nodes. *See also* node.

dual in-line memory module (DIMM)

A module to which are attached SDRAM chips.

ECC

Error correction code; used in memory to correct for single-bit errors.

electromagnetic interference (EMI)

Electromagnetic radiation that is produced by electronic equipment, and that can interfere with radio and television reception and cause problems with other electronic devices. Computer equipment is designed to contain EMI to various extents as determined by regulatory agencies.

Fast-20

The specification for SCSI-2, on a 16-bit bus, running at 20 MHz, and capable of 40 megatransfers per second. *See also* Ultra SCSI.

gigabyte (GB)

A measure of data. 1024 megabytes (MB). *See also* byte, kilobyte, and megabyte.

hertz (Hz)

Frequency in cycles-per second.

kilobyte (KB)

A measure of data. 1024 bytes. *See also* byte, megabyte, and gigabyte.

kilogram (kg)

A unit of weight. 1000 grams (about 2.2 pounds). *See also* pound.

MAC address

Unique hexadecimal serial number assigned to each Ethernet network device to identify it on the network. With Ethernet devices (as with most other network types), this address is permanently set at the time of manufacturer. Each card has a unique MAC address, so that it will be able to exclusively copy packets that are meant for it off the network.

megabyte (MB)

A measure of data. 1024 kilobytes (KB). *See also* byte, kilobyte, and gigabyte.

megatransfer

One million bytes of combined SCSI commands and data transferred across a bus.

module

An Origin200 chassis, CPU, and memory.

module system controller (MSC)

The board that contains logic to control low-level system functions, such as power-on, power-off, and fan speed. Located behind the front panel, the Origin200 MSC also contains the NIC that holds the system serial number.

mounting ear

An angled sheet-metal adapter used to attach a chassis to the rails of an equipment rack.

number in a can (NIC)

A device mounted on a circuit board that contains information such as the serial number of the board and other information. In Origin200 systems, the NIC mounted on the module system controller contains the system serial number.

node (node board)

A board that contains one or two R10000 processors and their caches, a section of the global main memory, a crosstalk I/O port, and an inter-node routing network connection (CrayLink Interconnect).

peripheral component interconnect (PCI)

A bus specification.

pound

A unit of weight. 16 ounces (about .64 kilograms). *See also* kilogram.

programmable read-only memory (PROM)

Memory that contains data, often configuration information and low-level programs, that usually is not updated by the system. Certain types of PROMs can be updated, for example, during software installation.

RAID

Redundant array of inexpensive disks.

random access memory (RAM)

Memory used for calculations and temporary storage. *See also* cache.

read-only memory (ROM)

Memory that contains data, often configuration information and low-level programs, that cannot be updated by the system.

SCSI

Small computer systems interface. *See also* channel and controller.

system

A general term for all the components of a computer. In the case of Origin200, the system consists of one or more nodes as well as the software installed on them. *See also* node.

system console

A device to which IRIX prints various messages, and which is the first serial I/O device to become active when the system boots. As opposed to the diagnostic port, you can log in to IRIX via the system console. In Origin200, the system console is connected to serial port 1.

terminal emulation

The process by which software emulates a character-based (ASCII) terminal. *See also* terminal emulator.

terminal emulator

Software that emulates a character-based (ASCII) terminal. Typically used with modems for remote, dial-up access, a terminal emulator can also be used over a serial cable connected directly between two computers. Terminal emulators are often called a "modem software" or "communication software."

Ultra SCSI

The specification for SCSI-2, on a 16-bit bus, running at 20 MHz, and capable of 40 megatransfers per second. *See also* Fast-20.

Uniform Resource Locator (URL)

The address by which resources (files) are identified on the World Wide Web.

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