Origin™ 200 and Origin 200 GIGAchannel™ Owner's Guide

CONTRIBUTORS

Written by Kameran Kashani and Carolyn Curtis
Illustrated by Francesca Angelesco, Cheri Brown, and Kameran Kashani
Production by Carlos Miqueo
Engineering contributions by Jim Gath, Jeffrey Heller, Dave Parry, Ken Hibbard, Eric
   Williams, Demick Boyden, Steve Smithson, Dilip Amin, Richard Wright, Brad
   Morrow, Matt Robinson, Tim Wong, Tom Jackman, and Carl Strasen
St. Peter's Basilica image courtesy of ENEL SpA and InfoByte SpA. Disk Thrower
   image courtesy of Xavier Berenguer, Animatica.

FCC Warning

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

This product requires the use of external shielded cables in order to maintain compliance pursuant to Part 15 of the FCC Rules.

International Special Committee on Radio Interference (CISPR)

This equipment has been tested to and is in compliance with the Class A limits per CISPR publication 22, Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment; Germany's BZT Class A limits for Information Technology Equipment; and Japan's VCCI Class 1 limits.

Canadian Department of Communications Statement

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the Radio Interference Regulations of the Canadian Department of Communications.

Attention

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

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

警告使用者：

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

CE   CSA ®   TUV GS geprufte Sicherheit

NRTL/C

Origin 200™ and Origin 200 GIGAchannel™ Owner's Guide
Document Number 007-3708-002

Contents

List of Figures

List of Tables

About This Guide

This guide describes how to set up and operate an SGI Origin200 server. It contains the following chapters:

- Chapter 1, "Overview of the Origin200 and Origin200 GIGAchannel Server," 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, 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 and Origin200 GIGAchannel Server," 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, "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 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.

Information about installing and removing memory, option boards, and internal components are found in the Origin200 *and Origin200 GIGAchannel Maintenance Guide* (p/n 007-3709-001, or later).

In addition, this guide contains the following appendixes:

- 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.
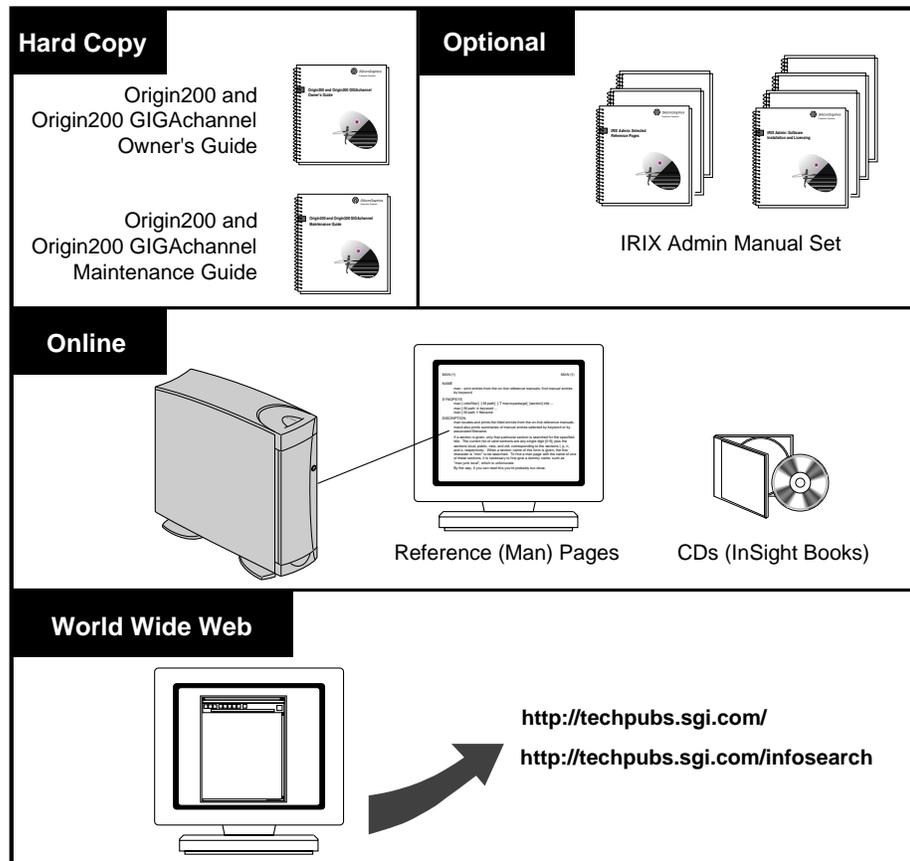
Figure i   Sources of Additional Information About Origin200

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

- "Origin200 and Origin200 GIGAchannel Owner's Guide" on page xxii

- "Optional Documentation" on page xxiii

- "Online Reference (Manual) Pages" on page xxiv

- "World Wide Web-Accessible Documentation" on page xxv

You may also wish to read these sections:

- "Release Notes" on page xxv

- "InfoSearch" on page xxv

Origin200 and Origin200 GIGAchannel Owner's Guide

Refer to the *Origin200 and Origin200 GIGAchannel Owner's Guide* (this manual) to set up the system, use the system, install peripherals (such as option drives and serial devices), and to find out about the cosmetic features of the system (such as locking the system and swiveling the feet on a tower chassis.)

Origin200 and Origin200 GIGAchannel Maintenance Guide

Refer to the *Origin200 and Origin200 GIGAchannel Maintenance Guide* to install memory, option boards (PCI and XIO), troubleshoot the system, and replace components. This book is provided with every Origin200 and Origin200 GIGAchannel server.

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 SGI 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 Filesystem*—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 IRIS InSight, you can obtain these optional books in one of the following ways:

- Visit the SGI 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

SGI 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 SGI 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 SGI 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 SGI 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*.

- IRIX commands and names of files appear in text as *italics*.

- Words that are found in the glossary are in *italics*.

- References to other chapters and sections within this guide are in quotation marks.

- 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.

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 an SGI 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 server, turn to Chapter 1, "Overview of the Origin200 and Origin200 GIGAchannel Server."

To set up the Origin200 server 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."

Overview of the Origin200 and Origin200 GIGAchannel Server

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

Installation Options: Tower and Rackmounting

The Origin200 server is a multiprocessor system that consists of one or two chassis, which are called *module*s. The Origin200 GIGAchannel uses an additional chassis to provide four extra PCI slots and five XIO slots. Each Origin200 system ships from SGI 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 SGI or your local support provider for information about obtaining a conversion kit (P-S-RM-KIT).

Figure 1-1 shows a two-module Origin200 server and a two-module Origin200 GIGAchannel server in tower configurations.

Two-module Origin200 Server   Two-module Origin200 GIGAchannel Server
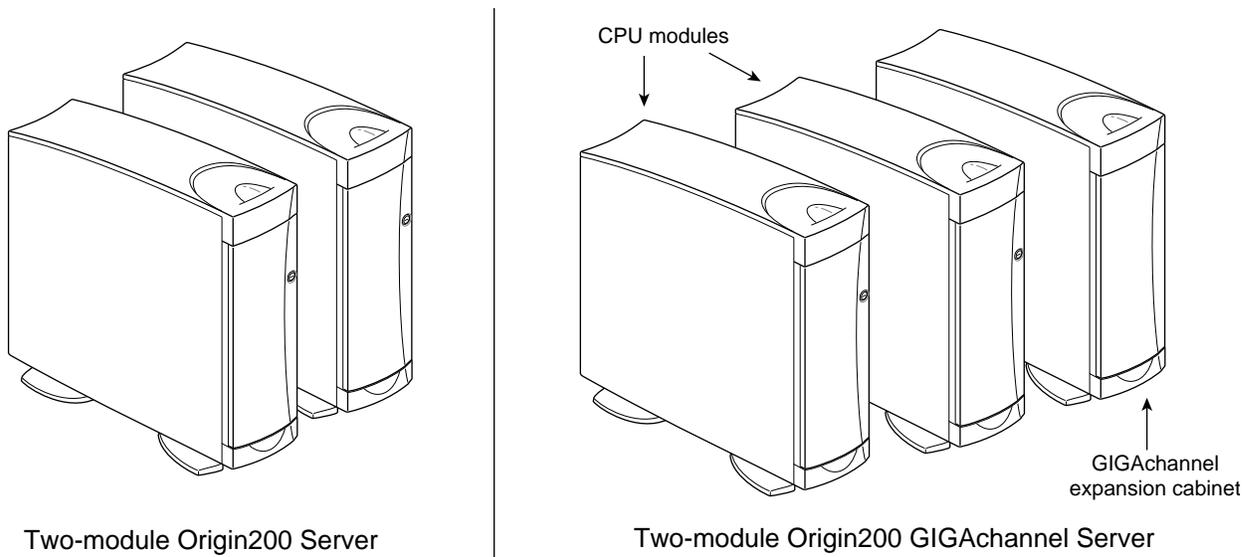
Figure 1-1   Two-Module Origin200 System, Front View

Figure 1-2 shows a rear view of a two-module Origin200 server and a two-module Origin200 GIGAchannel server.

Two-module Origin200 Server

Two-module Origin200 GIGAchannel Server
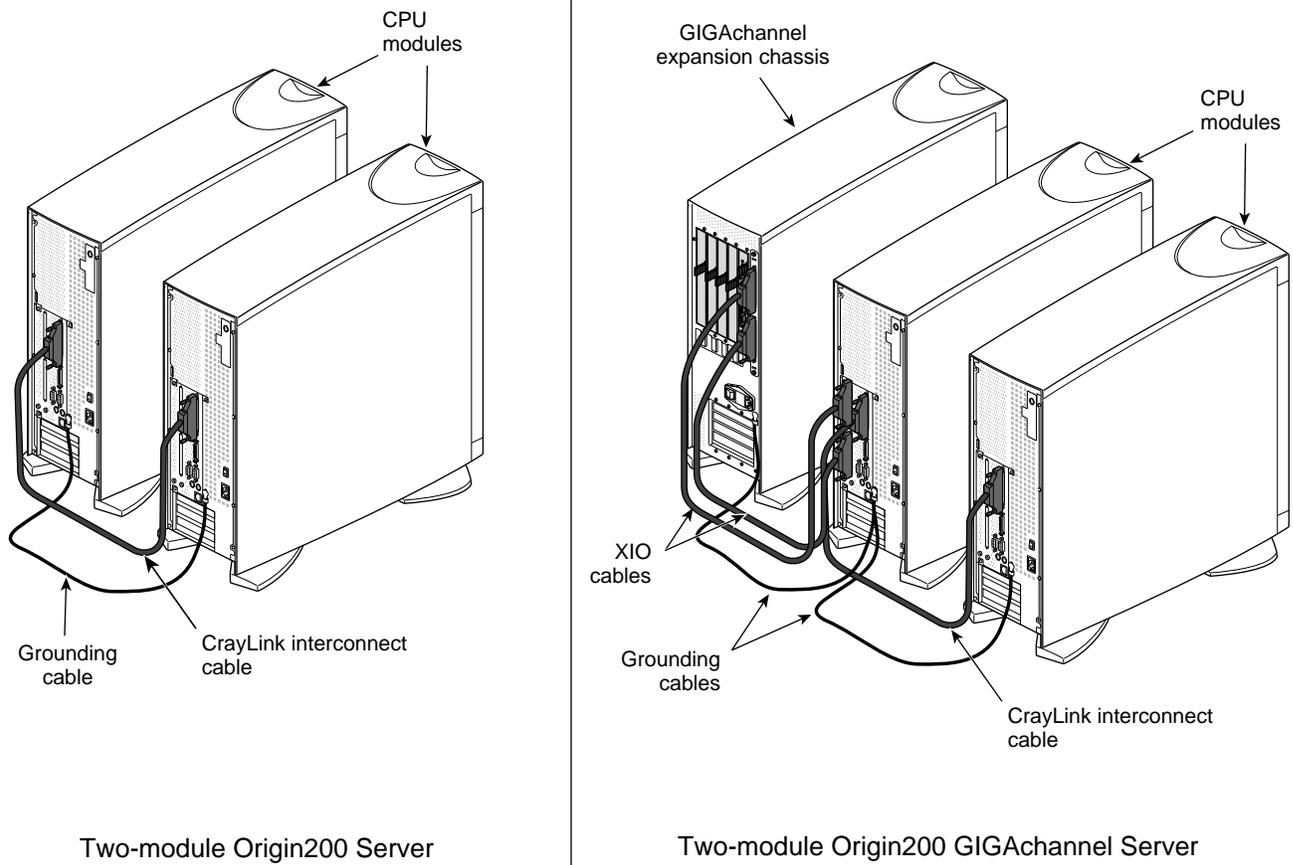
Figure 1-2   Two-Module Origin200 and Origin200 GIGAchannel Systems, Rear View

The Origin200 server can be mounted in a 21-inch SGI rack or a standard 19-inch rack. Figure 1-3 shows an example of a two-module system in a 19-inch rack.
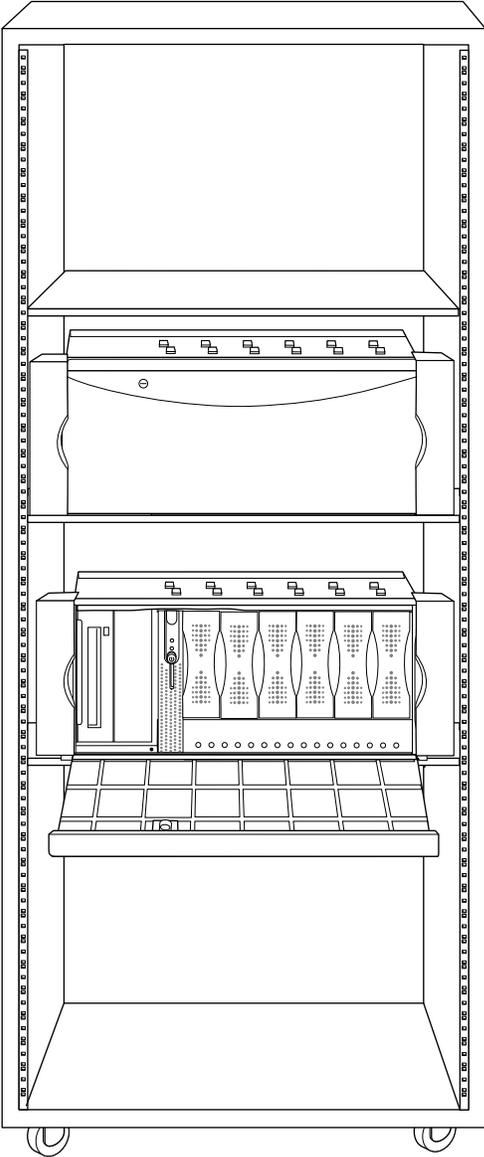
Figure 1-3   Two-Module Origin200 Server in a Rack

Origin200 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
Processors and cache MIPS R10000 or MIPS R12000	1 or 2 processors	3 or 4 processors
Memory	32 MB to 2 GB	64 MB to 4 GB
Module system controller (MSC)	One	Two; however, only the MSC in the master module is active.
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 Origin200	Three 32- or 64-bit full-size PCI	Six 32- or 64-bit full-size PCI
Origin200 GIGAchannel	Seven PCI slots, 32- or 64-bit (six full-size, one half-size) Five XIO slots	Ten PCI slots, 32- or 64-bit (nine full-size and two half-size) Five XIO slots
Power supply Standard Redundant	One per chassis (483 watt) One per chassis, internally redundant (483 watts)	Two (483 watts each) Two, each internally redundant (483 watts each)

For additional information about power requirements and features of the standard and redundant power supplies, see "Power Supply" on page 25. For environmental specifications, including operating and non-operating conditions, see "Physical and Environmental Specifications" on page 32.

Block Diagrams of Origin200 and Origin200 GIGAchannel Servers

Figure 1-4 shows the logical relationships between the major components of the Origin200 server. The major components are discussed in more detail in subsequent sections.
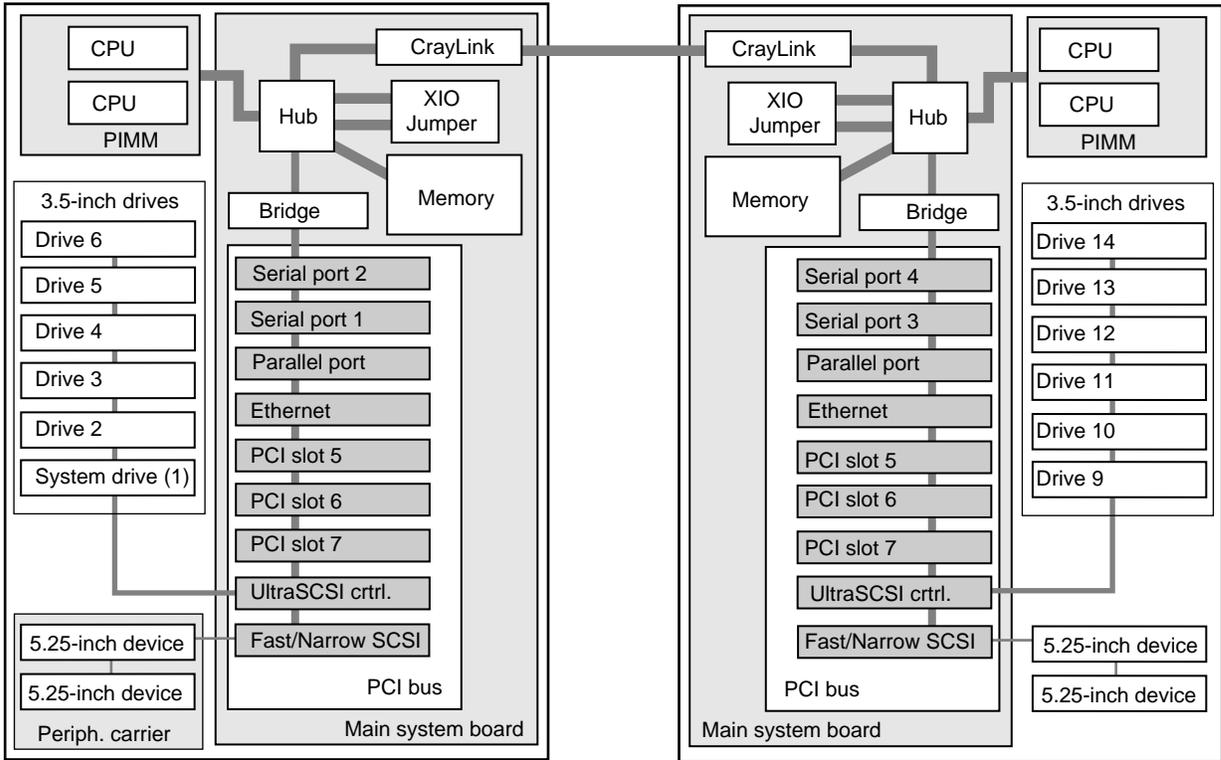
Figure 1-4   Logical Block Diagram of an Origin200 Server

Figure 1-5 shows the logical relationship between the major components of an Origin200 GIGAchannel server.
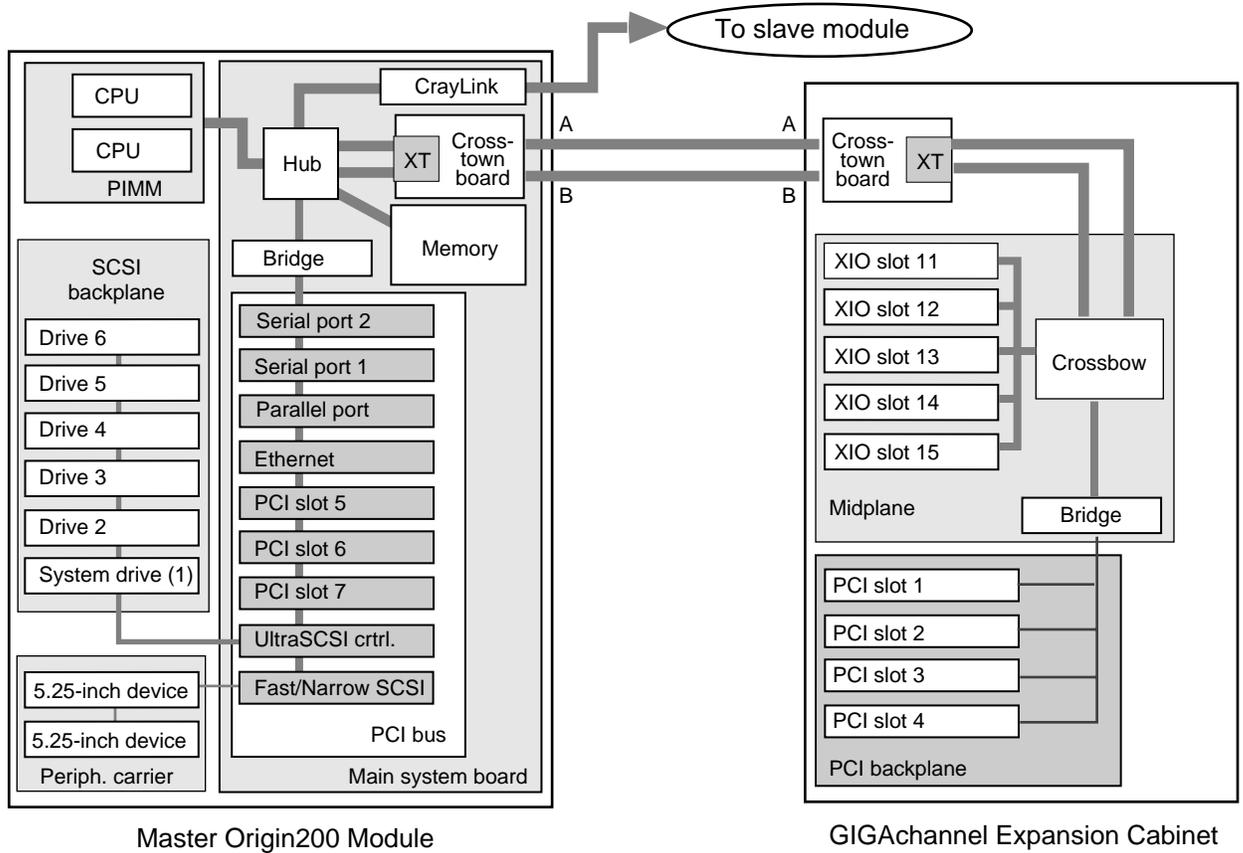
Figure 1-5   Logical Block Diagram of an Origin200 GIGAchannel Server

In Figure 1-5, although the GIGAchannel expansion cabinet is shown connected to a master CPU module, it can also be connected to a slave CPU module.

Logic Carrier

Each Origin200 module contains a logic carrier, which is a sheet-metal tray that holds

- the main system board
- a CPU daughtercard
- the PCI backplane

Together, the logic carrier sheet metal, the main system board, CPU daughtercard, and the PCI backplane form a single, field-replaceable unit. Figure 1-6 shows the complete logic carrier.
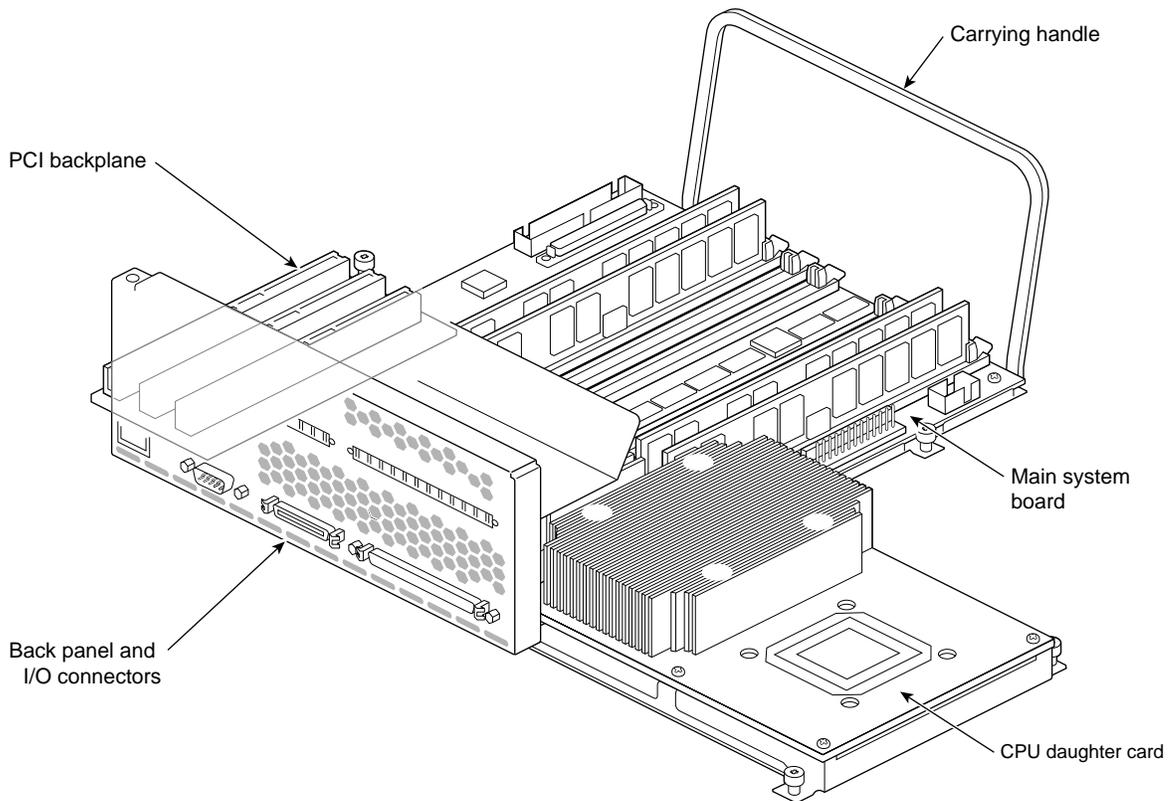
Figure 1-6   Logic Carrier

Main System Board

The main system board contains

- two SCSI controllers for internal drives

- an Ethernet controller

- two serial port interfaces (UARTs)

- a parallel port interface

- three PCI expansion slots

- four banks of two dual inline memory module (DIMM) sockets (eight total DIMM sockets)

- a CrayLink connector

- a Crosstown adapter board (Origin200 GIGAchannel only)

- XIO A and XIO B cable connectors (Origin200 GIGAchannel only)

External connectors for the serial, Ethernet, and parallel interfaces, and the CrayLink interconnect technology are all mounted directly to the main system board. See Figure 1-7.

CPU Daughtercard

Figure 1-7 shows the main system board and the CPU daughtercard, and points out the locations of various components.

SCSI channel 0
3.5-inch drives
68-pin Connector

Memory (DIMMs)

SCSI channel 1
5.25-inch drives
50-pin connector

External
(real-time)
interrupt ports

System controller
connector

Ethernet port
connector

Power connector

Serial port
connectors

Parallel port
connector

CrayLink Interconnect
connector
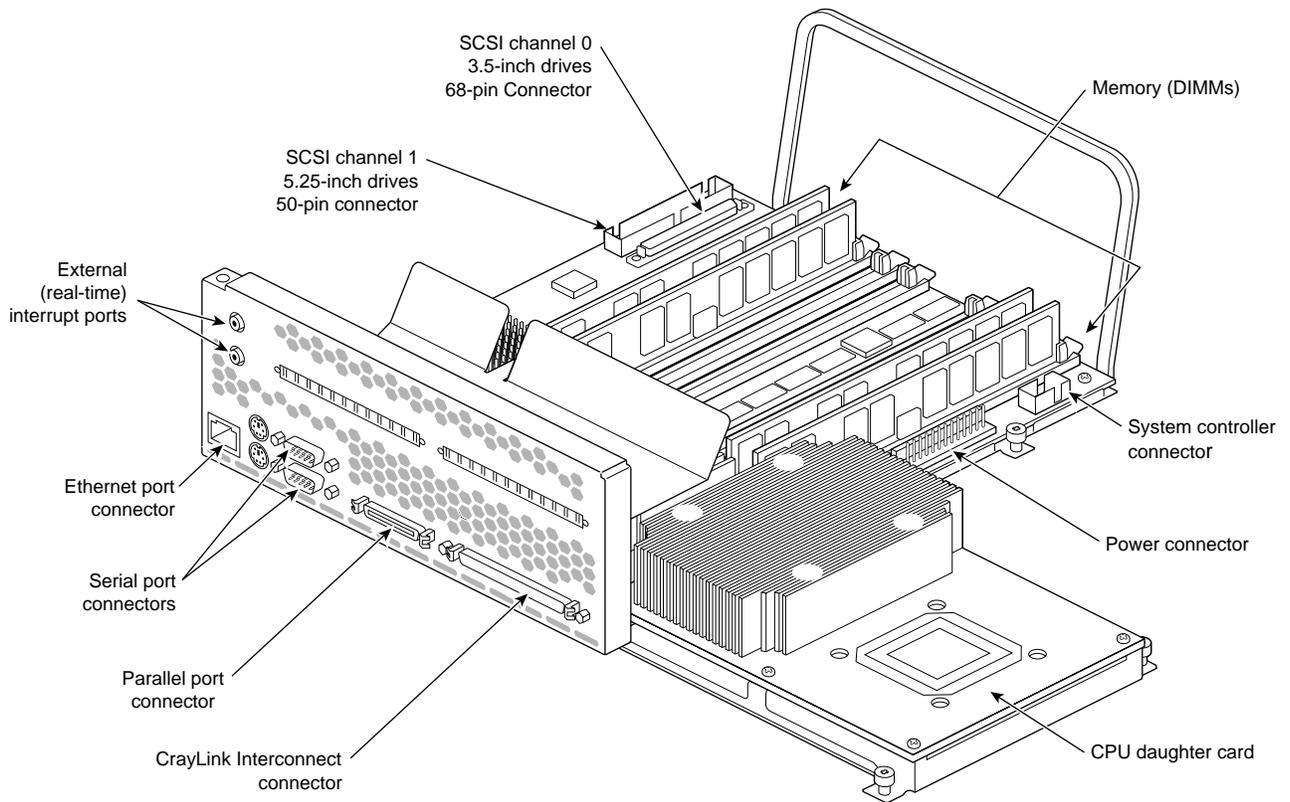
CPU daughter card

Figure 1-7   Main System Board and CPU Daughtercard

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 of a CPU Module: Status LED, Power, Reset, NMI" on page 95 in Chapter 4 for a description of the front panel.

See "Using the AUX Port and Module System Controller Commands" on page 120 in Chapter 4 for a description of the commands that the MSC can accept.

Logic Carrier PCI Backplane and Expansion Slots

There are three expansion slots available on each Origin200 logic carrier for peripheral component interconnect (PCI) bus cards. The slots provide PCI IDs 5, 6, and 7. See Figure 1-8.

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

Figure 1-8 shows the location and slot numbers of the PCI backplane.
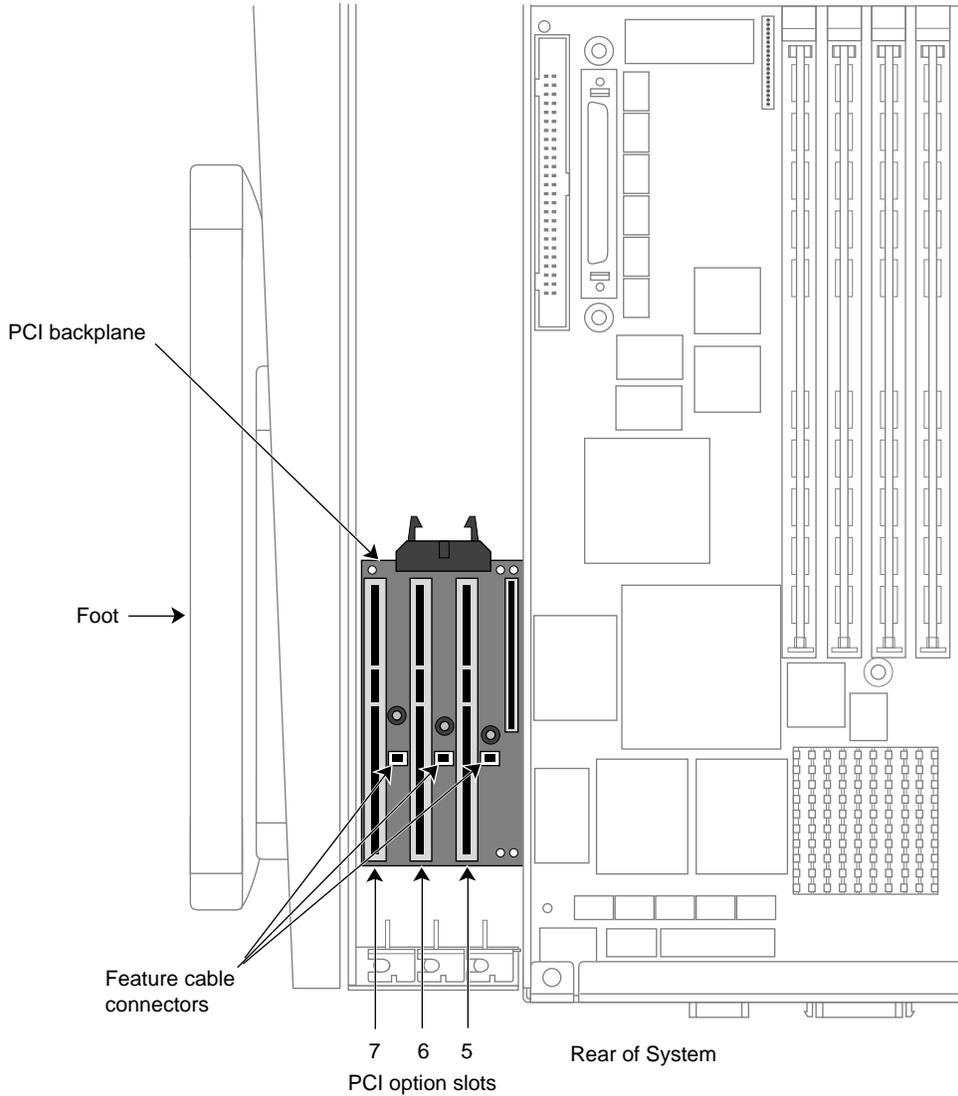
Figure 1-8   PCI Backplane and Slot IDs in a CPU Module

Memory

Each Origin200 module can have between 32 MB and 2 GB of memory, depending upon the type of dual inline memory module (DIMM) that you install. DIMMs are installed in sockets that are grouped into two banks of four sockets each. Figure 1-9 shows the layout of the DIMM sockets on the main system board.

Front of system
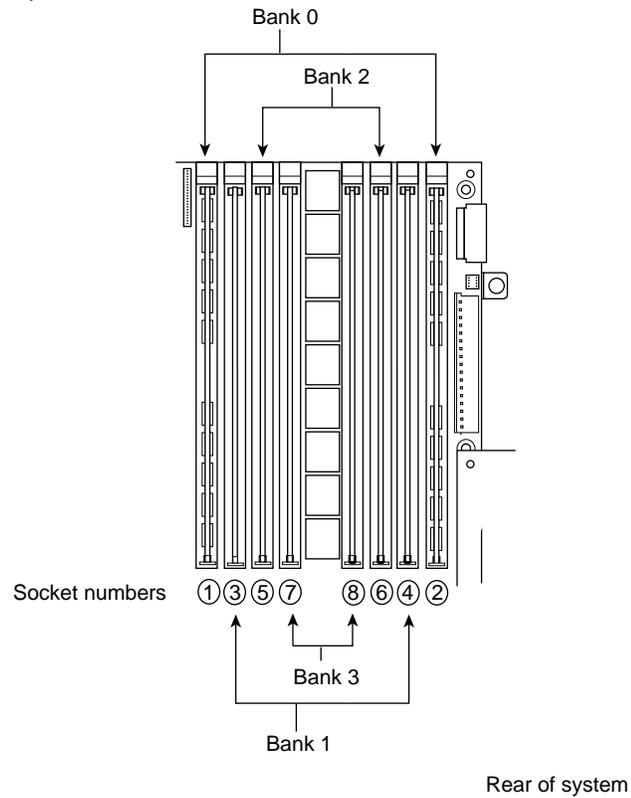
Figure 1-9   Layout of DIMM Sockets on the Origin200 Main System Board

Note the following about installing DIMMs in an Origin200 module:

- DIMMs are installed in pairs, with one pair per bank.

- DIMM sockets are numbered as shown in Figure 1-9: 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 1-10.
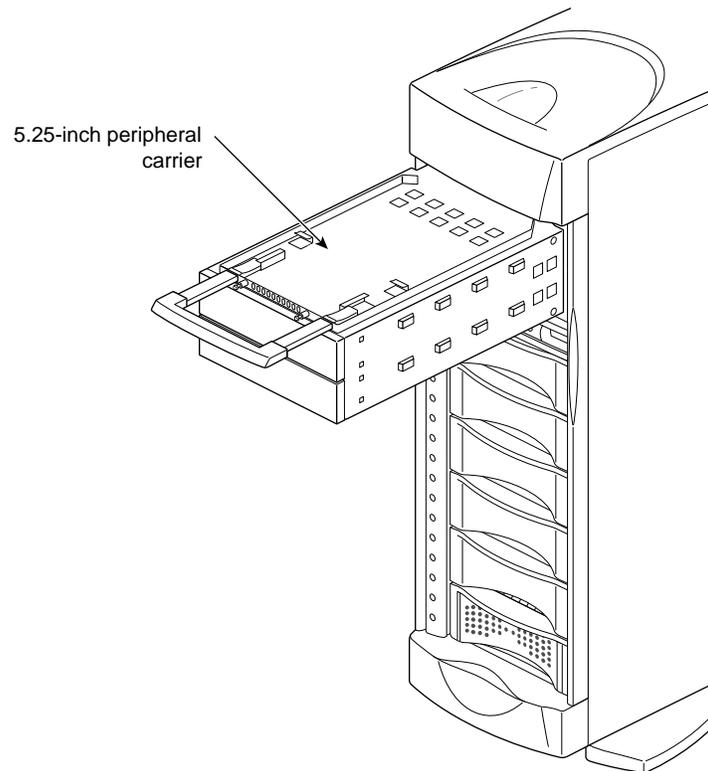
Figure 1-10   Origin200 5.25-inch Peripheral Carrier and Drive Bay

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 1-11 shows a 3.5-inch drive, sled, and drive bay.

3.5-inch drive bays

3.5-inch drive
and sled
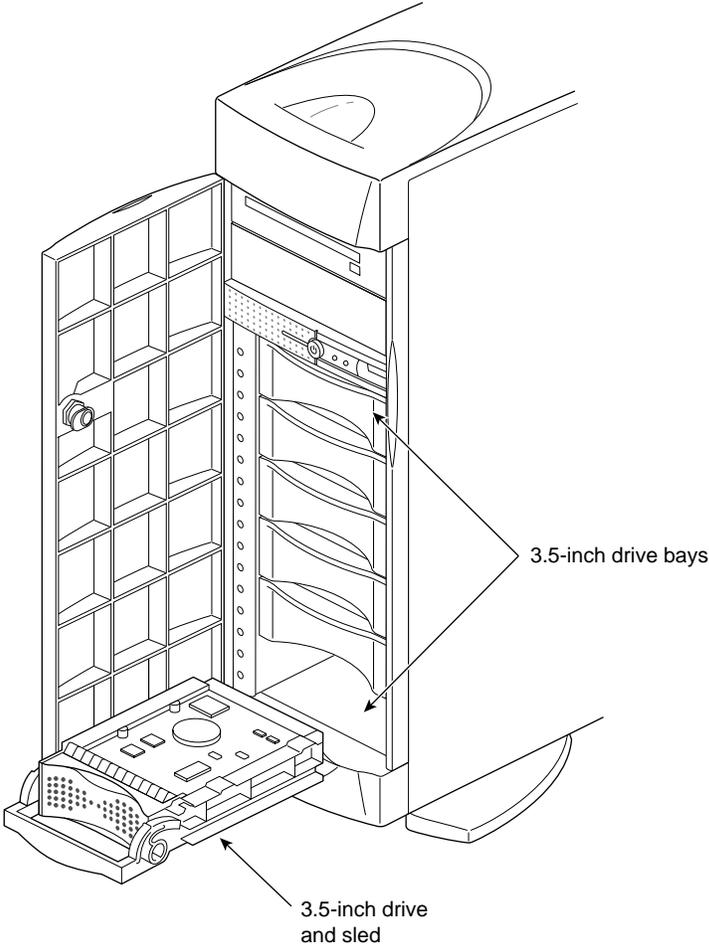
Figure 1-11   Origin200 3.5-inch Drive, Sled, and Bay

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" on page 133 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 ports can also be used to send and receive MIDI information.

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 SGI 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	IRIX Device File	IRIX Device File
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" on page 133 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" on page 120 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."

Origin200 GIGAchannel XIO Connectors

The Origin200 GIGAchannel has a pair of XIO connectors that attach to XIO cables, which route data between the server module and the GIGAchannel expansion cabinet. The connectors are labeled A and B, as shown in Figure 1-12.

XIO connector A
(Origin200 GIGAchannel only)

XIO connector B
(Origin200 GIGAchannel only)

Rear of System
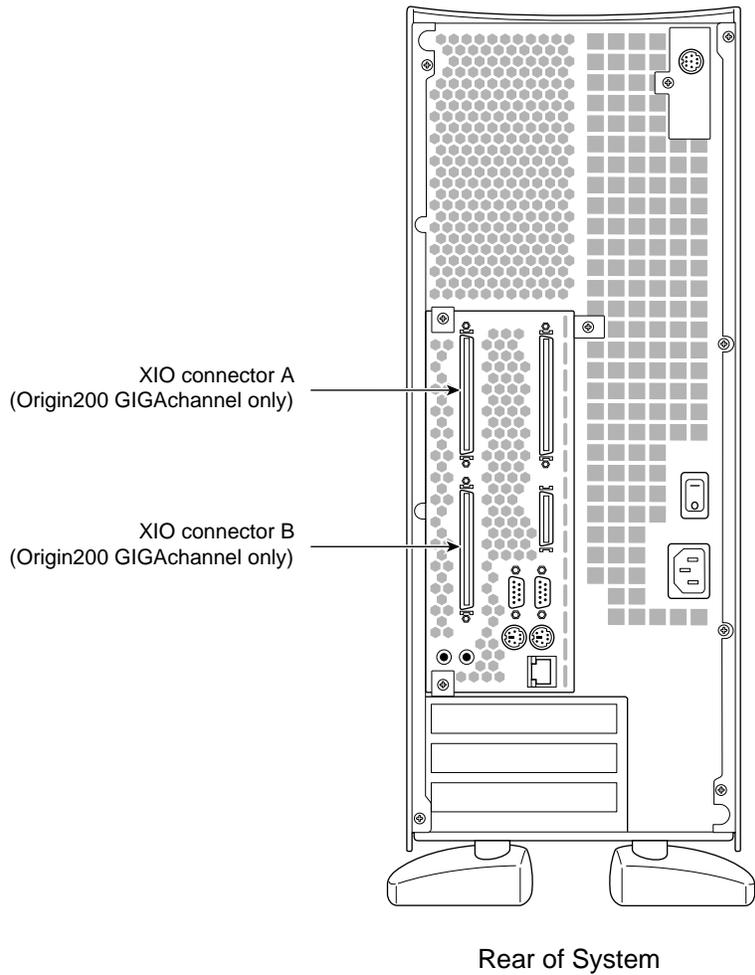
Figure 1-12   Origin200 GIGAchannel XIO Connectors

These connectors may be found on either the master or slave module of an Origin200 GIGAchannel server, and are attached directly to the Crosstown adapter board. The Crosstown adapter board replaces the sheet metal baffle and Crosstalk jumper normally found in an Origin200 CPU module.

Origin200 GIGAchannel PCI and XIO Expansion

The Origin200 GIGAchannel provides additional I/O capability beyond the standard Origin200 models. The GIGAchannel expansion chassis can hold all of these boards:

- four 32- or 64-bit PCI boards (three full-size boards and one half-size board)

- five high-performance XIO boards

Figure 1-13 shows the back of a GIGAchannel expansion chassis, slots for PCI and XIO boards, and the location of the XIO connectors that attach the cabinet to a CPU module.
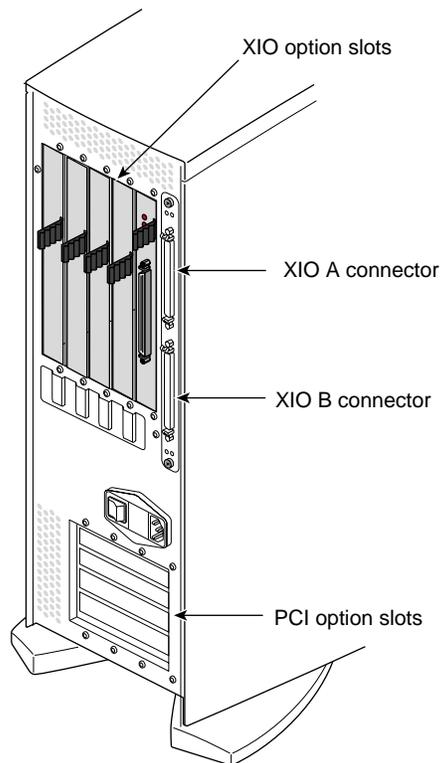
Figure 1-13   GIGAchannel Expansion Cabinet (Rear View) and XIO Connector Locations

The GIGAchannel expansion chassis is connected to either a master or slave Origin200 GIGAchannel module by two XIO cables. The XIO cables attach to the XIO A and XIO B connectors on the server module and GIGAchannel expansion cabinet. See Figure 1-13.

The XIO cables complete the XIO bus, running from the Origin200 GIGAchannel server module to the GIGAchannel expansion cabinet. See "Block Diagrams of Origin200 and Origin200 GIGAchannel Servers" on page 6.

Note: Because both cables are required to complete the signal path, you cannot operate an Origin200 GIGAchannel module without either a GIGAchannel expansion cabinet or an XIO cable attached in *loopback mode*.

The configurations of an Origin200 GIGAchannel server are as follows:

- Origin200 GIGAchannel CPU module (either a master or slave module) connected to a GIGAchannel expansion cabinet

- Origin200 GIGAchannel master and slave module each connected to their own GIGAchannel expansion cabinets (one GIGAchannel per module)

- Origin200 GIGAchannel in loopback mode (no GIGAchannel expansion cabinet)

Note: Loopback mode only applies to Origin200 GIGAchannel modules that have XIO A and B connectors. If the module does not have the XIO A and B connectors, loopback mode does not apply.

You cannot connect the CPU modules and the GIGAchannel expansion cabinet in the following ways:

- You cannot daisy-chain two GIGAchannel cabinets.

- You cannot connect the same GIGAchannel simultaneously to two CPU modules, regardless of whether the CPU modules comprise a single server (a master and a slave module) or the CPU modules are completely separate servers.

Figure 1-14 shows how a CPU module is connected to a GIGAchannel expansion cabinet. Figure 1-15 shows the cabling for loopback mode.
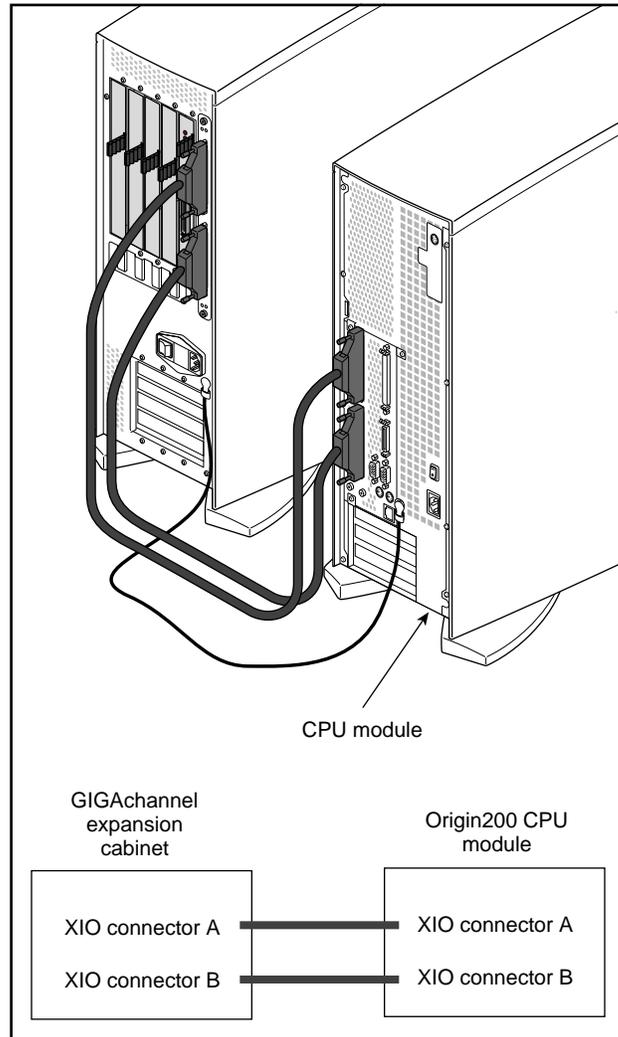
Figure 1-14   Origin200 GIGAchannel XIO Cable Connections

23

XIO cable

Origin200 GIGAchannel
CPU module

With no GIGAchannel
expansion, XIO bus
must be looped back
with an XIO cable.

XIO connector A

XIO connector B
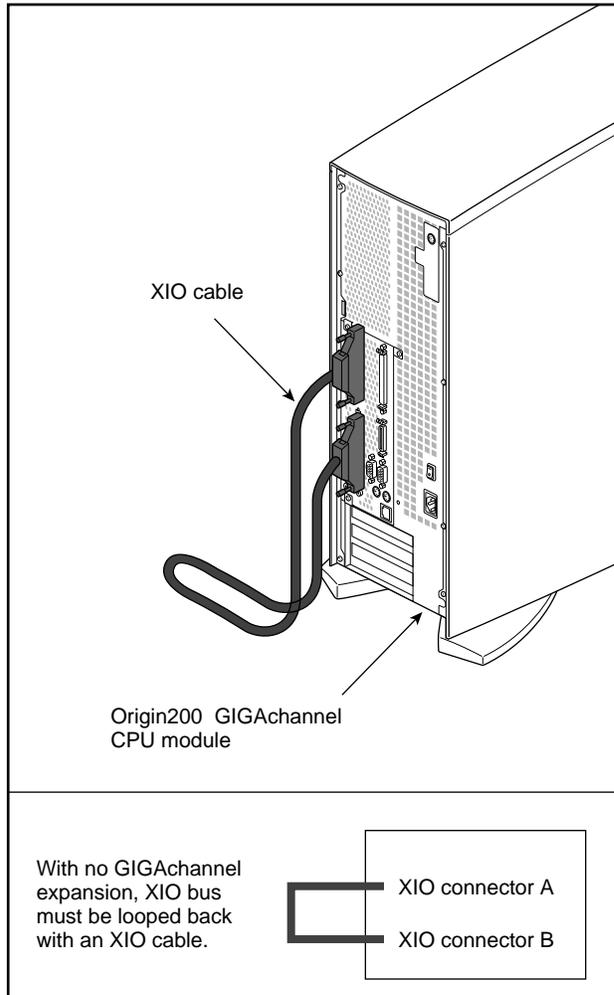
Figure 1-15   Origin200 GIGAchannel Cabling for Loopback Mode (No GIGAchannel
Expansion Installed)

A GIGAchannel expansion cabinet can be connected only to an Origin200 GIGAchannel
CPU module. The standard Origin200 models do not have the additional XIO connectors
required to attach the expansion cabinet. The GIGAchannel expansion cabinet may be
connected to either a master CPU module or a slave CPU module.

Power Supply

There are two types of power supplies available for Origin200 and Origin200 GIGAchannel servers:

• standard

• redundant

The following sections describe each of these power supplies.

Standard Power Supply

Table 1-4 summarizes specifications of the Origin200 and GIGAchannel power supply.

Table 1-4   Origin200 and GIGAchannel Power Supply Specifications

Specification	Value Per Server Module or GIGAchannel Chassis
Input volts	100 to 120 VAC, and 200 to 240 VAC, autoranging
Input watts Origin200 module GIGAchannel expansion chassis	805 watts (for a fully configured module) 576 watts (for a fully loaded cabinet)
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 Origin200 module GIGAchannel expansion chassis	483 watts (for a fully configured system) 345.25 watts (for a fully loaded cabinet)
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 amp of inrush current per chassis in the system. There is the possibility of fire, damage to the UPS, damage to the Origin200 server, and other hazards if the UPS cannot supply sufficient current.**

Each Origin200 module and GIGAchannel expansion chassis can draw up to 140 amp 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 may cause damage to the Origin200 server and to themselves.

Redundant Power Supply

The redundant power supply is an option available for Origin200 and Origin200 GIGAchannel servers (as well as for the optional Origin Vault disk expansion cabinet). The redundant power supply is actually two complete power supplies contained in a sheet metal housing that is almost identical to the standard power supply, although the redundant power supply is about 1/2 inch (12.5mm) longer than the standard power supply and about twice as heavy. It has the same input and output connectors as the standard power supply and can be used interchangeably with all of the previously-mentioned servers.

In normal operation, the redundant power supply is identical to the standard power supply, drawing the same amount of input power and providing identical power output. (See Table 1-4.) If one of the internal supplies fails, the second supply automatically takes over and powers the system and an LED error code indicates that the system is now running on the second power supply. See the *Origin200 and Origin200 GIGAchannel Maintenance Guide* for a description of the LED error code.

You can also query the module system controller (MSC) to determine the status of the redundant power supplies in a master or slave CPU module. See "Using the AUX Port and Module System Controller Commands" on page 120.

Note: The redundant power supply only works with Origin200 and Origin200 GIGAchannel servers that have module system controller (MSC) firmware versions 3.3S and later. You can use the MSC *ver* command, as described in "MSC Command Reference" on page 130 of Chapter 4, to determine the version of your module system controller.

Air Flow, Fans, and Blower

Air flows through both the Origin200 server module and the GIGAchannel expansion chassis from the front to the rear. The Origin200 server uses three fans to provide cooling air, whereas the GIGAchannel expansion chassis uses a single *blower*.

The following sections describe the details of air flow through each chassis:

- "Air Flow Through the CPU Module" on page 27
- "Air Flow Through the GIGAchannel Expansion Chassis" on page 30
- "Temperature and Fan Speed In the CPU Module" on page 31
- "Temperature and Blower Speed In the GIGAchannel Expansion Chassis" on page 31
- "If a Fan Fails In the Origin200 CPU Module" on page 31
- "If the Blower Fails In The GIGAchannel Expansion Chassis" on page 32

Air Flow Through the CPU Module

Air is drawn through the server module by three DC fans located just behind the internal drive bays. The maximum flow rate is 100 cfm (0.047 m^3/sec). Figure 1-16 shows the direction of air flow through an Origin200 CPU module.

Air from 5.25-inch peripheral carrier, 3.5-inch peripherals, and PCI plenum blown across logic carrier and out of the rear of the system.

Air flow through 5.25-inch peripheral carrier

Main air flow over 3.5-inch peripherals

Air flow through PCI plenum duct

Air is drawn up from PCI plenum duct, over PCI cards towards the fan plenum
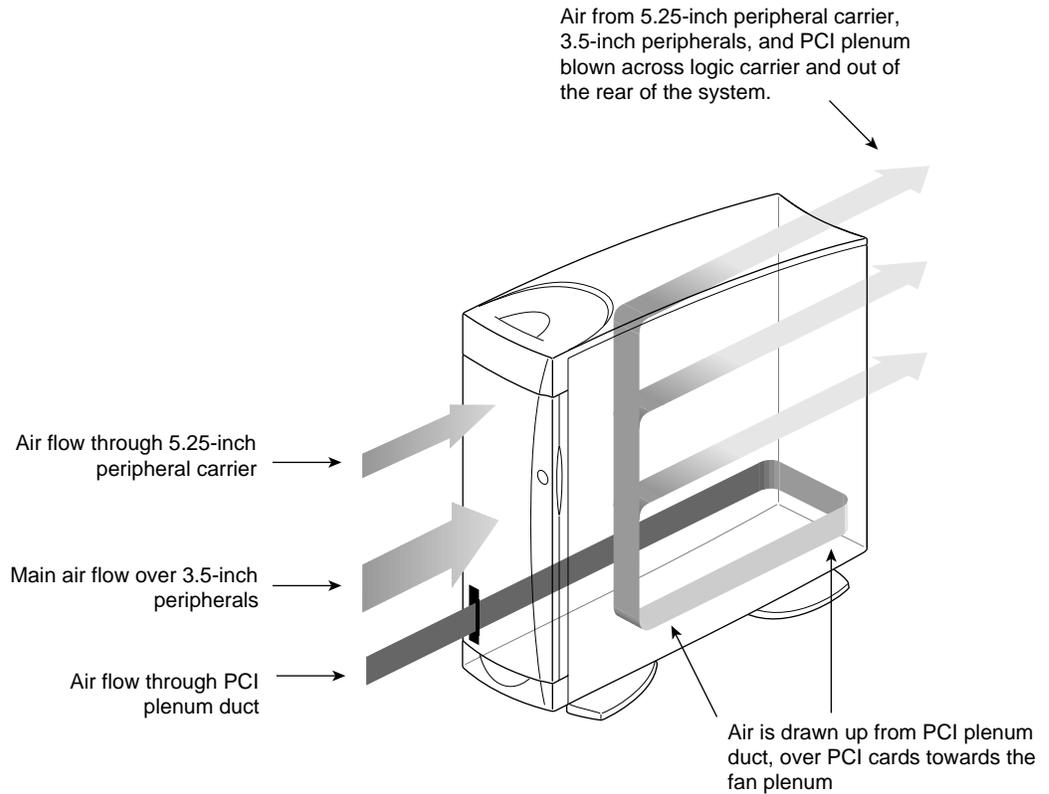
Figure 1-16   Air Flow Through the Origin200 CPU Module

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 1-17 shows the locations and numbering of the fans in a CPU module.
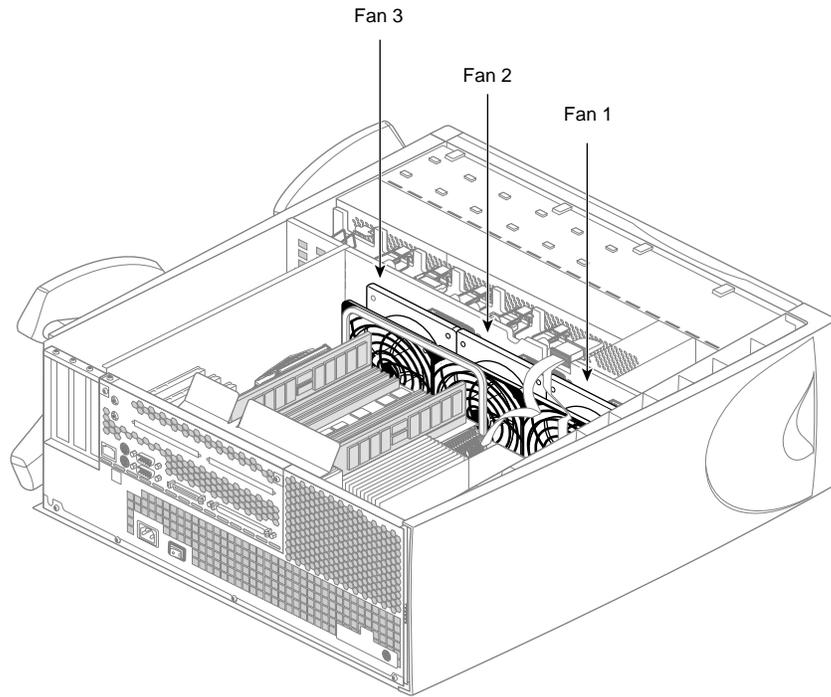
Figure 1-17   Locations and Numbering of Fans in the Origin200 CPU Module

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

Air Flow Through the GIGAchannel Expansion Chassis

The GIGAchannel expansion chassis uses a single blower to draw air through the cabinet. Figure 1-18 shows the direction of airflow through the GIGAchannel expansion chassis and the location of the blower.

Air flows under the power-supply
shroud and through the power supply.

XIO boards

PCI boards

Rear

Front
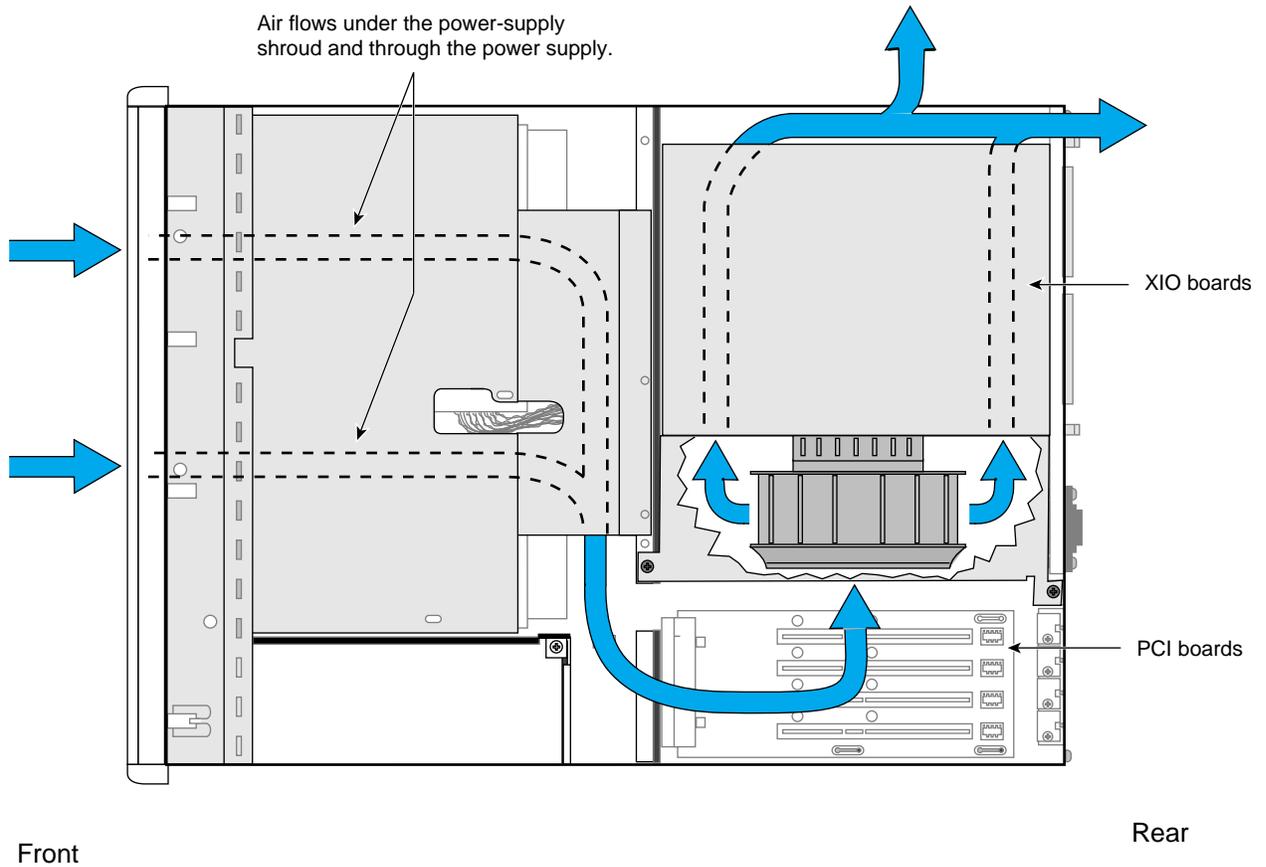
Figure 1-18   Air Flow and Blower Location in the GIGAchannel Expansion Chassis

Temperature and Fan Speed In the CPU Module

In an Origin200 CPU module, fan speeds adjust automatically depending upon the outside air temperature. A sensor inside the server 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 Module

Air Temperature	Action
Less than 83.3° F (28.5° C)	Fans run at normal speed.
83.3° F (28.5° C) to 95° F (35° 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 120.

Temperature and Blower Speed In the GIGAchannel Expansion Chassis

The blower runs at a constant speed throughout the entire operating temperature range of the system (+41° F to +95° F or +5° C to +35° C).

If a Fan Fails In the Origin200 CPU Module

If one of the three fans in an Origin200 CPU module 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 In a CPU Module When One Fan Fails

Air Temperature	Action If One CPU Module 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 95° F (35° 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 the *Origin200 and Origin200 GIGAchannel Maintenance Guide*.

If the Blower Fails In The GIGAchannel Expansion Chassis

If the blower fails in GIGAchannel expansion chassis, the entire server (both the expansion chassis and the Origin200 CPU modules) shut down immediately.

Physical and Environmental Specifications

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

Table 1-7   Origin200 CPU Module Physical and Environmental Specifications

Specification	Value Per Module
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 +95° F (+5° C to +35° 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)

Table 1-8 lists the various physical and environmental specifications of the GIGAchannel expansion chassis.

Table 1-8   GIGAchannel Expansion Chassis Physical and Environmental Specifications

Specification	Value Per Module
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	35 lbs (16 kg)
Maximum	65 (29 kg)
Environmental (Operating)	
Temperature	+41° F to +95° F (+5° C to +35° C)
Humidity	10% to 80% noncondensing
Altitude	10,000 MSL
Noise	60 dBa
Heat dissipation	1959 BTU per hour maximum
Air conditioning load	0.165 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 or an Origin200 GIGAchannel server, all parts of the system 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 25 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 36 for examples of correct and incorrect power and grounding configurations.

Caution: You must connect all modules and chassis of a multiple module Origin200 or Origin200 GIGAchannel system to the same grounded power source. If you do not, the resulting differences in ground potential (current) can damage components of the server.

Setting Up an Origin200 System

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

- "Choosing a Location for the Server" on page 36 which includes information on the weight of the system, minimum space requirements, and requirements for proper grounding (earthing)

- "Unpacking the Server and Checking the Shipment" on page 39, which lists the basic items included with each server

- "Planning the Server Configuration" on page 48, which describes the basic process of assembling different server configurations and lists various performance considerations

- "Putting the Pieces Together" on page 54, which describes how to assemble the parts of the server

- "Turning On the System" on page 80

- "Logging In for the First Time" on page 83

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 or an Origin200 GIGAchannel, all chassis must be connected to the same grounded power supply. If they are not, resulting differences in ground potential (current) can damage components on the server's main system board.

Choosing a Location for the Server

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

- "Providing Correct Electrical Grounding (Earthing)" on page 36

- "Supporting the Weight of the System" on page 38

- "Providing Space Around the System" on page 38

Providing Correct Electrical Grounding (Earthing)

Proper electrical grounding is critical. All parts of the server *must* be on the same grounded power supply. Otherwise, the server's system board will be damaged. Components 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 Origin200 and Origin200 GIGAchannel servers:

- 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 amp.

- Configuration B is also valid. Although the server modules and GIGAchannel expansion chassis are each on separate branch circuits, all three 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. The server modules and GIGAchannel expansion chassis are grounded at a subpanel.

N ○ ● L

G

3-wire branch
circuits

A

B

C

D

Service entrance

Subpanel

Chassis are connected to
separately grounded
power circuits. This may
damage one or both units!
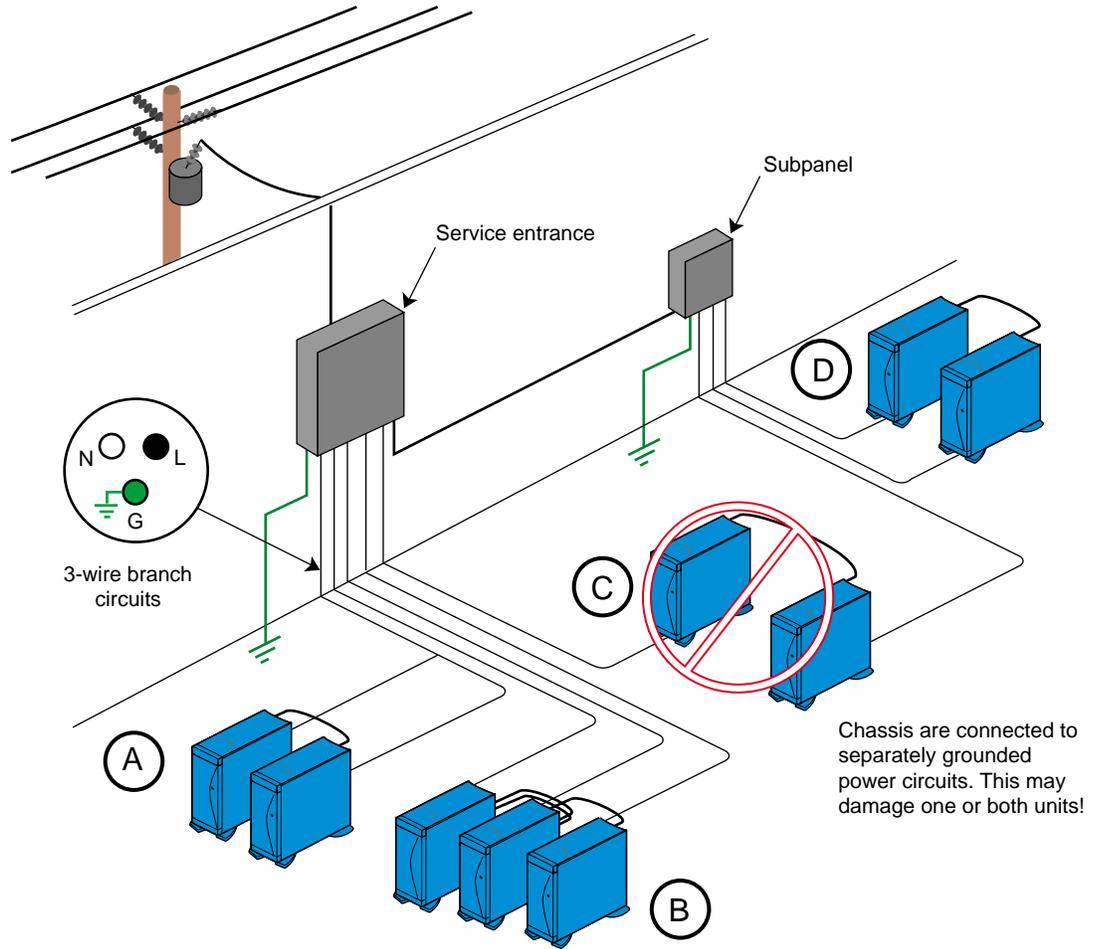
Figure 2-1   Origin200 and Origin200 GIGAchannel Power and Grounding (Earthing)
Overview

Supporting the Weight of the System

The weight of the server can vary considerably, depending upon the option drives you install in your system and their types. Table Table 2-1 indicates the minimum and maximum weights of a single Origin200 module and GIGAchannel expansion chassis.

Table 2-1   Minimum and Maximum Weight of the Server

Component	Minimum Weight	Maximum Weight
Origin200 server module	40 lbs (18 kg)	75 lbs (34 kg)
GIGAchannel expansion chassis	35 lbs (16 kg)	65 lbs (29 kg)

To estimate the minimum and maximum weight of your particular system, add the various weights of each component. For example, if you have a dual-module system, the minimum weight is 80 lbs (36 kg). If it is a dual-module Origin200 GIGAchannel system, the GIGAchannel chassis adds a minimum additional 35 lbs (16 kg).

The mounting shelf provided with a rackmount Origin200 and Origin200 GIGAchannel module can support the weight of a fully loaded chassis.

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 32 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 and Origin200 GIGAchannel Server" for a complete list of environmental specifications. Be aware that air flows from the front of the system to the rear. See "Air Flow, Fans, and Blower" on page 27 for a description of the air flow through the Origin200 server.

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

Top View

6 inches
(15 cm)

Rear

8 inches
(20 cm)

1.5 inches
(3.8 cm)

Feet swiveled inward

Front

4 inches
(10 cm)
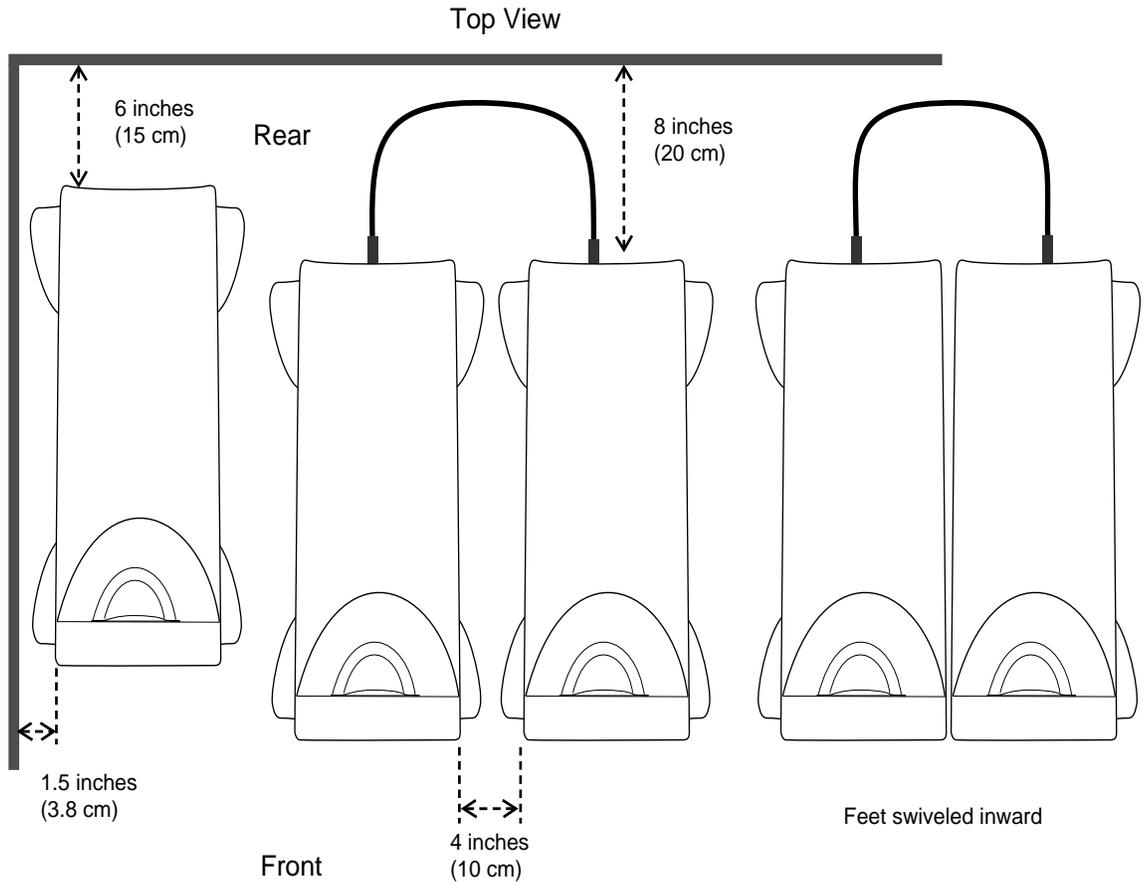
Figure 2-2   Minimum Clearances for the Origin200 Server, Tower Configuration

Unpacking the Server and Checking the Shipment

Unpack the server and check the shipment to make sure you received all the necessary pieces.

The following sections describe the basic pieces included with each type of server. Read through them to familiarize yourself with the parts of your server and to be sure you received all the pieces required to set up the system.

Parts Included With an Origin200 Server, Tower Configuration

Table 2-2 lists the parts included with an Origin200 server in a tower configuration.

Table 2-2   Parts Included With an Origin200 Server, Tower Configuration

Part	Single-Module System	Two-Module System
CPU module	1	2
Console serial cable	1	2
AUX port cable	1	2
PC adapter cable	1	2
Origin200 and Origin200 Giga Owner's Guide	1	2
Origin200 and Origin200 Giga Maintenance Guide	1	2
Software CDs (including CDs of the version of IRIX pre-installed on your system disk)	Varies	Varies
Chassis locking tabs	1 pair	2 pair
Power cord (appropriate for your location)	1	2
CrayLink interconnect cable	n/a	1
Grounding cable	n/a	1

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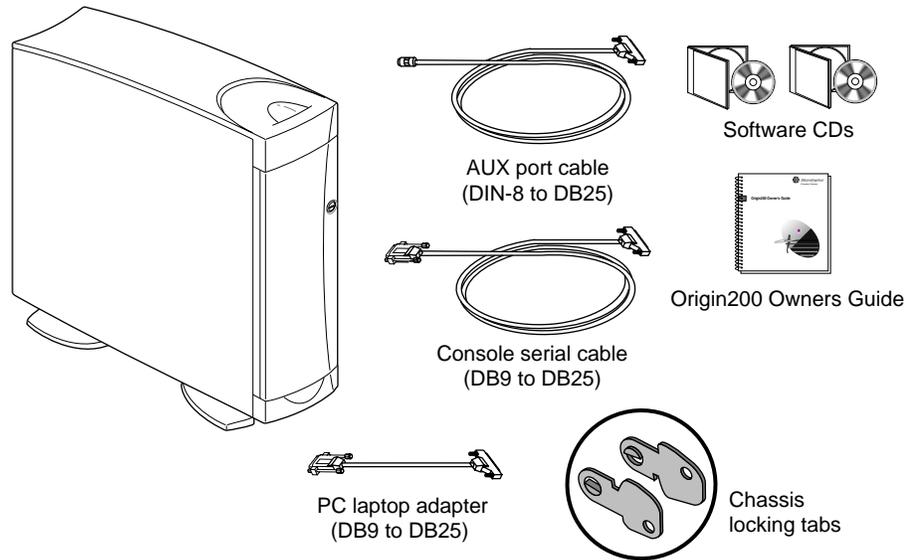
One-module system

Two-module system
adds these items:
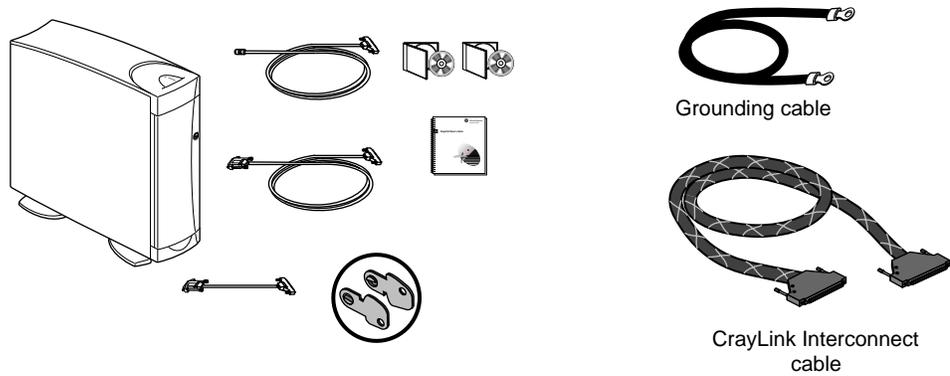
Figure 2-3　　Items Included With the Origin200 Server, Tower Configuration

Parts Included With an Origin200 Server, Rackmount Configuration

Table 2-3 lists the parts included with an Origin200 server in a rackmount configuration.

Table 2-3   Parts Included With an Origin200 Server, Rackmount Configuration

Part	Single-Module System	Two-Module System
CPU module	1	2
Console serial cable	1	2
AUX port cable	1	2
PC adapter cable	1	2
Mounting shelf	1	2
Mounting ears	2	4
Cosmetic end caps for 19-inch racks	2	4
Cosmetic end caps for 21-inch racks	2	4
Origin200 and Origin200 Giga Owner's Guide	1	2
Origin200 and Origin200 Giga Maintenance Guide	1	2
Software CDs (including CDs of the version of IRIX pre-installed on your system disk)	Varies	Varies
Chassis locking tabs	1 pair	2 pair
Power cord (appropriate for your location)	1	2
CrayLink interconnect cable	n/a	1
Grounding cable	n/a	1

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

One-module system

Chassis locking tabs

Mounting ears (left and right)

Origin200 Owners Guide

Mounting shelf

Software CDs

Console serial cable (DB9 to DB25)

AUX port cable (DIN-8 to DB25)

Laptop (PC) adapter (DB9 to DB25)

Screws and washers

End-caps for 19-inch and 21-inch racks

Two-module system adds these items:

CrayLink Interconnect cable

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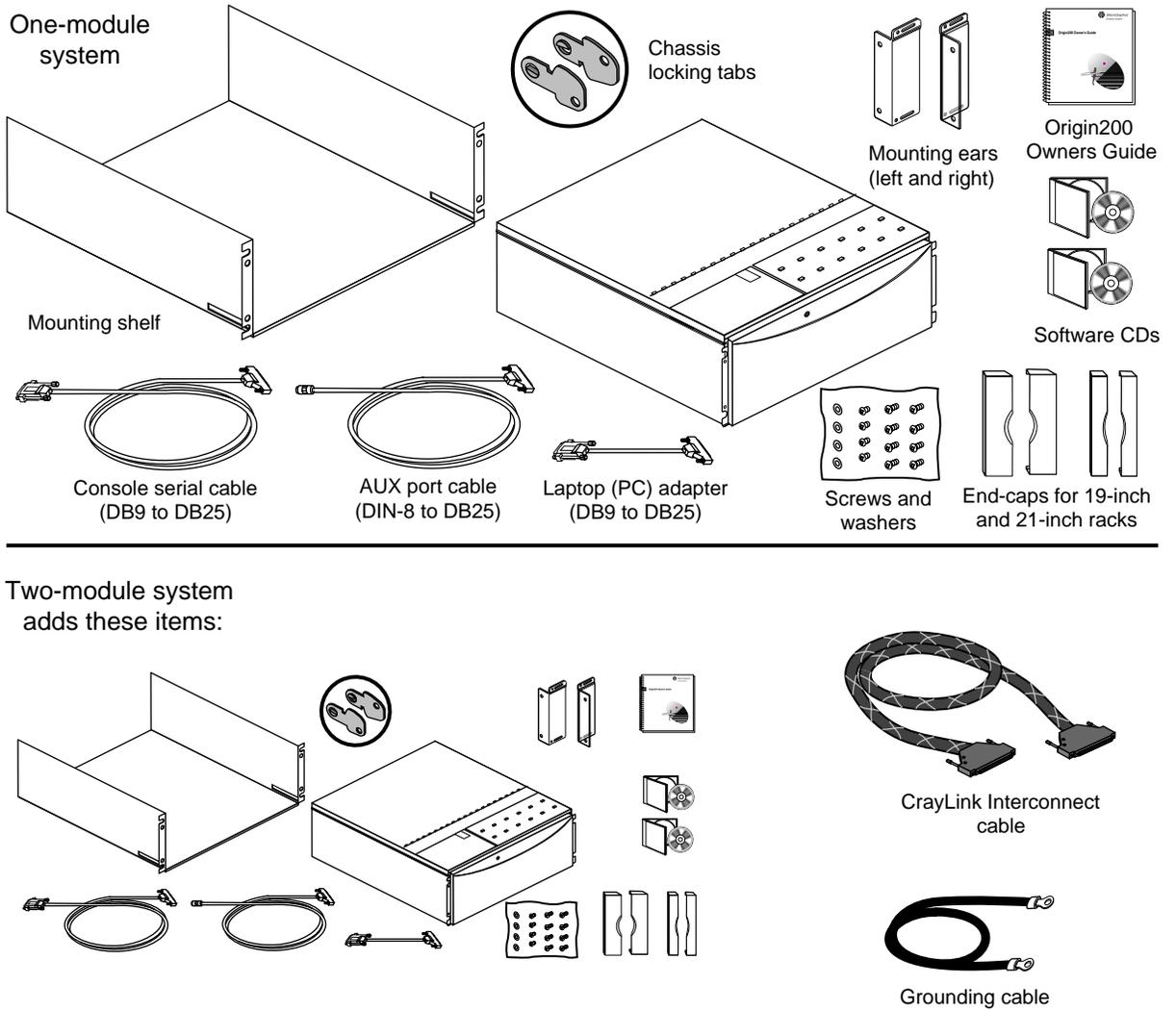
Figure 2-4   Basic Items Included With the Origin200 Server, Rackmountable Configuration

43

Parts Included With an Origin200 GIGAchannel Server, Tower Configuration

Table 2-4 lists the parts included with an Origin200 GIGAchannel server in a tower configuration:

Table 2-4 Parts Included With an Origin200 GIGAchannel Server, Tower Configuration

Part	Single-Module System	Two-Module System
CPU module	1	2
GIGAchannel expansion chassis	1	1
Console serial cable	1	2
AUX port cable	1	2
PC adapter cable	1	2
Origin200 and Origin200 Giga Owner's Guide	1	2
Origin200 and Origin200 Giga Maintenance Guide	1	2
Software CDs (including CDs of the version of IRIX pre-installed on your system disk)	Varies	Varies
Chassis locking tabs	2 pair	3 pair
CrayLink interconnect cable	n/a	1
XIO cables	2	2
Grounding cable	2	3
Power cord (appropriate for your location)	2	3

Figure 2-5 shows these items.

One-module GIGAchannel
system

GIGAchannel
expansion chassis

AUX port cable
(DIN-8 to DB25)

Software CDs

Console serial cable
(DB9 to DB25)

Owner's
Guide

Maintenance
Guide

PC laptop adapter
(DB9 to DB25)

Chassis
locking tabs
(two sets)

CPU module

Grounding cable

XIO cables

A two-module system
adds these items:

Second
CPU module

Grounding cable

CrayLink Interconnect
cable
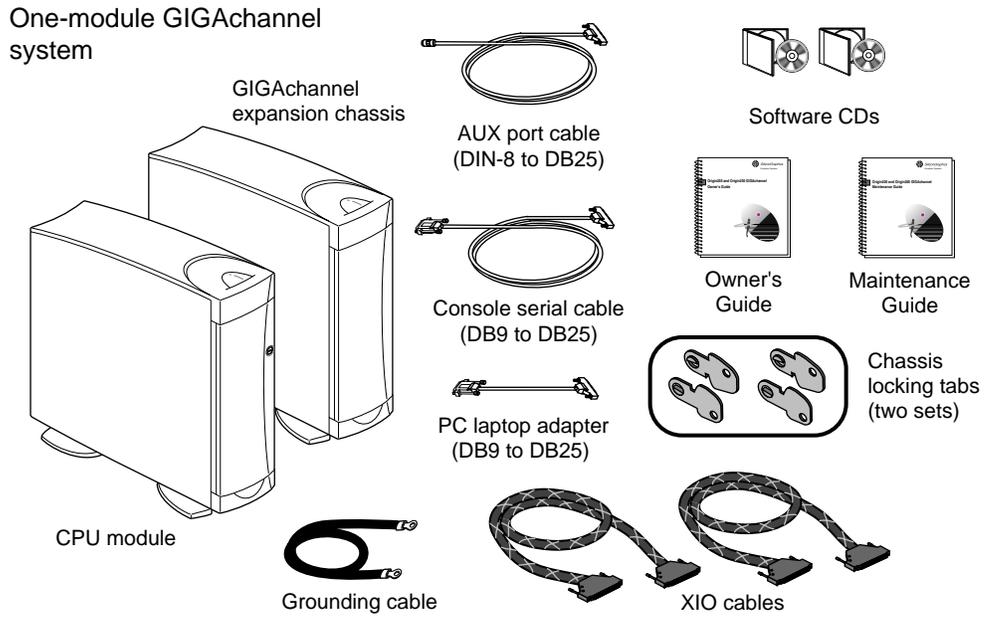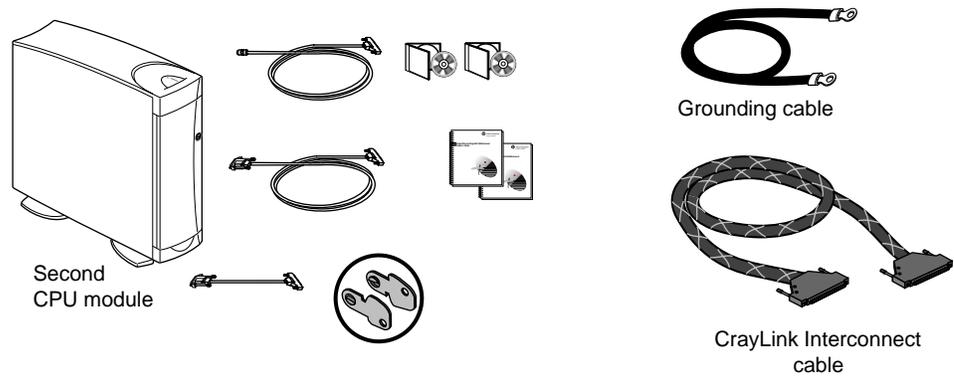
Figure 2-5   Basic Items Included With an Origin200 GIGAchannel Server, Tower
Configuration

Parts Included With an Origin200 GIGAchannel Server, Rackmount Configuration

Table 2-5 lists the parts included with an Origin200 GIGAchannel server in a tower configuration:.

Table 2-5   Parts Included With an Origin200 GIGAchannel Server, Rackmount Configuration

Part	Single-Module System	Two-Module System
CPU module	1	2
GIGAchannel expansion chassis	1	1
Console serial cable	1	2
AUX port cable	1	2
PC adapter cable	1	2
Mounting shelf	2	3
Mounting ears	4	6
Cosmetic end caps for 19-inch racks	4	6
Cosmetic end caps for 21-inch racks	4	6
Origin200 and Origin200 Giga Owner's Guide	1	2
Origin200 and Origin200 Giga Maintenance Guide	1	2
Software CDs (including CDs of the version of IRIX pre-installed on your system disk)	Varies	Varies
Chassis locking tabs	2 pair	3 pair
Power cord (appropriate for your location)	2	3
CrayLink interconnect cable	n/a	1
XIO cables	2	2
Grounding cable	2	3
Power cord (appropriate for your location)	2	3

Figure 2-6 shows these items.

One-module GIGAchannel system

GIGAchannel expansion chassis

CPU module

Chassis locking tabs (two sets)

Software CDs

Console serial cable (DB9 to DB25)

Owner's Guide

Maintenance Guide

Laptop (PC) adapter (DB9 to DB25)

AUX port cable (DIN-8 to DB25)

Grounding cable

Mounting shelves

End-caps for 19-inch and 21-inch racks

Mounting ears (left and right)

Screws and washers

XIO cables

A two-module system adds these items:

Second CPU module

CrayLink Interconnect cable

Grounding cable

Figure 2-6   Basic Items Included With an Origin200 GIGAchannel Server, Rackmount
Configuration

Planning the Server Configuration

Depending upon which server you have (Origin200 or Origin200 GIGAchannel), how many CPU modules are in the server (one or two) and whether you have an optional Origin Vault disk expansion cabinet, there are several ways to configure your server. These are described in the following sections:

- "Single-Module Origin200 Server With or Without an Origin Vault" on page 48
- "Dual-Module Origin200 Server With or Without an Origin Vault" on page 49
- "Single-Module Origin200 GIGAchannel Server" on page 50
- "Single-Module Origin200 GIGAchannel With an Origin Vault" on page 50
- "Dual Module Origin200 GIGAchannel" on page 51
- "Dual Module Origin200 GIGAchannel With an Origin Vault" on page 52
- "Dual Module Origin200 GIGAchannel With Two GIGAchannel Cabinets" on page 53

Each of these sections provides an overview of what is involved with setting up the server and describes any I/O performance issues.

In all cases, install drives after placing the server modules in their final locations. Drives add weight to the modules and make them more difficult to move.

Single-Module Origin200 Server With or Without an Origin Vault

To set up a single-module Origin200 server, follow these basic steps:

1. Install any PCI and memory options.
2. Install option drives (3.5 inch and 5.25 inch).
3. Connect external cables, such as the console serial cable, Ethernet, and power.

To set up a single-module Origin200 server with an Origin Vault disk expansion cabinet, follow these basic steps:

1. Install any PCI and memory options in the CPU module, including the PCI SCSI adapter option to which you connect the Origin Vault.
2. Install option drives (3.5 inch and 5.25 inch) in either the CPU module or the Origin Vault.

3. Connect external cables, such as the console serial cable, Ethernet, SCSI (to the Origin Vault), and power cables.

Dual-Module Origin200 Server With or Without an Origin Vault

With a dual-module Origin200 server, you have a choice of which module will be the master and which will be the slave. In this case, follow these basic steps:

1. Configure one of the modules as the slave (all modules are shipped pre-configured as master modules).

2. Install any PCI and memory options.

3. Connect external cables, such as the console serial cable, networking, and power.

4. Install option drives (3.5 inch and 5.25 inch) in either of the two CPU modules.

5. Connect the two CPU modules together with CrayLink and grounding cables.

To set up a dual-module Origin200 server with an Origin Vault disk expansion cabinet, follow these basic steps:

1. Configure one of the modules as the slave (all modules are shipped pre-configured as master modules).

2. Install any PCI and memory options; choose which of the modules (master or slave) will attach to the Origin Vault and install the PCI SCSI option in that module.

3. Connect external cables, such as the console serial cable, networking, SCSI (to the Origin Vault), and power.

4. Install option drives (3.5 inch and 5.25 inch) in either of the two CPU modules or the Origin Vault.

5. Connect the two CPU modules with CrayLink and grounding cables.

You may observe better I/O performance if you balance your PCI options (including the SCSI adapter for the Origin Vault) between the two CPU modules. For example, if you have two FDDI boards, place one in each CPU module.

Single-Module Origin200 GIGAchannel Server

To set up a single-module Origin200 GIGAchannel server, follow these basic steps:

1. Install any memory options in the CPU module.

2. Install PCI options in either the CPU module or the GIGAchannel expansion cabinet. (You may see better performance installing the cards in the GIGAchannel cabinet.)

3. Install XIO options in the GIGAchannel cabinet.

4. Connect the CPU module to the GIGAchannel cabinet with two XIO cables and a grounding cable.

5. Install option drives (3.5 inch and 5.25 inch) in the CPU module.

6. Connect external cables, such as the console serial cable, networking, and power.

In terms of I/O performance, you may see better PCI performance if you install your PCI cards in the GIGAchannel expansion cabinet rather than in the CPU module.

Single-Module Origin200 GIGAchannel With an Origin Vault

To set up a single-module Origin200 GIGAchannel server with an Origin Vault, follow these basic steps:

1. Install any memory options in the CPU modules.

2. Install PCI options in either the CPU module or the GIGAchannel expansion cabinet; choose where you will install the PCI SCSI option for the Origin Vault, either in the CPU module or the GIGAchannel cabinet. You may see better performance if you install the PCI card in the GIGAchannel cabinet.

3. Install XIO options in the GIGAchannel cabinet.

4. Connect the CPU module to the GIGAchannel cabinet with two XIO cables and a grounding cable.

5. Install option drives (3.5 inch and 5.25 inch) in the CPU modules and the Origin Vault.

6. Connect external cables, such as the console serial cable, networking, SCSI (to the Origin Vault), and power.

In terms of I/O performance, you may see better PCI performance if you install your PCI cards in the GIGAchannel expansion cabinet rather than in the CPU module.

Dual Module Origin200 GIGAchannel

To set up a dual-module Origin200 GIGAchannel server, follow these basic steps:

1. Configure one of the CPU modules as the slave (all modules are shipped pre-configured as master modules).

2. Install PCI options in either of the CPU modules or the GIGAchannel expansion cabinet. You may see better I/O performance if you place the PCI cards in the GIGAchannel expansion cabinet.

3. Install XIO options in the GIGAchannel cabinet.

4. Connect one of the CPU modules to the GIGAchannel cabinet with two XIO cables and a grounding cable.

5. Connect external cables, such as the console serial cable, networking, and power.

6. Install option drives (3.5-inch and 5.25-inch) in either of the two CPU modules.

7. Connect the two CPU modules with CrayLink and grounding cables.

You can connect the GIGAchannel expansion cabinet to either a master or a slave module. There are no I/O performance advantages to either configuration.

You may observe better I/O performance if you first install PCI cards in the GIGAchannel expansion cabinet, then balance any remaining PCI cards between the master and slave CPU modules.

Dual Module Origin200 GIGAchannel With an Origin Vault

To set up a dual-module Origin200 GIGAchannel server with an Origin Vault, follow these basic steps:

1. Configure one of the CPU modules as the slave (all modules are shipped pre-configured as master modules).

2. Install PCI options in either of the CPU modules or the GIGAchannel expansion cabinet; choose where you will install the PCI SCSI option for the Origin Vault, either in one of the CPU modules or the GIGAchannel cabinet. You may see better I/O performance if you install PCI cards first in the GIGAchannel cabinet, then balance the remaining cards between the two CPU modules.

3. Install XIO options in the GIGAchannel cabinet.

4. Connect one of the CPU modules to the GIGAchannel cabinet with two XIO cables and a grounding cable.

5. Connect external cables, such as the console serial cable, networking, SCSI (for the Origin Vault), and power.

6. Install option drives (3.5-inch and 5.25-inch) in either of the two CPU modules or the Origin Vault.

7. Connect the two CPU modules together with CrayLink and grounding cables.

You can connect the GIGAchannel expansion cabinet to either a master or a slave module. There are no I/O performance advantages to either configuration.

You may observe better I/O performance if you place your PCI cards first in the GIGAchannel expansion cabinet, then balance any remaining PCI options between the CPU modules.

Dual Module Origin200 GIGAchannel With Two GIGAchannel Cabinets

To set up a dual-module Origin200 GIGAchannel server with two GIGAchannel expansion cabinets, follow these basic steps:

1. Configure one of the CPU modules as the slave (all modules are shipped pre-configured as master modules).

2. Install PCI options in either of the CPU modules or the GIGAchannel expansion cabinets You may see better I/O performance if you install PCI cards first in the GIGAchannel cabinets, then balance any remaining cards between the two CPU modules.

3. Install XIO options in the GIGAchannel cabinets.

4. Connect one of the CPU modules to one of the GIGAchannel cabinets with two XIO cables and a grounding cable.

5. Connect the second GIGAchannel cabinet to the remaining CPU module.

6. Connect external cables, such as the console serial cable, networking, SCSI (for the Origin Vault), and power.

7. Install option drives (3.5-inch and 5.25-inch) in either of the two CPU modules.

8. Connect the two CPU modules together with CrayLink and grounding cables.

Each GIGAchannel expansion cabinet must be connected to its own CPU module. You cannot daisy-chain the expansion cabinets. Also, you may see better I/O performance if you install PCI cards first in the GIGAchannel cabinets, then balance any remaining PCI cards between the two CPU modules.

Putting the Pieces Together

The following sections describe how to put together all the pieces of your server:

- "Overview of the System Connectors and Ports" on page 55
- "Safety Considerations" on page 56
- "Setting the Slave CPU Module (Two-Module Servers Only)" on page 56
- "Installing PCI, XIO, and Memory Options" on page 60
- "Rackmount Installations" on page 60
- "Tower Installations" on page 60
- "Installing 3.5-Inch Drives" on page 64
- "Installing 5.25-Inch Drives" on page 66
- "Attaching an Optional Origin Vault Disk Expansion Cabinet" on page 75
- "Attaching an Ethernet Networking Cable" on page 75
- "Attaching the System Console" on page 76
- "Connecting Two CPU Modules" on page 77
- "Connecting the GIGAchannel Expansion Cabinet (Origin200 GIGAchannel Only)" on page 61
- "Checking the XIO Boards (Origin200 GIGAchannel Only)" on page 79
- "Connecting the Power Cables" on page 79

Overview of the System Connectors and Ports

Figure 2-7 provides an overview of the various connectors that are available on a CPU module.

Rear of System
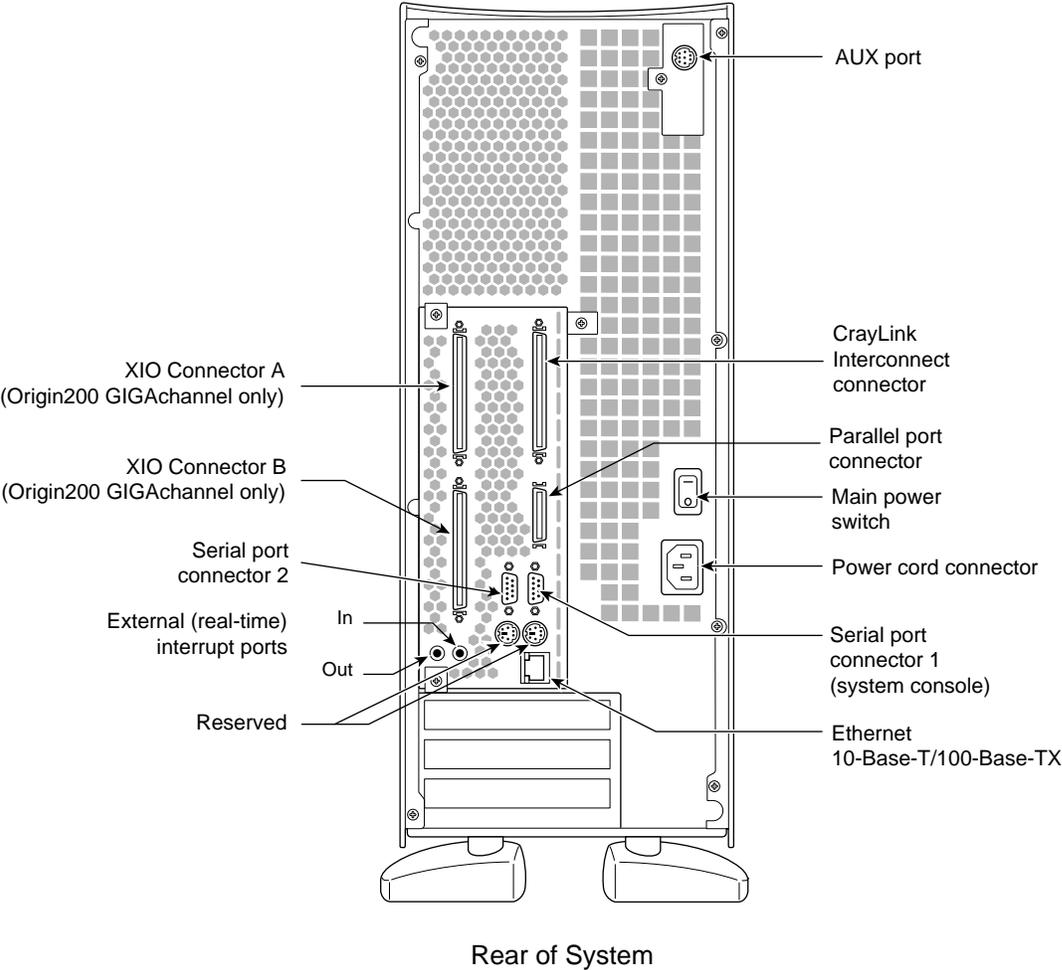
Figure 2-7   Origin200 CPU Module Connectors

For complete descriptions of these connectors, see Chapter 1, "Overview of the Origin200 and Origin200 GIGAchannel Server" 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. Each fully configured Origin200 CPU 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 SGI peripheral, memory, and upgrade options are shipped with wrist straps.

Setting the Slave CPU Module (Two-Module Servers Only)

In a two-module Origin200 or Origin200 GIGAchannel server, one CPU module is said to be the master module and the other is said to be the slave module. 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.

- In an Origin200 GIGAchannel server, either the master or the slave module can be connected to the GIGAchannel expansion cabinet.

Follow these steps to select one of your Origin200 modules as the slave:

1. If the slave system is in a tower configuration, remove the side panel as shown in Figure 2-8.

    ■   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.
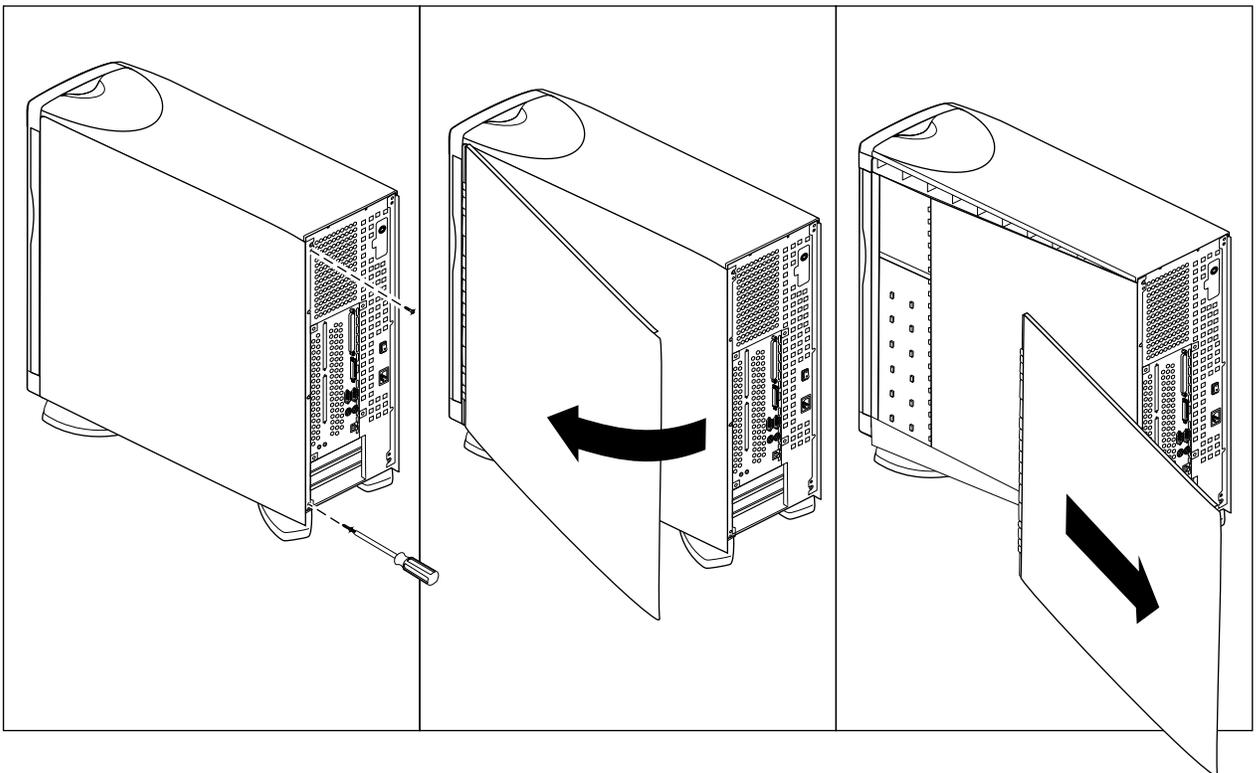
Figure 2-8   Removing the Side Panel of the Second (Slave) Module

2. Remove the module system controller (MSC) access plate, as shown in Figure 2-9

    ■   Remove the single screw that attaches the plate to the chassis.

    ■   Swing the plate out and away.
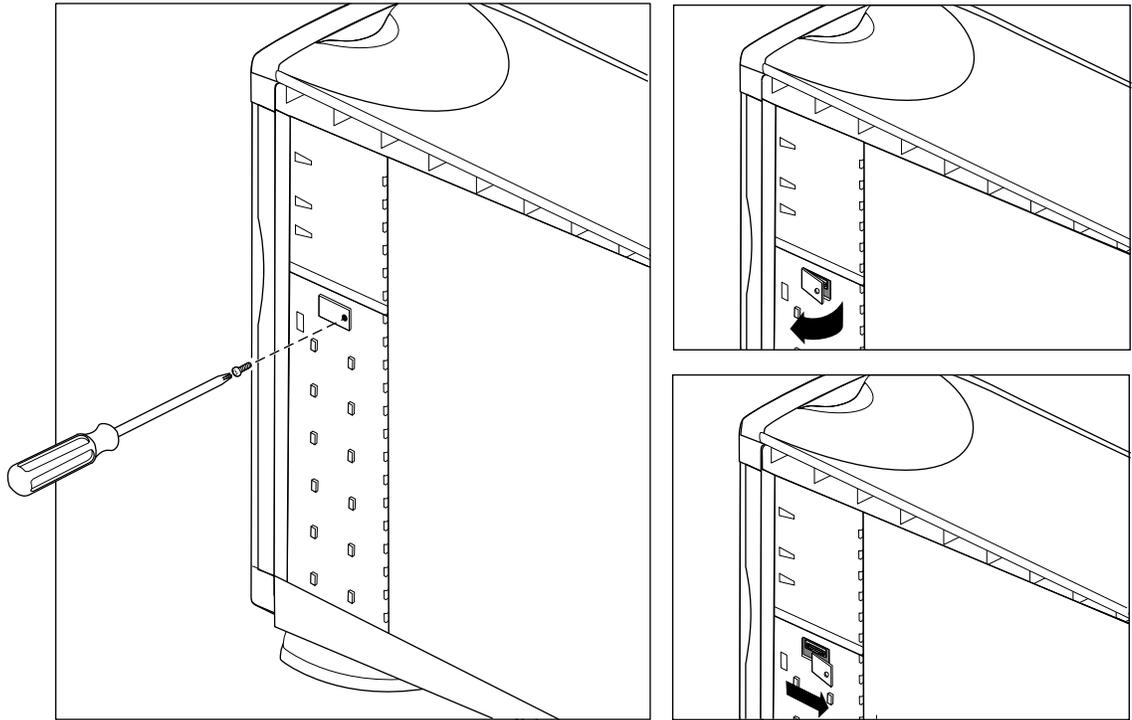
Figure 2-9   Removing the Module System Controller (MSC) Access Plate

3.   Locate the MSC DIP switch, as shown in Figure 2-10.
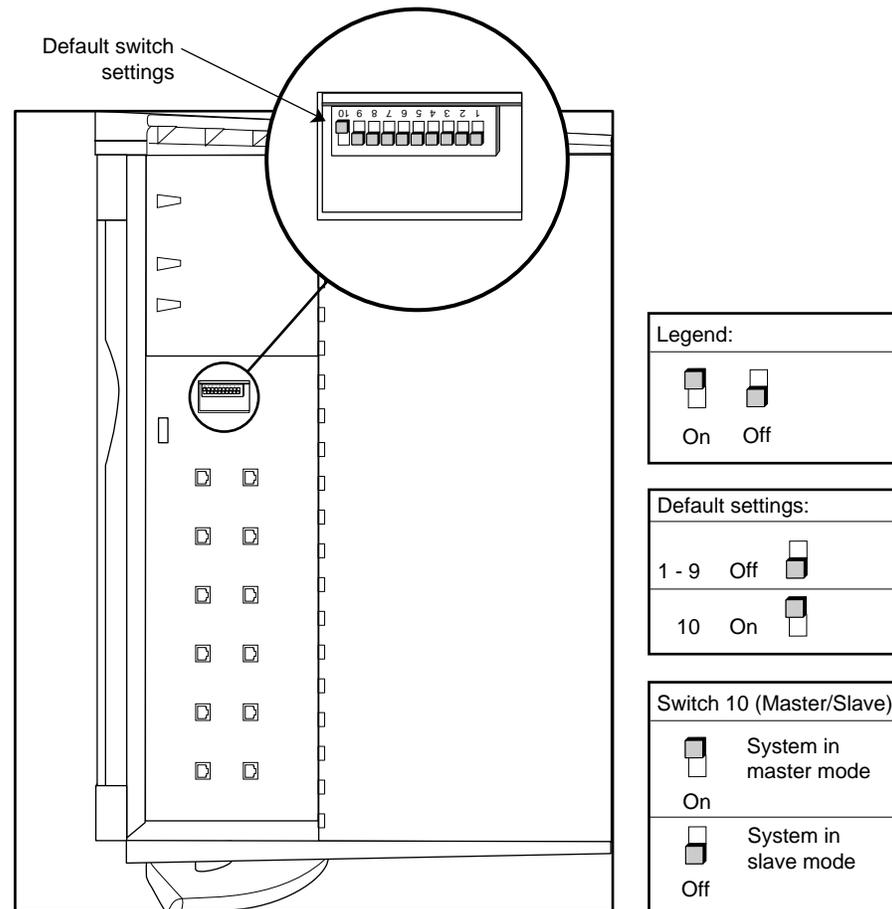
Figure 2-10   MSC DIP Switch Location and Settings

4. Using a ballpoint pen or similar object, change switch 10 to "off" to place this
    module in slave mode. See Figure 2-10.

5. Replace the MSC access plate.

6. *Tower systems only*: If you have no further options to install inside the CPU module
    (such as memory and PCI option boards), replace the side panel. Otherwise, leave
    the side panel off and continue assembling the server.

Installing PCI, XIO, and Memory Options

Make sure you understand where you will install PCI options and, in the case of the Origin200 GIGAchannel server, where you will attach the GIGAchannel expansion cabinet. See "Planning the Server Configuration" on page 48.

If you have additional memory or PCI option boards that you wish to install do so now.

- Turn to the *Origin200 and Origin200 Giga Maintenance Guide* for information on opening the modules, installing boards, and installing memory.

- If you have an Origin Vault disk expansion cabinet, verify that the PCI SCSI option is installed. If it is installed, you should see a SCSI connector in one of the PCI slots at the rear of the system.

- If you have an Origin200 GIGAchannel server, install any XIO boards in the GIGAchannel expansion cabinet. See the *Origin200 and Origin200 GIGAchannel Maintenance Guide*.

- *Do not* install disk drives yet. These make the modules heavier and more difficult to move as you continue to set up the system.

Rackmount Installations

If you are installing the system in an equipment rack, turn now to Chapter 3, "Installing an Origin200 System in a Rack." Follow the instructions for installing the system in an equipment rack.

When you are finished installing the system in the equipment rack, continue with the installation process in this chapter.

Tower Installations

If you are installing a tower (free-standing) server, place it in the location you determined earlier (see "Choosing a Location for the Server" on page 36).

Connecting the GIGAchannel Expansion Cabinet (Origin200 GIGAchannel Only)

If you are installing an Origin200 GIGAchannel server, follow these steps to attach the GIGAchannel expansion cabinet to a CPU module.

1. Attach the grounding cable between the GIGAchannel cabinet and the CPU module, as shown in Figure 2-11.
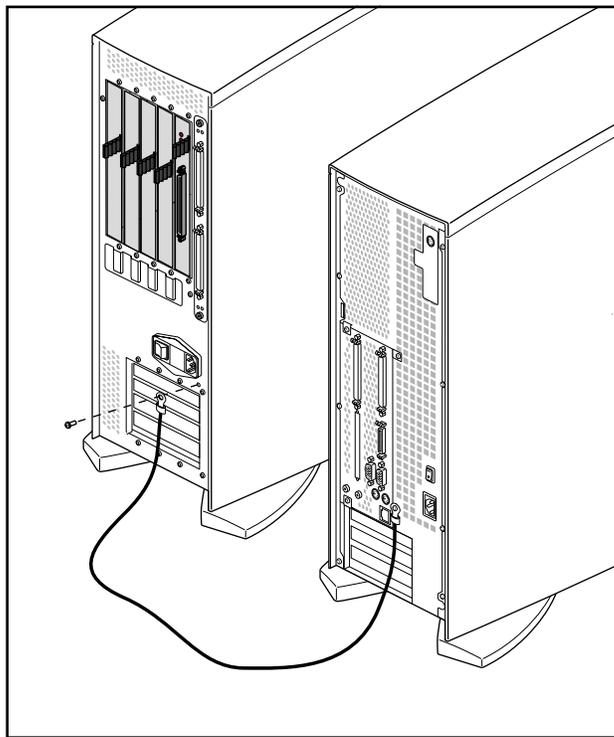
Figure 2-11   Attaching a Grounding Cable Between a GIGAchannel Expansion Cabinet and a CPU Module

2. Attach the XIO cables between the GIGAchannel and the CPU module, as shown in Figure 2-12.

    ■   Attach a cable between XIO connector A on the GIGAchannel and connector A on the CPU module.

    ■   Attach the other cable between XIO connector B on the GIGAchannel and connector B on the CPU module.

    ■   If you have two GIGAchannel expansion cabinets, each one must be connected to a separate CPU module (one to the master module and one to the slave module). You cannot daisy chain GIGAchannel cabinets and you cannot connect the same cabinet to two different CPU modules.
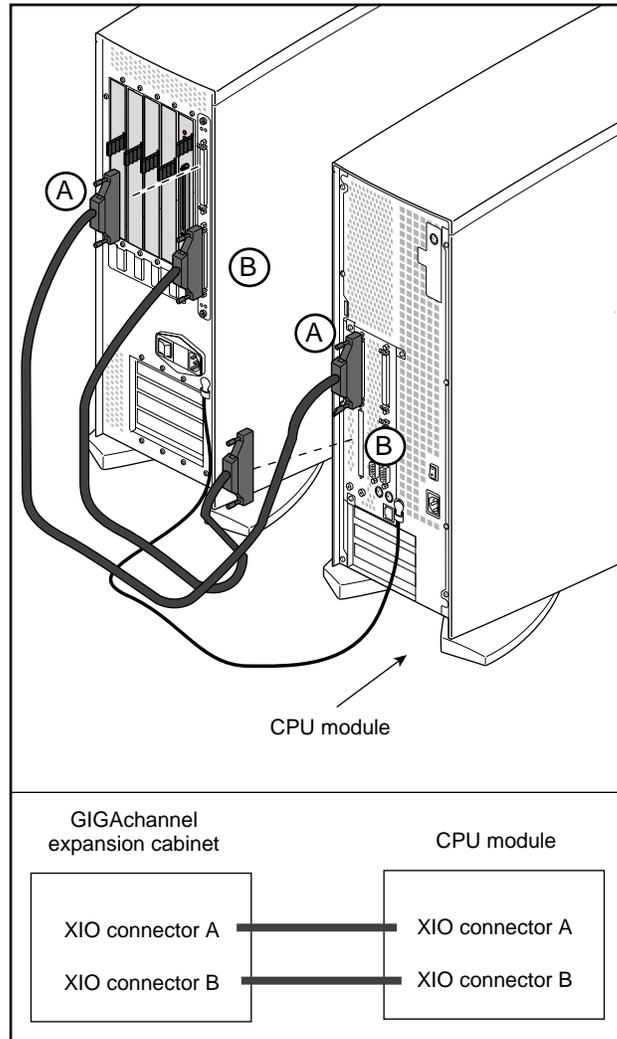
Figure 2-12   Attaching the XIO Cables Between a GIGAchannel Cabinet and a CPU Module

Note: An Origin200 GIGAchannel server cannot boot unless there is either a GIGAchannel cabinet attached correctly to the XIO connectors on the back of the server, or the XIO A and B connectors are connected together with a single XIO cable (loopback mode). See "Running an Origin200 GIGAchannel Without a GIGAchannel Expansion Cabinet (Loopback Mode)" on page 109 for information about running an Origin200 GIGAchannel server without a GIGAchannel.

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 SGI 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 2-13.

Slot 6 (SCSI ID 6)

Slot 1 (SCSI ID 1)
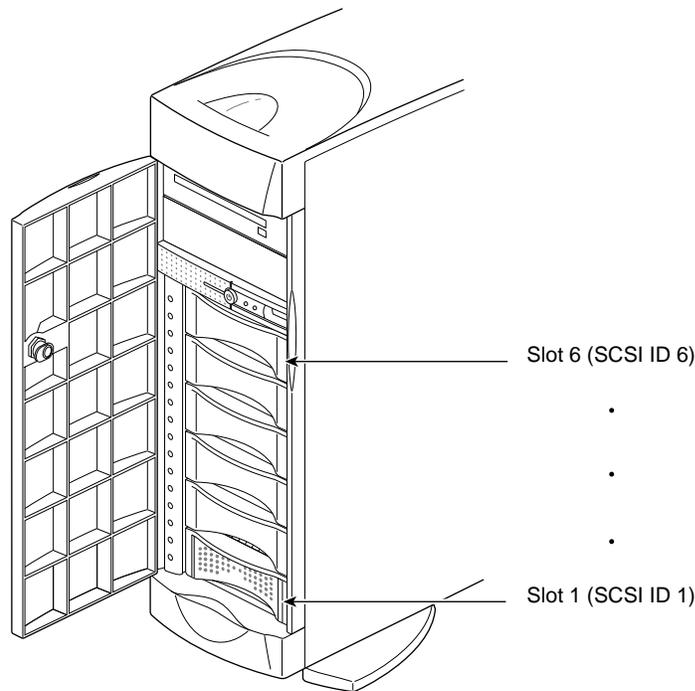
Figure 2-13   SCSI Drive ID Numbering for 3.5-Inch Drives in the Origin200 Server

Install any 3.5-inch drives as shown in Figure 2-14.
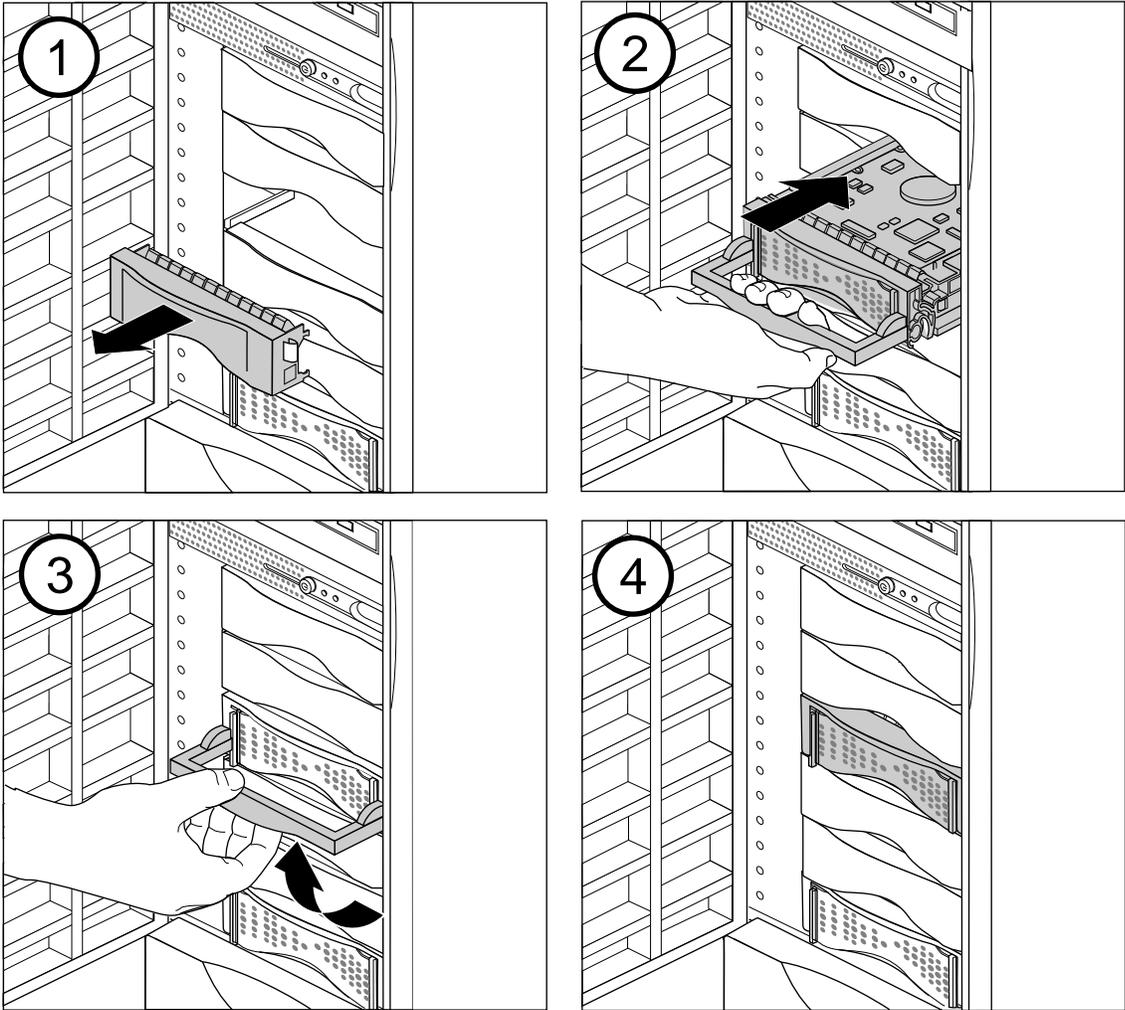
Figure 2-14   Installing 3.5-Inch Drives in the Origin200 Server

Save any blanking plates you remove in case you remove the drives later. For more information about using 3.5-inch drives, see Chapter 6, "Installing and Configuring Peripherals."

Installing 5.25-Inch Drives

Note: If you are installing a 5.25-inch drive that is not from SGI, see "Installing, Removing, and Configuring 5.25-Inch Peripherals" on page 151.

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

1. Remove the door of the CPU module.

    ■   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 2-15. The door pops off its hinges.
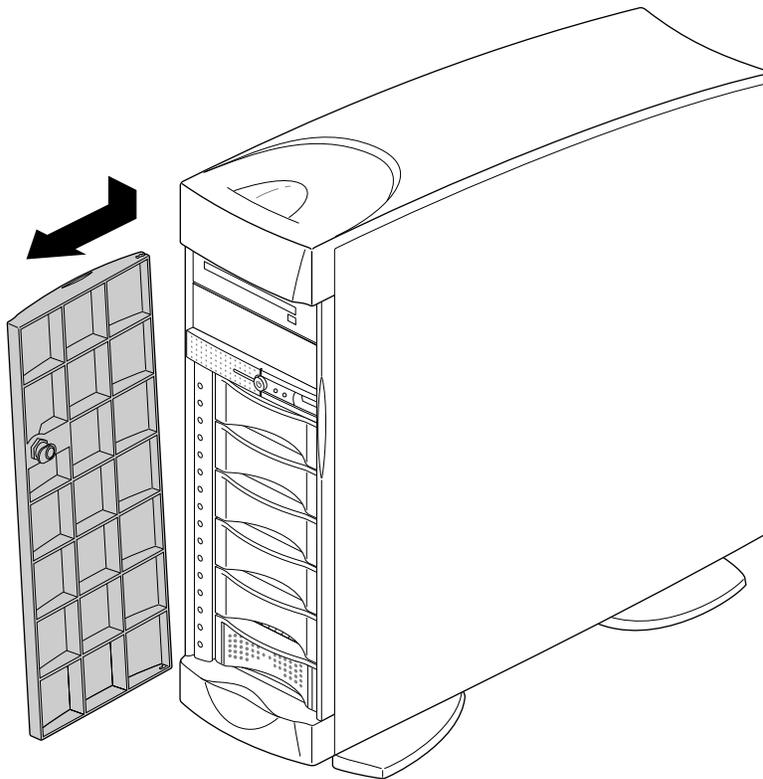
Figure 2-15   Removing the Front Door of a CPU Module, Tower Configuration

■   If the system is in a rackmount configuration, lift the door assist tab and pull the door off, as shown in Figure 2-16.
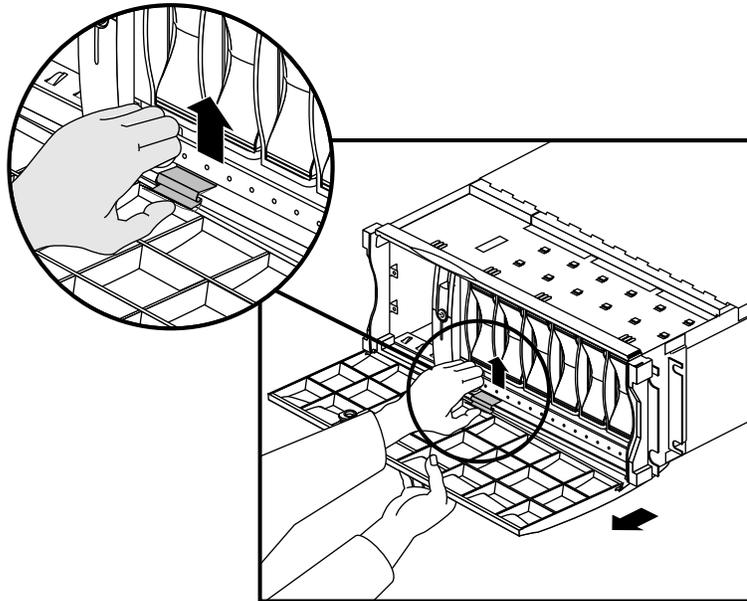
Figure 2-16   Removing the Front Door, Rackmount Configuration

2.   Remove the carrier, as shown in Figure 2-17.

■   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.
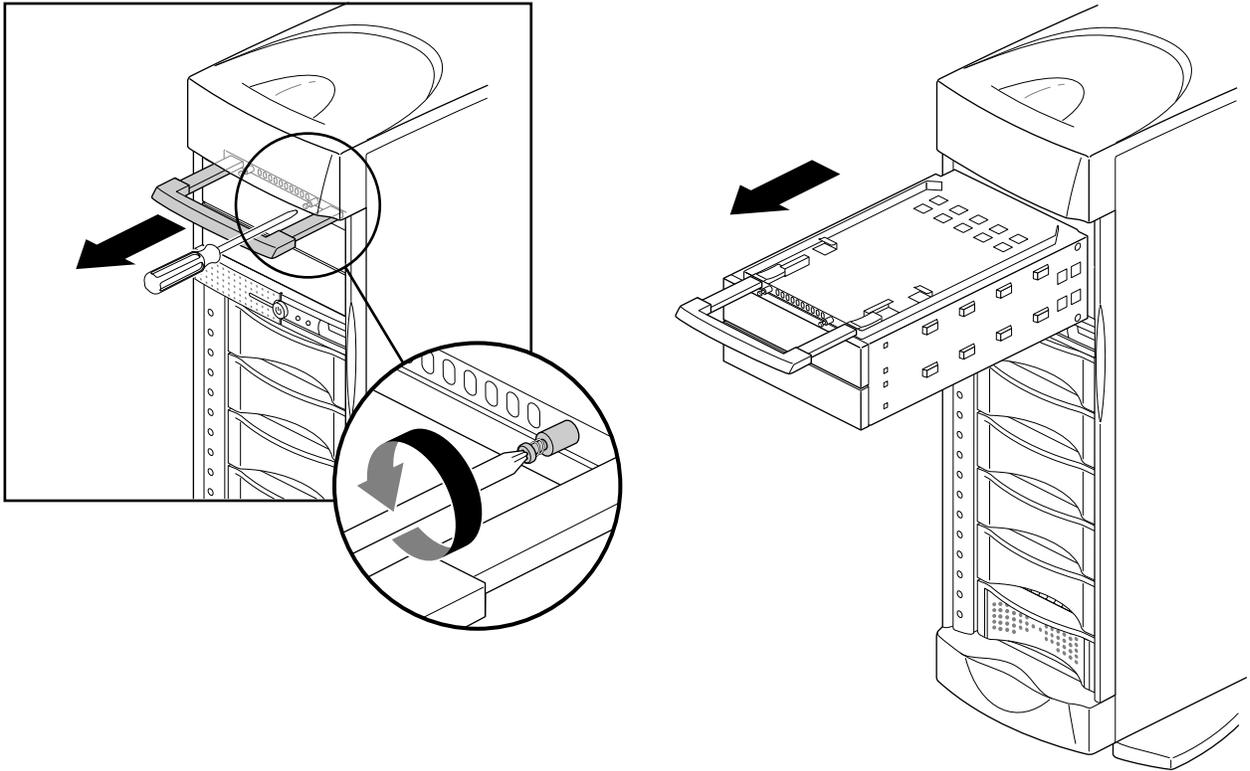
Figure 2-17   Removing the 5.25-Inch Peripheral Carrier

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 2-18.
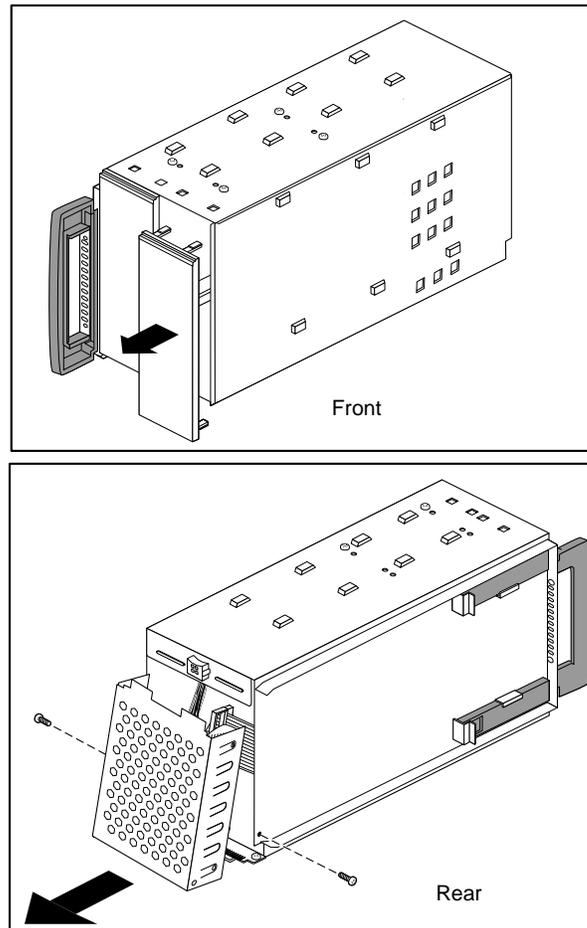
Figure 2-18   Removing a Blanking Plate and the Rear Access Plate From the Peripheral Carrier

4. Slide the drive into the peripheral carrier and attach it with four screws through the side of the carrier, as shown in Figure 2-19.

    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.

69
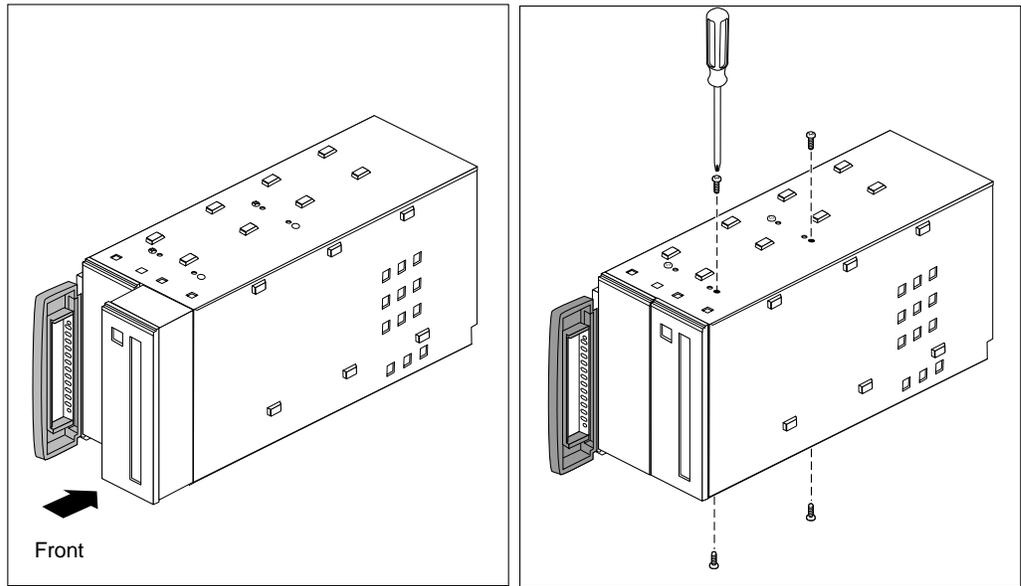
Figure 2-19   Inserting a 5.25-Inch Drive in the Peripheral Carrier

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 2-20.

70

Carrier power
receptacle

Peripheral
power connector
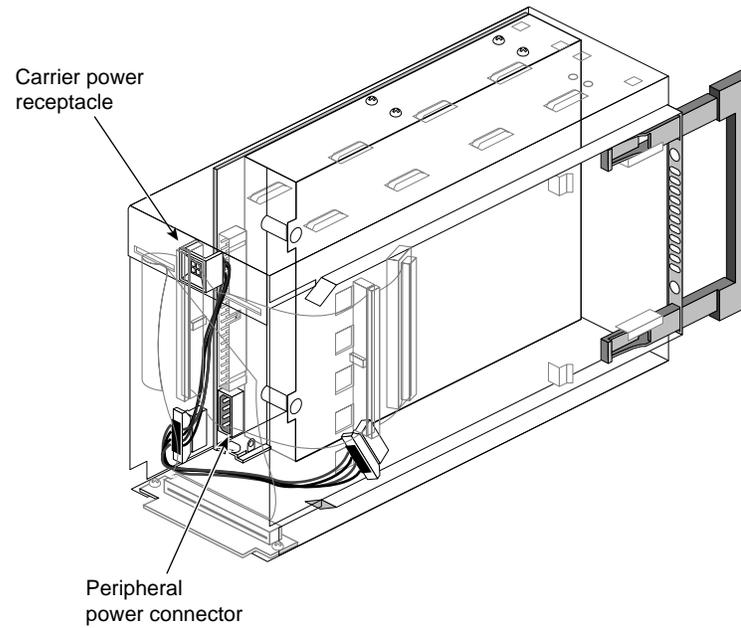
Figure 2-20   Attaching a Power Connector to a 5.25-inch Drive

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 2-21.

    Tuck the unused connector and terminator inside the carrier.
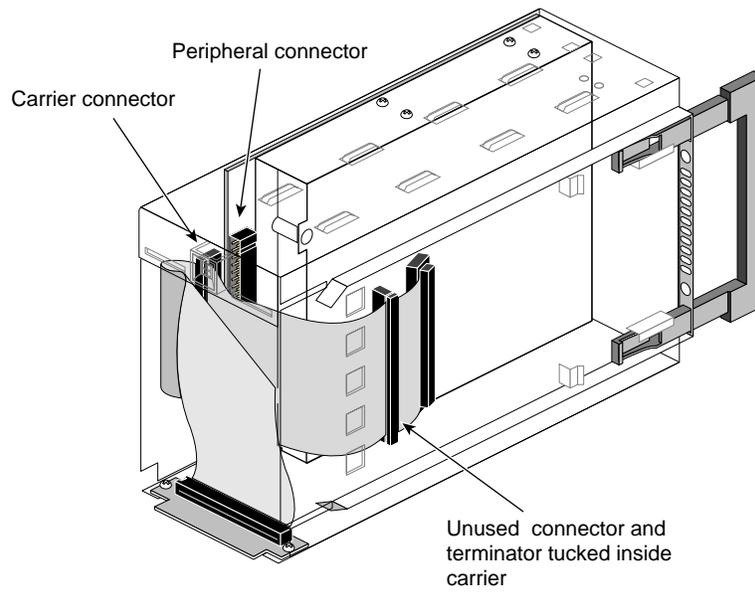
Figure 2-21   Attaching the SCSI Cable to a 5.25-Inch Drive

7.   Replace the access plate. See Figure 2-22. The plate should cover all of the loose
     wires (power and SCSI) at the rear of the carrier.
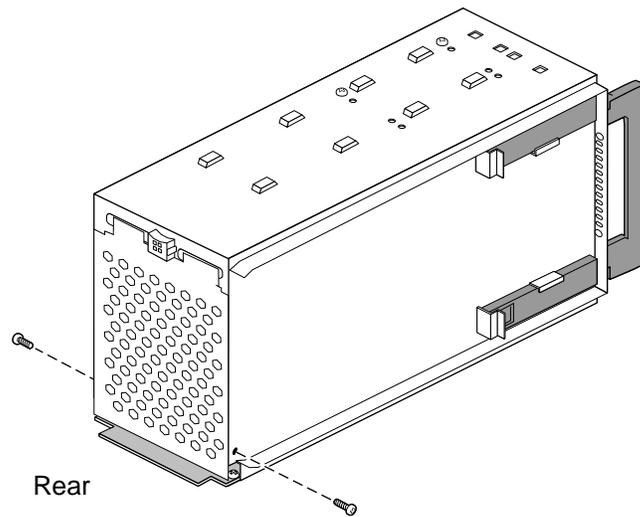
Rear

Figure 2-22   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 2-23.
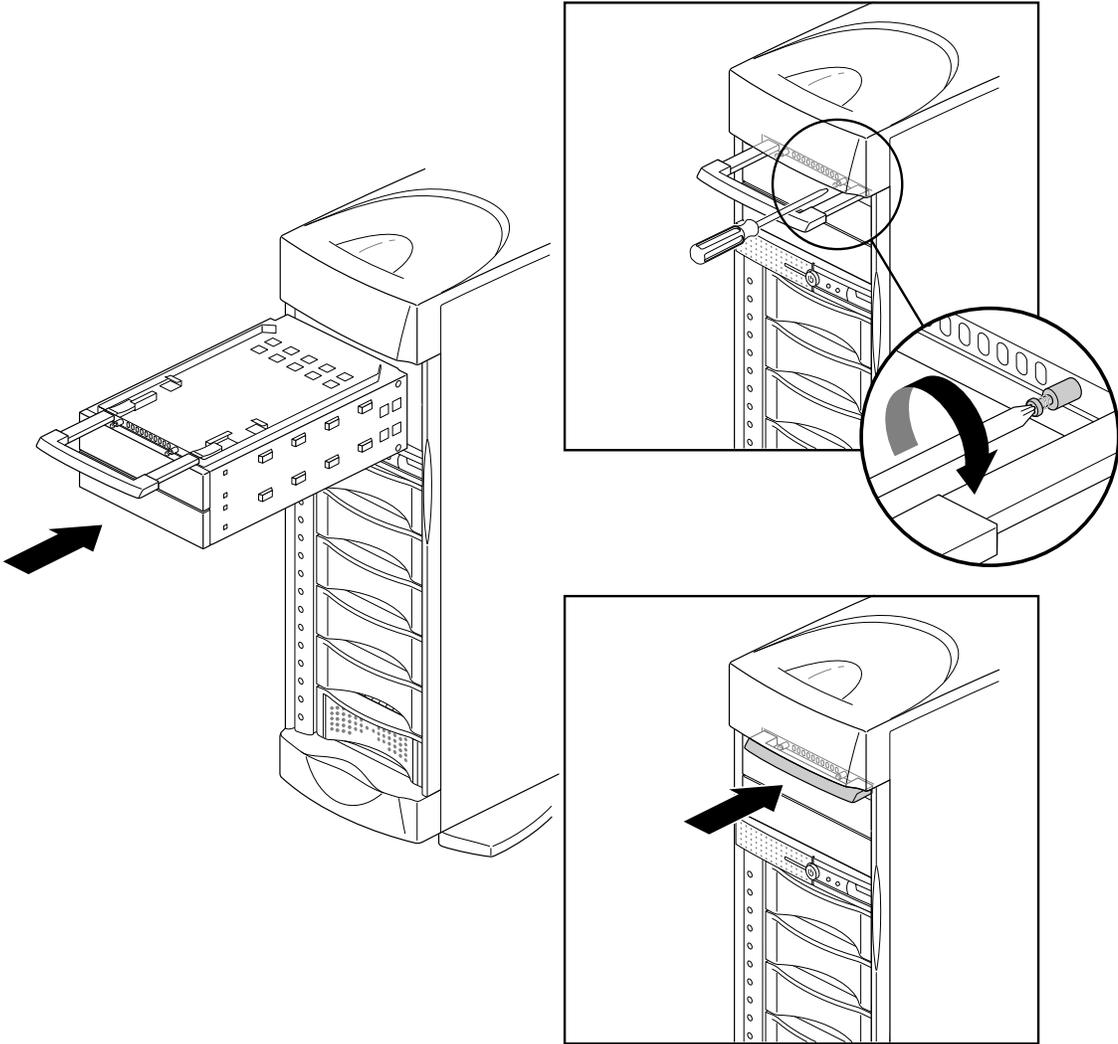
Figure 2-23   Replacing the 5.25-Inch Peripheral Carrier

Attaching an Optional Origin Vault Disk Expansion Cabinet

If you have an optional Origin Vault disk expansion cabinet, you may attach it to your server now. See the *Origin Vault Owner's Guide*, included with the option.

Attaching an Ethernet Networking Cable

Figure 2-24 shows how to attach an Ethernet 10-Base-T or 100-Base-TX cable to an Origin200 module.
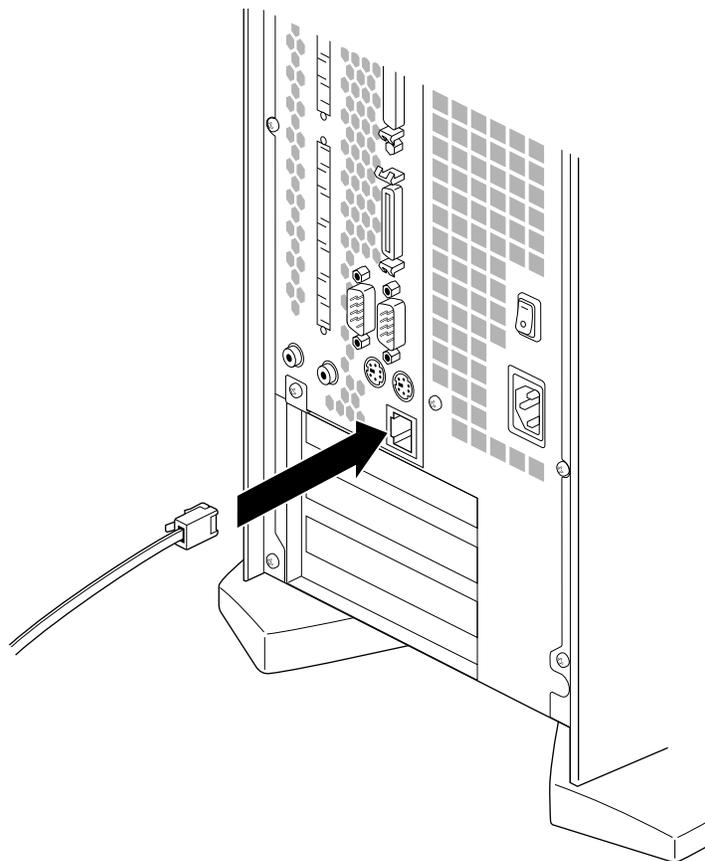
Figure 2-24   Attaching an Ethernet Networking Cable to an Origin200 Module

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

75

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 2-25.
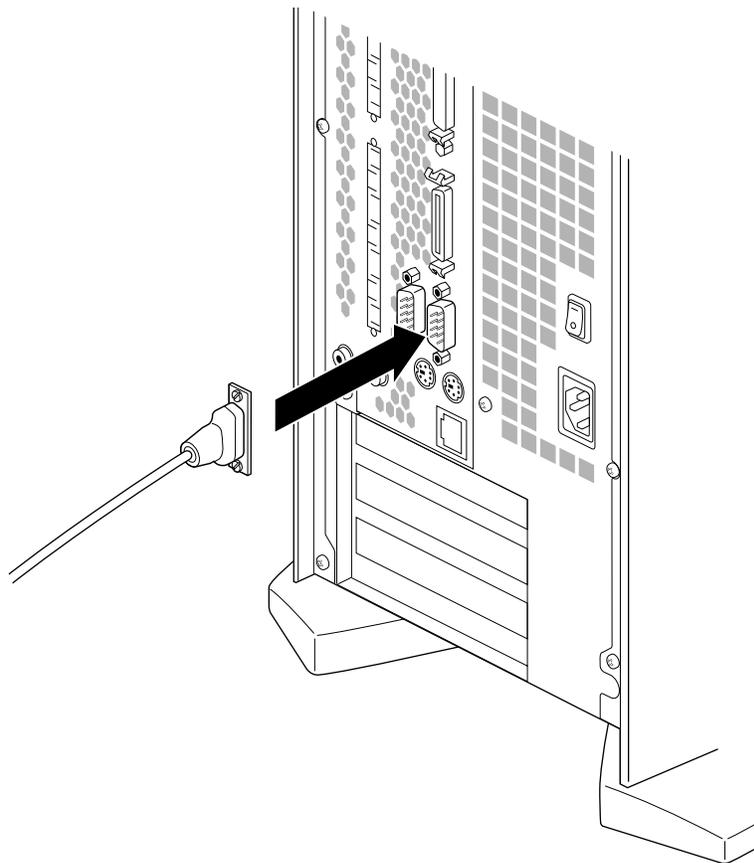
Figure 2-25   Attaching the Serial Cable

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 or a workstation as the system console instead of using an ASCII terminal. For more information, see "Using Another Computer or Workstation as the System Console" on page 111 in Chapter 4.

Connecting Two CPU Modules

Before connecting two CPU modules, you should already have configured one module as the slave. (See "Setting the Slave CPU Module (Two-Module Servers Only)" on page 56.)

Note: You can connect two CPU modules only if they have the same speed processors. You cannot connect modules whose CPUs run at different clock speeds.

Follow the steps in this section to connect the modules of a two-module Origin200 or Origin200 GIGAchannel server.

1. Connect the grounding cable and CrayLink cable between the two chassis, as shown in Figure 2-26.

    ■ Connect the ground cable first to avoid any possibility of electrostatic damage to the modules.

    ■ Connect the CrayLink cable and tighten the thumbscrews. Be sure to tighten the thumbscrews on the connectors for proper CrayLink operation.
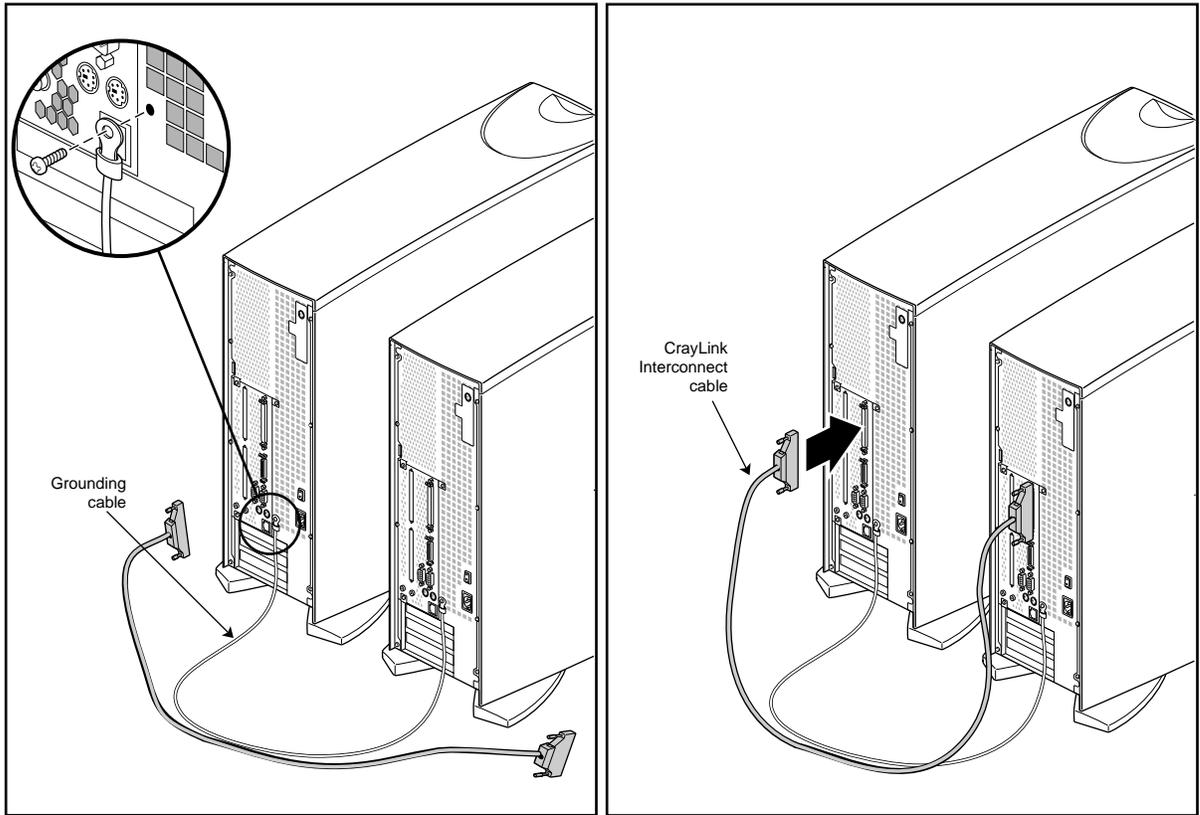
Figure 2-26   Attaching the Grounding and CrayLink Cables

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.

You are finished connecting the modules.

Checking the XIO Boards (Origin200 GIGAchannel Only)

If your Origin200 GIGAchannel server was shipped with XIO boards installed, take a moment to press on each of the board levers on the XIO boards. Occasionally during shipping and handling, one of the levers can be jostled loose. The server will still boot and run if one of the board levers is loose, but the XIO board may not be recognized and configured by the system.

Connecting the Power Cables

Attach the power cables to all of the parts of server (CPU modules, GIGAchannel expansion cabinet, and optional Origin Vault).

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). See Figure 2-1. You may also attach the different parts of the server to 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 ready to 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 2-27.
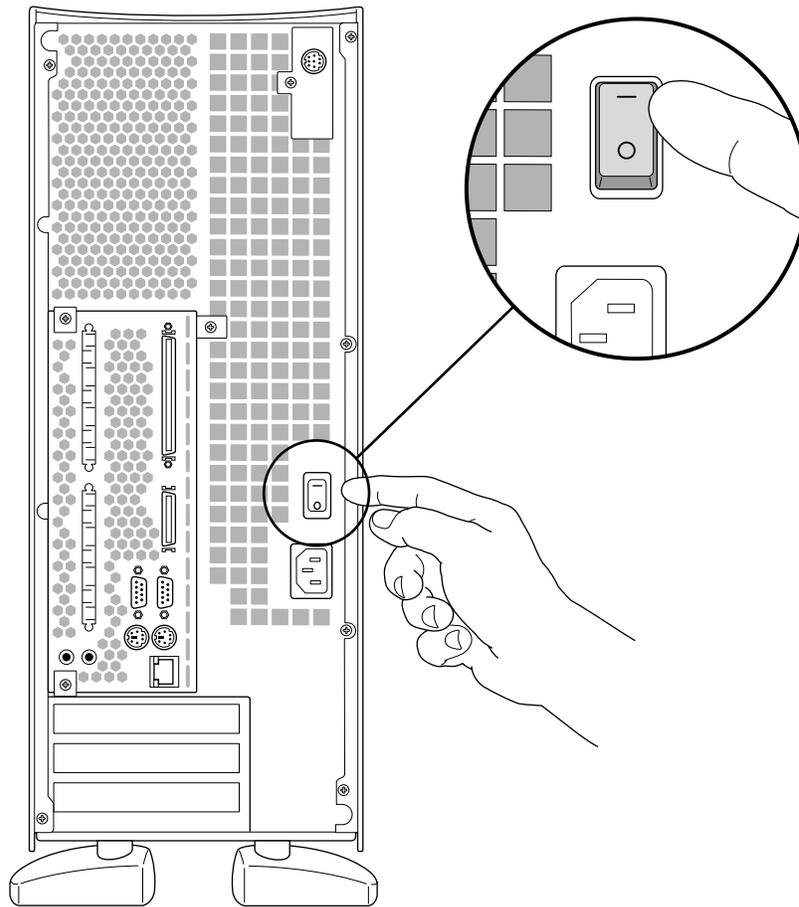
Figure 2-27   Turning On the Master Power Switch

- ■ If you have more than one cabinet in your Origin200 server, turn them on in the following order: Origin Vault expansion cabinet, GIGAchannel expansion chassis, slave CPU module, and finally the master CPU module.

- ■ When you turn on the master power switch, the status LED on the front panel briefly flashes all three of its colors in sequence.

Note: If you have an Origin200 GIGAchannel server, be sure the XIO cables are properly connected before you turn on the master power switches on the CPU module and GIGAchannel expansion chassis. If you turn on the master power switches without the XIO cables properly connected, the hardware may not function correctly.

2. Wait a few moments for the server to start. You should see some messages boot-up displayed on the system console.

- ■ If you do not see any messages after turning on the main power switch, press the front of the CPU module (the master in a two-module server), press the front power switch, as shown in Figure 2-28.
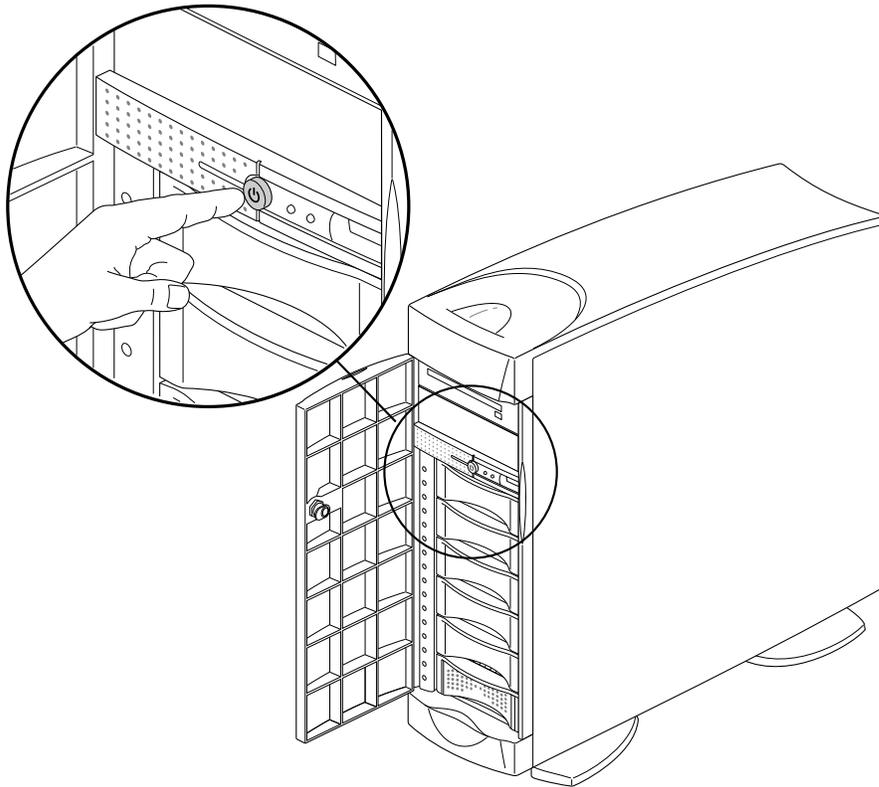
Figure 2-28   Turning On the Front Power Switch

- 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) of the master CPU module and proceeding to slot 6. After the 3.5-inch drives have power, power is applied to the 5.25-inch drives. This same process is repeated for the slave CPU module in a two-module system.

- If you have an Origin Vault attached to the server, the disks in the Origin Vault spin up in the same relative order as in the CPU module.

Logging In for the First Time

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

1. Name the system (so it can be identified on a network).

2. Assign an internet protocol (IP) address to the system (so that it can communicate on the network).

3. *Optional:* Assign passwords to critical system accounts (such as root and httpd).

4. *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.

Installing an Origin200 System in a Rack

This chapter describes how to install an Origin200 or Origin200 GIGAchannel server in a third-party (not from SGI) equipment rack. It contains the following sections:

- "Overview of Mounting Hardware" on page 86
- "Installing the Mounting Hardware on the Chassis" on page 87
- "Installing the Rackmounting Shelf" on page 90
- "Installing a Chassis in the Rack" on page 91
- "Removing a Chassis From an Equipment Rack" on page 93

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 a server in a tower configuration, and you wish to convert it to a rackmount configuration, a conversion kit is available from SGI (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 SGI or your local service provider to obtain this kit.

Caution: When installing a two-module system, or attaching an Origin Vault expansion cabinet, 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 36.

Overview of Mounting Hardware

Origin200 systems that are configured for rackmounting are shipped from SGI 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 and Origin200 GIGAchannel Server" 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 or an Origin200 GIGAchannel, be extremely careful with the CrayLink Interconnect cable and XIO cables. Do not allow them to become kinked or bent excessively inside the rack. Do not catch or smash them between the system and other parts of the equipment rack when sliding the system in and out.

Installing the Mounting Hardware on the Chassis

Each rackmountable Origin200 ships with 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 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.
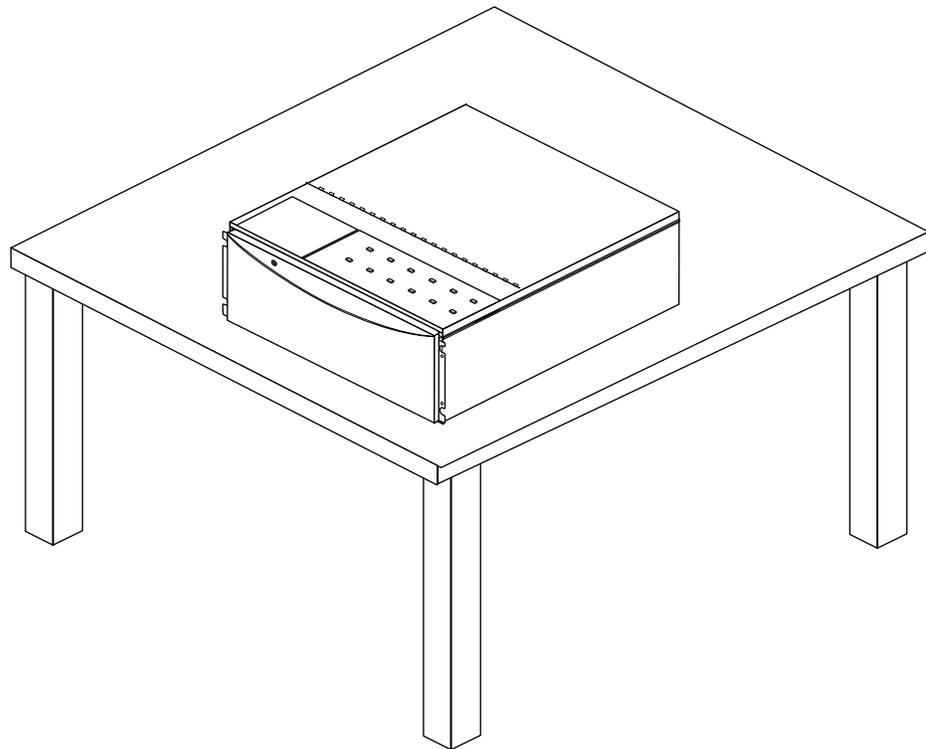
Figure 3-1   Placing the Origin200 on a Work Surface

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

Left   Right
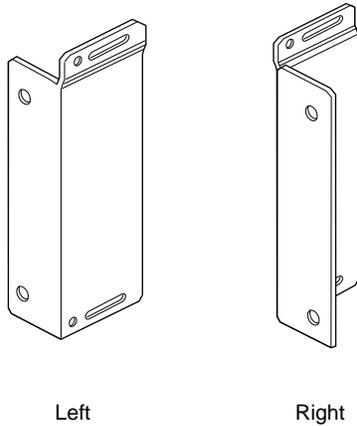
Figure 3-2   Origin200 Rackmounting Ears

3. Using a #2 Phillips screwdriver and the 6-32 x 1/4-inch screws provided with the 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.
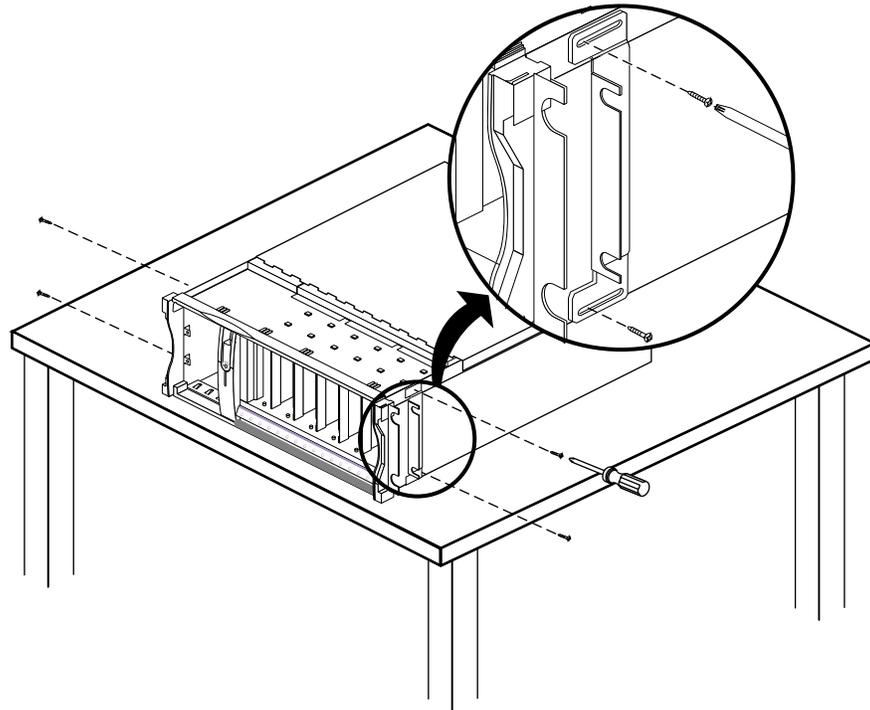
Figure 3-3   Attaching the Rackmounting Hardware (Ears)

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, and installing internal options, see the *Origin200 and Origin200 GIGAchannel Maintenance Guide*.

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 server takes up 4 U (7 inches, or 17.8 cm) of space in the rack and supports the weight of a fully-loaded system.

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.
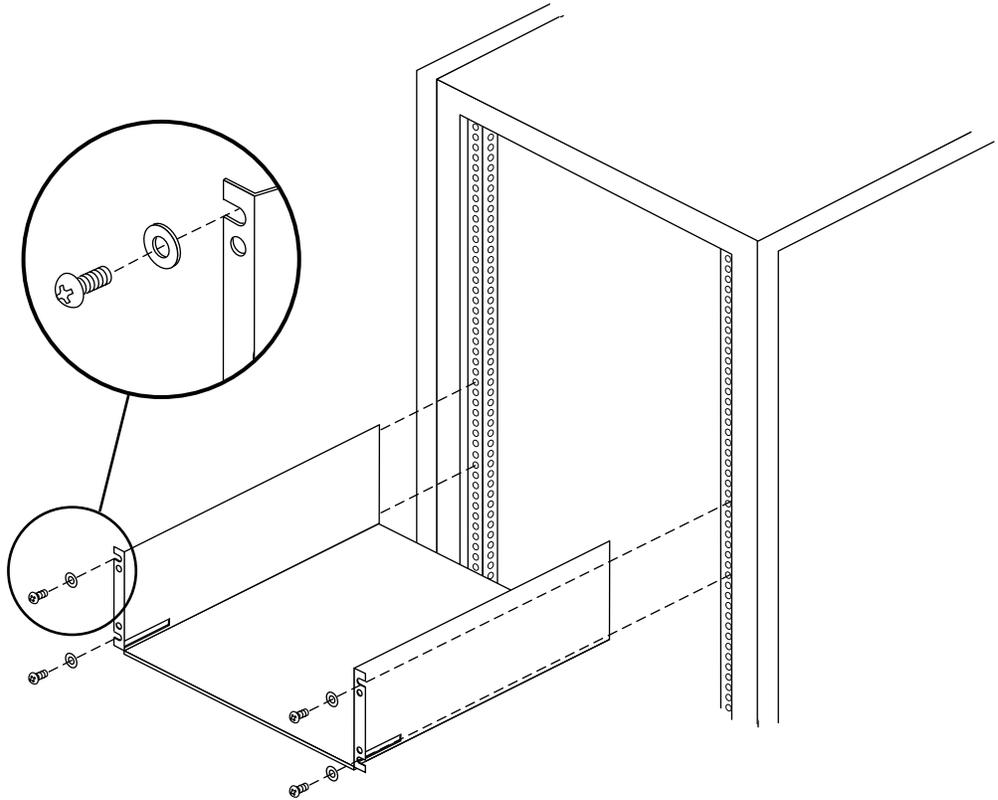
Figure 3-4   Installing the Rackmounting Shelf

Installing a Chassis in the Rack

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

1. *Recommended*: Lock the front door of a server module with the key. This prevents the door from being pulled open accidentally while you install the server. (This does not apply to the GIGAchannel expansion cabinet.)

2. With a person on each side of the chassis, lift it and move it to the equipment rack, as shown in Figure 3-5.
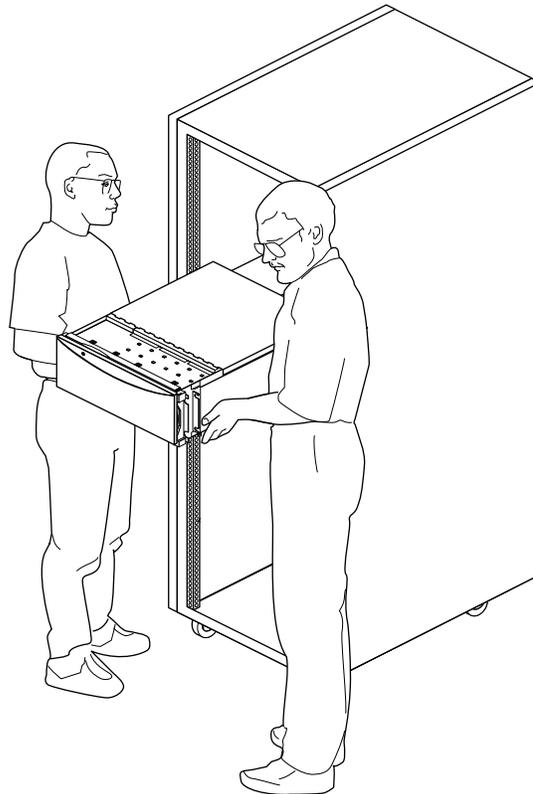
Figure 3-5   Lifting the Origin200 Server Into a Rack

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 10-32 x 1/2-inch screws.

5. Attach the plastic end caps to the front of the server to conceal the mounting flange, as shown in Figure 3-6.
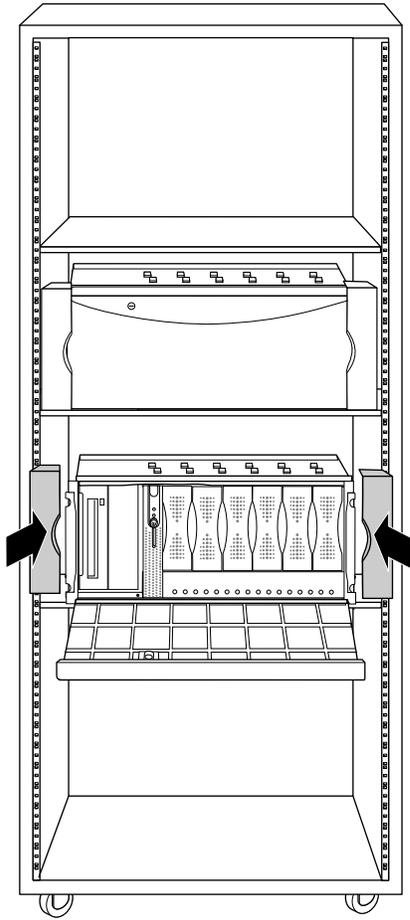
Figure 3-6   Attaching the Plastic End Caps to a Rackmounted Server

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 Chassis From an Equipment Rack

If you have a multi-module Origin200 system or an Origin200 GIGAchannel, be extremely careful with the CrayLink Interconnect and XIO cables. Do not bend or pull on them 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 of a server module with the key. This prevents the door from being pulled open accidentally while you install the server. (This does not apply to the GIGAchannel expansion cabinet.)

3. *Recommended*: Remove all drives from the server 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.

Operating an Origin200 and Origin200 GIGAchannel Server

This chapter describes how to operate an Origin200 or Origin200 GIGAchannel server. It covers these topics:

Front Panel Functions of a CPU Module: 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.
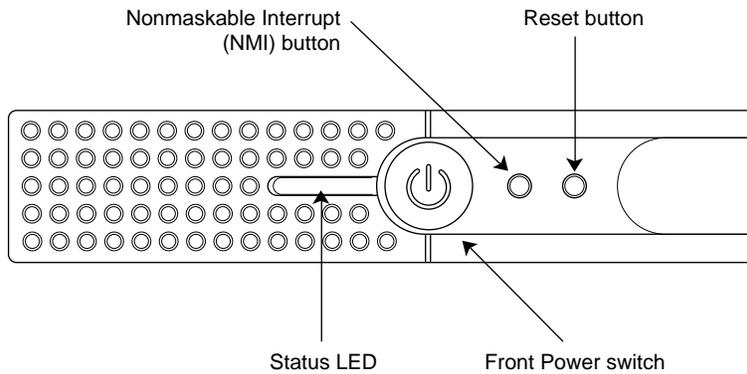
Figure 4-1   Origin200 Front Panel

Status LED

The actual status LED is part of the module system controller (MSC) 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 on a CPU module (master and slave) and a GIGAchannel expansion chassis is turned on, the status LED briefly flashes all three of its colors in sequence. When the system boots, for example after pressing the front power switch of a master CPU module or issuing a power-up command through the module system controller, the LED blinks green.

For a complete list of status LED codes for both the CPU module and the GIGAchannel expansion chassis, see the *Origin200 and Origin200 GIGAchannel Maintenance Guide*.

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 (MSC) signals the power supply to turn on power to the drive bays, PCI backplane, and main system board and CPU daughter card. Beginning with MSC versions 3.2S, the default is for the system to turn on whenever the master power switch is turned on. You can change this behavior by changing the aut variable in the MSC. See "Causing the System Not to Power On Automatically" on page 127.

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, the Front Power Switch, and Module System Controller (MSC)

Each Origin200 CPU module and GIGAchannel expansion chassis has two power switches: the master power switch and the front power switch.

The master power switch is located at the rear of the module or chassis. 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 module or chassis, 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.

Instead of using the front power switch to control whether or not the system powers up or down, you can instead use a module system controller (MSC) command. This is described in "Powering the System On and Off" on page 127.

Beginning with MSC version 3.2S, the system powers on whenever the master power switch is turned on. However, you can cause the system to wait until the front power switch is pressed (or a power-up command is given to the MSC through the AUX port) before powering on. See "Causing the System Not to Power On Automatically" on page 127.

Caution: Wait at least 10 seconds between turning the master power switch off and turning it on again. If you do not wait at least 10 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.
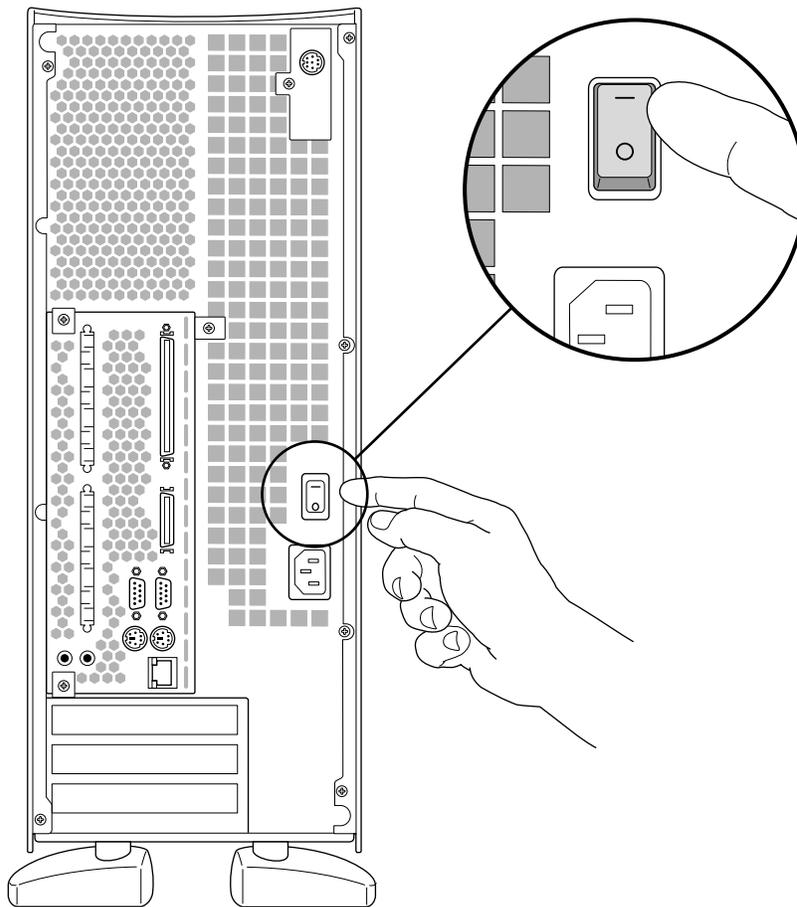
Figure 4-2   Turning On the Master Power Switch (CPU Module Shown)

- If you have more than one cabinet in your Origin200 server, turn on the master power switches in the following order: Origin Vault expansion cabinet, GIGAchannel expansion chassis, slave CPU module, and finally the master CPU module.

- When you turn on the master power switch, the status LED on the front panel briefly flashes all three of its colors in sequence.

Note: If you have an Origin200 GIGAchannel server, be sure the XIO cables are properly connected before you turn on the master power switches on the CPU module and GIGAchannel expansion chassis. If you turn on the master power switches without the XIO cables properly connected, the hardware may not function correctly.

2. Wait a few moments for the server to start. You should see some messages boot-up displayed on the system console.

- If you do not see any messages after turning on the main power switch, press the front power button, as shown in Figure 4-3.
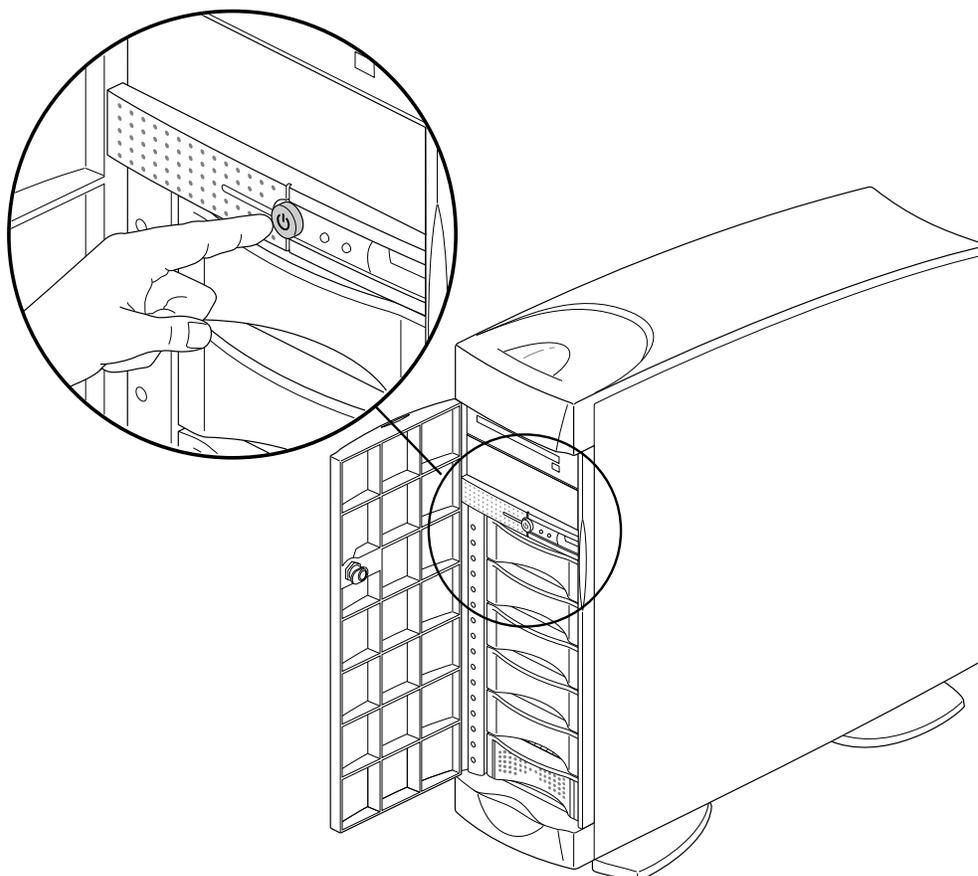
Figure 4-3   Turning On the Front Power Switch

- 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 10 seconds, turn the main power back on, and press the front panel switch again.

■ 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 120.

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

Note: Be aware that the more memory 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.

103

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, removing XIO cables, 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.
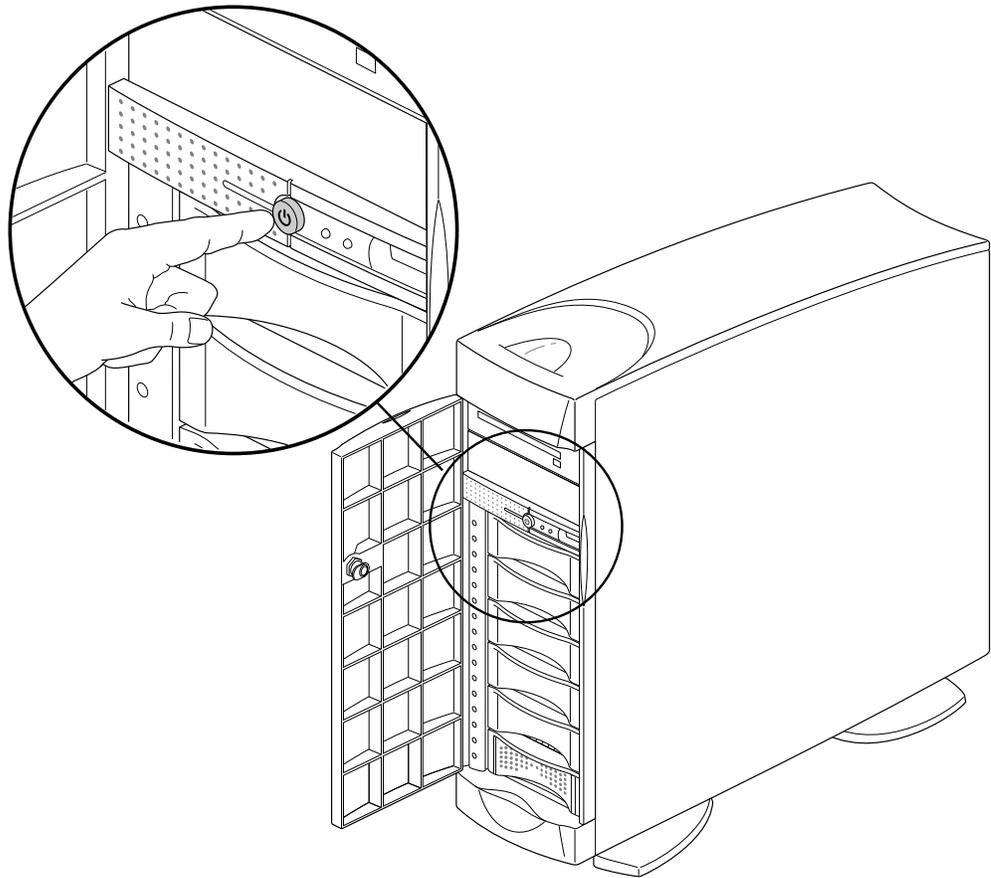
Figure 4-4   Turning Off the Front Power Switch

■   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).

Note: If you plan to disconnect the XIO cables from an Origin200 GIGAchannel server, you must also turn off the master power switches in the GIGAchannel expansion chassis and the CPU module to which it is connected, as described in the next step. If you leave the master power switches on when you disconnect the XIO cables, the system may not function properly.

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 10 seconds after turning off the main power switch before turning it back on again. Otherwise, the module system controller may not initialize properly.

Note: If you have an Origin200 GIGAchannel server, always turn the master power switches on the CPU module and the GIGAchannel expansion chassis off before you disconnect the XIO cables. If you disconnect the XIO cables while the master power switches are on, the system may not function properly the next time it is booted.
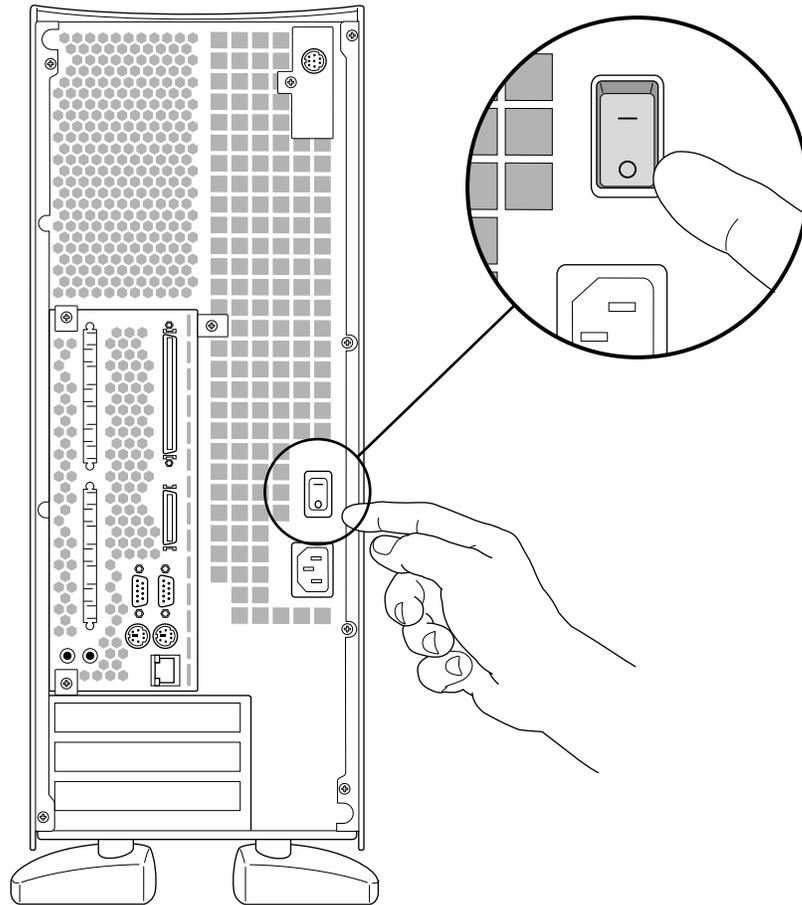
Figure 4-5   Turning Off the Master Power Switch

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 "Unpacking the Server and Checking the Shipment" on page 39 in Chapter 2

- must be configured to access the network; see "Logging In for the First Time" on page 83 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, open the following URL:

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

   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, 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 CPU Modules

If you wish to separate a system with two CPU modules into two individual servers, follow these steps:

1. Shut down the dual-module system completely. See "Turning the System On and Off" on page 98.

   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 2-26.

3. Detach the grounding cable from each chassis. See Figure 2-26.

4. Reset the system controller DIP switch on the slave system so that it is a master module. See Figure 2-10.

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.

Running an Origin200 GIGAchannel Without a GIGAchannel Expansion Cabinet (Loopback Mode)

If you want to run an Origin200 GIGAchannel server module without a GIGAchannel expansion cabinet attached, you must connect one of the XIO cables in a loop between the XIO A and XIO B connectors on the server module. This is called *loopback mode*. See Figure 4-6.

Note: You must turn off the system completely before removing XIO cables from an Origin200 GIGAchannel server. Be sure to turn off the main power switch at the rear of both the CPU module and the GIGAchannel expansion chassis before removing XIO cables.

109
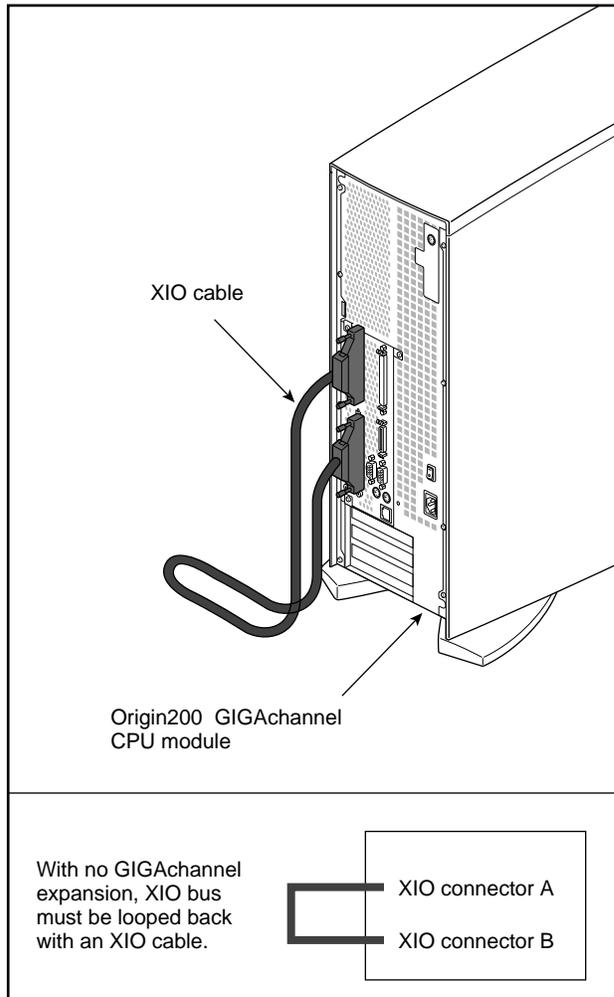
Figure 4-6   Running an Origin200 GIGAchannel Without the GIGAchannelExpansion Cabinet (Loopback Mode)

You cannot run an Origin200 GIGAchannel server module without either a GIGAchannel expansion cabinet attached, or a loopback cable.

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" on page 111

- "Using a Silicon Graphics Workstation as the System Console" on page 117

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)

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

1. Connect a serial port of the computer to serial port 1 of the Origin200 server.

2. 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" on page 112

- "Setting Up and Starting the Terminal Emulator" on page 114

- "Logging In to the Server" on page 115

Obtaining and Connecting the Correct Serial Adapter Cable

SGI 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	SGI 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 SGI 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 4-7.
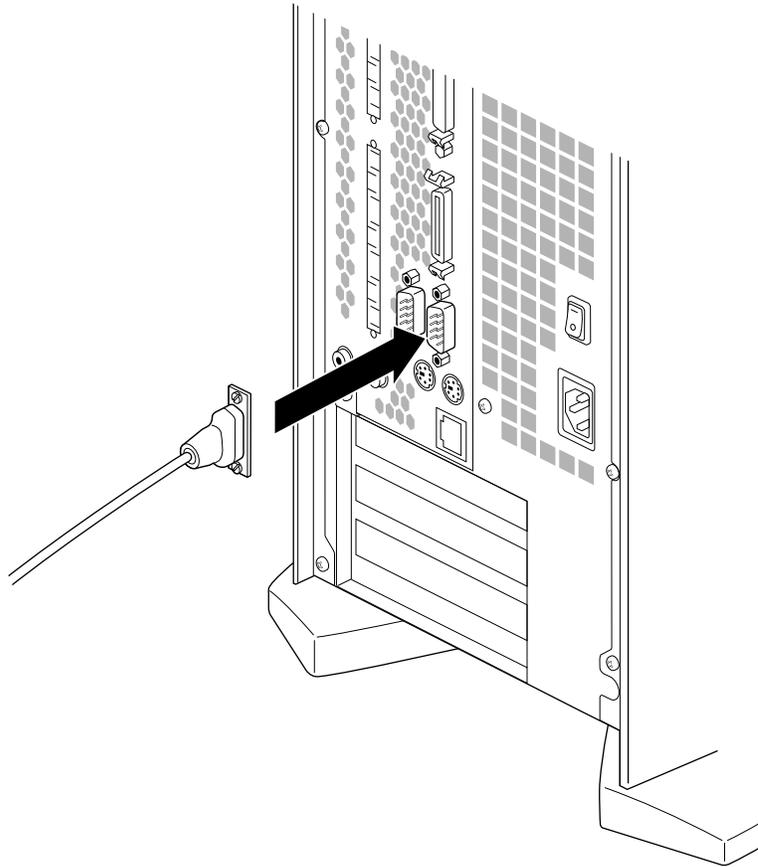
Figure 4-7   Attaching a Serial Cable to Port 1 of the Origin200 Server

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 serial port of an 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 the following:

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

Regardless of the type of terminal emulator you use, make sure it has the settings shown in Table 4-2.

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 100.)

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 system 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 that 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.

117

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."

   - Save the file, exit, and at the shell prompt enter this command:

     ```
     telinit q
     ```

118

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

Follow these steps:

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

    cu Direct

2. You should see this message:

    Connected

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

    IRIS login:

4. 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)

5. 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 an Origin200 CPU module that connects to the module system controller (MSC). You can use the AUX port to communicate with the MSC and perform various functions such as powering the server up and down, checking the temperature and fan status, and changing whether or not the server boots automatically when power is applied (for example, after an unexpected power outage). The AUX port only allows access to the MSC of the master CPU module. Neither of the module system controllers in a slave module or a GIGAchannel expansion cabinet can be accessed through the AUX port of a master module.

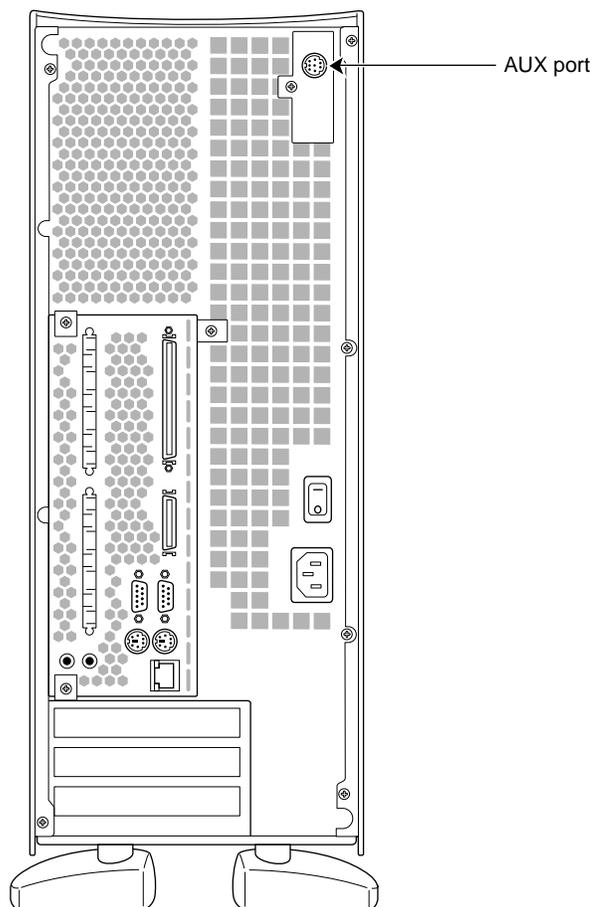Figure 4-8 shows the location of the AUX port.

Figure 4-8   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, Modem, or Other Computer to the AUX Port

To attach a terminal, modem, or other computer 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, modem, or computer at the other end. SGI has DIN-8 to DB25 terminal and modem cables and a DIN-8 to DIN-8 cable for use with Silicon Graphics Indy and Indigo^2 workstations and the CHALLENGE S server.

Example cables are listed in Appendix B, "Cable Descriptions." Appendix B also provides descriptions of cables that you can use to connect other computers and workstations (such as IBM compatible and Macintosh systems) to the AUX port. If necessary, you can use the descriptions provided in that appendix to construct your own cables. If you wish to use another computer to communicate with the AUX port, see also the instructions in "Using Another Computer or Workstation as the System Console" on page 111 for general information about configuring a terminal emulator.

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 4-8 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 computer):

    *   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 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, 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 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 SGI is the word "none." To enter Supervisor mode on an Origin200 system with the default Supervisor mode password, type:

Ctrl+t pas none

SGI 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 Supervisor Mode as described in the preceding section, then 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 h, the system is running at a higher-than normal temperature. If you see the letter o, the system is running at far-over the normal temperature and it will likely shut down.

If your server runs at higher than normal temperatures (h), 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) and 104° F (40° C), this can cause the system to run 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 (Origin200 CPU Module)" on page 125 and "Checking and Setting the Fan Speed" on page 126.

If you see the letter o, 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 (Origin200 CPU Module)

To check the fans in the Origin200 CPU module, enter this command:

Ctrl+t fan

If the fans are all functioning normally, the letter n or the letter h appears, indicating that 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* [*yyy*]

The letter f indicates a fan failure. The letters *xxx* represent a three-digit error code for the master CPU module that indicates which fans have failed, and *yyy* indicates any failed

fans in a slave CPU module (if there is a slave CPU in the system). Table 4-3 shows how to interpret the error codes.

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, Fans, and Blower" on page 27 for a diagram of the fan locations.

Note: There is only a single fan, called a *blower*, in the GIGAchannel expansion chassis and the only way to determine the status of the blower is by examining the status LED on the front of the GIGAchannel chassis. See the *Origin200 and Origin200 GIGAchannel Maintenance Guide* for a description of the status LED codes.

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

Be aware that if the system temperature is high, you cannot run the fans at slow speed.

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" on page 98.

Causing the System Not to Power On Automatically

You can set the MSC to prevent the system from turning on automatically when the master power switch is turned on. By default, the MSC turns on power to the system as soon as the master power switch is turned on. (Be aware that this is the default for MSC versions 3.2S and later. Use the MSC *ver* command to determine the MSC version number. Earlier versions of the MSC had the exact opposite default.)

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

Ctrl+t aut 1

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.

Configuring the System for a Redundant Power Supply

If your server was shipped from the factory with a redundant power supply installed and you have not changed the configuration of the power supply since then, you do not need to perform any configuration to use the redundant power supply.

However, if you upgrade an Origin200 or Origin200 GIGAchannel server from a standard power supply to a redundant power supply, you should configure the MSC to check the status of the new redundant power supply.

With the system off (only the MSC active), use this command:

Ctrl+t pwr y

If you type this command while the system is running, you see the error message err pwr_state.

Note: The redundant power supply is not supported with versions of IRIX prior to 6.5.4.

Checking the Status of the Redundant Power Supply

You can check the status of the redundant power supplies in the master and slave CPU modules with this command:

Ctrl+t pwr r

You see one of the following messages:

`m:n`	No redundant power supply detected in the master module.
`m:y:ok`	Redundant power supply in the master module is OK.
`m:y:fl`	One half of the power supply in the master module has failed.
`s:n`	No redundant power supply detected in the slave module.
`s:y:ok`	Redundant power supply in the slave module is OK.
`s:y:fl`	One half of the power supply in the slave module has failed.

You cannot check the status of the power supply in the GIGAchannel expansion chassis. The status LED on the front of the GIGAchannel expansion chassis is the only indicator of the state of the power supply. See the *Origin200 and Origin200 GIGAchannel Maintenance Guide* for information on the status LED.

Reconfiguring a System from a Redundant Power Supply to a Standard Power Supply

If you have a redundant power supply but wish to install a standard power supply instead, you can configure the MSC so that it no longer checks for the presence of a redundant power supply.

With the system off (only the MSC active), use this command:

Ctrl+t pwr n

If you type this command while the system is running, you see the error message `err pwr state`.

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.
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. This is the default setting.
clr	Resets all MSC options to their power-on defaults. This includes echo mode, no heartbeats, and so forth.

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

Command	Function
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 off the system. *N* is a hexadecimal value from 5 to 258 (5 to 600 decimal).
pwr c *N*	Waits *N* seconds and then powers on the system. *N* is a hexadecimal value from 5 to 258 (5 to 600 decimal).
pwr r	Checks the status of the redundant power supply in the master and slave modules. Displays: m:n — No redundant power supply detected in the master module. m:y:ok — Redundant power supply in the master module is OK. m:y:fl — One half of the power supply in the master module has failed. s:n — No redundant power supply detected in the slave module. s:y:ok — Redundant power supply in the slave module is OK. s:y:fl — One half of the power supply in the slave module has failed.

131

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

Command	Function
pwr r y	Tells the MSC that a redundant power supply is present in both the master and slave modules of the system. This command can only be used if the system is not running (prior to pressing the power button on the front panel, or issuing a *pwr u* command).
pwr r n	Tells the MSC that a redundant power supply is no present in both the master and slave modules of the system. This command can only be used if the system is not running (prior to pressing the power button on the front panel, or issuing a *pwr u* command).
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.
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`, `h`, or `o`, indicating whether the system is running at a normal temperature, high temperature, or seriously over-temperature (with a system shutdown impending).
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 SGI systems.

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 "How to Use the Hardware Graph" on page 133) 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 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.

133

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_ctlr 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 starting with 1; PCI slots are numbered starting with 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 4-9 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.

You can use the -S option to the ls command to determine where devices in the /dev directory are located in the /hw filesystem. For example:

```
# ls -S /dev/dks0d2s7
dks0d2s7 -> /hw/module/1/slot/io1/MotherBoard/pci/0/scsi_ctlr/0/target/
2/lun/0/disk/partition/7/block
```

For more information about using the hardware graph, see the ioconfig(1m) and hwgraph(4) reference pages.
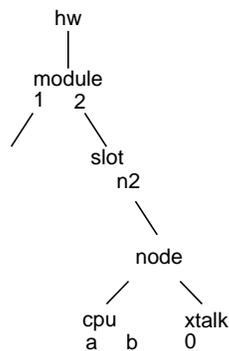
Figure 4-9   Example /hw Filesystem

135

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
```

Cosmetic Features and Covers

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

- "Locking the System" on page 137
- "Adjusting the Feet" on page 139
- "GIGAchannel Expansion Chassis Front Grill" on page 140
- "Removing the Front Door of an Origin200 CPU Module" on page 141
- "Removing the System Cover and Chassis Access Door" on page 143
- "Removing the Side Panel, Feet, and Exterior Plastic Parts of a Tower System" on page 146

Locking the System

The Origin200 provides two mechanisms to physically lock the system:

- a key lock on the front door (CPU modules only)
- 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

Note: This applies only to CPU modules. The door of the GIGAchannel expansion cabinet does not open.

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 a quarter turn (9 -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.
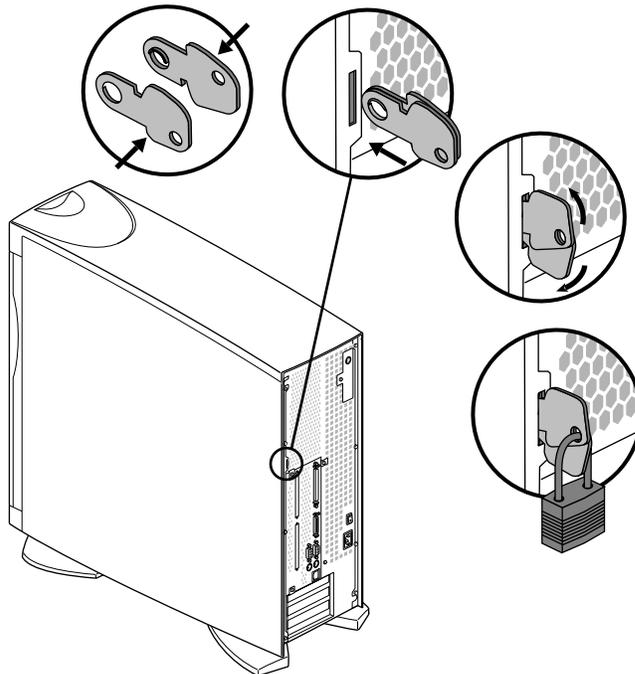
Figure 5-1   Locking the Chassis With the Locking Tabs

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 and GIGAchannel expansion chassis in a tower configuration can be swiveled in or out. See Figure 5-2.
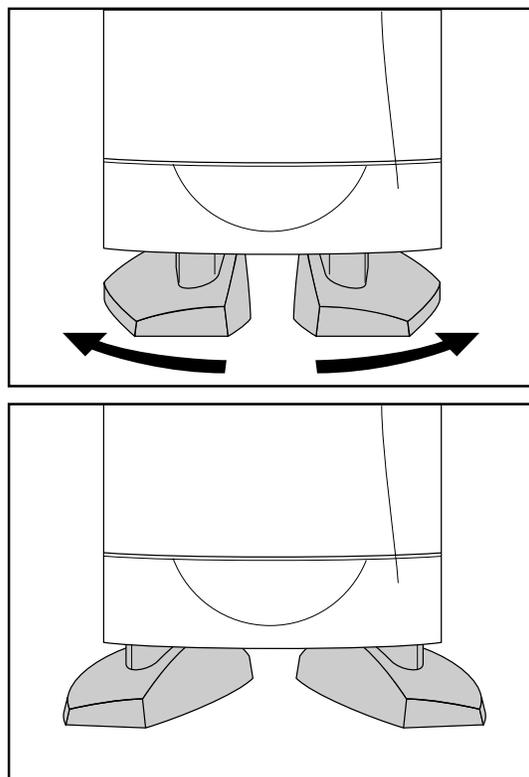
Figure 5-2   Adjusting the Feet

To adjust the feet:

1. Raise the system slightly, or tilt it to one side.

2. Rotate the feet inward or outward, as desired.

GIGAchannel Expansion Chassis Front Grill

The front of the GIGAchannel expansion chassis has a grill that resembles the Origin200 CPU module door for cosmetic purposes. This grill does not open, nor should you attempt to force it open because that would break the plastic bezel. See Figure 5-3.
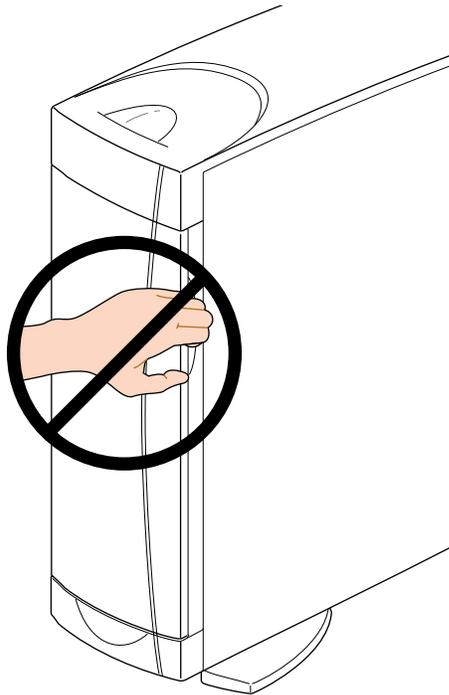
Figure 5-3   Cosmetic Grill on the GIGAchannel Expansion Chassis

Removing the Front Door of an Origin200 CPU Module

The front door of an Origin200 CPU module 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 5-4.
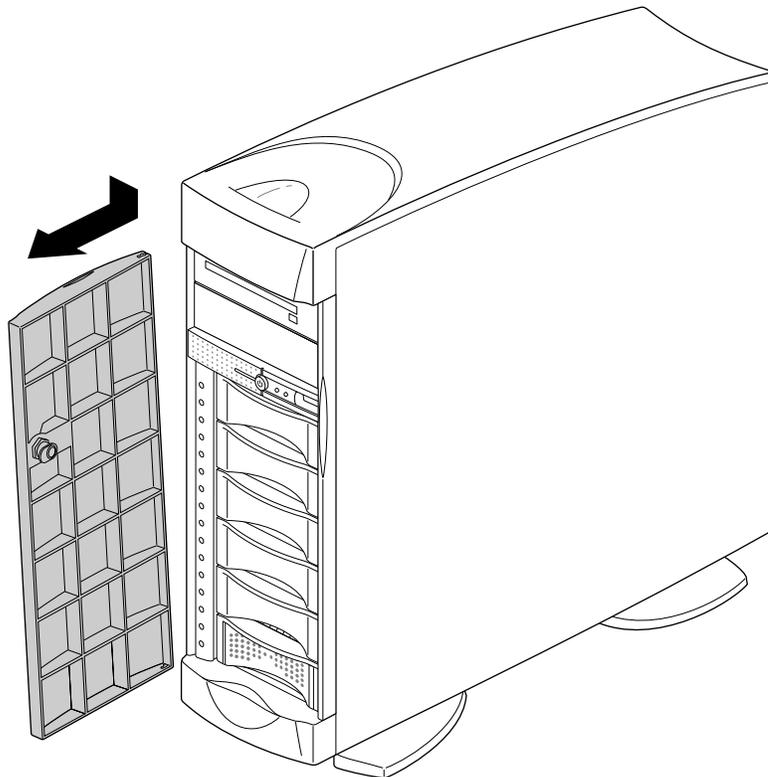
Figure 5-4   Removing the Front Door, Tower Configuration

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

1. Lift the door assist tab (catch), as shown in Figure 5-5.

2. Pull one side of the door off its hinge.
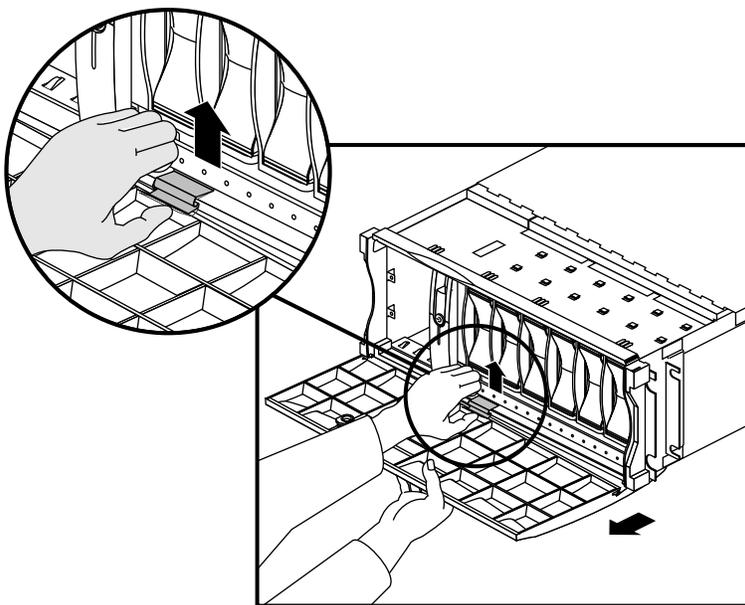
Figure 5-5   Removing the Front Door, Rackmount Configuration

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 CPU module or GIGAchannel expansion cabinet, follow these steps:

1. Power off the system. See "Turning Off the System" on page 104.

2. Remove the system cover, as shown in Figure 5-6.

   - 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.
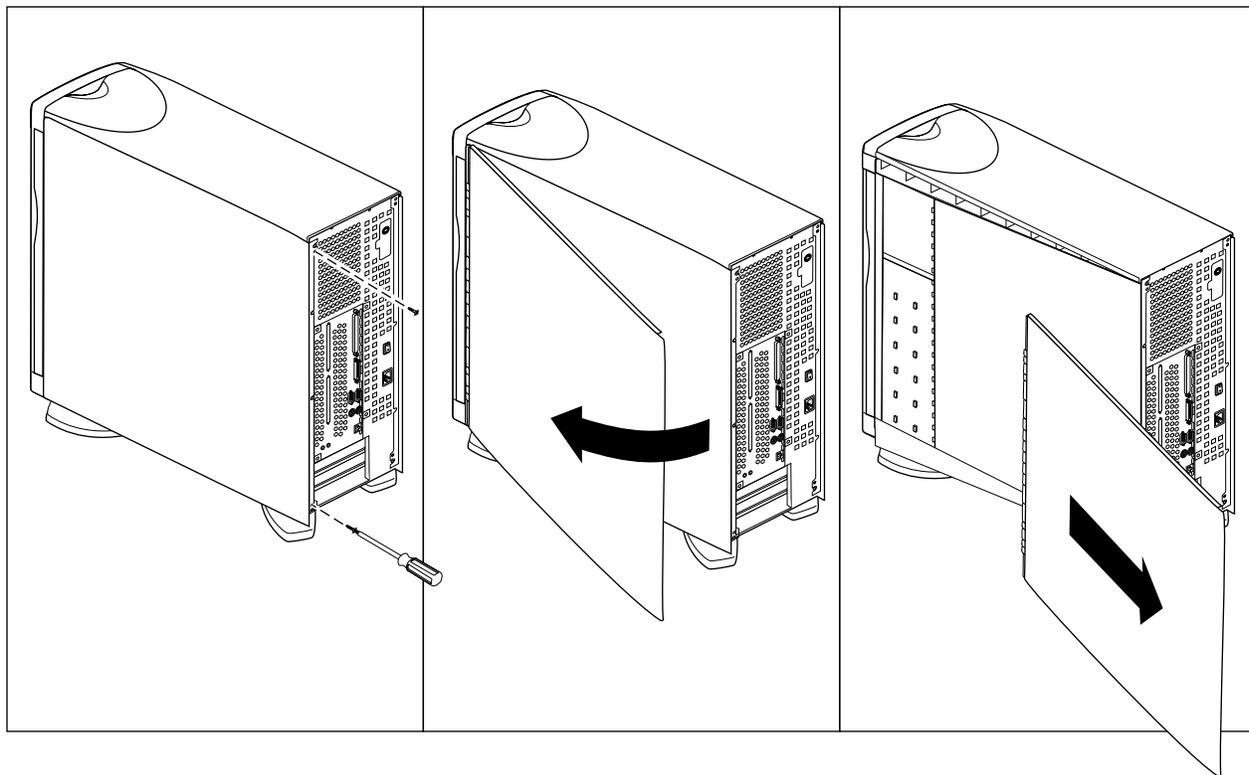
Figure 5-6   Removing the System Cover, Tower Origin200 System

3. Open the chassis access door, as shown in Figure 5-7.

    ■   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.
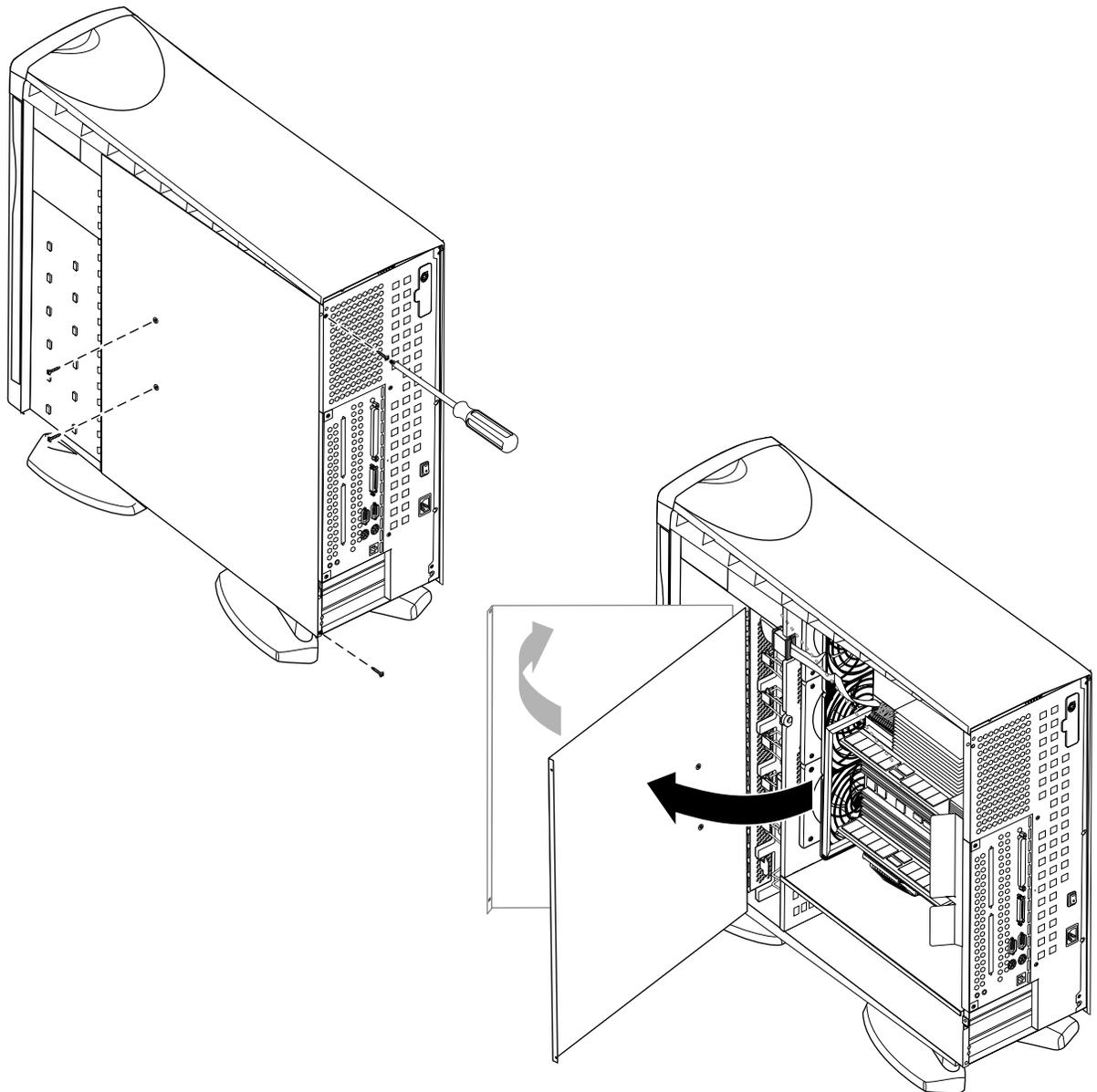
Figure 5-7   Opening the Chassis Access Door, Tower Origin200 System

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 SGI (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 SGI 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" on page 146
- "Removing the Feet and Exterior Plastic Parts" on page 147

Preparing to Remove Components

Before you remove exterior components, follow these steps:

1. Remove the front door; see "Removing the Front Door of an Origin200 CPU Module" on page 141.

2. Remove all drives from the system to make it easier to move and lift; see Chapter 6, "Installing and Configuring Peripherals."

3. 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 143. (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 5-8.

   - Insert a flat-blade screwdriver between the top cap and sheet metal, as shown in Figure 5-8.

   - 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 5-8.

   - 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.
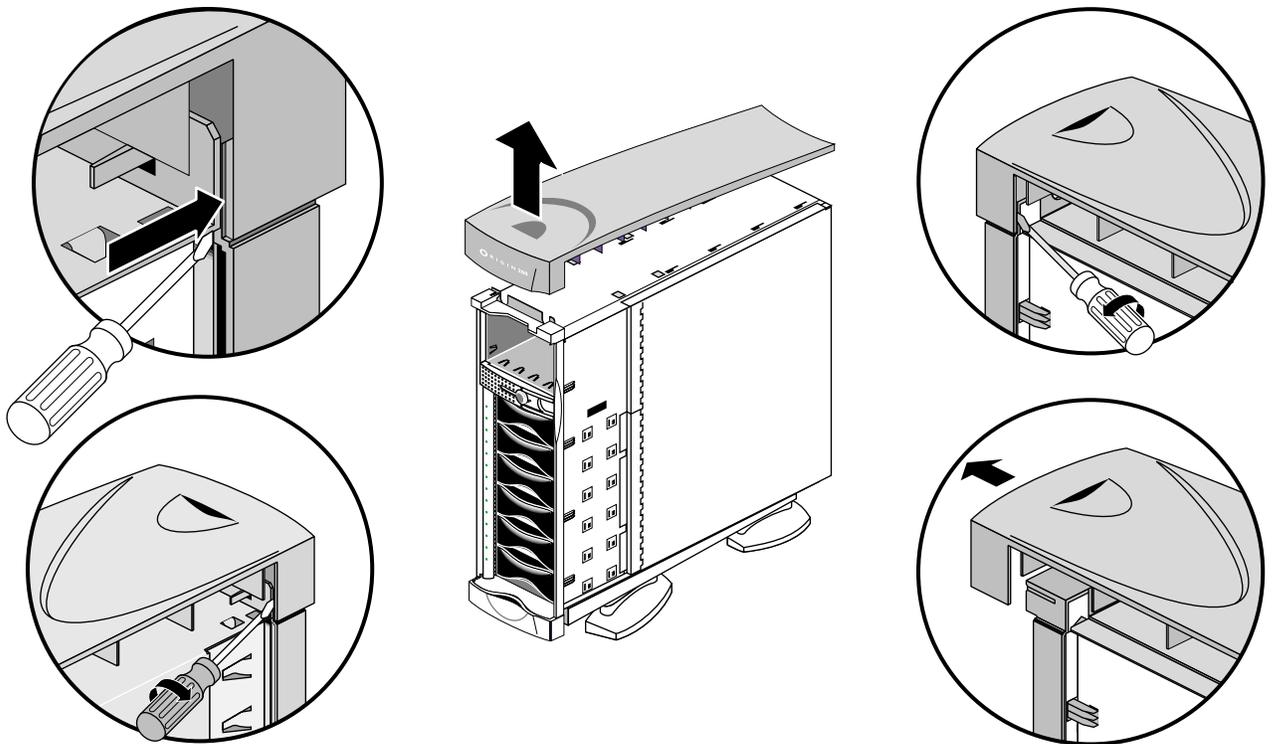
Figure 5-8   Removing the Top Cap

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 5-9.

    ■   Twist the screwdriver to disengage the lower bezel from the sheet metal.

    ■   Pull off the lower bezel.
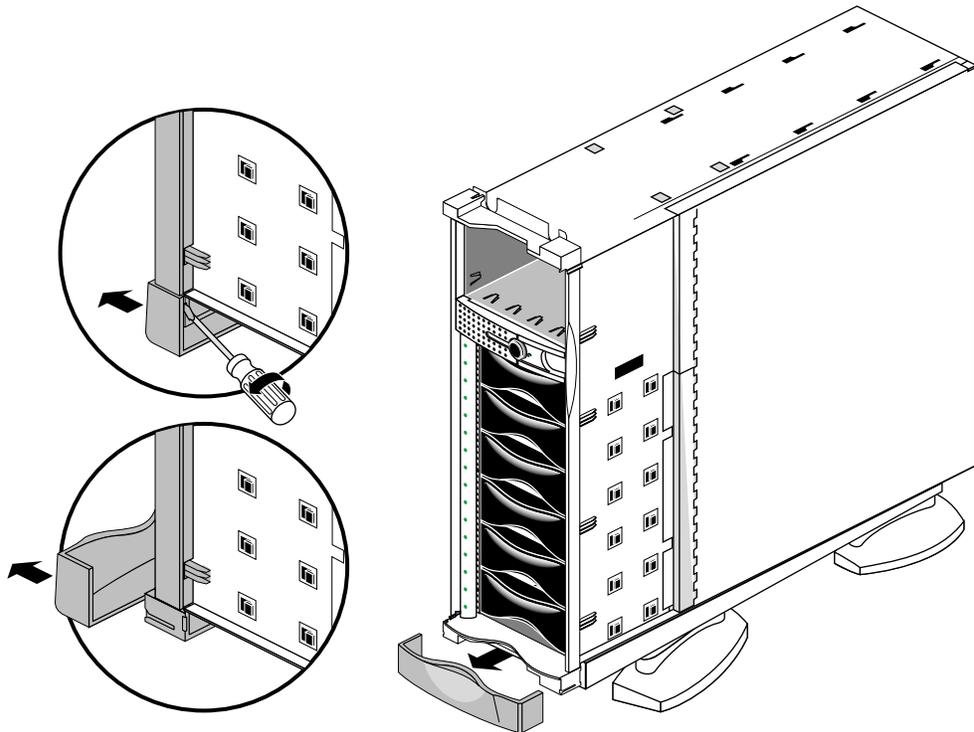
Figure 5-9   Removing the Lower Bezel

3. Remove the pedestal assembly (to which the feet are attached). See Figure 5-10.

■ 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.
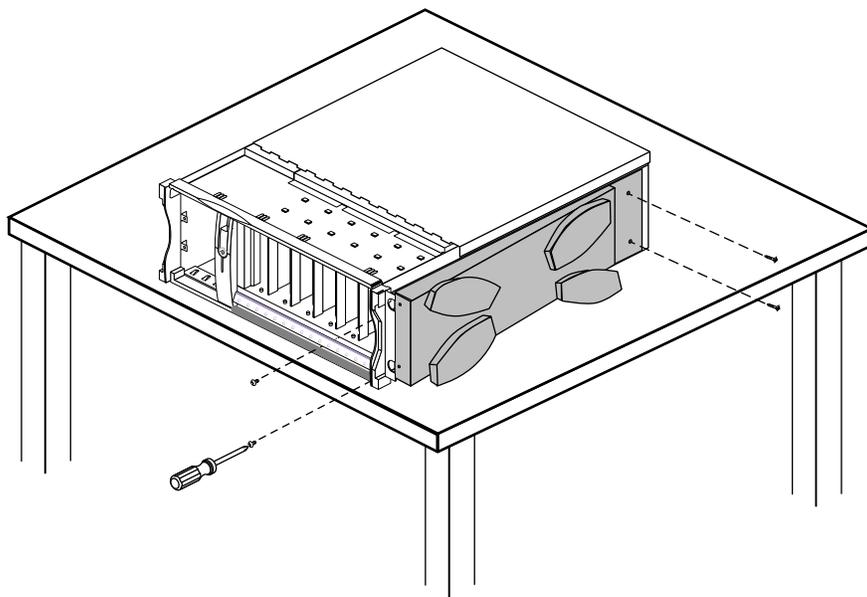
Figure 5-10   Removing the Pedestal Assembly (Feet)

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 151
- "Installing, Removing, and Configuring 3.5-Inch Peripherals" on page 164
- "Verifying That a Drive Is Installed Correctly" on page 172
- "Using Drives in the Origin200 Server" on page 172
- "Attaching Serial Devices" on page 174

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 152
- "Configuring a 5.25-Inch Peripheral" on page 153
- "Installing a 5.25-Inch Peripheral" on page 153
- "Removing 5.25-Inch Peripherals" on page 159

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 6-1 shows the location of the 5.25-inch drive bay.
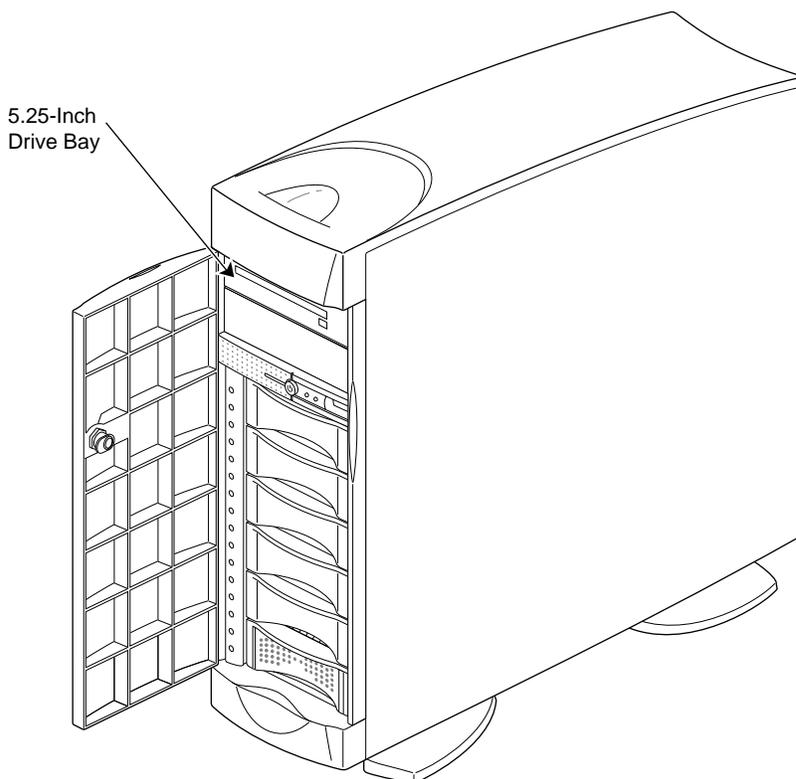
5.25-Inch
Drive Bay

Figure 6-1   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 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" on page 153
- "Installing a 5.25-Inch Peripheral" on page 153
- "Removing 5.25-Inch Peripherals" on page 159

Configuring a 5.25-Inch Peripheral

Peripherals obtained from SGI 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 an SGI-supplied drive, follow these guidelines:

1. Set the SCSI ID between 1 and 7. Do not use SCSI ID 0, because that is reserved for the controller.

2. 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, because this may draw too much current when the system is first turned on.

3. Set the drive termination jumper to "off" or remove the drive terminators.

4. Configure the drive to supply termination power.

SCSI drives are typically formatted by the manufacturer, so no further formatting is necessary. All SGI 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 of an Origin200 CPU Module" on page 141.

2. Remove the peripheral carrier, as shown in Figure 6-2.

   ■ 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.
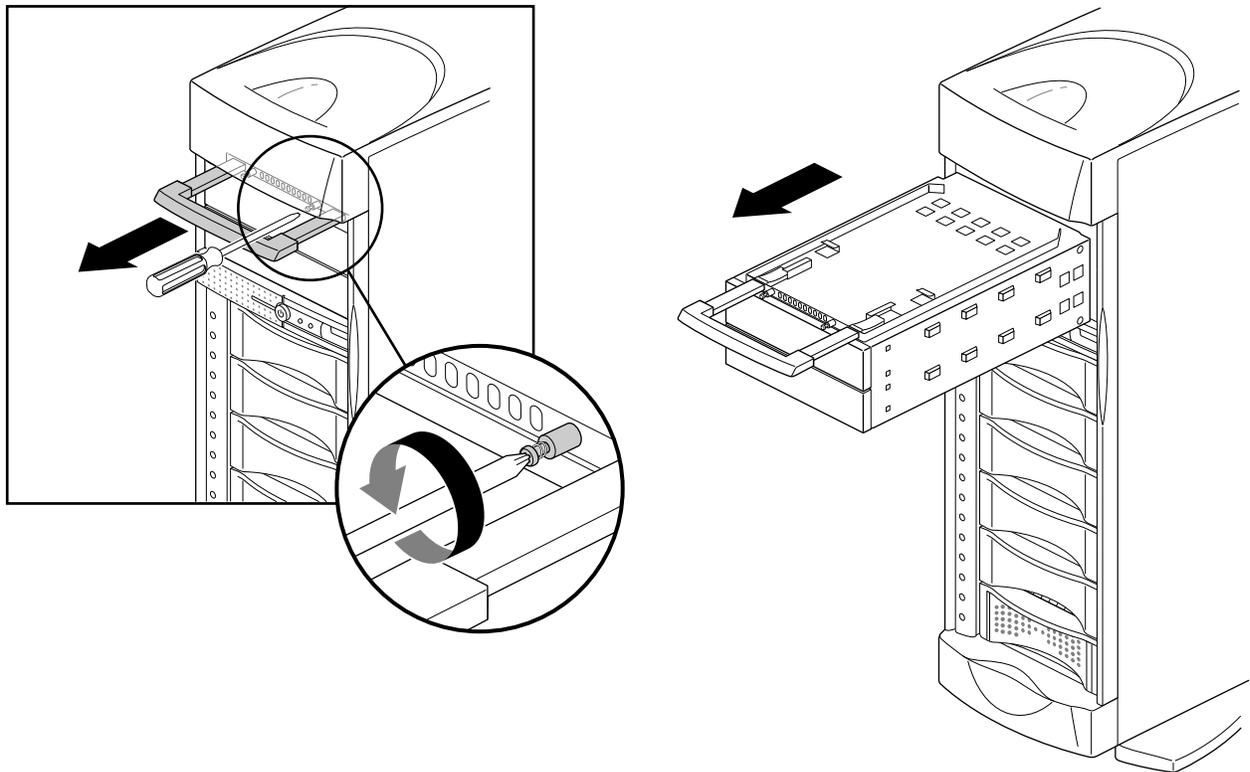
Figure 6-2   Removing the 5.25-Inch Peripheral Carrier

3. Prepare the peripheral carrier, as shown in Figure 6-3.

    ■   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.

Front
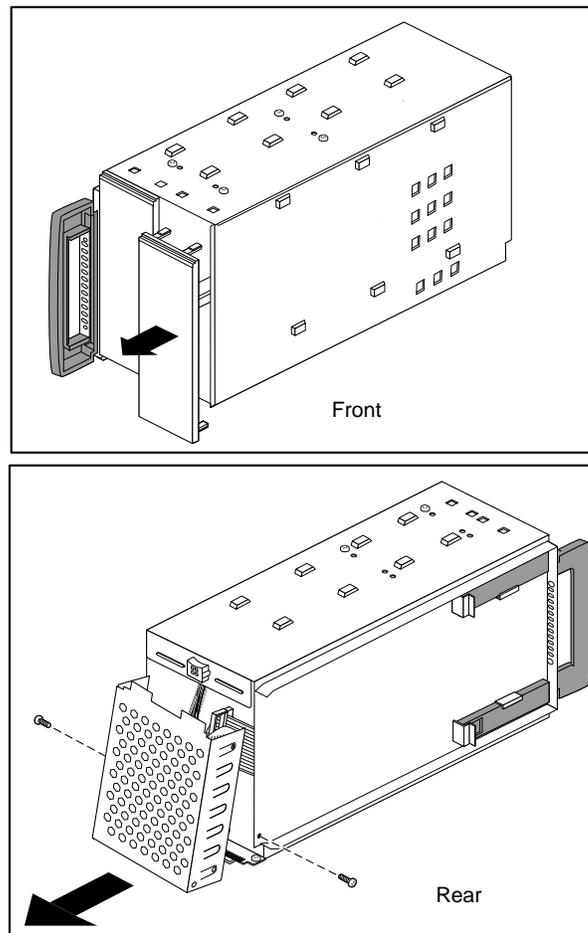
Rear

Figure 6-3   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 6-4.

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 6-4.

   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.
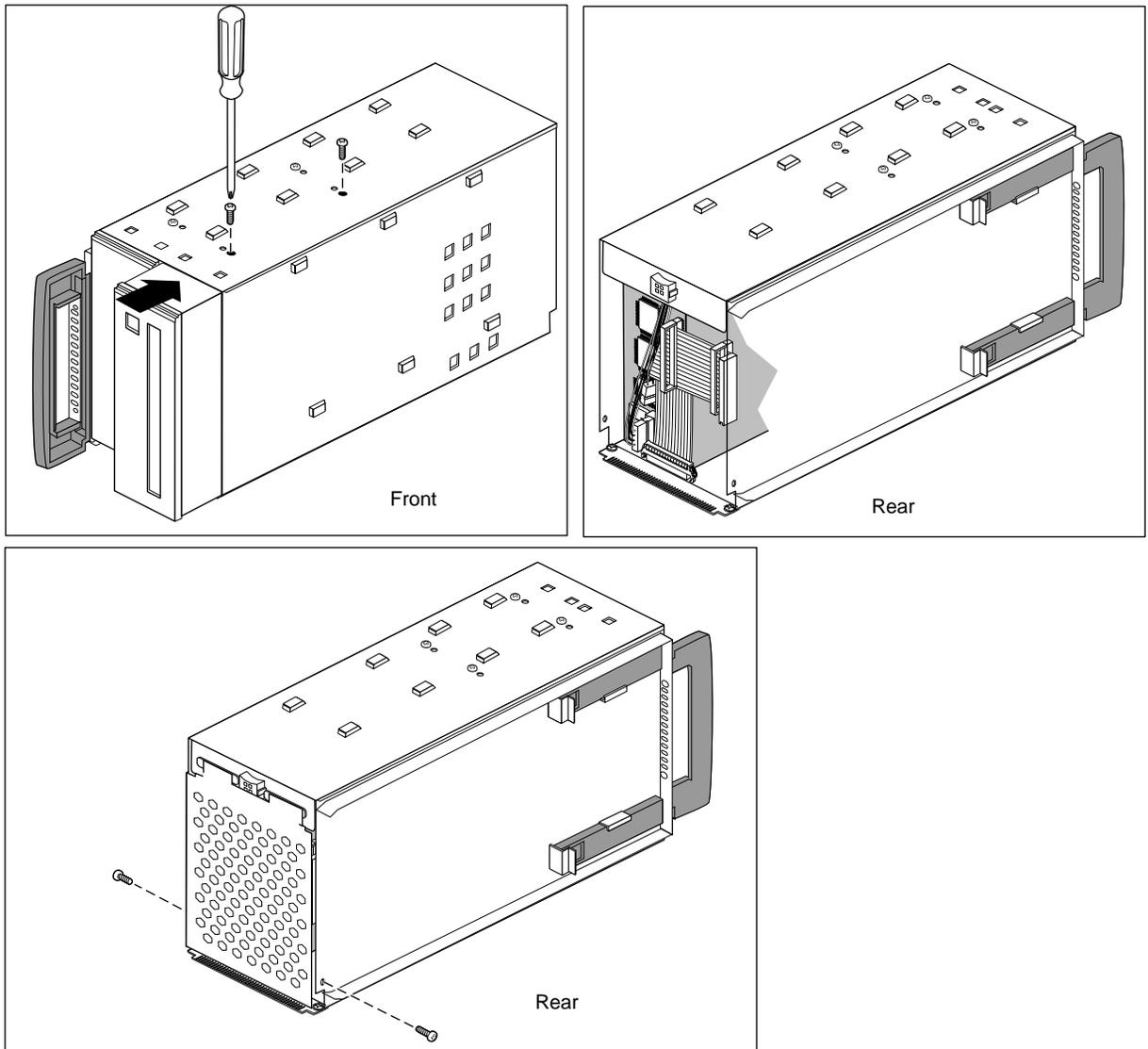
Figure 6-4   Installing a 5.25-Inch Drive in the Peripheral Carrier

7. Slide the carrier into the system and secure it with the two captive screws. See Figure 6-5.
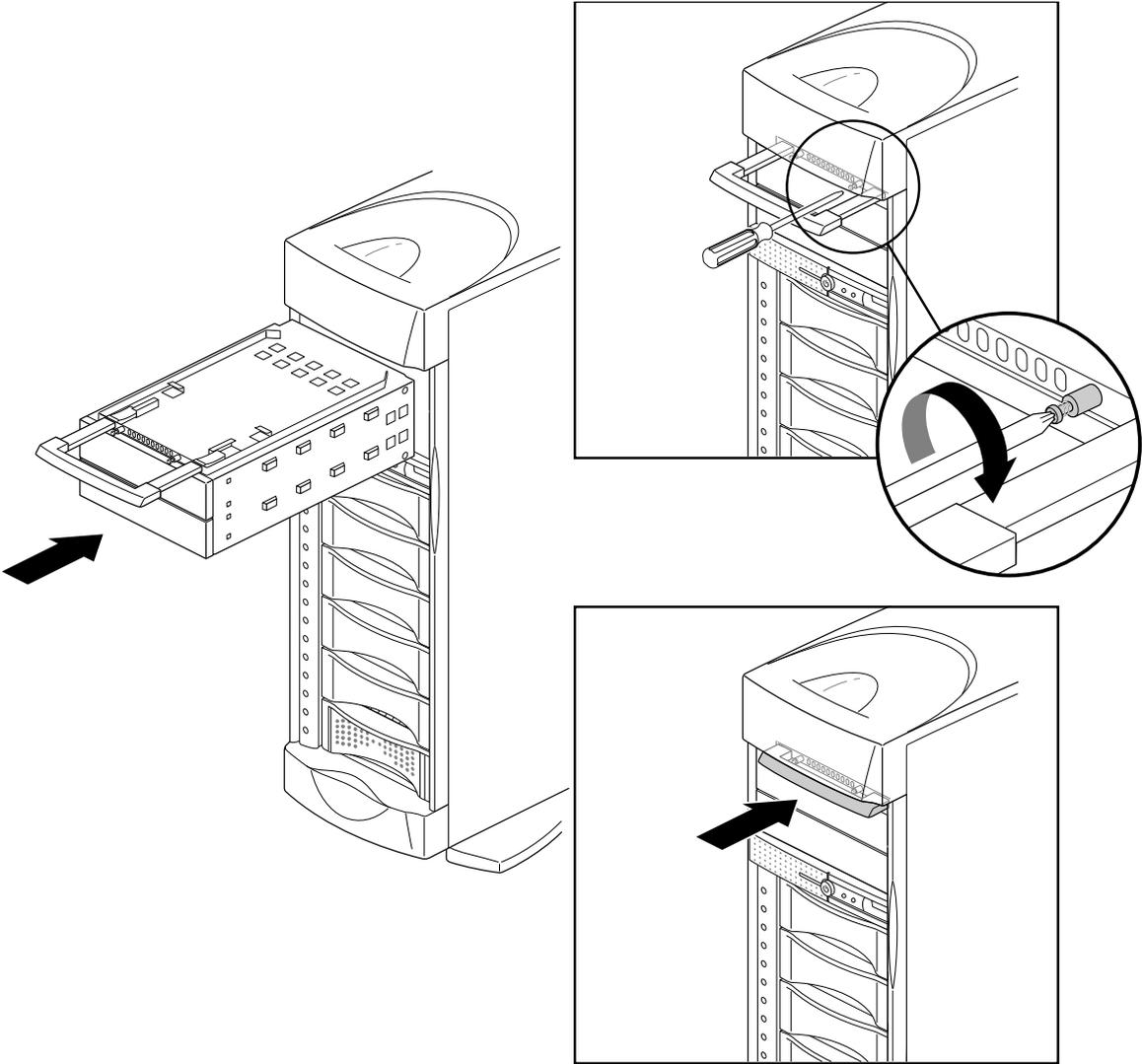
Figure 6-5   Replacing the 5.25-Inch Peripheral Carrier

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 of an Origin200 CPU Module" on page 141.

2. Remove the peripheral carrier, as shown in Figure 6-6.

   ■ 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.
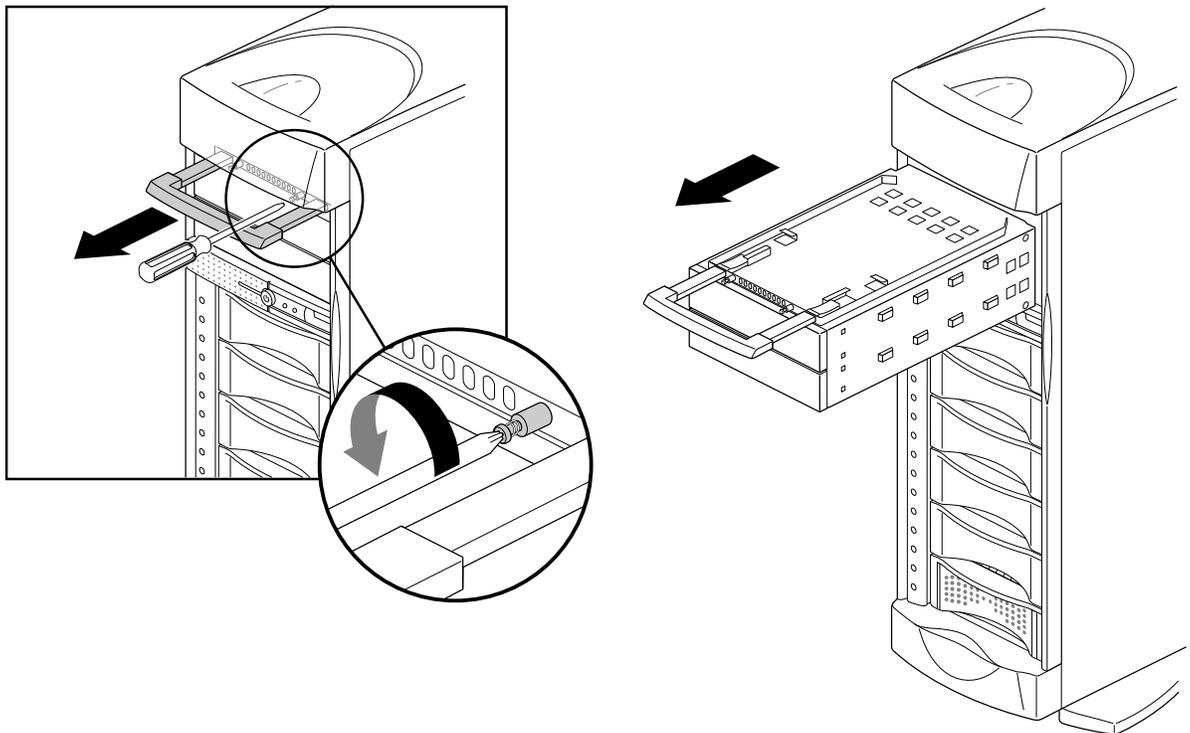
Figure 6-6   Removing the Peripheral Carrier

3. Remove the rear access plate from the peripheral carrier, as shown in Figure 6-7.

    Using a #2 Phillips screwdriver, remove the screws that hold the access plate to the rear of the carrier, then remove the access plate.
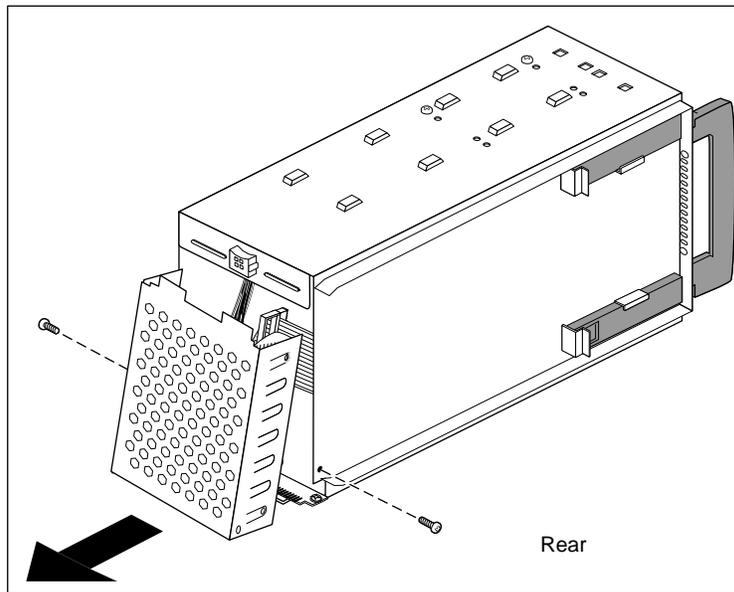
Rear

Figure 6-7   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 6-8.
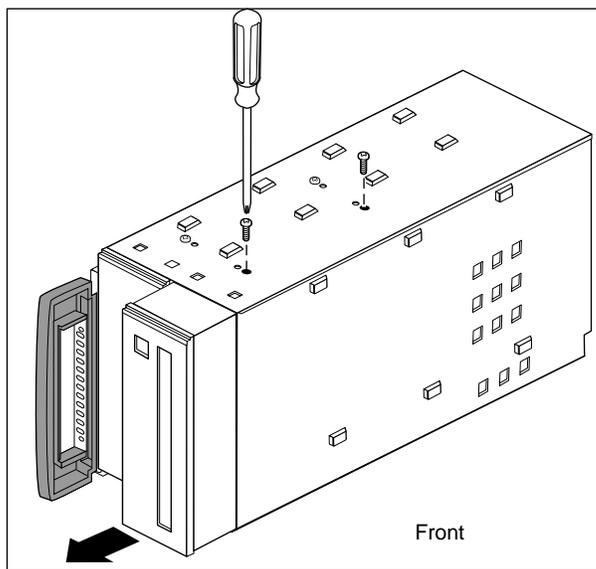
Figure 6-8   Removing a Drive From the Peripheral Carrier

6. Replace the blanking and access plates on the peripheral carrier. See Figure 6-9.

    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.
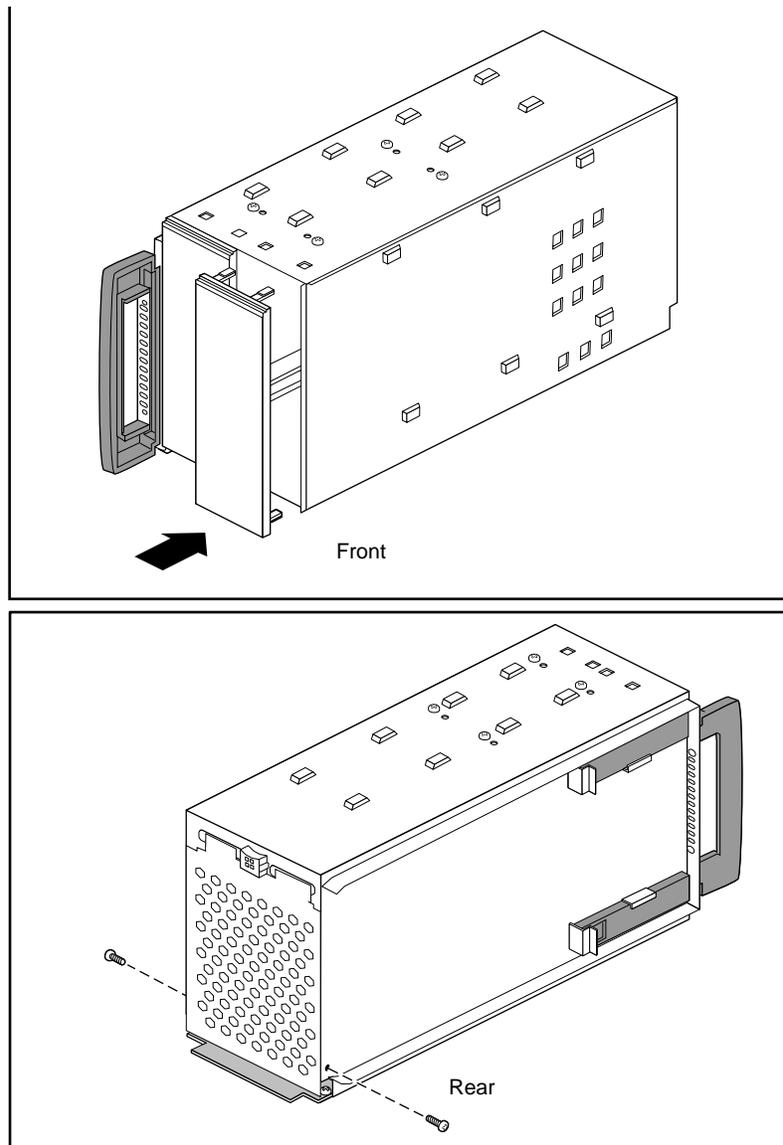
Figure 6-9   Replacing the Front Blanking Plate and Rear Access Plate

7. Slide the carrier into the system and secure it with the two captive screws. See
   Figure 6-10.
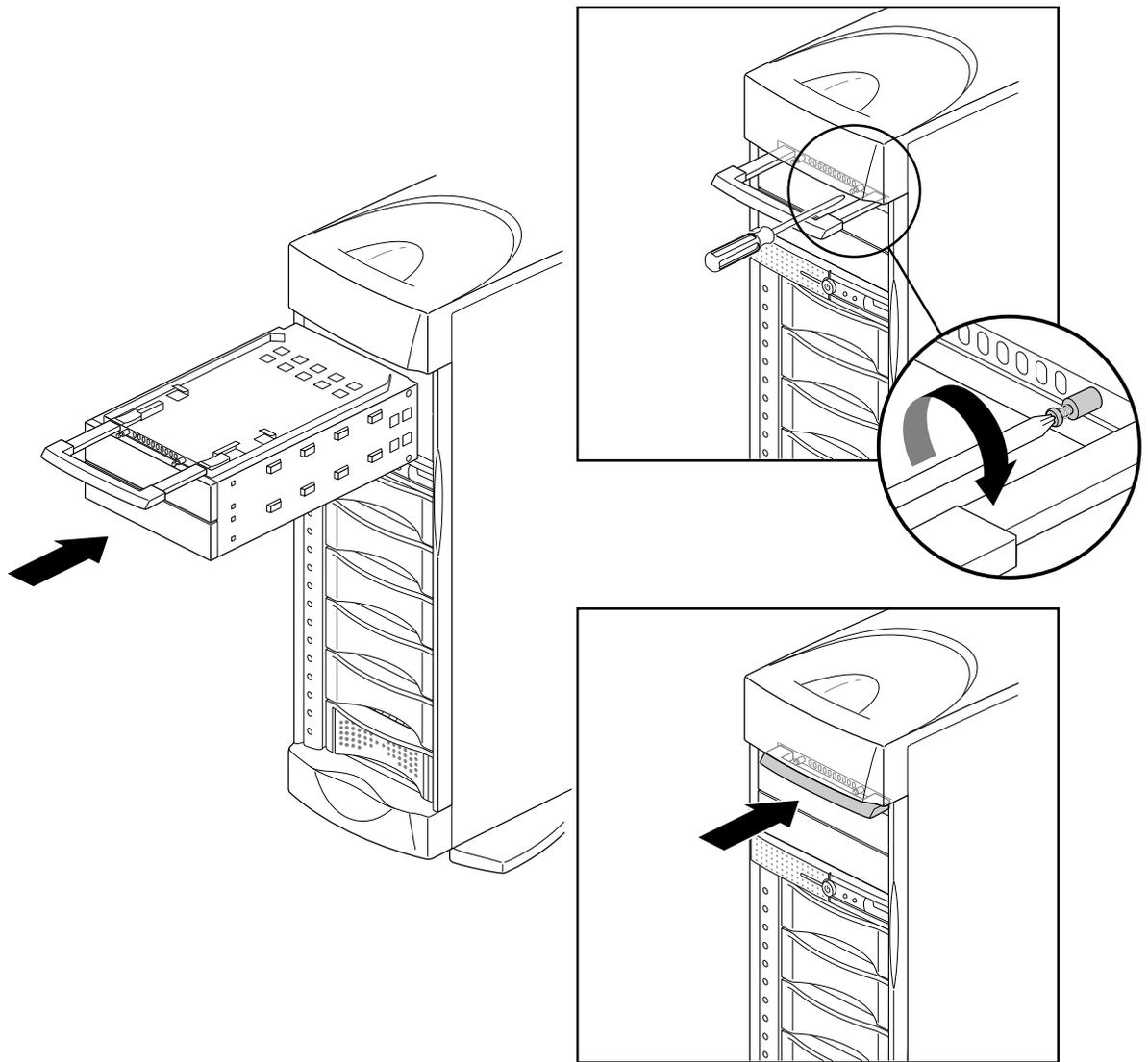
Figure 6-10   Replacing the 5.25-Inch Peripheral Carrier

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 6-11 shows how the slots correspond to SCSI IDs.

Slot 6 (SCSI ID 6)

Slot 1 (SCSI ID 1)
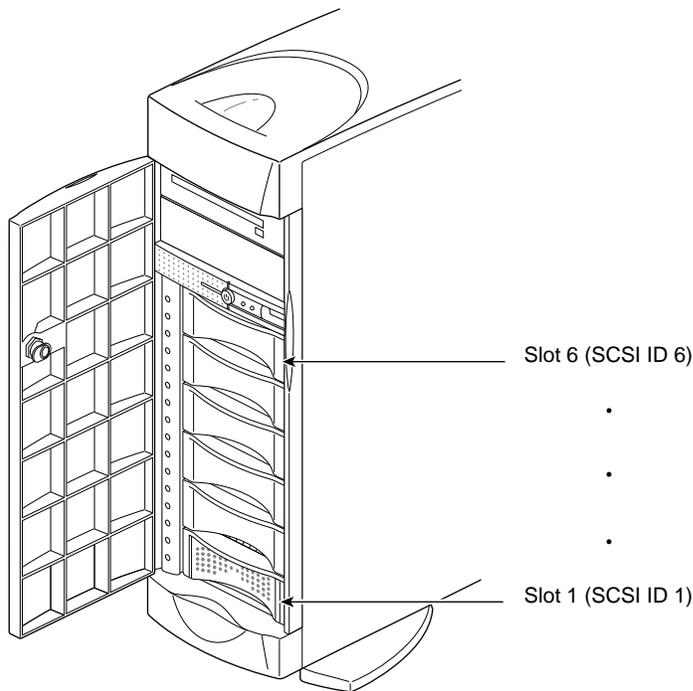
Figure 6-11   3.5-Inch Drive Bay and Correspondence of SCSI IDs to Drive Slots

Drive bays that do not contain peripherals are covered by blanking plates. Figure 6-12 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.
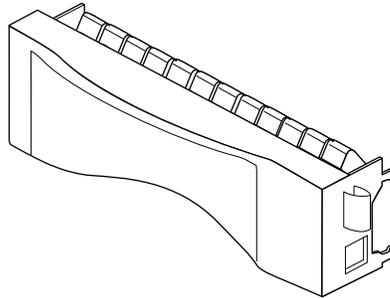
Figure 6-12   Example 3.5-Inch Drive Slot Blanking Plate

Configuring 3.5-Inch Peripherals

3.5-inch peripherals obtained from SGI 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 6-13.
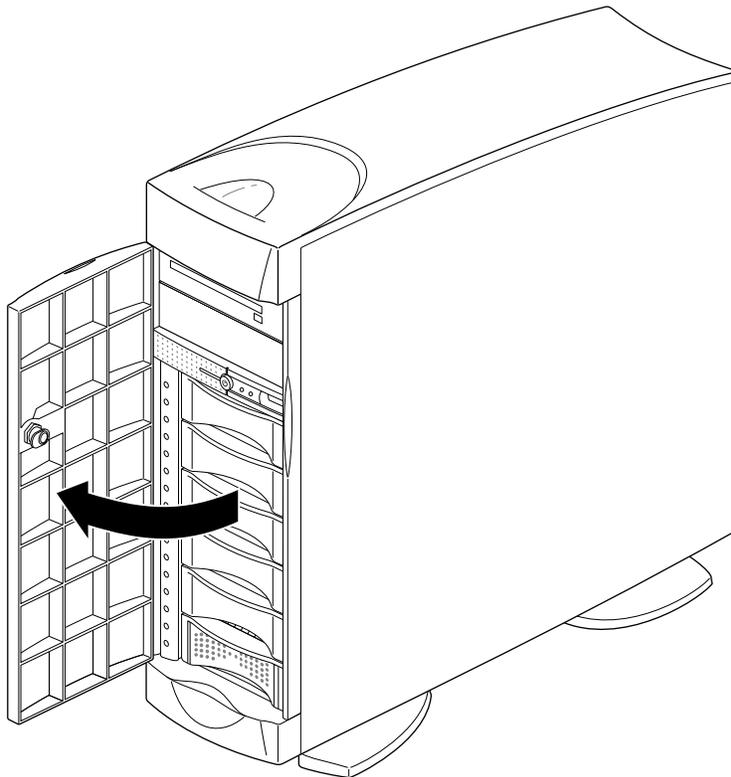
Figure 6-13   Opening the Front Door of the Origin200 System

2. Locate an available slot for the peripheral. Figure 6-14 shows how the drives are numbered.

Slot 6 (SCSI ID 6)

Slot 1 (SCSI ID 1)
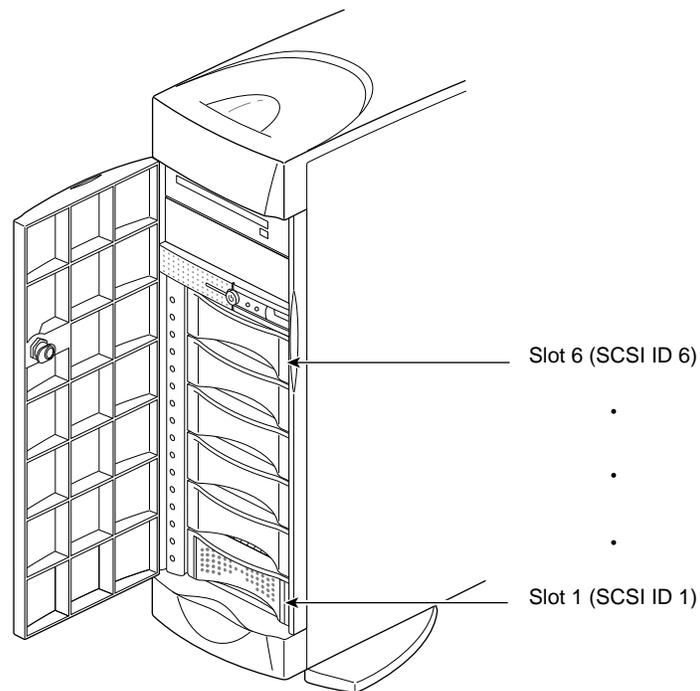
Figure 6-14   3.5-Inch Drives Numbering in an Origin200 System

3. Install the peripheral.

    ■   If there is a plastic blanking plate covering the slot, remove it as shown in Figure 6-15.

    ■   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 6-15.
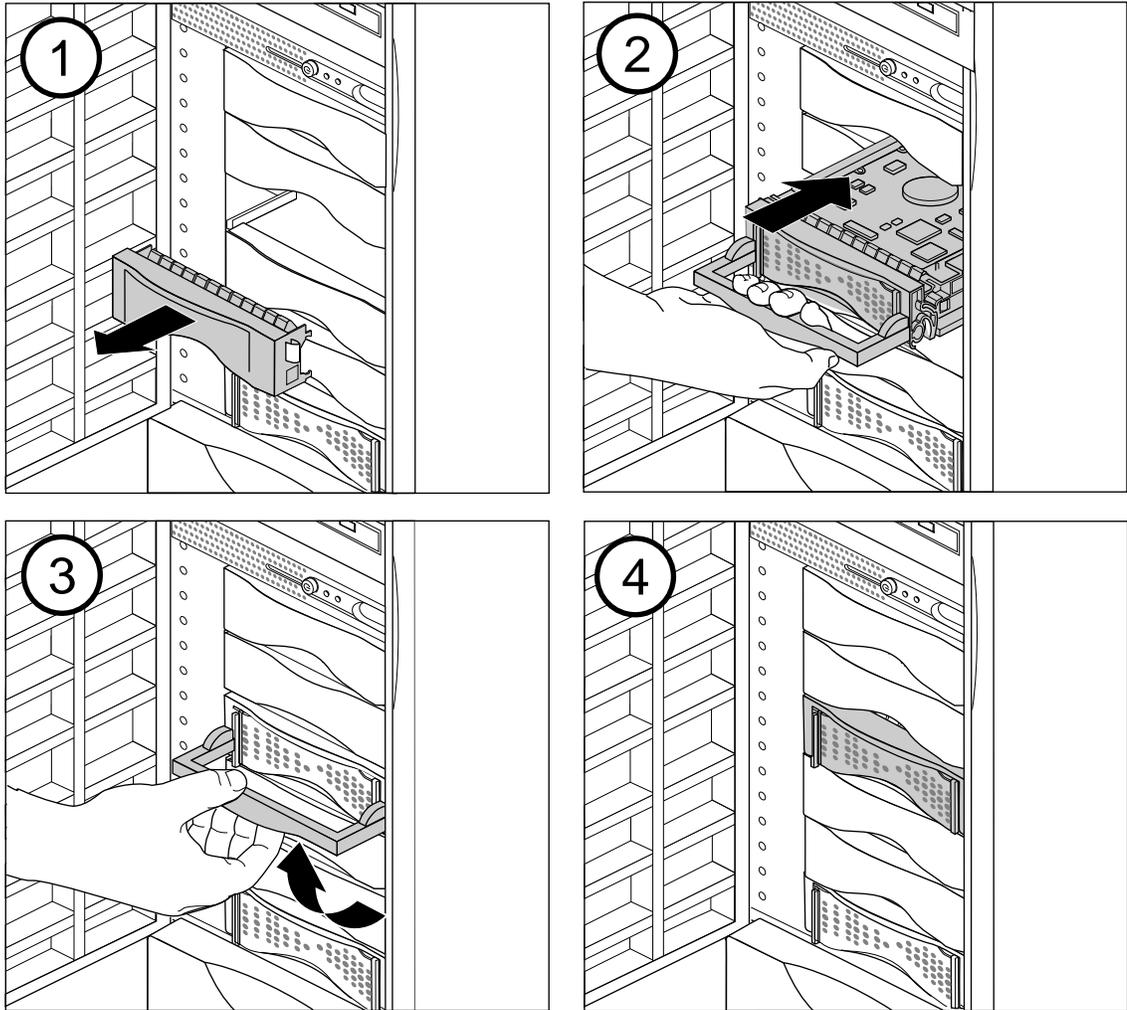
Figure 6-15   Installing a 3.5-Inch Peripheral in an Origin200 System

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 6-16.
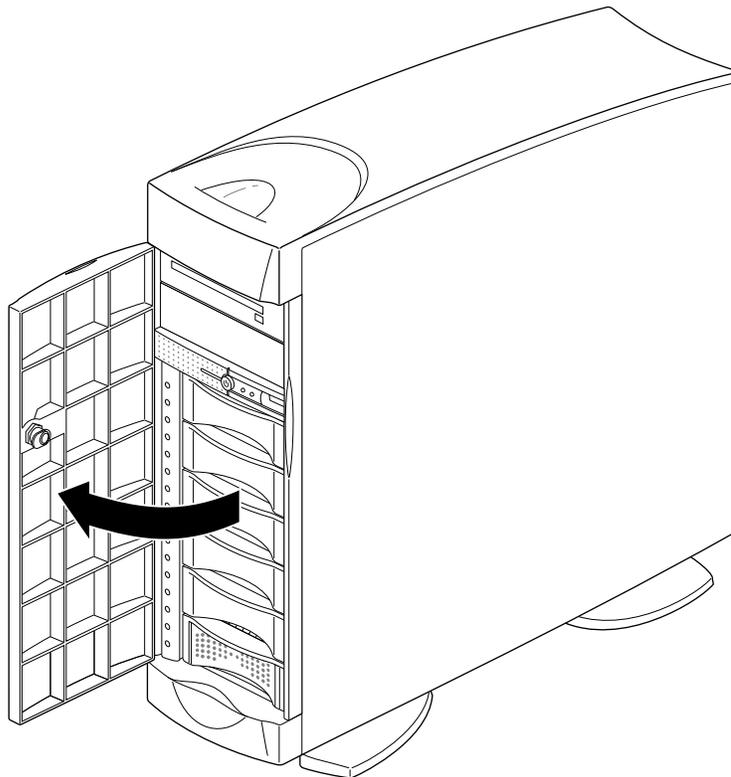
Figure 6-16   Opening the Front Door of an Origin200 System

2. Locate the drive you want to remove. The drives are numbered as shown in Figure 6-17.

Slot 6 (SCSI ID 6)

Slot 1 (SCSI ID 1)
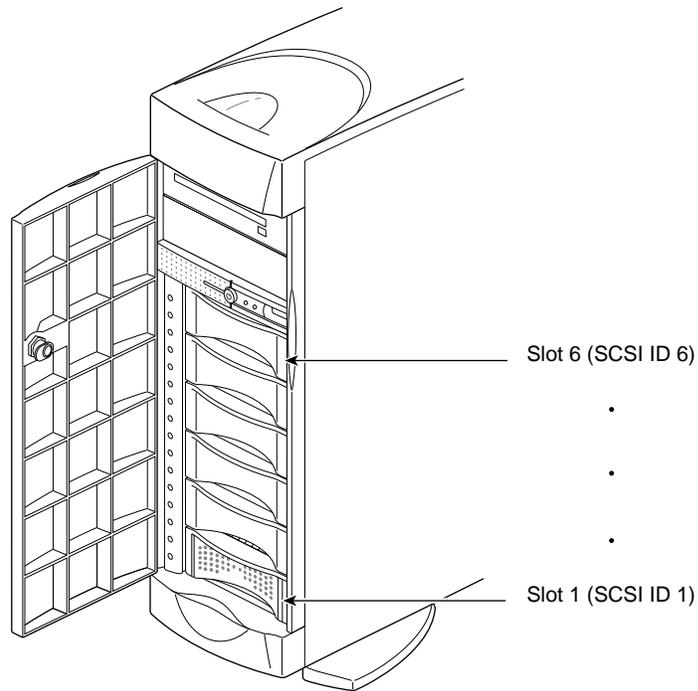
Figure 6-17   3.5-Inch Drives Numbering in an Origin200 System

3. Remove the drive, as shown in Figure 6-18.

   ■   Pull the locking lever down.

   ■   Grasp the lever and pull the drive straight out of the chassis.
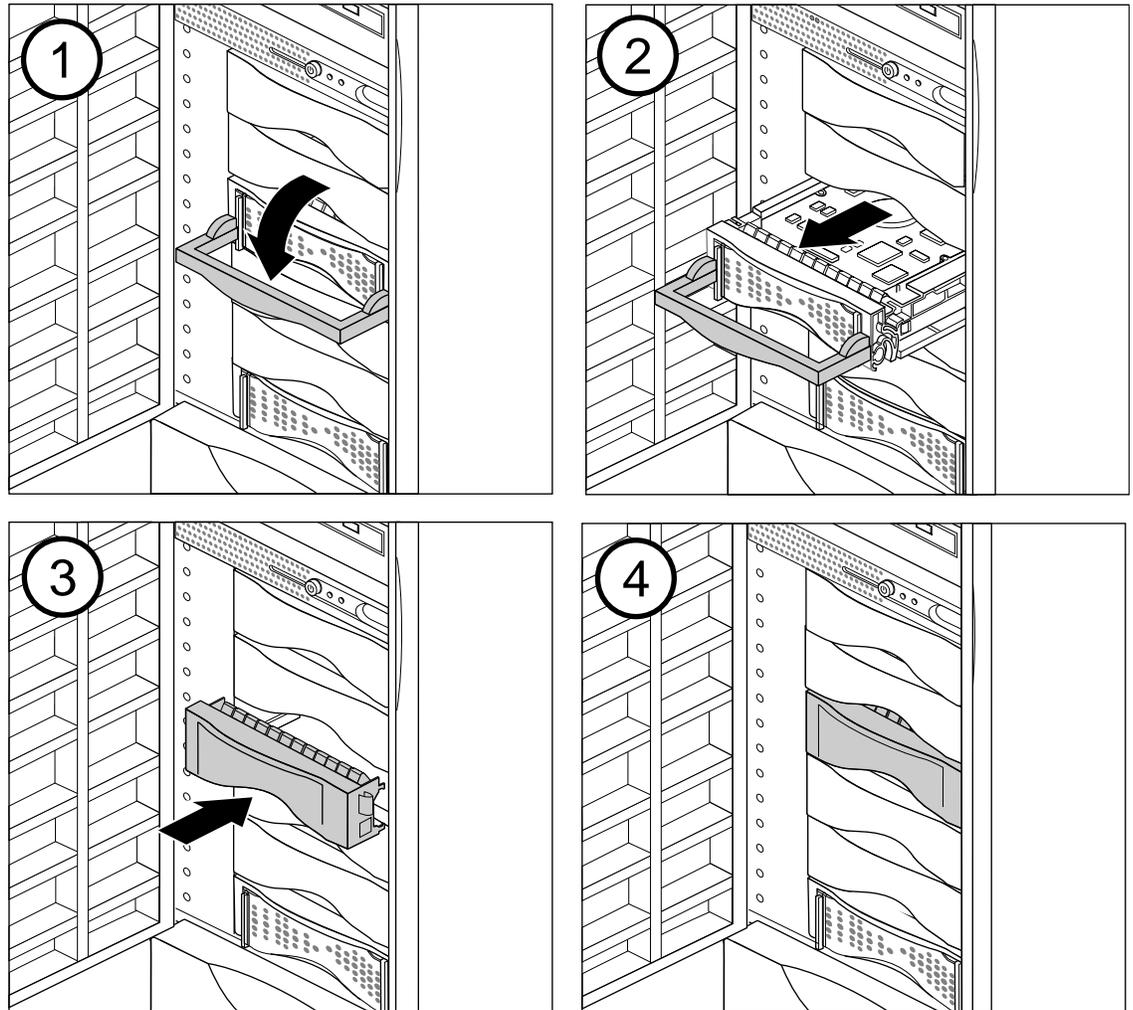
Figure 6-18   Removing a 3.5-Inch Drive From an Origin200 Server

4. If you are not replacing the drive with another peripheral, cover the open slot with a plastic blanking plate, as shown in Figure 6-18.

    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 enter:

  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 that the system recognizes two disk drives on SCSI channel 0 (the insystem 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, peripherals from SGI are all recognized by the operating system (IRIX) and are ready to be configured for use with the system. Table 6-1 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 6-1, refer to *IRIX Admin: Disks and Filesystems.* See "About This Guide" at the beginning of this manual for information about obtaining additional manuals and documentation.

Table 6-1   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 6-19 shows the locations of the connectors for these ports.

Serial port connector 2

Serial port connector 1
(system console on
the master module)

Rear of System
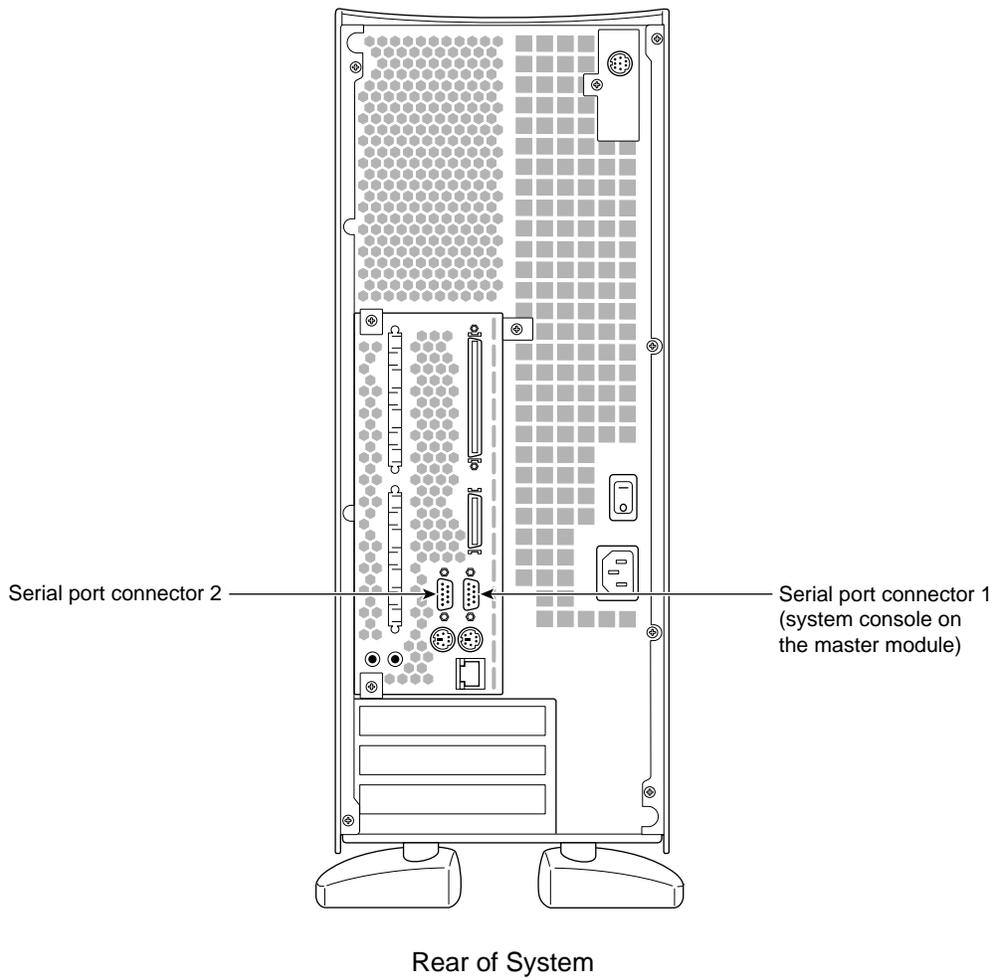
Figure 6-19   Location of the Serial Port Connectors on an Origin200 System

174

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.

These are the common types of serial devices that you can attach to these ports:

- 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. The serial ports can also be used to send and receive MIDI information.

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 SGI systems.

Table 6-2 shows the correspondence of ports to IRIX device files and protocols.

Table 6-2   Serial Port Numbers and Correspondence to IRIX Device Files

Module	Serial Port Number	IRIX Device File (RS-232 Mode)	IRIX Device File (RS-422 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 connect a terminal properly:

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* 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*

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 information on the following commands:

- *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*

Connector Pinout Assignments

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

- "Serial Ports" on page 183
- "Parallel Port" on page 185
- "Ethernet Port" on page 186
- "AUX Port" on page 187 (module system controller)
- "External Interrupt Ports" on page 188

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

Serial Ports
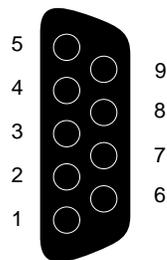
Figure A-1   Origin200 Serial Port Pinout Assignments

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
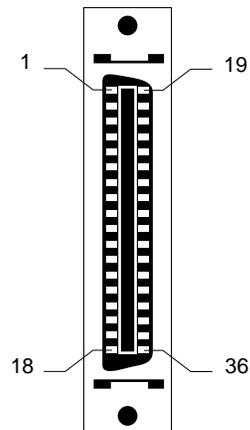
Figure A-2   Origin200 Parallel Port Pinout Assignments

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	Pin	Assignment
1	BUSY (Printer Busy)	19	Signal Ground for BUSY
2	SELECT (Printer Online)	20	Signal Ground for SELECT
3	nACK (Printer Acknowledge)	21	Signal Ground for nACK
4	nFAULT (Printer Fault)	22	Signal Ground for nFAULT
5	pERROR (Printer Error)	23	Signal Ground for pERROR
6	DATA 1 (Least-Significant Bit)	24	Signal Ground for DATA 1
7	DATA 2	25	Signal Ground for DATA 2
8	DATA 3	26	Signal Ground for DATA 3
9	DATA 4	27	Signal Ground for DATA 4
10	DATA 5	28	Signal Ground for DATA 5

185

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

Pin	Assignment	Pin	Assignment
11	DATA 6	29	Signal Ground for DATA 6
12	DATA 7	30	Signal Ground for DATA 7
13	DATA 8 (Most-Significant Bit)	31	Signal Ground for DATA 8
14	nINIT	32	Signal Ground for nINIT
15	nSTROBE (Data Strobe)	33	Signal Ground for nSTROBE
16	nSELECTIN (Device Selected)	34	Signal Ground for nSELECTIN
17	nAUTOFD	35	Signal Ground for nAUTOFD
18	(Host Logic High)	36	(Peripheral Logic High)

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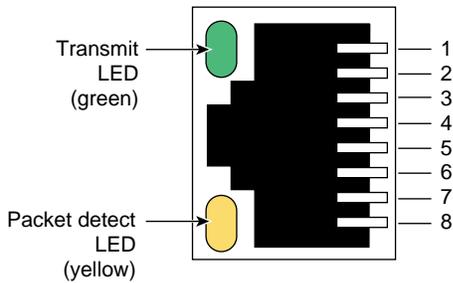
Figure A-3   Origin200 Ethernet 10-Base-T/100-Base-TX Port Pinout Assignments

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 –

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

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

AUX Port
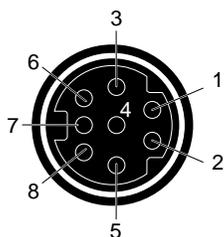
Figure A-4   Origin200 AUX Port Pinout Assignments

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

Table A-5 (continued)   Origin200 AUX Port Pin Assignments

Pin	Assignment	Description
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-inch (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 the two-conductor shielded cable type, 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.

Cable Descriptions

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

- "Serial Cables" on page 189
- "AUX Port Cables" on page 194

Serial Cables

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

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 SGI 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

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

Pin Number (DB9 Female)	Pin Number (DB25)	Signal
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 SGI 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 server 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 workstation to the Origin200 server. 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

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

Pin Number (DB9 Female)	Signal	Pin Number (DB9 Male)	Signal
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 the part numbers of the SGI cables described in this section.

Table B-7   SGI AUX Port Cables for Origin200 System

Cable	Connector Type	Part Number
Terminal cable	DIN-8 male to DB25 male	018-8114-001
Modem cable	DIN-8 male to DB25 male	018-8109-001
Silicon Graphics workstation/server cable	DIN-8 to DIN-8	018-8223-001

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 SGI 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

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

Pin Number (DIN-8 Male)	Pin Number (DB25 Male)	Signal
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 SGI 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

Silicon Graphics Indy, Indigo[2], and CHALLENGE S Cable

Use this cable to connect a Silicon Graphics workstation or server with a DIN-8 serial port (such as an Indy or Indigo[2] workstation or CHALLENGE S server) to the AUX port of an Origin200 server. This cable is available as SGI part number 018-8223-001.

Table B-10   Connector Pin Assignments for an SGI Workstation/Server DIN-8 Serial Port to the Origin200 AUX Port

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

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.

blower

As used in the GIGAchannel expansion chassis, a blower is a type of fan that draws air into its center, then expels it through channels outward into a shroud.

byte

A measure of data equal to 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 metal 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

An SGI interconnection fabric 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 equal to 1024 megabytes (MB). *See also* byte, kilobyte, and megabyte.

hertz (Hz)

Frequency in cycles per second.

kilobyte (KB)

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

kilogram (kg)

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

loopback cable

A cable that loops signals coming out of a chassis back into the chassis, either through the same connector or different connectors. Typically, a loopback cable is used for testing or to bypass equipment outside the chassis. In the case of Origin200 GIGAchannel, an XIO cable can be used as a loopback cable between the XIO A and XIO B connectors. *See also* loopback mode.

loopback mode

When an Origin200 GIGAchannel server is operating with an XIO cable attached (looped) between its XIO A and XIO B connectors. In loopback mode, the Origin200 GIGAchannel server module can run without the GIGAchannel expansion cabinet attached because the XIO bus signals are looped back from the XIO A connector to the XIO B connector.

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 manufacture. Each Ethernet device has a unique MAC address so that it can exclusively copy packets that are meant for it off the network.

master module

Also known as master CPU module. This is the module that controls the basic functions of the system, including powering up and powering down and when the system boots IRIX. The master module contains the boot drive and you can communicate with its module system controller (MSC). *See also* slave module.

megabyte (MB)

A measure of data equal to 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. *See also* master module and slave module.

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 of the master CPU module 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 equal to 16 ounces (about 0.64 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.

slave module

Also known as a slave CPU module. This is a second module in a two-module Origin200 server. Like the master module, it contains at least one CPU and memory. However, it does not have the boot drive and you cannot communicate with its module system controller (MSC). *See also* master module.

system

A general term for all the components of a computer. In the case of an Origin200 system, this 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. Unlike the diagnostic port, you can log in to IRIX via the system console. In an Origin200 server, 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.

XIO

An SGI high-speed bus technology; provides greater bandwidth than PCI.

Index

U

using drives in the Origin200 server, 172

V

verifying a serial connection, 179
vi, 118
vibration, 32, 33
vt100 terminal type, 120

W

weight, system, 32, 33, 38
wiring descriptions of cables, 189
World Wide Web
  accessing the system from, 108
  obtaining manuals via, xxiv, xxv
  setting up the server for access, 83
wrist strap
  importance of, 56

X

XFS filesystem, 172
XIO
  cabling between CPU module and GIGAchannel,
    22
  cabling for loopback mode, 24
  connectors on CPU module, 19
  connectors on GIGAchannel, 21
  location of A and B connectors on CPU modules,
    20
  location of A and B connectors on GIGAchannel,
    21
XIO slots
  available on GIGAchannel, 21

Tell Us About This Manual

As a user of Silicon Graphics products, you can help us to better understand your needs and to improve the quality of our documentation.

Any information that you provide will be useful. Here is a list of suggested topics:

- General impression of the document

- Omission of material that you expected to find

- Technical errors

- Relevance of the material to the job you had to do

- Quality of the printing and binding

Please send the title and part number of the document with your comments. The part number for this document is 007-3708-002.

Thank you!

Three Ways to Reach Us

- To send your comments by **electronic mail**, use either of these addresses:

  – On the Internet: techpubs@sgi.com

  – For UUCP mail (through any backbone site): *[your_site]*!sgi!techpubs

- To **fax** your comments (or annotated copies of manual pages), use this fax number: 650-932-0801

- To send your comments by **traditional mail**, use this address:

Technical Publications
Silicon Graphics, Inc.
1600 Amphitheatre Pkwy.
Mountain View, California 94043-1351