Origin 200™ and Origin 200 GIGAchannel™ Maintenance Guide

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About This Guide

This guide describes how to install hardware options in Origin200 and Origin200 GIGAchannel servers, troubleshoot problems, and maintain the servers. It contains these chapters:

- Chapter 1, “Preparing the System for Servicing”
- Chapter 2, “Installing and Removing PCI and XIO Option Boards”
- Chapter 3, “Installing and Removing Memory”
- Chapter 4, “Troubleshooting and Maintenance”
- Chapter 5, “Removing and Replacing Internal Components”

An index completes this guide.

Audience

This guide is written for customers who are performing their own maintenance and installing options inside the Origin200 and Origin200 GIGAchannel servers.

Additional Documentation

This maintenance guide is designed to be used along with the *Origin200 and Origin200 GIGAchannel Owner’s Guide*. The owner’s guide, which is provided with each Origin200 and Origin200 GIGAchannel server, contains information on setting up and operating the server and provides pointers to software and system administration manuals and reference material.

You can view this manual and the owner’s guide, as well as software and system administration manuals online at the Technical Publications library. See http://techpubs.sgi.com/.

Conventions

This *Origin200 and Origin200 GIGAchannel Maintenance Guide* uses these conventions:

- References to document titles are in *italics*.
- IRIX commands and names of files appear in text as *italics*.
- References to other chapters and sections within this guide are in quotation marks.
- 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.

Chapter 1

Preparing the System for Servicing

This chapter describes how to prepare Origin200 and Origin200 GIGAchannel servers for installing and removing internal parts, including PCI options, memory, fans, and other components. This chapter contains the following sections:

- "Shutting Down the System and Disconnecting Cables" on page 2
- "Removing the System From a Rack (Rackmount Only)" on page 5
- "Removing the System Cover (Tower Only)" on page 8
- "Removing the Chassis Access Cover" on page 9
- "Attaching a Grounding Wrist Strap" on page 11

Shutting Down the System and Disconnecting Cables

Follow these steps to shut down 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 begins to shut down the system immediately. See the shutdown(1M) reference page 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?
   ```

   - 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 1-1.If you are going to move the system, wait a few more seconds to allow the internal disks to stop spinning.
   - In an Origin200 GIGAchannel server, the front power switch also turns off the GIGAchannel expansion cabinet.
   - If you are installing or removing only XIO option boards in a GIGAchannel expansion cabinet, you do not need to do anything more to the system. Turn to Chapter 2, “Installing and Removing PCI and XIO Option Boards.”

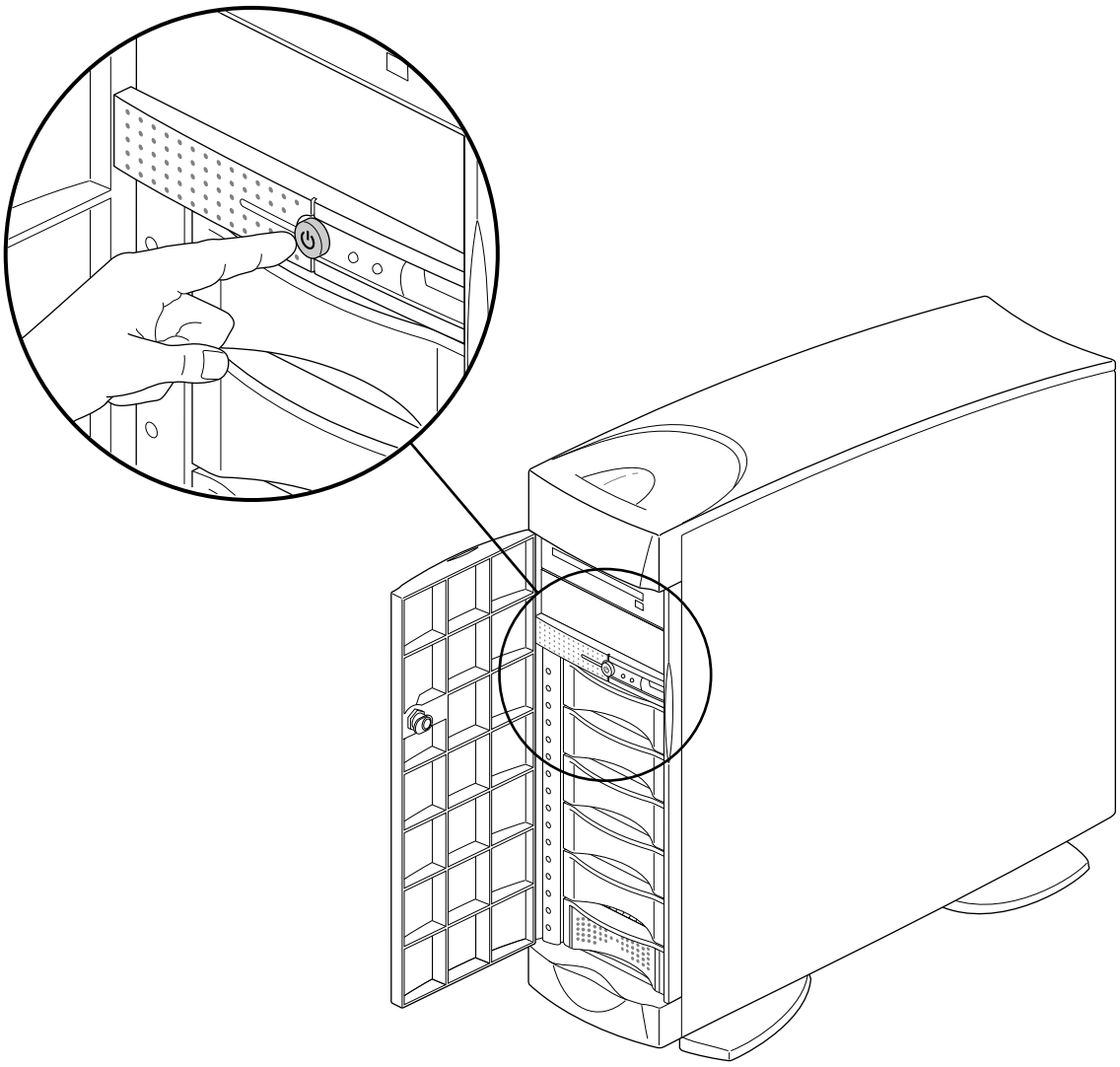

Figure 1-1 Turning Off the Front Power Switch

The status LED on the front of the system blinks, then goes out when the system is powered off.

4. If you are installing PCI options or memory or are servicing internal components, disconnect all cables from the rear of the chassis, including serial, Ethernet, CrayLink Interconnect, XIO, grounding, power, and so forth.

   - If the system is in an equipment rack and you are installing PCI options or memory, or you are servicing internal components, proceed with the next section, “Removing the System From a Rack (Rackmount Only)” on page 5.
   - If the system is in a tower configuration and you are installing PCI options or memory, or are servicing internal components, skip to the section “Removing the System Cover (Tower Only)” on page 8.

Removing the System From a Rack (Rackmount Only)

Follow these steps to remove the system from an equipment rack:

1. If you are servicing a CPU module, you may wish to either lock the front door closed or remove it from the server. This step is optional.
2. Remove the plastic end caps, as shown in Figure 1-2.

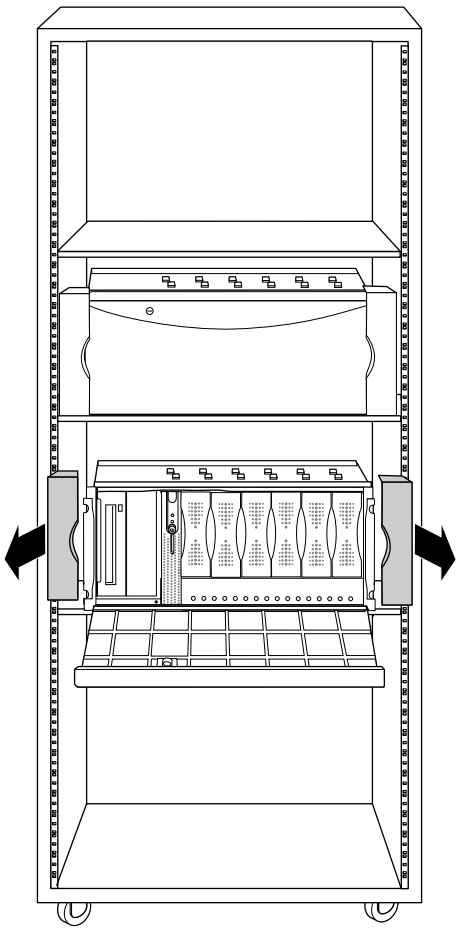

Figure 1-2 Removing the Plastic End Caps

3. Remove the screws that secure the chassis to the equipment rack.
4. With two people, one standing on each side of the chassis, slide the chassis out of the rack, as shown in Figure 1-3.

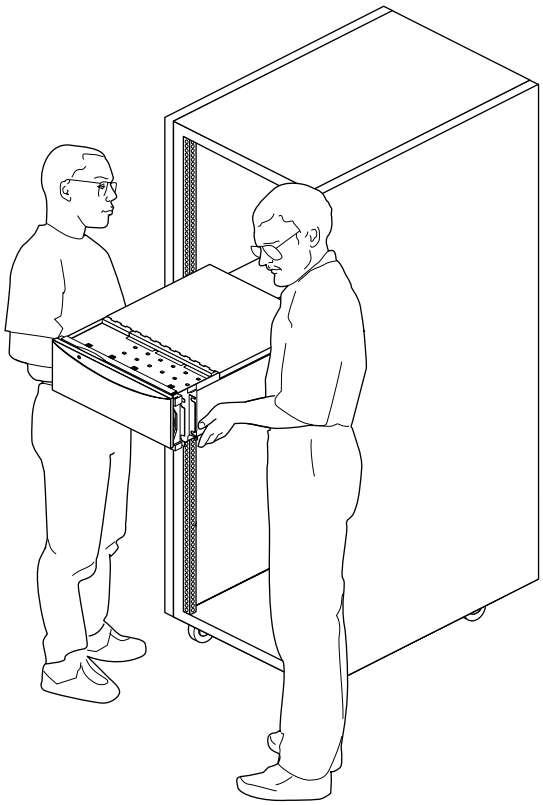

Figure 1-3 Removing the Chassis From the Rack

5. Place the chassis on a sturdy work surface, as shown in Figure 1-4.

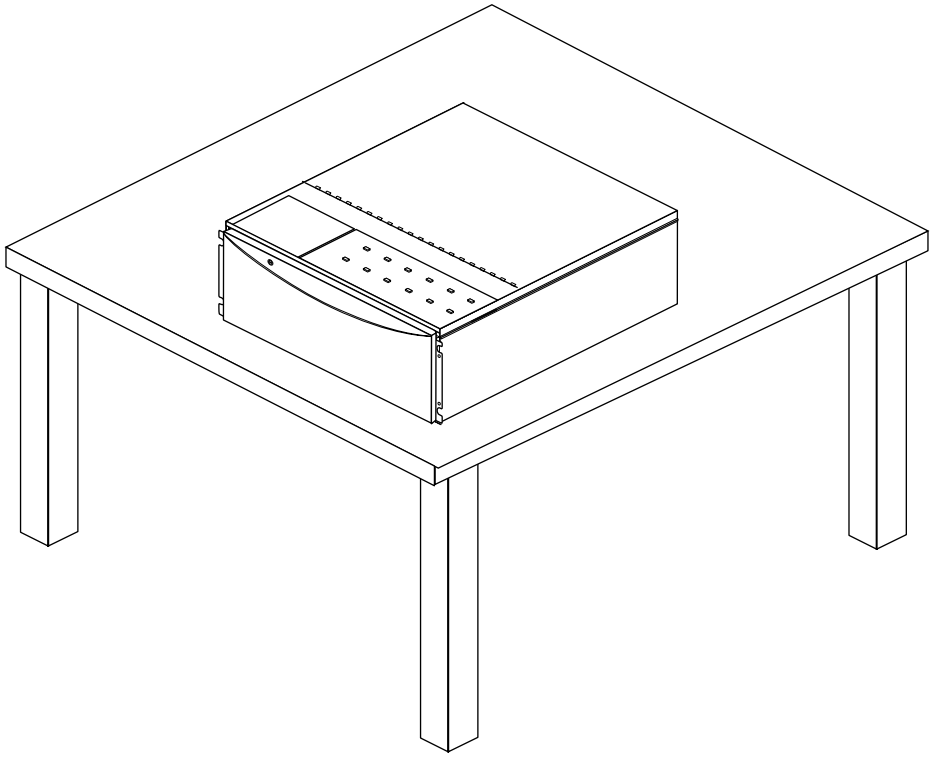

Figure 1-4 Chassis on a Work Surface

You are now ready to remove the chassis access cover. Proceed to “Removing the Chassis Access Cover” on page 9.

Removing the System Cover (Tower Only)

To remove the system cover, follow these steps:

1. Using a #2 Phillips screwdriver, remove the two screws that secure the system cover to the chassis. See Figure 1-5.
2. Pull the rear edge of the cover away from the rear of the system.
3. Slide the system cover back and off the system, as shown in Figure 1-5.

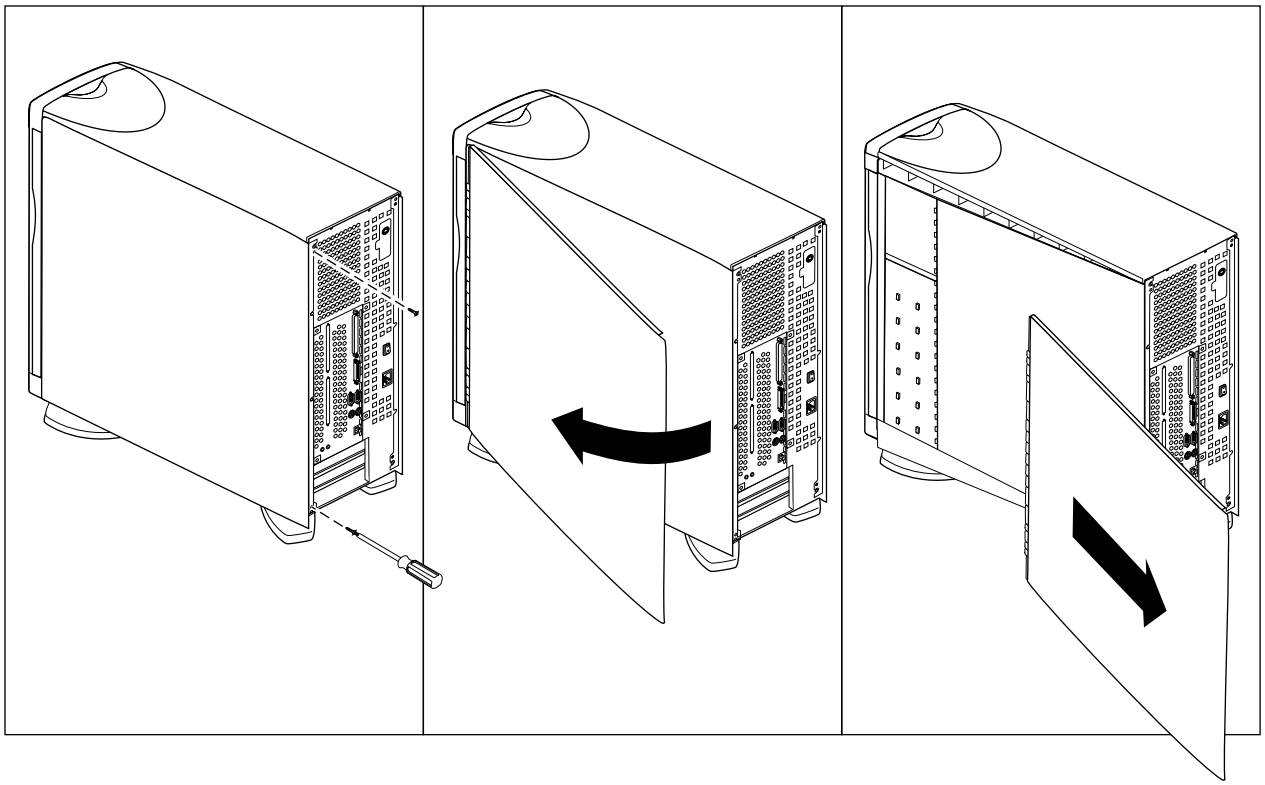

Figure 1-5 Removing the System Cover

You are now ready to remove the chassis access cover.

Removing the Chassis Access Cover

The chassis access covers on the CPU module and GIGAchannel are almost identical, except that there are two screws on the face of the cover of the CPU module (shown in Figure 1-6) and only one screw on the face of the cover of the GIGAchannel expansion cabinet (shown in Figure 1-7).

Figure 1-6 shows how to remove the chassis access cover from a CPU module.

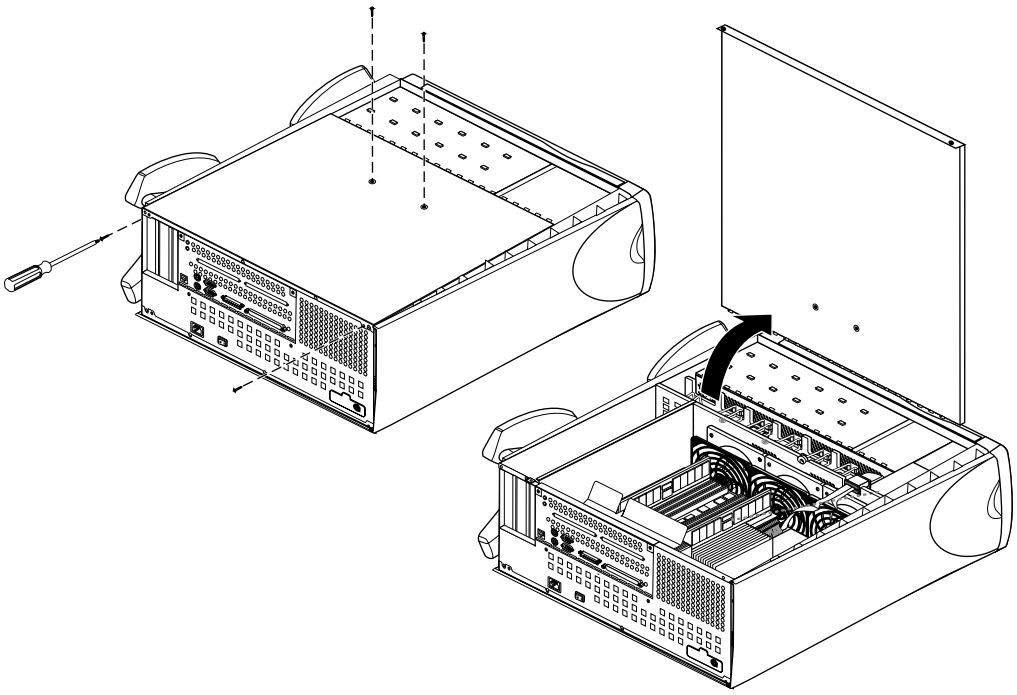

Figure 1-6 Removing the Chassis Access Cover (CPU Module)

Figure 1-7 shows how to remove the chassis access cover from a GIGAchannel expansion cabinet.

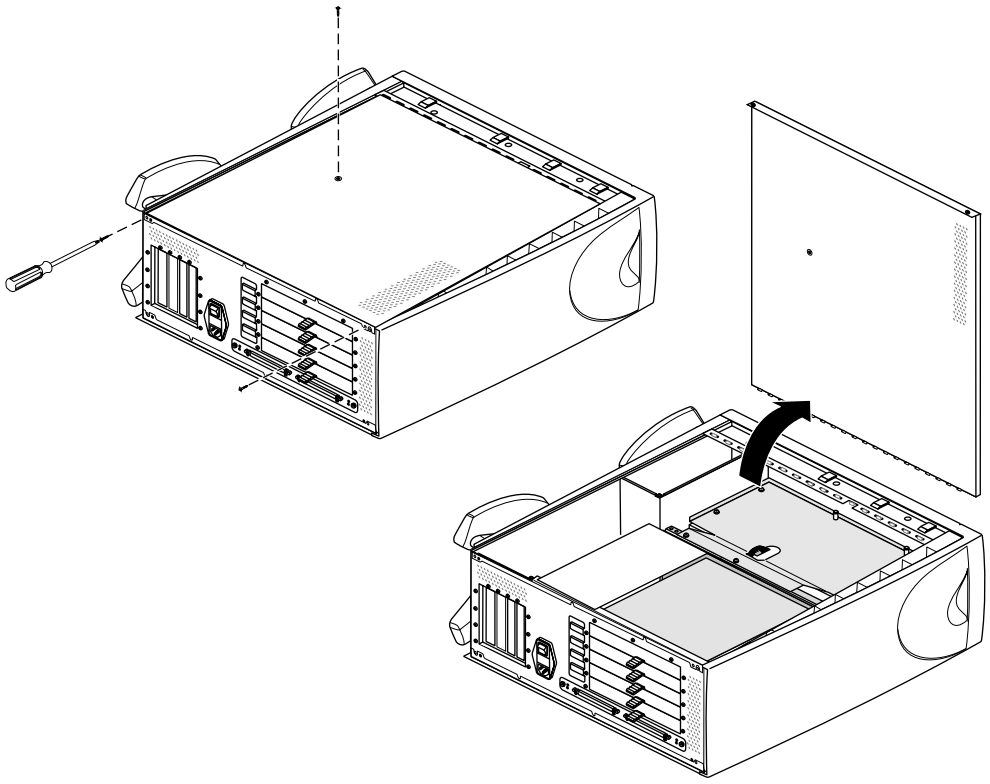

Figure 1-7 Removing the Chassis Access Cover (GIGAchannel Expansion Cabinet)

Attaching a Grounding Wrist Strap

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

Attach one end of a grounding strap to your wrist and the other to a metal portion of the chassis, as shown in Figure 1-8. Grounding straps are typically included with memory, PCI, and XIO options.

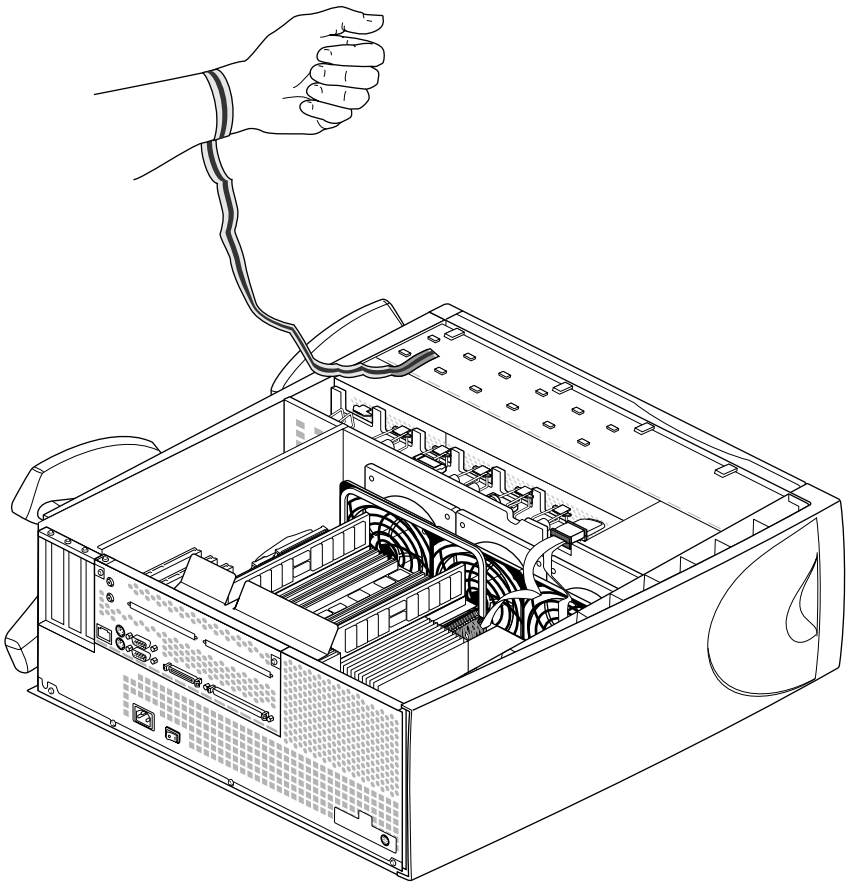

Figure 1-8 Attaching a Grounding Wrist Strap to the Chassis (CPU Module Shown)

You are now finished preparing the system for servicing.

Chapter 2

Installing and Removing PCI and XIO Option Boards

This chapter describes how to install PCI option boards in Origin200 and Origin200 GIGAchannel servers, and how to install XIO boards in an Origin200 GIGAchannel server. It also describes how to remove option boards from the respective chassis. This chapter contains the following sections:

- "Handling Precautions" on page 14
- "Installing a PCI Option Board in an Origin200 and Origin200 GIGAchannel CPU Module" on page 15
- "Installing a PCI Option Board in a GIGAchannel Expansion Cabinet" on page 23
- "Removing a PCI Option Board From an Origin200 or Origin200 GIGAchannel CPU Module" on page 27
- "Removing a PCI Option Board From a GIGAchannel Expansion Cabinet" on page 30
- "Installing an XIO Board in an Origin200 GIGAchannel Expansion Cabinet" on page 33
- "Removing an XIO Board From a GIGAchannel Expansion Cabinet" on page 39

Handling Precautions

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

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

Installing a PCI Option Board in an Origin200 and Origin200 GIGAchannel CPU Module

The following steps describe how to install a PCI option board in an Origin200 server. To install a PCI option in a GIGAchannel expansion cabinet, see "Installing a PCI Option Board in a GIGAchannel Expansion Cabinet" on page 23.

1. Prepare the system for servicing as described in Chapter 1, "Preparing the System for Servicing."
2. Locate an available PCI option slot. See Figure 2-1.

   Although you can install a PCI board in any open slot, you may observe better I/O performance if you install boards starting in order with slot 5, particularly if the PCI board you are installing can perform prefetching.

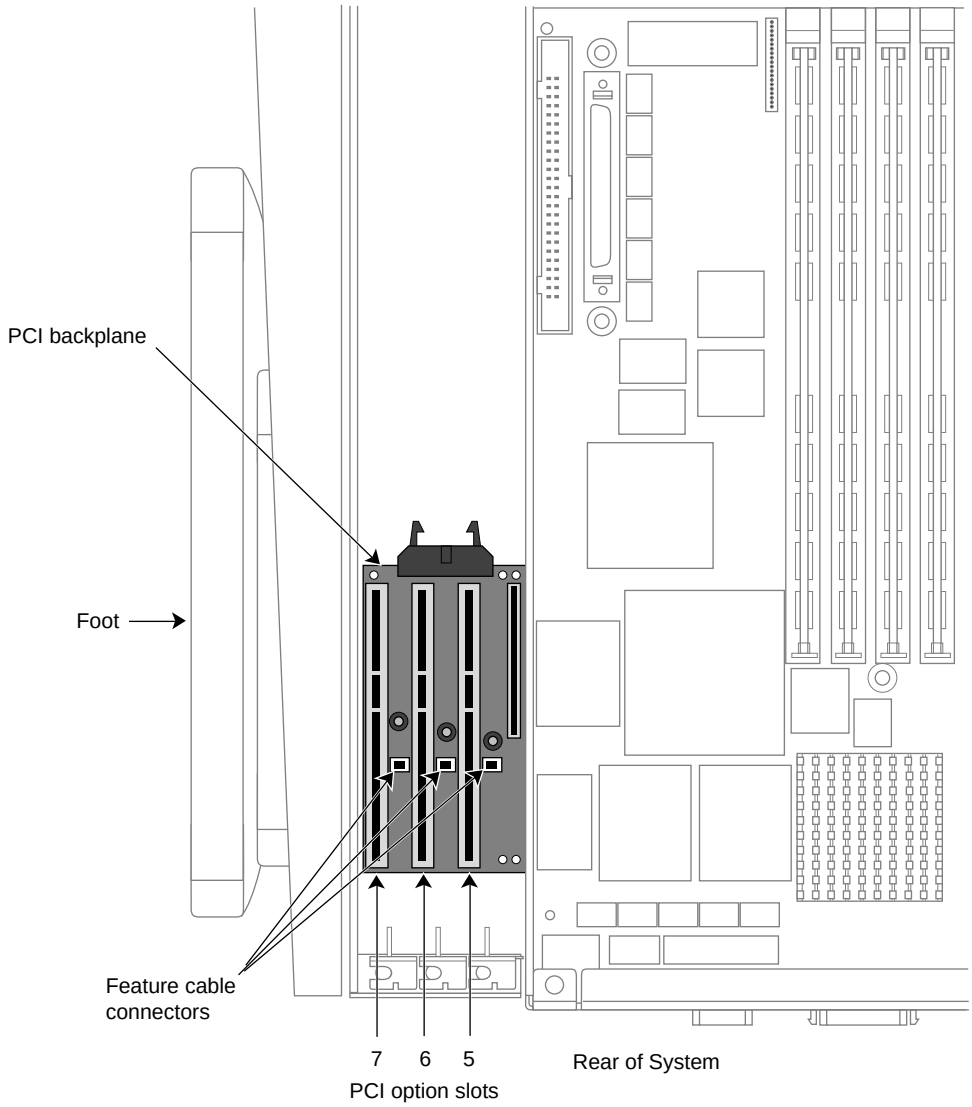

Figure 2-1 Locating the PCI Option Slots

3. Remove the blanking plate from the slot.
   - Using a #2 Phillips screwdriver, remove the single screw that secures the blanking plate to the chassis. See Figure 2-2.
   - Remove the blanking plate by lifting it straight up, as shown in Figure 2-2. Save the blanking plate it in case you have to remove this option in the future.

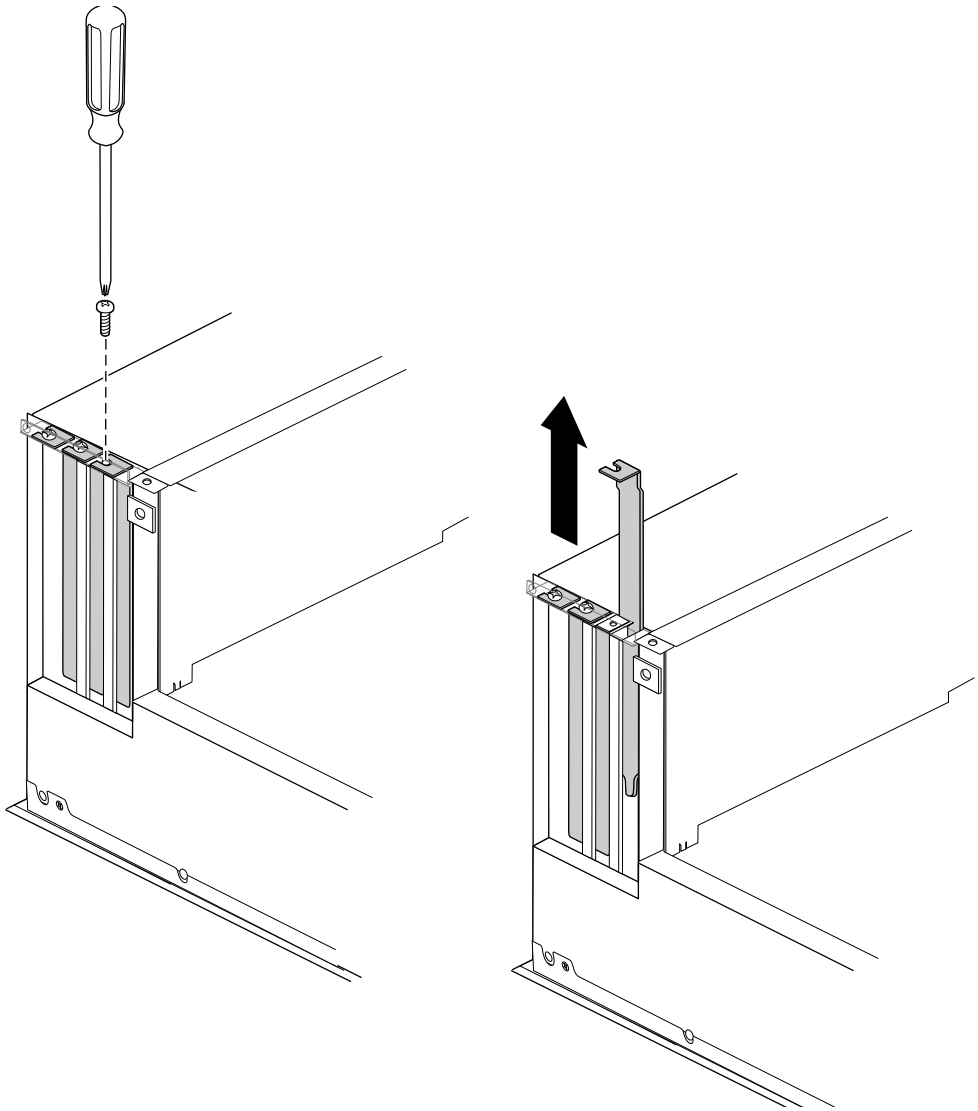

Figure 2-2 Removing a PCI Slot Blanking Plate

4. *For PCI boards with feature connectors only.* Some PCI boards from SGI provide an extra connector for additional signals used for multimedia applications. To install such a board in an Origin200 server, you must install a cable from a connector on the board to the feature connector on the PCI backplane. If you are not sure if the PCI board you are installing uses a feature connector, refer to Figure 2-3.

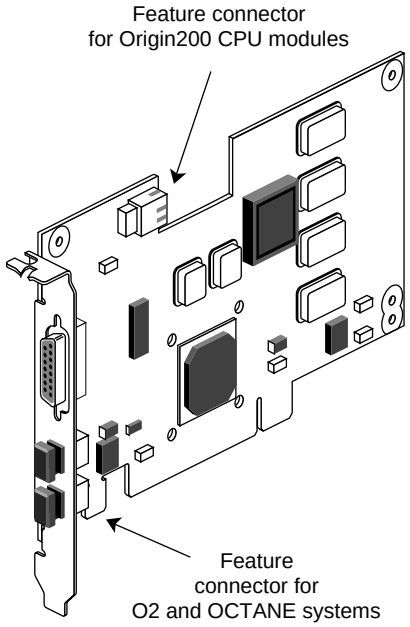

Figure 2-3 Example PCI Board With Feature Connectors

- Locate the feature-connector cable in the PCI board shipment. See Figure 2-4.
- Attach either end of the feature-connector cable to the connector next to the desired PCI slot on the Origin200 PCI backplane, as shown in Figure 2-4.

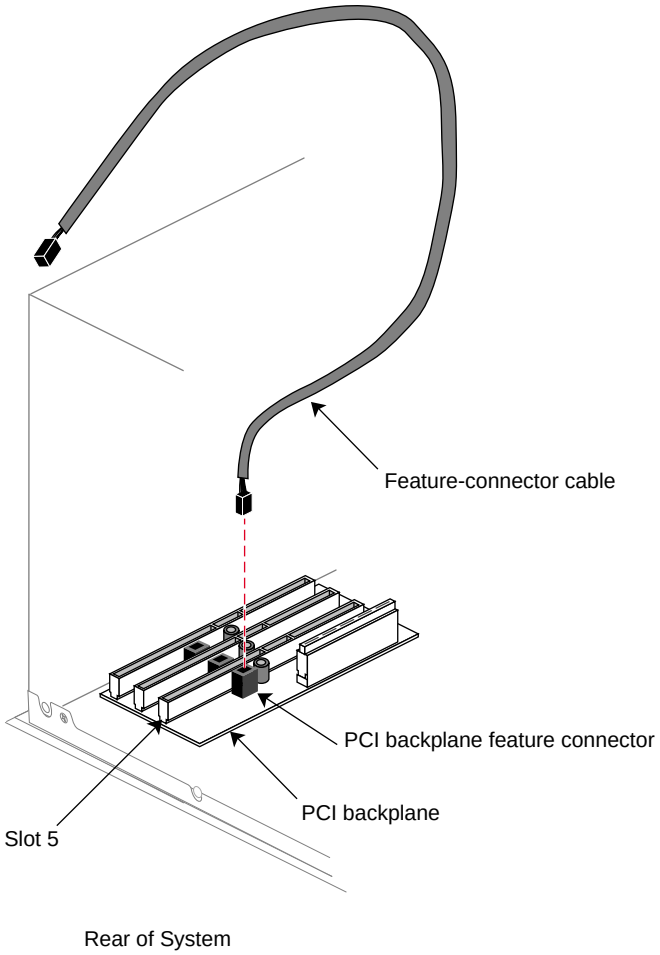

Figure 2-4 Attaching a Feature Connector Cable to the PCI Backplane

- Connect the other end of the cable to the Origin200 PCI board feature connector, as shown in Figure 2-5.

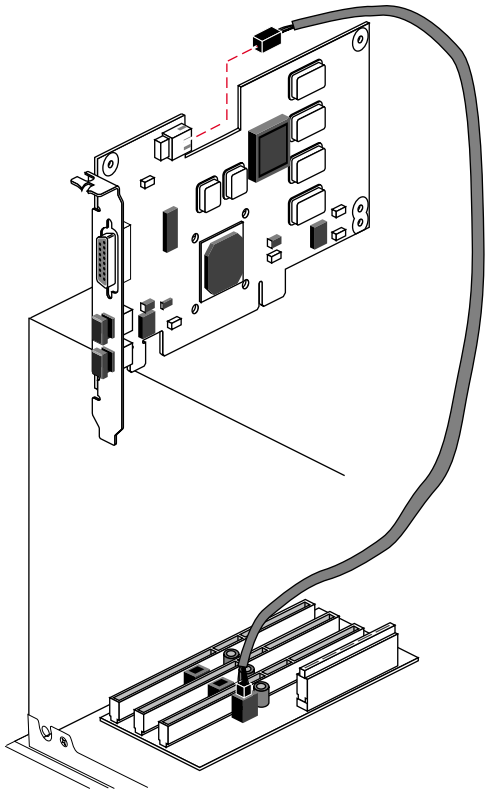

Figure 2-5 Attaching a Feature Connector Cable to the PCI Board

5. Install the PCI option board in the PCI slot.
   - Align the connector on the base of the PCI board with the PCI slot, as shown in Figure 2-6.
   - Press the board down into the slot until it engages.
   - Be sure the tab at the bottom of the PCI board plate slides into the slot on the rear chassis wall.
   - Press firmly until the board is seated. You may find that a slight front-to-back rocking motion helps seat the board more easily.

- Be careful not to kink or damage the flexible EMI gasket that surrounds the inside of the rear chassis wall.
- If the PCI board uses the feature connector cable, tuck the cable between the board and the adjacent one.
- Attach the screw that secures the PCI option board to the chassis, as shown in Figure 2-6.

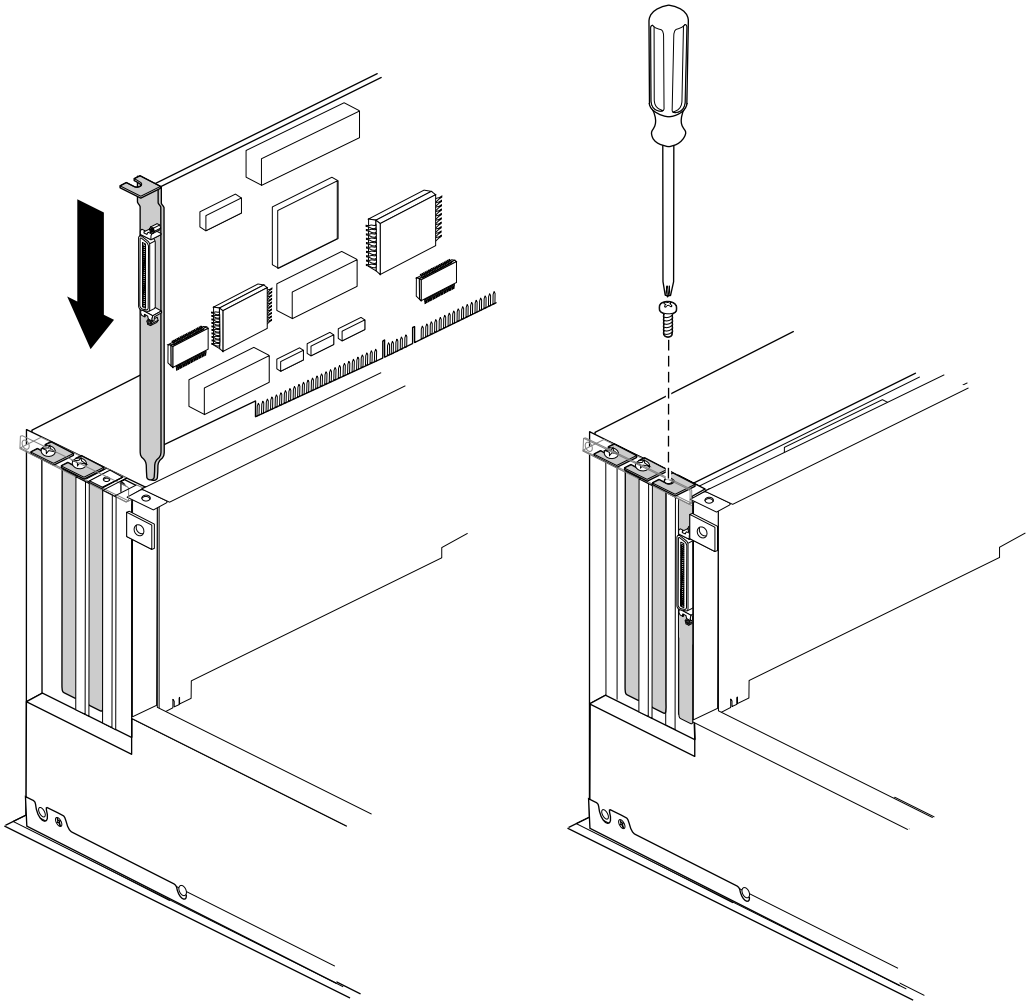

Figure 2-6 Securing the PCI Option Board to the Chassis

6. Remove your wrist strap and reassemble the system.
   - Replace the chassis access cover and side panel (the reverse of removing them).
   - Reattach the cables to the back of the system.

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

For information about how the board is recognized (detected) by the system and configured, see the *Origin200 and Origin200 GIGAchannel Owner's Guide* and whatever documentation is provided with your option board.

Installing a PCI Option Board in a GIGAchannel Expansion Cabinet

Follow these steps to install a PCI option board in a GIGAchannel expansion cabinet.

1. Prepare the system for servicing as described in Chapter 1, "Preparing the System for Servicing."
2. Choose an available PCI slot. See Figure 2-7.

   Note: The slot nearest to the power switch can hold only a half-length PCI board. The other slots can hold full-length boards.

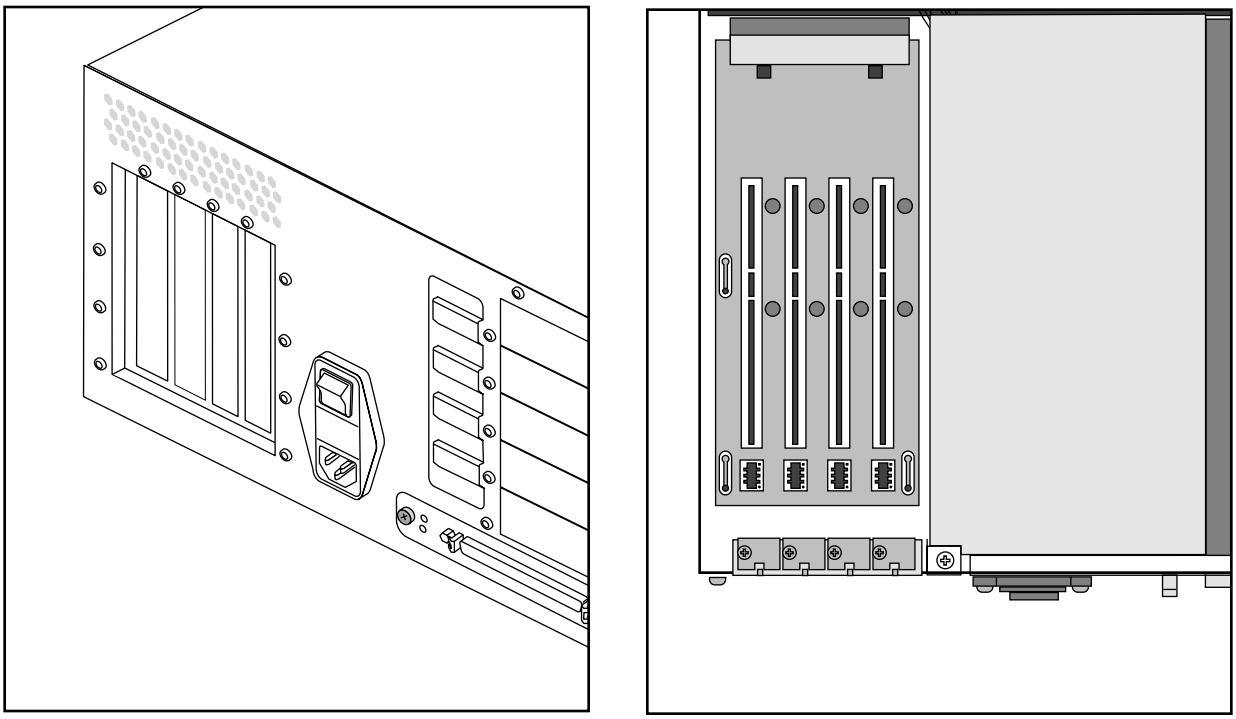

Figure 2-7 Location of PCI Slots in a GIGAchannel Expansion Cabinet

3. Remove the blanking plate from the slot you have chosen, as shown in Figure 2-8.
   - Save the blanking plate in case you need to remove this option board in the future. The blanking plates are critical to maintaining the proper flow of air inside the GIGAchannel chassis.

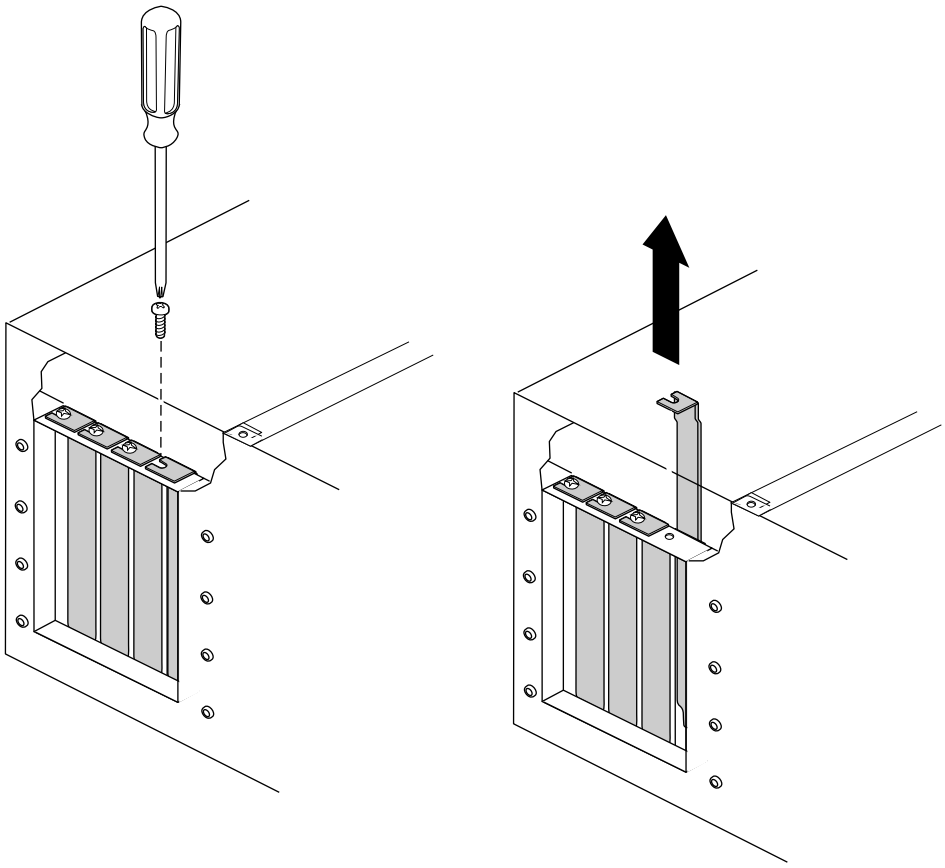

Figure 2-8 Removing the Blanking Plate From a GIGAchannel Expansion Cabinet

4. Install the PCI option board in the slot, as shown in Figure 2-9.
   - Align the board's edge connector with the PCI slot.
   - Lower the board into place. Be sure to align the back edge of the board with the alignment slots on the fan wall.
   - Be careful not to damage the foil gasket between the board and the back wall of the chassis.
   - Press the board firmly into the PCI slot connector until it engages.

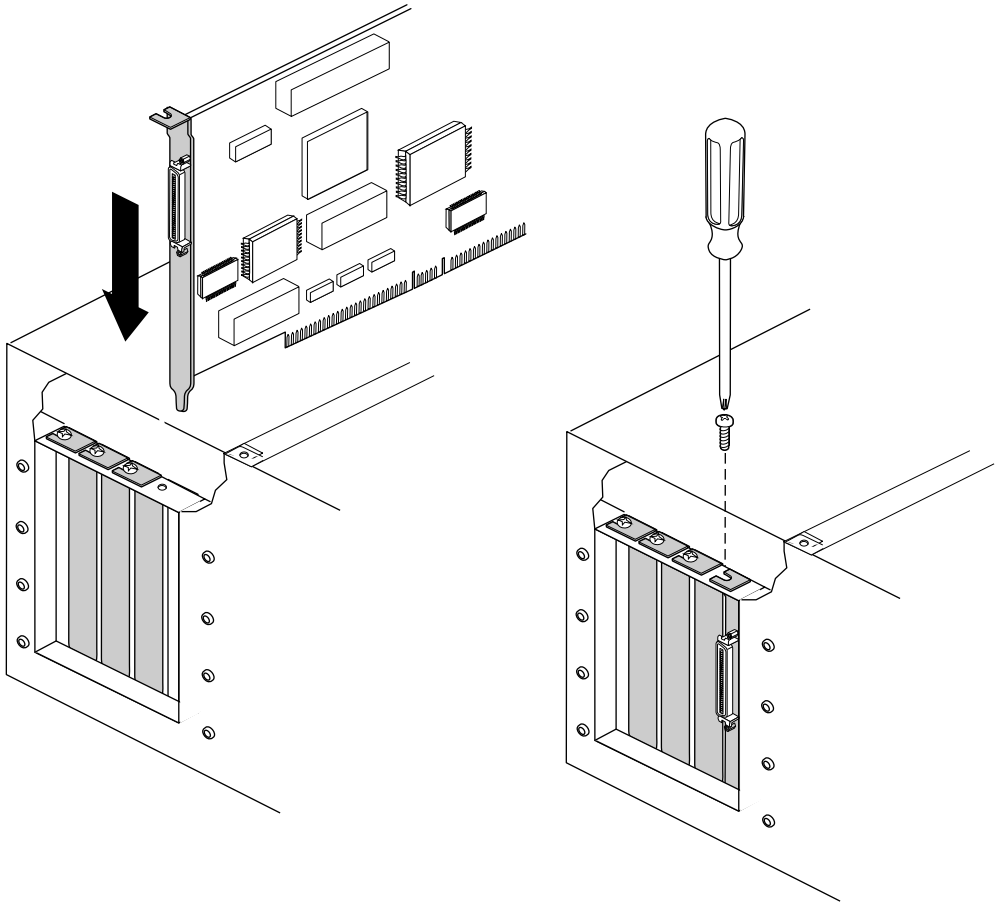

Figure 2-9 Installing a PCI Option Board in a GIGAchannel Expansion Cabinet

5. Remove your wrist strap and reassemble the system.
   - Replace the chassis access door and system cover (the reverse of removing them).
   - Reattach the cables to the back of the system.

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

For information about how the board is recognized (detected) by the system and configured, see the *Origin200 and Origin200 GIGAchannel Owner's Guide* and the documentation provided with your option board.

Removing a PCI Option Board From an Origin200 or Origin200 GIGAchannel CPU Module

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

1. Prepare the system for servicing, as described in Chapter 1, “Preparing the System for Servicing.”
2. Locate the PCI option board you wish to remove and remove it:
   - Using a #2 Phillips screwdriver, remove the screw that secures the PCI option board to the Origin200 chassis, as shown in Figure 2-10.Grasp the PCI option board at the front and rear of the board and pull it straight up and out of the system, as shown in Figure 2-10.
   - Be careful not to kink or damage the flexible EMI gasket that surrounds the inside of the rear chassis wall.
   - If the board uses a feature connector cable, disconnect the cable from the board and the server. See Figure 2-3, Figure 2-4, and Figure 2-5.
   - Place the PCI option board in an antistatic bag, preferably the bag in which the board was originally packaged.

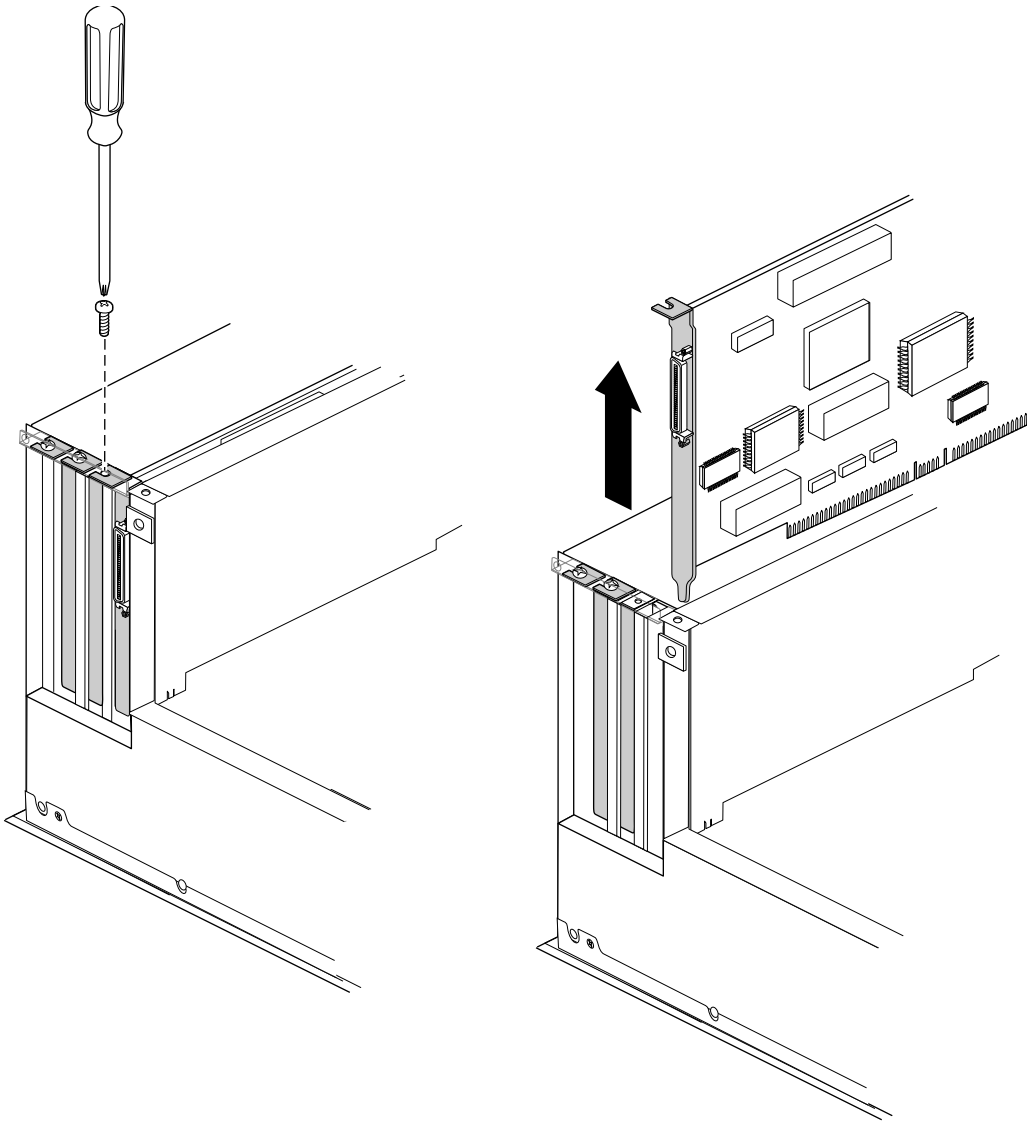

Figure 2-10 Removing a PCI Option Screw and Board

3. Replace the blanking plate.
   - Align the blanking plate and slide it in place, as shown in Figure 2-11.
   - Attach the screw that secures the blanking plate to the Origin200 chassis, as shown in Figure 2-11.

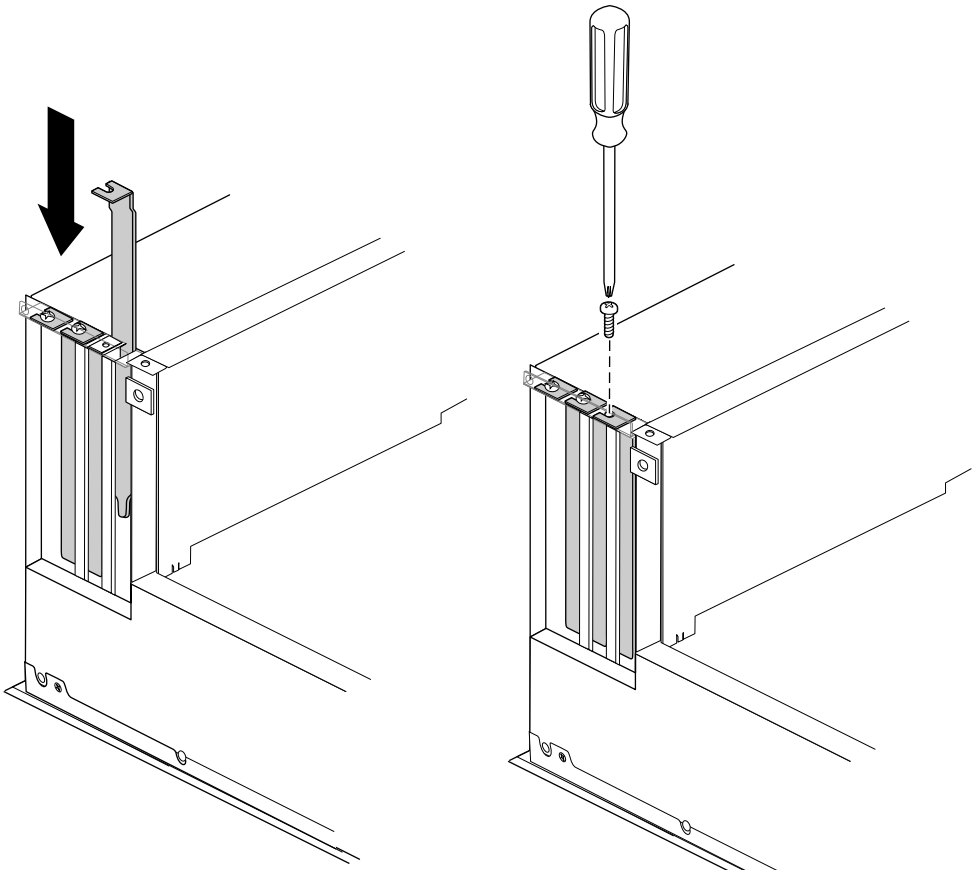

Figure 2-11 Replacing a PCI Option Board Blanking Plate and Screw

Caution: You must replace the PCI blanking plate to ensure the proper flow of cooling air in the chassis.

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

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

Removing a PCI Option Board From a GIGAchannel Expansion Cabinet

Follow these steps to remove a PCI option board from a GIGAchannel expansion cabinet:

1. Prepare the chassis for servicing, as described in Chapter 1, "Preparing the System for Servicing."
2. Select the board you wish to remove and remove it.
   - Using a #2 Phillips screwdriver, remove the screw that secures the PCI option board to the GIGAchannel chassis, as shown in Figure 2-12.
   - Be careful not to kink or damage the flexible EMI gasket that surrounds the inside of the rear chassis wall.
   - Place the PCI option board in an antistatic bag, preferably the bag in which the board was originally packaged.

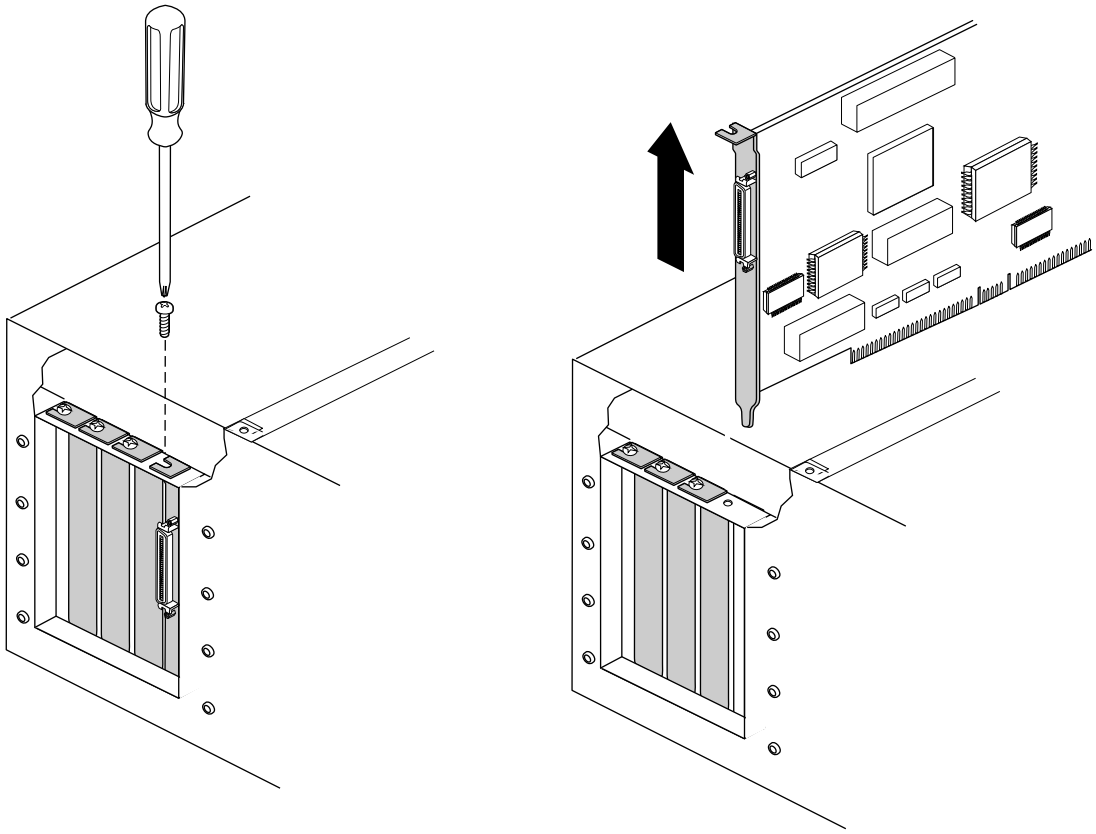

Figure 2-12 Removing a PCI Board From a GIGAchannel Expansion Cabinet

3. Replace the blanking plate.
   - Align the blanking plate and slide it in place, as shown in Figure 2-13.
   - Attach the screw that secures the blanking plate to the GIGAchannel chassis, as shown in Figure 2-13.

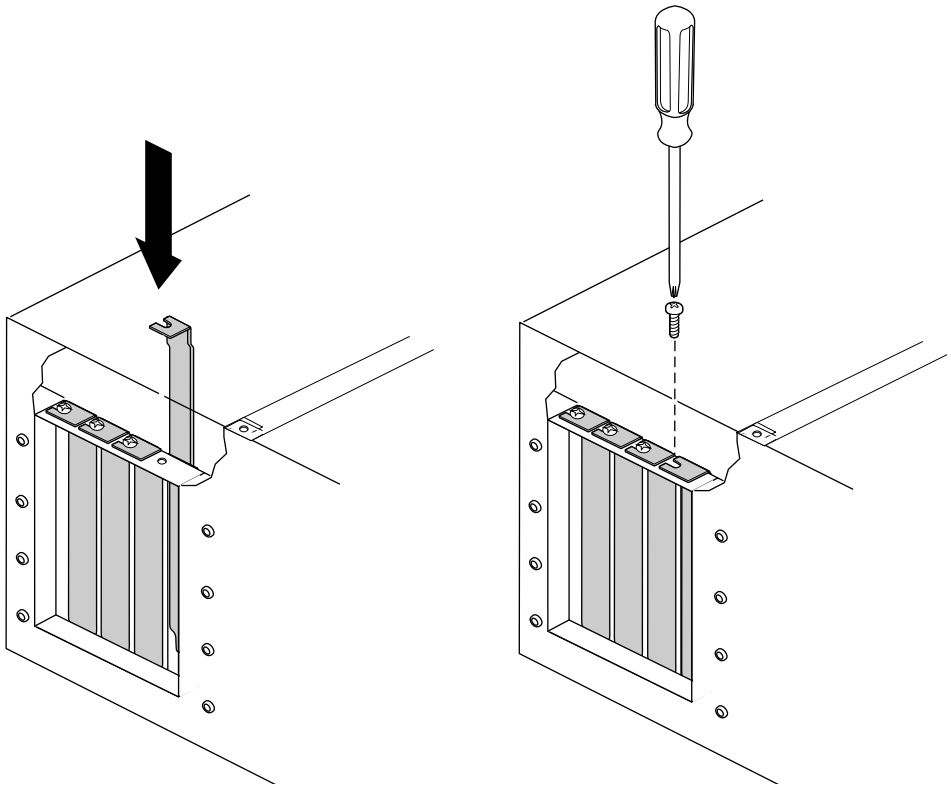

Figure 2-13 Replacing the PCI Blanking Plate in a GIGAchannel Expansion Cabinet

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

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

Installing an XIO Board in an Origin200 GIGAchannel Expansion Cabinet

Follow these steps to install an XIO board in a GIGAchannel expansion cabinet:

1. Turn off the system and unplug the power cords from the CPU module and the GIGAchannel expansion cabinet.
2. Loosen the XIO board retaining plate.
   - Use a #2 Phillips screwdriver to loosen the screws at each end of the plate, as shown in Figure 2-14.
   - Give each screw one and a half counterclockwise turns.

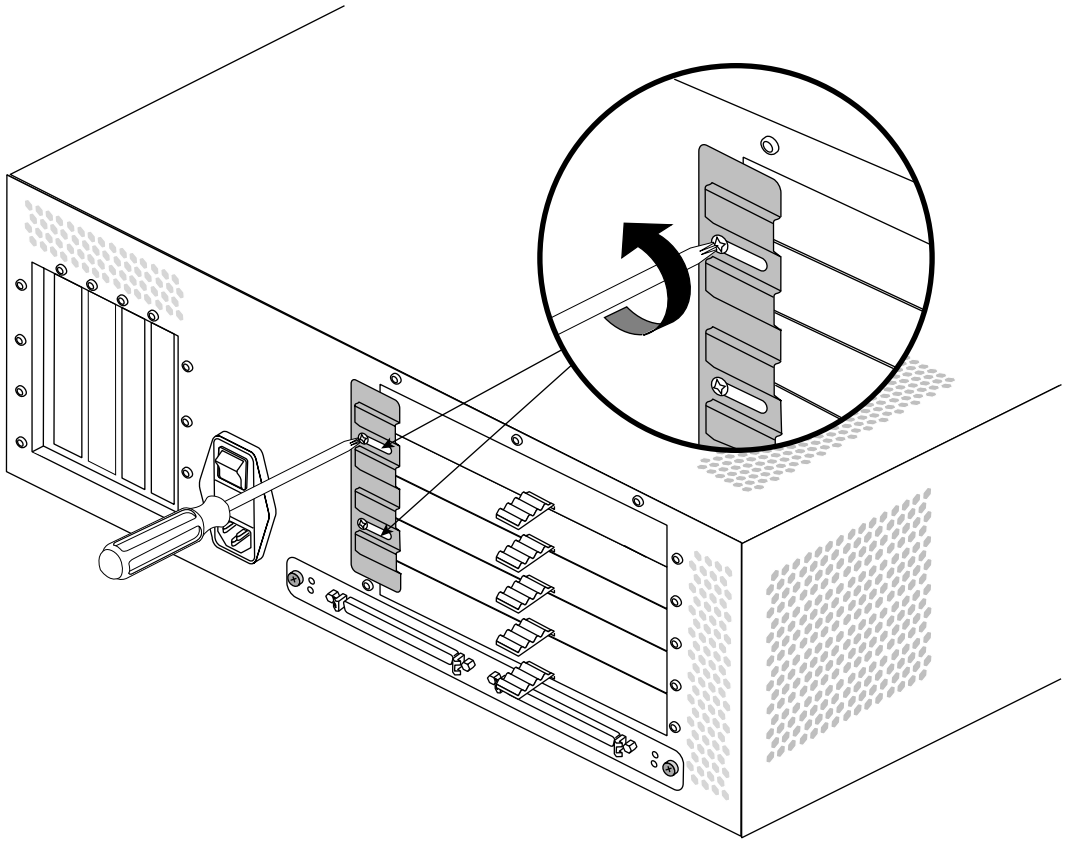

Figure 2-14 Loosening the XIO Board Retaining Plate

3. Slide the retaining plate towards the power switch so that it no longer overlaps the XIO slots, as shown in Figure 2-15.

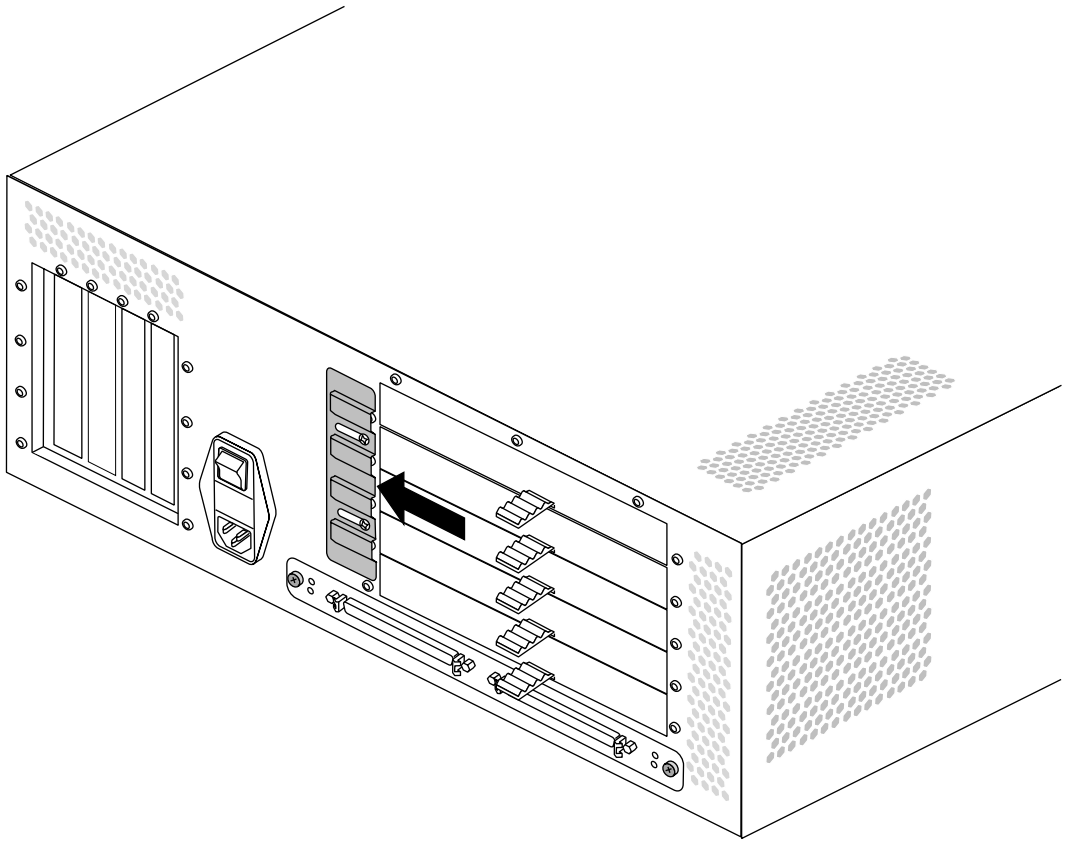

Figure 2-15 Sliding the Retaining Plate Aside

4. Remove the blanking card from the desired XIO slot.
   - Pull the tab on the blanking card and slide the card out of the XIO slot, as shown in Figure 2-16.

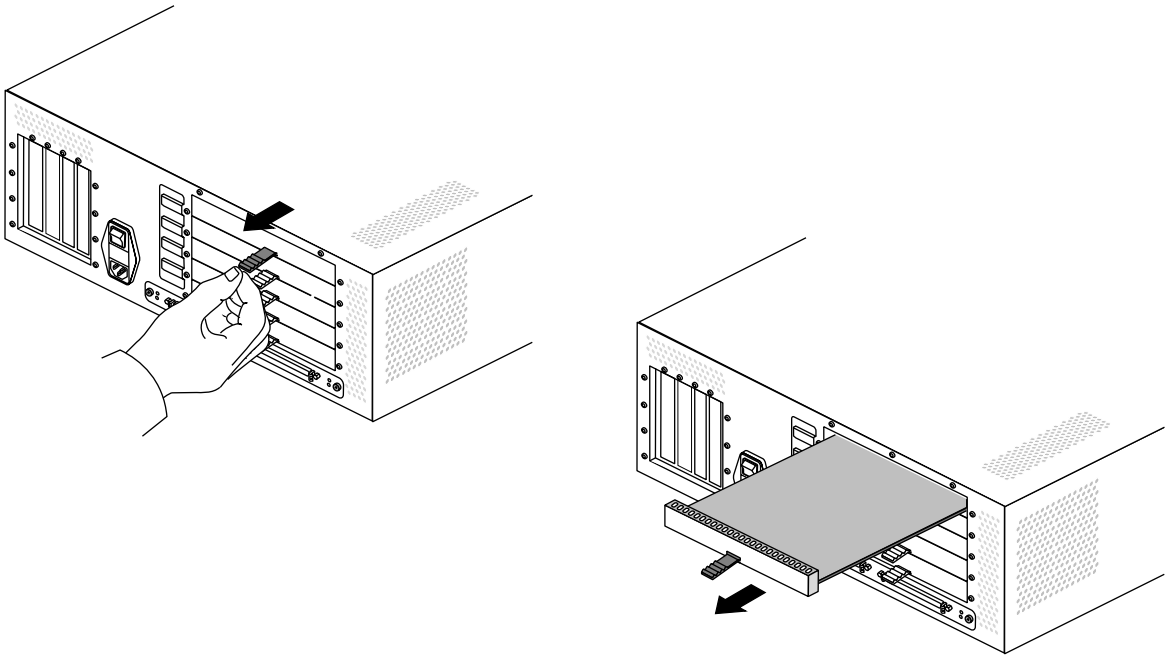

Figure 2-16 Removing an XIO Slot Blanking Card

Note: Save the blanking card in case you remove the XIO board in the future. The blanking card is required for proper airflow and to prevent electromagnetic interference (EMI).

5. Install the XIO board, as shown in Figure 2-17.
   - Slide the board into the empty slot.
   - Push the tab forward until it stops.

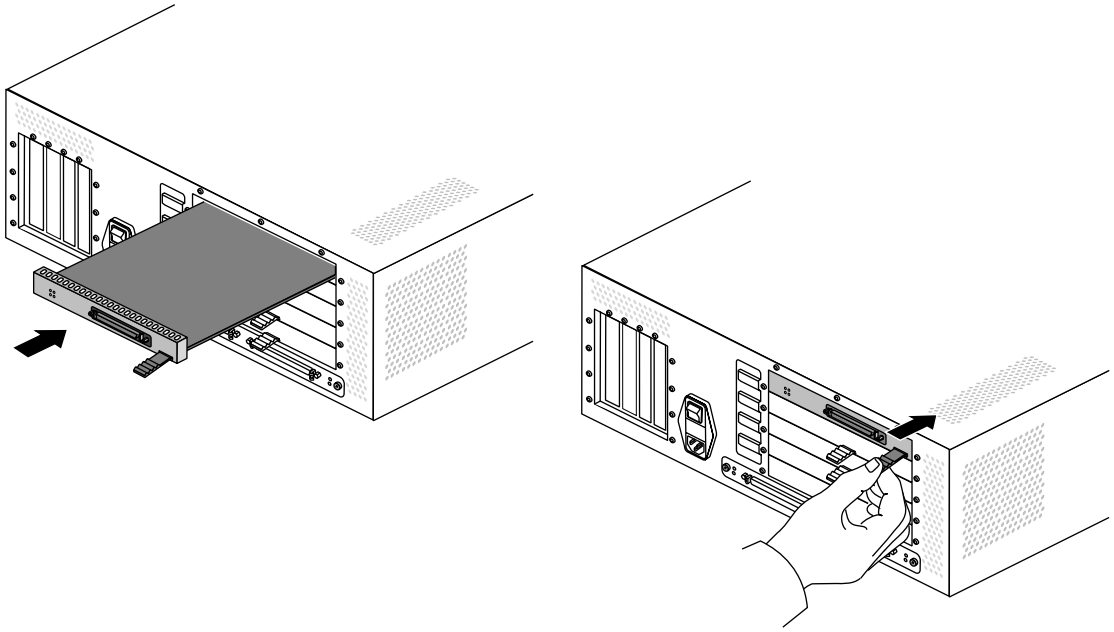

Figure 2-17 Installing an XIO Board

6. Slide the retaining plate away from the power switch so that it overlaps the XIO slots, as shown in Figure 2-18.

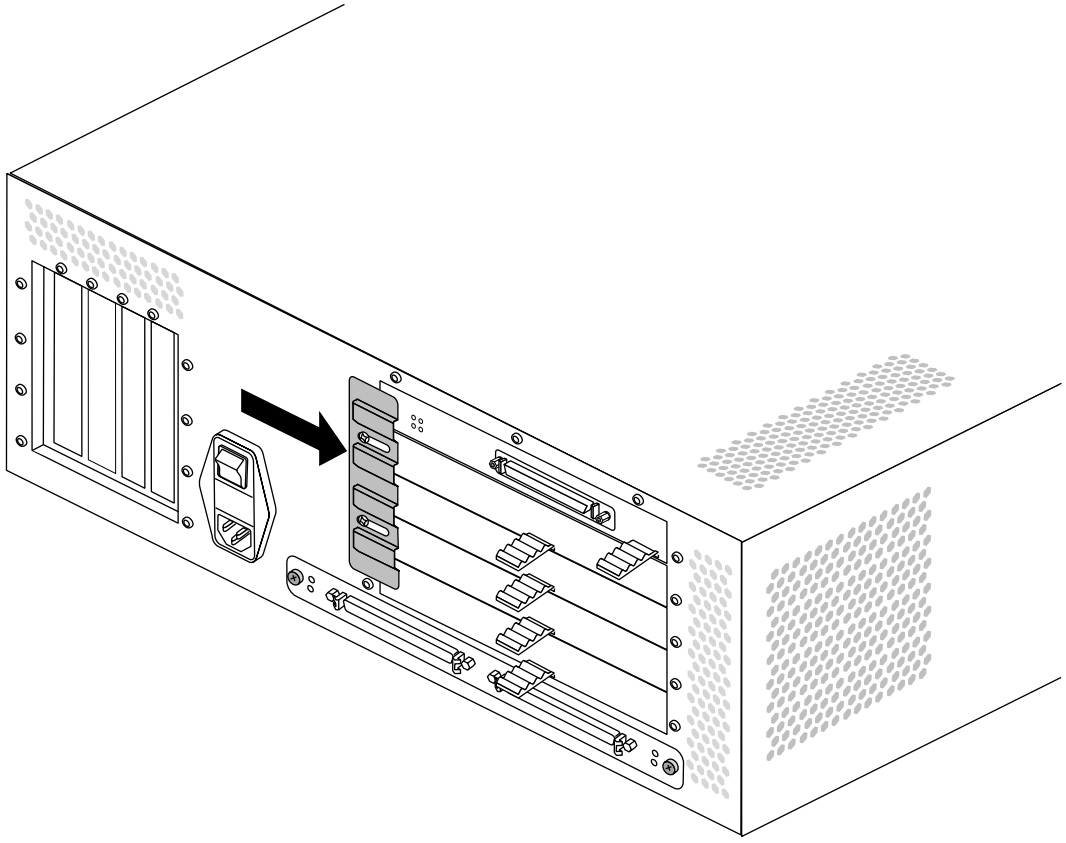

Figure 2-18 Sliding the XIO Board Retaining Plate Over the XIO Slots

7. Tighten the screws on the XIO board retaining plate, as shown in Figure 2-19.

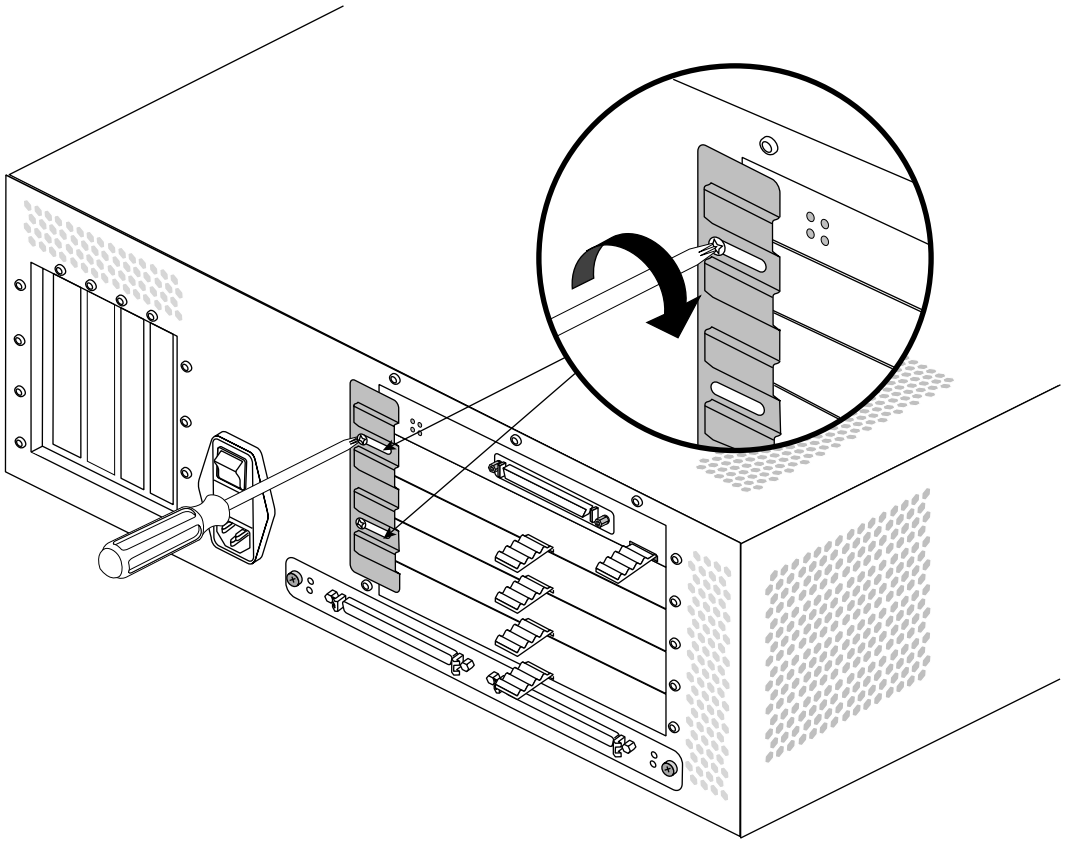

Figure 2-19 Tightening the XIO Retaining Plate Screws

You are finished installing the XIO board. You may replace the power cords and boot the system.

For information about how the board is recognized (detected) by the system and configured, see the *Origin200 and Origin200 GIGAchannel Owner's Guide* and the documentation provided with your option board.

Removing an XIO Board From a GIGAchannel Expansion Cabinet

Follow these steps to remove an XIO board from a GIGAchannel expansion cabinet.

1. Prepare the chassis for servicing, as described in Chapter 1, "Preparing the System for Servicing."
2. Loosen the XIO board retaining plate.
   - Use a #2 Phillips screwdriver to loosen the screws at each end of the plate, as shown in Figure 2-20.
   - Give each screw one and a half counterclockwise turns.

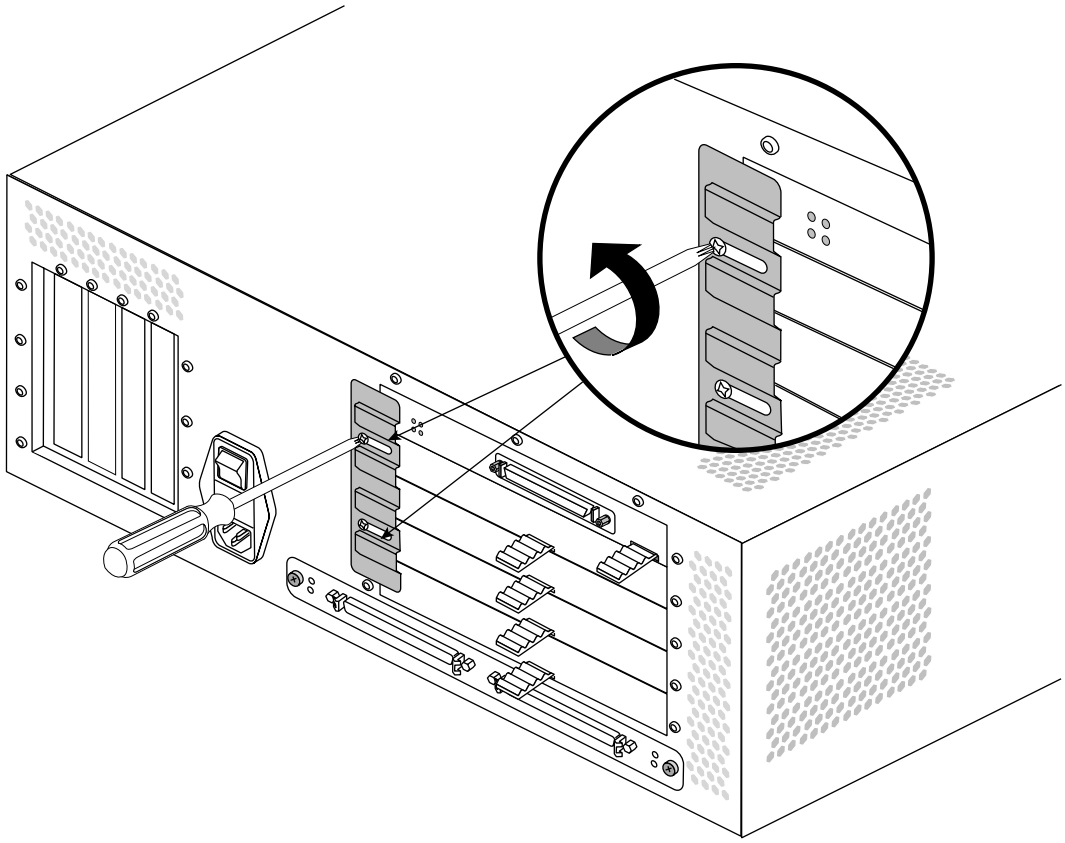

Figure 2-20 Loosening the XIO Board Retaining Plate

3. Slide the retaining plate towards the power switch so that it no longer overlaps the XIO slots, as shown in Figure 2-21.

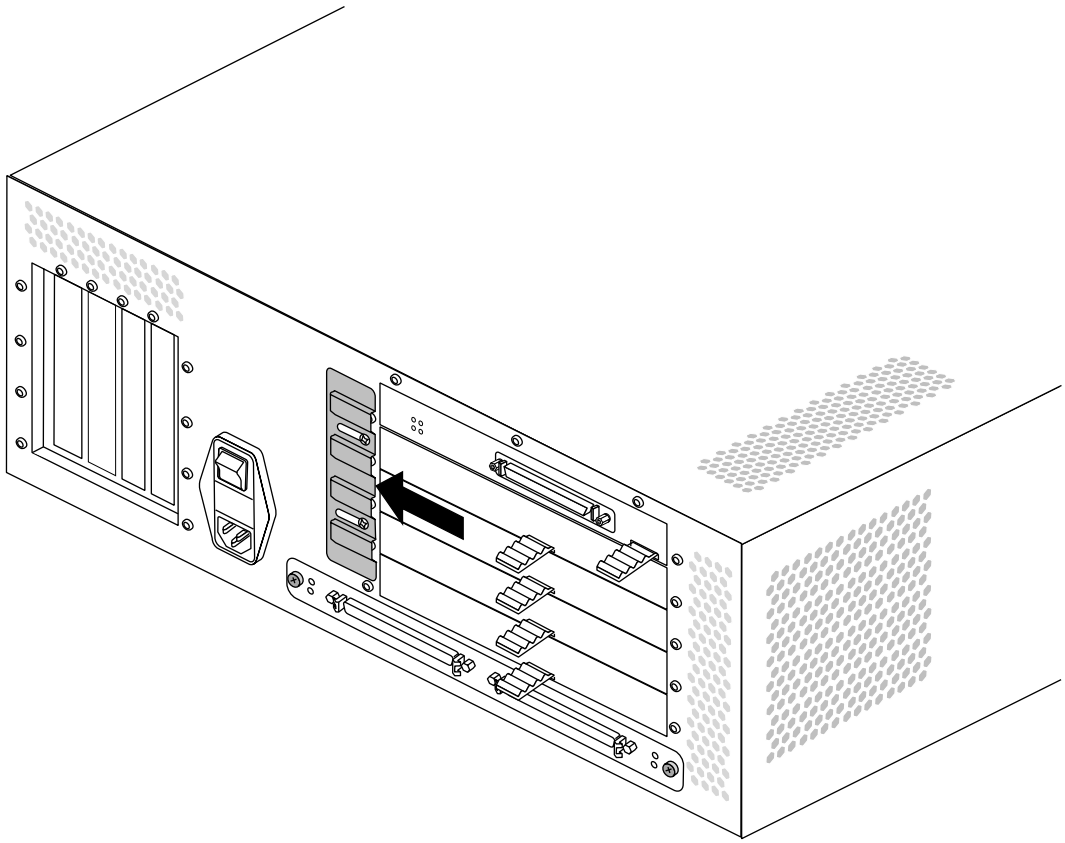

Figure 2-21 Sliding the XIO Board Retaining Plate Aside

4. Remove the desired XIO board.
   - Pull the tab on the board and slide the board out of the XIO slot, as shown in Figure 2-22.

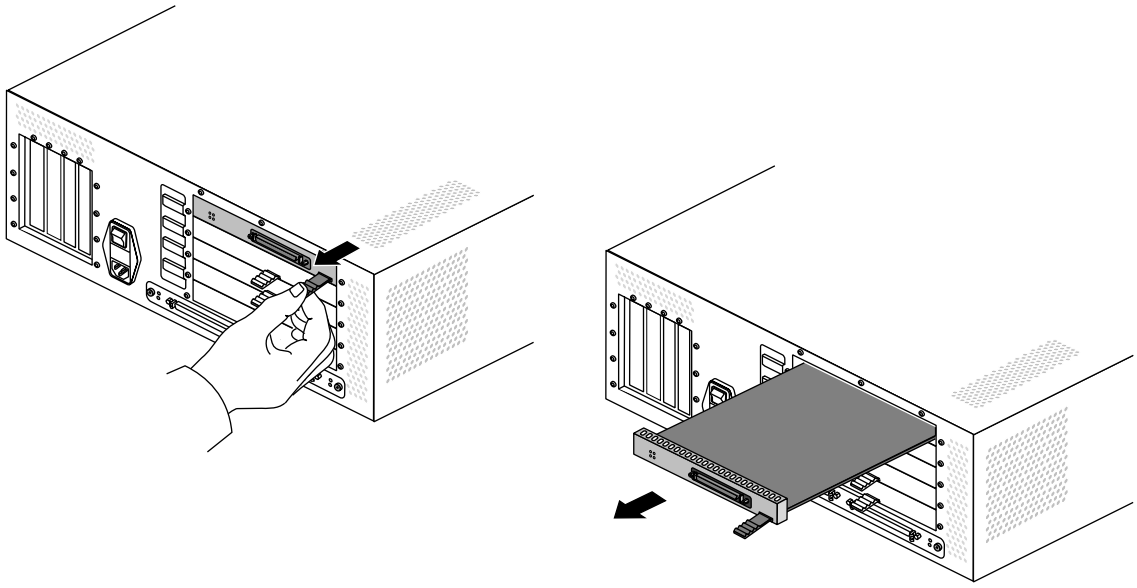

Figure 2-22 Removing an XIO Board From a GIGAchannel Expansion Cabinet

5. Install an XIO blanking card, as shown in Figure 2-23.
   - Slide the blanking card into the empty slot.
   - Push the tab forward until it stops.

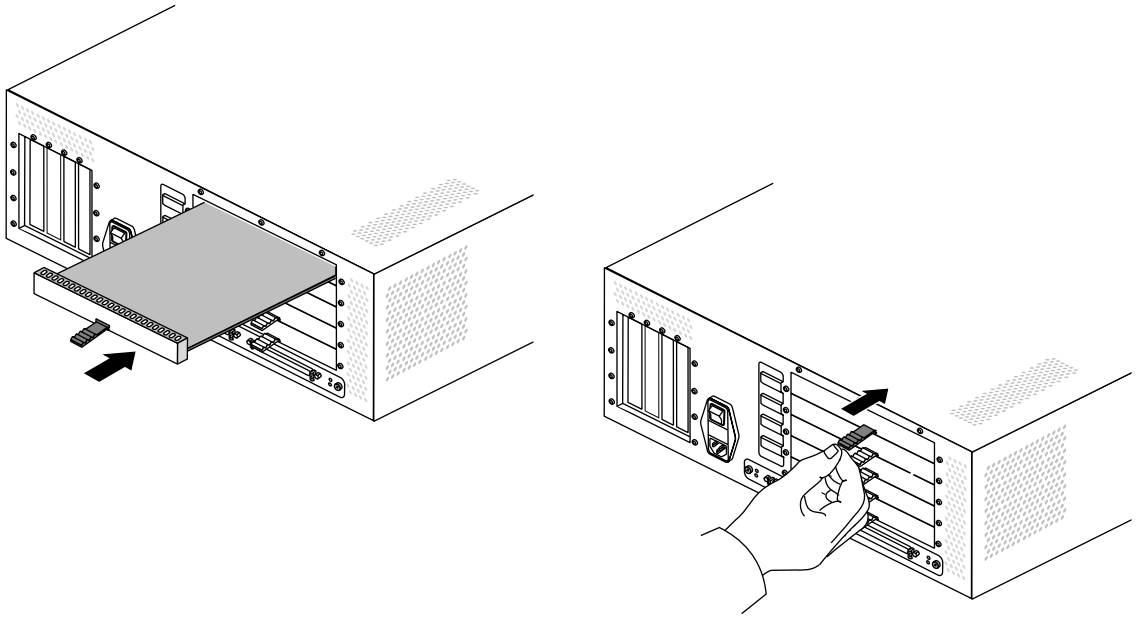

Figure 2-23 Installing an XIO Blanking Card in a GIGAchannel Expansion Cabinet

Note: A blanking card is required for proper airflow and to prevent electromagnetic interference (EMI).

6. Slide the retaining plate away from the power switch so that it overlaps the XIO slots, as shown in Figure 2-24.

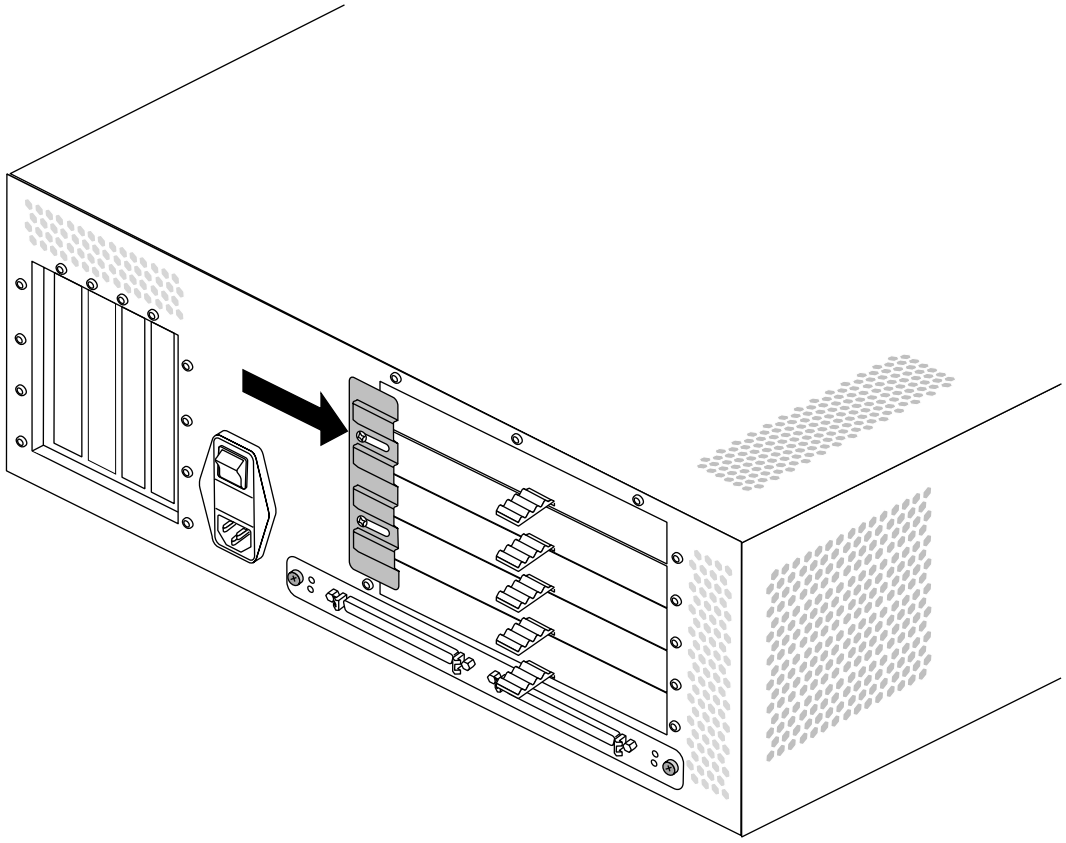

Figure 2-24 Sliding the XIO Board Retaining Plate Over the XIO Slots

7. Tighten the screws on the XIO board retaining plate, as shown in Figure 2-25.

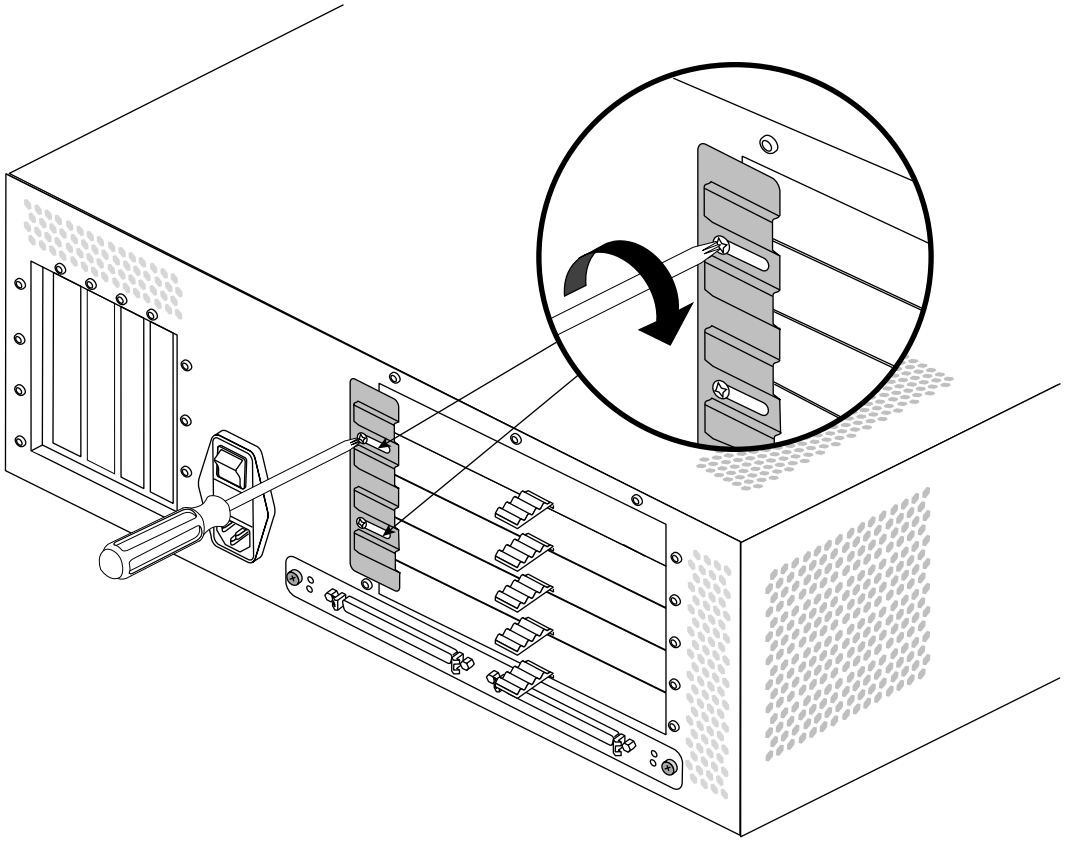

Figure 2-25 Tightening the XIO Retaining Plate Screws

You are finished removing the XIO board.

Chapter 3

Installing and Removing Memory

This chapter describes how to install and remove dual in-line memory modules (DIMMs) in an Origin200 CPU module:

- "Handling Precautions" on page 45
- "Origin200 Memory Requirements" on page 46
- "Installing Memory" on page 47
- "Verifying That Installed Memory Is Recognized by the System" on page 51
- "Removing Memory" on page 52

Handling Precautions

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

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

Origin200 Memory Requirements

Observe these rules about installing DIMMs:

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

Installing Memory

Follow these steps to install memory in an Origin200 server:

1. Prepare the system for servicing as described in Chapter 1, “Preparing the System for Servicing.”
2. Locate the DIMM slots. See Figure 3-1.

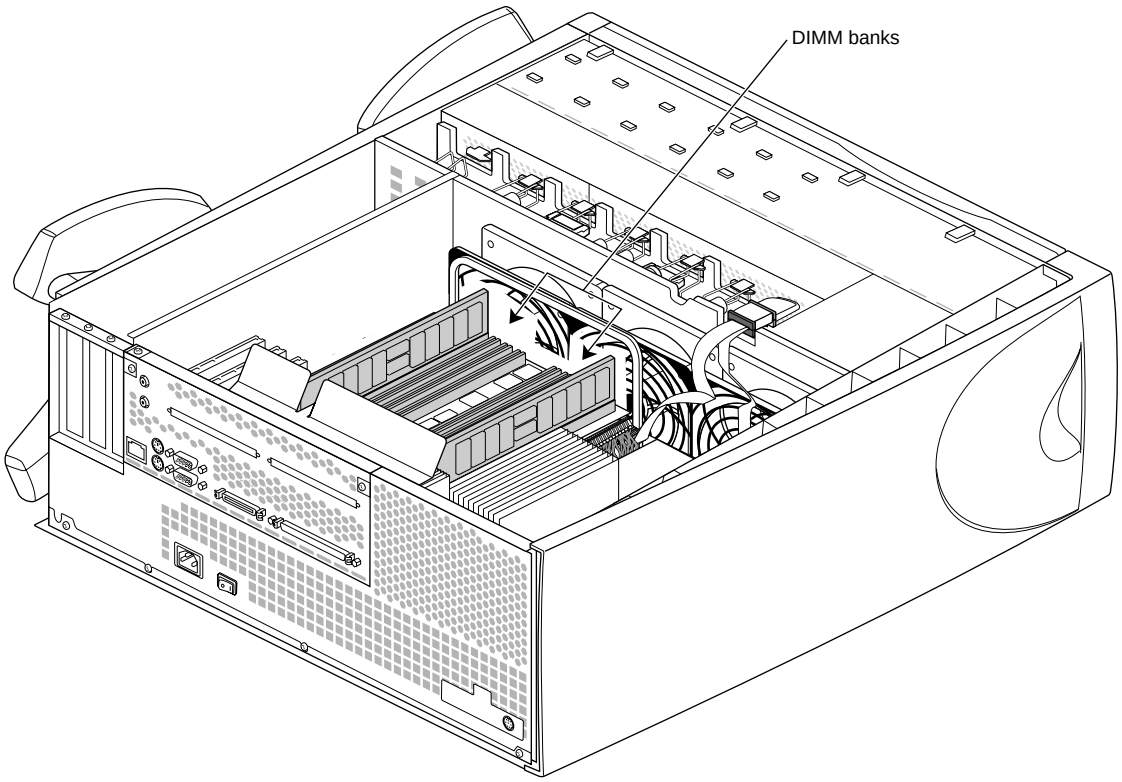

Figure 3-1 Locating DIMMs in the Origin200 Server

3. Install DIMMs in pairs, starting with the pair farthest away from the center of the banks and working inward. Do not skip banks. Figure 3-2 shows the grouping of DIMM pairs:

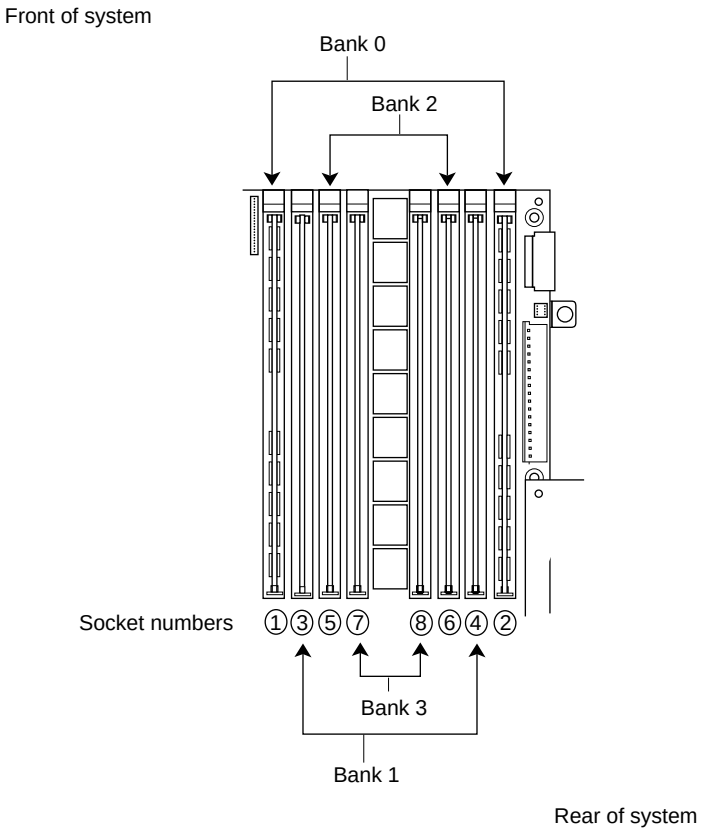

Figure 3-2 DIMM Pair Grouping in the Origin200 Server

Figure 3-2 shows one pair of DIMMs installed in bank 0 (all modules must have memory in bank 0; if you have a two-module system, both must have memory in bank 0).

- If you are installing one additional pair of DIMMs, install them in bank 1.
- Install a third pair of DIMMs in bank 2.
- Install a fourth pair of DIMMs in bank 3.

Figure 3-3 shows how to insert a DIMM into its socket.

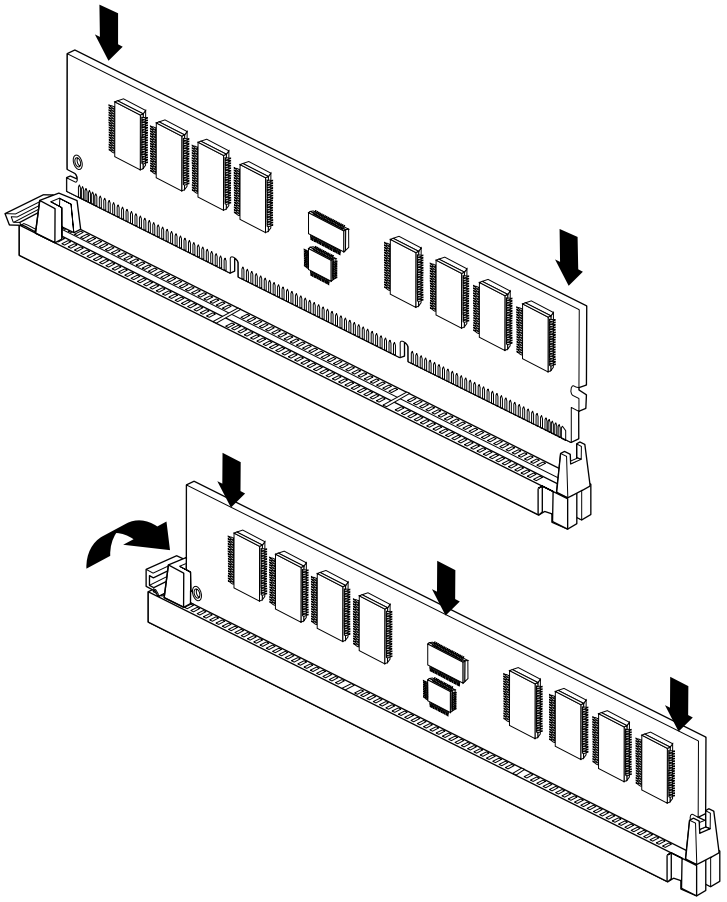

Figure 3-3 Installing a DIMM

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

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

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

Verifying That Installed Memory Is Recognized by the System

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

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

   `hinv -t memory`

   You should see a message similar to this:

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

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

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

Removing Memory

Follow these steps to remove memory from an Origin200 server:

1. Prepare the system for servicing as described in Chapter 1, “Preparing the System for Servicing.”
2. Locate the DIMMs. See Figure 3-4.

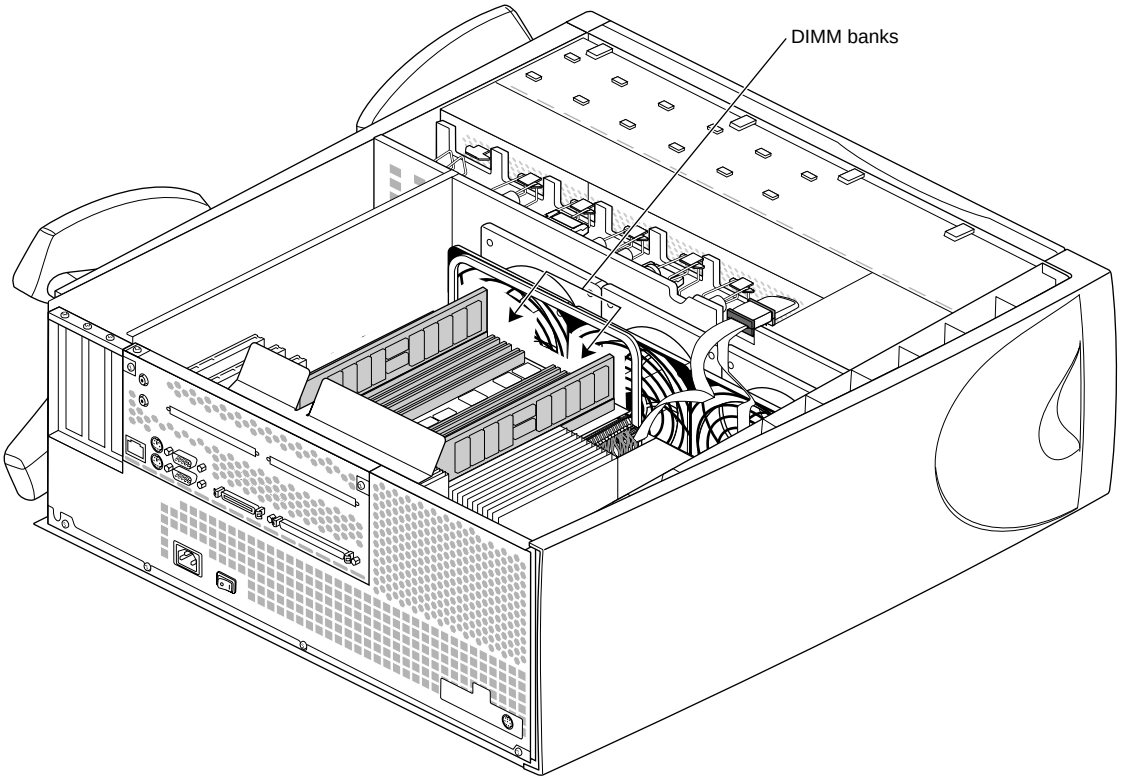

Figure 3-4 Locating DIMMs in an Origin200 Server

3. Remove DIMMs in pairs, starting with the pair closest to the center of the banks (bank 3). See Figure 3-5.

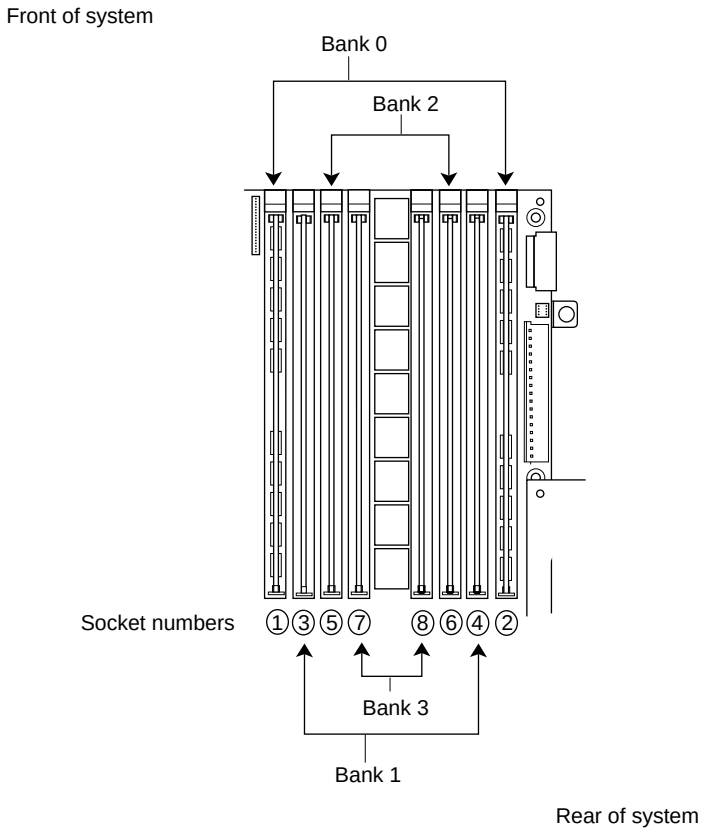

Figure 3-5 DIMM Pair Grouping in the Origin200 Server

- Start by removing bank 3, then bank 2, then bank 1. Do not skip banks.

  You must have memory installed in bank 0 of both modules in order for the system to operate. You cannot operate a two-module system unless there are DIMMs installed in both modules.

  Figure 3-6 shows how to remove the DIMMs from their sockets.

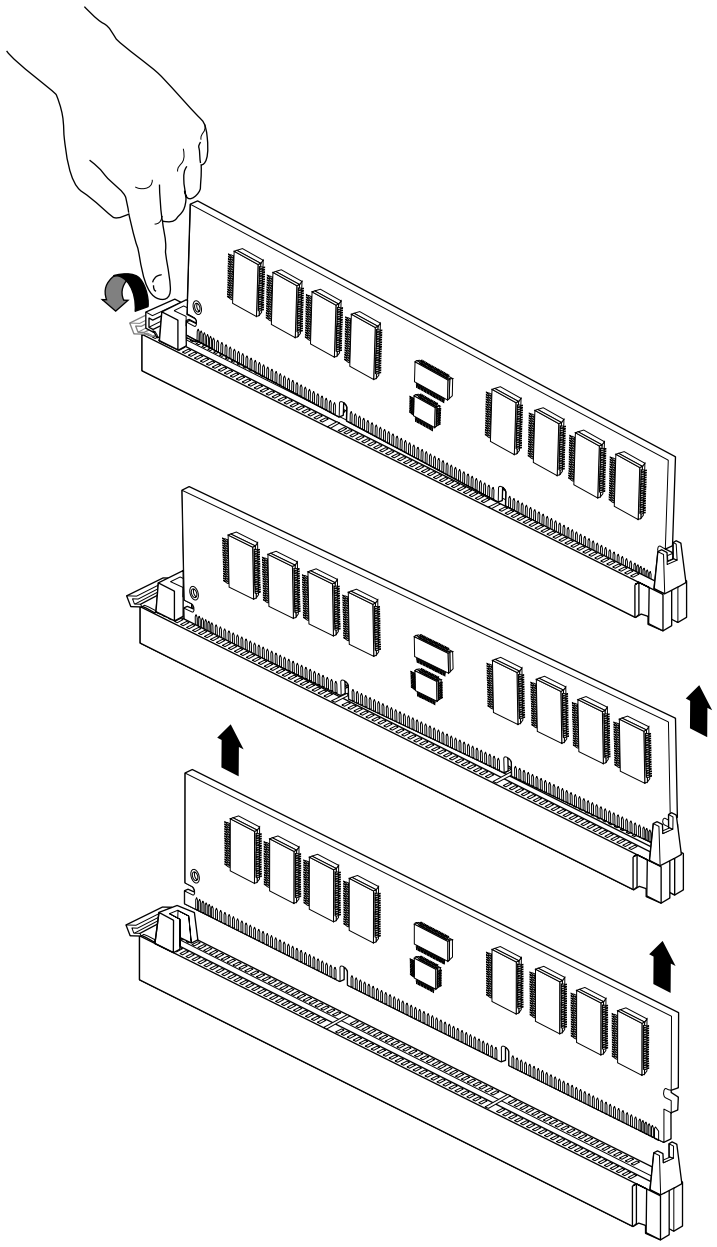

Figure 3-6 Removing DIMMs

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

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

Chapter 4

Troubleshooting and Maintenance

This chapter contains the following sections:

- "CPU Module LED Messages" on page 58
- "GIGAchannel Expansion Cabinet LEDs" on page 60
- "Crosstown (XIO) Status LEDs" on page 64
- "Ethernet Status LED Messages" on page 66
- "Regular Maintenance" on page 67

CPU Module LED Messages

The status LED on the front panel of the Origin200 and Origin200 GIGAchannel CPU module can display three colors: green, amber, and red.

Table 4-1 lists the messages displayed by the status LED.

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

Table 4-1 CPU Module Status LED Messages

LED Code	Meaning	Corrective Action
Red briefly, then amber, then green, then off (about 1/2 second per color)	If you have just turned on the master power switch, this indicates that the system controller is OK.	N/A
Green, blinking	The system is booting.	N/A
Green, blinking, while system is running (if the system is equipped with a redundant power supply)	One half of the redundant power supply has failed.	No immediate action is required, but you may wish to replace the redundant power supply. See "Replacing the Origin200 Power Supply" on page 90.
Green on solid	The system is on.	N/A
Amber, blinking, followed by the system shutting down.	Normal power-off sequence.	N/A
Amber on solid	One of the fans has failed.	Replace the fan. See "Replacing Fans" on page 77.
Red, blinking (during power-off sequence)	A problem with the power supply was detected.	Replace the power supply. See "Replacing the Origin200 Power Supply" on page 90.
Red, blinking (followed by system shutdown)	The system temperature is too high, and the server is shutting down.	Check ambient air temperature. If the ambient air temperature is below 104˚F (40˚C), verify that there is no debris or other obstruction preventing the flow of air into and through the system. Also, verify that the fans are working. If the ambient air temperature is above 104˚F (40˚C), the system shuts down automatically. Reduce the ambient air temperature.

Table 4-1 (continued) CPU Module Status LED Messages

LED Code	Meaning	Corrective Action
Red, blinking during bootup, (followed by shutdown)	The power supply or on-board voltage regulator failed.	Replace the power supply. See "Replacing the Origin200 Power Supply" on page 90. If that does not correct the problem, you may need to replace the logic carrier. See "Replacing the Logic Carrier" on page 80.
Red on solid (followed by system shutdown)	The system became too hot.	Check the system temperature using the module system controller (MSC) via the AUX port.
	The power supply or on-board voltage regulator failed.	Replace the power supply. See "Replacing the Origin200 Power Supply" on page 90. If that does not correct the problem, you may need to replace the logic carrier. See "Replacing the Logic Carrier" on page 80.

GIGAchannel Expansion Cabinet LEDs

The following sections describe the locations and functions of the various GIGAchannel status LEDs:

- "GIGAchannel Status LED"
- "GIGAchannel Diagnostic LEDs" on page 61

GIGAchannel Status LED

The status LED is located behind the front grille, as shown in Figure 4-1.

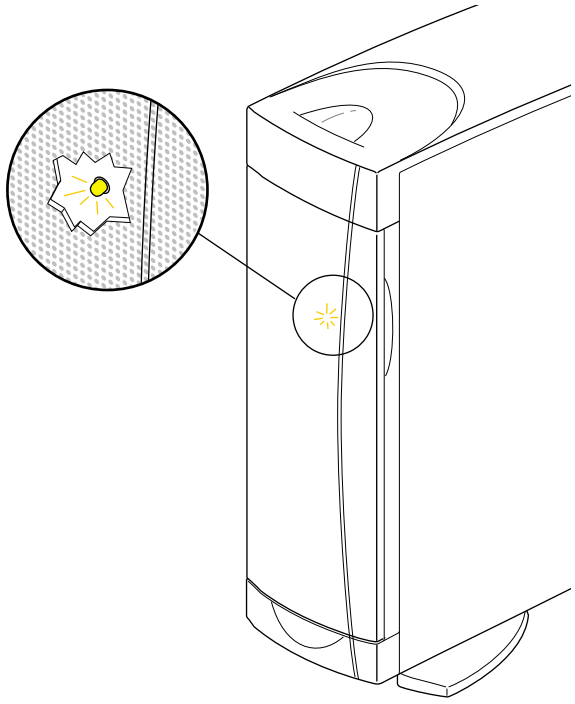

Figure 4-1 Location of the GIGAchannel Expansion Cabinet Status LED

Table 4-2 lists the status messages displayed by this LED.

Table 4-2 GIGAchannel Status LED Messages

LED Code	Meaning	Corrective
Green, blinking	Normal power-on sequence	N/A
Green, solid	System is on	N/A
Amber, blinking (if the system is equipped with a redundant power supply)	One half of the redundant power supply has failed.	No immediate action is required, but you may wish to replace the redundant power supply. See "Replacing the GIGAchannel Power Supply" on page 107.
Blinking red, system shuts down	One of three possible failures: (a) The blower has failed. (b) Power supply or voltage regulator has failed. (c) The system has overheated.	In all cases, refer to the next section, "GIGAchannel Diagnostic LEDs," to determine the failure. The diagnostic LEDs provide additional information about the exact failure.

GIGAchannel Diagnostic LEDs

There are three diagnostic LEDs inside the GIGAchannel expansion cabinet. When a failure occurs, the LED that corresponds to the particular failure blinks yellow. The LEDs are visible through the air vent at the rear of chassis to the far right (or top). Figure 4-2 shows the location of the LEDs.

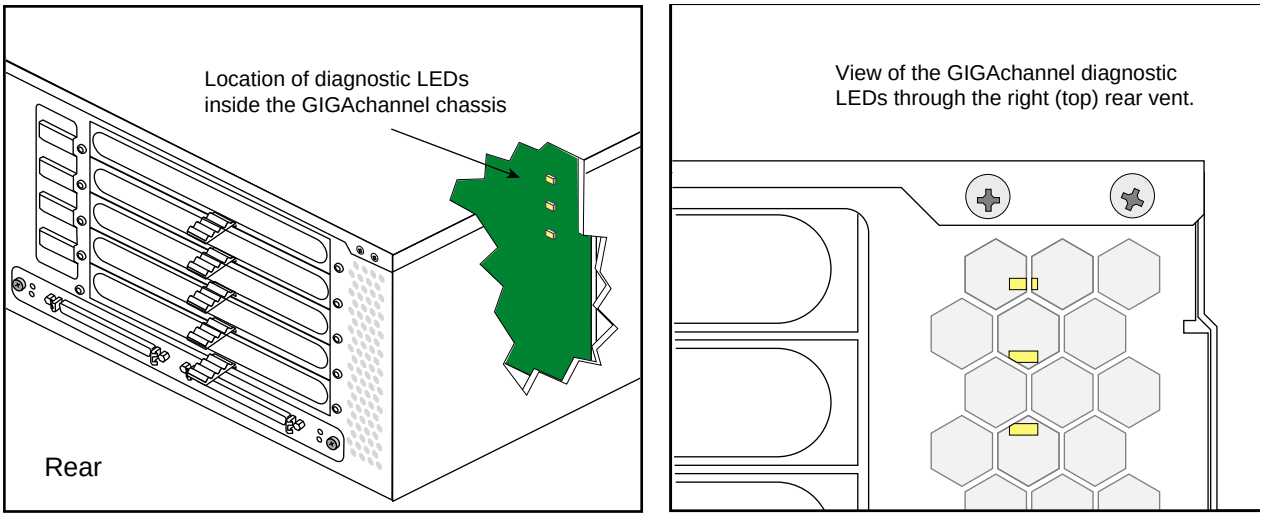

Figure 4-2 Location of the GIGAchannel Diagnostic LEDs

Caution: Do not attempt to run the system with a failed blower, as the GIGAchannel cabinet can overheat very quickly and damage internal components.

Figure 4-3 describes what each LED indicates when it is blinking.

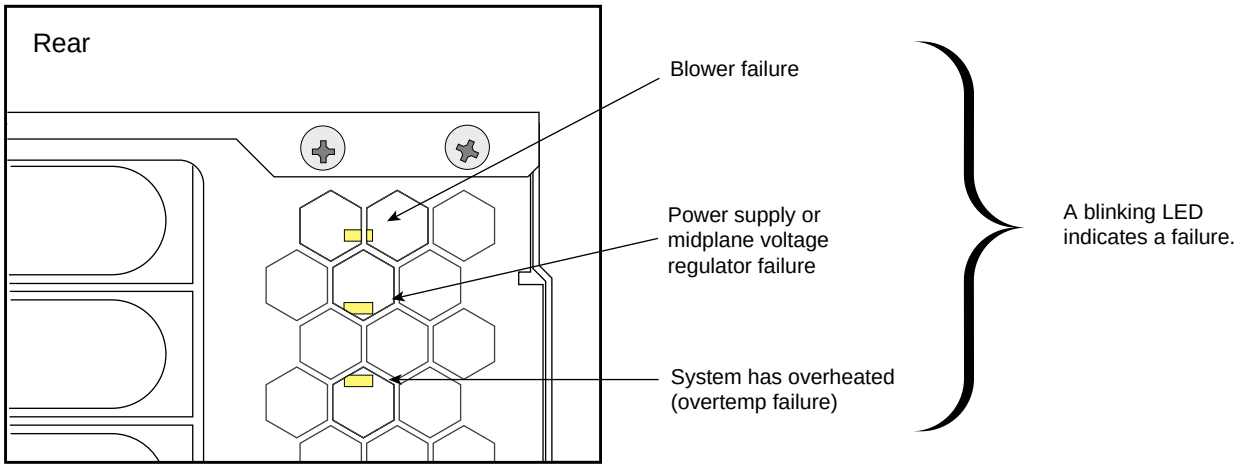

Figure 4-3 Viewing and Interpreting the GIGAchannel Diagnostic LEDs

Table 4-3 describes the problems indicated by the LEDs and how to fix those problems.

Table 4-3 GIGAchannel Diagnostic LED Messages

LED	Meaning	Corrective Action
Top (or left-hand)	Blower failure	Turn off the main power switch immediately, then replace the blower as described in "Replacing the Blower" on page 99. **Caution:** Do not attempt to run the system with a failed blower as the GIGAchannel cabinet can overheat quickly and damage internal components.
Middle	The power supply or voltage regulator on the midplane has failed.	Replace the power supply as described in "Replacing the GIGAchannel Power Supply" on page 107 in Chapter 5. If this does not correct the problem, replace the midplane as described in "Replacing the GIGAchannel Midplane" on page 115.
Bottom (or right-hand)	The GIGAchannel cabinet has overheated (overtemp failure).	Make sure the ambient air temperature is between +41°F and +95°F (+5°C and +35 C). Make sure there is adequate space around the system for proper airflow through the chassis and no obstructions at the front or rear of the chassis. Refer to the *Origin200 and Origin200 GIGAchannel Owner's Guide* for information about the proper clearances around the server and the direction of airflow through the GIGAchannel cabinet.

Crosstown (XIO) Status LEDs

There are two sets of LEDs located on the Crosstown board of the GIGAchannel expansion cabinet, as shown in Figure 4-4.

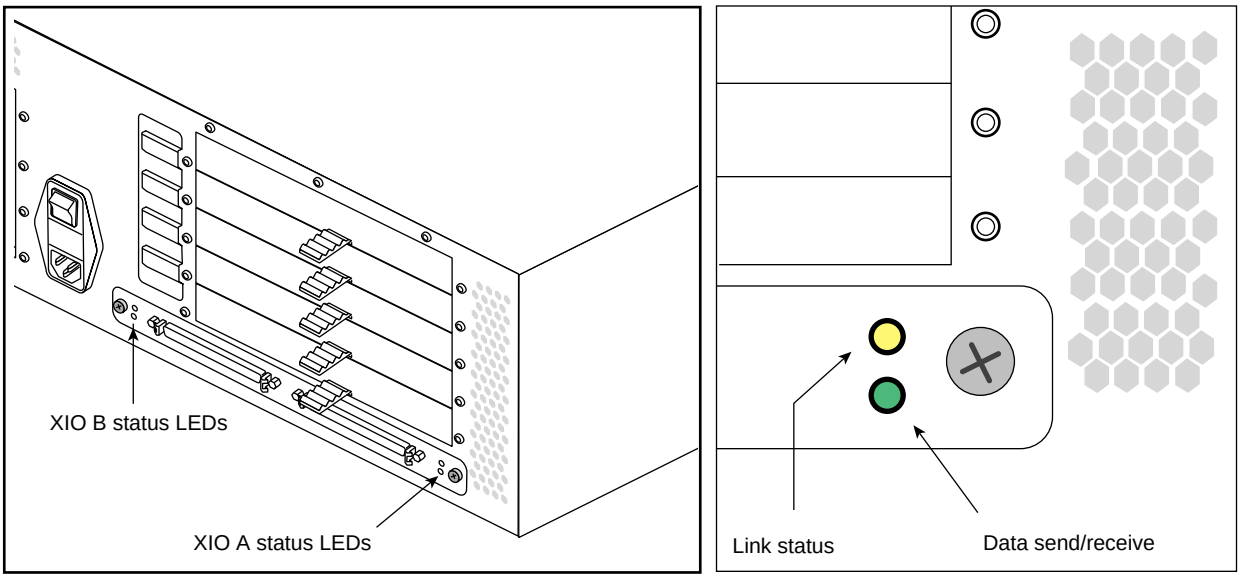

Figure 4-4 Location of Crosstown (XIO) Status LEDs

There is one set of LEDs for each of the two XIO ports (A and B). When the XIO cables are properly connected, all of the lights should be on and not blinking. If the Crosstown status LEDs do not light up, but the system appears fine otherwise, see the next section, "If the Crosstown LEDs Do Not Display."

If the Crosstown LEDs Do Not Display

If the LEDs are not on, but the system appears fine otherwise, check to be sure that the XIO cables are correctly attached:

- Connect CPU module connector A to GIGAchannel connector A.
- Connect CPU module connector B to GIGAchannel connector B.

If the connections are correct, verify that the cables are attached snugly and that the thumbscrews are tightened.

If checking the connections does not cause the LEDs to light, verify that there is not a problem with one of the cables. Swap the XIO cables and see if the LEDs light.

Ethernet Status LED Messages

The Ethernet 10-Base-T/100-Base-TX port contains two integral LEDs: the transmit LED (green) and the packet detect LED (yellow). Figure 4-5 shows their locations.

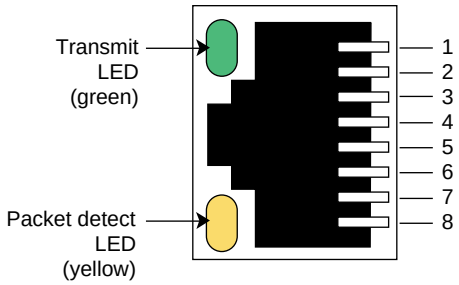

Figure 4-5 Ethernet 10-Base-T/100-Base-TX Port LEDs

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

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

Regular Maintenance

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

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

Use the following cleaning guidelines:

- With the system running, you can examine the exterior of the chassis for dust accumulation and remove it as necessary with a data vacuum. In both the CPU module and the GIGAchannel expansion chassis, air flows from the front of the chassis to the rear, so most dust accumulation should be at the front of the system.
- With the system off:
  - In the CPU module, remove and examine the 3.5-inch drives, blanking plates, and drive slots for dust. Vacuum off any dust you find and replace the drives and blanking plates.
  - In the CPU module, remove and examine the peripheral carrier and the bay into which it slides. If dust has accumulated on the rear of the carrier, remove the access plate on the rear of the carrier and examine the interior of the carrier for dust. Vacuum off any dust you find and replace any components you removed.
  - In both the GIGAchannel expansion cabinet and the CPU module, remove the system cover and chassis access door. Examine the interior of the system, starting with the front areas of the system and proceeding towards the rear. Vacuum off any visible dust, then replace the chassis access door and side panel.

XIO Compression Connector Care and Maintenance

The compression connector used for XIO boards has 96 pads that enable passage of signals between the system (via the midplane) and the XIO board. This compression connector has two parts: One is physically located on the XIO board and the other is on the midplane of the GIGAchannel cabinet. Each pad on a midplane connector is a flat, gold-plated surface. Each pad on an XIO board connector is composed of hundreds of tiny bristles (dendrites). When a bristled pad is pressed into a gold-plated pad, a connection is created for one signal.

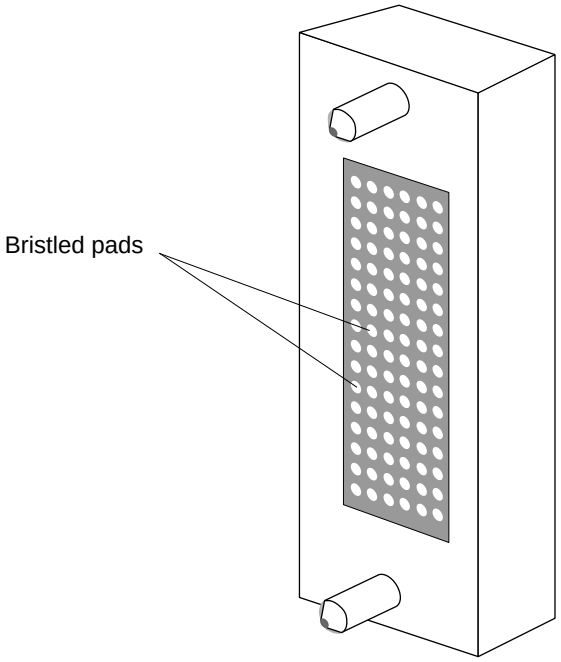

Figure 4-6 Compression Connector Used on XIO Boards

If not protected, the bristled pads can attract and hold dust, lint, grease, powder, and dirt. These substances clog or damage the bristles and prevent them from making proper contact with the gold-plated pads on the system's midplane. It is important to prevent this from occurring. "Guidelines for Storing and Handling the Compression Connector on an XIO Board" on page 69 explains how to keep the compression connector bristles clean; "Guidelines for Cleaning the Compression Connector on an XIO Board" on page 69 explains how to clean them if they become dirty.

Guidelines for Storing and Handling the Compression Connector on an XIO Board

To avoid damaging an XIO board's compression connector and to keep it in optimal working condition, follow these guidelines whenever the board is not installed:

Caution: Failure to follow these instructions can result in irreparable damage to the surface of the connector's pads, which may result in intermittent or complete failure of the product.

- XIO options that are not factory-installed are shipped with a protective plastic cap that snaps over the compression connector pad. Always replace this cap if you are storing boards outside of the GIGAchannel cabinet.
- Do not wipe or touch the pads of the compression connector with anything (no fingers, no brushes, no cloth, no probes), except as specified in the cleaning instructions. The bristles might be damaged.
- Whenever the board is not in an XIO slot, put the protective cap over the compression connector and store the board in an antistatic bag. Make sure to close (fold over) the open end of the bag to minimize exposure to dust and atmospheric gases.
- Do not put anything (not even water) onto the pads, except as specified in the cleaning instructions.
- Before laying the board down on a surface, make sure that the surface is free of dust, lint, powder, metal filings, oil, water, and other damaging materials.
- Do not blow dust, dirt, or powder anywhere near the board when it is not inside its protective bag.

Guidelines for Cleaning the Compression Connector on an XIO Board

A compression connector should never need cleaning, if you keep the protective cover on whenever the XIO board is not installed. However, if the connector becomes dirty, follow these instructions for removing pollutants.

Note: Some pollutants can irreversibly damage (corrode or chemically alter) the pad surfaces. Although cleaning may remove the pollutant, it does not repair damage incurred by this contact.

To remove pollutants, follow these instructions:

1. Obtain a can of dry, compressed air or inert gas.

   The Envi-Ro-Tech Duster 1671 product manufactured by Tech Spray, Inc., is the only product that SGI recommends for this application. Tech Spray can be reached by telephone in the U.S.A. at 806-372-8523. Also, their web site, at http://www.techspray.com, lists their worldwide manufacturing representatives.

   Caution: Do not use a cleaning product that contains any of the following ingredients: halogenated hydrocarbons, aromatic hydrocarbons, ethers, sulphur, ketones, or solvents of any kind. These substances can cause irreparable damage to the connector's surface.

2. Prepare the can for use, as instructed on the can. For example, if a tube is provided, attach it to the can's dispensing mechanism.

3. Hold the can vertically.

   During subsequent steps, it is important to maintain this vertical position because this helps prevent the non-inert material (expeller gases) from being expelled.

   Caution: Tipping or shaking the can while spraying can result in damage to the compression connector from the product's expeller gases.

4. Place or hold the XIO board so that the rounded edge of the compression connector faces up.

   Note that the rounded edge is completely closed, so that air cannot flow into the connector, whereas the squared edge has an opening.

   Caution: Spraying into the squared (open) edge of the connector can destroy it.

5. Position the XIO board at an angle to the can, so that the tip of the can's applicator is 1 to 2 inches away from the first (topmost) row of pads (as illustrated in Figure 4-7).

   - When you spray, the air hits each pad and flows downward.
   - Do not allow the applicator to touch the pads.

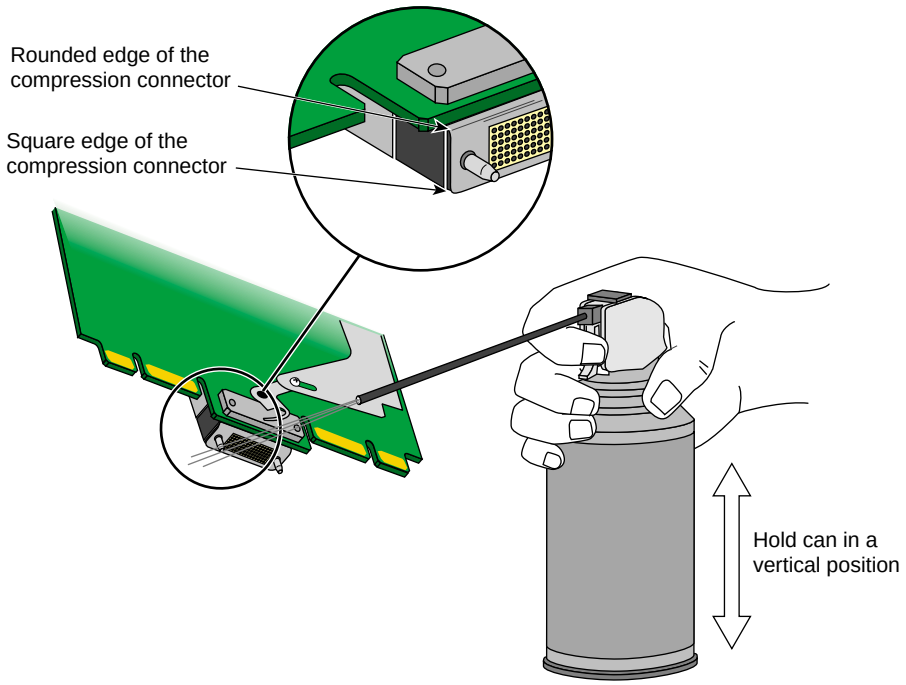

Figure 4-7 Position for Compressed Air Can When Cleaning Compression Connector

6. Start spraying.
   - As you spray, move the spray along the length of the connector until the entire length has been sprayed.
   - Move down a few rows and again spray along the entire length.

   Note: Do not shake the can. If any visible material (for example, foam) appears, stop spraying and switch to a new can. This foam blows away once you resume spraying just air.
7. Repeat until all the pads have been sprayed.
8. When you finish, cover the compression connector with its cap or immediately install the board in an XIO slot.

Chapter 5

Removing and Replacing Internal Components

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

- "Tools Required to Remove and Replace Components" on page 74
- "Miscellaneous Fasteners" on page 74
- "Removing and Replacing Internal Parts of the CPU Module" on page 75, which includes:
  - "Replacing the SCSI Backplane" on page 75
  - "Replacing Fans" on page 77
  - "Replacing the Logic Carrier" on page 80
  - "Replacing the Origin200 Power Supply" on page 90
  - "Replacing the Module System Controller" on page 93
- "Replacing Internal Parts of the GIGAchannel Expansion Chassis" on page 99, which includes:
  - "Replacing the Blower" on page 99
  - "Replacing the GIGAchannel Power Supply" on page 107
  - "Replacing the GIGAchannel PCI Backplane" on page 112
  - "Replacing the GIGAchannel Midplane" on page 115
  - "Replacing the GIGAchannel Crosstown Board" on page 122
  - "Replacing a Fuse" on page 125

Tools Required to Remove and Replace Components

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

- #2 Phillips screwdriver (for all screws except on the blower assembly)
- #1 Phillips screwdriver (for screws on the blower assembly)
- grounding (wrist) strap
- needle-nose pliers or large tweezers (needed when servicing the CPU module fans, which are attached with plastic rivets)
- small, flat-blade screwdriver

Miscellaneous Fasteners

The following miscellaneous fasteners are used in the Origin200 and Origin200 GIGAchannel servers, in case you need to replace them:

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

Removing and Replacing Internal Parts of the CPU Module

This section describes how to remove and install the following internal parts of the Origin200 and Origin200 GIGAchannel CPU module:

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

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

- PCI and XIO boards are described in Chapter 2, “Installing and Removing PCI and XIO Option Boards.”
- Memory is described in Chapter 3, “Installing and Removing Memory.”
- The 3.5-inch and 5.25-inch drives are described in the *Origin200 and Origin200 GIGAchannel Owner’s Guide*.

Replacing the SCSI Backplane

If you have not done so already, follow the procedures in Chapter 1, “Preparing the System for Servicing” to make sure the system is opened up and ready to be worked on. Once you have opened the Origin200 chassis, follow the procedures in the next sections to remove the SCSI backplane and install a new one.

Removing the SCSI Backplane

Follow these steps to remove the SCSI backplane:

1. Remove any 3.5-inch drives from the drive bays.
2. Detach the power cables from the SCSI backplane.
   - Figure 5-1 shows the location of the 12V and 5V power connectors.
   - If you are able, detach the SCSI cable from its connector; otherwise, wait until the backplane is partway out of the chassis.

3. Snap down the six spring clips on the SCSI backplane. The spring clips are shown in Figure 5-1.

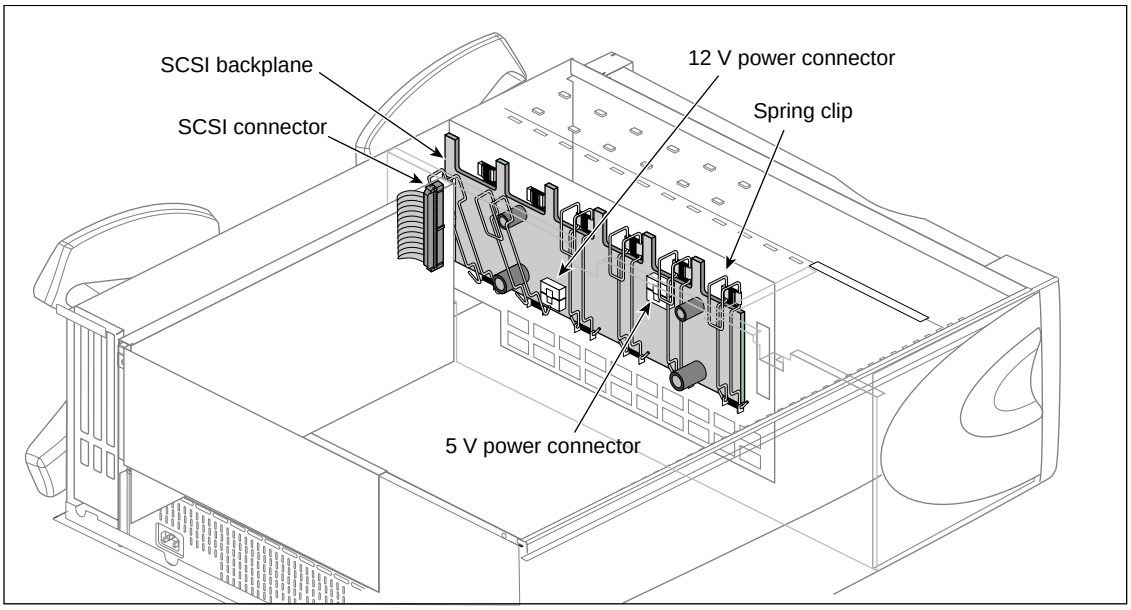

Figure 5-1 Cable Connections and Spring Clips on the SCSI Backplane

4. Grasp the SCSI backplane by the edges and tilt it out. The backplane hangs on two pins; pull the backplane up off the pins.
5. With the board partway out of the chassis, unhook the SCSI cable on one end of the SCSI backplane, if you have not already done so. Remove the backplane from the chassis and set it aside.

Installing a New SCSI Backplane

Follow these steps to install a new SCSI backplane:

1. Hang the new SCSI backplane over the guide pins on the sheetmetal wall (the one towards the front of the chassis).
2. As you lower the board in place, gently press in at the bottom of the board.
3. Push the top of the SCSI backplane towards the sheetmetal wall, being careful not to damage the LEDs as you guide them through their respective holes.

4. Snap the six spring clips back up into place.
5. Reattach the power cables.

Replacing Fans

If you have not done so already, follow the procedures in Chapter 1, “Preparing the System for Servicing” to make sure the system is opened up and ready to be worked on. Once you have opened the Origin200 chassis, follow the procedures in the next sections to replace a fan.

Removing a Fan

Follow these steps to remove a fan:

1. Unplug the power connector from the fan to the power supply, as shown in Figure 5-2.
2. Remove the two plastic rivets that hold the fan to the sheetmetal, as shown in Figure 5-2. Push them out from behind the sheetmetal with your fingertip.
   - Fan 1 is directly behind the 5.25-inch drive bay.
   - Fan 2 is in the middle, between fans 1 and 3.
   - Fan 3 is closest to the PCI backplane.

   In Figure 5-2, components in front of the fans (including the power supply and logic carrier) have been removed for clarity. In practice, you can remove and replace fans with the power supply and logic carrier in place.

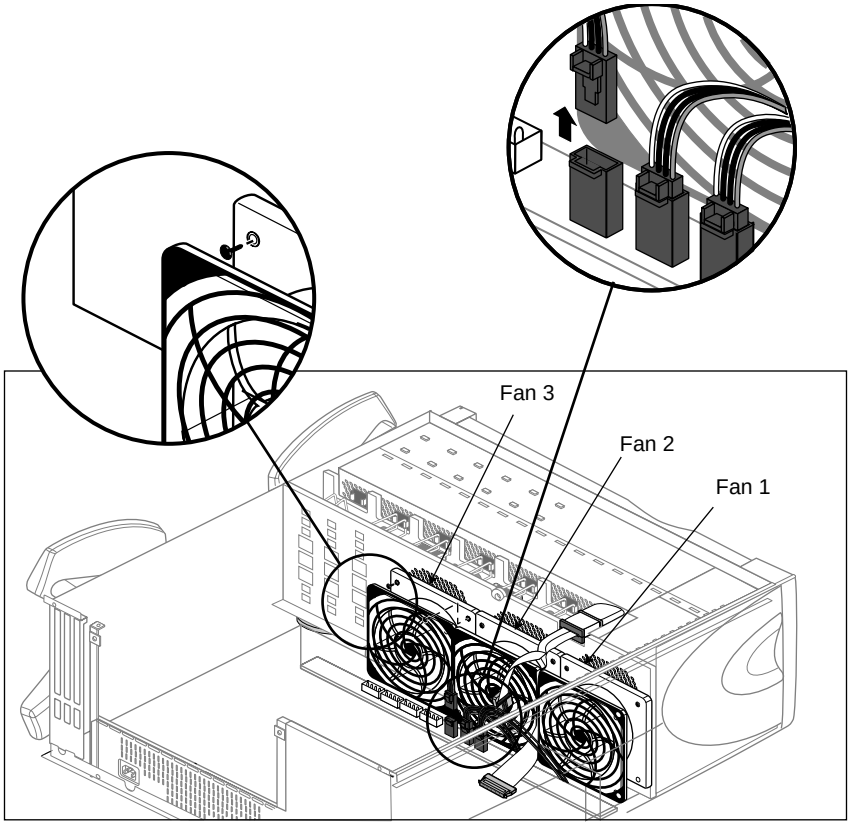

Figure 5-2 Disconnecting a Fan and Fan Power Cable (Some Components Not Shown For Clarity)

3. Lift the fan out of the system, as shown in Figure 5-3.

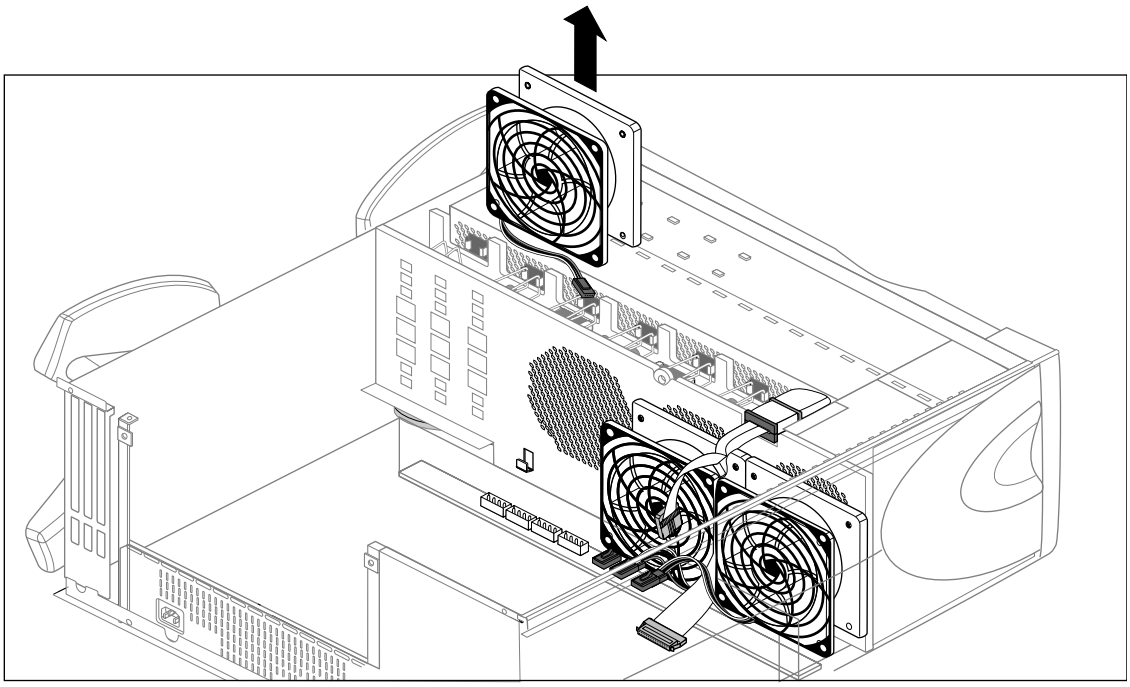

Figure 5-3 Removing a Fan From the System (Some Components Not Shown For Clarity)

Installing a New Fan

Follow these steps to install a fan:

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

Replacing the Logic Carrier

If you have not done so already, follow the procedures in Chapter 1, “Preparing the System for Servicing” to make sure the system is opened up and ready to be worked on. Once you have opened the Origin200 chassis, follow the procedures in the next sections to replace the logic carrier.

Removing the Logic Carrier

1. If there are any PCI boards in the system, remove them as described in Chapter 2, “Installing and Removing PCI and XIO Option Boards.”
2. Using a #2 Phillips screwdriver, remove the sheetmetal screw and captive fastener that secure the PCI plenum divider and lift the divider out of the system. See Figure 5-4.

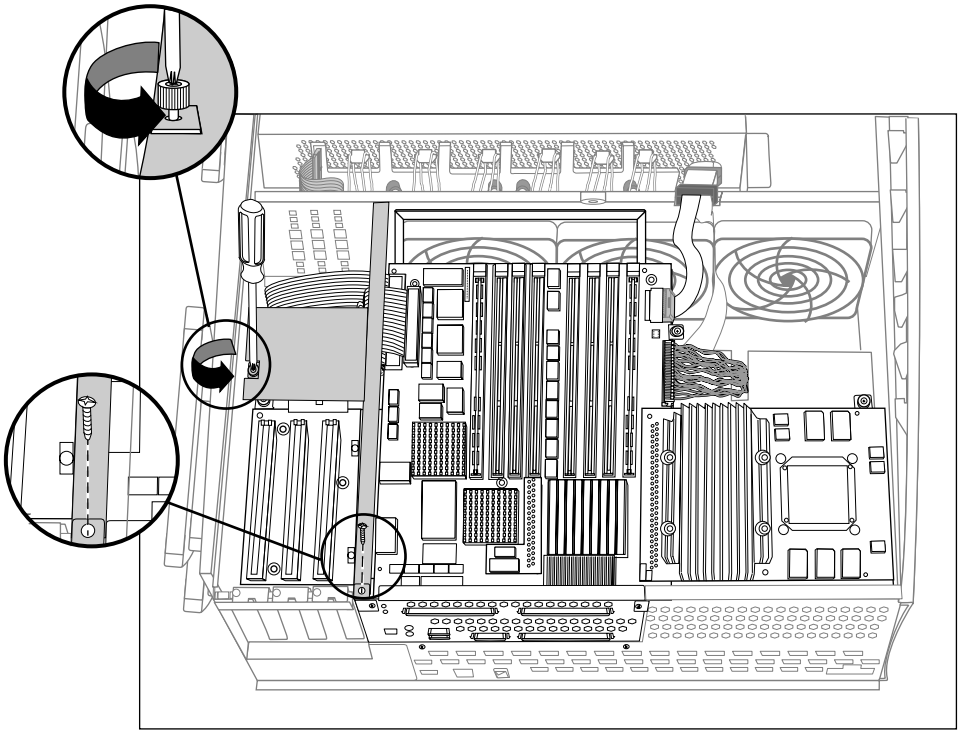

Figure 5-4 Unfastening the PCI Plenum Divider Sheetmetal

3. Lift the PCI plenum divider sheetmetal out of the system, as shown in Figure 5-5.

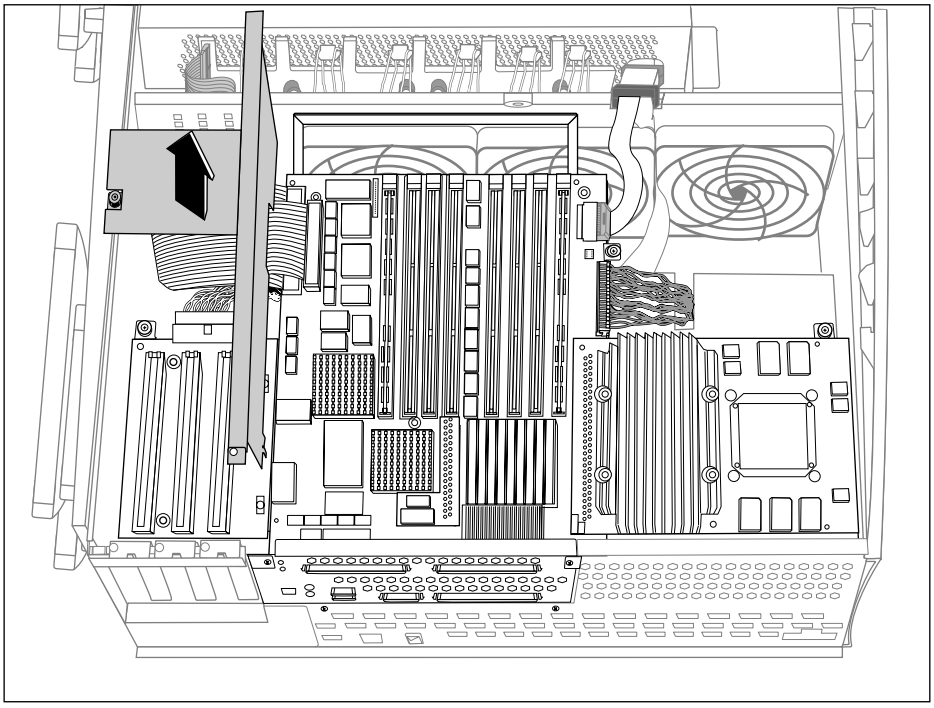

Figure 5-5 Removing the PCI Plenum Divider

4. Disconnect the cables that are attached to the logic carrier, as shown in Figure 5-6.
   - Detach the two SCSI cables.
   - Disconnect the system board power connector.
   - Remove the system controller cable.
   - Disconnect the PCI power cable.

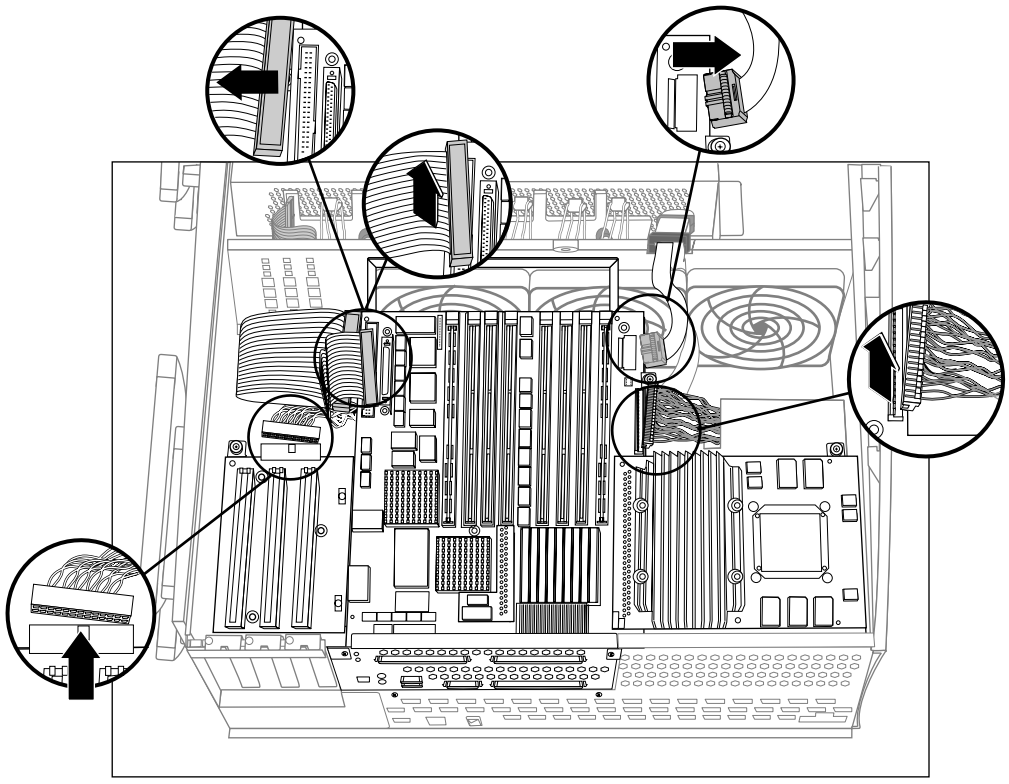

Figure 5-6 Disconnecting Cables From the Logic Carrier

5. Unfasten the captive screws and sheetmetal screws that secure the logic carrier. See Figure 5-7.

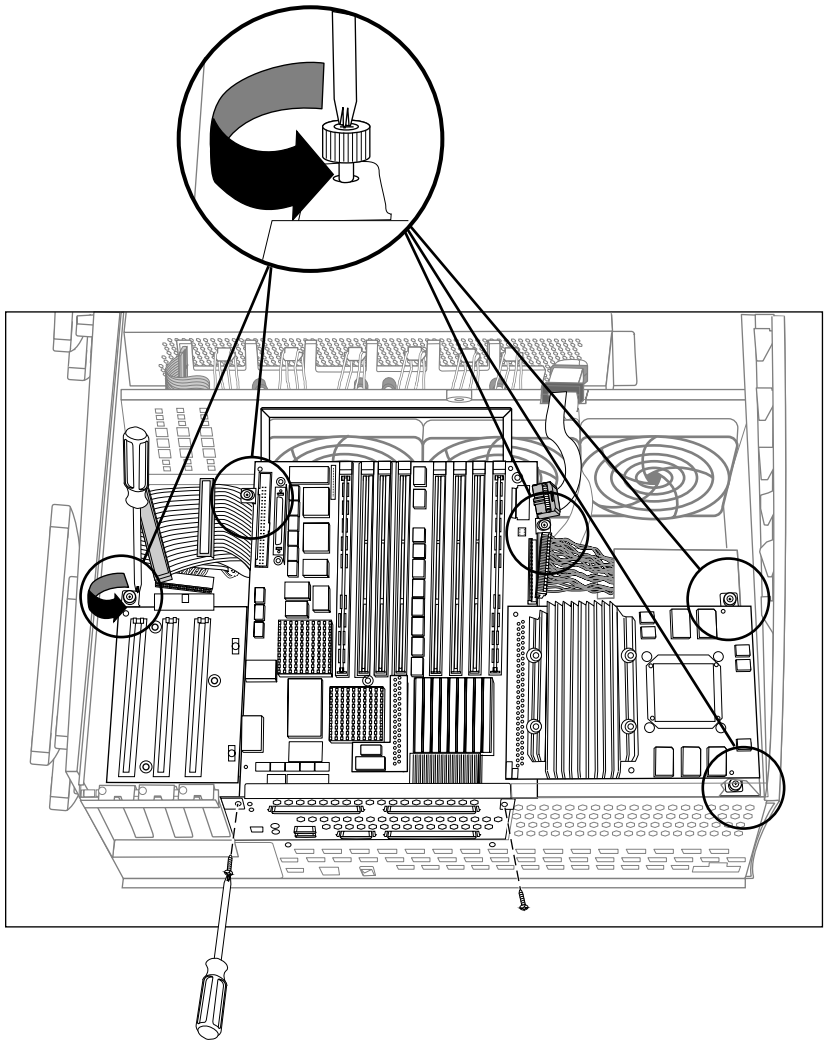

Figure 5-7 Unfastening the Logic Carrier

6. Lift the logic carrier out of the system, as shown in Figure 5-8.
   - Grasp the logic carrier handle with one hand and the connector panel with the other.
   - As you lift the logic carrier, tilt the side with the CPU daughtercard up slightly higher than the side with the PCI backplane. Angling the logic carrier in this way makes it easier to remove.

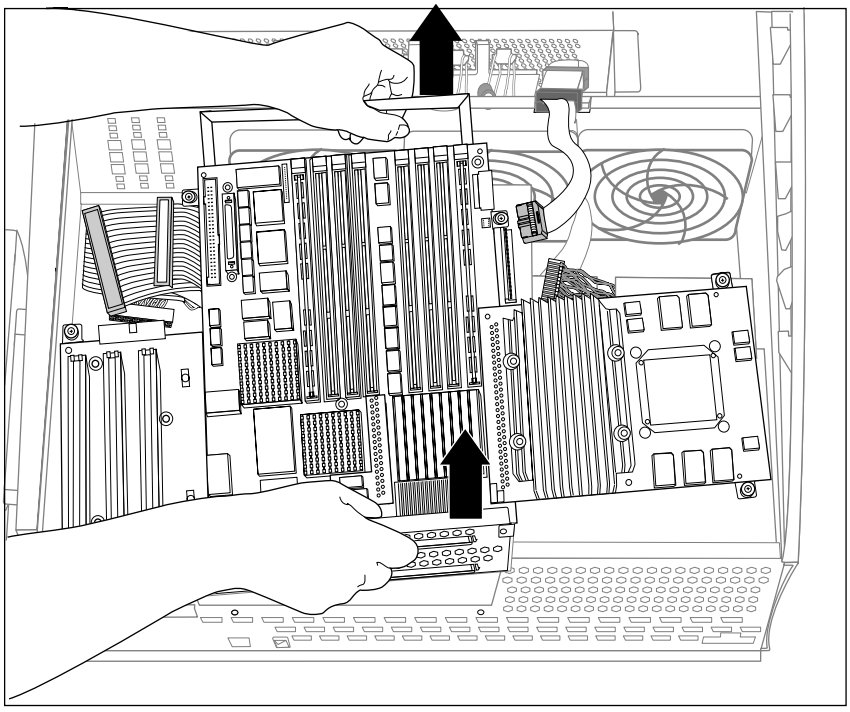

Figure 5-8 Removing the Logic Carrier

Installing a New Logic Carrier

Follow these steps to replace the logic carrier:

1. Lower the new logic carrier into the system, as shown in Figure 5-9.
   - As you lower the logic carrier, tilt the side with the CPU daughtercard up slightly higher than the side with the PCI backplane. Angling the logic carrier in this way makes it easier to install.

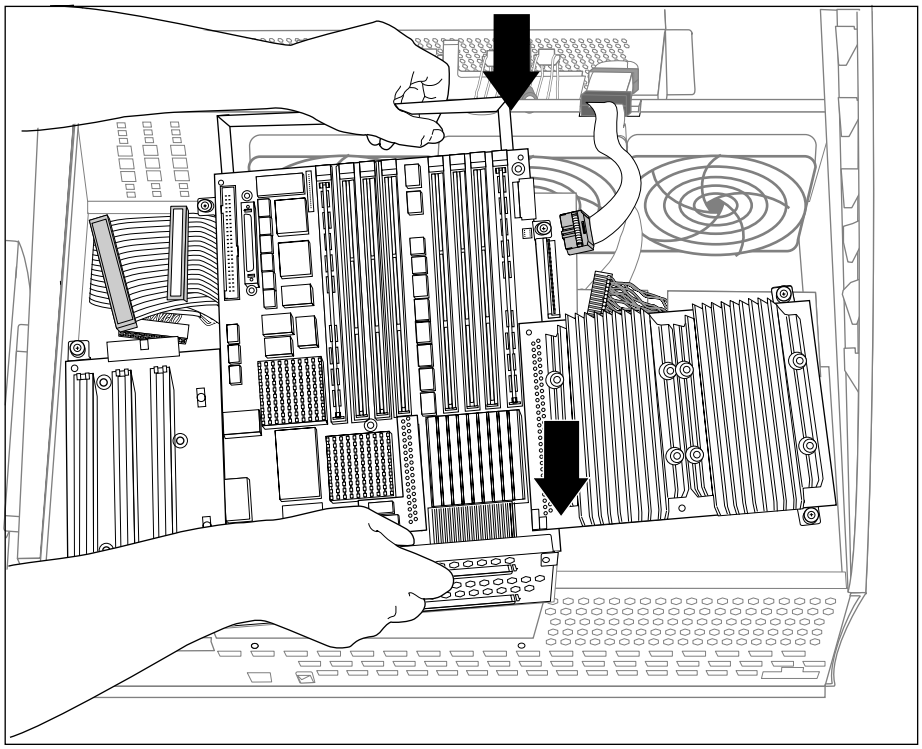

Figure 5-9 Lowering a Logic Carrier Into the System

2. Secure the logic carrier by tightening the captive fasteners and installing the sheetmetal screws, as shown in Figure 5-10.

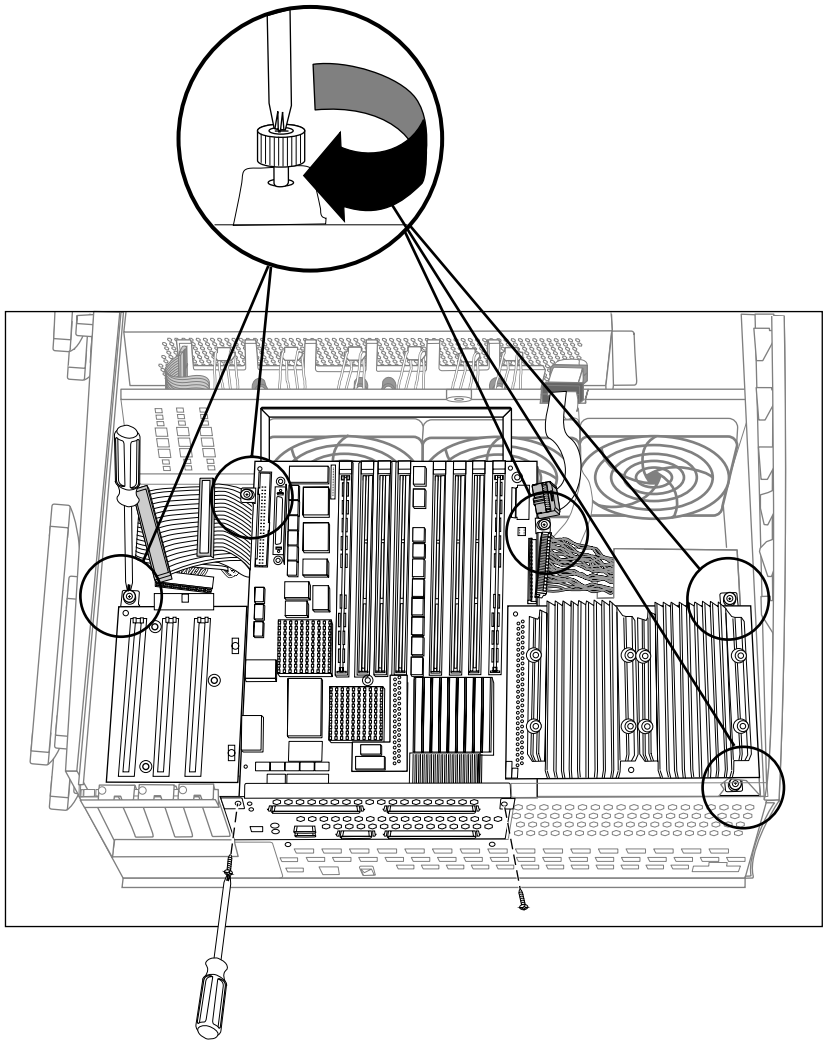

Figure 5-10 Fastening the Logic Carrier

3. Attach the PCI power, SCSI controller, system controller, and system board power cables to the logic carrier, as shown in Figure 5-11.

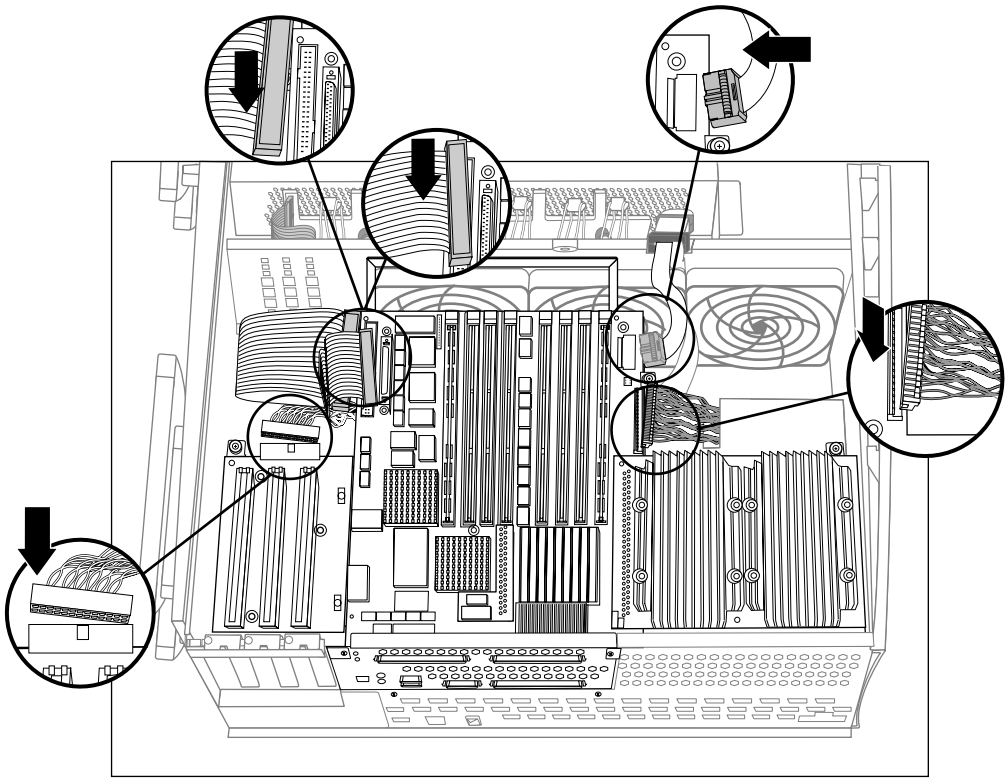

Figure 5-11 Attaching the Logic Carrier Cables

4. Install the PCI plenum divider sheetmetal as shown in Figure 5-13.
   - Be extremely careful not to pinch the SCSI cables when installing the PCI plenum divider.
   - Make sure that the SCSI cables are not underneath the plenum divider captive screw.

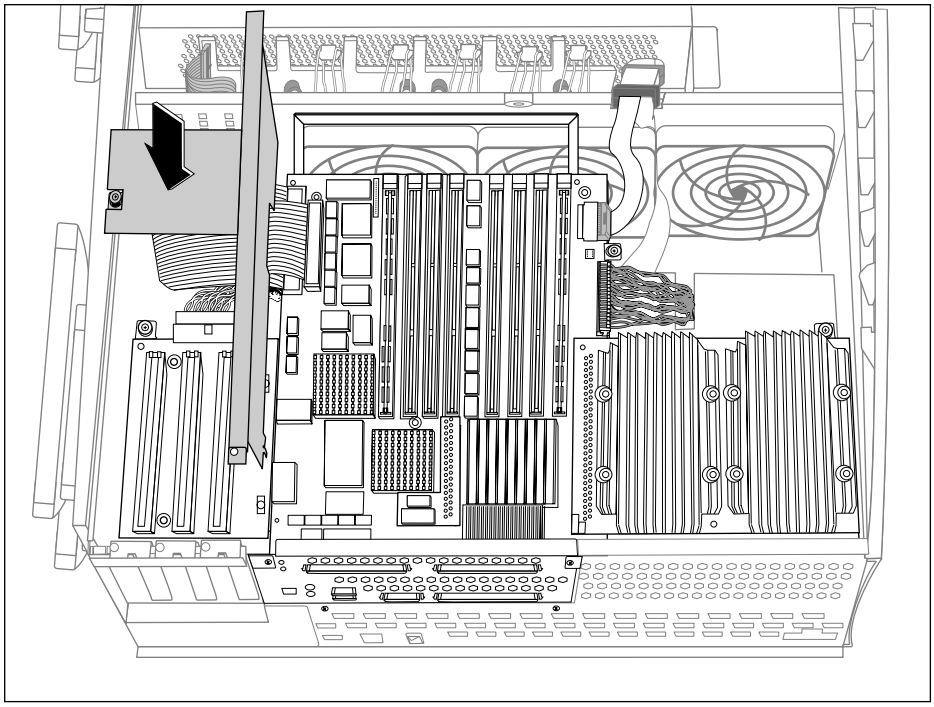

Figure 5-12 Installing the PCI Plenum Divider

5. Fasten the PCI plenum divider by tightening the captive screw and installing the sheetmetal screw, as shown in Figure 5-13.

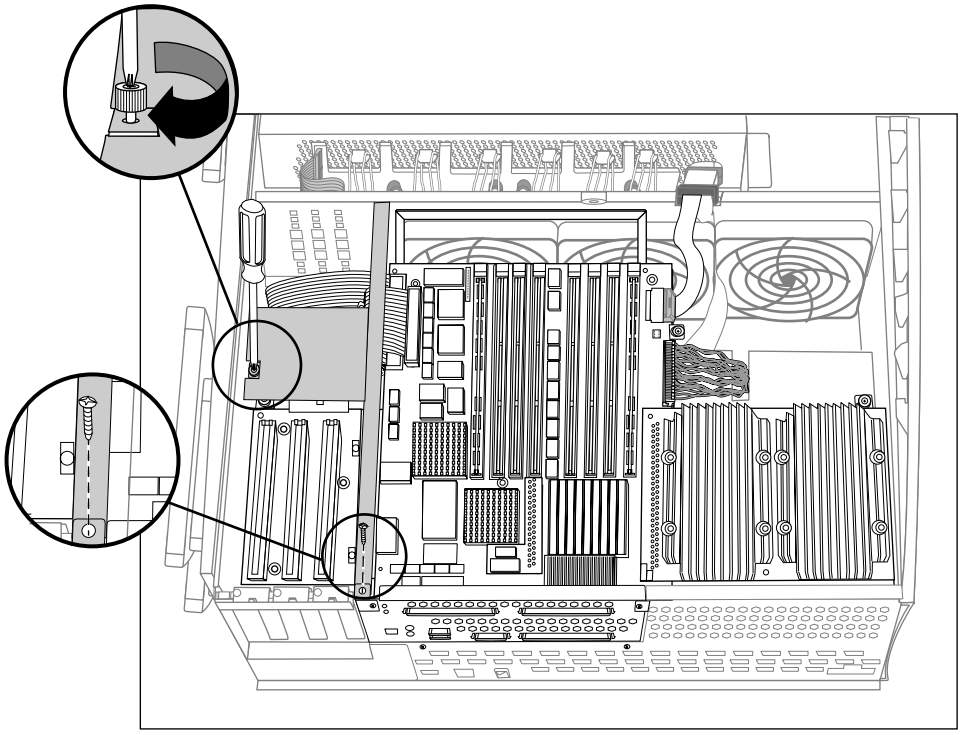

Figure 5-13 Fastening the PCI Plenum Divider

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

Replacing the Origin200 Power Supply

If you have not done so already, follow the procedures in Chapter 1, "Preparing the System for Servicing" to make sure the system is opened up and ready to be worked on. The procedure is identical for replacing the standard and redundant power supplies.

Note: Be aware that the redundant power supply works only in systems with module system controller firmware versions 3.3S and later. See the *Origin200 and Origin200 GIGAchannel Owner's Guide* for details on determining the MSC version number.

Once you have opened the Origin200 chassis, follow the steps in the next sections to replace the power supply.

Removing the Origin200 Power Supply

Follow these steps to remove the Origin200 power supply:

1. Remove any PCI boards that are in the system, as described in Chapter 2, "Installing and Removing PCI and XIO Option Boards."
2. Remove the logic carrier as described in "Replacing the Logic Carrier" on page 80.
3. Disconnect all cables from the power supply: fan power, the combined SCSI backplane and 5.25-inch drive power connector, and module system controller cable.
4. Using a #2 Phillips screwdriver, remove the screws that secure the power supply to the chassis, as shown in Figure 5-14. There are six screws at the rear of the power supply.

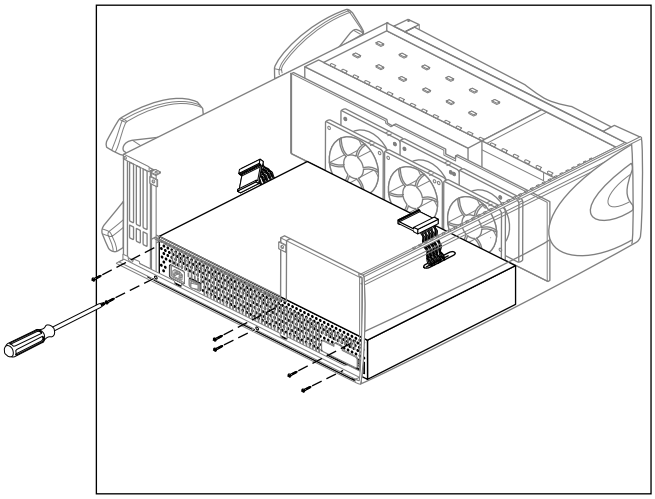

Figure 5-14 Removing the Origin200 Power Supply Screws

5. Remove the power supply, as shown in Figure 5-15.
   - Slide the power supply forward (towards the fans) until it unlatches from the chassis.
   - Lift the power supply out of the system.

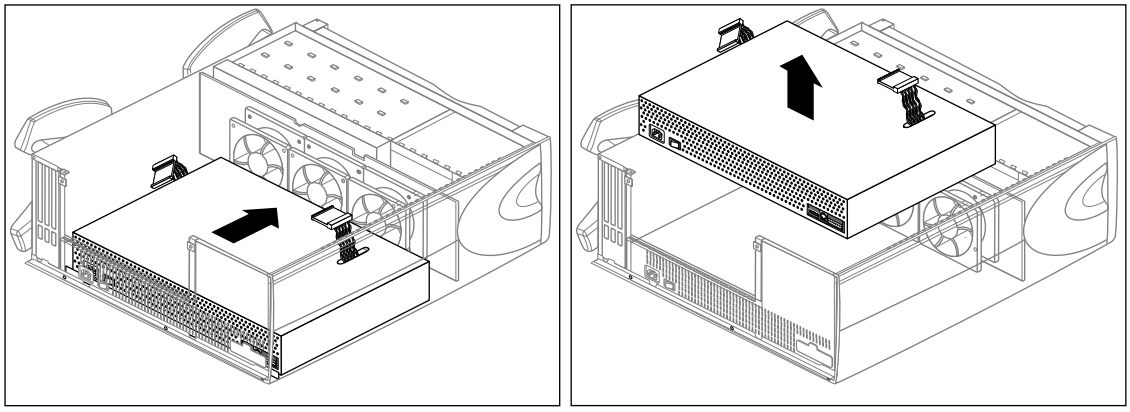

Figure 5-15 Removing the Origin200 Server Power Supply

Installing a New Power Supply in an Origin200 Server

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

1. Redundant power supply only: Remove the fans from the chassis.
   - See “Replacing Fans” on page 77 for information on removing the fans.
   - Because the redundant power supply is slightly longer than the standard power supply, removing the fans gives you necessary additional room in which to work.
2. Lower the power supply into the chassis with the power switch and receptacle towards the rear of the system.
3. Slide the power supply back until it latches on the underside and the power switch and receptacle are flush with the back of the chassis.
4. Install the screws at the rear of the system, as shown in Figure 5-16. Six screws secure the power supply to the chassis.

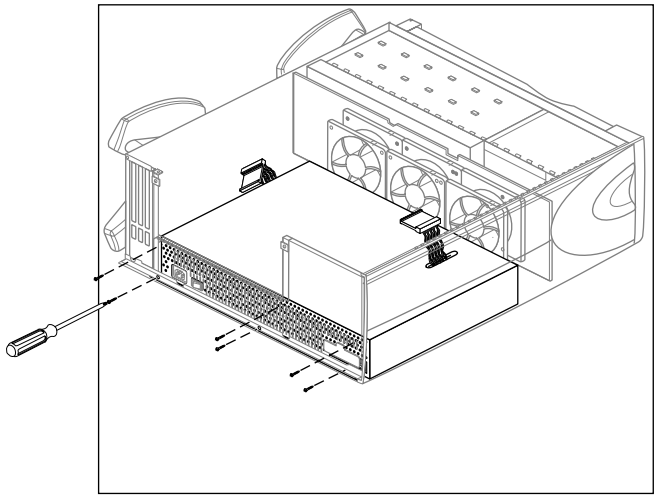

Figure 5-16 Replacing the Origin200 Server Power Supply Screws

5. Reconnect some of the cables: fan power cables, SCSI drive power cable, module system controller cable.
6. Install the logic carrier and any PCI boards you removed.

7. Reconnect the logic carrier cables.
8. Replace the chassis access cover.
9. If the system is in a tower configuration, replace both side panels.

Replacing the Module System Controller

Note: For this procedure, you do not have to follow the instructions in Chapter 1, "Preparing the System for Servicing." The module system controller can be removed with the system in place and fully assembled. However, make sure you turn off the master power switch.

The module system controller (MSC) is mounted on a sheetmetal carrier to form a single assembly. This assembly is housed behind the plastic bezel crossbar that forms the system front panel (where the status LED is located). Follow the steps in the next sections to remove the MSC and replace it.

Removing the Module System Controller

Follow these steps to remove the module system controller (MSC):

1. Shut down the system and turn off the master power switch.
2. Open the front door.
3. Remove the front bezel crossbar.
   - With your index finger, press against the catch on the inside of the recess in the crossbar, on the outside (right or top) of the recess. This recess is where the door lock fits. See Figure 5-17.
   - The crossbar swings out, hinging on the far side from the catch. Pull the crossbar out and set it aside.

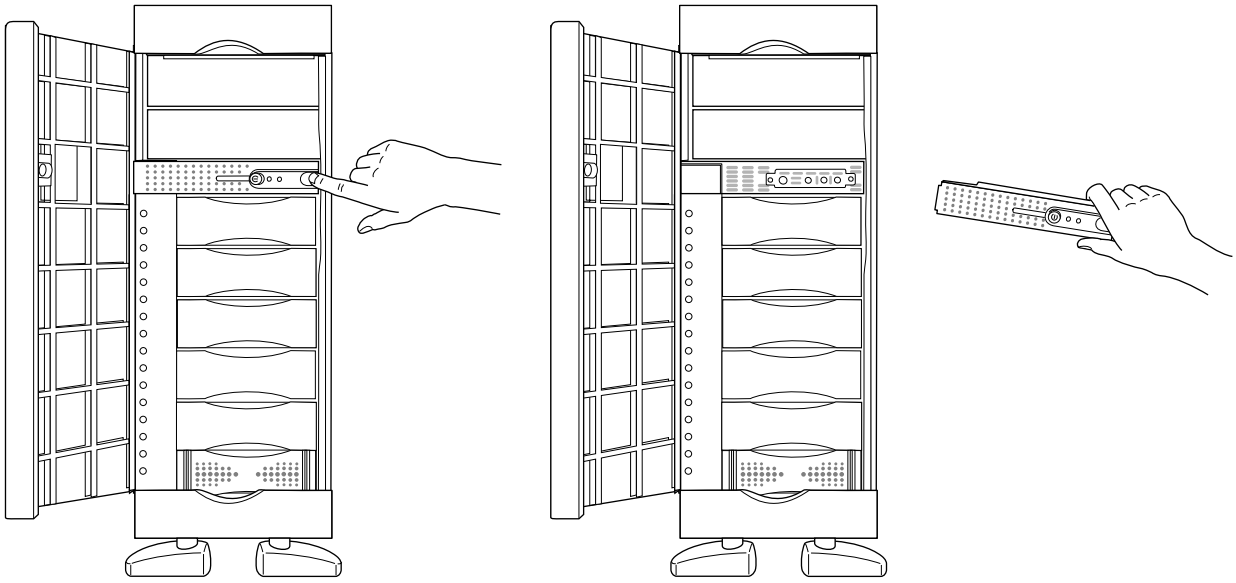

Figure 5-17 Removing the Front Bezel Crossbar

4. Using a #2 Phillips screwdriver, remove the two screws that fasten the system controller assembly to the chassis, as shown in Figure 5-18.

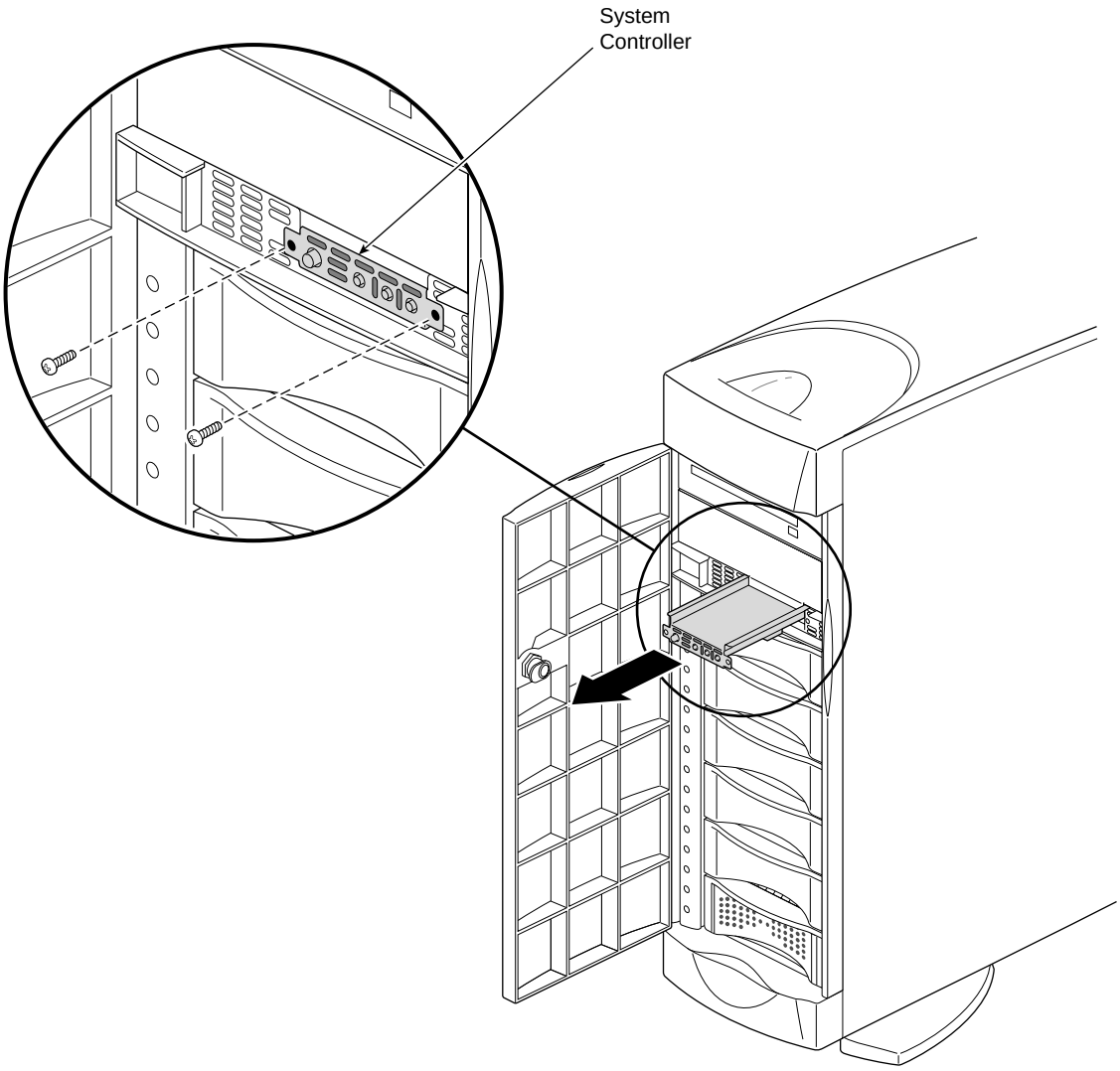

Figure 5-18 Removing the System Controller Assembly From the Chassis

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

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

6. Remove the system controller board from its carrier; it is secured by a screw and two pins, as shown in Figure 5-19.

   - Using a #2 Phillips screwdriver, remove the screw.
   - Slide the board on the carrier until you can lift the board off the pins.

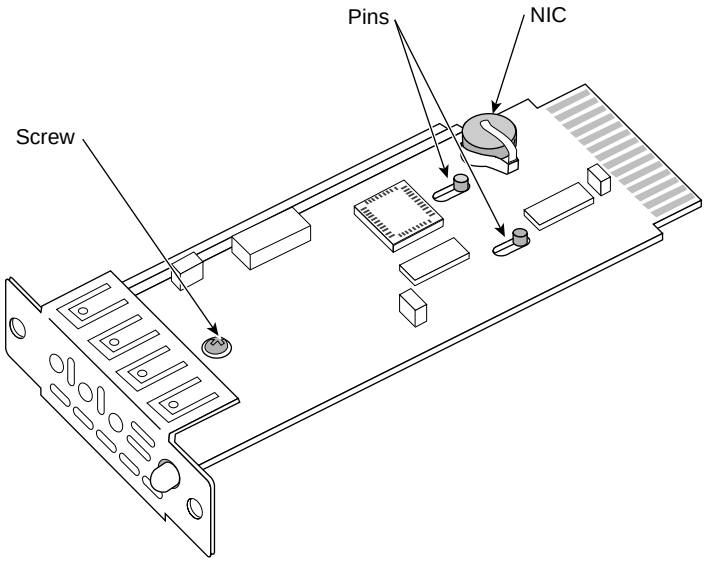

Figure 5-19 Removing the Module System Controller Board From Its Carrier

7. Remove the NIC (number in a can) package from the controller board. The NIC is a silver-colored device located at the rear of the controller board. It looks like a very large watch battery. See Figure 5-20.
   - The NIC stores the system serial number and should stay with your original Origin200 server.
   - Slide the NIC out of its socket and put it aside. You will install the NIC in the replacement module system controller.

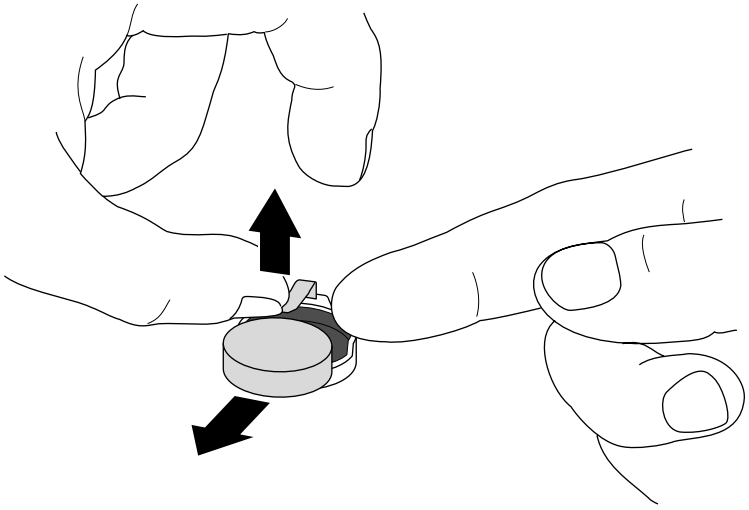

Figure 5-20 Removing the NIC From the Module System Controller

Installing a New Module System Controller

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

1. Install the NIC from the original module system controller on the replacement controller board.
2. Position the replacement controller board over the pins in the carrier; grasping the board by its sides, slide it so that the pins lock, making sure that the LED and button go through the proper holes. Screw in the reserved screw (shown in Figure 5-19).

3. Remove the disks (or blanking plates if no disks are installed) from slots 5 and 6 of the Origin200 server. Removing the disks (or blanking plates) allows you to see how the edge connector on the module system controller board aligns with its socket inside the chassis.
4. Slide the system controller assembly into the chassis. The assembly installs in only one direction.

   If necessary, guide the edge connector into its socket.

   When the edge connector is fully seated, the front of the carrier assembly should be flush with the chassis.

   Caution: To prevent ESD damage to the module system controller, be careful not to touch the board's edge connectors (gold fingers).
5. Replace the disks or blanking plates you removed in step 3.
6. Replace the two Phillips screws that hold the MSC assembly in place.
7. Replace the front bezel crossbar.

Replacing Internal Parts of the GIGAchannel Expansion Chassis

This section describes how to replace the various internal parts of the GIGAchannel expansion cabinet.

Replacing the Blower

If you have not done so already, follow the procedures in Chapter 1, “Preparing the System for Servicing.” to make sure the system is opened up and ready to be worked on. Once you have opened the GIGAchannel chassis, follow the procedures in the next sections replace the blower.

Removing the Blower

1. Remove the six screws that secure the power supply shroud, as shown in Figure 5-21.

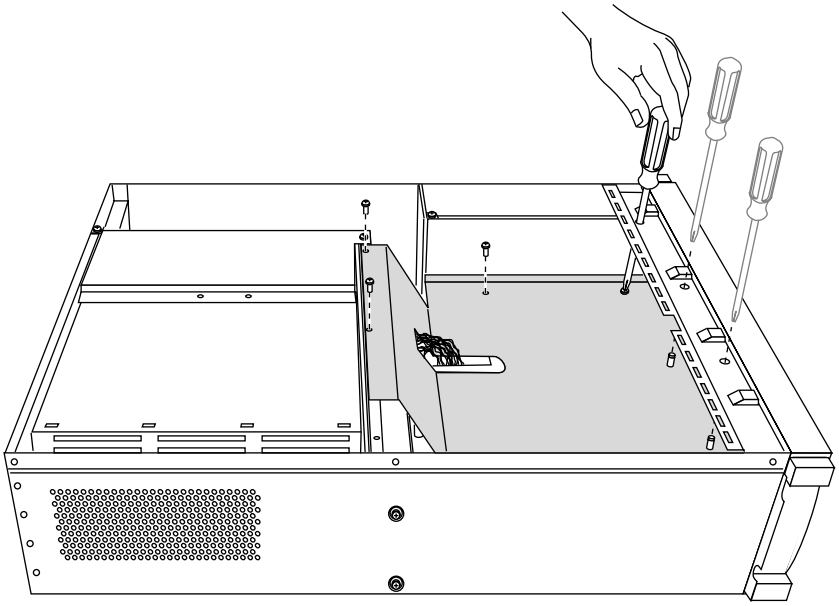

Figure 5-21 Unfastening the Power Supply Shroud

2. Lift the power supply shroud out of the chassis, as shown in Figure 5-22.

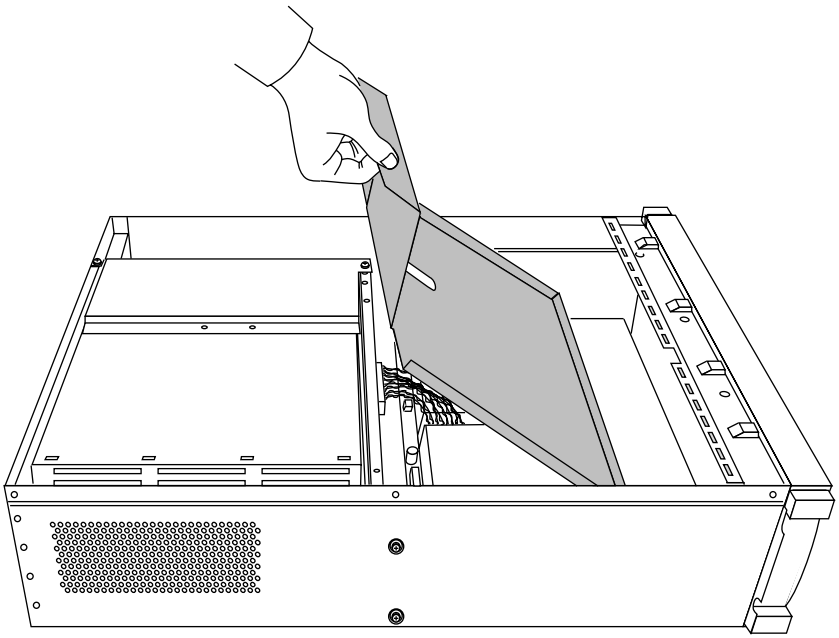

Figure 5-22 Lifting the Power Supply Shroud From the GIGAchannel Chassis

3. Unplug the power connector for the blower.
   - To unplug the connector, press the latch on the connector and lift it out of the socket, as shown in Figure 5-23.

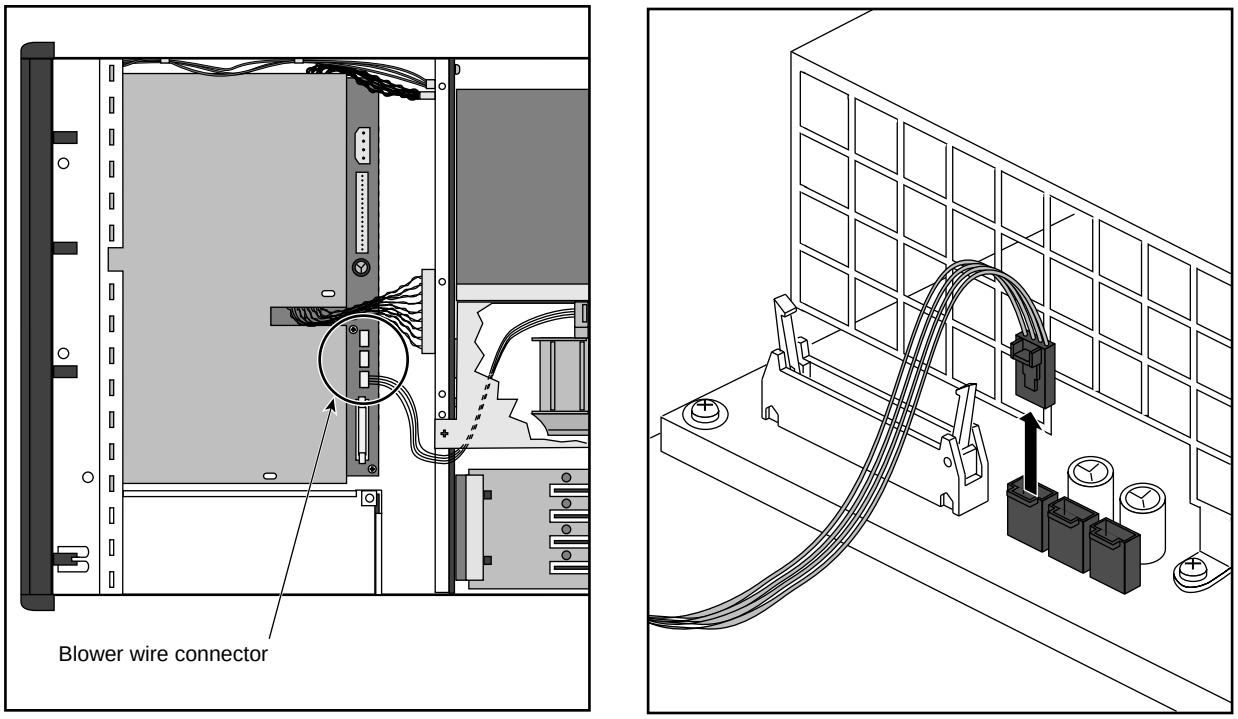

Figure 5-23 Unplugging the Blower Power Connector

The fan-power connectors on the redundant power supply are oriented slightly differently from those on the standard power supply, but are otherwise identical. The blower is attached to the connector that would be used by fan 1 if the power supply were installed in a CPU module.

4. Remove the blower cover.
   - Remove the four screws that attach the blower cover to the XIO cardcage, as shown in Figure 5-24.
   - Lift the blower cover out of the chassis.

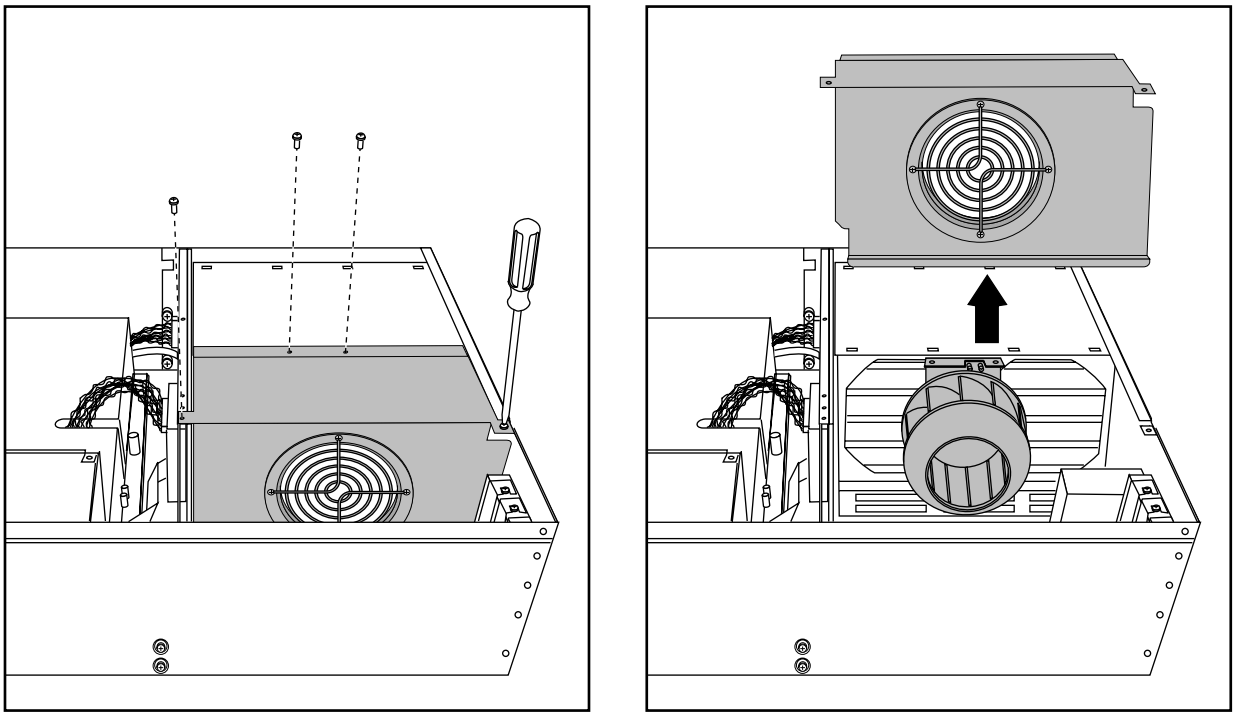

Figure 5-24 Removing the Blower Cover

5. Remove the blower assembly.
   - You may find that a smaller screwdriver, such as a #1 Phillips, or an offset screwdriver is easier to use than a #2 Phillips screwdriver.
   - The best way to undo the captive fasteners with a straight-shank screwdriver is to hold the screwdriver at an angle (as shown in Figure 5-25), and carefully turn the captive screws in small increments, counterclockwise.
   - Lift the entire blower assembly out of the GIGAchannel, as shown in Figure 5-25.

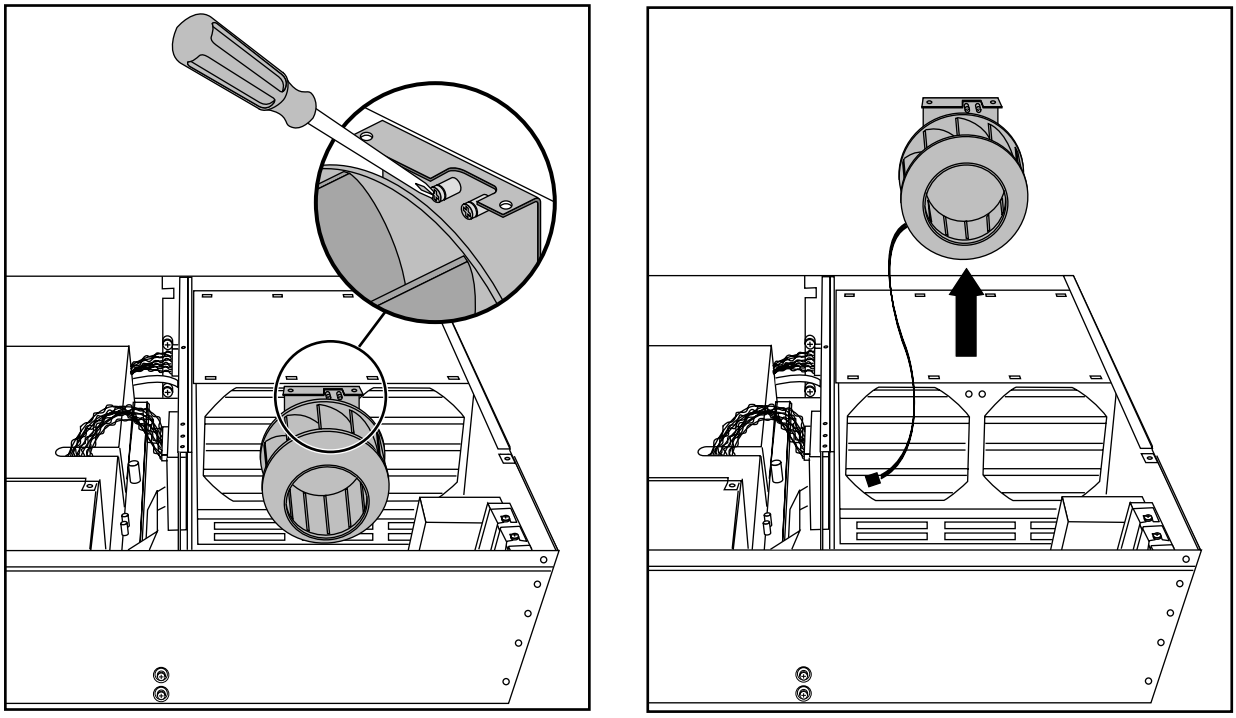

Figure 5-25 Removing the Blower from the GIGAchannel Cabinet

Installing a New Blower

To install a blower, follow these steps:

1. Replace the blower assembly, as shown in Figure 5-26.
   - Lower the blower into place.
   - Tighten the captive screws. The best way to tighten the captive fasteners with a straight-shank screwdriver is to hold the screwdriver at an angle (as shown in Figure 5-26), and carefully turn the captive screws in small increments, clockwise.

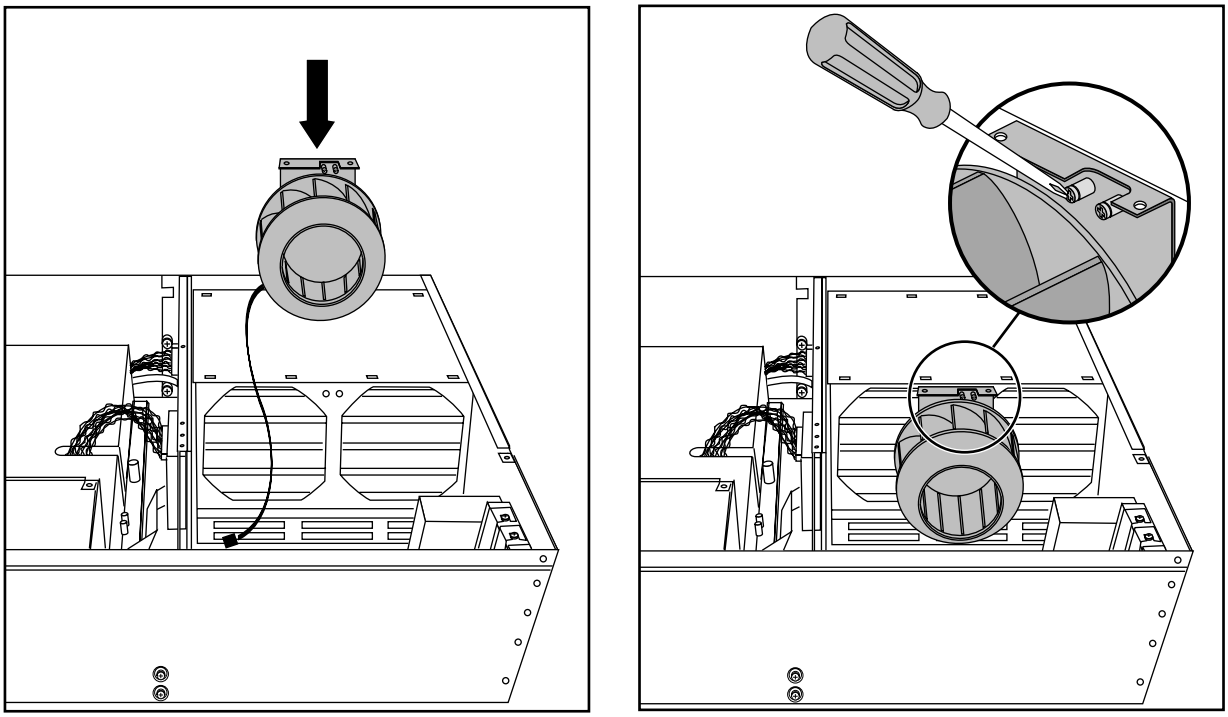

Figure 5-26 Replacing the Blower

2. Reattach the blower power cable, as shown in Figure 5-27.

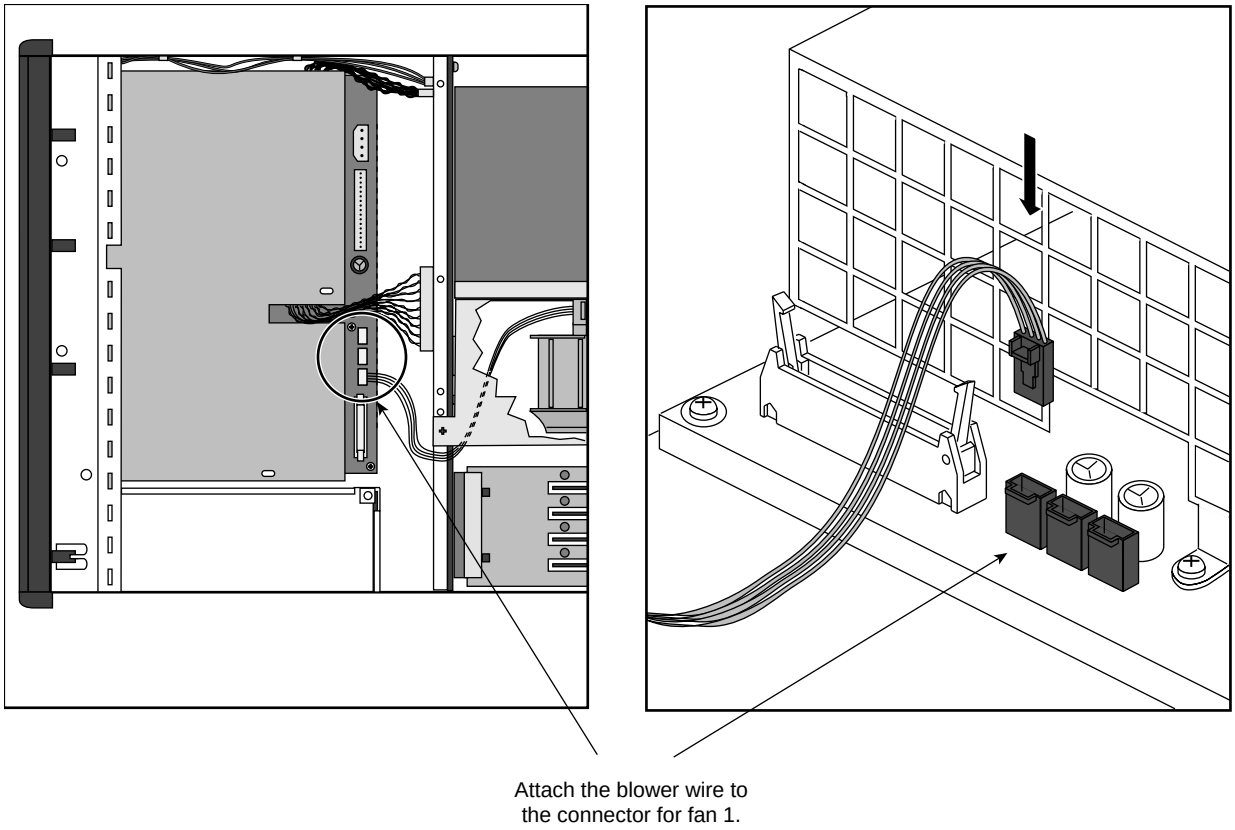

Figure 5-27 Reattaching the Blower Power Cable

The fan-power connectors on the redundant power supply are oriented slightly differently from those on the standard power supply, but are otherwise identical. Attach the blower wire to the connector that would be used by fan 1 if the power supply were installed in a CPU module.

3. Replace the blower cover, as shown in Figure 5-28.
   - Lower the blower cover into place.
   - Replace the four screws that secure the blower cover.

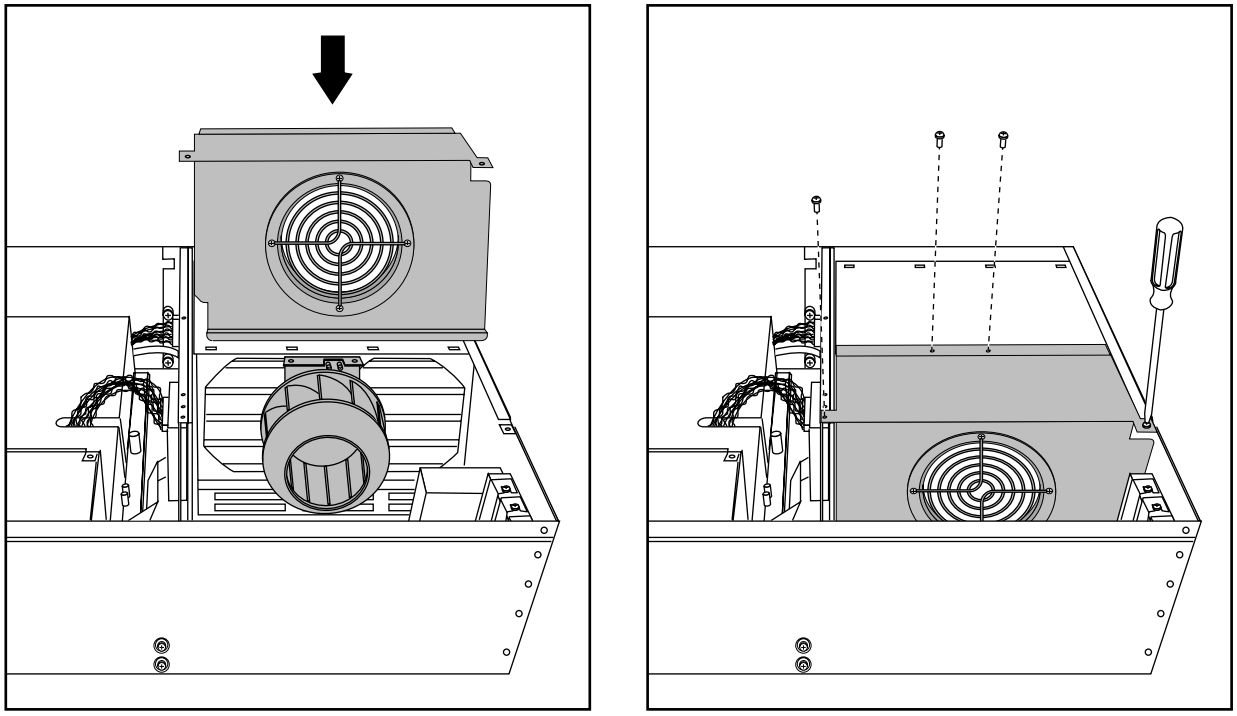

Figure 5-28 Replacing the Blower Cover

4. Replace the power supply shroud, reversing steps 1 and 2 on page 99 and page 100.

Replacing the GIGAchannel Power Supply

If you have not done so already, follow the procedures in Chapter 1, “Preparing the System for Servicing” to make sure the system is opened up and ready to be worked on. The procedure is identical for replacing the standard and redundant power supply.

Note: Be aware that the redundant power supply works only in systems with module system controller (MSC) firmware versions 3.3S and later. See the *Origin200 and Origin200 GIGAchannel Owner's Guide* for information about determining the MSC version number.

Once you have opened the GIGAchannel chassis, follow the procedures in the next sections to replace the power supply.

Removing the GIGAchannel Power Supply

1. Remove the power supply shroud.
   - Remove the four sheetmetal screws indicated in Figure 5-29.
   - Undo the two captive screws indicated in Figure 5-29.

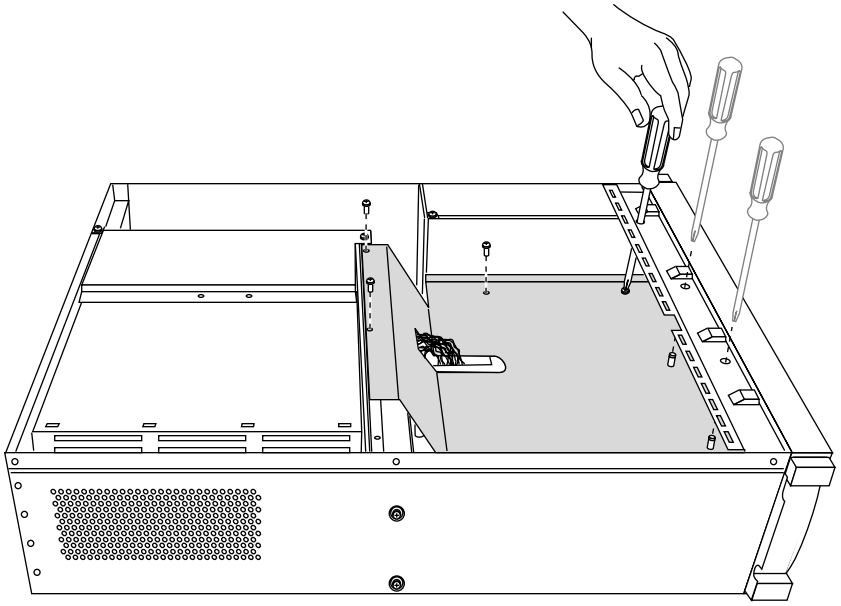

Figure 5-29 Removing the Power Supply Shroud Screws

2. Lift the shroud up and out of the chassis.
   - As you lift the shroud, tilt it as shown in Figure 5-30.

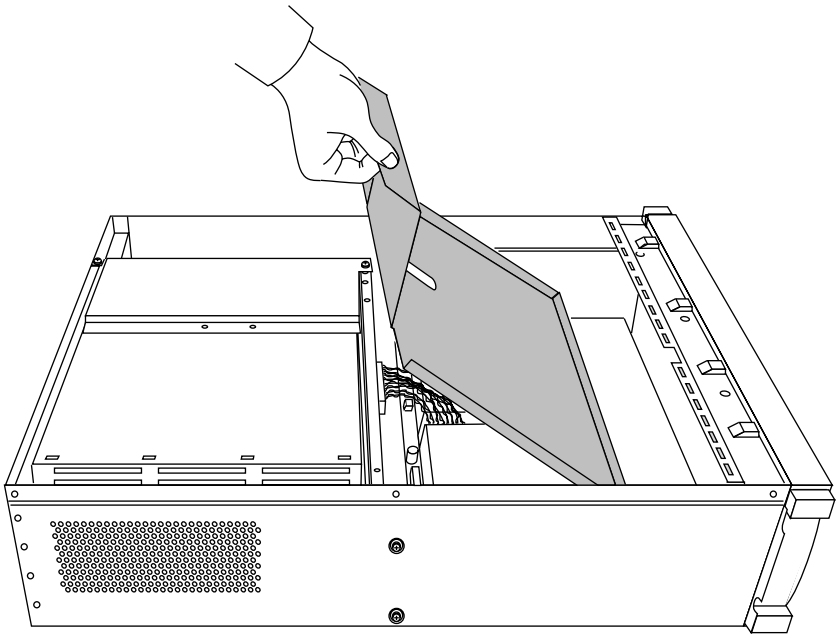

Figure 5-30 Removing the Power Supply Shroud

3. Disconnect all of the wires attached to the power supply.
4. Pull the power supply towards you until it unlatches from the base of the chassis.
5. Lift the power supply up and out of the system.

6. Disconnect the power cord extension at the front of the power supply, as shown in Figure 5-31.

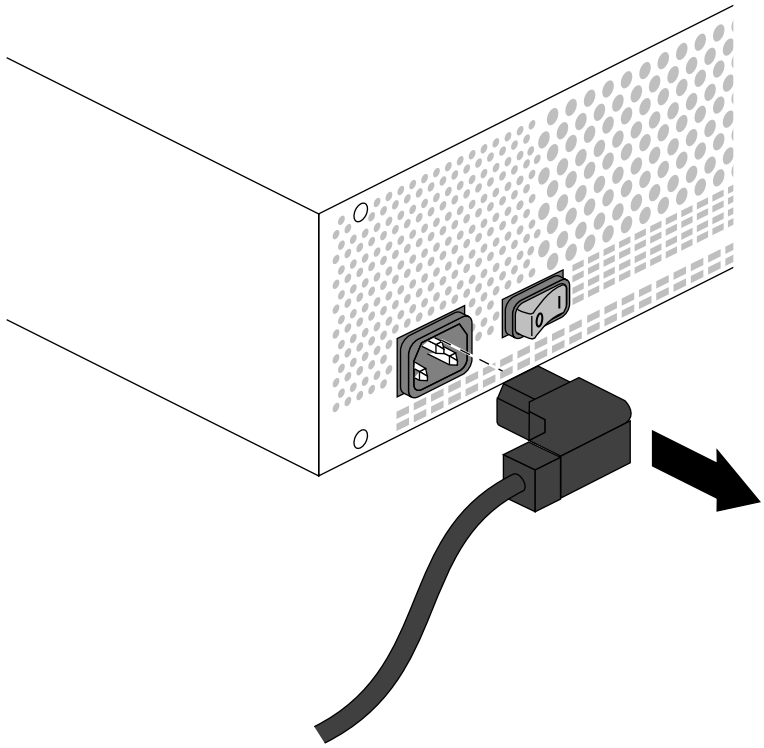

Figure 5-31 Disconnecting the Power Cord Extension

Installing a New Power Supply

Follow these steps to install a new power supply:

1. Attach the power cord extension to the front of the power supply, next to its built-in rocker switch.

   Note: There is a metal standoff located inside the chassis on the front bulkhead that presses on the rocker switch when the power supply is installed. Even if you forget to turn on the built-in rocker switch, this standoff will push the switch into the correct position.

2. Lower the power supply into the chassis and slide it forward until you feel the latches connect.

   If the power supply is correctly installed, you should not be able to lift it straight up and out of the chassis.

3. Reconnect the wires you removed.

   - Attach the blower wire to connector **1** (farthest away from the blower). See Figure 5-27.
   - Replace the latching logic connector (ribbon cable). It is keyed and can be installed in only one direction. Press down on the connector until the tabs on each side of the connector are fully engaged.
   - Replace the white power connector (braided pairs of wire). It is keyed and can be installed in only one direction.

4. Replace the shroud, reversing the steps on page 108 through page 109.

   - Pay close attention to the alignment of the holes in the shroud and the holes in the power supply. If they do not line up, you may have to shift the power supply slightly to the right, or slightly farther back towards the midplane.

5. Attach the captive screws, then install the four sheetmetal screws indicated in Figure 5-29.

6. Reassemble the system (replace covers, reattach cables, and so forth).

Replacing the GIGAchannel PCI Backplane

The steps in the following sections describe how to remove and replace the PCI backplane in the GIGAchannel expansion cabinet.

Removing the GIGAchannel PCI Backplane

Follow these steps to remove the PCI backplane:

1. Follow the procedures described in Chapter 1, “Preparing the System for Servicing” to shut down the system and remove the necessary covers from the chassis.
2. Remove any PCI boards that are currently installed, as described in Chapter 2, “Installing and Removing PCI and XIO Option Boards.”

3. Remove the backplane.
   - Remove the two screws, indicated in Figure 5-32.
   - Slide the PCI backplane towards the rear of the system so that its connector releases from the midplane.
   - Lift the board off of the retaining pins and out of the system.

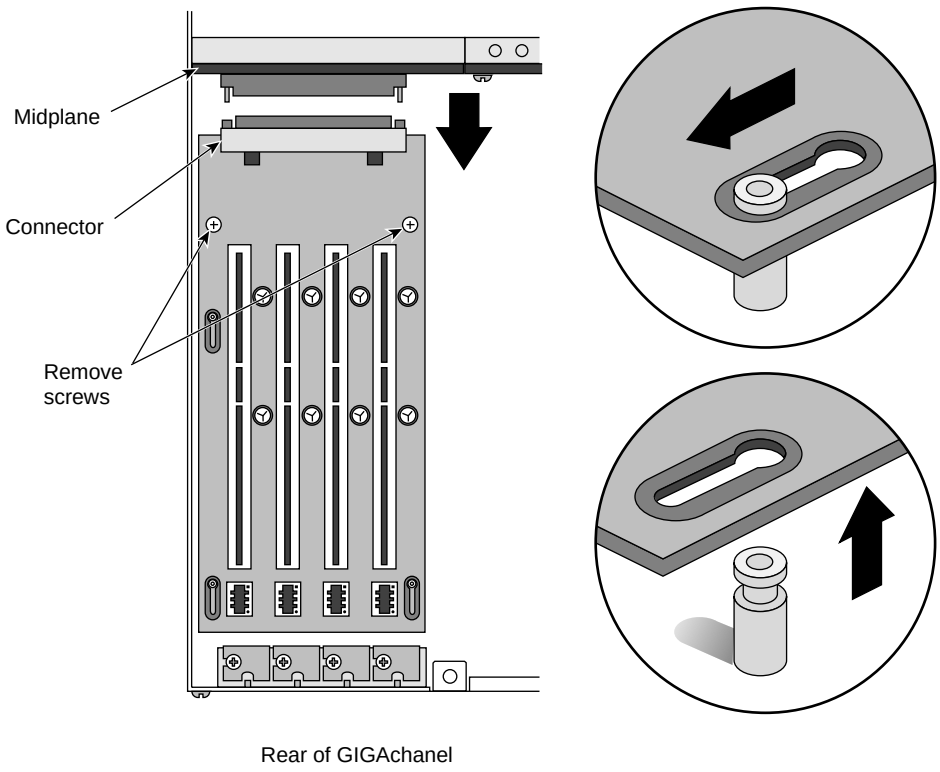

Figure 5-32 Removing the GIGAchannel PCI Backplane

Installing a New GIGAchannel PCI Backplane

Follow these steps to install a new GIGAchannel PCI backplane.

1. Lower the PCI backplane over the top of the retaining pins.
2. Secure the backplane.
   - Slide the backplane backwards until the connector on the PCI backplane fully engages the mating connector on the midplane, as shown in Figure 5-33.
   - Replace the two screws indicated in Figure 5-33.

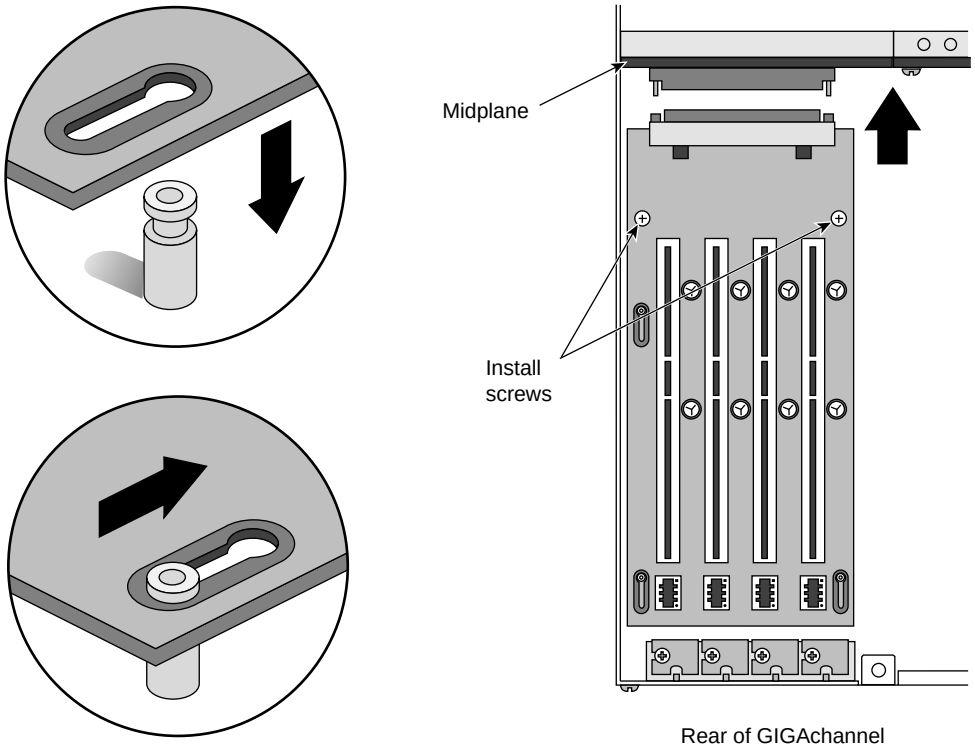

Figure 5-33 Replacing the PCI Backplane

3. Replace any PCI boards that were removed.
4. Reassemble the system (replace covers, reattach cables, and so forth).

Replacing the GIGAchannel Midplane

The next sections describe how to replace the GIGAchannel midplane.

Removing the GIGAchannel Midplane

Follow these steps to replace the midplane:

1. Follow the procedures described in Chapter 1, “Preparing the System for Servicing,” to shut down the system and remove the necessary covers from the chassis.
2. Remove the PCI backplane. See “Replacing the GIGAchannel PCI Backplane” on page 112.
3. Remove the blower cover, as shown in Figure 5-34.

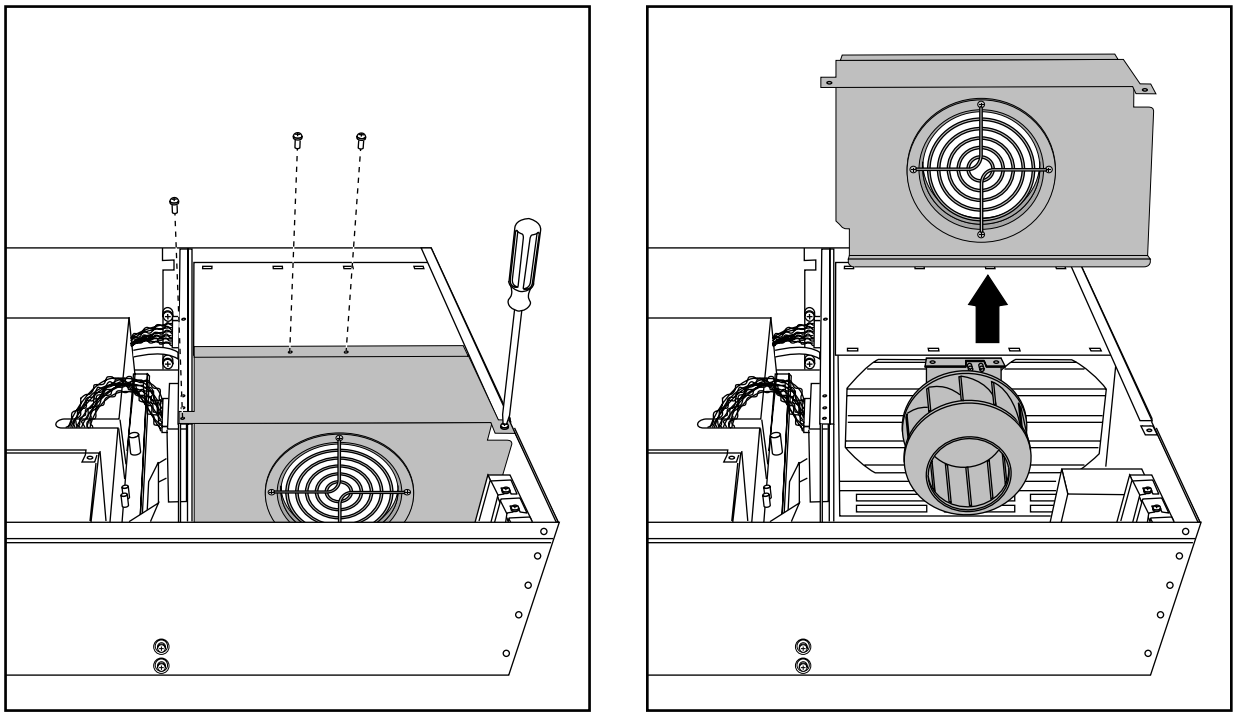

Figure 5-34 Removing the Blower Cover

4. Remove the power-supply shroud screws, as shown in Figure 5-35.

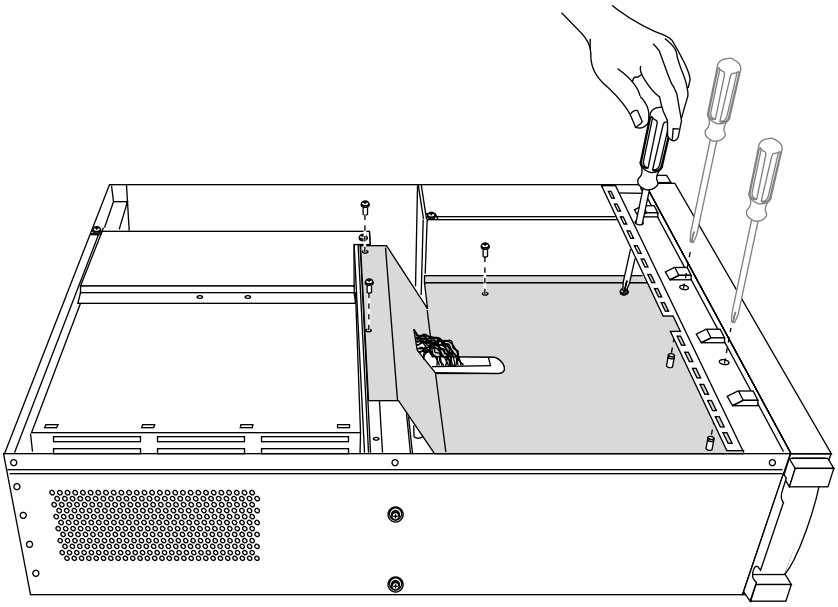

Figure 5-35 Removing the Power Supply Shroud Screws

5. Remove the power supply shroud, as shown in Figure 5-36.

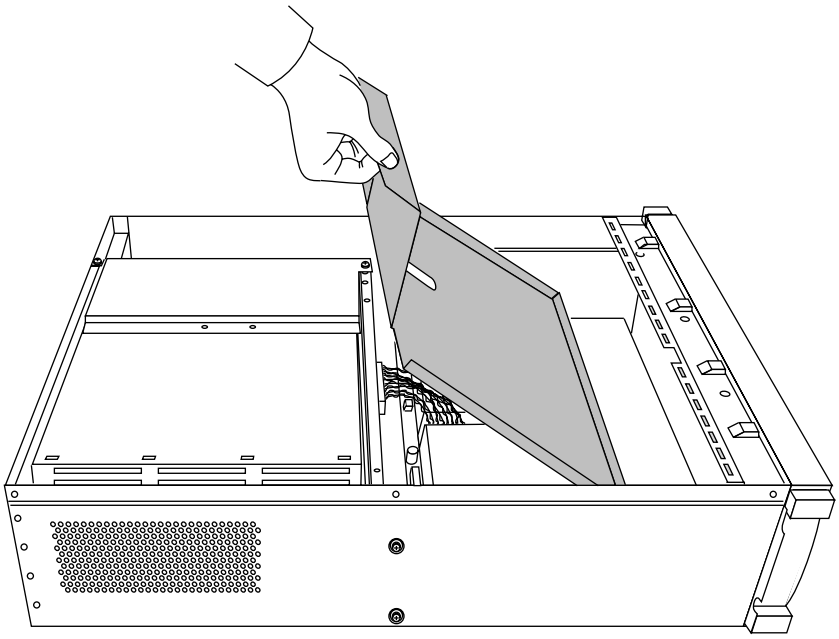

Figure 5-36 Removing the Power Supply Shroud

6. Disconnect all wires attached to the midplane.
7. Undo the eight captive screws that hold the midplane in place, as shown in Figure 5-37.

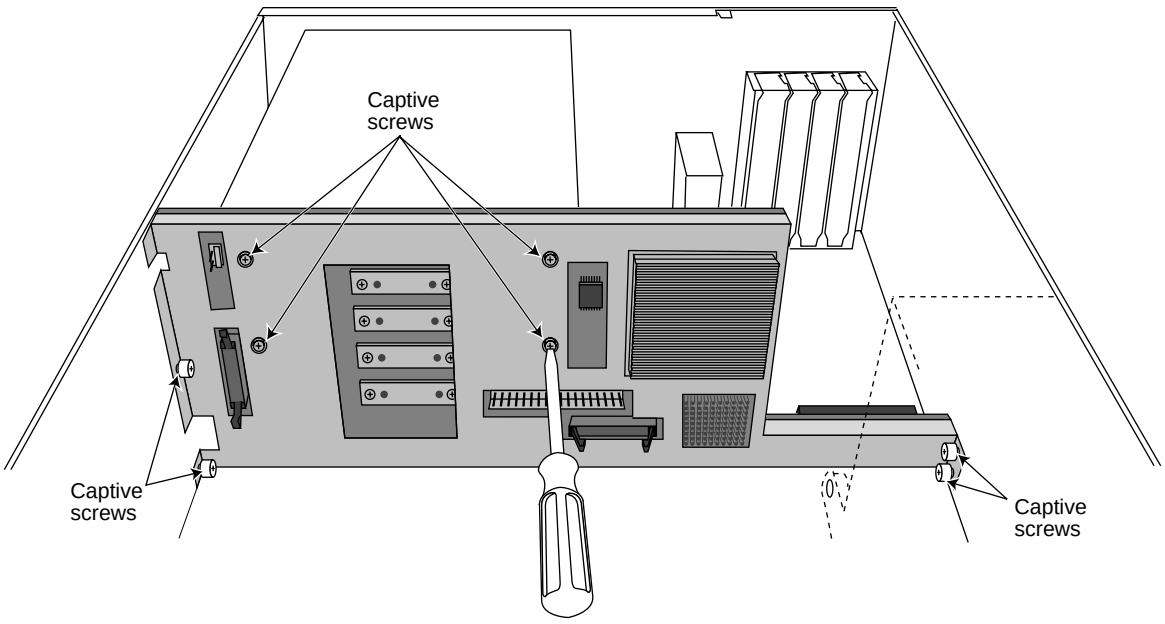

Figure 5-37 Unfastening the Midplane Captive Screws

8. Lift the midplane up and out of the chassis, as shown in Figure 5-38.

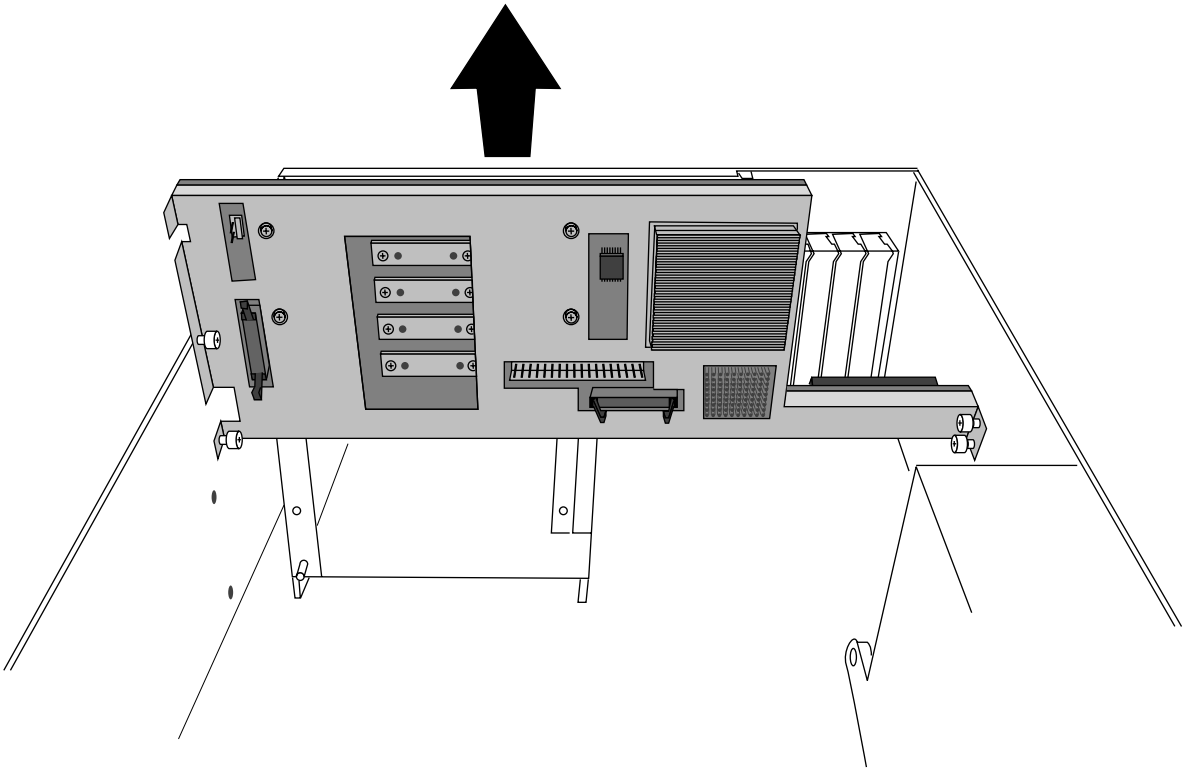

Figure 5-38 Lifting the Midplane out of the GIGAchannel Chassis

You are finished removing the midplane.

Installing a New Midplane

Follow these steps to install a new midplane.

1. Lower the new midplane into the GIGAchannel chassis, as shown in Figure 5-39.

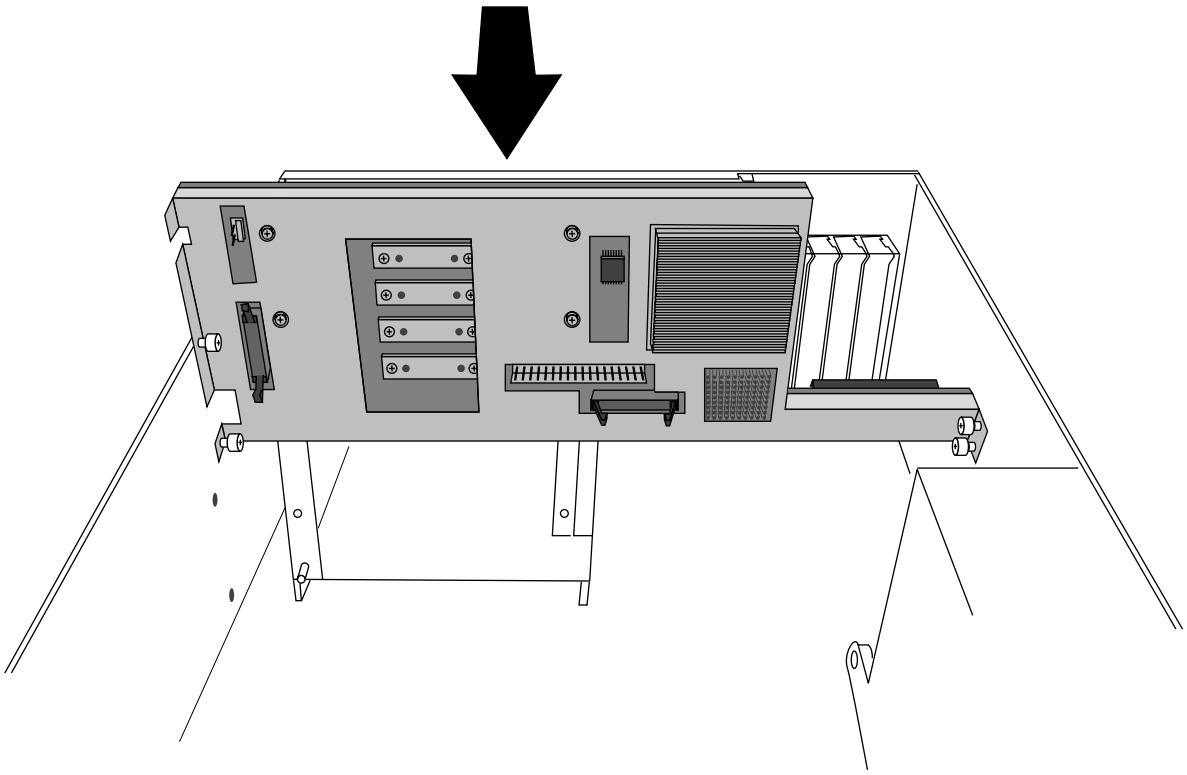

Figure 5-39 Installing a Midplane in a GIGAchannel Chassis

2. Tighten the captive screws indicated in Figure 5-40.

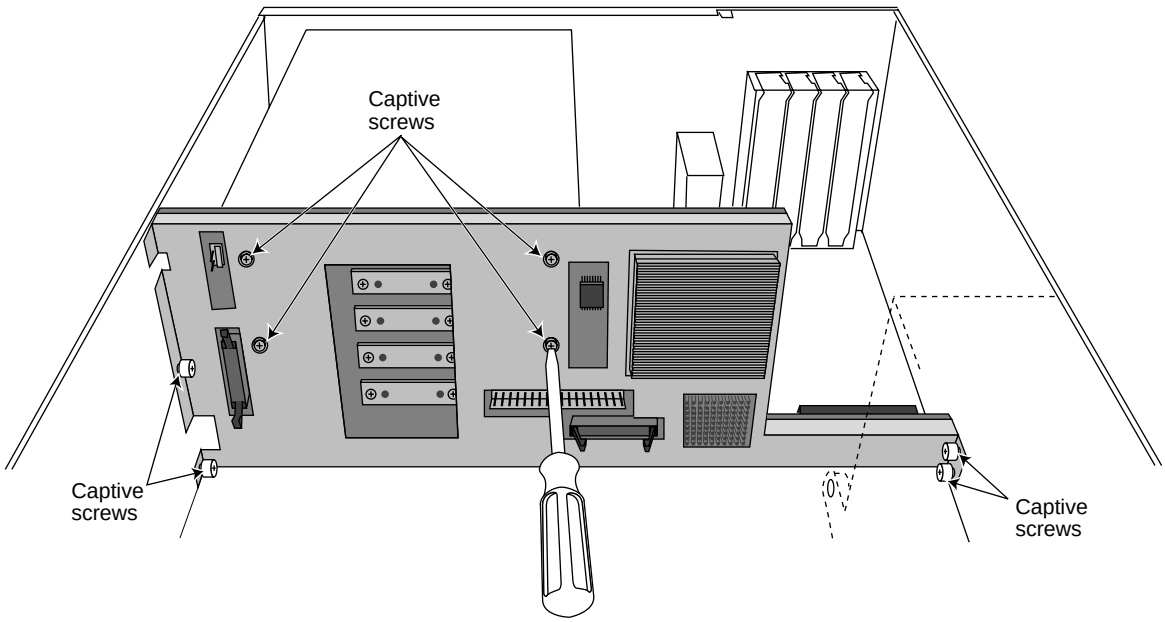

Figure 5-40 Midplane Captive Screws

3. Reconnect all midplane wires (including blower and power supply).
4. Replace the power supply shroud.
5. Replace the blower cover.
6. Replace the PCI backplane.
7. Reassemble the system (replace covers, reattach cables, and so forth).

You are finished replacing the midplane.

Replacing the GIGAchannel Crosstown Board

The next sections describe how to replace the GIGAchannel Crosstown board.

Note: Depending upon how your GIGAchannel cabinet is installed, you may not have to follow the procedures in Chapter 1, "Preparing the System for Servicing" to replace the Crosstown board. The board can be removed and replaced with the system completely assembled (except for the XIO cables). However, if the server is mounted in an equipment rack, you may need to remove the GIGAchannel cabinet from the rack in order to gain access to the rear of the chassis.

Removing the GIGAchannel Crosstown Board

Follow these steps to remove the Crosstown board:

1. Remove the XIO cables that are attached to the Crosstown board.
2. Undo the two captive fasteners on the Cfcrosstown board, at the rear of the chassis. See Figure 5-41.

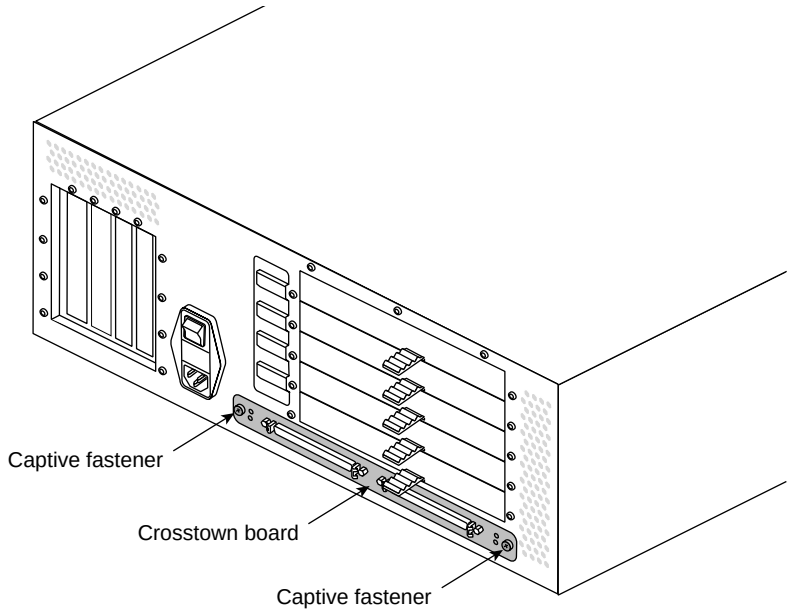

Figure 5-41 Location of the Crosstown Board and Captive Fasteners

3. Pull the board out of the chassis, as shown in Figure 5-42. You may have to pry the board slightly using a small, flat-bladed screwdriver.

   Caution: Be extremely careful not to damage the copper gasket in between the ears of the board (underneath the captive fasteners) and the chassis.

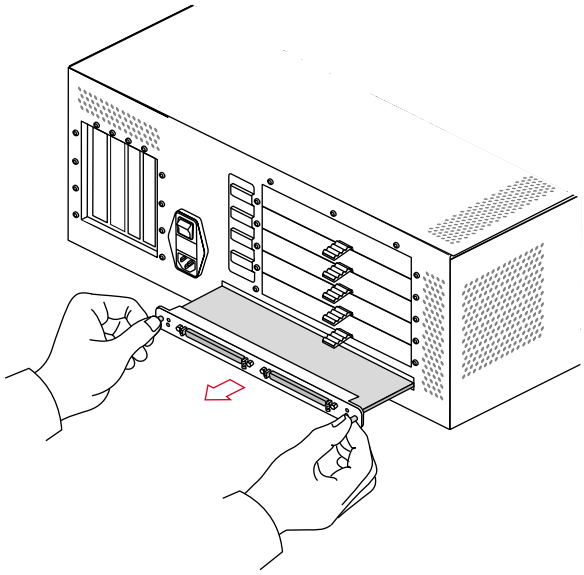

Figure 5-42 Removing the Crosstown Board

Installing a New Crosstown Board

Follow these steps to install a new Crosstown board:

1. Slide the new board in place.

   Note the alignment of the sides of the board on the guides inside the chassis. When properly aligned, the board should slide easily.

2. Slide the board back into chassis and press firmly to seat the connector at the back of the board.

3. Tighten the captive screws to secure the board.
4. Replace the XIO cables.
   - Connect XIO connectors A together on both the CPU module and the expansion cabinet.
   - Connect XIO connectors B together on both the CPU module and the expansion cabinet.

Replacing a Fuse

Note: Depending upon how your GIGAchannel cabinet is installed, you may not have to follow the procedures in Chapter 1, "Preparing the System for Servicing," to replace a fuse. The fuses can be removed and replaced with the system completely assembled (except for the power cable). However, if the server is mounted in an equipment rack, you may need to remove the GIGAchannel cabinet from the rack in order to gain access to the rear of the chassis.

The fuses are located in the black power plug housing (where you attach the power cord). Follow these steps to replace a fuse:

1. Shut down the system and unplug the power cords from both the CPU module and the GIGAchannel expansion chassis.
2. Locate the fuse cover on the GIGAchannel chassis, which is part of the power plug housing. See Figure 5-43.

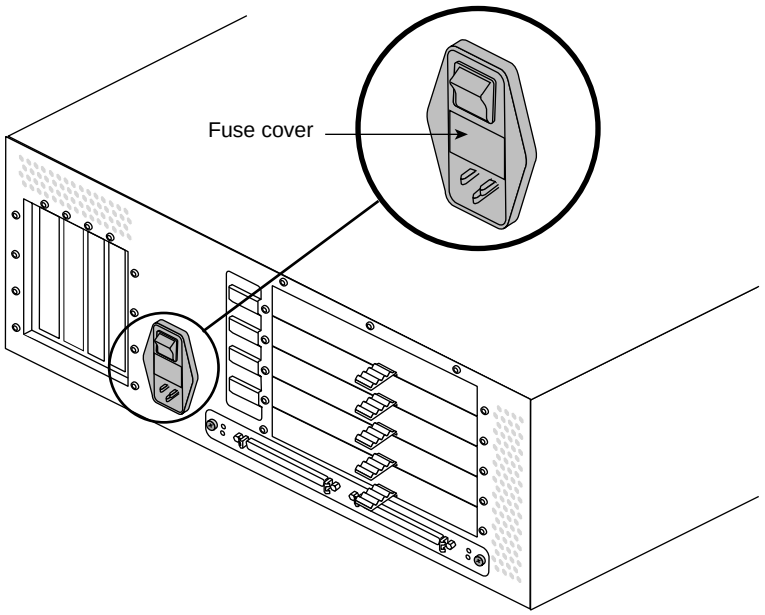

Figure 5-43 Location of the Fuse Cover in the GIGAchannel Expansion Chassis

3. Insert a small, flat-blade screwdriver in the notch of the fuse cover and pry outward. The fuse cover should release. See Figure 5-44.

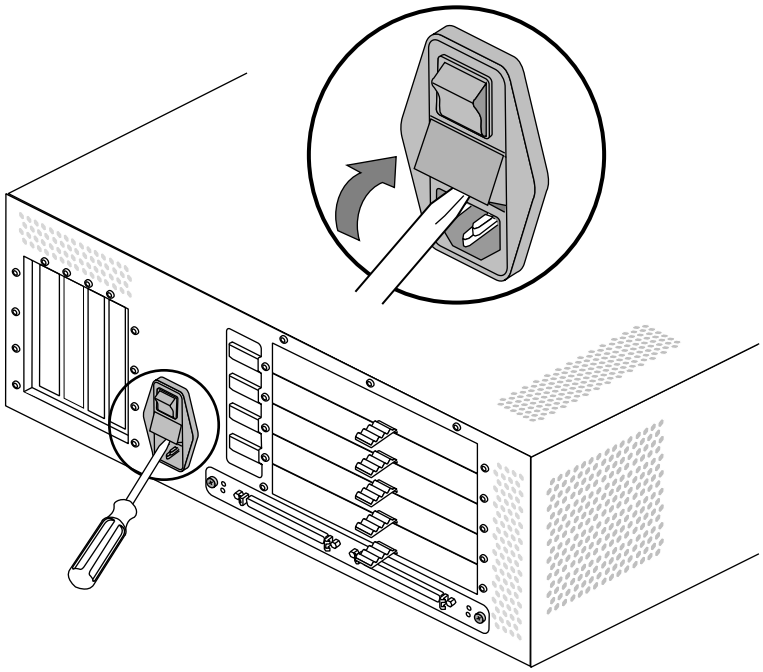

Figure 5-44 Removing the Fuse Cover From a GIGAchannel Expansion Chassis

4. There are two fuses inside the fuse cover. Locate the blown fuse and replace it with an identical type.
5. Snap the fuse cover back in place.

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 SGI 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 SGI Origin and Onyx2 systems) and 100BASE-T4.

blower

A type of fan used in the GIGAchannel expansion cabinet. Instead of blades that resemble the propeller of a ship, the blower uses blades that more closely resemble a paddle wheel (or water wheel). As the blower spins, it impells air out the bladed sides of the wheel, creating a slight vacuum in its center, thus drawing more air into the blower.

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 bus technology for linking nodes. *See also* node.

dual in-line memory module (DIMM)

A module to which are attached SDRAM chips.

ECC

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

electromagnetic interference (EMI)

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

Fast-20

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

gigabyte (GB)

A measure of data 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 manufacturer. Each card has a unique MAC address, so that it will be able to exclusively copy packets that are meant for it off the network.

megabyte (MB)

A measure of data 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.

module system controller (MSC)

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

mounting ear

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

number in a can (NIC)

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

node (node board)

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

peripheral component interconnect (PCI)

A bus specification.

pound

A unit of weight 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.

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 acronym for Crosstalk I/O, an SGI bus technology for linking I/O components of a system.

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