

# Indigo<sup>2</sup> CPU Upgrade Installation Guide

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## Upgrading the Indigo<sup>2</sup> R4000 to Indigo<sup>2</sup> R4400

This chapter explains how to install the R4400 CPU upgrade on an Indigo<sup>2</sup> R4000 workstation.

To install the hardware, you'll first shut down the system and check your version of the PROM chip from the Command Monitor. Next, you'll remove the covers, remove the existing CPU module, install the new CPU module, replace the PROM on the CPU board (if necessary), and replace the covers.

Read through this guide first before starting the upgrade. If you find a term you haven't seen before, see your workstation's *Owner's Guide*. The glossary contains definitions of many of the terms used in this guide.

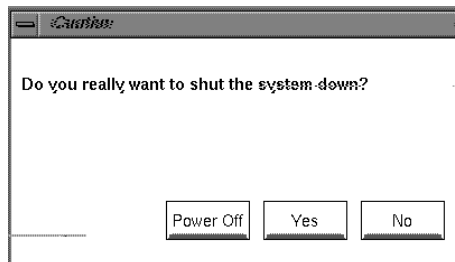
**Caution:** Make sure you have a full backup of your system before powering down and installing the upgrade. For instructions on backing up your system, see your *Personal System Administration Guide*.

## Shutting Down the System and Checking the PROM Chip

Before installing the CPU upgrade, you need to check what version of the PROM chip you have. You can do this while powering down your system.

Follow these steps to check what PROM version you have:

1. Shut down the system.
  - Place the cursor over the word "System" in the Toolchest in the upper left corner of your screen.
  - Press the left or right mouse button so that you see the menu. Drag the cursor down the menu until "System Shutdown" is highlighted; then click the mouse button. After a few seconds you see the notifier shown in Figure 1.



**Figure 1** System shutdown notifier.

- Click *Yes* to shut down without powering off the system. You see the message "Okay to power off the system now. Press any key to restart."
  - Click on the Restart button.  
You see the "Running power on diagnostics" message.
  - Click on the "Stop for Maintenance" button. The System Maintenance menu appears.
2. On the System Maintenance menu, type 5 or click on the *Command Monitor* icon.



3. See what version of the PROM you have. At the >> prompt, type:

**version**

Then press <Enter>.

You see a line similar to this:

```
PROM Monitor SGI Version 5.1 Rev. B, IP22, Sep 16, 1993  
(BE)
```

The date, "Sep 16, 1993" in the example above, tells you the version of the PROM.

If the date of your PROM is "Sep 16, 1993" or later, you *do not* need to change your PROM. When installing the upgrade, skip "Replacing the PROM Chip" on page 10 and go on to "Replacing the Cover" on page 18.

If the date of your PROM is *before* "Sep 16, 1993," you *do* need to change your PROM. Follow all the instructions while installing the upgrade.

4. After you have checked your PROM version, type **exit** to exit the PROM monitor.

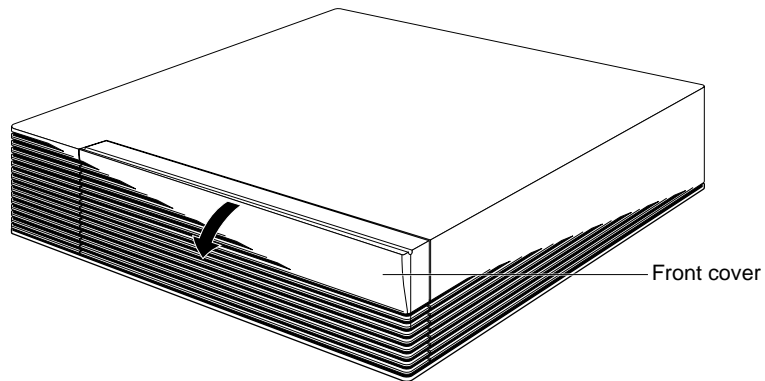
You see the System Maintenance menu again. It is safe to turn off your Indigo<sup>2</sup>.

5. Turn off the power by pressing and releasing the power switch on the front of the Indigo<sup>2</sup>. The system powers off automatically.

## Removing the Cover

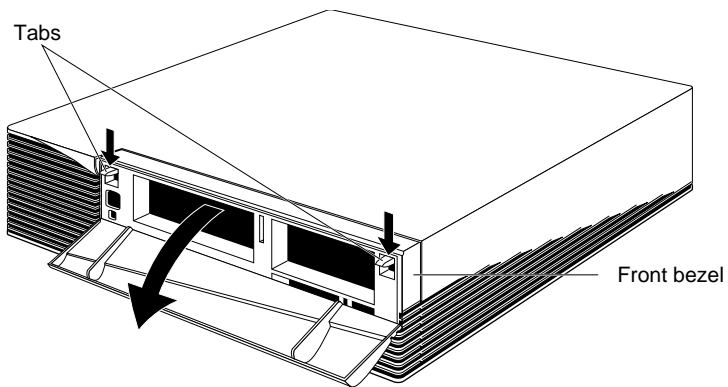
Follow these steps to disconnect the cables and remove the cover:

1. Disconnect the cables from the back of your Indigo<sup>2</sup> workstation.  
Make sure to disconnect the black power cable.
2. Remove the front cover.
  - Face the front of the Indigo<sup>2</sup> chassis.
  - Open the front cover by snapping it away from the top edge of the chassis and tipping it down, as shown in Figure 2.



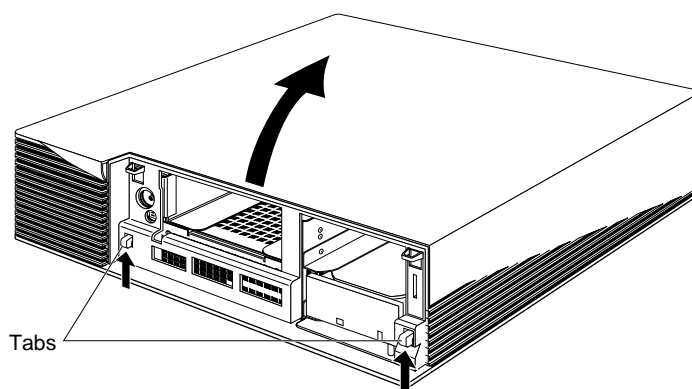
**Figure 2** Opening the front cover from the Indigo<sup>2</sup> chassis.

3. Remove the front bezel.
  - Press down on the tabs on each side of the bezel, as shown in Figure 3.
  - Pull the bezel away from the chassis.



**Figure 3** Removing the front bezel from the Indigo<sup>2</sup> chassis.

4. Remove the top cover.
  - Press up on the tabs on each side of the drive openings.
  - Pull up on the cover and rotate it back and away from the chassis, as shown in Figure 4.



**Figure 4** Removing the top cover from the Indigo<sup>2</sup> chassis.

## Attaching the Wrist Strap

Wear the wrist strap to prevent the flow of static electricity, which can damage the board.

**Caution:** The components inside the Indigo<sup>2</sup> are extremely sensitive to static electricity. Handle all boards carefully, and wear the wrist strap shipped with the upgrade board while replacing parts inside the system.

To attach the wrist strap, follow these steps:

1. Put the wrist strap over your wrist, making sure it is tight against your arm.
2. Attach the alligator clip to a metal part of the Indigo<sup>2</sup>.

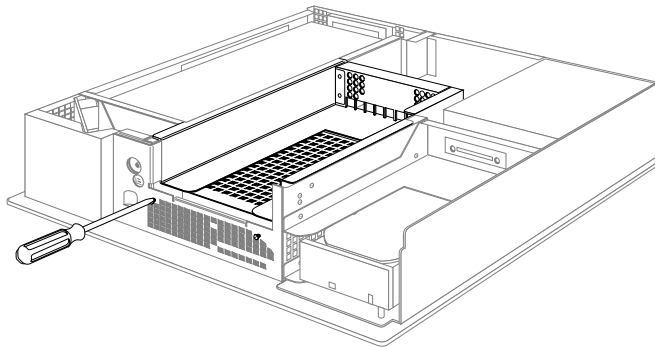
## Replacing the CPU Module

To replace the CPU module, follow the steps below to remove the 5-1/4" drive tray, remove the CPU module, install the new CPU module, and install the drive tray.

1. If you have not already shut down the system, removed the cover, and attached the wrist strap, go to "Shutting Down the System and Checking the PROM Chip" on page 2 for instructions.

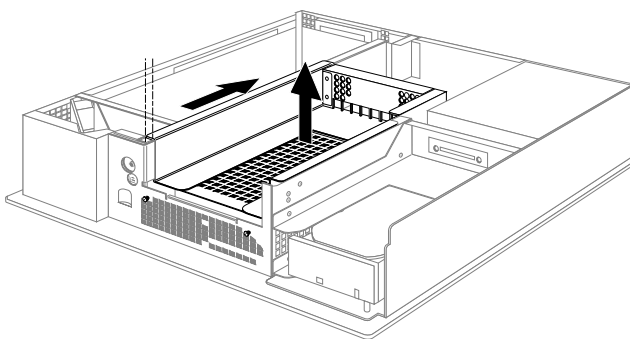
2. Remove the 5-1/4" drive tray and drive. If a drive is installed in the tray, you do not need to remove the drive from the tray.
  - Disconnect the SCSI cable from the connector on the back of the 5-1/4" drive tray.
  - Loosen the two screws that hold the 5-1/4" drive tray to the chassis, as shown in Figure 5.

The screws are located below the drive tray in the center front of the system.



**Figure 5** Loosening the screws on the 5-1/4" drive tray.

- Push the drive tray backward, and pull up to remove the tray, as shown in Figure 6.



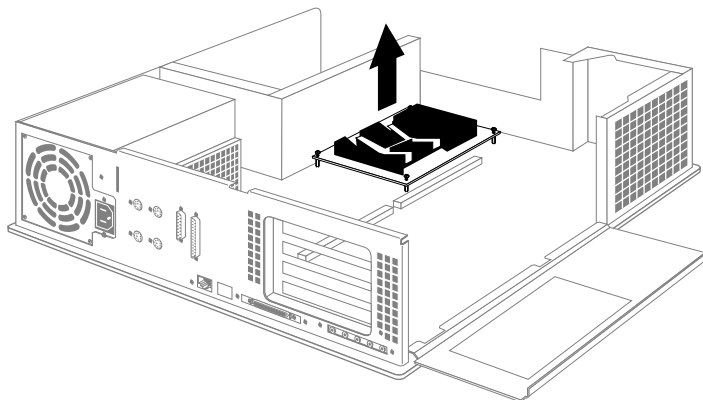
**Figure 6** Removing the 5-1/4" drive tray from the Indigo<sup>2</sup> chassis.

3. Locate the CPU module.

The CPU module is the large elevated module on the CPU board that is protected by a textured heat sink. It contains the CPU chip, cache, and CPU clock crystal. Figure 7 shows the CPU module as viewed from the rear of the system.

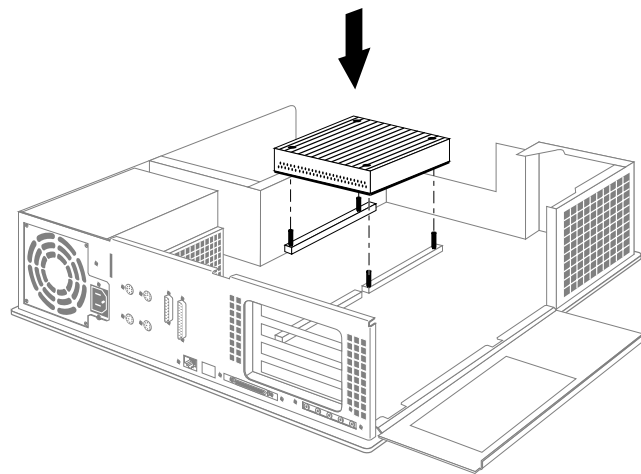
4. Remove the CPU module.

- Remove the screws on the corners of the module that attach the CPU module to the board, as shown in Figure 7.
- Disconnect the module connector from the socket on the board by lifting up on the sides of the module and gently rocking it back and forth.
- Lift the module up and away from the board.



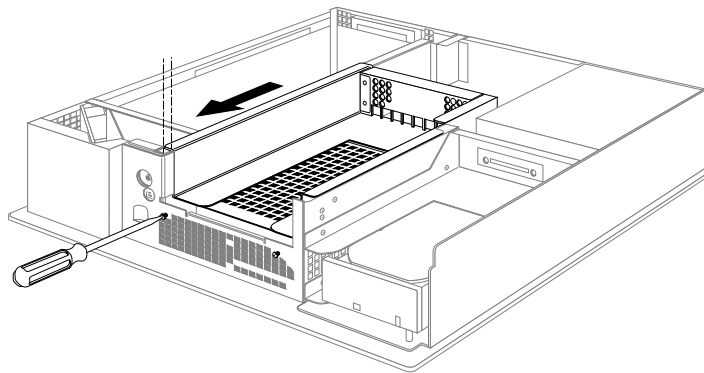
**Figure 7** Removing the CPU module.

5. Install the new CPU module.
  - Position the new module so that the connector on the bottom of the module aligns with the socket on the board, as shown in Figure 8.
  - Press down on top of the module connector until it is securely attached to the socket on the board.
  - Tighten the four screws in the top of the module.



**Figure 8** Installing the CPU module.

6. Install the 5-1/4" drive and tray.
  - Position the drive and tray so that the tabs on the sides of the tray fit inside the slot openings in the chassis and so that the open side of the tray faces the front of the system, as shown in Figure 9.



**Figure 9** Installing the 5-1/4" drive tray.

- Push the tray forward to lock it in place.
- Tighten the two captive screws.
- Reattach the SCSI cable to the connector on the back of the drive tray.

You are finished replacing the CPU module.

## Replacing the PROM Chip

If your PROM is dated before "Sep 16, 1992," follow the steps below to replace the PROM chip. (You should have already checked the version of your PROM chip. Refer to "Shutting Down the System and Checking the PROM Chip" on page 2.)

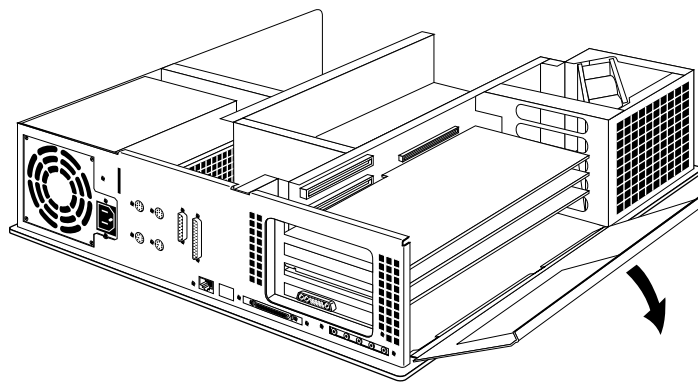
To install the new PROM chip, you must first remove the graphics board set to gain access to the CPU board. Follow these instructions:



## Removing the Graphics Board Set

To remove the board set, follow these steps:

1. Make sure the wrist strap is attached to a metal part of the system.
2. Move the system or position yourself so that you are facing the expansion slots, as shown in Figure 10.
3. Open the metal panel in front of the expansion slots by pulling up on the panel and lowering it down.

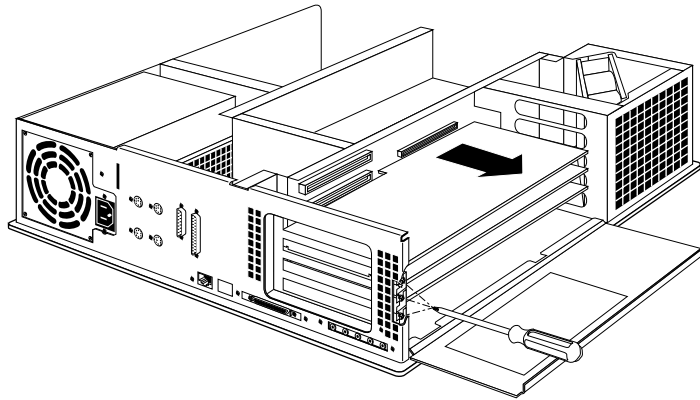


**Figure 10** Opening the metal panel in front of the expansion slots.

4. Remove the screws attaching it to the system slots as shown in Figure 11.

The screws are located on the metal extension on the left side of each board. Use the Phillips screwdriver to loosen the screw first and then use your hand to unscrew it all the way and remove it.

**Note:** The screws are very small. If you drop a screw into the chassis, remove it to prevent the possibility of shorting the system. If you lose a screw, extra screws are provided in a plastic bag.



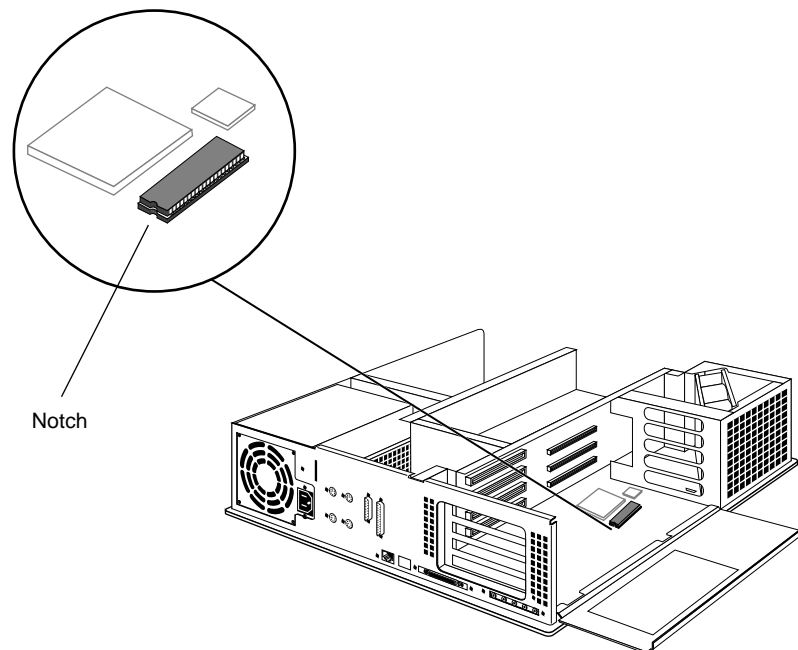
**Figure 11** Removing the graphics board set from the Indigo<sup>2</sup> chassis.

5. Pull the board set out of the system.
  - Turn both hands inward so that your thumbs point to the floor.
  - Place your index fingers behind the small metal posts on each side of the board.
  - Brace your thumbs against the chassis, and pull the board out of the slot. You may need to use some force.
  - Place the board set down on a flat, antistatic surface so the side with the chips faces up. An empty antistatic bag or a clean, dry desktop works well.

## Replacing the PROM Chip

Follow these steps to remove and replace the PROM chip:

1. Locate the PROM chip. The PROM chip is located on the CPU board below the slot from which you removed the graphics board, as shown in Figure 12.

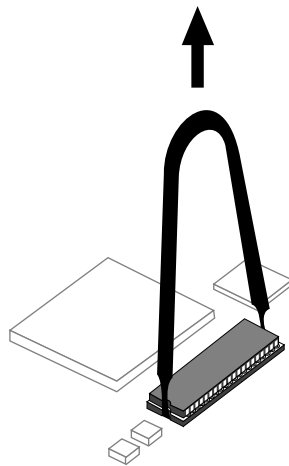


**Figure 12** Locating the PROM chip on the CPU board.

2. Familiarize yourself with the PROM chip.

Note that the PROM chip has a semi-circular notch on one end, as shown in Figure 12. You'll use this notch to orient the PROM.

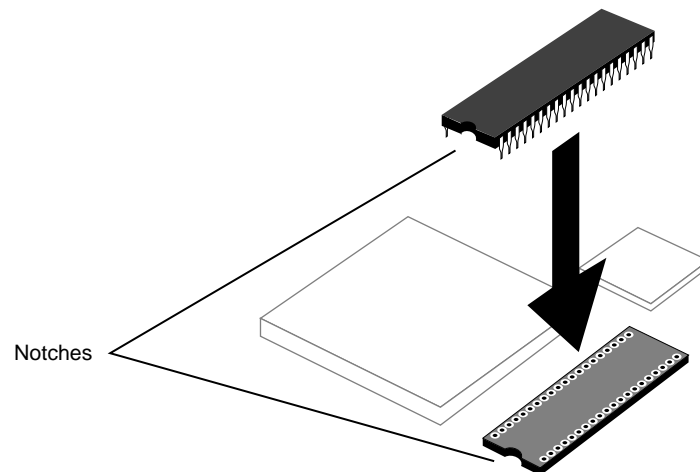
3. Remove the PROM chip from the CPU board. The PROM chip is seated in a socket that is permanently attached to the CPU board.
  - You received a chip removal tool - it looks like a pair of huge tweezers. Insert the chip removal tool between the PROM chip and the socket on the board, as shown in Figure 13. Work the chip away from the socket in a rocking motion, pulling up on one side of the chip and then on the other side.
  - Continue the rocking motion until the PROM chip is all the way out of the socket.



**Figure 13** Removing the PROM chip from the socket.

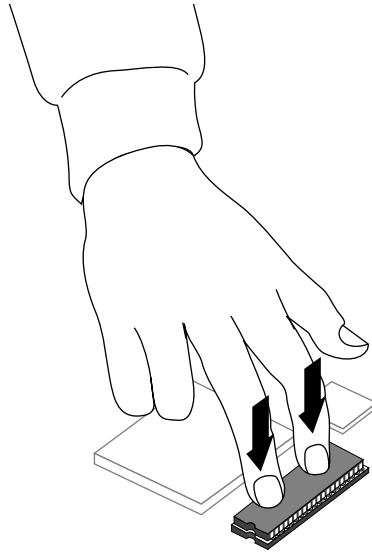
4. Install the new PROM chip.
  - Grasp the new PROM chip. Orient the PROM above the socket on the CPU board so the semi-circular notch on the PROM chip lines up with the notch in the socket, as shown in Figure 14.
  - Line up all of the pins on the PROM with the corresponding holes in the socket.

**Caution:** Make sure you line up the notch on the PROM chip with the notch in the socket. If you install the PROM chip backwards, the system will not power on.



**Figure 14** Lining up the PROM chip.

5. Once the pins are lined up, press down firmly on the top of the PROM chip until it is seated in the socket, as shown in Figure 15.



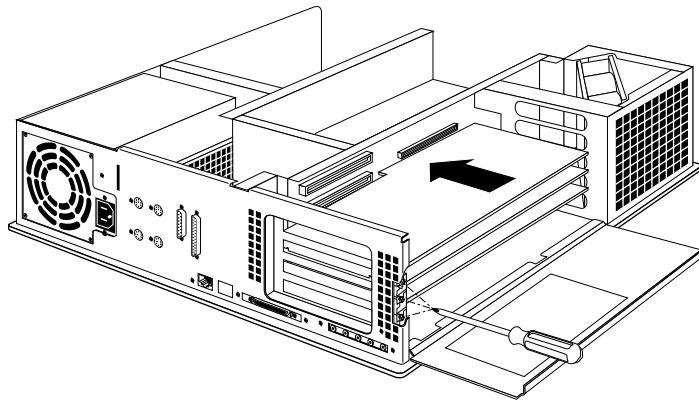
**Figure 15** Pressing the PROM chip into the socket.

6. Visually check to make sure all the pins on the PROM are inserted correctly in the holes on the socket and the PROM is seated all the way.

## Replacing the Graphics Board Set

Follow the steps below to re-install the graphics board set:

1. Install the board set.
  - Grasp the board set with metal extensions on the left and the sides with the chips facing up.
  - Align the metal extensions on the left of the board set with the slots on the chassis. At the same time align the right edge of the board set with the metal grooves on the right of the chassis, as shown in Figure 16.



**Figure 16** Replacing the graphics board set in the Indigo<sup>2</sup> chassis.

- Push the board set into the slot until the connector on the back of the board is securely connected to the connector on the EISA backplane.

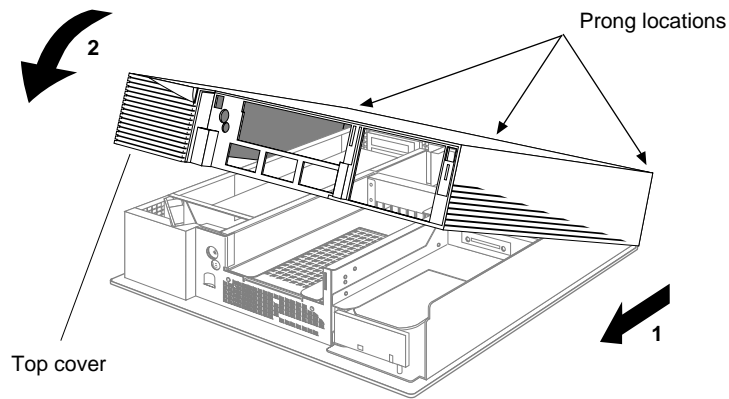
2. Insert and tighten the screws that hold the board set to the chassis. The screw openings are located on the metal extension on the left side of each board.
3. Tip the metal panel up in front of the boards you just installed until it snaps into place.

You are finished installing the PROM chip.

## Replacing the Cover

To replace the top cover, follow these steps:

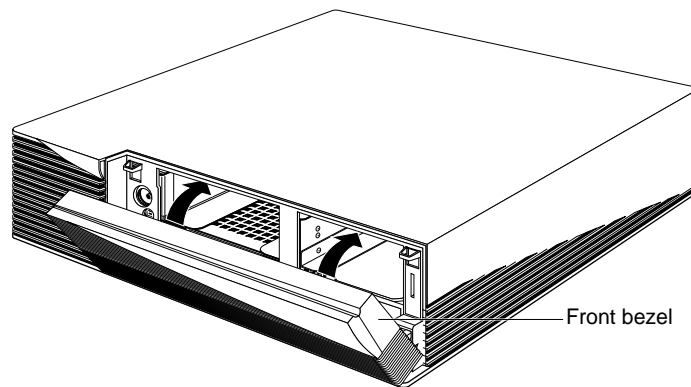
1. Place the prongs on the underside of the cover into the slots under the top ridge of the backplane of the chassis, as shown in Figure 17.
2. Lower the cover down onto the chassis until it snaps into place.



**Figure 17** Replacing the top cover on the Indigo<sup>2</sup> chassis.



3. Replace the front bezel.
  - Place the tabs on the bottom of the bezel in the grooves in the front of the chassis, as shown in Figure 18.
  - Tilt the bezel up until it snaps into place.



**Figure 18** Replacing the front bezel on the Indigo<sup>2</sup> chassis.

4. Reconnect the cables to the back of the system.

You are finished upgrading the CPU and ready to start the system.

## Returning the R4000 CPU Module

Use the box that contained the upgrade to return the R4000 CPU module to Silicon Graphics.

1. Place the CPU module in the antistatic bag that shipped with the upgrade, and pack the equipment in the box.
2. Use the Return Materials Authorization form to return the equipment to Silicon Graphics.

## Turning On the Indigo<sup>2</sup> Workstation

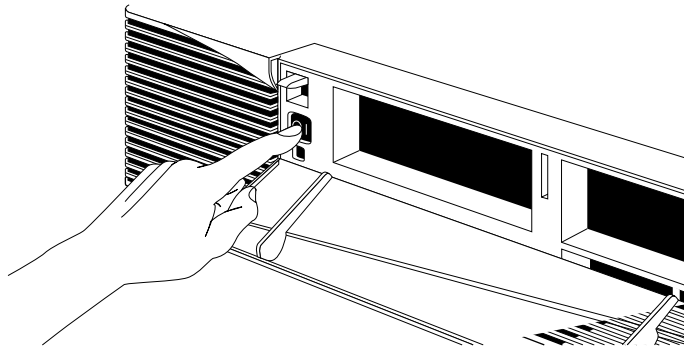
Power up and log in to your workstation by following these steps:

1. Turn on the monitor.

The monitor's power switch is on the front of the monitor in the lower right corner. The LED next to the switch lights up when you turn on the monitor.

2. Turn on the system power.

- Open the front cover by snapping it away from the top edge of the chassis and tipping it down.
- Press the power switch to turn on the system, as shown in Figure 19.



**Figure 19** Turning on the Indigo<sup>2</sup> workstation.

When you power on your system, you'll hear the boot "tune" and will see the LED on the front of the machine turn on. While the system is running power-on diagnostics, you'll see an orange light. You should see the orange light for a few seconds. If the system passes all of the diagnostics tests, the light will turn green, and the system will continue booting. If you do not hear the boot tune or the LED does not turn green, there may be a problem. See Chapter 6, Troubleshooting, in the *Indigo<sup>2</sup> Workstation Owner's Guide* to troubleshoot your system.

To install software, see the release notes that came with this upgrade.

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