

# Indy™ R4400SC™ 200 MHz CPU Upgrade Installation Guide

Document Number 007-3057-001

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Indy™ R4400SC™ 200 MHz  
CPU Upgrade Installation Guide  
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# Upgrading the Indy Workstation CPU

This manual explains how to install the CPU upgrade on an Indy workstation.

**Note:** If you received a CD with the upgrade, you must install the software first. Read the software release notes on the CD for software installation instructions *before* installing the hardware.

To install the hardware, you will complete these steps:

- Check the your system's PROM version.
- Shut down the system.
- Remove the cover.
- Remove any existing GIO option boards and the graphics board (if necessary).
- Remove and replace the PROM chip on the system board (if necessary).
- Remove and replace the CPU module.
- Replace the cover and restart your system.

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, choose "Online Books" from the Help toolchest. Then select the *Personal System Administration Guide* and search for "Backing Up and Restoring Files."

## The Upgrade Package

Your upgrade package includes all of the following items. If anything is missing, contact your sales representative.

- PROM chip in an antistatic bag
- CPU module in an antistatic bag
- open-ended wrench to remove standoffs and hexnuts
- Phillips screwdriver
- chip removal tool to remove the PROM chip
- anti-static wrist strap
- *Indy R4400SC 200 MHz CPU Upgrade Installation Guide* (this manual)
- CD (not in all upgrades)

In addition, some upgrade packages include a system label to attach to the underside of the Indy workstation.

## Installing the Software

If you received a CD with the upgrade, read the release notes on the CD for instructions on installing the software. Install the software *before* installing the hardware.

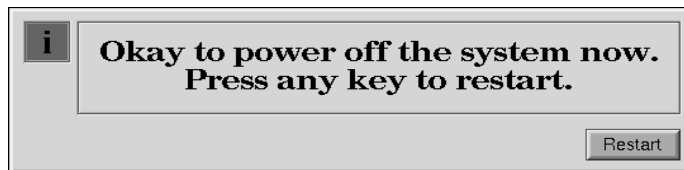


## Checking Your System's PROM Version

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

Follow these steps to check your system's PROM version:

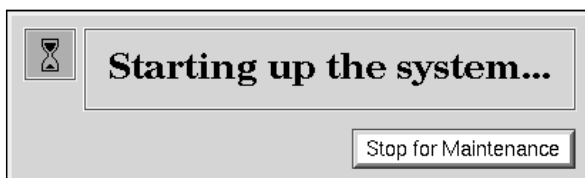
1. Shut down the system.
  - From the System toolchest in the upper left corner of your screen, choose "System Shutdown."  
If you have set a root password, you are prompted to enter it.  
You then see a cautionary message about stopping all running applications.
  - Click "OK" to shut down without powering off the system.  
After a few seconds, you see the message shown in Figure 1.



**Figure 1** Okay to Power Off Notifier

- Click the "Restart" button.

You then see the message shown in Figure 2.



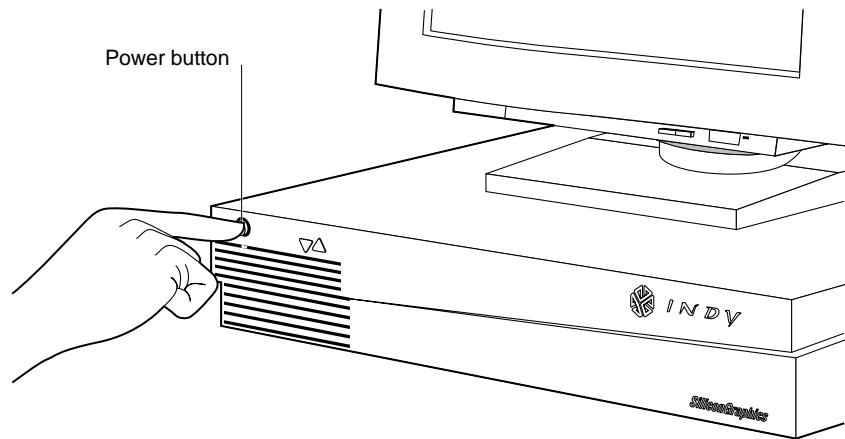
**Figure 2** Starting Up the System Notifier

- Click on the “Stop for Maintenance” button. The System Maintenance menu appears.
- 2. Press **5** on the keyboard, or click on the “Enter Command Monitor” icon on the System Maintenance menu.
- 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 5.3 Rev B7 R4X00 IP24 Feb 16, 1995 (BE)
```

The date, “Feb 16, 1995” tells you the version of the PROM.
  - If your PROM is dated July 15, 1994 or later, you do not need to replace the PROM chip. Skip the section “Replacing the PROM Chip”, and go to “Replacing the CPU Module” on page 22.
  - If your PROM is dated *before* July 15, 1994, you must replace the PROM chip. Go to the next section, “Replacing the PROM Chip” on page 7.
- 4. Type `exit` to exit the PROM monitor.  
You see the System Maintenance menu again. It is safe to turn off your Indy workstation.

5. Press and release the power button on the front of the workstation, as shown in Figure 3, to power off the system.



**Figure 3** Turning off the Indy workstation

## Removing the Top Cover and Disconnecting the Cables

Follow these steps to remove the top cover of your Indy workstation:

1. If the monitor is on top of the workstation, move it to one side.

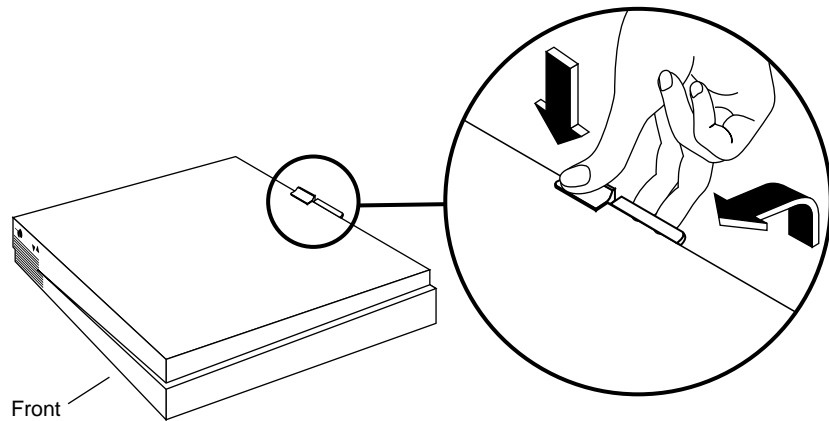
**Caution:** Monitors are very heavy. Have someone help you move it.

2. Disconnect the following cables from the back of the Indy workstation:
  - power cable
  - monitor cable
  - IndyCam™ cable (if connected)
  - EtherNet AUI cable (if connected). (Push the sliding bracket on the Ethernet port to the left and remove the cable.)

Disconnecting the IndyCam and EtherNet AUI cables is optional. Removing them gives you more room when removing the screws on either side of the graphics board connector.

3. Facing the front of the Indy workstation, place your right thumb on the small channel at the back of the cover, and your second and third fingers under the finger ledge, as shown in Figure 4.
4. Snap the cover loose by bracing your thumb against the lip and pushing up the finger ledge with the second and third fingers, followed by a small push toward the front.
5. Slide the cover forward about one inch and tilt it up to remove it.

**Tip:** It may be difficult to release the cover the first time, and you may have to use some force.



**Figure 4** Removing the top cover from the Indy workstation

### Attaching the Wrist Strap

Wear the wrist strap to prevent the flow of static electricity, which can damage the components in the Indy workstation.

**Caution:** The components inside the Indy are extremely sensitive to static electricity. Handle all chips and modules carefully, and wear the wrist strap shipped with the upgrade package 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 Indy chassis.

## Replacing the PROM Chip

To reach the PROM chip, you must first remove any GIO option boards that are installed and then remove the graphics board. Follow the steps below.

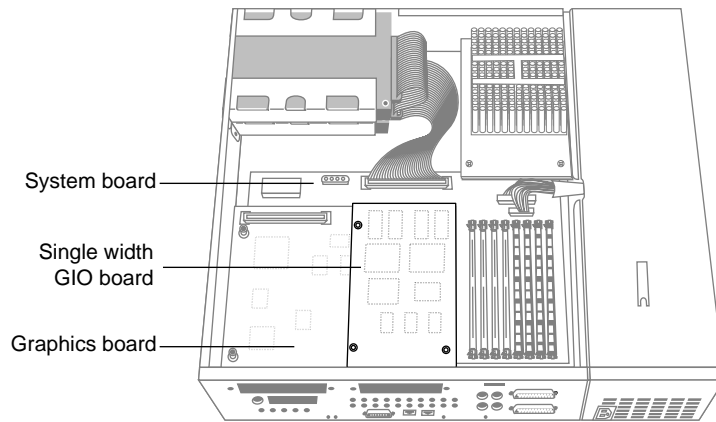
### Removing the GIO Option Board

GIO option boards are installed on top of the graphics board. A single-width GIO option board covers half of the graphics board; a double-width covers the entire graphics board. Figure 5 shows a single-width board.

To determine if your workstation has a GIO option board installed, look at your workstation and at Figure 5. If there is a GIO option board installed, follow these steps to remove it. If there is no GIO option board installed, skip to "Removing the Graphics Board" on page 9.

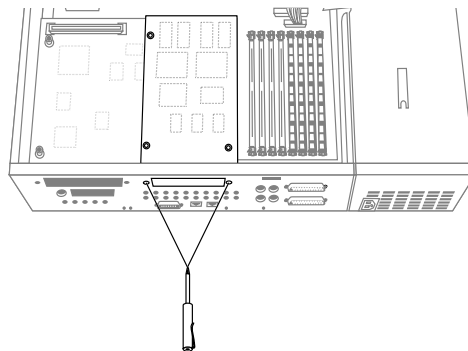
**Note:** These instructions are for a single-width GIO option board. Use the same steps to remove a double-width GIO option board. The only difference is that there are more screws to remove on a double-width board.

1. Locate the GIO option board, as shown in Figure 5.



**Figure 5** Locating the GIO option board

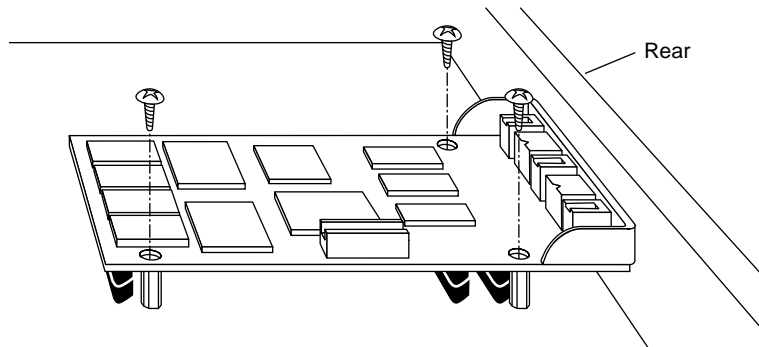
2. If there are external cables connected to the GIO option board connector on the rear of the workstation, disconnect them.
3. Using the Phillips screwdriver provided with this upgrade kit, remove the two screws from the GIO board connector on the rear of the workstation, as shown in Figure 6.



**Figure 6** Removing the screws from the rear of the workstation

4. Using a Phillips screwdriver, remove the three screws that connect the GIO option board to the graphics board, as shown in Figure 7.

**Note:** A double-width GIO option board has more than three screws to remove.



**Figure 7** Removing the screws from the GIO option board

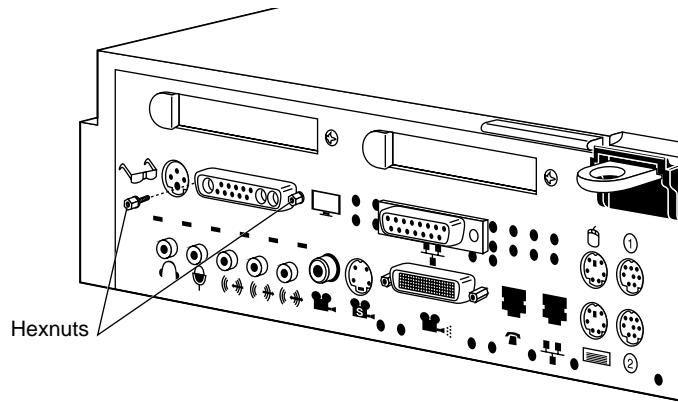
5. Disconnect the GIO board from the graphics board by grasping the GIO board firmly and pulling it up.

You are finished removing the GIO option board.

### Removing the Graphics Board

Follow these steps to remove the graphics board:

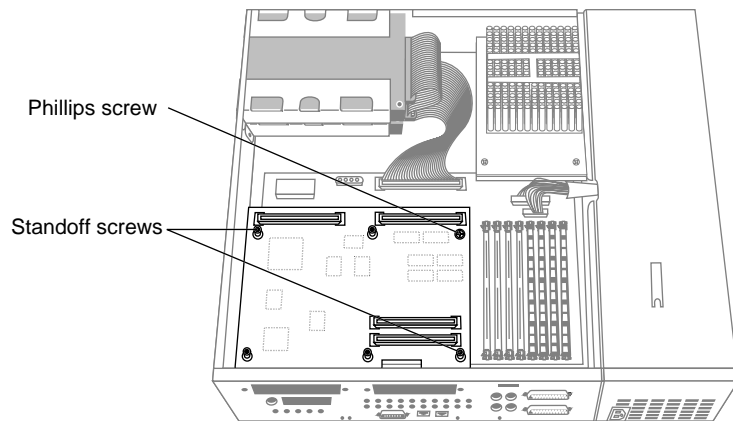
1. Facing the rear of the workstation, use the open-ended wrench to unscrew the two hexnuts on either side of the graphics board's I/O connector, as shown in Figure 8. The wrench is provided with this upgrade.



**Figure 8** Removing the screws from the graphics board's I/O connector

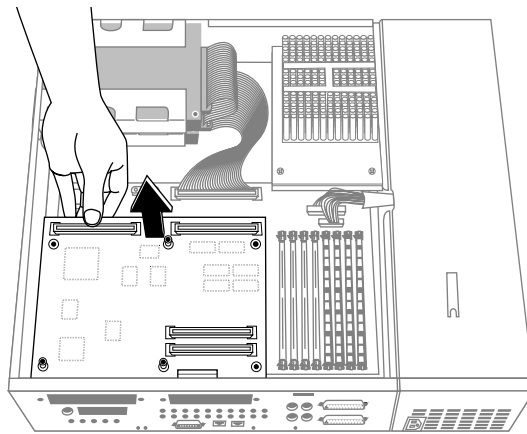


2. Use the other end of the open-ended wrench to unscrew the two standoff screws (tall, hexagonal posts) from the graphics board, as shown in Figure 9.
3. Use a Phillips screwdriver to remove one screw from the graphics board.



**Figure 9** Removing the screws from the graphics board

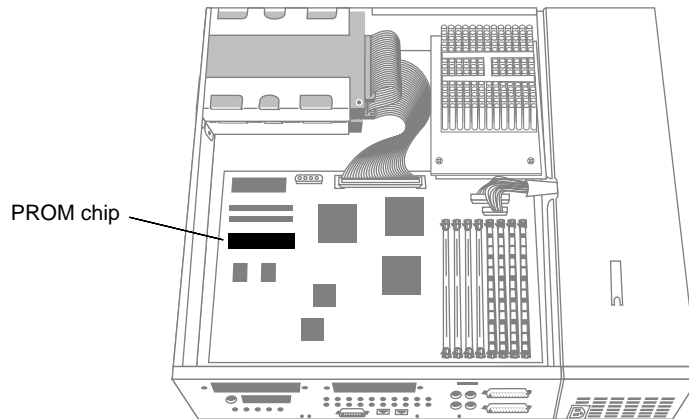
4. Disconnect the graphics board from the system board, as shown in Figure 10.
  - Grasp the board firmly on the side close to the system disk drive and pull up to disconnect the two connectors under the graphics board from the sockets on the system board.
  - Lift the graphics board up and remove it.



**Figure 10** Disconnecting the graphics board from the system board

## Replacing the PROM Chip

1. Locate the PROM chip. Facing the system from the rear, the PROM chip is located on the left of the system board, as shown in Figure 11.



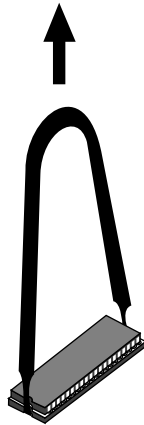
**Figure 11** Locating the PROM chip on the system board

Before removing the PROM chip, familiarize yourself with it. Note that it has either a semi-circular notch or a small, indented circle at one end. You'll use this notch or circle to orient the upgrade PROM when you install it.

2. Remove the PROM chip from the system board.

The PROM chip is seated in a socket that is permanently attached to the system board. It's important when you use the tool to remove the chip that you insert the tool under the PROM chip itself, *and not under the socket*.

- 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 12. 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. It may be difficult to loosen it.
- Continue the rocking motion until the PROM chip is all the way out of the socket.

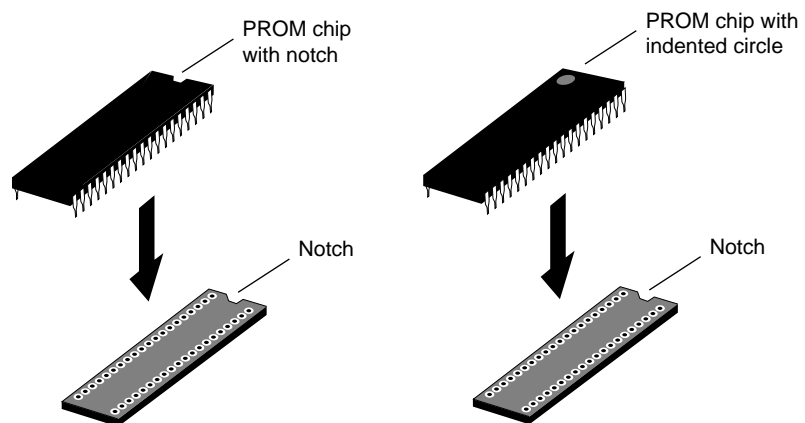


**Figure 12** Removing the PROM chip

3. Install the new PROM chip.
  - Grasp the new PROM chip. Orient the PROM above the socket on the system board so the end with the semi-circular notch or small, indented circle on the PROM chip lines up with the notch in the socket, as shown in Figure 13.

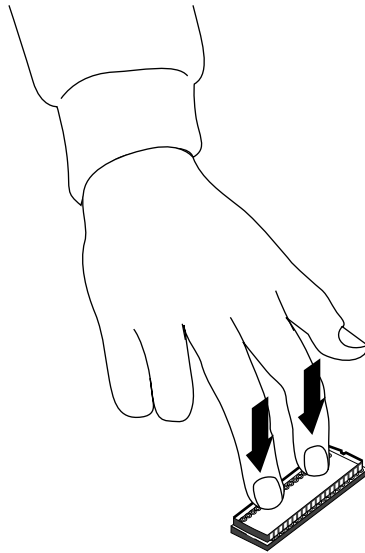
**Caution:** Make sure you line up the notch or the small circle on the PROM chip with the notch in the socket. If you install the PROM chip backwards, the system will not power on and you will damage the PROM chip.

- Line up all of the pins on the PROM with the corresponding holes in the socket.



**Figure 13** Lining up the PROM chip

4. 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 14.



**Figure 14** Pressing the PROM chip into the socket

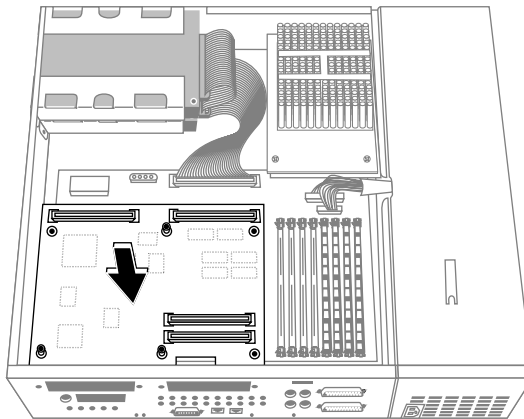
5. Visually check to make sure all the pins on the PROM are inserted correctly in the holes on the socket and the PROM is seated all the way.

You are now ready to replace the graphics board and GIO option board, if you removed one.

## Replacing the Graphics Board

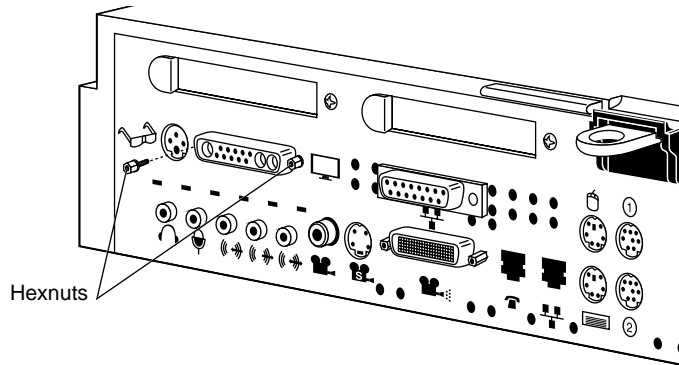
Follow these steps to replace the graphics board.

1. Lower the graphics board over the system board, tilting it to insert the graphics board's I/O connector through the open I/O slot on the rear of the chassis.
2. Align the screw holes on the graphics board over the vacant standoff screws (tall, hexagonal posts) on the system board.
3. Connect the graphics board to the system board, as shown in Figure 15.
  - Seat the connectors under the graphics board over the sockets on the system board. Make sure they are positioned correctly before going on to the next step.
  - Press down firmly on all four corners of the graphics board until it is securely seated in the two sockets on the system board. If the board is not seated all the way, the screws will not tighten correctly.
  - Visually inspect the socket connection.



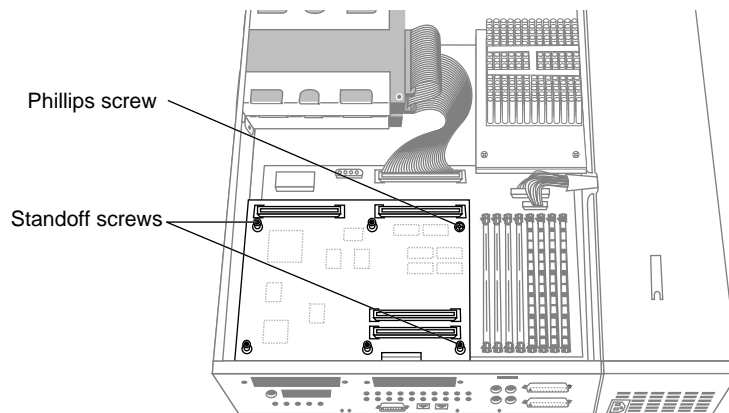
**Figure 15** Connecting the graphics board to the system board

4. Insert the two hexnut screws on either side of the graphics board's I/O connector on the rear of the chassis, as shown in Figure 16. Use the open-ended wrench provided with this upgrade to tighten the two hexnut screws.



**Figure 16** Replacing the screws on the graphics board's I/O connector

5. Insert the two standoff screws on the graphics board, as shown in Figure 17. As you tighten the screws, alternate between them so that the board is connected evenly.
6. Insert the Phillips screw on the graphics board, and tighten it with the Phillips screwdriver.



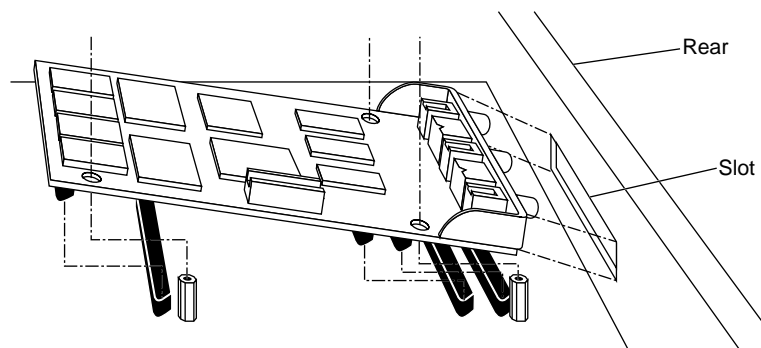
**Figure 17** Inserting the screws on the graphics board



## Replacing the GIO Option Board

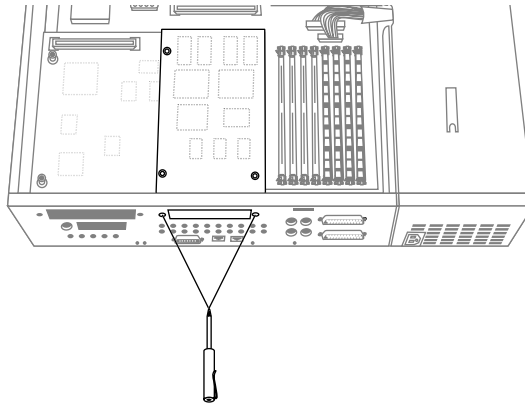
Follow these steps to replace the GIO option board, if one was installed.

1. Install the GIO board.
  - Lower the GIO option board over the graphics board, inserting the GIO board's I/O connector through the open slot on the rear of the workstation, as shown in Figure 18.
  - Align the three screw holes on the GIO option board over the vacant standoffs (tall, hexagonal posts) on the graphics board.
  - Seat the connector located under the GIO option board over the socket on the graphics board and press down firmly on all four corners of the board until the connector is securely seated on the graphics board.



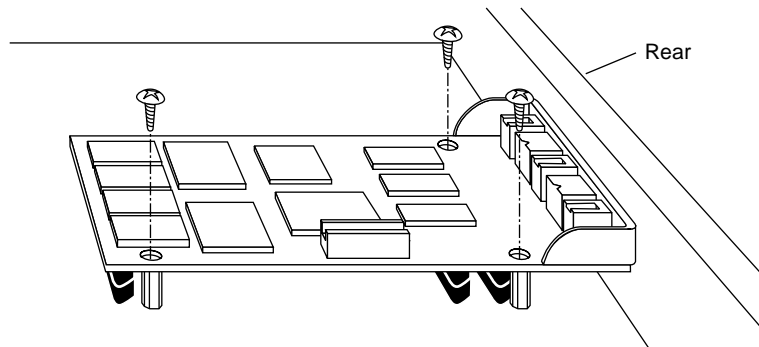
**Figure 18** Inserting the GIO board's I/O connector through the backplane

2. Insert and tighten the two screws through the rear of the workstation, as shown in Figure 19. If the screw holes do not line up, the board may not be seated all the way, or one of the screws may be screwed down too tightly.
  - Look under the board to make sure the connector or connectors are seated evenly and are inserted all the way into the sockets.
  - Press the four corners of the board to make sure the connectors are inserted all the way into the sockets on the graphics board.



**Figure 19** Inserting the screws from the rear of the workstation

3. Connect the GIO option board to the graphics board.
  - Using a Phillips screwdriver, insert and tighten the screws you removed earlier to connect the GIO option board to the graphics board, as shown in Figure 20. As you tighten the screws, alternate among them so that the board is connected evenly.



**Figure 20** Installing a single-width GIO option board

4. If the GIO option board has one or more external cables, reconnect them to the board's I/O connector.

You are finished installing the PROM chip and are ready to replace the CPU module.

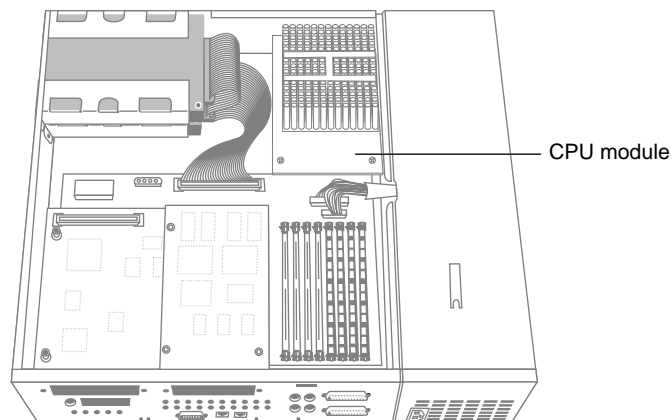
## Replacing the CPU Module

Follow the steps below to remove the CPU module and install the new CPU module.

1. Locate the CPU module, as shown in Figure 21.

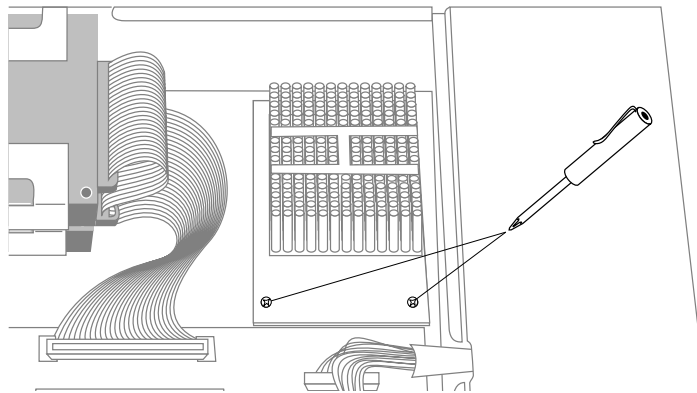
The CPU module is elevated on the system board and is located at the front of the system between the power supply and the system disk drive. It is protected by a textured heat sink. *Do not remove the heat sink.*

**Note:** The Indy workstation supports several CPU module shapes. Your system may have a CPU module and heat sink that look different than the one shown below.



**Figure 21** Locating the CPU module

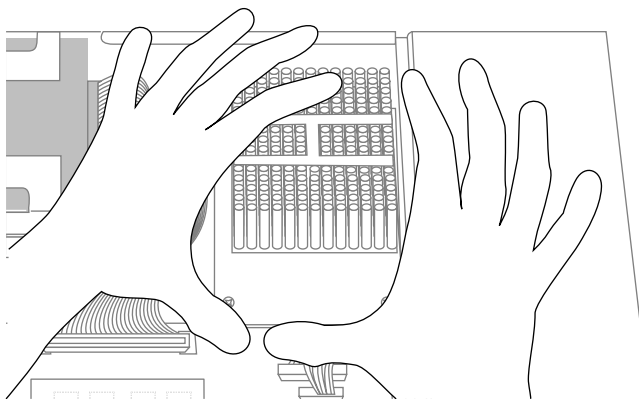
- Using the Phillips screwdriver provided, remove the two screws that connect the CPU module to the system board, as shown in Figure 22.



**Figure 22** Removing the two screws from the CPU module

- Lift the board by bracing your hands against the power supply and the chassis and pushing the board up with your thumbs, as shown in Figure 23.

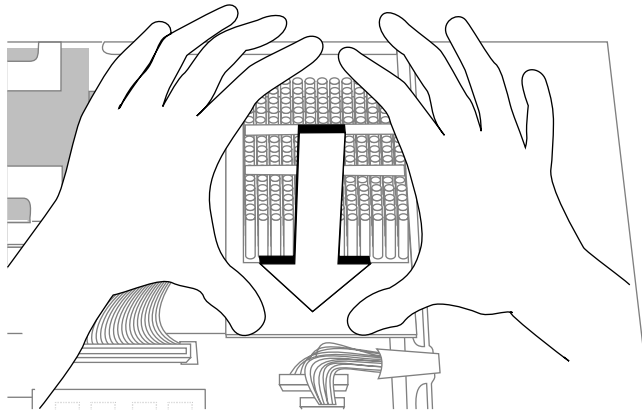
**Note:** Note that when the board disconnects, it pops up quite quickly and may startle you.



**Figure 23** Disconnecting the CPU module

4. Install the new CPU module, as shown in Figure 24.
  - Slide the feet on the bottom of the CPU module into the slippers on the base of the chassis.
  - Align the two screw holes on the CPU module over the screw holes on the system board.
  - Seat the connector under the CPU module over the connector on the system board. Make sure it is positioned correctly before going on to the next step.
  - Press down firmly on the CPU module until it is securely seated in the socket on the system board.

If the connector does not seem to fit into the socket, do not force it. Lift the end of the CPU module slightly and lower it again, making sure it's aligned correctly over the connector before pressing it all the way down. You may need to push the power cables gently aside to see the CPU's connectors.



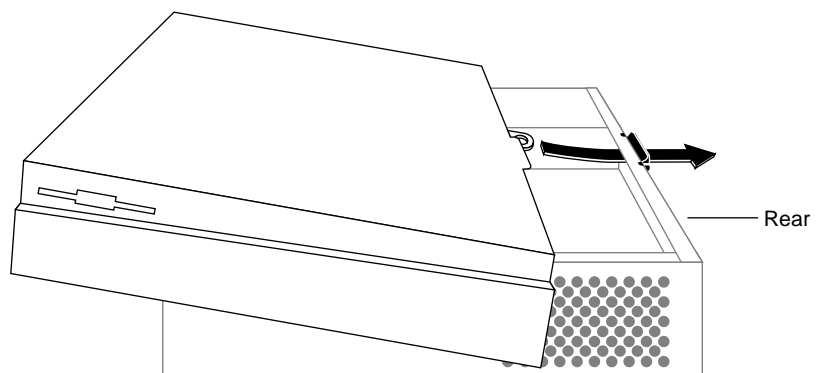
**Figure 24** Installing the CPU module

5. Insert and tighten the two screws you removed earlier to connect the CPU module to the system board. As you tighten the screws, alternate from one to the other so that the board is connected evenly.

## Replacing the Cover

To replace the cover of your Indy workstation, follow these steps:

1. Facing the front of the system, lower the cover a few inches from its fully closed position, as shown in Figure 25.
2. Tilt the cover and insert the tab through the hole in the rear of the chassis.
3. Slide the cover toward the back of the chassis until it snaps into place.



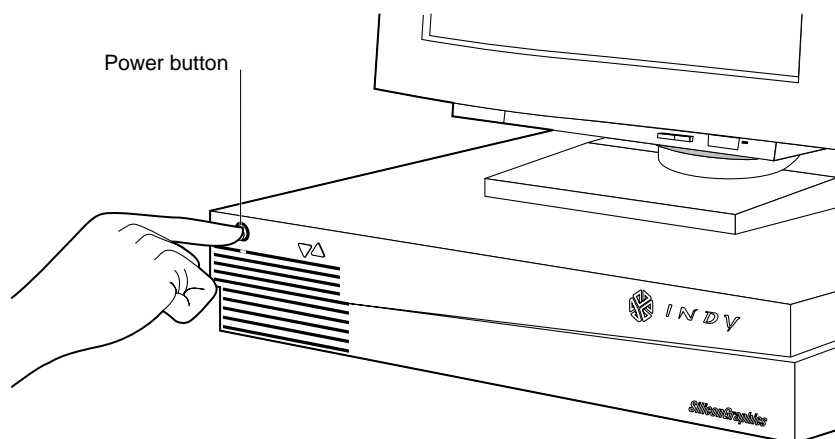
**Figure 25** Replacing the top cover on the Indy workstation

4. If you received a system label in this package, place the label on top of the existing system label on the underside of the chassis.
5. Reconnect the external cables you removed earlier. Be sure to connect the power cable.
6. Replace the monitor on top of the Indy workstation.

Congratulations! You have completed the CPU upgrade and are ready to turn on your Indy workstation.

## Turning on the Workstation

To turn on the system power, press and release the power button to turn on the system, as shown in Figure 26.



**Figure 26** Turning on the Indy workstation

When you power on your system, the power indicator LED on the front of the machine is amber for a few seconds, and then the LED turns to green and you hear the boot “tune.”

If you do not hear the boot tune or the LED is red and does not turn green, either the PROM chip or the CPU module may not be installed correctly.

Turn off the system, remove the top cover, and check that you’ve installed the components correctly, following the instructions in this manual.

You are now ready to log in.



## Product Support

When you purchased your system you may have purchased a support program from either Silicon Graphics, Inc., or a vendor who supplies software. Whenever you encounter any problems that you cannot solve using the methods in this booklet, contact the organization from which you purchased the support program.

If you would like support for your Silicon Graphics products, contact your service provider.



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