

# Indy™ Dual Head Installation Guide and Notes for Developers

Document Number 007-3020-001

## CONTRIBUTORS

Written by Jed Hartman, Judy Muchowski

Illustrated by Derrald Vogt, Cheri Brown, Dan Young

Engineering contributions by Dale Ah Tye, Joe Chien, Maggie Birmingham, Richard Wright

Production by Cindy Stief

© Copyright 1995, Silicon Graphics, Inc.— All Rights Reserved

This document contains proprietary and confidential information of Silicon Graphics, Inc. The contents of this document may not be disclosed to third parties, copied, or duplicated in any form, in whole or in part, without the prior written permission of Silicon Graphics, Inc.

## RESTRICTED RIGHTS LEGEND

Use, duplication, or disclosure of the technical data contained in this document by the Government is subject to restrictions as set forth in subdivision (c) (1) (ii) of the Rights in Technical Data and Computer Software clause at DFARS 52.227-7013 and/or in similar or successor clauses in the FAR, or in the DOD or NASA FAR Supplement. Unpublished rights reserved under the Copyright Laws of the United States. Contractor / manufacturer is Silicon Graphics, Inc., 2011 N. Shoreline Blvd., Mountain View, CA 94043-1389.

Silicon Graphics is a registered trademark and Indy, IRIS GL, IRIX, and OpenGL are trademarks of Silicon Graphics, Inc.

---

# Contents

**List of Figures** v

**Introduction** vii

- 1. Installing the Dual Head Graphics Board** 1
  - Dual Head Graphics Upgrade Package 2
  - Turning Off the Indy Workstation 2
  - Removing the Top Cover 3
  - Attaching the Wrist Strap 4
  - Checking the Version of the System Board 5
  - Removing the GIO Option Board (If Installed) 6
  - Removing the Indy Graphics Board 9
  - Installing the Dual Head Graphics Board 12
  - Installing the Indy Graphics Board 16
  - Replacing the Top Cover 21
- 2. Connecting the Monitors** 23
  - Unpacking the Secondary Monitor 23
  - Setting Up the Monitors 24
    - Connecting the Video Cables 26
    - Connecting the Power Cables 28
  - Turning on the Monitors and the Indy Workstation 29
- 3. Installing the Software and Using the Dual Head System** 31
  - Installing the Software 31
  - Moving the Cursor Between Monitors 31
  - Selecting the Head on Which a Program Runs 31
  - Reconfiguring the Software for Stacked Monitors 32
  - Swapping Head 0 and Head 1 34
  - Product Support 36

<b>A.</b>	<b>Choosing a Graphics Head (for Developers)</b>	37
	Using Multiple Graphics Heads Under OpenGL, X, or Mixed-Model GL	37
	Using Multiple Heads Under IRIS GL	39
	Screen Adjacency	39
	<b>Index</b>	41

---

## List of Figures

<b>Figure 1-1</b>	Turning Off the Indy Workstation	3
<b>Figure 1-2</b>	Removing the Top Cover From the Indy Workstation	4
<b>Figure 1-3</b>	Locating the Version Number on the System Board	5
<b>Figure 1-4</b>	Single-Width GIO Board	6
<b>Figure 1-5</b>	Removing the Screws From the Rear Panel	7
<b>Figure 1-6</b>	Removing the Screws From the GIO Option Board	8
<b>Figure 1-7</b>	Disconnecting the GIO Option Board	8
<b>Figure 1-8</b>	Removing the Hexnut Screws From the Rear Panel	9
<b>Figure 1-9</b>	Removing the Screws From the Graphics Board	10
<b>Figure 1-10</b>	Disconnecting the Graphics Board	11
<b>Figure 1-11</b>	Removing and Installing the Faceplates	12
<b>Figure 1-12</b>	Installing the Dual Head Board	13
<b>Figure 1-13</b>	Securing the Dual Head Board to the Rear of the Workstation	14
<b>Figure 1-14</b>	Securing the Dual Head Board to the System Board	15
<b>Figure 1-15</b>	Removing the Standoffs From the Graphics Board	16
<b>Figure 1-16</b>	Installing the Metal Gasket Over the Graphics Board Connector	17
<b>Figure 1-17</b>	Installing the Indy Graphics Board	18
<b>Figure 1-18</b>	Installing the I/O Faceplate on the Rear	19
<b>Figure 1-19</b>	Inserting the Screws on the Indy Graphics Board	20
<b>Figure 1-20</b>	Replacing the Top Cover on the Indy Workstation	21
<b>Figure 2-1</b>	Monitors in a Side by Side Configuration	25
<b>Figure 2-2</b>	Monitors in a Stacked Configuration	25
<b>Figure 2-3</b>	The Video Cable	26
<b>Figure 2-4</b>	Connecting the Video Cables in a Side by Side Configuration	27

<b>Figure 2-5</b>	Connecting the Video Cables in a Stacked Configuration 27
<b>Figure 2-6</b>	Connecting the Monitor's Power Cable 28
<b>Figure 3-1</b>	System Shutdown Caution Message 34
<b>Figure 3-2</b>	Okay to Power Off Notifier 34
<b>Figure 3-3</b>	Starting Up the System Notifier 35

---

# Introduction

Congratulations on purchasing the Dual Head Graphics upgrade for the Indy™ workstation.

This guide explains how to install the Dual Head Graphics Upgrade in your Indy workstation. It also includes information on using the Dual Head system and programming notes for developers.

Read this guide once all the way through before you start to work. Then you'll be familiar with the Indy system and the parts you'll be working with. If you find a term you haven't seen before, refer to your system owner's guide. The glossary in the owner's guide contains definitions of many of the terms used in this manual.



## Installing the Dual Head Graphics Board

This chapter describes how to install the dual head graphics board in the Indy workstation.

Installing the dual head board consists of:

- Turning off the Indy workstation.
- Removing the top cover.
- Checking the version of the system board.
- Removing any existing GIO option boards and the Indy graphics board.
- Installing the dual head graphics board.
- Installing the Indy graphics board.
- Replacing the top cover.

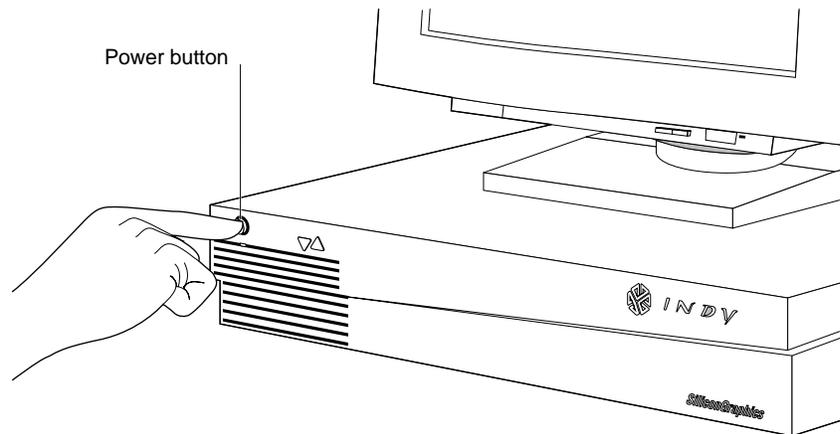
## Dual Head Graphics Upgrade Package

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

- Dual head graphics board
- Bag of screws and standoffs (there may be extra screws)
- Open-ended wrench to remove standoffs and hexnuts
- Reversible Phillips/flat screwdriver
- Antistatic wrist strap
- *Indy Dual Head Graphics Installation Guide and Notes for Developers* (this manual)
- Compact disc (CD-ROM)
- I/O faceplate for the Indy graphics board
- Blank faceplate
- EMI gasket
- Monitor cable

## Turning Off the Indy Workstation

To shut down the system, press and release the power button on the front of the workstation, as shown in Figure 1-1. The system powers off automatically. It's not necessary to shut down the system software before pressing the power button.



**Figure 1-1** Turning Off the Indy Workstation

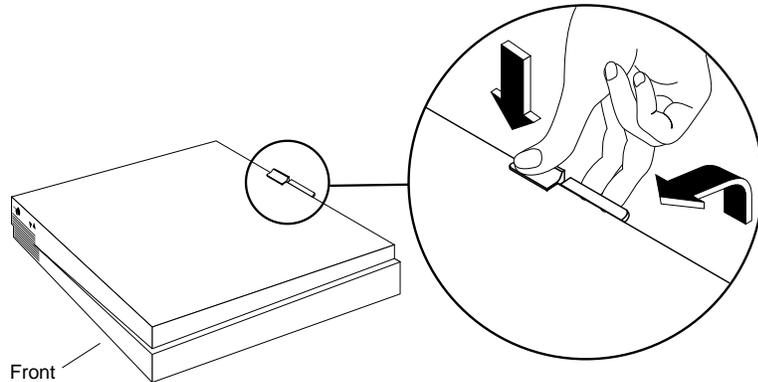
## Removing the Top Cover

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

1. If your monitor is on top of the workstation, move it to one side. Monitors are very heavy—consider asking someone to help you move it.  
  
Before removing any exterior cables, familiarize yourself with their location so that you'll find it easier when reconnecting them later.
2. Disconnect the black power cable and the monitor cable from the back of the Indy workstation.  
  
There are several other cables connected to the rear of the Indy chassis. Disconnecting them is optional, however, you'll have more room to work with when removing the screws from the back panel.
3. Facing the front of the Indy workstation, place your right thumb on the small lip at the back of the cover, and your second and third fingers under the finger ledge, as shown in Figure 1-2.
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 firm push toward the front.

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

5. Slide the cover forward about one inch and tilt it up to remove it.



**Figure 1-2** 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 workstation.

To attach the wrist strap, follow these steps:

1. Unwrap the first two folds of the band and wrap the exposed adhesive side firmly around your wrist.
2. Unroll the rest of the band and peel the liner from the copper foil at the opposite end.
3. Attach the copper foil to a convenient location on the metal part of the Indy chassis.

## Checking the Version of the System Board

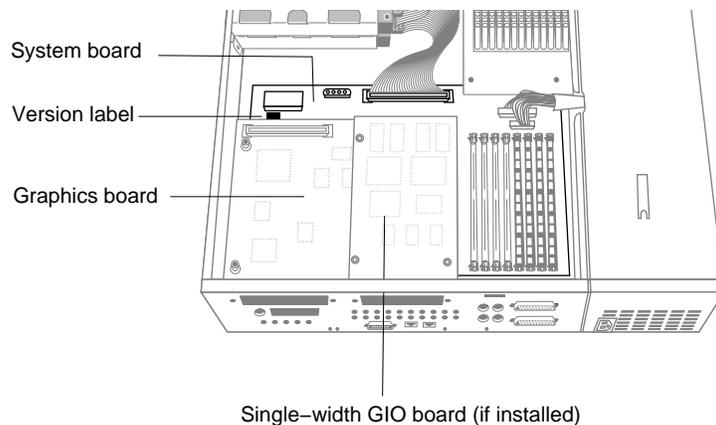
If you purchased the Indy dual head graphics Board at the same time as your Indy workstation, skip to the section “Removing the GIO Option Board (If Installed)” on page 6. Otherwise, continue with these instructions.

The Indy dual head graphics upgrade requires a system board assembly number -015 or greater. Your sales representative has advised you about this. To make sure your Indy has the correct level system board, however, you should check the assembly number on your system board now.

The system board is the lowest level board in your workstation. There is a graphics board above it, and perhaps a GIO board or boards above the graphics board.

The best way to view the assembly number is to stand in front of the workstation, and look beneath the graphics board in the location shown in Figure 1-3. The label has several digits, ending with a three-digit assembly number, such as -015. For example, the assembly number might be 030-8123-015.

- If the last three digits are -015 or greater, continue with these instructions.
- If the last three digits are -014 or lower, contact your service provider to arrange for a system board replacement.



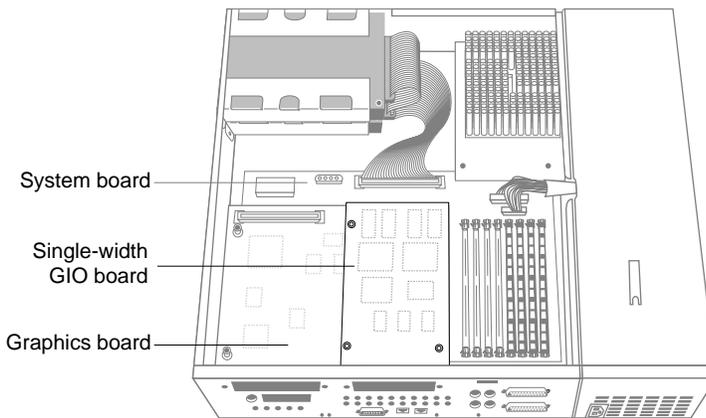
**Figure 1-3** Locating the Version Number on the System Board

## Removing the GIO Option Board (If Installed)

To install the dual head graphics board, you must first remove any GIO option boards (if installed) and the graphics board. When the dual head graphics board is installed, the Indy graphics board uses the slots that would otherwise be available for other GIO option boards.

GIO option boards are located on top of the graphics board and can be single-width, covering half of the graphics board, or double-width, covering the entire graphics board. Figure 1-4 shows a single-width board. If there's a GIO board installed, your system will have three levels of boards: the system board on the bottom, the graphics board in the middle, and the GIO board on top.

To determine if you have a GIO option board installed, look at your system and at Figure 1-4. Then follow the instructions below.



**Figure 1-4** Single-Width GIO Board

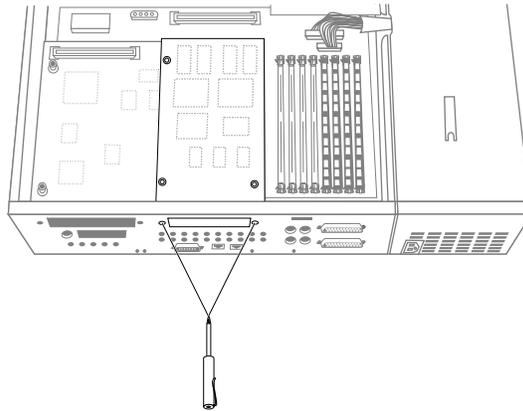
---

<b>If your Indy workstation has:</b>	<b>Then:</b>
One or more GIO option boards installed	Continue with these instructions
No GIO option board installed	Go to "Removing the Indy 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.

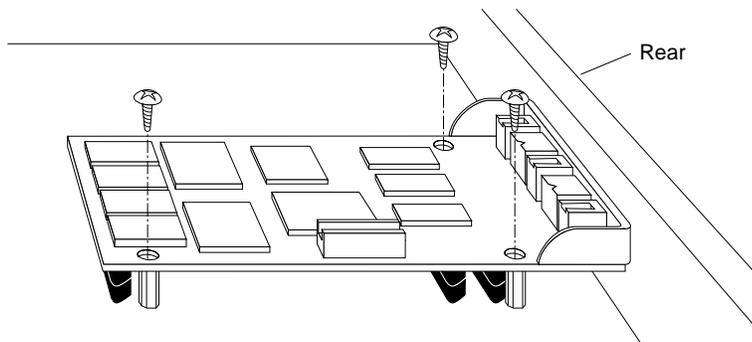
1. If there are external cables connected to the GIO option board's I/O connector on the rear of the workstation, disconnect them.
2. Using the reversible Phillips screwdriver provided with this upgrade kit, remove the two screws from the GIO board connector on the rear of the workstation, as shown in Figure 1-5. (If the flat end of the screwdriver is in position, pull it out and reverse it to the Phillips end.)



**Figure 1-5** Removing the Screws From the Rear Panel

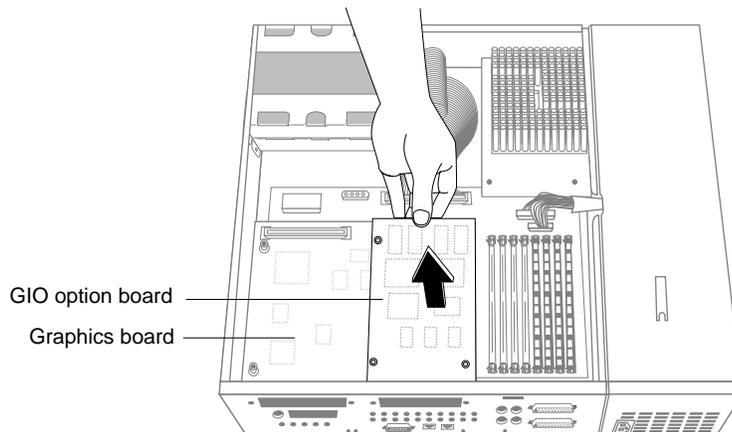
3. Using the Phillips screwdriver, remove the three screws that connect the GIO option board to the graphics board, as shown in Figure 1-6.

**Note:** A double-width GIO option board has four screws to remove.



**Figure 1-6** Removing the Screws From the GIO Option Board

4. Disconnect the GIO board from the graphics board by grasping the GIO board firmly and pulling it up, as shown in Figure 1-7.



**Figure 1-7** Disconnecting the GIO Option Board

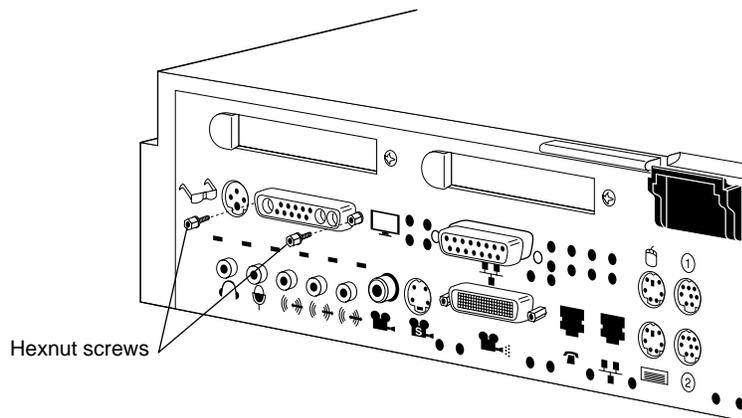
You are now ready to remove the graphics board.

## Removing the Indy Graphics Board

To install the dual head graphics board, you must remove the existing Indy graphics board. Follow these steps to remove the graphics board:

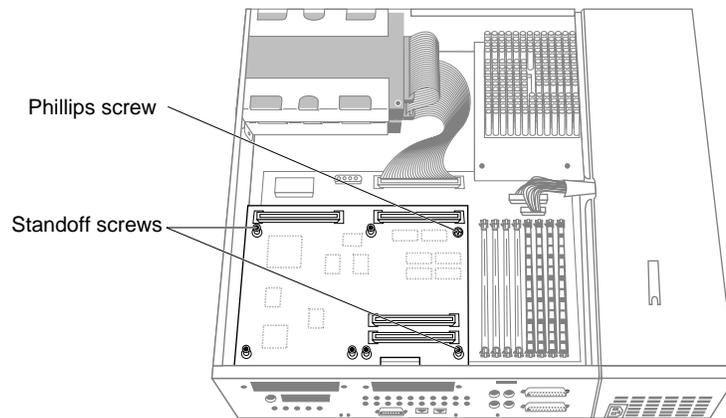
1. Facing the rear of the workstation, use the open-ended wrench to unscrew the two hexnut screws on either side of the I/O port on the rear panel. (See Figure 1-8.) The wrench is provided with this kit.

**Note:** Save the screws—you'll need them for the dual head board later in the installation.



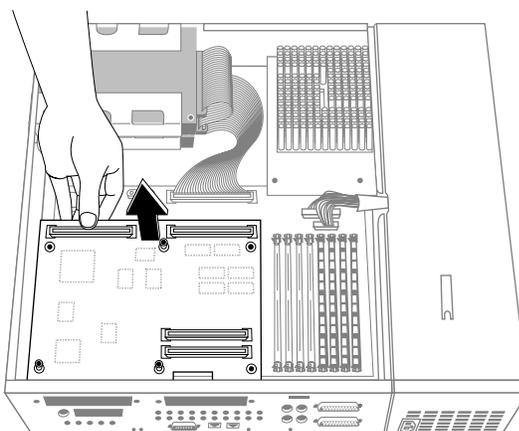
**Figure 1-8** Removing the Hexnut Screws From the Rear Panel

2. Remove the following screws from the graphics board:
  - Use the open-ended wrench or your fingers to unscrew the two standoffs (tall, hexagonal posts) from the graphics board in the locations shown in Figure 1-9.
  - Use the Phillips screwdriver to remove one screw from the graphics board in the location shown in Figure 1-9.



**Figure 1-9** Removing the Screws From the Graphics Board

3. Disconnect the graphics board from the system board, as shown in Figure 1-10.
  - Grasp the board firmly on the side close to the system disk drive.
  - Pull up to disconnect the two connectors under the board from the sockets on the system board.
  - Remove the graphics board.



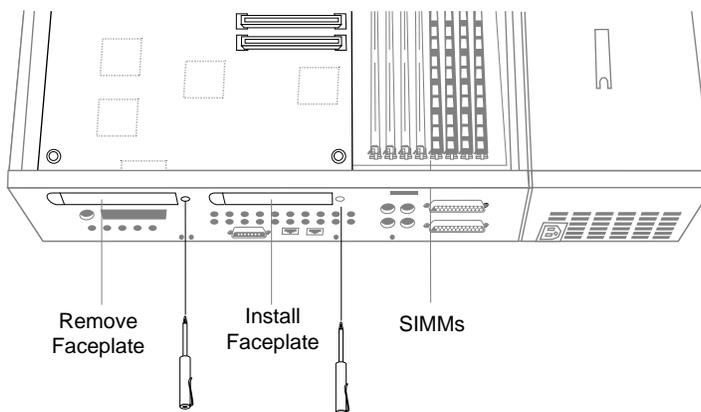
**Figure 1-10** Disconnecting the Graphics Board

You are now ready to install the dual head board.

## Installing the Dual Head Graphics Board

Follow these steps to install the dual head graphics board on the Indy system board.

1. Check if there is a faceplate covering the GIO option port farthest from the SIMMs, as shown in Figure 1-11.
  - If there is a faceplate covering the port, use a Phillips screwdriver to remove the screw and faceplate.
  - Save the faceplate. If you remove the dual head graphics board in the future and do not replace it, you should reinstall the faceplate.
2. Check if there is a faceplate covering the GIO option port closest to the SIMMs.
  - If there is a blank faceplate, leave it in place.
  - Otherwise, install the blank face plate provided with this package. Use a Phillips screw to secure it to the chassis.

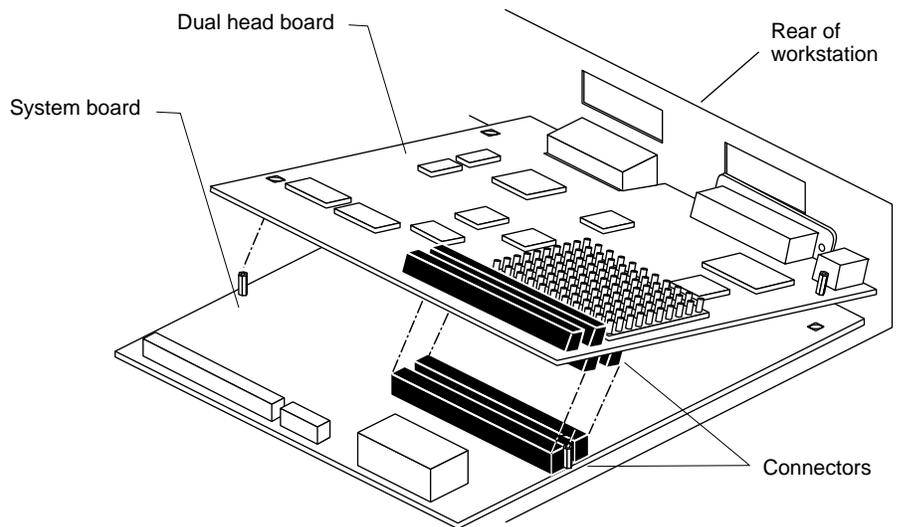


**Figure 1-11** Removing and Installing the Faceplates

3. Lower the dual head board over the system board, tilting it to insert its I/O connector through the open slot on the rear of the chassis. See Figure 1-12.
4. Loosely place the dual head board over the system board so that the two male connectors on the underside of the dual head board align with the two female connectors on the system board. See Figure 1-12.

**Caution:** The pins in the male connectors are delicate. Gently wiggle or reposition the board to fit the pins of the male connectors into their slots in the female connectors. Do not apply any pressure until the pins fit properly.

5. Place your fingers or thumbs on the dual head board above where the connectors are located and press to seat the connectors. They should fit snugly.
6. Check that each screw hole on the dual head board is sitting directly above a matching standoff (tall, hexagonal post) on the system board.



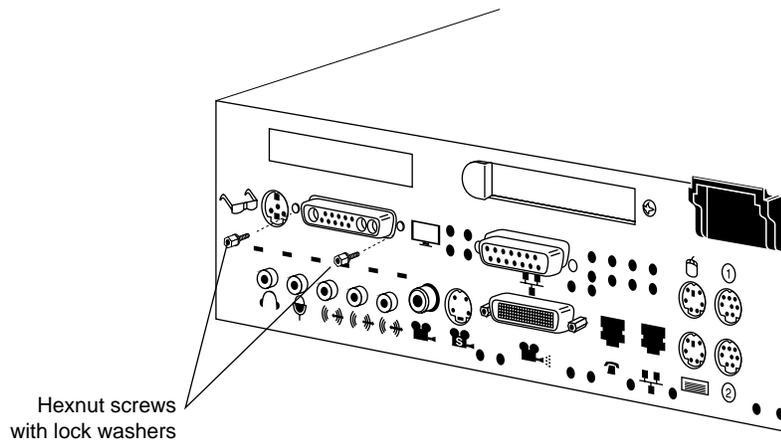
**Figure 1-12** Installing the Dual Head Board

7. Verify that the dual head board is properly seated.
  - Look underneath the dual head board to see the two connectors. It may be difficult to see them because of other components. The male and female connectors must be touching along the entire shared surface.
8. Secure the dual head board to the rear of the workstation, using the two hexnut screws that you removed earlier. See Figure 1-13.

**Note:** Do not use the screws with the blue nylon patch from the plastic bag. These are for the Indy graphics board.

- Insert and tighten two hexnut screws with lock washers, using the open-ended wrench.

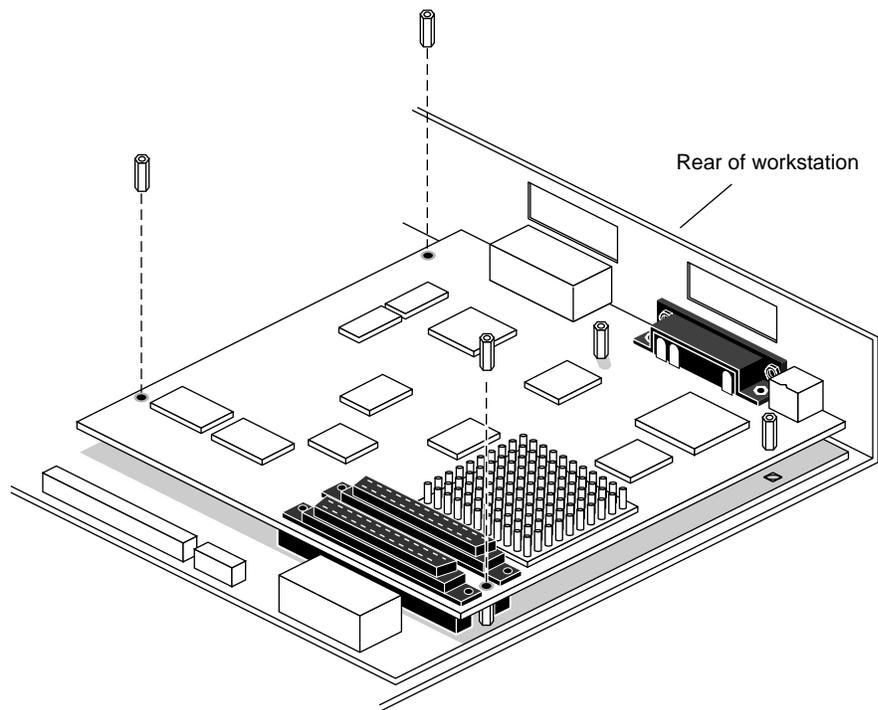
If the screw holes are not aligned, press the board lightly until they are aligned.



**Figure 1-13** Securing the Dual Head Board to the Rear of the Workstation

9. Secure the dual head board to the system board.
  - Insert and tighten three standoffs in the locations shown in Figure 1-14, using the open-ended wrench.

As you tighten the standoffs, alternate among them so that the board is fastened evenly.



**Figure 1-14** Securing the Dual Head Board to the System Board

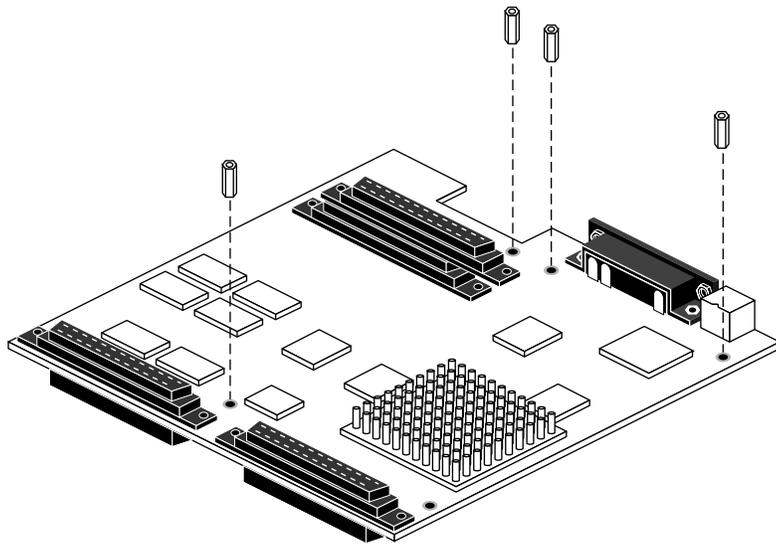
You are now ready to install the Indy graphics board.

## Installing the Indy Graphics Board

Follow these steps to install the Indy graphics board on top of the dual head board.

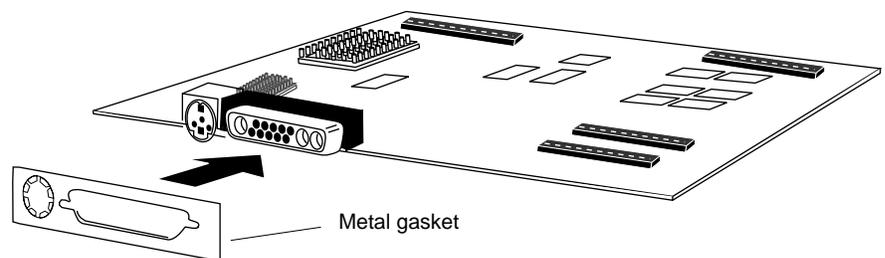
**Note:** The Indy workstation will not work with the dual head graphics board only. You must install the Indy graphics board as well to make it a working system.

1. Remove the four standoffs from the graphics board in the locations shown in Figure 1-15 (so the top cover of Indy will fit).
  - Hold the board upright.
  - Hold the standoff with one hand and use the Phillips screwdriver to unscrew the screw on the underside of the board.



**Figure 1-15** Removing the Standoffs From the Graphics Board

2. Install the thin, metal gasket over the I/O connectors on the Indy graphics board.
  - Locate the EMI gasket that came with this package. The gasket is shown in Figure 1-16.
  - Turn the board so that you are facing the I/O connectors.
  - On the inside of the gasket, remove the liner from the adhesive tape to expose the sticky surface.
  - Align the gasket over the graphics board connector so that the round opening is on the left with the fingers pointing inward toward the connector.
  - Press the gasket firmly over the tape in the center to attach it.

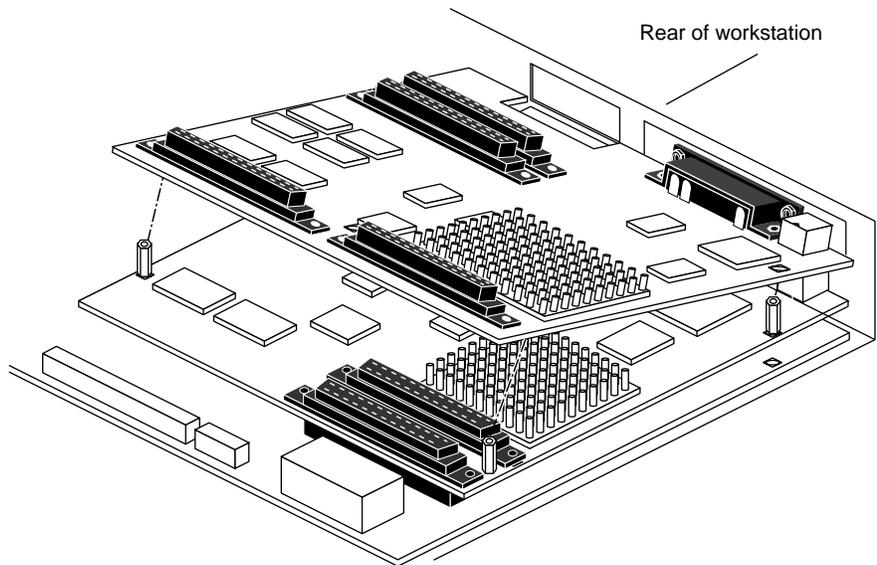


**Figure 1-16** Installing the Metal Gasket Over the Graphics Board Connector

3. Install the Indy graphics board.
  - Lower the Indy graphics board over the dual head board, tilting it to insert its I/O connector through the open slot on the rear of the chassis. See Figure 1-17.
  - Loosely place the Indy graphics board over the dual head board so that the two male connectors on the underside of the Indy graphics board align with the two female connectors on the dual head board. See Figure 1-17.

**Caution:** The pins in the male connectors are delicate. Gently wiggle or reposition the board to fit the pins of the male connectors into their slots in the female connectors. Do not apply any pressure until the pins fit properly.

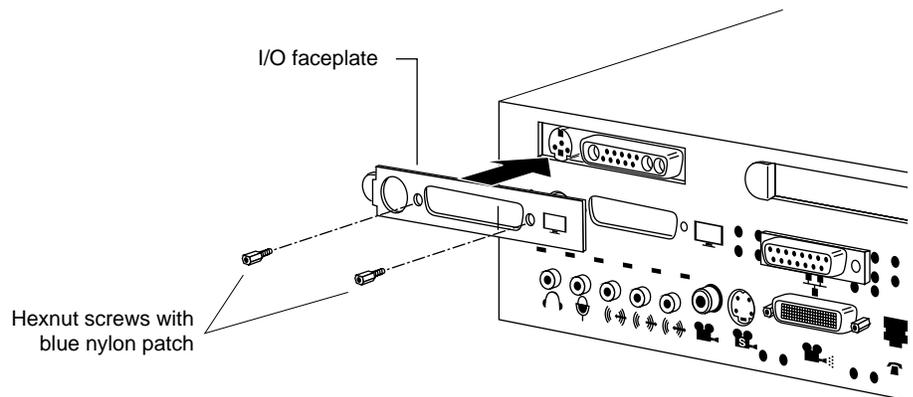
- Place your fingers or thumbs on the Indy graphics board above where the connectors are located and press to seat the connectors. They should fit snugly.
- Check that each standoff on the dual head board is sitting directly below a matching screw hole on the Indy graphics board.



**Figure 1-17** Installing the Indy Graphics Board

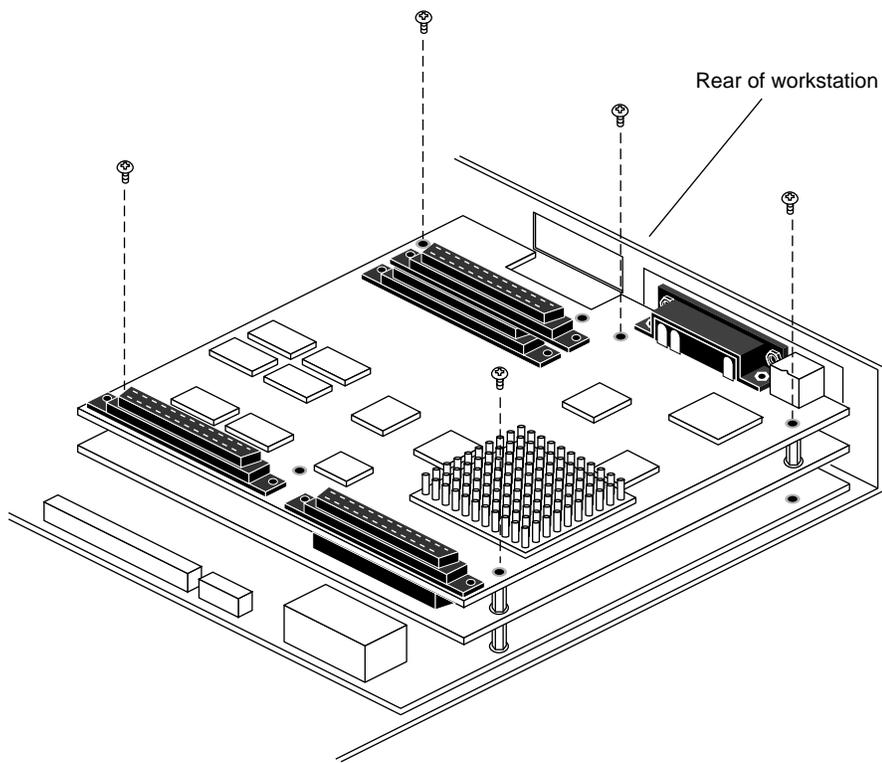
- Verify that the Indy graphics board is properly seated. Look underneath the board to see the two connectors. It may be difficult to see them because of other components. The male and female connectors must be touching along the entire shared surface.
4. Install the new I/O faceplate over the option port. The I/O faceplate is a small metal panel that comes with this upgrade package. It has a foam EMI shield attached to it. Do not remove the EMI shield.
- Locate the two hexnut screws with a blue nylon patch in the plastic bag.
  - Hold the faceplate in the orientation shown in Figure 1-18.
  - Angle the left lip of the faceplate inside the chassis, and pivot the faceplate against the outside of the slot.
  - Insert and tighten the two hexnut screws in the locations shown in Figure 1-18.

**Note:** It's important that you tighten the hexnut screws as much as possible. The top of the screw should be almost flush with the end of the connector.



**Figure 1-18** Installing the I/O Faceplate on the Rear

5. Secure the Indy graphics board to the dual head graphics board. As you tighten the screws, alternate among them so that the board is fastened evenly.
  - Using the Phillips screwdriver, insert and tighten five Phillips screws in the location shown in Figure 1-19.



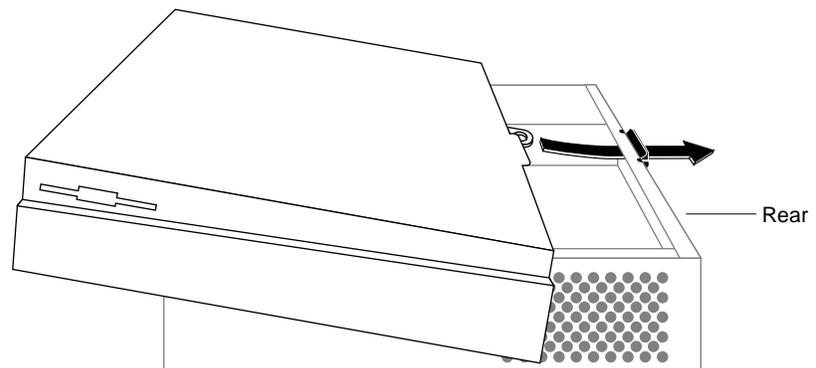
**Figure 1-19** Inserting the Screws on the Indy Graphics Board

You are finished installing the dual head board and Indy graphics board, and are ready to replace the top cover.

## Replacing the Top 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 1-20.
2. Tilt the cover and insert the tab through the slot in the rear of the chassis.
3. Lower the cover and slide it toward the back of the chassis until it snaps into place.



**Figure 1-20** Replacing the Top Cover on the Indy Workstation

You are now ready to connect the cables and set up the monitors. Go to Chapter 2, “Connecting the Monitors.”



## Connecting the Monitors

You can place your monitors side by side, or you can set them up in a stacked configuration. Follow the appropriate instructions for your configuration.

### Unpacking the Secondary Monitor

Unpack the secondary monitor from its box.

**Caution:** The monitor is very heavy. Have someone help you lift it out of the box.

The video cable for the secondary monitor comes with this upgrade package.

## Setting Up the Monitors

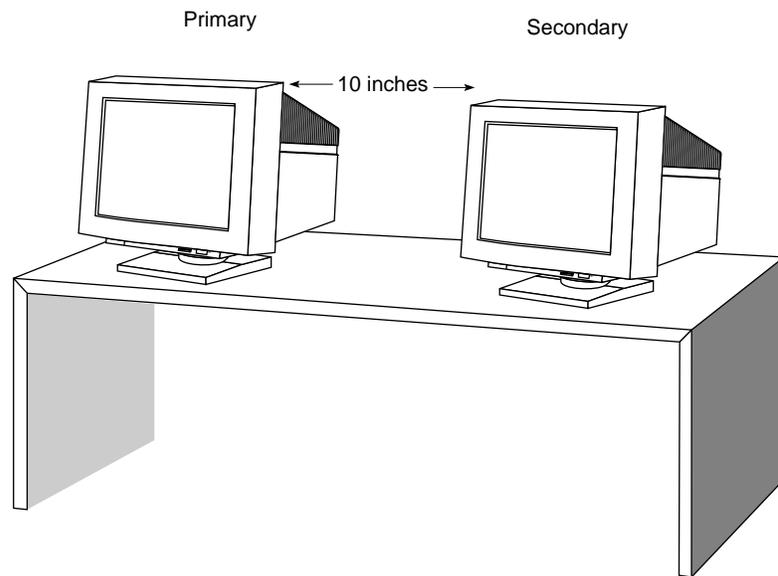
You can place the monitors side by side, or you can set them up in a stacked configuration.

- For a side by side configuration, place the monitors about 10 inches apart. Facing the front of the monitors, place the primary monitor on the left and the secondary monitor on the right, as shown in Figure 2-1.

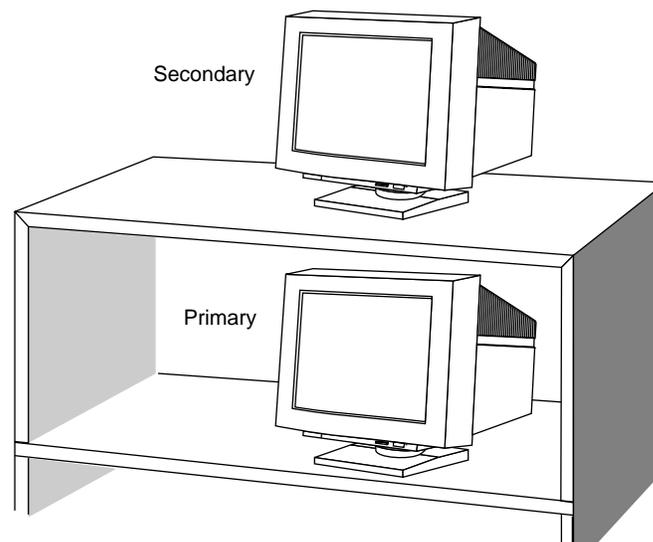
If the monitors are placed very close together (5 to 10 inches), you may see some video image distortion. If this occurs, move the monitors so that they are about 10 inches apart.

- For a stacked configuration, place the secondary monitor on a surface above the primary monitor, as shown in Figure 2-2. You must reconfigure the software, as described in “Reconfiguring the Software for Stacked Monitors” on page 32.

**Caution:** Do not rest the secondary monitor on the primary monitor. Place it instead on a bookshelf or similar type structure above the primary monitor.



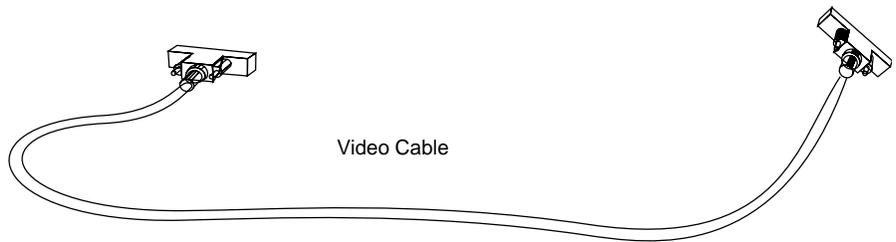
**Figure 2-1** Monitors in a Side by Side Configuration



**Figure 2-2** Monitors in a Stacked Configuration

### Connecting the Video Cables

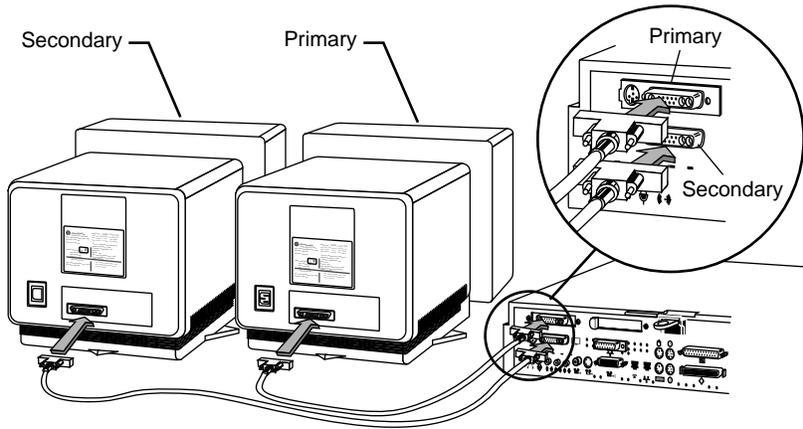
Follow these steps to connect a video cable (shown in Figure 2-3) to each monitor and to the Indy chassis. The video cable for the secondary monitor comes with this upgrade package.



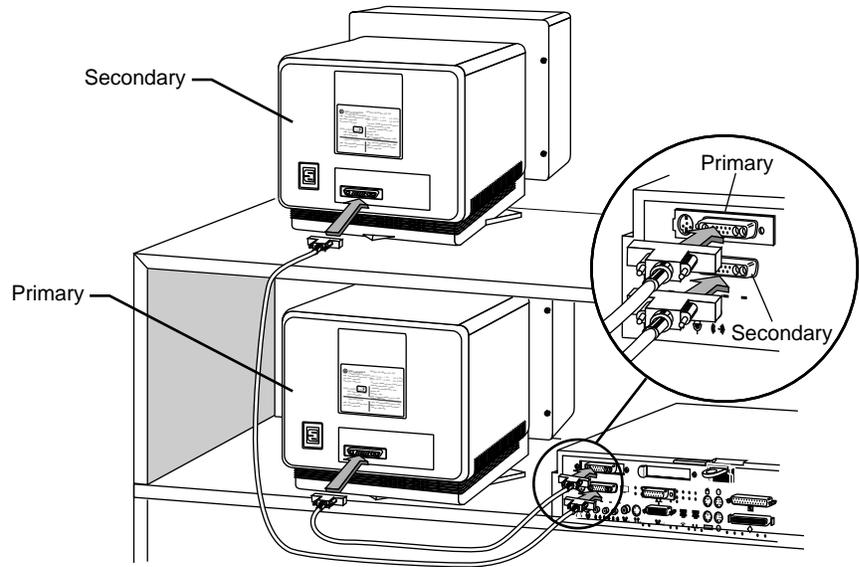
**Figure 2-3** The Video Cable

1. Connect the video cables as follows.
  - Connect one end of each monitor video cable to the connector on the back of each monitor. Screw in the thumbscrews on both sides of the connector.
  - Connect the other end of the video cable that is attached to the *primary* monitor to the *upper* graphics port on the back of the Indy chassis. See Figure 2-4 (side by side configuration) and Figure 2-5 (stacked configuration). Screw in the thumbscrews on both sides of the connector.
  - Connect the other end of the video cable that is attached to the *secondary* monitor to the *lower* graphics port on the back of the Indy chassis. See Figure 2-4 (side by side configuration) and Figure 2-5 (stacked configuration). Screw in the thumbscrews on both sides of the connector.

**Note:** It's important that you connect the video cable for each monitor to the correct graphics port on the Indy, as described above. If the video cables are not connected correctly, your mouse movements will be incorrect.



**Figure 2-4** Connecting the Video Cables in a Side by Side Configuration

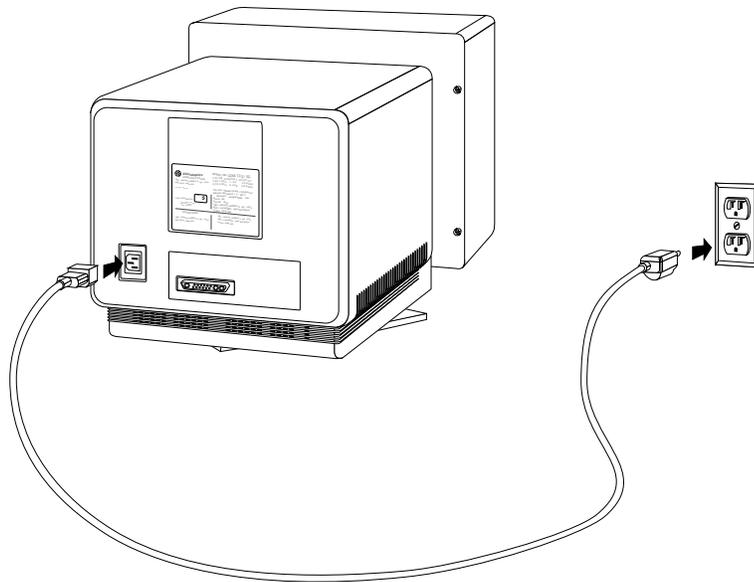


**Figure 2-5** Connecting the Video Cables in a Stacked Configuration

You are finished connecting the monitor video cables and are ready to connect the power cables.

### Connecting the Power Cables

1. Connect a power cable to each monitor as follows:
  - Pick up the monitor power cable. It is thick and black and has a male and female end.
  - Connect the female end of the power cable to the power connector on the back of the monitor, as shown in Figure 2-6.
  - Plug the male end into a three-prong grounded electrical outlet.



**Figure 2-6** Connecting the Monitor's Power Cable

2. Reconnect the power cable to the Indy workstation and to a three-prong grounded electrical outlet.

## Turning on the Monitors and the Indy Workstation

1. Turn on the primary monitor and the secondary monitor *before* turning on the Indy workstation. The power switch is on the front of the monitor in the lower right corner. The LED next to the switch lights up.
2. Turn on the Indy workstation by pressing and releasing the power button.

You are finished installing the secondary monitor and are ready to install the software.



## Installing the Software and Using the Dual Head System

This chapter explains how to use a dual head system.

### Installing the Software

Before using the dual head configuration, read the *Software Release Notes* on the CD for information on which software to install.

**Note:** If you stacked the monitors, be sure to reconfigure the software, as described in “Reconfiguring the Software for Stacked Monitors” on page 32.

### Moving the Cursor Between Monitors

To move the cursor from one monitor to the other, move the cursor off the screen you’re on toward the other monitor. The cursor jumps to the other monitor.

To switch cursor crossover locations, see the `xsgi` man page, under the `-hw` option.

### Selecting the Head on Which a Program Runs

During an interactive session under the X window system, you can use the `DISPLAY` environment variable to control the head on which newly-started graphics programs run. When `DISPLAY` is set to “:0.0,” programs you start will run on head 0; when it is set to “:0.1,” programs you start run on head 1.

For convenience, the default start-up files (.login, .profile) for *root* and *guest* shells set DISPLAY to a reasonable initial value, if it is not already set. Each head has a toolchest that can be used to invoke graphics programs. Each toolchest has the DISPLAY variable in its environment set to the correct value for the head on which it appears, so any application you invoke from a toolchest will inherit this DISPLAY value, and thus appear on the same head as the toolchest from which it was invoked.

Similarly, programs started by clicking on an icon appear on the head from which you invoked them.

Once a program has been launched under the X window system, it is impossible to move it from one head to another.

## Reconfiguring the Software for Stacked Monitors

The dual head software works as is for monitors positioned side-by-side. If your monitors are stacked on top of each other, you need to reconfigure the software.

Follow these steps to reconfigure the software:

1. Turn on the Indy workstation.
2. Log in to the system.
3. Select "Unix Shell" from the Desktop toolchest to open a shell window.
4. Place the cursor inside the shell window.
5. Log in as the super user by typing:

```
su
```

Then press **Enter**.

6. Change the directory by typing the following:

```
cd /usr/lib/X11/xdm
```

Then press **Enter**.

7. Use the *vi* editor to edit the *Xservers* file. Once you are in the *Xservers* file, You see a line that reads:

```
:0 secure /usr/bin/X11/x -bs -c -pseudomap 4sight
```

8. Add *-stacked* to the end of the line, so that it now reads:

```
:0 secure /usr/bin/X11/x -bs -c -pseudomap 4sight -stacked
```

9. Exit the *Xservers* file.

10. Restart *Xsgi* by typing:

```
/usr/gfx/stopgfx; /usr/gfx/startgfx&
```

After a few seconds the login window appears.

11. Log in to the system.

You are finished reconfiguring the software for stacked monitors.

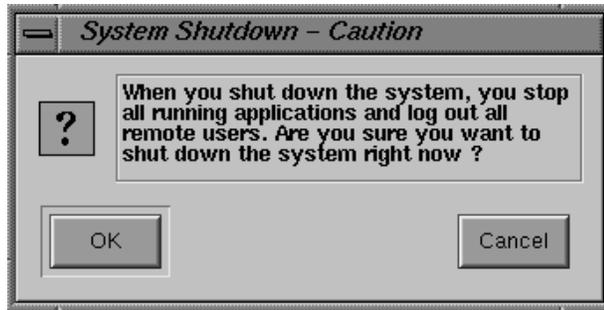
## Swapping Head 0 and Head 1

By default, the dual head board (secondary) is head 1 and the Indy graphics board (primary) is head 0. You can switch head 1 and head 0 by changing PROM variables from the Command Monitor. Follow these steps:

From the System toolchest choose "System Shutdown."

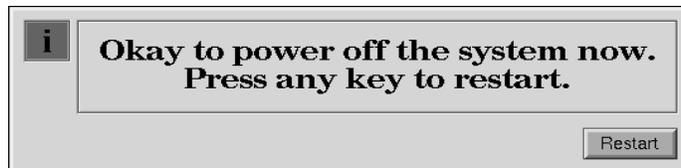
1. Shut down the system.
  - From the System toolchest in the upper left corner of your screen, choose "System Shutdown."

You then see a cautionary message similar to the one shown in Figure 3-1.



**Figure 3-1** System Shutdown Caution Message

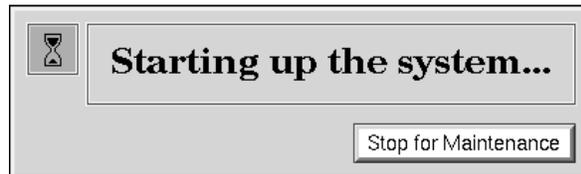
- Click "OK" to shut down without powering off the system. After a few seconds, you see the message shown in Figure 3-2.



**Figure 3-2** Okay to Power Off Notifier

- Click the "Restart" button.

You then see the message shown in Figure 3-3.



**Figure 3-3** 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. At the **>>** prompt, type:  

```
setenv console g1
```

and press **Enter**. This sets the dual head board to head 0 (primary) and the Indy graphics board to head 1 (secondary).
4. Type:  

```
init
```

and press **Enter**.
5. Reboot your system.
6. To return to the default settings, that is, Indy graphics head 0 (primary), and dual head board head 1 (secondary), type:  

```
setenv console g
```

and press **Enter**.
7. Type:  

```
init
```

and press **Enter**.
8. Reboot your system.

## **Product Support**

Silicon Graphics provides a comprehensive product support and maintenance program for its products. If you are in North America and would like support for your Silicon Graphics-supported products, contact the Technical Assistance Center at 1-800-800-4SGI, or your authorized service provider. If you are outside North America, contact the Silicon Graphics subsidiary or authorized distributor in your country.

## Choosing a Graphics Head (for Developers)

This chapter provides a brief overview of library routines that developers may need in order to make applications work on a dual-head system. For more information about the routines mentioned, see the appropriate reference pages.

Note that once you open a window on a given head, the user can't move it to the other head via the window manager; if you want users to be able to move windows from one head to another, your program will have to explicitly close the old window and open a new one on the other head.

### Using Multiple Graphics Heads Under OpenGL, X, or Mixed-Model GL

X, mixed-model IRIS GL™, and OpenGL™ all use X calls to choose on which screen to display: just pass the name of the desired display as the argument to **XOpenDisplay(3X11)**. (Pass NULL as the display name if you want to default to the value of the DISPLAY environment variable.) You can then call **RootWindow(3X11)** with the newly-opened display, specifying whichever screen you want; then call **XCreateWindow(3X11)** to create a window on the specified screen. After that, use the usual OpenGL or X calls, as appropriate, to draw or display in the window.

Here's the syntax for **XOpenDisplay()**:

```
Display *XOpenDisplay(display_name)
    char *display_name;
```

For example, to open a window on each head of a dual-head system:

```
#include <X11/Xlib.h>
#include <X11/Xutil.h>
#include <stdio.h>

void main(argc, argv)
int argc;
char **argv;
{
    Display *display;
    Window root0, root1, win0, win1;

    /* Open the display specified in the DISPLAY variable. */
    if ( (display = XOpenDisplay("")) == NULL )
        fprintf(stderr, "%s: cannot connect to X server.\n",
                argv[0]);

    /* Set up a root window for each screen. */
    root0 = RootWindow(display, 0);
    root1 = RootWindow(display, 1);

    /* Now create a window on each screen. */
    win0 = XCreateSimpleWindow(display, root0, 0, 0, 100,
                               100, 0, 0, 0);
    win1 = XCreateSimpleWindow(display, root1, 0, 0, 100,
                               100, 0, 0, 0);

    /* Display the windows and flush the output buffer. */
    XMapWindow(display, win0);
    XMapWindow(display, win1);
    XFlush(display);

    /* Leave them up for ten seconds before exiting. */
    sleep(10);
}
```

## Using Multiple Heads Under IRIS GL

Under IRIS GL, select a head on which to run a window by using the **scrnselect(3G)** function. If you don't call **scrnselect()** before opening a window with **winopen(3G)**, the window will open on whichever screen the user has specified in the DISPLAY environment variable.

This is the syntax for **scrnselect()**:

```
long scrnselect(gsnr)
    long gsnr;
```

where *gsnr* is the screen number relative to the current server—that is, zero for screen :0.0, or one for :0.1.

## Screen Adjacency

If you include system configuration files such as */usr/lib/X11/xdm/Xservers* with your application, you may want to configure the layout of the heads, specifying which is on the left and which on the right. For information on how to specify adjacency, see the Xsgi reference page, under the *-hw* option.



---

# Index

## A

anti-static wrist strap, attaching, 4

## B

boards

- installing dual head, 12
- installing graphics, 16
- removing GIO option boards, 6
- removing graphics, 9

## C

cables

- exterior, 3
- power, 28
- video, 26

cards

*See* boards

connecting

- monitors, 24
- power cables, 28
- video cables, 26

cover

- removing, 3
- replacing, 21

cursor, moving between monitors, 31

## D

disconnecting

- exterior cables, 3
- GIO option, 6
- graphics board, 9

dual head board, installing, 12

## E

exterior cables

- disconnecting, 3

## F

faceplate, 12, 19

## G

gasket, installing, 17

GIO option board

- removing, 6

graphics board

- installing, 16
- removing, 9

## H

- heads
  - selecting, 31
  - swapping, 34
  - using multiple, 37, 39
- help, 36

## I

- Indy cover
  - removing, 3
  - replacing, 21
- installing
  - dual head, 12
  - faceplate, 19
  - gasket, 17
  - graphics board, 16
  - software, 31

## M

- maintenance, 36
- monitors
  - configuring stacked, 32
  - moving cursor, 31
  - side by side, 24
  - stacked, 24
  - turning on, 29
- multiple heads, using, 37, 39

## O

- option boards
  - removing, 6

## P

- package, contents, 2
- power cable, connecting, 28
- product support, 36

## R

- removing
  - GIO option board, 6
  - graphics board, 9
  - top cover, 3
- replacing
  - top cover, 21

## S

- screen adjacency, 39
- selecting heads, 31
- Silicon Graphics support, 36
- software
  - configuring, 32
  - installing, 31
- stacked monitors, configuring, 32
- swapping heads, 34
- system board version number, 5

## T

- top cover
  - removing, 3
  - replacing, 21
- turning off the workstation, 2
- turning on
  - monitors, 29
  - workstation, 29

---

## V

video cables, connecting, 26



---

## We'd Like to Hear From You

As a user of Silicon Graphics documentation, your comments are important to us. They help us to better understand your needs and to improve the quality of our documentation.

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

- General impression of the document
- Omission of material that you expected to find
- Technical errors
- Relevance of the material to the job you had to do
- Quality of the printing and binding

Please include the title and part number of the document you are commenting on. The part number for this document is 007-3020-001.

Thank you!

### Three Ways to Reach Us



The **postcard** opposite this page has space for your comments. Write your comments on the postage-paid card for your country, then detach and mail it. If your country is not listed, either use the international card and apply the necessary postage or use electronic mail or FAX for your reply.



If **electronic mail** is available to you, write your comments in an e-mail message and mail it to either of these addresses:

- If you are on the Internet, use this address: [techpubs@sgi.com](mailto:techpubs@sgi.com)
- For UUCP mail, use this address through any backbone site:  
*[your\_site]!sgi!techpubs*



You can forward your comments (or annotated copies of manual pages) to Technical Publications at this **FAX** number:

415 965-0964