Silicon Graphics® Octane2™ Dual Head Installation Guide

Document Number 007-4493-001

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For regulatory and compliance information, see your *Octane2 Workstation Owner's Guide.*

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Record of Revision

Version	Description
001	November 2001 Initial version

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About This Guide

This guide describes the installation of a VPro Dual Head graphics upgrade in a Silicon Graphics Octane2 workstation. It also provides information about using and troubleshooting the Dual Head system and contains programming notes for developers. The guide is organized as follows:

- This section provides additional hardware information, software and system administration information, and product support information.
- Chapter 1 provides installation instructions for the Octane2 Dual Head graphics assembly as well as information about the XIO module and graphics boards.
- Chapter 2 provides information about connecting the monitors.
- Chapter 3 provides information about installing the software and using the Dual Head system.
- Chapter 4 provides troubleshooting information.
- Chapter 5 provides information about removing the Octane2 Dual Head graphics assembly.
- Appendix A helps you determine if your Octane or Octane2 system is ready for a VPro Dual Head graphics upgrade.
- Appendix B provides information about the care and cleaning of the compression connectors.
- Appendix C provides information about choosing a graphics head (for software developers).
- An Index completes this guide.

It is always a good idea to back up your system before installing a new board. If you have not backed up your system recently, take this opportunity to do so. For instructions on backing up your system, see the *Personal System Administration Guide*.

Upgradable Systems

The Octane2 Dual Head upgrade may only be installed in Octane systems that meet certain minimum requirements. To determine if your Octane system meets these requirements, refer to Appendix A, "Checking for VPro Dual Head Readiness."

Hardware Configurations

A listing of available configurations (upgrades and options) is available on the following SGI website:

`http://www.sgi.com/workstations/octane2/`

Related Publications

The following documents contain additional information that may be helpful:

- *Octane2 Workstation Owner's Guide*
- *Personal System Administration Guide*

Obtaining Publications

To obtain SGI documentation, go to the SGI Technical Publications Library at:

`http://techpubs.sgi.com`

Product Support

The Octane2 workstation is designed so that you can maintain and repair the workstation without the help of a trained technician. Contact your SGI subsidiary or authorized distributor for information about product support.

SGI provides a comprehensive range of product support for its products. If you are in North America and would like support for your SGI 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 SGI subsidiary or authorized distributor in your country.

Conventions

The following conventions are used throughout this document:

Convention	Meaning
`command`	This fixed-space font denotes literal items such as commands, files, routines, path names, signals, messages, and programming language structures.
variable	Italic typeface denotes variable entries and words or concepts being defined.
`user input`	This bold, fixed-space font denotes literal items that the user enters in interactive sessions. Output is shown in nonbold, fixed-space font.
[]	Brackets enclose optional portions of a command or directive line.
...	Ellipses indicate that a preceding element can be repeated.
`manpage`(*x*)	Man page section identifiers appear in parentheses after man page names.

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Installing Dual Head Graphics In An Octane2

This chapter tells you how to upgrade a Silicon Graphics Octane2 workstation containing a single VPro graphics board to one containing two VPro graphics boards.

This upgrade is accomplished by removing the existing XIO Tri-Module (holding the single head graphics board set) and replacing it with a new Dual Head XIO Module (holding the Dual Head graphics board sets). The original XIO Tri-Module, along with its attached graphics card, is then returned to SGI.

Before performing the installation, check any release notes for software information.

Note: Before proceeding with the upgrade, ensure that your system meets the minimum requirements for VPro Dual Head graphics detailed in Appendix A, "Checking for VPro Dual Head Readiness."

About the Dual Head Configuration

Dual graphics boards in the Octane2 workstation are designated primary and secondary heads.

- The primary head is the graphics board set in slots A/B (that is, the top two slots).
- The secondary (optional) head is the graphics board set in slots C/D (that is, the lower two slots).

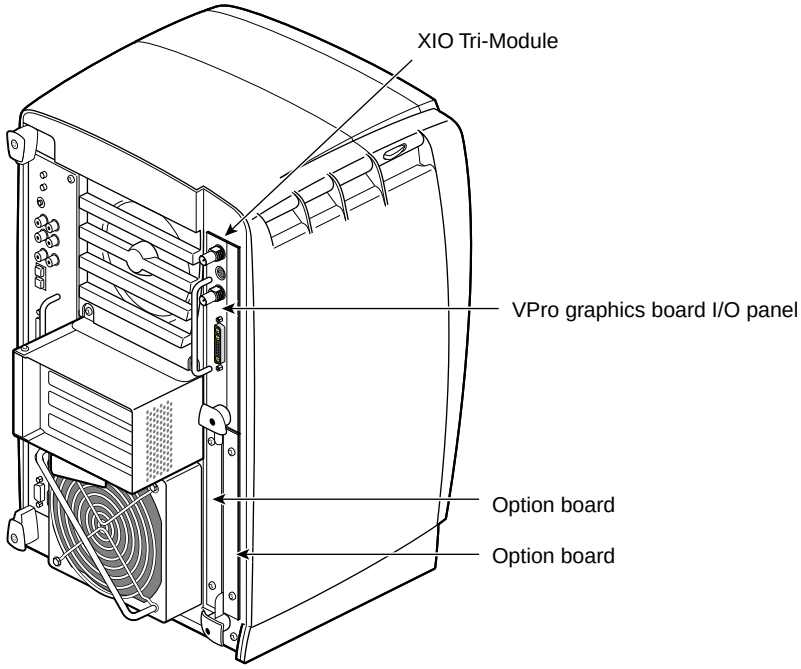

Figure 1-1 Locating the XIO Tri-Module

All graphics boards reside on the XIO module. Access to this module is from the back of the Octane2 workstation, as shown in Figure 1-1.

Octane2 systems with a single graphics head contain an XIO Tri-Module. The XIO Tri-Module holds the VPro graphics boards and any optional XIO boards installed in the system.

Octane2 systems with two graphics heads (that is, Dual Head systems) contain a Dual Head XIO module. The Dual Head XIO module holds two graphics heads, with each head occupying two XIO slots. There are thus no slots available for additional XIO boards.

Follow the directions in this chapter to install the Octane2 Dual Head graphics upgrade, beginning with the next section.

Preparing the Workstation to Install the Dual Head XIO Module

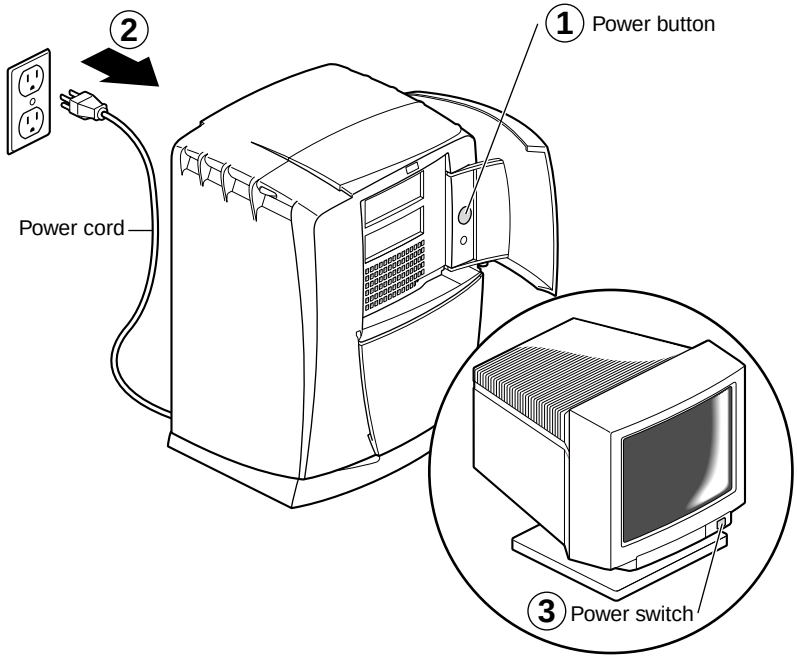

Figure 1-2 Powering Off the Octane2 Workstation

1. Open the cover and push the power button once to power off the Octane2 workstation (see Figure 1-2).
2. Unplug the power cord.
3. Power off the monitor by pressing the monitor power button.
4. Wait 5 minutes before removing the XIO Tri-Module.

Warning: The heatsinks on the XIO boards become very hot. Wait 5 minutes after powering off the Octane2 workstation before you remove the XIO Tri-Module. Test before touching any of the XIO boards.

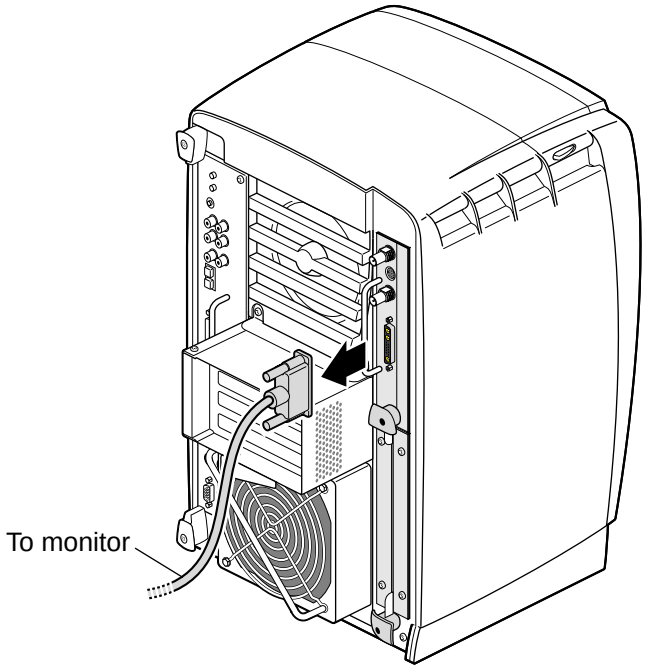

Figure 1-3 Removing the Monitor Cable

5. Remove all the cables from the XIO Tri-Module, as shown in Figure 1-3 (only one cable is shown here).

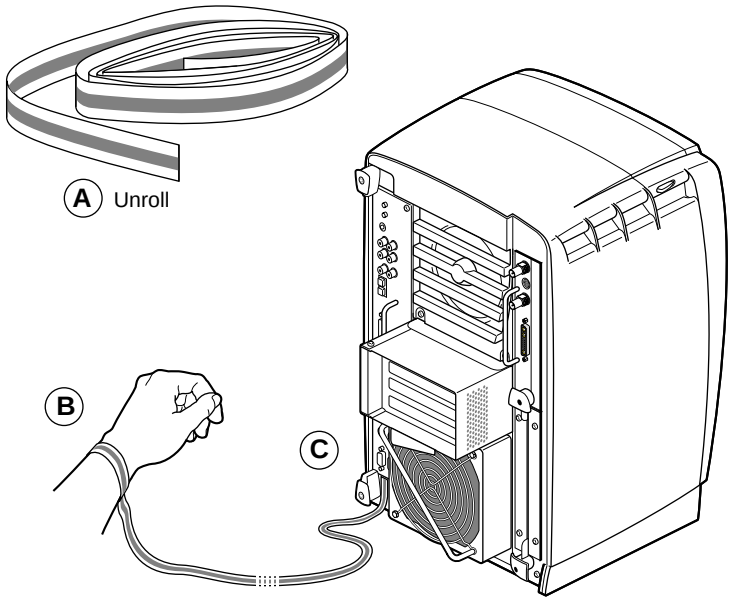

Figure 1-4 Attaching the Wrist Strap

6. Attach the wrist strap. See Figure 1-4 and follow these steps:
   a. Unwrap the first two folds of the band and wrap the exposed adhesive side firmly around your wrist.
   b. Unroll the rest of the band and peel the liner from the copper foil at the opposite end.
   c. Attach the copper foil to the XIO Tri-Module. Otherwise, use any convenient and exposed electrical ground, such as a metal part of the Octane2 workstation.

Caution: The components inside the Octane2 workstation are extremely sensitive to static electricity; you must wear the wrist strap while replacing parts inside the workstation.

Removing the Existing XIO Tri-Module

Before removing the XIO Tri-Module, you must power off the Octane2 workstation, wait 5 minutes to allow the heat sinks to cool, and attach the wrist strap. If you have not already done this, go to "Preparing the Workstation to Install the Dual Head XIO Module" on page 3 and follow the instructions through attaching the wrist strap. Then return here and follow the directions.

Caution: When you remove the XIO Tri-Module, the compression connectors on the back of the XIO boards are accessible and easily damaged. Do not touch or bump the bristled pad (shown in Figure 1-5). All XIO graphics boards have compression connectors, as do most XIO option boards. Before you remove the XIO Tri-Module, read Appendix B, "Care and Cleaning of Compression Connectors."

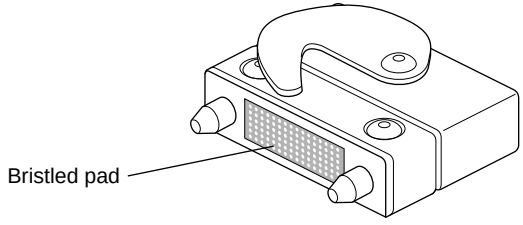

Figure 1-5 Identifying the Compression Connector

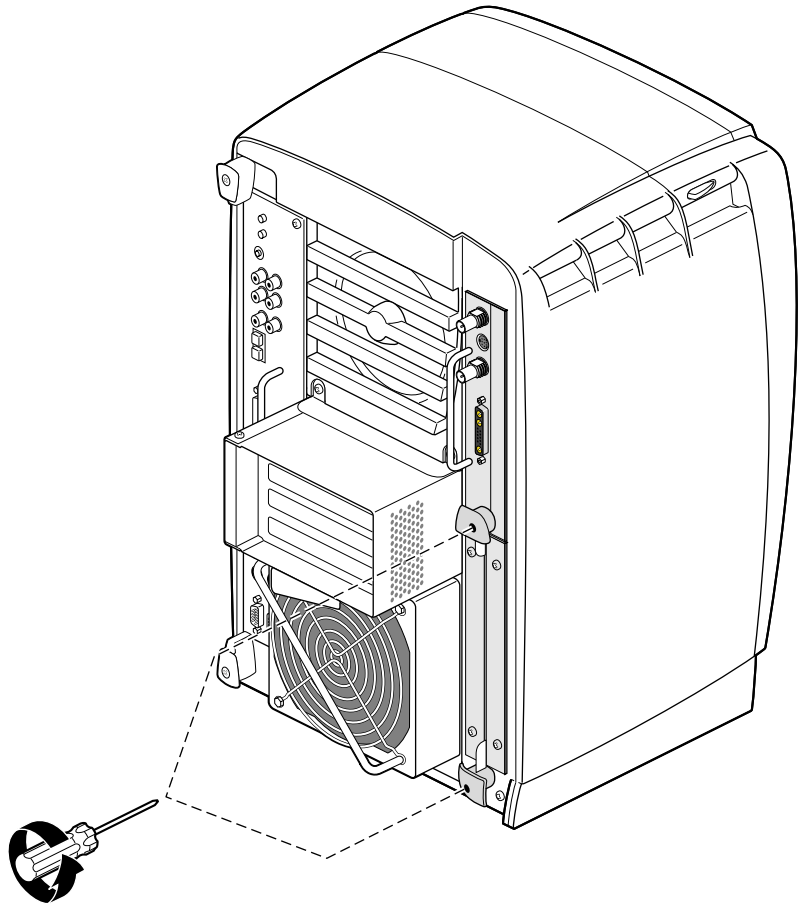

Figure 1-6 Removing the XIO Tri-Module Screws

Warning: The heat sinks on the XIO boards become very hot. Wait 5 minutes after powering off the Octane2 workstation before you remove the XIO Tri-Module. Test before touching any of the XIO boards.

1. Loosen the two captive screws in the XIO Tri-Module handles with the supplied Phillips screwdriver, as shown in Figure 1-6, until the screws are disconnected from the chassis.

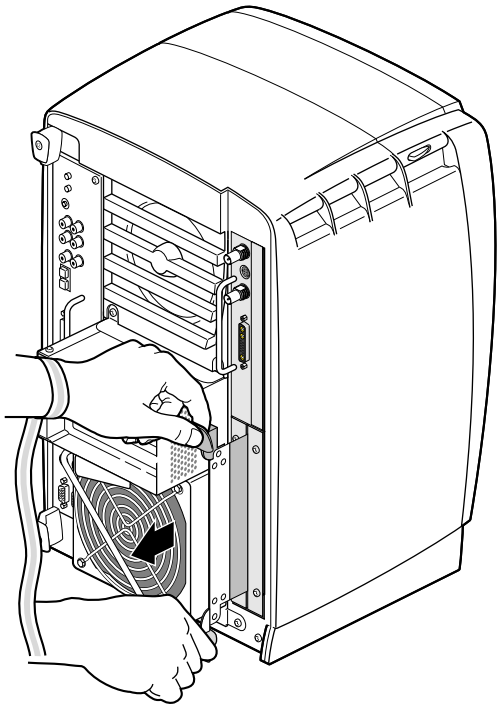

Figure 1-7 Unlatching the XIO Tri-Module

2. Grasp the plastic knobs and pull until the XIO Tri-Module latching board protrudes about an inch (2.5 cm) from the chassis, as shown in Figure 1-7.

   The plastic knobs and XIO Tri-Module latching board move out about one inch (2.5 cm) before the XIO Tri-Module itself moves.

3. Continue to pull on the plastic knobs until the XIO Tri-Module releases from the workstation.

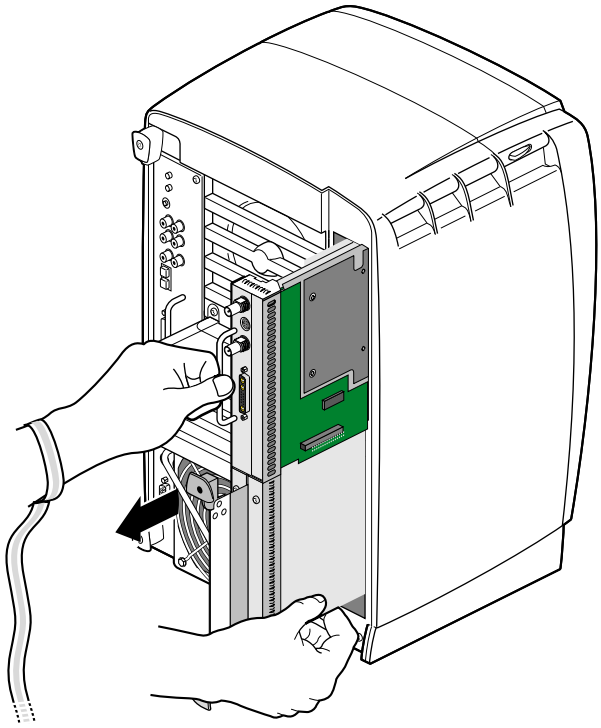

Figure 1-8 Removing the XIO Tri-Module

4. Grasp the XIO Tri-Module along its length, and support the base of the module with your hand as you remove it from the chassis, as shown in Figure 1-8.

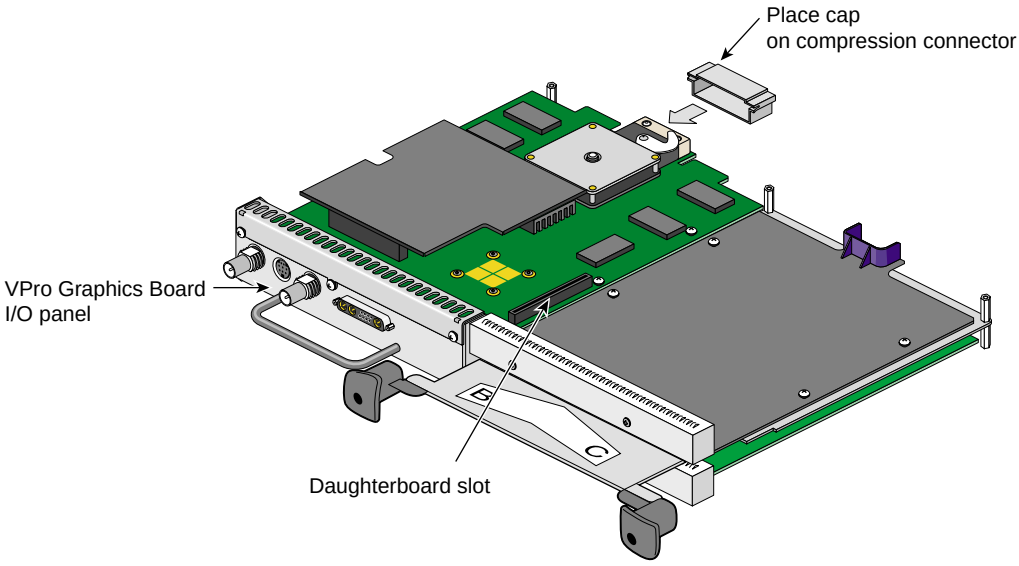

Figure 1-9 Placing the XIO Tri-Module on Its Side

The plastic knob assembly protrudes when the XIO Tri-Module is out of the chassis. When the assembly protrudes, the identification label for XIO slots B and C is visible. XIO slots A and D are on the reverse side. See Figure 1-9.

Note: Do not push on the plastic knob assembly after you have removed the XIO Tri-Module. The module locks to the workstation only if the plastic knob assembly is protruding.

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5. Place the XIO Tri-Module on a flat, antistatic surface. An empty antistatic bag on your desk works well.

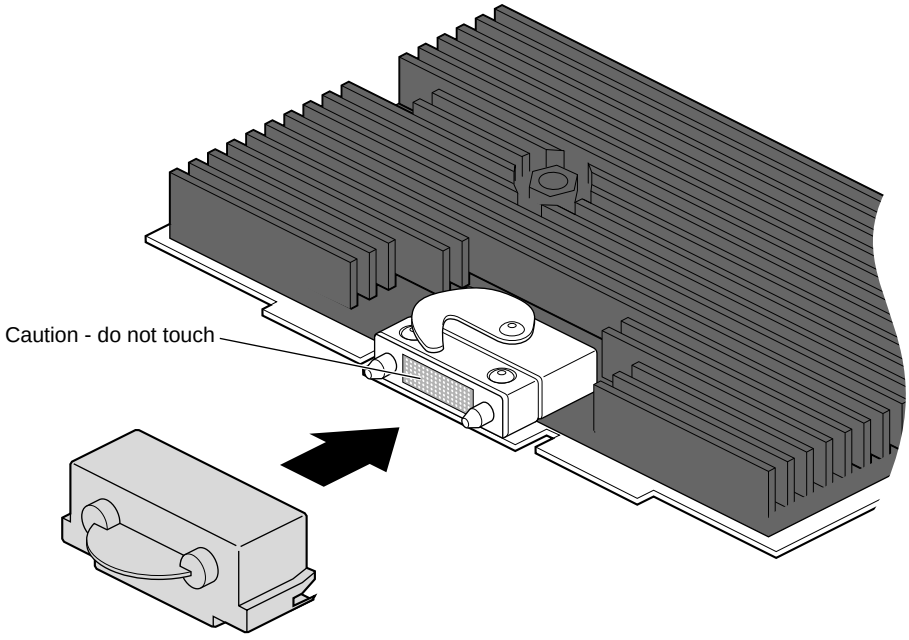

Figure 1-10 Placing a Cap on the XIO Compression Connector

Caution: Do not touch or bump the gold (front) surface of the XIO compression connector. Touching it could damage the connector. Place a protective cap on the XIO compression connector to prevent damage when the XIO boards are removed from the Octane2 workstation. See Appendix B, "Care and Cleaning of Compression Connectors."

6. Place a cap over the compression connector on each XIO board. Spare caps are shipped with the Octane2 workstation, or you may use one of the caps that came on your new Dual Head XIO module. See Figure 1-10.
7. Place the XIO Tri-Module in an antistatic bag.

Installing the Dual Head XIO Module

Follow the instructions in this section to install a Dual Head XIO module in an Octane2 workstation.

The instructions in this section assume that you have completed the instructions in "Removing the Existing XIO Tri-Module" on page 6, and now have an Octane2 that:

- Is powered off and unplugged
- Has an empty XIO module slot
- Has a wrist strap properly attached
- Is "VPro Dual Head Ready," as described in Appendix A, "Checking for VPro Dual Head Readiness."

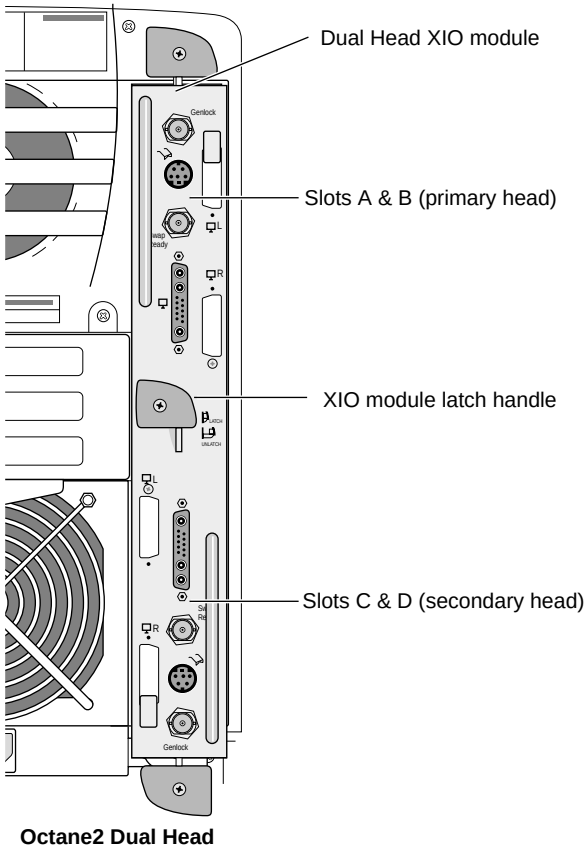

Figure 1-11 Placing the Primary Head Graphics Boards Toward the Top of the Workstation

Note: Be sure to install the Dual Head XIO module in the orientation shown in Figure 1-11. This orientation can be confirmed by ensuring that the silk-screened labels on the I/O panel are right-side up, and that the center plastic knob is in the orientation shown in Figure 1-11.

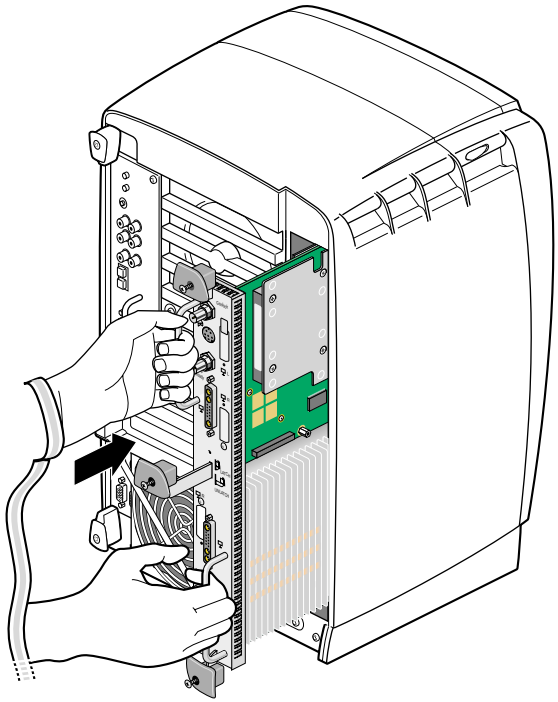

Figure 1-12 Inserting the Dual Head XIO Module

1. Remove the caps from both Dual Head XIO Module compression connectors.
2. Make sure the center plastic knob protrudes from the I/O panel, as shown in Figure 1-12.
3. Slide the Dual Head XIO module into the guides on the top and bottom of the workstation, as shown in Figure 1-12. Be sure the module is oriented correctly, as shown in Figure 1-11. If the module does not slide smoothly into the chassis, rock it very slightly up and down.

   If the Dual Head XIO module stops before it is fully inserted, check the center plastic knob. If the center plastic knob is flush with I/O panel, back the entire module out of the slot about an inch (2.5 cm), pull out the center knob, and then continue inserting the Dual Head XIO module into the chassis.

   If the center plastic knob is correctly extended, but the module still does not seat fully, the connectors may not be mating correctly to the frontplane. Try fully removing the module and carefully reinserting it.

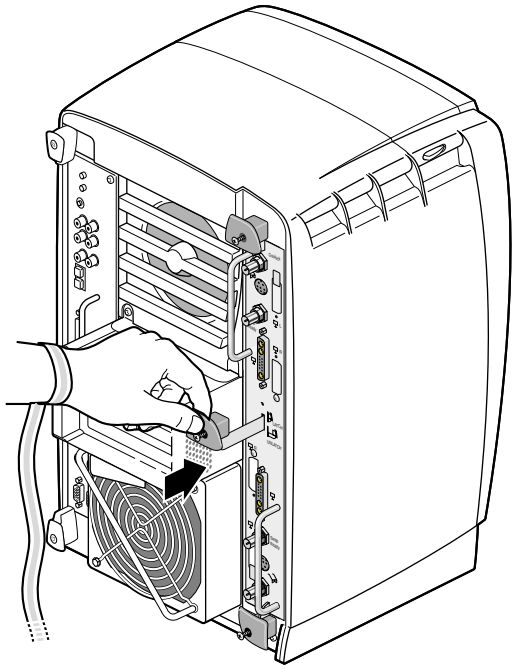

Figure 1-13 Latching the Dual Head XIO Module

4. Once the Dual Head XIO Module is fully inserted, grasp the center plastic knob, as shown in Figure 1-13, and push it into place against the I/O panel.

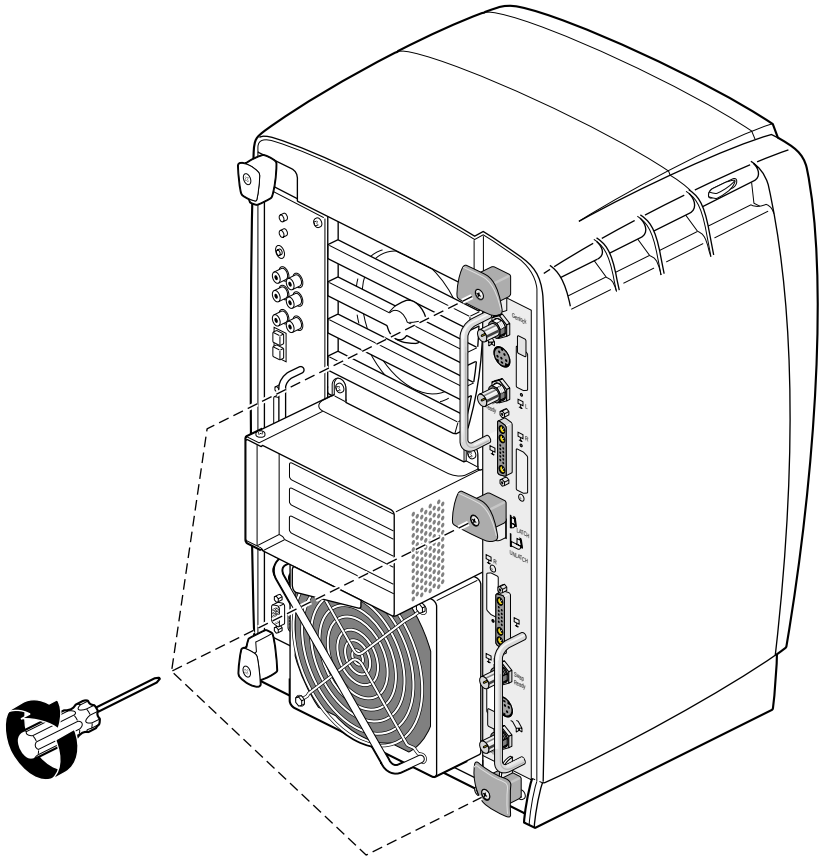

Figure 1-14 Replacing the Dual Head XIO Module Screws

5. Gently tighten each of the three captive screws in the plastic knobs, as shown in Figure 1-14. Be careful not to cross-thread these screws and do not over-tighten them.
6. Remove the wrist strap.

Returning Parts

To return any parts, use the packaging materials and box that came with those replacement parts.

For product support information, see “Product Support” on page xii.

You are finished installing the Dual Head XIO module. Go to Chapter 2, “Connecting the Monitors.”

Connecting the Monitors

If you have not already done so, go to Chapter 1, and follow the instructions for installing the Dual Head XIO module before you begin setting up the monitors.

On a Dual Head system, one of the monitors is considered the “primary” head (head 0), and the other the “secondary” head (head 1).

You can place the secondary monitor next to your current monitor (a “side by side” configuration) or you can place the secondary monitor above or below your current monitor (a “stacked” configuration). After unpacking the monitor, follow the instructions in either “Connecting Cables to the Monitors in a Side-by-Side Configuration” on page 21 or “Connecting Cables to the Monitors in a Stacked Configuration” on page 23, depending on your desired 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.

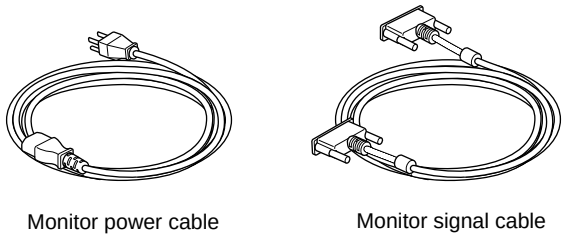

Figure 2-1 Identifying the Monitor Cables

The monitor ships with two cables, as shown in Figure 2-1: a monitor power cable and a monitor signal cable (to connect the monitor to the workstation).

Connecting Cables to the Monitors in a Side-by-Side Configuration

Follow the steps in this section to connect the monitors in a side-by-side configuration. If you want to configure the monitors in a stacked configuration, see "Connecting Cables to the Monitors in a Stacked Configuration" on page 23.

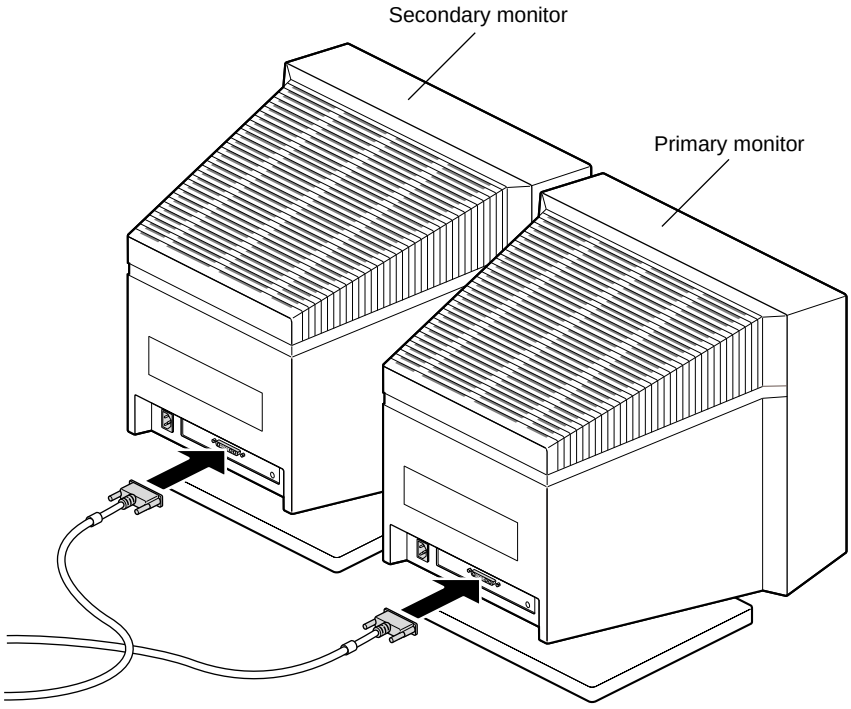

Figure 2-2 Placing the Monitors Side by Side

1. Facing the front of the monitors, place the primary monitor on the left and the secondary monitor on the right. The secondary monitor is the monitor that is part of the Dual Head shipment.
2. Connect one end of each monitor signal cable to the connector on the back of each monitor, as shown in Figure 2-2. Connect and tighten the thumbscrews on both sides of the connector.

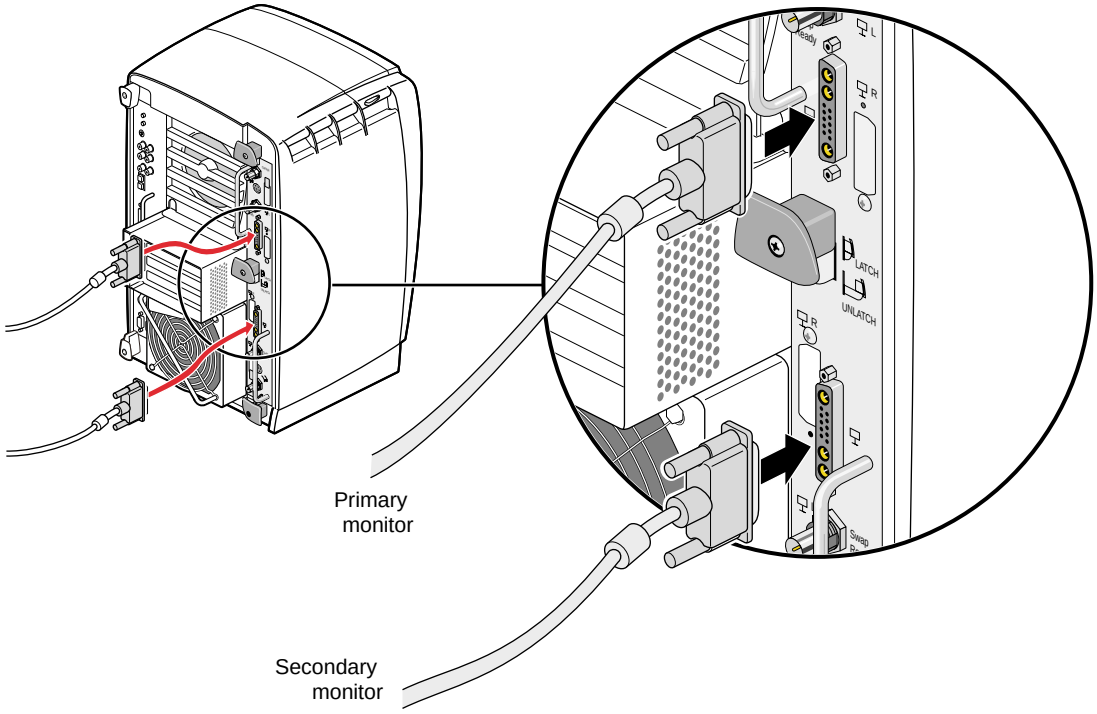

Figure 2-3 Connecting the Monitor Signal Cables

3. Connect the primary monitor signal cable to the primary graphics board set (in slots A and B), as shown in Figure 2-3. The primary graphics board set is toward the top of the Silicon Graphics Octane2 workstation.
4. Connect the secondary monitor signal cable to the secondary graphics board set (in slots C and D), as shown in Figure 2-3. The secondary graphics board set is toward the bottom of the Octane2 workstation.
5. Tighten the thumbscrews on both sides of the connectors.

Note: It is important that you connect the monitor cables to the correct monitor connectors (that is, primary and secondary) on the Octane2 workstation. Otherwise your cursor movements between monitors will be confusing.

You are finished connecting the monitor signal cables. Go to “Connecting the Power Cables” on page 26.

Connecting Cables to the Monitors in a Stacked Configuration

Follow the steps in this section to connect the monitors in a stacked configuration.

Note: If you use the stacked configuration, you must reconfigure the software. See Chapter 3, “Installing the Software and Using the Dual Head System,” for instructions on reconfiguring the software.

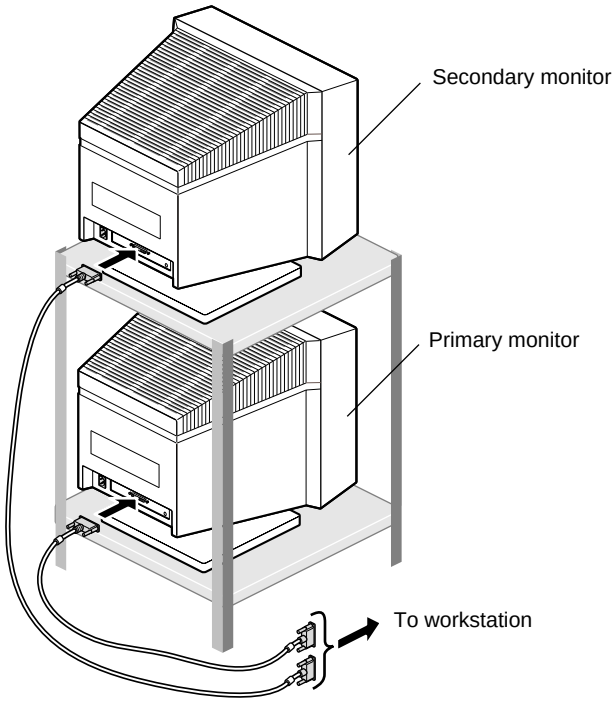

Figure 2-4 Placing the Secondary Monitor Above the Primary Monitor

1. Place the secondary monitor on a surface above the primary monitor. The secondary monitor is the monitor that is part of the dual head shipment.

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

2. Connect one end of each monitor signal cable to the connector on the back of each monitor, as shown in Figure 2-4. Connect and tighten the thumbscrews on both sides of the connectors.

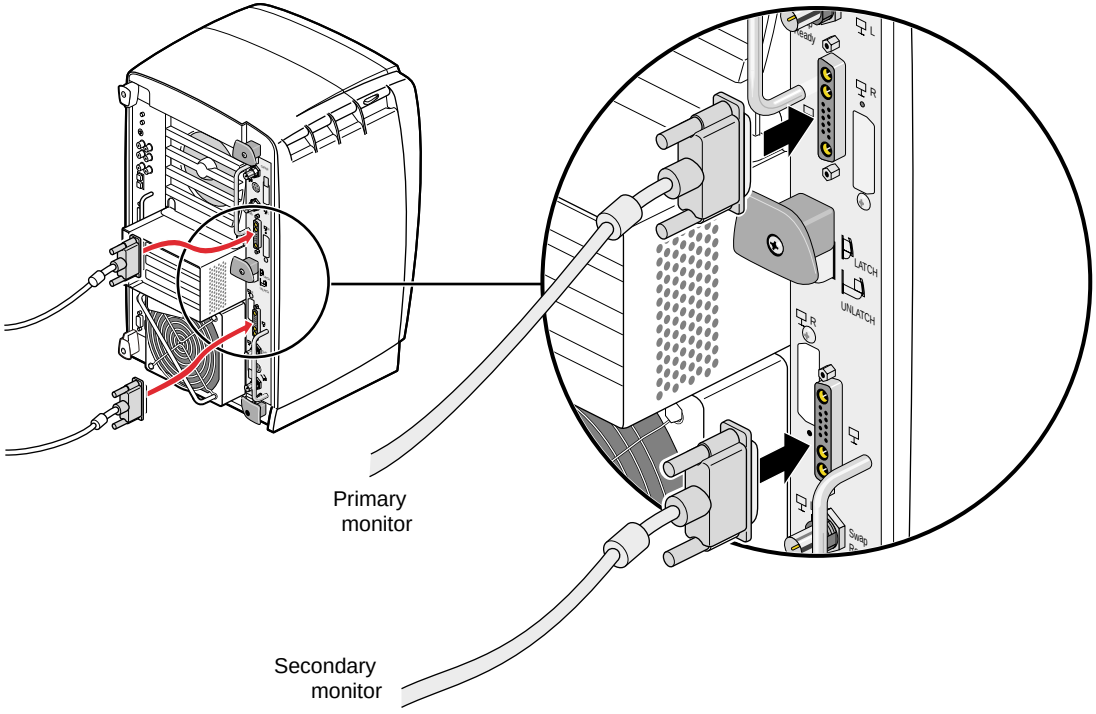

Figure 2-5 Connecting the Monitor Signal Cables

3. Connect the primary monitor signal cable to the primary graphics board set in slots A and B, as shown in Figure 2-5. The primary graphics board set is toward the top of the Octane2 workstation.
4. Connect the secondary monitor signal cable to the secondary graphics board set in slots C and D, as shown in Figure 2-5. The secondary graphics board set is toward the bottom of the Octane2 workstation.
5. Tighten the thumbscrews on both sides of the connectors.

Note: It is important that you connect the monitor cables to the correct monitor connectors (that is, primary and secondary) on the Octane2 workstation. Otherwise your cursor movements between monitors will be confusing.

You are finished connecting the monitor signal cables. Go to "Connecting the Power Cables" on page 26.

Connecting the Power Cables

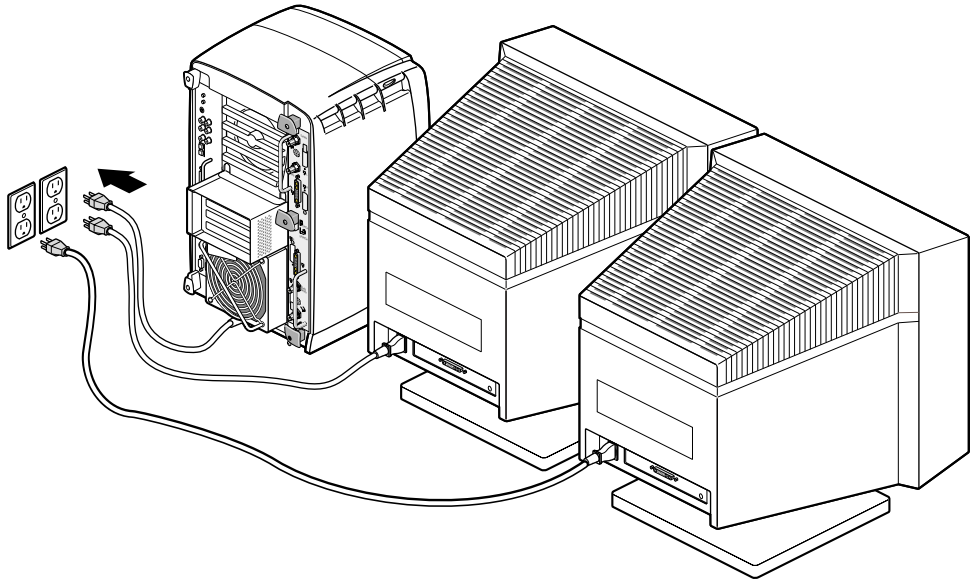

Figure 2-6 Connecting the Secondary Monitor Power Cable

Connect the power cable for each monitor as follows:

1. Connect the female end of the power cable to the power connector on the back of the monitor, as shown in Figure 2-6.
2. Plug the male end into a three-prong grounded electrical outlet.
3. Turn on the primary monitor and then the secondary monitor. The power switches are located on the front of each monitor in the lower right corner. The LED on the switch lights up when the monitor is powered on.

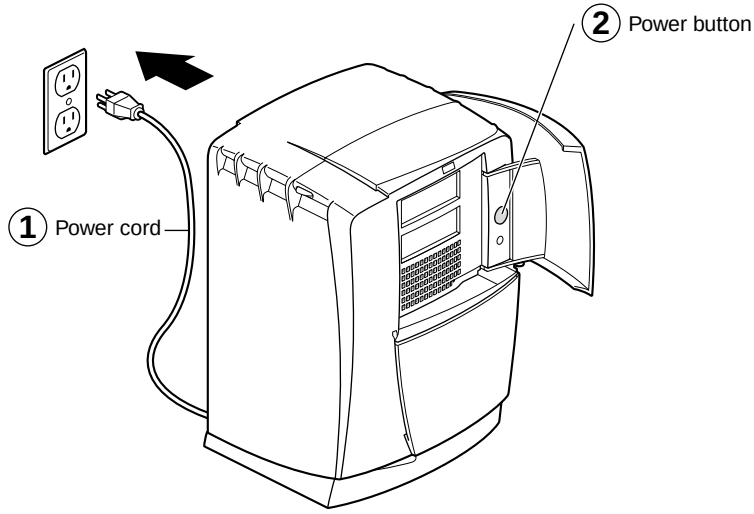

Figure 2-7 Powering On the Octane2 Workstation

Note: Be sure to turn both monitors on *before* turning on the Octane2 workstation.

4. Plug the Octane2 power cord into an electrical outlet, as shown in Figure 2-7.
5. Push the power button on the front of the Octane2 workstation, as shown in Figure 2-7.

You are finished connecting the monitors and are ready to install the software.

If you have a problem with your system, see Chapter 4, "Troubleshooting."

Installing the Software and Using the Dual Head System

This chapter explains how to use a Dual Head configuration.

Installing the Software

If you received a CD with your shipment, read the CD software installation booklet for information on installing the Dual Head software before proceeding.

If you stacked the monitors, be sure to reconfigure the software, as described in "Reconfiguring the Software for Use with Stacked Monitors" on page 32.

Moving the Cursor from One Monitor to the Other

To move the cursor from one monitor to the other, move the cursor off the screen it is on toward the other monitor. The cursor will jump to the other monitor.

The default is for the primary monitor to be located to your left as you face the front of the monitors and the secondary monitor to be located to your right. By default, the cursor moves from the right edge of the primary monitor to the left edge of the secondary monitor.

To switch cursor crossover locations, follow these instructions and refer to Table 3-1.

1. Move your monitors to the chosen position.
2. If your workstation is powered off, follow the steps in your *Octane2 Workstation Owner's Guide* to plug in the system and power it on.
3. Log in to the system.
4. From the **Toolchest**, click on **Desktop**, then select **Open Unix Shell** to open a shell window.
5. Place the cursor inside the shell window.
6. Become superuser by typing **`su`** and pressing the `Return` key, then entering the root password.
7. Change the directory to access the `Xservers` file as follows:

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

8. Change the permissions on this file (to be able to write to it) before you begin by typing the following command:

   ```
   chmod u+rw Xservers
   ```

9. Using your favorite text editor, open the `Xservers` file.
10. Add the appropriate line from Table 3-1 to the file.

Note: The contents of the file should be on one line. Do not insert hard returns.

Table 3-1 Changing Cursor Crossover Locations

If you want:	Add this:
Primary (0) on the left, Secondary (1) on the right (default)	Delete any command found in this table from the `Xservers` file.
Secondary (1) on the left, Primary (0) on the right	`-hw board=0,left=1 -hw board=1,right=0`
Primary (0) below, Secondary (1) above	`-hw board=0,above=1 -hw board=1,below=0`
Secondary (1) below, Primary (0) above	`-hw board=0,below=1 -hw board=1,above=0`

11. Save the file and exit the text editor.

> **Caution:** Close any open applications before you follow step 12. The command closes any running applications, and any unsaved work will be lost.

12. Restart your server.
    a. Stay in superuser mode.
    b. Type on the command line: **`killall Xsgi`**
13. After a few seconds, the login window appears.
14. Log in to the system.

Selecting the Head on Which a Program Runs

During an interactive session with the Window Manager, you can use the `DISPLAY` environment variable to control the head on which newly started graphics programs run. When the `DISPLAY` variable is set to *:0.0*, programs you start run on head 0 (the primary head); when it is set to *:0.1*, programs you start run on head 1 (the secondary head).

For convenience, the default startup files (`.login`, `.profile`) for `root` and `guest` shells set the `DISPLAY` variable 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 inherits this `DISPLAY` value, and thus appears 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, it is impossible to move it from one head to another from the Window Manager.

See Appendix C, “Choosing a Graphics Head (for Developers),” for more information on choosing a graphics head.

Reconfiguring the Software for Use with Stacked Monitors

The Dual Head software's default is for the monitors to be positioned side by side. If your monitors are stacked on top of each other, you will need to reconfigure the software.

Follow these steps to reconfigure the software:

1. If your workstation is powered off, follow the steps in your *Octane2 Workstation Owner's Guide* to plug in the system and power it on.
2. Log in to the system.
3. From the **Toolchest**, click on **Desktop**, then select **Open Unix Shell** to open a shell window.
4. Place the cursor inside the shell window.
5. Become superuser by typing **`su`** and pressing the `Return` key, then entering the root password.
6. Change the directory to access the `Xservers` file as follows:

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

7. Change the permissions on this file (to be able to write to it) before you begin by typing the following command:

   ```
   chmod u+rw Xservers
   ```

8. Using your favorite text editor, open the `Xservers` file. Once you are in the Xservers file, find the line that reads:

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

9. Add `-stacked` to the end of the following line:

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

   It should now read:

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

10. Save the file and exit the text editor.

Caution: Close any open applications before you follow step 11. The command closes any running applications, and any unsaved work will be lost.

---

11. Restart your X Windows server.
    c. Stay in superuser mode.
    d. Type on the command line: **killall Xsgi**
12. After a few seconds, the login window appears.
13. Log in to the system.

You are finished reconfiguring the software for use with stacked monitors.

Troubleshooting

This chapter provides you with troubleshooting information and diagnostic tests for the Dual Head VPro graphics system.

General Troubleshooting Procedures

If you are having trouble with your Dual Head installation, follow these preliminary steps before going on to the next sections:

1. Make sure that both monitors are connected to AC power and are powered on, as described in "Connecting the Power Cables" on page 26.
2. Make sure that both monitors are correctly connected to the appropriate graphics board set, as described in "Connecting Cables to the Monitors in a Side-by-Side Configuration" on page 21 or "Connecting Cables to the Monitors in a Stacked Configuration" on page 23.
3. Be sure you have installed any software that came with the second graphics board.
4. Check the Troubleshooting chapter in your *Octane2 Workstation Owner's Guide* for troubleshooting tips for the Octane2 workstation.

If none of these steps solve your problem, proceed to the appropriate section, "Both Screens are Blank" on page 36 or "One Screen is Blank or has Faulty Images" on page 37.

Both Screens are Blank

If both of your monitor screens are blank when the system is running, perform the steps suggested in “General Troubleshooting Procedures.”

If the problem persists, try reseating the graphics boards, as described in “Reseating the Dual Head XIO Module” on page 40.

Once the Dual Head XIO Module is reseated, look to see if the monitors are now working. If the problem persists, try reseating the graphics boards a few more times. If the problem still remains, contact your SGI representative.

One Screen is Blank or has Faulty Images

If one of your monitor screens is blank or has faulty images, you can make some determination of the cause of the problem by using the `gfxinfo` command, as described in this section.

1. From the **Toolchest**, click on **Desktop**, then select **Open Unix Shell**.
2. Move the mouse cursor to the newly opened UNIX shell window.
3. On the command line, type:

```
1%] /usr/gfx/gfxinfo
```

You should get back something similar to the following:

```
Graphics board 0 is "ODYSSEY" graphics.
       Managed (":0.0") 1280x1024
       BUZZ version B.0
       PB&J version 1
       128MB memory
              Banks: 4, CAS latency: 3
       Monitor 0 type: Unknown
       Channel 0:
       Origin = (0,0)
       Video Output: 1280 pixels, 1024 lines, 60.00Hz (1280x1024_60)
Graphics board 1 is "ODYSSEY" graphics.
       Managed (":0.1") 1280x1024
       BUZZ version B.0
       PB&J version 1
       128MB memory
              Banks: 4, CAS latency: 3
       Monitor 0 type: Unknown
       Channel 0:
       Origin = (0,0)
       Video Output: 1280 pixels, 1024 lines, 60.00Hz (1280x1024_60)
```

On a correctly functioning VPro Dual Head system this output will show two graphics boards, board 0 and board 1. Board 0 is the board set connected to the primary head (typically the monitor on the left) and board 1 is the board set connected to the secondary head (typically the monitor on the right).

If Gfxinfo Shows Only One Graphics Board

If your system shows only one board, try reseating the Dual Head XIO Module as described in “Reseating the Dual Head XIO Module” on page 40, and then rerun `gfxinfo`.

If this does not solve the problem, try reversing the primary and secondary graphics heads, as described in “Reversing the Primary and Secondary Graphics Heads” on page 40, and then rerun `gfxinfo`.

If the problem went away, it was probably a bad connection between the graphics board set and the Octane2 frontplane. You may return the graphics heads to their original positions, as described in “Returning the Graphics Heads to Their Original Positions” on page 41, or leave them in the reversed position. Other than the silk-screened labels being upside down, there is no problem leaving the Dual Head XIO Module reversed.

If the problem persists, return the graphics heads to their original positions, as described in “Returning the Graphics Heads to Their Original Positions” on page 41.

If none of these tests solve your problem, contact your SGI representative for assistance.

If Gfxinfo Shows Both Graphics Boards

If your system shows both graphics boards, but one of your monitor screens is blank or has faulty images, try reversing the monitors and cables, as described in "Reversing the Monitors and Cables" on page 41.

If the problem stays with one monitor (even though it is now connected to a different graphics board) the problem is likely in your monitor or monitor cable.

If the problem is now on the other monitor, that suggests that the problem is in your Octane2 system.

Return the monitors and cables to their original positions.

If the problem persists, try reversing the primary and secondary graphics heads, as described in "Reversing the Primary and Secondary Graphics Heads" on page 40.

Once the heads are reversed, look to see if the fault (the blank screen or faulty image) has gone away, has moved with the board set, or has stayed where it originally was.

If the problem went away, it was probably a bad connection between the graphics board set and the Octane2 frontplane. You may return the graphics heads to their original positions, as described in "Returning the Graphics Heads to Their Original Positions" on page 41, or leave them in the reversed position. Other than the silk-screened labels and the center plastic knob being upside down (both of which are purely cosmetic issues), there is no problem leaving the Dual Head XIO Module reversed.

If the problem moved with the board set (that is, if it was on the bottom graphics head before, and it is now on the top graphics head), the problem is probably in your graphics boards. Return the graphics heads to their original positions, as described in "Returning the Graphics Heads to Their Original Positions" on page 41 and contact your SGI representative for assistance.

If the problem remained in the same physical location (that is, if it was on the bottom graphics head before, and it is still on the bottom graphics head, even though a different board set is occupying that position) it is probably a software problem. Return the graphics heads to their original positions, as described in "Returning the Graphics Heads to Their Original Positions" on page 41 and contact your SGI representative for assistance.

Diagnostic Tests

This section details a number of diagnostic tests you can perform to help locate problems with your Dual Head VPro graphics system.

Reseating the Dual Head XIO Module

Sometimes problems with a graphics board are as simple as a poor connection between the graphics board set and the Octane2 frontplane. In this case, reseating the Dual Head XIO module will often fix the problem.

To reseat the Dual Head XIO Module, follow these steps:

1. Prepare the system as described in "Preparing the Workstation to Install the Dual Head XIO Module" on page 3.
2. Remove the Dual Head XIO module, as described in "Removing the Dual Head XIO Module" on page 43.
3. Reinstall the Dual Head XIO module, as described in "Installing the Dual Head XIO Module" on page 12.

Reversing the Primary and Secondary Graphics Heads

The diagnostic test described in this section reverses the physical locations of the primary and secondary graphics board sets.

To reverse the positions of the primary and secondary graphics board sets, follow these steps:

1. Prepare the system as described in "Preparing the Workstation to Install the Dual Head XIO Module" on page 3.
2. Remove the Dual Head XIO module, as described in "Removing the Dual Head XIO Module" on page 43.
3. Reinstall the Dual Head XIO module, as described in "Installing the Dual Head XIO Module" on page 12, but **install it upside down** (that is, the opposite of the manner shown in Figure 1-11).

Returning the Graphics Heads to Their Original Positions

To return the primary and secondary graphics heads to their original positions, follow these steps:

1. Prepare the system as described in "Preparing the Workstation to Install the Dual Head XIO Module" on page 3.
2. Remove the Dual Head XIO Module, as described in "Removing the Dual Head XIO Module" on page 43.
3. Reinstall the Dual Head XIO module, as described in "Installing the Dual Head XIO Module" on page 12, this time installing it correct-side up, as shown in Figure 1-11.

Reversing the Monitors and Cables

Reversing the monitors and monitor signal cables helps to determine if a problem is in the graphics boards or in the monitors and signal cables.

To reverse the monitors and cables, disconnect each cable from its 13W3 connector on the back of the Octane2 workstation and reconnect it to the other 13W3 connector.

If this causes the problem to change (move from one monitor to the other, for example) you may further diagnose the problem by leaving both cables connected to the Octane2 workstation, but disconnecting each from its monitor and reattaching it to the other monitor.

Removing Dual Head Graphics From An Octane2

This chapter describes how to remove Dual Head graphics from a Silicon Graphics Octane2, and reinstall the original single head graphics.

Preparing to Remove the Dual Head XIO Module

Before removing the Dual Head graphics option, you must power off the Octane2 workstation, wait 5 minutes for the heat sinks to cool, and attach a wrist strap. If you have not already done so, see "Preparing the Workstation to Install the Dual Head XIO Module" on page 3 and follow the instructions through attaching the wrist strap. Be sure to also read "Guidelines for Storing and Handling Compression Connectors" on page 60 before beginning your task. Then return here for instructions on removing the Dual Head graphics option.

Caution: Do not touch the gold (front) surface of the XIO compression connector. Touching it could damage the connector. Place a protective cap on the XIO compression connector to prevent damage when the XIO boards are removed from the Octane2 workstation. See Appendix B, "Care and Cleaning of Compression Connectors."

Removing the Dual Head XIO Module

The instructions in this section assume that you have completed the instructions in "Preparing the Workstation to Install the Dual Head XIO Module" on page 3, and now have an Octane2 that:

- Is powered off and unplugged
- Has been sitting for 5 minutes to allow the heatsinks to cool
- Has a wrist strap properly attached

If you have not already done so, go to "Preparing the Workstation to Install the Dual Head XIO Module" on page 3 and follow the instructions through attaching the wrist strap. Then return here and follow the directions.

Caution: When you remove the Dual Head XIO Module, the compression connectors on the back of the XIO boards are accessible and easily damaged. Do not touch or bump the bristled pad (shown in Figure 5-1). All XIO graphics boards have compression connectors, as do most XIO option boards. Before you remove the Dual Head XIO Module, read Appendix B, "Care and Cleaning of Compression Connectors."

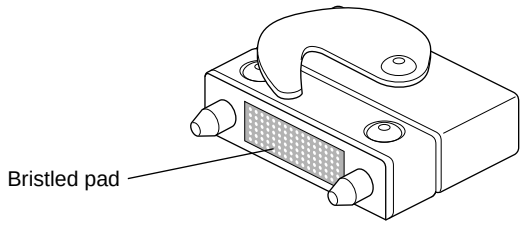

Figure 5-1 Identifying the Compression Connector

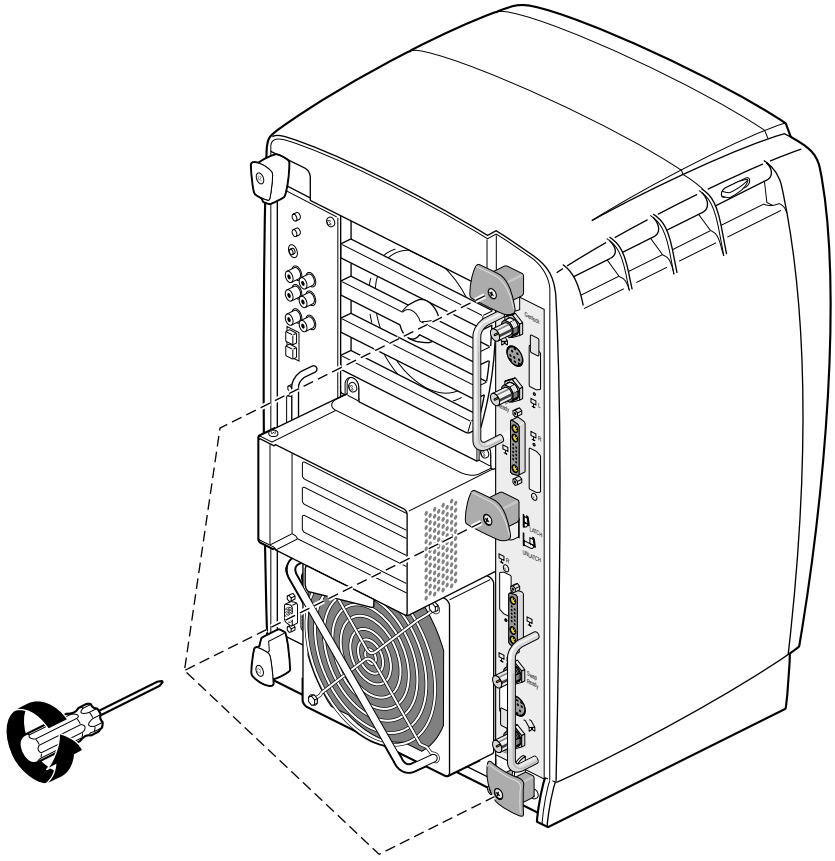

Figure 5-2 Removing the Dual Head XIO Module Screws

Warning: The heat sinks on the XIO boards become very hot. Wait 5 minutes after powering off the Octane2 workstation before you remove the Dual Head XIO module. Test before touching any of the XIO boards.

1. Using the supplied Phillips screwdriver, loosen the three captive screws in the Dual Head XIO module plastic knobs, as shown in Figure 5-2, until the screws are disconnected from the chassis.

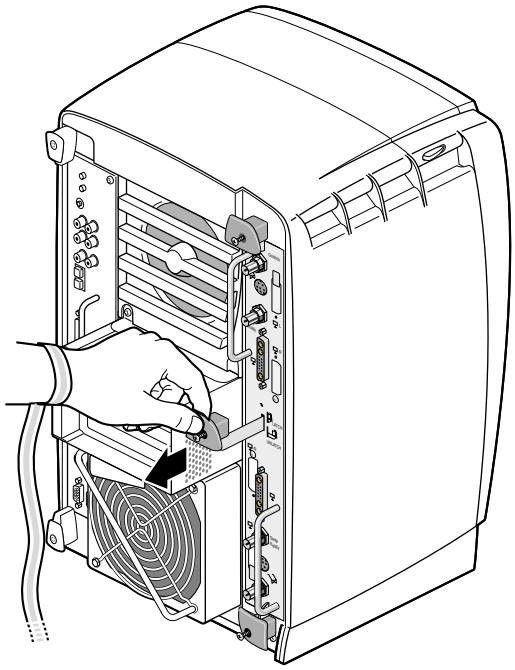

Figure 5-3 Unlatching the Dual Head XIO Module

2. Grasp the center plastic knob and pull until the Dual Head XIO module latch protrudes about an inch (2.5 cm) from the chassis, as shown in Figure 5-3.

   The knob moves out about one inch (2.5 cm) before the I/O panel moves.

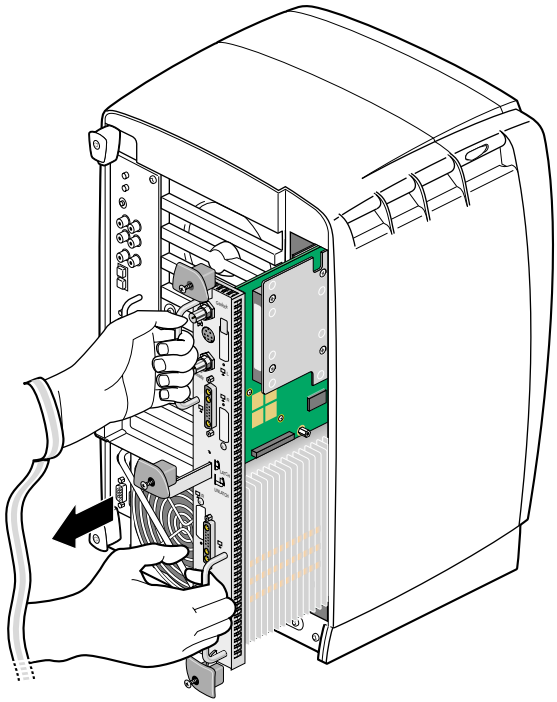

Figure 5-4 Removing the Dual Head XIO Module

3. Grasp the handles on the Dual Head XIO module and slide the module out of the chassis, as shown in Figure 5-4. You may also wish to support the bottom of the module while sliding it out.

   The center plastic knob protrudes when the Dual Head XIO module is out of the chassis.

   Note: Do not push on the knob after you have removed the Dual Head XIO module from the chassis. The module locks to the workstation only if the knob is protruding.

4. Place the Dual Head XIO module on a flat, antistatic surface. An empty antistatic bag on your desk works well.

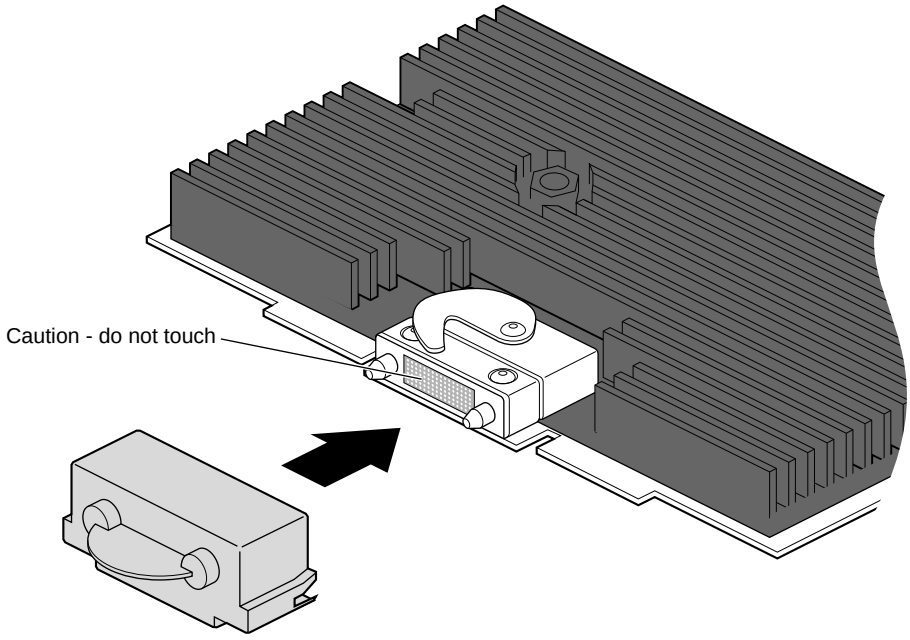

Figure 5-5 Placing a Cap on the XIO Compression Connector

Caution: Do not touch or bump the gold (front) surface of the XIO compression connectors. Touching them could damage the connectors. Place a protective cap on the XIO compression connectors to prevent damage when the XIO boards are removed from the Octane2 workstation. See Appendix B, “Care and Cleaning of Compression Connectors.”

5. Place a cap over each XIO board compression connector. Spare caps are shipped with the Octane2 workstation. See Figure 5-5.

Installing the XIO Tri-Module

Follow the instructions in this section to reinstall an XIO Tri-Module in an Octane2 workstation.

The instructions in this section assume that you have completed the instructions in “Removing the Dual Head XIO Module” on page 43, and now have an Octane2 that:

- Is powered off and unplugged
- Has an empty XIO module slot
- Has a wrist strap properly attached

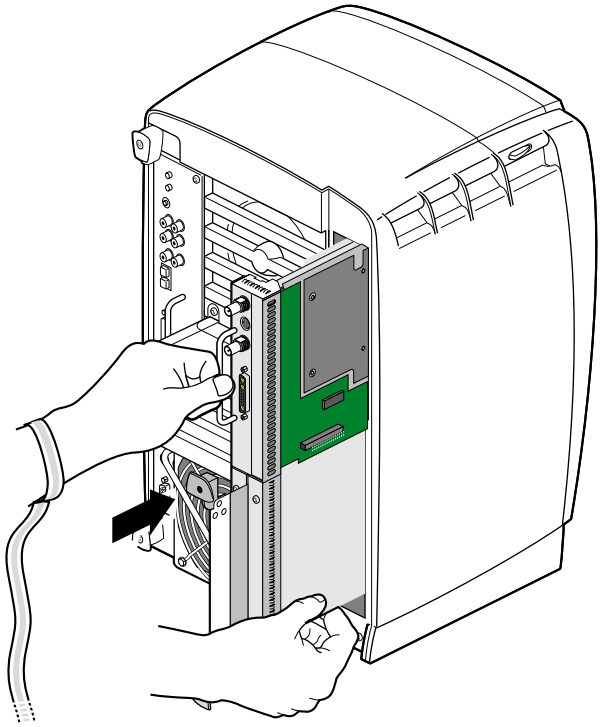

Figure 5-6 Inserting the XIO Tri-Module

1. Remove the caps from all compression connectors on the XIO Tri-Module.
2. Slide the XIO Tri-Module into the guides on the top and bottom of the workstation, as shown in Figure 5-6. Be sure the module is oriented correctly, as shown. There may or may not be other XIO boards in slots C and D (the bottom two slots) but the graphics board set should always be in slots A and B (the top two slots).

   Before you insert the XIO Tri-Module, make sure the plastic knob assembly protrudes in a locked position from the I/O panel, as shown in Figure 5-6.

   If the plastic knobs are flush with the I/O panel, the XIO Tri-Module will stop during insertion. If this happens, back the entire assembly out of the slot about one inch (2.5 cm), pull out the plastic knobs, and then continue inserting the XIO Tri-Module into the chassis.
3. Make sure that the XIO Tri-Module has been inserted fully into the chassis, and that the I/O panels are nearly flush with the chassis (a slight depth variation is normal).

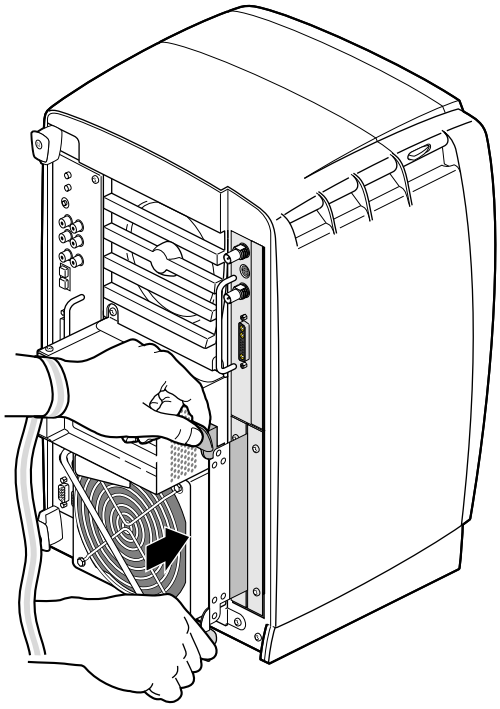

Figure 5-7 Latching the XIO Tri-Module

4. Use the plastic knobs to lock the XIO Tri-Module into position, as shown in Figure 5-7.

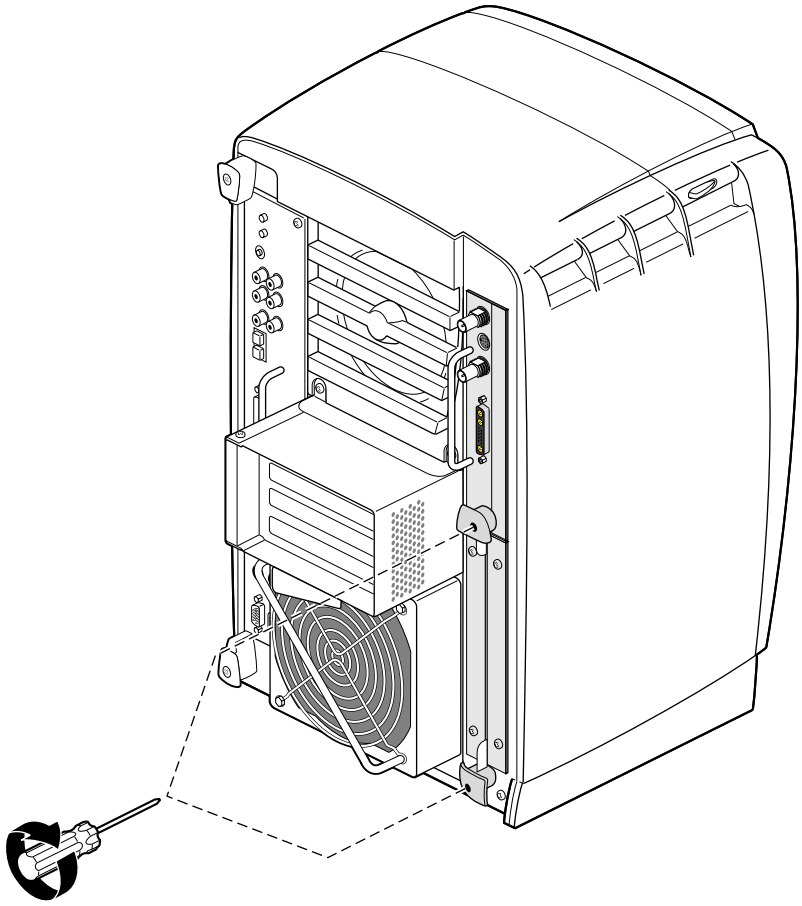

Figure 5-8 Replacing the XIO Tri-Module Screws

5. Gently tighten both captive screws in the plastic knobs, as shown in Figure 5-8. Be careful not to cross-thread these screws and do not over-tighten them.
6. Remove the wrist strap.

You are finished reinstalling the XIO Tri-Module.

Checking for VPro Dual Head Readiness

This appendix describes the steps required to ensure that your Silicon Graphics or Octane2 system is ready for the installation of the VPro Dual Head upgrade.

The VPro Dual Head upgrade requires the following:

- IRIX 6.5.14 with patch 4426, or IRIX 6.5.15 or later (when available)
- Two CPUs
- Frontplane part number 030-0891-003 or later
- Power supply part number 060-0038-003 or later

To determine if your systems meets these requirements, follow the steps outlined below.

Determining the IRIX Version

To determine the version of the IRIX operating system installed on your Octane or Octane2 system, follow the instructions in this section.

From an IRIX command prompt, type:

```
1% uname -R
```

You will see output similar to the following:

```
1% uname -R
6.5 6.5.13f
```

Depending on your version, go to one of these sections: “IRIX 6.5.13 or Earlier,” “IRIX 6.5.14,” or “IRIX 6.5.15 or Later (When Available).”

IRIX 6.5.13 or Earlier

If you system has IRIX version 6.5.13 or earlier, you will need to upgrade your system to IRIX 6.5.14 with patch 4426, or IRIX 6.5.15 (when available), before installing the VPro Dual Head graphics upgrade. Contact your SGI representative for more information.

IRIX 6.5.14

If you system has IRIX version 6.5.14, you will need patch 4426 before upgrading to VPro Dual Head graphics.

To determine if you have patch 4426 installed, type the following at an IRIX command prompt:

```
2% versions patchSG0004426
```

If the output of this command is simply the headings “Name,” “Date,” and “Description” you do not have patch 4426 installed. This patch must be installed (or you must upgrade your system to IRIX 6.5.15 or later, when released) before upgrading to VPro Dual Head graphics.

If the output of this command includes items below the Name-Date-Description heading, you do have patch 4426 installed, and your system *may* be ready for the VPro Dual Head graphics upgrade. Go on to the following section “Determining the Number of CPUs.”

IRIX 6.5.15 or Later (When Available)

If your system has IRIX version 6.5.15 or later (when available), your system *may* be ready for the VPro Dual Head graphics upgrade. Go on to the following section “Determining the Number of CPUs.”

Determining the Number of CPUs

To determine the number of CPUs in your system, follow the instructions in this section.

From an IRIX command prompt, type:

```
3% hinv | grep -i processor
```

You will see output similar to the following:

```
3% hinv | grep -i processor
2 300 MHZ IP30 Processors
CPU: MIPS R12000 Processor Chip Revision: 2.2
Iris Audio Processor: version RAD revision 12.0, number 1
```

Note: You may also use the `hinv` command alone and look for the `Processor` line.

Note the number of CPUs. This will be on a line that looks similar to:

```
2 300 MHZ IP30 Processors
```

If the first number on this line is "1," stop here. You have only one CPU, and therefore your system is not ready for the VPro Dual Head graphics upgrade. Contact your SGI representative for more information.

If the first number on this line is "2," you have two CPUs. Your system *may* be ready for the VPro Dual Head graphics upgrade. Go on to the following section "Verifying Your System's Frontplane Revision Level."

Verifying Your System's Frontplane Revision Level

To determine the frontplane revision level in your system, follow the instructions in this section.

From an IRIX command prompt, type:

```
4% hinv -m | grep -i fp1
```

You will see output similar to the following:

```
4% hinv -m | grep -i fp1
            FP1 Board: barcode 10622C     part 030-0891-003 rev  E
```

Note: You may also use the `hinv -m` command alone and look for the `FP1 Board` line. You must include `-m`, however, in order to see this information.

Note the frontplane (FP1 Board) part number. If the part number is 030-0891-002 or lower, your system is not ready for the VPro Dual Head graphics upgrade. Contact your SGI representative for more information.

If the part number is 030-0891-003 or higher, your system *may* be ready for the VPro Dual Head graphics upgrade. Go on to the following section "Verifying Your System's Power Supply Revision Level."

Verifying Your System's Power Supply Revision Level

To determine the power supply revision level in your system, follow the instructions in this section.

From an IRIX command prompt, type:

```
5% hinv -m | grep -i pwr
```

You will see output similar to the following:

```
5% hinv -m | grep -i pwr
    PWR.SPPLY.S2 Board: barcode AAC8080419 part 060-0038-001 rev  D
```

Note: You may also use the `hinv -m` command alone and look for the `PWR.SPPLY` line. You must include `-m`, however, in order to see this information.

Note the power supply (PWR.SPPLY) part number. If the part number is 060-0038-002 or lower, your system is not ready for the VPro Dual Head graphics upgrade. Contact your SGI representative for more information.

If the part number is 060-0038-003 or higher, your system is ready for the VPro Dual Head graphics upgrade.

Care and Cleaning of Compression Connectors

The Silicon Graphics Octane2 workstation uses compression connectors to connect several modules and boards to the frontplane.

A single compression connector is used in the Octane2 workstation:

- On the back of the PCI module
- On each XIO board on the XIO module

Two compression connectors are used on the system module.

The compression connector has 96 pads that enable passage of signals between the system (via the frontplane) and the system module, PCI module, or XIO board.

The compression connector has two halves: One half is located on the frontplane of the chassis; the other, on the system module, PCI module, or XIO board. Each pad on a frontplane connector is a flat, gold-plated surface. Each pad on the system module, PCI module, or XIO board is composed of hundreds of tiny bristles (dendrites), as shown in Figure B-1. When a bristled pad is pressed into a gold-plated pad, a connection is created for one signal.

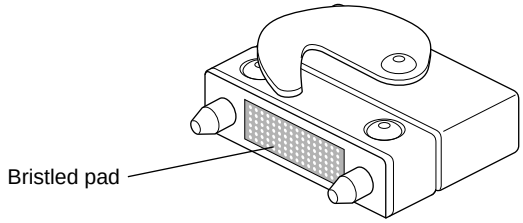

Figure B-1 Identifying the Bristled Pad of the Compression Connector

The bristled pads may attract and hold dust, lint, grease, powder, and dirt. The presence of these substances clogs or damages the bristles and prevents them from making proper

contact with the gold-plated pads on the system's frontplane. It is important to prevent this.

Guidelines for Storing and Handling Compression Connectors

To avoid damaging a compression connector and to keep it in optimal working condition, follow these guidelines whenever the board is not installed in the chassis.

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.

- Do not wipe or touch the pads of the compression connector with anything (no human fingers, no brushes, no cloth, no probes), except as specified in the cleaning instructions. The bristles might be damaged.
- Whenever the module or board is not in the chassis, put the protective cap over the compression connector and put the module or 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 on a surface, make sure that the surface is free of dust, lint, powder, metal filings, oil, water, and so on.
- Do not blow dust, dirt, or powder anywhere near the board when it is not inside its protective bag.

Guidelines for Cleaning Compression Connectors

A compression connector should never need to be cleaned if you keep the protective cover on whenever the module or board is not in the chassis. However, if the connector becomes dirty, follow the instructions below 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 TECHSPRAY (telephone 806-372-8523) works extremely well for this application.

   Caution: Do not use a cleaning product that contains any of the following ingredients: halogenated hydrocarbons, aromatic hydrocarbons, ethers, sulfur, ketones, or solvents of any kind. These substances 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.

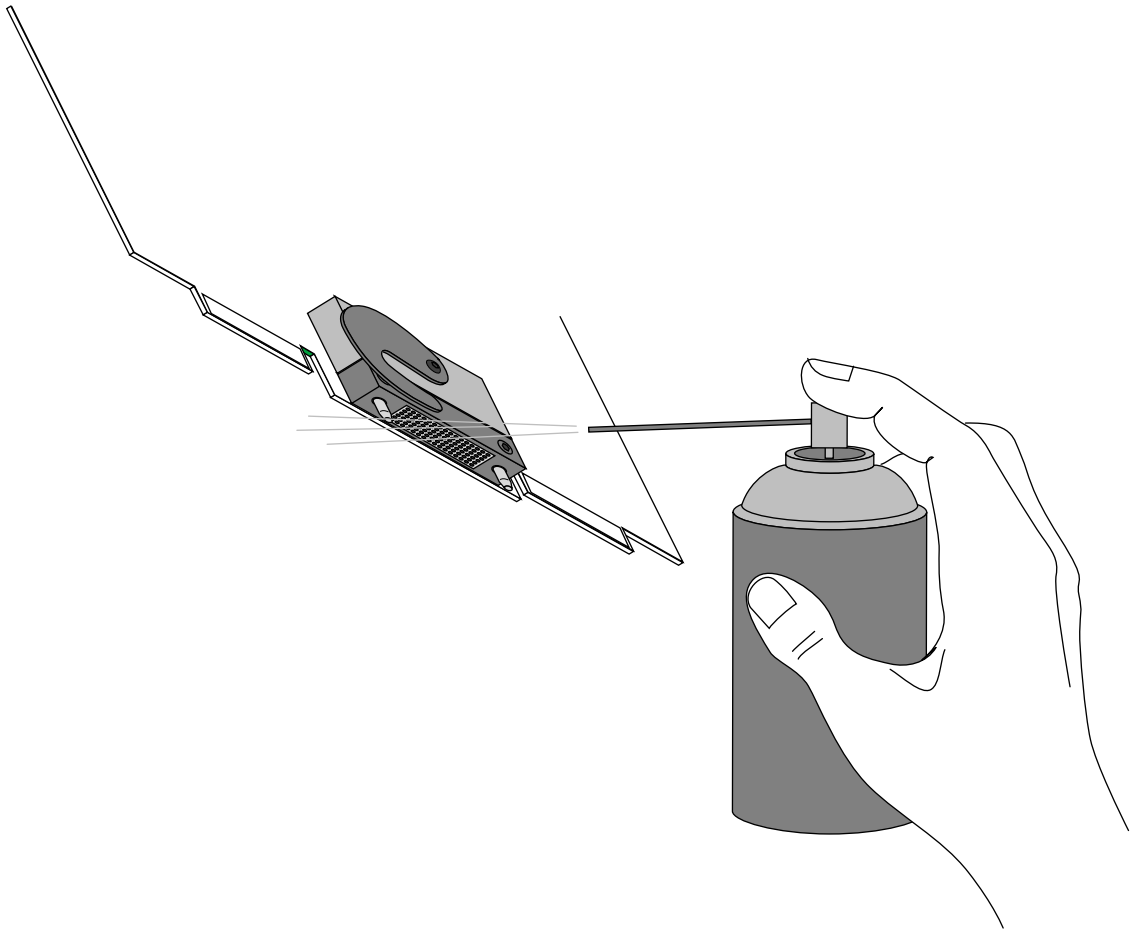

Figure B-2 Spraying the Compression Connector

3. Hold the can in a vertical position.
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. Do not allow the applicator to touch the pads. When you spray, the air hits each pad and flows downward.
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. Stop spraying if any visible material (for example, foam) appears. This foam will blow 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.

Choosing a Graphics Head (for Developers)

This appendix 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 man pages.

Note that once you open a window on a given head, the user cannot 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 must explicitly close the old window and open a new one on the other head.

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

OpenGL, X, and mixed-model IRIS GL, and 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.

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

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

For example, use the following code 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, you select a head on which to run a window by using the **scrnselect**(3G) function. If you do not call **scrnselect()** before opening a window using **winopen**(3G), the window opens 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, 0 for screen :0.0 or 1 for :0.1.

Specifying 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, or Chapter 3, "Installing the Software and Using the Dual Head System," in this guide.

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