

OCTANE™ Ultra SCSI XIO Option Board Installation Guide

Document Number 007-3581-001

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Introduction

This guide provides you with information about the features of the Ultra SCSI XIO board for the OCTANE™ workstation and explains how to install, remove, and configure it. The Ultra SCSI XIO option provides up to four additional external SCSI ports for the OCTANE workstation. Below is an overview of the contents of this guide:

- The introduction provides additional information about hardware resources, products, and support.
- Chapter 1 describes the features of the Ultra SCSI option board.
- Chapter 2 provides instructions for installing the Ultra SCSI option board in an OCTANE workstation.
- Chapter 3 provides instructions for configuring and cabling the Ultra SCSI option board.
- Chapter 4 provides instructions for removing the Ultra SCSI option board.
- Chapter 5 provides troubleshooting information.
- Appendix A provides illustrations of the Ultra SCSI option board, the OCTANE/SI, OCTANE/SI with texture memory option board, OCTANE/SSI, and OCTANE/MXI graphics boards.
- Appendix B provides port pinout information.
- Appendix C provides instructions on the care and cleaning of the XIO compression connector.

Read this guide once all the way through before you start to work. You will become familiar with the OCTANE system and the parts with which you will be working.

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

Additional Hardware Information

OCTANE Hardware Central is an online resource that provides access to hardware movies and other information previously found only in your printed owner's guide, such as port pinout information, user tips, environmental information, and so on. To access it:

1. Choose Toolchest > Selected > File QuickFind.
2. When the window appears, type **insight** and press **Enter**.
3. When the IRIS InSight™ bookshelf appears, choose *OCTANE Hardware Central* from the SGI EndUser bookshelf.

Or, access *OCTANE Hardware Central* through your Web browser. In the location window, type **file:/usr/share/Insight/library/SGI_bookshelves/SGI_EndUser/books/Octane_HWCnt1/index.html** and press **Enter**.

OCTANE Hardware Movies show *OCTANE* option boards being installed and removed. The hardware movies are found in *OCTANE Hardware Central*.

Hardware Configurations

A listing of available configurations (upgrades and options) is available on the Web. In the location window, type **http://www.sgi.com/Products/hardware/desktop/products/configurator/configurator.html**

Technical Publications Library

A copy of this manual, as well as other Silicon Graphics technical publications, is found in the Technical Publications Library. To access this library, open your Web browser and type **http://techpubs.sgi.com/library/**

Software and System Administration Information

For complete information on installing software, see the online *Personal System Administration Guide*. You can find it on your desktop by choosing Toolchest > Help > Online Books. For more advanced information, see the online *IRIX Admin: Software Installation & Licensing Guide*. For system administration information, see the SGI_Admin section of the online bookshelf.

Product Support

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

Silicon Graphics, Inc., provides a comprehensive range of product support 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.

Features of the Ultra SCSI Option Board

The Ultra SCSI XIO board for the OCTANE workstation provides external SCSI expansion capability. It can be installed in any free slot on the workstation's XIO module that is not occupied by XIO graphics boards. (Graphics boards reside only in slots A or D and A.)

Each of the four controllers on the Ultra SCSI XIO option board supports differential Ultra SCSI, both wide (16 bit) and narrow (8 bit) data transfer rates.

Other Sources of Information

See the online documentation that shipped with your system for any configuration or programming guides related to the Ultra SCSI board. When looking for a configuration or programming guide, look for a title similar to that of the board protocol name.

Check the release notes for additional information.

About SCSI Buses and Devices

SCSI devices continue to evolve with higher bus bandwidths, faster data transfer rates, and channels with longer cables and more devices. Specific information about the Ultra SCSI XIO board for the OCTANE workstation is in "About the Ultra SCSI Board for the OCTANE Workstation." This section provides some general information about SCSI buses and devices.

Table 1-1 Comparison of Ultra and Fast, Wide and Narrow SCSI Rates

	Wide (16 bit) Bus	Narrow (8 bit) Bus
Ultra SCSI (Fast-20)	40 MB/s (peak theoretical rate)	20 MB/s (peak theoretical rate)
Fast SCSI	20 MB/s (peak theoretical rate)	10 MB/s (peak theoretical rate)

Ultra SCSI is also referred to as Fast-20.

- The data transfer rate is also affected by the media speed of the SCSI peripheral. Fast-20 SCSI is not merely "fast SCSI". The "-20" in the term signifies the maximum number of megatransfers (millions of 8 bit or 16 bit data transfers per second) that can occur during an I/O operation.
- Data transfer rates are either slow or fast, and are measured in megabytes per second. An operation is either 8 or 16 bit in size; thus, data transfer rates are dependent on bus width.

Note: By default the Ultra SCSI board will try to negotiate for wide (16 bit) and for ultra speed.

Table 1-2 Bus Rate Plus Operating Mode = Data Burst Rate

Existing Bus	Operating Mode	Data Burst Rate
8-bit	Fast	10 MB second
8-bit	Ultra	20 MB second
16-bit	Fast	20 MB second
16-bit	Ultra	40 MB second

- You may mix Ultra and Fast devices on the same bus. You may also mix 16-bit and 8-bit devices on the same bus. The overall performance of a mixed bus can vary widely.
- To daisy-chain a mix of wide and narrow devices, place the wide devices (as a group) closest to the OCTANE workstation where the bus is wide, and place the narrow devices (as a group) at the end of the daisy chain.

Note: Be sure to use an adapter or other special cable that terminates the upper half of the SCSI bus when converting from the final wide device to the first narrow device. Silicon Graphics supplied cables have this integrated into the cable, but not all third-party cables have the terminator integrated into the cable.

- Unsupported devices may not work with the OCTANE workstation, and may cause problems with supported devices.
- The length of combined SCSI cables determines how many devices can be daisy-chained.
- Set addresses manually only on external SCSI devices. See the device manual for setting the address on the device.
- Drives can be easily damaged. Handle your drive carefully; do not drop it or handle it roughly.

About the Ultra SCSI Board for the OCTANE Workstation

The Ultra SCSI XIO board provides four differential Fast-20 external SCSI channels (0, 1, 2, and 3).

Each bus on the Ultra SCSI board is 16 bits wide. The host controller negotiates with the target SCSI peripheral as to how many bits of data to send in each clock, 8 (narrow SCSI) or 16 (wide SCSI). Each controller also negotiates for Ultra SCSI speeds (synchronous negotiation).

Differential SCSI Bus Type on the Ultra SCSI Board

A SCSI bus type is either single-ended or differential. All the ports on the Ultra SCSI option board are differential. Peripheral devices are either differential or single ended.

- Differential SCSI peripherals use differential drivers and receivers with built-in hysteresis to provide improved signal noise immunity so that the bus can be driven greater lengths.
- A single-ended SCSI peripheral uses inexpensive, open-collector-wired, OR busing configurations that use a signal comparison to ground. This design limits the distance the signal can be driven because of noise considerations.

Table 1-3 provides information about SCSI types, channels, and cable lengths allowed.

Table 1-3 Maximum Cable Lengths for SCSI Options and Configurations

SCSI Types	Channel	Maximum Cable Length of All Devices Daisy-chained on One Channel
Differential (Fast 10)	0, 1, 2, 3	25 m
Differential (Fast 10, wide)	0, 1, 2, 3	25 m

Note: Single-ended and differential SCSI peripherals use incompatible integrated circuitry and cannot be mixed on the same bus unless converters are used. No damage will occur, but no devices on the bus will operate.

Installing the Ultra SCSI Option Board

This chapter covers installing the Ultra SCSI option board in your OCTANE workstation.

The following topics are covered in this chapter:

- “Installing a New Version of the IRIX Operating System” on page 5
- “Ultra SCSI Option Board Package Components” on page 6
- “Preparing the Workstation” on page 7
- “Removing the XIO Module” on page 10
- “About the XIO Module” on page 16
- “Attaching the Ultra SCSI Option Board to the XIO Module” on page 16
- “Replacing the XIO Module” on page 21
- “Placing a Regulatory Label” on page 26

Installing a New Version of the IRIX Operating System

Before shutting down your system and installing the Ultra SCSI board, be sure you have the current version of the IRIX™ operating system installed on your system. Install the operating system that came with your board before installing the hardware.

Installing the Software

Read the flier and install the Ultra SCSI software that came with your shipment. Also read any release notes and the notes in the CD booklet for detailed information about the software. To review release notes, choose Toolchest > Help > Release Notes. Release notes are available here after the software has been installed.

To display ASCII text in an IRIX shell, at the prompt, type `cdrelnotes`.

Ultra SCSI Option Board Package Components

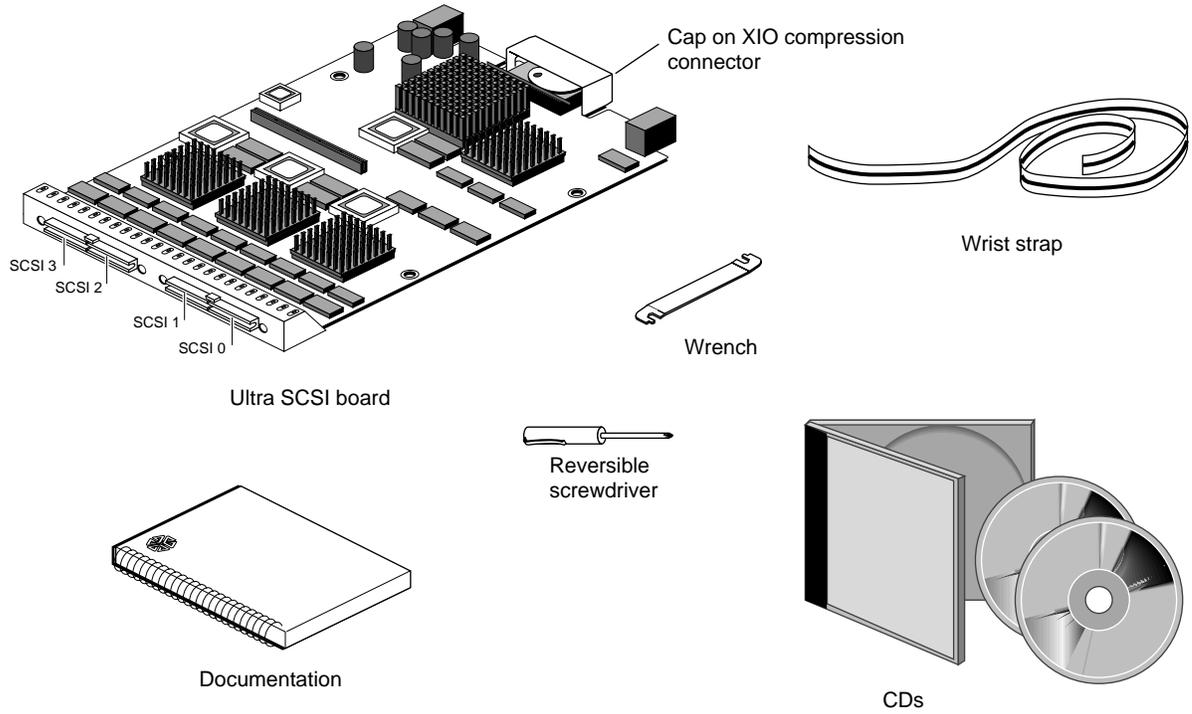


Figure 2-1 Checking the Ultra SCSI Option Board Shipment

It's a good idea to check your shipment when you receive it. You should receive the supplies shown in Figure 2-1.

Preparing the Workstation

This section contains instructions on installing the Ultra SCSI option board.

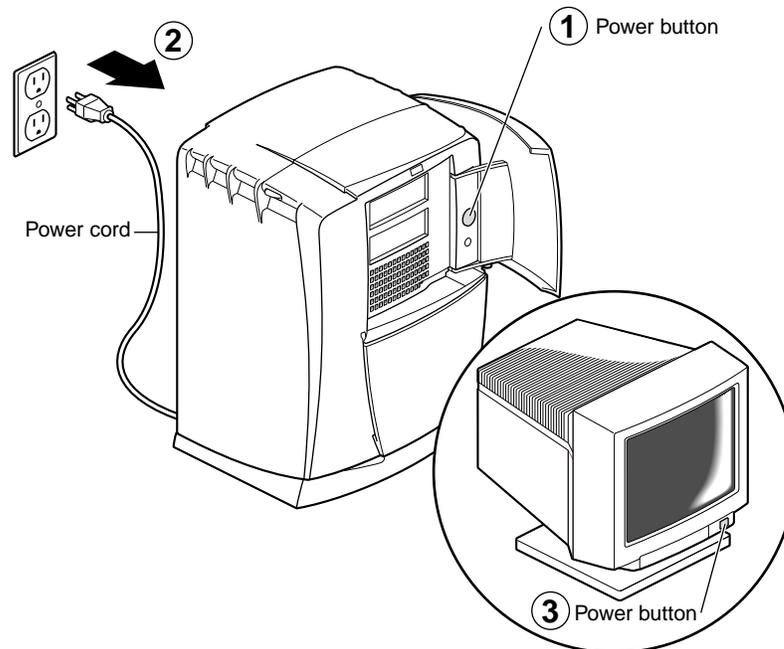


Figure 2-2 Powering Off the OCTANE Workstation

1. Open the cover and push the power button to power off the OCTANE workstation.
2. Unplug the power cord.
3. Push the power button on the monitor to power it off. Wait five minutes.
4. Face the rear of the workstation.



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

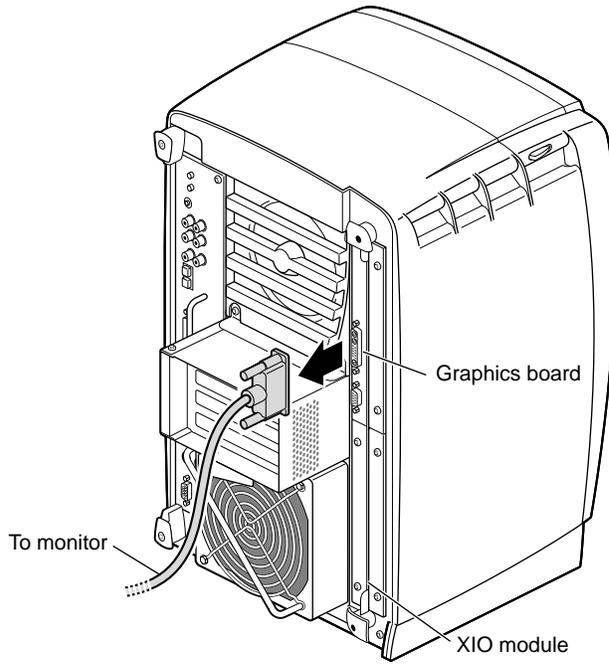


Figure 2-3 Removing the Monitor Cable

5. Remove the monitor cable or other cables from the XIO module. (For illustration purposes, only the monitor cable is shown in Figure 2-3.)

The XIO module can be thought of as a tray to which the XIO graphics boards and option boards are attached.

Note: The XIO module is always installed with the graphics board toward the top of the workstation, in the upper left quadrant. See Figure 2-3.

Attaching the Wrist Strap

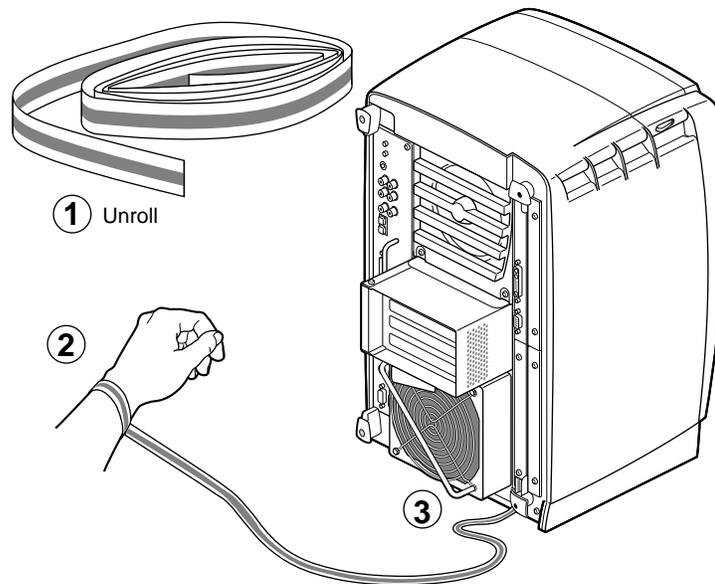


Figure 2-4 Attaching the Wrist Strap

Caution: The components inside the OCTANE workstation are extremely sensitive to static electricity; you must wear the wrist strap 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 and exposed electrical ground, such as a metal part of the OCTANE workstation.

Removing the XIO Module

Before removing the XIO module, you must power off the OCTANE workstation, wait five minutes after powering off the workstation to allow the heat sinks to cool, and attach the wrist strap. If you have not already done this, go to "Preparing the Workstation" on page 7 and follow the instructions through attaching the wrist strap. Then return here.

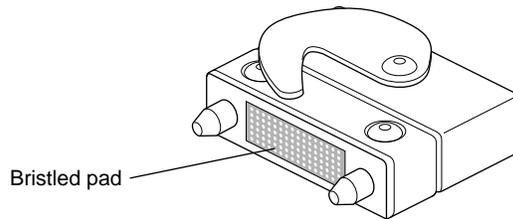


Figure 2-5 Identifying the Compression Connector

When you remove the XIO module, the compression connectors on the back of the XIO module (XIO boards) are accessible and easily damaged. All XIO graphics boards have compression connectors, and most XIO option boards do. The Ultra SCSI option board does.

Caution: The compression connectors on each XIO board are very delicate and easily damaged. Do not touch or bump the gold, bristled pad. For more information on care and cleaning of compression connectors, see the *OCTANE Workstation Owner's Guide*.

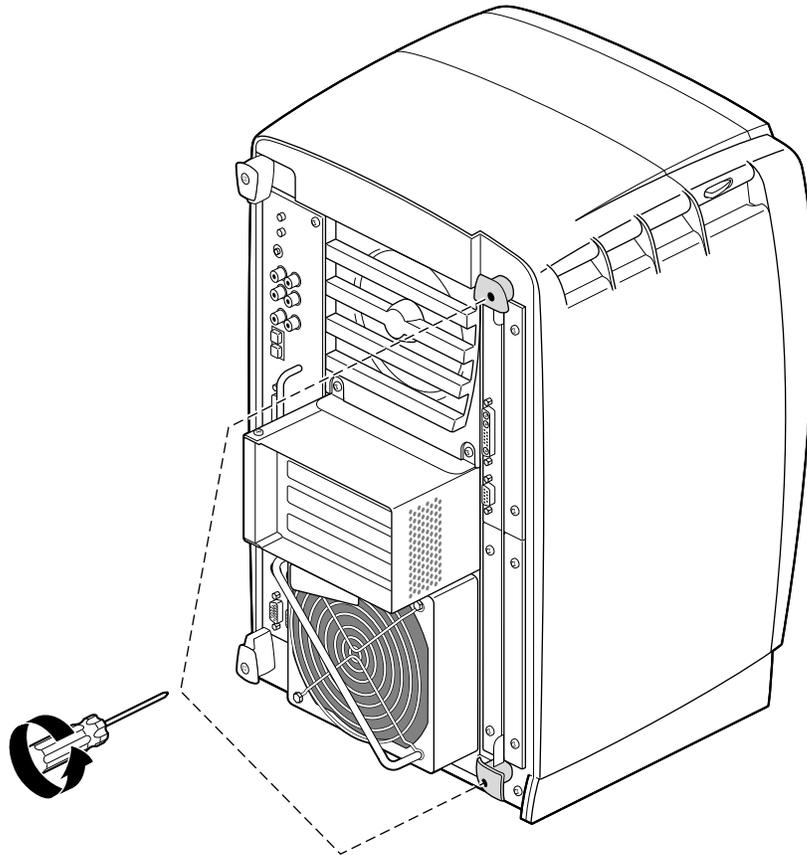


Figure 2-6 Removing the XIO Module Screws



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

The XIO module is the holding mechanism for XIO graphics or XIO option boards and holds up to four boards. It can be thought of as a tray to which boards are attached.

1. Loosen the two captive screws in the XIO module handles until the handles move free from the workstation.

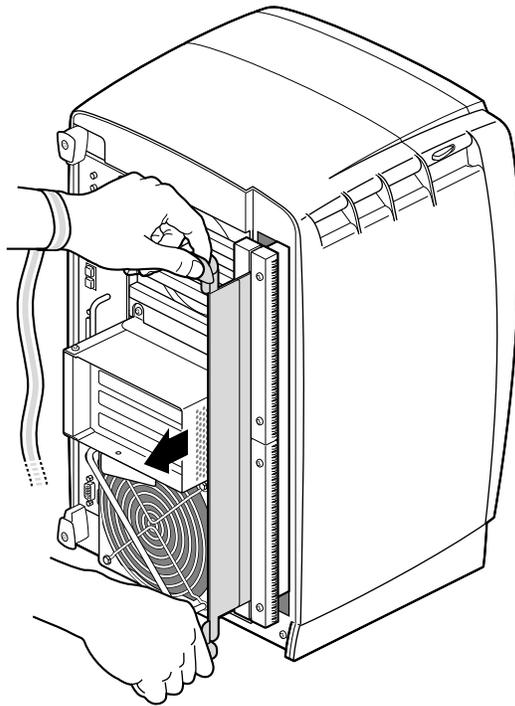


Figure 2-7 Removing the XIO Module

2. Grasp the handles and pull until the XIO module protrudes a couple of inches from the chassis.
The handles and the XIO module move out about two inches before the I/O panels move.
3. Continue to pull on the handles until the XIO module releases from the workstation.

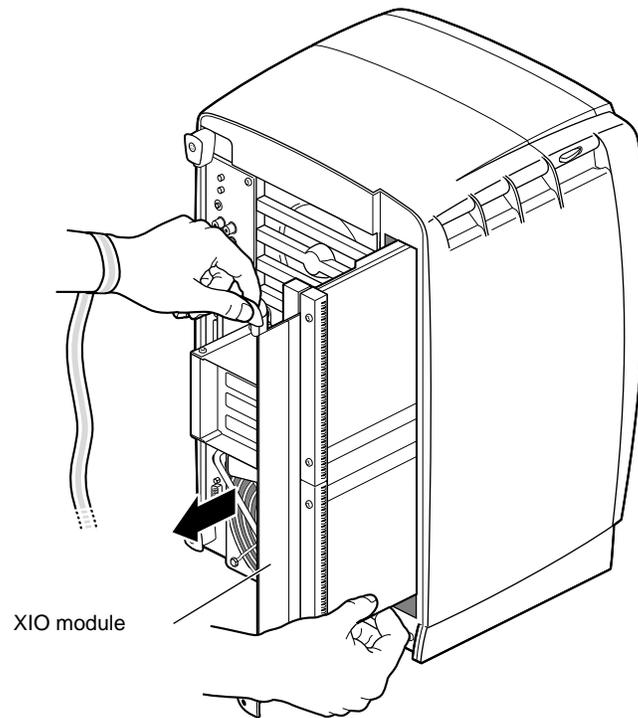


Figure 2-8 Supporting the XIO Module

4. Grasp the XIO module along its length, and support the module and XIO boards as you remove them from the chassis.

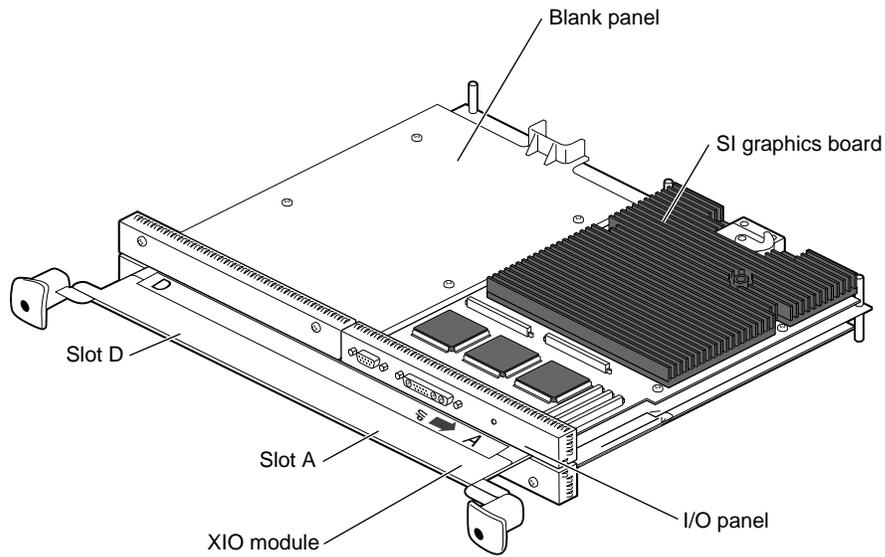


Figure 2-9 Placing the XIO Module on Its Side

The handles protrude from beneath the XIO boards when the XIO module is out of the chassis. When protruding, the identification slots for the XIO boards (D and A, B and C) are visible. Slots B and C are on the opposite side of the XIO module from slots D and A.

Note: Do not push on the handle area after you have removed the XIO module. The XIO module locks to the workstation only if the handle area is protruding.

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

Note: Figure 2-9 above shows an OCTANE/SI graphics board in slot A and blank panel in slot D. OCTANE/SSI or /MXI graphics are twice the width of the OCTANE/SI board and reside in slots D and A, although these boards connect to the workstation through the single compression connector on the slot A side of the board. See Appendix A for illustrations of different graphics boards and the Ultra SCSI option board.

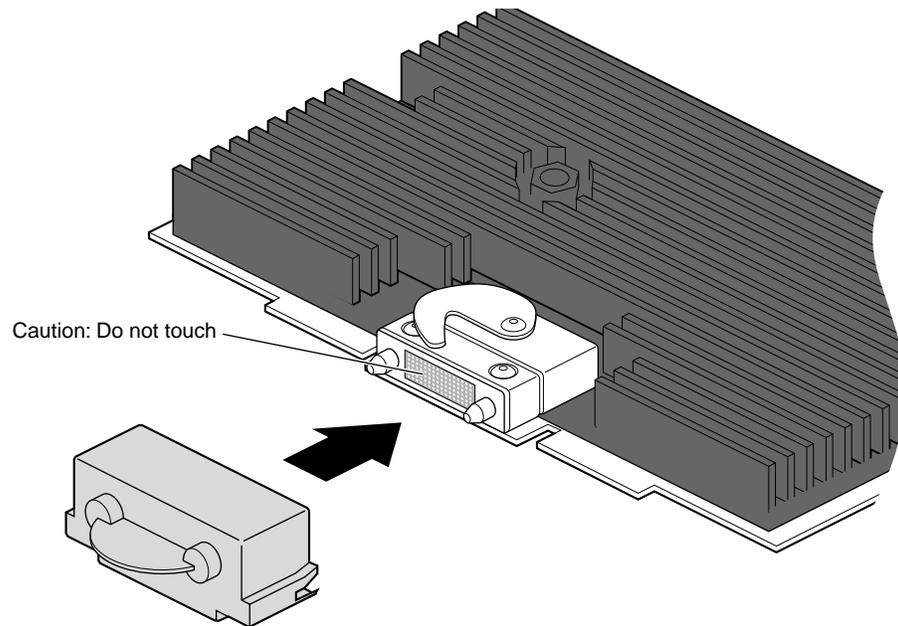


Figure 2-10 Placing a Protective Cap on the XIO Compression Connector

6. Place a cap on the XIO graphics board compression connector.

Note: The cap prevents damage to the gold (front) surface when the XIO boards are removed from OCTANE. These caps are placed on any XIO compression connector as soon as the XIO module is removed from the chassis, and then removed before placing the XIO module back in the chassis.

About the XIO Module

The XIO module is the holding mechanism for XIO graphics or XIO option boards and holds up to four boards. It can be thought of as a tray to which boards are attached. The four quadrants of the XIO module are slots A, B, C, and D. Slots D and A are on one side, Slots B and C on the other. A graphics board, option board, or blank panel attaches to each slot on the XIO module.

- The XIO module must be placed so that the graphics board in slot A is in the upper left corner, or the graphics board may overheat and be damaged.
- The graphics board is always in slot A or slot A and (covering) slot D.
- Option boards occupy slots B and C and possibly D.
- Graphics and option boards may be linked by flex cables.
- Protective blank panels must be placed in unused slots.
- A baffle must be attached to two side-by-side blank panels to ensure proper air flow.
- The XIO compression connector is always covered by a protective cap when an XIO board is out of the OCTANE workstation.
- Extra caps for the compression connectors are shipped with the workstation.

Attaching the Ultra SCSI Option Board to the XIO Module

If you have not already done so, go to page 5 and follow the instructions through removing the XIO module. If you have already removed the XIO module, go to step 1 on the next page. (Be sure you also read "About the XIO Module and XIO Boards" before beginning your task.)

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 OCTANE workstation. See Appendix C, "Care and Cleaning of the Compression Connector."

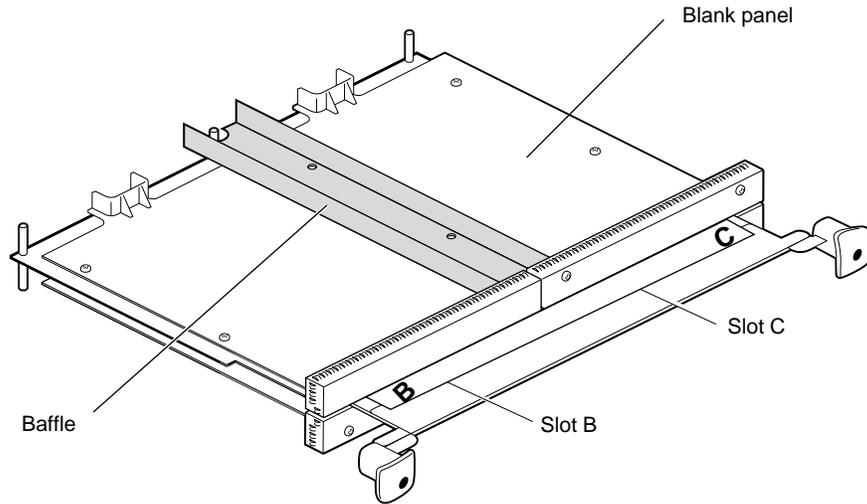


Figure 2-11 Identifying the Baffle

1. Turn the XIO module so that slots B and C are facing you. Select your next step from Table 1-1.

Table 2-1 Choosing the Next Instruction

If You Have	Go to
An option board in the slot in which you want to install the Ultra SCSI option board.	The option board installation guide for instructions on removing the board.
A blank panel and an option board, or an SI graphics board and blank panel, in side-by-side slots.	Step 3.
Blank panels in slots B and C.	Step 2.

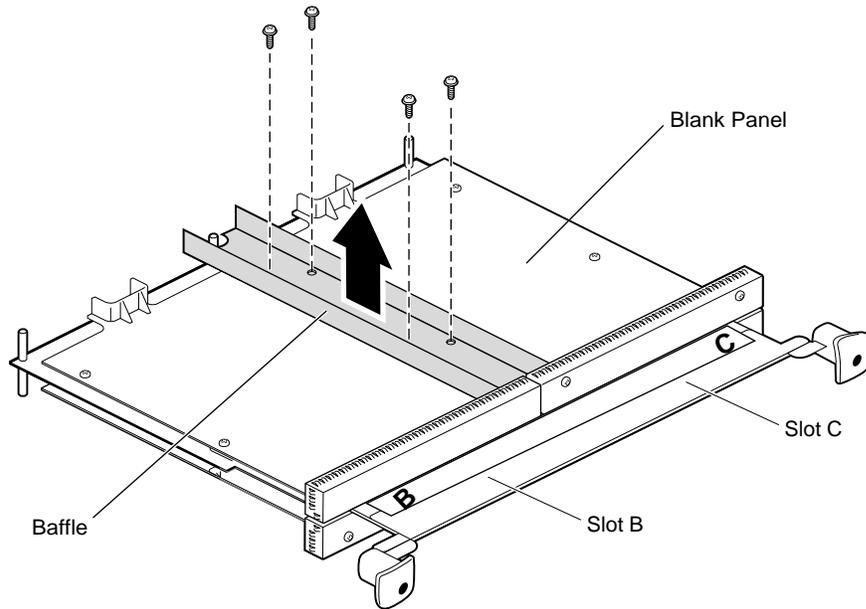


Figure 2-12 Removing the Baffle

Note: For illustration purposes, the Ultra SCSI option board is shown in slot C in this manual.

2. Remove the baffle attached to the two blank panels:
 - Using a Phillips screwdriver, remove the four screws holding the baffle to the two blank panels.
 - Remove the baffle.
 - Replace the two screws into the blank panel that stays on the XIO module.
3. Remove the four (or remaining) screws from the blank panel you are removing.
4. Remove the blank panel. Keep it in case you remove an option board. A blank panel or board must be in place in each slot on the XIO module.
5. Keep the baffle. The baffle must be in place over two blank panels to ensure proper air flow, should you ever need to place two blank panels side-by-side.

Note: The baffle is never used with an option board, only with two side-by-side blank panels.

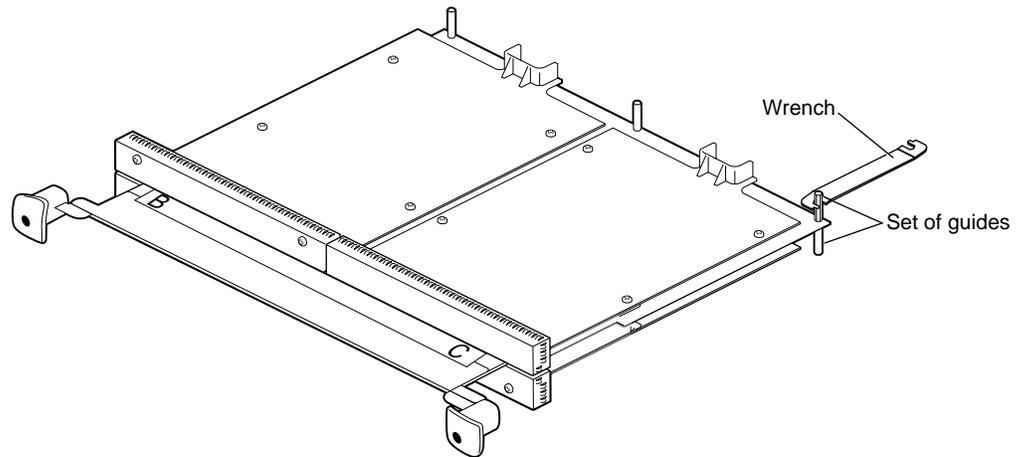


Figure 2-13 Removing a Set of Guides From the XIO Module

If your Ultra SCSI board has components on the corners of the board near the compression connector (see Figure 2-14), you must remove a set of guides. Go to step 6. If the components are not on your board, skip to step 9.

6. Remove the set of guides, back-to-back on the XIO module, only from the outer corner of the slot you selected. (The set of guides in the middle of the XIO module do not conflict with the Ultra SCSI board and should not be removed.)
7. Use the wrench that comes with the shipment to unscrew the guides.
8. Keep the guides in case you ever place a different option board in this slot of the XIO module. The guides should be reinstalled for use with other option boards, because they help guide the XIO module into the OCTANE workstation.

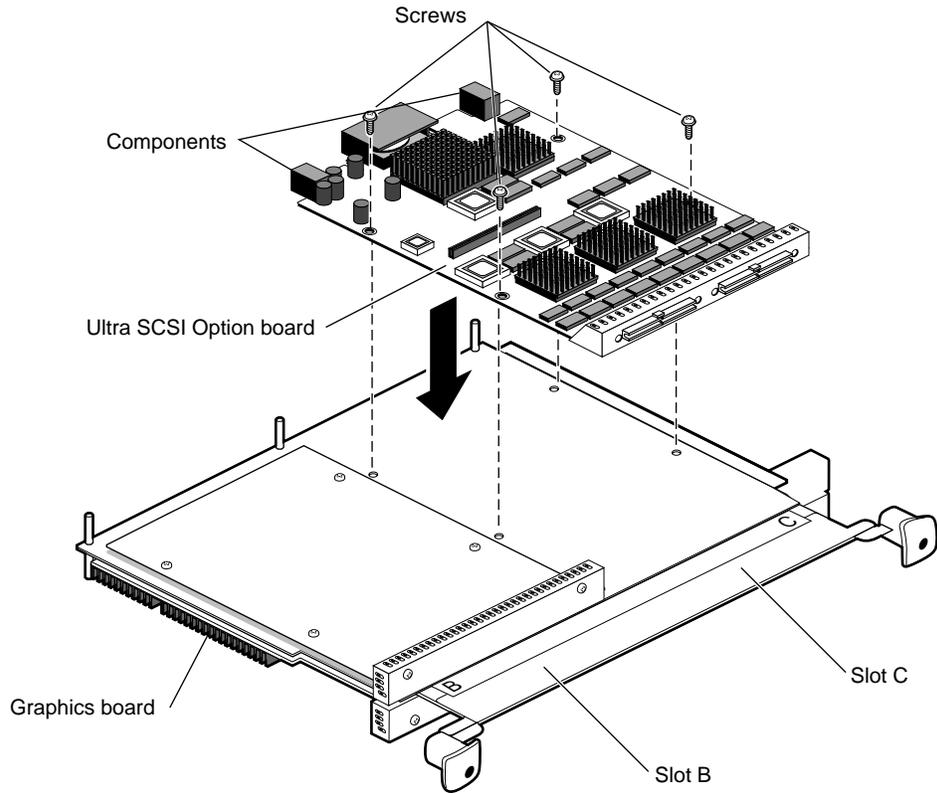


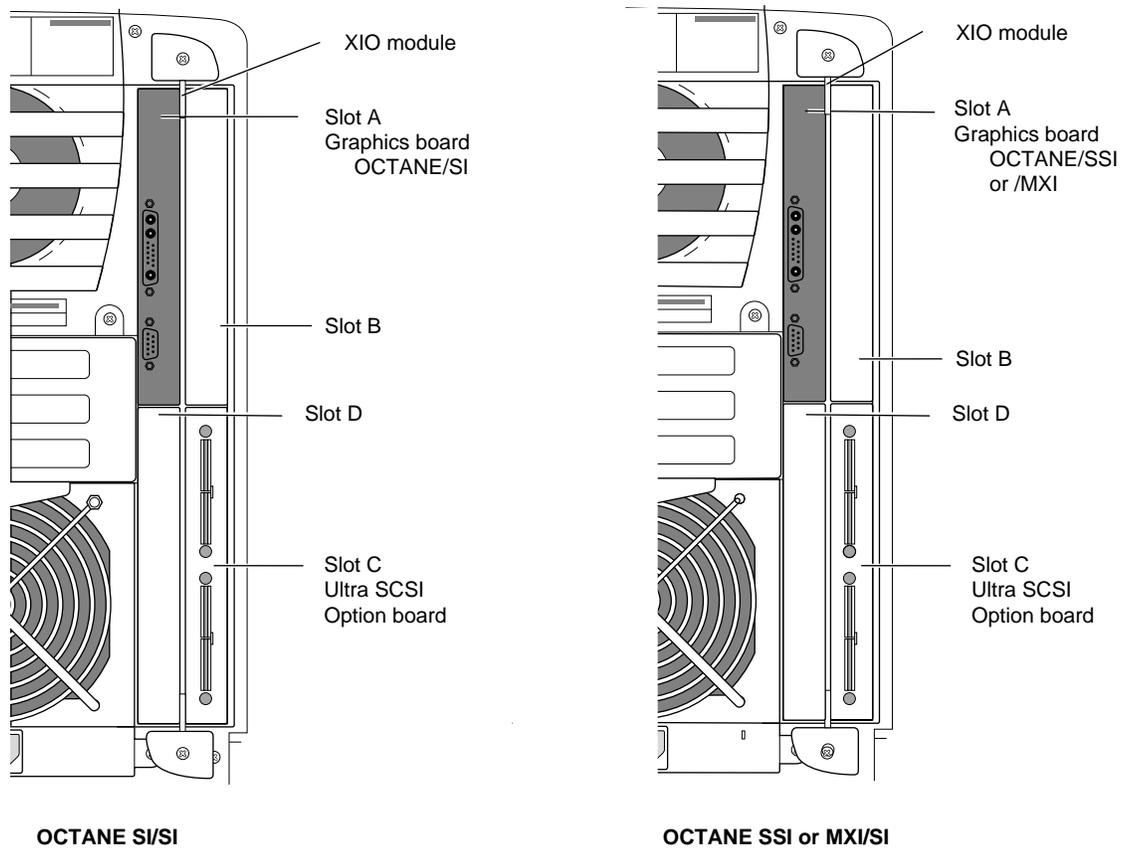
Figure 2-14 Attaching the Ultra SCSI Board to the XIO Module

9. Place the Ultra SCSI option board on the XIO module, aligning the holes in the board to the standoffs on the XIO module. (Do not remove the cap on the compression connector at this time.)
10. Insert and tighten four screws through the Ultra SCSI board and into the standoffs on the XIO module. (For illustration purposes, the board is shown in slot C.)

Caution: Do not install the baffle. The baffle is used only with two side-by-side blank panels. Placing a baffle on top of an option board risks breaking or bending components on the option board.

Go to “Replacing the XIO Module” on page 21 for instructions on replacing the XIO module.

Replacing the XIO Module



OCTANE SI/SI

OCTANE SSI or MXI/SI

Figure 2-15 Installing Slots A and D Toward the Interior of the OCTANE Workstation

Caution: The XIO module must be replaced with the graphics board toward the interior of the workstation to prevent overheating and damage to the boards. If the XIO module with the OCTANE/SSI or OCTANE/MXI graphics board is inserted incorrectly, a notifier appears during power on telling you to insert the XIO module with the graphics boards toward the interior of the workstation, and power-on stops. Power off the system and correctly insert the XIO module as shown in Figure 2-15.

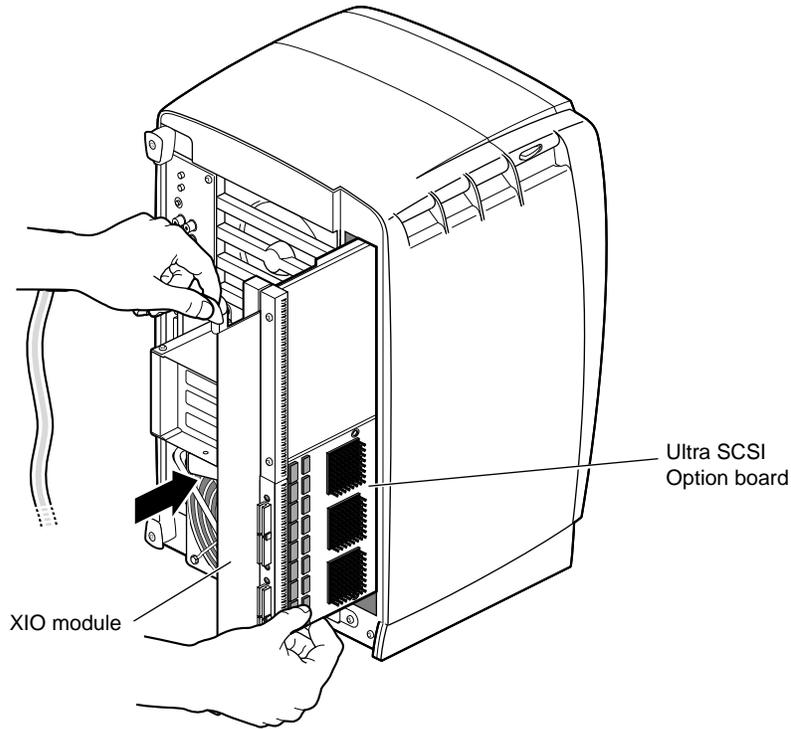


Figure 2-16 Replacing the XIO Module

Follow these steps to replace the XIO module:

1. Replace the XIO module in the OCTANE workstation. Slide the XIO module into guides on the top and bottom of the workstation.
2. Before you insert the XIO module, make sure the handle portion protrudes in a locked position from the I/O panels, as shown in Figure 2-16.

If the handles are flush with the I/O panels, the XIO module will stop during insertion. Pull out the handles until the sliding portion of the XIO module looks like that shown in Figure 2-16, and then continue inserting the XIO module into the chassis.

3. Use the handles to push the XIO module into a locked position.

Note: The I/O panels are not completely flush with each other or the chassis; there is some slight variation in the depth of the individual boards.

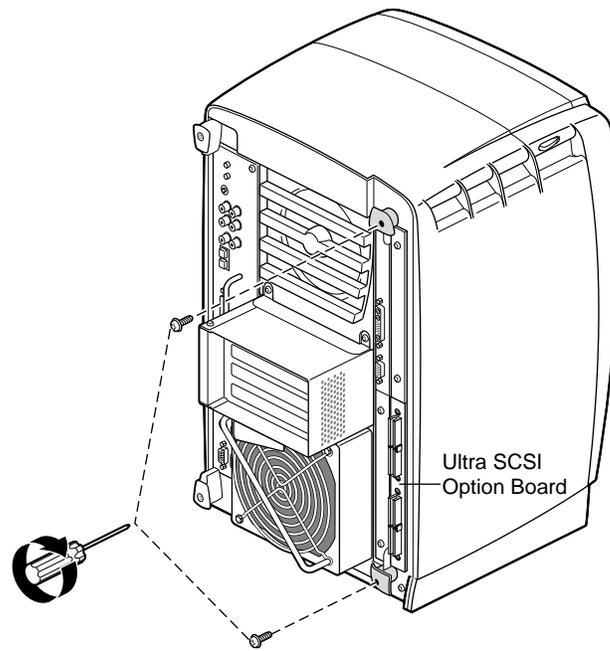


Figure 2-17 Replacing the XIO Module Screws

4. Tighten the screws in the handles so that the XIO module is attached to the chassis.
5. Remove the wrist strap.

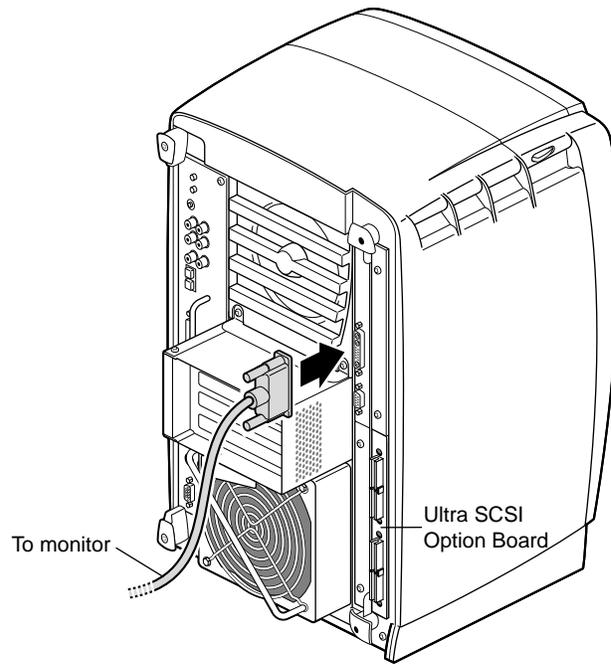


Figure 2-18 Replacing the Monitor Cable

6. Reattach the monitor cable to the I/O connector.

You have finished replacing the XIO module and are ready for the next step. Go to “Powering On the OCTANE Workstation” on page 25.

Powering On the OCTANE Workstation

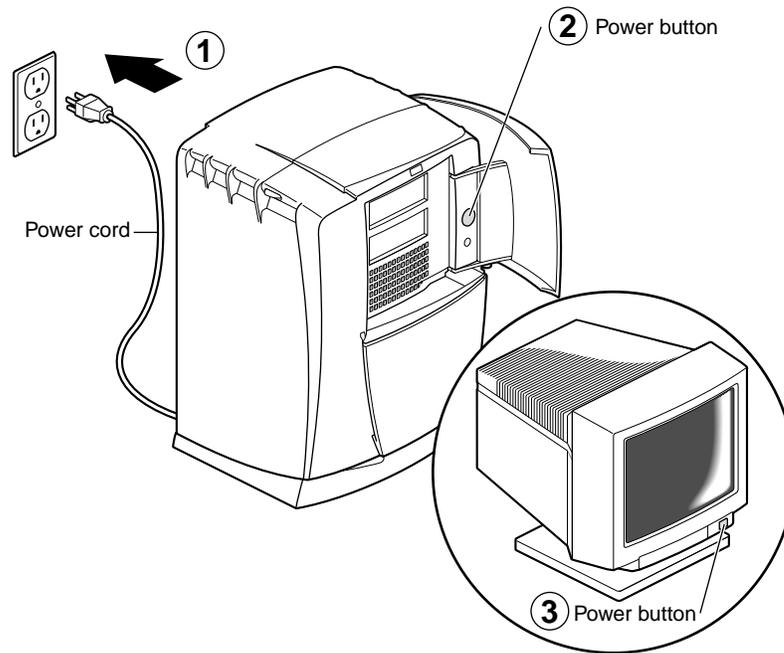


Figure 2-19 Powering On the OCTANE Workstation

1. Plug the power cord into an electrical outlet.
2. Push the power button on the front of the OCTANE workstation.
3. Push the power button on your monitor.

Go to the "Placing a Regulatory Label" on page 26 for instructions on placing an upgrade label, and then go to Chapter 3 for instructions on configuring the Ultra SCSI board and installing the cables.

Placing a Regulatory Label

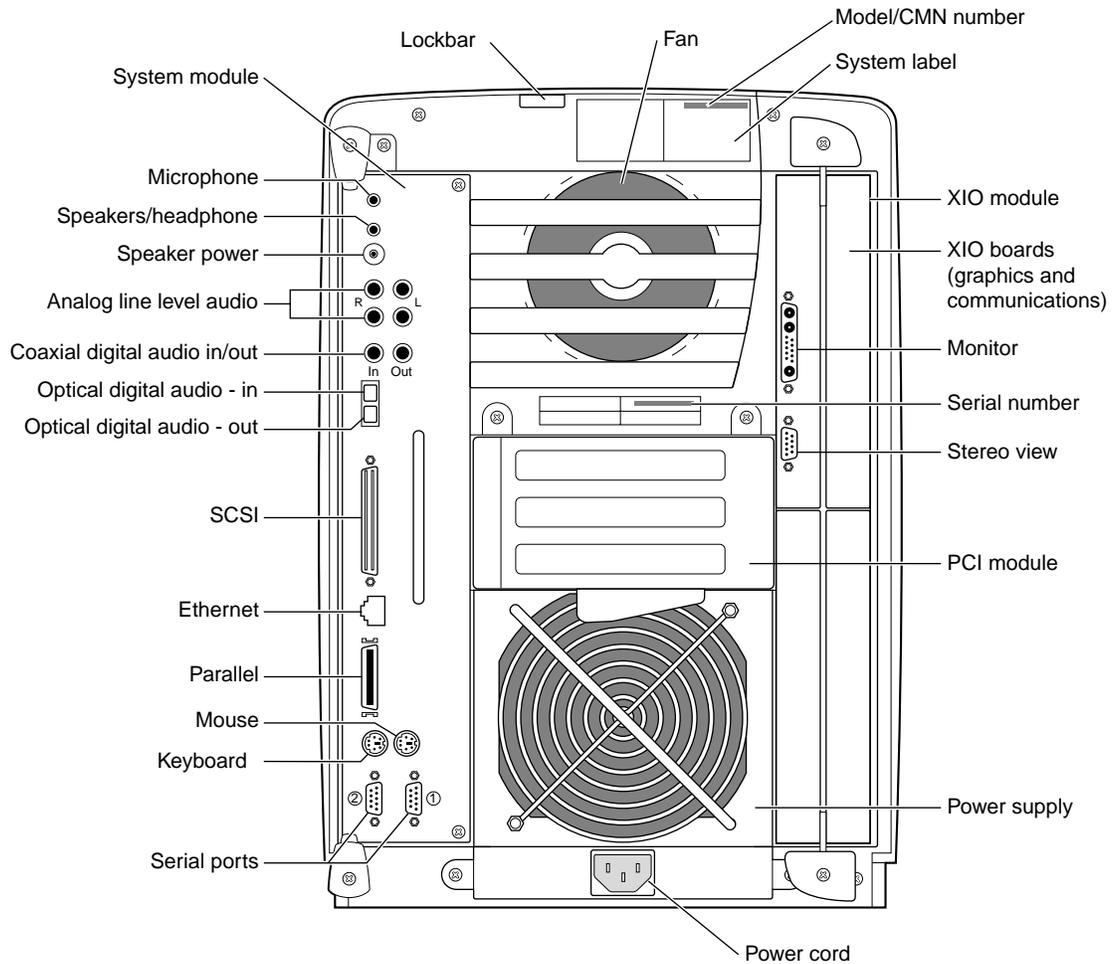


Figure 2-20 Rear View of the OCTANE Workstation

If you received a system upgrade label, place it on the system label (top of workstation).

1. Face the back of the OCTANE workstation. The system label (containing the model and CMN number) is located at the top center of the back of the workstation.
2. Place the label over the VCCI and CISPR 22 information.

Product Support

Silicon Graphics, Inc. provides a comprehensive range of product support 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.

Returning Parts

To return any part, use the packaging materials and box that came with your replacement part.

Configuring the Ultra SCSI Option Board and Installing the Cables

To configure a SCSI channel, you must verify the type of SCSI protocol required (differential and data transfer rate), identify each component in the SCSI channel, and obtain any missing components.

Because the system controller negotiates independently with the devices on a bus to establish the acceptable transfer rate of each device, you can mix fast and slow devices on the same bus. However, mixing narrow Fast-20 and wide Fast-20 devices on the same single-ended SCSI bus is not recommended.

These guidelines reflect the dependencies among SCSI bus bandwidths, types, and data transfer rates. Follow these guidelines to help to minimize inconsistent or inoperable SCSI buses:

- Include all cable length inside devices, components, and chassis in calculating SCSI bus length.
- Install wide and narrow SCSI devices on different buses for maximum performance.
- Always use a terminator at the end of a bus.

The speed of the devices in the daisy chain is determined by the speed of the active device. If a slow device is active, the bus runs at a slow speed; if a high-speed device is active, the bus runs at a high speed.

After installing the Ultra SCSI XIO option board in the OCTANE workstation, use the information in this chapter for cabling and configuration information.

Mapping the Logical Port Numbers to the Physical Port Locations

Before you can connect cables, you need to map the logical port numbers to the physical port locations. Follow these instructions:

1. Choose Toolchest > Desktop, and open a UNIX® shell.
2. At the prompt, type `cat /etc/ioconfig.conf`
3. Read all of this section, “Mapping the Logical Port Numbers to the Physical Port Locations,” before beginning your mapping task.

You see a listing similar to the example in Table 3-1.

Table 3-1 Identification of Information in ioconfig.conf File

Logical Controller Number	Hardware	Node	XIO (xtalk) Bus Type	Physical ID	PCI Bus Type	Bus ID	Port Type (Abbreviation)	Serial Port ID or SCSI ID
2	/hw	/node	/xtalk	/10	/pci	/0	/ef	
3	/hw	/node	/xtalk	/10	/pci	/1	/ef	
4	/hw	/node	/xtalk	/10	/pci	/2	/ef	
5	/hw	/node	/xtalk	/10	/pci	/3	/ef	
3	/hw	/node	/xtalk	/10	/pci	/4	/tty	/1
4	/hw	/node	/xtalk	/10	/pci	/4	/tty	/2
5	/hw	/node	/xtalk	/10	/pci	/5	/tty	/1
6	/hw	/node	/xtalk	/10	/pci	/5	/tty	/2
7	/hw	/node	/xtalk	/10	/pci	/6	/tty	/1
8	/hw	/node	/xtalk	/10	/pci	/6	/tty	/2
2	/hw	/node	/xtalk	/9	/pci	0	/scsi_ctrlr	/0
3	/hw	/node	/xtalk	/9	/pci	1	/scsi_ctrlr	/0
4	/hw	/node	/xtalk	/9	/pci	2	/scsi_ctrlr	/0
5	/hw	/node	/xtalk	/9	/pci	3	/scsi_ctrlr	/0

Logical Controller Number Column

The Logical Controller Number refers to the number assigned to a port on an optional board by the operating system. These numbers will always be higher than that of a port on the System Module. Ports of the same type are assigned incrementing port numbers. For example, because there is one Ethernet port on the System module, the logical number assigned to the first optional Ethernet port the software sees is 2. Because there are two serial ports on the System Module, the first logical number assigned to an optional serial port is 3. Subsequent optional serial ports are labeled, 4, 5, 6, and so on.

Hardware, Node, and XIO (xtalk) Bus Type Columns

Ignore the Hardware, Node, and Communication Type columns when looking for information in Table 3-1. They appear in the *ioconfig.conf* file to report that hardware is being probed, on one node, using crosstalk as the communication tool within the workstation.

Physical ID Column

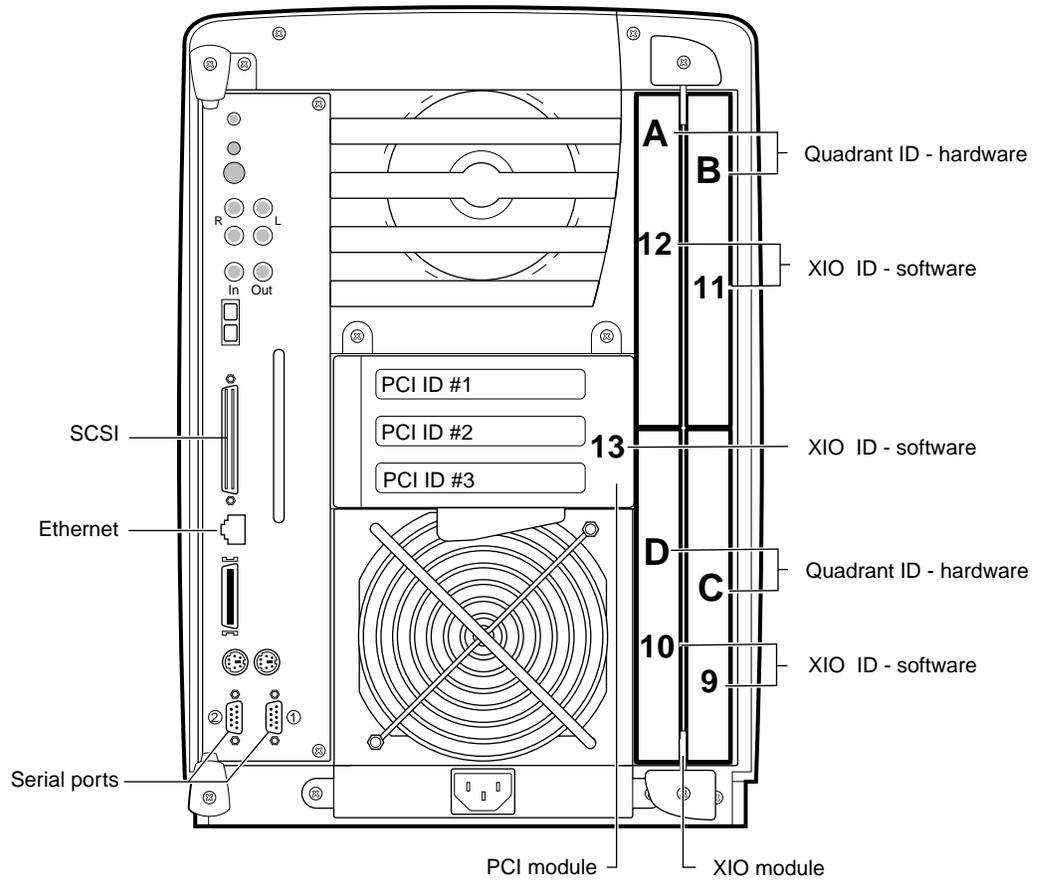


Figure 3-1 Physical Identification

Use Figure 3-1 to determine the physical XIO ID number. If the board is in the XIO module, determine the physical ID number by the following rule: XIO module, quadrant A = 12, quadrant B = 11, quadrant D = 10, and quadrant C = 9.

Note: Physical port numbers are assigned in descending XIO probing order. Example: an Ethernet board in the PCI module (13) will be assigned logical port 2 before an Ethernet port in quadrant C (9) of the XIO module because 13 is probed before 9.

PCI Bus Type Column

This column is read only in conjunction with the Physical ID column that comes before it. (See Table 3-3.) If the Physical ID number is 13, this means that the board is in the PCI module.

Bus ID and Port Type Columns

The Bus ID column refers to the number of the physical port on the option board.

Table 3-2 Example of an ioconfig.conf File

Logical Controller Number	Hardware	Node	XIO (xtalk) Bus Type	Physical ID	PCI Bus Type	Bus ID	Port Type (Abbreviation)	Serial port ID
1	/hw	/node	/xtalk	/13	/pci	/3	/ef	
4	/hw	/node	/xtalk	/10	/pci	/2	/ef	
3	/hw	/node	/xtalk	/10	/pci	/4	/tty	/1
2	/hw	/node	/xtalk	/9	/pci	0	/scsi_ctrl	/0
3	/hw	/node	/xtalk	/9	/pci	1	/scsi_ctrl	/0
4	/hw	/node	/xtalk	/9	/pci	2	/scsi_ctrl	/0
5	/hw	/node	/xtalk	/9	/pci	3	/scsi_ctrl	/0

In Table 3-2, Logical controller number 3 (XIO module quadrant C, Physical ID 9), is an option board (with multiple SCSI ports) specifying port number 0, labeled on the option board as port 0. The abbreviation in the Port Type column identifies this port as a SCSI (scsi_ctrl) port.

List of Abbreviations of Types of Ports

Table 3-3 Abbreviations and Definitions

Abbreviation	Definition
ef	Ethernet
rns	FDDI or CDDI
pckb	keyboard
pcms	mouse
tty	serial
scsi_ctlr	SCSI controller

About the `ioconfig.conf` File

The `ioconfig.conf` file records and saves option board and port information after the board is installed in the OCTANE workstation. However, the file reserves the board and port spaces if the option board is removed, and begins assigning new ID numbers when a new board is inserted. For example, if a board was in quadrant B (11) and was removed, and another Ultra SCSI board was placed in quadrant C (9), the file would begin numbering for the new board beginning with the next number after the last used for the previous board in quadrant B (11). This reporting pattern is desirable under some circumstances.

However, if you wish to have a listing of only what is currently installed, remove the `ioconfig.conf` file, and restart your system. The file is rebuilt with information about the current hardware configuration reflecting what is currently installed.

Instructions for the Mapping Task

1. Determine your Logical Slot ID number.
2. Use the Logical slot number to determine the port number on the option board.
3. Use the abbreviation to help you determine the type of port.
4. Find the Logical controller number (x) for the port you have located (listed in the first column).

For instructions on installing cables, go to “Installing the Ultra SCSI Cables.”

Installing the Ultra SCSI Cables

Before installing the cables, read the previous sections beginning with “Mapping the Logical Port Numbers to the Physical Port Locations” on page 30. Then return here.

1. Open another UNIX shell, and at the prompt type `hinv`
2. Use the Hardware Inventory file to find the port you are interested in. Look for the Integral (SCSI) Controller number (x) that matches the Logical Controller number in the `ioconfig.conf` file (first column.)
3. Under the Integral (SCSI) Controller information, find the port you want.

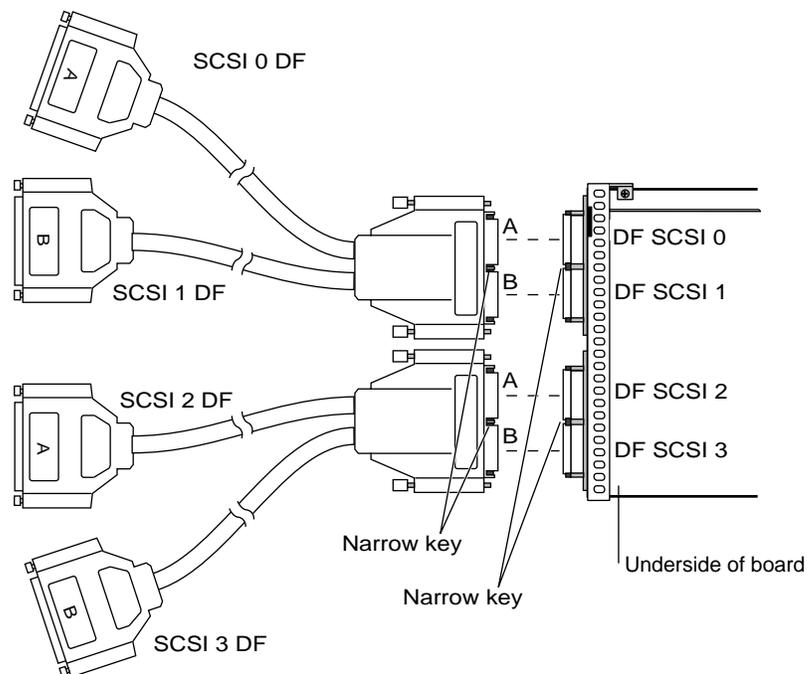


Figure 3-2 Connecting the Y Cables to the Ultra SCSI Board

Two Y cables included in the Ultra SCSI XIO board shipment connect the two double ports on the board to as many as four SCSI channels.

1. Connect the single end of the Y connector to the Ultra SCSI board connector, making sure the wide and narrow keys align.

The wide key is close to and is on the same side of the single cable connector as the B and A label. See Figure 3-2.

The high-density double cable connectors are labeled **A** and **B** on the narrow-keyed side of the cable connector.

- **A** corresponds to channel 0 or channel 2
- **B** corresponds to channel 1 or channel 3

Note: The connectors on the Ultra SCSI board are designed so that only the Y cables can be used with these connectors.

Caution: The cables can be forced to attach incorrectly. The cables are keyed with a wide and narrow side on both the cable connector and Ultra SCSI board connectors. The Ultra SCSI bus times-out during system start-up if a cable is in backwards.

2. Connect the A and B ends of the Y cable to SCSI cables that attach to a SCSI device.

Note: You connect the Y cable to another cable, not to the SCSI device.

Assigning a SCSI Address to the External Device

After you have installed the Ultra SCSI option board in the OCTANE workstation, follow these instructions for assigning a SCSI address to an external device.

You must shut down your system to install an external device, but before doing so you must assign an address to the device.

Example: SCSI bus addresses appear as two numbers. The first number is the bus number, the second is the number of the device. The second number is the number the user sets. For example: 1, 5 is bus 1, and device number 5.

- If you currently do not have any external devices attached to your system, you can assign any number between 1 and 15 (for wide SCSI devices) or 1 and 7 (for narrow devices) to the new device. Do not use address 0, as this is the default system SCSI ID.

- If you have at least one external device attached to your system and you are adding another device, you must check which addresses are assigned to the existing external devices and then choose a number between 1 and 15 (for wide SCSI devices) or between 1 and 7 (for narrow SCSI devices) that has not already been assigned.

Note: Although the OCTANE workstation allows up to 15 addresses for SCSI devices, the devices themselves may have dials that allow you to set a number only between 1 and 9.

To check available addresses for external devices, follow these steps:

1. If the OCTANE workstation is powered off, turn on the system power.
 - Open the door on the front of the OCTANE workstation.
 - Press and release the power button to power on the system.
2. Log in to your account. For more information on logging in, refer to the *OCTANE Workstation Owner's Guide*.
3. When the system comes up, choose Toolchest > System > System Manager > Hardware and Devices, About This System.
You see a listing of your system's hardware devices and their address numbers.
4. Power off the OCTANE workstation and the device.
5. Choose a number between 1 and 15 (for a wide SCSI device) or between 1 and 7 (for a narrow SCSI device) that is not assigned to your current devices.
6. Set the number on the device.
7. Power on the device.
8. Power on the OCTANE workstation. (Be sure to power on the OCTANE workstation after you power on the device so that the device is recognized.)

Useful Tools for Getting Information About SCSI Devices

To determine assigned SCSI addresses, choose Toolchest > System > System Manager > Hardware and Devices > About This System.

To access information about SCSI devices, open a UNIX shell, and at the prompt enter *hinv* or *scsiha*

Also see other reference material such as the IRIX Admin guides or man pages for *scsiha* or *ioconfig*

Removing the Ultra SCSI Option Board

This chapter provides detailed information on removing the Ultra SCSI option board.

The following topics are included in this chapter:

- “Detaching the Ultra SCSI Option Board From the XIO Module” on page 41
- “Placing an Option Board or Blank Panel in Slot B” on page 43
- “Product Support” on page 46
- “Returning Parts” on page 46

Follow the directions in this chapter to remove this board and to install another board or blank panel in its place.

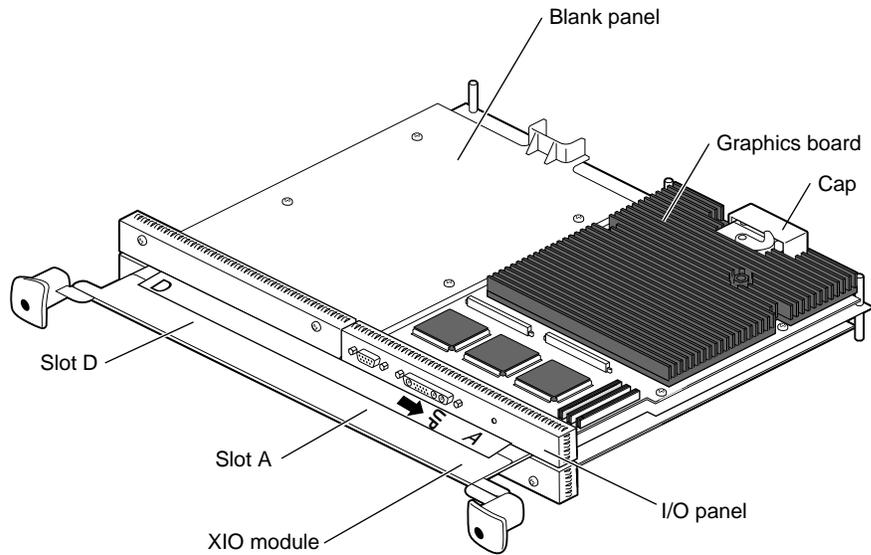


Figure 4-1 Orienting the XIO Module and Graphics Board

1. Go to Chapter 2, "Preparing the Workstation" on page 7, and follow the directions through removing the XIO module. Be sure you have placed a cap on the XIO compression connections of the graphics board, Ultra SCSI, and any other XIO boards. Then return to this section, and begin with step 2.
2. Position the XIO module so that slots D and A are facing you. The graphics board is in slot A or D and A. Locate the Ultra SCSI board. (An illustration of this board is shown in Appendix A, Figure A-1.)

Detaching the Ultra SCSI Option Board From the XIO Module

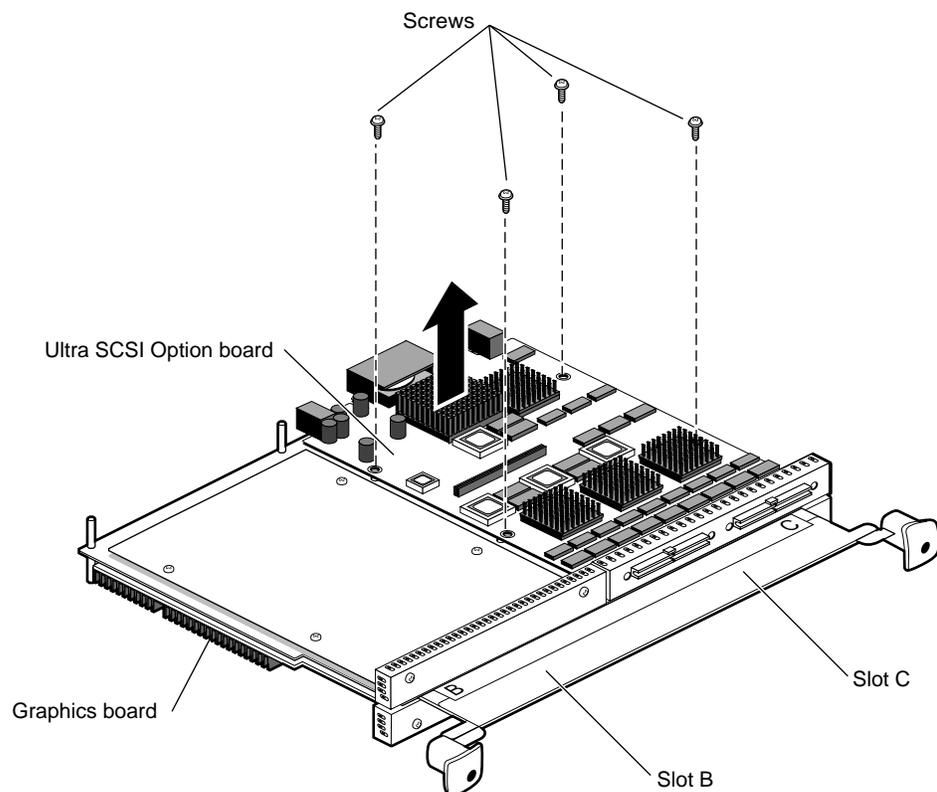


Figure 4-2 Removing the Ultra SCSI Option Board

Note: For illustration purposes, the Ultra SCSI option board is shown in slot C in this manual.

1. Remove the four screws holding the Ultra SCSI board to the XIO module.
2. Lift the Ultra SCSI board from the XIO module. Place it on an antistatic bag on a clean, dry, surface such as your desktop.

Replacing the Guides on the XIO Module

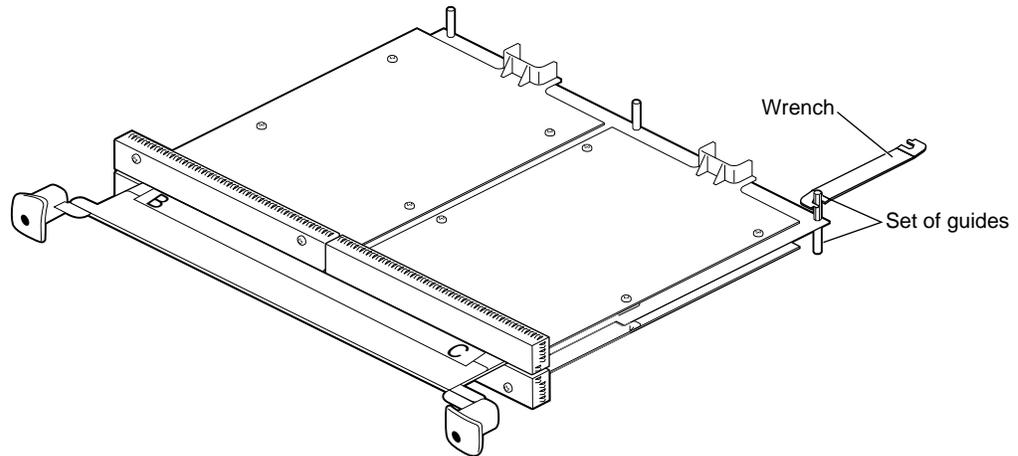


Figure 4-3 Installing a Set of Guides

If your XIO module is missing a set of guides from a corner, replace them. If all three sets of guides are in place on the XIO module, go to the next section, “Placing an Option Board or Blank Panel in Slot B” on page 43. Otherwise go to step 1 to re-install the guides.

1. Re-install the set of guides, one on each side of the XIO module, on the outer corner of the slot from which you removed the Ultra SCSI board. The guides help with inserting the XIO module into the OCTANE workstation.
 - Insert the guide with the screw threads through the XIO module.
 - Screw the guides together.
2. Tighten the guides with the wrench that comes with the shipment.

Placing an Option Board or Blank Panel in Slot B

After you have removed the Ultra SCSI option board, choose your next step from Table 4-1.

Table 4-1 Choosing the Next Instruction

Task	Go To
Installing a new Ultra SCSI board	Chapter 2, "Attaching the Ultra SCSI Option Board to the XIO Module" on page 16
Installing a different option board	The installation guide for that option board
Installing a blank panel	The next step

A blank panel must be installed in slot B of the XIO module if no option board is installed in that slot. If a blank panel is also in slot C, a baffle must be placed over them to allow proper airflow in the workstation.

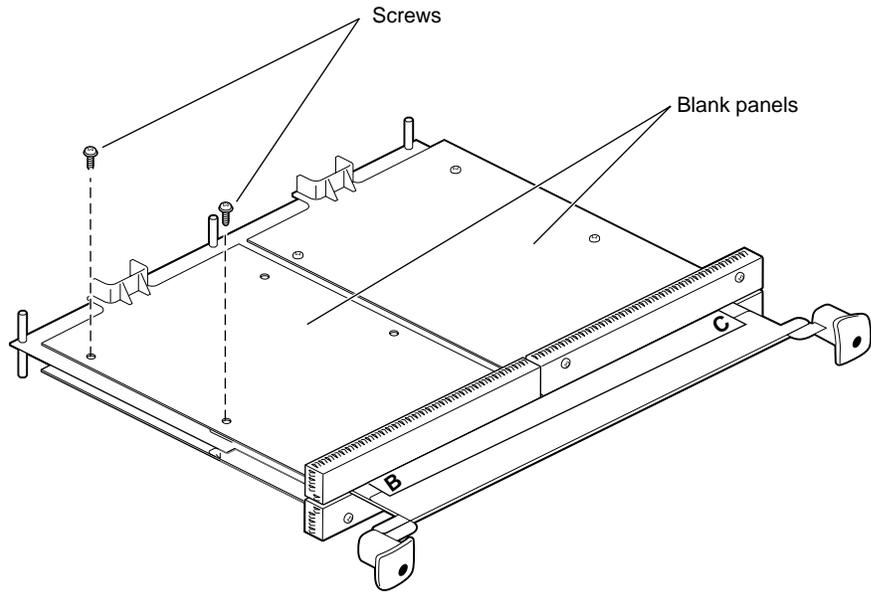


Figure 4-4 Placing a Blank Panel on the XIO Module

1. Place the blank panel on the standoffs on the XIO module.
2. If you are installing a baffle, use two short screws to attach the blank panel (on the outside edge) to the XIO module, as shown in Figure 4-4.
3. If you are not installing a baffle, use four short screws (in all four holes) to install the blank panel to the XIO module if you are not installing a baffle. Use an M3 x 8 mm screw for the fourth hole, if you cannot find the fourth short screw that came with the blank panel.

Caution: Do not use the long screw that comes with the spacer to attach a blank panel to the XIO module. It will damage the XIO module standoffs.

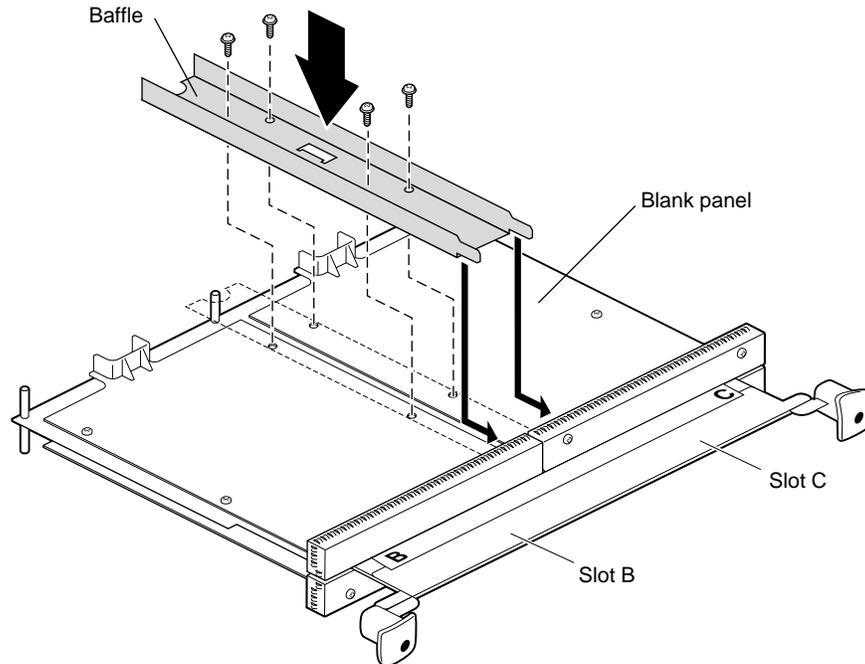


Figure 4-5 Placing the Baffle Over Two Blank Panels

4. If you have a blank panel in slot C, place a baffle over both blank panels.
 - Remove the two inside screws from the blank panel in slot C.
 - Place the baffle across the two blank panels.
 - Insert and tighten the four screws that hold the baffle to the blank panels and XIO module.

Caution: You must replace the baffle for cooling purposes when you install two side-by-side blank panels. The baffle is used only with two side-by-side blank panels.

5. If you are sending the Ultra SCSI option board to your authorized service representative, use the packing material and box in which you received your replacement part.
6. Go to “Replacing the XIO Module” on page 21.

Product Support

Silicon Graphics, Inc. provides a comprehensive range of product support 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.

Returning Parts

To return any part, use the packaging materials and box that came with your replacement part.

Troubleshooting

Use the following troubleshooting checklist to determine an installation problem:

- The power cables are connected to the workstation and the monitor.
- The cable connectors at the chassis I/O panel are inserted correctly, wide key matched to wide key, and narrow key matched to narrow key. (It is possible to force these connectors together improperly.)
- The cable connectors at the chassis I/O panel are completely seated.
- The Ultra SCSI option board and graphics board are properly seated in the chassis. Follow instructions in Chapter 2 for opening the chassis.
- The appropriate operating system and software have been installed. (See the software CD and release notes that came with your shipment.)
- The graphics boards are inserted toward the interior of the workstation.
- The XIO module is seated and the I/O panel on the Ultra SCSI option board is relatively flush with the chassis. If not, follow the instructions in Chapter 2, "Preparing the Workstation" on page 7, from powering off the workstation through removing the XIO module, and see if an XIO compression connector cap is on any XIO compression connector. If so, remove the cap, and follow the instructions in Chapter 2 for reinstalling the XIO module and powering on the workstation.

Troubleshooting Installed Devices

Use the information in Table 5-1 for troubleshooting the installation of SCSI devices.

Table 5-1 Troubleshooting the Installation of SCSI Devices

Symptom	Problem	Solution
All device IDs appear the same.	A device was given the same ID as the host controller ID.	Check the bus ID, then reassign a new number to the device.
Two devices are installed, but only one ID is shown on the system.	Two identical IDs were assigned.	Assign a new number to one device.
A single-ended device is installed, but the device is not recognized.	A differential channel does not recognize single-ended devices.	Remove the single-ended device.

Troubleshooting SCSI Types, Channels, and Cable Lengths

Use the information in Table 5-2 for information about SCSI types, channels, and allowed cable lengths.

Table 5-2 Maximum Cable Lengths for SCSI Options and Configurations

SCSI Types	Channel	Maximum Cable Length of All Devices Daisy-chained on One Channel.
Differential (Fast 10)	0, 1, 2, 3	25 m
Differential (Fast 10, wide,)	0, 1, 2, 3	25 m

Note: Single-ended and differential SCSI peripherals use incompatible integrated circuitry and cannot be mixed on the same bus unless converters are used. No damage will occur, but no devices on the bus will operate.

Useful Tools for Getting Information About SCSI Devices

To determine assigned SCSI addresses, choose Toolchest > System > System Manager > Hardware and Devices > About This System.

For accessing information about SCSI devices, open a UNIX shell and at the prompt type *hinv* or *scsiha*

Also see other reference material, such as the IRIX Admin guides or man pages in the Toolchest for information about *scsiha* or *ioconfig*.

Identifying Graphics Boards and the Ports and Modules on the Back of the Workstation

This appendix provides illustrations of the OCTANE Ultra SCSI Option board, OCTANE/SI graphics board, OCTANE/SI graphics board with texture memory option board, OCTANE/SSI graphics board, and OCTANE/MXI graphics board.

- “OCTANE Ultra SCSI Option Board” on page 52
- “OCTANE/SI Graphics Board” on page 53
- “OCTANE/SI With Texture Memory Option Board” on page 54
- “OCTANE/SSI Graphics Board” on page 55
- “OCTANE/MXI Graphics Board” on page 56

OCTANE Ultra SCSI Option Board

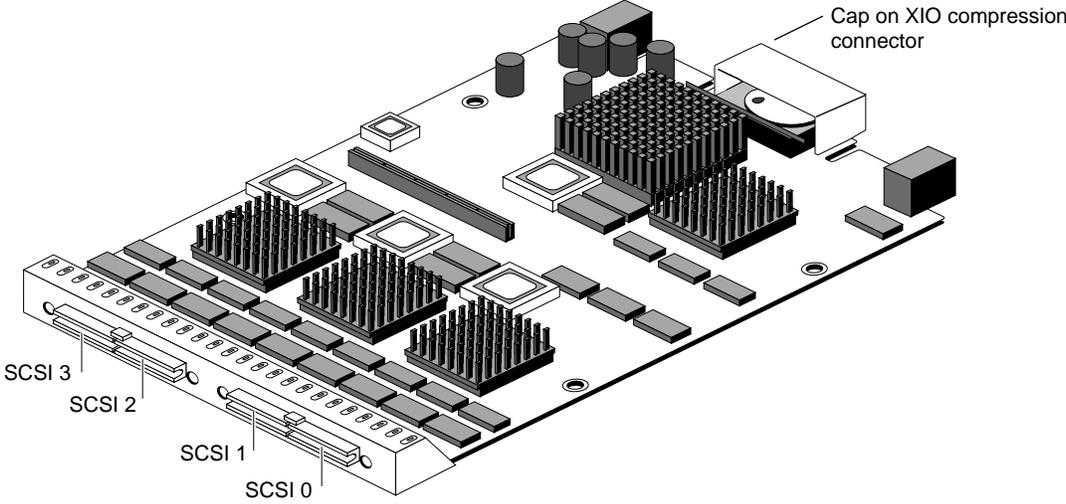


Figure A-1 OCTANE Ultra SCSI Option Board

OCTANE/SI Graphics Board

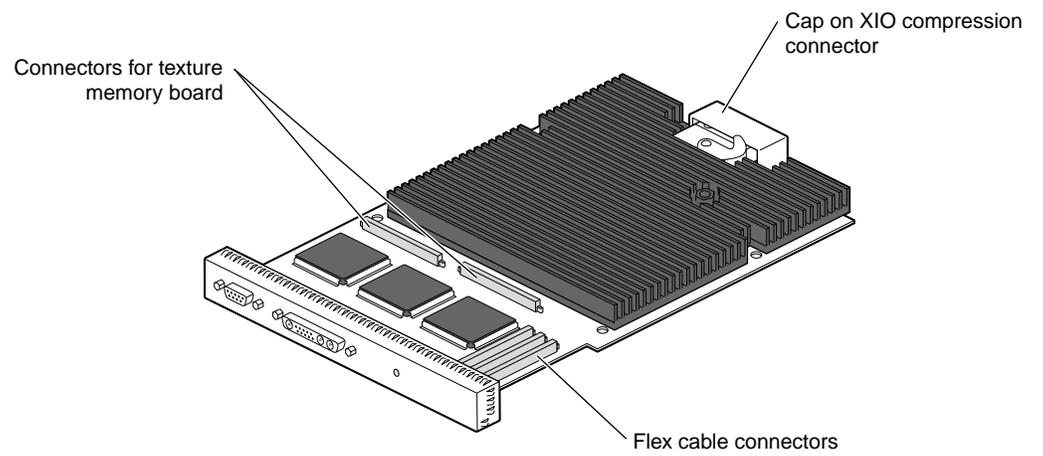


Figure A-2 OCTANE/SI Graphics Board

OCTANE/SI With Texture Memory Option Board

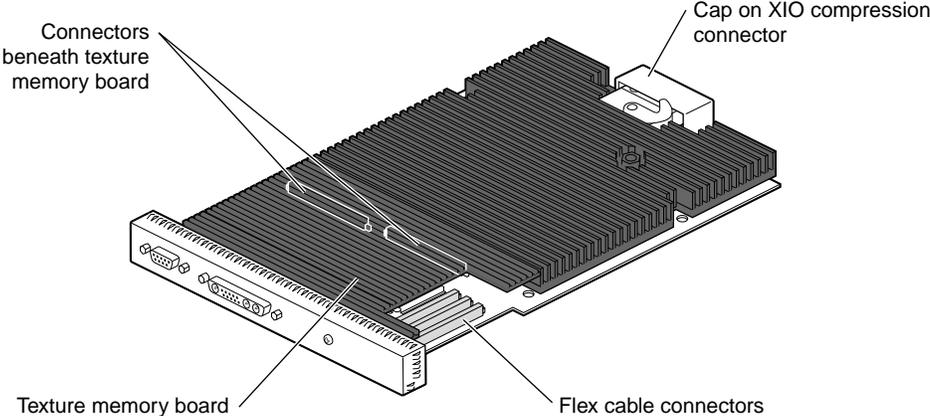


Figure A-3 OCTANE/SI With Texture Memory Option Board

OCTANE/SSI Graphics Board

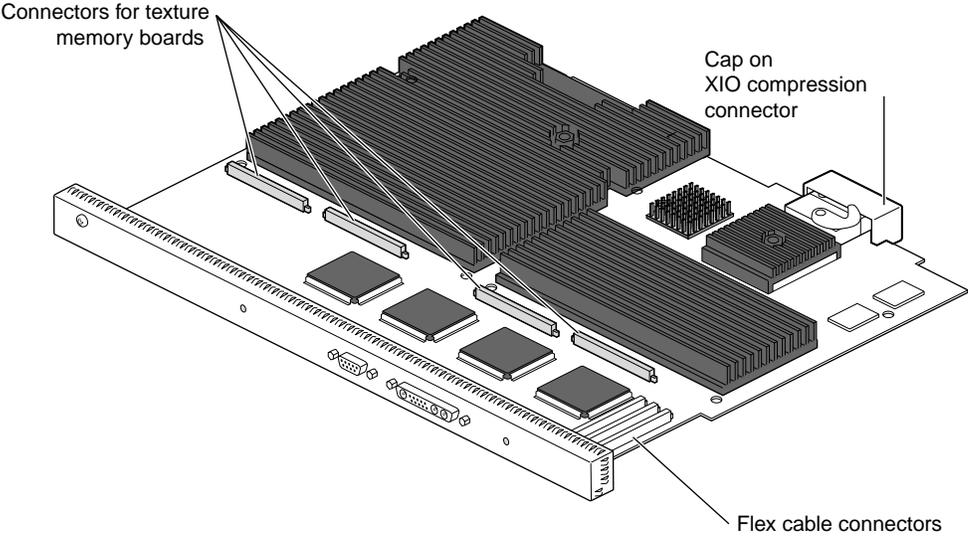


Figure A-4 OCTANE/SSI Graphics Board

OCTANE/MXI Graphics Board

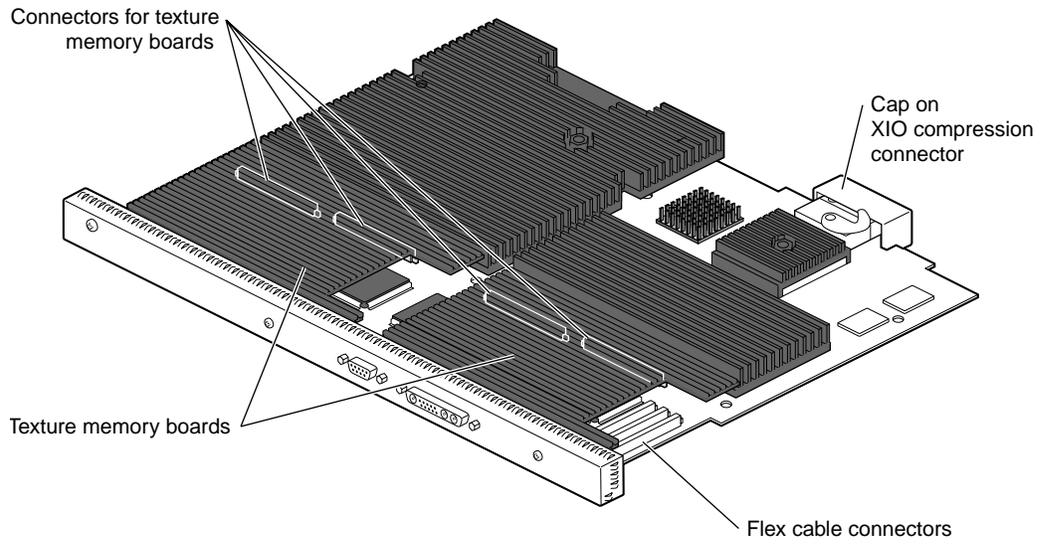


Figure A-5 OCTANE/MXI Graphics Board

SCSI Port Pinout

This appendix provides SCSI port pinout information.

Table 2-1 shows the cable pinout assignments for the four differential SCSI ports.

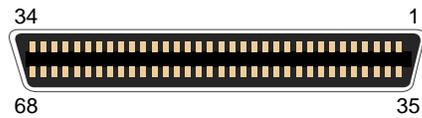


Figure B-1 68-Pin Connector

Table 2-1 SCSI Port Pinout (Differential)

Pin	Assignment	Pin	Assignment
1	+DB(12)	35	-DB(12)
2	+DB(13)	36	-DB(13)
3	+DB(14)	37	-DB(14)
4	+DB(15)	38	-DB(15)
5	+DPARH	39	-DPARH
6	+Ground	40	-Ground
7	+D0	41	-D0
8	+D1	42	-D1
9	+D2	43	-D2
10	+D3	44	-D3
11	+D4	45	-D4

Table 2-1 (continued) SCSI Port Pinout (Differential)

Pin	Assignment	Pin	Assignment
12	+D5	46	-D5
13	+D6	47	-D6
14	+D7	48	-D7
15	+DPAR	49	-DPAR
16	DIFSENS	50	Ground
17	TERMPWR	51	TERMPWR
18	TERMPWR	52	TERMPWR
19	Reserved	53	Reserved
20	+ATN	54	-ATN
21	Ground	55	Ground
22	+BSY	56	-BSY
23	+ACK	57	-ACK
24	+RST	58	-RST
25	+MSG	59	-MSG
26	+SEL	60	-SEL
27	+C/D	61	-C/D
28	+REQ	62	-REQ
29	+I/O	63	-I/O
30	Ground	64	Ground
31	+DB(8)	65	-DB(8)
32	+DB(9)	66	-DB(9)
33	+DB(10)	67	-DB(10)
34	+DB(11)	68	-DB(11)

Care and Cleaning of the XIO Compression Connector

This appendix provides information about the care and cleaning of the XIO compression connectors. The OCTANE workstation uses compression connectors to connect several modules and boards to the frontplane of the workstation.

A single compression connector is used in the OCTANE workstation in these locations:

- 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). When a bristled pad is pressed into a gold-plated pad, a connection is created for one signal.

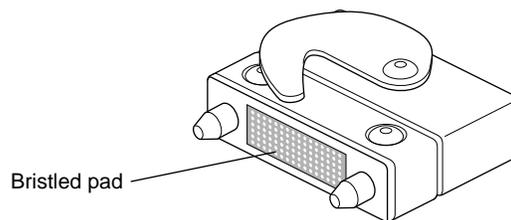


Figure C-1 Identifying the Bristled Pad of the Compression Connector

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 from occurring.

Guidelines for Storing and Handling the Compression Connector

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

- Do not wipe or touch the pads of the compression connector with anything (no fingers, brushes, cloth, 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 outside its protective bag.

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.

Guidelines for Cleaning the Compression Connector

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 in this section 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 in the USA) 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.

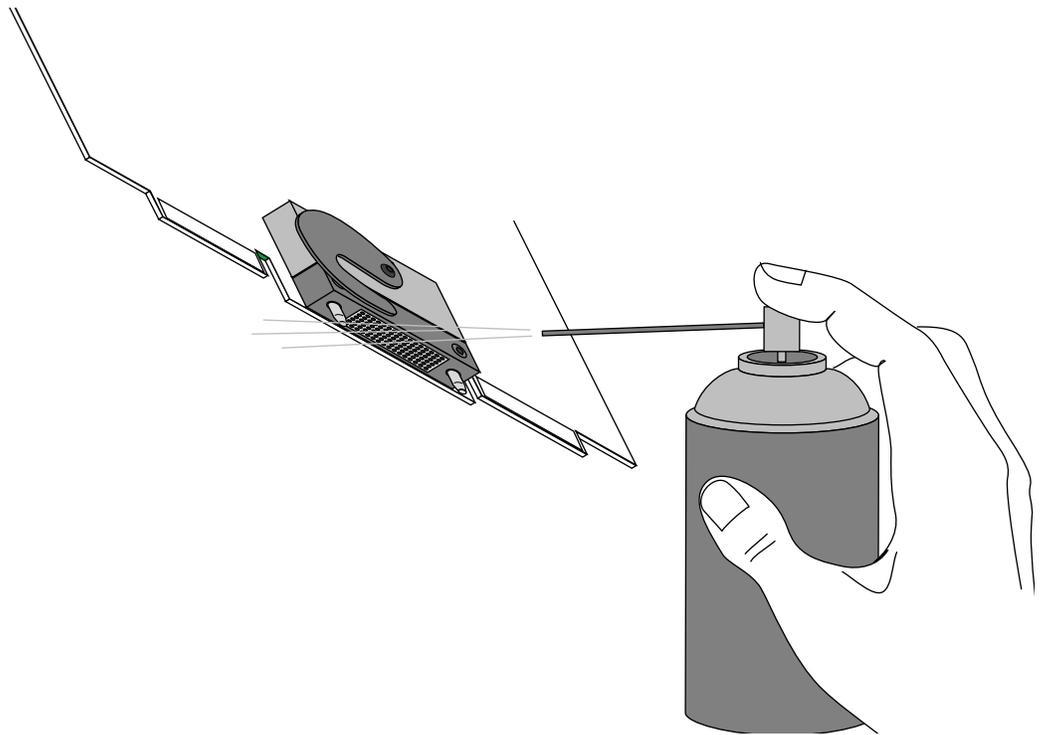


Figure C-2 Cleaning the XIO Compression Connector

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.

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