

# Sun™ Enterprise™ 6x00/5x00/4x00/3x00 PCI+ I/O Board Installation and Component Replacement

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# Installation and Component Replacement

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This guide provides instructions for the installation or replacement of the Sun™ Enterprise™ PCI I/O board and for the replacement of parts mounted on the board.

Each PCI board has two riser cards, each accommodating one PCI card (FIGURE 1-1). The PCI card voltage rating must be matched to the voltage rating of the riser card. Consult your Sun sales representative for the PCI cards supported for your particular system configuration.

Riser card connectors can be one of two voltage types, 5.0V or 3.3V. Sun PCI I/O boards are shipped with two 5.0V riser cards (installed) and two 3.3V riser cards (not installed). If you are switching to a 3.3V PCI card, you must replace the installed 5.0V riser card with the 3.3V riser card.

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## 1.1 System Requirements

Before installing the PCI I/O board make sure your system meets the following hardware and software requirements:

- Sun Enterprise 6x00/5x00/4x00/3x00 with an available I/O board slot
- OpenBoot™ PROM Version 3.2.8 or later
- Solaris™ 2.5.1 Hardware: 4/97 or Solaris 2.6 or later
- PCI short cards (PCI cards) with a maximum length of 174.63 cm (6.875 in.)

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## 1.2 Precautions



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**Caution** – The chassis AC power cord must remain connected to ensure a proper ground.

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**Caution** – The I/O+ boards, their modules, and cards have surface-mount components that can be broken by flexing the boards.

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To minimize board damage, observe the following precautions:

- Hold the board only by the edges near the middle of the board, where the board stiffener is located. Do not hold the board *only* at the ends.
- When removing the board from an antistatic bag, keep the board vertical until you lay it on the Sun™ ESD mat.
- Do not place the board on a hard surface. Use a cushioned antistatic mat.
- Do not use an oscilloscope probe on the components. The soldered pins are easily damaged or shorted by the probe point.
- Transport the board in an antistatic bag.
- Be careful of small parts located on the component side of the board.



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**Caution** – The heatsinks on the board can be damaged by incorrect handling. Do not touch the heatsinks while installing or removing the board. Hold the board only by the edges. If a heatsink is loose or broken, obtain a replacement board.

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**Caution** – The heatsinks on the board can be damaged by improper packaging. When storing or shipping the board, ensure that the heatsinks have sufficient protection.

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**Caution** – Remove a board from a powered-on system only after the ASR software has disabled the board. If a board has not been disabled by the ASR software, then the operating system should be halted and the system powered-off prior to board removal. See your server system reference manual for instructions on powering-off your system.

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**Caution** – Use a grounding wrist strap to prevent static damage.

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## 1.3 Hot-Plug Feature



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**Caution** – If the message: NOTICE: Hot Plug not supported in this system is displayed during boot, do NOT attempt hot-plug in this system or damage to the hardware will occur.

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The hot-plug feature is the ability to insert a new board into a powered-on system, despite being “live,” or being supplied with electrical power. Once a replacement board is added to a powered-on system with the hot-plug feature, you must reboot before the system can use the new board.

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## 1.4 Flash PROM

The Sun Enterprise 6x00/5x00/4x00/3x00 systems I/O boards use flash PROMs. Flash PROMs can be reprogrammed with the latest firmware code. For this procedure, refer to the *Sun Enterprise 6x00/5x00/4x00/3x00 System Flash PROM Programming Guide*, part number 805-5579.

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## 1.5 Installing or Replacing PCI I/O Boards

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**Note** – In Enterprise 3x00, 4x00 or 5x00 systems all empty board slots must have filler panels installed to ensure proper cooling. In Enterprise 6x00 systems all empty slots must have load boards installed.

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### 1.5.1 Removing a PCI I/O Board

The PCI board can be removed from a powered-on system as well as from a system with the power off.

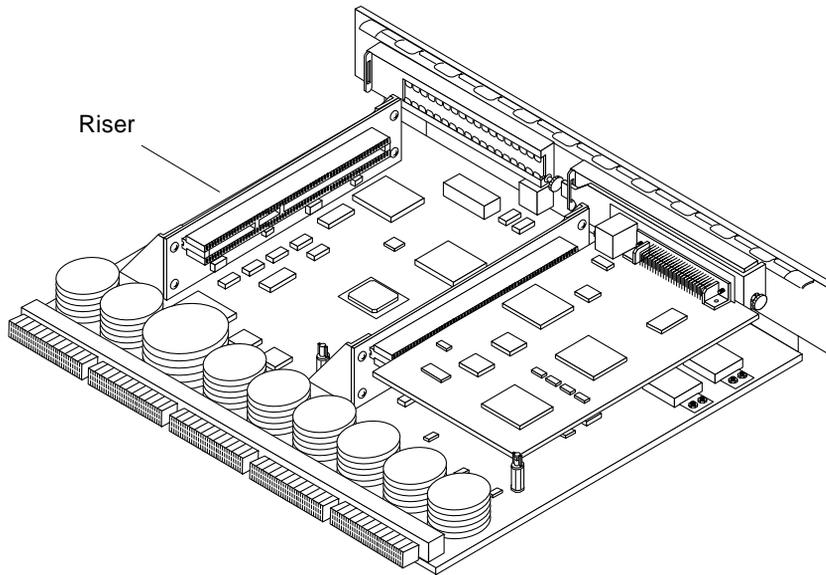


FIGURE 1-1 PCI I/O Board

**1. Ensure that the board is in low-power mode and ready for removal.**

If the board is not in low-power mode, halt the system and turn off the power before proceeding. The board is in low-power mode if one of the following is true:

- The three LEDs on the board are not lit (board has no power).
- The outer two green LEDs are not lit and the middle yellow LED is lit.

**2. Unfasten any cable connectors from the front panel and set them aside.**

Label cables to identify them for reconnection later.

**3. With a Phillips #1 screwdriver, turn the two quarter-turn access slots to the unlocked position (FIGURE 1-2).**

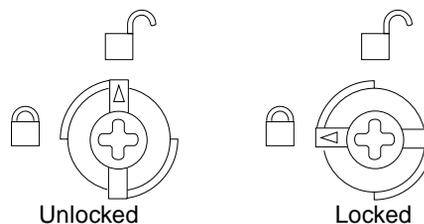


FIGURE 1-2 Unlocking and Locking Quarter-Turn Access Slots

4. Simultaneously pull the ends of both extraction levers outward to unseat the board connectors from the centerplane receptacles.

## 1.5.2 Installing a PCI I/O Board

1. If you are installing a new board, refer to your Enterprise server system reference manual for board slot section guidelines.
2. Open the extraction levers by pulling the ends of both levers toward you.
3. Carefully insert the board in the proper slot in the card cage, ensuring that the board does not slip out of the left and right card guides (FIGURE 1-3).
  - For a front slot in a 16-slot or 8-slot card cage, orient the board component-side down.
  - For a rear slot in a 16-slot or 8-slot card cage, orient the board component-side up.
  - For a 4- or 5-slot card cage with vertical slots, orient the board with the component side to the right.

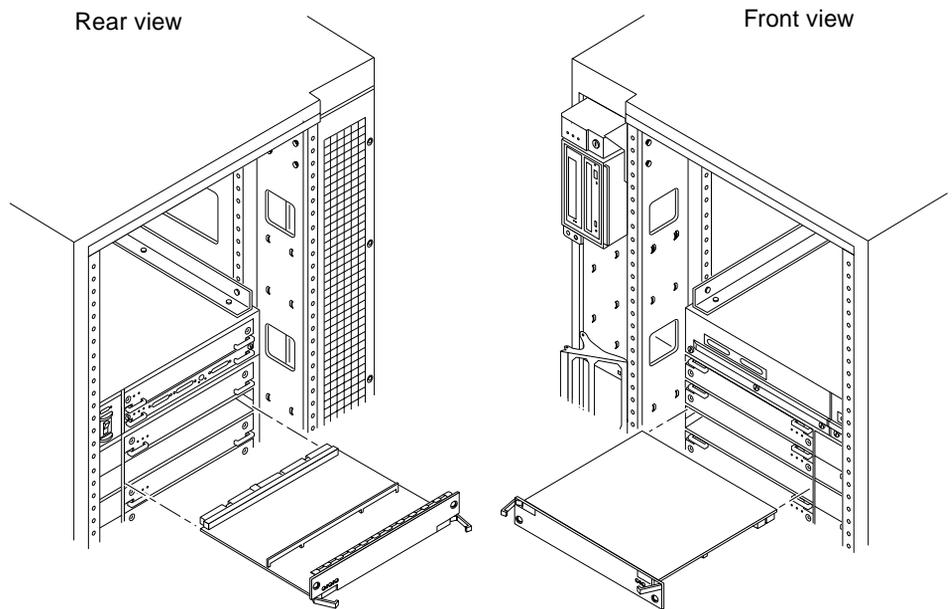


FIGURE 1-3 Board Replacement

4. **Ensure that both extraction levers are in the open position, and that the quarter-turn access slots are unlocked (arrow indicating unlocked position) as you slide the board toward the centerplane receptacles.**

The board will not seat fully unless the levers are in this starting position and the access slots are unlocked.

5. **Simultaneously press both extraction levers to seat the board on the centerplane.**

Simultaneously pressing both levers avoids twisting the board or bending the connector pins. Do not press on board front panel to seat it.

6. **Lock the board to the system card cage by inserting a Phillips #1 screwdriver into each quarter-turn access slot and then turning the slot to the locked position (FIGURE 1-2).**

7. **Replace or connect all necessary cables to the board.**

Once the board has been installed, a message similar to the following will be displayed if the system is powered-on. This example depicts the screen output when a new I/O board has been hot-plugged into slot 6 of an operating Enterprise system:

```
NOTICE: I/O Board Hotplugged into Slot 6
NOTICE: Board 6 is ready to remove
```

This screen output indicates that the board has been detected by the system and is in low-power mode. Additionally, any subsequent `prtdiag(1M)` output would include information for board slot 6.

8. **Reboot the system now or schedule a later time to reboot when system disruption will be minimized.**

The system cannot use the new board until the system is rebooted.

---

## 1.6 PCI Cards

Each PCI I/O board accommodates two riser cards. Each riser card accommodates one PCI card.

### 1.6.1 Removing a PCI Card

1. **Follow the procedures in the Section 1.5.1 “Removing a PCI I/O Board,” to remove the applicable I/O board.**

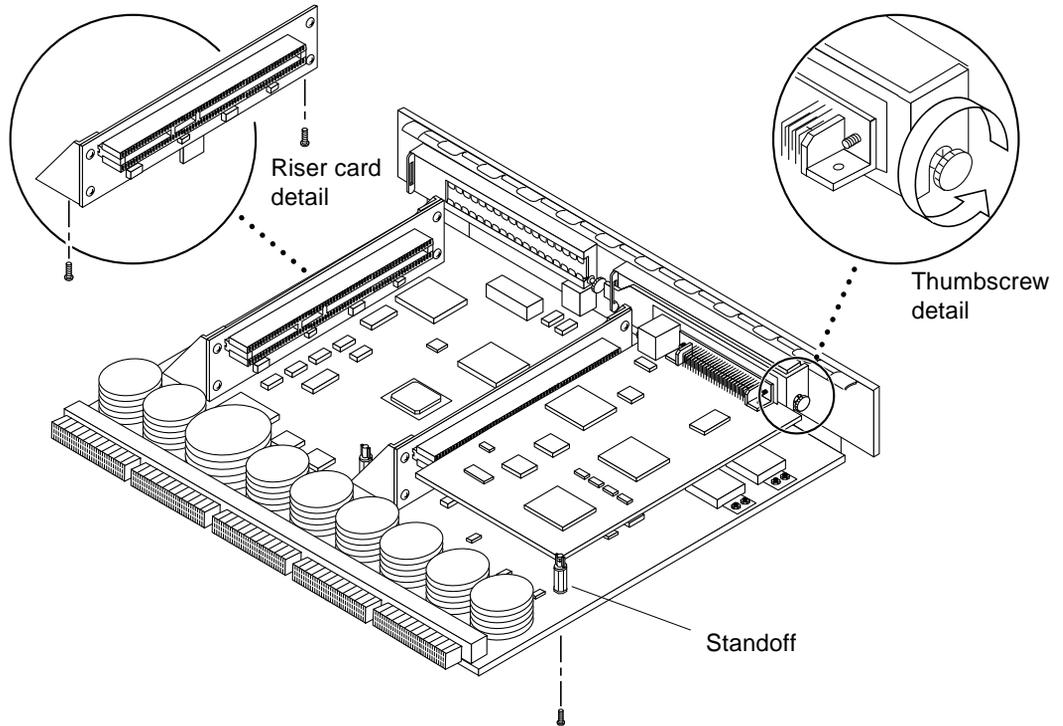
2. On the noncomponent side of the I/O board, loosen the locking standoff for the PCI card that is to be removed (FIGURE 1-4).

---

**Note** – Some PCI cards may not require the standoff for mounting.

---

3. Loosen and then remove the thumbscrew on the component side of the I/O board next to the external PCI card connector (FIGURE 1-4).



**FIGURE 1-4** PCI card and Riser Card Removal

4. Grasp the card to be removed with your index fingers on either side of the card where it mates with the connector on the riser card, thumbs against the connector (FIGURE 1-5).

Loosen the card from the PCI bus connector and the catch mechanism by firmly pushing with your thumbs against the PCI bus connector, while grasping the card edge with the index fingers of both hands.

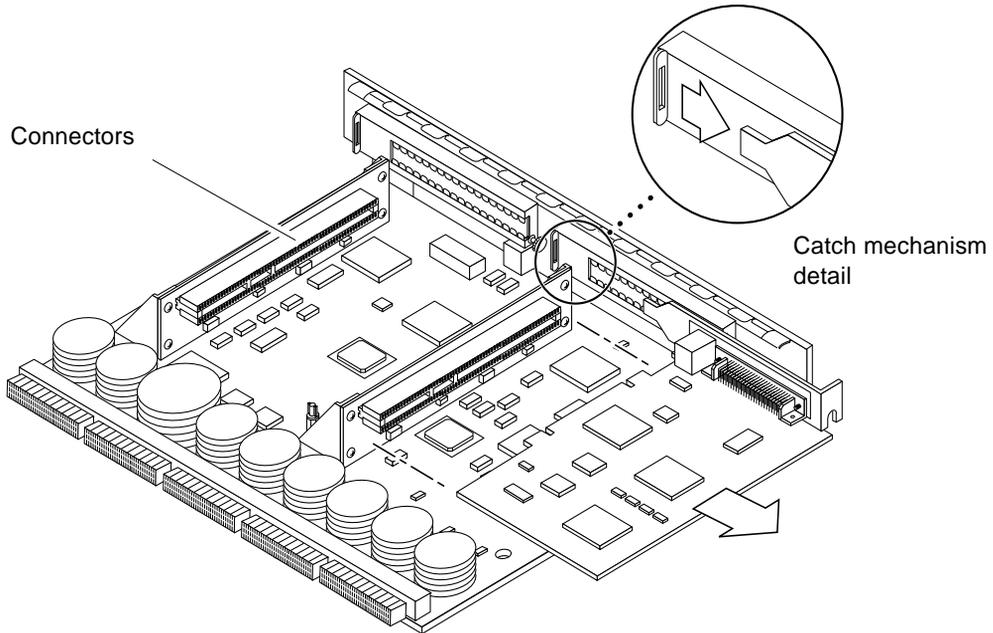


FIGURE 1-5 PCI Card Removal

5. Once the card is free of the PCI bus connector and the metal catch mechanism, remove the card from the I/O board (FIGURE 1-5).

## 1.6.2 Installing a PCI Card

1. Ensure that the voltage type of the PCI card you are replacing or installing matches the voltage type of the riser card, either 5.0V or 3.3V.
2. Verify that the JTAG test jumper is removed/disabled (FIGURE 1-6).

---

**Note** – PCI+ I/O boards purchased from Sun Microsystems are shipped with the JTAG test jumper disabled or removed on both of the 5.0V installed riser cards.

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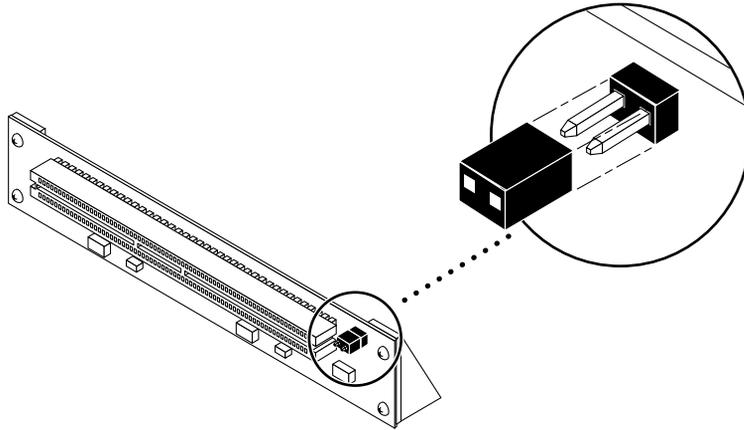
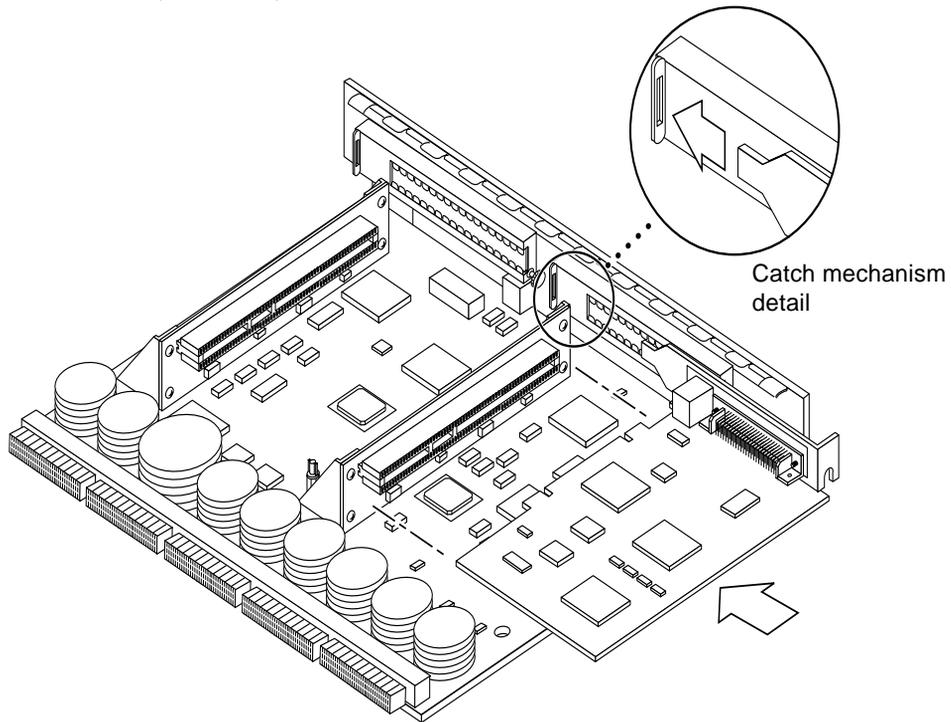


FIGURE 1-6 JTAG Jumper

**3. Align the PCI card so that the connector mates with the PCI board connector.**

Make sure that the right rear of the card is retained by the opening in the metal catch mechanism (FIGURE 1-7) and the front right is aligned to accept the locking thumbscrew (FIGURE 1-4).



**FIGURE 1-7** PCI card installation/replacement

**4. Once the card is properly positioned (as described in Step 3) and seated properly to the connector on the PCI board, tighten the locking thumbscrew.**

---

**Note** – Some PCI cards may not require the standoff for mounting.

---

**5. If the standoff is required ensure that the standoff is positioned to capture the edge of the PCI card, and then tighten the screw securing the standoff.**

**6. Use the procedures in the Section 1.5.2 “Installing a PCI I/O Board” on page 1-5, to replace the PCI I/O board.**

---

## 1.7 Replacing Riser Cards

Each PCI I/O board accommodates two riser cards.

1. Follow the procedures in the Section 1.5.1 “Removing a PCI I/O Board” on page 1-3, to remove the applicable I/O board.
2. If a PCI card is already installed in the riser card slot designated for replacement, remove the card as indicated in Section 1.6.1 “Removing a PCI Card” on page 1-6. If there is no PCI card presently installed, proceed to Step 3.
3. Remove the two screws securing the existing riser card to the PCI I/O board (FIGURE 1-4 on page 7) and remove the riser card.
4. Secure the new riser card onto the PCI I/O board using the two screws removed in Step 3.
5. If a PCI card was removed in Step 2, replace the card as indicated in Section 1.6.2 “Installing a PCI Card” on page 1-9.

---

## 1.8 Verifying Installation

After the PCI board is installed in the system, and *before booting the system*, verify installation by performing the following tasks. Refer to the *Solaris Handbook for SMCC Peripherals* manual or your Solaris documentation for detailed instructions.

1. Power on the system, and when the banner appears, press the Stop-A keys to interrupt the boot process and get to the `ok` prompt.
2. Use the `show-devs` command to list the system devices.

If you do not see your new device(s) listed, check that the PCI I/O board and any PCI cards are properly seated and reinstall the board or cards, if necessary.

Also verify that the JTAG test jumper on the PCI card is disabled or removed. See Section 1.6.2 “Installing a PCI Card” on page 1-9.”

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## 1.9 Diagnostics Testing

For PCI I/O board PCI card diagnostics testing, refer to the *SunVTS 2.1 User's Guide*. Also, refer to the documentation that came with your PCI card for further diagnostic testing.

## PCI I/O Board Notes

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This information applies to Sun Enterprise 6x00/5x00/4x00/3x00 server systems.

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### A.1 CD-ROM Drive Support

The Sun Enterprise PCI I/O board does not support audio volume control for the 4X CD-ROM drives connected to the on-board SCSI interface.

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### A.2 UltraSCSI Bus Support

Currently only two Sun™ StorEdge™ (SPARCstorage™) configurations are capable of supporting UltraSCSI transfers:

- Two Sun StorEdge UniPacks (SPARCstorage™ Unipack)
- One Sun StorEdge MultiPack 2 (SPARCstorage Multipack)

If your system does not have one of the above configurations, you must disable UltraSCSI. You can disable UltraSCSI either for the entire system or for specific controllers or individual drives.

#### A.2.1 Disabling UltraSCSI for the System

To disable UltraSCSI for the entire system, add this entry to the `/etc/system` file:

```
set scsi_options=0x3f8
```

To disable or enable UltraSCSI for specific controllers or drives, see the sections that follow.

---

**Note** – The Sun Enterprise PCI I/O board does not support UltraSCSI devices connected to the onboard SCSI interface at this time. If there are any UltraSCSI drives connected to the onboard SCSI interface, refer to the following section to force the drive to run at FastSCSI speed.

---

## A.2.2 Disabling UltraSCSI on PCI ISP Devices

By default the SCSI options are turned on (0x7f8). To disable UltraSCSI, turn the SCSI options off (0x3f8).

---

**Note** – The system must be rebooted for the SCSI options to take effect.

---

The following sections describe procedures for specific conditions.

### A.2.2.1 Disabling All UltraSCSI Devices on a Controller

- To disable only one controller, add an entry similar to this to the `/kernel/drv/isp.conf` file :

```
name="isp" parent="/pci@1f,4000/pci@4"
unit-address="4"
scsi-options=0x3f8;
```

---

**Note** – Entries in the `/kernel/drv/isp.conf` file override entries in the `/etc/system` file.

---

Use the method in this section for standard system configurations. For non-standard configurations, use the method described in Section A.2.1 “Disabling UltraSCSI for the System” on page A-1.

## A.2.2.2 Disabling Selected UltraSCSI Devices on a Controller

It is possible to disable only some UltraSCSI devices on a controller. The general method is to add an entry similar to the following to the `/kernel/drv/isp.conf` file.

```
name="isp" parent="/pci@1f,4000/pci@4"
unit-address="4"
target2-scsi-options=0x3f8
targetc-scsi-options=0x3f8
targete-scsi-options=0x3f8;
```

---

**Note** – The target must be specified using a hexadecimal value.

---

## A.2.3 Enabling UltraSCSI

To enable UltraSCSI for all devices on the system, except target 0 and 1 on `/pci@1f,2000/pci@1/SUNW,isp@4:`

1. Add this entry to the `/etc/system` file:

```
set scsi_options=0x7f8
```

2. Turn off UltraSCSI on targets 0 and 1 by adding this entry to the `/kernel/drv/isp.conf` file:

```
name="isp" parent="/pci@1f,2000/pci@1"
unit-address="4"
target0-scsi-options=0x3f8
target1-scsi-options=0x3f8;
```

### A.2.3.1 Example 2

To disable UltraSCSI for the entire system, and then enable one controller with the exception of target 0 on that controller:

1. Add this entry to the `/etc/system` file to disable UltraSCSI for the system:

```
set scsi_options=0x3f8
```

2. Add this entry to the `/kernel/drv/isp.conf` file:

```
name="isp" parent="/pci@1f,2000/pci@1"
unit-address="4"
scsi-options=0x7f8
target0-scsi-options=0x3f8;
```

The line `scsi-options=0x7f8` enables the controller.

The line `target0-scsi-options=0x3f8;` disables target 0.

---

## A.3 ISP Man Page

The `isp` man page provides help on determining the physical path name and using `prtconf` to verify what speed is allowed on the disks. The section on path names includes this information:

### PCI Bus

The above example is more specific to the ISP controller on SBus. To achieve the same setting of `scsi-options` on a PCI machine, create a file called `/kernel/drv/isp.conf` and add the following entries.

```
name="isp" parent="/pci@1f,2000/pci@1"
unit-address="4"
scsi-options=0x178
target3-scsi-options=0x58 scsi-initiator-id=6;
```

The physical pathname of the parent can be determined using the `/devices` tree or following the link of the logical device name:

```
example# ls -l /dev/rdisk/c4t3d0s0
lrwxrwxrwx  1 root root  58 Jun 20 23:48 /dev/rdisk/ c4t3d0s0 ->
../../../../devices/pci@1f,2000/pci@1/SUNW,ispwto4/sd@3,0:a,raw
```

To set scsi-options more specifically per device type, add the following line in the /kernel/drv/isp.conf file:

```
device-type-scsi-options-list =  
    "SEAGATE ST32550W", "seagate-scsi-options" ;  
  
seagate-scsi-options = 0x58;
```

All devices which are of this specific disk type will have scsi-options set to 0x58.

Scsi-options specified per target ID has the highest precedence, followed by scsi-options per device type. Global (for all isp instances) scsi-options per bus has the lowest precedence.

The system needs to be rebooted before the specified scsi-options take effect.

