Sun™ Dual FastEthernet/SCSI 6U CompactPCI Adapter With PMC Installation and User's Guide

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- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/television technician for help.

Shielded Cables: Connections between the workstation and peripherals must be made using shielded cables in order to maintain compliance with FCC radio frequency emission limits. Networking connections can be made using unshielded twisted pair (UTP) cables.

Modifications: Any modifications made to this device that are not approved by Sun Microsystems, Inc. may void the authority granted to the user by the FCC to operate this equipment.

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使用者會被要求採取某些適當的對策。

Declaration of Conformity

Compliance Model Number: Gemini

Product Name: Sun Dual Fast Ethernet/SCSI 6U CPCI Adapter with PMC (X1332A & X1339A)

EMC

European Union

This equipment complies with the following requirements of the EMC Directive 89/336/EEC:

EN55022:1995 / CISPR22:1997		Class A
EN550024:1998	EN61000-4-2	4 kV (Direct), 8 kV (Air)
	EN61000-4-3	3 V/m
	EN61000-4-4	1.0 kV Power Lines, 0.5 kV Signal Lines
	EN61000-4-5	1 kV Line-Line, 2 kV Line-Gnd Power Lines
	EN61000-4-6	3 V
	EN61000-4-8	3 A/m
	EN61000-4-11	Pass
EN61000-3-2:1995		Pass
EN61000-3-3:1995		Pass

Safety

This equipment complies with the following requirements of Low Voltage Directive 73/23/EEC:

EC Type Examination Certificates:

   EN60950:1992, 2nd Edition

Supplementary Information

This product was tested and complies with all the requirements for the CE Mark.

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Preface

The *Sun Dual FastEthernet/SCSI 6U CompactPCI Adapter With PMC Guide* provides installation and configuration instructions for the Sun™ Dual FastEthernet/SCSI 6U CompactPCI adapter with PCI mezzanine card (PMC). These instructions are designed for system administrators with experience installing similar hardware.

How This Book Is Organized

This manual contains the following chapters and appendixes:

Chapter 1 describes the adapter's features.

Chapter 2 tells you how to install the PMC to the adapter and how to install the adapter into a CompactPCI server.

Chapter 3 describes how to connect and configure the adapter's Ethernet, SCSI, and PMC interfaces.

Chapter 4 tells you how to detach the device driver before removing the adapter, and how to activate the driver after replacing it.

Appendix A lists the pin descriptions and specifications for the adapters.

Appendix B describes how to set advanced Ethernet interface features.

Appendix C describes how to set advanced device driver parameters.

Appendix D tells you how to test the adapter.

Using UNIX Commands

This document may not contain information on basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices.

See one or more of the following for this information:

- *Solaris Handbook for Sun Peripherals*
- AnswerBook2™ online documentation for the Solaris™ operating environment
- Other software documentation that you received with your system

Typographic Conventions

TABLE P-1   Typographic Conventions

Typeface	Meaning	Examples
AaBbCc123	The names of commands, files, and directories; on-screen computer output	Edit your `.login` file. Use `ls  -a` to list all files. `% You have mail.`
AaBbCc123	What you type, when contrasted with on-screen computer output	`% `**`su`** `Password:`
AaBbCc123	Book titles, new words or terms, words to be emphasized	Read Chapter 6 in the *User's Guide*. These are called *class* options. You *must* be superuser to do this.
	Command-line variable; replace with a real name or value	To delete a file, type `rm` *filename*.

Shell Prompts

TABLE P-2 Shell Prompts

Shell	Prompt
C shell	*machine_name*%
C shell superuser	*machine_name*#
Bourne shell and Korn shell	$
Bourne shell and Korn shell superuser	#

Related Documentation

TABLE P-3 Related Documentation

Application	Title or Description
Adapter installation, removal, and replacement	Your system's: • Service Manual • Installation Manual • Administrator's Guide
Device driver configuration	*Platform Notes: The Sun Quad FastEthernet Device Driver*
Using SCSI Devices	*Solaris Handbook for Sun Peripherals* Your SCSI device documentation
Managing networks	*Solaris System Administration Guide,* Volumes 1 through 3
SunVTS™ diagnostic testing	*SunVTS User's Guide* *SunVTS Test Reference Manual*
OpenBoot™ PROM commands	*OpenBoot 3.x Command Reference Manual*
Ethernet port trunking	*Sun Trunking Installation and User's Guide*

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http://docs.sun.com
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http://www.sun.com/netra
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Overview of the Sun Dual FastEthernet/SCSI 6U CompactPCI Adapter With PMC

This chapter contains an overview of the Sun Dual FastEthernet/SCSI 6U CompactPCI adapter with PMC, including these sections:

- "Product Description" on page 2
- "Features" on page 3

Product Description

The Sun Dual FastEthernet/SCSI 6U CompactPCI adapter with PMC is a network interface card that provides both Ethernet and SCSI connectivity for CompactPCI systems, as well as additional PCI mezzanine card (PMC) capability.

The adapter contains two fully buffered twisted-pair Ethernet ports (RJ-45), providing two switchable 10BASE-T/100BASE-TX channels, on a CompactPCI adapter. The adapter also contains two very high-density cable interface (VHDCI) SCSI connectors and a PMC slot.

The adapter is available for front and rear cable-access CompactPCI systems. For rear-access systems, the adapter consists of two cards: the front card and the rear transition card. For front-access systems, the adapter consists of just the front card (see FIGURE 1-1). The PMC slot is on the front card of the adapter only.

Front card   Rear transition card
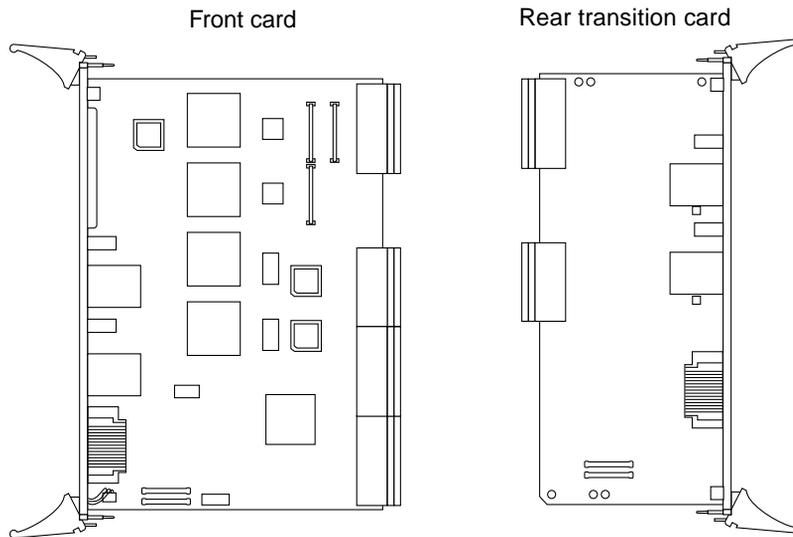
FIGURE 1-1 Sun Dual FastEthernet/SCSI 6U CompactPCI Adapter With PMC

Note – Unlike some other Sun 6U CompactPCI adapters, the same front card can be used in both front- and rear-access servers. If you install the front card in a rear-access server, you must also install the rear transition card in order to make the rear cable connections.

Features

The Sun Dual FastEthernet/SCSI 6U CompactPCI adapter with PMC provides the features described in the following sections.

CompactPCI

- Supports basic and full hot-swap CompactPCI installation and removal (using the Intel 21554 chip)
- Conforms to the CompactPCI specification, PICMG 2.0 D3.0
- Conforms to the CompactPCI Hot Swap specification, PICMG 2.1 R1.0

Ethernet Interfaces

- Fully compliant with the ANSI/IEEE standard 802.3 CSMA/CD physical-layer specification
  - Two switchable 10BASE-T or 100BASE-TX Ethernet channels with autonegotiation; conforms to IEEE 802.3u Ethernet standard
  - Provides operation of up to 100 meters of twisted-pair without use of repeaters
- Two independent Ethernet channels that run at either 10 Mbps or 100 Mbps
- Half-duplex or full-duplex operation modes
- Two 48-bit IEEE 802.3-style medium access control (MAC) identifiers, one for each channel
- Integrity LEDs to indicate: network connections, transaction activities, 10BASE-T or 100BASE-T, and half or full duplex for each channel

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Note – The adapter supports two-port trunking only. Only the two Ethernet ports on the same card can be linked together to form a trunk. Do not link ports between cards. Refer to the *Sun Trunking Installation and User's Guide* for detailed instructions on configuring the trunking software.

SCSI Interfaces

- ANSI X3.131-1994 SCSI-2 compliant
- ANSI X3T10/1071D SCSI-3 Fast-20 compliant
- ANSI X3T9.2/86-109 Rev. 10g (SCSI-2) specification, including Fast (10 MHz) and Wide (16-bit) SCSI options support
- Asynchronous and synchronous transfer modes support
- Synchronous SCSI data transfer rates
  - WideSCSI and UltraSCSI (40 Mbytes/sec)
  - UltraSCSI (20 Mbytes/sec)
  - Wide and Fast SCSI (20 Mbytes/sec)
  - Fast SCSI (10 Mbytes/sec)
  - Normal (5 Mbytes/sec)
- Fast single-ended 8- and 16-bit data operation
- SCSI asynchronous transfer rate:
  - Maximum 12 Mbytes/sec 16-bit
  - Maximum 6 Mbytes/sec 8-bit
- Up to 32-byte data FIFO between the DMA and SCSI channels
- 32-bit transfer counter (4 Gbytes maximum block length)
- 8-bit or 16-bit data and parity compatible, optional checking
- Fast SCSI, single-ended maximum cable length of 6m (19 ft.) (15 targets maximum)
- FAST-20 (Ultra) single-ended SCSI maximum cable length:
  - Up to 6 devices - maximum 3 meters
  - More than 6 devices - maximum 1.5 meters

PCI Mezzanine Card Slot

The adapter supports PMCs with the following specifications:

- 33 MHz, 32- or 64-bit interface
- 5V I/O signaling
- +5V, +3.3V, +/-12V inputs at 7.5 watts total power allocation
- 75 mm by 150 mm

Installing the Adapter

This chapter describes how to install the Sun Dual FastEthernet/SCSI 6U CompactPCI adapter with PMC in a hot-swap-compatible server. This chapter includes instructions for installing the adapter in both *hot-swap* mode (with the system powered on) and *cold-swap* mode (with the system powered off).

Note – Wherever possible, this chapter provides explicit instructions for installing the adapter in your system. However, you must refer to your system's documentation for specific I/O card installation instructions. Your system's service manual will describe the system-specific software commands and the usage of system LEDs required for installation.

This chapter contains the following sections:

- "Preparing for the Installation" on page 6
- "Installing the Adapter in Hot-Swap Mode" on page 14
- "Installing the Adapter in Cold-Swap Mode" on page 26

Note – After installing the adapter in the system, see Chapter 3 for instructions on connecting Ethernet interfaces, SCSI devices, and PMC devices.

Preparing for the Installation

Before installing the adapter, prepare for the installation by assembling the appropriate tools, unpacking the ship kit, selecting a CompactPCI slot, installing an optional PCI mezzanine card (PMC), and determining a mode of installation.

Tools and Equipment Needed

You will need:

- A No. 0 Phillips screwdriver
- A grounding wrist strap (included in the ship kit)
- Ethernet cables to connect the adapter to an Ethernet network
- Electrostatic discharge (ESD) mat (optional)
- VHDCI SCSI cables of the appropriate length

Note – Contact your Sun service representative for information on obtaining the SCSI cables appropriate for the adapter and the SCSI devices you are using.

Contents of the Ship Kit

The ship kit contains the following items:

- Front card
- Rear transition card (for rear cable-access systems only)
- Grounding wrist strap
- This manual
- A product note document

Caution – Electrostatic discharge can damage the integrated circuits on the cards. Leave the cards in their antistatic envelopes until you are ready to install them in the system.

Selecting a CompactPCI Slot Pair in the System

This section describes how to select a CompactPCI slot pair before installing the adapter into a server.

Front-Access Systems

The front-access version of the adapter is designed to be installed in a front-access system with 6U CompactPCI slots. Before installing the adapter, select a CompactPCI slot in the server where you want to install the adapter.

Note – Refer to your system's service manual for the exact locations of the CompactPCI I/O slots in your system and to determine the most appropriate slot in which to install the adapter.

Rear-Access Systems

On rear-access systems, you will have two cards: the front card and a rear transition card that contains the cable connectors. You must first install the rear transition card in a rear CompactPCI slot of the server, and then you can install the front card in the associated front slot of the server. Before starting to install the adapter, select an available CompactPCI slot pair in the server.

For example, a Sun Netra ct 800 server (see FIGURE 2-1) has six 6U CompactPCI I/O slot pairs available. (Slot 1 of this server will always be occupied by a CPU card; slot 8 can be used for an I/O card if it is not occupied by an alarm card). You can install the adapter's front card and rear transition card (RTC) into any of the open slot pairs.

Note – Refer to your system's service manual for the exact locations of the CompactPCI I/O slots in your system and to determine the most appropriate slot in which to install the adapter.

Front of chassis	Hard disk drives	Midplane		Rear of chassis
Slot 1	CPU card		CPU RTC	Slot 1
Slot 2	6U CompactPCI I/O card		I/O rear card	Slot 2
Slot 3	6U CompactPCI I/O card		I/O rear card	Slot 3
Slot 4	6U CompactPCI I/O card		I/O rear card	Slot 4
Slot 5	6U CompactPCI I/O card		I/O rear card	Slot 5
Slot 6	6U CompactPCI I/O card		I/O rear card	Slot 6
Slot 7	6U CompactPCI I/O card		I/O rear card	Slot 7
Slot 8	Alarm card		Alarm RTC	Slot 8

FIGURE 2-1   CompactPCI Slot Pairs in a Sun Netra ct 800 Server (Top View)

Caution – The rear transition card and the front card *must* be installed in associated CompactPCI slots. For example, if you install the rear transition card in the server's rear I/O slot 3, you must install the front card in the server's front I/O slot 3. You can panic the server if you install the cards in nonassociated slots.

Installing the Optional PCI Mezzanine Card

A PCI mezzanine card (PMC) is a slim, modular mezzanine card that provides additional communications functionality to the Sun Dual FastEthernet/SCSI 6U CompactPCI adapter with PMC. The front card of the adapter contains a slot in which you can install a PMC, but PMCs are not included in the adapter ship kit. You must install the PMC on the front card before you install the front card into the server.

In order for the PMC to work with a Sun Dual FastEthernet/SCSI 6U CompactPCI adapter with PMC:

- The PMC must have software drivers for the Solaris operating environment.
- The PMC driver must be hotplug-capable (so that you can install the card while the system is running).
- The combined power of the adapter plus the PMC should not exceed the power allocation allowed by the system's CompactPCI I/O slot specifications. Refer to your system's documentation to review these specifications.

Note – The Sun Dual FastEthernet/SCSI 6U CompactPCI adapter with PMC does not support PMCs that require signalling on the backplane.

▼ To Install the Optional PMC On the Front Card

If you do not have a PMC, go to "Determining the Installation Type" on page 13 to continue with the adapter installation.

1. **If the PMC requires its own software drivers, install the card's software to the server.**

   Refer to the PMC documentation for the software installation procedures.

2. **Retrieve the wrist strap from the adapter's ship kit.**

3. **Attach the adhesive copper strip of the antistatic wrist strap to the metal chassis of the system. Wrap the other end twice around your wrist, with the adhesive side against your skin.**

4. **Remove the front card from its antistatic envelope and place it on an ESD mat (if one is available) near the system.**

   If an ESD mat is not available, you can place the card on the antistatic envelope it was packaged in.

> **Note –** If EMI compliance is required, do not remove the PMC filler panel unless you are going to install a PMC to the adapter.

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5. **If the PMC has a connector for cabling, remove the front card's filler panel (**FIGURE 2-2**).**

   Depending on its application, a PMC may contain a connector where you need to attach a PMC-specific cable. For example, a SCSI card will have a SCSI connector, and an ATM card may have an SC connector. If the PMC has a connector, remove the front card's filler panel so that you can connect the appropriate cable after installing the front card.
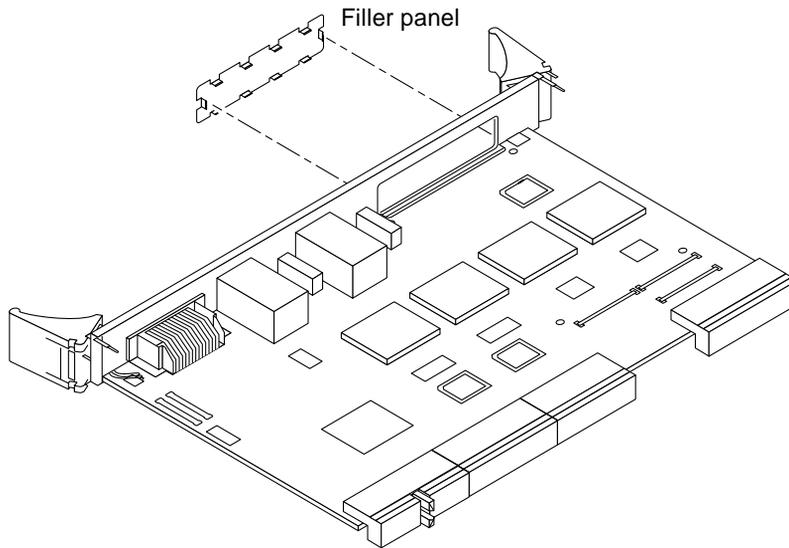
FIGURE 2-2   Removing the PMC Filler Panel

6. **Retrieve the PMC from its ship kit and place it on an antistatic surface.**

7. **Insert the PMC at an angle into the front card's PMC slot** (FIGURE 2-3**).**

Make sure that the PMC's connector goes through the front card's PMC slot.
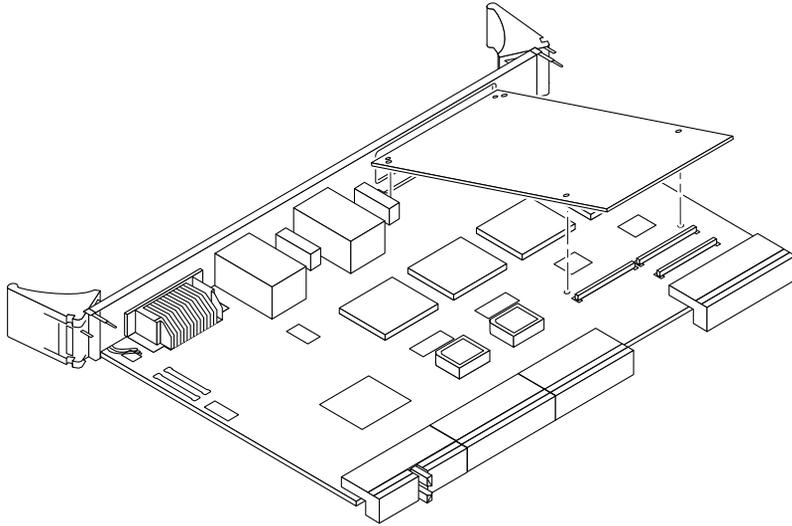
FIGURE 2-3   Inserting the PMC Into the Front Card's PMC Slot

8. **Align the PMC over the PMC connectors.**

9. **Carefully press the PMC into the front card's PMC connectors** (FIGURE 2-4**).**

PMC

Front
card panel
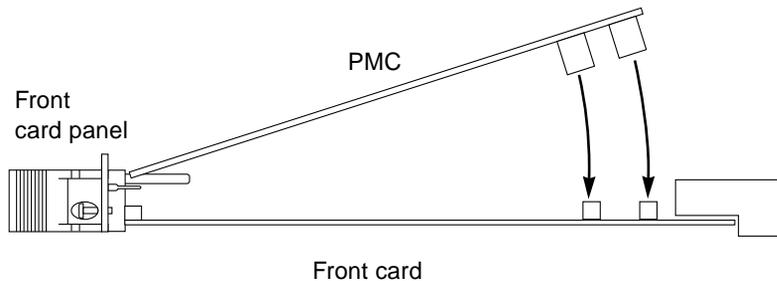
Front card

FIGURE 2-4   Pressing the PMC Into the Front Card's PMC Connectors (Side View)

Caution – Do not use excessive force when installing the PMC into the slot. You may damage the PMC's connectors or the connectors on the front card, causing permanent damage to the PMC or the front card. If the PMC does not seat properly when you apply even pressure, remove the PMC and carefully reinstall it.

10. Turn the front card over and use a screwdriver to secure the four screws that attach the PMC to the front card (FIGURE 2-5**).**

Bottom side of
front card
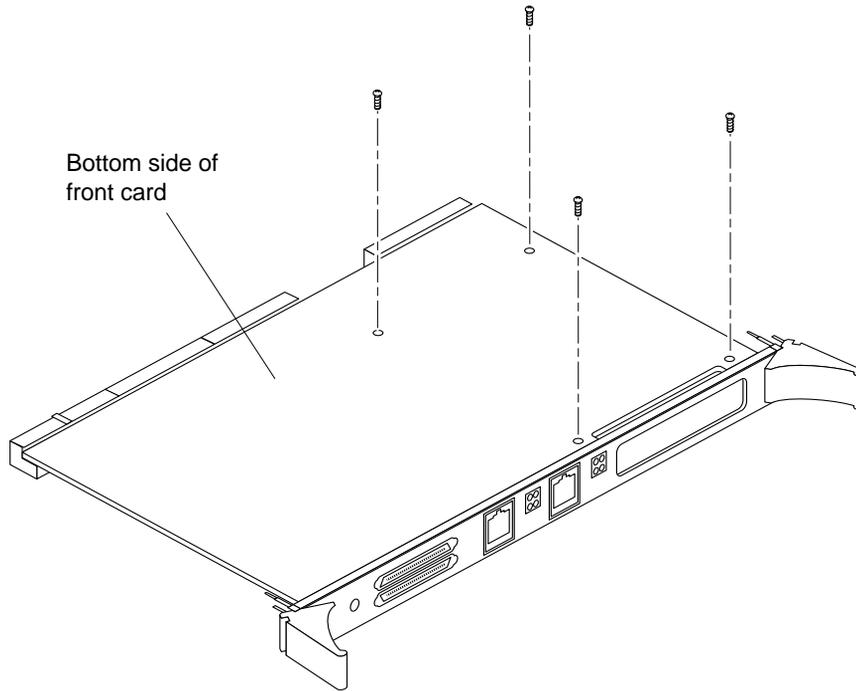
FIGURE 2-5   Securing the PMC Screws

After installing the PMC to the front card, go to "Determining the Installation Type" on page 13 and complete the procedures to install the adapter into the system. You can then cable the PMC and configure the PMC software as documented in the PMC's documentation.

Determining the Installation Type

The adapter is a hot-swappable component that can be installed in a hot-swap-compliant server without interrupting the operation of the system. The adapter can also be installed in cold-swap mode, where you power off the system before you install the adapter.

Note – This manual describes the general procedure needed for both a hot-swap and a cold-swap installation. Because software commands and LED displays can differ for each server, refer to your server's documentation for the exact installation procedures. For example, if you are installing the adapter in a Sun Netra ct server, refer to the *Netra ct Server Service Manual*.

Hot Swap Installation

The Sun Dual FastEthernet/SCSI 6U CompactPCI adapter with PMC meets the PCI Industrial Computer Manufacturers Group (PICMG) hot-swap standard, which means that it can be reliably inserted into or extracted from a powered and operating CompactPCI platform without affecting the other functions of the platform.

During a hot-swap installation, two connection processes occur:

- Hardware connection—the electrical connection of an I/O card.
- Software connection—the software management by the operating system of the board (allocating and releasing resources, attaching and detaching device drivers, and so on).

The adapter supports two methods of hot-swap:

- In a *full hot-swap installation*, both the hardware and the software connection processes are performed automatically.
- In a *basic hot-swap installation*, the hardware connection process occurs automatically, but you must perform the software connection process manually using Solaris commands.

To perform a hot-swap installation, go to "Installing the Adapter in Hot-Swap Mode" on page 14.

Cold Swap Installation

For a cold-swap installation, you must shut down the operating system and power off the server before installing the adapter. To perform a cold-swap installation, go to "Installing the Adapter in Cold-Swap Mode" on page 26.

Installing the Adapter in Hot-Swap Mode

When you are installing the adapter in a server in hot-swap mode, you must consult the documentation that shipped with the server. The server's documentation will describe the specific software commands and hardware components, such as LEDs, that are used when installing the adapter.

The detailed procedures for hot-swap installation are provided in the sections listed in TABLE 2-1. Make sure to read the instructions in "Preparing for the Installation" on page 6 before performing the hot-swap installation procedures.

TABLE 2-1   Hot-Swap Installation Overview

Task	Section or Chapter Documented
Installing the rear transition card (on rear-access systems only)	"To Install the Rear Transition Card (Rear-Access System Only)" on page 15
Installing the front card	"To Install the Front Card" on page 21
Connecting the Ethernet cables	"Connecting the Ethernet Cables to the Adapter" on page 30
Configuring the Ethernet interfaces	"Configuring the Fast Ethernet Interfaces to the Network" on page 33
Connecting SCSI devices	"Connecting SCSI Devices" on page 37

▼ To Install the Rear Transition Card (Rear-Access System Only)

If you have a rear-access system, install the rear transition card in the rear CompactPCI slot that you selected in "Selecting a CompactPCI Slot Pair in the System" on page 7.

Caution – Always install the adapter's rear transition card *before* you install the front card. In a hot-swap environment, you can panic the system if you install the front card first.

Note – If you need to remove the rear transition card after it has been installed, you must first remove the front card *before* you remove the rear transition card. See Chapter 4 for more information.

1. **Retrieve the wrist strap from the adapter's ship kit.**

2. **Attach the adhesive copper strip of the antistatic wrist strap to the metal chassis of the system. Wrap the other end twice around your wrist, with the adhesive side against your skin.**

3. **If the rear slot contains a factory-installed filler panel, remove the filler panel before installing the rear transition card.**

   Refer to the system's documentation for instructions on how to remove the filler panel. Typically, you will need to loosen the filler panel's captive screws before removing the panel from the system.

4. **Remove the rear transition card from its antistatic envelope and place it on an ESD mat (if one is available) near the system.**

   If an ESD mat is not available, you can place the card on the antistatic envelope it was packaged in.

5. **With the card resting on the mat, press the ejection levers on the card outward to open them (**FIGURE 2-6**).**

Top edge of
the card
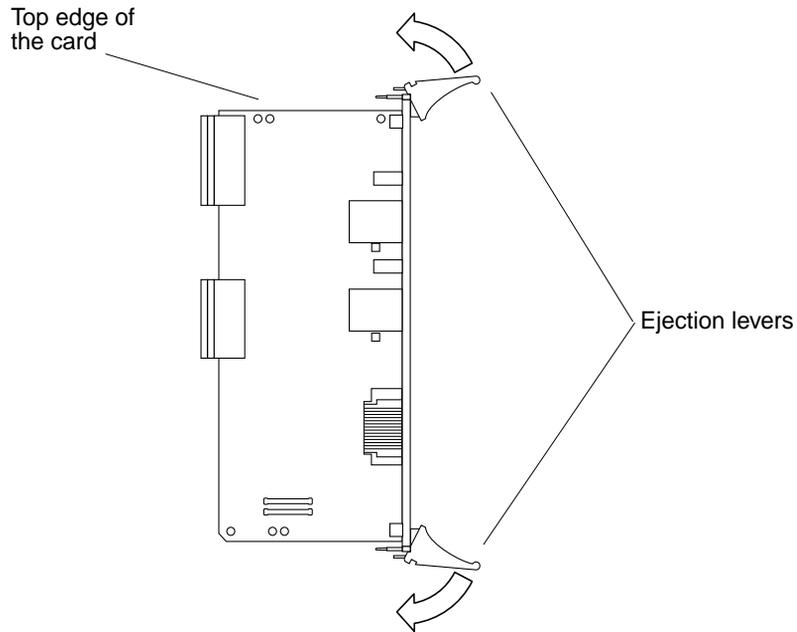
Ejection levers

FIGURE 2-6   Opening the Rear Transition Card's Ejection Levers

The card may contain different types of ejection levers. FIGURE 2-7 shows two possible types of levers. The levers may also contain a locking mechanism that you must unlock before you can open the levers.

Type 1   Type 2

Locking mechanism

Locking mechanism
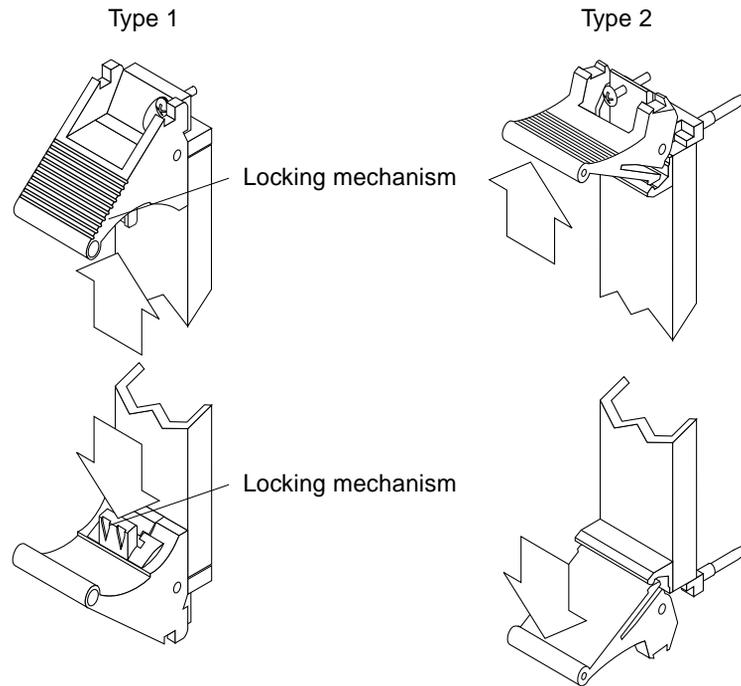
FIGURE 2-7   Opening the Ejection Levers (Two Types of Levers)

Caution – Do not use excessive force when installing the adapter's front or rear transition card into the CompactPCI slot. You can damage the card's connector or the pins on the midplane, causing permanent damage to the card or to the system. If a card does not seat properly when you apply even pressure, remove the card and carefully reinstall it.

6. **Lift up the card, and keeping it perfectly vertical, carefully slide it in the selected rear slot.**

Be sure to align the top and bottom of the card in the slot's card guides (FIGURE 2-8). Also, make sure the ejection levers remain open while you slide the card into the slot.
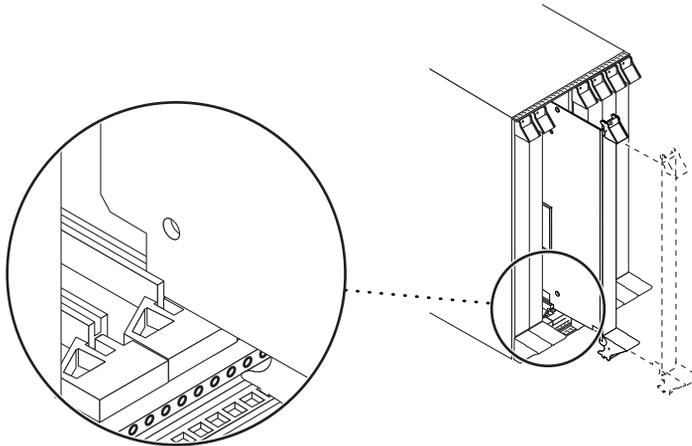
FIGURE 2-8   Aligning the Rear Transition Card With the CompactPCI Slot Card Guide

7. **Push the card all the way into the slot until the two ejection levers move inward (**FIGURE 2-9**).**

The tabs of the ejection levers should fit smoothly into the rectangular cutouts in the top and bottom of the slot.
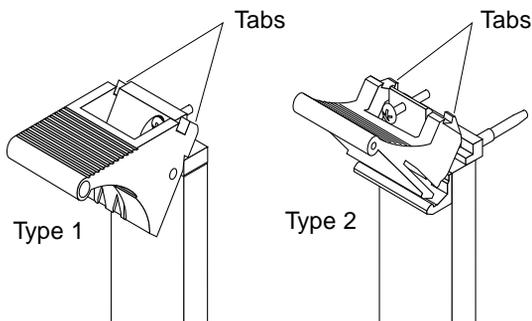
FIGURE 2-9   Ejection Lever Tabs (Two Types of Levers)

8. **Close the ejection levers by pushing the levers in toward the card until you hear each lever click into place (**FIGURE 2-10**).**

   The levers may also contain a locking mechanism that will lock when the levers have been properly closed.

Type 1   Type 2
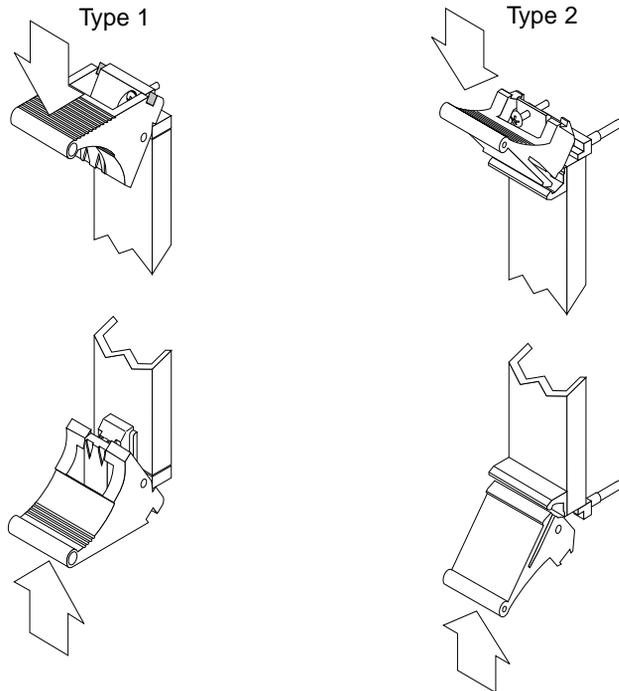
FIGURE 2-10 Closing the Ejection Levers (Two Types of Levers)

When installed correctly, the ejection lever tabs will fit smoothly into the rectangular cutouts in the top and bottom of the slot (FIGURE 2-11).
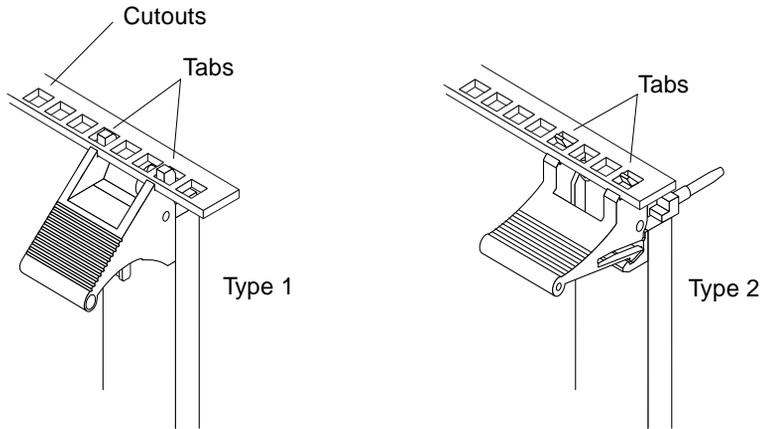
FIGURE 2-11 Ejection Levers Installed in the Slot's Cutouts (Two Types of Levers)

9. Using a No. 0 Phillips screwdriver, tighten the captive screws inside the card's top and bottom ejection levers (FIGURE 2-12**).**
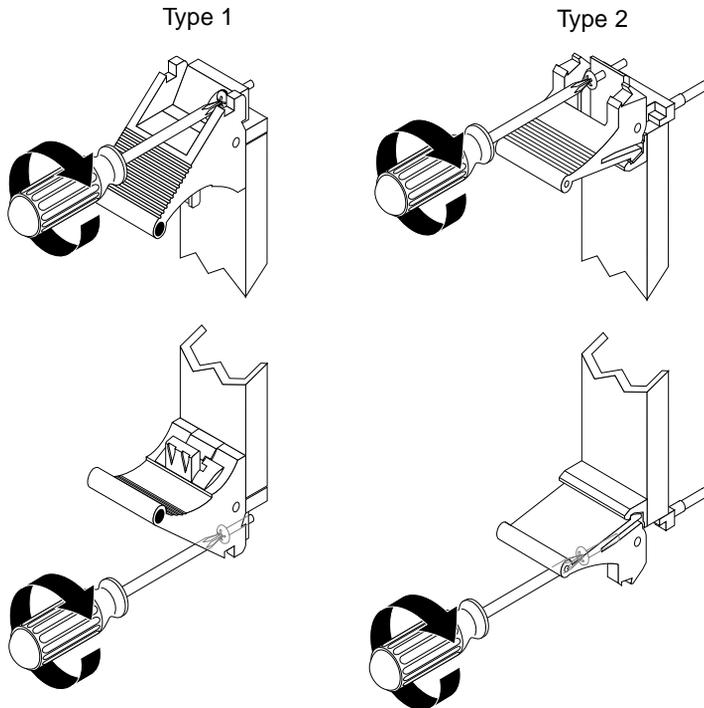
FIGURE 2-12 Tightening the Ejection Lever Captive Screws (Two Types of Levers)

▼ To Install the Front Card

The front card is hot-swappable, which means you don't have to power off the system to install it, and the system will recognize the card during the installation.

Note – If you have a PMC, make sure it is installed on the front card before you install the front card into the system. See "Installing the Optional PCI Mezzanine Card" on page 9 for PMC installation instructions.

---

1. **Go to the front of the server.**

2. **Confirm or reattach your wrist strap to the system's chassis and to your wrist.**

   If necessary, remove the strap from the rear of the chassis and attach it to the front of the chassis.

3. **Locate the slot where you plan to install the front card.**

Caution – If you are installing the adapter in a rear-access server, you *must* install this card in the front CompactPCI slot that is directly associated with the rear slot where you installed the rear transition card. If you install the card in a different slot, the system may panic or the circuits may be damaged. For example, if you installed the rear transition card into rear slot 3, you must install the front card into the front slot 3. See "Selecting a CompactPCI Slot Pair in the System" on page 7 for more information.

---

4. **If the front slot contains a factory-installed filler panel, remove the filler panel before installing the card.**

   Refer to the system's documentation for instructions on how to remove the filler panel. Typically, you will need to loosen the filler panel's captive screws before removing the panel from the system.

5. **Remove the card from its antistatic envelope and place it on an ESD mat (if one is available) near the system.**

   If an ESD mat is not available, you can place the card on the antistatic envelope it was packaged in.

6. With the card resting on the mat, press the ejection levers on the card outward to open them (FIGURE 2-13**).**
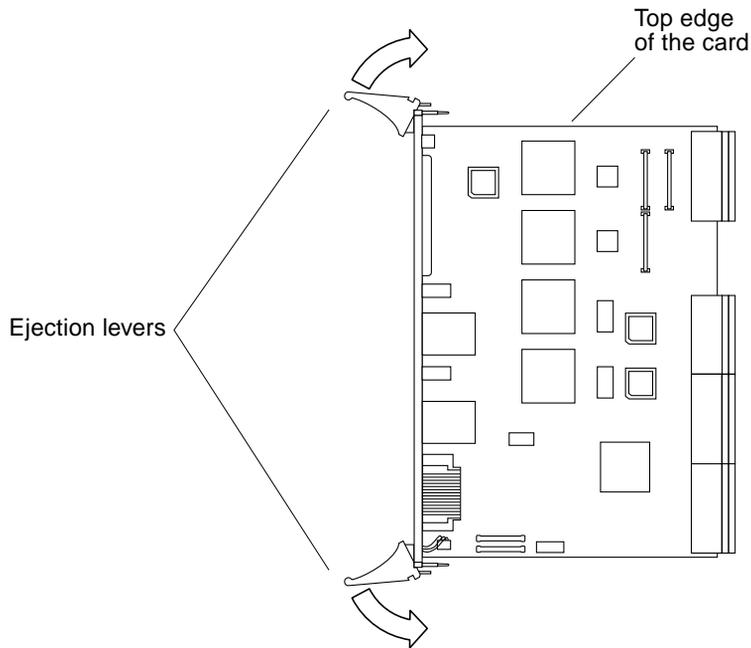
FIGURE 2-13 Opening the Front Card's Ejection Levers

The card may contain different types of ejection levers. FIGURE 2-7 shows two different types of levers. The levers may also contain a locking mechanism that must be unlocked before you can open the levers. The ejection levers may be different than the ones on the rear transition card.

7. **Lift up the card, and keeping it perfectly vertical, carefully slide it into the selected slot.**

   Be sure to align the top and bottom of the card into the slot's card guides (FIGURE 2-14). Make sure the ejection levers remain open while you slide the card into the slot.
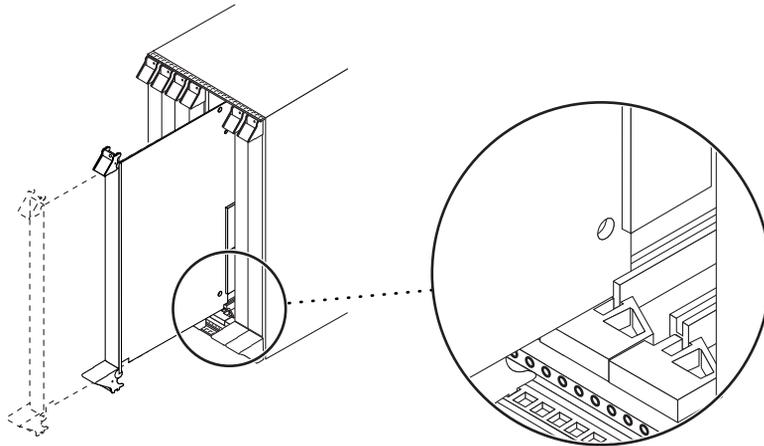
FIGURE 2-14 Aligning the Front Card With the CompactPCI Slot Card Guide

8. **Push the card all the way into the slot until the two ejection levers move inward.**

   The tabs of the ejection levers (see FIGURE 2-9) should fit smoothly into the rectangular cutouts in the top and bottom of the slot.

9. **Close the ejection levers by pushing the levers in toward the card until you hear each lever click into place.**

   The levers may contain a locking mechanism that will lock when the levers have been properly closed. When installed correctly, the ejection lever tabs will fit smoothly into the rectangular cutouts of the slot (FIGURE 2-11).

10. **Using a No. 0 Phillips screwdriver, tighten the captive screws inside the card's top and bottom ejection levers (**FIGURE 2-12**).**

11. **Remove the wrist strap from the chassis and from your wrist.**

▼ To Attach the Adapter to a Hot-Swap System

When you installed the front card into the hot-swap system, the system should have recognized and attached the adapter.

Note – If you are using a rear transition card, the rear SCSI and Ethernet connectors will be activated, and the front SCSI and Ethernet connectors will be disabled. The PMC connector is on the front card only, so the connections will be made from the front for both front-access and rear-access systems.

Follow this procedure to make sure the adapter has been attached to the system, and complete the configuration if this is a basic hot-swap system.

1. Locate the hot-swap LED on the front card (FIGURE 2-15**).**
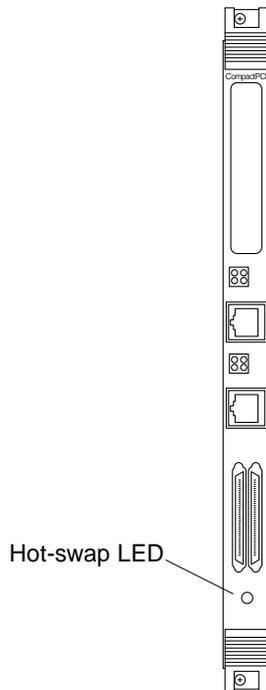
Hot-swap LED

FIGURE 2-15 Location of the Hot-Swap LED on the Front Card

The hot-swap LED shows whether the adapter has been activated.

- If the hot-swap LED is OFF (unlit), the I/O slots in the server have been set to *full* hot swap, and the adapter has successfully been activated. You have completed the adapter installation. Go to Chapter 3 for information on connection adapter interfaces.

■ If the hot-swap LED is ON, then the I/O slots in the server have been set to *basic* hot swap and you must continue with this procedure.

Note – You should also use the hot-swap LEDs on the server when installing the adapter. For example, Netra ct servers contain an OK to Remove LED (↵▯) on the system status panel that is used like the hot-swap LED on this adapter. Refer to your system's service manual for a description of how the hot-swap LEDs are used during a hot-swap installation.

---

2. **Log in to the server as superuser.**

   Refer to the server's documentation for detailed instructions.

3. **At the terminal prompt, type the hot-swap software commands to identify and attach the adapter to the server.**

   These commands may be specific to the server. Refer to the server's documentation for the correct commands and procedures.

   For example, if you are installing the adapter into a Netra ct server, you would use the cfgadm pci command to list the attachment-point IDs in the server. On a Netra ct 800 server, you should see feedback similar to the following:

```
# cfgadm pci
Ap_Id                   Type            Receptacle      Occupant        Condition
pci_pci0:cpci_slot2     unknown         empty           unconfigured    unknown
pci_pci0:cpci_slot3     unknown         disconnected    unconfigured    ok
pci_pci0:cpci_slot4     stpcipci/fhs    connected       configured      ok
pci_pci0:cpci_slot5     unknown         empty           unconfigured    unknown
pci_pci0:cpci_slot6     unknown         empty           unconfigured    unknown
pci_pci0:cpci_slot7     unknown         empty           unconfigured    unknown
pci_pci0:cpci_slot8     stpcipci/fhs    connected       configured      ok
```

   Once you have identified the attachment-point ID on the Netra ct server, you can use the following commands to attach the adapter to the server:

```
# cfgadm -c connect attachment-point-ID
# cfgadm -c configure attachment-point-ID
```

For example, if the attachment-point ID is `pci_pci0:cpci_slot3` (the third CompactPCI slot on the server), you would type:

```
# cfgadm -c connect pci_pci0:cpci_slot3
# cfgadm -c configure pci_pci0:cpci_slot3
```

The hot-swap LED should go off, indicating that the card has been activated. The LEDs on the system should also show that the card has been successfully connected.

4. **See Chapter 3 for instructions on connecting the Ethernet and SCSI connections, as necessary. See your PMC documentation for PMC connection information.**

Installing the Adapter in Cold-Swap Mode

When you are installing the adapter in a server in cold-swap mode, you must consult the documentation that shipped with the server. The server's documentation will describe the specific actions required to power off and power on the server.

The main procedures to install the adapter are provided in the sections listed in TABLE 2-2. Make sure to read the instructions in "Preparing for the Installation" on page 6 before performing the hot-swap installation procedures.

TABLE 2-2 Cold-Swap Installation Overview

Task	Section or Chapter Documented
Installing in cold-swap mode	"To Install the Adapter in Cold-Swap Mode" on page 27
Connecting the Ethernet cables	"Connecting the Ethernet Cables to the Adapter" on page 30
Configuring the Ethernet interfaces	"Configuring the Fast Ethernet Interfaces to the Network" on page 33
Connecting SCSI devices	"Connecting SCSI Devices" on page 37

When you are installing the adapter in cold-swap mode, you must shut down and power off the system. Once the system has been powered off, you can install the adapter and then power the system back on.

> ⚠ **Caution –** Do not use excessive force when installing the adapter's front card or rear transition card into the CompactPCI slot. You can damage the card's connector or the pins on the midplane, causing permanent damage to the card or to the system. If a card does not seat properly when you apply even pressure, remove the card and carefully reinstall it.

▼ To Install the Adapter in Cold-Swap Mode

This procedure describes a general overview of powering off and powering on the server. Refer to your system's documentation for the exact procedure.

1. **Before shutting down the operating environment and halting the system, ensure that all significant application activity on the server has stopped.**

2. **Follow the appropriate procedures, as documented in your system's service manual, to shut down and power off the server.**

   Refer to the system's documentation for the complete power-off procedure. For example, if you installed the adapter in a Netra ct server, refer to the *Netra ct Server Service Manual.*

3. **Verify that the system's power LED is off (unlit), indicating that the system is completely powered off.**

   Refer to the system's documentation for the location of the power LED. For example, on a Netra ct server, the power LED is on the front panel.

   Once the system has been shut down and powered off, you can safely install the rear and front cards.

4. **If necessary, install the PMC.**

   See "To Install the Optional PMC On the Front Card" on page 9 for the procedure.

5. **If you are installing the adapter into a rear-access system, install the rear transition card.**

   See "To Install the Rear Transition Card (Rear-Access System Only)" on page 15 for the procedure.

6. **Install the front card.**

   See "To Install the Front Card" on page 21 for the procedure.

7. **Before powering on the server, make sure that all peripheral devices connected to the server are powered on.**

   Refer to your peripheral device's documentation for the exact procedure.

8. **Follow the appropriate procedures, as documented in your server's service manual, to power on the system.**

   Refer to the server's documentation for the complete power on procedure.

   For example, if you installed the adapter in a Netra ct server, refer to the *Netra ct Server Service Manual.*

9. **During the power-on sequence, watch the hot-swap LED on the adapter's front card (**FIGURE 2-15**).**

   - The LED should blink quickly and then remain off if the adapter was installed correctly.

   - If the hot-swap LED remains on (lit), the adapter was not installed correctly. One or both of the cards may not be seated correctly in the slot. You must remove and reinstall the adapter's two cards to make sure that they sit correctly in the slots. Use the cold-swap procedures to re-install the two cards:

     - Power off the server
     - Remove and replace the rear transition card (if applicable)
     - Remove and replace the front card
     - Power on the server

   Refer to the system's documentation for additional troubleshooting instructions.

10. **Verify that the server's power LED is on (lit), indicating that the system has completely powered on.**

    Refer to the server's documentation for the location of the power LED. For example, on a Netra ct server, the power LED is on the front panel.

11. **See Chapter 3 for instructions on connecting the Ethernet and SCSI connections, as necessary. See your PMC documentation for PMC connection information.**

Connecting the Adapter Interfaces

This chapter describes how to configure the network, SCSI, and PMC software files associated with the Sun Dual FastEthernet/SCSI 6U CompactPCI adapter with PMC. This chapter contains the following sections:

- "Activating the Ethernet Interfaces" on page 30
- "Connecting SCSI Devices" on page 36
- "Connecting PMC Devices" on page 43

Note – The configuration procedures in this chapter were correct at the time this manual was printed. You should always refer to the *Platform Notes: The Sun Quad FastEthernet Device Driver* document for the latest configuration procedures for your system's version of the Solaris operating environment. You can view this document on the `http://docs.sun.com` web site.

Activating the Ethernet Interfaces

This section contains the following subsections:

- "Connecting the Ethernet Cables to the Adapter" on page 30
- "Configuring the Fast Ethernet Interfaces to the Network" on page 33
- "Autonegotiation Protocol" on page 36

Connecting the Ethernet Cables to the Adapter

After installing the adapter in the system, you can attach the Ethernet cables to the Ethernet ports on either the rear transition card (for rear-access systems) or the front card (for front-access systems).

▼ To Connect the Cables to the Ethernet Ports

1. **Locate the Ethernet ports on the adapter that you installed in the system** (FIGURE 3-1**).**

   The adapter contains two Ethernet ports. If you installed the adapter into a rear-access system, the Ethernet ports are on the rear transition card. If you installed the adapter into a front-access system, the ports are on the front card.
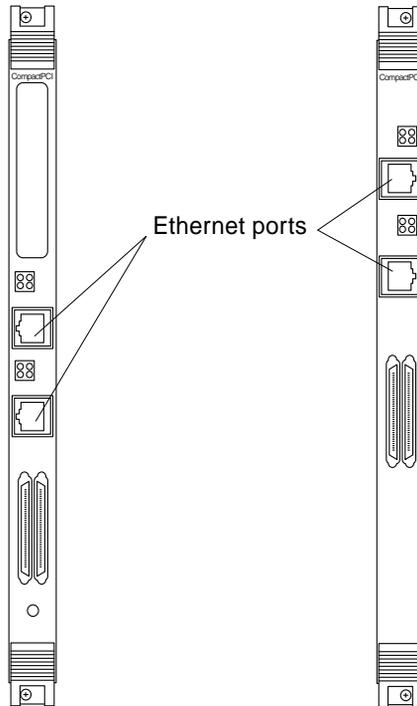
FIGURE 3-1   Location of Ethernet Ports

2. Connect one end of an Ethernet cable to an Ethernet port on the adapter (FIGURE 3-2**).**

Front card   Rear transition card
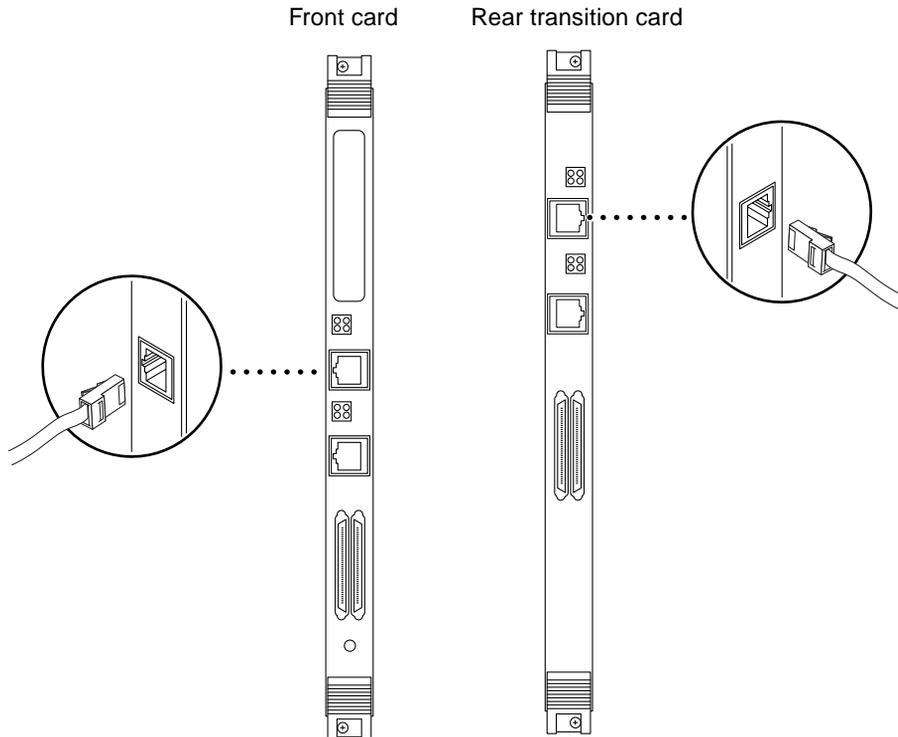
FIGURE 3-2 Connecting Cables to the Ethernet Ports

3. Connect the other end of the Ethernet cable to an active Ethernet network.

Repeat Step 2 and Step 3 for each Ethernet cable you need to connect.

Configuring the Fast Ethernet Interfaces to the Network

The adapter's two Fast Ethernet network interfaces are controlled by the Sun Quad FastEthernet™ qfe(1M) device driver. To use the adapter's qfe interfaces, you must use the Solaris ifconfig(1M) command to activate the interfaces and to assign them Internet protocol (IP) addresses.

To make the interface changes persist over system reboots, you must create a hostname.qfe*instance* file for each Ethernet interface on the adapter that you plan to use. For example, if you plan to use only one of the two Ethernet interfaces on the adapter, you will need to create only one hostname.qfe*instance* file. You must also add both an IP address and a host name for the new Ethernet interface to the /etc/inet/hosts file.

Note – For more information about configuring Solaris networks, refer to the *Solaris System Administration Guide*, Volumes 1 through 3. You can view these documents on the http://docs.sun.com web site.

▼ To Attach the Fast Ethernet Interfaces to the Network

1. **Log in to the server.**

   Refer to your server's documentation for the correct procedure.

2. **At the terminal prompt, use the** grep **command to search the** /etc/path_to_inst **file for** qfe **devices.**

   The grep command will display all of the qfe devices on the system, including the adapter's devices.

   ```
   # grep qfe /etc/path_to_inst
   "/pci@1f,0/pci@1/pci@1/pci@a/SUNW,qfe@0,1" 0 "qfe"
   "/pci@1f,0/pci@1/pci@1/pci@a/SUNW,qfe@1,1" 1 "qfe"
   ```

In the preceding example, the two SUNW,qfe instances are from a Sun Dual FastEthernet/SCSI 6U CompactPCI adapter with PMC. The path_to_inst file contains the full device path names to the two SUNW,qfe instances, the instance numbers (shown in bold italic type), and the driver names (qfe). Refer to the path_to_inst(4) man page for more information about this file.

You will need to know the instance numbers when creating the /etc/hostname.qfe*instance* files in Step 3.

Note – Refer to your system's service manual for more information on how the adapter's device path names correspond to the CompactPCI slot numbers in the system. For example, the /pci@1f,0/pci@1/pci@1/pci@a/SUNW,qfe@*x*,1 path names shown above correspond to I/O slot 7 of a Netra ct 800 server.

---

3. **Create an** /etc/hostname.qfe*instance* **file for each network interface you plan to use.**

For each file, replace *instance* with the instance number you found in Step 2. For example, if you want to use both of the network interfaces from the example in Step 2, you must create two files.

File Name	Instance Number	Adapter Ethernet Network Interface
/etc/hostname.qfe0	0	0
/etc/hostname.qfe1	1	1

Follow these rules when creating /etc/hostname.qfe*instance* files:

- Do not create /etc/hostname.qfe*instance* files for adapter network interfaces you plan to leave unused.
- The /etc/hostname.qfe*instance* file must contain the host name for the appropriate network interface.
- The host name must be different from any other host name of any other interface. For example: /etc/hostname.qfe0 and /etc/hostname.qfe1 cannot have the same host name.
- The host name must have an IP address entered in the /etc/inet/hosts file (see Step 4).

Using the instance examples in Step 2, the following example shows the two /etc/hostname.qfe*instance* files required for a system called maginot, which has a Sun Dual FastEthernet/SCSI 6U CompactPCI adapter with PMC with two qfe interfaces (maginot-11 and maginot-12).

```
# cat /etc/hostname.qfe0
maginot-11
# cat /etc/hostname.qfe1
maginot-12
```

4. **Create an entry in the** /etc/inet/hosts **file for each active** qfe **network interface.**

   You must create an entry for each /etc/hostname.qfe*instance* file you created in Step 3.

   Using the examples from Step 3, you would have:

```
# cat /etc/inet/hosts
#
# Internet host table
#
127.0.0.1       localhost
129.144.10.57 maginot loghost
129.144.10.83 maginot-11
129.144.10.41 maginot-12
```

Refer to the hosts(4) man page and the Solaris documentation for more information about this file.

Note – The Internet protocol, version 6 (IPv6), expands the capabilities of IPv4, which is the current and default version. The device driver included in the Solaris operating environment supports both IPv4 and IPv6. IPv4 uses the /etc/inet/hosts configuration file, but IPv6 uses different configuration files. To transition to, manage, and implement IPv6, refer to the *Solaris System Administration Guide,* Volume 3. You can view this document on the http://docs.sun.com web site.

---

5. **Activate the new** `qfe` **interfaces using the** `ifconfig` **command.**

   For each adapter interface, type the following two commands at the command line, replacing *instance* with the interface's instance number and *IP-address* with the interface's IP address:

   ```
   # ifconfig qfeinstance plumb
   # ifconfig qfeinstance IP-address up
   ```

   For example, if you wanted to activate the sample `qfe0` interface shown in Step 4, you would type:

   ```
   # ifconfig qfe0 plumb
   # ifconfig qfe0 129.144.10.83 up
   ```

Autonegotiation Protocol

A key feature of the Sun Dual FastEthernet/SCSI 6U CompactPCI adapter with PMC is autonegotiation. The autonegotiation protocol, as specified by the 100BASE-TX standard, selects the operational mode (half-duplex or full-duplex), and the autosensing protocol selects the speed (10 Mbps or 100 Mbps) for the adapter.

The link speed and modes supported by the Sun Dual FastEthernet/SCSI 6U CompactPCI adapter with PMC are listed as follows, in decreasing order of priority:

- 100 Mbps, full-duplex
- 100 Mbps, half-duplex
- 10 Mbps, full-duplex
- 10 Mbps, half-duplex

When the adapter is configured to the system, or when the system is booted, the adapter advertises these capabilities to the link partner at the other end of the link (a hub, switch, or another network interface card [NIC] in a host system). If the link partner also supports autonegotiation, it advertises its capabilities over the link. The common highest priority mode supported by both sides is selected for the link operation.

If the adapter is connected to a remote system or interface that is not capable of autonegotiation, your system automatically selects the speed and the half-duplex mode.

If the adapter is connected to a link partner with which the autonegotiation protocol fails to operate successfully, you can configure the device not to use this protocol and force the driver to set up the link in the mode and speed of your choice. See "To Set Forced Mode and Disable Autonegotiation" on page 96 for more information.

Connecting SCSI Devices

This section describes how to connect peripheral SCSI devices to a Sun Dual FastEthernet/SCSI 6U CompactPCI adapter with PMC.

Note – When connecting SCSI devices to your adapter, you should refer to the *Solaris System Administration Guide, Volume 1* for instructions on configuring SCSI devices in a hot-plug environment. You can view this document on the `http://docs.sun.com` web site. Refer to the SCSI device documentation for additional hardware and software configuration information.

▼ To Connect SCSI Devices to the Adapter

When you are connecting peripheral SCSI devices to one of the adapter's two SCSI connectors, you must use the `cfgadm` command to configure the device after connecting the cables to and powering on the peripheral device. For more information about using the `cfgadm` command, refer to the `cfgadm`(1M) and `cfgadm_scsi`(1M) man pages.

1. **Install the peripheral SCSI device.**

   The SCSI device should be within the proper cable length to the adapter. Refer to the SCSI device's documentation for installation instructions.

2. Obtain the correct SCSI cable needed to connect the SCSI device to the adapter.

See FIGURE 3-3 for the location of the two SCSI connectors on the adapter. To connect SCSI devices to the adapter, you will need a SCSI cable with a very high-density connector interface (VHDCI). Depending on your peripheral device, you may need to use a VHDCI-to-SCSI-3 cable.
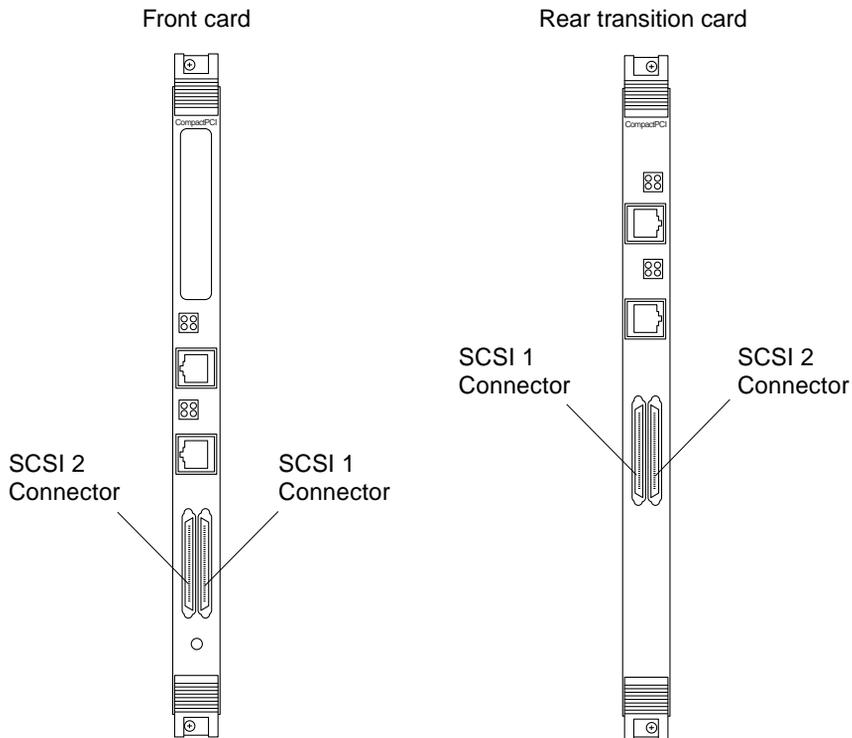
FIGURE 3-3   SCSI Connectors on the Front Card and the Rear Transition Card

3. **Connect one end of the SCSI cable to a SCSI connector on the adapter (see** FIGURE 3-4**).**

Front card   Rear transition card

FIGURE 3-4   Connecting SCSI Cables to the Adapter

4. **Connect the other end of the SCSI cable to the appropriate SCSI connector on the SCSI device.**

   Refer to the SCSI device's documentation for more information.

   Note – The SCSI controller initiator ID is 7.

   ---

5. **Set the SCSI target ID on the peripheral SCSI device to a unique target number.**

   Make sure that the SCSI device's target number is not shared by any other device connected to the adapter's SCSI controller. You can use the cfgadm -al command to list all of the SCSI devices, including the SCSI target numbers that are connected to the system (see Step 9 for an example).

   Refer to the SCSI device's documentation for instructions for setting SCSI target IDs.

6. **Make sure that the SCSI cable connections are secured properly, and if required, make sure that the final SCSI device connected to the adapter is terminated.**

   SCSI termination may be required for the last device connected to the adapter's SCSI controller. Refer to the SCSI device's documentation for more information.

   Note – The default state of the onboard SCSI termination is on. Make sure to terminate SCSI devices properly, especially if you use devices of different sizes.

   ---

7. **Power on the peripheral SCSI device.**

   Refer to the SCSI device's documentation for the power-on procedure.

8. **Log in to the host server as root.**

   Refer to the server's documentation for more information.

9. **Use the** `cfgadm` **command to determine the attachment-point identification (ID) names of the adapter's two SCSI controllers.**

   Each Sun Dual FastEthernet/SCSI 6U CompactPCI adapter with PMC contains two SCSI controllers. The Solaris SCSI hot-plug software will assign a unique attachment-point ID name to these SCSI controllers. You can use the `cfgadm` command to list the SCSI controllers on the system, including their attachment-point ID names.

   Note – For more information about the attachment-point ID names and the `cfgadm` command, refer to your system's service manual, the Solaris documentation, and the `cfgadm`(1M) man page.

   For example, to list all of the attachment points on a server, you can use the `cfgadm -al` command.

```
# cfgadm -al
Ap_Id                  Type          Receptacle     Occupant      Condition
c0                     scsi-bus      connected      configured    unknown
c0::dsk/c0t0d0         disk          connected      configured    unknown
c0::dsk/c0t1d0         disk          connected      configured    unknown
c1                     scsi-bus      connected      configured    unknown
c5                     scsi-bus      connected      configured    unknown
pci_pci0:cpci_slot2    unknown       empty          unconfigured  unknown
pci_pci0:cpci_slot3    unknown       disconnected   unconfigured  unknown
pci_pci0:cpci_slot4    unknown       disconnected   unconfigured  unknown
pci_pci0:cpci_slot5    unknown       empty          unconfigured  unknown
pci_pci0:cpci_slot6    stpcipci/fhs  connected      configured    ok
pci_pci0:cpci_slot7    stpcipci/fhs  connected      configured    ok
pci_pci0:cpci_slot8    stpcipci/fhs  connected      configured    ok
```

In this example, there are three SCSI controllers (scsi-bus). Their attachment-point ID names (Ap_Id) are c0 for the server's SCSI controller and c1 and c5 for the adapter's two SCSI controllers.

You can also use the cfgadm -v command to list the physical device paths (Phys_Id) of the attachment points on the server.

Using the output of these commands, you should be able to determine the attachment-point ID names (c1, c5, etc.) of the adapter's two SCSI controllers. Refer to the cfgadm(1M), cfgadm_pci(1M), and cfgadm_scsi(1M) man pages for more information.

10. **Use the** cfgadm **command to configure the new SCSI device to the adapter's SCSI controller.**

Replace *controller-ap-ID* with the SCSI controller's attachment-point ID name of appropriate SCSI controller (the one in which you connected the SCSI device).

```
# cfgadm -c configure controller-ap-ID
```

For example, if you connected the SCSI device to the adapter's first SCSI port (SCSI 1), and the attachment point ID name of this SCSI controller is c1, you would type:

```
# cfgadm -c configure c1
```

11. **Use the** `devfsadm` **command to rebuild the device files in the** `/dev` **and** `/devices` **directories.**

   If you have attached SCSI disk drives, CD-ROM drives, or DVD-ROM drives to the adapter's SCSI controller, type:

   ```
   # devfsadm -c disk
   ```

   If you have attached a tape drive to the adapter's SCSI controller, type:

   ```
   # devfsadm -c tape
   ```

   You are now able to use the devices you connected to the adapter's SCSI controller.

12. **Use the** `cfgadm` **command to confirm that the SCSI devices have been configured to the system.**

   Using the `cfgadm` command with the `-al` options will list all of the SCSI devices connected to the adapter's SCSI controller. Replace *controller-ap-ID* with the SCSI controller's attachment point ID name.

   ```
   # cfgadm -al controller-ap-ID
   ```

   For example, if the attachment-point ID name is `c1`, you would type:

   ```
   # cfgadm -al c1
   Ap_Id               Type         Receptacle    Occupant     Condition
   c1                  scsi-bus     connected     configured   unknown
   c1::dsk/c1t2d0      disk         connected     configured   unknown
   c1::dsk/c1t3d0      disk         connected     configured   unknown
   c1::dsk/c1t4d0      disk         connected     configured   unknown
   ```

   The preceding example shows that there are three disk drives attached to the adapter's SCSI controller.

   Refer to the `devfsadm`(1M) and `cfgadm_scsi`(1M) man pages for additional information about hot-plugging SCSI devices. Also, refer to the *Solaris System Administration Guide* (especially Volume 1) for more information about configuring SCSI devices and using these commands.

   Note – You can view and download all of the preceding manuals from the `http://docs.sun.com` web site.

Connecting PMC Devices

If a PMC is mounted on the adapter, follow the appropriate steps to connect any PMC devices to the PMC.

▼ To Connect PMC Devices

1. **If the PMC has a connector to attach to an external device, connect one end of the PMC cable to a PMC connector on the front card of the adapter (see** FIGURE 3-5**).**
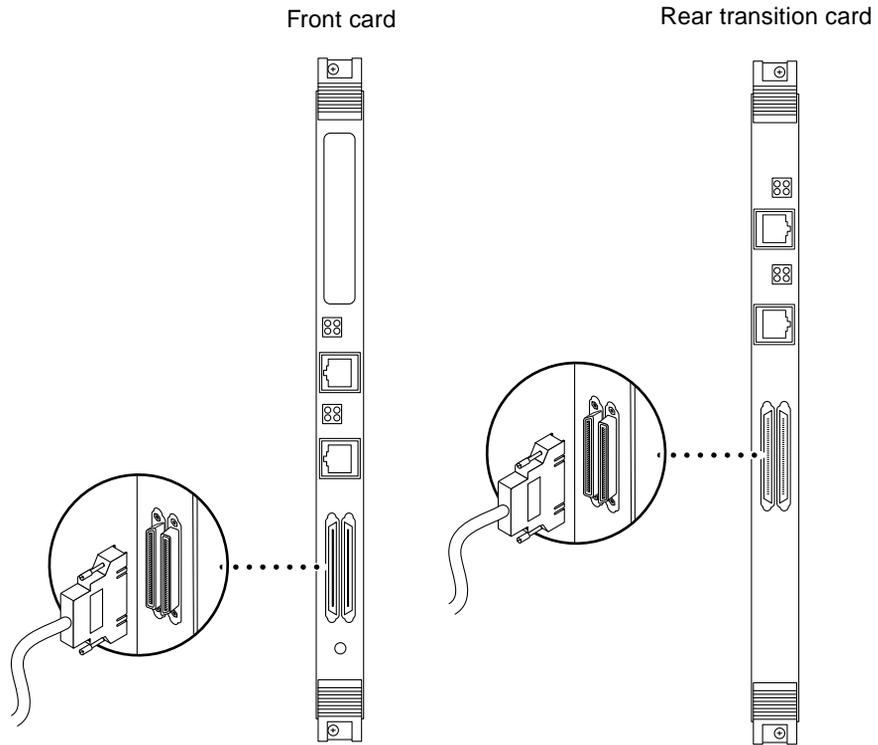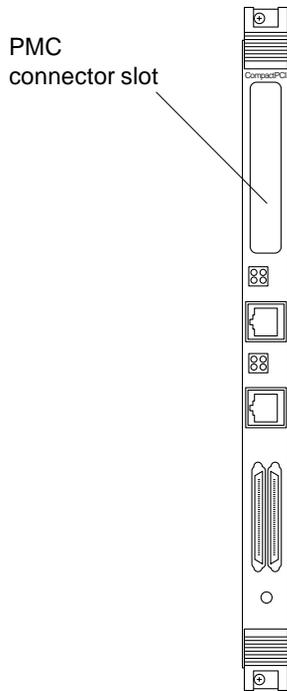

FIGURE 3-5   Connecting PMC Cables to the Adapter

2. **Connect the other end of the PMC cable to the appropriate connector on the external device.**

Refer to the PMC documentation for more information.

3. Configure the PMC software to the adapter.

Refer to your PMC documentation for instructions on how to configure the appropriate PMC software.

Note – If the PMC has a SCSI connector, see "To Connect SCSI Devices to the Adapter" on page 37 for information on configuring the SCSI devices.

Removing and Replacing the Adapter

This chapter contains the following procedures. These procedures apply to both the rear-access and front-access versions of the adapter.

Remove and Replace Overview

Your server's service manual describes how to remove and replace installed I/O cards in your server. However, before you can follow the service manual's removal instructions, you must first disable (unplumb) the adapter's two Ethernet interfaces and unconfigure the adapter's two SCSI controllers. After replacing the adapter, you must activate (plumb) the Ethernet interfaces and configure the SCSI devices.

Note – If the adapter has a PMC installed, the PMC driver must be hotpluggable. Refer to your PMC documentation to verify this.

Note – This section only addresses instructions for activating/deactivating Ethernet interfaces and configuring/unconfiguring SCSI controllers. If you are required to reinstall the cards, you *must* follow the instructions outlined in your system's service manual for the physical removal and replacement of I/O cards.

TABLE 4-1 lists the main procedures for removing and replacing the adapter in your system.

TABLE 4-1 Overview of the Tasks to Remove and Replace the Adapter

Task	Section Documented
Disabling the Ethernet and SCSI interfaces	"To Disable the Ethernet and SCSI Interfaces" on page 47
Disconnecting the Ethernet and SCSI cables	"To Disconnect the Ethernet and SCSI Cables" on page 51
Removing the adapter from the system	"To Remove the Adapter From the System" on page 53
Removing and replacing a PMC	"To Remove and Replace a PMC" on page 55
Replacing the adapter to the system	"To Replace the Adapter to the System" on page 56
Activating the Ethernet devices and configuring the SCSI devices	"To Activate the Ethernet Interfaces and Configure the SCSI Devices" on page 56

Removing the Adapter

This procedure describes how to disable the adapter's two Ethernet (`qfe`) interfaces and the SCSI controllers before removing the adapter from a hot-swap server. This procedure also lists cautions that must be read before removing the adapter from the server.

<table>
<tr><td>⚠</td><td>Caution – If you do not disable the adapter's network interfaces and SCSI controllers, you may cause the server to panic or become unstable when you attempt to remove the adapter.</td></tr>
</table>

Note – The instructions in this section do *not* cover the unconfiguration procedures that might be necessary if you are removing an adapter with hard disk drives that are under the control of any disk management software, such as Volume Manager or Solstice DiskSuite™. If you are running disk management software on your system, refer to the documentation that came with the disk management software for instructions on releasing hard disk drives from the control of the software before proceeding with these instructions.

▼ To Disable the Ethernet and SCSI Interfaces

1. **Log in to the system as superuser.**

   Refer to the system's documentation for the correct procedure.

2. **If necessary, disable any software being used by the PMC.**

   Refer to the PMC's documentation for the procedure.

3. **Use the** `ifconfig` **command to stop all network activity traveling over the adapter's Ethernet interfaces.**

   For example, if you were using the adapter's two interfaces, and they were named `qfe0` and `qfe1`, you would type:

   ```
   # ifconfig qfe0 unplumb
   # ifconfig qfe1 unplumb
   ```

   Refer to the `ifconfig`(1M) man page and the Solaris documentation for more information about this command.

4. **If you have a removable media module (CD-ROM or DVD-ROM drive), type the following to disable the Solaris Volume Manager software daemon connected to the adapter SCSI connector.**

```
# /etc/init.d/volmgt stop
```

If you do not disable the Volume Manager software, the operating system will consider the removable media module as busy. With the device busy, the hot-swap procedure will fail.

5. **Use the `cfgadm` command to determine the attachment-point ID names of the adapter's SCSI controllers.**

Each Sun Dual FastEthernet/SCSI 6U CompactPCI adapter with PMC contains two SCSI controllers. The Solaris SCSI hot-plug software will assign a unique attachment-point ID name to these SCSI controllers. You can use the `cfgadm` command to list the SCSI controllers on the system, including their attachment-point ID names.

Note – For more information about the attachment-point ID names and the `cfgadm` command, refer to your system's service manual, the Solaris documentation, and the `cfgadm`(1M) man page.

For example, to list all of the attachment points on a server, you can use the `cfgadm -al` command.

```
# cfgadm -al
Ap_Id                Type         Receptacle    Occupant       Condition
c0                   scsi-bus     connected     configured     unknown
c0::dsk/c0t0d0       disk         connected     configured     unknown
c0::dsk/c0t1d0       disk         connected     configured     unknown
c1                   scsi-bus     connected     configured     unknown
c1::dsk/c1t2d0       disk         connected     configured     unknown
c1::dsk/c1t3d0       disk         connected     configured     unknown
c1::dsk/c1t4d0       disk         connected     configured     unknown
c5                   scsi-bus     connected     configured     unknown
pci_pci0:cpci_slot2  unknown      empty         unconfigured   unknown
pci_pci0:cpci_slot3  unknown      disconnected  unconfigured   unknown
pci_pci0:cpci_slot4  unknown      disconnected  unconfigured   unknown
pci_pci0:cpci_slot5  unknown      empty         unconfigured   unknown
pci_pci0:cpci_slot6  stpcipci/fhs connected     configured     ok
pci_pci0:cpci_slot7  stpcipci/fhs connected     configured     ok
pci_pci0:cpci_slot8  stpcipci/fhs connected     configured     ok
```

In this example, there are three SCSI controllers (`scsi-bus`). Their attachment-point ID names (`Ap_Id`) are `c0` for the server's SCSI controller and `c1` and `c5` for the adapter's SCSI controllers.

You can also use the `cfgadm -v` command to list the physical device paths (`Phys_Id`) of the attachment points on the server.

Using the output of these commands, you should be able to determine the adapter's SCSI controller attachment-point ID name (`c0`, `c1`, `c5`, etc.). Refer to the `cfgadm`(1M), `cfgadm_pci`(1M), and `cfgadm_scsi`(1M) man pages for more information.

6. Use the `cfgadm` command to unconfigure the adapter's two SCSI controllers.

Replace *controller-ap-ID* with the SCSI controller's attachment-point ID name.

```
# cfgadm -c unconfigure controller-ap-ID
```

For example, if the attachment-point ID names are `c1` and `c5`, you would type:

```
# cfgadm -c unconfigure c1
# cfgadm -c unconfigure c5
```

> **Note –** If any hard disk drives with mounted partitions are connected to the
> adapter's SCSI controller, the cfgadm command will list these partitions in an error
> message (see the following example). If no hard disk drive partitions are mounted to
> the server, go to "To Disconnect the Ethernet and SCSI Cables" on page 51.

If any hard drive partitions are mounted to the server, you will receive an error
message similar to the following after entering the cfgadm -c unconfigure
command:

```
# cfgadm -c
cfgadm: Component system is busy, try again: failed to offline:
/devices/pci@1f,0/pci@1/pci@1/pci@d/SUNW,isptwo@4
    Resource                Information
------------------  ----------------------------
/dev/dsk/c2t4d0s0   mounted filesystem "/coyo_4"
/dev/dsk/c2t2d0s0   mounted filesystem "/coyo_2"
```

7. **If necessary, use the Solaris** umount**(1M) command to unmount the partitions.**

   For example, for every file system that was listed in the cfgadm message, you would
   type:

   ```
   # umount filesystem
   ```

   Replace *filesystem* with the file system that you want to unmount.

   For example, if the file system is /coyo_4, you would type:

   ```
   # umount /coyo_4
   ```

   Once these partitions have been unmounted, use the cfgadm command (as shown in
   Step 6) to unconfigure the adapter's SCSI controller.

▼ To Disconnect the Ethernet and SCSI Cables

1. **Disconnect the Ethernet cables from the adapter's Ethernet ports and SCSI cables from the adapter's SCSI ports.**

   FIGURE 4-1 displays how to disconnect the Ethernet cables from both the front and rear-access versions of the adapter.
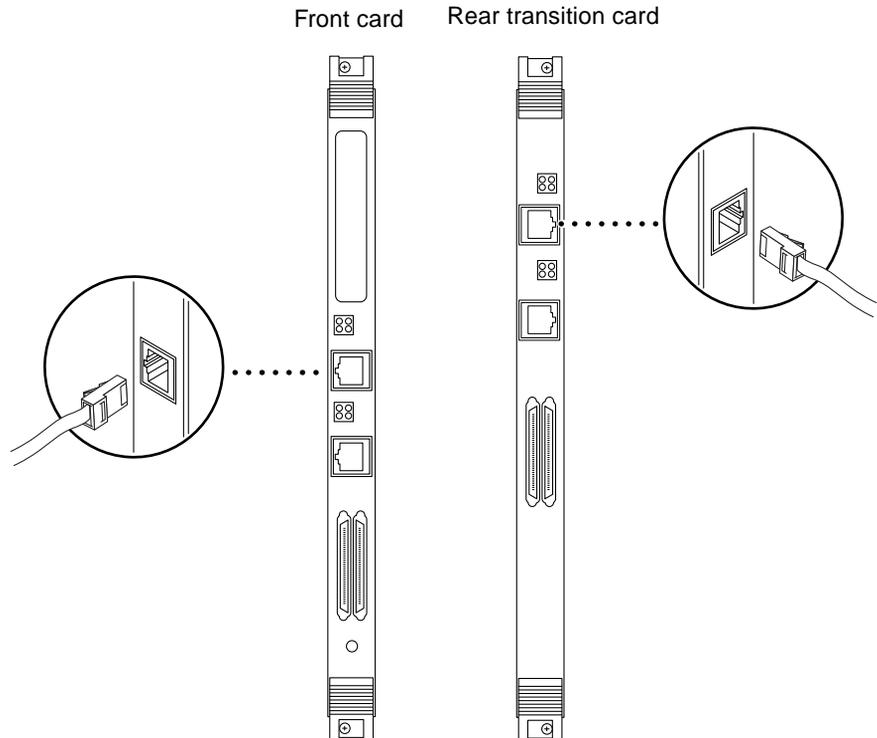
FIGURE 4-1   Disconnecting Ethernet Cables

FIGURE 4-2 displays how to disconnect the SCSI cables from both the front- and rear-access versions of the adapter.

Front card   Rear transition card
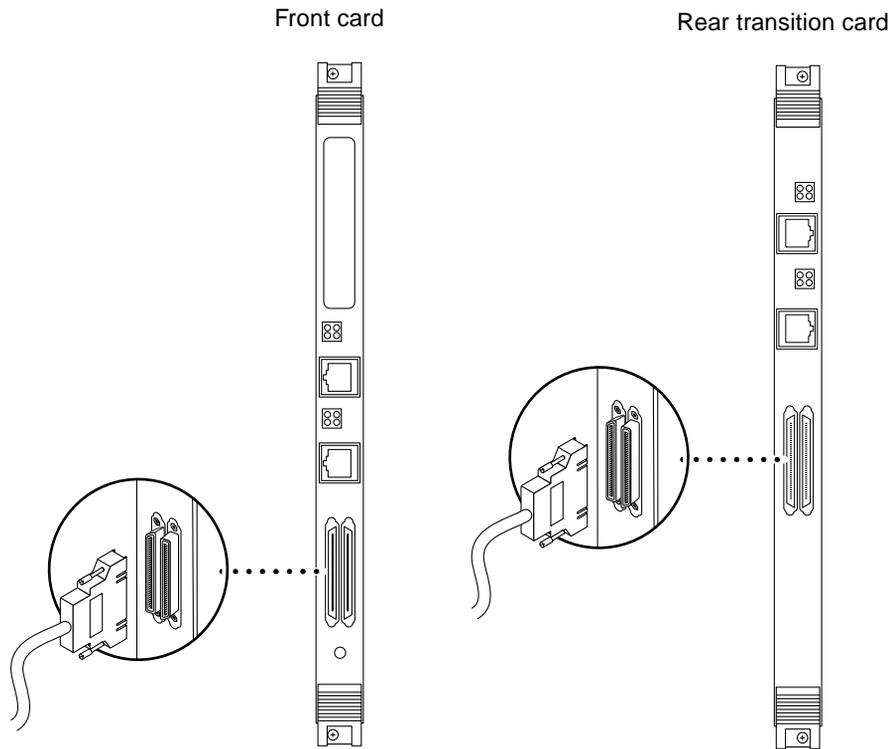
FIGURE 4-2 Disconnecting SCSI Cables

2. If necessary, disconnect any cable connected to the PMC and disable any PMC software.

Refer to the PMC documentation for specific instructions.

▼ To Remove the Adapter From the System

● **Remove the adapter from the system as documented in the system's service manual.**

The service manual will describe how to unconfigure the adapter and remove it from the system.

Caution – You *must* follow the instructions outlined in your system's service manual for the removal of network interface I/O cards. If you do not follow the procedures in the service manual, you may cause your system to panic.

In addition to the procedures documented in the server's service manual, consider the following caution statements when removing faulty adapters, or when moving adapters to other slots, in hot-swap mode:

■ If you are removing a rear-access version of the adapter, you must *always* remove the adapter's front card before removing the rear transition card. If you remove the rear transition card first, you may panic the system.

■ Do not trust the hot-swap LED on the adapter when removing the card from the system. On some systems, the hot-swap LED may turn on before the software has completely detached from the adapter. Use the LEDs on the system, as documented in the system's service manual, when removing the adapter.

■ If the server is set to full hot-swap mode, open and close the ejection levers slowly. When you open the ejection levers, the software detachment process begins. This detachment process must end before you can safely close the ejection levers, which begins the software attachment process.

■ If you reclose the levers after opening them without removing the card from the system, you will have to use the necessary software commands to reattach the adapter to the system. See "To Replace the Adapter to the System" on page 56.

■ When moving more than one adapter to different slots in the system, move the adapters one at a time. If you move multiple adapters in rapid succession and at the same time, you may panic or hang the system.

If necessary, remove the PMC from the adapter. See "Removing and Replacing a PMC" on page 54.

Removing and Replacing a PMC

This procedure describes how to remove a PMC if one is installed on the front card of the adapter.

Before removing the PMC, you must first:

- Disconnect any Ethernet interfaces and SCSI devices (see "To Disable the Ethernet and SCSI Interfaces" on page 47 and "To Disconnect the Ethernet and SCSI Cables" on page 51).
- Remove the adapter from the system according to the instructions in the system's service manual.

▼ To Remove and Replace a PMC

1. **Turn the front card upside down.**

2. **Remove the four screws holding the PMC from the bottom side of the front card (**FIGURE 4-3**).**

Bottom side of
the front card
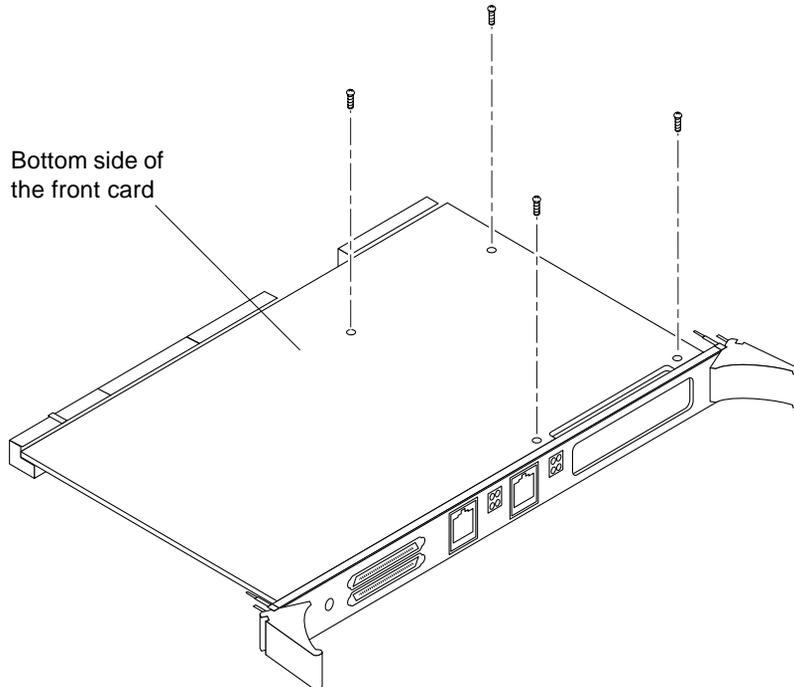
FIGURE 4-3   Removing the PMC Screws

3. **Turn the card right side up, and gently pull the PMC up off of the front card, lifting the connectors side first (**FIGURE 4-4**).**

PMC

Front
card panel

Front card
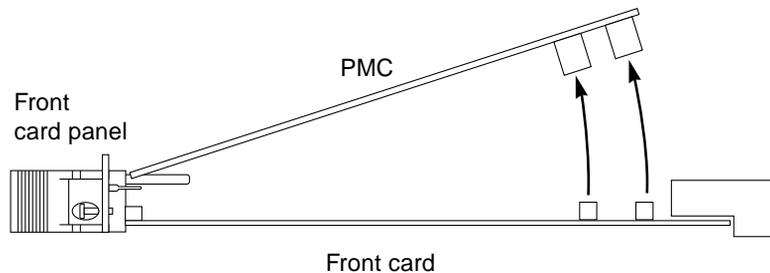
FIGURE 4-4   Removing the PMC From the Adapter (Side View)

4. **If necessary, reinstall a replacement PMC to the adapter.**

See "Installing the Optional PCI Mezzanine Card" on page 9 for more information.

To reinstall the adapter into the system, see "Replacing the Adapter" on page 56.

Replacing the Adapter

This procedure describes how to replace the adapter into a hot-swap server after removing it, and how to activate the Ethernet interfaces and SCSI controllers.

▼ To Replace the Adapter to the System

1. **If necessary, install the PMC in the adapter's PMC slot.**

See "Removing and Replacing a PMC" on page 54 for more information.

2. **Replace the adapter as documented in your system's service manual.**

Caution – You *must* follow the instructions outlined in your system's service manual for the replacement of I/O cards. If you do not follow the procedures in service manual, you may cause your system to panic.

▼ To Activate the Ethernet Interfaces and Configure the SCSI Devices

1. **Make sure that the Ethernet cables and the SCSI cables have been reconnected to the adapter.**

You should have connected these cables during the re-installation of the adapter. See FIGURE 4-1 and FIGURE 4-2 for the location of the adapter's cable connectors.

2. **If necessary, connect any PMC cable to the PMC.**

3. **Log in to the system as superuser.**

Refer to the system's documentation for the procedure.

4. **Use the** `ifconfig` **command to activate the adapter's Ethernet interfaces.**

   For each adapter interface, type the following commands, replacing *instance* with the interface's instance number and *IP-address* with the interface's IP address:

   ```
   # ifconfig qfeinstance plumb
   # ifconfig qfeinstance IP-address up
   ```

   For example, if you were using the adapter's `qfe0` interface, you would type:

   ```
   # ifconfig qfe0 plumb
   # ifconfig qfe0 IP-address up
   ```

   Note – For more information about configuring Solaris networks, refer to the *Solaris System Administration Guide*, Volumes 1 through 3, and the `ifconfig`(1M) man page. You can view these documents on the `http://docs.sun.com` web site.

5. **Make sure that any peripheral SCSI device connected to the adapter is powered on.**

6. **Use the** `cfgadm` **command to determine the attachment-point ID names of the adapter's SCSI controllers.**

   Each Sun Dual FastEthernet/SCSI 6U CompactPCI adapter with PMC contains two SCSI controllers. The Solaris SCSI hot-plug software will assign a unique attachment-point ID name to these SCSI controllers. You can use the `cfgadm` command to list the SCSI controllers on the system, including their attachment-point ID names.

   Note – For more information about the attachment-point ID names and the `cfgadm` command, refer to your system's service manual, the Solaris documentation, and the `cfgadm`(1M) man page.

   For example, to list all of the attachment points on a server, you can use the `cfgadm -al` command.

```
# cfgadm -al
Ap_Id                  Type          Receptacle    Occupant      Condition
c0                     scsi-bus      connected     configured    unknown
c0::dsk/c0t0d0         disk          connected     configured    unknown
c0::dsk/c0t1d0         disk          connected     configured    unknown
c1                     scsi-bus      connected     configured    unknown
c5                     scsi-bus      connected     configured    unknown
pci_pci0:cpci_slot2    unknown       empty         unconfigured  unknown
pci_pci0:cpci_slot3    unknown       disconnected  unconfigured  unknown
pci_pci0:cpci_slot4    unknown       disconnected  unconfigured  unknown
pci_pci0:cpci_slot5    unknown       empty         unconfigured  unknown
pci_pci0:cpci_slot6    stpcipci/fhs  connected     configured    ok
pci_pci0:cpci_slot7    stpcipci/fhs  connected     configured    ok
pci_pci0:cpci_slot8    stpcipci/fhs  connected     configured    ok
```

In this example, there are three SCSI controllers (scsi-bus). Their attachment-
point ID names (Ap_Id) are c0 for the server's SCSI controller and c1 and c5 for the
adapter's SCSI controllers.

You can also use the cfgadm -v command to list the physical device paths
(Phys_Id) of the attachment points on the server.

Using the output of these commands, you should be able to determine the adapter's
SCSI controller attachment-point ID name (c0, c1, c5, etc.). Refer to the
cfgadm(1M), cfgadm_pci(1M), and cfgadm_scsi(1M) man pages for more
information.

7. **Use the** cfgadm **command to configure the SCSI devices to the adapter's two SCSI
   controllers.**

   Replace *controller-ap-ID* with the SCSI controller's attachment-point ID name.

   ```
   # cfgadm -c configure controller-ap-ID
   ```

   For example, if the attachment-point ID names are c1 and c5, you would type:

   ```
   # cfgadm -c configure c1
   # cfgadm -c configure c5
   ```

8. **Use the** `devfsadm` **command to rebuild the device files in the** `/dev` **and** `/devices` **directories.**

If you have attached SCSI disk drives, CD-ROM drives, or DVD-ROM drives to the adapter's SCSI controller, type:

```
# devfsadm -c disk
```

If you have attached a tape drive to the adapter's SCSI controller, type:

```
# devfsadm -c tape
```

After using the `devfsadm` command, you will be able to use the devices you connected to the adapter's SCSI controller.

9. **If you disabled (stopped) the Solaris Volume Manager software prior to unconfiguring the adapter, restart the software now by typing:**

```
# /etc/init.d/volmgt start
```

10. **If you disabled any PMC software prior to unconfiguring the adapter, restart and configure the software now.**

Refer to the PMC software documentation for the procedure.

Specifications

This appendix defines the connector pin descriptions, describes the LED functions, and lists the specifications for the front and rear cable-access versions of the Sun Dual FastEthernet/SCSI 6U CompactPCI adapter with PMC.

This appendix contains the following sections:

Port Locations and Descriptions

FIGURE A-1 shows the two Ethernet port connectors and the two SCSI port connectors of both the rear-access and front-access versions of the Sun Dual FastEthernet/SCSI 6U CompactPCI adapter with PMC.
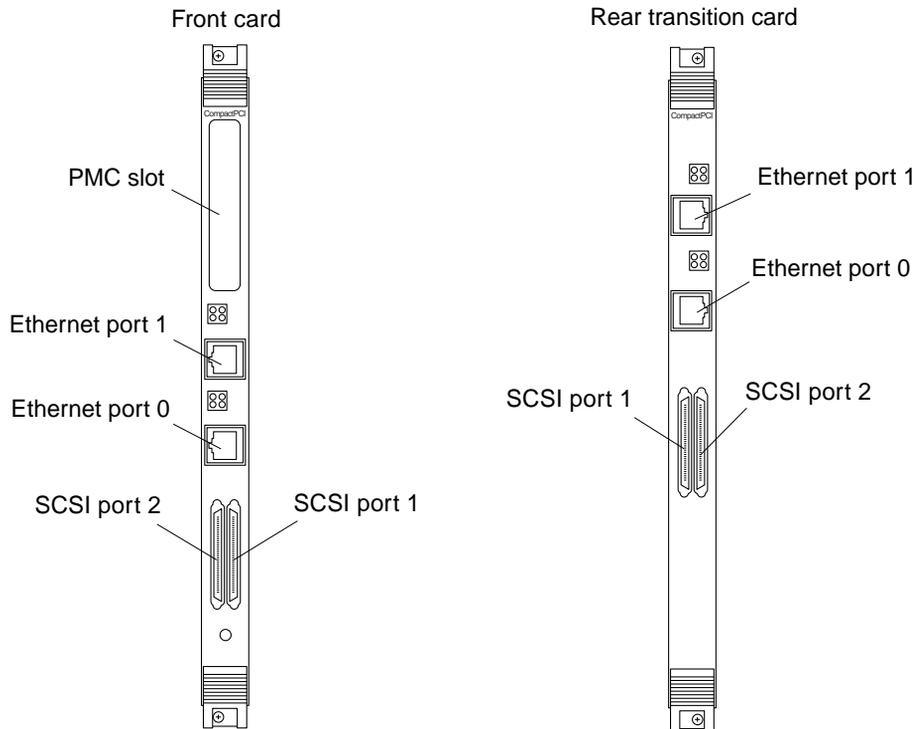
FIGURE A-1   Port Locations

Ethernet Port Pin Descriptions
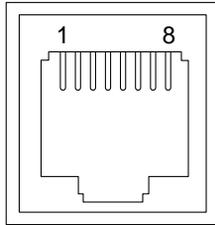
FIGURE A-2   Ethernet Connector Pins

TABLE A-1   Pin Descriptions for the Two 8-Pin RJ-45 Connectors (Ports 0 to 1)

Description	Port 0	Port 1
Not Used	1	1
Not Used	2	2
TD+	3	3
Not Used	4	4
TD–	5	5
RD+	6	6
RD–	7	7
Not Used	8	8

PMC Connector Pin Descriptions
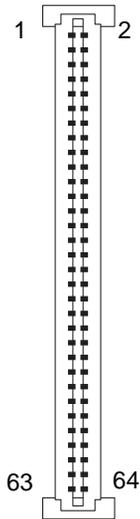
FIGURE A-3   PMC Connector Pins

TABLE A-2   PMC J1 Connector Pins

Pin	Signal	Pin	Signal
1	TCK	2	-12V
3	GND	4	INTA#
5	INTB#	6	INTC#
7	BUSMODE1#	8	+5V
9	INTD#	10	RSVD
11	GND	12	RSVD
13	PCI_CLK	14	GND
15	GND	16	GNT#
17	REQ#	18	+5V
19	+5V (VIO)	20	AD31
21	AD28	22	AD27
23	AD25	24	GND
25	GND	26	C/BE3#
27	AD22	28	AD21

TABLE A-2 PMC J1 Connector Pins *(Continued)*

Pin	Signal	Pin	Signal
29	AD19	30	+5V
31	+5V (VIO)	32	AD17
33	FRAME#	34	GND
35	GND	36	IRDY#
37	DEVSEL#	38	+5V
39	GND	40	LOCK[1]
41	SDONE#[1]	42	SBO#[1]
43	PAR	44	GND
45	+5V (VIO)	46	AD15
47	AD12	48	AD11
49	AD9	50	+5V
51	GND	52	C/BE0#
53	AD6	54	AD5
55	AD4	56	GND
57	+5V (VIO)	58	AD3
59	AD2	60	AD1
61	AD0	62	+5V
63	GND	64	REQ64#

1. These pins have 2K-Ohm resistor pull-up on the carrier board.

TABLE A-3 PMC J2 Connector Pins

Pin	Signal	Pin	Signal
1	+12V	2	TRST#
3	TMS	4	TDO
5	TDI	6	GND
7	GND	8	RSVD
9	RSVD	10	RSVD
11	BUSMODE2#	12	+3.3V
13	RST#	14	BUSMODE3#
15	+3.3V	16	BUSMODE4#

TABLE A-3 PMC J2 Connector Pins *(Continued)*

Pin	Signal	Pin	Signal
17	RSVD	18	GND
19	AD30	20	AD29
21	GND	22	AD26
23	AD24	24	+3.3V
25	IDSEL	26	AD23
27	+3.3V	28	AD20
29	AD18	30	GND
31	AD16	32	C/BE2#
33	GND	34	RSVD
35	TRDY#	36	+3.3V
37	GND	38	STOP#
39	PERR#	40	GND
41	+3.3V	42	SERR#
43	C/BE1#	44	GND
45	AD14	46	AD13
47	GND	48	AD10
49	AD8	50	+3.3V
51	AD7	52	RSVD
53	+3.3V	54	RSVD
55	RSVD	56	GND
57	RSVD	58	RSVD
59	GND	60	RSVD
61	ACK64#	62	+3.3V
63	GND	64	RSVD

TABLE A-4 PMC J3 Connector Pins

Pin	Signal	Pin	Signal
1	RSVD	2	GND
3	GND	4	C/BE7#
5	C/BE6#	6	C/BE5#

TABLE A-4 PMC J3 Connector Pins *(Continued)*

Pin	Signal	Pin	Signal
7	C/BE4#	8	GND
9	+5V (VIO)	10	PAR64
11	AD63	12	AD62
13	AD61	14	GND
15	GND	16	AD60
17	AD59	18	AD58
19	AD57	20	GND
21	+5V (VIO)	22	AD56
23	AD55	24	AD54
25	AD53	26	GND
27	GND	28	AD52
29	AD51	30	AD50
31	AD49	32	GND
33	GND	34	AD48
35	AD47	36	AD46
37	AD45	38	GND
39	+5V (VIO)	40	AD44
41	AD43	42	AD42
43	AD41	44	GND
45	GND	46	AD40
47	AD39	48	AD38
49	AD37	50	GND
51	GND	52	AD36
53	AD35	54	AD34
55	AD33	56	GND
57	+5V (VIO)	58	AD32
59	RSVD	60	RSVD
61	RSVD	62	GND
63	GND	64	RSVD

Single-Ended VHDCI SCSI Connector Pin Descriptions
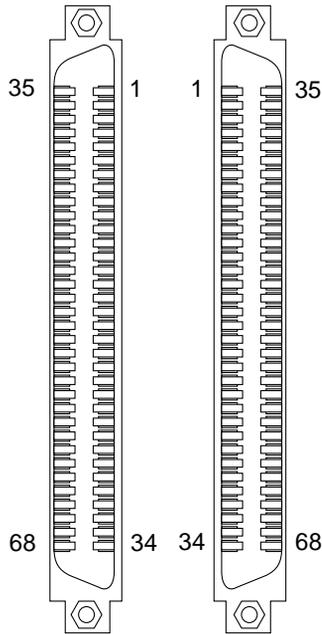
FIGURE A-4   VHDCI SCSI Connector Pins

TABLE A-5   Single-Ended VHDCI SCSI Connector Signals

Pin	Signal	Pin	Signal
1	SCSI_GND	35	SCSI_D<12>_
2	SCSI_GND	36	SCSI_D<13>_
3	SCSI_GND	37	SCSI_D<14>_
4	SCSI_GND	38	SCSI_D<15>_
5	SCSI_GND	39	SCSI_DATA_PARITY1_
6	SCSI_GND	40	SCSI_D<0>_
7	SCSI_GND	41	SCSI_D<1>_
8	SCSI_GND	42	SCSI_D<2>_
9	SCSI_GND	43	SCSI_D<3>_
10	SCSI_GND	44	SCSI_D<4>_

TABLE A-5 Single-Ended VHDCI SCSI Connector Signals *(Continued)*

Pin	Signal	Pin	Signal
11	SCSI_GND	45	SCSI_D<5>_
12	SCSI_GND	46	SCSI_D<6>_
13	SCSI_GND	47	SCSI_D<7>_
14	SCSI_GND	48	SCSI_DATA_PARITY0_
15	SCSI_GND	49	SCSI_GND
16	SCSI_GND	50	SCSI_GND
17	SCSI_TERMPOWER	51	SCSI_TERMPOWER
18	SCSI_TERMPOWER	52	SCSI_TERMPOWER
19	OPEN	53	OPEN
20	SCSI_GND	54	SCSI_GND
21	SCSI_GND	55	SCSI_ATN_
22	SCSI_GND	56	SCSI_GND
23	SCSI_GND	57	SCSI_BSY_
24	SCSI_GND	58	SCSI_ACK_
25	SCSI_GND	59	SCSI_RST_
26	SCSI_GND	60	SCSI_MSG_
27	SCSI_GND	61	SCSI_SEL_
28	SCSI_GND	62	SCSI_CD_
29	SCSI_GND	63	SCSI_REQ_
30	SCSI_GND	64	SCSI_IO_
31	SCSI_GND	65	SCSI_D<8>_
32	SCSI_GND	66	SCSI_D<9>_
33	SCSI_GND	67	SCSI_D<10>_
34	SCSI_GND	68	SCSI_D<11>_

Ethernet Interface LED Locations and Descriptions

Front card   Rear transition card

Ethernet
port 1 LED

Ethernet
port 0 LED

Ethernet
port 1 LED
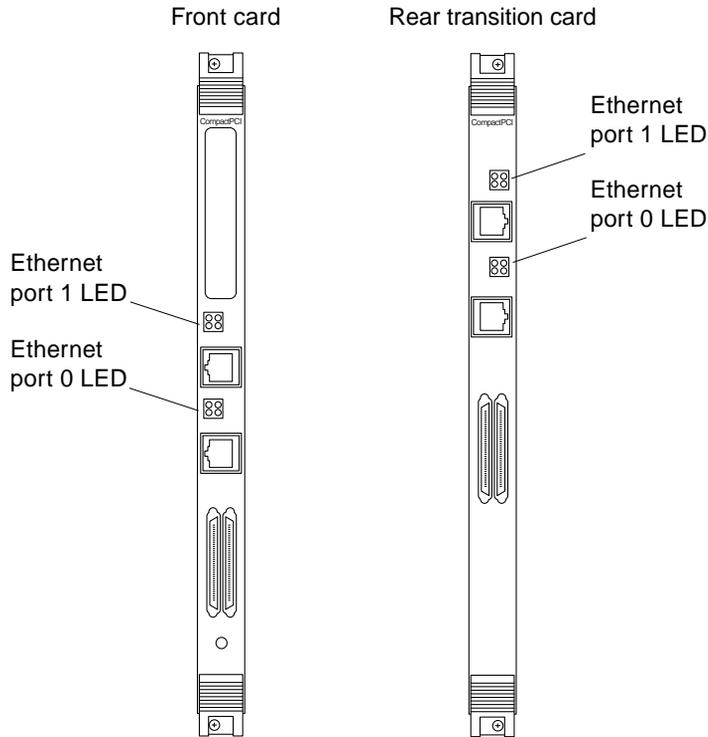
Ethernet
port 0 LED

FIGURE A-5   LED Locations

100   FDX

```
┌─────────────┐
│  ○       ○  │
│             │
│  ○       ○  │
└─────────────┘
```

ACT   LINK
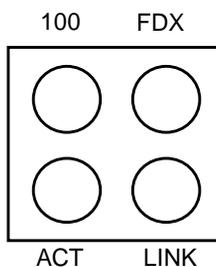
FIGURE A-6   Close-up of Ethernet LED Labels

TABLE A-6   Ethernet Interface LED Descriptions

Label	Light On/Off	Description
100	On	The interface is set at 100 Mbps.
	Off	The interface is set at 10 Mbps.
FDX	On	The interface is operating at full-duplex.
	Off	The interface is operating at half-duplex.
ACT	On	Transaction activities are present.
	Off	No transaction activities are present.
LINK	On	The interface is connected to the network.
	Off	The interface is not connected to the network.

Operation Specifications

TABLE A-7   Operation Specifications

Specification	Performance
Host interface	• 256-pin PBGA PCI-to-PCI bridge with a 64-bit primary and 32-bit secondary interface • Operates transparently in either 64-bit or 32-bit slots • Supports both 3.3V and 5V signalling environments • Fully compliant with PCI Local Bus Specification, Rev. 2.1
Network interface	100BASE-TX using Category 5 (data-grade) cable; 10BASE-T using Category 3 (voice-grade) cable or better Single UTP RJ-45 for both 10 and 100 Mbps per channel
Ethernet version	Conforms to IEEE 802.3u
Maximum Ethernet transfer rate	10/100 Mbps per channel
CompactPCI clock	33 MHz max.
CompactPCI data burst transfer rate	133 Mbps
CompactPCI data/address lines	AD63-0
CompactPCI bus interface	32- or 64 -bit interface at 33MHz
CompactPCI modes	Master/slave
SCSI synchronous transfer rate	20/40 Mbytes/sec
SCSI asynchronous transfer rate	Max. 12 Mbytes/sec 16-bit Max. 6 Mbytes/sec 8-bit
Transfer size	4 Gbytes max.
SCSI interface	Single-ended
SCSI bus parity	Yes
SCSI 8-bit bus devices	Yes
SCSI 16-bit bus devices	Yes
PMC interface	• 32- or 64-bit interface at 33MHz • 5V I/0 signalling • +5V, +3,3V, +/-12V inputs at 7.5 watts total power allocation

Physical Specifications

TABLE A-8   Physical Dimensions

Dimension	Front Card	Rear Transition Card
Length	233.35 mm (9.19 in.)	233.35 mm (9.19 in.)
Width	160 mm (6.3 in.)	80 mm (3.15 in.)
Height		
Primary component side	Meets the CompactPCI specs of 13.71 mm (0.54 in.)	Meets the CompactPCI specs of 13.71 mm (0.54 in.)
Back side	Meets the CompactPCI specs of 1.52 mm (0.06 in.)	Meets the CompactPCI specs of 1.52 mm (0.06 in.)
Weight	345.87 g (12.2 oz.)	206.95g (7.3 oz.)

Environmental Specifications

TABLE A-9   Environmental Specifications

Condition	Operating Specification	Nonoperating Specification
Temperature	-5˚ to 50˚C (23˚ to 122˚F)	-40˚ to 70˚C (-40˚ to 158˚F)
Relative humidity	5 to 95% RH noncondensing (maximum wet bulb temperature 40˚C)	95% RH noncondensing
Altitude	-392m to 4000m (-1,285 ft to 13,123 ft)	4000m (13,123 ft)
Shock	10g, 11 msec, 1/2 sine wave	100m drop
Vibration (sine)	0.2g, 5 to 500 Hz	1.5g, 5 to 500 Hz
Vibration (random)	Zone 4 Earthquake	0.01 g^2/Hz, 10 to 200 Hz 0.003 g^2/Hz, 200 to 2000 Hz

Power Requirements

TABLE A-10   Power Requirements

Specification	Measurement
Maximum power consumption	13.182 watts • 2.4A @ 5V • 300 mA @ 3.3V • 8 mA @ +12V • 8 mA @ -12V
Voltage tolerance	5V +/- 5% 3.3V +/- 5%
Ripple	Maximum 100 mV
Operational current	1.7A @ 5V, 200 mA @ 3.3V

Advanced Ethernet Interface Features

This appendix describes the procedures for activating the MAC addresses assigned to the network interfaces of the adapter and for booting the system over the adapter's Ethernet interface.

This appendix contains these sections:

- "Setting the `local-mac-address` Property" on page 75
- "Booting the System Over a Fast Ethernet Interface" on page 81

Setting the `local-mac-address` Property

Both of the network interfaces of the adapter have been assigned a unique medium access control (MAC) address, which represents the 48-bit Ethernet address for that network interface. The OpenBoot firmware reports this MAC address by means of the `local-mac-address` property in the device nodes corresponding to the network interfaces.

A system is not obligated to use this assigned MAC address if it has a system-wide MAC address. In such cases, the system-wide MAC address applies to all network interfaces on the system.

The device driver, or any other adapter utility, can use the network device's MAC address (`local-mac-address`) while configuring the device. A network interface's MAC address can be used when booting over the network.

The `mac-address` property of the network device specifies the network address (system-wide or `local-mac-address`) used for booting the system. To start using the MAC addresses assigned to the network interfaces of the adapter, set the NVRAM configuration variable `local-mac-address?` to `true`, as shown in the procedure below.

▼ To Set the `local-mac-address` Property to the Network Interfaces

Before starting this procedure, make sure that all network activity over the adapter's network interfaces has stopped.

1. **Log in to the system as superuser.**

   Refer to the system's documentation for the correct procedure. For example, if you are logging into a Netra ct series server, refer to the *Netra ct Server Service Manual.*

2. **At a terminal prompt, type the following command to set the property to true:**

   ```
   # eeprom local-mac-address\?=true
   ```

3. **Use the `ifconfig` command to stop all network activity traveling over the adapter's Ethernet interfaces.**

   For example, if you were using the adapter's two interfaces, and they were named `qfe0` and `qfe1`, you would type:

   ```
   # ifconfig qfe0 unplumb
   # ifconfig qfe1 unplumb
   ```

   Refer to the `ifconfig`(1M) man page and the Solaris documentation for more information about this command.

4. **If you have a removable media module (CD-ROM or DVD-ROM drive), type the following to disable the Solaris Volume Manager software daemon connected to the adapter SCSI connector.**

   ```
   # /etc/init.d/volmgt stop
   ```

   If you do not disable the Volume Manager software, the operating system will consider the removable media module as busy. With the device busy, the hot-swap procedure will fail.

5. **Use the** `cfgadm` **command to determine the attachment-point identification (ID) names of the adapter's SCSI controllers.**

Each Sun Dual FastEthernet/SCSI 6U CompactPCI adapter with PMC contains two SCSI controllers. (The adapter may have an additional SCSI controller if you installed a PMC with a SCSI port.) The Solaris SCSI hot-plug software will assign a unique attachment-point ID name to these SCSI controllers. You can use the `cfgadm` command to list the SCSI controllers on the system, including their attachment-point ID names.

Note – For more information about the attachment-point ID names and the `cfgadm` command, refer to your system's service manual, the Solaris documentation, and the `cfgadm`(1M) man page.

For example, to list all of the attachment points on a server, you can use the `cfgadm -al` command.

Note – The following `cfgadm` command output is an example. The output you see will vary depending on your server's hardware configuration.

```
# cfgadm -al
Ap_Id                 Type          Receptacle     Occupant      Condition
c0                    scsi-bus      connected      configured    unknown
c0::dsk/c0t0d0        disk          connected      configured    unknown
c0::dsk/c0t1d0        disk          connected      configured    unknown
c1                    scsi-bus      connected      configured    unknown
c1::dsk/c1t2d0        disk          connected      configured    unknown
c1::dsk/c1t3d0        disk          connected      configured    unknown
c1::dsk/c1t4d0        disk          connected      configured    unknown
c5                    scsi-bus      connected      configured    unknown
pci_pci0:cpci_slot2   unknown       empty          unconfigured  unknown
pci_pci0:cpci_slot3   unknown       disconnected   unconfigured  unknown
pci_pci0:cpci_slot4   unknown       disconnected   unconfigured  unknown
pci_pci0:cpci_slot5   unknown       empty          unconfigured  unknown
pci_pci0:cpci_slot6   stpcipci/fhs  connected      configured    ok
pci_pci0:cpci_slot7   stpcipci/fhs  connected      configured    ok
pci_pci0:cpci_slot8   stpcipci/fhs  connected      configured    ok
```

In this example, there are three SCSI controllers (`scsi-bus`). Their attachment-point ID names (`Ap_Id`) are `c0` for the server's SCSI controller and `c1` and `c5` for the adapter's SCSI controllers.

You can also use the `cfgadm -v` command to list the physical device paths (`Phys_Id`) of the attachment points on the server.

Using the output of these commands, you should be able to determine the adapter's SCSI controller attachment-point ID name (c0, c1, c5, etc.). Refer to the cfgadm(1M), cfgadm_pci(1M), and cfgadm_scsi(1M) man pages for more information.

6. **Use the** cfgadm **command to unconfigure the adapter's two SCSI controllers.**

   In the following command, replace *controller-ap-ID* with the SCSI controller's attachment-point ID.

   ```
   # cfgadm -c unconfigure controller-ap-ID
   ```

   For example, if the attachment-point IDs are c1 and c5, you would type:

   ```
   # cfgadm -c unconfigure c1
   # cfgadm -c unconfigure c5
   ```

   Note – If any hard disk drives with mounted partitions are connected to the adapter's SCSI controller, the cfgadm command will list these partitions in an error message (see the following example). If no hard drive partitions are mounted to the server, go to Step 8.

   If any hard drives partitions are mounted to the server, you will receive an error message similar to the following after entering the cfgadm -c unconfigure command:

   ```
   # cfgadm -c
   cfgadm: Component system is busy, try again: failed to offline:
   /devices/pci@1f,0/pci@1/pci@1/pci@d/SUNW,isptwo@4
        Resource                  Information
   -----------------  ----------------------------
   /dev/dsk/c2t4d0s0   mounted filesystem "/coyo_4"
   /dev/dsk/c2t2d0s0   mounted filesystem "/coyo_2"
   ```

7. **If necessary, use the Solaris** umount**(1M) command to unmount the partitions.**

   For example, for every file system that was listed in the cfgadm message, you would type:

   ```
   # umount filesystem
   ```

   Replace *filesystem* with the file system that you want to unmount.

For example, if the file system is /coyo_4, you would type:

```
# umount /coyo_4
```

Once these partitions have been unmounted, use the cfgadm command (as shown in Step 6) to unconfigure the adapter's SCSI controller.

8. **If necessary, disable any software being used by the PMC.**

   Refer to the PMC's documentation for the procedure.

9. **Disconnect and unconfigure the adapter from the system using the appropriate basic hot-swap command.**

   The command and usage may be unique to different systems, so refer to your system's service manual for the appropriate procedure.

   The following example is for a Netra ct series system with a Sun Dual FastEthernet/SCSI 6U CompactPCI adapter with PMC installed in the second CompactPCI slot (with the pci_pci0:cpci_slot2 attachment-point ID):

```
# cfgadm -c unconfigure pci_pci0:cpci_slot2
# cfgadm -c disconnect pci_pci0:cpci_slot2
```

10. **To make the adapter's network interfaces use the local MAC addresses, connect and configure the adapter to the system using the appropriate basic hot-swap command.**

    The command and usage may be unique to different systems, so refer to your system's service manual for the appropriate procedure.

    The following example is for a Netra ct series system with a Sun Dual FastEthernet/SCSI 6U CompactPCI adapter with PMC installed in the second CompactPCI slot (with the pci_pci0:cpci_slot2 attachment point ID):

```
# cfgadm -c connect pci_pci0:cpci_slot2
# cfgadm -c configure pci_pci0:cpci_slot2
```

11. **Use the** `ifconfig` **command to activate the adapter's Ethernet interfaces.**

For each adapter interface, type the following commands, replacing *instance* with the interface's instance number and *IP-address* with the interface's IP address:

```
# ifconfig qfeinstance plumb
# ifconfig qfeinstance IP-address up
```

For example, if you were using the adapter's `qfe0` interface, you would type:

```
# ifconfig qfe0 plumb
# ifconfig qfe0 IP-address up
```

The adapter's network interfaces should now be using the unique MAC addresses.

12. **Use the** `ifconfig -a` **command to verify that the unique local MAC addresses have been set.**

For example, type:

```
# ifconfig -a
qfe0: flags=1000843<UP,BROADCAST,RUNNING,MULTICAST,IPv4> mtu 1500 index 3
    inet 200.200.10.20 netmask ffffff00 broadcast 200.200.10.255
    ether 8:0:20:e1:d2:ca
```

The `ether` entry shows that the local MAC address for the `qfe0` is set at `8:0:20:e1:d2:ca`.

13. **Use the** `cfgadm` **command to configure the SCSI devices to the adapter's two SCSI controllers.**

Replace *controller-ap-ID* with the SCSI controller's attachment-point ID name.

```
# cfgadm -c configure controller-ap-ID
```

For example, if the attachment-point IDs are `c1` and `c5`, you would type:

```
# cfgadm -c configure c1
# cfgadm -c configure c5
```

14. **If you disabled (stopped) the Solaris Volume Manager software prior to unconfiguring the adapter, restart the software now by typing:**

```
# /etc/init.d/volmgt start
```

15. **If you disabled any PMC software prior to unconfiguring the adapter, restart the software now.**

Refer to the PMC software documentation for the procedure.

Booting the System Over a Fast Ethernet Interface

Perform the following procedure to use a Sun Dual FastEthernet/SCSI 6U CompactPCI adapter with PMC Ethernet interface as the boot device.

▼ To Boot the System Over the Network

1. **Make sure that all significant application activity on the server has stopped.**

2. **Follow the appropriate procedures, as documented in the system's service manual, to shut down and halt the system.**

Refer to the system's documentation for the complete shutdown procedure. For example, if you were shutting down a Netra ct server, you would refer to the *Netra ct Server Service Manual*.

After shutting down the system, you should see the OpenBoot PROM ok prompt on the system console.

3. **At the** ok **prompt, type** show-nets **to list the network devices on your system.**

   You should see the full path name of the qfe devices, similar to the following example:

   ```
   ok show-nets
   a) /pci@1f,0/pci@1/pci@1/pci@e/SUNW,hme@0,1
   b) /pci@1f,0/pci@1/pci@1/pci@d/SUNW,qfe@1,1
   c) /pci@1f,0/pci@1/pci@1/pci@d/SUNW,qfe@0,1
   d) /pci@1f,0/pci@1/pci@1/pci@b/SUNW,hme@0,1
   e) /pci@1f,0/pci@1/pci@1/pci@a/SUNW,hme@0,1
   f) /pci@1f,0/pci@1,1/network@3,1
   g) /pci@1f,0/pci@1,1/network@1,1
   q) NO SELECTION
   Enter Selection, q to quit:
   ```

4. **Select the** qfe **device that you want to use as a boot device.**

   Using the show-nets command, select the letter of the device you want to use. For example:

   ```
   Enter Selection, q to quit: b
   /pci@1f,0/pci@1/pci@1/pci@d/SUNW,qfe@1,1 has been selected.
   Type ^Y ( Control-Y ) to insert it in the command line.
   e.g. ok nvalias mydev ^Y
            for creating devalias mydev for
   /pci@1f,0/pci@1/pci@1/pci@d/SUNW,qfe@1,1
   ```

   Note – You can select only one of these qfe devices for booting.

   ---

5. **At the** ok **prompt, type the** boot **command and press the Control-Y key sequence to paste the full path name of the selected** qfe **device.**

   You can either type boot and the full path name to the qfe device, or you can type boot and press the Control-Y key sequence. In this example, the Control-Y key sequence would be replaced by:

   ```
   ok boot /pci@1f,0/pci@1/pci@1/pci@d/SUNW,qfe@1,1
   ```

6. **Press the Return key to boot the system over the** qfe **device.**

Configuring the Sun Quad FastEthernet Device Driver Parameters

The qfe(1M) device driver controls the two Sun Dual FastEthernet/SCSI 6U CompactPCI adapter with PMC SUNW,qfe Ethernet devices. You can manually set the qfe device driver parameters to customize the SUNW,qfe devices in your system. This appendix lists the available qfe device driver parameters and describes how you can set these parameters.

This appendix contains these sections:

- "Sun Quad FastEthernet Device Driver Parameters" on page 84
- "Setting the qfe Device Driver Parameters" on page 91

Note – The configuration procedures in this chapter were correct at the time this manual was printed. You should always refer to the *Platform Notes: The Sun Quad FastEthernet Device Driver* document for the latest configuration procedures for your system's version of the Solaris operating environment. You can view this document on the http://docs.sun.com web site.

Sun Quad FastEthernet Device Driver Parameters

This section describes the hardware overview of the local transceiver used in the adapter and defines the `qfe` device driver parameters.

Hardware Overview

The two `SUNW,qfe` channels each provide 10BASE-T or 100BASE-TX networking interfaces using the PCI Fast Ethernet and expansion (PFEX) ASIC and a local transceiver. The device driver automatically sets the link speed to 10 or 100 Mbps and conforms to the 100BASE-T IEEE 802.3u Ethernet standard. The PFEX ASIC provides the PCI interface and medium access control (MAC) functions. The local transceiver, which connects to an RJ-45 connector, provides the physical-layer functions.

The local transceiver is capable of all of the following operating speeds and modes:

■ 100 Mbps, full-duplex
■ 100 Mbps, half-duplex
■ 10 Mbps, full-duplex
■ 10 Mbps, half-duplex

The local transceiver performs autonegotiation with the remote end of the link (the link partner) to select a common mode of operation. See "Autonegotiation Protocol" on page 36 for more information.

The local transceiver also supports a forced mode of operation. You can set the speed and mode using the `ndd` utility, or, to ensure that the changes persist after a system reboot, you can create a `qfe.conf` file. See "Setting the `qfe` Device Driver Parameters" on page 91 for more information about setting driver parameters.

Device Driver Parameter Values and Definitions

TABLE C-1 lists the `qfe` device driver parameters.

TABLE C-1 `qfe` Driver Parameters, Status, and Descriptions

Parameter	Status	Description
transceiver_inuse	Read only	Defines the current status
link_status	Read only	Defines the current status
link_speed	Read only	Defines the current status
link_mode	Read only	Defines the current status
ipg1	Read and write	Interpacket gap parameter
ipg2	Read and write	Interpacket gap parameter
use_int_xcvr	Read and write	Operational mode parameter
pace_size	Read and write	Operational mode parameter
adv_autoneg_cap	Read and write	Operational mode parameter
adv_100fdx_cap	Read and write	Operational mode parameter
adv_100hdx_cap	Read and write	Operational mode parameter
adv_10fdx_cap	Read and write	Operational mode parameter
adv_10hdx_cap	Read and write	Operational mode parameter
autoneg_cap	Read only	Local transceiver autonegotiation capability
100fdx_cap	Read only	Local transceiver capability of the hardware
100hdx_cap	Read only	Local transceiver capability of the hardware
10fdx_cap	Read only	Local transceiver capability of the hardware
10hdx_cap	Read only	Local transceiver capability of the hardware
lp_autoneg_cap	Read only	Link partner autonegotiation capability
lp_100fdx_cap	Read only	Link partner capability
lp_100hdx_cap	Read only	Link partner capability
lp_10fdx_cap	Read only	Link partner capability
lp_10hdx_cap	Read only	Link partner capability
instance	Read and write	Device instance
lance_mode	Read and write	Additional delay before transmitting a packet
ipg0	Read and write	Additional delay before transmitting a packet

Parameters That Define the Current Status

The read-only parameters described in TABLE C-2 explain the operational mode of the interface. The following parameters display the current status of an interface.

TABLE C-2   Read-Only Parameters That Define the Current Status

Parameter	Description
link_status	Current link status 0 = Link down 1 = Link up
link_speed	Current link speed (valid only if the link is up) 0 = 10 Mbps 1 = 100 Mbps
link_mode	Current link mode (valid only if the link is up) 0 = Half duplex 1 = Full duplex

Interpacket Gap Parameters

The adapter's PCI Fast Ethernet and expansion (PFEX) ASIC supports programmable interpacket gap (IPG) parameters ipg1 and ipg2. The total IPG is the sum of ipg1 and ipg2. The total IPG is 9.6 microseconds when the link speed set by the autonegotiation protocol is 10 Mbps. When the link speed is 100 Mbps, the total IPG is 0.96 microseconds.

TABLE C-3 lists the default values and allowable values for the IPG parameters ipg1 and ipg2.

TABLE C-3   Read-Write Interpacket Gap Parameter Values and Descriptions

Parameter	Values (Byte-time)	Description
ipg1	0 to 255	ipg1 = 8 (default at initialization)
ipg2	0 to 255	ipg2 = 4 (default at initialization)

By default, the driver sets ipg1 to 8-byte time and ipg2 to 4-byte time, which are the standard values. (Byte time is the time it takes to transmit 1 byte on the link, with a link speed of either 100 Mbps or 10 Mbps.)

If your network has systems that use longer IPG (the sum of ipg1 and ipg2), and if those systems seem to be slow when accessing the network, increase the values of ipg1 and ipg2 to match the longer IPGs of the other systems.

Defining an Additional Delay Before Transmitting a Packet

The adapter's PFEX ASIC supports a programmable mode called *local area network controller for Ethernet* (*LANCE*) mode, which is set with the lance_mode parameter.

When a driver receives a packet with lance_mode enabled (the default), it adds an additional time delay before transmitting the packet. This delay, set by the ipg0 parameter, is in addition to the delay set by the ipg1 and ipg2 parameters. The additional ipg0 delay helps to reduce collisions.

If lance_mode is disabled, the value of ipg0 is ignored and no additional delay is set. Only the delays set by ipg1 and ipg2 are used. Disable lance_mode if other systems keep sending a large number of back-to-back packets. Systems that have lance_mode enabled might not have enough time to transmit a large number of back-to-back packets on the network.

You can add an additional delay by setting the ipg0 parameter to a value from 0 to 31, which is the nibble time delay. Note that nibble time is the time it takes to transfer 4 bits on the link. If the link speed is 10 Mbps, the nibble time is equal to 400 ns. If the link speed is 100 Mbps, the nibble time is equal to 40 ns.

For example, if the link speed is 10 Mbps, and you set ipg0 to 20, multiply 20 by 400 ns to get 8000 ns. If the link speed is 100 Mbps, and you set ipg0 to 30, you would multiply 30 by 40 ns to get 1200 ns.

TABLE C-4 defines the lance_mode and ipg0 parameters.

TABLE C-4   Parameters Defining lance_mode and ipg0

Parameter	Values	Description
lance_mode	0 1	0 = lance_mode disabled 1 = lance_mode enabled (default)
ipg0	0 to 31	Additional media byte time delay before transmitting a packet (after receiving a packet)

Note – The default value of ipg0 is 16, which is 6.4 microseconds for 10 Mbps and 0.64 microseconds for 100 Mbps.

Operational Mode Parameters

TABLE C-5 describes the operational mode parameters and their default values.

TABLE C-5   Operational Mode Parameters

Parameter	Description
adv_autoneg_cap	Local transceiver capability advertised by the hardware 0 = Forced mode 1 = Autonegotiation (default)
adv_100fdx_cap	Local transceiver capability advertised by the hardware; read/write parameter 0 = Not 100 Mbit/sec full-duplex capable 1 = 100 Mbit/sec full-duplex capable (default)
adv_100hdx_cap	Local transceiver capability advertised by the hardware; read/write parameter 0 = Not 100 Mbit/sec half-duplex capable 1 = 100 Mbit/sec half-duplex capable (default)
adv_10fdx_cap	Local transceiver capability advertised by the hardware; read/write parameter 0 = Not 10 Mbit/sec full-duplex capable (default) 1 = 10 Mbit/sec full-duplex capable
adv_10hdx_cap	Local transceiver capability advertised by the hardware; read/write parameter 0 = Not 10 Mbit/sec half-duplex capable 1 = 10 Mbit/sec half-duplex capable (default)

Note – The priority (in descending order) for these parameters is:
adv_100fdx_cap, adv_100hdx_cap, adv_10fdx_cap, and adv_10hdx_cap.

Defining the Number of Back-to-Back Packets to Transmit

The `pace_size` parameter (see TABLE C-6) defines the maximum number of back-to-back packets you can transmit at one time. If the value is zero, there will be no limit to the number of back-to-back packets that can be transmitted.

TABLE C-6   Back-to-Back Packet Transmission Capability

Parameter	Values
pace_size	1 to 255 = The number of back-to-back packets transmitted at one time 0 = No limit to the number of back-to-back packets that can be transmitted (default)

Parameters That Report Transceiver Capabilities

TABLE C-7 describes the read-only transceiver capabilities. These parameters define the capabilities of the local transceiver.

TABLE C-7   Read-Only Transceiver Capabilities

Parameter	Description
autoneg_cap	Local transceiver capability of the hardware 0 = Not capable of autonegotiation 1 = Autonegotiation capable
100fdx_cap	Local transceiver capability of the hardware; initialized at startup 0 = Not 100 Mbit/sec full-duplex capable 1 = 100 Mbit/sec full-duplex capable
100hdx_cap	Local transceiver capability of the hardware; initialized at startup 0 = Not 100 Mbit/sec half-duplex capable 1 = 100 Mbit/sec half-duplex capable
10fdx_cap	Local transceiver capability of the hardware; initialized at startup 0 = Not 10 Mbit/sec full-duplex capable 1 = 10 Mbit/sec full-duplex capable
10hdx_cap	Local transceiver capability of the hardware; initialized at startup 0 = Not 10 Mbit/sec half-duplex capable 1 = 10 Mbit/sec half-duplex capable

Parameters That Report the Link Partner Capabilities

TABLE C-8 describes the read-only link partner capabilities.

TABLE C-8 Read-Only Link Partner Capabilities

Parameter	Values
lp_autoneg_cap	0 = No autonegotiation 1 = Autonegotiation
lp_100fdx_cap	0 = No 100 Mbit/sec full-duplex transmission 1 = 100 Mbit/sec full-duplex
lp_100hdx_cap	0 = No 100 Mbit/sec half-duplex transmission 1 = 100 Mbit/sec half-duplex
lp_10fdx_cap	0 = No 10 Mbit/sec full-duplex transmission 1 = 10 Mbit/sec full-duplex
lp_10hdx_cap	0 = No 10 Mbit/sec half-duplex transmission 1 = 10 Mbit/sec half-duplex

If the link partner is *not* capable of autonegotiation (when lp_autoneg_cap is 0), the information described in TABLE C-8 is not relevant, and the parameter value equals 0.

If the link partner *is* capable of autonegotiation (when lp_autoneg_cap is 1), the speed and mode information are displayed when you use autonegotiation and get the link partner capabilities.

Setting the `qfe` Device Driver Parameters

This section describes how to set the `qfe` device driver parameters in two ways:

- Using the `ndd` utility
- Using the `qfe.conf` file

To set device driver parameters dynamically while the system is running, use the `ndd` utility. For example, on a hot-swap system, you can use the `ndd` utility to display and set parameters for `qfe` devices without rebooting the system. However, if you reboot the system, or if the system shuts down, the parameters revert back to their default settings. Using the `ndd` utility is a good way to display the current configuration and to test different parameter settings.

To set parameters for a single `qfe` device (or a subset of `qfe` devices) in the system permanently, set the parameters in the `/kernel/drv/qfe.conf` file. While the parameters values set in the `qfe.conf` file persist after the system is rebooted, you do not need to reboot the system in order for the parameter changes to take effect. You can use your system's hot-swap commands to apply the `qfe.conf` changes to the `qfe` devices.

Using the `ndd` Utility to Set and Display Parameters

The following sections describe how you can use the `ndd` utility to modify (with the `-set` option) or display (without the `-set` option) the parameters for each `SUNW,qfe` device.

▼ To Specify the Device Instance for the `ndd` Utility

Before you use the `ndd` utility to display or set a parameter for a `qfe` device, you must specify the device instance number for the utility, because there will be at least two `SUNW,qfe` devices. You can find the instance numbers of the `qfe` devices in the `/etc/path_to_inst` file.

1. **Check the** `/etc/path_to_inst` **file to identify the instance number associated with a particular** `SUNW,qfe` **device.**

   For example:

   ```
   # grep qfe /etc/path_to_inst
   "/pci@1f,0/pci@1/pci@1/pci@a/SUNW,qfe@1,1" 1 "qfe"
   "/pci@1f,0/pci@1/pci@1/pci@a/SUNW,qfe@2,1" 2 "qfe"
   ```

   In the preceding example, the two `SUNW,qfe@x,1` instances are from a Sun Dual FastEthernet/SCSI 6U CompactPCI adapter with PMC. For clarity, the instance numbers are shown in boldface type.

2. **Use the** `ndd` **command to select the** `SUNW,qfe` **device using the instance number.**

   ```
   # ndd -set /dev/qfe instance instance-number
   ```

   The device instance will remain selected until you change the selection.

Using the `ndd` Utility in Noninteractive and Interactive Modes

You can use the `ndd` utility in two modes:

- Noninteractive
- Interactive

In the noninteractive mode, you can invoke the utility to set or display a single device driver parameter. Once you execute the `ndd` command, the utility will exit back to the terminal prompt. In the interactive mode, you can display or set more than one driver parameter value using the utility's prompt. Refer to the `ndd`(1M) man page for more information about using the `ndd` utility.

Using the ndd *Utility in Noninteractive Mode*

This section describes how to modify a parameter value and how to display a parameter value using the ndd utility in noninteractive mode.

● **To modify a parameter value, use the** -set **option.**

If you invoke the ndd utility with the -set option, the utility will set the specified device driver *parameter* to *value*:

```
# ndd -set /dev/qfe parameter value
```

For example, if you want to disable LANCE mode, you would type:

```
# ndd -set /dev/qfe lance_mode 0
```

● **To display the value of a parameter, specify the parameter name, omitting the** -set **option.**

When you omit the -set option (and omit the parameter *value*), the utility assumes that you want to display the current parameter value.

```
# ndd /dev/qfe parameter
```

For example, if you wanted view the link speed of the device, you would type:

```
# ndd /dev/qfe link_speed
1
```

In the preceding example, the link speed is set to 100 Mbps.

● **To list all the parameters supported by the** `qfe` **driver, type** `ndd /dev/qfe \?` **at a terminal prompt.**

```
# ndd /dev/qfe \?
?                            (read only)
transceiver_inuse            (read only)
link_status                  (read only)
link_speed                   (read only)
link_mode                    (read only)
ipg1                         (read and write)
ipg2                         (read and write)
use_int_xcvr                 (read and write)
pace_size                    (read and write)
adv_autoneg_cap              (read and write)
adv_100fdx_cap               (read and write)
adv_100hdx_cap               (read and write)
adv_10fdx_cap                (read and write)
adv_10hdx_cap                (read and write)
autoneg_cap                  (read only)
100fdx_cap                   (read only)
100hdx_cap                   (read only)
10fdx_cap                    (read only)
10hdx_cap                    (read only)
lp_autoneg_cap               (read only)
lp_100fdx_cap                (read only)
lp_100hdx_cap                (read only)
lp_10fdx_cap                 (read only)
lp_10hdx_cap                 (read only)
instance                     (read and write)
lance_mode                   (read and write)
ipg0                         (read and write)
#
```

Using the `ndd` *Utility in Interactive Mode*

● **To modify a parameter value in interactive mode, start the utility as shown below.**

The `ndd` utility prompts for the name of a parameter:

```
# ndd /dev/qfe
name to get/set? (Enter the parameter name or ? to view all parameters)
```

After you type the parameter name, the `ndd` utility prompts for the parameter value. For example, if you want to disable LANCE mode, you would type:

```
# ndd /dev/qfe
name to get/set ? lance_mode
value ? 0
name to get/set ? q
#
```

● **To display a parameter value, start the `ndd` utility, type a parameter name, and press the Return key until the value is displayed.**

Press the Return key at the `value` and `length` prompts to display the current value of a selected parameter. For example, to display the value of the `lance_mode` parameter, you would type:

```
# ndd /dev/qfe
name to get/set ? lance_mode
value ?
length ?
0
name to get/set ?
```

● **Type** `q` **to exit interactive mode.**

```
name to get/set ? q
#
```

▼ To Set Forced Mode and Disable Autonegotiation

This procedure describes how to force a network speed over an interface (forced mode) and to disable autonegotiation.

1. **Use the** ndd **utility to select the** qfe **instance that you want to set.**

```
# ndd -set /dev/qfe instance instance-number
```

This procedure describes how to force a network speed over an interface (forced mode) and to disable autonegotiation.

See "To Specify the Device Instance for the ndd Utility" on page 91 for more information.

2. **Select one of the four operational mode parameters (**adv_100fdx_cap**,** adv_100hdx_cap**,** adv_10fdx_cap**, or** adv_10hdx_cap**), and use the** ndd **utility to set its value to 1.**

For example, to set the 10 Mbps, half-duplex mode, you would set the adv_10hdx_cap parameter to 1.

```
# ndd -set /dev/qfe adv_10hdx_cap 1
```

If you set more than one of the operational mode parameters to 1, the driver will select the mode that is highest in the priority order (see "Operational Mode Parameters" on page 88 for more information).

3. **Use the** ndd **utility to disable autonegotiation by setting the** adv_autoneg_cap **parameter to 0.**

```
# ndd -set /dev/qfe adv_autoneg_cap 0
```

▼ To Enable Autonegotiation Using the `ndd` Utility

This section describes how to set at least one of the four operational modes and enable autonegotiation. See "Autonegotiation Protocol" on page 36 for more information about the autonegotiation and operational modes.

1. **Use the** `ndd` **utility to select the** `qfe` **instance that you want to set.**

   ```
   # ndd -set /dev/qfe instance instance-number
   ```

   See "To Specify the Device Instance for the `ndd` Utility" on page 91 for more information.

2. **Select** *at least one* **of the four operational mode parameters (**`adv_100fdx_cap`**,** `adv_100hdx_cap`**,** `adv_10fdx_cap`**,** `adv_10hdx_cap`**) that you want to advertise to the remote link partner, and set its value to 1.**

   For example, to make the interface advertise a 10 Mbps, full-duplex mode, you would type:

   ```
   # ndd -set /dev/qfe adv_10fdx_cap 1
   ```

3. **Use the** `ndd` **utility to enable autonegotiation mode by setting the** `adv_autoneg_cap` **parameter to 1.**

   ```
   # ndd -set /dev/qfe adv_autoneg_cap 1
   ```

Using the `qfe.conf` File to Set Parameters

To set the `qfe` driver parameters for `qfe` devices so that the parameter variables stay in effect after rebooting the system, create a `qfe.conf` file in your system's `/kernel/drv` directory.

You can also create a `qfe.conf` file when you need to set parameters for a specific `qfe` device in the system. The parameters you set are *read and write* parameters listed in "Device Driver Parameter Values and Definitions" on page 85, and in TABLE C-9.

TABLE C-9   `qfe.conf` File Parameters

`qfe` **Driver Parameter**	**Description**
`ipg1`	Interpacket gap delay parameter
`ipg2`	Interpacket gap delay parameter
`use_int_xcvr`	Force the use of the internal transceiver
`pace_size`	Set the maximum number of back-to-back packets that can be transmitted at one time
`adv_autoneg_cap`	Advertise to the link partner whether or not the local transceiver is capable of autonegotiation
`adv_100fdx_cap`	Advertise to the link partner whether or not the local transceiver is capable of 100 Mbps, full-duplex
`adv_100hdx_cap`	Advertise to the link partner whether or not the local transceiver is capable of 100 Mbps, half-duplex
`adv_10fdx_cap`	Advertise to the link partner whether or not the local transceiver is capable of 10 Mbps, full-duplex
`adv_10hdx_cap`	Advertise to the link partner whether or not the local transceiver is capable of 10 Mbps, half-duplex
`lance_mode`	Allow an additional interpacket gap delay to be set by the `ipg0` parameter
`ipg0`	Additional interpacket gap delay parameter

The man pages for `prtconf`(1M), `system`(4), and `driver.conf`(4) include additional details about driver configuration files.

▼ To Set Driver Parameters by Creating a `qfe.conf` File

1. **Log in to the system.**

   Refer to the server's documentation for the procedure.

2. **Obtain the hardware path names for the `qfe` devices in the device tree.**

   The path names and the associated instance numbers are in the `/etc/path_to_inst` file.

   ```
   # grep qfe /etc/path_to_inst
   "/pci@1f,0/pci@1/pci@1/pci@a/SUNW,qfe@0,1" 0 "qfe"
   "/pci@1f,0/pci@1/pci@1/pci@a/SUNW,qfe@1,1" 1 "qfe"
   ```

   In the preceding lines:

   - The first part within the double quotes specifies the hardware node name in the device tree.
   - The second number is the instance number.
   - The last part in the double quotation marks is the driver name.
   - In the device path name, the last component after the last `/` character and before the `@` character is the device name.
   - The path name before the last component is the parent name.
   - The comma-separated numbers after the `@` character at the end represent the device and function numbers, which are together referred to as the unit-address.

   To identify a `qfe` device unambiguously in the `qfe.conf` file, use the name, the parent name, and the unit-address for the device. Refer to the `pci`(4) man page for more information about the PCI device specification.

   In the first line of the previous example:

   - Name = `SUNW,qfe`
   - Parent = `/pci@1f,0/pci@1/pci@1/pci@a`
   - Unit-address = `0,1`

   In the second line of the previous example:

   - Name = `SUNW,qfe`
   - Parent = `/pci@1f,0/pci@1/pci@1/pci@a`
   - Unit-address = `1,1`

3. **Using a text editor, create a `/kernel/drv/qfe.conf` file.**

4. Add entries to the `qfe.conf` **file that follow this format:**

```
name="name" parent="parent" unit-address="address" parameter=value;
```

For example, to set the `ipg1` and `ipg2` parameters for the two devices listed in Step 2, you would add these lines:

```
name= "SUNW,qfe" parent="/pci@1f,0/pci@1/pci@1/pci@a" unit-address="0,1" ipg1=20 ipg2=10;
name= "SUNW,qfe" parent="/pci@1f,0/pci@1/pci@1/pci@a" unit-address="1,1" ipg1=20 ipg2=10;
```

5. Save the `qfe.conf` **file.**

After editing the `qfe.conf` file, you can either reboot the system or use a hot-swap command to disconnect and connect the interface to the system. For example, the `cfgadm` command used by the Netra ct systems will access the `qfe.conf` file when it attaches the `qfe` devices to the system. See your system's documentation for more information about using hot-swap commands.

Testing the Adapter

This appendix describes how to test the adapter using either the SunVTS diagnostic application or the onboard FCode self-test.

This appendix contains the following sections:

- "Using the SunVTS Diagnostic Software" on page 102
- "Using the OpenBoot PROM FCode Self-Test" on page 103

Using the SunVTS Diagnostic Software

The SunVTS software executes multiple diagnostic hardware tests from a single user interface. It is used to verify the configuration and functionality of most hardware controllers and devices. The SunVTS software operates primarily from a user interface that enables you to set test parameters while diagnostic operations are being performed.

The SunVTS `nettest` diagnostic can be used to test all of the networking interfaces on the system, including the interfaces on the adapter. Besides the `nettest`, `disktest` is designed to test the specific SCSI devices that you may have connected to your adapter.

To use the `nettest` and `disktest` diagnostics, you must have the SunVTS software installed on your system. Refer to the *Solaris on Sun Hardware Platform Guide* for SunVTS installation instructions.

Refer to the SunVTS documentation (listed in TABLE D-1) for instructions on how to run and monitor the `nettest` and `disktest` diagnostics. These SunVTS documents are available on the *Solaris on Sun Hardware Collection*, which is provided on the Solaris Supplement CD for the Solaris release on your system. You can also view these documents on the `http://docs.sun.com` web site.

TABLE D-1 SunVTS Documentation

Title	Description
SunVTS User's Guide	Describes the SunVTS diagnostic environment
SunVTS Test Reference Manual	Describes each SunVTS test (including `nettest` and `disktest`) and describes the various test options and command-line arguments
SunVTS Quick Reference	Provides an overview of the user interface

Using the OpenBoot PROM FCode Self-Test

The Sun Dual FastEthernet/SCSI 6U CompactPCI adapter with PMC self-test verifies the correct operation of the adapter and identifies any hardware problems with the adapter. The self-test is a suite of tests that reside in the adapter's FCode PROM.

You can invoke the FCode self-test diagnostics using the OpenBoot PROM `test` or `test-all` commands. To access the OpenBoot PROM, you must shut down and halt your system to display the `ok` prompt.

You can use the adapter's self-test any time you want to determine the status of the hardware. If you encounter an error while running the diagnostic test, the self-test displays appropriate error messages.

Note – Although the self-test does not require the adapter's interface to be connected to an active network, you will see failing error messages if it is not connected.

▼ To Run the FCode Self-Test Diagnostic

For more information about the OpenBoot commands (including `test`) in this section, refer to the *OpenBoot Command Reference* manual.

1. **Make sure that all significant application and network activity on the server has stopped.**

2. **Follow the appropriate procedures, as documented in the system's service manual, to shut down and halt the system.**

   Refer to the system's documentation for the complete shutdown procedure.

   After shutting down the system, you should see the OpenBoot PROM's `ok` prompt on the system console.

3. **At the `ok` prompt, set the `auto-boot?` configuration variable to false.**

   ```
   ok setenv auto-boot? false
   ```

4. **Set the** `diag-switch?` **parameter to true.**

```
ok setenv diag-switch? true
```

5. **Reset the system to activate these parameter changes.**

```
ok reset-all
```

6. **Use the** `show-nets` **command to display the list of network devices on the system.**

Among the list of devices, you should see the two `SUNW,qfe` devices specific to the Sun Dual FastEthernet/SCSI 6U CompactPCI adapter with PMC you want to test, as shown in the following example.

```
ok show-nets
a) /pci@1f,0/pci@1/pci@1/pci@e/SUNW,hme@0,1
b) /pci@1f,0/pci@1/pci@1/pci@d/SUNW,qfe@1,1
c) /pci@1f,0/pci@1/pci@1/pci@d/SUNW,qfe@0,1
d) /pci@1f,0/pci@1/pci@1/pci@b/SUNW,hme@0,1
e) /pci@1f,0/pci@1/pci@1/pci@a/SUNW,hme@0,1
f) /pci@1f,0/pci@1,1/network@3,1
g) /pci@1f,0/pci@1,1/network@1,1
q) NO SELECTION
Enter Selection, q to quit: q
```

Note – The preceding device paths are examples. The actual device paths on your system may be different from the examples shown here.

---

7. **Use the** `test` **command and the device paths found in Step 6 to test the adapter when you use the FCode self-test.**

```
ok test device-path
```

Refer to the appropriate *OpenBoot Command Reference Manual* for more information on the `test` command.

The following tests are run when you execute the `test` command:

- HME register
- MAC internal loopback
- 100 Mbps PHY loopback
- 10 Mbps PHY loopback

Note – To test all of the interfaces of the adapter, you will need to execute the `test` command separately for each `SUNW,qfe` interface.

If all of the tests pass, you will see these messages:

```
ok test /pci@1f,0/pci@1/pci@1/pci@d/SUNW,qfe@1,1
Hme register test --- succeeded.
Internal loopback test -- succeeded
Transceiver check -- Using onboard transceiver -- Link up passed
ok
```

If the adapter's interface is not connected to a network, you will see the following error messages:

```
ok test /pci@1f,0/pci@1/pci@1/pci@d/SUNW,qfe@1,1
Hme register test --- succeeded.
Internal loopback test -- succeeded
Transceiver check -- Using onboard transceiver -- Link down
Autonegotiation timeout
Check Cable or contact system administrator
Failed
selftest failed. return code = -1
ok
```

Note – If the `test` command fails, verify that the adapter hardware is installed correctly and the Ethernet device is connected to an active network. If necessary, replace the adapter or contact your service provider for support.

---

8. **Use the** `show-disks` **command to display the list of SCSI devices on the system.**

In the following example, `scsi@8` is the PMC SCSI device, and `SUNW,isptwo@4` and `SUNW,isptwo@3` are the adapter SCSI devices.

```
ok show-disks
a) /pci@1f,0/pci@1/pci@1/pci@d/scsi@8/disk
b) /pci@1f,0/pci@1/pci@1/pci@d/SUNW,isptwo@4/sd
c) /pci@1f,0/pci@1/pci@1/pci@d/SUNW,isptwo@3/sd
d) /pci@1f,0/pci@1,1/scsi@2/disk
e) /pci@1f,0/pci@1,1/ebus@1/fdthree@14,3203f0
q) NO SELECTION
```

9. **Use the** `test` **command, and one of the device paths found in Step 8, to test the adapter's SCSI devices using the FCode self-test.**

```
ok test device-path
```

10. **Repeat the test in Step 9 for each SCSI device on the adapter.**

If all of the tests pass, you will see an `ok` prompt, and no messages. For example.

```
ok test /pci@1f,0/pci@1/pci@1/pci@d/SUNW,isptwo@4
ok
```

If a test fails, you will see a failure message. For example:

```
ok test /pci@1f,0/pci@1/pci@1/pci@d/SUNW,isptwo@3
/pci@1f,0/pci@1/pci@1/pci@d/SUNW,isptwo@3 selftest failed. Return
code = -1
```

11. **If necessary, use the** `probe-scsi-all` **command to determine which disks are connected to SCSI devices.**

```
ok probe-scsi-all
/pci@1f,0/pci@1/pci@1/pci@d/scsi@8

/pci@1f,0/pci@1/pci@1/pci@d/SUNW,isptwo@4
Target 2
  Unit 0   Disk    SEAGATE ST39102LCSUN9.0G0828
Target 3
  Unit 0   Disk    SEAGATE ST39102LCSUN9.0G0728
Target 4
  Unit 0   Disk    SEAGATE ST39102LCSUN9.0G0628

/pci@1f,0/pci@1/pci@1/pci@d/SUNW,isptwo@3
Target a
  Unit 0   Disk    SEAGATE ST318203LSUN18G 034A
Target b
  Unit 0   Disk    SEAGATE ST318203LSUN18G 034A
Target c
  Unit 0   Disk    SEAGATE ST318203LSUN18G 034A

/pci@1f,0/pci@1,1/scsi@2
Target 0
  Unit 0   Disk    SEAGATE ST318203LSUN18G 034A
```

12. **After testing the adapter, type the following commands to return the OpenBoot PROM to the standard operating mode.**

```
ok setenv diag-switch? false
ok setenv auto-boot? true
```

13. **Reset and reboot the system.**

```
ok reset-all
```

Refer to the system's documentation for the correct procedures for bringing up the system.

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