Sun™ Gigabit Ethernet 3U Compact PCI Adapter Installation and User's Guide

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Regulatory Compliance Statements

Your Sun product is marked to indicate its compliance class:

- Federal Communications Commission (FCC) — USA
- Industry Canada Equipment Standard for Digital Equipment (ICES-003) - Canada
- Voluntary Control Council for Interference (VCCI) — Japan
- Bureau of Standards Metrology and Inspection (BSMI) — Taiwan

Please read the appropriate section that corresponds to the marking on your Sun product before attempting to install the product.

FCC Class A Notice

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Shielded Cables: Connections between the workstation and peripherals must be made using shielded cables to comply 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.

FCC Class B Notice

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- 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.

ICES-003 Class A Notice - Avis NMB-003, Classe A

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

ICES-003 Class B Notice - Avis NMB-003, Classe B

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

VCCI 基準について

クラス A VCCI 基準について

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> この装置は、情報処理装置等電波障害自主規制協議会 (VCCI) の基準に基づくクラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

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Declaration of Conformity

Compliance Model Number: GEM3U
Product Family Name: Sun Gigabit Ethernet MMF 3U cPCI Adapter (X1261A)

EMC

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

EN55022:1998 / CISPR22:1997		Class A
EN55024:1998	Required Limits (as applicable):	
	EN61000-4-2	4 kV (Direct), 8 kV (Air)
	EN61000-4-3	3 V/m
	EN61000-4-4	1 kV AC Power Lines, 0.5 kV Signal and DC Power Lines
	EN61000-4-5	1 kV AC Line-Line and Outdoor Signal Lines
		2 kV AC Line-Gnd, 0.5 kV DC Power Lines
	EN61000-4-6	3 V
	EN61000-4-8	1 A/m
	EN61000-4-11	Pass
EN61000-3-2:1995 + A1, A2, A14		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, Amendments 1, 2, 3, 4, 11

Supplementary Information:

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

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Preface

The *Sun Gigabit Ethernet 3U Compact PCI Adapter Installation and User's Guide* provides installation instructions for the Sun Gigabit Ethernet 3U Compact PCI adapter. This manual also describes how to install and configure the driver software.

These instructions are designed for enterprise system administrators with experience installing network hardware and software.

How This Book is Organized

- **Chapter 1 "Product Overview,"** provides a description of the adapter, including hardware and software.
- **Chapter 2, "Installing the Software,"** describes how to install the software from either the Web or the CD-ROM.
- **Chapter 3, "Installing and Extracting the Adapter,"** describes how to install the adapter in your system and verify that it has been installed correctly.
- **Chapter 4, "Network Configuration,"** describes how to edit the network host files after the adapter has been installed on your system.
- **Chapter 5, "Configuring Driver Parameters,"** describes how to configure the driver parameters used by the Sun Gigabit Ethernet 3U Compact PCI adapter.
- **Appendix A, "Specifications,"** lists the specifications for the Sun Gigabit Ethernet 3U Compact PCI adapter.
- **Appendix B, "Diagnostic Software and Troubleshooting Issues,"** provides an overview of the SunVTS diagnostic application and instructions for testing the adapter using the onboard FCode selftest. There is also a section outlining some common troubleshooting issues.

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
PCI Adapter Installation	Your system installation or service manual
Storage Device Installation	Your storage device installation or service manual
Dynamic Reconfiguration Installation	*Sun Enterprise 6x00, 5x00, 4x00, and 3x00 Systems Dynamic Reconfiguration User's Guide*
Diagnostic Software	*SunVTS User's Guide* *SunVTS Test Reference Manual*
OpenBoot™ Commands	*OpenBoot 3.x Command Reference Manual*

Accessing Sun Documentation Online

The `docs.sun.com`[sm] web site enables you to access Sun technical documentation on the Web. You can browse the `docs.sun.com` archive or search for a specific book title or subject at:

```
http://docs.sun.com
```

Sun Welcomes Your Comments

We are interested in improving our documentation and welcome your comments and suggestions. You can email your comments to us at:

    docfeedback@sun.com

Please include the part number (806-3001-10) of your document in the subject line of your email.

Product Overview

This chapter provides a description of the Sun Gigabit Ethernet 3U Compact PCI adapter hardware. The Sun GigaSwift Ethernet driver for this adapter is part of the Solaris 8 10/01 operating environment and subsequent compatible releases. If your system is running a prior Solaris release, follow the instructions in Chapter 1 to install the driver software either from the Web or from the CD-ROM.

Hardware Overview

The Sun Gigabit Ethernet 3U Compact PCI adapter is a compact PCI network interface card with a single gigabit Ethernet fiber connection that operates in 1000 Mbps Ethernet networks.

Release button
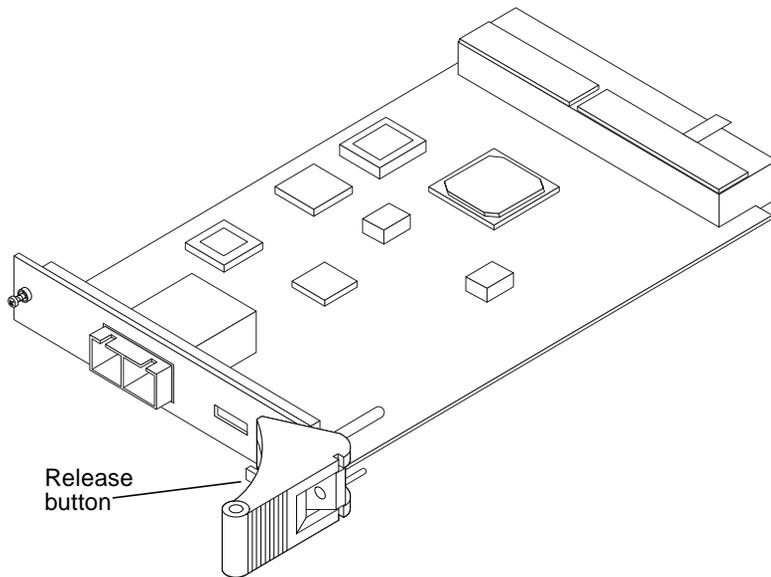
FIGURE 1-1   Sun Gigabit Ethernet 3U Compact PCI Adapter

Hardware and Software Requirements

Before using the Sun Gigabit Ethernet 3U Compact PCI adapter, make sure your system meets the following hardware and software requirements:

Hardware and Software	Requirements
Hardware	Any Sun machine with an available 3U cPCI slot
OpenBoot™ PROM	Revision 3.x
Operating Environment	Solaris 8 10/01 release and subsequent compatible releases

Product Features

You can install or replace the Sun Gigabit Ethernet 3U Compact PCI adapter. You can also diagnose a failure using the built-in diagnostic tools.

Key Features

- SNMP (limited MIB)
- Full-duplex gigabit ethernet interface
- Low CPU utilization—Frees up server system resource and bandwidth
- Dynamic Reconfiguration (DR) and Redundancy/Failover support
- Full Flow Control support
- 33/66-MHz, 32- or 64-bit bus master
- Universal dual voltage signaling (3.3V and 5V)
- PCI Local Bus Rev 2.2 compliant
- IPv4 and IPv6 support
- Load balancing for RX packets among multiple CPUs
- RAS support

Diagnostic Support

- User executable selftest using OpenBoot PROM
- SunVTS™ diagnostic tool

Installing the Software

This chapter describes how to install the driver software for the Solaris 8 5/01 or Solaris 8 7/01 operating environment either from the Web or from the CD-ROM.

The Sun GigaSwift Ethernet driver software required to operate the adapter is part of the Solaris 8 10/01 operating environment. If your system is running the Solaris 8 10/01 or a subsequent compatible release, proceed to Chapter 3. Refer to the documentation that shipped with the *Solaris Supplement* CD-ROM for additional information.

This chapter includes the following section:

- "Installing the Driver Software from the Web" on page 5
- "Installing the Driver Software from the CD-ROM" on page 8

Note – If your system is running the Solaris 8 5/01 or Solaris 8 7/01 operating environment, you must install the driver software. The Sun GigaSwift Ethernet driver that is part of the Solaris 8 7/01 release is not compatible with this adapter. You can download the driver from the Web or from the *Sun GigaSwift Ethernet Driver* CD. If your system is running Solaris 8 10/01 or a subsequent compatible release, the driver is already a part of your operating environment.

Installing the Driver Software from the Web

1. **Access the Sun Software Download Center at:**
   `http://www.sun.com/software/download`

2. **Go to the Free Packages site and select the Sun GigaSwift Ethernet software package:** `GigaSwiftEthernet.zip.`

3. **Follow the registration process.**

4. **From the download page, download the software files.**

5. **As root, copy the** `GigaSwiftEthernet.zip` **to a working directory such as** `/tmp`:

```
# cp GigaSwiftEthernet.zip /tmp
# cd /tmp
```

6. **Unzip the file as follows:**

```
# unzip GigaSwiftEthernet.zip
Archive: GigaSwiftEthernet.zip
    creating: GigaSwiftEthernet/
    inflating: GigaSwiftEthernet/Copyright
    inflating: GigaSwiftEthernet/FR_Copyright
    creating: GigaSwiftEthernet/Docs/
    creating: GigaSwiftEthernet/Solaris_8/
    inflating: GigaSwiftEthernet/Solaris_8/GSEPackages
```

You will see the following files and directories in the download zip file

TABLE 2-1 Files and Directories on the CD-ROM

File or Directory	Contents
`Copyright`	U.S. copyright file
`FR_Copyright`	French copyright file
`Docs/`	806-3001-10.ps 806-3001-10.pdf

`README`
  `Solaris_8/`
   `GSEPackages*`
	*Streams package that contains:
	• SUNWcea—32-bit adb macros
	• SUNWceax—64-bit adb macros
	• SUNWced.u—32-bit adapter driver
	• SUNWcedx.u—64-bit adapter driver
	• SUNWcedu—adapter driver headers
	• SUNWcem—man pages (optional)
	
	• SUNWvld—VLAN utility routines (optional)
	• SUNWvldx—VLAN utility routines (optional, 64-bit)
	• SUNWvldu—VLAN utility headers (optional)

> **Note –** If you intend to use VLAN, you must install VLAN packages when you
> install the GigaSwift Ethernet software packages.

7. **Add the packages by entering the following command:**

```
# pkgadd -d GigaSwiftEthernet/Solaris_8/GSEPackages
```

A menu similar to the following displays:

```
The following packages are available:
 1  SUNWcea        Sun GigaSwift Ethernet Adapter Driver 32 bit adb Macros
                     (sparc) 1.0,REV=2001.05.04
 2  SUNWceax       Sun GigaSwift Ethernet Adapter Driver 64 bit adb Macros
                     (sparc) 1.0,REV=2001.05.04
 3  SUNWced.u      Sun GigaSwift Ethernet Adapter (32-bit Driver)
                     (sparc.sun4u) 1.0,REV=2001.05.04
 4  SUNWcedu       Sun GigaSwift Ethernet Adapter Driver Headers
                     (sparc) 1.0,REV=2001.05.04
 5  SUNWcedx.u     Sun GigaSwift Ethernet Adapter (64-bit Driver)
                     (sparc.sun4u) 1.0,REV=2001.05.04
 6  SUNWcem        Sun GigaSwift Ethernet Adapter Driver Man Pages
                     (sparc) 1.0,REV=2001.05.04
 7  SUNWvld        Sun Ethernet Vlan Utility Routines
                     (sparc) 1.0,REV=2001.05.04
 8  SUNWvldu       Sun Ethernet Vlan Utility Headers
                     (sparc) 1.0,REV=2001.05.04
 9  SUNWvldx       Sun Ethernet Vlan Utility Routines (64-bit)
                     (sparc) 1.0,REV=2001.05.04

Select package(s) you wish to process (or 'all' to process
all packages). (default: all) [?,??,q]:
```

8. **Press Return or type** `all` **to accept the default and install all packages.**

   OR

9. **If you prefer not to install the optional packages, type the number of all but the
   optional packages**

   See TABLE 2-1 on page 6 to identify the optional packages.

Installing the Driver Software from the CD-ROM

The *Sun GigaSwift Ethernet Driver* CD contains the driver software required to operate the adapter. The Solaris 8 10/01 operating environment and subsequent compatible releases contain the latest Sun GigaSwift Ethernet driver software. Refer to the documentation that shipped with the *Solaris Supplement* CD-ROM for a listing of the available network drivers.

1. **Become superuser.**

2. **Insert the** *Sun GigaSwift Ethernet Driver* **CD into a CD-ROM drive that is connected to your system.**

   - If your system is running Sun Enterprise Volume Manager™, it should automatically mount the CD-ROM to the /cdrom/cdrom0 directory.
   - If your system is not running Volume Manager, mount the CD-ROM as follows:

   ```
   # mkdir /cdrom
   # mkdir /cdrom/cdrom0
   # mount -F hsfs -o ro /dev/dsk/c0t6d0s2 /cdrom/cdrom0
   ```

   You will see the following files and directories in the /cdrom/sun_gigaswift_ethernet directory or the /cdrom/cdrom0 directory, depending on how you mounted the CD-ROM.

TABLE 2-2   Files and Directories on the CD-ROM

File or Directory	Contents
Copyright	U.S. copyright file
FR_Copyright	French copyright file

TABLE 2-2 Files and Directories on the CD-ROM

File or Directory	Contents
Docs/	Contains PDF copy of the user manual
GigaSwiftEthernet/ Solaris_*OS-VER*/ Packages/	Contains the Sun GigaSwift Ethernet software packages applicable to your version (*OS-VER)* of the Solaris software • SUNWcea—32-bit adb macros • SUNWceax—64-bit adb macros • SUNWced.u—32-bit adapter driver • SUNWcedx.u—64-bit adapter driver • SUNWcedu—adapter driver headers • SUNWcem—man pages (optional) The optional VLAN packages for Solaris 8 only • SUNWvld—VLAN utility routines • SUNWvldx—VLAN utility routines (64-bit) • SUNWvldu—VLAN utility headers

Note – If you intend to use VLAN, you must install VLAN packages when you install the GigaSwift Ethernet software packages.

3. **Install the software packages by typing the following at the command line, replacing the** *OS_VER* **with your version (2.6, 7, or 8) of the Solaris Operating Environment:**

```
# /usr/sbin/pkgadd -d /cdrom/cdrom0/GigaSwiftEthernet/Solaris_OS_VER/Packages/
```

For example, if your system is running the Solaris 8 Operating Environment, you would type the following:

```
# /usr/sbin/pkgadd -d /cdrom/cdrom0/GigaSwiftEthernet/Solaris_8/Packages/
```

A menu similar to the following displays:

```
The following packages are available:
  1  SUNWcea        Sun GigaSwift Ethernet Adapter Driver 32 bit adb Macros
                     (sparc) 1.0,REV=2001.05.04
  2  SUNWceax       Sun GigaSwift Ethernet Adapter Driver 64 bit adb Macros
                     (sparc) 1.0,REV=2001.05.04
  3  SUNWced.u      Sun GigaSwift Ethernet Adapter (32-bit Driver)
                     (sparc.sun4u) 1.0,REV=2001.05.04
  4  SUNWcedu       Sun GigaSwift Ethernet Adapter Driver Headers
                     (sparc) 1.0,REV=2001.05.04
  5  SUNWcedx.u     Sun GigaSwift Ethernet Adapter (64-bit Driver)
                     (sparc.sun4u) 1.0,REV=2001.05.04
  6  SUNWcem        Sun GigaSwift Ethernet Adapter Driver Man Pages
                     (sparc) 1.0,REV=2001.05.04
  7  SUNWvld        Sun Ethernet Vlan Utility Routines
                     (sparc) 1.0,REV=2001.05.04
  8  SUNWvldu       Sun Ethernet Vlan Utility Headers
                     (sparc) 1.0,REV=2001.05.04
  9  SUNWvldx       Sun Ethernet Vlan Utility Routines (64-bit)
                     (sparc) 1.0,REV=2001.05.04

Select package(s) you wish to process (or 'all' to process
all packages). (default: all) [?,??,q]:
```

4. **Press Return or type** `all` **to accept the default and install all packages.**

   OR

5. **If you prefer not to install the optional packages, type the number of all but the optional packages**

   See TABLE 2-2 to identify the optional packages.

Installing and Extracting the Adapter

This chapter describes how to install and extract the Sun Gigabit Ethernet 3U Compact PCI adapter into a supported system.

This chapter contains the following sections:

- "Preparing for the Installation" on page 12
- "Installing the Adapter" on page 13
- "Extracting the Adapter" on page 19

Note – Refer to your system installation or service manual for detailed instructions for the following tasks.

Preparing for the Installation

Before installing the adapter, prepare for the installation by assembling the appropriate tools, unpacking the ship kit, and selecting an I/O slot in the system.

Tools and Equipment Needed

You will need:

- Number 1 Phillips screwdriver
- Ethernet cable to connect to an Ethernet network
- Electrostatic discharge (ESD) mat (optional)

Contents of the Ship Kit

The ship kit should contain the following items:

- Compact PCI card
- Anti-static wrist strap
- This manual

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

Determining the Type of Adapter Installation

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

Determine whether you want to perform a hot swap installation of the adapter or a cold installation.

- In a hot swap installation, you can install the adapter while the system is running, without interrupting the operation of the server. Depending on the level of hot swap your server is running (full or basic), you may be required to enter software commands before and after the installation.

- In a cold installation, you must shut down the operating system and power down the system before installing the adapter. After the installation, you must power the system back on for the system to recognize the new adapter.

Note – This chapter describes the general procedure needed for either a hot swap or a cold swap installation. Because software commands and LED displays can differ for each server, refer to you server's documentation for the exact installation procedures.

Models of Hot Swap

Hot swap, a key feature of the PCI Industrial Computer Manufacturers Group (PICMG) standard, means that a Compact PCI adapter that meets the PICMG standard can be reliably inserted into or extracted from a powered and operating Compact PCI platform without affecting the other functions of the platform. The standard also defines state transitions from the hardware and software connection processes that allow the card to be connected and configured.

The adapter supports two models of hot swap:

- Basic hot swap
- Full hot swap

The models can be explained by first defining the following processes:

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

In the basic hot swap model, the hardware connection process can be performed automatically by the hardware, while the software connection process requires operator assistance.

In the full hot swap model, both the hardware and the software connection process are performed automatically.

Installing the Adapter

This section contains the procedures required for installing the card in the server.

Note – This section provides a general overview of the tasks needed to prepare for either a hot or cold installation. For the exact procedures required for your system, refer to the documentation that shipped with your system.

▼ To Prepare the System for a Cold Installation

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 the system's service manual, to shut down and halt the system.**

   Refer to the system's documentation for the complete power down procedure.

3. **Verify that the system is completely powered off.**

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

▼ To Prepare the System for Hot Installation

● **Follow the appropriate procedures, as documented in the system's documentation, to prepare the system for a hot installation of the adapter.**

   Refer to the system's documentation for the complete hot swap instructions.

1. **Start cPCI hot swap.**

```
% drvconfig -i sghsc
```

2. **Type the following command:**

```
% cfgadm pci
```

Confirm that the intended slot can be identified as unconfigured on the list.

▼ To Install the Adapter

> **Note –** Refer to the system service or administration guide for detailed instructions for following tasks.

1. **Get the antistatic wrist strap from the ship kit.**

2. **Unwrap the first two folds of the wrist strap and wrap the adhesive side firmly against your wrist.**

3. **Peel the liner from the copper foil at the opposite end of the wrist strap and attach the copper end of the strap to a bare metal area on the front of the server.**

4. **Identify the slot number where you want to insert the adapter.**

5. **Remove the filler panel from the slot you selected.**

   Refer to the system's documentation for instructions on how to remove the filler panel.

6. **Remove the card from its antistatic envelope and package and place it on the electrostatic discharge mat.**

   If an electrostatic discharge mat is not available, you can place the card on the antistatic envelope it was shipped in.

7. **Before pushing the card into the slot, open the card's ejection lever.**

   a. **First press the release button on the ejection lever (see** FIGURE 3-1**).**

Release button
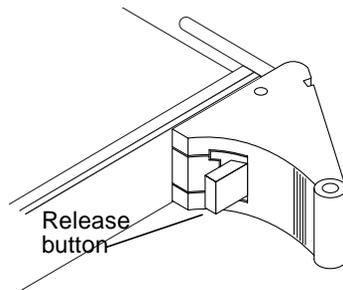
FIGURE 3-1   Releasing the Ejection Lever

   b. **Then, using only your thumb, fully open the ejection lever.**

8. **Slide the card into the cPCI slot.**

   The cards are designed to fit the slot tightly. You may have to tilt the card slightly to insert it into the slot.

△**!** **Caution –** Do not hold, pull, or push the cPCI card by the ejection lever. The ejection lever is not designed to be used as a handle. Hold the card by the front panel or edges only.

9. **Applying even pressure to the front panel of the card, push the card until it is firmly seated in the slot and the ejection handle clicks toward its locked position.**

△**!** **Caution –** Do not use excessive force when installing the adapter into the cPCI slot. You may damage the adapter's connector or the pins on the backplane, causing permanent damage to the adapter or the system. If the adapter does not seat properly when you apply even pressure, remove the adapter and carefully reinstall it.

In a hot swap installation, when the card is properly seated and the physical connection is complete the blue LED lights up.

10. **Push the ejection lever over the sprocket toward the card and into the locked position.**
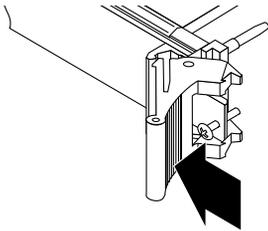
FIGURE 3-2 Closing the Ejection Lever

This locks the card into the slot and completes the hardware installation. In a hot installation, the blue LED should go off.

If the blue LED does not go off, it either means the system into which you inserted the card does not fully support the hot-swap feature or the card is not properly seated.

11. **Using a No. 1 Phillips screwdriver, tighten the captive screws inside the card's ejection lever.**

While the card will function without being tightened, failure to do so will make it impossible to install a card in the final slot of an I/O boat that holds multiple cards.
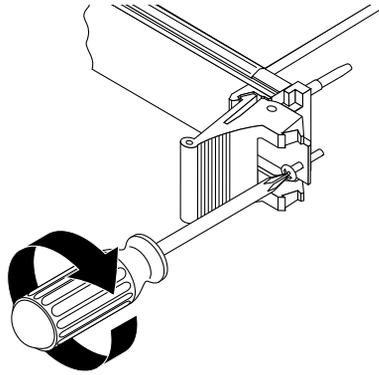
FIGURE 3-3 Tightening the Ejection Lever Captive Screw

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

13. **Check your system documentation for any additional actions that may be required to configure the system software for the newly inserted card.**

    For example, in some systems you must type the following command:

    ```
    % cfgadm -c configure attachment_point
    ```

    This turns off the blue LED and initiates the software, which responds by configuring the system software for the newly inserted card.

Connecting the Ethernet Cables

After installing the adapter, you can attach the Ethernet cable to the Ethernet port.

▼ To Connect the Ethernet Cables

1. **Connect one end of the Ethernet cable to the port on the card.**

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

Attaching the Adapter to the System

After installing the adapter, you must make the system recognize the new adapter and its Ethernet interfaces. The procedure for attaching the adapter to the system depends on whether you installed the adapter in a hot swap or cold environment. Once the adapter is attached, the driver software is also engaged.

If you performed a hot installation, see "To Attach the Adapter in a Hot Swap Environment" on page 18. If you powered down the system before installing the card, see "To Power on the System After a Cold Installation" on page 19.

▼ To Attach the Adapter in a Hot Swap Environment

1. **Follow the hot swap procedures for attaching an I/O card to the system in the system's documentation.**

   Refer to the system's server or hardware installation manual for the attachment procedure specific to your system.

2. **On some systems, for example, you would log into the system console as superuser and identify the board slot number (attachment point).**

   ```
   # cfgadm -s select=class(pci)
   ```

3. **At the system console, activate the adapter with the** `cfgadm -c connect` **command:**

   ```
   # cfgadm -c connect ap_id
   ```

   Where *ap_id* is the attachment point ID.

4. **Check the hot swap LED on the adapter.**
   - If the adapter was installed correctly, the blue LED should be off.
   - If the hot swap LED remains on (lit), the adapter was not installed correctly. Remove and reinstall the adapter to make sure it is seated correctly in the slot.

   If you have to reinstall the card, be sure to follow the instructions outlined in your system's service manual for the removal and replacement of I/O cards.

   Refer to the system documentation for additional troubleshooting instructions.

▼ To Power on the System After a Cold Installation

1. **Before powering on the system, make sure that all the cables are connected and the peripheral devices are powered on.**

2. **Follow the appropriate procedures, as documented in the system's hardware installation manual, to power on the system.**

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

3. **Check the hot swap LED on the adapter.**

   - If the adapter was installed correctly, the blue LED should be off.

   - If the hot swap LED remains on (lit), the adapter was not installed correctly. Remove and reinstall the adapter to make sure it is seated correctly in the slot.

     If you have to reinstall the card, be sure to follow the instructions outlined in your system's service manual for the removal and replacement of I/O cards.

     Refer to the system documentation for additional troubleshooting instructions.

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

Extracting the Adapter

The adapter is a hot swappable component that can be extracted from a hot-swap-compliant system without interrupting the operation of the system. The adapter can also be extracted from a cold environment, where you power down the system before you extract the adapter.

Determining the Type of Adapter Extraction

Determine whether you want to perform a hot extraction of the adapter or a cold extraction.

- In a hot swap extraction, you may be required to enter software commands before and after the extraction to detach the adapter from the system correctly.

- In a cold extraction, you must shut down the system's operating system and power down the system before extracting the adapter.

Note – The following procedures provide a general overview of the tasks needed to prepare for either a hot or cold extraction. For the specific procedures required for your system, refer to the documentation that shipped with your system.

▼ To Extract the Adapter from a Hot Environment

1. Start cPCI hot swap.

```
% drvconfig -i sghsc
```

2. As superuser, identify the cPCI card to be removed.

You must know the slot number (attachment point ID).

```
# cfgadm pci
Ap_Id                          Type          Receptacle  Occupant     Condition
pcisch0:sg6slot2 ***           ethernet/fhs connected    configured   ok
pcisch0:sg6slot3               unknown       empty        unconfigured unknown
pcisch1:sg6slot0               unknown       empty        unconfigured unknown
pcisch2:sg6slot4               stpcipci/fhs connected    configured   ok
pcisch7:sg8slot1               unknown       empty        unconfigured unknown
```

I/O assemblies are indicated by "..sg--..". The attachment points (board slots) displayed are numbered staring with 0 at the system board side of the cPCI I/O assembly. In the example above, the Sun Gigabit Ethernet 3U cPCI adapter is indicated by asterisks (***).

3. Detach (unconfigure) the cPCI card to be removed.

```
# cfgadm -c unconfigure attachment_point
```

Where *attachment_point* is pcischxxx, for example, in the example used in Step 2, pcisch0 is the attachment point for the Sun Gigabit Ethernet 3U cPCI adapter. The following example demonstrates using the information from Step 2.

```
# cfgadm -c unconfigure pcisch0:sg6slot2
Jul 26 14:20:00 r8-4 sghsc: sghsc_control: board 6, slot 2 unconfigured
```

4. Repeat the attachment point list to confirm the board detachment.

```
# cfgadm pci
Ap_Id                        Type          Receptacle   Occupant      Condition
pcisch0:sg6slot2   ***       unknown       disconnected unconfigured unknown
pcisch0:sg6slot3             unknown       empty        unconfigured unknown
pcisch1:sg6slot0             unknown       empty        unconfigured unknown
pcisch2:sg6slot4             stpcipci/fhs connected     configured    ok
pcisch7:sg8slot1             unknown       empty        unconfigured unknown
```

5. Check that the blue LED is on.

The Removal OK LED must change from green to amber to signal the unconfigured state. When the Removal OK LED is amber, it is safe to remove the cPCI card.

6. Using only your thumb, press the ejection lever to a fully opened position.

7. Slide the card out of the cPCI slot.

▼ To Extract the Adapter from a Cold Environment

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 the system's service manual, to shut down and halt the system.

Refer to the system's documentation for the complete power down procedure.

3. Verify that the system is completely powered off.

Once the system has been shut down and powered off, you can safely extract the card.

Network Configuration

This chapter describes how to edit the network host files after the adapter has been installed on your system. The chapter contains the following sections:

- "Configuring the Network Host Files" on page 23

Configuring the Network Host Files

After installing the driver software, you must create a `hostname.ce`*number* file for the adapter's Ethernet interface. You must also create both an IP address and a host name for its Ethernet interface in the `/etc/hosts` file.

1. **At the command line, use the** `grep` **command to search the** `/etc/path_to_inst` **file for** `ce` **interfaces.**

```
# grep ce /etc/path_to_inst
"/ssm@0,0/pci@1c,700000/network@1" 0 "ce"
"/ssm@0,0/pci@1c,600000/network@1" 1 "ce"
"/ssm@0,0/pci@1d,600000/network@1" 2 "ce"
```

In the example above, the device instance is from a Sun Gigabit Ethernet 3U cPCI adapter. For clarity, the instance number is in bold italics..

2. **Set up the adapter's** `ce` **interface.**

For example, you can use the `ifconfig` command to setup the adapter's `ce` interface.

Use the `ifconfig` command to assign an IP address to the network interface. Type the following at the command line, replacing *ip_address* with the adapter's IP address:

```
# ifconfig ce2 plumb ip_address up
```

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

- If you want a set-up that will remain the same after you reboot, create an `/etc/hostname.ce`*number* file, where *number* corresponds to the instance number of the `ce` interface you plan to use.

  To use the adapter's `ce` interface in the Step 1 example, create an `/etc/hostname.ce0` file, where `0` is the number of the `ce` interface. If the instance number were *1*, the filename would be `/etc/hostname.ce1`.

- Do not create an `/etc/hostname.ce`*number* file for a Sun Gigabit Ethernet 3U cPCI interface you plan to leave unused.

- The `/etc/hostname.ce`*number* file must contain the hostname for the appropriate `ce` interface.

- The host name should have an IP address and should be listed in the `/etc/hosts` file.

- The host name should be different from any other host name of any other interface, for example: `/etc/hostname.ce0` and `/etc/hostname.ce1` cannot share the same host name.

The following example shows the `/etc/hostname.ce`*number* file required for a system called `zardoz` that has a Sun Gigabit Ethernet 3U Compact PCI adapter (`zardoz-11`).

```
# cat /etc/hostname.hme0
zardoz
# cat /etc/hostname.ce0
zardoz-11
```

3. Create an appropriate entry in the /etc/hosts **file for each active** ce **interface.**

For example:

```
# cat /etc/hosts
#
# Internet host table
#
127.0.0.1      localhost
129.144.10.57 zardoz     loghost
129.144.11.83 zardoz-11
```

Configuring Driver Parameters

This chapter describes how to configure the Sun GigaSwift Ethernet driver parameters used by the Sun Gigabit Ethernet 3U cPCI adapter. This chapter contains the following sections:

GigaSwift Ethernet Device Driver Parameters

The `ce` device driver controls the GigaSwift Ethernet devices. The `ce` driver is attached to the UNIX `pci` name property `pci108e,abba` for the Sun Gigabit Ethernet 3U cPCI adapter (`108e` is the vendor ID and `abba` is the device ID).

You can manually configure the `ce` device driver parameters to customize each Sun Gigabit Ethernet 3U cPCI adapter in your system. This section provides an overview of the capabilities of the device used in the adapter, lists the available `ce` device driver parameters, and describes how to configure these parameters.

The Sun Gigabit Ethernet 3U cPCI adapter is capable of all the operating speeds and modes listed in "Setting the Autonegotiation Mode" on page 37. The ce device performs autonegotiation with the remote end of the link (link partner) to select a common mode of operation. The ce device also supports a forced mode of operation.

Driver Parameter Values and Definitions

TABLE 5-1 describes the parameters and settings for the `ce` device driver.

TABLE 5-1   `ce` Driver Parameter, Status, and Descriptions

Parameter	Status	Description
instance	Read and write	Device instance
adv_autoneg_cap	Read and write	Operational mode parameter
adv_1000fdx_cap	Read and write	Operational mode parameter
adv_1000hdx_cap	Read and write	Operational mode parameter
adv_100T4_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
adv_asmpause_cap	Read and write	Flow control parameter
adv_pause_cap	Read and write	Flow control parameter
link_master	Read and write	1Gb forced mode parameter
use_int_xcvr	Read and write	
enable_ipg0	Read and write	Enable additional delay before transmitting a packet
ipg0	Read and write	Additional delay before transmitting a packet
ipg1	Read and write	Interpacket Gap parameter
ipg2	Read and write	Interpacket Gap parameter
rx_intr_pkts	Read and write	Receive interrupt blanking values
rx_intr_time	Read and write	Receive interrupt blanking values
red_dv4to6k	Read and write	Random early detection and packet drop vectors
red_dv6to8k	Read and write	Random early detection and packet drop vectors
red_dv8to10k	Read and write	Random early detection and packet drop vectors
red_dv10to12k	Read and write	Random early detection and packet drop vectors
tx_dma_weight	Read and write	PCI Interface parameter
rx_dma_weight	Read and write	PCI Interface parameter
infinit_burst	Read and write	PCI Interface parameter
disable_64bit	Read and write	PCI Interface parameter

Operational Mode Parameters

The following parameters determine the transmit and receive speed and duplex. TABLE 5-2 describes the operational mode parameters and their default values.

TABLE 5-2   Operational Mode Parameters

Parameter	Description
adv_autoneg_cap	Local interface capability advertised by the hardware 0 = Forced mode 1 = Autonegotiation (default)
adv_1000fdx_cap	Local interface capability advertised by the hardware 0 = Not 1000 Mbit/sec full-duplex capable 1 = 1000 Mbit/sec full-duplex capable (default)
adv_1000hdx_cap	Local interface capability advertised by the hardware 0 = Not 1000 Mbit/sec half-duplex capable 1 = 1000 Mbit/sec half-duplex capable (default)
adv_100fdx_cap	Local interface capability advertised by the hardware 0 = Not 100 Mbit/sec full-duplex capable 1 = 100 Mbit/sec full-duplex capable (default)
adv_100hdx_cap	Local interface capability advertised by the hardware 0 = Not 100 Mbit/sec half-duplex capable 1 = 100 Mbit/sec half-duplex capable (default)
adv_10fdx_cap	Local interface capability advertised by the hardware 0 = Not 10 Mbit/sec full-duplex capable 1 = 10 Mbit/sec full-duplex capable (default)
adv_10hdx_cap	Local interface capability advertised by the hardware 0 = Not 10 Mbit/sec half-duplex capable 1 = 10 Mbit/sec half-duplex capable (default)

Note – If a parameter's initial setting is 0, it cannot be changed. If you try to change it, it will revert back to 0.

If all these parameters are set to 1, autonegotiation will use the highest speed possible. If all these parameters are set to 0, you will receive the following error message:

```
NOTICE: Last setting will leave ce2 with no link capabilities.
WARNING: ce2: Restoring previous setting.
```

Flow Control Parameters

The ce device is capable of sourcing (transmitting) and terminating (receiving) pause frames conforming to the IEEE 802.3x Frame Based Link Level Flow Control Protocol. In response to received flow control frames, the ce device can slow down its transmit rate. On the other hand, the ce device is capable of sourcing flow control frames, requesting the link partner to slow down, provided that the link partner supports this feature. By default, the driver advertises both transmit and receive pause capability during autonegotiation.

TABLE 5-3 provides flow control keywords and describes their function.

TABLE 5-3   Read-Write Flow Control Keyword Descriptions

Keyword	Description
adv_asmpause_cap	The adapter supports asymmetric pause, which means it can pause only in one direction. 0=Off (default) 1=On
adv_pause_cap	This parameter has two meanings depending on the value of adv_asmpause_cap. (Default=0) If adv_asmpause_cap = 1 while adv_pause_cap = 1 pauses are received. If adv_asmpause_cap = 1 while adv_pause_cap = 0 pauses are transmitted. If adv_asmpause_cap = 0 while adv_pause_cap = 1 pauses are sent and received. If adv_asmpause_cap = 0 then adv_pause_cap determines whether Pause capability is on or off.

Gigabit Forced Mode Parameter

In 10/100 mode it was possible to disable auto-negotiation and force the link to the speed you required. The `link_master` parameter will facilitate that. Usually switches will be enabled as master therefore this parameter can remain unchanged, since slave operation is the default. If this is not the case Then `link_master` can be used to enable `ce` as a master.

TABLE 5-4   Forced Mode Parameter

Parameter	Description
`link_master`	When set to 1 this enables master operation, assuming the link partner is a slave. When set to 0 this enables slave operation, assuming the link partner is a slave. (default)

Interpacket Gap Parameters

The `ce` device supports a programmable mode called `enable_ipg0`.

When a driver receives a packet with `enable_ipg0` set (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 `enable_ipg0` is disabled, the value of `ipg0` is ignored and no additional delay is set. Only the delays set by `ipg1` and `ipg2` will be used. Disable `enable_ipg0` if other systems keep sending a large number of back-to-back packets. Systems that have `enable_ipg0` set might not have enough time on the network.

You can add the additional delay by setting the `ipg0` parameter from 0 to 255, which is the media byte time delay.

TABLE 5-5 defines the `enable_ipg0` and `ipg0` parameters.

TABLE 5-5   Parameters Defining `enable_ipg0` and `ipg0`

Parameter	Values	Description
`enable_ipg0`	0 1	`enable_ipg0` reset `enable_ipg0` set (Default=8)
`ipg0`	0 to 255	The additional time delay (or gap) before transmitting a packet (after receiving the packet) (Default=8)

The ce device supports the programmable Interpacket Gap (IPG) parameters `ipg1` and `ipg2`. The total IPG is the sum of `ipg1` and `ipg2`. The total IPG is 0.096 microseconds for the link speed of 1000 Mbps.

TABLE 5-6 lists the default values and allowable values for the IPG parameters.

TABLE 5-6 Read-Write Interpacket Gap Parameter Values and Descriptions

Parameter	Values (Byte-time)	Description
ipg1	0 to 255	Interpacket gap 1 (Default = 8)
ipg2	0 to 255	Interpacket gap 2 (Default = 4)

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 one byte on the link, with a link speed of 1000 Mbps.)

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

Interrupt Parameters

TABLE 5-7 describes the receive interrupt blanking values.

TABLE 5-7 RX Blanking Register for Alias Read

Field Name	Values	Description
rx_intr_pkts	0 to 511	Interrupt after this number of packets have arrived since the last packet was serviced. A value of zero indicates no packet blanking. (Default=3)
rx_intr_time	0 to 524287	Interrupt after 4.5 US ticks have elapsed since the last packet was serviced. A value of zero indicates no time blanking. (Default=1250)

Random Early Drop Parameters

TABLE 5-8 describes the RX random early detection 8-bit vectors, which allows you to enable random early drop (RED) thresholds. When received packets reach the RED range packets are dropped according to the preset probability. The probability should increase when the fifo level increases. Control packets are never dropped and are not counted in the statistics.

TABLE 5-8   RX Random Early Detecting 8-Bit Vectors

Field Name	Values	Description
red_dv4to6k	0 to 255	Random early detection and packet drop vectors for when fifo threshold is greater than 4096 bytes and less than 6,144 bytes. Probability of drop can be programmed on a 12.5 percent granularity. For example, if bit 0 is set the first packet out of every eight will be dropped in this region. (Default=0)
red_dv6to8k	0 to 255	Random early detection and packet drop vectors for when fifo threshold is greater than 6,144 bytes and less than 8,192 bytes. Probability of drop can be programmed on a 12.5 percent granularity. For example, if bit 8 is set the first packet out of every eight will be dropped in this region. (Default=0)
red_dv8to10k	0 to 255	Random early detection and packet drop vectors for when fifo threshold is greater than 8,192 bytes and less than 10,240 bytes. Probability of drop can be programmed on a 12.5 percent granularity. For example, if bit 16 is set the first packet out of every eight will be dropped in this region. (Default=0)
red_dv10to12k	0 to 255	Random early detection and packet drop vectors for when fifo threshold is greater than 10,240 bytes and less than 12,288 bytes. Probability of drop can be programmed on a 12.5 percent granularity. For example, if bit 24 is set the first packet out of every eight will be dropped in this region. (Default=0)

PCI Bus Interface Parameters

These parameters allow you to modify PCI interface features to gain better PCI interperformance for a given application.

TABLE 5-9   PCI Bus Interface Parameters

Parameter	Description
tx_dma_weight	Determine the multiplication factor for granting credit to the TX side during a weighted round robin arbitration. Values are 0 to 3. (Default=0) Zero means no extra weighting. The other values are power of 2 extra weighting, on that traffic. For example of tx_dma_weight = 0 and rx_dma_weight = 3 then as long as RX traffic is continuously arriving its priority will be 8 times greater than TX to access the PCI
rx_dma_weight	Determine the multiplication factor for granting credit to the RX side during a weighted round robin arbitration. Values are 0 to 3. (Default=0)
infinite_burst	allows the infinite burst capability to be utilized. When this is in effect and the system supports infinite burst. The adapter will not free the bus until complete packets are transferred across the bus. Values are 0 or 1. (Default=0)
disable_64bit	Switches off 64 bit capability of the adapter. In some cases, it is useful to switch off this feature. Values are 0 or 1. (Default=0, which enables 64 bit capability)

Setting ce Driver Parameters

You can set the ce device driver parameters in two ways:

- Using the ndd utility
- Using the ce.conf file

If you use the ndd utility, the parameters are valid only until you reboot the system. This method is good for testing parameter settings.

To set parameters so they remain in effect after you reboot the system, create a /platform/sun4u/kernel/drv/ce.conf file and add parameter values to this file when you need to set a particular parameter for a device in the system.

Setting Parameters Using the `ndd` Utility

Use the `ndd` utility to configure parameters that are valid until you reboot the system. The `ndd` utility supports any networking driver, which implements the Data Link Provider Interface (DLPI).

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

▼ To Specify Device Instances for the `ndd` Utility

Before you use the `ndd` utility to get or set a parameter for a `ce` device, you must specify the device instance for the utility.

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

```
# grep ce /etc/path_to_inst
"/ssm@0,0/pci@18,700000/network@1" 1 "ce"
"/ssm@0,0/pci@18,700000/network@1" 0 "ce"
"/ssm@0,0/pci@19,600000/network@1" 2 "ce"
```

In the example above, the three GigaSwift Ethernet instances are from the installed adapters. The instance numbers are in bold italics for clarity.

2. **Use the instance number to select the device.**

```
# ndd -set /dev/ce instance instance#
```

The device remains selected until you change the selection.

Noninteractive and Interactive Modes

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

- Noninteractive
- Interactive

In noninteractive mode, you invoke the utility to execute a specific command. Once the command is executed, you exit the utility. In interactive mode, you can use the utility to get or set more than one parameter value. (Refer to the `ndd`(1M) man page for more information.)

Using the `ndd` Utility in Noninteractive Mode

This section describes how to modify and display parameter values.

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

  If you invoke the `ndd` utility with the `-set` option, the utility passes *value*, which must be specified, down to the named `/dev/ce` driver instance, and assigns it to the parameter:

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

  When you change any adv parameter, a message similar to the following appears:

  ```
  xcvr addr:0x00 - link up 1000 Mbps half duplex
  ```

- **To display the value of a parameter, specify the parameter name and omit the value.**

  When you omit the `-set` option, a query operation is assumed and the utility queries the named driver instance, retrieves the value associated with the specified parameter, and prints it:

  ```
  # ndd /dev/ce parameter
  ```

Using the `ndd` Utility in Interactive Mode

- **To modify a parameter value in interactive mode, specify `ndd /dev/ce`, as shown below.**

  The `ndd` utility then prompts you for the name of the parameter:

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

  After typing the parameter name, the `ndd` utility prompts you for the parameter value (see TABLE 5-1 through TABLE 5-11).

● **To list all the parameters supported by the** `ce` **driver, type** `ndd /dev/ce`**.**
(See TABLE 5-1 through TABLE 5-11 for parameter descriptions.)

```
# ndd /dev/ce
name to get/set ? ?
?                          (read only)
instance                   (read and write)
adv_autoneg_cap            (read and write)
adv_1000fdx_cap            (read and write)
adv_1000hdx_cap            (read and write)
adv_100T4_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)
adv_asmpause_cap           (read and write)
adv_pause_cap              (read and write)
link_master                (read and write)
use_int_xcvr               (read and write)
enable_ipg0                (read and write)
ipg0                       (read and write)
ipg1                       (read and write)
ipg2                       (read and write)
rx_intr_pkts               (read and write)
rx_intr_time               (read and write)
red_dv4to6k                (read and write)
red_dv6to8k                (read and write)
red_dv8to10k               (read and write)
red_dv10to12k              (read and write)
tx_dma_weight              (read and write)
rx_dma_weight              (read and write)
infinite_burst             (read and write)
disable_64bit              (read and write)
name to get/set ?
#
```

Setting the Autonegotiation Mode

By default, autonegotiation is set to `on`. This means that the adapter communicates
with its link partner to determine a compatible network speed, duplex mode, and
flow control capability.

▼ To Disable Autonegotiation Mode

If your network equipment does not support autonegotiation, or if you want to specify your network speed, you can set autonegotiation to `off` on the `ce` device.

1. Set the following driver parameters to the values that are described in the documentation that shipped with your link partner (for example, a switch):

- `adv_1000fdx_cap`
- `adv_1000hdx_cap`
- `adv_100fdx_cap`
- `adv_100hdx_cap`
- `adv_10fdx_cap`
- `adv_10hdx_cap`
- `adv_asmpause_cap`
- `adv_pause_cap`

See TABLE 5-2 for the descriptions and possible values of these parameters.

2. Set the `adv_autoneg_cap` **parameter to** `0`**.**

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

When you change any `ndd` link parameter, a message similar to the following appears:

```
xcvr addr:0x00 - link up 1000 Mbps full duplex
```

Setting Parameters Using the `ce.conf` File

You can also specify the driver parameter properties on a per-device basis by creating a `ce.conf` file in the `/platform/sun4u/kernel/drv` directory. Use a `ce.conf` file when you need to set a particular parameter for a device in the system. The parameters you set are read and write parameters that are listed in "Driver Parameter Values and Definitions" on page 28.

The man pages for `prtconf`(1M) and `driver.conf`(4) include additional details. The next procedure shows an example of setting parameters in a `ce.conf` file.

▼ To Set Driver Parameters Using a `ce.conf` File

1. **Obtain the hardware path names for the `ce` devices in the device tree.**

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

   ```
   # grep ce /etc/path_to_inst
   "/ssm@0,0/pci@18,700000/ethernet@1" 1 "ce"
   "/ssm@0,0/pci@18,700000/network@1" 0 "ce"
   "/ssm@0,0/pci@19,600000/ethernet@1" 2 "ce"
   ```

   - In the previous example:
     - The first part within the double quotes specifies the hardware node name in the device tree.
     - The second number is the instance number (shown in bold italics).
     - The last part in double quotes 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 unit-address.

   To identify a PCI device unambiguously in the `ce.conf` file, use the name, 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 = `ssm@0,0`
   - Parent name = `/pci@18,700000`
   - Unit-address = `18`

   In the second line in the previous example:
   - Name = `ssm@0,0`
   - Parent name = `pci@18,700000`
   - Unit-address = `18`

   In the third line in the previous example:
   - Name = `ssm@0,0`
   - Parent name = `/pci@19,600000`
   - Unit-address = `19`

2. **Set the parameters for the above devices in the `/kernel/drv/ce.conf` file.**

In the following example, the `adv_autoneg_cap` and `adv_1000fdx_cap` parameters are set for all Sun GigaSwift Ethernet devices. (See the `driver.conf(4)` man page for more information.)

```
adv_autoneg_cap=0 adv_1000fdx_cap=0
```

In the following example, the `adv_autoneg_cap` and `adv_1000fdx_cap` parameters are set for a single instance of the Sun GigaSwift Ethernet device.

```
name=ssm@0,0 parent=pci@19,600000 unit address=19 adv_autoneg_cap=0
adv_1000fdx_cap=0;
```

3. **Save the** `ce.conf` **file.**

4. **Save and close all files and programs, and exit the windowing system.**

5. **Shut down and reboot the system.**

GigaSwift Ethernet Driver Operating Statistics

These statistics are part of the statistics presented by the `netstat -k` command.

TABLE 5-10 describes the read-only Media Independent Interface (MII) capabilities. These parameters define the capabilities of the hardware. The Gigabit Media Independent Interface (GMII) supports all of the following capabilities.

TABLE 5-10   Read-Only `ce` Device Capabilities

Parameter	Description (Local interface Capabilities)
`cap_autoneg`	0 = Not capable of autonegotiation 1 = Autonegotiation capable
`cap_1000fdx`	Local interface full-duplex capability 0 = Not 1000 Mbit/sec full-duplex capable 1 = 1000 Mbit/sec full-duplex capable
`cap_1000hdx`	Local interface half-duplex capability 0 = Not 1000 Mbit/sec half-duplex capable 1 = 1000 Mbit/sec half-duplex capable

TABLE 5-10 Read-Only `ce` Device Capabilities *(Continued)*

Parameter	Description (Local interface Capabilities)
cap_100fdx	Local interface full-duplex capability 0 = Not 100 Mbit/sec full-duplex capable 1 = 100 Mbit/sec full-duplex capable
cap_100hdx	Local interface half-duplex capability 0 = Not 100 Mbit/sec half-duplex capable 1 = 100 Mbit/sec half-duplex capable
cap_10fdx	Local interface full-duplex capability 0 = Not 10 Mbit/sec full-duplex capable 1 = 10 Mbit/sec full-duplex capable
cap_10hdx	Local interface half-duplex capability 0 = Not 10 Mbit/sec half-duplex capable 1 = 10 Mbit/sec half-duplex capable
cap_asm_pause	Local interface flow control capability 0 = Not asymmetric pause capable 1 = Asymmetric pause (from the local device) capable
cap_pause	Local interface flow control capability 0 = Not Symmetric pause capable 1 = Symmetric pause capable

Reporting the Link Partner Capabilities

TABLE 5-11 describes the read-only link partner capabilities.

TABLE 5-11   Read-Only Link Partner Capabilities

Parameter	Description
lp_cap_autoneg	0 = No autonegotiation 1 = Autonegotiation
lp_cap_1000fdx	0 = No 1000 Mbit/sec full-duplex transmission 1 = 1000 Mbit/sec full-duplex
lp_cap_1000hdx	0 = No 1000 Mbit/sec half-duplex transmission 1 = 1000 Mbit/sec half-duplex
lp_cap_100fdx	0 = No 100 Mbit/sec full-duplex transmission 1 = 100 Mbit/sec full-duplex
lp_cap_100hdx	0 = No 100 Mbit/sec half-duplex transmission 1 = 1000 Mbit/sec half-duplex
lp_cap_10fdx	0 = No 10 Mbit/sec full-duplex transmission 1 = 10 Mbit/sec full-duplex

TABLE 5-11   Read-Only Link Partner Capabilities   *(Continued)*

Parameter	Description
lp_cap_10hdx	0 = No 10 Mbit/sec half-duplex transmission 1 = 10 Mbit/sec half-duplex
lp_cap_asm_pause	0 = Not asymmetric pause capable 1 = Asymmetric pause towards link partner capability
lp_cap_pause	0 = Not symmetric pause capable 1 = Symmetric pause capable

If the link partner is *not* capable of autonegotiation (when lp_autoneg_cap is 0), the remaining information described in TABLE 5-11 is not relevant and the parameter value = 0.

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

TABLE 5-12 describes the netstat -k transmit and receive parameters:

TABLE 5-12   Transmit and Receive Parameters

Parameter	Description
xcvr_inits	Number of Physical layer re-initializations every time you change link parameters using NDD this increments.
rev_id	Revision ID of the GigaSwift Ethernet device useful for recognition of device being used in the field.
xcvr_addr	GMII/MII Physical layer device address for management interface.
xcvr_id	GMII/MII Physical layer device Identification Decimal copy of MII registers 2 and 3.
lb_mode	Copy of the Loopback mode the device is in, if any.
qos_mode	When zero, the TX queues operate in a simple round robin queueing scheme, based on TCP/UDP destination port number. If set the TX queues operate in a scheme designed to provide VLAN priorities.
tx_starts	Number of times that the driver attempted to transmit a packet.
tx_dma_bind_fail	Number of times a page table entry was not available to allow the driver to map the kernel memory to device accessible memory for transmission.
tx_queue0	Number of packets queued for transmission on the first hardware transmit queue.

TABLE 5-12 Transmit and Receive Parameters

Parameter	Description
tx_queue1	Number of packets queued for transmission on the second hardware transmit queue.
tx_queue2	Number of packets queued for Transmission on the third hardware transmit queue.
tx_queue3	Number of packets queued for Transmission on the fourth hardware transmit queue.
tx_max_pend	Maximum number of transmits pending on any of the four queues.
rx_hdr_pkts	Number of packets received that were less than 256 bytes.
rx_mtu_pkts	Number of packets received that were greater than 256 bytes and less than 1514 bytes.
rx_split_pkts	Number of packets that were split across two pages.
rx_no_comp_wb	Number of times the hardware cannot post completion entries for received data.
rx_no_buf	Number of times the hardware cannot receive data because there is no more receive buffer space.
rx_new_pages	Number of pages that got replaced during reception.
rx_new_hdr_pgs	Number of pages that were filled with packets less than 256 bytes that got replaced during reception.
rx_new_mtu_pgs	Number of pages that were filled with packets greater than 256 bytes and less than 1514 that got replaced during reception.
rx_new_nxt_pgs	Number of pages that contained packets that were split across pages that got replaced during reception.
rx_hdr_drops	Number of times a whole page of packets less than 256 bytes was dropped because the driver was unable to map a new one to replace it.
rx_mtu_drops	Number of times a whole page of packets greater than 256 bytes and less than 1514 was dropped because the driver was unable to map a new one to replace it.
rx_nxt_drops	Number of times a page with a split packet was dropped because the driver was unable to map a new one to replace it.
rx_rel_flow	Number of times the driver was told to release a flow.

▼ To Check Link Partner Settings

● **As superuser, type the** `netstat -k` **command:**

```
# netstat -k ce0
ce0:
ipackets 0 ipackets64 0 ierrors 0 opackets 0 opackets64 0
oerrors 0 collisions 0 rbytes 0 rbytes64 0 obytes 0 obytes64 0
multircv 0 multixmt 0 brdcstrcv 0 brdcstxmt 0 norcvbuf 0
noxmtbuf 0 first_collision 0 excessive_collisions 0 late_collisions 0
peak_attempts 0 length_err 0 alignment_err 0 crc_err 0 code_violations 0
ifspeed 0 rev_id 1 xcvr_inits 1 xcvr_inuse 3 xcvr_addr 0
xcvr_id 0 cap_autoneg 1 cap_1000fdx 1 cap_1000hdx 1 cap_100T4 0
cap_100fdx 0 cap_100hdx 0 cap_10fdx 0 cap_10hdx 0 cap_asmpause 0
cap_pause 1 lp_cap_autoneg 0 lp_cap_1000fdx 0 lp_cap_1000hdx 0
lp_cap_100T4 0 lp_cap_100fdx 0 lp_cap_100hdx 0 lp_cap_10fdx 0
lp_cap_10hdx 0 lp_cap_asmpause 0 lp_cap_pause 0 link_T4 0
link_speed 0 link_duplex 0 link_asmpause 0 link_pause 0
link_up 0 lb_mode 0 qos_mode 0 tx_inits 0 tx_starts 0 tx_nocanput 0
tx_msgdup_fail 0 tx_allocb_fail 0 tx_no_desc 0 tx_dma_bind_fail 0
tx_uflo 0 tx_queue0 0 tx_queue1 0 tx_queue2 0 tx_queue3 0
tx_max_pend 0 rx_inits 0 rx_hdr_pkts 0 rx_mtu_pkts 0 rx_split_pkts 0
rx_no_buf 0 rx_no_comp_wb 0 rx_ov_flow 0 rx_len_mm 0 rx_bad_descs 0
rx_nocanput 0 rx_msgdup_fail 0 rx_allocb_fail 0 rx_new_pages 0
rx_new_hdr_pgs 0 rx_new_mtu_pgs 0 rx_new_nxt_pgs 0 rx_hdr_drops 0
rx_mtu_drops 0 rx_nxt_drops 0 rx_rel_flow 0 rx_pkts_dropped 0
pci_err 0 pci_rta_err 0 pci_rma_err 0 pci_parity_err 0 pci_bad_ack_err 0
pci_drto_err 0 ipackets_cpu00 0 ipackets_cpu01 0 ipackets_cpu02 0
ipackets_cpu03 0
```

Specifications

This appendix lists the specifications for the Sun Gigabit Ethernet 3U Compact PCI adapter. It contains the following sections:

- "Connectors" on page 45
- "Performance Specifications" on page 46
- "Physical Dimensions" on page 46
- "Power Specifications" on page 46
- "Environmental Specifications" on page 47

Connectors

FIGURE A-1 shows the connector for the Sun Gigabit Ethernet 3U cPCI adapter.

FIGURE A-1   Sun Gigabit Ethernet 3U cPCI Adapter Connector

TABLE A-1 lists the characteristics of the SC Connector (850 nm).

TABLE A-1   SC Connector Link Characteristics (IEEE P802.3z)

Description	62.5 Micron MMF	50 Micron MMF
Operating range	Up to 260 meters	Up to 550 meters

Performance Specifications

TABLE A-2 Performance Specifications

Feature	Specification
cPCI clock	33MHz/66MHz .
Maximum burst transfer rate	34 Mbytes/sec (approximately)
Steady state transfer rate	5 Mbytes/sec
cPCI bus modes	Master/Slave

Physical Dimensions

TABLE A-3 Physical Dimensions

Dimension	Measurement
Length	160 mm
Width	100 mm

Power Specifications

TABLE A-4 Power Specifications

Specification	Measurement
Power dissipation	6.67 Watt/66 MHz operation mode
Voltage tolerance	+/- 5%
Ripple	< = 100 mV
Operational current	1.9 Amps/66 MHz operation mode

Environmental Specifications

TABLE A-5   Environmental Specifications

Condition	Operating Specification	Storage Specification
Temperature	0 to 70 C (+32 to +131 F)	-25 to 70 C (-25 to +131 F)
Relative humidity	5 to 85% non-condensing (40 C, wet bulb temperature)	0 to 95% non-condensing 40 C/hour
Altitude	-1000 to +15,000 ft.	-1000 to +50,000 ft.
Shock	5g, 1/2 sine wave, 11 msec	30g, 1/2 sine wave, 11 msec
Vibration, pk to pk displacement	0.005 in. max. (5 to 32 Hz)	0.1 in. max (5 to 17 Hz)
Vibration, peak acceleration	0.25g (5 to 500 Hz) (Sweep rate = 1 octave/min.)	1.0g (5 to 500 Hz) (Sweep rate = 1 octave/min.)

Diagnostic Software and Troubleshooting Issues

This appendix provides an overview of the SunVTS diagnostic application and instructions for testing the adapter using the onboard FCode self-test. There is also a section outlining some common troubleshooting issues. This appendix contains the following sections:

- "SunVTS Diagnostic Software" on page 49
- "Using the OpenBoot PROM FCode Self-Test" on page 50
- "Troubleshooting Issues" on page 52
- "Non-Specific Issues" on page 54

SunVTS Diagnostic Software

The SunVTS software executes multiple diagnostic hardware tests from a single user interface and is used to verify the configuration and functionality of most hardware controllers and devices. The SunVTS software operates primarily from a graphical user interface, enabling test parameters to be set quickly and easily while a diagnostic test operation is being performed.

The `nettest` diagnostic checks all the networking interfaces on a system, including the Sun Gigabit Ethernet 3U Compact PCI adapter. Refer to the *SunVTS User's Guide* for more information on how to run the `nettest` diagnostic test.

Note – To use the `nettest` diagnostic, you must have the SunVTS software installed on your system. Refer to the *Solaris Sun Hardware Platform Guide*, which was shipped with the *Solaris Supplement* CD, for instructions on how to install the SunVTS software.

Using the OpenBoot PROM FCode Self-Test

The following tests are available to help identify problems with the adapter if the system does not boot.

You can invoke the FCode self-test diagnostics by using the OpenBoot user interface `test` or `test-all` commands. If you encounter an error while running diagnostics, appropriate messages will be displayed. Refer to the appropriate *OpenBoot Command Reference Manual* for more information on the `test` and `test-all` commands.

The FCode self-test exercises most functionality sub-section by sub-section and ensures the following:

- Connectivity during adapter card installation
- Verification that all components required for a system boot are functional

▼ Running the Ethernet FCode Self-Test Diagnostic

To run the Ethernet diagnostics, you must first bring the system to a stop at the OpenBoot prompt after issuing a `reset-all` at the OBP `ok` prompt. If you do not reset the system, the diagnostic tests might cause the system to hang.

For more information about the OpenBoot commands in this section, refer to the appropriate *OpenBoot Command Reference Manual.*

1. **Shut down the system.**

   Use the standard shutdown procedures described in the *Solaris Handbook for Sun Peripherals.*

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

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

3. **Reset the system.**

   ```
   ok reset-all
   ```

4. **Type** `show-nets` **to display the list of devices.**

   You should see a list of devices, similar to the example below, specific to the adapter:

   ```
   ok show-nets
   a) /ssm@0,0/pci@1d,600000/network@1
   b) /ssm@0,0/pci@1c,700000/network@1
   q) NO SELECTION
   Enter Selection, q to quit:
   ```

   Type the following to run the self-test using the `test` command:

   ```
   ok test device-path
   ```

   The following tests are run when the `test` command is executed:

   - `ce` register test (happens only when `diag-switch?` is true)
   - internal loopback test
   - link up/down test

5. **If the** `test` **passes, you see these messages:**

   ```
   ok test /ssm@0,0/pci@1c,700000/network@1
   ce register test --- succeeded.
   Internal loopback test -- succeeded.
   Link is  -- up
   ```

   If the card is not connected to a network, you see the following messages:

   ```
   ok test /ssm@0,0/pci@1c,700000/network@1
   ce register test --- succeeded.
   Internal loopback test -- succeeded.
   Link is  -- down
   ok
   ```

6. **For more robust test results, set the** `diag-switch?` **to** `true` **and reissue the tests as shown in Step above.**

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

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

```
ok setenv diag-switch? false
```

8. **Set the** `auto-boot?` **configuration parameter to** `true`.

```
ok setenv auto-boot? true
```

9. **Reset and reboot the system.**

Refer to the appropriate *OpenBoot Command Reference Manual* for more information.

Troubleshooting Issues

Known Incompatibilities with Pre-IEEE 802.3z Network Switches

You might experience interoperability issues when using the Sun Gigabit Ethernet 3U Compact PCI adapter with the SunSwitch switch, the Alteon ACE 110 switch, or other pre- or non-IEEE 802.3z standard compliant network equipment. If you experience difficulties with noncompliant equipment, set the adapter and switch autonegotiation properties to `off` and try to configure the interface manually.

▼ To Set Autonegotiation to `off` for a SunSwitch or an Alteon ACE 110 Switch

You can set autonegotiation to `off` for SunSwitch and Alteon ACE 110 switches using those switches' configuration program (`cgf`). Refer to your switch documentation for instructions on how to access and use the `cgf` program.

The following procedure describes how to turn autonegotiation off for one SunSwitch port.

1. **Establish a connection to the switch using either a serial connection or a Telnet connection.**

   Refer to the *SunSwitch 1.1 Installation and Configuration Guide* (805-3743-10) for more information. After connecting to the switch, the Main menu prompt (`Main#`) is displayed.

2. **At the** `Main#` **prompt, type** `cfg` **to display the Configuration menu and prompt (**`Configuration#`**).**

   ```
   >> Main# cfg
   [Configuration Menu]
           sys   -  System-wide parameter menu
           port  -  Port configuration menu
           ip    -  IP addressing menu
           vlan  -  VLAN configuration menu
           stp   -  Spanning Tree menu
           snmp  -  SNMP menu
           setup -  Step by step configuration set up
           dump  -  Dump current configuration to script file

   >> Configuration#
   ```

3. **Type the following to disable autonegotiation on a GigaSwift Ethernet port.**

   Replace *portnumber* with the Ethernet port used by the adapter.

   ```
   >> Configuration# /port portnumber/auto off
   ```

4. **Type the following to apply and save your changes.**

   ```
   >> Configuration# apply
   >> Configuration# save
   ```

   Refer to the switch documentation for further configuration instructions.

▼ To Set Autonegotiation to `off` for Other Noncompliant Network Equipment

If your network equipment does not support autonegotiation, you can set autonegotiation to `off` on the GigaSwift Ethernet (`ce`) device.

1. **Set the following GigaSwift Ethernet driver parameters to values according to the documentation that shipped with your switch:**

   - `adv_1000fdx_cap`
   - `adv_1000hdx_cap`
   - `adv_pauseTX`
   - `adv_pauseRX`.

2. **Set the** `adv_autoneg_cap` **parameter to** `0`**.**

Note – See Chapter 5 for the default values of these parameters and for instructions on how to set these parameters.

Non-Specific Issues

TABLE B-1 describes the problems you may encounter in using the GigaSwift Ethernet adapter as well as a solution for them:

TABLE B-1   Troubleshooting the GigaSwift Ethernet Adapter

Problem	Description	Solution
`prtdiag` does not recognize the NIC in slot 0.	If a PCI I/O board of an UltraSPARC III system is filled with network adapters with an internal bridge (for example, GigaSwift Ethernet or Quad FastEthernet), `prtdiag` displays the card on slot 0. Although the card in slot 1 is not recognized by `prtdiag`, the card is fully operational and appears in the `/etc/path_to_inst` file.	Use `prtconf -pv` instead of `prtdiag`
VLAN appears to accept VID 0 as end user input.	`ce000000`, `ce00000`, or `ce0000` configured as VID 0 is actually the regular `ce0` interface not VID 0 of the `ce0` interface. VID 0 is not supported as an end user device.	This is normal behavior.
`net-install`, diskless-boot hangs in 10/100 HDX mode; `nfs` mount and RPC time out.	In 10/100 HDX mode, a system connected directly to a hub hangs after the `root` file system is mounted when performing `netinstall` or diskless boot. The problem does not occur when the system connects directly to a 10/100 HDX switch.	• Use 10/100 FDX for netinstall or diskless booting. • Connect the system to a 10/100 HDX switch.

Problem	Description	Solution
System panics in Solaris 7 11/99 environment when CPR attempts to suspend a non-suspendable thread	The GigaSwift Ethernet driver uses certain not suspendable kernel threads. When CPR attempts to suspend the driver, the system panics. Currently, CPR is supported only in Sun desktop systems (for example, Ultra 10 and Ultra 60).	• Turn off CPR. • A CPR fix is incorporated in Solaris 8.
`Inetboot` may require several retries to complete with OBP 4.x	Systems with OBP 4.x (for example, Sun Blade 1000) may automatically retry several times before completing. The message below is displayed for each retry: Retrying ... Check TFTP server and network setup	Ignore these console messages until booting is complete

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