Sun™ Dual FastEthernet and Dual SCSI/P Adapter Installation and User's Guide

THE NETWORK IS THE COMPUTER™

Sun Microsystems, Inc.
901 San Antonio Road
Palo Alto, CA 94303-4900 USA
650 960-1300 Fax 650 969-9131

Part No. 806-6052-10
November 2001, Revision A

Send comments about this document to: docfeedback@sun.com

Please
Recycle

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

クラス A VCCI の表示があるワークステーションおよびオプション製品は、クラス A 情報技術装置です。これらの製品には、下記の項目が該当します。

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。

クラス B VCCI 基準について

クラス B VCCI の表示  があるワークステーションおよびオプション製品は、クラス B 情報技術装置です。これらの製品には、下記の項目が該当します。

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 B 情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。取扱説明書に従って正しい取り扱いをしてください。

Declaration of Conformity

Compliance Model Number: Cauldron

Product Family Name: Sun Dual Fast Ethernet and Dual SCSI/P adapter

EMC

USA—FCC Class B

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

1. This equipment may not cause harmful interference.
2. This equipment must accept any interference that may cause undesired operation.

European Union

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

EN55022:1998/CISPR22:1997		Class B
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 the 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.

/S/

Dennis P. Symanski DATE
Manager, Compliance Engineering
Sun Microsystems, Inc.
901 San Antonio Road, MPK15-102
Palo Alto, CA 94303-4900 U.S.A.
Tel: 650-786-3255
Fax: 650-786-3723

/S/

Peter Arkless DATE
Quality Manager
Sun Microsystems Scotland, Limited
Springfield, Linlithgow
West Lothian, EH49 7LR
Scotland, United Kingdom
Tel: 0506-670000 Fax: 0506-760011

Contents

Figures

Tables

Preface

The *Sun Dual Fast Ethernet and Dual SCSI/P Adapter Installation and User's Guide* provides installation instructions for the Sun™ Dual Fast Ethernet and Dual SCSI/P adapter. This manual also describes how to 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 Adapter,"** describes how to install the adapter in your system and how to verify that it has been installed correctly.
- **Chapter 3, "Network Configuration,"** describes how to edit the network host files after the adapter has been installed on your system.
- **Chapter 4, "Configuring Driver Parameters,"** describes how to configure the driver parameters used by the Sun Dual Fast Ethernet and Dual SCSI/P adapter.
- **Appendix A, "Specifications,"** lists the specifications for the Sun Dual Fast Ethernet and Dual SCSI/P adapter.
- ,**Appendix B "Interface Signals, "** lists the interface signals for both the SCSI-2 and RJ-45 connectors.
- **Appendix C, "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
```

Ordering Sun Documentation

Fatbrain.com, an Internet professional bookstore, stocks select product documentation from Sun Microsystems, Inc.

For a list of documents and how to order them, visit the Sun Documentation Center on Fatbrain.com at:

`http://www.fatbrain.com/documentation/sun`

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 (806-6052-10) of your document in the subject line of your email.

CHAPTER 1

Product Overview

This chapter provides a description of both the Sun Dual Fast Ethernet and Dual SCSI/P adapter hardware and software.

This chapter includes the following sections:

Hardware Overview

The Sun Dual Fast Ethernet and Dual SCSI/P adapter is a PCI card with two Fast Ethernet and two Ultra2 SCSI interfaces. The full-size card has a high performance PCI host interface with two UTP RJ-45 connectors for 10/100 Mbps Ethernet and a dual SCSI connector for 80 MBytes/sec SCSI interfaces.

The adapter provides extended attachment to FastEthernet LANs as well as connectivity to peripheral devices that require the Ultra2 SCSI interface.

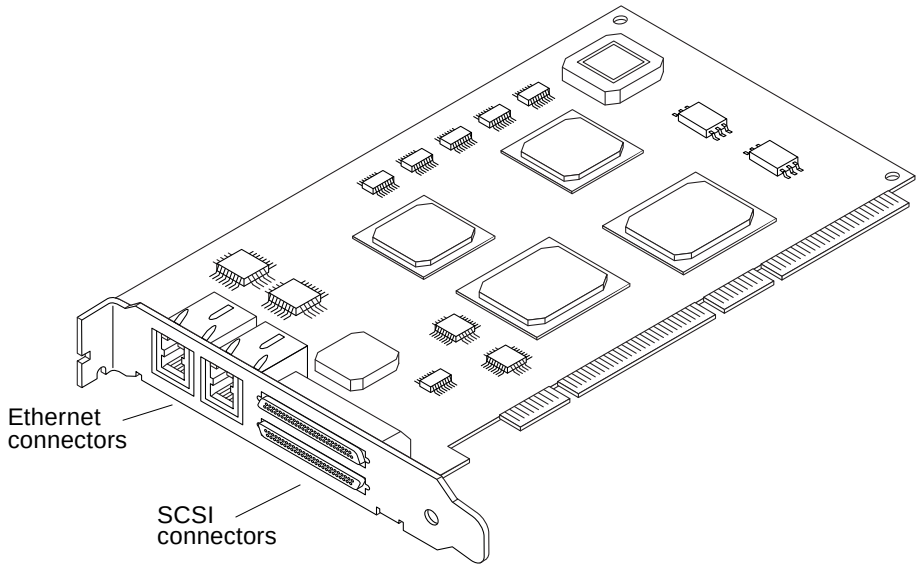

FIGURE 1-1 Sun Dual Fast Ethernet and Dual SCSI/P Adapter

LED Displays

Two Fast Ethernet port connectors are on the front panel of the Sun Dual Fast Ethernet and Dual SCSI/P adapter. Each port has two LED's. The explanation of the function of each LED is given in TABLE 1-1.

TABLE 1-1 Front Panel Display LEDs

Color	Meaning
Green	Physical connection to the network
Amber	Activity on the port

Hardware and Software Requirements

Before using the Sun Dual Fast Ethernet and Dual SCSI/P adapter, make sure your system meets the following hardware and software requirements:

Hardware and Software	Requirements
Hardware	Sun Ultra™ 5, 10, 60, 80 Sun Enterprise™ 220R, 250, 450, 10000 Sun Blade™ 100, 1000 Sun Fire™ 280R, 880R, 3800, 4800, 6800, 15K
Operating Environment	Solaris 8 10/01 and subsequent compatible releases
Firmware	OpenBoot™ PROM version 3.0 or greater
Peripherals Attached to PCI Adapter	All Ultra 2 SCSI devices
SCSI Cables	Only standard, Sun-supported cabling to ensure reliable SCSI interface connections

Supported Cables

The following cables, which you can order from Sun Microsystems, Inc., are required for this adapter:

- X1132A 530-2452-02 (CBL,ULTRA SCSI-3/VHDCI,68P.8M)
- X3832A 530-2453-02 (CBL,ULTRA SCSI-3/VHDCI,68P 2M)
- X3830A 530-2454-02 (CBL,ULTRA SCSI-3/VHDCI,68P 4M)
- X3831A 530-2455-02 (CBL,ULTRA SCSI-3/VHDCI,68P 10M)

Product Features

Following is a list of features for the Sun Dual Fast Ethernet and Dual SCSI/P adapter:

PCI Bus Interface

- PCI Local Bus Rev 2.2 compliant (6.875-inch x 4.2-inch short card)
- 33/66-MHz, 32- or 64-bit bus master
- Universal PCI slot (3.3V and 5V)
- Hot-plug capable
- Infinite Burst capable on Ultra III machines

Fast Ethernet Interfaces

- UTP RJ-45 connectors for 10/100 Mbps Ethernet
- Full and half-duplex Fast Ethernet interface
- Two independent IEEE 802.3 compatible 10/100BASE-T Ethernet channels
- Low CPU utilization—Frees up server system resource and bandwidth
- Dynamic Reconfiguration (DR) and Redundancy/Failover support
- Load balancing for RX packets among multiple CPUs
- RAS support

Ultra2 SCSI Interfaces

- 68-pin dual 0.8mm high-density SCSI interfaces
- 8-, 16-, 32-, and 64-byte PCI bursts
- Two independent 16-bit Ultra 2 SCSI channels
- Each SCSI interface supports single-ended (SE) or low volted differential (LVD) SCSI connector
  - Maximum LVD transfer rate of 80 MBytes/sec
  - Maximum SE transfer rate of 40 MBytes/sec
- 64-bit PCI transfers at 33 MHz
- Dynamic Reconfiguration (DR) and Redundancy/Failover support
- RAS support

Diagnostic Support

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

CHAPTER 2

Installing the Adapter

This chapter describes how to install the adapter in your system and how to verify that it has been installed correctly. This chapter is divided into the following sections:

Note – If you have a Sun Enterprise system that supports dynamic reconfiguration (DR), refer to the *Sun Enterprise Dynamic Reconfiguration User's Guide* and your systems documentation for further information about dynamic reconfiguration.

Installing the Driver Software

The *Sun GigaSwift Ethernet* CD contains the driver software required to operate the adapter. The Sun GigaSwift Ethernet driver software, included in the Solaris operating environment from Solaris 8 10/01 and subsequent compatible releases, is compatible with the Sun Dual Fast Ethernet and Dual SCSI/P adapter. Refer to the documentation that shipped with the *Solaris Supplement* CD-ROM for more information.

1. **Become superuser.**

2. **Insert the** *Sun GigaSwift Ethernet* **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
# mount -F hsfs -o ro /dev/dsk/c0t6d0s2 /cdrom
```

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

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/`	Contains PDF copy of the user manual

`DualFastEthernet/`
`Solaris_8/`
`Packages/`
	Contains the Sun GigaSwift Ethernet software
	Packages applicable to Solaris 8
	• 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
	• SUNWvld—VLAN utility routines
	• SUNWvldx—VLAN utility routines (64-bit)
	• SUNWvldu—VLAN utility headers

3. **Install the software packages by typing at the command line:**

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

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

Installing the Adapter Without Dynamic Reconfiguration

▼ To Install the Adapter

Note – The following instructions describe the basic tasks required to install the adapter. Refer to your system installation or service manual for detailed PCI adapter installation instructions.

1. **Halt and power off your system.**
2. **Power off all of the peripherals connected to your system.**
3. **Open the system unit.**
4. **Attach the adhesive copper strip of the antistatic wrist strap to the metal casing of the power supply. Wrap the other end twice around your wrist, with the adhesive side against your skin.**
5. **Holding the PCI adapter by the edges, unpack it and place it on an antistatic surface.**
6. **Using a No. 1 Phillips screwdriver, remove the PCI filler panel from the slot in which you want to insert the PCI adapter.**

   Save the filler panel screw for Step 9.
7. **Holding the PCI adapter by the edges, align the adapter edge connector with the PCI slot. Slide the adapter face plate into the small slot at the end of the PCI opening.**

8. **Applying even pressure at both corners of the adapter, push the PCI adapter until it is firmly seated in the slot.**

Caution – Do not use excessive force when installing the adapter into the PCI slot. You may damage the adapter's PCI connector. If the adapter does not seat properly when you apply even pressure, remove the adapter and carefully reinstall it again.

9. **Secure the adapter to the PCI slot using the screw you removed in Step 6.**
10. **Detach the wrist strap and close the system unit.**
11. **Connect the SCSI cables.**
12. **Connect the Ethernet cables.**
    a. **Connect one end of the Ethernet cable to the port on the card.**
    b. **Connect the other end of the Ethernet cable to an active Ethernet network.**

▼ To Verify the Installation

After you have installed the Sun Dual Fast Ethernet and Dual SCSI/P adapter, but *before* you boot your system, perform the following tasks to verify the installation. Refer to the *Solaris Handbook for Sun Peripherals* manual or your Solaris documentation for the detailed instructions.

Note – Verification is not required if your system supports Dynamic Reconfiguration (DR).

1. **Power on the system, and when the banner appears, press the Stop-A key sequence to interrupt the boot process and display the OpenBoot (**ok**) prompt.**

2. **Use the** `show-devs` **command to list the system devices.**

   You should see PCI adapter output similar to the example below.

```
ok show-devs
/pci@2,2000/pci@2           -----> Bridge Chip
/pci@2,2000/pci@2/scsi@2,1  -----> SCSI port #2
/pci@2,2000/pci@2/scsi@2    -----> SCSI port #1
/pci@1f,2000/pci@1/network@1 -----> Network #1
/pci@1f,2000/pci@1/network@0 -----> Network #2
/pci@2,2000/pci@2/scsi@2,1/tape -> SCSI Devices that can be Connected
/pci@2,2000/pci@2/scsi@2,1/disk
/pci@2,2000/pci@2/scsi@2/tape
/pci@2,2000/pci@2/scsi@2/disk
```

   If these devices are not listed, check that the adapter is properly seated and reinstall the adapter, if necessary.

3. **List the SCSI interfaces on your system.**

```
ok probe-scsi-all:
/pci@7,4000/SUNW,isptwo@3
/pci@3,2000/pci@2/SUNW,isptwo@4
/pci@3,4000/SUNW,isptwo@3 -----> Onboard SCSI devices
Target 0
  Unit 0   Disk     QUANTUM VK4550J  SUN4.2G8817
Target 6
  Unit 0   Removable Read Only device    TOSHIBA XM-
5401TASUN4XCD1036

/pci@2,2000/pci@2/scsi@2,1 -----> SCSI port #2
Target 4
  Unit 0   Disk     SEAGATE ST15230W SUN4.2G0738
Target 5
  Unit 0   Removable Read Only device   SONY   CD-ROM CDU-8012 3.1a

/pci@2,2000/pci@2/scsi@2 -----> SCSI port #1
Target 1
  Unit 0   Disk     SEAGATE ST11200N SUN1.058808
Target 2
  Unit 0   Disk     SEAGATE ST31200N SUN1.059866
Target 4
  Unit 0   Disk     SEAGATE ST32171W SUN2.1G7462
Target 5
  Unit 0   Disk     SEAGATE ST15230W SUN4.2G0738
```

   - `isptwo@3` identifies the onboard SCSI device.

- `scsi@2,1` identifies the first SCSI interface on the Dual SCSI/P adapter.
- `scsi@2` identifies the second SCSI interface on the Dual SCSI/P adapter.

If these devices are not listed, check that the adapter is properly seated and reinstall the adapter, if necessary.

4. **View the `.properties` file for a list of device properties.**

   It may be difficult to tell if the devices on your network are SCSI devices or other network interface cards. The `.properties` command displays the specific information about the installed adapter.

   To make sure that the device you just installed is connected to the network, type the following to check one SCSI device:

```
cd /pci@1f,4000/pci@5/scsi@2,1
ok .properties
assigned-addresses       81011110 00000000 00001400 00000000 00000100
                         83011114 00000000 00920000 00000000 00002000
                         8301111c 00000000 00922000 00000000 00002000
                         82011130 00000000 00930000 00000000 00010000
device_type              scsi-2
clock-frequency          02625a00
reg                      00011100 00000000 00000000 00000000 00000000
                         01011110 00000000 00000000 00000000 00000100
                         03011114 00000000 00000000 00000000 00002000
                         0301111c 00000000 00000000 00000000 00002000
                         02011130 00000000 00000000 00000000 00010000
name                     scsi
compatible               70 63 69 31 30 30 30 2c 62 2e 37 00 70 63 69 31
fcode-rom-offset         00000000
devsel-speed             00000001
class-code               00010000
interrupts               00000001
max-latency              00000040
min-grant                00000011
revision-id              00000007
device-id                0000000b
vendor-id                00001000
```

Type the following to verify the second SCSI device::

```
ok cd /pci@1f,4000/pci@5/scsi@2
ok .properties
assigned-addresses       81011010 00000000 00001000 00000000 00000100
                         83011014 00000000 00900000 00000000 00002000
                         8301101c 00000000 00902000 00000000 00002000
                         82011030 00000000 00910000 00000000 00010000
device_type              scsi-2
clock-frequency          02625a00
reg                      00011000 00000000 00000000 00000000 00000000
                         01011010 00000000 00000000 00000000 00000100
                         03011014 00000000 00000000 00000000 00002000
                         0301101c 00000000 00000000 00000000 00002000
                         02011030 00000000 00000000 00000000 00010000
name                     scsi
compatible               70 63 69 31 30 30 30 2c 62 2e 37 00 70 63 69 31
fcode-rom-offset         00000000
devsel-speed             00000001
class-code               00010000
interrupts               00000001
max-latency              00000040
min-grant                00000011
revision-id              00000007
device-id                0000000b
vendor-id                00001000
```

Note – Your `.properties` list may differ slightly from the examples above. The properties list will be affected by the system the SCSI is connected to.

5. **List the network devices on your system.**

```
ok show-nets
```

Use the `show-nets` command to list the system devices. You should see the full path name of the `network` devices, similar to the example below. In this example, the `network@1` and the `network@2` device are the Sun Dual Fast Ethernet and Dual SCSI/P adapter and the `hme@0,1` is the onboard Ethernet device.

```
ok show-nets
a) /pci@1f,2000/pci@1/network@1
b) /pci@1f,2000/pci@1/network@0
c) /pci@1f,4000/network@1,1
q) NO SELECTION
Enter Selection, q to quit:
```

- network@1 identifies the first FastEthernet port
- network@0 identifies the second FastEthernet port.

Note – If you do not see the device listed, check that the adapter is properly seated and, if necessary, reinstall the adapter.

---

6. **View the device that you installed.**

Using the previous example, type:

```
cd /pci@2,2000/pci@2/network@1
```

7. **View the** `.properties` **file for a list of device properties.**

   It may be difficult to tell if the devices on your network are FastEthernet devices or other network interface cards. The `.properties` command displays the specific information about the installed adapter.

   To make sure that the device you just installed is connected to the network, typethe following to check one FastEthernet device::

```
ok cd cd /pci@1f,2000/pci@1/network@1
ok .properties
assigned-addresses       82810810 00000000 00600000 00000000 00200000
                         82810830 00000000 00800000 00000000 00100000
d-fru-len                00 00 00 00
d-fru-off                00 00 e8 00
d-fru-dev                eeprom
s-fru-len                00 00 08 00
s-fru-off                00 00 e0 00
s-fru-dev                eeprom
compatible               70 63 69 31 30 38 65 2c 61 62 62 61 2e 31 31 00
reg                      00810800 00000000 00000000 00000000 00000000
                         02810810 00000000 00000000 00000000 00200000
                         02810830 00000000 00000000 00000000 00100000
address-bits             00 00 00 30
max-frame-size           00 00 40 00
device_type              network
name                     network
local-mac-address        08 00 20 8a 63 89
version                  Sun PCI Dual Fast Ethernet 10/100 Base-T FCode 2.5
01/07/24
phy-type                 mif
board-model              501-5727
model                    SUNW,pci-ce
fcode-rom-offset         00000000
66mhz-capable
fast-back-to-back
devsel-speed             00000002
class-code               00020000
interrupts               00000001
max-latency              00000040
min-grant                00000040
revision-id              00000011
device-id                0000abba
vendor-id                0000108e
```

Type the following to verify the second FastEthernet device:

```
cd /pci@1f,2000/pci@1/network@0
ok .properties
assigned-addresses       82810010 00000000 00200000 00000000 00200000
                         82810030 00000000 00400000 00000000 00100000
d-fru-len                00 00 00 00
d-fru-off                00 00 e8 00
d-fru-dev                eeprom
s-fru-len                00 00 08 00
s-fru-off                00 00 e0 00
s-fru-dev                eeprom
compatible               70 63 69 31 30 38 65 2c 61 62 62 61 2e 31 31 00
reg                      00810000 00000000 00000000 00000000 00000000
                         02810010 00000000 00000000 00000000 00200000
                         02810030 00000000 00000000 00000000 00100000
address-bits             00 00 00 30
max-frame-size           00 00 40 00
device_type              network
name                     network
local-mac-address        08 00 20 8a 63 88
version                  Sun PCI Dual Fast Ethernet 10/100 Base-T FCode 2.5
01/07/24
phy-type                 mif
board-model              501-5727
model                    SUNW,pci-ce
fcode-rom-offset         00000000
66mhz-capable
fast-back-to-back
devsel-speed             00000002
class-code               00020000
interrupts               00000001
max-latency              00000040
min-grant                00000040
revision-id              00000011
device-id                0000abba
vendor-id                0000108e
```

Note – If you are going to set the `local-mac-address` property, note the `local-mac-address` of your device at this time. See “Setting the `local-mac-address` Property” on page 17 for more information.

Setting the `local-mac-address` Property

Note – Setting the `local-mac-address` property is only required if you will be booting from the network.

The network interface of the Sun Dual Fast Ethernet and Dual SCSI/P adapter has been assigned a unique Media Access Control (MAC) address, which represents the 48-bit Ethernet address for that interface. The OpenBoot firmware reports this MAC address via the `local-mac-address` property in the device nodes corresponding to the network interface.

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 it. In the Solaris operating environment, you can use the MAC address 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 address assigned to the network interface of the Sun Dual Fast Ethernet and Dual SCSI/P adapter, set the NVRAM configuration variable `local-mac-address?` to `true`.

```
ok setenv local-mac-address? true
```

Rebooting the System

After verifying the adapter installation, use the `boot -r` command to perform a reconfiguration boot on your system.

```
ok boot -r
```

Installing the Adapter With Dynamic Reconfiguration

If you have a Sun Enterprise system that supports Dynamic Reconfiguration (DR), you do not have to reboot your system after installing the adapter.

The process of adding and configuring an adapter with DR involves (1) connecting the attachment point and (2) configuring its occupant. In most cases, the `cfgadm(1M)` command can perform both steps at once.

▼ To Install an Adapter in a Dynamic Reconfiguration System

1. **Verify that the selected board slot is ready for the adapter.**

```
# cfgadm
```

The states and conditions should be:

```
Receptacle state–Empty
Occupant state–Unconfigured
Condition–Unknown
```

Or

```
Receptacle state–Disconnected
Occupant state–Unconfigured
Condition–Unknown
```

2. **If the status of the slot is not “empty” or “disconnected”, enter:**

```
# cfgadm -c disconnect sysctrl#:slot#
```

3. **Physically insert the adapter into the slot and look for an acknowledgement on the console, such as, “***name* `board inserted into slot3`**.”**

After an I/O board is inserted, the states and conditions should become:

```
Receptacle state—Disconnected
Occupant state—Unconfigured
Condition—Unknown
```

Any other states or conditions should be considered an error.

4. **Connect any peripheral cables and interface modules to the adapter.**
5. **Configure the board with the command:**

```
# cfgadm -v -c configure sysctrl#:slot#
```

This command should both connect and configure the receptacle. Verify with the `cfgadm` command.

The states and conditions for a connected and configured attachment point should be:

```
Receptacle state—Connected
Occupant state—Configured
Condition—OK
```

Now the system is also aware of the usable devices which reside on the adapter and all devices may be mounted or configured to be used.

If the command fails to connect and configure the adapter and slot (the status should be shown as “configured” and “ok”), do the connection and configuration as separate steps:

a. **Connect the adapter and slot by entering:**

```
# cfgadm -v -c connect sysctrl#:slot#
```

The states and conditions for a connected attachment point should be:

```
Receptacle state–Connected
Occupant state–Unconfigured
Condition–OK
```

Now the system is aware of the adapter, but not the usable devices which reside on the adapter. Temperature is monitored and power and cooling affect the attachment point condition.

b. Configure the adapter and slot by entering:

```
# cfgadm -v -c configure sysctrl#:slot#
```

The states and conditions for a configured attachment point should be:

```
Receptacle state–Connected
Occupant state–Configured
Condition–OK
```

Now the system is also aware of the usable devices which reside on the adapter and all devices may be mounted or configured to be used.

6. Reconfigure the devices on the adapter by entering:

```
# drvconfig; devlinks; disks; ports; tapes;
```

The console should now display a list of devices and their addresses.

7. Connect the cables to the card and to an Ethernet network.

CHAPTER 3

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

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
"/pci@1f,2000/pci@1/network@1" 3 "ce"
"/pci@1f,2000/pci@1/network@0" 0 "ce"
"/pci@1f,4000/pci@2/network@0" 1 "ce"
"/pci@1f,4000/pci@2/network@1" 2 "ce"
```

In the example above, the device instance is from a Sun Dual Fast Ethernet and Dual SCSI/P adapter. For clarity, the instance number is in bold italics.

2. **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 ce0 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 Dual Fast Ethernet and Dual SCSI/P adapter 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 Dual Fast Ethernet and Dual SCSI/P 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
```

Setting Up a Diskless Client System on a GigaSwift Ethernet Network

Before you can boot and operate a diskless client system across a gigabit Ethernet network, you must first install the GigaSwift Ethernet software packages into the root directory of the diskless client located on the root server. You can find the GigaSwift Ethernet software packages on the *Sun GigaSwift Ethernet Driver* CD. Refer to the *Solaris Advanced Installation Guide* and the *System Administration Guide* for more information about installing and administering diskless client systems.

Note – The Solaris 8 operating environment does not support diskless clients. Solaris 8 Update 1/01 does support diskless clients. Refer to the *Solaris Advanced Installation Guide* and the *System Administration Guide* for more information about installing and administering diskless client systems.

▼ To Set Up a Diskless Client on a GigaSwift Ethernet Network

1. **Locate the root directory of the diskless client on the host server.**

   The root directory of diskless client system is commonly installed in the host server's `/export/root/`*client_name* directory, where *client_name* is the diskless client's host name. In this procedure, the root directory will be:

```
# ls /export/root
systest157-38/  systest162-38/  systest180-38/
systest160-38/  systest177-38/  systest182-38/
```

2. **Insert the** *Sun GigaSwift Ethernet Driver* **CD into the server's CD-ROM drive.**

   The CD should automatically mount to the `/cdrom/cdrom0` directory. If the CD did not get mounted to this directory, refer to "Installing the Driver Software" on page 7 for mounting instructions.

3. **Use the `pkgadd -R` command to install the three GigaSwift Ethernet software packages to the diskless client's root directory on the server. Either choose from the following packages, those you want to install.**

   - 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)

Install the software packages you choose to the client's root directory.

```
# cd /cdrom/cdrom0/GigaSwiftEthernet/Packages
# pkgadd -R /export/root/client_name -d . SUNWcea SUNWced.u SUNWcem SUNWcedu
# cd /
```

The above example installs all the packages you need for 32-bit client as well as manpages and header files..

```
# cd /cdrom/cdrom0/GigaSwiftEthernet/Packages
# pkgadd -R /export/root/client_name -d . SUNWceax SUNWcedx.u SUNWcem SUNWcedu
# cd /
```

The above example installs all the packages you need for 64-bit client as well as manpages and header files.

To install all the software packages to the client's root directory, use the following command:

```
# cd /cdrom/cdrom0/GigaSwiftEthernet/Packages
# pkgadd -R /export/root/client_name -d .
# cd /
```

4. **Eject the** *Sun GigaSwift Ethernet Driver* **CD from the CD-ROM drive.**

5. **Create a** `hostname.ce`*number* **file in the diskless client's root directory.**

   You will need to create an `/export/root/`*client_name*`/etc/hostname.ce`*number* file for the GigaSwift Ethernet interface. See "Configuring the Network Host Files" on page 21 for instructions.

6. **Edit the** `hosts` **in the diskless client's root directory.**

   You will need to edit the `/export/root/`*client_name*`/etc/hosts` file to include the IP address of the GigaSwift Ethernet interface. See "Configuring the Network Host Files" on page 21 for instructions.

Installing the Solaris Operating Environment Over a GigaSwift Ethernet Network

The *Solaris Advanced Installation Guide* describes the full procedure for installing the Solaris operating environment over the network. The procedure below assumes that you have created an install server, which contains the image of the Solaris CD, and that you have set up the client system to be installed over the network.

Before you can install the Solaris operating environment on a client system with a Sun Dual Fast Ethernet and Dual SCSI/P adapter, you must first add the GigaSwift Ethernet software packages to the install server. These software packages are on *Sun GigaSwift Ethernet Driver* CD.

▼ To Install the Solaris Environment Over a GigaSwift Ethernet Network

1. **Prepare the install server and client system to install the Solaris operating environment over the network.**

   The *Solaris Advanced Installation Guide* describes how to create the install server and set up the client systems.

   Note – If you want to install the client system over a network that is not part of the same subnet, you must also create a boot server. The *Solaris Advanced Installation Guide* describes how to create a boot server.

   ---

2. **Find the root directory of the client system.**

   The client system's root directory can be found in the install server's `/etc/bootparams` file. Use the `grep` command to search this file for the root directory.

   ```
   # grep client_name /etc/bootparams
   client_name root=server_name:/netinstall/Solaris_2.7/Tools/Boot
   install=server_name:/netinstall boottype=:in rootopts=:rsize=32768
   ```

   In the example above, the root directory for the Solaris 7 client is `/netinstall`. In Step 4, you would replace *root_directory* with `/netinstall`.

Note – If the root directory is not found in the `/etc/bootparams` file, refer to the *Solaris Advanced Installation Guide* for configuration instructions.

3. **Insert the** *Sun GigaSwift Ethernet Driver* **CD into the install server's CD-ROM drive.**

   The CD should automatically mount to the `/cdrom/cdrom0` directory. If the CD did not get mounted to this directory, refer to "Installing the Driver Software" on page 7 for mounting instructions.

4. **On the install server, install the GigaSwift Ethernet software to the client's root directory, as determined in Step 2.**

   Replace *root_directory* with the location of the client's root directory.

```
# cd /cdrom/cdrom0/GigaSwiftEthernet/Packages
# ls SUNWce*
SUNWcea SUNWceax SUNWced.u SUNWcedx.u SUNWcedu SUNWcem
# pkgadd -R root_directory/Solaris_2.7/Tools/Boot -d . SUNWcea SUNWced.u SUNWcem
SUNWcedu
# cd /
```

The above example installs all the packages you need for 32-bit client as well as manpages and header files..

```
# cd /cdrom/cdrom0/GigaSwiftEthernet/Packages
# pkgadd -R root_directory/Solaris_2.7/Tools/Boot -d . SUNWceax SUNWcedx.u SUNWcem
SUNWcedu
# cd /
```

The above example installs all the packages you need for 64-bit client as well as manpages and header files.

To install all the software packages to the client's root directory, use the following command:

```
# cd /cdrom/cdrom0/GigaSwiftEthernet/Packages
# pkgadd -R root_directory/Solaris_2.7/Tools/Boot -d .
# cd /
```

Note – The directory paths for these files might change in future Solaris releases. If the commands above do not work correctly, refer to the documentation that shipped with your version of the Solaris operating environment.

5. **Eject the** *Sun GigaSwift Ethernet Driver* **CD from the CD-ROM drive.**

Note – Perform the following steps on the client system.

6. **Shut down and halt the client system.**

   Use the `shutdown` command to display the OpenBoot (`ok`) prompt.

```
# shutdown -i0 -g0 -y
. . .
(shutdown command messages omitted)
. . .
ok
```

7. **At the** `ok` **prompt, use the** `show-nets` **command to find the device path of the GigaSwift Ethernet device.**

   The `show-nets` command lists the system devices. You should see the full path name of the network device, similar to the example below. In this example, the `network@4` device is the Sun Dual Fast Ethernet and Dual SCSI/P adapter.

```
ok show-nets
a) /pci@1f,2000/pci@1/network@1
b) /pci@1f,2000/pci@1/network@0
c) /pci@1f,4000/network@1,1
q) NO SELECTION Enter Selection, q to quit: q
```

8. **At the** `ok` **prompt, boot the client system using the full device path of the Gigabit Ethernet device.**

   For example:

```
ok boot /pci@1f,2000/pci@1/network@4
```

9. **Proceed with the Solaris operating environment installation.**

   Refer to the *Solaris Advanced Installation Guide* for more information about installing the Solaris operating environment over the network.

10. **After installing the Solaris operating environment, install the Sun GigaSwift Ethernet software on the client system.**

    The software installed in Step 4 was required to boot the client system over the GigaSwift Ethernet interface. You now need to install the software in order for the operating system to use the client's GigaSwift Ethernet interfaces in normal operation.

    Before installing the Sun GigaSwift Ethernet software, make sure that the client system does not already have the software installed. Use the `pkginfo` command to see if the Sun GigaSwift Ethernet software packages are installed on the client system.

```
# pkginfo | grep SUNWce
system  SUNWcea   Sun GigaSwift Ethernet Adapter Driver 32 bit adb Macros
system  SUNWceax  Sun GigaSwift Ethernet Adapter Driver 64 bit adb Macros
system  SUNWced   Sun GigaSwift Ethernet Adapter (32-bit Driver)
system  SUNWcedu  Sun GigaSwift Ethernet Adapter Driver Headers
system  SUNWcedx  Sun GigaSwift Ethernet Adapter (64-bit Driver)
```

    - If the packages you installed appear (which may be different from the example above), skip to Step 11.
    - If the packages you installed do not appear, install the software from *Solaris Supplemen*t CD.

      Refer to "Installing the Driver Software" on page 7 for instructions on installing the required software packages.

11. **Confirm that the network host files have been configured correctly during the Solaris installation.**

    Although the Solaris software installation creates the client's network configuration files, you may need to edit these files to match your specific networking environment. See "Configuring the Network Host Files" on page 21 for more information about editing these files.

CHAPTER 4

Configuring Driver Parameters

This chapter describes how to configure the driver parameters used by the Sun Dual Fast Ethernet and Dual SCSI/P adapter. This chapter contains the following sections:

GigaSwift Ethernet Driver Parameters

The ce driver is attached to the UNIX pci name property pci108e,abba for the Sun Dual Fast Ethernet and Dual SCSI/P adapter (108e is the vendor ID and abba is the PCI device ID).

You can manually configure the ce device driver parameters to customize each Sun Dual Fast Ethernet and Dual SCSI/P adapter device in your system. This section provides an overview of the capabilities of the GigaSwift Ethernet driver used in the adapter, lists the available ce device driver parameters, and describes how to configure these parameters.

The Sun Dual Fast Ethernet and Dual SCSI/P adapter operates at all the 10/100 speeds and modes listed in "Setting the Autonegotiation Mode" on page 42. The ce device performs autonegotiation with the remote end of the link (link partner) to select a common mode of operation.

Driver Parameter Values and Definitions

TABLE 4-1 describes the parameters and settings for the ce device driver.

TABLE 4-1 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 4-2 describes the operational mode parameters and their default values.

TABLE 4-2 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 (default) 1 = 1000 Mbit/sec full-duplex capable
`adv_1000hdx_cap`	Local interface capability advertised by the hardware 0 = Not 1000 Mbit/sec half-duplex capable (default) 1 = 1000 Mbit/sec half-duplex capable
`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 ce1 with no link capabilities.
WARNING: ce1: 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 4-3 provides flow control keywords and describes their function.

TABLE 4-3 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.

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 4-4 defines the `enable_ipg0` and `ipg0` parameters.

TABLE 4-4 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 4-5 lists the default values and allowable values for the IPG parameters.

TABLE 4-5 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 4-6 describes the receive interrupt blanking values.

TABLE 4-6 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 4-7 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 4-7 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)

TABLE 4-7 RX Random Early Detecting 8-Bit Vectors

Field Name	Values	Description
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 4-8 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

TABLE 4-8 PCI Bus Interface Parameters

Parameter	Description
`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)

Using the `infinit_burst` Parameter

Because only UltraSPARC™ III machines support the `infinit_burst` parameter it is turned off by default. If you are using an UltraSPARC III machine, you can enable this parameter. To discover if your machine is an UltraSPARC III, run the following command:

```
% modinfo | grep pcisch
```

If you get the following response:

```
22 101e1663   d5c1 109   1  pcisch (PCI Bus nexus driver 1.194)
```

Then the machine is an UltraSPARC III, and you can safely enable the `infinit_burst` parameter.

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
"/pci@1f,2000/pci@1/network@1" 3 "ce"
"/pci@1f,2000/pci@1/network@0" 0 "ce"
"/pci@1f,4000/pci@2/network@0" 1 "ce"
"/pci@1f,4000/pci@2/network@1" 2 "ce"
```

In the example above, the four 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 100 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 4-1 through TABLE 4-10).

- **To list all the parameters supported by the** `ce` **driver, type** `ndd /dev/ce`**.**

  (See TABLE 4-1 through TABLE 4-10 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_100fdx_cap`
   - `adv_100hdx_cap`
   - `adv_10fdx_cap`
   - `adv_10hdx_cap`
   - `adv_asmpause_cap`
   - `adv_pause_cap`

   See TABLE 4-2 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 100 Mbps half 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 26.

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.

```
# more path_to_inst |grep ce
"/pci@1f,2000/pci@1/network@1" 3 "ce"
"/pci@1f,2000/pci@1/network@0" 0 "ce"
"/pci@1f,4000/pci@2/network@0" 1 "ce"
"/pci@1f,4000/pci@2/network@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 = “`pci108e,abba`”
   - Parent name = pci@1
   - Unit-address = `2`

   In the second line in the previous example:

   - Name = “`pci108e,abba`”
   - Parent name = `pci@1`
   - Unit-address = `2`

   In the third line in the previous example:

   - Name = “`pci108e,abba`”
   - Parent name = `/pci@1`
   - Unit-address = `4`

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_100fdx_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=pci108e,abba parent=pci@4,4000 unit address=4 adv_autoneg_cap=0
adv_100fdx_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 4-9 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 4-9 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 4-9 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 4-10 describes the read-only link partner capabilities.

TABLE 4-10 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 4-10 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 4-10 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 4-11 describes the netstat -k transmit and receive parameters:

TABLE 4-11 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 4-11 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 0 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
```

APPENDIX **A**

Specifications

This appendix lists the specifications for the Sun Dual Fast Ethernet and Dual SCSI/P adapter. It contains the following sections:

Performance Specifications

Feature	Specification
PCI clock	33/66 MHz max.
PCI data burst transfer rate	1up to 64-byte bursts
SCSI synchronous transfer rate	20/40/80 MBytes/sec.
SCSI asynchronous transfer rate	Max. 12 MBytes/sec 16-bit Max. 6 MBytes/sec 8-bit
Transfer Size	4 GByte max.
PCI Data/Address Lines	AD63-0
PCI modes	Master/slave
SCSI interface	Single -ended/LVD
SCSI Bus parity	Yes
SCSI 8-Bit Bus devices	Yes
SCSI 16-Bit Bus devices	Yes
100BASE-TX transfer rate	<= 100 Mbps (in each direction for full duplex)
10BASE-T transfer rate	<= 10 Mbps (in each direction for full duplex)

Physical Characteristics

Dimension	Measurement
Length	6.875 inches
Width	4.2 inches

Power Requirements

Specification	Measurement
Maximum power consumption	10 watts
Voltage	3.3V and 5V

APPENDIX **B**

Interface Signals

PCI Adapter Connectors

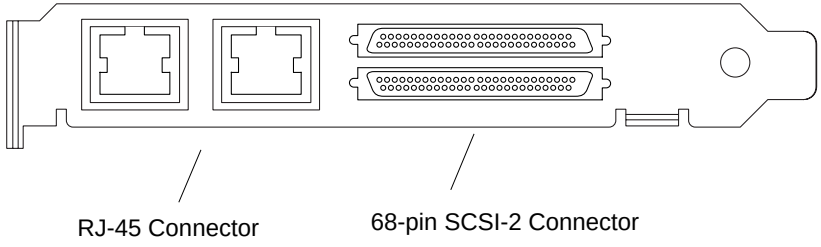

FIGURE B-1 Sun Dual Fast Ethernet and Dual SCSI/P Adapter Backplate

Single-End SCSI-2 Connector Signals

TABLE B-1 Single-End SCSI-2 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>_

TABLE B-1 Single-End SCSI-2 Connector Signals *(Continued)*

Pin	Signal	Pin	Signal
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>_
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>_

RJ-45 Connector Signals

TABLE B-2 Rj-45 Connector Signals

Pin	Signal
1	Transmit+
2	Transmit-
3	Receive+
4	No Connection
5	No Connection
6	Receive-
7	No Connection
8	No Connection

APPENDIX **C**

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

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 Dual Fast Ethernet and Dual SCSI/P adapter. Refer to the *SunVTS Test Reference Manual* 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 *SunVTS User's 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) /pci@1f,0/pci@1/network@4
b) /pci@1f,0/pci@1,1/network@1,1
q) NO SELECTION
Enter Selection, q to quit:
```

   Once you have deteremined and copied the device path for Step 5, type `q` to quit.

5. **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

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

```
ok test /pci@1f,0/pci@1/network@4
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 /pci@1f,0/pci@1/network@4
ce register test --- succeeded.
Internal loopback test -- succeeded.
Link is  -- down
ok
```

7. **For more robust test results, set the** `diag-switch?` **to** `true` **and reissue the tests as shown in Step 5 above.**

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

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

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

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

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

10. **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 GigaSwift Ethernet 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 SunSwitch 1.1 or Alteon ACE 110 Switches

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 4 for the default values of these parameters and for instructions on how to set these parameters.

Non-Specific Issues

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

TABLE C-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.

TABLE C-1 Troubleshooting the GigaSwift Ethernet Adapter *(Continued)*

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

Index

P

R

S