



Sun™ GigaSwift Ethernet Adapter Installation and User's Guide

Sun Microsystems, Inc.
www.sun.com

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Declaration of Conformity

Compliance Model Number: **GCS**
Product Family Name: **Sun GigaSwift Copper Ethernet PCI Adapter Card (X4050A)**

EMC

USA - FCC Class A

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.
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EN300-386 V.1.3.1 (09-2001) Required Limits:

EN55022/CISPR22	Class A
EN61000-3-2	Pass
EN61000-3-3	Pass
EN61000-4-2	6 kV (Direct), 8 kV (Air)
EN61000-4-3	3 V/m 80-1000MHz, 10 V/m 800-960 MHz and 1400-2000 MHz
EN61000-4-4	1 kV AC and DC Power Lines, 0.5 kV Signal Lines,
EN61000-4-5	2 kV AC Line-Gnd, 1 kV AC Line-Line and Outdoor Signal Lines, 0.5 kV Indoor Signal Lines > 10m.
EN61000-4-6	3 V
EN61000-4-11	Pass

As Information Technology Equipment (ITE) Class A per (as applicable):

EN55022:1998/CISPR22:1997 Class A

EN55024:1998 Required Limits:

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	Pass
EN61000-3-3	Pass

Safety

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

EC Type Examination Certificates:

EN 60950:2000, 3rd Edition	TÜV Rheinland Certificate No.
IEC 60950:2000, 3rd Edition,	CB Scheme Certificate No.
Evaluated to all CB Countries	
UL 60950, 3rd Edition, CSA C22.2 No. 60950-00	File: Vol. Sec.

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

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Declaration of Conformity

Compliance Model Number: GFS
Product Family Name: Sun GigaSwift Fiber Ethernet PCI Adapter Card (X4051A)

EMC

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EN55022/CISPR22	Class A
EN61000-3-2	Pass
EN61000-3-3	Pass
EN61000-4-2	6 kV (Direct), 8 kV (Air)
EN61000-4-3	3 V/m 80-1000MHz, 10 V/m 800-960 MHz and 1400-2000 MHz
EN61000-4-4	1 kV AC and DC Power Lines, 0.5 kV Signal Lines,
EN61000-4-5	2 kV AC Line-Gnd, 1 kV AC Line-Line and Outdoor Signal Lines, 0.5 kV Indoor Signal Lines > 10m.
EN61000-4-6	3 V
EN61000-4-11	Pass

As Information Technology Equipment (ITE) Class A per (as applicable):

EN55022:1998/CISPR22:1997 Class A

EN55024:1998 Required Limits:

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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	Pass
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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.

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

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- 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.

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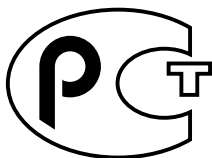
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GOST-R Certification Mark



Graphic showing the GOST-R Certification Mark.

Preface

The *Sun GigaSwift Ethernet Adapter Installation and User's Guide* provides installation instructions for both the Sun GigaSwift Ethernet UTP adapter and the Sun GigaSwift Ethernet MMF 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 provides a description of the adapter, including hardware and software.

Chapter 2 describes how to install the adapter in your system and how to verify that it has been installed correctly. It then describes how to install the driver software using the automated script. Finally, the chapter describes how to edit the network host files after installing the adapter on your system.

Chapter 3 describes how to edit the network host files after the hardware and software have been installed on your system.

Chapter 4 describes how to configure the driver parameters used by the Sun GigaSwift Ethernet adapter.

Chapter 5 explains VLANs in detail and provides configuration instructions and examples.

Appendix A describes how to install the driver software manually.

Appendix B describes the features and limitations of using the Sun GigaSwift Ethernet driver software in the Solaris 9 x86 Operating System.

Appendix C lists the specifications for the Sun GigaSwift Ethernet adapter.

Appendix D 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 might not contain information on basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices. See the following for this information:

- Software documentation that you received with your system
- Solaris™ Operating System documentation, which is at

<http://docs.sun.com>

Typographic Conventions

Typeface ¹	Meaning	Examples
AaBbCc123	The names of commands, files, and directories; on-screen computer output	Edit your <code>.login</code> file. Use <code>ls -a</code> to list all files. % You have mail.
AaBbCc123	What you type, when contrasted with on-screen computer output	% su Password:
<i>AaBbCc123</i>	Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values.	Read Chapter 6 in the <i>User's Guide</i> . These are called <i>class</i> options. You <i>must</i> be superuser to do this. To delete a file, type <code>rm filename</code> .

¹ The settings on your browser might differ from these settings.

Shell Prompts

Shell	Prompt
C shell	<i>machine_name%</i>
C shell superuser	<i>machine_name#</i>
Bourne shell and Korn shell	\$
Bourne shell and Korn shell superuser	#

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	<i>Sun Enterprise 6x00, 5x00, 4x00, and 3x00 Systems Dynamic Reconfiguration User's Guide</i>
Diagnostic Software	<i>SunVTS User's Guide</i> <i>SunVTS Test Reference Manual</i>
OpenBoot™ Commands	<i>OpenBoot 4.x Command Reference Manual</i>

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Sun GigaSwift Ethernet Adapter Overview

This chapter provides a description of the Sun GigaSwift Ethernet UTP and MMF adapter hardware and software. This chapter includes the following sections:

- “Hardware Overview” on page 1
- “Hardware and Software Requirements” on page 4
- “Patch Requirements” on page 4
- “Product Features” on page 5

Hardware Overview

The adapter relieves congestion experienced at the backbone and server levels by today’s networks, while providing a future upgrade path for high-end workstations that require more bandwidth than Fast Ethernet can provide.

Sun GigaSwift Ethernet MMF Adapter

The Sun GigaSwift Ethernet MMF adapter is a low-profile, single-port gigabit Ethernet fiber optics PCI bus card. It operates in 1000 Mbps Ethernet networks only.

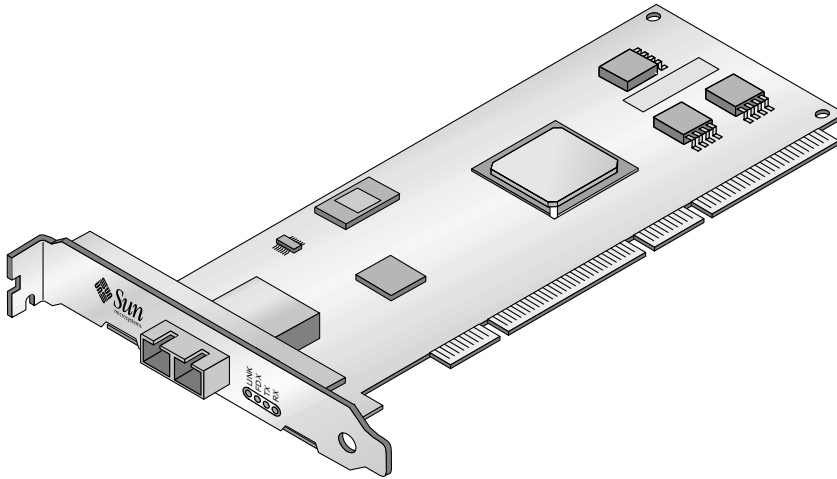


FIGURE 1-1 Sun GigaSwift Ethernet MMF Adapter

LED Displays on the MMF Adapter

Four LEDs are displayed on the front panel of Sun GigaSwift Ethernet MMF adapter. They are labeled on the front panel as shown in TABLE 1-1.

TABLE 1-1 Front Panel Display LEDs for the MMF Adapter

Label	Meaning if Lit	Color	Source
LINK	Link is up.	Green*	MAC
FDX	Link is in full-duplex mode.	Green	MAC
TX	Link is transmitting.	Green	MAC
RX	Link is receiving.	Green	MAC

*LED will not light until the latest version of the driver software is installed.

Sun GigaSwift Ethernet UTP Adapter

The Sun GigaSwift Ethernet UTP adapter is a low-profile, single-port gigabit Ethernet copper-based PCI bus card. It can be configured to operate in 10, 100, or 1000 Mbit/sec Ethernet networks. At 10 or 100 Mbit/sec the adapter can be set to either half or full-duplex. At 1000 Mbit/sec, the adapter must operate at full-duplex.

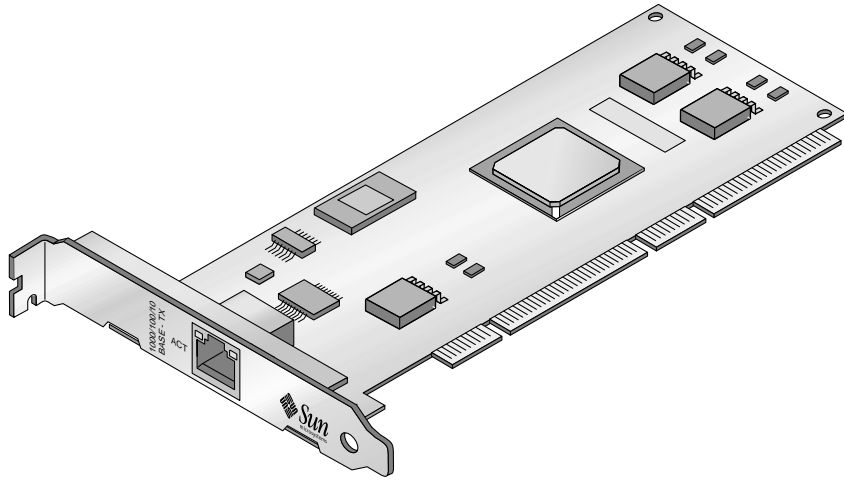


FIGURE 1-2 Sun GigaSwift Ethernet UTP Adapter

LED Displays on the UTP Adapter

Two LEDs are displayed on the front panel of the Sun GigaSwift Ethernet UTP adapter. They are labeled on the front panel as shown in TABLE 1-2.

TABLE 1-2 Front Panel Display LEDs for the UTP Adapter

Label	Meaning if On/Active	Color	Source
LINK	Gigabit link is up.	Green	PHY
ACT	Link is transmitting or receiving data.	Yellow	PHY

Hardware and Software Requirements

Before using the Sun GigaSwift Ethernet adapter, make sure your system meets the following hardware and software requirements:

Hardware and Software	Requirements
Hardware	Sun Ultra™ 60, 80 Sun Enterprise™ 280, 420, 3000/3500, 4000/4500, 5000/5500, 6000/6500/6800, 15000 Netra™ 20, 100 T1, 200 T1, 240, 1280 (1w8T8), 1405 Sun Fire™ 4900, 4800, 280R, v1280, v880, V480, v440, v240, v20Z* Sun Blade™ 1000, 100
OpenBoot PROM**	Revision 4.x for SPARC platforms only
Operating System	SPARC Solaris 7, 8, and 9 releases x 86 Solaris 9 release

*Opteron platforms such as the Sun Fire v20Z are the only platforms that currently support the Sun GigaSwift Ethernet adapter with the Solaris 9 x86 Operating System.

**the Solaris 9 x86 Operating System does not support OpenBoot PROM.

Sun Enterprise 3000, 4000, 5000, and 6000 series systems using the Sun GigaSwift Ethernet adapter require a shielded twisted-pair Ethernet cable.



Caution – Installing the Sun GigaSwift Ethernet adapter on the Sun Enterprise 3000, 4000, 5000, and 6000 series systems is prohibited if option (X)1080A Sun Enterprise Systems interface card is already installed on the 2632A PCI I/O board for these platforms. Install the Sun GigaSwift Ethernet adapter on the next available 2632A PCI I/O card.

Patch Requirements

The software driver package provided on the CD-ROM has the following patches preinstalled.

- Solaris 7 Operating System Patch-ID Number 112327-18
- Solaris 8 Operating System Patch-ID Number 111883-24
- Solaris 9 Operating System Patch-ID Number 112817-17
- Solaris 9 x86 Operating System Patch-ID Number 117714-01

The Solaris 8 2/02 release includes Patch-ID Number 111883-05. Subsequent versions of the Solaris operating system may include the correct version.

Following are the current driver patch versions (at the time this document was created):

- Patch-ID Number 112327-18 for Solaris 7 Operating System
- Patch-ID Number 111883-24 for Solaris 8 Operating System
- Patch-ID Number 112817-17 for Solaris 9 Operating System
- Patch-ID Number 117714-01 for Solaris 9 x86 Operating System

Install the *latest* version of the Patch-ID number. For example, the Patch-ID number for the Solaris 9 OS is 112817-17. The dash number -17 becomes higher with each new version of the patch.

If you install Solaris 8 2/02 or any *previous* version of the Solaris Operating System after installing the Sun GigaSwift Ethernet driver software, you must install the latest version of the patch from the following web site:

<http://sunsolve.sun.com>

If the patch is not available on SunSolve, contact your local sales or service representative.

Product Features

You can install or replace the Sun GigaSwift Ethernet adapter. You can also diagnose a failure using the built-in diagnostic tools.

Key Protocols and Interfaces

The Sun GigaSwift Ethernet adapter is interoperable with existing Ethernet equipment, assuming standard Ethernet minimum and maximum frame size (64 to 1518 bytes), frame format, and compliance with the following standards and protocols:

- 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
- Duplex SC fiber connector (850 nm, SX)
- 33/66-MHz, 32- or 64-bit bus master
- Universal dual voltage signaling (3.3V and 5V)

- PCI Local Bus Rev 2.2-compliant (6.6-inch x 2.5-inch short card)
- IPv4 and IPv6 support
- Load balancing for RX packets among multiple CPUs
- Jumbo frames enables the Ethernet interfaces to send and receive packets of up to 9216 bytes
- IEEE 802.1Q VLAN
- IEEE 802.1P/802.1D Priority Tagging/Quality Of Service
- RAS support
- Energy Star® support

Diagnostic Support

- User-executable self-test using OpenBoot PROM
- SunVTS™ diagnostic tool

Support for Solaris 9 x86 Operating System

The Sun GigaSwift Ethernet MMF/UTP adapter supports the Solaris 9 x86 Operating System in the Sun Fire v20Z.

Installing the Adapter

This chapter describes how to install the adapter in your system and verify that it has been installed correctly. It then describes how to install the driver software using the automated script. Finally, this chapter describes how to edit the network host files after installing the adapter on your system.

This chapter contains the following sections:

- “Installing the Adapter With Dynamic Reconfiguration” on page 7
- “Installing the Adapter Without Dynamic Reconfiguration” on page 8
- “Using the Installation Script” on page 14
- “Verifying the Software Installation” on page 21
- “Configuring the Network Host Files” on page 22

Note – If you are installing the Sun GigaSwift Ethernet adapter in a machine running the Solaris 9 x86 Operating System, the following features are *not* supported: diskless client, installing the Solaris Operating System over this adapter, using this adapter as the primary boot device.

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 connecting the attachment point and configuring its occupant. In most cases, the `cfgadm(1M)` command can perform both steps at once.

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

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 might 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.

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 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.**

We are observing that the EMI shielding around the PCI slots is quite flimsy. When we install a PCI card, sometimes, the EMI shielding become loose and touches the metal traces/pins at the back of the card. For the Quad Gigabit card (x4444a), the shield actually touches the LED pins and makes the link/activity LEDs go off/on by itself.

Also, when a full length PCI card is pulled out, it can easily pull the complete EMI shield with it.

Note – Green LEDs will not light until the correct driver is installed.

▼ To Verify the Hardware Installation

After you have installed the Sun GigaSwift Ethernet adapter, but *before* you boot your system, perform the following tasks to verify the installation. Refer to the your Solaris documentation for the detailed instructions.

Note – Verification is not required if your system supports DR. Verification is not supported if your system is running Solaris 9 x86 software.

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. List the network devices on your system.

```
ok show-nets
```

You should see the full path name of the network devices, similar to the example below. In this example, the `network@0` and the `network@1` devices are the Sun GigaSwift Ethernet adapter, and the `network@2` is the onboard Ethernet device.

```
ok show-nets
a) /pci@8,600000/network@1
b) /pci@8,700000/network@5,1
q) NO SELECTION
Enter Selection, q to quit:
```

`/pci@8,600000/network@1` identifies the Ethernet port

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

3. View the device that you installed.

Using the previous example, type:

```
cd /pci@8,600000/network@1
```


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

The `.properties` command displays the specific information about the installed adapter. If you are using the Sun GigaSwift Ethernet MMF adapter, your output will be similar to the following.

```
ok cd /pci@8,700000/network@2
ok .properties
assigned-addresses      82001010 00000000 00200000 00000000 00200000
                        82001030 00000000 11000000 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 30 62 2c 33 35 2e 33 30 00 70 63
reg                     00001000 00000000 00000000 00000000 00000000
                        02001010 00000000 00000000 00000000 00200000
                        02001030 00000000 00000000 00000000 00100000
address-bits            00 00 00 30
max-frame-size          00 00 40 00
network-interface-type  ethernet
device_type             network
name                    network
local-mac-address       00 03 ba 4e 7f 0b
version                 Sun PCI Gigaswift 1000Base-X FCode 2.12.4 04/03/25
phy-type                pcs
board-model             501-6762
model                   SUNW,pci-ce
fcode-rom-offset        00000000
66mhz-capable
fast-back-to-back
devsel-speed            00000002
class-code              00020000
interrupts              00000001
                        00000002
                        00000003
                        00000004
latency-timer           00000040
cache-line-size         00000010
max-latency             00000040
min-grant               00000040
revision-id             00000030
device-id               00000035
vendor-id               0000100b
```

If you are using the Sun GigaSwift Ethernet UTP adapter, your `.properties` output will be similar to the following.

```
ok cd /pci@8,700000/network@3
ok .properties
assigned-addresses      82001810 00000000 11200000 00000000 00200000
                        82001830 00000000 11100000 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 30 62 2c 33 35 2e 33 30 00 70 63
reg                     00001800 00000000 00000000 00000000 00000000
                        02001810 00000000 00000000 00000000 00200000
                        02001830 00000000 00000000 00000000 00100000
address-bits            00 00 00 30
max-frame-size          00 00 40 00
network-interface-type  ethernet
device_type             network
name                    network
local-mac-address       00 03 ba 0e 98 87
version                 Sun PCI Gigaswift 1000Base-T FCode 2.12.6 04/02/26
phy-type                mif
board-model             501-6719
model                   SUNW,pci-ce
fcode-rom-offset        00000000
66mhz-capable
fast-back-to-back
devsel-speed            00000002
class-code              00020000
interrupts              00000001
                        00000002
                        00000003
                        00000004
latency-timer           00000040
cache-line-size         00000010
max-latency             00000040
min-grant               00000040
revision-id             00000030
device-id               00000035
vendor-id               0000100b
```

Note – If you are going to set the `local-mac-address?` variable, note the local MAC address of your device at this time. See “Setting the `local-mac-address?` Variable” on page 13 for more information.

5. Type the following when you finish looking at the `.properties` values:

```
ok device-end
```

Setting the `local-mac-address?` Variable

Note – Enabling the `local-mac-address?` variable is only required if you boot from the network. Setting the `local-mac-address?` variable is not supported in systems running Solaris 9 x86 software.

Every Sun GigaSwift Ethernet adapter comes with a unique media access control (MAC) address that represents the 48-bit Ethernet address for that interface.

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

The `local-mac-address?` variable of the network device specifies the network address (system-wide or `local-mac-address?`) used for booting the system. If the `local-mac-address?` NVRAM variable is set to `true`, the system sets the MAC address for the network interface of the Sun GigaSwift Ethernet adapter to be the address provided by the adapter. If this variable is set to `false`, the system sets the MAC address for the adapter’s network interface to be the same as the *system* MAC address.

To start using the MAC address assigned to the network interface of the Sun GigaSwift Ethernet adapter, set the NVRAM configuration variable `local-mac-address?` to `true`.

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

▼ To Set the Gigabit Ethernet Device as the Primary Boot Device

Use this procedure *only* if you want the Gigabit Ethernet device to be your primary boot device.

1. List the network devices on your system.

```
ok show-nets
a) /pci@8,600000/network@1
b) /pci@8,700000/network@5,1
q) NO SELECTION
Enter Selection, q to quit:q
```

2. Set the Sun GigaSwift Ethernet adapter device to be your default boot device.

```
ok setenv boot-device /pci@8,600000/network@1
```

Note that the command shown in this example sets your boot device to be port 0 on the network portion of the card.

Rebooting the System

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

```
ok boot -r
```

Using the Installation Script

The Sun GigaSwift Ethernet CD provides automated installation for the GigaSwift Ethernet driver software. In most cases, you can use the following procedure and execute the installation script. If you have any problems, see Appendix A for manual installation procedures.

When you have executed the script, select the interface card that is installed on your system. For this product, select the “Sun GigaSwift Ethernet Adapter.”

The script first checks to ensure that the software driver package has already been installed. If the package is installed, the script verifies the patch level and updates the driver with the updated patch if necessary. If the packages are not installed on Solaris 8 or 9 software, the installation script installs the latest prepatched packages. If the system does not require updating because the patch level is at or beyond the current install version, the script exits with an appropriate message.

▼ To Install the Software Using the Installation Script

1. At the system console, become superuser (root).
2. Insert the Sun GigaSwift Ethernet Adapter 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 Sun Enterprise Volume Manager, mount the CD-ROM as follows:

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

Note – If you are installing the software from the download site, follow the online download instructions.

3. Change to the directory where the installation script resides:

```
# cd /media_path/
```

Where:

- `media_path` = `/cdrom/cdrom0`, if you are installing from the CD-ROM.

Or

- unzipped `GigaSwift_path/Sun_GigaSwift_Ethernet_Driver`, if you downloaded the driver from the Sun download center.

4. Execute the installation script:

```
# ./install
```

The script displays a menu of products:

```
Product Installation

1 - Dual Gigabit Ethernet Dual SCSI/P Adapter
2 - GigaSwift Ethernet Adapter (copper/fiber)
3 - GigaSwift Ethernet Compact PCI Adapter
4 - Quad GigaSwift Ethernet Adapter

Please select the product to install: 2
```

5. Select 2, the Sun GigaSwift Ethernet adapter, and answer the questions, if required, in the installation script.

Note – After the installation script runs, you see a summary of the software package or patch that was installed. You can also find a log of the installation in `/var/tmp`. The log file information is displayed when the installation completes unless the software meets or exceeds the required package or patch level.

Example 1: All Requirements Met on SPARC Systems

Following is an example of an installation script output if the driver and patch requirements are met on SPARC systems:

CODE EXAMPLE 2-1 Script Output for SPARC Systems When Requirements Are Met

```
Product Installation

1 - Dual Gigabit Ethernet Dual SCSI/P Adapter
2 - GigaSwift Ethernet Adapter (copper/fiber)
3 - GigaSwift Ethernet Compact PCI Adapter
4 - Quad GigaSwift Ethernet Adapter

Please select the product to install: 2

GigaSwift Ethernet Adapter Driver for sparc Installation.
Copyright 2004 Sun Microsystems, Inc. All rights reserved.
Use is subject to license terms.
```

CODE EXAMPLE 2-1 Script Output for SPARC Systems When Requirements Are Met

```
*** Checking for correct version of GigaSwift Ethernet Driver
Packages...
*** Checking for correct version of GigaSwift Ethernet Driver
Patches...

*** Checking for correct version of VLAN Utility Driver Packages..
*** Checking for correct version of VLAN Utility Driver Patches...

The CE/VLAN driver(s) installed on this system for:

        Dual GigaSwift Ethernet Adapter Driver

meets or exceeds the required package or patch version. No changes
to the system are required - exiting.
```

Example 2: All Requirements Met on Solaris 9 x86 Systems

Following is an example of an installation script output if the driver and patch requirements are met on Solaris 9 x86 systems:

CODE EXAMPLE 2-2 Script Output for x86 Systems When Requirements Are Met

```
Product Installation

1 - Dual Gigabit Ethernet Dual SCSI/P Adapter
2 - GigaSwift Ethernet Adapter (copper/fiber)
3 - GigaSwift Ethernet Compact PCI Adapter
4 - Quad GigaSwift Ethernet Adapter

Please select the product to install: 2

GigaSwift Ethernet Adapter Driver for x86 Installation.
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Use is subject to license terms.

*** Checking for correct version of GigaSwift Ethernet Driver
Packages...
*** Checking for correct version of GigaSwift Ethernet Driver
Patches...

*** Checking for correct version of VLAN Utility Driver Packages..
*** Checking for correct version of VLAN Utility Driver Patches...

The CE/VLAN driver(s) installed on this system for:
```

CODE EXAMPLE 2-2 Script Output for x86 Systems When Requirements Are Met

```
Dual GigaSwift Ethernet Adapter Driver

meets or exceeds the required package or patch version. No changes
to the system are required - exiting.
```

Example 3: Updates Required

The following is an example of an installation script output, if the packages are found and need updating by patching.

Note – The following two examples are from a SPARC system. The line, “GigaSwift Ethernet Adapter Driver for sparc Installation, “ will read “GigaSwift Ethernet Adapter Driver for x86 Installation” if you are installing on the Solaris 9 x86 Operating System.

CODE EXAMPLE 2-3 Script Output When Packages Require Patches

```
Product Installation

1 - Dual Gigabit Ethernet Dual SCSI/P Adapter
2 - GigaSwift Ethernet Adapter (copper/fiber)
3 - GigaSwift Ethernet Compact PCI Adapter
4 - Quad GigaSwift Ethernet Adapter

Please select the product to install: 2

GigaSwift Ethernet Adapter Driver for sparc Installation.

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*** Checking for correct version of GigaSwift Ethernet Driver
Packages...
*** Checking for correct version of GigaSwift Ethernet Driver
Patches...

*** Checking for correct version of VLAN Utility Driver Packages..
*** Checking for correct version of VLAN Utility Driver Patches...

This script is about to take the following actions:
- Install GigaSwift Ethernet Patch: 112817-16.
- Install VLAN Ethernet Utility Patch: 114600-02.

Press return to continue, or 'Q' followed by a return to quit:
```


CODE EXAMPLE 2-3 Script Output When Packages Require Patches *(Continued)*

```
*** Installing patch 112817-16 for Solaris 9...

Checking installed patches...
Verifying sufficient filesystem capacity (dry run method)...
Installing patch packages...

Patch number 112817-16 has been successfully installed.
See /var/sadm/patch/112817-16/log for details

Patch packages installed:
  SUNWcea
  SUNWceax
  SUNWced
  SUNWcedu
  SUNWcedu

*** Installing patch 114600-02 for Solaris 9...

Checking installed patches...
Verifying sufficient filesystem capacity (dry run method)...
Installing patch packages...

Patch number 114600-02 has been successfully installed.
See /var/sadm/patch/114600-02/log for details

Patch packages installed:
  SUNWvld
  SUNWvldu
  SUNWvldx

Installation completed. Summary:

GigaSwift Ethernet Adapter Driver has been updated using patch
112817-16. It will be necessary to reboot the system to reload
the updated driver.

Optional VLAN Utility has been updated using 114600-02. It
may be necessary to reboot the system to reload the updated
driver.

A log of this Install can be found at:
  /var/tmp/GigaSwift.install.2003.11.17.1213
```

Example 4: Packages Missing

Following is an example of an installation script output if the package(s) are not found:

CODE EXAMPLE 2-4 Script Output When Packages Are Not Found

```
Product Installation

1 - Dual Gigabit Ethernet Dual SCSI/P Adapter
2 - GigaSwift Ethernet Adapter (copper/fiber)
3 - GigaSwift Ethernet Compact PCI Adapter
4 - Quad GigaSwift Ethernet Adapter

Please select the product to install: 2

GigaSwift Ethernet Adapter Driver for sparc Installation.

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*** Checking for correct version of GigaSwift Ethernet Driver
Packages...

*** Checking for correct version of VLAN Utility Driver Packages..

The following supporting driver(s) can be used with Dual GigaSwift
Ethernet Adapter
Driver:

VLAN Utility Driver software
Install the Optional VLAN Utility Driver Software [y,n,?,q] y

This script is about to take the following actions:
- Install Dual GigaSwift Ethernet Adapter Driver packages.
- Optionally Install VLAN Utility Driver Software.

Press return to continue, or 'Q' followed by a return to quit:

*** Installing Sun GigaSwift Ethernet packages...
Copyright 2002 Sun Microsystems, Inc. All rights reserved.
Use is subject to license terms.
System configuration files modified but ce driver not loaded or
attached.

Installation of <SUNWced> was successful.
Copyright 2002 Sun Microsystems, Inc. All rights reserved.
Use is subject to license terms.
```

CODE EXAMPLE 2-4 Script Output When Packages Are Not Found *(Continued)*

```
Installation of <SUNWcedx> was successful.
Copyright 2002 Sun Microsystems, Inc. All rights reserved.
Use is subject to license terms.

Installation of <SUNWcedu> was successful.
Copyright 2002 Sun Microsystems, Inc. All rights reserved.
Use is subject to license terms.

Installation of <SUNWcea> was successful.
Copyright 2002 Sun Microsystems, Inc. All rights reserved.
Use is subject to license terms.

Installation of <SUNWceax> was successful.

*** Installing Sun VLAN Utility packages...
Copyright 2001 Sun Microsystems, Inc. All rights reserved.

Installation of <SUNWvld> was successful.
Copyright 2001 Sun Microsystems, Inc. All rights reserved.

Installation of <SUNWvldx> was successful.
Copyright 2001 Sun Microsystems, Inc. All rights reserved.

Installation of <SUNWvldu> was successful.

Installation completed. Summary:

GigaSwift Ethernet Driver packages have been installed.

Optional VLAN Utility packages have been installed.

A log of this Install can be found at:
/var/tmp/GigaSwift.install.2003.11.17.1205
```

Verifying the Software Installation

Unless you have the latest version of the driver software installed, the green LEDs on the adapter will not go on. If you are using a SPARC system, be sure that you have version 1.136 or later installed.

- Use the `modinfo` command to verify that you have the current driver (v1.136 or later) installed.

If you type `grep CE`, using uppercase letters, you will get only the specific driver information:

```
# modinfo |grep CE
84 7821c000 4f9a6 75 1 ce (CE Ethernet Driver v1.136)
```

If you type `grep ce`, using lowercase letters, you will still get the driver version information, but you will also get several lines of additional information. Your output will be similar to the following. The line showing the driver version is in ***bold italics***.

```
# modinfo |grep ce
11 1018bacb 1f7 - 1 fssnap_if (File System Snapshot Interface)
12 1018bc1b 10900 1 1 rpcmod (rpc interface str mod)
13 10199c5b 66f10 3 1 ip (IP Streams device)
35 1026ba5c 1ae7 - 1 busra (Bus Resource Allocator (BUSRA) )
36 1026d290 c4c - 1 hpcsvc (hot-plug controller services v1)
47 102663c6 304 143 1 ip6 (IP Streams device)
48 10296ed4 25e08 42 1 tcp (TCP Streams device)
50 1026650a 365 146 1 tcp6 (TCP Streams device)
51 10278264 9968 41 1 udp (UDP Streams device)
52 10234ef7 365 145 1 udp6 (UDP Streams device)
53 10280174 7f10 5 1 icmp (ICMP Streams device)
54 102666af 30e 144 1 icmp6 (ICMP Streams device)
56 10260029 4bfb 10 1 timod (transport interface str mod)
71 102f6d1d 1c30 43 1 rts (Routing Socket Streams device)
84 7821c000 4f9a6 75 1 ce (CE Ethernet Driver v1.136)
115 10232ced dc6 24 1 pts (Slave Stream Pseudo Terminal dr)
```

Configuring the Network Host Files

After installing the driver software, you must create a `hostname.cenumber` file (Where *number* = the instance number of the `ce` interface.) 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@8,600000/network@1" 0 "ce"
```

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

2. **Use the `ifconfig` command to set up 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 setup that remains 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 GigaSwift Ethernet adapter interface you plan to leave unused.
- The `/etc/hostname.ce $number$` file must contain the hostname and IP address for the appropriate `ce` interface.
- The host name and IP address must be listed in the `/etc/hosts` file.
- The host name must 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 GigaSwift Ethernet 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
```

Network Configuration

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

- “Configuring the Network Host Files” on page 25
 - “Setting Up a GigaSwift Ethernet Network on a Diskless Client System” on page 27
 - “Installing the Solaris Operating System Over a GigaSwift Ethernet Network” on page 28
-

Configuring the Network Host Files

After installing the driver software, you must create a `hostname.cenumber` 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@8,600000/network@1" 0 "ce"
```

In this example, the device instance is from a Sun GigaSwift Ethernet adapter installed in slot 1. For clarity, the instance number is in bold italics.

Be sure to write down your device path and instance, which in the example is `"/pci@1f,0/pci@1/network@4" 0`. Your device path and instance will be similar. You need this information to make changes to the `ce.conf` file. See “Setting Parameters Using the `ce.conf` File” on page 50.

2. **Use the `ifconfig` command to set up 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 setup that remains 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 GigaSwift Ethernet adapter interface you plan to leave unused.
- The `/etc/hostname.ce $number$` file must contain the host name for the appropriate `ce` interface.
- The host name must have an IP address listed in the `/etc/hosts` file.
- The host name must 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 GigaSwift Ethernet 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 GigaSwift Ethernet Network on a Diskless Client System

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. 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 and Solaris 9 x86 versions of the operating system do not support diskless clients.

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

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 is:

```
/export/root/client-name
```

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 does not mount to this directory, see Appendix A 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.

Install the `SUNWced.u`, `SUNWcedm`, and `SUNWcedu` software packages to the client's root directory.

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

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

5. Create a `hostname.cenumber` file in the diskless client's root directory.

You will need to create an `/export/root/client-name/etc/hostname.cenumber` file for the GigaSwift Ethernet interface. See “Configuring the Network Host Files” on page 25 for instructions.

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

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 25 for instructions.

7. Set the MAC address on the server side and rebuild the device tree if you want to boot from the GigaSwift Ethernet port.

8. To boot the diskless client from the GigaSwift Ethernet port, type the following boot command:

```
ok boot path-to-device:link-param, -v
```

Installing the Solaris Operating System Over a GigaSwift Ethernet Network

The *Solaris Advanced Installation Guide* describes the full procedure for installing the Solaris Operating System over the network. The following procedure 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.

Note – The Solaris 9 x86 version of the operating system *cannot* be installed over a GigaSwift Ethernet interface.

Before you can install the Solaris Operating System on a client system with a GigaSwift Ethernet adapter, you must first add the GigaSwift Ethernet software packages to the install server. These software packages are on Sun GigaSwift Ethernet Driver CD.

Note – Refer to the *Solaris Advanced Installation Guide* for more information about installing the Solaris Operating System over the network.

▼ To Install the Solaris Operating System Over a GigaSwift Ethernet Network

1. **Prepare the install server and client system to install the Solaris Operating System 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 this example, 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 does not mount to this directory, see Appendix A 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 SUNWcedu SUNWcem
# pkgadd -R root-directory/Solaris_2.7/Tools/Boot -d . SUNWced SUNWcem SUNWcedu
# cd /
```

Note – If the commands above do not work correctly, refer to the documentation that shipped with your version of the Solaris Operating System.

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 GigaSwift Ethernet adapter.

```
ok show-nets
a) /pci@8,600000/network@1
b) /pci@8,700000/network@5,1
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.

The following examples show the options available:

- Booting in autonegotiated mode:

```
ok boot :link-param, -v
```

- Booting in autonegotiated verbose mode at 1000 Mbps half-duplex:

```
ok boot /pci@1f,4000/network@4:speed=1000,duplex=half,link-clock=auto
```

Note – `link-clock` must be set to `auto`.

For this configuration, the highest capability is limited to 1000 Mbps half-duplex and the lowest is 10 Mbps half-duplex. The link is established within this range of capabilities, depending on the configuration of the link partner.

- Booting in non-autonegotiated verbose mode at 100 Mbps full-duplex:

```
ok boot /pci@1f,4000/network@4:speed=100,duplex=full, -v
```

- Booting in non-autonegotiated verbose mode at 1000 Mbps half-duplex link-clock master:

```
ok boot /pci@1f,4000/network@4:speed=1000,duplex=half,link-clock=master
```

Note – For a link to be successfully established, the link partner must be configured to 1000 Mbps half-duplex `link-clock` slave.

9. Proceed with the Solaris Operating System installation.

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

10. After installing the Solaris Operating System, 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 SUNWced   Sun Gigabit Ethernet Adapter Driver
system SUNWcem   Sun Gigabit Ethernet Adapter Driver Man Pages
system SUNWcedu  Sun Gigabit Ethernet Adapter Driver Headers
```

- If the software is installed (as shown in the example above), skip to Step 11.
- If the software is not installed, install the software from *Solaris Supplement CD*.
See Appendix A 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 25 for more information about editing these files.

Booting Over the GigaSwift Ethernet Network

Note – The Solaris 9 x86 version of the operating system *cannot* be installed over a GigaSwift Ethernet interface.

The Sun GigaSwift Ethernet adapter can be linked up either with autonegotiation enabled or disabled. When link-up is attempted with autonegotiation enabled (the default), the link parameter capabilities (such as speed in megabits/second, duplex and link-clock mastership only for 1000 Mbps) are automatically negotiated between

the device and its link partner. Attempting to link-up with autonegotiation disabled requires knowledge of the current capabilities at which both the device and its link partner are configured.

The structure of the `boot net` command line that includes device parameters is as follows:

```
ok boot device-path: speed=s,duplex=d,link-clock=c,promiscuous,
```

Where:

- s* = 1000, 100, 10, auto
- d* = half, full, auto
- c* = master, slave, auto

Note – Refer to the IEEE 802.3 (G)MII register specification for the details on autonegotiated and non-autonegotiated modes of operation. (This establishes the link successfully so that traffic is transferred without collisions caused by duplex mismatch between the local and remote devices both the local and remote link capabilities must be matched.)

TABLE 3-1 depicts the device link parameters you can specify on the `boot net` command line to establish a link between the local and remote device. TABLE 3-2 shows the speed, duplex and `link-clock` capabilities at which a link-up will be attempted:

TABLE 3-1 Device Link Parameters

Device Parameters			Device Link Capability						
speed	duplex	link-clock	autoneg	1000fdx	1000hdx	100fdx	100hdx	10fdx	10hdx
1000	full	master/slave	0	0	0	0	0	0	0
1000	half	master/slave	0	1	0	0	0	0	0
1000	full	auto	1	1	1	1	1	1	1
1000	half	auto	1	0	1	1	1	1	1
1000	auto		1	1	1	1	1	1	1
1000			1	1	1	1	1	1	1
1000		auto	1	1	1	1	1	1	1
100	full	N/A		0	0	0	1	0	0
100	half	N/A		0	0	0	0	1	0

TABLE 3-1 Device Link Parameters

Device Parameters			Device Link Capability						
speed	duplex	link-clock	autoneg	1000fdx	1000hdx	100fdx	100hdx	10fdx	10hdx
100	auto	N/A		1	0	0	1	1	1
100				1	0	0	1	1	1
10	full	N/A	0	0	0	0	0	0	1
10	half	N/A		0	0	0	0	0	0
10	auto	N/A		1	0	0	0	0	1
10				1	0	0	0	0	1
auto	full			1	1	0	1	0	1
auto	half			1	0	1	0	1	0
auto	auto			1	1	1	1	1	1
auto				1	1	1	1	1	1
	auto	auto		1	1	1	1	1	1

TABLE 3-2 link-clock Capabilities for Link Up

link-clock	master-cfg-enable	master-cfg-value	Description
slave	1	0	link clock slave
master	1	1	link clock master
auto	0	0	default link clock auto

The following examples show the usage of the `boot net` command line with device parameters specified:

To attempt to force the link-up while advertising 100 Mbps full-duplex capability to the link partner:

```
# boot net:speed=100,duplex=full,
```

To attempt to force link-up while advertising 1000 Mbps full-duplex link-clock master capability to the link partner:

```
# boot net:speed=1000,duplex=full,link-clock=master,
```

Note – The link partner must be configured as link-clock slave.

To attempt to autonegotiate the link while advertising 1000 Mbps full- and half-duplex, and link-clock auto capability to the link partner:

```
# boot net:speed=1000,duplex=auto,link-clock=auto,
```

Note – Link partner must autonegotiate in order to link-up at 1000 Mbps.

Configuring Driver Parameters

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

- “GigaSwift Ethernet Driver Parameter Values and Definitions” on page 38
- “Setting `ce` Driver Parameters” on page 46
- “Usability Enhancements to the Driver” on page 52
- “GigaSwift Ethernet Driver Operating Statistics” on page 54

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 GigaSwift Ethernet 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 GigaSwift Ethernet adapter device in your system. This section provides an overview of the capabilities of the GigaSwift Ethernet device used in the adapter, lists the available `ce` device driver parameters, and describes how to configure these parameters.

The Sun GigaSwift Ethernet UTP PCI adapter is capable of all the operating speeds and modes listed in “Setting the Autonegotiation Mode” on page 49. 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 Forced mode operation.

GigaSwift Ethernet 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
<code>instance</code>	Read and write	Device instance
<code>adv-autoneg-cap</code>	Read and write	Operational mode parameter
<code>adv-1000fdx-cap</code>	Read and write	Operational mode parameter
<code>adv-1000hdx-cap</code>	Read and write	Operational mode parameter
<code>adv-100T4-cap</code>	Read and write	Operational mode parameter
<code>adv-100fdx-cap</code>	Read and write	Operational mode parameter
<code>adv-100hdx-cap</code>	Read and write	Operational mode parameter
<code>adv-10fdx-cap</code>	Read and write	Operational mode parameter
<code>adv-10hdx-cap</code>	Read and write	Operational mode parameter
<code>adv-asmppause-cap</code>	Read and write	Flow control parameter
<code>adv-pause-cap</code>	Read and write	Flow control parameter
<code>master-cfg-enable</code>	Read and write	Gigabit link clock mastership controls
<code>master-cfg-value</code>	Read and write	Gigabit link clock mastership controls
<code>enable-ipg0</code>	Read and write	Enable additional delay before transmitting a packet
<code>ipg0</code>	Read and write	Additional delay before transmitting a packet
<code>ipg1</code>	Read and write	Interpacket gap parameter
<code>ipg2</code>	Read and write	Interpacket gap parameter
<code>rx-intr-pkts</code>	Read and write	Receive interrupt blanking values
<code>rx-intr-time</code>	Read and write	Receive interrupt blanking values
<code>red-dv4to6k</code>	Read and write	Random early detection and packet drop vectors
<code>red-dv6to8k</code>	Read and write	Random early detection and packet drop vectors
<code>red-dv8to10k</code>	Read and write	Random early detection and packet drop vectors
<code>red-dv10to12k</code>	Read and write	Random early detection and packet drop vectors
<code>tx-dma-weight</code>	Read and write	PCI interface parameter
<code>rx-dma-weight</code>	Read and write	PCI interface parameter

TABLE 4-1 ce Driver Parameter, Status, and Descriptions *(Continued)*

Parameter	Status	Description
<code>infinite-burst</code>	Read and write	PCI interface parameter
<code>disable-64bit</code>	Read and write	PCI interface parameter
<code>accept-jumbo</code>	Read and write	Enable jumbo frames

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
<code>adv-autoneg-cap</code>	Local interface capability advertised by the hardware 0 = Forced mode 1 = Autonegotiation (default)
<code>adv-1000fdx-cap</code>	Local interface capability advertised by the hardware 0 = Not 1000 Mbit/sec full-duplex capable 1 = 1000 Mbit/sec full-duplex capable (default)
<code>adv-1000hdx-cap</code>	Local interface capability advertised by the hardware 0 = Not 1000 Mbit/sec half-duplex capable 1 = 1000 Mbit/sec half-duplex capable (default)
<code>adv-100T4-cap</code>	Local interface capability advertised by the hardware 0 = Not 100T4 capable (default) 1 = 100T4 capable
<code>adv-100fdx-cap</code>	Local interface capability advertised by the hardware 0 = Not 100 Mbit/sec full-duplex capable 1 = 100 Mbit/sec full-duplex capable (default)
<code>adv-100hdx-cap</code>	Local interface capability advertised by the hardware 0 = Not 100 Mbit/sec half-duplex capable 1 = 100 Mbit/sec half-duplex capable (default)
<code>adv-10fdx-cap</code>	Local interface capability advertised by the hardware 0 = Not 10 Mbit/sec full-duplex capable 1 = 10 Mbit/sec full-duplex capable (default)
<code>adv-10hdx-cap</code>	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 the setting, it will revert back to 0.

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

NOTICE: Last setting will leave ce0 with no link capabilities.
WARNING: ce0: 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. The `ce` device is capable of sourcing flow control frames by 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
<code>adv_asmpause_cap</code>	The adapter supports asymmetric pause, which means it can pause only in one direction. 0=Off (default) 1=On
<code>adv_pause_cap</code>	This parameter has two meanings, each depending on the value of <code>adv_asmpause_cap</code> . (Default=0) <ul style="list-style-type: none">• If <code>adv_asmpause_cap</code> = 1 while <code>adv_pause_cap</code> = 1, pauses are received.• If <code>adv_asmpause_cap</code> = 1 while <code>adv_pause_cap</code> = 0, pauses are transmitted.• If <code>adv_asmpause_cap</code> = 0 while <code>adv_pause_cap</code> = 1, pauses are sent and received.• If <code>adv_asmpause_cap</code> = 0, then <code>adv_pause_cap</code> determines whether Pause capability is on or off.

Gigabit Link Clock Mastership Controls

The concept of link clock mastership was introduced with gigabit twisted-pair technology. One side of the link is the master that provides the link clock and the other side is the slave that uses the link clock. Once this relationship is established, the link is up, and data can be communicated. Two physical layer parameters control whether your side is the master or the slave, or whether mastership is negotiated with the link partner.

TABLE 4-4 Forced Mode Parameters

Parameter	Description
<code>master-cfg-enable</code>	Determines whether or not during the autonegotiation process the link clock mastership is setup automatically.
<code>master-cfg-value</code>	<ul style="list-style-type: none">• If the <code>master-cfg-enable</code> parameter is set, then the mastership is not set up automatically but depends on the value of <code>master-cfg-value</code>.• If the <code>master-cfg-value</code> is set then the physical layer expects the local device to be the link master.• If the <code>master-cfg-value</code> is not set then the parameter expects the link partner to be the master.• If autonegotiation is not enabled, then the value of <code>master-cfg-enable</code> is ignored and the value of <code>master-cfg-value</code> is key to the link clock mastership.• If the <code>master-cfg-value</code> is set, then the physical layer expects the local device to be the link master.• If the <code>master-cfg-value</code> is not set then the parameter expects the link partner to be the master.

Table describes the Forced mode parameters.



Caution – Do not adjust the link clock mastership parameters unless you clearly understand the settings of the link partner. Incorrect link clock mastership configuration results in link-up failure.

Interpacket Gap Parameters

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

When an instance 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 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 4-5 defines the `enable_ipg0` and `ipg0` parameters.

TABLE 4-5 Parameters Defining `enable_ipg0` and `ipg0`

Parameter	Values	Description
<code>enable_ipg0</code>	0	<code>enable_ipg0</code> reset
	1	<code>enable_ipg0</code> set (Default=8)
<code>ipg0</code>	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 4-6 lists the default values and allowable values for the IPG parameters.

TABLE 4-6 Read-Write Interpacket Gap Parameter Values and Descriptions

Parameter	Values (Byte-time)	Description
<code>ipg1</code>	0 to 255	Interpacket gap 1 (Default = 8)
<code>ipg2</code>	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 systems 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 4-7 describes the receive interrupt blanking values.

TABLE 4-7 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 4-8 describes the RX random early detection 8-bit vectors, which allow 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 4-8 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 fewer 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 4-8 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 fewer 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 fewer 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 fewer 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 4-9 PCI Bus Interface Parameters

Parameter	Description
tx_dma_weight	Determines the multiplication factor for granting credit to the TX side during a weighted round robin arbitration. Values are 0 to 3. (Default=0) 0 means no extra weighting. The other values are power of 2 extra weighting, on that traffic. For example if 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 4-9 PCI Bus Interface Parameters

Parameter	Description
<code>rx_dma_weight</code>	Determines the multiplication factor for granting credit to the RX side during a weighted round robin arbitration. Values are 0 to 3. (Default=0)
<code>infinite_burst</code>	Enables the infinite burst capability to be utilized. When this is in effect and the system supports infinite burs, the adapter does not free the bus until complete packets are transferred across the bus. Values are 0 or 1. (Default=0)
<code>disable_64bit</code>	Switches off 64-bit capability of the adapter. Values are 0 or 1. (Default=0, which enables 64 bit capability)

Jumbo Frames

The variable `accept-jumbo` enables the driver to instruct the upper layers that the driver is operating in Jumbo-frame mode.

Note – Jumbo-frame mode is not supported in systems running Solaris 9 x86 software.

TABLE 4-10 `accept-jumbo` Parameters

Parameter	Values	Description
<code>accept-jumbo</code>	1	Enables jumbo frames mode and sets MTU to greater than 1500.
	0	Jumbo frames is not enabled. MTU is at 1500.

In the Solaris 8 Operating System, `accept-jumbo=1` does not take effect on the next `ifconfig`. To get the maximum MTU setting use the following command:

```
# ifconfig ce0 mtu 9194
```

In the Solaris 9 Operating System, `accept-jumbo=1` takes effect on next `ifconfig`, and automatically sets the MTU to 9194.

Although jumbo frames is configurable in 10/100 mode, jumbo frames is only supported in the Gigabit (1000Mbps) mode. Configuring jumbo frames enables the Ethernet interfaces to send and receive packets of up to 9216 bytes. However, the actual transfer size depends on the switch capability.

Refer to the documentation that came with your switch for exact commands to configure jumbo frames support.

Jumbo Frames With Trunking 1.3

When using jumbo frames with Trunking 1.3, you must explicitly enable jumbo frames on each link participating in the Trunk.

▼ To Configure Jumbo Frames Using `ndd`

1. **Bring down and unplumb the interface.**
2. **Set the instance number:**

```
% ndd -set /dev/ce instance 0
```

In this example, the instance number set is 0.

3. **Set the instance to accept jumbo frames:**

```
% ndd -set /dev/ce accept-jumbo 1
```

4. **Plumb the interface up:**

```
% ifconfig ce0 plumb xx.xx.xx.xx up
```

Where `xx.xx.xx.xx` = the IP address of the interface.

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 that 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@8,600000/network@1" 0 "ce"
```

In this example, the Gigabit Ethernet instance is from the installed adapter. The instance number is in bold italics for clarity.

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

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

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.

▼ To Use 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 the value to the parameter:

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

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

```
ce0: xcvr addr:0x01 - link up 1000 Mbps full duplex
```

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

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

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

▼ To Use the `ndd` Utility in Interactive Mode

- **To modify a parameter value in interactive mode, specify `ndd /dev/ce:`**

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

After you enter the parameter name, the `ndd` utility prompts you for the parameter value (see TABLE 4-1 through TABLE 4-12).

- To list all the parameters supported by the `ce` driver, type `?`.

See TABLE 4-1 through TABLE 4-12 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)
master_cfg_enable               (read and write)
master_cfg_value                (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)
accept_jumbo                     (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.

Note – Disabling autonegotiation mode can cause collisions.

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-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.

Note – According to IEEE 802.3 specifications, when using 1000 Mbps speed over copper media, autonegotiation is not optional. In the absence of autonegotiation, (for example, while using Forced mode), link syncing between link partners may not happen and the link may not come up.

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 full duplex
```

Setting Parameters Using the `ce.conf` File

Specify the driver parameter properties for each device 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 can set are the read and write parameters listed in “GigaSwift Ethernet Driver Parameter Values and Definitions” on page 38.

Note – Configuring the parameters by putting `ndd` commands in `rcX.d` scripts is not supported.

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 access any man page, type the `man` command plus the name of the man page. For example, to access man pages for `prtconf(1M)`, type:**

```
% man prtconf
```

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

1. Obtain the hardware path names for the `ce` devices in the device tree.
 - a. Check the `/etc/driver_aliases` file to identify the name associated with a particular device:

```
# grep ce /etc/driver_aliases
ce "pci108e,abba"
ce "pci100b,35"
```

Note – `ce "pci100b, 35"` is used by the Sun GigaSwift Ethernet MMF/UTP adapter.

- b. Locate the path names and the associated instance numbers in the `/etc/path_to_inst` file.

```
# grep ce /etc/path_to_inst
"/pci@8,600000/network@1" 0 "ce"
```

- In this example:
 - The first part within the double quotes specifies the hardware node name in the device tree.
 - The number not enclosed in quotes is the instance number (shown in bold italics).
 - The last part in double quotes is the driver name.
- In the hardware node 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 number after the final @ character within quotes is the 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 this example:

- `parent = "/pci@8,600000"`
- `unit-address = "1"`

2. Set the parameters for the above devices in the `/platform/sun4u/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="pci100b,35" parent="/pci@8,600000" unit-address="1"  
adv-autoneg-cap=0 adv-100hdx-cap=0 adv-100fdx-cap=1 adv-1000fdx-cap=0 adv-  
10hdx-cap=0 adv-10fdx-cap=0 adv-1000hdx-cap=0 adv-100T4-cap=0;
```

Note – If you omit the `name=`, `parent=`, and `unit-address=` definitions, the settings become global to all Sun GigaSwift Ethernet instances.

3. Save the `ce.conf` file.

Usability Enhancements to the Driver

In older Ethernet device drivers, determining the link status for a driver required a two-step process:

First, you had to set the instance:

```
# ndd -set /dev/ce instance 2
```

Then you had to get the link status:

```
# ndd -get /dev/ce link_status
1
```

Starting in the Solaris 9 Operating System, this method of determining the link status is discouraged, and in some cases, it is removed completely as a driver feature.

The new improved approach moves all read-only parameters from the `ndd` options into `kstat`. This simplifies getting link status information by allowing you to do it with one simple command.

- **To get the link status of a driver, type the following command:**

```
# kstat ce:# | grep link_up
link_up                                0
```

Where # = instance.

For more information about the `kstat` command, refer to the `kstat` man page.

GigaSwift Ethernet Driver Operating Statistics

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

TABLE 4-11 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 4-11 Read-Only `ce` Device Capabilities

Parameter	Description (Local interface Capabilities)
<code>cap_autoneg</code>	0 = Not capable of autonegotiation 1 = Autonegotiation capable
<code>cap_1000fdx</code>	Local interface full-duplex capability 0 = Not 1000 Mbit/sec full-duplex capable 1 = 1000 Mbit/sec full-duplex capable
<code>cap_1000hdx</code>	Local interface half-duplex capability 0 = Not 1000 Mbit/sec half-duplex capable 1 = 1000 Mbit/sec half-duplex capable
<code>cap_100fdx</code>	Local interface full-duplex capability 0 = Not 100 Mbit/sec full-duplex capable 1 = 100 Mbit/sec full-duplex capable
<code>cap_100hdx</code>	Local interface half-duplex capability 0 = Not 100 Mbit/sec half-duplex capable 1 = 100 Mbit/sec half-duplex capable
<code>cap_10fdx</code>	Local interface full-duplex capability 0 = Not 10 Mbit/sec full-duplex capable 1 = 10 Mbit/sec full-duplex capable

TABLE 4-11 Read-Only ce Device Capabilities (*Continued*)

Parameter	Description (Local interface Capabilities)
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 4-12 describes the read-only link partner capabilities.

TABLE 4-12 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 = 100 Mbit/sec half-duplex
lp_cap_10fdx	0 = No 10 Mbit/sec full-duplex transmission 1 = 10 Mbit/sec full-duplex
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 4-12 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 4-13 describes the `netstat -k` transmit and receive parameters:

TABLE 4-13 Transmit and Receive Parameters

Parameter	Description
<code>xcvr_inits</code>	Number of physical layer re-initializations every time you change link parameters using NDD this increments.
<code>rev_id</code>	Revision ID of the GigaSwift Ethernet device useful for recognition of device being used in the field.
<code>xcvr_addr</code>	GMII/MII physical layer device address for management interface.
<code>xcvr_id</code>	GMII/MII physical layer device Identification Decimal copy of MII registers 2 and 3.
<code>lb_mode</code>	Copy of the Loopback mode the device is in, if any.
<code>qos_mode</code>	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.
<code>tx_starts</code>	Number of times that the driver attempted to transmit a packet.
<code>tx_dma_bind_fail</code>	Number of times a page table entry was not available to enable the driver to map the kernel memory to device accessible memory for transmission.
<code>tx_queue0</code>	Number of packets queued for transmission on the first hardware transmit queue.
<code>tx_queue1</code>	Number of packets queued for transmission on the second hardware transmit queue.
<code>tx_queue2</code>	Number of packets queued for transmission on the third hardware transmit queue.
<code>tx_queue3</code>	Number of packets queued for transmission on the fourth hardware transmit queue.
<code>tx_max_pend</code>	Maximum number of transmits pending on any of the four queues.
<code>rx_hdr_pkts</code>	Number of packets received that were less than 256 bytes.
<code>rx_mtu_pkts</code>	Number of packets received that were greater than 256 bytes and less than 1514 bytes.

TABLE 4-13 Transmit and Receive Parameters *(Continued)*

Parameter	Description
<code>rx_split_pkts</code>	Number of packets that were split across two pages.
<code>rx_no_comp_wb</code>	Number of times the hardware cannot post completion entries for received data.
<code>rx_no_buf</code>	Number of times the hardware cannot receive data because there is no more receive buffer space.
<code>rx_new_pages</code>	Number of pages that got replaced during reception.
<code>rx_new_hdr_pgs</code>	Number of pages that were filled with packets less than 256 bytes that got replaced during reception.
<code>rx_new_mtu_pgs</code>	Number of pages that were filled with packets greater than 256 bytes and less than 1514 that got replaced during reception.
<code>rx_new_nxt_pgs</code>	Number of pages that contained packets that were split across pages that got replaced during reception.
<code>rx_hdr_drops</code>	Number of times an entire page of packets less than 256 bytes each was dropped because the driver was unable to map a new page to replace it.
<code>rx_mtu_drops</code>	Number of times an entire page of packets greater than 256 bytes and less than 1514 each was dropped because the driver was unable to map a new page to replace it.
<code>rx_nxt_drops</code>	Number of times a page with a split packet was dropped because the driver was unable to map a new one to replace it.
<code>rx_rel_flow</code>	Number of times the driver was told to release a flow.

▼ To Check Link Partner Settings

- If you are running the Solaris 8 Operating System, type the `netstat -k` command as superuser:

```
# 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 1000000000 promisc off rev_id 48 xcvr_inits 1 xcvr_inuse 1
xcvr_addr 1 xcvr_id 536894584 cap_autoneg 1 cap_1000fdx 1 cap_1000hdx 1
cap_100T4 0 cap_100fdx 1 cap_100hdx 1 cap_10fdx 1 cap_10hdx 1
cap_asmpause 0 cap_pause 0 lp_cap_autoneg 1 lp_cap_1000fdx 1
lp_cap_1000hdx 1 lp_cap_100T4 0 lp_cap_100fdx 1 lp_cap_100hdx 1
lp_cap_10fdx 1 lp_cap_10hdx 1 lp_cap_asmpause 0 lp_cap_pause 1
link_T4 0 link_speed 1000 link_duplex 2 link_asmpause 0 link_pause 0
link_up 1 mac_mtu 0 lb_mode 0 qos_mode 0 trunk_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_hdr_pkts 0 tx_ddi_pkts 0 tx_dvma_pkts 0
mdt_reqs 0 mdt_hdr_bufs 0 mdt_pld_bufs 0 mdt_pkts 0 mdt_hdrs 0
mdt_plds 0 mdt_hdr_bind_fail 0 mdt_pld_bind_fail 0 tx_jumbo_pkts 0
tx_max_pend 0 rx_inits 0 rx_jumbo_pkts 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_tag_err 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_rel_bit 0 rx_pkts_dropped 0 pci_bus_speed 66
pci_err 0 pci_rta_err 0 pci_rma_err 0 pci_parity_err 0 pci_bad_ack_err 0
pci_drto_err 0 pci_dmawz_err 0 pci_dmarz_err 0 rx_taskq_waits 0
ipackets_cpu00 0 ipackets_cpu01 0 ipackets_cpu02 0 ipackets_cpu03 0
```

- If you are running the Solaris 9 Operating System, type the `kstat` command as superuser:

CODE EXAMPLE 4-1 Output from the `kstat` Command

```
# kstat ce:0
module: ce                               instance: 0
name:  ce0                               class:  net
      alignment_err                       0
      brdcstrcv                           0
      brdcstxmt                           0
      cap_1000fdx                         1
```


CODE EXAMPLE 4-1 Output from the `kstat` Command (Continued)

```
# kstat ce:0
  cap_1000hdx          1
  cap_100T4            0
  cap_100fdx          1
  cap_100hdx          1
  cap_10fdx           1
  cap_10hdx           1
  cap_asmpause        0
  cap_autoneg         1
  cap_pause           0
  code_violations     0
  collisions          0
  crc_err             0
  crtime              2345.407585961
  excessive_collisions 0
  first_collision     0
  ierrors            0
  ifspeed            0
  ipackets           0
  ipackets64         0
  ipackets_cpu0      0
  ipackets_cpu1      0
  ipackets_cpu2      0
  ipackets_cpu3      0
  late_collisions    0
  lb_mode            0
  length_err         0
  link_T4            0
  link_asmpause      0
  link_duplex        0
  link_pause         0
  link_speed         0
  link_up            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_autoneg     0
  lp_cap_pause       0
  multircv           0
  multixmt           0
  norcvbuf           0
  noxmtbuf           0
```

CODE EXAMPLE 4-1 Output from the `kstat` Command (Continued)

```
# kstat ce:0
  obytes                0
  obytes64              0
  oerrors                0
  opackets              0
  opackets64            0
  pci_bad_ack_err       0
  pci_dmarz_err          0
  pci_dmawz_err          0
  pci_drto_err           0
  pci_err                0
  pci_parity_err        0
  pci_rma_err            0
  pci_rta_err            0
  peak_attempts         0
  promisc                off
  qos_mode               0
  rbytes                 0
  rbytes64               0
  rev_id                 1
  rx_allocb_fail         0
  rx_hdr_drops           0
  rx_hdr_pkts            0
  rx_inits               0
  rx_len_mm              0
  rx_msgdup_fail         0
  rx_mtu_drops           0
  rx_mtu_pkts            0
  rx_new_hdr_pgs         0
  rx_new_mtu_pgs         0
  rx_new_nxt_pgs         0
  rx_new_pages           0
  rx_no_buf              0
  rx_no_comp_wb          0
  rx_nocanput            0
  rx_nxt_drops           0
  rx_ov_flow             0
  rx_pkts_dropped        0
  rx_rel_bit             0
  rx_rel_flow            0
  rx_split_pkts          0
  rx_tag_err             0
  rx_taskq_waits         0
  snaptime               2352.506837979
  tx_allocb_fail         0
  tx_ddi_pkts            0
  tx_dma_bind_fail       0
```

CODE EXAMPLE 4-1 Output from the `kstat` Command (Continued)

```
# kstat ce:0
tx_dma_hdr_bind_fail      0
tx_dma_pld_bind_fail     0
tx_dvma_pkts             0
tx_hdr_pkts              0
tx_inits                 0
tx_max_desc              0
tx_max_pend              0
tx_msgdup_fail           0
tx_no_desc               0
tx_nocanput              0
tx_queue0                3
tx_queue1                0
tx_queue2                0
tx_queue3                0
tx_starts                0
tx_uflo                  0
xcvr_addr                1
xcvr_id                  2121809
xcvr_inits               1
xcvr_inuse               1
```

▼ **To Discover Link Partner Capabilities**

- **Use the `kstat` command to discover link partner capabilities.**

```
# kstat ce:0 | grep lp_
lp_cap_1000fdx           1
lp_cap_1000hdx           1
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_autoneg           1
lp_cap_pause             0
```

▼ To Discover Link Settings

- Use the `kstat` command to discover link settings.

```
# kstat ce:0 | grep link
link_T4                0
link_asmpause          0
link_duplex            2
link_pause             0
link_speed             1000
link_up                1
```

Configuration Checking

The jumbo frame configuration checking occurs at Layer 2 or Layer 3, depending on the configuration method.

Layer 2 Configuration Checking

You can view the MTU configuration of a `ce` instance at any time using the `kstat` command. The `kstat mac_mtu` variable represents the complete size of the Ethernet frame, which includes the Ethernet header, maximum payload, and `crc`. This value is consistent with the definition of MTU presented by switch vendors.

Use the following command to get the information:

```
# kstat ce:0 | grep mac_mtu
```

Layer 3 Configuration Checking

You can check the Layer 3 configuration by invoking the `ifconfig` command on a preconfigured interface as shown in the above examples:

```
ifconfig ce123000
ce123000: flags=1000843<.....> mtu 9194
inet ip-address-vlan-1 .....
ether 8:0:20:c4:51:df
```

Configuring VLANs

This chapter explains VLANs in detail and provides configuration instructions and examples.

VLANs: Virtual Local Area Networks (VLANs) are commonly used to split up groups of network users into manageable broadcast domains, to create logical segmentation of workgroups, and to enforce security policies among each logical segment. With multiple VLANs on an adapter, a server with a single adapter can have a logical presence on multiple IP subnets. By default, 128 VLANs can be defined for each VLAN-aware adapter on your server. However, this number can be increased by changing the system parameters.

If your network does not require multiple VLANs, you can use the default configuration, in which case no further configuration is necessary.

- “Overview of VLANs” on page 63
- “Configuring VLANs” on page 66

Note – If you change any of the VLAN configuration parameters, you must reboot the system before the changes take effect. If you make changes and do not reboot, you may experience configuration problems.

Overview of VLANs

VLANs enable you to split your physical LAN into logical subparts, providing an essential tool for increasing the efficiency and flexibility of your network.

VLANs are commonly used to separate groups of network users into manageable broadcast domains, to create logical segmentation of workgroups, and to enforce security policies among each logical segment. Each defined VLAN behaves as its own separate network, with its traffic and broadcasts isolated from the others, increasing the bandwidth efficiency within each logical group.

Although VLANs are commonly used to create individual broadcast domains and/or separate IP subnets, it can be useful for a server to have a presence on more than one VLAN simultaneously. Several Sun products support multiple VLANs on a per port or per interface basis, allowing very flexible network configurations.

FIGURE 5-1 shows an example network that uses VLANs.

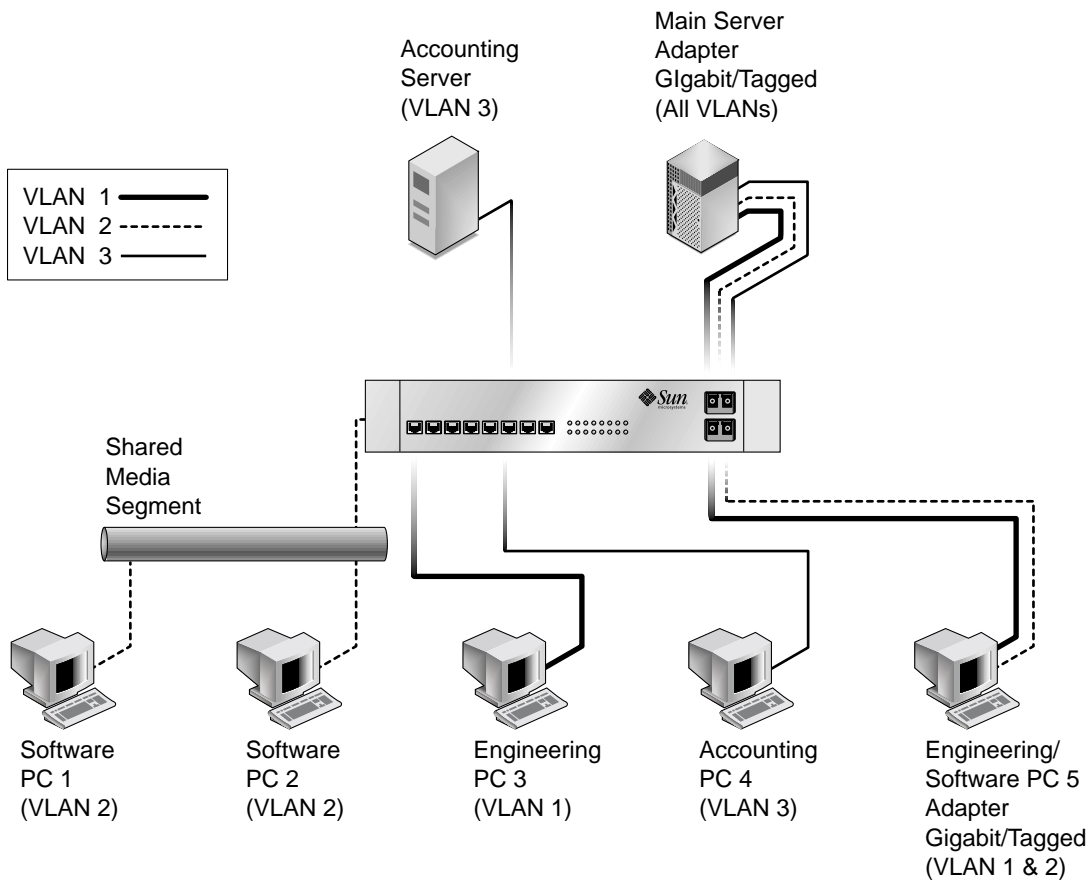


FIGURE 5-1 Example of Servers Supporting Multiple VLANs with Tagging Adapters

The example network has the following features:

The physical LAN network consists of a switch, two servers, and five clients. The LAN is logically organized into three different VLANs, each representing a different IP subnet.

- VLAN 1 is an IP subnet consisting of the Main Server, Client 3, and Client 5. This represents an engineering group.
- VLAN 2 includes the Main Server, Clients 1 and 2 by means of a shared media segment, and Client 5. This is a software development group.
- VLAN 3 includes the Main Server, the Accounting Server and Client 4. This is an accounting group.

The Main Server is a high-use server that needs to be accessed from all VLANs and IP subnets. The server has a Sun GigaSwift Ethernet adapter installed. All three IP subnets are accessed by means of the single physical adapter interface. The server is attached to one of the SunSwitch's Gigabit Ethernet ports, which is configured for VLANs 1, 2, and 3. Both the adapter and the connected SunSwitch™ port have tagging turned on. Because of the tagging VLAN capabilities of both devices, the server is able to communicate on all three IP subnets in this network, but continues to maintain broadcast separation between all of them.

The Accounting Server is available to VLAN 3 only. It is isolated from all traffic on VLANs 1 and 2. The switch port connected to the server has tagging turned off.

Clients 1 and 2 are attached to a shared media hub that is then connected to the switch. They belong to VLAN 2 only, and are logically in the same IP subnet as the Main Server and Client 5. The switch port connected to this segment has tagging turned off.

Client 3 is a member of VLAN 1, and can communicate only with the Main Server and Client 5. Tagging is not enabled on Client 3's switch port.

Client 4 is a member of VLAN 3, and can communicate only with the servers. Tagging is not enabled on Client 4's switch port.

Client 5 is a member of both VLANs 1 and 2, and has a Sun GigaSwift Ethernet adapter installed. It is connected to switch port 10. Both the adapter and the switch port are configured for VLANs 1 and 2 and have tagging enabled.

VLAN tagging is only required to be enabled on switch ports that create trunk links to other VLAN-aware Ethernet switches, or on ports connected to tag-capable end-stations, such as servers or workstations with VLAN-aware adapters.

Configuring VLANs

VLANs can be created according to various criteria, but each VLAN must be assigned a VLAN tag or VLAN ID (VID). The VID is a 12-bit identifier between 1 and 4094 that identifies a unique VLAN. For each network interface (ce0, ce1, ce2 and so on), 4094 possible VLAN IDs can be selected. Because IP subnets are commonly used, it is best to use IP subnets when setting up a VLAN network interface. This means that each VID assigned to a VLAN interface of a physical network interface will belong to different subnets.

Tagging an Ethernet frame requires the addition of a tag header to the frame. The header is inserted immediately following the Destination MAC address and the Source MAC address. The tag header consists of two bytes of Ethernet Tag Protocol Identifier (TPID, 0x8100) and two bytes of Tag Control Information (TCI). FIGURE 5-2 shows the Ethernet Tag Header format.

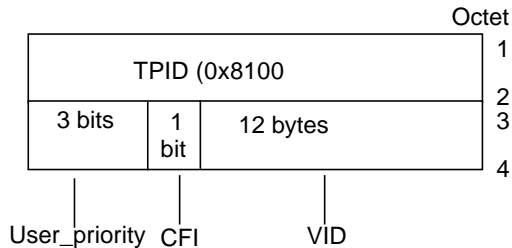


FIGURE 5-2 Ethernet Tag Header Format

By default, a single VLAN is configured for every port, which groups all ports into the same broadcast domain, just as if there were no VLANs at all, VLAN tagging for the switch port turned off.

Note – If you configure a VLAN virtual device for an adapter, all traffic sent or received by that adapter must be in VLAN-tagged format.

▼ To Configure Static VLANs

1. **Create one `hostname6.cenumber` file for each VLAN that will be configured for each adapter on the server.**

Use the following naming format that includes both the VID and the physical point of attachment (PPA):

VLAN logical PPA = $1000 * VID + Device PPA$

`ce123000 = 1000*123 + ce`

This format limits the maximum number of PPAs (instances) you can configure to 1000 in the `/etc/path_to_inst` file.

For example, on a server with the Sun GigaSwift Ethernet adapter having an instance of 0, that belongs to a member of two VLANs, with VID 123 and 224, you would use `ce123000` and `ce224000`, respectively, as the two VLAN PPAs.

2. **Use the `ifconfig(1M)` to configure a VLAN virtual device, for example:**

```
# ifconfig ce123000 plumb up
# ifconfig ce224000 plumb up
```

The output of `ifconfig -a` on a system having VLAN devices `ce123000` and `ce224000`:

```
# ifconfig -a
lo0: flags=1000849<UP,LOOPBACK,RUNNING,MULTICAST,IPv4> mtu 8232 index 1
    inet 127.0.0.1 netmask ff000000
hme0: flags=1000843<UP,BROADCAST,RUNNING,MULTICAST,IPv4> mtu 1500 index 2
    inet 129.144.131.91 netmask ffffffff0 broadcast 129.144.131.255
    ether 8:0:20:a4:4f:b8
ce123000: flags=1000843<UP,BROADCAST,RUNNING,MULTICAST,IPv4> mtu 1500 index 3
    inet 199.199.123.3 netmask ffffffff0 broadcast 199.199.123.255
    ether 8:0:20:a4:4f:b8
ce224000: flags=1000843<UP,BROADCAST,RUNNING,MULTICAST,IPv4> mtu 1500 index 4
    inet 199.199.224.3 netmask ffffffff0 broadcast 199.199.224.225
    ether 8:0:20:a4:4f:b8
```

3. **On the switch, set VLAN tagging and set VLAN ports to coincide with the VLANs you've set up on the server.**

Use the examples in Step 2, you would set up VLAN ports 123 and 224 on the switch.

Refer to the documentation that came with your switch for specific instructions for setting VLAN tagging and ports.

Installing the Software Manually

This appendix describes how to install the driver software manually. It contains the following sections:

- “Installing the Driver Software Manually” on page 69
- “Verifying Patches” on page 74

Installing the Driver Software Manually

The *Sun GigaSwift Ethernet Adapter* CD contains the driver software required to operate the adapter. When you update your Solaris operating system, refer to the documentation that shipped with the *Solaris Supplement* CD-ROM for a listing of the available network drivers. Install the Sun GigaSwift Ethernet driver for your updated version of the Solaris operating system.

▼ To Install the Driver Software Manually

1. **Become superuser.**
2. **Insert the Sun GigaSwift Ethernet Adapter 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_driver directory or the /cdrom/cdrom0 directory, depending on how you mounted the CD-ROM.

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

File or Directory	Contents
Copyright	U.S. copyright file
FR_Copyright	French copyright file
For Solaris 7 and 8 operating systems	
GigabitEthernet/Solaris_OS- <i>VER</i> /Packages/	<p>Contains the Sun GigaSwift Ethernet software packages applicable to your version (<i>OS-VER</i>) of the Solaris software:</p> <ul style="list-style-type: none"> • 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, Solaris 8 only) <p>(For Solaris 8 software only) The optional VLAN packages:</p> <ul style="list-style-type: none"> • SUNWvld—VLAN utility routines • SUNWvldx—VLAN utility routines (64-bit) • SUNWvldu—VLAN utility headers
For Solaris 9 SPARC architecture	
GigabitEthernet/Solaris_9/sparc/Packages/	<p>Contains the Sun GigaSwift Ethernet software packages applicable to the Solaris 9 SPARC version of the software:</p> <ul style="list-style-type: none"> • 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

TABLE A-1 Files and Directories on the CD-ROM (Continued)

File or Directory	Contents
	(For Solaris 9 software only) The optional VLAN packages: <ul style="list-style-type: none"> • SUNWvld—VLAN utility routines • SUNWvldx—VLAN utility routines (64-bit) • SUNWvldu—VLAN utility headers
For Solaris 9 x86 architecture	
GigaSwiftEthernet/Solaris_9/i386/Packages/	Contains the Sun GigaSwift Ethernet software packages applicable to the Solaris 9 x86 version of the software: <ul style="list-style-type: none"> • SUNWcea—32-bit adb macros • SUNWced—adapter driver • SUNWcedu—adapter driver headers • SUNWcem—man pages The optional VLAN packages: <ul style="list-style-type: none"> • SUNWvld—VLAN utility routines • SUNWvldu—VLAN utility headers
GigaSwiftEthernet/Docs/en	Contains PDF copy of the user manual

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

3. Determine if the `ce` and `vlan` drivers are installed on the system:

- If you are using a Solaris SPARC system:

```
#/usr/bin/pkginfo SUNWced SUNWcedx SUNWvld SUNWvldx
system      SUNWced      Sun GigaSwift Ethernet Adapter (32-bit Driver)
system      SUNWcedx     Sun GigaSwift Ethernet Adapter (64-bit Driver)
system      SUNWvld      Sun Ethernet Vlan Utility Routines
system      SUNWvldx     Sun Ethernet Vlan Utility Routines (64-bit)
```

- If you are using a Solaris x86 system:

```
#/usr/bin/pkginfo SUNWced SUNWvld
system      SUNWced      Sun GigaSwift Ethernet Adapter
system      SUNWvld      Sun GigaSwift Ethernet Adapter
```

- If the output of the command is similar to the appropriate example in Step 3, skip to Step 6.

- If nothing is reported back on SUNWced or SUNWcedx, then proceed to Step 4 and select SUNWcea, SUNWceax, SUNWced.u, SUNWcedx.u, SUNWcedu, and SUNWcem (if present).
 - If nothing is reported back for SUNWvld or SUNWvldx, then proceed to Step 4 and select SUNWvld, SUNWvldx, and SUNWvldu packages.
 - If nothing is reported back, then proceed to Step 4 and select "all" packages.
- 4. Install the software packages by typing the following at the command line, replacing the *OS_VER* with your version of the Solaris operating system:**
- If your system is running Solaris 7 or 8 software type the following:

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

Where OS_VER is 7 or 8

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

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

- If your system is running Solaris 9 SPARC software type the following:

```
# /usr/sbin/pkgadd -d /cdrom/cdrom0/GigaSwiftEthernet/Solaris_9/Sparc/Packages/
```

- If your system is running Solaris 9 x86 software type the following:

```
# pkgadd -d /Solaris_9/i386/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]:

5. Select the packages you want to install:

- Press Return or type **a11** to accept the default and install all packages (if neither the GigaSwift Ethernet Driver nor VLAN Utility packages are installed).
- Type the numbers of all but the optional packages if you prefer not to install them.

See TABLE A-1 to identify the optional packages.

6. If the packages are already installed, verify the patch version.

See the following section.

Verifying Patches

Verify whether your system has the needed patches for your version of the Solaris Operating System to ensure that you do not need to add patches.

Note – If patches meet the requirements, nothing needs to be installed on the install system.

TABLE A-2 lists and describes the patch versions:

TABLE A-2 Patch Versions

Solaris	Patch Version	Description
7	112327-18	SunOS 2.7: Sun GigaSwift Ethernet 1.0 driver patch
8	111883-24	SunOS 5.8: Sun GigaSwift Ethernet 1.0 driver patch
	112119-04	SunOS 5.8: vlan driver patch*
9	112817-17	SunOS 5.9: Sun GigaSwift Ethernet 1.0 driver patch
	114600-02	SunOS 5.9: vlan driver patch*
9 x86	117714-01	SunOS 5.9_x86: Sun GigaSwift Ethernet 1.0 driver patch

* Only required if packages SUNWvld or SUNWvldx are installed.

Table describes the patch versions.

▼ To Install Patches

1. Determine the version of the Solaris Operating System your system is running:

```
% cat /etc/release
Solaris 9 8/03 s9s_u4wos_08a SPARC
Copyright 2003 Sun Microsystems, Inc. All Rights Reserved.
Use is subject to license terms.
Assembled 13 June 2003
```

2. Verify patch versions for the GigaSwift Ethernet driver:

- To verify patches for the Solaris 8 Operating System, type the following:

```
# showrev -p | grep 111883
```

The patch version should be -24 or greater.

- To verify patches for the Solaris 9 SPARC Operating System, type the following:

```
# showrev -p | grep 112817
```

The patch version should be -17 or greater.

- To verify patches for the Solaris 9 x86 Operating System, type the following:

```
# showrev -p | grep 117714
```

The patch version should be -01 or greater.

3. If the patch is not present or the patch version is not correct, install the correct patch:

```
# cd /cdrom/cdrom0  
# patchadd GigaSwiftEthernet/OS/Patches/patch-id
```

- If your system is running Solaris 7 or 8 software type the following:

```
# patchadd GigaSwiftEthernet/OS/Patches/patch-id
```

Where:

OS_VER = Solaris 7 or Solaris 8

patch-id = 112327-18 for Solaris 7 or 11883-24 for Solaris 8

- If your system is running Solaris 9 SPARC software type the following:

```
# cd /cdrom/cdrom0  
# patchadd GigaSwiftEthernet/Solaris_9/sparc/Patches/112817-17
```

- If your system is running Solaris 9 x86 software type the following:

```
# cd /cdrom/cdrom0
# patchadd GigaSwiftEthernet/Solaris_9/i386/Patches/117714-01
```

▼ To Install a Sun VLAN Utility Patch

Note – The VLAN Utility is only supported in Solaris 8 and Solaris 9 software.

1. Determine the version of the Solaris Operating System your system is running:

```
% cat /etc/release
Solaris 9 8/03 s9s_u4wos_08a SPARC
Copyright 2003 Sun Microsystems, Inc. All Rights Reserved.
Use is subject to license terms.
Assembled 13 June 2003
```

2. Verify patch versions for the VLAN utility software:

- To verify patches for the Solaris 8 Operating System, type the following:

```
# showrev -p | grep 112119
```

The patch version should be -04 or greater.

- To verify patches for the Solaris 9 Operating System, type the following:

```
# showrev -p | grep 114600
```

Verify that the patch version is -02 or higher.

3. If the patch versions are not correct, install the correct patch.

- If your system is running the Solaris 8 SPARC Operating System, type the following:

```
# cd /cdrom/cdrom0
# patchadd GigaSwiftEthernet/Solaris_8/Patches/112119-04
```

4. If your system is running the Solaris 9 SPARC Operating System, type the following:

```
# cd /cdrom/cdrom0
# patchadd GigaSwiftEthernet/Solaris_9/Sparc/Patches/114600-02
```

You will see output similar to the following Solaris 9 SPARC Operating System example:

```
Verifying sufficient filesystem capacity (dry run method)...
Installing patch packages...

Patch number 114600-02 has been successfully installed.
See /var/sadm/patch/114600-02/log for details

Patch packages installed:
SUNWvld
SUNWvldu
SUNWvldx
```


Using the Sun GigaSwift Ethernet Driver in Solaris 9 x86 Operating Systems

This appendix describes the features and limitations of using the Sun GigaSwift Ethernet driver software in the Solaris 9 x86 Operating System:

- “Hardware and Software Requirements” on page 79
- “Patch Requirements” on page 80
- “Product Features” on page 80
- “Features Not Currently Supported” on page 81
- “Using the Installation Script” on page 81
- “Installing the Software Manually” on page 84
- “Configuring Driver Parameters” on page 87

Hardware and Software Requirements

Before using the Sun GigaSwift Ethernet adapter, make sure your system meets the following hardware and software requirements:

Hardware and Software	Requirements
Hardware	Opteron platforms such as the Sun Fire™ v20Z
Operating System	Solaris 9 x86 releases

Patch Requirements

The software driver package provided on the CD-ROM has current driver patch versions (at the time this document was created) preinstalled.

- Patch-ID Number 117714-01 for Solaris 9 x86 Operating System

Install the *latest* version of the Patch-ID number. For example, the Patch-ID number for the Solaris 9 x86 OS is 117714-01. The dash number -01 becomes higher with each new version of the patch. Updated versions of patches are available at the following web site:

<http://sunsolve.sun.com>

If the patch is not available on SunSolve, contact your local sales or service representative.

Product Features

You can install or replace the Sun GigaSwift Ethernet adapter.

Key Protocols and Interfaces

The Sun GigaSwift Ethernet adapter is interoperable with existing Ethernet equipment, assuming standard Ethernet minimum and maximum frame size (64 to 1518 bytes), frame format, and compliance with the following standards and protocols:

- SNMP (limited MIB)
- Full-duplex gigabit Ethernet interface
- Low CPU utilization—Frees up server system resource and bandwidth
- Full flow control support
- Duplex SC fiber connector (850 nm, SX)
- 33/66-MHz, 32-bit bus master
- Universal dual voltage signaling (3.3V and 5V)
- PCI Local Bus Rev 2.2-compliant (6.6-inch x 2.5-inch short card)
- IPv4 and IPv6 support
- Load balancing for RX packets among multiple CPUs
- IEEE 802.1Q VLAN
- IEEE 802.1P/802.1D Priority Tagging/Quality Of Service
- RAS support

- Energy Star® support

Features Not Currently Supported

The following features are not currently supported for the Sun GigaSwift Ethernet driver software in the Solaris 9 x86 Operating System.

- Dynamic reconfiguration (DR) and redundancy/failover support
- Diskless client
- Installing the Solaris Operating System over this adapter
- Using this adapter as the primary boot device
- Setting the `local-mac-address?` variable
- Jumbo-frame mode
- Sun Trunking
- User-executable self-test using OpenBoot PROM
- SunVTS™ diagnostic tool

Using the Installation Script

The Sun GigaSwift Ethernet CD provides automated installation for the GigaSwift Ethernet driver software. In most cases, you can use the following procedure and execute the installation script. If you have any problems, see Appendix A for manual installation procedures.

When you have executed the script, select the interface card that is installed on your system. For this product, select the “Sun GigaSwift Ethernet Adapter.”

The script first checks to ensure that the software driver package has already been installed. If the package is installed, the script verifies the patch level and updates the driver with the updated patch if necessary. If the packages are not installed on Solaris 8 or 9 software, the installation script installs the latest prepatched packages. If the system does not require updating because the patch level is at or beyond the current install version, the script exits with an appropriate message.

▼ To Install the Software Using the Installation Script

1. **At the system console, become superuser (root).**

2. Insert the Sun GigaSwift Ethernet Adapter 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 Sun Enterprise Volume Manager, mount the CD-ROM as follows:

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

3. Change to the directory where the installation script resides:

```
# cd /media_path/
```

Where:

- `media_path` = `/cdrom/cdrom0`, if you are installing from the CD-ROM.

Or

- unzipped `GigaSwift_path/Sun_GigaSwift_Ethernet_Driver`, if you downloaded the driver from the Sun download center.

4. Execute the installation script:

```
# ./install
```

The script displays a menu of products:

```
Product Installation

1 - Dual Gigabit Ethernet Dual SCSI/P Adapter
2 - GigaSwift Ethernet Adapter (copper/fiber)
3 - GigaSwift Ethernet Compact PCI Adapter
4 - Quad GigaSwift Ethernet Adapter

Please select the product to install: 2
```

5. Select 2, the Sun GigaSwift Ethernet adapter, and answer the questions, if required, in the installation script.

Note – After the installation script runs, you see a summary of the software package or patch that was installed. You can also find a log of the installation in `/var/tmp`. The log file information is displayed when the installation completes unless the software meets or exceeds the required package or patch level.

Example: All Requirements Met on Solaris x86 Systems

Following is an example of an installation script output if the driver and patch requirements are met on the Solaris 9 x86 Operating System:

CODE EXAMPLE B-1 Script Output for x86 Systems When Requirements Are Met

```
Product Installation

1 - Dual Gigabit Ethernet Dual SCSI/P Adapter
2 - GigaSwift Ethernet Adapter (copper/fiber)
3 - GigaSwift Ethernet Compact PCI Adapter
4 - Quad GigaSwift Ethernet Adapter

Please select the product to install: 2

GigaSwift Ethernet Adapter Driver Installation.
Copyright 2004 Sun Microsystems, Inc. All rights reserved.
Use is subject to license terms.

*** Checking for correct version of GigaSwift Ethernet Driver
Packages...
*** Checking for correct version of GigaSwift Ethernet Driver
Patches...

*** Checking for correct version of VLAN Utility Driver Packages..
*** Checking for correct version of VLAN Utility Driver Patches...

The CE/VLAN driver(s) installed on this system for:

GigaSwift Ethernet Adapter Driver

meets or exceeds the required package or patch version. No changes
to the system are required - exiting.
```

Installing the Software Manually

▼ To Install the Software Manually

1. **Become superuser.**
2. **Insert the Sun GigaSwift Ethernet Adapter 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_driver` directory or the `/cdrom/cdrom0` directory, depending on how you mounted the CD-ROM.

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

File or Directory	Contents
Copyright	U.S. copyright file
FR_Copyright	French copyright file
For Solaris 7 and 8 operating systems	
GigabitEthernet/Solaris_OS-VER/Packages/	Contains the Sun GigaSwift Ethernet software packages applicable to your version (<i>OS-VER</i>) of the Solaris software: <ul style="list-style-type: none">• 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, Solaris 8 only)

TABLE B-1 Files and Directories on the CD-ROM *(Continued)*

File or Directory	Contents
	(For Solaris 8 software only) The optional VLAN packages: <ul style="list-style-type: none">• SUNWvld—VLAN utility routines• SUNWvldx—VLAN utility routines (64-bit)• SUNWvldu—VLAN utility headers
For Solaris 9 SPARC architecture	
GigabitEthernet/Solaris_9/ sparc/Packages/	Contains the Sun GigaSwift Ethernet software packages applicable to to the Solaris 9 SPARC version of the software: <ul style="list-style-type: none">• 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 (For Solaris 9 software only) The optional VLAN packages: <ul style="list-style-type: none">• SUNWvld—VLAN utility routines• SUNWvldx—VLAN utility routines (64-bit)• SUNWvldu—VLAN utility headers
For Solaris 9 x86 architecture	
GigaSwiftEthernet/Solaris_9 /i386/Packages/	Contains the Sun GigaSwift Ethernet software packages applicable to to the Solaris 9 x86 version of the software: <ul style="list-style-type: none">• SUNWcea—32-bit adb macros• SUNWced—adapter driver• SUNWcedu—adapter driver headers• SUNWcem—man pages The optional VLAN packages: <ul style="list-style-type: none">• SUNWvld—VLAN utility routines• SUNWvldu—VLAN utility headers
GigaSwiftEthernet/Docs/en	Contains PDF copy of the user manual

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

3. Determine if the ce and vlan drivers are installed on the system:

```
#/usr/bin/pkginfo SUNWced SUNWvld
system          SUNWced          Sun GigaSwift Ethernet Adapter
system          SUNWvld          Sun GigaSwift Ethernet Adapter
```

4. Install the software packages by typing the following at the command line:

```
# /usr/sbin/pkgadd -d /cdrom/cdrom0/GigaSwiftEthernet/Solaris_9/i386/Packages/
```

A menu similar to the following displays:

```
The following packages are available:
1 SUNWcea      Sun GigaSwift Ethernet Adapter Driver 32 bit adb Macros
                (i386) 1.0,REV=2001.05.04
1 SUNWced      Sun GigaSwift Ethernet Adapter Driver (32-bit Driver)
                (i386) 1.0,REV=2001.05.04
2 SUNWcedu     Sun GigaSwift Ethernet Adapter Driver Headers
                (i386) 1.0,REV=2001.05.04
3 SUNWcem      Sun GigaSwift Ethernet Adapter Driver Man Pages
                (i386) 1.0,REV=2001.05.04
4 SUNWvld      Sun Ethernet Vlan Utility Routines
                (i386) 1.0,REV=2001.05.04
5 SUNWvldu     Sun Ethernet Vlan Utility Headers
                (i386) 1.0,REV=2001.05.04

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

5. Select the packages you want to install:

- Press Return or type **a11** to accept the default and install all packages.
- Type the numbers of all but the optional packages if you prefer not to install them.

6. Reboot the system:

```
ok boot -r
```

Verifying the Software Installation

After you have run the automated installation script, check to be sure you have the current version of the driver installed.

- **Use the `modinfo` command to verify that you have the current driver (v1.137 or later) installed.**

Type `grep CE`, using uppercase letters, to get only the specific driver information:

```
# modinfo |grep CE
84 7821c000 4f9a6 75 1 ce (CE Ethernet Driver v1.137)
```

Configuring Driver Parameters

See Chapter 4, “Configuring Driver Parameters,” for complete instructions. Configuring driver parameters is the same on both SPARC and Solaris 9 x86 systems.

Configuring VLANs

See Chapter 5, “Configuring VLANs,” for complete instructions. Configuring VLANs is the same on both SPARC and Solaris 9 x86 systems.

Specifications

This appendix lists the specifications for the Sun GigaSwift Ethernet adapter. It contains the following sections:

- “Connectors” on page 89
- “Performance Specifications” on page 91
- “Physical Characteristics” on page 91
- “Power Requirements” on page 91

Connectors

FIGURE C-1 shows the connector for the Sun GigaSwift Ethernet MMF adapter.

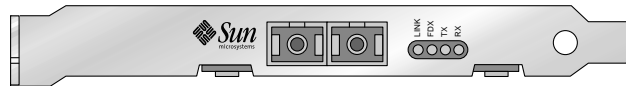


FIGURE C-1 Sun GigaSwift Ethernet MMF Adapter Connector

TABLE C-1 lists the characteristics of the SC connector (850 nm).

TABLE C-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

Table lists the characteristics of the MMF connector.

FIGURE C-2 shows the connector for the Sun GigaSwift Ethernet UTP adapter.

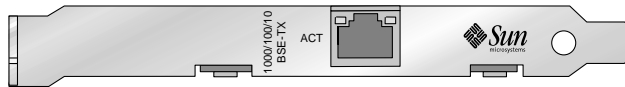


FIGURE C-2 Sun GigaSwift Ethernet UTP Adapter Connector

Table A-2 lists the characteristics of the Cat-5 connector used by the Sun GigaSwift Ethernet UTP adapter.

TABLE C-2 Cat-5 Connector Link Characteristics

Description	Distance
Operating range	Up 100 meters

Performance Specifications

TABLE C-3 Performance Specifications

Feature	Specification
PCI clock	33/66 MHz max
PCI data burst transfer rate	up to 64-byte bursts
PCI data/address width	32/64 -bit
PCI modes	Master/slave
1 GBit/s, 850 nm (MMF)	1000 Mbps (full-duplex)
1 GBit/s, 850 nm (UTP)	10/100/1000 Mbps (half-duplex or full-duplex)

Physical Characteristics

TABLE C-4 Physical Characteristics

Dimension	Measurement
Length	6.600 inches (167.64 mm)
Width	2.536 inches (64.41mm)

Power Requirements

TABLE C-5 Power Requirements

Specification	Measurement
Maximum power consumption	12 watts (MMF) 15 watts (UTP)
Voltage	3.3V and 5V

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 93
- “Using the OpenBoot PROM FCode Self-Test” on page 95

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.

Note – SunVTS diagnostic software is not currently available for Solaris 9 x86 Operating Systems.

The SunVTS `nettest` diagnostic can be used to test all of the networking interfaces on the system, including the interfaces on the adapter.

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

Refer to the SunVTS documentation (listed in TABLE D-1) for instructions on how to run and monitor the `nettest` diagnostic. These SunVTS documents are available on the *Solaris on Sun Hardware Collection*, which is provided on the Solaris Supplement CD for the Solaris release on your system.

TABLE D-1 SunVTS Documentation

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

Using the SunVTS `netlbttest`

You must have the Ethernet card and the device driver installed, a loopback connector in place, and Intervention mode enabled before running `netlbttest`. `netlbttest` cannot run if the network interface is connected to a live network, and requires that the Ethernet device be configured offline before running the test. Use the `ifconfig(1M)` command to bring the Ethernet device down before running `netlbttest`.

▼ To Use the `netlbttest`

1. **Ensure that the SunVTS software and the `ce` driver are installed on your system.**
2. **Plug in a loopback cable.**
3. **Unplumb the interface from the system, using the `ifconfig` command:**

```
# ifconfig ceinstance down
# ifconfig ceinstance unplumb
```

Where *instance* is the instance number of the interface.

Refer to SunVTS documentation for instructions on how to run `netlbttest`.

Using the OpenBoot PROM FCode Self-Test

The Sun GigaSwift Ethernet adapter's self-test verifies the correct operation of the adapter and identifies any hardware problems with the adapter. The self-test is a suite of tests that reside in the adapter's FCode PROM.

Note – The OpenBoot PROM FCode self-test is not available in the Solaris 9 x86 Operating System.

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

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

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

▼ To Run the FCode Self-Test Diagnostic

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

- 1. Before shutting down the operating system and halting the system, ensure that all significant application and network activity on the server has stopped.**
- 2. Follow the appropriate procedures, as documented in the system's service manual, to shut down and halt the system.**

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

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

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

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

4. Set the `diag-switch?` parameter to true in order to see the diagnostic power-on self-test (POST) messages.

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

5. Reset the system to activate these parameter changes.

```
ok reset-all
```

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

Among the list of devices, you should see the two interfaces specific to the Sun GigaSwift Ethernet adapter you want to test, as shown in the following example.

```
ok show-nets
a) /pci@1f,700000/network@2
b) /pci@1e,600000/pci@4/network@1
c) /pci@1e,600000/pci@4/network@0
q) NO SELECTION
Enter Selection, q to quit:
```

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

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

The structure of the `test` command line that includes the following device parameters:

```
ok test device-path:speed=s,duplex=d,link-clock=c,promiscuous,
```

Where:

```
s = 1000, 100, 10, auto
d = half, full, auto
c = master, slave, auto
```

Note – The speed, duplex, and link-clock parameters are optional tests. See TABLE 3-1 for more information about these parameters.

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

- MAC internal loopback
- 1000 Mbps PHY loopback
- 100 Mbps PHY loopback
- 10 Mbps PHY loopback

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

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

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

```
ok test pci@1e,600000/pci@4/network@1
Testing pci@1e,600000/pci@4/network@1
Register tests: passed
Internal loopback test: passed
pci@1e,600000/pci@4/network@1: 1000 Mbps full duplex link up
ok
```

If the adapter's interface is not connected, you will see the following error message:

```
ok test pci@1e,600000/pci@4/network@1
Testing /pci@1e,600000/pci@4/network@1
Register tests: passed
Internal loopback test: passed
/pci@8,600000/pci@1/network@0: Timed out waiting for Auto-
Negotiation to complete
pci@1e,600000/pci@4/network@1: Cannot establish link via Auto-
Negotiation
Please check cable and/or connection
pci@1e,600000/pci@4/network@1: link down
ok
```

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

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

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

9. At the `ok` prompt, reset the `auto-boot?` configuration variable to `true`.

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

10. Reset and reboot the system.

```
ok reset-all
```

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

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 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-ampause-cap`
 - `adv-pause-cap`
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.

Failure to Configure GigaSwift Ethernet Instance

If your machine fails to configure a GigaSwift Ethernet instance, yet `prtconf` indicates the adapter is present, the problem might be due to residue adapter instances in the `path_to_inst` file.

To solve this problem, open the `path_to_inst` file for editing and remove the lines containing `ce` device path.

Reboot the machine and try to configure it again.

Nonspecific Issues

TABLE D-2 describes the problems you may encounter in using the GigaSwift Ethernet adapter as well as a solution for them:

TABLE D-2 Troubleshooting the GigaSwift Ethernet Adapter

Problem	Description	Solution
<code>prtdiag</code> 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), <code>prtdiag</code> displays the card on slot 0. Although the card in slot 1 is not recognized by <code>prtdiag</code> , the card is fully operational and appears in the <code>/etc/path_to_inst</code> file.	Use <code>prtconf -pv</code> instead of <code>prtdiag</code>
VLAN appears to accept VID 0 as end user input.	<code>ce000000</code> , <code>ce00000</code> , or <code>ce0000</code> configured as VID 0 is actually the regular <code>ce0</code> interface not VID 0 of the <code>ce0</code> interface. VID 0 is not supported as an end user device.	This is normal behavior.
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).	<ul style="list-style-type: none">• Turn off CPR.• A CPR fix is incorporated in Solaris 8.
<code>Inetboot</code> 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

Problem With DR Attach on Sun Enterprise Platforms

DR attach does not configure `ce` interfaces on Sun Enterprise 10000 platforms running the Solaris 2.6 Operating System. To add DR support for `ce` interfaces on such systems, make the following changes:

1. Add the following lines to the `/etc/system` file:

```
set dr:detach_safe_list1="ce"  
set hswp:suspend_safe_list1="ce"
```

2. Reboot the system.

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