3Com

Installation and User Guide

Gigabit EtherLink™ Server Network Interface Cards (NICs) for Windows 2000 and Windows NT 4.0

Gigabit EtherLink Server NIC (3C985B-SX)
1000BASE-SX PCI Fiber NIC (710011, 710012)
10/100/1000BASE-T PCI NIC (3C986-T, 710024, 710025)
1000BASE-LX PCI Fiber NIC (710026)

http://www.3com.com/
http://www.3com.com/productreg

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The software and documentation contained herein are an interim version provided by 3Com Corporation for use with 3Com Gigabit NICs, and contain ACEnic software earlier released by Alteon WebSystems, Inc. circa Spring 200.

For all Gigabit product questions, contact 3Com Corporation directly at: www.3com.com/promotions/nics/nictransition.html.

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Preface

This manual describes how to install and use the 3Com Gigabit EtherLink Server network interface cards (NICs) in a Microsoft Windows 2000 or Windows NT 4.0 operating environment. The procedures in this manual assume that you are a system or network administrator experienced in installing similar hardware.

How This Manual Is Organized

This manual is organized as follows:

- **Chapter 1, "About the NIC,"** describes the features of the NICs. This chapter also describes the NIC faceplates and LED indicators.
- **Chapter 2, "Installing the NIC Hardware,"** lists the hardware and software requirements for NIC installation and use, and provides instructions to physically install the NIC in your system.
- **Chapter 3, "Installing the Driver Software in Windows 2000,"** explains how to install the NIC software under Windows 2000.
- **Chapter 4, "Installing the Driver Software in Windows NT 4.0,"** explains how to install the NIC software under Windows NT 4.0.
- **Chapter 5, "Installing DynamicAccess Software,"** explains how to install 3Com Dynamic*Access* software under Windows. Dynamic*Access* software adds intelligence to the NIC to improve network performance, management, and control.
- **Chapter 6, "Troubleshooting,"** provides a list of items to check for basic installation and configuration problems.
- **Appendix A, "Specifications,"** provides NIC hardware specifications.

Operating System Commands

This manual may not include all necessary hardware procedures or software commands. Instead, it may name specific tasks and refer you to operating system documentation or the hardware handbook that was shipped with your system.

You might need to use supplemental documentation for the following types of information:

- Shutting down the system
- Getting access to the system's PCI slots
- Booting the system
- Configuring devices
- Other basic software procedures

Contacting 3Com

3Com provides easy access to technical support information through a variety of services. This appendix describes these services.

Information contained in this appendix is correct at time of publication. For the most recent information, 3Com recommends that you access the 3Com Corporation World Wide Web site.

Online Technical Services

3Com offers worldwide product support 24 hours a day, 7 days a week, through the following online systems:

- World Wide Web site
- 3Com Knowledgebase Web Services
- 3Com FTP site
- 3Com Bulletin Board Service (3Com BBS)
- 3Com Facts℠ Automated Fax Service

World Wide Web Site

To access the latest networking information on the 3Com Corporation World Wide Web site enter this URL into your Internet browser:

`http://www.3com.com/`

This service provides access to online support information such as technical documentation and a software library, as well as support options that range from technical education to maintenance and professional services.

3Com Knowledgebase Web Services

This interactive tool contains technical product information compiled by 3Com expert technical engineers around the globe. Located on the World Wide Web at **`http://knowledgebase.3com.com`**, this service gives all 3Com customers and partners complementary, round-the-clock access to technical information on most 3Com products.

3Com FTP Site

Download drivers, patches, software, and MIBs across the Internet from the 3Com public FTP site. This service is available 24 hours a day, 7 days a week.

To connect to the 3Com FTP site, enter the following information into your FTP client:

- Hostname: **`ftp.3com.com`**
- Username: **`anonymous`**
- Password: **`<your Internet e-mail address>`**

NOTE: You do not need a user name and password with Web browser software such as Netscape Navigator and Internet Explorer.

3Com Bulletin Board Service

The 3Com BBS contains patches, software, and drivers for 3Com products. This service is available through analog modem or digital modem (ISDN) 24 hours a day, 7 days a week.

Access by Analog Modem

To reach the service by modem, set your modem to 8 data bits, no parity, and 1 stop bit. Call the telephone number nearest you:

Country (Region)	Data Rate	Telephone Number
Australia	Up to 14,400 bps	61 2 9955 2073
Brazil	Up to 28,800 bps	55 11 5181 9666
France	Up to 14,400 bps	33 1 6986 6954
Germany	Up to 28,800 bps	4989 62732 188
Hong Kong	Up to 14,400 bps	852 2537 5601
Italy	Up to 14,400 bps	39 2 27300680
Japan	Up to 14,400 bps	81 3 5977 7977
Mexico	Up to 28,800 bps	52 5 520 7835
P.R. of China	Up to 14,400 bps	86 10 684 92351
Taiwan	Up to 14,400 bps	886 2 377 5840
U.K.	Up to 28,800 bps	44 1442 438278
U.S.A.	Up to 53,333 bps	1 847 262 6000

Access by Digital Modem

ISDN users can dial in to the 3Com BBS using a digital modem for fast access up to 64 Kbps. To access the 3Com BBS using ISDN, call the following number:

1 847 262 6000

3Com Facts Automated Fax Service

The 3Com Facts automated fax service provides technical articles, diagrams, and troubleshooting instructions on 3Com products 24 hours a day, 7 days a week.

Call 3Com Facts using your Touch-Tone telephone:

1 408 727 7021

Support from Your Network Supplier

If you require additional assistance, contact your network supplier. Many suppliers are authorized 3Com service partners who are qualified to provide a variety of services, including network planning, installation, hardware maintenance, application training, and support services.

When you contact your network supplier for assistance, have the following information ready:

- Product model name, part number, and serial number
- A list of system hardware and software, including revision levels
- Diagnostic error messages
- Details about recent configuration changes, if applicable

If you are unable to contact your network supplier, see the following section on how to contact 3Com.

Support from 3Com

If you are unable to obtain assistance from the 3Com online technical resources or from your network supplier, 3Com offers technical telephone support services. To find out more about your support options, please the 3Com technical telephone support phone number at the location nearest you.

When you contact 3Com for assistance, have the following information ready:

- Product model name, part number, and serial number
- A list of system hardware and software, including revision levels
- Diagnostic error messages
- Details about recent configuration changes, if applicable

Here is a list of worldwide technical telephone support numbers:

Country (Region)	Telephone Number
Asia Pacific Rim	
Australia	1 800 678 515
Hong Kong	800 933 486
India	+61 2 9937 5085
Indonesia	001 800 61 009
Japan	0031 61 6439
Malaysia	1800 801 777
New Zealand	0800 446 398
Pakistan	+61 2 9937 5085
Philippines	1235 61 266 2602
P.R. of China	10800 61 00137 or 021 6350 1590
Singapore	800 6161 463
S. Korea	
From anywhere in S. Korea:	00798 611 2230
From Seoul:	(0)2 3455 6455
Taiwan	0080 611 261
Thailand	001 800 611 2000
Europe	
From anywhere in Europe, call:	+31 (0)30 6029900 phone +31 (0)30 6029999 fax

Country (Region)	Telephone Number
Europe, South Africa, and Middle East From the following countries, you may use the toll-free numbers:	
Austria	0800 297468
Belgium	0800 71429
Denmark	800 17309
Finland	0800 113153
France	0800 917959
Germany	0800 1821502
Hungary	00800 12813
Ireland	1800 553117
Israel	1800 9453794
Italy	1678 79489
Netherlands	0800 0227788
Norway	800 11376
Poland	00800 3111206
Portugal	0800 831416
South Africa	0800 995014
Spain	900 983125
Sweden	020 795482
Switzerland	0800 55 3072
U.K.	0800 966197
Latin America	
Argentina	AT&T +800 666 5065
Brazil	0800 13 3266
Chile	1230 020 0645
Colombia	98012 2127
Mexico	01 800 CARE (01 800 2273)
Peru	AT&T +800 666 5065
Puerto Rico	800 666 5065
Venezuela	AT&T +800 666 5065
North America	1-800-527-8677

Returning Products for Repair

Before you send a product directly to 3Com for repair, you must first obtain an authorization number. Products sent to 3Com without authorization numbers will be returned to the sender unopened, at the sender's expense.

To obtain an authorization number, call or fax:

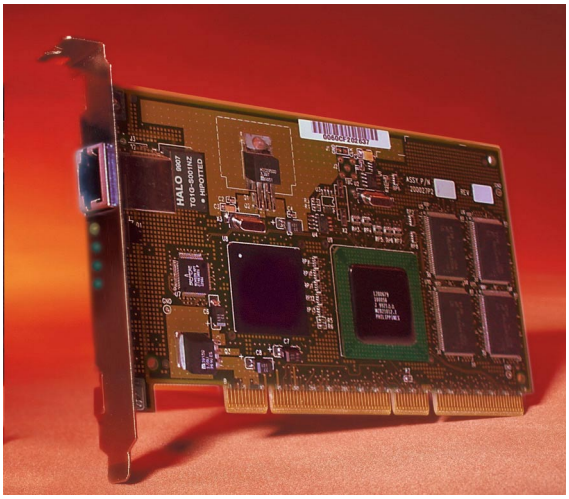
Country (Region)	Telephone Number	Fax Number
Asia, Pacific Rim	+65 543 6500	+65 543 6348
Europe, South Africa, and Middle East	+31 30 6029900	+31 30 6029999
Latin America	1 408 326 2927	1 408 326 3355
From the following countries, you may call the toll-free numbers; select option 2 and then option 2:		
Austria	0800 297468	
Belgium	0800 71429	
Denmark	800 17309	
Finland	0800 113153	
France	0800 917959	
Germany	0800 1821502	
Hungary	00800 12813	
Ireland	1800 553117	
Israel	1800 9453794	
Italy	1678 79489	
Netherlands	0800 0227788	
Norway	800 11376	
Poland	00800 3111206	
Portugal	0800 831416	
South Africa	0800 995014	
Spain	900 983125	
Sweden	020 795482	
Switzerland	0800 55 3072	
U.K.	0800 966197	
U.S.A. and Canada	1-800-527-8677	1 408 326 7120

1 About the NIC

The 3Com Gigabit EtherLink Server NIC connects your PCI-compliant server to a Gigabit Ethernet network. This guide covers the following NICs:

- 3Com Gigabit EtherLink Server fiber NIC
- 3Com 1000Base-SX fiber NICs (512 KB and 1 MB memory)
- 3Com 1000Base-LX fiber NIC
- 3Com 10/100/1000Base-T (3C986-T) copper NICs (512 KB and 1 MB memory)

The 10/100/1000Base-T Gigabit Ethernet NIC is shown below. Each NIC incorporates a technology that transfers data at a maximum rate of one gigabit per second—10 times the rate of a Fast Ethernet NIC.



Each NIC targets the increased congestion experienced at the backbone and server in today's networks, while providing a future upgrade path for high-end workstations that require more bandwidth than Fast Ethernet can provide.

Included with your NIC is the following:

- Anti-static bag (used for protecting the NIC when stored or shipped). Keep the NIC in its packaging until ready for installation.
- CD-ROM with NIC driver software and documentation.

Inform your network supplier of any missing or damaged items. If you need to return the NIC, you must pack it in the original (or equivalent) packing material or the warranty will be voided.

Features

Following is a list of the Gigabit Ethernet NIC features:

- Full-duplex Gigabit Ethernet interface (IEEE 802.3-1999)
- Interoperability with existing Ethernet and Fast Ethernet equipment

- Standard Ethernet frame size (up to 1,518 bytes)
- Supports 32 multicast addresses
- Adaptive interrupt frequency (maximizes network throughput; adapts to traffic load)
- Dual DMA channels
- 33/66 MHz, 32-bit or 64-bit PCI bus master with adaptive DMA
- PCI Local Bus Rev 2.2 compliant: 17.3 cm x 10.7 cm (6.8" x 4.2")
- ASIC with on-chip MAC and dual RISC processors
- Universal dual voltage signaling (3.3V and 5V)
- Status LEDs

Key Protocols and Interfaces

The NIC 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:

- Gigabit Ethernet (IEEE 802.3-1999)
- Logical Link Control (IEEE 802.2)
- Flow Control (IEEE 802.3x)

Adaptive Interrupt Frequency

The NIC driver intelligently adjusts host interrupt frequency based on traffic conditions, in order to increase overall application throughput. In light traffic, the NIC driver interrupts the host for each received packet, minimizing latency. When traffic is heavy, the NIC issues one host interrupt for multiple, back-to-back incoming packets, preserving host CPU cycles.

Dual DMA Channels

The PCI interface on the NIC contains two independent DMA channels for simultaneous read and write operations.

32-bit or 64-bit PCI Bus Master

Compliant with PCI Local Bus Rev 2.2, the PCI interface on the NIC is compatible with both 32-bit and 64-bit PCI buses. As a bus master, the NIC requests access to the PCI bus instead of waiting to be polled.

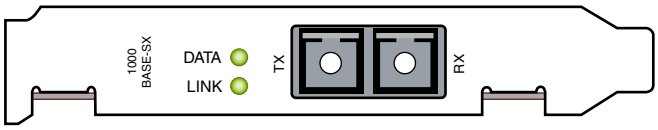
ASIC with Embedded RISC Processor

The core control for the NIC resides in a tightly integrated, high-performance ASIC. The ASIC includes dual RISC processors. This provides the flexibility to add new features to the card and adapt it to future network requirements via software download. This also enables the NIC drivers to exploit the built-in host off-load functions on the NIC as host operating systems are enhanced to take advantage of these functions.

Physical Description

1000Base-SX Fiber NICs

The 1000Base-SX NIC faceplate configuration is shown below.



Connectors

The faceplate of the NIC has one 1000Base-SX fiber-optic connector for connecting the NIC to a Gigabit Ethernet segment.

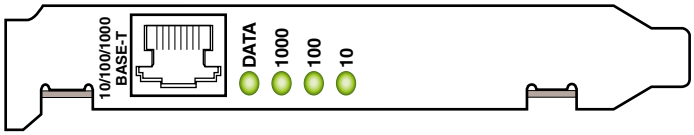
LEDs

There are two LEDs on the faceplate: one to indicate link status and one for data transfer status. Once the NIC hardware and its driver software have been properly installed on your system, the LEDs will indicate the following NIC states listed in the following table:

LED	State	Description
Data	Blinking	Data detected on the port.
	On	Data detected on the port.
	Off	No data detected on the port.
Link	Blinking slowly	Port has been disabled by software.
	On	Good link.
	Off	No link; possible bad cable, bad connector, or configuration mismatch.

10/100/1000Base-T NICs

The 10/100/1000Base-T NIC faceplate configuration is shown below.



Connectors

The faceplate on the 10/100/1000Base-T NIC provides an RJ-45 connector for connecting the NIC to another network device.

LEDs

The faceplate of the 10/100/1000Base-T NIC has four LEDs: one for each port speed option (10Mbps, 100Mbps, and 1Gbps), to indicate which link is active, and one LED for data transfer status. Until the driver software is properly installed, all four LEDs will remain lit when the server is powered on.

Once the NIC hardware and its driver software have been properly installed on your system, the LEDs will indicate the following NIC states listed in the following table:

LED	State	Description
Data	Blinking	Brief bursts of data detected on the port.
	On	Streams of data detected on the port.
	Off	No data detected on the port.
10	On	Good 10 Mbps Ethernet link
	Off	No 10 Mbps link; possible link at different speed, possible bad cable, bad connector, or configuration mismatch.
100	On	Good 100 Mbps Fast Ethernet link.
	Off	No 100 Mbps link; possible link at different speed, possible bad cable, bad connector, or configuration mismatch.
1000	On	Good 1000 Mbps (Gigabit) Ethernet link.
	Off	No 1000 Mbps link; possible link at different speed, possible bad cable, bad connector, or configuration mismatch.

NOTE: If all four LEDs remain lit simultaneously, the NIC driver software is either missing or improperly installed.

2 Installing the NIC Hardware

The following instructions apply to installing the NIC in most systems. Refer to the manuals that were supplied with your system for details about performing these tasks on your particular system.

System Requirements

Before installing the NIC, make sure your system meets the requirements listed in the following tables:

Windows 2000 System Requirements	
Category	**Requirements**
Hardware	■ Pentium-based computer that meets Windows 2000 software requirements ■ One open 32-bit or 64-bit PCI slot ■ 128MB RAM (minimum)
Software	
Operating System	Microsoft Windows 2000 (server or professional), and Microsoft Windows 2000 Advanced Server
NIC Software	NIC driver software, version 2.3 (or higher) for Windows 2000. See the NIC CD for the files

Windows NT 4.0 System Requirements	
Category	**Requirements**
Hardware	■ Pentium-based computer that meets Windows 2000 software requirements ■ One open 32-bit or 64-bit PCI slot ■ 128MB RAM (minimum)
Software	
Operating System	Microsoft Windows NT 4.0 (server or workstation) with Service Pack 4 or later
NIC Software	NIC driver software, version 2.3 (or higher) for Windows NT. See the NIC CD for the files.

Safety Precautions

CAUTION: The NIC is being installed in a system that operates with voltages that can be lethal. Before you remove the cover of your system, you must observe the following precautions to protect yourself and to prevent damage to the system components.

- Remove any metallic objects or jewelry from your hands and wrists.
- Make sure to use only insulated or nonconducting tools.
- Verify that the system is powered OFF and unplugged before accessing internal components.
- Installation or removal of NICs must be performed in a static-free environment. The use of a properly grounded wrist strap or other personal anti-static devices and an anti-static mat is strongly recommended.

Pre-Installation Checklist

1. **Check that your system meets the hardware and software requirements listed in the tables on page 11.**
2. **Verify that your system is using the latest BIOS.**
3. **Review the information in the** readme **file on the CD for important information not available at the time this manual was created.**

NOTE: If you acquired the NIC software on a floppy disk or from the 3Com website, please check the appropriate source for the most recent information.

4. **If your system is active, shut it down.**

   If Windows is currently up and running, close all applications and select *Start* | *Shut Down*. In the resulting dialog window, select *Shut down* from the pull-down options and click the *OK* button.
5. **When system shutdown is complete, power OFF and unplug your system.**
6. **Holding the NIC card by the edges, remove it from its shipping package and place it on an anti-static surface.**
7. **Check the NIC for visible signs of damage, particularly on the card's edge connector. Never attempt to install any damaged NIC.**

   If the NIC is damaged, report it to your 3Com Customer Support Representative. For more information, see "Contacting 3Com" on page 1.

NIC Installation

To install a NIC in your system, perform the following procedure.

1. **Observe all precautions and pre-installation instructions on page 12.**

   Before installing the NIC, ensure the system power is OFF and unplugged from the power outlet, and that proper electrical grounding procedures have been followed.
2. **Remove the system cover, and select any empty PCI slot.**

   If you do not know how to identify a PCI slot, refer to your system documentation.

3 **Remove the blank cover-plate from the slot that you selected. Retain the screw so that it can be replaced later.**

4 **Holding the PCI card by the edges, align the NIC's connector edge with the PCI connector dock in the system.**

NOTE: The connector dock in a 32-bit PCI slot is shorter than in a 64-bit PCI slot. Although the NIC is designed to fit in either slot type, when installed in a 32-bit PCI slot, part of the NIC's connector edge will remain undocked. This is perfectly normal.

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

CAUTION: Do not use excessive force when seating the card, as this may damage the system or the NIC. If the card resists seating, remove it from the system, realign it, and try again.

When properly seated, the NIC's port connectors will be aligned with the slot opening, and its faceplate will be flush against the system chassis.

6 **Use the screw removed above (in Step 3) to secure the NIC in the PCI card cage.**

7 **Replace the system cover and disconnect any personal anti-static devices.**

8 **Power the system on.**

Once the system returns to proper operation, the NIC hardware is fully installed. You must next connect the network cables (see page 13) and install the NIC driver software.

Connecting the Network Cables

This section provides information you'll find useful in attaching a network device to the 1000Base-SX or 10/100/1000Base-T NIC.

1000Base-SX NIC

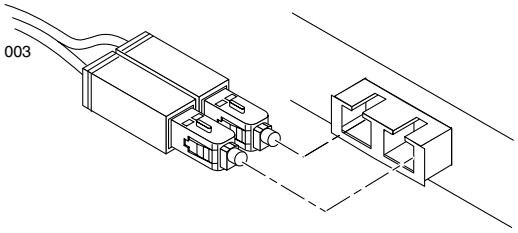
The NIC has one SC-type connector used for attaching the server to a Gigabit Ethernet fiber-optic segment. The port is auto-negotiating and supports full-duplex operation.

1 **Prepare an appropriate cable.**

The following table lists cable characteristics required for connecting to 1000Base-SX ports:

Medium Diameter		Frequency	Cable Type	Operating Range
SX	62.5 Microns	Shortwave (850 nanometers)	Multimode fiber	2 to 275 meters (6.5 to 902 feet)
	50 Microns	Shortwave (850 nanometers)	Multimode fiber	2 to 550 meters (6.5 to 1804 feet) (in compliance with IEEE 802.3-1999)

2 As shown in the following diagram, connect one end of the cable to the NIC.



3 Connect the other end of the cable to a Gigabit Ethernet network port.

Attach the cable connector so that the TX (transmit) port on the NIC is connected to the RX (receive) port of the device at the other end of the cable.

NOTE: The NIC port LEDs are not functional (they will not reflect port link or data status) until the NIC driver software is installed. See "Physical Description" on page 9 for descriptions of NIC port LED operation. See Chapter 3 and Chapter 4 for driver installation and configuration instructions.

10/100/1000Base-T NIC

The NIC has one RJ-45 connector used for attaching the system to an Ethernet copper-wire segment. When automatic link negotiation is disabled, the port can be configured for 10Mbps, 100Mbps, or 1000Mbps signaling and either half-duplex or full-duplex operation.

1 Prepare an appropriate cable.

The following table lists the cable characteristics for connecting to 10/100/1000Base-T ports:

Port Type	Connector	Media	Maximum Distance
10Base-T	RJ-45	Cat. 3, 4, or 5 UTP	100 meters (325 feet)
100/1000Base-T	RJ-45	Cat. 5 UTP	100 meters (325 feet)

NOTE: 1000Base-T signaling requires four twisted pairs of Category 5 balanced cabling, as specified in ISO/IEC 11801:1995 and ANSI/EIA/TIA-568-A (1995) and tested using procedures defined in TIA/EIA TSB95.

2 Connect one end of the cable to the NIC.

3 Connect the other end of the cable to an RJ-45 Ethernet network port.

NOTE: The NIC port LEDs are not functional (they will not reflect port link or data status) until the NIC driver software is installed. See the table for the 10/100/1000Base-T NIC in "Checking the Port LEDs" on page 29 for a description of NIC port LED operation. See Chapter 3 and Chapter 4 for driver installation and configuration instructions.

3 Installing the Driver Software in Windows 2000

NOTE: If you are using VLANs or teaming, you cannot use 3Com Dynamic*Access* software. For information on Dynamic*Access* software, see "About DynamicAccess Software" on page 25.

NOTE: If you have intermediate drivers for any third-party NICs installed, it will cause a conflict with the 3Com Dynamic*Access* intermediate drivers. Remove those intermediate drivers.

A network device driver must be installed before the NIC can be used with your Windows 2000 system. This chapter describes how to perform the following tasks:

- Install the driver software in the Windows 2000 environment
- Modify driver properties once the NIC is installed
- Move the NIC to a different slot
- Update or reinstall the driver software
- Move or remove the driver software

Installing the Driver Software

NOTE: The NIC must be physically installed in your server or workstation prior to installing the driver software. See "Installing the NIC Hardware" on page 11 for details.

When the Windows 2000 system first boots up after installing a new hardware device such as a NIC, the system automatically detects the new hardware and prompts you to install the driver software for the device.

A network driver must be installed before the NIC can be used with your Windows 2000 system.

To install the NIC software for Windows 2000, perform the following procedure:

1. **Verify that the Windows 2000 system is upgraded to the latest version.**
2. **Start your Windows 2000 system and log in.**

   You must have Network Administrator privileges to install the driver software.

   When you boot up the Windows 2000 system after installing the NIC card, a series of *Found New Hardware Wizard* windows is displayed.
3. **In the Install Hardware Device Drivers window, click *Search for a suitable driver for my device (recommended)*, then click *Next*.**
4. **In the Locate Driver Files window, check the "CD-ROM drives" box.**
5. **When prompted, insert the NIC CD-ROM into your system's CD-ROM drive, type the path to the driver, and select *OK*.**

   The path on the CD-ROM is as follows: `e:\`

   Where "e" is the designation of the CD-ROM drive on your system.

NOTE: If you acquired the NIC software on floppy disk or from the 3Com support website, enter the path to where the NIC driver files reside on your system.

6 **In the Driver Files Search Results window, verify that the correct path to the driver software is shown, then click *Next*.**

Once installation of the driver software has been completed, you are ready to configure NIC properties. For details, see the next section, "Modifying Configuration Parameters".

Modifying Configuration Parameters

This section describes the NIC configuration options in Windows 2000.

Although the default values should be appropriate in most cases, you may change any of the available options to meet the requirements of your specific system. Ensure that the NIC Status and Configuration tab is shown in the foreground of the Driver Properties window (click the tab if necessary).

The following options should be displayed:

- **Link Negotiation**
  - When checked (default), 802.3-1999 compliant Gigabit Ethernet link negotiation is enabled. All 3Com NICs use link negotiation by default.
  - When unchecked, link negotiation is disabled and only link signal detection is used. Use this setting when connecting to Ethernet equipment that does not support link negotiation, or if there is a problem establishing a link between the NIC and the connecting device. Unless otherwise specified, the default signaling speed for the Base-SX NIC and the 10/100/1000Base-T NIC is 1Gbps.

  When link negotiation is disabled, be sure that the connecting device uses the same duplex and speed settings.

NOTE: When link negotiation is on, the user-configured link speed and duplex settings are ignored in favor of automatically determined settings.

- **Full Duplex Enabled**

  When link negotiation is unchecked, this parameter sets the duplex mode. You can select either half-duplex or full-duplex operation.
  - When checked, full-duplex signaling is used (default).
  - When unchecked, half-duplex operation is used.
- **Tx Flow Control**
  - When Tx flow control is checked and link negotiation is enabled, the NIC will negotiate 802.3x transmit flow control with the device at the other end of the link. If 802.3x flow control is supported by the other device, Tx flow control will be enabled.
  - When Tx flow control is checked and link negotiation is disabled, you must check Full Duplex Enabled in order for Tx flow control to work properly. Tx flow control will not function under half duplex operation.
  - When Tx flow control is unchecked (default), or when Full Duplex Enabled is unchecked, transmit flow control is disabled.

- **Rx Flow Control**
  - When Rx flow control is checked (default) and link negotiation is enabled, the NIC will negotiate 802.3x receive flow control with the device at the other end of the link. If 802.3x flow control is supported by the other device, Rx flow control will be enabled.
  - When Rx flow control is checked and link negotiation is disabled, you must check Full Duplex Enabled in order for Rx flow control to work properly. Rx flow control will not function under half duplex operation.
  - When unchecked, or when Full Duplex Enabled is unchecked, receive flow control is disabled.
- **Port Link Speed**

  When link negotiation is disabled, this parameter sets the port link speed. You can select link speed to be either 10Mbps, 100Mbps, or 1Gbps. When the port link is connected, the selected link speed is indicated to the right of this field.

Removing the NIC or Moving it to a Different Slot

In systems that do not support PCI hot plug, you must first uninstall the driver before you physically remove the NIC or move it to another slot in the server. If you fail to first uninstall the driver, the NIC remains in the system.

To remove a NIC, follow the instructions in the next section, "Removing the Driver Software".

Removing the Driver Software

Windows 2000 automatically detects the installation of hardware. However, it does not automatically detect the removal of driver software.

To remove driver software:

- Run the Add/Remove Hardware wizard from the Windows Control Panel and remove the driver software.
- Shut down the system.
- Remove the NIC card from the PCI slot.

4 Installing the Driver Software in Windows NT 4.0

NOTE: If you are using VLANs or teaming, you cannot use 3Com Dynamic*Access* software. For information on Dynamic*Access* software, see "About DynamicAccess Software" on page 25.

NOTE: If you have intermediate drivers for any third-party NICs installed, it will cause a conflict with the 3Com Dynamic*Access* intermediate drivers. Remove those intermediate drivers

A network device driver must be installed before the NIC can be used with your Windows NT 4.0 system. This chapter describes how to perform the following tasks:

- Install the driver software in the Windows NT 4.0 environment
- Modify driver properties once the NIC is installed
- Move the NIC to a different slot
- Update or reinstall the driver software
- Move or remove the driver software

NOTE: To prevent a system abend when using the Windows NT Network Monitor, be sure to upgrade the operating system bhnt.sys file to the latest version available.

Installing the Driver Software

The NIC must be physically installed in your server or workstation prior to installing the driver software. See "Installing the NIC Hardware" on page 11 for details.

A network device driver must be installed before the NIC can be used with your Windows NT system. To install the NIC software for Windows NT, perform the following procedure.

NOTE: Make sure that the correct and latest BIOS and firmware are installed on your system to ensure that the system works correctly. Failure to do so may result in system failure.

NOTE: Before installing the drivers for any new 3Com Gigabit EtherLink Server NIC, any previously installed NIC drivers prior to version 2.2 must be removed. If there are no NIC drivers displayed in the Network NICs window, or if the drivers shown are version 2.2 or higher, proceed with the installation. If older NIC drivers are present, perform the procedure under "Removing the Driver Software" on page 23. To update NIC versions from 2.2 to the most recent release, perform the procedure under "Updating the Driver Software" on page 22.

1 Verify that Windows NT is upgraded with Service Pack 4 (or the latest service pack).

NOTE: If you attempt to install the NIC driver on a newly installed Windows NT system (without Service Pack 4 or the most recent service pack), the driver will not install. The system will display a message indicating that you must exit the installation and first install Service Pack 4 or later. Note that 3Com has tested and supports Service Pack 6.0a only. For Backup Domain Controller (BDC) installation, see the readme file on the CD-ROM for more information.

2 **Start your Windows NT system and log in.**
You must have Network Administrator privileges to install the driver software.

3 **Open the Windows Start menu and select *Settings*, *Control Panel*.**

4 **Double-click the *Network* icon.**

5 **When the Network window opens, select the *NICs* tab.**

6 **To install the driver software for the NIC, click *Add*.**

7 **When the Select Network NIC window opens, click *Have Disk...* .**

8 **When prompted, insert the NIC CD-ROM into your system's CD-ROM drive, type the path to the driver, and select *OK*.**
To install the NIC driver software for Windows NT, enter the following path: `e:\`
Where "e:" is the designation of the CD-ROM drive on your system.

NOTE: If you acquired the NIC software on floppy disk or from the 3Com website, enter the path to where the NIC driver files reside on your system.

9 **In the Select OEM Option window, "NIC Software Release" will be highlighted. Click *OK*.**
The Driver Properties window opens.
When the properties window appears, the NIC Status and Configuration tab is shown. The options under this tab are used for configuring basic NIC properties. For configurable options, see the next section, "Modifying Configuration Parameters".

10 **Perform any necessary configuration changes, if needed. Click *Close* in the Driver Properties window.**

11 **In the Network window, click *Close*.**

NOTE: If other NICs in your system use TCP/IP bindings, the TCP/IP Properties window will open.

12 **Perform any necessary TCP/IP configuration and click *OK* when finished.**
For help in configuring TCP/IP protocol, consult your Microsoft Windows NT 4.0 documentation.

13 **When prompted to restart your computer, click *Yes*.**
The system will restart, using the new configuration settings.

14 **When the system returns to proper operation, verify that the NIC port LEDs operate as described in "Checking the Port LEDs" on page 29.**
Once installation of the driver software is complete, you are ready to configure NIC properties. See the next section, "Modifying Configuration Parameters".

Modifying Configuration Parameters

This section describes the NIC configuration options in Windows NT 4.0.

Although the default values should be appropriate in most cases, you may change any of the available options to meet the requirements of your specific system. Ensure that the NIC Status and Configuration tab is shown in the foreground of the Driver Properties window (click the tab if necessary).

The following options should be displayed:

- **NIC**

  This field identifies which NIC is being configured. In a Windows NT 4.0 system with multiple NICs, select this field to access a pull-down list of the available NICs and teams. Each NIC installed in the system is labeled with a unique instance number. Typically, the first NIC detected is instance 1, the next is instance 2, and so on.

- **Link Negotiation**
  - When checked (default), 802.3-1999 compliant Gigabit Ethernet link negotiation is enabled. All 3Com NICs use link negotiation by default.
  - When unchecked, link negotiation is disabled and only link signal detection is used. Use this setting when connecting to Ethernet equipment that does not support link negotiation, or if there is a problem establishing a link between the NIC and the connecting device. Unless otherwise specified, the default signaling speed for the Base-SX NIC and the 10/100/1000Base-T NIC is 1Gbps.

  When link negotiation is disabled, be sure that the connecting device uses the same duplex and speed settings.

NOTE: When link negotiation is on, the user-configured link speed and duplex settings are ignored in favor of automatically determined settings.

- **Full Duplex Enabled**

  When link negotiation is unchecked, this parameter sets the duplex mode. You can select either half-duplex or full-duplex operation.
  - When checked, full-duplex signaling is used (default).
  - When unchecked, half-duplex operation is used.

- **Tx Flow Control**
  - When Tx flow control is checked and link negotiation is enabled, the NIC will negotiate 802.3x transmit flow control with the device at the other end of the link. If 802.3x flow control is supported by the other device, Tx flow control will be enabled.
  - When Tx flow control is checked and link negotiation is disabled, you must check Full Duplex Enabled in order for Tx flow control to work properly. Tx flow control will not function under half duplex operation.
  - When Tx flow control is unchecked (default), or when Full Duplex Enabled is unchecked, transmit flow control is disabled.

- **Rx Flow Control**
  - When Rx flow control is checked (default) and link negotiation is enabled, the NIC will negotiate 802.3x receive flow control with the device at the other end of the link. If 802.3x flow control is supported by the other device, Rx flow control will be enabled.
  - When Rx flow control is checked and link negotiation is disabled, you must check Full Duplex Enabled in order for Rx flow control to work properly. Rx flow control will not function under half duplex operation.
  - When unchecked, or when Full Duplex Enabled is unchecked, receive flow control is disabled.

- **Port Link Speed**
  When link negotiation is disabled, this parameter sets the port link speed. You can select link speed to be either 10Mbps, 100Mbps, or 1Gbps. When the port link is connected, the selected link speed is indicated to the right of this field.

Updating the Driver Software

Use the following procedure to replace version 2.2 (or higher) NIC driver software with newer versions as they become available.

NOTE: Do not use the update procedure to overwrite older NIC drivers installed prior to version 2.1. If any older drivers from previously installed NICs are on your system, they must be removed prior to installing the new drivers (version 2.2 or higher).

1 **Start your Windows NT system and log in.**

NOTE: You must have Network Administrator privileges to install the driver software.

2 **Open the Control Panel and double-click the *Network* icon.**

3 **When the Network window opens, select the *NICs* tab.**
  Any previously installed 3Com Gigabit EtherLink Server Adapters driver software is listed under Network NICs.

4 **Select a NIC and click *Update*.**

5 **When prompted, insert the CD-ROM into your system's CD-ROM drive, type the path to the driver that matches your system, and click *Continue*.**
  To install the NIC driver software for Windows NT, enter the following path: `e:\`
  where "e:" is the designation of the CD-ROM drive on your system.
  The system will then copy the appropriate NIC files from the CD-ROM.

NOTE: If you acquired the NIC software on a floppy disk or from the 3Com support website, enter the path to where the NIC driver files reside on your system.

6 **When the copying process is complete, click *Close* in the Network window.**

7 **When prompted to restart your computer, click *Yes*.**
  The system will restart, using the new configuration settings.

Moving the NIC to a Different Slot

To move a NIC to a different slot in the same system, you must do the following:

1 **Remove the NIC driver software (see the next section, "Removing the Driver Software").**

2 **Shut down the system and remove the NIC card from the PCI slot.**

3 **Install the NIC card in its new PCI slot (see "Installing the NIC Hardware" on page 11).**

4 **When the system is powered on, reinstall the driver software (see "Installing the Driver Software" on page 19).**

Removing the Driver Software

Before physically removing a NIC from your system, first remove the NIC driver software.

1 **Start your Windows NT system and log in.**

NOTE: You must have Network Administrator privileges to remove the driver software.

2 **Open the Control Panel and double-click the *Network* icon.**

3 **When the Network window opens, select the *NICs* tab.**
Any previously installed NIC will be listed under Network NICs.

4 **Individually select each NIC you wish to remove and click *Remove*.**

5 **Once the appropriate NICs have been removed, click *Close*.**

6 **When prompted to restart your computer, click *Yes*.**

5 Installing Dynamic*Access* Software

NOTE: If you are using VLANs or teaming, you cannot use 3Com Dynamic*Access* software.

NOTE: If you have intermediate drivers for any third-party NICs installed, it will cause a conflict with the 3Com Dynamic*Access* intermediate drivers. Remove those intermediate drivers.

About Dynamic*Access* Software

3Com Dynamic*Access* technology with advanced server features adds intelligence to the NIC to improve network performance, management, and control.

NOTE: This section describes how to install DynamicAccess software. For detailed information and configuration or troubleshooting instructions, see the *DynamicAccess Software User's Guide* located on the NIC CD-ROM.

Dynamic*Access* server features relieve network congestion and ensure high performance and maximum bandwidth availability.

- Self-healing drivers (SHD) detect common error conditions and correct them while maintaining server link.
- Load balancing groups share the network load over multiple NICs. Called Resilient Server Links (RSL), they keep traffic flowing even if a NIC in a group is temporarily disconnected.
- VLANs (IEEE 802.1Q and IEEE 802.3ac multiple virtual LANs) let you divide network segments into logical partitions that simplify configuration changes, organize work groups efficiently, help to control traffic, and provide extra security. **VLANs are supported in Windows 2000 and Windows NT 4.0 only.**
- Traffic prioritization (IEEE 802.1p) ensures that business-critical and delay-sensitive traffic (such as multimedia applications) have priority over normal data. **Traffic prioritization is supported in Windows 2000 and Windows NT 4.0 only.**

For detailed information on Dynamic*Access* technology products, go to:

http://www.3com.com/dynamicaccess

Installing Dynamic*Access* Software in Windows NT 4.0 or Windows 2000

For Windows NT 4.0, Dynamic*Access* software requires Service Pack 6.0a or higher.

Follow these steps for installing Dynamic*Access* software for a server NIC in a WIndows 2000 or Windows NT 4.0 computer:

1. **Make sure that the NIC and the network driver are installed.**
2. **Start your Windows system and log in.**
   You must have Network Administrator privileges to install the Dynamic*Access* software.
3. **Insert the NIC CD-ROM into the system CD-ROM.**

4 **Enter the proper path for your operating system, where** `e:\` **is the designation of the CD-ROM drive on your system:**
   - Windows 2000: **`e:\DA\Win2K\dasetup.exe`**
   - Windows NT 4.0: **`e:\DA\NT20\daserver.exe`**

5 **Click *Install DynamicAccess Technology*.**

6 **When prompted, click (*Yes*) Install Dynamic*Access* Technology.**

   When Dynamic*Access* server features are installed for Windows 2000, LAN connections bind to the Dynamic*Access* protocol and real protocols bind to the Dynamic*Access* Miniport. Do not modify these binding.

   When Dynamic*Access* features are installed for Windows NT 4.0 Server, NICs bind to the Dynamic*Access* protocol and real protocols bind to the Dynamic*Access* Miniport. Do not modify these bindings.

6 Troubleshooting

This chapter describes techniques for obtaining troubleshooting information regarding your NIC and correcting some types of problems. The following topics are covered:

- Instructions for performing detailed hardware diagnostics on the NIC
- Behavior of the NIC's status LEDs
- How to resolve some common networking problems
- How to reach 3Com customer service and support

Hardware Diagnostic Utility

DOS Diagnostics Internal/External Loopback Test (MS-DOS)

An MS-DOS based diagnostic utility, `TTP.EXE`, is included on the NIC CD-ROM. This utility is used for verifying that the NIC hardware is functional. It performs internal and external loopback tests and provides resulting pass/fail information. Perform the DOS Diagnostics tests any time you wish to rule out or identify possible NIC hardware problems.

To use the DOS Diagnostics utility, follow this procedure:

1 **Boot your system in clean MS-DOS mode rather than Windows 2000 or Windows NT.**

NOTE: `TTP.EXE` cannot be used from the Windows "Start | Run" command or from "Start | Programs | MS-DOS Prompt." To use `TTP.EXE`, you must boot your computer in clean MS-DOS mode, with no other plug-ins, add-ons, or resident programs installed.

2 **Disconnect the network cables on all NICs being tested.**

The loopback tests will not perform properly if the NIC is left connected to other devices.

3 **Connect a Cat. 5 UTP loopback cable to the NIC's RJ-45 jack.**

A loopback cable can be constructed by connecting the following pins back to the single connector:

Category 5 Loopback Cable

Pin 1	———	Pin 3
Pin 2	———	Pin 6
Pin 4	———	Pin 7
Pin 5	———	Pin 8

4 **Place the NIC CD-ROM into your system's CD-ROM drive.**

5 **From the MS-DOS prompt, enter the following commands to access the proper directory:**

```
>e:
>cd \dosdiags
```

Where "`e:`" is the designation of the CD-ROM drive on your system.

NOTE: If you acquired the diagnostic software on a floppy disk or from the 3Com website, specify the path to where the files reside on your system.

6 **From the MS-DOS prompt, enter the following command to run diagnostics:**

```
e:>dos4gw TTP.EXE [-c card_number] [-l c:log_filename]
```

If more than one NIC is installed in your system, the optional `-c` parameter can be used for specifying the NIC card to be tested. Cards are numbered starting with 0. By default, `TTP.EXE` tests only the first card (number 0) detected in the system.

The optional `-l` (letter L for "log") parameter is used for defining a file in which to log the test results. A text copy of the `TTP.EXE` test results will be placed in the specified file on the specified drive.

Example: To test the second card in a system and store the test results in `log.txt` in the current directory on the C: drive, the following command could be used:

```
e:>dos4gw TTP.EXE -c 1 -l c:log.txt
```

7 Review the test results.

The test result from the previous example could look like this:

```
Log file created by Development and Diagnostic Test Program v2.3.1
on: Thu Apr  6 10:20:46 2000
-------------------------------------------
Development and Diagnostic Test Program ( ) v2.3.1

PCI bios found. v0.16.
  HW Mech #1 supported
  Number of PCI buses: 1
3Com #0 found in PCI bus 0.
1 3Com card(s) detected
Current card set to bus 0 3Com #0.
internal Loopback Test
pkts:0  secs:0pkts:32  secs:1pkts:144  secs:2pkts:256  secs:3pkts:352
secs:4pkts:480  secs:5pkts:576  secs:6pkts:704  secs:7pkts:800  secs:8pkts:912
secs:9  1000 packets transmitted successfully
  1000 packets received successfully
     0 errors detected
external Loopback Test
pkts:0  secs:0pkts:96  secs:1pkts:208  secs:2pkts:320  secs:3pkts:432
secs:4pkts:544  secs:5pkts:656  secs:6pkts:768  secs:7pkts:880  secs:8pkts:992
secs:9  1000 packets transmitted successfully
  1000 packets received successfully
     0 errors detected
>
```

Both the internal and external loopback example tests show 1000 packets successfully received with 0 errors detected, indicating that the NIC hardware is functioning properly.

If the NIC does not perform as expected, try reinstalling the NIC card or moving it to a different slot or to a different system, then run the DOS Diagnostics tests again. If the card still fails, contact 3Com Customer Support.

Checking the Port LEDs

1000Base-SX NICs

Two port LEDs are located on the faceplate of the 1000Base-SX NIC: one to indicate link status and one for data transfer status (see "1000Base-SX Fiber NICs" on page 9). Before the port LEDs can provide troubleshooting information, the NIC must be connected to the network (see Chapter 2), and the network drivers for your particular operating system must be installed (see Chapter 3 or Chapter 4).

1 **Verify that the NIC driver software has been installed and that the NIC is connected to a network.**

2 **Verify that the NIC status LEDs operate as described in the following table:**

LED	State	Description
Data	Blinking On Off	Data detected on the port. Data detected on the port. No data detected on the port.
Link	Blinking slowly On Off	Port has been disabled by software. Good link. No link; possible bad cable, bad connector, or configuration mismatch.

10/100/1000Base-T NIC

The faceplate of the 10/100/1000Base-T NIC has four LEDs: one for each port speed option (10Mbps, 100Mbps, and 1Gbps), to indicate which link is active, and one LED for data transfer status (see "10/100/1000Base-T NICs" on page 10).

Before the port LEDs can provide troubleshooting information, the NIC must be connected to the network (see Chapter 2), and the network drivers for your particular operating system must be installed (see Chapter 3 or Chapter 4).

1 **Verify that the NIC driver software has been installed and that the NIC is connected to a network.**

Verify that the NIC status LEDs operate as described in the following table:

LED	State	Description
Data	Blinking On Off	Brief bursts of data detected on the port. Streams of data detected on the port. No data detected on the port.
10	On Off	Good 10 Mbps Ethernet link No 10 Mbps link; possible link at different speed, possible bad cable, bad connector, or configuration mismatch.
100	On Off	Good 100 Mbps Fast Ethernet link. No 100 Mbps link; possible link at different speed, possible bad cable, bad connector, or configuration mismatch.
1000	On Off	Good Gigabit Ethernet link. No 1000 Mbps link; possible link at different speed, possible bad cable, bad connector, or configuration mismatch.

NOTE: If all four LEDs remain lit simultaneously, the NIC driver software is either missing or improperly installed.

Troubleshooting Checklist

CAUTION: Before opening the cabinet of your system for removing or inserting the NIC, please review all precautions outlined under "Safety Precautions" on page 12.

The following checklist provides recommended actions to take to resolve problems installing the NIC or running it in your system.

- Inspect all cables and connections. Verify that the cable connections at the NIC and the switch are attached properly. Make sure that the cable length and rating are compliant with the requirements listed in "Connecting the Network Cables" on page 13.
- Connect the NIC to a different network port and run the tests again. If the test results reflect that the NIC is functioning properly, the original network port may be defective or improperly configured.
- Check the NIC installation by reviewing Chapter 2. Make sure that the NIC board is properly seated in a PCI slot. Check for specific hardware problems, such as obvious damage to board components or the PCI edge connector.
- Check the configuration settings and change them if they conflict with another device.
- Make sure that your system is using the latest BIOS.
- Try inserting the NIC in another slot. If the new position works, the original slot in your system may be defective.
- Replace the failed NIC with one that is known to work properly. If the second NIC works in the slot where the first one failed, the original NIC is probably defective.
- Install the NIC in another functioning system and run the tests again. If the NIC passed the tests in the new system, the original system may be defective.
- Remove all other NICs from the system and run the tests again. If the NIC passes the tests, the other NICs may be causing contention.

3Com Support Information

For product support information, software updates, and release notes, see "Contacting 3Com" on page 1.

A Specifications

1000Base-SX Link Characteristics

	Medium Diameter	Frequency	Cable Type	Operating Range
SX	62.5 Microns	Shortwave (850 nanometers)	Multimode fiber	2 to 275 meters (6.5 to 902 feet)
	50 Microns	Shortwave (850 nanometers)	Multimode fiber	2 to 550 meters (6.5 to 1804 feet) (in compliance with IEEE 802.3-1999)

10/100/1000Base-T Cable Specifications

Port Type	Connector	Media	Maximum Distance
10Base-T	RJ-45	Cat. 3, 4, or 5 UTP	100 meters (325 feet)
100/1000Base-T	RJ-45	Cat. 5 UTP	100 meters (325 feet)

NOTE: 1000Base-T signaling requires four twisted pairs of Category 5 balanced cabling, as specified in ISO/IEC 11801:1995 and ANSI/EIA/TIA-568-A (1995) and tested for additional performance using testing procedures defined in TIA/EIA TSB95.

Performance Specifications

Feature	Specification
PCI clock	66 MHz max
PCI Data/Address	32-bit and 64-bit
PCI data burst transfer rate	132 MB/second (32-bit bus) 264 MB/second (64-bit bus) 528 MB/second (64-bit bus at 66 MHz)
PCI modes	Master/slave
10/100/1000Base-T	10/100/1000 Mbps (full duplex)

Physical Characteristics

Dimension	Measurement
Length	17.3 cm (6.8 in.)
Width	10.7 cm (4.2 in.)

Power Requirements

Specification	Measurement
Operating voltage	+5 V ± 5%
Power consumption	14 Watts 2.8A @ +5VDC

Environmental Specifications

Condition	Operating Specification	Storage Specification
Temperature	0˚C to 55˚C (+32˚F to +131˚F)	–40˚C to +85˚C (–40˚F to +185˚F)
Relative humidity	5% to 85% (non-condensing) 40˚C (104˚F), 16 hour dwells at extremes	5% to 95% (non-condensing) 10˚C/hour
Altitude	Up to 3,048 meters (10,000 ft.)	Up to 10670 meters (35,000 ft.)
Shock	10g, 1/2 sine wave, 11 msec	60g, 1/2 sine wave, 11 msec
Vibration, peak to peak displacement	0.0127 cm. (0.005 in.) max (5 to 32 Hz)	0.2540 cm. (0.1 in.) max (5 to 17 Hz)
Vibration, peak acceleration	0.25g (5 to 500 Hz) (Sweep Rate = 1 octave/min.)	0.25g (5 to 500 Hz) (Sweep Rate = 1 octave/min.)

Warranty and Software License Agreement

3Com Corporation Limited Warranty

3Com Gigabit EtherLink Server Network Interface Cards

HARDWARE

3Com warrants this hardware product to be free from defects in workmanship and materials, under normal use and service, for the following length of time from the date of purchase from 3Com or its authorized reseller:

Three (3) years

3Com's sole obligation under this express warranty shall be, at 3Com's option and expense, to repair the defective product or part, deliver to Customer an equivalent product or part to replace the defective item, or if neither of the two foregoing options is reasonably available, 3Com may, in its sole discretion, refund to Customer the purchase price paid for the defective product. All products that are replaced will become the property of 3Com. Replacement products may be new or reconditioned.

3Com warrants any replaced or repaired product or part for ninety (90) days from shipment, or the remainder of the initial warranty period, whichever is longer.

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OBTAINING WARRANTY SERVICE

Customer must contact a 3Com Corporate Service Center or an Authorized 3Com Service Center within the applicable warranty period to obtain warranty service authorization. Dated proof of purchase from 3Com or its authorized reseller may be required. Products returned to 3Com's Corporate Service Center must be pre-authorized by 3Com with a Return Material Authorization (RMA) number marked on the outside of the package, and sent prepaid and packaged appropriately for safe shipment, and it is recommended that they be insured or sent by a method that provides for tracking of the package. The repaired or replaced item will be shipped to Customer, at 3Com's expense, not later than thirty (30) days after 3Com receives the defective product.

Dead- or Defective-on-Arrival. In the event a product completely fails to function or exhibits a defect in materials or workmanship within the first forty-eight (48) hours of installation but no later than thirty 30) days after the date of purchase, and this is verified by 3Com, it will be considered dead-or defective-on-arrival (DOA) and a replacement shall be provided by advance replacement. The replacement product will normally be shipped not later than three (3) business days after 3Com's verification of the DOA product, but may be delayed due to export or import procedures. When an advance replacement is provided and Customer fails to return the original product to 3Com within fifteen (15) days after shipment of the replacement, 3Com will charge Customer for the replacement product, at list price. 3Com shall not be responsible for any software, firmware, information, or memory data of Customer contained in, stored on, or integrated with any products returned to 3Com for repair, whether under warranty or not.

Warranty and Software License Agreement

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Governing Law

This Limited Warranty shall be governed by the laws of the State of California, U.S.A. excluding its conflicts of laws principles and excluding the United Nations Convention on Contracts for the International Sale of Goods.

3Com Corporation
5400 Bayfront Plaza
Santa Clara, CA 95054
(408) 326-5000

FCC Class B Statement

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

1 This device may not cause harmful interference, and

2 This device must accept any interference received, including interference that may cause undesired operation.

WARNING: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules, and the Canadian Department of Communications Equipment Standards entitled, "Digital Apparatus," ICES-003.These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from the one which the receiver is connected to.
- Consult the dealer or an experienced radio/TV technician for help.

The user may find the following booklet prepared by the Federal Communications Commission helpful:

The Interference Handbook

This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402. Stock No. 004-000-00345-4.

NOTE: In order to maintain compliance with the limits of a Class B digital device, 3Com requires that you use quality interface cables when connecting to this device. Changes or modifications not expressly approved by 3Com could void the user's authority to operate this equipment. Refer to the manual for specifications on cabling types.

FCC Declaration of Conformity

We declare under our sole responsibility that the

Model:	Description:
3C985B-SX	Gigabit EtherLink Server NIC
3C986-T, 710024, 710025	10/100/1000BASE-T PCI NIC
710011, 710012	1000BASE-SX PCI Fiber NIC
710026	1000BASE-LX PCI Fiber NIC

to which this declaration relates, is in conformity with the following standards or other normative documents:

- ANSI C63.4-1992 Methods of Measurement
- Federal Communications Commission 47 CFR Part 15, subpart B
  15.107 (e) Class B Conducted Limits
  15.109 (g) Class B Radiated Emissions Limits

3Com Corporation, 5400 Bayfront Plaza, P.O. Box 58145, Santa Clara, CA 95052-8145

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