

User Manual for the **NETGEAR 10/100/1000 Mbps Gigabit Ethernet Adapter GA311**



NETGEAR

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Technical Support

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NETGEAR, INC. Support Information

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Statement of Conditions

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October 2003

Certificate of the Manufacturer/Importer

It is hereby certified that the Model GA311 Gigabit Ethernet Adapter has been suppressed in accordance with the conditions set out in the BMPT- AmtsbIVfg 243/1991 and Vfg 46/1992. The operation of some equipment (for example, test transmitters) in accordance with the regulations may, however, be subject to certain restrictions. Please refer to the notes in the operating instructions.

Federal Office for Telecommunications Approvals has been notified of the placing of this equipment on the market and has been granted the right to test the series for compliance with the regulations.

VCCI Statement

This equipment is in the Class B category (information equipment to be used in a residential area or an adjacent area thereto) and conforms to the standards set by the Voluntary Control Council for Interference by Data Processing Equipment and Electronic Office Machines aimed at preventing radio interference in such residential areas. When used near a radio or TV receiver, it may become the cause of radio interference. Read instructions for correct handling.

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Chapter 1

About This Manual

Thank you for purchasing the NETGEAR 10/100/1000 Mbps Gigabit Ethernet Adapter GA311.

Audience, Conventions, Scope

This reference manual assumes that the reader has basic-to-intermediate computer and Internet skills.

This guide uses the following typographical conventions:

Table 1. Typographical conventions

<i>italics</i>	Emphasis, books, CDs, URL names
bold times roman	User input
<code>courier font</code>	Screen text, file and server names, extensions, commands, IP addresses



Note: This format is used to highlight information of importance or special interest.

This manual is written for the GA311 Gigabit Ethernet Adapter according to these specifications:

Table 1-1. Manual Specifications

Product Version	NETGEAR 10/100/1000 Mbps Gigabit Ethernet Adapter GA311
Manual Publication Date	October 2003



Note: Product updates are available on the NETGEAR, Inc. Web site at <http://www.netgear.com/support/main.asp>. Documentation updates are available on the NETGEAR, Inc. Web site at <http://www.netgear.com/docs>.

How to Use this Manual

The HTML version of this manual includes these features.

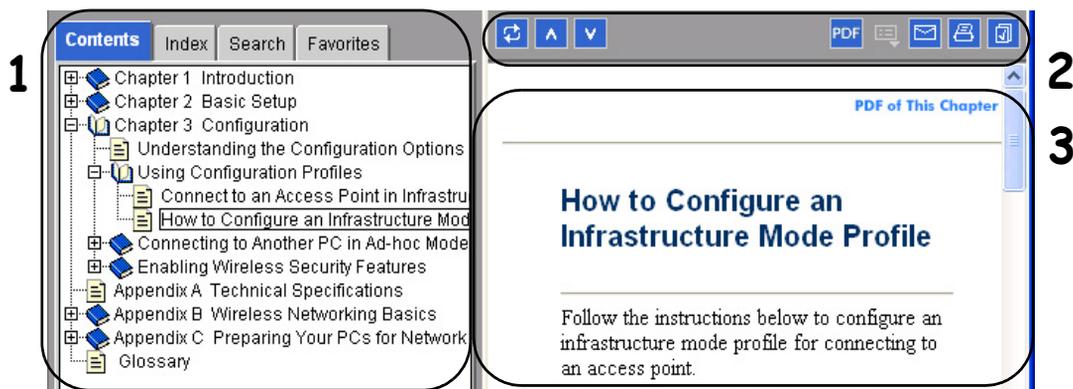


Figure 1 -1: HTML version of this manual

1. Left pane. Use the left pane to view the Contents, Index, Search, and Favorites tabs.

To view the HTML version of the manual, you must have a version 4 or later browser with JavaScript enabled.

2. Toolbar buttons. Use the toolbar buttons across the top to navigate, print pages, and more.

-  The *Show in Contents* button locates the current topic in the Contents tab.
-  *Previous/Next* buttons display the previous or next topic.
-  The *PDF* button links to a PDF version of the full manual.
-  The *Print* button prints the current topic. Using this button when a step-by-step procedure is displayed will send the entire procedure to your printer—you do not have to worry about specifying the correct range of pages.

3. Right pane. Use the right pane to view the contents of the manual. Also, each page of the manual includes a [PDF of This Chapter](#) link at the top right which links to a PDF file containing just the currently selected chapter of the manual.

How to Print this Manual

To print this manual you can choose one of the following several options, according to your needs.

- **Printing a “How To” Sequence of Steps in the HTML View.** Use the *Print* button on the upper right side of the toolbar to print the currently displayed topic. Using this button when a step-by-step procedure is displayed will send the entire procedure to your printer—you do not have to worry about specifying the correct range of pages.
- **Printing a Chapter.** Use the [PDF of This Chapter](#) link at the top right of any page.
 - Click the “PDF of This Chapter” link at the top right of any page in the chapter you want to print. A new browser window opens showing the PDF version of the chapter you were viewing.
 - Click the print icon in the upper left of the window.
 - **Tip:** If your printer supports printing two pages on a single sheet of paper, you can save paper and printer ink by selecting this feature.
- **Printing the Full Manual.** Use the PDF button in the toolbar at the top right of the browser window.
 - Click the PDF button. A new browser window opens showing the PDF version of the chapter you were viewing.
 - Click the print icon in the upper left side of the window.
 - **Tip:** If your printer supports printing two pages on a single sheet of paper, you can save paper and printer ink by selecting this feature.

Chapter 2

Introduction

This chapter introduces the features, package contents, and appearance of the NETGEAR 10/100/1000 Mbps Gigabit Ethernet Adapter GA311.

About the NETGEAR 10/100/1000 Mbps Gigabit Ethernet Adapter GA311

Congratulations on your purchase of the NETGEAR® GA311 Gigabit Ethernet Adapter. Designed especially for high-performance systems, such as servers and high-end workstations, it offers 2 gigabits per second (Gbps) of aggregate bandwidth and optimized performance while minimizing network overhead on the host system. This guide describes the installation and use of the GA311 for operation with a Microsoft® Windows® XP, Windows® 2000, Windows® Me, Windows® 98SE 2nd edition, or Windows NT 4.0 (with Service Pack 5 or above) system.

It connects your PCI-compliant workstation to a Gigabit Ethernet network, incorporating a new technology that transfers data at a rate of 1 Gbps or 1000 megabits per second (Mbps) over standard Category 5 cables. Performance is optimized and network overhead on the host system is minimized with the use of the GA311 Gigabit Ethernet Adapter.

The GA311 has demonstrated interoperability with all major Gigabit Ethernet equipment on the market that is compliant with IEEE 802.3ab standards and should work with most non-compliant Gigabit Ethernet products. In addition, because the GA311 uses standard Ethernet frame and Media Access Control (MAC) formats, it provides full compatibility with Fast Ethernet network equipment through network switches from a variety of vendors, including NETGEAR®.

The GA311 is 802.1Q/1p-compliant for frame priority tagging. The IEEE 802.1Q standard defines the operation of Virtual LAN (VLAN) Bridges that permit the definition, operation and administration of Virtual LAN topologies within a Bridged LAN infrastructure. Using the GA311 with 802.1p-compliant switches or routers offers a range of traffic prioritization of Layer 2 frames, providing a higher Quality of Service on high-speed local area networks.

Key Features and Related NETGEAR Products

The key features of the GA311 Gigabit Ethernet Adapter are:

- Flexible 10/100/1000 Mbps capability
- Includes proven Gigabit controller technology
- Full-duplex operation (2,000 Mbps: 1,000 Mbps each way) with DMA (Direct Memory Access) Gigabit Ethernet interface (IEEE 802.3ab)
- RJ-45 connector for Category 5 unshielded twisted pair (UTP) cable
- Interoperability with existing Fast Ethernet equipment compliance with the following standards and protocols:
 - IEEE 802.3ab Gigabit Ethernet
 - IEEE 802.3u Fast Ethernet
 - IEEE 802.3 Ethernet
 - IEEE 802.3u Auto Negotiation for auto-selectable 10/100/1000 Mbps line speed
 - IEEE 802.1Q VLAN
- Standard Ethernet frame size (up to 1500 bytes), optional Jumbo frame size (7500 bytes)
- 33/66 MHz, 32/64-bit PCI bus master (Local Bus Revision 2.2 compliant) with adaptive DMA channels
- Software driver support for Windows XP, Windows 2000, Windows Me, Windows 98SE, and Windows NT 4.0
- Universal dual-voltage signaling (3.3 V and 5 V)

The optional advanced configuration choices include:

- Configurable 802.1Q VLAN ID and 802.1Q/1p VLAN frame tagging for traffic prioritization
- Optional Jumbo Ethernet frame size (7500 bytes)
- Configurable link speed and duplex mode
- Checksum off loading to the network card
- Off load of TCP large packets to the network card
- Wakeup on ARP/PING

The following NETGEAR products can be configured to communicate with the GA311 Gigabit Ethernet Adapter:

- FS750AT Modular Fast Ethernet Switch with 48-Port 10/100 Mbps + 2 Gigabit Ports
- FS726AT Modular Fast Ethernet Switch with 24-Port 10/100 Mbps + 2 Gigabit Ports
- FS526T 24-Port Smart Switch with Gigabit Ports
- GS104 4-Port Gigabit Ethernet Switch
- GS108 8-Port Copper Gigabit Switch
- GS105 5-Port 10/100/1000 Mbps Gigabit Ethernet Switch
- GS524T 24-Port 10/100/1000 Mbps Copper Gigabit Switch
- GS516T 16-Port 100/1000 Mbps Copper Gigabit Switch
- GSM712 12-Port Managed Gigabit Switch
- GSM712F 12-Port Managed Fiber Gigabit Switch
- FSM750S 48-Port 10/100 Mbps Managed Stackable Switch with Gigabit Ports
- FSM726S 24-Port 10/100 Mbps Managed Stackable Switch with Gigabit ports
- FSM726 24-Port Mbps Managed Switch with Gigabit Ports
- FS526T 24-Port Smart Switch with Gigabit Ports
- GSM7324 24-Port Layer 3 Managed Gigabit Switch
- GSM7312 12-Port Layer 3 Managed Gigabit Switch

What's in the Box?

The product package should contain the following items:

- GA311 Gigabit Ethernet Adapter
- Installation Guide for the NETGEAR 10/100/1000 Mbps Gigabit Ethernet Adapter GA311 (201-10011-01)
- *NETGEAR Adapter Resource CD*, including:
 - Driver and System Utility Software
 - User Manual for the NETGEAR 10/100/1000 Mbps Gigabit Ethernet Adapter GA311
 - Animated Network Properties Configuration Tutorial
 - PC Networking Tutorial
- Warranty/Support information card

If any of the parts are incorrect, missing, or damaged, contact your NETGEAR dealer. Keep the carton, including the original packing materials, in case you need to return the product for repair.

To qualify for product updates and product warranty registrations, fill out the registration information within 30 days of purchase. For priority service, register online on the NETGEAR Web page at:

<http://www.NETGEAR.com>

You can also fill out and return the Warranty & Registration Card that is included in your product package.

Hardware Description

As illustrated in the figure below, the GA311 Gigabit Ethernet Adapter has an RJ-45 connector port and four LEDs.



Figure 1-1. Front Panel of Model GA311 Gigabit Adapter

The front panel of the GA311 has four LEDs: one for each port speed option (10 Mbps, 100 Mbps, and 1000 Mbps) to indicate which link is active, and one LED for the data transfer status.

Chapter 3

Basic Setup

This chapter describes how to install your NETGEAR 10/100/1000 Mbps Gigabit Ethernet Adapter GA311 and set up basic connectivity on your Local Area Network (LAN) using the setup.exe utility.

What You Need Before You Begin

You need to verify your computer meets the minimum system requirements and identify the network configuration settings of the LAN where you will connect before you can configure your gigabit Ethernet adapter and connect.

Verifying System Requirements

Before installing the NETGEAR 10/100/1000 Mbps Gigabit Ethernet Adapter GA311, please make sure that these minimum requirements have been met:

- A computer with a Pentium® 300 MHz or higher compatible processor
- One open 32-bit or 64-bit PCI slot
- A CD-ROM drive
- 64 MB of memory
- Windows XP Home, Windows XP Professional, 2000, Me, 98SE (2nd edition), Windows NT 4.0 (with Service Pack 5 or above), Windows 2000 Professional, Windows 2000 Server, or Windows 2000 Advanced Server

Some versions of Windows may ask for the original Windows operating system installation files to complete the installation of the GA311 driver software.

To download the latest Service Pack for Windows NT 4.0, go to the following Microsoft Web page and search for the latest service pack:

<http://www.microsoft.com/downloads/search.asp>

Preparing to Install Your GA311 Gigabit Ethernet Adapter

Follow the instructions provided in this section for installing the GA311 Gigabit Ethernet Adapter in your server or workstation. For additional information about performing these tasks on your particular system, refer to the manuals included with your system hardware.

Before installing your gigabit Ethernet adapter:

1. Make sure that your system meets the hardware and software requirements referenced in [“Verifying System Requirements” on page 3-1](#).
2. Make sure that your system uses the latest BIOS.
3. Turn off the power to your PC. If you are running Windows, close all applications and click Start from the desktop menu, select Shut Down, and then select Shut down the computer.

Warning: You are installing the gigabit Ethernet adapter in a machine that operates with voltages that can be dangerous. Protect yourself, the gigabit Ethernet adapter, and your server by taking these precautions:

- Shut down the server software and turn off the power to your server.
- Use only insulated or non-conducting tools.
- Hold the gigabit Ethernet adapter by the edges and place it on an antistatic surface only.
- Check the adapter for visible signs of damage, particularly to the connector on the edge of the card. Never attempt to install a damaged card.

Selecting the Network Cable

The GA311 has one RJ-45 connector used for attaching the system to an Ethernet copper-wire segment. The card will automatically negotiate the fastest connection speed and duplex possible. If a specific speed or duplex is desired, the card can be placed into one of the supported modes: 1000 Mbps full duplex; 100 Mbps full duplex, 100 Mbps half duplex; 10Mbps full duplex, 10Mbps half duplex. Prepare an appropriate cable. The cable specifications are:

- Port type: 10/100/1000BASE-T
- Connector: RJ-45
- Media: CAT 5 UTP/CAT 5e UTP
- Maximum Distance: 325 feet (100 meters)

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.

Installation Order

1. First, install the GA311 driver and utility software using the setup.exe program on the *NETGEAR Adapter Resource CD*.
2. When the Windows system boots up after installing the GA311 Gigabit Ethernet Adapter, the system automatically detects the new hardware and prompts you to install the driver software for the device.
3. Follow the prompts of the Found New Hardware Wizard to automatically use the driver installed in step 1.

If you are installing more than one GA311 Gigabit Ethernet Adapter, you must perform the following procedure for each card.

Basic Installation Instructions

Use the procedure below that corresponds to the version of Windows you are using:

- Windows XP, 2000, 98SE 2nd edition, or Me
- Windows NT 4.0

For Windows XP, 2000, Me, and 98SE Users

1

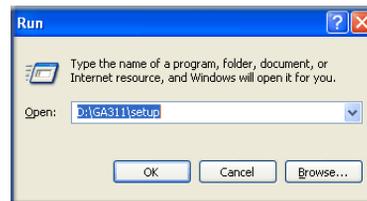
FIRST, INSTALL THE GA311 SOFTWARE.

- a. Power on your PC, let the operating system boot up completely, and log in as needed.
- b. Insert the *NETGEAR Adapter Resource CD* into your CD-ROM drive. The Adapter Resource CD main page will load.
- c. From the Windows Start menu, select Run. The Run dialog box opens.
- d. Enter the path to the GA311 setup.exe file on the CD. For example, if your CD-ROM is drive D, enter `D:\GA311\setup` as the path. Then, click **OK**.
- e. Follow the InstallShield Wizard steps, click **Finish** when done, and if prompted, restart your computer.

Now, the GA311 driver and utility software are installed.



Adapters Resource CD



Windows Start Run

2

Next, install the GA311 Gigabit Ethernet Adapter.

- a. Open the PC case, and locate an available PCI slot in your computer. Insert the card into the PCI expansion slot.

Note: To avoid damaging any components on the care, handle it by the edges. Use your thumbs to push it securely into the PCI slot. Do not use excessive force, but make sure the card is fully inserted into the slot to prevent the PC operating system from freezing at startup.

- b. Restart the PC and Follow the Found New Hardware Wizard steps.
Accept the “Install the software automatically” setting, and click **Next** to proceed.

Note: If Windows XP or 2000 displays a Windows XP Logo Testing or a Digital Signature Not Found warning, click Continue Anyway or Yes to proceed.

- c. Click **Finish** to complete the installation. If prompted to do so, restart the PC. You will see the GA311 system tray icon on the lower right of the Windows task bar.
- d. Double-click the GA311 icon in the Windows system tray to open the Windows network connection page.
- e. Click **Properties** and configure the GA311 according to your network requirements.



Windows Found New Hardware Wizard



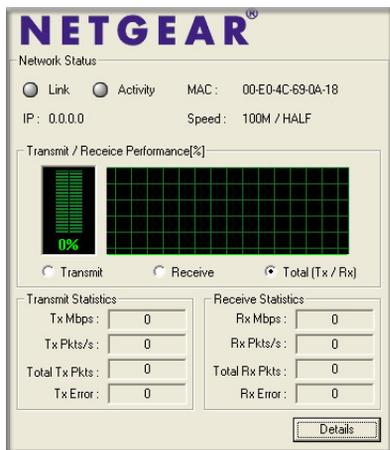
Local Area Connection Icon before you connect a network cable

For assistance with configuring the network settings, please see the networking tutorials on the *NETGEAR Adapter Resource CD*.

3

Verify connectivity to your network.

- a. Connect one end of the cable to the GA311 Gigabit Ethernet Adapter.
- b. Connect the other end of the cable to an RJ-45 Ethernet network port.
- c. Turn on power to the PC and then to the connected device.
- d. Verify that one of the four LEDs is on, indicating that there is a good link to the card.
- e. Click the GA311 system tray Netgear Smart Wizard utility icon on the lower right of the Windows task bar.
- f. Verify that the GA311 status information matches your network.



If there is a problem with the installation of the driver, an exclamation point will appear next to the NETGEAR GA311 Gigabit Adapter. Try rebooting your computer.

Note: If you are unable to connect, see troubleshooting tips in [“Basic Troubleshooting Tips”](#) on page 4-4.

For Windows NT 4.0 Users Installing a GA311

This section provides information about inserting the gigabit Ethernet adapter in your computer and installing the Microsoft Windows NT 4.0 driver software.

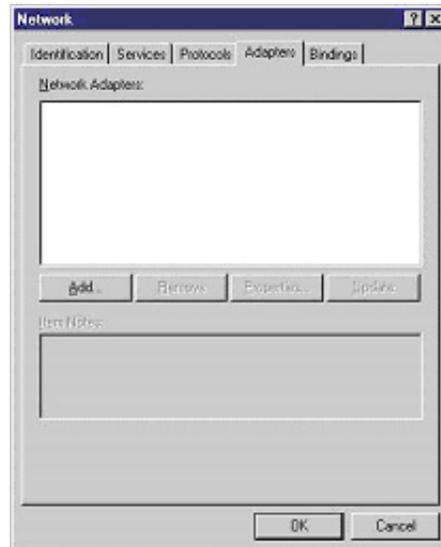
1

Install the GA311 Gigabit Ethernet Adapter.

- a. Locate an available PCI slot in your computer.
- b. Insert the card into the PCI expansion slot.

Note: To avoid damaging any components on the card, handle it by the edges, using your thumbs to push it securely into the PCI slot. Do not use excessive force, but make sure the card is fully inserted into the slot to prevent the PC operating system from freezing at startup.

- c. When you boot up the Windows system after installing the GA311 Gigabit Ethernet Adapter, on the Windows taskbar, click the Start button, point to Settings, and then click Control Panel. The Control Panel window opens, displaying a group of icons including the Network icon. Double-click on the network icon.
- d. The network dialog box opens, which displays a list of installed components. Click on the adapter tab, and then click the Add button.



Network Settings

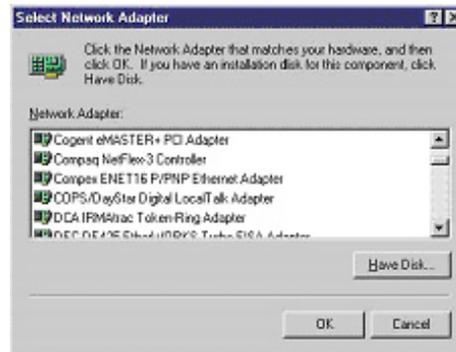
2

Install the driver for the NETGEAR 10/100/1000 Mbps Gigabit Ethernet Adapter GA311.

- a. The select network adapter dialog box opens, click the Have Disk button.
- b. The insert dialog box opens, insert the GA311 driver CD into your CD-ROM drive. Type D:\ in the dialog box and click OK.

Note: Windows NT 4.0 drivers are found at D:\, assuming that D: is the drive letter for the CD-ROM drive.

- c. The select OEM Option dialog box opens, highlight the GA311 Gigabit Ethernet Adapter and click OK.
- d. The driver is copied onto your system, and NT 4.0 will probably ask for the original Windows NT 4.0 CD-ROM. Point Windows NT 4.0 to the proper location (for example, D:\i386). When the Adapter property dialog box opens, click Continue to accept the default parameters.
- e. If other cards in your system use TCP/IP bindings, the Microsoft TCP/IP properties dialog box will open. Set any necessary TCP/IP configurations and click Close.
- f. When prompted to restart your computer, remove your driver CD from the CDROM drive and click OK.
- g. The GA311 Windows NT 4.0 driver installation is complete.



Select Network Adapter

Note: If Windows warns about a Digital Signature Not Found, click **Yes** to continue.



Accept the Default Speed & Duplex

3

Verify connectivity to your network.

- a. Connect one end of the cable to the GA311 Gigabit Ethernet Adapter.
- b. Connect the other end of the cable to an RJ-45 Ethernet network port.
- c. Turn on power to the PC and then to the connected device.
- d. Verify that one of the four LEDs is on, indicating that there is a good link to the card. See [“Determining the GA311 Connection Status” on page 3-11](#) for more information.
- e. Verify connectivity to the Internet or network resources:
 - Double-click My Computer on the desktop, double-click Control Panel, and then double-click System.
 - Click Hardware and click Device Manager tab, and then double-click Network adapters.
 - Double-click NETGEAR GA311 Gigabit Ethernet Adapter. A message appears describing the status of the device.

If there is a problem with the installation of the driver, an exclamation point will appear next to the NETGEAR GA311 Gigabit Ethernet Adapter. Try rebooting your computer.

Note: The Netgear Smart Wizard utility is not available for Windows NT.

Moving the GA311 to a Different Slot in Windows XP, 2000, Me, or 98SE

Windows automatically detects the installation and removal of hardware. To move a GA311 Gigabit Ethernet Adapter to a different slot in the same system, you need to do the following:

1. Shut down the system and remove the card from the PCI slot.
2. Install the card in its new PCI slot.
3. When the system is powered on, reinstall the driver software. See [“Basic Installation Instructions” on page 3-3](#) for more information.

Moving the GA311 to a Different Slot in Windows NT 4.0

Before moving your GA311 Gigabit Ethernet Adapter to a different slot in the same system, you must first remove the card driver software. After removing the driver software, you can move the card to a different slot and reinstall the driver software.

To remove the driver software:

1. Start your Windows NT 4.0 system and log in. You must have Network Administrator privileges to remove the driver software.
2. On the Windows taskbar, click the Start button, point to Settings, and then click Control Panel.
3. Double-click the Network icon. The Network dialog box opens.
4. Click on the Adapter tab. Any previously installed driver is listed in the Network Adapters list.
5. Click on the network card you want to remove, and then click Remove. Repeat step 5 for each network card that you want to remove.
6. Click Close.
7. When prompted to restart your computer, click No.
8. Shut down your computer.

Install the network card in a new slot and then install the network drivers by following the instructions in [“For Windows NT 4.0 Users Installing a GA311” on page 3-7](#).

Updating the Driver Software in Windows NT 4.0

To replace an old driver software with a newer version:

1. Start your Windows NT 4.0 system and log in. You must have Network Administrator privileges to install the driver software.
2. On the Windows taskbar, click the Start button, point to Settings, and then click Control Panel.
3. Double-click the Network icon.
4. Click on the Adapters tab. Any previously installed software drivers are listed in the Network Adapters list.
5. Click on the adapter that you want to update.
6. Click Update. The Select Network Adapter dialog box opens.
7. When prompted, insert the *NETGEAR Adapter Resource CD* into the CD-ROM drive in your PC.
8. Type the path that matches the CD-ROM drive on your system, and then click OK. For example, enter the following path:
E:\
In this example, the letter E: is the CD-ROM drive.
9. Click Close in the Network Dialog box when the copying process is complete.
10. When prompted to restart your computer, click Yes.

The system restarts using the new driver and the default configuration settings.

Determining the GA311 Connection Status

The NETGEAR 10/100/1000 Mbps Gigabit Ethernet Adapter GA311 provides the following two indicators which give you feedback on the status of your connection:

- The LEDs on the NETGEAR 10/100/1000 Mbps Gigabit Ethernet Adapter GA311 indicate the condition of link.
- The GA311 Smart Wizard utility displays the current status of the device.

Viewing the Physical Connection Indicators



Figure 3-1: Physical connection indicators on the front of the GA311 adapter

Once the hardware and its driver software are properly installed on your system, the LEDs indicate the conditions described in the table below.

Label	Activity	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
1000	On Off	Good 1000 Mbps Gigabit Ethernet link No 1000 Mbps link; possible link at different speed, possible bad cable, bad connector, or configuration mismatch
100	On Off	Good 100 Mbps Gigabit Ethernet link No 100 Mbps link; possible link at different speed, possible bad cable, bad connector, or configuration mismatch
10	On Off	Good 10 Mbps Gigabit Ethernet link No 10 Mbps link; possible link at different speed, possible bad cable, bad connector, or configuration mismatch

Table 3-1. GA311 Port LED Activity

Installing the GA311 Smart Wizard Utility

The GA311 Smart Wizard utility provides a convenient way to check the status of the adapter without needing to view the front of the adapter itself. To install the utility:

Note: The Netgear Smart Wizard utility is not available for Windows NT.

1. Click the Windows Start menu and select Run.
2. Choose cmd.
3. Type `d:\GA311\launch` to start the utility installation.

Note: The installation program is found on D:\, assuming that D: is the drive letter for the CD-ROM drive.

4. Follow the installation prompts.
5. Click Finish to complete the installation. The GA311 Smart Wizard utility appears in the right section of the Windows taskbar.



6. Click the GA311 Smart Wizard utility icon to view the current status.

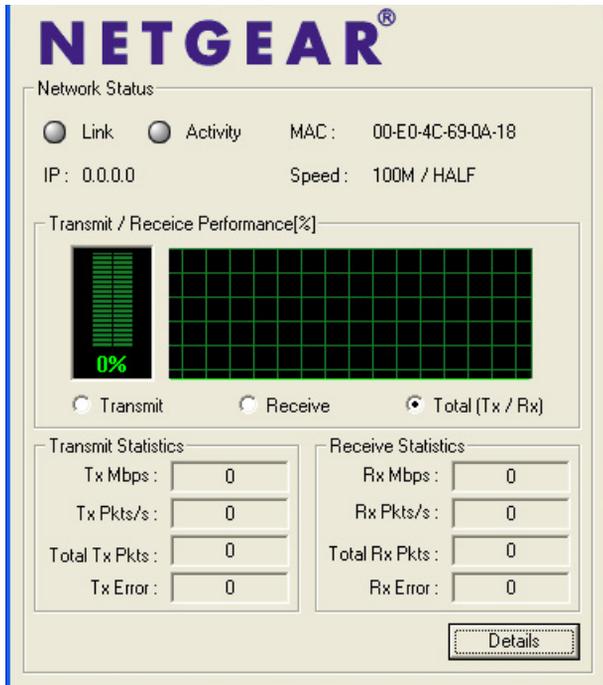


Figure 3-2: NETGEAR GA311 System Utility

The GA311 System Utility displays the following details:

- Link
- Activity
- MAC address
- IP number
- Speed
- TCP/IP Transmit/Receive Performance graph — select to view packets transmitted, received, or both
- TCP/IP Transmit and Receive Statistics

Click Details to view the settings of the adapter:



Figure 3-3: GA311 Adapter detailed information

Chapter 4

Configuration and Troubleshooting

This chapter describes how to use the advanced configuration options of your NETGEAR 10/100/1000 Mbps Gigabit Ethernet Adapter GA311 and basic troubleshooting techniques.

Understanding the Configuration Options

The GA311 adapter provides the following advanced options:

- Configure the 802.1Q VLAN ID. The IEEE 802.1Q standard defines the operation of Virtual LAN (VLAN) Bridges that permit the definition, operation and administration of Virtual LAN topologies within a Bridged LAN infrastructure.
- Configure 802.1Q/1p VLAN tagging. The 802.1p Quality of service (QOS) is an OSI layer 2 standard for prioritizing network traffic at the data link sublayer.
- Enable Jumbo frames to extend Ethernet frames to 7500 bytes
- Set the link speed and the duplex mode:
 - Auto Negotiation
 - 1000Mbps/Full Duplex
 - 100Mbps/Full Duplex
 - 100Mbps/Half Duplex
 - 10Mbps/Full Duplex
 - 10Mbps/Half Duplex
- Set up checksum offloading to the network card
- Set up the offload of TCP large packets to the network card
- Enable wakeup on ARP/PING

Configuring Optional Adapter Properties

The table below introduces the optional advanced capabilities of the adapter.

Properties	Description
802.1Q VLAN ID (Windows 2000, XP only)	Set the Virtual Lan ID number. The range is from 1 to 4094.
802.1Q/1p VLAN Tagging (Windows 2000, XP only)	When enabled, tags are recognized by 802.1p-aware switches and routers. Disabled by default.
Jumbo Frame (Windows NT not supported)	Extends the default Ethernet frame size from 1500 to 7500 bytes if enabled. Disabled by default.
Link Speed/Duplex Mode (Windows 2000, XP only)	A performance option that allows you to choose how the card transmits and receive packets over the network. You can select auto negotiation, or set the speed and whether to use half or full duplex.
Network Address	Displays the network address.
Offload Checksum (Windows 2000, XP only)	Supports hardware offload of checksum in the transmit and receive directions. When enabled, this option allows the card to verify the TCP/IP checksum of incoming (Rx) and/or outgoing (Tx) packets. This improves the TCP/IP transmit/receive performance by offloading this operation from the CPU.
Offload TCP_LargeSend (Windows 2000, XP only)	Supports hardware offload of large TCP packets in the transmit and receive directions. When enabled, this option improves the TCP/IP transmit/receive performance by offloading this operation from the CPU. Disabled by default.
WakeUp on ARP/PING (Windows NT not supported)	Enable wakeup on ARP/Ping. Disabled by default.

Table 4-1. Advanced GA311 Adapter Properties

To configure the optional advanced adapter properties:

1. Click the Local Area Connection icon in the lower right section of the Windows taskbar.
2. Select the NETGEAR GA311 Gigabit Ethernet Adapter.

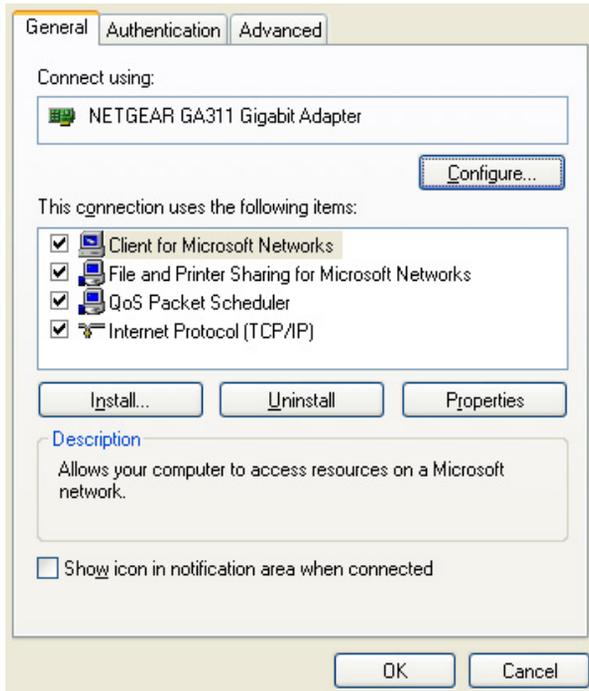


Figure 4-1: Local Area Connection General Options

3. Click Configure, then select the Advanced tab to display the advanced configuration options. Be careful when changing these settings. Incorrect Advanced settings can cause your GA311 to behave unpredictably or not function.
4. Select the Property to configure, then click the drop-down arrow to set the Value.
5. Click OK when you have finished changing the configuration.

Basic Troubleshooting Tips

Checking the Port LEDs

The front panel of the GA311 has four LEDs: one for each port speed option (10Mbps, 100 Mbps and 1000Mbps) to indicate which link is active, and one LED for data transfer status.

Before the port LEDs can provide troubleshooting information, the card must be connected to the network, and the network drivers for your particular operating system must be installed. See [“Basic Installation Instructions” on page 3-3](#) for more information.

The LEDs on the NETGEAR 10/100/1000 Mbps Gigabit Ethernet Adapter GA311 indicate the condition of link:



Figure 4-2: Front of the GA311 Adapter

Verify that the card status LEDs operate as described in the table below:

Label	Activity	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
1000	On Off	Good 1000 Mbps Gigabit Ethernet link No 1000 Mbps link; possible link at different speed, possible bad cable, bad connector, or configuration mismatch
100	On Off	Good 100 Mbps Gigabit Ethernet link No 100 Mbps link; possible link at different speed, possible bad cable, bad connector, or configuration mismatch
10	On Off	Good 10 Mbps Gigabit Ethernet link No 10 Mbps link; possible link at different speed, possible bad cable, bad connector, or configuration mismatch

Table 4-1. GA311 Port LED Activity

Using a Troubleshooting Checklist

If you need to test the network adapter further, check the following items:

- Inspect all cables and connections. Check the length and rating of the cable. Make sure that the cable segment is compliant with the requirements shown in Table 2-3 on page 2-8.
- Connect the adapter to a different network port and run the tests again. If successful, the original network port may be defective or improperly configured.
- Check the adapter installation by reviewing [“Basic Installation Instructions” on page 3-3](#). Make sure that the adapter is properly seated in a PCI slot.
- Check for specific hardware problems, such as broken traces or loose/broken solder connections.
- Check the configuration settings and change them if they are in conflict with another device.
- Make sure that your system is using the latest BIOS.

Check the PCI BIOS parameters for proper configuration of the slot where the adapter is installed. The following table shows several possible PCI BIOS parameters. (These parameters may not all be available on every system.)

Parameter	Setting
Bus-Master	Enabled
Interrupt number	Set to any IRQ that does not conflict with another device
Latency timer	Recommended range is between 20 and 255. This parameter is typically set to 64

Table 4-2. PCI BIOS Parameters

- Try inserting the network adapter in another slot. If the new position works, the original slot in your system may be defective.
- Replace the failed network adapter with one that is known to work properly. If the second adapter works in the slot where the first one failed, the original adapter is probably defective.
- Install the network adapter in another functioning system and run the tests again. If the adapter passed the tests in the new system, the original system may be defective.
- Remove all other network adapters from the system and run the tests again. If the adapter passes the tests, the other adapters might be causing the conflict.

Appendix A

Technical Specifications

This appendix provides technical specifications for the NETGEAR 10/100/1000 Mbps Gigabit Ethernet Adapter GA311.

Cable Specifications GA311 (10/100/1000BASE-T)

- Port type: 10/100/1000BASE-T
- Connector: RJ-45
- Media: CAT 5 UTP/CAT 5e UTP
- Maximum Distance: 325 feet (100 meters)

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.

Standards Compatibility	IEEE 802.3ab 1000Base-T Gigabit Ethernet IEEE 802.3u 100Base-TX Fast Ethernet IEEE 802.3 10Base-T Ethernet IEEE 802.3u Auto Negotiation IEEE 802.1Q VLAN
GA311 Network Connection	RJ-45 connector for Category 5 UTP cable Full-duplex 2000 Mbps (1000 Mbps each way) Gigabit Ethernet
Host Connection	64 bit, 66/33 MHz PCI slot 32-bit, 33 MHz PCI slot PCI rev 2.2 or higher
DC Operating Voltage	+5V +/- 5%
Power Consumption	4.75 watts, maximum
Dimensions	5.53 x 2.30 in. (14.04 x 5.84 cm)
Weight	2.2 oz. (60 g)
Operating Temperature	0° to 55° C
Storage Temperature	-10 degrees to 70 degrees
Operating Humidity	10% to 90% noncondensing
Agency Compliance	FCC Class B, CE mark, VCCI, C-Tick
WOL Support	Remote Walk-up

Appendix B

Manual Driver Installation

This Appendix describes how to install your NETGEAR 10/100/1000 Mbps Gigabit Ethernet Adapter GA311 driver without using the setup.exe but rather manually through the Windows utilities.



Note: The procedures below will only install the GA311 driver. If you also want the GA311 utility, run the launch.exe program in the GA311 directory on the *NETGEAR Adapter Resource CD*.

Basic Installation Instructions

Use the procedure below that corresponds to the version of Windows you are using:

- Windows XP
- Windows 2000, Windows 98SE 2nd edition, Windows Me
- Windows NT 4.0

For Windows XP Users Installing a GA311

1

Install the GA311 Gigabit Ethernet Adapter.

- a. Locate an available PCI slot in your computer.
- b. Insert the card into the PCI expansion slot.

Note: To avoid damaging any components on the card, handle it by the edges, using your thumbs to push it securely into the PCI slot. Do not use excessive force, but make sure the card is fully inserted into the slot to prevent the PC operating system from freezing at startup.

- c. When you boot up the Windows XP system after installing the GA311 Gigabit Ethernet Adapter, a Found New Hardware Wizard dialog box displays. Click Next.

Note: Click **Continue Anyway** if you are prompted with a Windows XP Logo testing message.

- d. Insert the GA311 driver CD into your CD-ROM drive.
- e. Select Install from a list or specific location (Advanced) and then click Next. The choose your search and installation options dialog box appears.



Found New Hardware Wizard

2

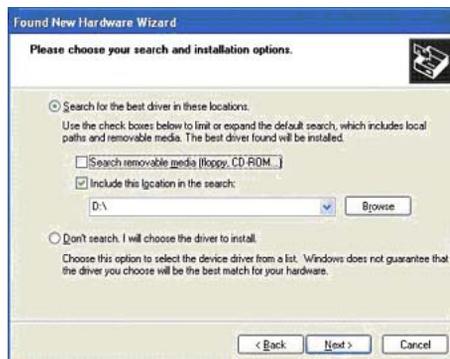
Install the driver for the NETGEAR 10/100/1000 Mbps Gigabit Ethernet Adapter GA311.

- a. Click Search for the best driver in these locations, clear the Search removable media (floppy, CD-ROM...) check box and select Include this location in the search. Type D:\ in the drop-down box. Click Next.

Note: Windows XP drivers are found at D:\ assuming that D:\ is the drive letter for the CD-ROM drive).

- b. The driver is copied onto your system, and XP will probably ask for the original Windows XP CD-ROM. Point Windows XP to the proper location (for example, D:\i386)
- c. The Completing the Found New Hardware Wizard dialog box appears with the following adaptor name: GA311 Gigabit Ethernet Adapter. Click Finish.
- d. Remove the GA311 driver CD from the CD-ROM drive. The GA311 Windows XP driver installation is complete.

You should see the Local Area Connection icon on the right in the lower right portion of the Windows task bar.



Search and Installation Options



Local Area Connection Icon before you connect a network cable

3

Verify connectivity to your network.

- a. Connect one end of the cable to the GA311 Gigabit Ethernet Adapter.
- b. Connect the other end of the cable to an RJ-45 Ethernet network port.
- c. Turn on power to the PC and then to the connected device.
- d. Verify that one of the four LEDs is on, indicating that there is a good link to the card. Alternatively, install the GA311System Utility to easily view the connection status without needing to view the end of the adapter.
- e. Verify connectivity to the Internet or network resources.



Local Area Connection icon

- Click the Local Area Connection icon in the lower right section of the Windows Taskbar.
- Click the NETGEAR GA311 Gigabit Adapter. A message appears describing the status of the device.

If there is a problem with the installation of the driver, an exclamation point will appear next to the NETGEAR GA311 Gigabit Adapter. Try rebooting your computer.

Note: If you are unable to connect, see troubleshooting tips in [“Basic Troubleshooting Tips”](#) on page 4-4.

For Windows 2000 & 98SE/Me Users Installing a GA311

You must have Network Administrator privileges to install the driver software. The following screens illustrate the Windows 2000 installation steps. The Windows 98SE and Windows Me installation process may proceed with different dialog boxes, or the dialog boxes may open in a different sequence, but should prompt you for the same information.

1

Install the GA311 Gigabit Ethernet Adapter.

- a. Locate an available PCI slot in your computer.
- b. Insert the card into the PCI expansion slot.

Note: To avoid damaging any components on the card, handle it by the edges, using your thumbs to push it securely into the PCI slot. Do not use excessive force, but make sure the card is fully inserted into the slot to prevent the PC operating system from freezing at startup.

- c. When you boot up the Windows system after installing the GA311 Gigabit Ethernet Adapter, a Found New Hardware Wizard dialog box appears, indicating that Windows has found the adapter. Click Next.
- d. Insert the GA311 driver CD into your CD-ROM drive.
- e. The install hardware device drivers dialog box appears. Select Search for a suitable driver for your device (Recommended). Click Next.



Found New Hardware Wizard



Search for a driver

2

Install the driver for the NETGEAR 10/100/1000 Mbps Gigabit Ethernet Adapter GA311.

- a. The Locate Driver Files dialog box appears.
- b. Select Specify a location. Click Next.
- c. Insert the GA311 driver CD into your CD-ROM drive. In the Copy manufacturers files from field, type D:\ and click OK.

Note: Windows drivers are found at D:\, assuming that D: is the drive letter for the CD-ROM drive.

- d. The Driver File Search Results dialog box appears. Click Next.
- e. The Completing the Found New Hardware Wizard dialog box appears with the following adapter name: NETGEAR 10/100/1000 Mbps Gigabit Ethernet Adapter GA311. Click Finish.
- f. Remove the GA311 driver CD from the CD-ROM drive. The GA311 Windows driver installation is complete.

You should see the Local Area Connection icon on the right in the lower right portion of the Windows task bar.



Locate Driver Files

Note: If Windows warns about a Digital Signature Not Found, click **Yes** to continue.



Local Area Connection Icon before you connect a network cable

3

Verify connectivity to your network.

- a. Connect one end of the cable to the GA311 Gigabit Ethernet Adapter.
- b. Connect the other end of the cable to an RJ-45 Ethernet network port.
- c. Turn on power to the PC and then to the connected device.
- d. Verify that one of the four LEDs is on, indicating that there is a good link to the card. Alternatively, install the GA311System Utility to easily view the connection status without needing to view the end of the adapter.
- e. Verify connectivity to the Internet or network resources.



Local Area Connection icon

- Click the Local Area Connection icon in the lower right section of the Windows taskbar.
- Click the NETGEAR GA311 Gigabit Ethernet Adapter. A message appears describing the status of the device.

If there is a problem with the installation of the driver, an exclamation point will appear next to the NETGEAR GA311 Gigabit Ethernet Adapter. Try rebooting your computer.

Note: If you are unable to connect, see [“Basic Troubleshooting Tips” on page 4-4.](#)

For Windows NT 4.0 Users Installing a GA311

This section provides information about inserting the gigabit Ethernet adapter in your computer and installing the Microsoft Windows NT 4.0 driver software.

1

Install the GA311 Gigabit Ethernet Adapter.

- a. Locate an available PCI slot in your computer.
- b. Insert the card into the PCI expansion slot.

Note: To avoid damaging any components on the card, handle it by the edges, using your thumbs to push it securely into the PCI slot. Do not use excessive force, but make sure the card is fully inserted into the slot to prevent the PC operating system from freezing at startup.

- c. When you boot up the Windows system after installing the GA311 Gigabit Ethernet Adapter, on the Windows taskbar, click the Start button, point to Settings, and then click Control Panel. The Control Panel window opens, displaying a group of icons including the Network icon. Double-click on the network icon.
- d. The network dialog box opens, which displays a list of installed components. Click on the adapter tab, and then click the Add button.



Network Settings

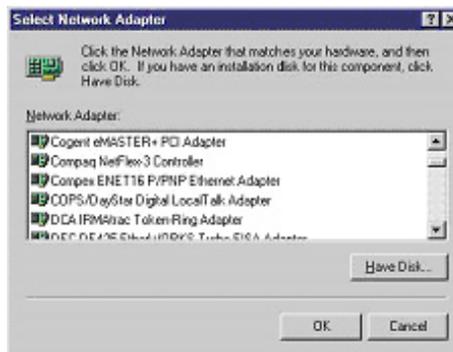
2

Install the driver for the NETGEAR 10/100/1000 Mbps Gigabit Ethernet Adapter GA311.

- a. The select network adapter dialog box opens, click the Have Disk button.
- b. The insert dialog box opens, insert the GA311 driver CD into your CD-ROM drive. Type D:\ in the dialog box and click OK.

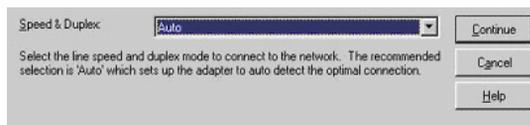
Note: Windows NT 4.0 drivers are found at D:\, assuming that D: is the drive letter for the CD-ROM drive.

- c. The select OEM Option dialog box opens, highlight the GA311 Gigabit Ethernet Adapter and click OK.
- d. The driver is copied onto your system, and NT 4.0 will probably ask for the original Windows NT 4.0 CD-ROM. Point Windows NT 4.0 to the proper location (for example, D:\i386). When the Adapter property dialog box opens, click Continue to accept the default parameters.
- e. If other cards in your system use TCP/IP bindings, the Microsoft TCP/IP properties dialog box will open. Set any necessary TCP/IP configurations and click Close.
- f. When prompted to restart your computer, remove your driver CD from the CDROM drive and click OK.
- g. The GA311 Windows NT 4.0 driver installation is complete.



Select Network Adapter

Note: If Windows warns about a Digital Signature Not Found, click **Yes** to continue.



Accept the Default Speed & Duplex

3

Verify connectivity to your network.

- a. Connect one end of the cable to the GA311 Gigabit Ethernet Adapter.
- b. Connect the other end of the cable to an RJ-45 Ethernet network port.
- c. Turn on power to the PC and then to the connected device.
- d. Verify that one of the four LEDs is on, indicating that there is a good link to the card.
- e. Verify connectivity to the Internet or network resources:
 - Double-click My Computer on the desktop, double-click Control Panel, and then double-click System.
 - Click Hardware and click Device Manager tab, and then double-click Network adapters.
 - Double-click NETGEAR GA311 Gigabit Ethernet Adapter. A message appears describing the status of the device.

If there is a problem with the installation of the driver, an exclamation point will appear next to the NETGEAR GA311 Gigabit Ethernet Adapter. Try rebooting your computer.

List of Glossary Terms

Use the list below to find definitions for technical terms used in this manual.

10BASE-T

IEEE 802.3 specification for 10 Mbps Ethernet over Category 3, 4, or 5 twisted pair wiring.

100BASE-Tx

IEEE 802.3 specification for 100 Mbps Fast Ethernet over Category 5 twisted pair wiring.

1000BASE-T

IEEE 802.3 specification for 1000 Mbps Gigabit Ethernet over Category 5 twisted pair wiring.

802.1Q

IEEE specification for the operation of Virtual LAN (VLAN) Bridges that permit the definition, operation and administration of Virtual LAN topologies within a Bridged LAN infrastructure.

802.3

The IEEE standard defining the hardware layer and transport layer of (a variant of) Ethernet. The maximum segment length is 500m and the maximum total length is 2.5km. The maximum number of hosts is 1024. The maximum packet size is 1518 bytes.

802.3ab

Gigabit ethernet over Copper (also known as 1000BaseT) is an extension of the existing Fast Ethernet standard. It specifies Gigabit Ethernet operation over the Category 5e/6 cabling systems already installed, making it a highly cost effective solution.

802.3u

The IEEE committee working on standards for Fast Ethernet.

ADSL

Short for asymmetric digital subscriber line, a technology that allows data to be sent over existing copper telephone lines at data rates of from 1.5 to 9 Mbps when receiving data (known as the downstream rate) and from 16 to 640 Kbps when sending data (known as the upstream rate).

ADSL requires a special ADSL modem. ADSL is growing in popularity as more areas around the world gain access.

DHCP

An Ethernet protocol specifying how a centralized DHCP server can assign network configuration information to multiple DHCP clients. The assigned information includes IP addresses, DNS addresses, and gateway (router) addresses.

DNS

Short for Domain Name System (or Service), an Internet service that translates domain names into IP addresses.

Because domain names are alphabetic, they're easier to remember. The Internet however, is really based on IP addresses. Every time you use a domain name, therefore, a DNS service must translate the name into the corresponding IP address. For example, the domain name `www.example.com` might translate to `198.105.232.4`. The DNS system is, in fact, its own network. If one DNS server doesn't know how to translate a particular domain name, it asks another one, and so on, until the correct IP address is returned.

Domain Name

A descriptive name for an address or group of addresses on the Internet. Domain names are of the form of a registered entity name plus one of a number of predefined top level suffixes such as `.com`, `.edu`, `.uk`, etc. For example, in the address `mail.NETGEAR.com`, `mail` is a server name and `NETGEAR.com` is the domain.

DSL

Short for digital subscriber line, but is commonly used in reference to the asymmetric version of this technology (ADSL) that allows data to be sent over existing copper telephone lines at data rates of from 1.5 to 9 Mbps when receiving data (known as the downstream rate) and from 16 to 640 Kbps when sending data (known as the upstream rate).

ADSL requires a special ADSL modem. ADSL is growing in popularity as more areas around the world gain access.

Dynamic Host Configuration Protocol

DHCP. An Ethernet protocol specifying how a centralized DHCP server can assign network configuration information to multiple DHCP clients. The assigned information includes IP addresses, DNS addresses, and gateway (router) addresses.

Gateway

A local device, usually a router, that connects hosts on a local network to other networks.

IETF

Internet Engineering Task Force. Working groups of the IETF propose standard protocols and procedures for the Internet, which are published as RFCs (Request for Comment) at www.ietf.org.

An open international community of network designers, operators, vendors, and researchers concerned with the evolution of the Internet architecture and the smooth operation of the Internet.

IP

Internet Protocol is the main internetworking protocol used in the Internet. Used in conjunction with the Transfer Control Protocol (TCP) to form TCP/IP.

IP Address

A four-byte number uniquely defining each host on the Internet, usually written in dotted-decimal notation with periods separating the bytes (for example, 134.177.244.57).

Ranges of addresses are assigned by Internic, an organization formed for this purpose.

IPX

Short for Internetwork Packet Exchange, a networking protocol used by the Novell NetWare operating systems.

Like UDP/IP, IPX is a datagram protocol used for connectionless communications. Higher-level protocols, such as SPX and NCP, are used for additional error recovery services.

ISP

Internet service provider.

Internet Protocol

The main internetworking protocol used in the Internet. Used in conjunction with the Transfer Control Protocol (TCP) to form TCP/IP.

LAN

A communications network serving users within a limited area, such as one floor of a building.

local area network

LAN. A communications network serving users within a limited area, such as one floor of a building.

A LAN typically connects multiple personal computers and shared network devices such as storage and printers. Although many technologies exist to implement a LAN, Ethernet is the most common for connecting personal computers.

MAC address

The Media Access Control address is a unique 48-bit hardware address assigned to every network interface card. Usually written in the form 01:23:45:67:89:ab.

Mbps

Megabits per second.

NetBIOS

The Network Basic Input Output System is an application programming interface (API) for sharing services and information on local-area networks (LANs).

Provides for communication between stations of a network where each station is given a name. These names are alphanumeric names, up to 16 characters in length.

Network Address Translation

NAT. A technique by which several hosts share a single IP address for access to the Internet.

NIC

Network Interface Card. An adapter in a computer which provides connectivity to a network.

packet

A block of information sent over a network. A packet typically contains a source and destination network address, some protocol and length information, a block of data, and a checksum.

router

A device that forwards data between networks. An IP router forwards data based on IP source and destination addresses.

Routing Information Protocol

RIP. A protocol in which routers periodically exchange information with one another so that they can determine minimum distance paths between sources and destinations.

Subnet Mask

A mask used to determine what subnet an IP address belongs to. Subnetting enables a network administrator to further divide an IP address into two or more subnets.

TCP/IP

The main internetworking protocols used in the Internet. The Internet Protocol (IP) used in conjunction with the Transfer Control Protocol (TCP) form TCP/IP.

WAN

A long distance link used to extend or connect remotely located local area networks. The Internet is a large WAN.

WEB Proxy Server

A Web proxy server is a specialized HTTP server that allows clients access to the Internet from behind a firewall.

The proxy server listens for requests from clients within the firewall and forwards these requests to remote Internet servers outside the firewall. The proxy server reads responses from the external servers and then sends them to internal client clients.

wide area network

WAN. A long distance link used to extend or connect remotely located local area networks. The Internet is a large WAN.

Windows Internet Naming Service

WINS. Windows Internet Naming Service is a server process for resolving Windows-based computer names to IP addresses.

If a remote network contains a WINS server, your Windows PCs can gather information from that WINS server about its local hosts. This allows your PCs to browse that remote network using the Windows Network Neighborhood feature.

WINS

WINS. Windows Internet Naming Service is a server process for resolving Windows-based computer names to IP addresses.

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