User Guide

Fast Ethernet Adapter
LPCI810

MOTOROLA
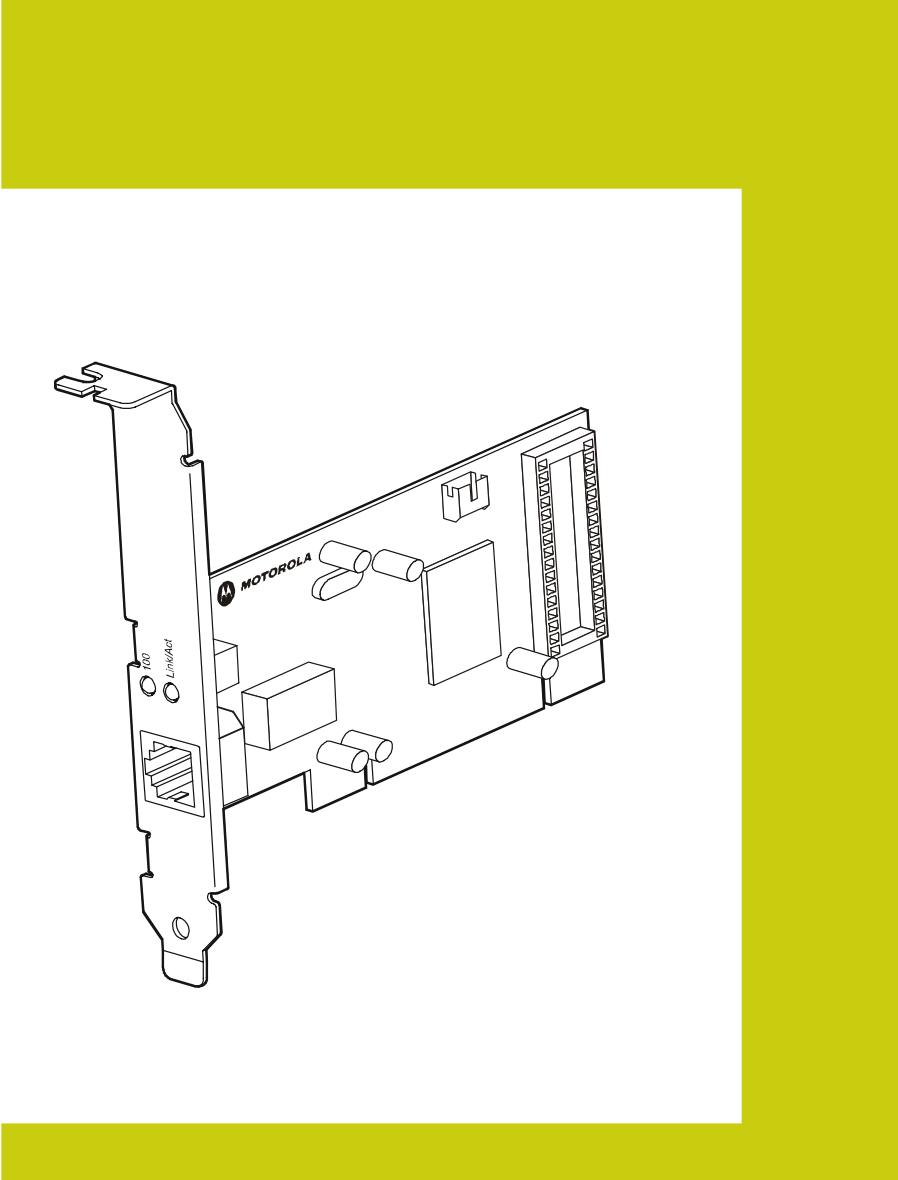*intelligence everywhere*™

Regulatory, Warranty, and Copyright Information

This device must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.

Postpone installation until there is no risk of thunderstorm or lightning activity in the area.

This product was qualified under test conditions that included the use of the supplied cables between system components. To be in compliance with regulations, the user must use these cables and install them properly.

FCC Compliance Class B Digital Device

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.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential environment. 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 of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help.

CAUTION: Changes or modifications not expressly approved by Motorola for compliance could void the user's authority to operate the equipment.

FCC Declaration of Conformity

Motorola, Inc., Broadband Communications Sector, 101 Tournament Drive, Horsham, PA 19044, 1-215-323-1000, declares under sole responsibility that the LPCI810 complies with 47 CFR Parts 2 and 15 of the FCC Rules as a Class B digital device. This device complies with Part 15 of FCC Rules. Operation of the device is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference that may cause undesired operation.

Table of Contents

Section 1:Overview

Congratulations on purchasing the Motorola Fast Ethernet Adapter LPCI810, your entry to high-speed networking!

With the Ethernet Adapter, desktop computers quickly join a home or small office network. The card inserts into your computer's available PCI slot and delivers a continuous network connection. Once connected, you can access a single broadband connection with everyone else on the Ethernet network. With an Ethernet Adapter in each of your computers, you can share files, pictures, printers and more.

The Ethernet Adapter works with the fastest network applications on both 10BaseT and 100BaseT networks natively. The Ethernet Adapter automatically adjusts to the network speed, eliminating the need for manual switching. It also works with older 5-volt and the newer 3.3-volt motherboards, expanding the reach of the card to match your needs.

Your adapter incorporates the latest technology into an easy-to-install package. After installing the Ethernet Adapter, you'll have the ability to connect to your network to receive and send e-mails and to print documents on your PC without restrictions.

Motorola Fast Ethernet Adapter LPCI810
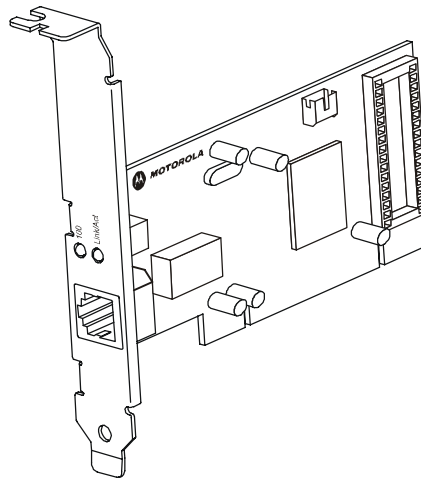
Features

The LPCI810 offers the following features:

- CD-ROM based Installation Wizard to provide easy installation
- Supports both 10BaseT and 100BaseT with an auto-detecting port to seamlessly switch to either situation
- Upgradeable driver to stay current with the latest specifications
- Multiple Operating System Support (Microsoft Windows® 98SE, ME, 2000, and XP™)

Understanding Your User Guide

The User Guide is divided into the following sections:

Overview	Describes the LPCI810 and its functions, the technology used, and recommended practices for using it.
Installation	Provides instructions for installing the hardware and setting up the firmware to get your adapter up and running.
Troubleshooting	Provides a list of frequently asked questions and possible solutions.
Glossary	List of terms and acronyms.

Simple Home Network Diagram

Your Ethernet Adapter allows you to access files, printers, and an Internet connection on your network. A sample Local Area Network (LAN) is shown here:
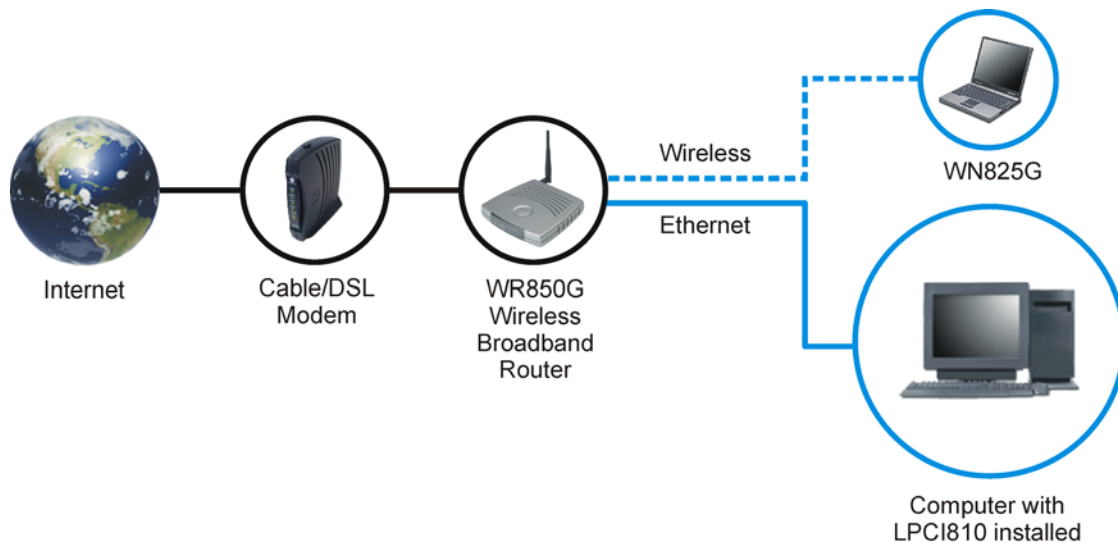
In the example above, the Internet communicates with the modem which communicates with the router. The router acts as the gateway to your network, sending information to whichever device asks for information. The Ethernet Adapter card enables your desktop computer to be part of the network.

Ethernet Adapter Card Physical Description

Side and Front of Ethernet Adapter Card

The following illustration shows the top and front view of the Ethernet Adapter:
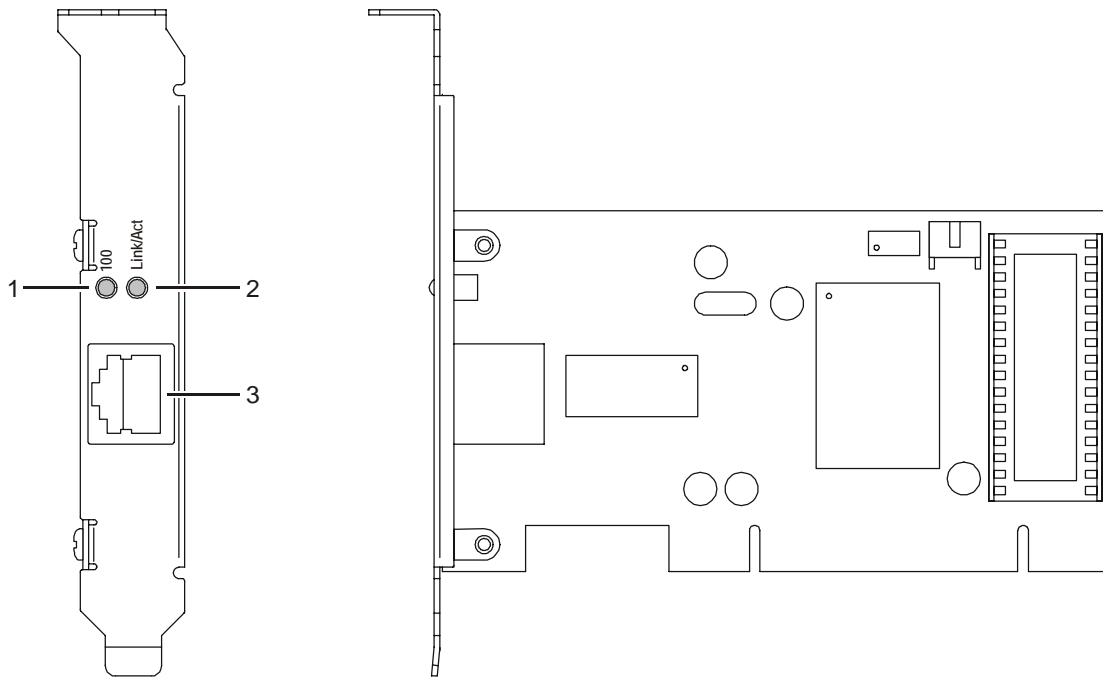
LED Description

	Feature	Description
1	100	The 100 LED illuminates *amber* when the card operates at 100Mbps. If the 100 LED is not illuminated and the PC is powered on, the card is operating at 10Mbps.
2	Link/Act	The Link/Act LED illuminates *green* when the card successfully connects to a network. It blinks when data is being transmitted or received over the network.
3	Ethernet Port	The port in which you plug in your Ethernet cable.

Section 2:Installation

Overview

Your Ethernet Adapter inserts into an unused PCI slot inside your computer.

Because your Ethernet Adapter supports both 10BaseT and 100BaseT (also known as Fast Ethernet), no additional hardware or software is required to work with different network segments.

Installing Your Ethernet Adapter

To install your adapter card:

1   Insert the supplied Ethernet Adapter CD-ROM into the CD-ROM drive of your computer. The software automatically starts the Installation Wizard program[1].
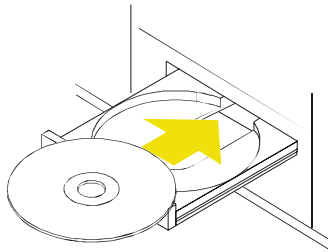
2   Follow the prompts to set up your adapter card.

If Windows 98SE prompts you for the original Windows CD-ROM, insert the CD-ROM, and direct Windows to its proper location (for example, D:\WIN98).

3   When prompted, power down the PC, and then unplug the electrical connection to install the adapter card.

4   Using the instructions you received with your desktop PC, remove the cover from your desktop PC. Ground yourself by touching the metal chassis.

5   Locate an empty PCI slot in your desktop PC.

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[1] Note: If the Windows set up wizard does not start automatically, do the following: Click **Start**, then **Run**. On the next window, click **Browse** and locate your CD-ROM drive. Locate Launch**.exe** and highlight it. Click **Open**, then **OK**. The set up wizard starts.

6 Using the instructions that came with your desktop PC, install the adapter card. If inserting an Ethernet Adapter for the first time, you might encounter some resistance. Insert the Ethernet Adapter by gently rocking it back and forth with constant downward pressure until the board is nearly flush. The following illustrates an example of how to install the card:
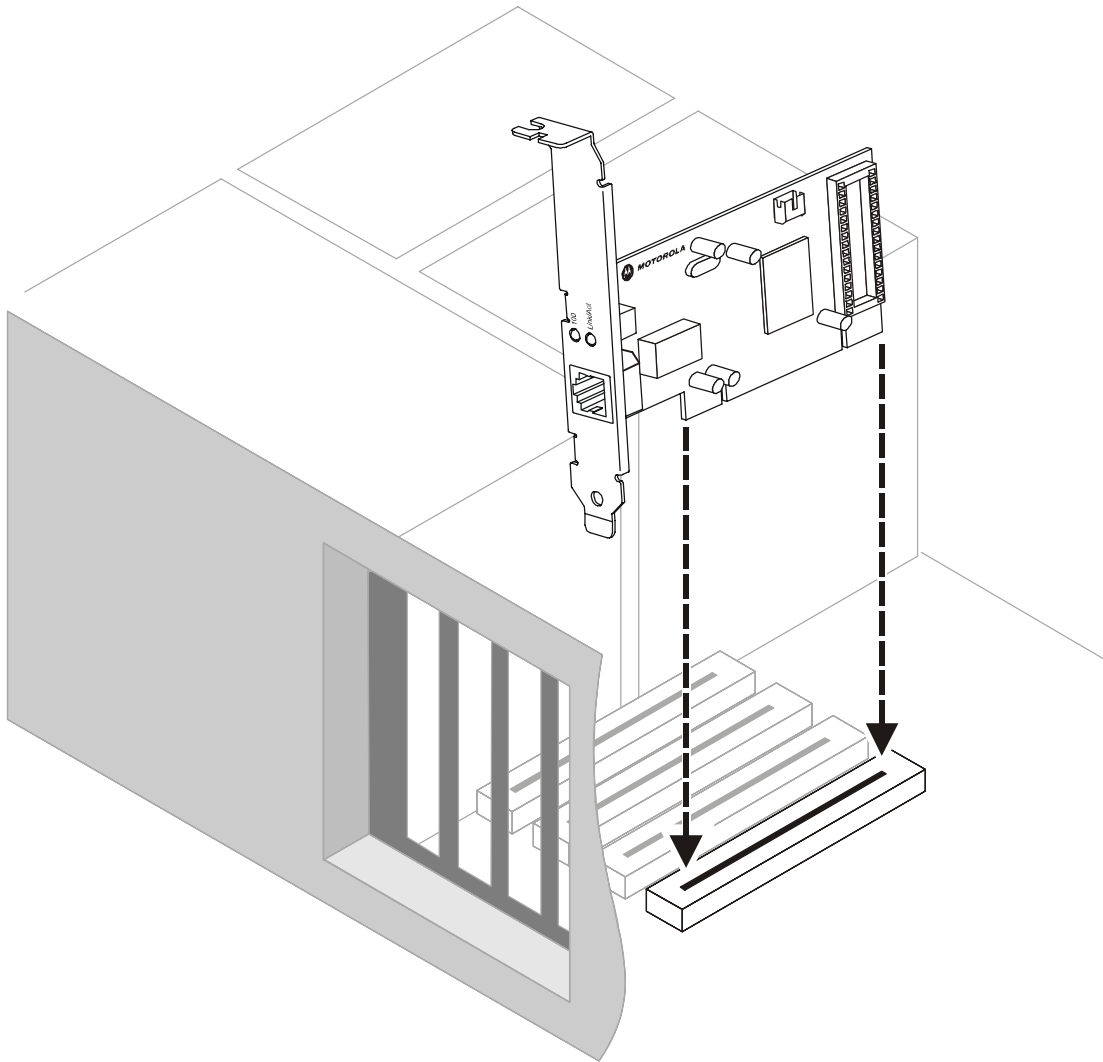
7 Re-attach the cover to your desktop computer.

8 Return power to the PC and complete the installation instructions supplied on the CD-ROM.

Manually Installing the Driver

You can also install the software driver necessary for your Ethernet Adapter manually. This installation sequence assumes you have already installed the Ethernet Adapter into your computer. If you have not, please refer to Installing Your Ethernet Adapter for instructions on physically installing the Ethernet Adapter.

What follows are generic instructions, your operating system may differ slightly, but the overall procedure is similar.

1 After you have installed the Ethernet Adapter and re-powered your computer, the Found New Hardware window is displayed:
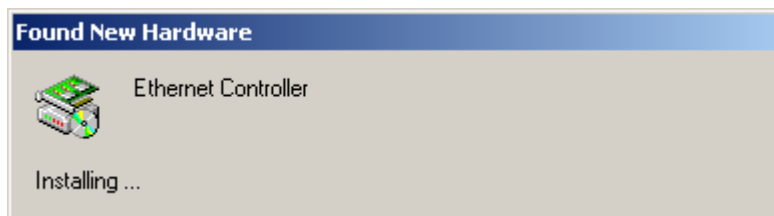
After a few moments, if the New Hardware Wizard does not automatically appear, click **Start** > **Setttings** > **Control Panel** > **Add/Remove Hardware**. The Add/Remove Hardware window is displayed:
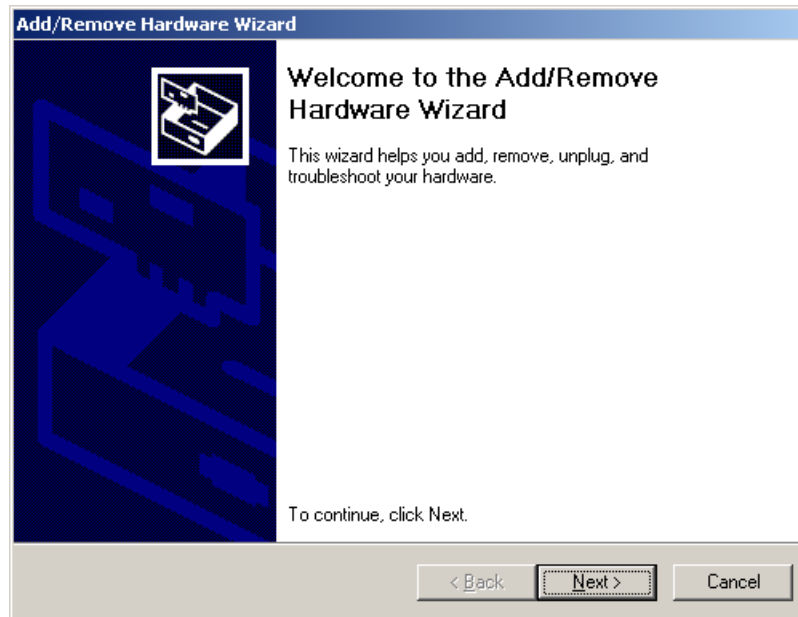
2 Click **Next**.

The Install Hardware Device Drivers window is displayed:
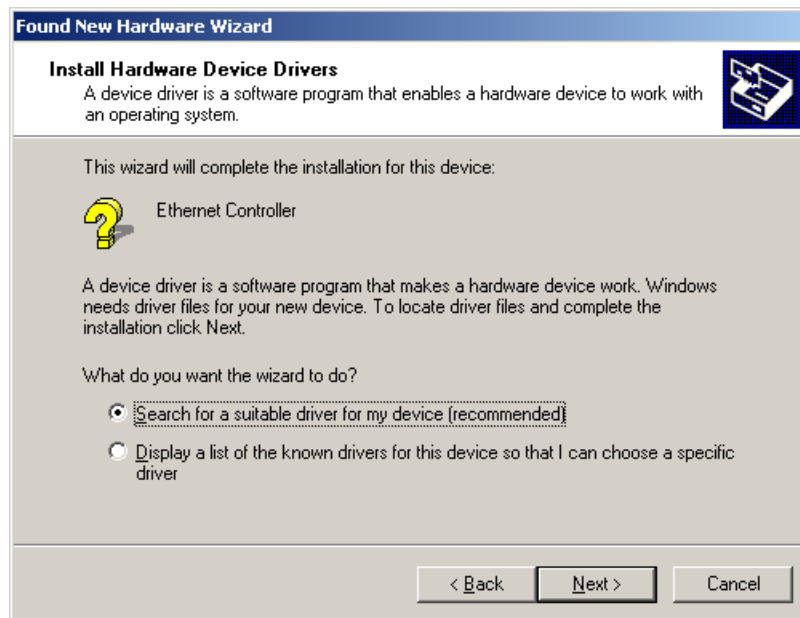
3 Ensure **Search for a suitable driver for my device (recommended)** is selected and click **Next**. The Locate Driver Files window is displayed:
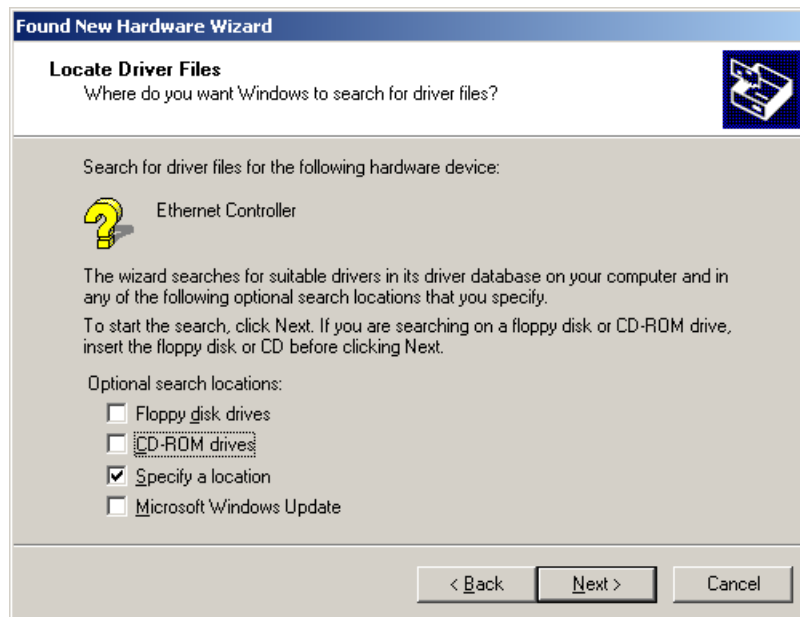
4 Select **Specify a location** and click **Next**.

The Found New Hardware Wizard window is displayed:
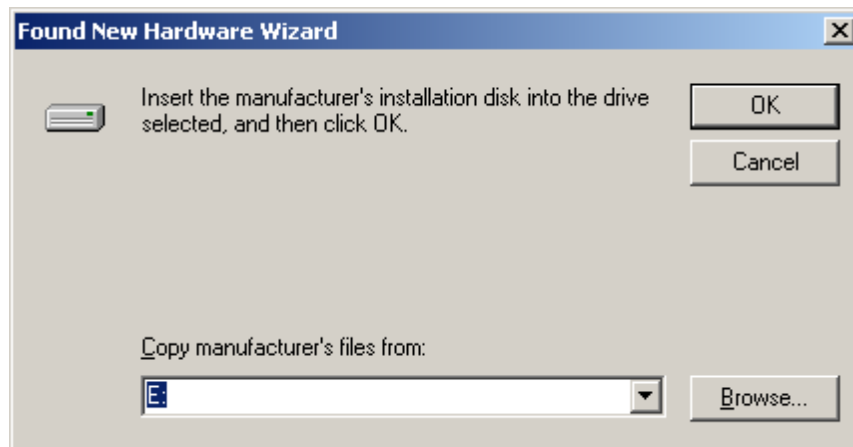
5 Insert the supplied CD-ROM.

6 In the **Copy manufacturer's files from** field type the path to the driver (where "E" represents your CD-ROM):

– For Windows 98SE, ME, and 2000 type **E:\Win98ME2K**

– For Windows XP type **E:\WinXP**

– or click **Browse** to navigate to the *.inf file appropriate for your operating system. An example appears below for the driver for Windows 98SE, ME, and 2000:
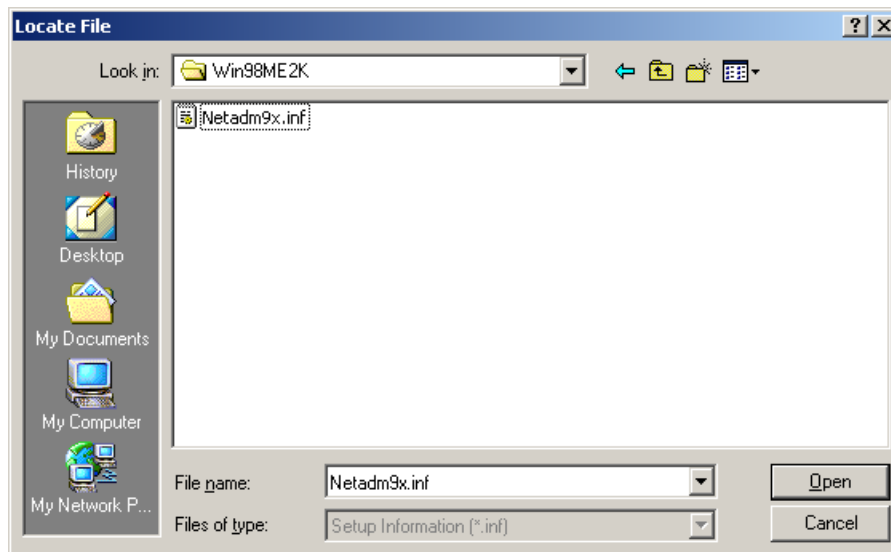
7 Click **Open**.

8 The Found New Hardware Wizard window is redisplayed with the selected path. Click **OK** again.

The driver is now installed for your Ethernet Adapter and the Completing the Found New Hardware Wizard window is displayed:
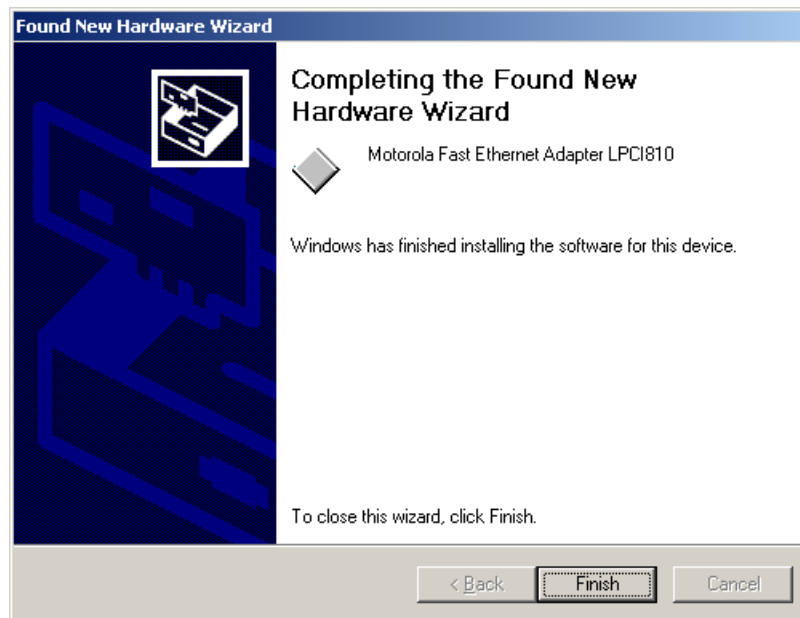
9   Click **Finish** to complete the driver installation.

Section 3:Troubleshooting

This section details possible solutions to common problems that may occur in using your Ethernet Adapter.

Contact Us

If you are unable to locate a solution here, please access our website at www.motorola.com/broadband/consumers for the latest information. You can also reach us 7 days a week, 24 hours a day at 1-877-466-8646.

Hardware Solutions

My computer is experiencing difficulty connecting to the network.

- Ensure that your PC and gateway are powered on.

- Ensure that your Ethernet Adapter is installed correctly and is active.

- Ensure that your Ethernet adapter is enabled. To check the status of your adapter, click the monitor icon in the System Tray at the bottom right of your screen.

  You can also check the status of the Ethernet adapter by selecting **Control Panel > Network and Dial-Up Connections**.

- Ensure that you are using Ethernet cables and not telephone cables between the router and modem or router and PC. See the illustration below. Ethernet cables use a wider RJ-45 style plug using 8 wires where telephone style plugs use the smaller RJ-11 style plug using 4 to 6 wires.

The plug on the left is RJ-45; the plug on the right is RJ-11 – use only RJ-45.

I would like to see if my Internet connection is live.

Use the *ping* command to test the connection. Before attempting, determine the IP Address of your adapter.

1 Open a command prompt by clicking **Start** and then **Run**.

2 For Windows 98 and ME, in the *Open* field, type **command** and press **Enter** or **OK**.

For Windows 2000 and XP, type **cmd**. Or, navigate using your **Start** button to **Programs**>**Accessories**>**Command Prompt**.

3 In the Command window, type **ipconfig**.

– You should see an IP address for your adapter, for example:

```
Ethernet Adapter Local Area Connection:

Connection-specific DNS Suffix. . : Example.example.example.com.

IP Address. . . . . . . . . . . . : 192.168.10.10

Subnet Mask . . . . . . . . . . . : 255.255.255.0

Default Gateway . . . . . . . . . : 192.168.10.1
```

4 If using a router at home, in the Command window, type **ping** followed by the ***Router's IP address*** and press **Enter**. For example, type **ping 192.168.10.1**

The router's IP address is most likely the default gateway.

– If you receive a reply (the first word will be *Reply…*), then your computer is connected to the router. Proceed to *Step 4.*

– If you do NOT receive a reply, repeat steps 1 – 4 on a different computer to verify that the first computer is not the cause of the problem.

5 In the Command window, type **ping** and your ***ISP's default gateway IP Address*** and press **Enter**. You can determine your ISP's default gateway by examining your modem and or router. Refer to the instructions provided with your modem/router.

– If you receive a reply (For example, *Reply from 216.109.125.72…*), then your connection to the Internet is live.

– If you do NOT receive a reply, repeat steps 1 – 5 on a different computer to verify that the first computer is not the cause of the problem.

If you cannot determine your ISP's default gateway, ping www.yahoo.com or another known web location.

Section 4:Glossary

A

Adapter

A device or card that connects a computer, printer, or other peripheral device to the network or to some other device. An adapter connects a computer to the LAN.

Address translation

See *NAT*.

ASCII

The American Standard Code for Information Interchange refers to alphanumeric data for processing and communication compatibility among various devices; normally used for asynchronous transmission.

B

Bandwidth

The transmission capacity of a medium in terms of a range of frequencies. Greater bandwidth indicates the ability to transmit more data over a given period of time.

bps

Bits Per Second

Broadband

A communications medium that can transmit a relatively large amount of data in a given time period.

C

Client

In a client/server architecture, a client is a computer that requests files or services such as file transfer, remote login, or printing from the server. Also see *server.*

Coaxial Cable

A type of cable consisting of a center wire surrounded by insulation and a grounded shield of braided wire. The shield minimizes electrical and radio frequency interference. Coaxial cable has high bandwidth and can support transmission over long distances.

CPE

Customer Premise Equipment: typically computers, printers, etc, that are connected to the gateway at the subscriber location. CPE can be provided by the subscriber or the cable service provider. Also called a client.

Crossover Cable

A crossover cable is a cable that is used to interconnect two computers by "crossing over" (reversing) their respective pin contacts. A crossover cable is sometimes known as a null modem.

D

Default Gateway

A routing device that forwards traffic not destined to a station within the local subnet.

DHCP

A Dynamic Host Configuration Protocol server dynamically assigns IP addresses to client hosts on an IP network. DHCP eliminates the need to manually assign static IP addresses by "leasing" an IP address and subnet mask to each client. It enables the automatic reuse of unused IP addresses.

DMZ

DeMilitarized **Z**one. This service opens one IP address to the Internet, usually for online gaming, and acts as a buffer between the Internet and your network.

DNS

The Domain Name System is the Internet system for converting domain names (like www.motorola.com) to IP addresses. A DNS server contains a table matching domain names such as Internetname.com to IP addresses such as 192.169.9.1. When you access the world-wide web, a DNS server translates the URL displayed on the browser to the destination website IP address. The DNS lookup table is a distributed Internet database; no one DNS server lists all domain name to IP address matches.

Domain Name

A unique name, such as motorola.com, that maps to an IP address. Domain names are typically much easier to remember than are IP addresses. See *DNS.*

Download

To copy a file from one computer to another. You can use the Internet to download files from a server to a computer.

Driver

Software that enables a computer to interact with a network or other device. For example, there are drivers for printers, monitors, graphics adapters, modems, Ethernet, USB, HPNA, and many others.

DSL

Digital Subscriber Line

Dynamic IP Address

An IP address that is temporarily leased to a host by a DHCP server. The opposite of *Static IP Address*.

E

Ethernet

The most widely used LAN type, also known as IEEE 802.3. The most common Ethernet networks are 10Base-T, which provide transmission speeds up to 10 Mbps, usually over unshielded, twisted-pair wire terminated with RJ-45 connectors. Fast Ethernet (100Base-T) provides speeds up to 100 Mbps. "Base" means "baseband technology" and "T" means "twisted pair cable."'

Each Ethernet port has a physical address called the MAC address. Also see *MAC address*.

Event

A message generated by a device to inform an operator or the network management system that something has occurred.

F

Firewall

A security software system on the some devices that enforces an access control policy between the Internet and the LAN for protection.

Firmware

Code written onto read-only memory (ROM) or programmable read-only memory (PROM). Once firmware has been written onto the ROM or PROM, it is retained even when the device is turned off. Firmware is upgradeable.

FTP

File Transfer Protocol is a standard Internet protocol for exchanging files between computers. FTP is commonly used to download programs and other files to a computer from web pages on Internet servers.

G

Gateway

A device that enables communication between networks using different protocols. See also *router*.

GUI

Graphical User Interface

H

Hexadecimal

A base-sixteen numbering system that uses sixteen sequential numbers (0 to 9 and the letters A to F) as base units before adding a new position. On computers, hexadecimal is a convenient way to express binary numbers.

Host

In IP, a host is any computer supporting end-user applications or services with full two-way network access. Each host has a unique host number that combined with the network number forms its IP address.

Host also can mean:

- A computer running a web server that serves pages for one or more web sites belonging to organization(s) or individuals

- A company that provides this service

- In IBM environments, a mainframe computer

I

ICMP

Internet Control Message Protocol is a protocol used for error, problem, and informational messages sent between IP hosts and gateways. ICMP messages are processed by the IP software and are not usually apparent to the end-user.

Internet

A worldwide collection of interconnected networks using TCP/IP.

IP

Internet Protocol is a set of standards that enable different types of computers to communicate with one another and exchange data through the Internet. IP provides the appearance of a single, seamless communication system and makes the Internet a virtual network.

IP Address

A unique 32-bit value that identifies each host on a TCP/IP network. TCP/IP networks route messages based on the destination IP address.

For a Class C network, the first 24 bits are the network address and the final 8 bits are the host address; in dotted-decimal format it appears "network.network.network.host."

ISDN

Integrated Services Digital Network

ISP

Internet Service Provider

L

LAN

Local Area Network. A local area network provides a full-time, high-bandwidth connection over a limited area such as a home, building, or campus. Ethernet is the most widely used LAN standard.

M

MAC Address

The Media Access Control address is a unique, 48-bit value permanently saved in the ROM at the factory to identify each Ethernet network device. It is expressed as a sequence of 12 hexadecimal digits printed on the unit's label. You need to provide the MAC Address to the cable service provider. Also called an Ethernet address, physical address, hardware address, or NIC address.

MB

One megabyte; equals 1,024 x 1,024 bytes, 1,024 kilobytes, or about 8 million bits.

Mbps

Million bits per second (megabits per second). A rate of data transfer.

MTU

The Maximum Transmission Unit is the largest amount of data that can be transmitted in one discrete message on a given physical network. The MTU places an upper bound on the size of a message that can be transferred by the network in a single frame. Messages exceeding the MTU must be fragmented before transmission, and reassembled at the destination.

Multicast

A data transmission sent from one sender to multiple receivers. See also *broadcast* and *unicast*.

N

NAT

Network Address Translation is an Internet standard for a LAN to use one set of IP addresses for internal traffic and a second set of IP addresses for external traffic. NAT provides some security because the IP addresses of LAN computers are invisible on the Internet.

Network

Two or more computers connected to communicate with each other. Networks have traditionally been connected using some kind of wiring.

NIC

A Network Interface Card converts computer data to serial data in a packet format that it sends over the LAN. A NIC is installed in an expansion slot or can be built-in. Every Ethernet NIC has a MAC address permanently saved in its ROM.

P

Packet

The unit of data that is routed between the sender and destination on the Internet or other packet-switched network.

PCMCIA

The Personal Computer Memory Card International Association sets international standards for connecting peripherals to portable computers. Laptop computers typically have a PCMCIA slot that can hold one or two PC Cards to provide features such as Ethernet or wireless connectivity.

PING

A network utility that tests host reachability by sending a small packet to the host and waiting for a reply. If you PING a computer IP address and receive a reply, you know the computer is reachable over the network. It also stands for "Packet Internet Groper."

Port Triggering

A mechanism that allows incoming communication with specified applications.

PPP

> Point-to-Point Protocol is used to transport other protocols, typically for simple links over serial lines. It is most commonly used to access the Internet with a dial-up modem.

PPPoE

> Point-to-Point Protocol over Ethernet. Used by many DSL Internet Service Providers for broadband connection.

PPTP

> Point-to-Point Tunneling Protocol encapsulates other protocols. It is a new technology to create VPNs developed jointly by several vendors.

Private IP Address

> An IP address assigned to a computer on the LAN by the DHCP server for a specified lease time. Private IP addresses are invisible to devices on the Internet. See also *Public IP Address*.

Protocol

> A formal set of rules and conventions for exchanging data. Different computer types (for example PC, UNIX, or mainframe) can communicate if they support common protocols.

Public IP Address

> The IP address assigned by the service provider. A public IP address is visible to devices on the Internet. See also *Private IP Address*.

R

RJ-11

> The most common type of connector for household or office phones.

RJ-45

> An 8-pin modular connector; the most common connector type for 10Base-T or 100Base-T Ethernet networks.

ROM

> Read-Only Memory.

Router

> On IP networks, a device connecting at least two networks, which may or may not be similar. A router is typically located at a gateway between networks. A router operates on OSI Network Layer 3. It filters packets based on the IP address, examining the source and destination IP addresses to determine the best route on which to forward them.

A router is often included as part of a network switch. A router can also be implemented as software on a computer.

Routing Table

A table listing available routes that is used by a router to determine the best route for a packet.

S

Server

In a client/server architecture, a dedicated computer that supplies files or services such as file transfer, remote login, or printing to clients. Also see *client.*

Service Provider

A company providing Internet connection services to subscribers.

SMTP

Simple Mail Transfer Protocol is a standard Internet protocol for transferring e-mail.

Static IP Address

An IP address that is permanently assigned to a host. Normally, a static IP address must be assigned manually. The opposite of *Dynamic IP Address.*

Subscriber

A user who accesses television, data, or other services from a service provider.

Subnet Mask

A methodology that determines what the router will examine for the destination of an IP address. A router delivers packets using the network address.

Switch

On an Ethernet network, a switch filters frames based on the MAC address, in a manner similar to a bridge. A switch is more advanced because it can connect more than two segments.

T

TCP

Transmission Control Protocol on OSI transport layer four, provides reliable transport over the network for data transmitted using IP (network layer three). It is an end-to-end protocol defining rules and procedures for data exchange between hosts on top of connectionless IP. TCP uses a timer to track outstanding packets, checks error in incoming packets, and retransmits packets if requested.

TCP/IP

The Transmission Control Protocol/Internet Protocol suite provides standards and rules for data communication between networks on the Internet. It is the worldwide Internetworking standard and the basic communications protocol of the Internet.

Tunnel

To place packets inside other packets to send over a network. The protocol of the enclosing packet is understood by each endpoint, or tunnel interface, where the packet enters and exits the network. VPNs rely on tunneling to create a secure network.

Tunneling requires the following protocol types:

- A carrier protocol, such as TCP, used by the network that the data travels over
- An encapsulating protocol, such as IPSec, L2F, L2TP, or PPTP, that is wrapped around the original data
- A passenger protocol, such as IP, for the original data

U

UDP

User Datagram Protocol. A method used along with the IP to send data in the form of message units (datagram) between network devices over a LAN or WAN.

Unicast

A point-to-point data transmission sent from one sender to one receiver. This the normal way you access websites. See also *multicast*.

USB

Universal Serial Bus is a computer interface for add-on devices such as printers, scanners, mice, modems, or keyboards. USB supports data transfer rates of 12 Mbps and plug-and-play installation. You can connect up to 127 devices to a single USB port.

V

VoIP

Voice over Internet Protocol is a method to exchange voice, fax, and other information over the Internet. Voice and fax have traditionally been carried over traditional telephone lines of the Public Switched Telephone Network (PSTN) using a dedicated circuit for each line. VoIP enables calls to travel as discrete data packets on shared lines. VoIP is an important part of the convergence of computers, telephones, and television into a single integrated information network.

VPN

A virtual private network is a private network that uses "virtual" connections (tunnels) routed over a public network (usually the Internet) to provide a secure and fast connection; usually to users working remotely at home or in small branch offices. A VPN connection provides security and performance similar to a dedicated link (for example, a leased line), but at much lower cost.

W

WAN

A wide-area network provides a connection over a large geographic area, such as a country or the whole world. The bandwidth depends on need and cost, but is usually much lower than for a LAN.

WWW

World Wide Web. An interface to the Internet that you use to navigate and hyperlink to information.

Visit our website at:
www.motorola.com/broadband

MOTOROLA

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