D-Link *Air*PlusX*TREMEG*™
DWL-G650

2.4GHz up to 54Mbps
Wireless Cardbus Adapter

Manual

D-Link

Building Networks for People

Contents

Package Contents

Contents of Package:

- **D-Link *Air*PlusXtreme *G*™ DWL-G650**
  2.4 GHz - 54Mbps Wireless Cardbus Adapter
- Manual and Warranty on CD
- Quick Installation Guide

If any of the above items are missing, please contact your reseller.

System Requirements for Configuration:

- A laptop or notebook computer with an available 32-bit Cardbus slot
- Windows XP, Windows 2000, Windows Me, or Windows 98SE
- At least 32 MB of memory and a 300 MHz processor
- An **802.11g** *Access Point* (*for optimal performance*), or an **802.11b** *Access Point (e.g., DWL-900AP)* for **Access Point** mode, or another **802.11g** wireless adapter *(DWL-G650) for* laptops or an **802.11b** wireless adapter (e.g., DWL-520 for desktops) for **Peer-to-Peer** mode.

Introduction

The D-Link *Air*PlusXtreme*G*™ DWL-G650 Wireless Cardbus Adapter is an enhanced 802.11g high-performance, wireless adapter that supports high-speed wireless networking at home, at work or in public places.

Unlike most network cards, the DWL-G650 provides speeds of up to 54 Mbps (compared to the standard 11 Mbps) when used with other D-Link *Air*Xtreme*G* products. This means that you do not need to change your entire network to maintain connectivity. You may sacrifice some of 802.11g' s speed when you mix 802.11b and 802.11g devices, but you will not lose the ability to communicate when you incorporate the 802.11g standard into your 802.11b network. You may choose to slowly change your network by replacing the 802.11b devices with 802.11g devices gradually.

In addition to offering faster data transfer speeds when used with other 802.11g products, the DWL-G650 has the newest, strongest, most advanced security features available today.

For home users that will not incorporate a radius server in their network, the security for the DWL-G650, used in conjunction with other 802.11g products, will be much stronger than ever before. No longer will you have to manually input a new WEP key frequently to ensure security, with the DWL-G650, you will automatically receive a new key every time you connect, vastly increasing the safety of your communications.

The DWL-G650 is compatible with existing 802.11b devices such as the D-Link *Air, Air*Plus *and Air*Pro family of products including the DWL-520, DWL-520+ and the DWL-AB520 Wireless PCI Adapter, the DI-714 Wireless Router/Access Point and the DWL-120 Wireless USB Adapter. (When used with 802.11b devices, the DWL-G650 will reach speeds at up to 11Mbps.)

It is an ideal way to connect one laptop computer to a Wireless Local Area Network (WLAN.) After completing the steps outlined in the **Quick Installation Guide** (included in the package) you will have the ability to share information and resources, such as files and printers, and take full advantage of a "connected" environment for work or play!

The DWL-G650 includes software drivers for the most popular Microsoft Windows operating systems (Windows XP, Windows 2000, Windows Me, Windows 98) and can be integrated into a larger network, running, in either Access Point mode (without an Access Point) or Peer-to-Peer mode (with an Access Point.)*Please take a look at our* **Getting Started** *section in this manual to see examples of typical network setups using the DWL-G650 in both* Access Point *and* Peer-to-Peer *modes.*

This manual provides a quick introduction to wireless technology and its application as it relates to networking. Take a moment to read through this manual and get acquainted with wireless technology.

Features

- D-Link AirPlusXtremeG DWL-G650 wireless data rate of up to 54Mbps

- Backwards compatible with the 802.11b standard to provide a wireless data rate of up to 11Mbps

- Utilizes OFDM technology (**O**rthogonal **F**requency **D**ivision **M**ultiplexing)

- User-friendly configuration and diagnostic utilities

- Operates in the 2.4GHz frequency range

LEDS

LED stands for **L**ight-**E**mitting **D**iode. The **DWL-G650** has the following LEDs:

LED	LED Activity
Activity	A blinking light indicates network activity

Wireless Basics

D-Link wireless products are based on industry standards to provide easy-to-use and compatible high-speed wireless connectivity within your home, business or public access wireless networks. Strictly adhering to the IEEE standard, the D-Link wireless family of products will allow you to securely access the data you want, when and where you want it. You will be able to enjoy the freedom that wireless networking delivers.

A wireless local area network (WLAN) is a cellular computer network that transmits and receives data with radio signals instead of wires. Wireless LANs are used increasingly in both home and office environments, and public areas such as airports, coffee shops and universities. Innovative ways to utilize WLAN technology are helping people to work and communicate more efficiently. Increased mobility and the absence of cabling and other fixed infrastructure have proven to be beneficial for many users.

Wireless users can use the same applications they use on a wired network. Wireless adapter cards used on laptop and desktop systems support the same protocols as Ethernet adapter cards.

Under many circumstances, it may be desirable for mobile network devices to link to a conventional Ethernet LAN in order to use servers, printers or an Internet connection supplied through the wired LAN. A Wireless Router is a device used to provide this link.

Wireless Basics *(continued)*

People use wireless LAN technology for many different purposes:

Mobility - Productivity increases when people have access to data in any location within the operating range of the WLAN. Management decisions based on real-time information can significantly improve worker efficiency.

Low Implementation Costs – WLANs (Wireless Local Area Networks) are easy to set up, manage, change and relocate. Networks that frequently change, both physically and logically, can benefit from WLANs ease of implementation. WLANs can operate in locations where installation of wiring may be impractical.

Installation Speed and Simplicity - Installing a wireless LAN system can be fast and easy and can eliminate the need to pull cable through walls and ceilings.

Network Expansion - Wireless technology allows the network to go where wires cannot.

Scalability – Wireless Local Area Networks (WLANs) can be configured in a variety of topologies to meet the needs of specific applications or existing infrastructures. Configurations are easily changed and range from peer-to-peer networks suitable for a small number of users to larger infrastructure networks to accommodate hundreds or thousands of users, depending on the number of wireless devices deployed.

The DWL-G650 is also compatible with 802.11b wireless products, which include:

- 2.4GHz Wireless Cardbus Adapters used with laptop computers
  (***D-Link Air*** *DWL-650,* ***D-Link Air*Plus** *DWL-650+*)

- 2.4GHz Wireless PCI cards used with desktop computers
  (***D-Link Air*** *DWL-520,* ***D-Link Air*Plus** *DWL-520+*)

- Enhanced 2.4GHz Wireless Access Point
  (***D-Link Air*Plus** *DWL-900AP+*)

- Enhanced 2.4GHz Wireless Broadband Router
  (***D-Link Air*Plus** *DI-614+*)

Standards-Based Technology

The DWL-G650 Wireless Cardbus Adapter increases the data rate up to 54 Mbps within the 2.4GHz band, utilizing **OFDM technology.**

This means that in most environments, within the specified range of this device, you will be able to transfer large files quickly or even watch a movie in MPEG format over your network without noticeable delays. This technology works by transmitting high-speed digital data over a radio wave utilizing **OFDM** (**O**rthogonal **F**requency **D**ivision **M**ultiplexing) technology. **OFDM** works by splitting the radio signal into multiple smaller sub-signals that are then transmitted simultaneously at different frequencies to the receiver. **OFDM** reduces the amount of **crosstalk** (interference) in signal transmissions. The D-Link *DWL-G650* will automatically sense the best possible connection speed to ensure the greatest speed and range possible.

The DWL-G650 is backwards compatible with 802.11b devices. This means that if you have an existing 802.11b network, the devices in that network will be compatible with 802.11g devices at speeds up to 11Mbps in the 2.4GHz range. Also based on the IEEE **802.11b** standard, the DWL-G650 is interoperable with existing compatible 2.4GHz wireless technology with data transfer speeds of up to 11Mbps.

Wireless Basics *(continued)*

Installation Considerations

The D-Link *Air*Extreme DWL-G650 lets you access your network, using a wireless connection, from virtually anywhere. Keep in mind, however, that the number, thickness and location of walls, ceilings, or other objects that the wireless signals must pass through, may limit the range. Typical ranges vary depending on the types of materials and background RF (radio frequency) noise in your home or business. The key to maximizing wireless range is to follow these basic guidelines:

1. Keep the number of walls and ceilings between the DWL-G650 and other network devices to a minimum - each wall or ceiling can reduce your D-Link *Air*Extreme Wireless product's range from 3-90 feet (1-30 meters.) Position your devices so that the number of walls or ceilings is minimized.

2. Be aware of the direct line between network devices. A wall that is 1.5 feet thick (.5 meters), at a 45-degree angle appears to be almost 3 feet (1 meter) thick. At a 2-degree angle it looks over 42 feet (14 meters) thick! Try to make sure that devices are positioned so that the signal will travel straight through a wall or ceiling for better reception.

3. Building Materials make a difference - a solid metal door or aluminum studs may have a negative effect on range. Try to position wireless devices and computers with wireless adapters so that the signal passes through drywall or open doorways and not other materials.

4. Keep your product away (at least 3-6 feet or 1-2 meters) from electrical devices or appliances that generate RF noise.

Getting Started

There are basically two modes of networking:

- ■ **Access Point** – using an Access Point, such as the DWL-900AP.

- ■ **Peer-to-Peer** – directly connecting to another computer, for peer-to-peer communication, using wireless network adapters on each computer, such as two or more DWL-G650 wireless network Cardbus adapters.

On the following pages we will show you an example of an **Infrastructure Network** and an **Ad Hoc Network**.

An **Infrastructure** network contains an Access Point or Router. To utilize the full features of the DWL-G650 you will need to include a radius server in your network. The **Infrastructure Network** example shown on the following page contains the following D-Link network devices (your existing network may be comprised of other devices):

- ■ A wireless Access Point - **D-Link *Air* 900AP**

- ■ A laptop computer with a wireless adapter - **D-Link *Air*Plus DWL-G650**

- ■ A desktop computer with a wireless adapter - **D-Link *Air* DWL-520** (802.11b devices have speeds up to 11Mbps)

- ■ A Cable modem - **D-Link DCM-200**

Getting Started
Setting up a Wireless Infrastructure Network

*Please remember that **D-Link Air**XtremeG *wireless devices are pre-configured to connect together, right out of the box, with their default settings.*

For a typical wireless setup at home (as shown above), please do the following:

1 You will need broadband Internet access (a Cable or DSL-subscriber line into your home or office)

2 Consult with your Cable or DSL provider for proper installation of the modem

3 Connect the Cable or DSL modem to your broadband router (*see the Quick Installation Guide included with your router.*)

4 If you are connecting a desktop computer to your network, install the D-Link *Air* DWL-520 wireless PCI adapter into an available PCI slot on your desktop computer. You may also install the DWL-520+.
(See the Quick Installation Guide included with the network adapter.)

5 Install the drivers for the D-Link DWL-G650 wireless Cardbus adapter into a laptop computer.
(*See the Quick Installation Guide included with the DWL-G650.*)

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Getting Started
Setting up a Wireless Ad Hoc Network

1. Install the **D-Link DWL-G520** Wireless Network adapter into one laptop computer. *See the **Quick Installation Guide** included with the product for installation instructions*.

2. Install another **DWL-G650** into a laptop computer. *See the **Quick Installation Guide** included with the product*.

3. Set the wireless configuration for the adapters to Ad-Hoc mode, set the adapters to the same channel, and assign an IP Address to each computer on the Ad-Hoc network. *(See Box below)*

IP Address

When assigning IP Addresses to the computers on the network, please remember that the **IP Address for each computer must be in the same IP Address range as all the computers in the network**, and the subnet mask must be exactly the same for all the computers in the network.

For example: If the first computer is assigned an IP Address of 192.168.0.2 with a Subnet Mask of 255.255.255.0, then the second computer can be assigned an IP Address of 192.168.0.3 with a Subnet Mask of 255.255.255.0, etc.

IMPORTANT: If computers or other devices are assigned the same IP Address, one or more of the devices may not be visible on the network.

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Using the Configuration Utility

If you wish to change the default settings or optimize the performance of the DWL-G650, D-Link has included a configuration utility for this purpose. However, in Windows XP, you will instead use zero configuration utility.

Before you use the configuration utility for the DWL-G650, you must install the drivers and the configuration utility from the CD-ROM that came with the DWL-G650. (Please see the *Quick Installation Guide* that came with the product.) After you have completed this installation and restarted your computer, you can access the Configuration Utility at any time by clicking on the icon in your taskbar at the bottom right corner, on the desktop.

After double-clicking on the icon in the taskbar (shown at right), the Link Info window shown on the next page will appear:

Configuration Utility

Link Info
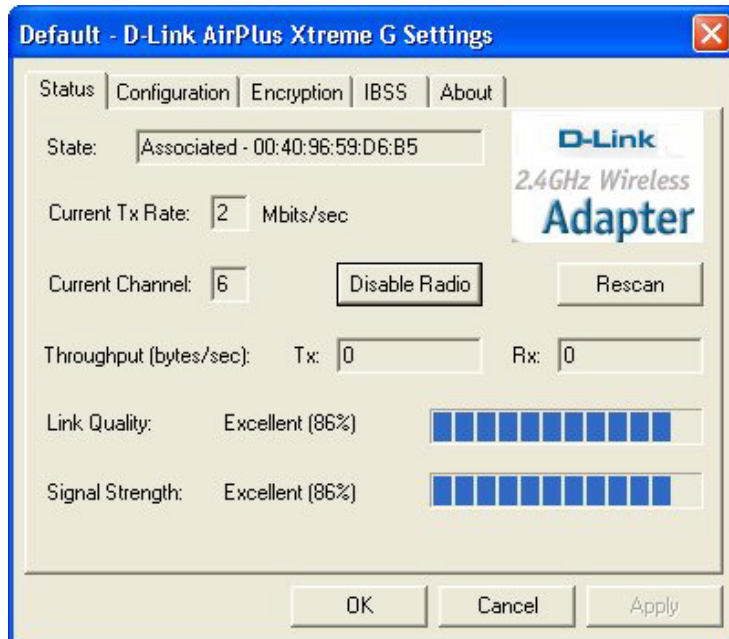
State: Displays the MAC Address of the Access Point that is associated with the DWL-G650.

CurrentTxRate: The factory setting is set to 11 Mbps; however,Current TxRate: The default setting is 2. meaning displays the current transmit rate of the current association.

Current Channel: Displays the channel information. Shows the channel on which the connection is made . In Access Point mode, this number changes as the radio scans the available channels.
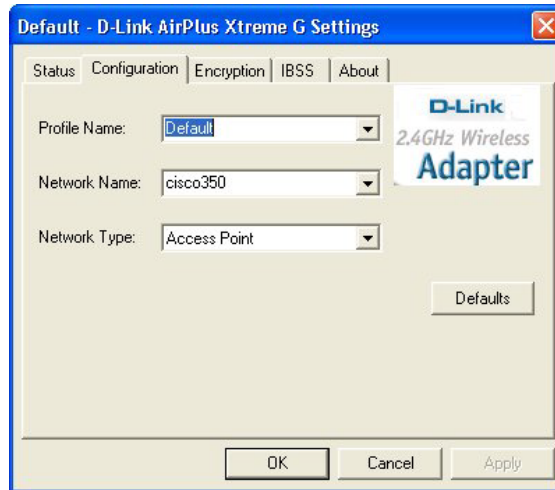
Throughput: Displays the statistics of data transmitted and received.

Link Quality / Signal Strength: Displays the Link Quality for the DWL-G650 wireless connection to the access point. The Signal Strength represents the wireless signal between the access point and the DWL-G650. The percentage coincides with the graphical bar.

Configuration Utility

Configuration

This configuration screen displays the default settings for the DWL-G650

Default - D-Link AirPlus Xtreme G Settings

Status | **Configuration** | Encryption | IBSS | About

Profile Name: | Default

Network Name: | cisco350

Network Type: | Access Point

D-Link
2.4GHz Wireless
Adapter

Defaults

OK | Cancel | Apply

To communicate on the network all devices must have the same settings for the following properties:

Profiles Name

You can manage the profiles that you have created for the wireless network at home, at the office and in public places. Scroll up and down and highlight the profile that you wish to configure. You can add a profile.

Network Name – Network Name is a name that identifies a wireless network. Access Points and wireless clients attempting to connect to a specific WLAN (Wireless Local Area Network) must use the same Network Name. The default setting is Clefault.
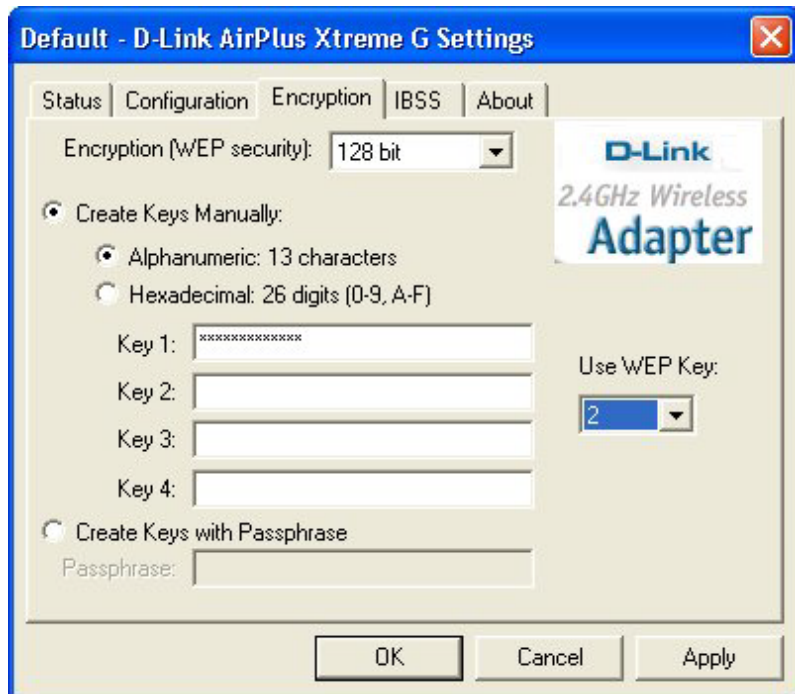
Network Type – Click on the pull-down menu; select from the following options:

Access Point - connecting the WLAN using an Access Point. (The **default** setting.)

Peer-to-Peer – wireless mode used when connecting directly to a computer equipped with a wireless adapter in a peer-to-peer environment.

Configuration Utility

Encryption

Encryption – enable Encryption by pulling down the field . Encryption is disabled as the default setting.

Create Keys Manually – enter a key in either ASCII (e.g., a word) or hexadecimal format

Key Format – ASCII or Hexadecimal
Key type – select the key length, either 64, or 128 bits
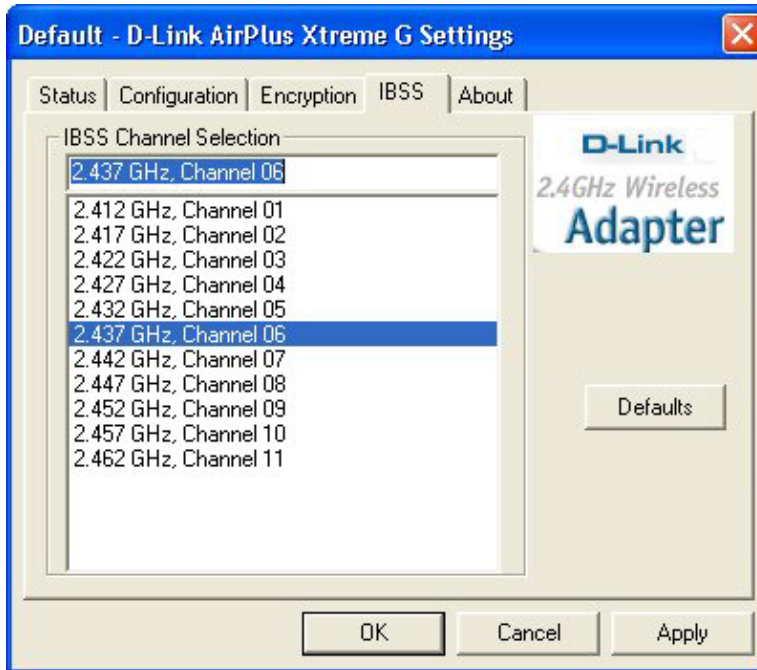**WEP Key** – You can create up to 4 different security keys
Click **Apply** to save the changes.

> *Hexadecimal digits consist of the numbers 0-9 and the letters A-F*
>
> *ASCII (American Standard Code for Information Interchange) is a code for representing English letters as numbers from 0-127*
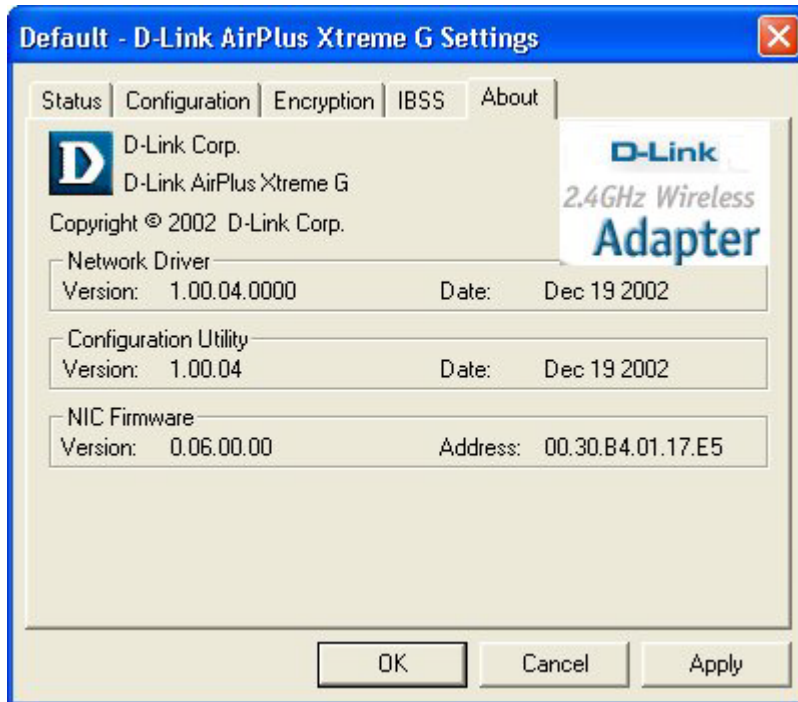
Configuration Utility
IBSS

IBSS Channel Selection However, the DWL-G650 will automatically select the channel to match the channel setting for the selected Access Point. In Ad Hoc mode, the channel must be manually set to the same channel for each wireless adapter.

Configuration Utility

About

The **ABOUT** screen gives you information about the F**irmware** and **Utility Versions** of the DWL-G650.

Networking Basics

Using the Network Setup Wizard in Windows XP

In this section you will learn how to establish a network at home or work, using **Microsoft Windows XP.**

Note: Please refer to websites such as http://www.homenethelp.com and http://www.microsoft.com/windows2000 for information about networking computers using Windows 2000, ME or 98SE.

Go to **Start>Control Panel>Network Connections**
Select **Set up a home or small office network**
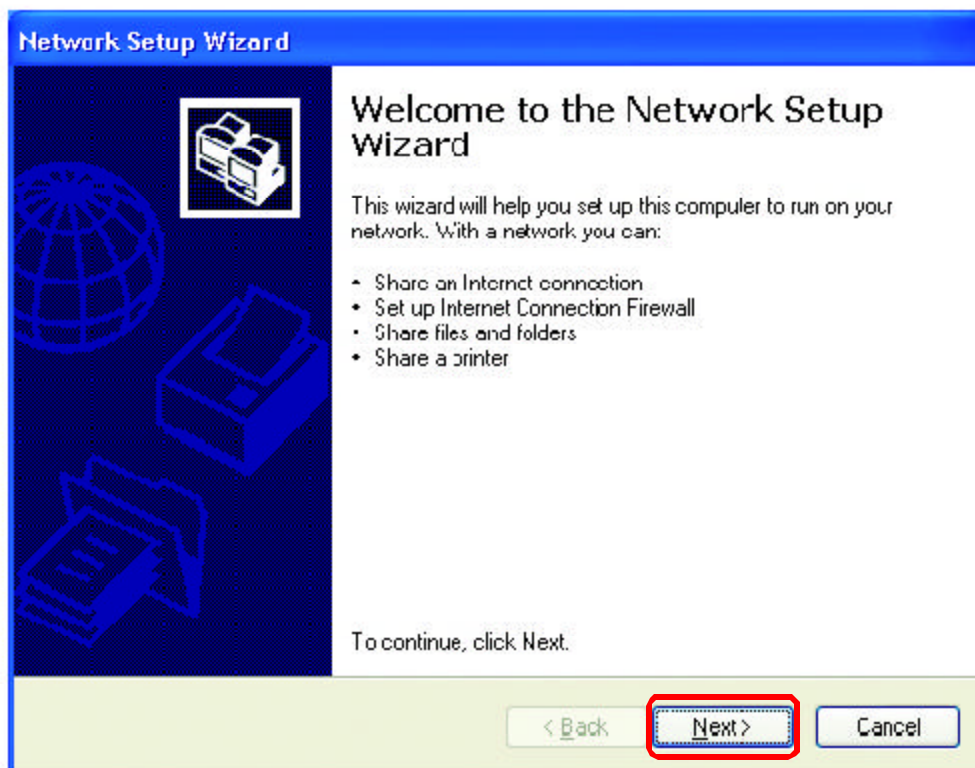
When this screen appears, click **Next.**