

# LINKSYS®

A Division of Cisco Systems, Inc.



## 2.4GHz 802.11g Wireless-G

### PCI Adapter

### User Guide



Model No. **WMP54Gv4**



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## How to Use This User Guide

This User Guide has been designed to make understanding networking with the Wireless-G PCI Adapter easier than ever. Look for the following items when reading this User Guide:



This checkmark means there is a note of interest and is something you should pay special attention to while using the Wireless-G PCI Adapter.



This exclamation point means there is a caution or warning and is something that could damage your property or the Wireless-G PCI Adapter.



This question mark provides you with a reminder about something you might need to do while using the Wireless-G PCI Adapter.

In addition to these symbols, there are definitions for technical terms that are presented like this:

***word: definition.***

Also, each figure (diagram, screenshot, or other image) is provided with a figure number and description, like this:

**Figure 0-1: Sample Figure Description**

Figure numbers and descriptions can also be found in the “List of Figures” section in the “Table of Contents”.

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# Chapter 1: Introduction

## Welcome

Thank you for choosing the Wireless-G PCI Adapter. With this Adapter, your wireless networking experience will be faster and easier than ever.

Like all wireless products, the Adapter allows for greater range and mobility within your wireless network. This adapter communicates over the 54Mbps 802.11g wireless standard, which is almost five times faster than 802.11b. But since they share the same 2.4GHz radio band, the Adapter can also communicate with the widely used 11Mbps 802.11b standard.

PCs equipped with wireless cards and adapters can communicate without cumbersome cables. By sharing the same wireless settings, within their transmission radius, they form a wireless network.

The included Setup Wizard will walk you through configuring the adapter to your network's settings, step by step. Then just slide it into your computer's PCI Card slot and enjoy network access with the freedom of wireless.

Once you're connected, you can keep in touch with your e-mail, access the Internet, and share files and other resources such as printers and network storage with other computers on the network. At home, you can surf the web or use instant messaging to chat with friends while sitting out on the patio. Your wireless connection is protected by the new, industrial-strength security of Wireless Protected Access (WPA).

Get connected to current-standard 802.11b networks today, and be prepared for the future with the Wireless-G PCI Adapter from Linksys.

**network:** a series of computers or devices connected for the purpose of data sharing, storage, and/or transmission between users.

**adapter:** a device that adds network functionality to your PC.

**Mbps:** one million bits per second; a unit of measurement for data transmission

**802.11g** an IEEE wireless networking standard that specifies a maximum data transfer rate of 54Mbps, an operating frequency of 2.4GHz, and backward compatibility with 802.11b devices.

**802.11b:** an IEEE wireless networking standard that specifies a maximum data transfer rate of 11Mbps and an operating frequency of 2.4GHz

## What's in this Guide?

This user guide covers the steps for setting up and using the Wireless-G PCI Adapter.

- **Chapter 1: Introduction**  
This chapter describes the Adapter's applications and this User Guide.
- **Chapter 2: Planning Your Wireless Network**  
This chapter discusses a few of the basics about wireless networking.
- **Chapter 3: Getting to Know the Wireless-G PCI Adapter**  
This chapter describes the physical features of the Adapter.
- **Chapter 4: Software Installation and Configuration**  
This chapter instructs you on how to install the Adapter's Setup Wizard and Configure the Adapter
- **Chapter 5: Hardware Installation**  
This chapter shows you how to connect the Adapter to your PC.
- **Chapter 6: Using the Wireless Network Monitor**  
This chapter show you how to use the Adapter's Wireless Network Monitor.
- **Appendix A: Troubleshooting**  
This appendix describes some problems and solutions, as well as frequently asked questions, regarding installation and use of the Adapter.
- **Appendix B: Wireless Security**  
This appendix discusses security issues regarding wireless networking and measures you can take to help protect your wireless network.
- **Appendix C: Windows Help**  
This appendix describes how you can use Windows Help for instructions about networking, such as installing the TCP/IP protocol.
- **Appendix D: Glossary**  
This appendix gives a brief glossary of terms frequently used in networking.
- **Appendix E: Specifications**  
This appendix provides the Adapter's technical specifications.
- **Appendix F: Warranty Information**  
This appendix supplies the Adapter's warranty information.

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- **Appendix G: Regulatory Information**  
This appendix supplies the Adapter's regulatory information.
- **Appendix H: Contact Information**  
This appendix provides contact information for a variety of Linksys resources, including Technical Support.



# Chapter 2: Planning your Wireless Network

## Network Topology

A wireless network is a group of computers, each equipped with one wireless adapter. Computers in a wireless network must be configured to share the same radio channel. Several PCs equipped with wireless cards or adapters can communicate with one another to form an ad-hoc network.

Linksys wireless adapters also provide users access to a wired network when using an access point or wireless router. An integrated wireless and wired network is called an infrastructure network. Each wireless PC in an infrastructure network can talk to any computer in a wired network infrastructure via the access point or wireless router.

An infrastructure configuration extends the accessibility of a wireless PC to a wired network, and can double the effective wireless transmission range for two wireless adapter PCs. Since an access point is able to forward data within a network, the effective transmission range in an infrastructure network can be doubled.

## Roaming

Infrastructure mode also supports roaming capabilities for mobile users. Roaming means that you can move your wireless PC within your network and the access points will pick up the wireless PC's signal, providing that they both share the same channel and SSID.

Before enabling you consider roaming, choose a feasible radio channel and optimum access point position. Proper access point positioning combined with a clear radio signal will greatly enhance performance.

**topology:** the physical layout of a network.

**ad-hoc:** a group of wireless devices communicating directly with each other (peer-to-peer) without the use of an access point.

**access point:** a device that allows wireless-equipped computers and other devices to communicate with a wired network. Also used to expand the range of a wireless network

**infrastructure:** a wireless network that is bridged to a wired network via an access point.

**roaming:** the ability to take a wireless device from one access point's range to another without losing the connection.

**ssid:** your wireless network's name.

## Network Layout

Linksys wireless access points and wireless routers have been designed for use with 802.11a, 802.11b, and 802.11g products. With 802.11g products communicating with the 802.11b standard and some products incorporating both “a” and “g”, products using these standards can communicate with each other.

Access points and wireless routers are compatible with 802.11a, 802.11b and 802.11g adapters, such as the PC Cards for your laptop computers, PCI Card for your desktop PC, and USB Adapters for when you want to enjoy USB connectivity. Wireless products will also communicate with the wireless PrintServer.

When you wish to connect your wired network with your wireless network, network ports on access points and wireless routers can be connected to any of Linksys's switches or routers.

With these, and many other, Linksys products, your networking options are limitless. Go to the Linksys website at [www.linksys.com](http://www.linksys.com) for more information about wireless products.

**switch:** *a data switch that connects computing devices to host computers, allowing a large number of devices to share a limited number of ports*

**router:** *a networking device that connects multiple networks together*

# Chapter 3: Software Installation and Configuration for Windows 2000, 98 SE, and ME

The Wireless-G PCI Adapter Setup Wizard will guide you through the installation procedure. The Setup Wizard will install the Wireless Network Monitor and driver, as well as configure the Adapter.

1. Insert the Setup Wizard CD-ROM into your CD-ROM drive. The Setup Wizard should run automatically, and the Welcome screen should appear. If it does not, click the Start button and choose Run. In the field that appears, enter D:\setup.exe (if "D" is the letter of your CD-ROM drive).

Click the Install button to continue the installation process. Clicking User Guide opened this User Guide. To close the Setup Wizard, click the Exit button.



**IMPORTANT:** You must run the Setup Wizard to install the software before connecting the Adapter. If you are running Windows XP, connect the Adapter as shown in Chapter 4 and proceed to Chapter 5.



Figure 3-1: The Setup Wizard's Welcome Screen

**software:** Instructions for the computer. A series of instructions that performs a particular task is called a "program".

2. Read the License Agreement displayed on the following screen and click the Next button to continue the installation. If you click the Cancel button, you will end the installation.



Figure 3-2: The License Agreement Screen

3. The Wireless Mode screen will ask for some information about your wireless network. In the SSID field, enter your network's SSID (Service Set Identifier). The SSID is your network name and must be identical for all devices in the network. The default setting is linksys (all lowercase).

Next, choose a wireless mode. Click the Infrastructure Mode radio button if you want your wireless computers to network with computers on your wired network using an access point. Click the Ad-Hoc Mode radio button if you want multiple wireless computers to network directly with each other.

Click the Next button to continue, or click the Back button to return to the previous page.

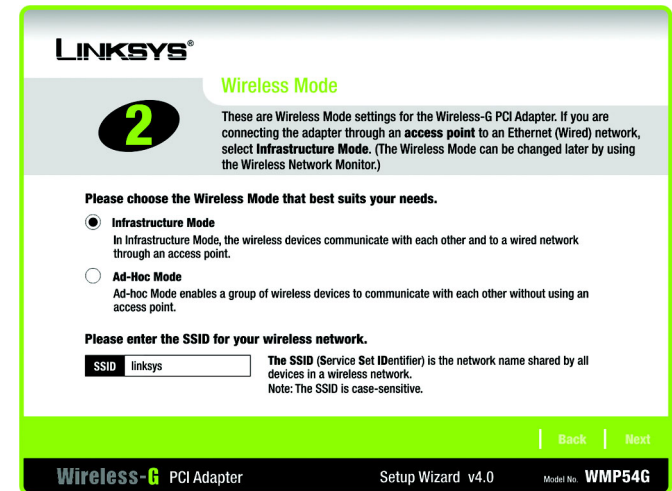


Figure 3-3: The Wireless Mode Screen

4. If you chose Infrastructure Mode, go to Step 5 now. If you chose Ad-Hoc Mode, select the correct operating channel for your network from the Channel drop-down menu. Then, select the Network Mode from the drop-down menu. Click the Next button, and go to Step 5. Click the Back button to change any settings.

**Channel** - The channel you choose should match the channel set on the other devices in your wireless network. If you are unsure about which channel to use, select the default channel (Channel 6).

**Network Mode** - Keep the default setting, Mixed, if you have Wireless-G and Wireless-B devices in your network. Select G-Only if you have only Wireless-G devices in your network.

5. The Wireless Security screen allows you to set the security level for your network. Enable or disable Wired Equivalent Privacy (WEP) encryption for your wireless network. If you enable WEP, enter a Passphrase or WEP key. Click the Next button to continue or the Back button to return to the previous screen.

**WEP** - If you do not want to use WEP encryption, choose Disabled. To use WEP encryption (recommended to increase network security), select 64-bit or 128-bit WEP from the drop-down menu, and enter either a Passphrase or WEP key.

**Passphrase** - Instead of manually entering WEP keys, you can enter a Passphrase, so that a WEP key is automatically generated. It is case-sensitive and should not be longer than 16 alphanumeric characters. This passphrase must match the passphrase of your wireless network and is compatible with other Linksys wireless products only. (If you have any non-Linksys wireless products, enter the WEP key(s) manually on those products.)

**WEP Key** - This WEP key must match the WEP key of your wireless network. If you are using 64-bit WEP encryption, then the key must consist of exactly ten hexadecimal characters. If you are using 128-bit WEP encryption, then the key must consist of exactly 26 hexadecimal characters. Valid hexadecimal characters are "0" to "9" and "A" to "F".

**TX Key** - This allows you to access different WEP keys used by different routers or access points in your network. Choose the TX Key used in that network. For instance, if the device uses TX Key 3, use TX Key 3. If you're not using multiple WEP Keys, leave this set at 1, the default setting.

**Authentication** - Select the Authentication method used by your network. Open Authentication does not employ WEP keys. Shared Authentication employs WEP encryption. Auto (the default setting) chooses the method of the network to which you're connecting.

Figure 3-4: The Ad-Hoc Mode Settings Screen

*bit: a binary digit*

Figure 3-5: The Wireless Security Screen

*encryption: encoding data transmitted in a network.*

- The Setup Wizard will ask you to review your settings before it starts to copy files. Click the Next button to save these settings, or click the Back button to change any settings.

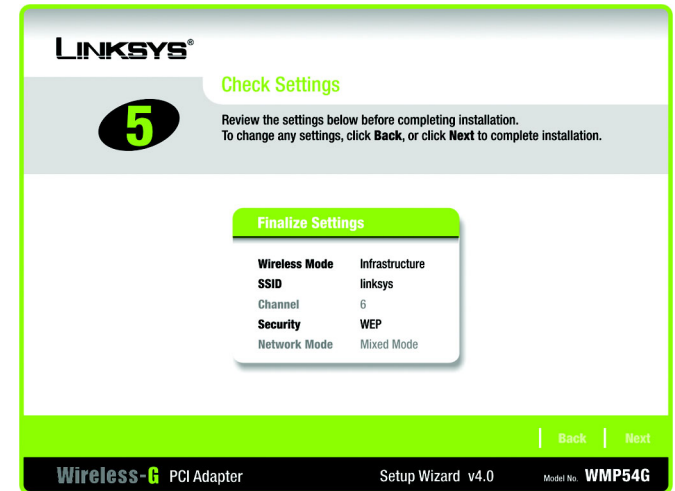


Figure 3-6: The Check Settings Screen

- At this point, a screen stating that a digital signature was not found may appear. This software has been tested and found to work properly with Windows 2000. Click the Yes button to continue installation.



Figure 3-7: The Windows Digital Signature Screen

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8. After the files have been successfully copied, the Congratulations screen will appear. Click the Exit button.

Now that the software installation is complete, proceed to Chapter 4: Connecting the Wireless-G PCI Adapter.



Figure 3-8: The Congratulations Screen

*software: instructions for the computer*

# Chapter 4: Connecting the PCI Adapter

1. Before connecting the PCI Adapter to your PC, turn off your desktop PC.
2. Open your PC case and locate an available PCI slot on the motherboard. Check with your computer manufacturer for instructions.
3. Slide the PCI Adapter into the PCI slot. Make sure that all of its pins are touching the slot's contacts. You may have to apply a bit of pressure to slide the adapter all the way in. After the adapter is firmly in place, secure its fastening tab to your PC's chassis with a mounting screw. Then, close your PC.



**IMPORTANT:** Windows 2000, 98 SE, and ME users must run the Setup Wizard to install the software before connecting the PCI Adapter.



**IMPORTANT:** Windows XP users must connect the PCI Adapter before installing the software, shown in Chapter 5.

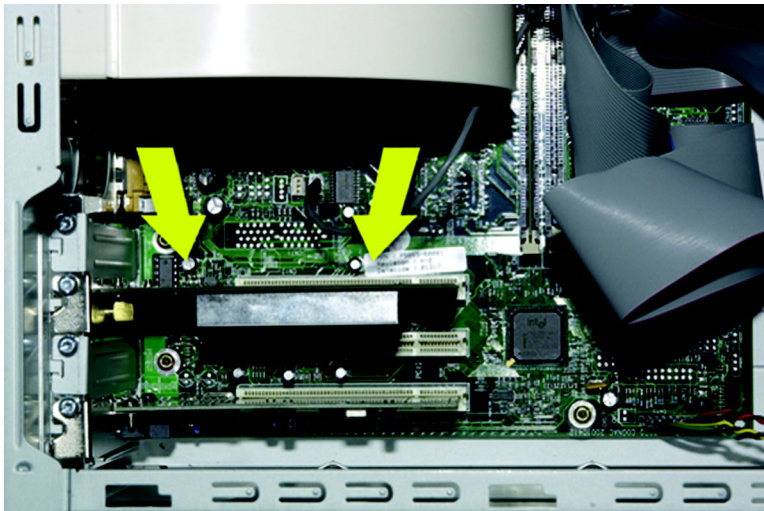


Figure 4-1: Your Computer's PCI slot with Adapter installed



4. Attach the external antenna to the adapter's antenna port.



Figure 4-2: Proper Positioning of the Antenna

**port:** the connection point on a computer or networking device used for plugging in a cable or an adapter.

5. Power on your desktop PC. Windows 2000 users may see a Windows Digital Signature screen, but can continue installation. Windows 98 SE users may be required to insert their Windows CD.

If your PC is running Windows XP, proceed to “Chapter 5: Driver Installation for Windows XP.”

If your PC is running Windows 2000, 98 SE, and ME, the installation of the Wireless-G PCI Adapter is complete. If you want to check the link information, search for available wireless networks, or make additional configuration changes, proceed to “Chapter 6: Using the Wireless Network Monitor.”

# Chapter 5: Driver Installation for Windows XP

After connecting the Adapter to your PC, as shown in Chapter 4, you'll need to install the driver.

Windows XP will automatically detect the Adapter. Insert the Setup CD-ROM into the CD-ROM drive. Click the radio button next to **Install the software automatically (Recommended)**. Then, click the Next button.



Figure 5-1: XP Setup Welcome Screen

The next screen shows that the Wizard is complete. Click the Finish button. The drivers are now installed.

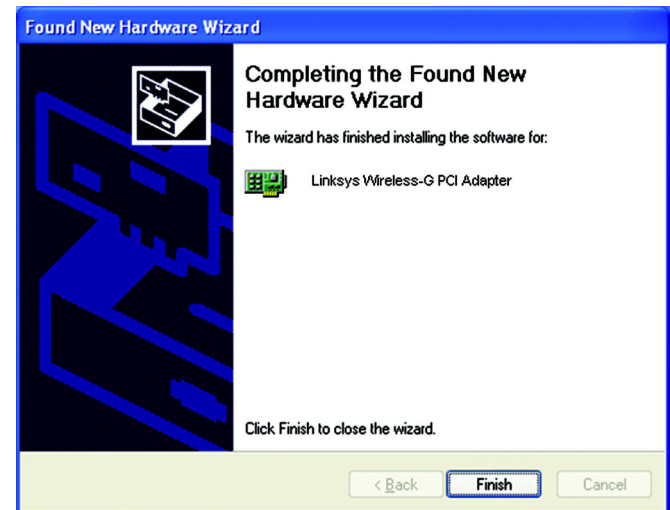


Figure 5-2: New Hardware Found screen

## Windows XP Wireless Zero Configuration

1. After installing the Adapter, the Windows XP Wireless Zero Configuration icon will appear in your computer's system tray. Double-click the icon.

2. The screen that appears will show any available wireless network. Select the network you want.

If this network has WEP encryption enabled, go to step 3.

If this network does not have WEP encryption enabled, you will be asked to select a network. Make sure the box next to Allow me to connect to the selected wireless network, even though it is not secure is checked. Then, click the Connect button, and go to step 4.



**NOTE:** Windows XP has a built-in configuration tool. Use Windows XP Wireless Zero Configuration (in the system tray at the bottom of your screen) to configure the Adapter.

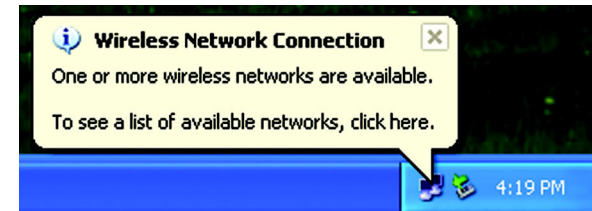


Figure 5-3: Windows XP Wireless Zero Configuration icon



**NOTE:** Steps 2 and 3 are the instructions and screenshots for Windows XP with Service Pack 1 installed. If you have not installed Service Pack 1, select the network you want, and click the Connect button. If the network has WEP encryption enabled, enter the WEP key in the Network key field, and then click the Connect button.

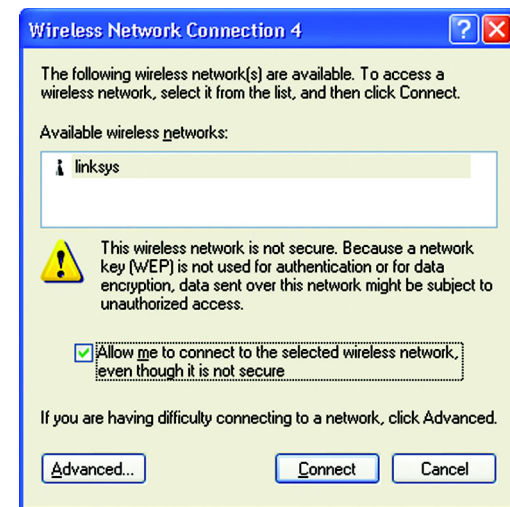


Figure 5-4: Network Connection - No WEP

3. If WEP is enabled, you will be asked to enter the network (WEP) key. Enter the WEP key of your wireless network in the Network key field, and re-enter it in the Confirm network key field. Then, click the Connect button, and proceed to step 4.

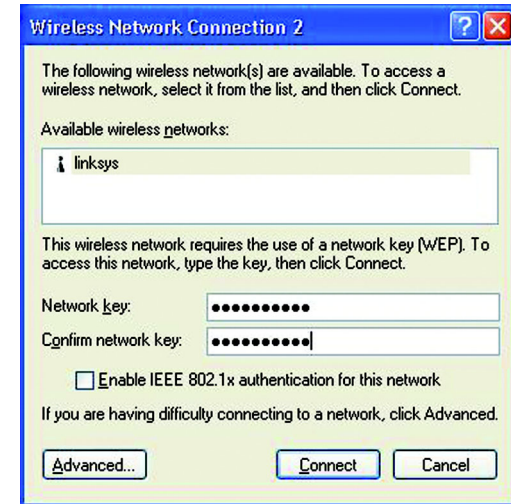


Figure 5-5: Network Connection - WEP



**NOTE:** Windows XP Wireless Zero Configuration does not support the use of a passphrase. Enter the exact WEP key used by your access point.

4. The Zero Configuration icon, showing a connection, will appear if your connection is active.



Figure 5-6: Optional Settings

For more information about wireless networking on a Windows XP computer, click the Start button, select Help, and choose Support. Enter the keyword wireless in the field provided, and press the Enter key.

**Congratulations!** The installation of the Wireless-G PCI Adapter is complete.

# Chapter 6: Using the Wireless Network Monitor

## Overview

Use the Wireless Network Monitor to check the link information, search for available wireless networks, or create profiles that hold different configuration settings.

## Accessing the Wireless Network Monitor

After installing the Adapter's Setup Wizard, the Wireless Network Monitor icon will appear in your system tray. Double-click the icon.

The *Link Information* tab will appear. From this tab, you can find out the strength of the current wireless signal as well as its quality. You can also click the **More Information** button to view additional status information about the current wireless connection. To search for available wireless networks, click the **Site Survey** tab. To perform configuration changes, click the **Profiles** tab.

## The Link Information Tab

The *Link Information* tab displays the signal strength and link quality information about the current connection and provides a button to click for additional status information.

**Ad-Hoc Mode or Infrastructure Mode** - The screen indicates whether the Adapter is currently working in ad-hoc or infrastructure mode.

**Signal Strength** - The Signal Strength bar indicates the signal strength.

**Link Quality** - The Link Quality bar indicates the quality of the wireless network connection.

Click the **More Information** button to view more information about the wireless network connection.

Click the **X (Close)** button in the upper right corner to exit the Wireless Network Monitor.

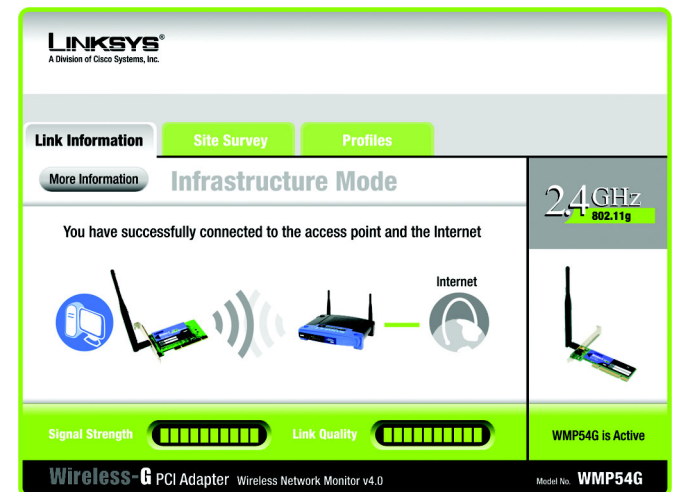


Figure 6-1: The Link Information Tab

Clicking the More Information button displays much more information about the Adapter's connection, as shown below:

### Wireless Network Status

**Status** - This shows the status of the wireless network connection.

**SSID** - This is the unique name of the wireless network.

**Wireless Mode** - The mode of the wireless network currently in use is displayed here.

**Transfer Rate** - The data transfer rate of the current connection is shown here.

**Channel** - This is the channel to which the wireless network devices are set.

**Security** - The status of the wireless security feature is shown here.

**Authentication** - This is your wireless network's authentication method.

**IP Address** - This shows the Adapter's IP Address.

**Subnet Mask** - This shows the Adapter's Subnet Mask.

**Default Gateway** - This is the Adapter's Default Gateway address.

**DNS** - The DNS address of the Adapter is displayed here.

**DHCP Client** - This displays the status of the DHCP client.

**MAC** - This is the MAC Address of the Access Point, Wireless Router, or other device with which the Adapter is currently communicating.

**Signal Strength** - The Signal Strength bar indicates the signal strength.

**Link Quality** - The Link Quality bar indicates the quality of the wireless network connection.

Click the Statistic button for more information about your wireless connection. Click the Back button to return to the initial *Link Information* tab. Clicking the Save to Profile button save the currently active connection to a profile. Click the X (Close) button in the upper right corner to exit the Wireless Network Monitor.

Clicking the Statistics button brings up the following information on your wireless connection:

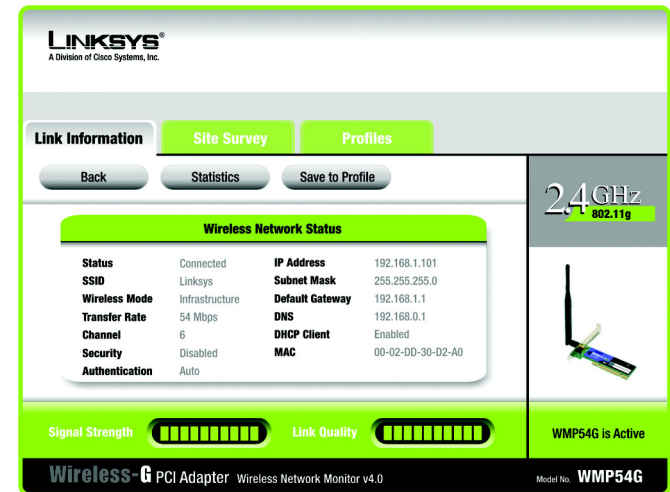


Figure 6-2: The Link Information Tab - More Information

**TCP/IP:** a set of instructions PCs use to communicate over a network.

**IP address:** the address used to identify a computer or device on a network

**subnet mask:** an address code that determines the size of a network

**default gateway:** a device that forwards Internet traffic from your local area network

**DNS:** the IP address of your ISP's server, which translates the names of websites into IP addresses.

**DHCP:** a protocol that lets one device on a local network, known as a DHCP server, assign temporary IP addresses to the other network devices, typically computers.

**Transmit Rate** - This shows the speed, in megabits per second, at which data is transmitted from the Adapter.

**Receive Rate** - This shows the speed, in megabits per second, at which data is received by the Adapter.

**Packets Received** - This shows the packets received by the Adapter, in real time, since connecting to the Wireless Network or since the *Refresh* button was last pressed.

**Packets Transmitted** - This shows the packets transmitted from the Adapter, in real time, since connecting to the Wireless Network or since the *Refresh* button was last pressed.

**Bytes Received** - This shows the bytes received by the Adapter, in real time, since connecting to the Wireless Network or since the *Refresh* button was last pressed.

**Bytes Transmitted** - This shows the bytes transmitted from the Adapter, in real time, since connecting to the Wireless Network or since the *Refresh* button was last pressed.

**Noise Level** - This shows the level of background noise affecting the wireless signal. A lower reading translates into a higher quality signal.

**Signal Strength** - This is the intensity of the wireless signal received by the card.

**Up Time** - This shows the period of the most recent connection to a wireless network.

**Total Up Time** - This shows the cumulative total of connection time with the Adapter.

**Driver Version** - This shows the version of the Adapter's driver.

**Signal Strength** - The Signal Strength bar indicates the signal strength.

**Link Quality** - The Link Quality bar indicates the quality of the wireless network connection.

Click the **Back** button to return to the initial *Link Information* tab. Click the **Status** button to return to the first screen of information about your wireless connection. Clicking the **Save to Profile** button save the currently active connection to a profile. Click the **X (Close)** button in the upper right corner to exit the Wireless Network Monitor.

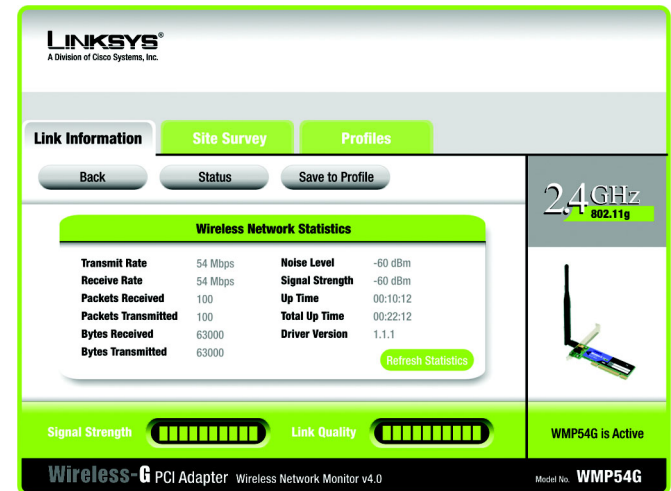


Figure 6-3: The Link Information Tab - Statistics

**packet:** a unit of data sent over a network

**byte:** a unit of data that is usually eight bits long