LINKSYS®

A Division of Cisco Systems, Inc.

2.4GHz 802.11g

Wireless-G

WIRELESS

PCI Adapter with SpeedBooster

User Guide

Model No. **WMP54GS ver. 1.1**

CISCO SYSTEMS

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WARNING: This product contains chemicals, including lead, known to the State of California to cause cancer, and birth defects or other reproductive harm. ***Wash hands after handling.***

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: Windows XP Wireless Zero Configuration
  This chapter instructs you on how to install Window XP Wireless Zero Configuration

- Appendix C: Wireless Security
  This appendix discusses security issues regarding wireless networking and measures you can take to help protect your wireless network.

- Appendix D: Windows Help
  This appendix describes how you can use Windows Help for instructions about networking, such as installing the TCP/IP protocol.

- Appendix E: Glossary
  This appendix gives a brief glossary of terms frequently used in networking.

- Appendix F: Specifications
  This appendix provides the Adapter's technical specifications.

- Appendix G: Warranty Information
  This appendix supplies the Adapter's warranty information.

- Appendix H: Regulatory Information
  This appendix supplies the Adapter's regulatory information.

- Appendix I: 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 at 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 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

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.

IMPORTANT: You must run the Setup Wizard to install the software before connecting 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.

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

software: *Instructions for the computer.*

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 wireless 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 to connect to a wireless router or access point. Click the **Ad-Hoc Mode** radio button if you want to connect to another wireless device directly without using a wireless router or access point.

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

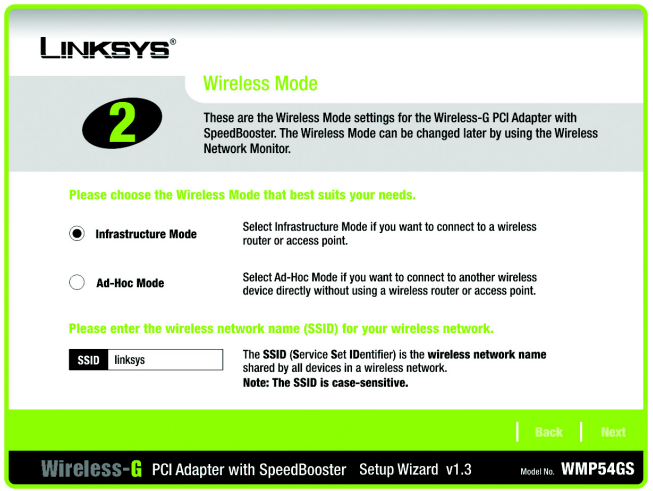

Figure 3-3: The Wireless Mode Screen

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, leave the default channel.

   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.

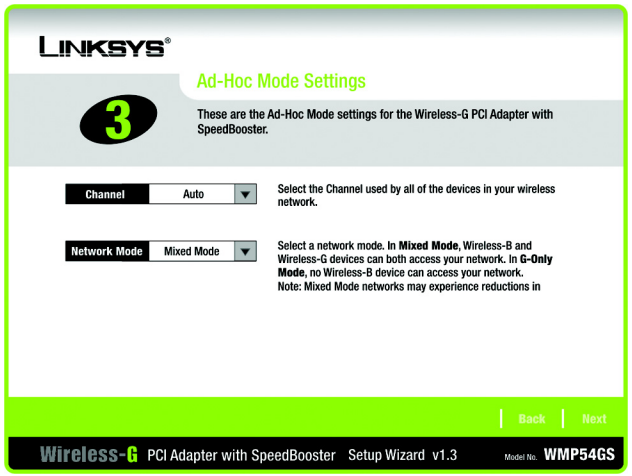

Figure 3-4: The Ad-Hoc Mode Settings Screen

5. Select the method of security that is used on your wireless network: **WEP**, **WPA-Personal**, **WPA2-Personal**, **WPA-Enterprise**, or **RADIUS**. WEP stands for Wired Equivalent Privacy, and WPA stands for Wi-Fi Protected Access. WPA is a stronger security method than WEP. WPA2 is a newer and stronger version of WPA. RADIUS stands for Remote Authentication Dial-In User Service. WPA-Enterprise and RADIUS use a RADIUS server. Click the **Next** button to continue or the **Back** button to return to the previous screen. For more information about the information on this screen, you can also click the **Help** button.

   If you don't want to use encryption, select **Disabled** and then click the **Next** button. Proceed to Step 8.

6. Proceed to the appropriate section for your security method: WEP, WPA-Personal, WPA2-Personal, WPA-Enterprise, or RADIUS.

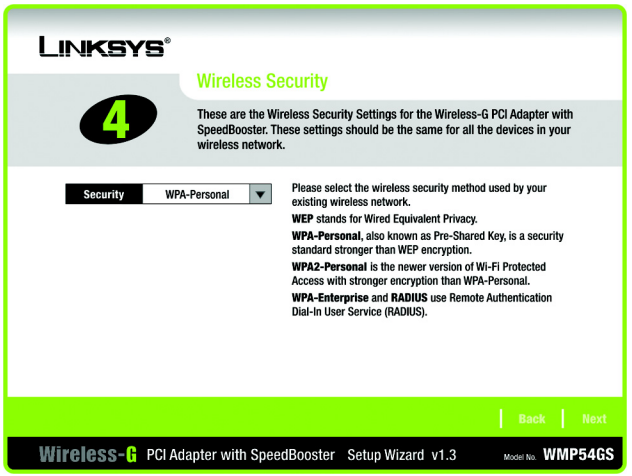

Figure 3-5: The Wireless Security Screen

WEP

WEP - Select **64-bit** or **128-bit** encryption from the drop-down menu.

Then enter a passphrase or WEP key.

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

WEP Key - The WEP key you enter must match the WEP key of your wireless network. For 64-bit encryption, enter exactly 10 hexadecimal characters. For 128-bit encryption, enter exactly 26 hexadecimal characters. Valid hexadecimal characters are "0" to "9" and "A" to "F".

For Advanced Users

TX Key - The default transmit key number is 1. If your network's access point or wireless router uses transmit key number 2, 3, or 4, select the appropriate number from the *TX Key* drop-down box.

Authentication -The default is set to **Auto**, so it will auto-detect for Shared Key or Open System authentication. For Shared Key authentication, both the sender and the recipient share a WEP key for authentication. For Open System authentication, the sender and the recipient do not share a WEP key for authentication. If you are not sure which authentication method to select, keep the default, **Auto**.

Click the **Next** button to continue or the **Back** button to return to the previous screen.

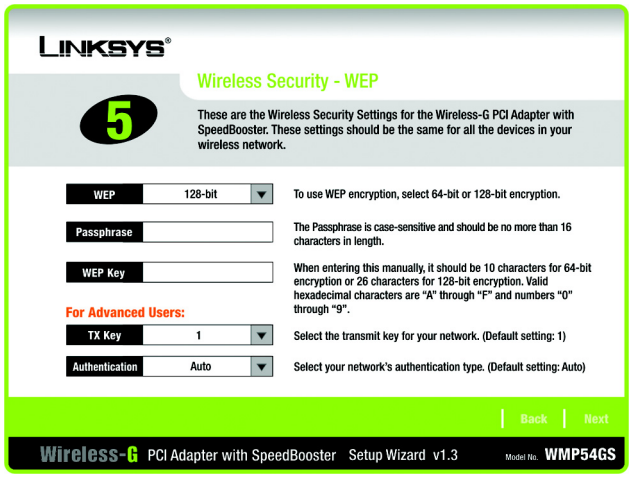

Figure 3-6: Wireless Security - WEP

wep *(wired equivalent privacy): a method of encrypting network data transmitted on a wireless network for greater security.*

encryption: *encoding data transmitted in a network.*

bit: *a binary digit*

WPA Personal

WPA Personal offers two encryption methods, TKIP and AES, with dynamic encryption keys. Select **TKIP** or **AES** for encryption. Then enter a Passphrase that is 8-63 characters in length.

Encryption - Select the type of algorithm you want to use, **TKIP** or **AES**, from the *Encryption* drop-down menu.

Passphrase - Enter a Passphrase, also called a pre-shared key, of 8-63 characters in the *Passphrase* field. The longer and more complex your Passphrase is, the more secure your network will be.

Click the **Next** button to continue or the **Back** button to return to the previous screen.

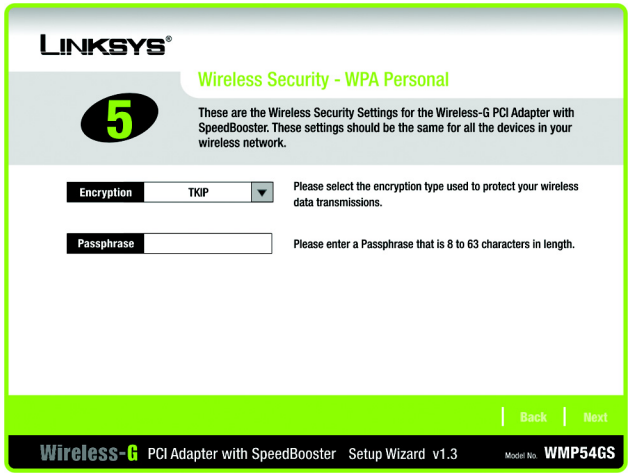

Figure 3-7: Wireless Security - WPA Personal

WPA2 Personal

wpa *(wi-fi protected access: a wireless security protocol using TKIP (Temporal Key Integrity Protocol) encryption, which can be used in conjunction with a RADIUS server.*

Passphrase - Enter a Passphrase, also called a pre-shared key, of 8-63 characters in the *Passphrase* field. The longer and more complex your Passphrase is, the more secure your network will be.

Click the **Next** button to continue or the **Back** button to return to the previous screen.

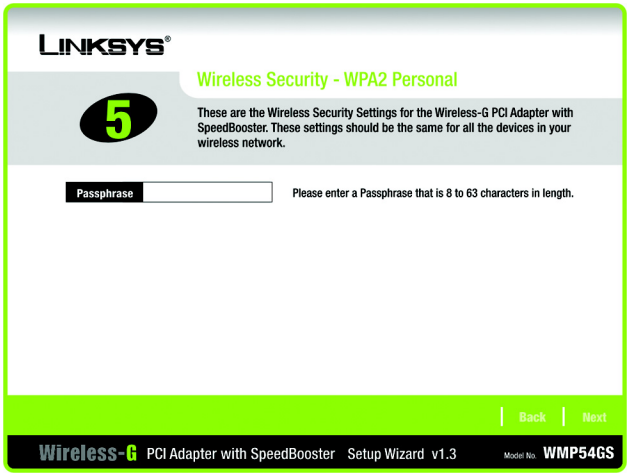

Figure 3-8: Wireless Security - WPA2 Personal

WPA Enterprise

WPA Enterprise features WPA security used in coordination with a RADIUS server. (This should only be used when a RADIUS server is connected to the Router.) WPA Enterprise offers two authentication methods, EAP-TLS and PEAP, as well as two encryption methods, TKIP and AES, with dynamic encryption keys.

Authentication - Select the authentication method your network is using, **EAP-TLS** or **PEAP**.

EAP-TLS

If you selected EAP-TLS, enter the login name of your wireless network in the *Login Name* field. Enter the name of the authentication server in the *Server Name* field (this is optional). From the *Certificate* drop-down menu, select the certificate you have installed to authenticate you on your wireless network. Select the type of encryption, **TKIP** or **AES**, from the *Encryption* drop-down menu.

Click the **Next** button to continue or the **Back** button to return to the previous screen.

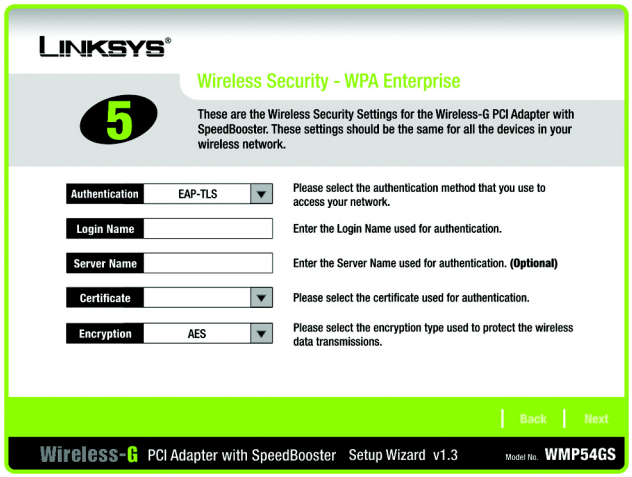

Figure 3-9: Wireless Security - WPA Enterprise - EAP-TLS

PEAP

If you selected PEAP, enter the login name of your wireless network in the *Login Name* field. Enter the password of your wireless network in the *Password* field. Enter the name of the authentication server in the *Server Name* field (this is optional). From the *Certificate* drop-down menu, select the certificate you have installed to authenticate you on your wireless network; if you want to use any certificate, keep the default setting, **Trust Any**. Then select the authentication method used inside the PEAP tunnel, **EAP-MSCHAP v2** or **Generic Token Card**. Select the type of encryption, **TKIP** or **AES**, from the *Encryption* drop-down menu.

Click the **Next** button to continue or the **Back** button to return to the previous screen

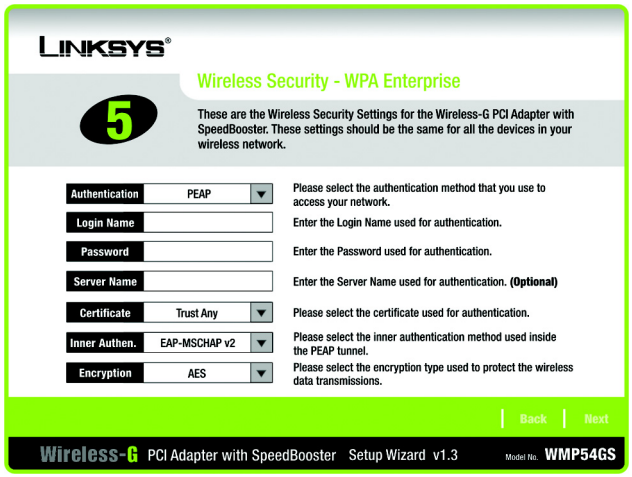

Figure 3-10: Wireless Security - WPA Enterprise - PEAP

RADIUS

RADIUS features use of a RADIUS server. (This should only be used when a RADIUS server is connected to the Router.) RADIUS offers two authentication types: EAP-TLS and PEAP.

Authentication - Select the authentication method your network is using, **EAP-TLS** or **PEAP**.

EAP-TLS

If you selected EAP-TLS, enter the login name of your wireless network in the *Login Name* field. Enter the name of the authentication server in the *Server Name* field (this is optional). From the *Certificate* drop-down menu, select the certificate you have installed to authenticate you on your wireless network.

Click the **Next** button to continue or the **Back** button to return to the previous screen.

Figure 3-11: Wireless Security - RADIUS - EAP-TLS

radius *(remote authentication dial-in user service): a protocol that uses an authentication server to control network access.*

PEAP

If you selected PEAP, enter the login name of your wireless network in the *Login Name* field. Enter the password of your wireless network in the *Password* field. Enter the name of the authentication server in the *Server Name* field (this is optional). From the *Certificate* drop-down menu, select the certificate you have installed to authenticate you on your wireless network; if you want to use any certificate, keep the default setting, **Trust Any**. Then select the authentication method used inside the PEAP tunnel, **EAP-MSCHAP v2** or **Generic Token Card**.

Click the **Next** button to continue or the **Back** button to return to the previous screen.

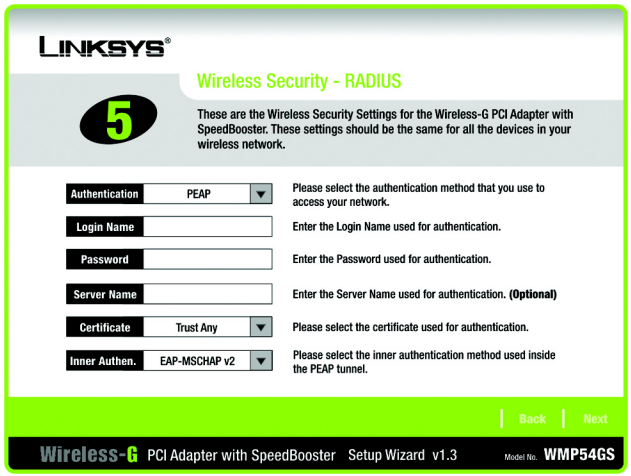

Figure 3-12: Wireless Security - RADIUS - PEAP