

Instant Wireless™ Series

Wireless PC Card



Use this Guide to install:

WPC54A

User Guide

LINKSYS®

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FCC STATEMENT

This product has been tested and complies with the specifications 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 installation. The antenna used for this transmitter must be installed to provide a separation distance of at least 20 centimeters from all persons and must operate in conjunction with other antenna or transmitters. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used according to 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 is found by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment or devices
- Connect the equipment to an outlet other than the receiver's
- Consult a dealer or an experienced radio/TV technician for assistance

UG-WPC54A-032802NC BW

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Chapter 1: Introduction

The Wireless PC Card

Put the “mobile” back into mobile computing! Whether you’re at your desk or in the boardroom, the Wireless PC Card allows you to share printers, files, and other resources anywhere within your LAN infrastructure, increasing your productivity and keeping you “in touch.”

The Wireless PC Card now has a new, higher-powered antenna that provides a greater range than ever. The increased sensitivity helps filter out interference and “noise” to keep your signal clear. Improved error correction in the chipset keeps you operating at higher transmission rates for longer distances. And, since you only need one Type II or III PCMCIA CardBus slot, you’re free to use your other slots for additional accessories.

Ready to run in Type II or III PCMCIA CardBus -equipped notebook PCs running Windows 98SE, Me, 2000, and XP, the Wireless PC Card is truly a “must-have” for all notebook PC users.

Features

- Up to 72Mbps Turbo Mode (with Linksys WAP54A only)
- Compatible with Virtually All Major Network Operating Systems
- Plug-and-Play Operation Provides Easy Setup
- Sturdy Metal Design with Integrated Antenna
- Works with Virtually All Standard Internet Applications
- Interoperable with 802.11a Network Equipment
- Capable of up to 152-Bit WEP Security
- Free Technical Support—24 Hours a Day, 7 Days a Week, Toll-Free US Calls
- 1-Year Limited Warranty



Figure 1-1

Package Contents

- One Wireless PC Card (IEEE 802.11a)
- One Setup Utility CD-ROM with User Guide
- One Quick Installation Guide
- One Registration Card

System Requirements

- Pentium-Class 200MHz or Faster Processor
- 64MB RAM Recommended
- One Available Type II or Type III PCMCIA CardBus Slot
- One CD-ROM Drive
- Windows 98SE, 2000, Me, or XP
- 5 Mb of free disk space for utility and driver installation

Chapter 2: Planning Your Wireless Network

Network Topology

A wireless LAN is exactly like a regular LAN, except that each computer in the LAN uses a Wireless PC Card to connect to the network through a wireless connection. Computers in a wireless LAN must be configured to share the same radio channel.

The Wireless PC Card provides LAN access for wireless workstations. An integrated wireless and wired LAN is called an Infrastructure configuration. A group of Wireless PC Card users and an Access Point compose a Basic Service Set (BSS). Each PC equipped with a Wireless PC Card in a BSS can talk to any computer in a wired LAN infrastructure via the Access Point.

An infrastructure configuration extends the accessibility of a Wireless PC Card PC to a wired LAN, and doubles the effective wireless transmission range for two PCs equipped with a Wireless PC Card. Since the Access Point is able to forward data within its BSS, the effective transmission range in an infrastructure LAN is doubled.

Roaming

Infrastructure mode also supports roaming capabilities for mobile users. More than one BSS can be configured as an Extended Service Set (ESS). This continuous network allows users to roam freely within an ESS. All PCs that are equipped with an Wireless PC Card, and are within one ESS, must be configured with the same ESS ID.

Before enabling an ESS with roaming capability, it is recommended to select a feasible radio channel and optimum Access Point position. Proper Access Point positioning combined with a clear radio signal will greatly enhance performance.

Chapter 3: Installation of the Drivers and WLAN Monitor for Windows 98SE, Me, and 2000

Before You Start



Important for Windows XP users: Do **NOT** run the Wireless Network Adapter Setup Wizard. Proceed directly to Chapter 4: Installation of the Wireless PC Card.



Note to Windows 98SE, Me, and 2000 users: You must install this software before installation of the hardware.

This Wireless PC Card Setup Wizard will guide you through the Installation Procedures for Windows 98SE, Me, and 2000.

Running the Automatic Driver Installation

1. Insert the **Setup Wizard CD** into your CD-ROM Drive. The Setup Wizard should run automatically and Figure 3-1 should appear. If it does not, click the **Start** button and choose **Run**. In the box that appears, enter **D:\setup.exe** (where “D” is the letter of your CD-ROM drive).

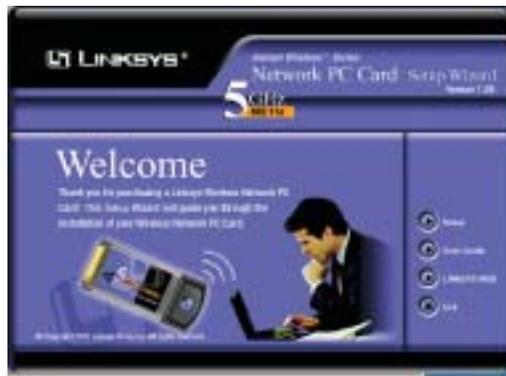


Figure 3-1

- The **Setup** button begins the software installation process, as shown on the next page.
- The **User Guide** button shows you a PDF file of the User Guide.
- The **LINKSYS WEB** button links you to the Linksys website.
- The **Exit** button allows you to exit the Setup Wizard.

Wireless PC Card



Note: If you stop the installation before it has finished, you will have to run the complete installation again before installation of your hardware.



Note: If you need to abort or terminate the installation, press the **Cancel** button at any time during the installation. Otherwise the installation will continue automatically.

1. To install your Wireless PC Card, click on the **Setup** button.
2. After you see Figure 3-2, click the **Next** button to continue.

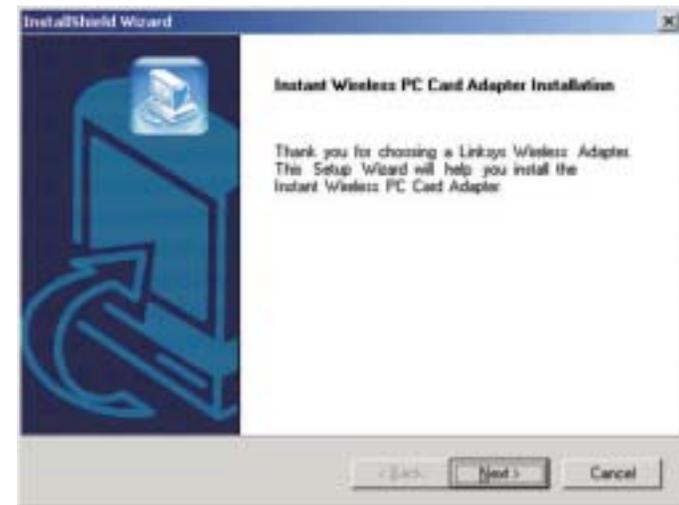


Figure 3-2

3. Figure 3-3 shows the **License Agreement** screen. Read the entire agreement by pressing the **Page Down** button on your keyboard or by using the on-screen scroll bar. Click on the **Yes** button if you agree and want to continue the installation, or **No** to terminate the installation.



Figure 3-3

4. The InstallShield Wizard will automatically choose the folder where Setup Wizard will install the files. Click the **Next** button.

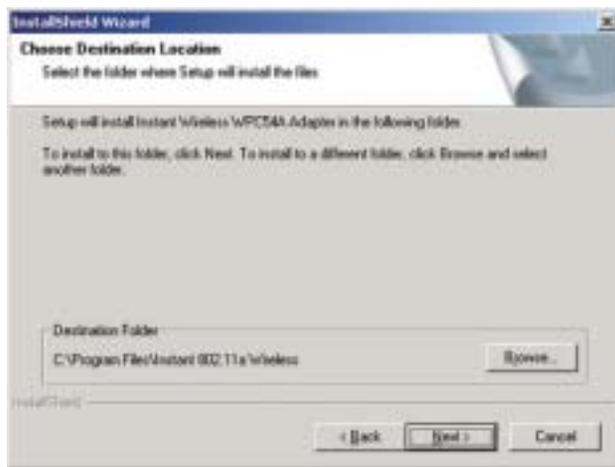


Figure 3-4

5. When the screen shown in Figure 3-5 appears, the InstallShield Wizard will ask you to choose a wireless mode. Choose the mode that applies to your network. **Ad-Hoc Mode** is used for simple peer-to-peer networking or the sharing of local resources between wireless Networked PCs, and **Infrastructure Mode** allows a wireless network to be integrated into an existing, wired network through an access point, permitting roaming between access points while maintaining a connection to all network resources. If you are unsure whether to choose Infrastructure or Ad-Hoc, refer to the next section for more information. After you make your choice, click the **Next** button.



Figure 3-5

Ad-Hoc versus Infrastructure Mode

Unlike wired networks, wireless networks have two different modes in which they may be set up: **Infrastructure** and **Ad-Hoc**. Choosing between these two modes depends on whether or not the wireless network needs to share data or peripherals with a wired network or not.

If the computers on the wireless network need to be accessible by a wired network or need to share a peripheral, such as a printer, with the wired network computers, the wireless network should be set up in the **Infrastructure** mode. The basis of Infrastructure mode centers around an **access point**, which serves as the main point of communications in a wireless network (see Figure 3-6). Access points transmit data to PCs that are equipped with wireless network cards, which can roam within a certain radial range of the access point. Multiple access points can be arranged to work in succession to extend the roaming range, and can be set up to communicate with your Ethernet hardware as well.



Figure 3-6

If the wireless network is relatively small and needs to share resources only with the other computers on the wireless network, then the **Ad-Hoc** mode can be used (shown in Figure 3-7). Ad-Hoc mode allows computers that are equipped with Wireless PC Cards to communicate directly with each other and eliminate the need for an access point. The drawback of this mode is that wireless-equipped computers are not able to communicate with computers on a wired network. And, communication between the wireless-equipped computers is limited by the distance and interference directly between them.



Figure 3-7

Wireless PC Card

- The Setup Wizard will automatically select a channel for your use in the Ad-Hoc Mode at this time. If you want to specify a channel, after you install the Wireless PC Card, refer to “Chapter 7: Configuration of the Wireless PC Card, “and use the WLAN Monitor.
- Enter in the name of your SSID (Service Set Identifier) for your Ad-Hoc or Infrastructure setting. The SSID must be identical for all points in the network. The SSID may be up to 32 characters in length, may include any character on the keyboard, but is case sensitive. If you are unsure, use the default value of “linksys.” Click the **Next** button. (See Figure 3-8.)



Figure 3-8

8. The screen shown in Figure 3-9 will appear next. The Wizard will ask you to review your settings before starting to copy files. Select **Back** to review or change any settings, or select **Next** if you are satisfied with your settings. Click the **Cancel** button if you need to stop the installation.

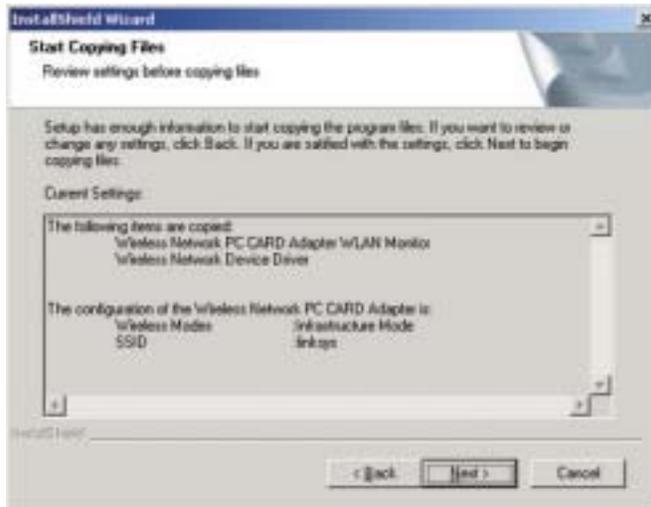


Figure 3-9

9. The next screen is Figure 3-10. The InstallShield Wizard will begin copying the files. The bar in the middle of the screen below shows the percentage of the files that are copied.

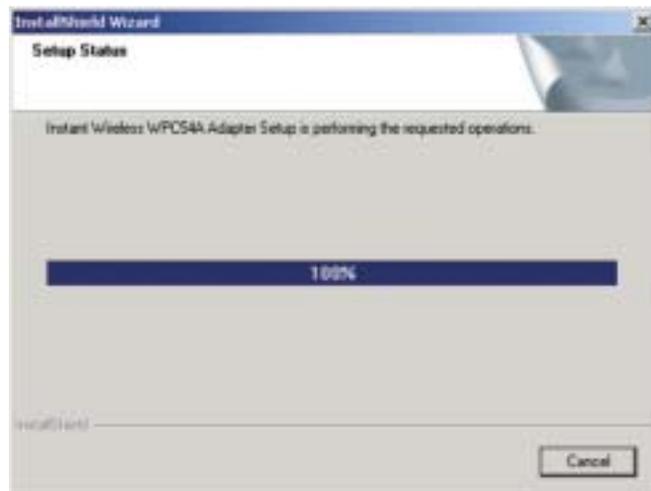


Figure 3-10

10. The screen in Figure 3-11 may appear. Click on the **Yes** button if you want to continue the installation. Click on the **No** button if you want to cancel the installation.



Figure 3-11

11. After the Wireless PC Card Setup Wizard is successfully installed, the screen in Figure 3-12 will appear.



Figure 3-12

You have now completed the installation of your Wireless PC Card Setup Wizard. To Install the Wireless PC Card, please go to Chapter 4: Installation of the Wireless PC Card.

Chapter 4: Installation of the Wireless PC Card



Important for Windows 98SE, Me, and 2000 users: You must install the Adapter's software before installation of the hardware.



Important for Windows XP users: You must install the Adapter's hardware before installation of the software.

1. Locate an available Type II or Type III PCMCIA CardBus slot on your notebook computer.
2. With the Wireless PC Card's 68-pin connector facing the PCMCIA CardBus slot and the "Wireless PC Card" label facing up, as shown in Figure 5-1, slide the Wireless PC Card completely into the PCMCIA CardBus slot while the computer is restarting and before the Windows desktop appears.



Figure 4-1

3. You may see several screens appear as the driver installation is finalized. One may say that a digital signature has not been found. This is normal. No input should be necessary, and the screens should disappear when the card is ready for use. Click **Yes** to continue. Click **Finish** to complete the installation.

The Hardware Installation is complete. Your Wireless PC Card is set up and ready for use. If using Windows XP, continue to Chapter 5, otherwise, continue reading to learn about the card's WLAN Monitor in Chapter 7.

Chapter 5: Installation of the Drivers and Configuration of the Wireless PC Card for Windows XP

After installing the Wireless PC Card into your computer, you will install the network driver.

1. Windows XP will automatically detect the presence of the Wireless PC Card in your computer. Insert the **Setup Wizard CD** into your CD-ROM Drive. Click the radio button next to **Install from a list or specific location (Advanced)**. Then click the **Next** button to continue.



Figure 5-1

2. Click the radio button next to **Search for the best driver in these locations.** Select **Include this location in the search:**, and enter **D:\Drivers** in the **location** field (if “D” is the letter of your CD-ROM drive). Click the **Next** button.

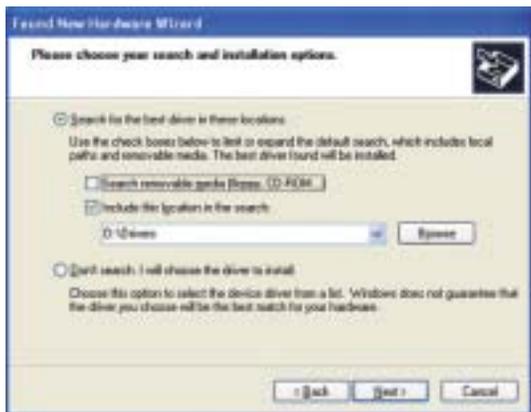


Figure 5-2

3. Windows will notify you that the driver has not passed Windows Logo testing. Since this product has been tested to work with Windows XP, click the **Continue Anyway** button.



Figure 5-3

4. Windows will tell you when it has finished installation of the new driver. Click the **Finish** button.

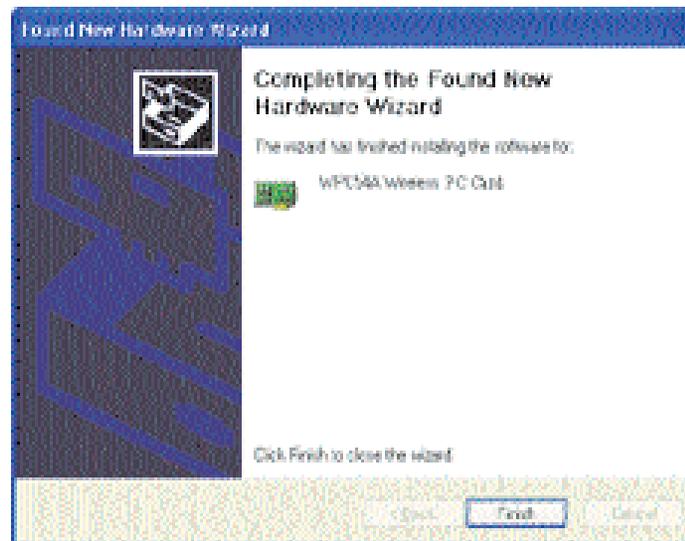


Figure 5-4

The Hardware Installation is complete.

Windows XP Wireless Zero Configuration

 **Important for Windows XP users:** Windows XP has built-in configuration tools. Use the Windows XP Wireless Zero Configuration, (in the system tray at the bottom of your screen) to configure the Adapter.

1. After installation of the Wireless PC Card, the Windows XP Wireless Zero Configuration icon will appear on your system tray. See Figure 5-5. Double-click the **icon** of the two monitors and Figure 5-6 will appear.



Figure 5-5

2. The screen that appears will show any available Network. Select a **Network**, then click on the **Connect** button.



Figure 5-6

3. If your Access Point has enabled WEP encryption, the screen in Figure 5-7 will appear. Enter the **WEP key** in the Network Key. Click the **Connect** button.

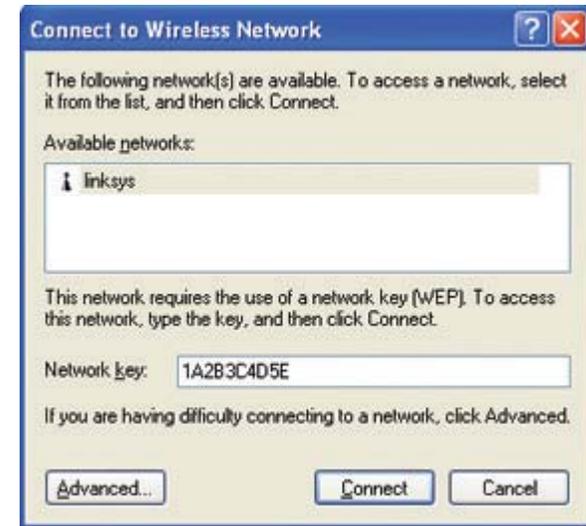


Figure 5-7

In order to find out the WEP encryption set by other wireless products in your network, such as the WAP54A, run the the setup tab from the web browser to check the WEP encryption tab for the correct key entries. If you are using other access points, please check their user guides for more information on WEP encryption configuration.

4. The screen in Figure 5-8 will appear next if your connection is successful.



Figure 5-8

For more information about WEP, refer to the Router's User Guide or the KnowledgeBase on the Linksys Website.

For further information on Wireless Networking with Windows XP, search the Windows XP Search Engine using the keyword: "wireless."

Chapter 6: Installation of Network Protocols

Protocols are necessary for computers to be recognized on your network. Windows 2000 and XP users need to check their Windows User Guides for protocol installation.

Installation of the Network Protocols for Windows 98SE and Me

1. From the **Start** Menu, select **Settings** and bring up the **Control Panel**. From the Control Panel, double-click on the **Network** icon. (See Figure 6-1.)

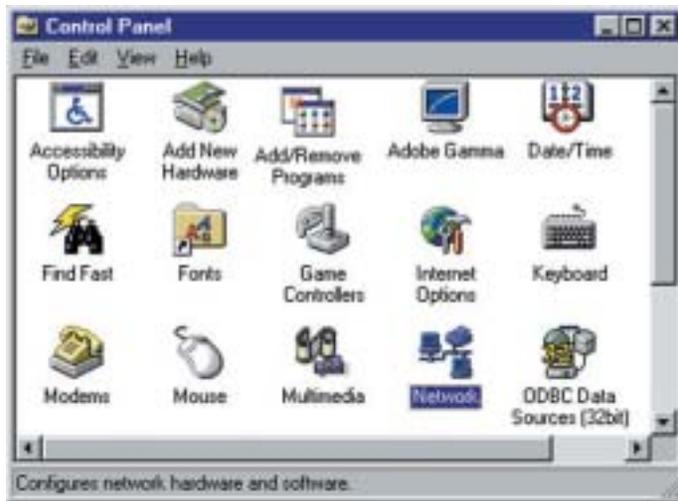


Figure 6-1



Note: Before adding any network protocols, verify that the protocol is not already installed. Never install duplicate protocols.

Wireless PC Card

2. From the Configuration tab, select the **WPC54A Wireless Network Adapter** from the list, and click the **Add** button.



Figure 6-2

3. Select **Protocol**, and click the **Add** button.

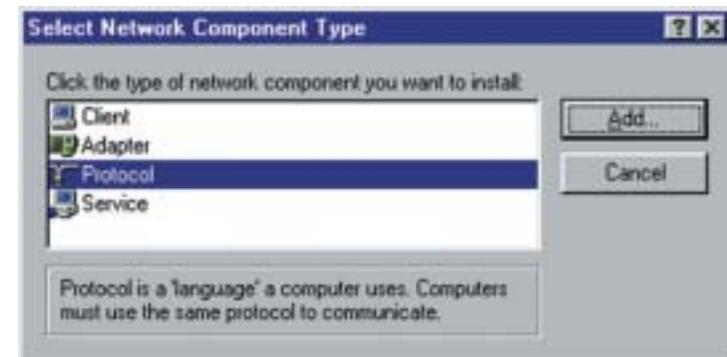


Figure 6-3

4. Select **Microsoft** from the list of “Manufacturers” and **TCP/IP** from the list of “Network Protocols.” Click the **OK** button to close the Network window.

Repeat steps 2 through 4 to install other protocols, such as NetBEUI or IPX/SPX.

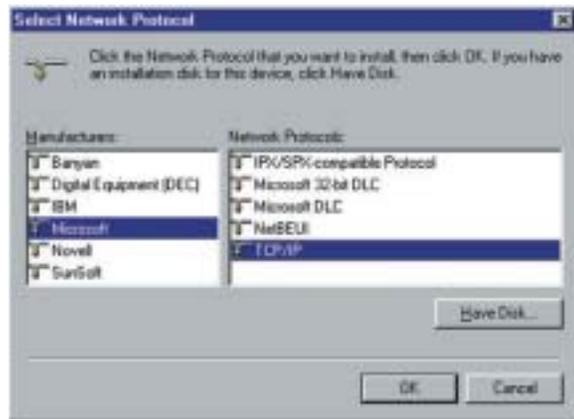


Figure 6-4

Windows may start copying some files or ask you for your Windows installation files at this time. Your Windows CD may be required. After the files are copied, Windows may ask you to restart. Click **Yes** to restart and complete the installation process.

Chapter 7: Configuration of the Wireless PC Card

After installation of the Wireless PC Card, Windows 98SE, Me, 2000, and XP will automatically identify the Wireless PC Card. Next, you may need to configure the Wireless PC Card’s driver software.

Using the WLAN Monitor



Important for Windows XP users: Windows XP has built-in configuration tools. Use the Windows XP Wireless Zero Configuration, (in the system tray at the bottom of your screen) to configure the Wireless PC Card. See Chapter 5: Installation of the Drivers and Configuration of the Wireless PC Card for Windows XP.

1. After installation of the Wireless PC Card, the **Wireless PC Card WLAN Monitor** icon will appear on your system tray. Double-click on the icon of the monitor in Figure 7-1, and Figure 7-2 will appear:



Figure 7-1



Figure 7-2

Figure 7-2 shows you the status of your current connection on the Link Status page. Click the **X (Close)** button in the upper right corner to **close** the WLAN Monitor or click the **Connections** button to continue.

2. The screen in Figure 7-3 shows you any available wireless device for network connection. Select the **wireless device**, and click the **Connect** button to connect or the **Refresh** button to search for more wireless devices. Attempt Auto-Connect to ANY network in range will connect you to the closest network within range. Click the **X (Close)** button in the upper right corner to close the WLAN Monitor or click the **Profile Setting** button to continue.



Figure 7-3

3. When the screen in Figure 7-4 appears, click on the **New** button to create a new profile or select a **Profile** and click on the **Edit** button to change an existing profile or Click on the **Delete** button to delete a profile. Select a **profile** and click the **Connect** button to connect.



Figure 7-4

4. If you click on the **New** or **Edit** button, the screen in Figure 7-5 will appear. You can enter a name for a new profile and change any of the settings on this page.



Figure 7-5

Under the **Network Type**, you may choose either Infrastructure or Ad-Hoc. **Infrastructure** mode allows a wireless adapter to communicate with a wired network that employs an access point, while the **Ad-Hoc** mode allows wireless-to-wireless, peer-to-peer communication. If you choose **Infrastructure**, the **SSID** should have the same name as the Access Point. If you choose **Ad-Hoc**, all clients should share the same **SSID** name. Click the **Apply** button to save the settings or click on the **Advanced** button for your WEP encryption settings.



Note: In order to enable WEP encryption, hexadecimal values, which are the letters “A” through “F” and the numbers “0” through “9”, must be entered.

5. If you click on the Advanced button, the Advanced page will appear. Under the WEP drop-down box, you can choose to have WEP encryption **Disabled**, **64**, **128**, or **152** Bits. If you choose 64 Bits, the screen in Figure 7-6 will appear. If you choose 128 Bits, the screen in Figure 7-7 will appear. If you choose 152 Bits, the screen in Figure 7-8 will appear.



Figure 7-6



Figure 7-7



Figure 7-8



Important: This hexadecimal number must match the Key on all other devices on the wireless network, or this device will be unable to transmit or receive data.

Wired Equivalent Privacy (WEP) is an encryption scheme used to protect wireless data communication. The Disabled setting prevents the sharing of data with other computers on the WEP network. There are two ways to create WEP Encryption keys. Type the WEP Encryption keys in the available fields manually. When manually typing the keys, you must use Hexadecimal characters, which are the letters “A” through “F” and the numbers “0” through “9”. To find out the WEP encryption set by other wireless products in your network, such as the WAP54A, go to the setup tab from the web browser to check the WEP encryption tab for the correct key entries. If you are using other access points, please check their user guides for more information on WEP encryption configuration.

6. The **About** tab, as shown in Figure 7-9, shows you copyright and version information about the driver, the application, and the firmware. The version number of the driver may vary from this screen, depending on which version was shipped with your Adapter. You can always visit www.linksys.com for the latest version of the driver. Click the **X (Close)** button in the upper right corner to complete the WLAN Monitor.

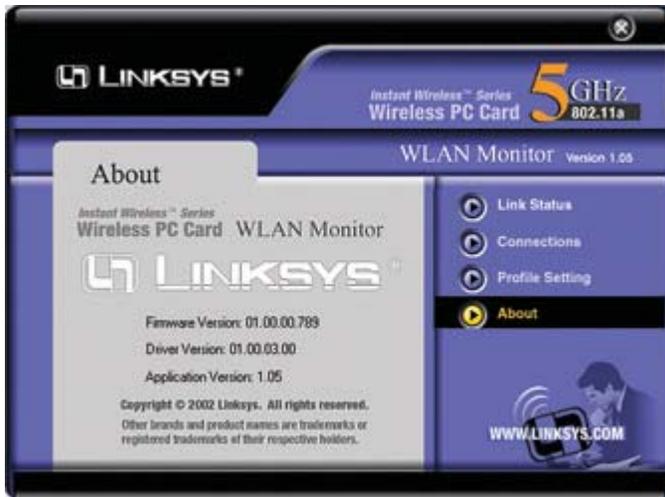


Figure 7-9

Appendix A: Troubleshooting

Common Problems and Solutions

This chapter provides solutions to problems usually occurring during the installation and operation of the Wireless PC Card. Read the description below to solve your problems. If you can't find an answer here, check the Linksys website at www.linksys.com.

1. My computer does not recognize the Wireless PC Card.

Make sure that the Wireless PC Card is properly inserted into the PCMCIA slot. Note that the card can be inserted either way, but is correct only when it is inserted so that the "Instant Wireless" logo on the front of the card cannot be seen. If in doubt, try inserting the card both ways. The card will slide in further when it is correct.

2. The Wireless PC Card does not work properly.

- Reinsert the Wireless PC Card into your notebook's PCMCIA slot. A beep should be heard if the card is properly inserted.
- For non-Windows environments, make sure that a PCMCIA card service driver is installed on your PC.
- Open the **Control Panel** and click on the **PC Card**. Check whether it has a PCMCIA card in one of the sockets or not. If you find the Network PC Card in one of the sockets, it means the card has been detected properly. If you see a yellow question mark, the resources are conflicting.
- Right-click on **My Computer** and select **Properties**. Select the device manager and click the **Network Adapter**. You will find the Wireless PC Card if it is installed successfully. If you see the yellow exclamation mark, the resources are conflicting. Click **PCMCIA card** and then click **PCMCIA card service**. You will see the status of the Network PC Card. If there is a yellow question mark, please check the following:
 - Make sure that your notebook has a free IRQ.
 - Make sure that you have inserted the right card and installed the proper driver.

If the Network PC Card does not function after attempting the above steps, remove the card and do the following:

- Uninstall the driver software from your PC.
- Restart your PC and repeat the hardware and software installation as specified in this User Guide.

3. I cannot communicate with the other computers linked via the Ethernet in the Infrastructure configuration.

- Make sure that the notebook PC is powered on.
- Make sure that your Wireless PC Card is configured on the same channel and with the same security options as the other computers in the Infrastructure configuration.

Frequently Asked Questions

Can I run an application from a remote computer over the wireless network?

This will depend on whether or not the application is designed to be used over a network. Consult the application's user guide to determine if it supports operation over a network.

Can I play computer games with other members of the wireless network?

Yes, as long as the game supports multiple players over a LAN (local area network). Refer to the game's user guide for more information.

What is the IEEE 802.11a standard?

The IEEE 802.11a Wireless LAN standards subcommittee, which is formulating a standard for the industry. The objective is to enable wireless LAN hardware from different manufacturers to communicate.

What IEEE 802.11 features are supported?

The product supports the following IEEE 802.11a functions:

- OFDM protocol
- Multi-Channel Roaming
- Automatic Rate Selection
- RTS/CTS feature
- Fragmentation

What is Ad-hoc?

An Ad-hoc wireless LAN is a group of computers, each with a WLAN adapter, connected as an independent wireless LAN. Ad-hoc wireless LAN is applicable at a departmental scale for a branch or SOHO operation.

What is Infrastructure?

An integrated wireless and wired LAN is called an Infrastructure configuration. Infrastructure is applicable to enterprise scale for wireless access to a central database, or wireless application for mobile workers.

What is Roaming?

Roaming is the ability of a portable computer user to communicate continuously while moving freely throughout an area greater than that covered by a single Access Point. Before using the roaming function, the workstation must make sure that it is the same channel number with the Access Point of dedicated coverage area.

To achieve true seamless connectivity, the wireless LAN must incorporate a number of different functions. Each node and Access Point, for example, must always acknowledge receipt of each message. Each node must maintain contact with the wireless network even when not actually transmitting data. Achieving these functions simultaneously requires a dynamic RF networking technology that links Access Points and nodes. In such a system, the user's end node undertakes a search for the best possible access to the system. First, it evaluates such factors as signal strength and quality, as well as the message load currently being carried by each Access Point and the distance of each Access Point to the wired backbone. Based on that information, the node next selects the right Access Point and registers its address. Communications between end node and host computer can then be transmitted up and down the backbone.

As the user moves on, the end node's RF transmitter regularly checks the system to determine whether it is in touch with the original Access Point or whether it should seek a new one. When a node no longer receives acknowledgment from its original Access Point, it undertakes a new search. Upon finding a new Access Point, it then reregisters, and the communication process continues.

What is BSS ID?

A specific Ad hoc LAN is called a Basic Service Set (BSS). Computers in a BSS must be configured with the same BSS ID.

What is ESS ID?

An Infrastructure configuration could also support roaming capability for mobile workers. More than one BSS can be configured as an Extended Service Set (ESS). Users within an ESS could roam freely between BSSs while served as a continuous connection to the network wireless stations, and Access Points within an ESS must be configured with the same ESS ID and the same radio channel.

What is Spread Spectrum?

Spread Spectrum technology is a wideband radio frequency technique developed by the military for use in reliable, secure, mission-critical communications systems. It is designed to trade off bandwidth efficiency for reliability, integrity, and security. In other words, more bandwidth is consumed than in the case of narrowband transmission, but the trade-off produces a signal that is, in effect, louder and thus easier to detect, provided that the receiver knows the parameters of the spread-spectrum signal being broadcast. If a receiver is not tuned to the right frequency, a spread-spectrum signal looks like background noise. There are two main alternatives, Direct Sequence Spread Spectrum (DSSS) and Frequency Hopping Spread Spectrum (FHSS).

What is DSSS? What is FHSS? And what are their differences?

Frequency-Hopping Spread-Spectrum (FHSS) uses a narrowband carrier that changes frequency in a pattern that is known to both transmitter and receiver. Properly synchronized, the net effect is to maintain a single logical channel. To an unintended receiver, FHSS appears to be short-duration impulse noise. Direct-Sequence Spread-Spectrum (DSSS) generates a redundant bit pattern for each bit to be transmitted. This bit pattern is called a chip (or chipping code). The longer the chip, the greater the probability that the original data can be recovered. Even if one or more bits in the chip are damaged during transmission, statistical techniques embedded in the radio can recover the original data without the need for retransmission. To an unintended receiver, DSSS appears as low power wideband noise and is rejected (ignored) by most narrowband receivers.

Would the information be intercepted while transmitting on air?

WLAN features two-fold protection in security. On the hardware side, as with Direct Sequence Spread Spectrum technology, it has the inherent security feature of scrambling. On the software side, WLAN offers the encryption function (WEP) to enhance security and Access Control.

What is WEP?

WEP is Wired Equivalent Privacy, a data privacy mechanism based on a 40 bit shared key algorithm, as described in the IEEE 802.11a.

Appendix B: Glossary

Ad-hoc Network - An ad-hoc network is a wireless network or other small network in which some of the network devices are part of the network only for the duration of a communications session while in some close proximity to the rest of the network.

Architecture - The total design and implementation of the network. It includes the network's topology, transmission technologies and communications protocols, management and security systems, and any other attributes that give a network a particular set of capabilities and functionalities.

Backbone - The part of a network that connects most of the systems and networks together and handles the most data.

Bandwidth - The transmission capacity of a given facility, in terms of how much data the facility can transmit in a fixed amount of time; expressed in bits per second (bps).

Bit - A binary digit. The value - 0 or 1-used in the binary numbering system. Also, the smallest form of data.

BSS (Basic Service Set) - A group of Instant Wireless Network PC Card users and an Access Point.

Buffer - A buffer is a shared or assigned memory area used by hardware devices or program processes that operate at different speeds or with different sets of priorities. The buffer allows each device or process to operate without being held up by the other. In order for a buffer to be effective, the size of the buffer and the algorithms for moving data into and out of the buffer need to be considered by the buffer designer. Like a cache, a buffer is a "midpoint holding place" but exists not so much to accelerate the speed of an activity as to support the coordination of separate activities.

Database - A database is a collection of data that is organized so that its contents can easily be accessed, managed, and updated.

Default Gateway - The routing device used to forward all traffic that is not addressed to a station within the local subnet.

DHCP (Dynamic Host Configuration Protocol) - A protocol that lets network administrators manage centrally and automate the assignment of Internet Protocol (IP) addresses in an organization's network. Using the Internet's set of protocol (TCP/IP), each machine that can connect to the Internet needs a unique IP address. When an organization sets up its computer users with a connection to the Internet, an IP address must be assigned to each machine. Without DHCP, the IP address must be entered manually at each computer and, if computers move to another location in another part of the network, a new IP address must be entered. DHCP lets a network administrator supervise and distribute IP addresses from a central point and automatically sends a new IP address when a computer is plugged into a different place in the network.

DHCP uses the concept of a "lease" or amount of time that a given IP address will be valid for a computer. The lease time can vary depending on how long a user is likely to require the Internet connection at a particular location. It's especially useful in education and other environments where users change frequently. Using very short leases, DHCP can dynamically reconfigure networks in which there are more computers than there are available IP addresses.

DHCP supports static addresses for computers containing Web servers that need a permanent IP address.

Domain - A subnetwork comprised of a group of clients and servers under the control of one security database. Dividing LANs into domains improves performance and security.

Driver - A workstation or server software module that provides an interface between a network interface card and the upper-layer protocol software running in the computer; it is designed for a specific NIC, and is installed during the initial installation of a network-compatible client or server operating system.

DSSS (Direct-Sequence Spread-Spectrum) - DSSS generates a redundant bit pattern for each bit to be transmitted. This bit pattern is called a chip (or chipping code). The longer the chip, the greater the probability that the original data can be recovered. Even if one or more bits in the chip are damaged during transmission, statistical techniques embedded in the radio can recover the original data without -the need for retransmission. To an unintended receiver, DSSS appears as low power wideband noise and is rejected (ignored) by most narrowband receivers.

Encryption - A security method that applies a specific algorithm to data in order to alter the data's appearance and prevent other devices from reading the information.

ESS - More than one BSS in a network.

Ethernet - IEEE standard network protocol that specifies how data is placed on and retrieved from a common transmission medium. Has a transfer rate of 10 Mbps. Forms the underlying transport vehicle used by several upper-level protocols, including TCP/IP and XNS.

FHSS (Frequency Hopping Spread Spectrum) - FHSS continuously changes the center frequency of a conventional carrier several times per second according to a pseudo-random set of channels, while chirp spread spectrum changes the carrier frequency. Because a fixed frequency is not used, illegal monitoring of spread spectrum signals is extremely difficult, if not downright impossible depending on the particular method.

Firmware - Code that is 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.

Fragmentation - Breaking a packet into smaller units when transmitting over a network medium that cannot support the original size of the packet.

Gateway - A device that interconnects networks with different, incompatible communications protocols.

Hardware - Hardware is the physical aspect of computers, telecommunications, and other information technology devices. The term arose as a way to distinguish the "box" and the electronic circuitry and components of a computer from the program you put in it to make it do things. The program came to be known as the software.

Hop - The link between two network nodes.

IEEE (The Institute of Electrical and Electronics Engineers) - The IEEE describes itself as "the world's largest technical professional society, promoting the development and application of electrotechnology and allied sciences for the benefit of humanity, the advancement of the profession, and the well-being of our members."

The IEEE fosters the development of standards that often become national and international standards. The organization publishes a number of journals, has many local chapters, and several large societies in special areas, such as the IEEE Computer Society.

Infrastructure - An infrastructure network is a wireless network or other small network in which the wireless network devices are made a part of the network through the Access Point which connects them to the rest of the network.

Internet Protocol (IP)- The method or protocol by which data is sent from one computer to another on the Internet. It is a standard set of rules, procedures, or conventions relating to the format and timing of data transmission between two computers that they must accept and use to be able to understand each other.

IP Address - In the most widely installed level of the Internet Protocol (IP) today, an IP address is a 32-binary digit number that identifies each sender or receiver of information that is sent in packet across the Internet. When you request an HTML page or send e-mail, the Internet Protocol part of TCP/IP includes your IP address in the message (actually, in each of the packets if more than one is required) and sends it to the IP address that is obtained by looking up the domain name in the Uniform Resource Locator you requested or in the e-mail address you're sending a note to. At the other end, the recipient can see the IP address of the Web page requestor or the e-mail sender and can respond by sending another message using the IP address it received.

IPX (Internetwork Packet EXchange) - A NetWare communications protocol used to route messages from one node to another. IPX packets include network addresses and can be routed from one network to another.

IRQ (Interrupt ReQuest) - A hardware interrupt on a PC. There are 16 IRQ lines used to signal the CPU that a peripheral event has started or terminated. In most cases, two devices cannot use the same line.

ISM band - The FCC and their counterparts outside of the U.S. have set aside bandwidth for unlicensed use in the ISM (Industrial, Scientific and Medical) band. Spectrum in the vicinity of 2.4 GHz, in particular, is being made available worldwide. This presents a truly revolutionary opportunity to place convenient high-speed wireless capabilities in the hands of users around the globe.

LAN - A local area network (LAN) is a group of computers and associated devices that share a common communications line and typically share the resources of a single processor or server within a small geographic area (for example, within an office building).

Mbps (MegaBits Per Second) - One million bits per second; unit of measurement for data transmission.

NetBEUI (NetBIOS Extended User Interface) - The transport layer for NetBIOS. NetBIOS and NetBEUI were originally part of a single protocol suite that was later separated. NetBIOS sessions can be transported over NetBEUI, TCP/IP and SPX/IPX protocols.

NetBIOS - The native networking protocol in DOS and Windows networks. Although originally combined with its transport layer protocol (NetBEUI), NetBIOS today provides a programming interface for applications at the session layer (layer 5). NetBIOS can ride over NetBEUI, its native transport, which is not routable, or over TCP/IP and IPX/SPX, which are routable protocols.

NetBIOS computers are identified by a unique 15-character name, and Windows machines (NetBIOS machines) periodically broadcast their names over the network so that Network Neighborhood can catalog them. For TCP/IP networks, NetBIOS names are turned into IP addresses via manual configuration in an LMHOSTS file or a WINS server.

There are two NetBIOS modes. The Datagram mode is the fastest mode, but does not guarantee delivery. It uses a self-contained packet with send and receive name, usually limited to 512 bytes. If the recipient device is not listening for messages, the datagram is lost. The Session mode establishes a connection until broken. It guarantees delivery of messages up to 64KB long.

Network - A system that transmits any combination of voice, video and/or data between users.

Node - A network junction or connection point, typically a computer or work station.

Notebook (PC) - A notebook computer is a battery-powered personal computer generally smaller than a briefcase that can easily be transported and conveniently used in temporary spaces such as on airplanes, in libraries, temporary offices, and at meetings. A notebook computer, sometimes called a laptop computer, typically weighs less than five pounds and is three inches or less in thickness.

OFDM - OFDM (Orthogonal Frequency Division Multiplexing) works by breaking one high-speed data stream into a number of lower-speed data streams, which are then transmitted in parallel. Each lower speed stream is used to modulate a subcarrier. Essentially, this creates a multi-carrier transmission by dividing a wide frequency band or channel into a number of narrower frequency bands or sub-channels.

Packet - A unit of data routed between an origin and a destination in a network.

Passphrase - Used much like a password, a passphrase simplifies the WEP encryption process by automatically generating the WEP encryption keys for Linksys products.

PC Card - A credit-card sized removable module that contains memory, I/O, or a hard disk.

PCMCIA - The PCMCIA (Personal Computer Memory Card International Association) is an industry group organized in 1989 to promote standards for a credit card-size memory or I/O device that would fit into a personal computer, usually a notebook or laptop computer.

Plug-and-Play - The ability of a computer system to configure expansion boards and other devices automatically without requiring the user to turn off the system during installation.

Roaming - The ability to use a wireless device and be able to move from one access point's range to another without losing the connection.

RTS (Request To Send) - An RS-232 signal sent from the transmitting station to the receiving station requesting permission to transmit.

Server - Any computer whose function in a network is to provide user access to files, printing, communications, and other services.

Software - Instructions for the computer. A series of instructions that performs a particular task is called a "program." The two major categories of software are "system software" and "application software." System software is made up of control programs such as the operating system and database management system (DBMS). Application software is any program that processes data for the user.

A common misconception is that software is data. It is not. Software tells the hardware how to process the data.

Spread Spectrum - Spread Spectrum technology is a wideband radio frequency technique developed by the military for use in reliable, secure, mission-critical communications systems. It is designed to trade off bandwidth efficiency for reliability, integrity, and security. In other words, more bandwidth is consumed than in the case of narrowband transmission, but the trade off produces a signal that is, in effect, louder and thus easier to detect, provided that the receiver knows the parameters of the spread-spectrum signal being broadcast. If a receiver is not tuned to the right frequency, a spread-spectrum signal looks like background noise. There are two main alternatives, Direct Sequence Spread Spectrum (DSSS) and Frequency Hopping Spread Spectrum (FHSS).

Static IP Address - A permanent IP address that is assigned to a node in an IP or a TCP/IP network.

TCP (Transmission Control Protocol) - A method (protocol) used along with the Internet Protocol (IP) to send data in the form of message units between computers over the Internet. While IP takes care of handling the actual delivery of the data, TCP takes care of keeping track of the individual units of data (called packet) that a message is divided into for efficient routing through the Internet.

TCP/IP (Transmission Control Protocol/Internet Protocol) - The basic communication language or protocol of the Internet. It can also be used as a communications protocol in a private network (either an intranet or an extranet). When you are set up with direct access to the Internet, your computer is provided with a copy of the TCP/IP program just as every other computer that you may send messages to or get information from also has a copy of TCP/IP.

Throughput - The amount of data moved successfully from one place to another in a given time period.

Topology - A network's topology is a logical characterization of how the devices on the network are connected and the distances between them. The most common network devices include hubs, switches, routers, and gateways. Most large networks contain several levels of interconnection, the most important of which include edge connections, backbone connections, and wide-area connections.

TX Rate - Transmission Rate.

WEP (Wired Equivalent Privacy) - A data privacy mechanism based on a 64-bit or 128-bit shared key algorithm, as described in the IEEE 802.11 standard.

Workgroup - Two or more individuals that share files and databases.

Appendix C: Specifications

Standards:	IEEE 802.11a PCMCIA Cardbus
Channels:	8 Channels (US, Canada)
Operating Range:	Indoors: Up to 328 ft. (100M)* Outdoors: Up to 1148 ft. (350M)*

Environmental

Dimensions:	4.4" x 2.13" x 0.4" (110 mm x 54 mm x 10 mm)
Unit Weight:	1.5 oz. (42 g)
Power:	275mA Tx, 225mA Rx
Certifications:	FCC Class B
Operating Temp.:	0°C to 45°C (32°F to 113°F)
Storage Temp. :	-20°C to 70°C (-4°F to 158°F)
Operating Humidity:	0% to 90%, Non-Condensing
Storage Humidity:	5% to 90%, Non-Condensing

Appendix D: Warranty Information

BE SURE TO HAVE YOUR PROOF OF PURCHASE AND A BARCODE FROM THE PRODUCT'S PACKAGING ON HAND WHEN CALLING. RETURN REQUESTS CANNOT BE PROCESSED WITHOUT PROOF OF PURCHASE.

IN NO EVENT SHALL LINKSYS'S LIABILITY EXCEED THE PRICE PAID FOR THE PRODUCT FROM DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF THE PRODUCT, ITS ACCOMPANYING SOFTWARE, OR ITS DOCUMENTATION. LINKSYS DOES NOT OFFER REFUNDS FOR ANY PRODUCT.

LINKSYS OFFERS CROSS SHIPMENTS, A FASTER PROCESS FOR PROCESSING AND RECEIVING YOUR REPLACEMENT. LINKSYS PAYS FOR UPS GROUND ONLY. ALL CUSTOMERS LOCATED OUTSIDE OF THE UNITED STATES OF AMERICA AND CANADA SHALL BE HELD RESPONSIBLE FOR SHIPPING AND HANDLING CHARGES. PLEASE CALL LINKSYS FOR MORE DETAILS.

Appendix E: Contact Information

For help with the installation or operation of this product, contact Linksys Technical Support at one of the phone numbers or Internet addresses below.

Sales Information	800-546-5797 (LINKSYS)
Technical Support	866-242-8558
RMA Issues	949-261-1288
Fax	949-261-8868
Email	support@linksys.com
Web	http://www.linksys.com
FTP Site	ftp.linksys.com



<http://www.linksys.com>

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