Wireless CompactFlash Card

Use this guide to install: WCF12

User Guide

LINKSYS®

LIMITED WARRANTY
Linksys guarantees that every Instant Wireless™ CompactFlash Card is free from physical defects in material and workmanship for one year from the date of purchase, when used within the limits set forth in the Specifications section of this User Guide. If these products prove defective during this warranty period, call Linksys Technical Support in order to obtain a Return Authorization Number. 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. When returning a product, mark the Return Authorization Number clearly on the outside of the package and include a copy of your original proof of purchase. All customers located outside of the United States of America and Canada shall be held responsible for shipping and handling charges.

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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 not be co-located or operating in conjunction with any other antenna or transmitter. 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

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Table of Contents

Chapter 1: Introduction

The Wireless CompactFlash Card

Experience the same speed and ease of wireless networking with your CompactFlash Type I ready personal digital assistant (PDA) as you do with your laptop or desktop computer. The Wireless CompactFlash Card is a Type I CompactFlash card that connects directly to your PDA. Just plug it in, and you're ready to share data, printers, or high-speed Internet access over your existing wireless network. Plus, user-friendly software makes it a snap to set up.

The Wireless CompactFlash Card is not only easy to install and use, but also powerful. Your PDA can send and receive data at speeds up to 11Mbps. A high-powered, built-in antenna keeps you connected at distances of up to 984 feet. The Wireless CompactFlash Card is also versatile and easily configurable through your PDA.

Features

- Compatible with Windows CE 3.0 or Higher
- Up to 11 Mbps, High-Speed Data Transfer Rates with Automatic Fallback
- User-Friendly Software Provides Simple Installation and Configuration
- Compliant with 802.11b, DSSS, 2.4GHz Standard
- Supports up to 128-bit WEP Encryption Security
- Free Driver Upgrades at *www.linksys.com*
- 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 Instant Wireless™ CompactFlash Card
- One Setup CD-ROM including Drivers and User Guide
- One Quick Installation
- One Registration Card

System Requirements

- One Computer with the following:
    - Pentium Class 200MHz or Faster Processor
    - CD-ROM Drive
    - 64MB RAM (recommended)
    - Windows 98, Me, 2000, or XP (to load drivers)
- Microsoft ActiveSync Utility
- PDA with Windows CE 3.0 or Higher and Available Type I CompactFlash Slot

Chapter 2: Planning Your Wireless Network

Network Topology

A wireless LAN is exactly like a regular LAN, except that each Personal Digital Assistant (PDA) equipped with a Wireless CompactFlash Card can connect to the network using no wires. All points (including PDAs) in a wireless LAN must be configured to share the same SSID and other wireless settings.

The Wireless CompactFlash Card provides LAN access for PDAs. An integrated wireless and wired LAN is called an infrastructure network. A group of wireless users and an Access Point comprise a Basic Service Set (BSS). Each PDA equipped with a Wireless CompactFlash Card in a BSS can talk to any computer in a wired LAN infrastructure via the Access Point. The Wireless CompactFlash Card also allows you to synchronize your PDA through a wireless connection.

An infrastructure network extends the accessibility of a Wireless CompactFlash Card PDA to a wired LAN, and it doubles the effective wireless transmission range for two Wireless CompactFlash Card PDAs. Since the Access Point is able to forward data within its BSS, the effective transmission range in an infrastructure LAN is doubled.

The use of a unique ID in a BSS is essential.

The wireless LAN infrastructure configuration is appropriate for enterprise-scale, wireless access to a central database, or as a wireless application for mobile users.

Roaming

Infrastructure mode also supports roaming capabilities for mobile users. More than one BSS can be configured to work as an Extended Service Set (ESS). This continuous network allows users to roam freely within an ESS. All Wireless CompactFlash Card PDAs within one ESS must be configured with the same SSID and other wireless settings.

Optimum position for the Access Point is recommended. Proper Access Point positioning combined with a clear radio signal will greatly enhance performance.

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 accessed 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 **Infrastructure** mode. (See Figure 2-1.) The basis of Infrastructure mode centers around an **access point**, which serves as the main point of communications in a wireless network. Access points transmit data to PCs 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 2-1

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. (See Figure 2-2.) Ad-Hoc mode allows computers equipped with wireless transmitters and receivers to communicate directly with each other, eliminating the need for an access point. The drawback of this mode is that, in Ad-Hoc mode, wireless-equipped computers are not able to communicate with computers on a wired network. And, of course, communication between the wireless-equipped computers is limited by the distance and interference directly between them.

Figure 2-2

Chapter 3: Installing the Wireless CompactFlash Card

Before You Start

The Wireless CompactFlash Card comes with an automated software installation procedure that interacts with the Windows operating system on your PC and the Windows CE operating systems on your PDA. This procedure automatically installs the Configuration Utility with the driver. After installing the software, you will install the hardware on your PDA.

> **Note:** Do NOT insert the Wireless CompactFlash Card into the PDA. You must install the Configuration Utility with driver first.

Configuration Utility with Driver Installation

1. Connect your PDA to your PC. Make sure you have the Microsoft ActiveSync Utility installed on your PC. Insert the Setup CD-ROM into your PC's CD-ROM drive. Unless you have deactivated the auto-run feature of Windows, the screen in Figure 3-1 should appear automatically.

Figure 3-1

If this screen does not appear automatically, you can access it by clicking the **Start** button and choosing **Run**. In the drop-down box provided, type **d:\setup.exe** (if "d" is the letter of your CD-ROM drive). Alternately, double-click **My Computer**, and then double-click the CD-ROM drive where the Setup CD is located. Double-click the **Setup.exe** icon that appears.

2. Click the **Setup** button.

3. When you see the screen in Figure 3-2, click the **Next** button.

Figure 3-2

If, for whatever reason, you need to abort or terminate the installation, click the **Cancel** button. Otherwise the installation will proceed.

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

4. When you see the License Agreement screen, read the entire policy by clicking the **Page Down** button on your keyboard. Click the **Yes** button if you agree, or **No** if you disagree. Clicking **No** will terminate the installation. If you click **Yes**, the installation will proceed.

Figure 3-3

5. You will determine where the Wireless CompactFlash Configuration Utility will be installed. If you would like the utility files installed in the default directory, click the **Next** button. If you would like to choose an alternate directory, click the **Browse** button, and select the appropriate folder. Then click the **Next** button.

Figure 3-4

6. Choose either **Infrastructure** mode or **Ad-Hoc** mode, depending on your needs. If you are unsure whether to choose Infrastructure or Ad-Hoc, refer to "Chapter 2: Planning Your Wireless Network" for more information. Once you have made your choice, click the **Next** button.

Figure 3-5

7a. If you chose **Infrastructure Mode,** go to Step 7b now. If you chose **Ad-Hoc Mode**, select the correct operating channel that applies to your network. The channel you choose should be the same as the channel for the other computers and devices in your wireless network. Channel 6 is the default. Select the appropriate channel, and click the **Next** button.

Figure 3-6

7b. Enter your wireless network's SSID. The SSID must be identical for all points in the network. The default setting is **linksys** (all lowercase). Enter this information, and click the **Next** button.

Figure 3-7

8. At this point, the Wizard will ask you to review your settings before copying files. Select **Back** to review or change any settings or **Next** if you are satisfied with your settings.

Figure 3-8

9. The screen shown in Figure 3-9 will be displayed while the Configuration Utility with driver is being installed.
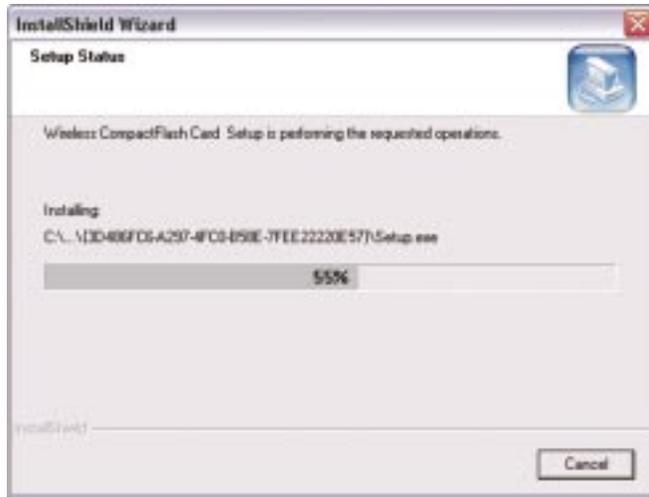

Figure 3-9

10. Windows will ask if you wish to install the driver in the default directory. Click the **Yes** button to use the default directory. Click the **No** button to select a different directory.

Figure 3-10

11. The screen shown in Figure 3-11 will be displayed while the driver is being installed.

Figure 3-11

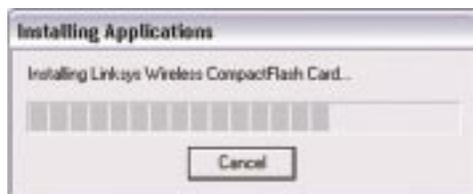12. When you see the screen in Figure 3-12, check your PDA to see if additional steps are required. Follow the steps requested by your PDA. Once this is done, or if none are requested, click the **OK** button.
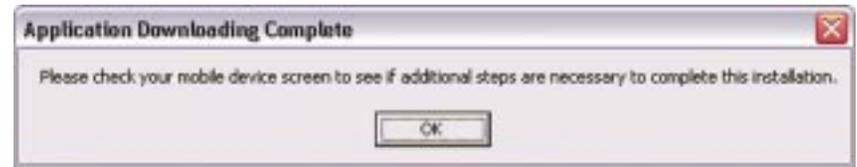

Figure 3-12

13. When the installation is complete, click the **Exit** button.
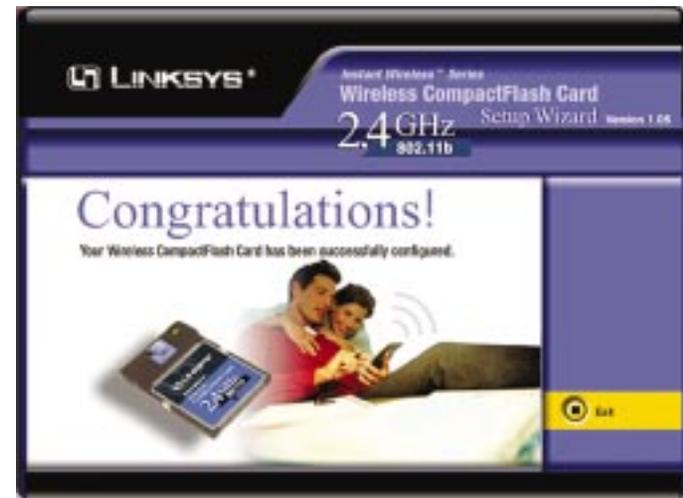
Figure 3-13

**The Setup Wizard has finished.
Proceed to the Hardware Installation section on the next page.**

Hardware Installation

1. Insert the Wireless CompactFlash Card into your PDA.

Figure 3-14

2. The screen in Figure 3-15 will appear. The default setting is **Use server-assigned IP address**. In most cases, you should keep the default setting. However, if you are using fixed IP addresses on your wireless network, then click the radio button next to **Use specific IP address**, and complete the **IP address**, **Subnet mask**, and **Default gateway** fields.

3. Click the **OK** button to close this screen.

The installation of the Wireless CompactFlash Card is complete.

Proceed to "Chapter 4: The Wireless CompactFlash Card's Configuration Utility" if you wish to further customize its configuration.

Figure 3-15

Chapter 4: The Wireless CompactFlash Card's Configuration Utility

Overview

The **Configuration Utility** is provided to allow you further customization of the Wireless CompactFlash Card. The Utility has five screens available:

- **Link** - The Link screen provides current information about the link between the Wireless CompactFlash Card and the wireless network.

- **Configuration** - The Configuration screen gives you access to the Wireless CompactFlash Card's general settings.

- **Encryption** - The Encryption screen lets you alter the Wired Equivalent Privacy (WEP) encryption settings.

- **Site Survey** - The Site Survey screen displays information about the Access Points the Wireless CompactFlash Card detects in its vicinity.

- **About** - The About screen displays release information for the driver, Configuration Utility, and firmware.

Accessing the Configuration Utility

After the Configuration Utility has been installed, you have two icons available for accessing the Utility. Use either icon.

To use the first icon, click **Start** and then **Programs**. Click the **Wireless CF Card Monitor** icon to access the Utility.

Figure 4-1

The second icon, shown in Figure 4-2, is located in the system tray on your PDA (see Figure 4-3). If you click the system tray icon, you will see Figure 4-4. Select one of the following menu choices:

Figure 4-2

Wireless Radio On Activates the Wireless CompactFlash Card.

Wireless Radio Off Deactivates the Wireless CompactFlash Card.

Remove Status Icon Deletes the Utility icon from the PDA's system tray.

Wireless Network Status Click here to access the Configuration Utility's Link tab.

Advanced Configuration Click here to access the Configuration Utility's Configuration tab.

WEP Encryption Click here to access the Configuration Utility's Encryption tab.

Version Information Click here to view the Configuration Utility's About tab.

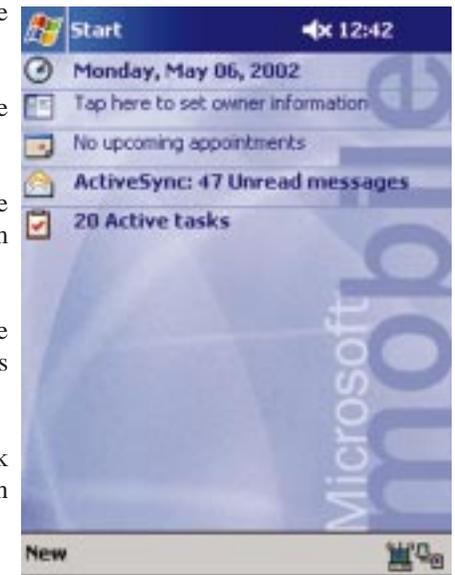**Site Survey** Click here to access the Configuration Utility's Site Survey tab.
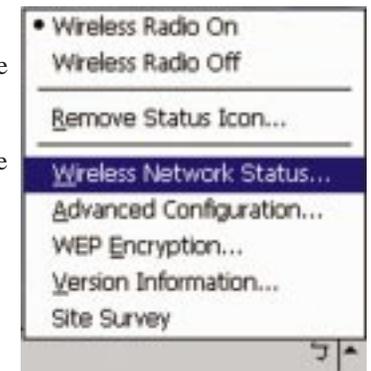

Figure 4-3

Figure 4-4

Using the Configuration Utility

Use the various screens to customize the Wireless CompactFlash Card's settings. Click the tab of the screen you wish to view.

LINK

The Link screen provides information about the current link between the Wireless CompactFlash Card and the wireless network. You cannot make any changes using this screen.
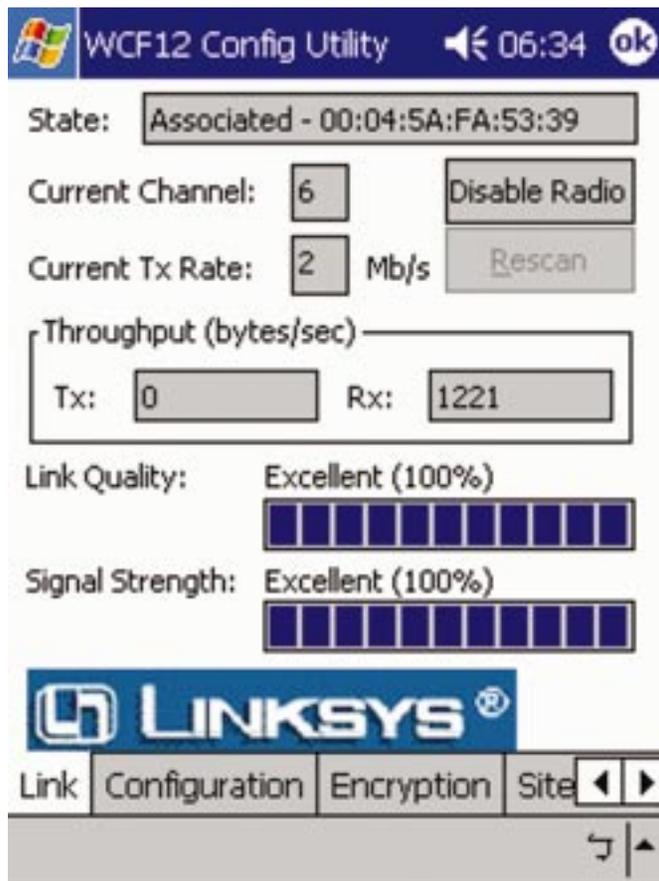
Figure 4-5

State The State field displays MAC address information about the Access Point with which the Wireless CompactFlash Card is communicating.

Current Channel The Current Channel field shows the channel setting of the Wireless CompactFlash Card.

Current Tx Rate The Current Tx Rate field shows the transfer rate in megabits per second.

Disable Radio Click this button to turn off the Wireless CompactFlash Card.

Rescan Click the Rescan button to refresh the information displayed on the Link screen.

Throughput The Throughput fields show the rates at which data is transferred and received in bytes per second.

Link Quality The Link Quality field displays a bar indicating the link's quality. The higher the percentage, between 0 and 100 percent, the better the link.

Signal Strength The Signal Strength field displays a bar indicating the signal strength. The higher the percentage, between 0 and 100 percent, the stronger the signal.

CONFIGURATION

The Configuration screen allows you to change the Wireless CompactFlash Card's general settings.

Figure 4-6

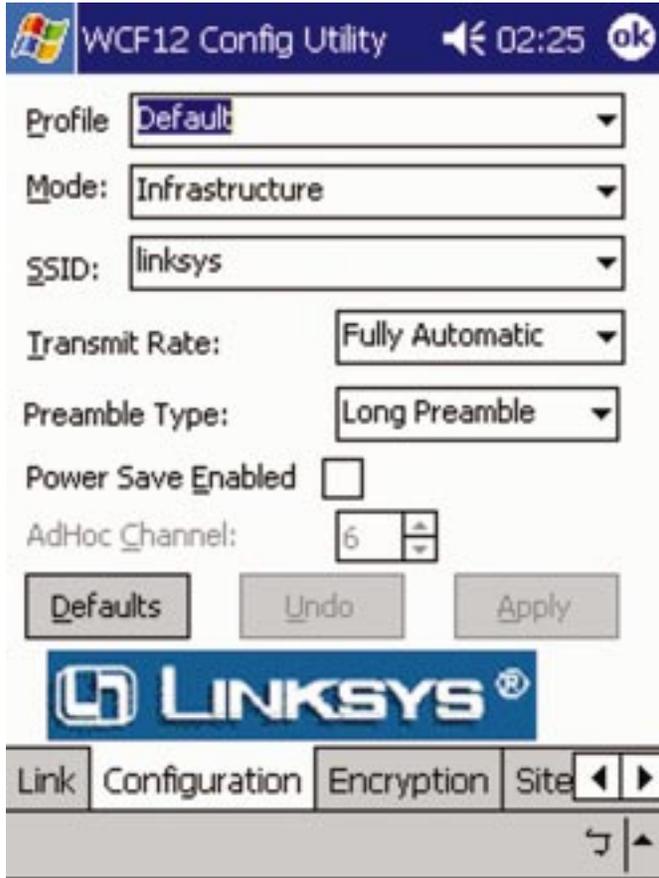**Profile** You can save any of your configuration settings by setting up a Profile. To do this, type the profile's name in the **Profile** field, and click the **Apply** button to save your changes under that profile. You can also select a profile from the drop-down menu.

Mode From the drop-down menu, choose between **Infrastructure** or **Ad-Hoc**, depending on your network type. The **Ad-Hoc** mode is used for a simple peer-

to-peer network and allows the sharing of local resources only between wireless-equipped PDAs and PCs—no use of an Access Point. The **Infrastructure** mode allows a wireless network to be integrated into an existing wired network by using an Access Point. Infrastructure networks permit roaming between Access Points.

SSID An acronym for Service Set Identifier, SSID is the unique name shared among all computers and other devices in a wireless network. The SSID setting must be identical for all devices in the wireless network. It is case-sensitive and must not exceed 32 alphanumeric characters.

Transmit Rate The Transmit Rate field shows the current transfer rate for the Wireless CompactFlash Card. To optimize performance and range, select **Fully Automatic** from the drop-down menu, so the Wireless CompactFlash Card will automatically adjust the transfer speed for best performance and longest range.

Power Save Enabled This option allows your PDA to enter "sleep" mode if your network connection experiences more than one second of no network activity. This feature depends on your PDA's power-saving mode.

Preamble Type The preamble defines the length of the CRC block for communication between the Wireless CompactFlash Card and an Access Point. All wireless devices on your network must use the same preamble type. The default is Long Preamble.

Ad-Hoc Channel The Ad-Hoc Channel setting specifies the channel used for wireless communications and must be set to the same channel as the other computers and devices of the wireless network. This setting can only be adjusted if the Wireless CompactFlash Card is set to Ad-Hoc mode.

To undo any changes, click the **Undo** button. To use the default settings and eliminate those changes you've already made, click the **Default** button. To save all of your changes, click the **Apply** button. To save all of your changes and close the Configuration Utility, click the **OK** button at the top of the screen.

ENCRYPTION

The Encryption screen allows you to customize security settings. Use this screen to generate 64-bit or 128-bit WEP keys.
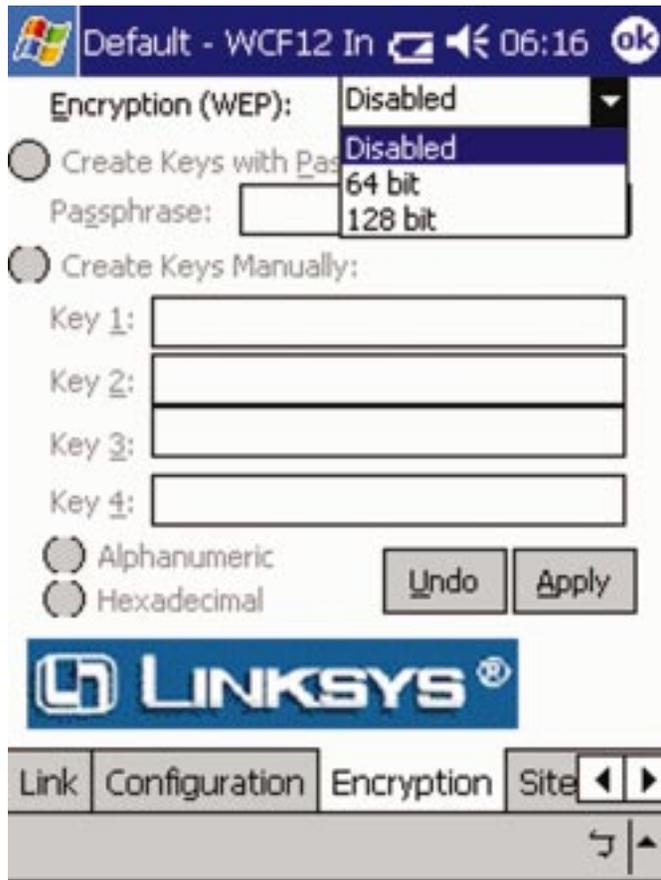

Figure 4-7

An acronym for Wired Equivalent Privacy, WEP is an encryption scheme used to protect your wireless data communications. WEP uses a combination of 64-bit or 128-bit keys to control network access and provide encryption security for every data transmission. To decode a data transmission, each point (device) in a network must use an identical 64-bit or 128-bit key. Higher encryption levels mean higher levels of security, but, due to the complexity of the encryption, they may mean decreased network performance.

Encryption (WEP)   You have three choices: Disabled, 64-bit, or 128-bit WEP encryption. Select the option you wish to use.

If you enable WEP encryption, then you can choose to create the encryption keys using a passphrase or create the encryption keys manually.

Create Keys with Passphrase   The Passphrase can be any text string with a maximum of 31 alphanumeric characters.

> **Note:** Creating and using the passphrase is recommended for easy WEP configuration and security purposes.

Create Keys Manually   Click **Alphanumeric** if you are using an alphanumeric phrase, or click **Hexadecimal** if you are using a hexadecimal number. Enter an alphanumeric phrase or hexadecimal number for each key that you wish to encrypt. (Hexadecimal numbers are comprised of numbers 0-9 and letters A-F.) Make sure that the values entered in these key fields are identical to the encryption keys used on the other wireless devices in the network.

Once you have chosen your key encryption method and entered either the Passphrase or Manual Key(s), click the **Apply** button to save your changes or **Undo** to delete them. To save your changes and close the Configuration Utility, click the **OK** button.

> **Important:** All the devices in your wireless network must have identical keys, so they can communicate with each other.

SITE SURVEY

The Site Survey screen lists the Access Points the Configuration Utility is able to detect. It also displays each Access Point's Network Name, MAC Address, Signal Strength, and Network Type.

Figure 4-8

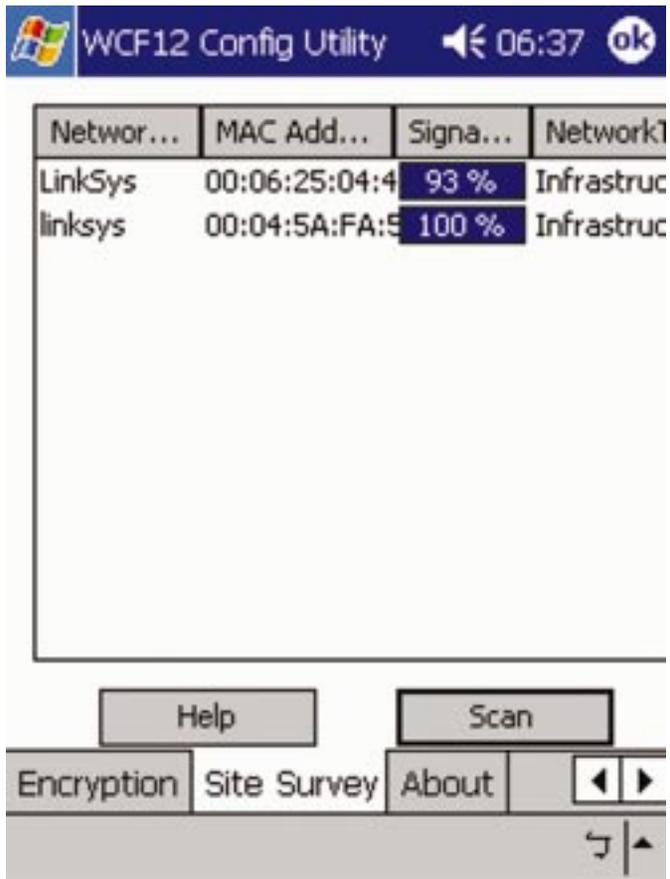**Help** Click this button for more information about the Site Survey features.

Scan Click this button to search for Access Points.

ABOUT

The About screen shows the release information for the Network Driver, Configuration Utility, and NIC Firmware.

Figure 4-9

Appendix A: Troubleshooting

Common Problems and Solutions

This chapter provides solutions to problems that may occur during the installation and operation of the Wireless CompactFlash Card. Read the descriptions below to solve your problems. If you can't find an answer here, check the Linksys website at *www.linksys.com.*

1. My PDA does not recognize the Wireless CompactFlash Card.
• Make sure that the Wireless CompactFlash Card is properly inserted into the CompactFlash port.
• Make sure the Link LED is solidly lit.

2. The Wireless CompactFlash Card does not work properly.
• Reinsert the Wireless CompactFlash Card into the PDA's CompactFlash port.
• Uninstall the utility and driver software from your PC and PDA device.
• Restart your PC, and repeat the software and hardware installation as specified in this User Guide.

3. I cannot communicate with the Access Point in the Infrastructure network.
• Make sure that the Access Point is powered on.
• Make sure that your Wireless CompactFlash Card is configured with the same channel, SSID, and WEP settings as the Access Point.

Frequently Asked Questions

What is the IEEE 802.11b standard?
It is the IEEE standard for wireless networks. This standard allows wireless LAN hardware from different manufacturers to communicate.

What IEEE 802.11b features are supported?
The product supports the following IEEE 802.11b functions:
• CSMA/CA plus Acknowledge protocol
• Multi-Channel Roaming
• Automatic Rate Selection
• RTS/CTS feature
• Fragmentation
• Power Management

What is Ad-Hoc?
An ad-hoc wireless LAN is a group of computers, each with a WLAN card, 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 using an access point is called an Infrastructure network. Infrastructure is applicable to enterprise scale for wireless access to central database, or as a 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 set to the same channel number with the Access Point of the 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 re-registers, and the communication process continues.

What is the 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 the ESS ID?
An Infrastructure network 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 can roam freely between BSSs while being served 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 the 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.

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 wireless network's information be intercepted while transmitting through the 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. Users can set it up depending upon their needs.

Can Instant Wireless™ products support printer sharing?
Instant Wireless™ products perform the same function as LAN products. Therefore, Instant Wireless products can work with NetWare, Windows 2000, or other LAN operating systems to support printer or file sharing.

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 802.11b standard.

Appendix B: Glossary

Ad-hoc Network - An ad-hoc network is a group of computers, each with a wireless adapter, connected as an independent 802.11 wireless LAN. Ad-hoc wireless computers operate on a peer-to-peer basis, communicating directly with each other without the use of an access point. Ad-hoc mode is also referred to as an Independent Basic Service Set (IBSS) or as peer-to-peer mode, and is useful at a departmental scale or SOHO operation.

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 (**B**asic **S**ervice **S**et) - An infrastructure network connecting wireless devices to a wired network using a single access point.

CompactFlash - A flash memory format card that plugs into a CompactFlash socket or into a standard Type II PC Card slot with an adapter.

CRC (**C**yclic **R**edundancy **C**hecking) - Technique used to check for errors in data transmissions.

CSMA/CD (**C**arrier **S**ense **M**ultiple **A**ccess/**C**ollision **D**etection) - The LAN access method used in Ethernet. When a device wants to gain access to the network, it checks to see if the network is quiet (senses the carrier). If it is not, it waits a random amount of time before retrying. If the network is quiet and two devices access the line at exactly the same time, their signals collide. When the collision is detected, they both back off and each wait a random amount of time before retrying.

CTS (**C**lear **T**o **S**end) - An RS-232 signal sent from the receiving station to the transmitting station that indicates it is ready to accept data.

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.

Driver - A software module that provides an interface between a network interface card and the upper-layer protocol software running in the computer.

DSSS (**D**irect **S**equence **S**pread **S**pectrum) - DSSS generates a redundant bit pattern for all data transmitted. This bit pattern is called a chip (or chipping code). Even if one or more bits in the chip are damaged during transmission, statistical techniques embedded in the receiver 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. However, to an intended receiver (i.e., another wireless LAN endpoint), the DSSS signal is recognized as the only valid signal, and interference is inherently rejected (ignored).

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 (**E**xtended **S**ervice **S**et) - A set of more than two or more BSSs (multiple access points) forming a single network.

Ethernet - IEEE standard network protocol that specifies how data is placed on and retrieved from a common transmission medium. Having a transfer rate of 10 Mbps., this forms the underlying transport vehicle used by several upper-level protocols.

FHSS (**F**requency **H**opping **S**pread **S**pectrum) - FHSS continuously changes (hops) the carrier frequency of a conventional carrier several times per second according to a pseudo-random set of channels. Because a fixed frequency is not used, and only the transmitter and receiver know the hop patterns, interception of FHSS is extremely difficult.

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.

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.

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 Network - An infrastructure network is a group of computers or other devices, each with a wireless adapter, connected as an 802.11 wireless LAN. In infrastructure mode, the wireless devices communicate with each other and to a wired network by first going through an access point. An infrastructure wireless network connected to a wired network is referred to as a Basic Service Set (BSS). A set of two or more BSS in a single network is referred to as an Extended Service Set (ESS). Infrastructure mode is useful at a corporation scale, or when it is necessary to connect the wired and wireless networks.

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 packets 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.

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 resources within a small geographic area (for example, within an office building).

MAC (**M**edia **A**ccess **C**ontrol) **Address** - A unique number assigned by the manufacturer to any Ethernet networking device, such as a network adapter, that allows the network to identify it at the hardware level.

Mbps (**M**ega**B**its **P**er **S**econd) - One million bits per second; unit of measurement for data transmission.

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

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.

PDA (**P**ersonal **D**igital **A**ssistant) - Any small mobile hand-held device that provides computing and information storage and retrieval capabilities for personal or business use.

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.

Port - A pathway into and out of the computer or a network device. For example, the serial and parallel ports on a personal computer are external sockets for plugging in communications lines, modems and printers.

Roaming - In an infrastructure mode wireless network, this refers to the ability to move out of one access point's range and into another and transparently reassociate and reauthenticate to the new access point. This reassociation and reauthentication should occur without user intervention and ideally without interruption to network connectivity. A typical scenario would be a location with multiple access points, where users can physically relocate from one area to another and easily maintain connectivity.

RTS (**R**equest **T**o **S**end) - An RS-232 signal sent from the transmitting station to the receiving station requesting permission to transmit.

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.

SOHO (**S**mall **O**ffice/**H**ome **O**ffice) - Market segment of professionals who work at home or in small offices.

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).

Storage - The semi-permanent or permanent holding place for digital data.

Subnet Mask - The method used for splitting IP networks into a series of subgroups, or subnets. The mask is a binary pattern that is matched up with the IP address to turn part of the host ID address field into a field for subnets.

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. 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.

Upgrade - To replace existing software or firmware with a newer version.

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.

Appendix C: Specifications

Standards:	IEEE 802.11b, Type I CompactFlash
Channels:	11 Channels (US, Canada)
	13 Channels (Europe)
	14 Channels (Japan)
Operating Range:	
Indoors:	up to 196 ft. (60 m)
Outdoors:	up to 984 ft. (300 m)
Data Rate:	up to 11 Mbps (with automatic fallback)
LED:	Link

Environmental

Dimensions:	2.37" x 1.70" x 0.13"
	(60.2 mm x 43.2 mm x 3.3 mm)
Unit Weight:	0.63 oz. (0.018 kg)
Power:	3.3V DC, 300 mA
Certifications:	FCC Class B, CE Mark
Operating Temp.:	32ºF to 131ºF (0ºC to 55ºC)
Storage Temp.:	-3ºF to 139ºF (-20ºC to 65ºC)
Operating Humidity:	10% to 90% Non-Condensing
Storage Humidity:	10% to 95% 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' 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	949-271-5461
Fax	949-265-6655
Email	support@linksys.com
Web	http://www.linksys.com
FTP Site	ftp.linksys.com

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