

Instant Wireless™ Series

# Wireless Network CF Card



Use this Guide to install: WCF12

User Guide

 **LINKSYS®**

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#### FCC STATEMENT

This product have 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. 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 device
- 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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# Introduction

## The Instant Wireless™ Wireless Network CF Card

Experience the same speed and ease of wireless networking with your CompactFlash Type II ready personal digital assistant as you do with your laptop or desktop computer with the Instant Wireless™ Wireless Network CF Card. This Type II CompactFlash card 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. User-friendly software makes it simple to set up.

Not only is the Instant Wireless™ Wireless Network CF Card easy to install and use, it's also powerful. You can send and receive data at speeds up to 11Mbps. A high-powered built-in antenna means that you're connected at distances of up to 1500 feet. It's also versatile and easily configurable through your PC.

So for full wireless flexibility and convenience, the Instant Wireless™ Wireless Network CF Card puts wireless networking in the palm of your hand!

## Features

- Up to 11 Mbps High-Speed Data Transfer Rate
- Compatible with Windows CE
- Low Interference and High Sensitivity to Guarantee Reliable Performance
- User-Friendly Software Provides Hassle-Free Installation and Configuration
- Plug-and-Play Operation Provides Easy Setup
- Built-in Antenna with Link LED
- Works with Virtually All Standard Internet Applications
- Interoperable with IEEE 802.11b (DSSS) 2.4GHz-Compliant Equipment
- Capable of up to 128-Bit WEP Encryption
- Free Software Driver Upgrades
- Free Technical Support-24 Hours a Day, 7 Days a Week for North America Only
- 1-Year Limited Warranty

## Package Contents

- One Instant Wireless™ Wireless Network CF Card
- One Setup CD-ROM with Drivers and User Guide
- One Registration Card (not shown)

## System Requirements

- Windows 9x or higher PC with CD-ROM (to load drivers)
- PDA with available Type II CompactFlash Slot
- Windows CE

# Planning Your Wireless Network

## Network Topology

A wireless LAN is exactly like a regular LAN, except that each Personal Digital Assistant (PDA) in the LAN uses an Instant Wireless™ Wireless Network CF Card to connect to the network using no wires. PDAs in a wireless LAN must be configured to share the same radio channel.

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

An infrastructure configuration extends the accessibility of a Network CF Card PDA to a wired LAN, and doubles the effective wireless transmission range for two Network CF 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 Basic Service Set 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.

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 Network CF Card PDAs within one Extended Service Set must be configured with the same SSID.

Selecting a feasible radio channel and optimum Access Point position 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 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. Access points transmit data to PCs equipped with wireless network card, 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.



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. 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 in the fact 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.



## Installing the Drivers

### Before You Start

Your new Instant Wireless™ Wireless Network CF 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 drivers and Configuration Utility while the Network CF Card is installed on your PDA.

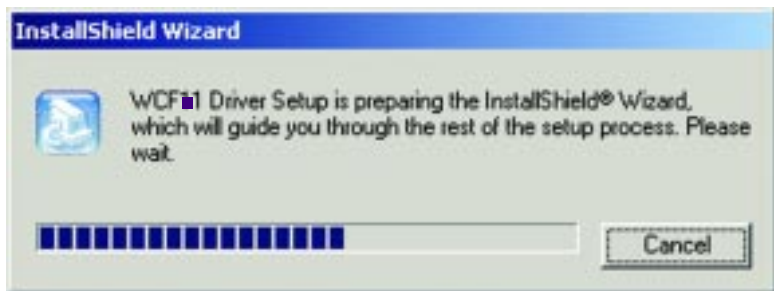
### Driver Installation

1. With the Network CF Card inserted into your PDA while your PDA is connected to your PC, insert the Setup CD into your PC's CD-ROM drive. Unless you have deactivated the auto-run feature of Windows, the following screen should appear automatically.



If this screen does not appear automatically, you can access the installation by pressing the **Start** button and choosing **Run**. In the drop down box provided, type **D:\setup.exe** (where 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. Then double-click the **Setup.exe** icon that appears.

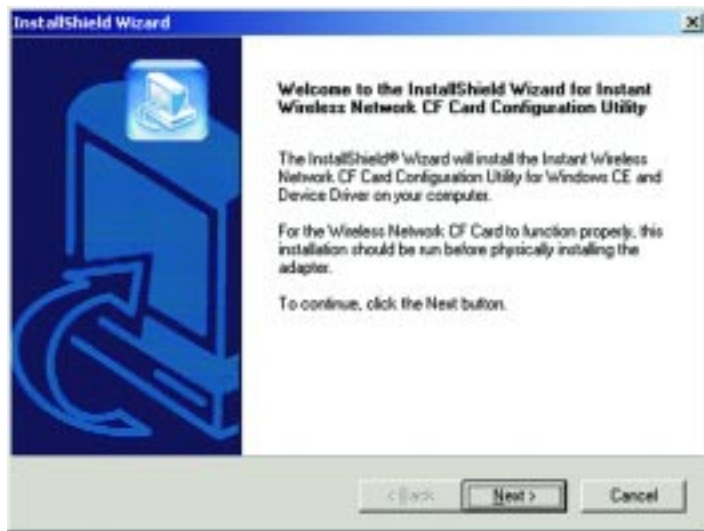
- The first tab across the top of the screen, labeled Install, should now be highlighted. Click on the **Install** button. The following screen should appear, indicating that Windows is preparing the installation.



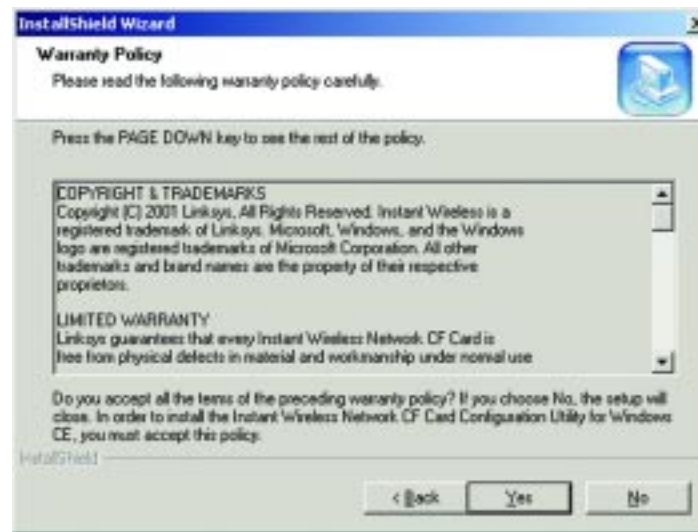
If, for whatever reason, you need to abort or terminate the installation, click the **Cancel** button at any time during the installation. Otherwise the installation will continue automatically.

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

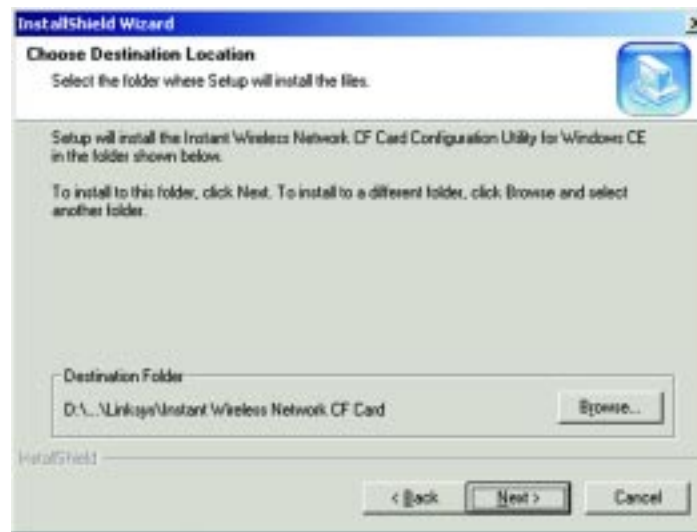
- The following screen will indicate that Windows is ready to continue the installation. Click the **Next** button.



- The next screen that appears will show the Warranty Policy. 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 continue.



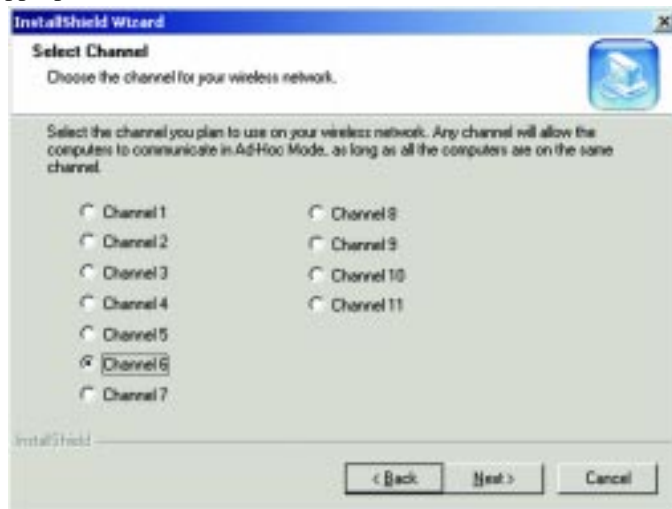
- From the following screen, you will determine where the driver will be installed. If you would like the drivers installed to the default directory, click the **Next** button. If you would like to choose an alternate directory, click the **Browse** button and select the appropriate folder.



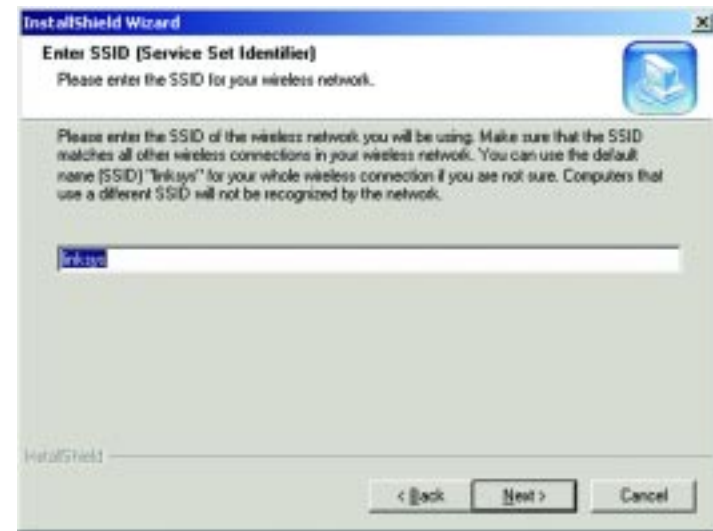
6. When the following screen appears, choose either **Infrastructure** mode or **Ad-Hoc** mode, depending on your needs. If you are unsure whether to choose Infrastructure or Ad-Hoc, refer to the next section for more information. Once you have made your choice, click the **Next** button.



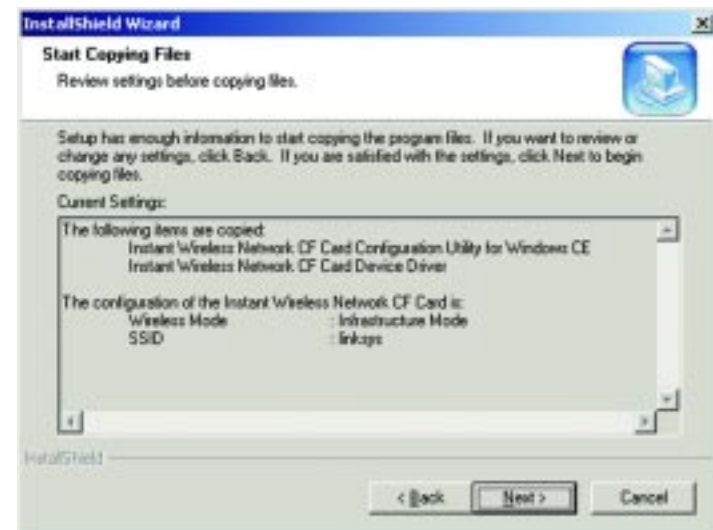
- 7a. If you chose **Infrastructure Mode**, go on to Step 7b now. If you chose **Ad-Hoc Mode**, choose the correct operating channel that applies to your network. The channel you choose should be set as the same as the other points in your wireless network. The default channel is set to Channel 6. Select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



- 7b. If you chose Infrastructure Mode from the screen shown in step six, enter your wireless network's SSID name. The SSID must be identical for all points in the network. To join any available SSID, type **ANY**. The default setting is **linksys** (all lowercase). Enter this information and click the **Next** button.

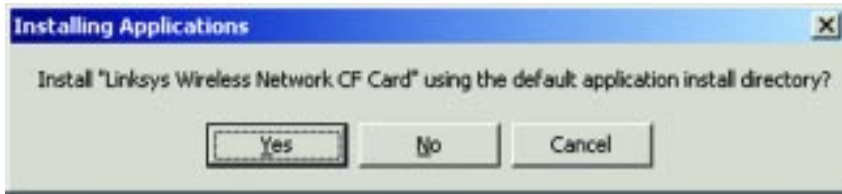


8. At this point, the Wizard will ask you to review your settings before starting to copy files. Select **Back** to review or change any settings or **Next** if you are satisfied with your settings.

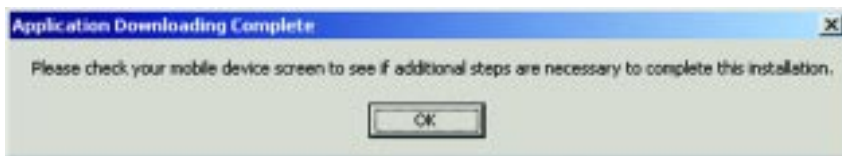




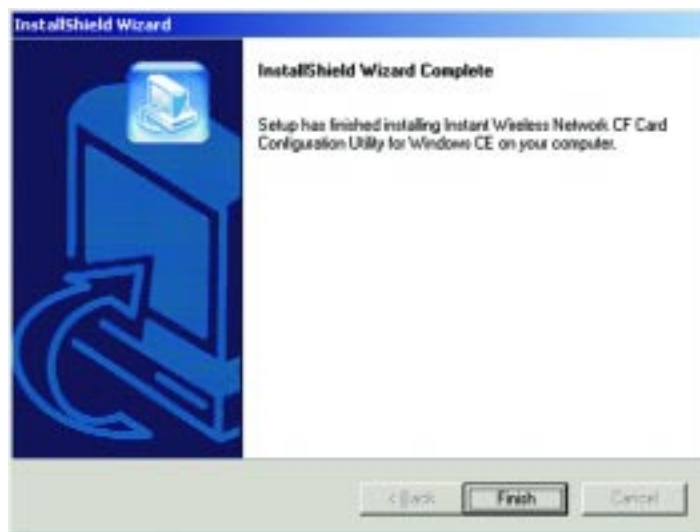
9. The following screen will ask if you wish to install the driver in the default directory. Click the **Yes** button to continue.



10. When you see the following screen, 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.



11. Once the installation wizard is complete, click the **Finish** button.



12. The following screen will also appear on your PDA, showing that the device has been successfully installed. When you see this, click the **OK** button.



**Note:** Check your network setting to set IP Address.



# Configuration Utility

The **Configuration Utility** is provided to allow you further customization of the Network CF Card in your wireless network.

## Using the Configuration Utility

Once the Configuration Utility has been installed, an icon will be placed in two places on your PDA, under Programs and settings under the System tab in Settings. Tapping this icon will open the Configuration Utility.

## CONFIGURATION

The Configuration screen allows you to change your Network CF Card's general settings.



You can save any of your configuration settings by setting up a Profile. To do this, type the profile's name in the **Profile** bar and click the **Apply** button to save your changes under that profile.

Mode allows you to 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 PDAs using the Network CF Card without needing an Access Point. The **Infrastructure** mode allows a wireless network to be integrated into an existing wired network through an Access Point. Infrastructure networks permit roaming between Access Points while maintaining a connection to all network resources.

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

The **Transmit Rate** field shows the current transfer rate for the Network CF Card. To optimize performance and range, the Transmit Rate should be set to Auto Rate, which will automatically adjust the transfer speed for best performance and longest range.

**Power Saving Enabled** allows your PDA to enter "sleep" mode if your network connection experiences more than 1 second of no network activity. This depends on PDA power saving mode.

The **Ad-Hoc Channel** setting specifies the channel used in wireless communication and should be set to the same channel as the other points in the wireless network. This setting can only be adjusted in 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 64-bit or 128-bit WEP keys can be generated here from a user-defined passphrase or entered manually.

The screenshot shows the 'WCF Config Utility' window. At the top, it says 'WCF Config Utility 2:49a' with an 'ok' button. The 'Encryption (WEP):' dropdown menu is open, showing options: 'Disabled' (selected), 'Disabled', '64 bit', and '128 bit'. Below this, there are two radio buttons: 'Create Keys with Passphrase' and 'Create Keys Manually'. The 'Passphrase:' field is empty. Under 'Create Keys Manually:', there are four input fields labeled 'Key 1:', 'Key 2:', 'Key 3:', and 'Key 4:'. At the bottom, there are 'Undo' and 'Apply' buttons. Below the buttons is the 'LINKSYS' logo and a navigation bar with tabs for 'Configuration', 'Encryption', 'Link', and 'About'.

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 provide access control to your network and encryption security for every data transmission. To decode a data transmission, each point 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)** can be **Disabled**, or set to **64-bit** or **128-bit** encryption as a hexadecimal number for each key that you wish to encrypt. Make sure that the values entered in these fields for WEP is identical to the encryption keys used on the other wireless devices on the network.

Once enabled, you can create an encryption key by using a **Passphrase**, or by entering the key manually. 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.

If you select to **Create Keys Manually**, enter a hexadecimal number for each key that you wish to encrypt. Make sure that the values entered in these fields for WEP are identical to the encryption keys used on the other wireless devices on the network.

Once you have chosen your key encryption method and entered either the Passphrase or manual key, 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.

## LINK

The Link screen provides information about the current link between the Network CF Card and the wireless network.

The **State** field displays information on the Access Point with which the Network CF Card is communicating.

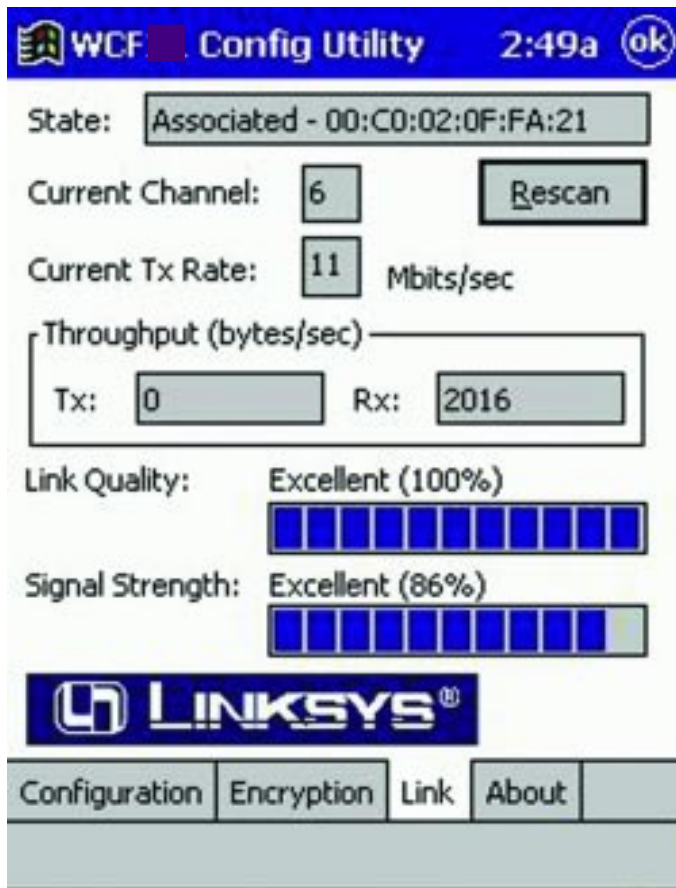
The **Current Channel** field shows to what channel the Network CF Card is set.

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

Clicking the **Rescan** button refreshes the information displayed.

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

The **Link Quality** field will display a bar indicating the percentage, between 0 and 100 percent, of the quality of the link. The higher the percentage, the better the link.



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

### ABOUT

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



# Troubleshooting

## Common Problems and Solutions

This chapter provides solutions to problems usually occurring during the installation and operation of the Network CF 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](http://www.linksys.com).

### 1. My PDA does not recognize the Wireless CF Network Card.

- Make sure that the Network CF Card is properly inserted into the CompactFlash port.
- Make sure the link led is solid.

### 2. The Wireless CF Network Card does not work properly.

- Reinsert the Network CF Card into the PDA's CompactFlash port.
- Uninstall the driver software from your PC and PDA device.
- Restart your PC and repeat the hardware and software installation as specified in this User Guide.

### 3. I cannot communicate with the Access Point via Ethernet in the Infrastructure configuration.

- Make sure that the Access Point is powered on.
- Make sure that your Network CF Card is configured on the same channel, SSID, and WEP as the Access Point.

## Frequently Asked Questions

### What is IEEE 802.11b standard?

The IEEE 802.11b 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 802.11b 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

## Wireless Network CF Card

### 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 is called an Infrastructure configuration. Infrastructure is applicable to enterprise scale for wireless access to 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 nodes 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 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.

### **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 series offer 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.

# 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.

**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 Network CF Card users and an 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.

**CSMA/CD (Carrier Sense Multiple Access/Collision Detection)** - 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.

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

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

**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. Having a transfer rate of 10 Mbps., this forms the underlying transport vehicle used by several upper-level protocols.

**FHSS** - Also known as "Frequency Hopping Spread Spectrum". 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** - Programming that is inserted into programmable read-only memory (programmable read-only memory), thus becoming a permanent part of a computing device.

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

Unlike e-mail programs in which graphics and program files have to be "attached," FTP is designed to handle binary files directly and does not add the overhead of encoding and decoding the data.

**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** - 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.

**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).

**Mbps** (MegaBits Per Second) - 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** - (Personal Digital Assistant) 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** - 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.

**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** (Small Office/Home Office) - 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 con-



sumed 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.

**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.

## Specifications

<b>Standards:</b>	IEEE 802.11b
<b>Channels:</b>	11 Channels (US, Canada) 13 Channels (Europe)* 14 Channels (Japan)*
<b>Operating Range:</b>	
Indoors:	<i>up to 30M (100 ft.) @ 11 Mbps</i> <i>up to 50M (165 ft.) @ 5.5 Mbps</i> <i>up to 70M (230 ft.) @ 2 Mbps</i> <i>up to 91M (300 ft.) @ 1 Mbps</i>
Outdoors:	<i>up to 152M (500 ft.) @ 11 Mbps</i> <i>up to 270M (885 ft.) @ 5.5 Mbps</i> <i>up to 396M (1300 ft.) @ 2 Mbps</i> <i>up to 457M (1500 ft.) @ 1 Mbps</i>
<b>Data Rate (Mbps):</b>	up to 11Mbps (with automatic scale back)
<b>LEDs:</b>	Link

\* will require different firmware and driver

### Environmental

<b>Dimensions:</b>	4.5" x 2" x .3" (115mm x 54mm x 8mm)
<b>Unit Weight:</b>	1.65 oz. (47g)
<b>Power:</b>	3.3V DC, 300 mA
<b>Certifications:</b>	FCC Class B, CE Mark Commercial
<b>Operating Temp.:</b>	32°F to 131°F (0°C to 55°C)
<b>Storage Temp.:</b>	-13°F to 158°F (-25°C to 70°C)
<b>Operating Hum.:</b>	10% to 90% Non-Condensing
<b>Storage Hum.:</b>	10% to 95% Non-Condensing

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## 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.

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## Contact Information

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

<b>Sales Information</b>	800-546-5797 (LINKSYS)
<b>Tech Support</b>	866-242-8558
<b>RMA Issues</b>	949-261-1288
<b>Fax</b>	949-261-8868
<b>Email</b>	support@linksys.com
<b>Web</b>	<a href="http://www.linksys.com">http://www.linksys.com</a>
<b>FTP Site</b>	<a href="ftp.linksys.com">ftp.linksys.com</a>

## **Federal Communication Commission Interference Statement**

This equipment has been tested and found to comply with the limits 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. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with 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 can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

**FCC Caution:** To assure continued compliance, (example - use only shielded interface cables when connecting to computer or peripheral devices). Any changes or modifications not expressly approved by the party responsible

for compliance could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

### **IMPORTANT NOTE:**

#### **FCC RF Radiation Exposure Statement:**

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

Caution: This device can emit RF energy. For compliance with FCC RF exposure rule, the user has to keep at least 2.5 cm separation distance between the radiator and the body of the user.

## **R&TTE Compliance Statement**

This equipment complies with all the requirements of the DIRECTIVE 1999/5/EC OF THE EUROPEAN PARLIAMENT AND THE COUNCIL of 9 March 1999 on radio equipment and telecommunication terminal Equipment and the mutual recognition of their conformity (R&TTE).

*The R&TTE Directive repeals and replaces in the directive 98/13/EEC (Telecommunications Terminal Equipment and Satellite Earth Station Equipment) As of April 8, 2000.*

## **Safety**

This equipment is designed with the utmost care for the safety of those who install and use it. However, special attention must be paid to the dangers of electric shock and static electricity when working with electrical equipment. All guidelines of this manual and of the computer manufacturer must therefore be allowed at all times to ensure the safe use of the equipment.

## **EU Countries Intended for Use**

The ETSI version of this device is intended for home and office use in Austria, Belgium, Denmark, Finland, France (with Frequency channel restrictions), Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

The ETSI version of this device is also authorized for use in EFTA member states Iceland, Liechtenstein, Norway and Switzerland.

## **EU Countries Not Intended for Use**

None.

## **Potential Restrictive Use**

France: Only channels 10,11,12, and13



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