

Instant Wireless™ Series

Wireless PCI Card



Use this Guide to install the following:

WMP11

User Guide

 **LINKSYS**®

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LIMITED WARRANTY

Linksys guarantees that every Instant Wireless™ Wireless PCI 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 Specification section of this User Guide. If these products prove defective during this warranty period, call Linksys Customer 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 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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Linksys P.O. Box 18558, Irvine, CA 92623.

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

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

IMPORTANT NOTE: FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

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

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Introduction

The Instant Wireless™ Wireless PCI Card

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

The Instant Wireless™ Wireless PCI Card now has a high-powered antenna that provides greater ranges than ever. Error correction in the chipset keeps you operating at higher transmission rates for longer distances.

Ready to run in PCs running Windows 95, 98, Millennium, NT, and 2000, the Instant Wireless™ Wireless PCI Card from Linksys is truly a “must-have” for all PC users.

Features

- 11 Mbps High-Speed Data Transfer Rate
- Compatible with Virtually All Major Network Operating Systems
- Plug-and-Play Operation Provides Easy Setup
- Integrated Equalizer Recovers Weak Signals and Enhances Sensitivity
- Sturdy Metal Design with Integrated Antenna
- Works with All Standard Internet Applications
- Interoperable with IEEE 802.11b (DSSS) 2.4GHz-Compliant Equipment
- Clear Channel Assessment Increases Network Throughput
- Hardware Buffer Chaining Provides High Performance While Reading and Writing Buffers
- Capable of up to 128-Bit WEP
- 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 PCI Card
- One Setup CD-ROM (Manual on CD)
- Quick Installation Guide and Registration Card (not shown)

System Requirements

- One Free PCI Slot
- Windows 95, 98, Millennium, NT or 2000
- 600 Kbytes of free disk space for utility and driver installation

Planning Your Wireless Network

Network Topology

A wireless LAN is exactly like a regular LAN, except that each computer in the LAN uses an Instant Wireless™ Wireless PCI Card to connect to the network using no wires. Computers in a wireless LAN must be configured to share the same radio channel.

The Instant Wireless™ Wireless PCI Card provides LAN access for wireless workstations. An integrated wireless and wired LAN is called an Infrastructure configuration. A group of Wireless PCI Card users and an Access Point compose a Basic Service Set (BSS). Each PC equipped with an Wireless PCI 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 an Wireless PCI Card PC to a wired LAN, and doubles the effective wireless transmission range for two Wireless PCI Card PCs. 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.

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 Wireless PCI Card PCs 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.

Installing the Drivers and Configuration Utility for Windows 95, 98, ME and 2000

Before You Start

Your new Instant Wireless™ Wireless PCI Card comes with an automated software installation procedure for Windows 95, 98, Millennium, and 2000. **Windows NT users should refer to the next section.** This new procedure automatically installs the drivers and Configuration Utility *before* you install your hardware, so there's no searching for the location of drivers. *Again, this step is taken before installing your hardware.*

Running the Auto Driver Installation

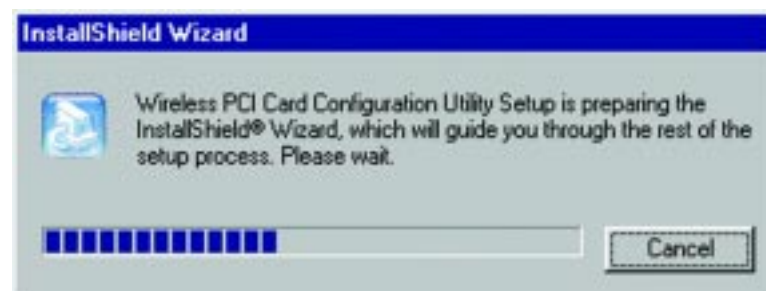
1. Before installing your adapter, insert the Setup CD into your CD-ROM drive. Unless you have deactivated the auto-run feature of Windows, the following screen should appear automatically.



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.

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2. 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, press 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.

3. This screen will appear next, indicating that Windows is ready to continue the installation. Click the **Next** button.



4. The next screen that appears will be the **Warranty Policy**. Read the entire policy by pressing the **Page Down** button on your keyboard. Click on 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.

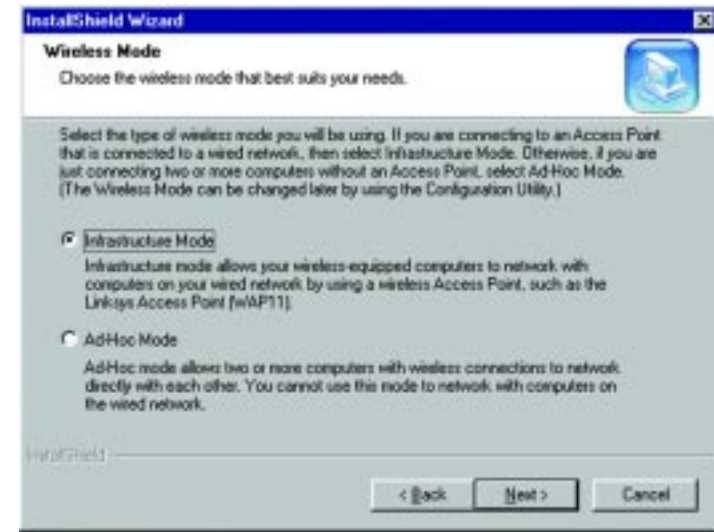


5. The following window will appear next. To install the Configuration Utility in the default directory (recommended), click the **Next** button. If you prefer to install the Utility in another directory, click the **Browse** button, locate the preferred directory then click the **Next** button.



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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.



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.



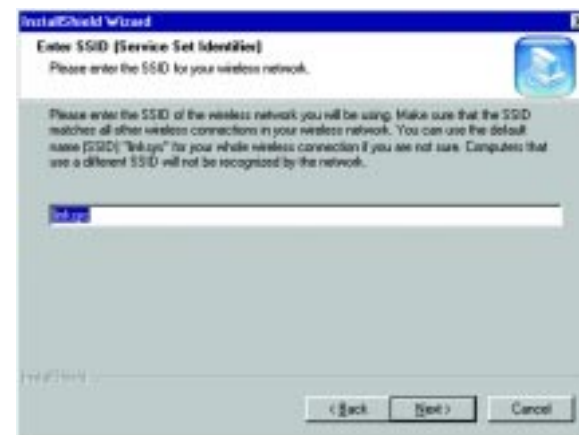
If the wireless network is relatively small and needs to share resources only with the other computers on the wireless network, then the **Ad-Hoc** mode can be used. Ad-Hoc mode allows computers equipped with wireless transmitters and receivers to communicate directly with each other, eliminating the 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.



Wireless PCI Card

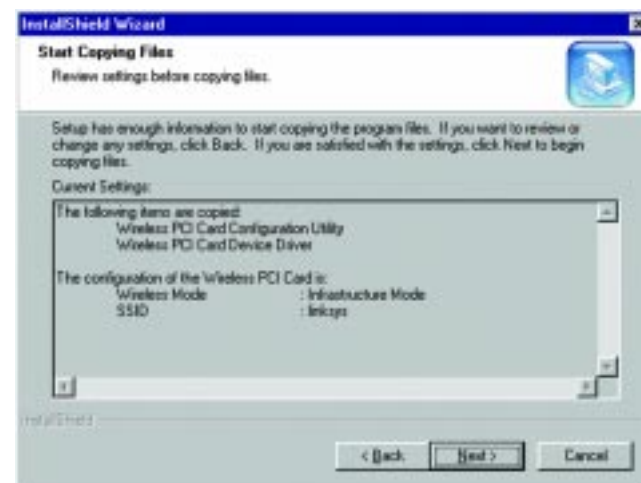
Infrastructure Mode

1. If you have chosen **Infrastructure** mode, the following screen will appear. If you have chosen **Ad-Hoc** mode, skip to the next section.

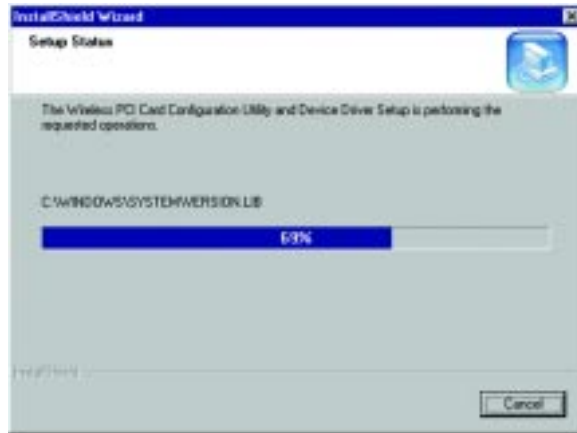


You will be prompted to enter an **SSID** value in the box provided. The SSID may be up to 32 characters in length and may include any character on the keyboard. All SSID values on your wireless network must match. If you are unsure, use the default value of “linksys”. Then, click the **Next** button. **Note:** All characters are case-sensitive.

2. The next screen to appear will be the Review Settings screen. Verify that all the settings are correct and click the **Next** button to continue.



3. The following screen will appear, indicating that all of the appropriate files are being copied onto your drive. Click the **Cancel** button if you need to stop the installation for any reason.



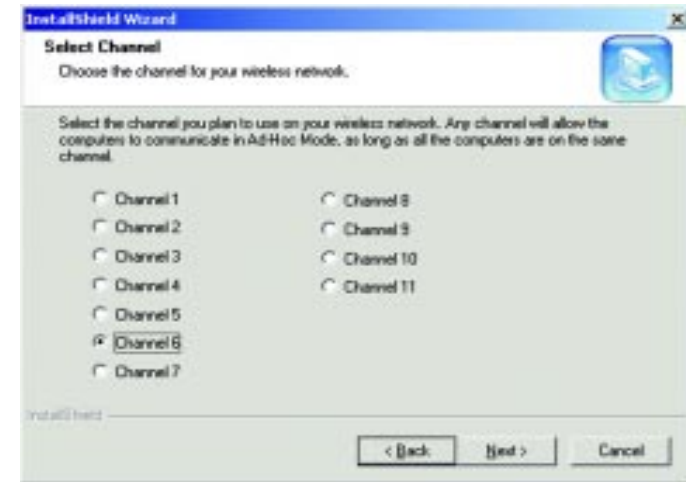
4. Once Windows has finished copying the necessary files, the following screen will appear. In order for the drivers to be installed properly, you must restart your computer. If you choose to do it now, select **Yes, I want to restart my computer now**. If you do not want to do it now, choose **No, I will restart my computer later**. Once you have made your choice, click the **Finish** button to continue.



Note: Restart the computer and go to the section called **Installing the Wireless PCI Card** for further instructions.

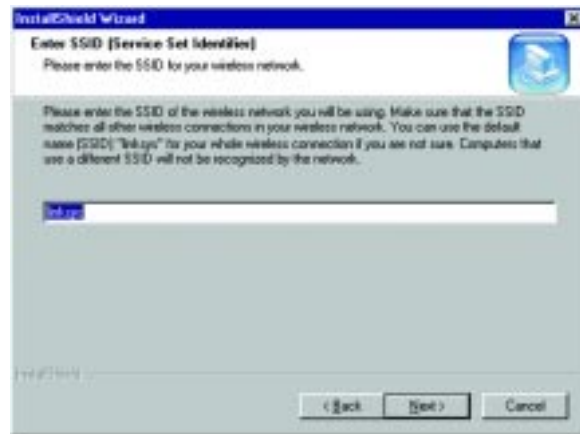
Ad-Hoc Mode

1. If you have chosen **Ad-Hoc** mode, the following screen will appear. If you have chosen **Infrastructure** mode, refer to the previous section.

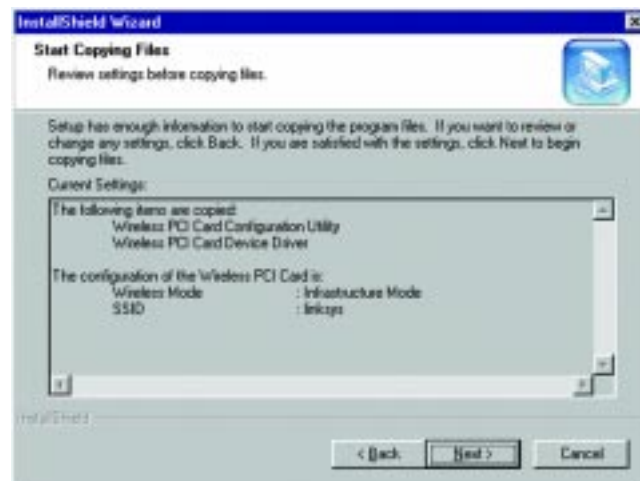


You will be prompted to choose a **Channel** from the list provided. All computers on your wireless network must be using the same channel in order to communicate with each other. If you are unsure about which channel to use, select the default channel (Channel 6). Once you have chosen your channel, click the **Next** button.

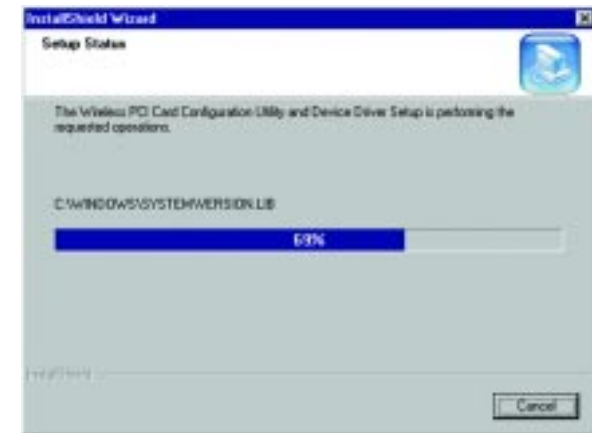
2. The following screen should appear. You will be prompted to enter an **SSID** value in the box provided. All SSID values on your wireless network must match. If you are unsure, use the default value of “linksys”. Then, click the **Next** button.



3. The next screen to appear will be the Review Settings screen. Verify that all the settings are correct and click the **Next** button to continue.



4. The following screen will appear, indicating that all of the appropriate files are being copied onto your drive. Click the **Cancel** button if you need to stop the installation for any reason.



5. Once Windows has finished copying the necessary files, the following screen will appear. In order for the drivers to be installed properly, you must restart your computer. If you choose to do it now, select **Yes, I want to restart my computer now**. If you do not want to do it now, choose **No, I will restart my computer later**. Once you have made your choice, click the **Finish** button to continue.



Note: Restart the computer and go to the section called **Installing the Wireless PCI Card** for further instructions.

Installing the Wireless PCI Card

Installing the Wireless PCI Card In Your Desktop PC

1. **Turn off your desktop PC.**
2. **Open your PC case** and locate an available PCI slot on the motherboard. Check with your computer manufacturer for instructions.
3. **Slide the Wireless PCI Card into the PCI slot.** Make sure that all of its pins are touching the slot's contacts. You may have to apply a bit of pressure to slide the card all the way in. After the card is firmly in place, secure its fastening tab to your PC's chassis with a mounting screw. Then, close your PC.
4. Attach the external antenna to the card's antenna port.
5. **Power on your desktop PC.**

The Hardware Installation is complete. Your Wireless PCI Card is set up and ready for use. You may continue reading to learn about the card's Configuration Utility in the Configuration Utility section.

Installing the Drivers and Configuration Utility for Windows NT

Overview

The installation of the Wireless PCI Card is different for users of Windows NT because it is not a Plug-and-Play(PnP) system, which means it will not automatically detect the presence of the Wireless PCI Card when it is inserted. Consequently, the order of the installation is different. The steps involved in the installation are different, as well. *If you are using any other operating system than Windows NT, stop here and refer to the section called **Installing the Drivers and Configuration Utility for Windows 95, 98, ME, and 2000.***

Installing the Drivers for Windows NT

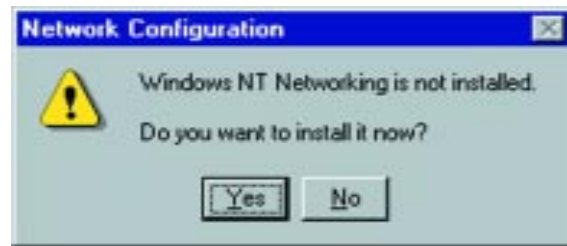
Windows NT will setup the Wireless PCI Card differently depending upon whether you've previously installed network hardware or not. Please follow the instructions appropriate for you.

If You Have Never Installed Network Hardware:

1. Windows NT is not a Plug-and-Play Operating System and will not automatically identify the Wireless PCI Card. To begin setup, insert the **Setup Utility CD** into your CD-ROM drive. If the Setup Utility CD attempts to autorun, exit out of the utility to the desktop. Then select **Settings** from the **Start** Menu and bring up the **Control Panel**. Then, double-click on the **Network** icon.



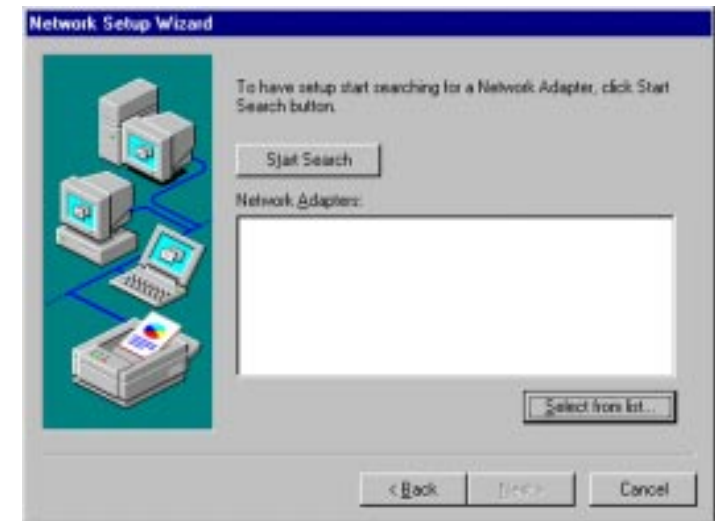
2. Windows will notify you that Networking is not installed. Click the **Yes** button to continue. (If Networking is already installed, proceed to “If You Have Installed Network Hardware Before”).)



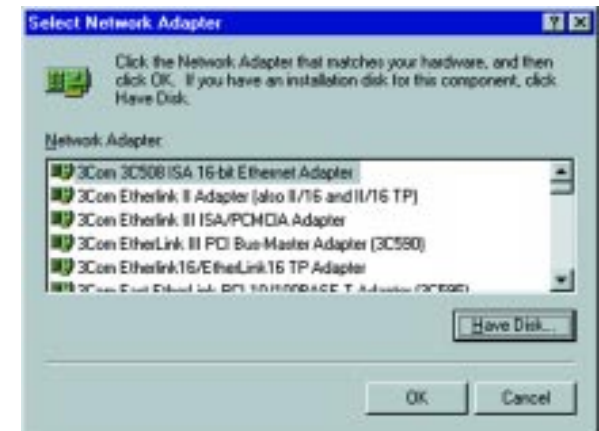
3. Installation will begin and you will reach the screen shown below. You will want to select the box that reads **Wired to the network** since you are adding network hardware. Then, click the **Next** button to continue.



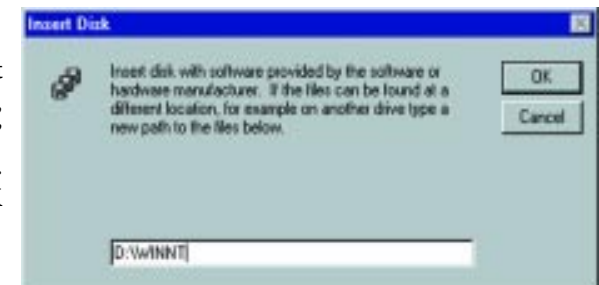
4. The next screen will not show any Network Adapters installed on your system, which signifies that no network hardware has been previously installed. Click the **Select from list** button to continue.



5. A list of adapters will appear on the next screen. You will not want to select one of these, however, as your installation disk (Setup Utility CD) has all of the appropriate drivers. Click the **Have Disk** button to continue.



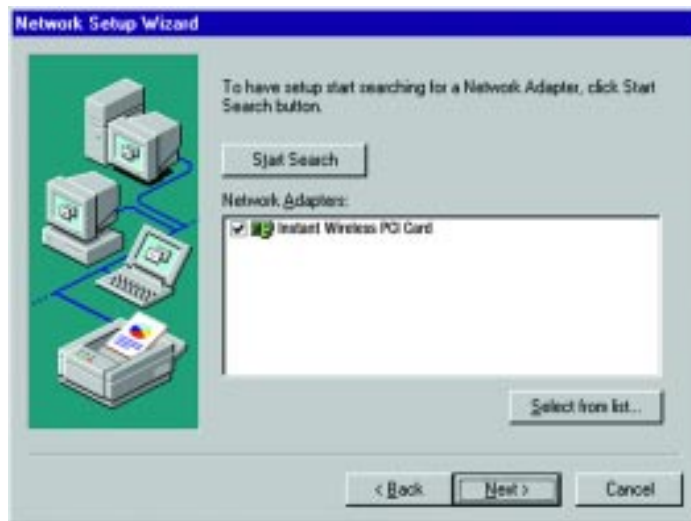
6. When the **Insert Disk** screen appears, type “D:\WINNT” in the field provided. Then, click the **OK** button to continue.



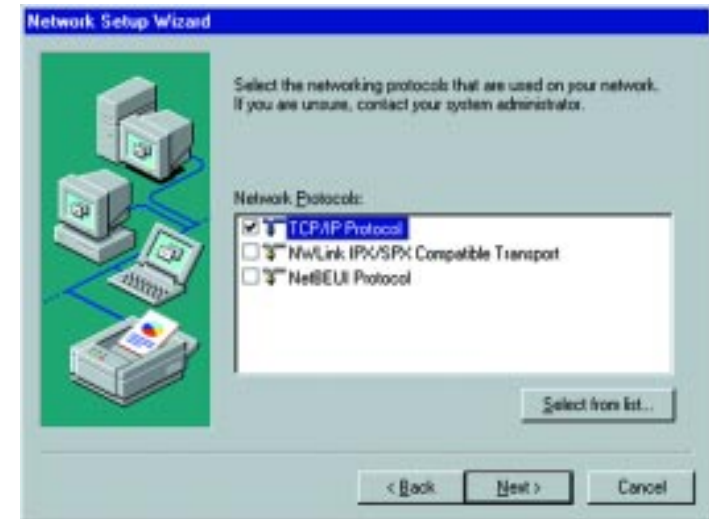
7. The **Select OEM Option** screen will display all available adapters. Make sure that **Instant Wireless PCI Card** is highlighted and click the **OK** button to continue.



8. On the next screen, make sure there is a check mark in the box beside **Instant Wireless PCI Card**. Then click the **Next** button to continue.



9. The next screen will show a list of network protocols. While the **TCP/IP Protocol** is already selected by default, you should check with your network administrator before installing any additional network protocols. Click the **Next** button to continue.



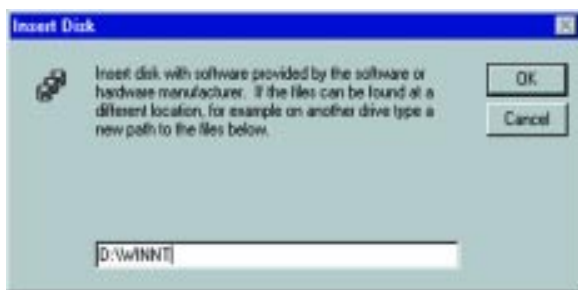
10. On the screen showing **Network Services**, the selections are automatically made. Click the **Next** button to continue.



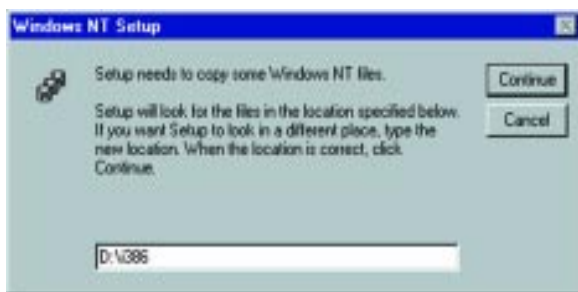
11. At this point, Windows NT will be ready to start installing Networking Components. After verifying your selections, click the **Next** button to continue. Or, click the **Back** button to make any necessary corrections.



12. Windows NT may request further files at this point. Type “D:\WINNT” in the field provided and click the **Continue** button.



If files are still requested, insert your **Windows NT CD** into your CD-ROM drive and type “D:\i386” (where “D” represents your CD-ROM drive). Then, click the **Continue** button.



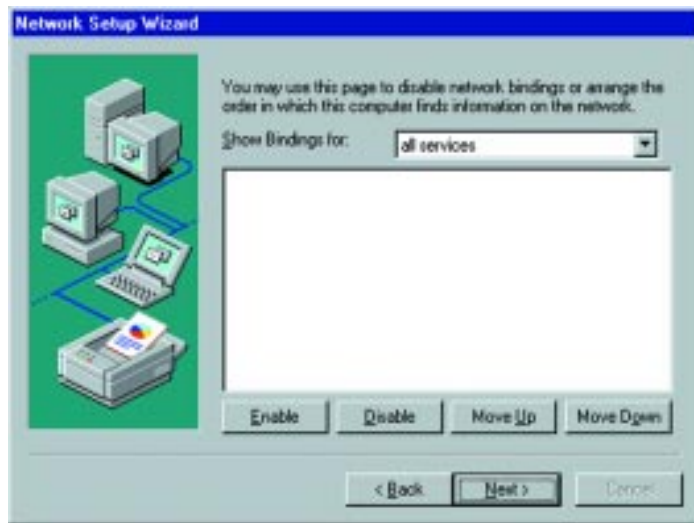
13. You will now reach the screen shown here. This is called the **Resources & Properties** screen. Your System Administrator if you have one, will give you all the information you need concerning these settings. Adjust the settings as are appropriate and click the **OK** button.



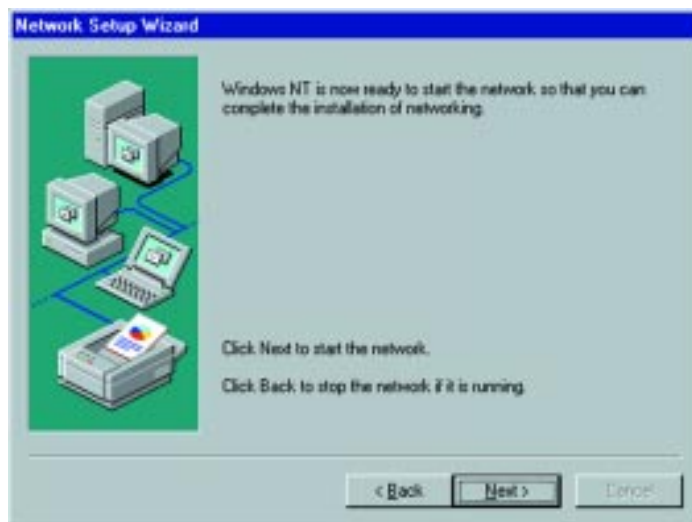
14. After setting the **Resource and Properties** fields, Windows NT will begin installing the network components you previously selected. You may be asked if you would like to configure the protocols with a DHCP server on your network. If this screen comes up, check with your Network Administrator before clicking the **Yes** or **No** button to continue. This setting may also be changed at a later time.



15. Now, the network components will finish installing. If a screen similar to that shown here appears, be sure to check with your network administrator before making ANY changes and then click the **Next** button to continue.



16. At this point, Windows NT will let you know that it is ready to start the network. If you'd like to stop the procedure, click the **Back** button. To continue, click the **Next** button.



17. On this screen, you will enter your **Computer Name**, which is how your computer will be identified on the network. You will also assign the computer to either a **Workgroup** or **Domain**, whichever is appropriate. The Computer Name must be different than any other on the Workgroup or Domain. Click the **Next** button.



18. Once the drivers have been installed, the following screen may appear.



Make sure that the Instant Wireless™ Wireless PCI Card appears in the Adapter window. Then, unless you need to assign a static IP address, select **Obtain an IP address from a DHCP server** and click the **OK** button. If you need to assign a static IP address, select Specify and IP Address, and enter the appropriate values under IP Address, Gateway Mask, and Default Gateway. When you have made your choice, click the **OK** button.

Windows NT has now completed installing the network. Remove the Setup CD from the CD-ROM drive and click the **Finish** button to continue. Then restart your computer.

The Driver Installation is complete. Continue now to the section called Installing the Configuration Utility for Windows NT.

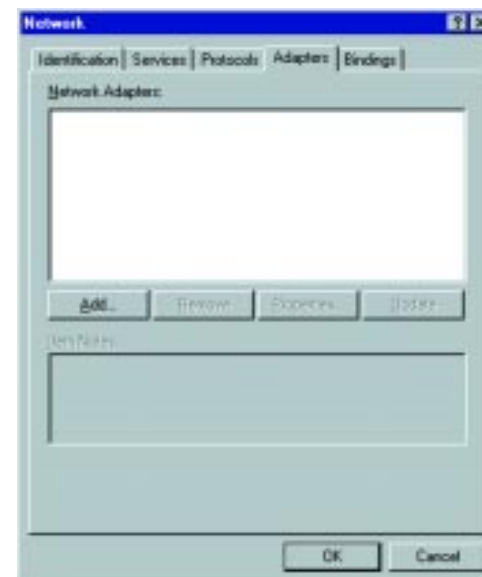
NOTE: After you have installed the Wireless PCI Card, reapply the Windows NT service pack.

If You Have Installed Network Hardware Before:

1. Windows NT is not a Plug-and-Play Operating System and will not automatically identify the Wireless PCI Card. To begin setup, insert the **Setup Utility CD** into your CD-ROM drive and then select **Settings** from the **Start** Menu and bring up the **Control Panel**. Then, double-click on the **Network** icon.



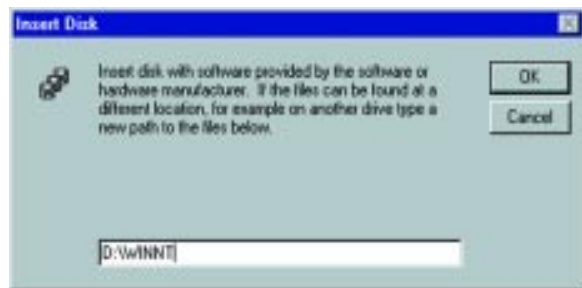
2. To add the Wireless PCI Card, you will want to click the **Adapters** tab and then click the **Add** button to continue.



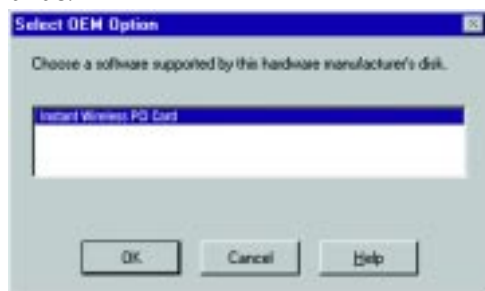
3. A list of adapters will appear on the next screen. You will not want to select one of these, however, as your installation disk (**Setup Utility CD**) has all of the appropriate drivers. Click the **Have Disk** button to continue.



4. On the **Insert Disk** screen, type “D:\WINNT” in the field provided. Then, click the **OK** button to continue.



5. The **Select OEM Option** screen will display all available adapters. Make sure that **Instant Wireless PCI Card** is highlighted and click the **OK** button to continue.



6. You will now reach the screen shown below. This is called the **Resources & Properties** screen. Your System Administrator will give you all the information you need concerning these settings. If you are the System Administrator, or just need more information concerning these settings, refer to the section called **Configuring the Wireless PCI Card for Windows NT**. Adjust the settings as are appropriate and click the **OK** button.



Wireless PCI Card

7. The Wireless PCI Card has now been installed. You will see it added onto this screen. Click the **Close** button to continue and then restart your computer.

NOTE: After you have installed the Wireless PCI Card, reapply the Windows NT service pack.



Once the installation has completed, the following screen may appear, depending on the configuration of your computer.



If the window does appear, make sure that the Instant Wireless™ Wireless PCI Card appears in the Adapter window. Then, unless you need to assign a static IP address, select **Obtain an IP address from a DHCP server** and click the **OK** button. If you need to assign a static IP address, select **Specify and IP Address**, and enter the appropriate values under **IP Address**, **Gateway Mask**, and **Default Gateway**. When you have made your choice, click the **OK** button.

Windows NT has now completed installing the drivers. Remove the Setup CD from the CD-ROM drive and click the **Finish** button to continue. Then restart your computer.

The Driver Installation is complete. Continue now to the section called Installing the Configuration Utility for Windows NT.

Installing the Configuration Utility for Windows NT

Once you have restarted your computer, the drivers for the Card should load successfully. Now it is necessary to install the Configuration Utility. Insert the Setup CD in the 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. Follow the instructions that appear on your screen. If you have any questions or difficulty, refer to the section called **Installing the Drivers and Configuration Utility for Windows 95, 98, ME and 2000**.

Configuration Utility

The **Configuration Utility** is provided to allow you further customization of the Wireless PCI Card and your wireless network.

Using the Configuration Utility

Once the Configuration Utility has been installed, an icon will be placed in the system tray (next to the clock) when the Wireless PCI Card is inserted.

This icon (which looks like a small computer) serves two purposes. Double-clicking on the icon will open the Configuration Utility. The other function of the icon is to indicate the status of your wireless connection. The icon does this by changing color. The different colors each indicate a different quality of wireless connection. The chart below details what the colors are and what each one means.



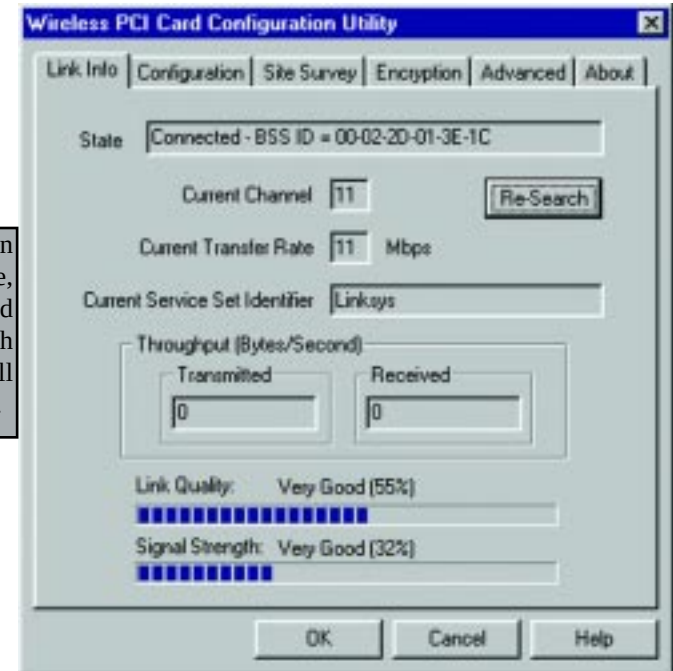
Icon Color	Connection Status
Green	When the icon is green, it is an indication of a good to excellent wireless connection
Yellow	When the icon is yellow, it is an indication of a weak to low wireless connection
Red	When the icon is red, it is an indication of a very low to no wireless connection

Note: In **Ad-Hoc** mode, the icon will **always** appear green. When in this mode, the icon color does not apply to the Link Quality and Signal Strength of the wireless connection.

You can also start the Configuration Utility by pressing the **Start** button and selecting Wireless PCI Card. Then choose **Configuration Utility**. You will see the Wireless LAN Configuration Utility screen. This utility is divided into four parts: **Link Info**, **Configuration**, **Site Survey**, **Encryption**, **Advanced**, and **About**. *It is recommended that you change all configuration settings for your Wireless PCI Card using this utility and not under the Network Properties section in your Control Panel.*

LINK INFO

The Link Info screen provides information about the current link between the Wireless PCI Card and the wireless Access Point.



Note: When in Ad-Hoc mode, Link Quality and Signal Strength indicators will not be available.

The **Current Channel** field shows to what channel the Wireless PCI Card is set.

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

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. (This is to be used as a guide only and not an indicator true signal strength or quality.)

CONFIGURATION

The Configuration screen allows you to customize the settings for the Wireless PCI Card and your wireless network. Once these are set, you can save these configuration settings with the Profile function. Click **Create** to save your configuration settings and **Activate** to use these settings. To delete settings you have saved, use the **Remove** button.

The **Wireless Mode** setting determines the architecture of your wireless network. Select **Ad-Hoc** or **Infrastructure** Mode 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 PCI Cards without needing a wireless Access Point. The **Infrastructure** mode allows a wireless network to be integrated into an existed, 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 must be identical for all points in the network. *It is case sensitive and must not exceed 32 characters.*

The **Transfer Rate** field shows the current transfer rate for the Wireless PCI Card. To optimize performance and range, the TX Rate should be set to Fully Automatic, which will automatically adjust the transfer speed for best performance and longest range.

Power Saving Mode, or **PS Mode**, enables or disables the power saving features of your Wireless PCI Card.



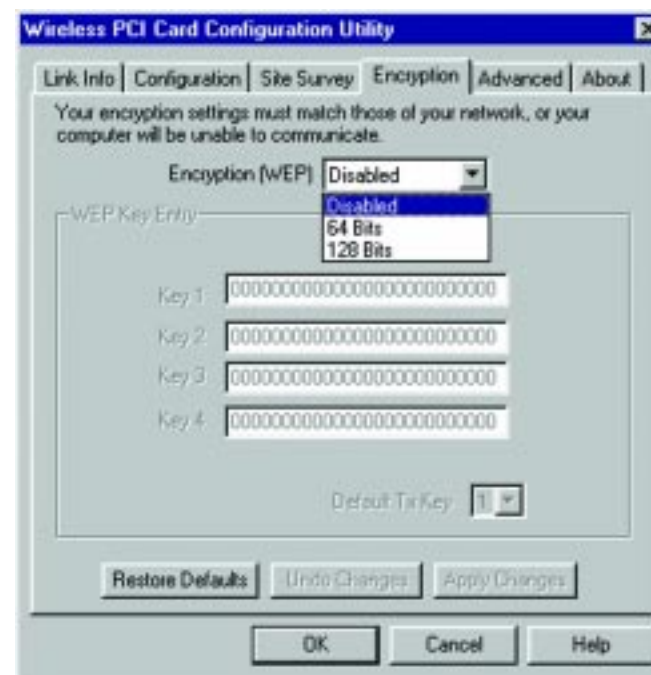
Wireless PCI Card

The **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.

ENCRYPTION

The 64-bit or 128-bit WEP keys can be generated from a user-defined passphrase or entered manually.

An acronym for **W**ired **E**quivalent **P**rivacy, **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.

The Default Key can then be set by selecting any of the four keys that have been entered in the Manual Entry fields. That key will then be the one used automatically by the Wireless PCI Card.

Once you have chosen your key encryption method and entered either the Passphrase or manual key, click the **Apply Changes** button. Then click the **OK** button and the encryption portion of the setup is complete. To undo these changes, click the **Undo Changes** button.

Note: 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.

You can also restore the card's default settings by clicking the **Restore Defaults** button.

ENCRYPTION

The **Site Survey** tab will show you that available Access Points and their features. Click on the desired Access Point, then click **Connect** to connect or **Search** to search for more Access Points. Click **OK** when you are finished.

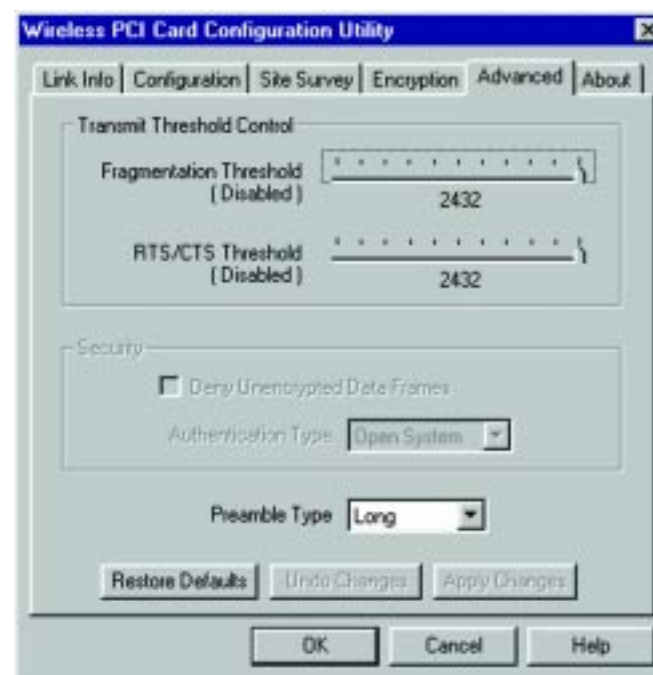


ADVANCED

The **Advanced** tab allows you to set the **Fragmentation Threshold**, the **RTS/CTS Threshold**, and the **Preamble Type**. The **Fragmentation Threshold Value** indicates how much of the network resources are devoted to recovering packet errors. The value should remain at its default setting of **2,436**. If you experience high packet error rates, you can decrease this value, but it will likely decrease overall network performance. Only minor modifications of this value are recommended.

The **RTS Threshold Value** should remain at its default setting of **2,437**. A preamble is a signal used to synchronize the transmission timing between two or more systems. A series of transmission pulses is sent before the data to indicate that "someone is about to transmit data". This ensures that systems receiving the information correctly interpret when the data transmission starts.

Security is used for WEP only. By selecting **Deny Unencrypted Data Frames**, all unencrypted data will not be seen. For **Authentication Type**, you may choose between **Open System** or **Shared Key**.



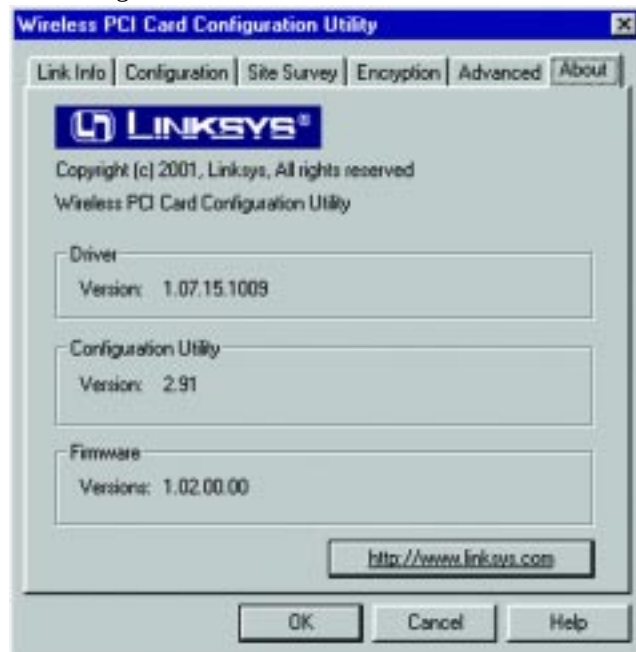
Shared Key is when both the sender and recipient share a secret key. Both units use this key for an extended length of time, sometimes indefinitely. Any eavesdropper that discovers the key may decipher all packets until the key is changed.

Open System, the default setting, is when the sender and the recipient do not share a secret key. Each party generates its own key-pair and asks the receiver to accept the (usually randomly) generated key. Once accepted, this key is used for a short time only, then a new key is generated and agreed upon. Even if the secret key is discovered, only a small amount of data may be decrypted.

The **Preamble Mode** should be set to **Long** (if in a “noisy” network environment), **Short** (if the environment is clear), or click **OK** to complete the configuration

ABOUT

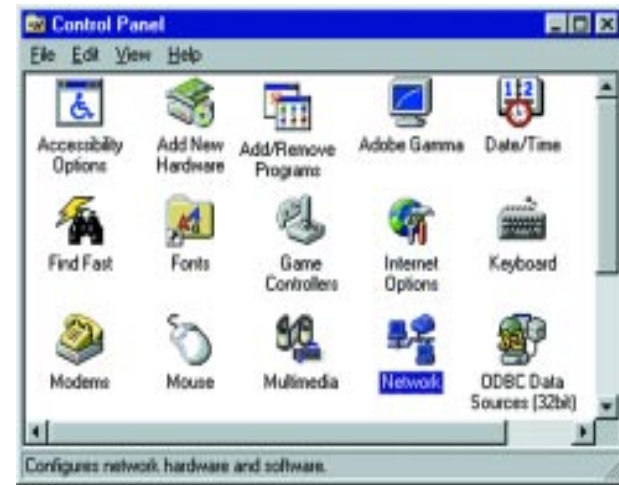
The About screen shows the release information for the Driver Version, Configuration Utility Version, and Firmware Version. You can also connect directly to the Linksys web site with your active internet connection by clicking the button showing the internet address at the bottom of the screen.



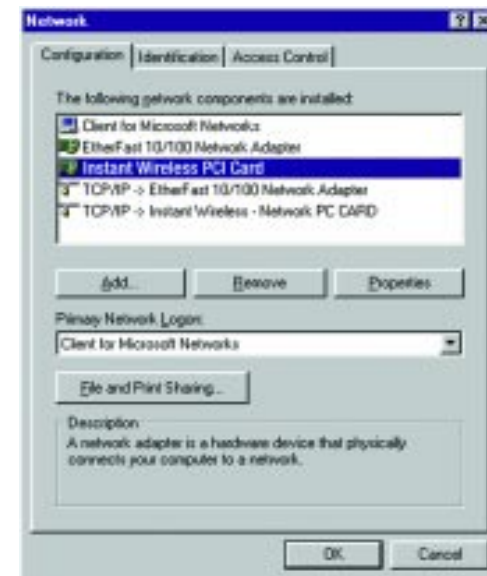
Installing Network Protocols

Protocols are necessary for computers to communicate on your network.

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



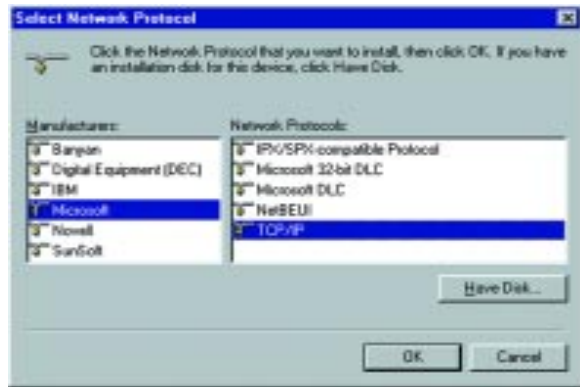
2. Select the **Wireless PCI Card** from the list and click the **Add** button.



3. Highlight **Protocol** and click the **Add** button.



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



5. Repeat steps two through four to install other protocols such as NetBEUI or IPX/SPX.

From the screen in step two, you can also press the **Properties** button. From this screen, you can verify that the drivers are working under Enhanced Mode on the **Driver Type** tab or reconfigure the card on the **Advanced** tab.

At this point, you must restart your computer. Installation is complete.



Troubleshooting

Common Problems and Solutions

This chapter provides solutions to problems usually occurring during the installation and operation of the Wireless PCI 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. The Wireless PCI Card does not work properly.

- Reinsert the Wireless PCI Card into your PC's PCI slot.
- Right click on **My Computer** and select **Properties**. Select the device manager and click on the Network Adapter. You will find the Wireless PCI Card if it is installed successfully. If you see the yellow exclamation mark, the resources are conflicting. You will see the status of the Wireless PCI Card. If there is a yellow question mark, please check the following:
 - Make sure your PC has a free IRQ.
 - Make sure you have inserted the right card and installed the proper driver.

If the Wireless PCI 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 Ethernet in the Infrastructure configuration.

- Make sure that the notebook PC to which the Wireless PCI Card is associated is powered on.
- Make sure that your Wireless PCI Card is configured on the same channel and with the same security options as with 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 multiplayer 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 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

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 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.

Default Gateway - The router 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.

DNS - The domain name system (DNS) is the way that Internet domain names are located and translated into Internet Protocol (IP) addresses. A domain name is a meaningful and easy-to-remember "handle" for an Internet address.

DSSS - Also known as “Direct Sequence Spread Spectrum”, this is a variety of radio transmission methods that continuously change frequencies or signal patterns. Direct sequence spread spectrum (DSSS), which is used in CDMA, multiplies the data bits by a very fast pseudo-random bit pattern (PN sequence) that “spreads” the data into a large coded stream that takes the full bandwidth of the channel

Dynamic IP Address - An IP address that is automatically assigned to a client station in a TCP/IP network, typically by a DHCP server. Network devices that serve multiple users, such as servers and printers, are usually assigned static IP addresses.

ESS - More than one BSS in a network.

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.

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.

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.

IPCONFIG - A utility that provides for querying, defining and managing IP addresses within a network. A commonly used utility, under Windows NT and 2000, for configuring networks with static IP addresses.

ISP - An ISP (Internet service provider) is a company that provides individuals and companies access to the Internet and other related services such as Web site building and virtual hosting.

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).

MAC Address - The MAC (Media Access Control) address is your computer’s unique hardware number.

mIRC - mIRC runs under Windows and provides a graphical interface for logging onto IRC servers and listing, joining and leaving channels.

Network Mask - also known as the “Subnet Mask”.

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.

Ping - (Packet INternet Groper) An Internet utility used to determine whether a particular IP address is online. It is used to test and debug a network by sending out a packet and waiting for a response.

RJ-45 - A connector similar to a telephone connector that holds up to eight wires, used for connecting Ethernet devices.

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.

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

Subnet Mask - The method used for splitting IP networks into a series of sub-groups, 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.

TCP (Transmission Control Protocol) - A method (protocol) used along with the Internet Protocol (Internet Protocol) 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 (TCP/IP) is 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.

UDP (User Datagram Protocol) - A communications method (protocol) that offers a limited amount of service when messages are exchanged between computers in a network that uses the Internet Protocol (IP). UDP is an alternative to the Transmission Control Protocol (TCP) and, together with IP, is sometimes referred to as UDP/IP. Like the Transmission Control Protocol, UDP uses the Internet Protocol to actually get a data unit (called a datagram) from one computer to another. Unlike TCP, however, UDP does not provide the service of dividing a message into packets (datagrams) and reassembling it at the other end. Specifically, UDP doesn't provide sequencing of the packets that the data arrives in. This means that the application program that uses UDP must be able to make sure that the entire message has arrived and is in the right order. Network applications that want to save processing time because they have very small data units to exchange (and therefore very little message reassembling to do) may prefer UDP to TCP.

UTP - Unshielded twisted pair is the most common kind of copper telephone wiring. Twisted pair is the ordinary copper wire that connects home and many business computers to the telephone company. To reduce crosstalk or electromagnetic induction between pairs of wires, two insulated copper wires are twisted around each other. Each signal on twisted pair requires both wires. Since some telephone sets or desktop locations require multiple connections, twisted pair is sometimes installed in two or more pairs, all within a single cable.

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

WINIPCFG - Configuration utility based on the Win32 API for querying, defining and managing IP addresses within a network. A commonly used utility, under Windows 95, 98, and Millennium, for configuring networks with static IP addresses.

Specifications

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

Environmental

Dimensions:	4.5" x 2" x .3" (115mm x 54mm x 8mm)
Unit Weight:	1.65 oz. (47g)
Power:	3.3V or 5V DC, 275mA Tx, 225mA Rx, 200mA Standby
Certifications:	FCC Class B, CE Mark Commercial
Operating Temp.:	32°F to 131°F (0°C to 55°C)
Storage Temp.:	-4°F to 158°F (-20°C to 70°C)
Operating Hum.:	0% to 90% Non-Condensing
Storage Hum.:	0% to 95% Non-Condensing

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.

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.

Sales Information	800-546-5797 (LINKSYS)
Tech 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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