

Instant Wireless™ Series

# Network PC Card



Use this Guide to install the following:

WPC11 V2.5

User Guide

 **LINKSYS**®

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#### FCC STATEMENT

This products have been tested and comply 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™ Network PC Card V2.5

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

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

Ready to run in Type II or III PCMCIA-equipped notebook PCs running Windows 95, 98, Millennium, NT, and 2000, the Instant Wireless Network PC Card V2.5 from Linksys is truly a “must-have” for all notebook 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
- Utilizes Intersil ISL3873 Chipset
- 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™ Network PC Card V2.5
- One Setup CD-ROM (Manual on CD)
- Quick Installation Guide and Registration Card (not shown)

### System Requirements

- A 16-bit PCMCIA Type II or Type III slot
- PCMCIA revisions 2.10 compliant card and socket services
- 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™ Network PC Card V2.5 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™ Network PC Card V2.5 provides LAN access for wireless workstations. An integrated wireless and wired LAN is called an Infrastructure configuration. A group of Instant Wireless™ Network PC Card V2.5 users and an Access Point compose a Basic Service Set (BSS). Each PC equipped with an Instant Wireless™ Network PC Card V2.5 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 Instant Wireless™ Network PC Card V2.5 PC to a wired LAN, and doubles the effective wireless transmission range for two Instant Wireless™ Network PC Card V2.5 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 BSS is essential. All computers that have Instant Wireless™ Network PC Cards V2.5 configured without roaming options in an independent BSS must be configured with a BSS ID (that is used in the BSS).

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 Instant Wireless™ Network PC Card V2.5 PCs within one ESS must be configured with the same ESS ID.

Before enabling an ESS with roaming capability, 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 Linksys Instant Wireless™ Network PC Card V2.5 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

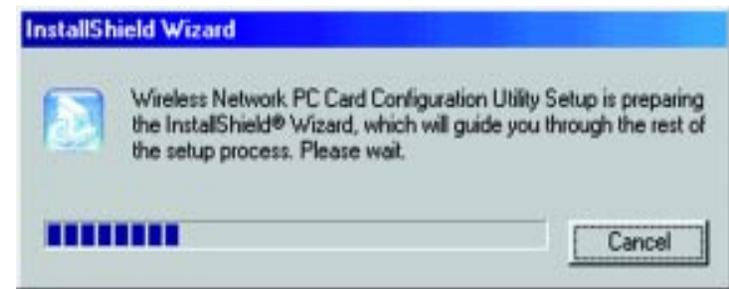
1. Before installing your adapter, insert the Setup CD into your CD-ROM drive. Unless you have deactivated the auto-run feature of Windows, the following screen should appear automatically.



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.

## Network PC Card

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.



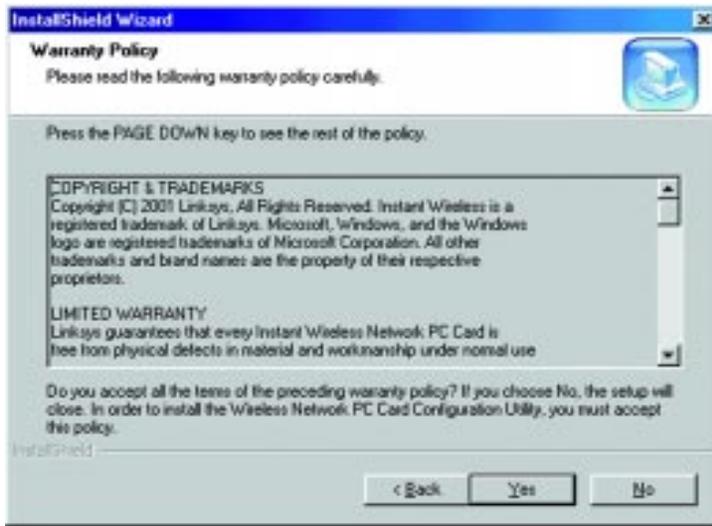
If, for whatever reason, you need to abort or terminate the installation, press the **Cancel** button at any time during the installation. Otherwise the installation will continue automatically.

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

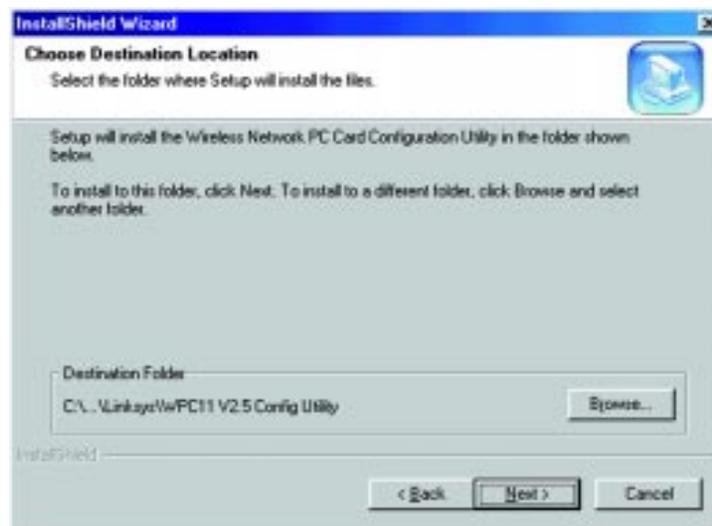
3. This screen will appear next, indicating that Windows is ready to continue the installation. Click the **Next** button.



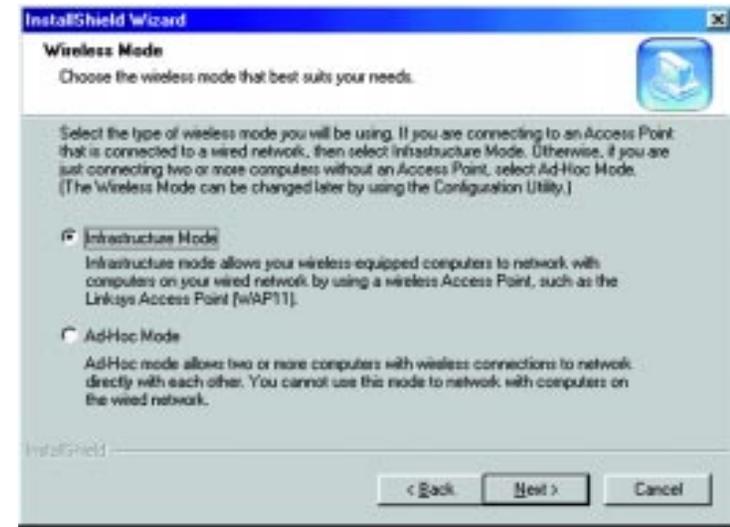
4. The next screen that appears will be the **Warranty Policy**. Read the entire policy by pressing the **Page Down** button on your keyboard. Click on the **Yes** button if you agree, or **No** if you disagree. Clicking **No** will terminate the installation. If you click **Yes**, the installation will 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.



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 adapters, 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.



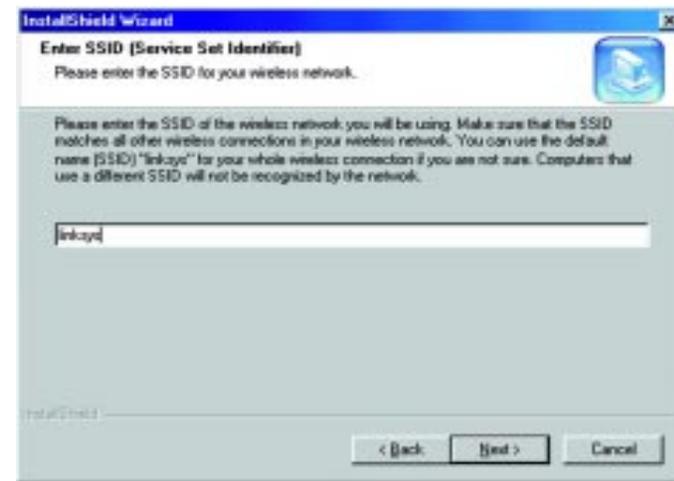
If the wireless network is relatively small and needs to share resources only with the other computers on the wireless network, then the **Ad-Hoc** mode can be used. Ad-Hoc mode allows computers equipped with wireless transmitters and receivers to communicate directly with each other, eliminating the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



a wired network. And, of course, communication between the wireless-equipped computers is limited by the distance and interference directly between them.

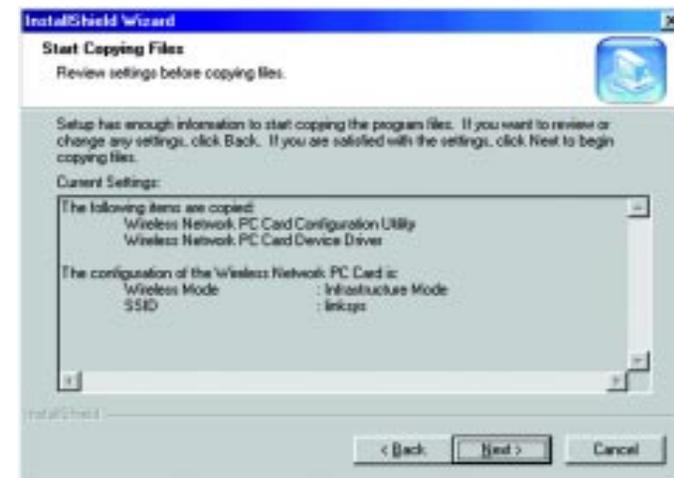
## Infrastructure Mode

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

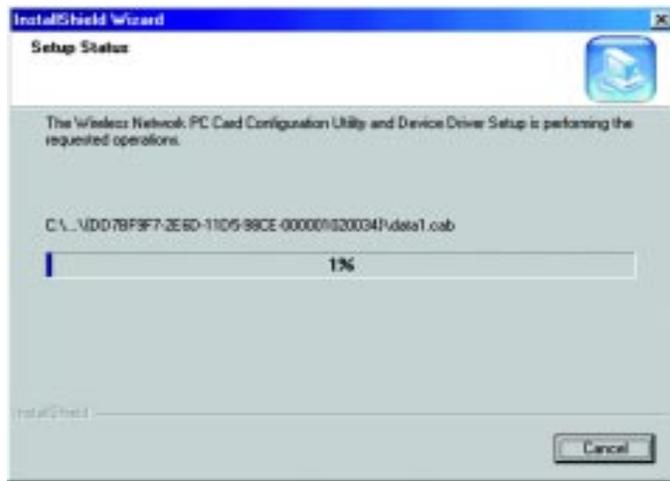


You will be prompted to enter an **SSID** value in the box provided. The SSID may be up to 32 characters in length and may include any character on the keyboard. All SSID values on your wireless network must match. If you are unsure, use the default value of “linksys”. Then, click the **Next** button.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



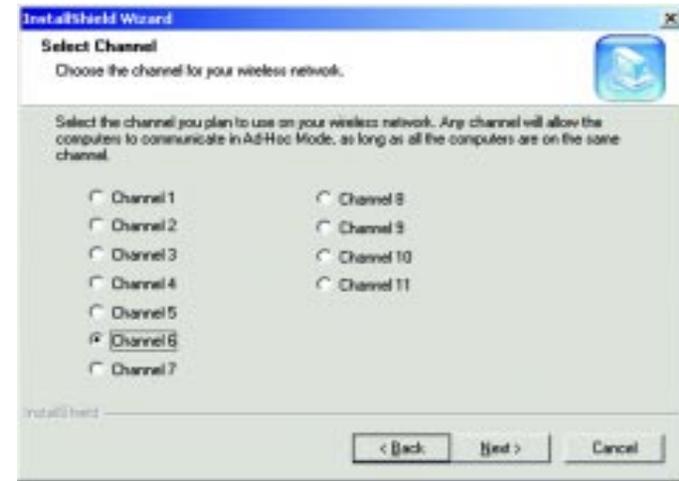
4. Once Windows has finished copying the necessary files, the following screen will appear. In order for the drivers to be installed properly, you must restart your computer. If you choose to do it now, select **Yes, I want to restart my computer now**. If you do not want to do it now, choose **No, I 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 Network PC Card** for further instructions.

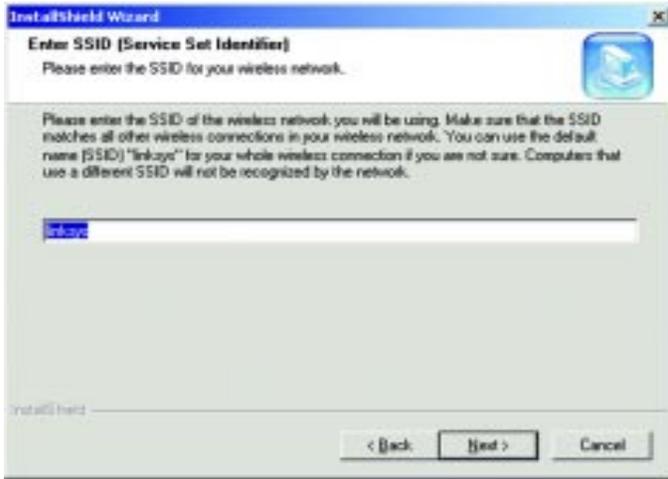
## Ad-Hoc Mode

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

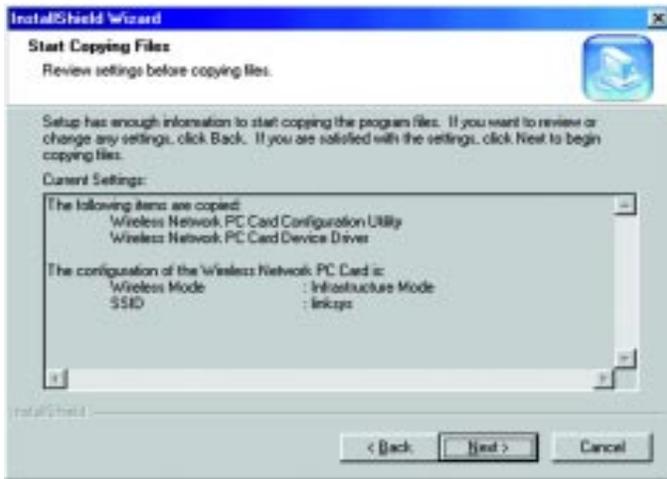


You will be prompted to choose a **Channel** from the list provided. All computers on your wireless network must be using the same channel in order to communicate with each other. If you are unsure about which channel to use, select the default channel (Channel 6). Once you have chosen your channel,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

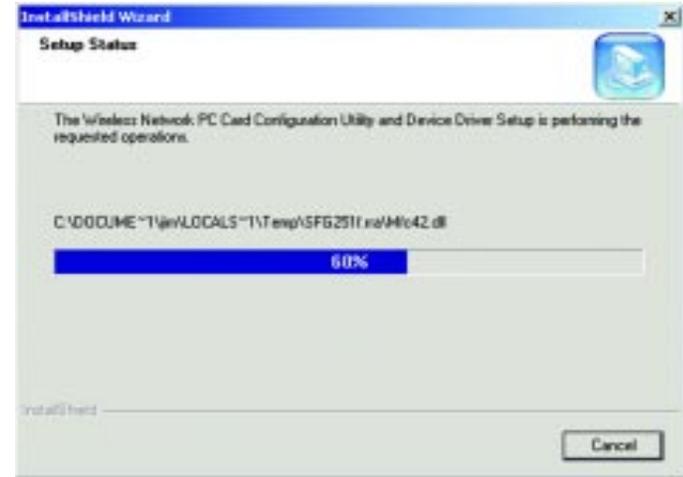
- The following screen should appear. You will be prompted to enter an **SSID** value in the box provided. All SSID values on your wireless network must match. If you are unsure, use the default value of "linksys". Then, click the **Next** button.



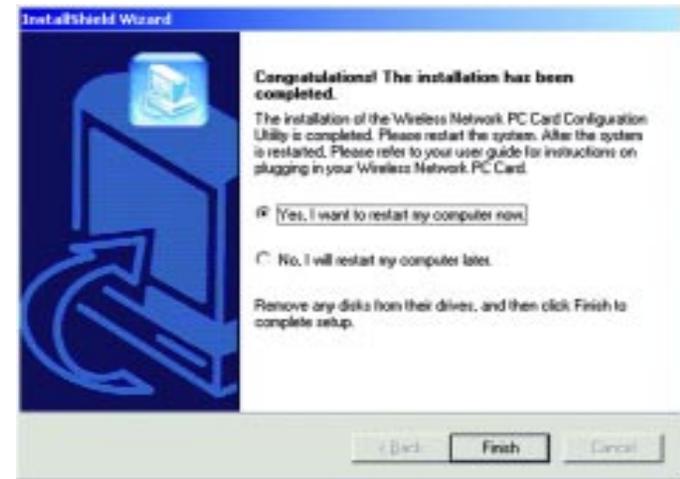
- The next screen to appear will be the Review Settings screen. Verify that all the settings are correct and click the **Next** button to continue.



- 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.



- 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 Network PC Card** for further instructions.

# Installing the Network PC Card

## Installing the Network PC Card In Your Notebook PC

1. **While the computer is restarting** and before the Windows desktop appears, locate an available Type II or Type III PCMCIA slot on your notebook computer.
2. **With the PCMCIA adapter's 68-pin connector facing the PCMCIA slot** and the "Network PC Card" label facing up, slide the PCMCIA adapter completely into the PCMCIA slot.
3. **You may see several screens appear as the driver installation is finalized**, but this is normal. No input should be necessary, and the screens should disappear when the card is ready for use.

**The Hardware Installation is complete. Your Wireless Network PC 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 Network PC 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 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 Network PC Card In Your Notebook PC

1. **While the computer is restarting** and before the Windows desktop appears, locate an available Type II or Type III PCMCIA slot on your notebook computer.
2. **With the PCMCIA adapter's 68-pin connector facing the PCMCIA slot** and the "Network PC Card" label facing up, slide the PCMCIA adapter completely into the PCMCIA slot.

**The Hardware Installation is complete.**

## Installing the Drivers for Windows NT

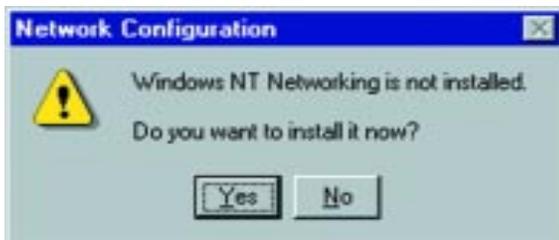
Windows NT will setup the Network PC Card differently depending upon whether you've previously installed network hardware or not. Please follow the instructions appropriate for you.

### If You Have Never Installed Network Hardware:

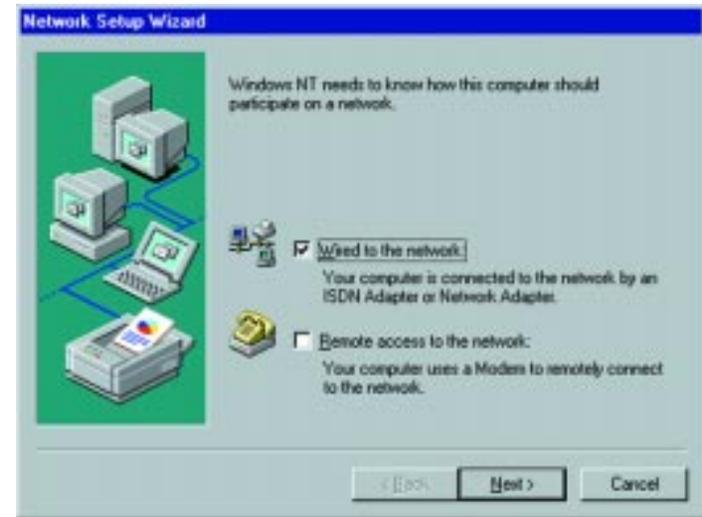
1. Windows NT is not a Plug-and-Play Operating System and will not automatically identify the Network PC Card. To begin setup, insert the **Setup Utility CD** into your CD-ROM drive. If the Setup Utility CD attempts to autorun, exit out of the utility to the desktop. Then select **Settings** from the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



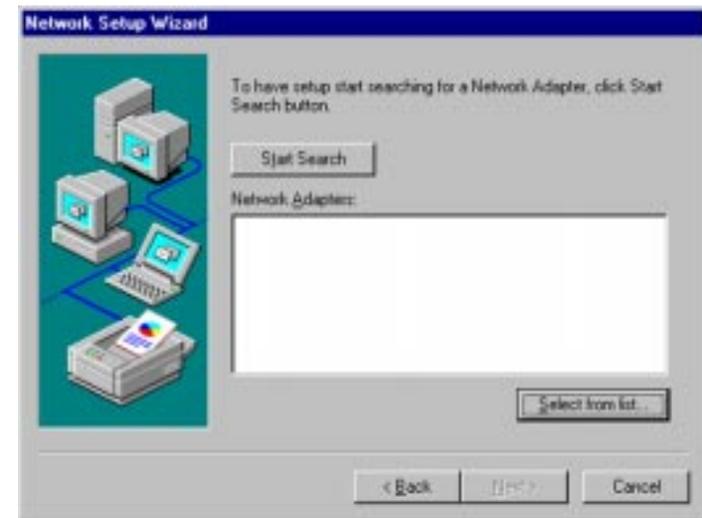
2. Windows will notify you that Networking is not installed. Click the **Yes** button to continue.



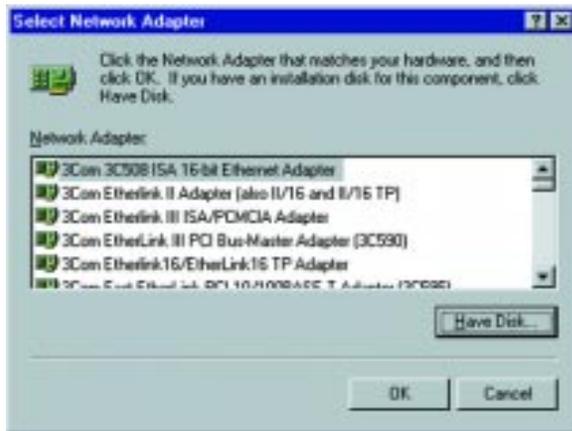
3. Installation will begin and you will reach the screen shown below. You will want to select the box that reads **Wired to the network** since you are adding network hardware. Then, click the **Next** button to continue.



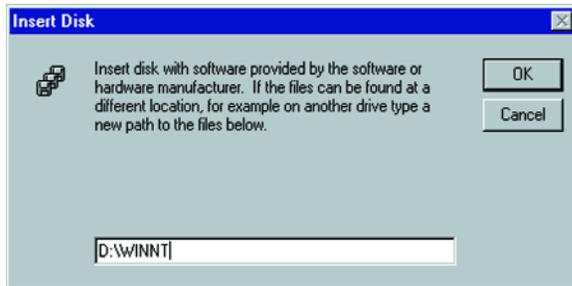
4. The next screen will not show any Network Adapters installed on your system, which signifies that no network hardware has been previously installed. You will want to click the **Select from list** button to continue.



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.



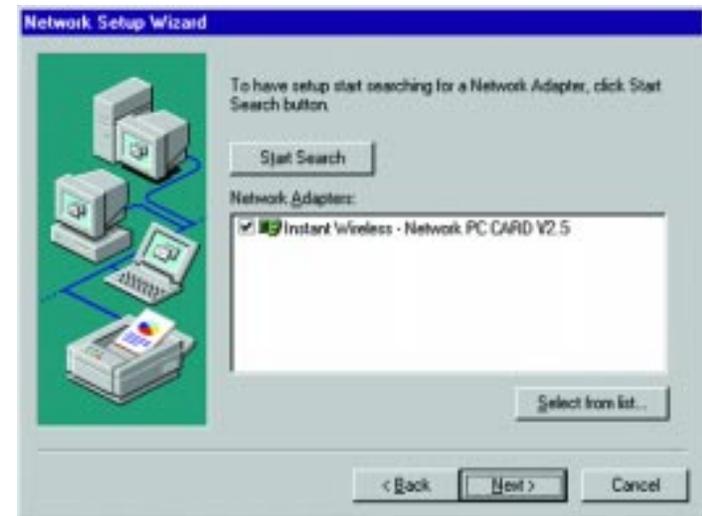
6. When the **Insert Disk** screen appears, type “D:\WINNT” in the field provided. Then, click the **OK** button to continue.



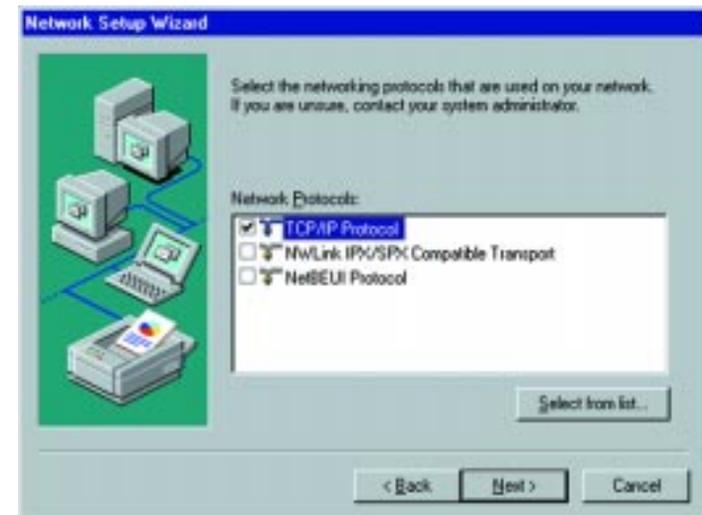
7. The **Select OEM Option** screen will display all available adapters. Make sure that **Instant Wireless - Network PC Card V2.5** is highlighted and click the **OK** button to continue.



8. On the next screen, make sure there is a check mark in the box beside **Instant Wireless - Network PC 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.



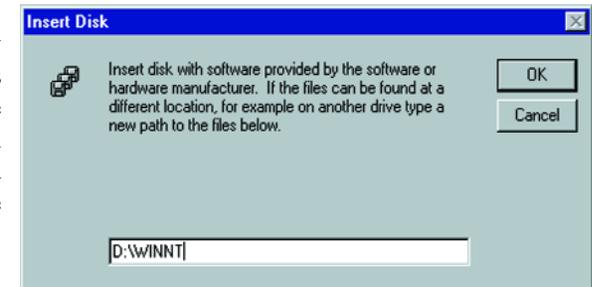
10. On the screen showing **Network Services**, the selections are automatically made. Click the **Next** button to continue.



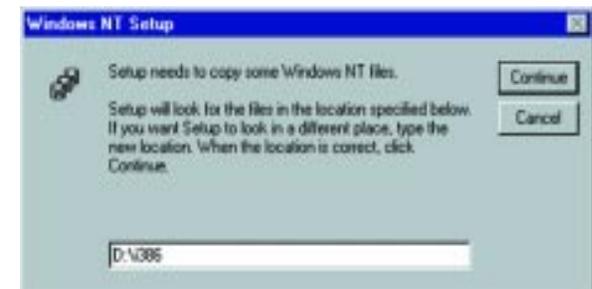
11. At this point, Windows NT will be ready to start installing Networking Components. After verifying your selections, click the **Next** button to continue. Or, click the **Back** button to make any necessary corrections.



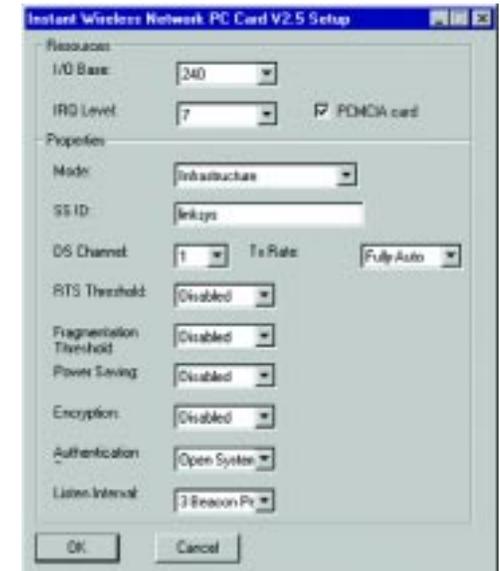
12. Windows NT may request further files at this point. Type “D:\WINNT” in the field provided and click the **Continue** button.



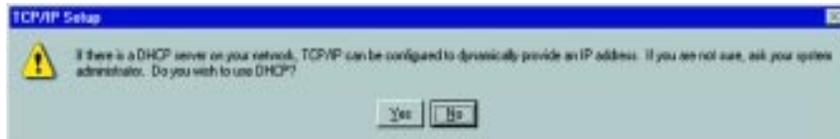
- If files are still requested, insert your **Windows NT CD** into your **CD-ROM** drive and type “D:\i386” (where “D” represents your **CD-ROM** drive). Then, click the **Continue** button.



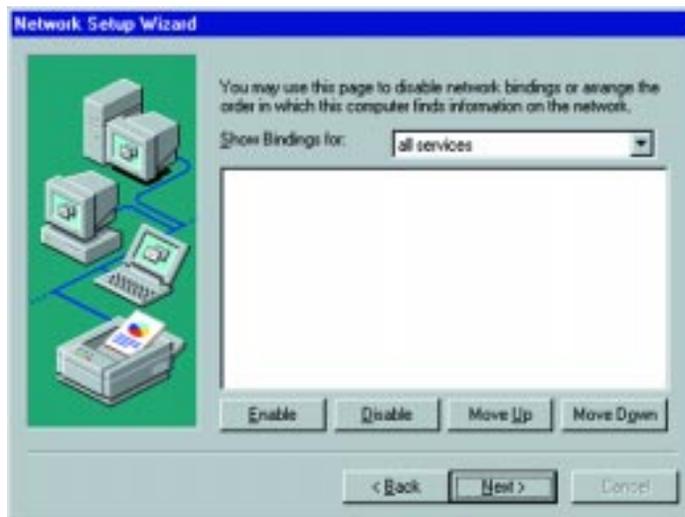
13. You will now reach the screen shown here. This is called the **Resources & Properties** screen. Your System Administrator if you have one, will give you all the information you need concerning these settings. Adjust the settings as are appropriate and click the **OK** button.



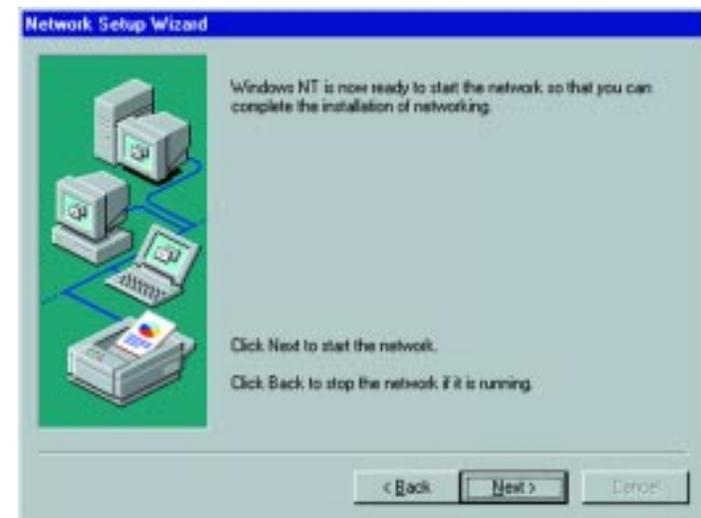
14. After setting the **Resource and Properties** fields, Windows NT will begin installing the network components you previously selected. You may be asked if you would like to configure the protocols with a DHCP server on your network. If this screen comes up, check with your Network Administrator before 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.



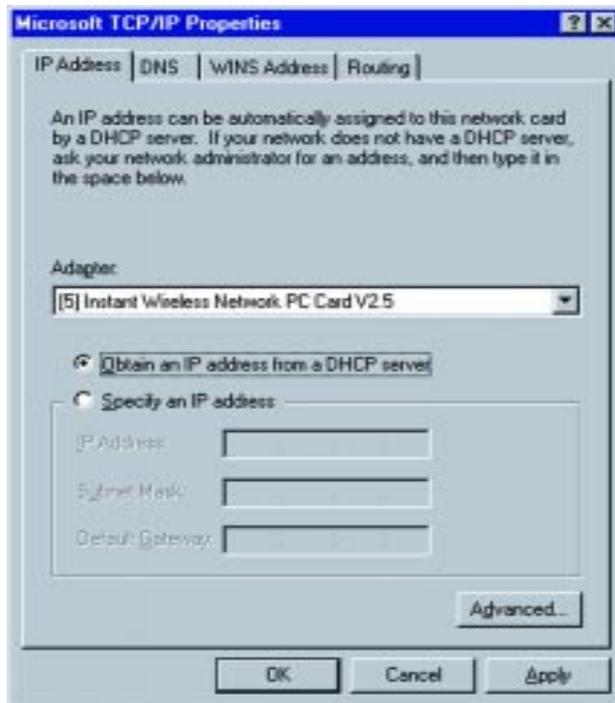
16. At this point, Windows NT will let you know that it is ready to start the network. If you'd like to stop the procedure, click the **Back** button. To continue, click the **Next** button.



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 Network PC Card V2.5 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 an IP address** and enter the appropriate values under IP Address, Subnet 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.**

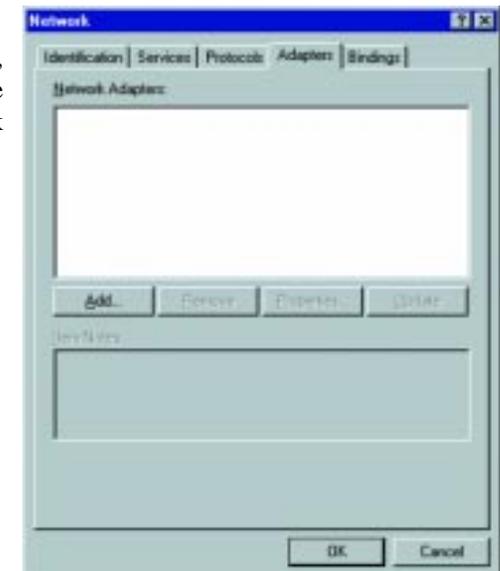
**NOTE:** After you have installed the Network PC Card, reapply the Windows NT service pack.

## If You Have Installed Network Hardware Before:

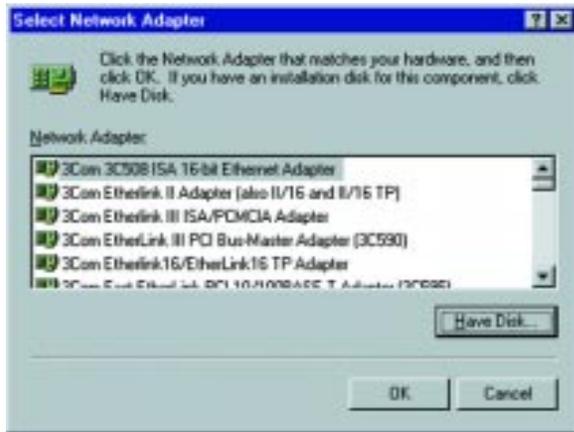
1. Windows NT is not a Plug-and-Play Operating System and will not automatically identify the Network PC Card. To begin setup, insert the **Setup Utility CD** into your CD-ROM drive and then select **Settings** from the **Start** Menu and bring up the **Control Panel**. Then, double-click on the **Network**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



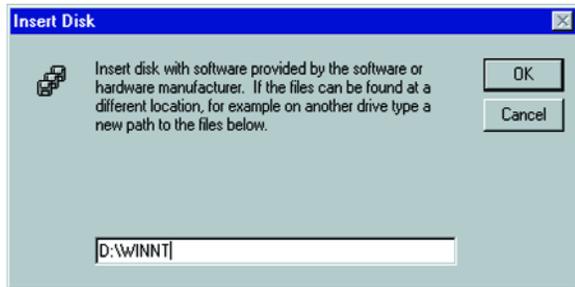
2. To add the Network PC Card, you will want to click the **Adapters** tab and then click the **Add** button to continue.



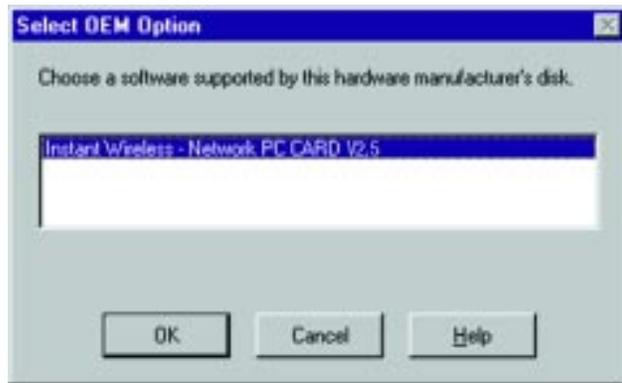
3. A list of adapters will appear on the next screen. You will not want to select one of these, however, as your installation disk (**Setup Utility CD**) has all of the appropriate drivers. Click the **Have Disk** button to continue.



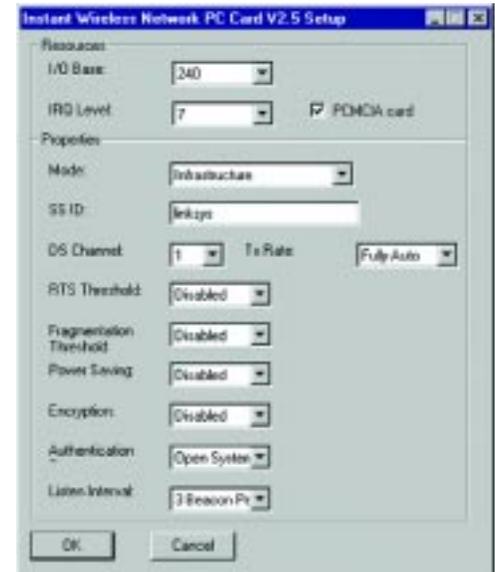
4. On the **Insert Disk** screen, type "D:\WINNT" in the field provided. Then, click the **OK** button to continue.



5. The **Select OEM Option** screen will display all available adapters. Make sure that **Instant Wireless - Network PC Card V2.5** 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 Network PC Card for Windows NT**. Adjust the settings as are appropriate and click the **OK** button.

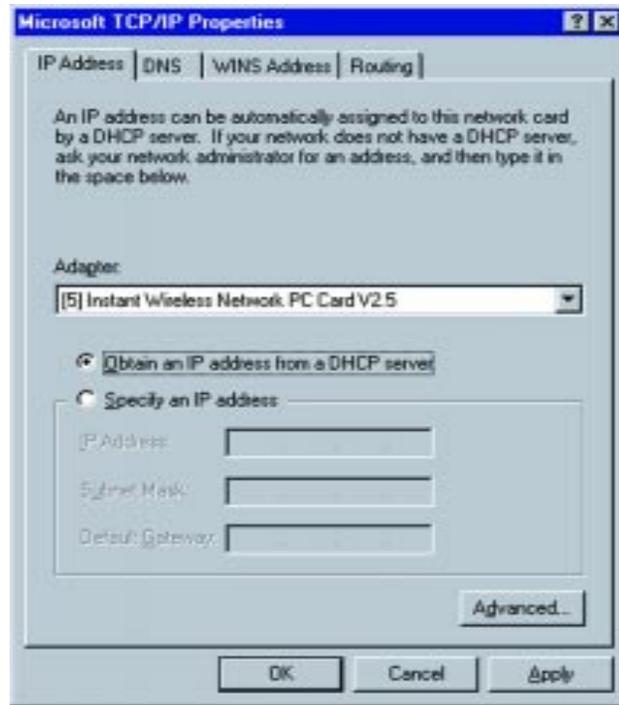


7. The Network PC Card has now been installed. You will see it added onto this screen. Click the **Close** button to continue and then restart your computer.



NOTE: After you have installed the Network PC 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 Network PC Card V2.5 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 an 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 Network PC 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 Network PC 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.

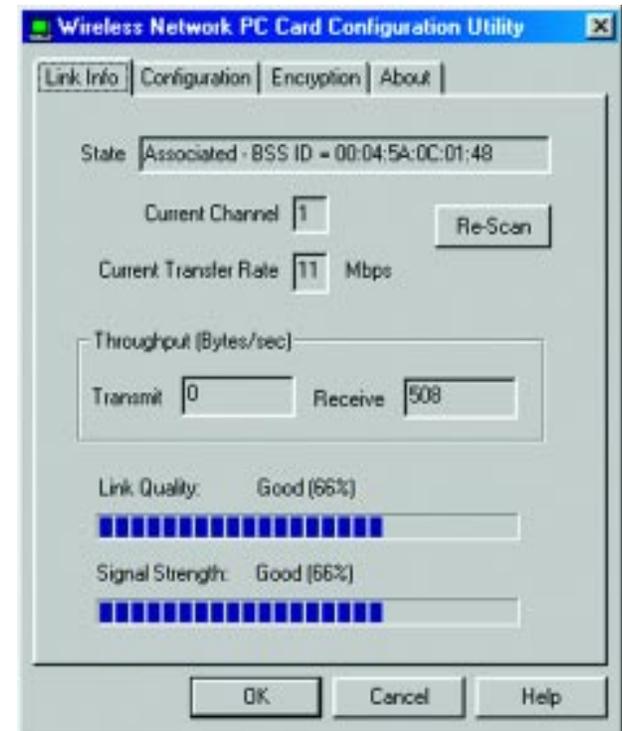
Icon Color	Connection Status
Green	When the icon is green, it is an indication of a good to excellent wireless connection
Yellow	When the icon is yellow, it is an indication of a weak to low wireless connection
Red	When the icon is red, it is an indication of a very low to no wireless connection

**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 Network PC Card. Then choose **Configuration Utility**. You will see the Wireless LAN Configuration Utility screen. This utility is divided into four parts: **Link Info**, **Configuration**, **Encryption**, and **About**. *It is recommended that you change all configuration settings for your Network PC 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 Network PC 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 Network PC 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.

## CONFIGURATION

The Configuration screen allows you to customize the settings for the Network PC Card and your wireless network.

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 Network PC 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 Network PC 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 Network PC Card.

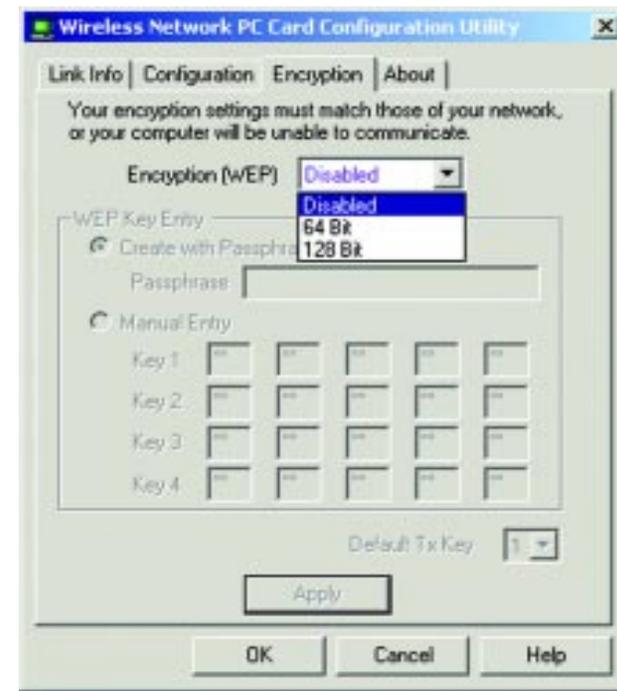
The **Channel** setting specifies the channel used in wireless communication and should be set to the same channel as the other points in the wireless network. This setting can only be adjusted in Ad-Hoc mode.



## ENCRYPTION

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

An acronym for **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 set to **Disabled**, **64-bit**, or **128-bit**. 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 **Manual Entry**, 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.

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 Network PC Card.

**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.

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

## ABOUT

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



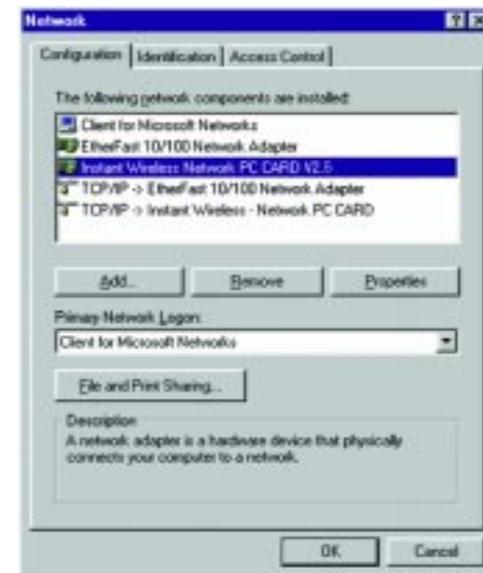
# Installing Network Protocols

Protocols are necessary for computers to communicate on your network.

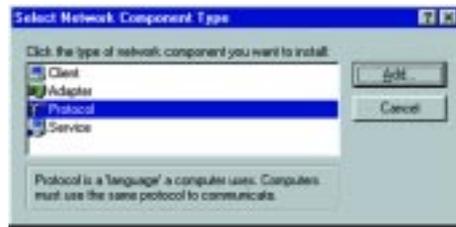
1. From the **Start** Menu, select **Settings** and bring up the **Control Panel**. From the Control Panel, double-click on the **Network** icon.



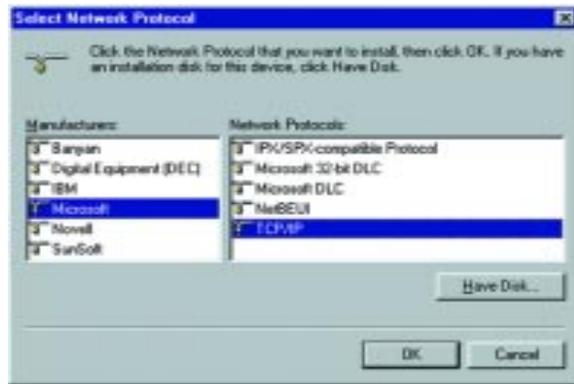
2. Select **Network PC Card** from the list and click the **Add** button.



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.



## Advanced Properties

The Advanced Properties for Windows 95, 98, ME and 2000

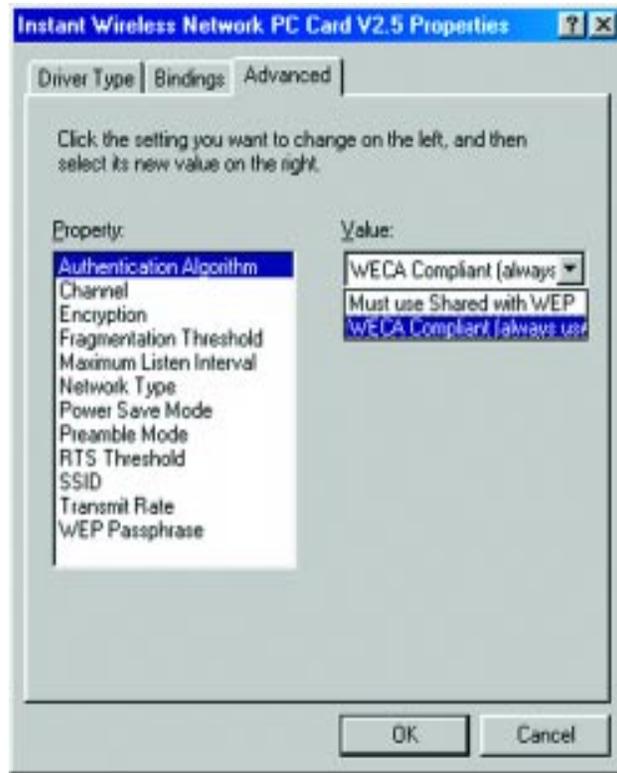
The Advanced Properties of the card are supplied for fine tuning the card's settings. These values should only be changed by those completely familiar with both the operating system and the settings of the network. Unless your specific situation requires changing them, the default settings should be sufficient for your card's proper operation. *Linksys advises that you change these values in the Configuration Utility rather than using this method, to ensure that the settings you change will be recognized everywhere.*

If you have questions or are unsure, check your wireless network settings before changing any of these values.

1. To access the **Instant Wireless Network PC Card Properties V2.5** screen (shown below), click on the **Start** button, choose **Settings** and then **Control Panel**. Double click on the **Network** icon and choose the **Advanced** tab.



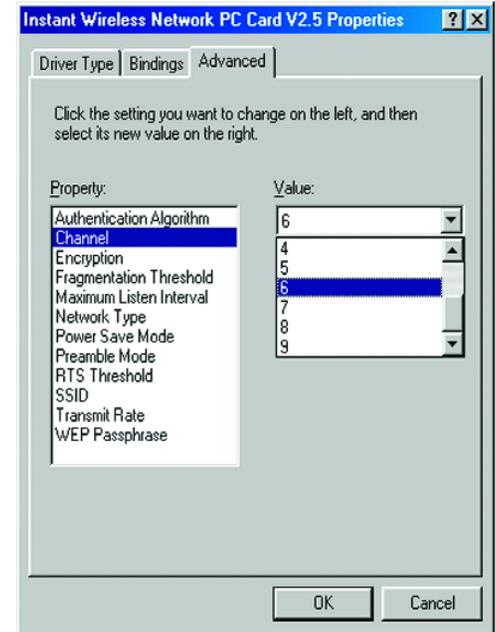
2. Select **Authentication Algorithm** from the list provided and select a **Value** from the drop down menu on the right.



**WECA Compliant (Default)** (also referred to as **Open Authentication**) Sender and recipient do NOT share a secret key. Each party generates its own key-pair and asks the receiver to accept the generated key. Once accepted, this key is used for a short time only; thereafter a new key is generated and agreed upon. Even if the secret key is discovered, only a small amount of data may be decrypted.

**Must use Shared with WEP (Optional)** This is when both the sender and recipient share a secret key. They use this key for an extended length of time. Any eavesdropper that discovers the key may decipher all packets until the key is changed. As indicated, you should always use **WECA Compliant (Always Use)** unless you have some other reason to do so. Choose **Encryption** to continue or the **OK** button to finish. If you choose to finish now, continue to the **Install Network Protocols** section.

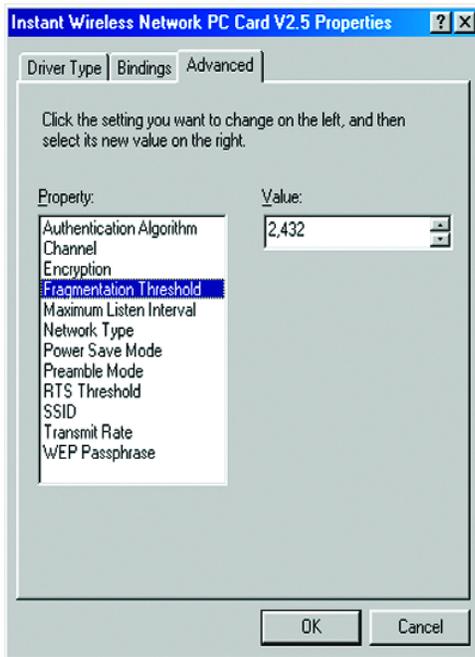
3. The **Channel** setting must be the same for all wireless points in the network. Use the settings, **1-11**, to find the best channel for your connection. For further information, see the **Configuration Utility** section of this guide. Once your card is configured, click **OK** and continue on to the **Install Network Protocols** section.



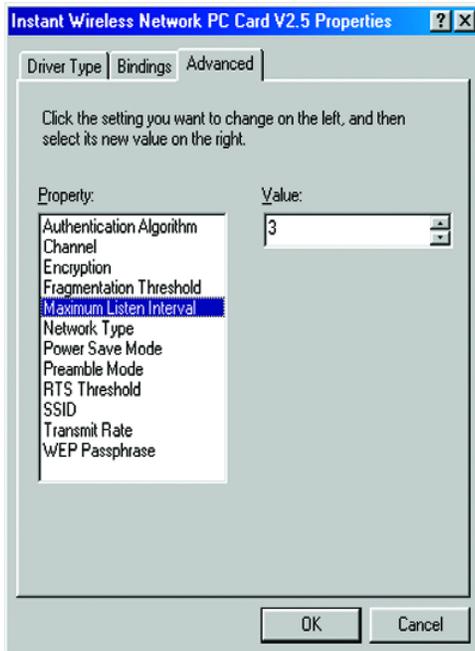
4. Select either **Disabled**, **64 bit**, or **128 bit** as the value under **Encryption**. Wired Equivalent Privacy (WEP) is an encryption scheme used to protect wireless data communication. The **Disabled** setting prevents the sharing of data with other computers on a WEP Network. For data sharing to be enabled, select either 64 or 128 bit encryption, depending on your needs. For further information, see the **Configuration Utility** section of this guide. Once your card is configured, click **OK** and continue on to the **Installing Network Protocols** section.



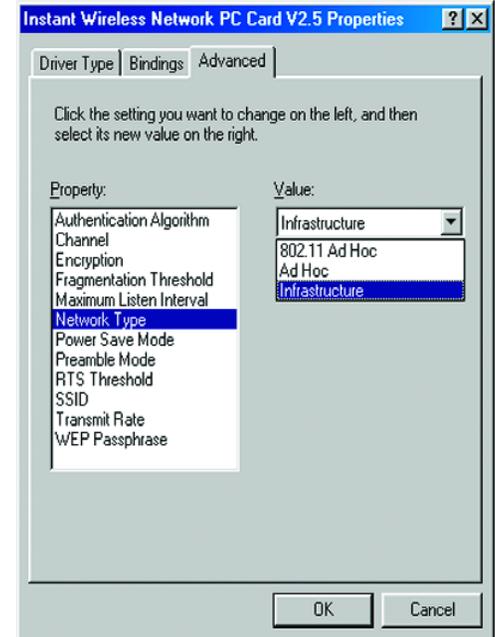
5. The **Fragmentation Threshold Value** indicates the maximum size of the transmit frame. Any data frame larger than this value will be fragmented into multiple frames. Lowering this value usually means a lower frame error rate, but a lower value also creates more overhead, which negatively affects network performance. The value can only be entered in increments of 128. Only minor modifications of this value are recommended. Click **Maximum Listen Interval** to continue or the **OK** button to finish. If you choose to finish now, continue to the **Install Network Protocols** section.



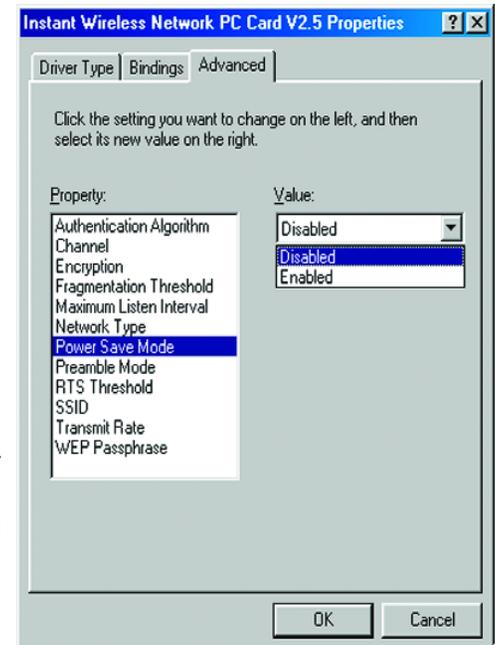
6. The **Maximum Listen Interval** only applies when operating in the Infrastructure mode while Power Saving is enabled. The value you input here will determine how often the computer “wakes up” from the power saving mode to receive any packets that were sent while it was “asleep”. The higher the value entered here, the longer the time your computer “sleeps” between waking up to check for packets. Click **Medium Reservation Value** to continue or the **OK** button to finish. If you choose to finish now, continue to the **Install Network Protocols** section.



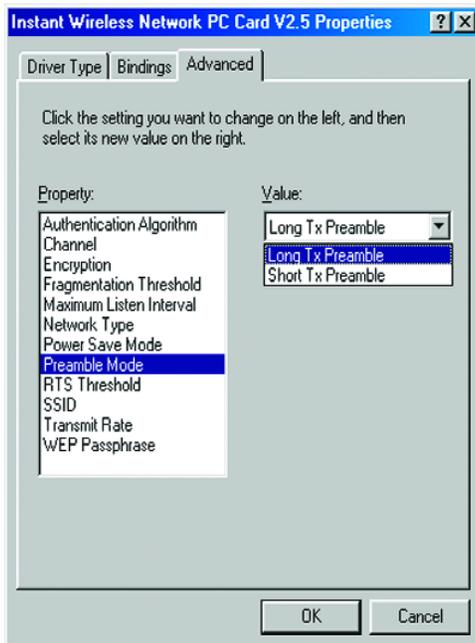
7. Select **Network Type** and select a **Value**, from the drop down menu, of either **Infrastructure** or **Ad-Hoc**. The Infrastructure mode allows a wireless adapter to communicate with a wired network employing an Access Point, while the Ad-Hoc mode allows wireless-to-wireless, peer-to-peer communication. Click **Power Save Mode** to continue or the **OK** button to finish. If you choose to finish now, continue to the **Install Network Protocols** section.



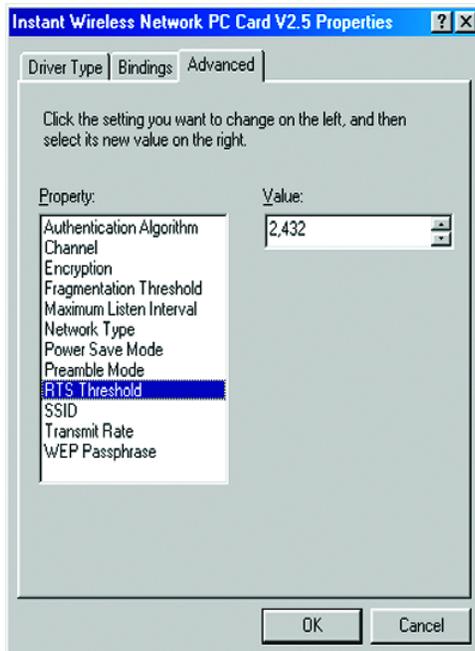
8. Select **Power Save Mode** and select either **Enabled** or **Disabled** for a **Value**. Disabled will allow for uninterrupted data communication. Selecting Enabled allows your notebook to enter “sleep” mode and could interrupt data communication. For further information about Power Save Mode, see the chapter entitled **Configuration Utility**. Click **Preamble Mode** to continue or the **OK** button to finish. If you choose to finish now, continue to the **Install Network Protocols** section.



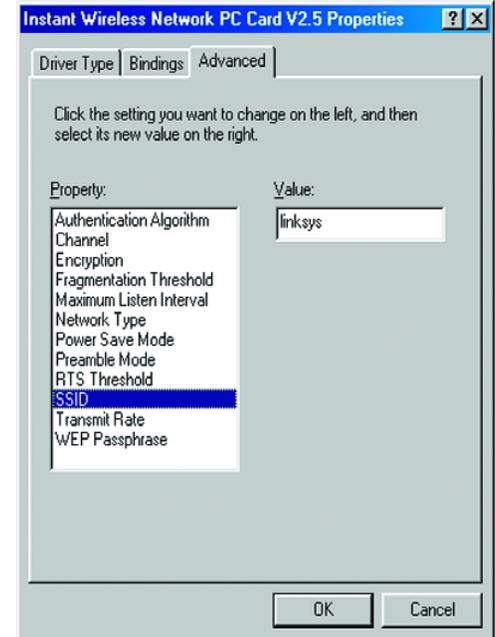
9. A preamble is a signal used to synchronize the transmission timing between two or more systems. The default setting is **Long Tx Preamble**. **Long Tx Preamble** allows extra time for the digital decoder to process the initial header packets, but is transmitted at 11Mbps. **Short Tx Preamble** allows for less time to process the packets, but initial packets are transmitted at 2Mbps. The preferred setting is **Long Tx Preamble**. Click **SSID** to continue or the **OK** button to finish and continue to the **Install Network Protocols** process.



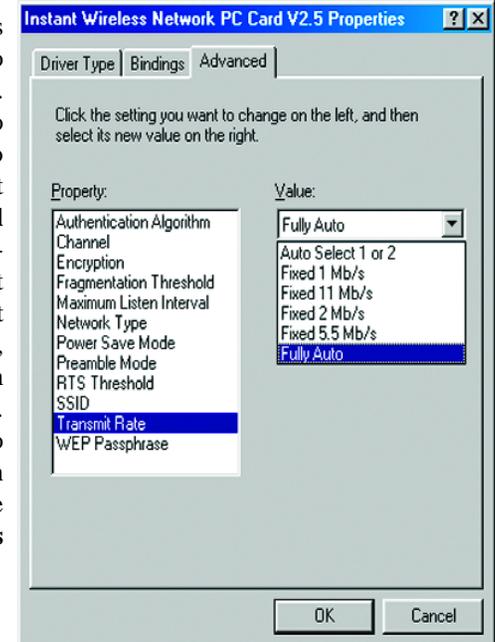
10. **RTS Threshold** should remain **Disabled** as set by default. Do not change the setting of the RTS Threshold unless connection quality is poor. Then, increase this setting by the smallest value first to establish a better connection. Click **Network Type** to continue or the **OK** button to finish. If you choose to finish now, continue to the **Install Network Protocols** section.



11. The value for **SSID** depends on what **Network Type** selected in item 8. If the Network Type you have chosen is "**Infrastructure**", it should have the same SSID name as the Access Point. If the Network Type is "**Ad-Hoc**", all clients should share the same SSID name. Click **Transmit Rate** to continue or the **OK** button to finish and continue to the **Install Network Protocols** process.



12. The **Transmit Rate** affects the speed of transmission to another wireless device. The rate can either be set to a fixed value if the user so chooses, or it can be left at the default value of **Full Auto**, which lets the computer determine the best transfer rate. The first option, **Auto Select 1 or 2**, is for compatibility with older wireless equipment. Click **WEP Passphrase** to continue or the **OK** button to finish and continue to the **Install Network Protocols** process.



2. The **WEP Passphrase** value allows the user to change the passphrase that is used to generate the encryption key for WEP. Any alphanumeric value can be entered here, but it will only be activated if you choose either 64 or 128 bit under **Encryption**. This value can also be changed using the Configuration Utility. For further information, see the **Configuration Utility** section of this guide.



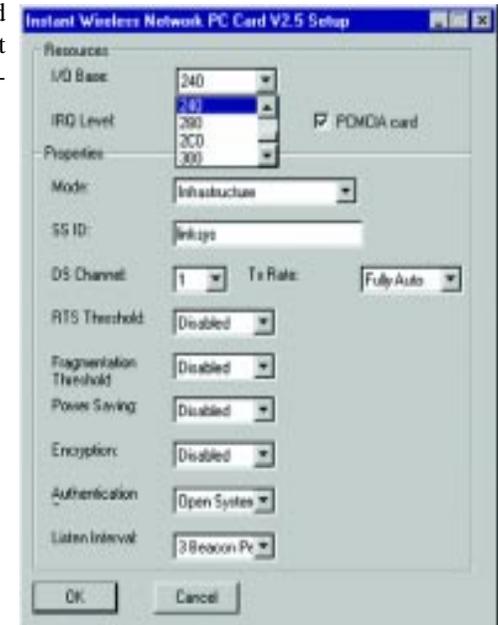
Once your card is configured, click **OK** and continue on to the **Install Network Protocols** section.

### The Advanced Properties for Windows NT

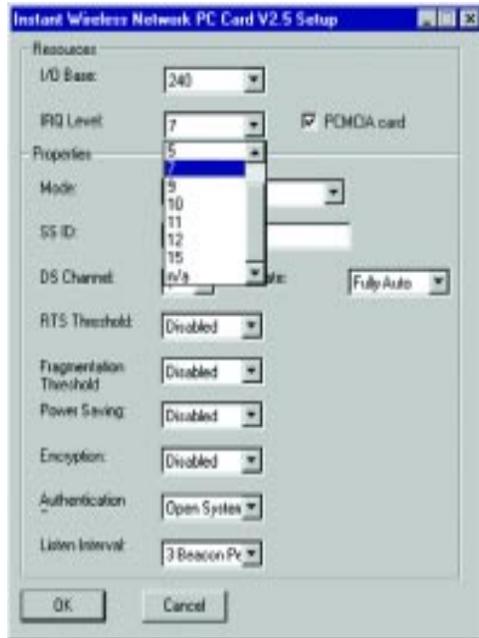
The **Advanced Properties** screen allows you to make modifications to your Network PC Card, optimizing performance. These properties are accessed by **right** clicking on the **Network Neighborhood** icon on the desktop. Select **Properties** from the menu that appears. A tabbed window will appear next. Click on the **Adapters** tab. Highlight the **Instant Wireless Network PC Card V2.5** and then click the **Properties** button. The following screen should appear. Choosing improper settings in these fields can keep the Wireless Network PC Card from functioning properly. Follow these steps to configure the **Advanced Properties** fields:

1. The **I/O Base** setting should be unique and not conflict with any other device settings in your system.

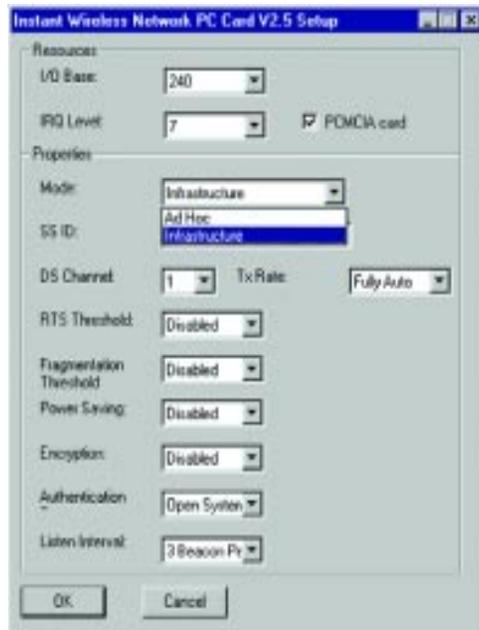
**NOTE:** In order to check for potential IRQ conflicts, run WINMSD by selecting RUN from the Start menu and typing **winmsd.exe** and pressing the **Enter** key.



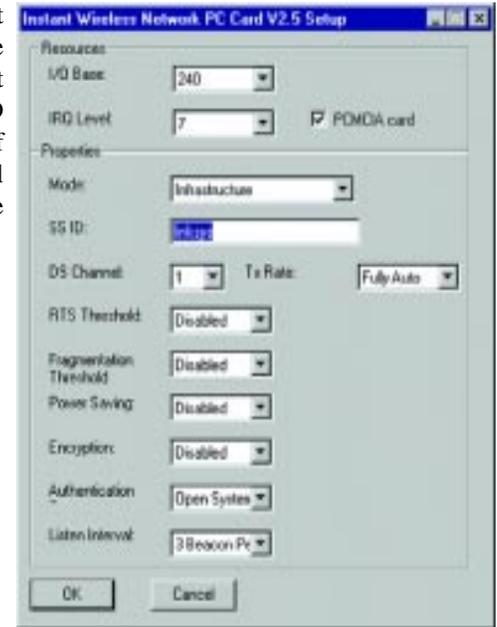
2. The **IRQ Base** level can be changed in order to avoid possible conflicts with other system devices. The default setting for the Wireless Network PC Card is 7. This value should only be changed if the Card does not work properly.



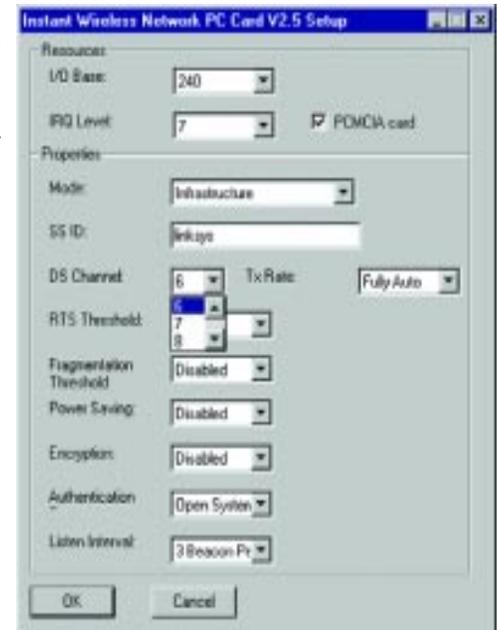
3. The **Mode** setting should be either **Infrastructure** or **Ad-Hoc**, depending upon your network's settings. The Infrastructure mode allows a wireless adapter to communicate with a wired network employing an Access Point, while the Ad-Hoc mode allows wireless-to-wireless, peer-to-peer communication. For more information about these settings, refer to the section called **Ad-Hoc versus Infrastructure Mode**.



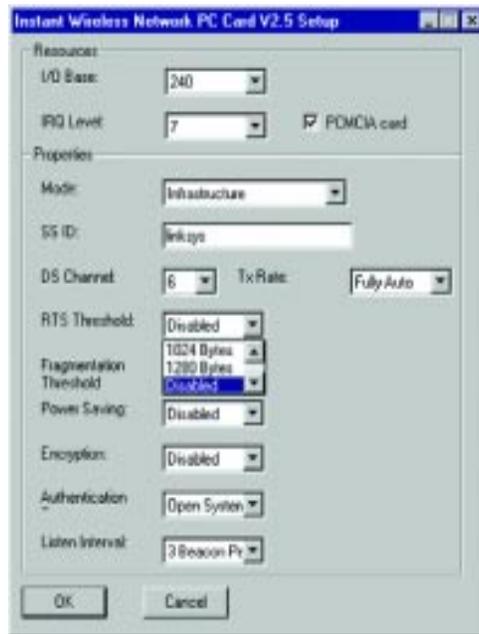
4. The **SSID** depends on what **Mode** is selected. If the Mode is **Infrastructure**, it should have the same SSID name as the Access Point. If the Mode is **Ad-Hoc**, all clients should share the same SSID name.



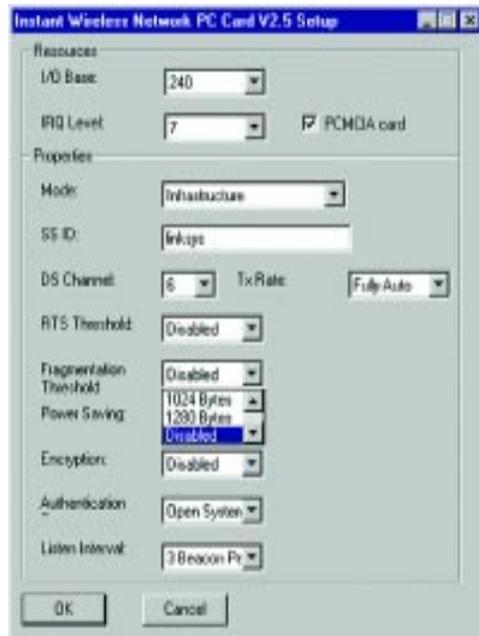
5. The **DS Channel** setting must be the same for all wireless points in the network. Use the settings, **1-11**, to find the best channel for your connection.



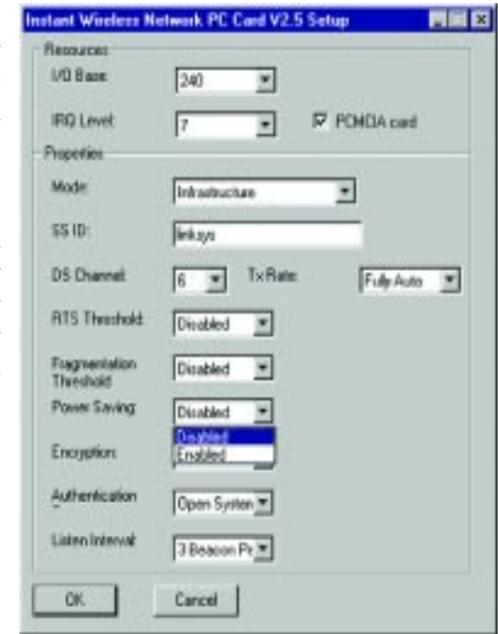
6. **RTS Threshold** should remain **Disabled** as set by default. Do not change the setting of the RTS Threshold unless connection quality is poor. Then, increase this setting by the smallest value first to establish a better connection.



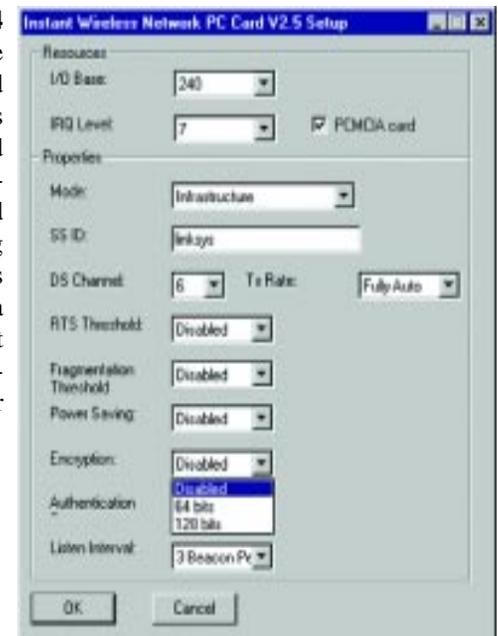
7. **Fragmentation Threshold** should remain **Disabled** as set by default. Do not change the setting of the Fragmentation Threshold unless connection quality is poor. Then, increase this setting by the smallest value first to establish a better connection.



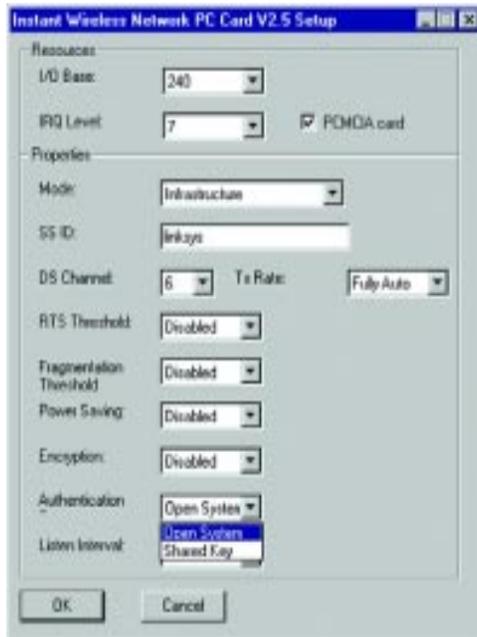
8. Under **Power Saving** mode, select either **Enabled** or **Disabled**. “Disabled” will allow for uninterrupted data communication. Selecting “Enabled” allows your notebook to enter “sleep” mode and could interrupt data communication. For further information about Power Save Mode, see the chapter entitled **Configuration Utility**.



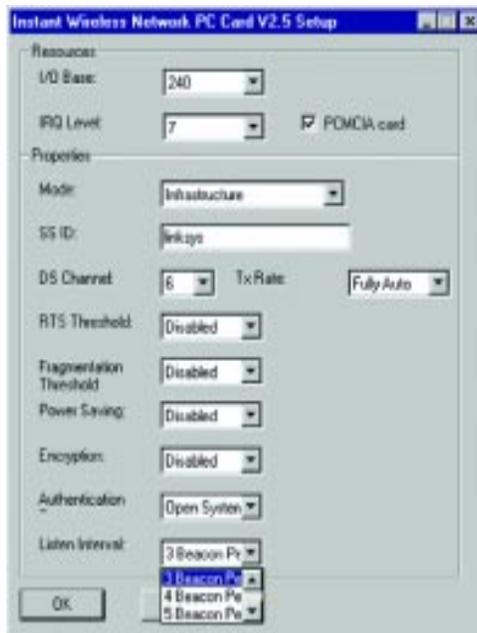
9. Select either **Disabled**, **64 bit**, or **128 bit** as the value under **Encryption**. Wired Equivalent Privacy (WEP) is an encryption scheme used to protect wireless data communication. The **Disabled** setting prevents the sharing of data with other computers on a WEP Network. For data sharing to be enabled, select either 64 or 128 bit encryption, depending on your needs.



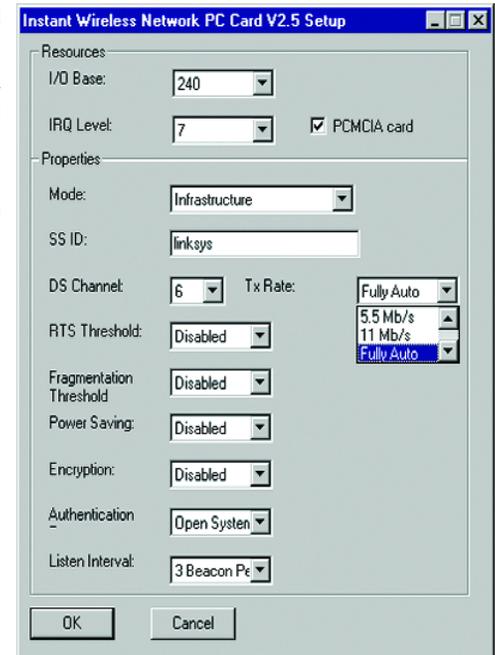
10. The **Authentication** setting is **Open System** by default. Open System is another name for WECA compliant and **Shared Key** is another name for WEP (see page 38 for a more detailed description of WECA and WEP). Once you have determined your encryption level needs, make your selection.



11. The **Listen Interval** setting should remain at **1 Beacon per Second**. Setting this higher could result in slower connection speeds.



12. The **Tx Rate** setting should remain **Fully Auto** as set by default. Changing this to a different transfer rate will lock in that rate and may result in dropped connections. Click the **OK** button to continue.



# Troubleshooting

## Common Problems and Solutions

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

### 1. My computer does not recognize the Network PC Card.

Make sure that the Network PC Card is properly inserted into the PCMCIA slot. Note that the card can be inserted either way, but when it is inserted properly, the "Instant Wireless" logo on the front of the card will not be seen. If seen from the opposite side, only a small portion of the barcode and no numbers can be seen when the card is inserted completely. If in doubt, try inserting the card both ways. The card will slide in further when it is correct.

### 2. The Network PC Card does not work properly.

- Reinsert the Network PC Card into your notebook's PCMCIA slot. A beep should be heard if the adapter is properly inserted.
- For non-Windows environments, make sure that a PCMCIA card service driver is installed in your PC.
- Click on the **Control Panel** and then on PC-Card. Check whether it has a PCMCIA card in one of the sockets or not. If you find Network PC Card in one of the sockets, it means the card is detected properly. If you see a yellow question mark, the resources are conflicting.

Right click on **My Computer** and select **Properties**. Select the device manager and click on the Network Adapter. You will find the Network PC Card if it is installed successfully. If you see the yellow exclamation mark, the resources are conflicting. Click on PCMCIA card and then on PCMCIA card service. You will see the status of the Network PC Card. If there is a yellow question mark, please check the following:

- Make sure your notebook supports a 5.0V card.
- Make sure your notebook has a free IRQ.
- Make sure you have inserted the right card and installed the proper driver.

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

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

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

- Make sure that the notebook PC to which the Network PC Card is associated is powered on.
- Make sure that your Network PC 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 (Internet Protocol) 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

<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.) @ up to 11 Mbps</i> <i>up to 50M (165 ft.) @ up to 5.5 Mbps</i> <i>up to 70M (230 ft.) @ up to 2 Mbps</i> <i>up to 91M (300 ft.) @ up to 1 Mbps</i>
Outdoors:	<i>up to 152M (500 ft.) @ up to 11 Mbps</i> <i>up to 270M (885 ft.) @ up to 5.5 Mbps</i> <i>up to 396M (1300 ft.) @ up to 2 Mbps</i> <i>up to 457M (1500 ft.) @ up to 1 Mbps</i>
<b>Data Rate (Mbps):</b>	up to 11Mbps (with automatic scale back)
<b>LEDs:</b>	Link, Power

### 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 or 5V DC, 275mA Tx, 225mA Rx, 200mA Standby
<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>	-4°F to 158°F (-20°C to 70°C)
<b>Operating Hum.:</b>	0% to 90% Non-Condensing
<b>Storage Hum.:</b>	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.

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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>	800-326-7114
<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>



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