1.0

CARDBUS WIRELESS LAN CARD

User's Manual

Index

Introduction

Thank you for purchasing this CardBus Wireless LAN Card. This card is a wireless network client that complies with IEEE 802.11b standard on wireless LANs. The IEEE 802.11b standards compliance means this adapter gives you the flexibility to connect it to any 802.11b network. The IEEE 802.11b Ethernet standard allows you to connect computers and devices at speeds up to 11Mbps, dependent upon the distance between wireless adapters, the configuration of your working environment, or the capabilities or limitations of your computer systems.

Package contents

- One Wireless CardBus Adapter
- One CD (Driver/Utility/User's Manual.)
- Quick Start Guide

NOTE:

If any of these items are missing from the retail package, contact your supplier immediately.

Specifications

Features

- Compatible with IEEE 802.11b Standard
- 2.4GHz spread spectrum technology
- Data rate up to 11Mbps
- 32bit CardBus Performance
- External antenna
- Support antenna diversity
- Support 64/128-bit WEP Data Encryption function for high level of security
- Support TKIP and AES advanced WLAN Security
- Supports peer-to-peer communication among any wireless users, no Access Point required
- Plug and Play installation

Specification

1. Interface:

- CardBus 32 bit

2. Functions:

- Main chip: RealTek RTL8180L and Philips SA2400A , SA2400
- Protocol: Compatible with IEEE 802.11b Standard
- Modulation Technique: DSSS (Direct Sequence Spread Spectrum) with BPSK (1Mbps), QPSK (2Mbps), and CCK (5.5 and 11Mbps)
- Media access protocol: CSMA/CA with ACK
- Transfer data rate: 11Mbps, 5.5Mbps, 2Mbps, 1Mbps, auto-rate
- Antenna: Support antenna diversity. One is a micro strip antenna, the other one is a 1/2 wave retractable antenna (external)
- Output Power: 15~17dBm
- RF sensitivity: @PER <0.08, 11Mbps < -80dBm (typical)
- Security: 64/128-bit WEP Encryption

64/128-bit TKIP Data Encryption

64/128-bit AES Data Encryption

- Channel Support:

US/Canada: 11 (1 ~ 11)

Major European countries: 13 (1 ~ 13)

France: 4 (10 ~ 13)

Japan: 13 (1 ~ 13)

Mechanical

Dimension: 91 x 54 x 4.6 mm (L x W x H)

Certification

FCC, CE class B

Environmental Operating Ranges

- Operating Temperature: 0 ~70° C,   Humidity   10 ~ 90%
- Storage Temperature: -20 ~90° C,   Humidity   10 ~ 90%

Power Consumption

- Maximum: Transmit: 260 mA (peak)

                    Receive: 180 mA (peak)

- Idle: 136 mA

## LED Indication

Blue: TX/RX

Green: Link

Driver support

Microsoft Windows 98SE / ME / 2000 / XP

Setup for Windows 98

1. Make sure your PC is powered on and that you are running the Windows 98 operating system.

2. Insert the "CardBus Wireless LAN Card" into the CardBus slot of your computer. The system will display the "**Add New Hardware Wizard**" dialog box. Insert the driver CD into CD-ROM drive and then click the "**Next**" button.
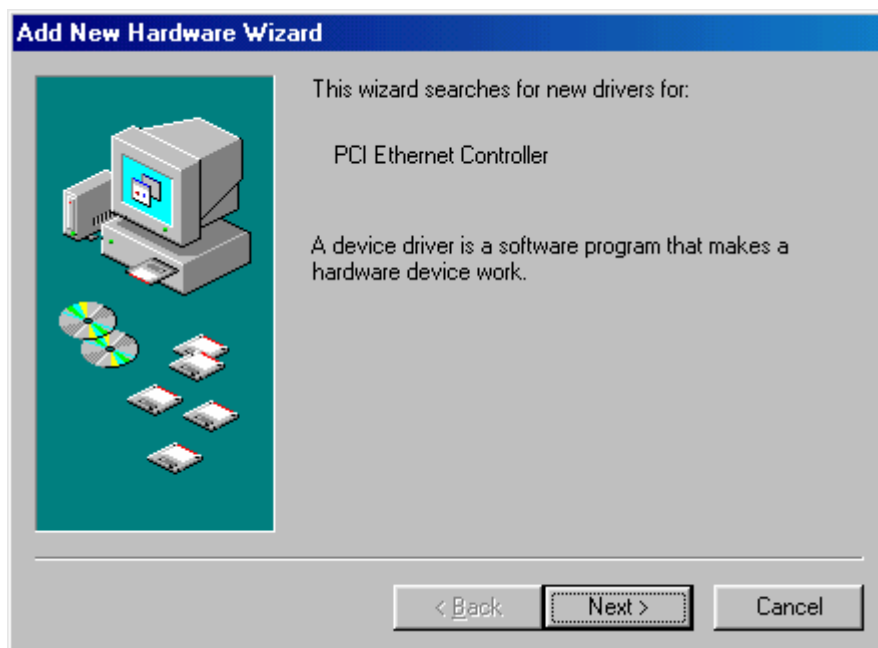
3. Select "**Search for the best driver for your device (Recommended)**", click the "**Next**" button.

4. Select "**Specify a location**" and click the "**Next**" button.
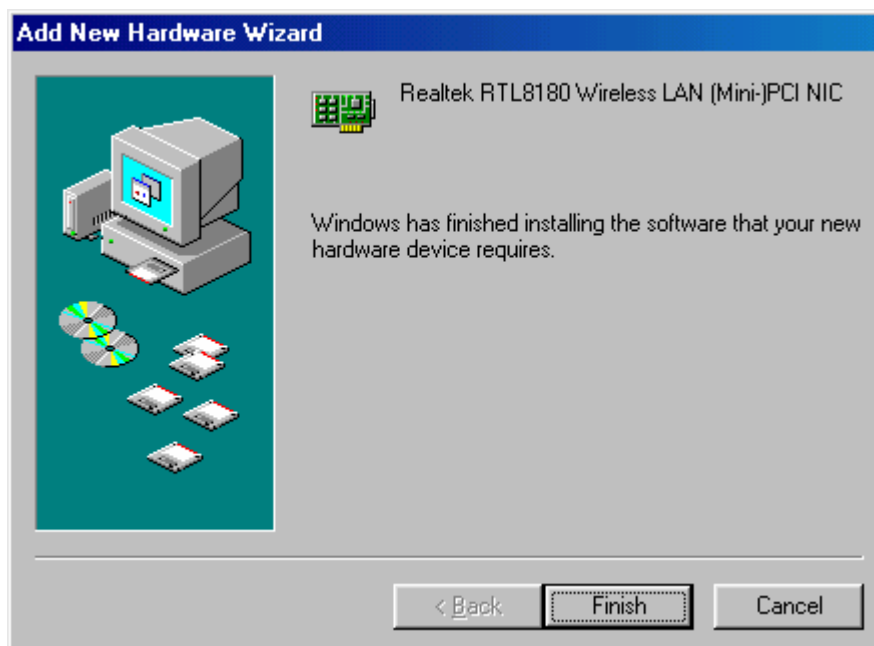
5. After Windows finds the driver, click the "**Next**" button.

6. Windows may request you to "**Insert Windows 98 CD-ROM into the driver selected, and click OK**". Follow the instruction and insert CD-ROM or disks as needed, direct Windows to the proper location, and then click the "**OK**" button.

7. When Windows finishes the installation, then click the "**Finish**" button.
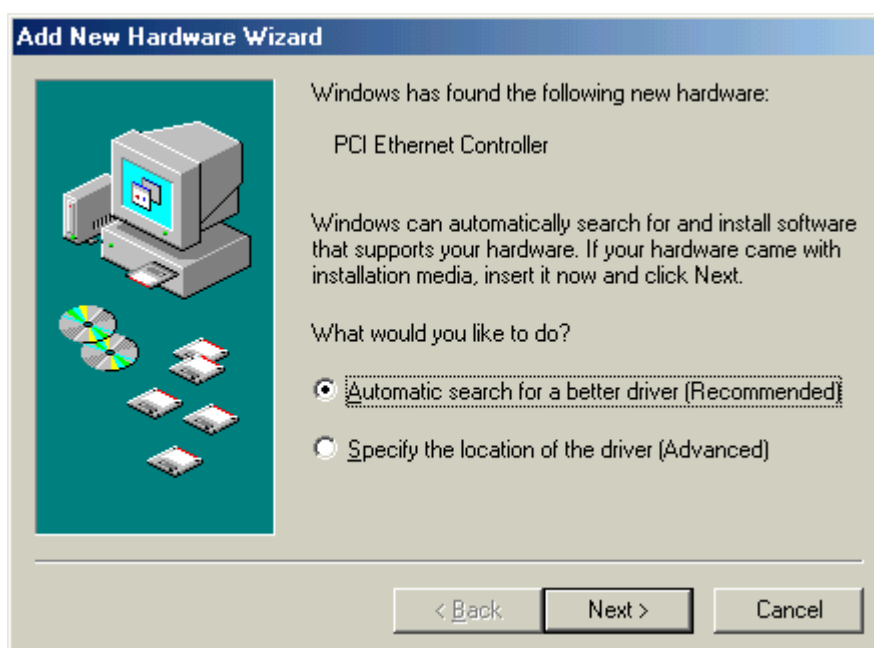
8. System will ask you "**Do you want to restart your computer now**". Click the "**Yes**" button to restart your computer.
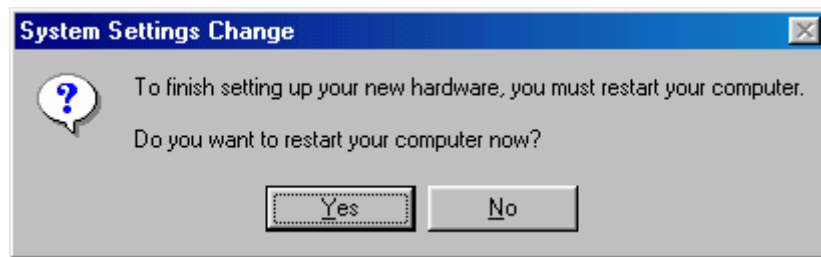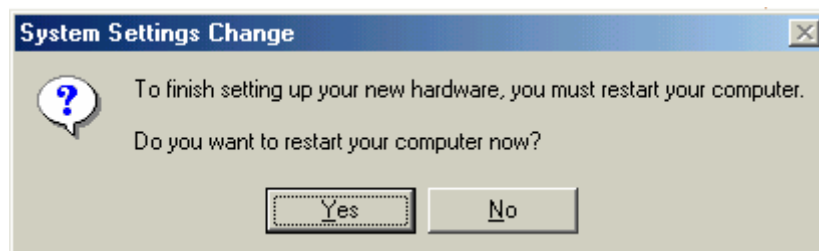
Setup for Windows ME

1. Make sure your PC is powered on and that you are running the Windows ME operating system.

2. Insert the "CardBus Wireless LAN Card" into the CardBus slot of your computer. The system will display the "**Add New Hardware Wizard**" dialog box. Select "**Automatic search for a batter driver (Recommended)**" and insert the driver CD and click the "**Next**" button.

3. Windows ME will search and recognize the driver, then Windows will automatically copy the driver files and related files into the system. After copying the driver files, the installation is completed; click the "**Finish**" button.

4. System will ask you "**Do you want to restart your computer now**". Click the "**Yes**" button to restart your computer.
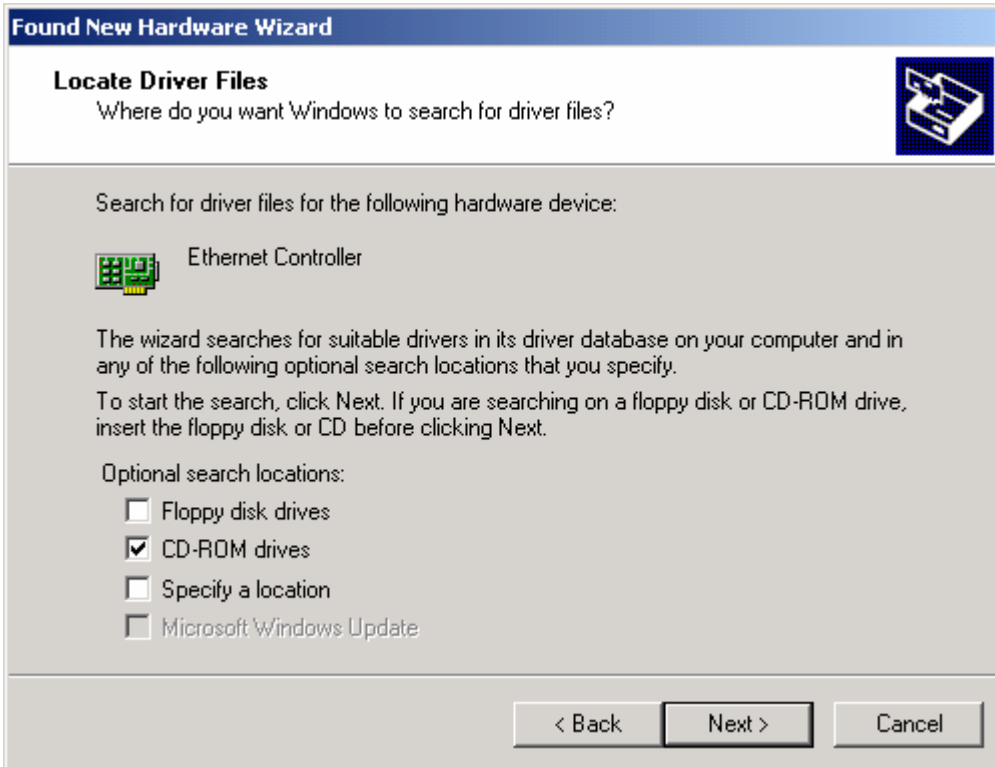
Setup for Windows 2000

1. Make sure your PC is powered on and that you are running the Windows 2000 operating system.

2. Insert the "CardBus Wireless LAN Card" into the CardBus slot of your computer. The system will display the "**Found New Hardware Wizard**" dialog box. Insert the driver CD into CD-ROM drive and then click the "**Next**" button.
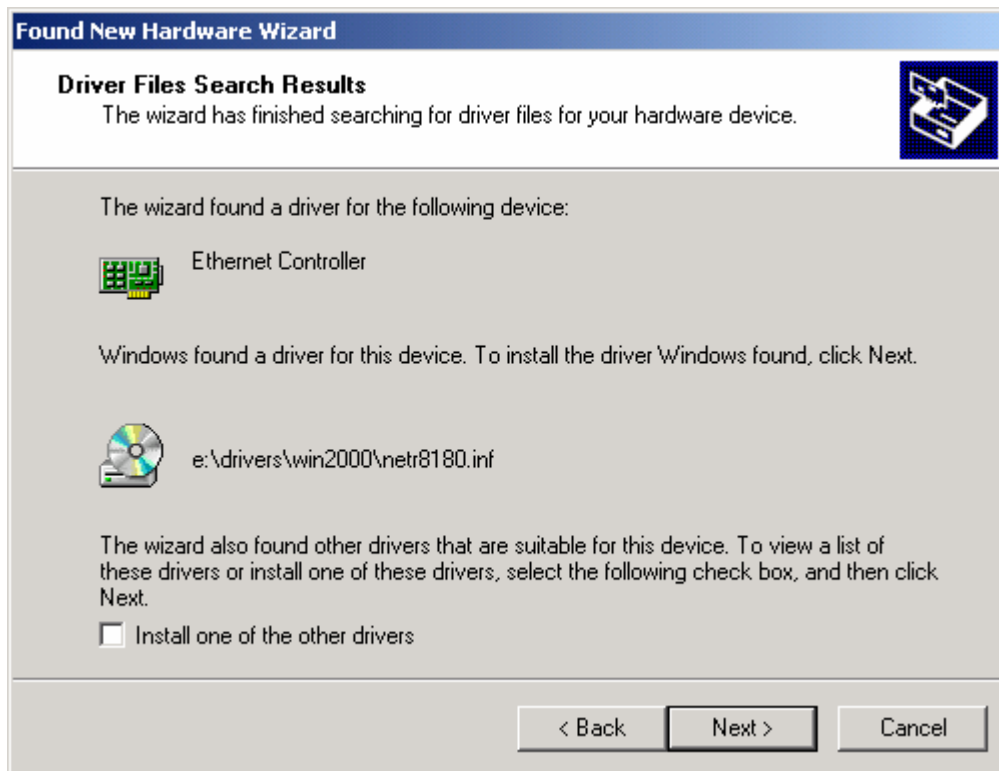
3. Select "**Search for a suitable driver for my device (Recommended)**" and click the "**Next**" button.
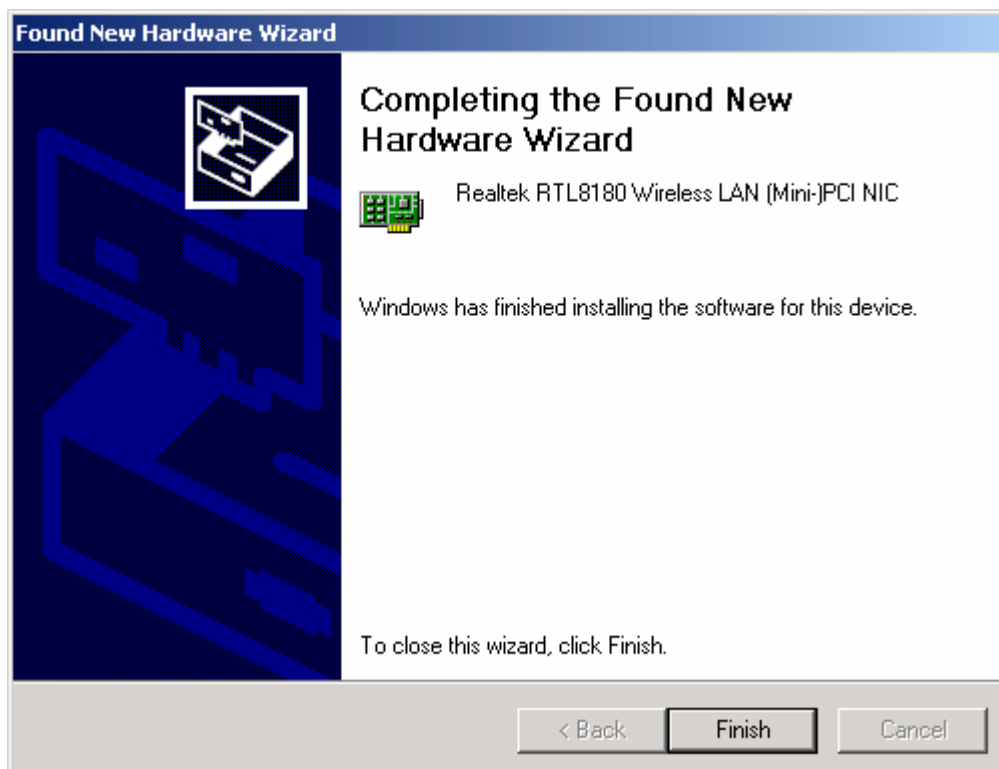

4. Select "**CD-ROM drives**" and click the "**Next**" button.

5. After Windows finds the driver, click the "**Next**" button, the driver then installs itself.

6. When Windows finishes the installation, then click the "**Finish**" button.
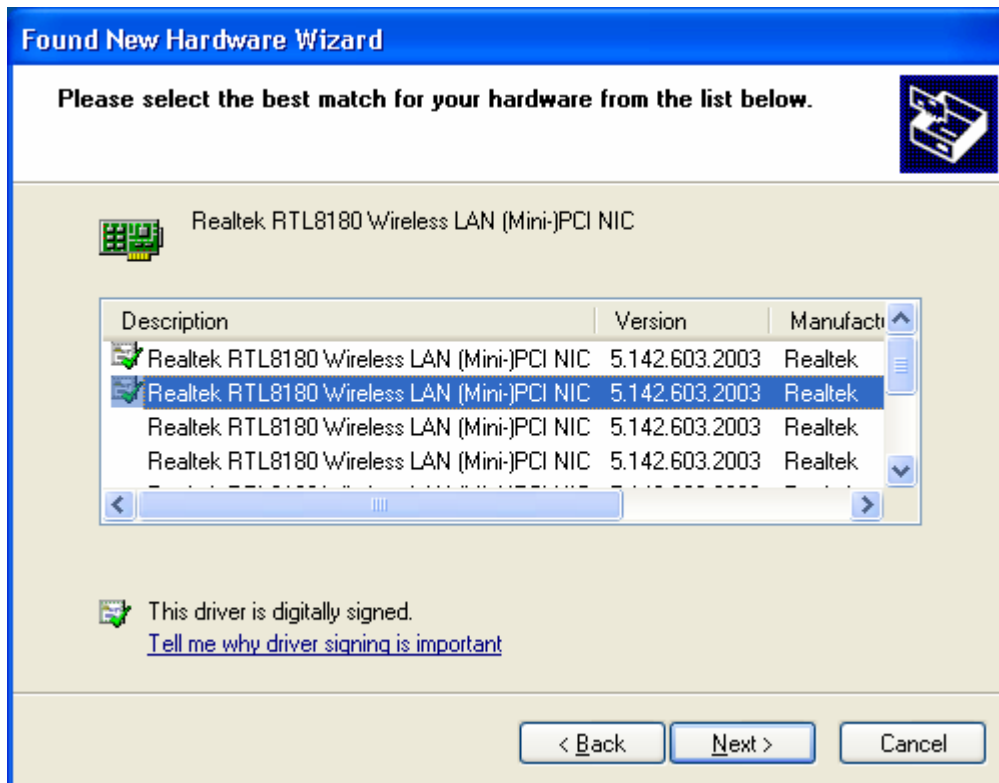
Setup for Windows XP

1. Make sure your PC is powered on and that you are running the Windows XP operating system.

2. Insert the "CardBus Wireless LAN Card" into the CardBus slot of your computer. The system will display the "**Found New Hardware Wizard**" dialog box. Select "**Install the software automatically (Recommended)**" and insert the driver CD and click the "**Next**" button.

3. Windows XP will search and recognize the driver, then Windows will automatically copy the driver files and related files into the system. After copying the driver files, the installation is completed; click the "**Finish**" button.
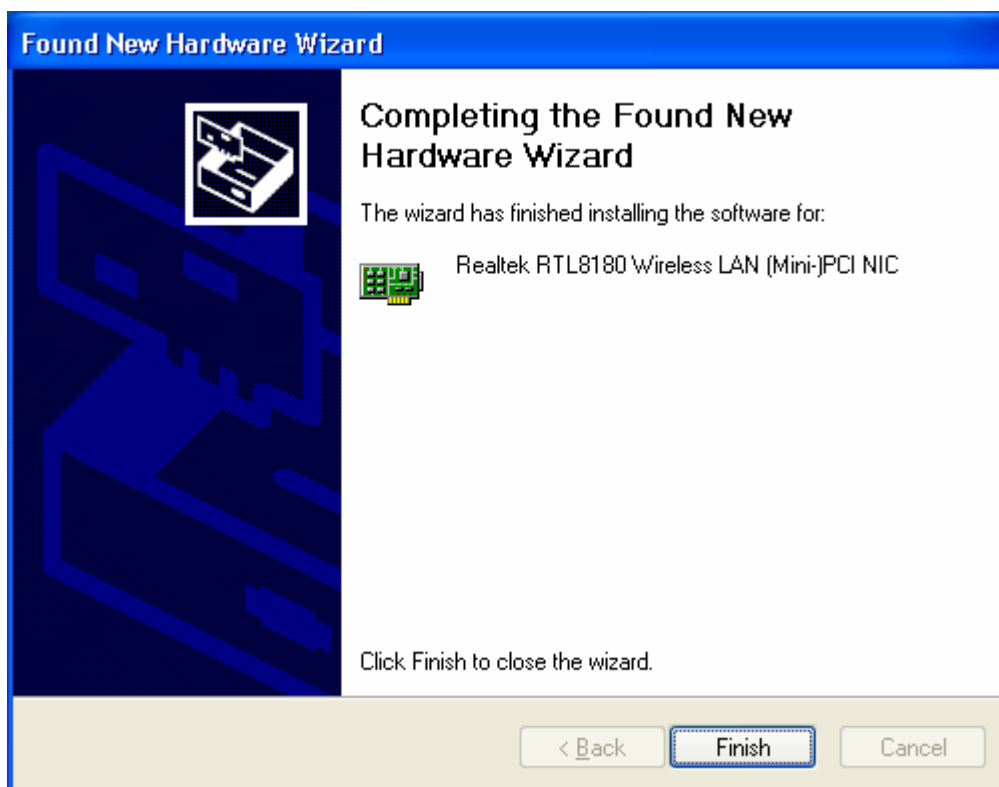
6

Install the Utility

1. Insert the CD into the CD-ROM device and execute the **"Utility\setup.exe"** program. The InstallShield Wizard box will appear, click **"Next"** to continue.
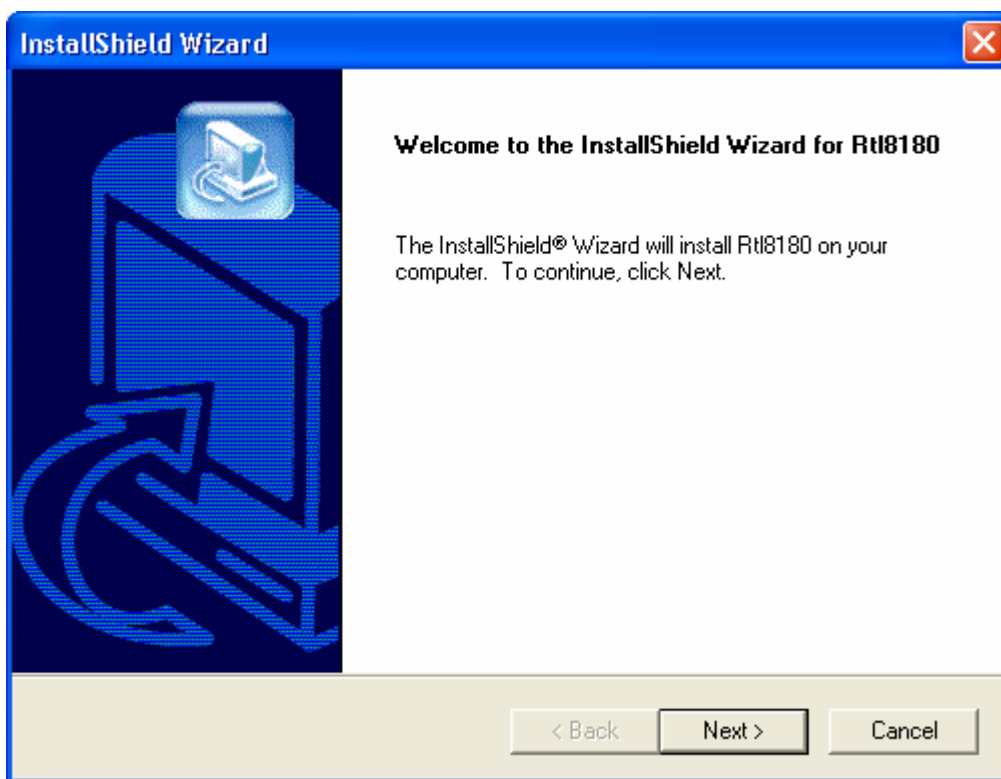
2. Follow the instruction of the installation program. The program will install the software for this device directly.
3. Click **"Finish"** to complete the installation.

4. When the Utility installation is completed, a shortcut named "Rtl8180"will appear in the computer's desktop and a new icon will display in th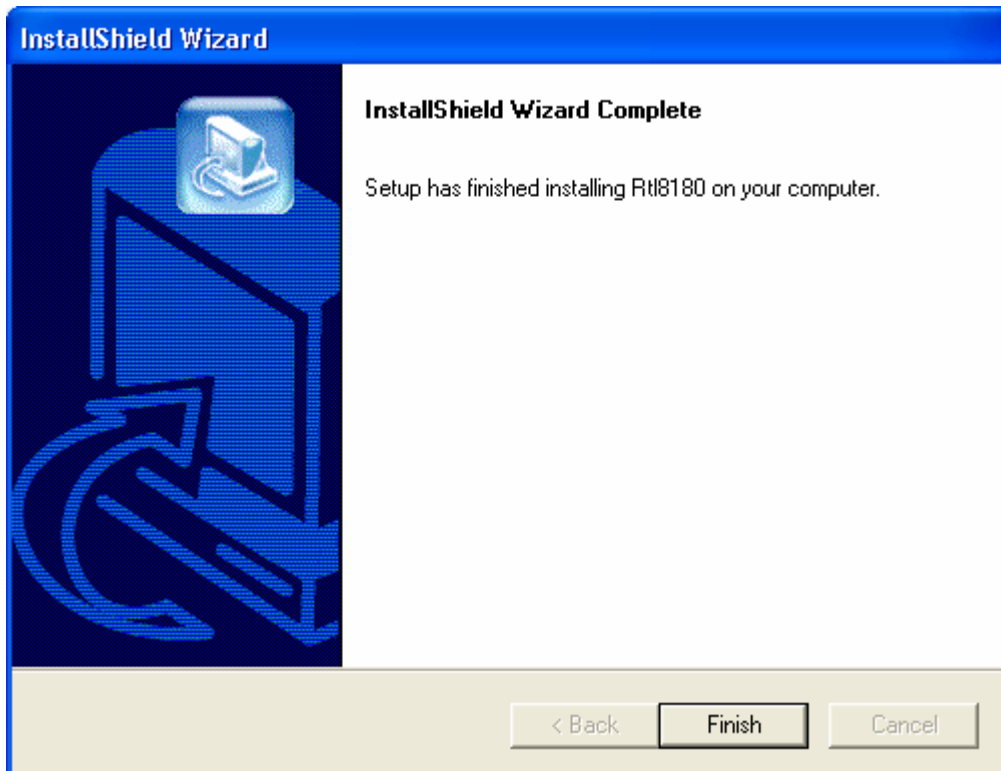e system tray at the bottom of the screen. Double click the shortcut or the icon to start using the WLAN CardBus Adapter.

In the Desktop   In the system tray

Windows XP

Due to Windows XP has built-in wireless network utility you may decide to use the system's utility or the one provided by this adapter. **It is strongly recommended to use the utility of this adapter**.

A. Using the Windows XP's Utility
Click the icon marked in red in the system tray and you may start using the Windows XP's wireless utility.
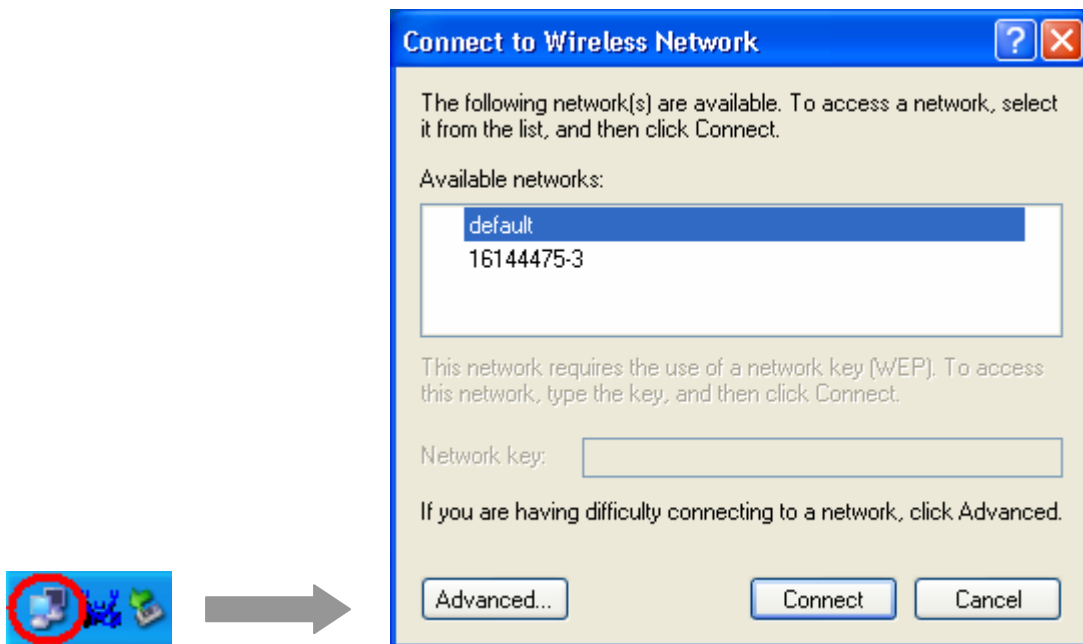
B. Using the Utility of this adapter

1. Get into Windows XP's Utility, click **"Advanced"** button.
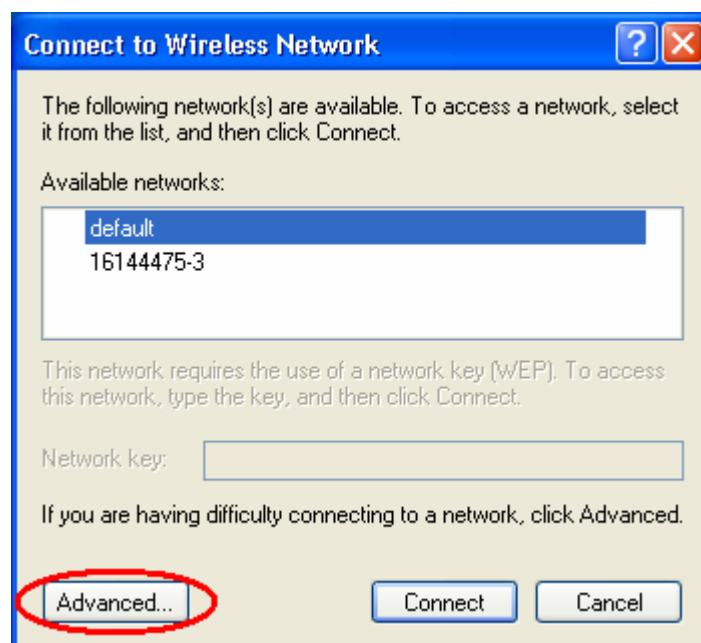
2. On the **"Wireless Networks"** tab in the **"Wireless Network Connection Properties"** screen, clear the "Use Windows to configure my wireless network settings" check box. If you want to enable the Windows XP built-in utility, select the check box again.
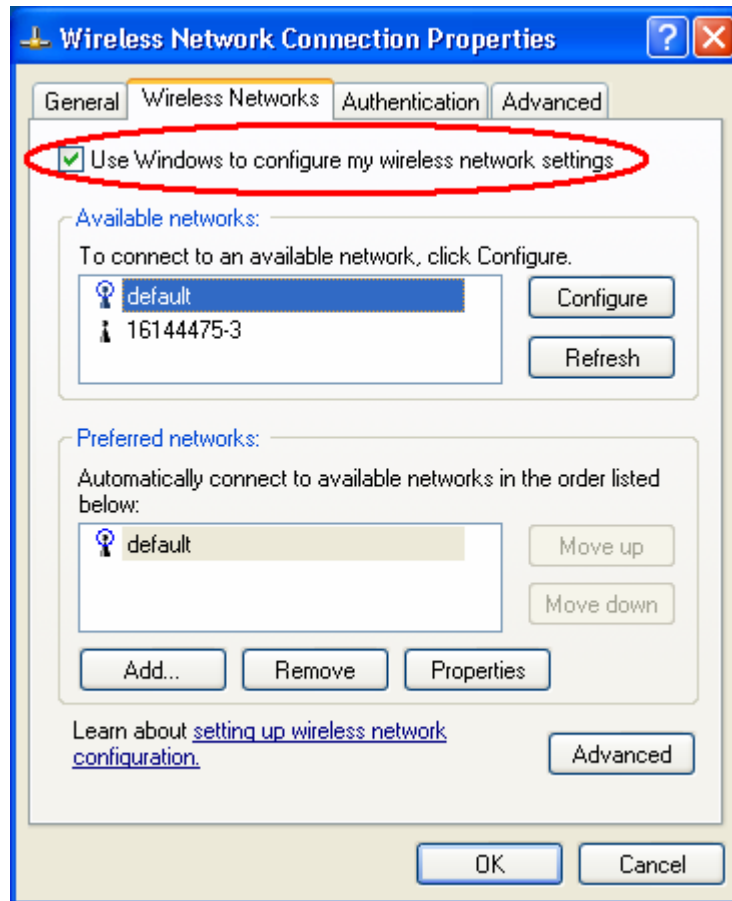
3. Double click the shortcut or the icon in the system tray and start using the WLAN CardBus Adapter.

Note: If you don't disable the XP's Utility, you can still see the link status and statistics during communication process from the adapter's utility.

Configuration Utility

The Configuration Utility is a powerful application that helps you configure the Wireless LAN CardBus Adapter and monitor the link status and the statistics during the communication process.

This utility can be used to change the following configuration parameters when the device is active.

1. Connect to the Wireless Network
From the **"Connect to Wireless Network"** screen you are able to view available wireless networks within range of your computer and access to the network you intend to.
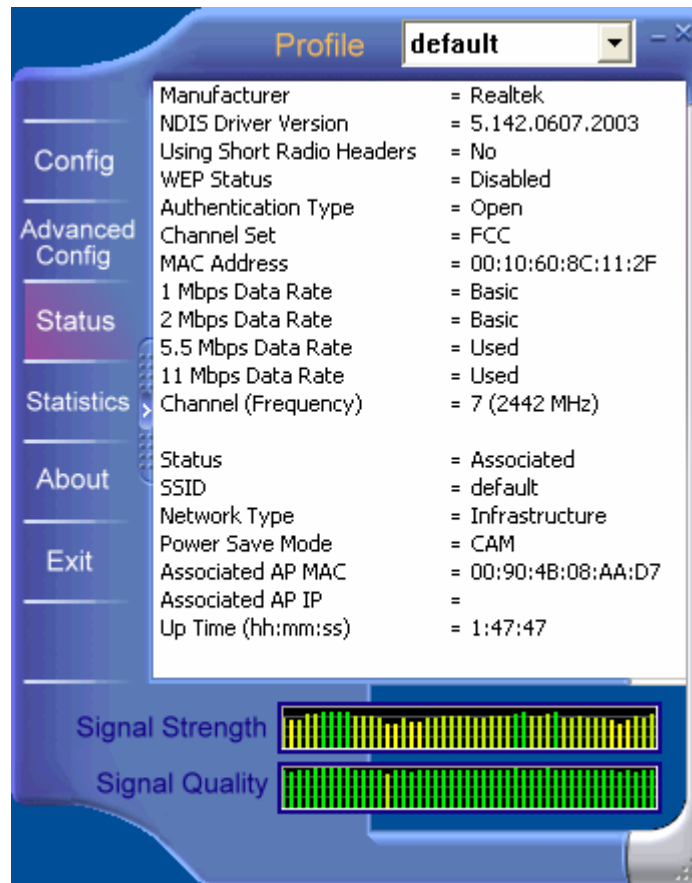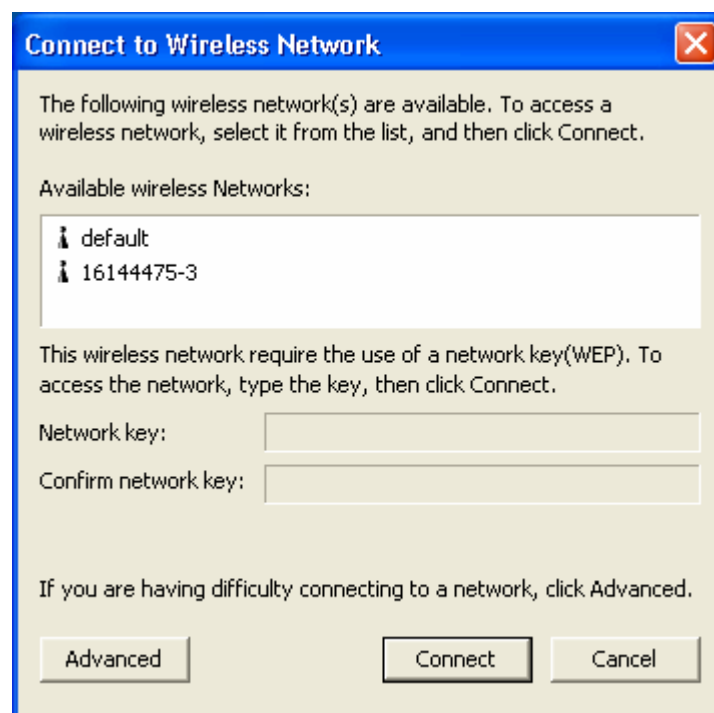

Available Wireless Networks

    This list shows the entire available wireless network within range of your computer. If you want to connect to any network on the list, select the network and click **"Connect"** button.

Network Key

    If the network requires a Wired Equivalent Privacy (WEP) key, type the key in the text box. The key should be 10 or 26 hexadecimal characters according to the WEP mode setting (64-bit or 128-bit) of the network.

Confirm Network Key

Enter the same network key again to confirm the key.

Advanced Button

To configure additional wireless network setting, review the link status and statistics or if you have difficulty connecting to a network, click "Advanced" button.

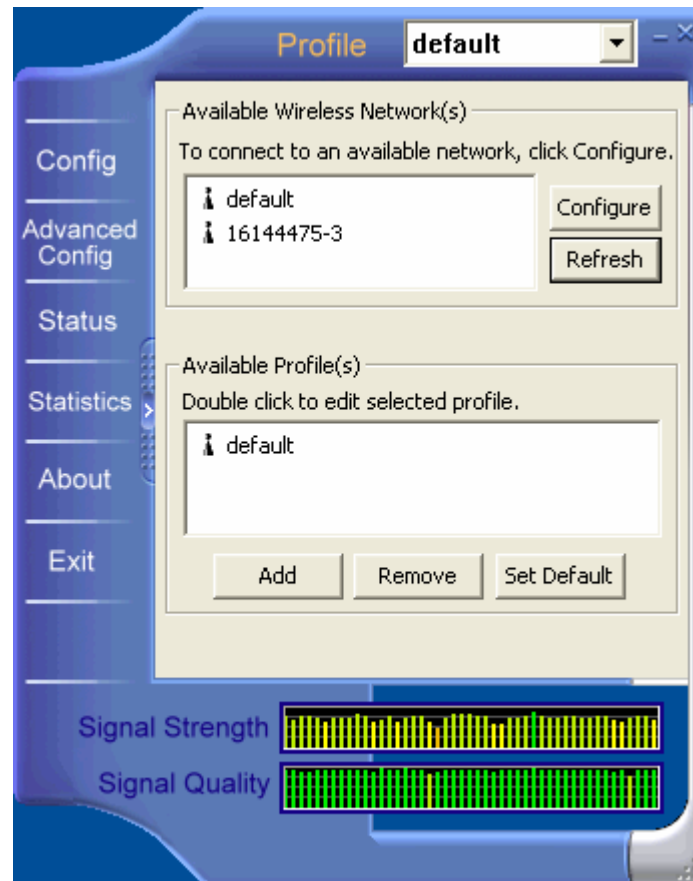**Connect Button**

Click the button to connect to the selected network.

Cancel Button

Click the button to cancel the wireless network connection.

2. Configuration

This screen is for you to make advanced settings in order to connect to an available network or create a new wireless network connection. You could also define the connection order here.

Profile

    Display the profiles the adapter is connected to. It also stores the profiles that the adapter had ever connected to. If you want to change the connection to another profile, pull down the list and select the profile you intend to connect.

Available Wireless Network(s)

    This list shows the entire available wireless networks within range of your computer. You can double click the network listed in the table to make further configurations.

    Configure Button

        If you are unable to connect to an existing wireless network, click the network name and then click this button. The **"Wireless Network Properties"** will show up for you to configure the adapter and ensure the settings are correct.

    Refresh Button

        To update the list of available networks, click the **"Refresh"** button.

Available Profile(s)

This list shows the preferred networks for the wireless connection. You can add, remove, edit the preferred networks or set one of the networks as the default connection.

Add Button

To configure a new profile, click "Add" button.

Remove Button

To remove a wireless network from the available profiles list, click the button.

Set Default Button

To designate a wireless network as the default network for the connection from the available profiles list, click the button.

Signal Strength

This bar shows the signal strength level. The higher percentage shown in the bar, the more radio signal been received by the adapter. This indicator helps to find the proper position of the wireless device for quality network operation.

Signal Quality

This bar indicates the quality of the link. The higher the percentage, the better the quality.
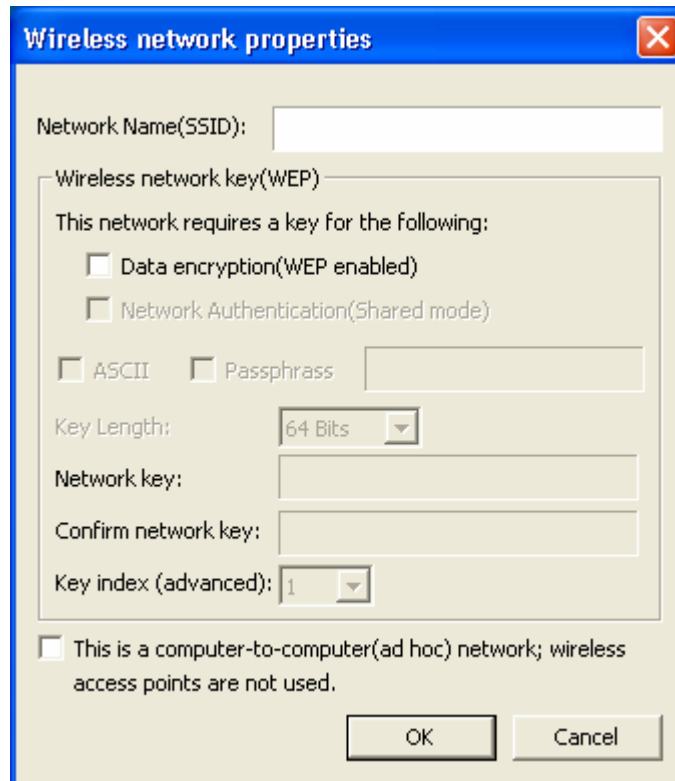
Network Name (SSID)

 The SSID (up to 32 printable ASCII characters) is the unique name identified in a WLAN. The ID prevents the unintentional merging of two co-located WLANs. Only the wireless devices with the same SSID can interconnect.

Wireless Network Key (WEP)

 WEP is an authentication algorithm, which protects authorized Wireless LAN users against eavesdropping. The security setting must be the same on the wireless stations within the network.

 Data Encryption (WEP Enabled)

 To enable the WEP function, select the check box.

 Network Authentication (Shared Mode)

 The wireless network supports two subtypes of network authentication services: Open System and Shared Key. Under Open System authentication, any wireless stations can request authentication. Under Shared Key authentication, only wireless stations using a shared key (WEP Key) are allowed to authenticate mutually. This network authentication mode setting has to be consistent with the wireless network that the adapter intends to connect.

 Network Key

 If the network is required for Wired Equivalent Privacy (WEP) key, type the key

in the text box. The key should be 10 or 26 hexadecimal characters according to the WEP mode designated by the network.

Note: The hexadecimal characters include the range of "A-F", "a-f" and "0-9", for example: "0123456aef" or "01234567890123456789abcdef".

Confirmed Network Key

Enter the same network key again to confirm the key.

Key Index (Advanced)

Select one of the four keys to encrypt your data.

Enable IEEE 802.1x authentication for this network

IEEE 802.1x authentication provides enhanced security for wireless network. If the wireless network requires IEEE 802.1x authentication for accessing to the network, please select the check box.

The "EAP-MD5 Authentication" screen (see the screen above) will appear when you attempt to connect the wireless network that requires IEEE 802.1x authentication. Please enter the user name and password that your network administrator assigns to you.

Note: This adapter only supports EAP-MD5 algorithm of the IEEE 802.1x authentication method when running in Windows 98SE/Me/2000/XP operating systems. Windows XP supports more algorithm of IEEE 802.1x such as EAP-TLS, please uses the Windows XP built-in Utility if you need to use the authentication method other than EAP-MD5.

In a computer-to-computer (ad hoc) network wireless access points are not used

In a Computer-to-Computer mode (Ad Hoc), wireless stations are connected to each other directly no Access Point is required. If the wireless network you selected is in Ad Hoc mode, select this check box.

3. Advanced Configuration

This screen allows you to do some advanced configuration including Power Save Mode, Encryption Algorithm and some specific settings for the adapter.
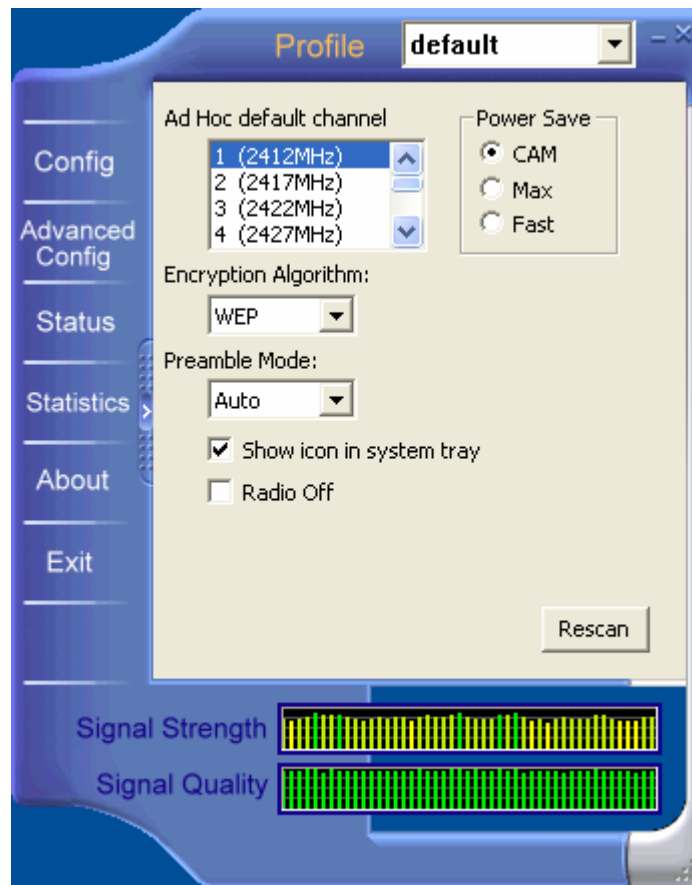
Ad Hoc Default Channel

Select the number of the radio channel used for the Ad Hoc networking. The channel of all the wireless stations in the Ad Hoc network should be the same. The parameter is not active in the infrastructure operation mode.

Note: The Infrastructure operation mode requires the presence of an 802.11 Access Point. All communication is done via the Access Point.

Encryption Algorithm

The parameter is only active in the Ad Hoc operation mode. There are three kinds of encryption algorithm supported by the adapter including WEP, TKIP and AES.

WEP is an authentication algorithm, which protects authorized Wireless LAN users against eavesdropping. WEP has been found that it has some security problems. TKIP is a temporary quick-fix method defined in IEEE 802.11i standard to quickly

overcome the inherent weaknesses in WEP security. AES has been developed to ensure the highest degree of security and authenticity for digital information and it is the most advanced solution defined by IEEE 802.11i for the security in the wireless network.

The security setting must be the same on the wireless stations within the network.

Preamble Mode

The preamble defines the length of the CRC block for communication among the wireless stations. There are three mode including Long, Short and Auto. High network traffic areas should use the shorter preamble type. If "Auto" mode is selected, the adapter will auto switch the preamble mode depending on the wireless stations that the adapter is connecting to.

Note that the parameter is only active in the Ad Hoc operation mode.

Show Icon in System Tray

Enable or disable the icon shown in the system tray.

Radio Off

When the setting is checked, the wireless connection of the adapter will be disabled.

Power Save

CAM (Continuous Access Mode) – Adapter will always set in active mode.
Max – Enable the adapter in the power saving mode when it is idle.
Fast – Enable the adapter in the power saving mode when it is idle, but some components of the adapter is still alive. In this mode, the power consumption is larger than "Max" mode.

Rescan Button

Click this button to scan the wireless network that the adapter is connecting to.

4. Status

This screen shows the information of manufacturer, driver version, settings of the wireless network that the adapter is connected to, linking time and link status. If you are not sure the status of the adapter and the network you are connected to, please go to the screen for more details.
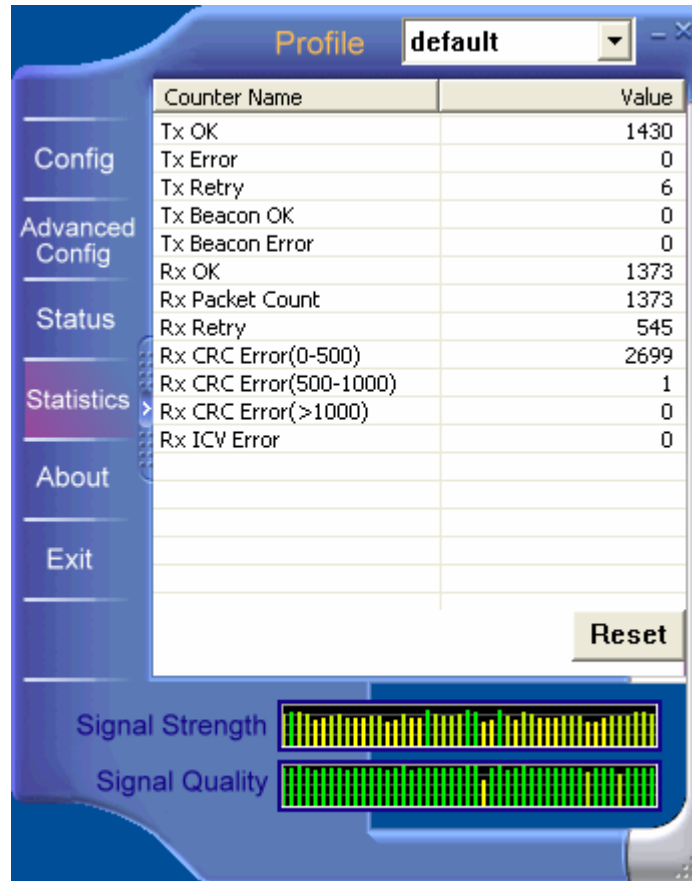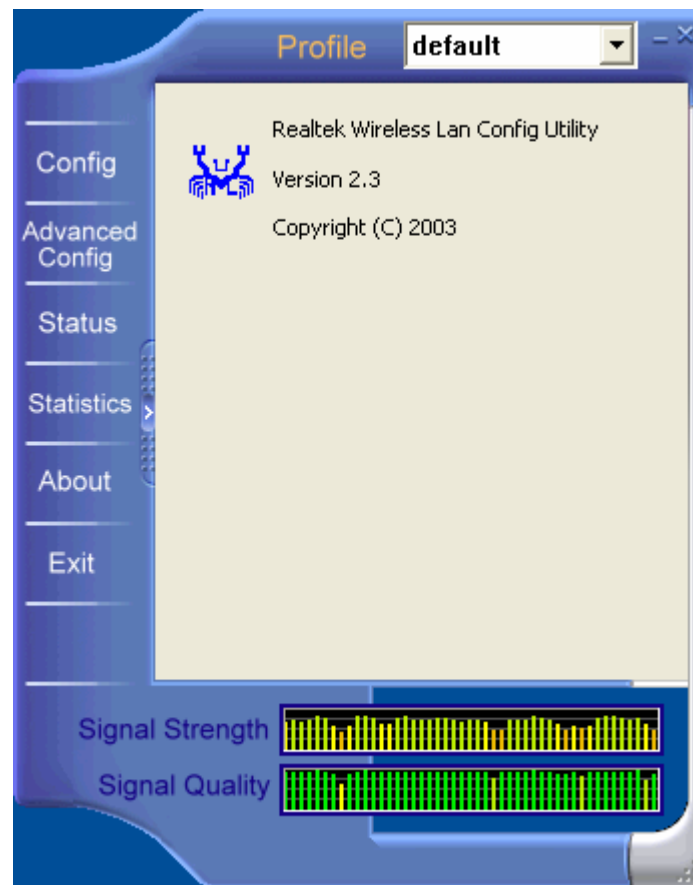
5. Statistics

You can get the real time information about the packet transmission and receiving status during wireless communication from the screen. If you want to recount the statistics value, please click **"Reset"** button.

6. About

This screen displays the version and the designer of the Utility.

Troubleshooting

This chapter provides solutions to problems usually encountered during the installation and operation of the adapter.

1. What is the IEEE 802.11b standard？

The IEEE 802.11b Wireless LAN standard subcommittee which formulates the standard for the industry. The objective is to enable wireless LAN hardware from different manufactures to communicate.

2. What does IEEE 802.11 feature support？

The product supports the following IEEE 802.11 functions:

- CSMA/CA plus Acknowledge Protocol
- Multi-Channel Roaming
- Automatic Rate Selection
- RTS/CTS Feature
- Fragmentation
- Power Management

3. What is Ad-hoc？

An Ad-hoc integrated wireless LAN is a group of computers, each has a Wireless LAN adapter, Connected as an independent wireless LAN. Ad hoc wireless LAN is applicable at a departmental scale for a branch or SOHO operation.

4. What is Infrastructure？

An integrated wireless and 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.

5. 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.

6. 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 .11 standard.

7. What is TKIP?

TKIP is a quick-fix method to quickly overcome the inherent weaknesses in WEP security, especially the reuse of encryption keys. TKIP is involved in the IEEE 802.11i WLAN security standard, and the specification might be officially released by early 2003.
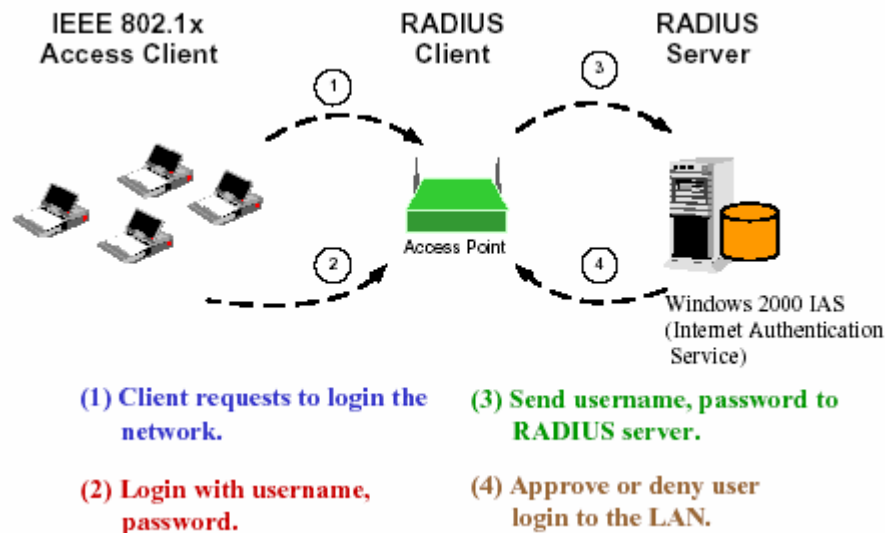
8. What is AES?

AES (Advanced Encryption Standard), a chip-based security, has been developed to ensure the highest degree of security and authenticity for digital information, wherever and however communicated or stored, while making more efficient use of hardware and/or software than previous encryption standards. It is also included in IEEE 802.11i standard. Compare with AES, TKIP is a temporary protocol for replacing WEP security until manufacturers implement AES at the hardware level.

9. What is IEEE 802.1x?

802.1x, an IEEE standard that provides an authentication framework for 802-based LANs. 802.1x will let wireless LANs scale by allowing centralized authentication of wireless users or stations. Based on the 802.1x framework, any wireless stations try to connect to the Access Point or Router should be authenticated by an Authentication Server.

The Authentication Server identifies the wireless station by a set of user name and password, only wireless stations provide correct user name and password can connect to the Access Point or Router and access to the network.

IEEE 802.1x Access Client — **RADIUS Client** — **RADIUS Server**

Access Point

Windows 2000 IAS (Internet Authentication Service)

(1) Client requests to login the network.

(2) Login with username, password.

(3) Send username, password to RADIUS server.

(4) Approve or deny user login to the LAN.

10. Can Wireless products support printer sharing？

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

11. 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.

12. 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 is, 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.

13. What is Spread Spectrum？

Spread Spectrum technology is a wideband radio frequency technique developed by the military for use in reliable, secure, mission-critical communication 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).