



# *Wireless LAN Cardbus Adapter*

**EW-7106PC**

## User Manual

**Version: 3.0  
(June, 2003)**



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# Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

## **FCC Caution**

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

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the authority to operate equipment.

## **Federal Communications Commission (FCC) Radiation Exposure Statement**

This equipment complies with FCC radiation exposure set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 2.5cm (1 inch) during normal operation.

## **Federal Communications Commission (FCC) RF Exposure Requirements**

SAR compliance has been established in the laptop computer(s) configurations with PCMCIA slot on the side near the center, as tested in the application for Certification, and can be used in laptop computer(s) with substantially similar physical dimensions, construction, and electrical and RF characteristics. Use in other devices such as PDAs or lappads is not authorized. This transmitter is restricted for use with the specific antenna(s) tested in the application for Certification. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

## **R&TTE Compliance Statement**

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

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

## **Safety**

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

## **EU Countries Intended for Use**

The ETSI version of this device is intended for home and office use in Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom.

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

## **EU Countries Not intended for use**

None.

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# 1 Introduction

Thank you for purchasing the Wireless LAN Cardbus Adapter. This card features the latest innovation wireless technology. IEEE 802.1x which request wireless stations to pass the authorization by entering a unique user name and password designated by the authorization server before connecting to the wireless devices such as Access Point or Router. TKIP (Temporal Key Integrity Protocol) and AES (Advanced Encryption Standard) which are advanced WLAN security technology included in the IEEE 802.11i standard, and supports 32-bit cardbus interface which enables higher transmission performance. Furthermore, this card provides several kinds of power saving modes allowing user customizes the way of saving the power from his/her portable or handheld devices. This card is cost-effective, together with the versatile features, it is the best solution for you to build your wireless network.

## 1.1 Features

- Complies with the IEEE 802.11b (DSSS) 2.4GHz standard.
- High-speed data transfer rate – up to 11Mbps.
- Support 64/128-bit AES/TKIP/WEP Data Encryption function for high level of security.
- Supports IEEE 802.1x advanced WLAN Security.
- Supports peer-to-peer communication among any wireless users, no Access Point required.
- Automatic rate fallback enables data security and reliability.
- Supports power save mode.
- Supports 32-bit cardbus interface.
- Supports the most popular operating systems: Windows 98SE/Me/NT/2000/XP and Linux.
- Plug and Play installation.

## 1.2 Specifications

- Standard: IEEE 802.11b
- Interface: 32-bit Cardbus
- Frequency Band: 2.4000 ~ 2.4835GHz (Industrial Scientific Medical Band)
- Modulation: CCK@11/5.5Mbps, DQPSK@2Mbps, DBPSK@1Mbps
- Radio Technology: Direct Sequence Spread Spectrum (DSSS)
- Data Rate: 11/5.5/2/1Mbps auto fallback
- Security:
  - 64/128-bit WEP Encryption
  - 64/128-bit TKIP Data Encryption
  - 64/128-bit AES Data Encryption
- IEEE 802.1x
- Antenna: Diversity Patch Antenna
- Drivers: Windows 98SE/Me/NT/2000/XP and Linux
- LEDs: TX/RX, Link
- Power Voltage: 3.3V

- Transmit Power: 16dBm~18dBm
- Receive Sensitivity: -83dBm (Typical)
- Dimension: 7(H) x 113(W) x 54(D)
- Temperature: 32~131 ° F (0 ~55 ° C)
- Humidity: 0-95% (NonCondensing)
- Certification: FCC, CE, Wi-Fi, WHQL

### **1.3 Package Contents**

Before you begin the installation, please check the items of your package. The package should include the following items:

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

***If any of the above items is missing, contact your supplier as soon as possible.***

## 2 Installation Procedure

### 2.1 Windows 98SE/Me/2000

Before you proceed with the installation, please notice following descriptions.

**Note1:** *The following installation was operated under Windows 2000. (Procedures will be the same for Windows 98SE/Me.)*

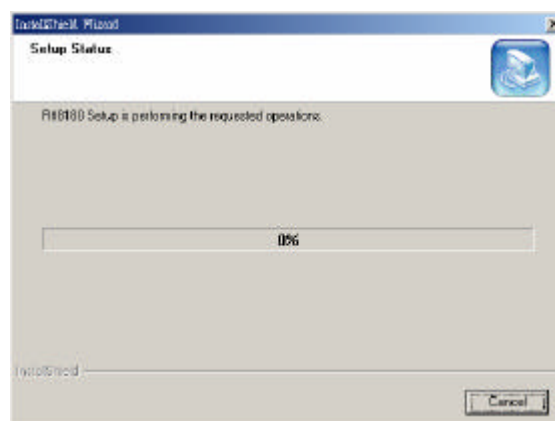
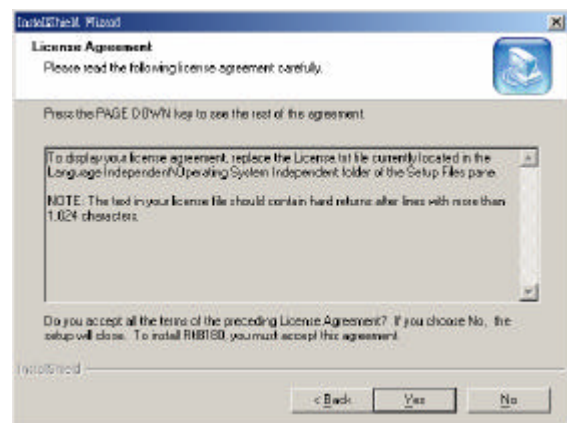
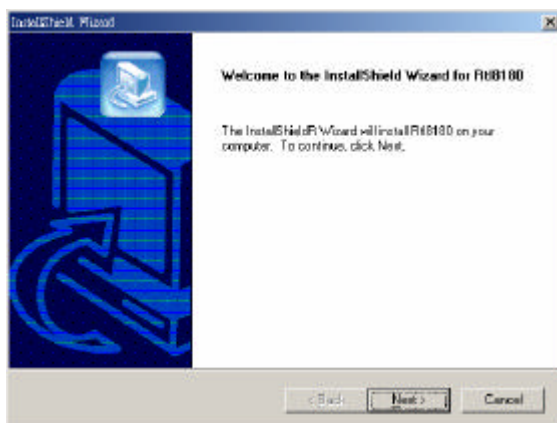
**Note2:** *If you have installed the Wireless PC Card driver & utility before, please uninstall the old version first.*

#### 2.1.1 Install the Driver

1. Insert the adapter into the Cardbus port of your computer, the system will automatically find the device and search for its driver.
2. Please select the "Driver\Win2000" folder (select the folder based on your computer's OS system) and the system will complete the driver installation automatically.

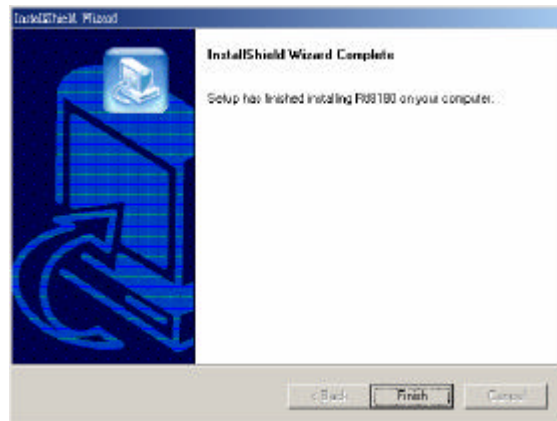
#### 2.1.2 Install the Utility

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.

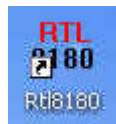




3. Click "Finish" to complete the installation.



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



*In the Desktop*



*In the system tray*

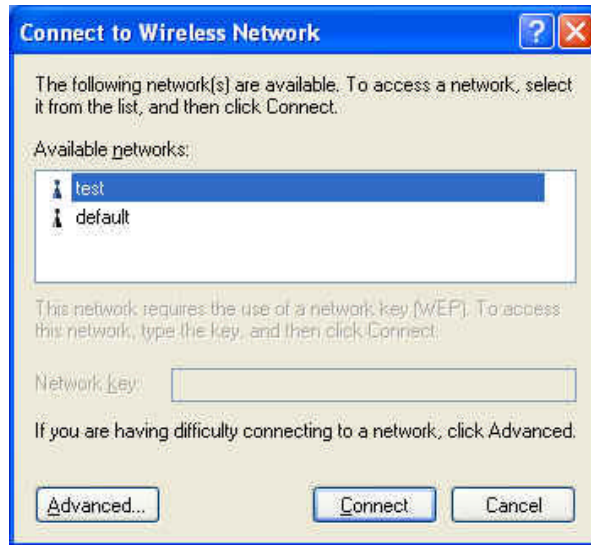
## 2.2 Windows XP

The installation process in Windows XP is similar with the process in windows 98SE/Me/2000. Please refer to the instructions described in section 2.1.

Due to the 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 using the utility of this adapter.**

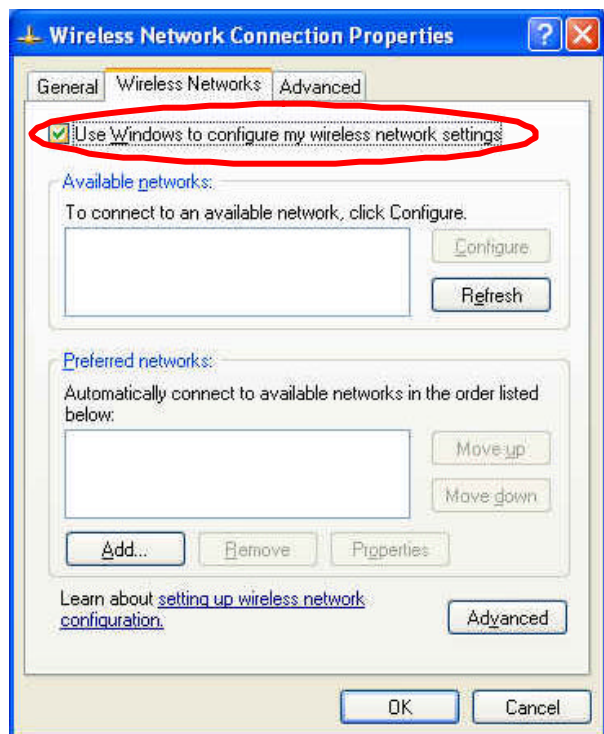
### A. Using the Windows XP's Utility

Click the icon marked in red in the system tray and you may start using the Windows XP's wireless utility.

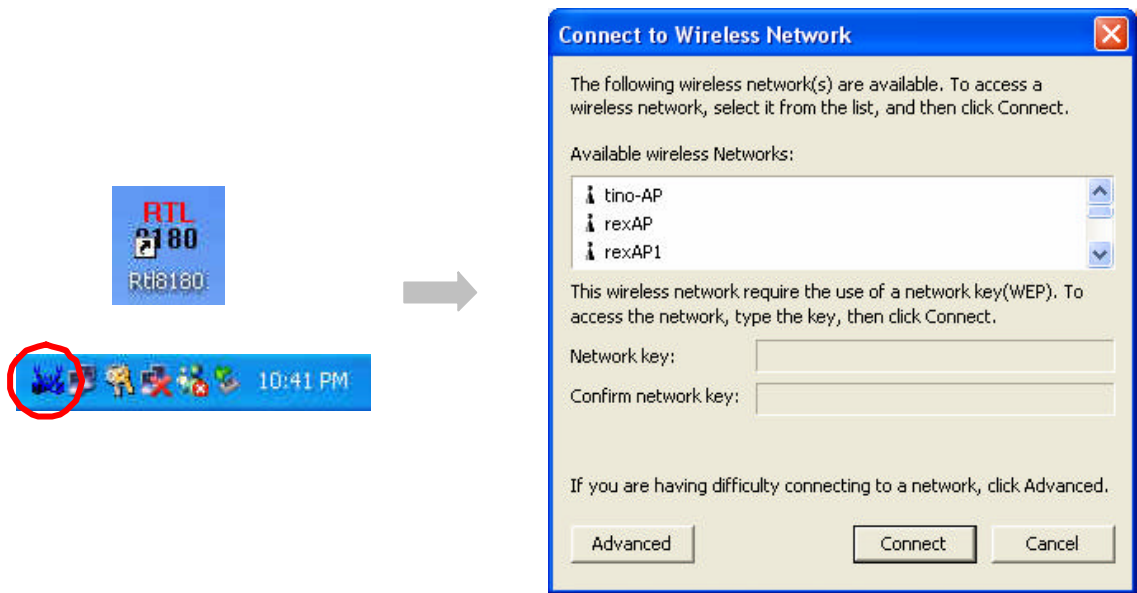


### B. Using the Utility of this adapter

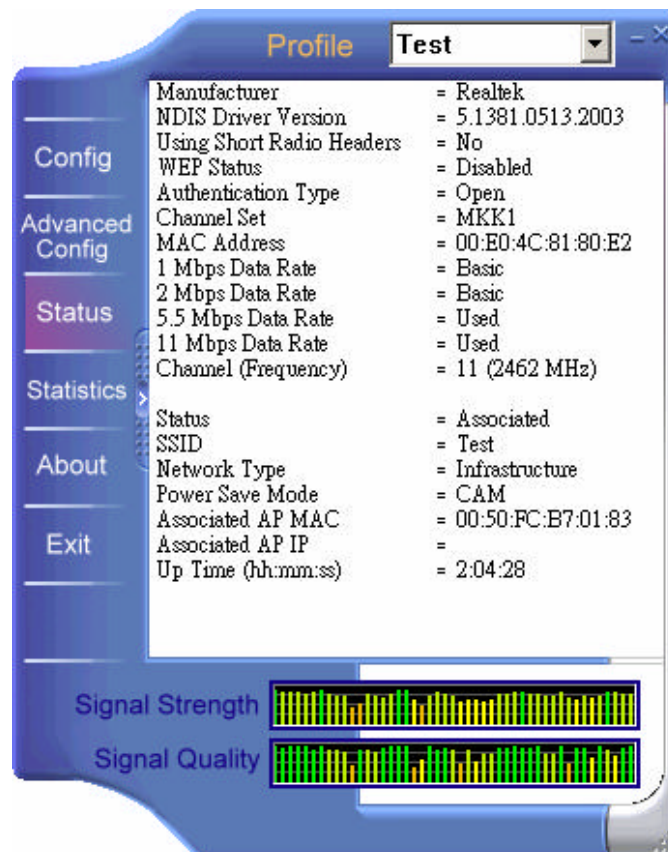
1. Get into Windows XP' s Utility, click "Advanced" button.
2. On the "Wireless Networks" tab in the "Wireless Network Connection Properties" screen, clear the "Use Windows to configure my wireless network settings" check box. If you want to enable the Windows XP built-in utility, select the check box 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.**



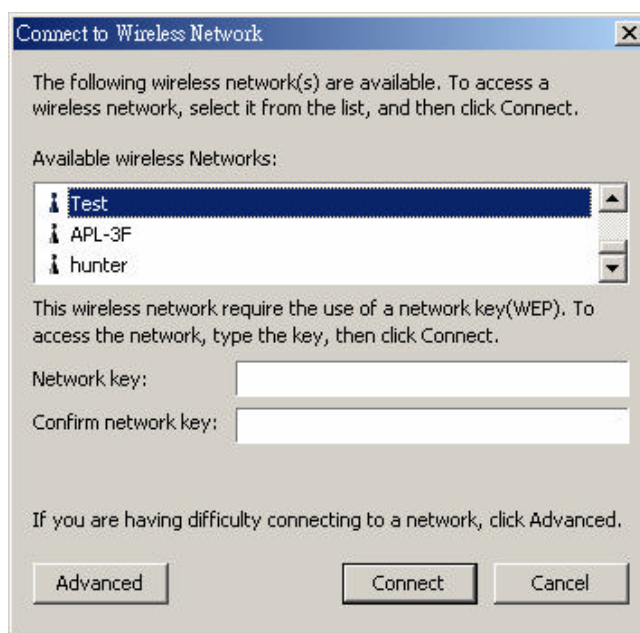
## 3 Configuration Utility

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.

### 3.1 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.

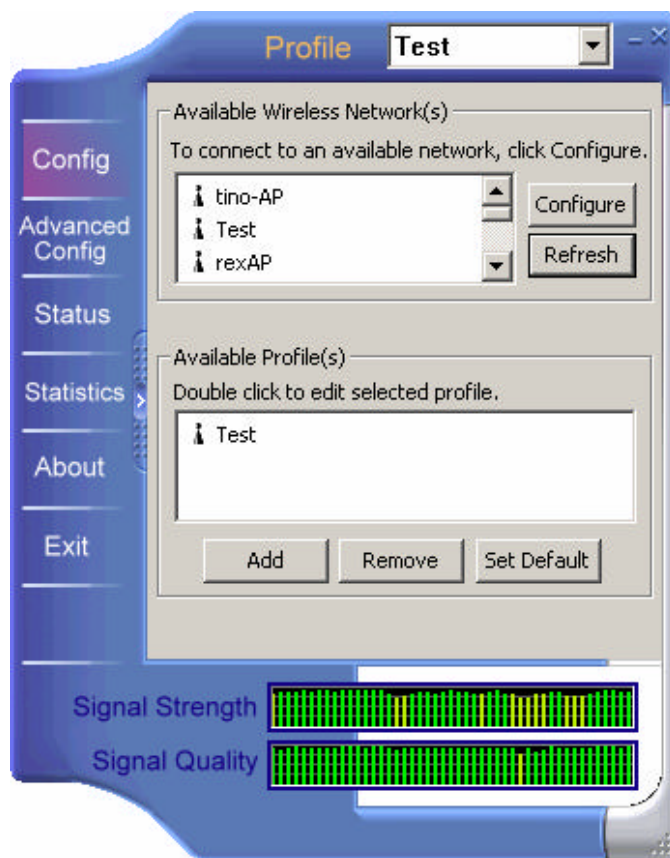


Parameter	Description
Available Wireless Networks	This list shows all available wireless network within range of your computer. If you want to connect to any network on the list, select the network and click “Connect” button.
Network Key	If the network is required for Wired Equivalent Privacy (WEP) key, type the key in the text box. The key should be 10 or 26 hexadecimal characters according to the WEP mode 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.

Parameter	Description
Connect Button	Click the button to connect to the selected network.
Cancel Button	Click the button to cancel the wireless network connection.

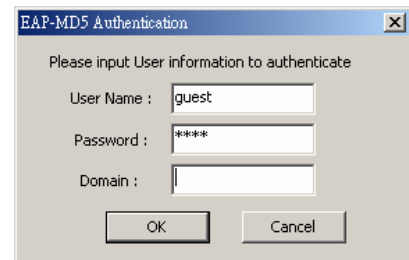
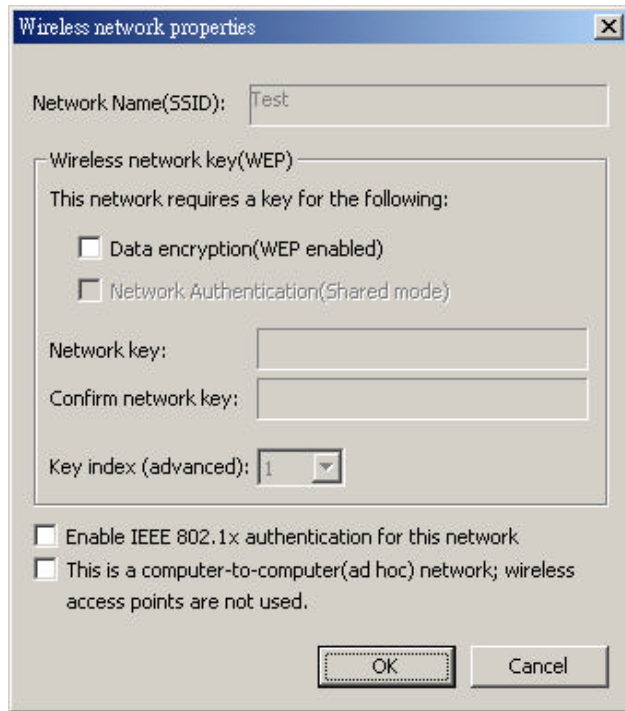
### 3.2 Configuration

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



Parameter	Description
Profile	Display the profiles the adapter is connecting to. It also stores the profiles that the adapter 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 all available wireless network within range of your computer. You can double click the network listed in the table to do more configuration.

Parameter	Description
<b>Available Wireless Network(s)</b>	
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.
<b>Available Profile(s)</b>	
	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 has 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.



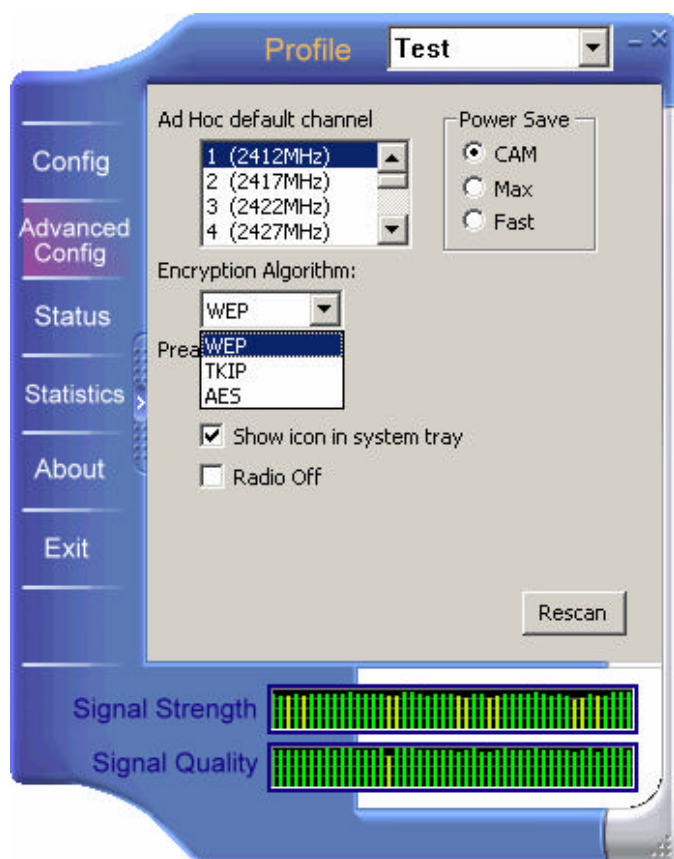
Parameter	Description
Network Name(SSID)	<p>The SSID (up to 32 printable ASCII characters) is the unique name identified in a WLAN. The ID prevents the unintentional merging of two co-located WLANs.</p> <p>Only the wireless devices with the same SSID can interconnect.</p>
Wireless Network Key(WEP)	<p>WEP is an authentication algorithm, which protects authorized Wireless LAN users against eavesdropping. The security setting must be the the same on the wireless stations within the network.</p>
Data Encryption(WEP Enabled)	To enable the WEP function, select the check box.
Network Authenticon (Shared Mode)	<p>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 wirelss 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 which the adapter intends to connect.</p>

Parameter	Description
<b>Wireless Network Key(WEP)</b>	
Network Key	<p>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.</p> <p>Note: The hexadecimal characters include the range of "A-F", "a-f" and "0-9", for example: "0123456aef" or "01234567890123456789abcdef".</p>
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	<p>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.</p> <p>The "EAP-MD5 Authentication" screen (see the screen above) will appear when you attempt to connect the wireless network which requires for IEEE 802.1x authentication. Please enter the user name and password which your network administrator assigns to you.</p> <p>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 use the Windows XP built-in Utility if you need to use the authentication method other than EAP-MD5.</p>
This is a computer-to-computer(ad hoc) network; wireless access points are not used	In Computer-to-Computer mode (Ad Hoc), wireless stations connect to each other directly, no Access Point is required. If the wireless network you selected is in Ad Hoc mode, select this check box.

### 3.3 Advanced Configuration

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



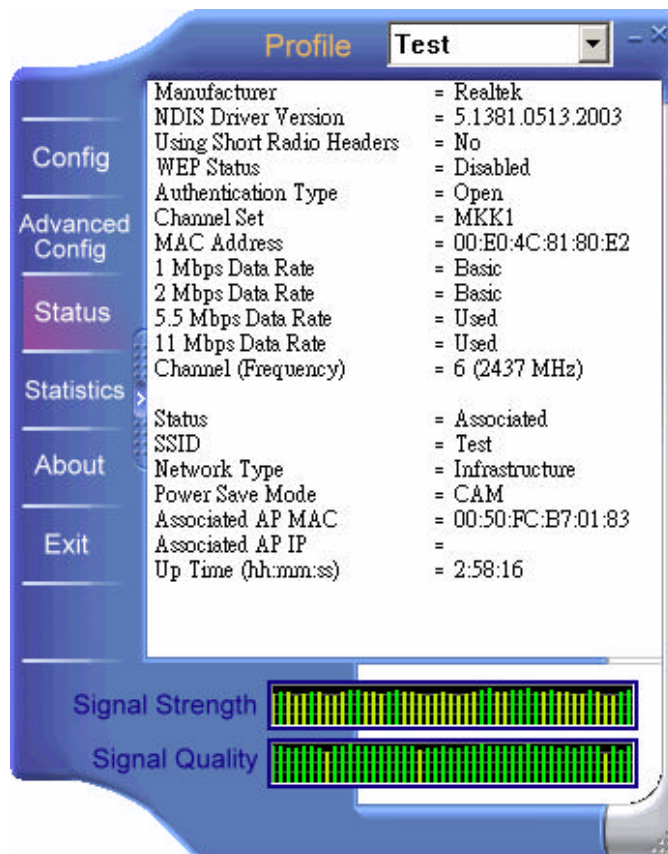


Parameter	Description
Ad Hoc Default Channel	<p>Select the number of the radio channel used for the Ad Hoc networking. The channel of all the wireless stations in the Ad Hoc network should be the same. The parameter is not active in the infrastructure operation mode.</p> <p>Note: The Infrastructure operation mode requires the presence of an 802.11 Access Point. All communication is done via the Access Point.</p>
Encryption Algorithm	<p>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.</p> <p>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.</p> <p>The security setting must be the the same on the wireless stations within the network.</p>

Parameter	Description
Preamble Mode	<p>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 which the adapter is connecting to.</p> <p>Note that the parameter is only active in the Ad Hoc operation mode.</p>
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	<ul style="list-style-type: none"> <li>● <b>CAM(Continuous Access Mode)</b> – Adapter will always set in active mode.</li> <li>● <b>Max</b> – Enable the adapter in the power saving mode when it is idle.</li> <li>● <b>Fast</b> – 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.</li> </ul>
Rescan Button	Click this button to scan the wireless network which the adapter is connecting to.

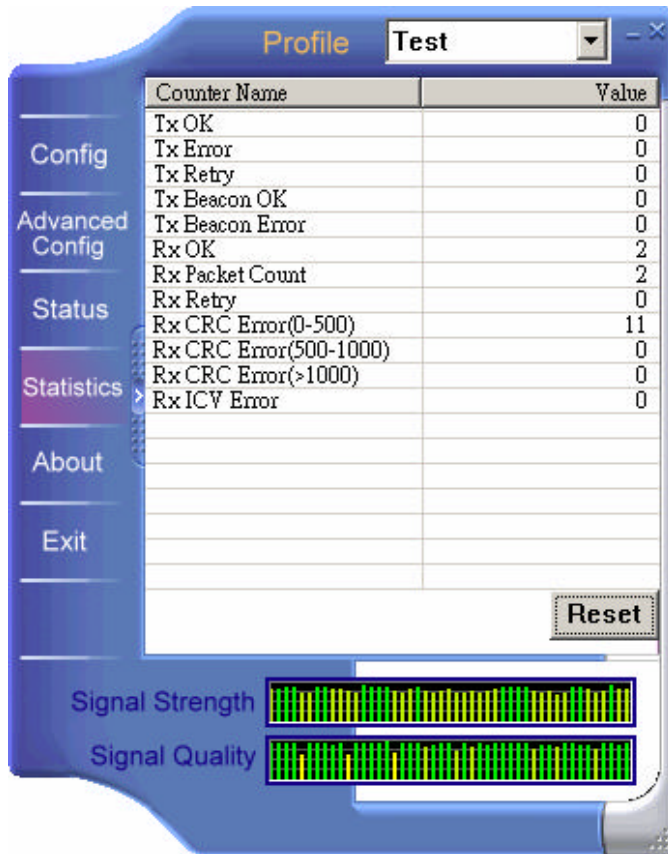
### 3.4 Status

This screen shows the information of manufacturer, driver version, settings of the wireless network the adapter is connecting to, linking time and link status. If you don't ensure the status of the adapter and the network you are connecting, please go to the screen for more details.



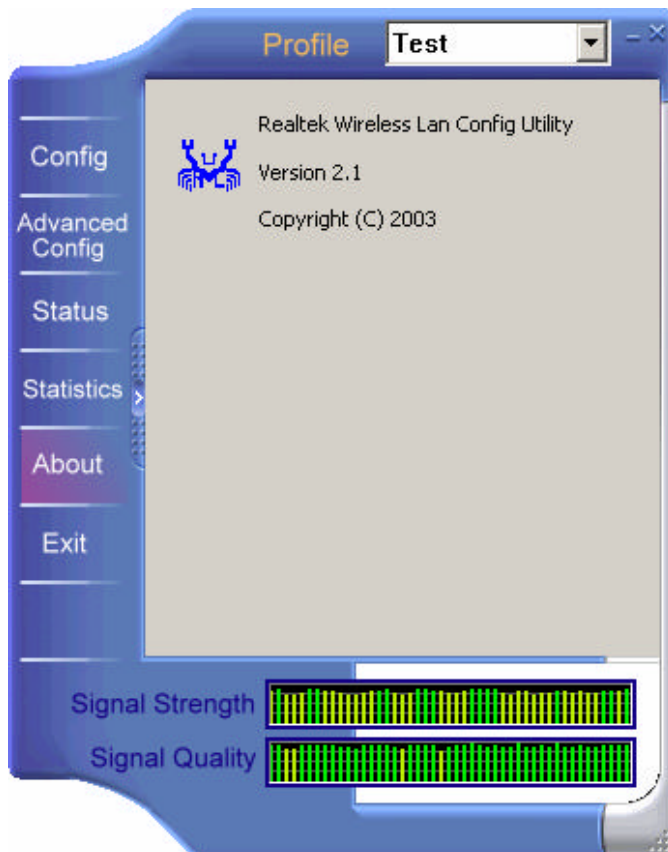
### 3.5 Statistics

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.



### 3.6 About

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



## **4 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.

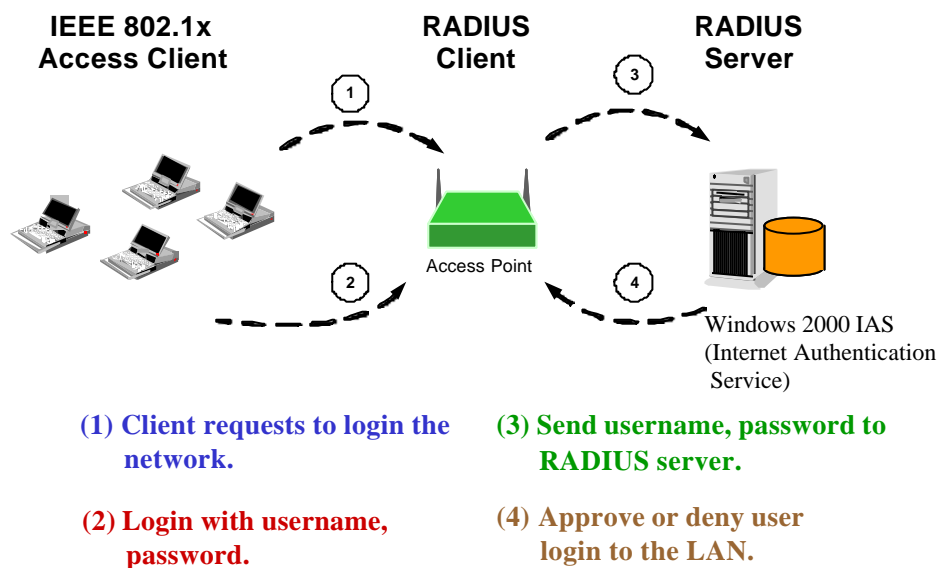
## 8. What is AES?

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.



## 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).