

1.0

CARDBUS WIRELESS LAN CARD

User's Manual

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

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

FCC Caution: To assure continued compliance, (example - use only shielded interface cables when connecting to computer or peripheral devices) any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

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

IMPORTANT NOTE:

This module is restricted to mobile configuration. To comply with FCC RF exposure compliance requirements, the antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. This transmitter module must not be co-located or operating in conjunction with any other antenna or transmitter

Industry Canada Statement

Operation is subject to the following two conditions:

- 1) This device may not cause interference
- 2) This device must accept any interference, including interference that may cause undesired operation of the device

This device has been designed to operate with an antenna having a maximum gain of 2.58 dBi. (Antenna gain)

Antenna having a higher gain is strictly prohibited per regulations of Industry Canada. The required antenna impedance is 50 ohms.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the EIRP is not more than required for successful communication.

To prevent radio interference to the licensed service, this device is intended to be operated indoors and away from windows to provide maximum shielding.

(Equipment (or its transmit antenna) that is installed outdoors is subject to licensing).

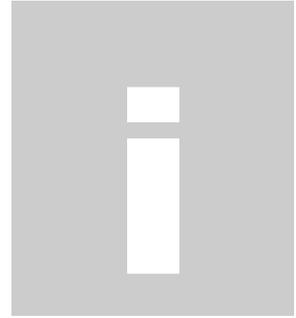
Manual Information That Must be Included

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrate this module.

The users manual for OEM integrators must include the following information in a prominent location " IMPORTANT NOTE: To comply with FCC RF exposure compliance requirements. The antenna must not be co-located or operating in conjunction with any other antenna or transmitter

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Introduction

Thank you for purchasing this CardBus Wireless LAN Card. This card is a wireless network client that complies with IEEE 802.11a/b/g standard on wireless LANs. The IEEE 802.11b/g standards compliance means this adapter gives you the flexibility to connect it to any 802.11g network. The IEEE 802.11b/g standard allows you to connect computers and devices at speeds up to 54Mbps, 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 CardBus Wireless LAN Card
- One CD (Driver/Utility/User's Manual)

NOTE:

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



Specifications

Features

- Fully Comply with IEEE 802.11a/b/g Standard
- Fully Comply with IEEE 802.11j (Japan J52,W52,W53) Standard.
- 2.4GHz and 5GHz ISM wireless system technology
- 6, 9, 12, 18, 24, 36, 48, 54 Mbps for OFDM; 5.5, 11Mbps for CCK; and 1,2Mbps for Barker Modulation.
- Support antenna diversity
- Support Complete Security Features: WEP 64/128, TKIP, WPA, WPA2, 802.11i
- Support Advanced Quality of Service (QoS) – 802.11e, WMM
- Supports peer to peer communication among any wireless users, no Access Point required.

Specification

1. Interface:

- CardBus

2. Mechanical

Dimension: 59.6 x 44.6 x 1 mm (L x W x H)

Function

- Protocol : Compatible with IEEE 802.11 a/ b /g Standard
- Modulation Technique :
 - 802.11b : DSSS (Direct Sequence Spread Spectrum) with BPSK (1Mbps), QPSK (2Mbps), and CCK (5.5 and 11Mbps)
 - 802.11g : OFDM (BPSK, QPSK, 16-QAM, 64-QAM)
 - 802.11a : OFDM (BPSK, QPSK, 16-QAM, 64-QAM)
- Transfer data rate : **802.11a** : 54, 48,36,24,18,12, 9, 6 Mbps, auto-fallback
802.11g : 54, 48,36,24,18,12, 9, 6Mbps, auto-fallback
802.11b : 11, 5.5, 2,1Mbps, auto-fallback
- Media access protocol : CSMA/CA with ACK
- Antenna connection interface : Miniature build-in antenna .

- Output Power : 14~16dBm(CCK), 10~13dBm(OFDM)
- RF sensitivity : @PER <0.08 ,11Mbps < -84dBm(typical)
@ PER <0.08 ,54Mbps < -70dBm(typical)
- Security : Complete Security Features - WEP 64/128, WPA, WPA2,802.1x, and 802.11i
- Support :Cisco CCX V1.0, V2.0, and V3.0 Compliant
- International Regulatory Compliance - 802.11 d + h
- Comprehensive Operating System Support: Windows 98/SE/ME, Windows2000, Windows XP
- WiFi and WHQL Certification
- Industry Leading Throughput - Packet-OVERDRIVE™ Technology
- Channels Support :
 - 802.11 b.g
 - US/Canada: 11 (1 ~ 11)
 - Major European country: 13 (1 ~ 13)
 - France: 4 (10 ~ 13)
 - Japan: 14 (1~13 or 14th)
 - 802.11 a
 - US/Canada: 12 non-overlapping channels (5.15~5.35GHz, 5.725~5.825GHz)
 - Major European country: 19 non-overlapping channels (5.15~5.35GHz, 5.47~5.725GHz)
 - Japan: 12 non-overlapping channels (5.15 ~ 5.35GHz)

Environmental Operating Ranges

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

Power Consumption

- Maximum: Transmit: 350mA (max),
Receive: 227mA (max)
- Idle: 128 mA

Green Certification

RoSH-2002/95/EC

Certification

FCC, CE class B,

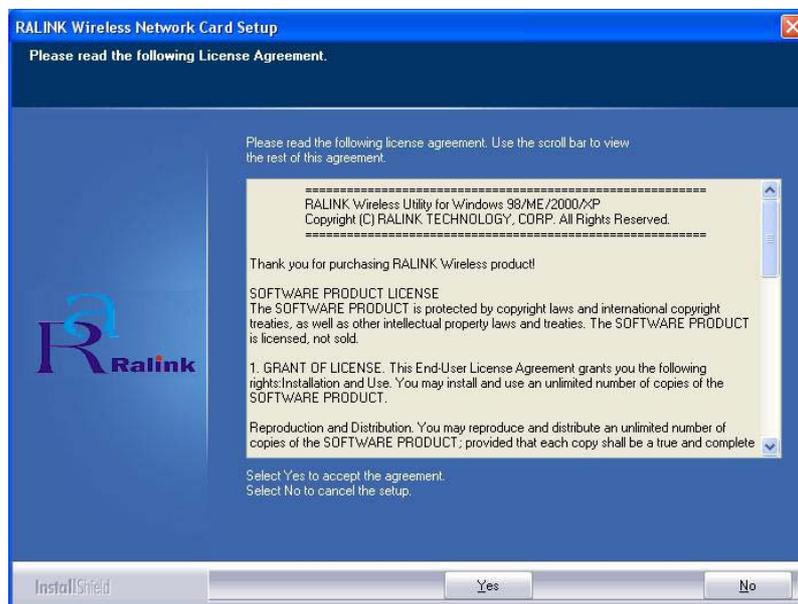
Driver support

Microsoft Windows 98SE, Windows ME/2000 /XP, Windows CE, Linux. Mac OSX

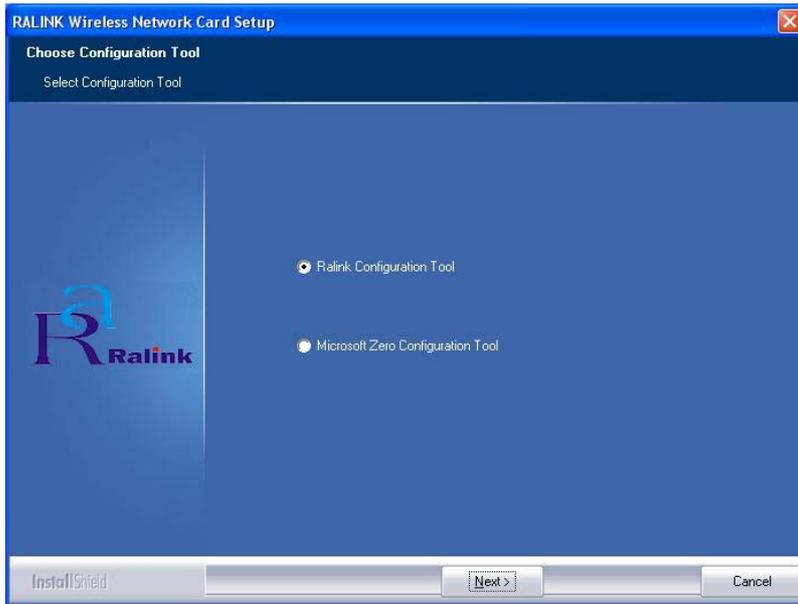
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Setup for Windows 98/2000/ME/XP

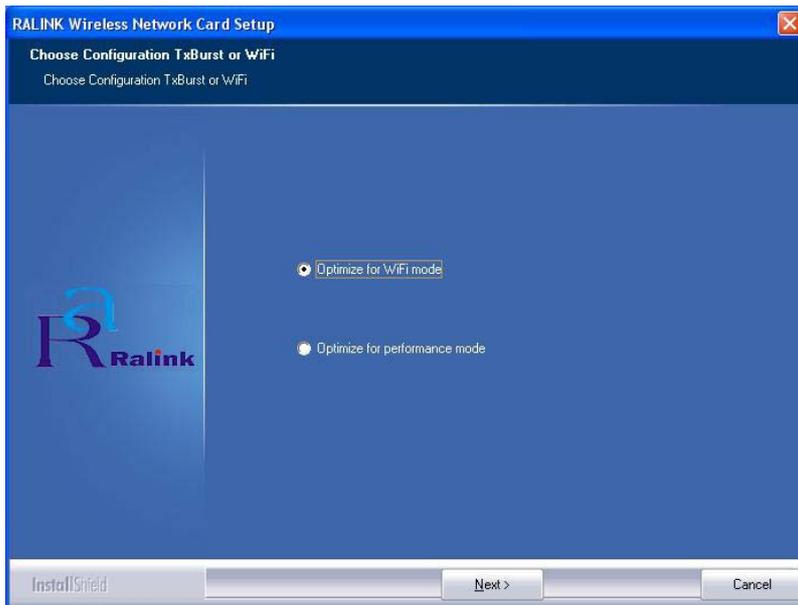
1. Insert the CD into the CD-ROM device , the installation will auto-run, or user can execute the "**setup.exe**" in the installation CD manually. The RALINK Wireless Network Card Setup License Agreement box will appear, click "**Yes**" to continue.



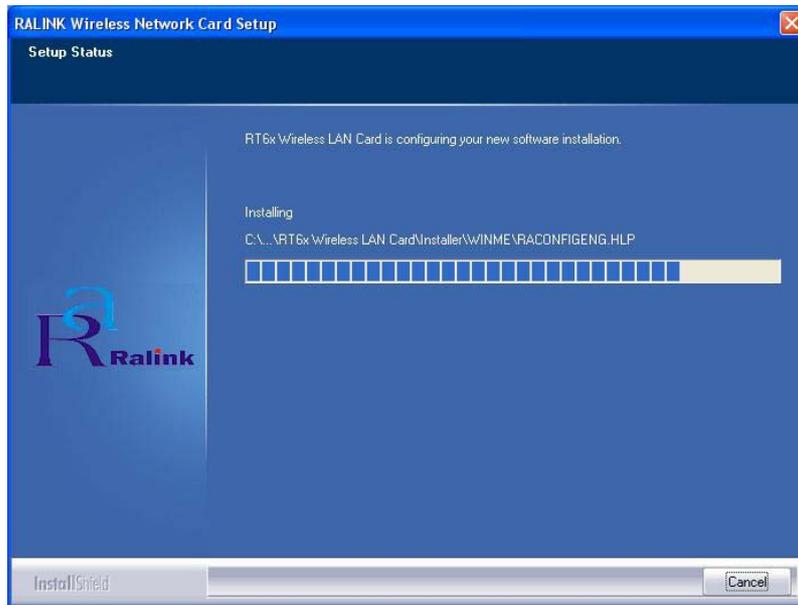
2. The RALINK Wireless Network Card Setup Configuration Tool box will appear, please select "**Ralink Configuration Tool**" and click "**Next**" to continue.



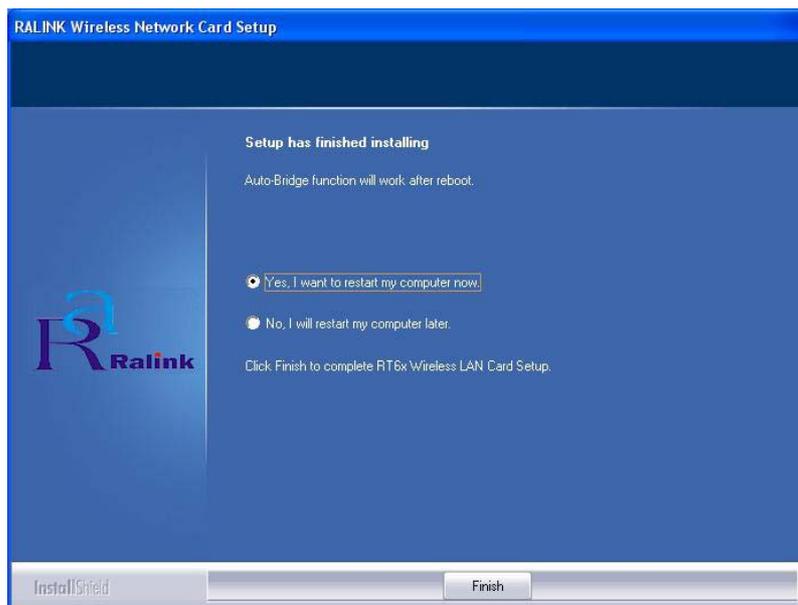
3. The RALINK Wireless Network Card Setup Configuration Tool box will appear, please select "**Optimize for WiFi mode**" and click "**Next**" to continue.



4. Follow the instruction of the installation program. The program will install the software for this device directly.



5. Click **"Finish"** to complete the installation.



6. When the Utility installation is completed, a new icon will display in the system tray at the bottom of the screen. Double click the shortcut or the icon to start using the CardBus Wireless LAN Card.



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.**

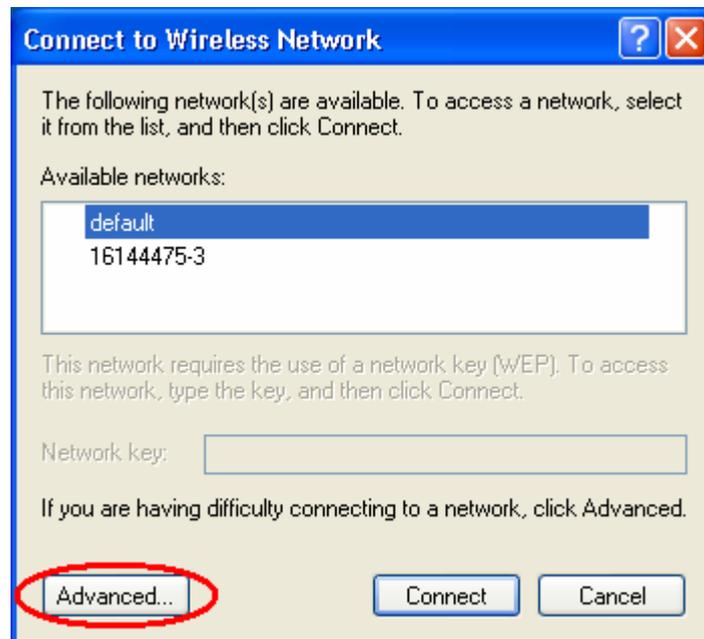
A. Using the Windows XP's Utility

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

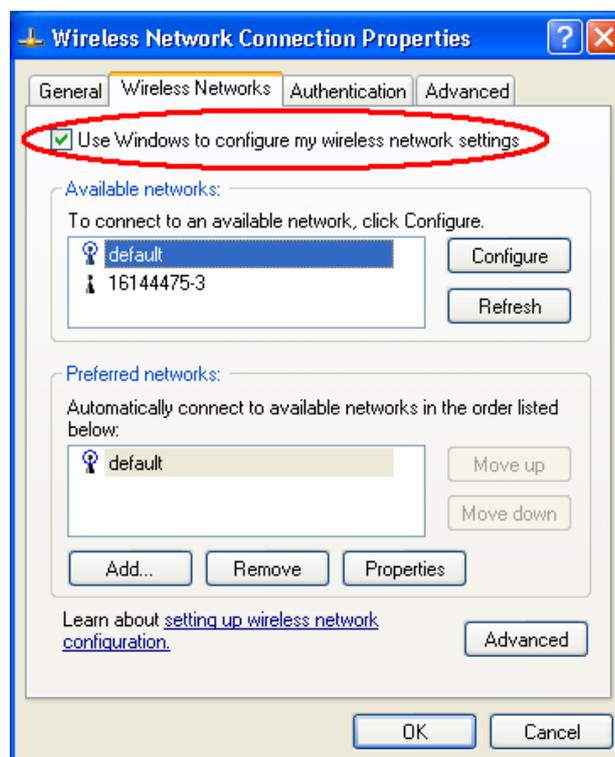


B. Using the Utility of this adapter

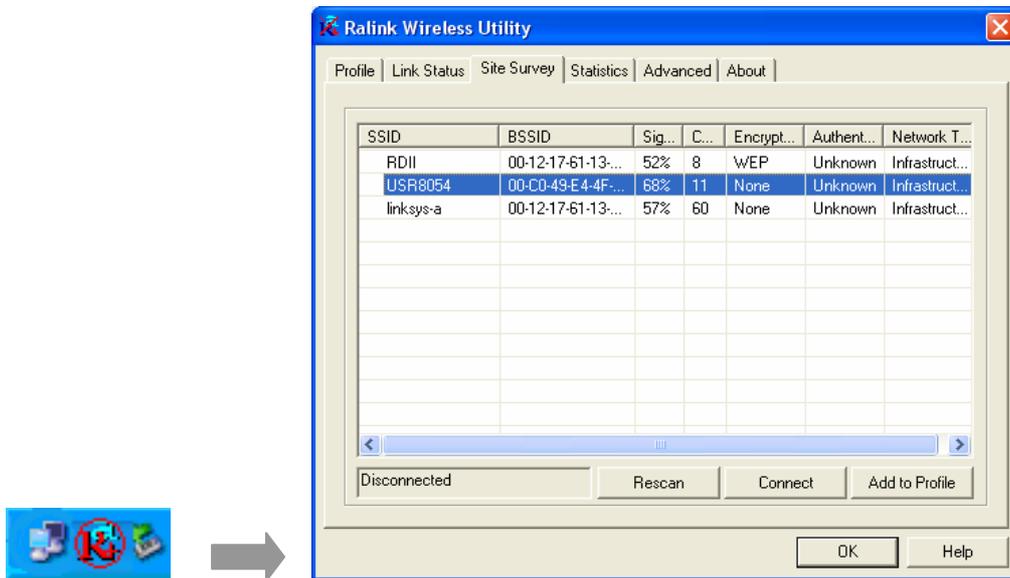
1. Get into Windows XP's Utility, click **"Advanced"** button.



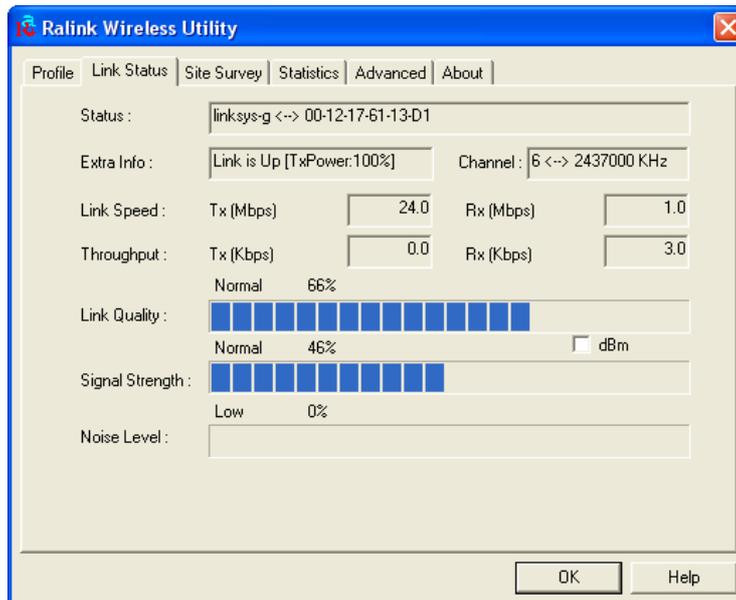
2. On the **"Wireless Networks"** tab in the **"Wireless Network Connection Properties"** screen, clear the **"Use Windows to configure my wireless network settings"** check box. If you want to enable the Windows XP built-in utility, select the check box again.



3. Double click the shortcut or the icon in the system tray and start using the CardBus Wireless LAN Card.



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.



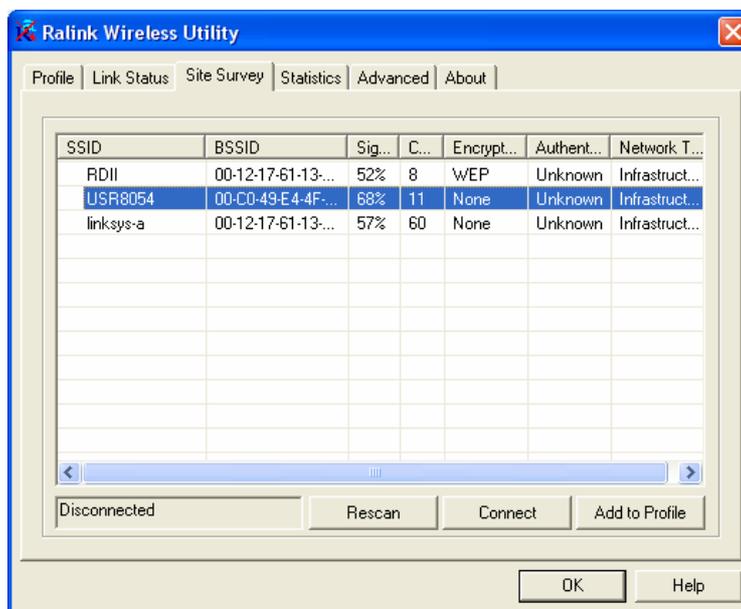
Configuration Utility

The Configuration Utility is a powerful application that helps you configure the CardBus Wireless LAN Card 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

Double click the shortcut of the icon on the system tray to open the wireless utility, then you can view available wireless networks within range of your computer and access to the network you intend to.



Note :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.

Rescan

To scan the available network within range of your computer once more.

Connect

Click the button to connect to the selected network.

Add to Profile

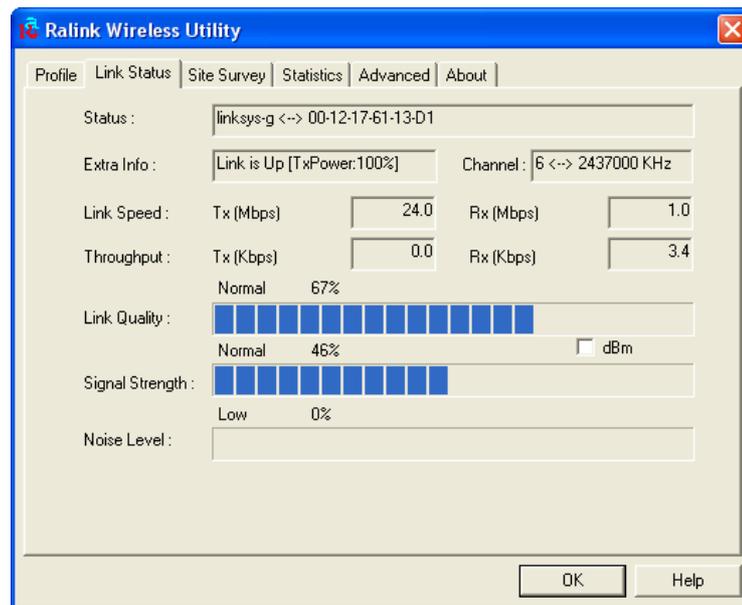
Click the button to add the network into list of the profile .

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.

Delete Button

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



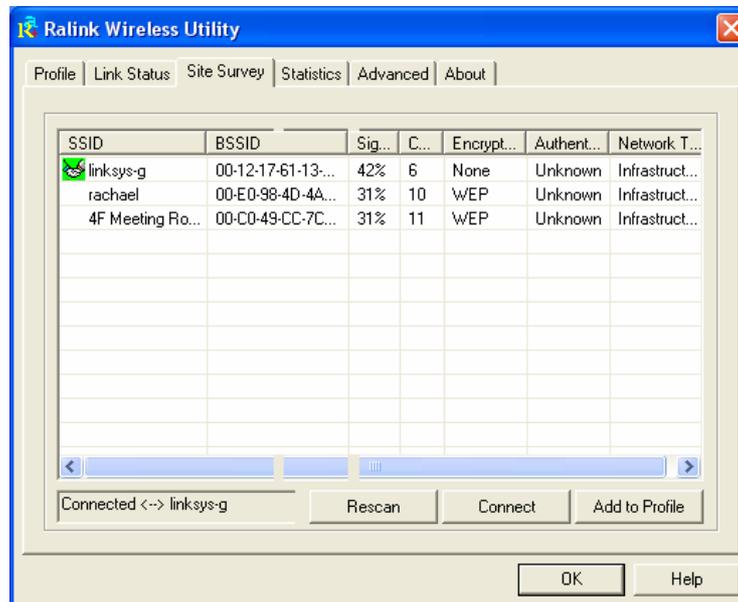
Link Status:

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.



Site Survey:

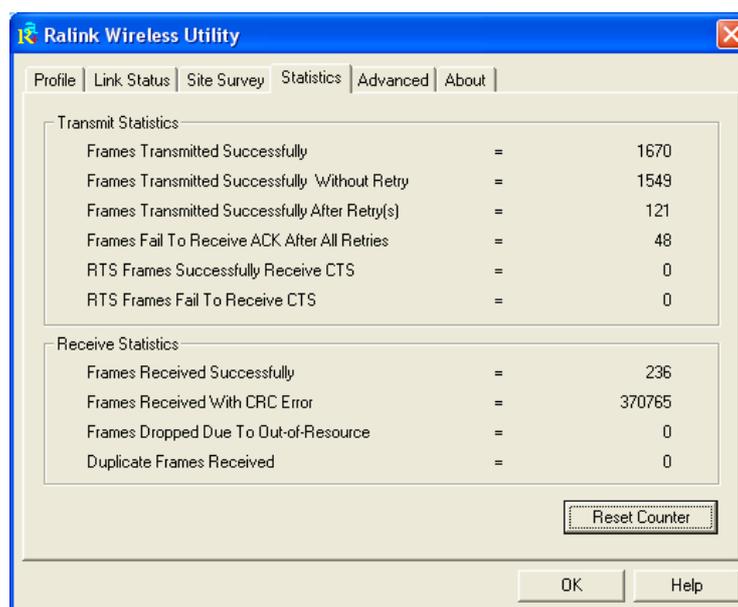
It will show all available wireless Network(s) within range of your computer. You can double click the network listed in the table to make further configurations.

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.

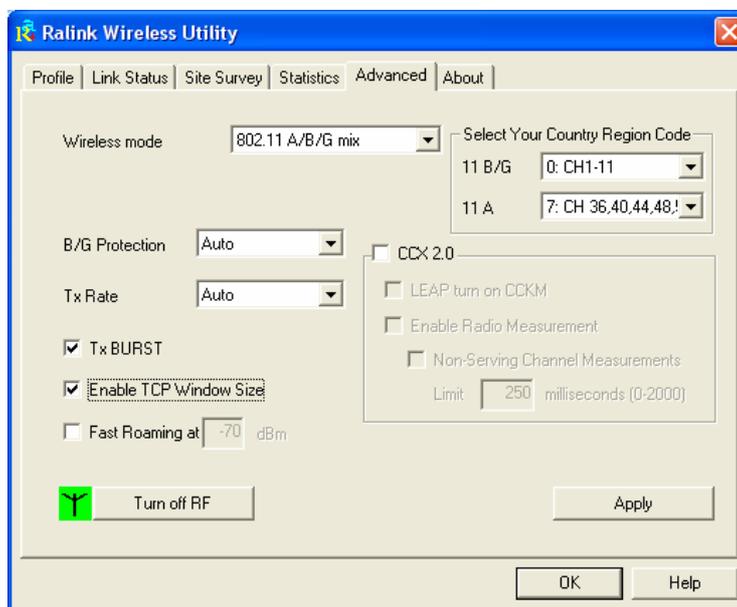
Rescan Button

To update the list of available networks, click the “**Rescan**“ button.



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 Counter**” button.



Advance

This screen allows you to do some advanced configuration and some specific settings for the adapter.

Note : You can enable the option of “Tx BURST” and “Enable TCP Windows Size” to get better performance. (Recommend)

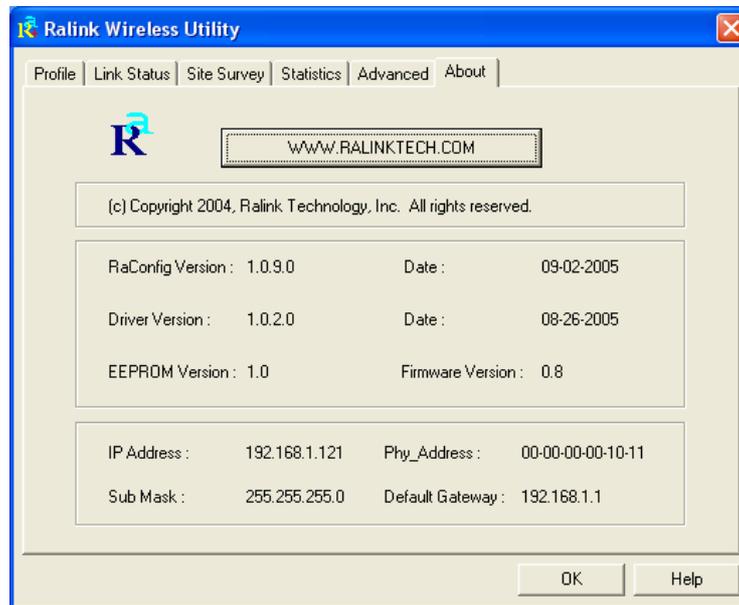
Ad Hoc wireless mode

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.

Turn Off RF

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



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 802.11g standard ?

The IEEE 802.11g 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.

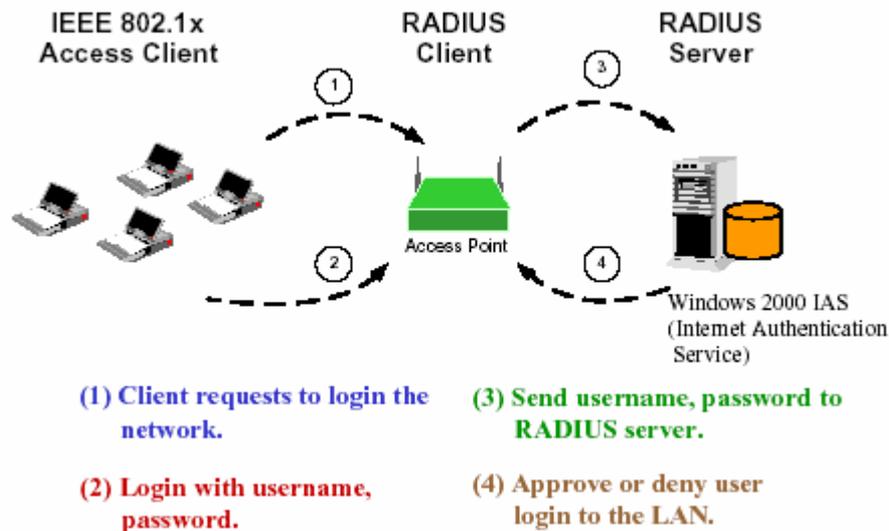
8. What is AES?

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).