Wireless PCI Card

WL-8303

User's Manual

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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

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 the 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, and (2) this Device must accept any interference received, including interference that may cause undesired operation.

Federal Communication 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 20 cm (8 inches) during normal operation.

R&TTE Compliance Statement

This equipment complies with all the requirements of DIRECTIVE 1999/5/CE OF THE EUROPEAN PARLIAMENT AND THE COUNCIL OF 9 March 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 Not Intended for Use

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

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

Potential restrictive use

France: Only channels 10,11,12 and 13

Revision

User's Manual for PLANET Wireless PCI Adapter

Model: WL-8303

Rev: 1.0 (March, 2003)

Part No. EM-WL8303V1

Table of Contents

Chapter 1 Introduction

Thank you for purchasing PLANET WL-8303. This device is an IEEE 802.11b Wireless PCI Adapter. It can operate in either Ad-Hoc mode (Point to Point/Point to Multipoint without Access Point) or Infrastructure mode (Point to Point/Point to Multipoint with Access Point). It operates in 2.4GHz unlicensed ISM band in the home or office environment.

The WL-8303 is compatible with Windows 98, Me, 2000, XP and Linux. It supports 64/128-bit WEP (Wired Equivalent Privacy), 64/128-bit AES (Advanced Encryption Standard) and 64/128bit TKIP (Temporal Key Integrity Protocol) Encryption, AES and TKIP are advanced WLAN security technology included in the fore coming IEEE 802.11i standard for securing wireless network connection. Its data rate support 11, 5.5, 2 and 1 Mbps. With its auto-fallback function, the data rate can be move to lower speed if signal quality is not good enough.

WL-8303 provided with a detachable dipole antenna and the original antenna can be replaced with other external antenna to get better signal quality and longer connection distance. Its range of coverage with original antenna is up to 350 feet indoor and 1100 feet outdoor.

1.1   Features

l   Wireless connection without the hassles and cost of cabling

l   Wireless LAN IEEE802.11b compliant

l   Up to 11 Mbps high-speed Transfer Rate

l   Base on the 2.4GHz Direct Sequence Spread Spectrum (DSSS) Technology

l   Supports 64/128-bit WEP (Wired Equivalent Privacy), 64/128-bit AES (Advanced Encryption Standard) and 64/128bit TKIP (Temporal Key Integrity Protocol) encryption

l   Supports Ad-Hoc (Peer to Peer) communication and Infrastructure mode with Access Point

l   Seamless integration with IEEE 802.3 LAN through WAP-1965, WAP-1960 or other IEEE 802.11b compliant Access Point

l   Support IEEE802.1x client

l   Supports most popular operating systems including Windows 98/Me/2000/XP and Linux

l   One detachable dipole antenna

l   Low Interference and High Susceptibility Guarantee Reliable Performance

l   Supports Power Save mode

l   Automatic rate fallback enables data security and reliability

l   Supports PCI standard v2.2

1.2   Applications

1.2.1 Infrastructure

The WL-8303 provides access to a wired LAN for wireless workstations. An integrated wireless and wired LAN is called an Infrastructure configuration. A group of WL-8303 PC users and an Access Point compose a Basic Service Set (BSS). Each WL-8303 PC in a BSS can talk to any computer in the wired LAN infrastructure via the Access Point.

An Infrastructure configuration extends the accessibility of a WL-8303 equipped PC to a wired LAN, and doubles the effective wireless transmission range for 2 WL-8303 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 WL-8303 equipped PCs configured without roaming options in an independent BSS must be configured with a BSS ID corresponding to the WL-8303 used in the BSS. Check your WL-8303 for its BSS ID or use the Site Survey function on Configuration Utility program to determine the BSS ID.

The Infrastructure Wireless LAN configuration is appropriate for enterprise-scale wireless access to a central database, or as a wireless application for mobile users.

Infrastructure mode also supports roaming capabilities for mobile users. More than one BSS can be configured as an Extended Service Set (ESS). The continuous network allows users to roam freely within an ESS. All WL-8303 PCs or other IEEE 802.11b compliant wireless adapter within one ESS must be configured with the same ESS ID and use the same radio channel.

Before enabling an ESS with roaming capability, choosing 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.
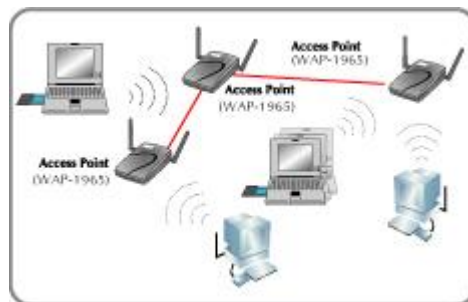
1.2.2 Ad-Hoc

An Ad-Hoc wireless LAN is a group of computers, each equipped with one WL-8303 adapter or other wireless adapters, connected as an independent wireless LAN. Computers in a specific Ad-Hoc wireless LAN must be configured to share the same radio channel.

Ad-Hoc wireless LAN configurations are appropriate for branch level departments or SOHO operations.

1.2.3 General Application

WL-8303 offers a fast, reliable, cost-effective solution for wireless client access to the network in applications like these:

1. Remote access to corporate network information

E-mail, file transfer and terminal emulation.

2. Difficult-to-wire environments

Historical or old buildings, asbestos installations, and open area where wiring is difficult to employ.

3. Frequently changing environments

Retailers, manufacturers and banks who frequently rearrange the workplace and change location.

4. Temporary LANs for special projects or peak time

Trade shows, exhibitions and construction sites need temporary setup for a short time period.

Retailers, airline and shipping companies need additional workstations for a peak period.

Auditors require workgroups at customer sites.

5. SOHO (Small Office and Home Office) users

SOHO users need easy and quick installation of a small computer network.

6. High security connection

The wireless security network installs quickly and provides the flexibility to reconfigure easily.

1.3 Specification

Product	Wire Free – 11Mbps Wireless PCMCIA Adapter
Model Name	WL-8303
Attach Interface	PCI V2.2/2.1
LED Indicators	LNK, TX/RX
Operating Frequency / Channel	2.412~2.462GHz (FCC, Canada) / 11 Channels
	2.412~2.4835GHz (TELEC, Japan) / 14 Channels
	2.412~2.472GHz (ETSI, Europe) / 13 Channels
RF Modulation	Direct Sequence Spread Spectrum (DSSS) Technology
	(CCK, DQPSK, DBPSK)
RF Output Power	16dBm
Sensitivity	-83dBm (@ PER<8%)
Data Rate	11, 5.5, 2, 1 Mbps with auto-rate fallback
Media Access Protocol	CSMA/CA + ACK
Standard Antenna	One detachable dipole antenna
Range	Up to 1100 feet outdoor and 350 feet indoor
Working Mode	Ad-Hoc, Infrastructure
Power Consumption	TX: 3.3V, 340mA
	RX: 3.3V, 160mA
	Stand by / sleep mode: 3.3V, 20mA
Dimension (mm)	135*121*19 (L*W*H)
Humidity	0 ~ 90%, non-condensing (Operating and storage)
Temperature	0 ~ 55 degree C (Operating), -10~70 degree C(Storage)
Compatibility	Windows 98, Me, 2000, XP and Linux
Management	Utility or Windows XP built-in management interface
STANDARDS COMPLIANCE	
Electromagnetic Compatibility	FCC Part 15 class B, CE Mark, ETSI 300 328

1.4 Package Contents

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

WL-8303	x 1
Dipole Antenna	x 1
Quick Installation Guide	x 1
Drivers and User's Manual CD	x 1

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

1.5　Minimum System Requirements

Before installation, please check the following requirements with your equipment.

- Operating System: Windows 98/Me/2000/XP or Linux
- PC with CD-ROM drive
- One vacant PCI slot

1.6　Installation Considerations

l　Please keep the number of walls and ceilings between the Access Point and clients as less as possible. Each wall or ceiling can reduce your wireless cover range form 3-90 feet. Position your Access points, Residential Gateways, and computers so that the number of walls or ceilings is minimized.

l　Building materials make a difference – A solid metal door or aluminum studs may have a negative effect on range. Try to position Access Points, and computers with wireless adapters so that the signal passes through drywall or open doorways and not other materials.

l　Keep the wireless product away from electrical devices or appliances at least 3-6 feet, which may generate extreme RF noise.

Chapter 2 Installation Procedure

Before you proceed with the installation, it is necessary that you have enough information about the *Wireless PCI Card.* Use the Procedure described in below in this chapter to install under Windows 98/Me/2000/XP.

Note: If you ever install the other Wireless Card before, please uninstall the existed driver and utility first. If this is the first time to install this device, please refer to the following steps to complete the installation.

2.1   Windows 98/Me/2000 Driver Installation

Note: The following installation operates under Window 2000. Procedures will be similar to Window 98/Me. About Windows XP driver installation, please refer to next section.

1.   Plug WL-8303 into your PC's PCI slot.
2.   Power on the PC and insert Drivers and User's manual CD into CD-ROM drive.
3.   Windows will automatically detect this wireless card and ask the user to install driver. Please click "Next".

4.   Please select the first option and click "Next" to continue.
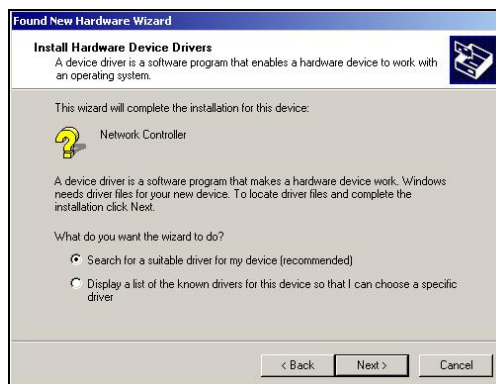
5. Select "Specify a location" and click "Next".

6. You can click "Browse" to find the driver location. (Assume "E" is your CD-ROM drive, the driver can be found in E:\Drivers\WL-8303\Win2000). Please click "OK" to continue.
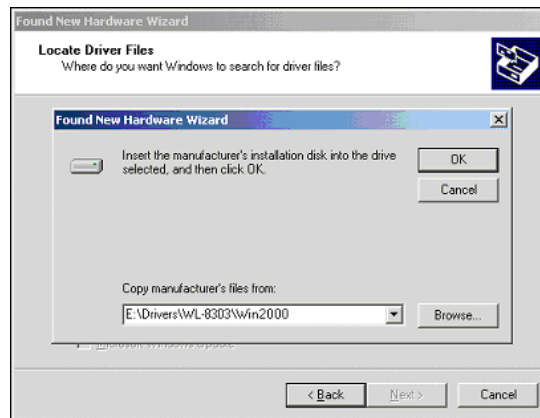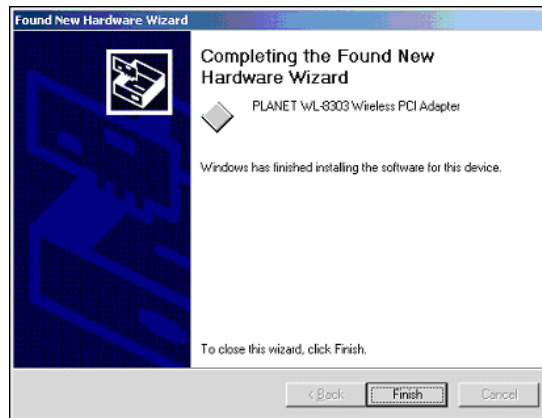

7. Windows will show this screen to prompt you that it found a driver for the device you are installing, please click "Next" to continue.

7
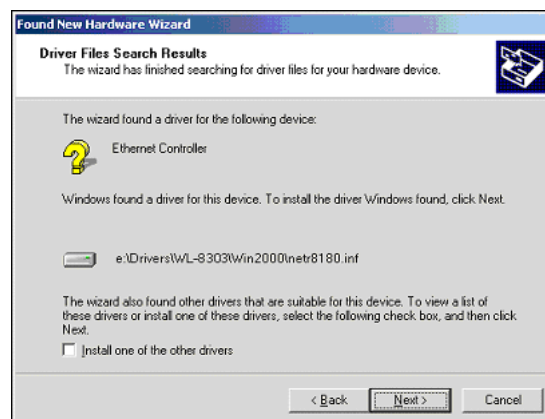
8. Windows 2000 may tell you this driver doesn't contain Microsoft digital signature. Please don't worry about this, you can click "Yes" to continue the installation.
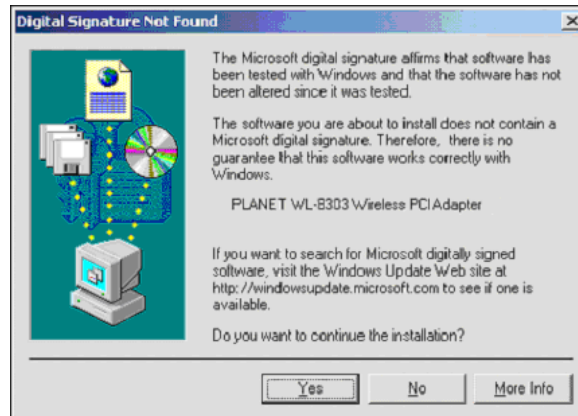
9. Please click "Finish" to complete the driver installation.

(For Win98/Me, Windows will ask you restart your PC when driver installation finished.)

2.2 Windows XP driver installation

1. Plug WL-8303 into your PC's PCI slot.
2. Power on the PC and insert Drivers and User's manual CD into CD-ROM drive.
3. Windows XP will detect WL-8303 and ask you to install driver. Please select the second option and click "Next".

4. Please select "Include this location in the search" and then click "Browse" to find out WL-8303 driver location to install driver. (Assume "E" is your CD-ROM drive, you can find out WL-8303 driver in E:\Drivers\WL-8303\WinXP). Please click "Next" to continue.

5. WinXP will show you this dialog box to prompt you the driver has not passed Windows logo testing, please press "Continue Anyway" to continue.
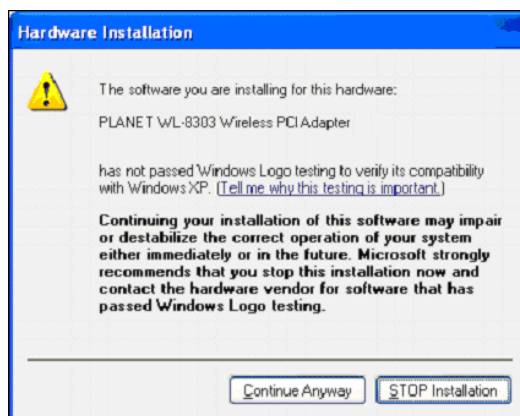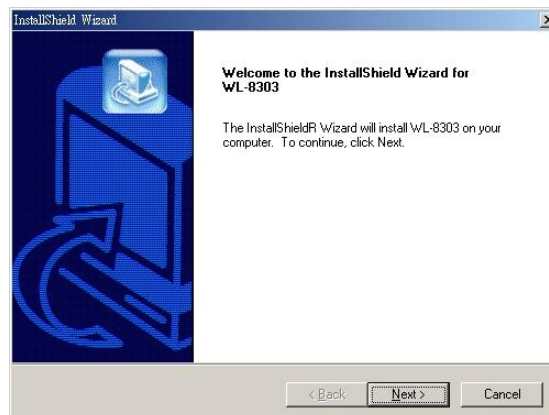
6. Please click "Finish" to complete the driver installation.
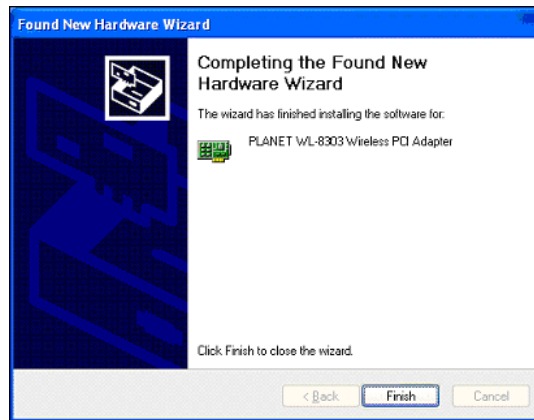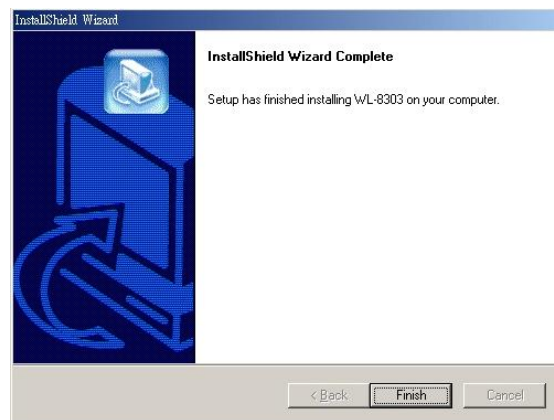

2.3 Configuration Utility Installation

1. Run "setup.exe" under "E:\Utility\WL-8303\" directory, or click the "Start" button and choose "Run". When the dialog box appears, enter "E:\Utility\WL-8303\setup.exe" (Assume "E" is your CD-ROM drive). You will see the dialog box as the picture. Please click "Next" to continue.

2. Please check the content of this dialog box. Press "Yes" to continue.

3. When installation completed, please click "Finish" and restart your PC.

Note: If the card is not working properly after the restart procedure, you should make sure that your system has free resources since it may show them as being available, although this may not be true.

Chapter 3 Configuration Utility

The Configuration Utility is a powerful application that helps you configure the Wireless LAN 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. Following details the configuration options.

After configuration utility installation finished and PC restart, the configuration utility will automatically start. You can find the icon 🌐 in the bottom right, please double click the icon to make further configuration. The configuration utility will automatically search all the nearby APs in the screen as below. You can select one of them and click "Connect" to connect or click "Advanced" for more detail settings as following sections.

3.1 Config
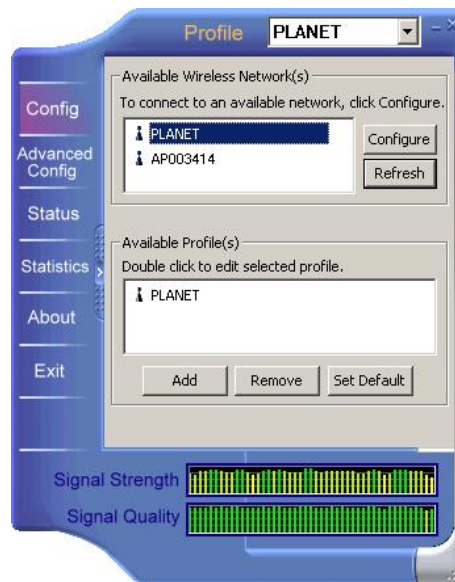
In this option, you can configure the settings of WL-8303 for the wireless device it will connect to.

ʊ **Available Wireless Network:** You can find all the available wireless stations for WL-8303. Please select the device you want to connect and click "Configure" for the detail settings. After click "Configure", you will see the dialog box as below. If you don't find the device you want to connect, please click "Refresh" to search again.

ʊ **Available Profile(s):**

If you want to modify the profile, please double click the profile that you want to modify. It provides three functions for users to edit the profiles.

   Ø **Add:** You can add a new profile with this button. If you want WL-8303 work in Ad-Hoc mode, you can add a new profile and set it to Ad-Hoc mode.

   Ø **Remove:** If you want to delete profile, please select the profile and click this button.

   Ø **Set to default:** You can select one of the profiles and set it to default. WL-8303 will use the settings of this profile to work.

ʊ **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 a good quality network operation.

ʊ **Signal Quality:** This bar indicates the quality of the link. The higher the percentage, the better the quality.

- ϋ   **Network Name (SSID):** It shows the SSID of the BSS that willing to join.
- ϋ   **Wireless network key (WEP):** You can enable the network security function, share authentication mode and enter network key value in this option. About the **Network Key**, please enter 10 or 26 Hexadecimal code as your network key and confirm the network key in next field. If you are use WinXP, you can use the build-in utility to set this WL-8303 with Hexadecimal or ASCII code as your Network Key.
- ϋ   **Enable IEEE802.1x authentication for this network:** If the network has support IEEE802.1x protocol, you can checked this option to join to your IEEE802.1x network.
- ϋ   **This is a computer-to-computer (ad hoc) network; wireless access points are not used:** If you want to set this PC to work in Ad-Hoc mode, please check this option.

3.2   Advanced Config
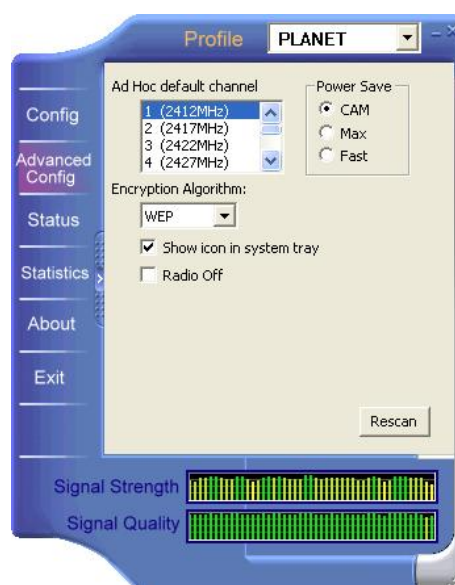
In this option, you can configure some advanced settings for WL-8303.

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u **Ad Hoc default channel:** This setting defines which channel the WL-8303 will use when it is working in Ad-Hoc mode.

u **Power Save:** Shows Power Management modes. There are two optional selections for this mode.

   Ø **CAM:** Continuous Access Mode, adapter will always set in active mode.

   Ø **Max:** Adapter will enter power saving mode when it is idle.

   Ø **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.

u **Encryption Algorithm:** WL-8303 has provided three kinds of encryption mode. WEP, TKIP and AES. Please ensure the wireless network that it will join is working with same encryption mode.

u **Show icon in system tray:** Enable or disable the icon shown in the taskbar.

u **Radio off:** When the setting is checked, WL-8303 will stop working.

u **Rescan:** Click this button to make the settings above effective.
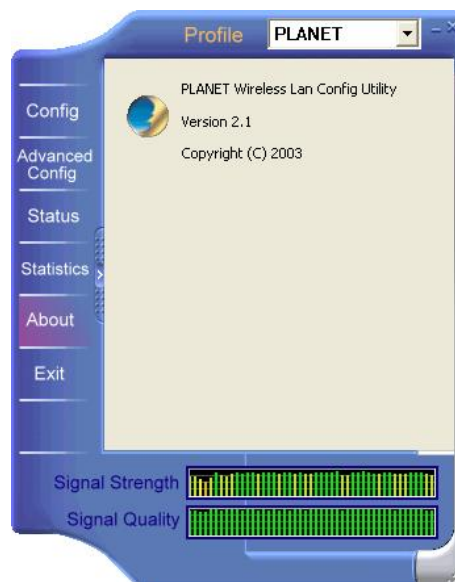
3.3 Status
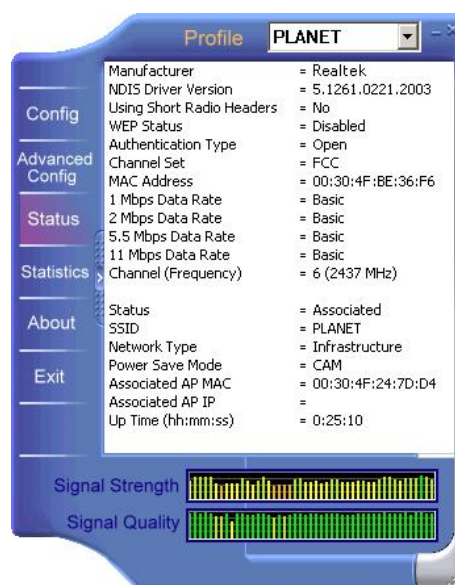
In this option, you can check the current status of the WL-8303.
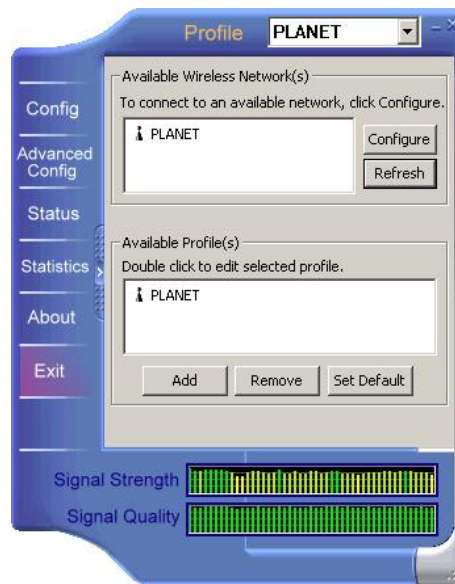
3.4 Statistics
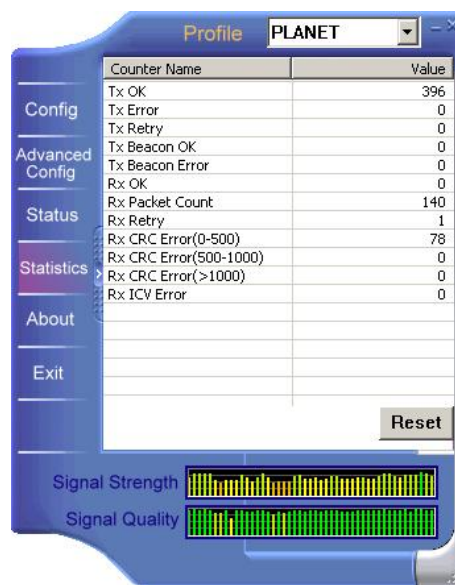
In this option, you can get the real time information about the packet transmission and receiving status.

3.5 About

You can see the configuration utility version in this option.

3.6 Exit

When you finished the settings, please select this option to exit.

Chapter 4 Troubleshooting

ü   **Why WAP-3000 and WL-8303 cannot work properly?**

If you want the WAP-3000 to works with WL-8303, please set the data rate of WAP-3000 fixed to 11Mbps. Because the WAP-3000 chipset and WL-8303 are not fully compatible, you need to make this setting for them to connect each other.

ü   **How to create a new Ad-Hoc network with WL-8303?**

If you want to create a new Ad-Hoc network with WL-8303, please add a new profile and checked the setting "This is a computer-to-computer (ad hoc) network; wireless access points are not used" of this profile. Then set this profile to default. When this setting is checked, WL-8303 will work in Ad-Hoc mode. If unchecked, WL-8303 will work in Infrastructure mode.

Appendix

This section provides some technology document of IEEE802.11b. Read the description below to know the standards about IEEE802.11b.

ü **What is the 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 manufactures to communicate.

ü **What IEEE 802.11 features are supported?**

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

ü **What is Ad-hoc?**

An Ad-hoc integrated 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.

ü **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.

ü **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.

ü **What is WEP?**

WEP is Wired Equivalent Privacy, a data privacy mechanism based on a 64/128 bit shared key algorithm, as described in the IEEE 802.11b standard.

ü **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 the fore coming IEEE 802.11i standard.

ü **What is TKIP?**

TKIP (Temporal Key Integrity Protocol), TKIP combines the temporal key with the client

machine's MAC address and then adds a relatively large 16-octet initialization vector to produce the key that will encrypt the data. This procedure ensures that each station uses different key streams to encrypt the data.

ü **Can Wireless products support printer sharing?**

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

ü **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.

ü **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.

ü **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).