Wireless LAN CardBus Adapter

User's Manual

Ver 1.0

Statement of Conditions

The content described in this manual may be improved or changed at any time and it is subject to be changed without notice.

Manufacturer assumes no responsibility for errors contained herein or for direct, indirect, special, incidental or consequential damages with the furnishing, performance, or use of this manual or equipment supplied with it, even if manufacturer of its suppliers have been advised of the possibility of such damages.

Electronic Emission Notices

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 will accept any interference received, including interference that may cause undesired operation.

FCC Radio Frequency 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 when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user need to correct the interference at his area. If the equipment causes interference to radio or television reception, try to correct the interference by using one or more of the following measures:

- Plug the equipment into an outlet that is on a different circuit from the television or radio.
- Change the direction of the television or radio antenna until the interference disappears.
- Move the equipment to one side or the other of the television or radio.
- Move the equipment farther away from the television or radio.

To assure continued compliance, any changes or modifications not expressly approved by manufacturer could void the user's authority to operate the equipment.

FCC Radiation Exposure Statement

This equipment complies with the FCC radiation exposure limits set forth for an uncontrolled environment. This device has been tested for compliance with FCC RF Exposure (SAR) limits in typical laptop configurations.

This transmitter must not be co-located or operating in conjunction withany other antenna or transmitter

FC

LIMITED WARRANTY

This product is warranted by manufacturer to be free from defects in material and workmanship for one (1) year from the date of purchase, unless otherwise stated.

During this period if this product is found to be defective in material or workmanship, manufacturer or one of its authorized service facilities will at its option either repair or replace this product without charge, subject to the following conditions, limitations and exclusions:

1. This warranty extends to the original consumer purchaser only and is not assignable or transferable.

2. This warranty shall not apply to any product which has been subjected to misuse, abuse, abnormal use, negligence, alteration or accident, or has had its serial number altered or removed.

3. This warranty does not apply to any defects or damage directly or indirectly caused by or resulting from the use of unauthorized replacement parts and/or service performed by unauthorized personnel.

4. This warranty does not apply to the software driver that accompanies this product.

This warranty is made expressly in lieu of all other warranties, expressed or implied, including but not limited to any implied warranty of merchantability of fitness for a particular purpose, and all other obligations on the part of Manufacturer provided, however, that if the disclaimer of implied warranties is ineffective under applicable law, the duration of any implied warranties arising by operation of law shall be limited to one (1) year from the date of purchase or such longer period as may be required by applicable law.

Manufacturer hereby disclaims any and all liabilities for consequential and incidental damages arising out of or in connection with any breach of this warranty or any other claim with respect to this product, including but not limited to claims of negligence, strict liability in tort or breach of contract.

Table of Contents

1. INTRODUCTION

Wireless LAN is local area networking without wires, which uses radio frequencies to transmit and receive data between PC's or other network devices. Wireless LAN is able to configure independent networks and infrastructure networks. The former is suitable for small or temporary peer-to-peer configurations, and the later is offering fully distributed data connectivity via micro cells and roaming.

The WLAN Cardbus Adapter is designed to meet the mobility, performance, security, interoperability, management, and reliability requirements of IEEE 802.11b high data rate standard. It is easy to install the WLAN Cardbus Adapter on various devices with 32bit Cardbus PCMCIA TYPE II card slot. It is able to communicate with other IEEE 802.11b compatible products to create a wireless LAN in your office or home.

1.1 Features

- Compliant with 11 Mbps 802.11b high-speed specification.
- Data rate 11/5.5/2/1 Mbps automatic fallback under noisy environment.
- Advanced Power Management for battery saving.
- Build PCB patch diversity antennas.
- Supports MS Windows 98SE/Me/2000/XP.
- Interoperable with IEEE 802.11b compliant equipment.
- Supports full mobility and seamless roaming from cell to cell.
- Plug-and-play installation and easy client management with utility software
- Supports point-to-point and point-to-multipoint access.
- Direct Sequence Spread Spectrum (DSSS) technology provides robust, interference-resistant and secure wireless connection.
- Wireless connection without the hassles and cost of cabling.
- Greater flexibility to locate or move networked PC's.

1.2 Applications

- Home networking for device sharing - Remote access to corporate network information email, file transfer and terminal emulation.
- Frequently changing environments - Retailers, manufacturers and banks that frequently rearrange the workplace and change location.
- SOHO (Small Office and Home Office) users - SOHO users need easy and quick installation of a small computer network functions.
- Inter-building connection - The wireless building-to-building network installs quickly, requires no monthly lease fees, and provides the flexibility to reconfigure easily.
- Typical applications include hard-to-wire buildings, campuses, hospitals/medical offices, warehouse, security huts, exhibition centers, etc.
- Temporary LANs for special projects or occasions - Auditors require workgroups at customer sites. Trade shows, exhibitions, retailers, airline, and shipping companies need additional workstations for a peak period of data traffic.

1.3 Wireless LAN System

1.3.1 802.11 Ad-Hoc Configuration

An 802.11 Ad-Hoc wireless LAN is a group of computers, each equipped with one WLAN PC Card (i.e., Cardbus Adapter), connected as an independent wireless LAN. Computers in a specific 802.11 Ad-Hoc wireless LAN must be configured at the same radio channel. 802.11 Ad-Hoc wireless LAN is applicable to a departmental scale for a branch or SOHO operation.
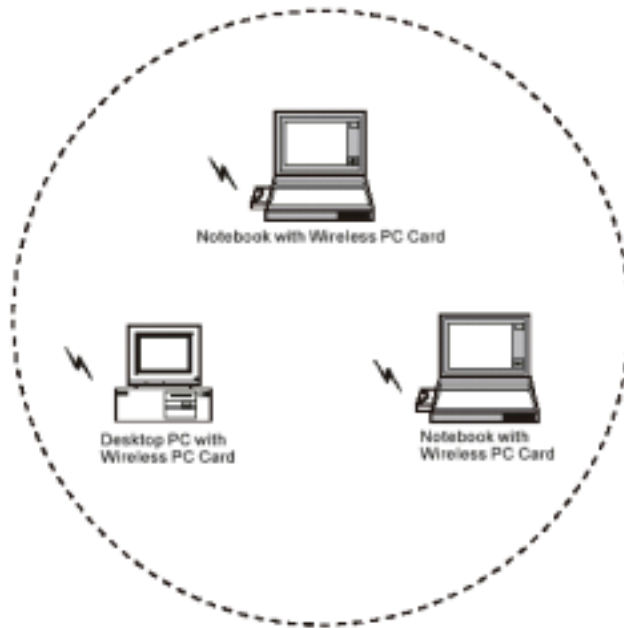
Figure 1-1   802.11 Ad-Hoc Configuration

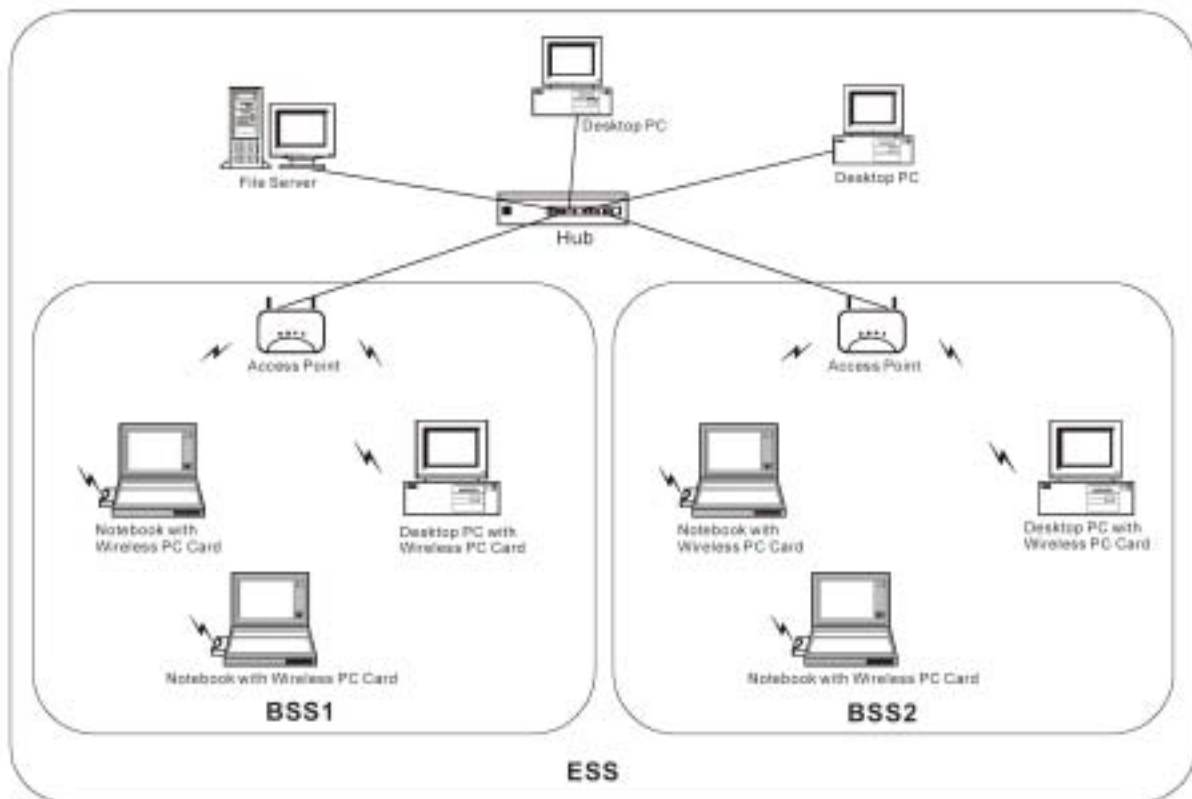### 1.3.2 Infrastructure Configuration

An integrated wireless and wired LAN is called an infrastructure configuration. A group of WLAN PC Cards and an Access Point (AP) is called a Basic Service Set (BSS). Each WLAN PC Card in this BSS can be linked to any computer in the wired LAN infrastructure via the AP.

Infrastructure configuration not only extends the accessibility of a WLAN PC Card to the wired LAN, but also doubles the effective wireless transmission range between two WLAN PC Cards.

BSS ID is, in essential, the ID of each independent WLAN PC Card. All WLAN PC Cards configured without roaming options in this independent BSS must be configured with BSS ID of that AP. You may need to check BSS ID of your AP by using its vendor supplied program.

Infrastructure configuration is applicable to enterprise scale for wireless access to central database, or wireless application for mobile workers.

Two APs can be used as a point-to-point link between two LANs. LAN interconnection is applicable to a wireless backbone between buildings.

Figure 1-2 Infrastructure Configuration

The infrastructure configuration supports roaming capability for mobile workers. More than one BSS can be jointly configured as an Extended Service Set (ESS). On account of a continuous connection to the network, users within this ESS can roam freely. All WLAN PC Cards and APs within one ESS must be configured with the same ESS ID.

Before setting up an ESS for roaming, it would be helpful to achieve good performance by choosing a feasible radio channel and right places for APs.
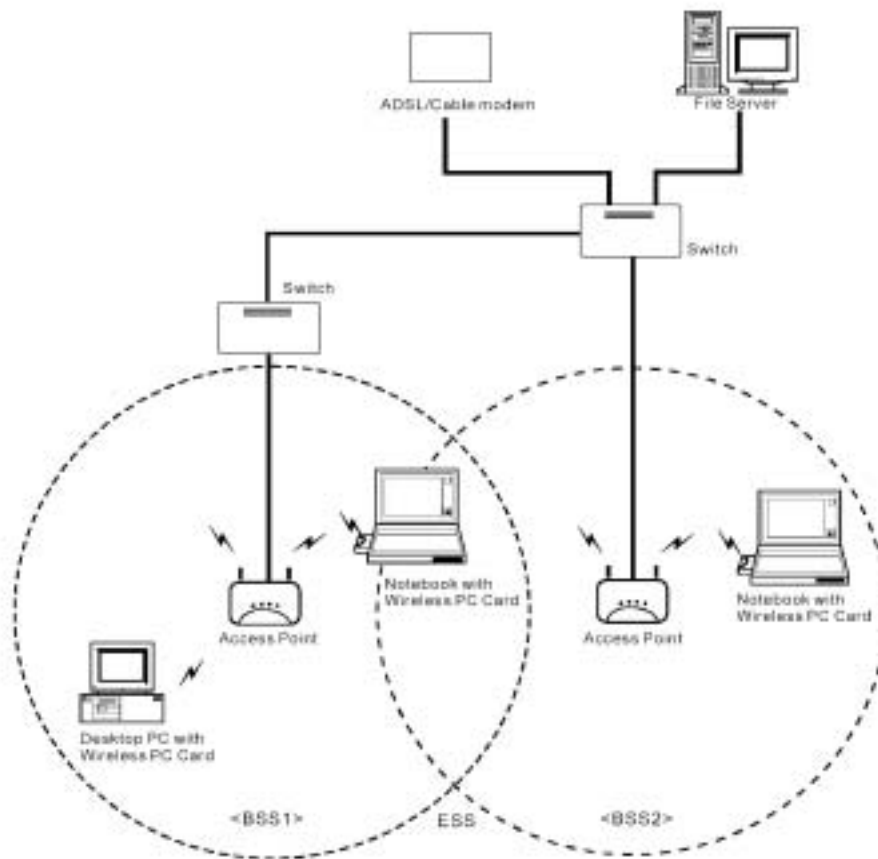
Figure 1-3   Seamless Roaming

2. INSTALLATION

Use the procedures described in this chapter to install your WLAN Cardbus Adapter under MS Windows 98SE/Me/2000, and XP.

2.1 Product Kit

Before starting installation, please make sure the WLAN Cardbus Adapter package you purchased includes the following items:

1) WLAN Cardbus Adapter.
2) CD-ROM (including Driver/Utility and User's Manual).
3) Quick Start Guide.

If anything is missing, please contact your vendor.

2.2 PC's Minimum Requirements

To install the WLAN Cardbus Adapter Card successfully, your PC (notebook, or desktop) should meet the following minimum requirements:

1) A PCMCIA slot compliant with Release 2.1 of the PCMCIA specification.
2) Windows 98SE, Me, 2000, or XP operating system.
3) Minimum 10 Mbytes free disk space for installing the driver and the utility program.

2.3 Installing the Utility and Driver

Depending on the operating system you use, follow the steps to install the Utility and Driver. Then go to Section 3 to continue the procedure.

Note: Please do not plug your WLAN Cardbus Adapter until the setup procedure has been completed.

2.3.1 Under MS Windows 98SE/Me/2000/XP

Please follow the steps below to install the utility and driver.

1) Insert the supplied CD-ROM in the CD-ROM drive.
2) The InstallShield Wizard should start automatically. If Autorun is disabled in your Windows settings, you will need to go to the Windows "Start" button, choose "Run" and type "D:\setup.exe" in the text box, where D is the drive letter of your CD-ROM drive.
3) Follow the InstallShield Wizard to install the driver and utility.
4) Reboot your PC after completing the installation process. (Recommended)
5) Plug your WLAN Cardbus Adapter. The "Add New Hardware Wizard" automatically loads the driver, then a new application (the Configuration & Monitor Utility) icon will be displayed in the task bar.
6) Go to Section 3 for Configuration.

Note: In the MS Windows 2000/XP installation procedure, an extra window prompts you to select the options whether you would like to install the "Digital Signature Not Found" or not. You can safely select "YES".

3. CONFIGURATION

The WLAN Configuration Utility is a powerful application that helps you to configure the WLAN Cardbus Adapter and monitor the statistics of the communication. Unlike the standard method of configuring the card via the operating system utilities (e.g. Control Panel), this application permits the dynamic modification of configuration parameters while the card is operating. This application also offers more configuration options.

3.1 Under MS Windows 98SE/Me/2000/XP

The WLAN Configuration Utility appears as an icon on the system tray of Windows while the card is running. You can open it by clicking on the icon (see Figure 3-1).
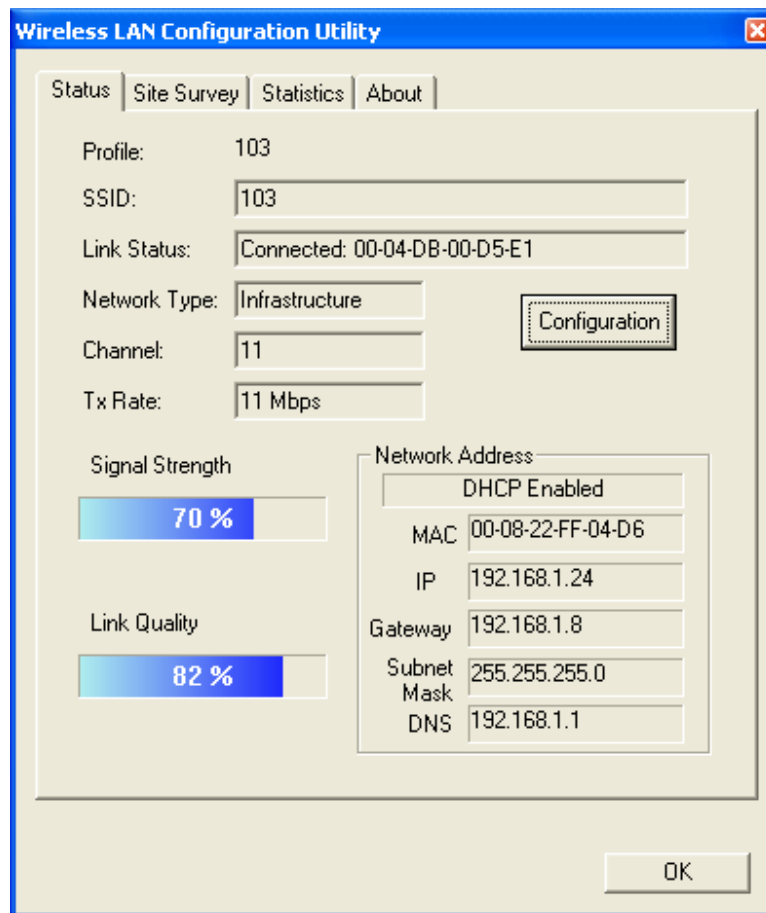

Figure 3-1 *WLAN Configuration Utility Icon*

The icon is appeared as bar diagram with different color and level for representing different connection status. While the station is not associated with other STA/AP, the icon will appear as an empty (blank) bar diagram. Once it is associated, it will appear as different color for different level of signal strength (RSSI). There are 3 levels of icons to represent the signal strength, the green one (signal strength from 100%-50%), the yellow one (50%-25%), and the red one (below 25%).

The WLAN Configuration Utility is a highly integrated application include the following main options (tabs), (Figure 3-2)
- Status
- Site Survey
- Statistics
- About

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Figure 3-2   *WLAN Configuration Utility in Infrastructure Mode*

Status

A typical screen of the application in Infrastructure mode is shown in Figure 3-2. The configuration parameters are shown at the top of the screen. In order to change the configuration parameters press the "Configuration" button, then it will pop-up a dialog for you to input your settings. (Figure 3-5, 3-6, 3-7)

Network Address section shows the current Network status such as the MAC address, DHCP (Enable or not), IP address, Subnet Mask address, Gateway Address and DNS server address that you can easily monitor these settings without the "IPCONFIG" provided by Windows.

Site Survey

By choosing the *Site Survey* option, you can scan all the channels to find all the access points/stations within the accessible range of your card. As shown in Figure 3-3, the list of the "Available Networks" includes the information about the BSSID, SSID, Mode (Network Type), Channel, WEP (On/Off), signal strength and Supports Rate. You may press the **"Rescan"** button dynamically in order to update this list and double-clicking at the one on the list once you want to associate with it. It will show the configuration property sheet (Figure 3-5, 3-6, 3-7) and then you can press "APPLY" after complete all the settings. After this, it will switch back to the *Status* page and update the current established status.

Profiles section: WLAN Configuration Utility provides the easy to use profile function. It shows all the profiles (Up to 32 sets) with its configurations currently stored in the program, which includes Profile Name, Network Type, SSID, Desired Rate and Encryption Key and other advanced settings. User may New, Delete, Edit anyone of it with the buttons next to the window.
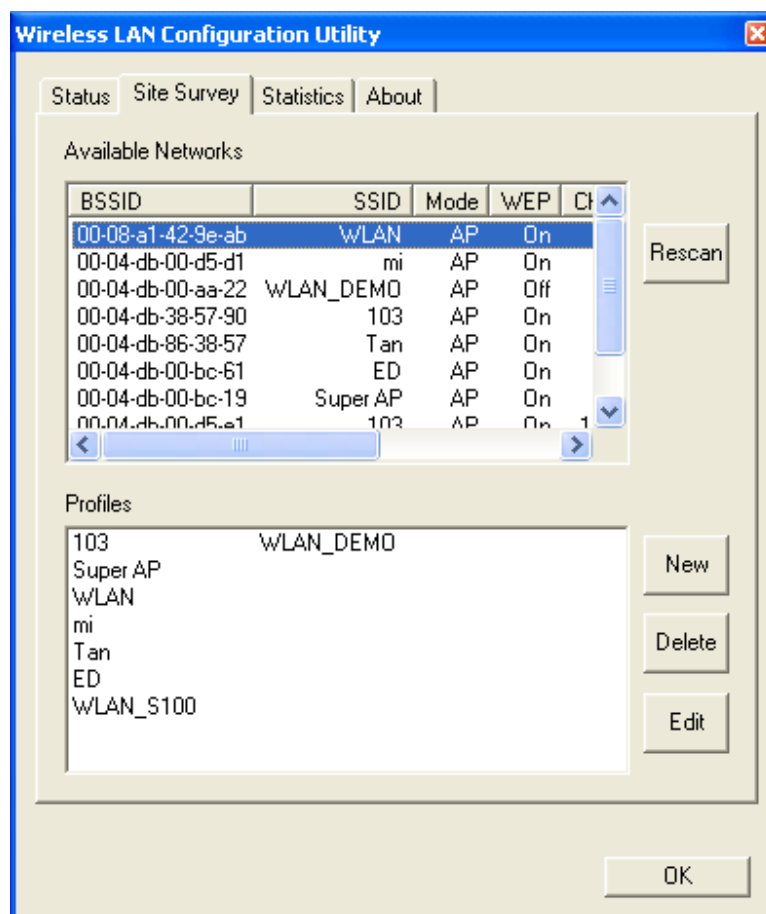
Figure 3-3   Site Survey page

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Users can apply the profile by double-clicking the item in the list or clicking on the one in the Profiles List of the icon in system tray (Figure 3-4).

Figure 3-4 *the Profiles list of the icon in system tray*

There's 3 property pages in the Configuration property sheet, which includes **General**, **Encryption**, and **Advanced.** (Figure 3-5, 3-6, 3-7)
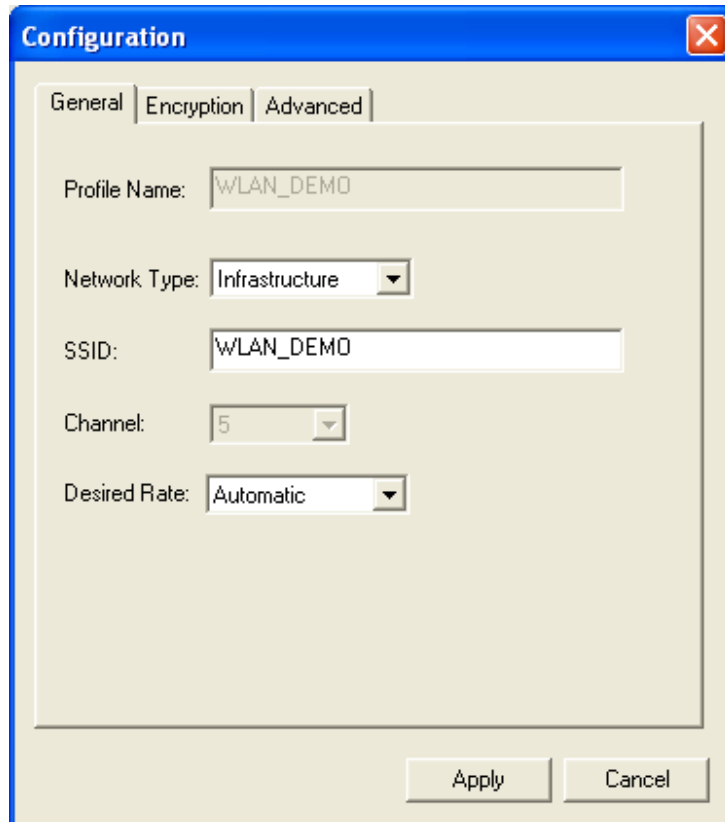
General

In this page, user can configure the station card with its Network type (Infrastructure/Ad hoc), SSID (up to 32 characters), channel (only in Ad hoc mode, and its range is according to the regulatory domain), and the Desire Tx Rate (Automatic/ 1 Mbps/1 Mbps/ 2 Mbps/ 5.5 Mbps/ 11 Mbps).

Encryption

By choosing this option, you can set the card with its encryption mode to NONE or WEP, the authentication mode to Open system or Shared key or Auto Switch. When set as WEP enabled, you have to set/complete the WEP key materials key material length and specify which one of them as the default key (1 to 4) correctly, which means 4 different keys should be in the same length or empty, and the default key radio button should be set to the set with non-empty key material. If the setting is not complete, the APPLY button will remain to be "gray" and cannot be clicked until user do correct settings of this page.
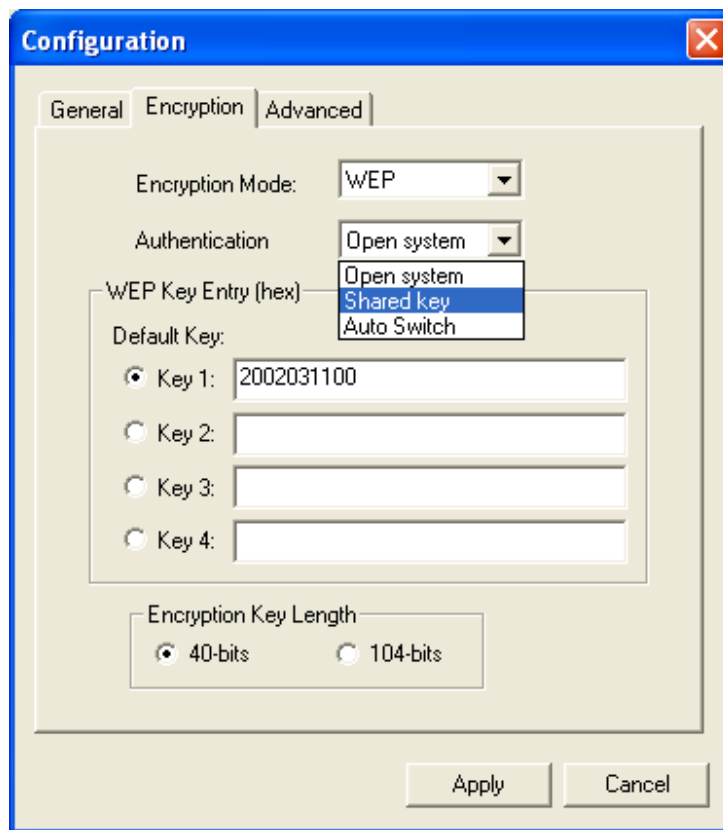
Advanced

Choosing the Advanced option, you can change advanced configuration settings, such as the Power Saving mode, Preamble Type, Fragmentation Threshold, and RTS Threshold (See Figure 3-7). Figure 3-7 shows the recommended configuration for the advanced settings. Before selecting Short Preamble, make sure that the other stations and APs are also supporting this feature.
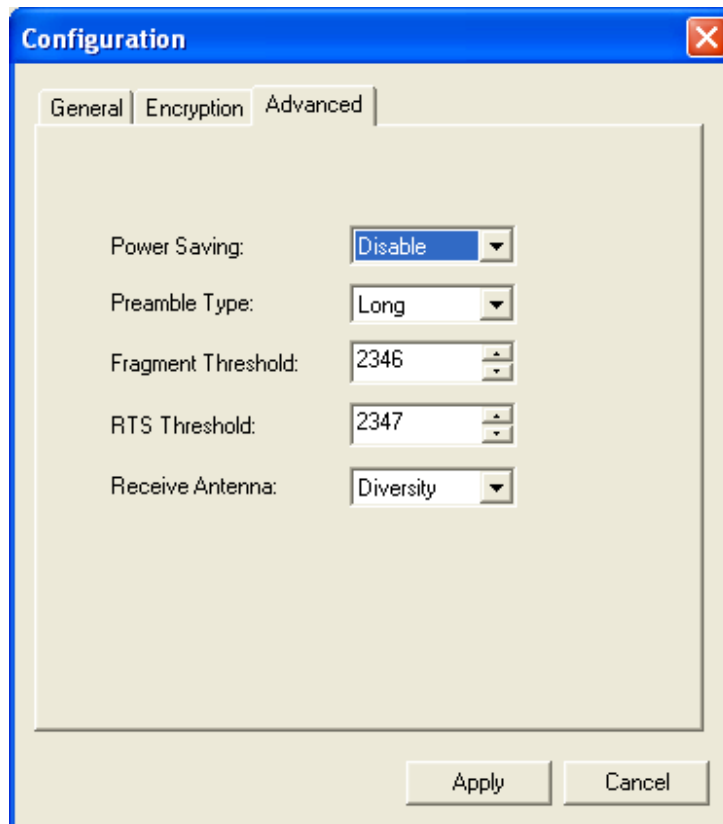

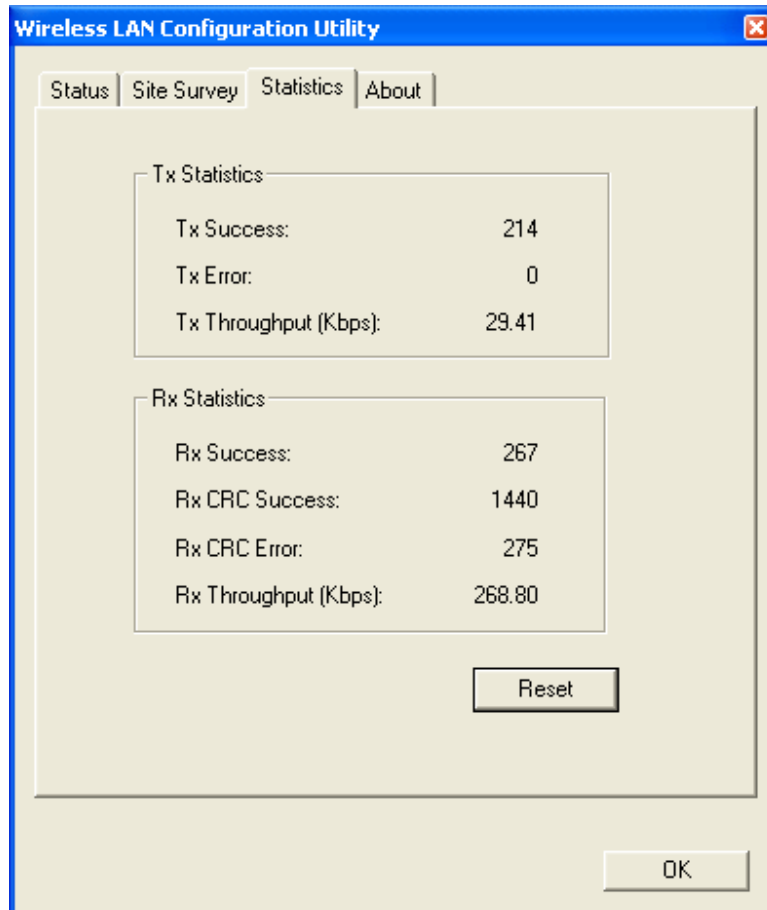*Figure 3-5   General Settings*

Figure 3-6   Encryption Settings

Figure 3-7   Advanced Settings

Statistics

This option enables you to view the available statistic information with its Tx counts (Tx success, Tx error), Tx Throughput, and its Rx counts (Rx success, Rx error), Rx Throughput. You may reset the counters by pressing its Reset button. (Figure 3-8)

Figure 3-8 *Statistics page*

About

By choosing this option (see Figure 3-9), you can check the basic information about the versions of Driver and Utility.
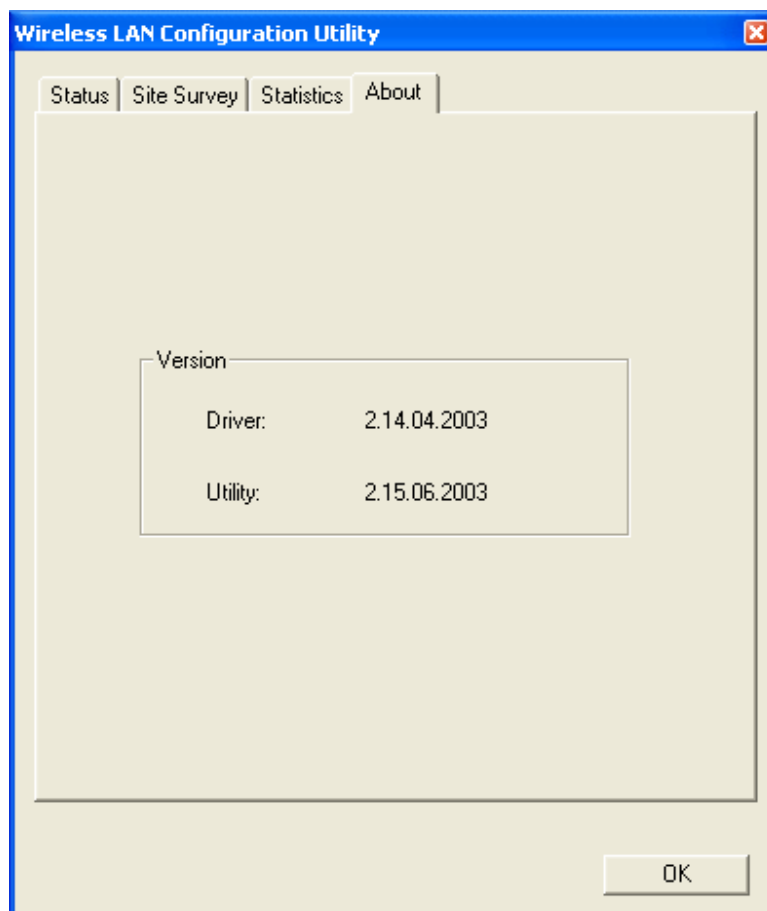
Figure 3-9   About information

4. SPECIFICATIONS

General	
Standard compliance	Compliant IEEE 802.11b Standard
Security	WEP 64-bit, 128-bit, encryption MD5
Hardware	
RF Range	Frequency range: 2.4 ~ 2.4835GHz
Data rate	11Mbps / 5.5Mbps / 2Mbps / 1Mbps
Modulation	DSSS (Direct Sequence Spread Spectrum) DBPSK/DQPSK
Coding	1, 2Mbps: 11 chip/bit Barker Coding 5.5, 11Mbps: Complementary Code Keying
Number of channels	Europe: 13 (3 non-overlapping) US: 11 (3 non-overlapping) France: 4 (1 non-overlapping) Japan: 14 (3 non-overlapping)
Host Interface	32bit CardBus
Transmit power	+15dBm (Typ.) , 10mW/MHz for Japan
Receive sensitivity	-80 dBm Typical. (11Mbps, @ BER 10E-5) -82 dBm Typical. (5.5 / 2 / 1Mbps, @ BER 10E-5)
Software	
Driver Support	MS Windows 98SE/Me/2000/XP
Utility	User setup and diagnostic tool
Mechanical	
Dimensions	54.0 x 118.5 x 6.0mm
Weight	40 grams
Environmental	
Temperature	0 ~ 55°C (operation), -20 ~ +65°C (storage)
Relative Humidity	95% (non-condensing)
Certificate	
EMC	U.S.: FCC Part 15, sections 15.247, 15.205, 15.209 Europe: ETS 300 328, ETS 300 826, CE Marked

5. GLOSSARY

The following glossary is for your reference only, and is not need for the installation of your Wireless LAN PC Card.

- Wireless Access Point (AP) – Any entity that has station functionality and provides access to the distribution services via the wireless medium (WM) for associated stations.

- Ad-Hoc – A network is composed solely of stations within mutual communication range of each other via the wireless medium (WM). An ad hoc network is typically created in a spontaneous manner. The principal distinguishing characteristic of an ad hoc network is its limited temporal and spatial extent. These limitations allow the act of creating and dissolving the ad hoc network to be sufficiently straightforward and convenient so as to be achievable by non-technical users of the network facilities; i.e., no specialized technical skills are required and little or no investment of time or additional resources is required beyond the stations that are to participate in the ad hoc network. The term ad hoc is often used as slang to refer to an independent basic service set (IBSS).

- BSS (Basic Service Set) – An AP associated with several wireless stations.

- ESS (Extended Service Set) – More than one BSS can be configured as an Extended Service Set. An ESS is basically a roaming domain.

- Ethernet – A popular local area data communications network, originally developed by Xerox Corp., which accepts transmission from computers and terminals. Ethernet operates on 10 Mbps baseband transmission over shielded coaxial cable or over shielded twisted pair telephone wire.

- Fragmentation Threshold – Indicates how much of the network resources is devoted to recovering packet errors. The value should remain at its default setting of 2,436. If you experience high packet error rates, you can decrease this value but it will likely decrease overall network performance. Only minor modifications of this value are recommended.

- Infrastructure – The infrastructure includes the distribution system medium (DSM), AP, and portal entities. It is also the logical location of distribution and integration service functions of an extended service set (ESS). An infrastructure contains one or more APs and zero or more portals in addition to the distribution system (DS).

- IEEE – Institute of Electrical and Electronic Engineering

- LAN – Local Area Network

- Roaming – A function that allows one to travel with a mobile end system (wireless LAN mobile station, for example) through the territory of a domain (an ESS, for example) while continuously connecting to the infrastructure.

- RTS (Request To Send) Threshold –It should remain at its default setting of 2,347. A preamble is a signal used to synchronize the transmission timing between two or more systems. A series of transmission pulses are sent before the data to indicate that "someone is going to transmit data." This ensures that systems receiving the information correctly when the data transmission starts.

□ SOHO – Small Office Home Office

□ SSID – Service Set Identifier

□ Wired Equivalent Privacy (WEP) – The optional cryptographic confidentiality algorithm specified by IEEE 802.11 is used to provide data confidentiality that is subjectively equivalent to the confidentiality of a wired local area network medium that does not employ cryptographic techniques to enhance privacy.