WLANTPBG

54 Wireless Mini-PCI

Adapter

OEM Guide

FCC 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 or more 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.

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.

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

OEM Installation Guide

This device is intended only form OEM integrators under the following conditions:

1) The antenna must be installed such that 20cm is maintained between the antenna and users, and

2) The transmitter module may not be co-located with any other transmitter or antenna.

IMPORTANT NOTE: In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

End Product Labeling

This transmitter module is authorized only for use in devices where the antenna may be installed such that 20 cm may be maintained between the antenna and users (for example access points, routers, wireless ADSL modems, and similar equipment). The final end product must be labeled in visible area with the following:

"Contains TX FCC ID: Q72WLANTPBG"

End Product Manual Information

The user manual for end users must include the following information in a prominent location "IMPORTANT NOTE: 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 20cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter."

IMPORTANT NOTE

FCC RF Radiation Exposure Statement: This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.

RF Exposure Info (For mobile configuration)

To comply with FCC RF exposure compliance requirements, this grant is applicable to only Mobile Configurations. The antennas 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

Chapter 1: Introduction

1.1 Overview of the product

The WLANTPBG mini-PCI adapter's auto-sensing capability allows high packet transfer rate of up to 54Mbps for maximum throughput, or dynamic range shifting to lower speeds due to distance or operating limitations in an environment with a lot of electromagnetic interference. It can also interoperate with all 11Mbps wireless (802.11b) products. Your wireless communications are protected by up to 152-bit WEP and WPA encryption for high security.

It adopts **2x to 3x eXtended Range^{TM} WLAN transmission technology** so that transmission distance is 2-3 times of traditional 11g/b solutions, up to 855.36m tested in China. Transmission range is extended to 4-9 times.

1.2 Features

> Complies with IEEE802.11g, IEEE802.11b standards
> Adopts **2x to 3x eXtended Range^{TM}** wireless LAN transmission technologies
> Supports WPA data security, IEEE802.1x authentication, TKIP/AES encryption, 64/128/152-bit WEP encryption
> Supports 54/48/36/24/18/12/9/6/11/5.5/3/2/1Mbps wireless LAN data transfer rates
> Provides 32-bit Mini-PCI interface
> Supports Ad-Hoc and Infrastructure modes
> Supports roaming between access points when configured in Infrastructure mode
> Eases to configure and provides monitoring information
> Supports Windows 98, Me, 2000, XP

Chapter 2: Installation Guide

2.1 Hardware Installation

Open the mini-PCI slot cover of host PC Notebook housing (please observe the necessary ESD precautions); Insert the adapter into the mini-PCI slot; Connect the host PC notebook antennas to the adapter antenna connectors; Close the mini-PCI slot cover of host PC Notebook housing.
The Wireless Mini-PCI adapter has a standard Mini-PCI interface for attaching to the Mini-PCI connector on others embedded system. And this adapter has connector to connect to the antenna.

2.2 Software Installation

2.2.1 Overview

This adapter also come with a wireless utility, following describe how to use the utility. For example, software installs using in notebook.

The Adapter's Setup Wizard will guide you through the Installation procedure for Windows 2000, XP. The Setup Wizard will install the Wireless Client Utility (WCU) and drivers.

The Setup steps for Windows 2000 and Windows XP are very similar. The following setup steps are for Windows 2000.

2.2.2 Software Installation for Windows 2000

1. Insert the Resource CD into your CD-ROM drive, click **Start** and choose **Run**. In the field that appears, enter F:\WCU\Setup.exe (if "F" is the letter of your CD-ROM drive), figure 2-1 should then appear.

2. You can click **Cancel** to end the installation on the Preparing Setup screen, figure 2-1. Otherwise, the Setup Wizard will display a screen similar to that shown in figure 2-2 after a moment.
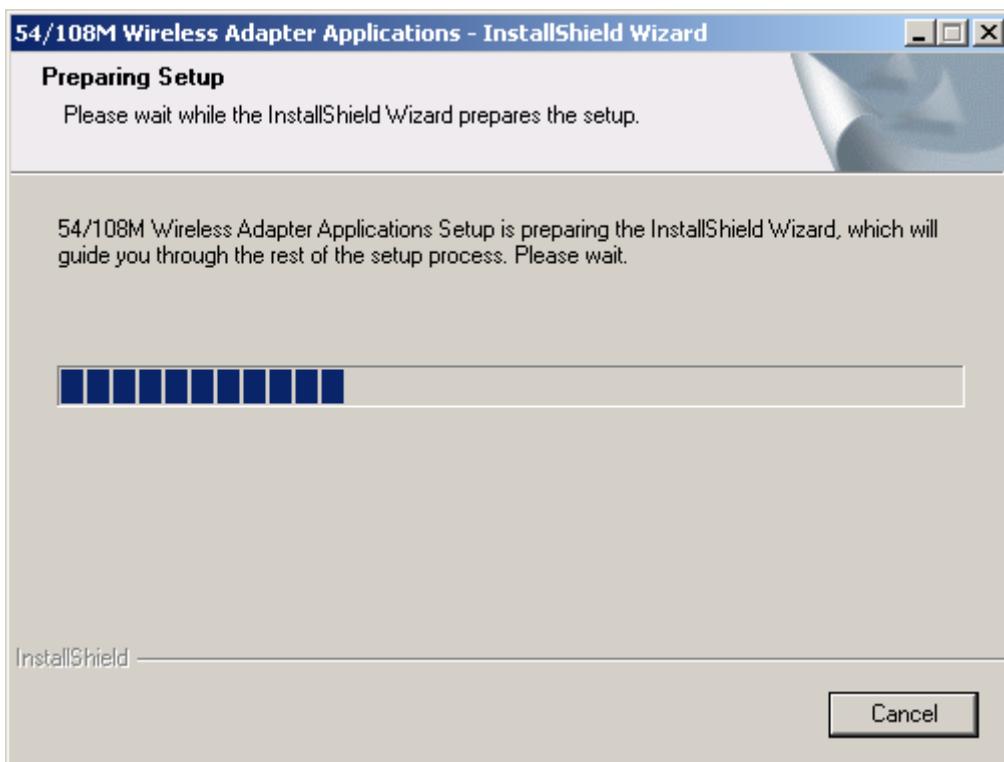
Figure 2-1   Wireless Client Utility – Install Shield Wizard

3.   To continue, click **Next** on the screen, figure 2-2. Click **Cancel** to end the Installation.
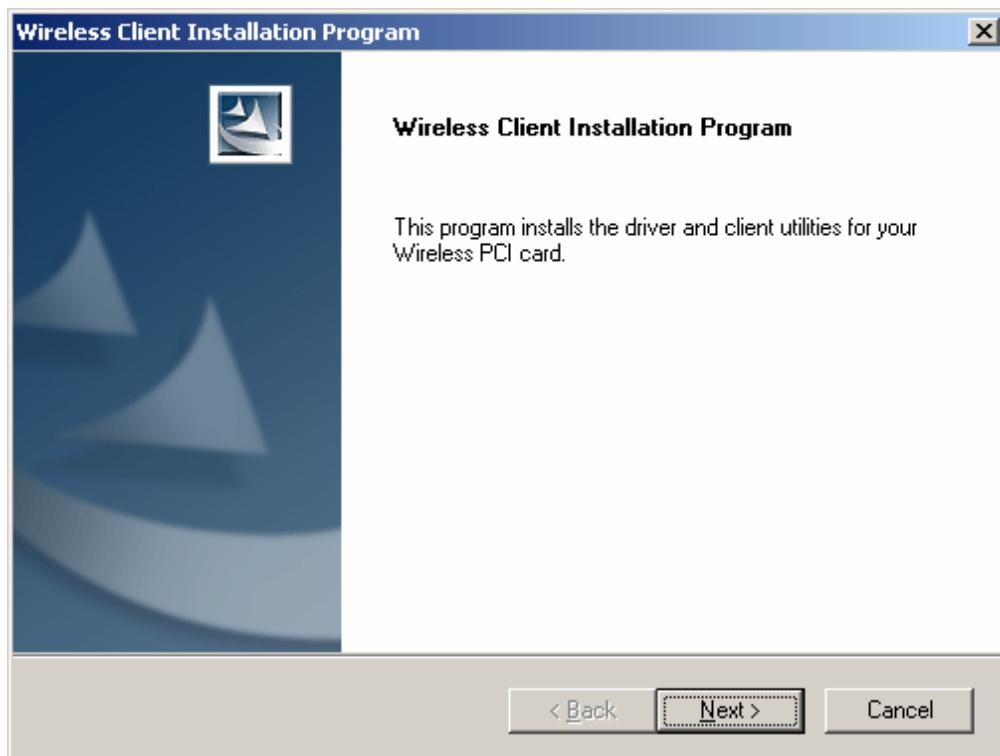

Figure 2-2   Wireless Client Utility Installation Program

4.   The Setup Wizard will ask you to choose a Setup type in figure 2-3. It is recommended that you select **Install Client Utilities and Driver**. Select **Install**

Driver Only to install driver only, select **Make Driver Installation Diskette(s)** to make the diskette(s) as the installation driver. Select **Install Client Utilities and Driver** and click **Next** to continue the Installation. Click **Back** to return to the previous page, or click **Cancel** to end the Installation.
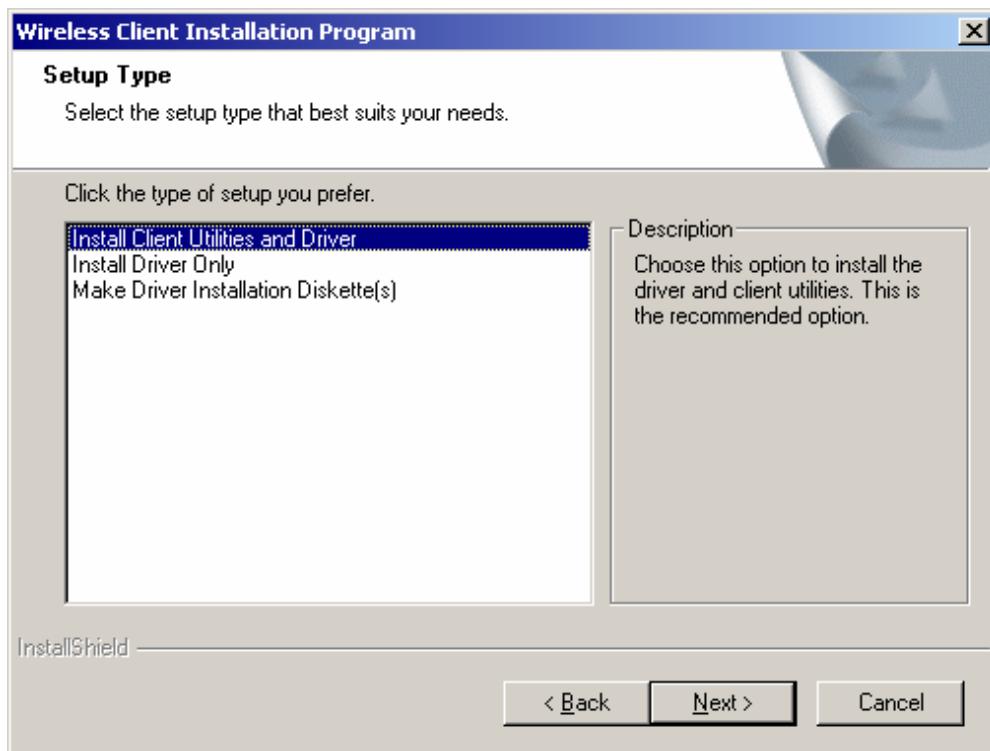

Figure 2-3   Select the setup type

5.   Figure 2-4 should appear. Click **Yes** to continue the Installation, or click **No** to end the Installation.
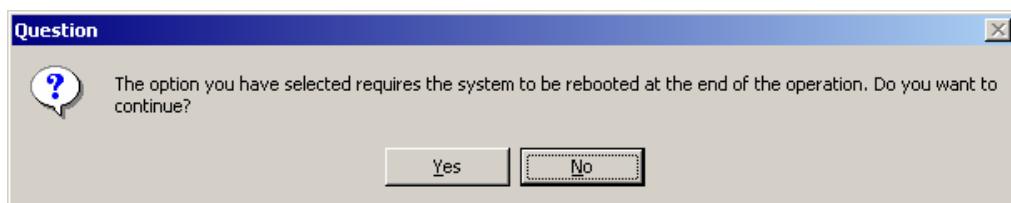

Figure 2-4   Question

6.   Click **Browse** to change the destination location for the software in figure 2-5. Click **Next** to continue the Installation. Click **Back** to return to the previous page, or click **Cancel** to end the Installation.
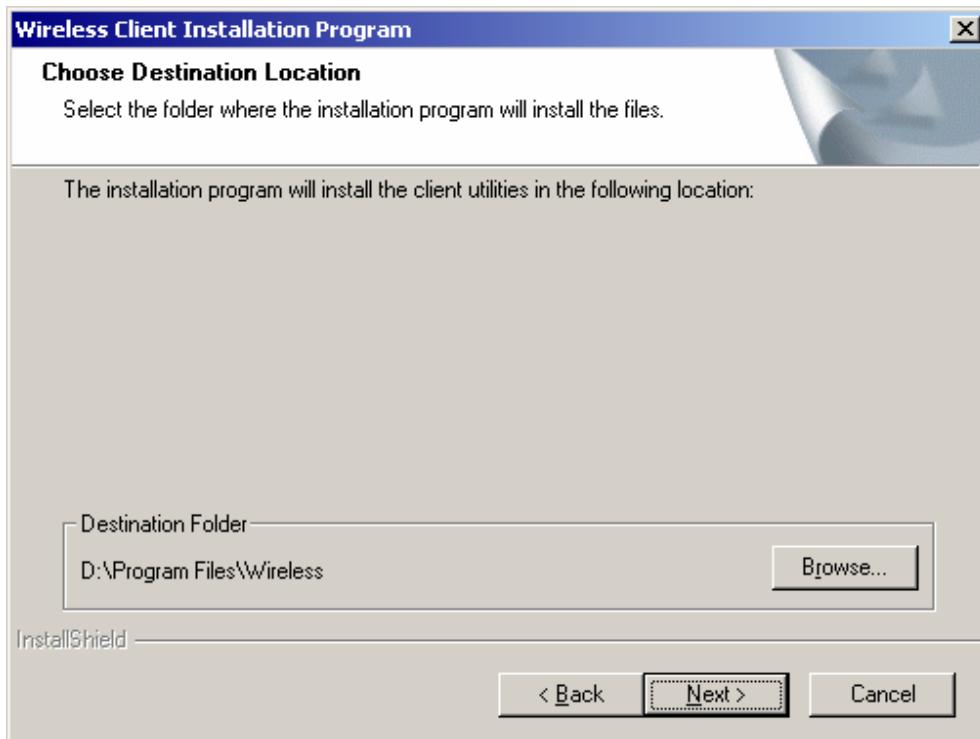
Figure 2-5　Choose Destination Location

7.　The Setup Wizard will ask you to create a new folder name or select one from the **Existing Folders** list shown in figure 2-6. It is recommended that you keep the default value. Click **Next** to continue the Installation. Click **Back** to return to the previous page, or click **Cancel** to end the Installation.
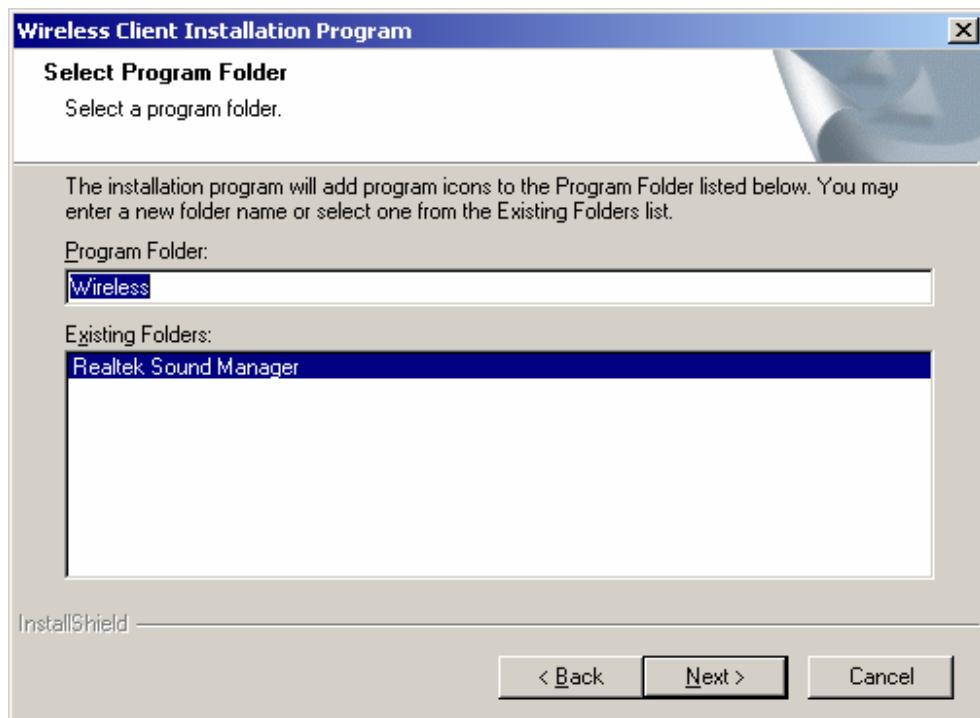

Figure 2-6　Select a Program Folder

8.　The Setup Wizard will notify you of how to proceed with the installation, shown in

figure 2-7. Click **OK** to continue the Installation.

Figure 2-7　Information prompt

9.　While files are copying, you will see a warning box, shown in figure 2-8. Please select **YES** to continue installation. Our drivers have been tested thoroughly, and are able to work with the operating system.

Figure 2-8　Widows 2000 Warning Box

Note: In Windows XP, the warning box is similar to that shown figure 2-8a. Please select **Continue Anyway** to continue installation.

Figure 2-8a   Windows XP Warning Box

10. After the files have been successfully copied, the screen in figure 2-9 will appear. Click **Finish** to reboot the system.
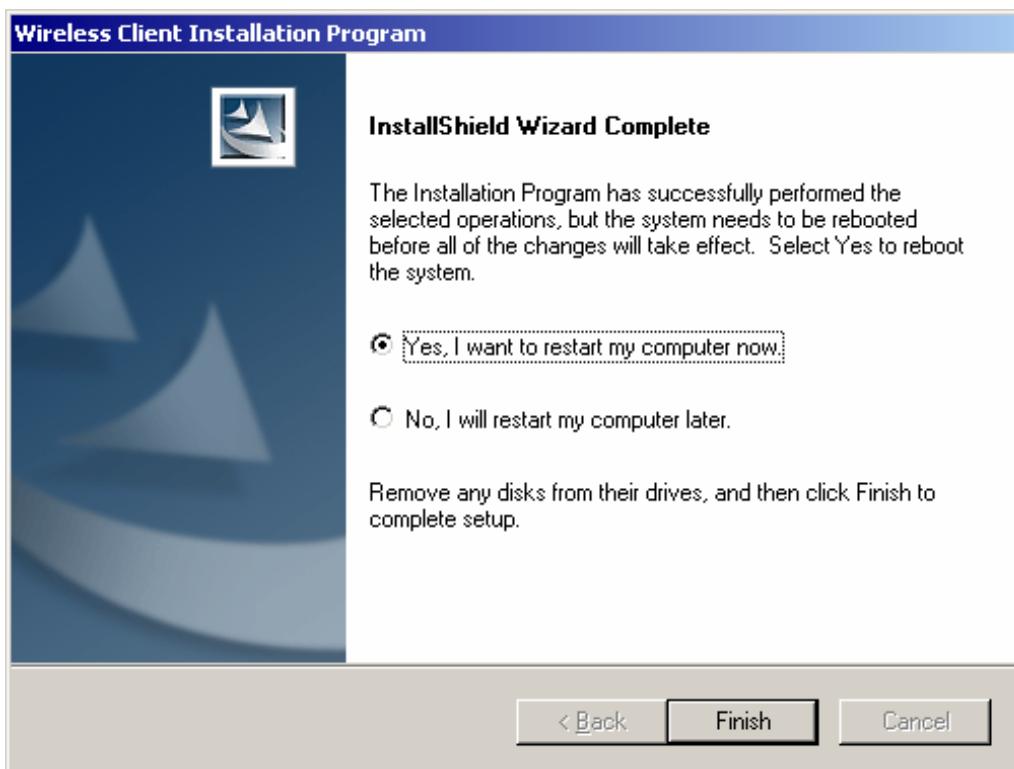

Figure 2-9   Finish

Chapter 3: Configuration

The Wireless Adapter can be configured by Wireless Client Utility (WCU). This chapter describes how to configure your Wireless Adapter for wireless connectivity on your Wireless Local Area Network (WLAN) and use the data security encryption features.

After Installing the Adapter, the Adapter's tray icon will appear in your system tray. It appears at the bottom of the screen, and shows the signal strength using color and the received signal strength indication (RSSI).

If the icon is gray, there is no connection.

If the icon is red, there is poor signal strength and the RSSI is less than 5dB.

If the icon is yellow, there is poor signal strength and the RSSI is between 5dB and 10dB.

If the icon is green, there is good signal strength and the RSSI is between 10dB and 20dB.

If the icon is green, there is excellent signal strength and the RSSI is more than 20dB.

Double-click the icon and the **WCU utility** will run. You can also run the utility by clicking the **Start>Program>Wireless>Wireless Client Utility**. The WCU utility provides a complete and easy to use set of tools to:
➢ Display current status information
➢ Edit and add configuration profiles
➢ Display current diagnostics information

The section below introduces these above capabilities.

3.1 Current Status

The Current Status tab contains general information about the program and its operations. The Current Status tab does not require any configurations.
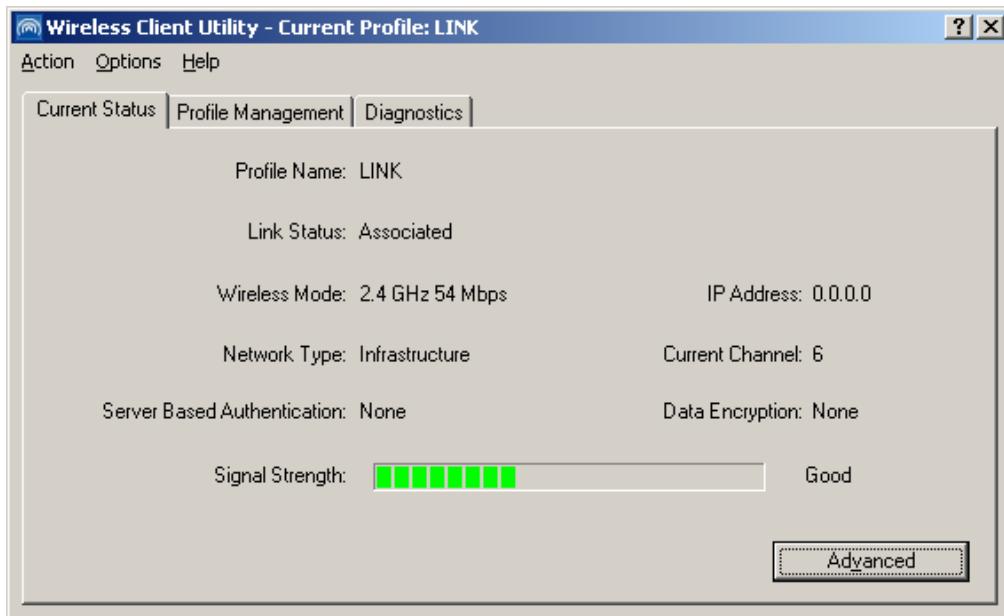
Figure 3-1　Current Status

The following table describes the items found on the Current Status screen.

- ➢ **Profile Name -** The name of current selected configuration profile. Set up the configuration name on the **General** tab of **Profile Management**.
- ➢ **Link Status -** Shows whether the station is associated to the wireless network.
- ➢ **Wireless Mode -** Displays the wireless mode. Configure the wireless mode on the **Advanced** tab of **Profile Management**.
- ➢ **Network Type -** The type of network and the station currently connected. The options include:
    - Infrastructure (access point)
    - Ad Hoc

    Configure the network type on the **Advanced** tab of **Profile Management**.
- ➢ **IP Address -** Displays the computer's IP address.
- ➢ **Current Channel -** Shows the currently connected channel.
- ➢ **Data Encryption -** Displays the encryption type the driver is using. Configure the encryption type on the **Security** tab of **Profile Management**.
- ➢ **Server Based Authentication -** Shows whether server based authentication is used.
- ➢ **Signal Strength -** Shows the strength of the signal.

Note: In the WCU utility, access the **General** tab, **Security** tab and **Advanced** tab by clicking **New** or **Modify** on the **Profile Management** tab.

Click **Advanced** to see advanced information about the program and its operations. For more information, please refer to the help file of the utility.
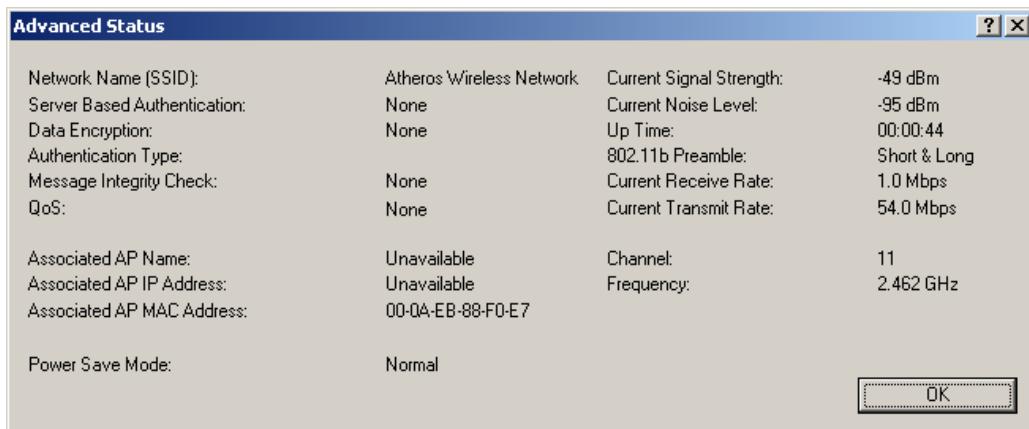
Figure 3-2   Advance Status

3.2 Profile Management

Click the Profile Management tab of the WCU Utility and the Profile Management screen will appear, figure 3-3. The Profile Management screen provides tools to:

➢   Add a profile
➢   Edit a profile
➢   Remove a profile
➢   Switch to another Profile
➢   Import a Profile
➢   Export a Profile
➢   Scan Available Networks
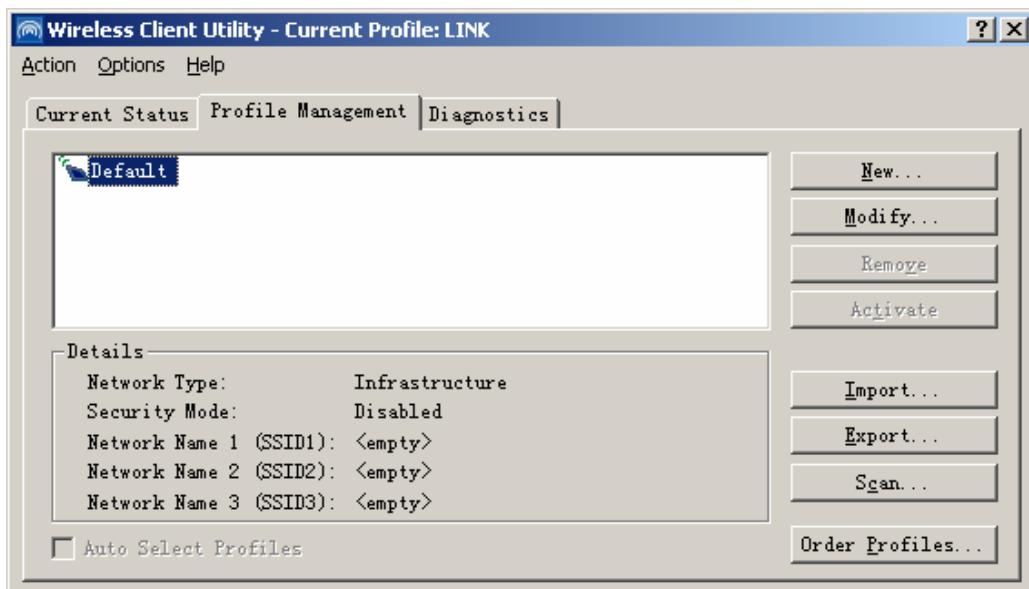➢   Order profiles

Figure 3-3   Profile Management tab

3.2.1 Add or Modify a Configuration Profile

To add a new configuration profile, click **New** on the Profile Management tab. To modify a configuration profile, select the configuration from the Profile list and click **Modify**.

The Profile Management dialog box will display a screen similar to that shown in Figure 3-4.

1. Edit the General tab

➢ **Profile Name -** Identifies the configuration profile. This name must be unique. Profile names are not case-sensitive.

➢ **Client Name -** Identifies the client machine.

➢ **Network Names (SSIDs) -** The IEEE 802.11 wireless network name. This field has a maximum limit of 32 characters.
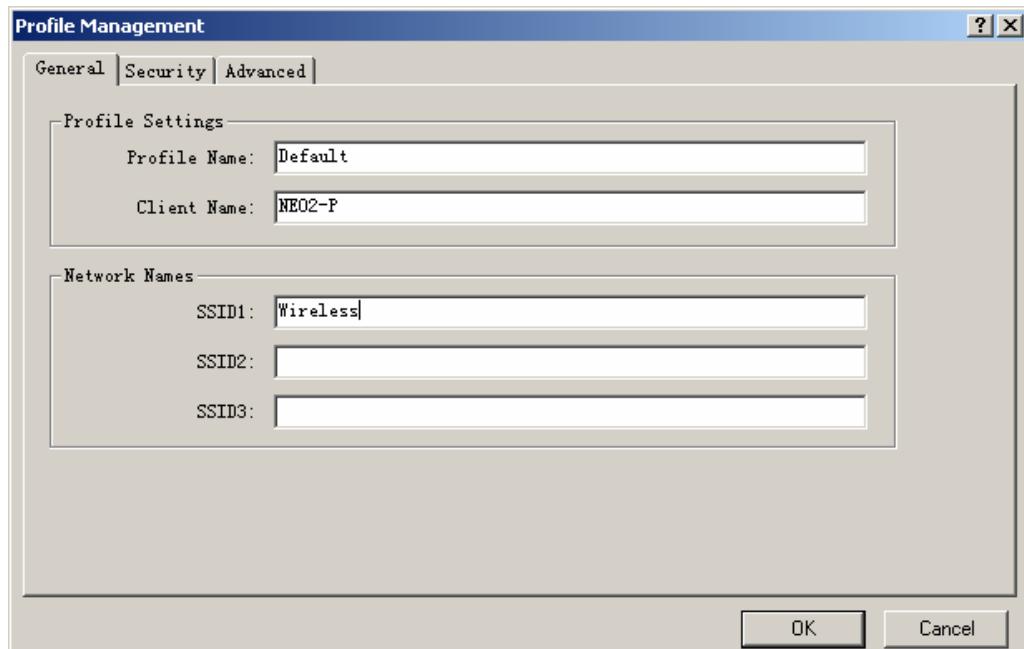

Figure 3-4   General Tab of Profile Management

2. Edit the Security tab

Edit the fields in the Security tab of Profile Management to configure the profile. To define the security mode, select the radio button of the desired security mode.

➢ **WPA -** Wi-Fi Protected Access

➢ **WPA Passphrase -** Wi-Fi Protected Access Passphrase

➢ **802.1x -** Enables 802.1x security.

➢ **Shared Key (Static WEP) -** Enables the use of shared keys that are defined on both the access point and the station. To define shared encryption keys, choose the Shared Key radio button and click **Configure** to fill in the Define Shared Keys window.

None: No security (not recommended).

Note: If the access point that the wireless adapter is associating to has WEP set to Optional and the client has WEP enabled, make sure that Allow Association to Mixed Cells is checked on the Security Tab to allow association. To complete WEP encryption configuration, you must select the 802.11 Authentication Mode as appropriate on the **Advanced** tab of this **Profile Management** dialog.
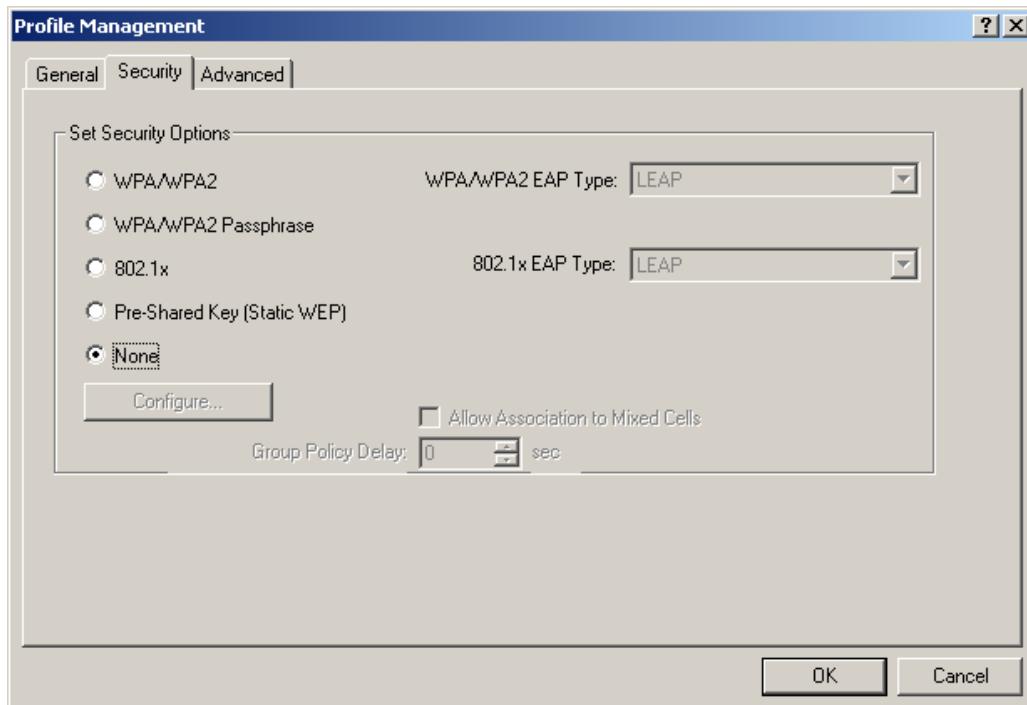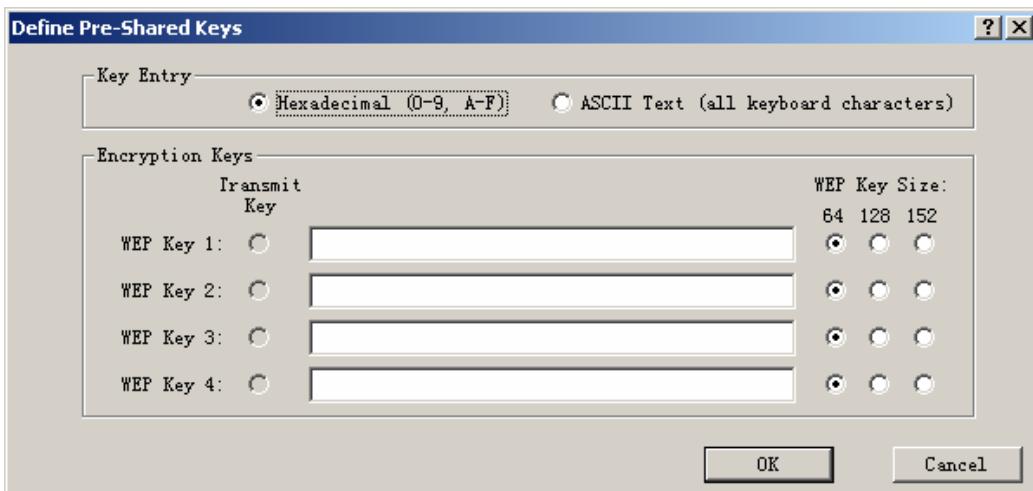
Figure 3-5　Security tab of Profile Management

Figure 3-6　Define Shared Keys

3.　Edit the Advanced tab

➢ **Power Save Mode -**
- **Maximum -** Selects maximum mode to let the access point buffer incoming messages for the wireless adapter.　The adapter will detect the access point if any messages are waiting periodically.
- **Normal -** In Normal mode, the adapter will be switched to maximum mode automatically when no large packets are retrieved.
- **Off -** turns power saving off, thus powering up the wireless adapter continuously for a short message response time.

➢ **802.11b Preamble -** Specifies the preamble setting in 802.11b.　The default setting is Short & Long (access point mode), which allows both short and long headers in the

802.11b frames. The adapter can only use short radio headers if the access point supports and uses them. Set to **Long Only** to override allowing short frames.

➢ **Wireless Mode -** Specifies 2.4 GHz 54 Mbps, 2.4 GHz 11 Mbps operation in an access point network. The wireless adapter must match the wireless mode of the access point with which it associates

➢ **Wireless Mode when Starting an Ad Hoc Network -** Specifies 2.4 GHz 54/11Mbps to start an Ad Hoc network if no matching network name is found after scanning all available modes. This mode also allows the selection of the channel the wireless adapter uses. The channels available depend on the regulatory domain. If the adapter finds no other ad hoc adapters, the channel that the adapter starts the ad hoc network with will be selected automatically. The wireless adapter must match the wireless mode and channel of the clients it associates.

➢ **802.11 Authentication Mode -** Select which mode the wireless adapter uses to authenticate to an access point:

- **Automatic** causes the adapter to attempt authentication using shared, but switches it to open authentication if shared fails.

- **Open System** enables an adapter to attempt authentication regardless of its WEP settings. It will only associate with the access point if the WEP keys on both the adapter and the access point match.

- **Shared-key** only allows the adapter to associate with access points that have the same WEP key.

For infrastructure (access point) networks, click **Preferred APs…** to specify up to four access points to the client adapter that attempts to be associated to the access points.
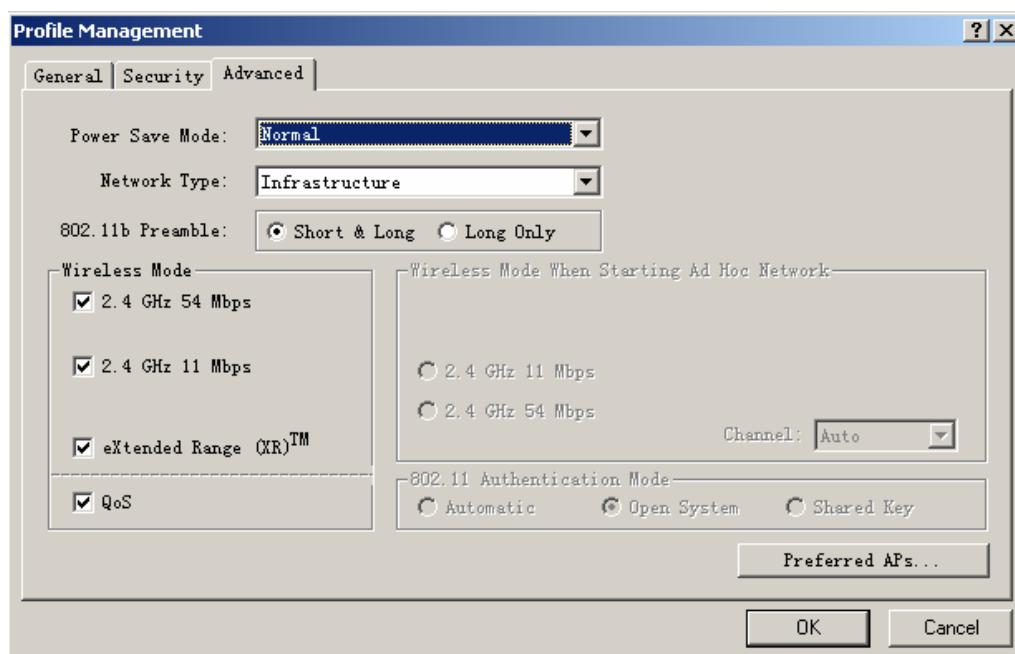

Figure 3-7   Advanced tab of Profile Management

3.2.2 Remove a profile

1.   Go to the Profile Management tab.

2. Select the profile name to remove in the Profiles List.

3. Click **Remove**.

3.2.3 Switch another Profile

1. Go to the Profile Management tab.

2. Click on the profile name in the Profiles List.

3. Click **Activate**.

3.2.4 Import a Profile

1. From the Profile Management tab, click **Import…**. The Import Profile will then appear.

2. Browse to the directory where the profile is located.

3. Highlight the profile name.

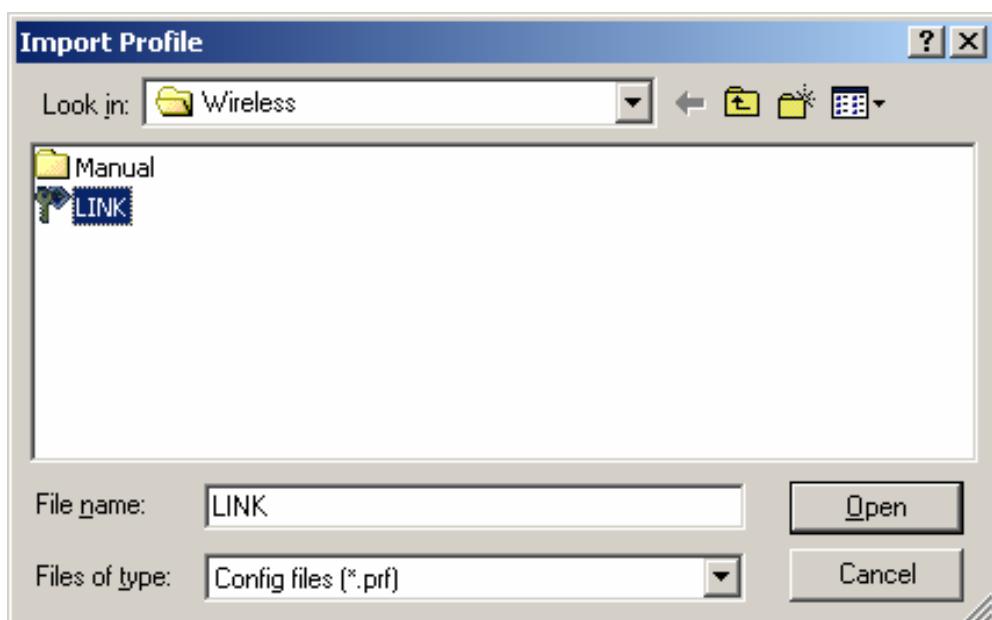4. Click **Open**, the imported profile will then appear in the Profiles List.

Figure 3-8   Import Profile Dialog

3.2.5 Export a Profile

1. From the Profile Management tab, highlight the profile to export.

2. Click **Export…**, the Export Profile window will then appear.

3. Browse the directory to export the profile to.

4. Click **Save**. The profile should then be exported to the specified location.
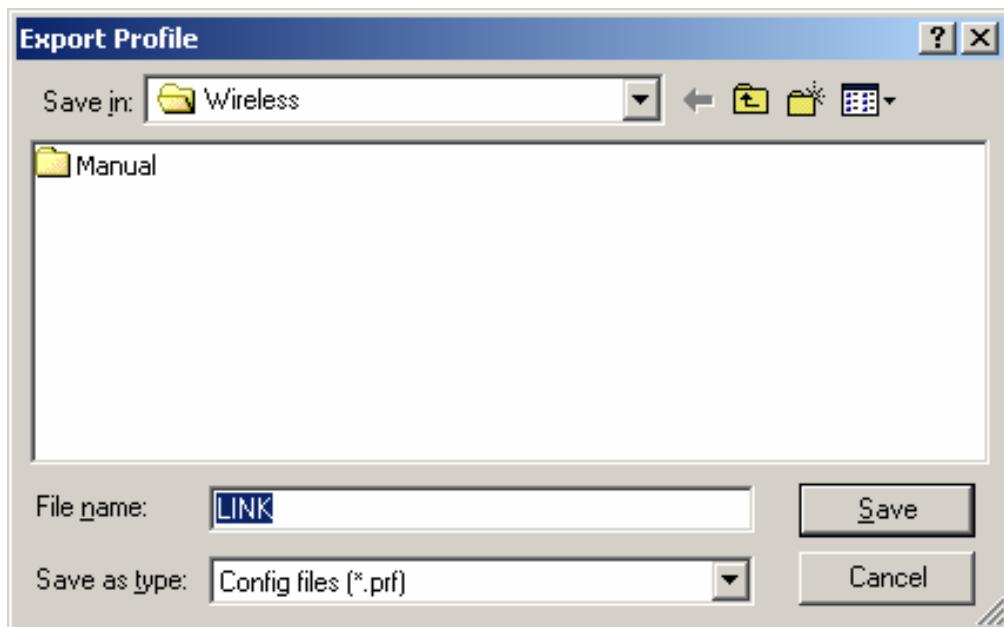
Figure 3-9   Export Profile Dialog

3.2.6 Scan Available Networks

1. Click **Scan** on the Profile Management, the Available Infrastructure and Ad Hoc Networks window will appear.
2. Click **Refresh** to refresh the list at any time.
3. Highlight a network name and click **Activate** to connect an available network. If no configuration profile exists for that network, the Profile Management window will open the General tab. Fill in the Profile name and click **OK** to create the configuration profile for that network.

Figure 3-10   Scan Available Networks Dialog

3.2.7 Auto Profile Selection Management

The auto selection feature allows the wireless adapter to automatically select a profile from the list of profiles and use it to connect to the network. To add a new profile into the

Auto Selected Profiles list, please follow these steps.

1. On the Profile Management tab, click **Order Profiles…**.
2. The Auto Profiles Selection management window will appear, with a list of all created profiles in the Available Profiles box.
3. Highlight the profiles to add to auto profile selection, and click **Add**. The profile will appear in the Auto Selected Profiles box.
4. Highlight a profile in the Auto Selected Profiles box.
5. Click **Move Up** or **Move Down** as appropriate. Note: The first profile in the Auto Selected Profiles box has highest priority, and the last profile has lowest priority.
6. Click **OK**.
7. Check the **Auto Select Profiles** checkbox on the **Profile Management** tab.

Note: When auto profile selection is enabled by checking **Auto Select Profiles** on the **Profile Management** tab, the client adapter will scan for an available network. The profile with the highest priority and the same SSID as one of the found networks will be used to connect to the network. If the connection fails, the client adapter will try the next highest priority profile that matches the SSID until an available network is found.

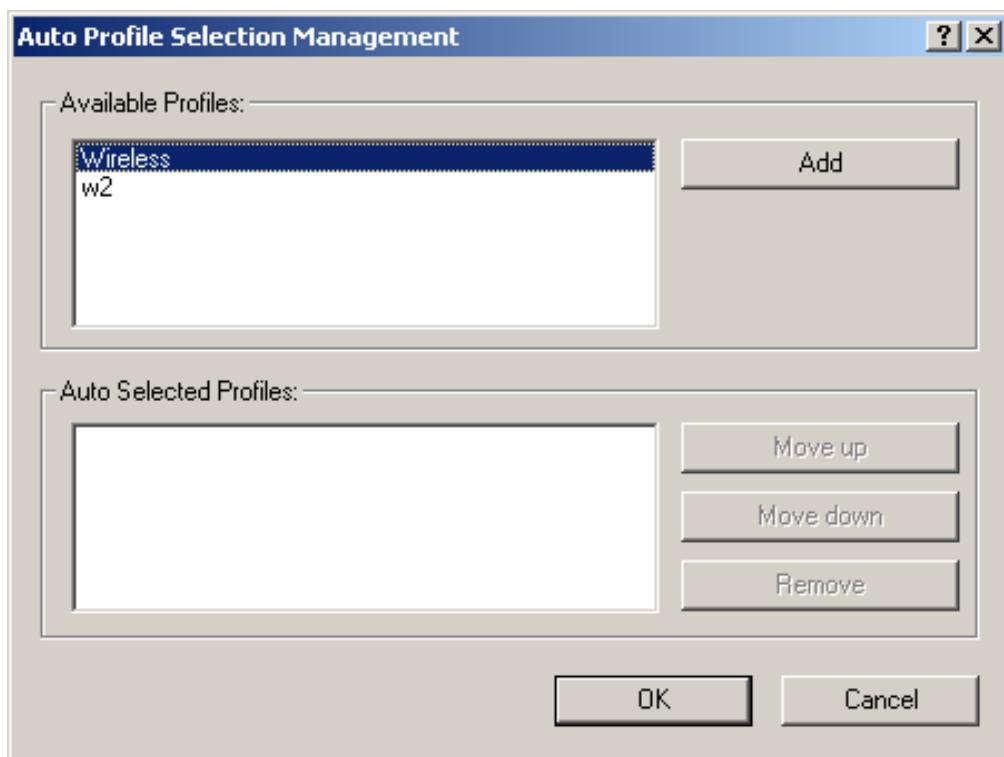Figure 3-11   Auto Profile Selection Management Dialog

3.3 Diagnostics

The **Diagnostics** tab of the Wireless Client Utility (WCU) provides buttons used to retrieve receiving and transmitting statistics. The Diagnostics tab does not require any configuration.

The Diagnostics tab lists the following receive and transmit diagnostics for frames received or transmitted by the wireless network adapter:

➢ Multicast frames transmitted and received
➢ Broadcast frames transmitted and received
➢ Unicast frames transmitted and received
➢ Total bytes transmitted and received

Figure 3-12   Diagnostics tab

3.3.1 Check Driver Information

The **Adapter Information** contains general information about the wireless network adapter and the Network Driver Interface Specification (NDIS) driver.   Access the adapter information from the Diagnostics tab.

➢ **Card Name -** The name of the wireless network adapter.
➢ **MAC Address -** The MAC address of the wireless network adapter.
➢ **Driver -** The driver name and path of the wireless network adapter driver.
➢ **Driver Version -** The version of the wireless network adapter driver.
➢ **Driver Date -** The creation date of the wireless network adapter driver.
➢ **Client Name -** The name of the client computer.

Figure 3-13 Adapter Information

3.3.2 Check Receive and Transmit Statistical Information

The **Advanced Statistics** show receiving and transmitting statistical information for the following receive and transmit diagnostics for frames received by or transmitted to the wireless network adapter.

Figure 3-14 Advanced Statistics

Appendix A: Specifications

Normal	
Interface	Mini-PCI interface
Standards	IEEE802.11b; IEEE802.11g
Operating System	Windows 98; Windows Me; Windows 2000; Windows XP
Transmission Distance	Indoor up to 100m, outdoor up to 300m (Standard transmission distance, It is limited to the environment). Indoor up to 200m, Outdoor up to 830m (Adopt 2x to 3x eXtended Range^{TM} WLAN transmission technology, it is limited to the environment)
Radio Data Rate	54/48/36/24/18/12/9/6/11/5.5/3/2/1Mbps (Auto Rate Sensing)
Sensitivity	54M: -68dBm/8%PER (TYPICAL) 11M: -84dBm/8%PER
Modulation	1M DBPSK; 2M DQPSK; 5.5M, 11M CCK; 6M, 9M, 12M, 18M, 24M, 36M, 48M, 54M OFDM;
Media Access Protocol	CSMA/CA with ACK
Transmit Power	21mW (TYPICAL)
Data Security	WPA; 64/128/152-bit WEP; TKIP/AES
Frequency	2.4 ~ 2.4835GHz
Spread Spectrum	Direct Sequence Spread Spectrum (DSSS)
Channel	11
Power Consumption	Typically 685mA in full Transmit (TX), 515mA in full Receive (RX)

Environmental and Physical	
Operating Temp.	0 ~40 (32 ~104)
Storage Temp.	-40 – 70 (-40 ~158)
Humidity	10% - 95% RH, Non-condensing
Dimensions (W× D× H)	60× 48× 4.5 mm

Appendix B: Glossary

➤ **2x to 3x eXtended Range^{TM} WLAN Transmission Technology -** The WLAN device with 2x to 3x eXtended Range^{TM} WLAN transmission technology make its sensitivity up to 105 dB, which gives users the ability to have robust, longer-range wireless connections. With this range-enhancing technology, a 2x to 3x eXtended Range^{TM} based client and access point can maintain a connection at as much as three times the transmission distance of traditional 802.11b and 802.11g products, for a coverage area that is up to nine times greater. A traditional 802.11b and 802.11g product transmission distance is about 300m, A 2x to 3x eXtended Range^{TM} based client and access point can maintain a connection transmission distance may be up to 830m.

➤ **802.11b -** The 802.11b standard specifies a wireless product networking at 11 Mbps using direct-sequence spread-spectrum (DSSS) technology and operating in the unlicensed radio spectrum at 2.4GHz, and WEP encryption for security. 802.11b networks are also referred to as Wi-Fi networks.

➤ **802.11g -** specification for wireless networking at 54 Mbps using direct-sequence spread-spectrum (DSSS) technology, using OFDM modulation and operating in the unlicensed radio spectrum at 2.4GHz, and backward compatibility with IEEE 802.11b devices, and WEP encryption for security.

➤ **Ad-hoc Network -** An ad-hoc network is a group of computers, each with a wireless adapter, connected as an independent 802.11 wireless LAN. Ad-hoc wireless computers operate on a peer-to-peer basis, communicating directly with each other without the use of an access point. Ad-hoc mode is also referred to as an Independent Basic Service Set (IBSS) or as peer-to-peer mode, and is useful at a departmental scale or SOHO operation.

➤ **DSSS** (**D**irect-**S**equence **S**pread **S**pectrum) **-** DSSS generates a redundant bit pattern for all data transmitted. This bit pattern is called a chip (or chipping code). Even if one or more bits in the chip are damaged during transmission, statistical techniques embedded in the receiver 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. However, to an intended receiver (i.e. another wireless LAN endpoint), the DSSS signal is recognized as the only valid signal, and interference is inherently rejected (ignored).

➤ **FHSS** (**F**requency **H**opping **S**pread **S**pectrum) **-** FHSS continuously changes (hops) the carrier frequency of a conventional carrier several times per second according to a pseudo-random set of channels. Because a fixed frequency is not used, and only the transmitter and receiver know the hop patterns, interception of FHSS is extremely difficult.

➤ **Infrastructure Network -** An infrastructure network is a group of computers or other devices, each with a wireless adapter, connected as an 802.11 wireless LAN. In infrastructure mode, the wireless devices communicate with each other and to a

wired network by first going through an access point. An infrastructure wireless network connected to a wired network is referred to as a Basic Service Set (BSS). A set of two or more BSS in a single network is referred to as an Extended Service Set (ESS). Infrastructure mode is useful at a corporation scale, or when it is necessary to connect the wired and wireless networks.

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

➢ **SSID -** A **S**ervice **S**et **Id**entification is a thirty-two character (maximum) alphanumeric key identifying a wireless local area network. For the wireless devices in a network to communicate with each other, all devices must be configured with the same SSID. This is typically the configuration parameter for a wireless PC card. It corresponds to the ESSID in the wireless Access Point and to the wireless network name.

➢ **WEP** (**W**ired **E**quivalent **P**rivacy) **-** A data privacy mechanism based on a 64-bit or 128-bit or 152-bit shared key algorithm, as described in the IEEE 802.11 standard.

➢ **Wi-Fi -** A trade name for the 802.11b wireless networking standard, given by the Wireless Ethernet Compatibility Alliance (WECA, see http://www.wi-fi.net), an industry standards group promoting interoperability among 802.11b devices.

➢ **WLAN** (**W**ireless **L**ocal **A**rea **N**etwork) - A group of computers and associated devices communicate with each other wirelessly, which network serving users are limited in a local area.

➢ **WPA** (**W**i-Fi **P**rotected **A**ccess) **-** A wireless security protocol use TKIP (Temporal Key Integrity Protocol) encryption, which can be used in conjunction with a RADIUS server.