

LAN-Express IEEE 802.11 USB User Guide

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# **LAN-Express IL IEEE 802.11 USB User's Guide**

**Version 1.0**

**November 10<sup>th</sup>, 2004**

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Chapter 1 Introduction

1.1 Introducing the LAN-Express IL IEEE 802.11 USB

LAN-Express IL IEEE 802.11 USB is a high performance wireless LAN adapter that complies with the IEEE 802.11b and 802.11g wireless standards, which can be used with 802.11b or 802.11g devices to form a stand-alone wireless Peer-to-Peer Group or used in conjunction with an Access Point infrastructure to provide mobile clients with wireless access to an Ethernet network.

The LAN-Express IL IEEE 802.11 USB supports Windows XP, Windows 2000, Windows Millennium Edition (ME), and Windows 98.

A wireless LAN provides the same functionality of a wired network, but it eliminates the need to install networking cables and other networking equipment. A wireless LAN is not only easier to deploy, but it also allows for mobility through “roaming.” For example, the LAN-Express IL IEEE 802.11 USB can roam from a conference room to an office without being disconnected from the network.

1.2 Specifications & System Requirements

You must meet the following minimum requirements in order to begin using an LAN-Express IL IEEE 802.11 USB,

- Windows XP, Windows 2000, Windows Millennium Edition (ME), or Windows 98 Second Edition (SE) installed
- At least 64 MB of memory
- A 300 MHz processor or higher
- At least one other IEEE 802.11b-compliant or 802.11g-compliant device

1.21 IEEE 802.11 Specifications

The Institute of Electrical and Electronics Engineers (IEEE) adopted the 802.11 standard for wireless devices operating in the 2.4 GHz frequency band in 1997. This standard includes provisions for three radio technologies: direct sequence spread spectrum, frequency hopping spread spectrum, and infrared. Devices that comply with the 802.11 standard operate at a data rate of either 1 or 2 Mbps.

802.11b

In 1999, the IEEE modified the 802.11 standard to support direct sequence devices that can operate at speeds of up to 11 Mbps. The IEEE ratified this standard as **802.11b**. 802.11b devices are backwards compatible with 2.4 GHz 802.11 direct sequence devices (that operates at 1 or 2 Mbps).

802.11g

In 2003, the IEEE ratified the 802.11g standard. This standard delivers the same 54Mbps maximum data rate as 802.11a, yet it offers an additional and compelling advantage-backward compatibility with 802.11b equipment. This means that 802.11b clients will work with 802.11g access points, and 802.11g clients will work with 802.11b access points. Note that 802.11b products cannot be upgraded to support 802.11g since the 802.11g radios use a different chipset than 802.11b devices. However, 802.11g products and 802.11b products can work in the same network. Because 802.11g and 802.11b operate in the same unlicensed band, the two standards share the same three channels, which can limit wireless capacity and scalability.



An 802.11a device and an 11b/g device cannot communicate with each other.

The Wi-Fi standard certified at 2.4 GHz ensures the wireless interoperability with other Wi-Fi (802.11b) certified devices.

1.22 Security Standards

The LAN-Express IL IEEE 802.11 USB supports the following security standards:

- Wired Equivalent Privacy (WEP) encryption using 64 bit and 128 bit encryption
- Support for Windows 802.1x supplicants
- Wi-Fi Protected Access (WPA) encryption: WPA (dynamic setting) and WPA-PSK, which uses text string with at least 8 to 63 characters, it can be any combination of letters, numbers and other characters.

1.3 LAN-Express IL IEEE 802.11 USB View

The LAN-Express IL IEEE 802.11 USB has an ACTIVE LED indicator on its front side. When there is wireless connection, the LED indicator is on. See the followings figures for its front view and side view.

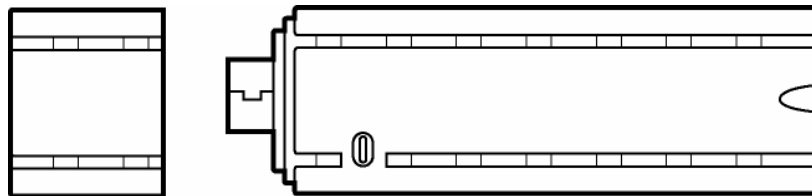


Figure 1-1 Side View of the LAN-Express IL IEEE 802.11 USB

Chapter 2 Installation

This chapter describes how to install an LAN-Express IL IEEE 802.11 USB and software in a computer running Windows XP, Windows 2000, Windows Millennium Edition (ME), or Windows 98 Second Edition (SE).



Note for Windows XP Users:

The Windows XP operating system has a built-in feature known as “Wireless Zero Configuration” which has the capability to configure and control the LAN-Express IL IEEE 802.11 USB (refer to [Configuring Your Wireless Networking Settings with Windows XP](#) for more details). The Wireless LAN Client utility will detect if there is Windows XP feature installed first. If the Windows XP operating system is found, the Wireless LAN Client utility will adjust the User Interface and have the Wireless Zero Configuration prevail and do the configuration.

2.1 Pre - installation Consideration

Review the following considerations before installing an LAN-Express IL IEEE 802.11 USB. The LAN-Express IL IEEE 802.11 USB must comply with the following EMI, safety and ESD requirements:

Emission

802.11g

- | | |
|-----------------|------------------------|
| ■ North America | FCC Part 15b, Part 15c |
| ■ Europe | EN 301 893 |
| ■ Japan | TELEC STD -33, STD- 66 |

Safety Requirements

- | | |
|-----------------|--|
| ■ North America | UL 60950 Ver.3 for USA, CSA C22.2 for Canada |
| ■ Europe | EN 60950 |

ESD Requirement

LAN-Express IL IEEE 802.11 USB must withstand 15KV test voltage of electrostatic discharge under operational conditions.

2.2 Windows ME and Windows 98 SE Installation CD Requirement

Before beginning the installation of an LAN-Express IL IEEE 802.11 USB, ensure that you have a Windows 98 SE or Windows ME installation CD available (depending on the computer's operating system). Windows 98/ME users may be prompted to insert a Windows CD during the installation. You should not need a Windows CD when installing the wireless USB adapter in a Windows XP or Windows 2000 computer.

If you do not have a Windows 98/ME CD, it is possible that you already have the Windows installation files on your hard drive. These Windows installation files are known as Windows Cabinet or CAB files. The Cabinet files are commonly located in *C:\WINDOWS\OPTIONS\INSTALL* or *C:\WINDOWS\OPTIONS\CABS*.



Windows 98/ME users may need the Windows CD or Cabinet files to complete the installation of an LAN-Express IL IEEE 802.11 USB. It is recommended that you do not proceed with the installation until you have confirmed that you have one of these Windows installation media available.

2.3 Wireless Client Utility Installation

Follow the instructions below to install an LAN-Express IL IEEE 802.11 USB in a Window 98 SE, Windows ME, Windows 2000, or Windows XP computer by running the installation program before inserting the USB into the computer. It is recommended that you insert the USB after the setup and configuration procedure is completed.

Turn on the computer and logon to Windows, if applicable.

Insert the Installation CD into the computer's CD-ROM drive. You will see the following figure telling you the InstallShield® Wizard will be guiding you through the setup process.

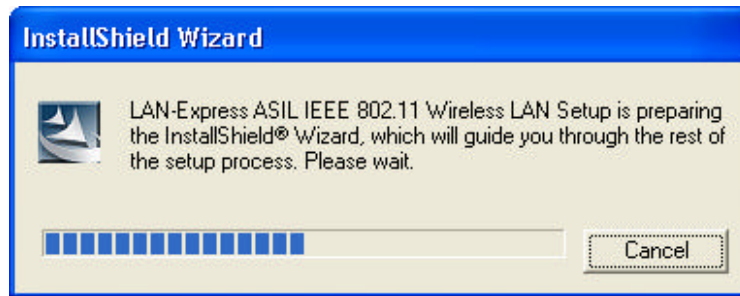


Figure 2-1 InstallShield Wizard in progress

Run **SETUP.EXE** from the Installation CD to launch the program if the Installation program does not launch automatically.

Click “**Next**” on the Software Setup Welcome dialog box as shown in Figure 2-2.

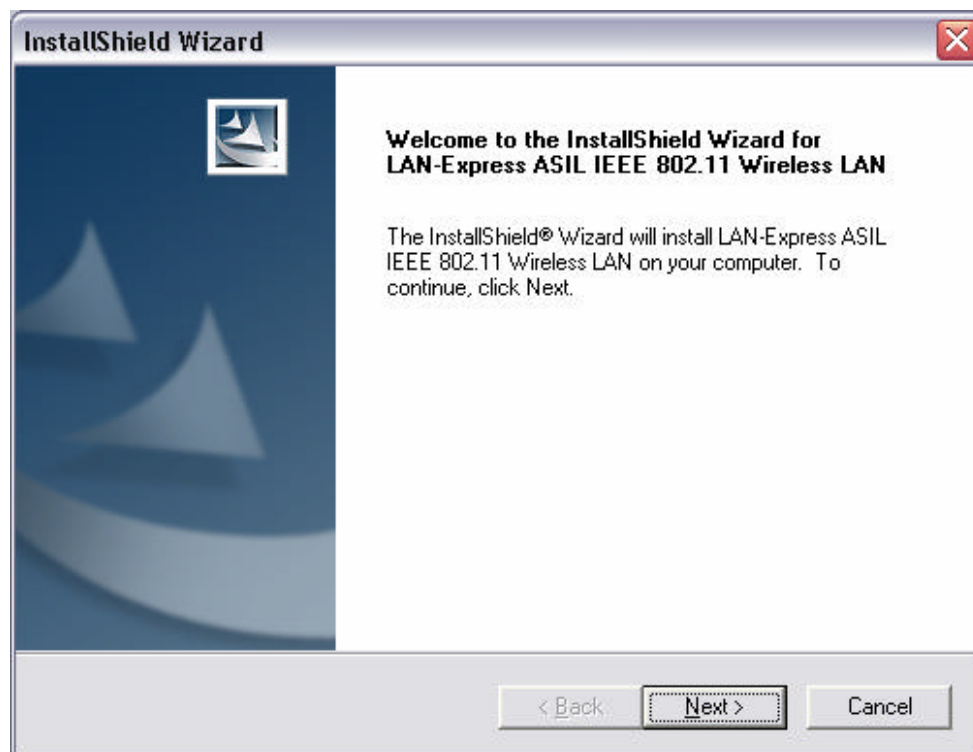


Figure 2-2 Setup “Welcome” Dialog Box

The License Agreement screen appears. Click “**Yes**” to continue.

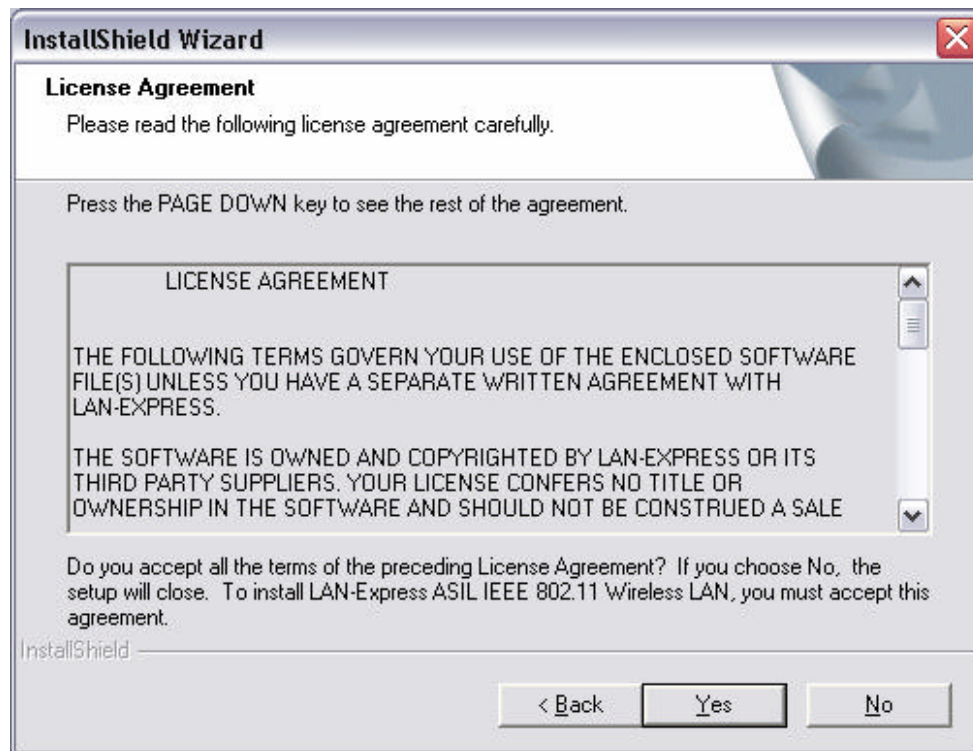


Figure 2-3 License Agreement for the Installation of the LAN-Express IL IEEE 802.11 USB

Choose a destination location for the LAN-Express IL IEEE 802.11 USB installation files. You may use the default path or click “**Browse**” to specify a different location. After you are done, click the “**Next**” button.

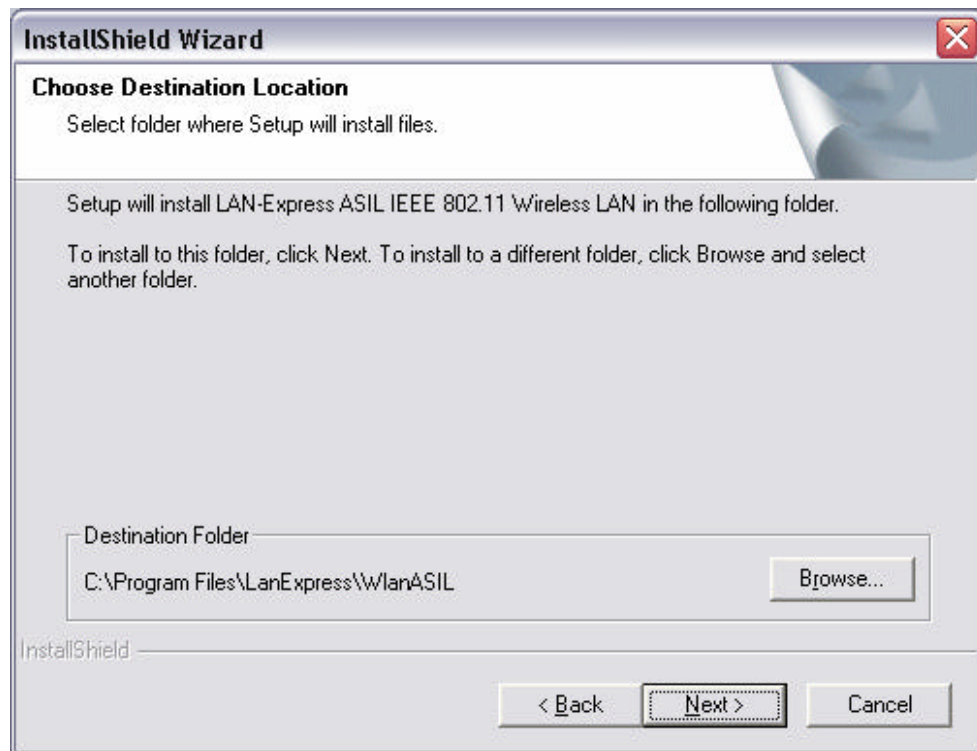


Figure 2-4 Choose Destination for Installation

Be patient while the software is installed on your computer.

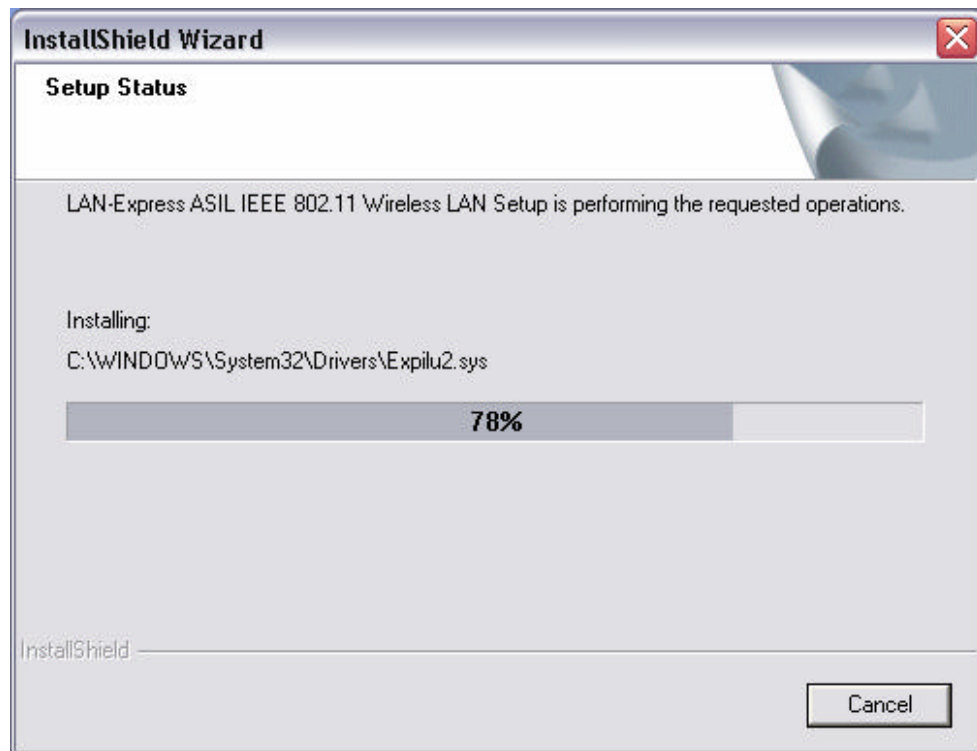


Figure 2-5 Software Setup in Process

Click “**Finish**” to close the Software Setup wizard when prompted.

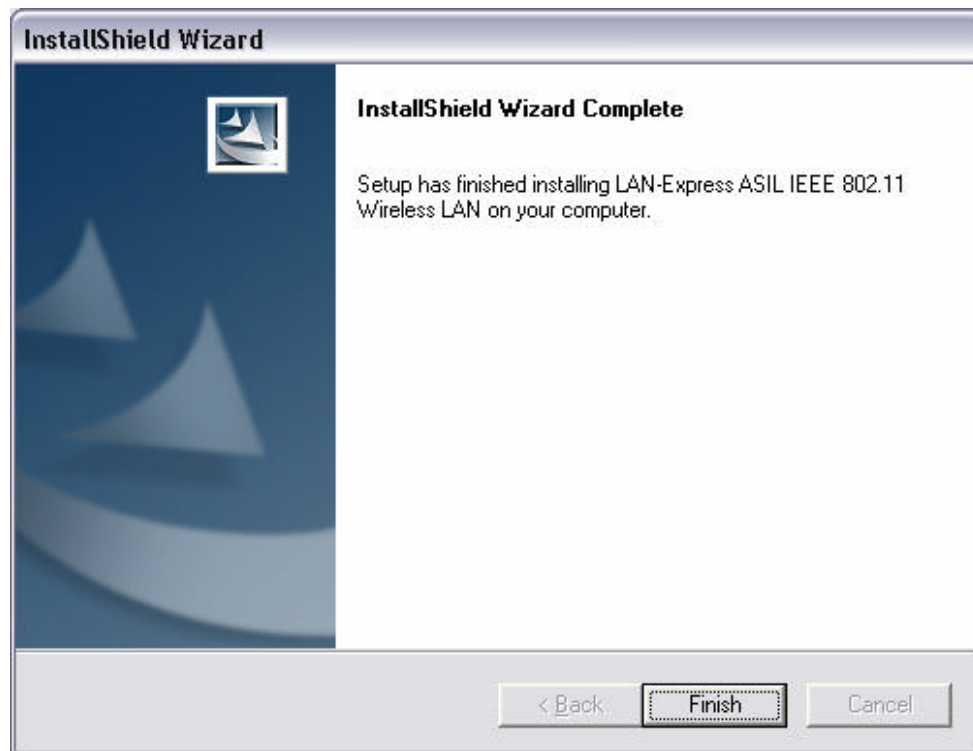


Figure 2-6 Installation Completed



The Wireless Client Utility will be automatically loaded each time your computer starts. To access the utility, click the Wireless Client Utility icon in the Windows Taskbar.

Per the specific interface of the LAN-Express IL IEEE 802.11 USB, connect the USB to your computer's USB port.

If prompted, follow any on-screen instructions to complete the installation.

The Wireless Client should now be successfully installed. If you have an Access Point on the network with no security enabled, the Wireless Client should connect automatically.

If you have an Access Point on the network with security enabled, double-click the LAN-Express IL icon to launch the Wireless Client Utility; use this utility to create profiles, configure the wireless USB adapter, and enable security.

If you do not have an Access Point, use the Wireless Client Utility to set the wireless USB

adapter to Peer-to-Peer Ad Hoc mode.

See Chapter 3 [Wireless Topologies](#) for more information on Peer-to-Peer Groups and Access-Point networks.

2.4 Uninstalling an LAN-Express IL IEEE 802.11 USB

Follow the images and steps shown below to uninstall the wireless USB adapter:

Access the Control Panel from the Start menu. Click the Add/Remove Programs icon.

Select LAN-Express IL AS 802.11 USB and click Change/Remove button.

Select **Remove** and then click the **Next** button to perform the un-installation. When prompted, click **OK** to remove the Wireless Client Utility.

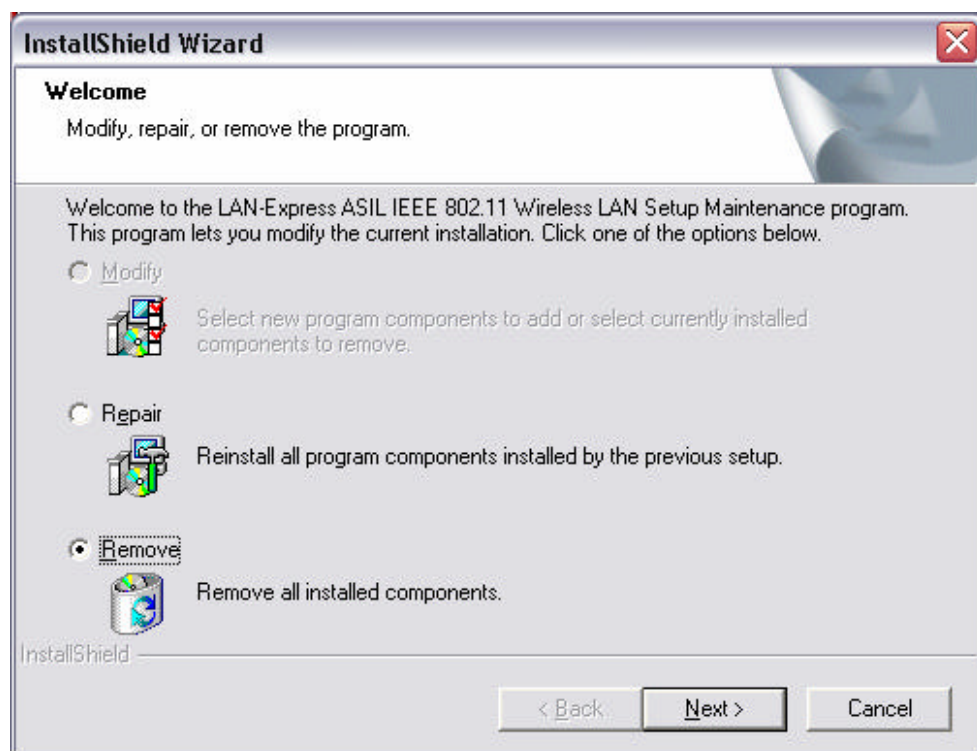


Figure 2-7 Select “Remove” to Modify the Situation

System asks if you are very sure about un-installing the selected application. Click **OK** if you are ready. If not, click **Cancel**.

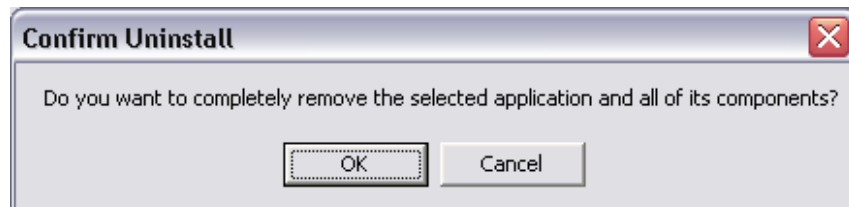


Figure 2-8 Un-installation Confirmation

Be patient while the wireless USB adapter is uninstalled from your computer.

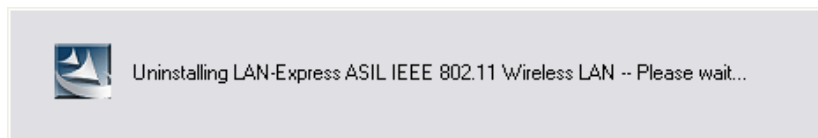


Figure 2-9 Install Un-installing Wireless Client Utility

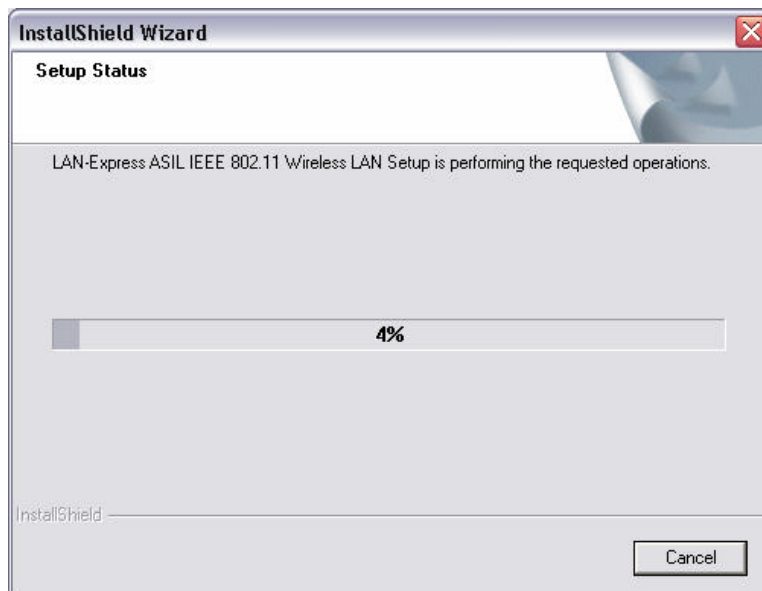


Figure 2-10 Un-installation in process

When prompted, click **Finish** to complete the un-Installation procedure.

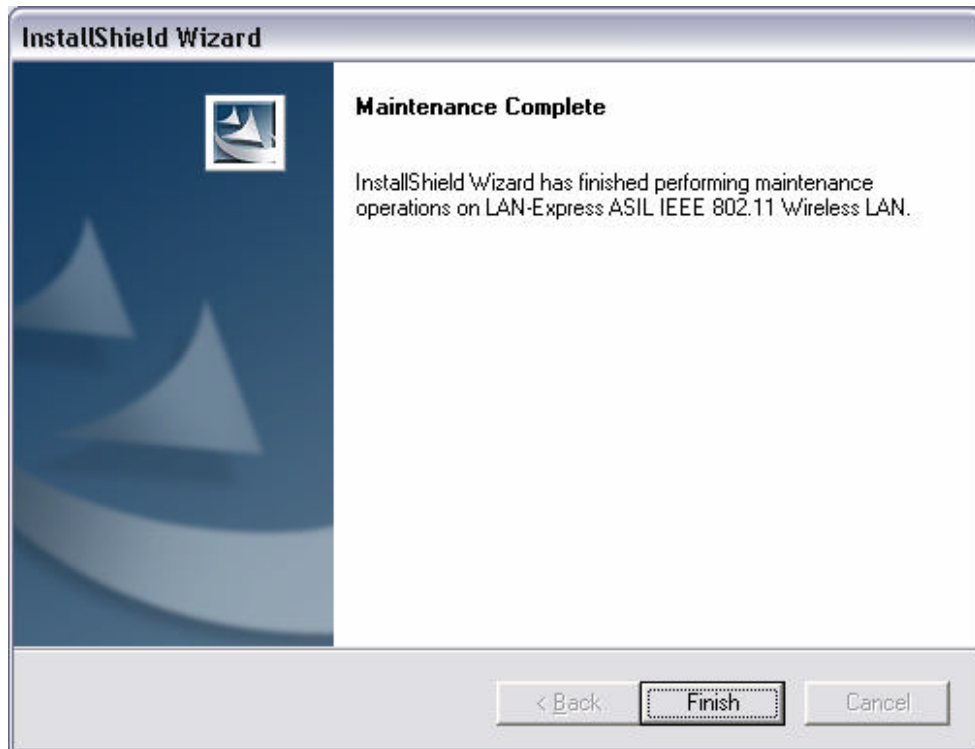


Figure 2-11 Un-installation and Maintenance Completed

Chapter 3 Wireless Topologies

LAN-Express IL IEEE 802.11 USB looks and operates similar to Ethernet products. The only difference is that a radio replaces the wire between communicating devices. This means that all of your existing applications that operate over Ethernet will work with the LAN-Express IL IEEE 802.11 USB without any special wireless networking software.

A wireless LAN can be configured for two different modes of operation. While each method has its advantages, one of them may be better suited for your needs. Review the following configurations to determine which mode is best for you.

3.1 Peer-to-Peer Group

A Peer-to-Peer group—also known as an **Ad-Hoc** network-- is the simplest to deploy and is ideal for small offices. Peer-to-Peer Group can be comprised of two or more wireless client configured to communicate with one another. Peer-to-Peer Group clients communicate directly with each other without using an access point (AP). As a user on this type of network, you are able to quickly build up a wireless network in order to share files with other employees, print to a shared office printer, and access the Internet through a single shared connection.

Ad-hoc networking is cost effective, because no other devices components are needed (such as access points, hubs or routers) in order to setup a network. However, with Ad-Hoc networking, your computer is only able to communicate with other nearby wireless clients.

By using the off-the-shelf peer-to-peer network operating systems, each computer

can dynamically connect and reconnect to the others with no additional configuration, as illustrated in Figure 3-1.

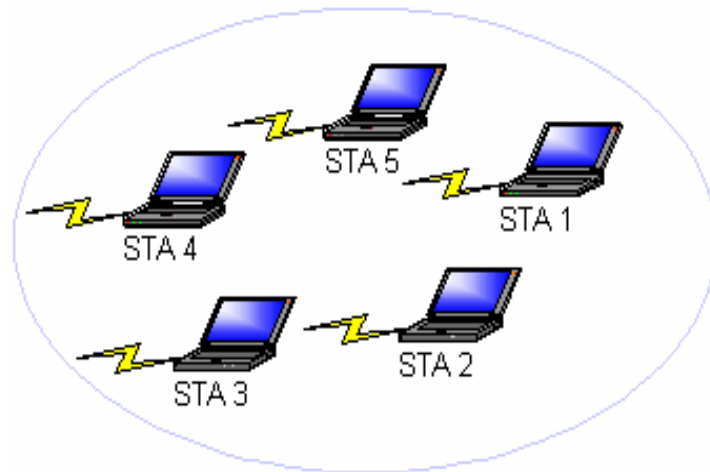


Figure 3-1 Peer-to-Peer Group

The LAN-Express IL IEEE 802.11 USB can communicate with an 802.11b or 802.11g Peer-to-Peer Group (but it can not dynamically switch between the two). Therefore, you must manually configure the USB to use one specific radio mode.

3.2 Access Point Infrastructure

Many companies have an existing Ethernet or wired LAN infrastructure and want to be able to extend that capability to wireless nodes. This is accomplished by installing one or more Access Points on the Ethernet network. Access Points are devices that communicate with both the Ethernet network and the wireless network.

An Access Point network is also referred to as an **Infrastructure** network. The key difference between an Infrastructure network and an Ad-Hoc network is the addition of one extra element—the Access Point. The Access Point serves as the focal point for all data

traffic on your wireless network, optimally managing all wireless data transactions.

Additionally, the wireless Infrastructure can provide access to an existing wired LAN. This link allows computers on the wireless LAN to access the other wired LAN's resources and tools, including Internet access, email delivery, file transfer, and printer sharing. See figure 3-2 for example.

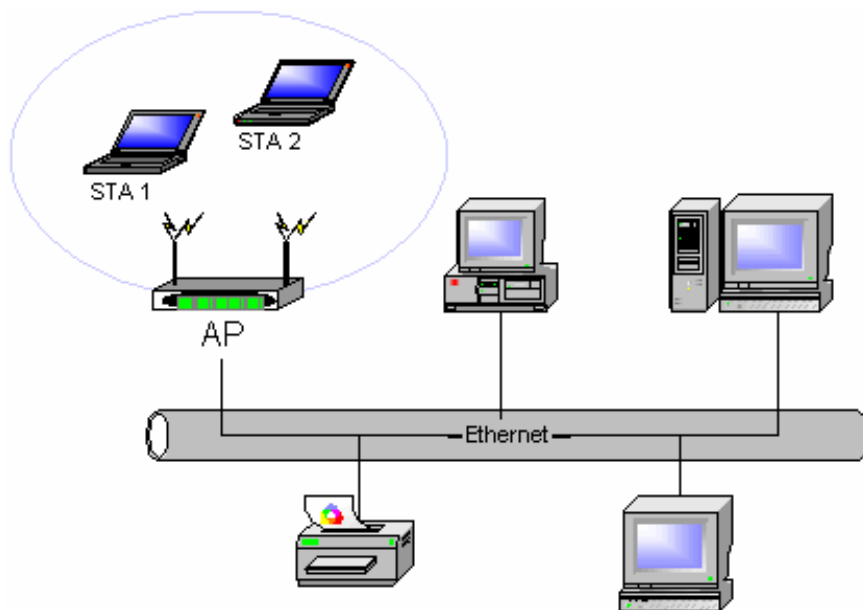


Figure 3-2 Access Point Network

You can use the LAN-Express IL IEEE 802.11 USB to communicate with 802.11g Access Points, 802.11b Access Points, or a combination of Access Point types. The USB is compatible with 802.11g and 802.11b Access Points from any vendor.

3.2.1 Roaming Among Multiple APs

For larger environments, the LAN-Express IL IEEE 802.11 USB may roam from one Access Point to another while maintaining the same network connection. The Access

Points establish coverage areas or cells similar in concept to those of a cellular phone network. The wireless USB adapter will connect to any Access Point that is within range. The LAN-Express IL IEEE 802.11 USB supports both roaming between APs of the same type (for example, from one 802.11b AP to another) and roaming between APs of different types (for example, from an 802.11b AP to an 802.11g AP). Figure 3-2 illustrates roaming between APs of different radio types:

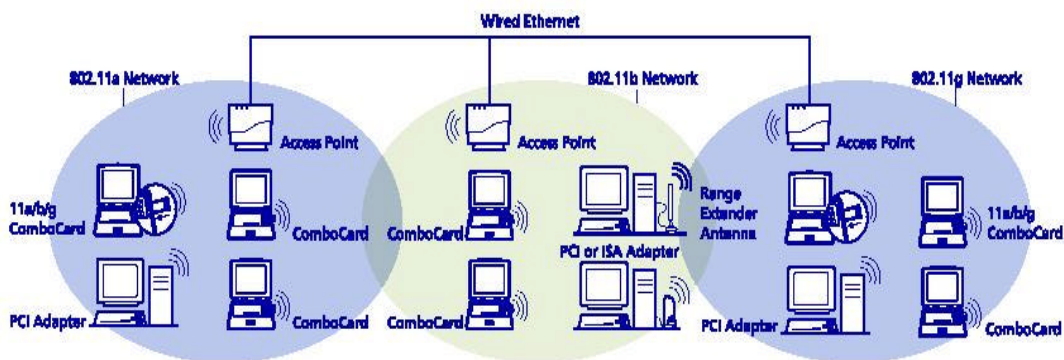


Figure 3-2 Roaming Between APs of Different Radio Types

As the mobile client seamlessly switches from cell to cell, its network connectivity is preserved. The user can move freely between the Access Points in the network. When the roaming client leaves the transmission range of one Access Point, the wireless USB adapter automatically detects the other Access Point(s) in the same vicinity to continue the network connection.

3.2.2 Roaming Principles

- A LAN-Express IL IEEE 802.11 USB can roam between 802.11 g Access Points and 802.11b Access Points.

- All 802.11b and 802.11g Access Points that a client will roam between must have the same Network Name. Depending on the Wireless Mode selection, a user can roam among 802.11g and 802.11b Access Points.
- All workstations with LAN-Express IL IEEE 802.11 USB installed must use either a Network Name of “any” or the same Network Name as the Access Points that they will roam between.
- All Access Points and LAN-Express IL IEEE 802.11 USB must have the same security settings to communicate.
- The Access Points’ cells must overlap to ensure that there are no gaps in coverage and to ensure that the roaming client will always have a connection available.
- Access Points installed in the same vicinity that use the same frequency band (2.4 GHz) should each use a unique, independent Channel to avoid potential interference.
- Access Points that use the same Channel should be installed as far away from each other as possible to reduce potential interference.

Chapter 4 Wireless Client Utility Configuration

The chapter introduces the Wireless Client Utility (WCU). The WCU provides quick access and friendly interface to configure the Wireless LAN settings. However, if you are using Windows XP and have not installed the Wireless Client Utility, [Configuring Your Wireless Networking Settings with Windows XP](#) contains information on how to configure your LAN-Express IL IEEE 802.11 USB using Windows XP Zero Configuration.

4.1 Wireless Client Utility icon

The Wireless Client Utility icon will appear in the Windows Taskbar (also known as the System Tray) each time your computer is restarted. Click the WCU icon to launch the utility.








Figure 4-1 Wireless Utility Icon

4.2 Link Indicators

The Wireless Client Utility icon will display the current status of the wireless connection. The following are different status displayed by the icon.

Table 4-1 Link Indicators Description

Indicator	Description
	Indicate the device is currently in excellent connection status.
	Indicate the device is currently in good connection status.
	Indicate the device is currently in poor connection status.
	Indicate the device is currently in very poor connection status.
	Indicate that the LAN-Express IL IEEE 802.11 USB has been disabled through either Hardware or Software.

4.3 Card Status tab

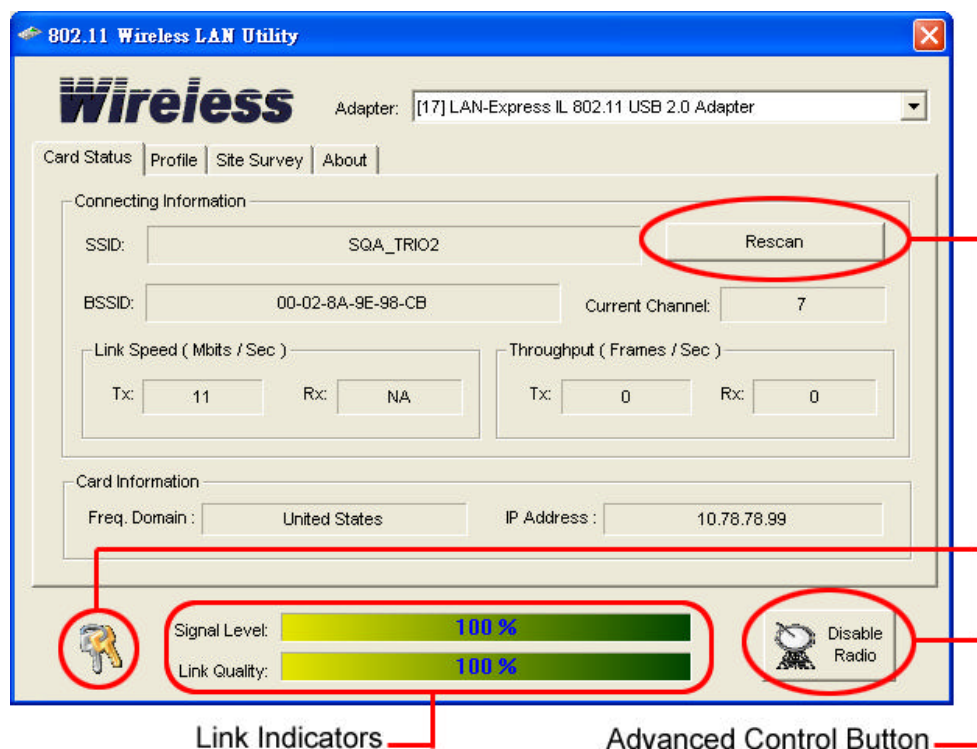


Figure 4-2 Status Tab Displays Current Wireless Connection

The Card Status tab is composed of two major parts: **Connecting Information** and **Card Information** as shown in Figure 4-2.

Connecting Information SSID (Service Set Identification) – It is also called "ESSID", "Group Name" or "Network Name". This field shows the Extended Service Set Identifier name that the wireless USB adapter is connected to.

BSSID (Basic Service Set Identifier) – This field displays the MAC address of the Access Point that the wireless USB adapter is currently associated to.

Current Channel – Specifies the current channel that the LAN-Express IL IEEE 802.11 USB is connecting to or scanning on.

Link Speed (Mbits/Sec)

- **TX** – Shows the transmission rate.
- **RX** – Shows the receiving rate.

Throughput (Frames/Sec): This field displays the current frame count of transmitting/receiving via radio.

Card Information:

- **Freq. Domain:** Shows which Frequency Domain you are in.
- **IP Address:** The current IP address of the LAN-Express IL IEEE 802.11 USB.

4.3.1 Link Indicators

The gauges on the bottom of WCU window, as Figure 4-2 illustrates, are **Link Indicators**. They represent the signal strength and connection quality, respectively.

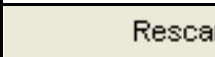



Signal Level: Indicates the strength of the signal received from access point. Signal Level would be higher when there is an access point nearby.

Link Quality: Indicates the quality of the signal received from access point.

4.3.2 Advanced Control Buttons

The four buttons on the Card Status screen are called **Advanced Control Button**. See the table below for details of the buttons.

Table 4-2 Description of Advanced Control Buttons

Figure	Description
 Rescan	Tell the wireless USB adapter to rescan and search the Access Point again. This button appears only on the Card Status Window as you only can rescan and search the Access Point under this window.
 Disable Radio	The wireless radio status is "On". To turn off the wireless radio, click the button.
 Disable Radio	The wireless radio status is "Off". To turn on the wireless radio, click the button.
	Indicates that the wireless device is working on security level.

4.4 Profile Management

The **Profile** page allows you to create the Wireless Profile for easy control over the wireless USB adapter. You can set up the wireless USB adapter to work in either **infrastructure mode** (Computer-to-Access Point) or **Ad-Hoc mode** (Computer-to-Computer, a group of stations participating in the WLAN).

4.4.1 Overview

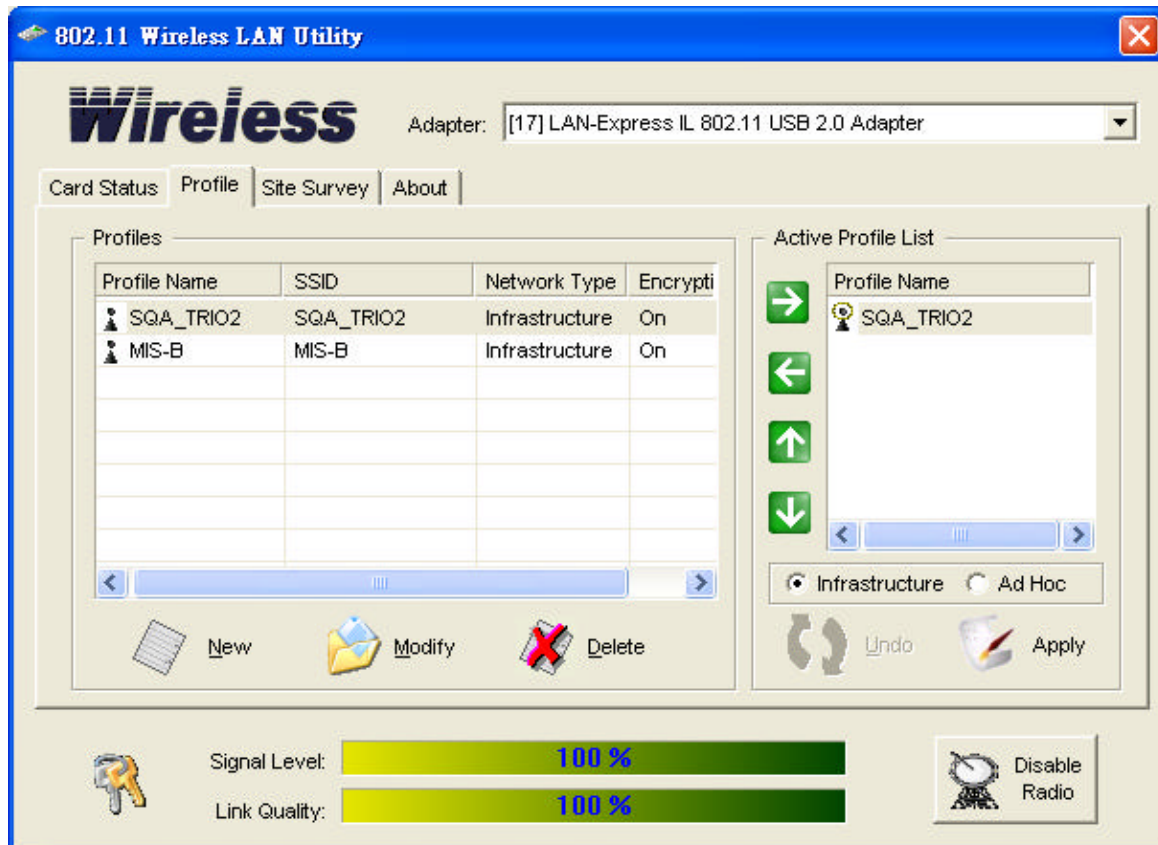


Figure 4-3 Profile Window Displays Detail of Active Profiles

The **Profile** tab allows the user to define multiple configuration profiles. Each profile can be configured to match the appropriate settings of a unique wireless network.

The **Profile** box lists all the configured profiles. It describes the basic settings (Profile Name, SSID, Network Type, Encryption) of the highlighted profile. The active profile will be displayed with the wireless icon next to it. You can add the Profile to "Active Profile List" by selecting the Profile and then clicking the Right-Arrow button. By this way, you can switch to different profile on the "Active Profile List" once the wireless connection drops.

Besides, you can connect to either "**Infrastructure**" network or "**Ad Hoc**" group by clicking the radio button of "Infrastructure" or "Ad Hoc".

See the table below for details of the three buttons on the "Profile" section.

Table 4-3 Description of Buttons on Profile Screen












 New	Create a New Profile setting. For detail, please refer to 4.4.2 Create and Modify a Profile.
 Modify	Modify the selected Profile. For detail, please refer to 4.4.2 Create and Modify a Profile.
 Delete	Click to delete the selected Profile. A confirmation dialog will appear as you click the button.

Table 4-4 Description of Direction Arrow / Connection Radio Button

	Add the selected Profile Name in Profiles to Active Profile List .
	Removed the selected Profile Name in Active Profile List .
	Put the selected Profile Name in Active Profile List to higher position and increase its priority to be connected with.
	Put the selected Profile Name in Active Profile List to lower position and decrease its priority to be connected with.

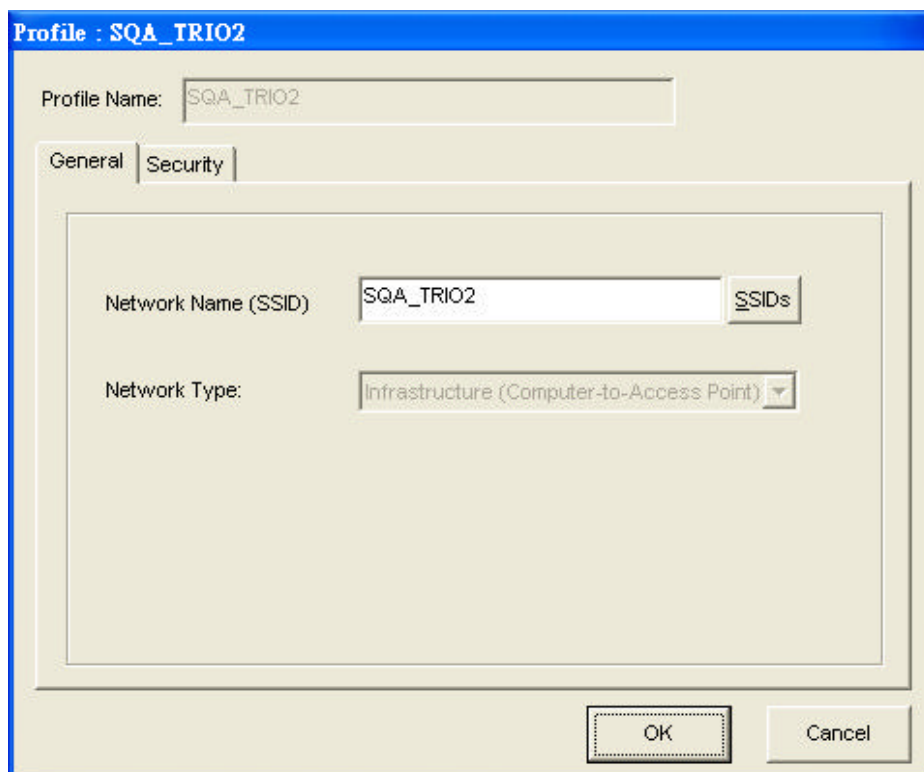
 Infrastructure  Ad Hoc	Check either radio button to decide the mode you wish to use.
 Apply	Click to activate the changes you made in the Active Profile List. Note: Changes cannot be applied when radio is disabled.
 Undo	Ignore the change and return back to the previous setting.

4.4.2 Create or Modify a Profile

From the “**Profile**” screen as shown in Figure 4-3, click the **New** or **Modify** button to create a new profile or modify an existing profile.

General Tab

The Profile Setting menu allows user to create the new Profile. Enter the Profile a unique name that describes the profile or the wireless network you want the wireless USB adapter to connect to first before creating the Profile.



The screenshot shows a dialog box titled "Profile : SQA_TRIO2". It has a "Profile Name:" field with the value "SQA_TRIO2". Below this are two tabs: "General" (selected) and "Security". The "General" tab contains a "Network Name (SSID)" field with the value "SQA_TRIO2" and a "SSIDs" button. Below that is a "Network Type:" dropdown menu showing "Infrastructure (Computer-to-Access Point)". At the bottom right are "OK" and "Cancel" buttons.

Figure 4-4 Profile Setting: General Information Setting

- **Profile Name** – Enter a unique name that describes the profile or the wireless network you want the wireless USB adapter to connect to.

- **Network Name (SSID)** –Service Set Identifier name. It can be up to 32 case-sensitive characters. You should have the same identifier name with wireless group that you want to connect to. In the Infrastructure Network, a blank SSID field is allowed and it refers to any and all SSIDs, which means the wireless USB adapter has the capability to connect to any available Access Point. You can also click the **SSIDs** button that is next to the box to view the available network.

- **Network Type**– You can choose two network type settings: Infrastructure Mode (Computer-to-Access Point) and Ad-Hoc Mode (Computer-to-Computer, a group of stations participating in the WLAN) from the drop-menu.

Click **OK** to activate the settings.

Security Tab

To prevent unauthorized access to the data that is transmitting through the network, the wireless USB adapter provides security services such as WEP (Wired Equivalent Privacy), WPA (Wi-Fi Protected Access) and 802.1x as static and dynamic security settings. Choose the security setting that matches the wireless network you want the wireless USB adapter to connect to. If you select **WPA** or **802.1x**, a drop-down menu to the right of the selection becomes available to allow you for additional configuration settings required by the selected security mode.



Mismatch security setting will cause the mal-function on your wireless device. Please contact your network administrator to obtain the information that is required for the network security dialogs.

4.5 Security Setting under Profile Screen

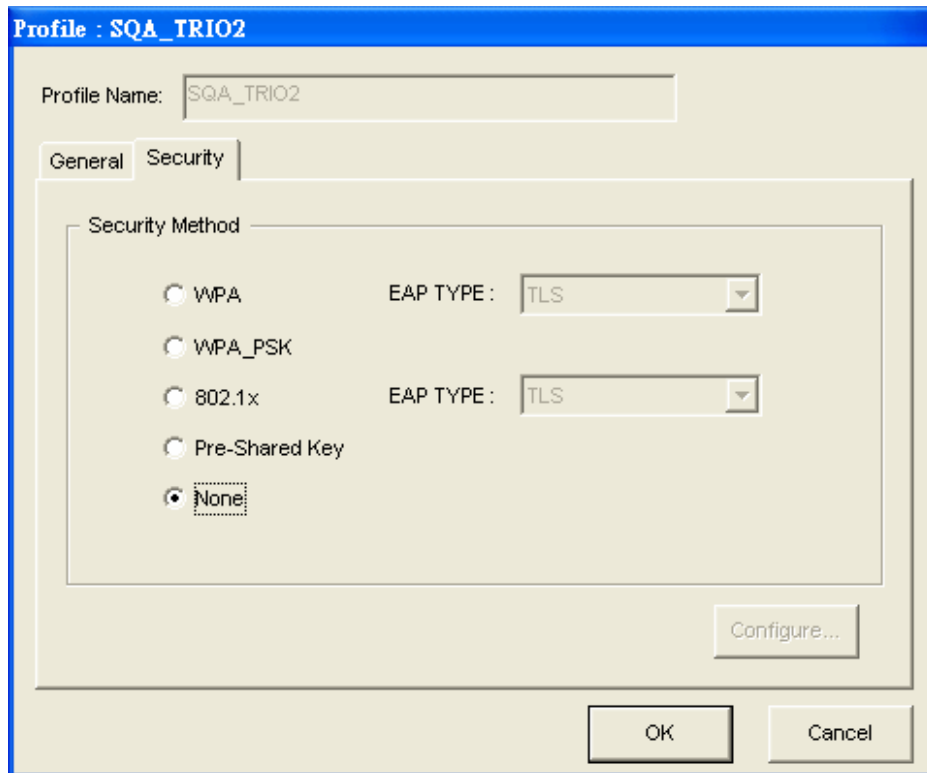


Figure 4-5 Security Setting for Profile

To enable the security service, select the proper radio button, security type and then click the "Configure..." button to configure the details.

- **WPA-** Wi-Fi Protected Access mode allows for the authentication and interoperability with enterprise class WPA enabled networks. This feature allows for authentication with networks that support the EAP-TLS or PEAP Extensible Authentication Protocol (EAP) types. For configuration, please refer to [4.5.1 Setting WPA Encryption](#).

- **WPA-PSK** – Wi-Fi Protected Access, Pre-Shared Key mode allows you to use WPA style authentication and encryption in a network that does not support EAP/802.1x authentication. For configuration, please refer to [4.5.2 Setting WPA PassPhrase](#).

- **802.1x** –This security mode allows the authentication of the user and/or the station to create a dynamic Wired Equivalency Key (WEP) key. EAP types supported by this mode are EAP-TLS and PEAP. For configuration, please refer to [4.5.1 Setting WPA Encryption](#).
- **Pre-Shared Key** –This mode is commonly referred to as IEEE 802.11 Wired Equivalency Privacy (WEP) encryption. For configuration, please refer to [4.5.3 Setting Pre-Shared Keys](#).
- **None** –Use this mode when there is no authentication or encryption enabled on the Wireless LAN network.

Click **OK** to save the profile.

4.5.1 Setting WPA Encryption

WPA is a new standard-based wireless security solution developed by the Wi-Fi Alliance. WPA also supports the WEP (Wired Equivalent Privacy) security standard. WPA encryption has two settings: **EAP-TLS** and **EAP-PEAP** authentication. Select either of them from the drop-down menu to the right of the WPA radio button.

EAP-TLS Authentication

The dialog box as shown in Figure 4-6 allows user to enter the authentication settings via EAP-TLS. Under EAP-TLS, the station and authentication server authenticate each other via an exchange of security certificates.

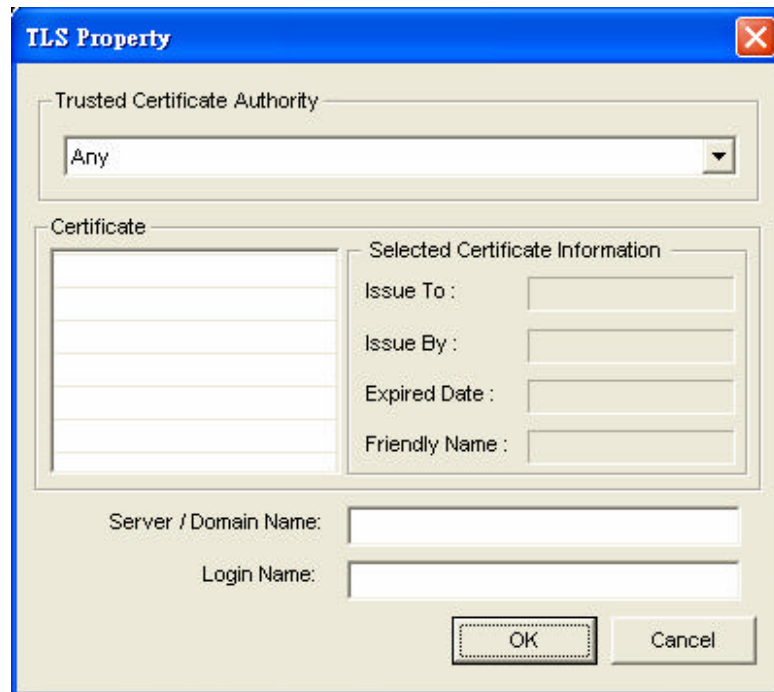


Figure 4-6 TLS Property Dialog Window

Trust Certificate Authority - This field allows the wireless USB adapter to verify the authentication server's certificate. If you accept any certificate, select the "Any" button. Otherwise, select a specific Certificate Authority that must be the Trusted Root Certificate Authority as the authentication's certificate.

Certificate - Allows the selection of any one of the certificates currently stored in the user's personal certificate database.

Server/Domain Name - This field restricts which authentication servers the wireless USB adapter is allowed to connect to. Enter a domain name to restrict and authenticate servers from that specific domain.

Login Name - This field is transmitted to the authentication server for referential purposes only. The server's authentication log file will record your login account information.

PEAP Authentication

The dialog box shown in Figure 4-7 allows user to enter the authentication settings via PEAP. Under PEAP type authentications, a virtual secure tunnel is created using the authentication server's digital certificate. Within this tunnel, the authentication server will authenticate user's security credentials.

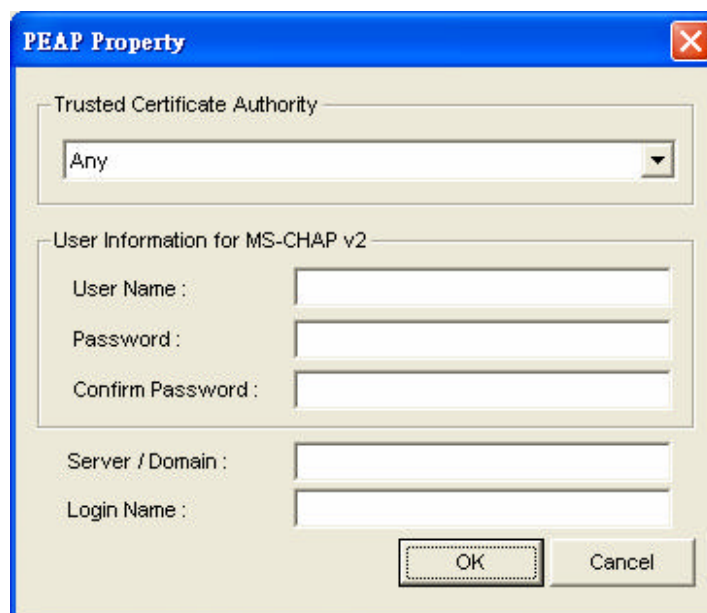


Figure 4-7 PEAP Property Setting Window

Trusted Certificate Authority - This field allows the Client Utility to verify the authentication server's certificate. If you will accept any server's certificate, select the "<Any>" item. Otherwise, select the specific Certificate Authority that must be the Trusted Root Certificate Authority for the authentication server's certificate.

User Name/Password - These fields are the user's security credentials that are used by an authentication server.

Server/Domain - This field restricts which authentication servers the wireless USB adapter is allowed to connect to. Enter a domain name to restrict and authenticate servers from that specific domain.

Login Name - This field is transmitted to the authentication server for referential purposes only. The server's authentication log file will record your login account information

4.5.2 Setting WPA PassPhrase

WPA-PSK (with no server) uses the so-called “pre-shared key” as the security key. A pre-shared key is basically a password that is between eight and 63 characters long. It can be any combination of letters, numbers, and other characters. This is the typical mode that is used in a home environment. WPA-PSK is a lightweight 802.1x type authentication that uses a shared secret ASCII based passphrase known by both the access point and station. To enable WPA with a passphrase (WPA-PSK), select “WPA-PSK” from the Security Options list and click OK to configure the setting.

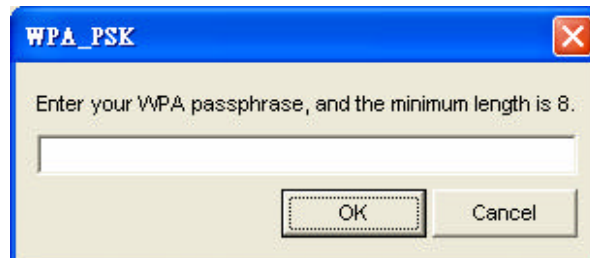


Figure 4-8 WPA-PSK Setting

4.5.3 Setting Pre-Shared Keys

This mode is commonly referred to as IEEE 802.11 Wired Equivalency Privacy (WEP) encryption. Pre-Shared Key setting dialog window, as Figure 4-9 shows, will appear as you click <configure...> button on the security tab under the Profile setting when the Pre-Shared Key radio button is checked.

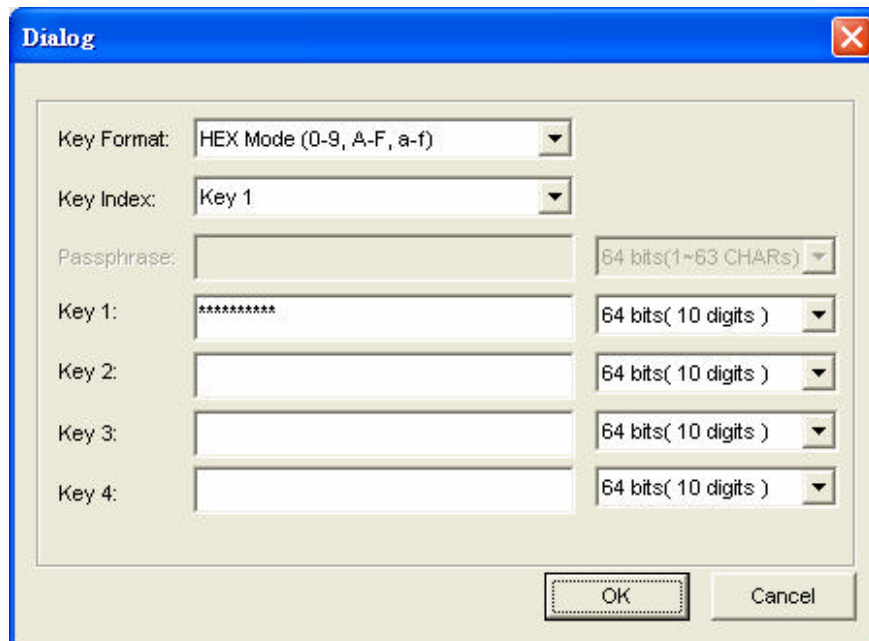


Figure 4-9 Pre-Shared Key Dialog Screen

Key Format – Determines the entry method for an encryption key:

- Hexadecimal (0-9, A-F)
- ASCII text (any keyboard characters, a-z, A-Z, 0-9)

Key Index – This is the key the wireless USB adapter uses to encrypt the data. It can be selected from the value Key 1 to Key 4.

Key 1-4 – Encryption key values. The key length depends on what Key Format is selected.

- 64 bit encryption (5-digit keys in ASCII Mode or 10 digits in HEX mode)
- 128 bit encryption (13-digit keys in ASCII Mode or 26 digits in HEX mode)

The number of characters that may be entered in the encryption key field will be automatically determined by the Key length setting.

4.6 Site Survey

The Site Survey as shown in Figure 4-10 provides a powerful capability to scan and list all the wireless group information within the radio coverage range.

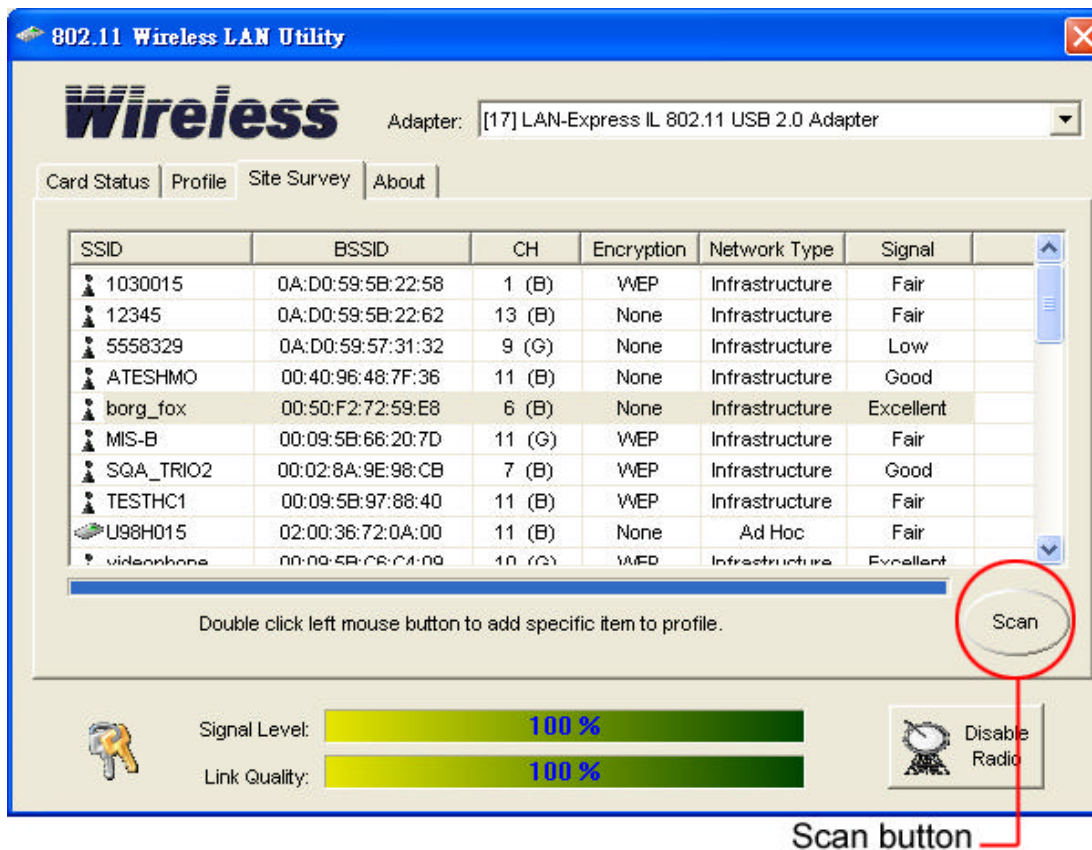


Figure 4-10 Site Survey Screen

Press the **Scan button** (the circled button shown in Figure 4-10) to collect the wireless group information. It includes the ESSID, BSSID, Channel allocation, Encryption Status, Network Type and Signal Level.

Highlight the list and double-click the selected item. You will then be allowed to add the new wireless Profile with corresponding parameters to the active profile list.

4.7 About

The **About** window as shown in Figure 4-11 displays the information of Driver, Utility, and Firmware. You may detect the signal strength and the link quality from the two black graphics.

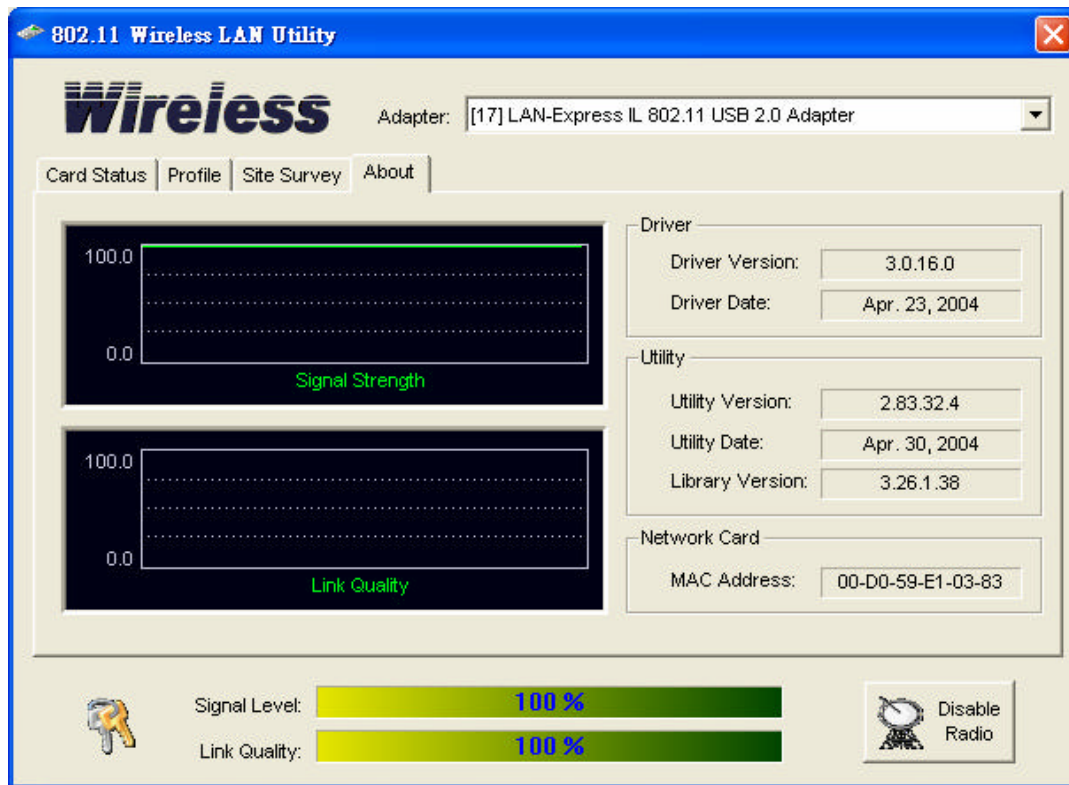


Figure 4-11 About Screen

Driver:

Displays the current driver information of the wireless USB adapter.

Utility:

Displays the current wireless configuration utility information.

Network Card:

Displays the MAC address of the wireless USB adapter.

4.8 Disable WPA Configuration under Window XP

The Windows XP operating system provides the built-in WZCS to configure the wireless device. Therefore, in order not to conflict the WZCS function, the Profile function on Wireless LAN Utility will be disabled once the utility detects the existence of the WZCS.

In order to enable the wireless Profile function on Windows XP platform, the WZCS function should be disabled in advance. Figure4-12 displays the GUI on the Windows XP with the Wireless Networks Property. To disable the WZCS function, uncheck the box of "Use Windows to configure my wireless network setting" on Wireless Networks page and then click the "OK" button to active the change.

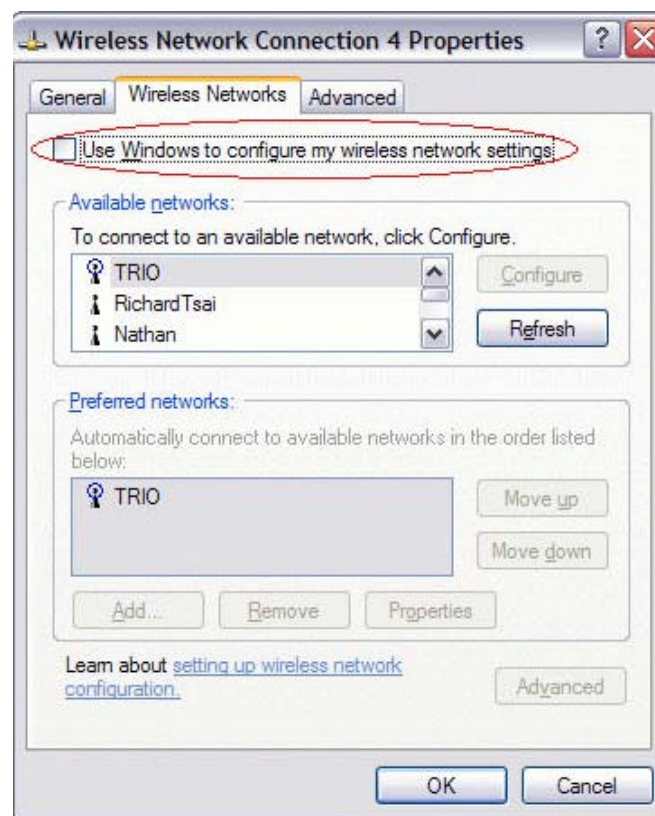


Figure 4-12 Disable the Configuration Ability under Windows XP

4.9 Setting Up WPA in Windows XP

However, you may set up WPA in Windows XP if you wish.

Follow the instructions below to set up WPA in “Windows wireless network utility”. The screenshots may vary slightly according to different utility installed on your computer.

Under Windows XP, click “Start > Control Panel > Network Connections”.

Right-click on “Wireless Network Connection”, and select “Properties”.

Clicking on the “Wireless Networks” tab will display the following screen. Ensure the “Use Windows to configure my wireless network settings” box is checked.

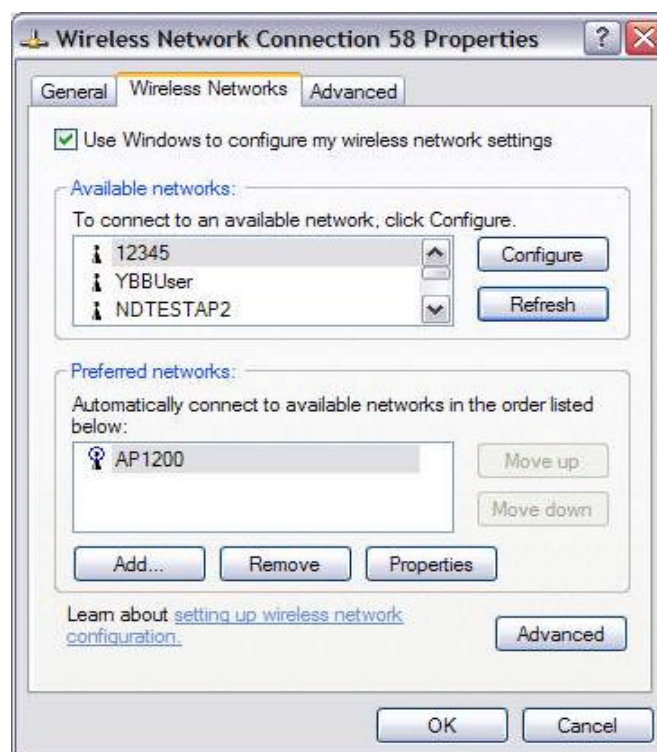


Figure 4-13 Configure Wireless Network Connection under Windows XP

Under the “Wireless Networks” tab, click the “Configure” button and you will see the screen

below.



Figure 4-14 Set Authentication for Wireless Network Connection

Select "WPA" under "Network Authentication".

Select "TKIP" or "AES" under "Data Encryption". This setting has to be identical to the Access Point that you set up.

For Home or Small Business User, you may select "WPA-PSK" under "Network Authentication". Then enter your encryption key in the "Network Key" box. It can be from eight to 63 characters and can be letters, numbers, or symbols. You must use the very same key on all the clients that you set up. If you are using this computer to connect to a corporate network that includes a RADIUS server, consult your network administrator for further

information.

Click “OK” to apply settings.

The following is an example of setting WPA under the TLS mode of Dynamic Security for business users. You may also set the authentication under the PEAP mode that matches your specific environment.

Click the “Authentication” tab. Select “*Smart Card or other Certificate*” under “EAP type” and you will see the following screen.



Figure 4-15 Set WPA Authentication Mode under Windows XP

Click “*Properties*” and “OK” to go to the following screen. You can check the proper boxes that

match your specific environment.

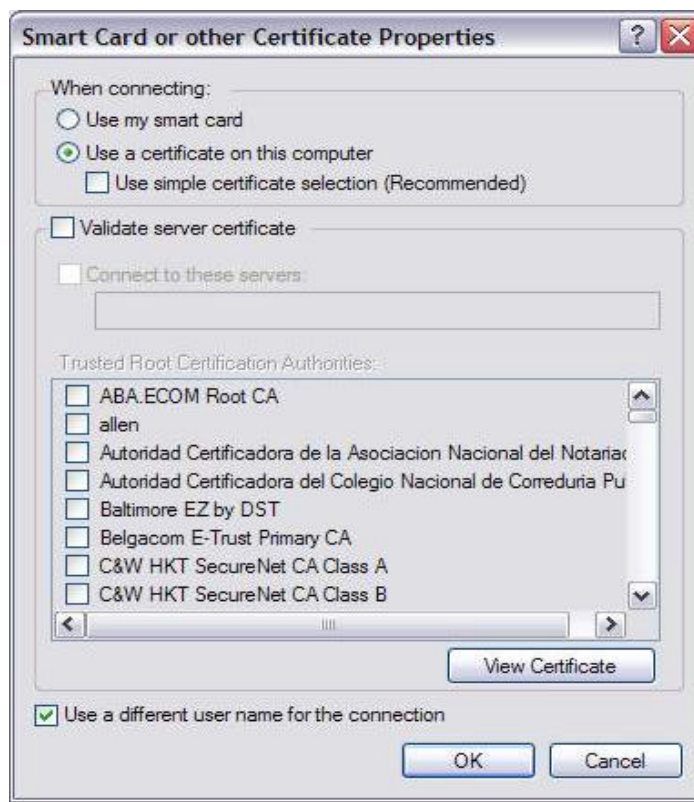
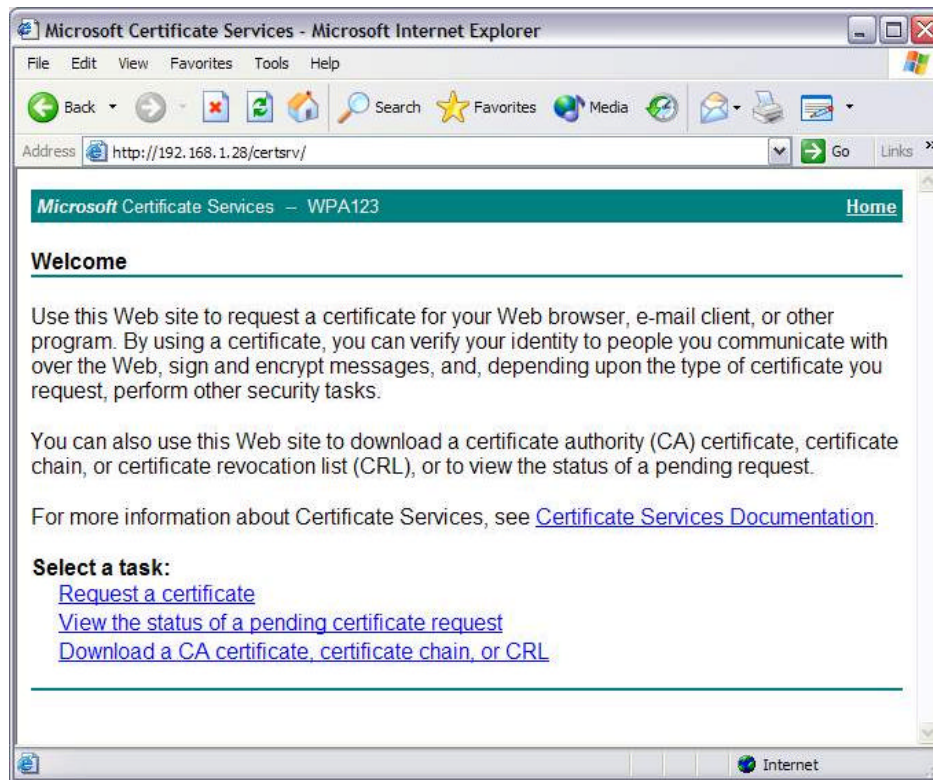


Figure 4-16 Define Certificate Properties

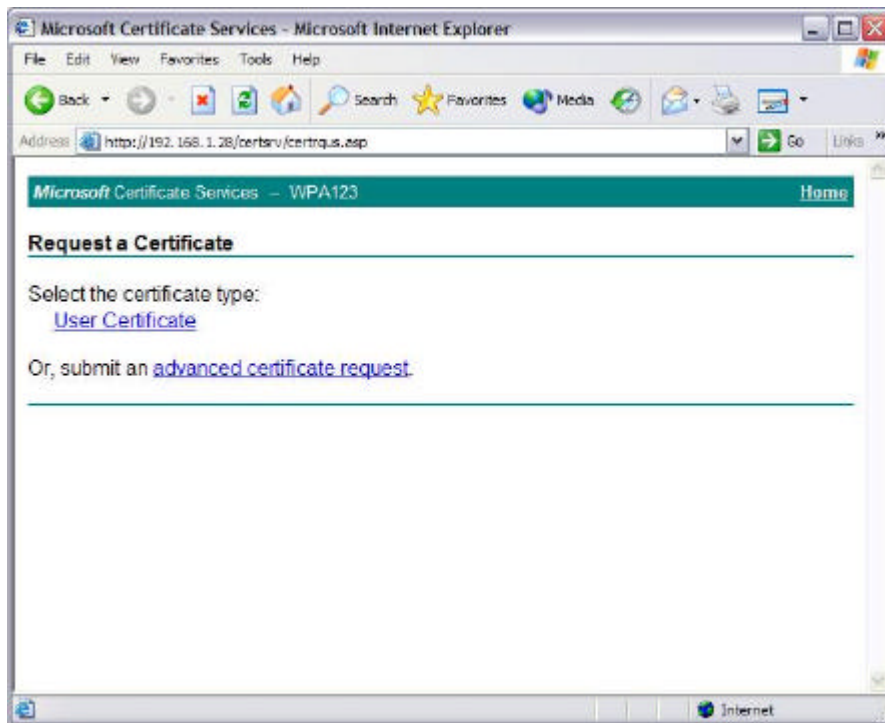
4.10 Load a Certification to Your Computer

Contact your network administrator for assistance if you do not have a certificate installed on your computer or do not know which one to use. Here is an example of loading a certification to your computer under the **Windows Server 2003 and Microsoft Certificate Service**.

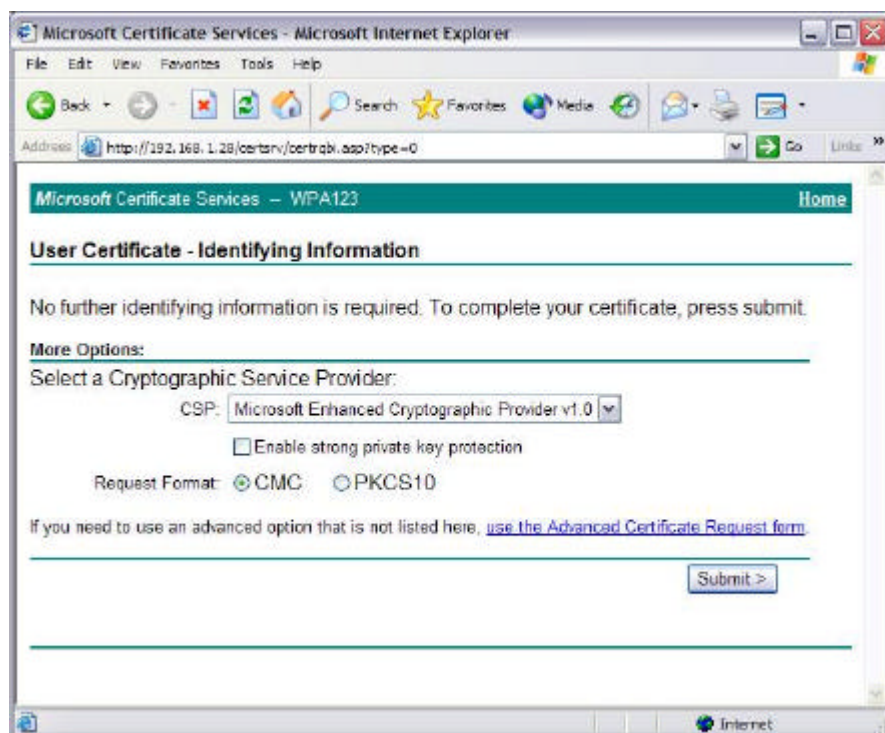
Go to the "Welcome" page and select "Request a certificate".



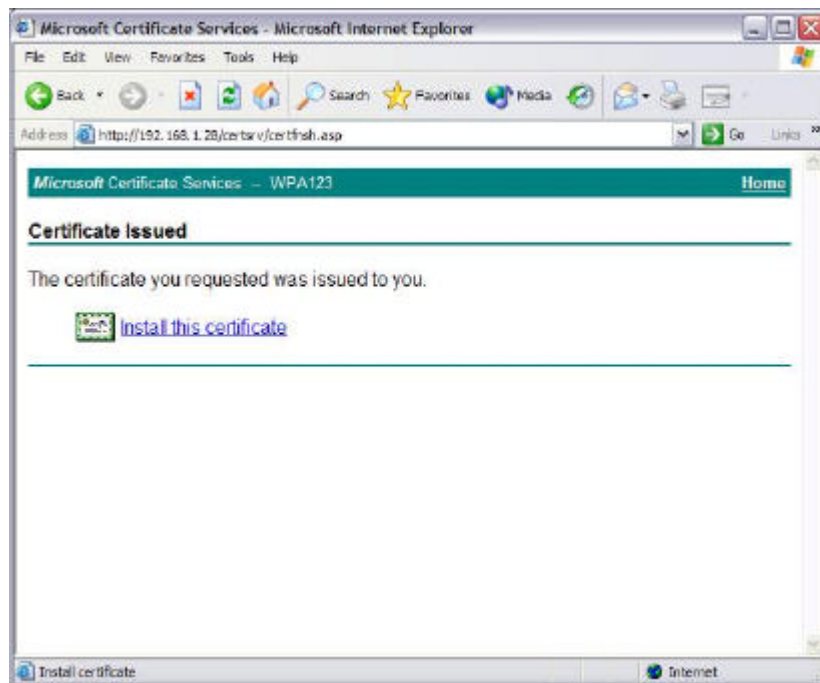
When the "Request a Certificate" screen appears, click on the "User Certificate" to continue.



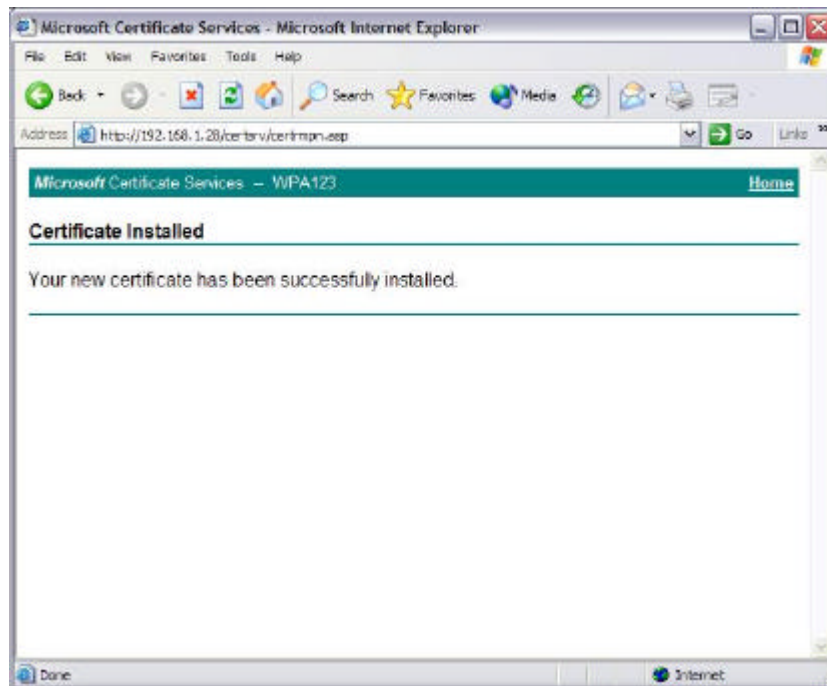
Select a Cryptographic Service Provider that matches the settings in your computer.



Wait for the Microsoft Certificate Services to issue the certificate to you.



Certificate installed successfully.



4.11 Configuring Your Wireless Networking Settings with Windows XP

The Windows XP operating system has a built-in feature known as “Wireless Zero Configuration” which has the capability to configure and control this Wireless LAN device. Follow the steps below to configure your device.

From the Start menu, select **Control Panel**.

Click Network and Internet Connections.

Click Network Connections.

Right-click the network connection associated with your LAN-Express IL IEEE 802.11 USB and select **Properties**.

Click the Wireless Networks tab.

Click the link Setting Up Wireless Network Configuration.

When the Help and Support Center window appears, you can access information regarding Wireless Network configuration. Follow the on-screen instructions to access configuration information for your adapter.

4.11.1 Help and Support Information

Configuration information and troubleshooting in Windows XP is available in Microsoft's Help and Support Center on Windows XP systems. Links to the appropriate Microsoft Web sites are also available here.

To access this information:

From the **Start** menu, select **Control Panel**.

Click Network and Internet Connections.

Click Network Connections.

Right-click the connection for your LAN-Express IL IEEE 802.11 USB, and select **Properties**.

From the **General** tab, click the **Configure** button.

From the **General** tab, click the **Troubleshoot** button.

When the Help and Support Center window appears, you can access information regarding the Network adapter. To access configuration information for your adapter, follow the on-screen Instructions. For the network adapter to function in a wireless LAN, you may need change the settings per the requirement of network environment.

Chapter 5 Troubleshooting

The LAN-Express IL 802.11 USB is designed to be very easy to install and operate. However, if you experience any difficulties, use the information in this chapter to help diagnose and solve the problem.

5.1 Common Installation Problems

[Installation](#) describes how to install an LAN-Express IL IEEE 802.11 USB in a computer running Windows 98 Second Edition (SE), Windows Millennium Edition (ME), Windows 2000, or Windows XP. This section provides suggestions to resolve some of the common installation problems with a LAN-Express IL 802.11 USB.

5.1.1 Device Not Installed Properly

If Windows Networking reports that the LAN-Express IL IEEE 802.11 USB has not been properly installed or configured after you have completed the Installation program, open the Device Manager (found within the Control Panel's System icon) and locate the wireless USB adapter's entry in the Network adapters category. If a yellow exclamation point ("!") appears next to the wireless USB adapter's Device Manager entry, then the wireless USB adapter is not working properly. Follow these steps:

Uninstall the wireless USB adapter as described in Chapter 2 Installation

Reinstall the wireless USB adapter following the instructions in [Installation](#).

5.2 Configuring Networking Clients and Protocols

An LAN-Express IL 802.11 USB will bind to any existing networking components, such as Client for Microsoft Networks and the Internet Protocol (TCP/IP). Refer to the steps below that correspond to your computer's operating system to configure the wireless USB adapter's networking components.

5.2.1 Windows XP/2000

Follow these steps to configure the USB's networking clients and protocols in a Windows XP or 2000 computer:

Open the Control Panel's **Network and Dial-up Connections** (Windows 2000) or **Network Connections** (Windows XP) icon.

Scroll through the list of network connections and right-click the Local Area Connection that corresponds to the LAN-Express IL 802.11 USB.

Select **Properties** from the drop-down menu to view the connection's properties screen.

Select a client or protocol from the list of components and click **Properties** to configure its settings. For example, if you want to assign the wireless USB adapter a static IP address, highlight **Internet Protocol (TCP/IP)** and click **Properties**.



To add a new client or protocol, click **Install...** and follow the on-screen instructions.

5.2.2 Windows ME/98 SE

Follow these steps to configure a wireless USB adapter's networking clients and protocols in a Windows 98/ME computer:

Open the Control Panel's **Network** icon.

Select a client or protocol from the list of installed components and click **Properties** to configure its settings. For example, if you want to assign the LAN-Express IL 802.11 USB a static IP address, highlight ***TCP/IP or TCP/IP -> LAN-Express IL 802.11 USB and click Properties.***



To add a new client or protocol, click **Add...** and follow the on-screen instructions.

5.3 Range

Every environment is unique with different obstacles, barriers, materials, etc., and, therefore, it is difficult to determine the exact range that will be achieved without testing. Radio signals may reflect off of some obstacles or be absorbed by others depending on their construction.

The IEEE 802.11 standards support multiple data rates that correspond to different transmission techniques. For wireless devices, there is a trade-off between range and data rate. Transmission techniques that provide high data rates operate over short distances; techniques that provide slower data rates operate over greater distances. By default, the LAN-Express IL 802.11 USB automatically switches between these data rates to maintain a usable radio connection and achieve the best data rate based on the wireless USB

adapter's distance from the Access Point. Therefore, a client that is close to an Access Point will operate at a higher data rate than a client that is farther away from the Access Point.

The LAN-Express IL 802.11 USB includes two integral omni-directional antennas. Note that the coverage footprint of the USB's antennas will vary depending on the laptop's design and the location of the USB connector in the computer. Two antennas are provided to support antenna diversity, a technique which can improve system reliability. Due to the characteristics of radio waves, it is possible that one antenna may provide better performance than a second antenna installed a short distance away.

Proper antenna placement can help improve range. Here are some guidelines:

Try to keep the wireless USB adapter antennas free of obstructions (particularly metal objects) and do not place a sheet of metal (like a filing cabinet) between the antennas of two 802.11 devices.

Use the Wireless Client Utility to evaluate the signal strength and link quality between 802.11 devices.

Refer to the documentation that came with your Access Points for suggestions on how to locate the AP and its antennas to maximize range and performance.

5.4 LED Indicators

The blue LED on the LAN-Express IL 802.11 USB, as shown in the Figure 5-1 on next page, indicates the current connection status.

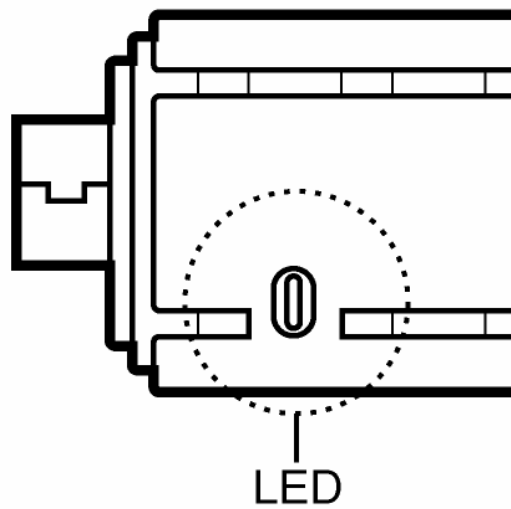


Figure 5-1 LED indicator

The following table depicts the three behaviors of the LED.

Table 1-1 Table of LED behavior

Behavior	Description
On	Network connection is active, The device is transmitting or receiving data
Off	The radio is disabled.
Blinks	The device is searching for the available wireless network connection

Chapter 6 Specifications

The following technical specification is for reference purposes only. Actual product's performance and compliance with local telecommunications regulations may vary from country to country. Wireless Corporation will only ship products that are type approved in the destination country.

6.1 General

Compatibility	Fully interoperable with IEEE 802.11b and 802.11g compliant products in 802.11b and 802.11g mode.
LED Indicator	One LED indicates Power On, Transmit Activity, Association, and Power Off
Host Interface	USB 2.0

6.2 Network Information

Security	RC4 WEP 64(40-bit key)/128(104-bit key)
Network Architecture	Supports Ad Hoc Peer-to-Peer Groups and communication to wired infrastructure networks via Access Points.
Installation & Diagnostics	Complete configuration utility application included. Utility's site survey tool, surveys other wireless units and reports packet throughput; Desktop icon continuously reports status
Operating System Support	Windows 98SE/ ME /2000/XP
Roaming	Seamless among 802.11b compliant access points (in 802.11b/g modes) and 802.11g compliant access points (in 802.11g mode)

6.3 Radio Specification

Antenna	Planar Antenna
Antenna Gain	1.09 dBi
Output Power	IEEE 802.11b: ± 3 dBm 17dBm @ 1/2/5.5/11 Mbps
	IEEE 802.11g: ± 3 dBm 13dBm @ 54Mbps 15dBm @ 48/24/36Mbps 16dBm @ 12/18bps 17dBm @ 6/9Mbps
Sensitivity	IEEE 802.11b: sensitivity @ Packet Error Rate: 8% <ul style="list-style-type: none"> ● 11Mbps: --80dBm ● 5.5Mbps: -83dBm ● 2Mbps: -84dBm ● 1Mbps: -87dBm
	IEEE 802.11g: sensitivity @ Packet Error Rate: 10% <ul style="list-style-type: none"> ● 54Mbps: -65dBm ● 48Mbps: -66dBm ● 36Mbps: -70dBm ● 24Mbps: -72dBm ● 18Mbps: -77dBm ● 12Mbps: -79dBm ● 9Mbps: -81dBm ● 6Mbps: -82dBm
Modulation	IEEE 802.11b (DSSS) <ul style="list-style-type: none"> ● 5.5/11 Mbps (CCK) ● 2 Mbps (DQPSK) ● 1 Mbps (DBPSK)

	IEEE 802.11g (OFDM/DSSS) <ul style="list-style-type: none"> ● 48/54 Mbps (QAM-64) ● 24/36 Mbps (QAM-16) ● 12/18 Mbps (QPSK) ● 6/9 Mbps (BPSK)
Range Coverage	IEEE 802.11b <ul style="list-style-type: none"> ● 11Mbps: 80 meter ● 5.5Mbps: 120 meter ● 2Mbps: 200 meter ● 1Mbps: 300 meter
	IEEE 802.11g <ul style="list-style-type: none"> ● 54Mbps: 60 meter ● 48Mbps: 70 meter ● 36Mbps: 80 meter ● 24/18Mbps: 120 meter ● 12/9/6Mbps: 120 meter
Operating Frequency	IEEE 802.11b/g ISM Band <ul style="list-style-type: none"> ● USA(FCC): 2.412GHz~2.462GHz(CH1~CH11) ● Europe(ETSI): 2.412 GHz~2.472GHz (CH1~CH13) ● Japan(TELEC): 11b/g:2.412GHz~2.472GHz(CH1~CH13)

6.4 Environmental Restrictions

Operating Temperature	0° C to +55° C
Storage Temperature	- 20° C to +80° C
Operating Humidity	90% non-condensing
Storage Humidity	5% to 90% non-condensing

6.5 Physical Features

Operating Voltage	DC 5V \pm 5%
Weight	35 g
Dimension	82.5 mm x 25.2 mm x12 mm

6.6 Power Consumption

802.11b	TX: 480 mA
	RX: 430 mA
802.11g	TX: 480 mA
	RX: 430 mA

Chapter 7 Regulatory Information

7.1 Regulatory Information

USA – Federal Communication Commission (FCC)

FCC Class B Statement

This device complies with Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

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

FCC RF Safety Requirement

The radiated output power is far below the FCC radio frequency exposure limits.

- (1) Shielded cables, if any, must be used in order to comply with the emission limits.
- (2) Any change or modification not expressly approved by the grantee of the equipment authorized could void the user authority to operate the equipment.

7.2 FCC WARNING

This equipment has been tested and found to comply with the limits for a Class B digital
Chapter 7 Regulatory Information 59

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 the receiver.

Connect the equipment into an outlet on a circuit different from that 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, and (2) this device must accept any interference received, including interference that may cause undesired operation.

WARNING For your health sake, please keep at least 20 cm away from your Notebook LCD Panel while using wireless LAN.

Chapter 8 Glossary

WCU - Wireless Client Utility (WCU); the utility that configures the LAN-Express IL IEEE 802.11 USB.

WPA - Wi-Fi Protected Access mode allows for the authentication and interoperability with enterprise class WPA enabled networks. This feature allows for authentication with networks that support the EAP-TLS or PEAP Extensible Authentication Protocol (EAP) types.

Access Point - An internetworking device that seamlessly connects wired and wireless networks together.

Ad Hoc - A peer- to-peer wireless network without Access Point. A group of wireless clients consistent an independent wireless LAN.

Backbone - The core infrastructure of a network, the portion of the network that transports information from one central location to another central location. The information is then off-loaded onto a local system.

BSS - Basic Service Set. An Access Point 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.

ESSID – Extended Service Set Identifier The length of the ESSID information is between 0 and 32 octets. A 0 length identifier indicates the broadcast SSID.

Ethernet - A popular local area data communications network, originally developed by Xerox Corp., which accepts transmission from computers and terminals. Ethernet operates on 10/100 Mbps transmission rate over shielded coaxial cable or over shielded twisted pair

telephone wire.

Infrastructure - An integrated wireless and wired LAN is called an infrastructure configuration.

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.

SSID – Service Set Identifier (SSID) is the network name used by the Wireless LAN. The length of the SSID information is between 0 and 32 octets.

USB – Universal Serial Bus

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