



U S E R ' S M A N U A L

T60H677

Mini-PCI Type IIIB 802.11a/b WLAN CARD

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Section One: Introduction

Ambit Wireless Mini-PCI Module complied with IEEE 802.11a/b Standard, it can be used to provide a variety of low-cost wireless network interface card to connect your wireless LAN via fitting into the Mini-PCI Type III slot. The Wireless Mini-PCI Module that complies with this specification and combines networking with high-speed Internet access will let people connect to the Internet anywhere, anytime.

With seamless roaming, fully interoperability and advanced security with WEP standard, Wireless Mini-PCI Module can allow user to switch to different vendors' Access Points through the wireless networks and to prevent from eavesdropping.

1-1 Features

1.1.1 Wireless LAN Function

802.11a

| | |
|---------------------------------|---|
| Wireless LAN Compliance | IEEE 802.11a |
| Operating Frequency | 5.15~5.25GHz (lower band) for US/Canada/Japan 5.25~5.35GHz (middle band) for US/Canada 5.725~5.825GHz (high band) for US |
| Modulation Schemes | OFDM, QPSK, BPSK, 16-QAM and 64-QAM |
| WLAN Data Rate | 54Mbps with fall back rates of 48, 36, 24, 18, 12, 9, and 6Mbps |
| Media Access Protocol | CSMA/CA with ACK |
| Transmitter Output Power | Typical 12 dBm for 54, 48Mbps of 5.15 to 5.35GHz Typical 12 dBm for 48Mbps of 5.725 to 5.825GHz Typical 10 dBm for 54Mbps of 5.725 to 5.825GHz Typical 15 dBm for 36, 24, 18, 12, 9, 6Mbps |
| Receiver Sensitivity | UNII low and middle band (5.15 to 5.35GHz) Typical -70 dBm for 54Mbps @ 10% PER |

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Typical -72 dBm for 48Mbps @ 10% PER

Typical -78 dBm for 36Mbps @ 10% PER

Typical -81 dBm for 24Mbps @ 10% PER

Typical -83 dBm for 18Mbps @ 10% PER

Typical -85 dBm for 12Mbps @ 10% PER

Typical -87 dBm for 9Mbps @ 10% PER

Typical -87 dBm for 6Mbps @ 10% PER

UNII high band (5.725 to 5.825GHz)

Typical -63 dBm for 54Mbps @ 10% PER

Typical -71 dBm for 48Mbps @ 10% PER

Typical -78 dBm for 36Mbps @ 10% PER

Typical -81 dBm for 24Mbps @ 10% PER

Typical -83 dBm for 18Mbps @ 10% PER

Typical -85 dBm for 12Mbps @ 10% PER

Typical -87 dBm for 9Mbps @ 10% PER

Typical -87 dBm for 6Mbps @ 10% PER

Current Consumption

600mA at transmit mode (typically)

330mA at receive mode (typically)

20mA at normal power saving mode (typically)

10mA at maximum power saving mode (typically)

802.11b

| | |
|----------------------------|---|
| Radio Technology | IEEE 802.11b Direct Sequence Spread Spectrum |
| Operating Frequency | 2412 ~ 2462MHz ISM band |
| Modulation Schemes | DQPSK, DBPSK and CCK |
| Channel Numbers | IEEE 802.11b compliant 11 channels for United States 13 channels for Europe Countries |

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| | |
|---------------------------------|--|
| | 14 channels for Japan |
| Data Rate | 11Mbps with fall back rates of 5.5, 2, and 1Mbps |
| Spreading | 11-chip Barker Sequence |
| Media Access Protocol | CSMA/CA with ACK |
| Transmitter Output Power | 15dBm typically |
| Receiver Sensitivity | Typical -83dBm for 11Mbps @ 8% PER Typical -85dBm for 5.5Mbps @ 8% PER Typical -86dBm for 2Mbps @ 8% PER Typical -90dBm for 1Mbps @ 8% PER |
| Current Consumption | 500mA at transmit mode (typically) 350mA at receive mode (typically) 40mA at normal power saving mode (typically) 30mA at max power saving mode (typically) |

1-2 FCC Notice

U.S. Regulatory Wireless Notice

This device complies with Part 15 of the FCC Rules. This product emits radio frequency energy, but the radiated output power of this device is far below the FCC radio frequency exposure limits. Nevertheless, the device should be used in such a manner that the potential for human contact with the antenna during normal operation is minimized.

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

- 1) The antenna must be installed such that 20 cm is maintained between the antenna and users. For laptop installations, the antenna must be installed to ensure that the proper spacing is maintained in the event the users places the device in their lap during use (i.e. positioning of antennas must be placed in the upper portion of the LCD panel only to ensure 20 cm will be maintained if the user places the device in their lap for use) and
- 2) The transmitter module may not be co-located with any other transmitter or

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antenna.

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 ASDL modems, certain laptop configurations, and similar equipment).

The final end product must be labeled in a visible area with the following: "
FCC ID: MCLT60H67703"

Additional Information That must be Provided to OEM Integrators

The end user should NOT be provided any instructions on how to remove or install the device.

USA Radio Frequency Interference Requirements

FCC Regulations Part 15 Declaration of Conformity (DoC)

Ambit Microsystems Corporation declares that the equipment described in this document is within the requirements of the Code of Federal Regulations listed below:

Title 47 Part 15, Subpart B, Class B for a digital device.

This declaration is based upon the compliance of the Wireless LAN Mini PCI Adapters to the above standards. Ambit has determined that the models listed have been shown to comply with the applicable technical standards if no unauthorized change is made in the equipment and if the equipment is properly maintained and operated. The hardware or software can not be replaced or modified by any third party other than Ambit. Changes or modifications not expressly approved by Ambit could void the user's authority to operate the equipment.

These units are identical to the units tested and found acceptable with the applicable standards. Records maintained by Ambit continue to reflect that units being produced under this Declaration of Conformity, within the variation

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that can be expected due to quantity production and tested on a statistical basis, continue to comply with the applicable technical standards.

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Section Two: Wireless Lan Installation

2-1 System Requirements

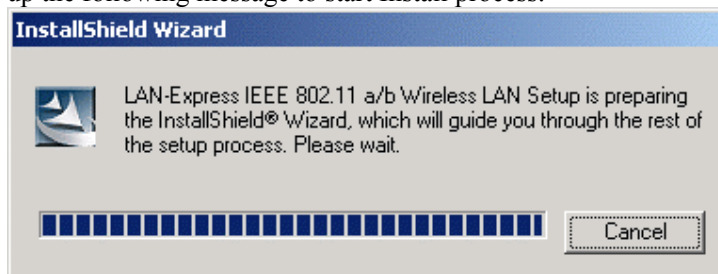
In order to install Wireless LAN driver and Utility and use the Wireless LAN card in your notebook computer. Your notebook system must meet the following requirements:

- Ambit Mini-PCI Wireless LAN Card already inserted
- Windows 98SE,2K,ME,XP OS Support

2-2 Installation and Uninstall Process

Install Wireless LAN (Windows 98/2K/ME/XP)

1. While starting the Windows system, if it detect the 802.11 a/b card exist, then it will pop up the following message to start Install process.

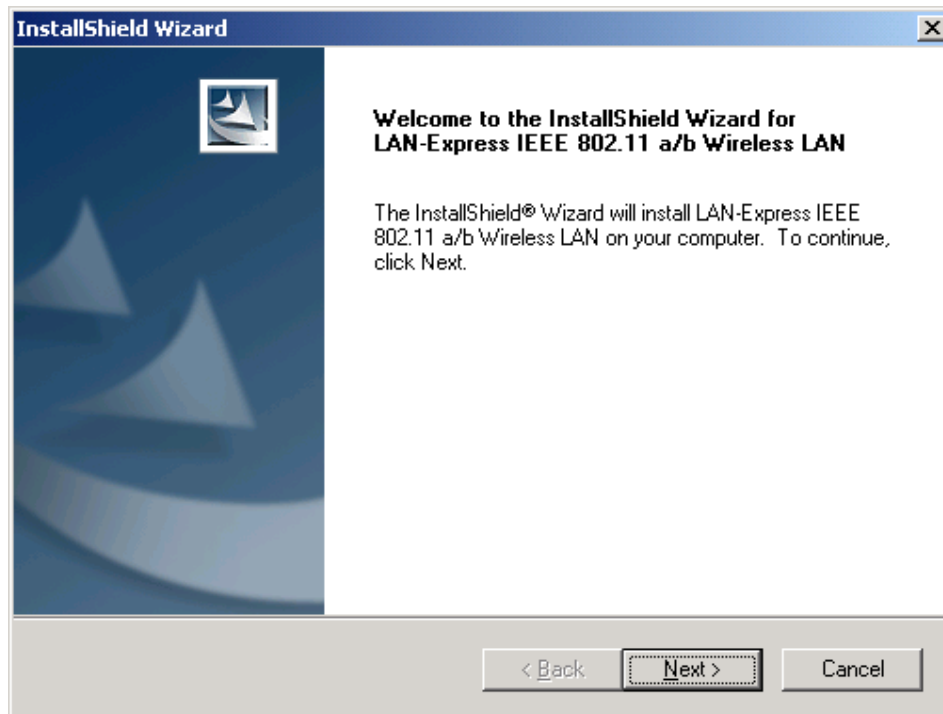


Or you can execute the program 'Setup.exe' in the CD. Windows displays the dialog as below. Press 'Next' button to continue.

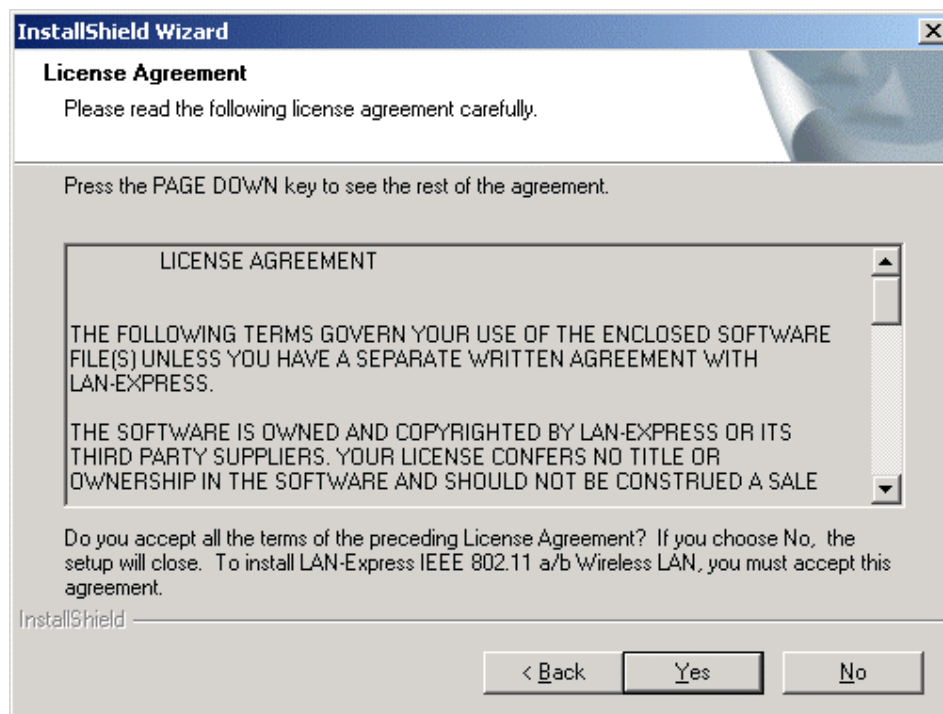
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2. It displays a License Agreement dialog. Press 'Yes' to continue.



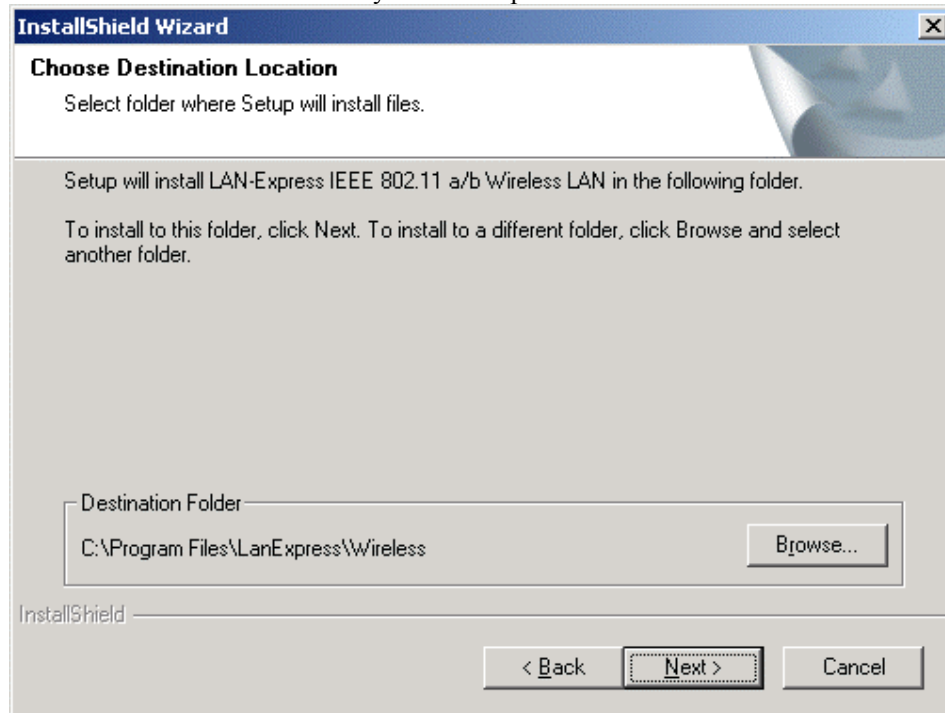
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3. Select the destination folder that you want to place the files.

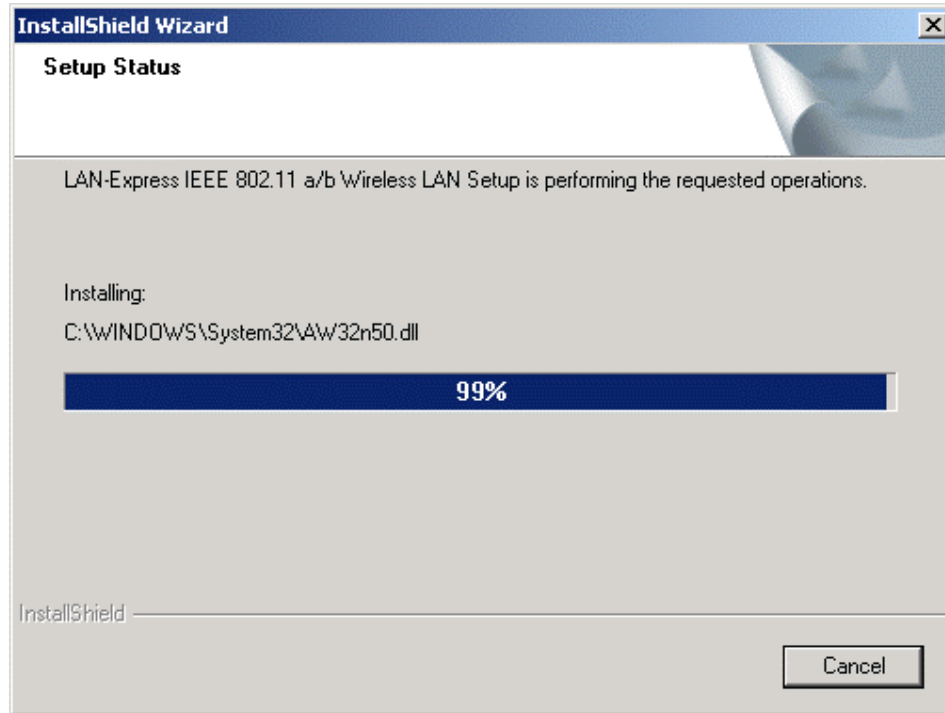


4. Wait for the install program to do the installation.

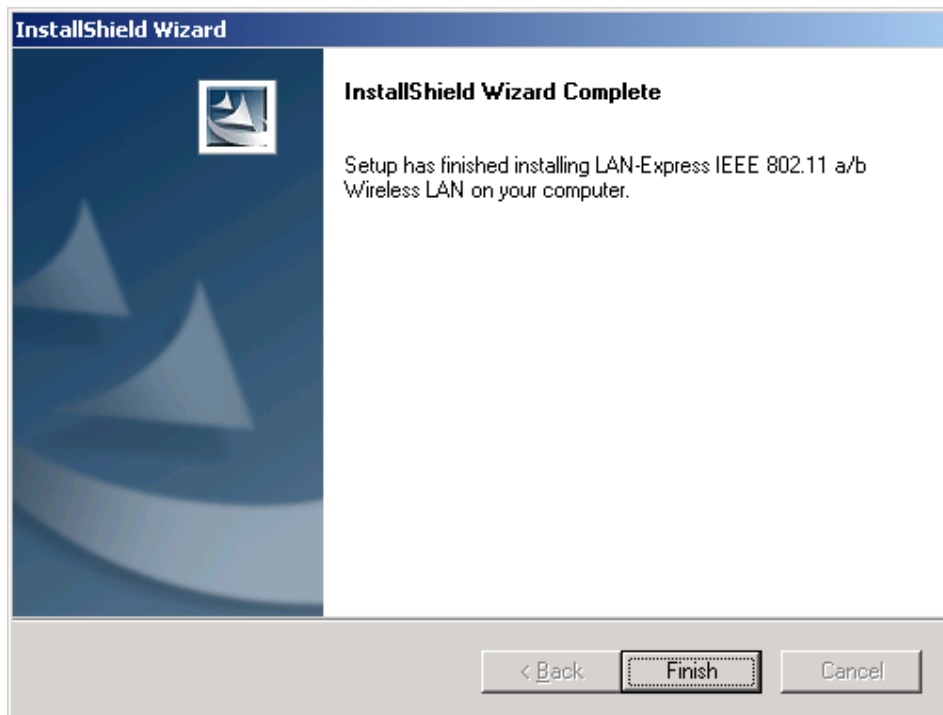
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5. Congratulations! Wireless LAN has been installed successfully.
Please click **'Finish'** to go to the next step.



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6. Please remove any disks from any drives before your click '**Finish**'.
Then click '**Finish**' to complete setup.

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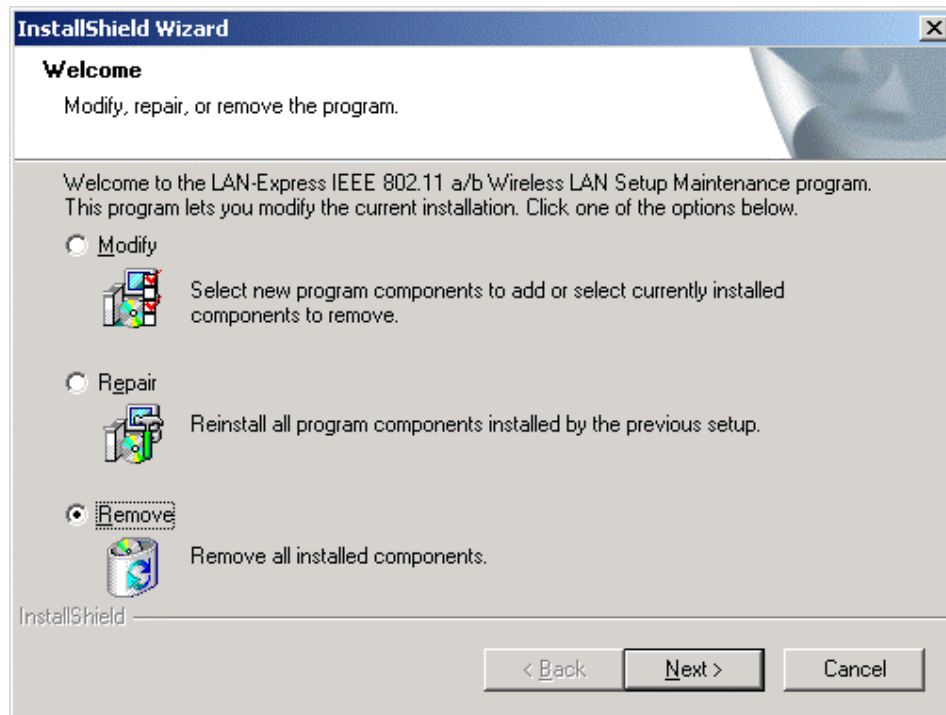
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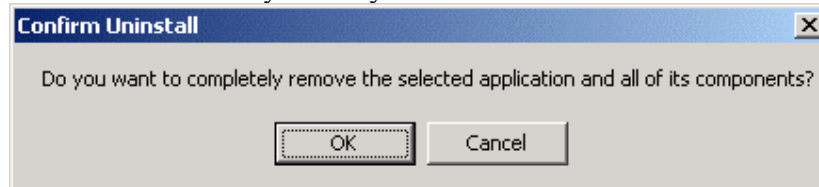


Uninstall Wireless LAN (Windows 98/2K/ME/XP)

1. One can remove the Wireless LAN via the 'Add/Remove Programs' in the 'Control Panel'. Select 'Wireless LAN' and click 'Add/Remove' button, the dialog as below displays.



2. Select 'Remove' and then click the 'Next' button to perform the un-installation. Click 'OK' button if you really want to remove the Wireless LAN.

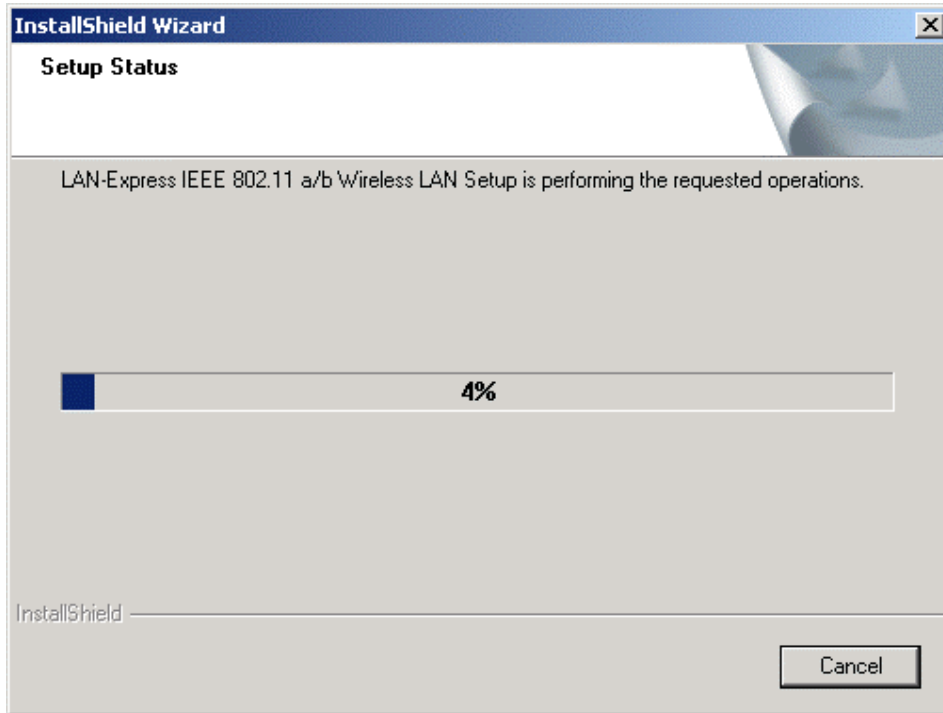
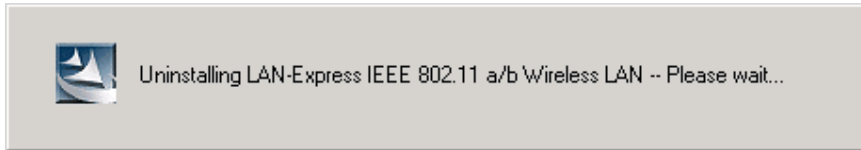


3. Wait for the un-installation to do its work.

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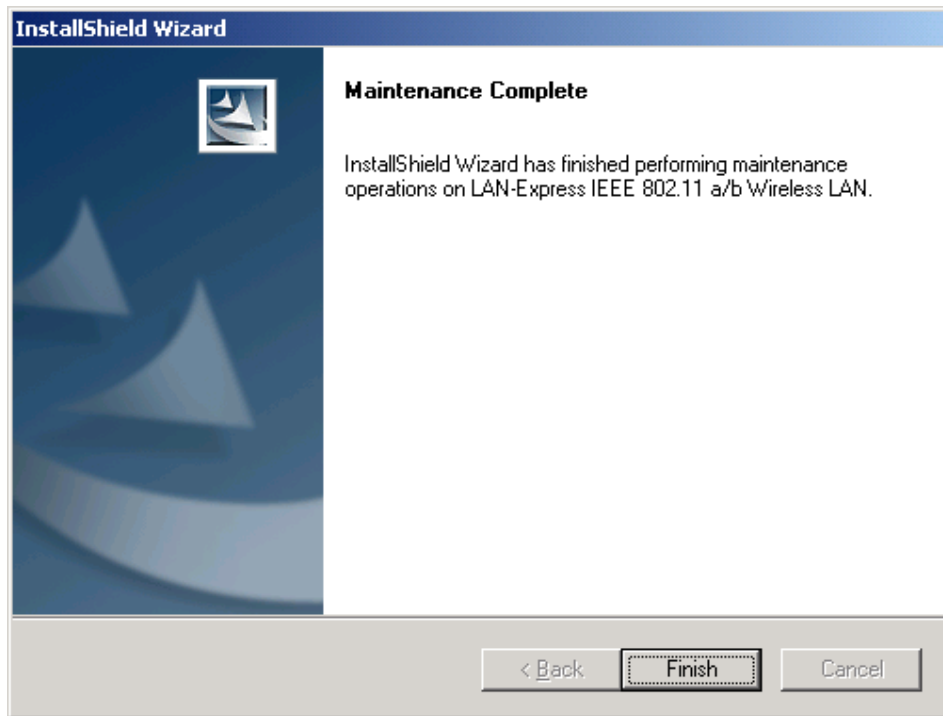


4. Click **Finish** to complete the un-Installation.

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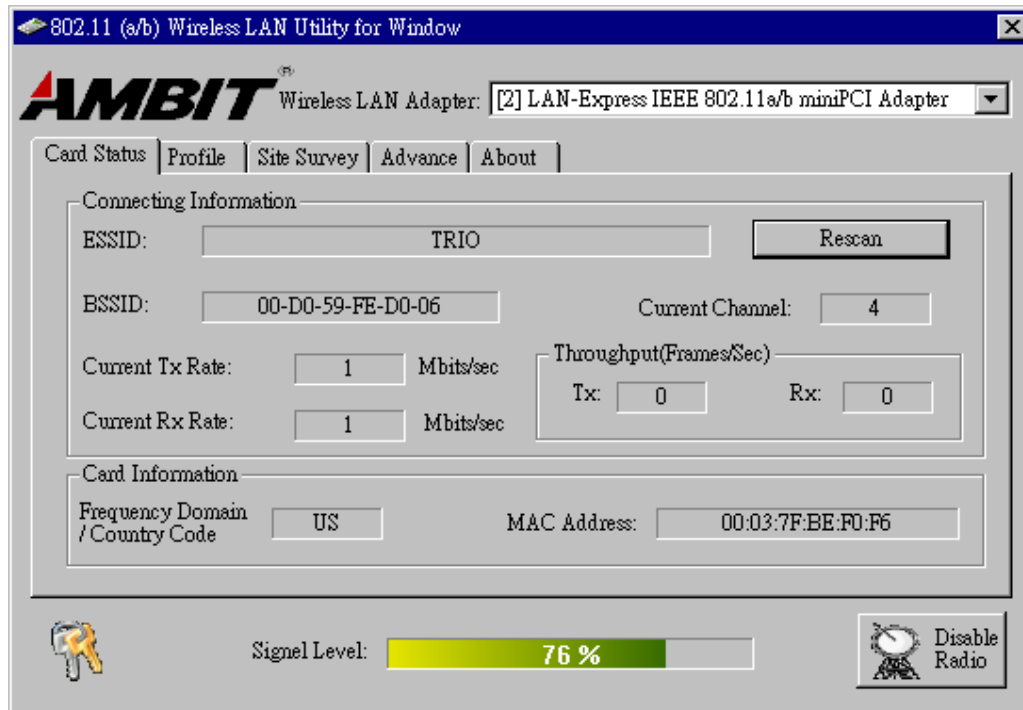
Section Three: Wireless Utility and Configuration

The following sections describe the Wireless Network Configuration Utility. This utility provides quick access and friendly interface to configure the card setup.

3-1 Windows 98/ME/2000 Wireless Utility

After installation is completed, a Wireless LAN Utility icon will appear in task bar screen. Click it, then you will see the screen below. If you cannot find the icon, you can select “Start” ->”Program”->”Wireless LAN Configuration Utility” Icon.

Card Status



You can see the some information that your card connected. In this page you also can find information like **TX/RX Rate**, **Current Channel**, **Throughput**, **MAC Address** and **Frequency Domain**.

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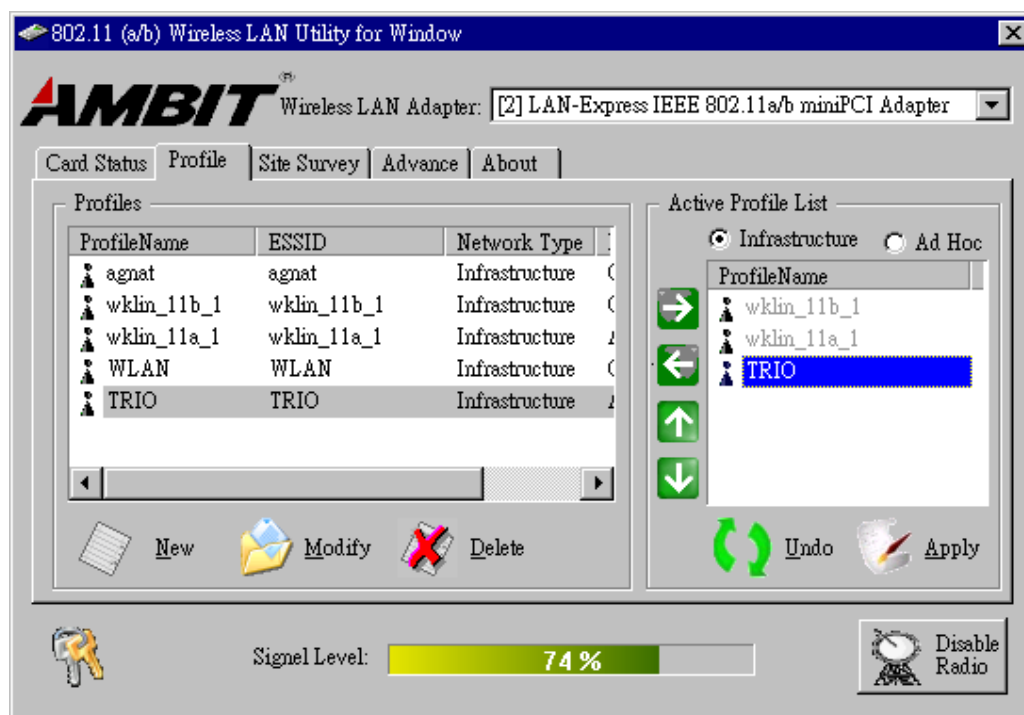
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ESSID: An acronym for Extended Service Set Identifier, ESSID is the unique name shared among all clients and Access Points in a wireless network. The ESSID must be identical for all clients or Access Points participating in the same network. The ESSID is case sensitive and must not exceed 32 characters. Press '**Rescan**' it will scan the specific ESSID that your profile set. If your profile set the ESSID to be ANY, then while you press '**Rescan**', it will scan AP in the nearby area and choose the stronger one. From Signal level, you can tell the wireless transmission quality.

Profile



Profiles

The Profiles column will show all the profiles you set.

Active Profile List

Select the favorite profiles you want to activate in the Profiles list. While you use the following buttons to decide what profiles you favor and what priority they are. Then use '**Apply**' to decide the Active Profile List you want. If you want to forget the action you just do, use '**Undo**' to turn back to the previous status.

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Use it to let this specific profile add in the Active Profile List.



If you want to remove this profile out of Active Profile List, you can use it.



Use these two buttons to change the scanning priorities



Disable Radio/Enable Radio: You can use this button to disable/enable Radio by this Utility.

New/Modify/Delete:

Use 'New' can let you create a new configuration of profile setting. And use 'Delete' can let you delete this profile setting. Or you can use 'Modify' or just *double click* one specific profile name column in Profiles list to modify the existing profile configuration. Then it will pop up the following Profile Setting manu to let you modify it.

Basic Setting

Profile Setting: TRIO

Profile Name: TRIO

Basic Setting | Encryption | Advance Security

Network Name (SSID): TRIO SSIDs

Network Type: Infrastructure (Computer-to-AccessPoint)

OK Cancel

Network Name (SSID): The SSID differentiates one WLAN from another, so all access points and all devices attempting to connect to a specific WLAN must use the same SSID. A device will not be permitted to join the BSS unless it can provide the

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unique SSID.

Network Type:

Ad-Hoc- This mode is used for a simple peer-to-peer network. It offers file sharing between wireless clients without a wireless Access Point (AP).

Infrastructure- This mode allows a wireless LAN to be integrated into an existing wired network through an AP. Infrastructure type networks also permit roaming between Access Points while maintaining connection to all network resources. Infrastructure mode provides additional features, such as WEP security, power saving and extended range.

Encryption

Profile Name: TRIO

Basic Setting | Encryption | Advance Security

Enable Encryption (AES/WEP)

Encryption Keys

Key: HEX Mode (0-9, A-F, a-f)

Key Index: Key 1

Key 1: ***** 64 bits(10 digits)

Key 2: 64 bits(10 digits)

Key 3: 64 bits(10 digits)

Key 4: 64 bits(10 digits)

OK Cancel

Enable Encryption (AES/WEP): If you check the 'Enable Encryption (AES/WEP)', then the Encryption Keys will need you enter the encryption keys

KEY: You can enter the key values either by "Hex Mode" or "ASCII Mode". The encryption key value is case-sensitive. Following are the valid key value for "Hex Mode" and "ASCII Mode".

Hex Mode:

0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F

ASCII Mode:

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Numeric values in the range of "0~9",
Alphabetical characters in the range of "a~z" and
Alphabetical characters in the range of "A~Z"

Key Index: Select which key you want to enter now.

KEY1~4: Encryption key values. The key length depend on what the Key Format be selected.

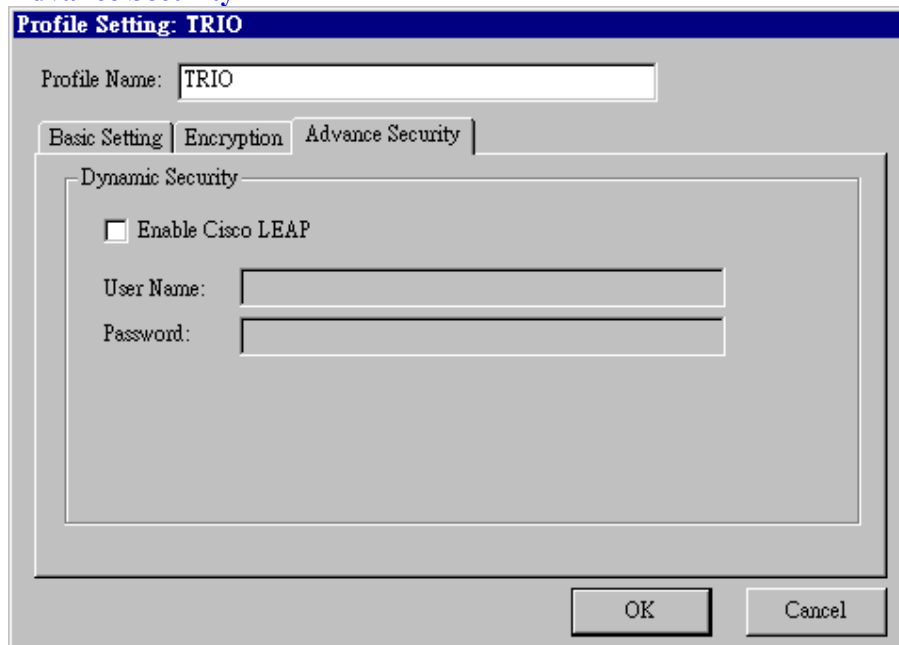
64 bits:

5-digit keys in "ASCII Mode" or
10-digit keys in "Hex Mode".

128 bits:

13-digit keys in "ASCII Mode" or
26-digit keys in "Hex Mode".

Advance Security



To enable the LEAP support on Windows XP by checking the check box of "Enable Cisco LEAP".

User Name: The user name used to log in to the LEAP network.

Password: The password used to log in to the LEAP network.

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Site Survey

802.11 (a/b) Wireless LAN Utility for Window

AMBIT Wireless LAN Adapter: [2] LAN-Express IEEE 802.11a/b miniPCI Adapter

Card Status | Profile | Site Survey | Advance | About

| ESSID | BSSID | CH | Encryption | Network Type | Signal |
|-------|-------------------|----|------------|----------------|-----------|
| Genre | 00:D0:59:68:90:25 | 7 | Off | Infrastructure | Excellent |
| GIGA | 00:40:96:55:A5:AC | 11 | On | Infrastructure | Excellent |
| Eddic | 00:D0:59:68:90:1C | 5 | Off | Infrastructure | Excellent |
| CHT | 00:D0:59:F8:41:83 | 11 | Off | Infrastructure | Fair |
| Agnat | 0A:D0:59:5B:11:20 | 1 | Off | Infrastructure | Good |
| APPLE | 00:03:93:E8:35:E4 | 3 | Off | Infrastructure | Excellent |
| 5611 | 0A:D0:59:5B:56:11 | 1 | On | Infrastructure | Good |
| 2195 | 00:D0:59:AA:01:02 | 1 | Off | Infrastructure | Excellent |

Double click left mouse button to add specific item to profile.

Scan

Signal Level: 78 %

Disable Radio

Use the Site Survey Tool. You can identify each ESSID information like MAC Address(BSSID), channel you use, Encryption On/Off, Network Type and signal quality.

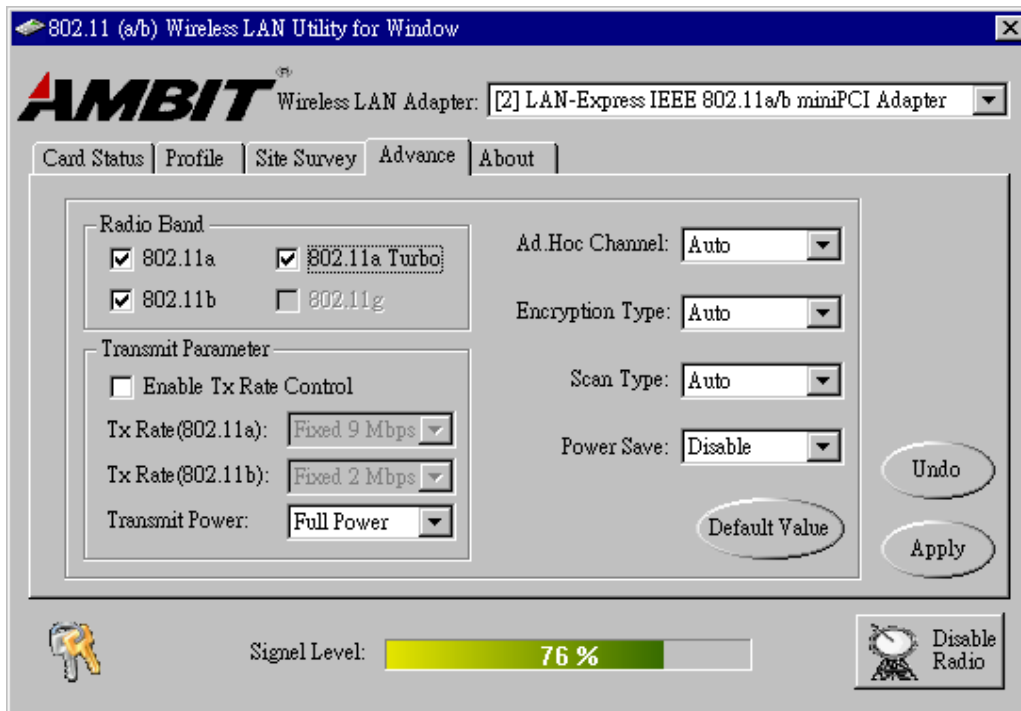
High-light the list and double-click the selecting item will allow you to add the new wireless Profile with corresponding parameters.

Advance

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Radio Band

You can choose the Radio Band you want to use like '802.11a', '802.11b', '802.11a Turbo', '802.11g'. Currently '802.11g' is not supported at our 802.11a/b MiniPCI wireless LAN Card. And '802.11a Turbo' is the specific Turbo mode for Atheros solution to let you reach the data rate up to 108Mbps while connecting to the same Atheros AP that also enable this turbo mode.

Transmit Parameter

You can set TX Rate of 802.11a or 802.11b by checking 'Enable TX Rate Control'. Then go to TX Rate (802.11a or 802.11b) to choose the data rate you want to fix.

Transmit Power: You can choose the Full Power, 50%, 25%, 12% or Lowest Power depend on the device distance you want to associate with. While the device is very close to your Wireless LAN Card, then you can choose Lowest output Power to save the battery life.

Ad Hoc Channel: Select which channel you want to use at Ad hoc mode. If you don't know which channel you want to use, please select Auto.

Encryption Type: This field defines the card to use the specific security type (WEP, AES only or Auto switching on WEP and AES) when the card enable the encryption.

Scan Type: Specify passive or auto scans. Most regions are set to use an active scan mode. Passive mode sets the wireless card to listen-only mode when its power on

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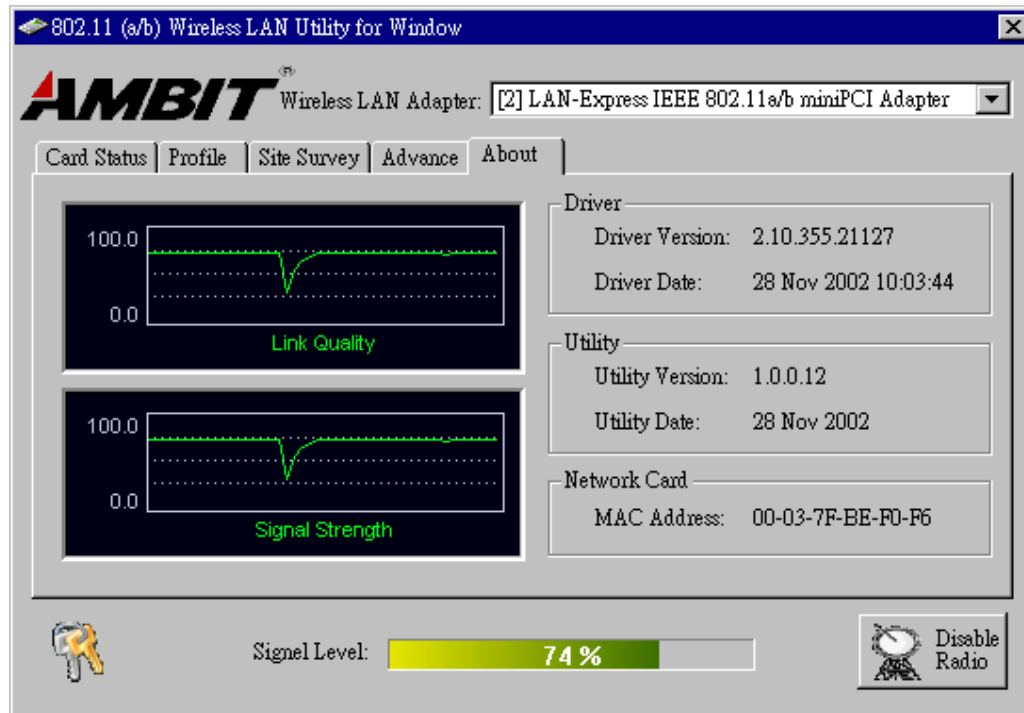
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state or roam state.

Power Save: This property controls whether 802.11 power management is used. Power management is disabled in Ad. Hoc mode. The driver turns off power to the adapter for period time.

About



D

You can see some statistic value of Link Quality and Signal Strength in About column.

Driver: Displays the current driver version of wireless card.

Utility: Displays the current wireless configuration utility version for your wireless card.

Network Card: Displays the MAC address of wireless card.

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Section Four: Windows XP Wireless Utility and Configuration

4-1 Windows XP Wireless Utility

1. To configure the wireless card setting, you can select Start\Settings\Network Connection in the Windows XP. Choose the wireless network connection, then you will see below screen. From this screen, you can see wireless connection status and wireless signal level.



2. Select 'Properties' in the above screen. The following windows will show up.

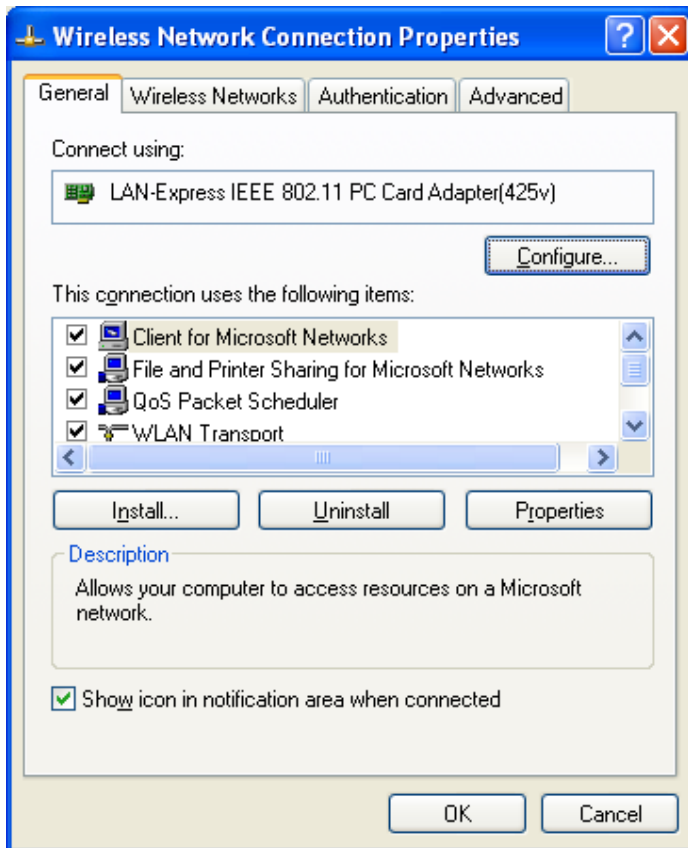
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In 'General' page, Wireless LAN card information and networking protocol have been displayed. Extra networking protocol can be installed in this page.

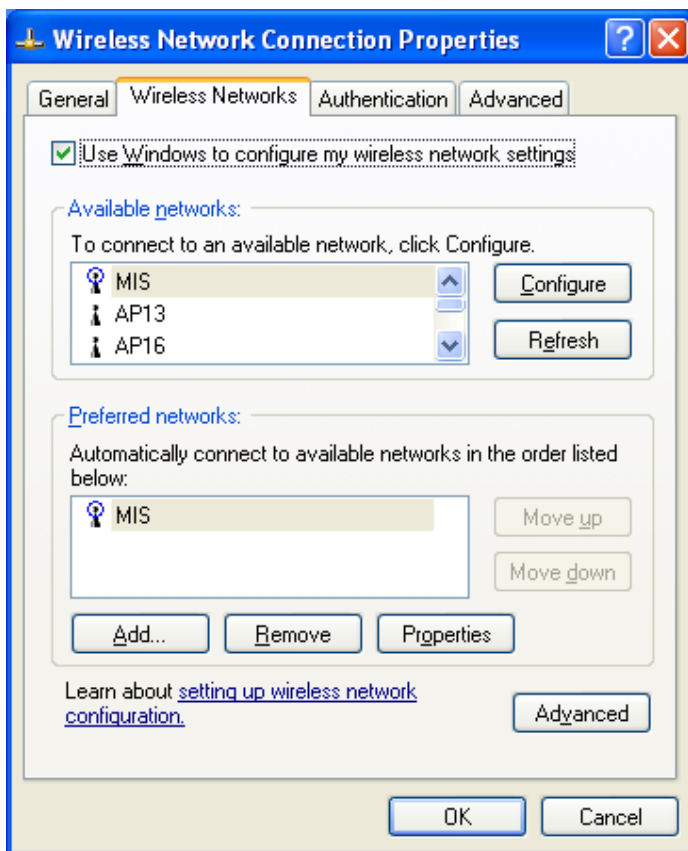


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3. Select Wireless Networks page, you can see available wireless networks in your nearby area. You can add your preferred wireless Access Point to your list, so your wireless card will search for specific wireless networks.



Configure

To connect to an existing access point (infrastructure) network, under Available

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networks, click the network name, and then click 'Configure' to setup wireless security and data encryption.

Refresh

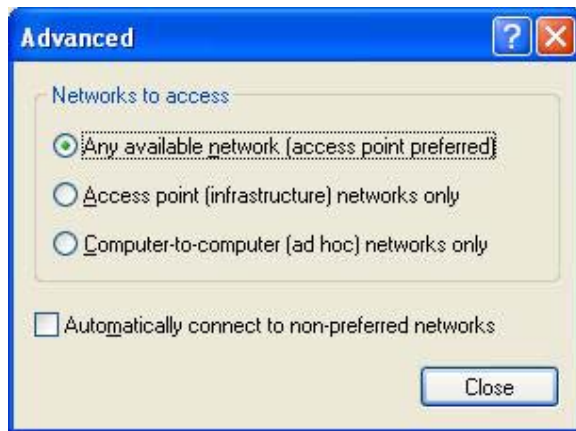
To update the list of available networks that are within range of your computer, click Refresh.

Add

To connect to an access point (infrastructure) network that you know is available but that does not appear under Available networks, under Preferred networks, click Add. In Wireless Network Properties, specify the network name (Service Set Identifier).

Remove

To remove a wireless network from the list of preferred networks.



Advanced

*If your network are configuring to a computer-to-computer (ad hoc) network, select 'Computer-to-computer (ad hoc) network only'.

*If you want to connect to a computer-to-computer and access point (infrastructure) networks are within range of your computer, click 'Access point (infrastructure)network only'.

*If you want to connect to a computer-to-computer (ad hoc) network and both computer-to-computer and access point (infrastructure) networks are within range of your computer, click 'Any available network (access point preferred)'.

To automatically connect to available networks that do not appear in the Preferred networks list, click Advanced, and then select the Automatically connect to non-preferred networks check box.

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Define your network name (SSID) in the following windows, so your can join a specific wireless network. Check AP has WEP on or not. You wireless network will need to have same WEP setting with AP in order to communicate. If your wireless network don't have any AP, check the **'This is computer-to computer (ad-hoc) network; wireless access points are not used'**

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Wireless Network Properties [?] [X]

Network name (SSID): MIS

Wireless network key (WEP)

This network requires a key for the following:

Data encryption (WEP enabled)

Network Authentication (Shared mode)

Network key: []

Key format: ASCII characters [v]

Key length: 104 bits (13 characters) [v]

Key index (advanced): 0 [v]

The key is provided for me automatically

This is a computer-to-computer (ad hoc) network; wireless access points are not used

[OK] [Cancel]

This window provides authentication via 802.1X. 802.1X, an IEEE standard that provides an authentication framework for 802-based LANs. 802.1X takes advantage of an existing authentication protocol known as the Extensible Authentication

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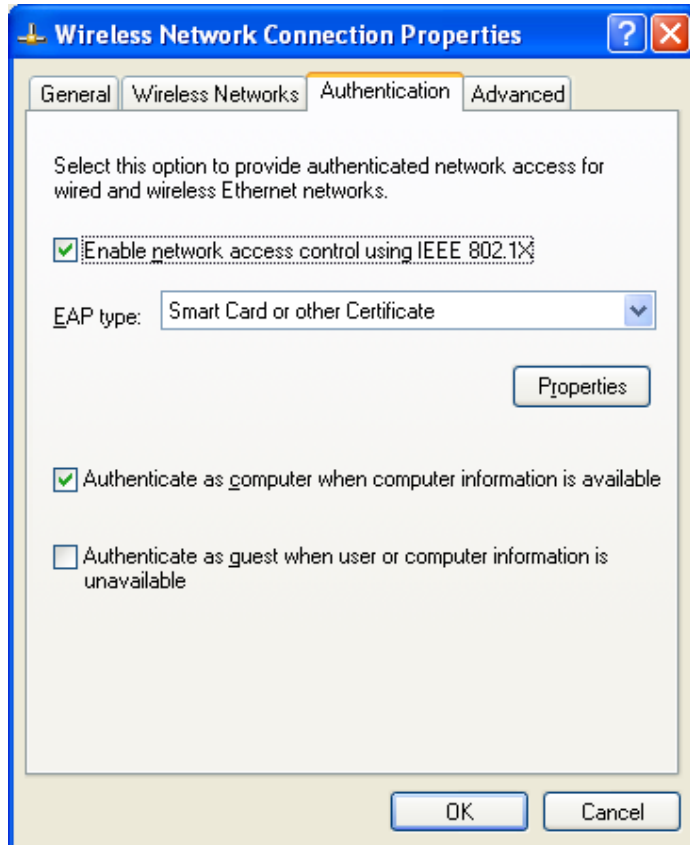
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Protocol. 802.1x, giving someone secure, encrypted, wireless access on a Microsoft network will be as easy as setting a flag on the users domain account.

What does this mean for the Home Network user?

802.1x will ensure that if and when you make the change over to Wireless Ethernet, your neighbor will not be able to access your wireless LAN!

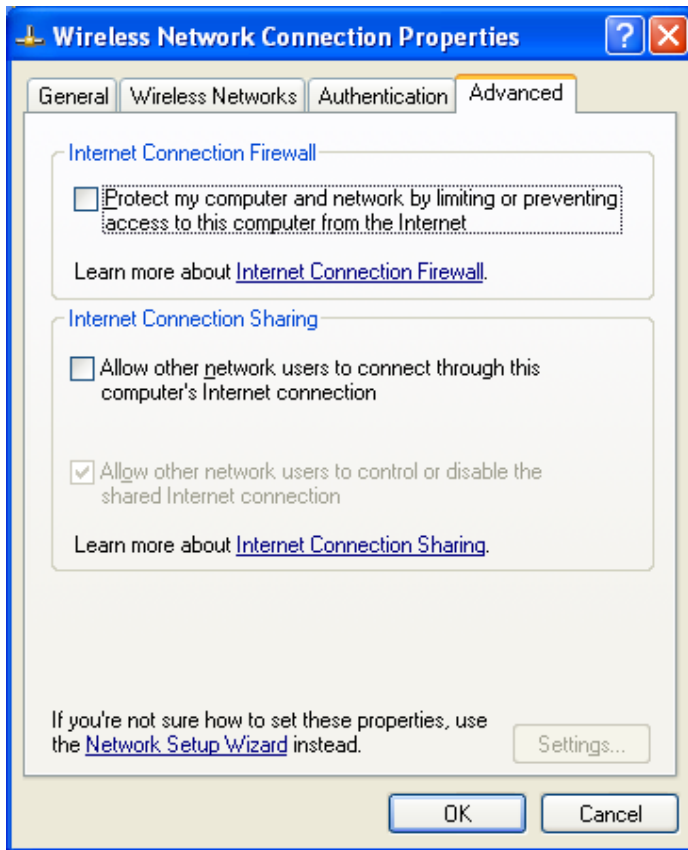


The 'Advanced' window offers Firewall and Internet Connection Sharing functions. Depends on your networking environment, you can select below functions.

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Appendix A Glossary

Access Point - An internetworking device that seamlessly connects wired and

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wireless networks together.

Ad-Hoc - Ad-Hoc is 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 - Stands for “Basic Service Set.” An Access Point associated with several wireless stations.

ESS - Stands for “Extended Service Set.” More than one BSS can be configured as an Extended Service Set. An ESS is basically a roaming domain.

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

MINI-PCI TYPE III– Mini-PCI is a small form factor version of the PCI specification. The Mini-PCI format comes in several different form factors: the Type I, Type II, and Type III. The Mini-PCI Type III card is the most popular of the Mini-PCI standards. The Mini-PCI Type III golden finger plugs into a 124-pin card edge type connector that is similar to the SODIMMS type. Mini-PCI provides the same 32bit 33MHz performance that you have come to expect from the PCI bus. Mini-PCI is still pretty much an OEM product, as you are not yet able to go to a store and purchase a Mini-PCI card.

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.

Wired Equivalent Privacy (WEP) - To prevent access from the unauthorized wireless stations to the data that is transmitting through the network, the Wireless LAN card provides the WEP (Wired Equivalent Privacy) level of security that was part of the original 802.11 standard. The wireless LAN card supports both 64 bits WEP and 128 bits data encryption based on the RC4 algorithm.

SSID - Short for Service Set Identifier. The SSID differentiates one WLAN from another, so all access points and all devices attempting to connect to a specific WLAN must use the same SSID. A device will not be permitted to join the BSS unless it can provide the unique SSID.

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