

■ Chapter 1 Introduction

The 3054 PCI Aries installed in a PCI slot is the most convenient way to let you put a desktop computer almost anywhere without the hassle of running network cables. Now you don't need to suffer from the drilling holes and exposed cables. Once you are connected, you can do anything, just like the wired network. The 3054 PCI Aries operates seamlessly and simultaneously in both modes of 2.4GHz frequency spectrum supporting the 802.11b (11Mbps) and the 802.11g (54Mbps) wireless standards. It's the best way to add wireless capability to your existing wired network, or add bandwidth to your wireless installation.

To protect your wireless connectivity, the 3054 PCI Aries can encrypt all wireless transmissions through 64/128/152-bit WEP data encryption. Dynamic Frequency Selection (DFS) puts your network on the cleanest channel in your location. With the 3054 PCI Aries, you will experience the best wireless connectivity available.

1-1 Package Content

The 3054 PCI Aries package contains the following items.

1. One PCI Card
2. One Quick Installation Guide
3. One Installation CD

1-2 PCI Card Description

The PCI Card is a standard PCI Card that fits into any 32-bit PCI slot. The PCI Card has a LED indicator and one antenna as shown in Figure 1-1.

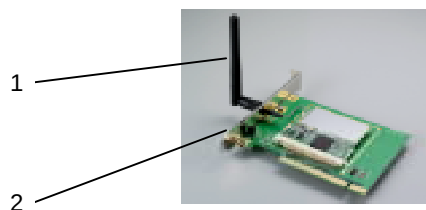


Figure 1-1

1. Dipole Antenna, which is perpendicular to the horizon
2. LED indicator

1-3 System Requirements

Installation of the PCI Card requires:

- ◆ Desktop PC containing:
 - ✓ 32-bit PCI slot
 - ✓ 32 MB memory or greater
 - ✓ 300 MHz processor or higher
- ◆ Compatible with:
 - ✓ Microsoft Windows 2000
 - ✓ Microsoft Windows XP
 - ✓ Microsoft Windows ME
 - ✓ Microsoft Windows 98 SE

1-4 Features and Benefits

Feature	Benefit
Up to 54Mbps high-speed data rates	Capable of handling heavy data payloads such as MPEG video streaming
Up to 152-bit WEP Data Encryption with TKIP	Powerful data security
IEEE802.1x Client support (Optional)	Enhances authentication and security
Multi-country Roaming (802.11d) support	Automatically adjusts regulatory domain to operate in different countries
Advanced Power Management	Low power consumption in power saving mode
TPC (Transmission Power Control) Support	TPC offers flexibility to adjust RF output power

1-5 Applications

Wireless LAN products are easy to install and highly efficient. The following list describes some of the many applications made possible through the power and flexibility of wireless LANs:

1. Difficult-to-wire environments

There are many situations where wires cannot be laid easily. Historic buildings, older buildings, open areas and across busy streets make the installation of LANs either impossible or very expensive.

2. Temporary workgroups

Consider situations in parks, athletic arenas, exhibitions, disaster-recovery, temporary office and construction sites where one wants a temporary WLAN established and removed.

3. The ability to access real-time information

Doctors/nurses, point-of-sale employees, and warehouse workers can access real-time information while dealing with patients, serving customers, and processing information.

4. Frequently changed environments

Show rooms, meeting rooms, retail stores, and manufacturing sites where the workplace is rearranged frequently.

5. Small Office and Home Office (SOHO) networks

SOHO users need a cost-effective, easy, and quick installation of a small network.

6. Wireless extensions to Ethernet networks

Network managers in dynamic environments can minimize the overhead caused by moves, extensions to networks, and other changes with wireless LANs.

7. Wired LAN backup

Network managers implement wireless LANs to provide backup for mission-critical applications running on wired networks.

8. Training /Educational Facilities

Training sites at corporations and students at universities use wireless connectivity to ease access to information, information exchanges, and learning.

1-6 Network Configuration

To better understand how wireless LAN products work together to create a wireless network, it might be helpful to depict a few of the possible wireless LAN PCI card network configurations. The wireless LAN products can be configured as:

1. Ad-hoc (or peer-to-peer) for departmental or SOHO LANs.
2. Infrastructure for enterprise LANs.

Ad-hoc (peer-to-peer) Mode

This is the simplest network configuration that several computers equipped with PCI Cards that form a wireless network whenever they are within range of one another (**Figure 1-2**). In ad-hoc mode, each client is peer-to-peer and would only have access to the resources of the other client and requires no access point. This is the easiest and least expensive way for the SOHO to set up a wireless network.

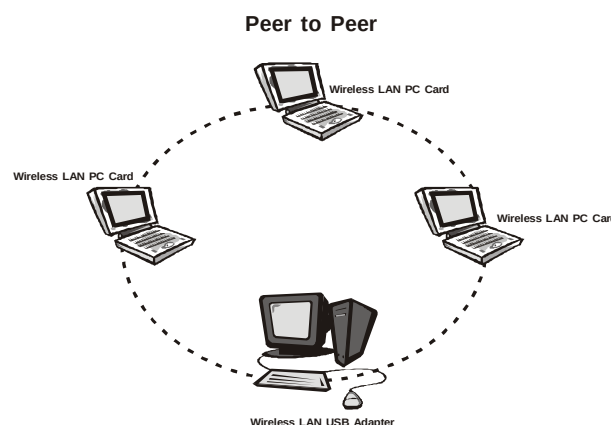


Figure 1-2

Infrastructure Mode

The infrastructure mode requires the use of an access point (AP). In this mode, all wireless communications between two computers have to be via the AP, no matter if the AP is wired to an Ethernet network or stand-alone. If used in stand-alone, the AP can extend the range of independent wireless LANs by acting a repeater, which effectively doubles the distance between wireless stations as shown in **Figure 1-3**.

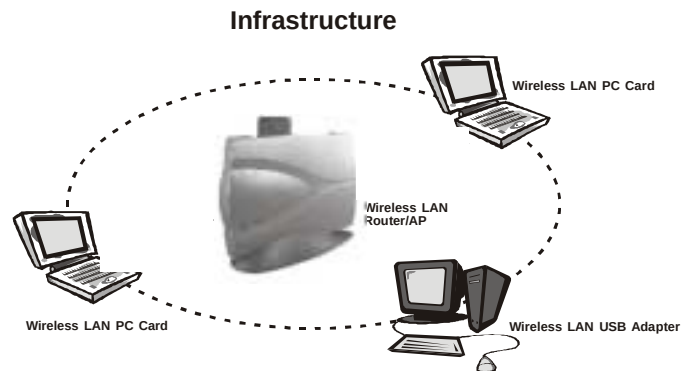


Figure 1-3

Extended-range independent WLAN using AP as repeater

If wired to an Ethernet network as shown in **Figure 1-4**, the AP serves as a bridge and provides the link between the server and the wireless clients. The wireless clients can move freely throughout the coverage area of the AP while remaining connected to the server. Since the AP is connected to the wired network, each client would have access to the server's resources as well as to other clients.

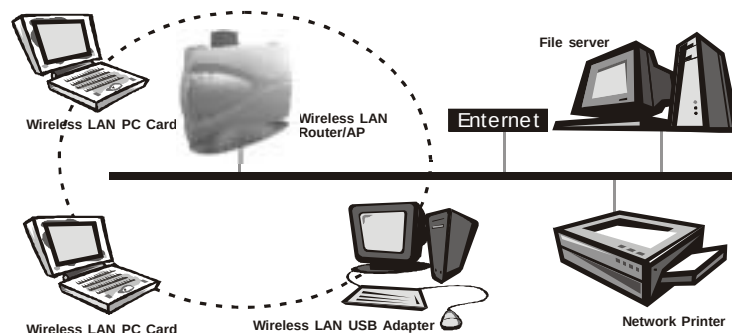


Figure 1-4

Access points have a finite range, on the order of 50 meters indoor and 100 meters outdoors. In a very large facility such as an enterprise, a warehouse, or on a college campus, it will probably be necessary to install more than one access point to cover an entire building or campus, as shown in **Figure 1-5**. In this scenario, access points hand the client off from one to another in a way that is invisible to the client. Ensuring Token connectivity, wireless clients can roam seamlessly between different coverage areas and remain connected to the network.

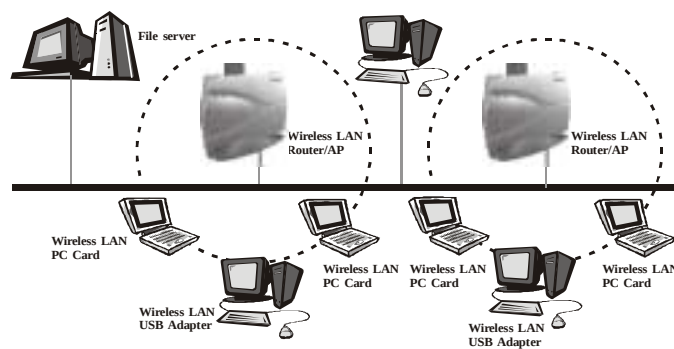


Figure 1-5

Wireless Router and IP Sharing

In infrastructure mode, in addition to acting as a bridge between an Ethernet and wireless network, the AP can be configured as a wireless router and IP sharing device for Internet access as shown in **Figure 1-6**. You don't have to buy an expensive router. Nor do you have to buy several modems and setup phone lines. Just share one AP, one modem, a single dial-up account, and one phone line, dozens of network users can go surfing the Internet concurrently.

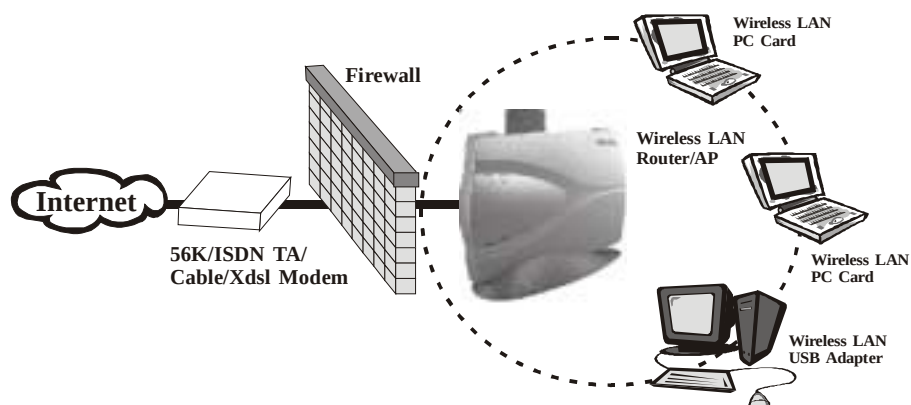


Figure 1-6

■ **Chapter 2 Installing Drivers & Client Utility**

This chapter describes how to install the PCI Card drivers and client utility under Windows 98/ME/2000/XP.

2-1 Installation for Windows 98SE/ME/2000/XP

This section describes the first-time installation for the driver installation under Windows 98SE/ME/2000/XP. For a previously installed driver, we provide the Install Shield Wizard, which includes an application for upgrading the present driver and the utility

Installation Procedure:

1. Turn on your computer.
2. Be sure that there is no PCI Card inserted yet.
3. Insert the **Wireless LAN Installation** CD into your CD-ROM drive and execute **Setup.exe** by selecting the file from the CD-ROM drive.
4. When the Setup.exe program starts, it will pop up a window as shown in **Figure 2-1.**, click on the **Next** button to continue the installation.

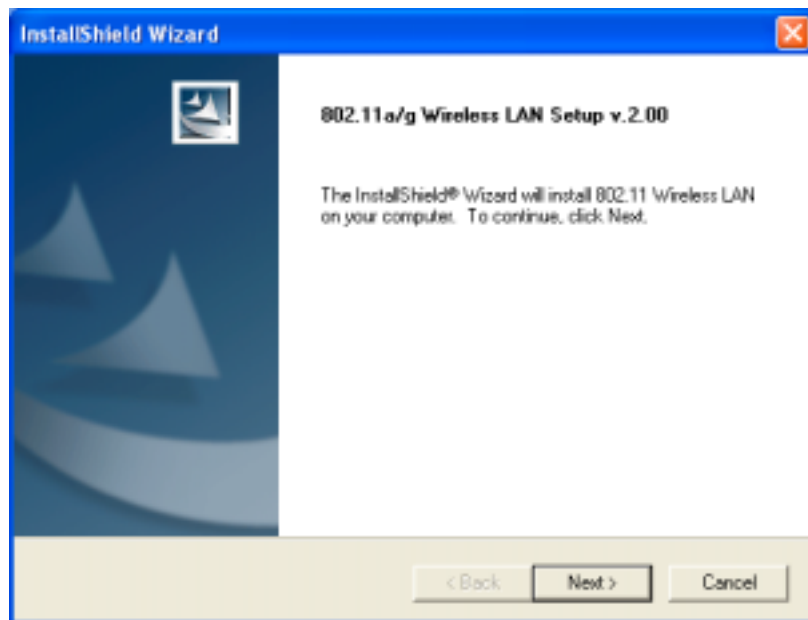


Figure 2-1

5. After finishing all installation steps, click **Finish** to complete the installation as **Figure 2-2.**

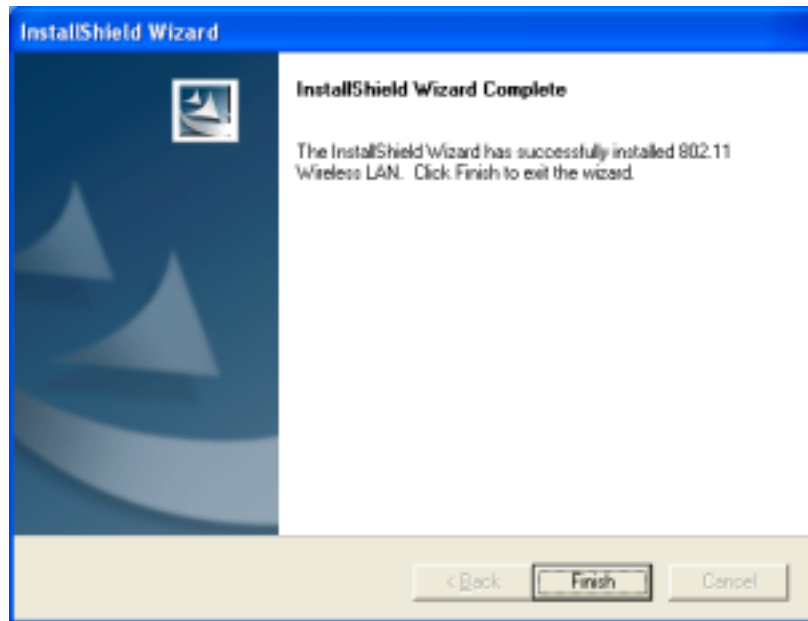


Figure 2-2

6. Insert the PCI Card into the PCI slot of your computer and wait for the **Found New Hardware Wizard** dialog box to display.
7. During the installation, the driver and utility will both install into the system, so please select **Install the software automatically (Recommended)** as shown in **Figure 2-3** and click **Next** to search the driver installation file.

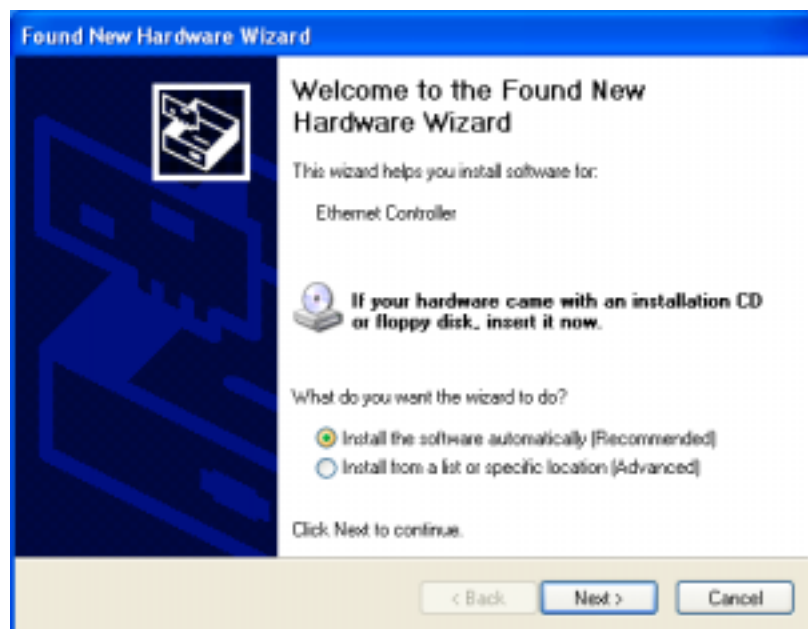


Figure 2-3

8. Then the system will find the driver and start to install as shown in **Figure 2-4**.

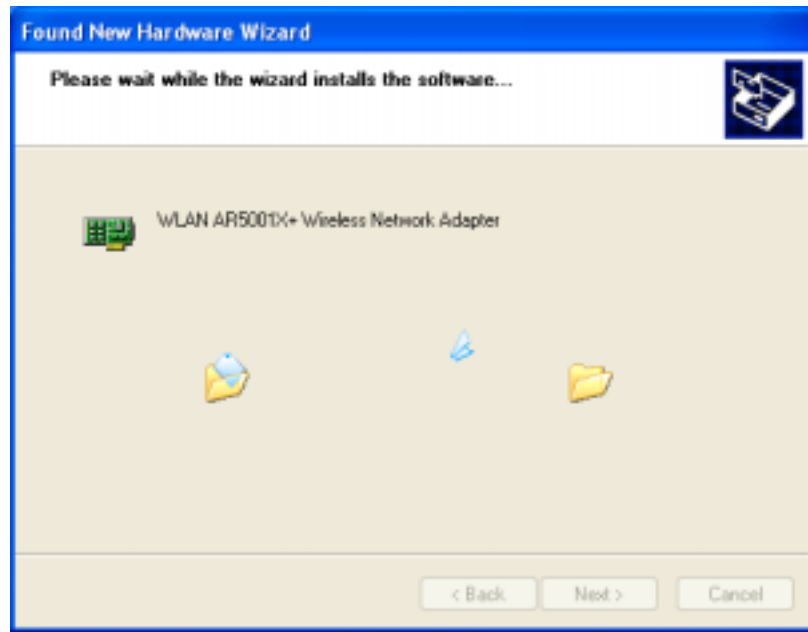


Figure 2-4

9. The driver currently does not have a digital signature from Microsoft. Therefore, Windows 2000/XP will show a warning message. Click **Continue Anyway** to proceed with driver installation as shown in Figure 2-5.



Figure 2-5

10. Click **Finish** to complete the driver installation as shown in Figure 2-6.

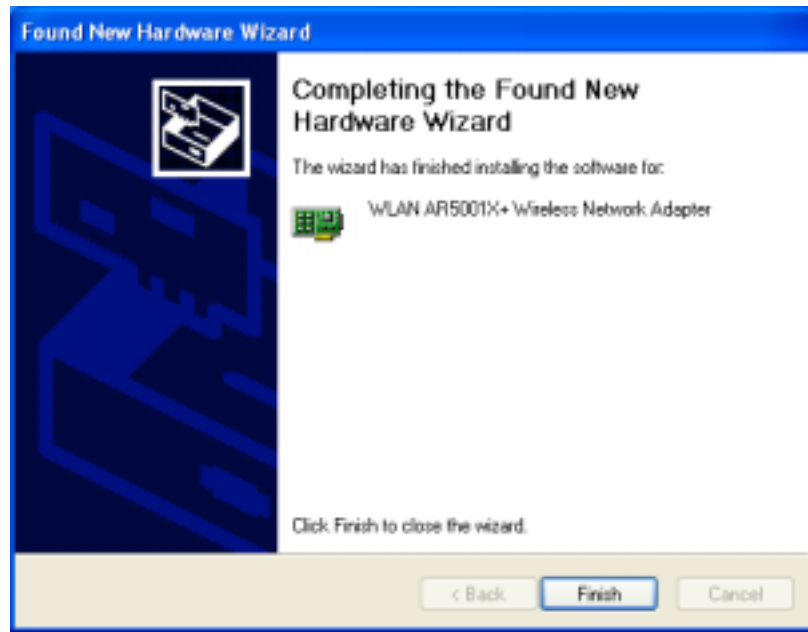


Figure 2-6

2-2 Check after Installation

After installing the driver and utility, follow the steps below to check that the PCI Card is operating correctly.

1. Click the **Start** button, right-click on **My Computer**, and then select **Properties**.
2. In the **System Properties** window, select the tag **Hardware**, and then select **Device Manager**.
3. Double-click **Network adapters**, and then select **WLAN AR5001X+ Wireless Network Adapter** as shown in Figure 2-7.

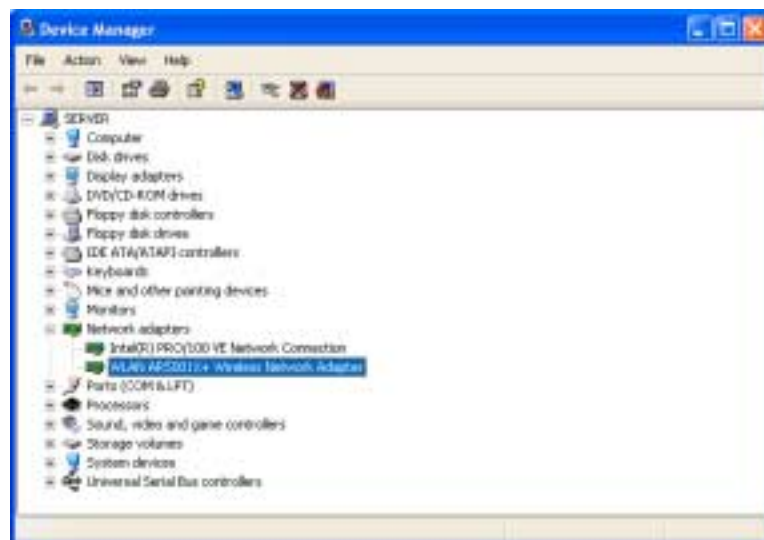


Figure 2-7

4. Right-click on **WLAN AR5001X+ Wireless Network Adapter**, then select **Properties**. This device is working properly is displayed on **Device status** as show in Figure 2-8.

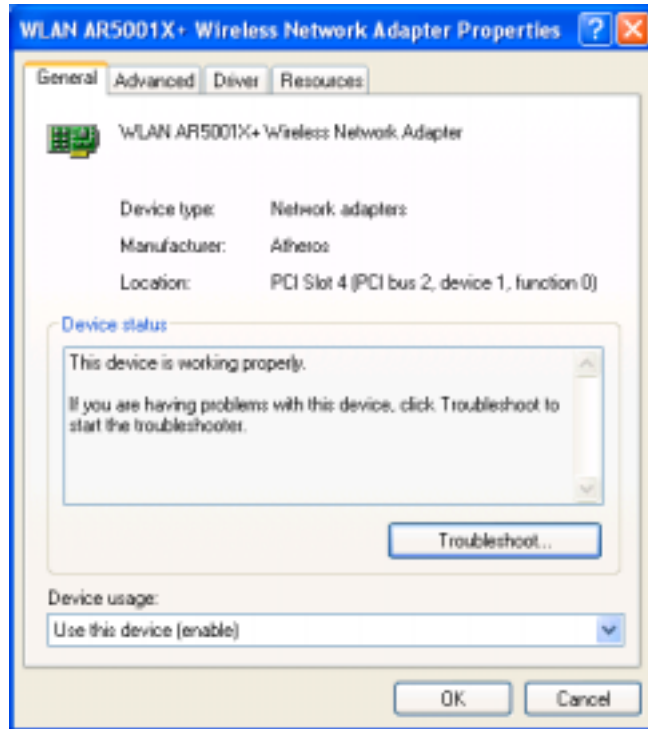


Figure 2-8

5. If you find the yellow (?) sign on the adapter or the above message is not displayed, it shows that the drivers for this device were not installed or the wireless LAN PCI Card is not operating properly. Uninstall and re-install the driver, referring to Chapter 2-4 **Uninstalling Driver and Utility**.

2-3 IEEE 802.11 WLAN NIC Client Utility

Use the 802.11 NIC Client Utility to configure the device driver. Access the Utility by clicking the **Start** button and selecting **Programs > IEEE 802.11 > 802.11 WLAN NIC Utility**. The 802.11 NIC Client Utility system tray icon is displayed in the bottom right and the taskbar. Launch the 802.11 NIC Client Utility by double-clicking the tray icon, or by right-clicking the tray icon and selecting **Open Client Utility ...**

The 802.11 NIC Client Utility is used to display or change the PCI Card information such as: **Current Status**, **Profile Management** and **Diagnostics**. The client utility will be installed automatically after installing the driver and utility. After you have completed installing the driver and utility, the client utility will automatically execute and show a small icon at the Taskbar whenever the PCI Card is inserted into the PCI Slot of your computer. You can click the tags on the top of the windows to select various screen messages as shown in **Figure 2-9**.

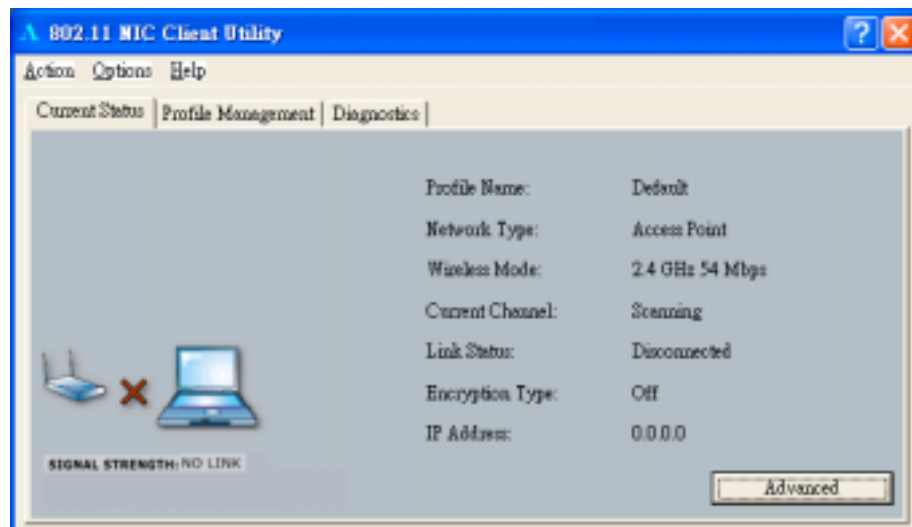
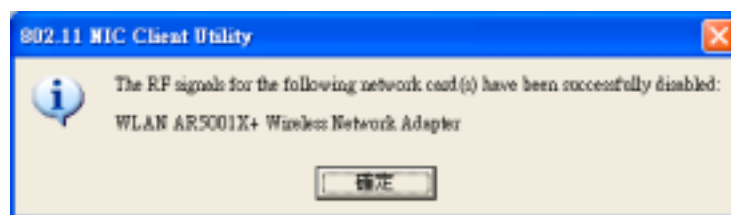


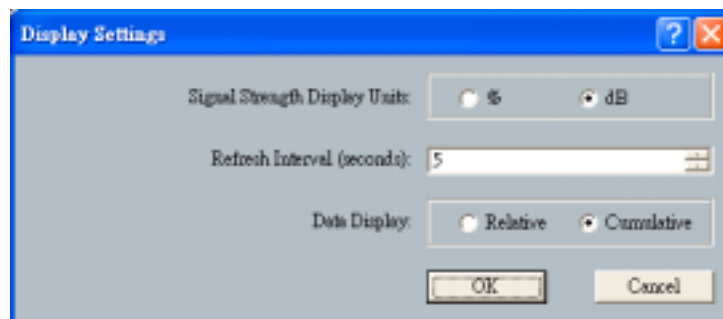
Figure 2-9

The tool bar provides three functions: **Action**, **Option** and **Help**.

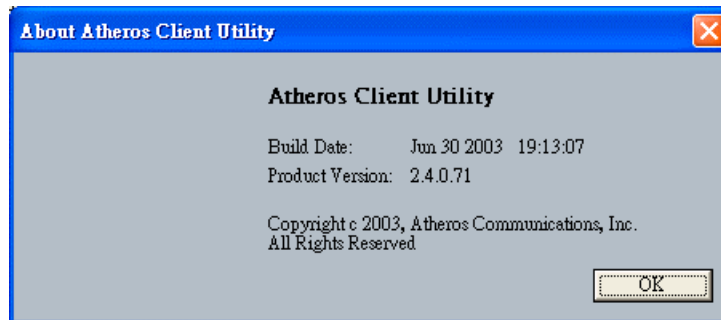
Action: the **Disable Radio** function is used to break down the wireless connection, the **Country Select...** is used to select suitable country code for the utility. If you don't want to see icon shown in Taskbar, you can use **Disable Tray Icon** function to hide it.



Option: you can use **Display settings** to change Signal Strength Display Units, Refresh Interval and Data Display settings.



Help: click **About Atheros Client Utility...** function to get related information of the Client Utility.



Except for the tool bar' functions, the utility also provides **Current Status**, **Profile Management** and **Diagnostics**, three main functions for configuration.

Explained below are the uses and meanings of the various screen messages.

1. Current Status

Current Status provides user information such as: Profile Name, Network Type, Wireless Mode, Current Channel, Link Status, Encryption and IP Address. If you click on the Advanced button, it will display an advanced status window as shown in **Figure 2-10**. Advanced Status provides user information of Country, Transmit Power Level, Network Name (SSID), Power Save Mode, Frequency, Transmit Rate and Receive Rate.

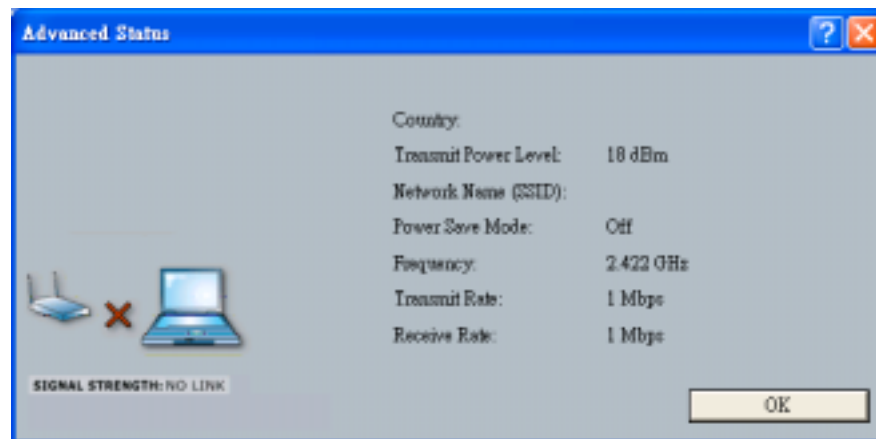


Figure 2-10

2. Profile Management

Profile Management, provides functions to New, Modify, Remove or Activate a Profile settings as shown in **Figure 2-11**. With default status, the profile will be empty and you have to click on the New button to add a profile setting or if there exists a Profile file, you can use the Modify button to change the settings. Use the Remove button to erase the file or Activate button to activate other profile setting.

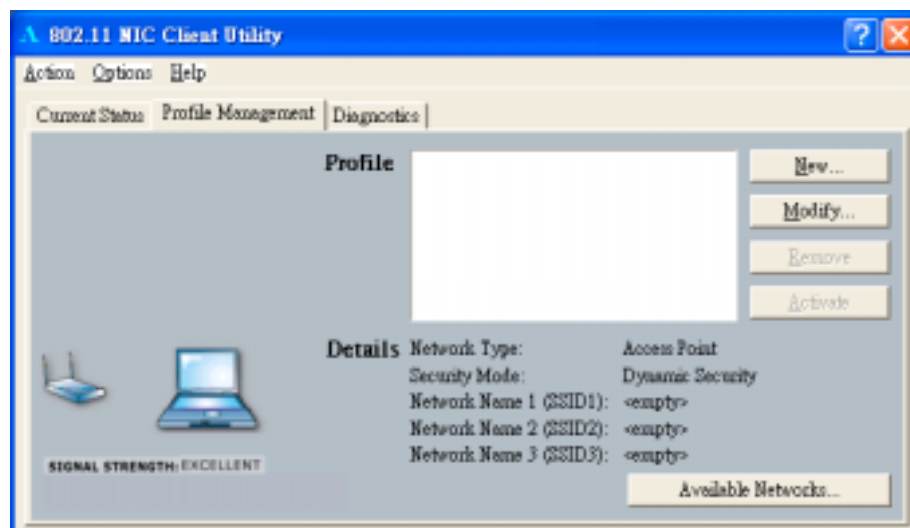
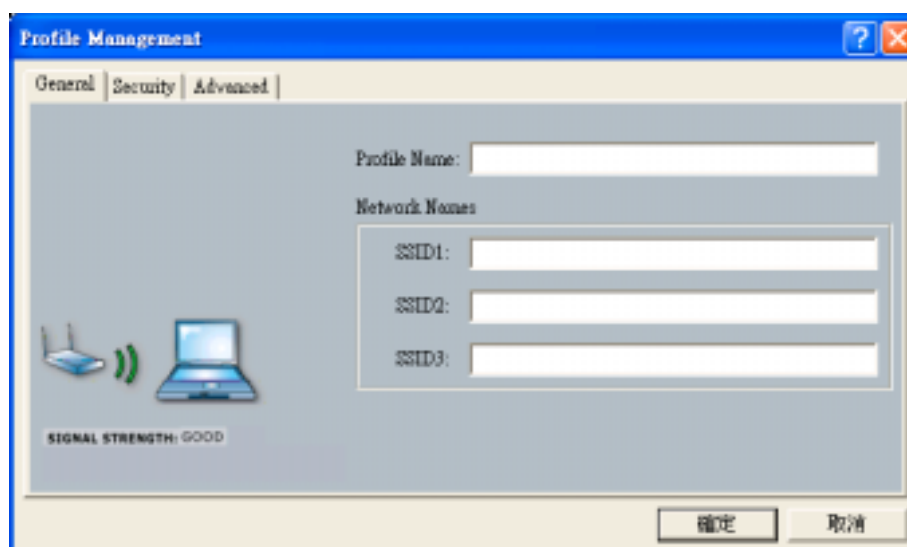


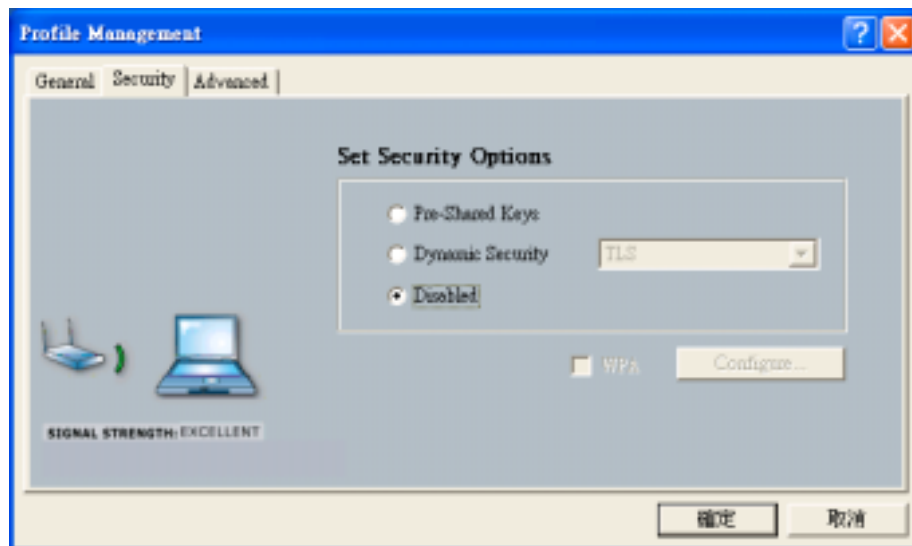
Figure 2-11

Click on the **New** button, it will display a Profile Management window which includes: General, Security and Advanced configuration pages.

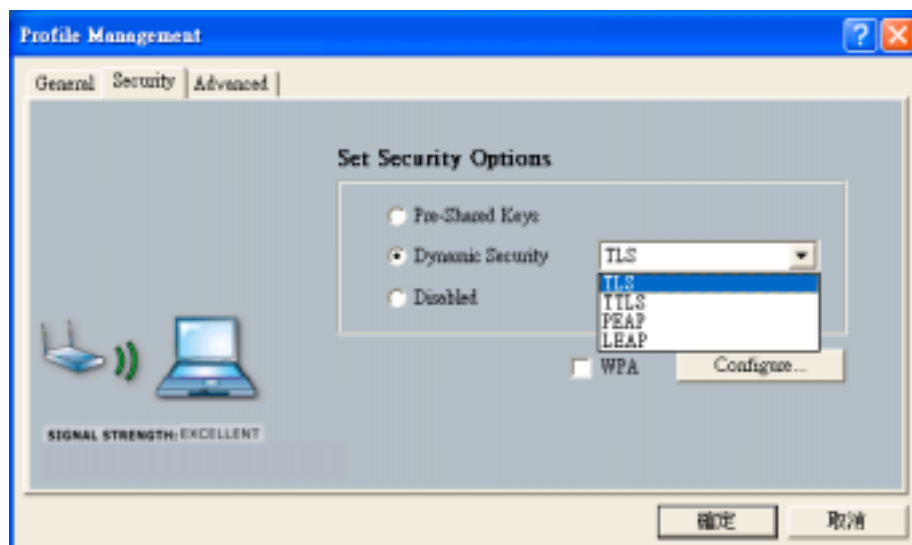
In General page: type the desirable profile name into the Profile Name field and the known SSID into the Network field.



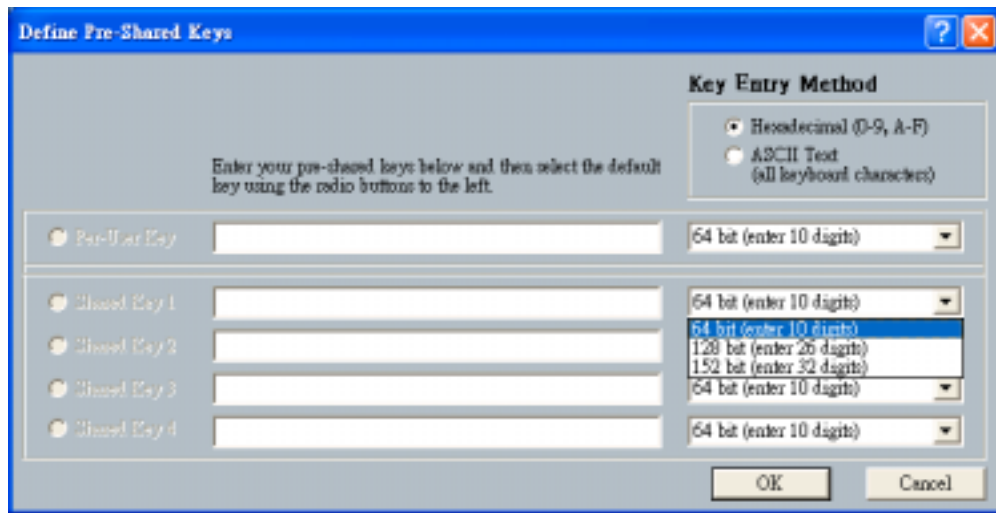
In **Security** page: the default value is **Disable** and you may provide **Pre-Shared Keys**, **Dynamic Security** and Externally Managed 802.1x Keys for selection.



- **Dynamic Security:** the default value is TLS and you may provide TTLS, PEAP, LEAP and Externally Managed 802.1x Keys for selection.

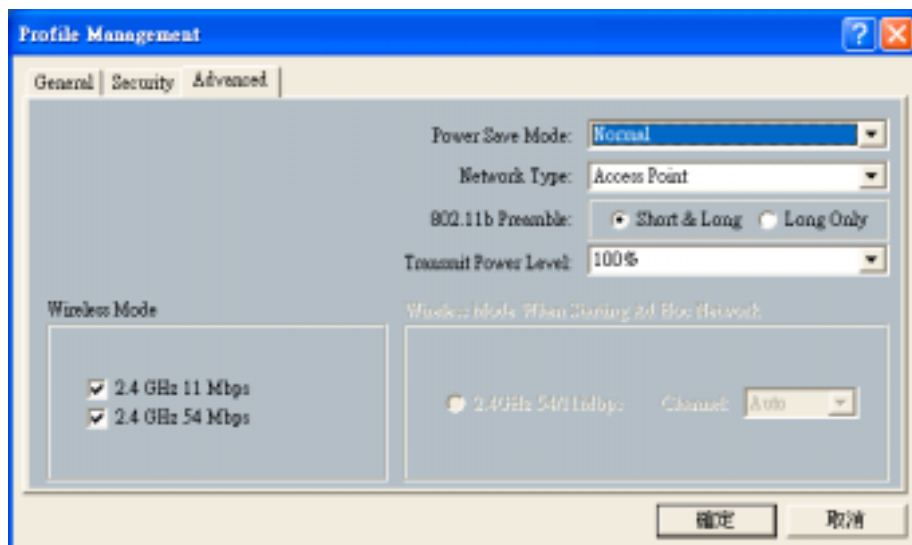


-**Pre-Shared Keys:** There two key entry methods, Hexadecimal and ASCII Text and three levels of Encryption, 64/128/152-bit.



The 'Define Pre-Shared Keys' dialog box features a blue title bar and a light gray background. It includes a 'Key Entry Method' section with two radio buttons: 'Hexadecimal (0-9, A-F)' (selected) and 'ASCII Text (all keyboard characters)'. Below this, a text box instructs the user to 'Enter your pre-shared keys below and then select the default key using the radio buttons to the left.' There are five radio buttons for key selection: 'Per-User Key', 'Shared Key 1', 'Shared Key 2', 'Shared Key 3', and 'Shared Key 4'. Each key has a corresponding text input field and a dropdown menu for encryption level. The dropdown for 'Shared Key 2' is open, showing options: '64 bit (enter 10 digits)', '128 bit (enter 26 digits)', '152 bit (enter 32 digits)', and '64 bit (enter 10 digits)'. The 'OK' and 'Cancel' buttons are at the bottom right.

In **Advanced** page: you can set Power Save Mode, Network Type, 802.11 Preamble, Transmit Power Level and Wireless Mode in this page.



The 'Profile Management' dialog box, 'Advanced' tab, has a blue title bar and a light gray background. It contains several settings: 'Power Save Mode' (dropdown set to 'Normal'), 'Network Type' (dropdown set to 'Access Point'), '802.11b Preamble' (radio buttons for 'Short & Long' and 'Long Only', with 'Short & Long' selected), and 'Transmit Power Level' (dropdown set to '100%'). Below these are two sections: 'Wireless Mode' with two checked checkboxes for '2.4 GHz 11 Mbps' and '2.4 GHz 54 Mbps', and 'Wireless Mode When Joining Ad Hoc Network' with a radio button for '2.4GHz 54Mbps' and a 'Channel' dropdown set to 'Auto'. The 'OK' and 'Cancel' buttons are at the bottom right.

Profile Management provides **Available Networks....** for the user to get information of available AP and Ad Hoc Networks as shown in **Figure 2-12**.

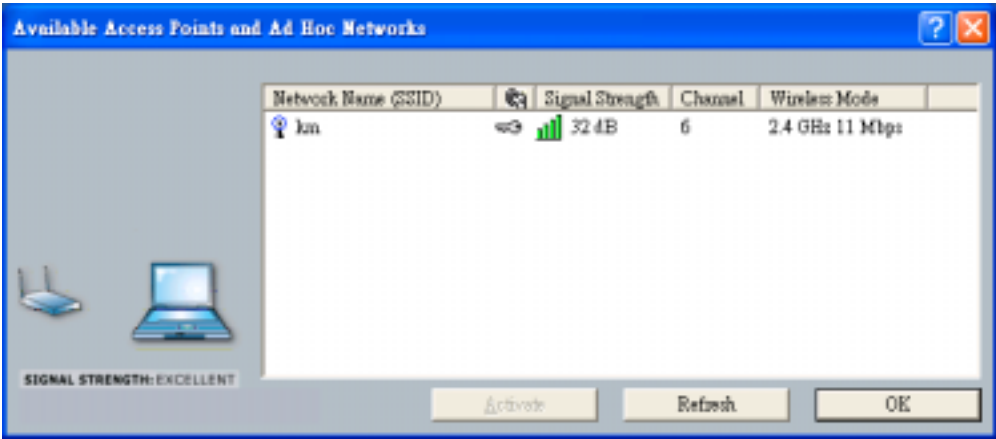


Figure 2-12

3. Diagnostics

Diagnostics provide statistics of Multicast Frames, Broadcast Frames, Unicast Frames and Total Bytes for **Transmit** and **Receive** as shown in **Figure 2-13**.

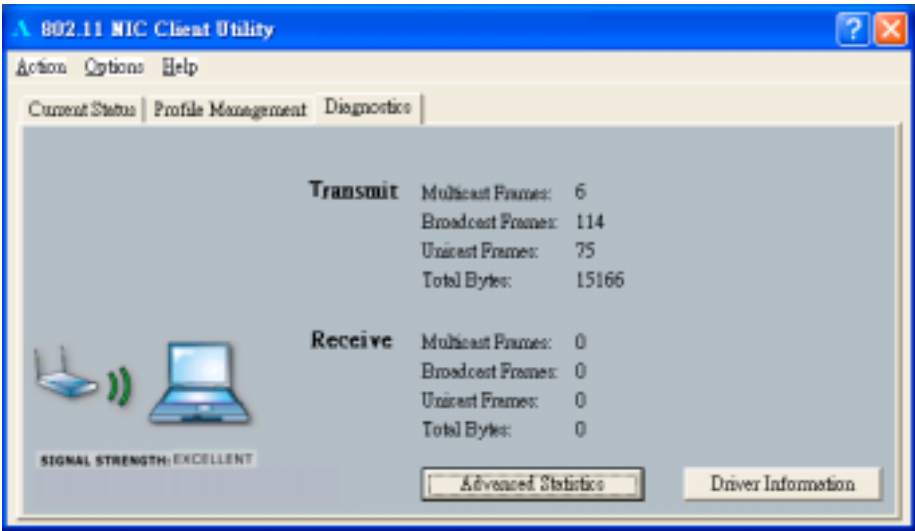


Figure 2-13

Advanced Statistics provide more advanced information for reference as shown in **Figure 2-14**.

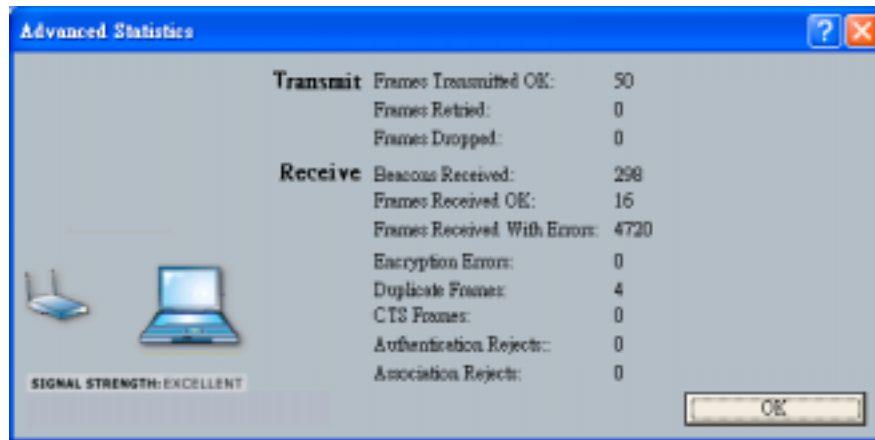


Figure 2-14

Driver Information provides information of Card Name, MAC Address, Driver, Driver Version and Driver Date as shown in **Figure 2-15**.

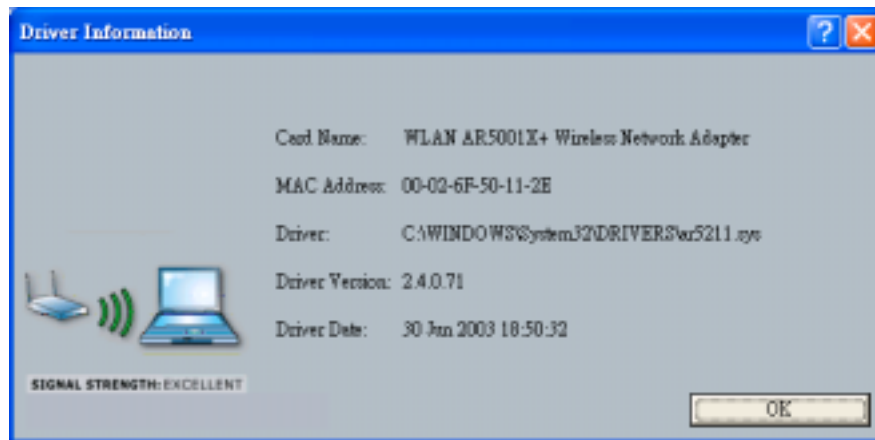


Figure 2-15

2-4 Uninstalling Driver and Utility

If the PCI Card installation is unsuccessful for any reason, the best way to solve the problem may be to completely uninstall the PCI Card and its software and repeat the installation procedure again.

1. Click the **Start** button, select **Control Panel**, and then click on **Add or Remove Programs**.
2. In the Add or Remove Programs window, then select the **802.11 Wireless LAN** item and remove the driver and utility as shown in **Figure 2-16**.

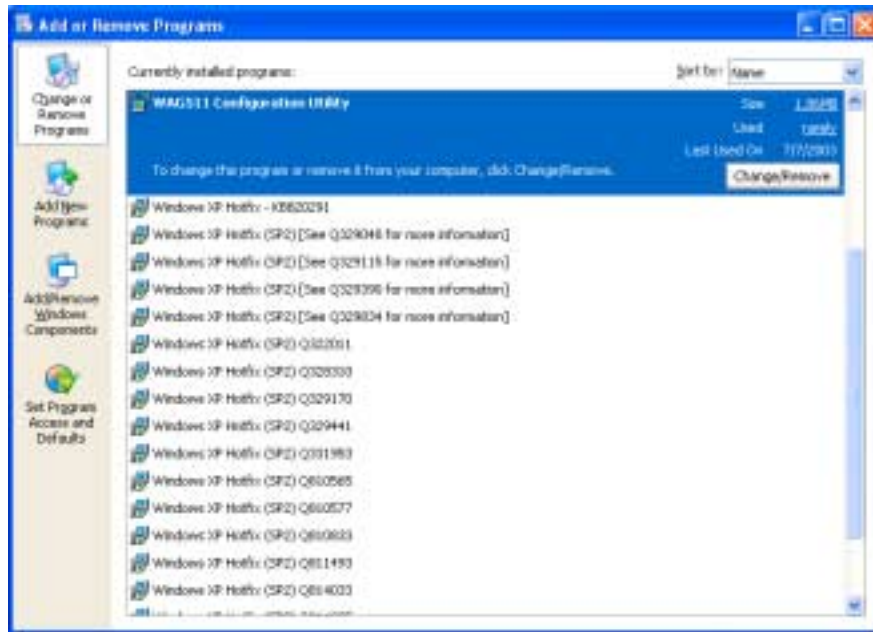


Figure 2-16

3. Select **Remove** in Install Shield Wizard and click **Next** to start to remove driver then click **Finish** to complete driver and utility un-installation as shown in **Figure 2-17**

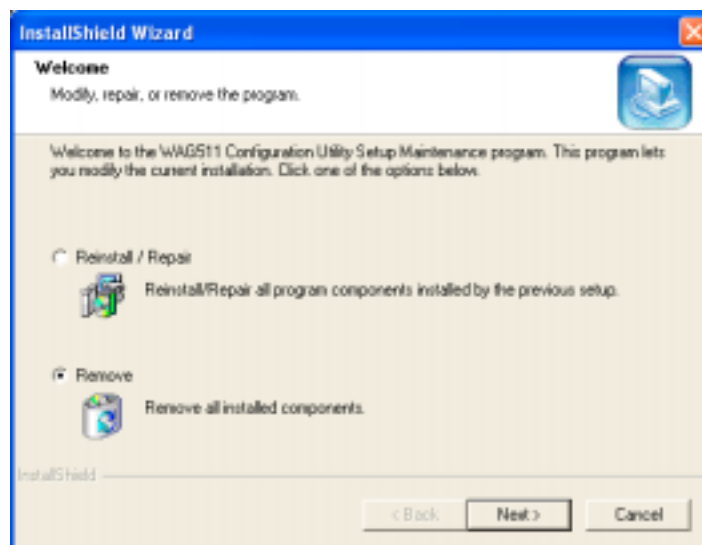


Figure 2-17

■ Chapter 3 Connecting to a Network

This chapter describes how to prepare a connection to network after installing the PCI Card drivers and utility. The following is required for all computers if you want to connect to a network.

1. Check **Client for Microsoft Networks** is installed.
2. Check **Internet Protocol (TCP/IP)** is installed.
3. Check **File and Printer Sharing for Microsoft Networks** is installed.
4. Check **Computer Name** and **Workgroup Name**.

Click **Start** button, select **Control Panel** to open the Control Panel window. In the Control Panel window, clicks on the **Network and Internet Connections**, and then click on **Network Connections** to open the Network Connection window. Right-click on **WLAN AR5001X+ Wireless Network Adapter**, then select **Properties** as shown in **Figure 3-1**.

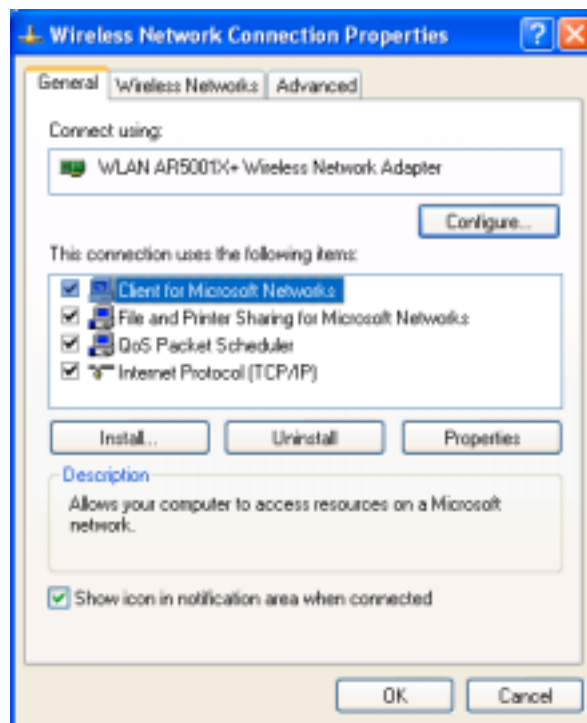


Figure 3-1

3-1 Checking and Adding Client for Microsoft Networks

The Client for Microsoft Networks enables you to connect to other Microsoft Windows computers and servers and use the files and printers shared on them. If you work on Microsoft network environment, you need to set up Client for Microsoft Windows.

Checking the "The connection uses the following items:" list, if there is the Client for Microsoft Networks on it. If no, click on **Install...**, select **Client**, click on **Add...**, and select **Client for Microsoft Networks**, then click on **OK** as shown in **Figure 3-2**, and click on its check box.

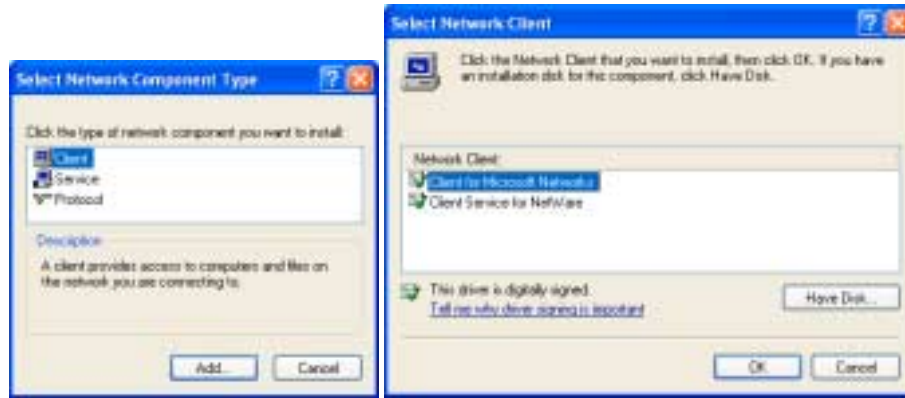


Figure 3-2

3-2 Checking and Adding TCP/IP

TCP/IP is the protocol used to connect to the Internet and wide-area networks. If you want to connect to Internet, you need to set up the TCP/IP protocol.

Check the “**This connection uses the following items:**” list, for the **Internet Protocol (TCP/IP)** on it. If not available, click on **Install...**, select **Protocol**, click on **Add...**, and select **Internet Protocol (TCP/IP)**, then click on **OK** as shown in **Figure 3-3**, and click on its check box. If TCP/IP exists, select the **Internet Protocol (TCP/IP)**, and then click on Properties to configure XXX. Due to different network applications there are many different setting here. You can select either **Obtain an IP address automatically** or **Specify an IP address**. If you use the Specify IP address, then you need to enter an **IP address**, **Subnet Mask**, **Default Gateway** address and **DNS Server** IP address for connecting to Internet.

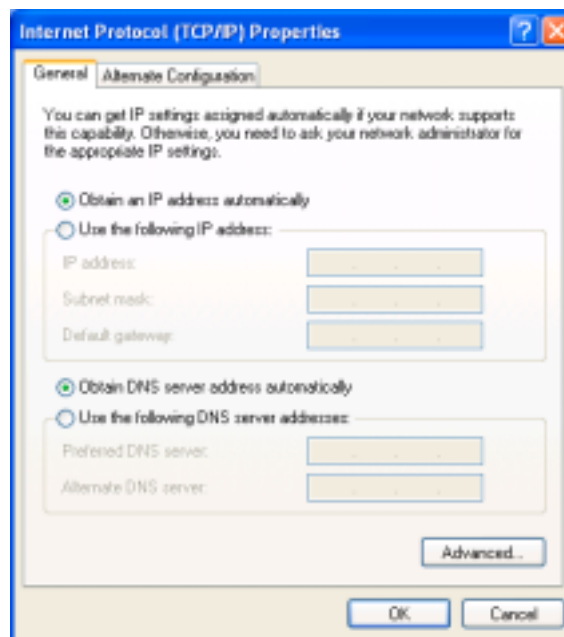


Figure 3-3

3-3 Checking and Adding File and Printer Sharing for Microsoft

Networks

File and Printer Sharing for Microsoft Networks gives you the ability to share your files and printers with other Microsoft Windows computers. If you want to share your files and printers, you need to set up this service.

Check the “**This connection uses the following items:**” list for the **File and Printer Sharing for Microsoft Networks** on it. If not available, click on **Install...**, select **Service**, click on **Add...**, and select **Microsoft > File and Printer Sharing for Microsoft Networks**, then click on **OK** as shown in **Figure 3-4**, and click on its check box.

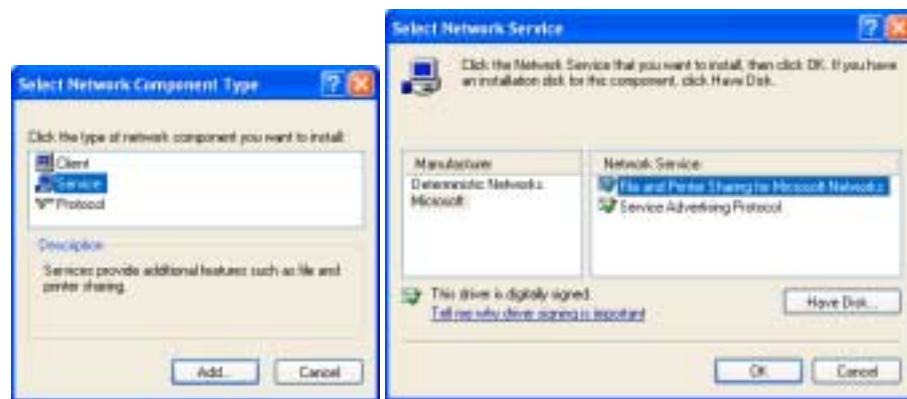


Figure 3-4

3-4 Checking and Adding Computer Name & Workgroup Name

Windows uses the computer name and workgroup name to identify your computer on the network. Please enter a unique name for your computer, the workgroup it will appear in, and a short description of the computer.

From **Start > My Computer** (right-click) > **Properties** in **Computer Name** tag to check the computer name, workgroup name and computer description are entered as shown in **Figure 3-5**.

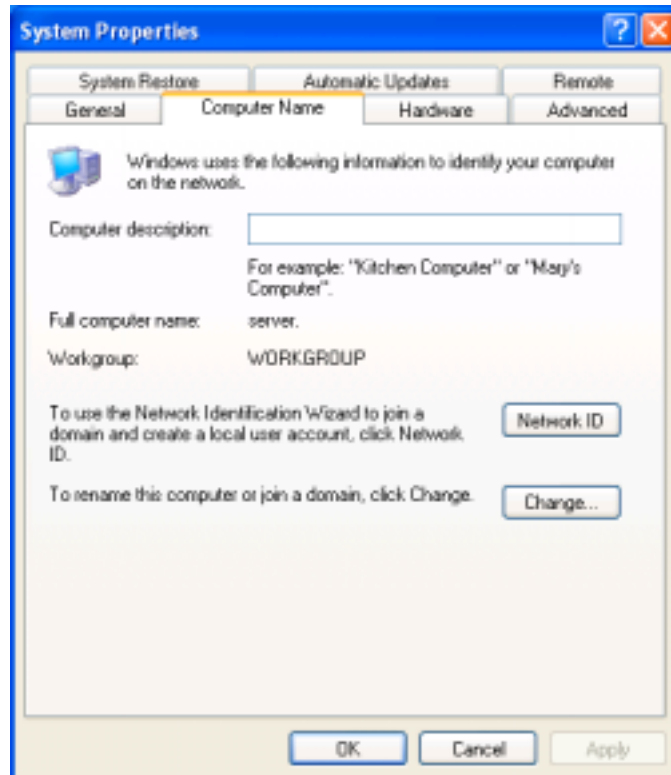


Figure 3-5

Then click the **Change...** button to rename the computer and join a workgroup or a domain as shown in Figure 3-6.

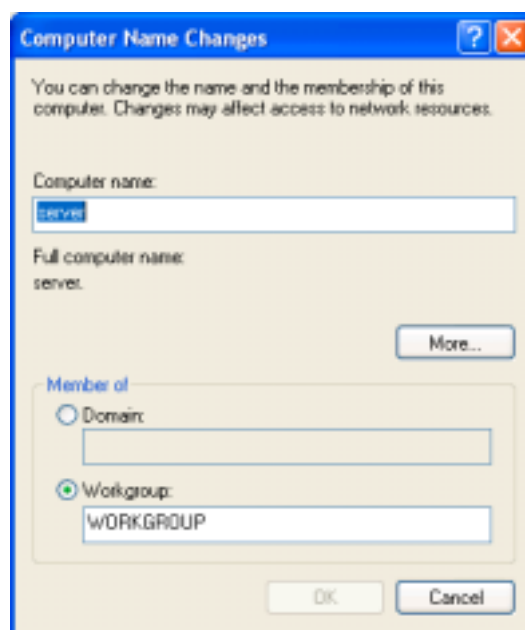


Figure 3-6

■ Chapter 4 Troubleshooting

This chapter describes the problems and corresponding solutions that may occur while installing and operating the 3054 PCI Aries. If you cannot find the answer you need here, please visit the SENA website www.senao.com to get further support.

● Common Problems and Solutions

1. The 3054 PCI Aries does not work properly.
 - Reinsert the 3054 PCI Aries into PCI slot of your computer.
 - Click the **Start** button, right-click on **My Computer**, and then select **Properties**. In the **System Properties** window, select the tag of **Hardware**, and then click on **Device Manager**. Click on the **Network adapters**, and then you will find the **WLAN AR5001X+ Wireless Network Adapter**, if it is installed successfully. If you find an exclamation mark or a yellow question mark, that means there are some resource conflict, then please check the following:
 - Make sure that a free IRQ has been assigned to this network adapter.
 - Make sure that the network adapter has been inserted correctly and drivers have been installed properly.

(If the 3054 network adapter still does not function well, remove the network adapter and do the following.)

 - Uninstall the driver software from your computer.
 - Restart your computer and repeat the steps in Chapter 2.
2. Under Infrastructure mode, the computer linked via wireless cannot communicate with other computers linked via Ethernet.
 - Make sure the computer inserted 3054 PCI Aries is associated correctly with your AP or wireless router.
 - Make sure both computers are configured on the same IP subnet.

■ Appendix A Product Specifications

General

Data Rates	802.11g : 6, 9, 12, 18, 24, 36, 48 & 54Mbps
Network Standard	IEEE 802.11, IEEE 802.11b, 802.11g draft
Compliance	FCC Part 15/UL, ETSI 300/328/CE
Drivers	Microsoft Windows 98SE/ME/2000/XP
Operational Voltage	3.3 V
Security	IEEE802.1x Client Support for LEAP (Optional) WPA -- Wi-Fi Protected Access (64,128,152-WEP with TKIP)

RF Information

Frequency Band	2.412~2.462GHz(US) 2.412~2.484GHz(Japan) 2.412~2.472GHz(Europe ETSI) 2.457~2.462GHz(Spain) 2.457~2.472GHz(France)
Media Access Protocol	Carrier sense multiple access with collision avoidance (CSMA/CA)
Modulation Technology	802.11g : OFDM (64-QAM, 16-QAM, QPSK, BPSK)
Operating Channels	11 for North America, 14 for Japan, 13 for Europe, 2 for Spain, 4 for France
Receive Sensitivity	-91dBm@ 1Mbps -85dBm@ 9Mbps -77dBm @ 36Mbps -89dBm@ 2Mbps -82dBm@ 12Mbps -76dBm@ 48Mbps -87dBm@ 5.5Mbps -80dBm@ 18Mbps -73dBm@ 54Mbps -86dBm@ 6Mbps -78dBm@ 24Mbps
Transmit Output Power (Typical)	Up to 21dBm

Physical

Interface	PCI Type
Connector	MMCX (Ms)
Dimensions (H*W*L)	50.9(L) mm x 59.6(W) mm x 4.8(H) mm (2 (L) in x 2.3(W) in x 0.2(H) in)
Weight	15 g (0.53 oz)

Environmental

Temperature Range	-10°C to 60°C (14°F to 140°F) - Operating -40°C to 70°C (-40°F to 158°F) – Storage
Humidity (non-condensing)	5%~95% Typical

■ Appendix B Regulatory Compliance Information

Radio Frequency Interference Requirements

This device complies with Part 15 of FCC Rules and Canada RSS-210.

Operation is subject to the following conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.
3. To comply with RF safety requirements, you must maintain a distance of 20 cm from the antenna when operating the device.
4. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules; these limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates and uses and 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 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.

FCC Caution: To assure continued compliance, (example – use only shielded interface cables when connecting to computer or peripheral devices). Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.