SENAO
Wireless LAN Card

User Guide

NL-2511CD PLUS EXT2

Before operating the unit, please read this manual and retain it for future

Manufactured by ISO-9001 Certified Factories

The user guide is fit for both Wireless LAN Card and Long Range Wireless LAN Card

Contents

1. Introduction **1**

1.1 Package Contents **1**

1.2 PC Card Description **1**

1.3 System Requirements **2**

1.4 Features and Benefits **2**

1.5 Applications **2**

1.6 Network Configurations **3**

2. Installing Driver and Utility **7**

2.1 Installation for Windows 95/98/ME/2000 **7**

2.2 Installation for Windows XP **9**

2.3 Checking after Installation **10**

2.4 Wireless LAN Client Utility **12**

2.5 Uninstalling Driver and Utility **17**

3. Connecting to a Network **18**

3.1 Checking and Adding Client for Microsoft Networks **18**

3.2 Checking and Adding NetBEUI **19**

3.3 Checking and Adding TCP/IP **20**

3.4 Checking and Adding File and Printer Sharing for Microsoft Networks **21**

3.5 Checking and Adding Computer Name and Workgroup Name **21**

4. Troubleshooting **22**

Appendix A Product Specifications **25**

Appendix B Regulatory Compliance Information **27**

Chapter 1 Introduction

This chapter describes the package contents, PC Card description, system requirements, features & benefits, applications and network configurations of our wireless LAN products.

1-1 Package Contents

The PC Card package contains the following items as shown in ***Figure 1-1***

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

Figure 1-1

1- 2 PC Card Descriptions

The PC Card is a standard PC Card that fits into any PCMCIA Card Type II slot. The PC Card has a LED indicator and two antenna connectors as shown in ***Figure 1-2***.

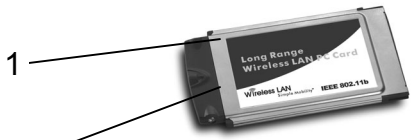


Figure 1-2

1. Two antenna connectors
2. Link LED
   - 802.11 AdHoc mode – Blinking, no matter the wireless is connected or not
   - Infrastructure – Solid GREEN when the wireless is connected
   - Off – No wireless activity

1- 3 System Requirements

Installation of the PC Card requires:

1. PC/AT compatible computer with PCMCIA Type II slot.
2. Windows 98//ME/2000/XP operating system environment.
3. Minimum 1.3M bytes free disk space for installing the PC Card driver and utility program.

1- 4 Features and Benefits

11Mbps data transfer rate	High-speed data transmission
22.5dBm transmit output power	Long operating range, up to three times range of standard products
IEEE 802.11 complient	Fully interoperable with IEEE 802.11b compliant products
Automatic data rate scaling at 11, 5.5, 2 and 1 Mbps	Optimized throughput, range and connectivity
Improved 64/128-bit WEP Engine	Significantly improved throughput
Wide coverage range up to 1200 meters in open space	Wireless connectivity for all your computers
Advanced Power Management	Extended battery life
Plug and Play PC Card Interface	Easy installation
Significantly improved indoor multipath distortion	Higher link quality in indoor environment

1- 5 Applications

The 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 can not or not easily be laid. 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 frequently rearrange the workplace.
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 Configurations

To better understand how the wireless LAN products work together to create a wireless network, it might be helpful to depict a few of the possible wireless LAN PC 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.
3. IP Sharing for 56K/ISDN TA/Cable/DSL Modem – Connect Internet and your SOHO network.

Ad-hoc (peer-to-peer) Mode

This is the simplest network configuration that several computers equipped with the PC Cards that form a wireless network whenever they are within range of one another (***Figure 1-3***). In ad-hoc mode, each client, is peer-to-peer, would only have access to the resources of the other client and requires no the access point. This is the easiest and

least expensive way for the SOHO to set up a wireless network.

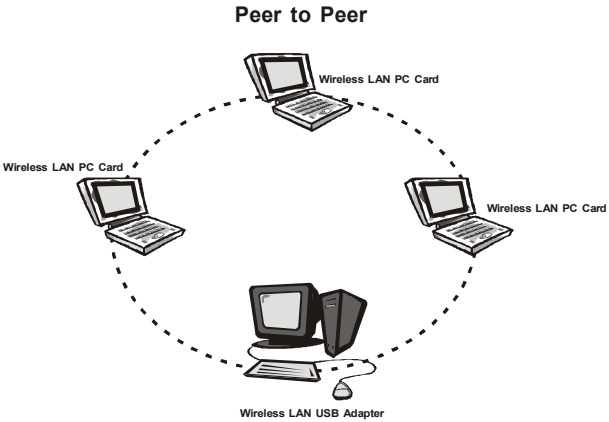


Figure 1-3 A wireless Ad-hoc network

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 the AP is wired to 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 doubling the distance between wireless stations as shown in ***Figure 1-4.***

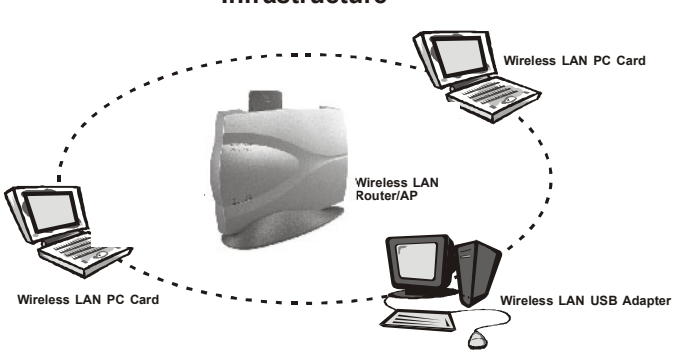


Figure 1-4

Extended-range independent WLAN using AP as repeater

If wired to an Ethernet network as shown in ***Figure 1-5***, 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 server resources as well as to other clients.

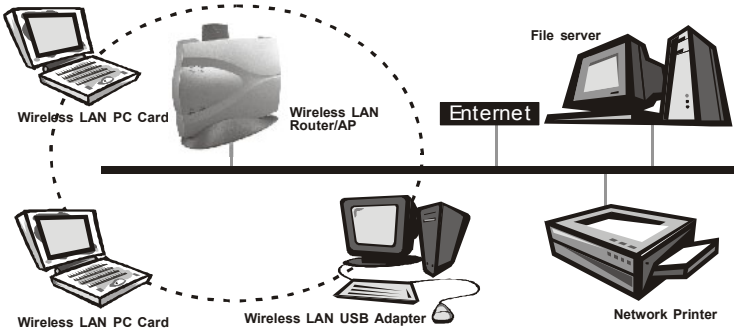


Figure 1-5 Single AP bridge

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 1-6. In this scenario, access points hand the client off from one to another in a way that is invisible to the client, ensuring roken connectivity. Wireless clients can roam seamlessly between different coverage areas and remain connected to the network.

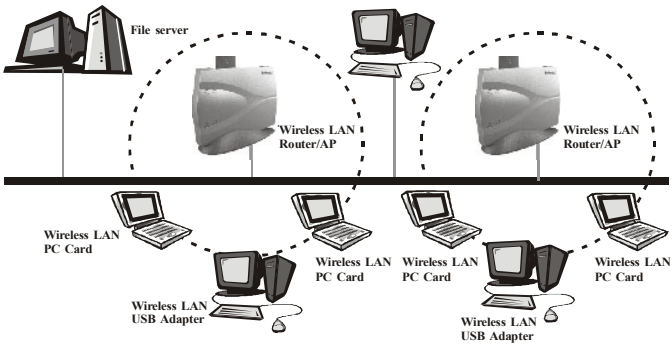


Figure 1-6 Multiple-AP and roaming

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 1-7***. You don't have to buy an expensive router. Nor you have to buy several modems and setup phone lines. Just share one AP, one Modem, single dial-up account, and one phone line, dozens of network users can go surfing the Internet concurrently.

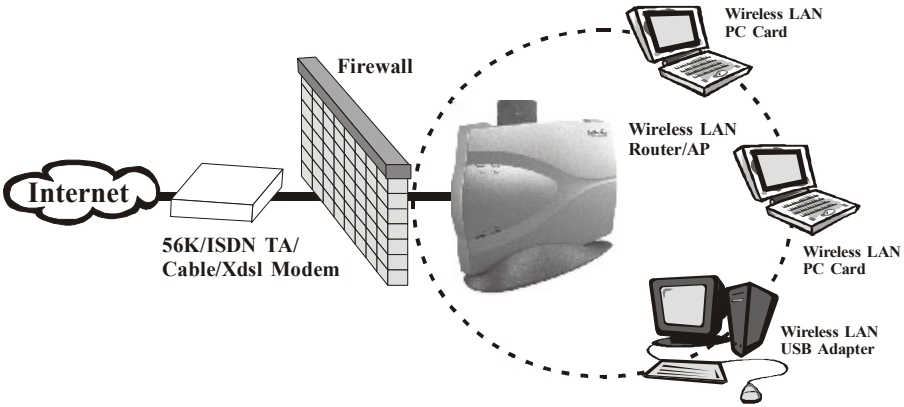


Figure 1-7 Wireless router and IP Sharing

Chapter 2 Installing Drivers & Client Utility

This chapter describes how to install the PC Card drivers and client utility under Windows 95/98/ME/2000/XP.

2-1 Installation for Windows 95/98/ME/2000

During the installation, Windows 95/98/ME/2000 may need to copy Windows systems files from the Windows 95/98/ME/2000 installation diskette or CD-ROM. Therefore you will need a copy of the Windows 95/98/ME/2000 installation diskette or CD-ROM at hand before installing the driver. On many systems, instead of a CD, the necessary installation files are archived on the hard disk in C:\WINDOWS \OPTIONS\CABS directory.

Installation Procedure:

1. Turn on your computer.
2. Be sure that there is no PCMCIA adapter inserted yet.
3. Insert the ***Wireless LAN Installation*** CD into your CD-ROM drive. The setup program should start automatically as shown in ***Figure 2-1***. If it does not start, you can run it manually by selecting RUN from the Start menu and running SETUP.EXE from CD-ROM drive.

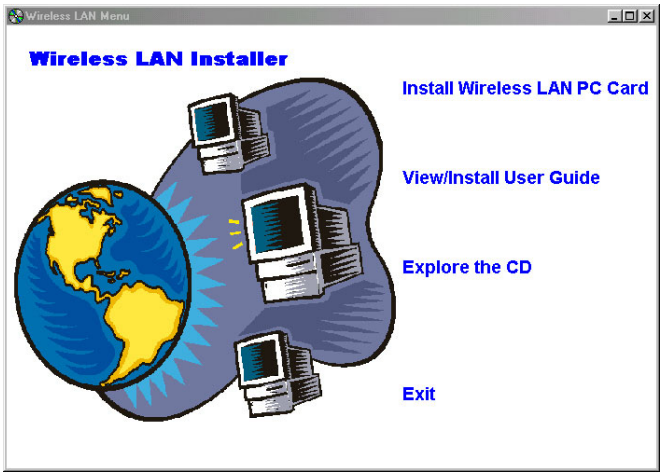


Figure 2-1

4. From LAN Installer, select ***Install Wireless PC Card***. Follow the instructions as they appear.
5. Enter the System ID (or SSID) of the wireless LAN (default Network ID is ***IEEE802.11***) as shown in ***Figure 2-2***. The SSID is the name of the wireless LAN Service Area of the wireless network to which your computer will connect. The name you enter here must match exactly the name assigned to the Access Point. Characters, capitalization, and spacing must be identical.

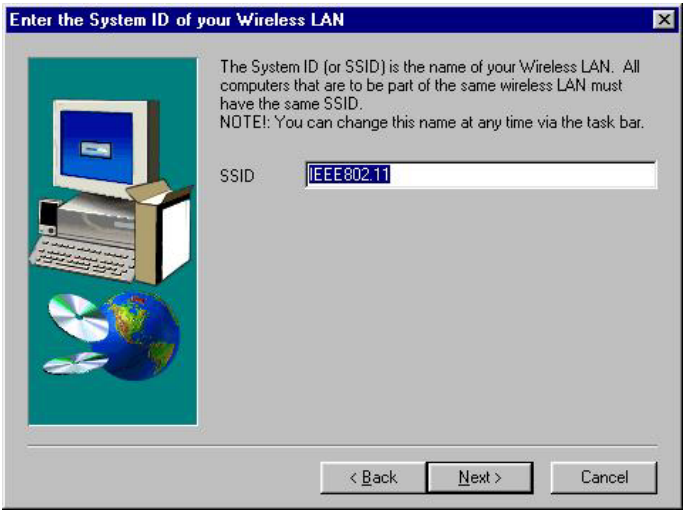


Figure 2-2

6. Select the Network Mode in which your wireless client will operate as shown in ***Figure 2-3***. If you are unfamiliar with Network Mode, refer to Chapter 1-6 Network Configurations for details. Follow the instructions as they appear.
7. Restart your computer.
8. Insert the PC Card into the PCMCIA slot of your computer.
9. Make sure that the network protocol parameters are set correctly for your computer. These include the IP address, subnet mask, gateway and DNS. If you are unfamiliar with how to set network protocol parameters, refer to Chapter 3 Connection to Network for details.
10. Restart your computer for changes to take effect.

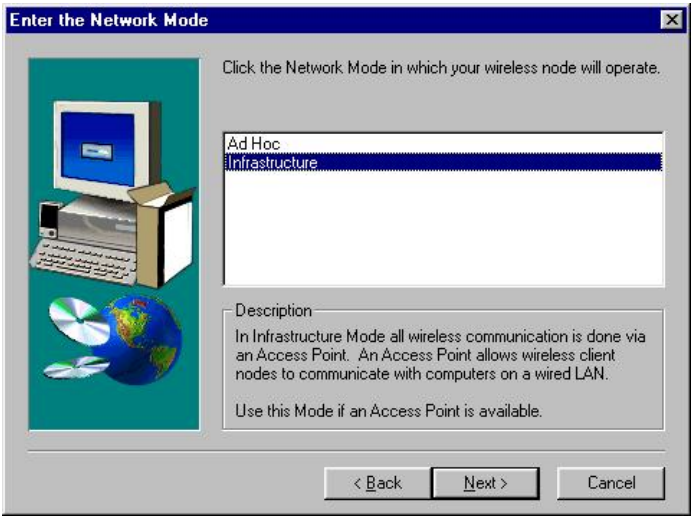


Figure 2-3

2- 2 Installation for Windows XP

Installation Procedure:

1. Insert the Wireless LAN PC Card into the PCMCIA slot and power on your computer.
2. Windows XP would automatically detect the Wireless LAN PC Card, and asks you for the proper Device Driver.
3. Insert your ***Wireless LAN Installation CD*** into your CD-ROM device and specify the installation path at ***D:\winxp*** (where D: is the letter of your CD-ROM drive).
4. A warning message would pop up while installation, the message shows this driver need the "***digital signature***", and click the ***Next*** button.
5. Click the ***Finish*** button, and Windows XP would show a network connection icon on "***taskbar***". If not, restart your computer.

Note

1. If your computer running Windows 95/98/ME/2000/NT installed Wireless LAN PC card and you would like to upgrade to Windows XP, you have to remove Wireless LAN PC card driver & utility from your computer in advance to let the Wireless LAN PC card work with Windows XP properly.
2. Please follow the procedure: click ***Start*** button, select ***Program***, point to ***Wireless LAN PC Card***, and then click Uninstaller to uninstall the driver and utility automatically.
3. Once you finish removing the driver and utility, please refer to the above installation procedure for Windows XP.

Uninstallation Procedure:

1. Insert the Wireless LAN PC Card into the PCMCIA slot.
2. Right click ***My Computer***--->Select ***Properties***.
3. On the **Hardware tab**, choose **Device Manager**, and click ***Network Adapter.***
4. Choose ***Wireless LAN PC Card*** and remove it.
5. After removing the ***Wireless LAN PC Card***, restart your computer.

2- 3 Checking after Installation

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

1. Click the ***Start*** button, select ***Settings***, and then click ***Control Panel***.
2. In the ***Control Panel*** window, double-click the ***System*** icon, then select the ***Device Manager*** tab.
3. Double-click ***Network adapters***, then select ***Wireless LAN PC CARD*** as shown in ***Figure 2-4***.

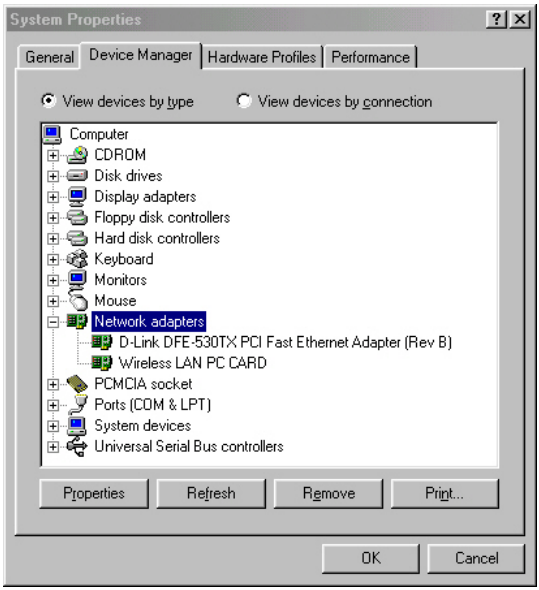


Figure 2-4

4. Click the ***Properties*** button, then check the message. ***This device is working properly*** is displayed for Device status as shown in ***Figure 2-5***.
5. If you find the Yellow (?) sign on the adapter or the above message is not displayed, it shows the installation is not successful or the wireless LAN PC Card is not operating properly. Uninstall and re-install the driver, referring to Chapter 2-6 Uninstalling Driver and Utility.

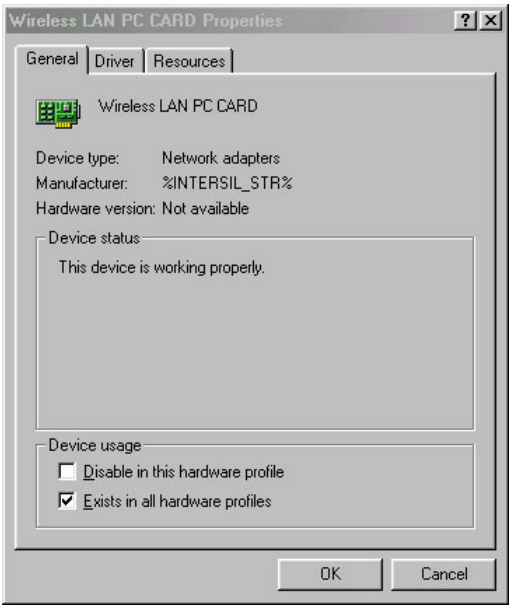


Figure 2-5

2- 4 Wireless LAN Client Utility

Wireless LAN Client Utility is used to display or change the PC Card information about link, configuration, encryption, and utility/driver/firmware version information. The client utility will also help you with site selection. The client utility will be installed automatically after installing the driver and utility. A new icon should appear in your Icon tray. If the icon change to red icon, it means the wireless is disconnection.

After finishing installing the driver and utility, the client utility will automatically be executed and show a small green ***radio*** icon at the right corner of ***Taskbar*** whenever the PC Card is inserted into the PC Card slot of your computer. Double-click the ***radio*** icon to open the ***Wireless LAN Client Utility*** window as shown in ***Figure 2-6***. You can click the taps on the top of the windows to select various screen messages. Below we explain the use and meanings of the various screen messages.

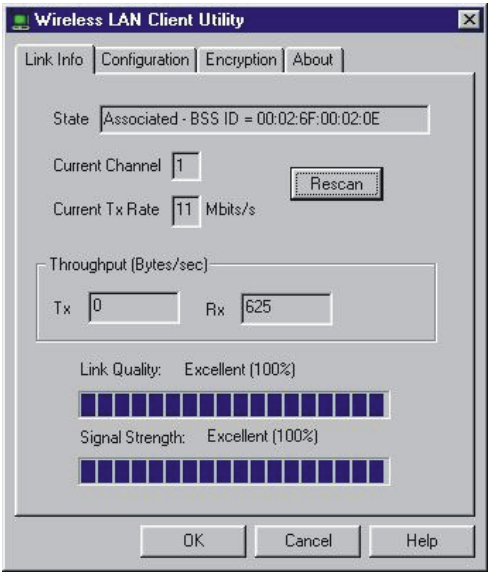


Figure 2-6

1. Link Info

State

Shows status information about the radio link, as shown in ***Figure 2-6***

- Associated BSSID – means the wireless client is connected to an access point. BSSID is shown in the form of six hex digits which is the MAC address of the access point.
- Scanning – means the wireless client is searching for an available access point in infrastructure mode.
- Disconnected – means there are no access points or other wireless clients (if communicating in Ad-hoc mode), or the PC Card is unplugged in your computer.

Current Channel

The operation radio frequency channel that wireless client is using in infrastructure mode. In infrastructure mode, wireless client will always go the same channel as their Access Point.

Current Tx Rate (Mbits/s)

The data speed that wireless client is transmitting.

Throughput (Bytes/sec)

• Tx: shows the outgoing (sent) data speed.

• Rx: shows the incoming (received) data speed.

Link Quality

The bar shows the measured signal level and connection status. The higher blue bar is, the better is radio signal received by the PC card.

Signal Strength

The bar shows signal strength level. The higher blue bar is, the more powerful radio signal is received by the PC Card.

2. Configuration

Mode

Selects one of the following network mode, as shown in ***Figure 2-7***.

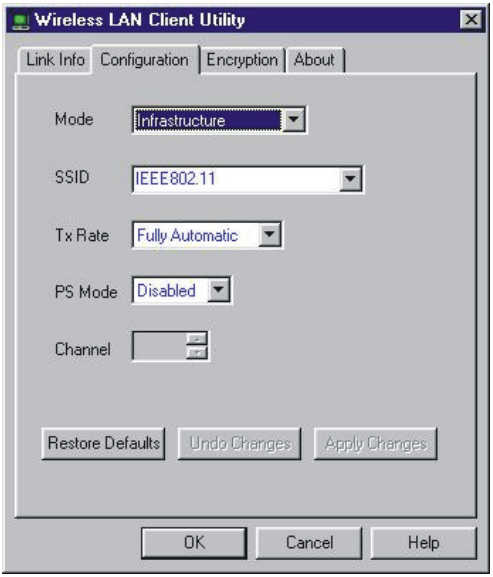


Figure 2-7

- 802.11 AdHoc: this is the IEEE802.11 peer-to-peer mode of operation and requires no the Access Point. When wireless clients are operated in this mode, all wireless clients require the same SSID and don't care the channel number.
- Infrastructure: this mode of operation requires the use of an Access Point.

In this mode, all wireless communications between computers have to be via the Access Point. (Default setting is ***Infrastructure***)

SSID

SSID is an identification code required for communication in a wireless LAN. You will only be able to connect with a wireless client (802.11 AdHoc) or an Access Point (Infrastructure) which has the same SSID. If the SSID of a PC Card is set as ***any***, then the PC Card is possible to be connected to all available Access Point. (Default setting is ***IEEE802.11***)

Tx Rate

Select the transmission rate at which the data packets are transmitted by the client. You can set this to Fully Automatic, 1Mbps, 2Mbps, Auto 1 or 2Mbps, 5.5Mbps, or 11Mbps. (Default setting is ***Fully Automatic***)

PS Mode

Power saving management, disabled or enabled. (Default setting is ***Disabled***)

Channel

Select the operating radio frequency channel in 802.11 AdHoc mode.

3. Encryption

If you require high security in transmission, you can select 64 or 128-bit WEP (Wired Equivalent Privacy) key to encrypt data (Default setting is ***Disable***) as shown in ***Figure 2-8***. WEP encrypts each frame transmitted from the radio using one of the Keys from this panel. When you use WEP to communicate with the other wireless clients, all the wireless devices in this network must have the same encryption key or passphrase.

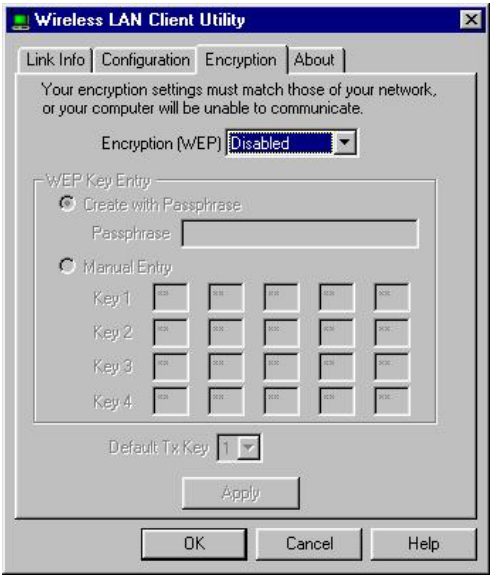


Figure 2-8

This panel allows the entry of keys or passphrase, which can then be written to the driver and registry. Note that each key must consist of hex digits, it means that only digit 0-9 and letters A-F are valid entries. If entered incorrectly, program will not write keys to a driver.

4. About

About tab shows the product/driver/utility/PC Card firmware version as shown in ***Figure 2-9***. Users have to use this version number when reporting their problems to technical support.

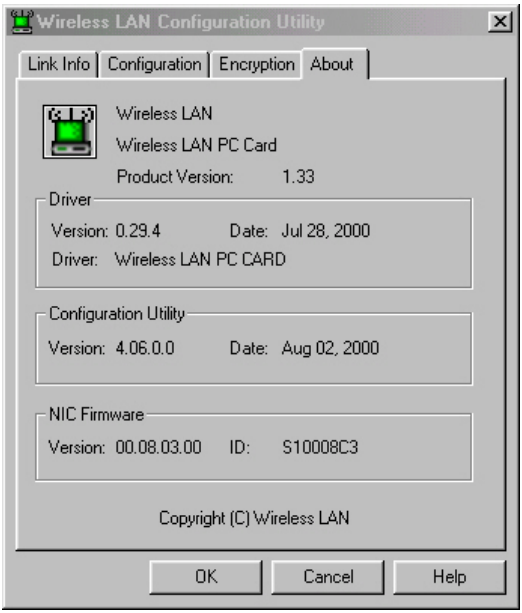


Figure 2-9

2- 5 Uninstalling Driver and Utility

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

1. Click the ***Start*** button, select ***Program/Wireless LAN PC Card***, and then click ***Uninstaller*** to uninstall the driver and utility. Uninstaller will automatically uninstall and clear all drivers, utility, related settings installed previously.

Chapter 3 Connecting to a Network

This chapter describes how to prepare for connection to network after install the PC 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 ***NetBEUI -> Wireless LAN PC Card*** installed.
3. Check ***TCP/IP -> Wireless LAN PC Card*** is installed.
4. Check file and printer sharing for Microsoft Networks.
5. Check computer name and workgroup name.

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 works on Microsoft network environment, you need to set up ***Client for Microsoft Networks***.

1. After finishing installing the driver & utility and rebooting the computer as described in Chapter 2. The computer will show a dialog box titled ***Enter Network Password*** dialog box. Enter your password if it had been set or just click ***Cancel***.
2. Click ***Start*** button, select ***Settings*** and then click ***Control Panel*** to open the ***Control Panel*** window.
3. In the ***Control Panel*** window, double-click the ***Network*** icon to open the ***Network*** dialog box.
4. Select ***Configuration*** tab to check ***Client for Microsoft Networks*** is installed as shown in ***Figure 3-1***. If no, click the ***Add*** button. Select ***Client*** and click the ***Add*** button.

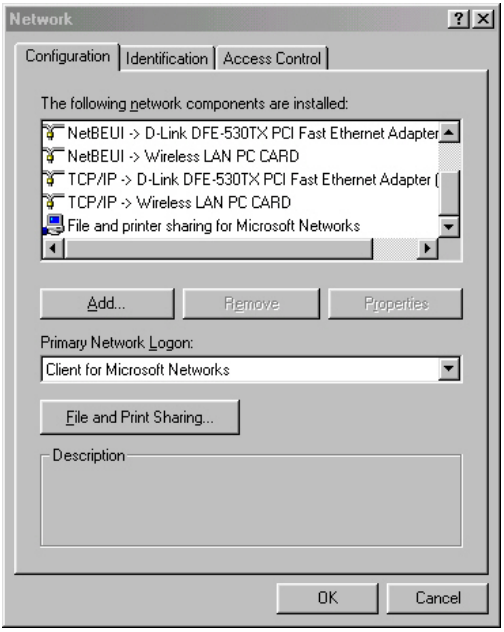


Figure 3-1

5. Select ***Microsoft*** for Manufacturer and ***Client for Microsoft Networks*** for Network Client, and then click ***OK***.

3-2 Checking and Adding NetBEUI

NetBEUI is a protocol you can use to connect to Windows NT, Windows for Workgroups, or LAN Manager servers. If you work on Microsoft network environment, you need to set up NetBEUI protocol.

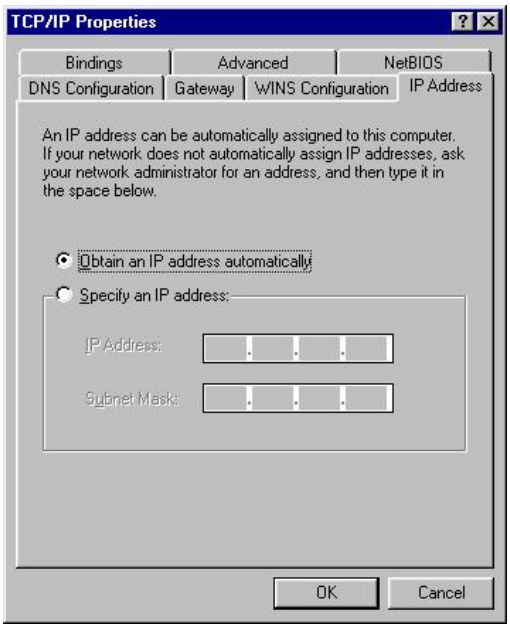
1. Repeat the step 2 and 3 of Chapter 3-1 Checking and Adding Client for Microsoft Networks.
2. Select ***Configuration*** tab to check ***NetBEUI -> Wireless LAN PC Card*** is installed. If no, click the ***Add*** button. Select ***Protocol*** and click the ***Add*** button.
3. Select ***Microsoft*** for Manufacturer and ***NetBEUI*** for Network Protocol, and then click ***OK***.

3-3 Checking and Adding TCP/IP

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

1. Repeat the step 2 and 3 of Chapter 3-1 Checking and Adding Client for Microsoft Networks.
2. Select ***Configuration*** tab to check ***TCP/IP -> Wireless LAN PC Card*** is installed. If no, click the ***Add*** button. Select ***Protocol*** and click the ***Add*** button.
3. Select ***Microsoft*** for Manufacturer and ***TCP/IP*** for Network Protocol, and then click ***OK***.
4. If yes, double-click ***TCP/IP -> Wireless LAN PC Card*** to open ***TCP/IP properties*** as shown in ***Figure 3-2***. Due to different network applications there are many different settings here. You can select either ***Obtain an IP address automatically*** or ***Specify an IP address***. If you use the ***Specify and IP address***, then you need to enter an ***IP address***, ***Subnet Mask***, ***Gateway*** IP address, and ***DNS Server*** IP address for connecting to Internet.

Figure 3-2



3-4 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 or printers with Windows NT and Windows for Workgroups computers. If you want to share your files or printers with Microsoft networks, you need to set up this service.

1. Repeat the step 2 and 3 of Chapter 3-1 Checking and Adding Client for Microsoft Networks.
2. Select ***Configuration*** tab to check ***File and printer sharing for Microsoft Networks*** is installed. If no, click the ***File and Printer Sharing*** button.
3. In the ***File and Print Sharing*** window, select what you need, and click ***OK***. ***File and printer sharing for Microsoft Networks***, and then click ***OK***.

3-5 Checking and Adding Computer Name & Workgroup Name

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

1. Repeat the step 2 and 3 of Chapter 3-1 Checking and Adding Client for Microsoft Networks.
2. Select ***Identification*** tab (Windows 98) or User Information tab (Windows 95) to check the computer name, workgroup and computer description are entered. If no, enter a computer name, a workgroup name and then click ***OK***. The description field may be left blank. If you want to share data with other persons, make sure you have the same workgroup name.

Chapter 4 Troubleshooting

This chapter describes the problems and corresponding solutions that may occur when installing a PC Card.

Symptom	Solution
Windows does not detect the PC Card when installed.	Verify that the PC Card is properly inserted into the PC Card slot. Check whether the computer has a Plug and Play BIOS. Windows 95/98/ME/2000/XP might not detect the PC Card if a previous installation of the PC Card was cancelled before it was finished. Remove the previous driver, and redo the installation again.
Driver fails to load	A resource conflict could exist. For Windows 95/98/ME/2000, use the ***Device Manager*** to resolve resource conflicts. Select ***System*** from the ***Control Panel***, then click on the ***Device Manager*** tab.

Device conflict on a Windows system	A device conflict under Windows 95/98/ME/2000 may be related to the PC Card. For Windows 95/98/ME/2000, use the Computer properties to identify the used I/O port addresses and IRQ values. If there is a device conflict, select alternative settings for I/O Base Address or IRQ values. If you know which device is conflicting with the PC Card, you have the option of changing that device's I/O address or IRQ instead of changing the PC Card.
No resource conflicts were detected, but the wireless station does not attach to the network	Verify that the ***SSID*** of the PC Card matches that of the access point. Use the ***Network Configuration Properties Application*** in the ***Control Panel*** to modify the ***SSID***. Verify that the ***Network Mode*** of the PC Card is configured correctly.

Nonfunctioning card LED	The PC Card is not powered on. The cause may be: • No Driver loaded or installed. • Card – Driver mismatch which prevented the driver from loading. • Device conflict which prevented the driver from loading. Actions: • Verify that a driver has been installed. • Determine if there is a conflict with another device.
Weak signal or intermittent connection.	Try reorienting the antenna. The PC Card antenna is attached to the end of the PC Card. For best use of the antenna: Keep the area around the antenna clear from materials that could block radio transmission, such as metal objects, electronic devices, and cordless telephones. If your signal is weak, change the direction of the antenna slightly. If necessary, move your notebook computer a few inches to find a better signal. Use the Link Quality and Signal Strength display in the ***Client Utility*** to determine the best location and orientation for a network connection.

Appendix A Product Specifications

General

Radio Data Rate	11, 5.5, 2 and 1 Mbps, Auto Fall-Back
Range (open environment)	11 Mbps – 450m 5.5 Mbps – 600m 2 Mbps – 750m 1 Mbps – 1200m
Operating Voltage	3.3V/5V
Regulation Certifications	FCC Part 15/UL, ETSI 300/328/CE
Compatibility	Fully interoperable with IEEE802.11b compliant products
LED Indicator	RF Link activity

Network Information

Network Architecture	Support ad-hoc, peer-to-peer networks and infrastructure communications to wired Ethernet networks via Access Point
Drivers	Windows 95/98/ME/2000/XP
Access Protocol	CSMA/CA
Roaming	IEEE802.11b compliant
Security	64/128-bit WEP data encryption

Radio

Frequency Band	2.4 – 2.484 GHz
Radio Type	Direct Sequence Spread Spectrum (DSSS)
Modulation	CCK (11, 5.5Mbps) DQPSK (2Mbps) DBPSK (1Mbps)
Operation Channels	11 for North America, 14 for Japan, 13 for Europe, 2 for Spain, 4 for France
RF Output Power	22.5dBm
Antenna	Two antenna connectors
Connectors	MMCX (female)
Sensitivity @FER=0.08	11 Mbps <-87dbm 5.5 Mbps<-90dbm 2 Mbps <-93dbm 1 Mbps <-95dbm

Environmental

Temperature Range	0 to 50 C (operating) -20 to 80 C (storage)

Humidity (non-condensing)	5% to 95% typical

Physical Specifications

Form Factor	PCMCIA Type II PC Card
Dimensions	100(L)mm * 54(W)mm * 7.5(H)mm
Weight	35 g

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.
5. Since the module is installed inside the end product, the end product should be affixed a label on visible area showing that this product contains a RF module, and also its FCC ID.

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, 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 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.