GemTek Technology Co., Ltd.

Wireless LAN 11Mbps PC Card

User's Manual

Version 2.2 – March. 2001

Copyright statement

Printed in Taiwan, March 2001

Federal Communication Commission 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.

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.

Installation Caution: This device is only allowed to be installed in the platform (host housing) of Access Point. The housing of the host Access Point should provide two antenna ports with at least 7 cm separation. It is NOT allowed to be plugged in the PCMCIA slot of laptop PC directly.

FCC Radiation Exposure Statement:
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.
After this device is installed into the host Access Point, the Access Point should be installed and operated with minimum distance 20cm between the radiator & your body.

R&TTE Compliance Statement
This equipment complies with all the requirements of the DIRECTIVE 1999/5/EC OF THE EUROPEAN PARLIAMENT AND THE COUNCIL of 9 March 1999 on radio equipment and telecommunication terminal Equipment and the mutual recognition of their conformity (R&TTE).

The R&TTE Directive repeals and replaces in the directive 98/13/EEC (Telecommunications Terminal Equipment and Satellite Earth Station Equipment) As of April 8, 2000.

Safety
This equipment is designed with the utmost care for the safety of those who install and use it. However, special attention must be paid to the dangers of electric shock and static electricity when working with electrical equipment. All guidelines of this manual and of the computer manufacturer must therefore be allowed at all times to ensure the safe use of the equipment.

EU Countries intended for use
The ETSI version of this device is intended for home and office use in Austria, Belgium, Denmark, Finland, France (with Frequency channel restrictions), Germany, Greece, Ireland, Italy, Luxembourg, The Netherlands, Portugal, Spain, Sweden and United Kingdom.

The ETSI version of this device is also authorized for use in EFTA member states Iceland, Liechtenstein, Norway and Switzerland.

EU Countries Not intended for use

None.

Potential restrictive use
France: Only channels 10,11,12, and13

Contents

2. Introduction

Thank you for purchasing your Wireless LAN, Wireless LAN 11 Mbps PC Card. This manual will assist you with the installation procedure.

The package you have received should contain the following items:

- Wireless LAN 11 Mbps PC Card
- User manual
- Quick installation guide
- Diskette or CD containing Wireless LAN Management utility and drivers
  Note: if anything is missing, please contact your vendor

The diskette or CD contains the drivers and the program **Configuration Utility** that is used for managing the Wireless LAN Card and establishing the wireless connection with your Local Area Network.

3. Wireless LAN Basics

Wireless LAN (Local Area Networks) systems offer a great number of advantages over a traditional, wired system. Wireless LANs (WLANs) are more flexibles, easier to setup and manage and often more cost effective than their wired equivalence.

Using radio frequency (RF) technology, WLANs transmit and receive data over the air, minimizing the need for wired connections. Thus, WLANs combine data connectivity with user mobility, and, through simplified configuration, enable movable LANs.

With wireless LANs, users can access shared information without looking for a place to plug in and network managers can set up or augment networks without installing or moving wires. Wireless LANs offer the following productivity, convenience and cost advantages over traditional wired networks:

- Mobility - Wireless LAN systems can provide LAN users with access to real-time information anywhere in their organization. This mobility supports productivity and service opportunities not possible with wired networks.

- Installation Speed and Simplicity - Installing a wireless LAN system can be fast and easy and can eliminate the need to pull cable through walls and ceilings.

- Installation Flexibility - Wireless technology allows the network to go where wires cannot go.

- Reduced Cost-of-Ownership - While the initial investment required for wireless LAN hardware might be higher than the cost of wired LAN hardware, overall installation expenses and life-cycle costs will be significantly lower. Long-term cost benefits are greatest in dynamic environments requiring frequent moves, adds, and changes.

- Scalability - Wireless LAN systems can be configured in a variety of topologies to meet the needs of specific applications and installations. Configurations are easily changed and range from peer-to-peer networks suitable for a small number of users to full infrastructure networks of thousands of users that allows roaming over a broad area.

4. Installation for Windows platform

The following section will assist you to in installing wireless LAN Adapter successfully. You will first install software (driver) and then insert the Wireless LAN PC card, and finally set the network properties to accommodate resource sharing and select the type of wireless network that you wish to install. The Wireless LAN can easily be installed and used, without bothering to connect cables for keeping your computer to use network resources, as in case of wired LAN.

4.1. Installation Overview

Here are some steps you will perform in establishing your wireless network connection:

- Install the Acess Point at first. AP is needed in case of Infrastructure network mode.
- Install the software using the Installation Diskette or CD.
- Install the Wireless LAN Card (WIRELESS LAN 11Mbps PC Card).
- Install the network protocol(s) required to communicate on your network. Most likely you will need the TCP/IP protocol.

4.2. Installation Procedure for Windows 95(OSR2) /98

> Note: Do not insert the **PCMCIA** card until you are asked to do so, failure of which may result in unsuccessful installation of your **WLAN PC** card

Please follow the following steps one by one in order to install the WLAN PC card successfully.

1. Power on your computer and allow **Windows 95 (OSR2) / 98** to load fully.
2. Be sure that there is no **PCMCIA** adapter inserted yet.
3. Insert the given **Installation CD** in the **CD-ROM** and then click on the **Setup.**
4. Accept the license agreement.
5. Select the **SSID.** Default ESSID is default. You can change this later also using the configuration utility or network configuration. Click on **Next.**
6. Select network type and click on **Next.** Default is **Infrastructure.**
7. Give the path of the destination folder. To set the path of your choice click on **Browse** and then click **Next.**
8. Setup will add program icon to the Program Folder. You may type a new folder name, or select one from the existing Folder list.
9. It takes a few seconds for copying the utility files and then click on Finish. Then insert **Wireless LAN 11 Mbps PC card** into slot and restart PC.
10. Restart the PC and Click on the Control Panel and then on PC Card. Check whether it has PCMCIA card in one of the sockets or not. If you find **Wireless LAN 11 Mbps** in one of the sockets, it means the card is detected properly.
11. Check for the **Wireless LAN 11 Mbps** by right clicking on My Computer using the mouse. Select the Device manager and then Network Adapters. If you find the **Yellow (?)** sign on the adapter, it shows the installation is not successful. Select the adapter and click on **Remove**. Restart your computer after uninstalling the driver to make the changes effective. And refer to manual.
12. Right click on the **Network Neighborhood** using the mouse.
13. Select **Properties** from the pop up menu. The network box appears and you see three main tables: **Configuration**, **Identification**, and **Access Control**.
14. Click on the **Configuration** tab and then click on the **Add** button. Select Network Component Type box appears. Click on the **Protocol** the click the **Add** button.
15. Select Network Protocols box appears. From the list of manufactures, click on **Microsoft**. From the list of network protocols list, select **NetBEUI**, then click **OK**.

16. The **NetBEUI** protocol is now installed. After clicking on **OK** return back to Network Component Type box.

17. Repeat the step 15 and 16 to add IPX/SPX protocol.

18. Repeat the step 15 and 16 to add TCP/IP protocol.

19. Click on the **TCP/IP** option for setting the **IP** address for your computer. You can select either **Static** or **DHCP** setting. If you use the static IP setup then enter the **IP** value, **Subnet** masking, **DNS**, **Domain**/ **Workgroup** name, and **Gateway** Address values. After setting these parameter appropriately, click OK to return to Network Component Type and you can select the **File and Printer Sharing** options as well as the **Access** to your computer like other users connected to that network by setting the computer sharing options. Click on **OK**.

20. Screen message **do want to restart your Computer** will pop up. Select **Yes**. It will shut down your computer and will restart.

Important: **Restart your computer to make the changes effective before you reinstall the driver.**

4.3. Uninstallation Procedure for Windows 95(OSR2) /98

If you want to uninstall the PCMCIA/PCI card under Win 95 (OSR2)/98, click on the **Start** at the left bottom of your screen. Select the **Programs.** Click on the **Wireless LAN 11Mbps PC Card** and click on **Uninstaller.** Confirm message about removing the **" Wireless LAN 11Mbps PC Card ",** click on **Yes** and all of its components appear.   UninstallShield removes the software **" Wireless LAN 11Mbps PC Card "** successfully. Click on **OK** to finish the uninstall procedure.

> <u>Important</u>**: Restart your computer to make the changes effective before you reinstall the driver.**

4.4. Installation Procedure for Windows NT4.0

1. Power on your computer. Please make sure Windows NT networking is already installed:

2. Insert **Wireless Lan 11 Mbps PC card** into PC card slot.

3. Insert the given **Installation CD** in the **CD-ROM** and then click on the **Setup.**

4. Accept the license agreement.

5. Select the **SSID.** Default ESSID is default. You can change this later also using the configuration utility or network configuration. Click on **Next.**

6. Select network type and click on **Next.** Default is **Infrastructure.**

7. Give the path of the destination folder. To set the path of your choice click on **Browse** and then click **Next.**

8. Setup will add program icon to the Program Folder. You may type a new folder name, or select one from the existing Folder list.

9. It takes a few seconds for copying the utility files and then click on Finish.

10. Few seconds later Microsoft TCP/IP properties table pops up, set **Internet protocol (TCP/IP) ,** either choose obtain an IP address automatically or set your own IP address. Then click **OK**.

11. Restart your Computer

4.5. Uninstallation Procedure for Windows NT4.0

If you want to uninstall the **Wireless LAN 11Mbps PC Card** under Win 2000, click on the **Start** at the left bottom of your screen. Select the **Programs.** Click on the **Uninstaller** of **Wireless LAN 11Mbps PC Card.** Confirm message about removing the **"Wireless LAN 11 Mbps PC Card "** and all of its components appear. Click on **Yes.** UninstallShield removes the software **successfully.** Click on **OK** to finish the uninstall procedure.

> **Important: Restart your computer to make the changes effective before you reinstall the driver.**

Proceed to chapter 5 for the explanation of the Configuration Utility.

4.6. Installation Procedure for Windows 2000 / Windows ME

> Note: Do not insert the **PC** card until you are asked to do so, failure of which may result in unsuccessful installation of your **WLAN PC** card

Please follow the following steps one by one in order to install the Wireless-LAN 11Mbps PC Card successfully.

1. Power on your computer and allow **Windows 2000 / ME** to load fully.
2. Be sure that there is no **PC Card** inserted yet.
3. Insert the given **Installation CD** in the **CD-ROM** and then click on the **Setup.**
4. Accept the license agreement.
5. Select the **SSID.**   Default ESSID is default. You can change this later also using the configuration utility or network configuration. Click on **Next.**
6. Select network type and click on **Next.** Default is **Infrastructure.**
7. Give the path of the destination folder. To set the path of your choice click on **Browse** and then click **Next.**
8. Setup will add program icon to the Program Folder. You may type a new folder name, or select one from the existing Folder list.
9. It takes a few seconds for copying the utility files and then click on Finish.
10. Then insert **Wireless LAN 11 Mbps PC Card** into the slot, wizard will found new hardware **Wireless LAN 11 Mbps PC Card,** click on **Next**.
11. Choose **Display a list of the known drivers for this device so that I can choose a specific driver** , then click on **Next** .
12. Select Hardware types **Network adapters**, click on **Next,** then one click **Wireless LAN 11 Mbps PC Card Adapter**, click **Have disk** then enter the path name **D:** (where D is the CD drive of your Notebook PC)**.** It copies the driver files.
13. Restart your computer
14. Click Control panel – System - Hardware – Device Manager, you will find **Wireless LAN 11 Mbps PC Card** in **Network adapters .** If you find the **Yellow (?)** sign on the adapter, it shows the installation is not successful. Select the adapter and click on **Remove**.
    Then reinstall from the step #3.
15. If your **Wireless LAN 11 Mbps PC Card** is install properly, then right click on the **My Network Place** using the mouse, click **Properties** to set up local area connection.
    own IP address. Then click **OK**.
16. Restart your Computer

4.7. Uninstallation Procedure for Windows 2000/Windows ME

If you want to uninstall the **Wireless LAN 11Mbps PC Card** under Win 2000, click on the **Start** at the left bottom of your screen. Select the **Programs.** Click on the **Uninstaller** of **Wireless LAN 11Mbps PC Card.** Confirm message about removing the **"Wireless LAN 11 Mbps PC Card "** and all of its components appear. Click on **Yes.** UninstallShield removes the software successfully. Click on **OK** to finish the uninstall procedure.

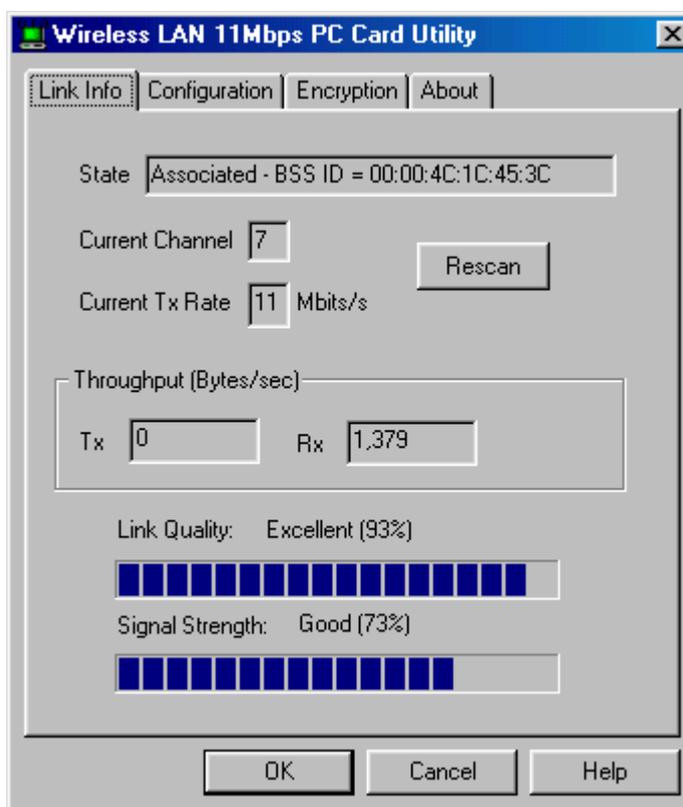> <u>Important</u>**: Restart your computer to make the changes effective before you reinstall the driver.**

5. Configuration Utility

Wireless LAN 11 Mbps Wireless LAN adapter uses its own management software. All functions controlled by user are provided by this application. Usually this application starts automatically, Use Start, Programs, Wireless LAN 11 Mbps Wireless LAN to start the Manager application.

A new icon - should appear in your Icon tray. If the icon is in red, it means that Wireless LAN 11 Mbps NIC configuration is invalid or incomplete. Sometimes icon can be colored in red. This can happen when driver is in Pseudo BSS mode, and the radio channel, which is used for communication is defined incorrectly.

Figure 1 Icon tray with a new icon

Double clicking on that icon will show you the screen as shown below.

Figure 2 Management window with "Status" tab open

User can navigate through "sheets", by clicking or tapping them with a stylus. "OK" button will minimize window, and "Cancel" (or X button) will close application. Here we explain the use and meanings of the various screen messages.

Link Info

- State

  This field is used to display the current state of the driver. When the state is "Associated " means normal flow of operation in Infrastructure mode. The PC is connected to access point. BSSID is shown in the form of hex digits. Networking is available.

  A state of "Scanning " means that the node is searching for available access point and can not detect the SSID for an access point within range.

This field will also display an error message if for some reason the driver failed to initialize.

- Rescan

  Pressing the rescan button causes the driver to restart and begin its Connection Procedure. The connection procedure differs depending on the Mode of the driver.

  Infrastructure Mode   - The driver will scan all available channels continuously until it finds one or more Access Points that matches its SS ID. At that point it will try and authenticate and associate with the Access Point.

  Ad Hoc Mode   - The driver will scan for 5 seconds looking for an existing Ad Hoc network using the same SS ID. If one is not found the driver will start its own Ad Hoc network.

- Current Channel and Tx Rate

  Shows the channel of the radio and transmit rate are being currently used for an active connection. This value has no meaning when the radio is "Scanning"

- Throughput

  These two fields display the instantaneous wireless Receive and Transmit throughput displayed in bytes per second. These values are updated every two seconds.

- Link Quality

  The Link Quality bar graph is only active when the node is in Infrastructure Mode. The bar graph displays the quality of the link between the node and its Access Point. A label summarizes the quality of the link over the bar graph, which can take on one of the following values:

    "Poor"
    "Weak"
    "Fair"
    "Good"
    "Excellent"

The driver will start looking for a better Access Point if the Link Quality becomes "Poor". Link Quality is a measure of receives and transmits errors over the radio.

- Signal Strength

  The Signal Strength bar graph is only active when the node is in Infrastructure Mode. The bar graph displays normalized signal strength as reported by the radio, averaged over all frames over 100 bytes long that are received from the Access Point.

"CONFIGURATION" tab

The Configuration Tab contains several fields where operating parameters of the driver can be viewed or changed. Changes to any of the parameters in this panel can be applied to the driver without the need to reboot the PC.
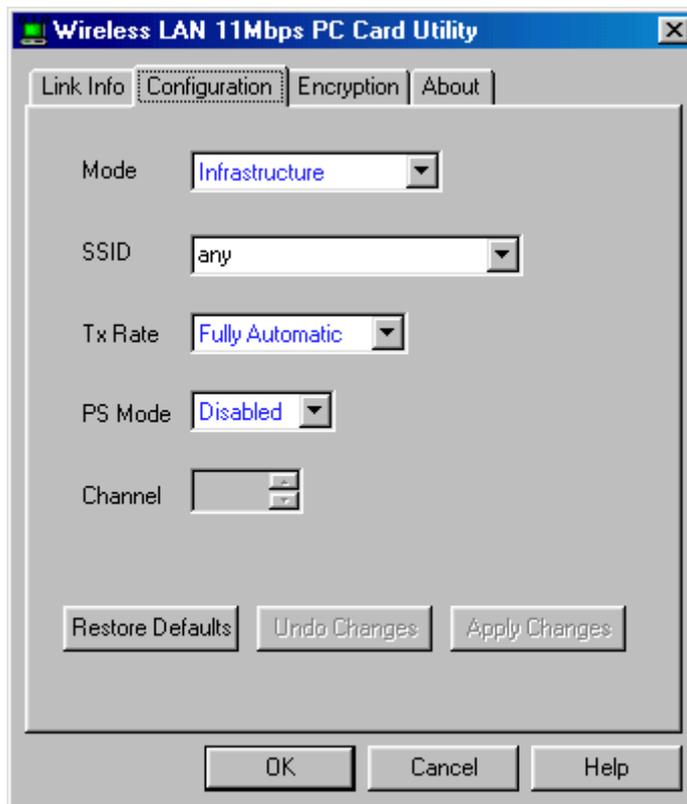

Figure 4 Management window with "CONFIGURATION" tab open

Restore Defaults: Pressing this button restores each field in the panel to its default value. The Apply Changes button or OK must be pressed before the default values are saved to the driver and registry.

Undo Changes: Pressing this button reverts all fields in the panel back to their original values that were present when the Configuration Utility was opened from the Task Bar.

Apply Changes: This button becomes active only when one of the fields has been modified. Pressing this button applies the changed values to the driver and saves them to the registry for the next time the PC boots up.

- **Mode**

This field allows you to select from a list of supported Network "Modes". The modes displayed will have three values: "802.11Ad Hoc", " Ad Hoc", and "Infrastructure".

802.11 Ad Hoc   - This is the 802.11 peer-to-peer mode of operation. In 802.11Ad Hoc only one wireless "cell" is supported for each different SSID. All communication is done from Client to Client without the use of an Access Point. 802.11 Ad Hoc networking use the same SSID for establishing the wireless connection.

Ad Hoc - A non-compliant mode that will allow Prism2 (and only Prism2) cards to talk with one another without an AP regardless any SSID. Since it is not standards compliant, It would have the interpretability with non-Prism2 radios.

 Infrastructure - This mode of operation requires the presence of an 802.11 Access Point. All communication is done via the Access Point, which relays packets to other wireless Clients in the BSS as well as to nodes on a wired network such as Ethernet.

TX Rate – The transmission rate at which the data packets are transmitted by client of AP. You can set this to fixed 1Mbps, fixed 2 Mbps, fixed 5.5 Mbps or 11 Mbps.

PS Mode - Power saving mode.
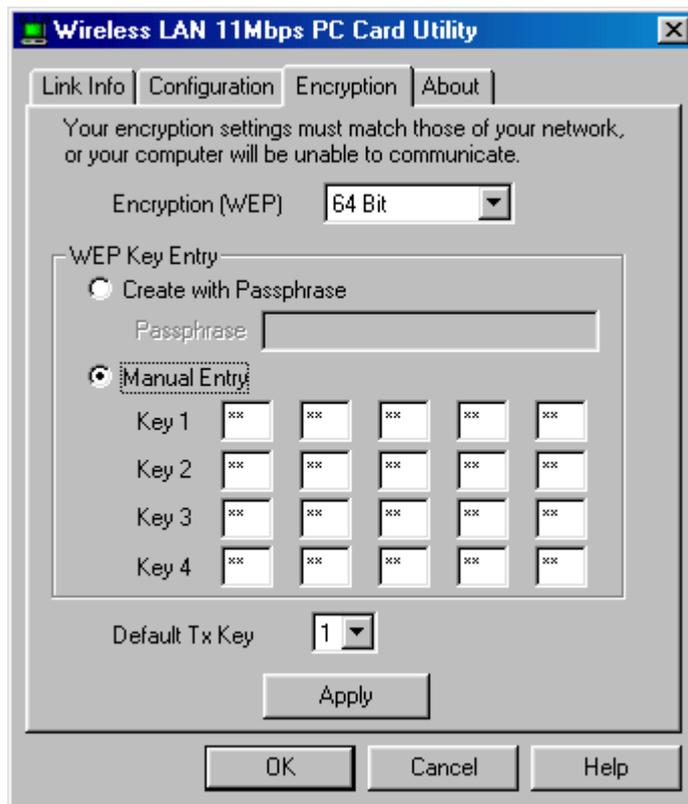
"ENCRYPTION" tab

Figure 5 Management window with "Encryption" tab open

You may desire an additional measure of security on your wireless network, which can be achieved by using WEP (Wired Equivalent Privacy) encryption. WEP encrypts each frame transmitted from the radio using one of the Keys entered from this panel.

When an encrypted frame is received it will only be accepted if it decrypts correctly. This will only happen if the receiver has the WEP Key used by the transmitter.

This panel allows the entry of four keys for 64-bit encryption and one set of 128-bit key according to WEP function select. To be written to the driver and registry, each key must consists of hex digits which means that only digit 0-9 and letters A-F are valid entries. If entered incorrectly program will not write keys to a driver.

Alternatively a Pass-phrase can be entered which is used as a "seed" to randomly generate the four keys. This saves considerable time since the same keys must be entered into each node on the wireless network.

- **Key 1 – Key 4**

  These four fields can be used to manually enter the keys. This may be necessary if you wish this node to match keys in a different vendor's product. These fields also display the keys when they are generated using a Pass-phrase.

- **Default Tx Key**

  This button updates the driver with the four keys displayed in Key1 through Key4. The keys are also written to the registry for permanent storage. For 128 bit encryption, this button will be invisible.

- **Apply**

  This button updates the driver with the four keys displayed in Key field. The keys are also written to the registry for permanent storage. This button clears all the bytes in the four keys, useful when manually entering and you wish to start over.
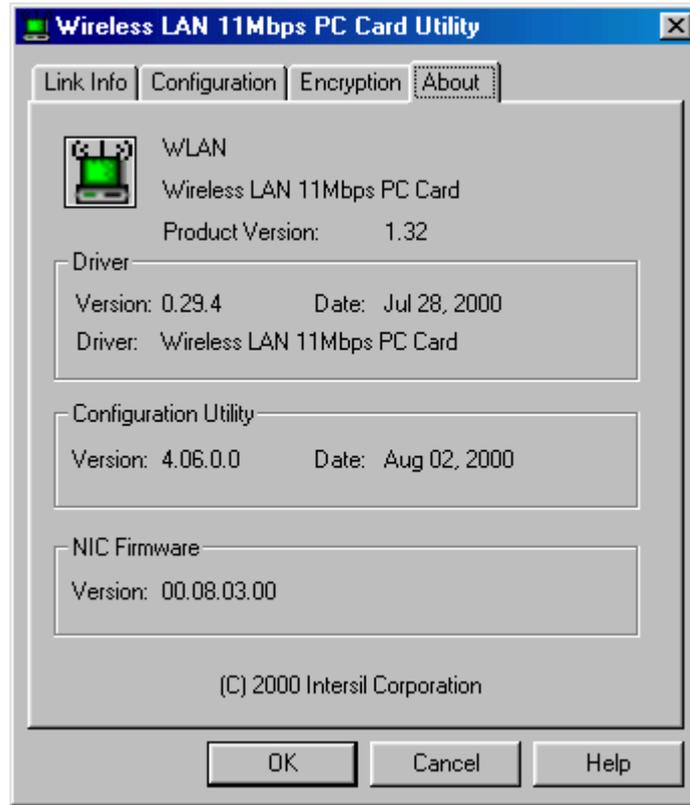
"ABOUT" tab

Figure 6 Management window with "ABOUT" tab open

About tab shows the product version including the detail of Driver, Configuration Utility, and NIC firmware version. Users must use this version number when reporting their problems to tech support.

6. Troubleshooting

To make the installation of Wireless LAN Card more users friendly, we have suggested following the installation steps one by one as listed in the section 4 and section 5. Still you encounter some problems while installing the WLAN Card or you want to confirm whether your card is installed properly or not, we have listed the procedure for checking the various components after you have installed the card. In first part of **Troubleshooting,** we have suggested the users to check the various properties of the card to check the proper installation. In second section, we have listed the various problems that you may encounter during the installation and have also listed the possible solution. Check the first part to guess the probable reason of unsuccessful installation.

Procedure to Check the Various Properties of Card after Installation under Windows 95 (OSR2)/98:
Please check the followings if you encounter some problem while installing the PC card or your PC card is non-functional.

1. Click on the **Control Panel** and then on **PC Card.** Check whether it has **Wireless LAN 11 Mbps PC** card in one of the sockets or not. If you find **Wireless LAN 11 Mbps** in one of the sockets, it means the card is detected properly. If you see the **Yellow** sign of question-mark (?), the resources are conflicting.

2. Right click on **My Computer** and the select **Properties.** Select the **Device Manager** and click on the **Network Adapter.** You will find **Wireless LAN 11 Mbps** if it is installed successfully. If you see the **Yellow** sign the resources are conflicting. Click on PCMCIA Card and then on PCMCIA Card Service, you can see the status of PCMCIA card. If there are yellow sip either on adapter or PCMCIA card, please check the followings.
    1. Check if your Notebook supports **3.3V** Card.
    2. Check if your Notebook has a free **IRQ.** If not, make an IRQ free by assigning the same IRQ to some devices, for example COM 1, COM 2 can be assigned same IRQ values.
    3. Check that you have inserted the right card and have installed the proper driver.

For the Card under Windows NT:

Please check the followings if you encounter some problem while installing the PCMCIA card or your

PCMCIA card is non-functional.

1. Check the **Windows NT Diagnostics.** You should find out whether there is any conflict in the **resource** allocation or the I/O **address, IRQ** allocations. If you find that the **IRQ** or I/O addresses are already assigned to some other devices, you must change that value. I/O address needs 40h byte length.

2. Click on the **Control panel.** Double click on the **PC Card,** you will see **Wireless 11mbps WLAN Card.** Double clicking on that will show you the **Card Information,** driver name and the driver **file.** You must confirm the name of the driver and the driver file as **"cw10"** and **"cw10.sys".** If you do not find the names as we listed before, there are some problems and the driver is not installed properly. Reinstall the driver.

Note: Check the PnP BIOS setup menu and select **no** in case of the Wireless LAN

Card installation.

7. Technical specifications of Wireless LAN

Hardware compatibility

- IBM-compatible computer with a PC Card Type II

Driver support

- Windows 95 OSR2

- Windows 98

- Windows 2000

- WindowsME

- Windows NT 4.0 and higher

Standards supported

- IEEE 802.11 standard for Wireless LAN

- All major networking standards (including TCP/IP, IPX)

Environmental

Operating temperature (ambient):

- -10°C to 50°C (Operating),-20 to 70°C (Storing)

- *Max . Humidity:*95% Non-condensing

Power specifications

Operating voltage:

- +5 V ,+3.3V DC ±5%

- Nominal Temp Range: 17 dBm

- Extended Temp Range: 14 dBm min.

- Transmit Power, 2.7v to 3v: 14 dBm min.

Radio specifications

Range:

- per cell indoors approx. 35-100 meters or more

- per cell outdoors up to 100-300 meters

Frequency range:

- 2.4-2.4835 GHz, direct sequence spread spectrum

Number of Channels:

- Europe: 13 (3 non-overlapping)

- US: 11 (3 non-overlapping)

- France: 4 (1 non-overlapping)

- Japan: 14 (4 non-overlapping)

Antenna system:

− Internal patch antenna supporting diversity.

Mobility:

− Seamless roaming across cell boundaries with handover

Specific features

Supported bit rates:

− 11 Mbps

− 5.5 Mbps

− 1 Mbps

− 2 Mbps

Data encryption:

− 64 /128 bit WEP Encryption

Utility Software:

− Management utility software

Physical Dimensions

− Extended type-II PC Card 110 x 54 x 6 mm