11Mbps Wireless LAN MINI-PCI Card

WL-250F

User's Manual

2001/7/19

Copyright statement

No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, whether electronic, mechanical, photocopying, recording, or otherwise without the prior writing of the publisher.

Printed in Taiwan, 2001/7/23

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.

Statements Needed to be Shown on End Product

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

Statements Needed to be Shown on the Users Manual of End Product

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.

FCC RF Radiation Exposure Statement:

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and 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, **11Mbps Wireless LAN Mini-PCI Card Card**. This manual will assist you with the installation procedure.

The package you have received should contain the following items:

- **11Mbps Wireless LAN Mini-PCI Card Card**.
- User's Manual
- Quick installation guide
- Diskette containing Wireless LAN Management utility and drivers
  Note: if anything is missing, please contact your vendor

The diskette contains the drivers and the program **Configuration Utility** that is used for managing the **11Mbps Wireless LAN Mini-PCI Card 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 flexible, 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 **11Mbps Wireless LAN Mini-PCI Card 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 Access Point (AP) at first. AP is needed in case of Infrastructure network mode.
- Install the software using the Installation Diskette.
- Install the Wireless **Mini-PCI** Card (**11Mbps Wireless LAN Mini-PCI Card 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 98*

Note: Do not insert the **Mini-PCI** card until you are asked to do so, failure of which may result in unsuccessful installation of your **11Mbps Wireless LAN Mini-PCI Card** card

Please follow the following steps one by one in order to install the Mini-PCI card successfully.

1. Power on your computer and allow **Windows 98** to load fully.
2. Be sure that there is no **Mini-PCI** adapter inserted yet.
3. Insert the given **Installation CD** in the **CD-ROM.**
4. Select **ELAN** (P-Series Driver) and then click on the **Setup**.


5. Accept the license agreement.
6. It takes a few seconds for copying the utility files and then click on **Finish**.
7. Restart the **PC**.
8. Insert **Mini-PCI Card** in the Mini-PCI slot, and complete setup according to detected instructions.
9. Find **Mini-PCI** in the **CD-ROM** and click on the **Setup**.
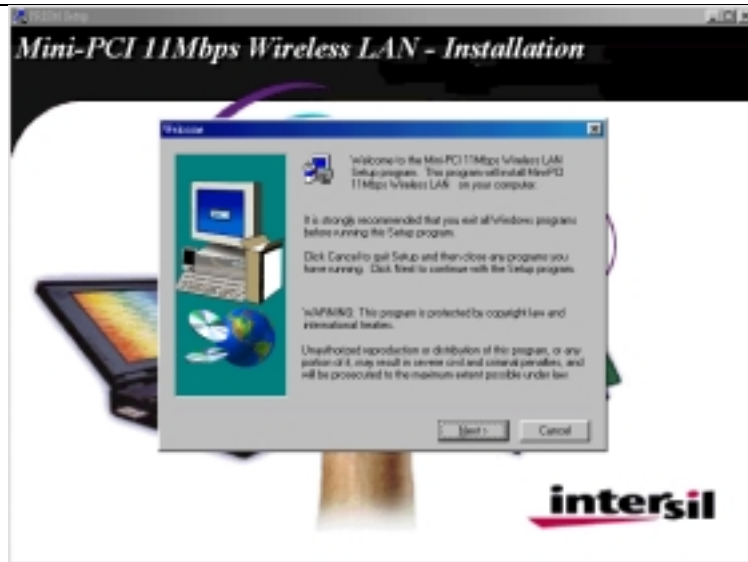
10. Accept the license agreement.

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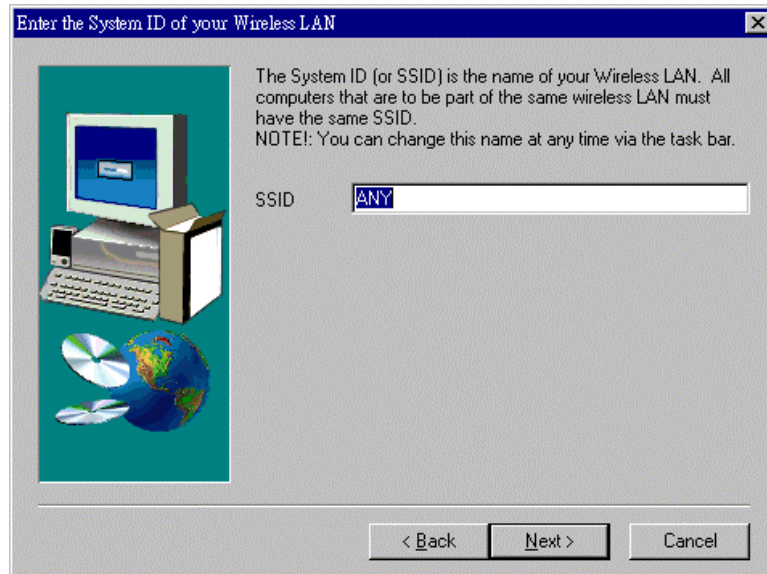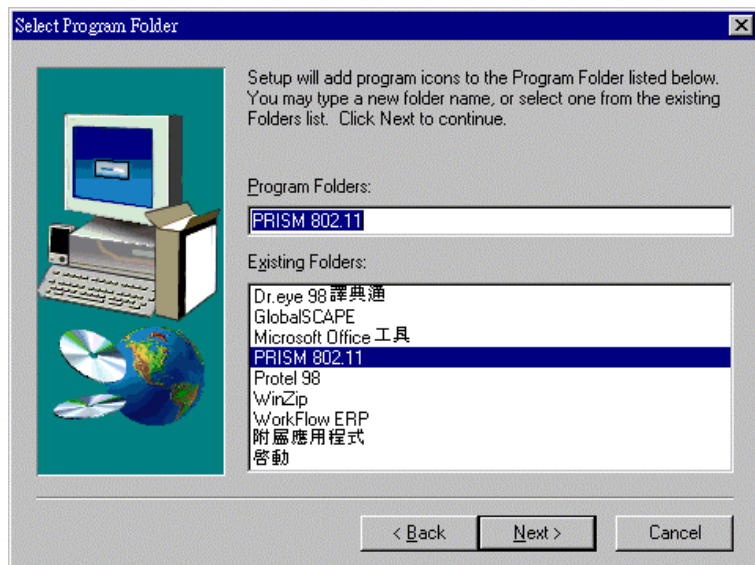

12. Select network type and click on **Next.** Default is **Infrastructure.**
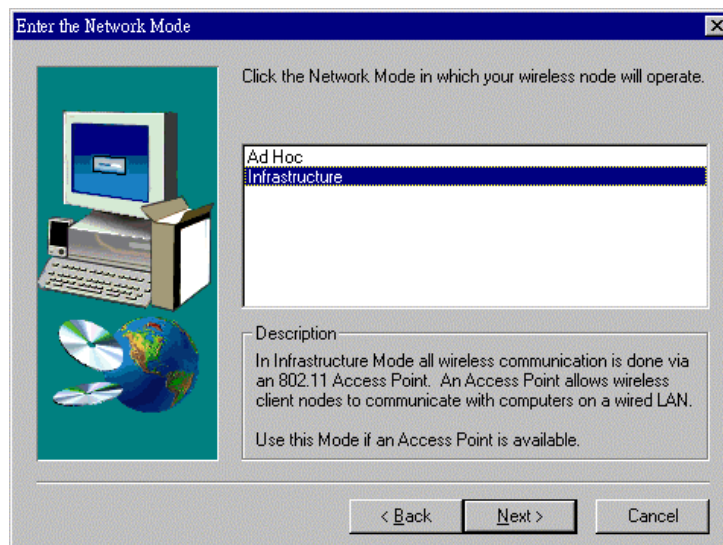
13. Give the path of the destination folder. To set the path of your choice click on **Browse** and then click **Next.**
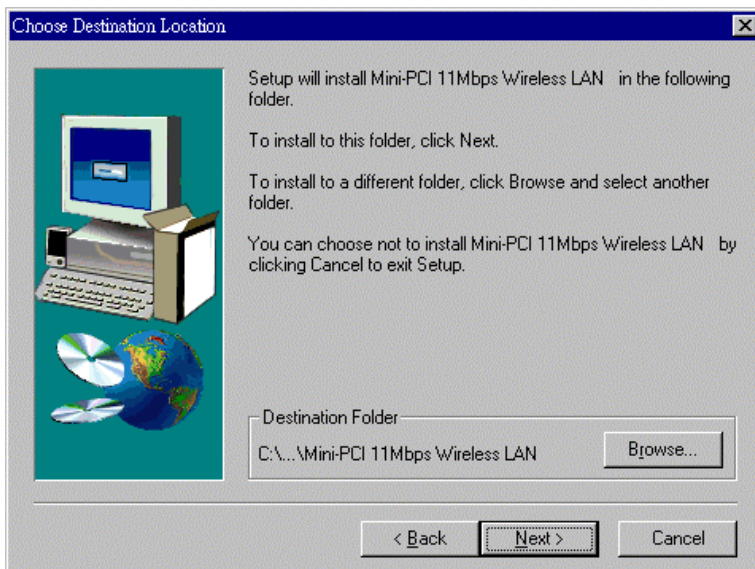
14. Setup will add program icon to the Program Folder. You may type a new folder name, or select one from the existing Folder list.

15. It takes a few seconds for copying the utility files and then click on Finish.
16. Restart the PC and Click on the Control Panel and then on PC Card. Check whether it has Mini-PCI card in one of the sockets or not. If you find **11Mbps Wireless LAN Mini-PCI Card** in one of the sockets, it means the card is detected properly.

17. Right click on the **Network Neighborhood** using the mouse.

18. Select **Properties** from the pop up menu. The network box appears and you see three main tables:
   **Configuration**, **Identification**, and **Access Control**.
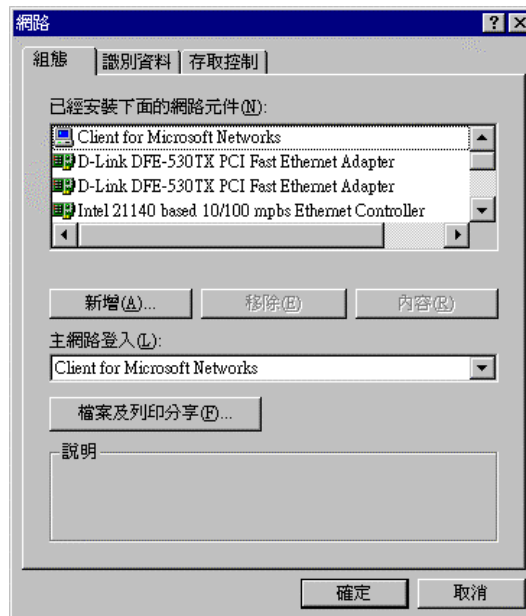
19. Click on the **Configuration** tab and then click on the **Add** button. Select Network Component Type
    box appears. Click on the **Protocol** the click the **Add** button.

20. 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**.

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

22. Repeat the step 20 and 21 to add IPX/SPX protocol.

23. Repeat the step 20 and 21 to add TCP/IP protocol.

24. 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**.
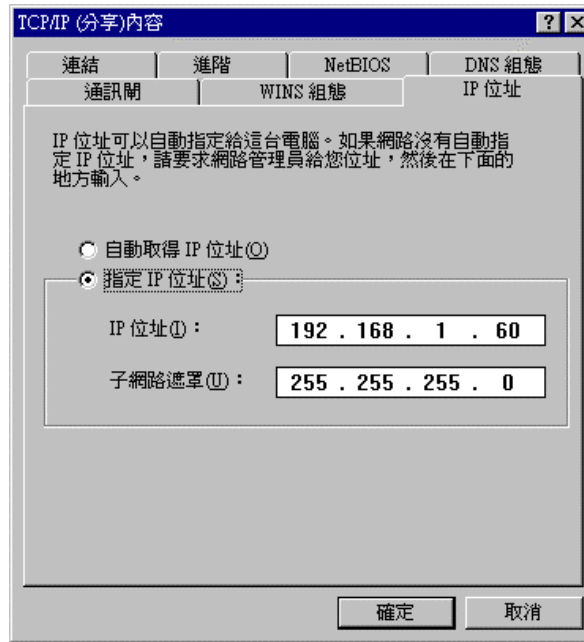
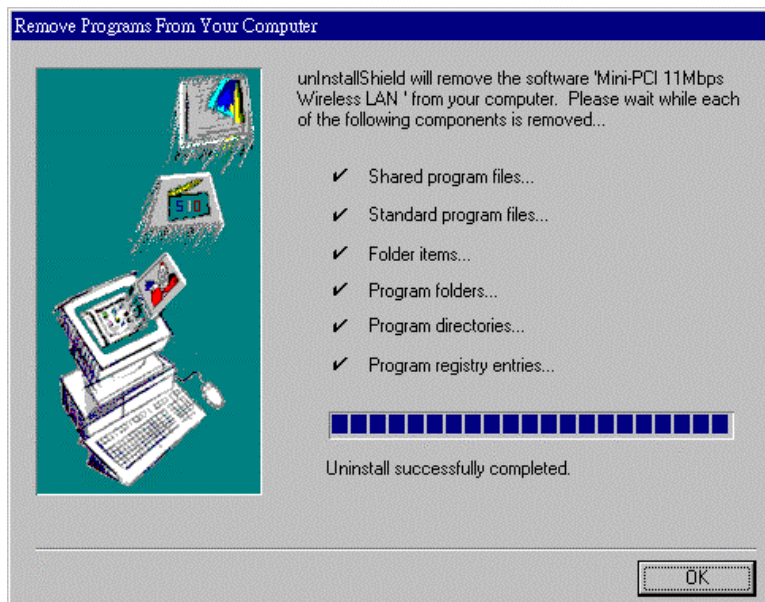

25. Screen message **do want to restart your Computer** will pop up. Select **Yes**. It will shut down your computer and will restart.

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

4.3. Uninstallation Procedure for Windows 98

If you want to uninstall the Mini-PCI card under Win 98, click on the **Start** at the left bottom of your screen. Select the **Programs.** Click on the **PRISM 802.11** and click on **Uninstaller.** Confirm message about removing the **" 11Mbps Wireless LAN Mini-PCI Card "** and all of its components appear. Click on **Yes.** UninstallShield removes the software **" 11Mbps Wireless LAN Mini-PCI Card "** successfully. Click on **OK** to finish the uninstall procedure.
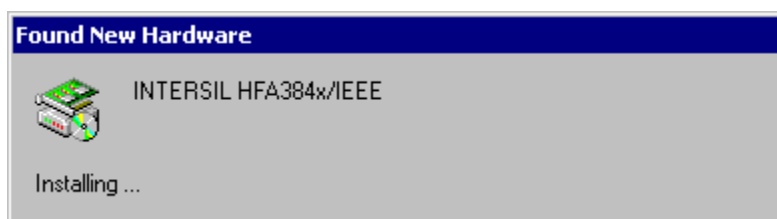

Important: Restart your computer to make the changes effective before you reinstall the driver.

4.4. Installation Procedure for Windows 2000 / Windows ME

Note: Do not insert the **Mini-PCI** card until you are asked to do so, failure of which may result in unsuccessful installation of your **11Mbps Wireless LAN Mini-PCI Card** card

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

1. Power on your computer and allow **Windows 2000 / ME** to load fully.
2. Be sure that there is no **mini-PCI 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 mode 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 **11Mbps Wireless LAN Mini-PCI Card Card** into the slot, wizard will found new hardware "**11Mbps Wireless LAN Mini-PCI Card Card",** click on **Next**.

11 Choose "**Search for a suitable driver for my device**", and then click on **Next**.
12 Select CD-ROM drives to locate driver files. And click on **Next.**

13 Complete the installation and the restart your computer.

14 If your **11Mbps Wireless LAN Mini-PCI Card Card** is install properly, then right click on the **My Network Place** using the mouse, click **Properties** to set up local area connection.

15 Set **Internet protocol (TCP/IP),** either choose obtain an IP address automatically or set your own IP address. Then click **OK**.

16 Restart your Computer

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

4.5. Uninstallation Procedure for Windows 2000/Windows ME

If you want to uninstall the Mini-PCI card under Win 98, click on the **Start** at the left bottom of your screen. Select the **Programs.**   Click on the **PRISM 802.11** and click on **Uninstaller.**   Confirm message about removing the **" 11Mbps Wireless LAN Mini-PCI Card "** and all of its components appear. Click on **Yes.** UninstallShield removes the software **" 11Mbps Wireless LAN Mini-PCI 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.**

5. Configuration Utility

11Mbps Wireless LAN Mini-PCI Card adapter uses its own management software. All functions controlled by user are provided by this application. Usually this application starts automatically, Use Start, Programs, **11Mbps Wireless LAN Mini-PCI Card** to start the Manager application.
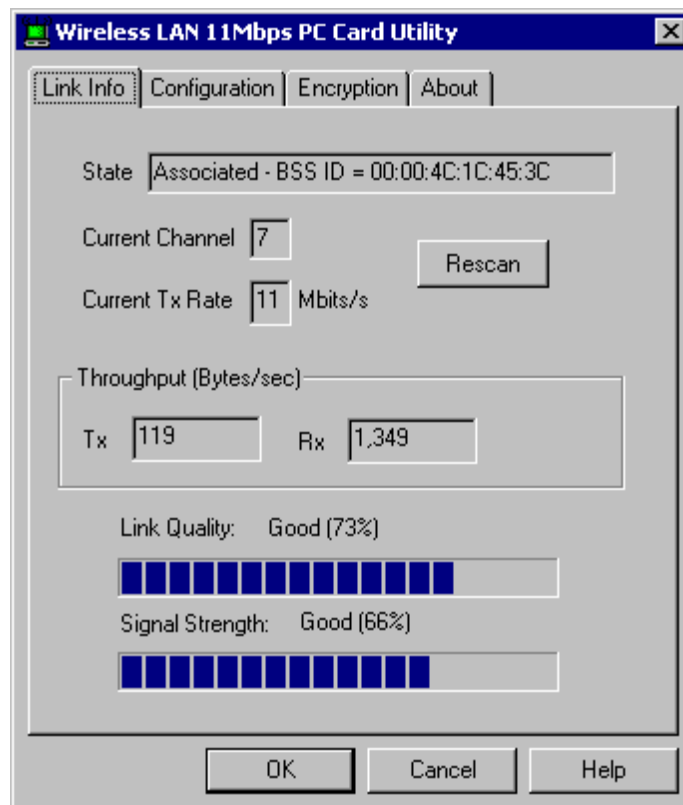
A new icon - should appear in your Icon tray. If the icon is marked with a red "X", it means that 11Mbps Wireless LAN Mini-PCI Card NIC configuration is invalid or incomplete. Sometimes icon can be colored in red. This can happen when driver is in Pseudo BSS mode, and the radio channel, which is used 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 "Exit" (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 Notebook 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:

      "Not Applicable"
      "Poor"
      "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 receive and transmit 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 Notebook.
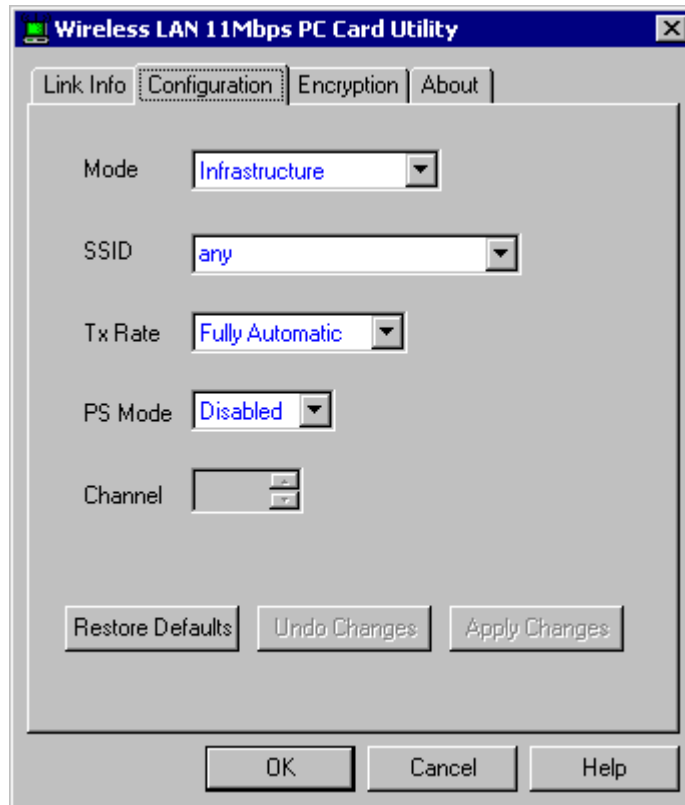
Figure 4 Management window with "CONFIGURATION" tab open

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 Notebook 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.
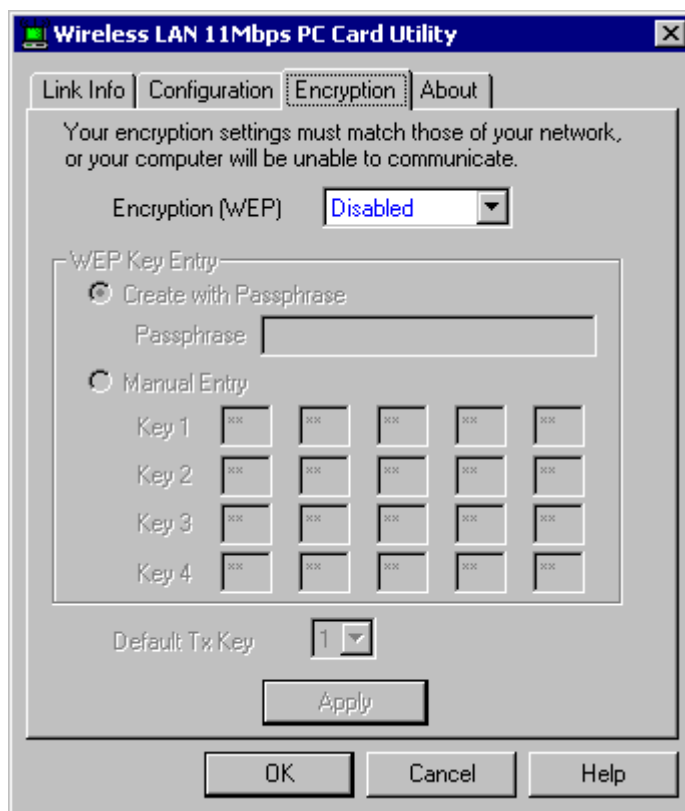
"ENCRYPTION" tab

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 consist 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.
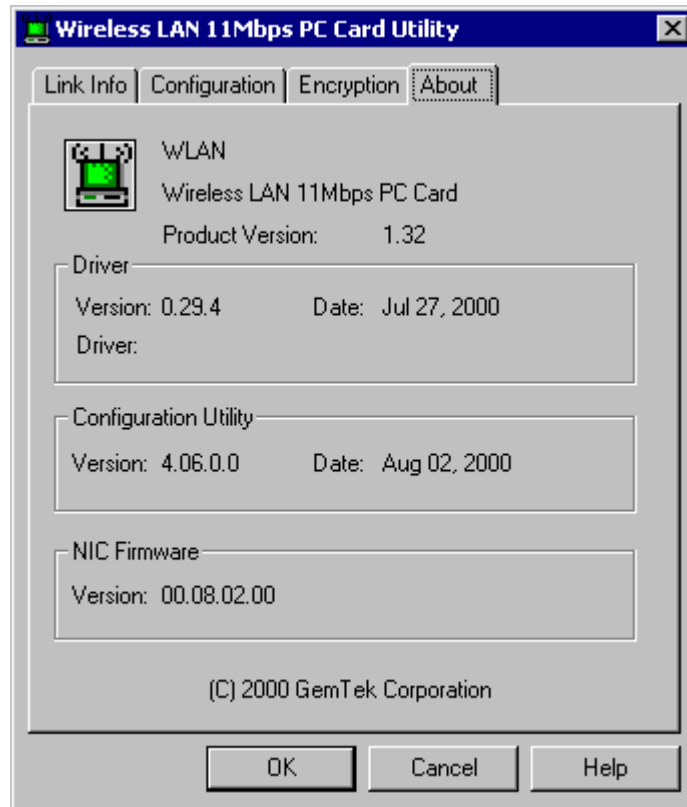

"ABOUT" tab

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 **11Mbps Wireless LAN Mini-PCI Card 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 **11Mbps Wireless LAN Mini-PCI Card 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 98:
Please check the followings if you encounter some problem while installing the Mini-PCI card or your Mini-PCI card is non-functional.

1. Click on the **Control Panel** and then on **Mini-PCI Card.** Check whether it has **Mini-PCI** card in one of the sockets or not. If you find **11Mbps Wireless LAN Mini-PCI Card Card** 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 **11Mbps Wireless LAN Mini-PCI Card Card** if it is installed successfully. If you see the **Yellow** sign the resources are conflicting. Click on Mini-PCI Card and then on Mini-PCI Card Service, you can see the status of Mini-PCI card. If there are yellow sip either on adapter or Mini-PCI 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 2000:

Please check the followings if you encounter some problem while installing the Mini-PCI card or your

Mini-PCI card is non-functional.

1. Check the **Windows 2000 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 **Mini-PCI Card,** you will see **11Mbps Wireless LAN Mini-PCI Card 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 **11Mbps Wireless LAN Mini-PCI Card Card** installation.

7. Technical specifications of 11Mbps Wireless LAN Mini-PCI Card Card

WL250F Specification

Product Name	11 Mbps Wireless LAN mini PCI card	
Model Number	WL-250F	
Host Interface	MINI PCI Type III A	
Dimensions	59.75 x 50.95 x 5 mm	
Weight	19 g	
Frequency Band	2.400 ~ 2.4835GHz (subject to local regulations)	
Number of Channel	USA and Canada – 11	Most European countries - 13
	France – 4	Japan – 13 (optional 14)
Operating Voltage	3.3V	
Spreading	DSSS (Direct Sequence Spread Spectrum)	
Data rate	11Mbps, 5.5Mbps, 2Mbps, 1Mbps	
Transmit Power	13 dBm	
Receive Sensitivity	11 Mbps10-5 BER @ -81 dBm, minimum	
Modulation	11Mbps and 5.5Mbps CCK; 2Mbps: DQPSK;1Mbps: DBPSK;	
Security	40-bit WEP Encryption	
Antenna	UFL connector	
LED indicator	None, or optional	
Driver	Windows 98/2000, NT 4.0, WIN CE, Linux	
Standards	IEEE 802.11b, WI-FI compliant	
Media Access Protocol	CSMA/CA with ACK	
Warranty	1 year, optional 3 years	
Temperature Range	0 ~ 50°C (Operating), -20~70°C (Storing)	
Humidity	Max. 95% Non-condensing	
Operating Range	Open Space: 100 – 300m; Indoor: 35m – 100m	
Roaming	Full mobility and seamless roaming from cell to cell and across access points (subject to access point)	
Network Protocol	TCP/IP, IPX, NDIS3, NDIS4	
Management Utility	Link Config for network join and diagnostics	
EMC certification	FCC part 15 class in US, ETSI 300.328 and CE EMC-EEC in Europe, and ARIB-Telec in Japan	
Packaging	Generic, built-in	

Features

	Benifits
Reliable Performance Without Wires	
Load balancing	PC Cards, PCI cards, USB cards and mini-PCI cards automatically switch to the best available Access Point when the current Access Point becomes congested or the signal weakens. This ensures uninterrupted access to network services and optimum data rates.
Dynamic rate shifting	Points dynamically support 11,5.5,2,and 1 Mbps for maximum availability and reliability of network connections. The proper data rate is determined automatically, based on signal strength.
Antenna diversity	All Gemtek WLAN products feature antennae with signal diversity. Each product has two antennae to improve the likelihood of strong signal reception
Standards-based	
IEEE802.11b- and -Wi-Fi –compliant	Gemtek SparkLAN products comply with IEEE802.11b at 1,2,5.5,and 11 Mbps. They offer backwards compatibility with the original 802.11 standard at 1 and 2 Mbps, interoperating with other Direct Spread Spectrum products. The SparkLAN wireless LAN solution is also Wi-Fi certified.