Contents

Chapter 1 About the WLAN Combo Card

The IEEE 802.11 WLAN Combo Card is compatible with any standard, notebook computer Type III MiniPCI slot. Upon successful installation, the WLAN Combo card will communicate seamlessly with other 802.11B wireless home and office networking products.

1-1 FEATURES

1. Supports up to 11 Mbps data rate: T-1 line alternative/replacement that dramatically cuts costs.
2. Working range up to 800 ft. in an open environment enhances mobility.
3. Supports point-to-point and point-to-multipoint access provides increased flexibility.
4. Seamless connectivity to wired Ethernet and PC network LAN's offers quick, trouble-free integration with existing networks.
5. Robust Direct Sequence Spread Spectrum (DSSS) technology provides secure, interference resistant wireless connection.
6. Wireless connections eliminate the hassle and cost of cabling.
7. Supports a wide range of LAN (Local Area Network) Network Operating Systems (NOS) including Windows ® 98 and Windows ® 2000
8. Omni - directional antenna included
9. Greater flexibility to locate or move networked PC's

1-2 APPLICATIONS

802.11B WLAN offer a fast, reliable, cost-effective solution for wireless client access to the network the following applications and environments:

- Remote access to corporate network information
- E-mail, file transfer and terminal emulation
- Difficult-to-wire environments
- Historic or older buildings
- Buildings with asbestos insulation
- Open areas where wiring is difficult to employ
- Frequently changing environments
- Retailers, manufacturers or other organizations that frequently rearrange the workplace or relocate
- Temporary LANs for special projects or peak time usage
- Trade shows, exhibitions and construction sites that employ temporary networks.

Retailers, airline and shipping companies that need additional workstations for a peak
period and Auditors that require workgroups at customer sites.

- Access to database for mobile workers

- Medical, Technical and Retail specialists that require roaming access to a database or
other network resources.

- SOHO (Small Office and Home Office) users

- Perfect for users that need a small, easy-to-install network that deploys rapidly.

- Inter-building connection

- Wireless building-to-building networks are quickly and easily installed, require no monthly lease fees, and
provide the flexibility to reconfigure easily.

1-3 PRODUCT KIT

The WLAN 802.11b WLAN product kit includes the following items. Ensure that the items in the following list have
been included. If any of the listed items are missing, please contact your local dealer.

- 1 X Type III WLAN MiniPCI Adapter

- 1 X Driver

- 1 X User Manual & Utility

Chapter 2 Network Configuring and Planning

The WLAN supports legacy Ethernet LAN network configuration options as defined by the IEEE 802.11
standards committee.

The 802.11B WLAN can be configured as:

. Ad-Hoc for departmental or SOHO LANs.

. Infrastucture for enterprise LANs.

. LAN -Interconnection for to point-to-point link as a campus backbone.
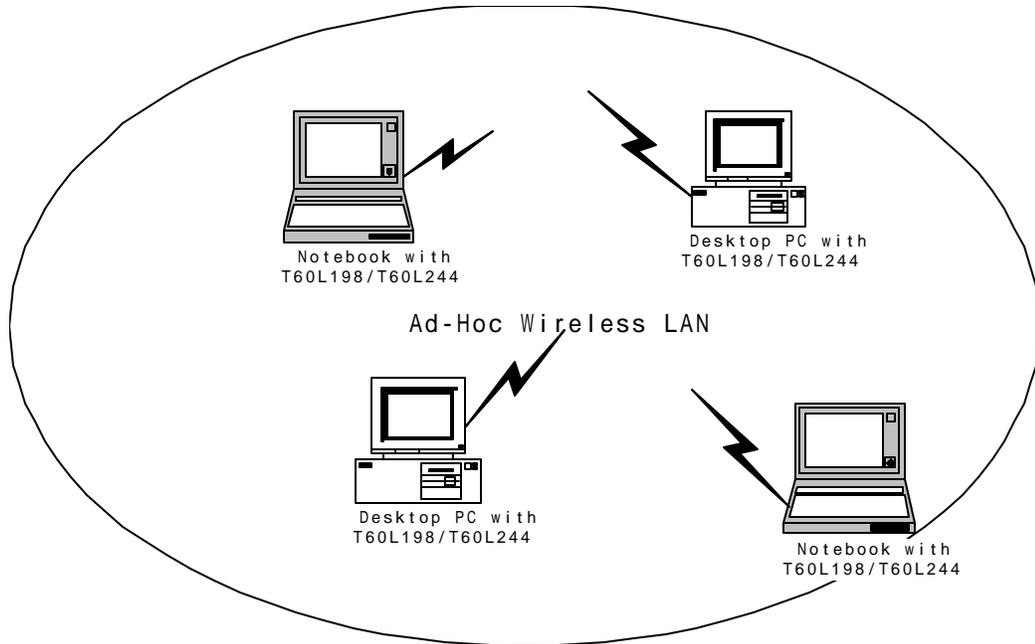
2-1 Network Topology

Fig. 1 Ad-Hoc Wireless LAN

An Ad-Hoc wireless LAN is a group of computers. Each equipped with on 802.11B WLAN adapter, connected as an independent wireless LAN.Computers in a specific Ad-Hoc wireless LAN must be configured to share the same radio channel.

Ad-Hoc wireless LAN configurations are appropriate for branch level departments or SOHO operations.
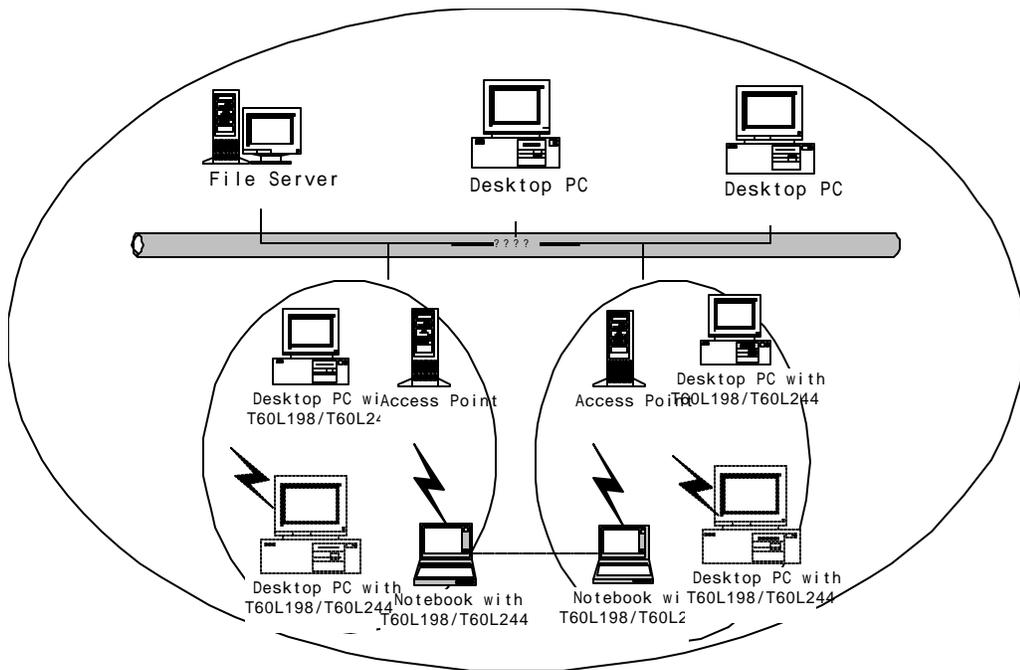

Fig. 2 Infrastructure Wireless LAN Configuration

The 802.11B WLAN provides access to a wired LAN for wireless workstations.An integrated wireless and wired LAN is called an Infrastructure configuration. A group of 802.11B WLAN PC users and an Access Point compose a Basic Service Set (BSS).Each 802.11B WLAN can talk to any computer in the wired LAN infrastructure via the Access Point.

An Infrastructure configuration extends the accessibility of a 802.11B WLAN equipped PC to a wired LAN and doubles the effective wireless transmission range for 2 802.11B WLAN PCs. Since the Access Point is able to forward data within its BSS, the effective transmission range in an infrastucture LAN is doubled.
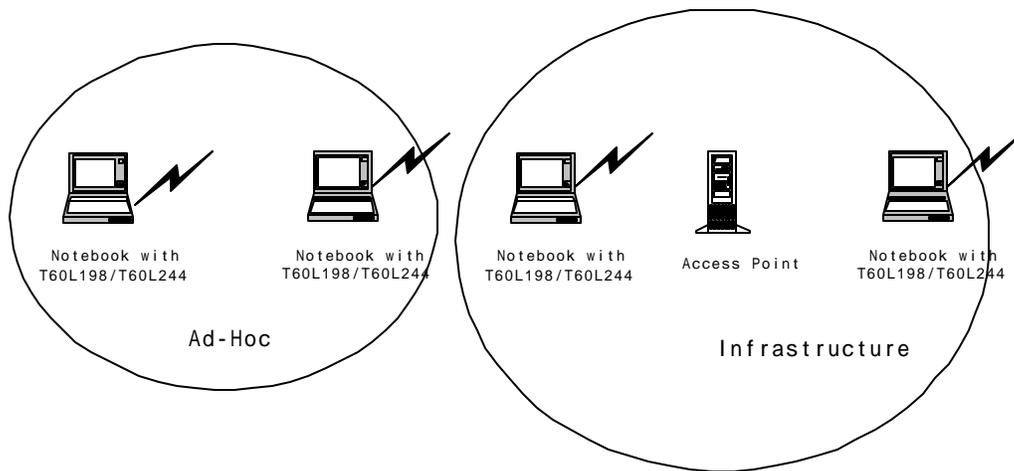

Fig 3 The effective transmission ranges

2-2 Roaming

Infrastructure mode also supports roaming capabilities for mobile users More than one BSS can be configured as an Extended Service Set (ESS). The continuous network allows users to roam freely within an ESS. All 802.11B WLAN PCs and Access Point within one ESS must be configured with the same ESSID and use the same radio channel.
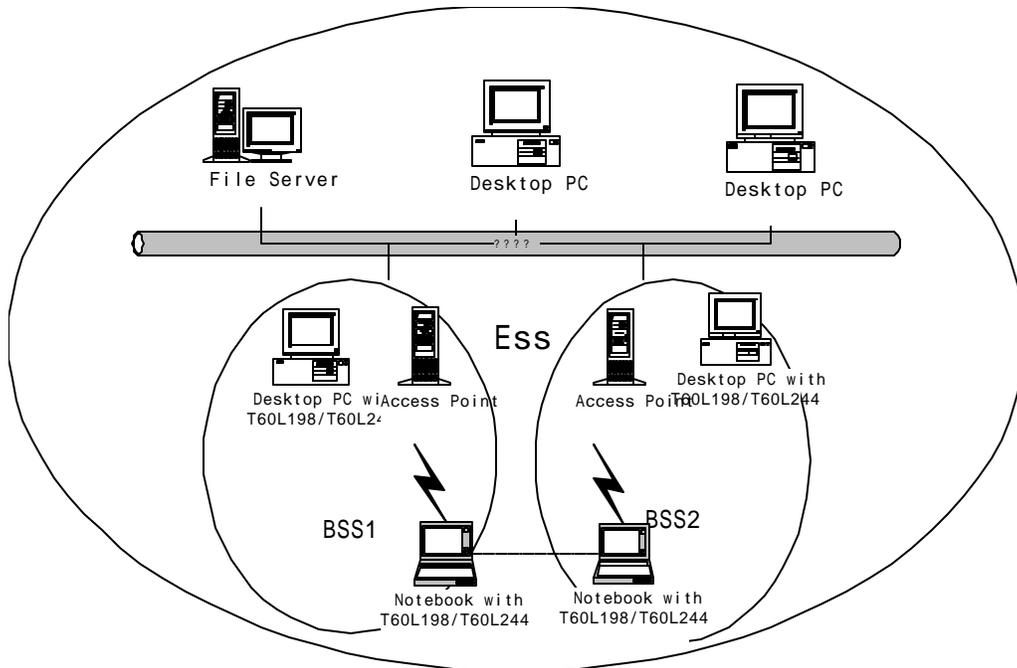
Fig. 4 Roaming in an Extended Service Set (ESS)

Before enabling an ESS with roaming capability, choosing a feasible radio channel and optimum Access Point position is recommended. Proper Access Point positioning combined with a clear radio signal will greatly enhance performance.

Chapter 3 Adapter Installation and Configuration – Windows ® 98 / 2000

3-1 SYSTEM REQUIREMENTS

In order to install and use the WLAN Combo card your PC system must meet the following requirements:

- A Type III MiniPCI slot
- MiniPCI revision 2.10 compliant card and socket services
- Windows 98 (with the Floppy , for use during installation)
- 500 Kbytes free disk space for utility and driver installation

3-2 INSERTING THE ADAPTER

To insert the WLAN Network Adapter into a notebook computer, do the following:

1. Locate an available Type II or Type III MiniPCI slot.

2. With the MiniPCI Adapter's 124-pin connector facing the MiniPCI

slot, the MiniPCI Adapter completely into the MiniPCI slot.

Mini PCI slot
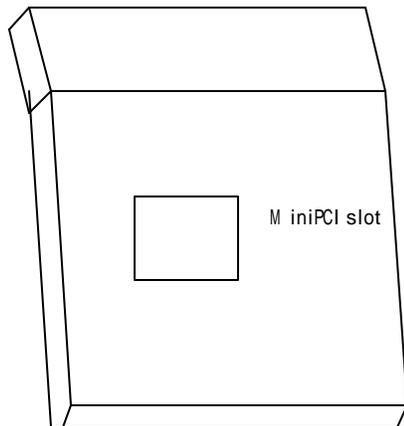
**Notebook with
WLAN Combo Card**

Fig. 5.2 Insert the MiniPCI Adapter into Notebook

After properly inserting the Network Adapter into your notebook, continue with the 802.11B WLAN driver and Lan-Express Configuration Utility installation.

NOTE: Windows 98 requires that the Network card and socket services must be compliant with the PCMCIA revision 2.10 specification. Please check the documentation of the MiniPCI driver before installing the WLAN MiniPCI adapter.

3-3.1 802.11B WLAN DRIVER INSTALLATION -WINDOWS 98

Note: Before proceeding, have the Windows 98 Floppy ready, as it will be required during the software installation process.

1. Insert the WLAN adapter into a standard Type II or Type III MiniPCI card slot, as described in the preceding section.

2. Windows 98 will automatically detect the 802.11B WLAN and prompt you to install the necessary driver. Click "Next" to begin the installation.

(MiniPCI Adapter is button side)

3. Check "Search for the best driver…" click "Next".

4. Check "floppy disk drivers" , click "Next". Windows ® 98 will automatically find the file.

Add New Hardware Wizard

Windows will search for new drivers in its driver database on your hard drive, and in any of the following selected locations. Click Next to start the search.

☑ Floppy disk drives

☐ CD-ROM drive

☐ Microsoft Windows Update

☐ Specify a location:

E:\Driver

Browse...

< Back   Next >   Cancel

5. Windows ® 98 will then acknowledge that it has found the appropriate driver, click "Next".

Add New Hardware Wizard

Windows driver file search for the device:

LAN-Express IEEE 802.11 PC Card Adapter

Windows is now ready to install the best driver for this device. Click Back to select a different driver, or click Next to continue.

Location of driver:

A:\NETWLAN.INF

< Back   Next >   Cancel

6. Clink "Finish" to compete the installation.

3-3.2 ADAPTER CONFIGURATION – WINDOWS 98

After successful installation of the 802.11B WLAN and its driver, continue the installation process by configuring the 802.11B WLAN adapter properties. To configure the 802.11B WLAN Adapter complete the following steps :
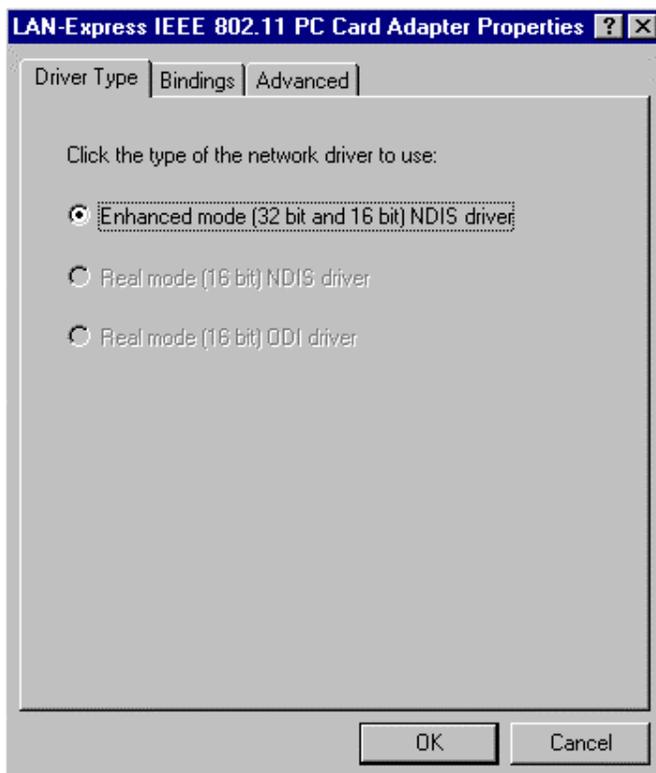
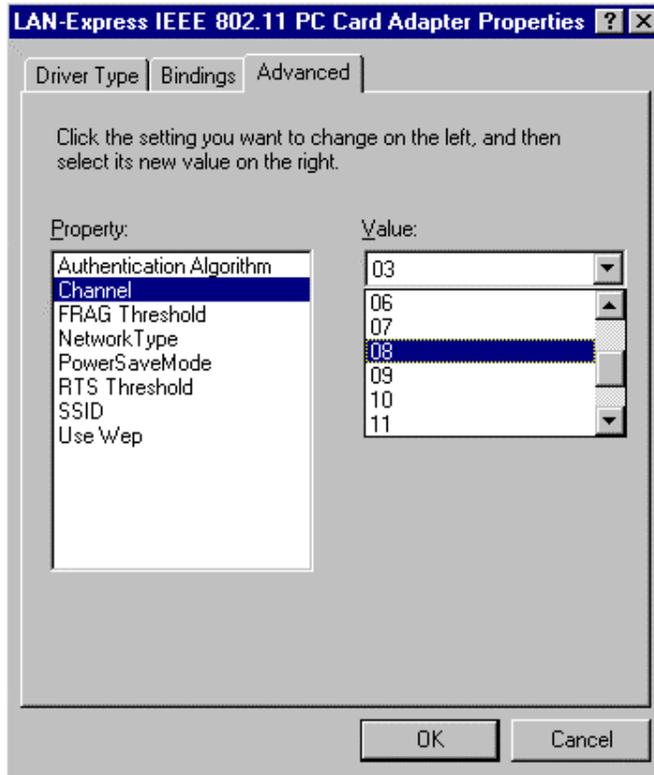1.From the Control Panel, double-click the "Network" icon.

2.Select "LAN-Express IEEE 802.11 MiniPCIAdapter" from the list and press the "Properties" button.
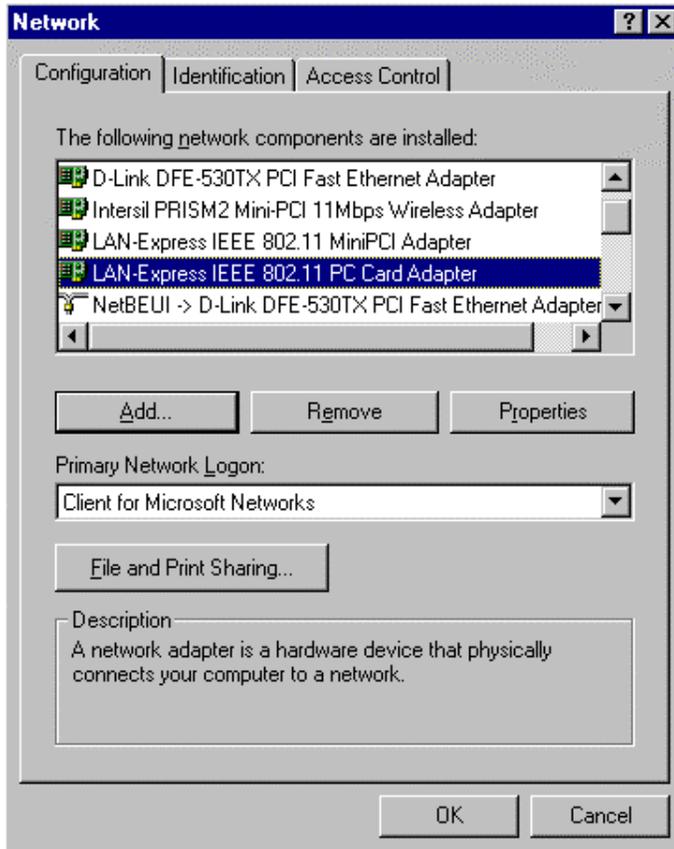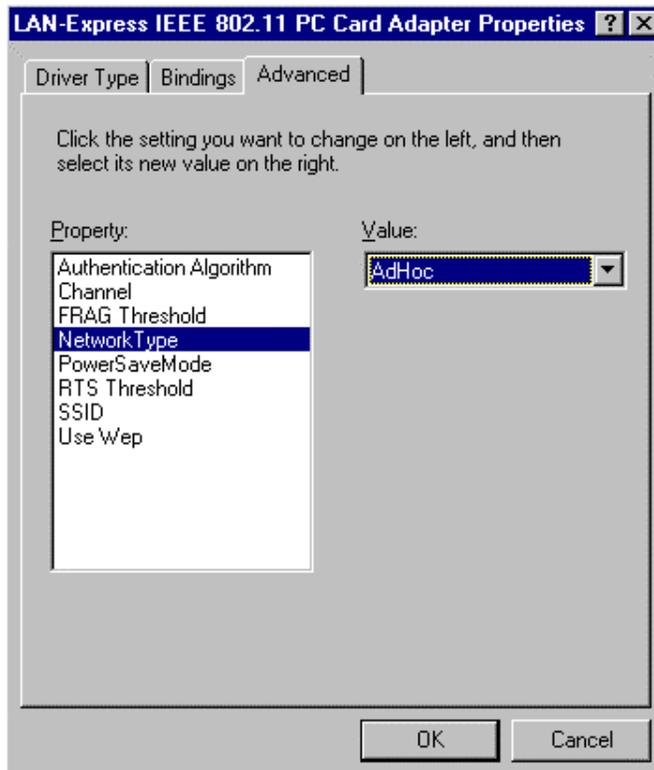
3. From the "Properties" menu select the "Advanced" tab.

4. Select "Channel" from the list, and choose a "Value" from the drop down list. FCC regulations require a "Value" between 1 and 11.


5. Select "Network Type", and choose "Infrastructure" or "Ad-Hoc" as the "Value".

Note: "Infrastructure" mode allows a wireless adapter to communicate with a wired network,

While "Ad-Hoc" mode allows wireless-to-wireless communication. Consult your System

Administrator for information about your network communication type. For more information

About Infrastructure and Ad-Hoc networks, see Chapter 2 of this manual

6. Select "Power Save Mode" and choose a "Value".
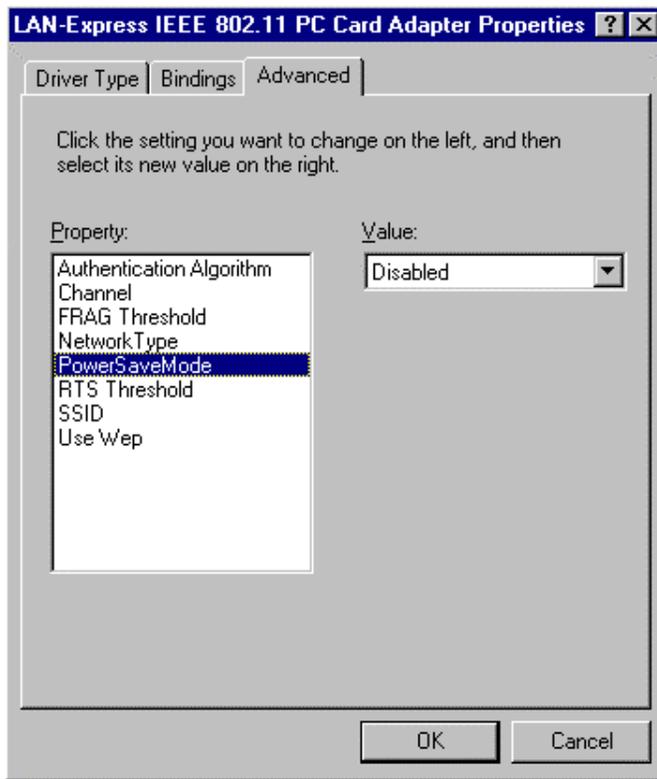
NOTE: To allow uninterrupted data communication, choose "Disabled" as the "Value".

Choosing "Enabled" allows your notebook to enter "sleep" mode, however, this will interrupt

data communication. Consult your System Administrator to find out the best setting for your

network type. For more information about Power Save Mode, see the chapter entitled "LAN-Express

Configuration Utility" in this manual.

8. Select "SSID"; enter a "Value" of "ANY".
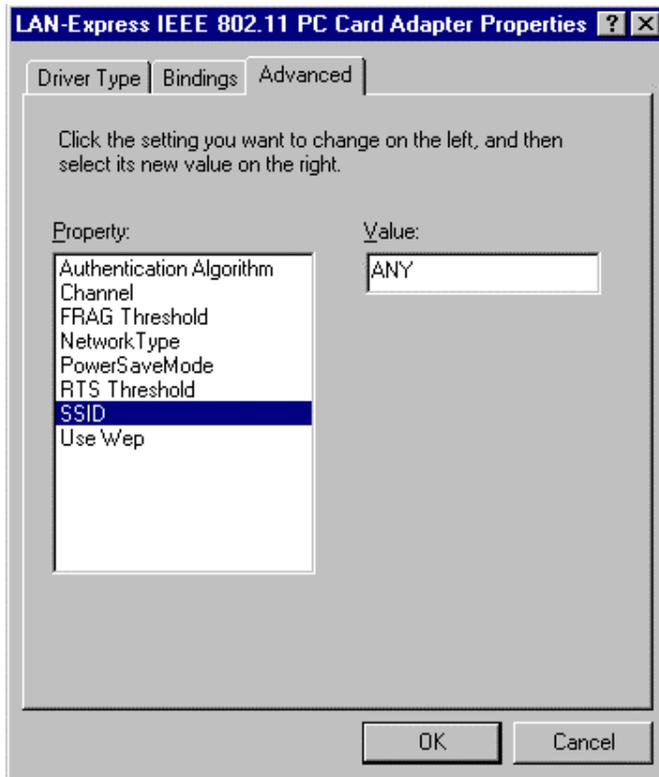
*NOT*E: The SSID can have any value, but should have the same value as the Access Point

(AP). In Ad-Hoc mode, all clients should share the same SSID

9. Select "Transmit Rate", and choose a "Value".
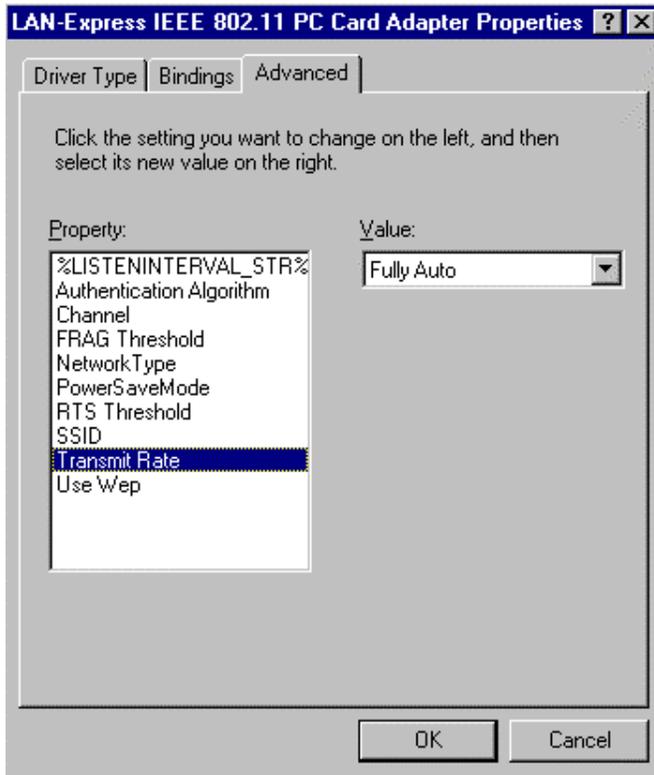
NOTE: Fixed 11 Mb/s is the preferred "Value" for environments where the client has line of sight access and is a short distance away from the AP. Fully Auto is the recommended setting for clients that are farther away from the AP and where there may be interference between the client and the AP.

10. Select "Use Wep", and choose a "Value".
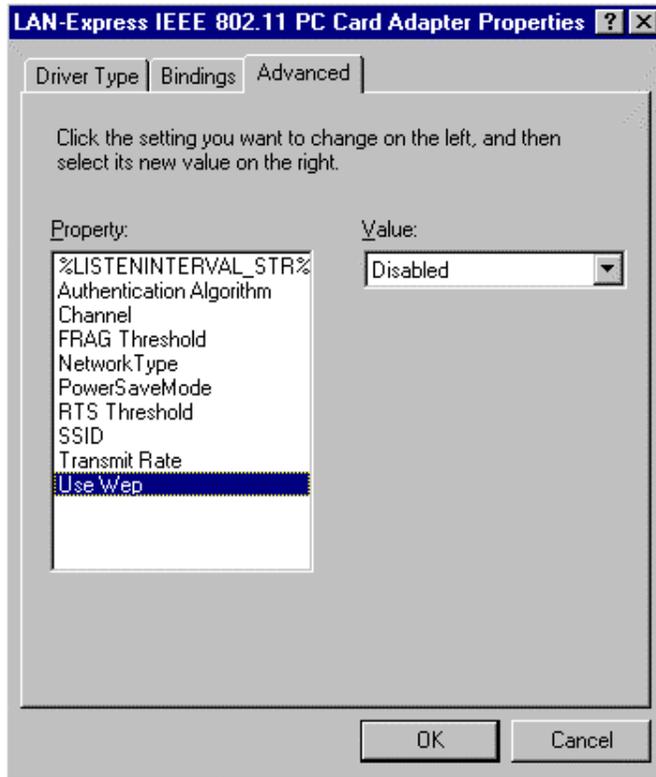
NOTE: Wired Equivalent Privacy (Wep) is an encryption scheme used to protect wireless data communication. Selecting "Disabled" will prevent you from sharing data with other computers if your network uses Wep. If your network is Wep enabled, you must choose "64bit" or "128bit". Consult your System Administrator for more information about your network type. For more information about Wep, see the chapter entitled "PRISM Configuration Utility" in this manual.

11. After the configuring the "Properties", click "OK" and continue with the Protocol Installation, described in the following section.

3-3.3 PROTOCOL INSTALLATION – WINDOWS 98

Before continuing with the Protocol installation consult your System Administrator for details about your specific network. To install network protocols complete the following steps.

1. From the "Control Panel" double-click the "Network" icon.

2. Select "LAN-Express IEEE 802.11 PC Card Adapter" or "LAN-Express IEEE 802.11 MiniPCI Adapter" and click "Add".
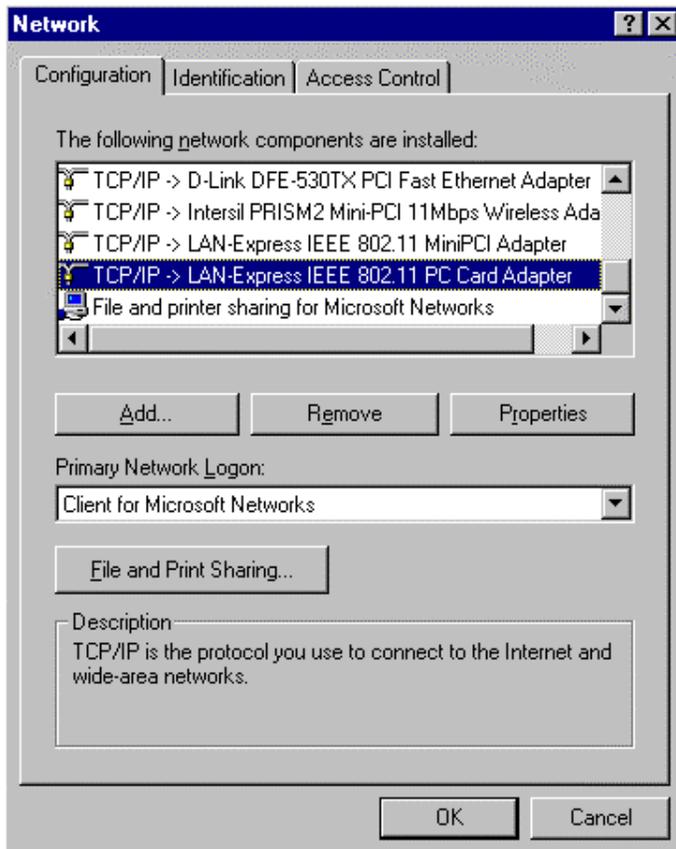
3. Highlight "Protocol" and click "Add" .
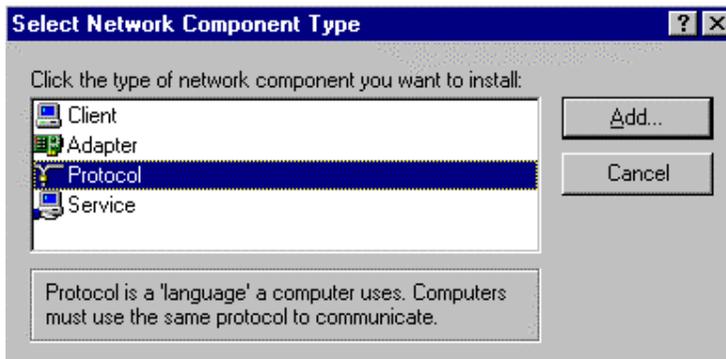
4. Select "Microsoft" from the list of "Manufacturers" and "TCP-IP" from the list of "Network

Protocols", click "OK"

Select Network Protocol

Click the Network Protocol that you want to install, then click OK. If you have an installation disk for this device, click Have Disk.

Manufacturers:
- Banyan
- IBM
- **Microsoft**
- Novell

Network Protocols:
- Microsoft 32-bit DLC
- Microsoft DLC
- NetBEUI
- **TCP/IP**
- WAN support for ATM
- Winsock2 ATM Service Provider

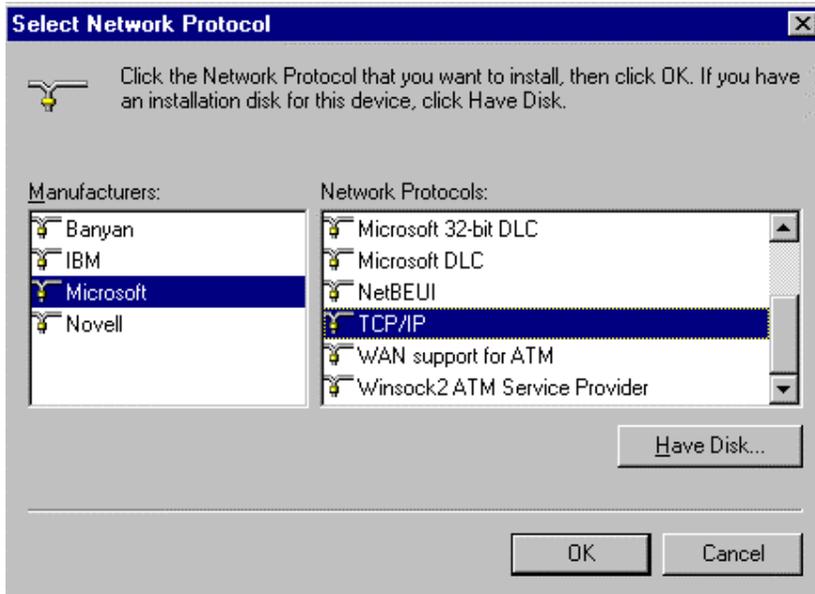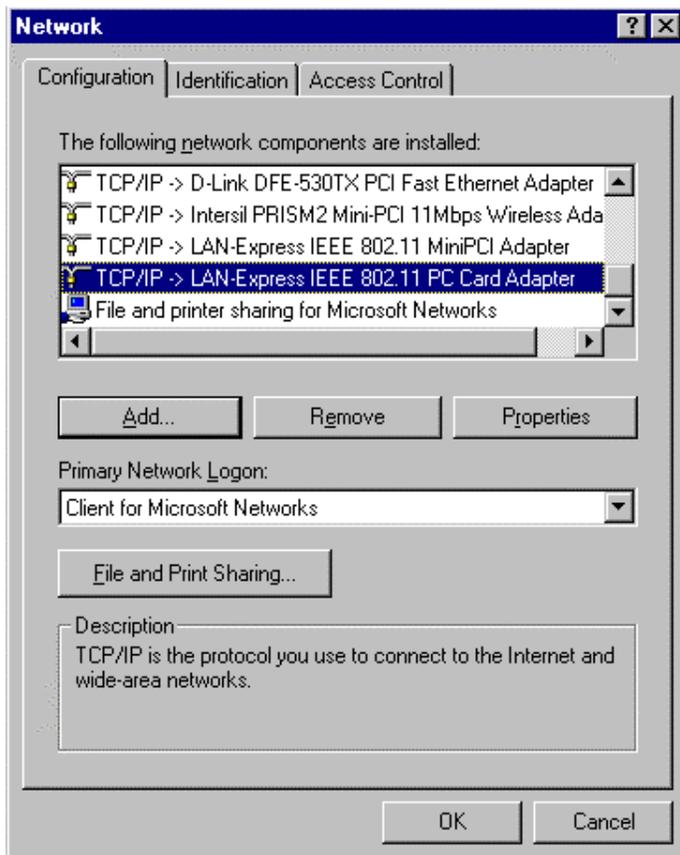Have Disk...

OK   Cancel

5. Select "TCP/IP " and click "Properties".

Network

Configuration | Identification | Access Control

The following network components are installed:

- TCP/IP -> D-Link DFE-530TX PCI Fast Ethernet Adapter
- TCP/IP -> Intersil PRISM2 Mini-PCI 11Mbps Wireless Ada
- TCP/IP -> LAN-Express IEEE 802.11 MiniPCI Adapter
- **TCP/IP -> LAN-Express IEEE 802.11 PC Card Adapter**
- File and printer sharing for Microsoft Networks

Add...   Remove   Properties

Primary Network Logon:

Client for Microsoft Networks

File and Print Sharing...

Description
TCP/IP is the protocol you use to connect to the Internet and wide-area networks.

OK   Cancel

Repeat step 2 – 5 to install other protocols such as NetBeui or IPX/SPX.

NOTE: The following steps apply to DHCP servers. Consult your system administrator for

specific information regarding your server type, and for help in specifying an IP address if you do

not use a DHCP server and must manually enter the IP address and DNS number.

6. Check "Obtain an IP address…" and click "OK". If you are using a DHCP server the IP
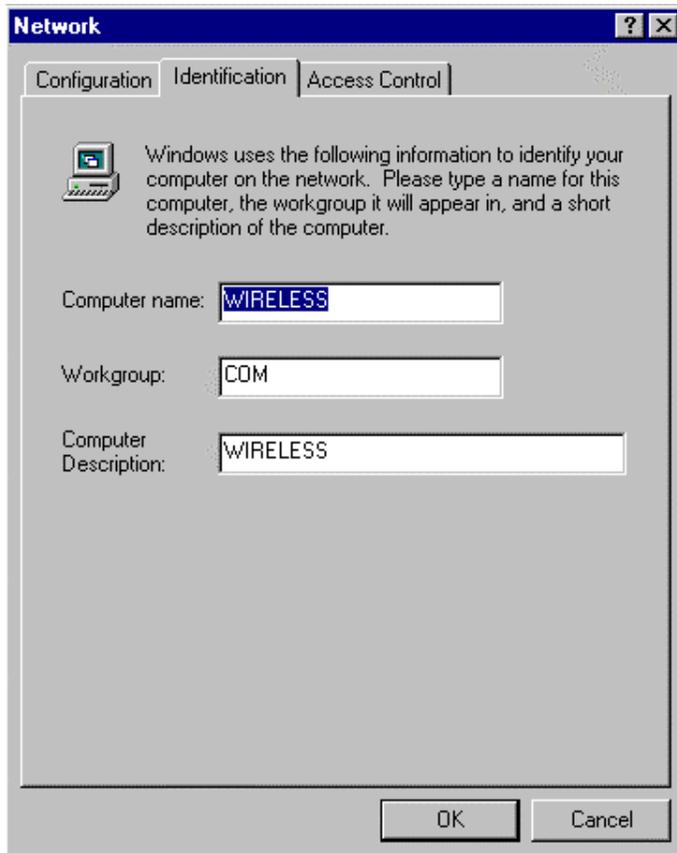address will be entered automatically.
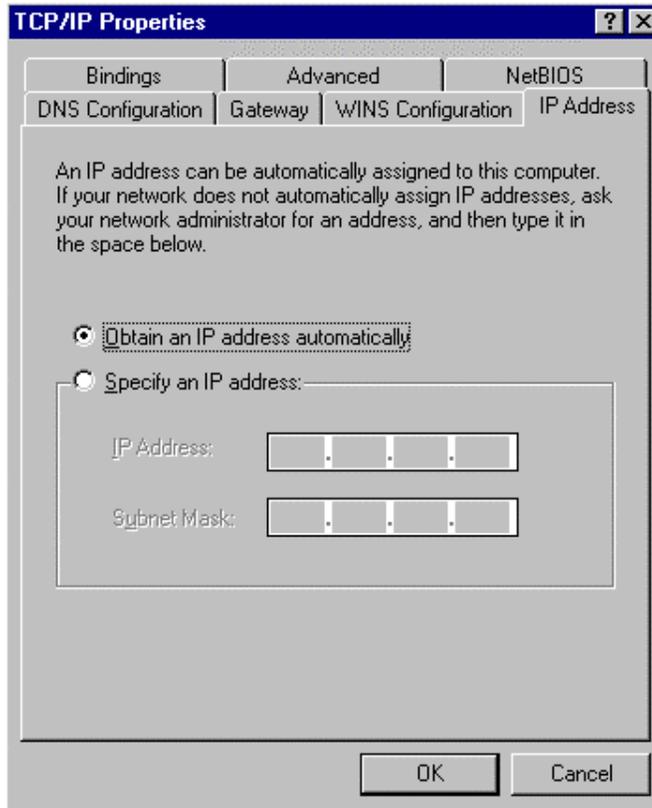
7. From the Network menu highlight "Client from Microsoft Networks", and click" File and
Print Sharing".
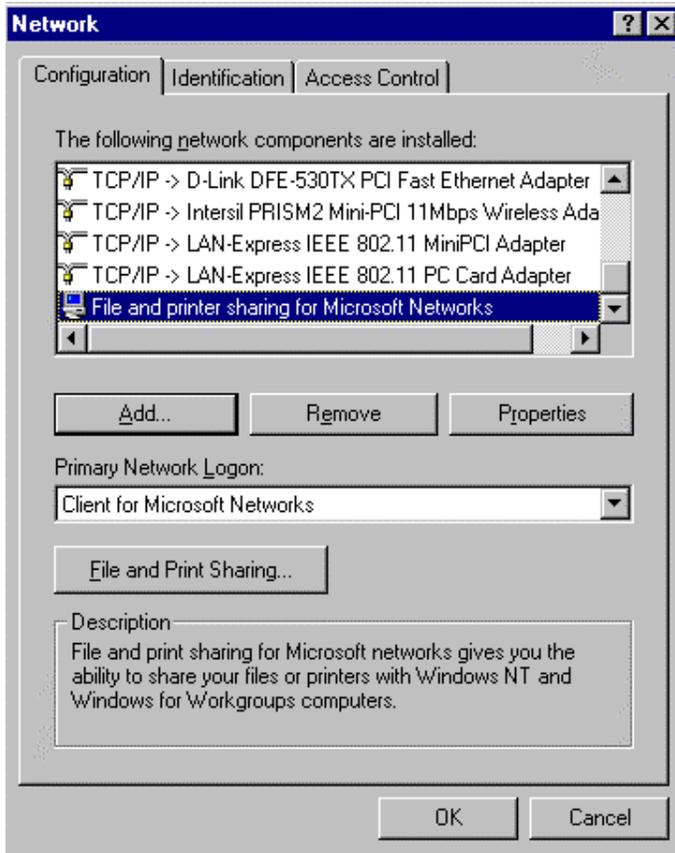
8. Check both boxes and click "OK".

9. Enter a "Computer name", "Workgroup" and "Computer Description", click "OK"

11. You will be prompted to restart your computer, click "Yes" to complete the installation.

Note: Please see the trouble shooting if you encounter some problem while installing the PC-Card or your PC-Card is non-functional.

3-5 802.11B WLAN SETUP FOR WINDOWS ® 2000

1. Insert the WLAN adapter into a standard Type II or Type III MiniPCI card slot, as described in the preceding section.

2. Windows ® 2000 will automatically detect the 802.11B WLAN and prompt you to install the necessary driver. Click "Next" to begin the installation.

3. Check "search for the best driver…" click "Next".

4. Check "floppy disk drivers" , click "Next". Windows ® 2000 will automatically find the file.
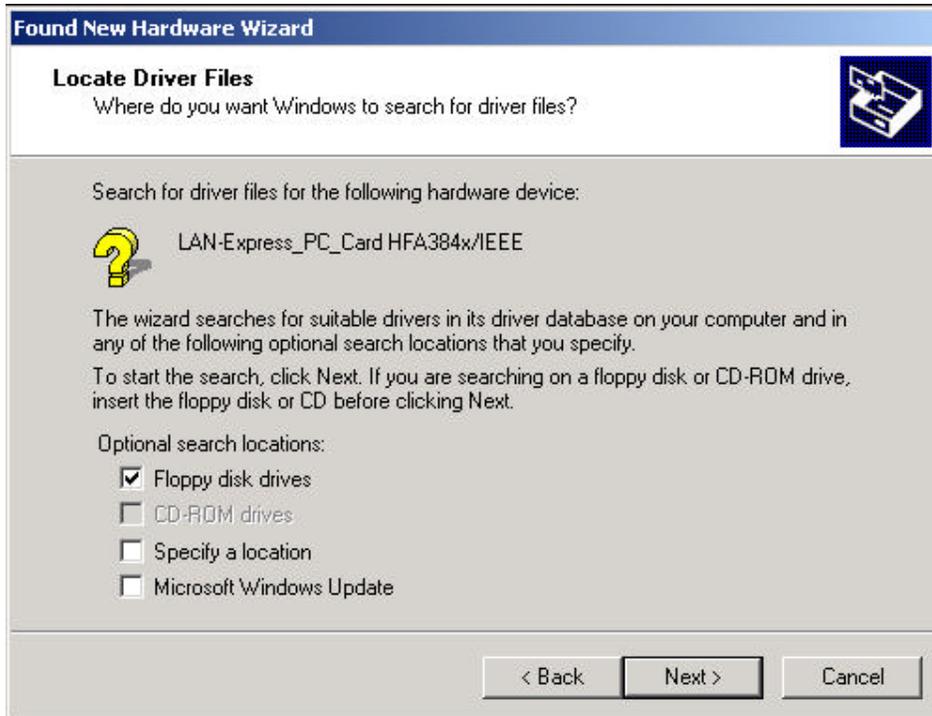
5. Windows ® 2000 will then acknowledge that it has found the appropriate driver, click "Next".

6. Click "Yes" to continue the installation.

Digital Signature Not Found

The Microsoft digital signature affirms that software has been tested with Windows and that the software has not been altered since it was tested.
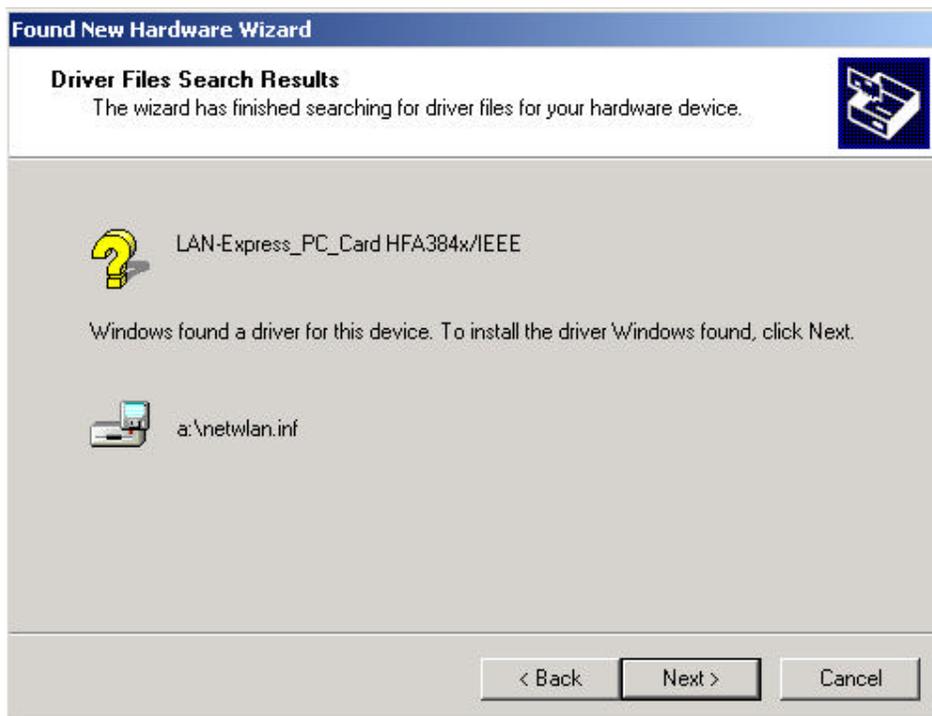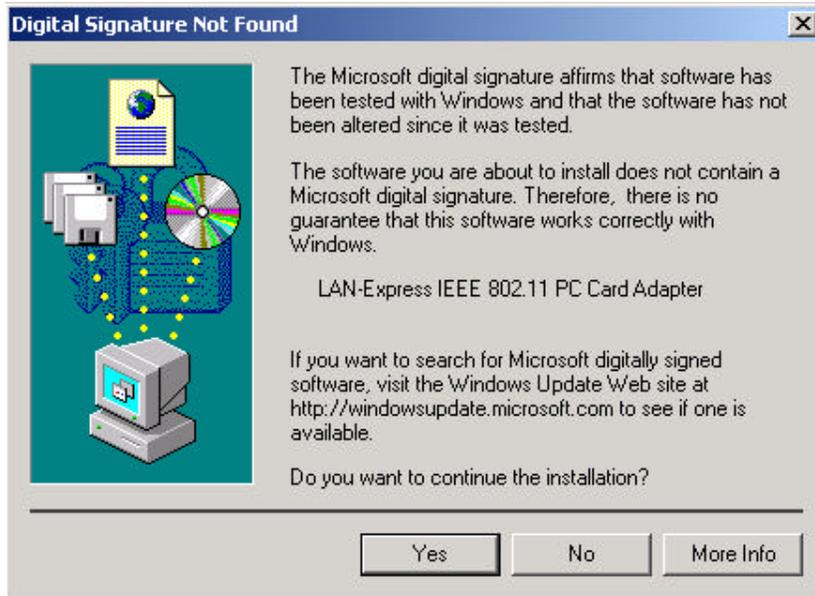
The software you are about to install does not contain a Microsoft digital signature. Therefore, there is no guarantee that this software works correctly with Windows.

LAN-Express IEEE 802.11 PC Card Adapter

If you want to search for Microsoft digitally signed software, visit the Windows Update Web site at http://windowsupdate.microsoft.com to see if one is available.

Do you want to continue the installation?

[Yes]   [No]   [More Info]

7. Clink "Finish" to compete the installation.

Found New Hardware Wizard

Completing the Found New Hardware Wizard

LAN-Express IEEE 802.11 PC Card Adapter

Windows has finished installing the software for this device.

To close this wizard, click Finish.

[< Back]   [Finish]   [Cancel]

Chapter 4 Installing & Navigating the LAN-Express Configuration Utility

## 4-1 LAN-Express CONFIGURATION UTILITY - INSTALLATION

Insert the LAN-Express Network Configuration Utility disk into an available floppy disk drive.

From the "Run" window type "A:\utility \setup.ex e" (where "A" represents a floppy disk drive).

## 4-2 LAN-Express CONFIGURATION UTILITY - NAVIGATION

The following section describes and defines the various functions of the LAN-Express Network Configuration Utility. This utility provides quick access to all adapter settings.

After installation is complete, a LAN-Express utility icon will appear in the "Start" ->"Program"->"Wireless LAN Card Utility"->"Wireless LAN Utility" Icon.

**The LAN-Express About Icon:** Clicking the upper left corner icon in the LAN-Express Utility will open the About, here you will find Version, Copyright and Manufacturer information.
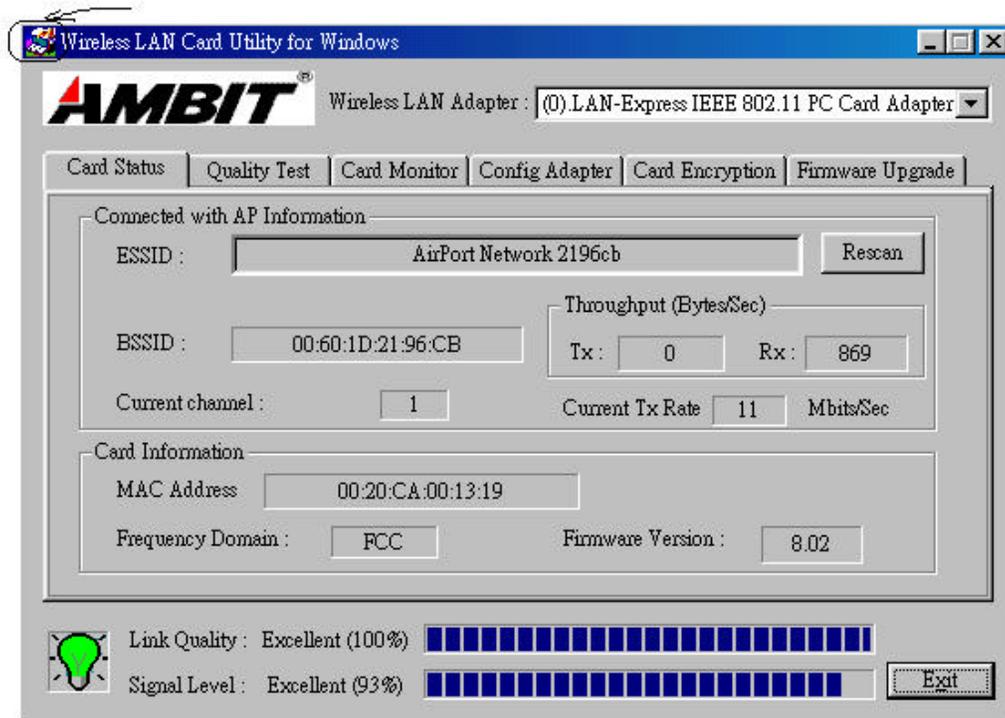

The LAN-Express Card Status: Clicking the Card Status button in the LAN-Express Utility will open the Card Status, The Link Info menu provides information about the current link between the adapter and the base station(or AP).
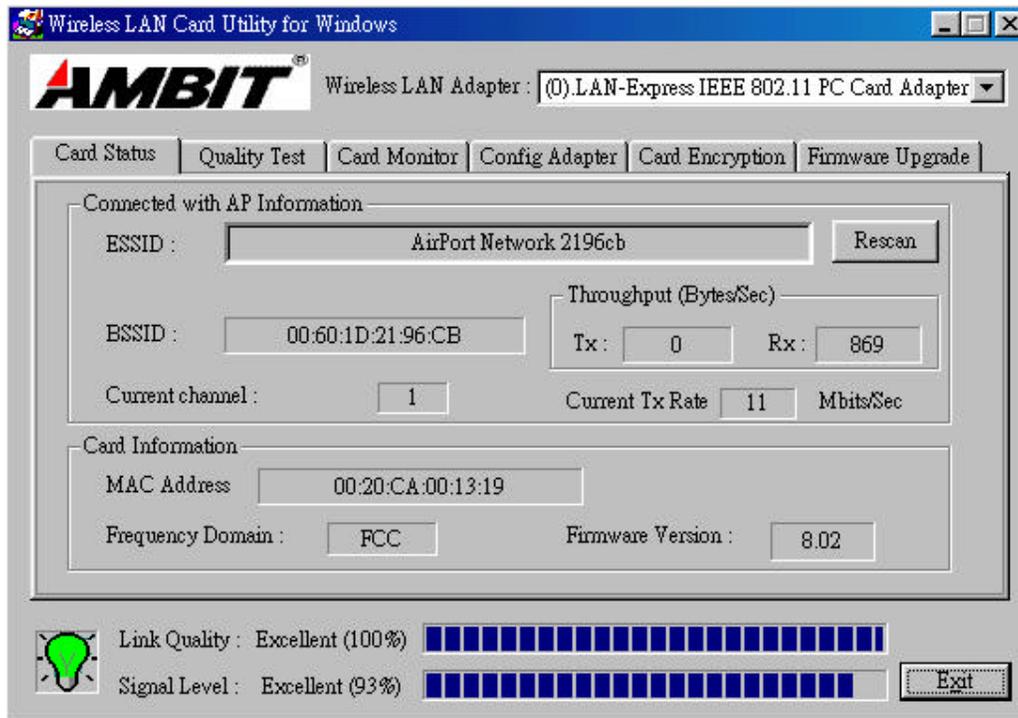
The LAN-Express Quality Test: Clicking the Quality Test button in the LAN-Express Utility

will open the Quality Test, providing a simple test on two station. While one station Set a Master mode, another

station set a slave mode. Master station must set slave station's Mac Address. If a station is tested under

loopback test mode, it should use AP of LAN-Express.
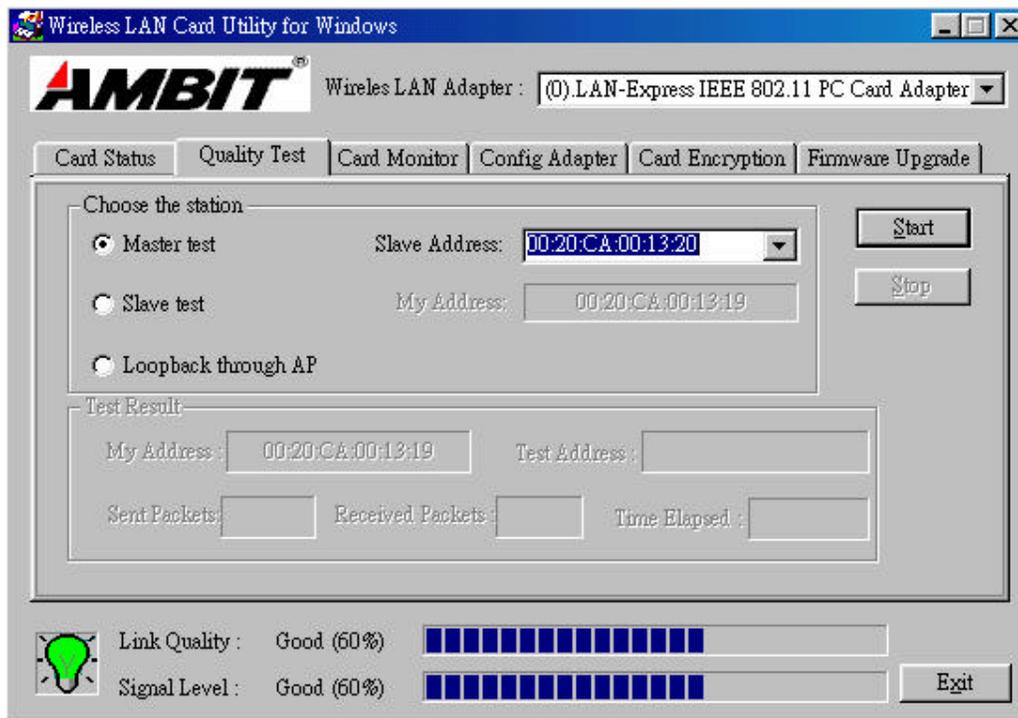
The LAN-Express Card Monitor: Clicking the Card Monitor button in the LAN-Express Utility

will open the Card Monitor, It can monitor a physical layer in the Adapter currently.
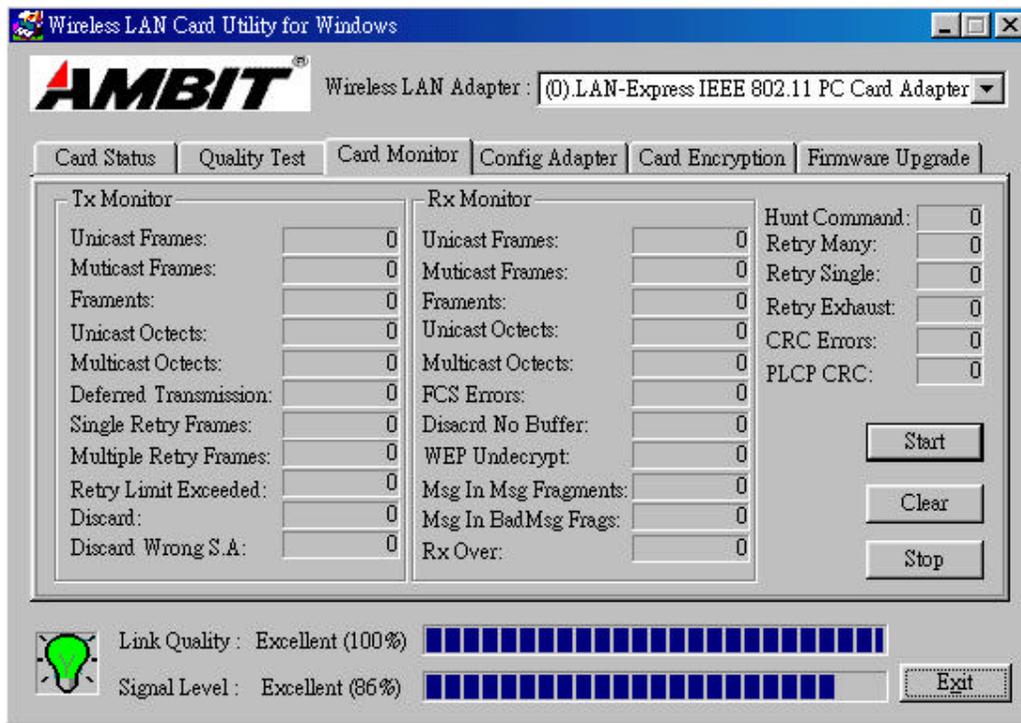
The LAN-Express Configuration: Clicking Config Adapter in the LAN-Express Utility

will open the Config Adapter, providing quick access to all adapter settings. The following image shows the

LAN-Express Configuration Utility. It can change every parameters.
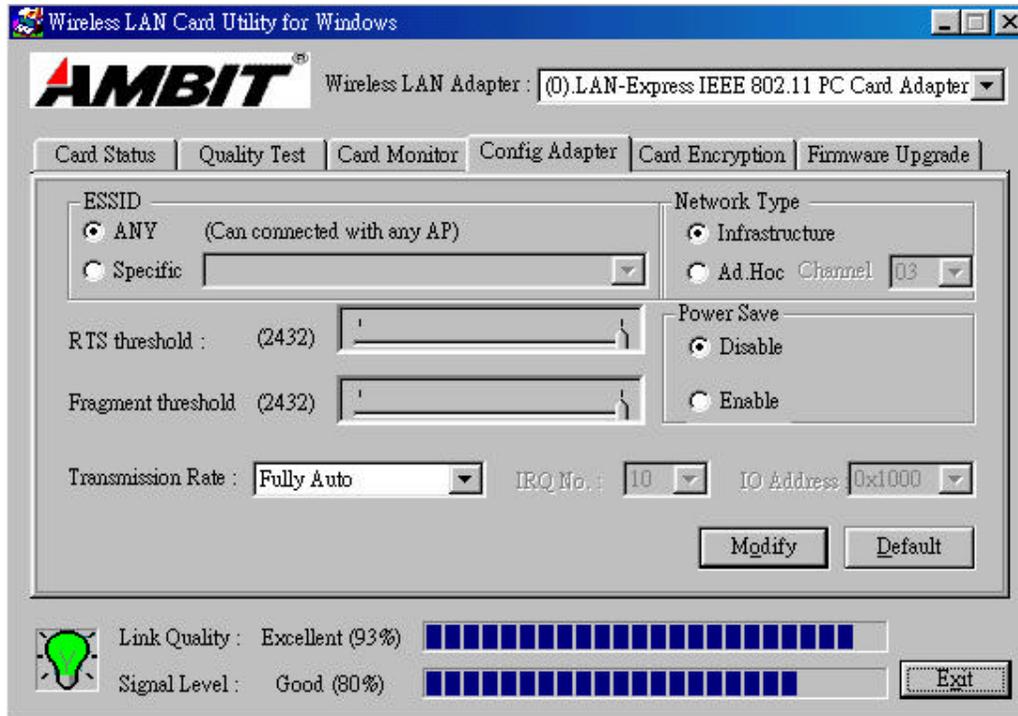
The LAN-Express Card Encryption: Clicking the Card Encryption button in the LAN-Express Utility
will open the Card Encryption, An acronym for Wired Equivalent Privacy, WEP is an encryption scheme used to
protect your wireless data communications. WEP uses a combination of 64-bit keys,128-bit keys to provide
access control to your network and encryption security for every data transmission. To decode a
data transmission, each wireless client on the network must use an identical 64-bit key,128-bit key.
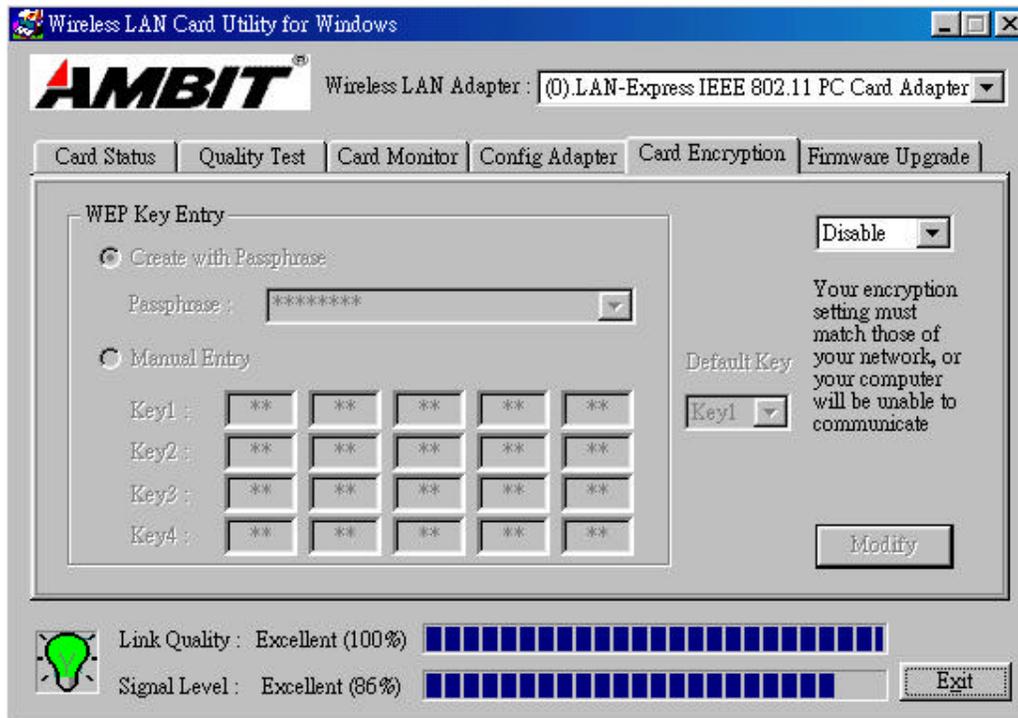
The LAN-Express Firmware Upgrade: Clicking the Firmware Upgrade button in the LAN -Express Utility

will open the Firmware Upgrade, It can upgrade a firmware of differ version.
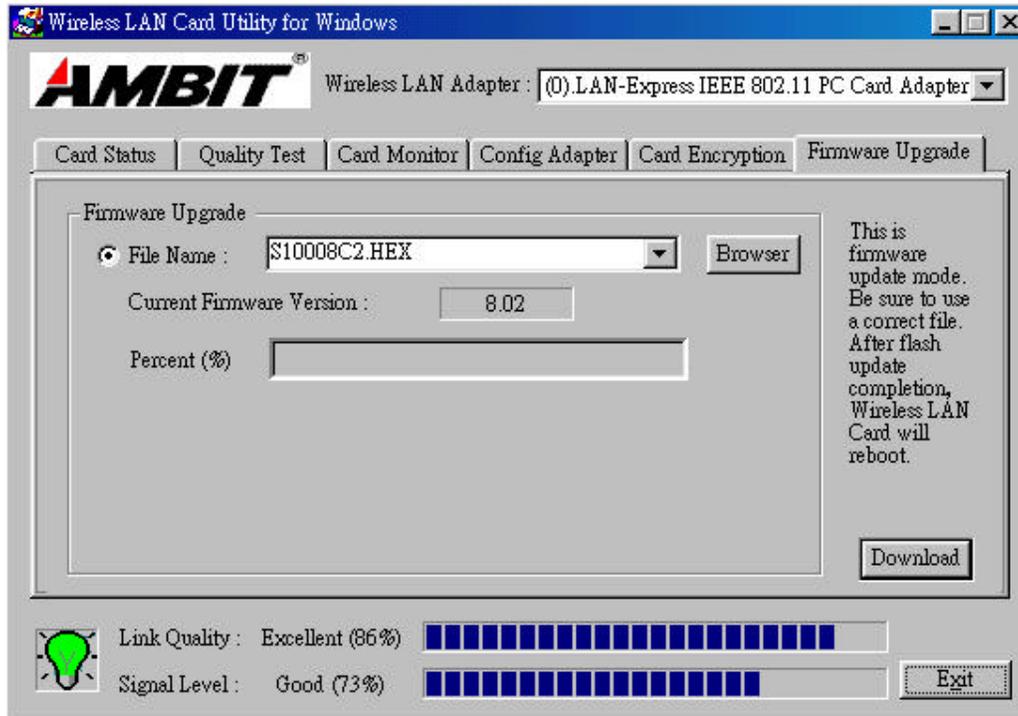
Configuration: Selecting this tab opens the "Configuration" menu. Here you will find options for

configuring your adapter.

Description of Settings

Following is an explanation of each adapter setting presented by the "Configuration" menu.

Mode: The Mode setting determines the architecture of your wireless LAN. Choose Ad-Hoc or Infrastructure Mode depending on your network type. A brief explanation of each mode follows:

- **Ad-Hoc:** This mode is used for a simple peer-to-peer network. This type of network allows the sharing of local resources only between wireless clients without a wireless Access Point (AP).

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

SSID: An acronym for Service Set Identifier, SSID is the unique name shared among all clients and Access Points in a wireless network. The SSID must be identical for all clients or Access Points participating in the same network. The SSID is case sensitive and must not exceed 30 characters.

Ethernet Conversion: The RFC1042 mode is the 802.11 standard conversion method and is selected by default. If compatibility with older wireless LAN systems is necessary select another conversion implementation from the **Ethernet Conversion drop** down list.

Tx Rate: The transmit rate or Tx Rate selects the allowable transfer rates of the wireless client. To optimize performance and range, the Tx Rate should be set to Fully Automatic, which will automatically adjust the transfer speed for best performance and longest range.

Note: The Tx rate setting must be supported by the AP. If the AP does not support the Tx rate, undesired results may occur.

WEP: An acronym for Wired Equivalent Privacy, WEP is an encryption scheme used to protect your wireless data communications. WEP uses a combination of 64-bit keys,128-bit keys to provide access control to your network and encryption security for every data transmission. To decode a data transmission, each wireless client on the network must use an identical 64-bit key,128-bit key.

NOTE: This feature is only available in Infrastructure Mode and must also be enabled on the Access Point. Select the WEP tab to enable or disable this feature.

PS Mode: Power Saving Mode enables or disables the power saving features of your wireless adapter. When enabled on a laptop, the power saving mode can reduce power consumption by the wireless card and extend the battery life of your laptop. This setting is only implemented in a network operating in Infrastructure mode.

- **Changing the PS mode:** The PS Mode on your adapter is set to "Disabled" by default. To change the setting, select "Enabled" from the drop-down list, click "OK" and wait a few seconds. The screen will then is updated and show the current Connection Status, Link Quality and Signal Strength.

Channel: This setting specifies the default 802.11 channel used by the Wireless LAN

communication. In an Infrastructure type network without an Access Point active on the default channel, clients will scan through all available channels searching for a network with matching SSID.

- **Changing the Channel:** Changing the channel is only effective in Ad-Hoc networks. Networks operating in Infrastructure mode automatically scan for a channel. The following table presents contains the operational channel frequency for several countries.

Appendix A Troubleshooting

Problem Solving

*My computer does not recognize the 802.11B WLAN.*

Probable Solution:

- The 802.11B WLAN is not properly inserted into the MiniPCI slot.
- Ensure that the 802.11B WLAN has been inserted into an available MiniPCI slot.

*The 802.11B WLAN does not work properly.*

Probable Solution:

- Insert the MiniPCI adapter into Notebook's slot again. A beep should be heard if the adapter is properly inserted.
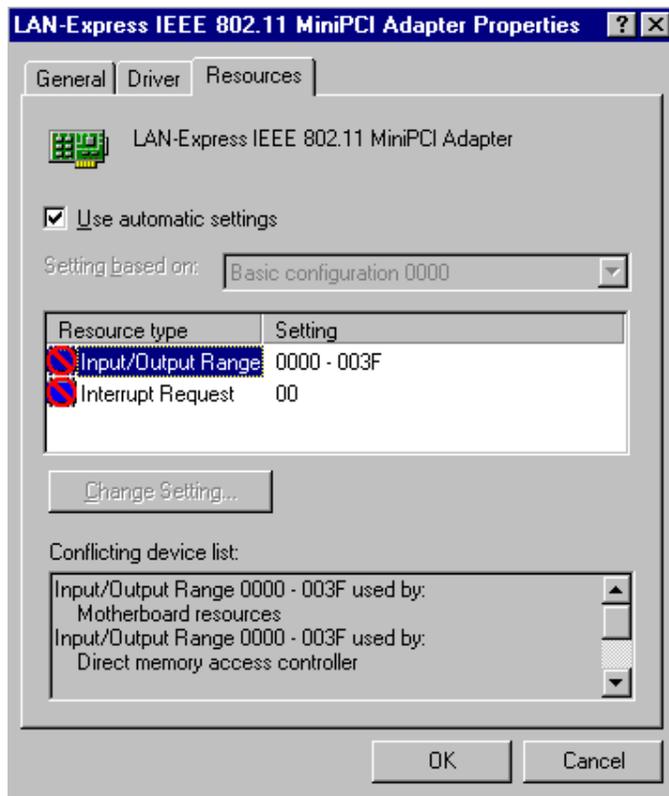
- Check the I/O cable that connects the RF module and the MiniPCI adapter.
- For non-Windows 95/98 environments, ensure that a MiniPCI card service driver is installed in your computer.

- 1) Click on the Control Panel and then on PC -Card/MiniPCI. Check whether it has MiniPCI card
in one of the sockets or not. If you find "LAN-Express IEEE 802.11 PC-Card Adapter" or "LAN-Express IEEE
802.11 MiniPCI Adapter" 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 "LAN-Express IEEE 802.11 PC-Card Adapter" or "LAN-Express IEEE 802.11 MiniPCI
Adapter" if it is installed successfully. If you see the Yellow sign the resources are conflicting. Click on MiniPCI
card and then on MiniPCI Card service, you can see the status of MiniPCI.
card. If there are yellow sign either on adapter or MIniPCI card, please check followings.

- 2-1) Check if your Notebook supports 3.3V card.

- 2-2)Check if your Notebook has a free IRQ

- 2-3) Check that you have inserted the right card and have installed the proper driver.
If the 802.11B WLAN does not function after attempting the above steps, remove the MiniPCI adapter,
and do the following:
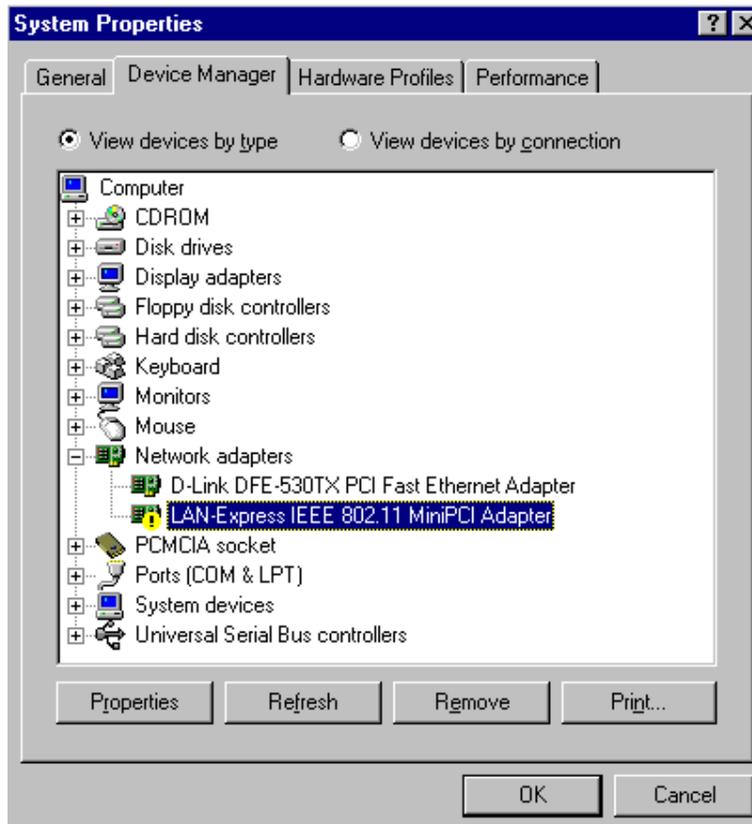
- From the run window enter, c:\windows\system, locate and delete the Express.sys file

- Open the "Control Panel" double-click "System" and delete "LAN -Express IEEE 802.11 PC-card
Adapter" or "LAN-Express IEEE 802.11 MiniPCI Adapter".

- Restart the PC and repeat the hardware and software installation steps outlined in
Chapters 3 and 4.

The 802.11b WLAN station cannot communicate with other computers linked via Ethernet in the Infrastructure configuration.

Probable Solution:

- Ensure that the 802.11B WLAN with which the station is associated is powered on.
- Confirm the station is configured with the same operating radio channel as the 802.11B WLAN. If the IDs are different, change the 802.11B WLAN and all the stations within the BSS to another radio channel.
- Ensure that the station is configured with the same security options as the 802.11B WLAN, and can be turned off and on with the same security key.
- Confirm that the BSS ID is the same as the 802.11B WLAN for a roaming disabled station. Alternately confirm that the ESS ID is the same as the 802.11B WLAN for a roaming enabled Station

Appendix B Glossary

Access Point - An internetworking device that seamlessly connects wired and wireless networks together.

Ad-Hoc - An Ad-Hoc wireless LAN is a group of computers each with wireless adapters, connected as an independent wireless LAN.

Backbone - The core infrastructure of a network, the portion of the network that transports information from one central location to another central location. The information is then off-loaded onto a local system.

Base Station - In mobile telecommunication, a base station is the central radio transmitter/ receiver that maintains communication with the mobile radio telephone sets within range. In cellular and personal communications applications, each cell or microcell has its own base station; each base station in turn is interconnected with other cells' base.

BSS - Stands for "Basic Service Set." An Access Point associated with several wireless stations.

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

Ethernet - A popular local area data communications network, originally developed by Xerox Corp., which accepts transmission from computers and terminals. Ethernet operates on 10 Mbps baseband transmission over shielded coaxial cable or over shielded twisted pair telephone wire.

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

PCMCIA - Personal Computer Memory Card International Association, which develops standards for PC cards, formerly known as PCMCIA cards, are available in three "types" which are about the same length and width as credit cards, but range in thickness from 3.3 mm (Type I) to 5.0 mm (Type II) to 10.5 mm (Type III). These cards can be used for many functions, including memory storage, as landline modems and as wireless LAN.

Roaming - A function that allows one to travel with a mobile end system (wireless LAN mobile station, for

example) through the territory of a domain (an ESS, for example) while continuously connecting to the infrastructure.

RTS Threshold – Transmitters contending for the medium may not hear each other. RTS/CTS mechanism can solve this " Hidden Node Problem".

Product Specifications for WLAN :

Radio: Complies with IEEE 802.11

Frequency Band: 2400 ~ 2483.5MHz (for US, Canada, and ETSI

2400 ~ 2497MHz (for Japan)

Modulation TYPE: CCK,BPSK,QPSK

Operating Channels: IEEE 802.11 compliant

11 channels (US, Canada)

13 channels (ETSI)

14 channels (Japan)

Radio Technology: Direct Sequence Spread Spectrum

Data Rate: 1 / 2 / 5.5 / 11 Mbps

Output Power: > +13dBm

Receive sensitivity: Min. -76dBm for 11Mbps; Min. -80dBm for 5.5/2/1

Mbps ;(@BER 10E-5)

Antenna Type: De-attached PCB patch diversity antenna or MMCX connector for external antenna

Current

Consumption : 3.3 V/5 V , Tx mode 350 m A (Max.) ; Rx mode 230 m A (Max.);

Package : MiniPCI Type III

Certification: FCC Part 15

ETSI 300.328

ARIB STD33 & T66

Driver : Windows 95/98/2000/ME