InstantWave™

CardBus Enhanced

Wireless Network Adapter

OEM's manual

Version A1

NWH1022

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TRADEMARKS

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FCC WARNING

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 .
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 or more 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

Changes or modifications not expressly approved by the party responsible for compliance could void user's authority to operate the 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. Test

CAUTION:

This device is not authorized to be integrated and used in PDAs, hand-held devices, laptops, or any portable devices, as separate FCC equipment authorization must be obtained to address RF exposure (SAR) requirements for portable devices into which this module is installed. The device is ONLY approved to be integrated and used in mobiles devices of the type Access Point.

Packing List

The adapter package should contain the following items:

- One InstantWave NWH1022 CardBus enhanced wireless network adapter with integrated antenna
- Four floppy disks – one containing drivers, two containing the InstantWave HighRate Utility for the NWH1022, and one containing this user's guide in PDF format

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Introduction

Thank you for choosing an InstantWave wireless networking product. This guide gives comprehensive instructions on installing and using the InstantWave NWH1022 CardBus enhanced wireless network adapter, and also explains how to install and use the InstantWave utility program.

Your InstantWave wireless network adapter is part of a family of easy-to-use, high-performance wireless communication products. This family of products includes:

- InstantWave 11-Mbps Wireless Access Point (NWH650)
- InstantWave 11-Mbps Wireless Access Point (NWH660)
- InstantWave 11-Mbps Wireless Workgroup Bridge (NWH6210)
- InstantWave 11-Mbps Wireless Ethernet Client (NWH2210)
- InstantWave 11-Mbps Wireless Secure Router (NWH8010)
- InstantWave 11-Mbps Wireless PC Card (NWH1010)
- InstantWave 11-Mbps Wireless PCI Card (NWH630)

System Requirements

Hardware

The adapter is designed to be installed in an IBM-type microcomputer with a CardBus interface (also known as a PCMCIA or PC Card interface or slot). The minimum system configuration is the same as that required to run Microsoft Windows (Windows 98, Me, 2000, or XP).

To allow installation of the driver and utility software for the adapter, the computer must have a 3.5-inch floppy disk drive.

Software

The utility and driver software included with the adapter will work in Microsoft Windows 98, Windows ME, Windows 2000, and Windows XP.

Terminology Used in this Guide

Ad Hoc Network

An ad hoc network is formed by a number of wireless stations (without an access point) communicating via radio waves. For the users, the shared resources on the wireless network appear exactly as they would on a regular wired network. The wireless operation of the network is totally transparent. Figure 1 depicts a typical ad hoc network scenario.

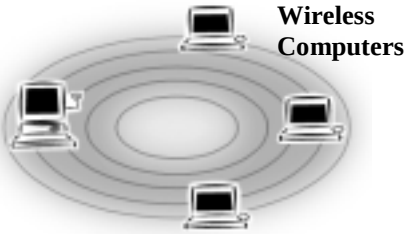

Figure 1. An Ad Hoc Network

Infrastructure Network

An infrastructure network is formed by several stations and one access point (AP), with the stations within range of the AP. Figure 2 depicts a typical infrastructure network topology.

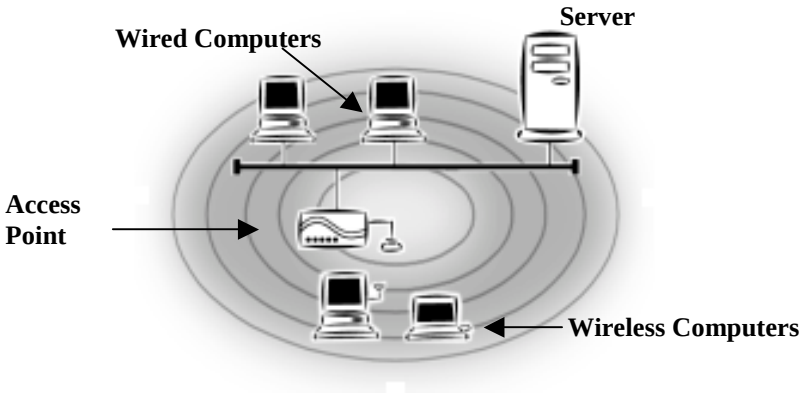

Figure 2. An Infrastructure Network

BSSID/MAC ID

BSSID (Basic Service Set ID) is an ID unique to each AP that is factory set and is identical to the MAC ID (Media Access Control ID). It allows each AP to be identified on the network.

Domain Name/SSID

A domain is usually defined by the network administrator as a segment/subnet of a large network and may be made up of overlapping wireless cells. Wireless nodes can roam freely within the same domain without disconnecting from the network. Figure 3 depicts a common wireless network setup.

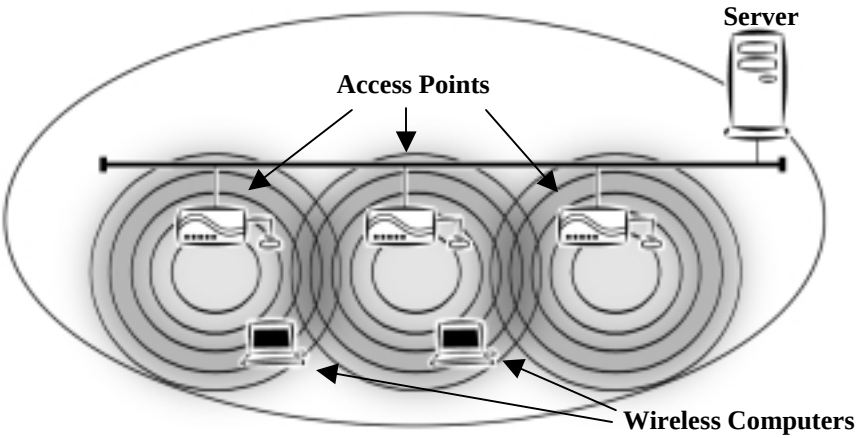

Figure 3. Roaming in the Same Domain

Roaming

The convenience of a mobile PC is the ability to move freely. The concept is similar to that of a cellular phone moving from one base station to another. InstantWave offers built-in high-performance seamless roaming capabilities.

Adapter Installation

The adapter fits into a Type II or Type III CardBus slot, also known as a PCMCIA or PC Card slot. The antenna is encased in a plastic case, in line with the main body of the adapter, such that it extends outside the slot when the adapter is inserted.

step1. Insert the adapter into the computer's CardBus slot. Insert the adapter with its 68-pin connector facing the slot and the label facing up.

step2. Repeat the above procedure for each of the other computers to be networked.

LEDs

The adapter has two light-emitting diode (LED) indicators, one to indicate power and one to indicate wireless activity. When you hold the adapter so the antenna housing faces right like a capital letter *D*, the power LED is above the activity LED. The power LED shines green whenever the adapter is receiving power; the activity LED shines orange when the adapter is transmitting or receiving.

Driver Installation/Uninstallation

For Windows 98 see the following section, for Windows Me go to page 8, for Windows 2000 go to page 10, and for Windows XP go to page 11. Note that if networking components have not yet been installed in the operating system, you may be asked to insert the Windows installation CD-ROM during installation of the driver.

A message about certification of the driver may appear during installation in some versions of Windows. This message can safely be ignored.

Installation in Windows 98

Complete the following procedure to install the driver for Windows 98.

step1. Turn on the power and start Windows 98.

step2. Windows 98 will detect the adapter. The *Add New Hardware Wizard* dialog box will open (**Figure 4**).

Figure 4. Add New Hardware Wizard-1

step3. Click ***Next***.

Figure 5. Add New Hardware Wizard-2

step4. Choose *Search for the best driver for your device* (**Figure 5**). Click ***Next*** to open the following window (**Figure 6**).

Figure 6. Add New Hardware Wizard-3

step5. Insert the driver disk. Check *Floppy disk drives*, check *Specify a location*, and enter ***a:\win98*** (assuming the floppy drive is A). Click ***Next***.

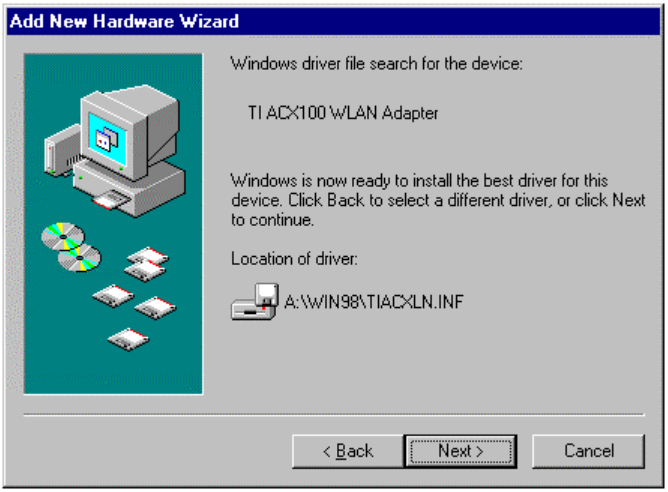

Figure 7. Add New Hardware Wizard-4

step6. The *Add New Hardware Wizard* will indicate that Windows 98 found the driver (**Figure 7**). Click ***Next*** and follow the on-screen instructions to complete the installation.

Uninstalling the Driver from Windows 98

To completely remove the adapter and driver from your system you will need to physically remove the adapter (with the system powered off). The hardware removal procedure is the reverse of the hardware installation procedure. Restart the computer and then proceed as follows:

step1. Click ***Start/Settings/Control Panel.*** Double-click the ***Network*** icon. Highlight the entry ***TI ACX100 WLAN Adapter***.

step2. Click the ***Remove*** button to remove the adapter driver.

step3. Click ***OK***. The system will ask you to restart the PC. Click ***Yes***.

Installation in Windows Me

Complete the following procedure to install the driver in Windows Me:

step1. Turn on the power and start Windows Me.

step2. Windows Me will detect the adapter. The *Add New Hardware Wizard* will open (**Figure 8**).

Figure 8. Add New Hardware Wizard-1

step3. Select *Specify the location of the driver* and click ***Next***.

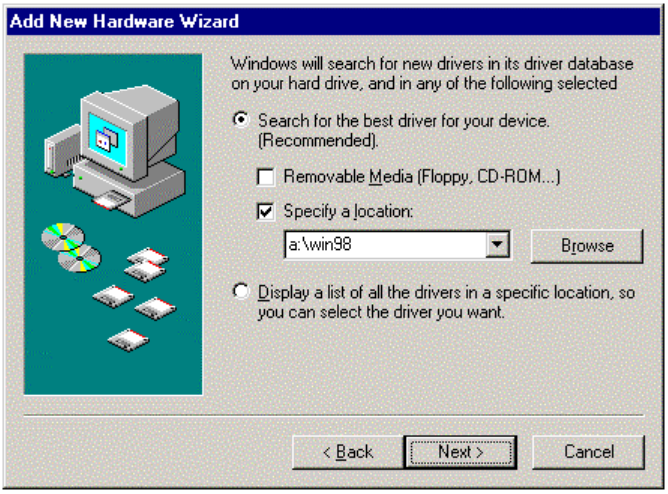

Figure 9. Add New Hardware Wizard-2

step4. Check *Search for the best driver for your device* and check *Specify a location.* Assuming the floppy drive is drive A, type ***a:\win98*** (the driver is the same as that for Windows 98).

step5. Insert the adapter driver disk and click ***Next*** to open the following window (**Figure 10**).

Figure 10. Add New Hardware Wizard-3

step6. Click ***Next***. The *Add New Hardware Wizard* will complete the installation.

step7. Click ***Finish*** and follow the on-screen instructions to complete the installation.

Uninstalling the Driver from Windows Me

To completely remove the adapter and driver from your system you will need to physically remove the adapter (with the system powered off). The removal procedure is the reverse of the hardware installation procedure on page 4. Restart the computer and then proceed as follows:

step1. Click ***Start/Settings/Control Panel***. Double-click the ***Network*** icon, then highlight the entry ***TI ACX100 WLAN Adapter***.

step2. Click the ***Remove*** button to remove the adapter driver.

step3. Click ***OK***. The system will ask you to restart the PC. Click ***Yes***.

Installation in Windows 2000

step1. Turn on the power to the PC and start the Windows 2000 operating system.

step2. The *Found New Hardware Wizard* dialog box will open. Click ***Next***.

step3. Choose *Search for a suitable driver for my device* and click ***Next***.

step4. Check *Specify a location.* Click ***Next***.

step5. Insert the adapter driver disk. Type ***a:\win2k*** (assuming the floppy disk drive is drive A) and click ***OK***.

step6. Click ***Next*** when Windows finds a driver for this device.

step7. Click ***Yes*** to begin copying the driver files.

step8. In the *Completing the Found New Hardware* window, click ***Finish***.

Uninstalling the Driver from Windows 2000

To completely remove the adapter and driver from your system you will need to uninstall the device driver first:

step1. Click ***Start/Settings/Control Panel***. Double-click the ***System*** icon, then select the *Hardware* tab and click ***Device Manager***.

step2. Highlight the entry ***TI ACX100 WLAN Adapter*** in the the *Network Adapters* section.

step3. Click the right mouse button and select *Uninstall*.

step4. Click ***OK*** to confirm the device removal.

step5. Click ***OK*** to close *Device Manager* and the *System Properties* window.

Then shut down the computer and physically remove the adapter. The hardware removal procedure is the reverse of the hardware installation procedure on page 4.

Installation in Windows XP

step1. Turn on the power to the PC and start the Windows XP operating system.

step2. The *Found New Hardware Wizard* dialog box will open. Click ***Next***.

step3. Check *Install from a list* or *Specify a location* and click ***Next***.

step4. Check *Include this location in the search.*

step5. Insert the driver disk. Type ***a:\winxp*** (assuming the floppy disk drive is drive A) and click ***OK***.

step6. Click ***Next*** when Windows finds the driver for the adapter.

step7. Click ***Continue Anyway*** to begin copying the driver files.

step8. In the *Completing the Found New Hardware* window, click ***Finish***.

Uninstalling the Driver from Windows XP

To completely remove the adapter and driver from your system you will need to uninstall the device driver first:

step1. Click ***Start/Settings/Control Panel***. Double-click the ***System*** icon, then select the *Hardware* tab and click ***Device Manager***.

step2. Highlight the entry ***TI ACX100 WLAN Adapter*** in the *Network Adapters* section.

step3. Click the right mouse button and select *Uninstall*.

step4. Click ***OK*** to confirm the device removal.

step5. Click ***OK*** to close *Device Manager* and the *System Properties* window.

Then shut down the computer and physically remove the adapter. The hardware removal procedure is the reverse of the hardware installation procedure on page 4.

The InstantWave HighRate Utility

The InstantWave HighRate Utility is a Windows-based application that allows users to monitor and configure an InstantWave wireless adapter. The program includes tools that allow users to determine the best location to place the InstantWave products, or to diagnose the wireless network for problems.

The utility allows users to configure the wireless network type (ad hoc or infrastructure), domain name (SSID), and security (WEP). The *Site Survey* tool allows users to view existing groups (domain name/SSID of wireless cells in a domain). It provides the option to manually join a particular group in the network.

Tools are also provided for viewing the network in terms of wireless signal quality, and for monitoring the station data throughput.

HighRate Utility Installation

step1. Insert InstantWave Utility disk 1 in the floppy disk drive and click ***Start/Run***. Type ***a:\setup.exe*** (where the floppy disk drive is A).

step2. A Welcome screen will appear. After reading the installation description, click ***Next*** to advance to the *Choose Destination Location* dialog box (**Figure 11**).

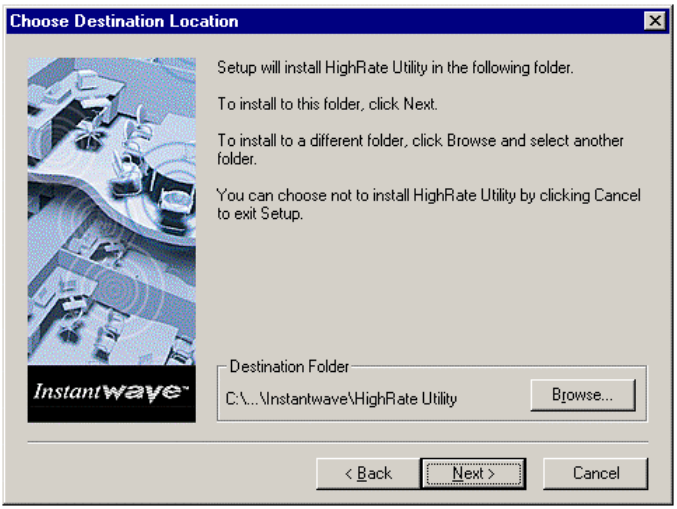

Figure 11. Choose Destination Location

step3. Click ***Next*** to copy the program files to the default location, *C:\Program Files\Instantwave\HighRate Utility*, or click ***Browse*** to choose another location.

step4. The setup program will copy the necessary files into the specified directory. Insert disk 2 when instructed to do so. File copying progress will be displayed in the InstantWave HighRate Utility setup screen.

step5. Click ***OK*** to complete the installation.

Using the HighRate Utility

The InstantWave HighRate Utility toolbar appears in the top right corner of the screen whenever the computer is started up with the adapter inserted. You can also display the toolbar as follows:

step1. Click the ***Start*** button on the taskbar.

step2. Go to ***Programs***, ***Instantwave***, and ***HighRate Utility*** (**Figure 12**).

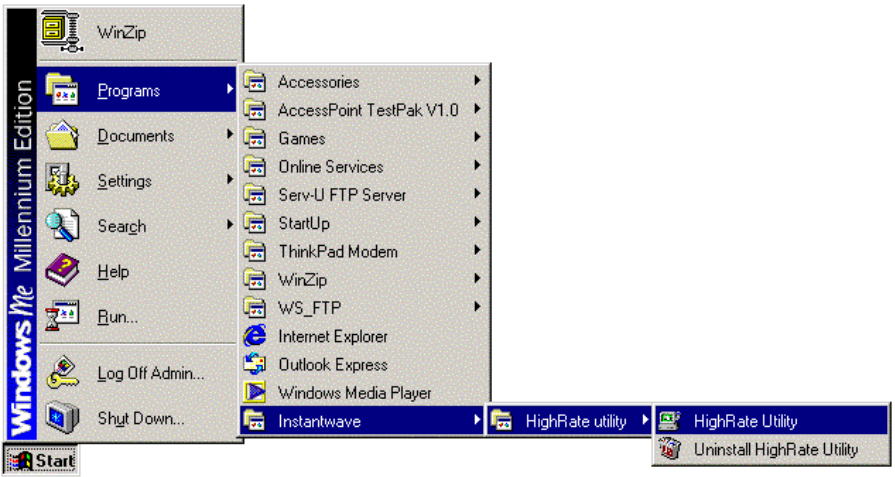

Figure 12. InstantWave HighRate Utility

step3. Click ***HighRate Utility***, and the InstantWave toolbar will appear in the upper right corner of the screen, offering fast access to the utility functions (**Figure 13**).

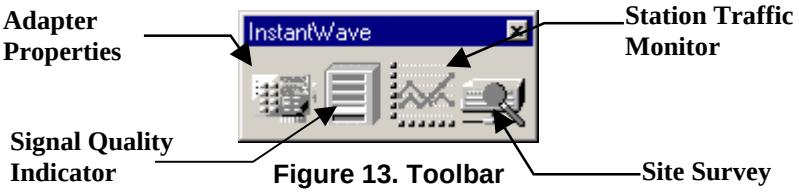

Figure 13. Toolbar

step4. Click the icon for the task you wish to perform. The functions provided by the utility program are, reading from left to right:

- Adapter Properties
- Signal Quality Indicator
- Station Traffic Monitor
- Site Survey

step5. Right-click the InstantWave toolbar's title bar. Four functions are available:

- **Move** is used to move the toolbar to a suitable screen position.
- **Close** is used to close the toolbar.
- **Preferences** allows you to customize utility settings.
- **About** provides product information.

step6. Click ***Preferences***. The *Preferences* dialogue box will be shown (**Figure 14**).

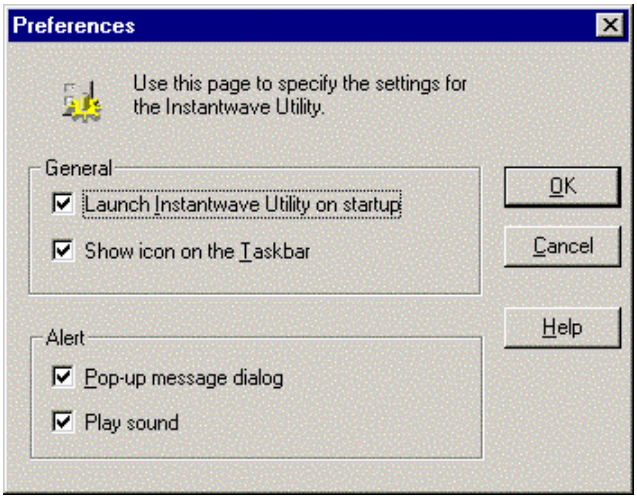

Figure 14. Preferences

- *Launch InstantWave Utility on startup* automatically starts the utility at each system boot.
- *Show Icon on the Taskbar* displays an icon on the taskbar (**Figure 15**).

Figure 15. Lamp Icon

The color of the icon indicates the wireless adapter's current status:

Color	***Status***
Red	The wireless adapter or the driver is not working properly
Yellow	Fair signal quality
Green	Good signal quality

- *Pop-up message dialog* is used to display a warning message in case of abnormal conditions.
- *Play sound* is used to generate an alert sound in case of abnormal conditions.

Right-click on the icon to open a pop-up menu for fast access to the utility program, Preferences, and Help.

Adapter Properties

Click the *Adapter Properties* icon on the InstantWave utility toolbar to open the *Adapter Properties* window (**Figure 16**). *Adapter Properties* allows the user to view the adapter properties, and to change the wireless configuration of the InstantWave station.

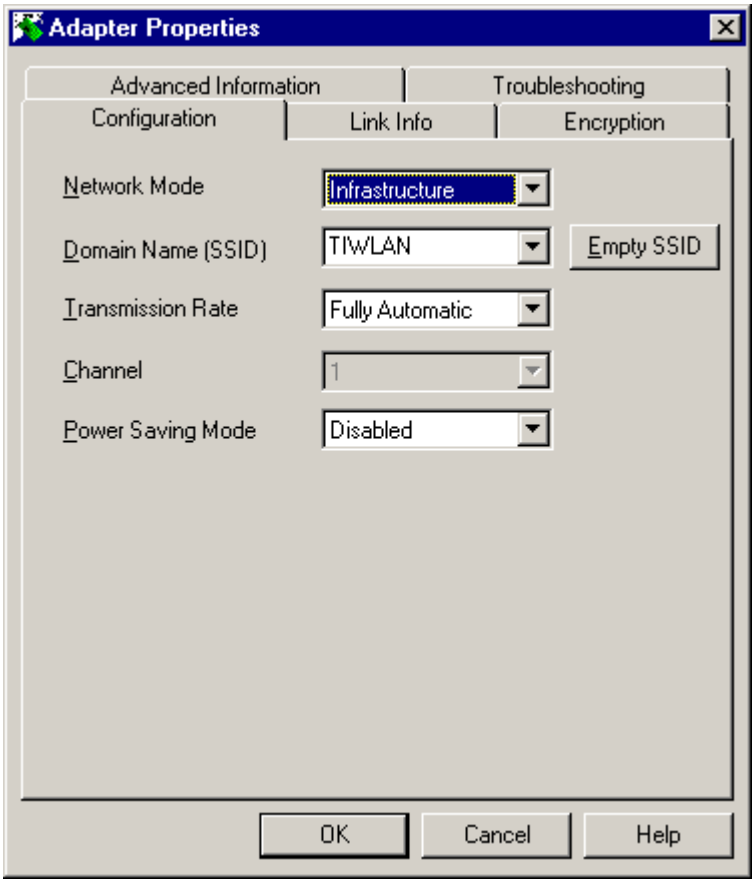

Figure 16. Adapter Properties/Configuration

Configuration

Configuration (**Figure 16**) displays, and allows you to modify, some important parameters of the InstantWave adapter. All parameter changes are saved and are referred to by the InstantWave driver when the system boots.

- ***Network Mode*** – The IEEE 802.11 and IEEE 802.11b wireless specifications allow for two types of network, *infrastructure* and *ad hoc*. *Infrastructure* is used when networking with an access point. The default setting is *Infrastructure*.

- ***Domain Name (SSID)*** – Stations and APs in the same group must use the same domain name. This name is defined in the 802.11b wireless standard as the SSID (Service Set ID).
  Having the same domain name allows all wireless nodes in the same domain (or cell) to communicate with each other. The default setting is *TIWLAN*. All SSIDs entered will be stored and may be accessed from the dropdown list. You can clear the list by clicking *Empty SSID*.
  Note: The SSID is case-sensitive and should not contain any spaces.

- ***Empty SSID*** – Clears the SSID list.

- ***Transmission Rate*** – The speed at which the data packets are transmitted by the client or AP. You can set this to *1Mb* (that is, 1 megabit per second), *2Mb*, *5.5Mb*, *11Mb*, 22*Mb*, or *Fully Automatic*. Usually this should be set to *Fully Automatic*. In an electromagnetically "noisy" environment, a lower rate can provide more stable transmission quality.

- ***Channel*** – For ad hoc networks only. In a multiple cell network topology, overlapping and/or adjacent cells using different channels can operate simultaneously without interference if the frequency distance between the center frequencies is at least 30 MHz. For example, channels 1, 7, and 13 are non-overlapping channels.
  In the case of an infrastructure network, changing the channel number has no affect as the channel is scanned for automatically. The client will look for an AP with the same SSID, and automatically associate with it.

- ***Power Saving Mode*** – Power saving mode is used to minimize the power consumption of the adapter when the notebook PC is powered by battery. Be aware that the transmission performance will be degraded when power saving is enabled.

Advanced Information

Click the *Advanced Information* tab to view read-only information that may be useful in troubleshooting (**Figure 17**).

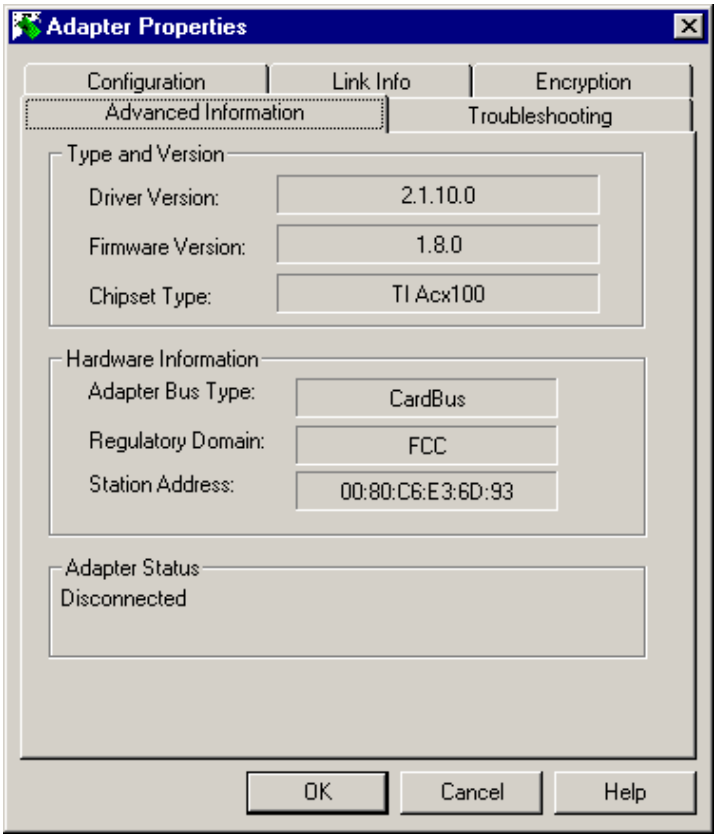

Figure 17. Adapter Properties/Advanced Information

The window is divided into three sections as described below:

- ***Type and Version*** – This section shows the driver and firmware version numbers and the kind of chipset in the adapter.
- ***Hardware Information*** – Shows the adapter bus type, regulatory domain, and MAC address.
- ***Adapter Status*** – Displays the wireless adapter's operating status.

Link Info

Click the *Link Info* tab to view wireless connection properties (**Figure 18**).

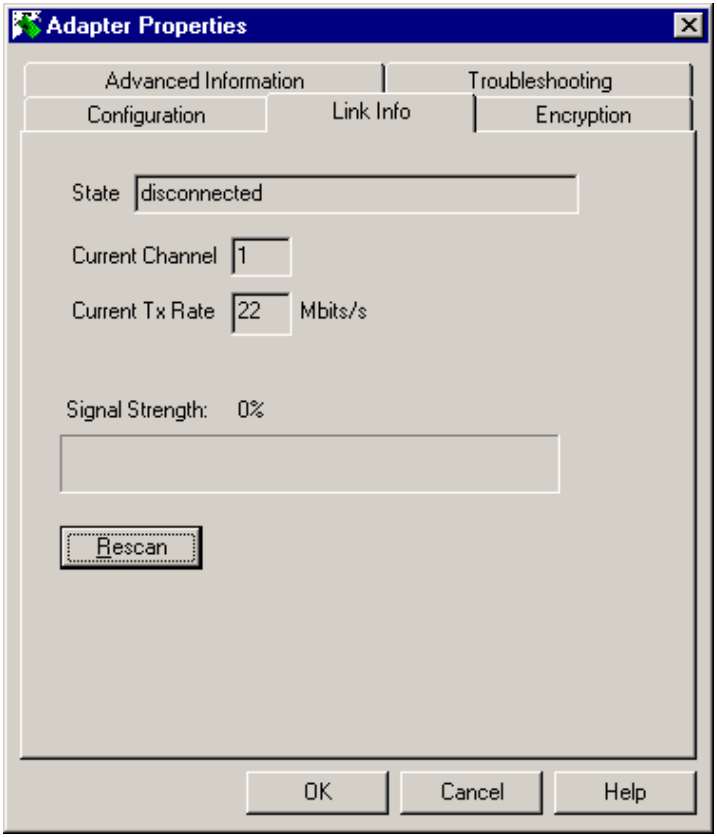

Figure 18. Adapter Properties/Link Info

- ***State*** – State shows whether the client is connected to an AP or not. If connected, it also shows the BSSID (Basic Service Set ID) address of the AP. This is also the AP's MAC address.

- ***Current Channel*** – Channel number is the channel used for communication between the clients and AP or between the clients only. In infrastructure network mode, the associating stations will scan for the channel the AP is

using and change to the same channel automatically. In ad hoc network node, the channel number must be set manually on each client that wishes to connect.

- ***Current Tx Rate*** – Shows the current wireless transmission rate.
- ***Signal Strength*** – Displays the signal strength level.
- ***Rescan*** – Clicking ***Rescan*** forces the client to rescan for an access point with the same domain name on a different channel.

Encryption

Data encryption provides more secure wireless data communication. Click the *Encryption* tab to setup/change the security settings (**Figure 19**). The default is *Disabled* and initially the keys section will be blank.

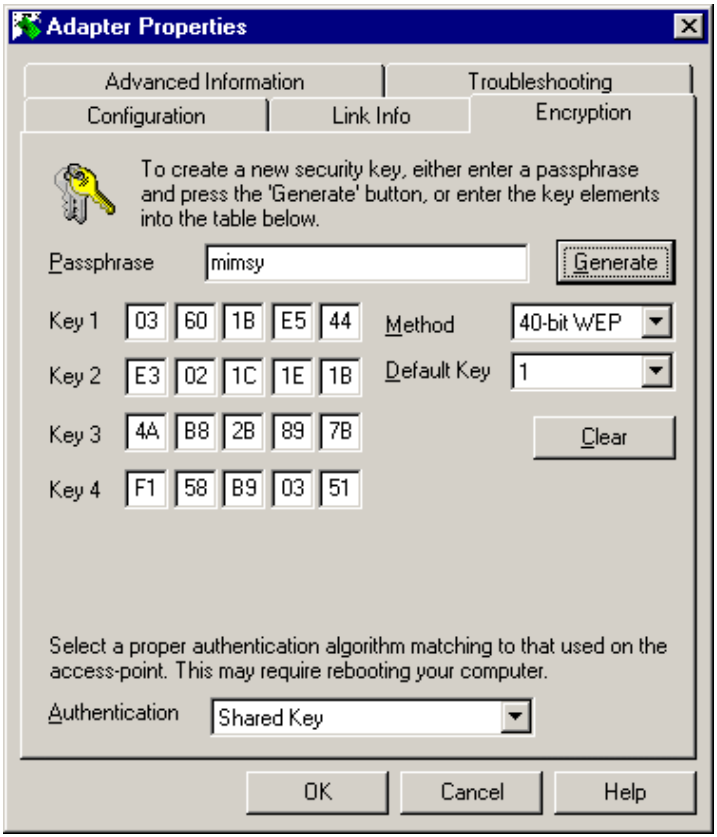

Figure 19. Adapter Properties/Encryption

- ***WEP*** – WEP stands for Wired Equivalent Privacy and is an encryption scheme that provides secure wireless data communications. WEP uses a 40-, 128-, or 256-bit key to control network access. In order to decode transmissions, each wireless client on the network must use exactly the same key.

  Disabled (default): Stations and APs communicate without any data encryption.

  40-bit WEP: Stations and APs communicate using 40-bit WEP encryption.

  128-bit WEP: Stations and APs communicate using 128-bit WEP encryption.

  256-bit WEP: Stations and APs communicate using 256-bit WEP encryption. Note that not all wireless devices support 256-bit encryption.

- ***WEP Key Generation*** – There are two ways to create a WEP key:

  The first is by entering text in the *Passphrase* field and then clicking ***Generate***. For 40-bit WEP, four WEP keys will be generated – Key 1, Key 2, Key 3, and Key 4. You must select the key currently being used on the network. If you do not select a key, Key 1 will be selected. For 128- and 256-bit WEP, a single key will be generated.

  The second way to create a WEP key is by inserting the key values directly from the keyboard. If the key is not entered correctly, a client cannot access the resources. If WEP is enabled on the AP, all clients must use the same WEP key to connect to it.

Troubleshooting

Should a problem be encountered that cannot be resolved using the 'Troubleshooting' section of this manual, click the Troubleshooting tab (**Figure 20**).

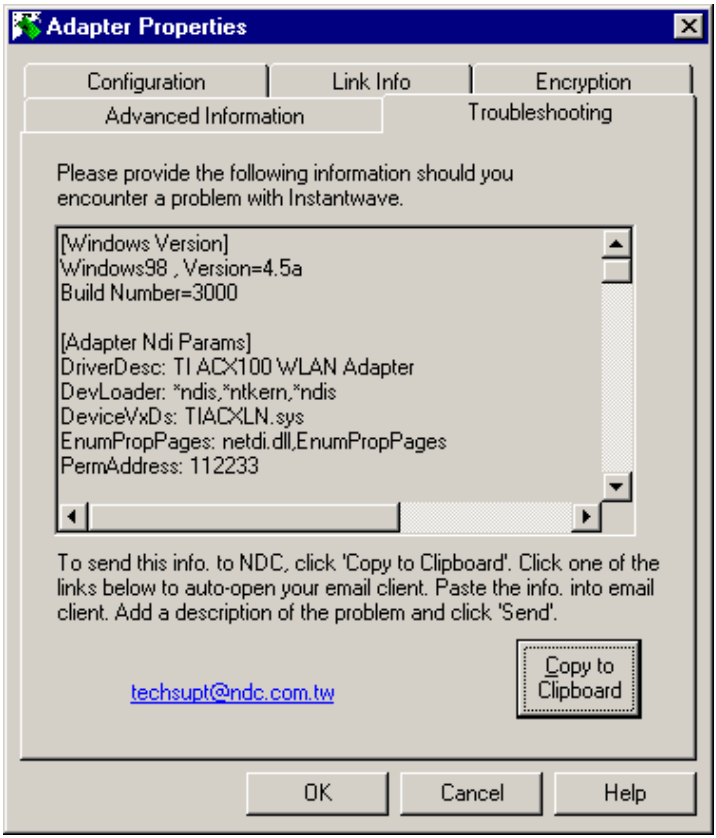

Figure 20. Troubleshooting

A diagnosis program will run and display a diagnostic message. Follow the on-screen instructions to send the message, together with a description of the symptoms, to NDC's technical support via e-mail.

Site Survey (Infrastructure Mode Only)

Site Survey scans for all existing APs and displays the domain name (SSID), BSSID (MAC ID), channel number, signal strength, network mode, WEP status, and estimated distance. It also gives users the option of selecting a particular access point to associate with (and thus "join" a wireless network).

When *Site Survey* is run, the program first reads and displays information stored in the database. The information is not dynamically updated. To refresh the data click the ***Scan*** button.

The Signal Strength column shows either green (strong signal), or yellow (average signal).

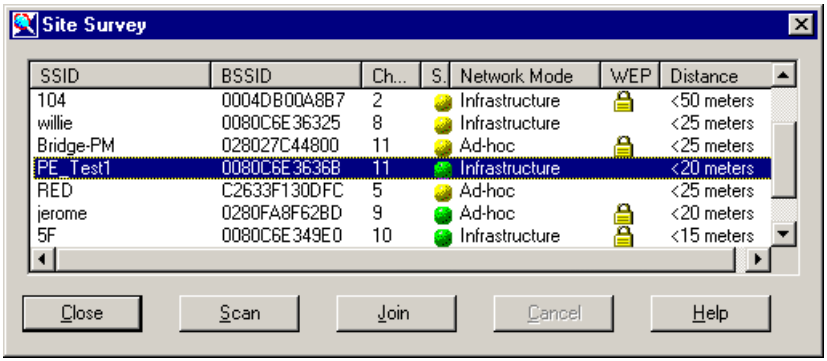

Figure 21. Site Survey

Scan

Click *Scan* to obtain and display updated BSSID information. You may need to wait a short time until the scan is completed.

Join

Selecting one of the APs from the list will enable the ***Join*** button. The ***Join*** command allows you to manually connect to a specific AP. Alternatively, you can double-click the AP's entry in the list.

If joining cannot be accomplished within 20 seconds (possibly due to an AP that has gone off the air since the data was last refreshed, RF interference, or a busy AP), the operation will fail. If this happens, you may try joining with the same AP again, or select another AP to join.

Signal Quality Indicator

Signal Quality Indicator dynamically displays the current radio signal quality (**Figure 22**). The quality level is indicated by colors. Green means the signal is good, yellow indicates the signal is fair, red denotes the signal is poor. When the signal quality goes from fair to poor, the station will search for a different AP.

Figure 22. Signal Quality Indicator

Station Traffic Monitor

This tool lets you monitor the throughput of the wireless station (**Figure 23**).

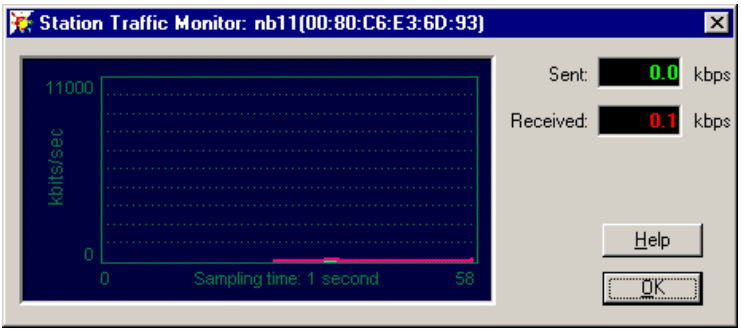

Figure 23. Station Traffic Monitor

The tool shows the amount of data transmitted/received from/to this station. This information is useful when diagnosing networking throughput problems.

Uninstalling the InstantWave Utility

Should you wish to uninstall the utility, click ***Start/Programs/InstantWave/ HighRate utility/Uninstall HighRate Utility***

Or carry out the following steps:

step1. Click ***Start/Settings/Control Panel***.

step2. Click ***Add/Remove Programs*** and select *InstantWave HighRate Utility*.

step3. Click the ***Remove*** button.

Driver/Utility Upgrade Procedure

New drivers or utilities will be released from time to time. Check http://www.ndc.com.tw/support/driver.htm for the latest releases.

To upgrade the InstantWave adapter driver or utility, you need to uninstall the current driver or utility first. See the index (last pages in this guide) to find the location of detailed uninstallation instructions for your operating system.

After removing the old InstantWave adapter driver or utility, follow the driver or utility installation procedure to install the new one.

Troubleshooting

This section provides you with some troubleshooting information should you encounter installation or operation problems with InstantWave products. If your problem still cannot be remedied after going through the Troubleshooting section, check the FAQs at http://www.ndc.com.tw/support/insfaq.htm

If you still have a problem, call the reseller from whom you purchased the InstantWave product, or contact NDC technical support for assistance (see Technical Support, page 31).

Symptom	***Suggested Solutions***
Could not complete the InstantWave adapter installation.	1. Make sure the adapter is fully home in the computer's CardBus slot. 2. Uninstall and reinstall the adapter to see if the error persists. If it does, uninstall the adapter and reinstall it in another slot and, if possible, try the adapter in another PC to verify that the problem is in the adapter and not its PC environment. 3. You may have IRQ conflicts with another device: Go to *Start/Control Panel/System/Device Manager* and expand the *Network Adapters* entry. If you see an exclamation mark [!] displayed on the TI ACX100 WLAN Adapter icon, highlight the adapter entry and click *Properties*. On the *Resources* panel you will see a device conflict message displayed in the *Conflicting device list*. Uncheck *Use automatic settings* and click the ***Change Setting*** button. Select a new IRQ value. When the *Conflicting device list* confirms there is no conflict, click ***OK*** to close the windows. Restart the computer.

1. *The adapter fails to function.* 2. *The adapter LED is off.* 3. *The operating system does not detect the InstantWave adapter.*	These problems may be caused by unsuccessful installation. Completely uninstall the adapter (hardware and driver) and repeat the installation procedure as described in this manual.
The computer cannot associate with an access point (AP), even though the link quality is good and the taskbar indicator is green.	Make sure the computer has the same SSID and security settings as the AP. 1. SSID: The domain name (SSID) is case-sensitive and must be the same as that of the AP. It should not contain any spaces. See Figure 16, page 17. 2. Security: You need to have the same security setting (*Disabled*, *40-bit WEP*, *128-bit WEP*, or *256-bit WEP*) and WEP key (if WEP is enabled). See *Encryption*, page 21.
The wireless network is often interrupted (the InstantWave Lamp icon indicator shows red, or the link quality indicator shows black).	1. Move your wireless PC closer to the access point (AP) to find a better signal. If the signal is still weak, change the angle of the antenna. 2. There may be interference, possibly caused by a microwave oven, 2.4-GHz wireless phone, or metal objects. Move these interference sources or change the location of the wireless PC or AP. 3. Change the wireless channel on the AP. See the AP User Guide. 4. Make sure the AP's antenna, connectors, and cabling are firmly connected.
The AP cannot be detected by the Site Survey tool.	The distance between the AP and the wireless PC is too great. The Secure SSID setting has been set on the AP. See the AP user guide.

The utility or the network rejects the domain name (SSID)	Please note the following points when inputting an SSID during adapter installation: (1) The domain name (SSID) is case-sensitive. (2) There should not be any spaces in the SSID.
After the InstantWave utility is successfully installed, executing the utility may cause a "Divide Error."	When the InstantWave utility is successfully installed, please remember to reboot your machine although the installation program didn't force you to. After the system is rebooted, the utility will run normally.
I installed the NWH1022 adapter under Windows 98 (SE) on my IBM ThinkPad X20. There was no problem while installing the driver or utility, but when I reboot the notebook it seems hung/frozen.	The IBM ThinkPad X20 and some other notebooks need more time to get/set the TCP/IP parameters for a wired or wireless network adapter. Please be patient and wait 3 to 5 minutes for the machine to boot. After booting, the NWH1022 will operate normally.
When I tried to install the NWH1022 on my Compaq laptop, the system recognized it as a "PCMCIA-MTD-0002" and the installation failed.	This problem was found on some Compaq laptops using the Phoenix BIOS, which creates a hardware conflict problem. To resolve this issue, disable the Sound Blaster setting in the Phoenix BIOS, but do not disable Onboard PCI Audio in the Phoenix BIOS.

Technical Support

Support from Your Network Supplier

If assistance is required, call your supplier for help. Have the following information ready before you make the call.

1. LED status.
2. A list of the product hardware (including revision levels), and a brief description of the network structure.
3. Details of recent configuration changes, if applicable.

Support from NDC

If you have any problems that you cannot resolve with the information in troubleshooting, or the FAQs at
http://www.ndc.com.tw/support/faq.htm
Please note the following information and contact our technical support team:

- What you were doing when the error occurred.
- What error message you saw.
- Whether the problem can be reproduced.
- The serial number of the product.
- The firmware version and the debug information.

NDC technical support is available via:

E-mail: techsupt@ndc.com.tw

For other information about NDC, please visit us at: http://ww.ndc.com.tw/

NDC Limited Warranty

Hardware

NDC warrants its products to be free of defects in workmanship and materials, under normal use and service, for a period of 12 months from the date of purchase from NDC or its Authorized Reseller, and for the period of time specified in the documentation supplied with each product.

Should a product fail to be in good working order during the applicable warranty period, NDC will, at its option and expense, repair or replace it, or deliver to the purchaser an equivalent product or part at no additional charge except as set forth below. Repair parts and replacement products are furnished on an exchange basis and will be either reconditioned or new. All replaced products and parts will become the property of NDC. Any replaced or repaired product or part has a ninety (90) day warranty or the remainder of the initial warranty period, whichever is longer.

NDC shall not be liable under this warranty if its testing and examination disclose that the alleged defect in the product does not exist or was caused by the purchaser's, or any third party's misuse, neglect, improper installation or testing, unauthorized attempt to repair or modify, or any other cause beyond the range of the intended use, or by accident, fire, lightning, or other hazard.

Software

Software and documentation materials are supplied "as is" without warranty as to their performance, merchantability, or fitness for any particular purpose. However, the media containing the software is covered by a 90-day warranty that protects the purchaser against failure within that period.

Limited Warranty Service Procedures

Any product (1) received in error, (2) in a defective or non-functioning condition, or (3) exhibiting a defect under normal working conditions, can be returned to NDC by following these steps:

You must prepare:

- Dated proof of purchase
- Product model number and quantity
- Product serial number
- Precise reason for return

- Your name/address/email address/telephone/fax

1. Inform the distributor or retailer.
2. Ship the product back to the distributor/retailer with prepaid freight. The purchaser must pay the shipping fee from the distributor/retailer to NDC. Any package sent C.O.D. (Cash On Delivery) will be refused.
3. Charges: Usually RMA (Returned Material Authorization) items will be returned to the purchaser via airmail, prepaid by NDC. If returned by another carrier, the purchaser will pay the difference. A return freight and handling fee will be charged to the purchaser if NDC determines that there was "No Problem Found" or that the damage was caused by the user.

Warning

NDC is not responsible for the integrity of any data on storage equipment (hard drives, tape drives, floppy diskettes, etc.). We strongly recommend that our customers back their data up before sending such equipment in for diagnosis or repair.

Services after Warranty Period

After the warranty period expires, all products can be repaired for a reasonable service charge. The shipping charges to and from the NDC facility will be borne by the purchaser.

Return for Credit

In the case of a DOA (Dead on Arrival) or a shipping error, a return for credit will automatically be applied to the purchaser's account, unless otherwise requested.

Limitation of Liability

All expressed and implied warranties of a product's merchantability, or of its fitness for a particular purpose, are limited in duration to the applicable period as set forth in this limited warranty, and no warranty will be considered valid after its expiration date.

If this product does not function as warranted, your sole remedy shall be repair or replacement as provided for above. In no case shall NDC be liable for any incidental, consequential, special, or indirect damages resulting from loss of data, loss of profits, or loss of use, even if NDC or an authorized NDC distributor/dealer has been advised of the possibility of such damages, or for any claim by any other party.

Specifications

General

Regulatory Compliance	FCC Part 15 Class B. (US) CE: ETS 300 328 and ETS 300 826 TELEC: ARIB STD-T66
Computer Slot Type	PCMCIA Type II or Type III
Standards	IEEE 802.11b, Wi-Fi compliant
Operating Systems Supported	Microsoft Windows 98/Me/2000/XP
Data Rate	22/11/5.5/2/1 Mbps, with auto fallback
Communication Method	Half-duplex
Security	40/128/256-bit WEP data encryption
LED Indicators	Power, Wireless Activity
Power	Voltage: 3.3V ±5% Power Consumption: ▪ 550 mA (transmitting) ▪ 350 mA (receiving)
Dimensions	118 × 54 × 9 mm (L × W × H)
Temperature	Operating: 0° to 50° C (32° to 122° F) Storage: -30° to 70° C (-22 to 158° F)
Humidity	85% at 40° C (104° F)

Wireless

Emission Type	Direct Sequence Spread Spectrum
RF Frequency Range	2471 to 2497 MHz – Japan Band 2400 to 2483.5 MHz – North America, Europe, and Extended Japan Band 2445 to 2475 MHz – Spain 2446.5 to 2483.5 MHz – France
Transmitter	RF Output Power: 15 dBm (typical) Data Modulation Type: BPSK (1 Mbps), QPSK (2/5.5/11 Mbps), PBCC (22 Mbps) Data Modulation Speeds: 22, 11, 5.5, 2, and 1 Mbps, with auto fallback
Receiver Sensitivity	11 Mbps: -82 dBm (typical) 22 Mbps: -78 dBm (typical)
Antenna Type	On-board phase array antenna

Appendix

This appendix lists the channels supported by the world's regulatory domains.

The channel numbers, channel center frequencies, and regulatory domains are shown in the table.

Channel Number	***Center Frequency (MHz)***	***FCC/ Canada***	***ETSI***	***Spain***	***France***	***Japan***
1	2412	O	O			O
2	2417	O	O			O
3	2422	O	O			O
4	2427	O	O			O
5	2432	O	O			O
6	2437	O	O			O
7	2442	O	O			O
8	2447	O	O			O
9	2452	O	O			O
10	2457	O	O	O	O	O
11	2462	O	O	O	O	O
12	2467		O		O	O
13	2472		O		O	O
14	2484					O

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