DW-290

5GHz Wireless LAN mini PCI Card

User's Manual

First Edition (December, 2001)

6DW290....01

Wichtige Sicherheitshinweise

1. Bitte lesen Sie sich diese Hinweise sorgfältig durch.
2. Heben Sie diese Anleitung für den spätern Gebrauch auf.
3. Vor jedem Reinigen ist das Gerät vom Stromnetz zu trennen. Vervenden Sie keine Flüssig- oder Aerosolreiniger. Am besten dient ein angefeuchtetes Tuch zur Reinigung.
4. Um eine Beschädigung des Gerätes zu vermeiden sollten Sie nur Zubehörteile verwenden, die vom Hersteller zugelassen sind.
5. Das Gerät is vor Feuchtigkeit zu schützen.
6. Bei der Aufstellung des Gerätes ist auf sichern Stand zu achten. Ein Kippen oder Fallen könnte Verletzungen hervorrufen. Verwenden Sie nur sichere Standorte und beachten Sie die Aufstellhinweise des Herstellers.
7. Die Belüftungsöffnungen dienen zur Luftzirkulation die das Gerät vor Überhitzung schützt. Sorgen Sie dafür, daß diese Öffnungen nicht abgedeckt werden.
8. Beachten Sie beim Anschluß an das Stromnetz die Anschlußwerte.
9. Die Netzanschlußsteckdose muß aus Gründen der elektrischen Sicherheit einen Schutzleiterkontakt haben.
10. Verlegen Sie die Netzanschlußleitung so, daß niemand darüber fallen kann. Es sollete auch nichts auf der Leitung abgestellt werden.
11. Alle Hinweise und Warnungen die sich am Geräten befinden sind zu beachten.
12. Wird das Gerät über einen längeren Zeitraum nicht benutzt, sollten Sie es vom Stromnetz trennen. Somit wird im Falle einer Überspannung eine Beschädigung vermieden.
13. Durch die Lüftungsöffnungen dürfen niemals Gegenstände oder Flüssigkeiten in das Gerät gelangen. Dies könnte einen Brand bzw. Elektrischen Schlag auslösen.
14. Öffnen Sie niemals das Gerät. Das Gerät darf aus Gründen der elektrischen Sicherheit nur von authorisiertem Servicepersonal geöffnet werden.
15. Wenn folgende Situationen auftreten ist das Gerät vom Stromnetz zu trennen und von einer qualifizierten Servicestelle zu überprüfen:

a – Netzkabel oder Netzstecker sint beschädigt.

b – Flüssigkeit ist in das Gerät eingedrungen.

c – Das Gerät war Feuchtigkeit ausgesetzt.

d – Wenn das Gerät nicht der Bedienungsanleitung ensprechend funktioniert oder Sie mit Hilfe dieser Anleitung keine Verbesserung erzielen.

e – Das Gerät ist gefallen und / oder das Gehäuse ist beschädigt.

f – Wenn das Gerät deutliche Anzeichen eines Defektes aufweist.

16. Bei Reparaturen dürfen nur Orginalersatzteile bzw. den Orginalteilen entsprechende Teile verwendet werden. Der Einsatz von ungeeigneten Ersatzteilen kann eine weitere Beschädigung hervorrufen.
17. Wenden Sie sich mit allen Fragen die Service und Repartur betreffen an Ihren Servicepartner. Somit stellen Sie die Betriebssicherheit des Gerätes sicher.
18. Zum Netzanschluß dieses Gerätes ist eine geprüfte Leitung zu verwenden, Für einen Nennstrom bis 6A und einem Gerätegewicht großer 3kg ist eine Leitung nicht leichter als H05VV-F, 3G, 0.75mm2 einzusetzen

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FCC Statement

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.

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 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 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.**

CE Mark Warning

This is a Class B product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

VCCI Class B Warning

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスＢ情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。

Notices

NOTE: This message denotes neutral or positive information that calls out important points to the text. A note provides information that may apply only in special cases.

CAUTION: Cautions call special attention to hazards that can cause system damage or data corruption, to a lesser degree than warnings.

WARNING: Warnings call special attention to hazards that can cause system damage, data corruption, personal injury, or death.

Statements:

Warning

To ensure compliance with FCC RF exposure requirements, the antenna used for this device must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or radio transmitter. Installers and end-users must follow the installation instructions provided in this user guide.

1. *Modifications to this device, unless expressly approved by D-Link, could void the user's right to operate this equipment.*

2. *The frequency band 5150-5250 MHz is only for indoor usage to reduce potential for harmful interference to co-channel Mobile Satellite systems. The device can only be operated as an indoor unit.*

3. *High power radars are allocated as primary users (meaning they have priority) of 5250-5350 MHz and 5650-5850 MHz and these radars could cause interference and/or damage to LELAN devices used in Canada.*

D-link will incorporated, the Mini PCI, into other equipment, manufacture by D-link, without having to re-certified for use in the USA by the FCC provided that:

The module is not modified

The module is only used or configured with antennas provided. Do not use other antennas that have not been approved or tested with the MINI PCI card. Doing so will violate the grant of authorization approval and could result in a system exceeding the RF Exposure Requirements or the FCC radiation limits.

The module is properly label and if being installed inside a product, were the Module's FCC ID is not visible, then an external label must be place on the outside of the device, stating the following:

"Contains Transmitter Module FCC ID: KA22001120013-1"

The FCC warning statements and compliance statements found in the user manual for the module must be replicated in the manual for the host equipment, specifically those related to RF exposure and Indoor Use only.

The module is used as a mobile device. The final configuration, where the module will be installed, must meet the 20-cm requirement for it to be classified as mobile. The final configuration must, also, be in compliance with the RF exposure requirements. The module is not approved for portable applications. If portable application is desired, then a separate FCC equipment authorization is required.

The module is installed inside an enclosure that cannot be easily open or accessible to the user, so that the antenna(s) provided cannot be easily change by the user.

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Preface

This user's guide provides the necessary information for first-time users to successfully install the D-Link Network Driver Interface Specification (NDIS) driver, for the purpose of evaluating and/or operating the D-Link DW-290 Station Reference Design in a Microsoft Windows environment. This guide also provides information for users who wish to upgrade the D-Link NDIS driver from previous releases.

This guide describes the steps required to install NDIS drivers for the D-Link DW-290 Wireless Network mini PCI Card in Windows 2000, Windows Millennium Edition, Windows 98 Second Edition, Windows XP, and Windows NT 4.0. This guide also includes detailed instructions for configuring the PC Card device, or IEEE 802.11a station (STA), to interact with an access point (AP) in infrastructure mode and with other STAs in ad hoc mode. Instructions for installing or upgrading the diagnostic utility LinkMon are also included. You should also read this before proceeding to install the D-Link DW-290 Wireless Network mini PCI Card and NDIS driver in the targeted operating system (OS) environment.

About this Document

The document consists of the following chapters and appendixes:

Chapter 1	**Introduction**—Hardware, Software, and System Requirements needed to setup D-Link DW-290 Station Reference Design.
Chapter 2	**Windows 2000**—Installation/Uninstallation Procedures and Device/Network Configurations for Windows 2000.
Chapter 3	**Windows Millennium Edition**—Installation/Uninstallation Procedures and Device/Network Configurations for Windows Millennium Edition.
Chapter 4	**Windows 98 Second Edition**—Installation/Uninstallation Procedures and Device/Network Configurations for Windows 98 Second Edition.
Chapter 5	**Windows XP**—Installation/Uninstallation Procedures and Device/Network Configurations for Windows XP.

Chapter 6	**Windows NT 4.0**—Installation/Uninstallation Procedures and Device/Network Configurations for Windows NT 4.0.
Chapter 7	**LinkMon**—Graphical User Interface for Operational Status and Statistics of D-Link DW-290 Station Reference Design.
Chapter 8	**RFSilent**—RFSilent application that allows you to enable or disable the RF Signal (radio) on all D-Link STA Reference Designs.
Chapter **Error! Reference source not found.**	Error! Reference source not found.—Utility for selecting countries' regulatory domains, FCC (USA and Canada) and TELEC (Japan).
Chapter 9	**Troubleshooting**—Hints on fixing common Installation/Uninstallation and Device/Network Configurations issues.
Appendix A	**Channel and Data Rate Selection**—Describes how to select Fixed Data Rate and/or Channel Frequency for specific testing.

Audience

This document is intended for D-Link customers who wish to install and evaluate the D-Link DW-290 Station Reference Design in the supported Microsoft Windows environments.

Additional Resources

D-Link STA Reference Design hardware, software, and documentation contain proprietary information of D-Link Communications, Inc., and are provided under a license agreement containing restrictions on use and disclosure, and are also protected by copyright law. Reverse engineering of this hardware, software, or documentation is prohibited.

The following resources should be referenced regarding topics that are not addressed in this document:

- *AR5110 Radio-on-a-Chip for 5-GHz Wireless LANs data sheet*
- *AR5210 MAC/Baseband Processor for IEEE 802.11a 5-GHz Wireless LAN data sheet*
- *AP User's Guide*

- *STA Reference Design Functional Specification*

1
Introduction

The D-Link DW-290 Wireless Network mini PCI Card is an IEEE 802.11a two-chip solution reference design based on the Atheros AR5110 and AR5210 chipset. This reference design implements a half-duplex, Orthogonal Frequency Division Multiplexing (OFDM) baseband processor supporting all IEEE 802.11a data rates (6 to 54 Mbps). It also supports the D-Link Turbo Mode™ supporting data rates up to 72 Mbps. The host interface is compatible with the PC Card 7.1 standard. You can find information regarding the D-Link Station Reference Designs in the detailed *D-Link STA Reference Design Functional Specification*.

Package Contents

Make sure the following materials are available before you begin:

- One 802.11a PCI Card
- One Installation CD-ROM containing software and utilities and this user's guide
- One 802.11a PCI Card Quick Start Guide
- One warranty registration card

System Requirements

- A computer that meets the following specifications:

  -Windows 2000,Windows ME, or Windows 98SE

- PCI expansion slot
- At least 64 MB of memory
- A 300 MHz processor or higher
- At least one other IEEE 802.11a-compliant device

Hardware Installation

Follow these steps to install the 802.11a PCI Card in a computer's PCI slot:

1. Turn off your computer and unplug its power cord from the wall outlet for safety purposes.
2. Remove the computer cover.
3. Locate an unused PCI slot and refer to your PC 's manual for instructions on how to remove the plate that covers the slot (if applicable).
4. Align the Harmony 802.11a PCI Card over the empty slot.
5. Firmly insert the card into the slot, as illustrated below.
6. Secure the card's metal bracket to the computer following the directions provided in your PC's manual.
7. Replace the computer cover.
8. Plug the computer's power cord back into the wall outlet.
9. Place the antenna with the longer cable on top of your desk, computer, or monitor.

10. Turn on the computer.

DO NOT COPY

2

Windows 2000

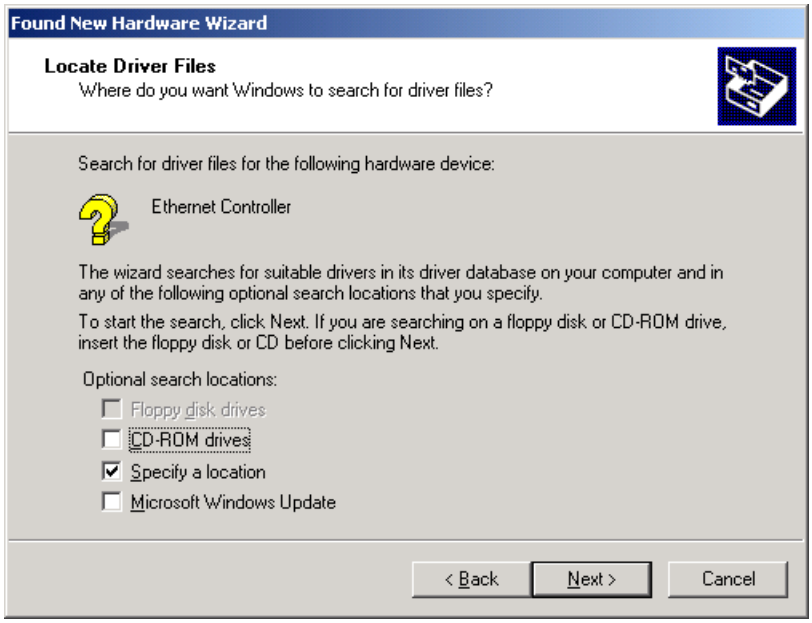
Driver Installation (First-time Install)

Insert the D-Link DW-290 Wireless Network mini PCI Card into a 32-bit CardBus slot and follow these steps to install the NDIS driver:

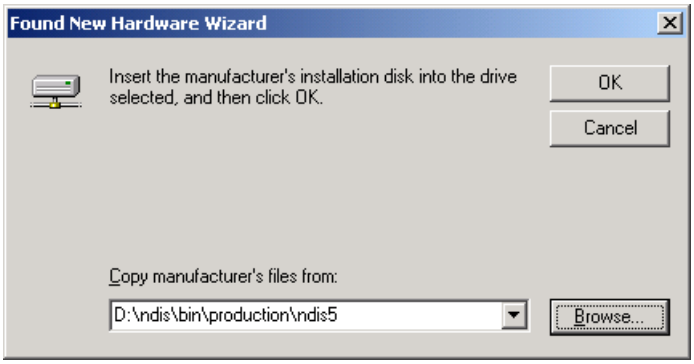
1. Wait for the following dialog box to display, and click Next to continue.

2. Choose “Search for a suitable driver for my device (recommended),” and click Next.

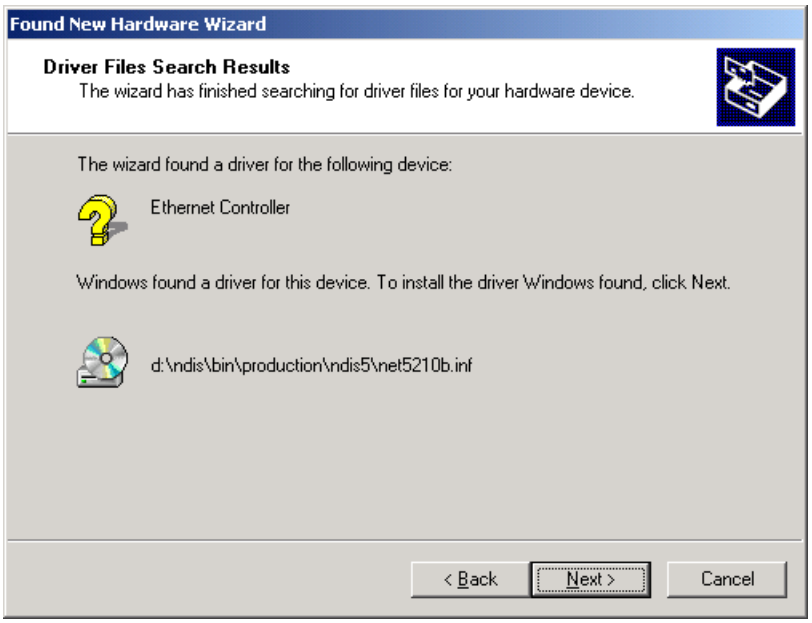
3. Insert the installation CD in your CD-ROM drive. Choose “Specify a location” under “Optional search locations,” and click Next to continue.



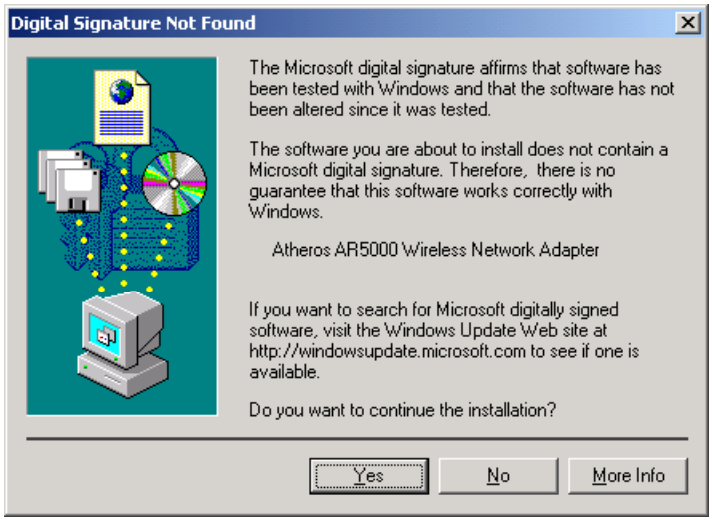
4. Browse to the location where the NDIS driver is located (assuming D is the CD-ROM drive), the default folder is D:\ndis\bin\production\ndis5. Click OK to continue.



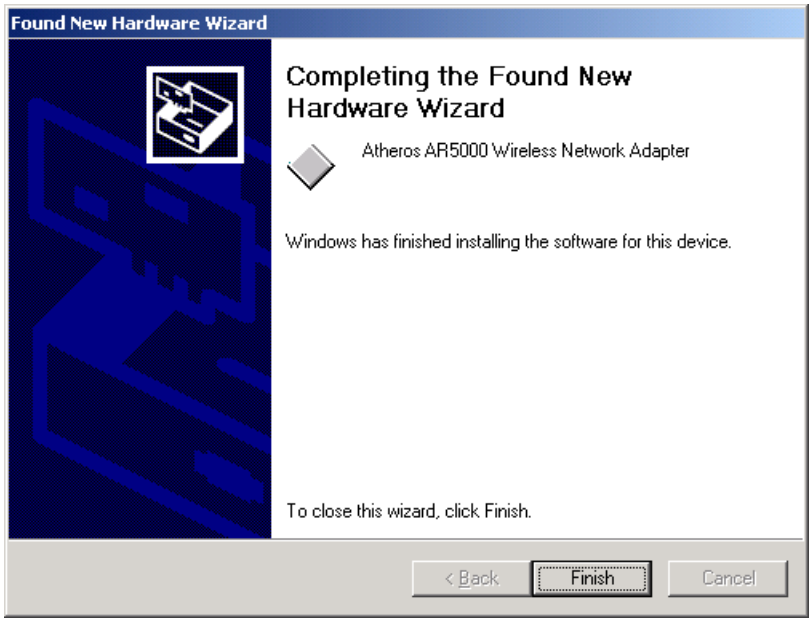
5. When you find the D-Link driver installation file (net5210b.inf), click Next to continue.



6. The D-Link NDIS evaluation driver currently does not have a digital signature from Microsoft. Therefore, Windows 2000 shows a warning message. Click Yes to proceed with driver installation.



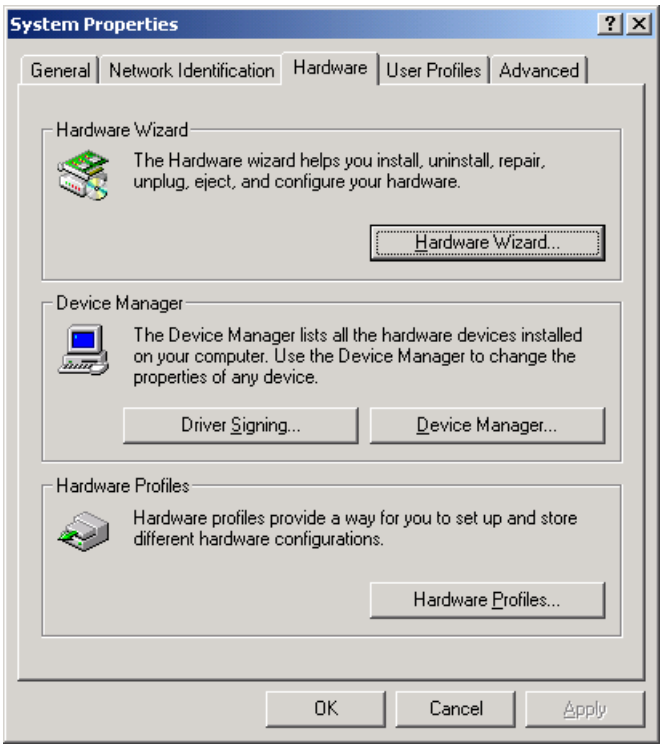
7. Click Finish to complete the driver installation. See Section “Device Configuration” for the device configuration.



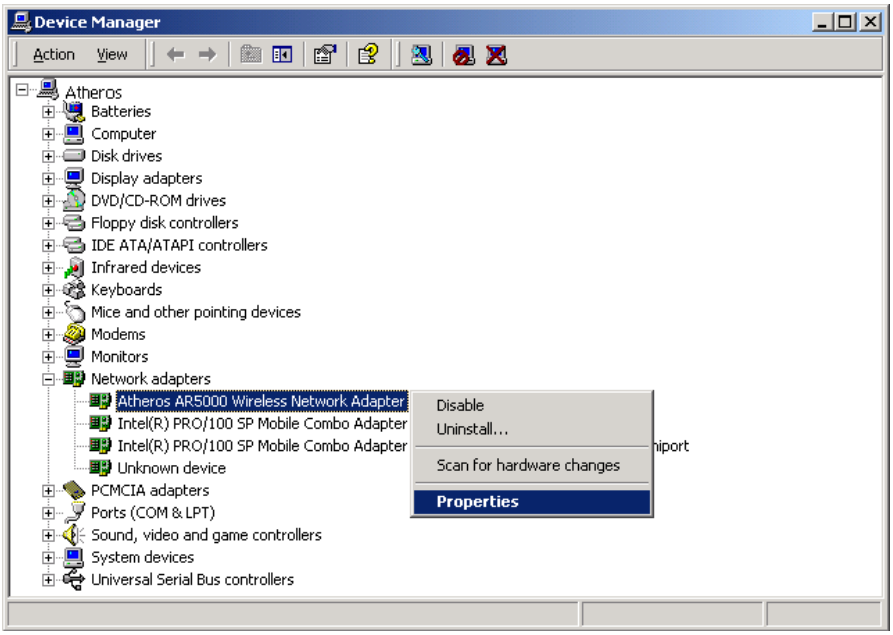
Driver Installation (Previous Driver Installed)

If the system already has a previous release of the D-Link NDIS installed, Windows does not prompt for the device driver when the WLAN Card is inserted. Follow the steps below to update the NDIS driver:

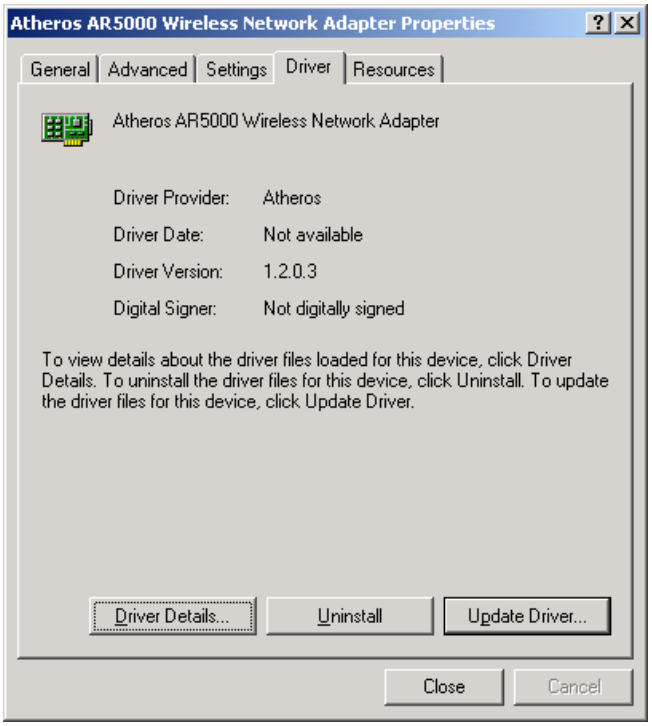
1. Start System Properties from Control Panel. Under Hardware tab, click Device Manager.



2. Within Device Manager, right-click “D-Link DW-290 Wireless Network mini PCI Card” under “Network adapters” device node, and click Properties.

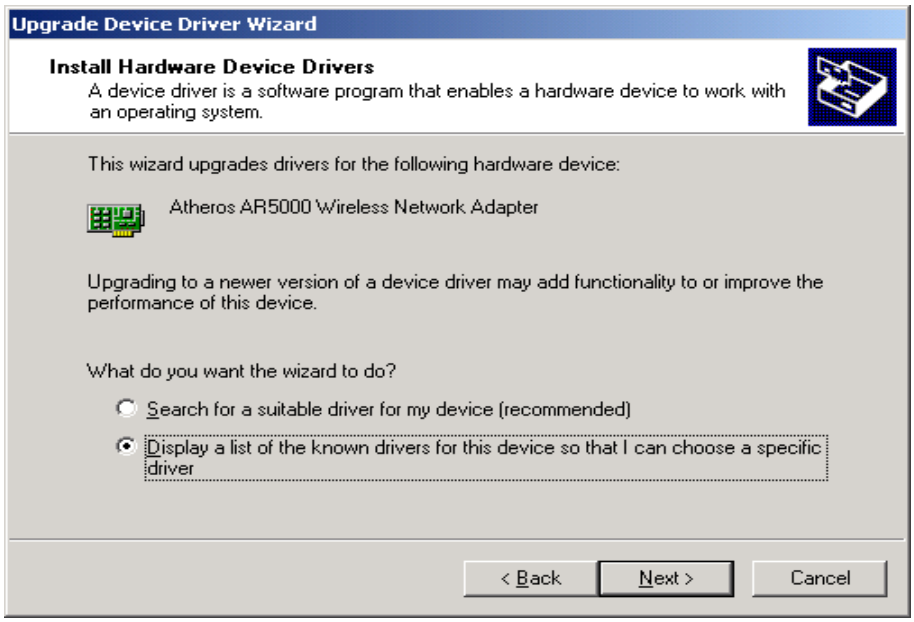


3. Click “Update Driver…” from the Driver tab. Note the Driver Version that you are updating from. You may need to verify this field again after driver update completes to make sure Release 1.3 driver has been updated correctly.

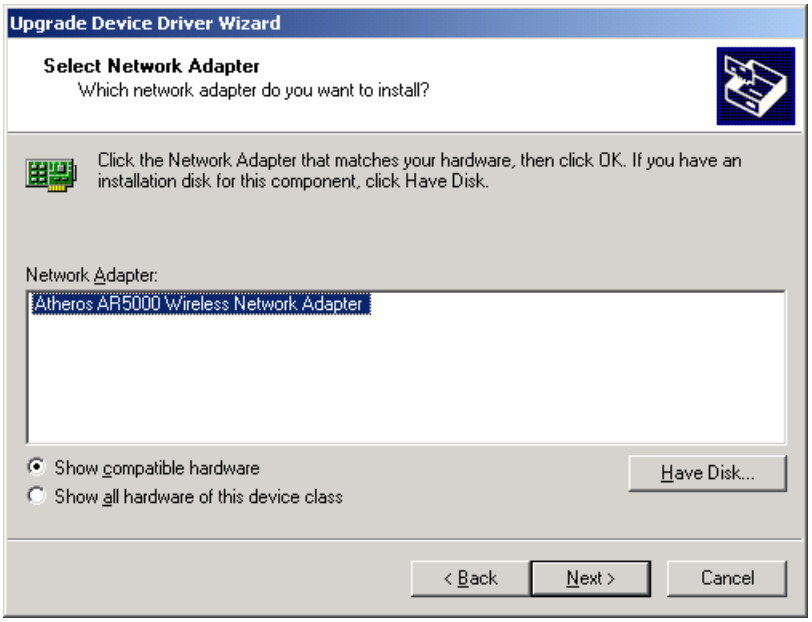


4. Click Next to continue.

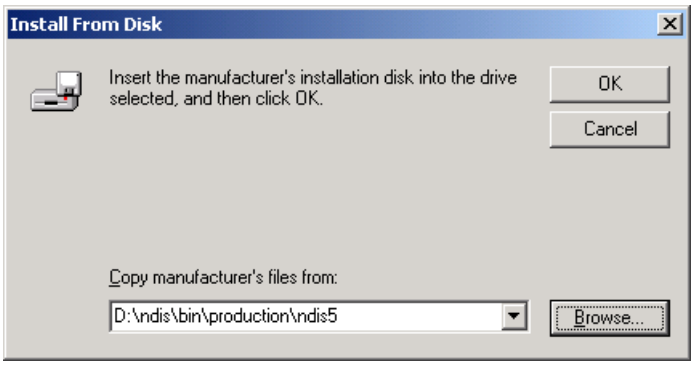
5. Choose “Display a list of the known drivers for this device so that I can choose a specific driver,” and click Next to continue.



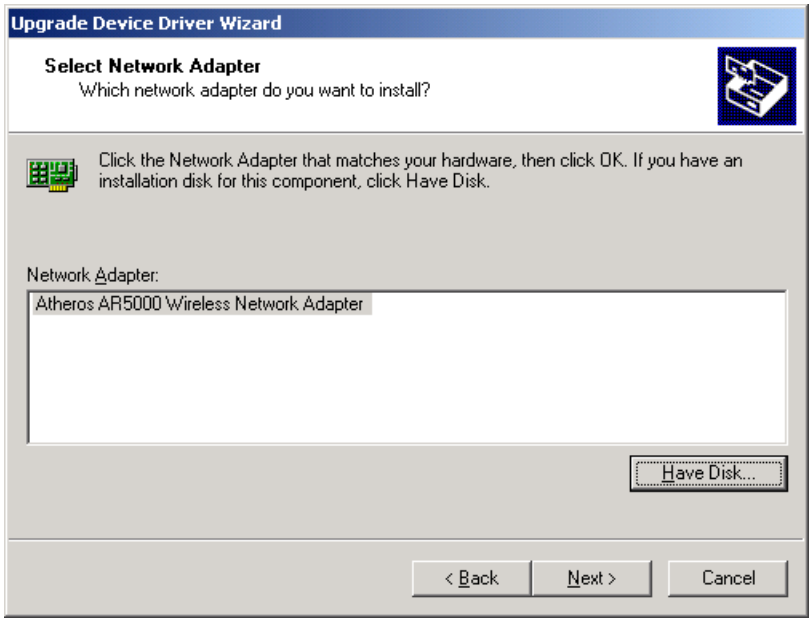
6. Insert the Release 1.3 CD into your CD-ROM drive. Click “Have Disk…” to continue.



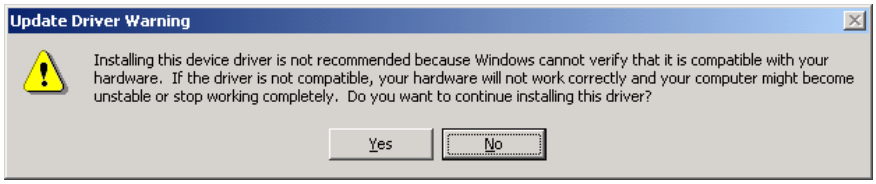
7. Browse to the location where the NDIS driver is located (assuming D is the CD-ROM drive), the default folder is “D:\ndis\bin\production\ndis5”. Click OK to continue.



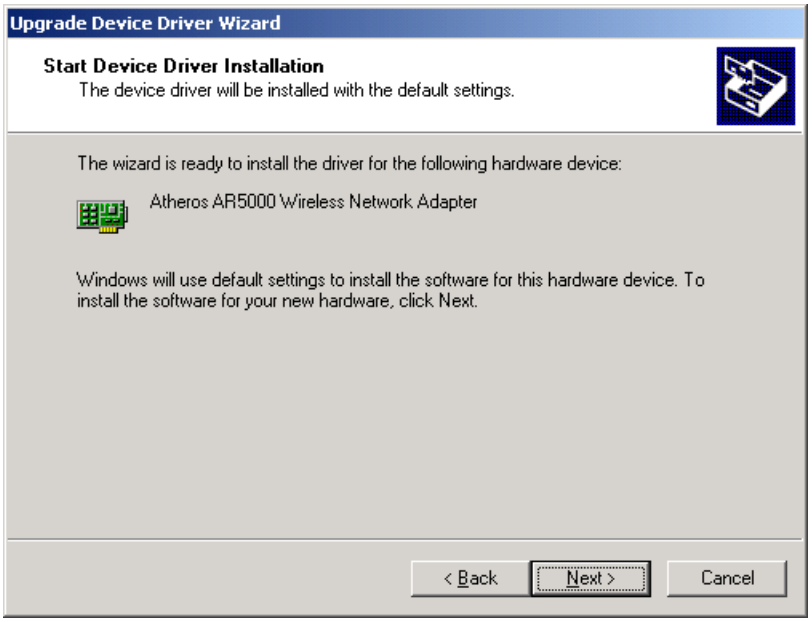
8. Select “D-Link DW-290 Wireless Network mini PCI Card” from the list and click Next to continue.



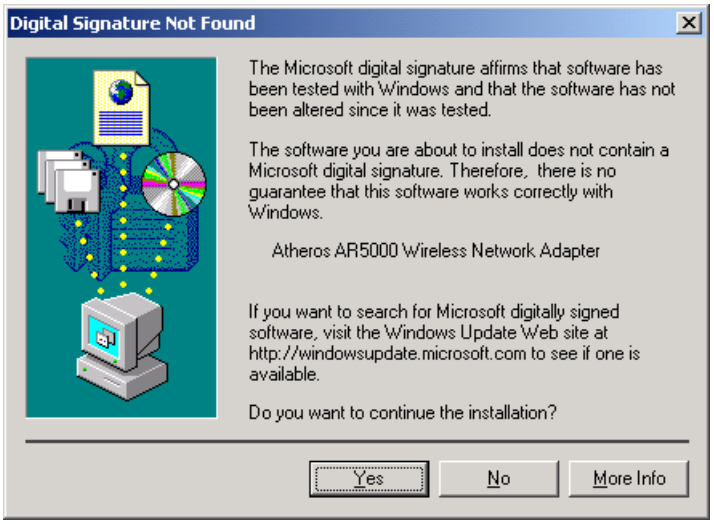
9. Click Yes to continue when Windows displays the warning message.



10. Click Next to proceed with installation.

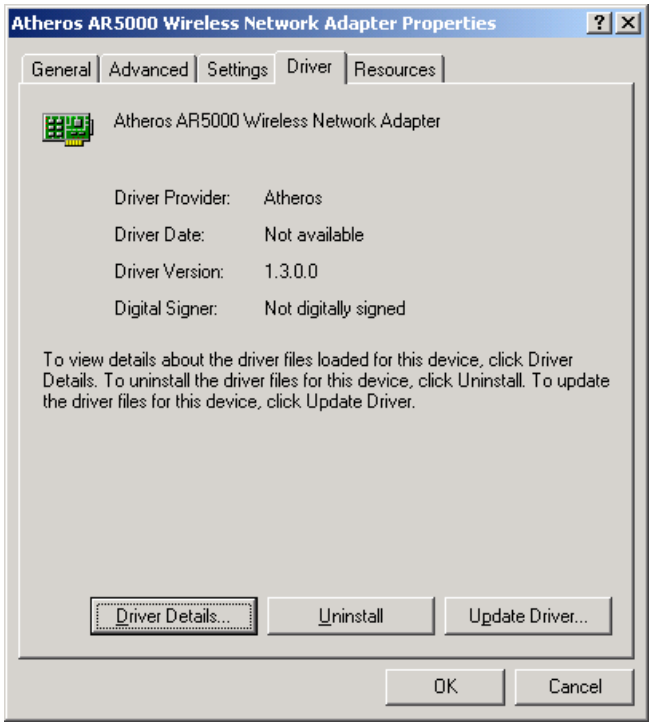


11. The D-Link NDIS evaluation driver currently does not have a digital signature from Microsoft. Therefore, Windows 2000 shows a warning message. Click Yes to proceed with driver installation.

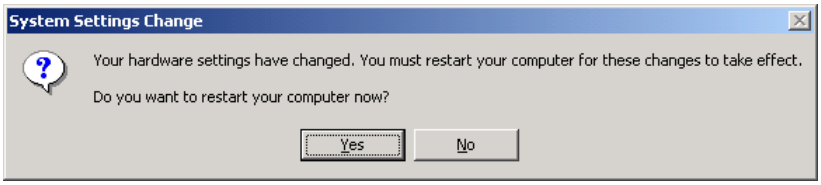


12. Click Finish.

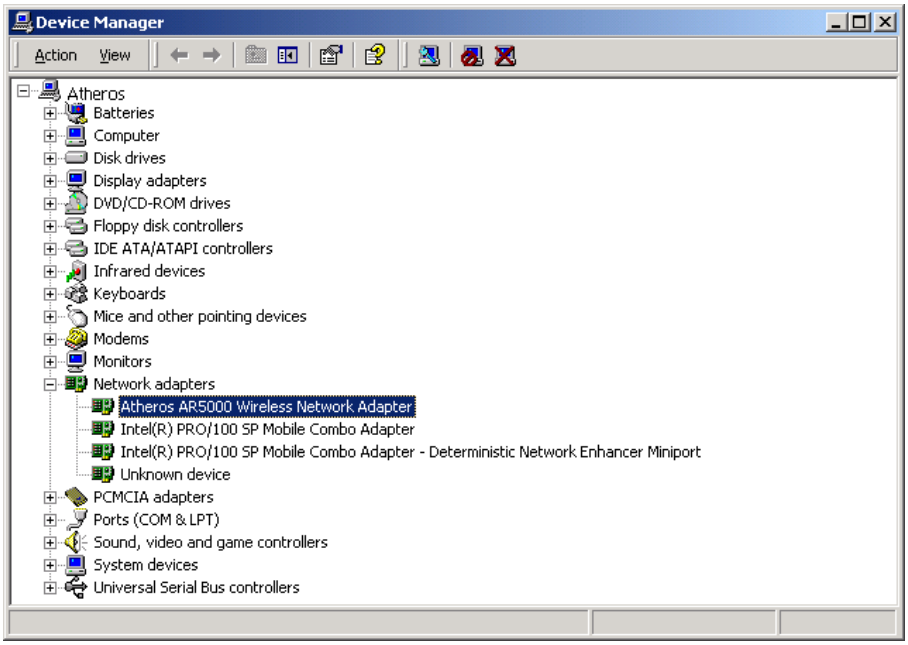
13. Note that Driver Version should display 1.3 as the major revision number. Click OK to continue.



14. Click Yes to restart system.



15. After system restarts, the “D-Link DW-290 Wireless Network mini PCI Card” now displays under “Network adapters” in the Device Manager. Proceed to Section “Device Configuration” for device configuration information.

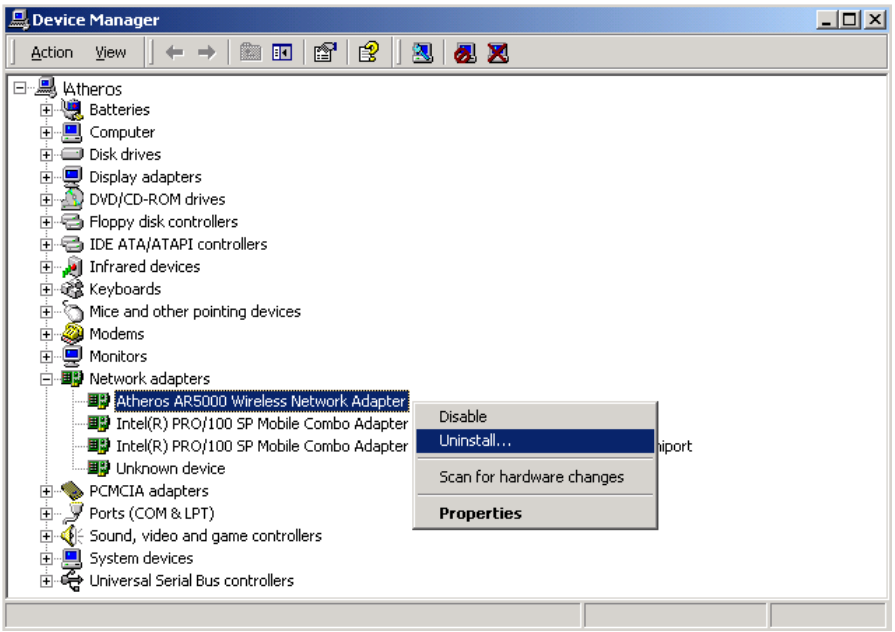


Driver Uninstallation

This section provides information about uninstallation procedures required for upgrading the NDIS driver from previous D-Link software releases. If the system does not have previously installed versions of the NDIS driver and you wish to remove the newly installed driver from the system, proceed to Step 4.

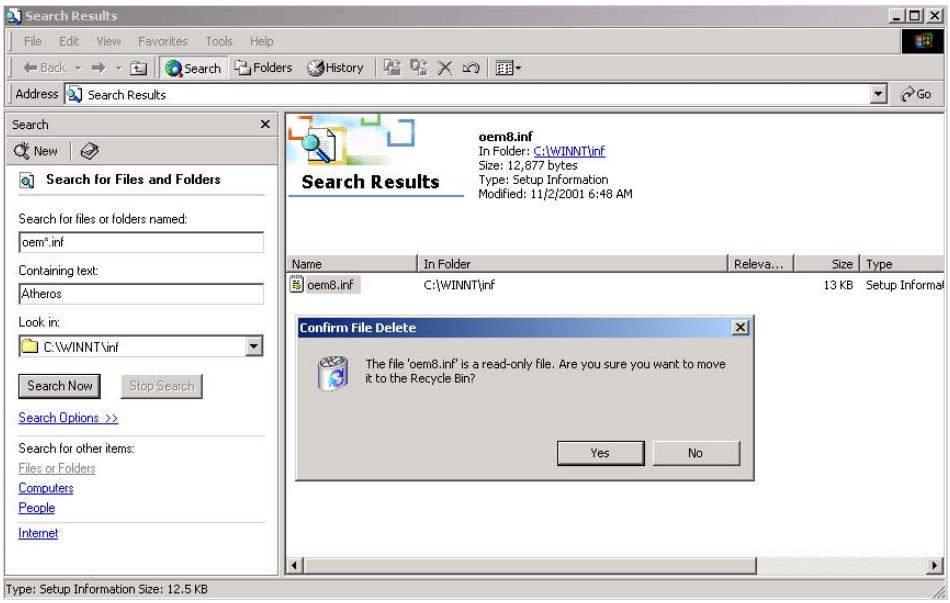
The NDIS driver since Release 1.0 no longer leverages the Transport Driver Interface (TDI) protocol to provide the LinkMon programming interface. The TDI protocol should be uninstalled. Follow these steps to uninstall the TDI protocol:

1. To remove the NDIS driver from the OS, go to Device Manager, right-click “D-Link DW-290 Wireless Network mini PCI Card,” and choose Uninstall.

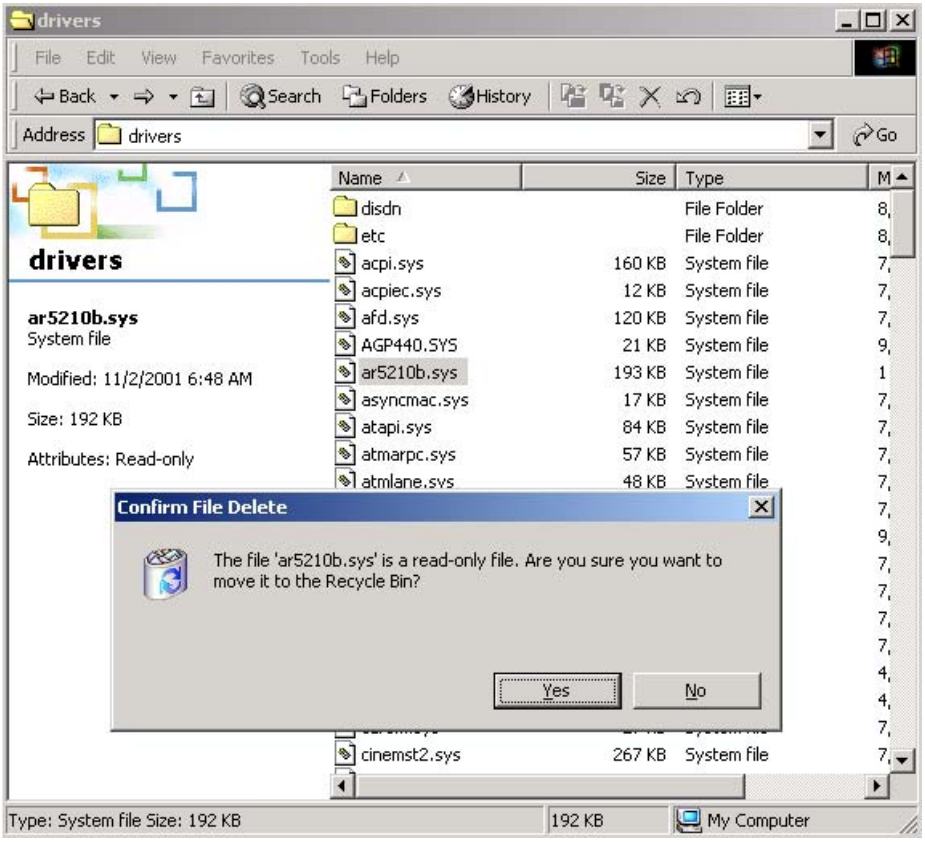


2. Click OK to uninstall the device.

3. When the device is uninstalled from Device Manager, search for and delete the driver files that reside in the system. To do so, go to the Start menu and choose Search For Files or Folders…, enter “oem*.inf” in the “Search for files or folders named:” field, and enter “D-Link” in the “Containing text:” field. Click Search Now. A few files matching these criteria are possible, if previous drivers have not been removed properly. Choose the files that have been found and delete them from the system.



4. To complete the uninstallation, “ar5210b.sys” should also be removed from the “\WINNT\system32\drivers” folder.



Device Configuration

Configuration of the D-Link DW-290 Wireless Network mini PCI Card can be done through the Network Control Panel (NCP) in adapter properties. You can set the Wireless Network mini PCI Card to work in one of two modes, either infrastructure mode (which leverages an AP) or ad hoc mode (which consists of a group of stations participating in the WLAN).

In infrastructure mode, the Wireless Network mini PCI Card participates in a basic service set (BSS) as a station, and communicates with the other stations through an AP, as illustrated in Figure 2-1.

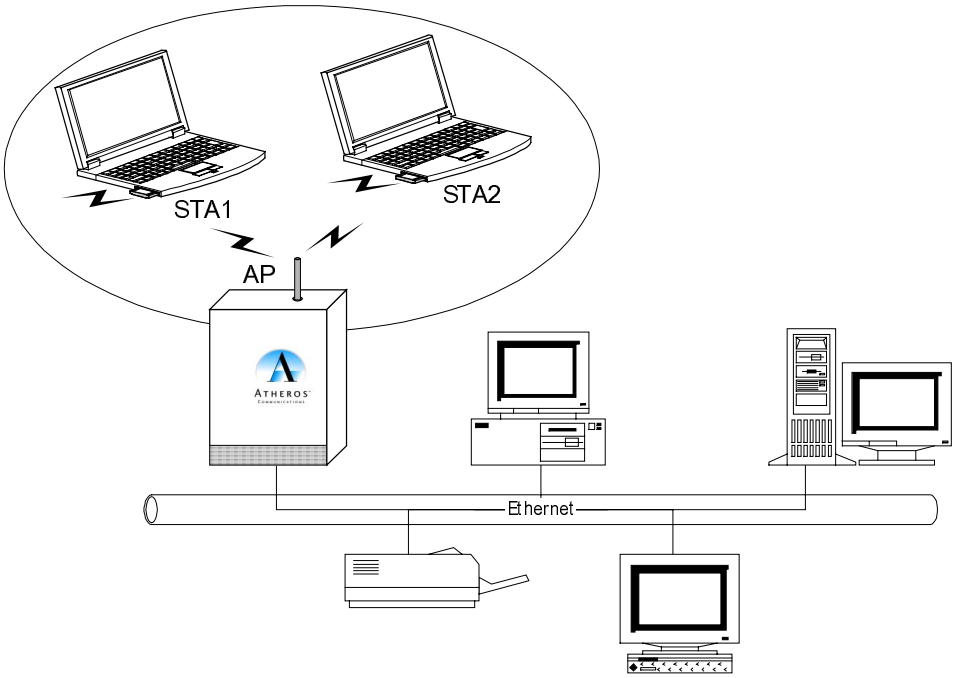


Figure 2-1. **Infrastructure Mode**

In ad hoc mode, a Wireless Network mini PCI Card works within an independent basic service set (IBSS), as illustrated in Figure 2-2. All stations communicate directly with other stations without an AP.

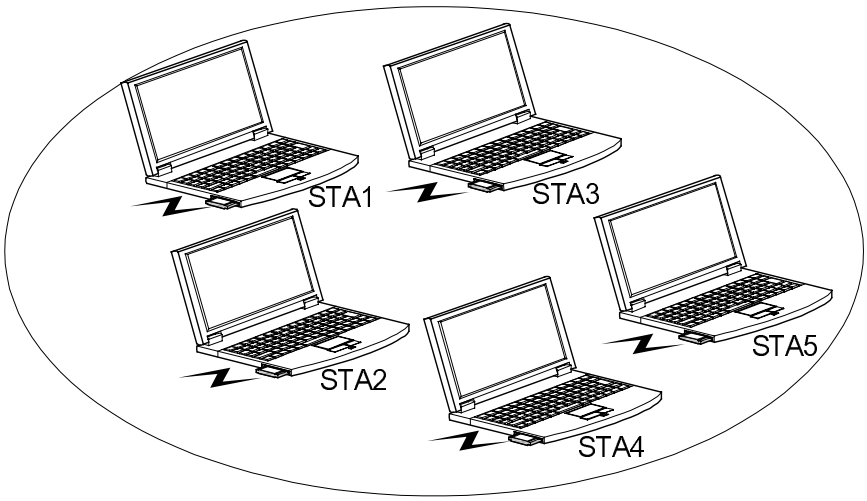
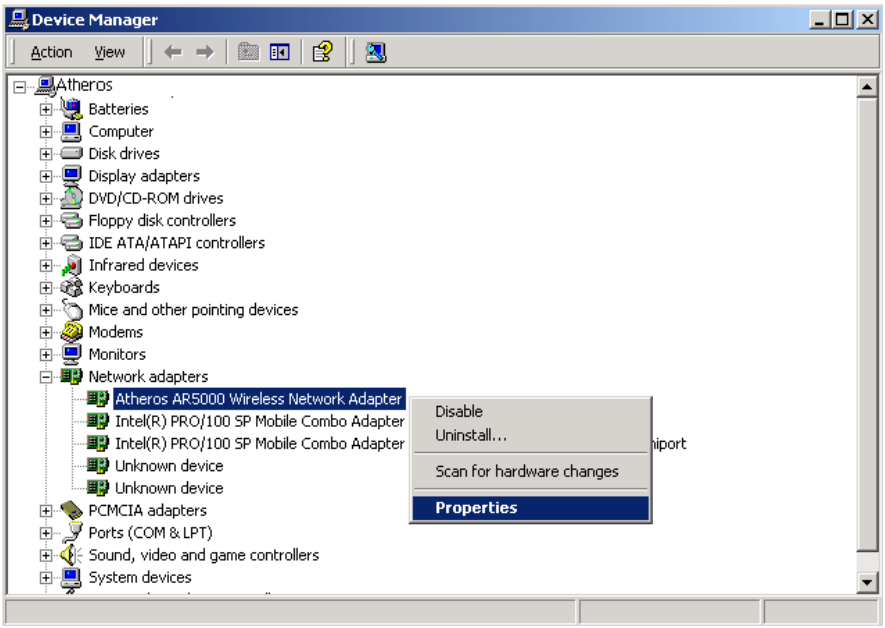


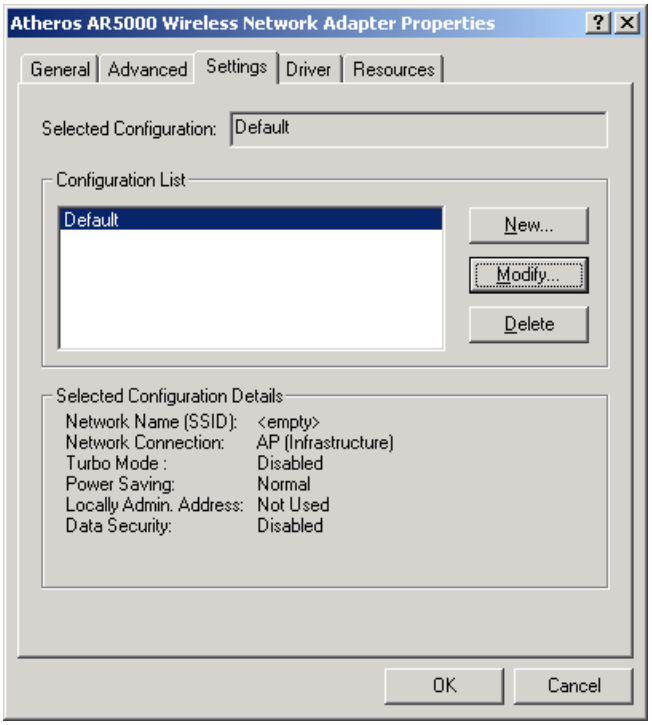
Figure 2-2. **Ad Hoc Mode**

To configure the DW-290 Wireless Network mini PCI Card:

1. In the Device Manager, right-click “D-Link DW-290 Wireless Network mini PCI Card,” and click Properties to access the properties of the adapter.



2. Configuration additions, modifications, and deletions are made under the “Settings” tab of the “D-Link DW-290 Wireless Network mini PCI Card” properties.



3. Select one of the configurations under the configuration list, and click Modify to show the “Network Configuration Settings” screen. This property sheet has two pages: General and Security. The General page has the following fields:

   – Configuration Name: This field identifies the configuration. This name must be unique. Configuration names are case insensitive.

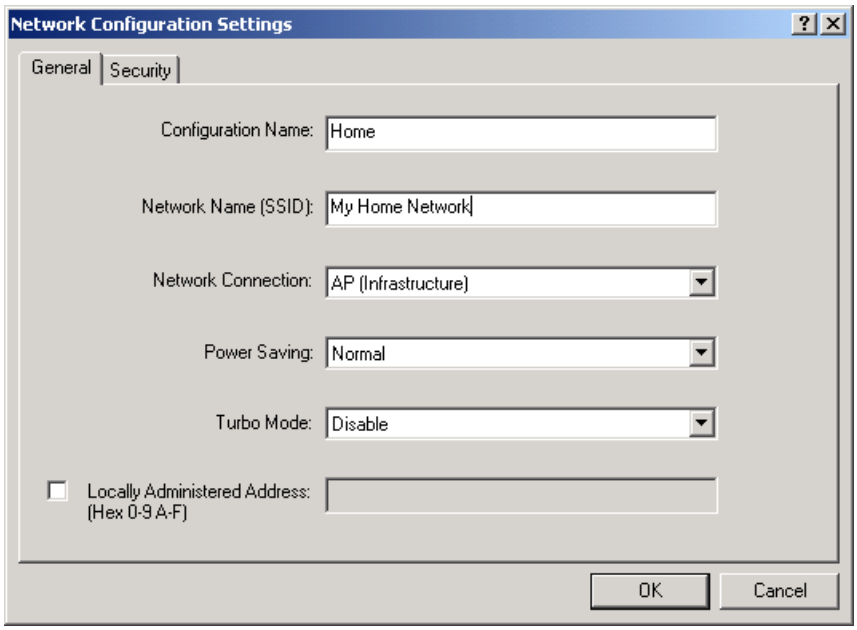
   – Network Name (SSID): This is the name of the IEEE 802.11a wireless network, for example, “D-Link 802.11a Wireless Network.” This field has a maximum limit of 32 characters.

   – Network Connection: This field defines whether the STA is configured for an ad hoc or infrastructure network.

– Power Saving: This field allows the configuration of power management options. The options are Off, Normal, and Maximum. Power management is disabled when ad hoc mode is selected in the Network Connection field. When the Power Saving setting is Off, the adapter receives full power from the PC. When the Power Saving setting is Normal, the driver turns off power to the adapter for brief periods over briefly-spaced time intervals. When the Power Saving setting is Maximum, the driver turns off power to the adapter for longer periods over more widely-spaced time intervals.

– Turbo Mode: This field enables or disables D-Link turbo mode.

– Locally Administered Address: This field defines the locally administered MAC address (LAA). To enter a value in the address field, the check box needs to be selected. Typically, an LAA is not required, because the driver automatically loads a unique, globally administered address from the EEPROM.



4. The next tab on this property sheet allows for the selection of security features. The fields on this page are as follows:

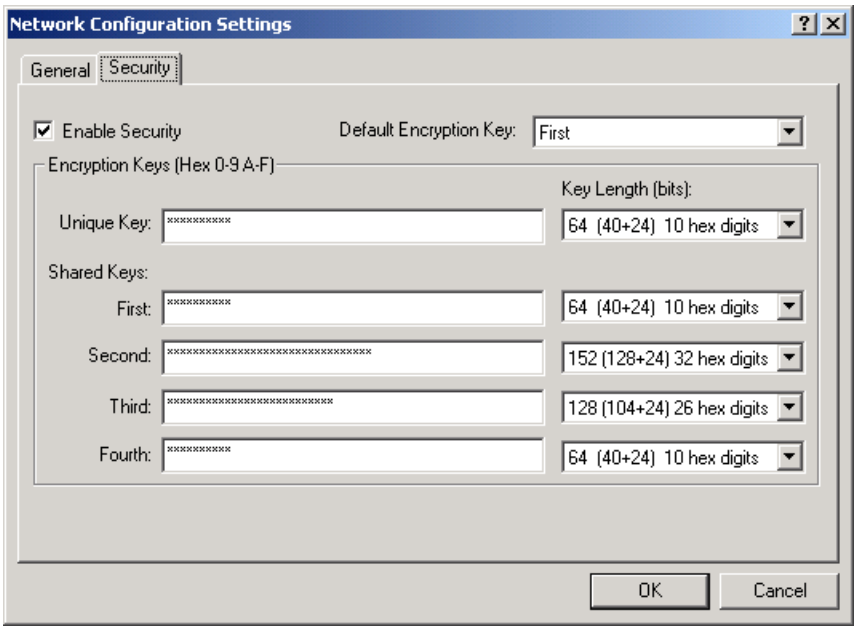
– Enable Security: This field completely enables or disables the IEEE 802.11 wired equivalent privacy (WEP) security feature.

– Default Encryption Key: This field defines the type of encryption key to use (either Unique Key or Shared Keys). This field allows you to select only a key (Unique, First, Second, Third, or Fourth) whose corresponding field has been completed.

– Unique Key: This field defines the unique encryption key for security for the current network configuration. In ad hoc mode, this encryption key type is not used. To enable security using a Unique Key, this field must be populated.

– Shared Keys: These fields define a set of shared encryption keys. To enable security using Shared Keys, at least one Shared Key field must be populated.

– Key Length: This field defines the length for each encryption key. As the Key Length is changed, the number of available characters in the field is changed automatically. If after a key is entered the length is adjusted to a smaller number, the key is automatically truncated to fit. If the length is increased again, the field is not automatically updated to its previous value.

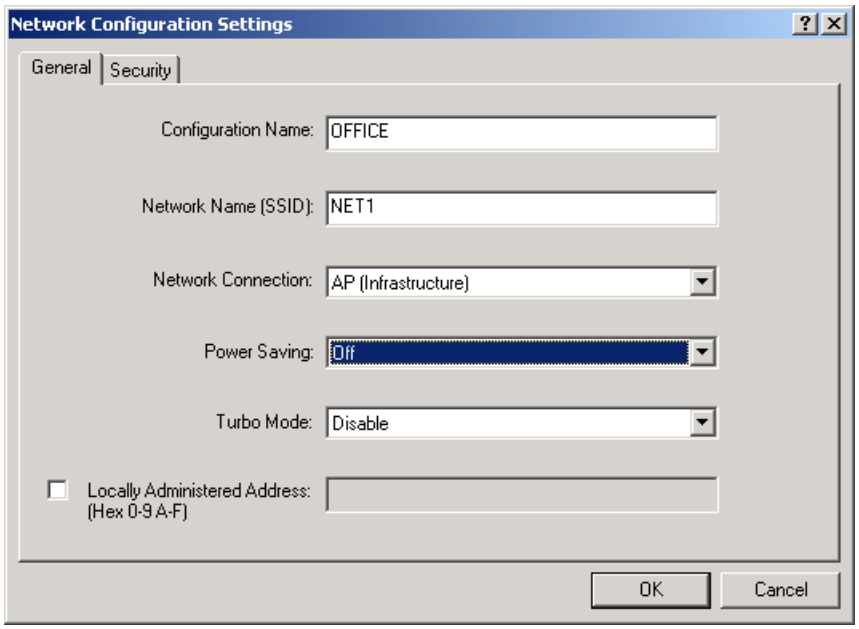


All encryption key fields are displayed only when initially entered. On subsequent entry into the security property page, the fields are masked. The keys must be entered as hexadecimal digits.

Infrastructure Mode

To configure an D-Link DW-290 Wireless Network mini PCI Card in infrastructure mode:

1. Ensure that the “Locally Administered Address” checkbox is unchecked.



2. Choose the following settings:

   – Configuration Name: This field identifies the configuration. This name must be unique. Configuration names are case insensitive.

   – Network Name (SSID): This is the name of the IEEE 802.11a wireless network, for example, “D-Link 802.11a Wireless Network.” This field has a maximum limit of 32 characters. If this field is left blank, the STA connects to the AP with the best signal strength.

   – Network Connection: AP (infrastructure).

   – Power Saving: This field allows the configuration of power management options. The options are Off, Normal, and Maximum.

   – Turbo Mode: This field enables or disables D-Link turbo mode.

   – Locally Administered Address: This field defines the locally administered MAC address (LAA). To enter a value in the address field, the check box needs to be selected.

Usually infrastructure mode is used in an enterprise environment where APs are installed and maintained by corporate IT staff. Much of the data in the enterprise network is confidential. It is important to configure security to make sure only stations with appropriate keys can receive sensitive data. The D-Link DW-290 Wireless Network mini PCI Card and NDIS driver support key lengths of 40 bits, 104 bits, and 128 bits. Typically, the appropriate encryption and decryption keys are supplied by the corporate IT staff.

Ad Hoc Mode

An ad hoc network usually is a short-lived network with a small number of stations. The network is usually created for a special purpose such as exchanging data between friends, or between customer and client. Because the duration of the ad hoc network tends to be limited, Power Saving and Security features are not typically a requirement. For ad hoc network activity, the Power Saving and Security features can be disabled. Currently, shared key security is supported in ad hoc mode. Future D-Link software implementations will provide unique key support.

In ad hoc mode, a station scans the air for an existing BSS. If no BSS is found, the station establishes a BSS for other stations to join. When other stations scan the air and find an established BSS in place, they join that BSS to form an ad hoc network. If a specific set of stations requires ad hoc network connectivity, it is recommended to have one station establish a BSS first before configuring the remaining stations. This prevents the scenario of several stations trying to form a BSS at the same time, which can result in multiple singular BSSs being established, rather than a single BSS with multiple stations.

- Configuration Name: This field identifies the configuration. This name must be unique. Configuration names are case insensitive.

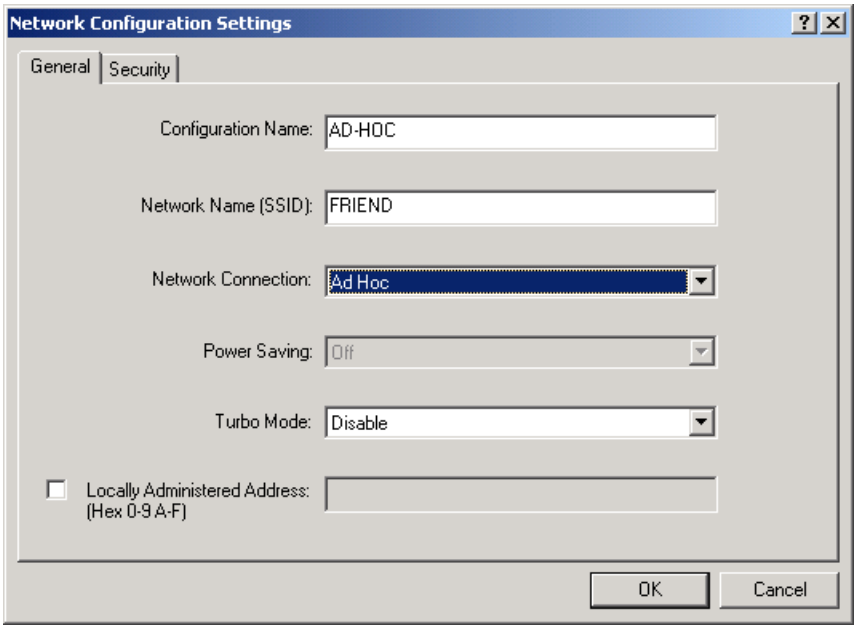
- Network Name (SSID): A Network Name is <u>mandatory</u> for ad hoc mode. The SSID for all stations in a single ad hoc network <u>must</u> be the same.

- Network Connection: Ad Hoc.

- Power Saving: Power saving mode is not currently supported in an ad hoc network.

- Turbo Mode: All stations participating in the ad hoc network must have the same rate setting.

- Locally Administered Address: This field defines the locally administered MAC address (LAA). To enter a value in the address field, the check box needs to be selected.

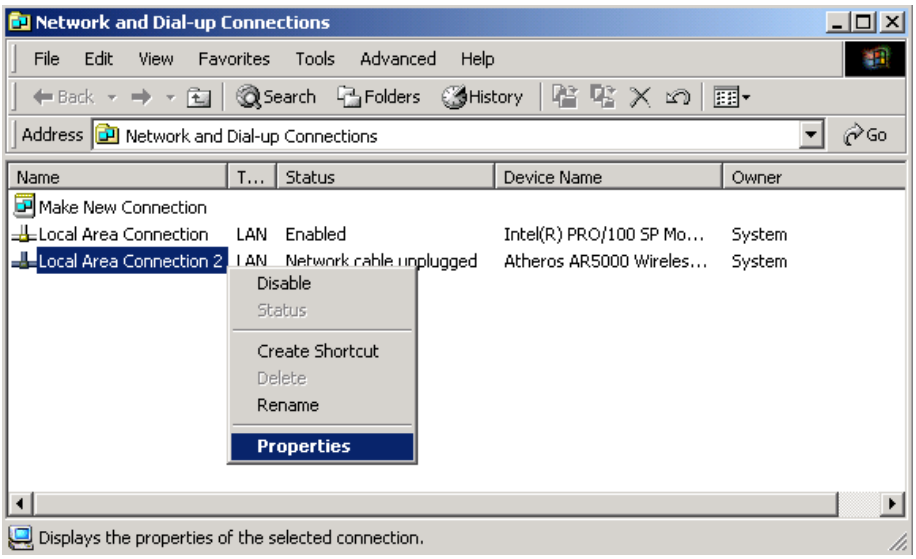


TCP/IP Setup

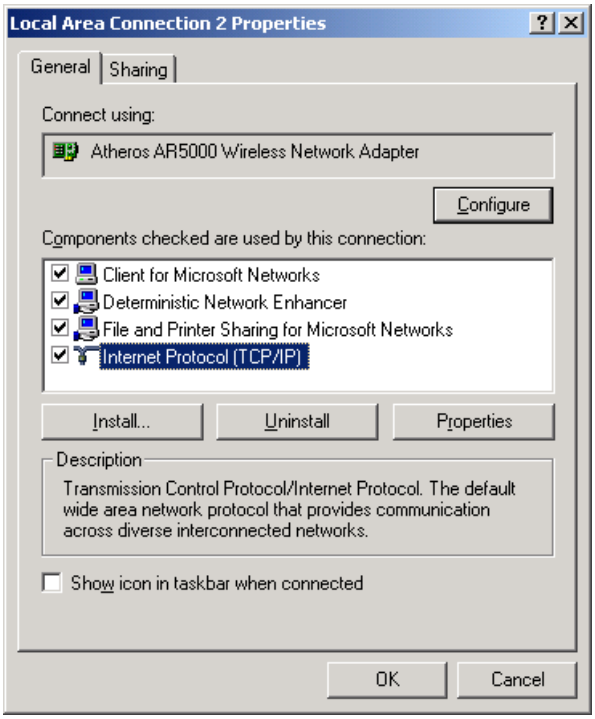
After configuring the D-Link DW-290 Wireless Network mini PCI Card through the Network Control Panel, the TCP/IP address for the network device must be configured.

1. Open the “Control Panel” and click “Network and Dial-up Connections.”

2. Find the “Local Area Connection” that is associated with the D-Link DW-290 Wireless Network mini PCI Card. Right-click that connection, and click Properties.

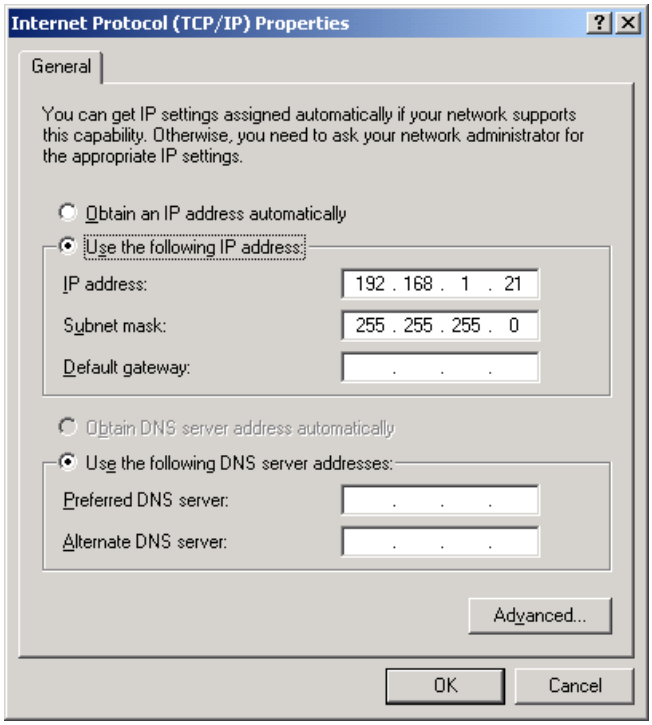


3. Select “Internet Protocol (TCP/IP)” and click Properties.

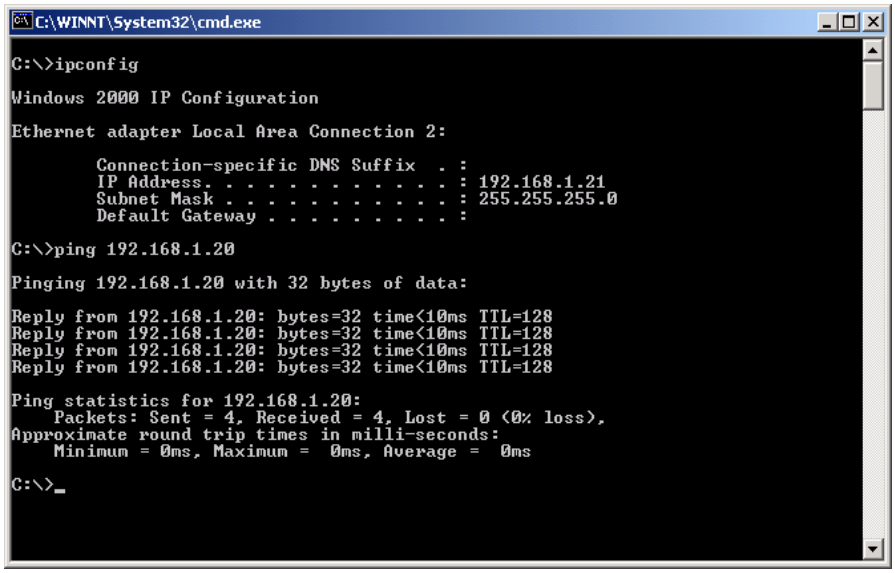


4. Click “Use the following IP address” and input an IP address and Subnet mask. Assigning an IP address and Subnet mask allows stations to operate in infrastructure mode and to have Internet access. “Default gateway” and “DNS server” information is also required. IP configuration information (DHCP or assigned IP address, Gateway and DNS server IP addresses) is usually obtained from the corporate IT staff.

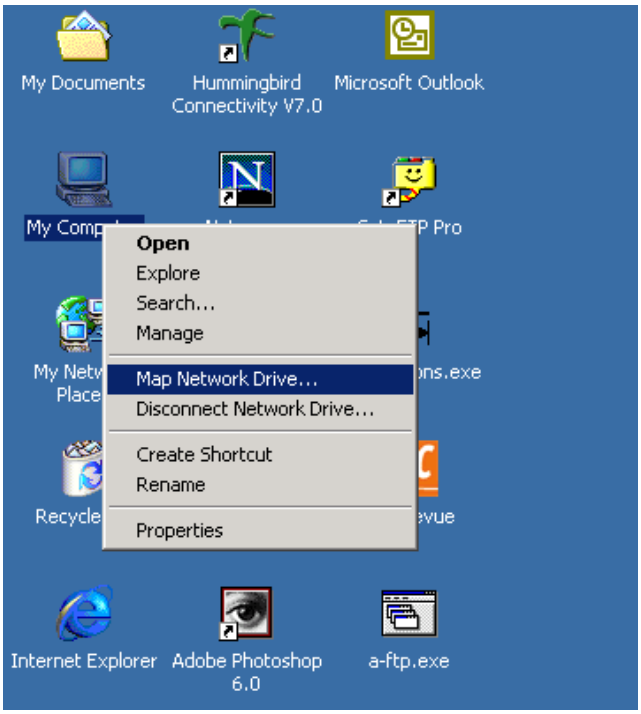
5. After obtaining IP configuration information from the appropriate IT staff, click OK in both “Internet Protocol (TCP/IP) Properties” and “Local Area Connection Properties” to complete the IP configuration.



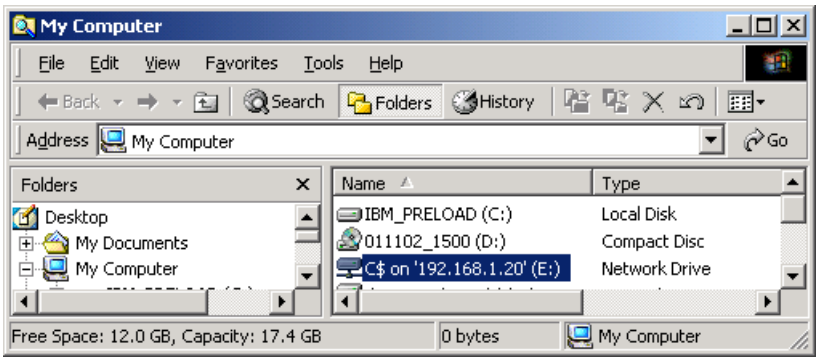
6. Choose Start > Programs > Accessories > Command Prompt to open the DOS command prompt window. Type “ipconfig” at the C:\> prompt to determine if the TCP/IP configuration has taken effect. To test IP connectivity in ad hoc or infrastructure mode, use the “ping <ipaddress>” command. When a TCP/IP connection is established, the LinkMon utility (See Chapter 7) can be used to monitor the D-Link DW-290 Wireless Network mini PCI Card operating status.



7. To map the drive on another machine to your computer, right-click “My Computer” and click “Map Network Drive….”



8. After mapping the drive, you can perform file transfers, use video streaming applications, and all other network data transfers that are normally performed with wired 10/100 Ethernet connections.



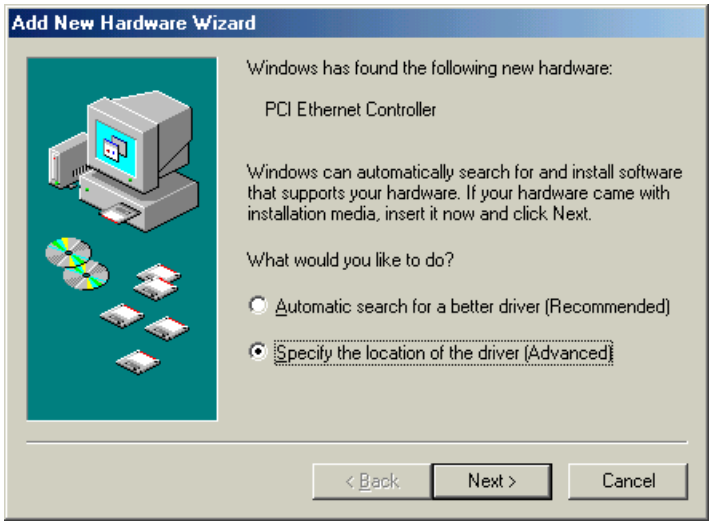
3

Windows Millennium Edition

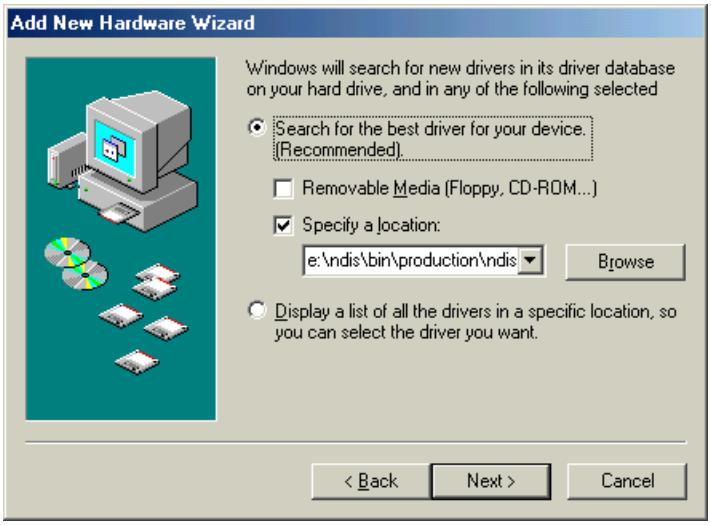
Driver Installation

D-Link recommends that you remove any existing D-Link NDIS driver on the PC system before installing Version **Error! Reference source not found.** release of the NDIS driver. See Section “Driver Uninstallation” on page 3-5 for the instructions on how to remove previous driver releases. When the system no longer has the D-Link NDIS driver installed, insert the DW-290 Wireless Network mini PCI Card into a 32-bit CardBus slot, and follow these steps to install the NDIS driver:

1. Wait for the following dialog box to appear. Choose “Specify the location of the driver (Advanced),” and click Next to continue.


Add New Hardware Wizard
Windows has found the following new hardware:
PCI Ethernet Controller
Windows can automatically search for and install software that supports your hardware. If your hardware came with installation media, insert it now and click Next.
What would you like to do?
Automatic search for a better driver (Recommended)
Specify the location of the driver (Advanced)
< Back
Next >
Cancel

2. Choose “Search for the best driver for your device. (Recommended)” and select “Specify a location.” Click Browse to locate the NDIS driver. The default folder is “E:\ndis\bin\production\ndis5” (assuming E: is the CD-ROM drive). Click Next to continue.



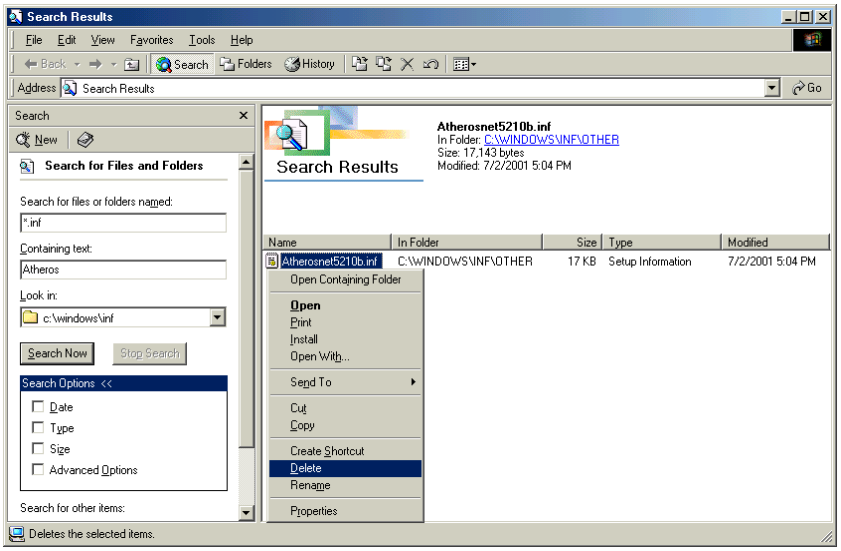
3. When the D-Link driver installation file (NET5210B.INF) has been found, click Next to continue.

4. Click Finish to continue, and restart the system to complete driver installation. Refer to Section “Device Configuration” on page 3-7 for device configuration.

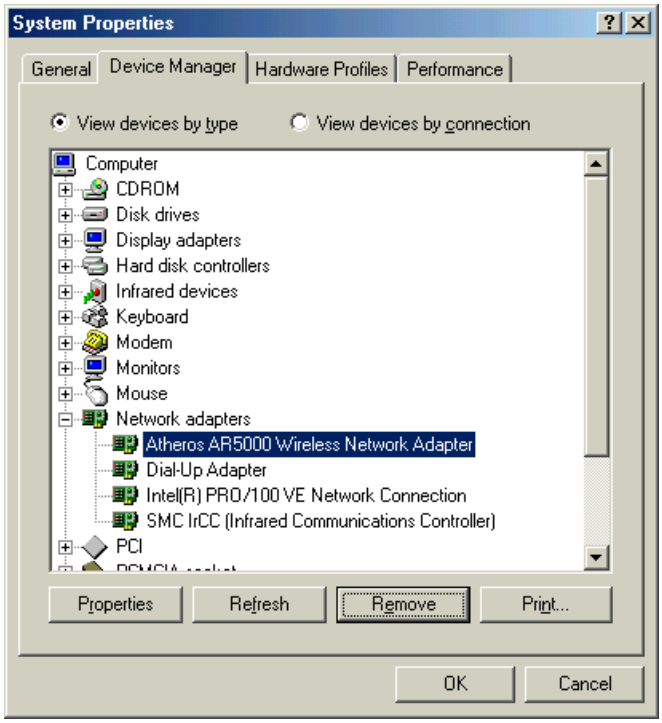
Driver Uninstallation

This section provides uninstallation procedures for removing the D-Link NDIS driver from the system. Uninstallation is recommended for upgrading the NDIS driver from previous D-Link driver releases.

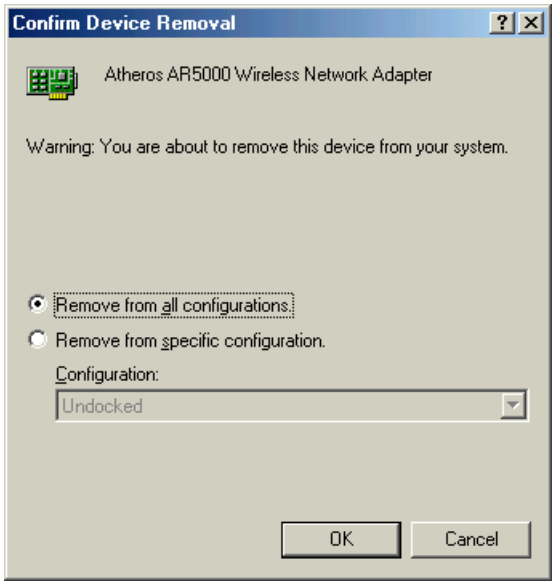
1. To remove the NDIS driver from the OS, go to Start > Search > For Files or Folders…, and search for the INF file containing the “D-Link” text string under the \WINDOWS\INF folder. Be sure to include subfolders in the search criteria. When “D-Linknet5210b.inf” has been found, delete it by right-clicking the file and choose Delete.



2. From Control Panel, launch the System Properties window. Select “D-Link DW-290 Wireless Network mini PCI Card” from Device Manager, and click Remove to uninstall the device.



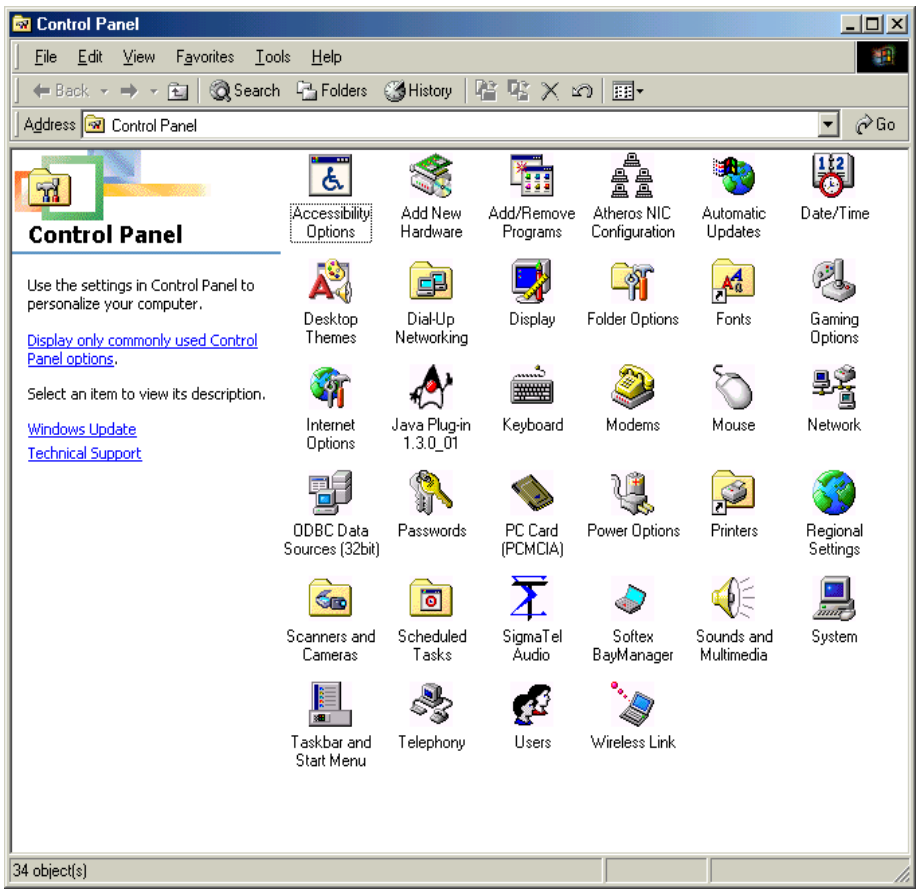
3. Click OK to confirm the removal of the device. Restart the system to complete un-installation.



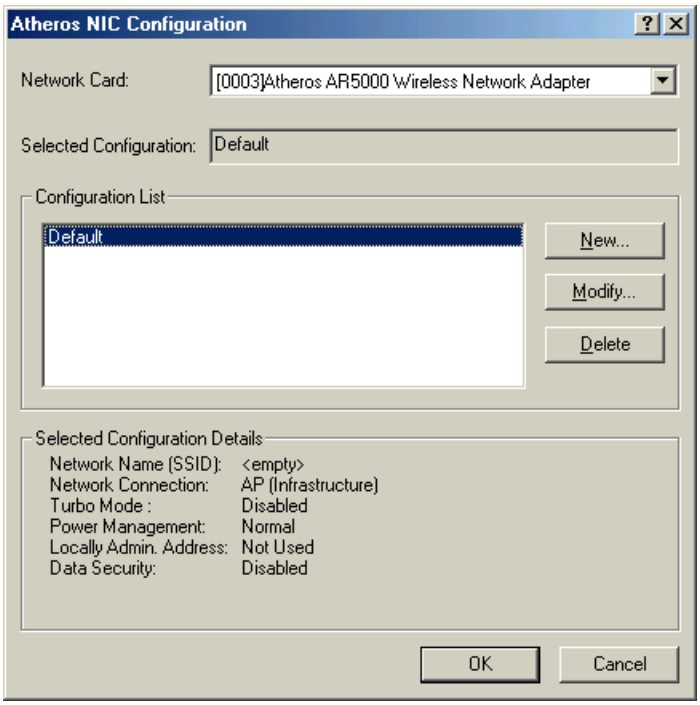
Device Configuration

Configuration of the D-Link DW-290 Wireless Network mini PCI Card can be done through the D-Link NIC Configuration utility found in the Windows Control Panel. Similar to Windows 2000, the device can be set to work in one of two modes: infrastructure mode or ad hoc mode. Please refer to Section “Device Configuration” beginning on page 2-17 for more details on these network connection types.

To launch the configuration utility, go to Control Panel and double-click on the D-Link NIC Configuration icon.



The configuration utility allows addition, modification, and deletion of the configuration profiles. Select one of the existing configuration profiles under the configuration list to modify, or click New to add a new configuration profile. Follow Section “Infrastructure Mode” on page 3-9 and Section “Ad Hoc Mode” on page 3-10 to set up the station to work in infrastructure mode and ad hoc mode.



Infrastructure Mode

This section defines the process of configuring an D-Link DW-290 Wireless Network mini PCI Card in infrastructure mode. See Section “Device Configuration” beginning on page 2-17 for detailed descriptions of each option in the Network Configuration Settings.

1. Under the “General” tab, make sure the “Locally Administered Address” checkbox is unchecked. Use the following information as a guideline to choose the values of each field in the configuration window:

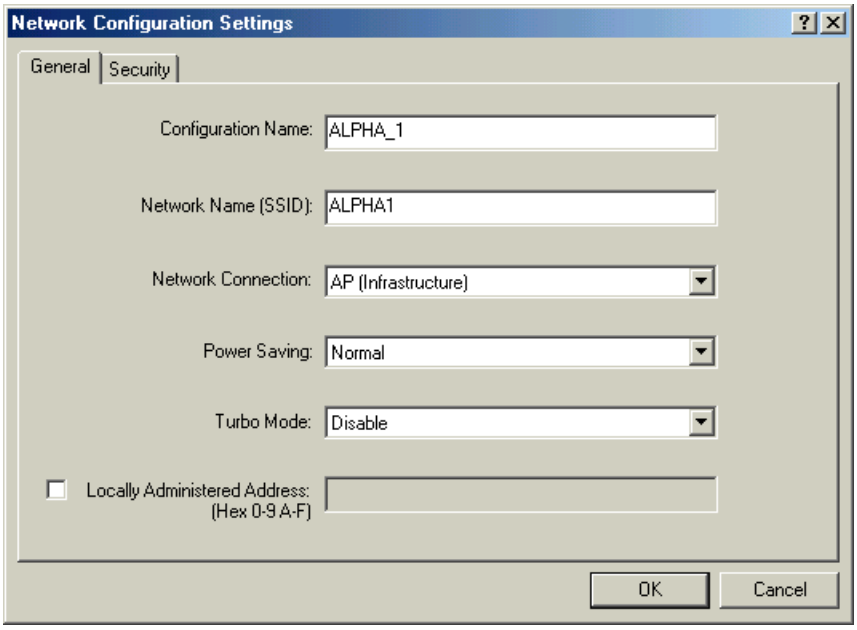
   – Configuration Name: This field identifies the configuration. This name must be unique. Configuration names are case insensitive.

   – Network Name (SSID): This is the name of the IEEE 802.11a wireless network. This field has a maximum limit of 32 characters. If this field is left blank, the STA connects to the AP with the best signal strength.

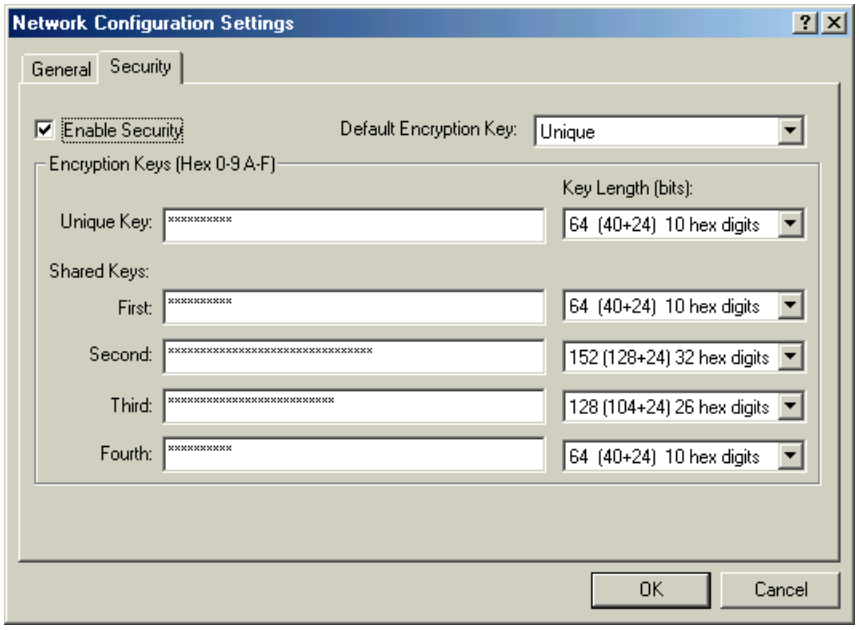
   – Network Connection: AP (Infrastructure)

   – Power Saving: This field allows the configuration of power management options. The options are Off, Normal, and Maximum.

   – Turbo Mode: This field enables or disables D-Link turbo mode.



2. Usually, infrastructure mode is used in an enterprise environment where APs are installed and maintained by corporate IT staff. Much of the data in the enterprise network is confidential. It is important to configure security to make sure only stations with appropriate keys can receive sensitive data. The D-Link DW-290 Wireless Network mini PCI Card and NDIS driver support key lengths of 40 bits, 104 bits and 128 bits. Typically, the appropriate encryption and decryption keys are supplied by the corporate IT staff.



Ad Hoc Mode

This section defines the process of configuring an D-Link DW-290 Wireless Network mini PCI Card in ad hoc or IBSS mode. See Section “Ad Hoc Mode” on page 2-23 for descriptions of ad hoc operation.

1. Similar to the set-up of AP Infrastructure mode described in the previous section, ad hoc mode is also configured by changing the options in the Network Configuration Settings of the D-Link NIC Configuration utility. Use the following information as a guideline to choose the values of each field in the configuration window:

   – Configuration Name: This field identifies the configuration. This name must be unique. Configuration names are case insensitive.

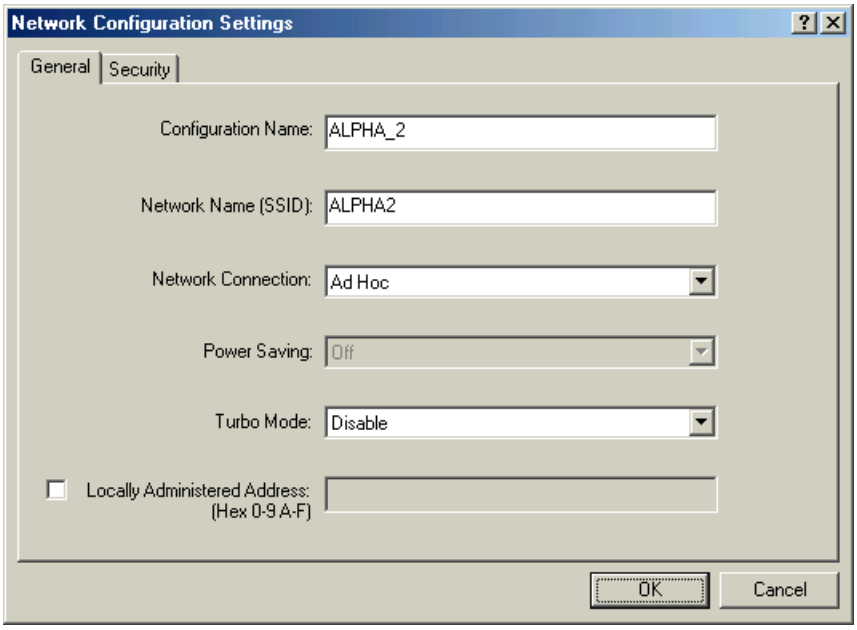
   – Network Name (SSID): A Network Name is mandatory for ad hoc mode. The SSID for all stations in a single ad hoc network must be the same.

   – Network Connection: Ad Hoc.

– Power Saving: Power saving mode is not currently supported in an ad hoc network.

– Turbo Mode: All stations participating in the ad hoc network must have the same rate setting.

– Locally Administered Address: This field defines the locally administered MAC address (LAA). To enter a value in the address field, the check box needs to be selected.



2. You can optionally set up other properties, but because the duration of the ad hoc network tends to be limited, Power Saving and Security features are not typically a requirement. For ad hoc network activity, the Power Saving and Security features can be disabled. Currently, shared key security is supported in ad hoc mode. Future D-Link software implementations will provide unique key support.

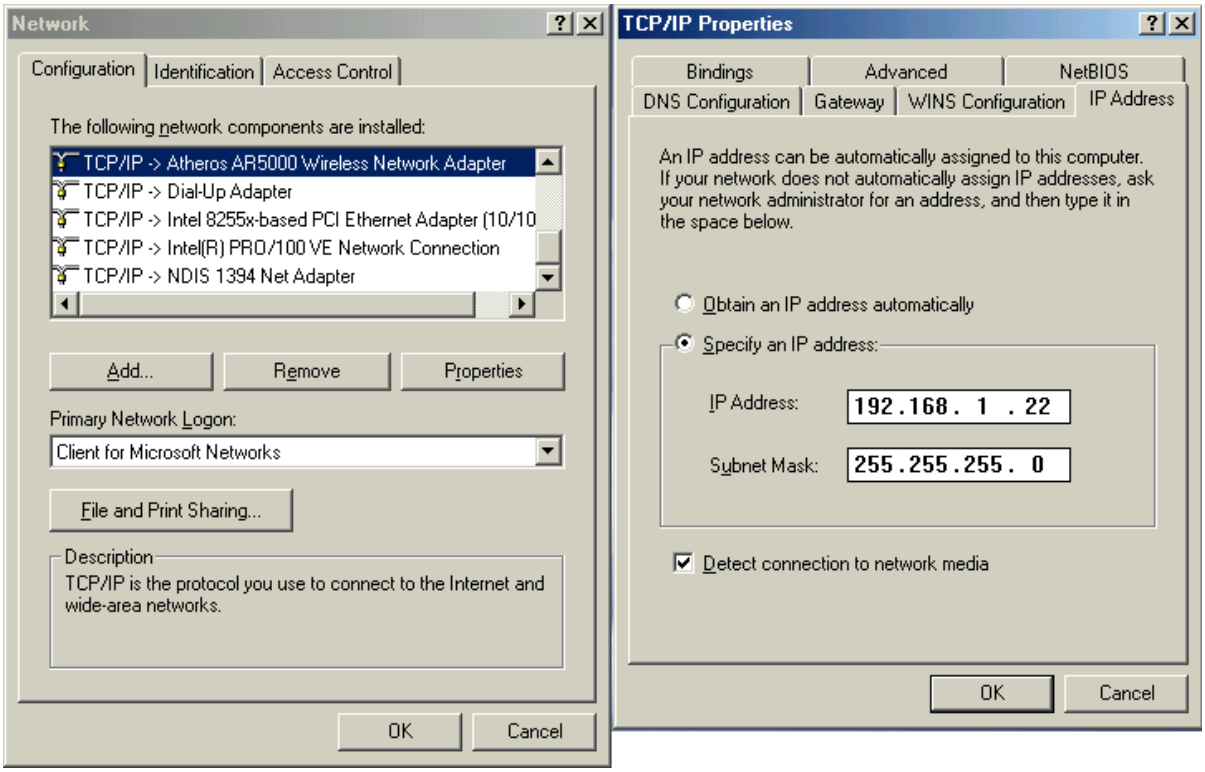
3. Click OK when the properties are set correctly. The system needs to reboot in order for the changes to take effect.

Note that in ad hoc mode, a station scans the air for an existing BSS. If no BSS is found, the station establishes a BSS for other stations to join. When other stations scan the air and find an established BSS in place, they join that BSS to form an ad hoc network. If a specific set of stations requires ad hoc network connectivity, it is recommended to have one station establish a BSS first before configuring the remaining stations. This prevents the scenario of several stations trying to form a BSS at the same time, which can result in multiple singular BSSs being established, rather than a single BSS with multiple stations.

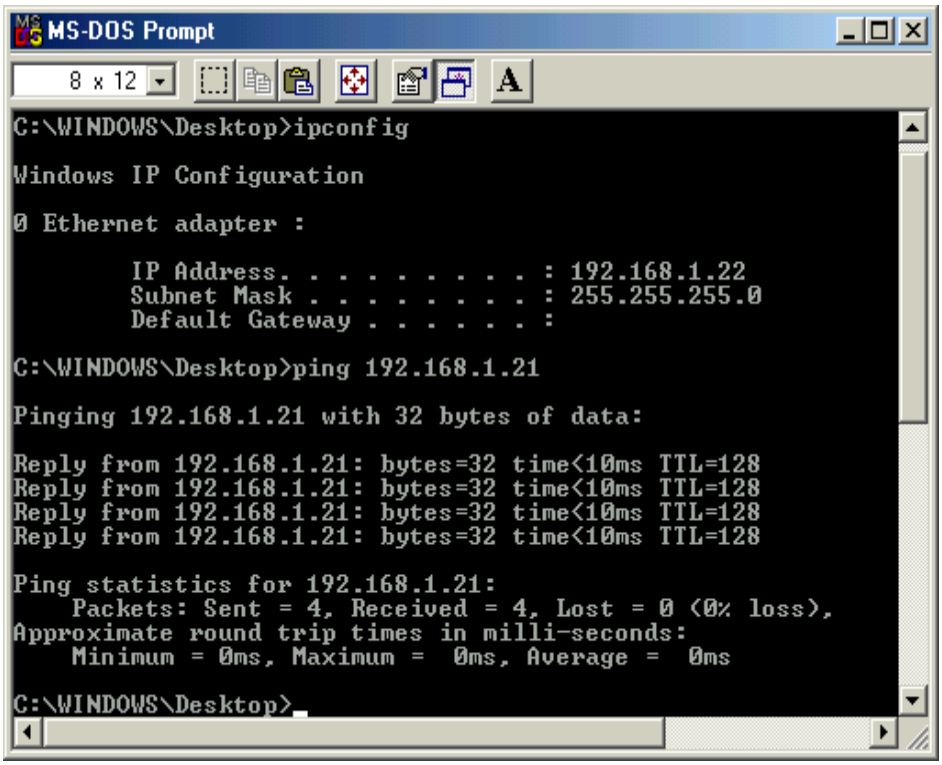
TCP/IP Configuration

After configuring the D-Link DW-290 Wireless Network mini PCI Card network adapter properties, the TCP/IP address for the network device needs to be configured.

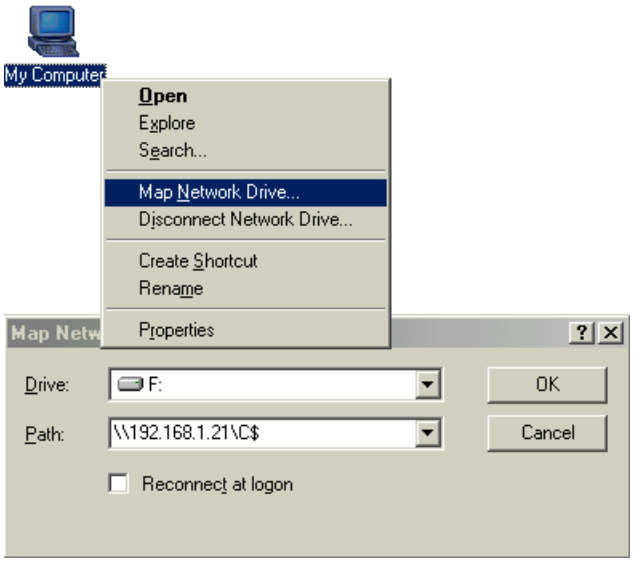
1. From Control Panel, launch the Network properties window. Select "TCP/IP → D-Link DW-290 Wireless Network mini PCI Card" and click Properties. Depending on the type of network the station connects to, Gateway and DNS Configuration information can also be required.
   IP configuration information (DHCP or assigned IP address, Gateway and DNS server IP addresses) is usually obtained from the corporate IT staff. For a simple demonstration, the station is assigned a static IP address. From "TCP/IP Properties," choose "IP Address" and select "Specify an IP address." Input an IP address and subnet mask. Assigning an IP address and subnet mask allows the station to interact with the AP or other stations in the same IP subnet. Click OK to complete the TCP/IP configuration, and restart the system for the changes to take effect.



2. Choose Start > Programs > Accessories > Command Prompt to open the DOS command prompt window. Type “ipconfig” to determine if the TCP/IP configuration has taken effect. To test IP connectivity in ad hoc or infrastructure mode, use the “ping <ipaddress>” command. When a TCP/IP connection is established, the LinkMon utility (see Chapter 7) can be used to monitor the D-Link DW-290 Wireless Network mini PCI Card operating status.



3. To map the drive on another machine to your computer, right-click “My Computer” and click “Map Network Drive….” Specify the path of a network-shared folder.



4. After mapping the drive, you can perform file transfers, video streaming, and all other network data transfers that are normally performed with wired 10/100 Ethernet connections.

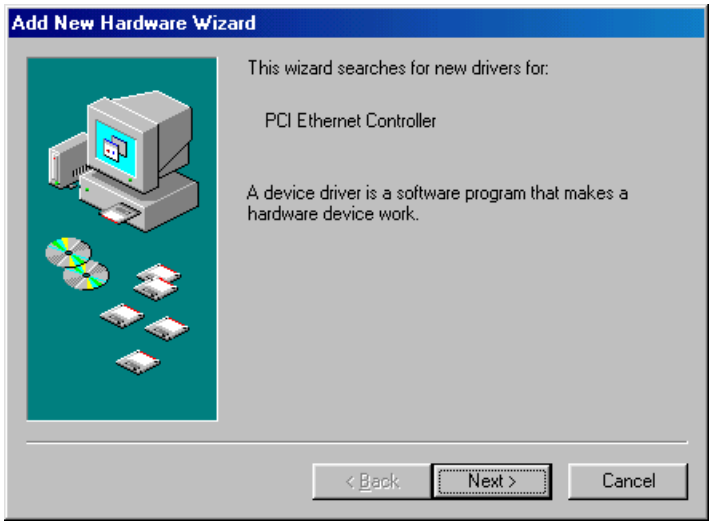
4

Windows 98 Second Edition

Driver Installation

D-Link recommends that you remove any existing D-Link NDIS driver on the PC system before installing Version 1.3 release of the NDIS driver.
See Section “Driver Uninstallation” on page 4-5 for the instructions on how to remove previous driver releases. When the system no longer has the D-Link NDIS driver installed, insert the DW-290 Wireless Network mini PCI Card into a 32-bit CardBus slot, and follow these steps to install the NDIS driver:

1. Wait for the following dialog box to appear, and click Next to continue.

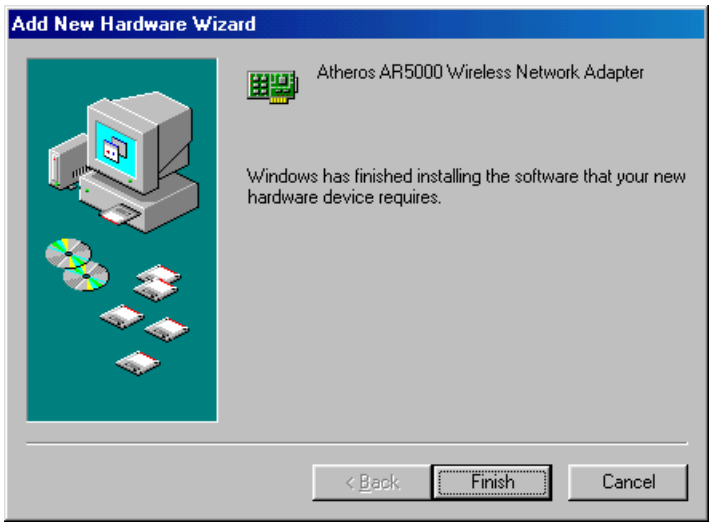

Add New Hardware Wizard
This wizard searches for new drivers for:
PCI Ethernet Controller
A device driver is a software program that makes a hardware device work.
< Back
Next >
Cancel

2. Choose “Search for the best driver for your device. (Recommended),” and click Next.

3. Insert the D-Link Software Release CD in your CD-ROM drive. Choose “Specify a location” and browse to the location where the NDIS driver is located. The default folder is D:\ndis\bin\production\ndis5 (assuming D: is the CD-ROM drive). Click Next to continue.

4. When the D-Link driver installation file (NET5210B.INF) has been found, click Next to continue.

5. Click Finish to continue.

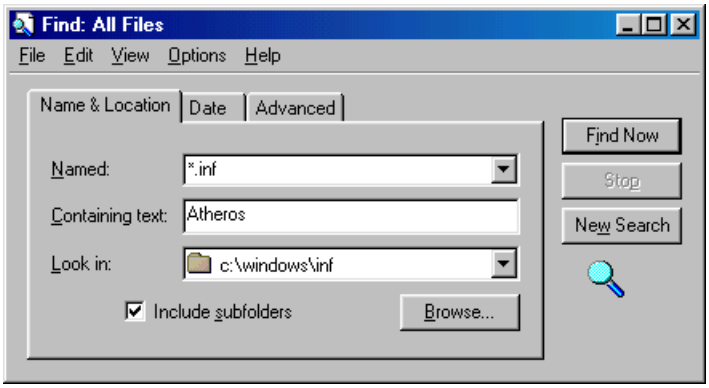


6. Click Yes to restart the system and complete driver installation.
   See Section “Device Configuration” on page 4-8 for device configuration.

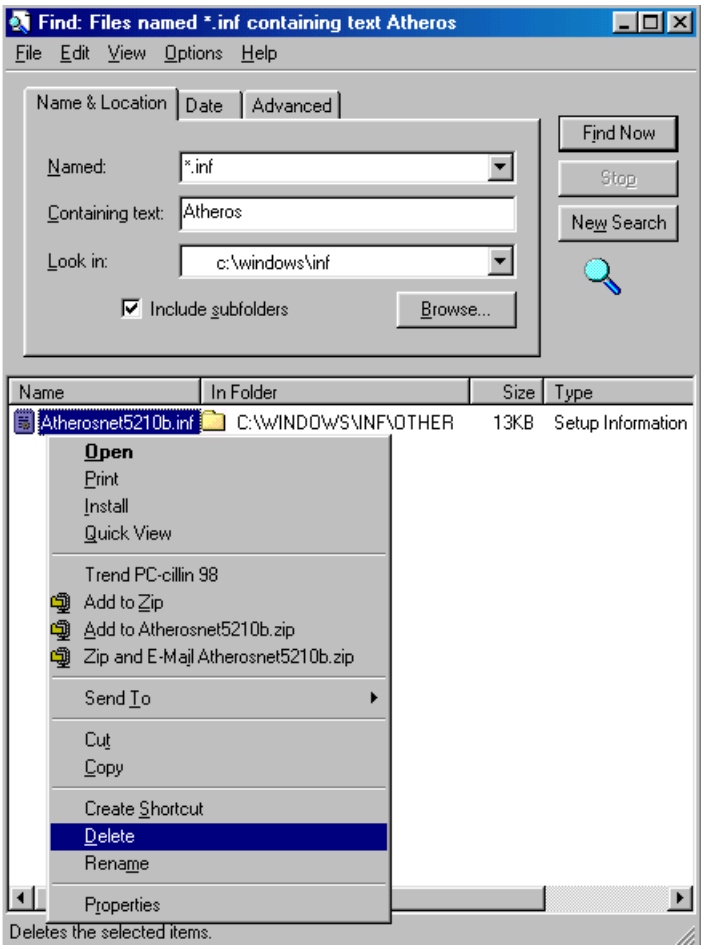
Driver Uninstallation

This section provides uninstallation procedures for removing the D-Link NDIS driver from the system. Uninstallation is recommended for upgrading the NDIS driver from previous D-Link driver releases.

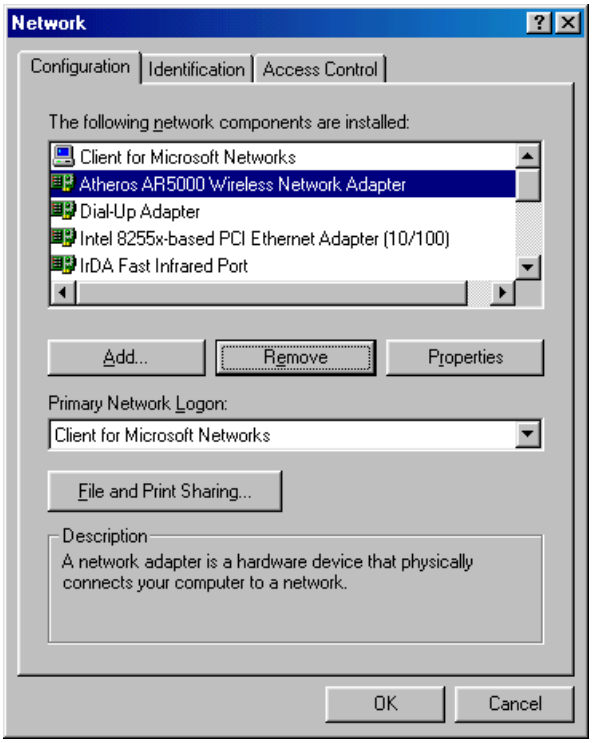
1. To remove the NDIS driver from the OS, go to Start > Search > For Files or Folders…, and search for the INF file containing the “D-Link” text string under the \WINDOWS\INF folder. Be sure to include subfolders in the search criteria.



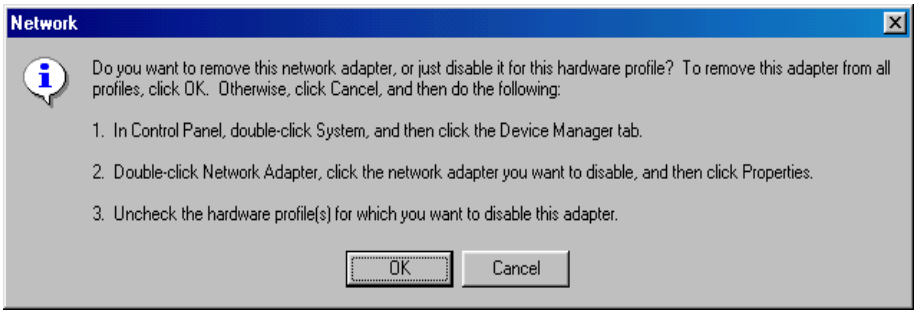
2. When “D-Linknet5210b.inf” has been found, delete it by right-clicking the file and choose “Delete.”



3. From Control Panel, launch the Network properties window. Select “D-Link DW-290 Wireless Network mini PCI Card” from the list, and click Remove to uninstall the device.



4. Click OK to confirm the removal of the device. Restart the system to complete uninstallation.

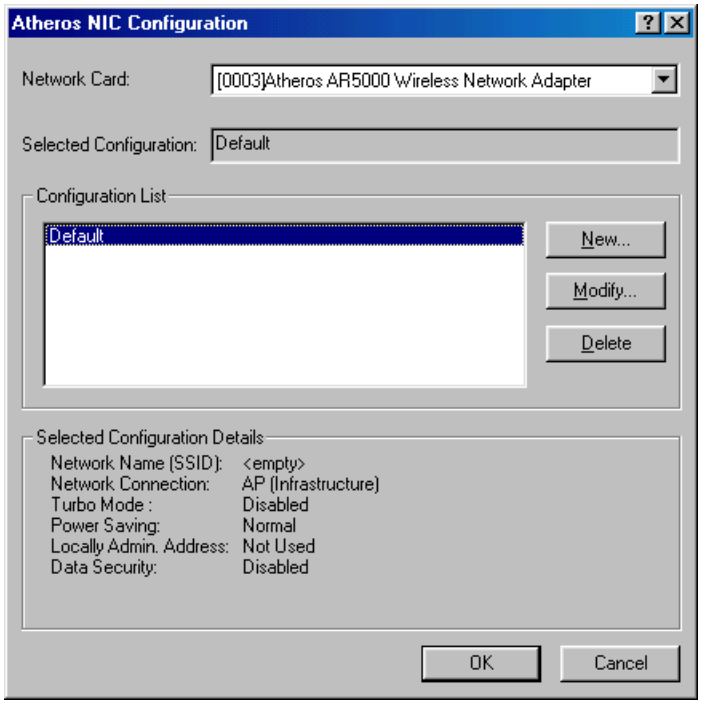


Device Configuration

Configuration of the D-Link DW-290 Wireless Network mini PCI Card can be done through the D-Link NIC Configuration utility found in the Windows Control Panel. Similar to Windows 2000 the device can be set to work in one of two modes: infrastructure mode or ad hoc mode. Please refer to Section “Device Configuration” beginning on page 2-17 for more details on these network connection types.

To launch the configuration utility, go to Control Panel and double-click on the D-Link NIC Configuration icon.

The configuration utility allows addition, modification, and deletion of the configuration profiles. Select one of the existing configuration profiles under the configuration list to modify, or click New to add a new configuration profile. Follow Section “Infrastructure Mode” on page 4-9 and Section “Ad Hoc Mode” on page 4-11 to set up the station to work in infrastructure mode and ad hoc mode.



Infrastructure Mode

This section defines the process of configuring an D-Link DW-290 Wireless Network mini PCI Card in infrastructure mode. See Section “Device Configuration” beginning on page 2-17 for detailed descriptions of each option in the Network Configuration Settings.

1. Under the “General” tab, make sure the “Locally Administered Address” checkbox is unchecked. Use the following information as a guideline to choose the values of each field in the configuration window:

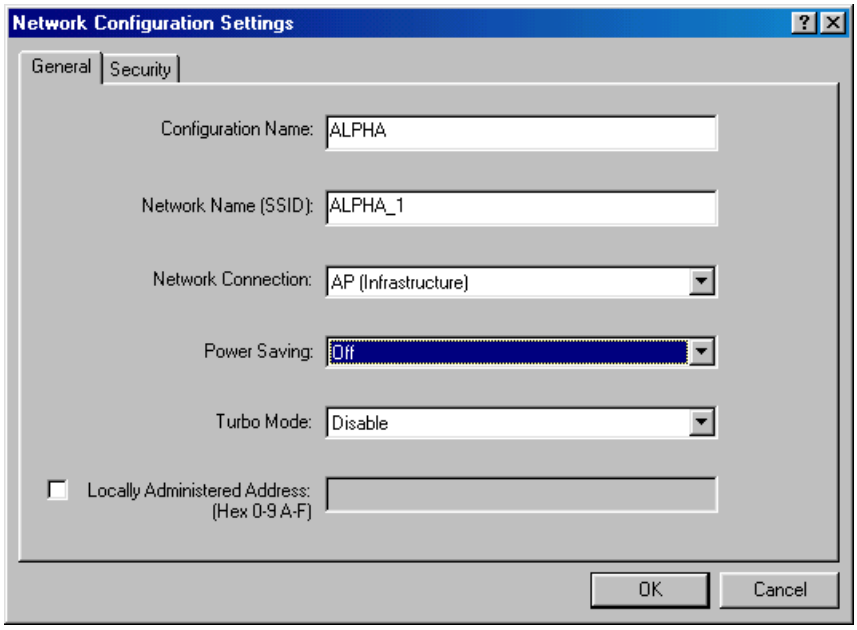
   – Configuration Name: This field identifies the configuration. This name must be unique. Configuration names are case insensitive.

   – Network Name (SSID): This is the name of the IEEE 802.11a wireless network. This field has a maximum limit of 32 characters. If this field is left blank, the STA connects to the AP with the best signal strength.

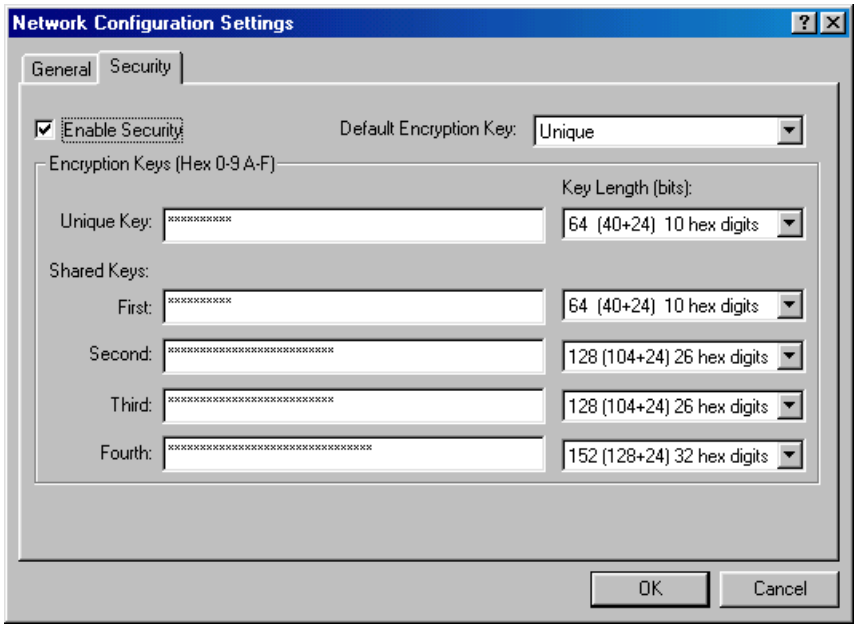
   – Network Connection: AP (Infrastructure)

   – Power Saving: This field allows the configuration of power management options. The options are Off, Normal, and Maximum.

   – Turbo Mode: This field enables or disables D-Link turbo mode.



2. Usually, infrastructure mode is used in an enterprise environment where APs are installed and maintained by corporate IT staff. Much of the data in the enterprise network is confidential. It is important to configure security to make sure only stations with appropriate keys can receive sensitive data. The D-Link DW-290 Wireless Network mini PCI Card and NDIS driver support key lengths of 40 bits, 104 bits, and 128 bits. Typically, the appropriate encryption and decryption keys are supplied by the corporate IT staff.



Ad Hoc Mode

This section defines the process of configuring an D-Link DW-290 Wireless Network mini PCI Card in ad hoc or IBSS mode. See Section “Ad Hoc Mode” on page 2-23 for descriptions of ad hoc operation.

1. Similar to the setup of the AP infrastructure mode described in the previous section, ad hoc mode is also configured by changing the Network Configuration Settings of the D-Link NIC Configuration utility. Use the following information as a guideline to choose the values of each field in the configuration window:

   – Configuration Name: This field identifies the configuration. This name must be unique. Configuration names are case insensitive.

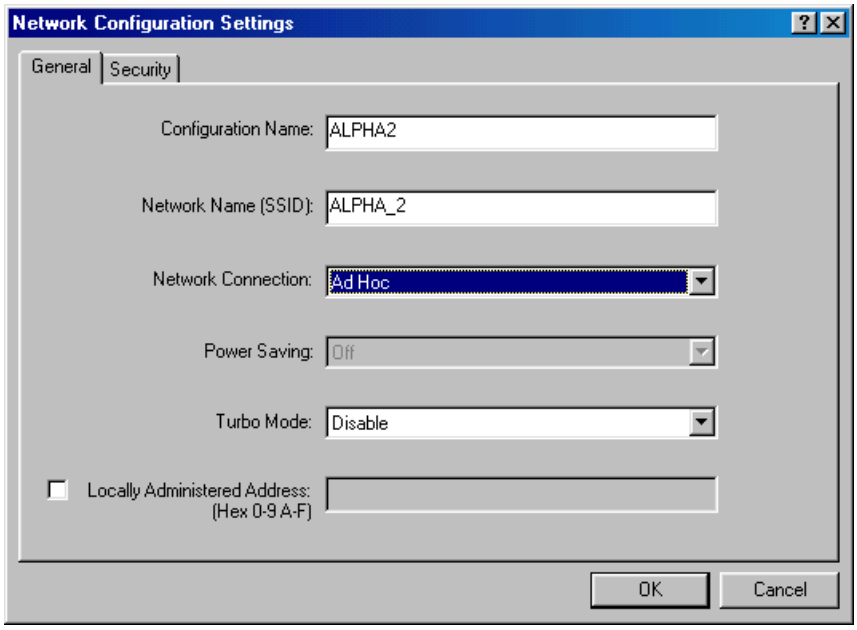
   – Network Name (SSID): A Network Name is mandatory for ad hoc mode. The SSID for all stations in a single ad hoc network must be the same.

   – Network Connection: Ad Hoc.

   – Power Saving: Power saving mode is not currently supported in an ad hoc network.

   – Turbo Mode: All stations participating in the ad hoc network must have the same rate setting.

   – Locally Administered Address: This field defines the locally administered MAC address (LAA). To enter a value in the address field, the check box needs to be selected.



2. You can optionally set up other properties, but because the duration of the ad hoc network tends to be limited, Power Saving and Security features are not typically a requirement. For ad hoc network activity, the Power Saving and Security features can be disabled. Currently, shared key security is supported in ad hoc mode. Future D-Link software implementations will provide unique key support.

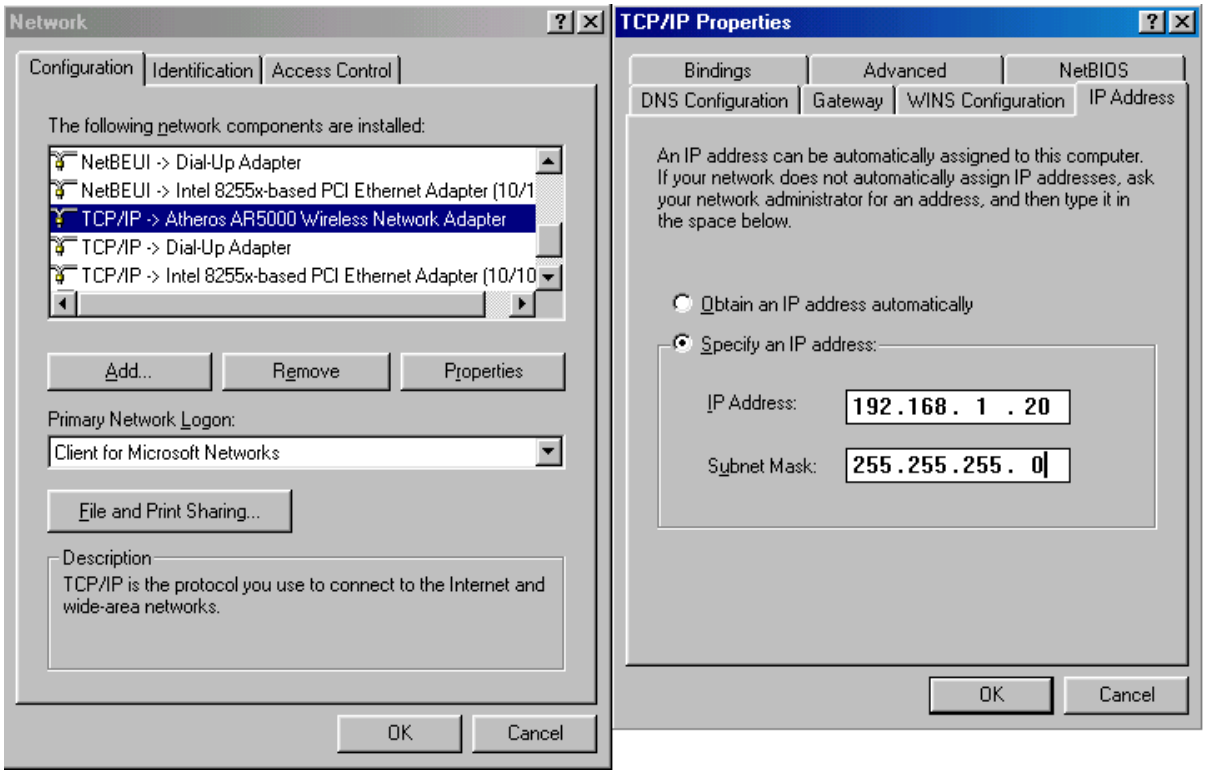
3. Click OK when the properties are set correctly. The system needs to reboot in order for the changes to take effect.

Note that in ad hoc mode, a station scans the air for an existing BSS. If no BSS is found, the station establishes a BSS for other stations to join. When other stations scan the air and find an established BSS in place, they join that BSS to form an ad hoc network. If a specific set of stations requires ad hoc network connectivity, it is recommended to have one station establish a BSS first before configuring the remaining stations. This prevents the scenario of several stations trying to form a BSS at the same time, which can result in multiple singular BSSs being established, rather than a single BSS with multiple stations.

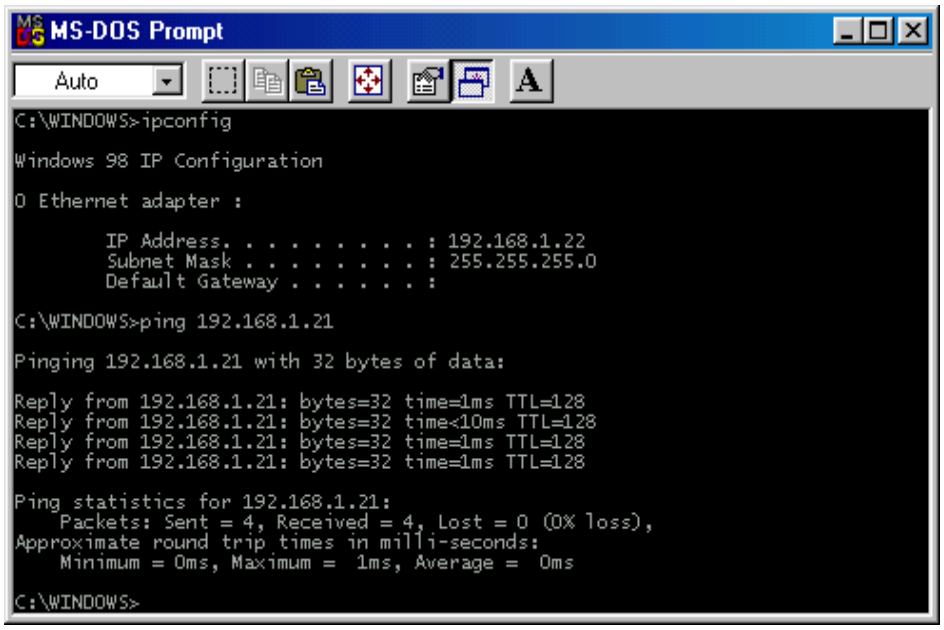
TCP/IP Setup

After configuring the D-Link DW-290 Wireless Network mini PCI Card network adapter properties, the TCP/IP address for the network device needs to be configured.

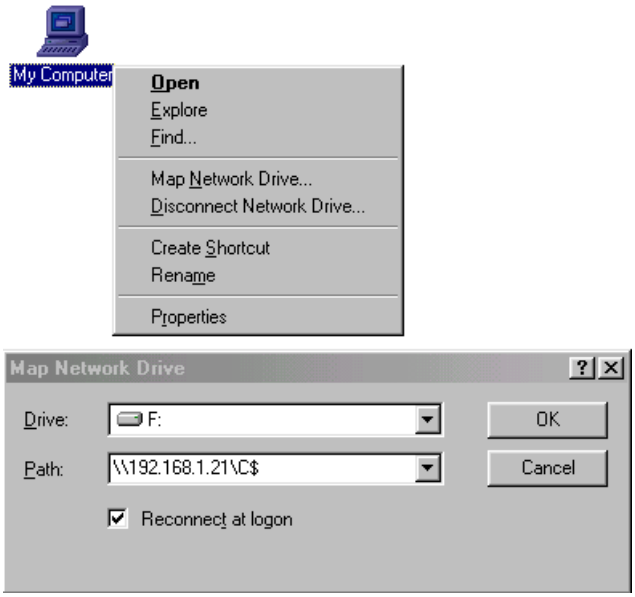
1. From Control Panel, launch the Network properties window. Select "TCP/IP → D-Link DW-290 Wireless Network mini PCI Card" and click Properties. Depending on the type of network the station connects to, Gateway and DNS Configuration information can also be required.
   IP configuration information (DHCP or assigned IP address, Gateway and DNS server IP addresses) is usually obtained from the corporate IT staff. For a simple demonstration, the station is assigned a static IP address. From "TCP/IP Properties," choose "IP Address" and select "Specify an IP address." Input an IP address and subnet mask. Assigning an IP address and subnet mask allows the station to interact with the AP or other stations in the same IP subnet. Click OK to complete the TCP/IP configuration, and restart the system for the changes to take effect.



2. Choose Start > Programs > Accessories > Command Prompt to open the DOS command prompt window. Type “ipconfig” to determine if the TCP/IP configuration has taken effect. To test IP connectivity in ad hoc or infrastructure mode, use the “ping <ipaddress>” command. When a TCP/IP connection is established, the LinkMon utility (see Chapter 7) can be used to monitor the D-Link DW-290 Wireless Network mini PCI Card operating status.



3. To map the drive on another machine to your computer, right-click “My Computer” and click “Map Network Drive….” Specify the path of a network-shared folder.



4. After mapping the drive, you can perform file transfers, video streaming, and all other network data transfers that are normally performed with wired 10/100 Ethernet connections.

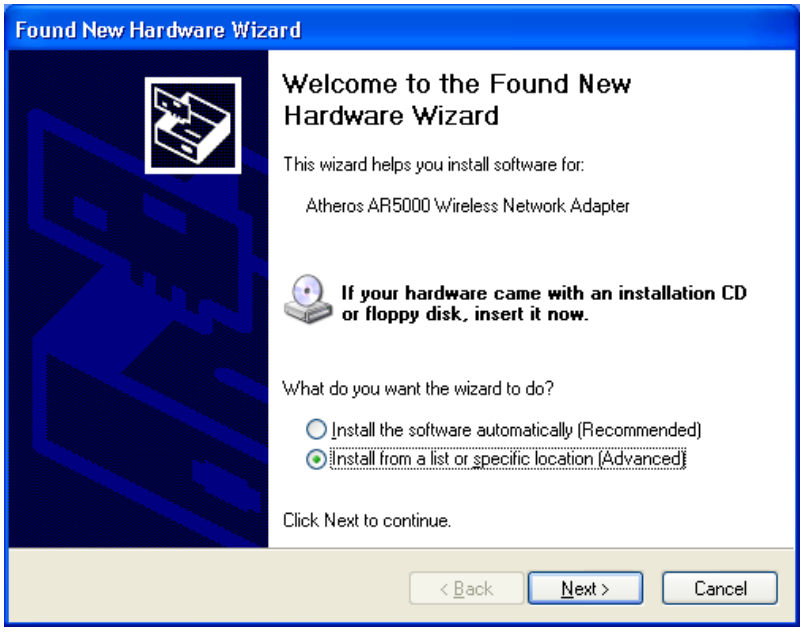
5

Windows XP

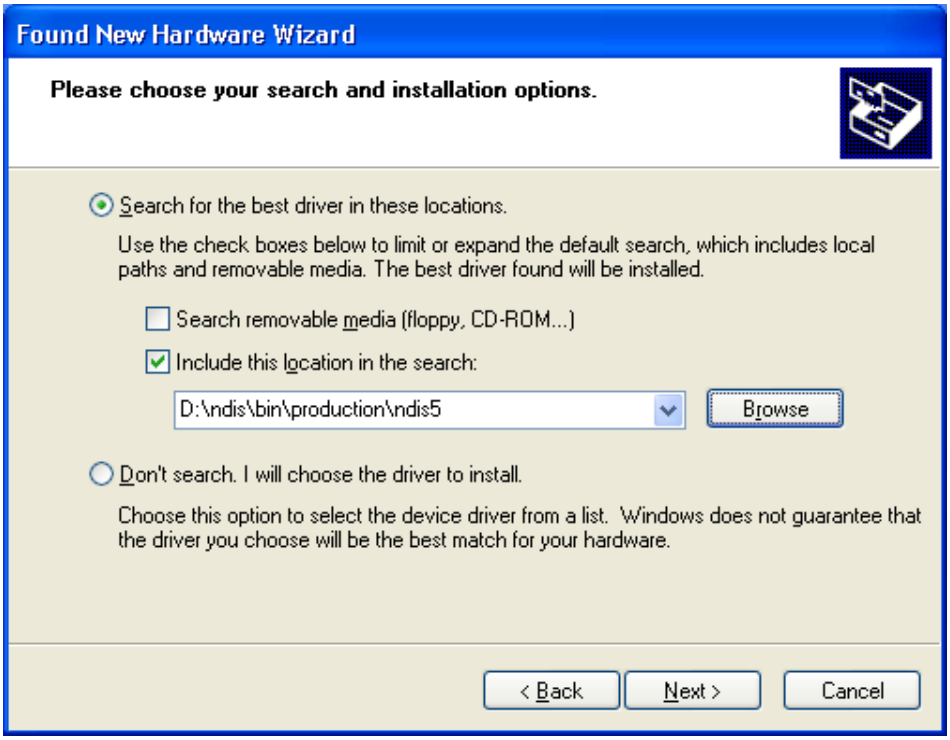
Driver Installation (First-time Install)

D-Link recommends that you remove any existing D-Link drivers on the PC system before installing Version **Error! Reference source not found.** release of the NDIS driver. See Section “Driver Uninstallation” on page 5-6 for the instructions on how to remove previous driver releases. With no existing D-Link NDIS driver installed, insert the D-Link DW-290 Wireless Network mini PCI Card into a 32-bit CardBus slot, and follow these steps to install the NDIS driver:

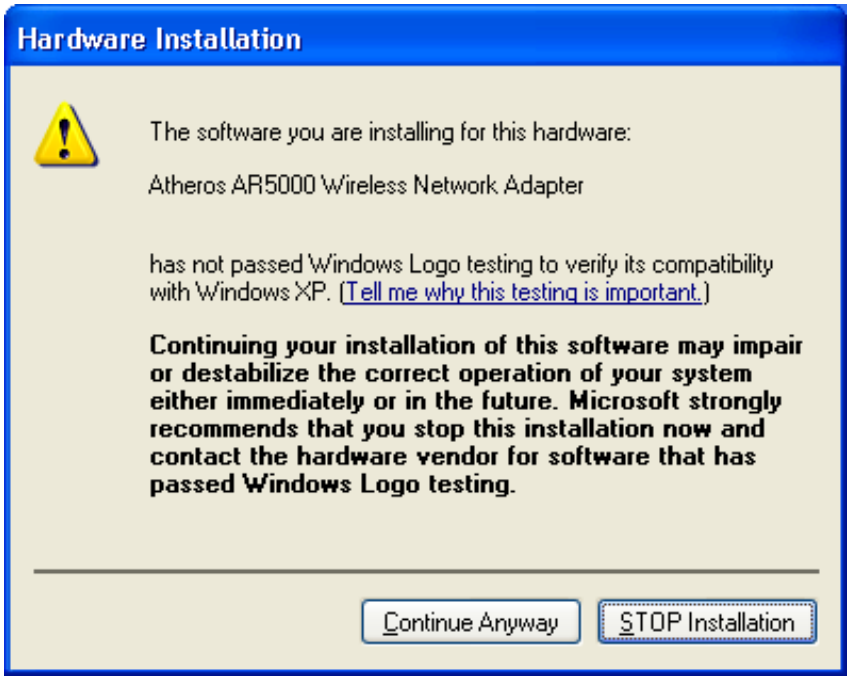
1. Wait for the following dialog box to appear. Choose “Install from a list or specific location (Advanced),” and click Next to continue.


Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
This wizard helps you install software for:
Atheros AR5000 Wireless Network Adapter
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Install the software automatically (Recommended)
Install from a list or specific location (Advanced)
Click Next to continue.
< Back
Next >
Cancel

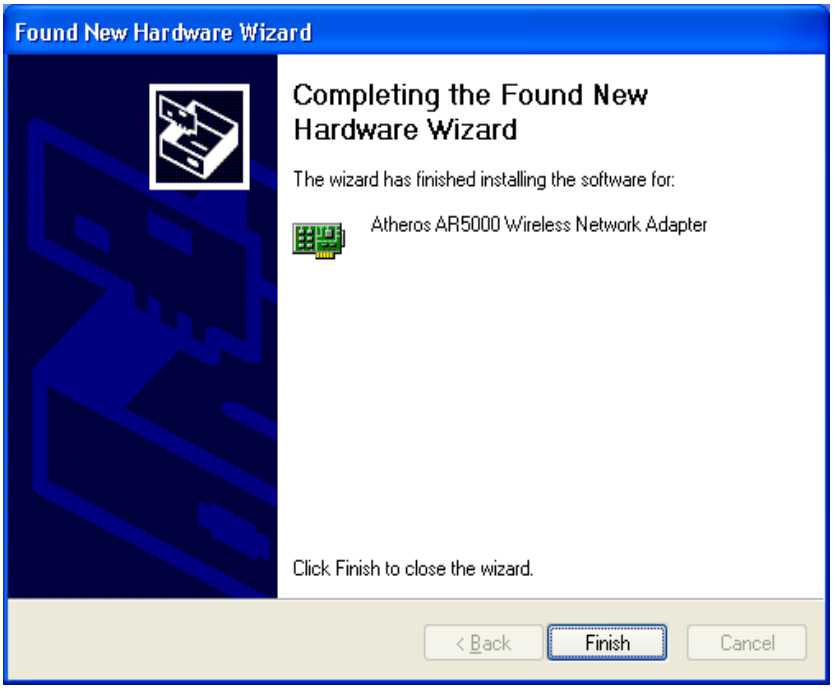
2. Under “Search for the best driver in these locations,” choose “Include this location in the search” and click Browse to find the location of the NDIS driver. When the driver location has been identified, click Next to continue.



3. The D-Link NDIS evaluation driver currently does not have a digital signature from Microsoft. Therefore, Windows XP shows a warning message. Click Continue Anyway to proceed with driver installation.



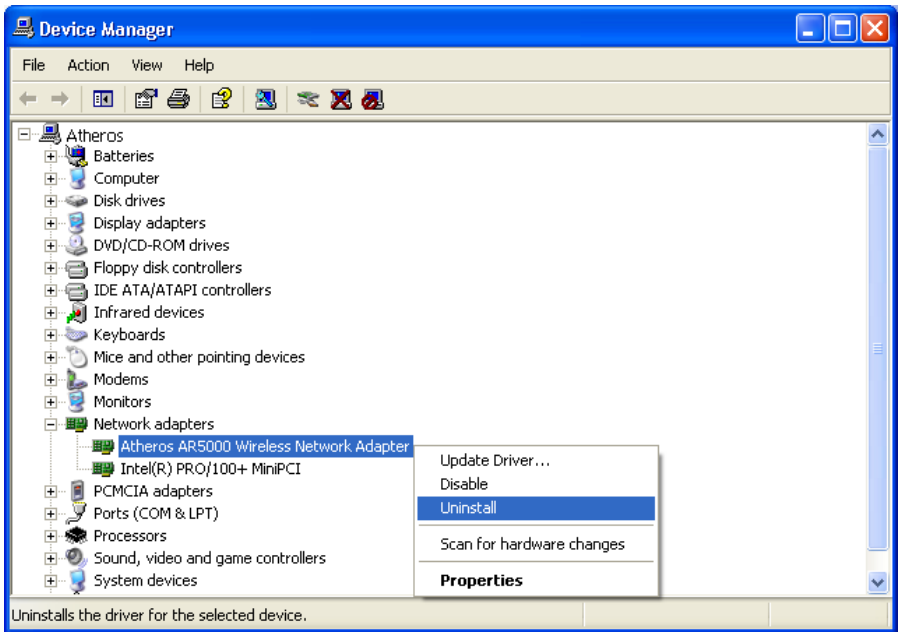
4. Click Finish to complete driver installation, and refer to Section “Device Configuration” on page 5-10 for device configuration.


Found New Hardware Wizard
Completing the Found New Hardware Wizard
The wizard has finished installing the software for:
Atheros AR5000 Wireless Network Adapter
Click Finish to close the wizard.
< Back
Finish
Cancel

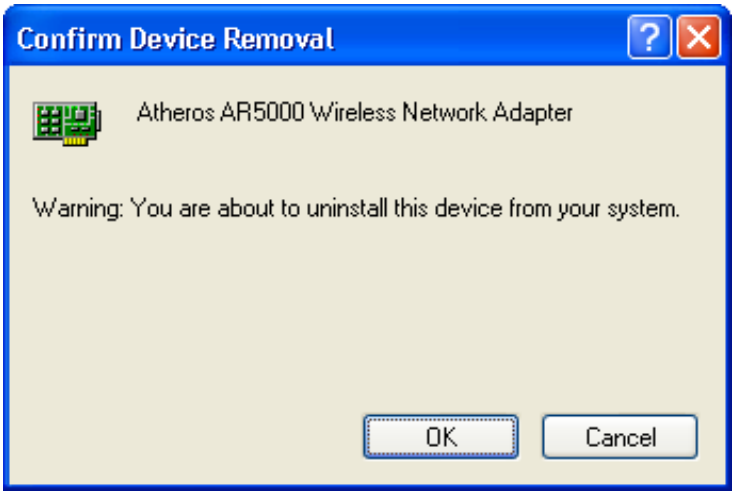
Driver Uninstallation

This section provides uninstallation procedures for removing the D-Link NDIS driver from the system. Uninstallation is recommended for upgrading the NDIS driver from previous D-Link driver releases.

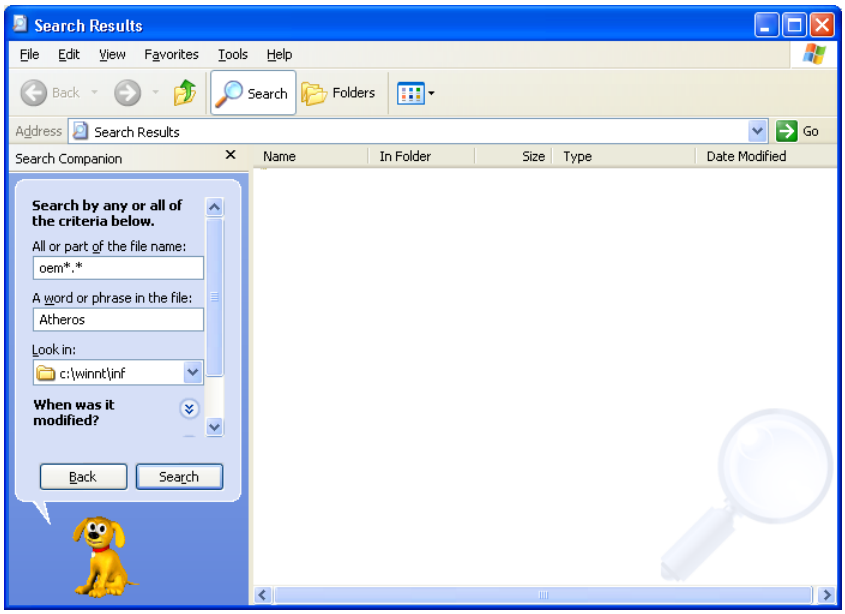
1. To remove the NDIS driver from the OS, go to Device Manager, right click “D-Link DW-290 Wireless Network mini PCI Card,” and choose Uninstall.



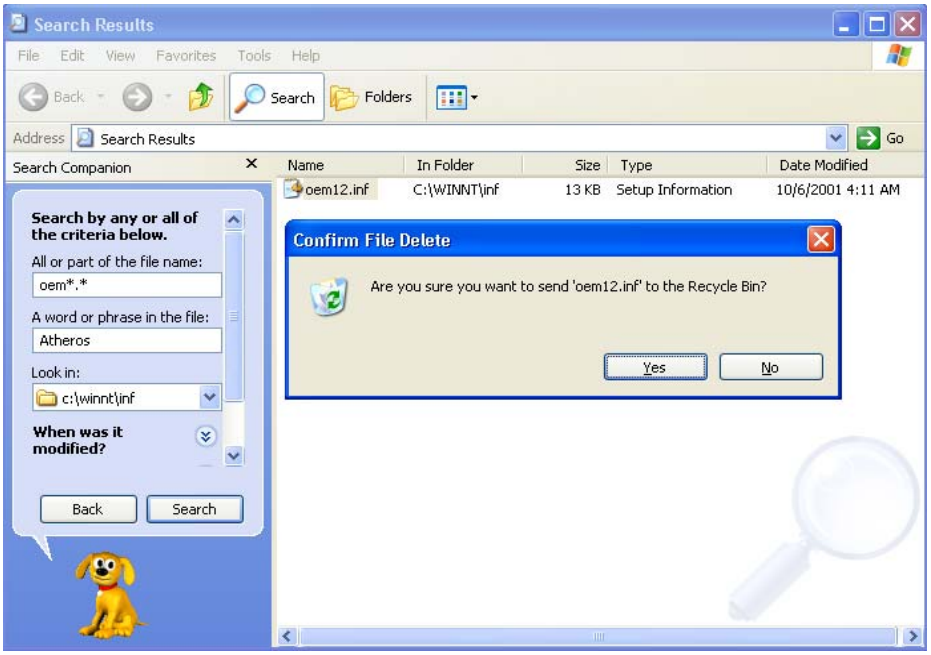
2. Click OK to uninstall the device.


Confirm Device Removal
Atheros AR5000 Wireless Network Adapter
Warning: You are about to uninstall this device from your system.
OK
Cancel

3. When the device is uninstalled from Device Manager, search for and delete the driver installation file that resides in the system. To do so, go to Start and choose Search > All files and folder, enter “oem*.inf” in the “All or part of the file name” field, and enter “D-Link” in the “A word or phrase in the file” field. Enter “C:\WINNT\INF” in the “Look in” field, where C: is the drive letter of where Windows XP is installed. Click Search to find the driver installation file.



4. A file matching the search criteria is displayed. Choose this file and delete it from the system.

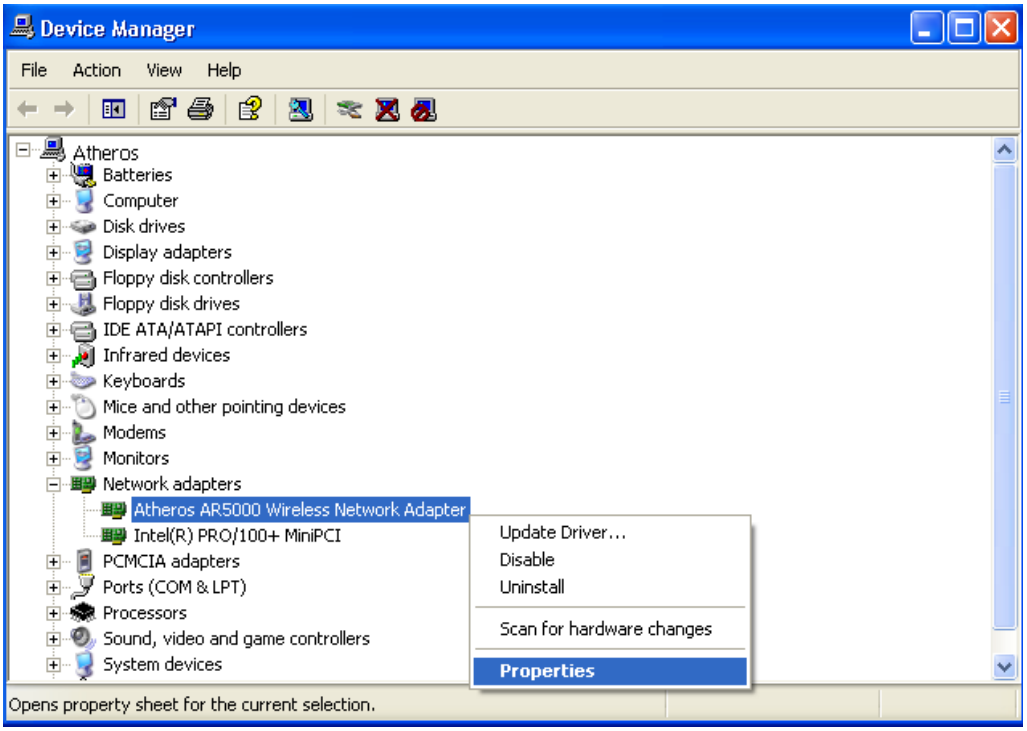

Search Results
File Edit View Favorites Tools Help
Back
Search
Folders
Address
Search Results
Go
Search Companion
Search by any or all of the criteria below.
All or part of the file name:
oem*.*
A word or phrase in the file:
Atheros
Look in:
c:\winnt\inf
When was it modified?
Back
Search
Name
In Folder
Size
Type
Date Modified
oem12.inf
C:\WINNT\inf
13 KB
Setup Information
10/6/2001 4:11 AM
Confirm File Delete
Are you sure you want to send 'oem12.inf' to the Recycle Bin?
Yes
No

Device Configuration

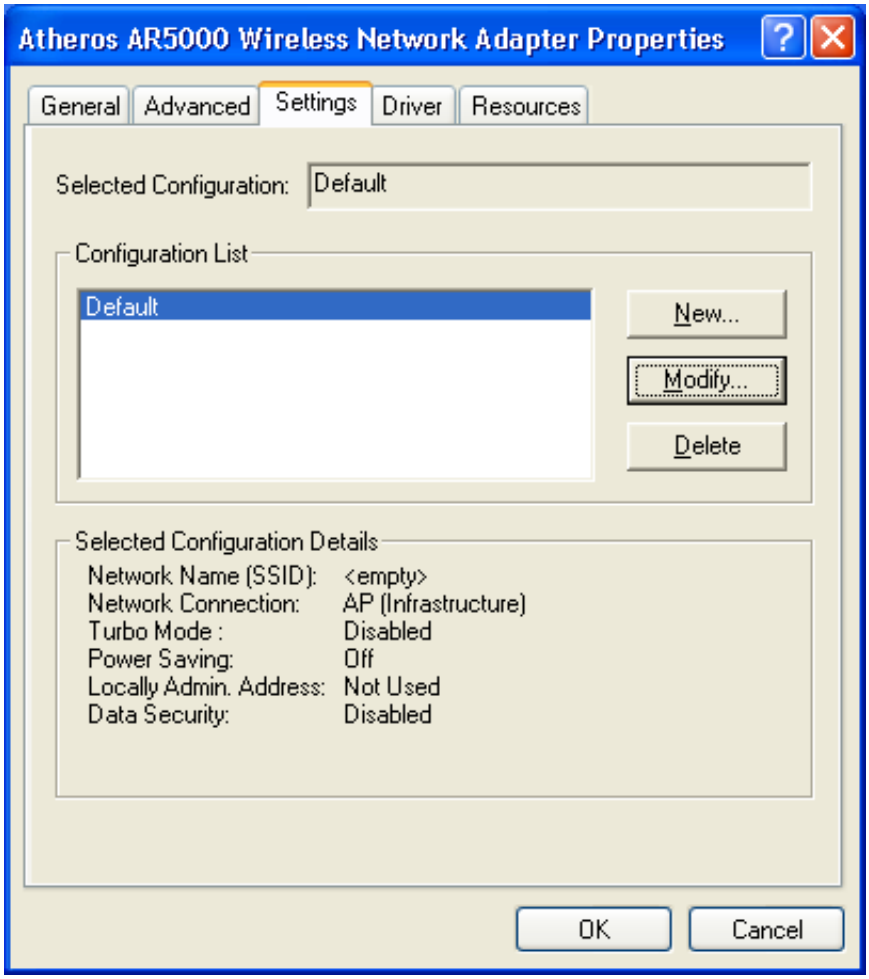
Windows XP zero-configuration functionality allows the user to select and join a wireless network without having to configure the device separately. You can decide to choose the default parameters and directly proceed to zero-configuration in Section “Windows XP Wireless Network Configuration” on page 5-20.

Similar to Windows 2000, configuration of the D-Link DW-290 Wireless Network mini PCI Card can be done through the Network Control Panel (NCP) in adapter properties. You can set the Wireless Network mini PCI Card to work in one of two modes: infrastructure mode or ad hoc mode. See Section “Device Configuration” beginning on page 2-17 for more details on these network connection types.

To launch NCP go to Device Manager, right-click “D-Link DW-290 Wireless Network mini PCI Card,” and select Properties to access to the properties of the adapter.



Configuration additions, modifications, and deletions are made under the “Settings” tab of “D-Link DW-290 Wireless Network mini PCI Card Properties.” Select one of the configurations under the configuration, click Modify or New and complete the steps in Section “Infrastructure Mode” on page 5-12 or Section “Ad Hoc Mode” on page 5-13 to set up the station to work in infrastructure mode or ad hoc mode, respectively.



Infrastructure Mode

This section defines the process of configuring an D-Link DW-290 Wireless Network mini PCI Card in infrastructure mode. See Section “Device Configuration” beginning on page 2-17 for detailed descriptions of each option in the Network Configuration Settings.

1. Under the “General” tab, make sure the “Locally Administered Address” checkbox is unchecked. Use the following information as a guideline to choose the values of each field in the configuration window:

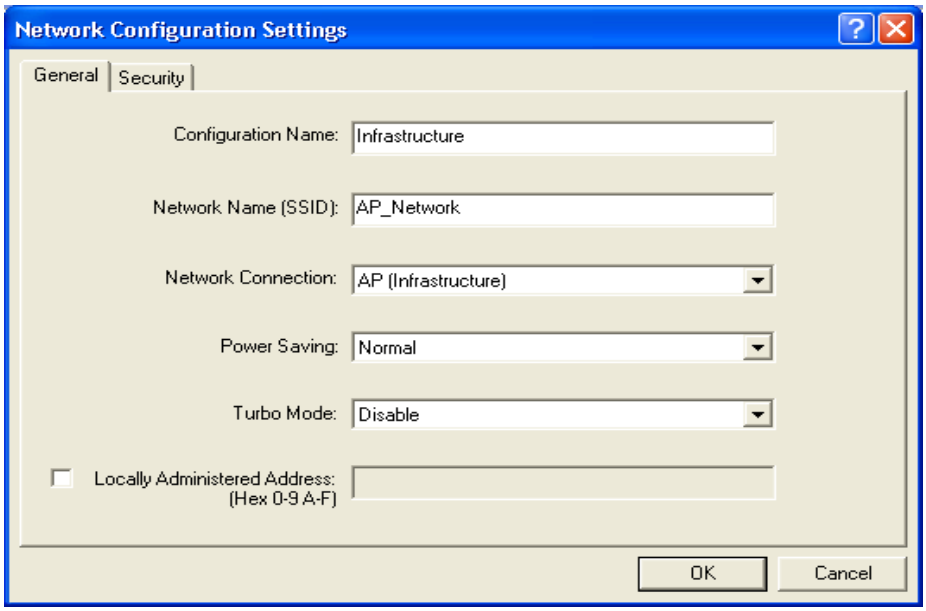
   – Configuration Name: This field identifies the configuration. This name must be unique. Configuration names are case insensitive, for example, “Infrastructure.”

   – Network Name (SSID): This is the name of the IEEE 802.11a wireless network, for example, “AP_Network.” This field has a maximum limit of 32 characters. If this field is left blank, the STA connects to the AP with the best signal strength.

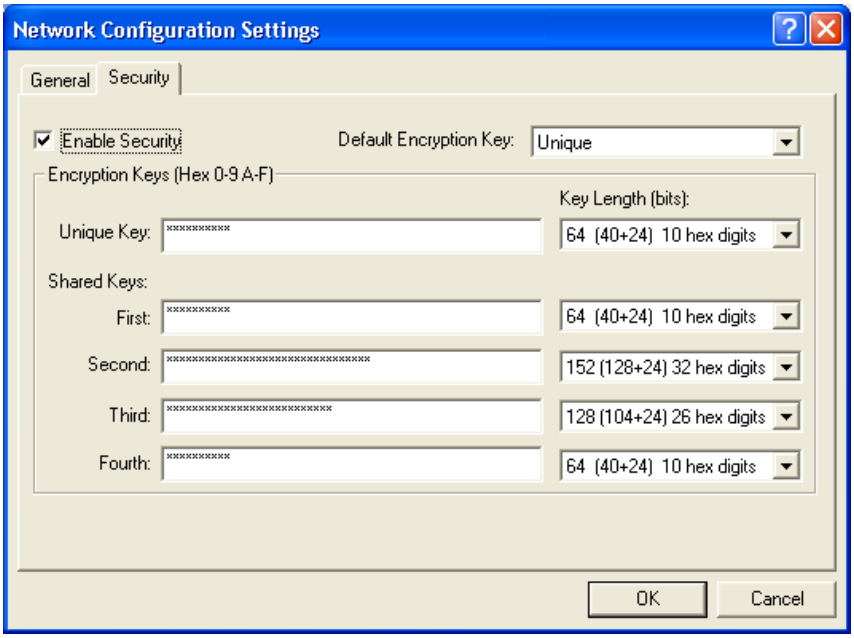
   – Network Connection: AP (Infrastructure).

   – Power Saving: This field allows the configuration of power management options. The options are Off, Normal, and Maximum.

   – Turbo Mode: This field enables or disables D-Link turbo mode.



2. Usually, infrastructure mode is used in an enterprise environment where APs are installed and maintained by corporate IT staff. Much of the data in the enterprise network is confidential. It is important to configure security to make sure only stations with appropriate keys can receive sensitive data. The D-Link DW-290 Wireless Network mini PCI Card and NDIS driver support key lengths of 40 bits, 104 bits and 128 bits. Typically, the appropriate encryption and decryption keys are supplied by the corporate IT staff.



Ad Hoc Mode

This section defines the process of configuring an D-Link DW-290 Wireless Network mini PCI Card in ad hoc or IBSS mode. See Section “Ad Hoc Mode” on page 2-23 for descriptions of ad hoc operation.

1. Similar to the setup of AP Infrastructure mode described in the previous section, ad hoc mode is also configured by changing the options in the “Network Configuration Settings” window. Use the following information as a guideline to choose the values of each field in the configuration window:

   – Configuration Name: This field identifies the configuration. This name must be unique. Configuration names are case insensitive, for example, “Ad Hoc.”

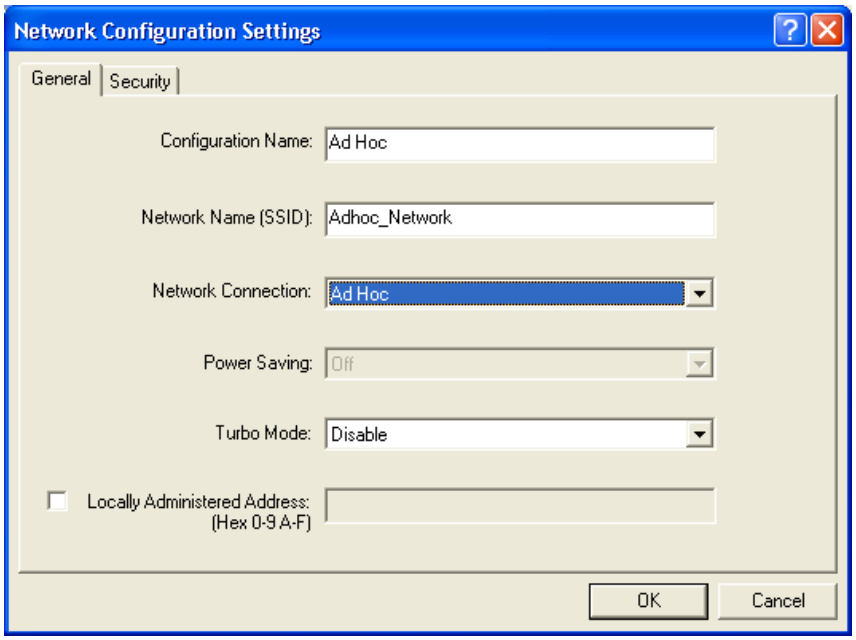
- Network Name (SSID): A Network Name is mandatory for ad hoc mode. The SSID for all stations in a single ad hoc network must be the same.

- Network Connection: Ad Hoc.

- Power Saving: Power saving mode is not currently supported in an ad hoc network.

- Turbo Mode: All stations participating in the ad hoc network must have the same rate setting.

- Locally Administered Address: This field defines the locally administered MAC address (LAA). To enter a value in the address field, the check box needs to be selected.



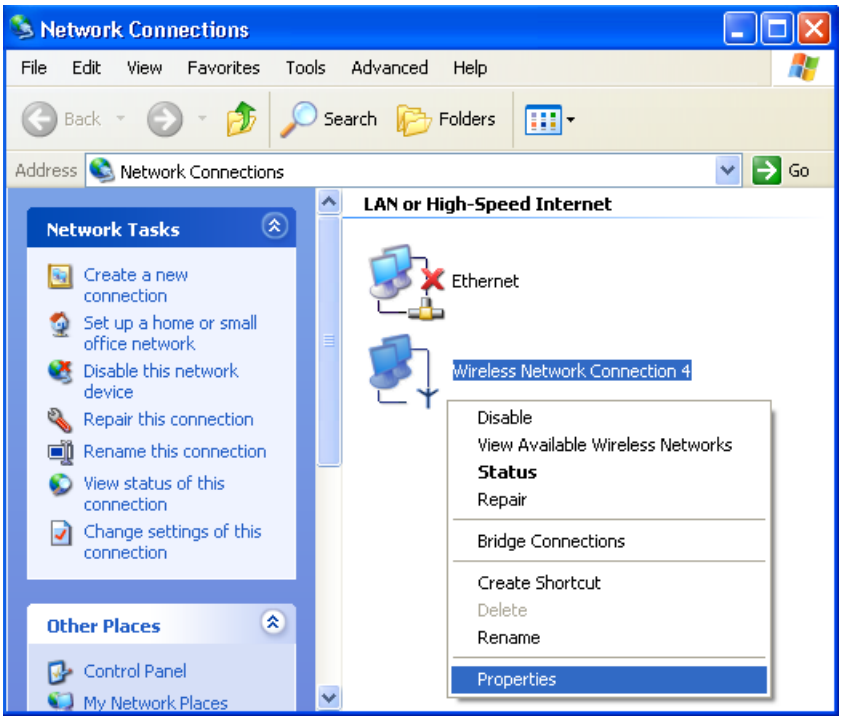
2. You can optionally set up security features, but it is not typically a requirement because the duration of the ad hoc network tends to be limited. Currently, shared key security is supported in ad hoc mode. Future D-Link software implementations will provide unique key support.

3. In ad hoc mode, a station scans the air for an existing BSS. If no BSS is found, the station establishes a BSS for other stations to join. When other stations scan the air and find an established BSS in place, they join that BSS to form an ad hoc network. If a specific set of stations requires ad hoc network connectivity, it is recommended to have one station establish a BSS first before configuring the remaining stations. This prevents the scenario of several stations trying to form a BSS at the same time, which can result in multiple singular BSSs being established, rather than a single BSS with multiple stations.

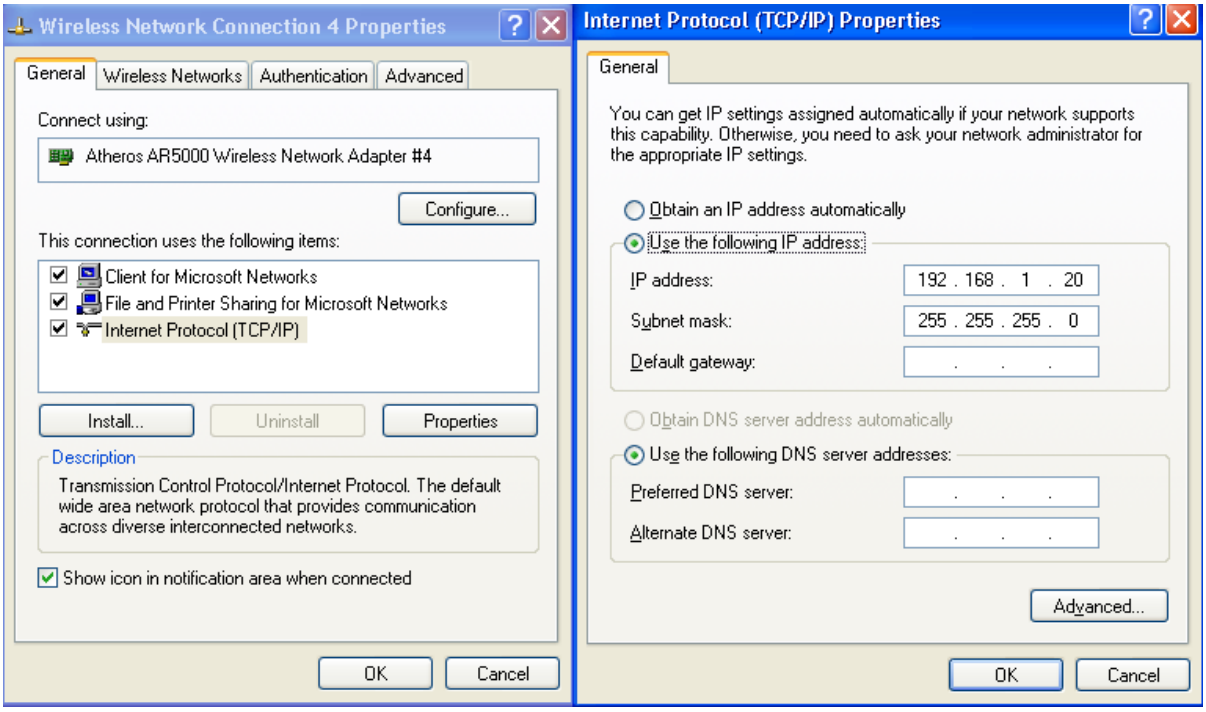
TCP/IP Setup

After configuring the D-Link DW-290 Wireless Network mini PCI Card through the Network Control Panel, the TCP/IP address for the network device needs to be configured.

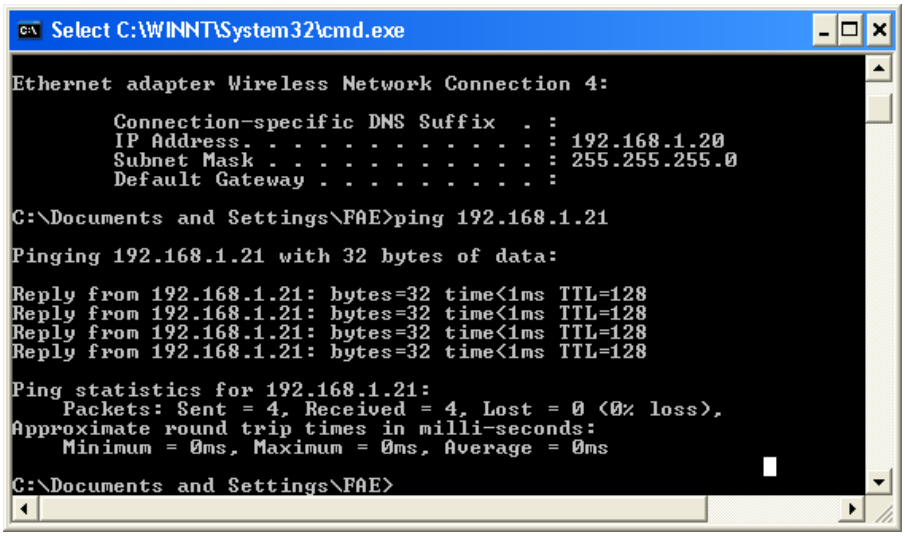
1. From the Start menu, choose Programs > Accessories > Communications > Network Connections. Find the “Local Area Connection” that is associated with the D-Link DW-290 Wireless Network mini PCI Card. Right-click that connection and click Properties.



2. Select “Internet Protocol (TCP/IP)” and click Properties. Click “Use the following IP address” and input an IP address and Subnet mask. Depending on the type of network the station connects to, Gateway and DNS Configuration information can also be required. IP configuration information (DHCP or assigned IP address, Gateway and DNS server IP addresses) is usually obtained from the corporate IT staff. For a simple demonstration, the station is assigned a static IP address. Click OK in both “Internet Protocol (TCP/IP) Properties” and “Local Area Connection Properties” to complete the IP configuration.

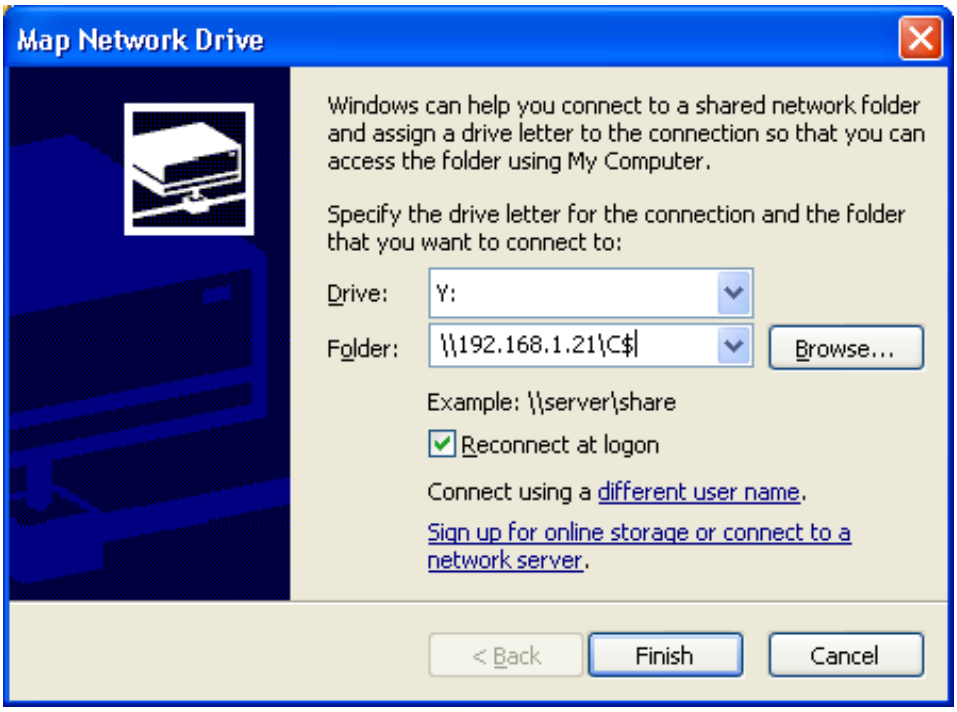


3. Choose Start > Programs > Accessories > Command Prompt to open a command prompt window. Type “ipconfig” to determine if the TCP/IP configuration has taken effect. To test IP connectivity in ad hoc or infrastructure mode, use the “ping <IP address>” command. When a TCP/IP connection is established, the LinkMon utility (see Chapter 7) can be used to monitor the operating status of D-Link DW-290 Wireless Network mini PCI Card.



4. To map the drive on another machine to your computer, from the Start menu, choose My Computer and right-click to select “Map Network Drive….”

5. Assign the drive letter that maps to the network-shared folder and specify the shared folder information. Click Finish to map the drive.



6. After mapping the drive, you can perform file transfers, video streaming, and all other network data transfers that are normally performed with wired 10/100 Ethernet connections.

Windows XP Wireless Network Configuration

Aside from using the Network Control Panel (NCP) to configure the D-Link DW-290 Wireless Network mini PCI Card, Windows XP provides zero-configuration functionality that automatically tries to connect the STA to available wireless networks in the following order:

a. Infrastructure mode with valid WEP keys

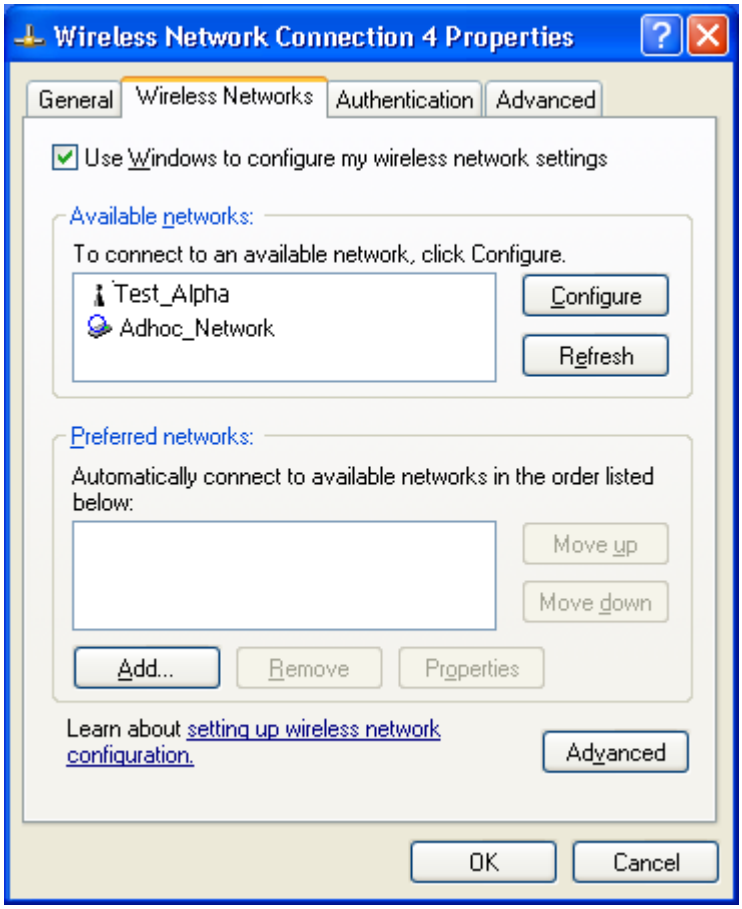
b. Infrastructure mode with unauthenticated access for stations without WEP keys

c. Ad hoc mode

To configure wireless network settings through the Windows XP user interface, open Network Connections from Control Panel. Right-click the Local Area Network Connection icon (pertinent to D-Link DW-290 Wireless Network mini PCI Card), click Enable to enable the device first, and then click Properties. On the Wireless Networks tab, select the “Use Windows to configure my wireless network settings” check box to enable automatic wireless network configuration. Follow Section “Infrastructure Mode” on page 5-12 or Section “Ad Hoc Mode” on page 5-13 to set up the station to connect to an infrastructure or ad hoc network.

If you want to use non-default settings for power saving and turbo mode, you should set those parameters through the NCP method described in Section “Device Configuration” on page 5-10. Then use Wireless Networks tabs to select network name, network type, and encryption keys.

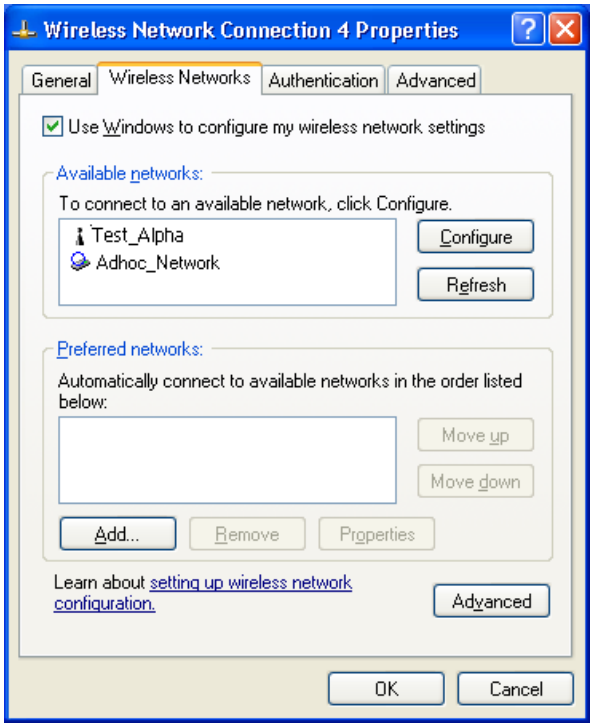
Note that you can disable automatic wireless network configuration, and revert back to using D-Link NCP configuration settings, by clearing the “Use Windows to configure my wireless network settings” check box.



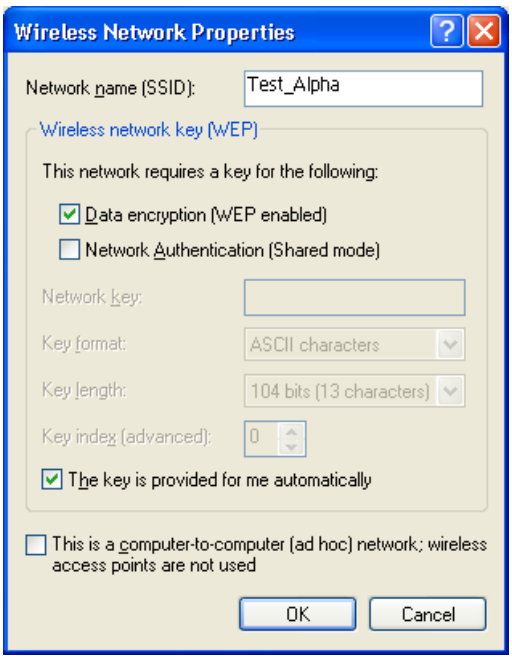
Infrastructure Mode

To set up automatic wireless network configuration to connect to an existing Access Point (infrastructure network):

1. Click the network name under “Available networks” in the Wireless Networks tab, and click Configure. You can update the list of available networks that are within range of your computer by clicking Refresh under Available Networks.



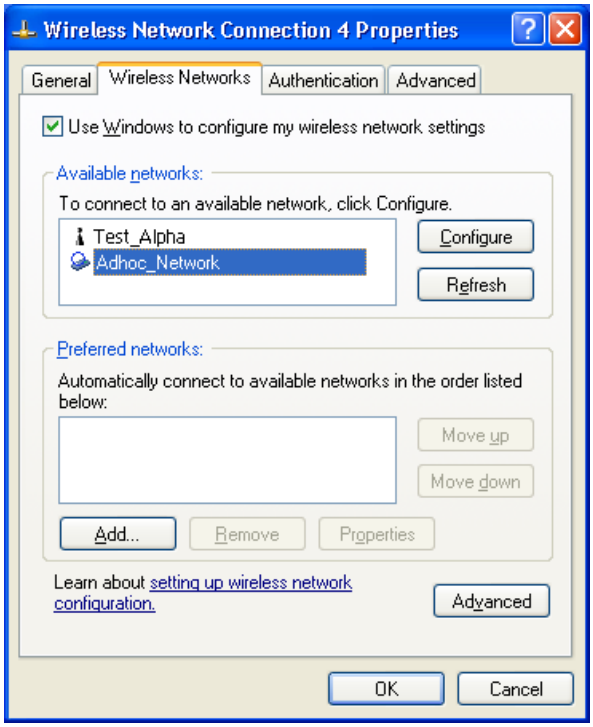
2. If the network requires WEP, then the “Data encryption (WEP enabled)” check box is selected by default in Wireless Network Properties. Select the “The key is provided for me automatically” check box if the WEP key is automatically provided for you. The driver will then use the Default Encryption key from the current D-Link NCP configuration profile irrespective of the network name. You may choose to enter the WEP key by clearing this check box and manually entering the network key and key length. Note that the key format must be hexadecimal digits and the key length is limited to 104-bit in Windows XP, as opposed to 128-bit key supported by D-Link NDIS driver in the NCP configuration interface. If the network that you are connecting to requires 128-bit WEP key, then it is recommended that you disable Windows XP automatic wireless network configuration and use D-Link NCP configuration instead.



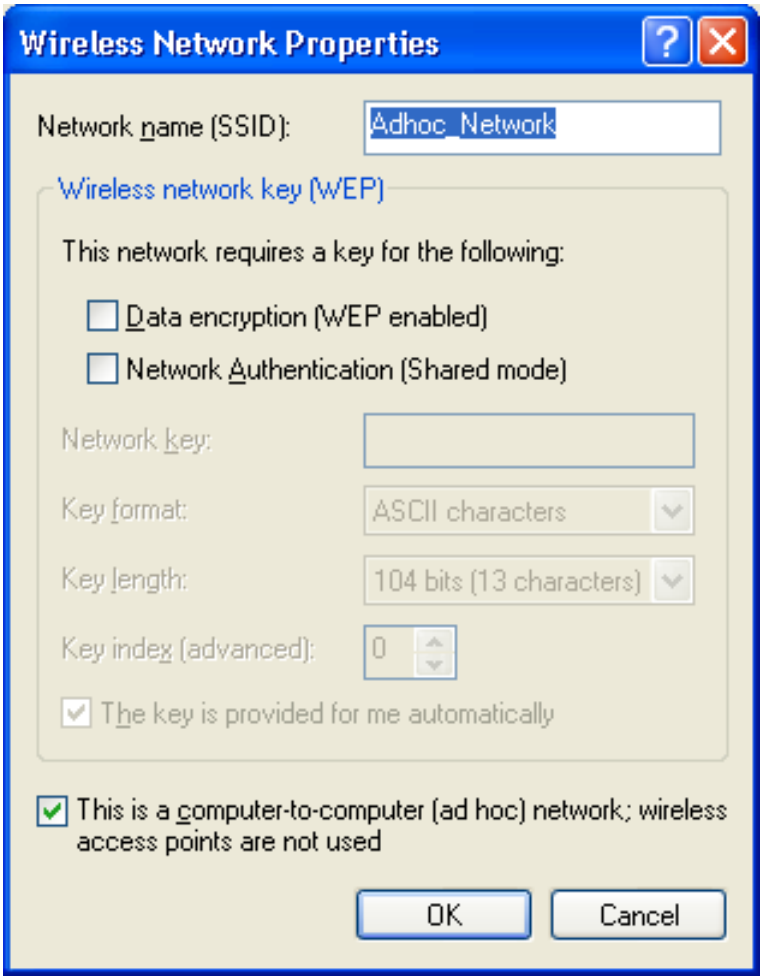
Ad hoc mode

To connect to an existing computer-to-computer (ad hoc) network:

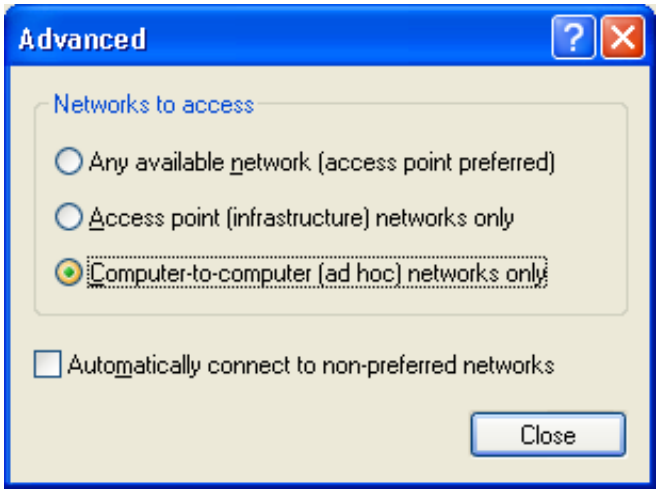
1. Click the ad hoc network name under “Available networks” in the Wireless Networks tab, and click Configure.



2. In Wireless Network Properties, the “This is a computer-to-computer (ad hoc) network; wireless access points are not used” check box is selected by default. You may choose to enable WEP by selecting the “Data encryption (WEP enabled)” check box and the “Network Authentication (Shared mode)” check box. Select the “The key is provided for me automatically” check box if the shared key is automatically provided for you. The driver will then use the Default Encryption key from the current D-Link NCP configuration profile irrespective of the network name.
   You may choose to enter the shared key by clearing this check box and enter the key and key length manually. Note that the key format must be hexadecimal digits and the key length is limited to 104-bit in Windows XP as opposed to 128-bit key supported by D-Link NDIS driver in the NCP configuration interface. If the network that you are connecting to requires 128-bit WEP key then it is recommended that you disable Windows XP automatic wireless network configuration and use D-Link NCP configuration instead.



3. If you want to connect to an ad hoc network, but both ad hoc and infrastructure networks are within range of your computer, then click Advanced in the Wireless Networks tab and then select “Computer-to-computer (ad hoc) networks only”. Note that if you want the station to start its own ad hoc network, the “Computer-to-computer (ad hoc) networks only” option should be selected. There should be no network active from the preferred list and the “Automatically connect to non-preferred networks” check box should be cleared.

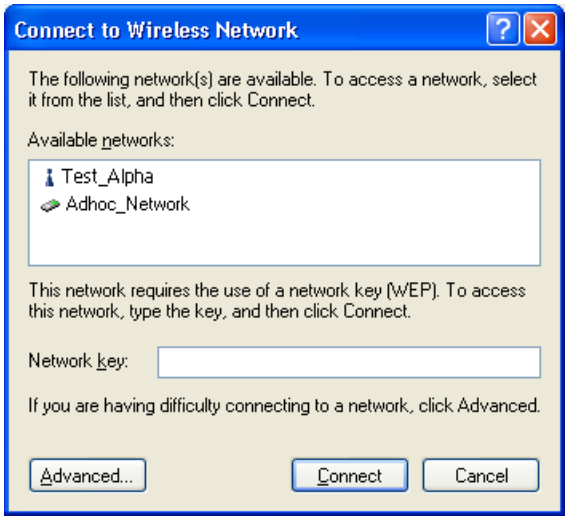


Connect to an Available Wireless Network

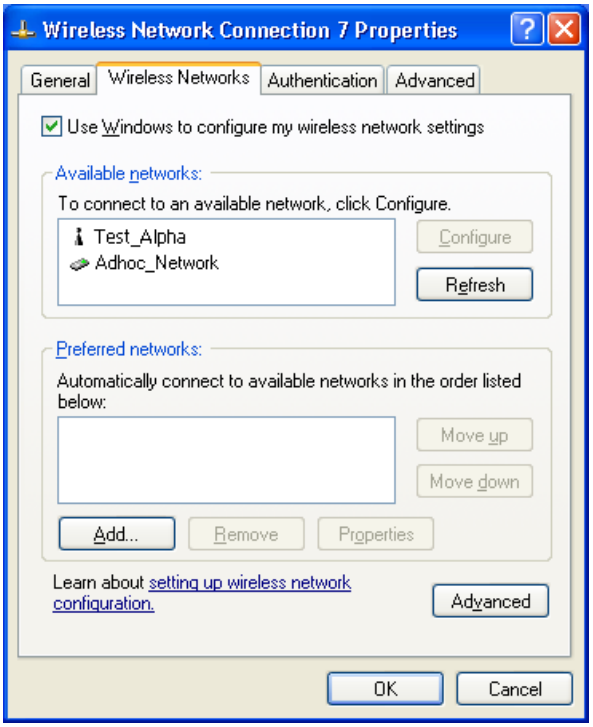
When there is more than one available network detected by Windows XP, the OS will prompt the user to select and connect to a preferred network.

To connect to an available wireless network, right-click the network connection icon in the notification area, and then click “View Available Wireless Networks”.

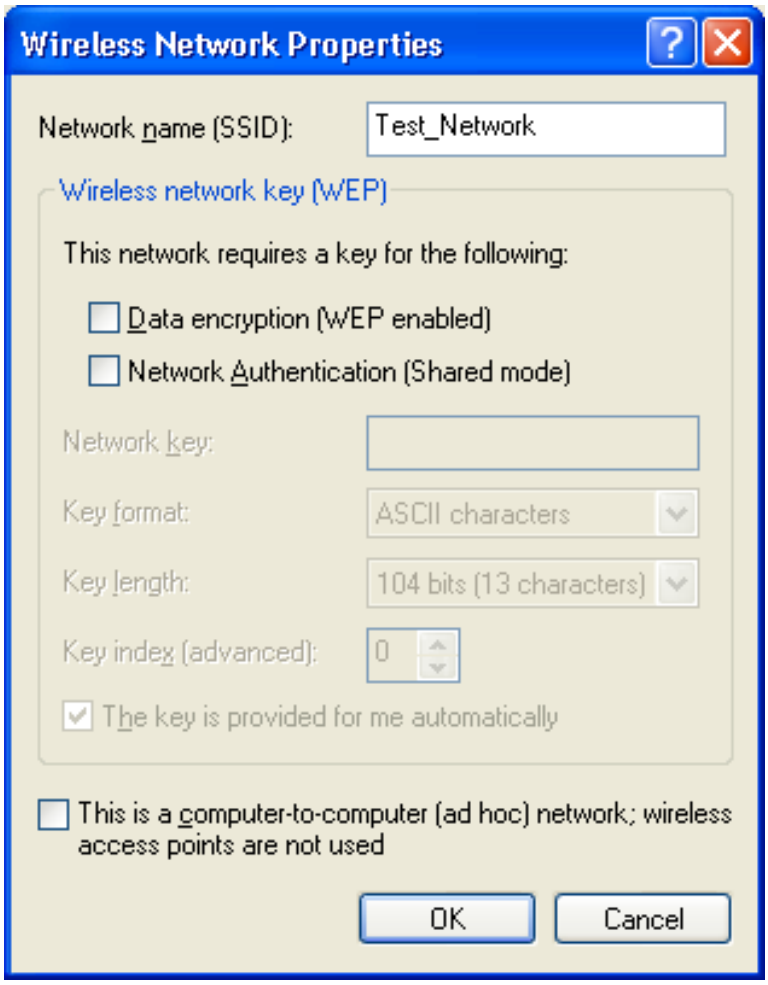
In Connect to Wireless Network, under “Available networks”, select the wireless network that you want to connect to. If a network key is required and is automatically provided for you, then leave “Network key” blank. If the network key is not automatically provided for you, then type the key in “Network key”. Click Connect to establish the network connection.



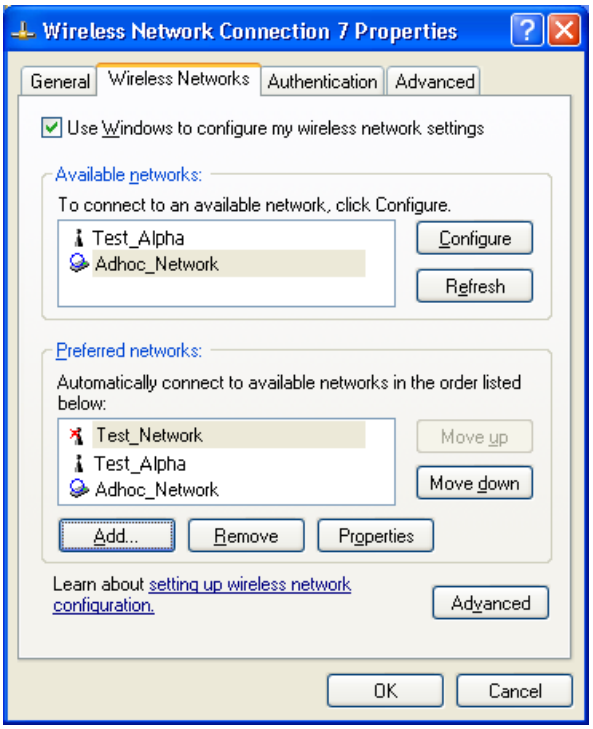
If you are either unable to make a connection to the wireless network that you selected or need to configure additional wireless network connection settings, click Advanced in Connect to Wireless Network, and the Wireless Networks tab will appear.



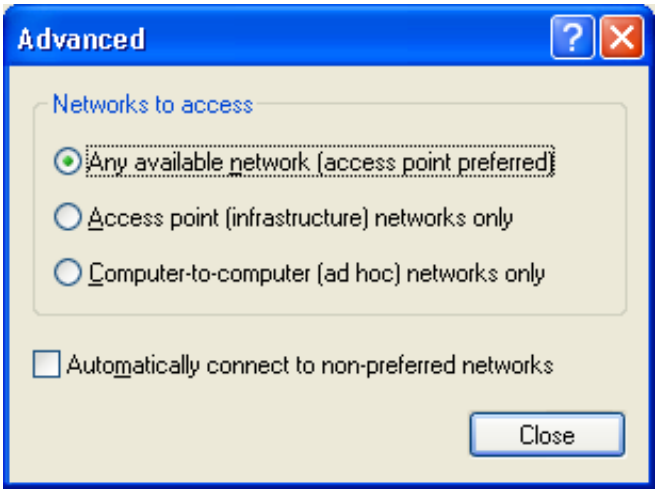
You can configure a new wireless network connection by clicking Add, and specifying the network name (SSID) in Wireless Network Properties, and the wireless network key settings, if needed. If the network connection that you are configuring is an ad hoc network, then select “This is a computer-to-computer (ad hoc) network; wireless access points are not used” check box. The network will be added under “Preferred networks” in the Wireless Networks tab.



You can change the order of the preferred networks by selecting the wireless network that you want to reposition on the list, and then clicking Move up or Move down. You can change the wireless network connection settings of a preferred network by selecting the wireless network, clicking Properties, and then changing the settings as needed. To remove a wireless network from the list of preferred networks, select the wireless network that you want to remove, and then click Remove.



If a network is not defined in the preferred networks list, but you know it is available and you want to automatically connect to it, then click Advanced in the Wireless Networks tab, and select the “Automatically connect to non-preferred networks” check box.



6

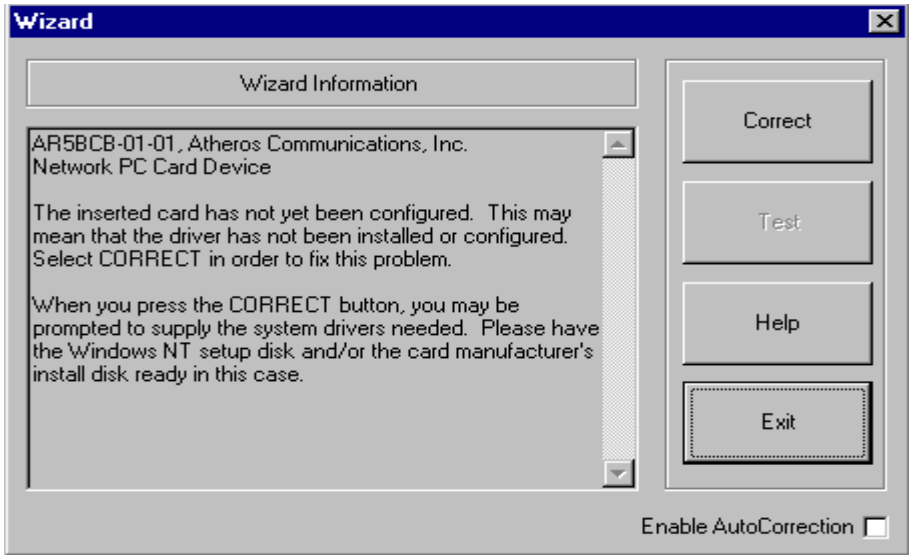
Windows NT 4.0

Driver Installation and TCP/IP Setup

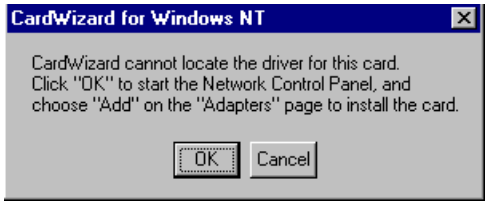
Windows NT 4.0 does not support Plug-and-plug. Therefore, the D-Link NDIS driver installation uses an approach that is different from the installation used in other Operating Systems. In order to install D-Link DW-290 Wireless Network mini PCI Card in Windows NT 4.0 with Service Pack 6, a PC Card utility called CardWizard is used. If your computer system does not have CardWizard utility pre-loaded, then you can purchase it from SystemSoft Corporation (www.systemsoft.com) or you can download a 14-day evaluation copy from ftp://www.systemsoft.com/pub/Wn51tren.exe. Note that CardWizard requires Windows NT 4.0 Build 1381 (Service Pack 6) installed in order to function correctly. Please install Service Pack 6 if your Windows NT 4.0 is not updated.

After CardWizard utility is loaded, insert the D-Link DW-290 Wireless Network mini PCI Card into a 32-bit CardBus slot, and follow these steps to install the NDIS driver:

1. CardWizard will detect the insertion of the D-Link CardBus card and show the following screen. Click Correct to continue.

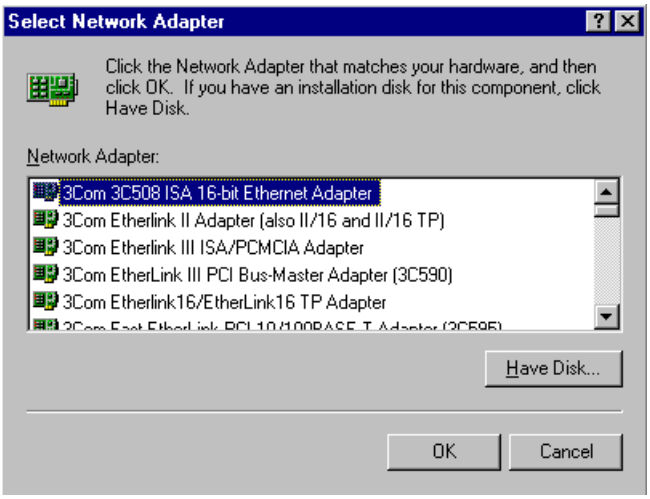


2. Click OK to continue.

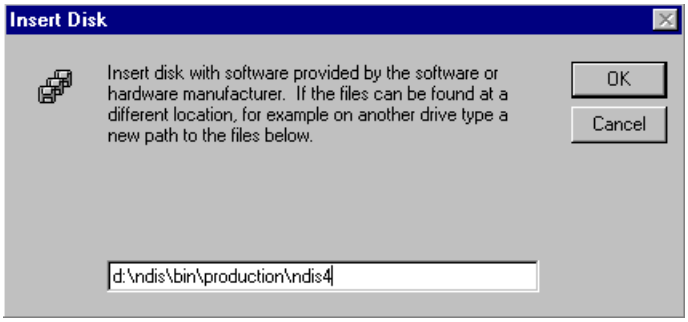


3. Windows NT 4.0 Network Properties windows displays. Click Add to continue.

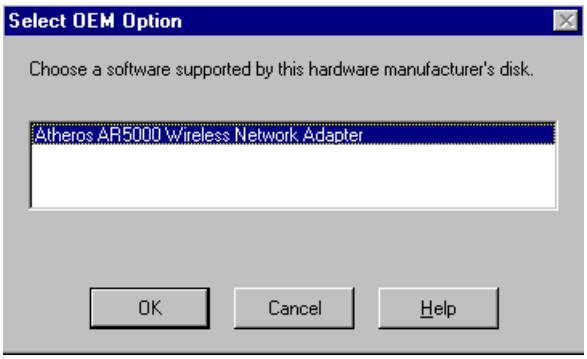
4. Click Have Disk.



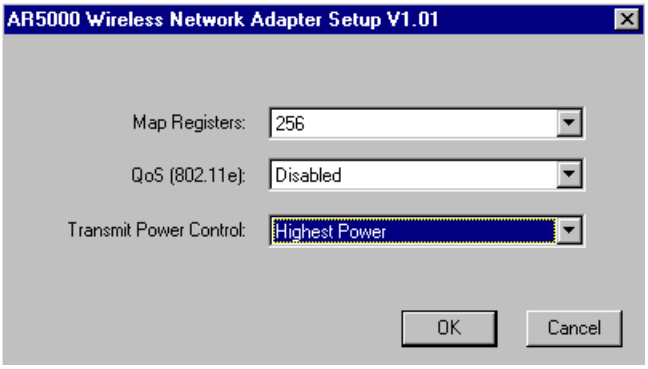
5. Manually enter the location of where the D-Link NDIS 4.0 driver is located. For example, D:\NDIS\BIN\PRODUCTION\NDIS4. Click OK to continue.


Insert Disk
Insert disk with software provided by the software or hardware manufacturer. If the files can be found at a different location, for example on another drive type a new path to the files below.
OK
Cancel
d:\ndis\bin\production\ndis4

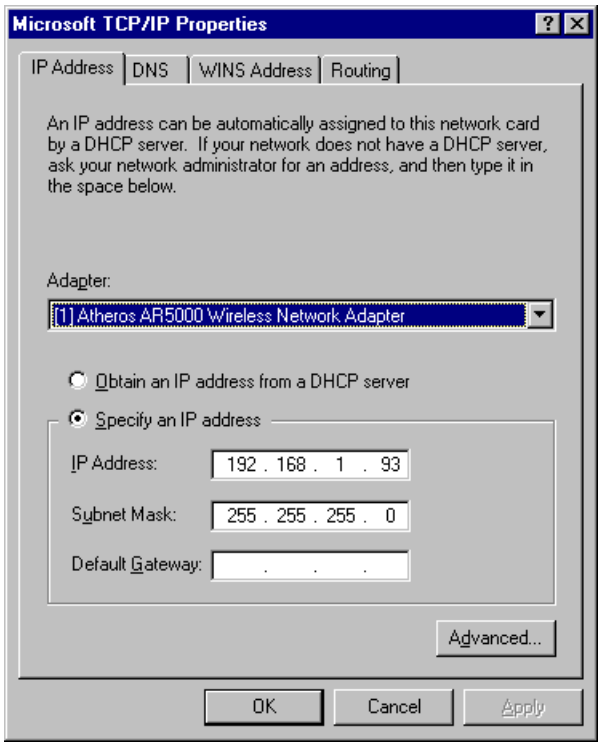
6. Make sure D-Link DW-290 Wireless Network mini PCI Card is selected. Click OK to continue.



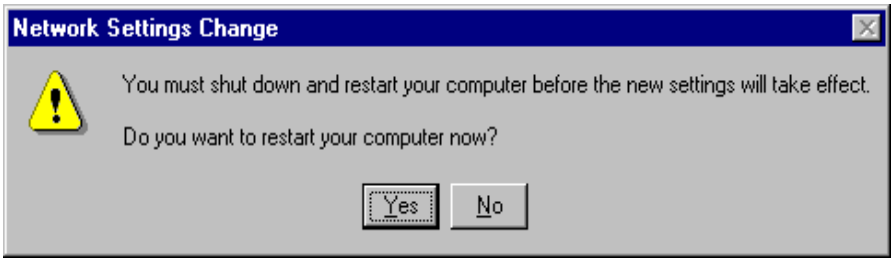
7. Set Map Registers, QoS, and Transmit Power Control to default values and click OK.



8. Windows NT 4.0 binds TCP/IP protocol to D-Link DW-290 Wireless Network mini PCI Cards and TCP/IP properties have to be entered. Depending on the type of network the station connects to, Gateway and DNS Configuration information may also be required. IP configuration information (DHCP or assigned IP address, Gateway and DNS server IP addresses) is usually obtained from the corporate IT staff. For a simple demonstration, the station is assigned a static IP address. Choose “Specify an IP address” and enter an IP address and subnet mask. Assigning an IP address and subnet mask allows the station to interact with the AP or other stations in the same IP subnet. Click OK to complete the TCP/IP configuration.



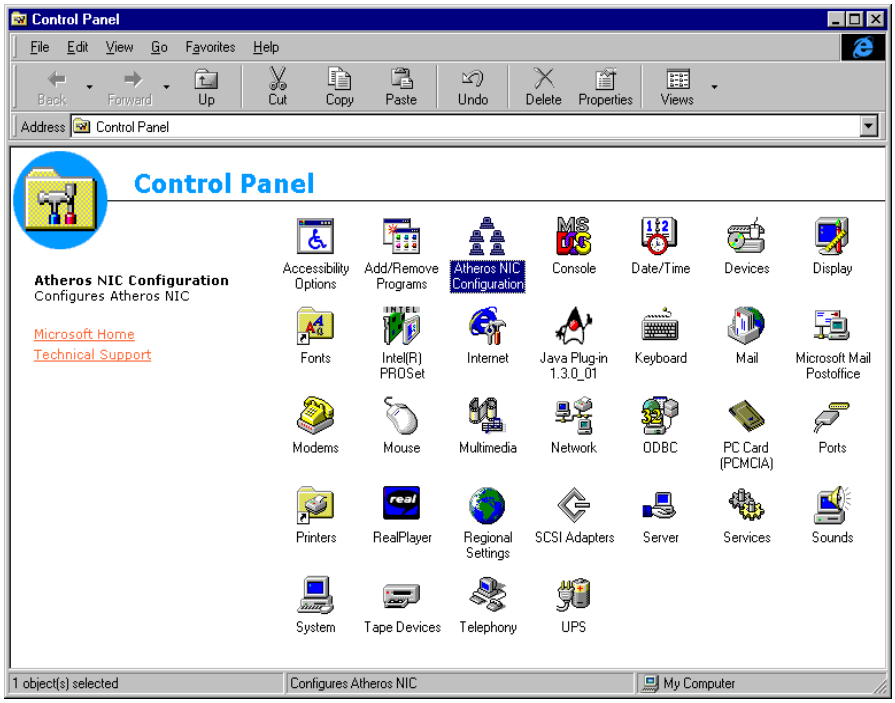
9. Restart the system for the changes to take effect.



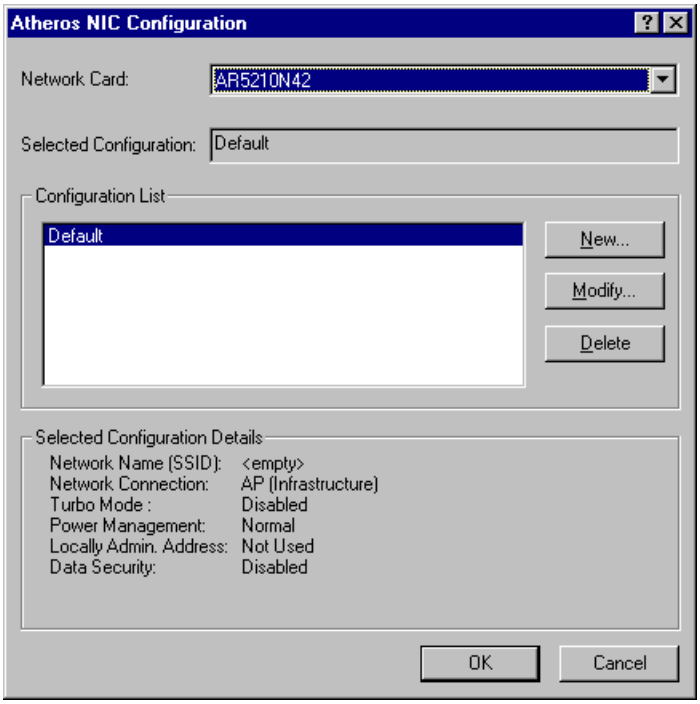
Device Configuration

Configuration of the D-Link DW-290 Wireless Network mini PCI Card can be done through the D-Link NIC Configuration Control Panel applet provided by D-Link. Similar to Windows 2000, the device can be set to work in one of two modes, either infrastructure mode or ad hoc mode. See Section “Device Configuration” beginning on page 2-17 for more details on these network connection types.

Start D-Link NIC Configuration utility from the Control Panel.



Select one of the configuration(s) under the configuration list and click Modify or click New, and follow the Section “Infrastructure Mode” on page 6-8 and Section “Ad Hoc Mode” on page 6-11 to set up the station to work in infrastructure mode and ad hoc mode.



Infrastructure Mode

This section defines the process of configuring an D-Link DW-290 Wireless Network mini PCI Card in infrastructure mode. Refer to Section “Device Configuration” beginning on page 2-17 for detailed descriptions of each option in the Network Configuration Settings.

1. Under the “General” tab, make sure the “Locally Administered Address” checkbox is unchecked. Use the following information as a guideline to choose the values of each field in the configuration window:

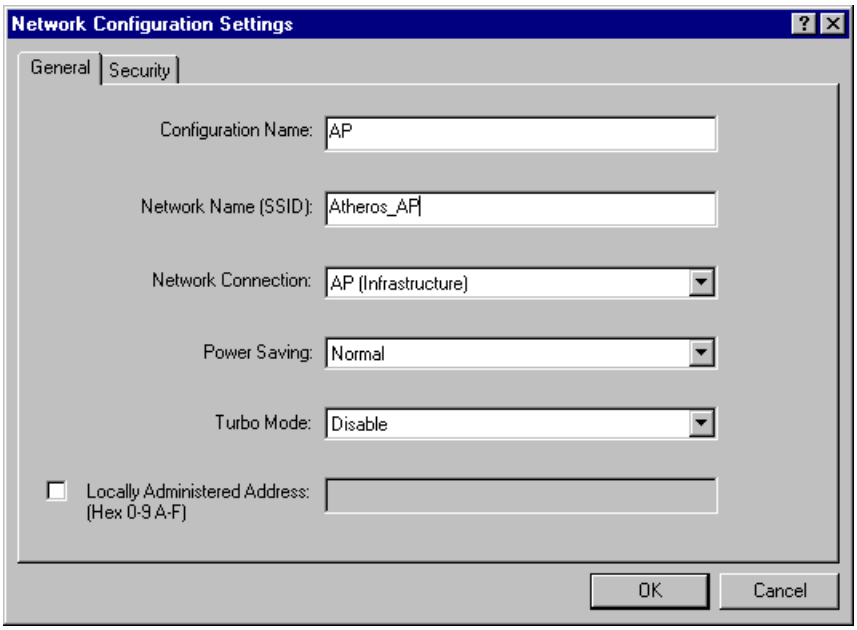
   – Configuration Name*:* This field identifies the configuration. This name must be unique. Configuration names are case insensitive. For example, “AP”.

– Network Name (SSID): This is the name of the IEEE 802.11a wireless network. For example, "*D-Link_AP*". This field has a maximum limit of 32 characters. If this field is left blank, the STA will connect to the AP with the best signal strength.

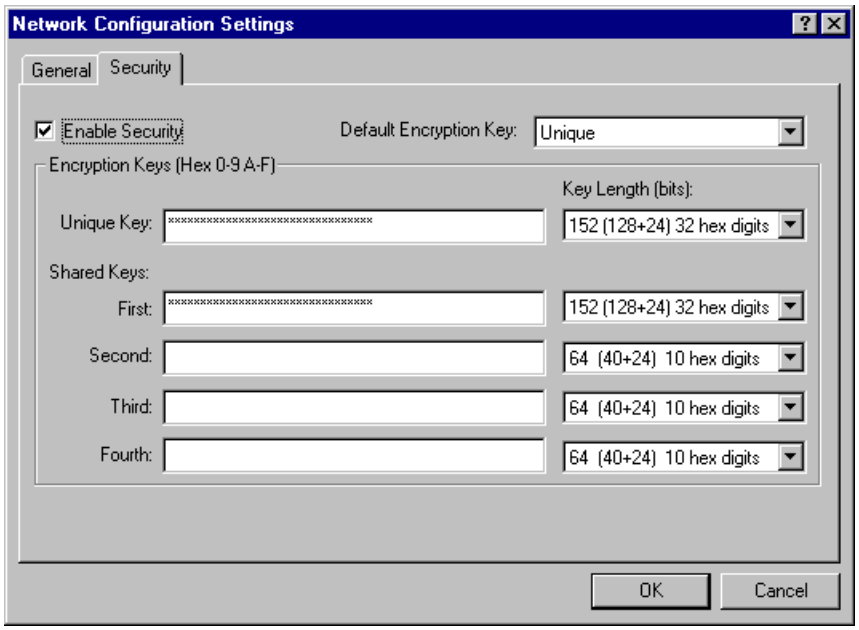
– Network Connection: AP (Infrastructure).

– Power Saving: This field allows the configuration of power management options. The options are Off, Normal, and Maximum.

– Turbo Mode: This field enables or disables D-Link Turbo mode.



Usually, infrastructure mode is used in an enterprise environment where APs are installed and maintained by corporate IT staff. Much of the data in the enterprise network is confidential. It is important to configure security to make sure only stations with appropriate keys can receive sensitive data. The D-Link DW-290 Wireless Network mini PCI Card and NDIS driver support key lengths of 40-bits, 104-bits and 128-bits. Typically, the appropriate encryption and decryption keys will be supplied by the corporate IT staff.



Ad Hoc Mode

This section defines the process of configuring an D-Link DW-290 Wireless Network mini PCI Card in ad hoc or IBSS mode. Refer to Section “Ad Hoc Mode” on page 2-23 for detail descriptions of ad hoc operation.

1. Similar to the set up of AP Infrastructure mode described in the previous section, ad hoc mode is also configured by changing the options in “Network Configuration Settings” window. Use the following information as a guideline to choose the values of each field in the configuration window:

   – Configuration Name: This field identifies the configuration. This name must be unique. Configuration names are case insensitive. For example, “Ad Hoc”.

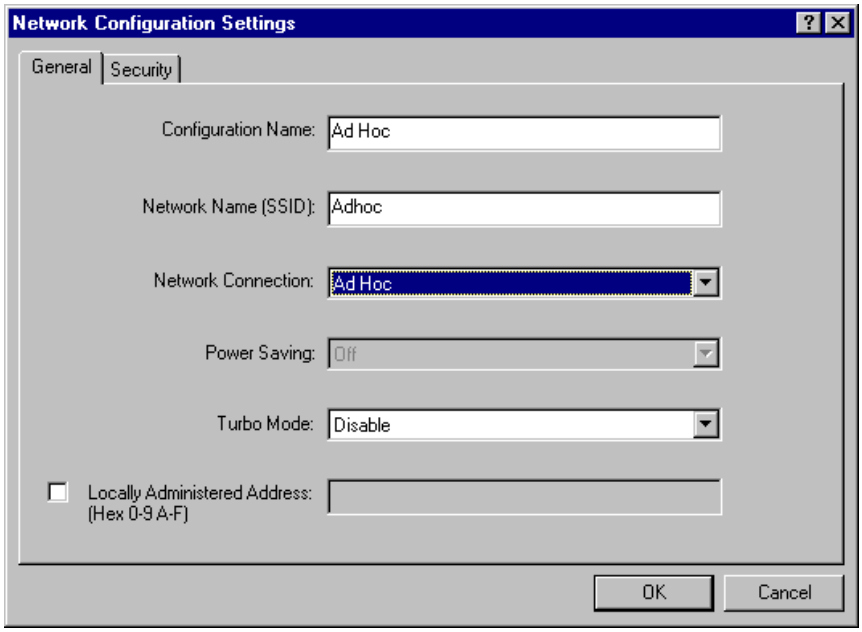
   – Network Name (SSID): A Network Name is mandatory for ad hoc mode. The SSID for all stations in a single ad hoc network must be the same.

   – Network Connection: Ad Hoc.

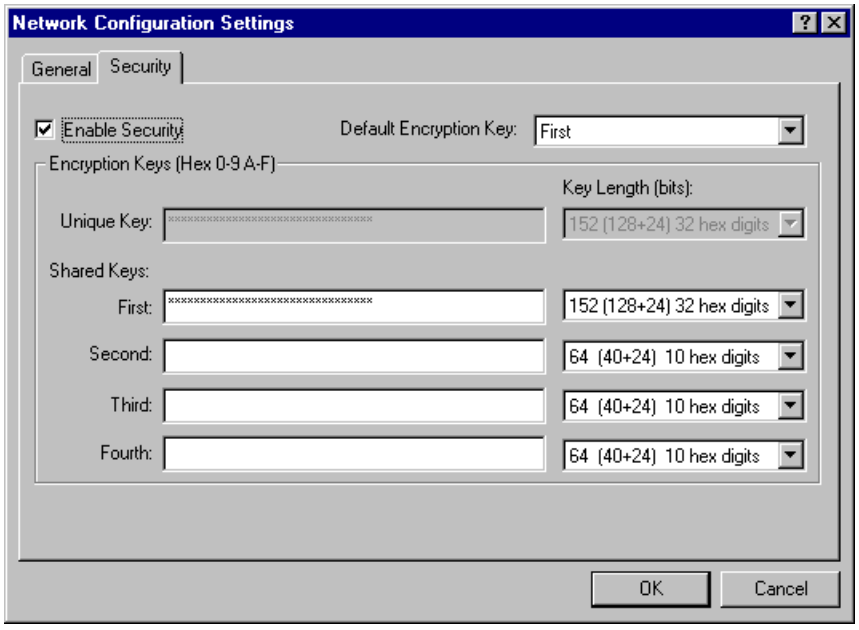
   – Power Saving: Power saving mode is not currently supported in an ad hoc network.

   – Turbo Mode: All stations participating in the ad hoc network must have the same rate setting.

   – Locally Administered Address: This field defines the locally administered MAC address (LAA). To enter a value in the address field, the check box needs to be selected.



2. You may optionally set up security features, but it is not typically a requirement, since the duration of the ad hoc network tends to be limited. Currently, only shared key security is supported in ad hoc mode. Future D-Link software implementations will provide unique key support.

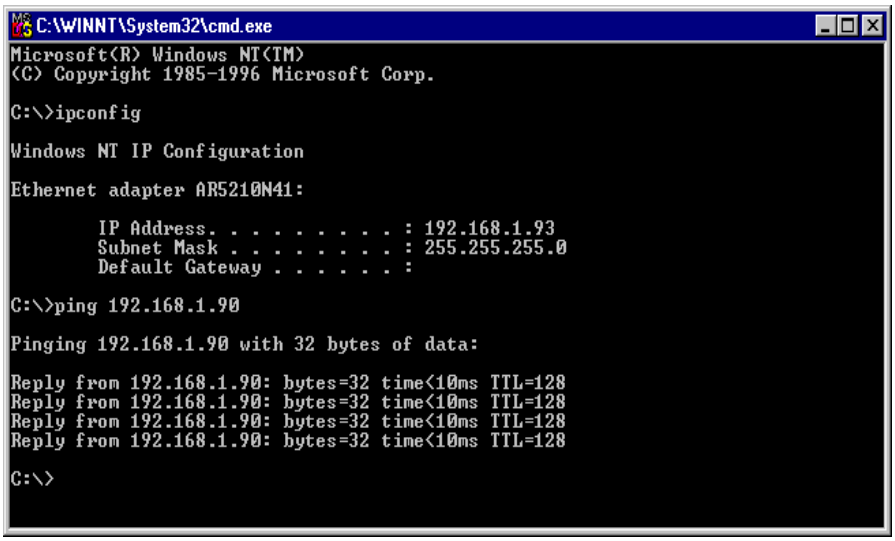


3. In ad hoc mode, a station will scan the air for an existing BSS. If no BSS is found, the station will establish a BSS for other stations to join. When other stations scan the air and find an established BSS in place, they join that BSS to form an ad hoc network. If a specific set of stations requires ad hoc network connectivity, it is recommended to have one station establish a BSS first before configuring the remaining stations. This will prevent the scenario of several stations trying to form a BSS at the same time, which may result in multiple singular BSSs being established rather than a single BSS with multiple stations.

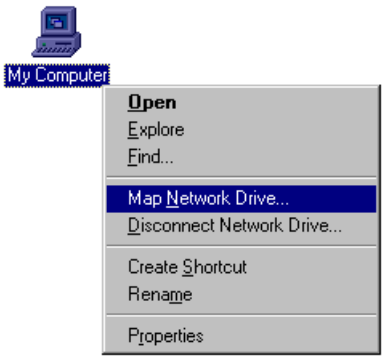
Verify Connection

You may use LinkMon utility to monitor the operating status of D-Link DW-290 Wireless Network mini PCI Card once the STA is connected. Please refer to Chapter 7 for descriptions of LinkMon utility. If the STA is configured properly then you will be able to perform ping test as well as other network applications that a wired Ethernet device can perform.

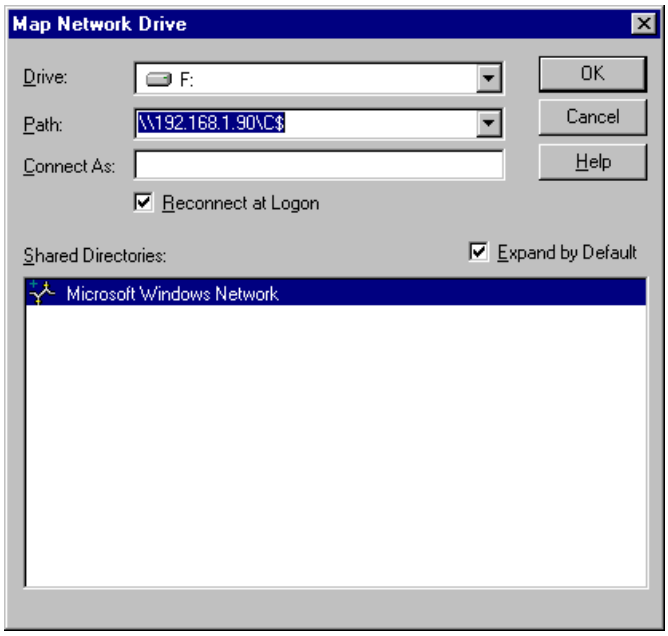
1. Choose Start > Programs > Accessories > Command Prompt to open the command prompt window. Type “ipconfig” to determine if the TCP/IP configuration has taken effect. To test IP connectivity in ad hoc or infrastructure mode, use the “ping <ipaddress>” command.



2. To map the drive on another machine to your computer, right-click “My Computer” and click “Map Network Drive….”



3. Specify the path of a network-shared folder.

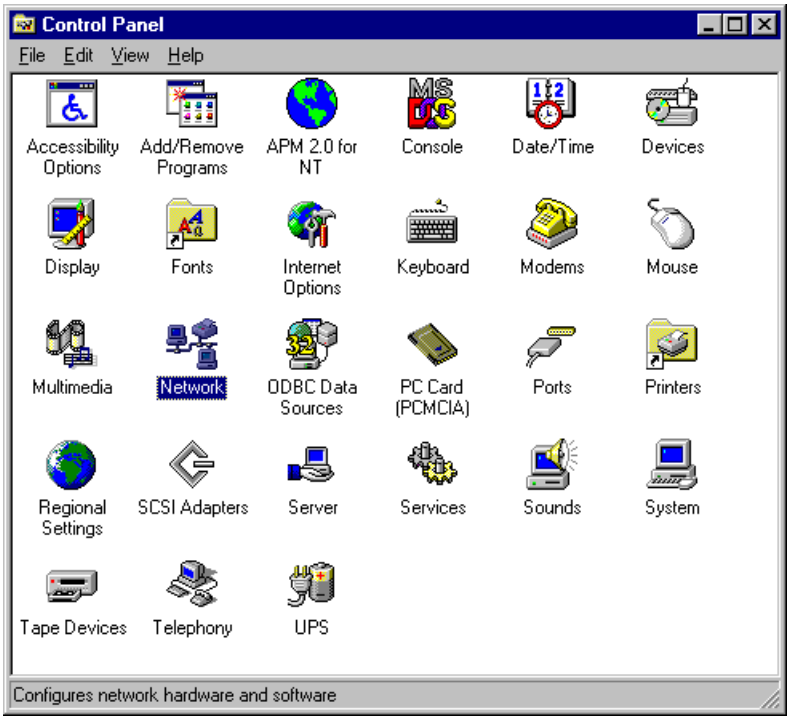


4. After mapping the drive, you can perform file transfers, video streaming, and all other network data transfers that are normally performed with wired 10/100 Ethernet connections.

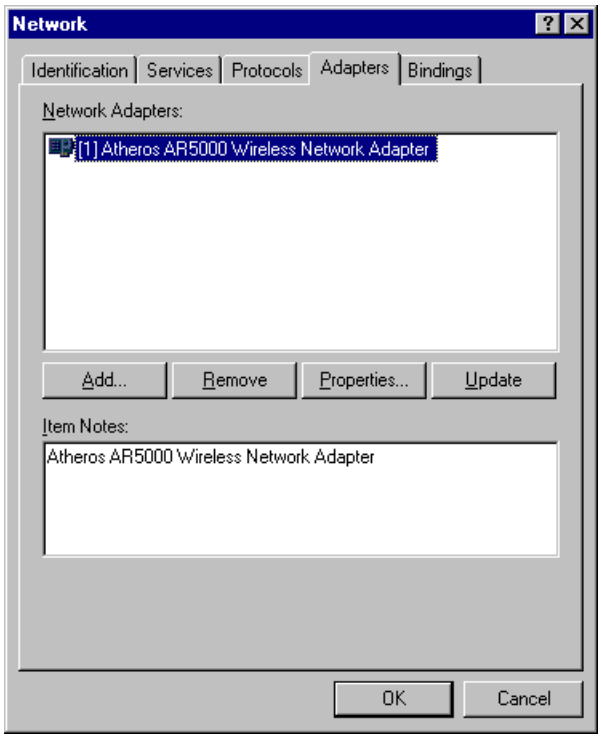
Driver Uninstallation

This section provides uninstallation procedures for removing the D-Link NDIS driver from the system.

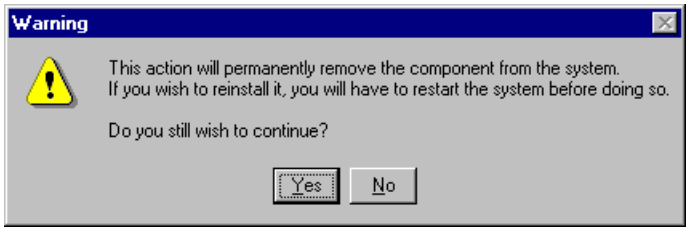
1. To remove the NDIS driver from the system, go to Control Panel and open Network properties.



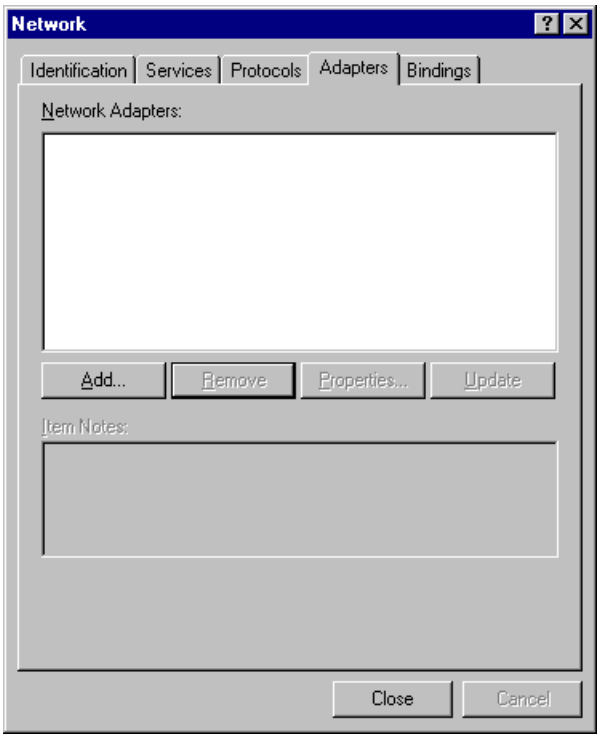
2. Under the Adapters tab, choose D-Link DW-290 Wireless Network mini PCI Card and click Remove.



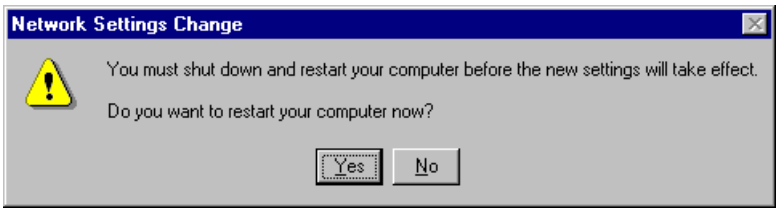
3. Click OK to confirm the removal of the D-Link DW-290 Wireless Network mini PCI Card.



4. D-Link DW-290 Wireless Network mini PCI Card is no longer listed under the Adapters tab. Click Close to continue.



5. Restart the system to complete the un-installation of D-Link NDIS 4.0 driver.



7

LinkMon

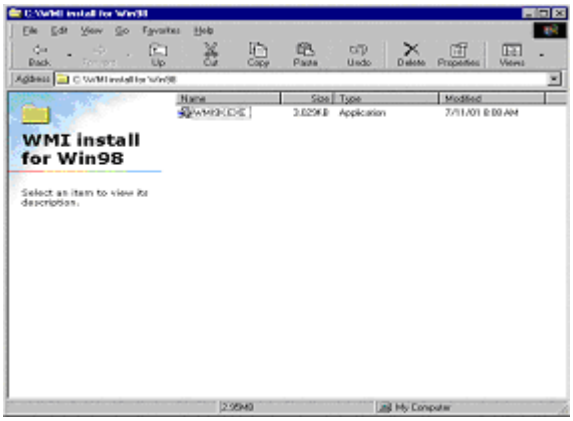
Installation

LinkMon is a Graphical User Interface (GUI) program that provides detailed operational status and statistics for the D-Link DW-290 Wireless Network mini PCI Card. The LinkMon executable file, linkmon.exe, is included on the D-Link Release Version **Error! Reference source not found.** CD, and is in the folder \ndis\bin\production\. Copy this file from the CD to a local drive for execution.

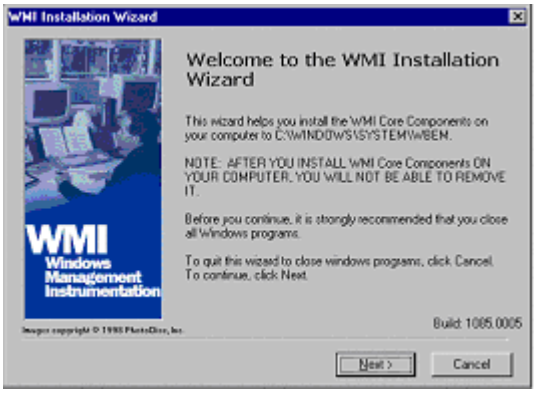
Since Windows 98 SE does not have native support for WMI, which is required to make LinkMon work correctly, an upgrade from Microsoft is needed. Use the procedures described in the following section to acquire and install the necessary WMI module from Microsoft. This is only required for Windows 98 SE installations.

1. Download WMI installer from Microsoft (wmi9x.exe) and save it to your hard disk.

2. Execute WMI installer by double-clicking wmi9x.exe.

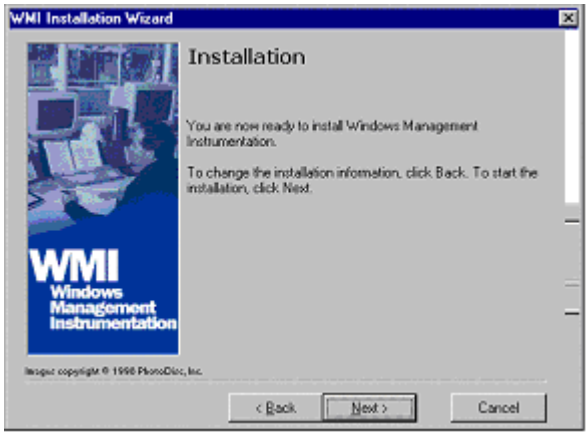

C:\WMI install for Win98
File Edit View Go Favorites Help
Back Forward Up Cut Copy Paste Undo Delete Properties Views
Address C:\WMI install for Win98
Name Size Type Modified
WMI98.EXE 3,029 KB Application 7/11/01 8:00 AM
WMI install for Win98
Select an item to view its description.
2.95MB
My Computer

3. Click Next to continue.

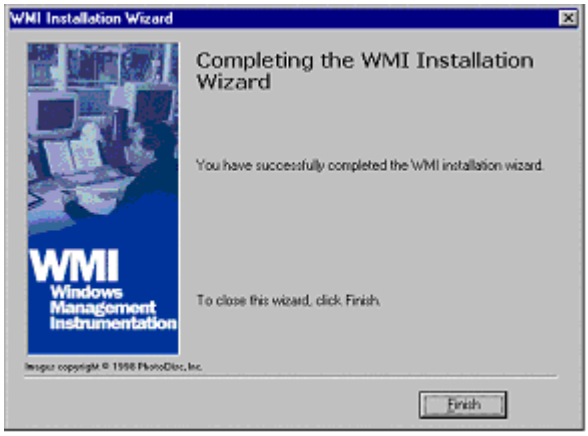


4. Click “I accept this agreement” and then click Next to continue.

5. Click Next to continue.



6. The installer now installs files to the SYSTEM directory.



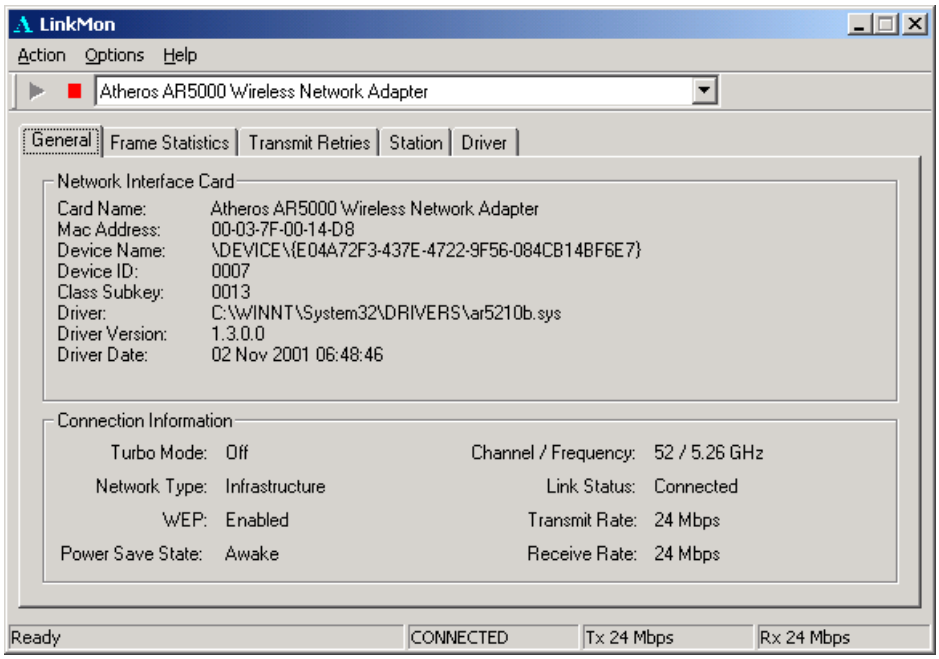
7. The system must be rebooted for the WMI installation files to become effective. When the system completes the rebooting process, launch LinkMon.

Features

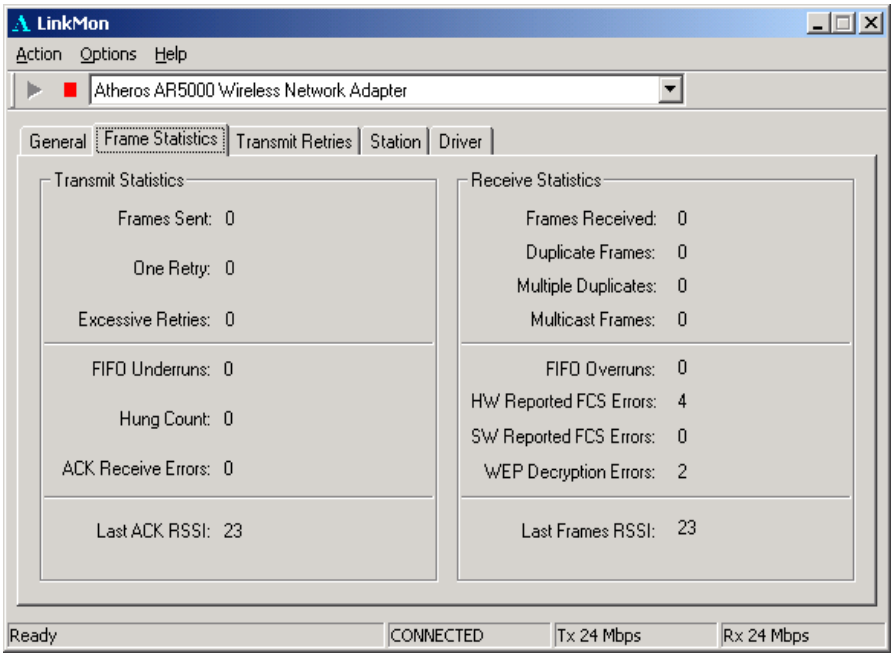
There are five tabs in LinkMon used to display STA information:

- General tab
- Frame Statistics tab
- Transmit Retries tab
- Station tab
- Driver tab

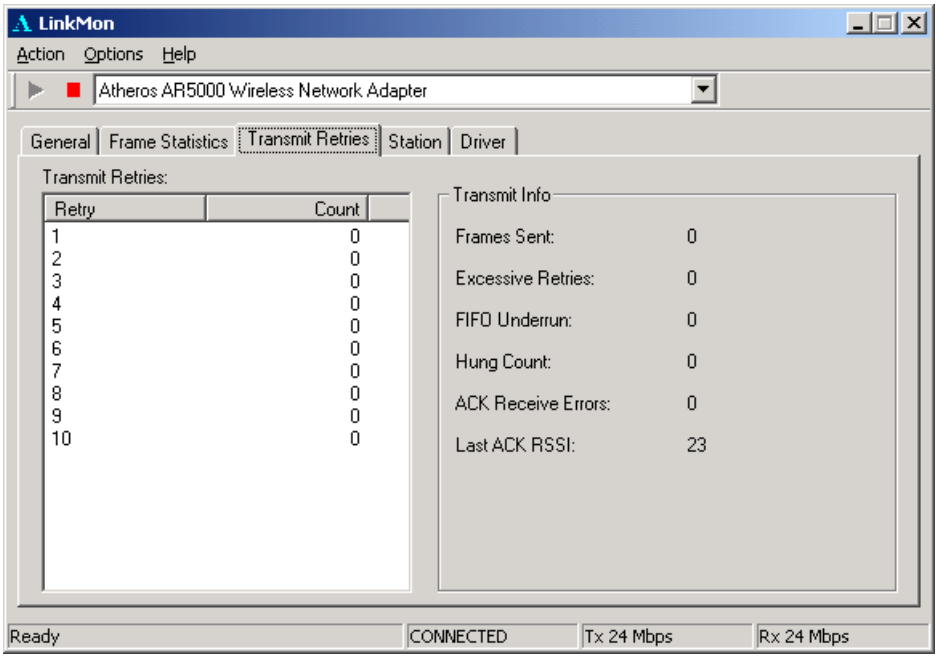
Under the General tab of the LinkMon program property sheet is general information about the program and its operations.



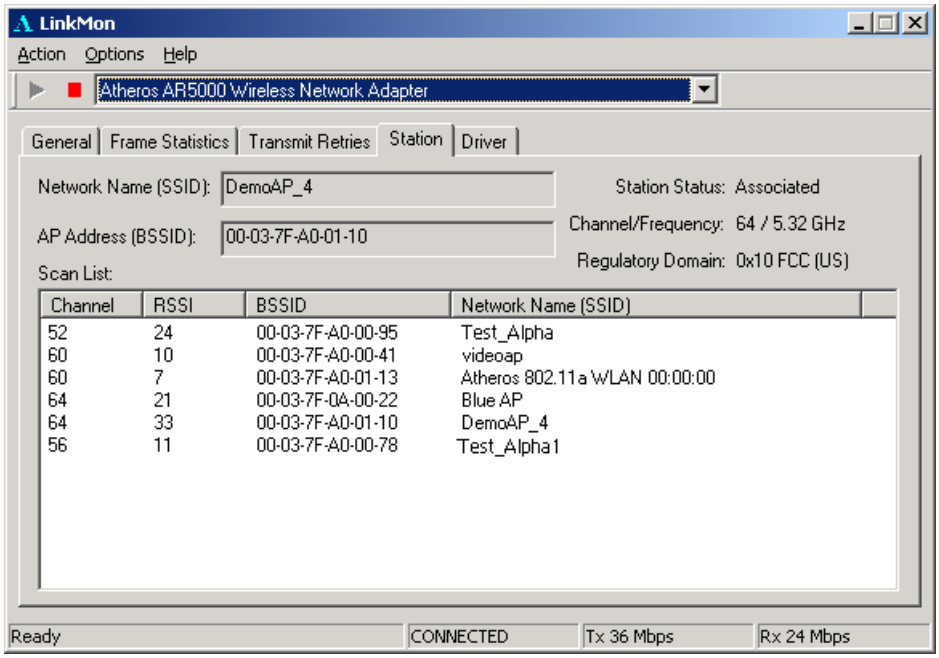
Under the Frame Statistics tab is statistical information showing the number of frames being sent and received, retry count on frames sent, frame checksum error counts for received frames, and receive signal strength indicator (RSSI) information. These fields are described in the Station Programmer's Guide under Appendix A as OIDs. LinkMon supports most of the OIDs listed in that section.



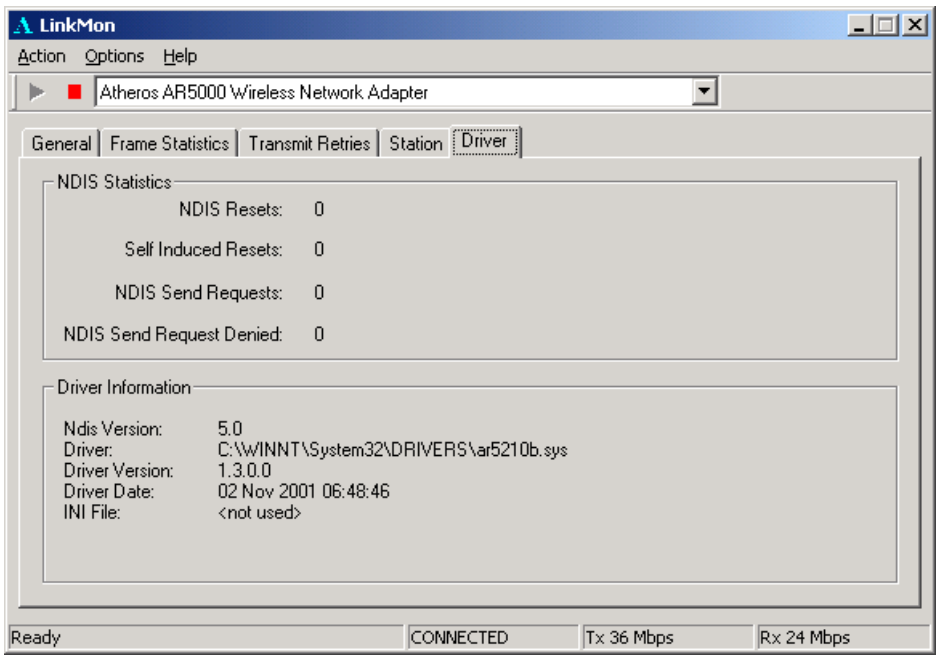
Under the Transmit Retries tab is detailed transmit retry statistical information for transmitted frames.



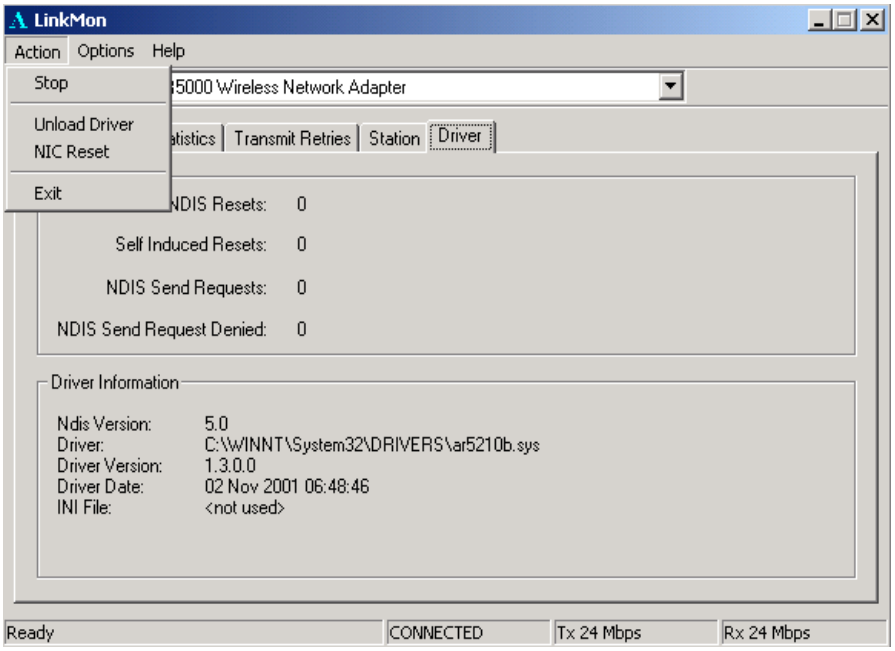
Under the Station tab is detailed BSS information including SSID, BSSID, association status, operating channel frequency, and information about scanned APs.



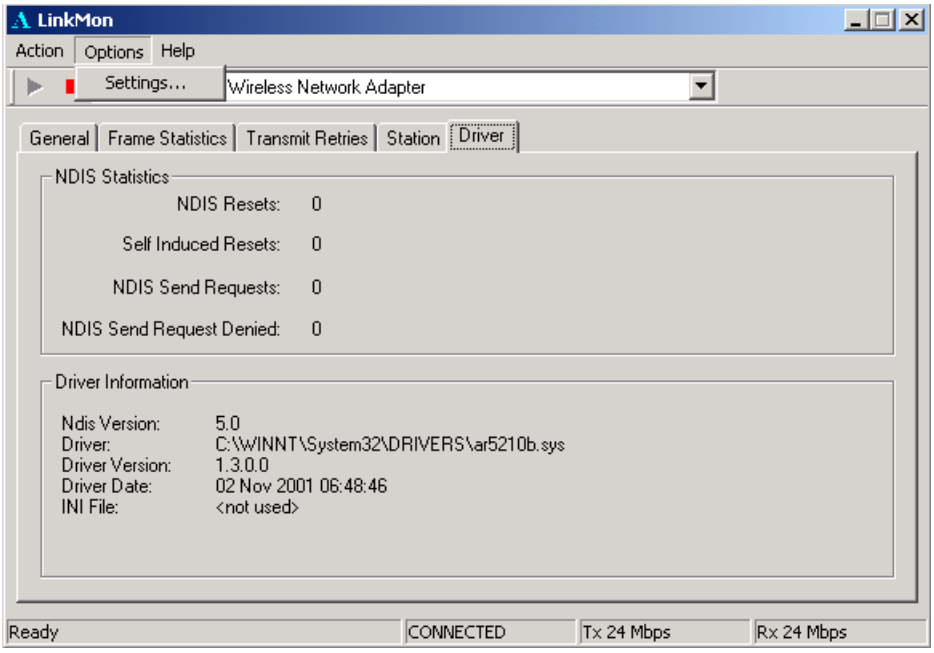
Under the Driver tab is statistical data pertaining to NDIS driver operation.



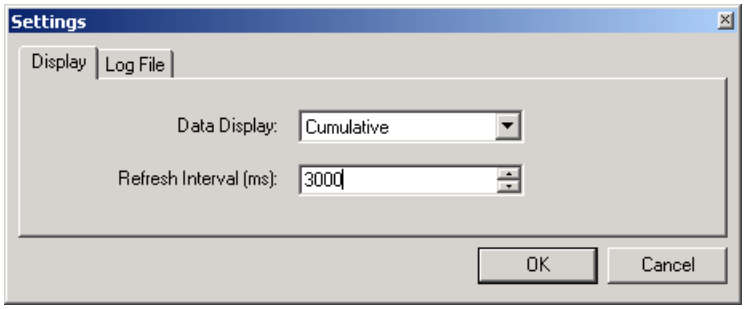
The Action menu enables a NDIS driver unloading and reloading, and network interface card (NIC) reset. Note that driver unload option is not available in Windows Me, Windows 98SE, and Windows NT 4.0. NIC reset is also not available in Windows NT 4.0.



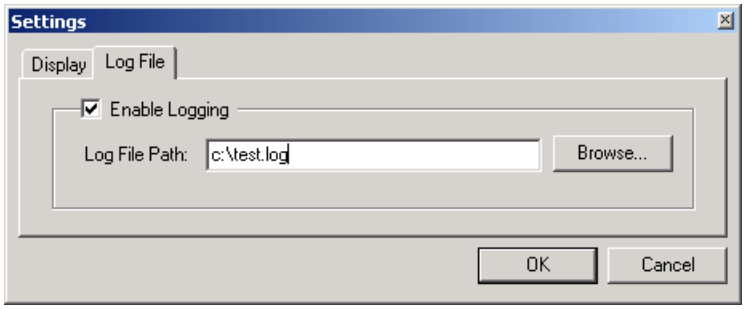
On the Options menu, choose Settings….



Under the Display tab, you can select the data display modes of “Cumulative” or “Relative.” “Cumulative” mode displays statistical LinkMon data collected from the beginning of driver load. “Relative” mode displays differences in the statistical data since the last update.



Under the Log File tab, the logging function can be enabled to log to a file the statistical information collected by the LinkMon utility, for later reference or post processing by an application such as Microsoft Excel.



8

RFSilent

This chapter describes the RFSilent application that allows you to enable or disable the RF Signal (radio) on all D-Link STA Reference Designs. The RFSilent is a Windows-based application that appears in the right-hand corner of your Windows taskbar.

System Requirements

The RFSilent application communicates with most Windows applications using Windows Management Instrumentation (WMI). For Windows NT 4.0, RFSilent communicates through the Input and Output Control (IOCTL) mechanism.

If you are using Windows 98SE, WMI does not come pre-installed and you must install it prior to using RFSilent. Refer to the following procedure to acquire and install the required WMI module from Microsoft.

Windows 98SE Environment

If you want to use the RFSilent application in a Windows 98SE environment, you must install WMI.

Follow these steps to install WMI:

1. Download the WMI installer (wmi9x.exe) from Microsoft and save it to your hard disk.

2. Execute the WMI Installer by double-clicking wmi9x.exe.

3. Click Next to continue.

4. Click “I accept this agreement” and then click Next to continue.

5. Click Next to continue.

   The installer now copies the necessary files to the SYSTEM directory.

6. Reboot the system.

RFSilent Setup

The RFSilent application allows you to enable or disable D-Link STA References Designs. You can enable or disable the RFSilent application through user-defined settings. Refer to a description of driver parameters in the *AP Programmer’s Reference Guide*.

Operation

The RFSilent application is a Windows-based application that, once enabled, appears as an icon (RF) in the right-hand corner of your Windows taskbar (see Figure 8-1). You can automatically launch RFSilent at system boot-up by entering a shortcut statement in the Startup folder.

Figure 8-1. **RFSilent Icon**

Position your cursor over the RF Icon in your toolbar and use your right or left mouse button to display the RFSilent application selections (see Figure 8-2). The radio button on the side of menu selections indicates the current state of the RFSilent application.

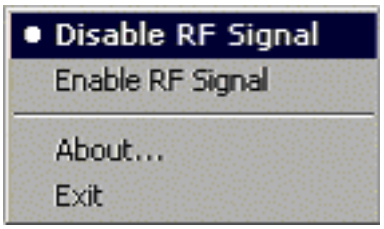


Figure 8-2. **RFSilent Menu Selections**

Refer to Table 8-1 for a description of the RFSilent menu selections.

Table 8-1. **RFSilent Menu Descriptions**

RFSilent Menu Item	Descriptions
Disable RF Signal	Use this selection to disable D-Link STA Reference Design.
Enable RF Signal	Use this selection to enable D-Link STA Reference Design.
About	Displays copyright, version information, and the build date for the RFSilent application.
Exit	Quits the RFSilent application.

9

Troubleshooting

This chapter provides solutions to common problems that usually occur during the installation and operation of the D-Link DW-290 Wireless Network mini PCI Card. Read the following descriptions if you are having problems. If you cannot find an answer here, please contact an D-Link field application engineer for assistance.

1. **My computer does not recognize the D-Link CardBus reference card.**

   Make sure the CardBus card is properly inserted into a 32-bit CardBus slot. If Windows does not detect the hardware upon insertion of the card, the system could have a previous D-Link NDIS driver installed. Remove the old driver and try again.

2. **The D-Link DW-290 Wireless Network mini PCI Card does not work properly after the driver is installed.**

   Re-insert the CardBus card into the slot. A beep should be heard if the adapter is properly inserted. Go to Device Manager and make sure the D-Link DW-290 Wireless Network mini PCI Card exists under the network adapters device node. If you see the yellow exclamation mark then there are conflicting resources. In this case, make sure the computer system has a free IRQ and make sure you have installed the proper driver. Uninstall the driver, restart the system, and repeat the driver installation steps if necessary.

3. **Stations cannot associate in ad hoc mode.**

   Make sure the same service set identifier is specified for all stations that need to join the same ad hoc network. Set up one station to establish a BSS and wait briefly before setting up other stations. This prevents several stations from trying to establish a BSS at the same time, which can result in multiple singular BSSs being established, rather than a single BSS with multiple stations associated to it.

4. **The station cannot access the Internet in the infrastructure configuration.**

   Make sure the station is associated and joined with the AP. If Wired Equivalent Privacy (WEP) security is enabled on the AP, the station must have the proper WEP keys specified. Also make sure TCP/IP properties are correctly configured.

5. **ARCCSEL Country Code Selector shows the following error message: No configurable D-Link network cards were found in this system.**

   Make sure the D-Link DW-290 Wireless Network mini PCI Card has Release 1.1 EEPROM contents programmed. D-Link CardBus Reference Design boards that were released prior to Release 1.1 do not contain the regulatory domain information in the EEPROM. Therefore, the country code selection utility will not recognize the card.

A

Channel and Data Rate Selection

This section provides basic information for selecting fixed data rate and channel frequency in the NDIS driver. This becomes necessary if you want to test the D-Link Wireless Network mini PCI Card at a specific channel with the rate adaptation controls turned off.

To select channel frequency and data rate in the Windows environment with NDIS driver installed:

1. Choose Start > Run, and type “regedit” to open Registry Editor.

2. For Windows 2000 and Windows XP, locate the following registry key, and select Find from the Edit menu:

   HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\

   For Windows 98SE and Windows Me, locate the following registry key, and select Find from the Edit menu:

   HKEY_LOCAL_MACHINE\System\CurrentControlSet\

3. Type “clist” and click Find Next to find the registry key. Note that if you have multiple instances of the D-Link Wireless Network mini PCI Card installed, for example, the NDIS driver is installed more than once, then you will need to click Find Next to locate the current instance of the device that is in use.

4. Double-click on clist and enter the channel number in the “Value Data” field. Enter the IEEE channel number from the following table. For example, enter 40 to select channel frequency of 5.20 GHz. The channel numbers follow the IEEE format where:

Channel Frequency (in GHz) = 5 + 0.005 * (Channel Number)

Channel Number	Channel Frequency	Regulator Domain
26	5.13 GHz	N/A (not calibrated)
28	5.14 GHz	N/A (not calibrated)
30	5.15 GHz	N/A (not calibrated)
32	5.16 GHz	N/A (not calibrated)
34	5.17 GHz	TELEC
36	5.18 GHz	FCC
38	5.19 GHz	TELEC
40	5.20 GHz	FCC
42	5.21 GHz	TELEC
44	5.22 GHz	FCC
46	5.23 GHz	TELEC
48	5.24 GHz	FCC
50	5.25 GHz	N/A (not calibrated)
52	5.26 GHz	FCC
54	5.27 GHz	N/A (not calibrated)
56	5.28 GHz	FCC
58	5.29 GHz	N/A (not calibrated)
60	5.30 GHz	FCC
62	5.31 GHz	N/A (not calibrated)
64	5.32 GHz	FCC
66	5.33 GHz	N/A (not calibrated)
68	5.34 GHz	N/A (not calibrated)
70	5.35 GHz	N/A (not calibrated)
72	5.36 GHz	N/A (not calibrated)
74	5.37 GHz	N/A (not calibrated)
76	5.38 GHz	N/A (not calibrated)
78	5.39 GHz	N/A (not calibrated)
80	5.40 GHz	N/A (not calibrated)

Channel Number	Channel Frequency	Regulator Domain
82	5.41 GHz	N/A (not calibrated)
84	5.42 GHz	N/A (not calibrated)
86	5.43 GHz	N/A (not calibrated)

5. To select the fixed data rate at which you want the station to transmit, double-click on rateCtrlEnable from the same registry key location where clist resides, and enter 0 to disable rate adaptation. Double-click on TransmitRate and enter the value specified in the following table to select the actual data rate. For example, enter 3 for 18 Mbps.

Rate Number	Data Rate
0	6 Mbps
1	9 Mbps
2	12 Mbps
3	18 Mbps
4	24 Mbps
5	36 Mbps
6	48 Mbps
7	54 Mbps

6. For the changes to take effect:

   – If you are running Windows 98SE or Windows Me, close Register Editor and restart the systems.

   – If you are running Windows 2000 or Windows XP, unload and load the driver from LinkMon.

7. To undo these changes and go back to normal operation where the channel and data rate are dynamically set, change rateCtrlEnable to 1 and clear the clist value.