D-Link *Air*Plus Xtreme G™
DWL-G520

High-Speed 802.11g
Wireless PCI Adapter

Manual

Rev. B1

D-Link

Building Networks for People

Contents

Package Contents 3

Introduction 4

Wireless Basics 6

Getting Started 9

Using the Configuration Utility 12

Networking Basics 26

Troubleshooting 39

Technical Specifications 44

Contacting Technical Support 46

Warranty and Registration 47

Package Contents

Contents of Package:

- **D-Link *Air*Plus Xtreme G™ DWL-G520**
  High-Speed 2.4 GHz/802.11g Wireless PCI Adapter
- Manual and Drivers on CD
- Quick Installation Guide

If any of the above items are missing, please contact your reseller.

System Requirements:

- A computer or laptop with an available 32-bit PCI slot
- Windows XP/2000/Me/98SE
- At least 32 MB of memory and a 300 MHz processor
- An **802.11g** or **802.11b** *Access Point (for Infrastructure mode),* or another **802.11g** or **802.11b** wireless adapter (for Ad-Hoc, Peer-to-Peer networking mode).

Introduction

The D-Link *Air*Plus *X*treme *G*™ DWL-G520 Wireless PCI Adapter is an 802.11g high-performance, wireless adapter that supports high-speed wireless networking at home, at work or in public places.

Unlike most network cards, the DWL-G520 provides data transfers at up to 54 Mbps. The 802.11g standard is backwards compatible with 802.11b products.

The DWL-G520 has the newest, strongest, and most advanced security features available today. When used with other 802.11 WPA (Wi-Fi Protected Access) and 802.1x compatible products in a network with a RADIUS server, the security features include:

WPA: **Wi-Fi Protected Access** which authorizes and identifies users based on a secret key that changes automatically at regular intervals. **WPA** uses **TKIP** (**Temporal Key Integrity Protocol**) to change the temporal key every 10,000 packets (a packet is a kind of message transmitted over a network.) This ensures much greater security than the standard WEP security. (By contrast, the older WEP encryption required the keys to be changed manually.)

802.1x: **Authentication** which is a first line of defense against intrusion. In the authentication process, the Authentication Server* verifies the identity of the client attempting to connect to the network. Unfamiliar clients would be denied access.

For home users that will <u>not</u> incorporate a RADIUS server in their network, the security for the DWL-G520, used in conjunction with other WPA-compatible 802.11 products, will still be much stronger than ever before. Utilizing the **Pre Shared Key mode** of WPA, the DWL-G520 will obtain a new security key every time it connects to the 802.11 network. You only need to input your encryption information once in the configuration menu. No longer will you have to manually input a new WEP key frequently to ensure security. With the DWL-G520, you will automatically receive a new key every time you connect, vastly increasing the safety of your communication.

** Not all servers can provide Authentication.*

Features & Benefits

- **Five times faster** - achieve data transfer speeds up to 54 Mbps; up to 5x faster than conventional 802.11b networks, when used with other 802.11g devices
- **Fully compliant with the 802.11b** standard and interoperable with all existing 802.11b-compliant and 802.11g compliant devices
- **Provides a simple and inexpensive way** to connect your desktop computer to a wireless network at home, at the office, or in public places
- **Quick and Easy Installation**- The DWL-G520 installs quickly and easily into a standard PCI 2.2 slot in a desktop computer. By following the simple steps outlined in the *Quick Installation Guide*, you can connect to an available wireless network in a matter of seconds
- **High Performance 32-bit PCI** - The high capacity PCI interface utilized by the DWL-G520 ensures optimal performance in transmitting a wireless signal within the desktop computer. By utilizing a standard PCI 2.2 interface, the DWL-G520 ensures a wide range of compatibility with motherboards used by PC manufacturers
- **Operates in the 2.4GHz** frequency range
- **Maximum reliability**, throughput and connectivity with automatic data rate switching
- **Supports Infrastructure** networks via an access point and Peer-to-Peer communication in Ad-Hoc mode
- **User-friendly** configuration and diagnostic utilities
- **Provides a measure of security** for the information transmitted over a wireless network with high data encryption at 64-, 128-, and 152-bit WEP
- **Stronger Security than ever before with WPA -** Wi-Fi Protected Access authorizes and identifies users based on a secret key that changes automatically at regular intervals, for example:
  - **TKIP** (Temporal Key Integrity Protocol), in conjunction with a RADIUS server, changes the temporal key every 10,000 packets, ensuring greater security
  - **Pre-Shared Key** mode means that the home user, without a RADIUS server, will obtain a new security key every time he or she connects to the network, vastly improving the safety of communications on the network
- **Extra Protection** - 802.1x **Authentication** in conjunction with the RADIUS server verifies the identity of wireless clients wishing to gain access to the WLAN

Wireless Basics

D-Link wireless products are based on industry standards to provide easy-to-use and compatible high-speed wireless connectivity within your home, business or public access wireless networks. D-Link wireless products will allow you access to the data you want, when and where you want it. You will be able to enjoy the freedom that wireless networking brings.

A Wireless Local Area Network (WLAN) is a computer network that transmits and receives data with radio signals instead of wires. WLANs are used increasingly in both home and office environments, and public areas such as airports, coffee shops and universities. Innovative ways to utilize WLAN technology are helping people to work and communicate more efficiently. Increased mobility and the absence of cabling and other fixed infrastructure have proven to be beneficial for many users.

Wireless users can use the same applications they use on a wired network. Wireless adapter cards used on laptop and desktop systems support the same protocols as Ethernet adapter cards.

People use WLAN technology for many different purposes:

Mobility - Productivity increases when people have access to data in any location within the operating range of the WLAN. Management decisions based on real-time information can significantly improve worker efficiency.

Low Implementation Costs – WLANs are easy to set up, manage, change and relocate. Networks that frequently change can benefit from WLANs ease of implementation. WLANs can operate in locations where installation of wiring may be impractical.

Installation and Network Expansion - Installing a WLAN system can be fast and easy and can eliminate the need to pull cable through walls and ceilings. Wireless technology allows the network to go where wires cannot go - even outside the home or office.

Scalability – WLANs can be configured in a variety of ways to meet the needs of specific applications and installations. Configurations are easily changed and range from peer-to-peer networks suitable for a small number of users to larger infrastructure networks to accommodate hundreds or thousands of users, depending on the number of wireless devices deployed.

Inexpensive Solution - Wireless network devices are as competitively priced as conventional Ethernet network devices.

The DWL-G520 is compatible with 802.11g and 802.11b wireless products, which include:

- **D-Link *Air* DWL-650,D-Link *Air*Plus DWL-650+,**
  D-Link *Air*Plus Xtreme G™ DWL-G650
  2.4GHz Wireless Cardbus Adapter used with laptop computers
- **D-Link *Air* DWL-520, D-Link *Air*Plus DWL-520+**
  2.4GHz Wireless PCI cards used with desktop computers
- **D-Link *Air*Plus DWL-900AP+, D-Link *Air*Plus Xtreme G™ DWL-2000AP**
  2.4GHz Wireless Access Points
- **D-Link *Air*Plus DI-614+, DI-714P+**
  2.4GHz Wireless Routers

Standards-Based Technology

The DWL-G520 Wireless PCI Adapter utilizes the new **802.11g** standard.

The IEEE **802.11g** standard is an extension of the 802.11b standard. It increases the data rate up to 54 Mbps within the 2.4GHz band, utilizing **OFDM technology.**

This means that in most environments, within the specified range of this device, you will be able to transfer large files quickly or even watch a movie in MPEG format over your network without noticeable delays. This technology works by transmitting high-speed digital data over a radio wave utilizing **OFDM** (**O**rthogonal **F**requency **D**ivision **M**ultiplexing) technology. **OFDM** works by splitting the radio signal into multiple smaller sub-signals that are then transmitted simultaneously at different frequencies to the receiver. **OFDM** reduces the amount of **crosstalk** (interference) in signal transmissions. The D-Link DWL-G520 will automatically sense the best possible connection speed to ensure the greatest speed and range possible.

802.11g offers the most advanced network security features available today, including: *WPA , 802.1x, TKIP, AES and Pre-Shared Key mode*. These security features are explained in more detail in the *Introduction* and the *Features* section of this manual.

The DWL-G520 is backwards compatible with 802.11b devices. This means that if you have an existing 802.11b network, the devices in that network will be compatible with 802.11g devices at speeds up to 11Mbps in the 2.4GHz range.

Installation Considerations

The D-Link *Air*Plus Xtreme G™ DWL-G520 lets you access your network using a wireless connection from virtually anywhere within its operating range. Keep in mind, however, that the number, thickness and location of walls, ceilings, or other objects that the wireless signals must pass through, may limit the range. Typical ranges vary depending on the types of materials and background RF (radio frequency) noise in your home or business. The key to maximizing wireless range is to follow these basic guidelines:

1. Keep the number of walls and ceilings between the DWL-G520 and other network devices to a minimum - each wall or ceiling can reduce your DWL-G520's range from 3-90 feet (1-30 meters.) Position your devices so that the number of walls or ceilings is minimized.

2. Be aware of the direct line between network devices. A wall that is 1.5 feet thick (.5 meters), at a 45-degree angle appears to be almost 3 feet (1 meter) thick. At a 2-degree angle it looks over 42 feet (14 meters) thick! Position devices so that the signal will travel straight through a wall or ceiling (instead of at an angle) for better reception.

3. Building materials can impede the wireless signal - a solid metal door or aluminum studs may have a negative effect on range. Try to position wireless devices and computers with wireless adapters so that the signal passes through drywall or open doorways and not other materials.

4. Keep your product away (at least 3-6 feet or 1-2 meters) from electrical devices or appliances that generate RF noise.

Getting Started

With its default settings, the DWL-G520, when activated, will connect with other D-Link *Air*Plus Xtreme G™ products, right out of the box.

There are basically two modes of networking:

- **Infrastructure** – using an Access Point or Router, such as the DI-624

- **Ad-Hoc** – directly connecting to another computer, for peer-to-peer communication, using wireless network adapters on each computer, such as two or more DWL-G520 wireless network adapters

On the following pages we will show you an example of an **Infrastructure Network** and an **Ad-Hoc Network**.

An **Infrastructure** network contains an Access Point or Router. The **Infrastructure Network** example shown on the following page contains the following D-Link network devices (your existing network may be comprised of other devices):

- A wireless Router - **D-Link *Air*Plus Xtreme G™ DI-624**

- A desktop computer with a wireless adapter - **D-Link *Air*Plus *Xtreme G*™ DWL-G520, D-Link Air DWL-520,** or **D-Link AirPlus DWL-520+**
  (**D-Link *Air*** devices have speeds up to 11Mbps)

- A Cable modem - **D-Link DCM-201**

LEDs

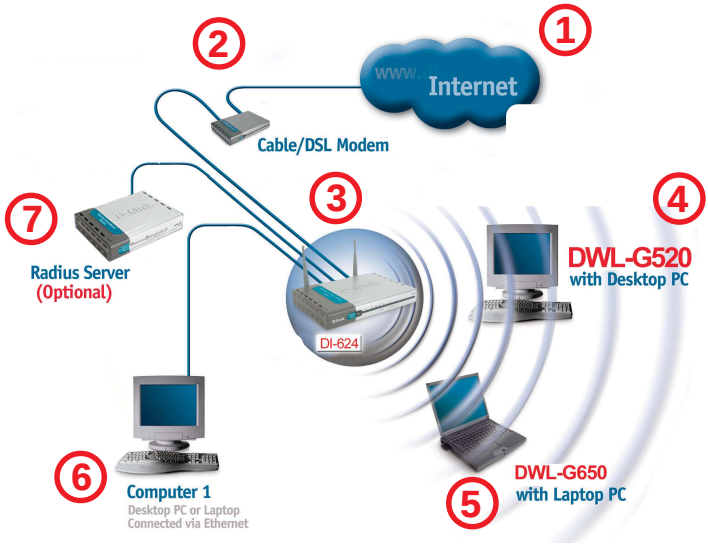
LED stands for **L**ight-**E**mitting **D**iode.

Power: Solid **green** light indicates connection to the network

Network: Blinking **green** light indicates activity on the network

Getting Started *(continued)*

Setting up a Wireless Infrastructure Network



*Please remember that **D-Link AirPlus Xtreme G**™ wireless devices are pre-configured to connect together, right out of the box, with their default settings.*

For a typical wireless setup at home (as shown above), please do the following:

1. You will need broadband Internet access (a Cable or DSL-subscriber line into your home or office).

2. Consult with your Cable or DSL provider for proper installation of the modem.

3. Connect the Cable or DSL modem to your broadband router (*see the **Quick Installation Guide** included with your router.*)

4. Install the D-Link *AirPlus Xtreme G*™ DWL-G520 Wireless PCI Adapter into an available PCI slot on your desktop computer. *(See the **Quick Installation Guide** included with the DWL-G520.)*

5. Install the D-Link *AirPlus Xtreme G*™ DWL-G650 Wireless PC Card Adapter into a laptop computer.
(*See the **Quick Installation Guide** included with the DWL-G650.*)

6. If you wish, you may connect a computer that is equipped with an Ethernet network adapter (such as a DFE-530TX+) to the router also.

7. A RADIUS Server is optional. Connect a RADIUS Server to your network to use all the features of WPA. (Without a RADIUS Server you can still use the *WPA Pre-Shared Key* mode.) RADIUS Authentication can also be provided by another service provider over the Internet and remote to your network site.

Getting Started *(continued)*

Setting up a Wireless Ad Hoc Network

1. Install the DWL-G520 into the desktop computer.
*(See the **Quick Installation Guide** included with the product for installation instructions.)*

2. Install the DWL-G650 Wireless PC Card Adapter into a laptop computer.
*(See the **Quick Installation Guide** included with the product.)*

3. Set the wireless configuration for the adapters to Ad-Hoc mode, set the adapters to the same channel, and assign an IP Address to each computer on the Ad-Hoc network. *(See Box below).*

IP Address

When assigning IP Addresses to the computers on the network, please remember that the **IP Address for each computer must be in the same IP Address range as all the computers in the network**, and the subnet mask must be exactly the same for all the computers in the network.

For example: If the first computer is assigned an IP Address of 192.168.0.2 with a Subnet Mask of 255.255.255.0, then the second computer can be assigned an IP Address of 192.168.0.3 with a Subnet Mask of 255.255.255.0, etc.

IMPORTANT: If computers or other devices are assigned the same IP Address, one or more of the devices may not be visible on the network.

Using the Configuration Utility

D-Link *AirPlus Xtreme G*™ DWL-G520 uses the **Configuration Utility** as the management software. The utility provides the user an easy interface to change any settings related to the wireless adapter. After you have completed the installation of the DWL-G520 (refer to the ***Quick Installation Guide*** that came with your purchase) whenever you start the computer, the **Configuration Utility** starts automatically and the system tray icon is loaded in the toolbar (see illustration below*.) Clicking on the utility icon will start the **Configuration Utility**. Another way to start the **Configuration Utility** is to click on **Start>Programs>D-Link *AirPlus* Xtreme G>D-Link *Air*Plus Xtreme G Utility.**

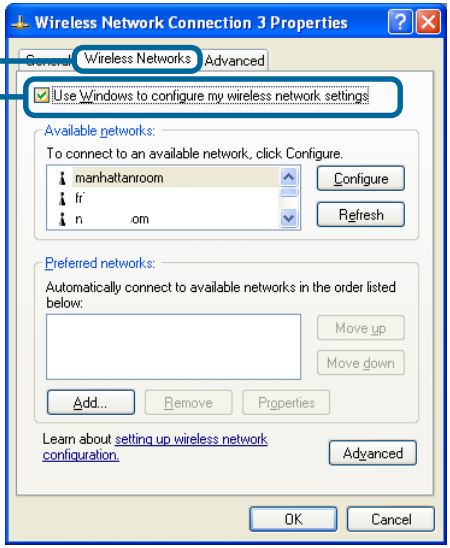
If you are using Windows XP, you can use either the Zero Configuration Utility or the D-Link Configuration Utility.

To use the D-Link Configuration Utility with XP, right-click on the Wireless network icon in the taskbar in the lower right-hand corner of your computer screen.

In the window that appears, select **View Available Wireless Networks** and click the **Advanced** button. The screen at right will appear.

Select the **Wireless Networks** tab.

Uncheck the box in the properties window that enables windows configuration.



After you have done this, you can then use the D-Link Configuration Utility with XP by clicking on the D-Link Configuration Utility icon.

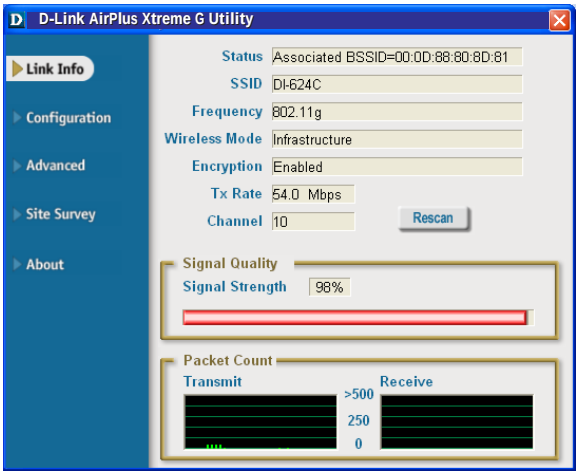
**Configuration Utility icon in the system tray*

If the icon does not display in the taskbar, then click on this icon on your desktop to open.

Using the Configuration Utility *(continued)*

After clicking on the Configuration Utility icon, the **Link Info** screen will display the settings for the DWL-G520:

Link Info



Status:

Displays the MAC Address of the Access Point or Router to which the DWL-G520 is associated

SSID:

The Service Set Identifier is the name assigned to the wireless network. The factory SSID setting is **default**.

Frequency:

802.11g indicates that the DWL-G520 is communicating in the 2.4GHz band.

Wireless Mode:

Either **Infrastructure** or **Ad-Hoc** will be displayed here. (Please see the *Getting Started* section in this manual for an explanation of these two modes.)

Encryption:

You can see if WEP (Wired Equivalent Privacy) is **Enabled** or **Disabled** here.

Tx Rate:

Tx Rate settings are automatically determined for an optimal speed up to a maximum of 54Mbps.

Channel:

The channel selection is automatically determined by the DWL-G520.

Signal Strength:

Displays the Link Quality for the DWL-G520 wireless connection to the Access Point. The Signal Strength represents the wireless signal between the Access Point and the DWL-G520. The percentage coincides with the graphical bar.

Packet Count:

Displays the statistics of the data packets that are transmitted and received.

Rescan Button:

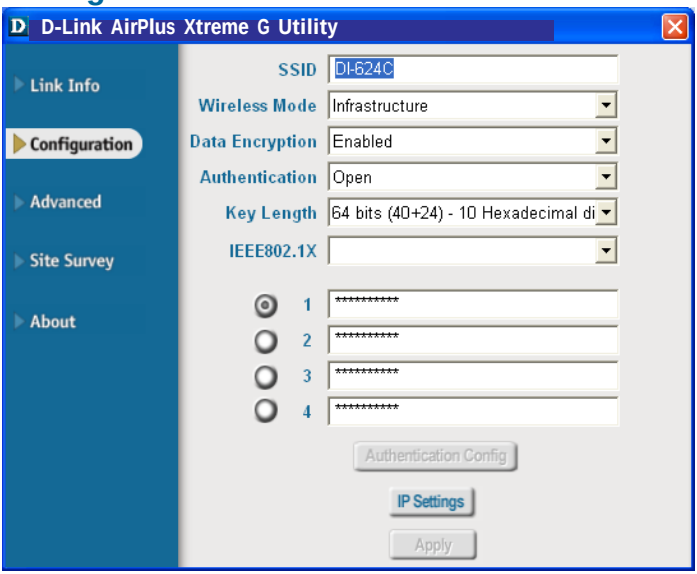
Rescans for the strongest signal in your environment and associates with that Access Point or Router.

Using the Configuration Utility *(continued)*

Configuration

After you have configured the network through the Site Survey section of the D-Link *Air*Plus Utility, you can make minor adjustments and check on settings in this **Configuration** screen.

*For a complete explanation of the configuration of a network, please refer to the **Site Survey** section in this chapter.*



SSID:

Service Set Identifier is a name that identifies a wireless network. Access Points and wireless devices attempting to connect to a specific WLAN (Wireless Local Area Network) must use the same SSID. The default setting is **default**.

Wireless Mode:

Click on the pull-down menu; select from the following options:

Infrastructure - connecting to the WLAN using an Access Point. (This is the **default** setting).

Ad-Hoc – wireless mode used when connecting directly to a computer equipped with a wireless adapter in a peer-to-peer environment.

Data Encryption:

Select **Enabled** or **Disabled.**

Authentication:

Choose one of the following modes:

Open Authentication – the DWL-G520 is visible to all devices on the network

Shared Authentication – allows communication only with other devices with identical WEP settings

WPA – Wi-Fi Protected Access which authorizes and identifies users based on a secret key that changes automatically at a regular interval. (A RADIUS Server is required for this mode.)

WPA-PSK - WPA Pre-Shared Key mode ensures that the DWL-G520 will obtain a new security key every time it connects to the 802.11 network. (A RADIUS Server is not required for this mode.)

Key Length:
Select the key length and either ASCII or hexadecimal format.

IEEE 802.1x:
Authentication which is a first line of defense against intrusion. In the Authentication process the Authentication Server* verifies the identity of the client attempting to connect to the network. Unfamiliar clients are denied access.

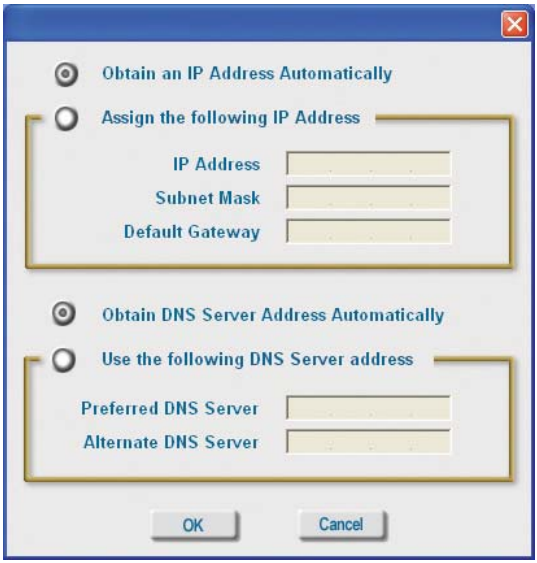
Keys 1-4:
Select the default key

Hexadecimal *digits consist of the numbers 0-9 and the letters A-F*

ASCII *(American Standard Code for Information Interchange) is a code for representing English letters as numbers from 0-127*

IP Settings

When you click **IP Settings** in the Configuration window, this pop-up screen will appear. Configure the IP Settings in this window.



Click **Apply** to save changes.

*Not all servers can provide Authentication

Using the Configuration Utility *(continued)*

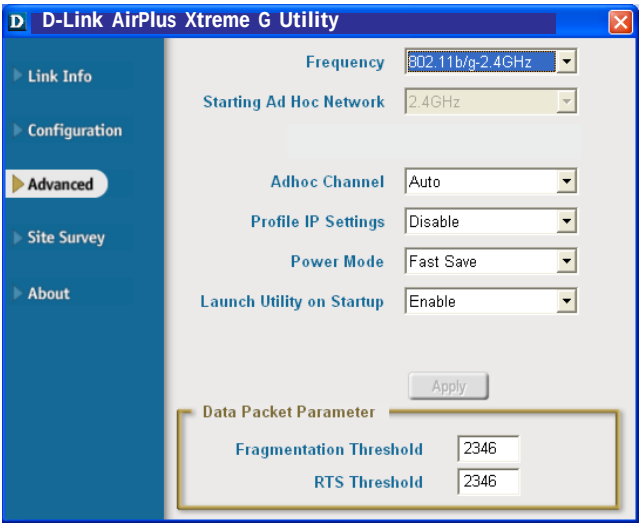
Frequency:
Select the Frequency

Starting Ad-Hoc Network:
Select the Ad-Hoc Network

Ad-Hoc Channel:
All devices in the Ad-Hoc network must be set to the same channel

Profile IP Settings:
You can **Enable** or **Disable** the *IP Settings* portion of your profile here. If you select **Disable** you will need to configure the IP Address information each time you connect to a network. If you select **Enable** you will maintain the same IP Address information each time you connect to a network.

Advanced



Power Mode:
Disable -this default setting consumes the most power
Enable - this setting consumes the least power.

Launch Utility on Startup:
Select **Enable** or **Disable**

Data Packet Parameter:
Set the *Fragmentation Threshold* and the *RTS Threshold*. Please see below.

Fragmentation Threshold:
This value should remain at its default setting of 2432. If you experience a high packet error rate, you may slightly increase your Fragmentation Threshold within the value range of 256 to 2432. Setting the Fragmentation Threshold too low may result in poor performance.

RTS Threshold:
This value should remain at its default setting of 2432. If inconsistent data flow is a problem, only a minor modification should be made.

Click **Apply** if you have made any changes

Using the Configuration Utility *(continued)*

Available Network:

The top section of the window displays the **Available Networks**. Scroll up and down the list and highlight the network to which you wish to connect. Click on the **Connect** button.

Profile:

In the lower half of the screen, you can manage the profiles that you have created for the wireless network at home, at the office and in public places. Scroll up and down and highlight the profile that you wish to configure. You can **Add** or **Remove** a profile, or configure the **Properties** of the profile in order to connect with an available network.

Refresh:

Click on **Refresh** to get the most updated list of available networks.

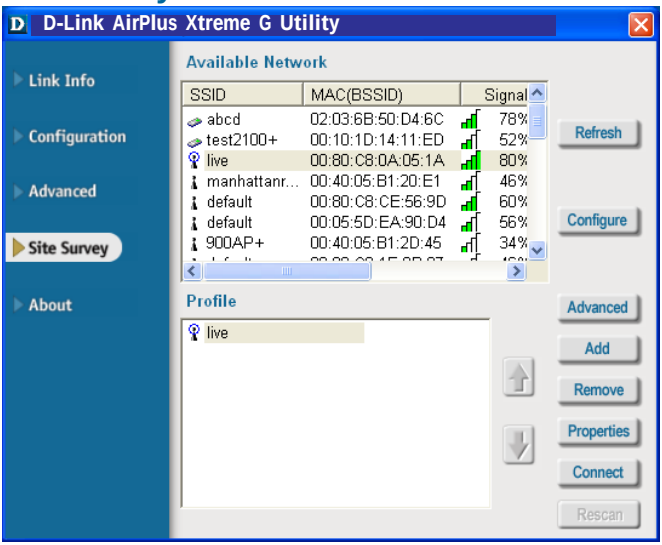
Configure:

Highlight an existing network and click **Configure**; the configuration window on the next page will appear.

Advanced:

Highlight a network; click **Advanced** and the screen on the next page will appear.

Site Survey



Add:

Click **Add** and the screen on the next page will appear.

Remove:

Highlight a network profile; click **Remove** to remove a network from the profile list.

Properties:

Highlight a network profile; click **Properties** and the screen on the next page will appear.

Connect:

Highlight a network profile; click **Connect** to connect to that network.

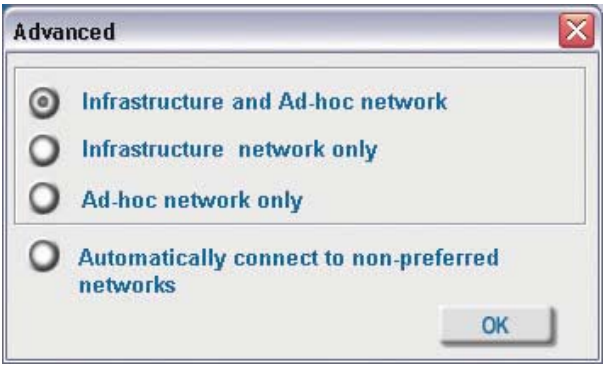
Rescan:

Click Rescan to rescan and connect to the strongest signal.

Advanced

In this window you can select the type of network connection.

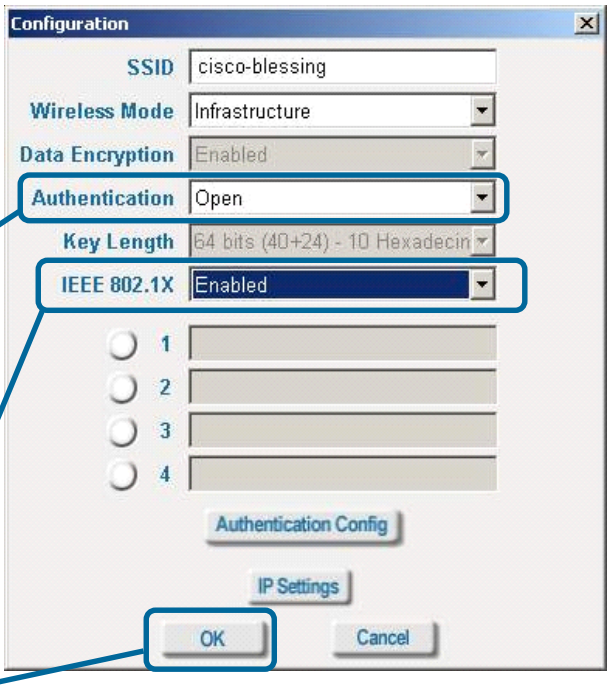
Click **OK** to save the changes.



Configuration, Add or Properties

If you clicked on **Add,** you can configure, in this window, all the properties of a profile that you wish to add to the network.

If you clicked on **Configuration or Properties** you can configure, in this window, all the properties of a profile that already exists in the network.



If you select **WPA** in the *Authentication* field, please see detailed instructions for configuring WPA on the following pages.

If you choose to use the **IEEE 802.1x** feature, please see the detailed instructions on the following pages.

Click **OK** to save the changes.

Using the Configuration Utility *(continued)*

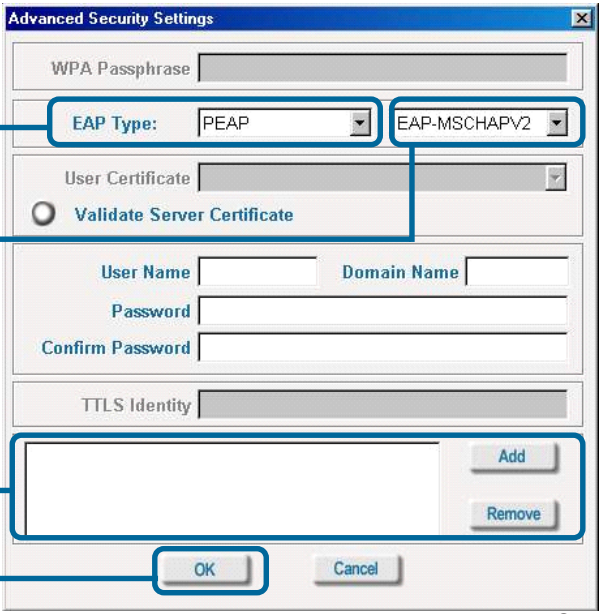
Site Survey > Configuration > 802.1x

To use 802.1x and to configure its settings, please do the following:

IEEE 802.1x - Select **Enabled**.

Click **Authentication Config.**

Advanced Security Settings



Select the **EAP Type** you want to use. Configure the information needed for authenticating.

Inner Authentication Protocol.

For an explanation of the terms shown in this window please see the following pages.

Trusted CA List.

Click **OK**

EAP Type	Inner Authentication Protocol	Information needed for Authenticating
EAP-TLS		Certificate User Name
EAP-MSCHAPv2		User Name Password Domain Name
LEAP		User Name Password
EAP-TTLS	PAP	TTLS Identity User Name Password
	CHAP	TTLS Identity User Name Password
	MSCHAP	TTLS Identity User Name Password Domain Name
	MSCHAPv2	TTLS Identity User Name Password Domain Name

802.1x > Advanced Security Settings > EAP Types (continued)

EAP Type	Inner Authentication Protocol	Information needed for Authenticating
EAP-TTLS	EAP-MD5	TTLS Identity User Name Password
	EAP- Generic Token card	TTLS Identity User Name Password
	EAP-MSCHAPv2	TTLS Identity User Name Password Domain Name
PEAP	EAP-MD5	User Name Password
	EAP-MSCHAPv2	User Name Password Domain Name
	EAP- Generic Token card	User Name Password

802.1x > Advanced Security Settings > Definitions of Terms

Validate Server Certificate:

Check **Validate Server Certificate** to verify the identity of the authentication server based on its certificate when using EAP-TTLS, PEAP, and EAP-TLS. (This is checked by default.)

Certain protocols, such as EAP-TTLS, PEAP, and EAP-TLS, allow you to verify the identity of the authentication server as the server verifies your identity. This is called mutual authentication.

You can select trusted authentication server certificates using the **Add** button at the **Trusted CA List** (at the bottom of the **Advanced Security Settings** page).

Domain Name:

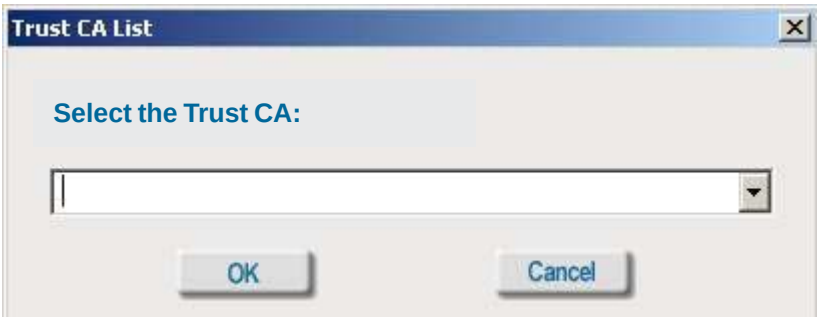
Each server has a domain name that uniquely identifies it. That domain name is normally contained in the ***Subject CN*** field of the server certificate. A server domain name ends with the name of a larger administrative domain, to which the server belongs.

TTLS Identity:

Tunneled Transport Layer Security satisfies a requirement for strong encryption and mutual authentication on Wireless networks. EAP-TTLS has a unique feature that other protocols do not offer. Because it sets up an encrypted tunnel for your credentials, it is also able to pass your login name through that tunnel. That means that not only are your credentials secure from eavesdropping, but your identity is protected as well. Thus, with EAP-TTLS you have two identities: an inner one, and an outer one. The inner identity is your actual user name. Your outer identity can be completely anonymous. Set your outer identity in the ***TTLS Identity*** field.

Trusted CA List:

The **Trusted CA List** allows you to configure which authentication servers you trust for the purpose of logging you in to the network.
Click **Add** at the **Trusted CA List** at the bottom of the *Advanced Security Settings* page. Select the **Trusted CA** that you want to add and click **OK**.

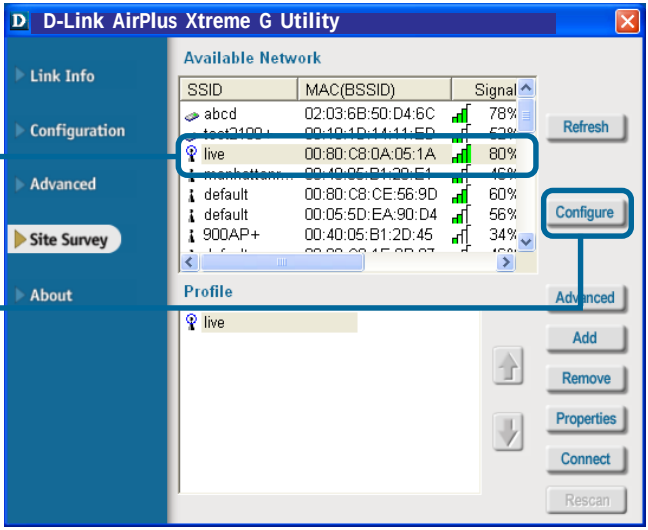


Using the Configuration Utility *(continued)*

Authentication > WPA

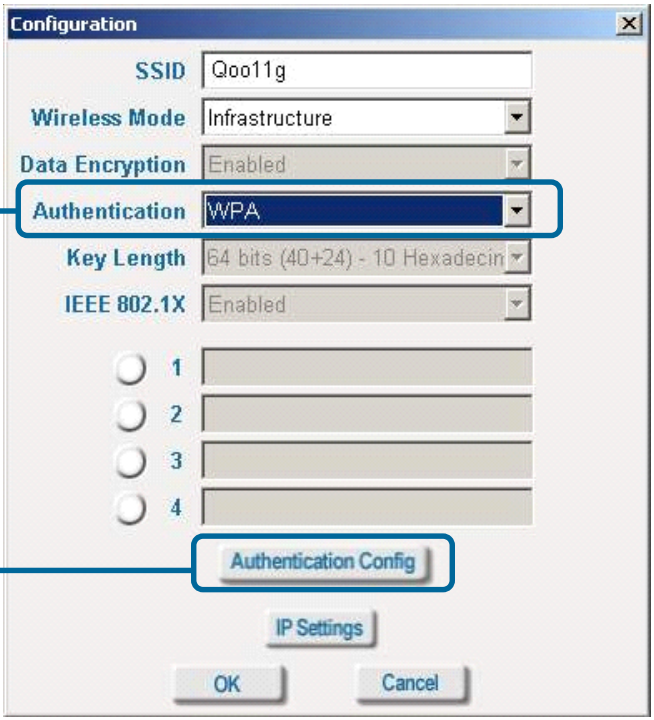
Select the available network to which you want to connect.

Click **Configure**.



Select **WPA** in the *Authentication* field.

Click **Authentication Config**



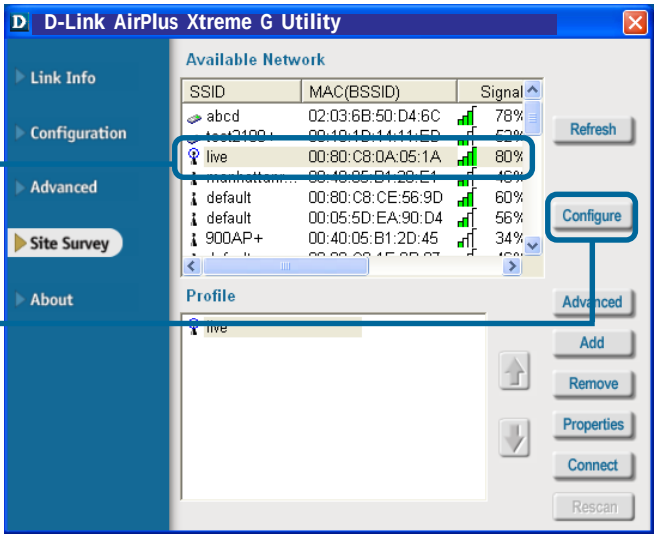
After you click **Authentication Config**, the *Advanced Security Settings* screen will appear. Complete the *Advanced Security Settings* configuration. Please see pages 19-22 of this manual to find out more about the *Advanced Security Settings*.

Using the Configuration Utility *(continued)*

Authentication > WPA-PSK

Select the available network to which you want to connect.

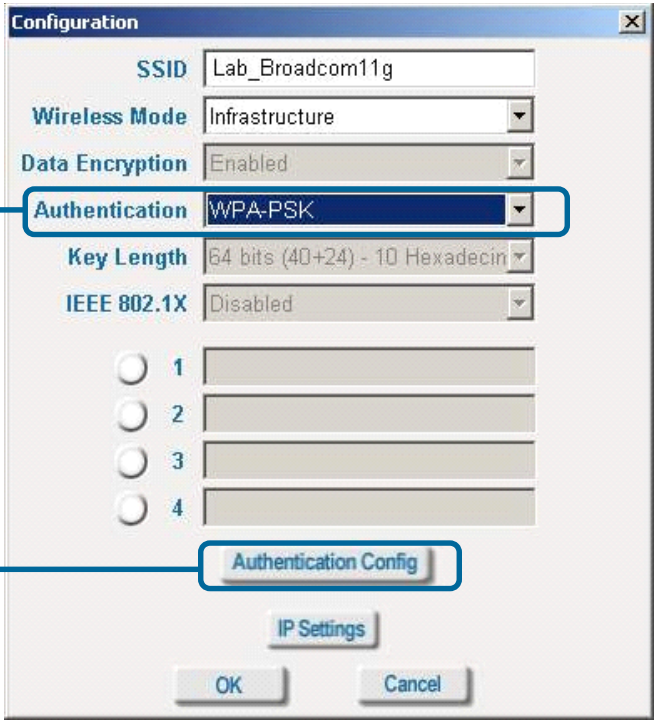
Click **Configure**.



WPA-PSK does not require a RADIUS Server in the network.

Select **WPA-PSK** in the *Authentication* field.

Click **Authentication Config**

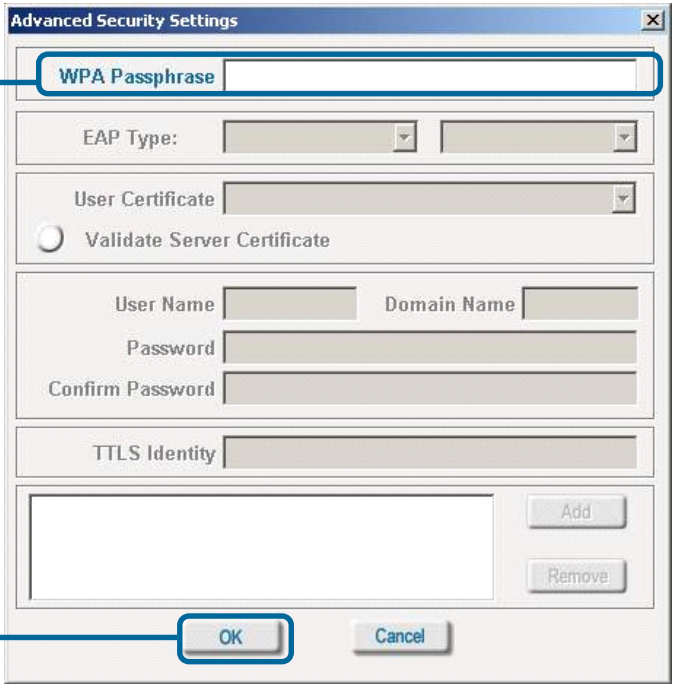


Using the Configuration Utility *(continued)*

Authentication > WPA-PSK (continued)

Advanced Security Settings

Enter the **WPA Passphrase.**



Click **OK**.
The configuration is done.

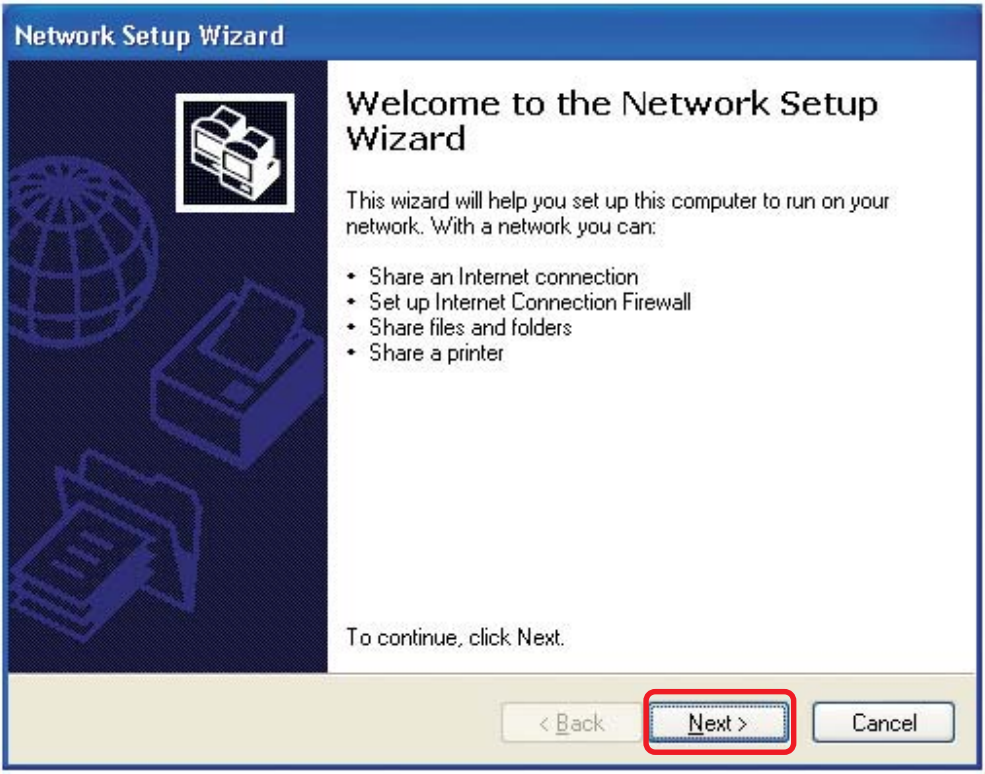
Networking Basics

Using the Network Setup Wizard in Windows XP

In this section you will learn how to establish a network at home or work, using **Microsoft Windows XP.**

Note: Please refer to websites such as http://www.homenethelp.com and http://www.microsoft.com/windows2000 for information about networking computers using Windows 2000, ME or 98SE.

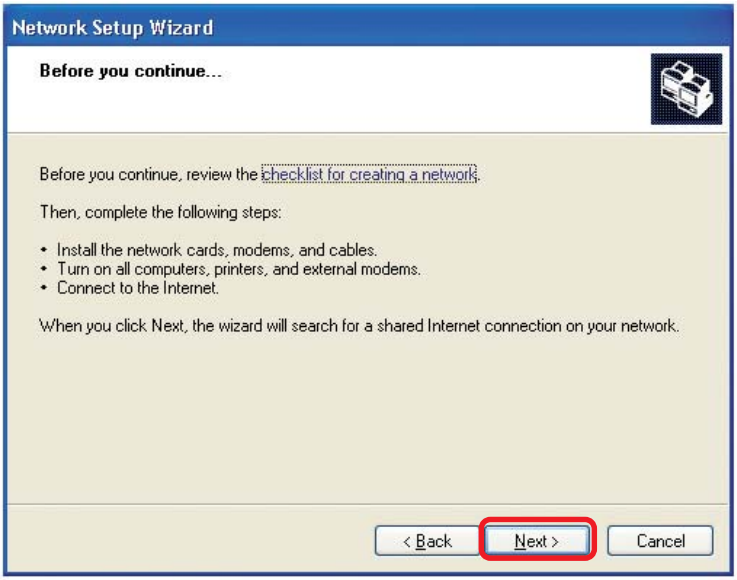
Go to **Start>Control Panel>Network Connections**
Select **Set up a home or small office network**



When this screen appears, click **Next.**

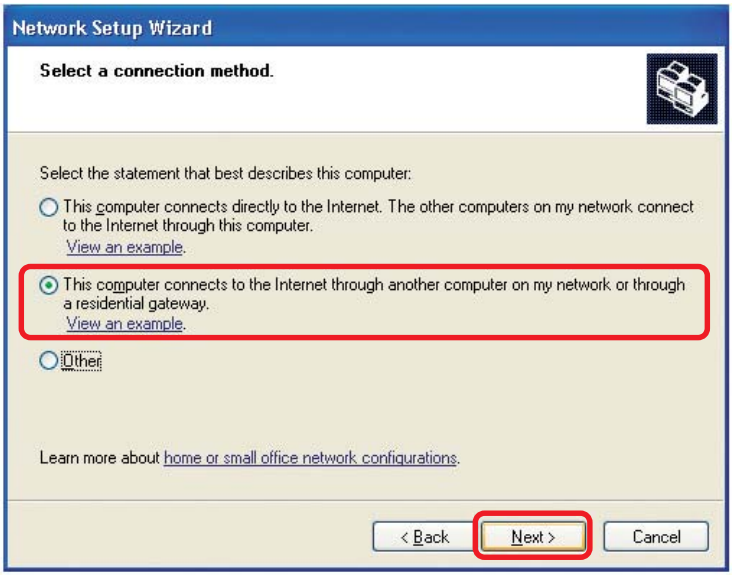
Networking Basics *(continued)*

Please follow all the instructions in this window:



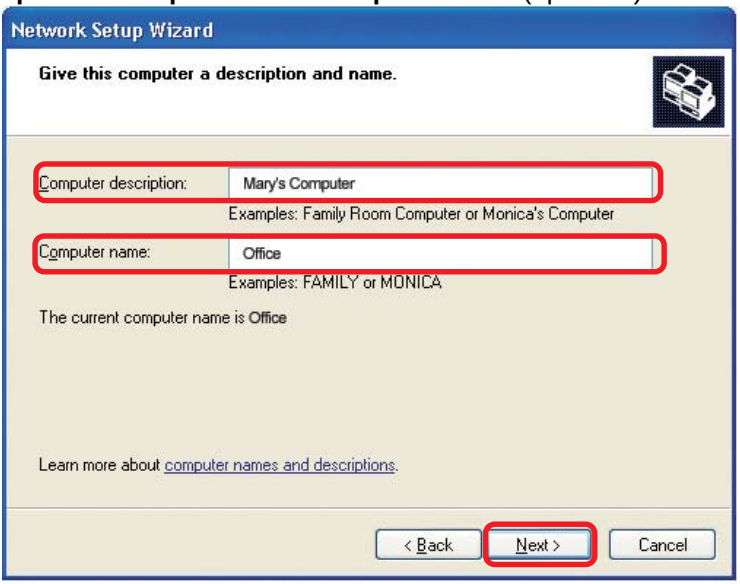
Click **Next**

In the following window, select the best description of your computer. If your computer connects to the Internet through a gateway/router, select the second option as shown.



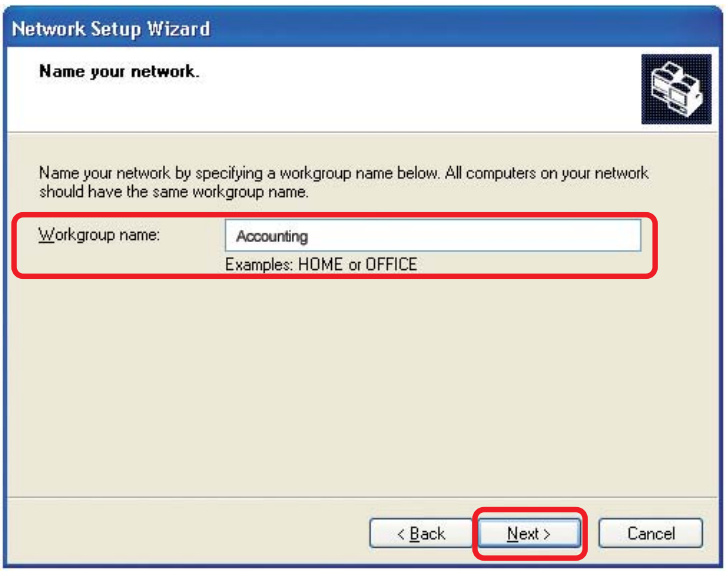
Click **Next**

Enter a **Computer description** and a **Computer name** (optional.)



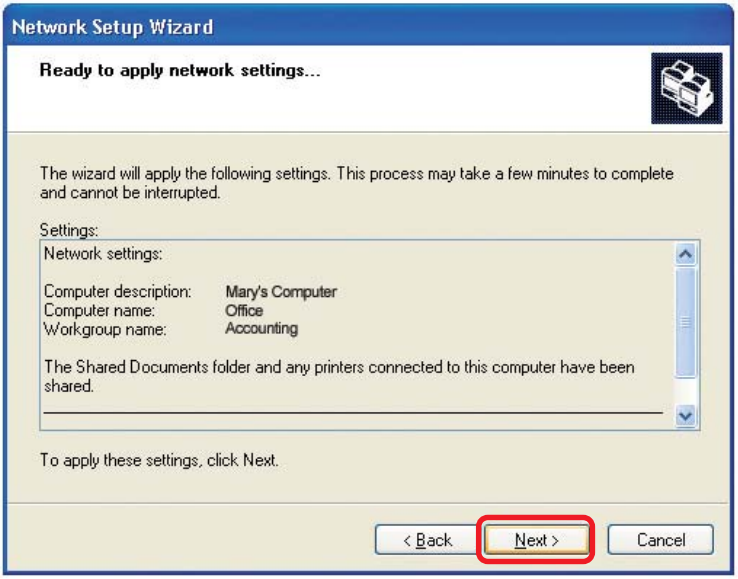
Click **Next**

Enter a **Workgroup** name. All computers on your network should have the same **Workgroup name.**



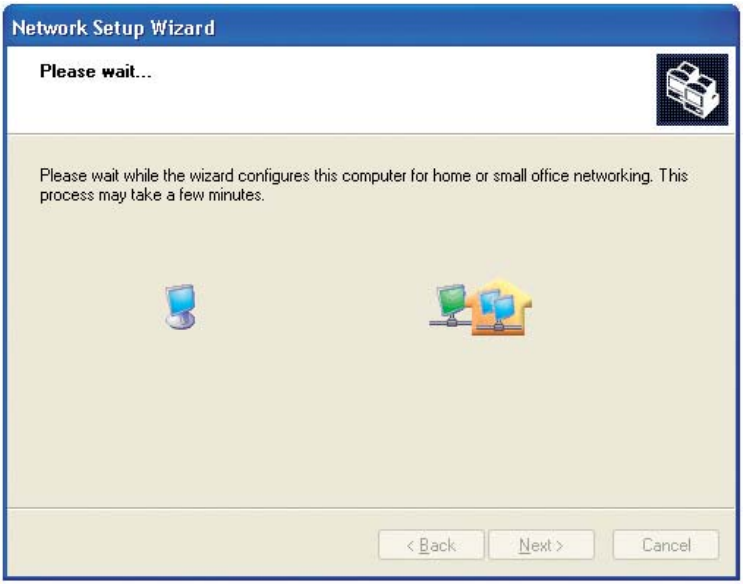
Click **Next**

Please wait while the **Network Setup Wizard** applies the changes.



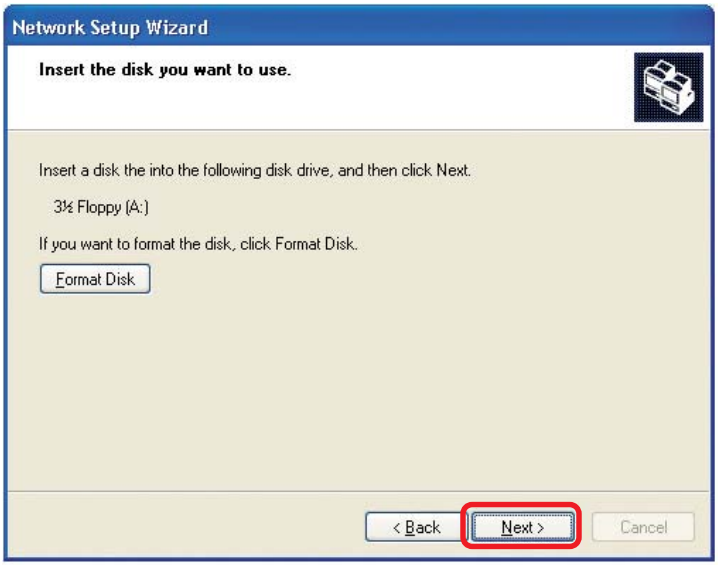
When the changes are complete, click **Next**.

Please wait while the **Network Setup Wizard** configures the computer. This may take a few minutes.

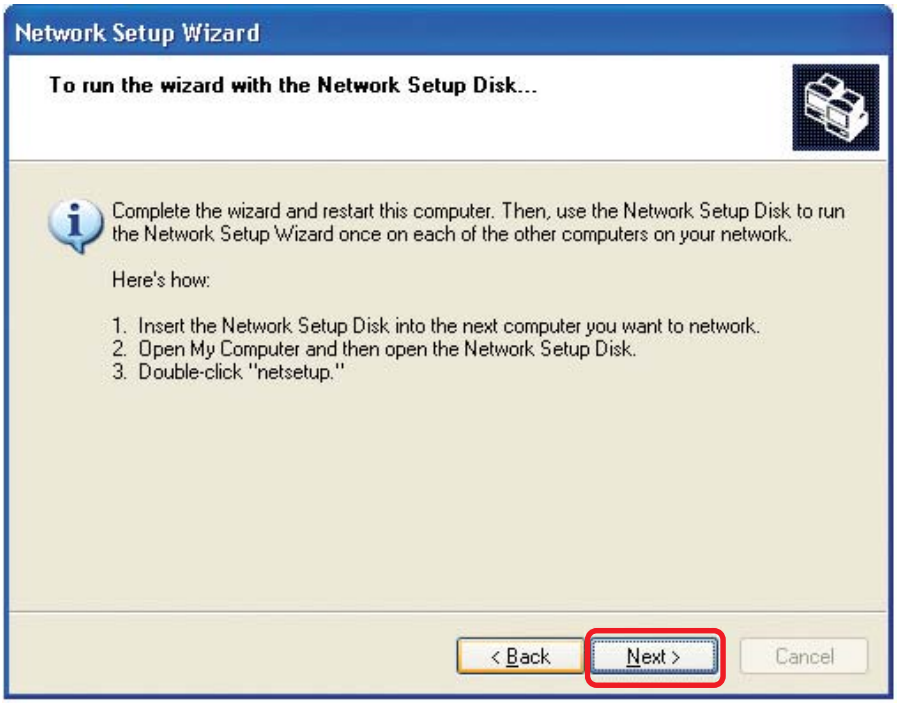


In the window below, select the option that fits your needs. In this example, **Create a Network Setup Disk** has been selected. You will run this disk on each of the computers on your network. Click **Next**.

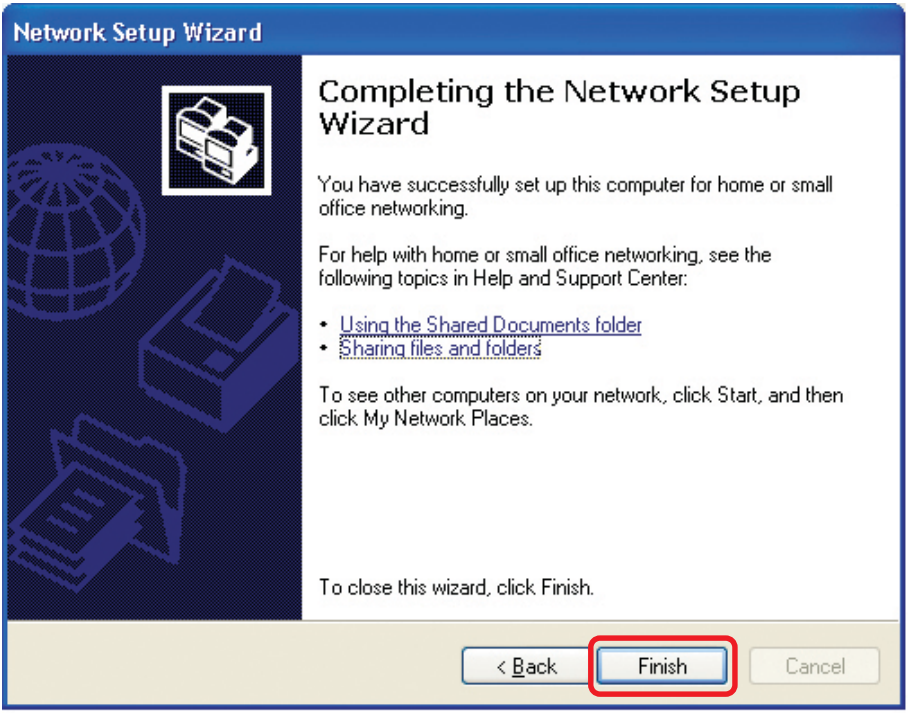
Insert a disk into the Floppy Disk Drive, in this case drive **A.**



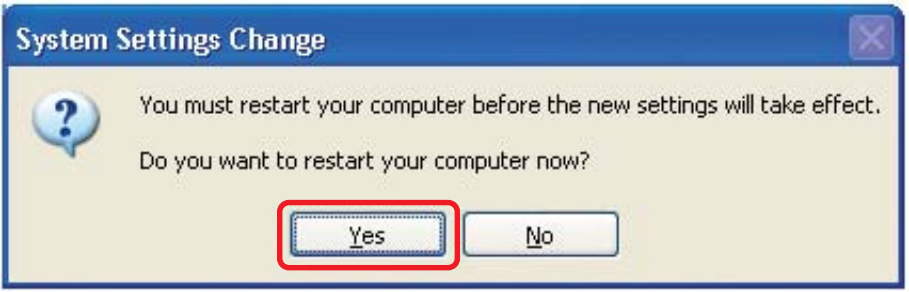
Please read the information under **Here's how** in the screen below. After you complete the **Network Setup Wizard** you will use the **Network Setup Disk** to run the **Network Setup Wizard** once on each of the computers on your network. To continue click **Next.**



Please read the information on this screen, then click **Finish** to complete the **Network Setup Wizard**.



The new settings will take effect when you restart the computer. Click **Yes** to restart the computer.



You have completed configuring this computer. Next, you will need to run the **Network Setup Disk** on all the other computers on your network. After running the **Network Setup Disk** on all your computers, your new wireless network will be ready to use.

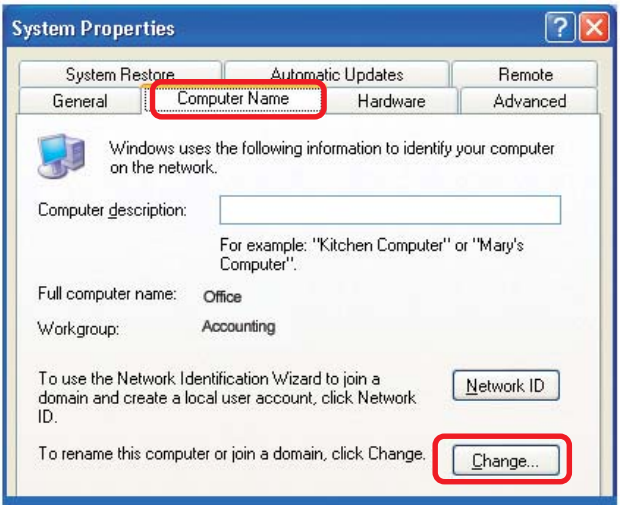
Networking Basics *(continued)*

Naming your Computer

To name your computer, please follow these directions:In **Windows XP**:

- Click **Start** (in the lower left corner of the screen)
- **Right-click** on **My Computer**
- Select **Properties** and click

- Select the **Computer Name Tab** in the System Properties window.

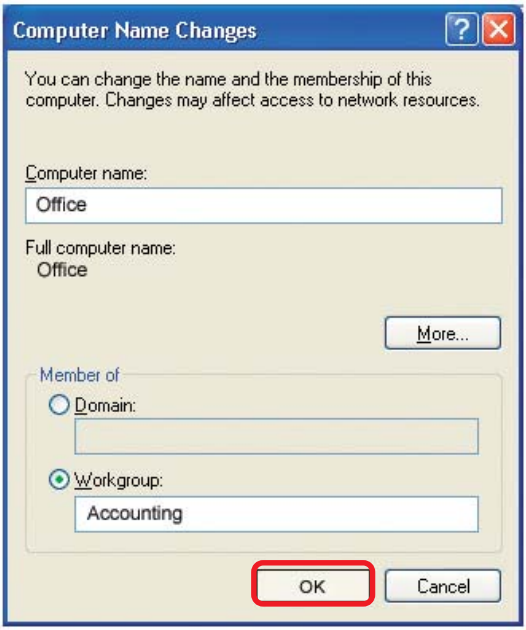


- You may enter a **Computer Description** if you wish; this field is optional.

- To rename the computer and join a domain, Click **Change**.

Naming your Computer

- In this window, enter the **Computer name**
- Select **Workgroup** and enter the name of the **Workgroup**
- All computers on your network must have the same **Workgroup** name.
- Click **OK**



Checking the IP Address in Windows XP

The wireless adapter-equipped computers in your network must be in the same IP Address range (see Getting Started in this manual for a definition of IP Address Range.) To check on the IP Address of the adapter, please do the following:

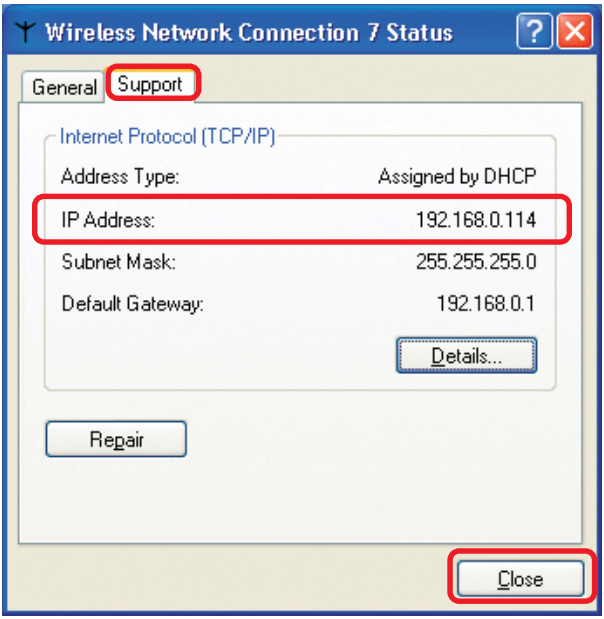
- Right-click on the ***Local Area Connection icon*** in the task bar
- Click on **Status**

Checking the IP Address in Windows XP

This window will appear.

- Click the **Support tab**

- Click **Close**



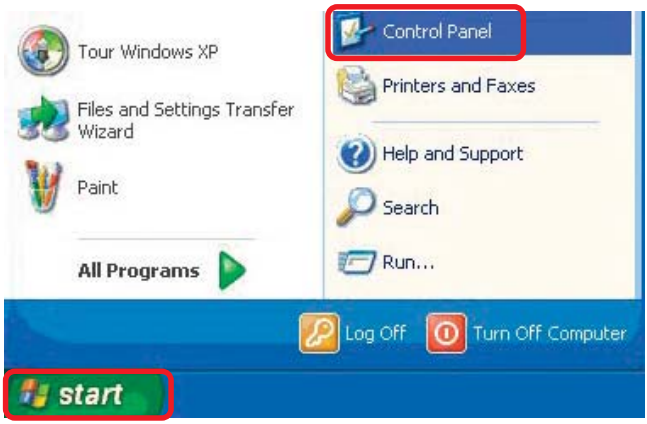
Assigning a Static IP Address in Windows XP/2000

Note: Residential Gateways/Broadband Routers will automatically assign IP Addresses to the computers on the network, using DHCP (Dynamic Host Configuration Protocol) technology. If you are using a DHCP-capable Gateway/Router you will not need to assign Static IP Addresses.

If you are not using a DHCP capable Gateway/Router, or you need to assign a Static IP Address, please follow these instructions:

- Go to **Start**

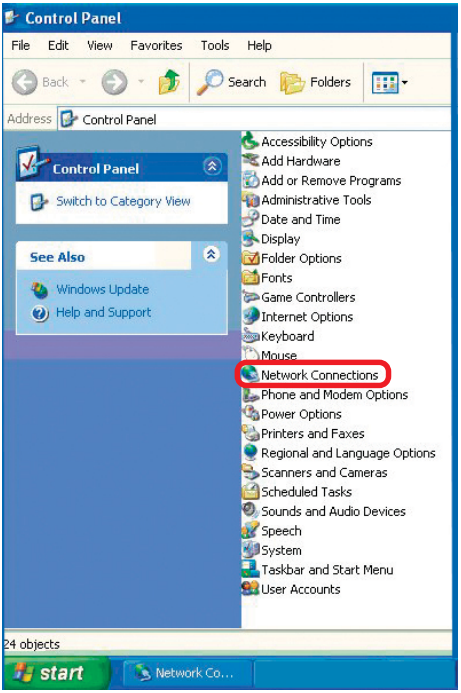
- Double-click on **Control Panel**



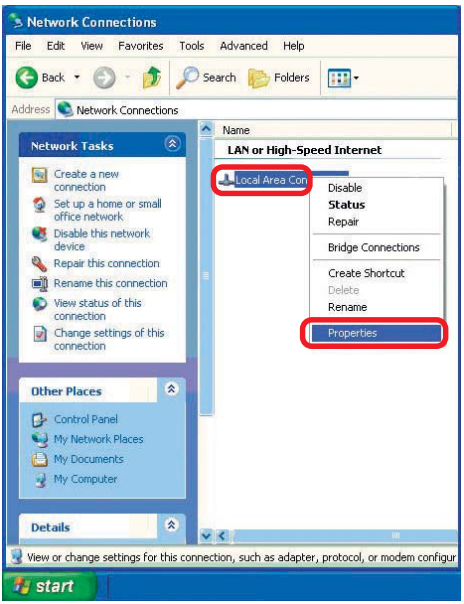
Networking Basics *(continued)*

Assigning a Static IP Address in Windows XP/2000

- Double-click on **Network Connections**

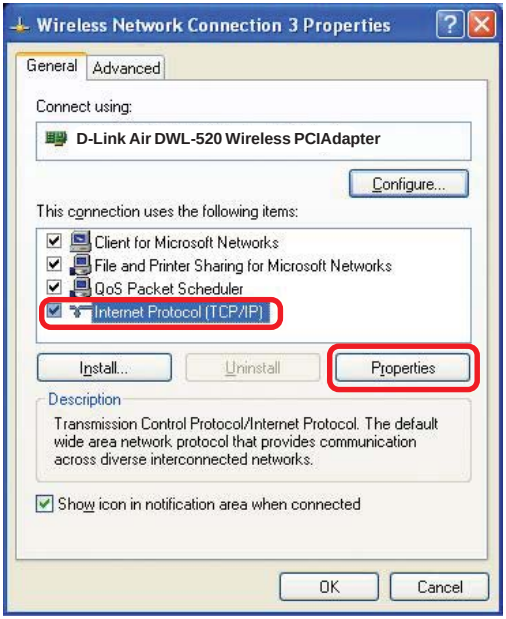


- Right-click on **Local Area Connections**
- Double-click on **Properties**



Networking Basics *(continued)*

Assigning a Static IP Address in Windows XP/2000

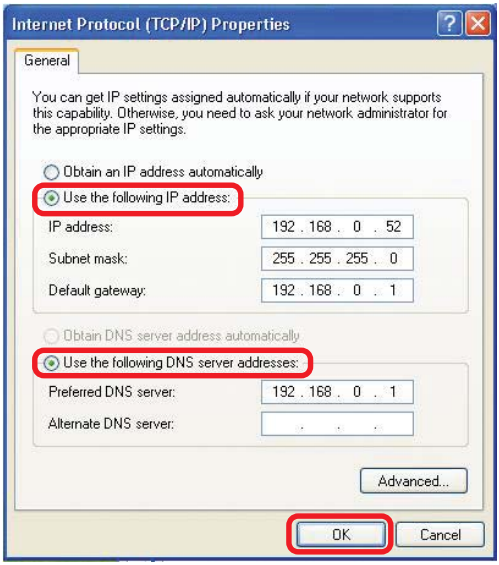


- Click on **Internet Protocol (TCP/IP)**
- Click **Properties**
- In the window below, select **Use the following IP Address**. Input your **IP Address and subnet mask.** (The IP Addresses on your network must be within the same range. For example, if one computer has an IP Address of 192.168.0.2, the other computers should have IP Addresses that are sequential, like 192.168.0.3 and 192.168.0.4. The subnet mask must be the same for all the computers on the network.)

IP Address:
e.g., 192.168.0.2

Subnet Mask:
255.255.255.0

Default Gateway:
Enter the LAN IP Address of the wireless router. (D-Link wireless routers have a LAN IP Address of 192.168.0.1)

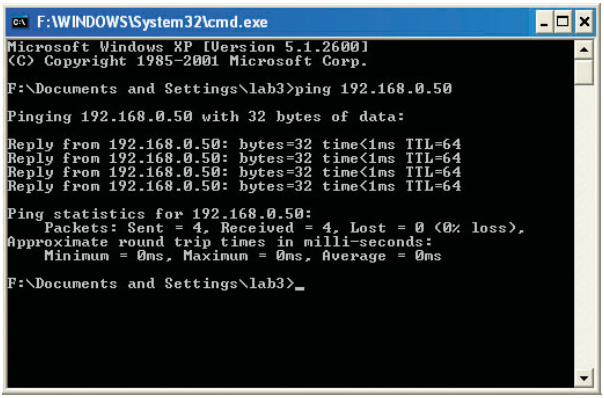


- Select **Use the following DNS server address**. Enter the LAN IP Address of the wireless router. (D-Link wireless routers have a LAN IP Address of 192.168.0.1)
- Click **OK**

You have completed the assignment of a Static IP Address. (You do not need to assign a Static IP Address if you have a DHCP-capable Gateway/Router.)

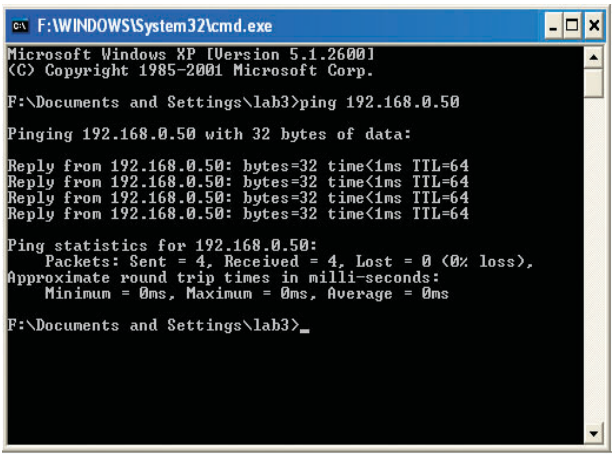
*Checking the Wireless Connection by Pinging in Windows XP and 2000**

- Go to **Start** > **Run** > type **cmd**. A window similar to this one will appear. Type **ping xxx.xxx.xxx.xxx**, where **xxx** is the **IP Address** of the Wireless Router or Access Point. A good wireless connection will show four replies from the Wireless Router or Access Point, as shown.



*Checking the Wireless Connection by Pinging in Windows Me and 98**

- Go to **Start** > **Run** > type **command**. A window similar to this will appear. Type **ping xxx.xxx.xxx.xxx** where **xxx** is the **IP Address** of the Wireless Router or Access Point. A good wireless connection will show four replies from the wireless router or access point, as shown.



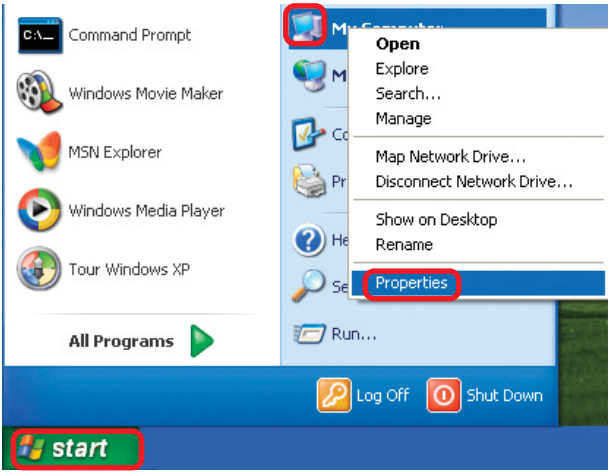
**You may be pinging different IP Addresses than the ones pictured here, however the procedure for pinging remains the same.)*

Troubleshooting

This chapter provides solutions to problems that can occur during the installation and operation of the DWL-G520. Read the following descriptions if you are having problems. (The examples below are illustrated in Windows XP. If you have another operating system, these solutions will still apply although the appearance on your computer screen may differ.)

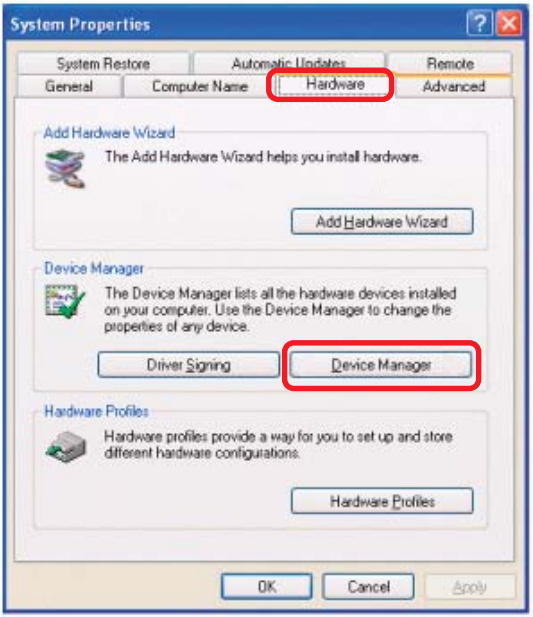
1. Check that the drivers for the DWL-G520 are installed properly.

- Go to **Start** > **My Computer** > **Properties**



- Select the **Hardware Tab**

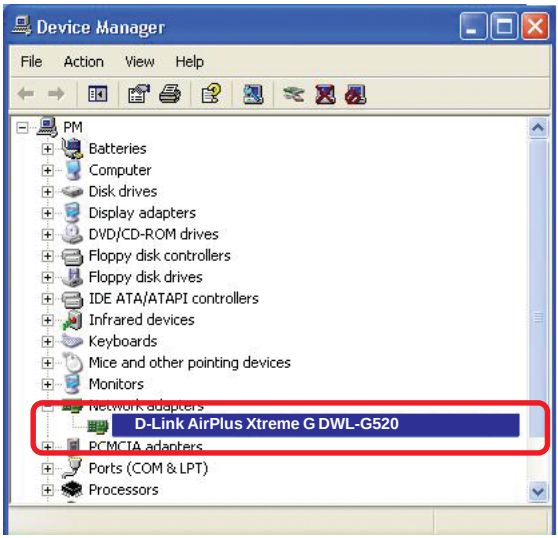
- Click **Device Manager**



- Double-click on **Network Adapters**

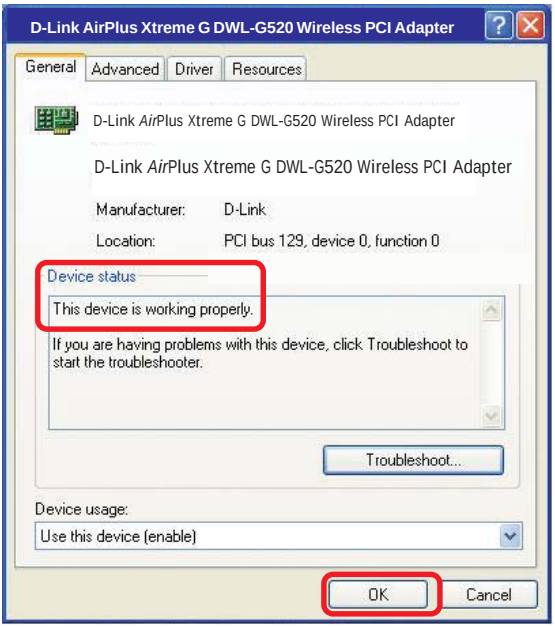
- Right-click on **D-Link *Air* Plus Xtreme G™ DWL-G520 Wireless PCI Adapter**

- Select **Properties** to check that the drivers are installed properly



- Look under **Device Status** to check that the device is working properly

- Click **OK**



2. I cannot connect to the Access Point or the Wireless Router.

- Make sure that the SSID on the DWL-G520 Wireless PCI Adapter is exactly the same as the SSID on the Access Point or Wireless Router.
- Move the DWL-G520 and Access Point or Wireless Router into the same room and then test the wireless connection.
- Disable all security settings. (WEP, MAC Address Control, AES)
- Turn off your Access Point and the computer with the DWL-G520. Turn on the Access Point, and then turn on the computer with the DWL-G520.
- Refresh the DWL-G520 Utility

3. The DWL-G520 Power and Link lights are not on.

- Check to see if the DWL-G520 PCI adapter is firmly inserted into the PCI slot of your computer.

4. I forgot my Encryption key.

- Reset the Access Point to its factory default settings and restore the DWL-G520 Wireless PCI Adapter to the factory default settings. (The default settings are listed in the **Using the Configuration Utility** section in this manual.)

5. The computer does not recognize the DWL-G520 Wireless PCI Adapter.

- Make sure that the DWL-G520 Wireless PCI Adapter is properly seated in the computer's PCI slot.
- If Windows does not detect the hardware upon insertion of the adapter, make sure to completely remove drivers that were previously loaded. To remove the drivers, do the following:

A. Under **Tools**> select **Folder Options**…> select **View** > under **Hidden files and folders** > select **Show hidden files and folders**

B. Uncheck **Hide extension for known file types** > click on **Apply**

C. Search for the files **DWLG520.INF** and **DWLG520.SYS**. Remove these files from the **INF** and **SYSTEM32** (DRIVERS) folders in the Windows directory. Note: Windows XP and Windows 2000 will rename **.inf** files that have not received WHQL certification into **oem.inf** files (e.g., **oem1.inf.)**

6. The computer with the DWL-G520 installed is unable to connect to the wireless network and/or the Internet.

- Check that the LED indicators for the broadband modem are indicating normal activity. If not, there may be a problem with the broadband connection.
- Check that the LED indicators on the wireless router are functioning properly. If not, check that the AC power and Ethernet cables are firmly connected.
- Check that the IP Address, subnet mask, gateway, and DNS settings are correctly entered for the network
- In **Infrastructure** mode, make sure the same **Service Set Identifier (SSID)** is specified on the settings for the wireless clients and Access Points. The **SSID** factory default setting for the D-Link*Air and Air*Plus products is **default.** (Double-click on the WLAN icon in the taskbar. The **Link Info** screen will display the SSID setting.)
- In **Ad-Hoc** mode, both wireless clients will need to have the same **SSID**. Please note that it might be necessary to set up one client to establish a **BSS (Basic Service Set)** and wait briefly before setting up other clients. This prevents several clients 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 clients associated to it.

- Check that the **Network Connection** for the wireless client is configured properly. Select **AP (Infrastructure)** when connecting to an Access Point and select **Ad-Hoc mode** when connecting without an Access Point. Double-click on the **WLAN icon** in the taskbar > click on **Configuration** to change the settings for the wireless adapter.

- If **Security** is enabled, make sure that the correct encryption keys are entered on both the DWL-G520 and the Access Point. Double-click on the **WLAN** icon in the taskbar > click **Encryption**. Check to see that the key selected is set to the same key as other devices on the network.

7. How can I troubleshoot distance issues using the DWL-G520.

- Move the DWL-G520 and Access Point or Wireless Router into the same room and then test the wireless connection.

- Change the channel of the Access Point.

- Move devices within the line of sight

Technical Specifications

Standards

- IEEE 802.11g
- IEEE 802.11
- IEEE 802.11b

Bus Type:

- PCI 2.2

Data Rates:

With Automatic Fallback

- 54Mbps; 48Mbps; 36Mbps; 24Mbps; 18Mbps; 12Mbps; 11Mbps; 9Mbps; 6Mbps; 5.5Mbps; 2Mbps; 1Mbps

Security:

- 802.1x
- WPA (Wi-Fi Protected Access), 64-,128-bit WEP with TKIP, MIC, IV Expansion, Shared Key Authentication

Media Access Control:

- CSMA/CA with ACK

Frequency Range:

- 2.4GHz to 2.497GHz

Range:*

- Indoors: Up to 328 feet (100 meters)
- Outdoors: Up to 1,312 feet (400 meters)

Power Consumption:

- PowerSave mode = 28mA
- Standby mode = 4.66mA
- Transmit mode = 248mA

Modulation Technology:

- Orthogonal Frequency Division Multiplexing (OFDM)

*Environmental factors may adversely affect range

Technical Specifications

Receiver Sensitivity:

- 54Mbps OFDM, 10% PER,-68dBm
- 48Mbps OFDM, 10% PER,-68dBm
- 36Mbps OFDM, 10% PER,-75dBm
- 24Mbps OFDM, 10% PER,-79dBm
- 18Mbps OFDM, 10% PER,-82dBm
- 12Mbps OFDM, 10% PER,-84dBm
- 11Mbps CCK, 8% PER, -82dBm
- 9Mbps OFDM, 10% PER,-87dBm
- 6Mbps OFDM, 10% PER,-88dBm
- 5.5Mbps CCK, 8% PER,-85dBm
- 2Mbps QPSK, 8% PER,-86dBm
- 1Mbps BPSK, 8% PER,-89dBm

Transmitter Output Power:

- 15dBm ± 2dB

Internal Antenna Type:

- Dipole with detachable reverse SMA connector

Temperature

- Operating: 0ºC to 55ºC (32ºF to 149ºF)

Humidity:

- 95% maximum, non-condensing

Physical Dimensions:

- L = 4.64 inches (114.3mm)
- W = 2.13 inches (54mm)
- H = 0.34 inches (8.7mm)

Weight:

- 0.12 lb. (55 grams)

Certifications:

- FCC part 15b

Warranty:

- 3 years

Technical Support

You can find software updates and user documentation on the D-Link website.

D-Link provides free technical support for customers within the United States and within Canada for the duration of the warranty period on this product.

U.S. and Canadian customers can contact D-Link technical support through our website, or by phone.

Tech Support for customers within the United States:

D-Link Technical Support over the Telephone:
(877) 453-5465
24 hours a day, seven days a week.

D-Link Technical Support over the Internet:
http://support.dlink.com
email:support@dlink.com

Tech Support for customers within Canada:

D-Link Technical Support over the Telephone:
(800) 361-5265
Monday to Friday 8:30am to 9:00pm EST

D-Link Technical Support over the Internet:
http://support.dlink.ca
email:support@dlink.ca

Warranty and Registration
(USA only)

Subject to the terms and conditions set forth herein, D-Link Systems, Inc. (“D-Link”) provides this Limited warranty for its product only to the person or entity that originally purchased the product from:

- D-Link or its authorized reseller or distributor and
- Products purchased and delivered within the fifty states of the United States, the District of Columbia, U.S. Possessions or Protectorates, U.S. Military Installations, addresses with an APO or FPO.

Limited Warranty: D-Link warrants that the hardware portion of the D-Link products described below will be free from material defects in workmanship and materials from the date of original retail purchase of the product, for the period set forth below applicable to the product type (“Warranty Period”), except as otherwise stated herein.

3-Year Limited Warranty for the Product(s) is defined as follows:

- Hardware (excluding power supplies and fans) Three (3) Years
- Power Supplies and Fans One (1) Year
- Spare parts and spare kits Ninety (90) days

D-Link’s sole obligation shall be to repair or replace the defective Hardware during the Warranty Period at no charge to the original owner or to refund at D-Link’s sole discretion. Such repair or replacement will be rendered by D-Link at an Authorized D-Link Service Office. The replacement Hardware need not be new or have an identical make, model or part. D-Link may in its sole discretion replace the defective Hardware (or any part thereof) with any reconditioned product that D-Link reasonably determines is substantially equivalent (or superior) in all material respects to the defective Hardware. Repaired or replacement Hardware will be warranted for the remainder of the original Warranty Period from the date of original retail purchase. If a material defect is incapable of correction, or if D-Link determines in its sole discretion that it is not practical to repair or replace the defective Hardware, the price paid by the original purchaser for the defective Hardware will be refunded by D-Link upon return to D-Link of the defective Hardware. All Hardware (or part thereof) that is replaced by D-Link, or for which the purchase price is refunded, shall become the property of D-Link upon replacement or refund.

Limited Software Warranty: D-Link warrants that the software portion of the product (“Software”) will substantially conform to D-Link’s then current functional specifications for the Software, as set forth in the applicable documentation, from the date of original retail purchase of the Software for a period of ninety (90) days (“Warranty Period”), provided that the Software is properly installed on approved hardware and operated as contemplated in its documentation. D-Link further warrants that, during the Warranty Period, the magnetic media on which D-Link delivers the Software will be free of physical defects. D-Link’s sole obligation shall be to replace the non-conforming Software (or defective media) with software that substantially conforms to D-Link’s functional specifications for the Software or to refund at D-Link’s sole discretion. Except as otherwise agreed by D-Link in writing, the replacement Software is provided only to the original licensee, and is subject to the terms and conditions of the license granted by D-Link for the Software. Software will be warranted for the remainder of the original Warranty Period from the date or original retail purchase. If a material non-conformance is incapable of correction, or if D-Link determines in its sole discretion that it is not practical to replace the non-conforming Software, the price paid by the original licensee for the non-conforming Software will be refunded by D-Link; provided that the non-conforming Software (and all copies thereof) is first returned to D-Link. The license granted respecting any Software for which a refund is given automatically terminates.

Non-Applicability of Warranty: The Limited Warranty provided hereunder for hardware and software of D-Link’s products will not be applied to and does not cover any refurbished product and any product purchased through the inventory clearance or liquidation sale or other sales in which D-Link, the sellers, or the liquidators expressly disclaim their warranty obligation pertaining to the product and in that case, the product is being sold “As-Is” without any warranty whatsoever including, without limitation, the Limited Warranty as described herein, notwithstanding anything stated herein to the contrary.

Submitting A Claim: The customer shall return the product to the original purchase point based on its return policy. In case the return policy period has expired and the product is within warranty, the customer shall submit a claim to D-Link as outlined below:

- The customer must submit with the product as part of the claim a written description of the Hardware defect or Software nonconformance in sufficient detail to allow D-Link to confirm the same.

- The original product owner must obtain a Return Material Authorization ("RMA") number from the Authorized D-Link Service Office and, if requested, provide written proof of purchase of the product (such as a copy of the dated purchase invoice for the product) before the warranty service is provided.

- After an RMA number is issued, the defective product must be packaged securely in the original or other suitable shipping package to ensure that it will not be damaged in transit, and the RMA number must be prominently marked on the outside of the package. Do not include any manuals or accessories in the shipping package. D-Link will only replace the defective portion of the Product and will not ship back any accessories.

- The customer is responsible for all in-bound shipping charges to D-Link. No Cash on Delivery ("COD") is allowed. Products sent COD will either be rejected by D-Link or become the property of D-Link. Products shall be fully insured by the customer. D-Link will not be held responsible for any packages that are lost in transit to D-Link. The repaired or replaced packages will be shipped to the customer via UPS Ground or any common carrier selected by D-Link, with shipping charges prepaid. Expedited shipping is available if shipping charges are prepaid by the customer and upon request.

- Return Merchandise Ship-To Address

USA: 53 Discovery Drive, Irvine, CA 92618
Canada: 2180 Winston Park Drive, Oakville, ON, L6H 5W1 (Visit http://www.dlink.ca for detailed warranty information within Canada)

D-Link may reject or return any product that is not packaged and shipped in strict compliance with the foregoing requirements, or for which an RMA number is not visible from the outside of the package. The product owner agrees to pay D-Link's reasonable handling and return shipping charges for any product that is not packaged and shipped in accordance with the foregoing requirements, or that is determined by D-Link not to be defective or non-conforming.

What Is Not Covered: This limited warranty provided by D-Link does not cover: Products, if in D-Link's judgment, have been subjected to abuse, accident, alteration, modification, tampering, negligence, misuse, faulty installation, lack of reasonable care, repair or service in any way that is not contemplated in the documentation for the product, or if the model or serial number has been altered, tampered with, defaced or removed; Initial installation, installation and removal of the product for repair, and shipping costs; Operational adjustments covered in the operating manual for the product, and normal maintenance; Damage that occurs in shipment, due to act of God, failures due to power surge, and cosmetic damage; Any hardware, software, firmware or other products or services provided by anyone other than D-Link; Products that have been purchased from inventory clearance or liquidation sales or other sales in which D-Link, the sellers, or the liquidators expressly disclaim their warranty obligation pertaining to the product. Repair by anyone other than D-Link or an Authorized D-Link Service Office will void this Warranty.

Disclaimer of Other Warranties: EXCEPT FOR THE LIMITED WARRANTY SPECIFIED HEREIN, THE PRODUCT IS PROVIDED "AS-IS" WITHOUT ANY WARRANTY OF ANY KIND WHATSOEVER INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT. IF ANY IMPLIED WARRANTY CANNOT BE DISCLAIMED IN ANY TERRITORY WHERE A PRODUCT IS SOLD, THE DURATION OF SUCH IMPLIED WARRANTY SHALL BE LIMITED TO NINETY (90) DAYS. EXCEPT AS EXPRESSLY COVERED UNDER THE LIMITED WARRANTY PROVIDED HEREIN, THE ENTIRE RISK AS TO THE QUALITY, SELECTION AND PERFORMANCE OF THE PRODUCT IS WITH THE PURCHASER OF THE PRODUCT.

Limitation of Liability: TO THE MAXIMUM EXTENT PERMITTED BY LAW, D-LINK IS NOT LIABLE UNDER ANY CONTRACT, NEGLIGENCE, STRICT LIABILITY OR OTHER LEGAL OR EQUITABLE THEORY FOR ANY LOSS OF USE OF THE PRODUCT, INCONVENIENCE OR DAMAGES OF ANY CHARACTER, WHETHER DIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL (INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF GOODWILL, LOSS OF REVENUE OR PROFIT, WORK STOPPAGE, COMPUTER FAILURE OR MALFUNCTION, FAILURE OF OTHER EQUIPMENT OR COMPUTER PROGRAMS TO WHICH D-LINK'S PRODUCT IS CONNECTED WITH, LOSS OF INFORMATION OR DATA CONTAINED IN, STORED ON, OR INTEGRATED WITH ANY PRODUCT RETURNED TO D-LINK FOR WARRANTY SERVICE) RESULTING FROM THE USE OF THE PRODUCT, RELATING TO WARRANTY SERVICE, OR ARISING OUT OF ANY BREACH OF THIS LIMITED WARRANTY, EVEN IF D-LINK HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. THE SOLE REMEDY FOR A BREACH OF THE FOREGOING LIMITED WARRANTY IS REPAIR, REPLACEMENT OR REFUND OF THE DEFECTIVE OR NON-CONFORMING PRODUCT. THE MAXIMUM

LIABILITY OF D-LINK UNDER THIS WARRANTY IS LIMITED TO THE PURCHASE PRICE OF THE PRODUCT COVERED BY THE WARRANTY. THE FOREGOING EXPRESS WRITTEN WARRANTIES AND REMEDIES ARE EXCLUSIVE AND ARE IN LIEU OF ANY OTHER WARRANTIES OR REMEDIES, EXPRESS, IMPLIED OR STATUTORY.

Governing Law: This Limited Warranty shall be governed by the laws of the State of California. Some states do not allow exclusion or limitation of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the foregoing limitations and exclusions may not apply. This limited warranty provides specific legal rights and the product owner may also have other rights which vary from state to state.

Trademarks: D-Link is a registered trademark of D-Link Systems, Inc. Other trademarks or registered trademarks are the property of their respective manufacturers or owners.

Copyright Statement: No part of this publication or documentation accompanying this Product may be reproduced in any form or by any means or used to make any derivative such as translation, transformation, or adaptation without permission from D-Link Corporation/D-Link Systems, Inc., as stipulated by the United States Copyright Act of 1976. Contents are subject to change without prior notice. Copyright© 2002 by D-Link Corporation/D-Link Systems, Inc. All rights reserved.

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.

FCC Statement: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communication. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures**:**

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

For detailed warranty outside the United States, please contact corresponding local D-Link office.

FCC Caution:
The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment; such modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

IMPORTANT NOTE:
FCC Radiation Exposure Statement:
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. The antenna(s) used for this equipment must be installed to provide a separation distance of at least eight inches (20 cm) from all persons.

This equipment must not be operated in conjunction with any other antenna.

Register your D-Link product online at http://support.dlink.com/register/