D-Link *Air*Plus Xtreme G™ DWA-520

Wireless PCI Adapter

Manual

Rev. A1

D-Link

Building Networks for People

Contents

Package Contents

Contents of Package:

■ **D-Link *Air*Plus Xtreme G**™ **DWA-520**
  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^{TM} DWA-520 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 DWA-520 provides data transfers at up to 54 Mbps. The 802.11g standard is backwards compatible with 802.11b products.

The DWA-520 has the newest, strongest, and most advanced security features available today. When used with other 802.11 WPA/WPA2 (Wi-Fi Protected Access) and 802.1x compatible products in a network with a RADIUS server, the security features include:

WPA/WPA2: Wi-Fi Protected Access which authorizes and identifies users based on a secret key that changes automatically at regular intervals. **WPA/WPA2** uses **TKIP** 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 DWA-520, used in conjunction with other WPA/WPA2-compatible 802.11 products still be much stronger than ever before. Utilizing the **Pre Shared Key mode** of WPA/WAP2 the DWA-520 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 configurationmenu. No longer will you have to manually input a new WEP key frequently to ensure security. With the DWA-520, 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 DWA-520 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 DWA-520 ensures optimal performance in transmitting a wireless signal within the desktop computer. By utilizing a standard PCI 2.2 interface, the DWA-520 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/WPA2 -** 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

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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.

Wireless Basics *(continued)*

The DWA-520 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 DWA-520 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/WPA2,802.1x,TKIP,AES and Pre-Shared Key mode*. These security feature are explained in more detail in the *Introduction* and the *Features* section of this manual.

The DWA-520 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 ™ DWA-520 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 DWA-520 and other network devices to a minimum - each wall or ceiling can reduce your DWA-520'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 DWA-520, 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 DWA-520 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*™ DWA-520, 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.
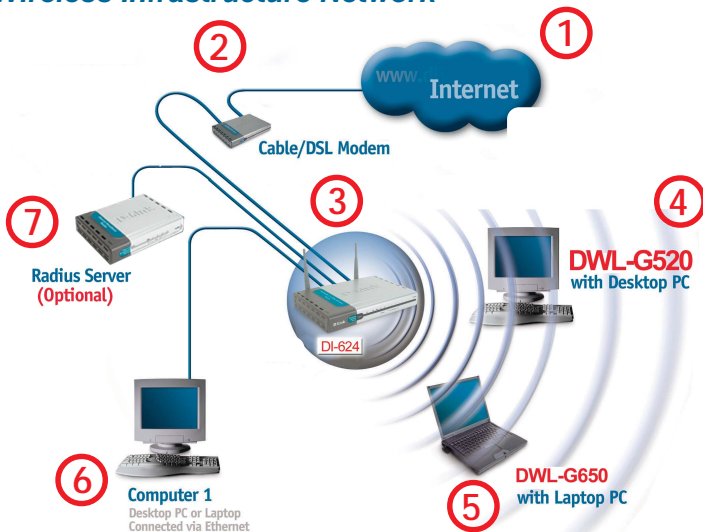
Power: Solid **green** light indicates connection to the network

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

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 DWA-520 ™ Wireless PCI Adapter into an available PCI slot on your desktop computer. *(See the **Quick Installation Guide** included with the DWA-520.)*

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/WPA2. (Without a RADIUS Server you can still use the *WPA/WPA2 Pre-Shared Key* mode.) RADIUS Authentication can also be provided by another service provider over the Internet and remote to your network site.

Desktop

D-Link *Air*Plus Xtreme G™

Laptop
D-Link *Air*Plus Xtreme G™
DWL-G650

Install the DWA-520 into the desktop computer.
*(See the **Quick Installation Guide** included with the product for installation instructions.)*

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

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 DWA-520 uses the^{TM} **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 DWA-520 (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.
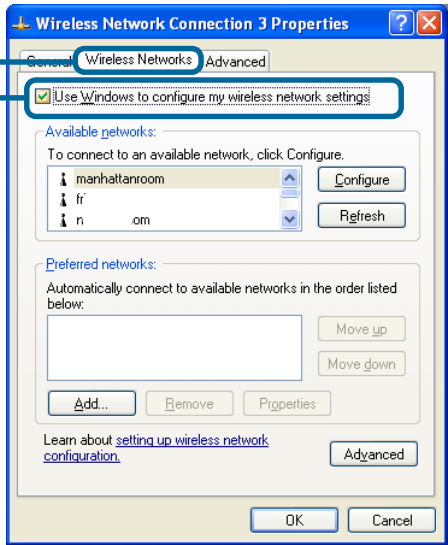
After you have done this, you can then use the D-Link Configuration Utility with XP by clicking on the D-Link Configuration Utility icon.

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.

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Using the Configuration Utility *(continued)*

After clicking on the Configuration Utility icon, the **Link Info** screen will display the settings for the DWA-520:

Status:
Displays the MAC Address of the Access Point or Router to which the DWA-520 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.

Link Info

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 DWA-520.

Signal Strength:
Displays the Link Quality for the DWA-520 wireless connection to the Access Point. The Signal Strength represents the wireless signal between the Access Point and the DWA-520. 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.
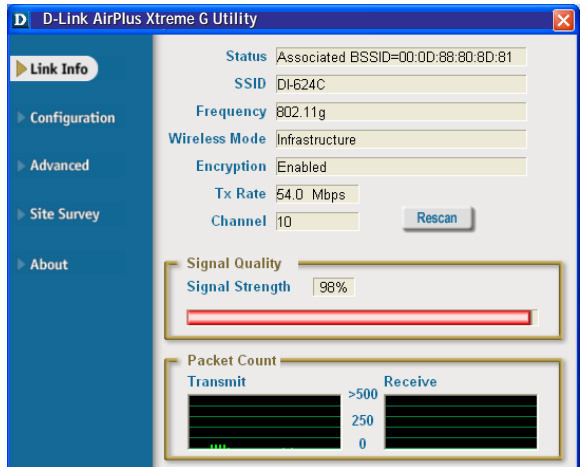
Using the Configuration Utility *(continued)*

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 DWA-520 is visible to all devices on the network

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

WPA/WPA2 – 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/WPA2-PSK - WPA/WPA2 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.)

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Using the Configuration Utility *(continued)*

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.

Using the Configuration Utility *(continued)*

Frequency:
Select 802.11b/g - 2.4GHz or 802.11b.

Super G:
Enable or Disable the Super G function (108Mbps). In order to communicate, all devices must share the same setting for this feature.

Starting Ad-Hoc Network:
This setting is always 2.4GHz.

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

Advanced

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.

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.   16

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:

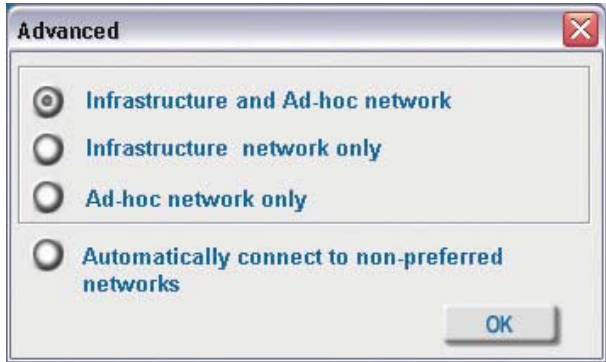Click Rescan to rescan and connect to the strongest signal.

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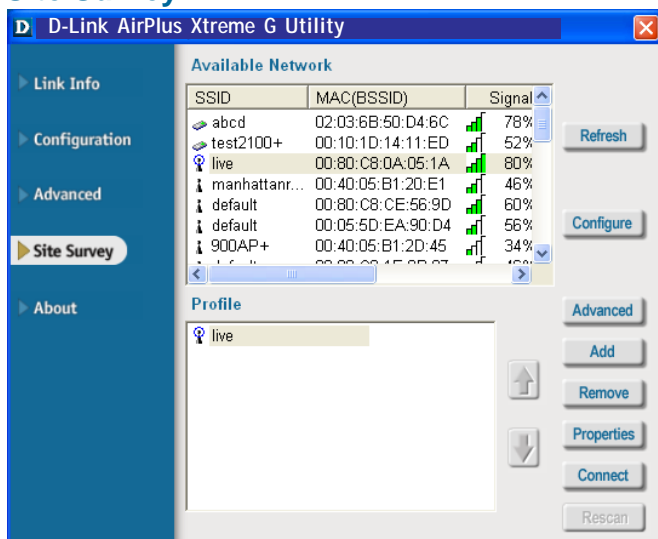
Using the Configuration Utility *(continued)*
Site Survey > Add

Advanced

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

Click **OK** to save the changes.

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/WPA2** in the *Authentication* field, please see detailed instructions for configuring WPA/WPA2 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.

Configuration, Add or Properties

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**.

Configuration	
SSID	cisco-blessing
Wireless Mode	Infrastructure
Data Encryption	Enabled
Authentication	Open
Key Length	64 bits (40+24) - 10 Hexadecin
IEEE 802.1X	Enabled

○ 1
○ 2
○ 3
○ 4

Click **Authentication Config.** ——— Authentication Config

IP Settings

OK   Cancel

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**

Advanced Security Settings	
WPA Passphrase	
EAP Type:	PEAP EAP-MSCHAPV2
User Certificate	
○ Validate Server Certificate	
User Name	Domain Name
Password	
Confirm Password	
TTLS Identity	

Add

Remove

OK   Cancel

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
EAP-TTLS	CHAP	TTLS Identity User Name Password
EAP-TTLS	MSCHAP	TTLS Identity User Name Password Domain Name
EAP-TTLS	MSCHAPv2	TTLS Identity User Name Password Domain Name

Using the Configuration Utility *(continued)*

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**.
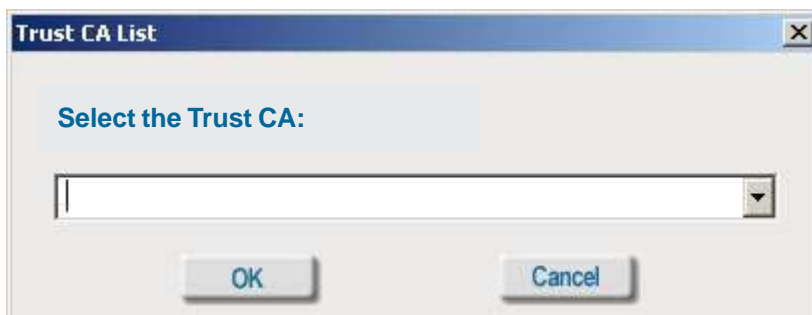
Using the Configuration Utility *(continued)*
Authentication > WPA/WPA2

Select the available network to which you want to connect.

Click **Configure**.

Select **WPA/WPA2** 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/WPA2-PSK

Select the available network to which you want to connect.

D D-Link AirPlus Xtreme G Utility

Available Network

▸ Link Info

SSID	MAC(BSSID)	Signal
abcd	02:03:6B:50:D4:6C	78%
test2183+	00:10:4D:14:11:ED	53%
live	00:80:C8:0A:05:1A	80%
manhattan...	00:40:05:B1:23:E1	48%
default	00:80:C8:CE:56:9D	60%
default	00:05:5D:EA:90:D4	56%
900AP+	00:40:05:B1:2D:45	34%

▸ Configuration

▸ Advanced

▸ Site Survey

▸ About

Refresh

Configure

Profile

live

Advanced

Add

Remove

Properties

Connect

Rescan

Click **Configure**.

⚠️
WPA/WPA2-PSK does require a RADIUS Server in the network.

Select **WPA/WPA2-PSK** in the *Authentication* field.

Configuration

SSID Lab_Broadcom11g

Wireless Mode Infrastructure

Data Encryption Enabled

Authentication WPA-PSK

Key Length 64 bits (40+24) - 10 Hexadecim

IEEE 802.1X Disabled

○ 1

○ 2

○ 3

○ 4

Click **Authentication Config**

Authentication Config

IP Settings

OK   Cancel

Using the Configuration Utility *(continued)*
Authentication > WPA/WPA2-PSK (continued)

Advanced Security Settings

Enter the **WPA/WPA2 Passphrase.**

Advanced Security Settings	
WPA Passphrase	
EAP Type:	
User Certificate	
○ Validate Server Certificate	
User Name	Domain Name
Password	
Confirm Password	
TTLS Identity	
	Add
	Remove

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

OK   Cancel

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:

Network Setup Wizard

Before you continue...

Before you continue, review the checklist for creating a network.

Then, complete the following steps:

* Install the network cards, modems, and cables.
* Turn on all computers, printers, and external modems.
* Connect to the Internet.

When you click Next, the wizard will search for a shared Internet connection on your network.

[< Back] [Next >] [Cancel]
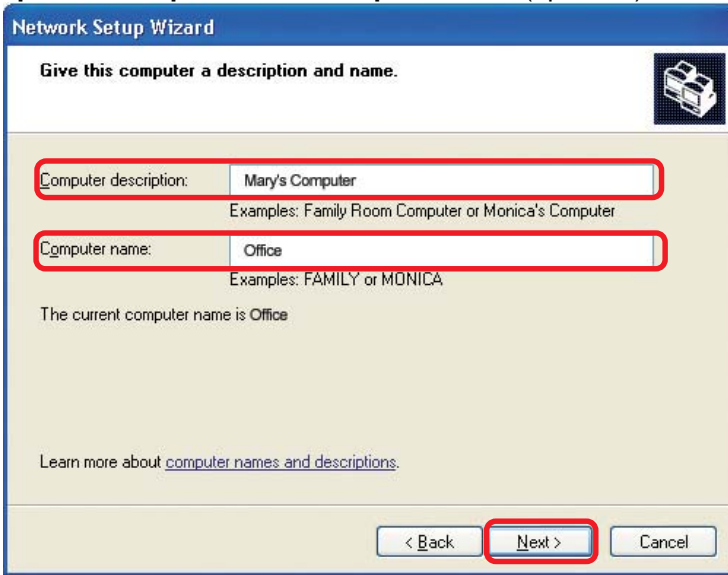
Click **Next**

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.

Network Setup Wizard

Select a connection method.

Select the statement that best describes this computer:

○ This computer connects directly to the Internet. The other computers on my network connect to the Internet through this computer.
    View an example.

⊙ This computer connects to the Internet through another computer on my network or through a residential gateway.
    View an example.

○ Other

Learn more about home or small office network configurations.

[< Back] [Next >] [Cancel]

Click **Next**

27

Networking Basics *(continued)*

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

Network Setup Wizard

Give this computer a description and name.

Computer description: Mary's Computer

Examples: Family Room Computer or Monica's Computer

Computer name: Office

Examples: FAMILY or MONICA

The current computer name is Office

Learn more about computer names and descriptions.

[< Back] [Next >] [Cancel]

Click **Next**

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

Network Setup Wizard

Name your network.

Name your network by specifying a workgroup name below. All computers on your network should have the same workgroup name.

Workgroup name: Accounting

Examples: HOME or OFFICE

[< Back] [Next >] [Cancel]

Click **Next**

Please wait while the **Network Setup Wizard** applies the changes.
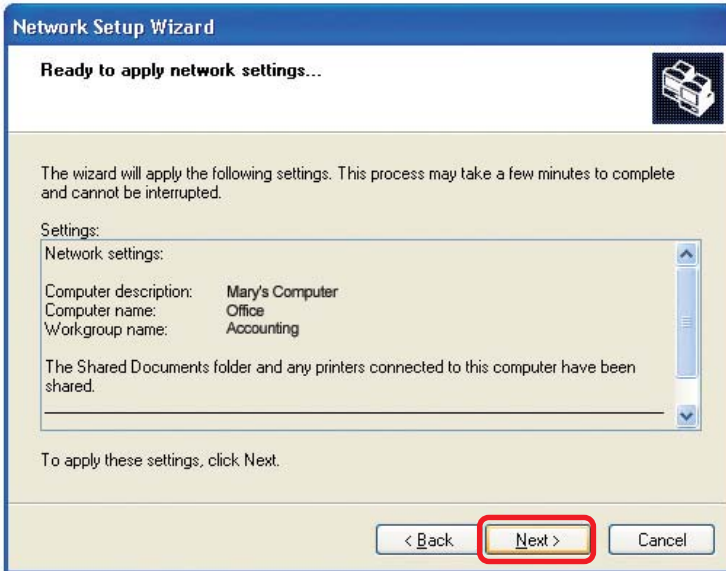
When the changes are complete, click **Next**.

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

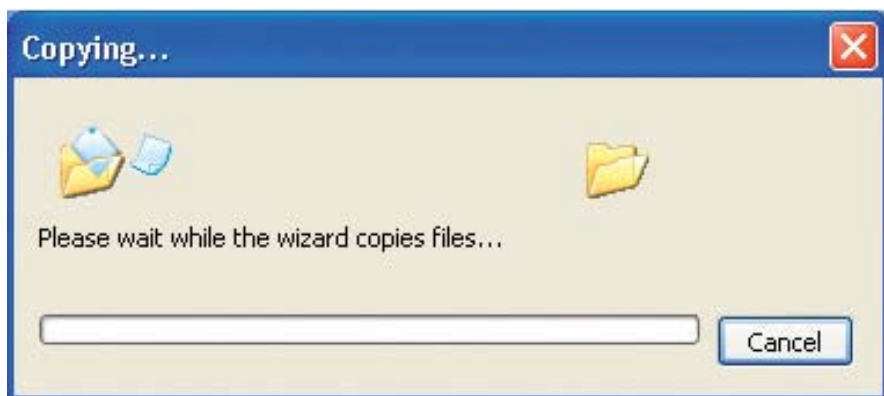## Networking Basics *(continued)*

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**.
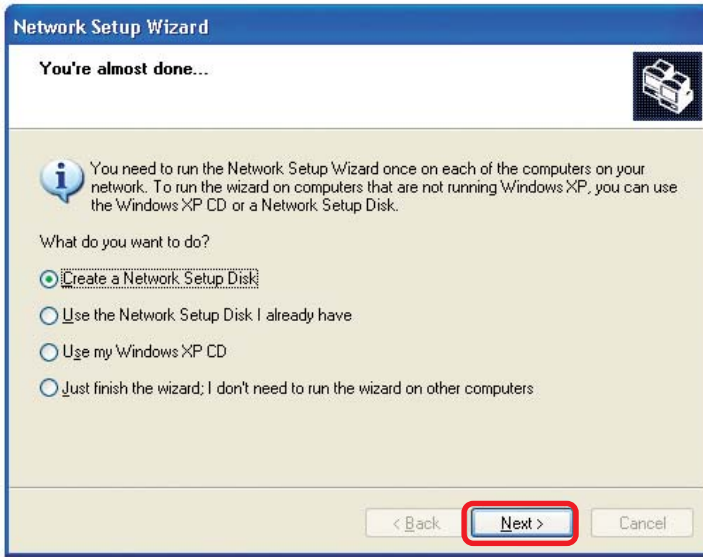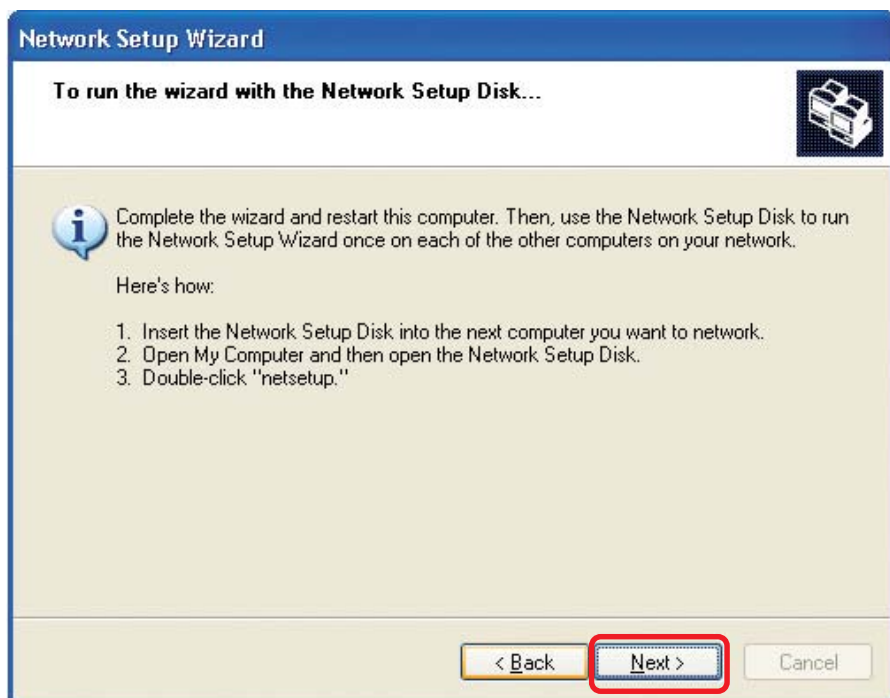

Insert a disk into the Floppy Disk Drive, in this case drive **A.**

Networking Basics *(continued)*

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.**

Networking Basics *(continued)*

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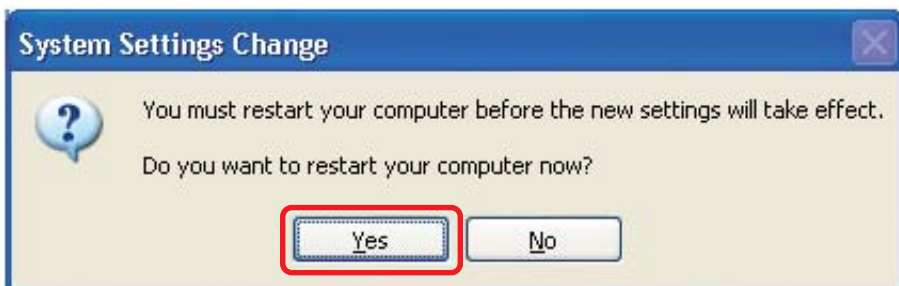
You have completed configuring this computer. Next, you will need to run the **Network Setup Disk** on all the other computers on your network. After running the **Network Setup Disk** on all your computers, your new wireless network will be ready to use.

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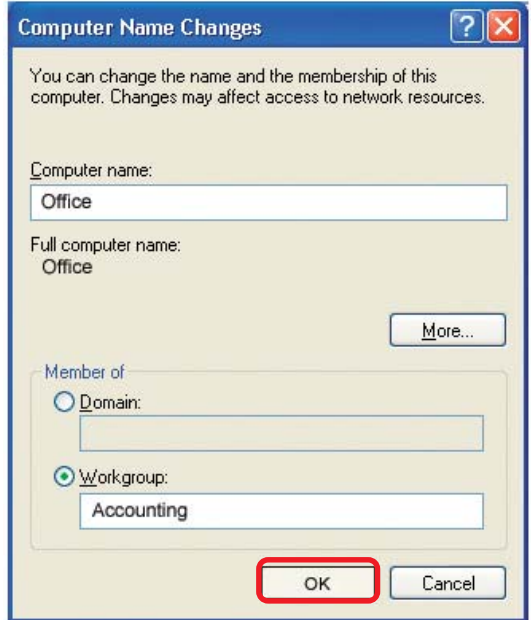- ■ Select **Properties** and click
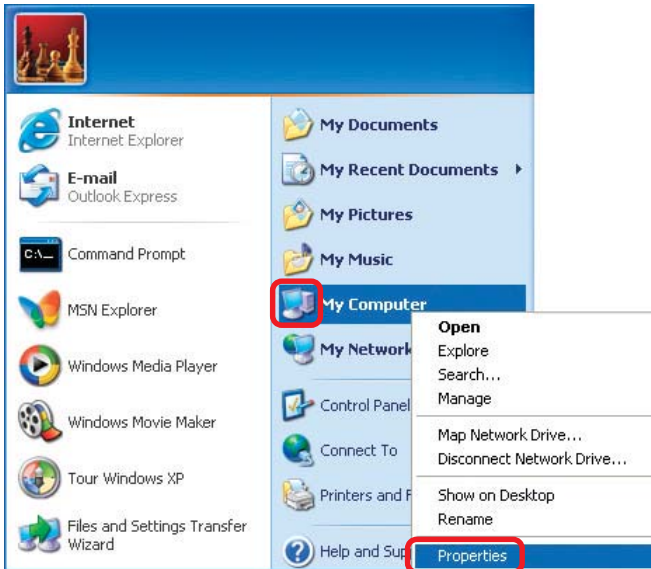
- ■ Select the **Computer Name Tab** in the System Properties window.

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

- ■ To rename the computer and join a domain, Click **Change**.
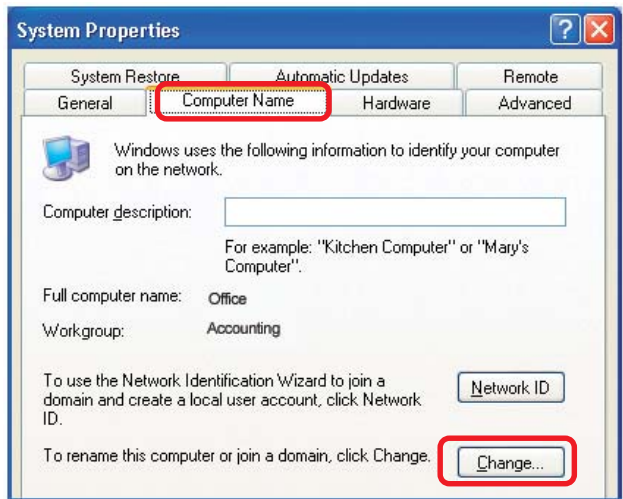
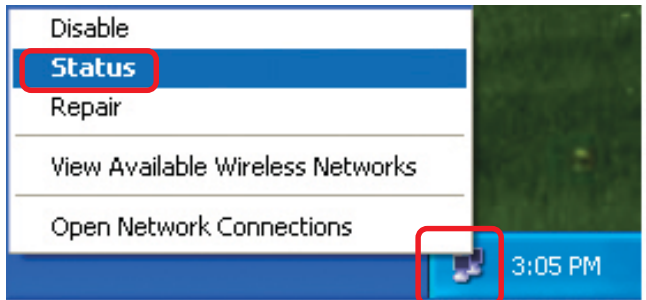## Networking Basics *(continued)*
Naming your Computer

- 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**

Computer Name Changes [?][X]

You can change the name and the membership of this computer. Changes may affect access to network resources.

Computer name:

Office

Full computer name:
Office

[More...]

Member of
- ○ Domain:

- ⊙ Workgroup:

  Accounting

[OK] [Cancel]

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:

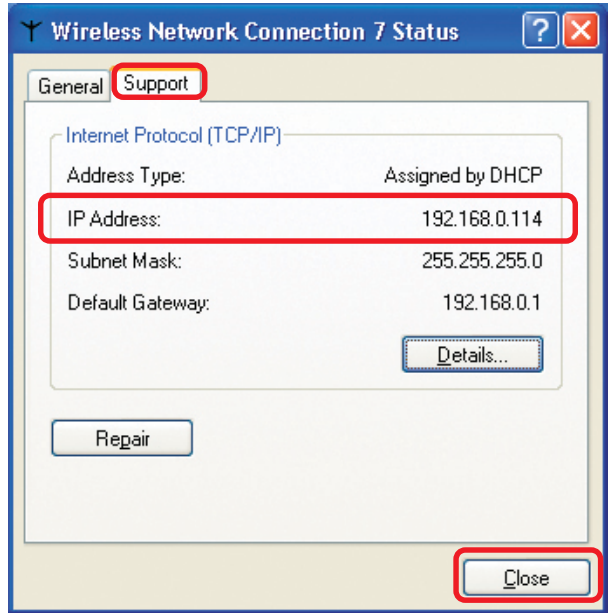- Right-click on the *Local Area Connection icon* in the task bar

- Click on **Status**

Disable
Status
Repair

View Available Wireless Networks

Open Network Connections

3:05 PM

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:
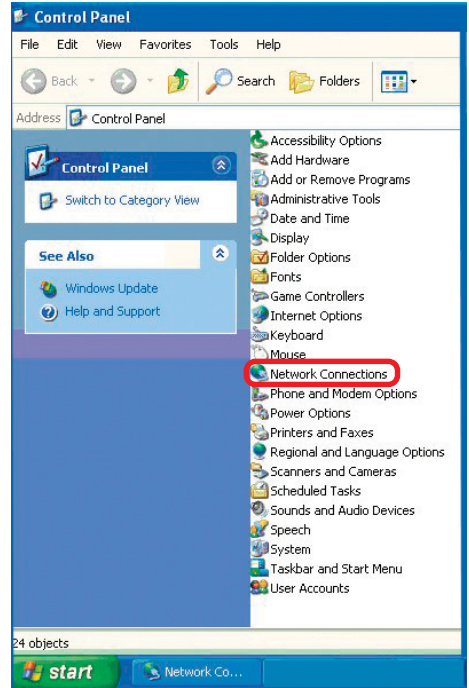
■ Go to **Start**

■ Double-click on
   Control Panel
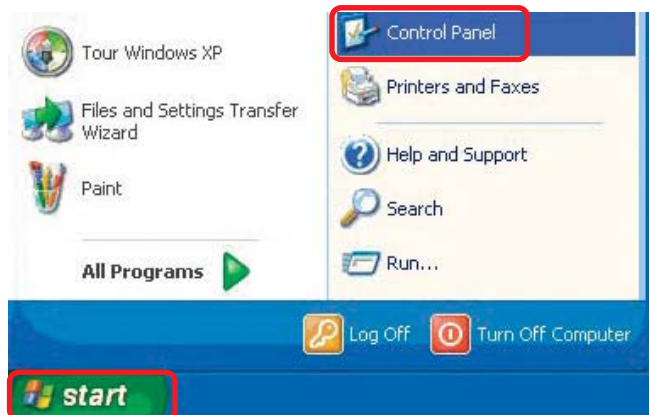
■ Double-click on **Network Connections**
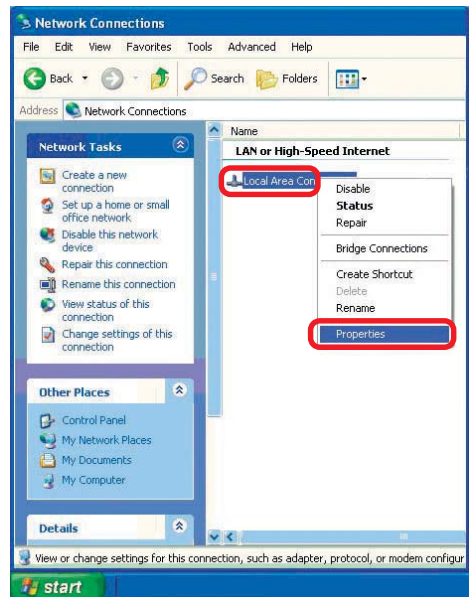
■ Right-click on **Local Area Connections**
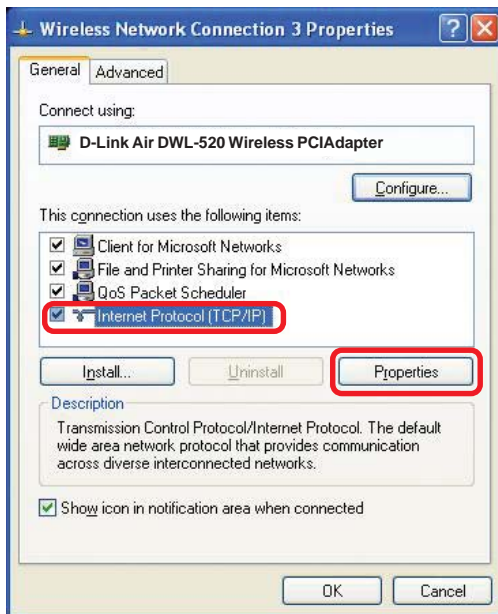
■ Double-click on **Properties**

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.)

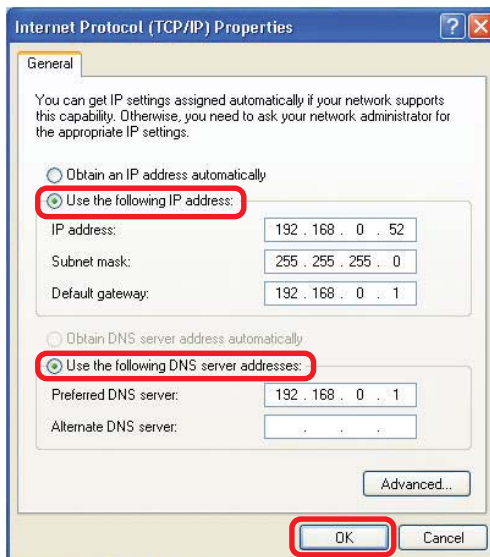**IP Address:**
e.g., 192.168.0.2

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)
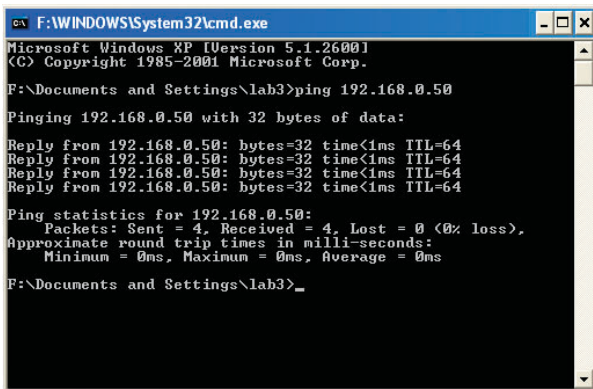
■ Click **OK**

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.)

Networking Basics *(continued)*
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.

```
F:\WINDOWS\System32\cmd.exe                              _ □ ×
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

F:\Documents and Settings\lab3>ping 192.168.0.50

Pinging 192.168.0.50 with 32 bytes of data:

Reply from 192.168.0.50: bytes=32 time<1ms TTL=64
Reply from 192.168.0.50: bytes=32 time<1ms TTL=64
Reply from 192.168.0.50: bytes=32 time<1ms TTL=64
Reply from 192.168.0.50: bytes=32 time<1ms TTL=64

Ping statistics for 192.168.0.50:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

F:\Documents and Settings\lab3>_
```
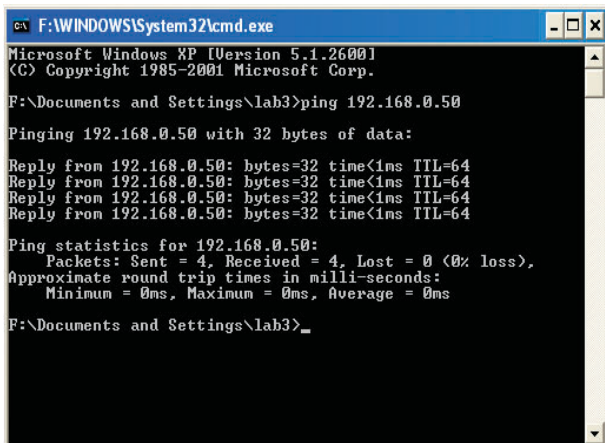
Checking the Wireless Connection
*by Pinging in Windows Me and 98**

■ 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.

```
F:\WINDOWS\System32\cmd.exe                              _ □ ×
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

F:\Documents and Settings\lab3>ping 192.168.0.50

Pinging 192.168.0.50 with 32 bytes of data:

Reply from 192.168.0.50: bytes=32 time<1ms TTL=64
Reply from 192.168.0.50: bytes=32 time<1ms TTL=64
Reply from 192.168.0.50: bytes=32 time<1ms TTL=64
Reply from 192.168.0.50: bytes=32 time<1ms TTL=64

Ping statistics for 192.168.0.50:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

F:\Documents and Settings\lab3>_
```

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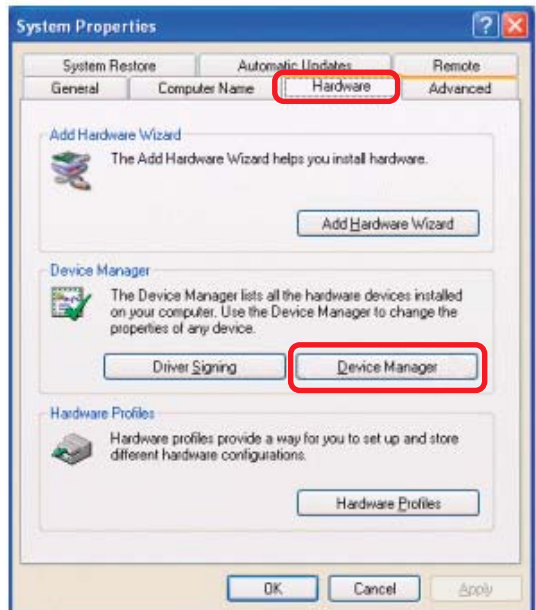
Troubleshooting

This chapter provides solutions to problems that can occur during the installation and operation of the DWA-520. 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 DWA-520 are installed properly.

■ Go to **Start** > **My Computer** > **Properties**
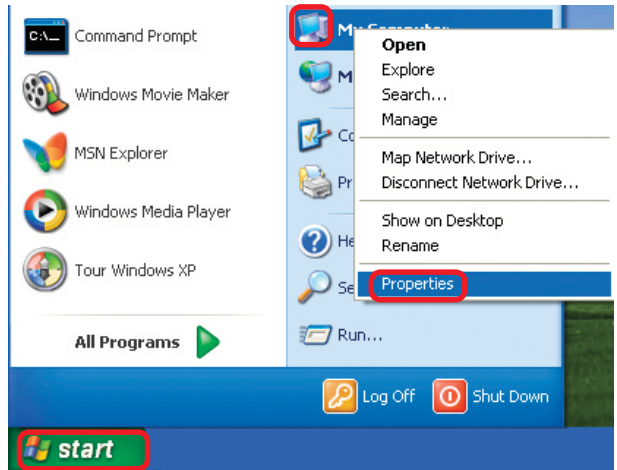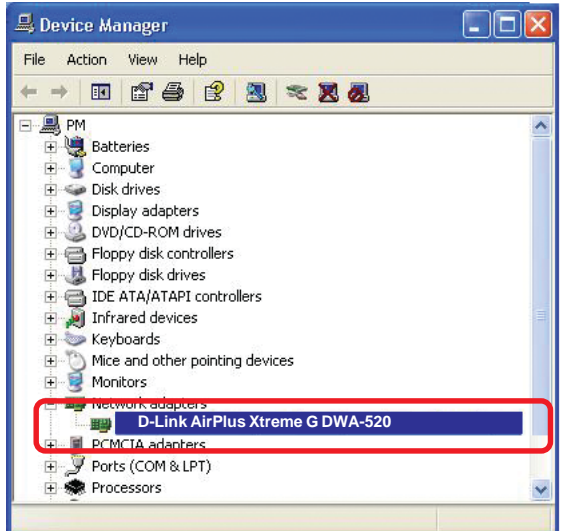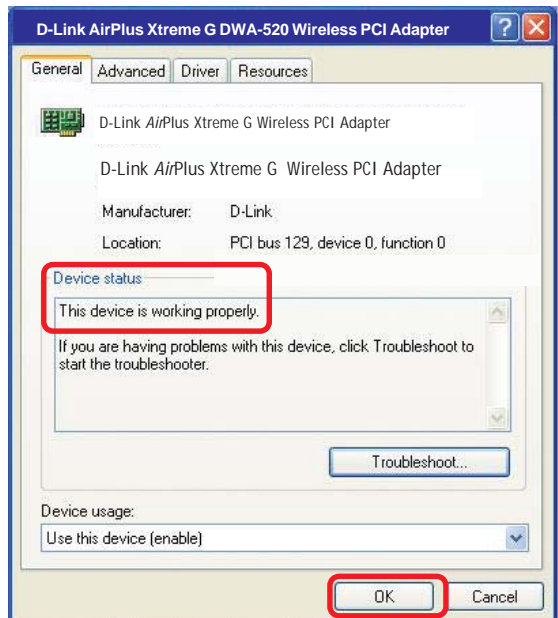
■ Select the **Hardware Tab**

■ Click **Device Manager**

Troubleshooting *(continued)*

■ 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**

Troubleshooting *(continued)*

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

- Make sure that the SSID on the DWA-520 Wireless PCI Adapter is exactly the same as the SSID on the Access Point or Wireless Router.

- Move the DWA-520 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 DWA-520. Turn on the Access Point, and then turn on the computer with the DWA-520.

- Refresh the DWA-520 Utility

3. The DWA-520 Power and Link lights are not on.

- Check to see if the DWA-520 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 DWA-520 Wireless PCI Adapter.

- Make sure that the DWA-520 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:

Troubleshooting *(continued)*

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 DWA-520 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.

Troubleshooting *(continued)*

■ 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 DWA-520 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 DWA-520.

■ Move the DWA-520 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;108Mbps

Security:
- 802.1x
- WPA/WPA2 (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 ~ 2.4835GHz

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:FCC Part 15B/C/MPE   Taiwan: LP0002

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

Federal Communication Commission Interference Statement

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

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

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

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

IMPORTANT NOTE:
FCC Radiation Exposure Statement:
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.
This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

NCC   :