

# **D-Link *AirPro* DWL-5000AP**

## **5 GHz Wireless Access Point**

### **Manual**

*Rev. 031502*

**D-Link**<sup>®</sup>  
Building Networks for People

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## Package Contents



### Contents of Package:

- D-Link *AirPro* DWL-5000AP 5GHz Wireless Access Point
- Power Cable
- Power Supply – 5V DC, 2.5A
- Manual on CD
- Printed Quick Installation Guide
- Console Cable

*Note: Using a power supply with a different voltage rating than the one included with the DWL-5000AP will cause damage and void the warranty for this product.*

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

### System Requirements:

- Computer with a Windows or Macintosh or Linux based operating system with an installed Ethernet adapter.
- Internet Explorer or Netscape Navigator, version 4.0 or above, with JavaScript enabled.

## Introduction

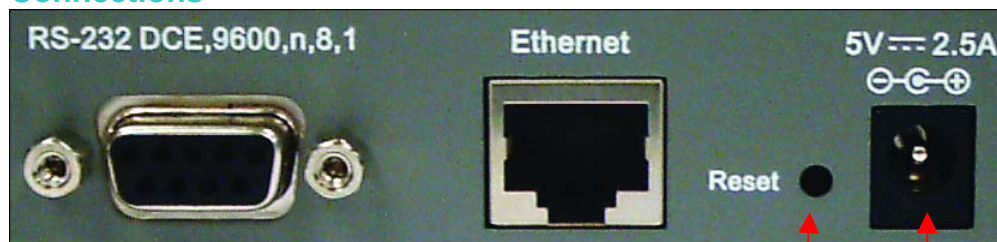
The D-Link *AirPro* DWL-5000AP Wireless Access Point is an IEEE 802.11a compatible, high performance, wireless access point that supports data transfer speeds of up to 72 Mbps in **Turbo Mode**.

It is an ideal way to extend the reach and number of computers connected to your wireless network. After completing the steps outlined in the *Quick Installation Guide* (included in your package) you will have the ability to share information and resources, such as files and printers, and take full advantage of a “connected” environment for work or play! Please take a look at our **Getting Started** section in this manual. You will see several options for setting up a network using the DWL-5000AP.

The DWL-5000AP is compatible with most popular operating systems, including Macintosh, Linux and Windows, and can be integrated into a large network. This Manual is designed to help you connect the Access Point and the D-Link *AirPro* 802.11a Wireless Adapters into a network in Infrastructure mode. The IEEE 802.11a standards compliance means that the DWL-5000AP gives you the flexibility to connect to any 802.11a network.

This manual provides a quick introduction to wireless technology and its application as it relates to networking. Take a moment to read through this manual and get acquainted with wireless technology.

## Connections



### Console Port

Connect the **Console Cable** to this port and to the **Com Port** on the computer for one method of Configuring the DWL-5000AP. You can also Configure the DWL-5000AP wirelessly, or through an Ethernet connection.

### MDIX Ethernet Port

- **Cross-over** cable is required when connecting to a router or switch
- **Straight-through** cable to connect to a computer

### Power inlet

Reset button

## Product Features

- Adheres to 802.11a standard in providing high data wireless transfer rates of up to 54 Mbps.\* Capable of providing data rates of up to 72 Mbps in **Turbo Mode**.
- Web-based interface for Managing and Configuring
- Eight non-overlapping Channels available to users
- Operation in the 5.2GHz Unlicensed National Information Infrastructure (U-NII) frequency band
- Orthogonal Frequency Division Multiplexing (OFDM) – a new technique for transmitting high-speed data over a radio wave.
- Dynamic data rate scaling from 6, 9, 12, 18, 24, 36, 48, 54 and 72Mbps depending upon reception quality.
- Maximum reliability, throughput and connectivity with automatic data rate switching.
- Supports Wired Equivalent Privacy (WEP) data encryption at 64/128/152-bit encryption with dynamic key exchange for security.
- Two external antennas

\*Maximum wireless signal rate based on IEEE Standard 802.11a specifications. Actual data throughput will vary. Network conditions and environmental factors, including volume of network traffic, building materials and construction, and network overhead lower actual data throughput rate.

## LEDS

**LED** stands for **Light-Emitting Diode**. The **DWL-5000AP Wireless Access Point** has 4 LEDs as shown below:

LED	LED Activity
Power	Steady light indicates a connection to a power source
10M	Flashes steadily to indicate connection; intermittent flashes indicate activity at 10Mbps
100M	Flashes steadily to indicate connection; intermittent flashes indicate activity at 100Mbps
11a	Flashes steadily to indicate a wireless connection

## Wireless Basics

D-Link *AirPro* wireless products are based on industry standards to provide easy-to-use and compatible high-speed wireless connectivity within your home or business. Strictly adhering to IEEE 802.11a, the D-Link *AirPro* wireless family of products will allow you to access the data you want, when and where you want it. No longer will you be limited to one location or forced to run new wiring through your home or office. You will be able to enjoy the freedom that wireless networking delivers.

A wireless LAN (WLAN) is a cellular computer network that transmits and receives data with radio signals instead of wires. Wireless LANs are used increasingly in both home and office environments. 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 network applications they use on an Ethernet LAN. Wireless adapter cards used on laptop and desktop systems, support the same protocols as Ethernet adapter cards. For most users, there is no noticeable functional difference between a wired Ethernet desktop computer and a wireless computer equipped with a wireless adapter other than the added benefit of the ability to roam within the wireless-cell. Under many circumstances, it may be desirable for mobile network devices to link to a conventional Ethernet LAN in order to use servers, printers or an Internet connection supplied through the wired LAN. A Wireless Access Point (AP) is a device used to provide this link.

People use wireless LAN technology for many different purposes.

**Mobility** - Productivity increases when people have access to data in any location within the operating range of the WLAN. Ad-hoc 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, both physically and logically, can benefit from WLANs ease of implementation. WLANs can operate in locations where installation of wiring may be impractical. Furthermore, IEEE standardization mandates interoperability of all WLAN devices that conform to the 802.11a set of standards.

**Installation Speed and Simplicity** - Installing a wireless LAN system can be fast and easy and can eliminate the need to pull cable through walls and ceilings.

## Wireless Basics *(continued)*

**Installation Flexibility** - Wireless technology allows the network to go where wires cannot go.

**Reduced Cost-of-Ownership** - While the initial investment required for wireless LAN hardware might be higher than the cost of wired LAN hardware, overall installation expenses and life-cycle costs will be significantly lower. Long-term cost benefits are greatest in dynamic environments requiring frequent moves, adds, and changes.

**Scalability** - Wireless LAN systems can be configured in a variety of topologies 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 full infrastructure networks of thousands of users that allow roaming over a broad area.

D-Link *AirPro* Wireless LAN products include:

- ◆ 802.11a 5GHz Wireless Cardbus Adapters used with laptop computers (DWL-A650)
- ◆ 802.11a 5GHz Wireless PCI cards used with desktop computers (DWL-A520)
- ◆ 802.11a 5GHz Wireless Access Points (DWL-5000AP)

### **Standards - Based Technology**

The IEEE 802.11a standard designates that devices operate at an optimal data rate of 54 Megabits per second. This means 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**rtogonal **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. D-Link *AirPro* products will automatically sense the best possible connection speed to ensure the greatest speed and range possible with the technology.

## Wireless Basics *(continued)*

### Installation Considerations

Designed to go up to 900 feet (~300 meters), D-Link *AirPro* DWL-5000AP lets you access your network with your laptop computer from virtually anywhere you want. Keep in mind, however, that the number and thickness of walls, ceilings or other objects that the wireless signals must pass thru may limit range. Typical ranges vary depending on the types of materials and background RF noise in your home or business. The key to maximizing range is to follow these basic principles:

1. Keep the number of walls and ceilings between the Access Point and your receiving device to a minimum - Each wall or ceiling can reduce your D-Link *AirPro* Wireless product's range from 3-90 feet (1-30 meters.) For some businesses or for a large residential home deployment, it may be beneficial to have more than one access point with overlapping coverage.
2. Be aware of the direct line between Access Points and computers with wireless adapters - 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! Try to make sure that the Access Points and Adapters are positioned so that the signal will travel straight through a wall or ceiling for better reception.
3. Building Materials make a difference - A solid metal door or aluminum studs may have a negative effect on range. Try to position Access Points, and computers with wireless adapters so that the signal passes through drywall or open doorways and not other materials.
4. Make sure that the antenna is positioned for best reception by using the software signal strength tools included with your product.
5. Keep your product away (at least 3-6 feet or 1-2 meters) from electrical devices or appliances that generate extreme RF noise.



## Wireless Basics *(continued)*

For the average residence, range should not be a problem. If you experience low or no signal strength in areas of your home that you wish to access, consider positioning the Access Point in a location directly between the computers with wireless adapters that will be connected. Additional Access Points can be connected to provide better coverage in rooms where the signal does not appear as strong as desired.

Using radio frequency (RF) technology, WLANs (Wireless Local Area Networks) transmit and receive data over the air, minimizing the need for wired connections. Thus, WLANs combine data connectivity with user mobility, and, through simplified configuration, enable movable LANs.

## Getting Started

To begin, select the type of wireless network you will be building. We will discuss the following types of networks in this section:

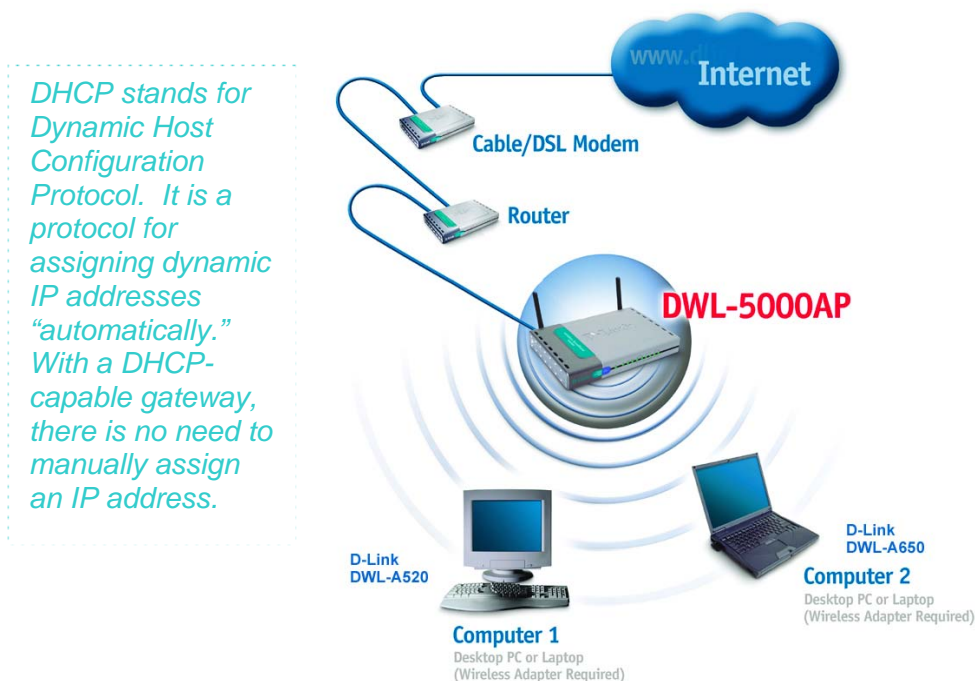
1. *A Home Internet Network with A Residential Gateway/Router*
2. *A Home Internet Network with Multiple IP Addresses*

Please select, from the two types of networks described above, the type of network that is appropriate for your needs. Please follow the instructions in the corresponding section that follows.

### 1. A Home Internet Network with A Residential Gateway/Router

*(Network administrators with Dynamic IPs can also follow these instructions.)*

If you have two or more computers (laptops or desktops) and want to share files, printers, and Internet access using a DHCP-capable Residential Gateway/Router – or - if you want to connect to an Ethernet network that uses Dynamic (DHCP) IP addresses, then follow the instructions on the next page. When it is complete, your network may look similar to this:



## 1. A Home Internet Network with A Residential Gateway/Router

*(continued)*

*(Requirements: A Residential Gateway/Router connected with an Ethernet (CAT5) cable to an 802.11a Access Point such as the DWL-5000AP.)*

This type of installation requires that you provide a dynamic IP address for each computer on your network. You will need a DHCP-capable Residential Gateway/Router for your network.

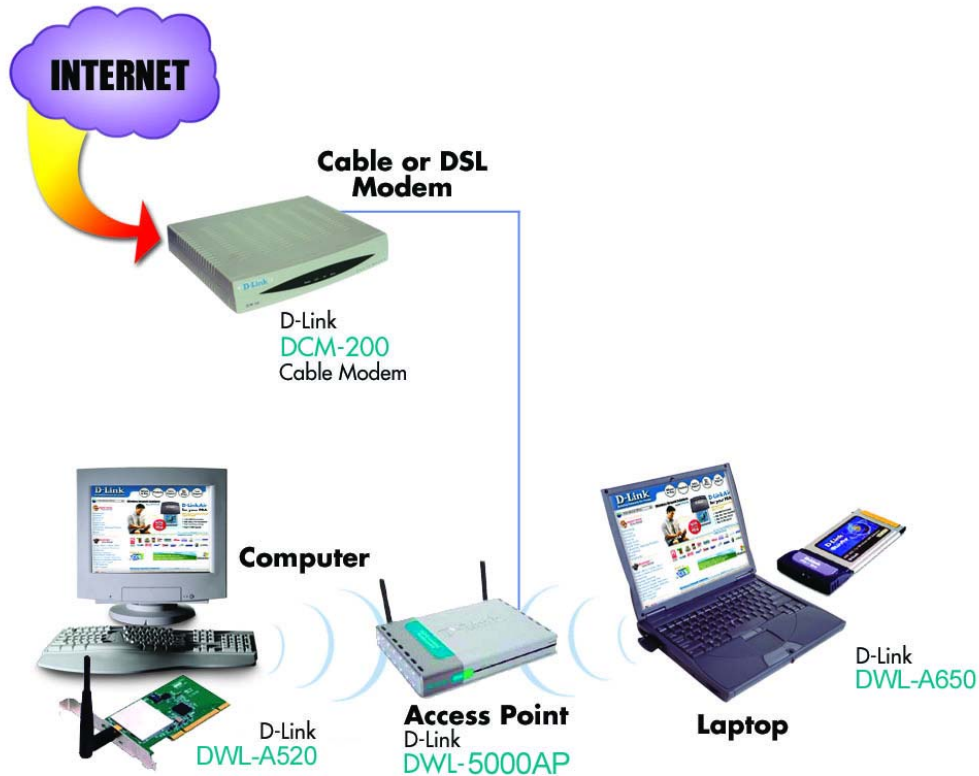
**To complete the installation, please follow these steps:**

1. Connect the **Router/Gateway** (for example, the **D-Link DI-704P**) to a Broadband connection, (e.g., a **Cable** modem such as the **D-Link DCM-200** cable modem or a **DSL** modem such as the **D-Link DSL-300**.)
2. Connect the 802.11a Access Point (**DWL-5000AP**) to the router.
3. Install the **D-Link AirPro DWL-A650 Wireless Cardbus Adapter** into a laptop computer on your wireless network. (You can also install the **DWL-A520 AirPro Wireless PCI Adapter** into your desktop computer. Please refer to the **Quick Install Guide** included with each product.)
4. Check the **Device Manager** to confirm that the wireless adapter is installed correctly. Please refer to the **Troubleshooting** section in this manual entitled: **Checking the Installation of the Drivers for the Wireless Adapter**.
5. *By default, the wireless adapter is set to obtain a Dynamic IP Address.* If you are having difficulty connecting, check to make sure that the **IP Address** of the **wireless adapter** is within the IP address range of your network. Please refer to the **Networking Basics** section in this manual entitled: **Checking The IP Address**.
6. Learn to share printers and files. Please refer to the **Networking Basics** section in this manual entitled: **Adding and Sharing Printers in Windows XP**.

## 2. A Home Internet Network with Multiple IP Addresses

*(Network administrators with Static IPs can also follow these instructions.)*

If you have two or more computers (laptops or desktops) and want to share files, printers, and Internet access using multiple IP addresses that you have purchased from your Internet Service Provider **-or-** you want to connect to an Ethernet network that uses Static IP Addresses, then follow the instructions on the next page. When you have completed your network, it should look similar to this:



Please note that this type of installation requires that your ISP (Internet Service Provider) provides you a static IP address for each computer and the Access Point on your network. Please refer to the manual that came with your Access Point to determine its configuration.

## 2. A Home Internet Network with Multiple IP Addresses (continued)

Please follow these steps to complete the installation:

1. Connect the **Wireless Access Point** (the **D-Link AirPro DWL-5000AP**) to a Broadband connection (i.e., a **Cable** modem such as the **D-Link DCM-200** cable modem.)
2. Install the **D-Link AirPro DWL-A650 Wireless Cardbus Adapter** into the laptop computer(s) on your wireless network. (You can also install the **D-Link AirPro DWL-A520 Wireless PCI Adapter** into your desktop computers. Please refer to the **Quick Install Guide** included with each product.)
3. Check the **Device Manager** to confirm that the **wireless adapter** is installed correctly. Please refer to the **Troubleshooting** section in this manual entitled: **Checking the Installation of the Drivers for the Wireless Adapter**.
4. Set the **Static IP Address** of the **wireless adapters**. Please refer to the **Networking Basics** section in this manual entitled: **Assigning an IP Address**.

**Note:** *The IP Address for all computers must be in the same IP Address range, and the Subnet Mask must be the same for all the computers on 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 should be assigned an IP Address of 192.168.0.3 with a Subnet Mask of 255.255.255.0, etc. Each computer must have a unique IP Address. If two devices share an identical AP Address, a conflict occurs, and one device may not be visible on the network.*

*If you are using a **PPPoE client (Point to Point Protocol over Ethernet)** please contact your **ISP (Internet Service Provider)** for further instructions regarding connecting to the Internet.*

5. Learn to share printers and files. Please refer to the **Networking Basics** section in this manual entitled: **Adding and Sharing Printers in Windows XP**.



## Using the Configuration Utility

The **Configuration Utility** program for the DWL-5000AP is web-based. You will need a JavaScript-enabled web-browser such as the Internet Explorer 4.0 or higher, or the Netscape Navigator 4.0 or higher. **The computer that you are using for initial configuration must have an IP Address within the same range as the IP Address of the DWL-5000AP.** (Please refer to the *Quick Installation Guide* for more information.) If you are using a D-Link router in your network, such as the DI-704P, with the factory default settings, you will not need to assign a static IP Address. However, if you are not using a D-Link router in your network, you will need to assign a Static IP Address, within the IP Address Range of the DWL-5000AP. (Please see **Networking Basics** in this manual for information on **Assigning a Static IP Address.**)

To use the Configuration Utility, open the web-browser and type in the IP Address of the DWL-5000AP. The DWL-5000AP IP Address is shown below:

- Open the web browser
- Type in the **IP Address** of the Access Point
- Type **Admin** in the **User Name** field (Upper case **A**, lower case **dmin**)
- Leave the **Password** blank
- Click **OK**



The screen below will appear.

- Click **Configuration**



## Using the Configuration Utility *(continued)*

### General Configuration

In this window you can make changes to the default settings, if you wish. D-Link 802.11a *AirPro* products network together, out of the box, with the **default** settings. No configuration is needed. All computers on the network must be within the same **IP Address range**, and have the same settings for the **Radio Channel**, **Turbo Mode** and **SSID** in order to communicate.

D-Link Driving the Wireless Future 5GHz Wireless Access Point

DWL-5000AP

Statistics Configuration About

General | Shared Keys | Per Station Privacy | Configuration Script | Firmware Update

Configuration -> General Update Help

SSID: Default

System Name:

Radio Channel: 60, 5.30GHz

Enable Auto Channel Select:

Turbo: Off Turn Turbo On

Enable Encryption:

Authentication Type:  Open System  Shared Key

IP Address: 192 . 168 . 0 . 50

Subnet Mask: . . . .

Default Gateway Address: 192 . 168 . 0 . 1

UserName: Admin

Password:

Click the Advanced button to the advanced configuration menu

General | Shared Keys | Per Station Privacy | Configuration Script | Firmware Update

- To make changes, enter the changes in the appropriate fields and click **Update**.
- To create **Advanced** settings, click **Advanced**.
- If you need help, click **Help** in any **Configuration** window.
- To accept these **Default Settings**, make no changes in this window. To view another Configuration window, click **Shared Keys**, near the top of the window.



## Using the Configuration Utility (continued) Shared Keys

For added security on your network, you can use this window to configure encryption keys. Encryption is optional. If you do use encryption, then all the computers on the network, and the DWL-5000AP, must use the same encryption key in order to communicate.

The screenshot shows the 'Shared Keys' configuration page for a D-Link DWL-5000AP. The page has a blue header with the D-Link logo and the text 'Driving the Wireless Future 5GHz Wireless Access Point'. Below the header are tabs for 'Statistics', 'Configuration', and 'About'. The 'Configuration' tab is active, and the 'Shared Keys' sub-tab is selected. There are 'Update' and 'Help' buttons. The configuration table has four rows, each with a radio button, an 'Encryption Key' field, and a 'Key Length' dropdown menu. The first row is selected, and the 'Key Length' dropdown is open, showing options: 64 (40+24) 10 hex digits, None, 64 (40+24) 10 hex digits (highlighted), 128 (104+24) 26 hex digits, 152 (128+24) 32 hex digits, and None. Red arrows point to the 'Encryption Key' and 'Key Length' headers.

Default:	Encryption Key	Key Length
1:	<input type="radio"/> 1111111111	64 (40+24) 10 hex digits
2:	<input type="radio"/>	None
3:	<input type="radio"/>	64 (40+24) 10 hex digits
4:	<input type="radio"/>	128 (104+24) 26 hex digits
		152 (128+24) 32 hex digits
		None

- From the pull-down **Key Length** menu, select the **Key Length**.
- Enter the **Encryption Key**. The **Encryption Key** must be in a hexadecimal format. For **64-bit** encryption, you must type exactly **10** hexadecimal digits in the **Encryption key** field; for **128-bit** encryption, you must type exactly **26** hexadecimal digits, and for **152-bit** encryption, you must type exactly **32** hexadecimal digits.

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

- Click **Update**

## Using the Configuration Utility *(continued)*

### Per Station Privacy

**ACL (Access Control List)** gives you the option of allowing or disallowing association with the Access Point for certain computers on your network. **ACL** is optional. MAC Addresses are used to create this list. If you choose to use this function, please do the following:



- Click on the pull-down menu to the right of **ACL**, select **Enable** or **Disable**
- Click **Add** to add a new **ACL**



- Input the **MAC Address** of the new member of the **ACL**

- **ACL Type:** For an extra level of security on the network, enter **Default Shared Key**, or a specific **Unique Key** (either 64, 128 or 152 bits.) If you select **Allow** in this field, you must keep the **Unique Key** field blank.

## Using the Configuration Utility *(continued)*

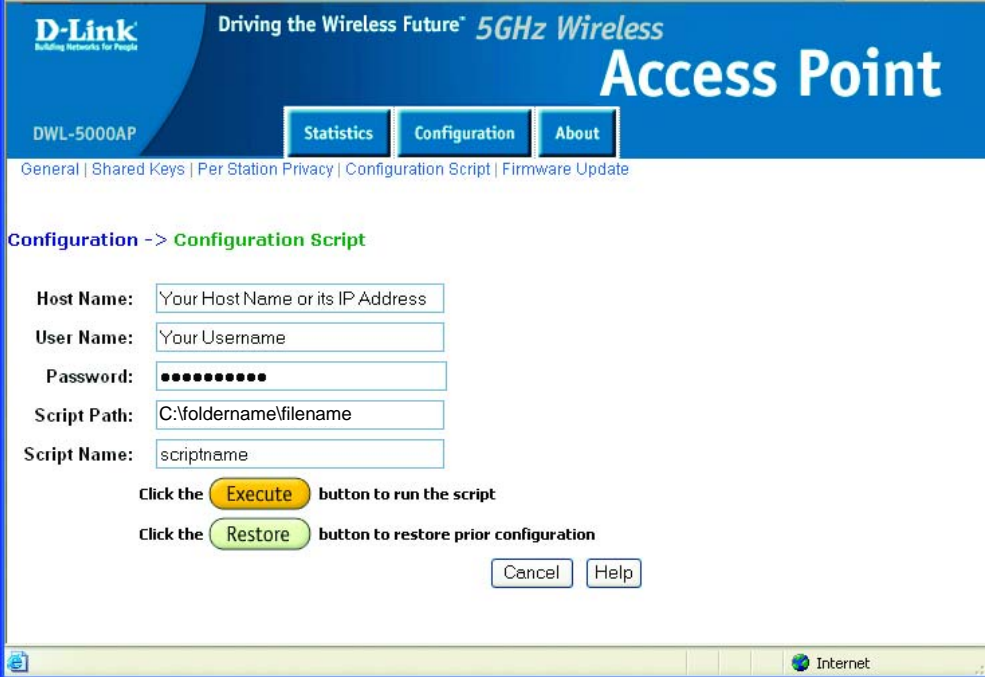
### Per Station Privacy

The screenshot shows the D-Link Access Point configuration utility for model DWL-5000AP. The page title is "Access Point" and the sub-page is "Per Station Privacy". The breadcrumb trail is "Configuration -> Per Station Privacy -> New". The "MAC Address" field contains "00:50:5d:12:23:56" with a note "(MAC Address format: aa:bb:cc:dd:ee:ff)". The "ACL Type" dropdown menu is set to "Default Shared Key", indicated by a red arrow. The "Unique Key" field contains "1111111111" with a note "(If unique key is used in ACL type)". Below the fields are three buttons: "Add to List", "Back", and "Help". The "Add to List" button is circled in yellow. The browser's status bar at the bottom shows "Done" and "Internet".

- If you select **Default Shared Key** in the **ACL Type** field, you will then enter the **WEP encryption key** that is shared on your network into the **Unique Key** field.
- If you select a specific **Unique Key** (such as 64, 128 or 152 bits) in the **ACL Type** field, a **Unique Key**, in the format you selected (64,128,152 bits,) will be generated in the **Unique Key** field.
- Click **Add to List**

## Using the Configuration Utility (continued) Configuration Script

If you are using multiple Access Points on your network, after you have completed the configuration of one DWL-5000AP, you can use the **Configuration Script** to configure all the other DWL-5000APs. To use this function, please do the following:



The screenshot shows the D-Link DWL-5000AP Configuration Utility web interface. The page title is "Access Point" and the model is "DWL-5000AP". The navigation menu includes "Statistics", "Configuration", and "About". The "Configuration" section is active, and the "Configuration Script" sub-section is selected. The form contains the following fields and buttons:

- Host Name:** Input field with placeholder text "Your Host Name or its IP Address".
- User Name:** Input field with placeholder text "Your Username".
- Password:** Input field with placeholder text "••••••••".
- Script Path:** Input field with placeholder text "C:\foldername\filename".
- Script Name:** Input field with placeholder text "scriptname".
- Execute:** A yellow button to run the script.
- Restore:** A green button to restore prior configuration.
- Cancel:** A button to cancel the operation.
- Help:** A button to access help.

- Enter the **Host Name** of the computer in which the **Script Name** resides
- Enter the **User Name** and **Password** of the host computer
- Enter the **Script Path** using the format in the example above
- Enter the **Script Name** (the file name of the Configuration Script)
- Click **Execute** if you make any changes in this window

- Click **Help** for more information regarding writing **Configuration Script**

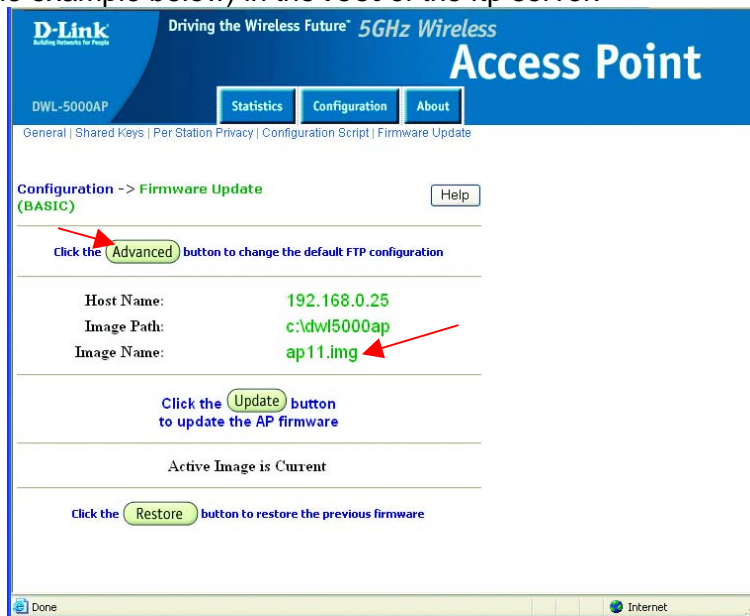
## Using the Configuration Utility *(continued)*

### Firmware Update

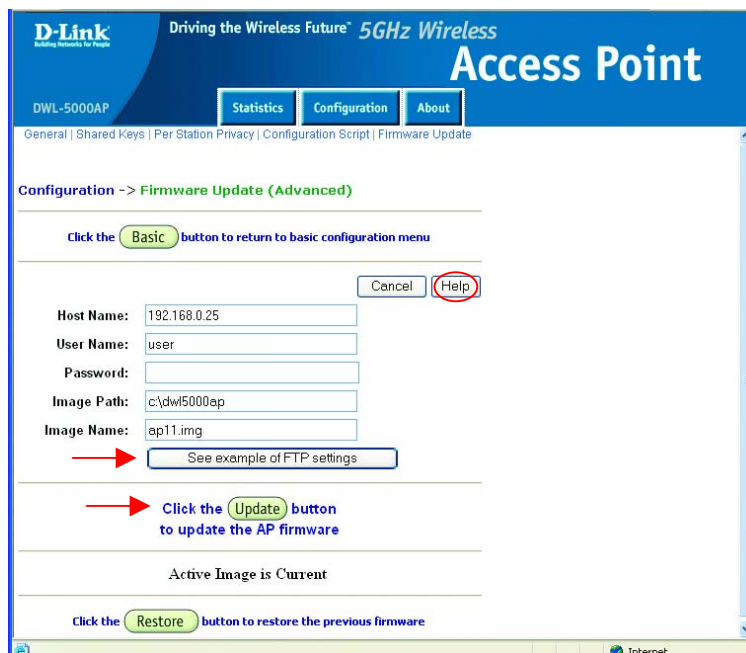
To update your firmware, an ftp server is required. Place the **Image Name** file (**ap11.img** in the example below) in the **root** of the ftp server.

- Click **Advanced** to update the firmware

*(Note: Do not power down or cancel the AP during the update or the update will be lost. Click **Help** at any time for more information)*



- Enter the IP Address of the ftp server in the **Host Name** field.
- Enter the **User Name**. (**Anonymous** is frequently used.)
- If there is no password, leave it blank.
- The **Image Path** is not required if the image file is placed in the ftp root.
- Click **Update**

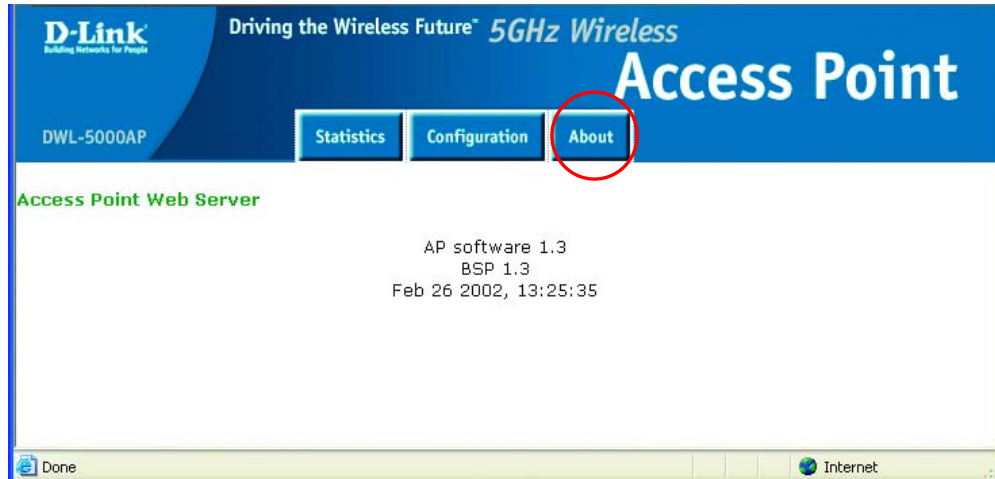


## Using the Configuration Utility (continued) Firmware Update

After you click **Update**, the screen below will appear. It may take a few moments to update the Firmware.



- Click **About**, when the upgrade is complete. Information about the updated firmware will be displayed.



## Using the Configuration Utility *(continued)* Statistics

- Click **Statistics** for more detailed information about the DWL-5000AP

**D-Link** Driving the Wireless Future™ 5GHz Wireless  
**Access Point**

DWL-5000AP **Statistics** Configuration About

BSS Stats ->  
**AP 00:28:38**

State	Authentication Type	Power Save	WEP
up	open-system	no	off

Authentication	Deauthentication	Associations	Disassociation
0	0	0	0

	MSDU	Data	Multicast	Management	Control	Errors
Receive	38	0	0	38	0	1
Transmit	133	77	88	56	0	0

Broadcast/Multicast Transmit Rate (Mbps)	Short Frame	Long Frame
(Mbps)	24	24

Receive Errors	Ack Rcv Failures	FCS Failures	CRC Errors
1	3	1	1

Short Transmit Frame Retries	1 Retry
3	3

Done [Signal Strength] Internet

It is recommended that you use an **Ethernet** connection for configuring the DWL-5000AP through the web-browser.

If there is a problem accessing the web configuration through an Ethernet connection, the **Console port** is provided as an alternate method of connection. To use the **Console port**, first connect one end of the **Console cable** to the **Console port** on the DWL-5000AP (the Console Port settings are **9600,n,8,1**) and the other end to the **Com port** on the computer. Using **Hyper Terminal**, a program available in Windows Operating Systems, you will enter **Admin** (upper case **A**) in the **User Name** field, and leave the password blank. Type in **Help** at the prompt. You can now configure the DWL-5000AP using the **CLI** (Command Line Interface) in the Hyper Terminal program.

Note: The Ethernet port on the DWL-5000AP is a MDIX port. You will need to use a straight-through Ethernet cable when connecting the DWL-5000AP to a computer; and you will need to use a cross-over Ethernet cable when connecting the DWL-5000AP to a router or switch.



## Troubleshooting

This chapter provides solutions to problems that can occur during the installation and operation of the DWL-5000AP Wireless Access Point. We cover various aspects of the network setup, including the network adapters. Please read the following if you are having problems.

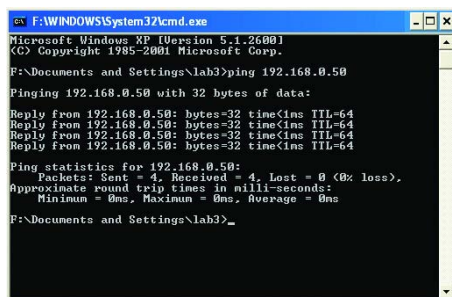
**(Note: It is recommended that you use an Ethernet connection to configure the DWL-5000AP Access Point.)**

### 1. The computer used to configure the DWL-5000AP cannot access the Configuration menu.

- Check that the **Ethernet LED** on the DWL-5000AP is **ON**. If the **LED** is not **ON**, check that the cable for the Ethernet connection is securely inserted.
- Check that the Ethernet Adapter is working properly. Please see item 6 (**Check that the drivers for the network adapters are installed properly**) in this **Troubleshooting** section to check that the drivers are loaded properly.
- Check that the **IP Address** is in the same range and subnet as the DWL-5000AP. Please see **Checking the IP Address in Windows XP** in the **Networking Basics** section of this manual.

**Note: The IP Address of the DWL-5000AP is 192.168.0.50. All the computers on the network must have a unique IP Address in the same range, e.g., 192.168.0.x. Any computers that have identical IP Addresses will not be visible on the network. They must all have the same subnet mask, e.g., 255.255.255.0**

- Do a **Ping test** to make sure that the DWL-5000AP is responding. Go to **Start>Run>Type Command>Type ping 192.168.0.50**. A successful ping will show four replies.



```
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<ins TTL=64
Reply from 192.168.0.50: bytes=32 time<ins TTL=64
Reply from 192.168.0.50: bytes=32 time<ins TTL=64
Reply from 192.168.0.50: bytes=32 time<ins 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

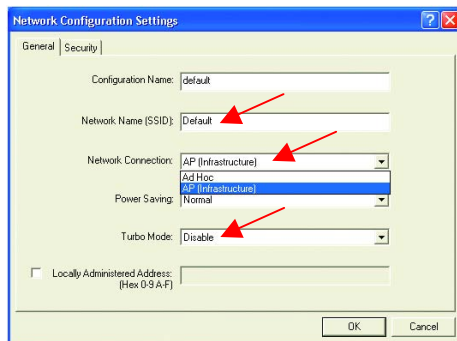
F:\Documents and Settings\lab3>_
```

## Troubleshooting (continued)

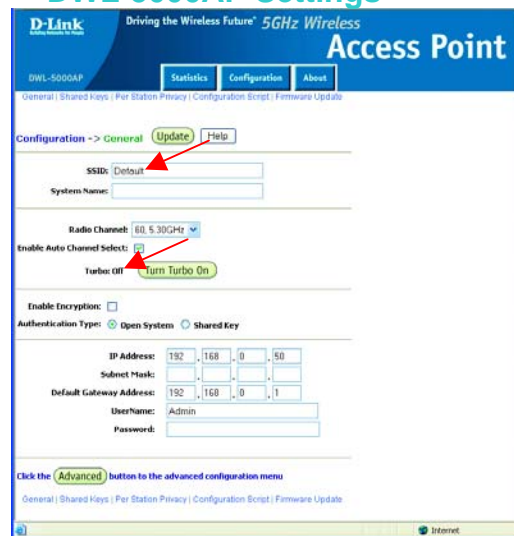
### 2. The computer with the wireless adapter installed is unable to connect to the wireless network.

In the example below, we show you the settings of the DWL-A650 wireless cardbus adapter. You may be using other adapters, but the procedure will remain the same. The first screen and the path to reach it, can be found in the **Networking Basics** section in this manual entitled: **Checking the Wireless Configuration of the Network Adapter**. The second screen and the path to reach it, can be found in the **Using the Configuration Utility** section of this manual.

#### 802.11a Network Adapter Settings



#### DWL-5000AP Settings

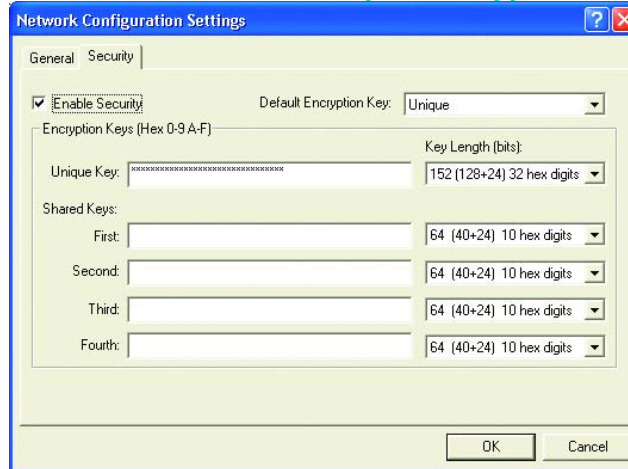


- In **Infrastructure** mode, make sure the same **Service Set Identifier (SSID)** is specified in the settings for the wireless clients and access points. The **SSID** factory default setting for the D-Link *AirPro* products is **Default** (Upper-case **D**, with the remainder of the word in lower-case.) Please refer to **Checking the Wireless Configuration** in the **Networking Basics** section of this manual for more information.
- Check that the **Network Connection** for the wireless client is configured properly. Select **AP (Infrastructure)** when connecting to an access point. **Double-click** on the **Local Area Connection** icon in the taskbar > click on **Properties** > click on **Configure** > select the **Settings** Tab > click on **Modify** to change the settings for the wireless adapter. (Please refer to **Checking the Wireless Configuration** in the **Networking Basics** section of this manual for more information.)

## Troubleshooting (continued)

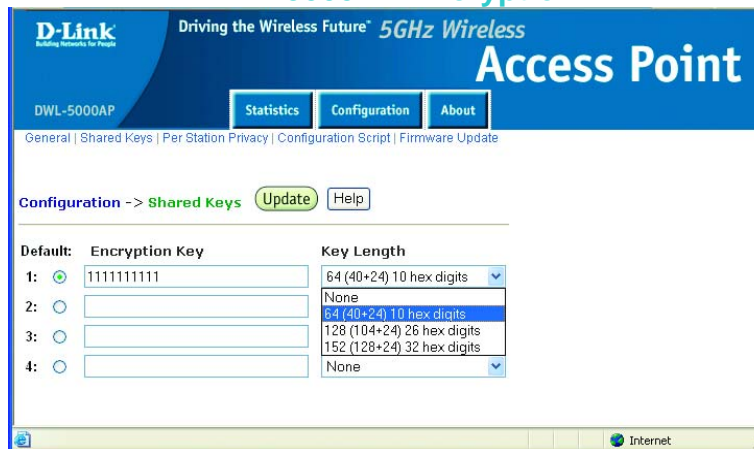
- Verify that the **Turbo Mode** setting is exactly the same for wireless clients and the DWL-5000AP. Please note that the wireless connection will not be established in **Infrastructure** or **Ad-Hoc** mode if **Turbo Mode** is enabled on one end of the wireless connection and not the other. (Please refer to **Checking the Wireless Configuration** in the **Networking Basics** section of this manual for more information.)
- If **Enable Security** is selected, make sure that the correct encryption keys are entered on both the wireless clients and the access points. (Please see **Checking the Wireless Configuration** in the **Networking Basics** section of this manual for more information.)

### 802.11a Network Adapter Encryption



The screenshot shows the 'Network Configuration Settings' dialog box with the 'Security' tab selected. The 'Enable Security' checkbox is checked. The 'Default Encryption Key' is set to 'Unique'. Under 'Encryption Keys (Hex 0-9 A-F)', there is a 'Unique Key' field with a masked value and a 'Key Length (bits)' dropdown set to '152 (128+24) 32 hex digits'. Below this are four 'Shared Keys' labeled 'First', 'Second', 'Third', and 'Fourth', each with a text input field and a 'Key Length (bits)' dropdown set to '64 (40+24) 10 hex digits'. 'OK' and 'Cancel' buttons are at the bottom right.

### DWL-5000AP Encryption



The screenshot shows the D-Link DWL-5000AP web interface. The page title is 'Access Point' and the model is 'DWL-5000AP'. The 'Configuration' tab is active, and the 'Shared Keys' sub-tab is selected. There are 'Update' and 'Help' buttons. The 'Default:' section shows a table of encryption keys:

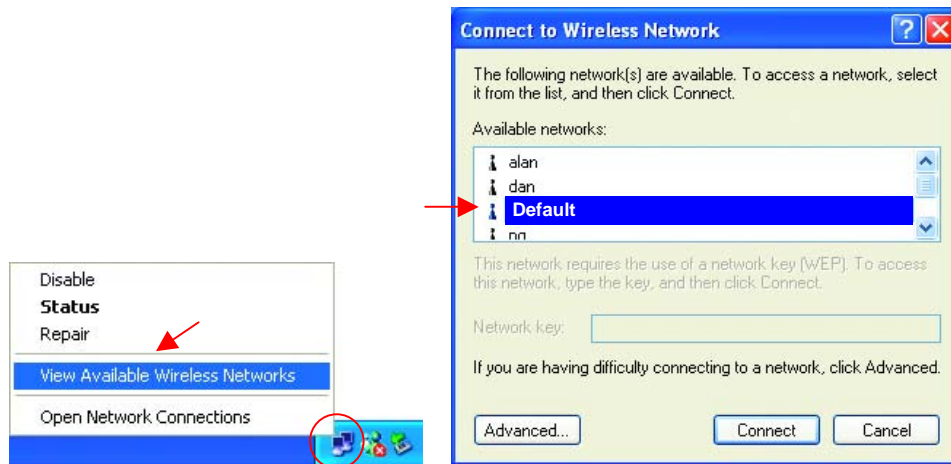
Default:	Encryption Key	Key Length
1:	<input type="radio"/> 1111111111	64 (40+24) 10 hex digits
2:	<input type="radio"/>	None
3:	<input type="radio"/>	64 (40+24) 10 hex digits
4:	<input type="radio"/>	128 (104+24) 26 hex digits
		152 (128+24) 32 hex digits
		None

The interface also shows navigation links for 'General', 'Shared Keys', 'Per Station Privacy', 'Configuration Script', and 'Firmware Update'.

## Troubleshooting *(continued)*

### 3. The wireless client cannot access the Internet in the Infrastructure mode.

- Make sure the wireless client is associated and joined with the correct Access Point. To check this connection: **Right-click** on the **Local Area Connection icon** in the taskbar > select **View Available Wireless Networks**. The **Connect to Wireless Network** screen will appear. Please make sure you have selected the correct available network, as shown in the illustrations below.



- Check that the **IP Address** assigned to the wireless adapter is within the same **IP Address range** as the access point and gateway. *Since the DWL-5000AP has an IP Address of 192.168.0.50, wireless adapters must have an IP Address in the same range, e.g., 192.168.0.x. Each device must have a unique IP Address; no two devices may have the same IP Address. The subnet mask must be the same for all the computers on the network.)* To check the **IP Address** assigned to the wireless adapter, **double-click** on the **Local Area Connection icon** in the taskbar > select the **Support tab** and the **IP Address** will be displayed. (Please refer to **Checking the IP Address** in the **Networking Basics** section of this manual.)
- If it is necessary to assign a **Static IP Address** to the wireless adapter, please refer to the appropriate section in **Networking Basics**. If you are entering a **DNS Server address** you must also enter the **Default Gateway Address**. *(Remember that if you have a DHCP-capable router, you will not need to assign a Static IP Address. See **Networking Basics: Assigning a Static IP Address**.)*

## Troubleshooting (continued)

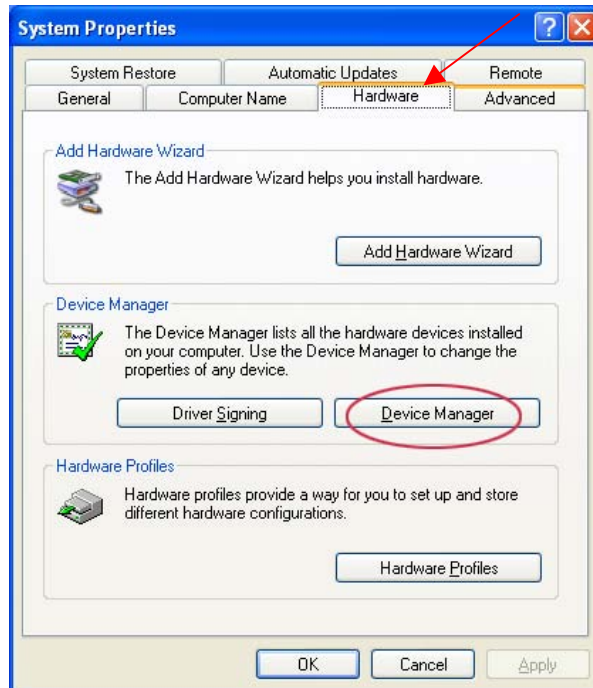
### 4. Check that the drivers for the network adapters are installed properly.

You may be using different network adapters, but this procedure will remain the same, regardless of the type of network adapters you are using.

- Go to **Start**
- **Right-click** on **My Computer**
- Click **Properties**

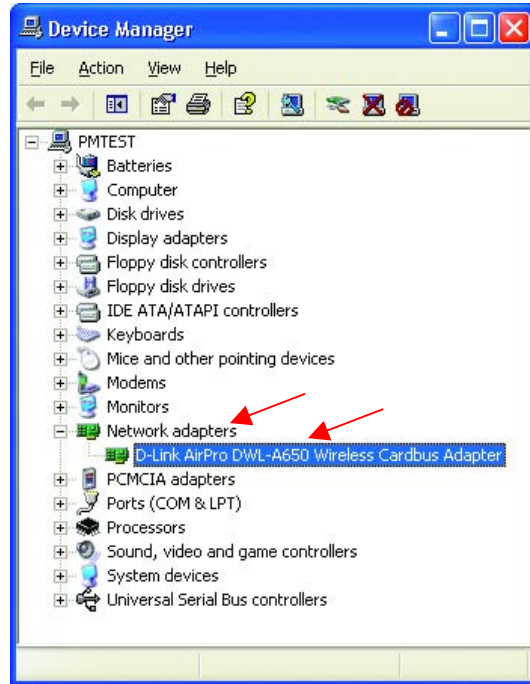


- **Select the Hardware Tab**
- Click **Device Manager**

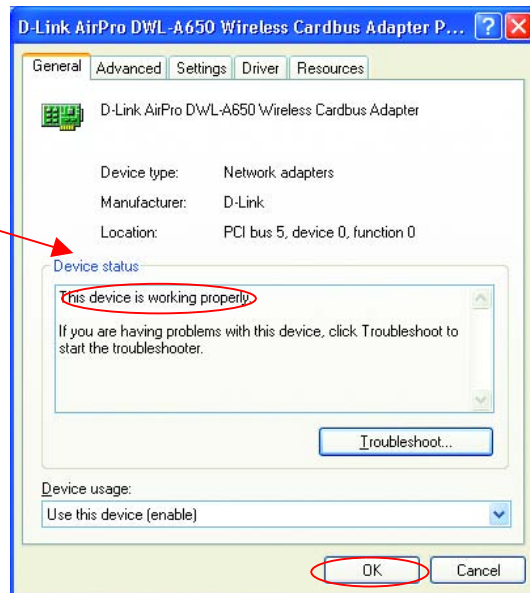


## Troubleshooting (continued)

- Double-click on **Network Adapters**
- Right-click on **D-Link Air Pro DWL-A650 Wireless Cardbus Adapter**
- Select **Properties** to check that the drivers are installed properly



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

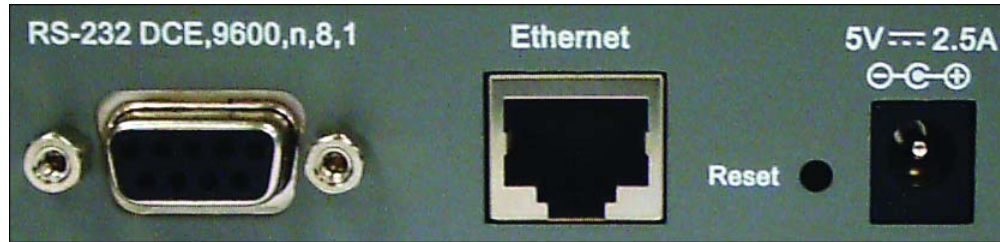


- Click **OK**

## Troubleshooting *(continued)*

### 5. Resetting the DWL-5000AP to Factory Default Settings

After you have tried other methods for troubleshooting your network, you may choose to **Reset** the DWL-5000AP to the factory default settings. Remember that all 802.11a D-Link *AirPro* products network together, out of the box, at the factory default settings.



To hard-reset the D-Link *AirPro* DWL-5000AP to Factory Default Settings, please do the following:

- Locate the **Reset** button on the back of the DWL-5000AP
- Use a paper clip to press the **Reset** button.
- Hold for about 5 seconds and then release
- After the DWL-5000AP reboots (this may take a few moments) it will be reset to the factory **Default** settings.



# 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 98.*

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

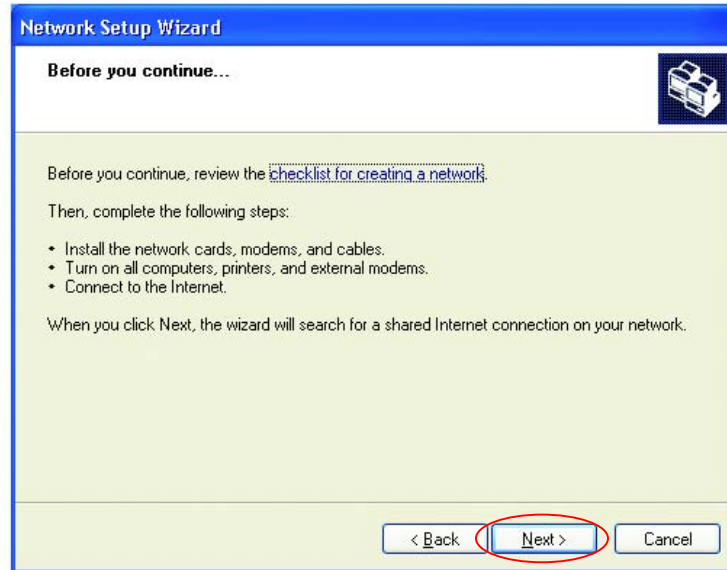


When this screen appears, **Click Next**.



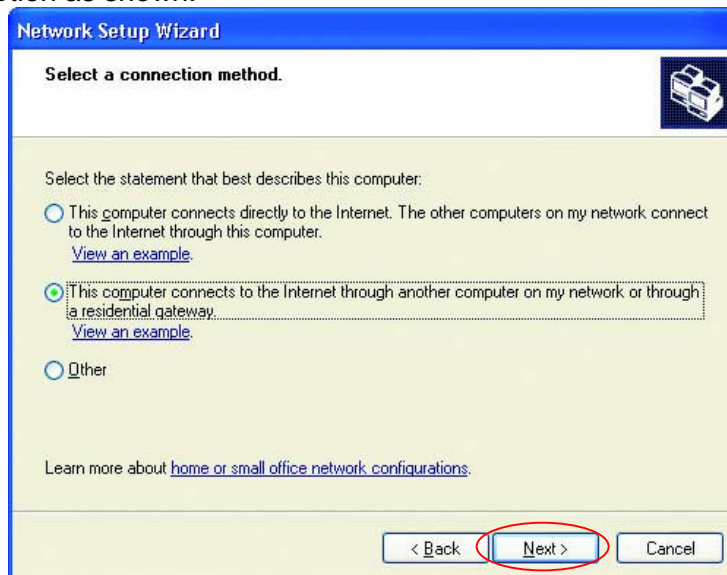
# Networking Basics

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**

# Networking Basics

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

The screenshot shows the 'Network Setup Wizard' window with the title 'Give this computer a description and name.' The window contains two text input fields. The first field is labeled 'Computer description:' and contains the text 'Mary's Computer'. Below it are examples: 'Examples: Family Room Computer or Monica's Computer'. The second field is labeled 'Computer name:' and contains the text 'Office'. Below it are examples: 'Examples: FAMILY or MONICA'. Below the fields, it says 'The current computer name is Office'. At the bottom, there are three buttons: '< Back', 'Next >', and 'Cancel'. The 'Next >' button is circled in red. Two red arrows point to the 'Computer description:' and 'Computer name:' labels.

Click **Next**

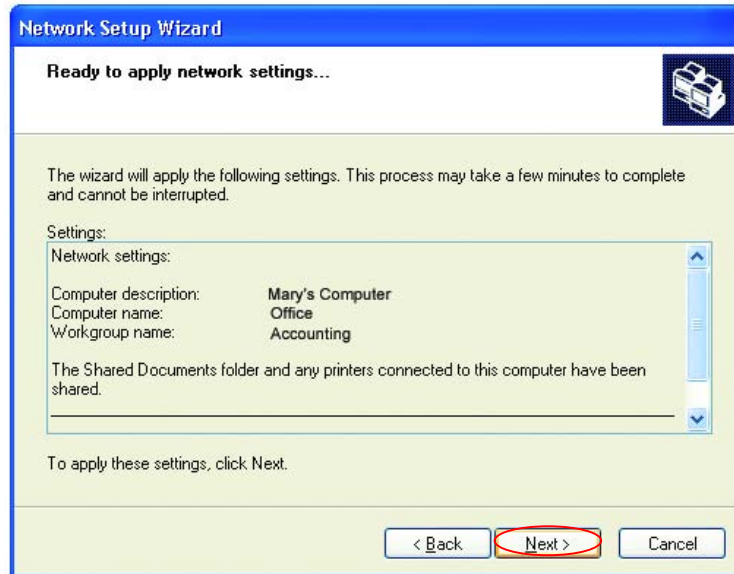
Enter a **Workgroup** name. All computers on your network should have the same **Workgroup** name.

The screenshot shows the 'Network Setup Wizard' window with the title 'Name your network.' The window contains a text input field labeled 'Workgroup name:' which contains the text 'Accounting'. Below it are examples: 'Examples: HOME or OFFICE'. At the bottom, there are three buttons: '< Back', 'Next >', and 'Cancel'. The 'Next >' button is circled in red. A red arrow points to the 'Workgroup name:' label.

Click **Next**

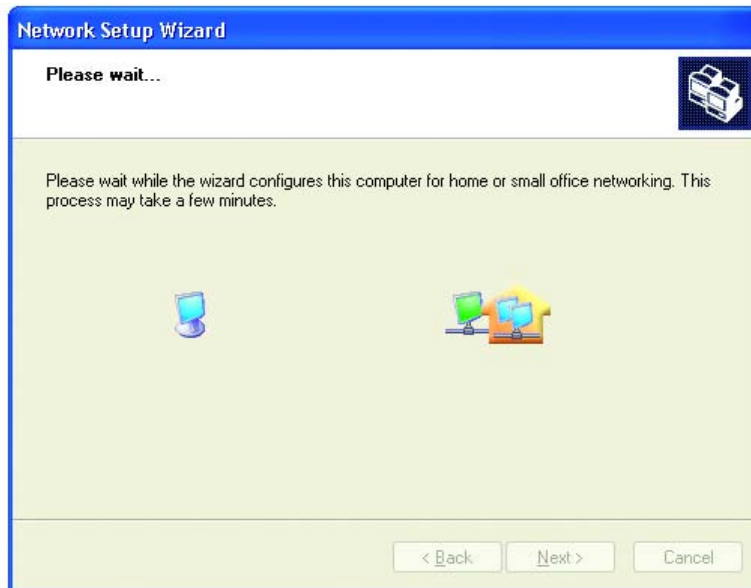
# Networking Basics

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



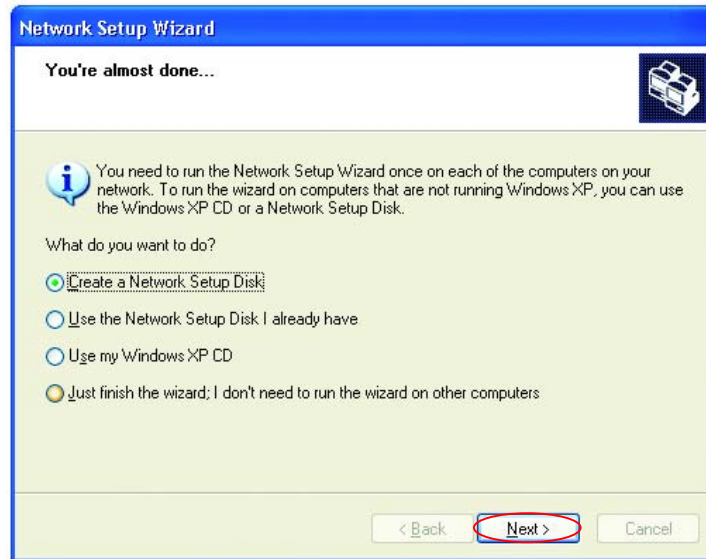
When the changes are complete, click **Next**.

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



## Networking Basics

In the window below, select the best option. 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**.



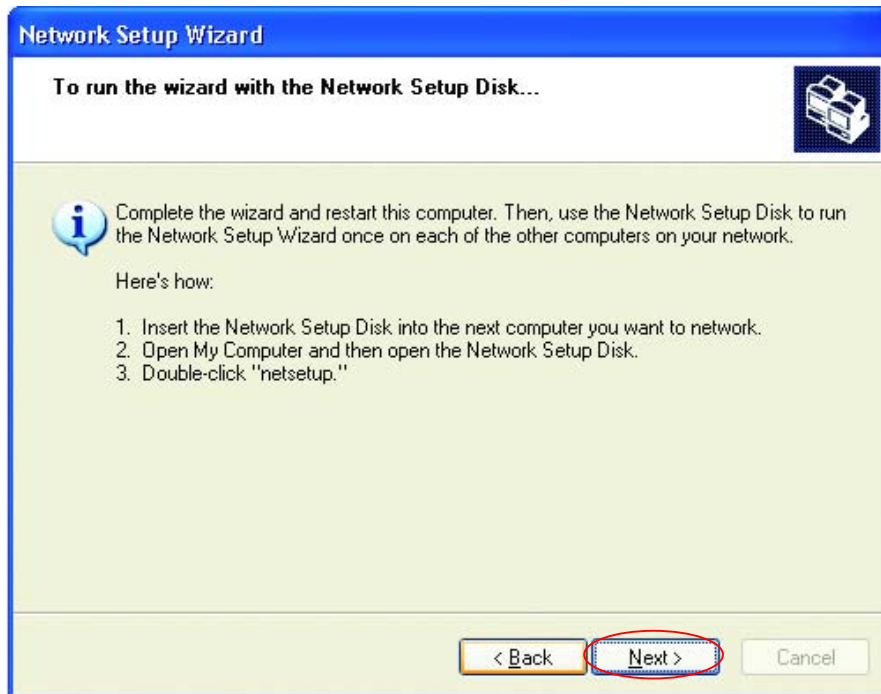
Format the disk if you wish, and click **Next**.

## Networking Basics

Please wait while the **Network Setup Wizard** copies the files.



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**.

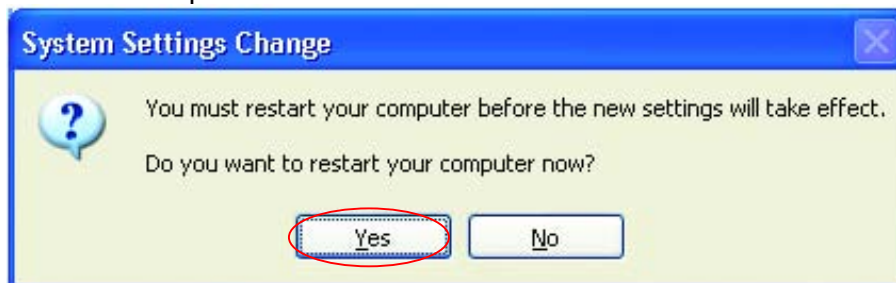


## Networking Basics

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.

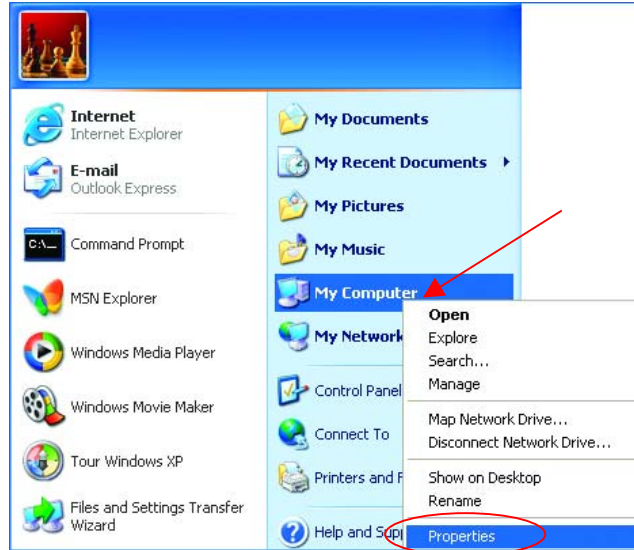
# Networking Basics

## 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

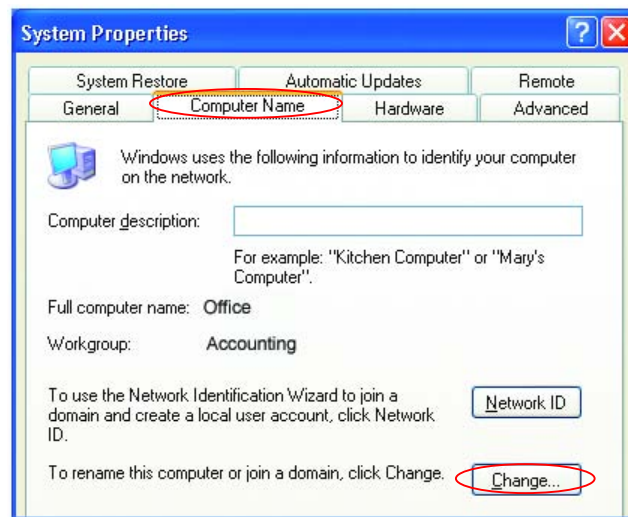


- Select the **Computer Name Tab** in the **System Properties** window.

*You may enter a **Computer description** if you wish, this field is optional.*

To rename the computer and join a domain,

- Click **Change**

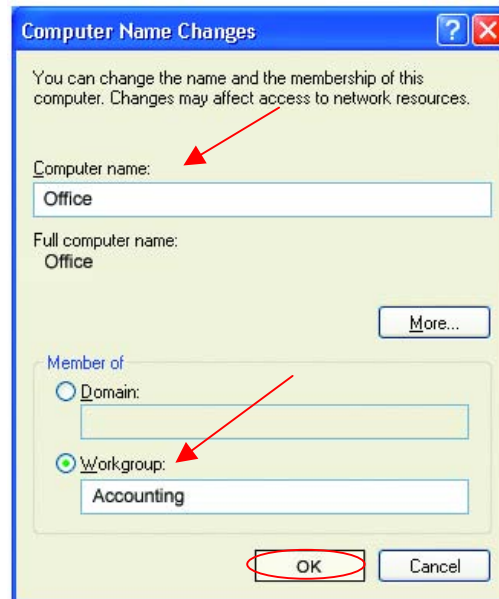




# Networking Basics

## Naming your Computer *(continued)*

- 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**

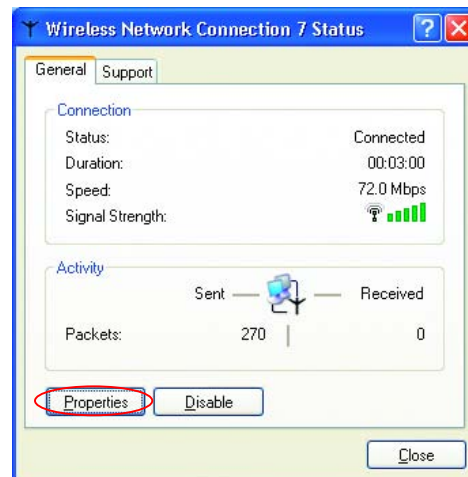


## Checking the Wireless Configuration of the Network Adapter

- Double-click on the **Local Area Connection Icon** in the taskbar.



In this window you will see the **Signal Strength** and the **Status** of the network adapter.  
In this case the Status and the Signal Strength are fine.



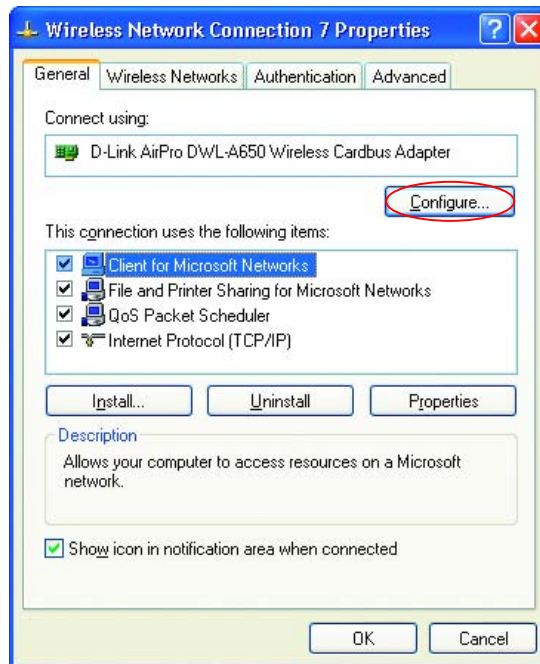
- For more information:
- Click **Properties**



# Networking Basics

## Checking the Wireless Configuration of the Network Adapter

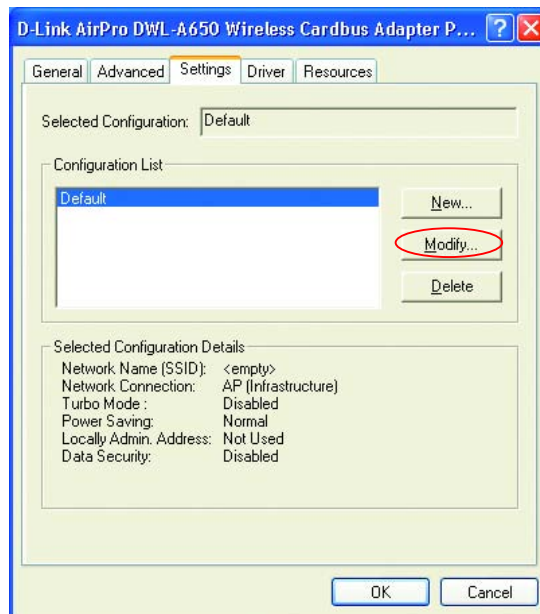
- Click **Configure** to access more information.



- Select **Settings**

*This screen shows the wireless configuration.*

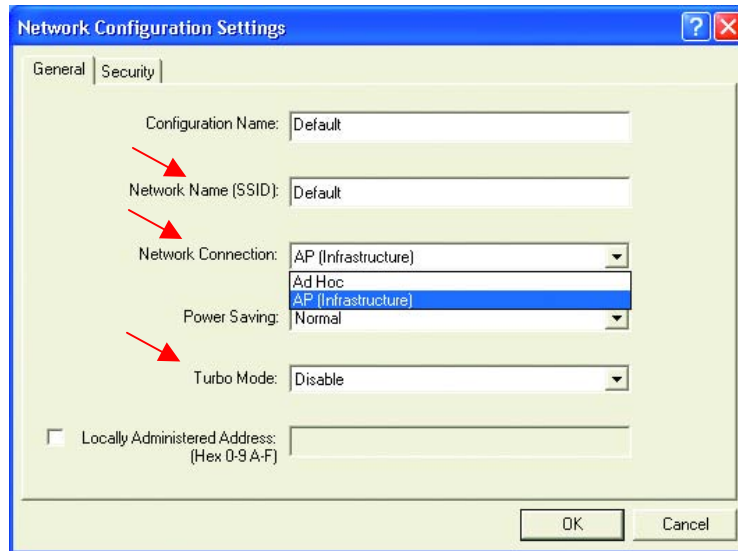
- Click **Modify** to check on the configuration.



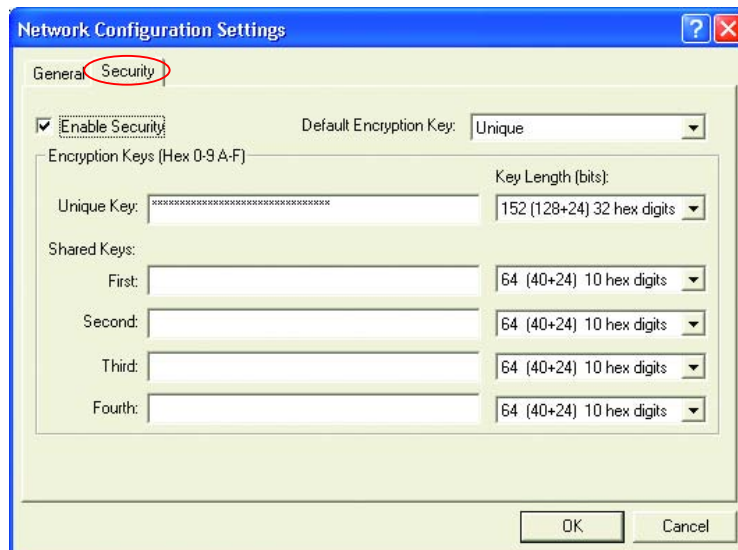
# Networking Basics

## Checking the Wireless Configuration of the Network Adapter

- The **Network Name (SSID)** should be set to **Default**.
- The **Network Connection** should be set to the correct mode (**Infrastructure** or **Ad Hoc**.)
- The **Turbo Mode** setting (**Disabled** in the example here) must be the same on all the stations in your network.



- Click on the **Security Tab**
- If **Enable Security** is selected on one station on your network, it must be selected on all stations. Likewise, if **Enable Security** is deselected on one station, it must be deselected on all stations.



- Check to see that your **IP Address** and your **Subnet Mask** are in the correct range. See the **Networking Basics** sections: **Checking the IP Address** and **Assigning a Static IP Address**.

# Networking Basics

## 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:

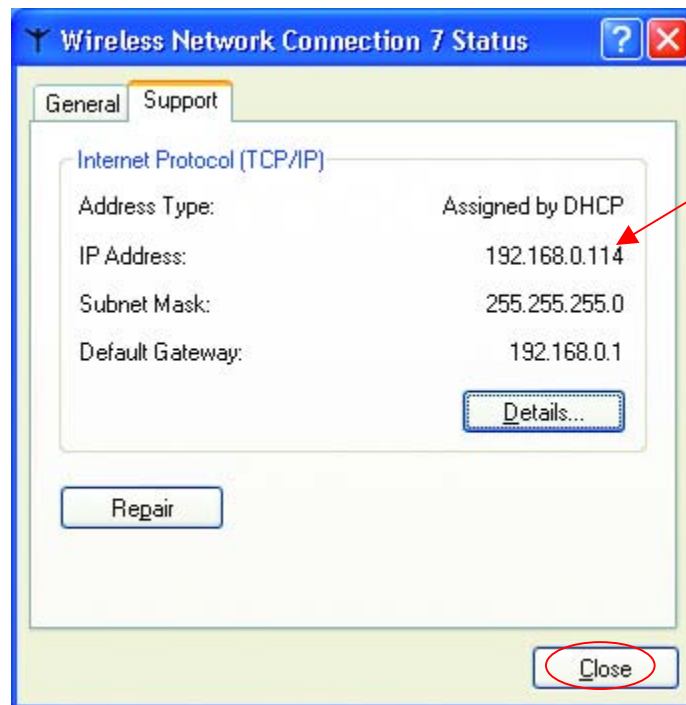
- **Right-click** on the Local Area Connection icon in the task bar



- Click on **Status**

The following window will display

- Click the **Support** tab.



- Click **Close**

# Networking Basics

## Assigning a Static IP Address

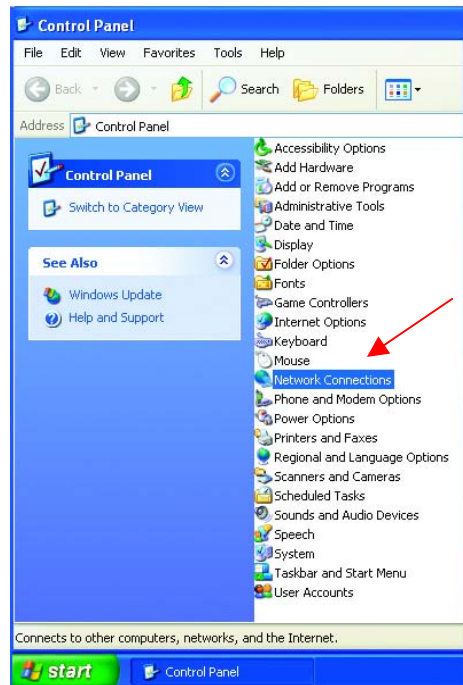
**Note:** Residential Gateways/Broadband Routers will automatically assign IP Addresses to the computers on the network, using DHCP (Dynamic Host Configuration Protocol) technology. If you are using a DHCP-capable Gateway/Router you will not need to assign Static IP Addresses.

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**



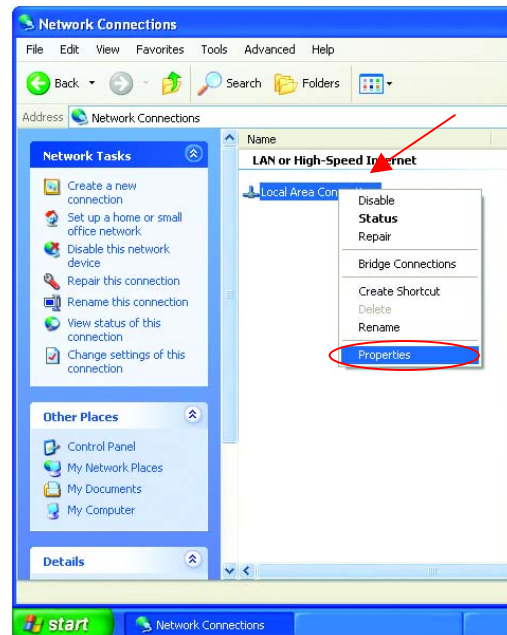
- **Double-click on Network Connections**



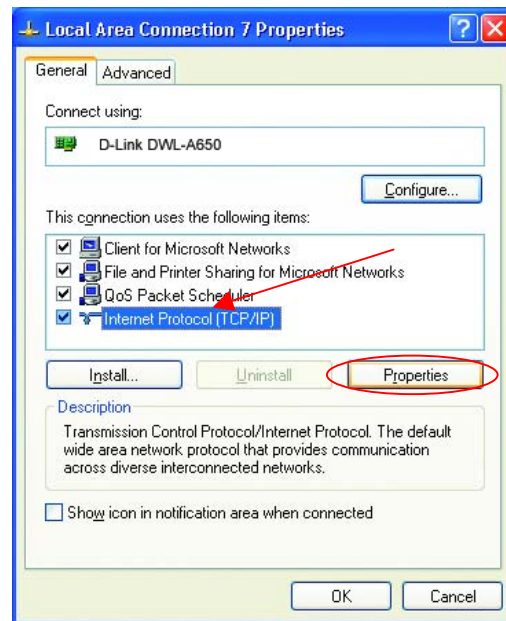
## Networking Basics

### Assigning a Static IP Address

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



- Highlight **Internet Protocol (TCP/IP)**
- Click **Properties**

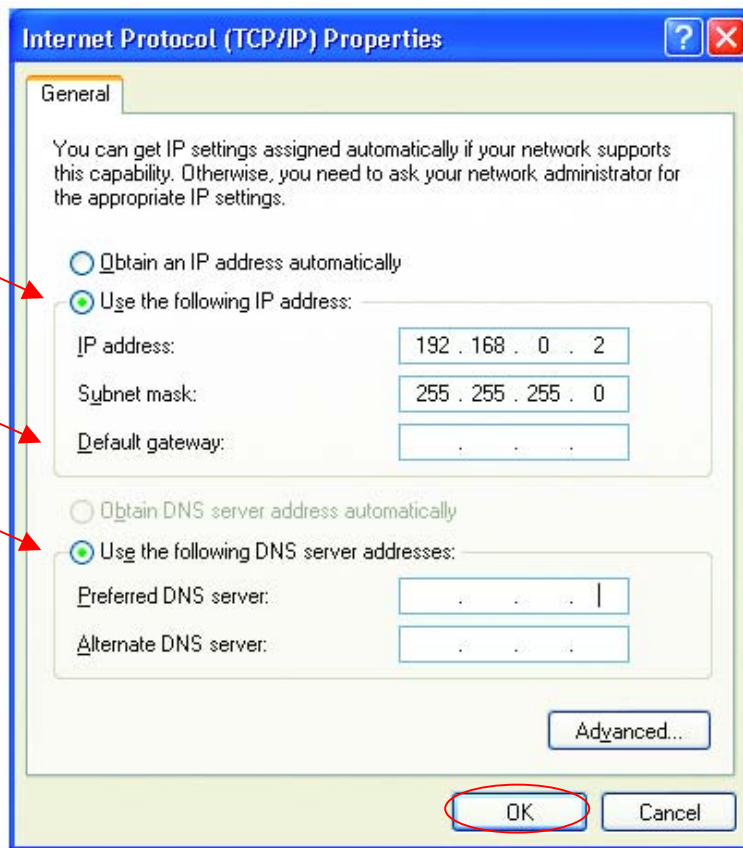


## Networking Basics

### Assigning a Static IP Address

- **Select Use the following IP address** in the **Internet Protocol (TCP/IP) Properties** window,
- 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.)
- Input your **DNS server addresses**. (**Note: If you are entering a DNS server, you must enter the IP Address of the Default Gateway.**)

*The DNS server information will be provided by your ISP (Internet Service Provider.)*



- 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

### Adding and Sharing Printers in Windows XP

After you have run the **Network Setup Wizard** on all the computers in your network (please see the **Network Setup Wizard** section at the beginning of **Networking Basics**,) you can use the **Add Printer Wizard** to add or share a printer on your network.

Whether you want to add a **local printer** (a printer connected directly to one computer,) share an **LPR printer** (a printer connected to a print server) or share a **network printer** (a printer connected to your network through a Gateway/Router,) use the **Add Printer Wizard**. Please follow the directions below:

**First, make sure that you have run the Network Setup Wizard on all of the computers on your network.**

We will show you 3 ways to use the **Add Printer Wizard**

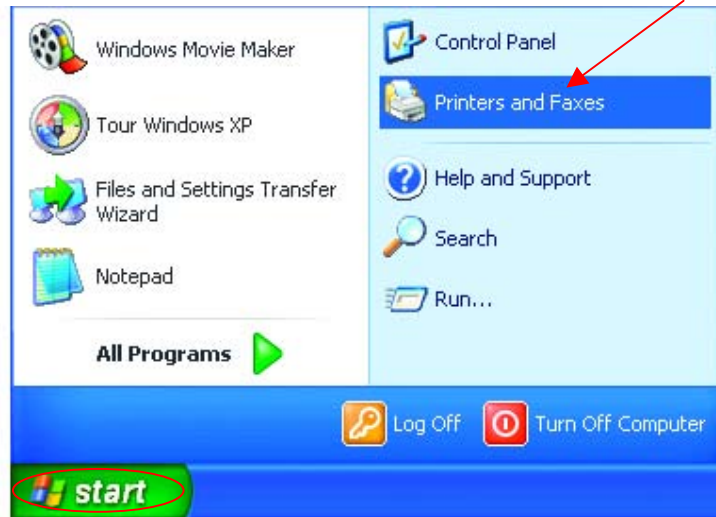
1. Adding a local printer
2. Sharing a network printer
3. Sharing an LPR printer

### Adding a local printer

*(A printer connected directly to a computer)*

A printer that is not shared on the network and is connected directly to one computer is called a **local printer**. If you do not need to share your printer on a network, follow these directions to add the printer to one computer.

- Go to **Start> Printers and Faxes**

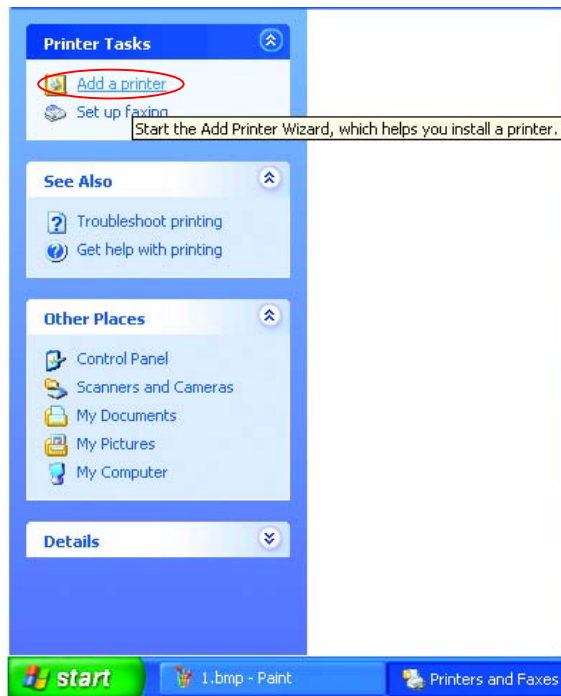


## Networking Basics

### Adding a local printer



- Click on **Add a printer**



- Click **Next**



# Networking Basics

## Adding a local printer

- Select **Local printer attached to this computer**
- (Deselect **Automatically detect and install my Plug and Play printer** if it has been selected.)

- Click **Next**

- Select **Use the following port:**

- From the pull-down menu **select the correct port** for your printer

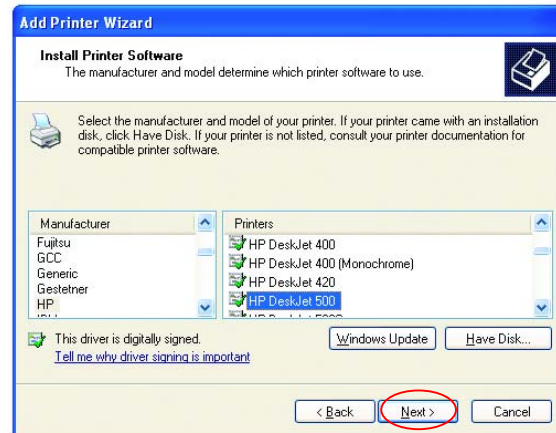
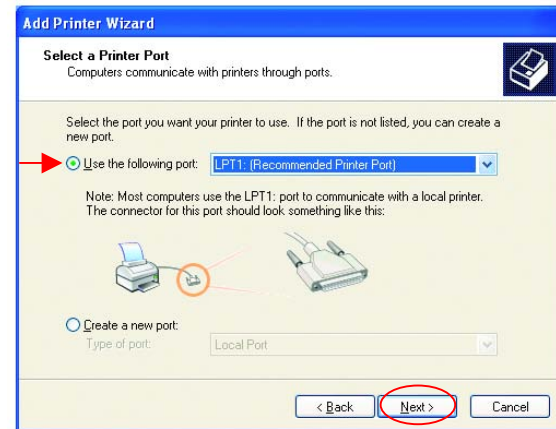
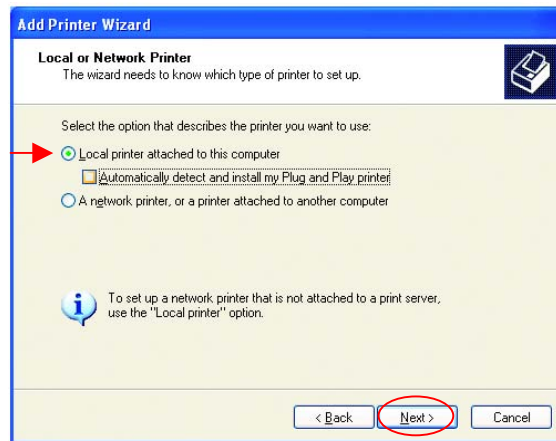
(Most computers use the **LPT1:** port, as shown in the illustration.)

- Click **Next**

- Select and highlight the **correct driver** for your printer.

- Click **Next**

(If the correct driver is not displayed, insert the CD or floppy disk that came with your printer and click **Have Disk.**)



# Networking Basics

## Adding a local printer

- At this screen, you can change the name of the printer (optional.)

The screenshot shows the 'Name Your Printer' step of the 'Add Printer Wizard'. The title bar reads 'Add Printer Wizard'. Below the title bar, the text says 'Name Your Printer' and 'You must assign a name to this printer.' There is a printer icon in the top right corner. The main area contains the instruction: 'Type a name for this printer. Because some programs do not support printer and server name combinations of more than 31 characters, it is best to keep the name as short as possible.' Below this is a text box labeled 'Printer name:' containing the text 'HP DeskJet 500'. At the bottom right, there are three buttons: '< Back', 'Next >', and 'Cancel'. The 'Next >' button is circled in red.

- Click **Next**

- Select **Yes**, to print a test page. A successful printing will confirm that you have chosen the correct driver.

The screenshot shows the 'Print Test Page' step of the 'Add Printer Wizard'. The title bar reads 'Add Printer Wizard'. Below the title bar, the text says 'Print Test Page' and 'To confirm that the printer is installed properly, you can print a test page.' There is a printer icon in the top right corner. The main area contains the question: 'Do you want to print a test page?'. Below this are two radio buttons: 'Yes' (which is selected) and 'No'. At the bottom right, there are three buttons: '< Back', 'Next >', and 'Cancel'. The 'Next >' button is circled in red.

- Click **Next**

This screen gives you information about your printer.

The screenshot shows the 'Completing the Add Printer Wizard' step. The title bar reads 'Add Printer Wizard'. On the left, there is a printer icon and a blue graphic. The main area contains the text: 'Completing the Add Printer Wizard' and 'You have successfully completed the Add Printer Wizard. You specified the following printer settings:'. Below this is a list of settings: Name: HP DeskJet 500, Share name: <Not Shared>, Port: LPT1:, Model: HP DeskJet 500, Default: Yes, Test page: Yes. At the bottom, it says 'To close this wizard, click Finish.' At the bottom right, there are three buttons: '< Back', 'Finish', and 'Cancel'. The 'Finish' button is circled in red.

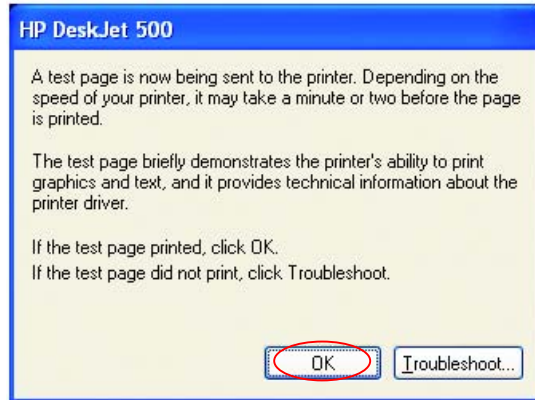
- Click **Finish**

# Networking Basics

## Adding a local printer

When the test page has printed,

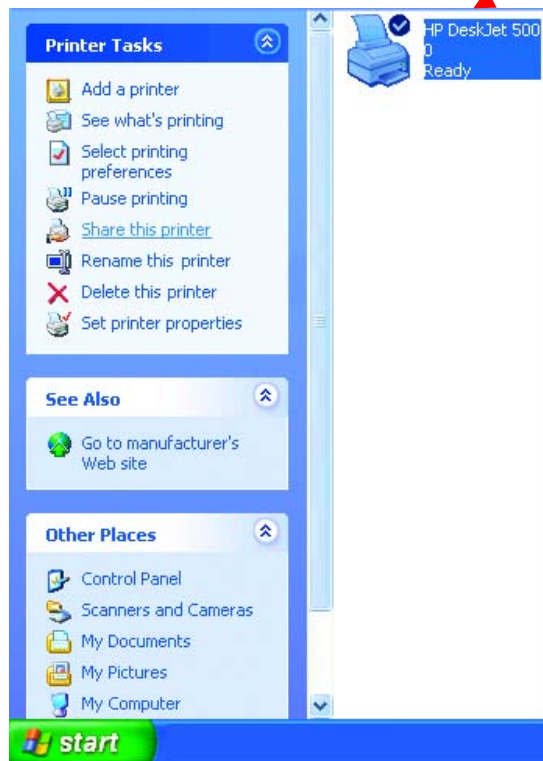
- Click **OK**



- Go to **Start > Printers and Faxes**

*A successful installation will display the printer icon as shown at right.*

You have successfully added a local printer.



# Networking Basics

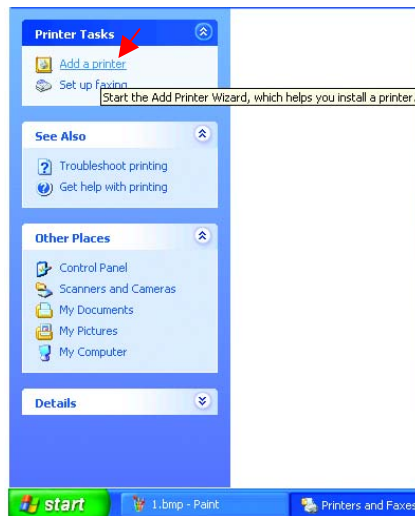
## Sharing a network printer

After you have run the **Network Setup Wizard** on all the computers on your network, you can run the **Add Printer Wizard** on all the computers on your network. Please follow these directions to use the **Add Printer Wizard** to share a printer on your network:

- Go to **Start> Printers and Faxes**



- Click on **Add a Printer**



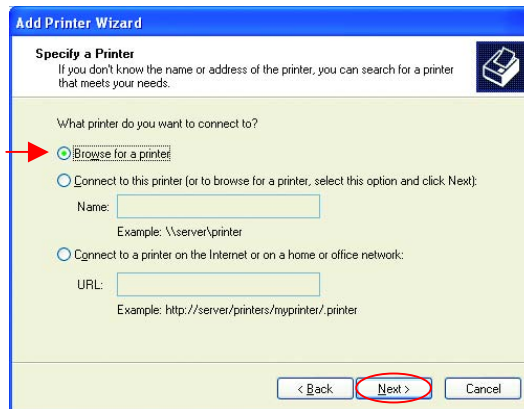
- Click **Next**



# Networking Basics

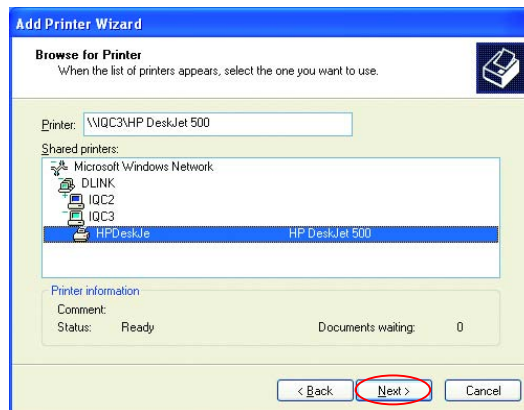
## Sharing a network printer

- Select **Browse for a printer**



- Click **Next**

- Select the **printer** you would like to share.



- Click **Next**

- Click **Finish**

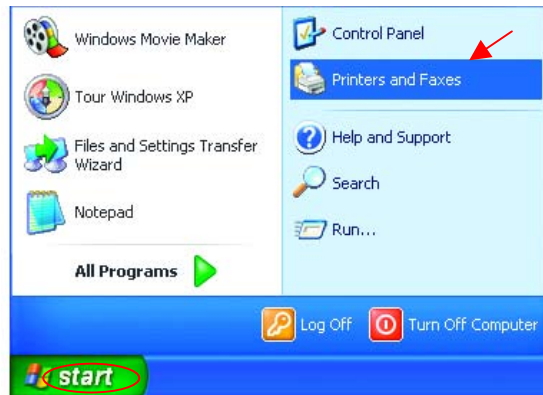


## Networking Basics

### Sharing a network printer

To check for proper installation:

- Go to **Start> Printers and Faxes**



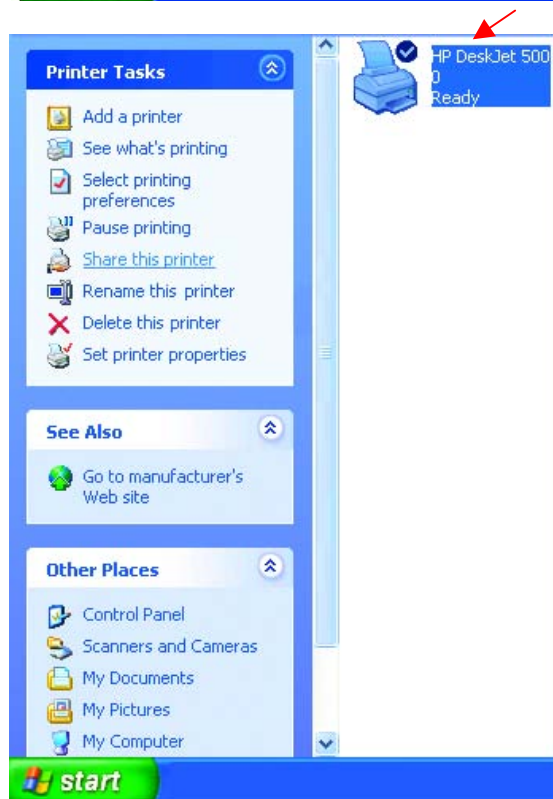
*The printer icon will appear at right, indicating proper installation.*

*You have completed adding the printer.*

To share this printer on your network:

- Remember the **printer name**
- Run the **Add Printer Wizard** on all the computers on your network.
- Make sure you have already run the **Network Setup Wizard** on all the network computers.

After you run the **Add Printer Wizard** on all the computers in the network, you can share the printer.





# Networking Basics

## Sharing an LPR printer

To share an **LPR printer** (using a print server,) you will need a Print Server such as the **DP-101P+** or the **DP-313**. Please make sure that you have run the **Network Setup Wizard** on all the computers on your network. To share an **LPR printer**, please follow these directions:

- Go to **Start Printers and Faxes**
- Click on **Add a Printer**
- Click **Next**

The screen to the right will display.



**Add Printer Wizard**

**Welcome to the Add Printer Wizard**

This wizard helps you install a printer or make printer connections.

**i** If you have a Plug and Play printer that connects through a USB port (or any other hot pluggable port, such as IEEE 1394, infrared, and so on), you do not need to use this wizard. Click Cancel to close the wizard, and then plug the printer's cable into your computer or point the printer toward your computer's infrared port, and turn the printer on. Windows will automatically install the printer for you.

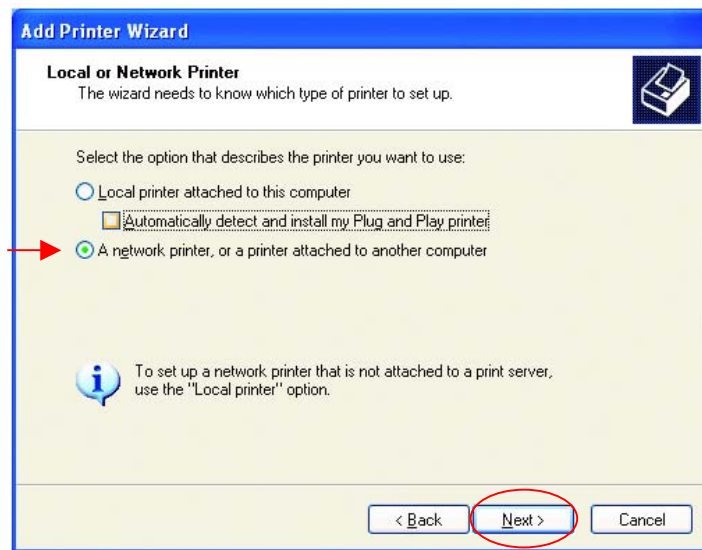
To continue, click Next.

< Back   **Next >**   Cancel





- Select **A Network Printer**

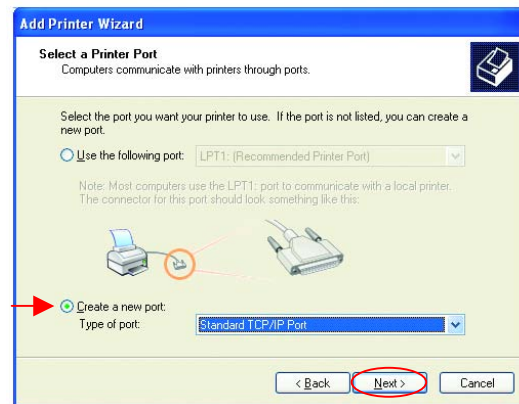


- Click **Next**

## Networking Basics

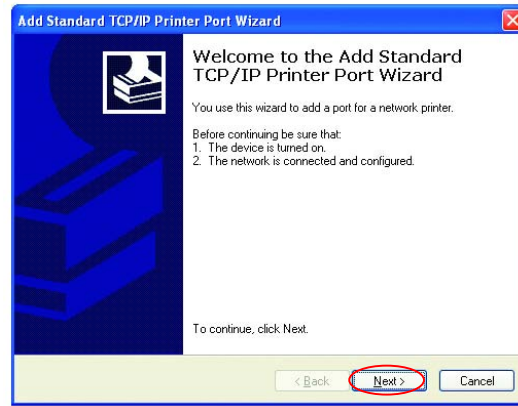
### Sharing an LPR printer

- Select **Create a new port**
- From the pull-down menu, select **Standard TCP/IP Port**, as shown.



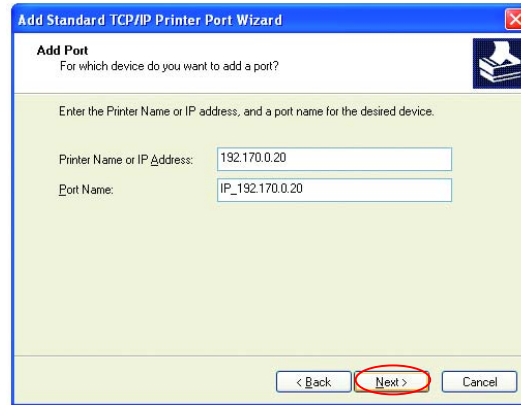
- Click **Next**

- Please read the instructions on this screen.



- Click **Next**

- Enter the **Printer IP Address** and the **Port Name**, as shown.



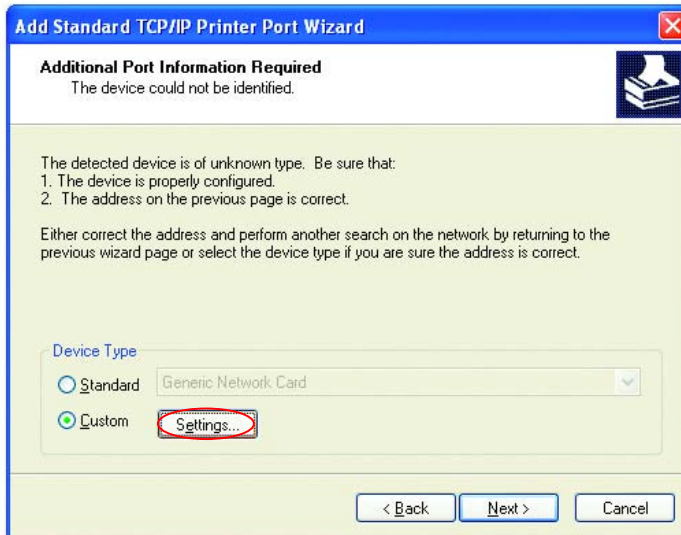
- Click **Next**

# Networking Basics

## Sharing an LPR printer

- In this screen, select **Custom**.

- Click **Settings**

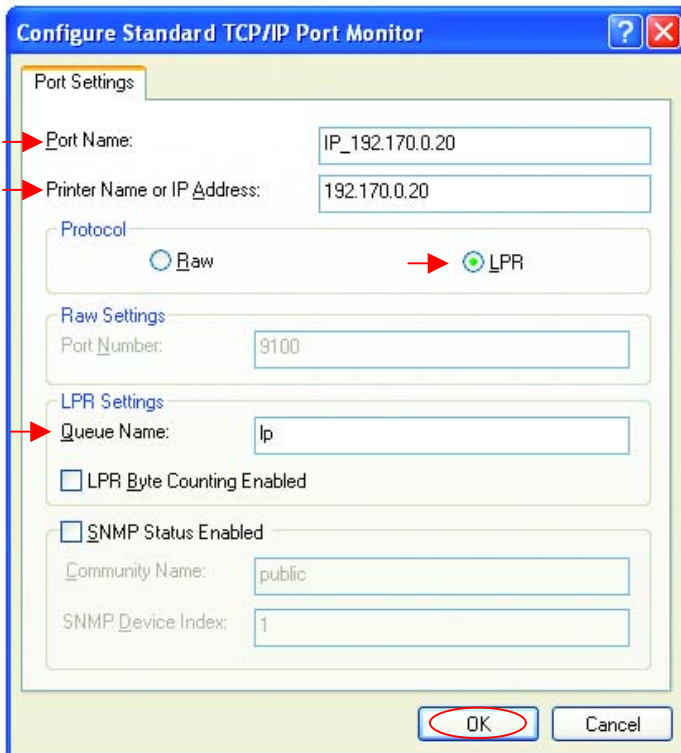


- Enter the **Port Name** and the **Printer Name** or **IP Address**.

- Select **LPR**

- Enter a **Queue Name** (if your Print-Server/ Gateway has more than one port, you will need a **Queue name**.)

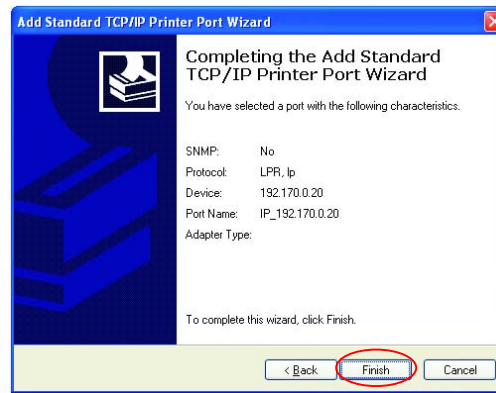
- Click **OK**



# Networking Basics

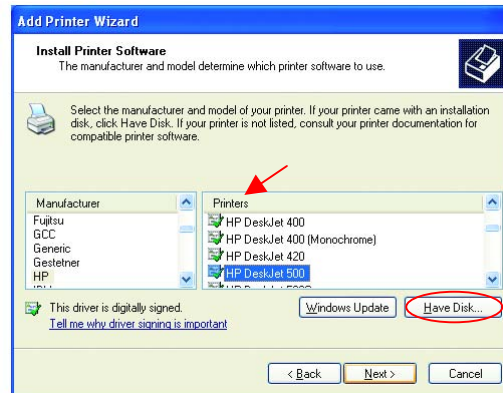
## Sharing an LPR printer

- This screen will show you information about your printer.



- Click **Finish**

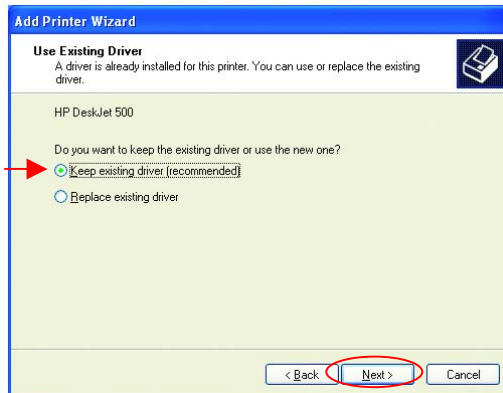
- Select the **printer** you are adding from the list of **Printers**.



- Insert the printer driver disk that came with your printer.
- Click **Have Disk**

If the printer driver is already installed,

- Select **Keep existing driver**



- Click **Next**

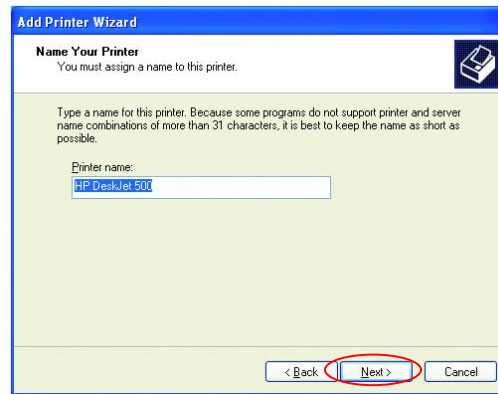
# Networking Basics

## Sharing an LPR printer

- You can rename your printer if you choose. It is optional.

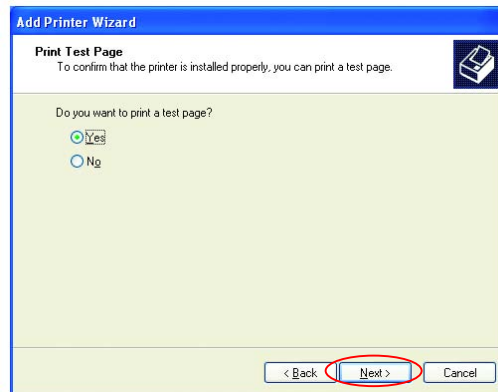
*Please remember the name of your printer. You will need this information when you use the **Add Printer Wizard** on the other computers on your network.*

- Click **Next**



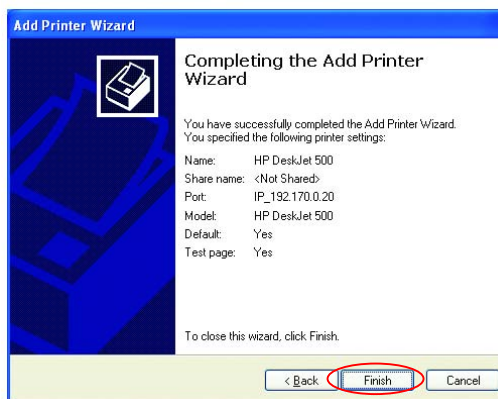
- Select **Yes**, to print a test page.

- Click **Next**



*This screen will display information about your printer.*

- Click **Finish** to complete the addition of the printer.
- Please run the **Add Printer Wizard** on all the computers on your network in order to share the printer.



*Note: You must run the **Network Setup Wizard** on all the computers on your network before you run the **Add Printer Wizard**.*

For help with other tasks in home or small office networking, see **Using the Shared Documents** folder and **Sharing files and folders** in the **Help and Support Center** in Microsoft Windows XP.

## Technical Specifications

### Standards

- IEEE 802.11a (Wi-Fi5)
- IEEE 802.3 and IEEE 802.3u
- IEEE 802.1d

### Ports

- (1) 10/100Base-T Ethernet, RJ-45 (UTP)
- (1) RS-232 (DB9)
- (1) Power – 5V DC, 2.5A

### Network Management

- Web-Based browser with JavaScript

### Frequency Range

- 5.150-5.350 GHz

### Data Rates\*

- 6, 9, 12, 18, 24, 36, 48, 54, 72 Mbps

### Modulation Technology

- Orthogonal Division Frequency Multiplexing (OFDM)

### Modulation Techniques

- BPSK (Binary Phase Shift Keying)
- QPSK (Quadrature Phase Shift Keying)
- 16 QAM (Quadrature Amplitude Modulation)
- 64 QAM (Quadrature Amplitude Modulation)

### Data Security

- 64, 128, 154-bit WEP (Wired Equivalent Privacy) Encryption
- Access Control List

### Media Access Control

- CSMA/CA

\*Maximum wireless signal rate based on IEEE Standard 802.11a specifications. Actual data throughput will vary. Network conditions and environmental factors, including volume of network traffic, building materials and construction, and network overhead lower actual data throughput rate.

**Diagnostic LED**

- Power
- Ethernet Link/Activity
- Wireless Activity

**Operating Voltage**

- 5V± -10%

**Network Architecture**

- Supports Infrastructure Mode (Communications to wired networks via Access Points with Roaming)

**Antenna Type**

- Dual 5dBi dipole antennas with diversity
- Power parameter software configurable

**Available Channels:**

- Eight non-overlapping channels for North America

**MTBF (Mean Time Between Failure)**

- >30,000 hours

**Physical Dimensions**

- L ~ 9.25 inches (235mm)
- W ~ 6.38 inches (162 mm)
- H ~ 1.63 inches (41mm)

**Temperature**

- Operating: 0°C to 55°C (32°F to 131°F)
- Storing: -20°C to 65°C (-4°F to 149°F)

**Humidity:**

- 5%-95%, non-condensing

**Emissions:**

- FCC part 15b
- UL1950-3

**Warranty**

- Three Years

## Contacting Technical Support

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

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

U.S. customers can contact D-Link technical support through our web site, or by phone.

### **D-Link Technical Support over the Telephone:**

(800) 758-5489

24 hours a day, seven days a week.

### **D-Link Technical Support over the Internet:**

<http://support.dlink.com>

*When contacting technical support, please provide the following information:*

- *Serial number of the unit*
- *Model number or product name*
- *Software type and version number*



## Limited Warranty and Registration

D-Link Systems, Inc. ("D-Link") provides this 3-Year warranty for its product only to the person or entity who originally purchased the product from:

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

**3-Year Limited Hardware Warranty:** D-Link warrants that the hardware portion of the D-Link products described below ("Hardware") will be free from material defects in workmanship and materials from the date of original retail purchase of the Hardware, for the period set forth below applicable to the product type ("Warranty Period").

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

- Hardware (excluding power supplies and fans)
- Spare parts and spare kits Ninety (90) days.

D-Link's sole obligation shall be to repair or replace the defective Hardware at no charge to the original owner. 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 of an identical make, model or part; D-Link may in its 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. The Warranty Period shall extend for an additional ninety (90) days after any repaired or replaced Hardware is delivered. 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 delivery of the Software for a period of ninety (90) days ("Warranty Period"), if 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. 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. The Warranty Period shall extend for an additional ninety (90) days after any replacement Software is delivered. 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.

**What You Must Do For Warranty Service:**

Registration is conducted via a link on our Web Site (<http://www.dlink.com/>). Each product purchased must be individually registered for warranty service within ninety (90) days after it is purchased and/or licensed.

FAILURE TO PROPERLY TO REGISTER MAY AFFECT THE WARRANTY FOR THIS PRODUCT.

**Submitting A Claim.** Any claim under this limited warranty must be submitted in writing before the end of the Warranty Period to an Authorized D-Link Service Office.

- The customer must submit 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.
- The customer is responsible for all shipping charges to and from D-Link (No CODs allowed). Products sent COD will become the property of D-Link Systems, Inc. Products should be fully insured by the customer and shipped to **D-Link Systems Inc., 53 Discovery Drive, Irvine CA 92618.**

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 that 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; and Any hardware, software, firmware or other products or services provided by anyone other than D-Link.

**Disclaimer of Other Warranties:** EXCEPT FOR THE 3-YEAR LIMITED WARRANTY SPECIFIED HEREIN, THE PRODUCT IS PROVIDED "AS-IS" WITHOUT ANY WARRANTY OF ANY KIND 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, WORK STOPPAGE, COMPUTER FAILURE OR MALFUNCTION, 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.

**GOVERNING LAW:** This 3-Year 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.

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**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.

Modifications to this device are not authorized, may violate FCC regulation Part 15.407, and will void the warranty for this product. This device is intended to operate in the frequency band of 5.15 to 5.25 GHz under all conditions of normal operation. According to FCC 15.407 (e), normal operation of this device is restricted to indoor use only to reduce any potential harmful interference to co-channel Mobile Satellite Systems, or radar systems that use 5.25 to 5.35 GHz and 5.65 to 5.85 GHz frequency bands. This interference could also damage this device.

