

# **D-Link *AirPro*<sup>™</sup> DWL-AB650**

2.4GHz / 5GHz Dual-Band Multimode  
Wireless Cardbus Adapter

## **Manual**

**D-Link**

Building Networks for People

# Contents

Package Contents .....	3
Introduction .....	4
Wireless Basics .....	6
Getting Started .....	10
Using the Configuration Utility .....	13
Networking Basics .....	18
Troubleshooting .....	31
Technical Specifications .....	36
Contacting Technical Support .....	38
Warranty and Registration .....	39

# Package Contents



## Contents of Package:

- **D-Link AirPro DWL-AB650**  
2.4 GHz / 5GHz Dual-Band Multimode  
Wireless Cardbus Adapter
- Manual and Warranty on CD
- Quick Installation Guide

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

## System Requirements:

- A laptop or notebook computer with an available 32-bit Cardbus slot
- Windows XP, Windows 2000, Windows Me, or Windows 98SE
- At least 32 MB of memory and a 300 MHz processor
- An **802.11a/802.11b Multimode Access Point** (e.g., DWL-6000AP or DI-764), or an **802.11a Access Point** (e.g., DWL-5000AP for **Infrastructure Mode**), or an **802.11b Access Point** (e.g., DWL-900AP+), or an **802.11a wireless adapter** (e.g., DWL-A650 for laptops or DWL-A520 for **Ad-Hoc mode**), or an **802.11b wireless adapter** (e.g., DWL-650.)

# Introduction

D-Link introduces the integrated multimode 802.11a/802.11b Wireless Cardbus Adapter, as part of the high performance D-Link *AirPro* series of wireless networking products.

Featuring a breakthrough all-in-one dual-band multimode design, the new D-Link *AirPro* DWL-AB650 is a next generation adapter that serves either 802.11a wireless networks at 54 Mbps (108 Mbps in proprietary *Turbo mode*\*) or 802.11b wireless networks at 11Mbps.

The D-Link *AirPro* DWL-AB650 delivers the fastest IEEE standards-based wireless technology in the industry and is interoperable with other 802.11a and 802.11b wireless devices.

After completing the steps outlined in the *Quick Installation Guide* (included in your package) not only will you have the ability to share information and resources, but you will also be able to enjoy the freedom that wireless networking delivers, at speeds capable of handling large data files or video streams.

\*When used with other D-Link *AirPro* products.

# Features

- Fully compatible with the 802.11a standard to provide a wireless data rate of up to 54Mbps (up to 108Mbps in proprietary Turbo Mode)
- Fully compatible with the 802.11b standard to provide a wireless data rate of up to 11Mbps
- 802.1x support
- Dynamic data rate scaling at 6, 9, 12, 18, 24, 36, 48, and 54Mbps for 802.11a
- Dynamic data rate scaling at 1, 2, 5.5, and 11Mbps for 802.11b
- Maximum reliability, throughput and connectivity with automatic data rate switching
- Supports wireless data encryption with 64-bit WEP, 128-bit WEP (802.11b); and 152-bit WEP for security (with Dynamic Keying for 802.11a transmissions)
- Built-in dual diversity antenna for better wireless reception in environments with multi-path interference
- Supports Cardbus (32-bit) Type II PC Card
- User-friendly configuration and diagnostic utilities
- Supports AES (Advanced Encryption Security)

## LEDS

**LED** stands for **L**ight-**E**mitting **D**iode. The **DWL-AB650** has the following LEDs:

LED	LED Activity
Power	A steady light indicates a connection to a power source
Activity	A blinking light indicates network activity

# 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. Strictly adhering to the IEEE standard, the D-Link wireless family of products will allow you to securely access the data you want, when and where you want it. You will be able to enjoy the freedom that wireless networking delivers.

A wireless local area network (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, 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.

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 Router is a device used to provide this link.

## Wireless Basics (*continued*)

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. Management decisions based on real-time information can significantly improve worker efficiency.

**Low Implementation Costs** – WLANs (Wireless Local Area Networks) 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.

**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.

**Network Expansion** - Wireless technology allows the network to go where wires cannot.

**Scalability** – Wireless Local Area Networks (WLANs) can be configured in a variety of topologies to meet the needs of specific applications or existing infrastructures. 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.

*The DWL-AB650 is compatible with other 802.11a products, which include:*

- 2.4GHz/5GHz Dual Band, Multi-mode Wireless PCI Adapters used with desktop computers (**D-Link AirPro DWL-AB520**)
- 5GHz Wireless Cardbus Adapters used with laptop computers (**D-Link AirPro DWL-A650**)
- 5GHz Wireless PCI Adapters used with desktop computers (**D-Link AirPro DWL-A520**)
- 5GHz Multimode Wireless Broadband Routers computers (**D-Link AirPro DI-764, and DI-754**)
- 5GHz Wireless Access Points (**D-Link AirPro DWL-5000AP, DWL-6000AP**)

## Wireless Basics (continued)

The DWL-AB650 is also compatible with 802.11b wireless products, which include:

- 2.4GHz Wireless Cardbus Adapters used with laptop computers (**D-Link Air DWL-650, D-Link AirPlus DWL-650+**)
- 2.4GHz Wireless PCI cards used with desktop computers (**D-Link Air DWL-520, D-Link AirPlus DWL-520+**)
- Enhanced 2.4GHz Wireless Access Point (**D-Link AirPlus DWL-900AP+**)
- Enhanced 2.4GHz Wireless Broadband Router (**D-Link AirPlus DI-614+**)

## Standards-Based Technology

The versatile DWL-AB650 Wireless Multimode Cardbus Adapter integrates both 802.11a and 802.11b standards into a single unit.

The IEEE **802.11a** standard designates that devices may operate at an optimal data rate of 54 Mbps (108 Mbps in proprietary *Turbo* mode.) 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** (Orthogonal Frequency Division Multiplexing) 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* 802.11a products will automatically sense the best possible connection speed to ensure the greatest speed and range possible.

Also based on the IEEE **802.11b** standard, the DWL-AB520 is interoperable with existing compatible 2.4GHz wireless technology with data transfer speeds of up to 11Mbps.



## Wireless Basics (*continued*)

### Installation Considerations

The D-Link *AirPro* DWL-AB650 lets you access your network, using a wireless connection, from virtually anywhere. Keep in mind, however, that the number, thickness and location of walls, ceilings, or other objects that the wireless signals must pass through, may limit the range. Typical ranges vary depending on the types of materials and background RF (radio frequency) noise in your home or business. The key to maximizing wireless range is to follow these basic guidelines:

1. Keep the number of walls and ceilings between the DWL-AB650 and other network devices to a minimum - each wall or ceiling can reduce your D-Link *AirPro* Wireless product'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! Try to make sure that devices 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 wireless devices and computers with wireless adapters so that the signal passes through drywall or open doorways and not other materials.
4. Keep your product away (at least 3-6 feet or 1-2 meters) from electrical devices or appliances that generate RF noise.

# Getting Started

With its default settings, the DWL-AB650, when activated, will connect with other D-Link *AirPro* products, right out of the box.

There are basically two modes of networking:

- **Infrastructure** – using an Access Point, such as the DWL-900AP+, DWL-5000AP or DWL-6000AP.
- **Ad-Hoc** – directly connecting to another computer, for peer-to-peer communication, using wireless network adapters on each computer, such as two or more DWL-AB650 wireless network Cardbus adapters.

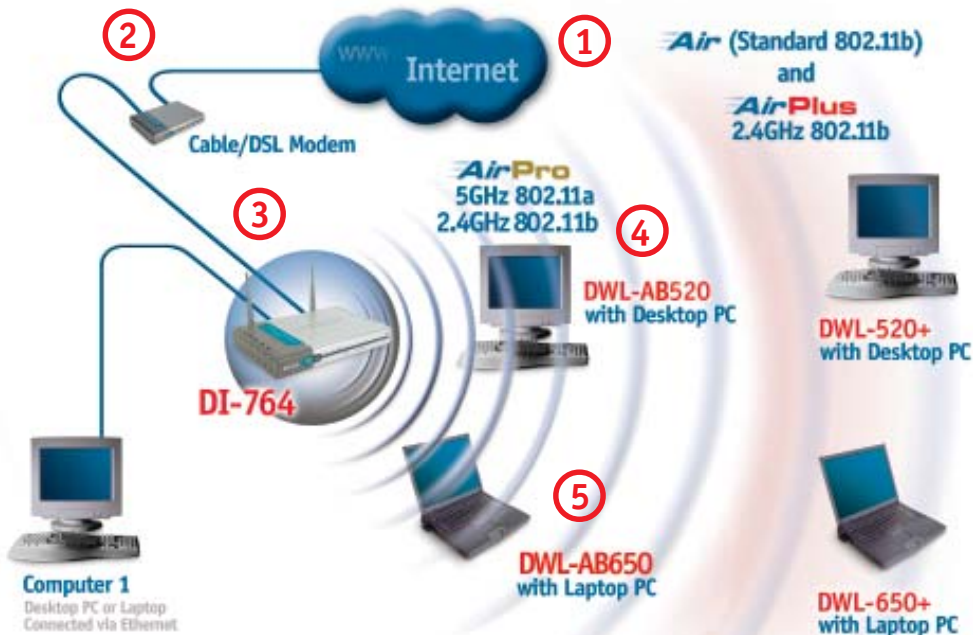
On the following pages we will show you an example of an **Infrastructure Network** and an **Ad-Hoc Network**.

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 *AirPro* DI-764**
- A laptop computer with a wireless adapter - **D-Link *AirPro* DWL-AB650**
- A desktop computer with a wireless adapter - **D-Link *AirPro* DWL-AB520**
- A Cable modem - **D-Link DCM-200**

## Getting Started

### Setting up a Wireless Infrastructure Network



Please remember that **D-Link AirPro** 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** If you are connecting a desktop computer to your network, install the D-Link AirPro DWL-AB520 wireless PCI adapter into an available PCI slot on your desktop computer. You may also install the DWL-520+ or the DWL-520. (See *the Quick Installation Guide* included with the network adapter.)
- 5** Install the drivers for the D-Link DWL-AB650 wireless Cardbus adapter into a laptop computer. (See *the Quick Installation Guide* included with the DWL-AB650.)

## Getting Started

### Setting up a Wireless Ad Hoc Network



- 1** Install the **D-Link AirPro DWL-AB520** Wireless Network adapter into the desktop computer. Other installation possibilities include the DWL-A520 or DWL-520. See the **Quick Installation Guide** included with the product for installation instructions.
- 2** Install the **DWL-AB650** into a laptop computer. See the **Quick Installation Guide** included with the product.
- 3** Set the wireless configuration for the adapters to Ad-Hoc mode, set the adapters to the same channel, and assign an IP Address to each computer on the Ad-Hoc network. (See Box below)

### IP Address

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

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

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

# Using the Configuration Utility

If you wish to change the default settings or optimize the performance of the DWL-AB650, D-Link has included a configuration utility for this purpose. However, in Windows XP, you will instead use zero configuration utility.

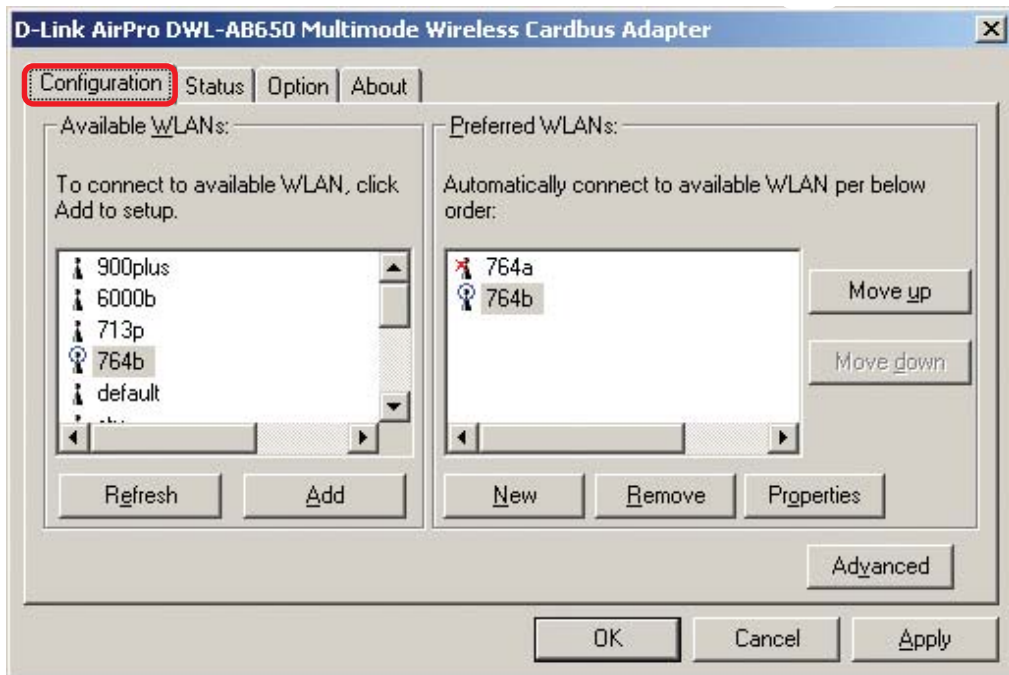
**Note:** With its default settings, the DWL-AB650 will associate with D-Link *AirPro* products such as the DI-764 (a wireless router), and D-Link *AirPlus* products such as the DI-614+ (a wireless router), right out of the box.

Before you use the configuration utility for the DWL-AB650, you must install the drivers and the configuration utility from the CD-ROM that came with the DWL-AB650. (Please see the *Quick Installation Guide* that came with the product.) After you have completed this installation and restarted your computer, you can access the Configuration Utility at any time by clicking on the icon in your taskbar at the bottom right corner, on the desktop.

After double-clicking on the icon in the taskbar (shown at right), the following Configuration Utility window will appear:



## Configuration



# Using the Configuration Utility

## Configuration *(continued)*

- Refresh-** Click **Refresh** to display the current available networks
- Add-** Highlight the network to which you wish to connect and click **Add** to add it to Preferred WLANs
- New-** Click **New** to manually add a WLAN
- Remove-** Click **Remove** to eliminate the highlighted network from Preferred WLANs
- Move up-** Click **Move up** to move the network up higher in the list of Preferred WLANs
- Move down-** Click **Move down** to move the network lower in the list of Preferred WLANs
- Properties-** Click **Properties** to configure the highlighted network and the screen below will appear

### Configuration>Properties

**1 Wireless network name-** Input a wireless network name (an SSID)

**2 Network Authentication (Shared mode)-** Select this option if you are not using WEP encryption

**3 Enable Data encryption-** Select this option if you are using WEP encryption

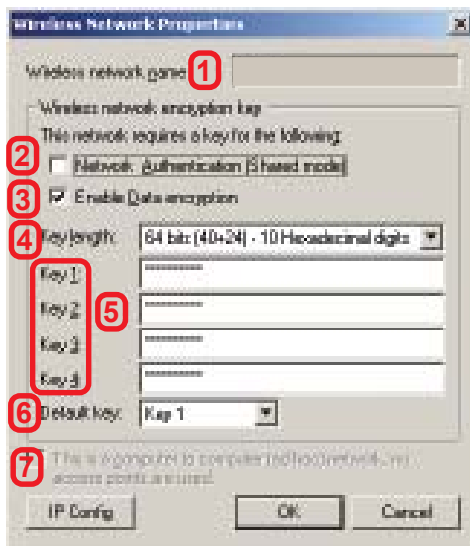
**4 Key Length-** Select the key length. 802.11b networks use 64 or 128 bit key lengths. 802.11a networks use 64, 128, or 152 bit key lengths.

**5 Keys 1-4-** Input up to 4 keys

**6 Default Key-** Select the default key

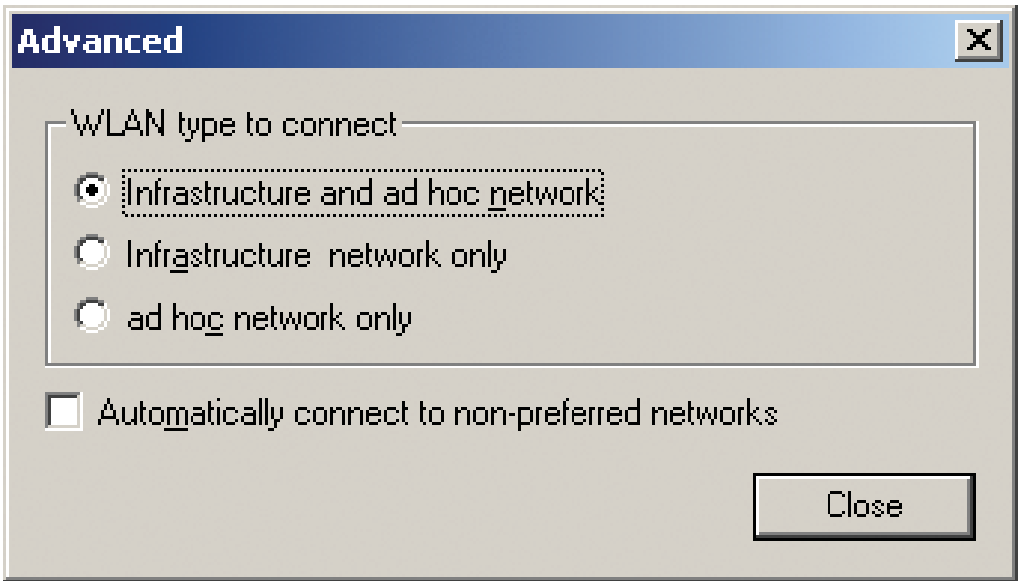
**7 This is a computer to computer (Ad-Hoc) network; no access points are used. -** Select this option if your computer is in an Ad-Hoc network.

Click **OK** to the save changes.



# Using the Configuration Utility

## Configuration>Advanced



Click on **Advanced** in the **Configuration** window to select the type of WLAN (Wireless Local Area Network) to which you wish to connect. Select from the following options in the **Advanced** pop-up window:

### WLAN type to connect

#### Infrastructure and ad-hoc network-

Choose this option to connect to both **Infrastructure** and **Ad-Hoc** networks

#### Infrastructure network only-

Choose this option to connect to **Infrastructure** networks only (networks with an Access Point like the DI-764)

#### Ad-hoc network only-

Choose this option to connect directly to another ethernet adapter equipped computer

#### Automatically connect to non-preferred networks-

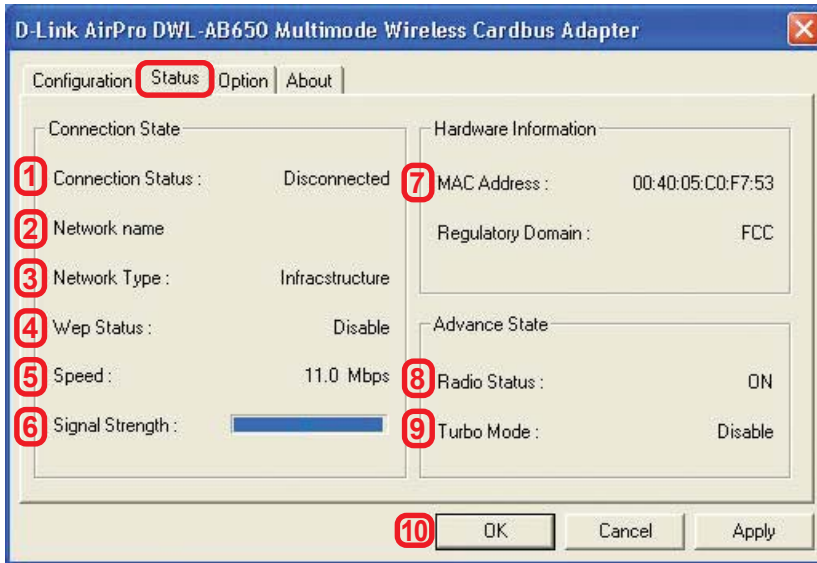
Choose this option to connect to any available network. (This option could result in a security risk.)

#### Close-

Click **Close** to save the changes.

# Using the Configuration Utility

## Status



If you enable **WEP encryption** or **Turbo Mode** make sure to enable WEP encryption and Turbo Mode on all the devices in your network.

The Status screen displays the current properties of the DWL-AB650.

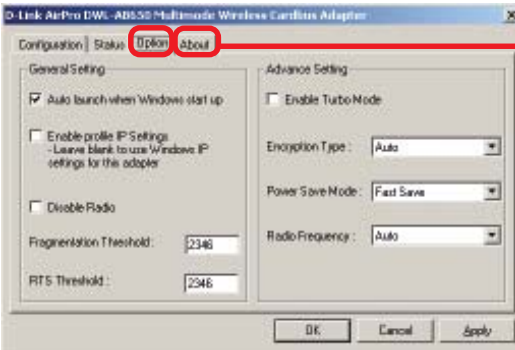
- 1 Connection Status-** Indicates the connection status: either connected or disconnected.
- 2 Network Name-** Displays the network name that you have input
- 3 Network Type-** Indicates either **Infrastructure**, **Ad-Hoc** or **Infrastructure and Ad-Hoc**
- 4 WEP Status-** Either **Enable** or **Disable**  

WEP stands for **Wired Equivalent Privacy**.  
It is a security protocol for **Wireless Local Area Networks**
- 5 Speed-** Indicates data rate speed
- 6 Signal Strength-** Displays the signal strength
- 7 MAC Address-** **Media Access Control** address is a unique hardware address that identifies the DWL-AB650 on the network
- 8 Radio Status-** **ON** or **OFF**
- 9 Turbo Mode-** **Enable** or **Disable**. **Disable** is the default setting
- 10 Click OK or Apply-** Click **Apply** to save the changes



# Using the Configuration Utility

## Option



Click on the **About** tab to find out the firmware version

## General Setting

### Auto Launch when Windows starts up-

Automatically enables the adapter when Windows starts up. By default this option is selected.

### Enable Profile IP Settings-

To use the profile selection feature under the configuration tab, you must first enable profile IP settings. Leave this field blank if you wish to use the Windows IP settings and do not choose to select an IP profile.

### Disable Radio-

Select this box to disable the DWL-AB650

### Fragmentation Threshold-

This value should remain at its default setting of **2346**. The Fragmentation threshold, which is specified in bytes, determines whether packets will be fragmented. Packets exceeding the 2346 byte setting will be fragmented before transmission.

### RTS Threshold-

Request to **S**end threshold measures the value in bytes. Any packet size exceeding 2346 will trigger the DWL-AB650 to use RTS/CTS mechanism for transmission.

## Advance Setting

### Enable Turbo Mode-

Disable is the default setting. Make sure all devices in your network have identical settings for Turbo mode

### Encryption Type-

Select from **Auto**, **WEP** or **AES**

### Power Save Mode-

Select from **Fast Save**, **Max. Save** or **Disable**. Default is **Fast Save**.

### Radio Frequency-

Select from **802.11b - 2.4GHz**, **802.11a - 5GHz** or **Auto**. Default is **Auto**.

### Click OK or Apply-

Click **Apply** to save the changes; click **OK** to close the utility

# 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.*

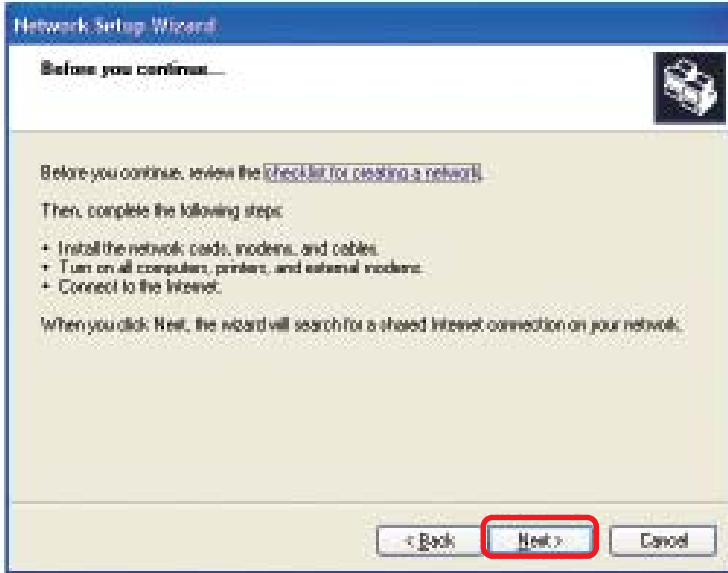
Go to **Start>Control Panel>Network Connections**  
Select **Set up a home or small office network**



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

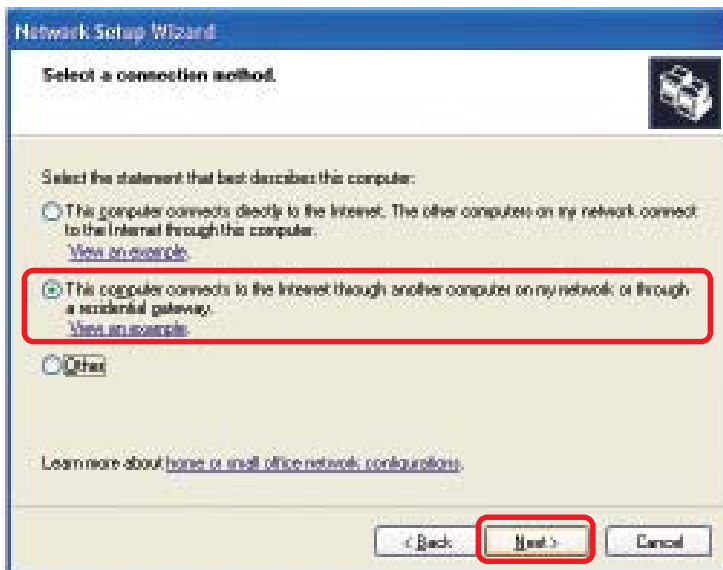
# Networking Basics

Please follow all the instructions in this window:



Click **Next**

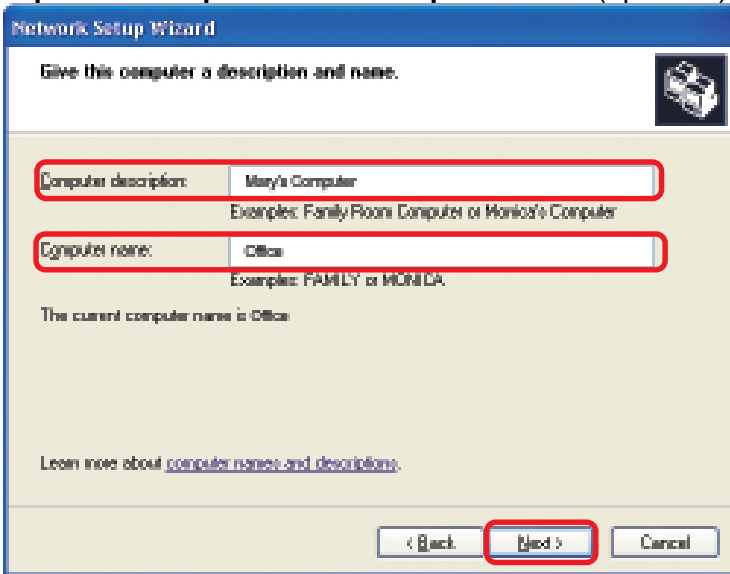
In the following window, select the best description of your computer. If your computer connects to the internet through a gateway/router, select the second option as shown.



Click **Next**

## Networking Basics

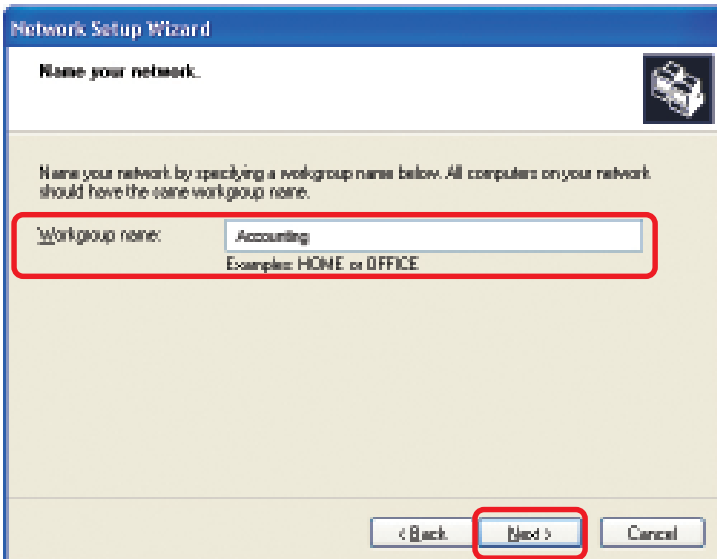
Enter a **Computer description** and a **Computer name** (optional.)



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, both highlighted with red rectangles. The first field is labeled 'Computer description:' and contains the text 'Mary's Computer'. Below it, there is a smaller text label: 'Examples: Family Room Computer or Monitor's Computer'. The second field is labeled 'Computer name:' and contains the text 'Office'. Below it, there is a smaller text label: 'Examples: FAMILY or MONICA'. Below the fields, there is a line of text: 'The current computer name is Office'. At the bottom of the window, there are three buttons: '< Back', 'Next >', and 'Cancel'. The 'Next >' button is highlighted with a red rectangle.

Click **Next**

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

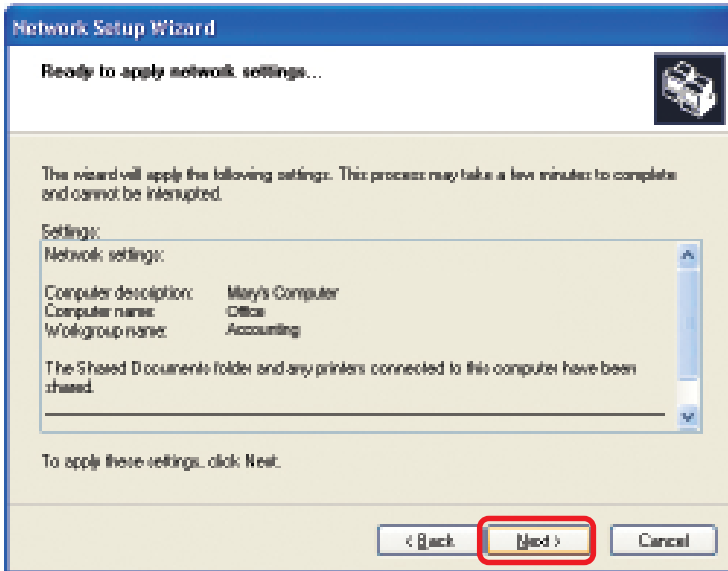


The screenshot shows the 'Network Setup Wizard' window with the title 'Name your network.' The window contains a text input field highlighted with a red rectangle. The field is labeled 'Workgroup name:' and contains the text '.Accounting'. Below it, there is a smaller text label: 'Examples: HOME or OFFICE'.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

Click **Next**

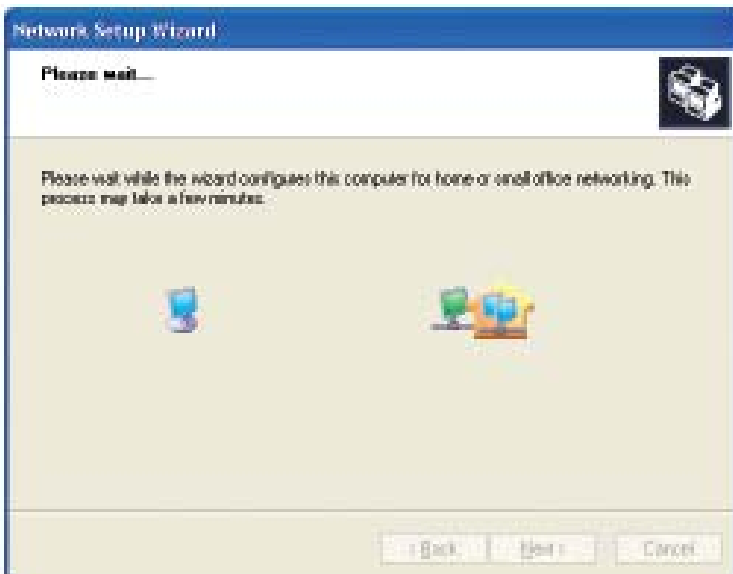
## Networking Basics

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



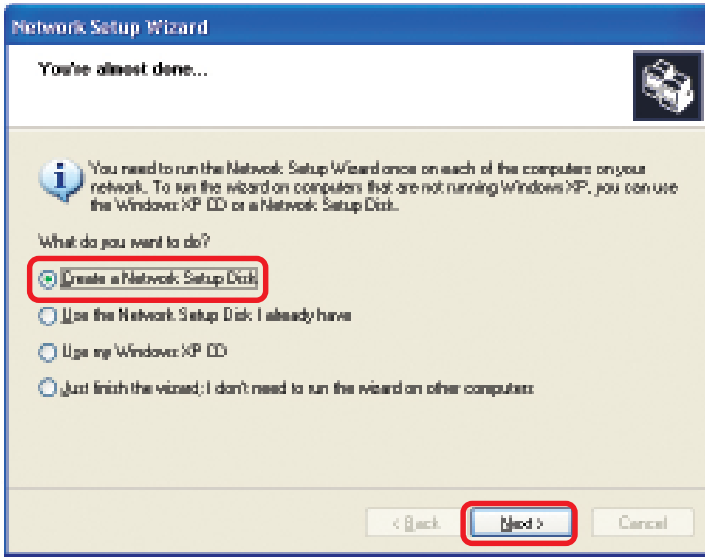
When the changes are complete, click **Next**.

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

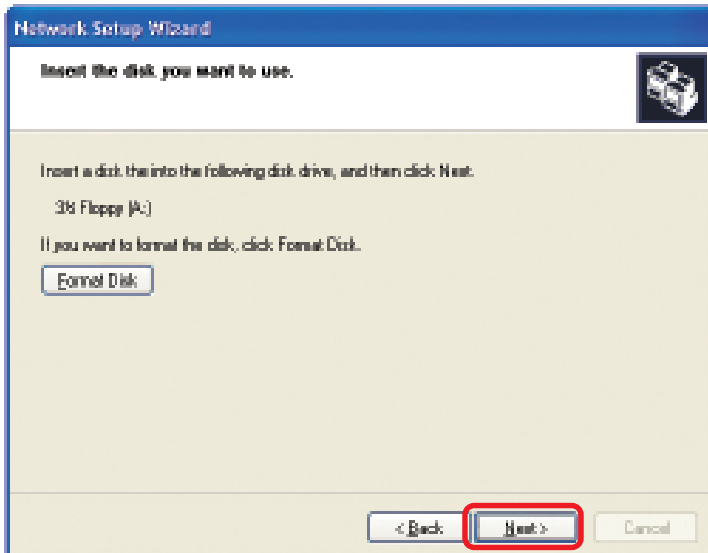


## Networking Basics

In the window below, select the 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**.

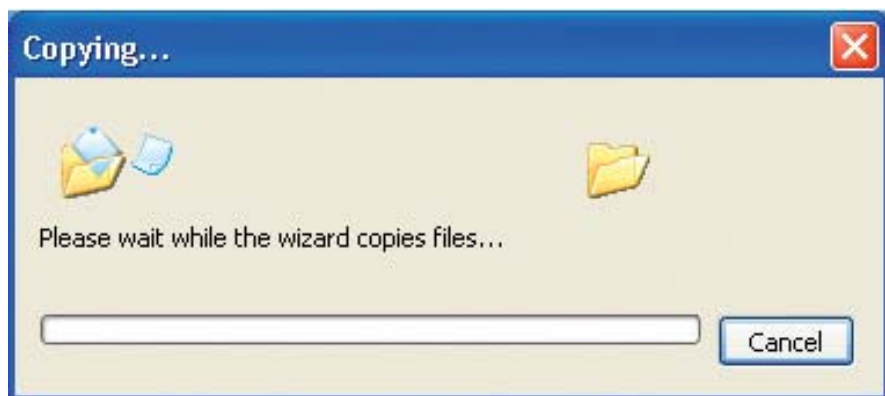


Insert a disk into the Floppy Disk Drive, in this case drive **A**.

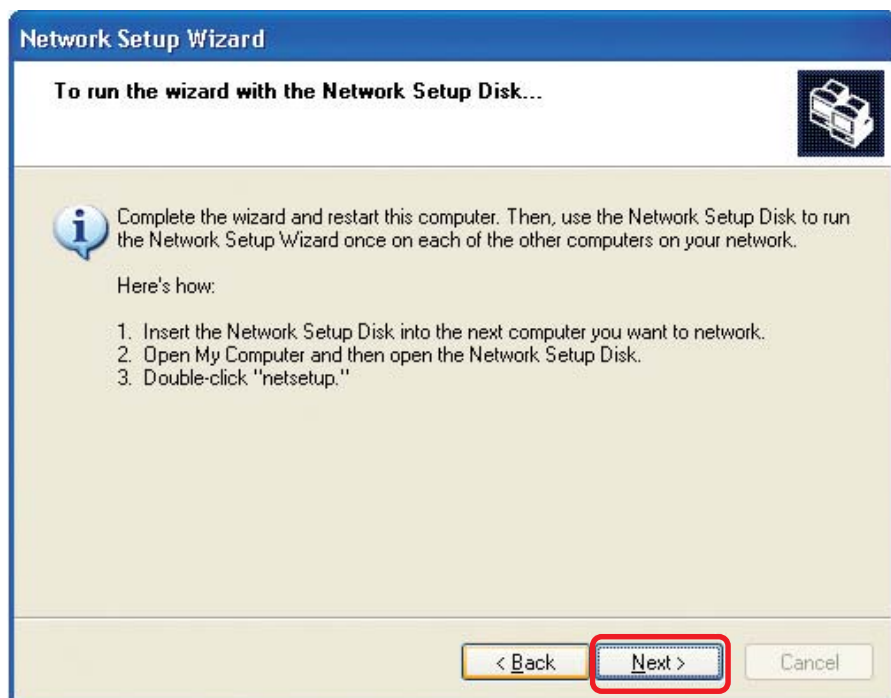


Click **Next**

## Networking Basics



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**.

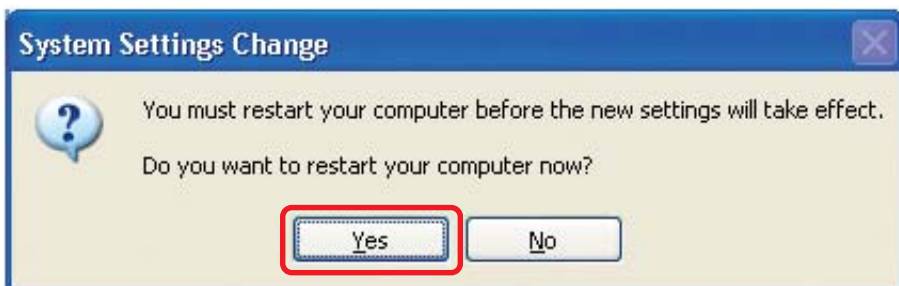


## Networking Basics

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

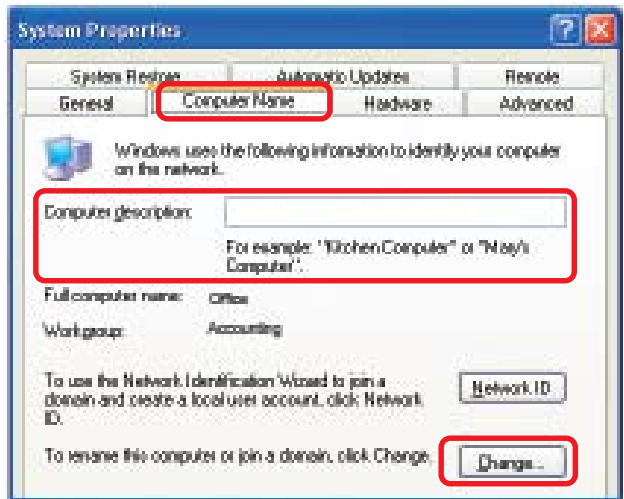
## Naming your Computer

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.

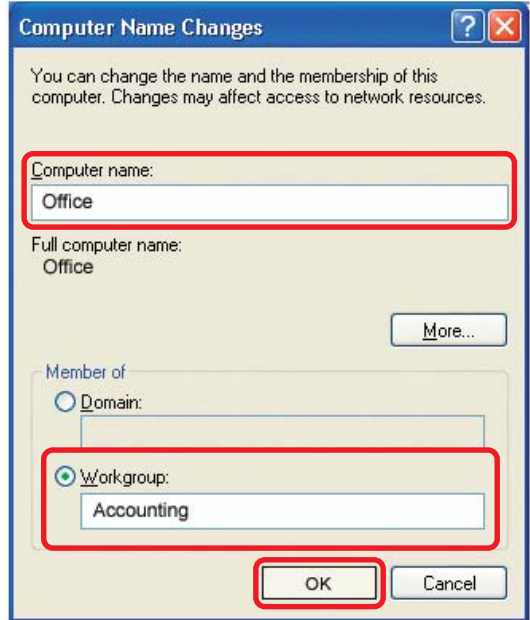


- You may enter a **Computer Description** if you wish; this field is optional.
- To rename the computer and join a domain, Click **Change**.

## Networking Basics

### Naming your Computer

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



### Checking the IP Address in Windows XP

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

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



## Networking Basics

### Checking the IP Address in Windows XP

This window will appear.

- Click the **Support** tab

- Click **Close**

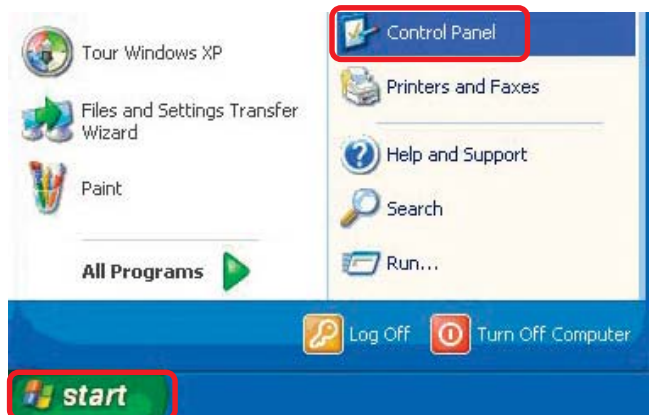


### Assigning a Static IP Address in Windows XP/2000

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

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

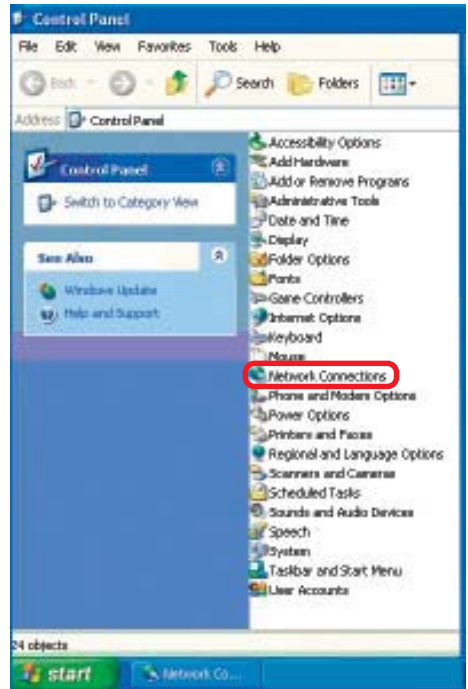
- Go to **Start**
- Double-click on **Control Panel**



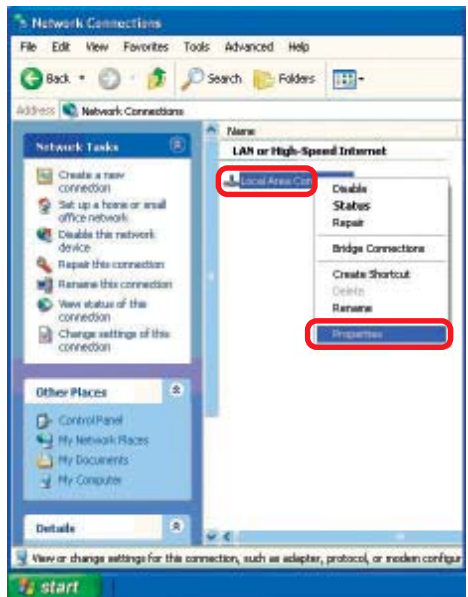
# Networking Basics

## Assigning a Static IP Address in Windows XP/2000

- Double-click on **Network Connections**



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

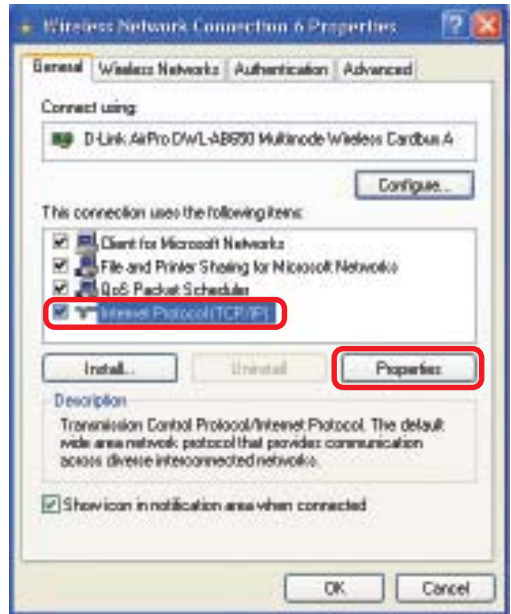


- Double-click on **Properties**

# Networking Basics

## 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:

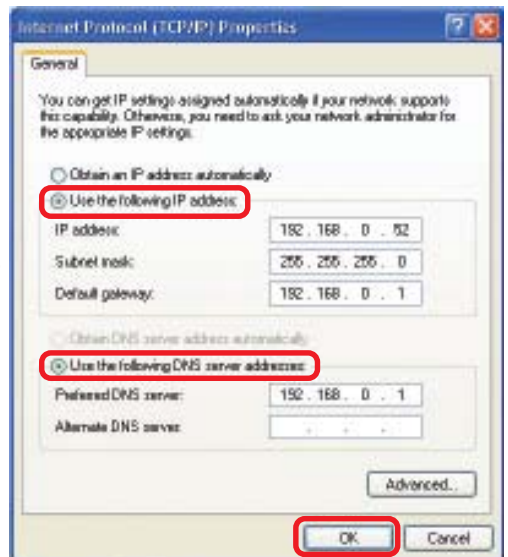
255.255.255.0

### 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**

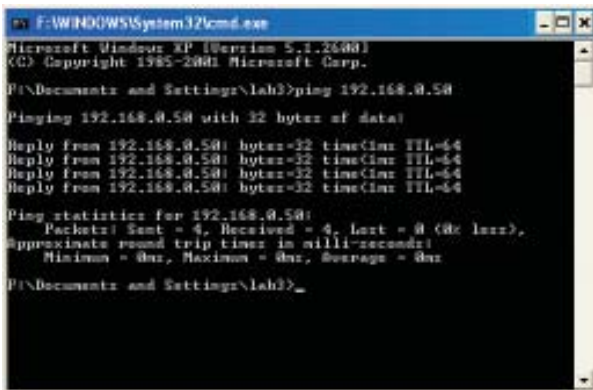


You have completed the assignment of a Static IP Address. (You do not need to assign a Static IP Address if you have a DHCP-capable Gateway/Router.)

## Networking Basics

### 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\lah3>ping 192.168.0.50

Pinging 192.168.0.50 with 32 bytes of data:

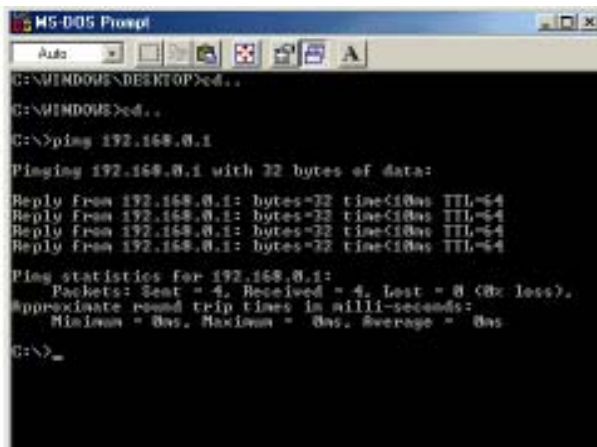
Reply from 192.168.0.50: bytes=32 time<1ms TTL=64
Reply from 192.168.0.50: bytes=32 time<1ms TTL=64
Reply from 192.168.0.50: bytes=32 time<1ms TTL=64
Reply from 192.168.0.50: bytes=32 time<1ms TTL=64

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\lah3>_
```

### Checking the Wireless Connection by Pinging in Windows ME and 98SE

- 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.



```
MS-DOS Prompt
Auto
G:\WINDOWS\DESKTOP>cd..
G:\WINDOWS>cd..
G:\>ping 192.168.0.1

Pinging 192.168.0.1 with 32 bytes of data:

Reply from 192.168.0.1: bytes=32 time<18ms TTL=64
Reply from 192.168.0.1: bytes=32 time<18ms TTL=64
Reply from 192.168.0.1: bytes=32 time<18ms TTL=64
Reply from 192.168.0.1: bytes=32 time<18ms TTL=64

Ping statistics for 192.168.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

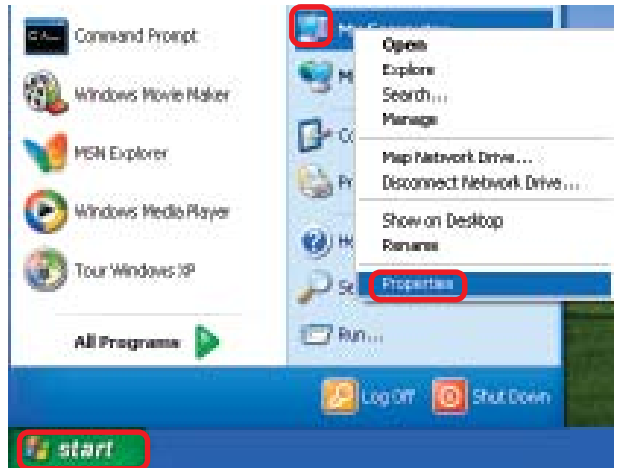
G:\>_
```

# Troubleshooting

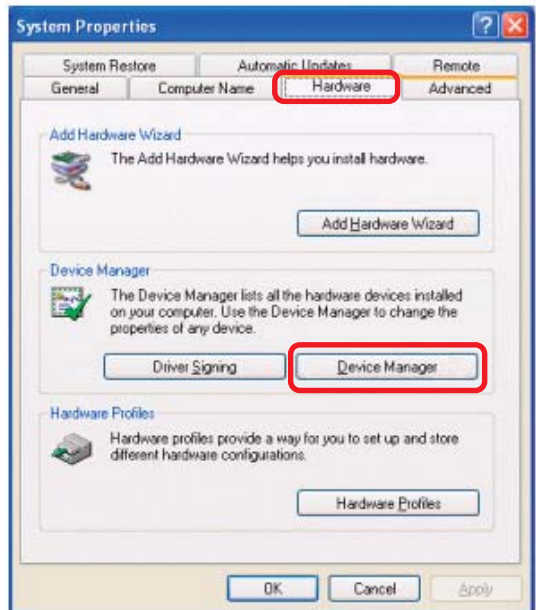
This chapter provides solutions to problems that can occur during the installation and operation of the DWL-AB650. Read the following descriptions if you are having problems. (The examples below are illustrated in Windows XP. If you have a different operating system, the screenshots on your computer will look similar to the following examples.)

## 1. Check that the drivers for the DWL-AB650 are installed properly.

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



- Select the **Hardware Tab**

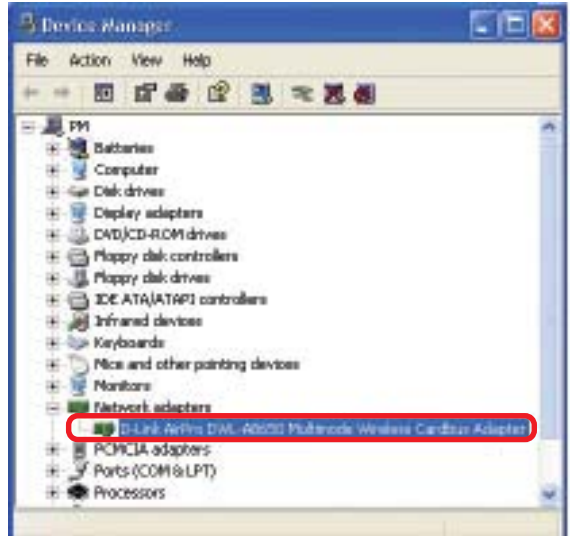


- Click **Device Manager**

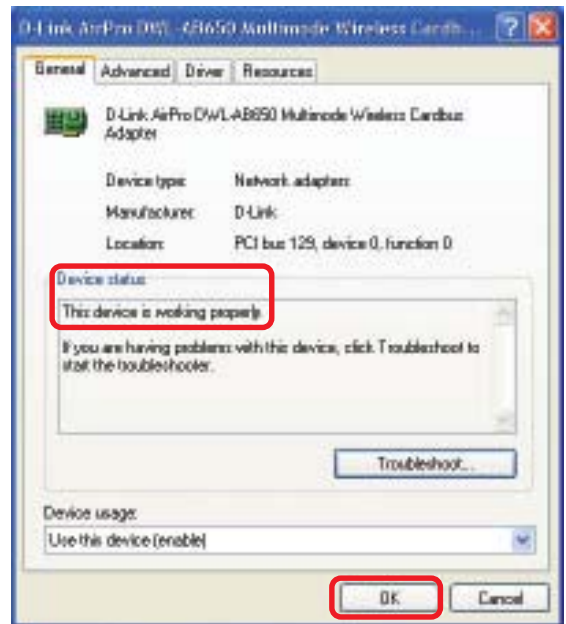


# Troubleshooting

- Double-click on **Network Adapters**
- Right-click on **D-Link AirPro DWL-AB650 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

### 2. I cannot connect to the access point or the wireless router.

- Make sure that the SSID on the DWL-AB650 Cardbus adapter is exactly the same as the SSID on the Access Point or wireless router.
- Move the DWL-AB650 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)
- Make sure that the Radio is not locked down to a different frequency
- Turn off your Access Point and the computer with the DWL-AB650. Turn on the Access Point, and then turn on the computer with the DWL-AB650.
- Refresh the DWL-AB650 Utility

### 3. The DWL-AB650 Power and Link lights are not on.

- Check to see if the DWL-AB650 Cardbus adapter is firmly inserted into the Cardbus slot of your laptop computer.

### 4. I forgot my Encryption key.

- Reset the Access Point to its factory default settings and restore the DWL-AB650 Wireless Cardbus Adapter to the factory default settings. (The default settings are listed in the **Using the Configuration Utility** section in this manual.)

### 5. The computer does not recognize the DWL-AB650 Wireless Adapter.

- Make sure that the DWL-AB650 Wireless Adapter is properly seated in the computer's Cardbus 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

- 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 **NetA3AB.inf** and **TIA3AB.sys**. Remove these files from the **INF** and **SYSTEM32** (DRIVERS) folders in the Windows directory. Note: Windows XP and Windows 2000 will rename **.inf** files that have not received WHQL certification into **oem.inf** files (e.g., **oem1.inf**.)

### 6. The computer with the DWL-AB650 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, AirPlus and AirPro* 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

- Check that the **Network Connection** for the wireless client is configured properly. Select **AP (Infrastructure)** when connecting to an access point and select **Ad-Hoc mode** when connecting without an access point. Double-click on the **WLAN icon** in the taskbar > click on **Configuration** to change the settings for the wireless adapter.
- If **Security** is enabled, make sure that the correct encryption keys are entered on both the DWL-AB650 and the access point. Double-click on the **WLAN icon** in the taskbar > click **Encryption**. Check to see that the key selected is set to the same key as other devices on the network.

### 7. How can I troubleshoot distance issues using the DWL-AB650.

- Move the DWL-AB650 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 802.11a
- IEEE 802.11b
- IEEE 802.1x
- Wi-Fi

## Diagnostic LED

- Power
- Network

## Temperature

- Operating: 0°C to 55°C (32°F to 131°F)
- Storing: -20°C to 75°C (-4°F to 167°F)

## Humidity:

- 10%-90%, non-condensing (Operating)
- 5%-95%, non-condensing (Non-operating)

## Antenna Type:

- Integrated dual diversity antenna with a max. of 1.9dBi Gain

## Operating Voltage:

- 3.3VDC +/-10%

## MTBF:

- Mean time between failure >30,000 hours

## Emissions:

- FCC part 15b

## Physical Dimensions:

- L = 4.65 inches (118mm)
- W = 2.13 inches (54mm)
- H = .51 inches (13mm)

## Weight:

- .09 lb. (40 grams)

## Warranty:

- 3 years

# Technical Specifications

## Data Rates:

802.11a

- 6, 9, 12, 18, 24, 36, 48, 54 (108 Mbps in Turbo mode at 5 GHz)

802.11b

- 1, 2, 5.5, 11Mbps (with Automatic Fallback)

## Encryption:

- Supports 64-bit, 128-bit, and 152-bit WEP encryption
- Supports AES (Advanced Encryption Security)

## Available Channels:

- 12 non-overlapping channels for North America

## Frequency Range:

802.11a

- 5.150 – 5.350 and 5.725 ~ 5.825 GHz (U.S. & Canada)

802.11b

- 2.400 – 2.497GHz

## Radio and Modulation Technology:

802.11a

- Orthogonal Frequency Division Multiplexing (OFDM)

802.11b

- DSSS (Direct Sequence Spread Spectrum)

## Media Access Control:

- CSMA/CA with ACK

## Transmit Power:

802.11a

- +13 ~ 14dBm (20-25mW) at  
54Mbps

802.11b

- +18dBm (63mW) at 11Mbps

## Technical Specifications

### Bus Type:

- PC Card Type II Cardbus

### OS Supported:

- Windows XP
- Windows 2000
- Windows ME
- Windows 98SE

### Receiver Sensitivity:

802.11a

- -66 dBm (54Mbps)

802.11b

- -84 dBm (11Mbps)

## 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:

(877) 453-5465

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 (*Bottom of unit*)
- Model number or product name
- Software type and version number

# Warranty and Registration

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

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

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

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

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

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

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

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

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

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

- The original product owner must obtain a Return Material Authorization (“RMA”) number from the Authorized D-Link Service Office and, if requested, provide written proof of purchase of the product (such as a copy of the dated purchase invoice for the product) before the warranty service is provided.
- After an RMA number is issued, the defective product must be packaged securely in the original or other suitable shipping package to ensure that it will not be damaged in transit, and the RMA number must be prominently marked on the outside of the package. Do not include any manuals or accessories in the shipping package. D-Link will only replace the defective portion of the Product and will not ship back any accessories.
- The customer is responsible for all in-bound shipping charges to D-Link. No Cash on Delivery (“COD”) is allowed. Products sent COD will either be rejected by D-Link or become the property of D-Link. Products shall be fully insured by the customer and shipped to **D-Link Systems, Inc., 53 Discovery Drive, Irvine, CA 92618**. D-Link will not be held responsible for any packages that are lost in transit to D-Link. The repaired or replaced packages will be shipped to the customer via UPS Ground or any common carrier selected by D-Link, with shipping charges prepaid. Expedited shipping is available if shipping charges are prepaid by the customer and upon request.

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

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

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

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



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

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

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

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

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

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

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

(11/11/2002)