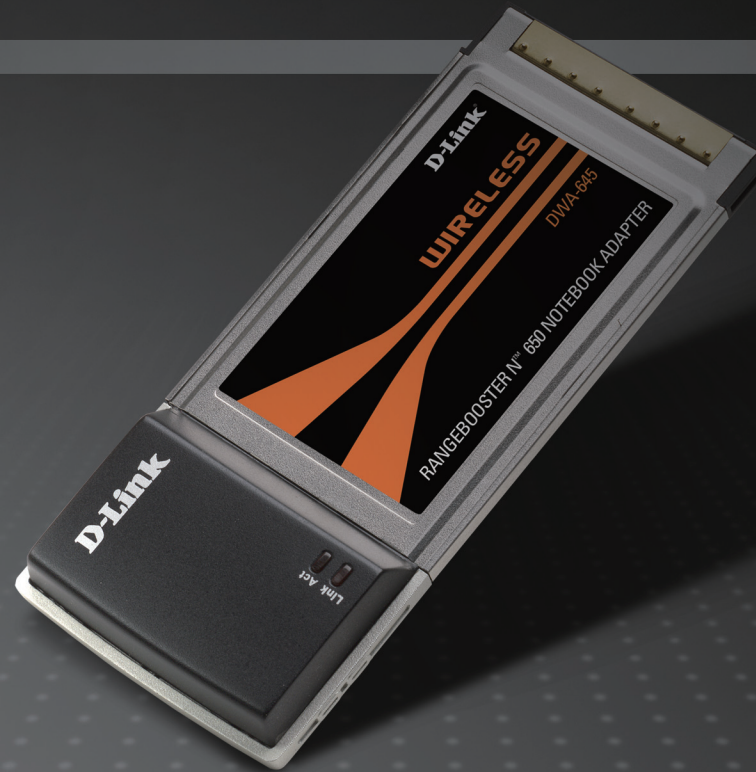


# USER MANUAL

DWA-645

VERSION 2.0



**D-Link**<sup>®</sup>

**WIRELESS**

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# Package Contents

- D-Link DWA-645 Wireless N Notebook Adapter
- Manual and Warranty on CD
- D-Link Wireless Connection Manager on CD



# System Requirements

- A laptop computer with an available 32-bit cardbus slot
- Windows® 2000 (Service Pack 4) or XP (Service Pack 2), or Vista, or Windows® 7
- CD-ROM Drive
- 20MB Hard Disk Space
- A 802.11n, 802.11g or 802.11b access point (for Infrastructure mode), or another 802.11n, 802.11g or 802.11b wireless adapter (for Ad Hoc mode.)

# Introduction

The D-Link Wireless N Notebook Adapter (DWA-645) is a 802.11n client device that delivers unrivaled wireless performance for your notebook computer. With the DWA-645, you can add or upgrade your notebook's wireless connectivity without having to purchase a new notebook. Once connected, access your network's high-speed Internet connection while sharing photos, files, music, video, printers, and storage. Get a better Internet experience with a faster wireless connection so you can enjoy digital phone calls, gaming, downloading, and video streaming.

Powered by Wireless N technology, the DWA-645 provides a faster wireless connection and superior reception than 802.11g\*. The DWA-645 is designed for use in bigger homes and for those that demand higher networking. Maximize wireless performance by connecting this notebook adapter to a Wireless N Router and stay connected from virtually anywhere in the home. This notebook adapter supports WEP, WPA and WPA2 encryption to prevent outside intrusion and protect your personal information from being exposed.

D-Link's Quick Setup Wizard guides you step-by-step through the installation process. The D-Link Wireless Manager is included with this product to keep track of all your most frequently accessed networks.

With unmatched wireless performance, reception, and security protection, the D-Link Wireless N Notebook Adapter (DWA-645) is the best choice for easily adding or upgrading wireless connectivity to your notebook computer.

\* Maximum wireless signal rate derived from IEEE Standard 802.11g and 802.11n 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. Environmental conditions will adversely affect wireless signal range.

\*\* All devices in the wireless network must be enabled with D-Link Wireless N Technology

# Features

- **Faster Wireless Networking** - Enable wireless connectivity on your notebook computer with the DWA-645. With the performance of D-Link's Wireless N line of wireless products, the DWA-645 delivers an unsurpassed wireless experience. Perform multiple network tasks at once with the speed provided by this Wireless Adapter.
- **Compatible with 802.11b and 802.11g Devices** - Fully compatible with the IEEE 802.11b and 802.11g standards, the DWA-645 can connect with existing 802.11b or 802.11g compliant routers, access points and cards. That means you can still communicate with colleagues and friends while you have the ability to link to even more wireless networks.
- **Better Security with 802.1x and WPA** - With the DWA-645 in your laptop PC you can securely connect to a wireless network using 802.1x for wireless authentication, as well as WPA (Wi-Fi Protected Access) providing you a much higher level of security for your data and communication than has previously been available.
- **32-bit Cardbus Performance/Plug & Play Connectivity** - The DWA-645 is a powerful 32-bit Notebook Adapter that installs quickly and easily into laptop PCs, and when used with other D-Link Wireless N products will automatically connect to the network out of the box.
- **Total Performance** - Upgrade your notebook with the latest 802.11n technology.
- **Total Wireless Protection** - Connect to secure wireless networks using WEP, and WPA.
- **Total Connection** - Get reception throughout your home by connecting to a Wireless N Router.

# Hardware Overview

## LEDs

### Activity LED

A blinking light indicates data is being transmitted.



### Link LED

A steady light indicates a connection to a wireless network.

# Installation

This section will walk you through the installation process. If you have a built-in wireless adapter, please disable it in device manager before installing your D-Link adapter. Also, if you have previously installed another wireless adapter, please make sure any software is uninstalled.

## Getting Started

Before installing your new D-Link wireless adapter, please verify the following:

- Remove any previous installations of wireless adapters
- Disable any built-in wireless adapters
- Verify the settings such as the SSID and security settings of the network(s) you want to connect to

## Remove Existing Installations

If you've installed a different manufacture's adapter or a different model D-Link adapter, make sure the software is uninstalled before installing the new software. Some utilities may cause a conflict with the new software. If you plan to use multiple adapters at different times, make sure the utilities are not set to load when your computer boots up. Windows® XP users may use the built-in wireless utility for all adapters.

To remove any old software:

Windows® 7 users: Click **Start > Control Panel > Programs or Features**.

Windows® XP/Vista users: Click **Start > Control Panel > Add or Remove Programs**.

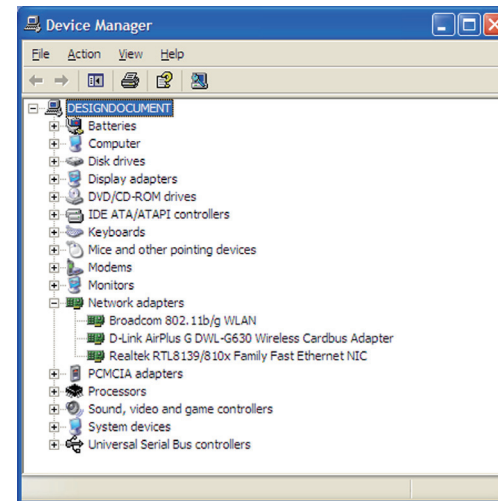
Windows® 2000 users: Click **Start > Settings > Control Panel > Add or Remove Programs**.

# Disable Other Wireless Adapters

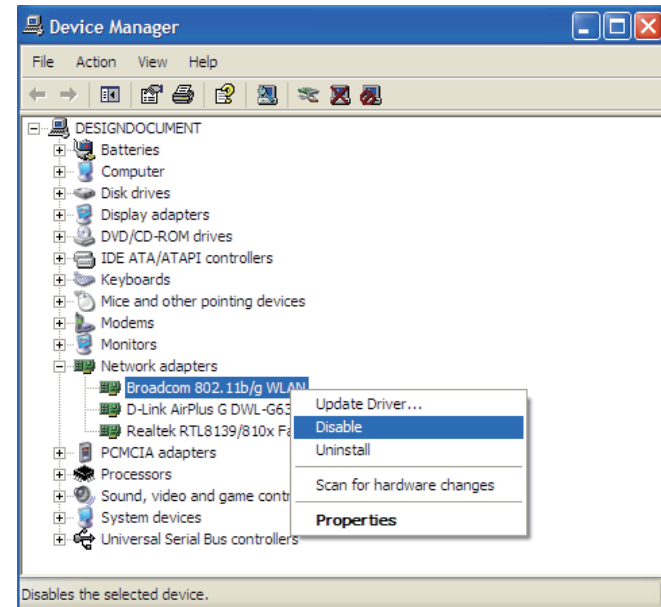
Most newer laptops may include a built-in wireless adapter. To prevent any conflicts with the D-Link wireless adapter, it is recommended to disable the wireless adapter (as well as any unused Ethernet adapters).

From the desktop, right-click on the **My Computer** icon and select **Properties**.

Click the **Hardware** tab and then click **Device Manager**. Scroll down the list and click the + sign to the left of **Network Adapters**.

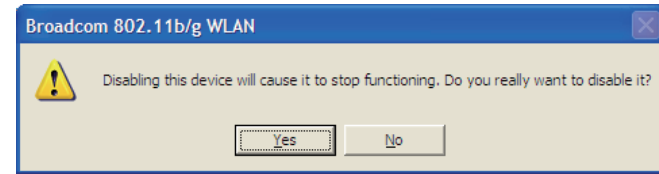


Right-click the adapter you would like to disable and select **Disable**.



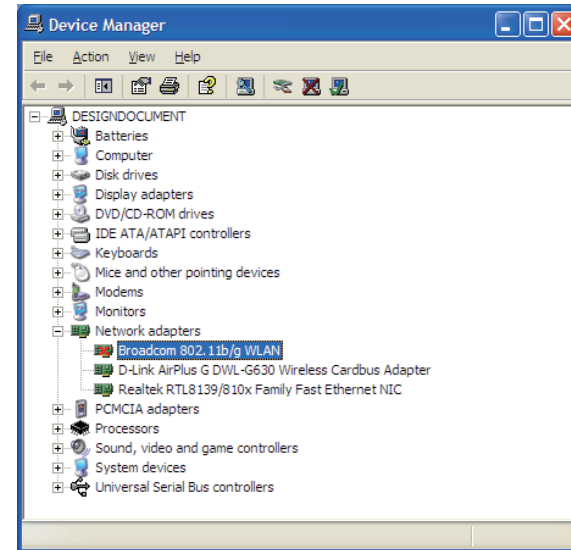


Click **Yes** to disable the adapter.



The adapter is now disabled. When disabled, a red X will be displayed.

Disabling the adapter will not remove the drivers. If you would like to use the adapter, simply right-click it and select **Enable**.



# Wireless Installation Considerations

The D-Link wireless adapter lets you access your network using a wireless connection from virtually anywhere within the operating range of your wireless network. 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 D-Link adapter and other network devices to a minimum - each wall or ceiling can reduce your adapter's range from 3-90 feet (1-30 meters.) Position your devices so that the number of walls or ceilings is minimized.
2. Be aware of the direct line between network devices. A wall that is 1.5 feet thick (.5 meters), at a 45-degree angle appears to be almost 3 feet (1 meter) thick. At a 2-degree angle it looks over 42 feet (14 meters) thick! Position devices so that the signal will travel straight through a wall or ceiling (instead of at an angle) for better reception.
3. Building Materials make a difference. A solid metal door or aluminum studs may have a negative effect on range. Try to position access points, wireless routers, and computers so that the signal passes through drywall or open doorways. Materials and objects such as glass, steel, metal, walls with insulation, water (fish tanks), mirrors, file cabinets, brick, and concrete will degrade your wireless signal.
4. Keep your product away (at least 3-6 feet or 1-2 meters) from electrical devices or appliances that generate RF noise.
5. If you are using 2.4GHz cordless phones or X-10 (wireless products such as ceiling fans, lights, and home security systems), your wireless connection may degrade dramatically or drop completely. Make sure your 2.4GHz phone base is as far away from your wireless devices as possible. The base transmits a signal even if the phone is not in use.

# Adapter Installation

**Warning: Do NOT install the DWA-645 Notebook Adapter into your computer before installing the driver software from the D-Link CD.**

Turn on the computer and Insert the D-Link DWA-645 Driver CD in the CD-ROM drive. The step-by-step instructions that follow are shown in Windows XP. The steps and screens are similar for the other Windows operating systems.

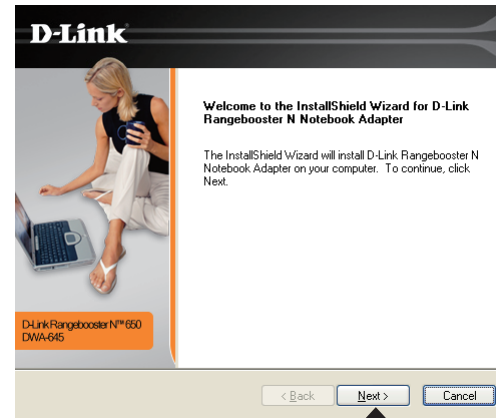
If the CD Autorun function does not automatically start on your computer, go to **Start > Run**. In the run box type “**D:\DWA645.exe**” (where **D:** represents the drive letter of your CD-ROM drive).

When the autorun screen appears, click **Install Drivers**.

Click Install Drivers

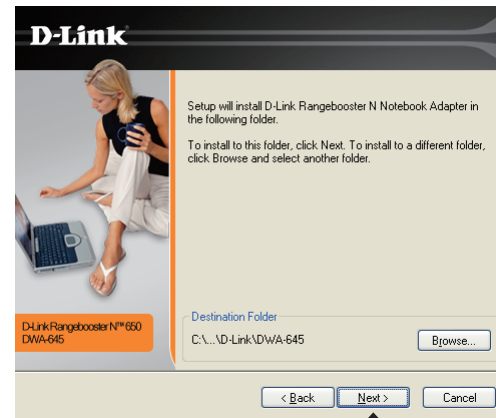


The *InstallShield Wizard* window will appear.



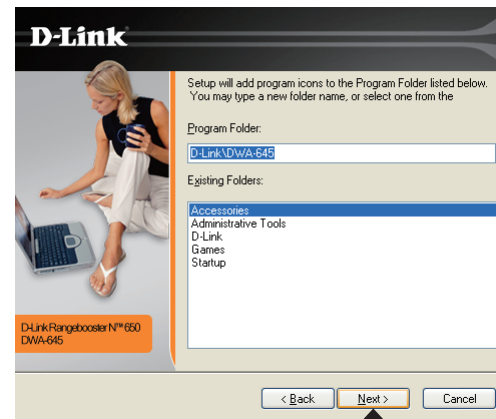
Click Next

By default setup will install to the default location: *C:\Program Files\D-Link\DWA-645*, where C: represents the drive letter of your hard drive. To install to a different location click **Browse** and specify the location.



Click Next

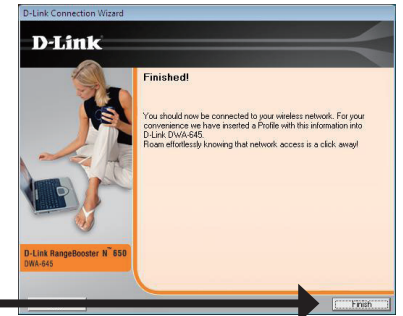
Select the Program Files folder location.



Click Next

Click **Finish** to continue.

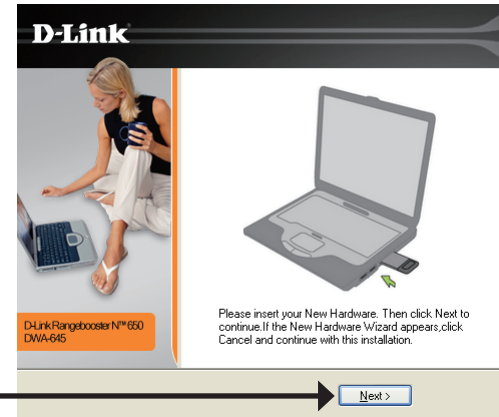
Click **Finish**



Insert the adapter into an available cardbus slot on your computer.

If the *Found New Hardware Wizard* appears, click **Cancel**.

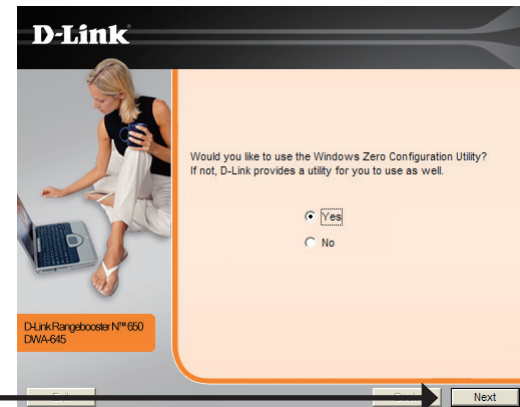
Click **Next**



The D-Link configuration wizard will now appear.

If you are using Windows® XP (SP2), you will have the option to use either the D-Link manager or the built-in Windows® Wireless utility.

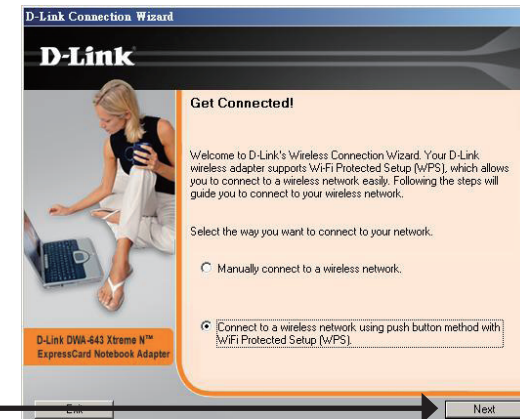
Click **Next**



The Wireless Connection Wizard will now appear.

If you want to manually connect to a wireless network, refer to page 30. The following instructions will connect you to a wireless network using Wi-Fi® Protected Setup (WPS).

Click **Next**

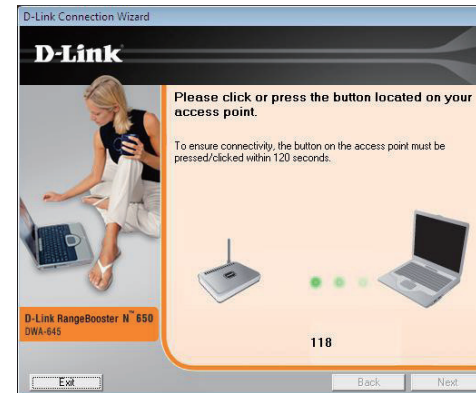


## Push Button Configuration (PBC)

To connect to your network using the WPS push button configuration method, click the virtual button as shown in the screenshot.

Press the WPS button on your access point or wireless router within 2 minutes to establish connectivity.

When this screen appears, you have successfully connected to your wireless network. Click **Next** to complete your setup.



Click **Next**



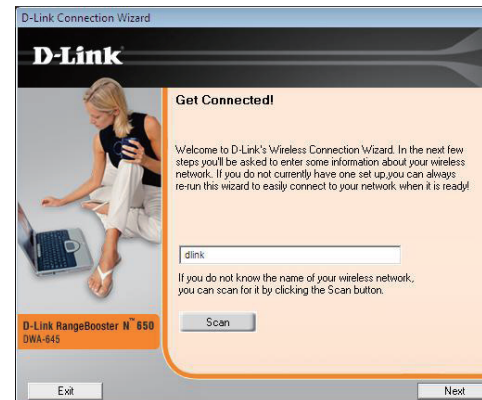
## Manual Connect

To manually connect to your wireless network, select **Manually connect to a wireless network** and then click **Next**.



Click Next

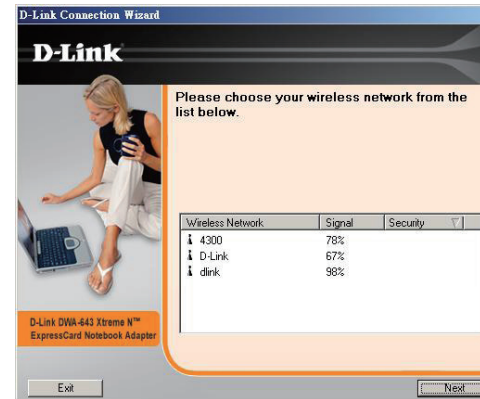
Enter the network name (SSID) manually. If you enter the SSID incorrectly, you will automatically be brought to the site survey page. Click **Scan** to display the site survey page.



Click Next



Click the **Scan** button to display a list of wireless networks (site survey). Click on the network name (SSID) and click **Next**.



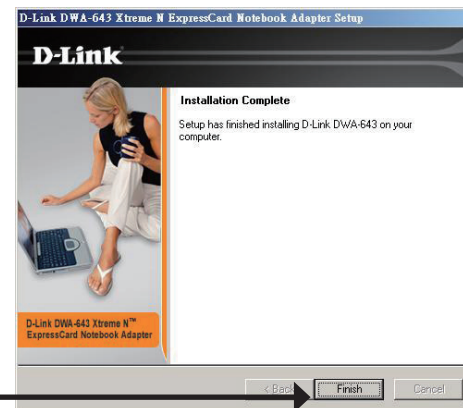
Click **Next**

When this screen appears, you are successfully connected to your wireless network. Click **Finish** to complete your setup.



Click **Finish**

Click **Finish** to continue. If you are prompted to reboot your computer, select **Yes, I want to restart my computer now.**



Click **Finish**

# Configuration

This section will show you how to configure your new D-Link wireless adapter using the D-Link Utility as well as the Windows® XP Zero Configuration Utility and Vista WLAN Auto Configuration.

## D-Link Wireless Connection Manager

The D-Link DWA-645 uses the Wireless Connection Manager as the management software. The manager provides the user an easy interface to change any settings related to the wireless adapter. Clicking on the Wireless Connection Manager icon on the desktop will start the Configuration .

If you are using Windows® 7 please skip to page 28, Windows Vista® please skip to page 30 or Windows® XP skip to page 32.

Double-click the **Wireless Connection Manager** icon on your desktop.



## Wireless Networks

The Wireless Networks (Site Survey) page will display all wireless networks that are available in your area. To connect to a network, simply highlight the wireless network (SSID) and click **Connect**.

**SSID:** The SSID (Service Set Identifier) is the name of the wireless network.

**MAC:** Displays the MAC address of the wireless device.

**Signal:** Displays the Link Quality of the wireless connection.

**Security:** If there is a “lock” icon, this means the wireless network is secure. You must know the encryption key/security settings to connect.

**Channel:** Displays the channel of the wireless network.

**WPS Button:** Connect to a wireless network using Wi-Fi® Protected Setup. Refer to the next page.

**Refresh Button:** Rescans for available wireless networks in your area.

**Connect Button:** Highlight a wireless network and click the **Connect** button. If the network is secure, a pop-up window will appear. Enter the security information to connect (refer to the *Wireless Security* section for more information).

**Activate Button:** Select a wireless network profile from the drop-down menu and click **Activate** to connect. Allow up to 30 seconds to connect.

D-Link RangeBooster N 650 DWA-645

Network Name : dlink      Signal : [Signal Strength Icon]

Connected      IP Address: 192.168.0.199      Channel : 10

**D-Link**

DWA-645      WIRELESS NETWORKS      MY WIRELESS NETWORKS      SUPPORT>>

SSID	MAC(BSSID)	Signal	Security	Channel
E-Link	00:15:E9:D7:91:D7	97%	[Lock Icon]	2
dfl-wireless	00:80:C8:36:4A:99	96%	[Lock Icon]	6
TSD1_SW	00:13:46:9B:AD:EA	94%	[Lock Icon]	6
DLINK_TSD_FTP	00:13:46:FD:8B:D5	91%	[Lock Icon]	6
DDDD	00:13:46:EF:3E:1A	92%	[Lock Icon]	6
ITD-AP	00:0F:3D:03:D3:EC	81%	[Lock Icon]	6
agenda_wifi	00:19:5B:EE:74:B7	87%	[Lock Icon]	6
agenda_wep	06:19:5B:EE:74:B7	87%	[Lock Icon]	6
Mega Test	00:13:46:EF:3D:70	91%	[Lock Icon]	6
524-rex	00:1C:F0:02:29:39	93%	[Lock Icon]	8
DIR-655G+N-DHLAB	00:19:5B:02:B5:7A	93%	[Lock Icon]	10
wbr2310-viiv-5013	00:15:E9:70:AD:7A	82%	[Lock Icon]	11
4300	00:0F:A3:1A:EF:5A	90%	[Lock Icon]	1
D-Link	00:19:5B:8F:93:38	78%	[Lock Icon]	1
D-Link	00:13:46:90:55:13	69%	[Lock Icon]	1
DIR-655_steven	00:1C:F0:FB:40:04	94%	[Lock Icon]	2
624-A.Tina	00:50:18:52:4E:2E	100%	[Lock Icon]	6

WPS      Refresh      Connect

My Wireless Networks

dlink - dlink      Activate

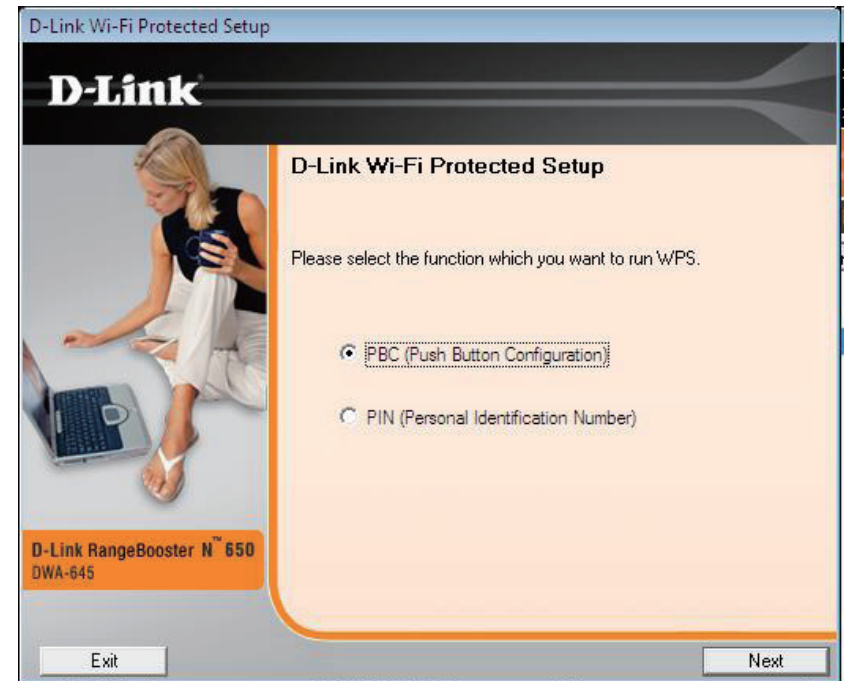
## Wi-Fi® Protected Setup (WPS)

Wi-Fi Protected Setup (WPS) System is designed for easy setup of security-enabled Wi-Fi networks. It is recommended to have the access point or wireless router nearby during setup.

For more information on WPS, visit the Wi-Fi Alliance website at [www.wi-fi.org](http://www.wi-fi.org).

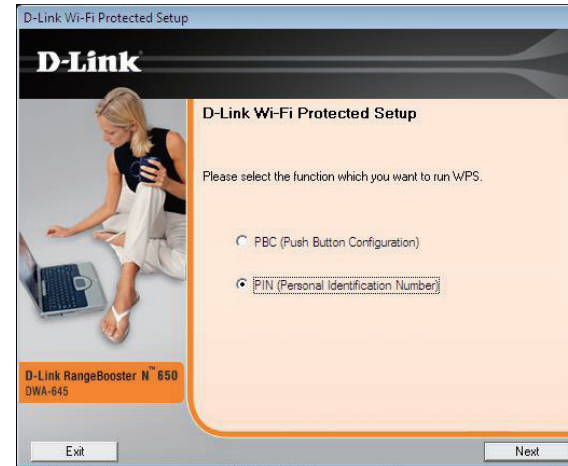
**“Push Button Configuration”** (PBC) is a virtual button in the utility that connects you to other WPS-enabled devices. A connection can be established by clicking on the virtual button, then pushing the physical button on the access point or wireless router within 120 seconds. Refer to page 15.

**“Personal Identification Number”** (PIN) is an unique number generated randomly by the wireless adapter’s utility. Entering this number in the utility of the WPS-enabled wireless router or access point connects you with the intended wireless network. Refer to the next page for more information.



# Personal Identification Number (PIN)

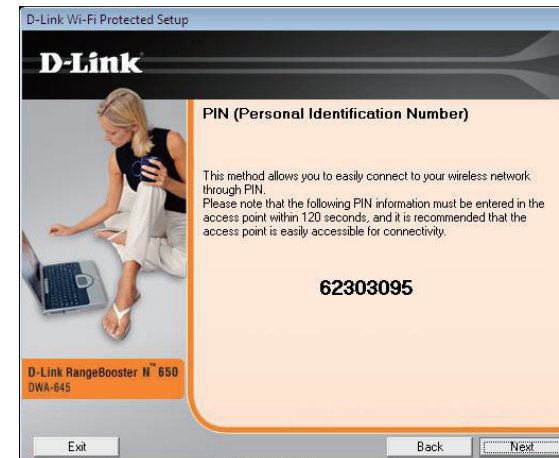
If you want to connect using the PBC method, refer to page 15. To use the PIN method, select PIN (Personal Identification Number) and click **Next**.



Click **Next**

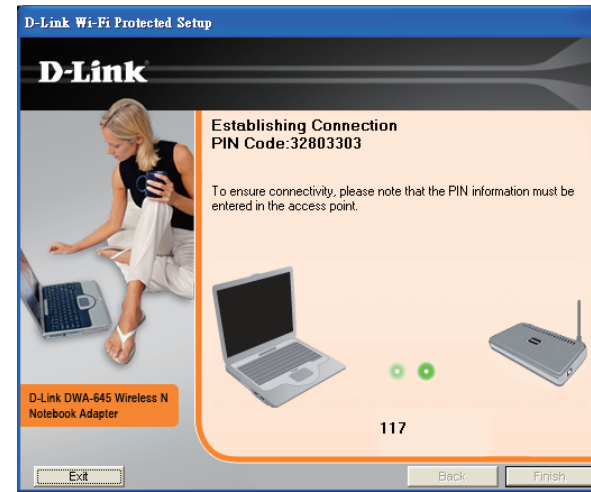
Make sure your access point or wireless router is close by. Write down the number on the screen. Enter this number in your access point or wireless router. Please refer to the manufacture's manual for instructions.

Once you click **Next**, you will have 2 minutes to enter this number in your access point or wireless router.



Click **Next**

The adapter will try to establish connectivity to your access point or wireless router.



When this screen appears, you have successfully established connectivity. Click **Finish** to complete your setup.



Click **Finish**

## My Wireless Networks

The My Wireless Networks page will allow you to create, edit, and delete wireless network profiles. Every time you connect to a network using the *Wireless Networks* page, a profile will automatically be created.

**New Button:** Click **New** to create a new wireless network profile (refer to page 19).

**Modify:** Click **Modify** to edit a current profile (refer to page 20).

**Delete:** Click **Delete** to remove a profile.

**Activate:** Click **Activate** to use a profile. Allow up to 30 seconds to connect to the wireless network.

**Profile Details:** The Profile Details section will display information about the wireless network such as the network name (SSID), network type (Infrastructure or Ad Hoc), and if the network is secured.



## Add Profile

You may add a new network by clicking the **New** button from the *My Wireless Networks* page.

**Profile Name:** Enter a name for your profile (e.g. Home, Office, Coffee Shop).

**SSID:** Enter the SSID of the wireless network.

**Network Type:** Select the network type. If you are connecting to a wireless router or access point, select **Infrastructure**. If you are connecting to another wireless client such as an adapter, select **Ad Hoc**.

**Set Security:** Select the type of security used. Please refer to the **Wireless Security** section for more information.

**OK Button:** Click **OK** to save your settings.

The screenshot shows the 'Profile Setting' dialog box with the following configuration:

- Basic Settings:**
  - Profile Name: dlink
  - SSID: dlink
  - Network Type:  Infrastructure  Ad Hoc
- Set Security Option:**
  - None
  - WEP
  - WPA/WPA2 passphrase
  - WPA/WPA2
  - 802.1x
- Wired Equivalent Privacy(WEP):**
  - Open  Shared  Auto
  - Key: [Empty text field]
  - Key Length: 64 bits(40+24)- 10 Hexadecimal dig [dropdown]
  - Key Index: 1 [dropdown]
  - Show text in the password field

Buttons: OK, Cancel



## Modify Profile

You may edit an existing profile by clicking the **Modify** button from the *My Wireless Networks* page.

**Profile Name:** Enter a name for your profile (e.g. Home, Office, Coffee Shop).

**SSID:** Displays the SSID of the network.

**Network Type:** Displays the network type.

**Set Security:** Select the type of security used. Please refer to the **Wireless Security** section for more information.

**OK Button:** Click **OK** to save your settings.

The screenshot shows a 'Profile Setting' dialog box with the following fields and options:

- Basic Settings:**
  - Profile Name: dlink
  - SSID: dlink
  - Network Type:  Infrastructure  Ad Hoc
- Set Security Option:**
  - None
  - WEP
  - WPA/WPA2 passphrase
  - WPA/WPA2
  - 802.1x
- Wired Equivalent Privacy(WEP):**
  - Open  Shared  Auto
  - Key: [Empty text field]
  - Key Length: 64 bits(40+24)- 10 Hexadecimal dig [Dropdown]
  - Key Index: 1 [Dropdown]
  - Show text in the password field

Buttons: OK, Cancel

# Support

If you need help, click the Support button. A pane will appear to the right of the utility which will display information about the utility.



## About

The About screen gives you information about the Firmware and Utility Versions of the DWA-645.



# Connect to a Wireless Network Using Windows® 7

Windows® 7 users may use the built-in wireless utility. If you are using another company's utility or Windows® 2000, please refer to the user manual of your wireless adapter for help with connecting to a wireless network. Most utilities will have a "site survey" option similar to the Windows® 7 utility as seen below.

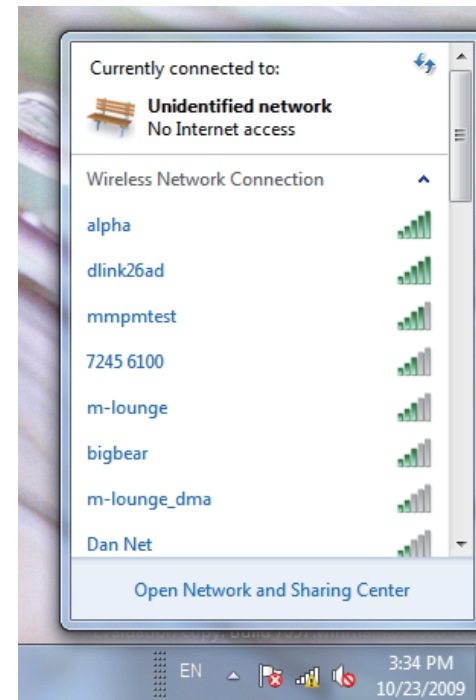
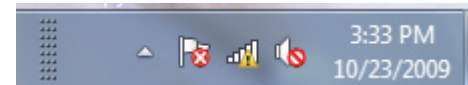
If you receive the **Wireless Networks Detected** bubble, click on the center of the bubble to access the utility.

or

Right-click on the wireless computer icon in your system tray (lower-right corner next to the time). Select **Connect to a network**.

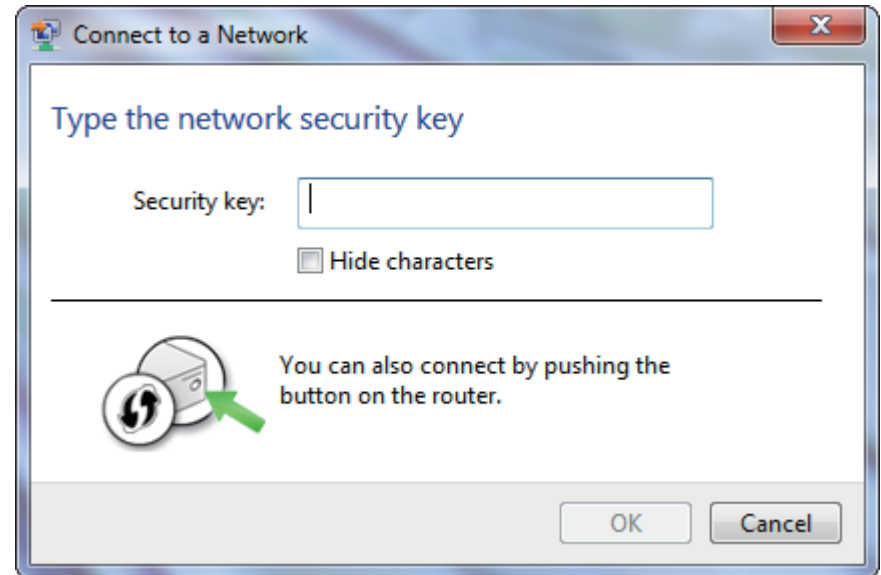
The utility will display any available wireless networks in your area. Click on a network (displayed using the SSID) and click the **Connect** button.

If you get a good signal but cannot access the Internet, check you TCP/IP settings for your wireless adapter. Refer to the **Networking Basics** section in this manual for more information.



Enter the same security key or passphrase that is on your router and click **Connect**.

It may take 20-30 seconds to connect to the wireless network. If the connection fails, please verify that the security settings are correct. The key or passphrase must be exactly the same as on the wireless router.



# Connect to a Wireless Network Using Windows® Vista™

Windows® Vista™ users may use the built-in wireless utility. If you are using another company's utility or Windows® 2000, please refer to the user manual of your wireless adapter for help with connecting to a wireless network. Most utilities will have a "site survey" option similar to the Windows® Vista™ utility as seen below.

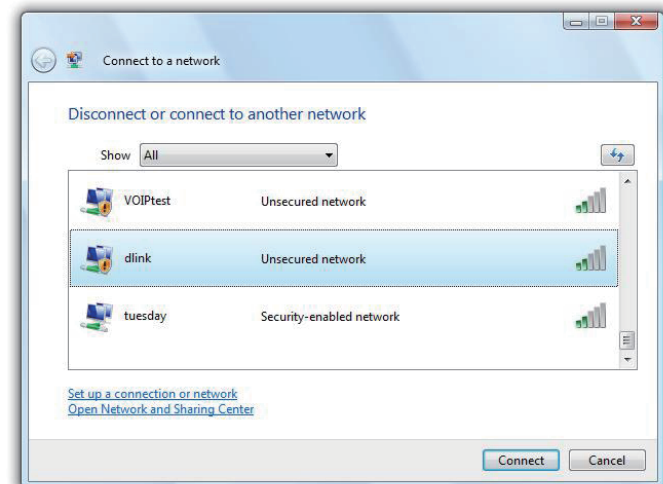
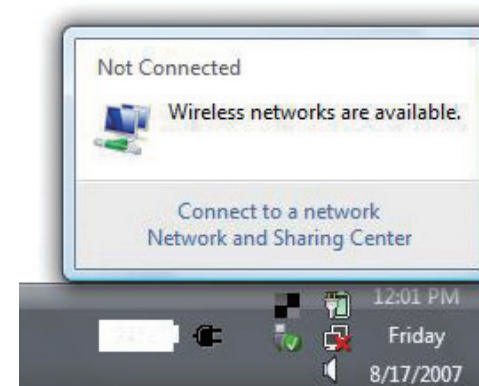
If you receive the **Wireless Networks Detected** bubble, click on the center of the bubble to access the utility.

or

Right-click on the wireless computer icon in your system tray (lower-right corner next to the time). Select **Connect to a network**.

The utility will display any available wireless networks in your area. Click on a network (displayed using the SSID) and click the **Connect** button.

If you get a good signal but cannot access the Internet, check the TCP/IP settings for your wireless adapter. Refer to the **Networking Basics** section in this manual for more information.



Enter the same security key or passphrase that is on your router and click **Connect**.

It may take 20-30 seconds to connect to the wireless network. If the connection fails, please verify that the security settings are correct. The key or passphrase must be exactly the same as on the wireless router.



# Connect to a Wireless Network Using Windows® XP

Windows® XP users may use the built-in wireless utility (Zero Configuration Utility). The following instructions are for Service Pack 2 users. If you are using another company's utility or Windows® 2000, please refer to the user manual of your wireless adapter for help with connecting to a wireless network. Most utilities will have a "site survey" option similar to the Windows® XP utility as seen below.

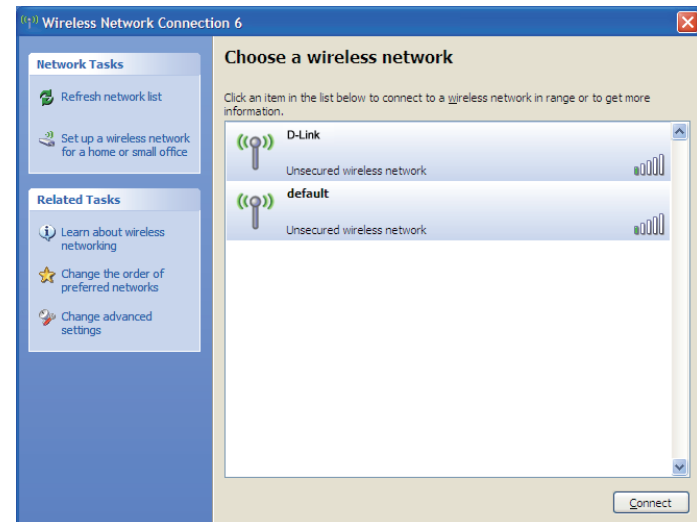
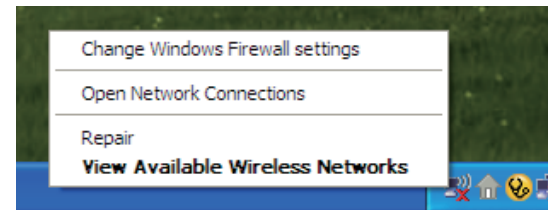
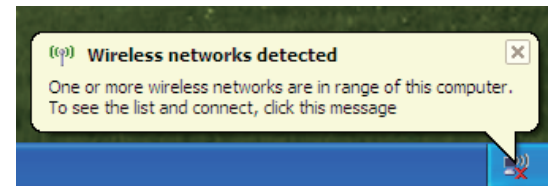
If you receive the **Wireless Networks Detected** bubble, click on the center of the bubble to access the utility.

Right-click on the wireless computer icon in your system tray (lower-right corner next to the time). Select **View Available Wireless Networks**.

The utility will display any available wireless networks in your area. Click on a network and click the **Connect** button.

Refer to the **Wireless Security** section for information on connecting to a secure network.

If you want to use the D-Link utility instead of the Windows® XP wireless utility, refer to the next page.

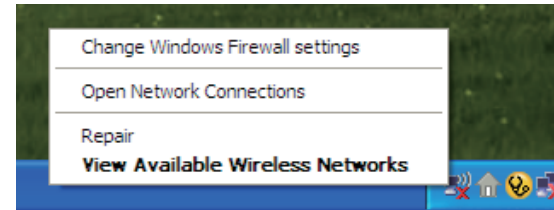




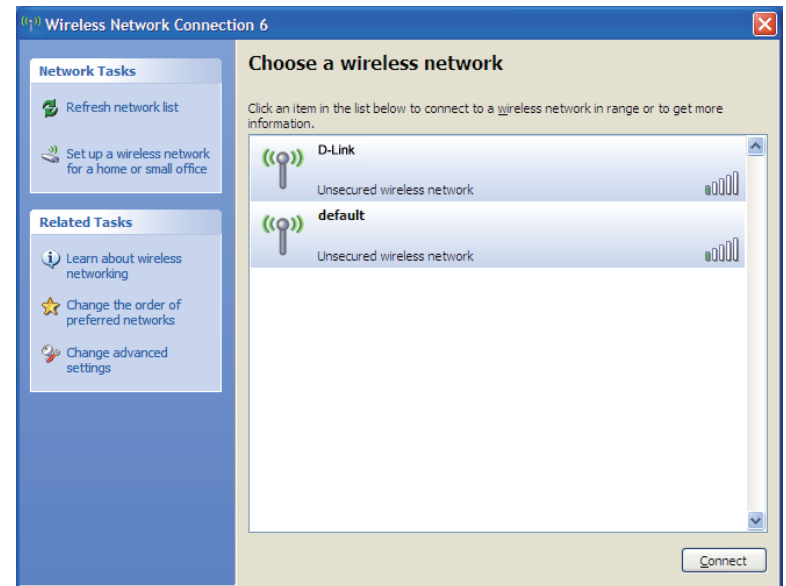
## Disabling The Windows® XP Utility

If you want to use the D-Link Wireless Connection Manager you must disable the Windows® XP wireless utility.

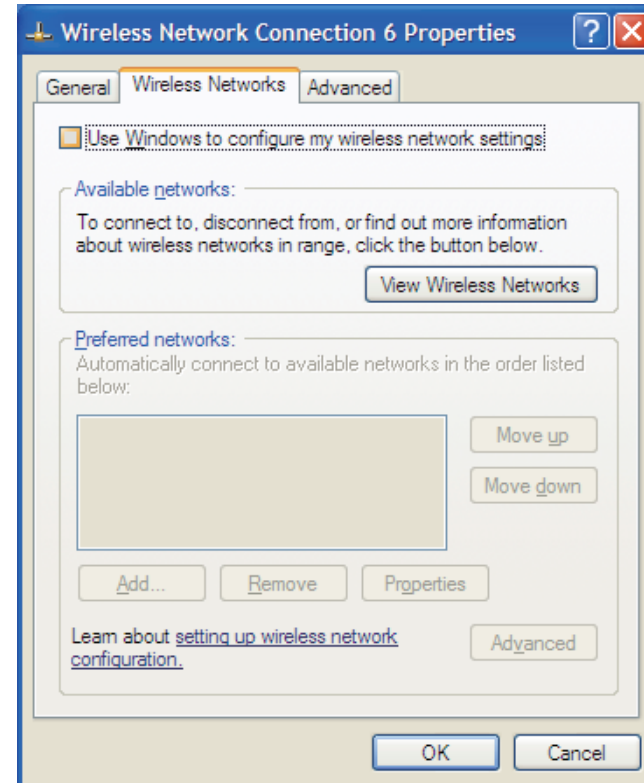
Right-click on the wireless computer icon in your system tray (lower-right corner next to the time). Select **View Available Wireless Networks**.



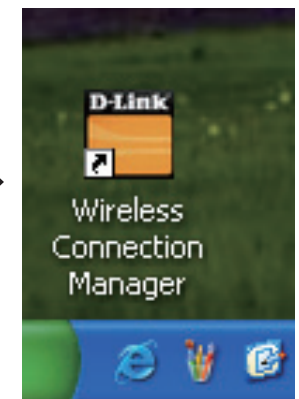
In the **Choose a Wireless Network** window click **Change Advanced Settings** on the left side below *Related Tasks*.



In the *Wireless Network Connection Properties* window, uncheck **Use Windows® to configure my wireless network settings** and then click **OK**.



Double-click the **Wireless Connection Manager** icon on your desktop.



# Wireless Security

This section will show you the different levels of security you can use to protect your data from intruders. The DWA-645 offers the following types of security:

- WPA2 (Wi-Fi Protected Access 2)
- WPA (Wi-Fi Protected Access)
- WEP (Wired Equivalent Privacy)
- WPA2-PSK (Pre-Shared Key)
- WPA-PSK (Pre-Shared Key)
- 802.1x (RADIUS)

## What is WEP?

WEP stands for Wired Equivalent Privacy. It is based on the IEEE 802.11 standard and uses the RC4 encryption algorithm. WEP provides security by encrypting data over your wireless network so that it is protected as it is transmitted from one wireless device to another.

To gain access to a WEP network, you must know the key. The key is a string of characters that you create. When using WEP, you must determine the level of encryption. The type of encryption determines the key length. 128-bit encryption requires a longer key than 64-bit encryption. Keys are defined by entering in a string in HEX (hexadecimal - using characters 0-9, A-F) or ASCII (American Standard Code for Information Interchange – alphanumeric characters) format. ASCII format is provided so you can enter a string that is easier to remember. The ASCII string is converted to HEX for use over the network. Four keys can be defined so that you can change keys easily.

# What is WPA?

WPA, or Wi-Fi Protected Access, is a Wi-Fi standard that was designed to improve the security features of WEP (Wired Equivalent Privacy).

The 2 major improvements over WEP:

- Improved data encryption through the Temporal Key Integrity Protocol (TKIP). TKIP scrambles the keys using a hashing algorithm and, by adding an integrity-checking feature, ensures that the keys haven't been tampered with. WPA2 is based on 802.11i and uses Advanced Encryption Standard instead of TKIP.
- User authentication, which is generally missing in WEP, through the extensible authentication protocol (EAP). WEP regulates access to a wireless network based on a computer's hardware-specific MAC address, which is relatively simple to be sniffed out and stolen. EAP is built on a more secure public-key encryption system to ensure that only authorized network users can access the network.

WPA-PSK/WPA2-PSK uses a passphrase or key to authenticate your wireless connection. The key is an alpha-numeric password between 8 and 63 characters long. The password can include symbols (!?\*&\_) and spaces. This key must be the exact same key entered on your wireless router or access point.

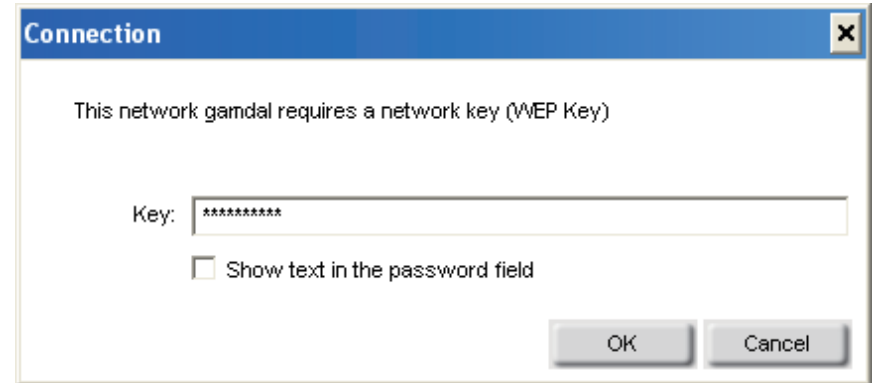
WPA/WPA2 incorporates user authentication through the Extensible Authentication Protocol (EAP). EAP is built on a more secure public key encryption system to ensure that only authorized network users can access the network.

# Configure WEP

## Using the D-Link Wireless Connection Manager

It is recommended to enable WEP on your wireless router or access point before configuring your wireless adapter. If you are joining an existing network, you will need to know the WEP key being used.

1. Open the Wireless Connection Manager by double-clicking on the D-Link icon on your desktop. From the list of available wireless networks, select the network you want to connect to and click **Connect**. If the network is using WEP, the screen (as shown to the right) will appear.
2. Enter the WEP key exactly as it is on your wireless router or access point.

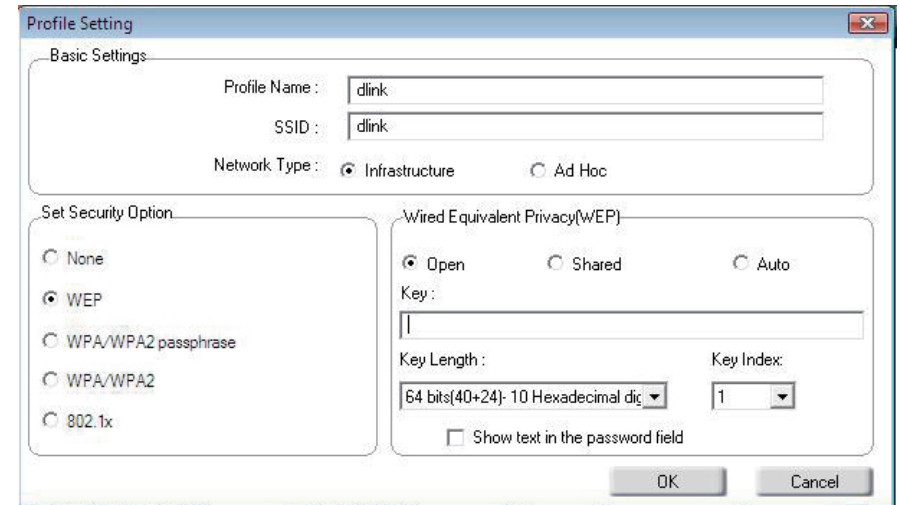


3. Click the **Show text in the password field** box to see the WEP key. Unchecking it will hide the key.
4. Click **OK** to connect to the network. Allow up to 30 seconds to connect.

If you would like to create a new network and enter the WEP settings, refer to the next page.

It is recommended to enable WEP on your wireless router or access point before configuring your wireless adapter. make sure you enter the WEP key exactly the same on all wireless devices. It is strongly recommended to set the authentication to **Shared Key**.

1. Open the Wireless Connection Manager by double-clicking on the D-Link icon on your desktop. Click on **New** to create a new profile or highlight an existing profile and click **Modify**.
2. Select **WEP** under *Set Security Option*.
3. Select **Shared** and then select the *Key Length* from the drop-down menu.
4. Enter the WEP key exactly as it is on your wireless router or access point.
5. Click **OK** to connect to the network. Allow up to 30 seconds to connect.

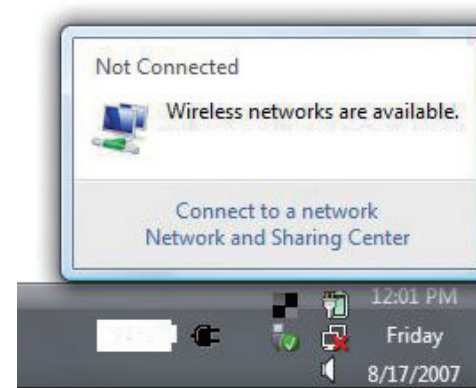


# Configure WEP

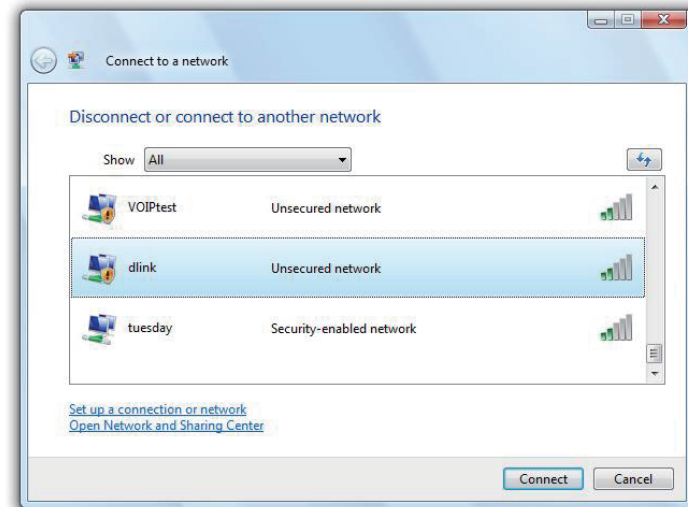
## Using Windows® Vista/Windows® 7

It is recommended to enable wireless security (WEP) on your wireless router or access point before configuring your wireless adapter. If you are joining an existing network, you will need to know the security key or passphrase being used.

1. Open the Windows® Vista™ Wireless Utility by right-clicking on the wireless computer icon in your system tray (lower right corner of screen). Select **Connect to a network**.

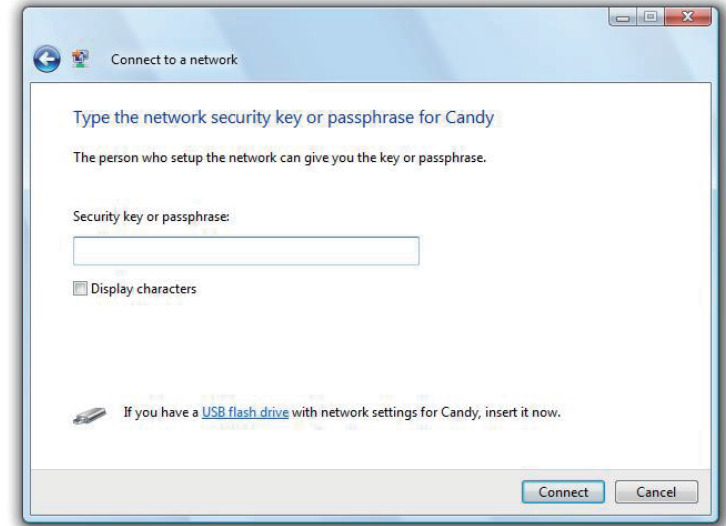


2. Highlight the wireless network (SSID) you would like to connect to and click **Connect**.



3. Enter the same security key or passphrase that is on your router and click **Connect**.

It may take 20-30 seconds to connect to the wireless network. If the connection fails, please verify that the security settings are correct. The key or passphrase must be exactly the same as on the wireless router.



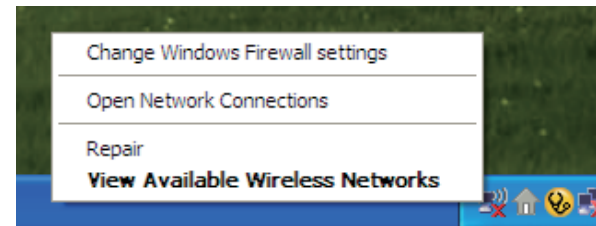


# Configure WEP

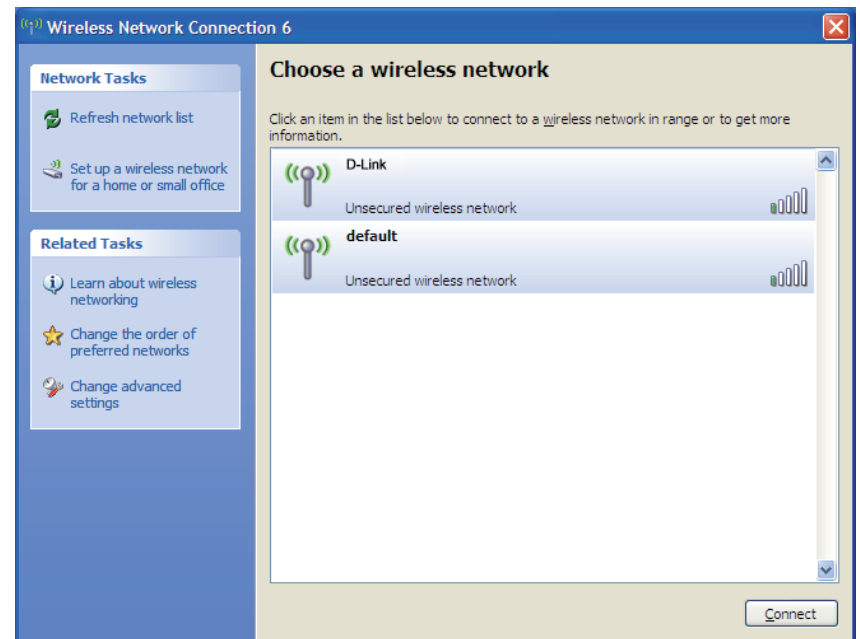
## Using the Windows® XP Utility

It is recommended to enable WEP on your wireless router or access point before configuring your wireless adapter. If you are joining an existing network, you will need to know the WEP key being used.

1. Open the Windows® XP Wireless Utility by right-clicking on the wireless computer icon in your system tray (lower-right corner of screen). Select **View Available Wireless Networks**.

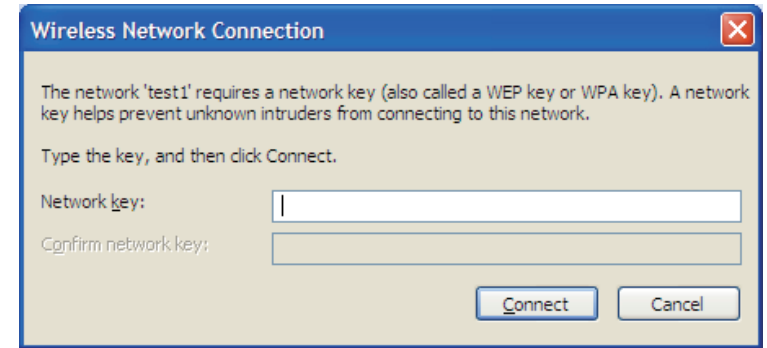


2. Highlight the wireless network (SSID) you would like to connect to and click **Connect**.



3. The **Wireless Network Connection** box will appear. Enter the WEP key and click **Connect**.

It may take 20-30 seconds to connect to the wireless network. If the connection fails, please verify that the WEP settings are correct. The WEP key must be exactly the same as on the wireless router or access point.



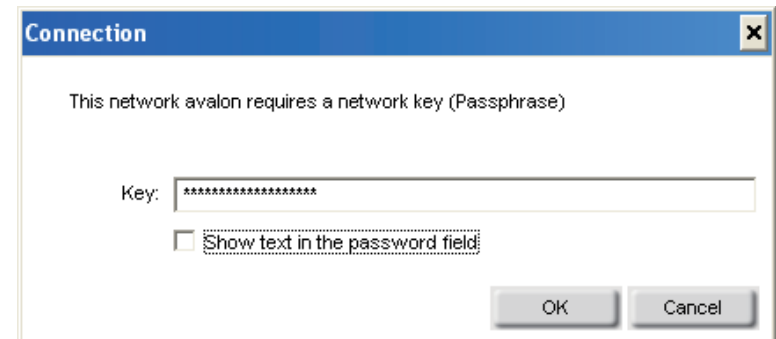
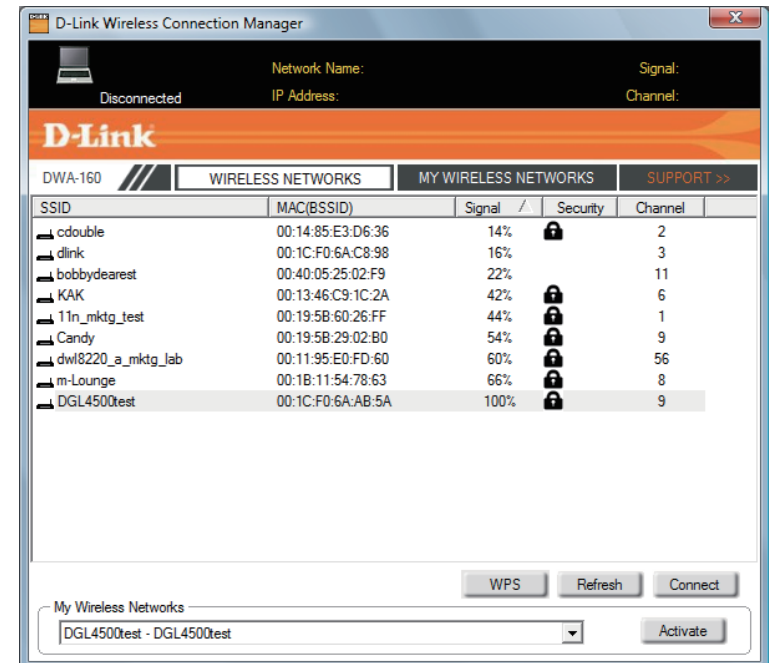
# Configure WPA/WPA2 Passphrase

## Using the D-Link Wireless Connection Manager

It is recommended to enable WPA-PSK on your wireless router or access point before configuring your wireless adapter. If you are joining an existing network, you will need to know the WPA-PSK passphrase being used.

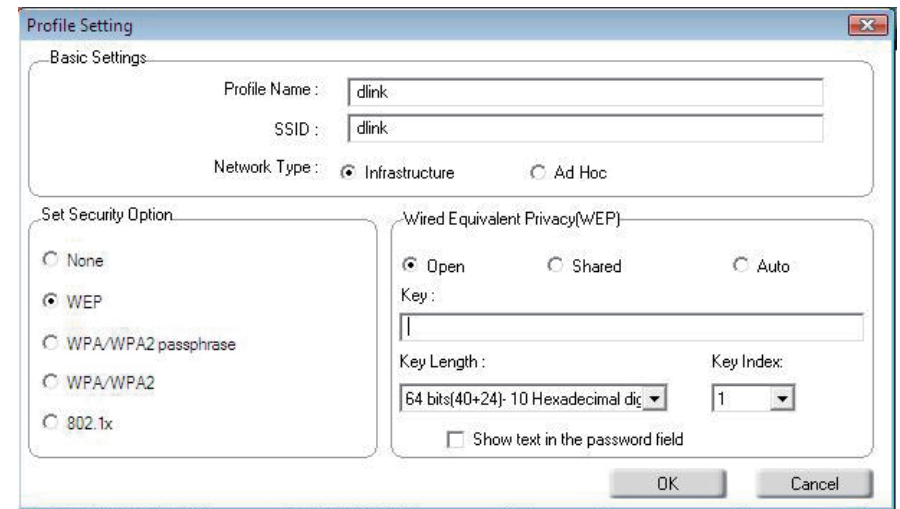
1. Open the Wireless Connection Manager by double-clicking on the D-Link icon on your desktop.
2. Highlight the wireless network (SSID) you would like to connect to and click **Connect**. If the network is using WPA-PSK, the screen (as shown to the left) will appear.
3. Enter the WPA-PSK passphrase exactly as it is on your wireless router or access point. Click the **Show text in the password field** to see the passphrase. Unchecking it will hide it.
4. Click **OK** to connect to the network. Allow up to 30 seconds to connect.

If you would like to create a new network and enter the WPA-PSK settings, refer to the next page.



It is recommended to enable WPA-PSK on your wireless router or access point before configuring your wireless adapter. Make sure you enter the passphrase exactly the same on all wireless devices.

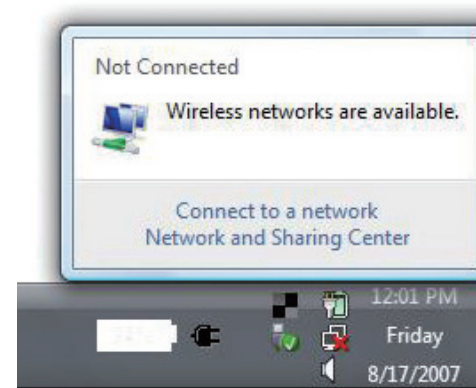
1. Open the Wireless Connection Manager by double-clicking on the D-Link icon on your desktop. Click on **New** to create a new profile or highlight an existing profile and click **Modify**.
2. Select **WPA/WPA2 Passphrase** under *Set Security Option*.
3. Select **TKIP** or **AES**.
4. Enter the passphrase exactly as it is on your wireless router or access point.
5. Click **OK** to connect to the network. Allow up to 30 seconds to connect.



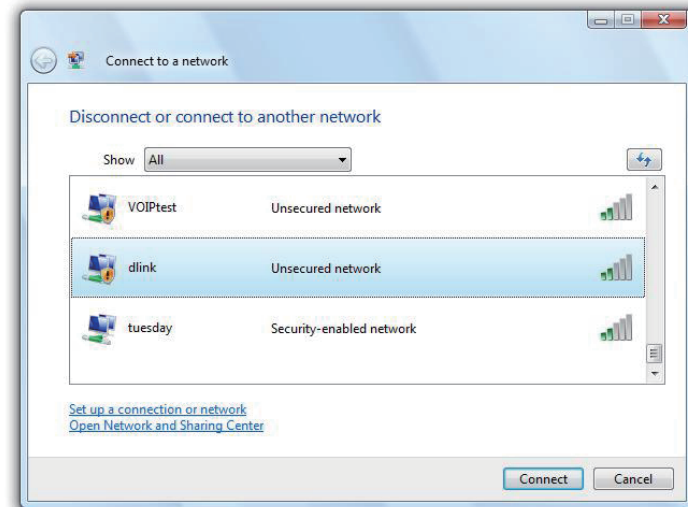
# Configure WPA™/WPA™-Personal Using Windows® Vista/Windows® 7

It is recommended to enable wireless security (WPA/WPA2) on your wireless router or access point before configuring your wireless adapter. If you are joining an existing network, you will need to know the security key or passphrase being used.

1. Open the Windows® Vista™ Wireless Utility by right-clicking on the wireless computer icon in your system tray (lower right corner of screen). Select **Connect to a network**.

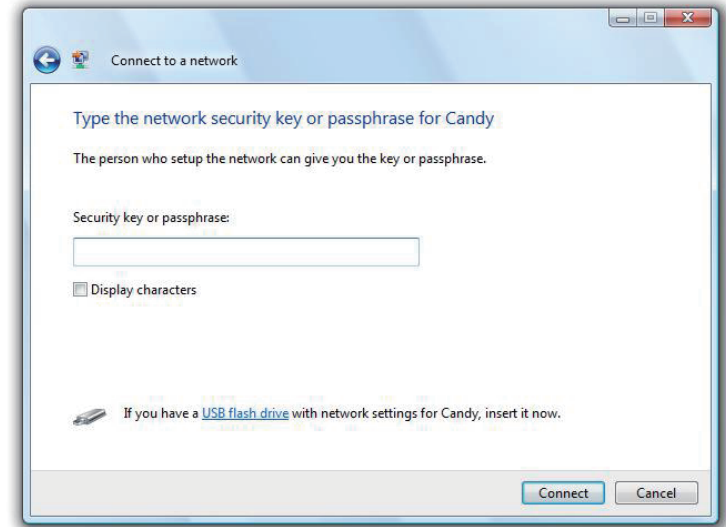


2. Highlight the wireless network (SSID) you would like to connect to and click **Connect**.



3. Enter the same security key or passphrase that is on your router and click **Connect**.

It may take 20-30 seconds to connect to the wireless network. If the connection fails, please verify that the security settings are correct. The key or passphrase must be exactly the same as on the wireless router.

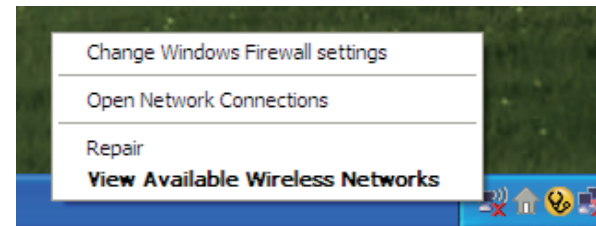


# Configure WPA/WPA2 Passphrase

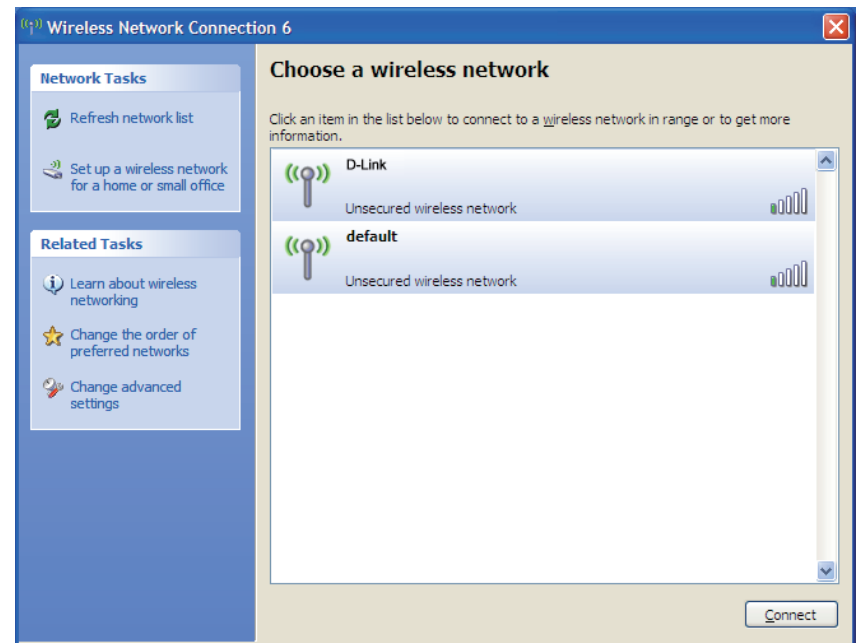
## Using the Windows® XP Utility

It is recommended to enable WPA-PSK on your wireless router or access point before configuring your wireless adapter. If you are joining an existing network, you will need to know the WPA-PSK key being used.

1. Open the Windows® XP Wireless Utility by right-clicking on the wireless computer icon in your system tray (lower-right corner of screen). Select **View Available Wireless Networks**.

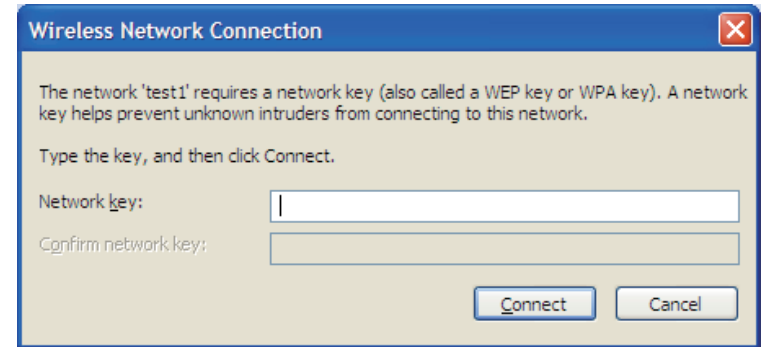


2. Highlight the wireless network (SSID) you would like to connect to and click **Connect**.



3. The **Wireless Network Connection** box will appear. Enter the WPA-PSK passphrase and click **Connect**.

It may take 20-30 seconds to connect to the wireless network. If the connection fails, please verify that the WPA-PSK settings are correct. The WPA-PSK passphrase must be exactly the same as on the wireless router or access point.



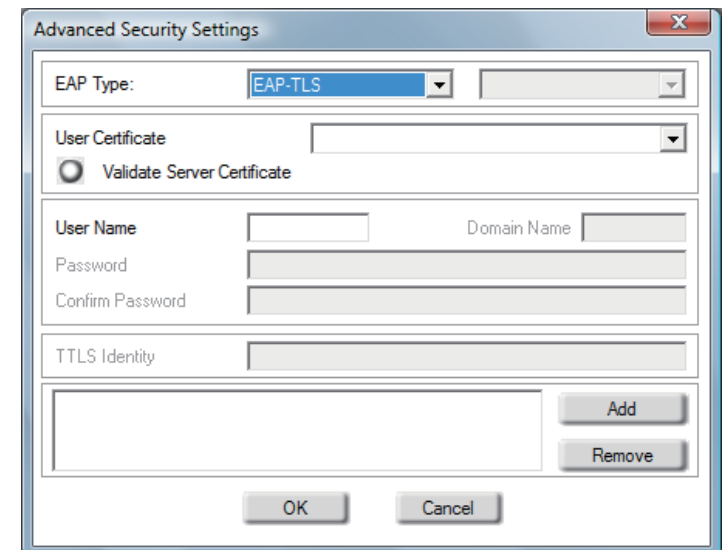
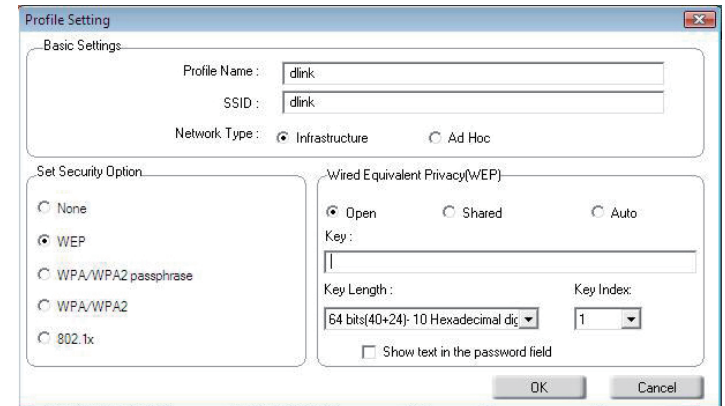


# Configure WPA™/WPA2™-Enterprise

## Using the D-Link Wireless Connection Manager

WPA/WPA2-Enterprise is for advanced users who are familiar with using a RADIUS server and setting up certificates.

1. Open the Wireless Connection Manager by double-clicking on the D-Link icon on your desktop. Click on **New** to create a new profile or highlight an existing profile and click **Modify**.
2. Select **WPA/WPA2-Enterprise** under *Set Security Option* and then select **TKIP** or **AES**.
3. Click on **Advanced Config** to continue.
4. Next to *EAP Type*, select **EAP-TLS**, **EAP-TTLS**, or **PEAP**. Extensible Authentication Protocols allow devices on the network to request authentication from the RADIUS server in the network. All the devices on the network must use the same EAP type when using a RADIUS server for authentication. Some RADIUS servers require that the Validate Server field be selected. Check this field if your RADIUS server requires validation.
5. Select an **User Certificate** from the drop-down menu.
6. Enter the login information required to authenticate.
7. Click **Add** to enter the IP address(es) of your RADIUS servers.
8. Click **OK** to save your settings.

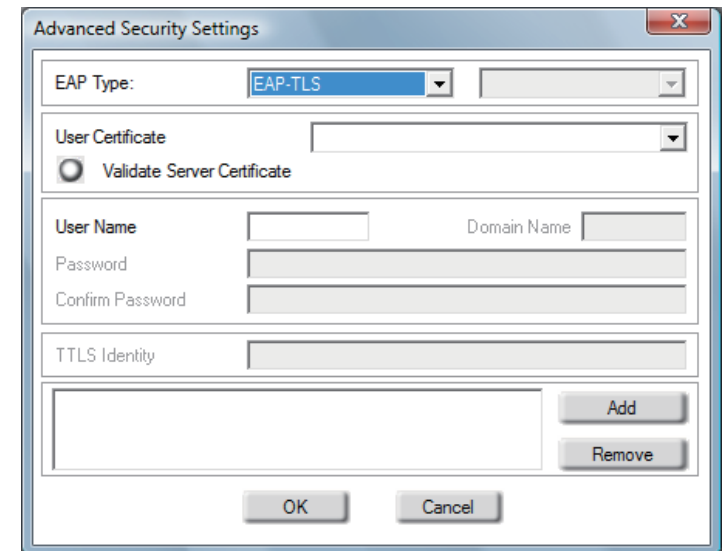
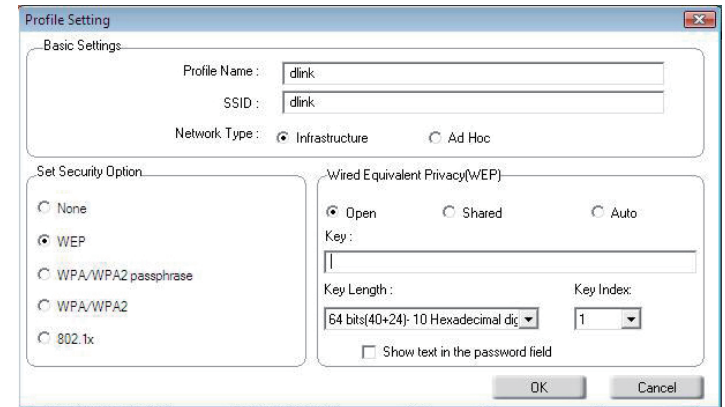


# Configure 802.1x (RADIUS)

## Using the D-Link Utility

802.1x is for advanced users who are familiar with using a RADIUS server and setting up certificates.

1. Open the Wireless Utility by double-clicking on the D-Link icon in your system tray (lower-right corner of screen). Click on **New** to create a new profile or highlight an existing profile and click **Modify**.
2. Select **802.1x** under *Set Security Option*.
3. Click on **Advanced Config** to continue.
4. Next to *EAP Type*, select **EAP-TLS**, **LEAP**, **EAP-TTLS**, or **PEAP**. Extensible Authentication Protocols allow devices on the network to request authentication from the RADIUS server in the network. All the devices on the network must use the same EAP type when using a RADIUS server for authentication. Some RADIUS servers require that the Validate Server field be selected. Check this field if your RADIUS server requires validation.
5. Select an **User Certificate** from the drop-down menu.
6. Enter the login information required to authenticate.
7. Click **Add** to enter the IP address(es) of your RADIUS servers.
8. Click **OK** to save your settings.

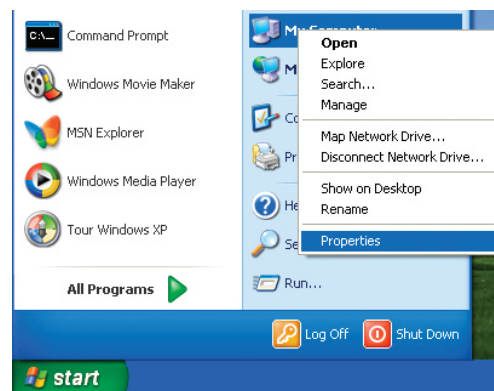


# Troubleshooting

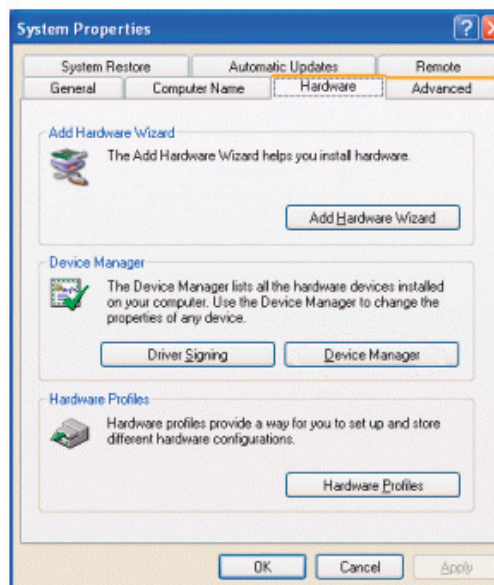
This chapter provides solutions to problems that can occur during the installation and operation of the DWA-645. Read the following descriptions if you are having problems. (The examples below are illustrated in Windows® XP. If you have a different operating system, the screenshots on your computer will look similar to the following examples.)

## 1. How do I know if my adapter is installed properly?

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



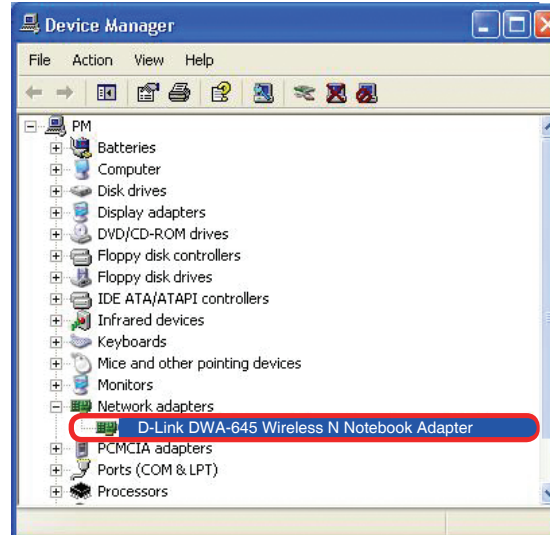
Select the **Hardware Tab**.



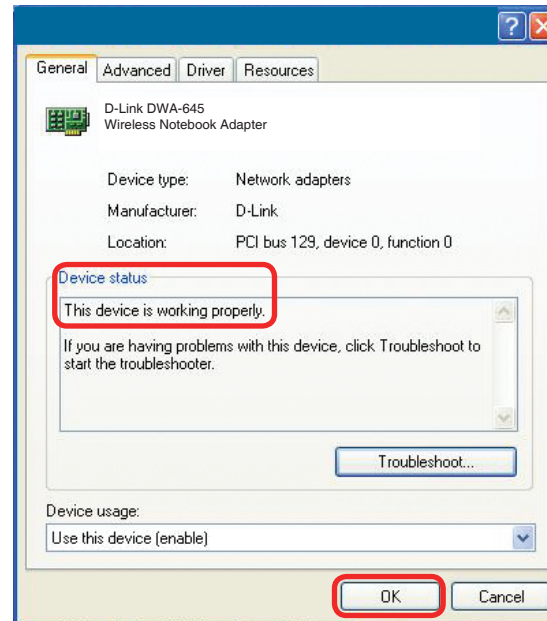
Click the + sign next to **Network Adapters**.

Right-click on **D-Link DWA-645 Wireless N Notebook 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** to continue.



## 2. The computer does not recognize the DWA-645 Wireless Adapter.

Make sure that the DWA-645 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.

## 3. The computer with the DWA-645 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 D-Link products is **dlink**. (Double-click on the WLAN icon in the taskbar. The **Link Info** screen will display the SSID setting.)
- In **Ad Hoc** mode, both wireless clients will need to have the same **SSID**. Please note that it might be necessary to set up one client to establish a **BSS (Basic Service Set)** and wait briefly before setting up other clients. This prevents several clients from trying to establish a **BSS** at the same time, which can result in multiple singular **BSSs** being established, rather than a single **BSS** with multiple clients associated to it.

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

If **Security** is enabled, make sure that the correct encryption keys are entered on both the DWA-645 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.

# 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.

## **What is Wireless?**

Wireless or Wi-Fi technology is another way of connecting your computer to the network without using wires. Wi-Fi uses radio frequency to connect wirelessly, so you have the freedom to connect computers anywhere in your home or office network.

## **Why D-Link Wireless?**

D-Link is the worldwide leader and award winning designer, developer, and manufacturer of networking products. D-Link delivers the performance you need at a price you can afford. D-Link has all the products you need to build your network.

## **How does wireless work?**

Wireless works similar to how cordless phone work, through radio signals to transmit data from one point A to point B. But wireless technology has restrictions as to how you can access the network. You must be within the wireless network range area to be able to connect your computer. There are two different types of wireless networks Wireless Local Area Network (WLAN), and Wireless Personal Area Network (WPAN).

### **Wireless Local Area Network (WLAN)**

In a wireless local area network, a device called an Access Point (AP) connects computers to the network. The access point has a small antenna attached to it, which allows it to transmit data back and forth over radio signals. With an indoor access point as seen in the picture, the signal can travel up to 300 feet. With an outdoor access point the signal can reach out up to 30 miles to serve places like manufacturing plants, industrial locations, college and high school campuses, airports, golf courses, and many other outdoor venues.



## **Wireless Personal Area Network (WPAN)**

Bluetooth is the industry standard wireless technology used for WPAN. Bluetooth devices in WPAN operate in a range up to 30 feet away.

Compared to WLAN the speed and wireless operation range are both less than WLAN, but in return it doesn't use nearly as much power which makes it ideal for personal devices, such as mobile phones, PDAs, headphones, laptops, speakers, and other devices that operate on batteries.

## **Who uses wireless?**

Wireless technology has become so popular in recent years that almost everyone is using it, whether it's for home, office, business, D-Link has a wireless solution for it.

### **Home**

- Gives everyone at home broadband access
- Surf the web, check email, instant message, and etc
- Gets rid of the cables around the house
- Simple and easy to use

### **Small Office and Home Office**

- Stay on top of everything at home as you would at office
- Remotely access your office network from home
- Share Internet connection and printer with multiple computers
- No need to dedicate office space

## **Where is wireless used?**

Wireless technology is expanding everywhere not just at home or office. People like the freedom of mobility and it's becoming so popular that more and more public facilities now provide wireless access to attract people. The wireless connection in public places is usually called "hotspots".

Using a D-Link Notebook Adapter with your laptop, you can access the hotspot to connect to Internet from remote locations like: Airports, Hotels, Coffee Shops, Libraries, Restaurants, and Convention Centers.

Wireless network is easy to setup, but if you're installing it for the first time it could be quite a task not knowing where to start. That's why we've put together a few setup steps and tips to help you through the process of setting up a wireless network.

## **Tips**

Here are a few things to keep in mind, when you install a wireless network.

### **Centralize your router or Access Point**

Make sure you place the router/access point in a centralized location within your network for the best performance. Try to place the router/access point as high as possible in the room, so the signal gets dispersed throughout your home. If you have a two-story home, you may need a repeater to boost the signal to extend the range.

### **Eliminate Interference**

Place home appliances such as cordless telephones, microwaves, and televisions as far away as possible from the router/access point. This would significantly reduce any interference that the appliances might cause since they operate on same frequency.

## Security

Don't let your next-door neighbors or intruders connect to your wireless network. Secure your wireless network by turning on the WPA or WEP security feature on the router. Refer to product manual for detail information on how to set it up.

# Wireless Modes

There are basically two modes of networking:

- **Infrastructure** – All wireless clients will connect to an access point or wireless router.
- **Ad Hoc** – Directly connecting to another computer, for peer-to-peer communication, using wireless network adapters on each computer, such as two or more DWA-645 wireless network notebook adapters.

An Infrastructure network contains an Access Point or wireless router. All the wireless devices, or clients, will connect to the wireless router or access point.

An Ad Hoc network contains only clients, such as laptops with wireless notebook adapters. All the adapters must be in Ad Hoc mode to communicate.

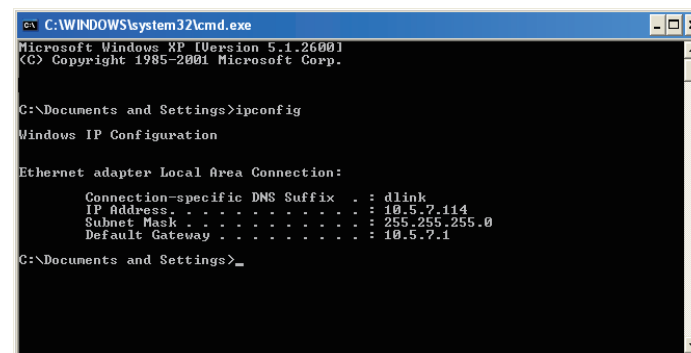
# Networking Basics

## Check your IP address

After you install your new D-Link wireless adapter and have established a wireless connection, by default, the TCP/IP settings should be set to obtain an IP address from a DHCP server (i.e. router) automatically. To verify your IP address, please follow the steps below.

### Windows® XP/2000 Users

- Click on **Start > Run**. In the run box type **cmd** and click **OK**.
- At the prompt, type **ipconfig** and press **Enter**.
- This will display the IP address, subnet mask, and the default gateway of your adapter.



```

C:\WINDOWS\system32\cmd.exe
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings>ipconfig

Windows IP Configuration

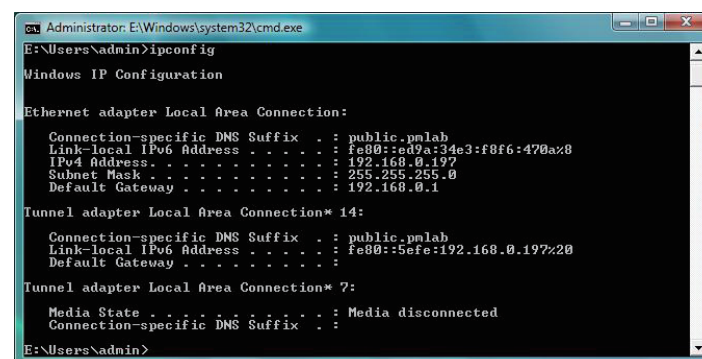
Ethernet adapter Local Area Connection:

    Connection-specific DNS Suffix  . : dlink
    IP Address. . . . . : 10.5.7.114
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 10.5.7.1

C:\Documents and Settings>
  
```

### Windows Vista®/Windows® 7 Users

- Click **Start > All Programs > Accessories > Command Prompt**. You may need administrative access to run this application.
- For all additional prompt windows inquiring of running the command prompt application, select **Yes, OK, or Continue**.
- At the prompt, type **ipconfig** and press **Enter**.
- This will display the IP address, subnet mask, and default gateway of your adapter.



```

Administrator: E:\Windows\system32\cmd.exe
E:\Users\admin>ipconfig

Windows IP Configuration

Ethernet adapter Local Area Connection:

    Connection-specific DNS Suffix  . : public.pmlab
    Link-local IPv6 Address . . . . . : fe80::ed9a:34e3:f8f6:470ax8
    IPv4 Address. . . . . : 192.168.0.197
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.0.1

Tunnel adapter Local Area Connection* 14:

    Connection-specific DNS Suffix  . : public.pmlab
    Link-local IPv6 Address . . . . . : fe80::5efe:192.168.0.197%20
    Default Gateway . . . . . :

Tunnel adapter Local Area Connection* 7:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

E:\Users\admin>
  
```

If the address is 0.0.0.0, check your adapter installation, security settings, and the settings on your router. Some firewall software programs may block a DHCP request on newly installed adapters.

# Statically Assign an IP address

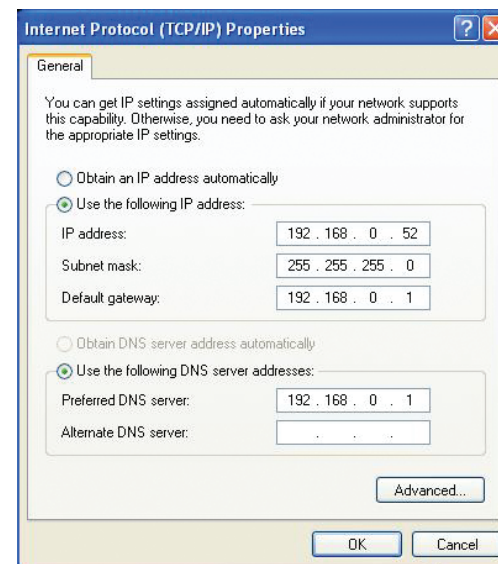
If you are not using a DHCP capable gateway/router, or you need to assign a static IP address, please follow the steps below:

## Windows® XP/2000 Users

- **Windows® XP** - Click on **Start > Control Panel**. Make sure you are in Classic View. Double-click on the Network Connections icon.  
**Windows® 2000** – From the desktop, right-click **My Network Places > Properties**.
- Right-click on the **Local Area Connection** which represents your D-Link wireless network adapter (or other adapter) which will be connected to your router.
- Highlight **Internet Protocol (TCP/IP)** and click **Properties**.
- Click **Use the following IP address** and enter an IP address that is on the same subnet as your network or LAN IP address on your router.

**Example:** If the router's LAN IP address is 192.168.0.1, make your IP address 192.168.0.X where X is a number between 2 and 99. Make sure that the number you choose is not in use on the network.

- Set **Default Gateway** the same as the LAN IP address of your router or gateway.
- Set **Primary DNS** the same as the LAN IP address of your router or gateway.
- The **Secondary DNS** is optional (you may enter a DNS server from your ISP).
- Click **OK** to save your settings.



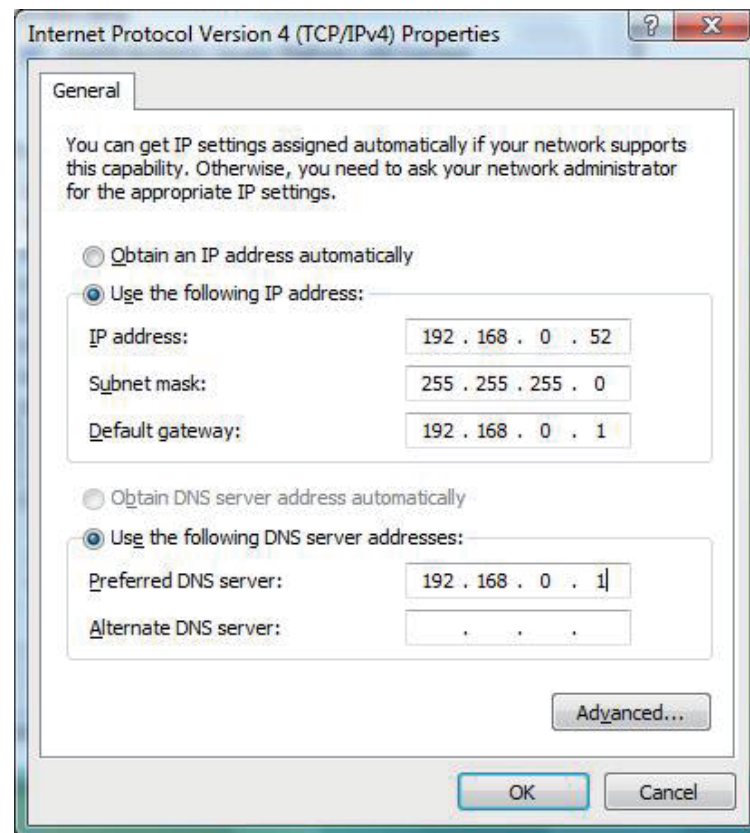
## Windows Vista®/Windows® 7 Users

- Click on **Start > Control Panel**. Make sure you are in Classic View. Double-click on the **Network and Sharing Center** icon. Along the left panel in the window, click on **Manage network connections**.
- Right-click on the **Local Area Connection** which represents your D-Link wireless network adapter which will be connected to your network.
- Highlight **Internet Protocol Version 4 (TCP /IPv4)** and click **Properties**.

- Click **Use the following IP address** and enter an IP address that is on the same subnet as your network or LAN IP address on your router or network.

**Example:** If the router's LAN IP address is 192.168.0.1, make your IP address 192.168.0.X where X is a number between 2 and 99. Make sure that the number you choose is not in use on the network.

- Set **Default Gateway** the same as the LAN IP address of your router or gateway.
- Set **Primary DNS** the same as the LAN IP address of your router or gateway.
- The **Secondary DNS** is optional (you may enter a DNS server from your ISP).
- Click **OK** to save your settings.



# Technical Specifications

## Standards

- IEEE 802.11n
- IEEE 802.11g
- IEEE 802.11b

## Interface

32-bit Cardbus

## Frequency Range

2.4GHz to 2.462GHz

## Security

- 64/128-bit WEP
- WPA/ WPA2 PSK
- WPA/ WPA2 EAP
- Wi-Fi Protected Access (WPS)

## Led

- Link
- Activity

## Certifications

FCC,CE,IC,C-Tick

## Dimensions

- Item (WxDxH): 2.1" x 4.7" x 0.3"
- Packaging (WxDxH): 6.8" x 9.5" x 1.4"

## Weight

- Item: 0.1 lbs (45.4g)
- Packaging: 0.5 lbs (226.8g)

\* Maximum wireless signal rate derived from IEEE Standard 802.11g and 802.11n 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. Environmental conditions will adversely affect wireless signal range.