802.11 b/g/n (1.0 draft)

Wireless USB Dongle

User's Manual

Package Contents

- WLN-1501 Wireless USB Adapter

- Manual and Warranty on CD

- Wireless Connection Manager on CD

- Quick Installation Guide

System Requirements

- A computer or laptop with an available USB 2.0 port

- Windows® 2000 (Service Pack 4) or XP (Service Pack 2)

- CD-ROM Drive

- 300MHz processor and at least 64MB of RAM

- A draft 802.11n or 802.11b/g access point (for Infrastructure mode), or another draft 802.11n wireless adapter (for Ad-Hoc mode.)

Introduction

The WLN-1501 Pre-N USB Adapter is a convenient wireless connectivity solution for desktop or notebook PCs. Instead of stringing Ethernet cables to your PC or dismantling your desktop computer case, the WLN-1501 can enable Draft 802.11n wireless connectivity by simply utilizing your desktop or notebook PC's USB port.

Powered by Pre-N technology, the WLN-1501 provides a faster wireless connection and superior reception than 802.11g*. The WLN-1501 is designed for use in bigger homes and for those that demand higher networking. Maximize wireless performance by connecting this USB Adapter to a Pre-N Router and stay connected from virtually anywhere in the home. This USB Adapter supports WEP, WPA and WPA2 encryption to prevent outside intrusion and protect your personal information from being exposed.

The Quick Setup Wizard guides you step-by-step through the installation process. You'll be able to configure this USB Adapter without having to call the teenager from down the street to help you. The Wireless Manager is included with this product to keep track of all your most frequently accessed networks.

Compact in size, robust in speed the WLN-1501 Wireless USB Adapter is great for travel and a convenient solution for providing high performance wireless connectivity to your desktop or notebook PC. Enjoy the many benefits of wireless connectivity today!

* Maximum wireless signal rate derived from IEEE Standard 802.11g and Draft 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.

Features

- Compact size for placement anywhere.

- Convenience of Plug & Play installation.

- Fully 802.11b/802.11g compatible.

- Draft 802.11n compliant.

- Powered by the USB port; no external power source required.

- USB 2.0 standard*.

- Better Security with 802.1x and WPA - In addition to 64-bit and 128-bit WEP encryption, you can also 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.

- Position the WLN-1501 almost anywhere in your workspace to achieve the best reception possible.

- Supports Infrastructure networks via an access point and Peer-to-Peer communication in Ad-Hoc mode.

- User-friendly configuration and diagnostic utilities.

* Using a USB 1.1 port will adversely affect throughput.

Hardware Overview

USB Port

Used to connect the WLN-1501 to your computer.

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 adapter. Also, if you have previously installed another wireless adapter, please make sure any software is uninstalled.

Getting Started

Before installing your new 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 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® XP 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 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**.

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**.

Adapter Installation

Warning: Do NOT install the WLN-1501 USB Adapter into your computer before installing the driver software from the CD.

Turn on the computer and Insert the WLN-1501 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:\Setup.exe**" (where *D:* represents the drive letter of your CD-ROM drive).

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

The *InstallShield Wizard* window will appear. Click **Next**

By default setup will install to the default location: *C:\Program Files\Wireless LAN\WLN-1501*, 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**

Insert the adapter into an available USB port on your computer.

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

The configuration wizard will now appear.

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

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 wireless adapter using the Wireless Utility as well as the Windows® XP Zero Configuration Utility.

The Wireless Connection Manager

The WLN-1501 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® XP, please skip to page 22.

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**.

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

Displays the MAC address of the wireless device.

Displays the Link Quality of the wireless connection.

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

Displays the channel of the wireless network.

Rescans for available wireless networks in your area.

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).

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

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.

Click **New** to create a new wireless network profile (refer to page 18).

Click **Modify** to edit a current profile (refer to page 19).
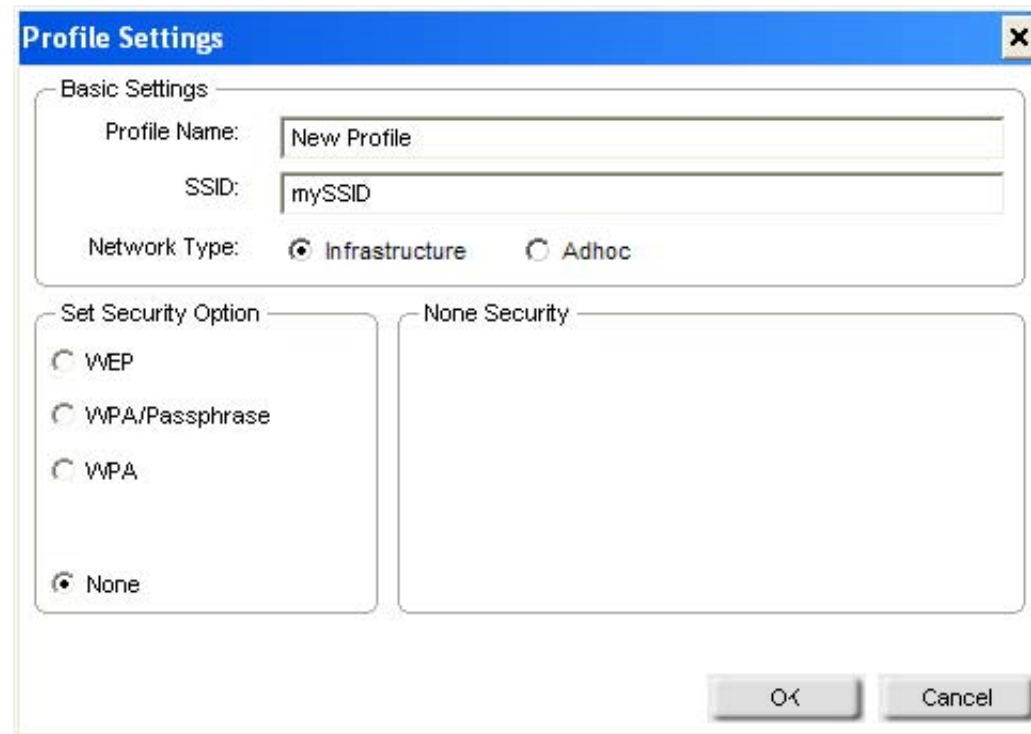
Click **Delete** to remove a profile.

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

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.

Enter a name for your profile (e.g. Home, Office, Coffee Shop).
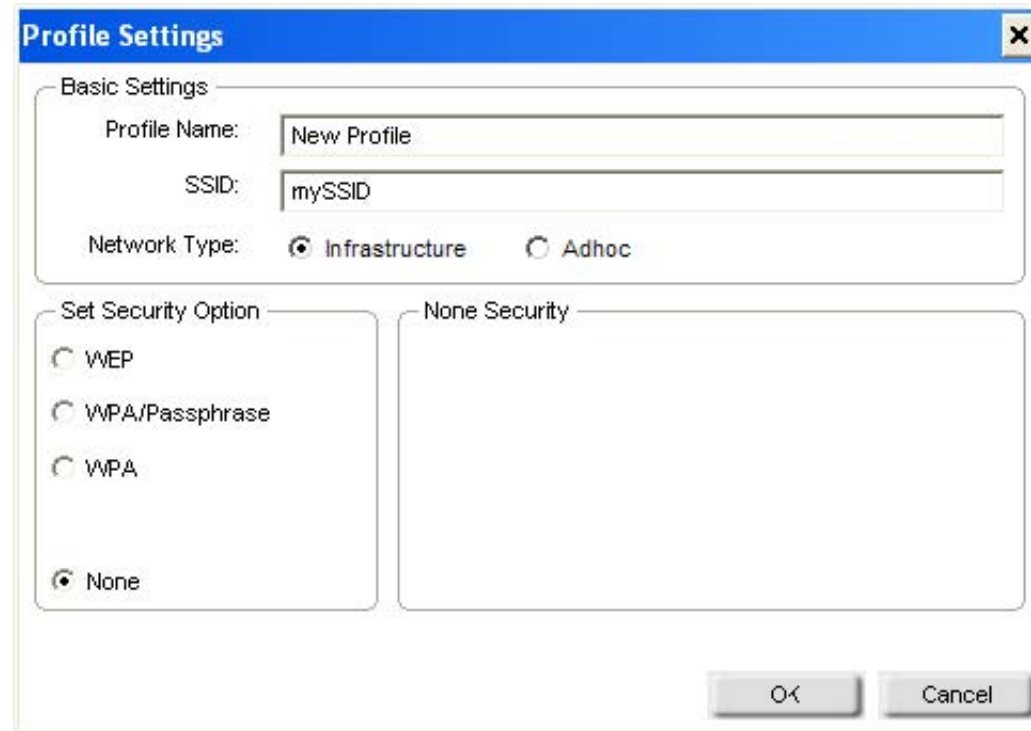
Enter the SSID of the wireless network.

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.

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

Click **OK** to save your settings.

Modify Profile

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

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

Displays the SSID of the network.

Displays the network type.

Select the type of security used. Please refer to the **Wireless Security** section for more information. Click **OK** to save your settings.

Support

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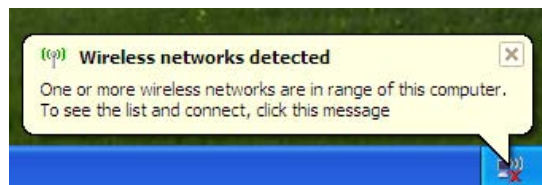
About

The About screen gives you information about the Firmware and Utility Versions of the WLN-1501.

Windows® XP Configuration Utility

Windows® XP users may use the built-in wireless utility. The following instructions are for Service Pack 2 users.
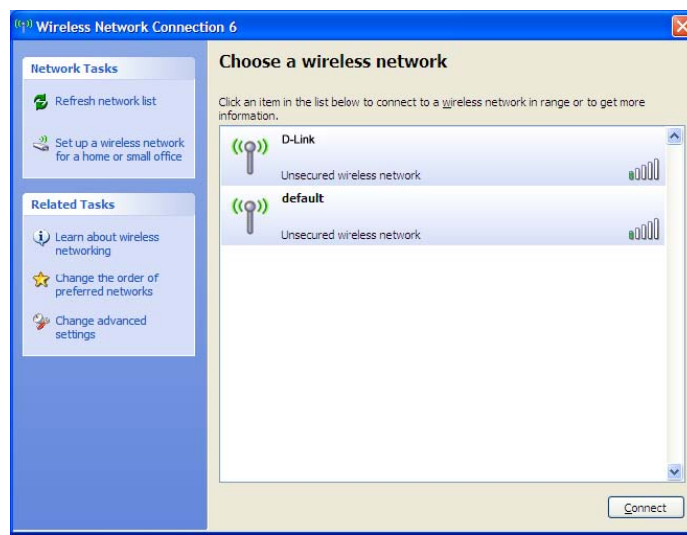
If you are using Windows® 2000, you must use the Wireless utility. Please refer to page 15.

If you receive the **Wireless Networks Detected** bubble, click on the center of the bubble to access the utility.
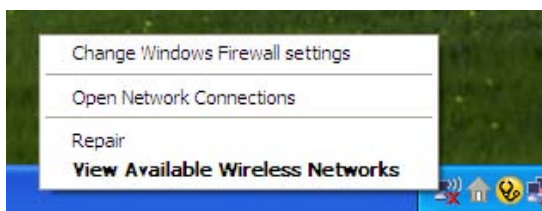
Right-click on the wireless computer icon in your system tray (lower-right corner next to the time). Select **View Available Wireless Networks**.

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 utility instead of the Windows® XP wireless utility, refer to the next page.

Disabling The Windows® XP Utility

If you want to use the Wireless Connection Manager you must disable the Windows® XP wireless utility.
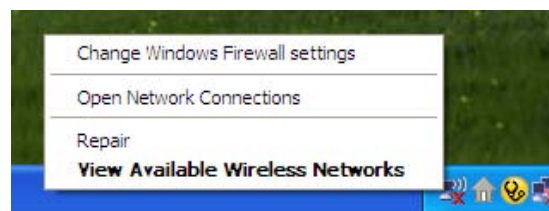
Right-click on the wireless computer icon in your system tray (lower-right corner next to the time). Select **View Available Wireless Networks**.

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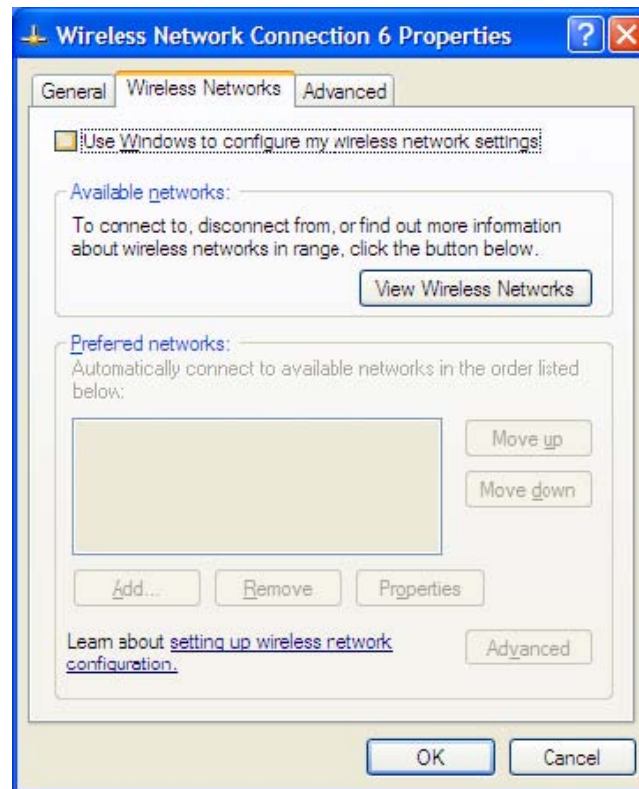
Double-click the **Wireless Connection Manager** icon on your desktop.

Wireless Security

This section will show you the different levels of security you can use to protect your data from intruders. The

WLN-1501 offers the following types of security:

- WPA2 (Wi-Fi Protected Access 2)
- WPA2-PSK (Pre-Shared Key)

- WPA (Wi-Fi Protected Access)
- WPA-PSK (Pre-Shared Key)

- WEP (Wired Equivalent Privacy)
- 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.
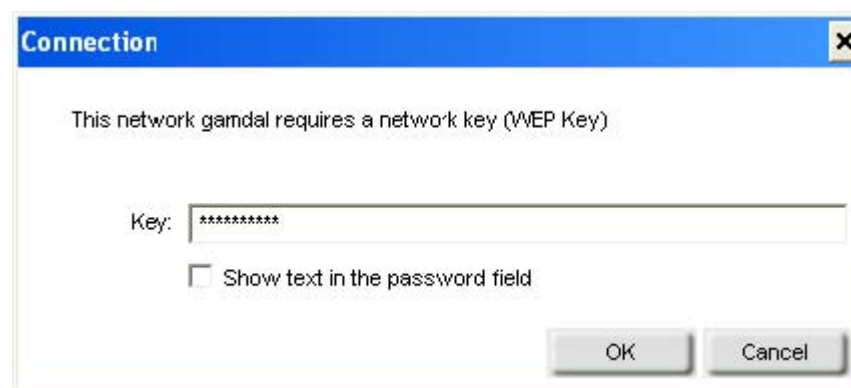
Configure WEP

Using the 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 wireless icon on your desktop. From the list of available wireless networks, select the network you want to connect to can 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 wireless 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.
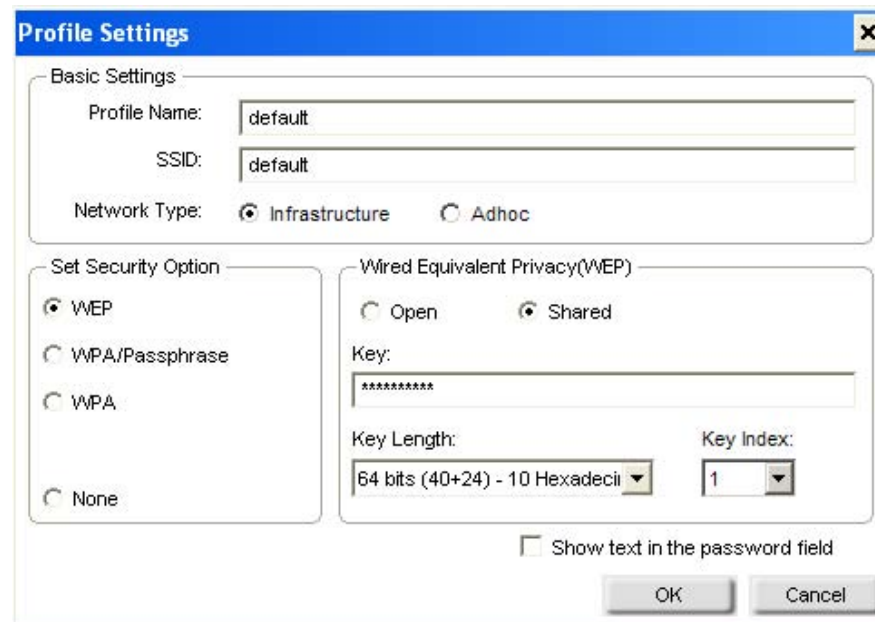
Configure WEP

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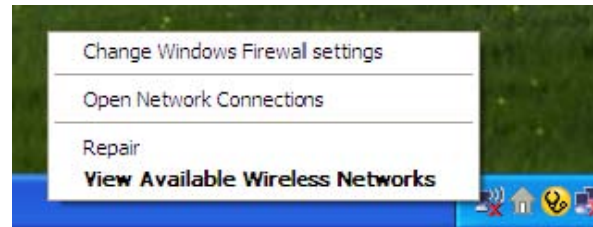
1. Open the Windows® XP Wireless Utility by right-clicking on the wireless computer icon in your system tray (lower-right corner of screen). Select **View Available Wireless Networks**.

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 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.
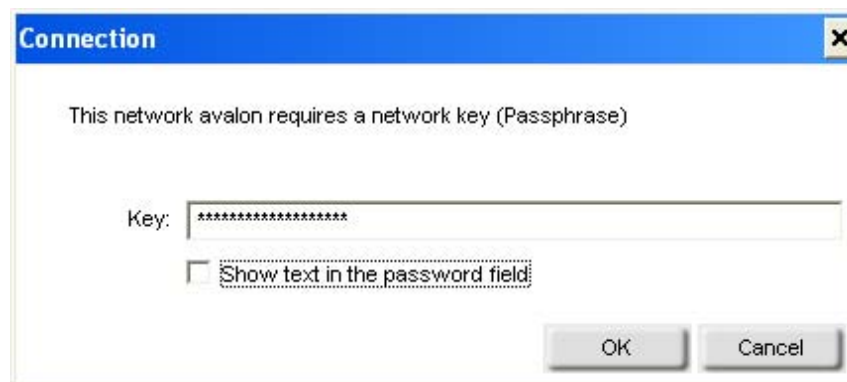
1. Open the Wireless Connection Manager by double-clicking on the wireless icon on your desktop.

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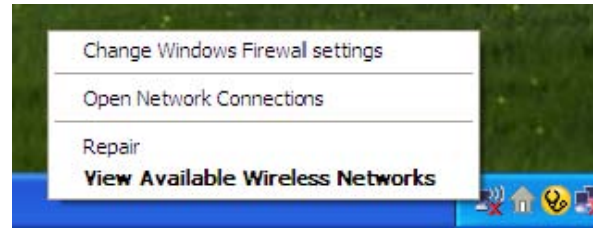
1. Open the Windows® XP Wireless Utility by right-clicking on the wireless computer icon in your system tray (lower-right corner of screen). Select **View Available Wireless Networks**.

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.
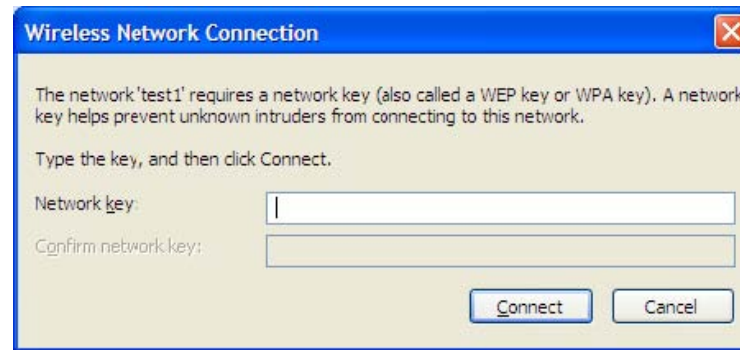
Wireless Installation Considerations

The 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 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 in not in use.

Technical Specifications

Standards

- IEEE 802.11n (draft)

- IEEE 802.11b

- IEEE 802.11g

Bus Type

- USB 2.0 (1.1 compatible)

Security

- WPA - Wi-Fi Protected Access (TKIP, MIC, IV Expansion, Shared Key Authentication)

- 802.1x

- 64/128-bit WEP

Media Access Control

- CSMA/CA with ACK

Frequency Range

- 2.4GHz to 2.462GHz

Wireless Signal Range*

- Indoors: Up to 328 feet (100 meters)

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

Power Consumption

- PowerSave mode = 28mA

- Standby mode = 4.66mA

- Transmit mode = 248mA

Modulation Technology

- Orthogonal Frequency

Division Multiplexing (OFDM)

- Complementary Code Keying (CCK)

Receiver Sensitivity

- 54Mbps OFDM, 10% PER,-68dBm)

- 48Mbps OFDM, 10% PER,-68dBm)

- 36Mbps OFDM, 10% PER,-75dBm)

- 24Mbps OFDM, 10% PER,-79dBm)

- 18Mbps OFDM, 10% PER,-82dBm)

- 12Mbps OFDM, 10% PER,-84dBm)

- 11Mbps CCK, 8% PER,-82dBm)

- 9Mbps OFDM, 10% PER,-87dBm)

- 6Mbps OFDM, 10% PER,-88dBm)

- 5.5Mbps CCK, 8% PER,-85dBm)

- 2Mbps QPSK, 8% PER,-86dBm)

- 1Mbps BPSK, 8% PER,-89dBm)

Operating Temperature

- 32°F to 131°F (0°C to 55°C)

Humidity

- 95% maximum (non-condensing)

Dimensions

- L = 4.64 (114.3mm)

- W = 2.13 (54mm)

- H = 0.34 inches (8.7mm)

Weight

- 0.12 lb (55g)

Warranty

- 1 Year

* Maximum wireless signal rate derived from IEEE Standard 802.11g 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 factors will adversely affect wireless signal range.

CE Mark Warning: $\mathsf{C}\mathsf{E}_{0560}$ ①

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.

Hereby, Cameo, declares that this device is in compliance with the essential requirement and other relevant provisions of the R&TTE Driective 1999/5/EC.
This device will be sold in the following EEA countries：Austria, Italy, Belgium, Liechtenstein, Denmark, Luxembourg, Finland, Netherlands, France, Norway, Germany, Portugal, Greece, Spain, Iceland, Sweden, Ireland, United Kingdom, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Slovakia, Poland, Slovenia, Bulgaria, Romania.

FCC Statement:

IMPORTANT NOTE:
Federal Communication Commission (FCC) Radiation Exposure Statement
This EUT is compliance with SAR for general population/uncontrolled exposure limits in ANSI/IEEE C95.1-1999 and had been tested in accordance with the measurement methods and procedures specified in OET Bulletin 65 Supplement C.

This device cannot be used with handheld PDAs (personal digital assistants). This device and its antenna(s) must not be co-located or operated in conjunction with any other antenna or transmitter.

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.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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

IC Statement:

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

For product available in the USA/Canada market, only channel 1~11 can be operated. Selection of other channels is not possible.