LevelOne

User Manual

WUA-0601

N_Max Wireless USB Adapter

V1.0.0-0804

Safety

FCC WARNING

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

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

To assure continued compliance, any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. (Example - use only shielded interface cables when connecting to computer or peripheral devices).

FCC Radiation Exposure Statement

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

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.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

CE Marking Warning

Digital Data Communications, declares that this product (Model-no. WNC-0601) is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

The CE-Declaration of Conformity can be downloaded at:

http://www.levelone.eu/support.php


N18085

Table of Contents

Chapter 1
Introduction

This Chapter provides an overview of the USB Wireless Adapter's features and capabilities.

Congratulations on the purchase of your USB Wireless Adapter. The USB Wireless Adapter provides a wireless network interface for your Notebook or Desktop Computer.

Package Contents

The following items should be included:

- WUA-0601 N_Max Wireless USB Adapter
- Quick Installation Guide
- CD Manual/Driver/Utility
- Extension Cable

If any of the above items are damaged or missing, please contact your dealer immediately.

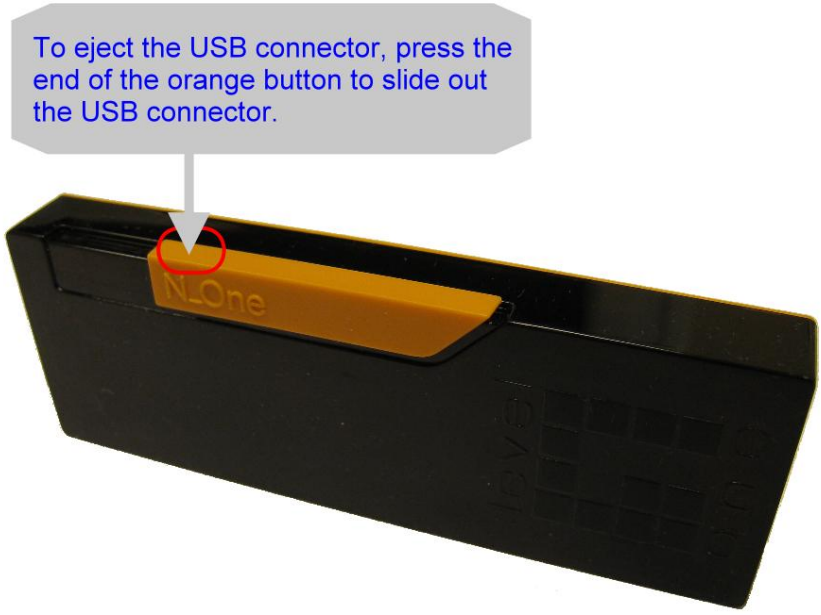
LEDs

USB Wireless Adapter

The Wireless Adapter has a single Link/Activity LED.

Link/Act LED	• On – Associated with the network. • Off - Not associated with the network. • Blinking - Data being transferred.

Operation



To eject the USB connector, press the end of the orange button to slide out the USB connector.

You should install the supplied software on the CD-ROM before inserting the USB adapter.

Chapter 2
Initial Installation

This Chapter covers the software installation of the USB Wireless Adapter.

Requirements

- Windows 2000/XP/Vista
- Available USB port.
- CD-ROM drive.
- IEEE802.11b/IEEE802.11g or 802.11n Draft, Wireless LAN.

Procedure

IMPORTANT: Do not insert the Adapter into your computer BEFORE installing the supplied software from the LevelOne CD.

1. Insert the CD-ROM into the drive on your PC.
2. The installation program should start automatically. If it does not, run autorun.exe program.
3. Select the WUA-0601 and click “Utility” on the screen.

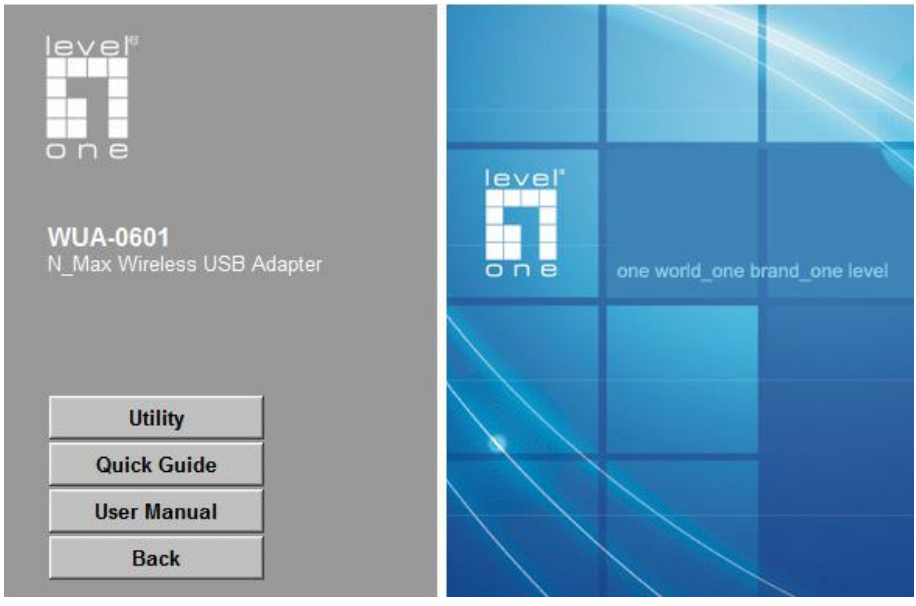


Figure: Select the Utility of WUA-0601

4. Select the desired installation language on the screen.

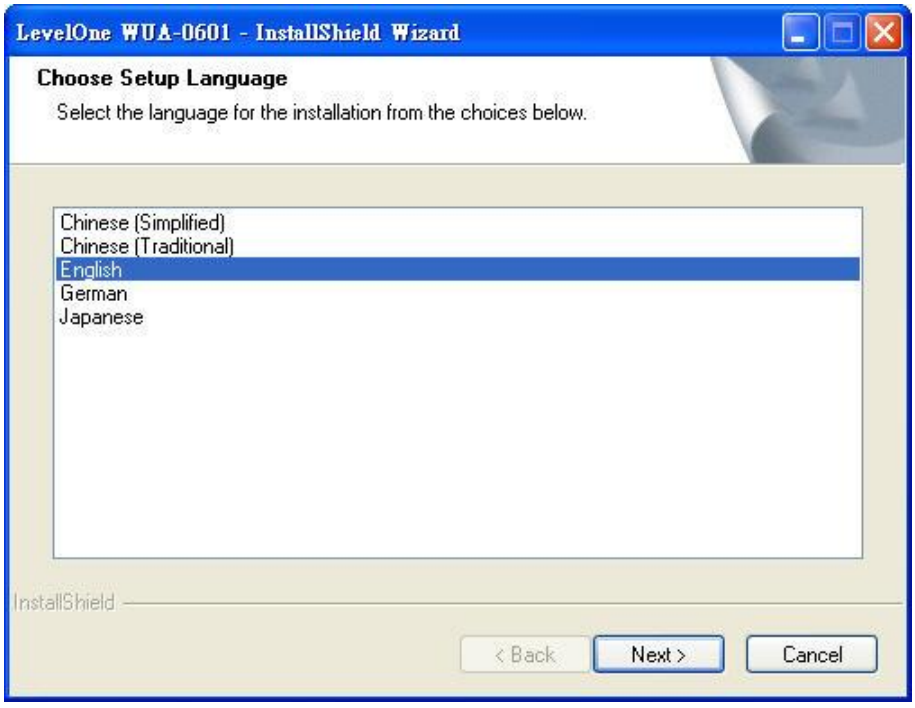


Figure: Select language

5. On the screen below, click "Next" to start the installation.

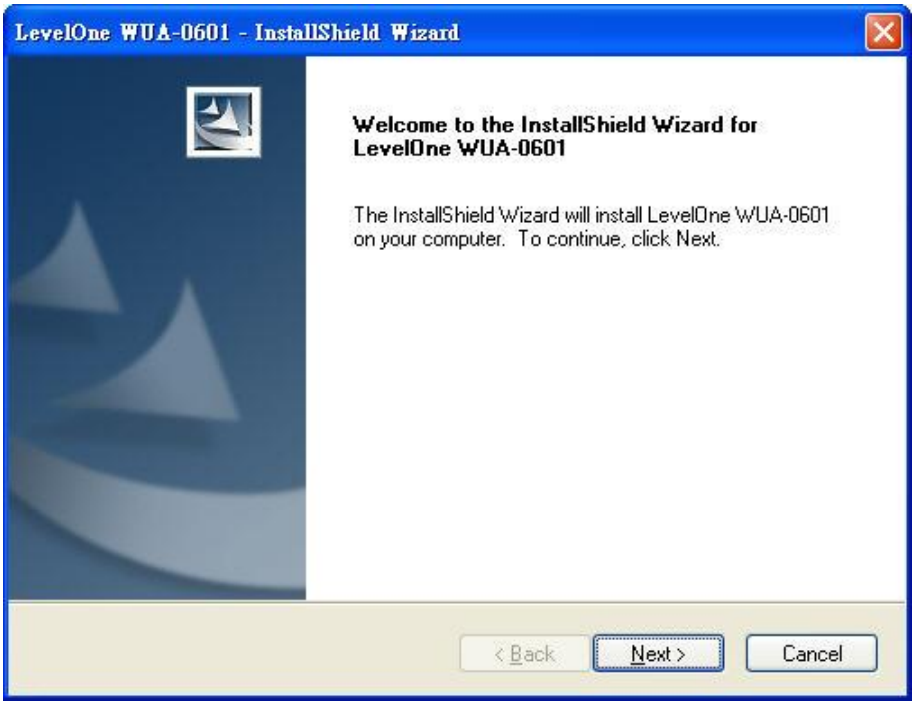


Figure: Start Installation

6. Ready to install the program, click "Install" to begin the installation.

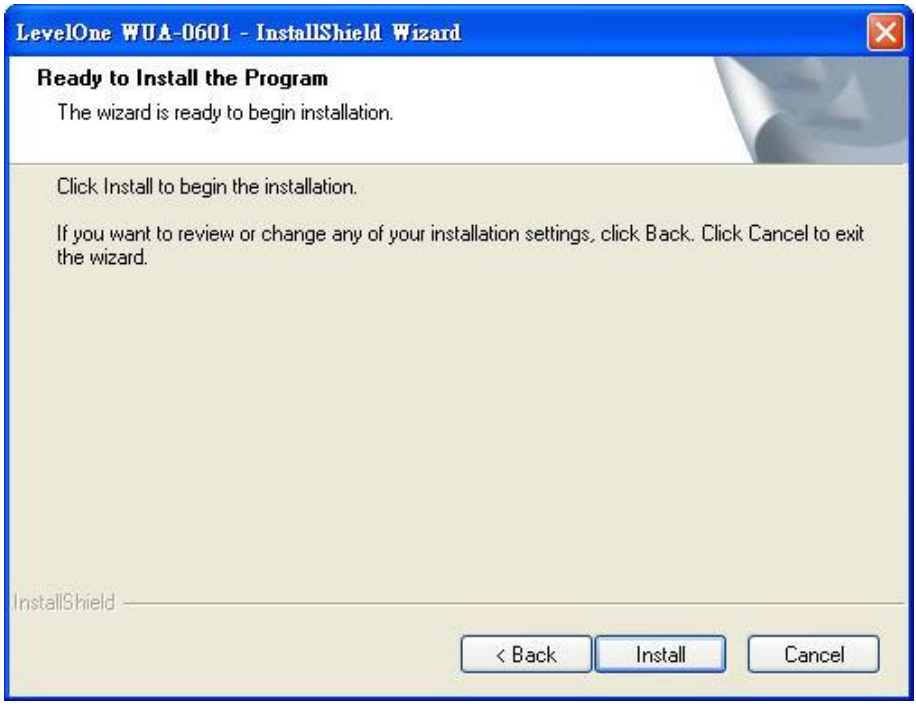


Figure: Ready to install the program

7. Click "Continue Anyway" on the screen below.

Figure: Installation Screen

8. Press the USB adapter firmly into the slot, then click "OK".

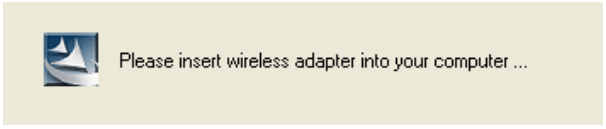


Figure: Insert wireless adapter

9. The Windows "New Hardware" wizard screen will appears, click “Next”.

10. Select Install the software automatically (Recommended) to allow it to complete the installation of the Windows driver, and then click Next.

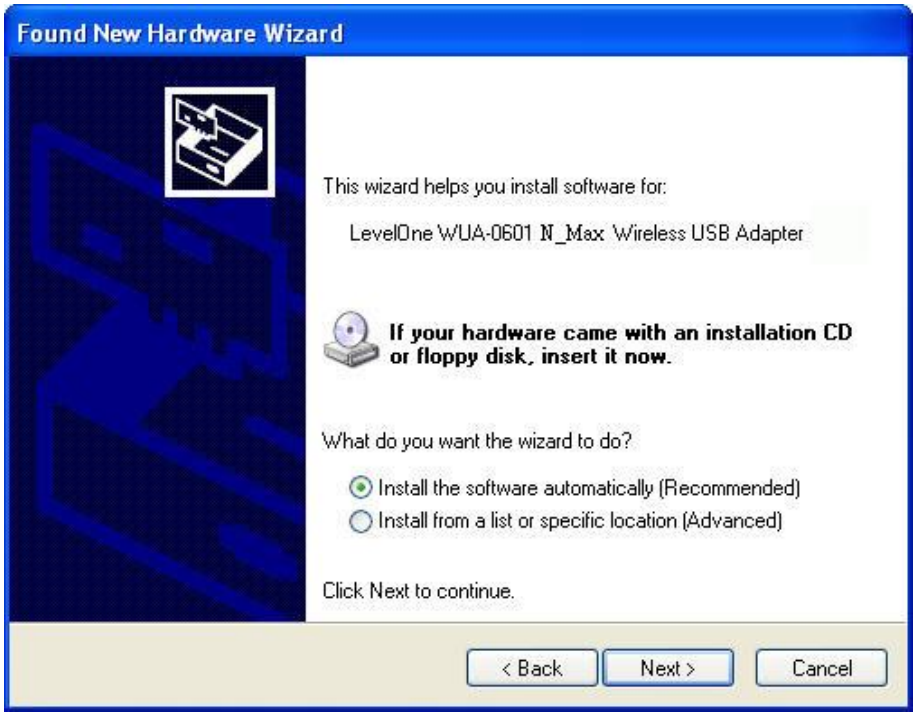


Figure: Install the software automatically

11. If using Windows XP, you may see a warning screen like the example below. If you do see this screen, just click "Continue Anyway"

Figure: Windows XP Warning

If the wizard can not Install the driver automatically, please search for driver in the default location. The driver is located in C:\Program Files\LevelOne\WUA-0601\Driver\ directory.

12. When the Wizard has finished installing the software, click “Finish”.

Figure: Complete the Found New Hardware Wizard

13. When the Windows wizard is complete, you will now have a new icon in your system tray, as shown below.

Figure: System Tray Icon

USB Wireless Adapter Icon Table

	Connection to the USB Wireless Adapter is established. The length of green color indicates the signal strength.
	No connection to the USB Wireless Adapter.
	The USB Wireless Adapter is unplugged.

14. You can double- click this icon to configure the Wireless interface. See the following chapter for details.

Chapter 3
Using the Windows Utility

This Chapter provides Setup details for the AP mode of the Wireless Adapter.

Overview

If using Windows, you can use the supplied utility to configure the Wireless interface.

To Use the supplied Windows utility for Configuration

- Right-click the System Tray icon
- From the pop-up menu, select "Restore".

This Chapter assumes you are using the supplied WUA-0601 Wireless LAN utility.

System Tray Icon

If the Wireless LAN Utility is running, you can double-click the icon in the System Tray to open the application.

If the program is not running, you can start it using the option in the Start menu created by the installation.

For the USB Adapter, this will be ***Start - Programs - LevelOne – WUA-0601 – WUA-0601 Wireless LAN Utility***.

Status Information

The menu options available from the System Tray icon are:

- **Restore** - This will display the main screen.
- **Radio Off** - The wireless adapter is not associated with the network when the radio is off.
- **WZC On** - Wireless Zero Configuration (WZC), is a service of Microsoft Windows which dynamically selects a wireless network to connect.
- **Exit** - Terminate the connection to the Wireless Adapter.

Figure: Wireless Adapter menu

Connecting to a Wireless Network

Double-click the Icon to open the Site Survey screen, when you can select the Wireless network you wish to join.

Auto Connect

Normally, this option should be enabled. The adapter will then connect to an available network which was connected successfully last time.

There are various methods to specify the required network.

- On the Profile Manager tab, select the desired profile in the list, and click the Apply Profile button.
- On the Site Survey tab, either double-click the network in the list, or select the network and click the Connect button.

Site Survey Screen

This screen is displayed when you double-click the system tray icon. You can also click the Site Survey Tab in the screen.

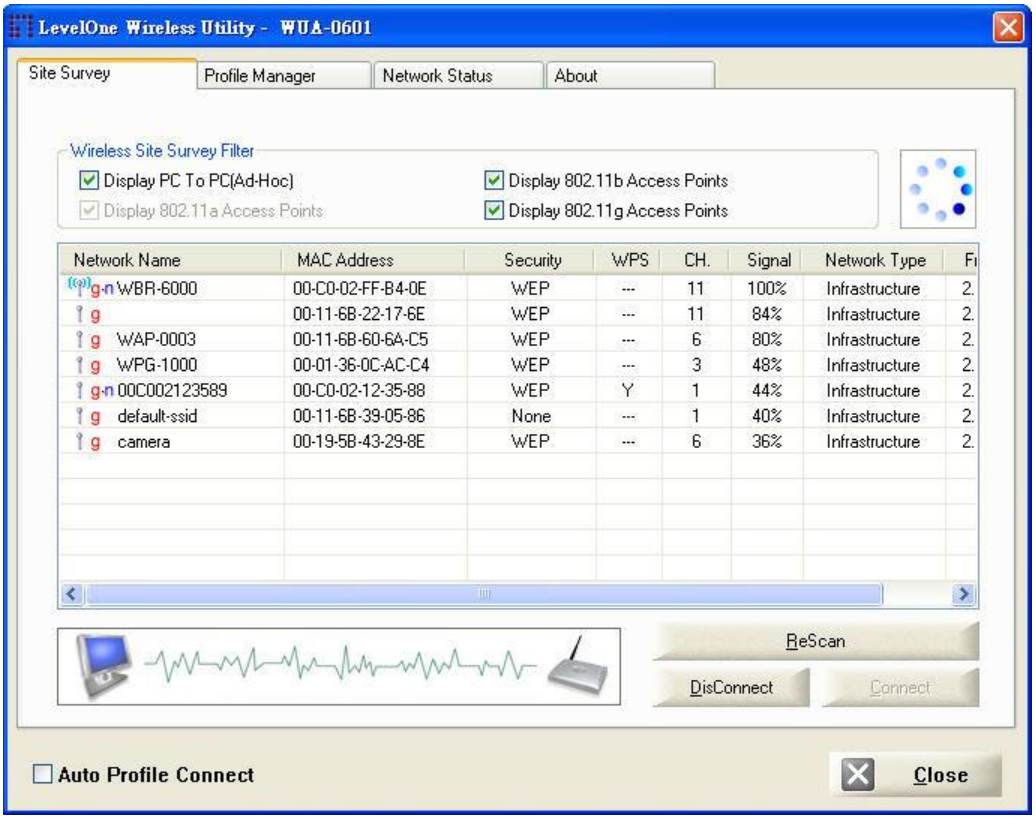


Figure: Site Survey Screen

Data - Site Survey Screen

Display PC To PC (Ad-Hoc)	Select this check box to display ad-hoc (computer-to-computer) networks.
Display 802.11b Access Points	Select this check box to display 802.11b (infrastructure) networks.
Display 802.11g Access Points	Select this check box to display 802.11g (infrastructure) networks.
Network Name	Available wireless networks are listed.
MAC Address	This is the MAC address of the Access Point (or Wireless station, if the network is an Ad-hoc network).
Security	Data encryption and authentication methods used on the wireless network
WPS	This will indicate "Y" (the Access Point with WPS function), "Y+". (the WPS function of the Access Point is in used) or "---" (the Access Point without WPS function)
CH.	The channel used by the Wireless network.
Signal	This is displayed as percentage (0 ~ 100%).
Frequency	The Wireless band used by this Wireless network.
Network Type	This will indicate "Infrastructure" (displayed device is an Access Point) or "Ad-hoc". (displayed device is a Wireless station)
Status	The area to the left of the "Rescan" button shows the current status. In the example above, it shows "Connected".
Rescan	Click this button to rescan for all Wireless networks.

Wireless Network Sequence (order)

You can click the headings (ex. Network Name, MAC Address, Security…) of the Wireless network table to arrange the Wireless network in the desired order.

To Connect to a Wireless Network

- Double-click on the desired network.
- Click the name of the wireless network to which you want to connect, and then click **Connect**.

Note that once you are connected to a Wireless network, the **Site Survey** screen will identify the current wireless network with a blue icon, as shown below.

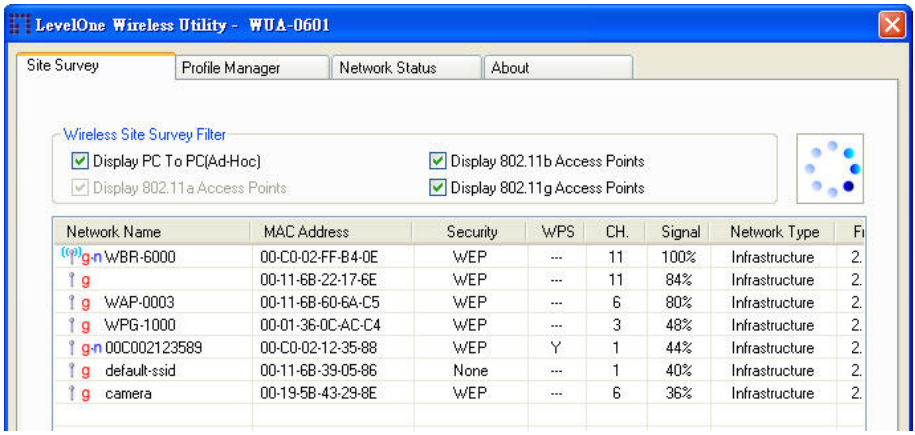


Figure: Site Survey Screen - Connected

Profile Manager Screen

This screen is accessed by clicking the *Profile Manager* tab on the main screen.

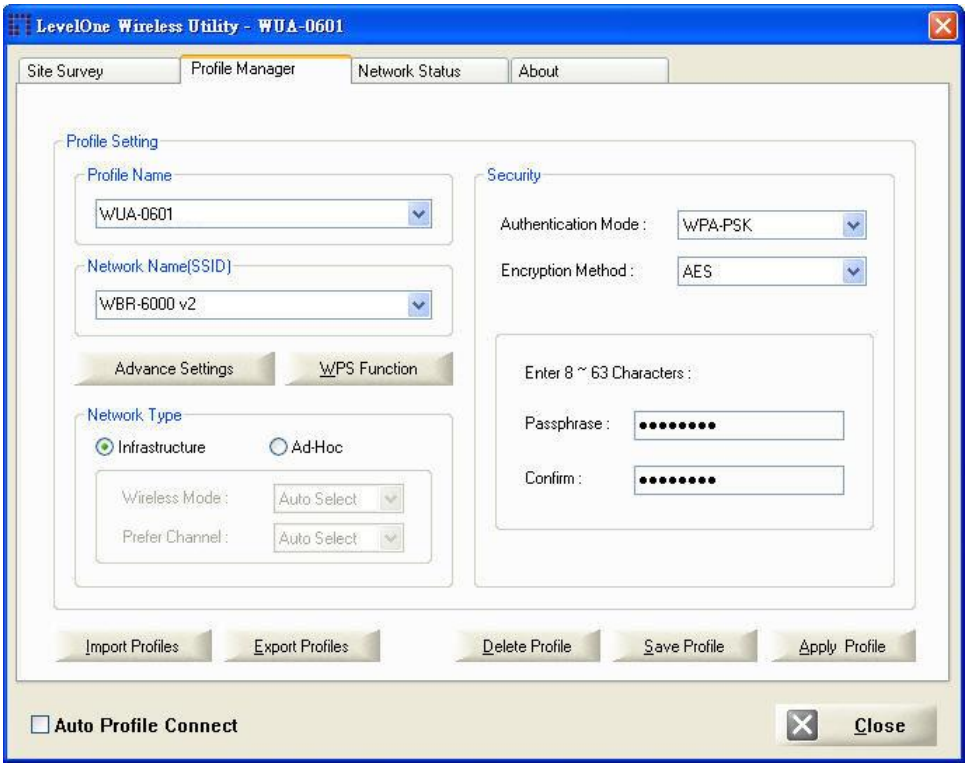


Figure: Profile Manager Screen

Data - Profile Manager Screen

Profile Name	Enter or select a suitable name for this profile. Each profile must have a unique name before user can actually save the profile.
Network Name (SSID)	If the desired wireless network is currently available, you can select its SSID. Otherwise, type in the SSID of the desired wireless network.
Advanced Settings	On the resulting sub-screen, enter the required data for the advanced settings. Advanced settings only available under 11b/g wireless environment.
WPS Function	WPS (Wi-Fi Protected Setup) can simplify the process of connecting any device to the wireless network by using the push button configuration (PBC) on the Wireless Access Point, or entering an 8-digit PIN code.
Network Type	Select the desired option: • **Infrastructure** - Select this to connect to an Access point. • **Ad-Hoc** - Select this if you are connecting directly to another computer.

Wireless Mode	Select the desired wireless mode to which you want to connect. This option only available under **Ad-Hoc** mode, it allows user to select the prefer channel.
Prefer Channel	Select the channel you would like to use under **Ad-Hoc** mode. Channel 1 ~ 13.
Authentication Mode	You MUST select the option to match the Wireless LAN you wish to join. The available options are: • **Open System** - Broadcast signals are not encrypted. This method can be used only with no encryption or with WEP. • **Shared Key** - Broadcast signals are encrypted using WEP. This method can only be used with WEP. • **Auto Switch** - This is another WEP system; it will select either Open System or Shared Key as required. • **WPA-PSK** - PSK means "Pre-shared Key". You must enter this Passphrase value; it is used for both authentication and encryption. • **WPA2-PSK** - This is a further development of WPA-PSK, and offers even greater security. You must enter this Passphrase value; it is used for both authentication and encryption. • **WPA Radius** - This version of WPA requires a Radius Server on your LAN to provide the client authentication according to the 802.1x standard. Data transmissions are encrypted using the WPA standard. • **WPA2 Radius** - This version of WPA2 requires a Radius Server on your LAN to provide the client authentication according to the 802.1x standard. Data transmissions are encrypted using the WPA2 standard.
Encryption Method	The available options depend on the Authentication method selected above. The possible options are: • **Security Off** - No data encryption is used. • **WEP** - If selected, you must enter the WEP data shown below. This WEP data must match the Access Point or other Wireless stations. • **AES, TKIP** - These options are available with WPA-PSK, WPA2-PSK, WPA-Radius and WPA2-Radius. Select the correct option.
Create with Passphrase	Enable this check box and enter a word or group of printable characters in the Passphrase box, select the desired encryption to automatically configure the WEP Key.
Enter Key Manually	Enable this check box and select the desired key in the drop-down list. Then enter the key values you wish to use and select the desired encryption. Other stations must have matching key values.
Passphrase	For WPA-PSK and WPA2-PSK modes, you need to enter the desired value (8~63 characters). Other Wireless Stations must use the same key.

Confirm	For WPA-PSK and WPA2-PSK modes, re-enter the value in this field.
802.1x Authentication Protocol	For WPA Radius and WPA2 Radius modes, select the desired option in the drop-down list.
Configure WPA Radius	For WPA Radius and WPA2 Radius modes, click this button to open a sub-window where you can enter details of the Radius Server.

To add a profile

1. On the Profile Manager tab, complete the settings on this screen. (Please make sure to specific the Profile name)
2. Verify that the settings you configured are correct.
3. Click Save Profile.

To export profiles

1. On the Profile Manager tab, click Export Profiles. The Save As dialog box appears.
2. Type a name for the profile that you are saving, and then verify that the file name extension is set to .cfg.
3. Click Save.

To import profiles

1. On the Profile Manager tab, click Import Profiles. The open dialog box appears.
2. Select the profile set that you want to import.
3. Click Open.

To delete a profile

1. On the Profile Manager tab, select the profile that you want to delete.
2. Click Delete Profile.

To edit a profile

1. On the Profile Manager tab, select the profile that you want to edit.
2. Change the profile settings as necessary.
3. Click Save Profile.

To enable a profile

1. In the list of available profiles, click the profile that you want to enable.
2. Click Apply Profile.

Advanced Settings Screen

Once you have created a profile, as described above, the **Advanced Settings** tab will be available on the Profile Manager screen.

Note: **Advanced settings** only available when 11b/g wireless mode has been selected.

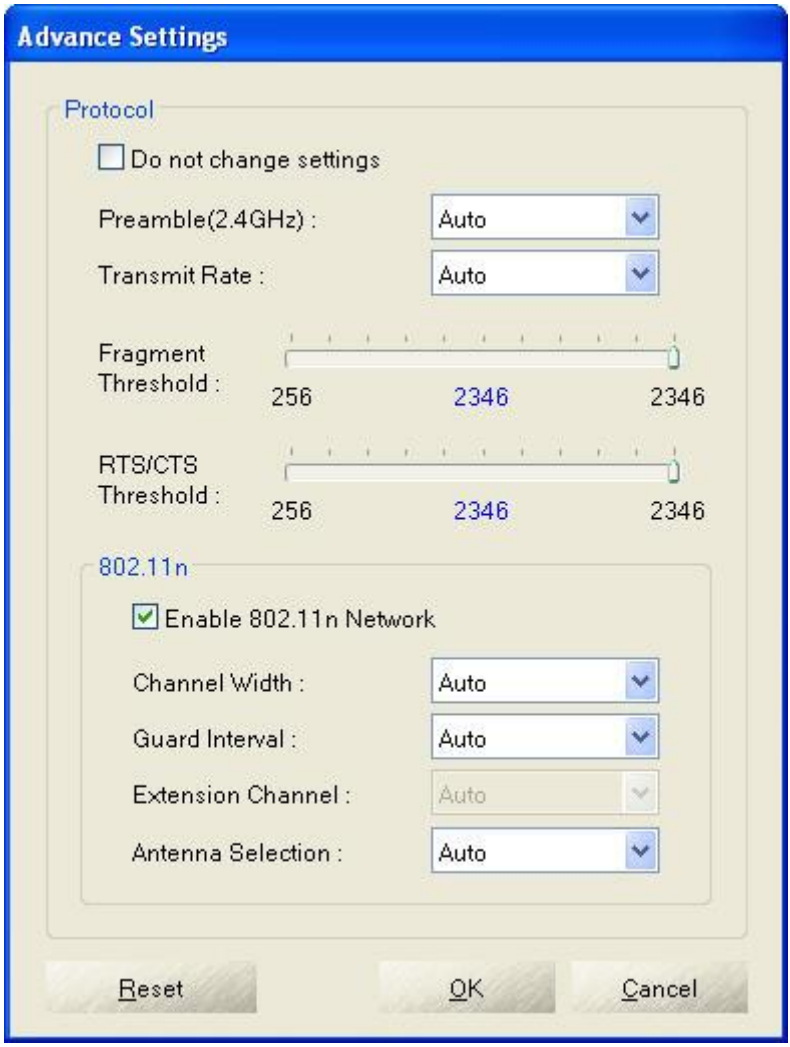


Figure: Advanced Settings Screen

Data - Advanced Settings Screen

Do not change settings	Enable this check box if you don't want to modify the settings in this screen.
Preamble (2.4GHz)	Normally, this should be left at "Auto". The option "Short", "Long" preamble and header is intended for special application and equipment.
Transmit Rate	Use this to manually set the speed, if desired. The default is "Auto".

Fragment Threshold	The default value is 2346. In some cases, you may be able to improve performance by adjusting this value.
RTS/CTS Threshold	The default value is 2346. In some cases, you may be able to improve performance by adjusting this value.
802.11n	
Enable 802.11n Network	802.11n wireless network connectivity
Channel Width	The value is set as “Auto”
Guard Interval	This value is set as "Auto"
Extension Channel	Auto selects the wireless channel. The value is set to “Auto” It will auto select the most suitable channel.
Antenna Selection	The default value is set to "Auto".

WPS Function Screen

The Wi-Fi Protected Setup (WPS) is to simplify the security setup and management of Wi-Fi networks. WPS (Wi-Fi Protected Setup) allows consumers to protect their home networks by using the push button configuration on the router, or entering an 8-digit PIN code if there's no button.

You will see the WPS screen when you try to connect the wireless network with the WPS function.

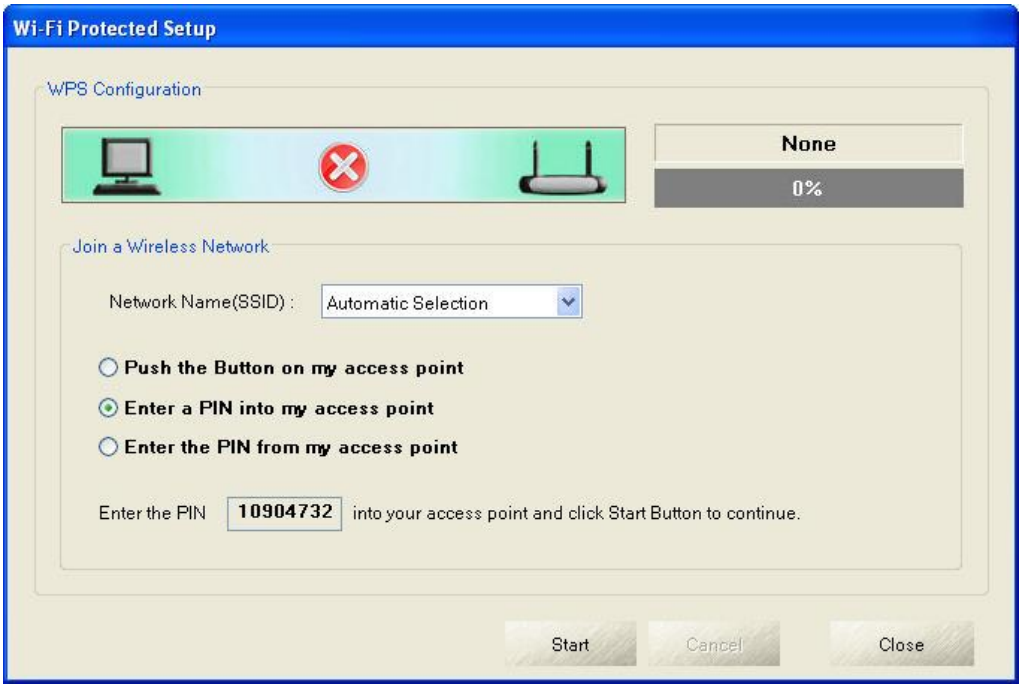
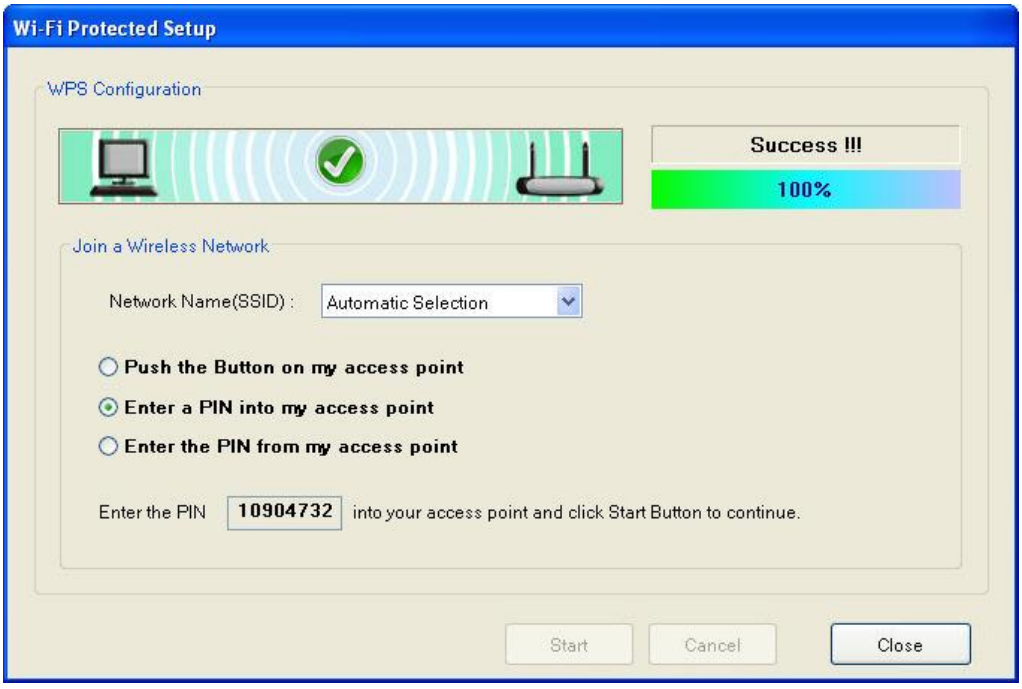


Figure: WPS Function Screen

Data - WPS Function Screen

Network Name(SSID)	Select the desired wireless network from the drop-down list.
Push the Button on my access point	Select this and click Start button. Then push the WPS button of the Access Point.
Enter a PIN into my access point	Select this to use the PIN method. It will automatically generate the new pin code displayed in the field. Click Start button and copy the value and paste in the Wi-Fi Protected Setup screen of the Access Point
Enter the PIN from my access point	Select this to use the PIN method. Entering the PIN from your access point in the Wi-Fi Protected Setup screen of the Access Point and click "Start" button to continue.

You will see the following screen if WPS configuration is success:



Network Status Screen

This screen displays the status of the current wireless link. Clicking the **Network Status** tab will display a screen like the following.

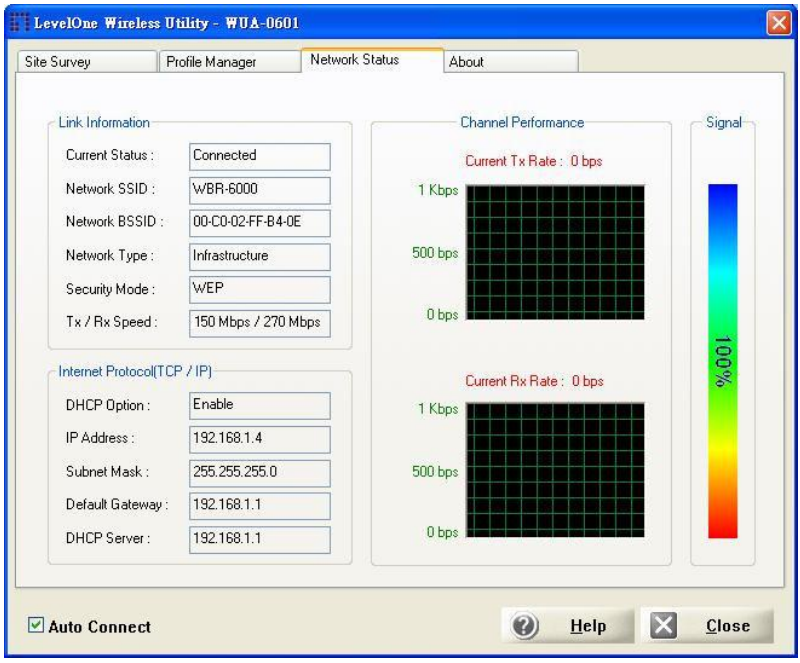


Figure: Network Status Screen

You may have to wait a few seconds for the screen to be populated.

Data - Network Status Screen

Link Information	
Current Status	It will indicate the current link status.
Network SSID	It shows the SSID or network name of the selected wireless network.
Network BSSID	It shows the MAC address of the access point.
Network Type	This will indicate "Infrastructure" or "Ad-hoc".
Security Mode	It shows the wireless security that the wireless network is using.
Tx/Rx Speed	It shows the current wireless connection speed.
Internet Protocol	
DHCP Option	It shows if the IP address was automatically obtained from a DHCP server.
IP Address	It shows the current IP address on the wireless interface.
Subnet Mask	Subnet mask for the current IP address.
Default Gateway	Gateway IP address associated with the current IP address.

DHCP Server	It shows the IP address of the DHCP Server.
Channel Performance	
Channel Performance	It graphically presents the Transmission (Tx) rate and Receiving (Rx) rate over time.
Signal	
Signal	It graphically presents the Signal strength.

The Channel Performance diagram indicates the real time TX and RX.

About Screen

This screen displays details of the traffic sent or received on the current Wireless network.

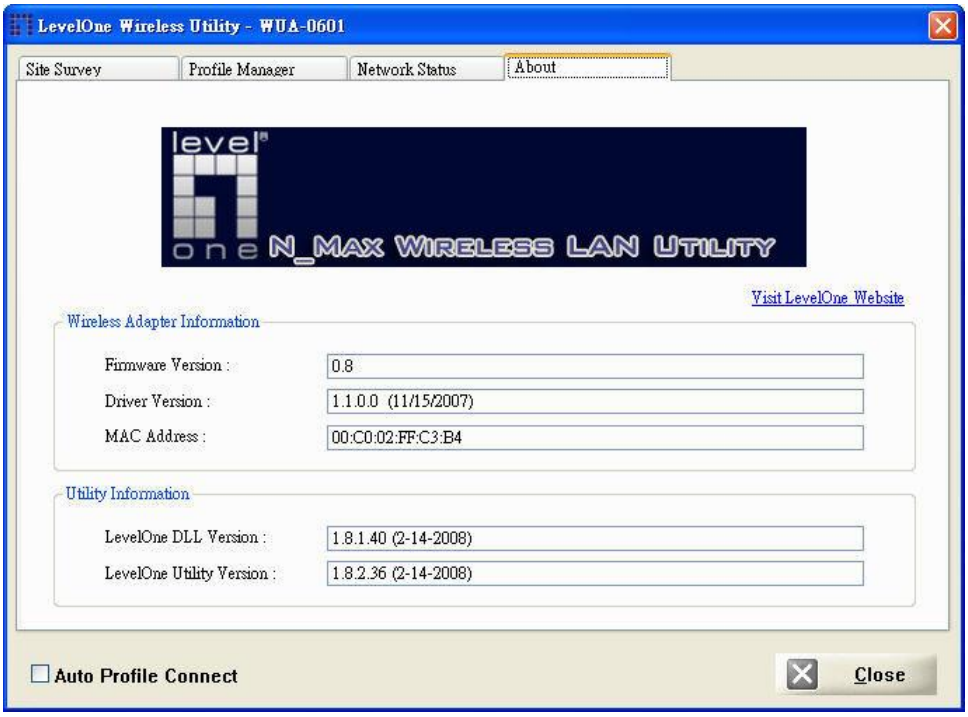


Figure: About Screen

This tab shows the following information:

- Regional Domain
- Firmware Version
- Driver Version
- MAC Address
- LevelOne DLL Version
- LevelOne Utility Version

Appendix A
Specifications

USB Adapter

Model	LevelOne WUA-0601 *N_Max* Wireless USB Adapter	
Bus Type:	USB 2.0	
Data Rates:	20 MHz BW: 130, 117, 104, 78, 52, 39, 26, 13 (802.11n) 40 MHz BW: 300,270, 243, 216, 162, 108, 81, 54, 27	
	54, 48, 36, 24, 18, 12, 9, and 6 Mbps (802.11g)	
	11, 5.5, 2, 1 Mbps (802.11b)	
Frequency Band:	2.4GHz to 2.5GHz	
Wireless Medium:	DSSS and OFDM	
Media Access Protocol:	CSMA/CA	
Wireless Medium:	Draft 802.11n	BPSK, QPSK, 16-QAM, 64-QAM
	802.11g	OFDM
	802.11b	CCK,QPSK,BPSK
Media Access Protocol:	CSMA/CA	
Transmit Power:	802.11n:	14±1 dBm
	802.11g:	14±1 dBm
	802.11b:	17±1 dBm
Security:	WEP 64/128, WPA-PSK, WPA2-PSK, WPA Radius, WPA2 Radius	

Appendix B
About Wireless LANs

This Appendix provides some background information about using Wireless LANs (WLANs).

Modes

Wireless LANs can work in either of two (2) modes:

- Ad-hoc
- Infrastructure

Ad-hoc Mode

Ad-hoc mode does not require an Access Point or a wired (Ethernet) LAN. Wireless Stations (e.g. notebook PCs with wireless cards) communicate directly with each other.

Infrastructure Mode

In Infrastructure Mode, one or more Access Points are used to connect Wireless Stations (e.g. Notebook PCs with wireless cards) to a wired (Ethernet) LAN. The Wireless Stations can then access all LAN resources.

Access Points can only function in "Infrastructure" mode, and can communicate only with Wireless Stations which are set to "Infrastructure" mode.

BSS/ESS

BSS

A group of Wireless Stations and a single Access Point, all using the same ID (SSID), form a Basic Service Set (BSS).

Using the same SSID is essential. Devices with different SSIDs are unable to communicate with each other.

ESS

A group of Wireless Stations, and multiple Access Points, all using the same ID (ESSID), form an Extended Service Set (ESS).

Different Access Points within an ESS can use different Channels. In fact, to reduce interference, it is recommended that adjacent Access Points SHOULD use different channels.

As Wireless Stations are physically moved through the area covered by an ESS, they will automatically change to the Access Point which has the least interference or best performance. This capability is called **Roaming**. (Access Points do not have or require Roaming capabilities.)

Channels

The Wireless Channel sets the radio frequency used for communication.

- Access Points use a fixed Channel. You can select the Channel used. This allows you to choose a Channel which provides the least interference and best performance. In the USA and Canada, 11 channels are available. If using multiple Access Points, it is better if adjacent Access Points use different Channels to reduce interference.
- In "Infrastructure" mode, Wireless Stations normally scan all Channels, looking for an Access Point. If more than one Access Point can be used, the one with the strongest signal is used. (This can only happen within an ESS.)
- If using "Ad-hoc" mode (no Access Point), all Wireless stations should be set to use the same Channel. However, most Wireless stations will still scan all Channels to see if there is an existing "Ad-hoc" group they can join.

WEP & WPA-PSK

Both WEP and WPA-PSK are standards for encrypting data before it is transmitted.

This is desirable because it is impossible to prevent snoopers from receiving any data which is transmitted by your Wireless Stations. But if the data is encrypted, then it is meaningless unless the receiver can decrypt it.

WPA-PSK is a later standard than WEP, and is more secure.

Wireless LAN Configuration

To allow Wireless Stations to use the Access Point, the Wireless Stations and the Access Point must use the same settings, as follows:

Mode	On client Wireless Stations, the mode must be set to "Infrastructure" (The Access Point is always in "Infrastructure" mode.)
SSID (ESSID)	Wireless Stations should use the same SSID (ESSID) as the Access Point they wish to connect to. Alternatively, the SSID can be set to "any" or null (blank) to allow connection to any Access Point.
Security	The Wireless Stations and the Access Point must use the same settings for Wireless security (Disabled, WEP, WPA-PSK) **WEP** - If WEP is used, the WEP Key must be the same on the Wireless Stations and the Access Point. **WEP Authentication** ("Open System" or "Shared Key") must also be the same, unless the Access Point supports both methods simultaneously. **WPA-PSK** - If using WPA-PSK, the PSK (Pre-shared Key) must be entered on each Wireless station. The encryption key is derived from the PSK, and changes frequently. **WPA2-PSK** - This is a later version of WPA (WPA-PSK). The major change is the use of AES (Advanced Encryption System) for protecting data. AES is very secure, considered to be unbreakable. The PSK (Pre-shared Key) must be entered on each Wireless station.