

802.11g Wireless LAN Mini USB Adapter

User Manual

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Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of 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 or more of the following measures:

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

FCC Caution

This equipment must be installed and operated in accordance with provided instructions and a minimum 5 cm spacing must be provided between computer mounted antenna and person's body (excluding extremities of hands, wrist and feet) during wireless modes of operation.

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.

Any changes or modifications not expressly approved by the party responsible for compliance could void the authority to operate equipment.

Federal Communication Commission (FCC) Radiation Exposure Statement

This equipment complies with FCC radiation exposure set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 20cm (8 inches) during normal operation.

R&TTE Compliance Statement

This equipment complies with all the requirements of DIRECTIVE 1999/5/CE OF THE EUROPEAN PARLIAMENT AND THE COUNCIL of March 9, 1999 on radio equipment and telecommunication terminal Equipment and the mutual recognition of their conformity (R&TTE)

The R&TTE Directive repeals and replaces in the directive 98/13/EEC (Telecommunications Terminal Equipment and Satellite Earth Station Equipment) As of April 8, 2000.

Safety

This equipment is designed with the utmost care for the safety of those who install and use it. However, special attention must be paid to the dangers of electric shock and static electricity when working with electrical equipment. All guidelines of this and of the computer manufacture must therefore be allowed at all times to ensure the safe use of the equipment.

EU Countries Intended for Use

The ETSI version of this device is intended for home and office use in Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom.

The ETSI version of this device is also authorized for use in EFTA member states: Iceland, Liechtenstein, Norway, and Switzerland.

EU Countries Not intended for use

None.

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1 Introduction

Thank you for purchasing the 802.11g Wireless LAN Mini USB Adapter. This USB Adapter is designed to comply with IEEE 802.11g Wireless LAN standard and easy to carry with the Mini size. It is suitable for any Laptop or Desktop computers.

This adapter supports 64/128/256-bit WEP data encryption that protects your wireless network from eavesdropping. It also supports WPA (Wi-Fi Protected Access) feature that combines IEEE 802.1x and TKIP (Temporal Key Integrity Protocol) technologies. Client users are required to authorize before accessing to APs or AP Routers, and the data transmitted in the network is encrypted/decrypted by a dynamically changed secret key. This adapter has built-in AES engine which ensure the highest degree of security and authenticity for digital information and it is the most advanced solution defined by IEEE 802.11i for the security in the wireless network.

This adapter is cost-effective, together with the versatile features; it is the best solution for you to build your wireless network.

1.1 Features

- Complies with the IEEE 802.11b and IEEE 802.11g 2.4GHz standards.
- Up to 54Mbps high data transfer rate.
- Support 64/128/256-bit WEP, WPA (TKIP, IEEE 802.1x) and AES functions for high level of security.
- Supports Software AP function, which turns the wireless station into a wireless AP.
- Complies with IEEE 802.11d country roaming standard.
- Support the most popular operating system: Windows 98SE/Me/2000/XP.
- Supports USB 2.0/1.1/1.0 interface.
- Portable and mini-size design.
- Suitable for Any Notebook or Desktop PC.

1.2 Specifications

- Standard: IEEE 802.11g/b
- Bus Type: USB 2.0 Type A
- Frequency Band: 2.4000~2.4835GHz (Industrial Scientific Medical Band)
- Modulation: OFDM with BPSK, QPSK, 16QAM, 64QAM (11g)
BPSK, QPSK, CCK (11b)
- Data Rate: 54/48/36/24/18/12/11/9/6/5.5/2/1Mbps auto fallback
- Security: 64/128/256-bit WEP Data Encryption, WPA (IEEE 802.1x with TKIP) and AES
- Antenna: Internal Antenna
- Drivers: Windows 98SE/Me/2000/XP/2003 Server
- LED: Link/Activity
- Transmit Power: 16dBm (Typical)

- Dimension: 9(H) x 27(W) x 87(D)
- Temperature: 32~131°F (0 ~55°C)
- Humidity: 0-95% (NonCondensing)
- Certification: FCC, CE

1.3 Package Contents

Before you begin the installation, please check the items of your package. The package should include the following items:

- One USB Adapter
- One USB 2.0 Extension Cable (100 cm)
- One Quick Guide
- One CD (Driver/Utility/Manual)

If any of the above items is missing, contact your supplier as soon as possible.

2 Installation Procedure

Before you proceed with the installation, please notice following descriptions.

Note1: *Please do not install the USB adapter into your computer before installing the software program from the CD.*

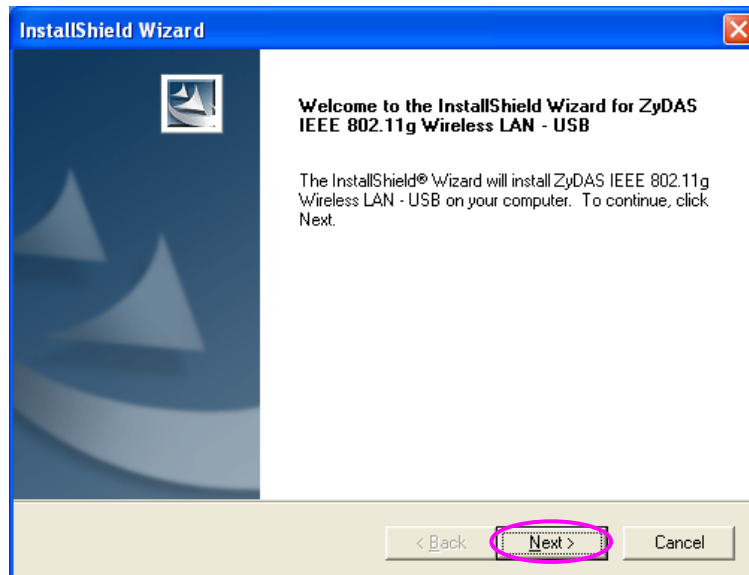
Note2: *The following installation was operated in Windows XP. (Procedures are similar for Windows 98SE/Me/2000/2003 Server.)*

Note3: *If you have installed the Wireless PC Card driver & utility before, please uninstall the old version first.*

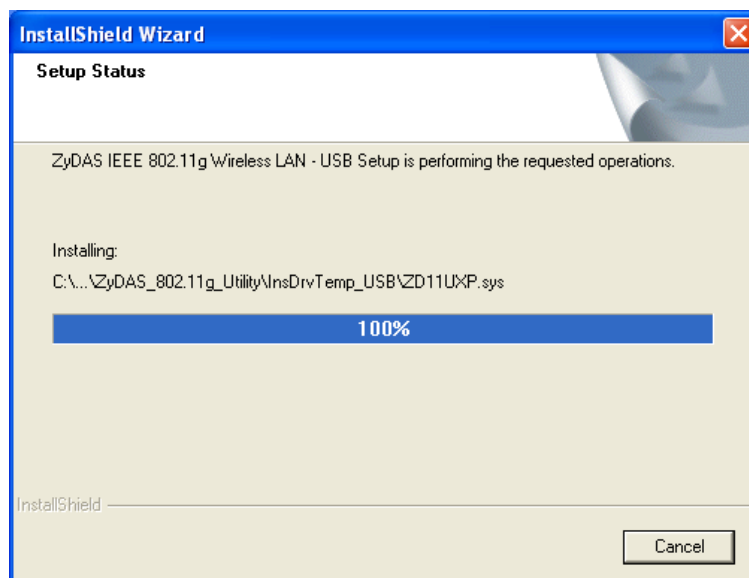
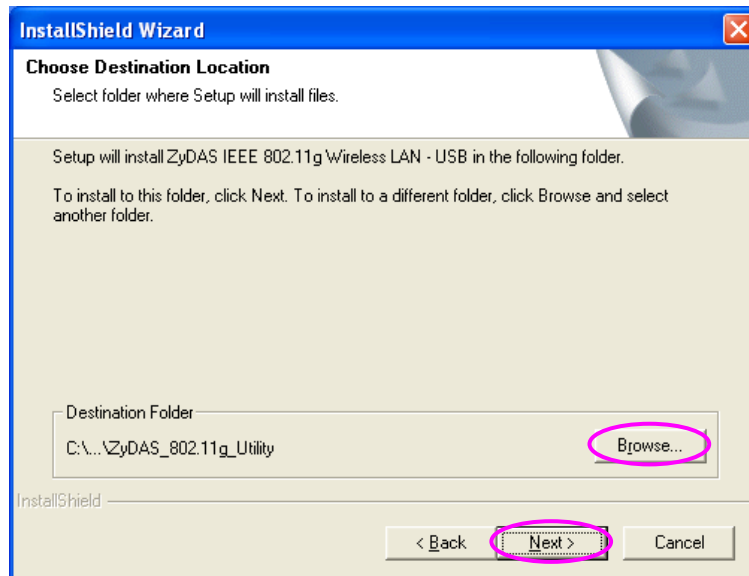
Please follow below instructions to install the USB Adapter.

I. Install the Configuration Utility

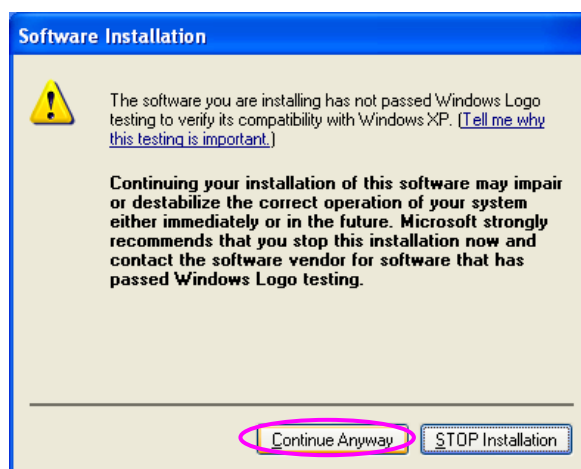
A. Insert the Installation CD to your CD-ROM Drive. Execute the “setup” program.



B. If you want to install the software program in another location, click “Browse” and select an alternative destination. Then, click “Next”.



C. Click "Continue Anyway" to finish the installation.



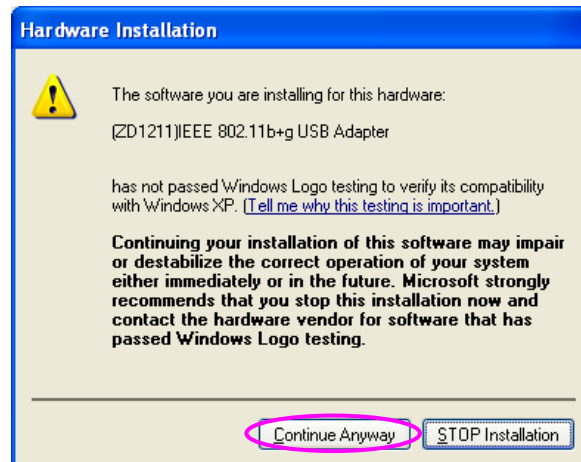
II. Install the USB Adapter

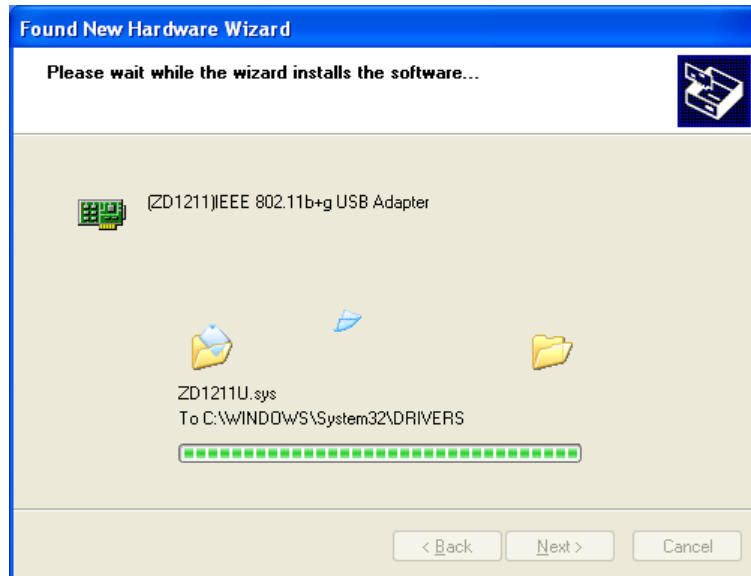
A. Plug the USB Adapter into the USB port of your computer.

B. The “Found New Hardware Wizard” is displayed, select “Install the software automatically (Recommended)” and click “Next”.

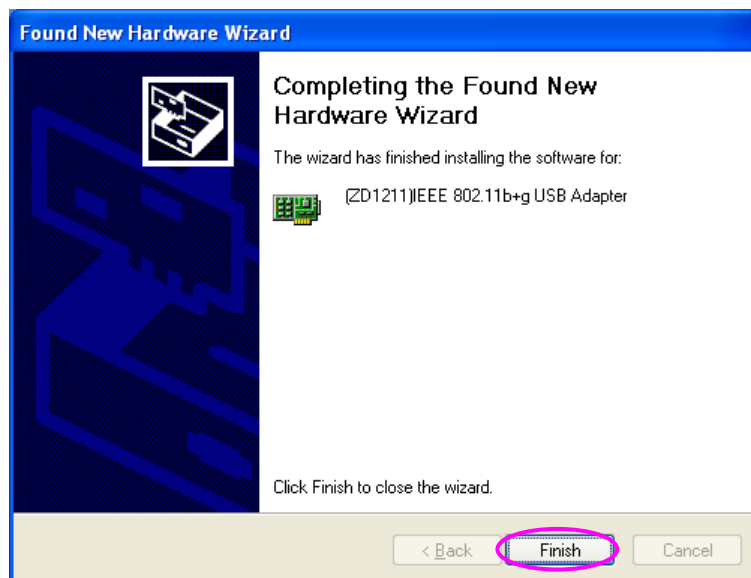


C. Click “Continue Anyway” and the system will start to install the USB adapter.





D. Click “Finish” to complete the installation.



III. Using the Configuration Utility

To setup the USB adapter, double-click the icon in the system tray.

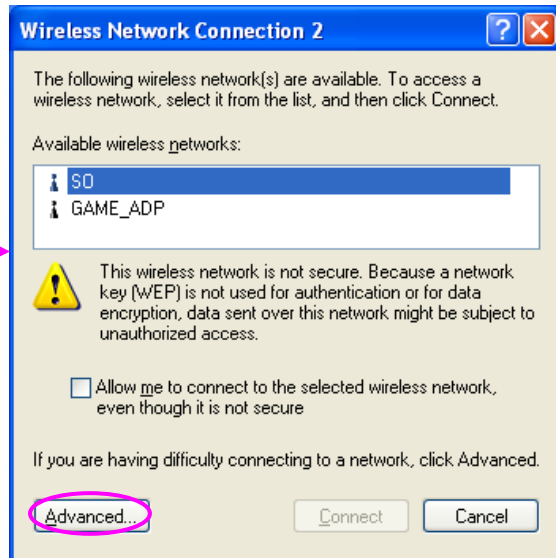
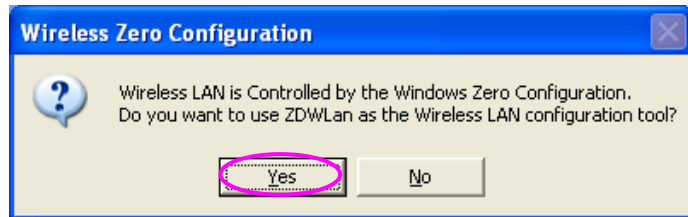


For Windows XP, there is a “Windows Zero Configuration Tool” by default for you to setup wireless clients. If you want to use the Utility of the USB adapter, please follow one of the ways as below.



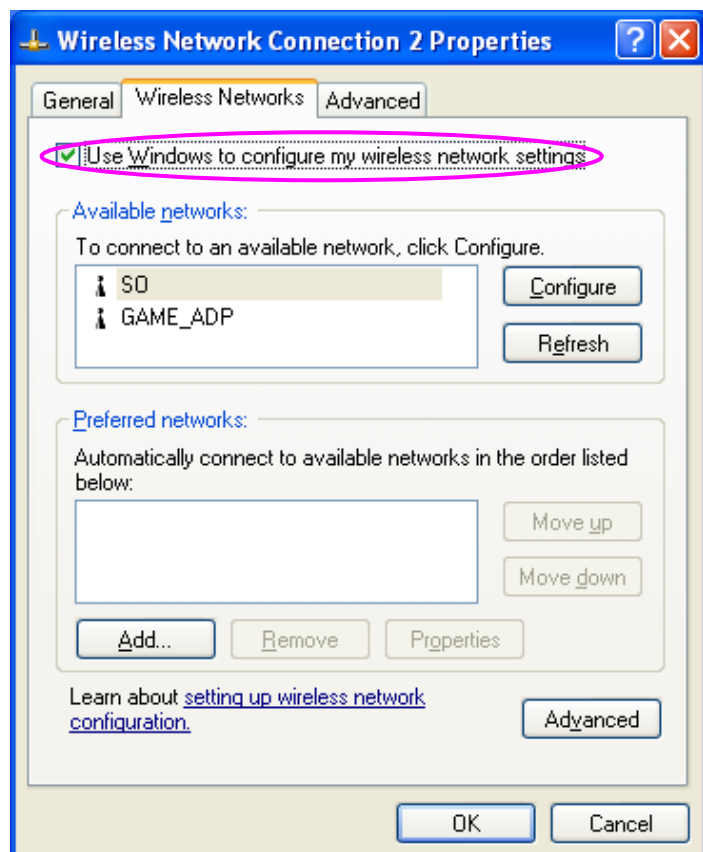
First Way

- Double-click the utility icon in the system tray.
- Click "Yes" to use the utility of the USB adapter.



Second Way

- Double-click the icon.
- Click "Advance".
- Uncheck "Use Windows to configure my wireless network settings".



3 Configuration Utility

The Configuration Utility is a powerful application that helps you configure the 802.11g Wireless LAN Mini USB Adapter and monitor the link status during the communication process.

The Configuration Utility appears as an icon on the system tray of Windows while the card is running. You can open it by double-click on the icon.



Right click the icon, there are some items for you to operate the configuration utility.

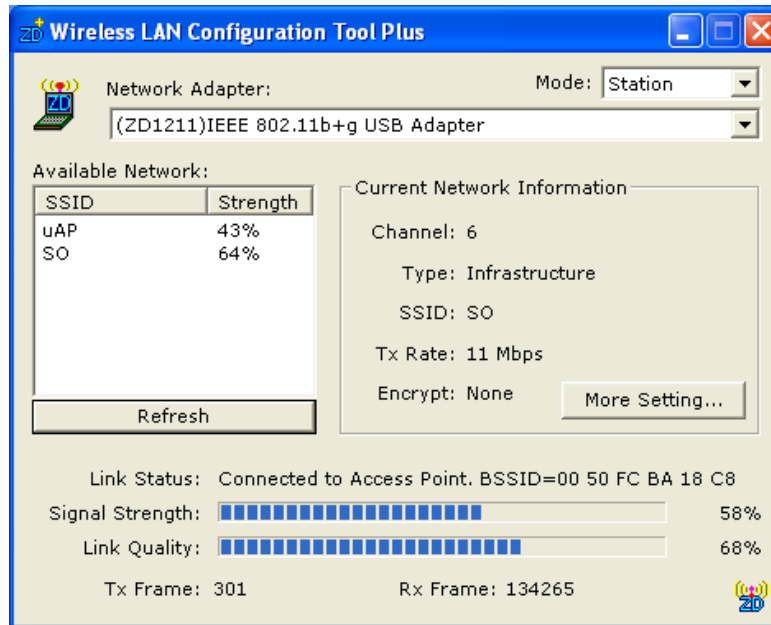
- Open Utility Window
Select “Open Utility Window” to open the Configuration Utility tool.
- Exit ZDWlan
Select “Exit ZDWlan” to close the Configuration Utility tool.

Before using the utility, you have to know some restrictions of the utility.

1. If you want to connect to 11g (up to 54Mbps) network, please ensure to install the adapter to PC or laptop with USB 2.0 interface. This adapter runs at lower performance while you connect it to the USB 1.1/1.0 port of your computer.
2. This adapter will work in 11b mode when the network type is in Ad Hoc mode. It is defines by Wi-Fi organization. If you want to enable the data rate up to 54Mbps (11g), please follow steps listed below.
 - A. Go to “Network Connections”.
 - B. Right Click the “Wireless Network Connection” and select “Properties”.
 - C. From the pop-up screen, click “Configure”.
 - D. Enter into “Advanced” page of the “Properties” screen.
 - E. Enable the setting of “IBSS_G_Mode”.

3.1 Wireless Connection

When you open the Configuration Utility, the system will scan all the channels to find all the access points/stations within the accessible range of your card and automatically connect to the wireless device with the highest signal strength. From the screen, you may know all the infomration about the wireless connection.

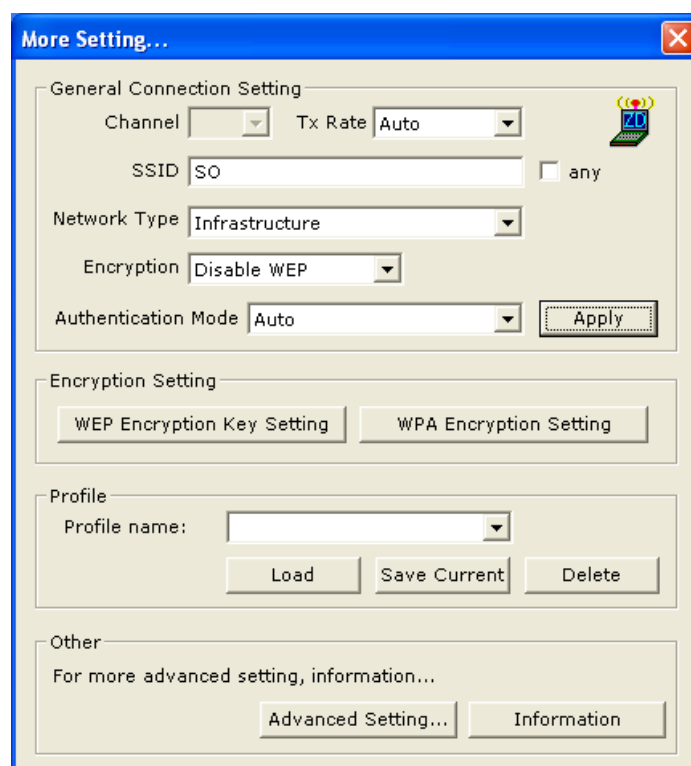


Parameter	Description
Mode	Station – Set the USB adapter a wireless client. Access Point – Turns the USB adapter to function as a wireless AP.
Network Adapter	Display the product information of the USB Adapter.
Available Network	<p>Display all the SSID and Signal Strength of wireless stations nearby. To re-survey the available wireless devices please click “Refresh”.</p> <p>There are two ways to automatically make the connection between the USB Adapter and the wireless station on the list.</p> <ol style="list-style-type: none"> 1. Double-click the wireless station on the list directly. 2. Select the station you intend to connect and then click “Connect this site”.
Current Network Information	Display the information about the wireless network this adapter is connecting to. The information includes Channel, Type, SSID, TX Rate and Encrypt settings. Note: Please refer to Section 3.2 for the description of each item.
More Setting	For setting more functions including disable/enable WEP and Power Saving Mode, etc. Please refer to Section 3.2, 3.3 and 3.4.
Link Status	Display the status of the wireless connection.

Parameter	Description
Signal Strength	This bar shows the signal strength level. The higher percentage shown in the bar, the more radio signal been received by the adapter. This indicator helps to find the proper position of the wireless station for quality network operation.
Link Quality	This bar indicates the quality of the link. The higher the percentage, the better the quality.
TX Frame	It shows the number of data frames which are transmitted by the adapter successfully.
RX Frame	It shows the number of data frames which are received by the adapter successfully.

3.2 General Connection Setting

Click “More Setting”, users are allowed to setup the wireless connection setting and Encryption Setting of the USB adapter.



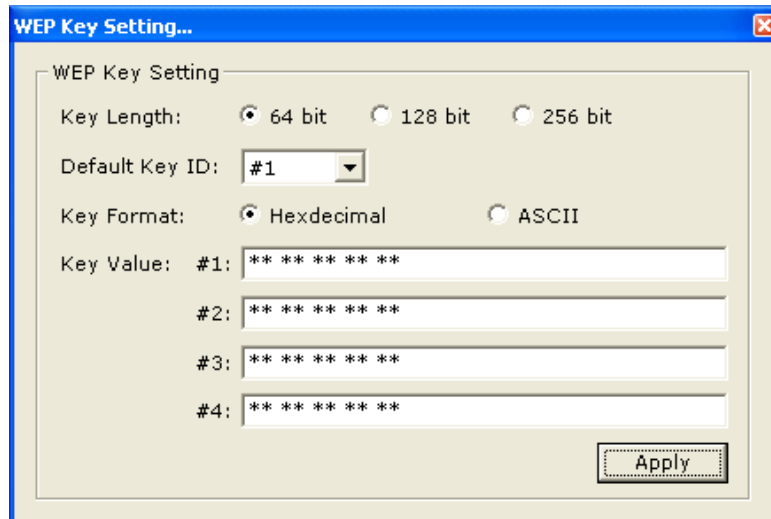
Parameter	Description
General Connection Setting	
Channel	Select the number of the radio channel used for the networking. The channel setting of the wireless stations within a network should be the same.

Parameter	Description
Tx Rate	<p>There are several options including Auto/1/2/5.5/11/6/9/12/18/24/36/48/54Mbps for you to select. When the “Auto” is selected, the device will choose the most suitable transmission rate automatically. The higher data rate you designated in the network, the shorter distance is allowed between the adapter and the wireless stations.</p> <p>When the adapter works in 11b mode, the maximum data rate is 11Mbps so that there are only “Auto/1/2/5.5/11Mbps” options you can select.</p>
SSID	<p>The SSID (up to 32 printable ASCII characters) is the unique name identified in a WLAN. The ID prevents the unintentional merging of two co-located WLANs.</p> <p>You may specify a SSID for the adapter and then only the device with the same SSID can interconnect to the adapter.</p>
Any	<p>If “Any” check box is enabled, the adapter will survey and connect to one of the available wireless stations without checking the consistency of channel and SSID with the wireless station.</p>
Network Type	<p>Ad-Hoc – This mode enables wireless network adapters interconnecting without through AP or Router. Select this mode if there is no AP or Router in the network.</p> <p>Infrastructure – This operation mode requires the presence of an 802.11 Access Point. All communication is done via the Access Point or Router.</p>
Change	<p>Click “Change” will enable you to setup the parameters of “General Connection Setting”. In the meantime, the button will change to “Apply” for you to confirm your settings.</p>
Encryption Setting	<p>In the block, users may enable/disable WEP encryption within the network. Please refer to Section 3.3 for more description.</p>

Parameter	Description
Authentication Mode	<p>This setting has to be consistent with the wireless networks that the adapter intends to connect.</p> <p>Open System – No authentication is needed among the wireless network.</p> <p>Shared Key – Only wireless stations using a shared key (WEP Key identified) are allowed to connecting each other.</p> <p>Auto – Auto switch the authentication algorithm depending on the wireless networks that the adapter is connecting to.</p>
WEP Encryption Key Setting	Click this button to setup the WEP key. Please refer to the following description.
Profile	
Profile Name	Input the profile name to write the setting values of the adapter to the file or load the setting values from the file you designate.
Load	Load the setting values from the file entered in the “Profile Name“. The new settings will be activated immediately.
Save Current	Write the current setting values to the file entered in the “Profile Name“. Please record the file name the data are saved.
Delete	Delete the profile you select.
Other	
Advanced Setting...	For more advanced setting, please click it. To know more of the setting, please refer to Section 3.4.
Information	To view the version of the driver, firmware and the MAC Address of the adapter, click the button.

3.3 WEP Encryption

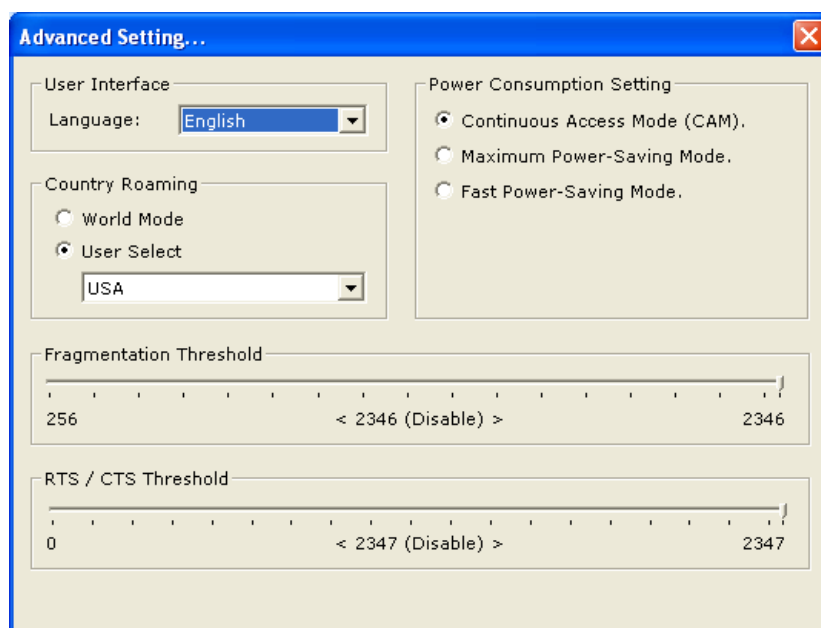
WEP is an authentication algorithm, which protects authorized Wireless LAN users against eavesdropping. The Authentication type and WEP key must be the same on the wireless stations within the network. This adapter supports 64/128/256-bit WEP Encryption function. With this function, your data will be transmitted over the Wireless network securely.



Parameter	Description
Key Length	You may select the 64-bit, 128-bit or 256-bit to encrypt transmitted data. Larger key length will provide higher level of security, but the throughput will be lower.
Default Key ID	Select one of the keys (1~4) as the encryption key.
Key Format	<p>Hexadecimal – Only “A-F”, “a-f” and “0-9” are allowed to be set as WEP key.</p> <p>ASCII – Numerical values, characters or signs are allowed to be the WEP key. It is more recognizable for user.</p>
Key1 ~ Key4	<p>The keys are used to encrypt data transmitted in the wireless network. Fill the text box by following the rules below.</p> <p>64-bit – Input 10-digit Hex values or 5-digit ASCII values as the encryption keys. For example: “0123456aef” or “Guest”.</p> <p>128-bit – Input 26-digit Hex values or 13-digit ASCII values as the encryption keys. For example: “01234567890123456789abcdef” or “administrator”.</p> <p>256-bit – Input 30-digit Hex values or 29-digit ASCII values as the encryption keys.</p>

3.4 Advanced Setting

The “Advanced Setting” allows user to enable/disable country roaming and power consumption mode, setup the fragmentation threshold and RTS/CTS threshold of the adapter.



Parameter	Description
User Interface	Select the display language of the utility. Two languages are enabled: English and Chinese.
Power Consumption Setting	<p>Continuous Access Mode (CAM) – The adapter will always set in active mode.</p> <p>Maximum Power-Saving Mode – Enable the adapter in the power saving mode when it is idle.</p> <p>Fast Power-Saving Mode – Enable the adapter in the power saving mode when it is idle, but some components of the adapter is still alive. In this mode, the power consumption is larger than “Max” mode.</p>
Fragementation Threshold	The value defines the maximum size of packets, any packet size larger than the value will be fragmented. If you have decreased this value and experience high packet error rates, you can increase it again, but it will likely decrease overall network performance. Select a setting within a range of 256 to 2346 bytes. Minor change is recommended.
RTS / CTS Threshold	Minimum packet size required for an RTS/CTS (Request To Send/Clear to Send). For packets smaller than this threshold, an RTS/CTS is not sent and the packet is transmitted directly to the WLAN. Select a setting within a range of 0 to 2347 bytes. Minor change is recommended

4 Troubleshooting

This chapter provides solutions to problems usually encountered during the installation and operation of the adapter.

1. What is the IEEE 802.11g standard?

802.11g is the new IEEE standard for high-speed wireless LAN communications that provides for up to 54 Mbps data rate in the 2.4 GHz band. 802.11g is quickly becoming the next mainstream wireless LAN technology for the home, office and public networks. 802.11g defines the use of the same OFDM modulation technique specified in IEEE 802.11a for the 5 GHz frequency band and applies it in the same 2.4 GHz frequency band as IEEE 802.11b. The 802.11g standard requires backward compatibility with 802.11b.

The standard specifically calls for:

- A. A new physical layer for the 802.11 Medium Access Control (MAC) in the 2.4 GHz frequency band, known as the extended rate PHY (ERP). The ERP adds OFDM as a mandatory new coding scheme for 6, 12 and 24 Mbps (mandatory speeds), and 18, 36, 48 and 54 Mbps (optional speeds). The ERP includes the modulation schemes found in 802.11b including CCK for 11 and 5.5 Mbps and Barker code modulation for 2 and 1 Mbps.
- B. A protection mechanism called RTS/CTS that governs how 802.11g devices and 802.11b devices interoperate.

2. What is the IEEE 802.11b standard ?

The IEEE 802.11b Wireless LAN standard subcommittee, which formulates the standard for the industry. The objective is to enable wireless LAN hardware from different manufactures to communicate.

3. What does IEEE 802.11 feature support ?

The product supports the following IEEE 802.11 functions:

- CSMA/CA plus Acknowledge Protocol
- Multi-Channel Roaming
- Automatic Rate Selection
- RTS/CTS Feature
- Fragmentation
- Power Management

4. What is Ad-hoc ?

An Ad-hoc integrated wireless LAN is a group of computers, each has a Wireless LAN adapter, Connected as an independent wireless LAN. Ad hoc wireless LAN is applicable at a departmental scale for a branch or SOHO operation.

5. What is Infrastructure ?

An integrated wireless and wireless and wired LAN is called an Infrastructure configuration. Infrastructure is applicable to enterprise scale for wireless access to central database, or wireless application for mobile workers.

6. What is BSS ID ?

A specific Ad hoc LAN is called a Basic Service Set (BSS). Computers in a BSS must be configured with the same BSS ID.

7. What is WEP ?

WEP is Wired Equivalent Privacy, a data privacy mechanism based on a 40 bit shared key algorithm, as described in the IEEE 802 .11 standard.

8. What is TKIP?

TKIP is a quick-fix method to quickly overcome the inherent weaknesses in WEP security, especially the reuse of encryption keys. TKIP is involved in the IEEE 802.11i WLAN security standard, and the specification might be officially released by early 2003.

9. What is AES?

AES (Advanced Encryption Standard), a chip-based security, has been developed to ensure the highest degree of security and authenticity for digital information, wherever and however communicated or stored, while making more efficient use of hardware and/or software than previous encryption standards. It is also included in IEEE 802.11i standard. Compare with AES, TKIP is a temporary protocol for replacing WEP security until manufacturers implement AES at the hardware level.

10. Can Wireless products support printer sharing ?

Wireless products perform the same function as LAN products. Therefore, Wireless products can work with Netware, Windows 2000, or other LAN operating systems to support printer or file sharing.

11. Would the information be intercepted while transmitting on air ?

WLAN features two-fold protection in security. On the hardware side, as with Direct Sequence Spread Spectrum technology, it has the inherent security feature of scrambling. On the software side, WLAN series offer the encryption function (WEP) to enhance security and Access Control. Users can set it up depending upon their needs.

12. What is DSSS ? What is FHSS ? And what are their differences ?

Frequency-hopping spread-spectrum (FHSS) uses a narrowband carrier that changes frequency in a pattern that is known to both transmitter and receiver. Properly synchronized, the net effect is to maintain a single logical channel. To an unintended receiver, FHSS appears to be short-duration impulse noise. Direct-sequence spread-spectrum (DSSS) generates a redundant bit pattern for each bit to be transmitted. This bit pattern is called a chip (or chipping code). The longer the chip is, the greater the probability that the original data can be recovered. Even if one or more bits in the chip are damaged during transmission, statistical techniques embedded in the radio can recover the original data without the need for retransmission. To an unintended receiver, DSSS appears as low power wideband noise and is rejected (ignored) by most narrowband receivers.

13. What is Spread Spectrum ?

Spread Spectrum technology is a wideband radio frequency technique developed by the military for use in reliable, secure, mission-critical communication systems. It is designed to trade off bandwidth efficiency for reliability, integrity, and security. In other words, more bandwidth is consumed than in the case of narrowband transmission, but the trade off produces a signal that is, in effect, louder and thus easier to detect, provided that the receiver knows the parameters of the spread-spectrum signal being broadcast. If a receiver is not tuned to the right frequency, a spread –spectrum signal looks like background noise. There are two main alternatives, Direct Sequence Spread Spectrum (DSSS) and Frequency Hopping Spread Spectrum (FHSS).