



**GW-US54GD**

**2.4GHz IEEE 802.11g Wireless LAN  
USB Adapter with Wi-Fi Detector**

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**PLANEX COMMUNICATIONS INC.**

# **USER'S MANUAL**

2.4GHz IEEE 802.11g Wireless LAN

USB Adapter with Wi-Fi Detector

**GW-US54GD**

# Foreword

## Explanation of the Signals

In order to let you set up and use this product correctly, please pay attention when reading or browsing the manual as you see these signals listed below.



### **Warning/ Danger**

Users should read the explanation carefully and understand it completely, otherwise users might be in danger or even be injured.



### **Caution/ Be Careful**

Remind users to be careful when setting up the product and to avoid damaging the product or its system programs.

## Seeking for Service or Searching for a Dealer

Thank you for purchasing products from Planex Communications Inc. If you have any operational problems while configuring or setting up the product, you may contact with our Customer Service Department or ask the reseller or agency from which you bought the product for help. Moreover, during warranty, if you find any defect or breakdown of the product, you may bring the product, assembly, and its warranty card to our company or to the agency to ask for repair, but this service is only provided in Taiwan, Kinmen and Matsu area.

※Every product has different warranty period and contract; please refer to our company for further information or consult the agency.

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## Chapter **1** Introduction

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Thank you for purchasing GW-US54GD, the 2.4GHz IEEE 802.11g Wireless LAN USB adapter with Wi-Fi detector. This convenient device can help users to search for a great hotspot at anytime, anywhere. Moreover, its backlight LCM display shows the users detailed information about the detected hotspots. And, best of all, there's no need to purchase any battery because there is a rechargeable Li-Polymer battery which recharges whenever the device is inserted into a USB port which connects to a computer.

GW-US54GD is designed to comply with IEEE 802.11g Wireless LAN standard. It is suitable for any laptop or desktop computer. Besides, it supports 64/128/256-bit WEP data encryption which protects the wireless network from eavesdropping, and also supports WPA (Wi-Fi Protected Access) and WPA2 which combines IEEE 802.1x and TKIP (Temporal Key Integrity Protocol) technologies. Therefore, client users must have authorization before accessing APs or AP Routers, and the data transmission on the network will be encrypted and decrypted by a dynamical secret key. GW-US54GD has a built-in AES (Advanced Encryption Standard) engine which ensures the highest degree of security and authenticity for digital information that is the most advanced solution defined by IEEE 802.11i for the security on the wireless network.

## 1.1 Features

- Complies with IEEE 802.11b and IEEE 802.11g 2.4GHz standards.
- LCM displays: SSID, signal strength, network type (802.11b/g), network mode (infrastructure, ad-hoc), operating channel, number of detected APs, battery strength, Link/Act indicator).
- Data transmission rate is up to 54Mbps.
- Supports 64/128/256-bit WEP, WPA (TKIP with IEEE 802.1x) and WPA2 (AES with IEEE 802.1x) 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.
- Supports the most popular operating system: Windows 98SE/Me/2000/XP.
- Supports USB 2.0/1.1/1.0 interfaces.
- Mini-size and portable.
- Suitable for any notebook or desktop PC.

## 1.2 Specifications

Specification	
Model Name	GW-US54GD
Standard	IEEE802.11 / 802.11b / 802.11g, ARIB STD-T66
Host Interface	compliant
Frequency Range	USB 2.0 Standard, USB 1.1 Compliant
Number of Selectable	2.412GHz ~ 2.4835GHz
Channels	USA , Canada : 11 channels Europe : 13 channels Japan : 14 Channels
Sensitivity	54Mbps:-65dBm @ 10% PER 48Mbps:-66dBm @ 10% PER 36Mbps:-70dBm @ 10% PER 24Mbps:-74dBm @ 10% PER

Sensitivity	18Mbps:-77dBm @ 10% PER 12Mbps:-79dBm @ 10% PER 9Mbps:-81dBm @ 10% PER 6Mbps:-82dBm @ 10% PER 11Mbps:-76dBm @ 10% PER 5.5Mbps:-79dBm @ 10% PER 2Mbps:-88dBm @ 10% PER
Modulation Technique	IEEE802.11b:DBPSK (1Mbps), DQPSK (2Mbps), CCK (5.5/11Mbps) IEEE802.11g:BPSK (6/9Mbps), QPSK (12/18Mbps), 16-QAM (24/36Mbps), 64QAM (48/54Mbps)
Data Rate	IEEE802.11b:1 / 2 / 5.5 / 11Mbps (auto sensing) IEEE802.11g:6 / 9 / 12 / 18 / 24 / 36 / 48 / 54Mbps (auto sensing)
Security	WEP 64/128/256bit, TKIP, WPA, WPA-PSK, WPA2, WPA2-PSK, 802.11i, compliant AES encryption
Software AP	RTS/CTS support Fragment and Reassembly Power Saving support WEP (64/128/256bit) MAC address filter Support software bridge on Win 98SE, WinME, Win2000, WinXP
Output power	14.5±0.5dBm (OFDM) / 18.5±0.5dBm(CCK)
Media Access Protocol	CSMA / CA
Operation Temperature	0 ~ 55
Storage Temperature	5 °C ~ 55°C
Operation Range	250M
Battery	Rechargeable Li-Polymer Battery
Power	from USB cable
Working time	8HR (Max)
Charging time	1HR (Max) from battery empty to full
Charge times	250times from battery full
Support OS	Windows XP, Windows2000, Windows ME, 98SE, Linux (Kernel 2.4.x, Kernel 2.6.x), Mac 10.3, Mac 10.4
EMI	CE, FCC, DGT, TELEC, VCCI
Dimension	14(H) x 28.5(W) x 91(D)
Weight	30g

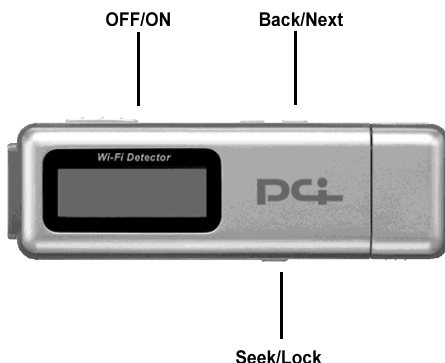
## 1.3 Package Contents

After purchasing GW-US54GD, 2.4GHz IEEE 802.11g Wireless LAN USB adapter with Wi-Fi detector, from a reseller or an agency, please open the package and check that all the components listed below are included. If there is any item missing, please contact with the reseller or the agency at once.

- GW-US54GD
- CD-ROM (Driver and Utility and User's Manual)
- User's Manual
- Necklace
- USB Cable
- Warranty Card

## Chapter 2 How to use GW-US54GD

### 2.1 Illustration of product design



OFF/ON	Push the switch to right and start using GW-US54GD. If you want to turn it off, just push the switch to the left.
Back/Next	Use these two buttons as a navigator. If you want to go back to the previous channel which was detected by GW-US54GD, you may click on the " <b>Back</b> " button. If you want to go to the next channel, click " <b>Next</b> ."
Seek/Lock	If you to know where the signal strength of the current operating channel is the strongest, you only need to press the " <b>Seek/Lock</b> " button for 3 seconds to enter the " <b>lock mode</b> ." After that, GW-US54GD will constantly refresh the receiving signal strength. Press the " <b>Seek/Lock</b> " button for 3 seconds again and you may unlock the mode.

## 2.2 How to charge GW-US54GD

- 1.First, remove the cap from GW-US54GD and then turn the power switch to **“ON”** position. Insert the USB connector into any available USB port on a computer carefully, and you will see the recharging screen as below.



- 2.The battery strength indicator will be animated while GW-US54GD is recharging. The **“Link/Act”** square icon will be blinking while GW-US54GD is being used to surf the Internet as a wireless USB adapter.
- 3.Finally, when GW-US54GD finishes recharging, it will automatically stop charging the battery and you will see **“Charge Complete”** displayed on the LCD; meanwhile, the battery strength indicator will stop blinking.



- 4.If you turn the power switch to “OFF” position when GW-US54GD is recharging, it will stop action at once, and you will see “**Stop Charging**” displayed on the LCD and the battery strength will stop blinking.



## 2.3 Using GW-US54GD as a Wi-Fi detector

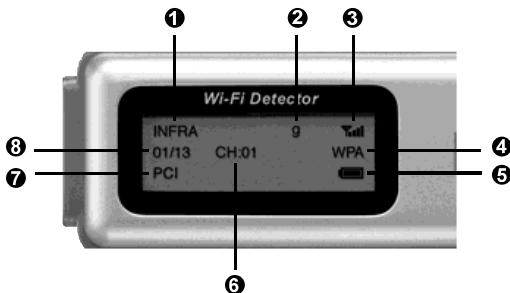
- 1.Turn the power switch to the “ON” position, and the welcome to PCI screen will greet you.



- 2.After the welcome screen displays, the Wi-Fi detector will automatically enter the detecting mode to search for Wi-Fi signals.



3. After detecting, GW-US54GD will show the total number of non-encrypted and encrypted Wi-Fi signals. And the detector will automatically sort the signals by the following criteria: 1) Non-encrypted APs are preceding to encrypted ones, 2) Stronger signals are prior to weaker ones.

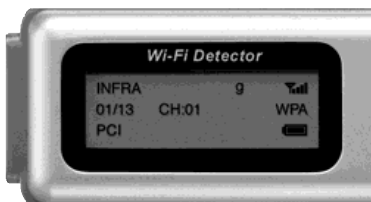


4. The icons on the LCD are displayed as follows:

1. INFRA	This signal means GW-US54GD is in the infrastructure mode, ADHOC indicates it is in the ad-hoc mode.
2. "g" & "b"	The signal "g" means GW-US54GD uses 802.11g standard and "b" means it uses 802.11b standard.
3. Signal strength indicator	There are 5 bars which indicate the signal strength.
4. Encryption indicator	"WEP" means WEP encryption, "WPA" means WPA encryption and "WPA2" is for WPA2 encryption. "OPEN" indicates it is a non-encrypted signal.
5. Battery indicator	There are 3 bars which indicate battery power. When the indicator is empty, please recharge GW-US54GD by inserting it into a USB port.
6. Operating channel	It indicates the current operating channel of the detected Wi-Fi signal.
7. SSID indicator	It displays the SSID of the detected Wi-Fi signal, if the SSID is too long, the SSID indicator will automatically scroll to display the complete SSID.
8. Number of detected APs	The left digit indicates the detected Wi-Fi signal which is displaying now and the right digit indicates the total amount of detected Wi-Fi signals.



5.If the user wishes to know where the signal strength of the current operating channel is the strongest, the user simply has to press the "Seek/Lock" button for 3 seconds to enter the "lock mode". When the detector is in the "lock mode," a capitalized "L" icon appears in the upper left corner of the screen. In the "lock mode" the detector constantly refreshes the signal strength, so the user can move around to find where the detected signal strength is the strongest. Just press the "Seek/Lock" button for 3 seconds again and you may unlock the mode.





## Chapter 3 Basic installation and configuration

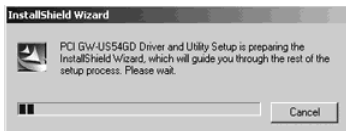
Before starting to install the utility, please pay attention to the following statements:

1. Do **NOT** insert GW-US54GD into the USB port on your computer before finishing installing the software program from the CD-ROM which comes with GW-US54GD.
2. If you had installed the wireless PC card driver and utility before, please uninstall the old version first.
3. The following illustrations of installation procedures are from Windows 2000. And these procedures are all similar to the operating procedures on Windows 98SE/ME/XP/2000.

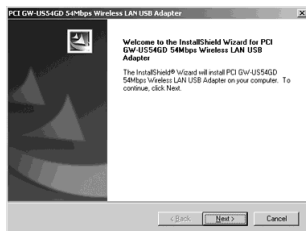
### 3.1 How to install the driver and utility

Please follow the instructions below to install the driver and utility of GW-US54GD.

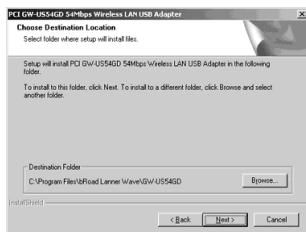
1. Put the installation CD-ROM into the CD-ROM player and then start the “**Setup.exe**” program. After that, the setup wizard will automatically start the “InstallShield Wizard” to continue setting up.



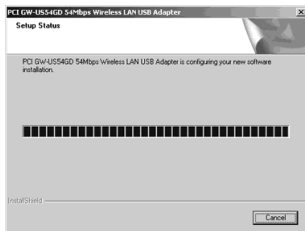
- The wizard will show you the PCI welcome page and ask if you want to proceed to install it. If you hope to continue, click **"Next,"** or click **"Cancel"** to install it later.



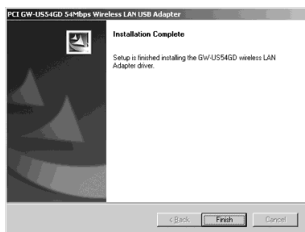
- The software program will be installed in the default destination folder: **"C:\Program Files\bRoad Lanner Wave\GW-US54GD."** If you want to install the software program into another folder, you may click on the **"Browse..."** icon and select a folder to install the driver in it.



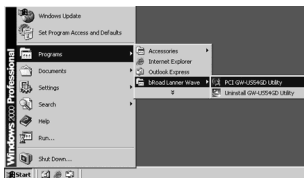
- After clicking on the **"Next"** icon, the wizard will start to configure a new software installation for GW-US54GD.



5. The wizard will soon finish the installation and the **"Digital Signature Not Found"** page will pop up spontaneously. Click on **"Yes"** to continue the installation and then you may click on the **"Finish"** icon on the **"Installation Complete"** page to finish the installation.



6. When finishing the installation, you can click **“Start→Programs→bRoad Lanner Wave”** on the desktop to check if the PCI GW-US54GD Utility program is installed successfully.




7. Now you can insert GW-US54GD WLAN USB adapter into the USB port on your computer, and the computer will automatically find the new hardware for you. It will show the following page and ask if you want to continue the installation again. Click **“Yes”** to continue the installation.



8. After clicking “**Yes**” to proceed to install the adapter, it will show the installing page.



9. After finding GW-US54GD on your computer, you can use PCI GW-US54GD utility to check the wireless connection status. Go to the desktop and click “**Start→Programs→bRoad Lanner Wave.**” The network cable will be unplugged for a short while and then the utility icon  will be shown on the taskbar.



10. Now the driver and the utility of GW-US54GD have been installed into your computer. You may proceed to configure the adapter.

## 3.2 Wireless connection status

The configuration utility is a powerful application that helps you configure GW-US54GD and monitor the link status during the communication process. When you open the utility program, it will scan all the channels to find all the access points/stations within the accessible range and automatically connect to the one of the wireless devices which has the highest signal strength. From the utility homepage, you can see all the information about the wireless connections.


Before using the utility, you have to know the following 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 instead.
2. This adapter will work in 11b mode when the network type is in Adhoc 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".

To enter the utility program, please follow the instructions below.



1. Right click the mouse on the utility icon  on the taskbar, and you can click on the “**Open Utility Window**” to enter PCI GW-US54GD utility; or you can just double click on the utility icon and enter the utility directly.




Right click the icon; there are two items for users to operate the configuration utility.

- **Open Utility Window**

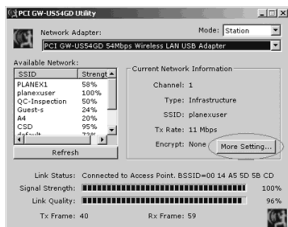
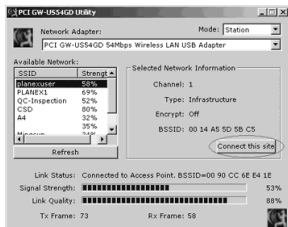
Click it to enter the utility program of GW-US54GD.

- **Exit PCI Wlan**

Select "Exit PCI Wlan" to close the configuration utility tool.

2. The runner icon  on the bottom of the utility page will be animated when detecting the available networks. There are many items and parameters shown on this page. Their descriptions and functions are described in the following chart.

Items & Parameters	Description
Mode	<p><b>Station</b> - Set GW-US54GD as a WLAN client on the network.</p> <p><b>Access Point</b> - Make GW-US54GD function as a wireless AP on the WLAN.</p>
Network Adapter	It displays the product name of the USB adapter. The box displays all the SSIDs (Service Set Identifier) and signal strength of the APs nearby. To detect the available wireless devices again please click " <b>Refresh</b> ."
Available Network	<p>There are two ways to make a connection between GW-US54GD and one of the APs on the list:</p> <ol style="list-style-type: none"> <li>1. Double-click the wireless station on the list directly.</li> <li>2. Select the station you intend to connect and then click "<b>Connect this site</b>."</li> </ol>
Current Network Information	This column displays the information about the wireless network which GW-US54GD is connecting to. The information includes Channel, Type, SSID, TX Rate and Encryption.
More Setting...	Click this button to configure the network connection, including disable/enable WEP and Power Saving Mode, etc.
Link Status	It shows the status of the wireless connection.
BSSID	It displays the MAC Address of the AP which GW-US54GD is connecting to.
Signal Strength	This bar shows the level of the signal strength. The higher percentage the bar shows, the more radio wave has been received by the adapter. This indicator helps users to find a proper position for the adapter to have better network connection.
Link Quality	This bar indicates the quality of the connection. The higher percentage the bar shows, the better quality the linkage has.
TX Frame	It shows the number of the data frames transmitted by GW-US54GD.
RX Frame	It shows the number of the data frames received by GW-US54GD.



### 3.3 General connection settings

Click on the “**More Setting...**” button, and enter the following page. Here users are allowed to configure the General/Wireless Connection Setting, Encryption Setting, and Profile of GW-US54GD. If you want to check more advanced setting, and information, you can refer to the next chapter.

For configuring the General Connection Setting, you have to click on the “**Change**” icon. And the page will become as below. And the settings descriptions are listed in the following chart.

Parameter	Description
<b>General Connection Setting</b>	
Wireless Mode	The mode depends on the AP which GW-US54GD is connecting to at present. It can be 2.4GHz (802.11b+g) mode.
Channel	Here it shows the number of the radio channel used for the wireless connection. The channel setting of the wireless stations within a network should be the same.
Tx Rate	Tx rate means the data transmission rate. There are several options, including Auto/1/2/5.5/11/6/9/12/18/24/36/48/54Mbps. When " <b>Auto</b> " is chosen, the adapter will automatically find the most suitable transmission rate. If you choose higher Tx rate, the distance between the adapter and the AP must be closer. Besides, when the adapter works in 802.11b mode, the maximum data rate is 11Mbps, so there are only Auto/1/2/5.5/11Mbps for you to choose.
SSID	The SSID (up to 32 printable ASCII characters) is a unique name identified in a WLAN. The SSID can prevent the unintentional merging of two co-located WLANs. You may assign an SSID for GW-US54GD, and only the device with the same SSID can interconnect to it.
Any	If the check box of " <b>Any</b> " is enabled, the adapter will detect and connect to one of the available APs without checking if the channel and SSID are consistent with each other.
Network Type	<b>Ad-Hoc</b> - This mode is an 802.11 networking framework in which devices or stations communicate directly with each other, without the use of an access point (AP). Choose this mode if there is no AP or router in the network. And you can set the channel and wireless mode when in Ad-Hoc mode.

	<p><b>Infrastructure</b> - This mode is an 802.11 networking framework which devices communicate with each other by first going through an access point (AP). All communication is done via the Access Point or Router.</p>
Authentication	<p>The setting has to be consistent with the WLAN which GW-US54GD want to connect to.</p> <p><b>Open System</b> - It does not need authentication when connecting to the AP.</p> <p><b>Shared Key</b> - Only wireless adapters using a shared key (WEP Key identified) are allowed to connecting to the AP.</p> <p><b>Auto</b> - It can change the authentication algorithm depending on the wireless networks that the adapter is connecting to.</p> <p><b>WPA</b> - The function of WPA will be explained in the advanced setting chapter.</p>
Encryption	<p><b>WEP</b> - The function of WEP will be explained in the advanced setting chapter.</p> <p><b>TKIP</b> - It is short for <b>Temporal Key Integrity Protocol</b>. TKIP scrambles the key using a hashing algorithm and, by adding an integrity-checking feature, ensures that the keys haven't been tampered with.</p> <p><b>AES</b> - Short for <b>Advanced Encryption Standard</b>, a symmetric 128-bit block data encryption technique. It works at multiple network layers simultaneously and has a fixed block size of 128-bits and a key size of 128, 192, or 256-bits.</p>
Change/Apply	<p>Click "<b>Change</b>," and you can set up the parameters of "<b>General Connection Setting</b>." In the meantime, the button will change into "<b>Apply</b>" for you to confirm your settings and apply it to the adapter.</p>

More Setting...

General Connection Setting

WirelessMode: 2.4GHz(802.11b+g)

Channel: 1 Tx Rate: Auto

SSID: [ ] any

Network Type: Infrastructure

Authentication: Auto

Encryption: Disable [Change]

Encryption Setting

WEP Encryption Key Setting WPA Encryption Setting

Profile

Profile Name: [ ]

Load Save Current Delete

Other

For more advanced setting, information...

Advanced Setting... Information

More Setting...

General Connection Setting

WirelessMode: 2.4GHz(802.11b+g)

Channel: 1 Tx Rate: Auto

SSID: planexuser [ ] any

Network Type: Infrastructure

Authentication: Auto

Encryption: [Open System Shared Key WPA WPA PSK WPA2 WPA2 PSK] Apply

Encryption Setting

WEP Encryption Key Setting WPA Encryption Setting

Profile

Profile Name: [ ]

Load Save Current Delete

Other

For more advanced setting, information...

Advanced Setting... Information

More Setting...

General Connection Setting

WirelessMode: 2.4GHz(802.11b+g)

Channel: 1 Tx Rate: Auto

SSID: planexuser [ ] any

Network Type: Infrastructure

Authentication: Auto

Encryption: Disable [Apply]

Encryption Setting

WEP Encryption Key Setting WPA Encryption Setting

Profile

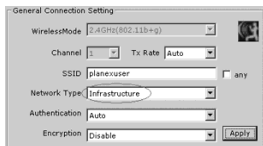
Profile Name: [ ]

Load Save Current Delete

Other

For more advanced setting, information...

Advanced Setting... Information



Parameter	Description
<b>Encryption Setting</b>	
Encryption Setting	In the block, users may enable/disable WEP and WPA encryption within the network.
WEP Encryption Key Setting	Click this button to set up the WEP key.
WPA Encryption Setting	Click this button to set up the WPA encryption.
<b>Profile</b>	
Profile Name	You can save the connection setting as a profile. To make a connection between the adapter and an AP without making any additional configuration, you can load the
Load	Choose a file of the settings from the " <b>Profile Name</b> " list. And click " <b>Load</b> ," the new settings will be applied to the adapter immediately.
Save Current	Give each profile a different name to make it distinguishable, and click " <b>Save Current</b> " to write the current setting values to be a profile in the " <b>Profile Name</b> " list.
Delete	Delete the profile you choose from the list.
<b>Other</b>	
Advanced Setting...	For more advanced setting, please click it.
Information	To view the version of the driver, firmware and the MAC Address of the adapter, click the button.

Encryption Setting	
WEP Encryption Key Setting	WPA Encryption Setting
Profile	
Profile Name	<input type="text"/>
Load	Save Current
Delete	
Other	
For more advanced setting, information...	
Advanced Setting...	Information



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## Chapter 4 *Advanced configuration*

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### 4.1 WEP and WPA encryption

**WEP** is short for Wired Equivalent Privacy, a security protocol for WLANs defined in the 802.11b standard. WEP is designed to provide the same level of security as that of a wired LAN. WEP aims to provide security by encrypting data over radio waves so that it is protected as it transmitted from one end point to another.

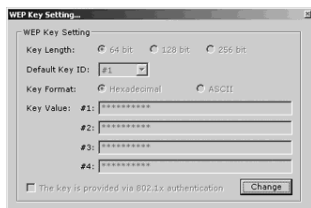
**WPA** is short for Wi-Fi Protected Access, a Wi-Fi standard that was designed to improve upon the security features of WEP. The technology is designed to work with existing Wi-Fi products that have been enabled with WEP. It also provides strong data protection by using encryption as well as strong access controls and user authentication. WPA utilizes 128-bit encryption keys and dynamic session keys to ensure your wireless network's privacy and enterprise security.

**WPA-PSK** is short for Wi-Fi Protected Access-Pre-Shared Key. WPA-PSK is basically an authentication mechanism in which users provide some form of credentials to verify that they should be allowed access to a network. This requires a single password entered into each WLAN node (Access Points, Wireless Routers, client adapters, bridges). As long as the passwords match, a client will be granted access to a WLAN. Encryption mechanisms used for WPA and WPA-PSK are the same. The only difference between the two is in WPA-PSK, authentication is reduced to a simple common password, instead of user-specific credentials.

**WPA2** is short for Wi-Fi Protected Access 2, the follow on security method to WPA for wireless networks that provides stronger data protection and network access control. It provides enterprise and consumer Wi-Fi users with a high level of assurance that only authorized users can access their wireless networks. There are two versions of WPA2: WPA2-Enterprise, and WPA2-Personal. WPA2-Enterprise verifies network users through a server. WPA2-Personal protects unauthorized network access by utilizing a set-up password. For environments without a Remote Authentication Dial-In User Service (RADIUS) infrastructure such as small office/home office (SOHO) networks, WPA2-Personal supports the use of a pre-shared key (PSK).

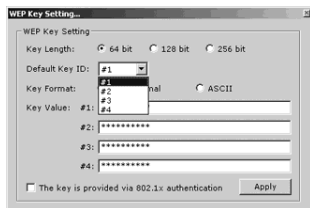
### 4.1.1 WEP settings

WEP is a data encryption algorithm, which can protect data in the WLAN against eavesdropping. Although it has been found that WEP is not as secure as once believe, WEP still can be used with MAC filter at the same time to protect the WLAN.



In the “**WEP Key Setting...**” page, you may click on the “**Change**” button to configure the setting. And the page will show as the following picture.

Parameter	Description
Key Length	You may choose <b>64-bit</b> , <b>128-bit</b> or <b>256-bit</b> to encrypt the transmitting 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 encrypted key.
Key Format	<b>Hexadecimal</b> - Only "A~F," "a~f," and "0~9" are allowed to be set in a WEP key. <b>ASCII</b> - Numerical values, characters or signs are all allowed to be arranged into a WEP key. It is more recognizable for user.
Key1 ~ Key4	The keys are used to encrypt data transmitted in the wireless network. Fill in the text box according to the rules below. <b>64-bit</b> - Enter 10-digit Hex values or 5-digit ASCII values as the encryption keys. For example: "0123456aef" or "Guest." <b>128-bit</b> - Enter 26-digit Hex values or 13-digit ASCII values as the encryption keys. For example: "01234567890123456789abcdef" or "administrator." <b>256-bit</b> - Enter 58-digit Hex values or 29-digit ASCII values as the encryption keys.
The key is provided via 802.1x authentication	If you have a RADIUS server which supports 802.1x, you may check this check box.
Change/Apply	Click " <b>Change</b> " and you can set up the WEP keys. In the meantime, the button will change into " <b>Apply</b> " for you to confirm your settings and apply it to the adapter.



## 4.1.2 WPA settings

GW-US54GD supports WPA which combines IEEE 802.1x and TKIP (Temporal Key Integrity Protocol) technologies. Client users are required to authorize before accessing APs or AP routers, and the data transmitted in the network will be encrypted and decrypted by a dynamical secret key. It can also automatically detect the WPA settings of the AP which the adapter want to connect to. To connect to the AP, the settings of the adapter should be the same as the settings of the AP.

GW-US54GD uses many kinds of WPA mode: **WPA**, **WPA-PSK**, **WPA2**, and **WPA2-PSK**. WPA and WPA2 are for enterprise which requires a RADIUS Server and Certificate Server for the authentication. **WPA-PSK** and **WPA2-PSK** are special modes designed for small office/home office users who do not have access to the network authentication servers.

If you want to use WPA as your encryption setting, you may refer to the detailed description of the “**WPA Setting...**” in the following chart.

Parameter	Description
<b>Connect Information</b>	
Protocol	<p>This adapter supports two kind of protocol for authentication including <b>TLS</b>, <b>PEAP</b>, and <b>TTLS</b>. They all require a certificate which is provided by the Certificate Server.</p> <p><b>TLS</b> - Short for <b>Transport Layer Security</b>, a protocol that guarantees privacy and data integrity between client/server applications communicating over the Internet. Select a certificate from the “<b>Certificate</b>” list.</p> <p><b>PEAP</b> - Pronounced “peep” and short for <b>Protected Extensible Authentication Protocol</b>, a protocol developed jointly by Microsoft, RSA Security and Cisco for transmitting authentication data, including passwords, over 802.11 wireless networks. And it requires a set of user name and password in addition.</p>

	Enter the " <b>User Name</b> " and " <b>Password</b> " and also select a certificate from the " <b>Certificate</b> " list. To get the certificate and the personal user name and password, please contact with your administrator. <b>TTLS</b> - Short for <b>Tunneled Transport Layer Security</b> , and is an advanced TLS protocol.
User Name	It is required by <b>PEAP</b> protocol.
Password	It is required by <b>PEAP</b> protocol.
Phase2Auth	<b>PAP</b> - Short for <b>Password Authentication Protocol</b> , the most basic form of authentication, in which a user's name and password are transmitted over a network and compared to a table of name-password pairs. Typically, the passwords stored in the table are encrypted. The Basic Authentication feature built into the HTTP protocol uses PAP. The main weakness of PAP is that both the username and password are transmitted "in the clear" – that is, in an unencrypted form. <b>CHAP</b> - Short for <b>Challenge Handshake Authentication Protocol</b> , a type of authentication in which the authentication agent (typically a network server) sends the client program a random value that is used only once and an ID value. Both the sender and peer share a predefined secret. <b>MSCHAP</b> - Short for Microsoft Challenge Handshake Authentication Protocol. <b>MSCHAP v.2</b> - Advanced version of MSCHAP.
Pre-shared Key	It is the setting required by <b>WPA-PSK</b> mode.
Passphrase	This Passphrase (also called a shared secret) that must be entered in both the wireless access point and the WPA clients (computers). The Passphrase can technically be between 8 and 63 characters and can include special characters and spaces. The WPA pre-shared key should be a random sequence of either keyboard characters (upper and lowercase letters, numbers, and punctuation) at least 20 characters long or hexadecimal digits at least 24 hexadecimal digits long. You have to enter the same Passphrase or Hexadecimal key into both your access points and computers but the length requirement is changed. The more random your WPA pre-shared key, the safer it is to use.

Key Format	<b>ASCII</b> is a code for representing English characters as numbers, with each letter assigned a number from 0 to 127. <b>Hexadecimal</b> is refers to the base-16 number system, which consists of 16 unique symbols: the numbers 0 to 9 and the letters A to F. Choose one format to apply to the Passphrase.
Certificate	All the available certificates for <b>TLS</b> or <b>PEAP</b> will display in the list. Please select a proper certificate for the wireless authentication.
Change/Apply	Click "Change" will enable you to setup the WPA setting. In the meantime, the button will change to "Apply" for you to confirm your settings.

The WPA Setting dialog box is shown with the following fields:

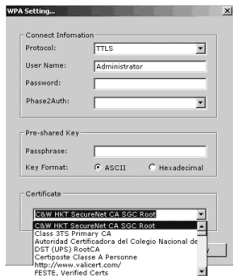
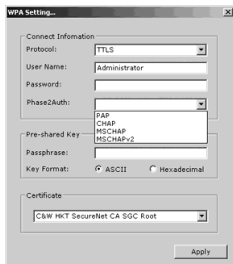
- Connect Information:**
  - Protocol: TLS (selected)
  - User Name: Administrator
  - Password: (empty)
  - Phase2Auth: (empty)
- Pre-shared Key:**
  - Passphrase: (empty)
  - Key Format: ☒ ASCII ☐ Hexadecimal
- Certificate:**
  - Administrator - issued by Administrator (selected)

An "Apply" button is located at the bottom right.

The WPA Setting dialog box is shown with the following fields:

- Connect Information:**
  - Protocol: A dropdown menu is open, showing options: TLS (highlighted), PEAP, and TTLS.
  - User Name: (empty)
  - Password: (empty)
  - Phase2Auth: (empty)
- Pre-shared Key:**
  - Passphrase: (empty)
  - Key Format: ☒ ASCII ☐ Hexadecimal
- Certificate:**
  - Administrator - issued by Administrator (selected)

An "Apply" button is located at the bottom right.



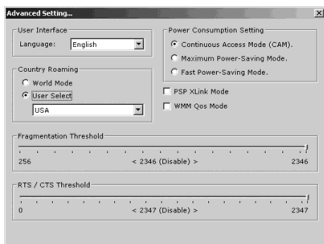
## 4.2 Advanced settings

The “Advanced Setting...” page allows users to choose the Language used by the interface, to enable/disable the Country Roaming function, and to configure the Power Consumption Setting. Moreover, users can set up the Fragmentation Threshold and RTS (ready to send)/CTS (clear to send) Threshold for GW-US54GD.

Parameter	Description
User Interface	Select a language from for the utility. GW-US54GD provides two languages: English and Chinese.
Country Roaming	<p>IEEE 802.11d (Country Roaming) is a standard which enable the wireless devices to work at the proper transmission power. And users can select a radio channel regulated by the country where the user is located.</p> <p><b>World Mode</b> - Enable the country roaming function, GW-US54GD will follow the setting of the connecting AP automatically.</p> <p><b>User Select</b> - Choose this option to disable the country roaming function, users can select a country where they are located. The channel setting may differ from the country selected by the users.</p>
Power Consumption Setting	<p><b>Continuous Access Mode (CAM)</b> - The adapter will always set in active mode.</p> <p><b>Maximum Power-Saving Mode</b> - Enable the adapter in the power saving mode when it is idle.</p> <p><b>Fast Power-Saving Mode</b> - Choose this mode when GW-US54GD is idle, but some components of the adapter is still alive. In this mode, the power consumption is larger than "Maximum Power-Saving Mode."</p>
PSP XLink Mode	If you have the XLink software, you may choose this mode to have the most compatible connection with PSP.
WMM QoS Mode	WMM stands for <b>Wi-Fi Multimedia</b> . It is a standard created to define quality of service (QoS) in Wi-Fi networks. It is a precursor to the upcoming IEEE 802.11e WLAN QoS draft standard, which is meant to improve audio, video and voice applications transmitted over Wi-Fi. WMM adds prioritized capabilities to Wi-Fi networks and optimizes their performance when multiple concurring applications, each with different latency and throughput requirements, compete for network resources.



Fragmentation 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.
RTS / CTS Threshold	Here it defines the minimum packet size required for RTS/CTS (Request to Send/Clear to Send). Select a value within a range of 0 to 2347 bytes.



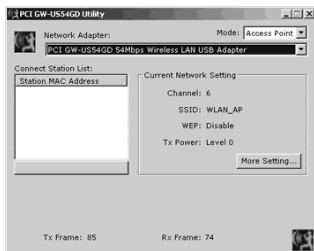
## 4.3 Software AP mode

GW-US54GD can be used as a wireless AP. The detailed functions of the AP mode, including Channel, SSID, MAC Address Filter, WEP encryption, etc. will be explained in the following chapters.

### 4.3.1 AP connection status

Choose “**Access Point**” in the “**Mode**” column, and the utility page will show as below. Every configuration and description are in the following chart.

Parameter	Description
Mode	<b>Station</b> - Set GW-US54GD as a WLAN client on the network. <b>Access Point</b> - Make GW-US54GD function as a wireless AP on the WLAN.
Network Adapter	It displays the product name of the USB adapter.
Connect Station List	In the " <b>Station MAC Address</b> " box, it displays all the MAC addresses of the wireless adapters which are connecting to GW-US54GD.
Current Network Setting	This column displays the information about the wireless network which GW-US54GD is connecting to. The information includes Channel, SSID, and TX Rate.
More Setting...	Click this button to configure the network connection, including disable/enable WEP, MAC Address Filter and Bridge Adapter, and etc.
TX Frame	It shows the number of the data frames transmitted by GW-US54GD.
RX Frame	It shows the number of the data frames received by GW-US54GD.



### 4.3.2 AP general connection settings

Click on “More Setting...” button to enter the configuration page. Users are allowed to configure General Connection Setting, WEP encryption setting, and other advanced functions. The “**Access Point Setting**” page shows as the following picture.

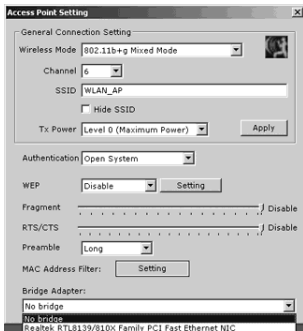
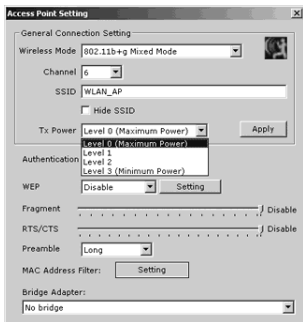


If you want to configure the general settings, please click on the “**Change**” button, and it will show as the picture below. The detailed descriptions of every function are listed in the following chart.

Parameter	Description
<b>General Connection Setting</b>	
Wireless Mode	The mode depends on the AP which GW-US54GD is connecting to at present. It can be 2.4GHz (802.11b+g) mode.
Channel	Here it shows the number of the radio channel used by the AP. The channel setting of the wireless stations within a network should be the same.
SSID	<p>The SSID (up to 32 printable ASCII characters) is a unique name identified in a WLAN. The SSID can prevent the unintentional merging of two co-located WLANs.</p> <p>The default SSID of GW-US54GD is <b>WLAN_AP</b>. The wireless adapters which want to connect to the AP should set up the same SSID as it does.</p>
Hide SSID	If the check box of " <b>Hide SSID</b> " is enabled, the AP will not appear in the list of all the other wireless adapters. It means only the wireless adapters which has the same SSID can connect to the AP. In this way, it can avoid the AP being connected by unauthorized users.
Tx Power	If you choose Level 0, you can make GW-US54GD has the maximum TX Power on wireless network. If you choose Level 3, it will have the minimum TX Power. There are four levels of Tx Power.
Change/Apply	Click " <b>Change</b> ," and you can set up the parameters of " <b>General Connection Setting</b> ." In the meantime, the button will change into " <b>Apply</b> " for you to confirm your settings and apply it to the adapter.
Authentication	<p>The setting has to be consistent with the WLAN which GW-US54GD want to connect to.</p> <p><b>Open System</b> - It does not need authentication when connecting to the AP.</p> <p><b>Shared Key</b> - Only wireless adapters using a shared key (WEP Key identified) are allowed to connecting to the AP.</p> <p><b>Auto</b> - It can change the authentication algorithm depending on the wireless networks that the adapter is connecting to.</p>

Setting	Click " <b>Setting</b> " to setup the WEP key.
Fragment	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.
RTS / CTS	Here it defines the minimum packet size required for RTS/CTS [Request to Send/Clear to Send]. Select a value within a range of 0 to 2347 bytes.
Preamble	The preamble defines the length of the CRC (cyclic redundancy check) block when communicating among the wireless networks. There are two types of preamble: Long and Short. Intensive network traffic areas should use the short preamble type.
MAC Address Filter	When GW-US54GD used as an AP, it can prevent the unauthorized users from accessing the network by using MAC address filter.
Bridge Adapter	Wireless adapters which connect to GW-US54GD can access the wired network through the bridge adapter. You can select an Ethernet adapter in the list to be a bridge between the wireless networks and wired networks.





### 4.3.3 MAC address filter

Parameter	Description
Filter Type	<p><b>Disable</b> - Disable the MAC Address filter function.</p> <p><b>Accept</b> - Only the wireless adapters with the MAC Addresses set up in the table can connect to GW-US54GD.</p> <p><b>Reject</b> - The wireless adapters with the MAC Addresses set up in the table will be rejected to connect to GW-US54GD.</p>
Filter MAC Address	<p>MAC address is a unique identification for hardware devices on the network. It is a 12-digit hexadecimal value.</p> <p>Users can have 15 sets of MAC addresses in the table. Fill in the MAC addresses of wireless adapters you want to accept or reject to access GW-US54GD in this table.</p>

Access Point Setting

Filter Type: Disable

Filter MAC Address

00.		08.	
01.		09.	
02.		10.	
03.		11.	
04.		12.	
05.		13.	
06.		14.	
07.		15.	

Apply





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## Chapter **5** *Troubleshooting*

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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°H**

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).

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**Federal Communication Commission Interference Statement**

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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.

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.

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.

**IMPORTANT NOTE:**

**FCC Radiation Exposure Statement:**

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. To maintain compliance with FCC RF exposure compliance requirements, please avoid direct contact to the transmitting antenna during transmitting.

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



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