802.11b/g/n
Wireless Broadband
Router

User's Manual

Table of Contents

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 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.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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

IEEE 802.11b or 802.11g operation of this product in the U.S.A. is firmware-limited to channels 1 through 11.

IMPORTANT NOTE:

FCC Radiation Exposure Statement:

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

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

The availability of some specific channels and/or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destination. The firmware setting is not accessible by the end user.

Chapter 1: Introduction

The **802.11b/g/n Wireless Broadband Router** is a draft 802.11n/b/g compliant Wireless Broadband Router with 4-port Fast Ethernet Switch. With the advanced MIMO technology, it can support the data transmission rate 6 times more (up to 300Mbps) and the coverage 3 times more than IEEE 802.11b/g devices. **802.11b/g/n Wireless Broadband Router** enables your whole network sharing a high-speed cable or DSL Internet connection. The incredible speed of **802.11b/g/n Wireless Broadband Router** makes it ideal for media-centric applications like streaming video, gaming, and Voice over IP technology, ensure optimum performance and maximum coverage with two external antennas.

With **802.11b/g/n Wireless Broadband Router**, you can share a high-speed Internet connection, files, printers, and multi-player games at incredible speeds, without the hassle of stringing wires. **802.11b/g/n Wireless Broadband Router** offers easy configuration for your wireless network in the home and presents wireless network to you home of high functionality, security, and flexibility.

Features

- Support the IEEE 802.11b/g/n standard, high speed date rate up to 300Mbps.
- Support WPS (Wi-Fi Protected Setup) with physical reset button.
- High security with built-in Security: WEP 64/128 bits, WPA, WPA2, 802.1x and 802.11i.
- Support Router, AP, WDS (Bridge + Repeater) and Client.
- Advanced Quality of Service (QoS) - 802.11e, WMM.
- Easy configuration for home user setup.

Package Contents

The following items should be included:

- The Wireless Router Unit
- Power Adapter
- Quick Installation Guide
- CD-ROM containing the on-line manual

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

Physical Details

Front-mounted LEDs

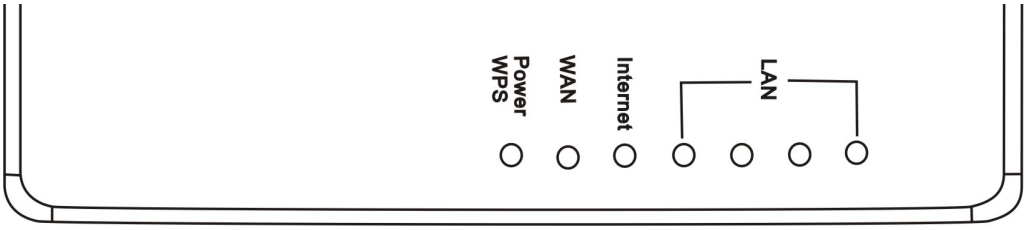


Figure 1: Front Panel

LED	Printed	Color	Behavior	Indication
Power/ WPS	Power	N/A	Off	No power
		Green	On	System powered on
		Orange	Blinking	Booting
	WPS	Green	Blinking	WPS link (Duration 2 min)
Wireless LAN	WLAN	N/A	Off	WLAN Disabled
		Green	Blinking	WLAN Enabled
10/100 WAN	Internet	N/A	Off	Link failed, or not linked
		Green	On	Link active
		Green	Blinking	Traffic transmitting
10/100M Switch	n (n=1~4) LAN/Activity	N/A	Off	Link failed, or not linked
		Green	On	Link active
		Green	Blinking	Traffic transmitting

Rear Panel

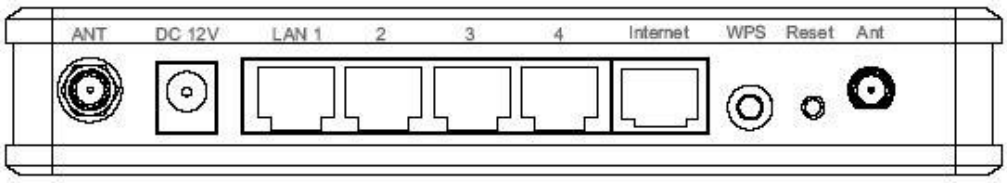


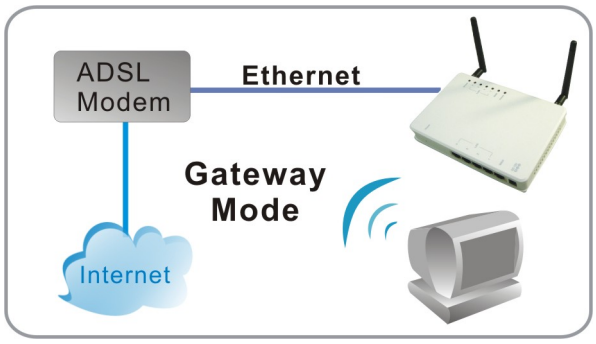
Figure 2: Rear Panel

Power port	Connect the supplied power adapter here.
LAN 1~4 ports	Use standard LAN cables (RJ45 connectors) to connect your PCs to these ports. If required, any port can be connected to another hub. Any LAN port will automatically function as an "Uplink" port when necessary.
Internet port	Connect the DSL or Cable Modem here. If your modem came with a cable, use the supplied cable. Otherwise, use a standard LAN cable.
WPS Button	To enable the WPS function, keep pressing the Reset Button more than 2 seconds, until the GREEN LED has flashed.
Reset Button	This button has two (2) functions: • **Reboot** When holding the button for 2 seconds, the power LED blinks in ORANGE, the Wireless Router will reboot (restart) automatically. • **Restore Factory Default Setting** This button can also be used to clear all data and restore all settings back to the factory default values. To Clear All Data and restore the factory default values: 1. After Power On. 2. Press the Reset Button. 3. Keep pressing the Reset Button more than 5 seconds, until the GREEN LED has flashed. 4. Release the Reset Button. The Wireless Router is now using the factory default values.

About the Operation Modes

Gateway Mode

In this mode, the device is supposed to connect to internet via ADSL/Cable Modem. The NAT is enabled and PCs in LAN ports share the same IP to ISP through WAN port. The connection type can be setup in WAN page by using PPPOE, DHCP client, PPTP client or static IP.

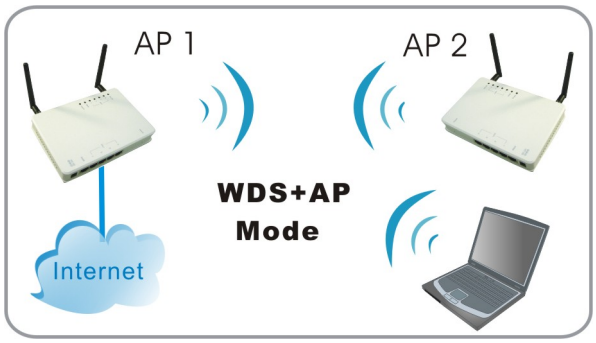


Bridge Mode

The WDS (Wireless Distributed System) function lets this access point act as a wireless LAN access point and repeater at the same time. Users can use this feature to build up a large wireless network in a large space like airports, hotels and schools and so on. This feature is also useful when users want to bridge networks between buildings where it is impossible to deploy network cable connections between these buildings.

In this mode, all Ethernet ports and wireless interface are bridge together and NAT function is disabled. All the WAN related function and firewall are not supported.

Wireless Distribution System uses wireless media to communicate with other APs, like the Ethernet does. To do this, you must set these APs in the same channel and set MAC address of other APs which you want to communicate with in the table and then enable the WDS.



Wireless ISP Mode

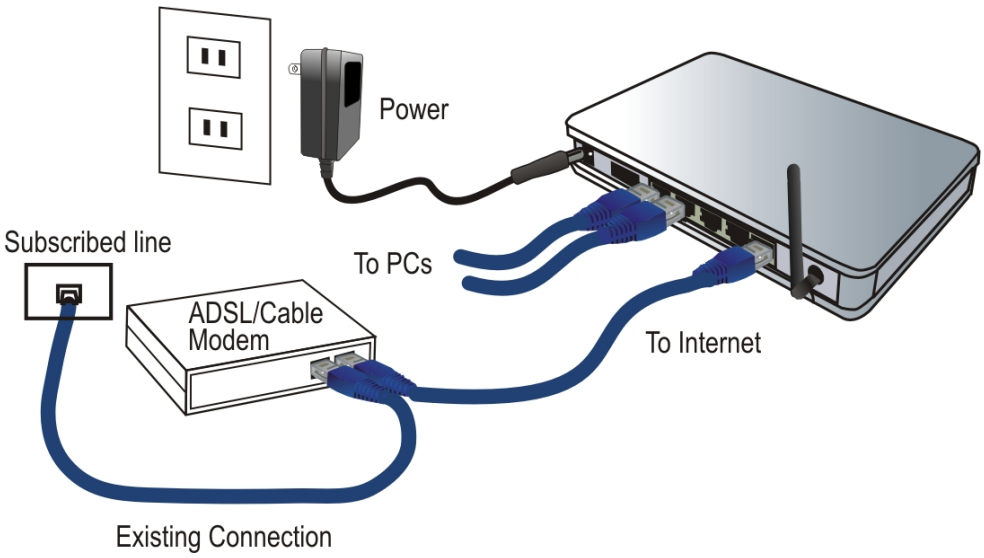
In this mode, all Ethernet ports are bridged together and the wireless client will connect to ISP access point. The NAT is enabled and PCs in Ethernet ports share the same IP to ISP through wireless LAN. You must set the wireless to client mode first and connect to the ISP AP in Site-Survey page. The connection type can be setup in WAN page by using PPPOE, DHCP client, PPTP client or static IP.

Chapter 2: Installation

Requirements

- Network cables. Use standard 10/100BaseT network (UTP) cables with RJ45 connectors.
- TCP/IP protocol must be installed on all PCs.
- For Internet Access, an Internet Access account with an ISP, and either of a DSL or Cable modem (for WAN port usage.)
- To use the Wireless Access Point, all wireless devices must be compliant with the IEEE802.11b or IEEE802.11g specifications.

Procedure



1. Choose an Installation Site

Select a suitable place on the network to install the Wireless Router.
Ensure the Wireless Router and the DSL/Cable modem are powered OFF.

2. Connect LAN Cables

Use standard LAN cables to connect PCs to the switching hub ports on the Wireless Router. Both 10BaseT and 100BaseT connections can be used simultaneously.

If required, connect any port to a normal port on another hub, using a standard LAN cable. Any LAN port on the Wireless Router will automatically function as an "Uplink" port when required.

3. Connect WAN Cable

Connect the DSL or Cable modem to the WAN port on the Wireless Router. Use the cable supplied with your DSL/Cable modem. If no cable was supplied, use a standard cable.

4. Power Up

- Power on the Cable or DSL modem.
- Connect the supplied power adapter to the Wireless Router and power up.
  Use only the power adapter provided. Using a different one may cause hardware damaged.

5. Check the LEDs

- The *Power* LED should be ON.
- For each LAN (PC) connection, the LAN *Link/Act* LED should be ON (provided the PC is also ON.)
- The *WAN* LED should be ON.
- The *WLAN* LED should be ON.

For more information, refer to *Front-mounted LEDs* in Chapter 1.

Chapter 3: Configuration via Web

Overview

This chapter describes the setup procedure for:

- Internet Access
- LAN configuration
- Wireless setup
- Assigning a password to protect the configuration data

PCs on your local LAN may also require configuration. For details, see *Chapter 4 - PC Configuration.*

Other configuration may also be required, depending on which features and functions of the Wireless Router you wish to use. Use the table below to locate detailed instructions for the required functions.

Configuration Program

The Wireless Router contains a HTTP server. This enables you to connect to it, and configure it, using your Web Browser. **Your Browser must support JavaScript**.

The configuration program has been tested on the following browsers:

- Netscape V4.08 or later
- Internet Explorer V4 or later

Preparations

Before attempting to configure the Wireless Router, please ensure that:

- Your PC can establish a physical connection to the Wireless Router. The PC and the Wireless Router must be directly connected (using the Hub ports on the Wireless Router) or on the same LAN segment.
- The Wireless Router must be installed and powered ON.
- If the Wireless Router's default IP Address (192.168.1.254) is already used by another device, the other device must be turned OFF until the Wireless Router is allocated a new IP Address during configuration.

Using UPnP

If your Windows system supports UPnP, an icon for the Wireless Router will appear in the system tray, notifying you that a new network device has been found, and offering to create a new desktop shortcut to the newly-discovered device.

- Unless you intend to change the IP Address of the Wireless Router, you can accept the desktop shortcut.
- Whether you accept the desktop shortcut or not, you can always find UPnP devices in *My Network Places* (previously called *Network Neighborhood*).
- Double - click the icon for the Wireless Router (either on the Desktop, or in *My Network Places*) to start the configuration. Refer to the following section *Setup Wizard* for details of the initial configuration process.

Using your Web Browser

To establish a connection from your PC to the Wireless Router:

1. After installing the Wireless Router in your LAN, start your PC. If your PC is already running, please restart it.
2. Start your Web Browser.
3. In the *Address* box, enter "HTTP://" and the IP Address of the Wireless Router, as in this example, which uses the Wireless Router's default IP Address:
   `HTTP://192.168.1.254`

Simply enter the username "**admin**" and password "**admin**". However, you can assign and changed username and set the password for future security in the Password Setup section. See the *Password Setup* section later in this chapter for details.

If you can't connect...

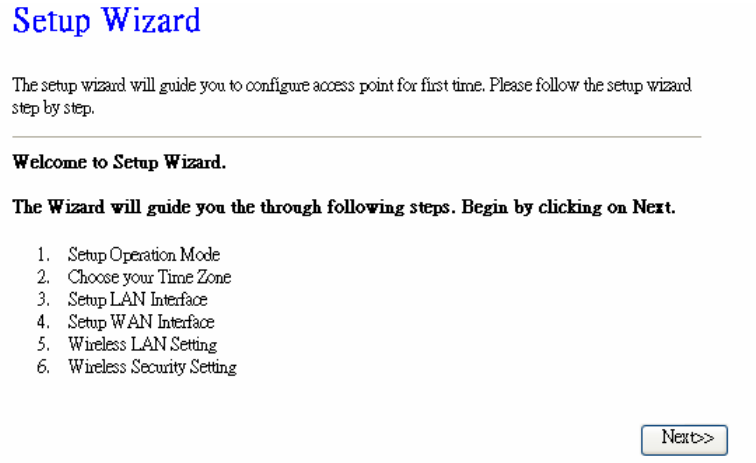
If the Wireless Router does not respond, check the following:

- The Wireless Router is properly installed, LAN connection is OK, and it is powered ON. You can test the connection by using the "Ping" command:
  - Open the MS-DOS window or command prompt window.
  - Enter the command:
    `ping 192.168.1.254`
    If no response is received, either the connection is not working, or your PC's IP address is not compatible with the Wireless Router's IP Address. (See next item.)
- If your PC is using a fixed IP Address, its IP Address must be within the range 192.168.1.1 to 192.168.1.253 to be compatible with the Wireless Router's default IP Address of 192.168.1.254. Also, the *Network Mask* must be set to 255.255.255.0. See *Chapter 4 - PC Configuration* for details on checking your PC's TCP/IP settings.
- Ensure that your PC and the Wireless Router are on the same network segment. (If you don't have a router, this must be the case.)
- Ensure you are using the wired LAN interface. The Wireless interface can only be used if its configuration matches your PC's wireless settings.

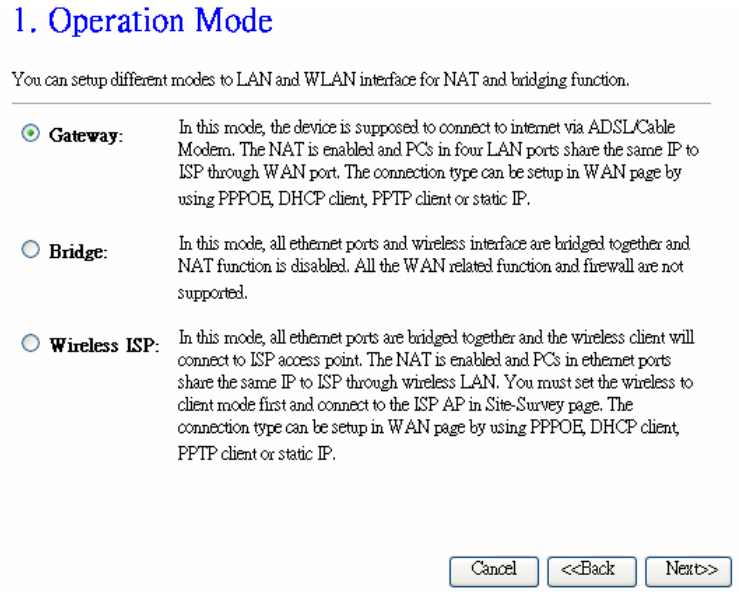
Setup Wizard

The Setup Wizard provides brief and basic configuration of this device, you may enter each screen to change the default settings. For more detailed settings, you may refer to the "*Configuration via Web*" section.

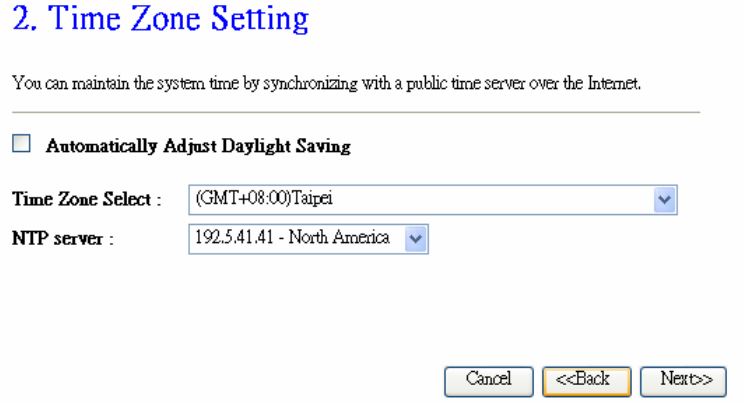
1. View the listed configuration items and click **Next** to continue.



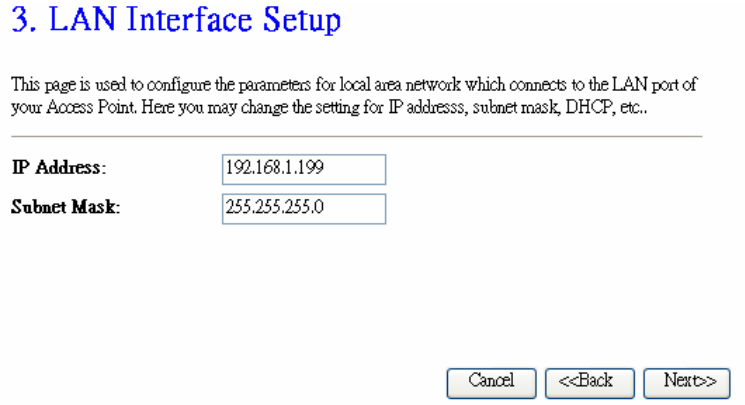
2. You can setup different modes to LAN and WLAN interface for NAT and bridging function. Then click **Next** to continue.



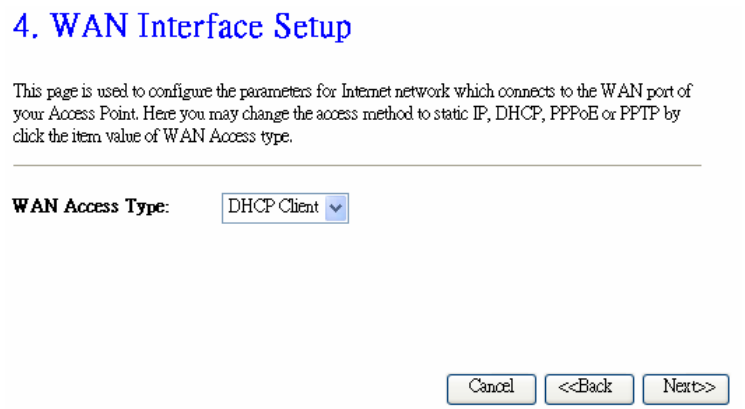
3. You can maintain the system time by synchronizing with a public time server over the Internet. Then click **Next** to continue.



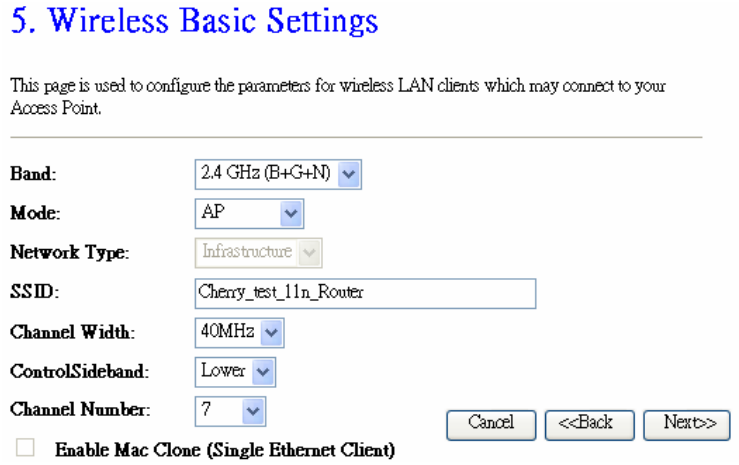
4. Configure the parameters for local area network (If you want to change the default parameters) by entering New IP Address and Subnet Mask. Then click **Next** to continue.



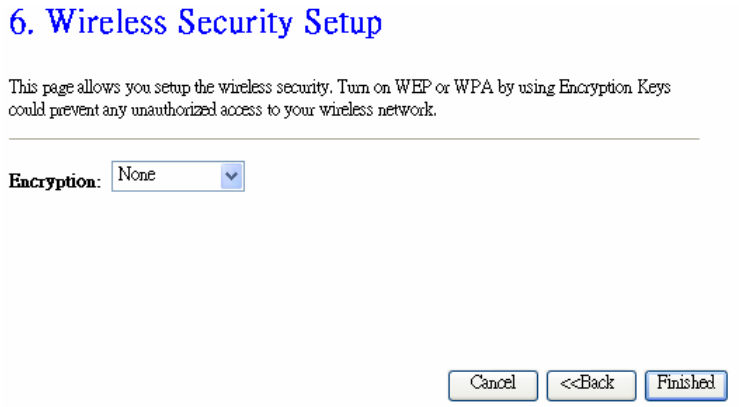
5. Change the access method (Static IP, DHCP Client, PPPoE or PPTP) by selecting for the pull-down menu. Then click **Next** to continue.



6. This page is used to configure the parameters for wireless LAN clients which may connect to your Access Point.



7. To manage your wireless network security by selecting the encryption type (None, WEP, WPA, WPA2 (AES) and WPA2 Mixed) from the pull-down menu. Click **Finished** to exit **Setup Wizard** screen.



Common Connection Types

Cable Modems

Type	Details	ISP Data required
Dynamic IP Address	Your IP Address is allocated automatically, when you connect to you ISP.	Usually, none. However, some ISP's may require you to use a particular Hostname, Domain name, or MAC (physical) address.
Static (Fixed) IP Address	Your ISP allocates a permanent IP Address to you.	IP Address allocated to you. Some ISP's may also require you to use a particular Hostname, Domain name, or MAC (physical) address.

DSL Modems

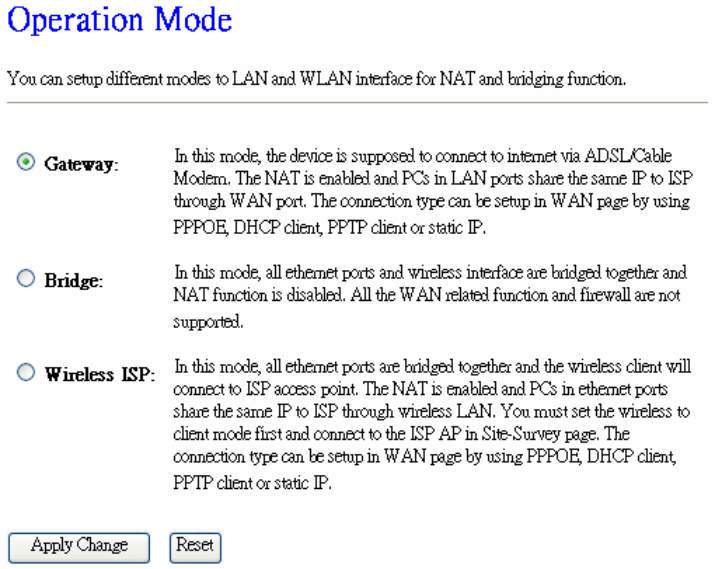
Type	Details	ISP Data required
Dynamic IP Address	Your IP Address is allocated automatically, when you connect to you ISP.	None.
Static (Fixed) IP Address	Your ISP allocates a permanent IP Address to you.	IP Address allocated to you.
PPPoE	You connect to the ISP only when required. The IP address is usually allocated automatically.	User name and password.
PPTP	Mainly used in Europe. You connect to the ISP only when required. The IP address is usually allocated automatically, but may be Static (Fixed).	• PPTP Server IP Address. • User name and password. • IP Address allocated to you, if Static (Fixed).

Other Modems (e.g. Broadband Wireless)

Type	Details	ISP Data required
Dynamic IP Address	Your IP Address is allocated automatically, when you connect to you ISP.	None.
Static (Fixed) IP Address	Your ISP allocates a permanent IP Address to you.	IP Address allocated to you.

Operation Mode

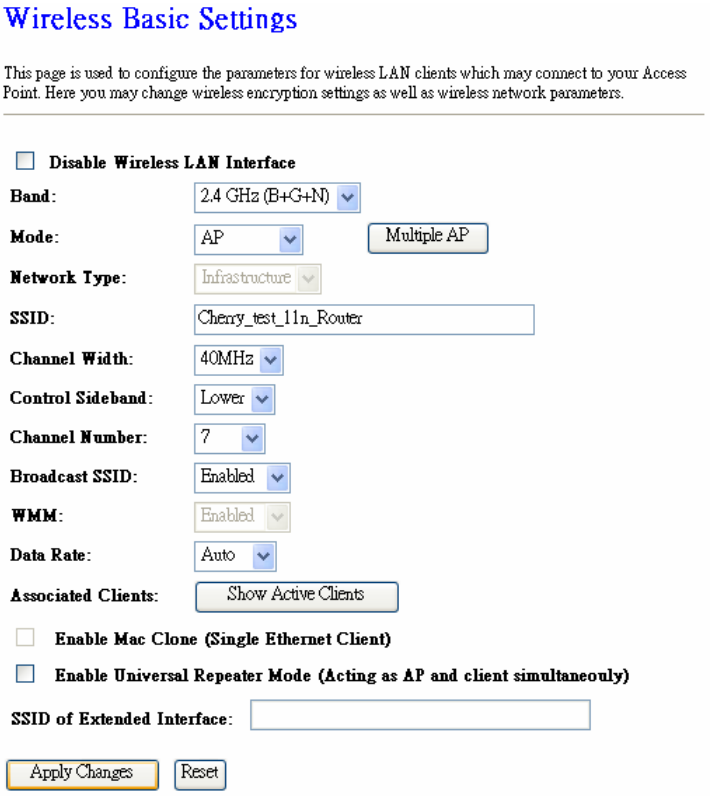
You can setup different modes to LAN and WLAN interface for NAT and bridging function.



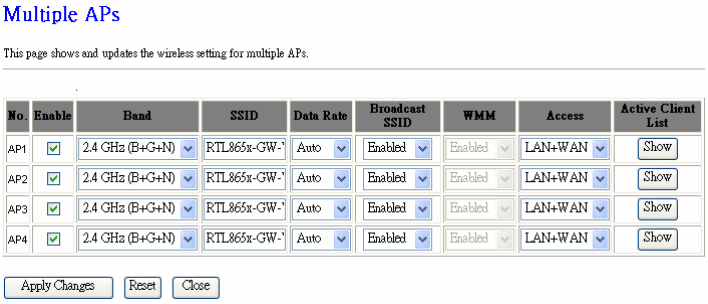
Wireless

Basic Settings

This page is used to configure the parameters for wireless LAN clients which may connect to your Access Point. Here you may change wireless encryption settings as well as wireless network parameters.



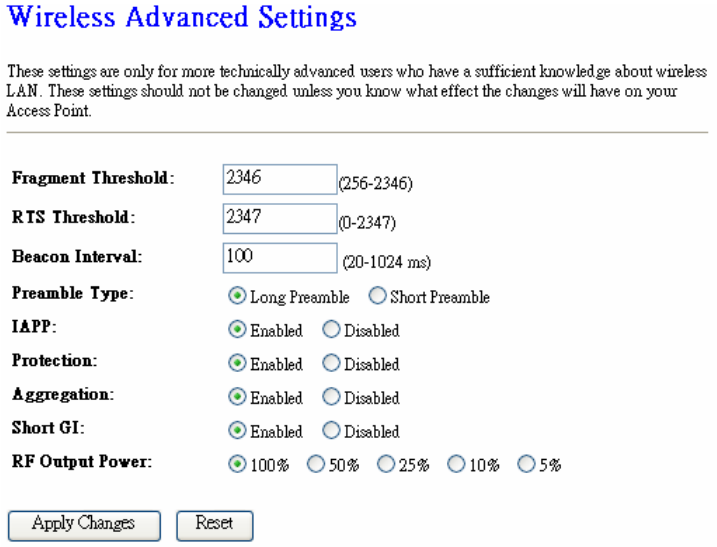
Disable Wireless LAN Interface	Check to disable the Access Point function. The wireless (WLAN) LED on front panel will remain OFF if the Wireless interface is disabled.
Band	You can choose one mode of the following you need. ● 2.4GHz **(B):** 802.11b supported rate only. ● 2.4GHz **(G):** 802.11g supported rate only. ● 2.4GHz **(N):** 802.11n supported rate only. ● 2.4GHz **(B+G):** 802.11b supported rate and 802.11g supported rate. ● 2.4GHz **(G+N):** 802.11g supported rate and 802.11n supported rate. ● 2.4GHz **(B+G+N):** 802.11b, 802.11g and 802.11n supported rate. The default is 2.4GHz **(B+G+N)** mode.

Mode	You can select **AP**, **Client**, **WDS** or **AP+WDS** mode as you need. Under the AP mode, you can click the **Multiple AP button** to display the Multiple APs list. Default Multiple AP settings are enabled. 
Network Type	Under **Client** mode this function will be enabled, there is **Infra-structure** or **Ad hoc** type can be selected form the pull-down menu.
SSID	A SSID is referred to a network name because essentially it is a name that identifies a wireless network.
Channel Width	Select 20MHz channel width, the channel number will be form 1~11 and auto; Select 40Mhz channel width the channel number will be form 1~9 and auto. Default is 20MHz.
Control Sideband	You can select Lower or Upper form the pull-down list.
Channel Number	The channel number base on the channel width you select. Default channel is 7.
Broadcast SSID	**Enabled**: This wireless AP will broadcast its SSID to stations. **Disabled**: This wireless AP will not broadcast its SSID to stations. If stations want to connect to this wireless AP, this AP's SSID should be known in advance to make a connection.
WMM	The WiFi Multiple Media function is available under 2.4GHz (B), 2.4GHz (G) and 2.4GHz (B+G) band, and is disabled under 2.4GHz (N), 2.4GHz (G+N) and 2.4GHz (B+G+N) band.
Data Rate	There are several data rate that you can select from the pull-down menu.
Associated Clients	Click **Show Active Clients** button to show all the listed active clients.
Enable Mac Clone (Single Ethernet Client)	This function will be enabled under Client mode. Check the box to enable this function.
Enable Universal Repeater Mode	This function will be disable under WDS mode. Check the box to

(Acting as AP and client simultaneously)	enable to this function.
SSID of Extended Interface	When the **Enable Universal Repeater Mode (Acting as AP and client simultaneously)** function is enabled, the **SSID of Extended Interface** can be entered.
Apply changes	After completing the settings on this page, click **Apply changes** button to save the settings.
Reset	Click **Reset** to restore to default values.

Advanced Settings

These settings are only for more technically advanced users who have a sufficient knowledge about wireless LAN. These settings should not be changed unless you know what effect the changes will have on your Access Point.



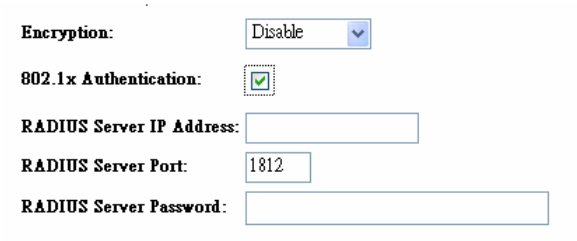
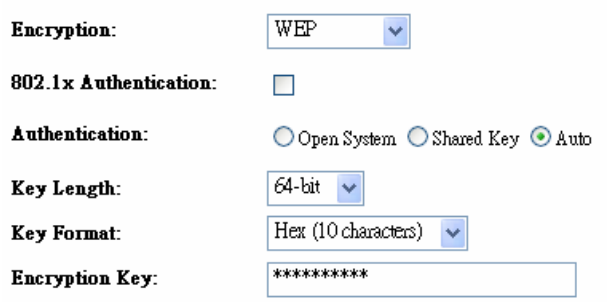
Fragment Threshold	Fragmentation mechanism is used for improving the efficiency when high traffic flows along in the wireless network. If the 802.11g MIMO Wireless Router often transmit large files in wireless network, you can enter new Fragment Threshold value to split the packet. The value can be set from 256 to 2346. The default value is **2346**.
RTS Threshold	RTS Threshold is a mechanism implemented to prevent the "**Hidden Node**" problem. If the "Hidden Node" problem is an issue, please specify the packet size. *The RTS mechanism will be activated if the data size exceeds the value you set*. **Warning:** Enabling RTS Threshold will cause redundant network overhead that could negatively affect the throughput

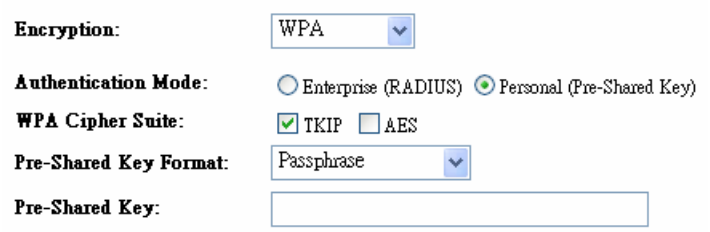
	performance instead of providing a remedy. This value should remain at its default setting of **2347**. Should you encounter inconsistent data flow, only minor modifications of this value are recommended.
Beacon Interval	Beacon Interval is the amount of time between beacon transmissions. Before a station enters power save mode, the station needs the beacon interval to know when to wake up to receive the beacon. Range 20-1024 ms, default is 100.
Preamble Type	A preamble is a signal used in wireless environment to synchronize the transmitting timing including Synchronization and Start frame delimiter. You can select Long or Short for the preamble type.
IAPP	Select Enabled or Disabled to execute this function.
Protection	Select Enabled or Disabled to execute the security function.
Aggregation	Select Enabled or Disabled to execute this function.
Short GI	Select Enabled or Disabled to execute this function.
RF Output Power	Select the transmitting power rate 100%, 50%, 25%, 10% or 5%.
Apply changes	After completing the settings on this page, click **Apply changes** button to save the settings.
Reset	Click **Reset** to restore to default values.

Security

Here you can configure the security of your wireless network. Selecting different method will enable you to have different level of security. Please note that by using any encryption, by which data packet is encrypted before transmission to prevent data packets from being eavesdropped by unrelated people, there may be a significant degradation of the data throughput on the wireless link.

Select SSID	Select the preferred AP from pull-down list.
Apply changes	After completing the settings on this page, click **Apply changes**

	button to save the settings.
Reset	Click **Reset** to restore to default values.
Encryption	**Disable:** (Encryption is set to **Disable** by default**).** If **Use 802.1x Authentication** is selected, the RADIUS Server will proceed to check the 802.1x Authentication. **RADIUS Server IP Address:** Please enter the RADIUS Server IP Address in the field. **RADIUS Server Port:** Please enter the RADIUS Server Port, default server port is 1812. **RADIUS Server Password:** Please enter RADIUS Server Password in the field.  **WEP** If **WEP** encryption is selected, users will have to **Set WEP keys** either manually or select to **Use 802.1x Authentication** to make the RADIUS server to issue the WEP key dynamically.  **Wireless WEP Key Setup**: **Key Length:** Select the key length from the pull-down menu, either 64-bit or 128-bit. **Key Format:** Select Hex if you are using hexadecimal numbers (0-9, or A-F). Select ASCII if you are using ASCII characters (case-sensitive). ● **Hexadecimal (64-bit):** 10 Hex characters (0~9, a-f). ● **Hexadecimal (128-bit):** 26 Hex characters (0~9, a-f). ● **ASCII (64-bit):** 5 ASCII characters (case-sensitive). ● **ASCII (128-bit):** 13 ASCII characters (case-sensitive). **Encryption Key:** To configure your WEP settings. **WEP (Wired Equivalent Privacy)** encryption can be used to ensure the security of your wireless network. Fill in the appropriate value or

	phrase in **Encryption Key** field. ***Note**: You must use the same **Key** and **Encryption** settings for the both sides of the wireless network connection.* **WPA**  **WPA (TKIP/AES):** If **WPA** is selected, users will have to select the **WPA Authentication Modes** between **Enterprise (RADIUS)** and **Personal** (**Pre-shared Key)**, and select **WPA Cipher Suite** for **TKIP** or **AES.** Then enter the **WPA Pre-shared Key** in the column to setup the wireless network security if you select **Personal** (**Pre-shared Key)** authentication mode or enter the **Port, IP address** and **Password** if you select the **Enterprise (RADIUS)** authentication mode. **WPA2 (AES)/WPA2 Mixed** If **WPA2 (AES)/WPA2 Mixed** is selected from encryption pull-down menu, users will have to select the WPA Authentication Modes between **Enterprise (RADIUS) -**set the **Port, IP address** and **Password**, and **Personal (Pre-shared Key)** –select **Passphrase** or **Hex (64 characters)** then enter the **WPA Pre-shared Key** in the column to setup the wireless network security.
WPA (Pre-shared Key) Format	The WPA (Pre-shared Key) Format will be enabled when **WPA, WPA2 (AES)** and **WPA2 Mixed** encryption be selected. There are two formats for choice to set the Pre-shared key, **Passphrase** and **Hex (64 characters)**. If **Hex** is selected, users will have to enter a 64 characters string. For easier configuration, the **Passphrase** (at least 8 characters) format is recommended.
WPA Pre-Shared Key	Pre-Shared Key serves as a password. Users may key in 8 to 63 characters string if you select Passphrase Pre-shared key format to set the passwords or leave it blank, in which the 802.1x Authentication will be activated. Make sure the same password is used on client's end.
Enable Pre-Authentication	The two most important features beyond WPA to become standardized through 802.11i/WPA2 are pre-authentication, which enables secure fast roaming without noticeable signal latency. Pre-authentication provides a way to establish a PMK security association before a client associates. The advantage is that the client reduces the time that it's disconnected to the network.
Authentication	**Port**: Enter the RADIUS Server's port number provided by your

RADIUS Server	ISP. The default is **1812**. **IP Address:** Enter the RADIUS Server's IP Address provided by your ISP. **Password:** Enter the password that the AP shares with the RADIUS Server.
Apply changes	After completing the settings on this page, click **Apply changes** button to save the settings.
Reset	Click **Reset** to restore to default values.

Access Control

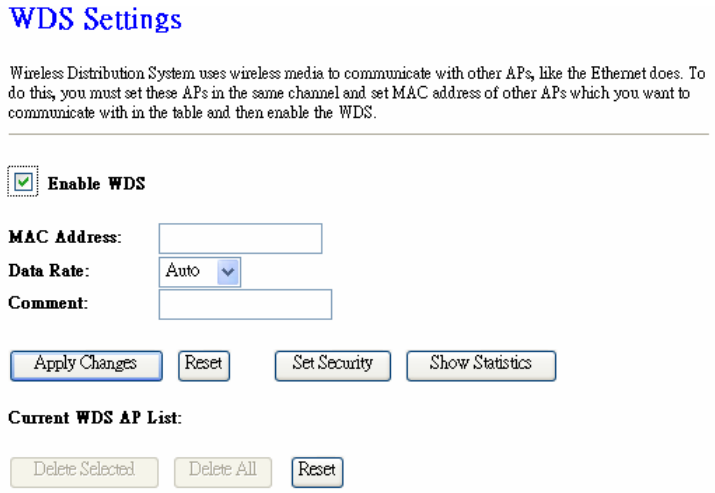
If you choose 'Allowed Listed', only those clients whose wireless MAC addresses are in the access control list will be able to connect to your Access Point. When 'Deny Listed' is selected, these wireless clients on the list will not be able to connect the Access Point.

Wireless Access Control Mode	Select Allow Listed or Deny List form the pull-down menu to enable access control function. Default setting is Disable.
MAC Address	Enter the MAC address of a station that is allowed to access this Access Point.
Comment	You may enter up to 20 characters as a remark to the previous MAC address.
Apply Changes	After completing the settings on this page, click **Apply changes** button to save the settings.
Reset	Click **Reset** to restore to default values.
Current Access Control List	This table displays you the station MAC information.
Delete Selected	Click **Delete Selected** to delete items which are selected.

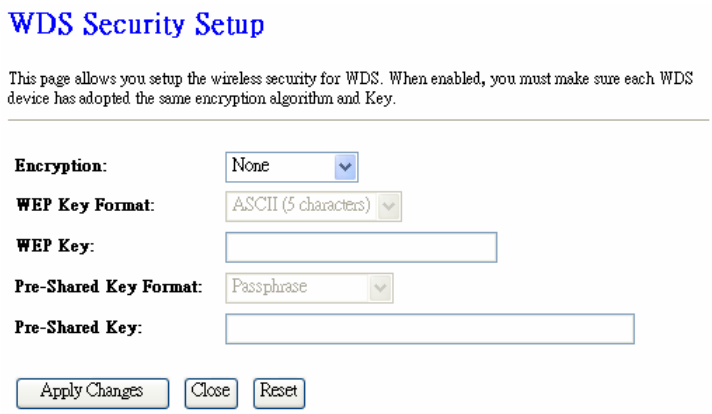
Delete All	Click **Delete All** to delete all the items.
Reset	Click **Reset** to rest.

WDS Settings

Wireless Distribution System uses wireless media to communicate with other APs, like the Ethernet does. To do this, you must set these APs in the same channel and set MAC address of other APs which you want to communicate with in the table and then enable the WDS. If you would like to setup this WDS function, please go to **Wireless Basic Settings**, and then select the **Mode** into WDS mode.



Enable WDS	Check the box to enable the WDS function.
MAC Address	**MAC Address**: Enter the Wireless BSSID (MAC) of the wireless AP that you want to connect with. To check your wireless router's MAC address, please go to **Management > Status** tab to find your MAC address.
Data Rate	Select the data rate form the pull-down list.
Comment	Enter a description for the device.
Apply Changes	After completing the settings on this page, click **Apply changes** button to save the settings.
Reset	Click **Reset** to restore to default values.
Set Security	Enable the WDS function and then click **Set Security** button to set up the WDS security.



WDS Security Setup

Encryption: Select the encryption type **None, WEP 64 bits, WEP 128 bits, WPA (TKIP)** and **WPA2 (AES)** from the pull-down menu.

WEP Key Format: For **WEP 64 bits** and **WEP 128 bits** encryption type, the selection of **WEP Key Format** are **Hex** and **ASCII**.

WEP Key: If select Hex if you are using hexadecimal numbers (0-9, or A-F). Select ASCII if you are using ASCII characters (case-sensitive).

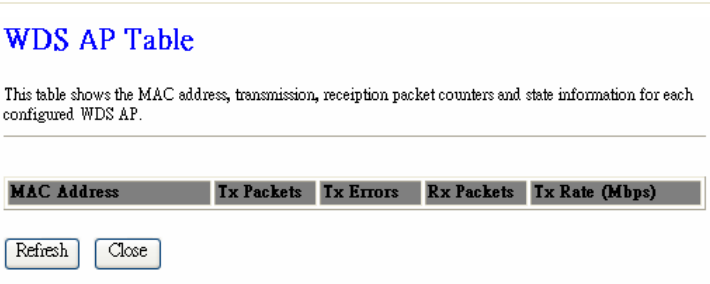
- **Hexadecimal (WEP 64 bits):** 10 Hex characters (0~9, a~f).
- **Hexadecimal (WEP 128 bits):** 26 Hex characters (0~9, a~f).
- **ASCII (WEP 64 bits):** 5 ASCII characters (case-sensitive).
- **ASCII (WEP 128 bits):** 13 ASCII characters (case-sensitive).

Pre-Shared Key Format: The **Pre-shared Key Format** will be enabled when **WPA (TKIP)** and **WPA2 (AES)** encryption be selected. There are two formats for choice to set the Pre-shared key, **Passphrase** and **Hex (64 characters)**. If **Hex** is selected, users will have to enter a 64 characters string. For easier configuration, the **Passphrase** (at least 8 characters) format is recommended.

Pre-Shared Key: Pre-Shared-Key serves as a password. Users may key in 8 to 63 characters string to set the passwords or leave it blank, in which the 802.1x Authentication will be activated. Make sure the same password is used on client's end.

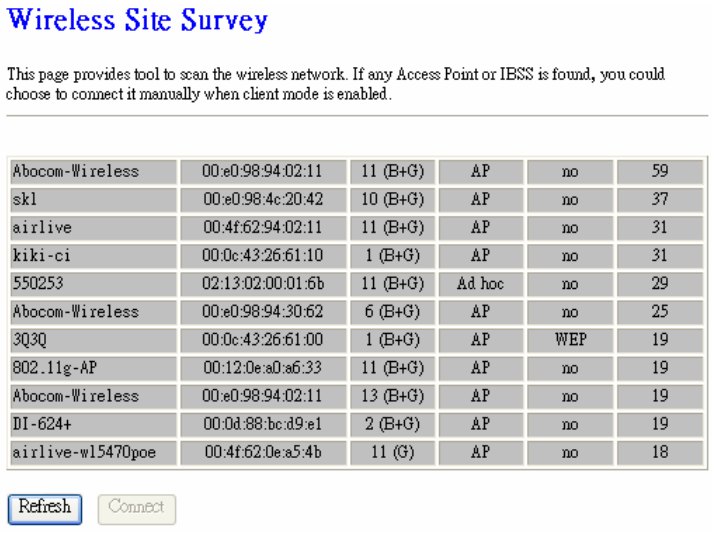
Apply Changes: Press to save the new settings on the screen.
Close: Click to leave the screen.
Reset: Click to restore the screen.

Show Statistics	Click to show the current WDS AP table. This table shows the MAC address, transmission packets and errors, reception packets and Tx Rate (Mbps) counters for each configured WDS AP.

	 **Refresh**: Click to renew the counters information. **Close**: Click to leave the screen.
Current WDS AP List	Here shows the current WDS AP information.
Delete Selected	Click **Delete Selected** to delete the selected AP information.
Delete All	Click **Delete All** to delete all the items.
Reset	Click **Reset** to restore the settings.

Site Survey

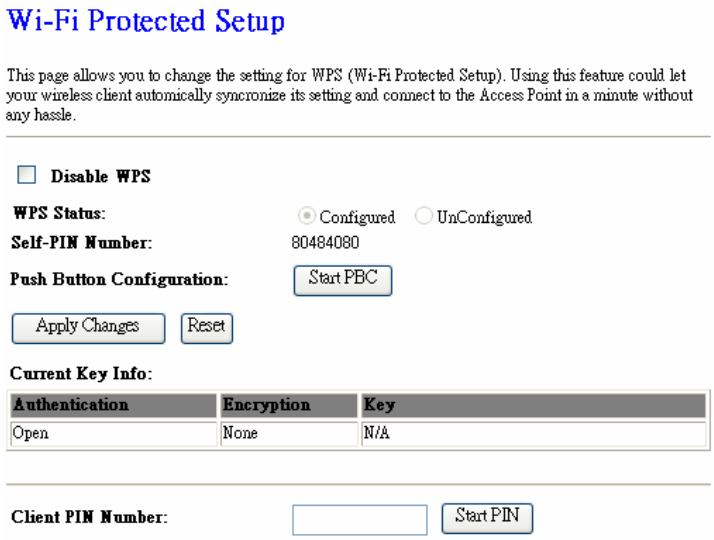
Site survey displays all the active Access Points, MAC, BSSID, Channel, RSSI and Security in the neighborhood.



Refresh	Check this button to refresh all the Site Survey statistics.
Connect	Select a site that you would like to communicate, and then click the Connect button.

WPS

This page allows you to change the setting for WPS (Wi-Fi Protected Setup). Using this feature could let your wireless client atomically synchronizes its setting and connect to the Access Point in a minute without any hassle.

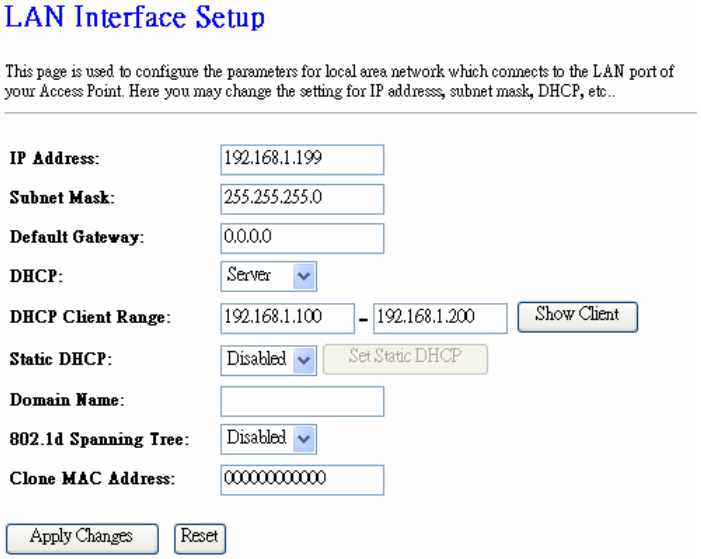


Disable WPS	Check the box to Disable the WPS function, default setting is Enabled.
WPS Status	Here shows the current status of the WPS function.
Self-PIN Number	Here shows the PIN code of the router itself.
Push Button Configuration	Click **Start PBC** button to make a WPS connection with client.
Current Key Information	Here shows current security status that apply on the router.
Client PIN Number	Enter the client PIN code into the blank field then click the **Start PIN** button to make a WPS connection with client.

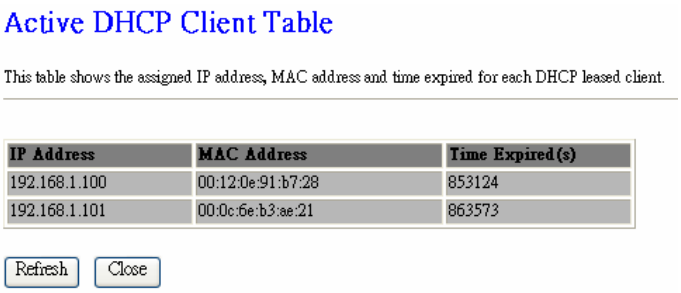
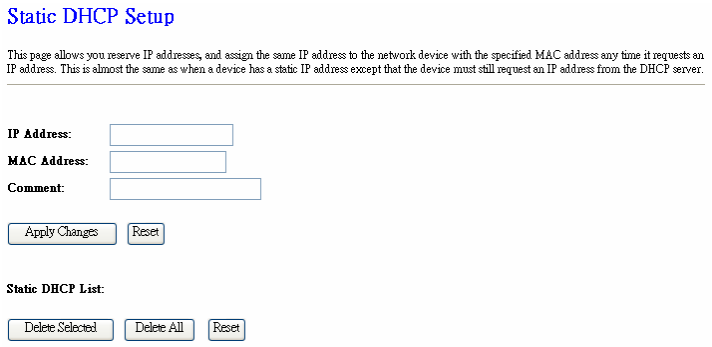
TCP/IP Settings

LAN Interface

This page is used to configure the parameters for local area network which connects to the LAN port of your Access Point. Here you may change the setting for IP addresss, subnet mask, DHCP, etc.



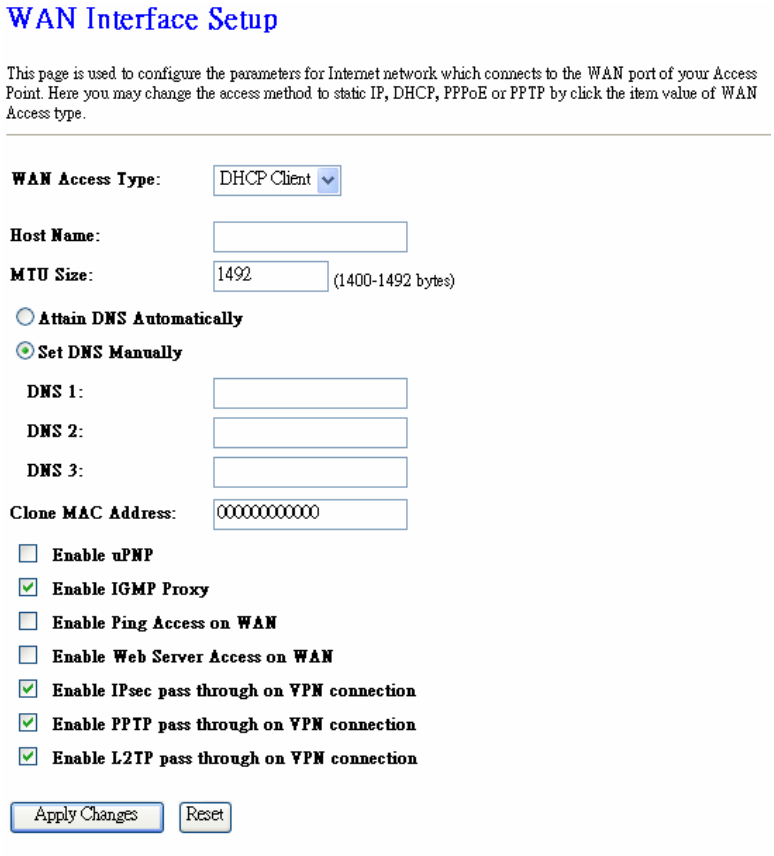
IP Address	Shows the IP address of the router.
Subnet Mask	The subnet mask of the router.
Default Gate-way	Shows the default gateway IP address.
DHCP	**Disabled**: Select to disable this Router to distribute IP addresses. **Client**: Select to enable the router works as a client. **Server**: Select to enable this Router to distribute IP Addresses (DHCP Server). And the following field will be activated for you to enter the starting IP Address.
DHCP Client Range	The starting address of this local IP network address pool. The pool is a piece of continuous IP address segment. Keep the default value 192.168.1.1 should work for most cases. • Maximum: 253. Default value 253 should work for most cases. Note: If "Continuous IP address poll starts" is set at 192.168.1.1 and the "Number of IP address in pool" is 253, the device will distribute IP addresses from 192.168.1.1 to 192.168.1.253 to all the computers in the network that request IP addresses from DHCP server (Router)
Show Client	Click to show Active DHCP Client Table.

	 **Refresh**: Click this button to refresh the table. **Close**: Click this button to close the window.
Static DHCP	Select enabled or disabled form pull-down menu, default setting is disabled. When set to enabled, user can click **Static DHCP** button to set the **Static DHCP** function.  **IP Address**: Enter the fixed IP address that DHCP Server assigned to a certain connected station. **MAC Address**: Enter the MAC address of a certain station, and then the DHCP Server will to distribute a fixed IP address to the station automatically once they connected. **Comment**: You can enter a comment to description above IP address or MAC address. **Apply Changes:** After completing the settings on this page, click Apply changes button to save the settings. **Reset:** Click Reset to restore to default values. **Static DHCP List**: Here shows the static IP address that have been assigned according to the MAC address. **Delete Selected**: Click Delete Selected to delete items which are selected. **Delete All**: Click **Delete All** button to delete all the items. **Reset**: Click **Reset** button to rest.
Domain Name	Enter the Domain Name here.
802.1d Spanning Tree	Select Enabled or Disabled from the pull-down menu.

Clone MAC Address	This table displays you the station MAC information.
Apply Changes	After completing the settings on this page, click **Apply changes** button to save the settings.
Reset	Click **Reset** to restore to default values.

WAN Interface

This page is used to configure the parameters for Internet network which connects to the WAN port of your Access Point. Here you may change the access method to static IP, DHCP, PPPoE or PPTP by click the item value of WAN Access type.



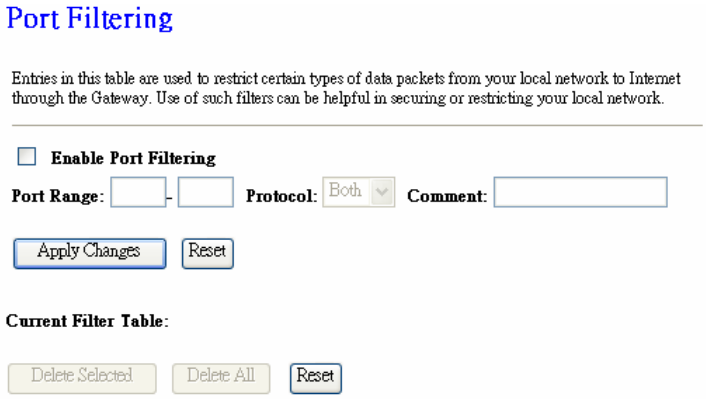
WAN Access Type	Select the WAN Access Type (**Static IP, DHCP Client, PPPoE** and **PPTP)** from the pull-down menu. Default setting is **DHCP Client** enabled.
Host Name	Enter the host name in this field.
MTU Size	The most appropriate MTU (Maximum Transmission Unit) namely the maximum packet size, the default value is 1492 for your applica-

	tion. Reducing the packet size can help connecting to certain web sites or speeding up packet transfer rate. If the incorrect packet size is entered, you may not be able to open certain web sites.
Attain DNS Automatically **Set DNS Manually**	Select to **Attain DNS Automatically** or select **Set DNS Manually** to set the DNS server IP address at the following DNS 1~3 columns. Default setting is **Attain DNS Automatically**.
DNS 1 **DNS 2** **DNS 3**	Enter the DNS server IP address(es) provided by your ISP, or you can specify your own preferred DNS server IP address(es). DNS 2 and DNS 3 servers are optional. You can enter another DNS server's IP address as a backup. DNS 2 and DNS 3 servers will be used when the DNS 1 server fails.
Clone MAC Address	Your ISP may require a particular MAC address in order for you to connect to the Internet. This MAC address is the PC's MAC address that your ISP had originally connected your Internet connection to. Type in this Clone MAC address in this section to replace the WAN MAC address with the MAC address of that PC.
□ **Enable uPNP** □ **Enable Ipsec pass through on VPN connection** □ **Enable L2TP pass through on VPN connection**	Check to enable the listed functions.
Apply Changes	After completing the settings on this page, click **Apply changes** button to save the settings.
Reset	Click **Reset** to restore to default values.

Firewall

Port Filtering

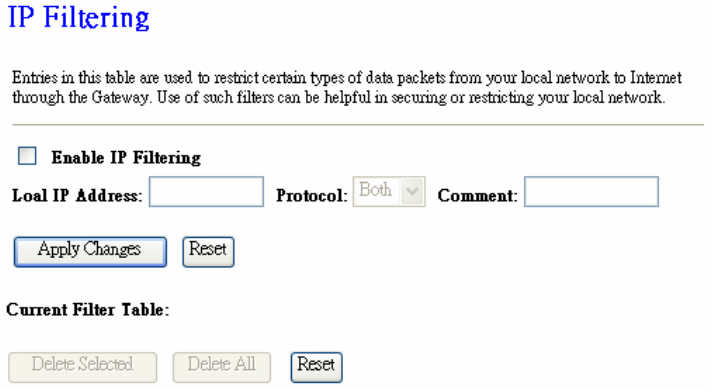
Entries in this table are used to restrict certain types of data packets from your local network to Internet through the Gateway. Use of such filters can be helpful in securing or restricting your local network.



Enable Port Filtering	Check to enable this port filtering function.
Port Range	For TCP and UDP Services, enter the beginning of the range of port numbers used by the service. If the service uses a single port number, enter it in both the start and finish fields.
Protocol	Select the protocol (TCP, UDP or Both) used to the remote system or service.
Comment	You may key in a description for the port range.
Apply Changes	After completing the settings on this page, click **Apply changes** button to save the settings.
Reset	Click **Reset** to restore to default values.
Current Filter Table	Shows the current port filter information.
Delete Selected	Click **Delete Selected** button to delete items which are selected.
Delete All	Click **Delete All** button to delete all the items.
Reset	Click **Reset** button to rest.

IP Filtering

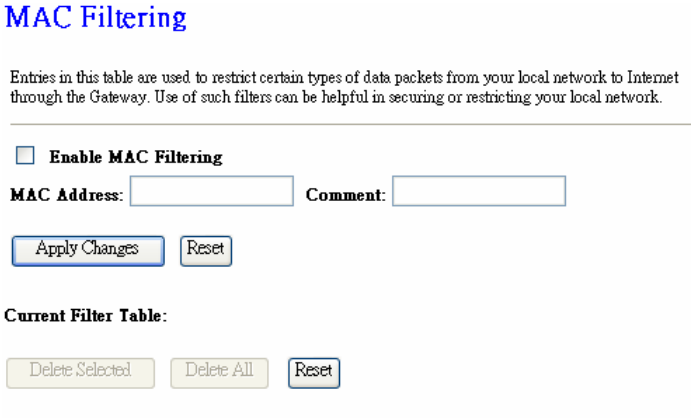
Entries in this table are used to restrict certain types of data packets from your local network to Internet through the Gateway. Use of such filters can be helpful in securing or restricting your local network.



Enable IP Filtering	Check to enable IP filtering function.
Local IP Address	Enter the local server's IP address.
Protocol	Select the protocol (TCP, UDP or Both) used to the remote system or service.
Comment	You may key in a description for the port range.
Apply Changes	After completing the settings on this page, click **Apply Changes** button to save the settings.
Reset	Click **Reset** button to restore to default values.
Current Filter Table	Shows the current IP filter information.
Delete Selected	Click **Delete Selected** button to delete items which are selected.
Delete All	Click **Delete All** button to delete all the items.
Reset	Click **Reset** button to rest.

MAC Filtering

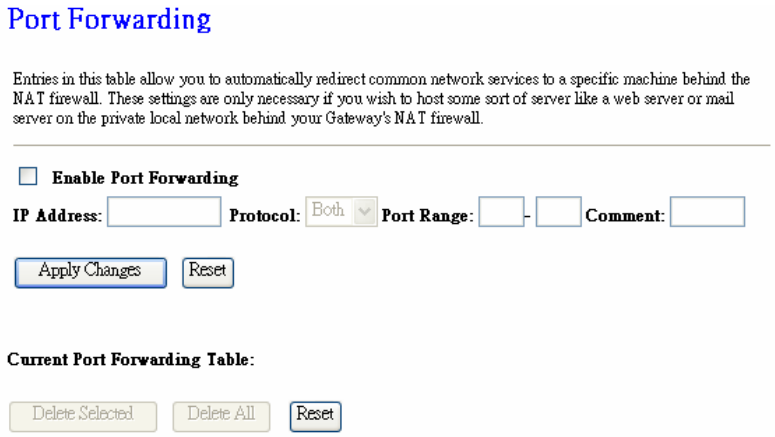
Entries in this table are used to restrict certain types of data packets from your local network to Internet through the Gateway. Use of such filters can be helpful in securing or restricting your local network.



Enable MAC Filtering	Check to enable MAC filtering function.
MAC Address	Enter the client MAC address in the field.
Comment	You may key in a description MAC address.
Apply Changes	After completing the settings on this page, click **Apply Changes** button to save the settings.
Reset	Click **Reset** button to restore to default values.
Current Filter Table	Shows the current MAC filter information.
Delete Selected	Click **Delete Selected** button to delete items which are selected.
Delete All	Click **Delete All** button to delete all the items.
Reset	Click **Reset** button to rest.

Port Forwarding

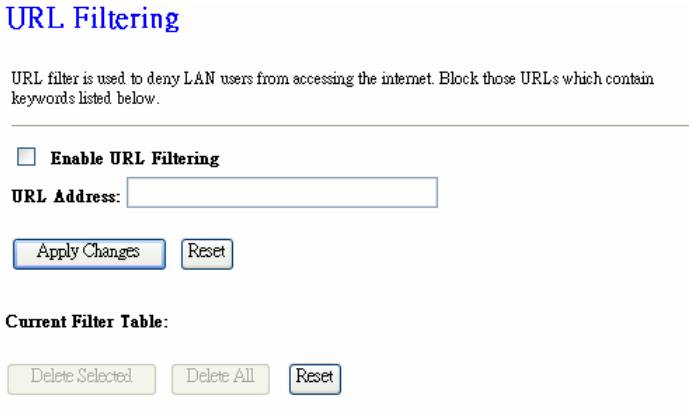
Entries in this table allow you to automatically redirect common network services to a specific machine behind the NAT firewall. These settings are only necessary if you wish to host some sort of server like a web server or mail server on the private local network behind your Gateway's NAT firewall.



Enable Port Forwarding	Check to enable Port Forwarding function.
IP Address	Enter the IP address in the field.
Protocol	Select the protocol (TCP, UDP or Both) used to the remote system or service.
Port Range	For TCP and UDP Services, enter the beginning of the range of port numbers used by the service. If the service uses a single port number, enter it in both the start and finish fields.
Comment	You may key in a description MAC address.
Apply Changes	After completing the settings on this page, click **Apply Changes** button to save the settings.
Reset	Click **Reset** button to restore to default values.
Current Port Forwarding Table	Shows the current Port Forwarding information.
Delete Selected	Click **Delete Selected** button to delete items which are selected.
Delete All	Click **Delete All** button to delete all the items.
Reset	Click **Reset** button to rest.

URL Filtering

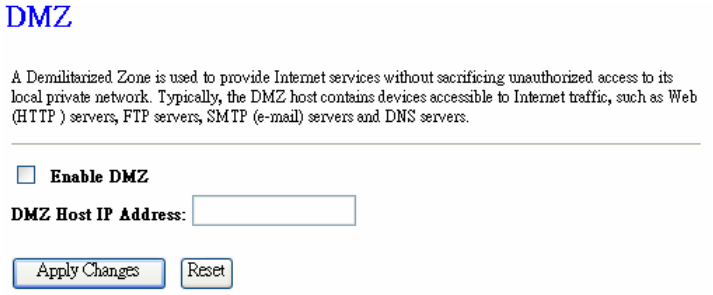
URL filter is used to deny LAN users from accessing the internet. Block those URLs which contain keywords listed below.



Enable URL Filtering	Check to enable URL filtering function.
URL Address	Enter the URL address in the field.
Apply Changes	After completing the settings on this page, click **Apply Changes** button to save the settings.
Reset	Click **Reset** button to restore to default values.
Current Filter Table	Shows the current URL address filter information.
Delete Selected	Click **Delete Selected** button to delete items which are selected.
Delete All	Click **Delete All** button to delete all the items.
Reset	Click **Reset** button to rest.

DMZ

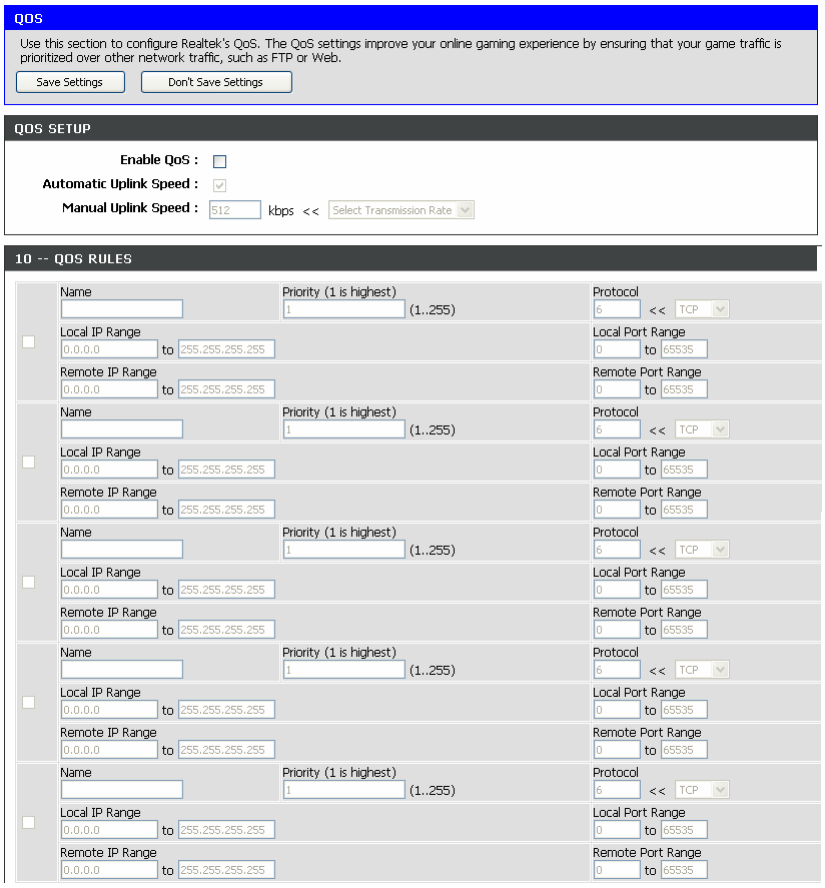
A Demilitarized Zone is used to provide Internet services without sacrificing unauthorized access to its local private network. Typically, the DMZ host contains devices accessible to Internet traffic, such as Web (HTTP) servers, FTP servers, SMTP (e-mail) servers and DNS servers.



Enable DMZ	Check the box to enable DMZ function. If the DMZ Host Function is enabled, it means that you set up DMZ host at a particular computer to be exposed to the Internet so that some applications/software, especially Internet / online game can have two-way connections.
DMZ Host IP Address	Enter the IP address of a particular host in your LAN which will receive all the packets originally going to the WAN port/Public IP address above. **Note:** You need to give your LAN PC clients a fixed/static IP address for DMZ to work properly.
Apply Changes	After completing the settings on this page, click **Apply Changes** button to save the settings.
Reset	Click **Reset** button to restore to default values.

QoS

Use this section to configure QoS. The QoS settings improve your online gaming experience by ensuring that your game traffic is prioritized over other network traffic, such as FTP or Web.

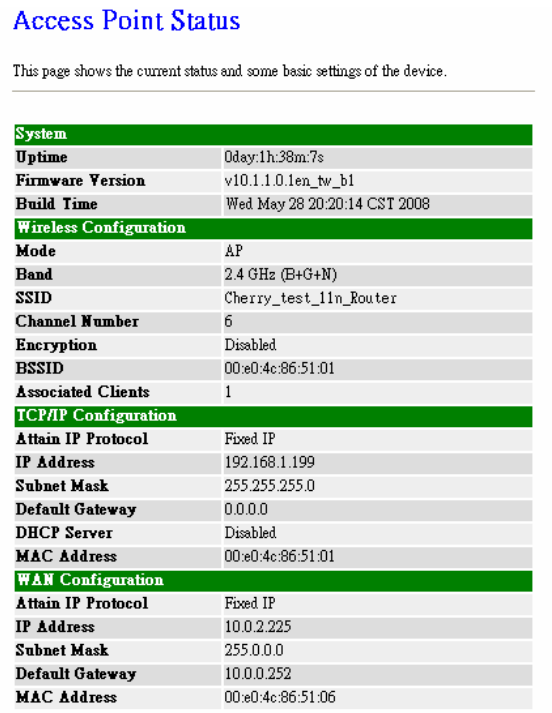


Enable QoS	Check the box to enable QoS function. If the DMZ Host Function is enabled, it means that you set up DMZ host at a particular computer to be exposed to the Internet so that some applications/software, especially Internet / online game can have two-way connections. You can select automatic or manual uplink speed.
Automatic Uplink Speed	Check the box to enable the automatic uplink speed function.
Manual Uplink Speed	You can manually enter the transmission rate in the blank field or select transmission rate, 512 kbps, 1024 kbps, 2048 kbps, 4096 kbps, 6144 kbps or 8192 kbps form the pull-down menu.

Management

Status

This page shows the current status and some basic settings of the device.



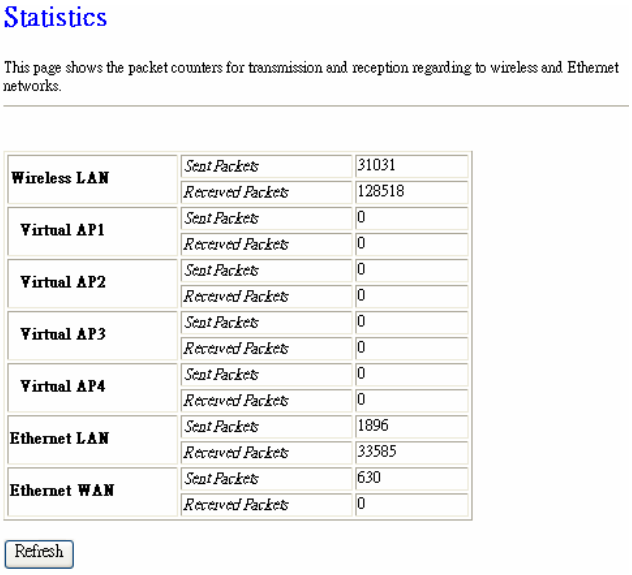
Access Point Status

This page shows the current status and some basic settings of the device.

System	
Uptime	0day:1h:38m:7s
Firmware Version	v10.1.1.0.1en_tw_b1
Build Time	Wed May 28 20:20:14 CST 2008
Wireless Configuration	
Mode	AP
Band	2.4 GHz (B+G+N)
SSID	Cherry_test_11n_Router
Channel Number	6
Encryption	Disabled
BSSID	00:e0:4c:86:51:01
Associated Clients	1
TCP/IP Configuration	
Attain IP Protocol	Fixed IP
IP Address	192.168.1.199
Subnet Mask	255.255.255.0
Default Gateway	0.0.0.0
DHCP Server	Disabled
MAC Address	00:e0:4c:86:51:01
WAN Configuration	
Attain IP Protocol	Fixed IP
IP Address	10.0.2.225
Subnet Mask	255.0.0.0
Default Gateway	10.0.0.252
MAC Address	00:e0:4c:86:51:06

Statistics

This page shows the packet counters for transmission and reception regarding to wireless and Ethernet networks.



Statistics

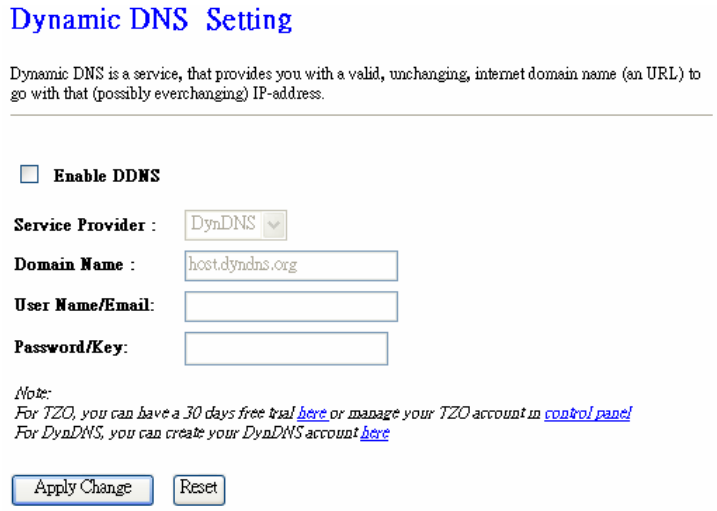
This page shows the packet counters for transmission and reception regarding to wireless and Ethernet networks.

Wireless LAN	*Sent Packets*	31031
	Received Packets	128518
Virtual AP1	*Sent Packets*	0
	Received Packets	0
Virtual AP2	*Sent Packets*	0
	Received Packets	0
Virtual AP3	*Sent Packets*	0
	Received Packets	0
Virtual AP4	*Sent Packets*	0
	Received Packets	0
Ethernet LAN	*Sent Packets*	1896
	Received Packets	33585
Ethernet WAN	*Sent Packets*	630
	Received Packets	0

Refresh

DDNS

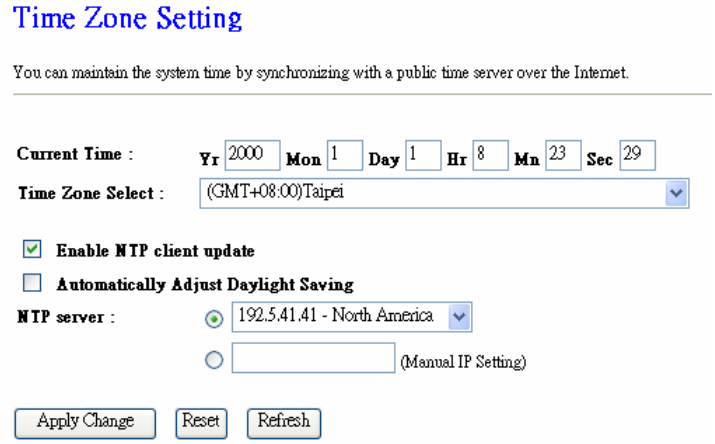
Dynamic DNS is a service that provides you with a valid, unchanging, internet domain name (an URL) to go with that (possibly ever changing) IP-address.



Enable DDNS	Check to enable the DDNS function.
Service Provider	Select the desired DDNS Service Provider DynDNS or TZO from the pull-down list.
Domain Name	Here shows the domain name of the service provider.
User Name/Email	Enter your email that you registered in service provider website. (You can refer to below Note information to apply a account form the service provider website.)
Password/Key	Enter your passwords that you registered in service provider website. Maximum input is 30 alphanumeric characters (case sensitive).
Apply Change	After completing the settings on this page, click Apply Changes button to save the settings.
Reset	Click Reset button to restore to default values.

Time Zone Setting

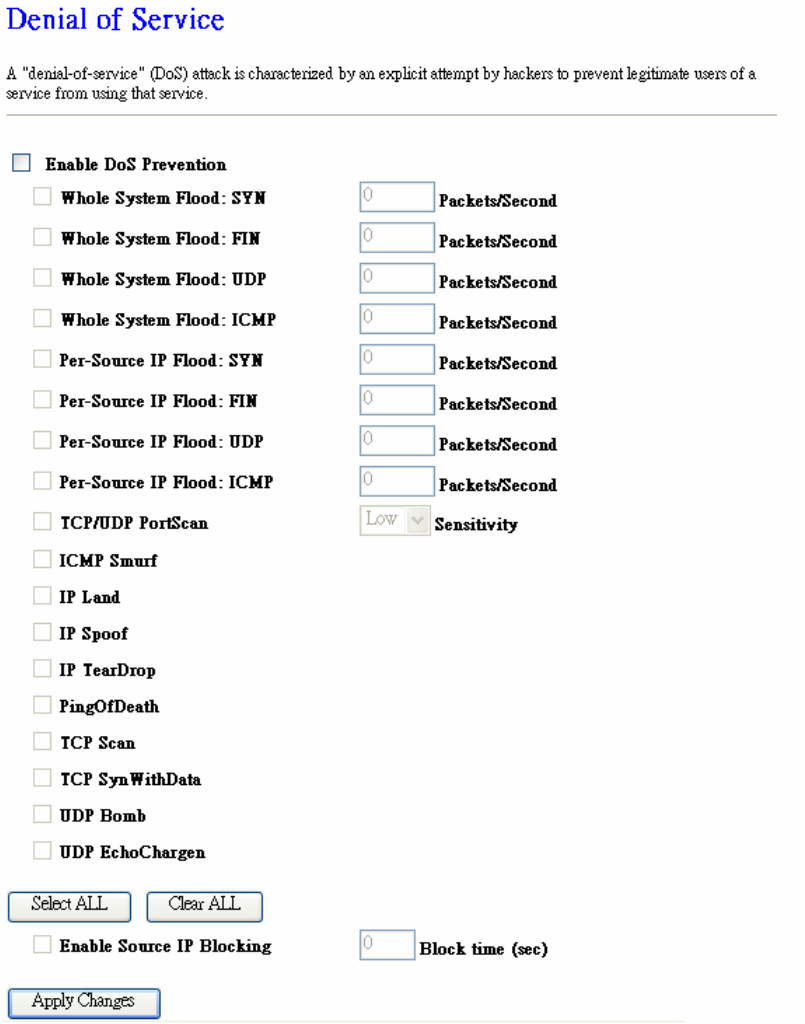
You can maintain the system time by synchronizing with a public time server over the Internet.



Current Time	Enter the current time of this wireless router.
Time Zone Select	Select the local time zone from the pull-down menu.
Enable NTP client update	Check to enable **NTP (**Network Time Protocol Server) **client update** function.
Automatically Adjust Daylight Saving	Check the box to enable this function.
NTP server	You may choose to select NTP server from the pull-down menu or enter an IP address of a specific server manually.
Apply Change	After completing the settings on this page, click **Apply Change** button to save current settings.
Reset	Click **Reset** button to restore to default values.
Refresh	Click **Refresh** button to renew current time.

Denial of Service

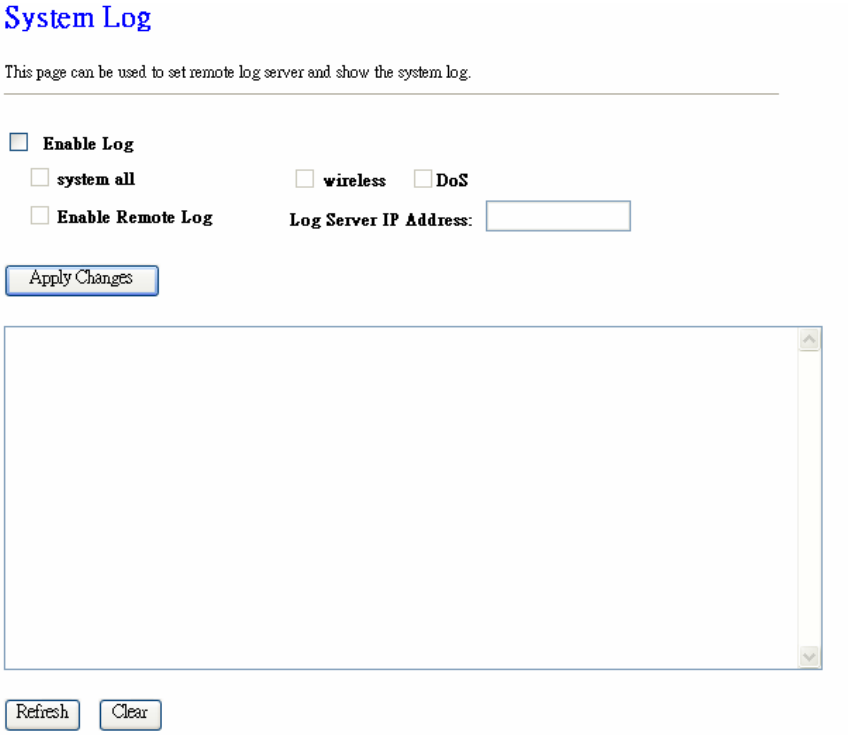
A "denial-of-service" (DoS) attack is characterized by an explicit attempt by hackers to prevent legitimate users of a service from using that service.



Enable DoS Prevention	DoS (Denial of Service) attacks can flood your Internet connection with invalid packets and connection requests, using so much band-width and so many resources that Internet access becomes unavailable. The Wireless Router incorporates protection against DoS attacks. This screen allows you to configure DoS protection. Check the box to enable the DoS settings.
Select All	After you enabled the DoS prevention, you can click to select all DoS preventions.
Clear All	After you enabled the DoS prevention, you can click to uncheck all DoS preventions.
Apply Changes	After completing the settings on this page, click **Apply Change** button to save current settings.

Log

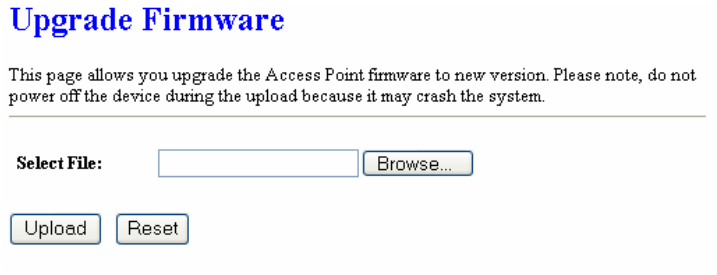
This page can be used to set remote log server and show the system log.



Enable Log	Check to enable logging function.
System all	Activates all logging functions.
Wireless	Only logs related to the wireless LAN will be recorded.
DoS	Only logs related to the DoS protection will be recorded.
Enable Remote Log	Only logs related to the Remote will be recorded.
Log Server IP address	
Apply Changes	After completing the settings on this page, click **Apply Changes** button to save current settings.
Refresh	Click **Refresh** button to renew the logs.
Clear	Click **Clear** button to delete the logs.

Upgrade Firmware

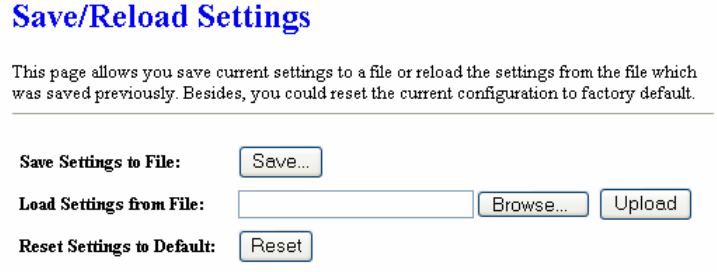
This page allows you upgrade the Access Point firmware to new version. Please note, do not power off the device during the upload because it may crash the system.



Select File	Click the **Browse** button to find and open the firmware file (the browser will display to correct file path.)
Upload	Click the **Upload** button to perform.
Reset	Click **Reset** button to restore to default values.

Save/ Reload Settings

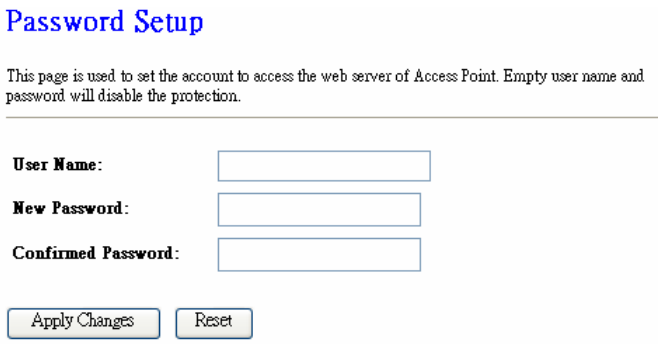
This page allows you save current settings to a file or reload the settings from the file which was saved previously. Besides, you could reset the current configuration to factory default.



Save Settings to File	Click the **Save** button to save the current settings file in the PC.
Load Settings form File	Click the **Browse** button to find and open the previous saved file (the browser will display to correct file path.) Then, click **Upload** button to upload the previous file.
Reset Settings to Default	Click **Reset** button to set the device back to default settings.

Password Setup

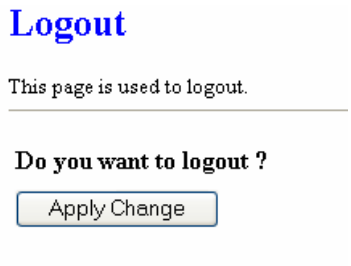
This page is used to set the account to access the web server of Access Point. Empty user name and password will disable the protection.



User Name	Key in a new login user name in the blank field.
New Password	Maximum input is 36 alphanumeric characters (case sensitive.)
Confirmed Password	Key in the password again to confirm.
Apply Changes	After completing the settings on this page, click **Apply Changes** button to save current settings.
Reset	Click **Reset** button to restore to default values.

Logout

This page is used to logout. Click **Apply Change** button to logout the configuration page.



Chapter 4: PC Configuration

Overview

For each PC, the following may need to be configured:

- TCP/IP network settings
- Internet Access configuration
- Wireless configuration

Windows Clients

This section describes how to configure Windows clients for Internet access via the Wireless Router.

The first step is to check the PC's TCP/IP settings.

The Wireless Router uses the TCP/IP network protocol for all functions, so it is essential that the TCP/IP protocol be installed and configured on each PC.

TCP/IP Settings - Overview

If using the default Wireless Router settings and the default Windows TCP/IP settings, no changes need to be made.

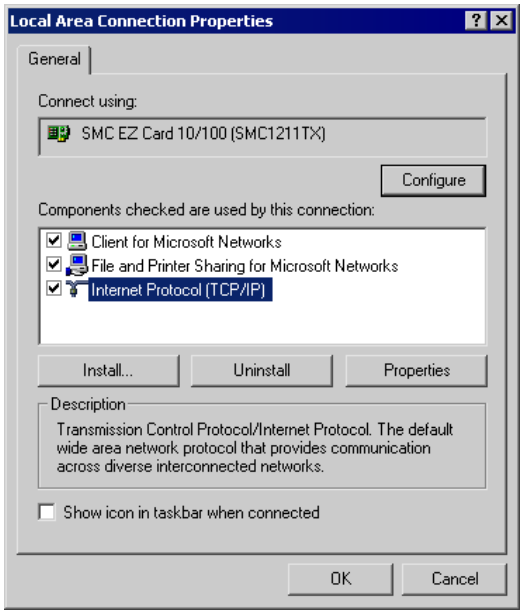
- By default, the Wireless Router will act as a DHCP Server, automatically providing a suitable IP Address (and related information) to each PC when the PC boots.
- For all non-Server versions of Windows, the default TCP/IP setting is to act as a DHCP client.

If using a Fixed (specified) IP address, the following changes are required:

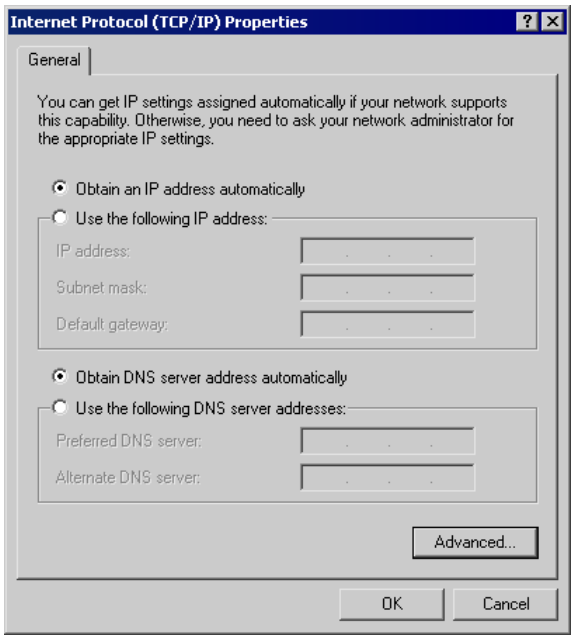
- The *Gateway* must be set to the IP address of the Wireless Router.
- The *DNS* should be set to the address provided by your ISP.

Checking TCP/IP Settings - Windows 2000:

1. Select *Control Panel - Network and Dial-up Connection*.
2. Right - click the *Local Area Connection* icon and select *Properties*. You should see a screen like the following:



3. Select the *TCP/IP* protocol for your network card.
4. Click on the *Properties* button. You should then see a screen like the following.



5. Ensure your TCP/IP settings are correct, as described below.

Using DHCP

To use DHCP, select *Obtain an IP Address automatically*. This is Windows default setting. **Using this setting is recommended**. By default, the Wireless Router will act as a DHCP Server.

Restart your PC to ensure it obtains an IP Address from the Wireless Router.

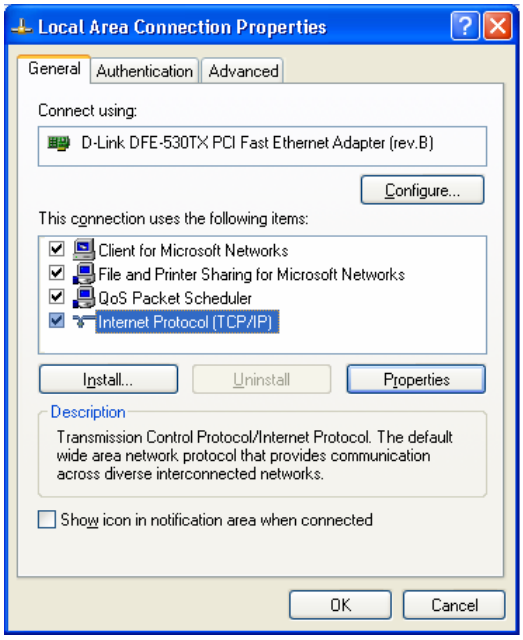
Using a fixed IP Address ("Use the following IP Address")

If your PC is already configured, check with your network administrator before making the following changes.

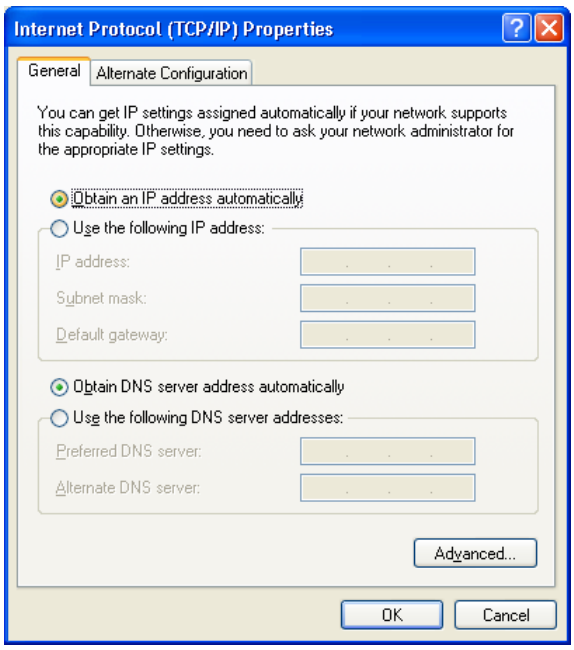
- Enter the Wireless Router's IP address in the *Default gateway* field and click *OK*. (Your LAN administrator can advise you of the IP Address they assigned to the Wireless Router.)
- If the *DNS Server* fields are empty, select *Use the following DNS server addresses*, and enter the DNS address or addresses provided by your ISP, then click *OK*.

Checking TCP/IP Settings - Windows XP

1. Select *Control Panel - Network Connection*.
2. Right click the *Local Area Connection* and choose *Properties*. You should see a screen like the following:



3. Select the *TCP/IP* protocol for your network card.
4. Click on the *Properties* button. You should then see a screen like the following.



5. Ensure your TCP/IP settings are correct.

Using DHCP

To use DHCP, select the radio button *Obtain an IP Address automatically*. This is the default Windows setting. **Using this setting is recommended**. By default, the Wireless Router will act as a DHCP Server.

Restart your PC to ensure it obtains an IP Address from the Wireless Router.

Using a fixed IP Address ("Use the following IP Address")

If your PC is already configured, check with your network administrator before making the following changes.

- In the *Default gateway* field, enter the Wireless Router's IP address and click *OK*. Your LAN administrator can advise you of the IP Address they assigned to the Wireless Router.
- If the *DNS Server* fields are empty, select *Use the following DNS server addresses*, and enter the DNS address or addresses provided by your ISP, then click *OK*.

Internet Access

To configure your PCs to use the Wireless Router for Internet access:

- Ensure that the DSL modem, Cable modem, or other permanent connection is functional.
- Use the following procedure to configure your Browser to access the Internet via the LAN, rather than by a Dial-up connection.

For Windows 2000

1. Select *Start Menu - Settings - Control Panel - Internet Options*.
2. Select the Connection tab, and click the *Setup* button.
3. Select "I want to set up my Internet connection manually, or I want to connect through a local area network (LAN)" and click *Next*.
4. Select "I connect through a local area network (LAN)" and click *Next*.
5. Ensure all of the boxes on the following Local area network Internet Configuration screen are **unchecked**.
6. Check the "No" option when prompted “Do you want to set up an Internet mail account now?”
7. Click *Finish* to close the Internet Connection Wizard.
   Setup is now completed.

For Windows XP

1. Select *Start Menu - Control Panel - Network and Internet Connections*.
2. Select *Set up or change your Internet Connection*.
3. Select the *Connection* tab, and click the *Setup* button.
4. Cancel the pop-up "Location Information" screen.
5. Click *Next* on the "New Connection Wizard" screen.
6. Select "Connect to the Internet" and click *Next*.
7. Select "Set up my connection manually" and click *Next*.
8. Check "Connect using a broadband connection that is always on" and click *Next*.
9. Click *Finish* to close the New Connection Wizard.
   Setup is now completed.

Accessing AOL

To access AOL (America On Line) through the Wireless Router, the *AOL for Windows* software must be configured to use TCP/IP network access, rather than a dial-up connection. The configuration process is as follows:

- Start the *AOL for Windows* communication software. Ensure that it is Version 2.5, 3.0 or later. This procedure will not work with earlier versions.
- Click the *Setup* button.
- Select *Create Location*, and change the location name from "New Locality" to "Wireless Router".
- Click *Edit Location*. Select *TCP/IP* for the *Network* field. (Leave the *Phone Number* blank.)
- Click *Save*, then *OK*.
  Configuration is now complete.
- Before clicking "Sign On", always ensure that you are using the "Wireless Router" location.

Macintosh Clients

From your Macintosh, you can access the Internet via the Wireless Router. The procedure is as follows.

1. Open the TCP/IP Control Panel.
2. Select *Ethernet* from the *Connect via* pop-up menu.
3. Select *Using DHCP Server* from the *Configure* pop-up menu. The DHCP Client ID field can be left blank.
4. Close the TCP/IP panel, saving your settings.

Note:

If using manually assigned IP addresses instead of DHCP, the required changes are:

- Set the *Router Address* field to the Wireless Router's IP Address.
- Ensure your DNS settings are correct.

Linux Clients

To access the Internet via the Wireless Router, it is only necessary to set the Wireless Router as the "Gateway".

Ensure you are logged in as "root" before attempting any changes.

Fixed IP Address

By default, most Unix installations use a fixed IP Address. If you wish to continue using a fixed IP Address, make the following changes to your configuration.

- Set your "Default Gateway" to the IP Address of the Wireless Router.
- Ensure your DNS (Name server) settings are correct.

To act as a DHCP Client (recommended)

The procedure below may vary according to your version of Linux and X -windows shell.

1. Start your X Windows client.
2. Select *Control Panel - Network*
3. Select the "Interface" entry for your Network card. Normally, this will be called "eth0".
4. Click the *Edit* button, set the "protocol" to "DHCP", and save this data.
5. To apply your changes
    - Use the "Deactivate" and "Activate" buttons, if available.
    - OR, restart your system.

Other Unix Systems

To access the Internet via the Wireless Router:

- Ensure the "Gateway" field for your network card is set to the IP Address of the Wireless Router.
- Ensure your DNS (Name Server) settings are correct.

Wireless Station Configuration

This section applies to all Wireless stations wishing to use the Wireless Router's Access Point, regardless of the operating system which is used on the client.

To use the Wireless Access Point in the Wireless Router, each Wireless Station must have compatible settings, as follows:

Mode	The mode must be set to ***Infrastructure***.
SSID (ESSID)	This must match the value used on the Wireless Router. The default value is **`Untitled`** **Note! The SSID is case sensitive.**
WEP	By default, WEP on the Wireless Router is **disabled**. • If WEP remains disabled on the Wireless Router, all stations must have WEP disabled. • If WEP is enabled on the Wireless Router, each station must use the same settings as the Wireless Router.
WPA **WPA2 (AES)** **WPA2 Mixed**	**WPA (TKIP/AES)/ WPA2 (AES)/ WPA2 Mixed:** If one of these securities is enabled on the Wireless Router, each station must use the same settings as the Wireless Router. If there is no security is enabled on the Wireless Router, the security of each station should be disabled as well.

Note: *By default, the Wireless Router will allow both 802.11b,802.11g and 802.11n connections.*

Appendix A: Troubleshooting

Overview

This chapter covers some common problems that may be encountered while using the Wireless Router and some possible solutions to them. If you follow the suggested steps and the Wireless Router still does not function properly, contact your dealer for further advice.

General Problems

Problem 1:	**Can't connect to the Wireless Router to configure it.**
Solution 1:	Check the following: • The Wireless Router is properly installed, LAN connections are OK, and it is powered ON. • Ensure that your PC and the Wireless Router are on the same network segment. (If you don't have a router, this must be the case.) • If your PC is set to "Obtain an IP Address automatically" (DHCP client), restart it. • If your PC uses a Fixed (Static) IP address, ensure that it is using an IP Address within the range 192.168.1.1 to 192.168.1.253 and thus compatible with the Wireless Router's default IP Address of 192.168.1.254. Also, the Network Mask should be set to 255.255.255.0 to match the Wireless Router. In Windows, you can check these settings by using *Control Panel-Network* to check the *Properties* for the TCP/IP protocol.

Internet Access

Problem 1:	**When I enter a URL or IP address I get a time out error.**
Solution 1:	A number of things could be causing this. Try the following troubleshooting steps. • Check if other PCs work. If they do, ensure that your PCs IP settings are correct. If using a Fixed (Static) IP Address, check the Network Mask, Default gateway and DNS as well as the IP Address. • If the PCs are configured correctly, but still not working, check the Wireless Router. Ensure that it is connected and ON. Connect to it and check its settings. (If you can't connect to it, check the LAN and power connections.) • If the Wireless Router is configured correctly, check your Internet connection (DSL/Cable modem etc) to see that it is working correctly.
Problem 2:	**Some applications do not run properly when using the Wireless Router.**
Solution 2:	The Wireless Router processes the data passing through it, so it is not transparent. Use the *Special Applications* feature to allow the use of Internet applications which do not function correctly. If this does solve the problem you can use the *DMZ* function. This should work with almost every application, but: • It is a security risk, since the firewall is disabled. • Only one (1) PC can use this feature.

Wireless Access

Problem 1:	**My PC can't locate the Wireless Access Point.**
Solution 1:	Check the following. • Your PC is set to *Infrastructure Mode*. (Access Points are always in *Infrastructure Mode*) • The SSID on your PC and the Wireless Access Point are the same. Remember that the SSID is case-sensitive. So, for example "Workgroup" does NOT match "workgroup". • Both your PC and the Wireless Router must have the same setting for security. The default setting for the Wireless Router is disabled, so your wireless station should also have security disabled. • If security of the Wireless Router is on, your PC must have the same security enabled. • If the Wireless Router's *Wireless* screen is set to *Allow LAN access to selected Wireless Stations only*, then each of your Wireless stations must have been selected, or access will be blocked. • To see if radio interference is causing a problem, see if connection is possible when close to the Wireless Router. Remember that the connection range can be as little as 100 feet in poor environments.
Problem 2:	**Wireless connection speed is very slow.**
Solution 2:	The wireless system will connect at the highest possible speed, depending on the distance and the environment. To obtain the highest possible connection speed, you can experiment with the following: • Wireless Router location. Try adjusting the location and orientation of the Wireless Router. • Wireless Channel If interference is the problem, changing to another channel may show a marked improvement. • Radio Interference Other devices may be causing interference. You can experiment by switching other devices Off, and see if this helps. Any "noisy" devices should be shielded or relocated. • RF Shielding Your environment may tend to block transmission between the wireless stations. This will mean high access speed is only possible when close to the Wireless Router.

Appendix B: About Wireless LANs

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

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.

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 channel 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.)

Note to US model owner: To comply with US FCC regulation, the country selection function has been completely removed from all US models. The above function is for non-US models only.

Security

WEP

WEP (Wired Equivalent Privacy) is a standard 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.

If WEP is used, the Wireless Stations and the Access Point must have the same settings for each of the following:

WEP	64 Bits, 128 Bits.
Key	For 64 Bits encryption, the Key value must match. For 128 Bits encryption, the Key value must match.
WEP Authentication	Open System or Shared Key.

WPA/WPA2

WPA/WPA2 (Wi-Fi Protected Access) is more secure than WEP. It uses a "Shared Key" which allows the encryption keys to be regenerated at a specified interval. There are four encryption options: **TKIP, AES, TKIP-AES** and additional setup for **RADIUS** is required in this method.

WPA-PSK/WPA2-PSK

WPA/WPA2 (Wi-Fi Protected Access using Pre-Shared Key) is recommended for users who are not using a RADIUS server in a home environment and all their clients support WPA/WPA2. This method provides a better security.

Encryption	**WEP Key 1~4**	**Passphrase**
TKIP	**NOT REQUIRED**	**8-63 characters**
AES		

802.1x

With **802.1x** authentication, a wireless PC can join any network and receive any messages that are not encrypted, however, additional setup for **RADIUS** to issue the WEP key dynamically will be required.

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, but the SSID can not set to be null (blank).
WEP	The Wireless Stations and the Access Point must use the same settings for WEP (64 Bit, 128 Bit). **WEP Key:** If WEP is enabled, the Key must be the same on the Wireless Stations and the Access Point. **WEP Authentication:** If WEP is enabled, all Wireless Stations must use the same setting as the Access Point (either "Open System" or "Shared Key").
WPA **WPA2 (AES)** **WPA2 Mixed**	WPA (TKIP/AES)/ WPA2 (AES)/ WPA2 Mixed: If one of these securities is enabled on the Wireless Router, each station must use the same settings as the Wireless Router. If there is no security is enabled on the Wireless Router, the security of each station should be disabled as well.

Appendix C: Specifications

802.11n/b/g Wireless Broadband Router

Standards	IEEE 802.11 n/b/g standards compliant
Antenna	2 Dipole antennas(2dBi)
Security	WEP 64, 128 WPA, WPA2
Frequency Range	2.400 ~ 2.4835GHz (subject to local regulations)
Number of Selectable Channels	USA and Canada – 11 Most European countries – 13 Japan – 14
Data Rate	802.11b: 1, 2, 5.5, 11Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11n: up to 300Mbps
Coverage Area	Indoor: up to 100M Outdoor: up to 300M
Transmit Power	802.11g : 15 +/- 1.5dBm @ normal temp 802.11b : 19 +/- 1.5dBm @ normal temp 802.11n : 13 +/- 1.5dBm @ normal temp
Receiver Sensitivity	11Mbps @ -85dBm 54Mbps @ -73dBm Typtical 300Mbps @ -68dBm
Physical Specifications	Weight : 150g Dimension : 150(L)* 106(W)* 27(H) mm
Environment Specifications	Operating Temp : 0OC to 50 OC Storage Temp : -20 OC to 70 OC Operating Humidity : 10% to 90% Non-Condensing Storage Humidity : 5% to 90% Non-Condensing
Power Requirement	DC 12V/1A
Certifications:	FCC, CE
Warranty	12 months