802.11 b/g Access Point

User's Guide

FCC Certifications

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 or more of the following measures:

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

CAUTION:

Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the 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.

FCC RF Radiation Exposure Statement

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

CE Mark Warning

This is a Class B product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

All trademarks and brand names are the property of their respective proprietors.

Specifications are subject to change without prior notification.

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

-

Table of Content

Introduction **1**
FEATURES 1
APPLICATION 2
PARTS NAMES AND FUNCTIONS 3
FACTORY DEFAULT SETTINGS 5
Wireless AP *5*
Hardware Connection **6**
Check the LEDs: *7*
About the Operation Modes **8**
ACCESS POINT MODE 8
WDS REPEATER MODE 8
CLIENT MODE (INFRASTRUCTURE) 9
CLIENT MODE (AD-HOC) 9
WDS BRIDGE MODE 9
Configuration **10**
LOGIN 10
STATUS 11
System *11*
Statistics *12*
WIRELESS 13
Basic Settings *13*
Advanced Settings *14*
Security *18*
Access Control *20*
TCP/IP 22
Basic *22*
OTHER 24
Upgrade Firmware *24*
Save/Reload Settings *25*
Password *27*
System Log *27*

INTRODUCTION

This is an IEEE802.11b/g compliant 11 Mbps & 54 Mbps Ethernet Wireless Access Point. The Wireless Access Point is equipped with two 10/100 M Auto-sensing Ethernet ports for connecting to LAN and also for cascading to next Wireless Access Point.

This Access Point provides 64/128bit WEP encryption, WPA and IEEE802.1x which ensures a high level of security to protect users' data and privacy. The MAC Address filter prevents the unauthorized MAC Addresses from accessing your Wireless LAN. Your network security is therefore double assured.
The web-based management utility is provided for easy configuration that your wireless network connection is ensured to be always solid and hassle free.

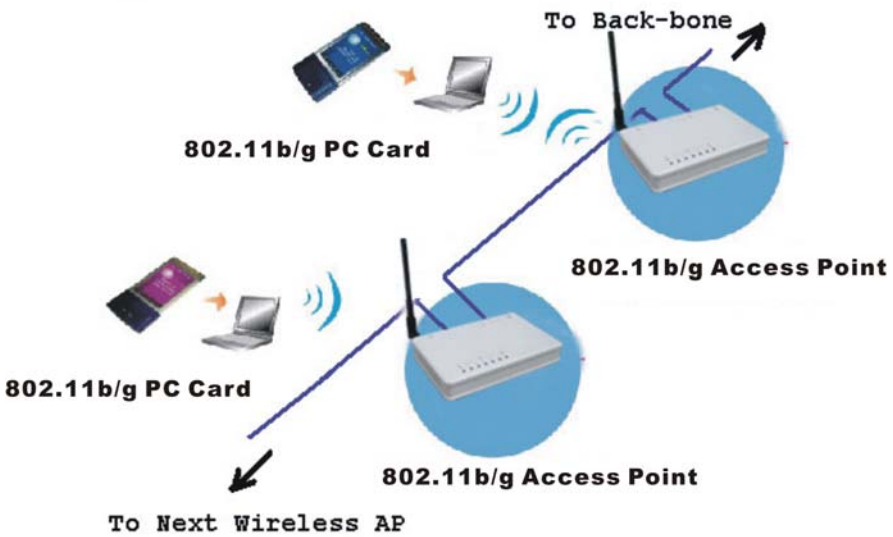
Features

- Two LAN ports for Wireless AP cascade
- Support WPA
- Support AP client mode
- Support WDS for bridge mode
- Support data rate automatic fallback
- Automatic channel selection
- Client access control
- Support 802.1x/Radius client with EAP-TLS, TKIP, AES encryption
- Support IAPP
- Adjustable Tx power, Tx rate, and SSID broadcast
- Allow WEP 64/128 bit
- Web interface management
- Support System event log and statistics
- MAC filtering (For wireless only)
- Support High power
- Support POE (Power Over Ethernet), which enables an Ethernet network cable to deliver both data and power

Application

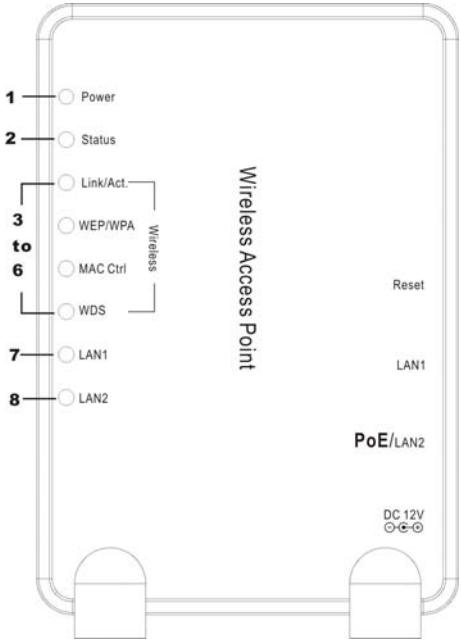
Example 1

Example 2



Parts Names and Functions

1. Front Panel: (LED Indicators)

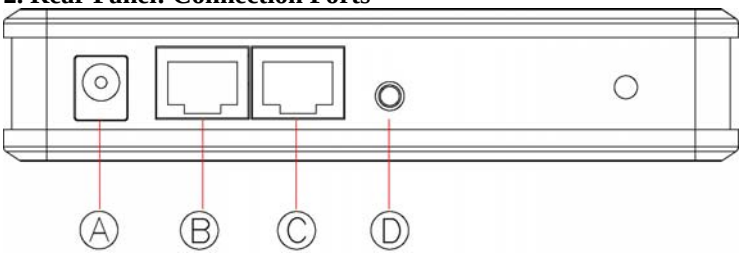


	LED Indicator	Color	Status	
			Solid	**Flashing**
1	**Power**	Green	Turns solid green when the power is applied to this device.	N/A.
2	**Status**	Red	Turns solid red when the device is booting. After booting successfully, the light will be turned off.	
3~6 Wireless	**Link/Act.**	Green	Turns solid green when wireless interface is turned on.	Receiving/ Sending data
	WEP/WPA	Orange	Turns solid orange when wireless security is enabled.	N/A
	MAC Ctrl	Orange	Turns solid orange when MAC Control is enabled.	N/A

	WDS	Orange	Turns solid orange when WDS is enabled.	N/A
7	**LAN 1**	Green	Turns solid green when linked to a local network.	Receiving/ Sending data
8	**LAN 2**			

Table 1: LED Indicators

2. Rear Panel: Connection Ports



	Port/button	Functions
A	**12V DC**	Connects the power adapter plug
B	**LAN2 (PoE 48V)**	Connects to Ethernet
C	**LAN1**	Connects to Ethernet
D	**(Factory) RESET**	Press for less than 5 seconds to reboot this device. Press for over 5 seconds to restore factory settings. Performing the Factory Reset will erase all previously device settings.

Table 2: Connection Ports

Factory Default Settings

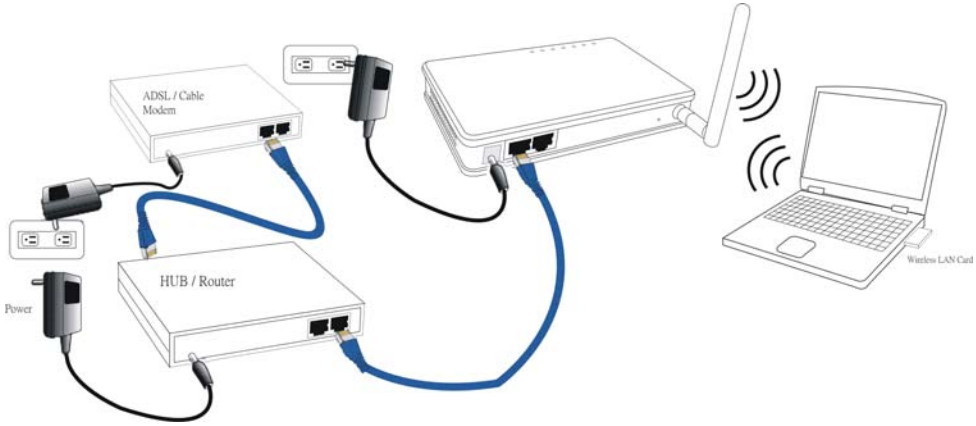
Setting	Wireless Access Point
Device Name	**Wireless AP**
SSID	Default value: 802.11g-AP
Channel	**11**
WEP	Default value: **Disabled**
IP Address	**192.168.1. 254**

▪

HARDWARE CONNECTION

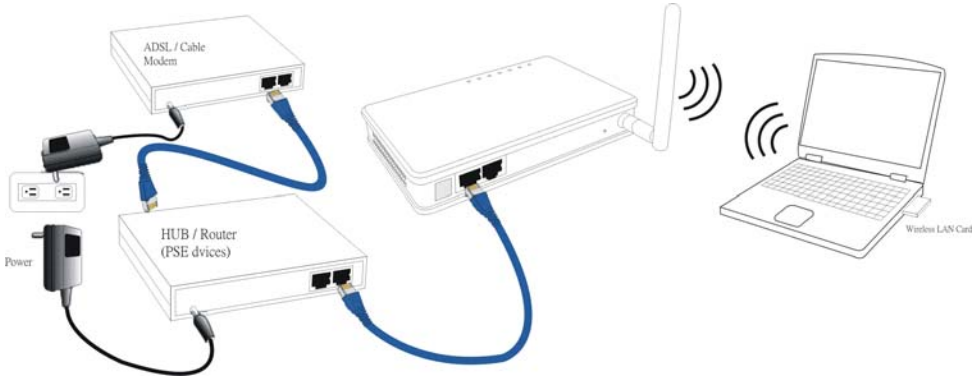
Note: Before you starting hardware connection, you are advised to find an appropriate location to place the Access Point. Usually, the best place for the Access Point is at the center of your wireless network, with line of straight to all your wireless stations. Also, remember to adjust the antenna; usually the higher the antenna is placed, the better will the performance be.

Connection of using the included Power adapter:



1. **Connect to your local area network:** connect a **Ethernet cable** to one of the **Ethernet** port (LAN1 or LAN2) of this Wireless Access Point, and the other end to a hub, switch, router, or another wireless access point.
2. **Power on the device**: Connect the included AC power adapter to the Wireless Access Point's power port and the other end to a wall outlet.

Connection of using PoE:



The hardware connection is basically the same as using a power adapter to supply power to your wireless access point, except for a different power origin it gains. With PoE, your

wireless access point gains power from a PSE device through simply an Ethernet UTP cable!

Check the LEDs:

The Power and ***LAN #*** LEDs should be ON. LAN# LED will even blink if there is traffic.

The ***Link/Act*** LED will be on in static when wireless interface is turned on.

If the ***Status*** LED glows after self-test , it means this Wireless Access Point fails on self test. Please ask your dealer for technical support.

3. **Configure your PC:** Make sure your local PC(s) has wireless network adapter installed.

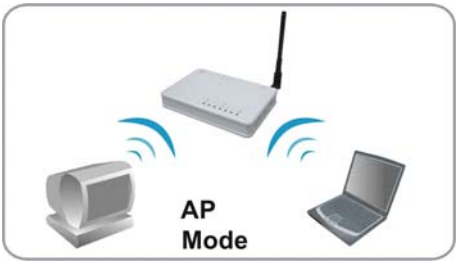
ABOUT THE OPERATION MODES

This device provides four operational applications with **Access Point, Bridge, Client (Ad-hoc) and Client (Infrastructure)** modes, which are mutually exclusive.

This device is shipped with configuration that is functional right out of the box. If you want to change the settings in order to perform more advanced configuration or even change the mode of operation, you can use the web-based utility provided by the manufacturer as described in the following sections.

Access Point Mode

When acting as an access point, this device connects all the stations (PC/notebook with wireless network adapter) to a wired network. All stations can have the Internet access if only the Access Point has the Internet connection.

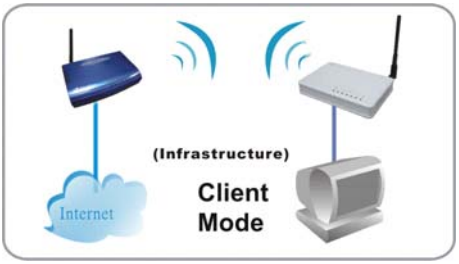


WDS Repeater Mode

While acting as Bridges, AP1 (with Station 1 being associated to) and AP2 (with Station 2 being associated) can communicate with each other through wireless interface (with WDS). Thus Station 1 can communicate with Station 2 and both Station 1 and Station 2 are able to access the Internet if only AP1 or AP2 has the Internet connection.

Client Mode (Infrastructure)

If set to Client (Infrastructure) mode, this device can work like a wireless station when it's connected to a computer so that the computer can send packets from wired end to wireless interface.

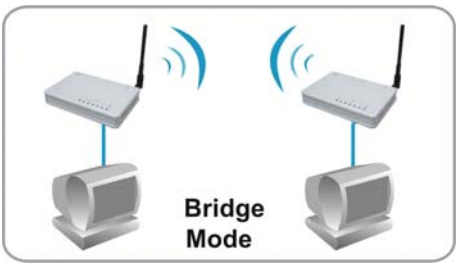


Client Mode (Ad-hoc)

If set to the Client (Ad-hoc) mode, this device can work like a wireless station when it is connected to a computer so that the computer can send packets from wired end to wireless interface. You can share files and printers between wireless stations (PC and laptop with wireless network adapter installed).

WDS 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 …etc. 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.



CONFIGURATION

Login

1. Start your computer. Connect an Ethernet cable between your computer and the Wireless Access Point.
2. Make sure your wired station is set to the same subnet as the Wireless Access Point, i.e. 192.168.1.254
3. Start your WEB browser. In the *Address* box, enter the following:

HTTP://192. 168. 1. 254

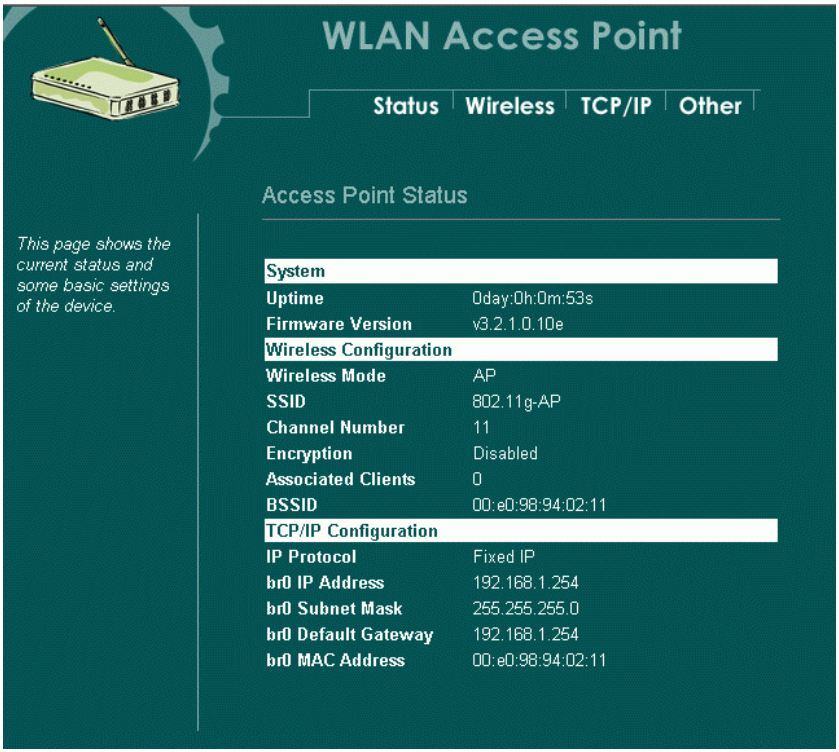
The configuration menu is divided into four categories: **Status, Wireless, TCP/IP,** and **Other settings**. Click on the desired setup item to expand the page in the main navigation page. The setup pages covered in this utility are described below.

No password required for the first login (the default setting), just enter the User name **'admin'** which is systematically fixed. Afterwards, you can assign a password for a security consideration without changing the fixed user name.

Status

In this screen, you can see the current settings and status of this Access Point. You can change settings by selecting specific tab described in below.

System

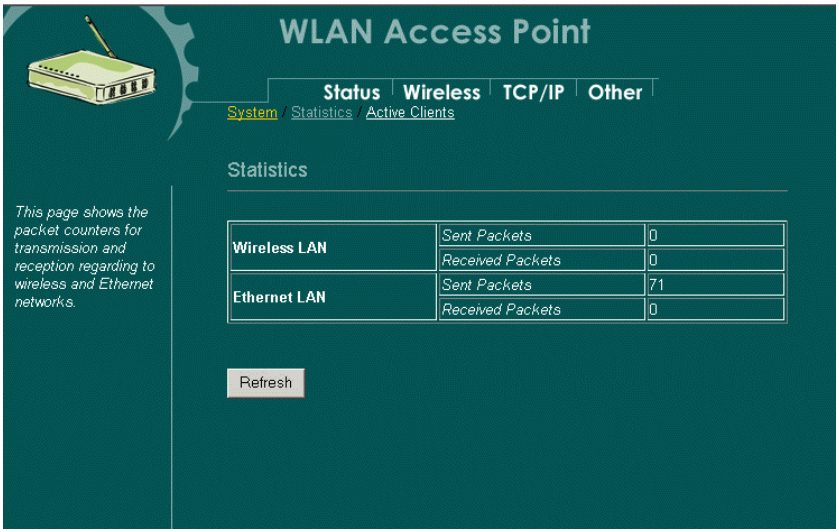


System	
Uptime	The time period since the device was up.
Firmware Version	The current version of the firmware installed in this device.
Wireless Configuration	
Wireless Mode	There are four modes supported, **Access Point, Client (Ad-hoc and Infrastructure), WDS Bridge and WDS repeater**. The default mode is **Access Point**. If you want to change to **bridge** mode, please go to **Wireless/WDS Setting** to enable the WDS function.
SSID	The SSID differentiates one WLAN from another, therefore, all access points and all devices attempting to connect to a specific WLAN must use the same SSID. It is case-sensitive and must not exceed 32 characters. A device will not be permitted to join the BSS unless it can provide the unique

	SSID. An SSID is also referred to as a network name because essentially it is a name that identifies a wireless network.
Channel Number	The number of channels supported depends on the region of this Access Point. All stations communicating with the Access Point must use the same channel.
Encryption	WEP Encryption (Wired Equivalent Privacy) is set to **Disabled** by default. When WEP is enabled, data packet is encrypted before being transmitted. The WEP prevents data packets from being eavesdropped by unrelated people. By using WEP data encryption, there may be a significant degradation of the data throughput on the wireless link.
Associated Clients	Displays the total number of clients associated to this AP. You can have up to 64 clients to associate to this Access Point.
BSSID	**BSSID** displays the ID of current BSS, which uniquely identifies each BSS. In AP mode, this value is the MAC address of this Access Point.
TCP/IP Configuration	
IP Protocol	Display the method to get the IP of this AP, which could be obtained by Fixed-IP or DHCP-client.
br0 IP Address	Current IP address for this Access Point
br0 Subnet Mask	Current Subnet mask for this Access Point
br0 Default Gateway	Default Gateway for this Access Point
br0 MAC Address	The MAC Address for this Access Point

Statistics

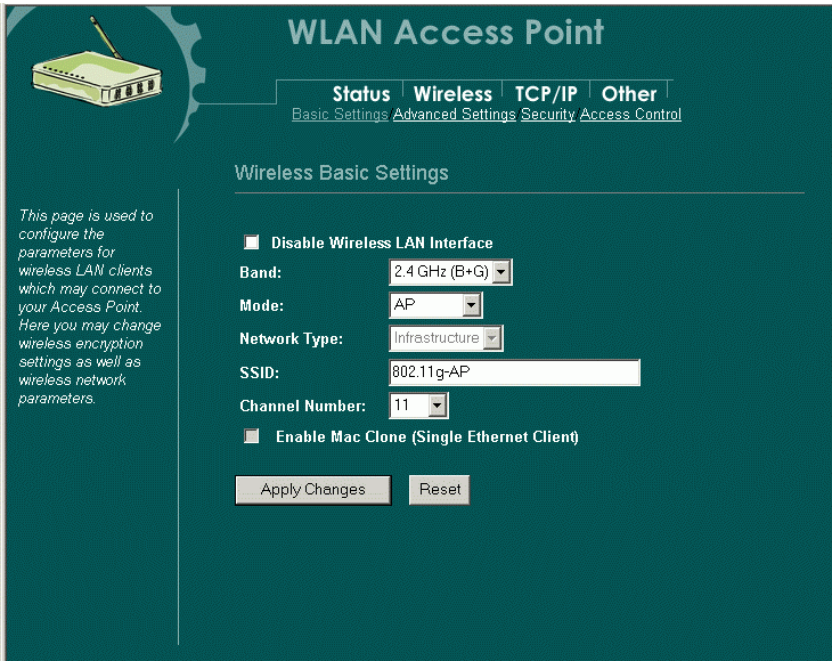
The Statistics table shows the packets sent/received over wireless and ethernet LAN respectively.



Wireless

Basic Settings

This page includes all primary and major parameters. Any parameter change will cause the device to reboot for the new settings to take effect.



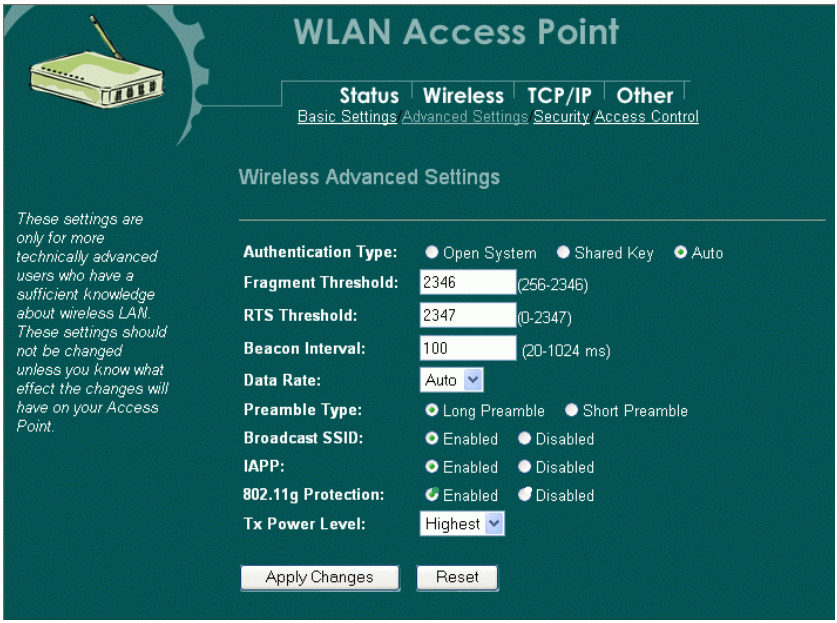
☐ **Disable Wireless LAN Interface**	Check the box to disable the Wireless LAN Interface, by so doing, you won't be able to make wireless connection with this Access Point in the network you are located. In other words, this device will not be visible by any wireless station.
Band	You can choose one mode of the following you need. ⦿ 2.4GHz **(B):** 802.11b supported rate only. ⦿ 2.4GHz **(G):** 802.11g supported rate only. ⦿ 2.4GHz **(B+G):** 802.11b supported rate and 802.11g supported rate. The default is 2.4GHz **(B+G)** mode.
Mode	This Wireless Access Point can support four

	modes **AP**, **Client, Bridge and Repeater.**
Network Type	When in **Client** mode, you can select between **Ad-Hoc** and **Infrastructure**.
SSID	The SSID differentiates one WLAN from another, therefore, all access points and all devices attempting to connect to a specific WLAN must use the same SSID. It is case-sensitive and must not exceed 32 characters. A device will not be permitted to join the BSS unless it can provide the unique SSID. An SSID is also referred to as a network name because essentially it is a name that identifies a wireless network.
Channel Number	Allow user to set the channel **manually** or **automatically**. If set channel manually, just select the channel you want to specify. If "Auto" is selected, user can set the channel range to have Wireless Access Point automatically survey and choose the channel with best situation for communication. The number of channels supported depends on the region of this Access Point. All stations communicating with the Access Point must use the same channel.
☐**Enable Mac Clone (Single Ethernet Client)**	If your ISP restricts service to PCs only, use the MAC Clone feature to copy a PC Media Access Control (MAC) address to your router. This procedure will cause the router to appear as a single PC, while allowing online access to multiple computers on your network.

Apply Changes	Press to save the new settings on the screen.
Reset	Press to discard the data you have entered since last time you press Apply Change.

Advanced Settings

It is not recommended that settings in this page to be changed unless advanced users want to change to meet their wireless environment for optimal performance



Authentication Type	To provide a certain level of security, the IEEE 802.11 standard has defined two types of authentication methods, Open System and Shared Key. With Open System authentication, a wireless PC can join any network and receive any messages that are not encrypted. With Shared Key authentication, only those PCs that possess the correct authentication key can join the network. By default, IEEE 802.11 wireless devices operate in an Open System network. Wired Equivalent Privacy (WEP) data encryption is used when the wireless devices are configured to operate in Shared Key authentication mode. If the Access Point is using **Open System**, then the wireless adapter will need to be set to the same authentication mode. **Shared Key** is used when both the sender and the recipient share a secret key. Select **Auto** for the network adapter to select the Authentication mode automatically depending on the Access

	Point Authentication mode.
Fragment Threshold	Fragmentation mechanism is used for improving the efficiency when high traffic flows along in the wireless network. If your 802.11g Wireless LAN PC Card 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. "Hidden Node" is a situation in which two stations are within range of the same Access Point, but are not within range of each other. Therefore, they are hidden nodes for each other. When a station starts data transmission with the Access Point, it might not notice that the other station is already using the wireless medium. When these two stations send data at the same time, they might collide when arriving simultaneously at the Access Point. The collision will most certainly result in a loss of messages for both stations. Thus, the RTS Threshold mechanism provides a solution to prevent data collisions. When you enable RTS Threshold on a suspect "hidden station", this station and its Access Point will use a Request to Send (RTS). The station will send an RTS to the Access Point, informing that it is going to transmit the data. Upon receipt, the Access Point will respond with a CTS message to all station within its range to notify all other stations to defer transmission. It will also confirm the requestor station that the Access Point has reserved it for the time-frame of the requested transmission. 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.*. The default value is **2347**. **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 (and learn whether there are buffered frames at the access point).
Data Rate	By default, the unit adaptively selects the highest possible

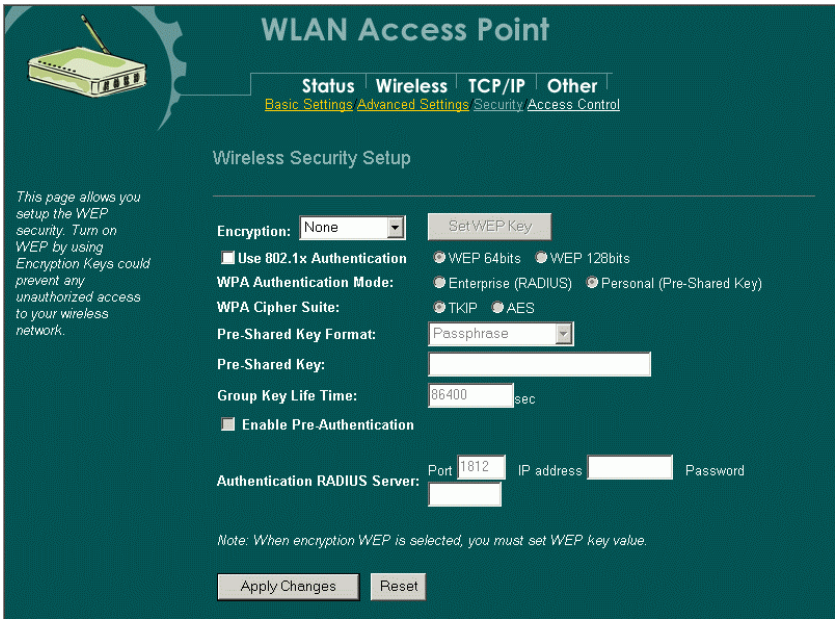
	rate for transmission. Select the basic rates to be used among the following options: Auto, 1, 2, 5.5, 11or 54 Mbps. For most networks the default setting is **Auto** which is the best choice. When **Auto** is enabled the transmission rate will select the optimal rate. If obstacles or interference are present, the system will automatically fall back to a lower rate.
Preamble Type	A preamble is a signal used in wireless environment to synchronize the transmitting timing including Synchronization and Start frame delimiter. In a "noisy" network environment, the Preamble Type should be set to **Long Preamble**. The **Short Preamble** is intended for applications where minimum overhead and maximum performance is desired. If in a "noisy" network environment, the performance will be decreased.
Broadcast SSID	Select **enabled** to allow all the wireless stations to detect the SSID of this Access Point.
IAPP	IAPP (Inter Access Point Protocol) is designed for the enforcement of unique association throughout a ESS (Extended Service Set) and a secure exchange of station's security context between current access point (AP) and new AP during handoff period.
802.11g Protection	The 802.11g standard includes a protection mechanism to ensure mixed 802.11b and 802.11g operations. If there is no such kind of mechanism exists, the two kinds of standards may mutually interfere and decrease network's performance.
Tx Power Level	Select the Transmission rate level ranging from **Highest**, **High**, **Middle**, **Low** and **Lowest**.

Apply Change	Press to save the new settings on the screen.
Reset	Press to discard the data you have entered since last time you press Apply Change.

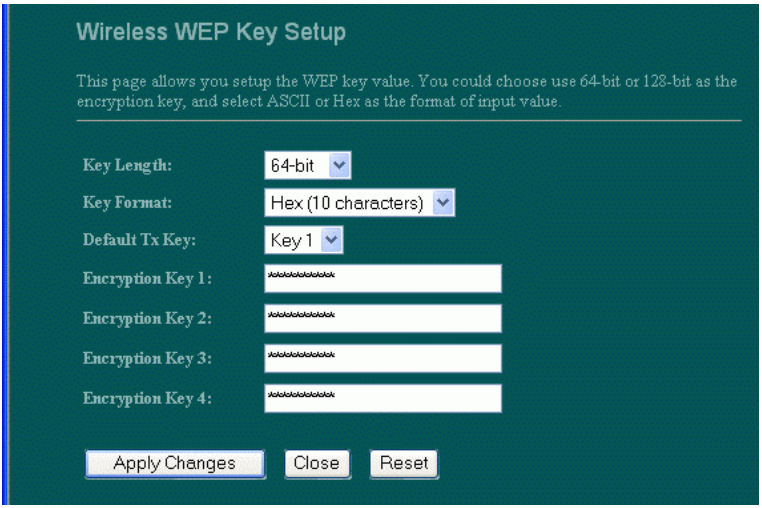
Security

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.

Encryption**:** **None** (Encryption is set to **None** by default. **)**
If **Use 802.1x Authentication** is selected, the RADIUS Server will proceed to check the 802.1x Authentication.



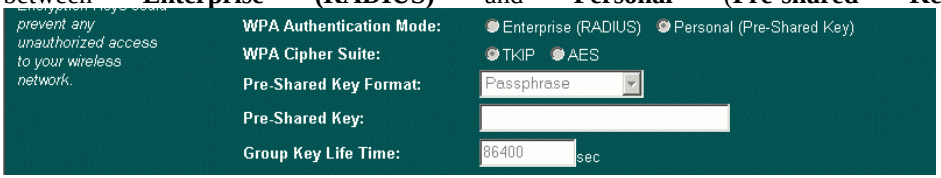
Encryption: WEP
If **WEP** is selected, users will have to **Set WEP keys** either manually, or select to **Use 802.1x Authentication** to make the RADIUS server to issue the WEP key dynamically.



Set WEP key	▪ Click the **Set WEP Keys** will prompt you a window to set **64bit** or **128bit** Encryption. ▪ Select **HEX** if you are using hexadecimal numbers (**0-9, or A-F**). Select **ASCII** if you are using ASCII characters (**case-sensitive**). ▪ **Ten hexadecimal digits** or **five ASCII characters** are needed if **64-bit WEP** is used; **26 hexadecimal digits** or **13 ASCII characters** are needed if **128-bit WEP** is used.

Encryption: WPA (TKIP)

WPA (TKIP): If **WPA** is selected, users will have to select the Authentication modes between **Enterprise (RADIUS)** and **Personal (Pre-shared Key)**.



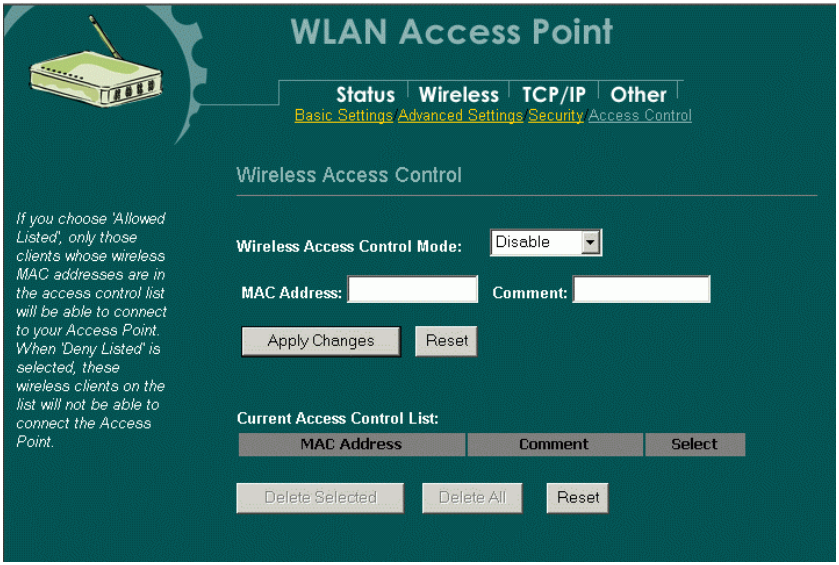
Pre-shared Key	Pre-Shared-Key serves as a password. Users may key in a 8 to 63 characters string to set the password or leave it blank, in which the 802.1x Authentication will be activated. Make sure the same password is used on client's end. There are two formats for choice to set the Pre-shared key, i.e. **Passphrase** and **Hex**. 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.

Group Key Life Time	Enter the number of seconds that will elapse before the group key change automatically. The default is 86400 seconds.
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. Preauthentication 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 RADIUS Server	**Port**: Enter the RADIUS Server's port number provided by your 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 Change	Press to save the new settings on the screen.
Reset	Press to discard the data you have entered since last time you press Apply Change.

Access Control

When **Enable Wireless Access Control** is checked, only those clients whose wireless MAC addresses listed in the access control list can access this Access Point. If the list contains no entries with this function being enabled, then no clients will be able to access this Access Point.

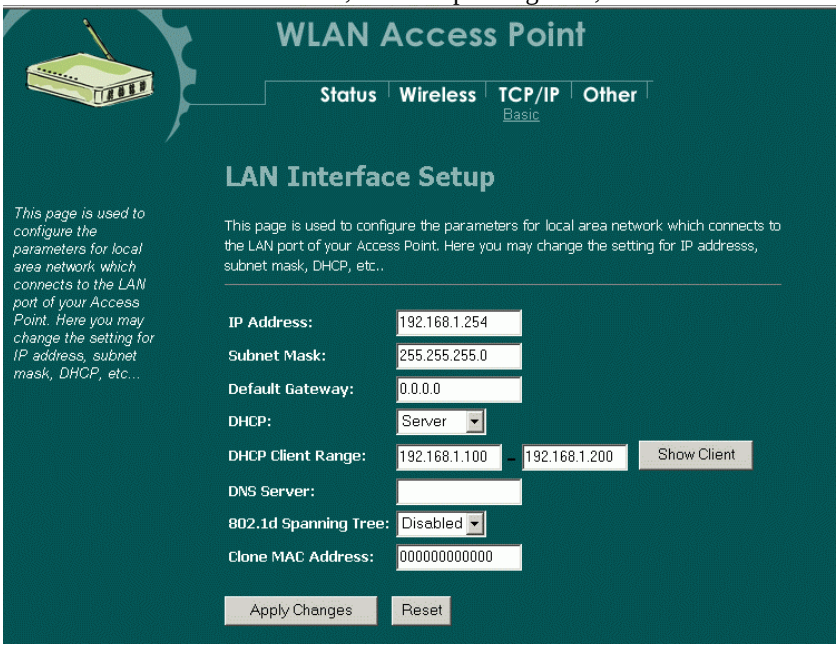


Wireless Access Control Mode	Select the Access Control Mode from the pull-down menu. **Disable**: Select to disable Wireless Access Control Mode. **Allow Listed**: Only the stations shown in the table can associate with the AP. **Deny Listed**: Stations shown in the table won't be able to associate with the AP.
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	Press to save the new settings on the screen.
Reset	Press to discard the data you have entered since last time you press Apply Change.
Delete Selected	To delete clients from access to this Access Point, you may firstly check the **Select** checkbox next to the MAC address and Comments, and press **Delete Selected**.
Delete All	To delete all the clients from access to this Access Point, just press **Delete All** without selecting the checkbox.
Reset	If you have made any selection, press **Reset** will clear all the select mark.

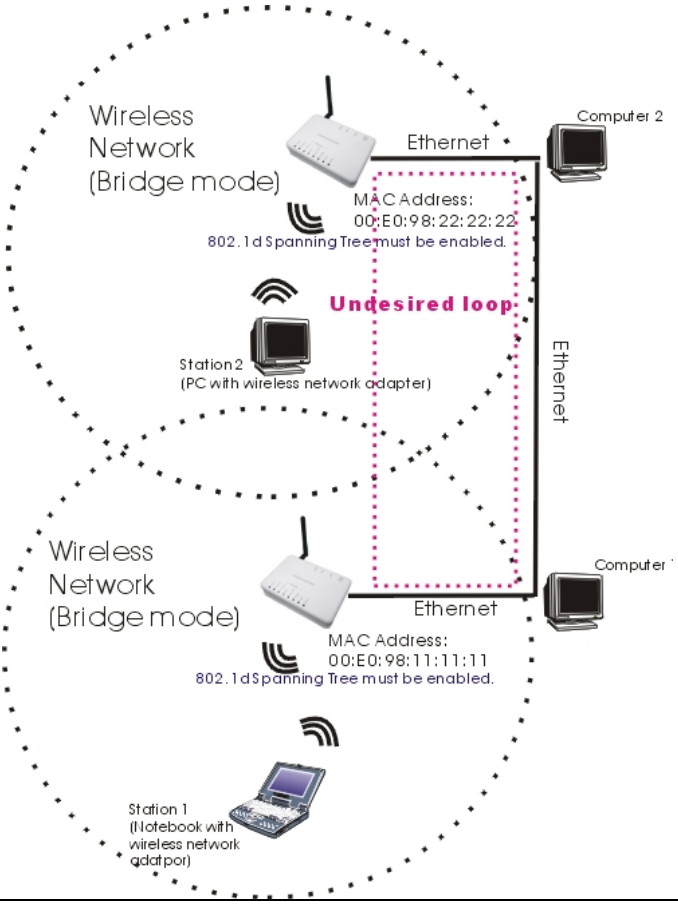
TCP/IP

Basic

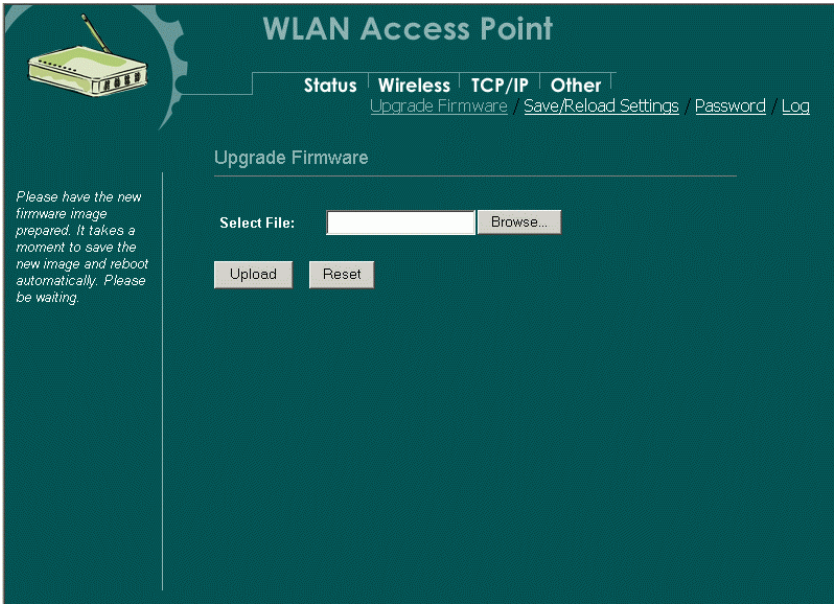
In this page, you can change the TCP/IP settings of this Access Point, select to enable/disable the DHCP Client, 802.1d Spanning Tree, and Clone MAC Address.



IP Address	This field can be modified only when DHCP Client is disabled. If your system manager assigned you static IP settings, then you will have to enter the information provided.
Subnet Mask	Enter the information provided by your system manager.
Default Gateway	Enter the information provided by your system manager.
DHCP	Select **Disable**, **Client** or **Server** from the pull-down menu. **Disable:** Select to disable DHCP server function. **Client:** Select to automatically get the LAN port IP address from ISP (For ADSL/Cable Modem). **Server:** Select to enable DHCP server function.
DHCP Client Range	253 IP addresses continuing from 192.168.1.1 to 192.168.1.253
Show Client	Click to show Active DHCP Client table.
DNS Server	Enter the Domain Name Service IP address.

802.1d Spanning Tree	To enable 802.1d Spanning Tree will prevent the network from infinite loops. Infinite loop will happen in the network when WDS is enabled and there are multiple active paths between stations. 
Clone MAC Address	You can specify the MAC address of your Access Point to replace the factory setting.
Apply Change	Press to save the new settings on the screen.
Reset	Press to discard the data you have entered since last time you press Apply Change.

Upgrade Firmware

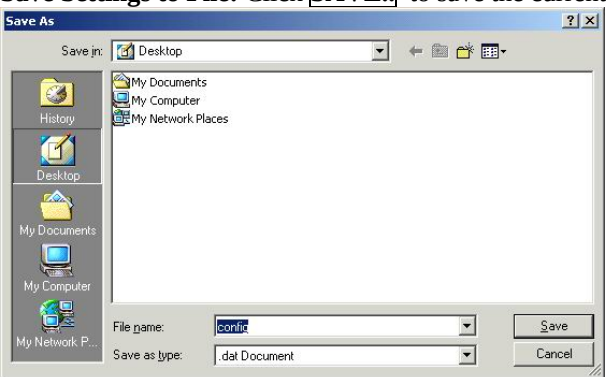


1. Download the latest firmware from your distributor and save the file on the hard drive.
2. Start the browser, open the configuration page, click on **Other,** and click **Upgrade Firmware** to enter the **Upgrade Firmware** window. Enter the new firmware's path and file name (i.e. C:\FIRMWARE\firmware.bin). Or, click the **Browse** button, find and open the firmware file (the browser will display to correct file path).
3. Click **Reset** to clear all the settings on this page. Or click **Upload** to start the upgrade.

Save/Reload Settings

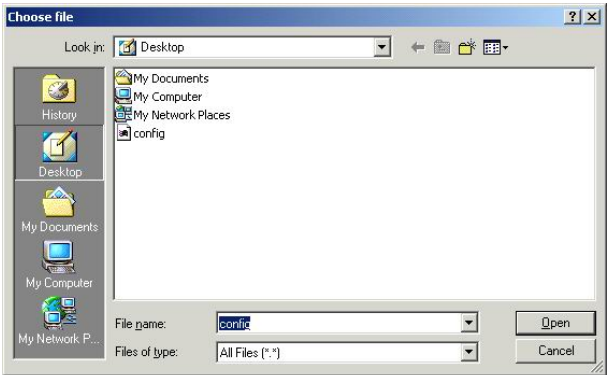
This function enables users to save the current configuration~~s~~ as a file (i.e. **config.dat**) To load configuration from a file, enter the file name or click **Browse…** to find the file from your computer.

Save Settings to File: Click **SAVE..** to save the current configuration to file.



When prompted the upper left screen, select "**Save this file to disk**", and the upper right screen will prompt you a dialog box to enter the file name and the file location.

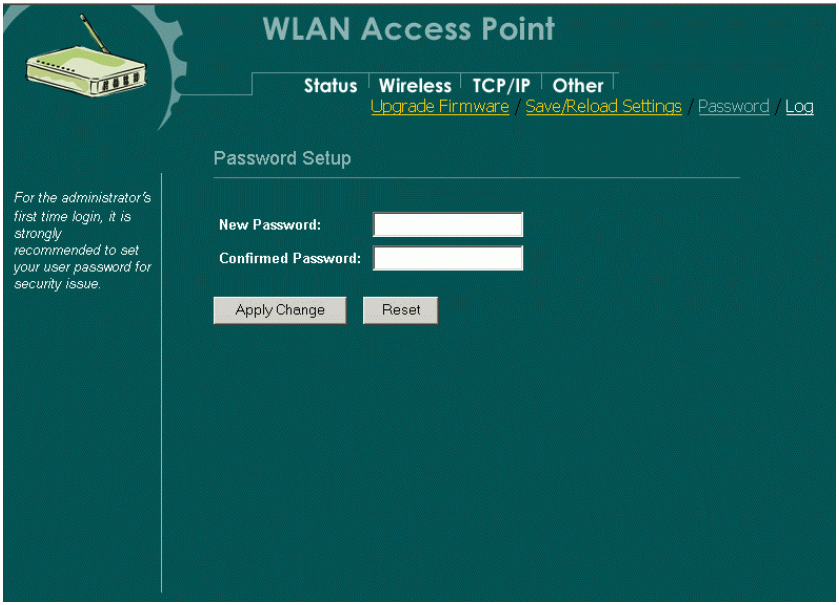
Load Settings From File: Click **Browse…** if you want to load a pre-saved file, enter the file name with the correct path and then click on **Upload**. Or click **Browse…** to select the file.



Reset: Click to restore the default configuration.

Password

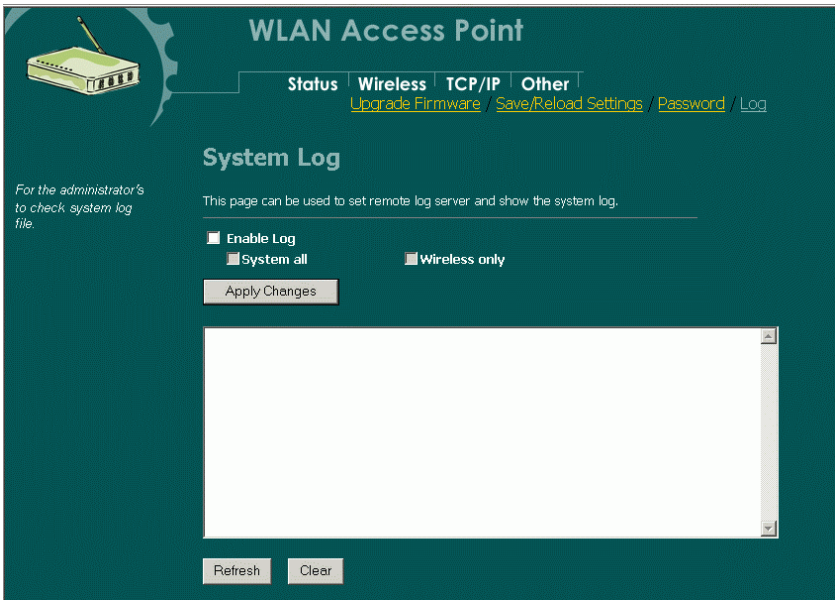
For secure reason, it is recommended that you set the account to access the web server of this Access Point. Leaving the user name and password blank will disable the protection. The login screen prompts immediately once you finish setting the account and password. Remember your user name and password for you will be asked to enter them every time you access the web server of this Access Point.



New Password	Set your new password. Password can be up to 30 characters long. Password can contain letter, number and space. It is case sensitive.
Confirm Password	Re-enter the new password for confirmation.
Apply Change	Press to save the new settings on the screen.
Reset	Press to discard the data you have entered since last time you press Apply Change.

System Log

This page display log events with time when events happened, log events' types, log sources and the description for events themselves. System manager can use the system log to trace when problems occur.



Enable Log	Select **System all** or **Wireless only**.
Apply Changes	Press to save the new settings on the screen.
Refresh	Click to refresh the screen.
Clear	Click to clear the current setting.