802.11a+802.11g Dual Band

Wireless Access Point

User’s Manual

Chapter 1 Introduction

1.1 Feature

- Fully interoperable with IEEE 802.11b compliant products.
- High-Speed data transfer rate up to 11Mbps.
- 64-bit and 128-bit WEP Encryption.
- MAC Address filtering.
- Web-Based Network Manager/Telnet for Configuring and Managing Your access points.
- SNMP MIB I and MIB II supported.
- Capable of acting as a DHCP Server.
- Remote Management supported.
- Firmware Upgrade via WEB/TFTP
- IEEE802.1x/RADIUS Client (EAP-MD5/TLS/TTLS) Support

1.2 Package Contents

- One CD-ROM with User Guide included
- One Power Adapter
- One CAT 5 UTP Cable
- One Fast Start Guide and One Registration Card

Chapter 2 Hardware Configuration

2.1 Hardware Configuration

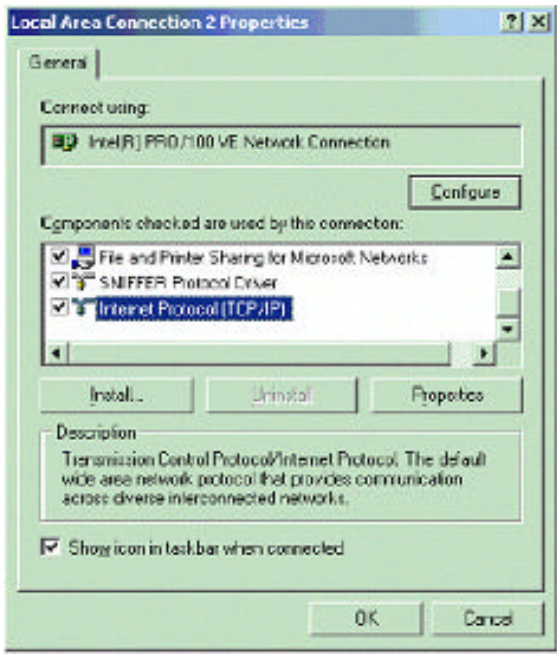
1. **RJ-45 Ethernet connector**
   Provides 10/100 Mbps connectivity to a wired Ethernet LAN.
2. **Reset Button**
   By pressing this button for over 3 seconds, the AP will be reset with factory default configuration.
3. **Power Supply connector**
   It is for connecting to the power adapter.

2.2 Hardware Installation

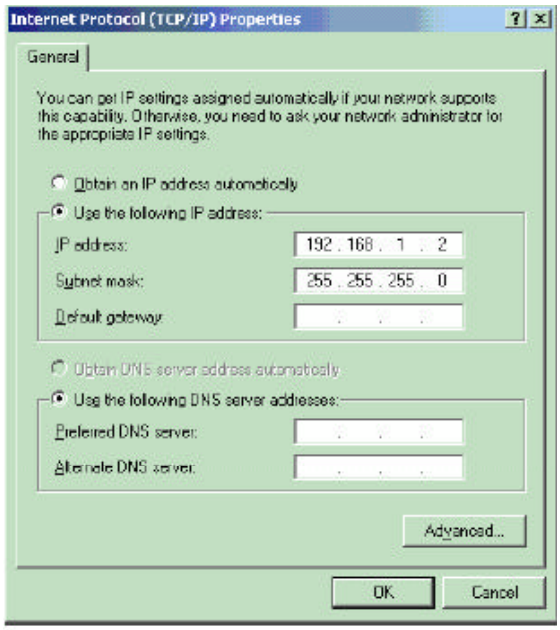
1. Configure your notebook or PC with Wireless LAN card.
2. For Wired LAN, connect your PCs' Ethernet port to any AP's LAN port by an Ethernet cable.
3. For WLAN, locate the AP to a proper position.
4. Plug the power cord into a power outlet.

Chapter 3 Configuring your PC

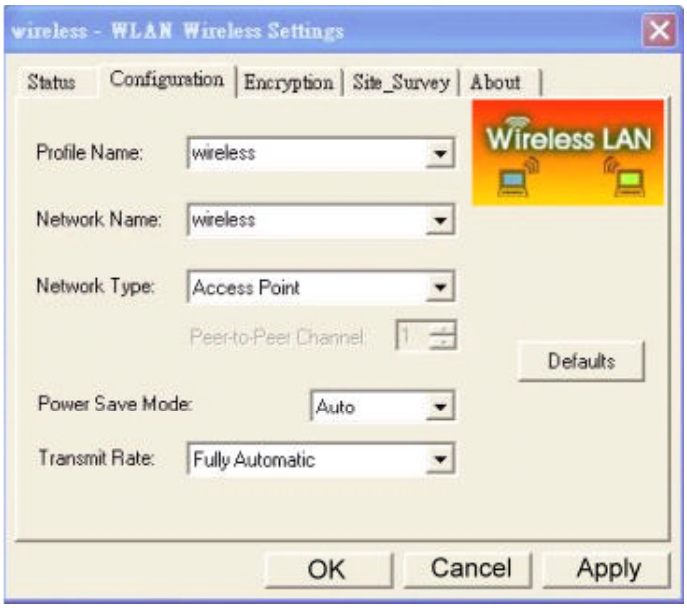
1. Change the TCP/IP setting of your managing computer. Select the TCP/IP line that has been associated to your network card. Click the **Properties** button.



2. Make sure the IP address of your computer and the AP are in the same subnet. The default IP address of the access point is 192.168.1.1 and the default subnet mask is 255.255.255.0.



3. For WLAN, open the WLAN client utility. Click **Configuration** tab. Type default SSID (default SSID: wireless) in the Network Name field. Choose "Access Point" for Network Type, then click **OK** button.
   Note: the default channel is 6.Configuring the Router through Web Browser



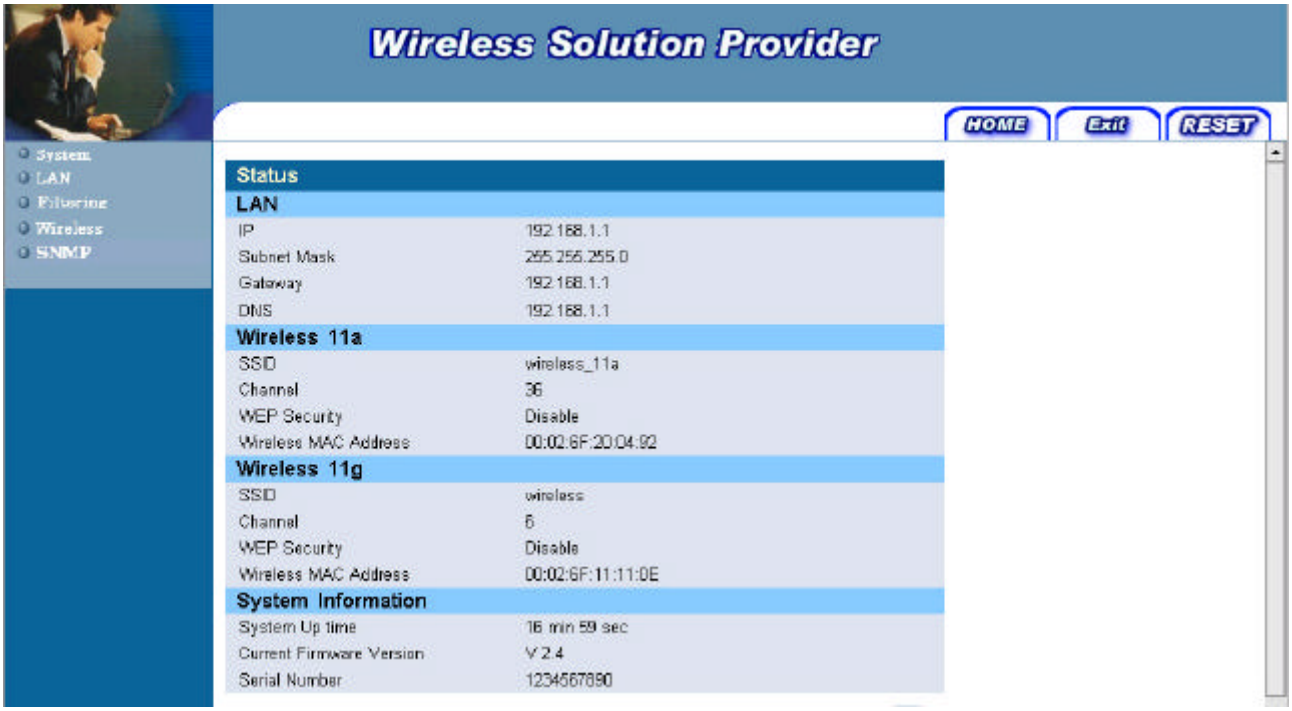
Chapter 4 Initial Software Installation and Configuration

The access point can be configured through your web browser with the Web-Based Utility. Open your web browser and type the default IP address of the AP in the address field (default IP: 192.168.1.1) and press **Enter**. Make sure the IP address of AP and your computer are in the same subnet.

After the connection is established, you will see the User Login page as shown below. Leave the password field blank when the first time you open the Web-Based utility. You can change the password on the "Administrator settings" page.

The system will be time out after idling about 1 minute. You have to login again to re-enter the main setting page. You can change the idle time out period on the "Administrator settings" page.

On any page, you can click **HELP** to obtain more descriptions and explanations. To clear any values you've entered on any page, click **CANCEL** and re-enter information.

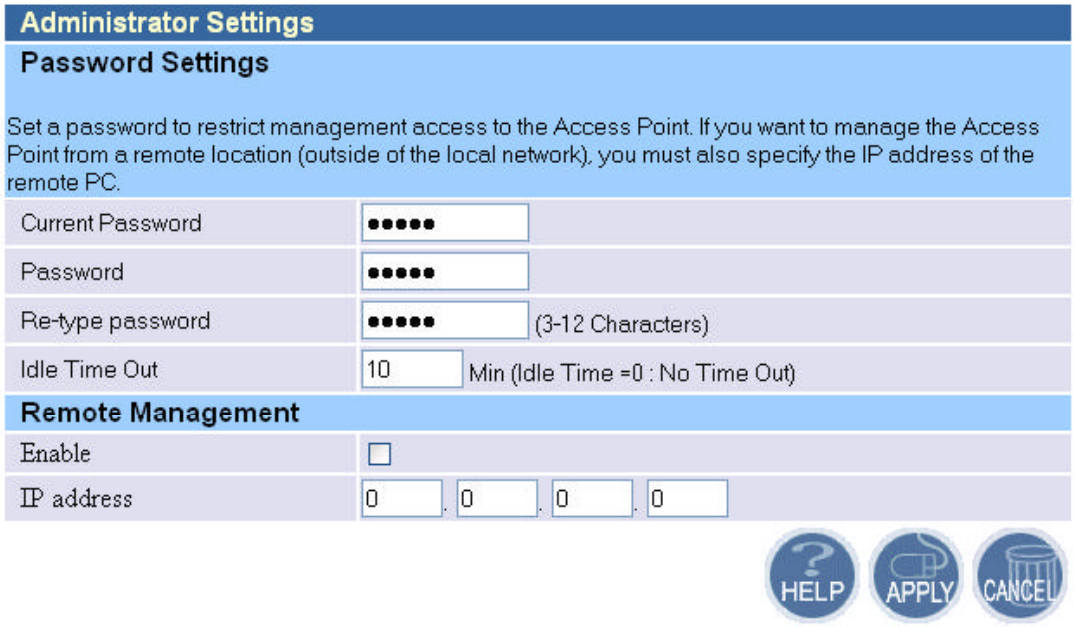


There are three tabs on the upper right-corner of each page. To go back to the main setting page, press HOME tab. To log out of the web management, press EXIT tab. To complete any change you have made, press RESET tab after clicking APPLY button.

Chapter 5 Configuring the Access Point through web browser

5.1.1 Administrator Settings

Set a password to restrict management access to the access point. If you want to manage the access point from a remote location (outside of the local network), you must also specify the IP address of the remote PC.



Password Settings:

To change your password, enter your current password in the "Current Password" box. Enter new password in the "Password" box. Enter it again in the "Re-type password" box to confirm it. Click **APPLY** to complete your change.

The "idle Time Out" is the amount of time of inactivity before the access point will automatically close the Administrator session. Set this to zero to disable it.

Remote Management:

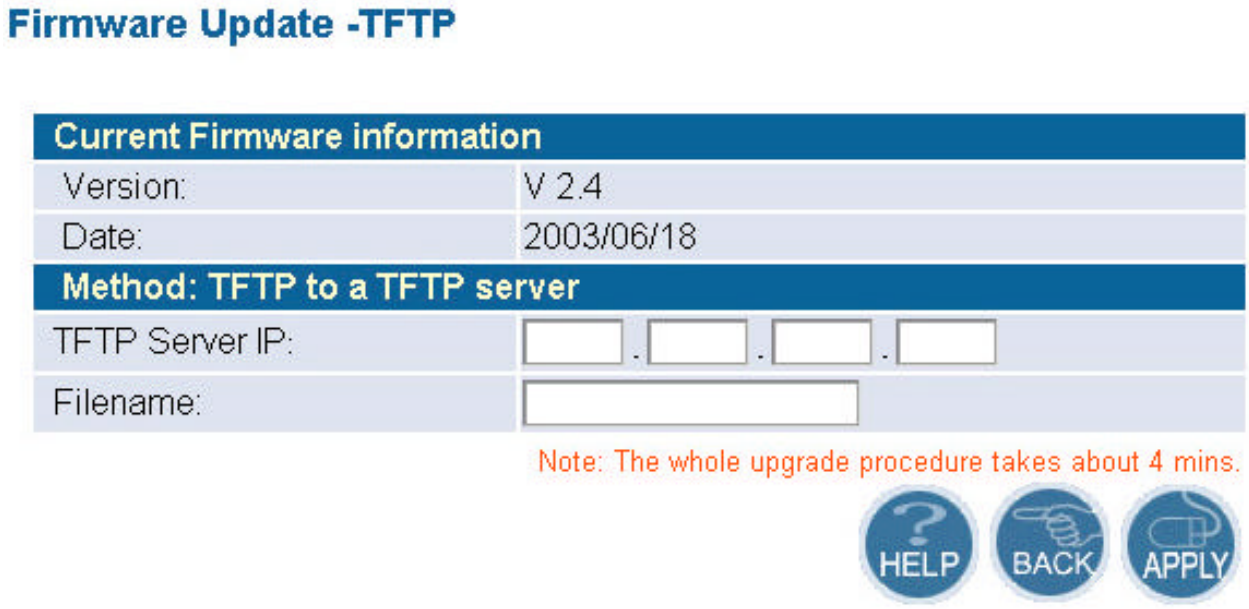
By default, management access is only available to users on your local network. However, you can also manage the access point from a remote host. Just check the Enable check box and enter the IP address of an administrator to this screen.

5.1.2 Firmware Upgrade

The firmware information is displayed on this page. You can find firmware version and firmware date here. There are two ways to upgrade the firmware: "Using TFTP" and "Using WEB". Click **"NEXT" button** to choose the one you want.

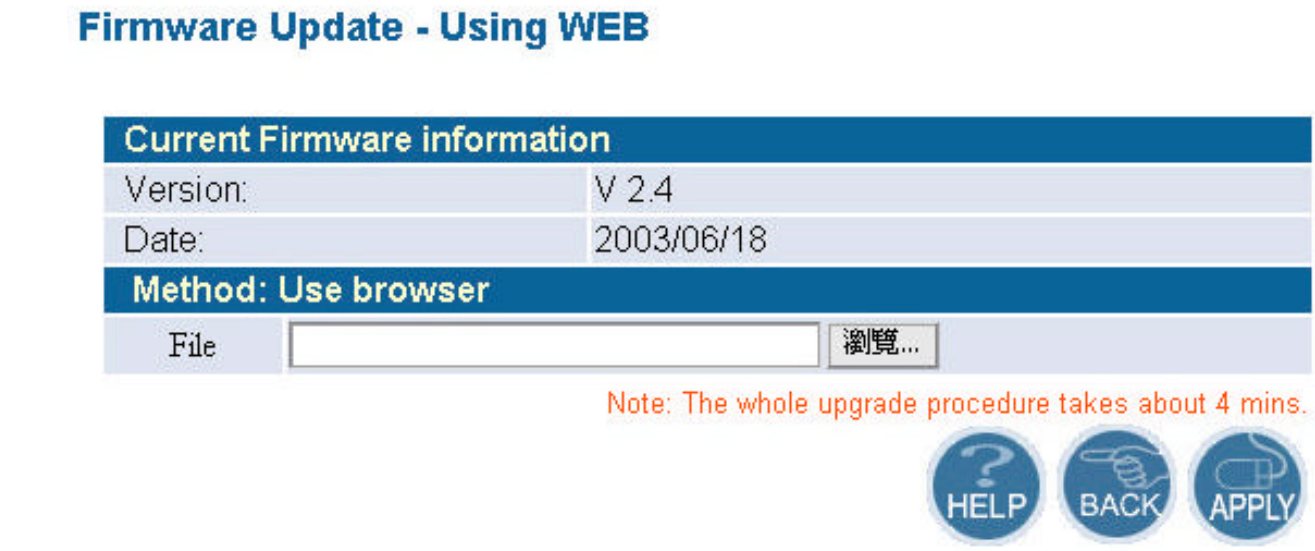
- **Using TFTP**

  On the managed computer, run the TFTP Server utility. And specify the folder in which the firmware file resides. After running the TFTP server, enter the TFTP server IP and the filename on the following page. Click on **APPLY** to complete your change.



- **Using WEB**

Type the correct firmware file path and file name on the File field. You can click Browse to select the file location. Click on **APPLY** to complete your change.

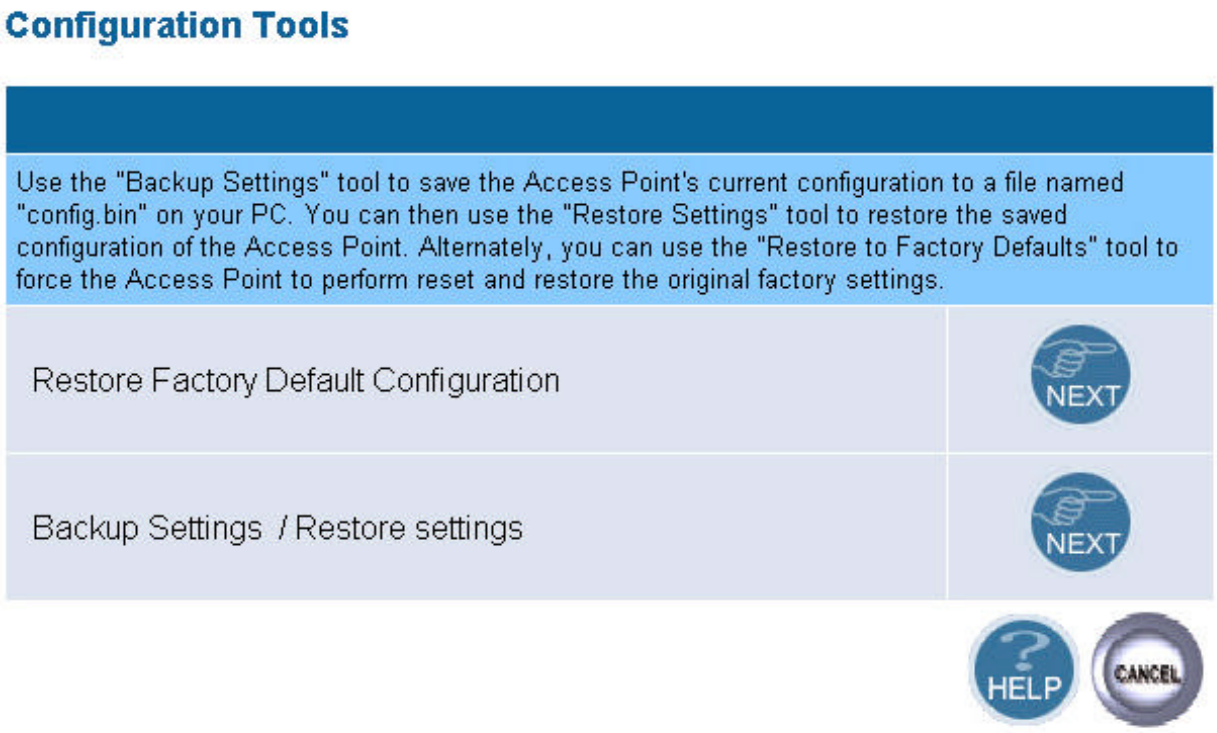


5.1.3 Configuration Tools

This tool can backup or restore the AP's configuration. It can also restore the original factory default settings.

- **Restore Factory default configuration:**

(1) Chick the "Restore Factory Default Configuration**"** button and then click **NEXT**.



(2) Click **Restore** button to force the access point to perform reset and restore the original factory settings.

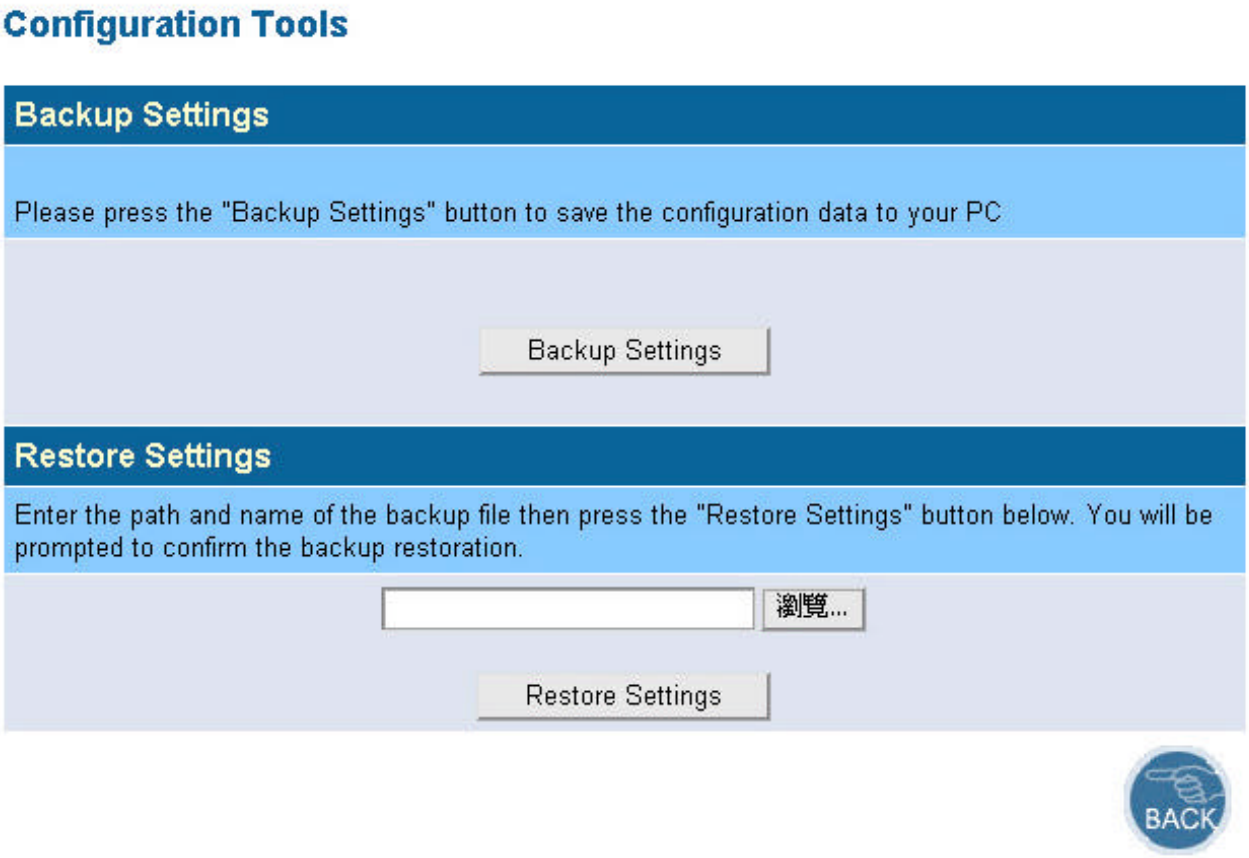
- **Backup Setting/Restore Settings:**

(1) Check the **"**Backup Settings/Restore Settings**"** radio button and click **NEXT**.

(2) To save the access point's current configuration to a file named "config.bin" on your PC, click **Backup Settings** button.

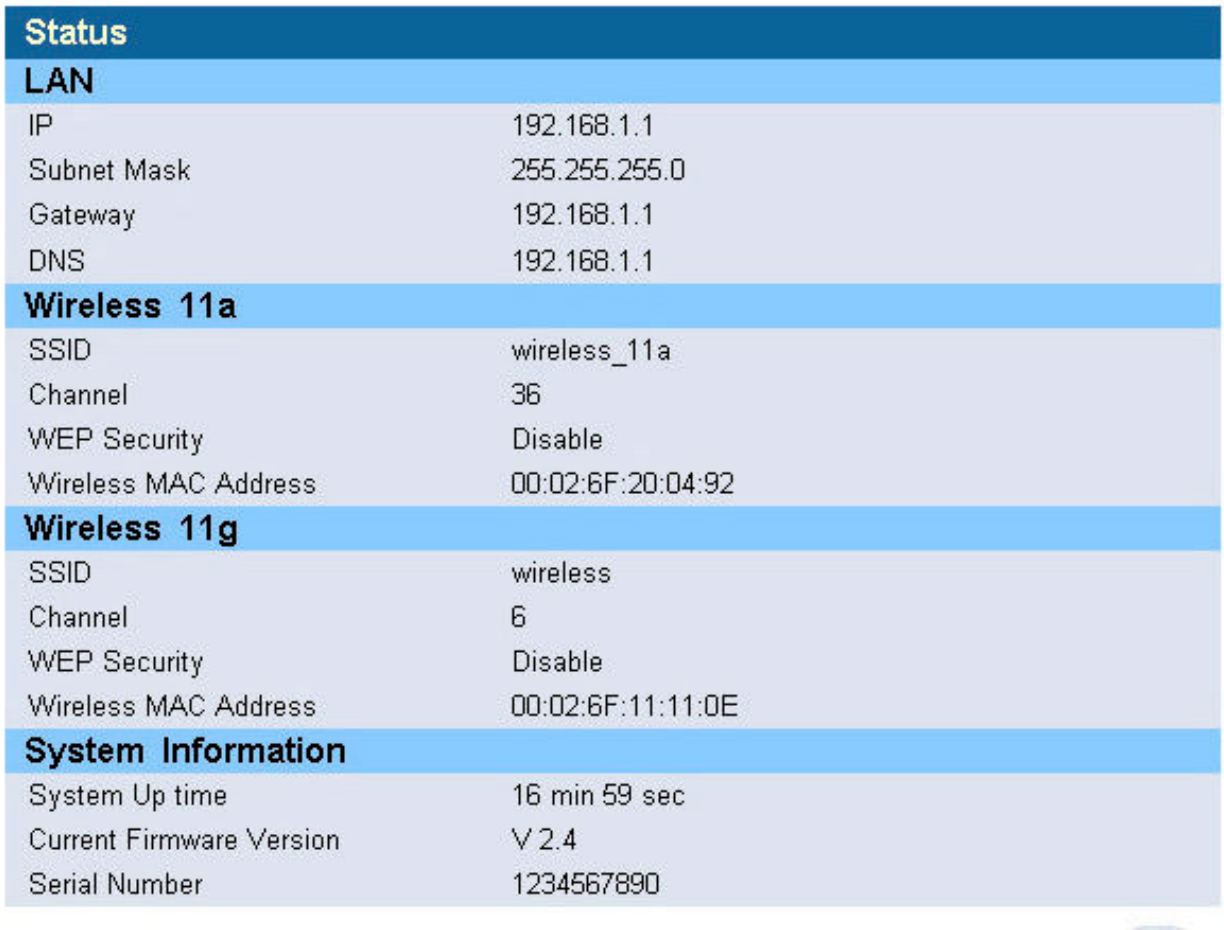
(3) To restore configuration, you can use the "Restore Settings" tool to restore the saved configuration of the access point.

(4) Enter the path and file name then click **Restore Settings** button. You can also click **Browse** to locate and select the previously saved backup file.



5.1.4 Status

The Status window displays current information and settings for your AP. It has five main parts – LAN, Wireless 11a, Wireless 11g, System Information.



Status	
LAN	
IP	192.168.1.1
Subnet Mask	255.255.255.0
Gateway	192.168.1.1
DNS	192.168.1.1
Wireless 11a	
SSID	wireless_11a
Channel	36
WEP Security	Disable
Wireless MAC Address	00:02:6F:20:04:92
Wireless 11g	
SSID	wireless
Channel	6
WEP Security	Disable
Wireless MAC Address	00:02:6F:11:11:0E
System Information	
System Up time	16 min 59 sec
Current Firmware Version	V 2.4
Serial Number	1234567890

For LAN, it displays AP's IP address, MAC address, and Subnet Mask. It also displays the IP address of the DNS and the number of clients connected by DHCP server.

For Wireless 11a, it displays SSID, Channel, WEP security status, and wireless MAC address of the 11a adapter.

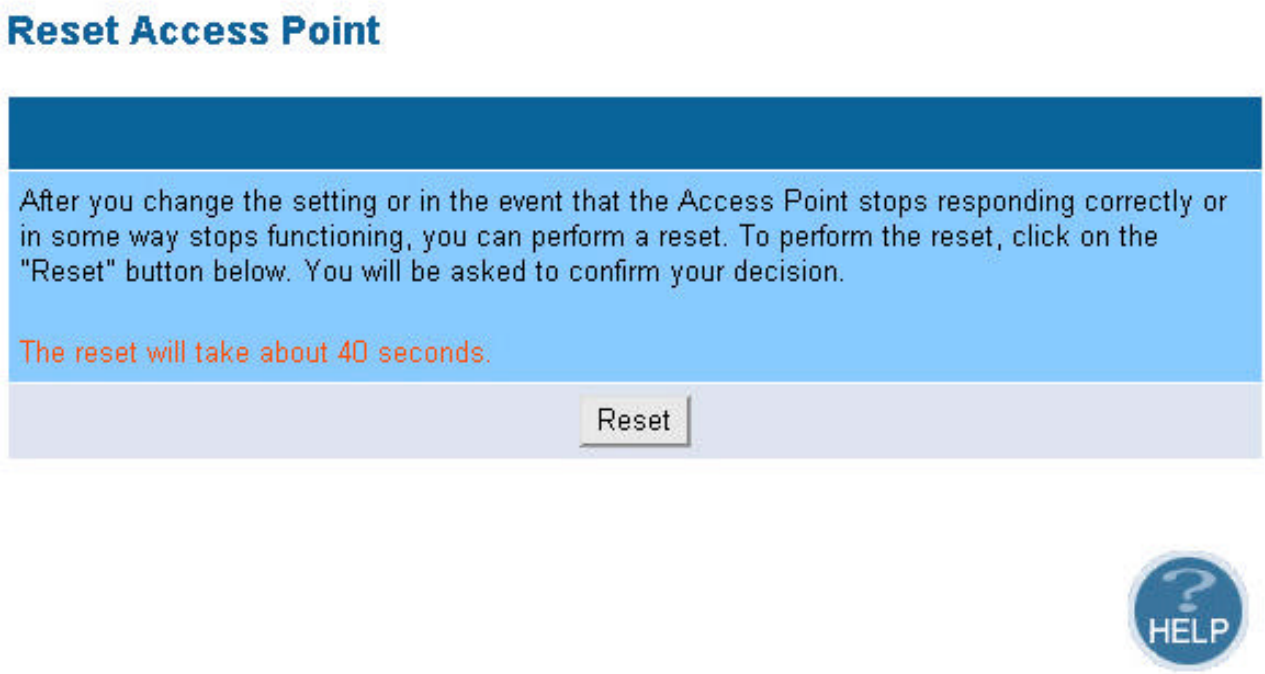
For Wireless 11g, it displays SSID, Channel, WEP security status, and wireless MAC address of the 11g adapter.

For System Information, it displays system time, firmware version, firmware date, hardware version, and serial number.

You can obtain the most up-to-date information by pressing the "Refresh" button.

5.1.5 Reset

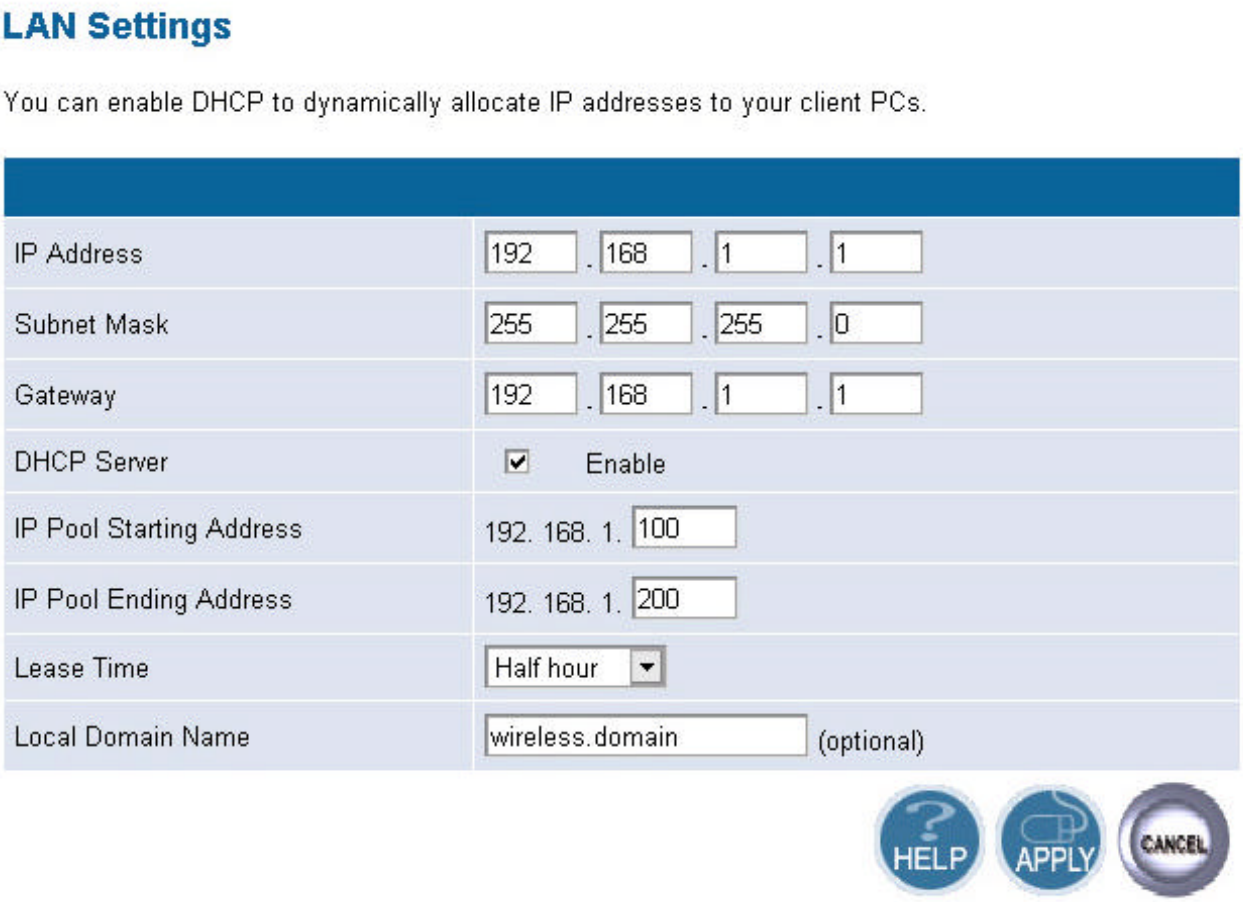
In the event that the access point stops responding correctly or in some way stops functioning, you can perform a reset. Your settings will not be changed. To perform the reset, click on the **Reset** button below. You will be asked to confirm your decision. The reset will take about 18 seconds.



5.2 LAN Setting

5.2.1 LAN Settings

You can change the basic settings of AP here, including IP address, Subnet mask, IP Pool Address, Lease Time, and Local Domain Name. Click **APPLY** to complete your change.



(1) **IP Address:** The IP address of the AP. You should have a unique IP address to your network. The default value is 192.168.1.1.

(2) **Subnet Mask:** The Subnet Mask of your access point. The default value is 255.255.255.0.

(3) **DHCP Server:** By default, the AP can function as a DHCP server. The AP can automatically assign an IP address to a client. To enable this function, clear the "Enable" check box.

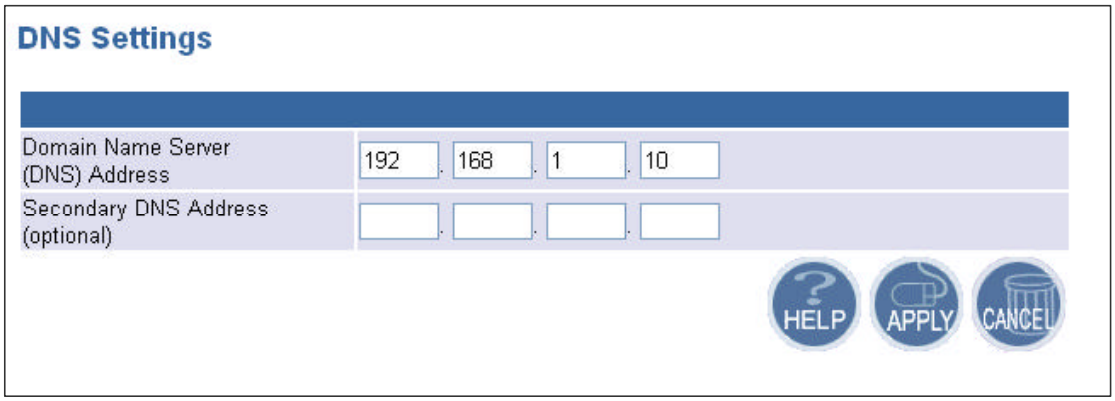
(4) **IP Pool Starting Address & IP Pool Ending Address:** The first and the last address in the IP address pool.

(5**) Lease Time:** The period client can have the IP address assigned by DHCP server.

(6) **Local Domain Name:** It's optional.

5.2.2 DNS Settings

Domain Name Servers are used to map an IP address to the equivalent domain name. Your ISP should provide the IP address for one or more domain name servers. The access point can be a DNS relay to send clients' request to the Domain Name Server. You can do a DNS lookup to find the IP address of some specific servers. Click **APPLY** to complete your change.



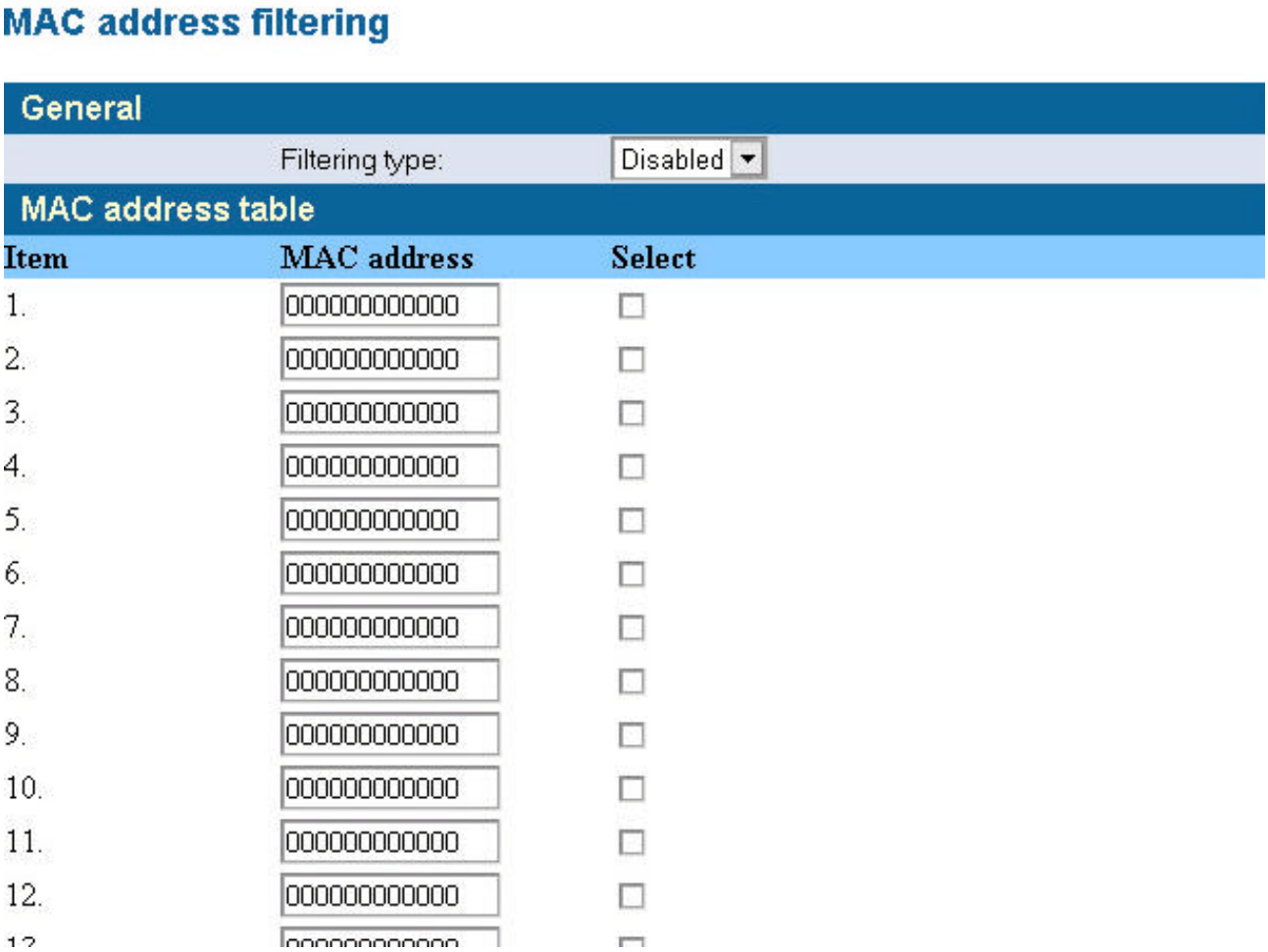
5.2.3 MAC Control

You can block certain clients PCs accessing the internet based on MAC address.

When you enable "MAC Address Control" without allowing unspecified MAC address connect to internet, you will block all client PCs accessing the internet. The clients whose MAC addresses listed in the "MAC Address Control List" can access the internet only if the "Allow Connect to Internet is checked.

5.2.4 MAC address filtering

The maximum number of items is 64. Check the **select** check box to include or exclude corresponding items. The wireless clients whose MAC addresses listed in the "MAC address table" cannot get associations to the AP while the "Filtering type" is chosen to **"**Include**".** On the other hand, only those wireless clients' with MAC addresses listed in the "Exclude" filtering list can associate to the AP. The MAC address filtering function can be disabled by choosing the "Filtering type" to "Disable". Click **APPLY** to complete your change.



5.3 Wireless Setting

General

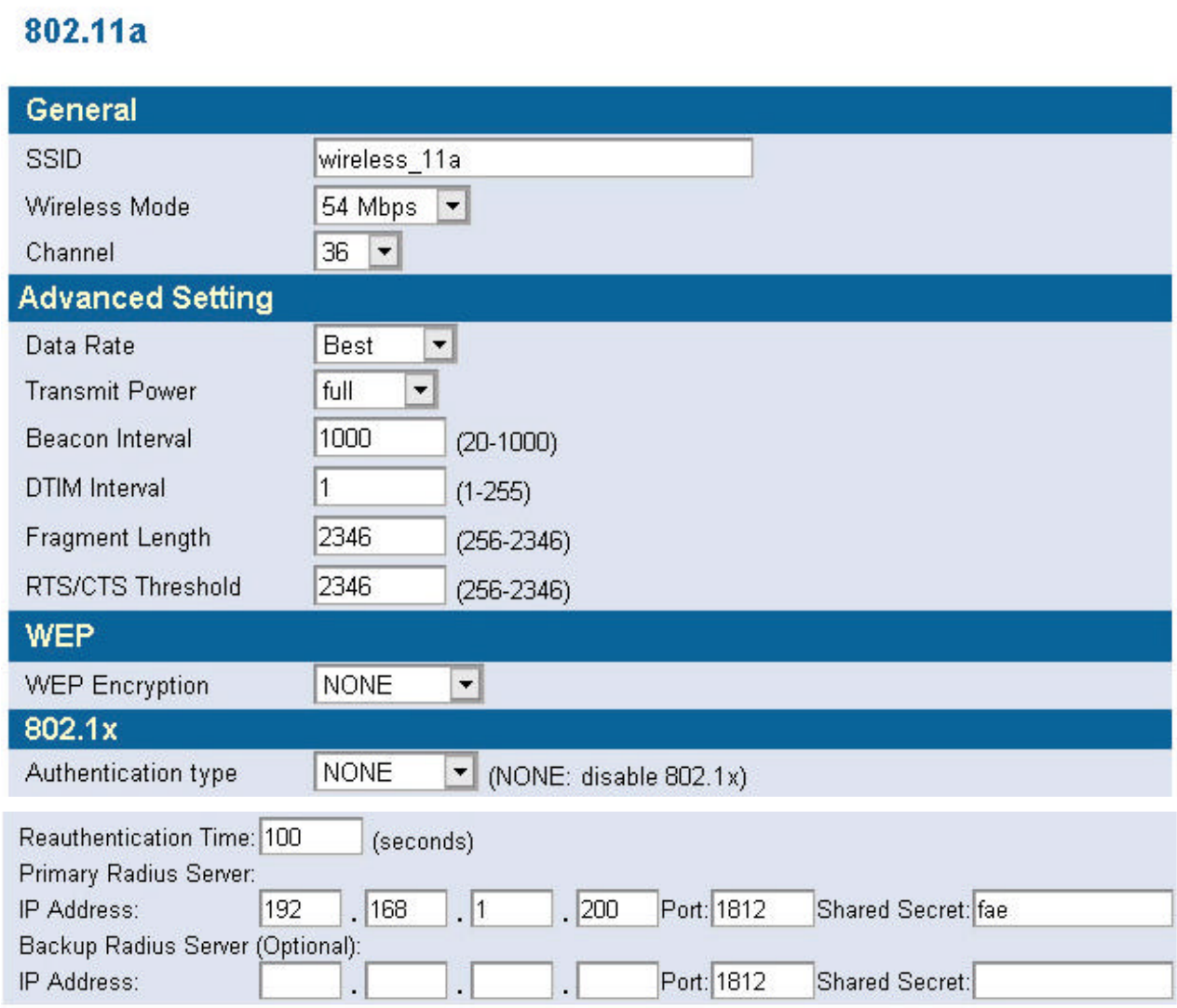
Select the country regulatory domain which you belong to.

- **11a**

In this window you can make changes to the default wireless settings. For communicating, all computers on the network must be within the same IP Address range, and have the same settings for the Radio channel and SSID. If you don't want to utilize WEP Encryption, select "None" to disable

this function.

1. **SSID**: The SSID is a unique name shared among all points in your wireless network. The SSID must be identical for all points in the network. It is case sensitive and must not exceed 32 characters. The default SSID for 11a Interface is wireless_11a.
2. **Channel**: The channel shared by all wireless devices. The range of channel is 1~14.
3. **WEP**: Short for Wired Equivalent Privacy, a security protocol for wireless local area networks (WLANs) defined in the 802.11a standard. WEP is designed to provide the same level of security as that of a wired LAN. Select **None** to disable this function.
   There are two WEP Encryption key length: 64-bit(10 hex digits) 128 bit(26 hex digits) and 152 bit(32 hex digits).
   - **Data Rate:** Specify the transmit and receive data rate. Select the desired rate from the drop-down menu.
   - **Transmit Power:** Specify the level of the transmit power. Use the drop-down menu to specify the value of the transmit power.
   - **Beacon Interval (20~1000):** Beacon transmissions announce the existence of 802.11 network at regular intervals. Enter a value between 20 and 1000 to specify the Beacon Interval.
   - **Data Beacon Rate (1~16384):** Specify the Data Beacon Rate. Enter a value between 1 and 16384 that specify the Delivery Traffic Indication Message (DTIM).
   - **Fragment Length (256~2346):** Enter a value between 256 and 3346 to specify the Fragment Length.
   - **RTS/CTS Threshold (256~2346):** Packets large than the value are preceded by an RTS/CTS handshake. Enter a value between 256 and 2346 to specify the value of the RTS /CTS Threshold.



4. 802.1X: The 802.1X standard is designed to enhance the security of wireless local area networks that follow the IEEE 802.11 standard. 802.1X uses an existing protocol, the Extensible Authentication Protocol (EAP) for message exchange during the authentication process.

In a wireless LAN with 802.1X, a user requests access to an access point (known as the *authenticator*). The access point forces the user into an unauthorized state that allows the client to send only an EAP-start message. The AP replies with an EAP-request identify message to obtain the clients identity. The clients EAP-response packet containing the clients identity is forwarded to the authentication server. The authentication server is configured to authenticate clients with a specific authentication algorithm. The result is an accept or reject packet from authentication server to AP. Once authenticated, the AP opens the client' s port and traffic will be forwarded.

Authentication type: There are three EAP (Extensible Authentication Protocol) types supported. You can choose between EAP-TLS[1], EAP-MD5[2], and EAP -TTLS[3]. You can choose NONE to disable the 802.1X.

[1] TLS- Transport Layer Security (TLS) is a protocol that ensures privacy between communicating applications and their users on the

Re-authentication time: The time period that AP informs clients to re-authenticate.

Radius Server:

1. **Primary Radius Server:** The IP address and port number of Primary Radius Server. You need to know the shared secret between AP and Radius Server. The default port number is 1812.
2. **Backup Radius Server:** The IP address, shared secret, and port number of backup Radius Server. It is optional.

- **11g**

In this window you can make changes to the default wireless settings. For communicating, all computers on the network must be within the same IP Address range, and have the same settings for the Radio channel and SSID. If you don't want to utilize WEP Encryption, select "None" to disable this function.

1. **SSID**: The SSID is a unique name shared among all points in your wireless network. The SSID must be identical for all points in the network. It is case sensitive and must not exceed 32 characters. The default SSID for 11g Interface is wireless_11g.
2. **Channel**: The channel shared by all wireless devices. The range of channel is 1~14.
3. **WEP**: Short for Wired Equivalent Privacy, a security protocol for wireless local area networks (WLANs) defined in the 802.11a standard. WEP is designed to provide the same level of security as that of a wired LAN. Select **None** to disable this function.
   There are two WEP Encryption key length: 64-bit(10 hex digits) 128 bit(26 hex digits) and 152 bit(32 hex digits).

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- **Transmit Power:** Specify the level of the transmit power. Use the drop-down menu to specify the value of the transmit power.
- **Beacon Interval (20~1000):** Beacon transmissions announce the existence of 802.11 network at regular intervals. Enter a value between 20 and 1000 to specify the Beacon Interval.
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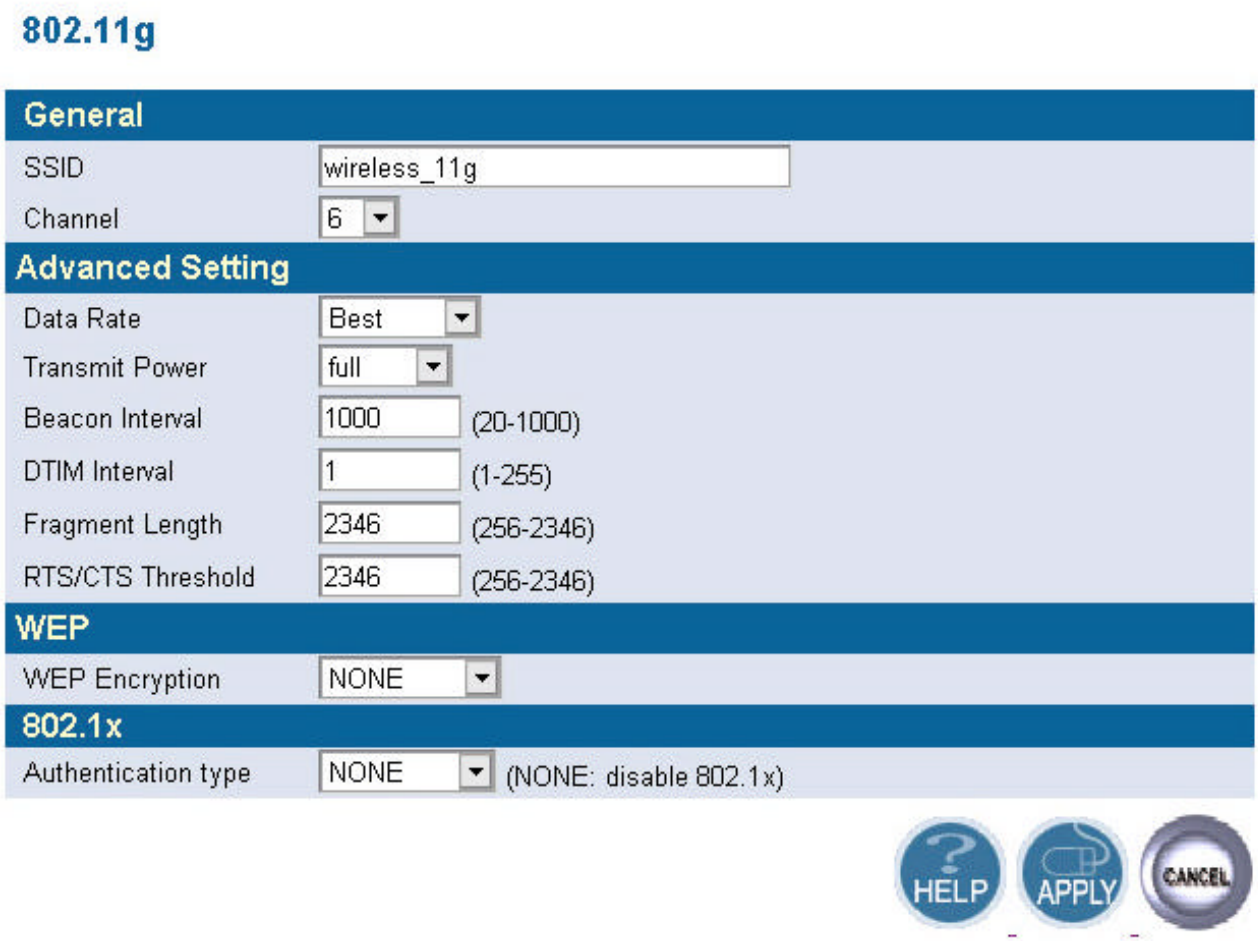
- **Fragment Length (256~2346):** Enter a value between 256 and 3346 to specify the Fragment Length.

Internet. When a server and client communicate, TLS ensures that no third party may eavesdrop or tamper with any message. TLS is the successor to the Secure Sockets Layer.

[2] MD5- provides basic security and is analogous to the challenge handshake authentication protocol (CHAP). MD5 is intended for use with signal signature applications, which require that large files must be compressed by a secure method before being encrypted with a secret key, under a public key cryptosystem.

[3] TTLS- provides mutual authentication, supports legacy password protocols and does not require clients to have certificates. As a result, enterprises can reduce the costs associated with operating a certificate authority to distribute and revoke user certificates.

- **RTS/CTS Threshold (256~2346):** Packets large than the value are preceded by an RTS/CTS handshake. Enter a value between 256 and 2346 to specify the value of the RTS /CTS Threshold.



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In a wireless LAN with 802.1X, a user requests access to an access point (known as the *authenticator*). The access point forces the user into an unauthorized state that allows the client to send only an EAP-start message. The AP replies with an EAP-request identify message to obtain the clients identity. The clients EAP-response packet containing the clients identity is forwarded to the authentication server. The authentication server is configured to authenticate clients with a specific authentication algorithm. The result is an accept or reject packet from authentication server to AP. Once authenticated, the AP opens the client' s port and traffic will be forwarded.

Authentication type: There are three EAP (Extensible Authentication Protocol) types supported. You can choose between EAP-TLS[4], EAP-MD5[5], and EAP -TTLS[6]. You can choose NONE to disable the 802.1X.

Re-authentication time: The time period that AP informs clients to re-authenticate.

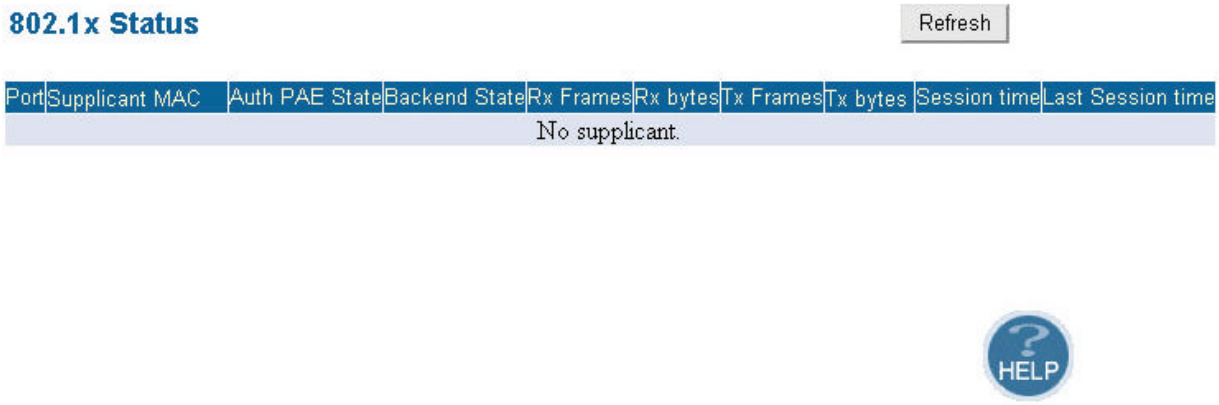
Radius Server:

1. **Primary Radius Server:** The IP address and port number of Primary Radius Server. You need to know the shared secret between AP and Radius Server. The default port number is 1812.
2. **Backup Radius Server:** The IP address, shared secret, and port number of backup Radius Server. It is optional.

[4] TLS- Transport Layer Security (TLS) is a protocol that ensures privacy between communicating applications and their users on the Internet. When a server and client communicate, TLS ensures that no third party may eavesdrop or tamper with any message. TLS is the successor to the Secure Sockets Layer.
[5] MD5- provides basic security and is analogous to the challenge handshake authentication protocol (CHAP). MD5 is intended for use with signal signature applications, which require that large files must be compressed by a secure method before being encrypted with a secret key, under a public key cryptosystem.
[6] TTLS- provides mutual authentication, supports legacy password protocols and does not require clients to have certificates. As a result, enterprises can reduce the costs associated with operating a certificate authority to distribute and revoke user certificates.

- **802.1x Status**

  In this window, it shows the 802.1x status information of the supplicants, including the port number, MAC address, Authentication PAE state, Backend state, Rx bytes, Tx Frames, Tx bytes, Session time, and Last Session time.



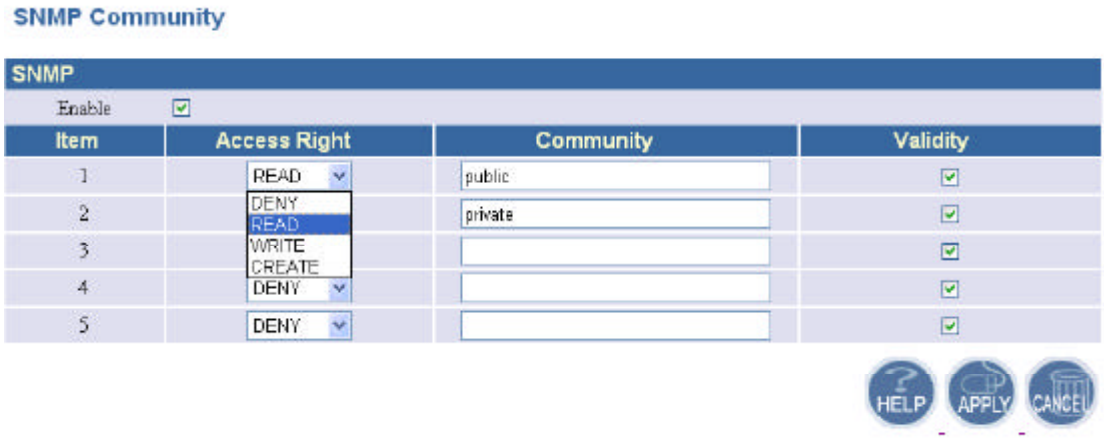
5.4 SNMP

Short for Simple Network Management Protocol, a set of protocols for managing complex networks. SNMP works by sending messages, called protocol data units (PDUs), to different parts of a network. SNMP-compliant devices, called agents, store data about themselves in Management Information Bases (MIBs) and return this data to the SNMP requesters.

5.4.1 SNMP Community

SNMP Community provides a simple kind of password protection. Access to the SNMP device is controlled through community names. The community name can be thought of as a password. If you don' t have the correct community name you can' t retrieve any data (get) or make any changes (sets). Multiple SNMP managers may be organized in a specified community. You can change your SNMP community settings on this screen. Check the "Enable" check box to enable the SNMP function. Click **APPLY** to complete your change.

Validity: You can enable or disable the SNMP function of the corresponding community item.



Access Right: Select a access right for the corresponding SNMP community (Deny[7]/Read[8]/Write[9]).

Community: Specify the name of community for the SNMP manager(Private/Public). By convention, "Public" community is with a read-only access right.

5.4.2 SNMP Trap

Traps can be used by network entities to signal abnormal conditions to management stations. SNMP TRAP message can be sent to a host. Click **APPLY** to complete your settings.

Version: Select the SNMP Version.

Select "Disable" to disable the snmp trap function of the corresponding item.

Version1: SNMP Version1

Version2: SNMP Version2

IP Address: Specify the IP Address of the SNMP Manager for SNMP Trap Report.

Community: Specify the name of community (public/Private) for SNMP manager.

Following are the traps supported in the access point:

Cold-start trap:

This trap indicates that the specified node's power has just come on. The cold-start trap is generated every time the access point is power-cycled. Cold-start traps are not generated until three seconds after the access point is power-cycled. This allows time for the hardware providing the low-level IP network interface to start up and stabilize before attempting to send a packet.

[7] Deny community will not allow a remote device to read information from a device or to modify settings on that device.

[8] Read-only community enables a remote device to retrieve "read-only" information from a device.

[9] Read-Write community allows a remote device to read information from a device and to modify settings on that device.

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.

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.

If this device is going to be operated in 5.15 ~ 5.25GHz frequency range, then it is restricted in indoor environment only.

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