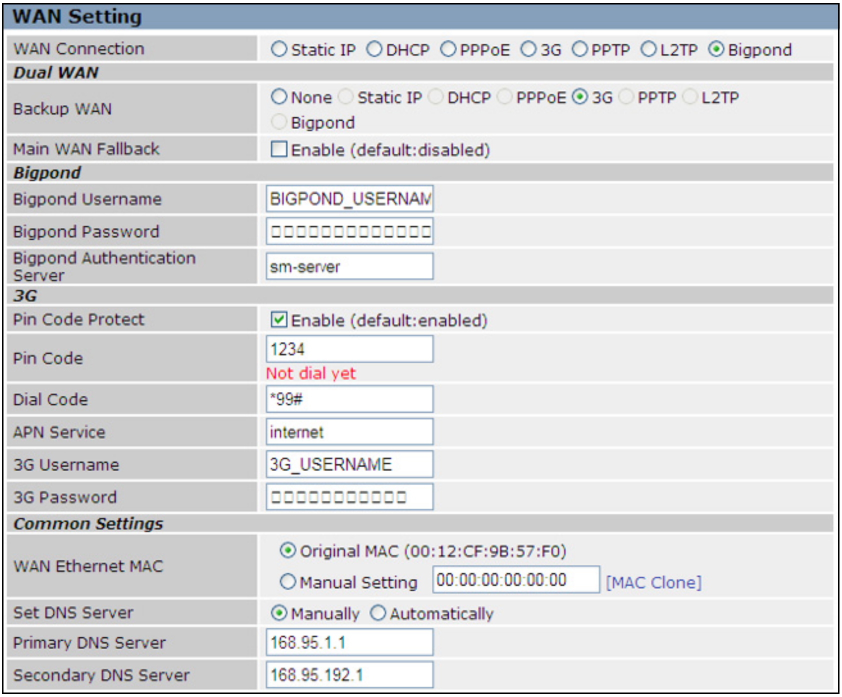
- **L2TP Password**: Sets a L2TP password for the WAN port. (Default: L2TP_PASSWORD; Range: 1~32 characters)

Bigpond

Enables the settings of Telstra Bigpond network service in Australia.

The following example shows the dual WAN function enabled using 3G as a secondary WAN connection.



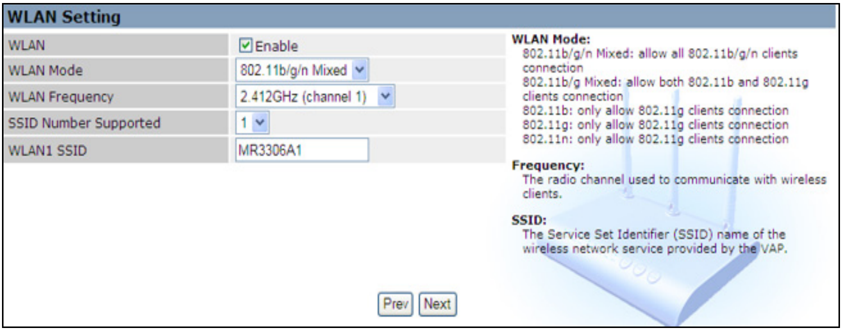
WAN Setting

WAN Connection	○ Static IP ○ DHCP ○ PPPoE ○ 3G ○ PPTP ○ L2TP ● Bigpond
Dual WAN	
Backup WAN	○ None ○ Static IP ○ DHCP ○ PPPoE ● 3G ○ PPTP ○ L2TP ○ Bigpond
Main WAN Fallback	□ Enable (default:disabled)
Bigpond	
Bigpond Username	BIGPOND_USERNAM
Bigpond Password	□□□□□□□□□□□□□□
Bigpond Authentication Server	sm-server
3G	
Pin Code Protect	☑ Enable (default:enabled)
Pin Code	1234 Not dial yet
Dial Code	*99#
APN Service	internet
3G Username	3G_USERNAME
3G Password	□□□□□□□□□□□□
Common Settings	
WAN Ethernet MAC	● Original MAC (00:12:CF:9B:57:F0) ○ Manual Setting 00:00:00:00:00:00 [MAC Clone]
Set DNS Server	● Manually ○ Automatically
Primary DNS Server	168.95.1.1
Secondary DNS Server	168.95.192.1

Figure 4-14. Setup Wizard - WAN Bigpond

- **Bigpond Username**: Sets the Bigpond user name for the WAN port. (Default: BIGPOND_USERNAME; Range: 1~32 characters)
- **Bigpond Password**: Sets a Bigpond password for the WAN port. (Default: BIGPOND_USERNAME; Range: 1~32 characters)
- **Bigpond Authentication Server**: Specifies a Bigpond authentication server. (Default: sm-server)

4. **WLAN Setting** – Enables the wireless interface, selects the operating channel and configures SSIDs for both VAPs. Click Next after completing the setup.



WLAN Setting

WLAN	☑ Enable
WLAN Mode	802.11b/g/n Mixed
WLAN Frequency	2.412GHz (channel 1)
SSID Number Supported	1
WLAN1 SSID	MR3306A1

WLAN Mode:
802.11b/g/n Mixed: allow all 802.11b/g/n clients connection
802.11b/g Mixed: allow both 802.11b and 802.11g clients connection
802.11b: only allow 802.11g clients connection
802.11g: only allow 802.11g clients connection
802.11n: only allow 802.11g clients connection

Frequency:
The radio channel used to communicate with wireless clients.

SSID:
The Service Set Identifier (SSID) name of the wireless network service provided by the VAP.

Figure 4-15. Setup Wizard - WLAN Configuration

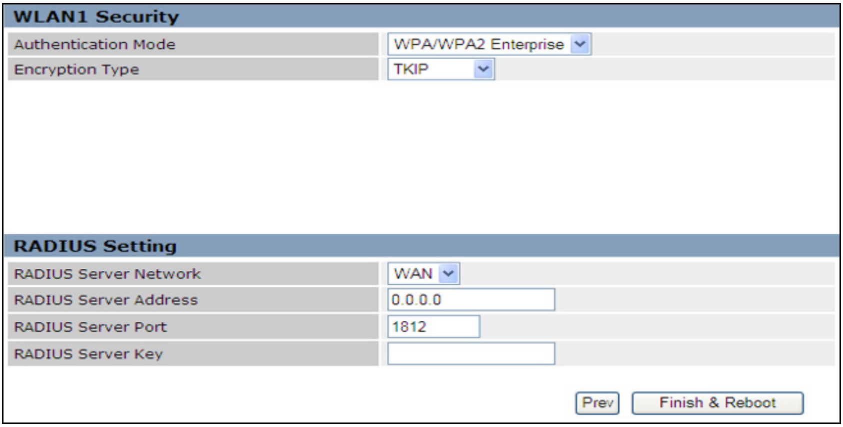
The displayed items on this page can be described as follows:

- **WLAN** – Enables the communication for the VAP wireless interface. (Default: Enabled)
- **WLAN Mode** – Defines the radio mode for the VAP interface. See “WLAN Mode” on page 5-21 for more information. (Default: 802.11b/g/n Mixed)
- **WLAN Frequency** – The radio channel that the wireless AP/Router uses to communicate with wireless clients. When multiple access points are deployed in the same area, set the channel on neighboring access points at least five channels apart to avoid interference with each other. For example, you can deploy up to three access points in the same area using channels 1, 6, 11. Note that wireless clients automatically set the channel to the same as that used by the wireless AP/Router to which it is linked. Selecting Auto Select enables the wireless AP/Router to automatically select an unoccupied radio channel. (The supported channels are dependent on the country code setting.)

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.

- **SSID Number Supported** – The number of wireless network interfaces (SSIDs) supported on the device. (Default: 1)
- **WLAN1 SSID / WLAN2 SSID** – The name of the wireless network service provided by the VAP. Clients that want to connect to the network must set their SSID to the same as that of the VAP interface. (Default: “mr3306a1” for WLAN1; “mr3306a2” for WLAN2; Range: 1-32 characters)

5. **WLAN1/WLAN2 Security** — Sets the wireless security encryption key for the wireless network.



WLAN1 Security

Authentication Mode	WPA/WPA2 Enterprise
Encryption Type	TKIP

RADIUS Setting

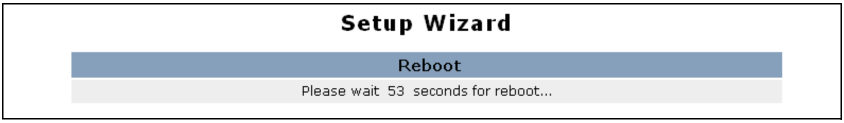
RADIUS Server Network	WAN
RADIUS Server Address	0.0.0.0
RADIUS Server Port	1812
RADIUS Server Key	

Figure 4-16. Setup Wizard - WLAN1 Security

Authentication Mode – Configures the authentication mode used by clients. See “Authentication Mode” on page 5-28 for more information. (WLAN1/WLAN2 Defaults: Open)

6. Click Finish & Reboot after completing the configuration changes. Note that all configuration changes are not saved until the Setup Wizard is completed and the system has restarted.

   When the system restarts, a countdown window displays for 60 seconds.



Setup Wizard

Reboot

Please wait 53 seconds for reboot...

Figure 4-17. Implementing Wizard Settings

Chapter 5: System Configuration

The wireless AP/Router offers a user-friendly web-based management interface for the configuration of all the unit's features. Any PC directly attached to the unit can access the management interface using a web browser, such as Internet Explorer (version 6.0 or above).

This chapter describes the wireless AP/Router's configurable features, all of which may be accessed through the web interface.

Note: Before accessing the web interface, first set the device to Router or AP Mode using the switch on the bottom panel. Note that the unit reboots when the operating mode is changed.

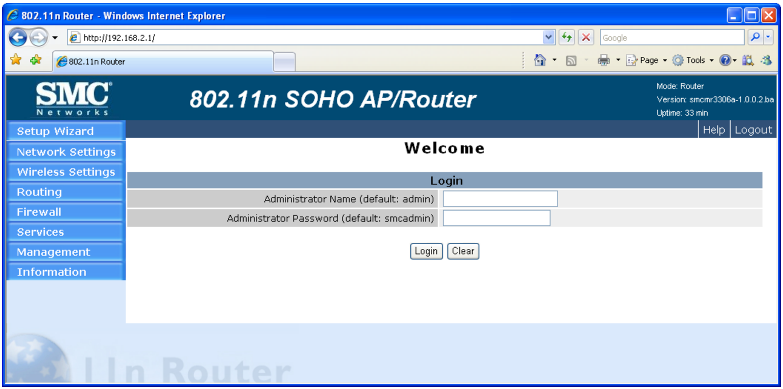
It is recommended to make initial configuration changes by connecting a PC directly to one of the wireless AP/Router's LAN ports. The wireless AP/Router has a default IP address of 192.168.2.1 and a subnet mask of 255.255.255.0. If your PC is set to "Obtain an IP address automatically" (that is, set as a DHCP client), you can connect immediately to the web interface. Otherwise, you must set your PC IP address to be on the same subnet as the wireless AP/Router (that is, the PC and wireless AP/Router addresses must both start 192.168.2.x).

To access the configuration menu, follow these steps:

1. Use your web browser to connect to the management interface using the default IP address of 192.168.2.1.

2. Log into the wireless AP/Router management interface by entering the default username "admin" and password also "smcadmin," then click Login.

Note: It is strongly recommended to change the default user name and password the first time you access the web interface. For information on changing user names and passwords, See "Admin Accounts and Remote Administration" on page 5-60



Mode: Router
Version: smcmr3306a-1.0.0.2.ba
Uptime: 33 min

Welcome

Login

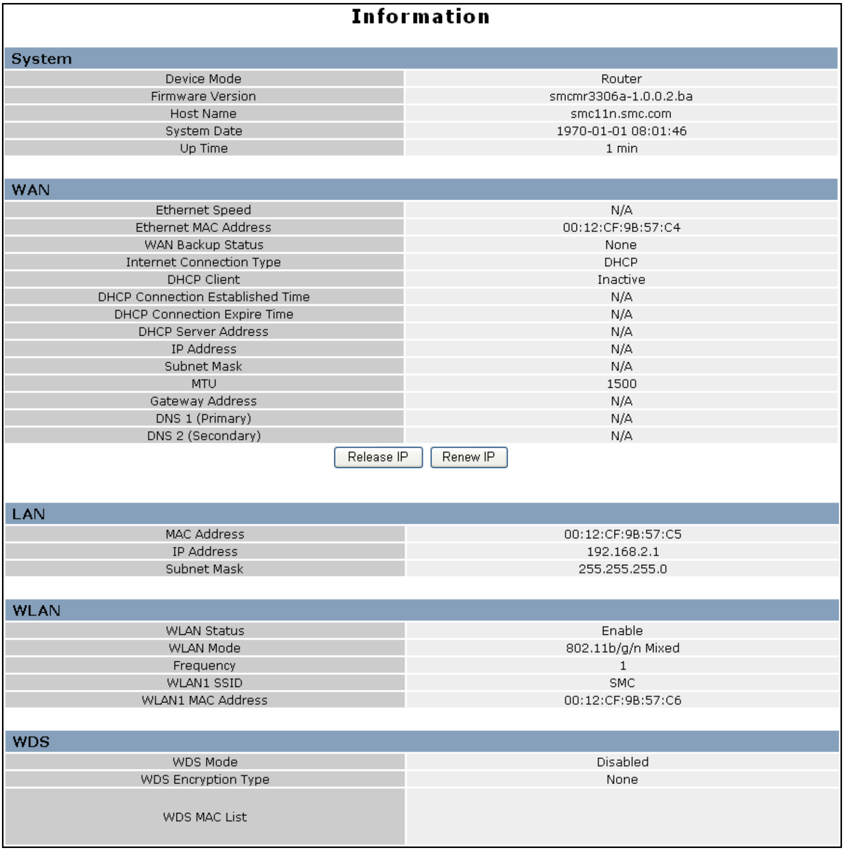
Administrator Name (default: admin)

Administrator Password (default: smcadmin)

Login Clear

Figure 5-1. Login Page

The System Information page displays the System, Management IP, WAN, LAN, WLAN, and WDS settings.



Information

System

Device Mode	Router
Firmware Version	smcmr3306a-1.0.0.2.ba
Host Name	smc11n.smc.com
System Date	1970-01-01 08:01:46
Up Time	1 min

WAN

Ethernet Speed	N/A
Ethernet MAC Address	00:12:CF:9B:57:C4
WAN Backup Status	None
Internet Connection Type	DHCP
DHCP Client	Inactive
DHCP Connection Established Time	N/A
DHCP Connection Expire Time	N/A
DHCP Server Address	N/A
IP Address	N/A
Subnet Mask	N/A
MTU	1500
Gateway Address	N/A
DNS 1 (Primary)	N/A
DNS 2 (Secondary)	N/A

LAN

MAC Address	00:12:CF:9B:57:C5
IP Address	192.168.2.1
Subnet Mask	255.255.255.0

WLAN

WLAN Status	Enable
WLAN Mode	802.11b/g/n Mixed
Frequency	1
WLAN1 SSID	SMC
WLAN1 MAC Address	00:12:CF:9B:57:C6

WDS

WDS Mode	Disabled
WDS Encryption Type	None
WDS MAC List	

Figure 5-2. Home Page (Router mode)

The information in this chapter is organized to reflect the structure of the web management screens for easy reference.

The Configuration pages include the options in the table below. For details on configuration for each feature, see the corresponding page number.

Note: The displayed pages and settings may differ depending on whether the unit is in Router or AP Mode.

Table 5-1. Configuration Options

Menu	Description	Mode	Page
Network Settings			5-4
Management IP	Specifies an IP and subnet mask for management access	AP	5-4
WAN	Configures settings for the wide area network	Router	5-5
LAN	Sets the unit’s IP address and enables DNS	Router	5-18
QoS	Configures Quality of Service (QoS) for wireless traffic	Router	5-19
Wireless Settings			5-21
Basic Setting	Configures wireless transmission method, frequency and SSID	Both	5-22
Advanced Setting	Configures advanced wireless transmission values	Both	5-24
WLAN Security	Configures radio security parameters for the VAP interface	Both	5-26
WLAN MAC ACL	Configures MAC ACLs for the VAP interface	Both	5-36
WPS	Configures WPS settings	Both	5-38
Routing			5-41
Static Route	Configures IP settings for routing of traffic through the AP/ Router from another subnet	Router	5-41
Dynamic Route	Enables RIP protocols for the LAN and WAN ports.	Router	5-42
Multicast Routing	Enables multicast routing.	Router	5-43
Firewall			5-44
NAT	Configures NAT settings	Router	5-44
Packet Filter	Configures WAN, LAN and MAC packet filtering	Router	5-48
URL Filter	Configures web site address filtering	Router	5-50
Security	Enables intrusion detection	Router	5-51
Services			5-52
DHCP	Configures the DHCP server settings	Router	5-52
UPnP	Enables UPnP	Router	5-53
DDNS	Configures Dynamic DNS settings	Router	5-54
System Log Setting	Enables system logs	Both	5-55
Date/Time	Configures NTP settings	Both	5-57

Table 5-1. Configuration Options			
Menu	**Description**	**Mode**	**Page**
PING Test	Performs a loopback test on a specified IP address	Both	5-59
Management			5-60
Admin	Enables remote administration and configures user accounts for control of the unit	Both	5-60
Config	Backups and restores the configuration data and restores the factory defaults	Both	5-62
Firmware	Upgrades system software from a local file and enables provisioning updates	Both	5-63
Information			5-64
System Information	Displays the current system status	Both	5-64
Routing Table	Displays information on configured routes	Router	5-67
Packet Statistics	Displays received and sent packet statistics	Both	5-67
System Log	Displays the system message log	Both	5-69

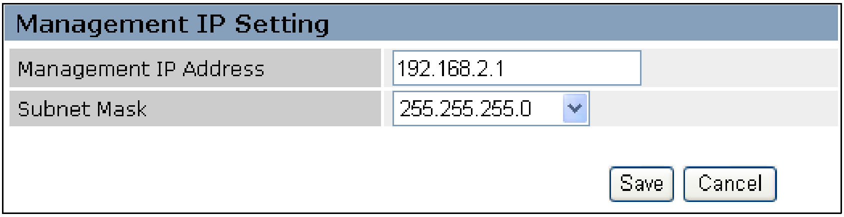
Network Settings

The Network Settings pages allow you to manage basic system configuration settings.

Note: In AP mode, the wireless AP/Router's Network Settings options are significantly reduced.

Management IP

Assigns an IP address for connecting to the wireless AP/Router. Click on "Network Settings" followed by "Management IP."



Management IP Setting

Management IP Address	192.168.2.1
Subnet Mask	255.255.255.0

Figure 5-3. IP Settings (AP mode)

- **Management IP Address** – Specifies an IP address for management of the wireless AP/Router. Valid IP addresses consist of four decimal numbers, 0 to 255, separated by periods. (Default: 192.168.1.254.)

- **Subnet Mask** – Indicates the local subnet mask. Select the desired mask from the drop down menu. (Default: 255.255.255.0)

WAN Setting

Specifies the Internet connection parameters. Click on “Network Settings” followed by “WAN.”

WAN Connection

By default, the access point WAN port is configured with DHCP enabled. After you have network access to the access point, you can use the web browser interface to modify the initial IP configuration, if needed. The options are Static IP, DHCP, PPPoE, 3G, PPTP, L2TP and Bigpond. Each option changes the parameters below it. (Default: DHCP)

Backup WAN

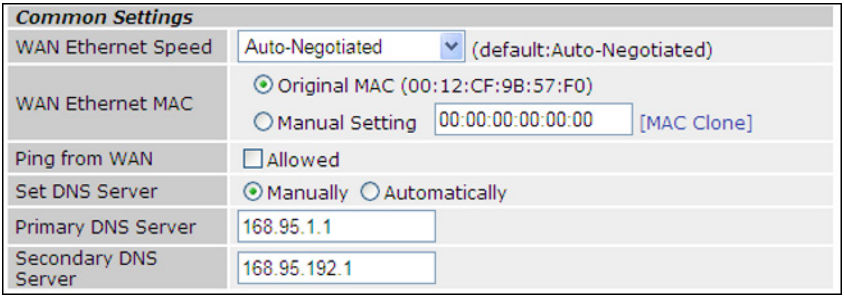
A backup failsafe connection for the WAN port (Dual WAN.) Options are determined by the WAN Connection selected. Backup WAN and WAN Connection parameters are identical for each of their seven equivilent modes: Static IP, DHCP, PPPoE, 3G, PPTP, L2TP and Bigpond. (Default: None)

- **Main WAN Fallback**: When the Backup WAN is enabled, Main WAN Fallback can be enabled to periodically search the primary WAN port for recovery of the lost connection. If connection is re-established the connection switches back to the primary WAN connection. (Default: Disabled)

Note: When 3G is selected as the primary WAN Connection the Backup WAN may not be 3G also.

Common Settings

Common Settings are the same for each Static IP, DHCP, PPPoE, 3G, PPTP, L2TP, Bigpond and Wi-Fi modes. The following section describes their parameters.



Common Settings	
WAN Ethernet Speed	Auto-Negotiated ▾ (default:Auto-Negotiated)
WAN Ethernet MAC	● Original MAC (00:12:CF:9B:57:F0) ○ Manual Setting 00:00:00:00:00:00 [MAC Clone]
Ping from WAN	□ Allowed
Set DNS Server	● Manually ○ Automatically
Primary DNS Server	168.95.1.1
Secondary DNS Server	168.95.192.1

Figure 5-4. WAN Common Settings (Router Mode)

WAN Ethernet Speed — Configures the WAN Ethernet connection speed. (Default: Auto-Negotiated)

- **Auto-Negotiated** – Enables auto-negotiation.
- **100Mbps, Full-Duplex** – Forces 100 Mbps full-duplex operation.
- **100Mbps, Half-Duplex** – Forces 100 Mbps half-duplex operation.
- **10Mbps, Full-Duplex** – Forces 10 Mbps full-duplex operation.
- **10Mbps, Half-Duplex** – Forces 10 Mbps half-duplex operation.

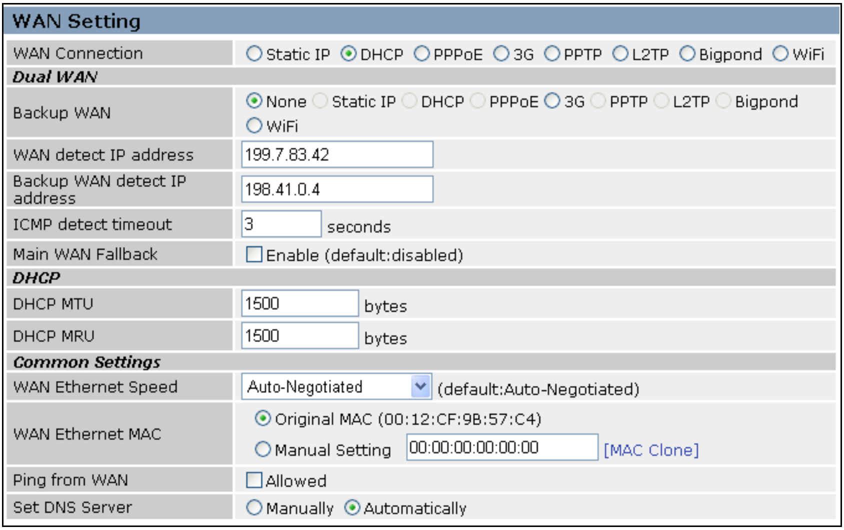
WAN Ethernet MAC — Some ISPs limit Internet connections to a specified MAC address of one PC. This setting allows you to manually change the MAC address of the wireless AP/Router's WAN interface to match the PC's MAC address provided to your ISP for registration. You can enter the registered MAC address manually by typing it in the boxes provided. Otherwise, connect only the PC with the registered MAC address to the wireless AP/Router, then click the “MAC Clone.” (Default: Original MAC)

Note: If you are unsure of the PC MAC address originally registered by your ISP, call your ISP and request to register a new MAC address for your account. Register the default MAC address of the wireless AP/Router.

- **Original MAC** – Specifies a preset MAC address to uniquely identify the unit.
- **Manual Setting** – Configures a specific MAC address to use for the WAN connection.
- **Ping from WAN** – Sends a ping from the wireless AP/Router to the WAN connection to test for connectivity.
- **Set DNS Server** – Allows manual or automatic selection of DNS severs.
- **Primary DNS Server**: The IP address of the Primary Domain Name Server on the network. A DNS maps numerical IP addresses to domain names and can be used to identify network hosts by familiar names instead of the IP addresses. If you have one or more DNS servers located on the local network, type the IP addresses in the text fields provided. Otherwise, leave the addresses as all zeros (0.0.0.0).
- **Secondary DNS Server**: The IP address of the Secondary Domain Name Server on the network.

DHCP

DHCP (dynamic host control protocol) is set as default for the primary WAN connection. To enable DHCP for the Backup WAN you must select 3G as the primary WAN connection.



WAN Setting

WAN Connection	○ Static IP ● DHCP ○ PPPoE ○ 3G ○ PPTP ○ L2TP ○ Bigpond ○ WiFi
Dual WAN	
Backup WAN	● None ○ Static IP ○ DHCP ○ PPPoE ○ 3G ○ PPTP ○ L2TP ○ Bigpond ○ WiFi
WAN detect IP address	199.7.83.42
Backup WAN detect IP address	198.41.0.4
ICMP detect timeout	3 seconds
Main WAN Fallback	□ Enable (default:disabled)
DHCP	
DHCP MTU	1500 bytes
DHCP MRU	1500 bytes
Common Settings	
WAN Ethernet Speed	Auto-Negotiated (default:Auto-Negotiated)
WAN Ethernet MAC	● Original MAC (00:12:CF:9B:57:C4) ○ Manual Setting 00:00:00:00:00:00 [MAC Clone]
Ping from WAN	□ Allowed
Set DNS Server	○ Manually ● Automatically

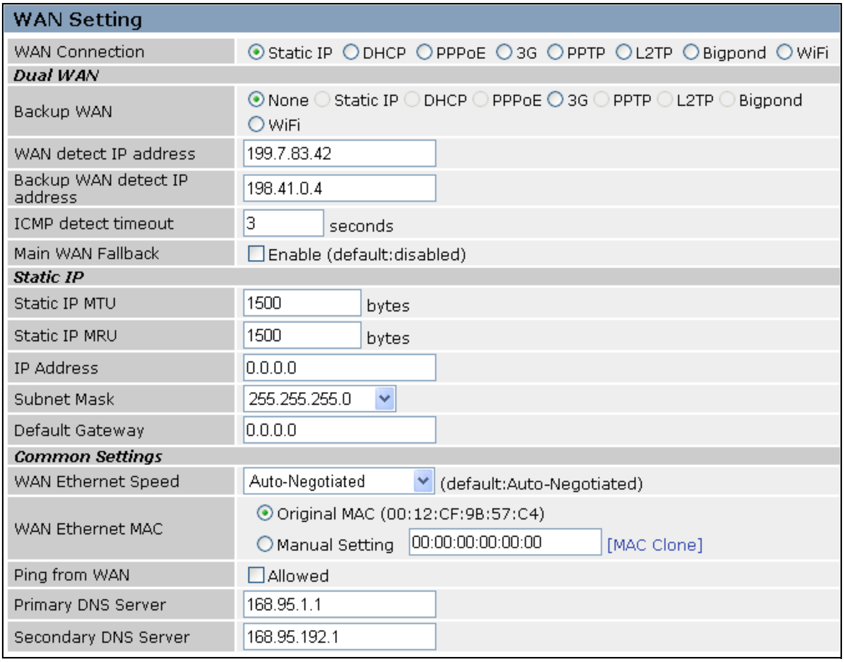
Figure 5-5. WAN Settings for DHCP (Router mode)

DHCP — Enables DHCP for the WAN port.

- **DHCP MTU**: Sets the maximum packet size that the WAN port may transmit. The Maximum Transmission Unit (MTU) is expressed in bytes. (Default:1500 bytes)
- **DHCP MRU**: Sets the maximum packet size that the unit may receive from other units on the network and sends a message to inform them of the set threshold. Maximum Receive Unit (MRU) is expressed in bytes. (Default: 1500 bytes)

Static IP

Configures the unit to use the same IP address each time it connects.



WAN Setting

WAN Connection	● Static IP ○ DHCP ○ PPPoE ○ 3G ○ PPTP ○ L2TP ○ Bigpond ○ WiFi
Dual WAN	
Backup WAN	● None ○ Static IP ○ DHCP ○ PPPoE ○ 3G ○ PPTP ○ L2TP ○ Bigpond ○ WiFi
WAN detect IP address	199.7.83.42
Backup WAN detect IP address	198.41.0.4
ICMP detect timeout	3 seconds
Main WAN Fallback	□ Enable (default:disabled)
Static IP	
Static IP MTU	1500 bytes
Static IP MRU	1500 bytes
IP Address	0.0.0.0
Subnet Mask	255.255.255.0
Default Gateway	0.0.0.0
Common Settings	
WAN Ethernet Speed	Auto-Negotiated (default:Auto-Negotiated)
WAN Ethernet MAC	● Original MAC (00:12:CF:9B:57:C4) ○ Manual Setting 00:00:00:00:00:00 [MAC Clone]
Ping from WAN	□ Allowed
Primary DNS Server	168.95.1.1
Secondary DNS Server	168.95.192.1

Figure 5-6. WAN Settings for Static IP (Router mode)

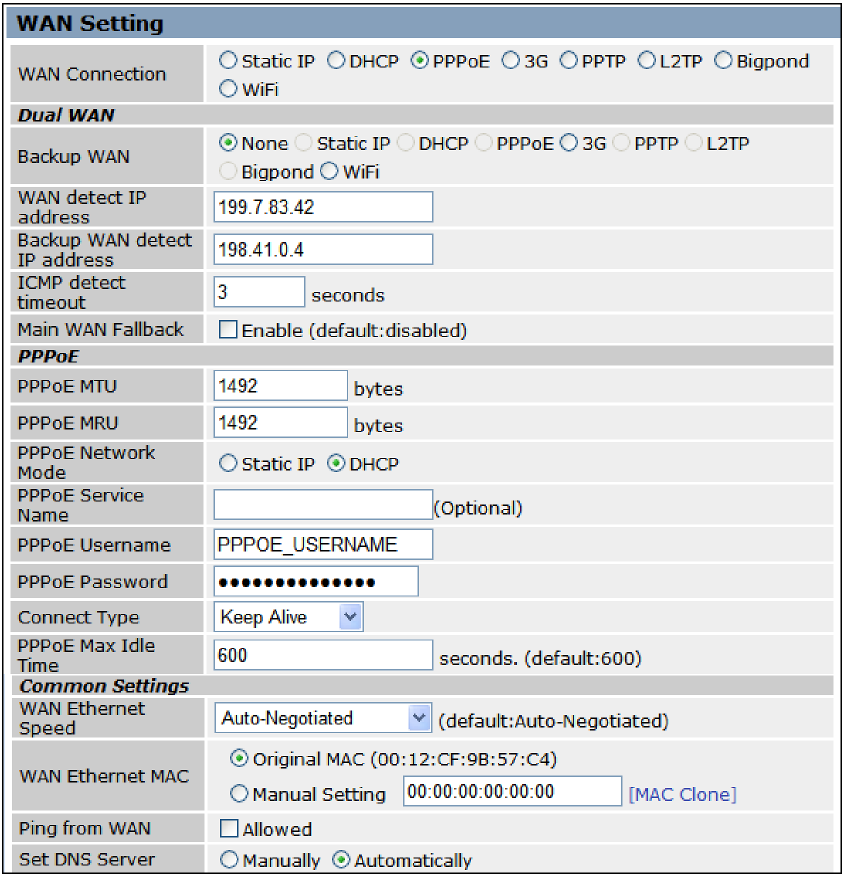
Static IP — Configures a static IP for the WAN port.

- **Static IP MTU**: Sets the maximum packet size that the WAN port may transmit. The Maximum Transmission Unit (MTU) is expressed in bytes. (Default:1500 bytes)
- **Static IP MRU**: Sets the maximum packet size that the unit may receive from other units on the network and sends a message to inform them of the set threshold. Maximum Receive Unit (MRU) is expressed in bytes. (Default: 1500 bytes)
- **IP Address**: Sets the static IP address as given by the PPTP service provider. (Default: 0.0.0.0, available when PPTP Network Mode is set to static IP.)
- **Subnet Mask**: Sets the static IP subnet mask. (Default: 255.255.255.0, available when PPTP Network Mode is set to static IP.)
- **Default Gateway**: The IP address of the gateway router for the wireless AP/ Router, which is used if the requested destination address is not on the local subnet.

- **WAN IP Alias** – Adds more than one IP address to the network interface for multiple connectivity.
  - **Enable**: Enables the specified IP address.
  - **Add**: Specifies a WAN IP alias.
  - **Change**: Changes the already specified IP alias.
  - **Delete**: Deletes the IP alias.

PPPoE

Enable the wireless AP/Router IP address to be assigned automatically from an Internet service provider (ISP) through an ADSL modem using Point-to-Point Protocol over Ethernet (PPPoE).



WAN Setting

WAN Connection	○ Static IP ○ DHCP ● PPPoE ○ 3G ○ PPTP ○ L2TP ○ Bigpond ○ WiFi
Dual WAN	
Backup WAN	● None ○ Static IP ○ DHCP ○ PPPoE ○ 3G ○ PPTP ○ L2TP ○ Bigpond ○ WiFi
WAN detect IP address	199.7.83.42
Backup WAN detect IP address	198.41.0.4
ICMP detect timeout	3 seconds
Main WAN Fallback	□ Enable (default:disabled)
PPPoE	
PPPoE MTU	1492 bytes
PPPoE MRU	1492 bytes
PPPoE Network Mode	○ Static IP ● DHCP
PPPoE Service Name	(Optional)
PPPoE Username	PPPOE_USERNAME
PPPoE Password	●●●●●●●●●●●●●●●
Connect Type	Keep Alive
PPPoE Max Idle Time	600 seconds. (default:600)
Common Settings	
WAN Ethernet Speed	Auto-Negotiated (default:Auto-Negotiated)
WAN Ethernet MAC	● Original MAC (00:12:CF:9B:57:C4) ○ Manual Setting 00:00:00:00:00:00 [MAC Clone]
Ping from WAN	□ Allowed
Set DNS Server	○ Manually ● Automatically

Figure 5-7. WAN Settings for PPPoE (Router mode)

PPPoE — Configures PPPoE.

- **PPPoE MTU**: Sets the maximum packet size that the WAN port may transmit. The Maximum Transmission Unit (MTU) is expressed in bytes. (Default:1492 bytes)
- **PPPoE MRU**: Sets the maximum packet size that the unit may receive from other units on the network and sends a message to inform them of the set threshold. Maximum Receive Unit (MRU) is expressed in bytes. (Default: 1492 bytes)

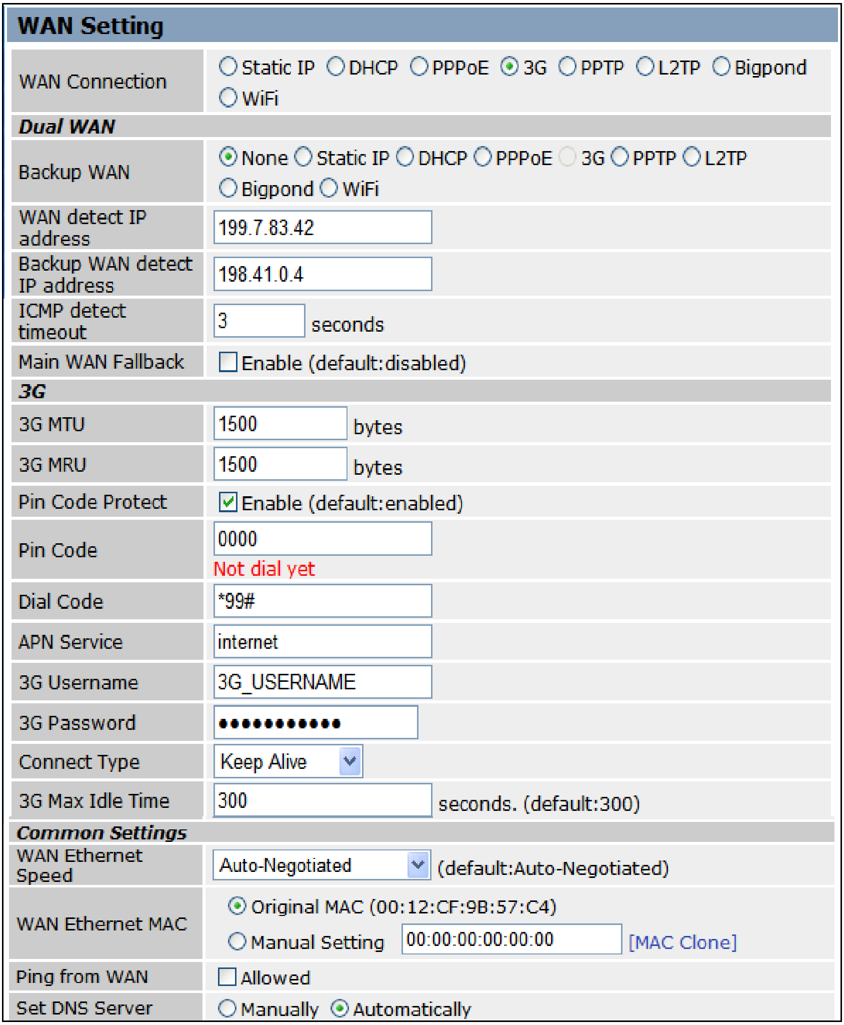
Note: Only change the default MTU and MRU values if specifically instructed by the PPPoE service provider.

- **PPPoE Network Mode**: Sets the PPPoE network mode to Static IP or DHCP. (Default: DHCP)
- **IP Address**: Sets the static IP address as given by the PPPoE service provider. (Default: 0.0.0.0, available when PPPoE Network Mode is set to static IP.)
- **PPPoE Service Name (Optional)**: The service name assigned for the PPPoE connection. The service name is normally optional, but may be required by some service providers. (Range: 1-32 alphanumeric characters)
- **PPPoE User Name**: Sets the PPPoE username for the WAN port.
  (Default: PPPOE_USERNAME; Range: 1~32 characters)
- **PPPoE Password**: Sets a PPPoE password for the WAN port.
  (Default: PPPOE_PASSWORD; Range: 1~32 characters)
- **Connect Type**: Selects the connection type as Keep Alive or Auto Connect.
  (Default: Keep Alive)
- **PPPoE Max Idle Time**: The maximum length of inactive time the unit will stay connected to the DSL service provider before disconnecting. This feature only works when Connect Type is set to "Auto-Connect." (Default: 600 seconds)

3G

3G technologies enable cellular network operators to offer users a wider range of more advanced services while achieving greater network capacity through improved spectral efficiency. Services include wide-area wireless voice telephony, video calls, and broadband wireless data, all in a mobile environment.

To use the 3G option, you need to first connect a 3G/3.5G USB modem to the USB port on the back of the unit and have registered an account with a cellular operator.



WAN Setting

WAN Connection	○ Static IP ○ DHCP ○ PPPoE ● 3G ○ PPTP ○ L2TP ○ Bigpond ○ WiFi
Dual WAN	
Backup WAN	● None ○ Static IP ○ DHCP ○ PPPoE ○ 3G ○ PPTP ○ L2TP ○ Bigpond ○ WiFi
WAN detect IP address	199.7.83.42
Backup WAN detect IP address	198.41.0.4
ICMP detect timeout	3 seconds
Main WAN Fallback	□ Enable (default:disabled)
3G	
3G MTU	1500 bytes
3G MRU	1500 bytes
Pin Code Protect	☑ Enable (default:enabled)
Pin Code	0000 Not dial yet
Dial Code	*99#
APN Service	internet
3G Username	3G_USERNAME
3G Password	●●●●●●●●●●●
Connect Type	Keep Alive
3G Max Idle Time	300 seconds. (default:300)
Common Settings	
WAN Ethernet Speed	Auto-Negotiated (default:Auto-Negotiated)
WAN Ethernet MAC	● Original MAC (00:12:CF:9B:57:C4) ○ Manual Setting 00:00:00:00:00:00 [MAC Clone]
Ping from WAN	□ Allowed
Set DNS Server	○ Manually ● Automatically

Figure 5-8. WAN Settings for 3G (Router mode)

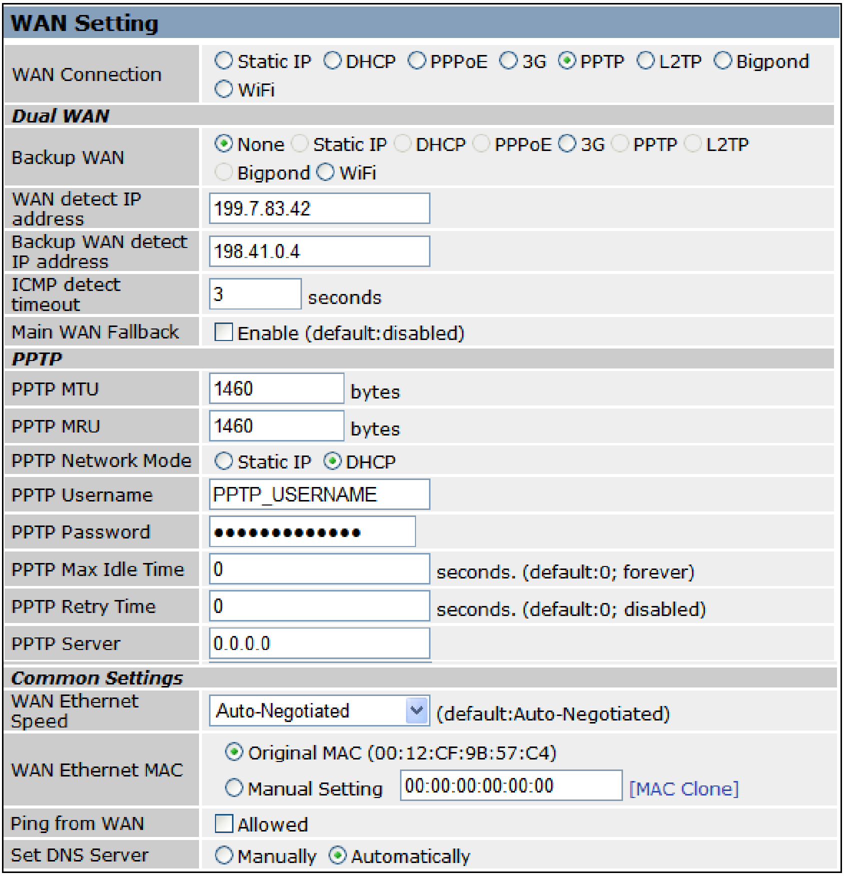
3G — Enables a 3G/3.5G wide-area wireless cellular link on the USB port using an optional USB modem.

- **Pin Code Protect**: Enables the use of a PIN code (personal identification number) to encrypt access to the wireless 3G connection. Some service providers do not require PIN code authentication. If the PIN code for your 3G/3.5G modem is disabled, then disable this function. (Default: Enabled)
- **Pin Code**: Specifies a PIN code number that corresponds with that set on your 3G/ 3.5G USB modem.
- **Dial Code**: A dialled access code that connects the USB device to the service provider.
- **APN Service**: The name that uniquely identifies the cellular operator, access point name (APN).
- **3G Username**: The username of the account registered with the service provider.
- **3G Password**: The password of the account registered with the service provider.

PPTP

Enable the Point-to-Point Tunneling Protocol (PPTP) for implementing virtual private networks. The service is provided across the Internet in many European countries.

The following example shows PPTP selected as the primary WAN connection with 3G enabled as a backup WAN.



WAN Setting

WAN Connection	○ Static IP ○ DHCP ○ PPPoE ○ 3G ● PPTP ○ L2TP ○ Bigpond ○ WiFi
Dual WAN	
Backup WAN	● None ○ Static IP ○ DHCP ○ PPPoE ○ 3G ○ PPTP ○ L2TP ○ Bigpond ○ WiFi
WAN detect IP address	199.7.83.42
Backup WAN detect IP address	198.41.0.4
ICMP detect timeout	3 seconds
Main WAN Fallback	□ Enable (default:disabled)
PPTP	
PPTP MTU	1460 bytes
PPTP MRU	1460 bytes
PPTP Network Mode	○ Static IP ● DHCP
PPTP Username	PPTP_USERNAME
PPTP Password	•••••••••••••
PPTP Max Idle Time	0 seconds. (default:0; forever)
PPTP Retry Time	0 seconds. (default:0; disabled)
PPTP Server	0.0.0.0
Common Settings	
WAN Ethernet Speed	Auto-Negotiated (default:Auto-Negotiated)
WAN Ethernet MAC	● Original MAC (00:12:CF:9B:57:C4) ○ Manual Setting 00:00:00:00:00:00 [MAC Clone]
Ping from WAN	□ Allowed
Set DNS Server	○ Manually ● Automatically

Figure 5-9. WAN Settings for PPTP (Router mode)

PPTP — Enable the Point-to-Point Tunneling Protocol (PPTP) for implementing virtual private networks. The service is provided across the Internet in many European countries.

- **PPTP MTU**: Sets the maximum packet size that the WAN port may transmit. The Maximum Transmission Unit (MTU) is expressed in bytes. (Default:1460 bytes)

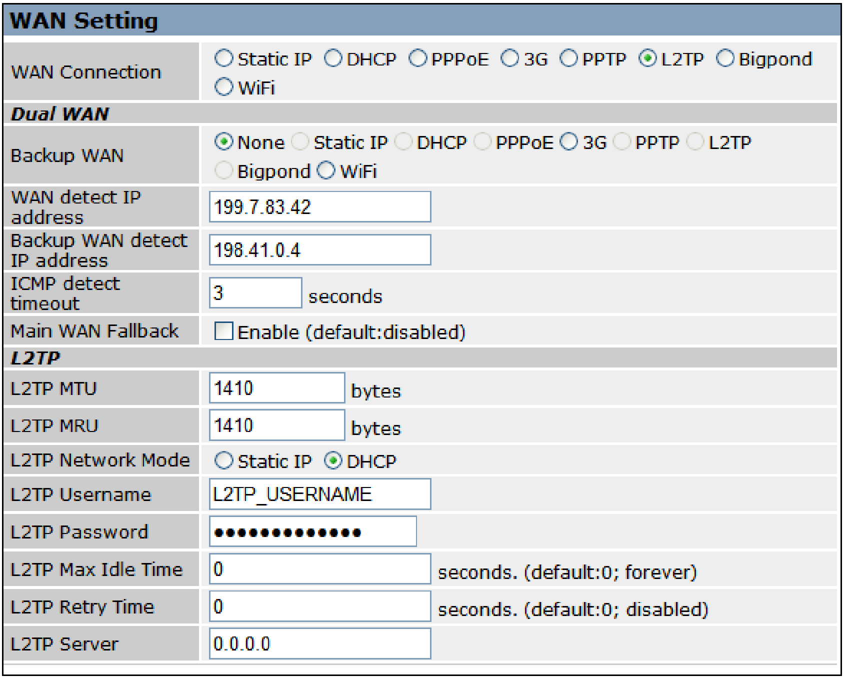
- **PPTP MRU**: Sets the maximum packet size that the unit may receive from other units on the network and sends a message to inform them of the set threshold. Maximum Receive Unit (MRU) is expressed in bytes. (Default: 1460 bytes)

Note: Only change the default MTU and MRU values if specifically instructed by the PPTP service provider.

- **PPTP Network Mode**: Sets the PPTP network mode to Static IP or DHCP. (Default: DHCP)
- **PPTP Username**: Sets the PPTP user name for the WAN port. (Default: PPTP_USERNAME; Range: 1~32 characters)
- **PPTP Password**: Sets a PPTP password for the WAN port. (Default: PPTP_PASSWORD; Range: 1~32 characters)
- **PPTP Server**: Configures the IP address of the PPTP server interface. (Default: 0.0.0.0)

L2TP

Enable the Layer Two Tunneling Protocol (L2TP) for implementing virtual private networks. The service is provided across the Internet in many European countries.



WAN Setting

WAN Connection	○ Static IP ○ DHCP ○ PPPoE ○ 3G ○ PPTP ● L2TP ○ Bigpond ○ WiFi
Dual WAN	
Backup WAN	● None ○ Static IP ○ DHCP ○ PPPoE ○ 3G ○ PPTP ○ L2TP ○ Bigpond ○ WiFi
WAN detect IP address	199.7.83.42
Backup WAN detect IP address	198.41.0.4
ICMP detect timeout	3 seconds
Main WAN Fallback	□ Enable (default:disabled)
L2TP	
L2TP MTU	1410 bytes
L2TP MRU	1410 bytes
L2TP Network Mode	○ Static IP ● DHCP
L2TP Username	L2TP_USERNAME
L2TP Password	•••••••••••••
L2TP Max Idle Time	0 seconds. (default:0; forever)
L2TP Retry Time	0 seconds. (default:0; disabled)
L2TP Server	0.0.0.0

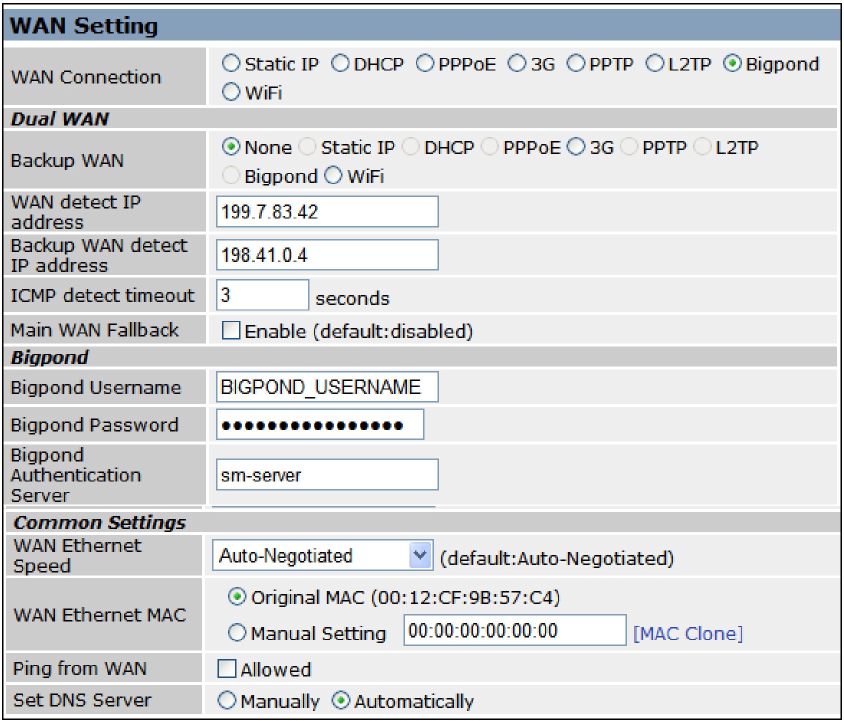
Figure 5-10. WAN Settings for L2TP (Router mode)

L2TP — Enable the Layer Two Tunneling Protocol (L2TP).

- **L2TP MTU**: Sets the maximum packet size that the WAN port may transmit. The Maximum Transmission Unit (MTU) is expressed in bytes. (Default:1410 bytes)
- **L2TP MRU**: Sets the maximum packet size that the unit may receive from other units on the network and sends a message to inform them of the set threshold. Maximum Receive Unit (MRU) is expressed in bytes. (Default: 1410 bytes)
- Only change the default MTU and MRU values if specifically instructed by the PPTP service provider.
- **L2TP Network Mode**: Sets the L2TP IP address assignment to Static IP or DHCP. (Default: DHCP)
- **IP Address**: Sets the static IP address as given by the L2TP service provider. (Default: 0.0.0.0, available when L2TP Network Mode is set to static IP.)
- **Subnet Mask**: Sets the static IP subnet mask. (Default: 255.255.255.0, available when L2TP Network Mode is set to static IP.)
- **Default Gateway**: The IP address of the gateway router for the wireless AP/ Router, which is used if the requested destination address is not on the local subnet.
- **L2TP Username**: Sets the L2TP user name for the WAN port. (Default: L2TP_USERNAME; Range: 1~32 characters)
- **L2TP Password**: Sets a L2TP password for the WAN port. (Default: L2TP_PASSWORD; Range: 1~32 characters)
- **L2TP Max Idle Time**: The maximum length of inactive time the unit will stay connected to the DSL service provider before disconnecting. (Default: 15 seconds; Range: 5 ~ 600 seconds)
- **L2TP Retry Time After Disconnect**: Sets a L2TP retry time after the network is disconnected. (Default: 0 seconds; disabled)
- **L2TP Server**: Configures the IP address of the L2TP server interface. (Default: 0.0.0.0)

Bigpond

BigPond is an Australian Internet service provider, is a subsidiary of Telstra and owns a majority share of internet penetration in Australia.



WAN Setting

WAN Connection	○ Static IP ○ DHCP ○ PPPoE ○ 3G ○ PPTP ○ L2TP ● Bigpond ○ WiFi
Dual WAN	
Backup WAN	● None ○ Static IP ○ DHCP ○ PPPoE ○ 3G ○ PPTP ○ L2TP ○ Bigpond ○ WiFi
WAN detect IP address	199.7.83.42
Backup WAN detect IP address	198.41.0.4
ICMP detect timeout	3 seconds
Main WAN Fallback	□ Enable (default:disabled)
Bigpond	
Bigpond Username	BIGPOND_USERNAME
Bigpond Password	••••••••••••••••
Bigpond Authentication Server	sm-server
Common Settings	
WAN Ethernet Speed	Auto-Negotiated (default:Auto-Negotiated)
WAN Ethernet MAC	● Original MAC (00:12:CF:9B:57:C4) ○ Manual Setting 00:00:00:00:00:00 [MAC Clone]
Ping from WAN	□ Allowed
Set DNS Server	○ Manually ● Automatically

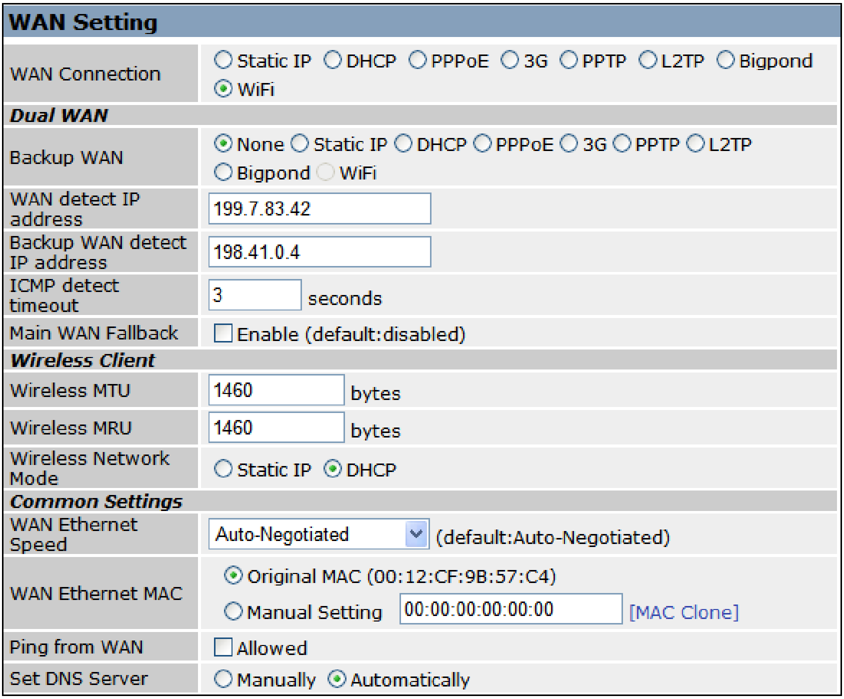
Figure 5-11. WAN Settings for Bigpond (Router mode)

Bigpond — Enables the settings of Telstra Bigpond network service in Australia.

- **Bigpond Username**: Sets the Bigpond user name for the WAN port. (Default: BIGPOND_USERNAME; Range: 1~32 characters)
- **Bigpond Password**: Sets a Bigpond password for the WAN port. (Default: BIGPOND_USERNAME; Range: 1~32 characters)
- **Bigpond Authentication Server**: Specifies a Bigpond authentication server. (Default: sm-server)

Wi-Fi

Wi-Fi enables a WAN connection over a wireless 802.11a/b/g/n connection.



WAN Setting

WAN Connection	○ Static IP ○ DHCP ○ PPPoE ○ 3G ○ PPTP ○ L2TP ○ Bigpond ● WiFi
Dual WAN	
Backup WAN	● None ○ Static IP ○ DHCP ○ PPPoE ○ 3G ○ PPTP ○ L2TP ○ Bigpond ○ WiFi
WAN detect IP address	199.7.83.42
Backup WAN detect IP address	198.41.0.4
ICMP detect timeout	3 seconds
Main WAN Fallback	□ Enable (default:disabled)
Wireless Client	
Wireless MTU	1460 bytes
Wireless MRU	1460 bytes
Wireless Network Mode	○ Static IP ● DHCP
Common Settings	
WAN Ethernet Speed	Auto-Negotiated (default:Auto-Negotiated)
WAN Ethernet MAC	● Original MAC (00:12:CF:9B:57:C4) ○ Manual Setting 00:00:00:00:00:00 [MAC Clone]
Ping from WAN	□ Allowed
Set DNS Server	○ Manually ● Automatically

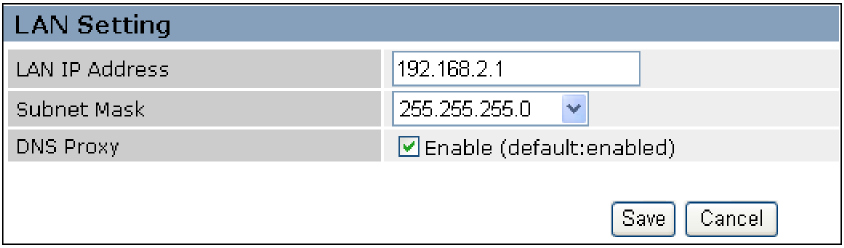
Figure 5-12. WAN Settings for Wi-Fi (Router mode)

Wireless Client — Enables one of the units VAPs to act as a wireless connection to the WAN port.

- **Wireless MTU**: Sets the maximum transmission units in bytes. (Default: 1460 bytes)
- **Wireless MRU**: Sets the maximum receive units in bytes. (Default: 1460 bytes)
- **Wireless Network Mode**: Sets the wireless network mode. (Default: DHCP)
  - **Static IP**: Select this option for a static manually configured IP address.
  - **DHCP**: Select this option to enable the client to obtain its IP address from a DHCP server.

LAN Setting

The wireless AP/Router must have a valid IP address for management using a web browser and to support other features. The unit has a default IP address of 192.168.1.254. You can use this IP address or assign another address that is compatible with your existing local network. Click on "Network Settings" followed by "LAN."



LAN Setting

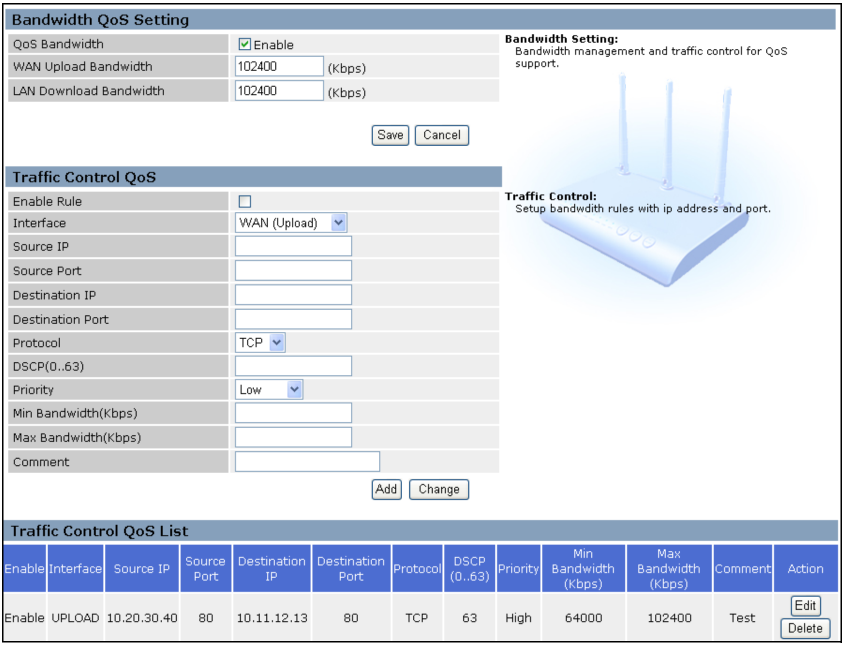
LAN IP Address	192.168.2.1
Subnet Mask	255.255.255.0
DNS Proxy	☑ Enable (default:enabled)

Figure 5-13. LAN Settings (Router mode)

- **LAN IP Address** – Valid IP addresses consist of four decimal numbers, 0 to 255, separated by periods. The default setting is 192.168.1.254.
- **Subnet Mask** – Indicate the local subnet mask. (Default: 255.255.255.0.)
- **DNS Proxy** – Enables DNS proxy on the LAN port. (Default: Enabled)

QoS Setting

The QoS setting page is used to configure Quality of Service (QoS) for Traffic Prioritization and Bandwidth Management. Quality of Service (QoS) provides users the control over which type of outgoing data traffic is given priority by the router. The throughput rate of both the upload and download data passed through the wireless AP/Router can be throttled.



Bandwidth QoS Setting

QoS Bandwidth	☑ Enable
WAN Upload Bandwidth	102400 (Kbps)
LAN Download Bandwidth	102400 (Kbps)

Bandwidth Setting:
Bandwidth management and traffic control for QoS support.

Traffic Control QoS

Enable Rule	□
Interface	WAN (Upload)
Source IP	
Source Port	
Destination IP	
Destination Port	
Protocol	TCP
DSCP(0..63)	
Priority	Low
Min Bandwidth(Kbps)	
Max Bandwidth(Kbps)	
Comment	

Traffic Control:
Setup bandwdith rules with ip address and port.

Traffic Control QoS List

Enable	Interface	Source IP	Source Port	Destination IP	Destination Port	Protocol	DSCP (0..63)	Priority	Min Bandwidth (Kbps)	Max Bandwidth (Kbps)	Comment	Action
Enable	UPLOAD	10.20.30.40	80	10.11.12.13	80	TCP	63	High	64000	102400	Test	Edit Delete

Figure 5-14. QoS Settings (Router mode)

Bandwidth QoS Setting — The maximum upload and download speeds of the Internet connection on the WAN port. It is recommended that you set these values at between 85-90% of your true speeds. Most broadband services are rated in Megabits per second (Mbps). To convert Mbps to Kilobits per second (Kbps), multiply the value by 1024. The following table lists the most common broadband service speeds:

Mbps	Kilobits
1	1024
2	2048
3	3072
4	4069
6	6144

Mbps	Kilobits
8	8192
12	12288

- **QoS Bandwidth** – Enables the QoS bandwidth management and traffic control.
- **WAN Upload Bandwidth** – Sets the maximum WAN upload bandwidth. (Default: 102400 kbps)
- **LAN Download Bandwidth** – Sets the maximum LAN download bandwidth. (Default: 102400 kbps)

Traffic Control QoS — The feature is applied when the applications use static ports to provide services. The wireless AP/Router can map traffic using specific TCP/UDP ports to one of the QoS priorities; low, medium, high, and highest. (Maximum 32 entries are allowed.)

- **Enable** – Activates an application port-based QoS entry. (Default: Disabled)
- **Interface** – Specifies the LAN ports (download) or WAN port (upload).
- **Source IP** – The source IP address.
- **Source Port** – Specifies source TCP/UDP port numbers used by an application. Multiple ports can be specified, for example, you can enter "1000-2000" for a continuous port range. Also, specific ports or port ranges can be entered together in one expression, for example "1000,2000-2100,3000." Up to eight elements can be supported in each expression. (Range: 1-65535)
- **Destination IP** – The destination IP address.
- **Desination Port** – Specifies destination TCP/UDP port numbers used by an application. Multiple ports can be specified, for example, you can enter "1000-2000" for a continuous port range. Also, specific ports or port ranges can be entered together in one expression, for example "1000,2000-2100,3000." Up to eight elements can be supported in each expression. (Range: 1-65535)
- **Protocol** – Specifies TCP or UDP.
- **DSCP** – Differentiated Services Code Point (DSCP) specifies a field in the header of IP packets for packet classification purposes.
- **Priority** – Selects Low, Medium, High or Highest as the QoS priority specified for an application.
- **Minimum Bandwidth** – Specifies the smallest bandwidth allowed.
- **Maximum Bandwidth** – Specifies the largest bandwidth allowed.
- **Comment** – An optional field to make notation.
- **Action** – Specifies an action to take on the QoS table entry.
  - **Change**: By selecting an entry from the table, its parameters display in an editable form. Click "Change" to save parameters once you have updated them.
  - **Add**: Adds a newly configured QoS entry to the table.
  - **Edit**: Click "Edit" to highlight a configured QoS entry to modify its parameters.
  - **Delete**: Deletes QoS entry from the table.

Wireless Settings

The IEEE 802.11n interfaces include configuration options for radio signal characteristics and wireless security features.

The wireless AP/Router can operate in five modes, mixed 802.11b/g/n, mixed 802.11b/g, 802.11b only, 802.11g only or 802.11n only. Also note that 802.11g is backward compatible with 802.11b, and 802.11n is backward compatible with both 802.11b/g at slower data transmit rates.

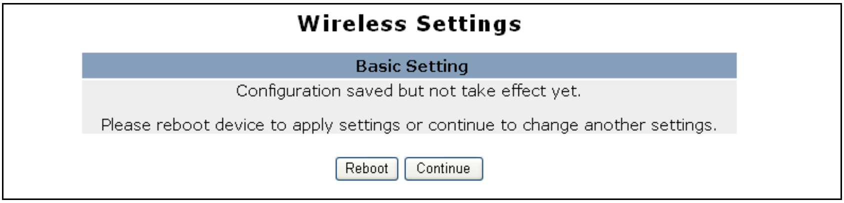
Each radio supports two virtual access point (VAP) interfaces, referred to as WLAN1 and WLAN2. Each VAP functions as a separate access point, and can be configured with its own Service Set Identification (SSID) and security settings. However, most radio signal parameters apply to both VAP interfaces. The configuration options are nearly identical, and are therefore both covered in this section of the manual.

Traffic to specific VAPs can be segregated based on user groups or application traffic. Both VAPs can have up to 64 wireless clients, whereby the clients associate with these VAPs the same as they would with a physical access point.

Note: The radio channel settings for the access point are limited by local regulations, which determine the number of channels that are available. See “Specifications” on page B-1“ for additional information on the maximum number channels available.

The hardware switch feature to toggle between Router and AP Mode, located on the base of the wireless AP/Router, affects some of the Wireless Interface parameters. However, most radio signal parameters apply in both modes so will be described together in the following sections.

Changing settings in the Wireless Settings configuration and clicking “submit" prompts you to either “Reboot” for your changes to immediately take effect, or “Continue” to continue making configuration changes without them taking effect until you next reboot.



Wireless Settings

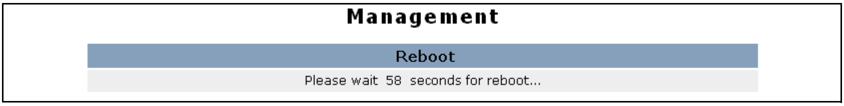
Basic Setting

Configuration saved but not take effect yet.

Please reboot device to apply settings or continue to change another settings.

Figure 5-15. Changing Settings

Choosing to reboot after making configuration changes triggers a countdown window that requires 60 seconds to complete.



Management

Reboot

Please wait 58 seconds for reboot...

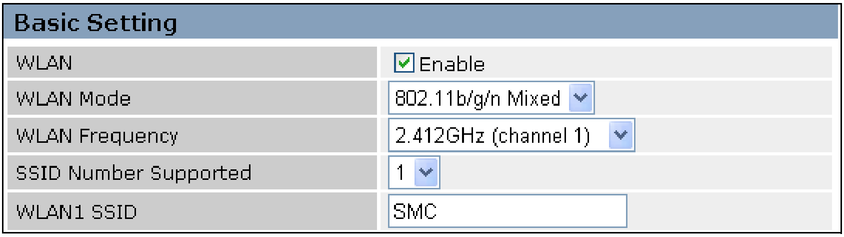
Figure 5-16. Implementing Changed Settings

Basic Settings

The Basic Setting page allows you to enable the wireless interface, select which radio mode to use, choose the transmit frequency and configure SSIDs.

Click on "Wireless Settings," followed by "Basic Setting."

Note: There are several variables to consider when selecting a radio mode that make it fully functional. Simply selecting the mode you want is not enough to ensure full compatibility for that mode. Information on these variables may be found in the Advanced Setting section.



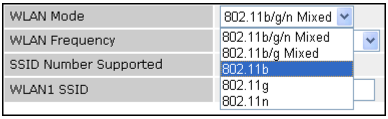
Basic Setting

WLAN	☑ Enable
WLAN Mode	802.11b/g/n Mixed
WLAN Frequency	2.412GHz (channel 1)
SSID Number Supported	1
WLAN1 SSID	SMC

Figure 5-17. Basic Radio Settings

- **WLAN** – Enables the communication for the VAP wireless interface. (Default: Enabled)
- **WLAN Mode** – Defines the radio mode for the VAP interface. (Default: 802.11b/g/n Mixed)

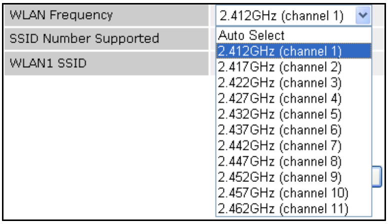
Note: Enabling the wireless AP/Router to communicate with 802.11b/g clients in both 802.11b/g/n Mixed and 802.11n modes also requires that HT Operation in the Advanced Settings menu be set to Mixed. Setting HT Operation to Green Field is exclusive for 802.11n client communication only and prevents 802.11 b/g communication.



WLAN Mode	802.11b/g/n Mixed
WLAN Frequency	
SSID Number Supported	
WLAN1 SSID	

- **802.11b/g/n Mixed**: All 802.11b/g/n clients can communicate with the wireless AP/Router (up to 300 Mbps), but data transmission rates may be slowed to compensate for 802.11b/g clients.

- **802.11b/g Mixed**: Both 802.11b and 802.11g clients can communicate with the wireless AP/Router (up to 108 Mbps), but data transmission rates may be slowed to compensate for 802.11b clients. Any 802.11n clients will also be able to communicate with the wireless AP/Router, but they will be limited to 802.11g protocols and data transmission rates.
- **802.11b**: All 802.11b, 802.11g, and 802.11n clients will be able to communicate with the wireless AP/Router, but the 802.11g and 802.11n clients will be limited to 802.11b protocols and data transmission rates (up to 11 Mbps).
- **802.11g**: Both 802.11g and 802.11n clients will be able to communicate with the wireless AP/Router, but the 802.11n clients will be limited to 802.11g protocols and data transmission rates (up to 54 Mbps). Any 802.11b clients will not be able to communicate with the wireless AP/Router.
- **802.11n**: Only 802.11n clients can communicate with the wireless AP/Router (up to 300 Mbps). Any 802.11b or 802.11g clients will not be able to communicate with the wireless AP/Router.



WLAN Frequency: 2.412GHz (channel 1)

SSID Number Supported

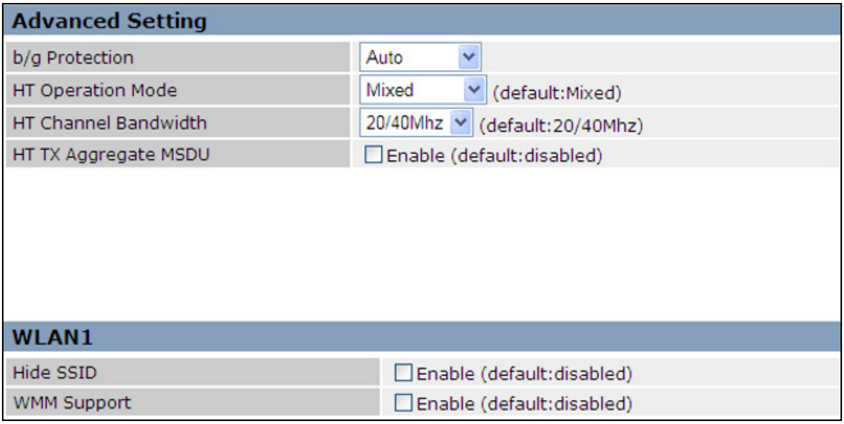
WLAN1 SSID

- **WLAN Frequency** – The radio channel that the wireless AP/Router uses to communicate with wireless clients. When multiple access points are deployed in the same area, set the channel on neighboring access points at least five channels apart to avoid interference with each other. For example, you can deploy up to three access points in the same area using channels 1, 6, 11. Note that wireless clients automatically set the channel to the same as that used by the wireless AP/Router to which it is linked. Selecting Auto Select enables the wireless AP/Router to automatically select an unoccupied radio channel. (The supported channels are dependent on the country code setting.)
- **SSID Number Supported** – The number of wireless network interfaces (SSIDs) supported on the device. (Default: 1; Ranage: 1 or 2)
- **WLAN1 SSID / WLAN2 SSID** – The name of the wireless network service provided by the VAP. Clients that want to connect to the network must set their SSID to the same as that of the VAP interface. (Default: “mr3305a1” for WLAN1; “mr3305a2” for WLAN2; Range: 1-32 characters)
- **Submit** – Saves and enables the Basic Wireless Setting configuration.
- **Reset** – Restores the previous Basic Wireless Setting configuration information.

Advanced Settings

The Advanced Setting page allows you to configure the more advanced radio settings, many of which are enabled by default.

Click “Wireless Settings” followed by “Advanced Setting.”



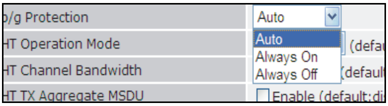
Advanced Setting

b/g Protection	Auto
HT Operation Mode	Mixed (default:Mixed)
HT Channel Bandwidth	20/40Mhz (default:20/40Mhz)
HT TX Aggregate MSDU	□ Enable (default:disabled)

WLAN1

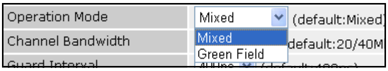
Hide SSID	□ Enable (default:disabled)
WMM Support	□ Enable (default:disabled)

Figure 5-18. Advanced Radio Settings



- **b/g Protection** – Enables a backward compatible protection system for 802.11b clients. There are three modes. (Default: Auto):
  - **Auto**: The wireless AP/Router enables its protection mechanism for 802.11b clients when they are detected in the network. When 802.11b clients are not detected, the protection mechanism is disabled.
  - **Always On**: Forces the unit to always use protection for 802.11b clients, whether they are detected in the network or not.
  - **Always Off**: Forces the unit to never use protection for 802.11b clients. This prevents 802.11b clients from connecting to the network.

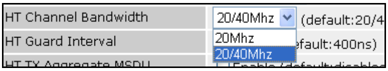
Note: Enabling “Always On” b/g Protection can slow throughput for 802.11g/n clients by as much as 50%.



- **HT Operation Mode** – Packets from 802.11n clients are referred to as High Throughput (HT) Greenfield packets, in other words packets that can be transmitted at rates of up to 300 Mbps assuming that HT Channel Bandwidth is set to 20/40Mhz, see HT Channel Bandwidth next page.

Note: Some 802.11n wireless clients may be capable of transmission rates of up to 600 Mbps, however the wireless AP/Router will only be able to connect to them at a maximum transmission rate of 300 Mbps.

802.11b/g packets are referred to as non-HT packets, being transmitted at lower throughput rates. HT mixed format frames contain a preamble compatible with the non-HT receivers.
HT Greenfield frames do not contain a non-HT compatible part. Support for HT Greenfield format is optional. An HT station that does not support the reception of an HT Greenfield format frame must be able to detect that an HT Greenfield format frame is an HT transmission (as opposed to a non-HT transmission). In this case the receiver must decode the high throughput signal (HT-SIG) in the packet header and determine if the HT-SIG cyclic redundancy check (CRC) passes.
(Default: Mixed)



HT Channel Bandwidth	20/40Mhz	(default:20/4
HT Guard Interval		efault:400ns)

- **HT Channel Bandwidth** – The wireless AP/Router provides a channel bandwidth of 40 MHz by default giving an 802.11g connection speed of 108 Mbps (sometimes referred to as Turbo Mode) and a 802.11n connection speed of up to 300 Mbps. Setting the HT Channel Bandwidth to 20 MHz slows connection speed for 802.11g and 802.11n to 54 Mbps and 74 Mbps respectively and ensures backward compliance for slower 802.11b devices. (Default: 20/40Mhz)
- **HT TX Aggregate MSDU** – This option enables Mac Service Data Unit (MSDU) aggregation. (Default: Enabled)

WLAN1~WLAN2 — Stipulates settings specific to each VAP interface.

- **Hide SSID** – Hiding the SSID of the VAP increases security of the network but does not allow clients to detect your presence on the network and requires that clients already know your SSID. (Default: Disabled)
- **WMM Support** – Wi-Fi Multimedia (WMM), also known as Wireless Multimedia Extensions (WME), is a Wi-Fi Alliance interoperability certification. It provides basic Quality of Service (QoS) features for IEEE 802.11 wireless network.
  Enabling WMM support provides prioritization of Wi-Fi data packets on four categories voice, video, best effort, and background. (Default: Enabled)
- **Save** – Saves and enables the Advanced Wireless Setting configuration.
- **Cancel** – Restores the previous Advanced Wireless Setting configuration information.

WLAN Security

The wireless AP/Router’s wireless interface is configured by default as an “open system,” which broadcasts a beacon signal including the configured SSID. Wireless clients with a configured SSID of “ANY” can read the SSID from the beacon, and automatically set their SSID to allow immediate connection to the wireless network.

To improve wireless network security, you have to implement two main functions:

- Authentication – It must be verified that clients attempting to connect to the network are authorized users.
- Traffic Encryption – Data passing between the unit and clients must be protected from interception and eavesdropping.

For a more secure network, the wireless AP/Router can implement one or a combination of the following security mechanisms:

- Wired Equivalent Privacy (WEP)
- IEEE 802.1X
- Wi-Fi Protected Access (WPA) or WPA2

The security mechanisms that may be employed depend on the level of security required, the network and management resources available, and the software support provided on wireless clients.

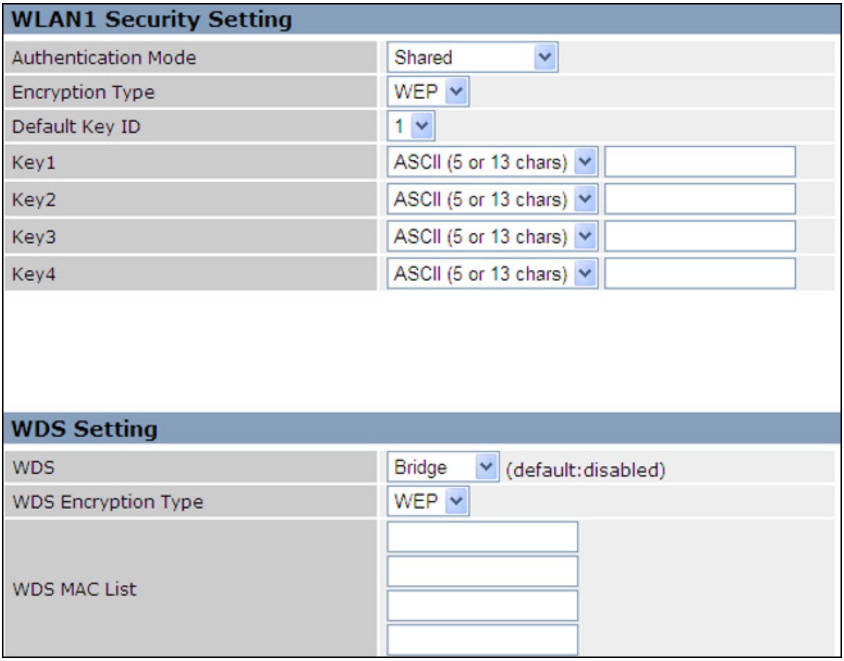
WLAN1 and WLAN2 Security

The wireless AP/Router supports two virtual access point (VAP) interfaces referred to as WLAN1 and WLAN2. Each VAP functions as a separate access point, and can be configured with its own security settings.

Note: WDS settings may only be configured for WLAN1, See “WDS Settings” on page 5-33. WLAN2 only operates as an access point service.

Note: Configuring WLAN1 to operate in Bridge mode automatically disables WLAN2.

Click "Wireless Settings" followed by either "WLAN1 Security" or "WLAN2 Security."



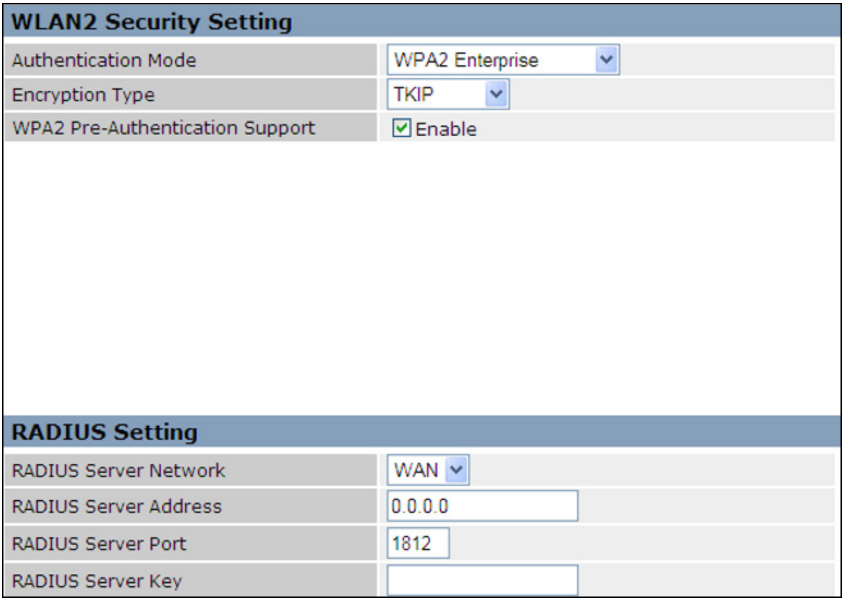
WLAN1 Security Setting

Authentication Mode	Shared
Encryption Type	WEP
Default Key ID	1
Key1	ASCII (5 or 13 chars)
Key2	ASCII (5 or 13 chars)
Key3	ASCII (5 or 13 chars)
Key4	ASCII (5 or 13 chars)

WDS Setting

WDS	Bridge (default:disabled)
WDS Encryption Type	WEP
WDS MAC List	

Figure 5-19. WLAN1 Settings



WLAN2 Security Setting

Authentication Mode	WPA2 Enterprise
Encryption Type	TKIP
WPA2 Pre-Authentication Support	☑ Enable

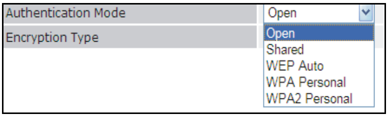
RADIUS Setting

RADIUS Server Network	WAN
RADIUS Server Address	0.0.0.0
RADIUS Server Port	1812
RADIUS Server Key	

Figure 5-20. WLAN2 Settings

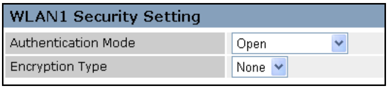
Security Settings — The security settings determine the authentication mode and enable WEP keys.

- **Authentication Mode** – Configures the authentication mode used by clients. (WLAN1/WLAN2 Defaults: Open)



Authentication Mode	Open
Encryption Type	Open Shared WEP Auto WPA Personal WPA2 Personal

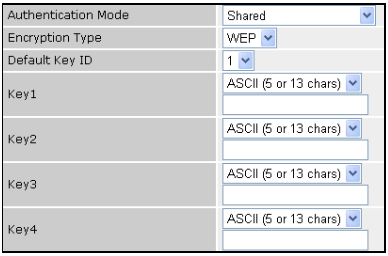
- **Open**: Open-system authentication accepts any client attempting to connect the wireless AP/Router without verifying its identity. In this mode the default encryption type is "None."



WLAN1 Security Setting

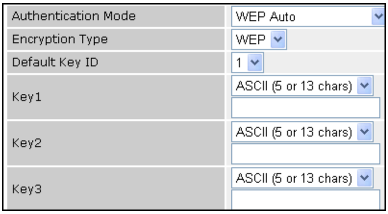
Authentication Mode	Open
Encryption Type	None

- **Shared**: The shared-key approach uses Wired Equivalent Privacy (WEP) to verify client identity by distributing a shared key to clients before attempting authentication.



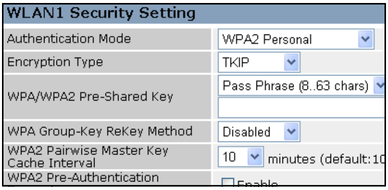
Authentication Mode	Shared
Encryption Type	WEP
Default Key ID	1
Key1	ASCII (5 or 13 chars)
Key2	ASCII (5 or 13 chars)
Key3	ASCII (5 or 13 chars)
Key4	ASCII (5 or 13 chars)

- **WEP Auto**: Allows WLAN clients to associate using Open-WEP (uses WEP for encryption only) or Shared-WEP (uses WEP for authentication and encryption). If enabled, you must configure at least one key for the VAP interface and all its clients. Wired Equivalent Privacy (WEP) provides a basic level of security, preventing unauthorized access to the network and encrypting data transmitted between wireless clients and the wireless AP/ Router. WEP uses static shared keys (fixed-length hexadecimal or alphanumeric strings) that are manually distributed to all clients that want to use the network.



Authentication Mode	WEP Auto
Encryption Type	WEP
Default Key ID	1
Key1	ASCII (5 or 13 chars)
Key2	ASCII (5 or 13 chars)
Key3	ASCII (5 or 13 chars)

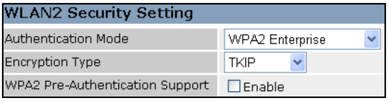
- **WPA Personal** or **WPA2 Persona**l: The WPA or WPA2 Personal mode uses a common password phrase, called a Pre-Shared Key, that must be manually distributed to all clients that want to connect to the network. Specify a key as an easy-to-remember form of letters and numbers. The WPA Preshared Key can be input as ASCII string (8-63 characters) or Hexadecimal format (length is 64). All wireless clients must be configured with the same key to communicate with the VAP interface.



WLAN1 Security Setting

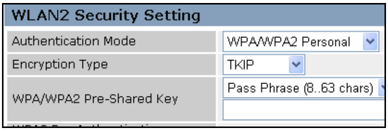
Authentication Mode	WPA2 Personal
Encryption Type	TKIP
WPA/WPA2 Pre-Shared Key	Pass Phrase (8..63 chars)
WPA Group-Key ReKey Method	Disabled
WPA2 Pairwise Master Key Cache Interval	10 minutes (default:1
WPA2 Pre-Authentication	□ Enable

- **WPA Enterprise** or **WPA2 Enterprise**: The WPA Enterprise mode uses IEEE 802.1X as its basic framework for user authentication and dynamic key management. IEEE 802.1X access security uses Extensible Authentication Protocol (EAP) and requires a configured RADIUS authentication server to be accessible in the enterprise network. If you select WPA or WPA2 Enterprise mode, be sure to configure the RADIUS settings. See “RADIUS” on page 5-32 for more information.



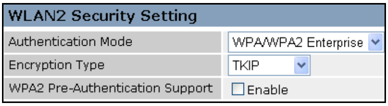
WLAN2 Security Setting	
Authentication Mode	WPA2 Enterprise
Encryption Type	TKIP
WPA2 Pre-Authentication Support	□ Enable

- **WPA/WPA2 Personal**: The WPA/ WPA2 Personal Mode allows both WPA and WPA2 clients to join the network. The WPA Preshared Key can be input as ASCII string (8-63 characters) or Hexadecimal format (length is 64). All wireless clients must be configured with the same key to communicate with the VAP interface.



WLAN2 Security Setting	
Authentication Mode	WPA/WPA2 Personal
Encryption Type	TKIP
WPA/WPA2 Pre-Shared Key	Pass Phrase (8..63 chars)

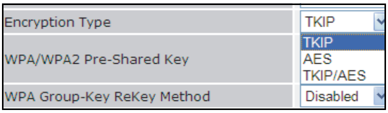
- **WPA/WPA2 Enterprise**: Defines a transitional mode of operation for networks moving from WPA security to WPA2. WPA/WPA2 Enterprise Mode allows both WPA and WPA2 clients to associate to a common SSID interface. In WPA/WPA2 mixed mode, the unicast encryption cipher (TKIP or AES-CCMP) is negotiated for each client. The access point advertises its supported encryption ciphers in beacon frames and probe responses. WPA and WPA2 clients select the cipher they support and return the choice in the association request to the access point. For mixed-mode operation, the cipher used for broadcast frames is always TKIP. WEP encryption is not allowed.



WLAN2 Security Setting	
Authentication Mode	WPA/WPA2 Enterprise
Encryption Type	TKIP
WPA2 Pre-Authentication Support	□ Enable

• **Encryption Type** – Selects the data encryption type to use. (Default: determined by the Authentication Mode selected)

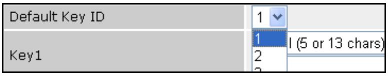
- None: Disables data encryption.
- WEP: Selects WEP keys for data encryption.
- **TKIP**: Uses Temporal Key Integrity Protocol (TKIP) keys for encryption. WPA specifies TKIP as the data encryption method to replace WEP. TKIP avoids the problems of WEP static keys by dynamically changing data encryption keys.
- **AES**: Uses Advanced Encryption Standard (AES) keys for encryption. WPA2 uses AES Counter-Mode encryption with Cipher Block Chaining Message Authentication Code (CBC-MAC) for message integrity. The AES Counter-Mode/CBCMAC Protocol (AES-CCMP) provides extremely robust data confidentiality using a 128-bit key. Use of AES-CCMP encryption is specified as a standard requirement for WPA2. Before implementing WPA2 in the network, be sure client devices are upgraded to WPA2-compliant hardware.



Encryption Type	TKIP
WPA/WPA2 Pre-Shared Key	
WPA Group-Key ReKey Method	Disabled

- **TKIP/AES**: Uses either TKIP or AES keys for encryption. WPA/WPA2 mixed modes allow both WPA and WPA2 clients to associate to a common SSID interface. In mixed mode, the unicast encryption cipher (TKIP or AES-CCMP) is negotiated for each client.

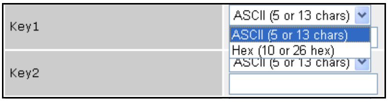
- **Default Key ID** – Sets the WEP key used for authentication.
  (Default: 1; Range: 1~4)



Default Key ID 1

Key1 l (5 or 13 chars)

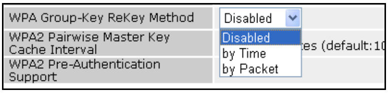
- **Key 1 ~ Key 4** – Sets WEP key values. The user must first choose between ASCII or Hexadecimal keys. At least one key must be specified. Each WEP key has an index number. The selected key is used for authentication and encryption on the VAP interface. Enter key values that match the key type and length settings. Standard keys are either 5 or 13 alphanumeric characters; or 10 or 26 hexadecimal digits.
  (Default: ASCII, no preset value)



Key1 ASCII (5 or 13 chars)

Key2 ASCII (5 or 13 chars)

- **WPA Group-Key ReKey Method** – WPA Rekeying is an extra security measure whereby the broadcast WPA authentication key is automatically changed after a certain time period or after a certain number of packets have been sent. (Default: Disabled)

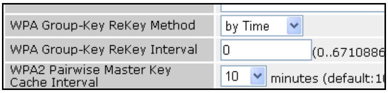


WPA Group-Key ReKey Method Disabled

WPA2 Pairwise Master Key Cache Interval es (default:1

WPA2 Pre-Authentication Support

- **WPA Group-Key ReKey Interval** – The elapsed time after which the wireless AP/ Router will change the unicast WPA authentication key. (Default: 0; Range: 0~67108864)

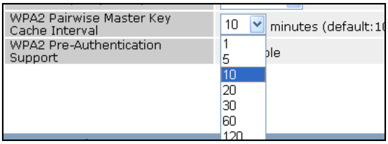


WPA Group-Key ReKey Method by Time

WPA Group-Key ReKey Interval 0 (0..6710886

WPA2 Pairwise Master Key Cache Interval 10 minutes (default:1

- **WPA2 Pairwise Master Key Cache Interval** – The elapsed time after which the wireless AP/Router will delete the WPA2 master keys from its security association cache.



WPA2 Pairwise Master Key Cache Interval 10 minutes (default:1

WPA2 Pre-Authentication Support ble

- **WPA2 Pre-Authentication Support** – Each time a client roams to another access point it has to be fully re-authenticated. This authentication process is time consuming and can disrupt applications running over the network. WPA2 includes a mechanism, known as pre-authentication, that allows clients to roam to a new access point and be quickly associated. The first time a client is authenticated to a wireless network it has to be fully authenticated. When the client is about to roam to another access point in the network, the access point sends pre-authentication messages to the new access point that include the client's security association information. Then when the client sends an association request to the new access point, the client is known to be already authenticated, so it proceeds directly to key exchange and association. Pre-authentication support attaches a security flag to the packet header. (Default: Disabled)

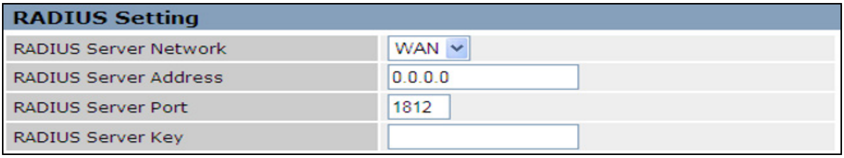
RADIUS

Remote Authentication Dial-in User Service (RADIUS) is an authentication protocol that uses software running on a central server to control access to RADIUS-aware devices on the network. An authentication server contains a database of user credentials for each user that requires access to the network.

A RADIUS server must be specified for the access point to implement IEEE 802.1X network access control and Wi-Fi Protected Access (WPA) wireless security.

Click "WLAN1/WLAN2 Security" and be sure that an "Enterprise" mode is selected.

Note: This guide assumes that you have already configured RADIUS server(s) to support the access point. Configuration of RADIUS server software is beyond the scope of this guide, refer to the documentation provided with the RADIUS server software.



RADIUS Setting

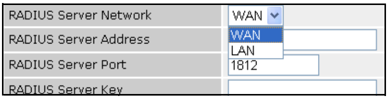
RADIUS Server Network	WAN
RADIUS Server Address	0.0.0.0
RADIUS Server Port	1812
RADIUS Server Key	

Figure 5-21. RADIUS Settings

RADIUS Setting — Configures RADIUS server settings.

Note: RADIUS settings only apply to WPA, WPA2, or WPA/WPA2 Enterprise modes.

- **RADIUS Server Network** – Use the RADIUS Server Network options to specify if the server is located on the local area network, or wide area network. (Default: WAN)



RADIUS Server Network	WAN WAN LAN
RADIUS Server Address	
RADIUS Server Port	1812
RADIUS Server Key	

- **RADIUS Server Address** – Specifies the IP address of the RADIUS server.
- **RADIUS Server Port** – The User Datagram Protocol (UDP) port number used by the RADIUS server for authentication messages. (Range: 1024-65535; Default: 1812)
- **RADIUS Server Key** – A shared text string used to encrypt messages between the access point and the RADIUS server. Be sure that the same text string is specified on the RADIUS server. Do not use blank spaces in the string. (Maximum length: 20 characters)

WDS Settings

The WLAN1 radio interface can be configured to operate in a mode that allows it to forward traffic directly to other access point units. To set up links between access point units, you must configure the Wireless Distribution System (WDS) forwarding table by specifying the wireless MAC address of all units to which you want to forward traffic.

Traffic forwarded to WDS links is automatically converted to 802.11 four-address format frame. This uses the MAC addresses of the station and that of the AP connected to it on the transmitting LAN, and the MAC addresses of the AP functioning as a wireless repeater/bridge and that of the station connected to it on a neighboring LAN in the 802.11 frame header. Ethernet traffic follows a three-address format that is reconstructed for WDS transmission. The wireless AP/Router will reconstruct the frame format upon receival and transmission using the criteria of the receiving and forwarding port location and whether it is Ethernet or wireless in type.

Note: The wireless AP/Router does not support the spanning tree algorithm. WDS links should be configured appropriately to avoid causing loops on the network.

Up to four WDS links can be specified for each unit in the WDS network.

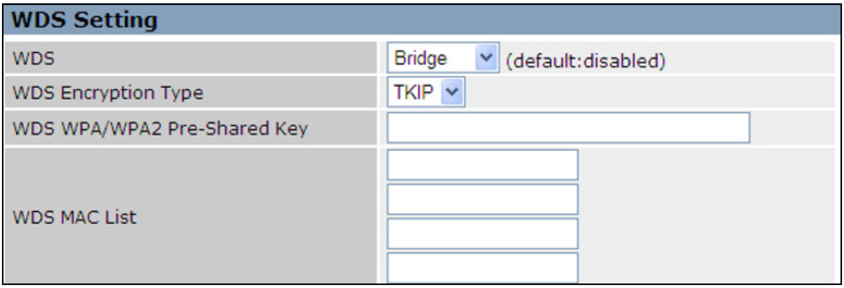
The WDS link can be configured in the following combinations:

1. Both two units are configured as Router Mode
2. One unit is Router Mode and one unit is AP Bridge Mode
3. Both two units are configured as AP Bridge Mode

When both units are set to Router Mode, be sure to check these settings:

- Be sure each unit is configured with a different LAN IP address.
- Be sure that only one unit has Internet access on its WAN port.
- Be sure the DHCP server is enabled only on one unit. If one unit is providing Internet access, enable the DHCP server on that unit.

Note: WDS Settings only apply to WLAN1. WLAN2 is pre-configured to AP mode unless WLAN1 is configured to act as a bridge, in which case WLAN2 is disabled.



WDS Setting

WDS	Bridge (default:disabled)
WDS Encryption Type	TKIP
WDS WPA/WPA2 Pre-Shared Key	
WDS MAC List	

Figure 5-22. WDS Settings

WDS Setting — Configures WDS related parameters. Up to four MAC addresses can be specified for each unit in the WDS network. WDS links may either be manually configured (Bridge and Repeater modes) or auto-discovered (Lazy mode).

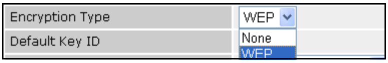
- **WDS** – Selects the WDS mode of WLAN1. (Default: Disabled)
  - **Disabled**: WDS is disabled.
  - **Bridge**: Operates as a standard bridge that forwards traffic between WDS links (links that connect to other AP/wireless bridges, or units in Repeater or Lazy mode) and an Ethernet port. Only data destined for stations which are known to be on the peer Ethernet link, multicast data or data with unknown destinations, need to be forwarded through the WDS link. The Bridge mode does not transmit a beacon, unlike the other three modes. In this mode the wireless AP/Router may also function as a repeater.

Note: Enabling "Bridge" mode disables WLAN2.

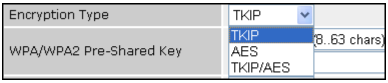
  - **Repeater** – Operates as a wireless repeater, extending the range for remote wireless clients and connecting them to an AP connected to the wired network. WDS peers must be registered with the wireless AP/Router. Repeater mode also supports the dual capability of the VAP functioning as an AP. In this mode, traffic is not forwarded to the Ethernet port from the radio interface. In Repeater mode the wireless AP/Router transmits a beacon.
  - **Lazy** – Operates in an automatic mode that detects and learns WDS peer addresses from received WDS four-address format frame packets, without the need to configure a WDS MAC list entry. This feature allows the wireless AP/Router to associate with other wireless AP/Routers in the network and use their WDS MAC list. In Lazy mode the wireless AP/Router sends a beacon.
- **WDS Encryption Type** – Sets the WDS encryption type, the options for which are determined by the Authentication Mode and the Encryption Type selected in the Security Settings.

Note: When WDS is disabled or the WDS Encryption Type is set to "none," WDS encryption is also disabled.

  - When Authentication Mode is set to Open, Shared, or WEP auto; WEP is the only WDS encryption type.
  - When Authentication Mode is set to WPA Personal, or WPA2 Personal, the WDS encryption type may be TKIP or AES.



Encryption Type	WEP ▾ None WEP
Default Key ID	

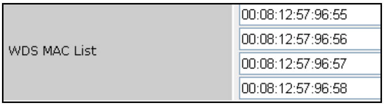


Encryption Type	TKIP ▾ TKIP AES TKIP/AES
WPA/WPA2 Pre-Shared Key	(8..63 chars)

  - None: Disables WDS encryption.
  - WEP: Uses WEP keys for data encryption.
  - **TKIP**: Uses Temporal Key Integrity Protocol (TKIP) keys for encryption as a replacement for WEP. TKIP avoids the problems of WEP static keys by dynamically changing data encryption keys.
  - **AES**: Uses Advanced Encryption Standard (AES) keys for encryption. Use of AES-CCMP encryption is specified as a standard requirement for WPA2. Before implementing WPA2 in the network, be sure client devices are upgraded to WPA2-compliant hardware.

- **TKIP/AES**: Use both TKIP and AES keys for encryption. WPA2 defines a transitional mode of operation for networks moving from WPA security to WPA2.WPA2 Mixed Mode allows both WPA and WPA2 clients to associate to a common SSID interface. In mixed mode, the unicast encryption cipher (TKIP or AES-CCMP) is negotiated for each client.

- **WDS WPA/WPA2 Pre-Shared Key** – This option is available only when Authentication Mode is set to WPA Personal, WPA2 Personal or WPA/WPA2 Personal. Enter a key as an easy-to-remember form of letters and numbers. The WDS WPA/WPA2 Preshared Key can be input as ASCII string (8-63 characters) or Hexadecimal format (length is 64). Other bridge units must be configured with the same key to communicate with this unit.
- **WDS MAC List** – The physical layer address of other bridge units for which this unit communicates as a network node. (12 hexadecimal digits in the form “xx:xx:xx:xx:xx:xx”)

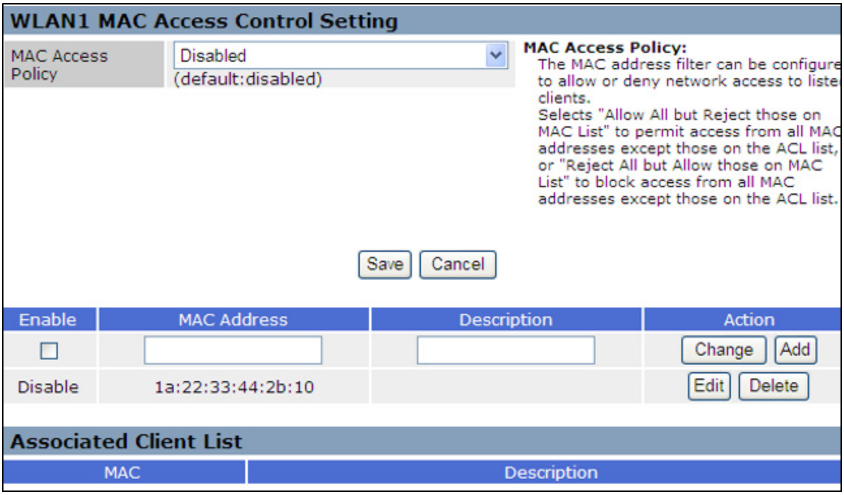


WDS MAC List	00:08:12:57:96:55 00:08:12:57:96:56 00:08:12:57:96:57 00:08:12:57:96:58

Note: In WDS Lazy mode any entries in the WDS MAC List are redundant because the MAC is pre-configured to 00:00:00:00:00:00.

MAC Access Control Lists

Wireless clients can be authenticated for network access by checking their MAC address against a local database configured on the wireless AP/Router. You can configure a list of up to 32 wireless client MAC addresses in the filter list to either allow or deny network access. MAC ACL configuration is the same for both WLAN1 and WLAN2.



WLAN1 MAC Access Control Setting

MAC Access Policy	Disabled (default:disabled)

MAC Access Policy:
The MAC address filter can be configure to allow or deny network access to liste clients.
Selects "Allow All but Reject those on MAC List" to permit access from all MAC addresses except those on the ACL list, or "Reject All but Allow those on MAC List" to block access from all MAC addresses except those on the ACL list.

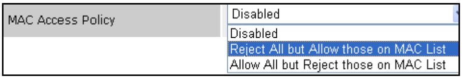
Enable	MAC Address	Description	Action
☐			Change Add
Disable	1a:22:33:44:2b:10		Edit Delete

Associated Client List

MAC	Description

Figure 5-23. MAC Filter

WLAN1/WLAN2 MAC Access Control Setting — Configures all MAC ACL parameters. (Maximum 64 entries are allowed.)



MAC Access Policy	Disabled

Disabled
Reject All but Allow those on MAC List
Allow All but Reject those on MAC List

- **MAC Access Policy** – The MAC address filter can be configured to allow or deny network access to listed clients. Select "Allow All but Reject those on MAC List" to permit access from all MAC addresses except those on the ACL list, or "Reject All but Allow those on MAC List" to block access from all MAC addresses except those on the ACL list. (Default: Disabled)
- **Submit** – Implements the selected MAC Access Policy.
- **Reset** – Restores the previous MAC Access Policy configuration information.
- **Enable** – Activates the MAC address into the ACL.
- **MAC Address** – MAC Address to filter, specified in the form of 12 hexadecimal digits, “xx:xx:xx:xx:xx:xx”.
- **Description** – An optional parameter to help identify the selected MAC address. (Range: 1~16 characters)

- **Action** – Specifies an action to take on the MAC ACL filtering configuration.
  - **Change**: By selecting a MAC ACL entry from the table its parameters display in an editable form. Click "Change" to save parameters once you have updated them.
  - **Add**: Adds a newly configured MAC ACL entry to the list.
  - **Edit**: Click "Edit" to highlight a configured MAC ACL filtering rule for changing its parameters.
  - **Delete**: Deletes a MAC entry from the list.

Associated Client List — Lists the MAC addresses of wireless clients currently associated to the wireless AP/Router.

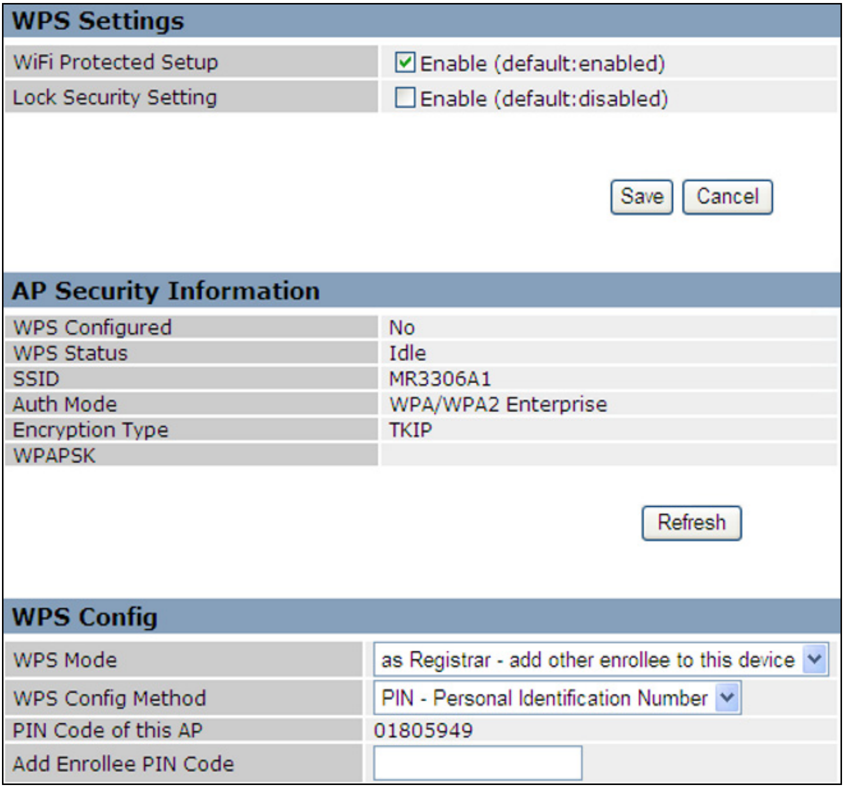
- **MAC** – A wireless client MAC address.
- **Description** – An optional parameter that helps identify the MAC address of the associated client.

Wi-Fi Protected Setup (WPS)

Wi-Fi Protected Setup (WPS) is designed to ease installation and activation of security features in wireless networks. WPS has two basic modes of operation, Push-button Configuration (PBC) and Personal Identification Number (PIN). The WPS PIN setup is optional to the PBC setup and provides more security. The WPS button on the wireless AP/Router can be pressed at any time to allow a single device to easily join the network.

Note: WPS settings only apply to WLAN1.

The WPS Settings page includes configuration options for setting WPS device PIN codes and activating the virtual WPS button.



WPS Settings

WiFi Protected Setup	☑ Enable (default:enabled)
Lock Security Setting	□ Enable (default:disabled)

AP Security Information

WPS Configured	No
WPS Status	Idle
SSID	MR3306A1
Auth Mode	WPA/WPA2 Enterprise
Encryption Type	TKIP
WPAPSK	

WPS Config

WPS Mode	as Registrar - add other enrollee to this device
WPS Config Method	PIN - Personal Identification Number
PIN Code of this AP	01805949
Add Enrollee PIN Code	

Figure 5-24. WPS Settings

WPS Settings — Enables WPS, locks security settings, and refreshes WPS configuration information.

- **WiFi Protected Setup** – Enables WPS. (Default: Enabled)

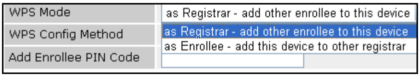
- **Lock Security Setting** – Enabling this setting and clicking “Submit” or “Reset” allows the wireless AP/Router to retain the previous WPS negotiated security setup after a reboot or power off. Upon booting the unit will not re-authenticate clients that were retained in memory. Only new clients will require authentication. (Default: Disabled)
- **Submit** – Enables the WPS configuration.
- **Reset** – Restores the previous WPS configuration information.

AP Security Information — Provides detailed WPS statistical information.

- **WPS Configured** – States if WPS for wireless clients has been configured for this device. (Default: no)
- **WPS Status** – Displays if there is currently any WPS traffic connecting to the wireless AP/Router. (Options: Start WSC Process; Idle; Default: Idle)
- **SSID** – The service set identifier for WLAN1. (Default: mr3305a1)
- **Auth Mode** – The method of authentication used. (Default: Open)
- **Encryption Type** – The encryption type used for WLAN1. (Default: None)
- **WPAPSK** – Displays the pre-shared key if WPA/WPA2 has been enabled.
- **Refresh** – Refreshes the AP Security Information statistics.

WPS Config — Configures WPS settings for the wireless AP/Router.

- **WPS Mode** – The wireless AP/Router can be set as a registrar (master) device or an enrollee (client) device:



WPS Mode: as Registrar - add other enrollee to this device
WPS Config Method
Add Enrollee PIN Code

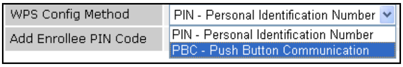
as Registrar - add other enrollee to this device
as Enrollee - add this device to other registrar

  - **as Registrar**: When the wireless AP/Router is set as the registrar device, enter the PIN code/s of the enrollee device/s and click “start WPS Config" to add the client/s to the network.

Note: When the wireless AP/Router is the registrar device, the enrollee device can join the network by entering the wireless AP/Router’s PIN code “61773981.”

  - **as Enrollee**: When the wireless AP/Router is set as the enrollee device, the default PIN-Code for the unit is displayed. Click “start WPS Config" to join the network.

- **WPS Config Method** – Selects between methods of broadcasting the WPS beacon to network clients wanting to join the network:



WPS Config Method: PIN - Personal Identification Number
Add Enrollee PIN Code

PIN - Personal Identification Number
PBC - Push Button Communication

  - **PIN**: The wireless AP/Router, along with other WPS devices, such as notebook PCs, cameras, or phones, all come with their own eight-digit PIN code. When one device, the WPS enrollee, sends a PIN code to the wireless AP/Router, it becomes the WPS registrar. After configuring PIN-Code information you must press “start WPS Config" to send the beacon, after which you have up to two minutes to activate WPS on devices that need to join the network.

  - **PBC**: This has the same effect as pressing the physical WPS button that is located on the front of the wireless AP/Router. After checking this option and clicking "Start WPS Config" you have up to two minutes to activate WPS on devices that need to join the network.

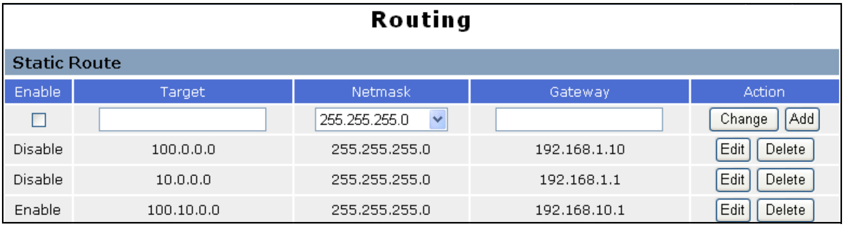
- **Add Enrollee PIN Code** – In Registrar mode enter the PIN Code for the WDS device that wants to join the network.
- **PIN Code of this AP** – In Enrollee mode this displays the PIN Code for the wireless AP/Router. The default is exclusive for each unit.
- **Start WPS Config** – Sends a handshake beacon to devices wanting to join the network, for a duration of two minutes.

Routing

Routing setup allows a manual method that is used to set up routing between networks. The network administrator configures static routes in a router by entering routes directly into the routing table of a router. Static routing has the advantage of being predictable and easy configuration.

Static Route

This screen is used to manually configure static routes to other IP networks, subnetworks, or hosts. Click "Network Settings" followed by “static Route." (Maximum 32 entries are allowed.)



Routing

Static Route

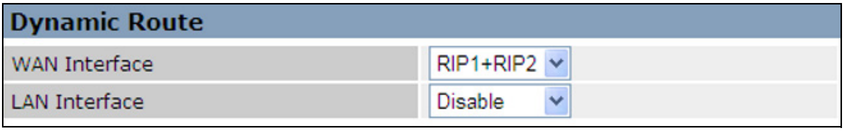
Enable	Target	Netmask	Gateway	Action
□		255.255.255.0		Change Add
Disable	100.0.0.0	255.255.255.0	192.168.1.10	Edit Delete
Disable	10.0.0.0	255.255.255.0	192.168.1.1	Edit Delete
Enable	100.10.0.0	255.255.255.0	192.168.10.1	Edit Delete

Figure 5-25. Static Route (Router mode)

- **Enable** – Enables the configured route. (Default: Disabled)
- **Target** – A destination network or specific host to which packets can be routed.
- **Netmask** – The subnetwork associated with the destination. This is a template that identifies the address bits in the destination address used for routing to specific subnets. Each bit that corresponds to a “1” is part of the network/subnet number; each bit that corresponds to “0” is part of the host number.
- **Gateway** – The IP address of the router at the next hop to which matching frames are forwarded.
- **Action** – Specifies an action to take on a static route.
  - **Change**: By selecting a configured route from the routing table its parameters display in an editable form. Click “Change” to save parameters once you have updated them.
  - **Add**: Adds a newly configured route to the list.
  - **Edit**: Click "Edit" to highlight an entry in the static MAC list for changing its parameters.
  - **Delete**: Deletes a static route from the list.

Dynamic Route

The wireless AP/Router supports RIP 1 and RIP 2 dynamic routing protocol. Routing Information Protocol (RIP) is the most widely used method for dynamically maintaining routing tables. RIP uses a distance vector-based approach to routing. Routes are chosen to minimize the distance vector, or hop count, which serves as a rough estimate of transmission cost. Each router broadcasts its advertisement every 30 seconds, together with any updates to its routing table. This allows all routers on the network to build consistent tables of next hop links which lead to relevant subnets.



Dynamic Route

WAN Interface	RIP1+RIP2
LAN Interface	Disable

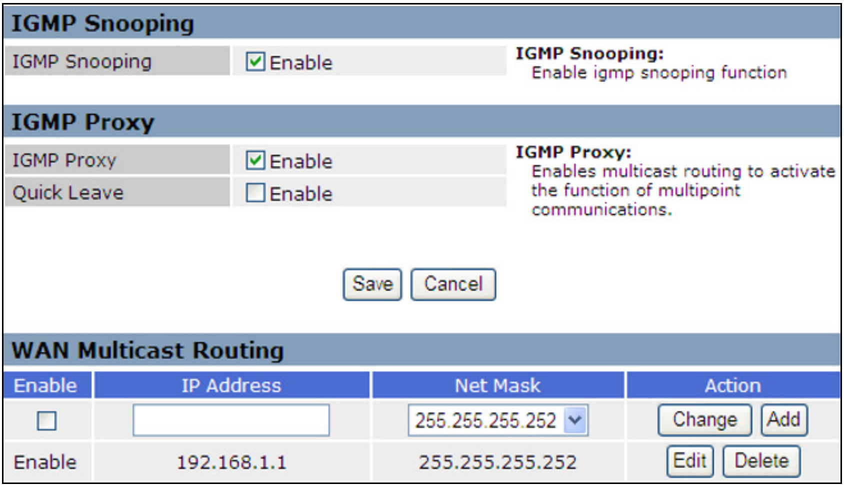
Figure 5-26. Dynamic Route (Router mode)

- **WAN Interface** – Specifies RIP1, RIP2, RIP1/RIP2, or disables the function for the WAN interface.
- **LAN Interface** – Specifies RIP1, RIP2, RIP1/RIP2, or disables the function for the LAN interface.

Multicast Routing

Multicasting is used to support real-time applications such as videoconferencing or streaming audio. A multicast server does not have to establish a separate connection with each client. It merely broadcasts its service to the network, and any hosts that want to receive the multicast register with their local multicast router. Although this approach reduces the network overhead required by a multicast server, the broadcast traffic must be carefully pruned at every multicast network device it passes through to ensure that traffic is only passed on to the hosts that have subscribed to the service.

This device uses IGMP (Internet Group Management Protocol) Snooping to monitor IGMP service requests passing between multicast clients and servers, and dynamically configure the ports that need to forward multicast traffic.



IGMP Snooping

IGMP Snooping	☑ Enable	**IGMP Snooping:** Enable igmp snooping function

IGMP Proxy

IGMP Proxy	☑ Enable	**IGMP Proxy:** Enables multicast routing to activate the function of multipoint communications.
Quick Leave	□ Enable	

WAN Multicast Routing

Enable	IP Address	Net Mask	Action
□		255.255.255.252	Change Add
Enable	192.168.1.1	255.255.255.252	Edit Delete

Figure 5-27. Multicast Route (Router mode)

IGMP Snooping — The wireless AP/Router can passively snoop on IGMP Query and Report packets transferred between IP multicast routers and IP multicast host groups to identify the IP multicast group members. It simply monitors the IGMP packets passing through it, picks out the group registration information, and configures the multicast filters accordingly.

- **Enable** – Enables IGMP snooping on the wireless AP/Router.

IGMP Proxy — Collects and sends multicast group membership information onto the upstream interface based on IGMP messages monitored on downstream interfaces, and forwards multicast traffic based on that information.

- **IGMP Proxy** – Enables IGMP proxy on the wireless AP/Router.
- **Quick Leave** – The wireless AP/Router can immediately delete a member port of a multicast service if a leave packet is received at that port.

WAN Multicast Routing — IP addresses of upstream multicast routers on the WAN interface. You can add, edit, and delete IP addresses from the list.

- **IP Address** – Specifies an IP address to route to.
- **Net Mask** – Specifies a network mask.

Firewall

The wireless AP/Router provides extensive firewall protection by restricting connection parameters to limit the risk of intrusion and defending against a wide array of common hacker attacks.

NAT

Network Address Translation (NAT) is a standard method of mapping multiple "internal" IP addresses to one "external" IP address on devices at the edge of a network. For the wireless AP/Router, the internal (local) IP addresses are the IP addresses assigned to PCs and wireless clients by the DHCP server, and the external IP address is the IP address assigned to the WAN port.

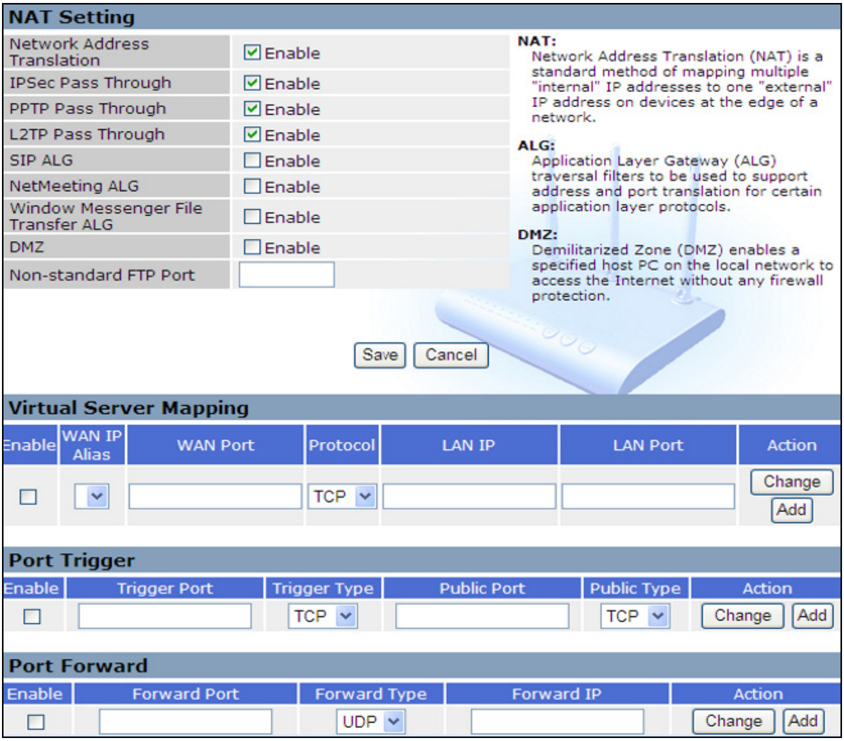
If you configure the wireless AP/Router as a virtual server, remote users accessing services such as web or FTP at your local site through public IP addresses can be automatically redirected to local servers configured with private IP addresses. In other words, depending on the requested service (TCP/UDP port number), the wireless AP/Router redirects the external service request to the appropriate server (located at another internal IP address).

For example, if you set Type/Public Port to TCP/80 (HTTP or web) and the Private IP/Port to 192.168.2.2/80, then all HTTP requests from outside users will be transferred to 192.168.2.2 on port 80. Therefore, by just entering the IP address provided by the ISP, Internet users can access the service they need at the local address to which you redirect them.

The more common TCP service port numbers include: HTTP: 80, FTP: 21, Telnet: 23, and POP3: 110.

Some applications, such as Internet gaming, videoconferencing, Internet telephony and others, require multiple connections. These applications cannot work with Network Address Translation (NAT) enabled. If you need to run applications that require multiple connections, use port mapping to specify the additional public ports to be opened for each application.

Click "Network Settings" followed by "NAT."



NAT Setting

Network Address Translation	☑ Enable
IPSec Pass Through	☑ Enable
PPTP Pass Through	☑ Enable
L2TP Pass Through	☑ Enable
SIP ALG	□ Enable
NetMeeting ALG	□ Enable
Window Messenger File Transfer ALG	□ Enable
DMZ	□ Enable
Non-standard FTP Port	

NAT:
Network Address Translation (NAT) is a standard method of mapping multiple "internal" IP addresses to one "external" IP address on devices at the edge of a network.

ALG:
Application Layer Gateway (ALG) traversal filters to be used to support address and port translation for certain application layer protocols.

DMZ:
Demilitarized Zone (DMZ) enables a specified host PC on the local network to access the Internet without any firewall protection.

Virtual Server Mapping

Enable	WAN IP Alias	WAN Port	Protocol	LAN IP	LAN Port	Action
□			TCP			Change Add

Port Trigger

Enable	Trigger Port	Trigger Type	Public Port	Public Type	Action
□		TCP		TCP	Change Add

Port Forward

Enable	Forward Port	Forward Type	Forward IP	Action
□		UDP		Change Add

Figure 5-28. NAT (Router mode)

NAT Setting — Enables NAT related settings.

- **Network Address Translation** – Enables the forwarding of TCP/UDP packets through a NAT device.
- **IPSec Pass Through** – Enables tunnelling encrypted Internet Protocol Security (IPSec) packets through a NAT device.
- **PPTP Pass Through** – Enables tunnelling Point-to-Point Tunneling Protocol (PPTP) packets through a NAT device.
- **L2TP Pass Through** – Enables tunnelling Layer 2 Tunnelling Protocol (L2TP) packets through a NAT device.
- **SIP ALG** – Allows SIP Application Layer Gateway (ALG) traversal filters to be used to support address and port translation for certain application layer protocols.
- **NetMeeting ALG** – Allows NetMeeting ALG traversal filters to be used to support address and port translation for certain application layer protocols.
- **Window Messenger File Transfer ALG** – Enables Window Messenger File Transfer ALG to transmit packets through proxy servers.

- **DMZ** – Enables a specified host PC on the local network to access the Internet without any firewall protection. Some Internet applications, such as interactive games or videoconferencing, may not function properly behind the wireless AP/ Router's firewall. By specifying a Demilitarized Zone (DMZ) host, the PC's TCP ports are completely exposed to the Internet, allowing open two-way communication. The host PC should be assigned a static IP address (which is mapped to its MAC address) and this must be configured as the DMZ LAN IP.
- **DMZ LAN IP** – Specifies the IP address of the DMZ.
- **Non-standard FTP port** – Enables routing of traffic through a non-standard FTP port.
- **Submit** – Saves the current NAT configuration.
- **Reset** – Restores the previous NAT configuration information.

Virtual Server Mapping — Using the NAT Virtual Server Mapping feature, remote users can access different servers on your local network using your single public IP address. (Maximum 32 entries are allowed.)

- **Enable** – Enables port mapping for the specified IP address. (Default: Disabled)
- **WAN IP Alias** – Selects an alias IP address to route traffic to and from the WAN port. Using IP aliasing increases the traffic the WAN port can handle.
- **WAN Port** – Specifies the WAN port number, or a port range, for example “4040-4080.” (Range: 1~65535)
- **Protocol** – Specifies the port type, TCP or UDP. (Default: TCP)
- **LAN IP** – The IP address of the server on the local Ethernet network. The specified address must be in the same subnet as the wireless AP/Router and its DHCP server address pool.
- **LAN Port** – Specifies the LAN port number, or a port range, for example “4040-4080.” (Range: 1~65535)
- **Action** – Specifies an action to take on the virtual server map.
  - **Change**: By selecting a configured virtual server map from the table its parameters display in an editable form. Click "Change" to save parameters once you have updated them.
  - **Add**: Adds a newly configured map to the list.
  - **Edit**: Click "Edit" to highlight a mapping rule entry in the list for changing its parameters.
  - **Delete**: Deletes a mapping rule from the list.

Port Trigger — Port triggering is a way to automate port forwarding in which outbound traffic on predetermined ports ("triggering ports") causes inbound traffic to specific incoming ports to be dynamically forwarded to the initiating host while the outbound ports are in use. (Maximum 32 entries are allowed.)

- **Enable** – Enables port triggering on the specified ports. (Default: Disabled)
- **Trigger Port** – Specifies the outbound port, or port range, for example “4040-4080.” (Range: 1~65535, or number1-number2)
- **Trigger Type** – Specifies the trigger port type, TCP or UDP. (Default: TCP)

- **Public Port** – Specifies the port to forward traffic to.
- **Public Type** – Specifies the forwarded port type, TCP or UDP. (Default: TCP)
- **Action** – Specifies an action to take on the port triggering configuration.
  - **Change**: By selecting a configured port trigger from the table its parameters display in an editable form. Click "Change" to save parameters once you have updated them.
  - **Add**: Adds a newly configured port trigger to the list.
  - **Edit**: Click "Edit" to highlight a port trigger rule in the list for changing its parameters.
  - **Delete**: Deletes a port trigger rule from the list.

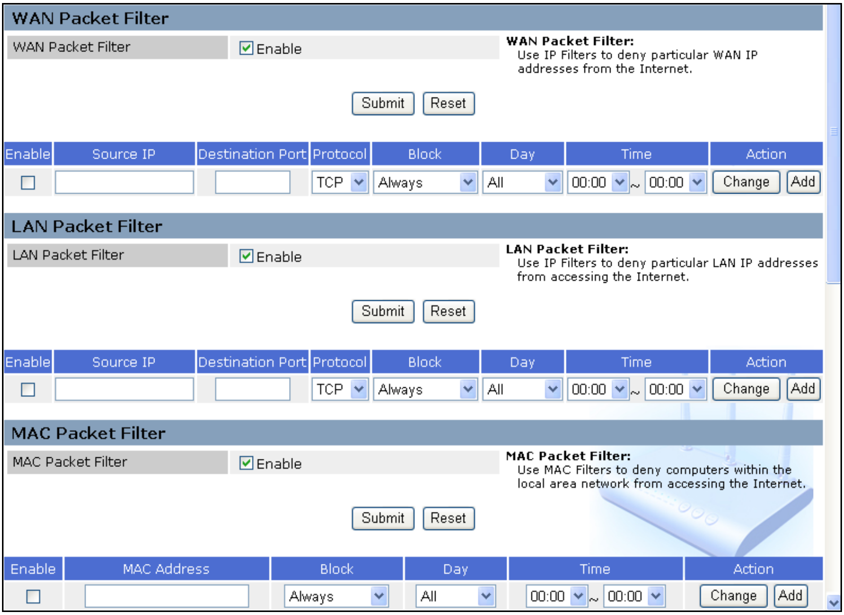
Port Forward — Port forwarding (sometimes referred to as tunneling) is the act of forwarding a network port from one network node to another. This technique can allow an external user to reach a port on a private IP address (inside a LAN) from the outside through a NAT-enabled router. (Maximum 32 entries are allowed.)

- **Enable** – Enables port forwarding on the specified port. (Default: Disabled)
- **Forward Port** – Specifies the port through which traffic is forwarded.
- **Forward Type** – Specifies the forwarding port type, TCP or UDP. (Default: TCP)
- **Forward IP** – Specifies the IP address on the local network to allow external access to.
- **Action** – Specifies an action to take on the port forwarding configuration.
  - **Change**: By selecting a port forwarding configuration from the table its parameters display in an editable form. Click "Change" to save parameters once you have updated them.
  - **Add**: Adds a newly configured port that allows forwarding in to the local area network to the list.
  - **Edit**: Click "Edit" to highlight a forwarding port rule in the list for changing its parameters.
  - **Delete**: Deletes a port forwarding rule from the list.

Packet Filtering

The wireless AP/Router provides extensive firewall protection through packet filtering.

Packet filtering restricts connection parameters to limit the risk of intrusion and defends against a wide array of common hacker attacks. Packet filtering allows the unit to permit, deny or proxy traffic through its ports.



WAN Packet Filter

WAN Packet Filter ☑ Enable

WAN Packet Filter: Use IP Filters to deny particular WAN IP addresses from the Internet.

Submit Reset

Enable	Source IP	Destination Port	Protocol	Block	Day	Time	Action
□			TCP	Always	All	00:00 ~ 00:00	Change Add

LAN Packet Filter

LAN Packet Filter ☑ Enable

LAN Packet Filter: Use IP Filters to deny particular LAN IP addresses from accessing the Internet.

Submit Reset

Enable	Source IP	Destination Port	Protocol	Block	Day	Time	Action
□			TCP	Always	All	00:00 ~ 00:00	Change Add

MAC Packet Filter

MAC Packet Filter ☑ Enable

MAC Packet Filter: Use MAC Filters to deny computers within the local area network from accessing the Internet.

Submit Reset

Enable	MAC Address	Block	Day	Time	Action
□		Always	All	00:00 ~ 00:00	Change Add

Figure 5-29. Packet Filtering (Router mode)

WAN Packet Filter — Globally enables WAN packet filtering. (Default: Enabled, maximum 32 entries are allowed.)

- **Enable** – Enables the filtering rule on a specified IP address and TCP/UDP port. (Default: Disabled)
- **Source IP** – Specifies the IP address to block WAN traffic from.
- **Destination Port** – Specifies the port to block traffic from the specified WAN IP address from reaching.
- **Protocol** – Specifies the destination port type, TCP or UDP. (Default: TCP)
- **Block** – Specifies if traffic should be blocked "Always" or configured "by Schedule."
- **Day** – Specifies the day or days of the week on which to block traffic.
- **Time** – Specifies the time of day during which to block traffic.
- **Action** – Specifies an action to take on the WAN packet filtering configuration.

  - **Change**: By selecting a packet filtering configuration from the table its parameters display in an editable form. Click "Change" to save parameters once you have updated them.
  - **Add**: Adds a newly configured packet filter that denies forwarding in to the local area network to the list.
  - **Edit**: Click "Edit" to highlight a packet filtering rule in the list for changing its parameters.
  - **Delete**: Deletes a packet filtering rule from the list.

LAN Packet Filter — Globally enables LAN packet filtering. (Default: Enabled, maximum 32 entries are allowed.)

- **Enable** – Enables the filtering rule on a specified IP address and TCP/UDP port. (Default: Enabled)
- **Source IP** – Specifies the IP address to block LAN traffic from.
- **Destination Port** – Specifies the port to block traffic from the specified LAN IP address from reaching.
- **Protocol** – Specifies the destination port type, TCP or UDP. (Default: TCP)
- **Block** – Specifies if traffic should be blocked "Always" or configured "by Schedule."
- **Day** – Specifies the day or days of the week on which to block traffic.
- **Time** – Specifies the time of day during which to block traffic.
- **Action** – Specifies an action to take on the LAN packet filtering configuration.
  - **Change**: By selecting a packet filtering configuration from the table its parameters display in an editable form. Click "Change" to save parameters once you have updated them.
  - **Add**: Adds a newly configured packet filter that denies forwarding in to the local area network to the list.
  - **Edit**: Click "Edit" to highlight a packet filtering rule in the list for changing its parameters.
  - **Delete**: Deletes a packet filtering rule from the list.

MAC Packet Filter — Globally enables MAC packet filtering. (Default: Enabled, maximum 32 entries are allowed.)

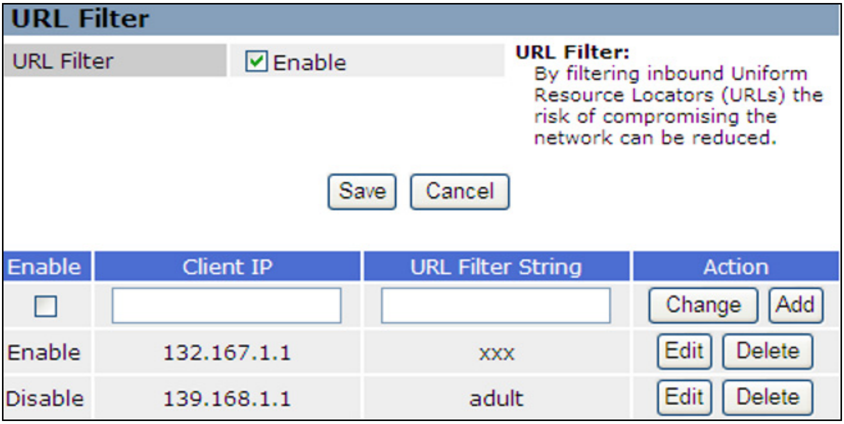
- **Enable** – Enables the filtering rule on a specified MAC address. (Default: Disabled)
- **MAC Address** – Specifies the MAC address to block traffic from.
- **Block** – Specifies if traffic should be blocked "Always" or configured "by Schedule."
- **Day** – Specifies the day or days of the week on which to block traffic.
- **Time** – Specifies the time of day during which to block traffic.
- **Action** – Specifies an action to take on the MAC packet filtering configuration.
  - **Change**: By selecting a packet filtering configuration from the table its parameters display in an editable form. Click "Change" to save parameters once you have updated them.
  - **Add**: Adds a newly configured packet filter that denies forwarding in to the local area network to the list.

- **Edit**: Click "Edit" to highlight a preconfigured packet filtering rule for changing its parameters.
- **Delete**: Deletes a packet filtering rule from the list.

URL Filter

By filtering inbound Uniform Resource Locators (URLs) the risk of compromising the network can be reduced. URLs are commonly used to point to websites. By specifying a URL or a keyword contained in a URL traffic from that site may be blocked.

Click "Network Settings" followed by "URL Filter."



URL Filter

URL Filter ☑ Enable

URL Filter:
By filtering inbound Uniform Resource Locators (URLs) the risk of compromising the network can be reduced.

Enable	Client IP	URL Filter String	Action
□			Change Add
Enable	132.167.1.1	xxx	Edit Delete
Disable	139.168.1.1	adult	Edit Delete

Figure 5-30. URL Filtering (Router mode)

URL Filter — Globally enables URL filtering. (Default: Enabled, maximum 32 entries are allowed.)

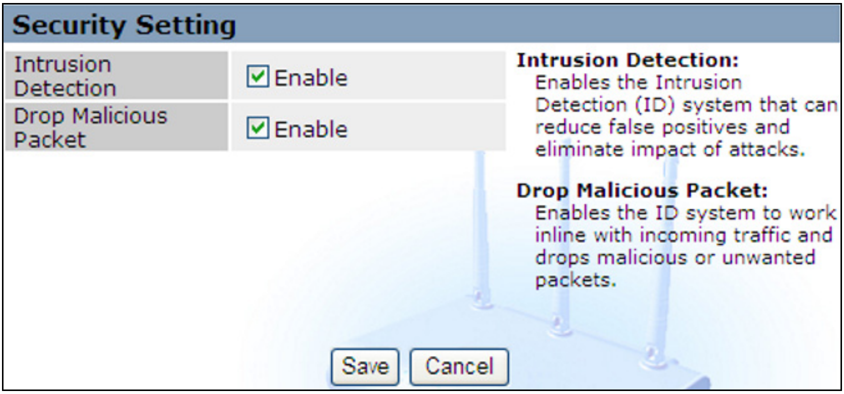
- **Enable** – Enables the filtering rule on a specified LAN IP address. (Default: Disabled)
- **Client IP** – Specifies the LAN IP address that traffic should be blocked from.
- **URL Filter String** – Specifies either a string, or a specific website address that traffic is to be blocked from. May be in the form of a text or number string with no spaces, or a website address.
- **Action** – Specifies an action to take on the URL packet filtering configuration.
  - **Change**: By selecting a URL filtering configuration from the table its parameters display in an editable form. Click "Change" to save parameters once you have updated them.
  - **Add**: Adds a newly configured URL filter that denies forwarding in to the local area network to the list.
  - **Edit**: Click "Edit" to highlight a URL filtering rule in the list for changing its parameters.

- **Delete**: Deletes a URL filtering rule from the list.

Security Setting

The Security Setting page enables intrusion detection (ID), a type of security management system for computers and networks. An ID system gathers and analyzes information from various areas within a computer or a network to identify possible security breaches, which include both intrusions (attacks from outside the organization) and misuse (attacks from within the organization). ID uses vulnerability assessment (sometimes referred to as scanning), which is a technology developed to assess the security of a computer system or network.

Click on "Network Settings" followed by ’security Setting."



Security Setting

Intrusion Detection	☑ Enable
Drop Malicious Packet	☑ Enable

Intrusion Detection:
Enables the Intrusion Detection (ID) system that can reduce false positives and eliminate impact of attacks.

Drop Malicious Packet:
Enables the ID system to work inline with incoming traffic and drops malicious or unwanted packets.

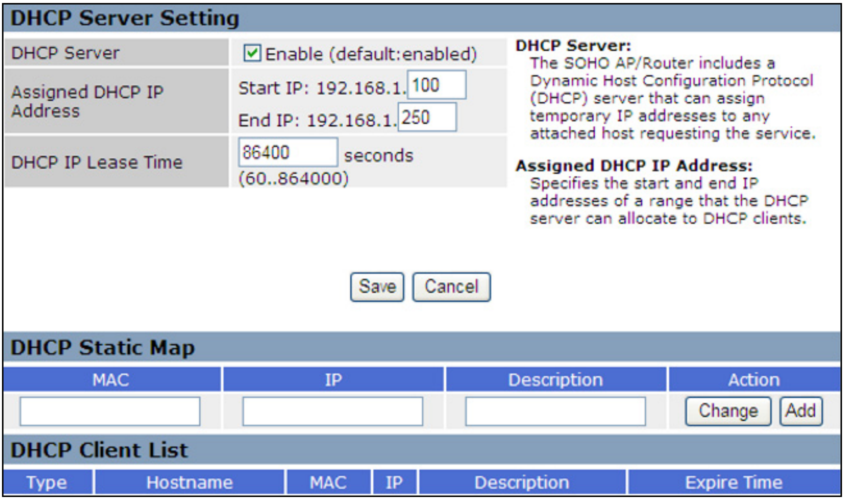
Figure 5-31. Security Setting (Router mode)

- **Intrusion Detection** – Enables the ID system. (Default: Disabled)
- **Drop Malicious Packet** – Enables the ID system to work inline with incoming traffic and drops malicious or unwanted packets. (Default: Disabled)

Service Settings

DHCP

The wireless AP/Router includes a Dynamic Host Configuration Protocol (DHCP) server that can assign temporary IP addresses to any attached host requesting the service. The unit can support up to 253 local clients. Addresses are assigned to clients from a common address pool configured on the unit. Configure an address pool by specifying start and end IP addresses. Be sure not to include the unit's IP address in the address pool range. Click on “Network Settings” followed by “DHCP.”



DHCP Server Setting

DHCP Server	☑ Enable (default:enabled)
Assigned DHCP IP Address	Start IP: 192.168.1. 100 End IP: 192.168.1. 250
DHCP IP Lease Time	86400 seconds (60..864000)

DHCP Server:
The SOHO AP/Router includes a Dynamic Host Configuration Protocol (DHCP) server that can assign temporary IP addresses to any attached host requesting the service.

Assigned DHCP IP Address:
Specifies the start and end IP addresses of a range that the DHCP server can allocate to DHCP clients.

DHCP Static Map

MAC	IP	Description	Action
			Change Add

DHCP Client List

Type	Hostname	MAC	IP	Description	Expire Time

Figure 5-32. DHCP Settings (Router mode)

- **DHCP Server** – Enables the DHCP server. (Default: Enabled)
- **Assigned DHCP IP Address** – Specify the start and end IP addresses of a range that the DHCP server can allocate to DHCP clients. Note that the address pool range is always in the same subnet as the unit’s IP setting. The maximum clients that the unit can support is 253.
- **DHCP IP Lease Time** – Select a time limit for the use of an IP address from the IP pool. When the time limit expires, the client has to request a new IP address. The lease time is expressed in seconds.
  (Default: 86400 seconds; Range: 60~864000 seconds)
- **Save** – Saves the current DHCP configuration.
- **Cancel** – Restores the previous DHCP configuration information.
- **DHCP Static Map** – Maps client MAC addresses to static IP addresses. This allows specified clients to always be assigned the same IP when they request settings. (Maximum 32 entries are allowed.)

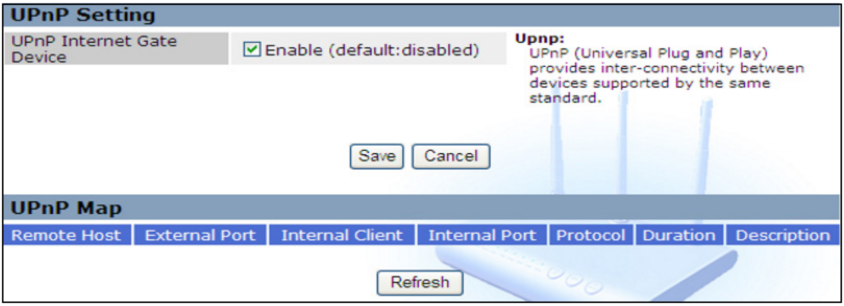
- MAC: The physical layer address used to uniquely identify the static IP address to be assigned to the specified client MAC address. The IP address must be in the same subnet as the wireless AP/Router..
- IP: The static IP address to be assigned to the specified client MAC address. The IP address must be in the same subnet as the wireless AP/Router.
- Description: An optional brief description that can be used to help identify the client device.
- Action: Specifies changes or additions to the DHCP static map table.
  - **Change**: By selecting an already configured DHCP static map its parameters display in an editable form. Click “Change” to save parameters once you have modified them.
  - **Add**: Adds a newly configured DHCP static map to the list.
  - **Edit**: Click “Edit” to highlight an entry in the static DHCP client list for changing its parameters.
  - **Delete**: Deletes a DHCP static map from the list.

- **DHCP Client List** – Lists information about associated DHCP clients.
  - Type: Describes the type of DHCP client.
  - Hostname: The hostname of the DHCP client.
  - MAC: The MAC address of the DHCP client.
  - IP: The IP address of the DHCP client.
  - Description: Optional description of the DHCP client.
  - **Expire Time**: The time after which the connection will expire and the DHCP client must request a new IP address.

UPnP Setting

UPnP (Universal Plug and Play) provides inter-connectivity between devices supported by the same standard. UPnP is based on standard Internet protocols, such as TCP/IP, UDP, and HTTP.

Click on “Network Settings” followed by “UPnP.”



UPnP Setting

UPnP Internet Gate Device: ☑ Enable (default:disabled)

Upnp:
UPnP (Universal Plug and Play) provides inter-connectivity between devices supported by the same standard.

UPnP Map

Remote Host	External Port	Internal Client	Internal Port	Protocol	Duration	Description

Figure 5-33. UPnP Setting (Router mode)

UPnP Setting — Allows the device to advertise its UPnP capabilities.

- **UPnP Internet Gate Device** – Enables UPnP on the wireless AP/Router. (Default: Disabled)
- **Save** – Saves the enabled UPnP configuration.
- **Cancel** – Restores the previous UPnP configuration information.

UPnP Map — Displays UPnP statistics.

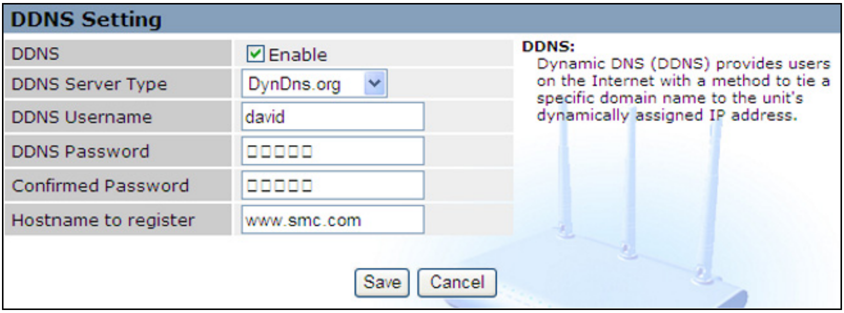
- **Remote Host** – Displays the UPnP host device on the WAN.
- **External Port** – Displays the external WAN port from which UPnP discovery is broadcast to the wireless AP/Router.
- **Internal Client** – Displays the LAN connected UPnP supporting device.
- **Internal Port** – Displays the LAN port to which the internal client is connected.
- **Protocol** – Specifies the protocol used, TCP, UDP, or HTTP.
- **Duration** – Displays the time the device will advertise its UPnP capabilities, after which it must send a renewal message. It is generally expected that a device will display an duration advertisement for 1800 seconds (30 minutes) or more.
- **Description** – Optional parameter that describes the device to a network administrator.
- **Refresh** – Refreshes the UPnP Map statistics.

DDNS Settings

Dynamic DNS (DDNS) provides users on the Internet with a method to tie a specific domain name to the unit's dynamically assigned IP address. DDNS allows your domain name to follow your IP address automatically by changing your DNS records when your IP address changes.

The wireless AP/Router provides access to three DDNS service providers, DynDns.org, Non-IP.com and ZoneEdit.com. To set up an DDNS account, visit the websites of these service providers at www.dyndns.org, www.non-ip.com, or www.zoneedit.com.

Click on "Network Settings" followed by "DDNS."



DDNS Setting

DDNS	☑ Enable
DDNS Server Type	DynDns.org
DDNS Username	david
DDNS Password	□□□□□
Confirmed Password	□□□□□
Hostname to register	www.smc.com

DDNS:
Dynamic DNS (DDNS) provides users on the Internet with a method to tie a specific domain name to the unit's dynamically assigned IP address.

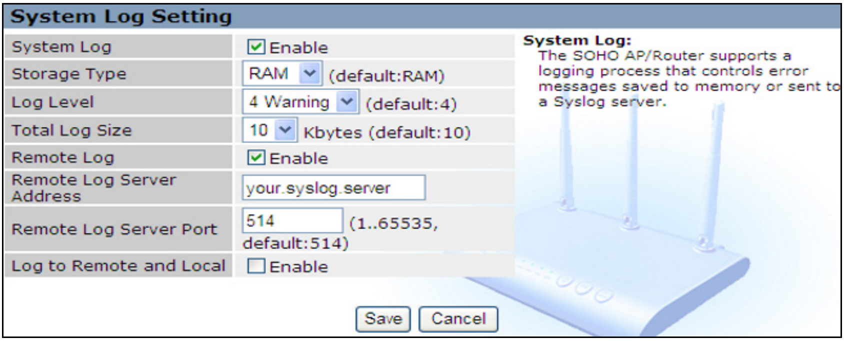
Figure 5-34. DDNS Setting (Router mode)

- **DDNS** – Enables DDNS. (Default: Disabled)
- **DDNS Server Type** – Specifies the DDNS service provider, DynDns.org, Non-IP.com, or ZoneEdit.com. (Default: DynDns.org)
- **DDNS Username** – Specifies your username for the DDNS service.
- **DDNS Password** – Specifies your password for the DDNS service.
- **Confirmed Password** – Prompts you to re-enter your chosen password.
- **Hostname to register** – Specifies the prefix to identify your presence on the DDNS server.
- **Submit** – Saves and sends the enabled DDNS configuration to the DDNS server.
- **Reset** – Restores the previous DDNS configuration information.

System Log Settings

The wireless AP/Router supports a logging process that controls error messages saved to memory or sent to a Syslog server. The logged messages serve as a valuable tool for isolating wireless AP/Router and network problems.

The System Log Settings page controls the type of logging message that the wireless AP/Router can send.



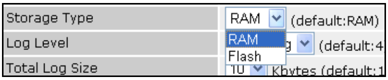
System Log Setting

System Log	☑ Enable
Storage Type	RAM (default:RAM)
Log Level	4 Warning (default:4)
Total Log Size	10 Kbytes (default:10)
Remote Log	☑ Enable
Remote Log Server Address	your.syslog.server
Remote Log Server Port	514 (1..65535, default:514)
Log to Remote and Local	□ Enable

System Log: The SOHO AP/Router supports a logging process that controls error messages saved to memory or sent to a Syslog server.

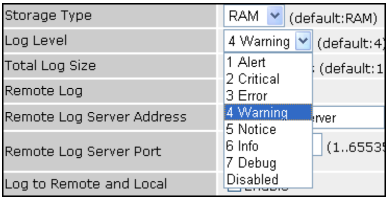
Figure 5-35. System Log Settings

- **System Log** – Enables local storage of system logs concerned with the wireless AP/Router only. (Default: Disabled)
- **Storage Type** – Indicates where the system log messages are to be stored. (Default: RAM)



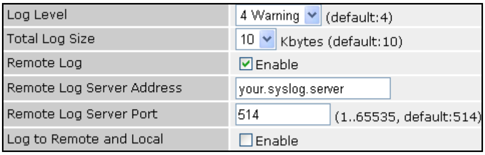
Storage Type	RAM (default:RAM)
Log Level	RAM Flash (default:4
Total Log Size	10 Kbytes (default:1

Note: System log messages stored in RAM are cleared after a reboot.



Storage Type	RAM ▾ (default:RAM)
Log Level	4 Warning ▾ (default:4 1 Alert 2 Critical 3 Error 4 Warning 5 Notice 6 Info 7 Debug Disabled
Total Log Size	(default:1
Remote Log	
Remote Log Server Address	rver
Remote Log Server Port	(1..6553
Log to Remote and Local	

- **Log Level** – Configures the minimum severity level for event logging. The system allows you to limit the messages that are logged by specifying the minimum severity level.
  (Default: 4 Warning)
  - **1 Alert** – An error condition requiring immediate user intervention to prevent a problem.
  - **2 Critical** – An error condition that may require user intervention.
  - **3 Error** – An error condition that does not cause significant problems with normal operation.
  - **4 Warning** – An error condition that does not cause system problems but may require attention.
  - **5 Notice** – A system condition that does not cause system problems but should be noted.
  - **6 Info** – Informational message only.
  - **7 Debug** – Sends the lowest level of system log messages only. Debug messages carry information for debugging software.
  - **Disabled** – Disables sending of any logging messages.



Log Level	4 Warning ▾ (default:4)
Total Log Size	10 ▾ Kbytes (default:10)
Remote Log	☑ Enable
Remote Log Server Address	your.syslog.server
Remote Log Server Port	514 (1..65535, default:514)
Log to Remote and Local	☐ Enable

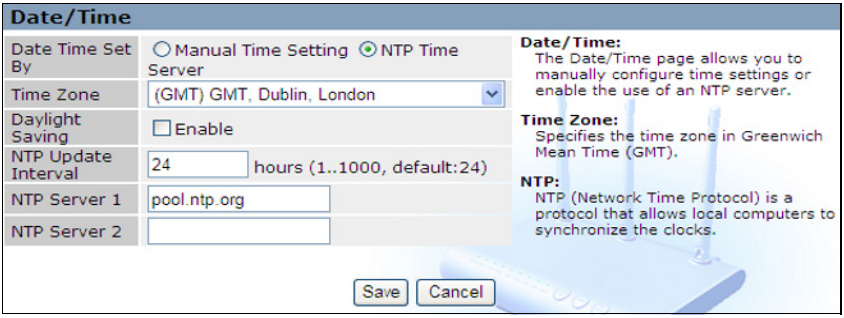
- **Total Log Size** – Indicates the amount of RAM or Flash memory available for logging messages. (Default: 10 Kbytes; Range: 10 or 20 Kbytes)
- **Remote Log** – Enables remote storage of system logs on a Syslog server. (Default: Disabled)
- **Remote Log Server Address** – The address of the remote logging server. (Default: your.syslog.server)
- **Remote Log Server Port** – The remote port to which messages are to be sent to. (Default: 514; Range: 1~65535)
- **Log to Remote and Local** – Enables simultaneous logging to a remote Syslog server and local logging on the wireless/AP Router’s RAM or Flash memory. (Default: Disabled)

Note: Enabling Remote Logging disables local logging unless “Log to Remote and Local” is selected.

- **Submit** – Saves the current system log configuration.
- **Reset** – Restores the previous current system log configuration.

Date and Time Settings

The Date/Time page allows you to manually configure time settings or enable the use of an NTP server.



Date/Time

Date Time Set By	○ Manual Time Setting ● NTP Time Server
Time Zone	(GMT) GMT, Dublin, London
Daylight Saving	□ Enable
NTP Update Interval	24 hours (1..1000, default:24)
NTP Server 1	pool.ntp.org
NTP Server 2	

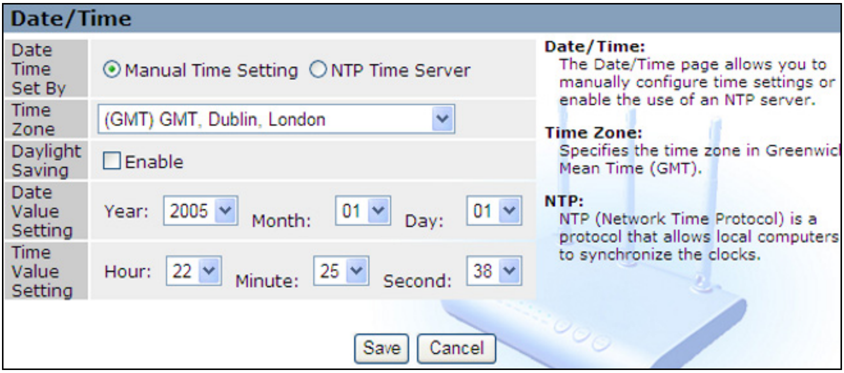
Date/Time:
The Date/Time page allows you to manually configure time settings or enable the use of an NTP server.

Time Zone:
Specifies the time zone in Greenwich Mean Time (GMT).

NTP:
NTP (Network Time Protocol) is a protocol that allows local computers to synchronize the clocks.

Figure 5-36. Date and Time Settings - NTP

- **Date Time Set By** – Allows you to manually configure time settings or select the use of an NTP server.
- **Time Zone** – Specifies the time zone in Greenwich Mean Time (GMT).
- **Daylight Saving** – Enables daylight savings for summertime. Daylight Saving Time begins for most of the United States at 2:00 a.m. on the first Sunday of April. Time reverts to standard time at 2:00 a.m. on the last Sunday of October. In the U.S., each time zone switches at a different time. In the European Union, Summer Time begins and ends at 1:00 a.m. GMT. It begins the last Sunday in March and ends the last Sunday in October. In the EU, all time zones change at the same moment. (Default: Disabled)
- **NTP Update Interval** – Specifies the number of hours before which the wireless AP/Router will send for a time update from NTP servers. (Default: 24 hours; Range 1~1000 hours)
- **NTP Server 1~2** – The IP address or URL of the NTP server to be used.
- **Submit** – Applies the Date/Time settings.
- **Reset** – Restores the previous Date/Time settings.



Date/Time

Date Time Set By	● Manual Time Setting ○ NTP Time Server
Time Zone	(GMT) GMT, Dublin, London
Daylight Saving	□ Enable
Date Value Setting	Year: 2005 Month: 01 Day: 01
Time Value Setting	Hour: 22 Minute: 25 Second: 38

Save Cancel

Date/Time:
The Date/Time page allows you to manually configure time settings or enable the use of an NTP server.

Time Zone:
Specifies the time zone in Greenwic
Mean Time (GMT).

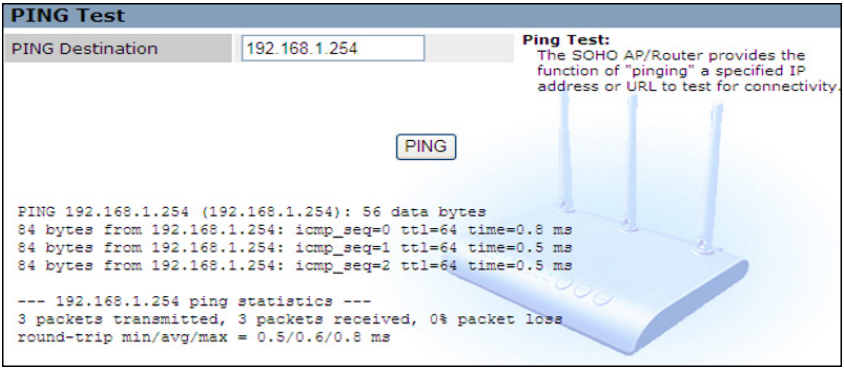
NTP:
NTP (Network Time Protocol) is a protocol that allows local computers to synchronize the clocks.

Figure 5-37. Date and Time Settings - Manual

- **Date Time Set By** – Allows you to manually configure time settings or select the use of an NTP server.
- **Time Zone** – Specifies the time zone in Greenwich Mean Time (GMT).
- **Daylight Saving** – Enables daylight savings for summertime. (Default: Disabled)
- **Date Value Setting** – Sets the date for the wireless AP/Router in year; month; day format.
- **Time Value Setting** – Sets the time for the wireless AP/Router in hour, minute; second format.
- **Submit** – Applies the Date/Time settings.
- **Reset** – Restores the previous Date/Time settings.

PING Test

The wireless AP/Router provides the function of "pinging" a specified IP address or URL to test for connectivity.



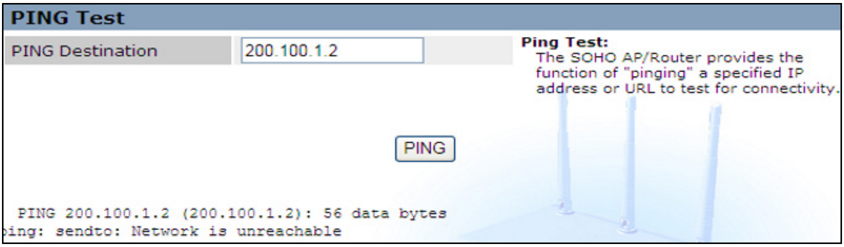
PING Test

PING Destination: 192.168.1.254

Ping Test:
The SOHO AP/Router provides the function of "pinging" a specified IP address or URL to test for connectivity.

```
PING 192.168.1.254 (192.168.1.254): 56 data bytes
84 bytes from 192.168.1.254: icmp_seq=0 ttl=64 time=0.8 ms
84 bytes from 192.168.1.254: icmp_seq=1 ttl=64 time=0.5 ms
84 bytes from 192.168.1.254: icmp_seq=2 ttl=64 time=0.5 ms

--- 192.168.1.254 ping statistics ---
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max = 0.5/0.6/0.8 ms
```

Figure 5-38. Ping Test - success



PING Test

PING Destination: 200.100.1.2

Ping Test:
The SOHO AP/Router provides the function of "pinging" a specified IP address or URL to test for connectivity.

```
 PING 200.100.1.2 (200.100.1.2): 56 data bytes
ping: sendto: Network is unreachable
```

Figure 5-39. Ping Test - failure

- **PING Destination** – The destination IP address to test.
- **PING** – Sends the request.

Management Settings

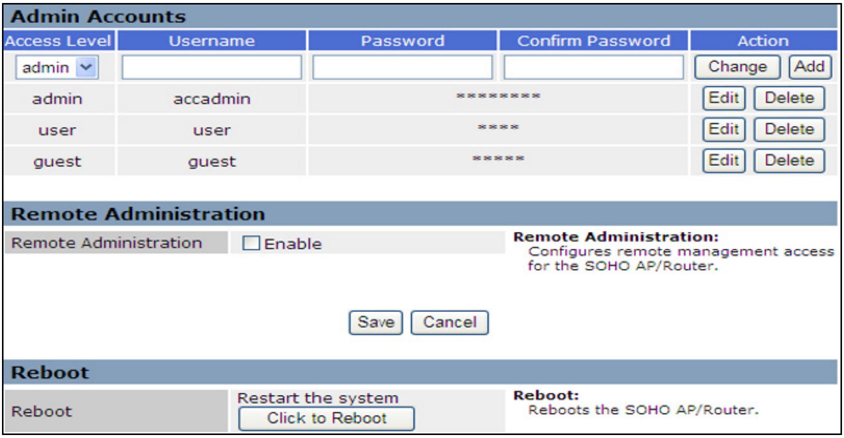
The wireless AP/Router’s Management Settings menu provides the same configuration options in both Router and AP Mode. These settings allow you to change the operating mode, set the system time, configure a management access password, and upgrade the system software.

Admin Accounts and Remote Administration

Management access to the wireless AP/Router is controlled through different levels of user name and password. You can also gain additional access security by using control filters such as ACLs and URL filters.

To protect access to the management interface, you need to configure a new Administrator’s user name and password as soon as possible. If a new user name and password are not configured, then anyone having access to the wireless AP/Router may be able to compromise the unit's security by entering the default values. Once a new Administrator has been configured, you can delete the default “admin” user name from the system.

Management access to the wireless AP/Router through the WAN port is possible when remote administration is enabled and the connecting HTTP, port or IP address is configured.



Admin Accounts

Access Level	Username	Password	Confirm Password	Action
admin				Change Add
admin	accadmin	********		Edit Delete
user	user	****		Edit Delete
guest	guest	*****		Edit Delete

Remote Administration

Remote Administration ☐ Enable

Remote Administration: Configures remote management access for the SOHO AP/Router.

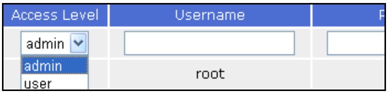
Reboot

Reboot Restart the system

Reboot: Reboots the SOHO AP/Router.

Figure 5-40. Administration Settings

Admin Accounts — Configures access levels, usernames and passwords. (Maximum 32 entries are allowed.)



- **Access Level** – Configures the access privileges that the user has.
  - Admin: Grants administrator level access, no restrictions.
  - User: Grants user level access, some restrictions.
  - **Guest**: Grants guest level access, configuration settings may not be changed.

Note: Pressing the Reset button on the back of the wireless AP/Router for more than 5 seconds resets the user names and passwords to the factory defaults.

- **Username** – The name of the user. The default names preset for access to the unit are "root" for admin level, "user" for user level and "guest" for guest level. (Length: 3-16 characters, case sensitive)
- **Password** – The password for management access. The default passwords preset for access to the unit are identical to their user names, “root” for admin level, “user” for user level and “guest” for guest level. (Length: 3-16 characters, case sensitive)
- **Confirm Password** – Prompts you to enter the password again for verification.
- **Action** – Specifies an action to take on the admin account.
  - **Change**: By selecting a user from the table its parameters display in an editable form. Click "Change" to save parameters once you have updated them.
  - **Add**: Adds a newly configured user to the list.
  - **Edit**: Click "Edit" to highlight a configured user for changing its parameters.
  - **Delete**: Deletes a user entry from the list.

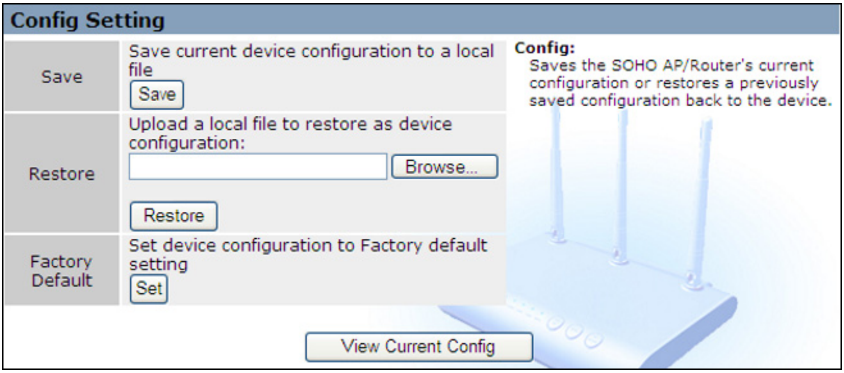
Remote Accounts — Configures remote management access for the wireless AP/ Router.

- **Remote administration** – Enables remote administration. (Default: Enabled)
- **HTTP port for remote** – Specifies the HTTP port for remote access. (Default: 8888; Range: 1~65535)
- **Remote administration only from IP** – Configures an IP address from which to manage the unit. Using an address of 0.0.0.0 enables remote management access from any IP address and is therefore recommended that the user change the default setting. (Default: 0.0.0.0)
- **Update** – Updates the remote administration information.

Reboot – Click the button to reboot the wireless AP/Router.

Config Settings

The Config Setting page allows you to save the wireless AP/Router's current configuration or restore a previously saved configuration back to the device



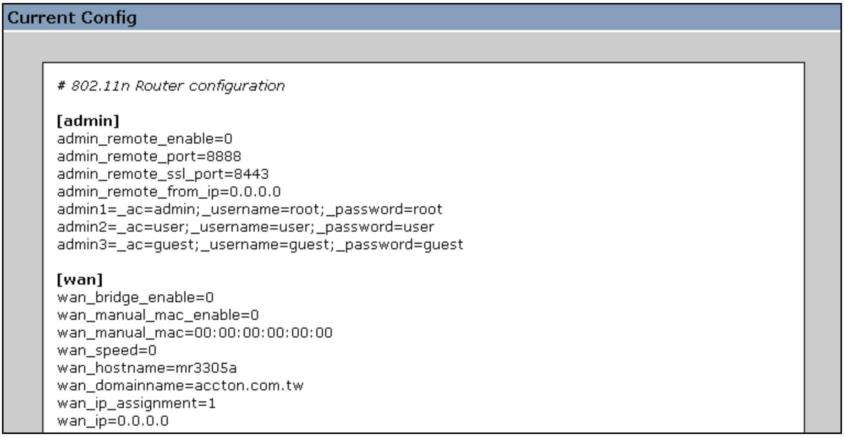
Config Setting

Save	Save current device configuration to a local file
Restore	Upload a local file to restore as device configuration:
Factory Default	Set device configuration to Factory default setting

Config:
Saves the SOHO AP/Router's current configuration or restores a previously saved configuration back to the device.

Figure 5-41. Config Settings

- **Save** – Saves the current configuration locally.
- **Restore** – Restores a previously saved configuration from a specified file.
- **Factory Default** – Restores the factory defaults.
- **View Current Config** – Opens a display window that details parameters about the current configuration.



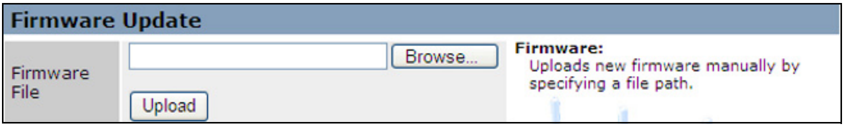
Current Config

```
# 802.11n Router configuration

[admin]
admin_remote_enable=0
admin_remote_port=8888
admin_remote_ssl_port=8443
admin_remote_from_ip=0.0.0.0
admin1=_ac=admin;_username=root;_password=root
admin2=_ac=user;_username=user;_password=user
admin3=_ac=guest;_username=guest;_password=guest

[wan]
wan_bridge_enable=0
wan_manual_mac_enable=0
wan_manual_mac=00:00:00:00:00:00
wan_speed=0
wan_hostname=mr3305a
wan_domainname=accton.com.tw
wan_ip_assignment=1
wan_ip=0.0.0.0
```

Figure 5-42. View Current Config Settings

Firmware Upgrade

You can update the wireless AP/Router firmware by using the Firmware Update facility.



Firmware Update

Firmware File

Firmware:
Uploads new firmware manually by specifying a file path.

Figure 5-43. View Current Config Settings

Firmware Update — Allows you to upload new firmware manually by specifying a file path. Make sure the firmware you want to use is on the local computer by clicking Browse to search for the firmware to be used for the update.

- **Browse** – Opens a directory on the local hard drive for specifying the path of file required for uploading.
- **Upload** – Starts the upload procedure.

Status Information

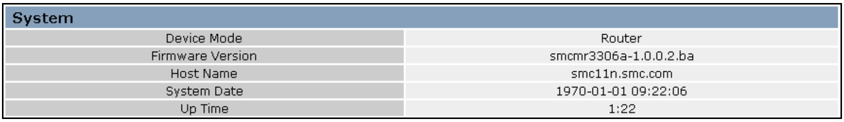
The Information pages display details on the current configuration and status of the wireless AP/Router, including associated wireless stations and event log messages.

Note: The Status Information pages will display different statistics depending on the mode selected, AP or Router. Please refer to “Installation” on page 2-1 for details.

System Information

The System Information page displays basic system information as well as Management IP, WAN, LAN, WLAN and WDS settings. The displayed settings are for status information only and are not configurable on this page. This information is split into the four sections that follow.

Click "Information", followed by “System Information" and scroll to the relevant section.

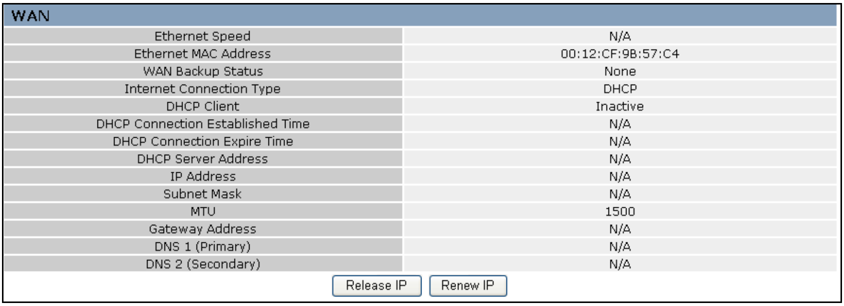


System	
Device Mode	Router
Firmware Version	smcmr3306a-1.0.0.2.ba
Host Name	smc11n.smc.com
System Date	1970-01-01 09:22:06
Up Time	1:22

Figure 5-44. System Information - Basic Information

System — Displays the basic system information in both AP and Router modes:

- **Device Mode** – Displays the hardware setting determined by the switch on the base of the unit.
- **Model Name** – The device name and model number.
- **Firmware Version** – The version number of the current wireless AP/Router software.
- **Host Name** – The web address assigned as an alias for the wireless AP/Router, enabling the device to be uniquely identified on the network.
- **System Date** – The current date and time set for the wireless AP/Router, in the form year; month; day; hours; minutes; seconds.
- **Up Time** – Length of time the management agent has been up, specified in hours and minutes.

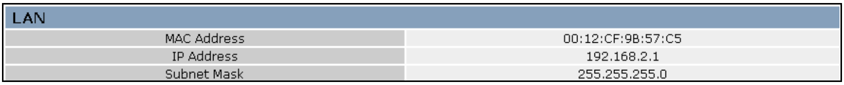


WAN	
Ethernet Speed	N/A
Ethernet MAC Address	00:12:CF:9B:57:C4
WAN Backup Status	None
Internet Connection Type	DHCP
DHCP Client	Inactive
DHCP Connection Established Time	N/A
DHCP Connection Expire Time	N/A
DHCP Server Address	N/A
IP Address	N/A
Subnet Mask	N/A
MTU	1500
Gateway Address	N/A
DNS 1 (Primary)	N/A
DNS 2 (Secondary)	N/A

Figure 5-45. System Information - WAN Statistics (Router mode)

WAN — Displays the basic WAN information:

- **Ethernet Speed** – The connection speed of the WAN port.
- **Ethernet MAC Address** – The physical layer address for the Ethernet WAN port.
- **IP Assignment** – Indicates if the IP address has been manually configured or assigned by DHCP.
- **DHCP Client** – Displays if the wireless AP/Router is acting as a DHCP client.
- **DHCP Connection Established Time** – If connected as a DHCP client it displays the duration the other device has been connected
- **DHCP Connection Expire Time** – If connected as a DHCP client it displays the length of time before which the connection will expire.
- **DHCP Server Address** – If connected to a DHCP server it displays the address of the server.
- **IP Address** – IP address of the WAN port for this device.
- **Subnet Mask** – The mask that identifies the host address bits used for routing to the WAN port.
- **MTU** – Indicates the Maximum Transmission Unit (MTU), the largest packet size allowed to be transmitted over the WAN port.
- **Gateway Address** – The default gateway is the IP address of the router for the wireless AP/Router, which is used if the requested destination address is not on the local subnet
- **DNS 1 (Primary)** / **DNS 2 (Secondary)** – The IP address of Domain Name Servers on the network. A DNS maps numerical IP addresses to domain names and can be used to identify network hosts by familiar names instead of the IP addresses.

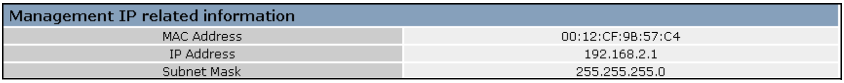


LAN	
MAC Address	00:12:CF:9B:57:C5
IP Address	192.168.2.1
Subnet Mask	255.255.255.0

Figure 5-46. System Information - LAN Statistics (Router mode)

LAN — Displays the basic LAN information:

- **MAC Address** – The shared physical layer address for the wireless AP/Router’s LAN ports.
- **IP Address** – The IP address configured on the wireless AP/Router.
- **Subnet Mask** – The mask that identifies the host address bits used for routing to the LAN port.
- **DHCP Server Function** – Indicates the DHCP server status.

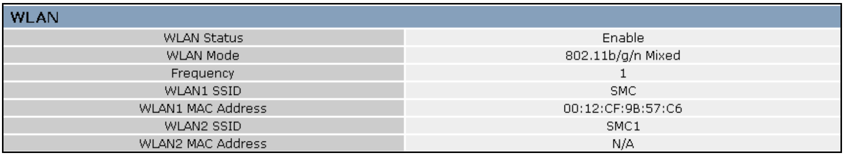


Management IP related information	
MAC Address	00:12:CF:9B:57:C4
IP Address	192.168.2.1
Subnet Mask	255.255.255.0

Figure 5-47. System Information - Management IP Statistics (AP mode)

Management IP related information — Displays basic management IP information settings:

- **MAC Address** – The shared physical layer address for the wireless AP/Router’s LAN and WAN ports.
- **IP Address** – The IP address configured on the wireless AP/Router.
- **Subnet Mask** – The mask that identifies the host address bits used for routing to the LAN port.
- **DHCP Server Function** – Indicates the DHCP server status.

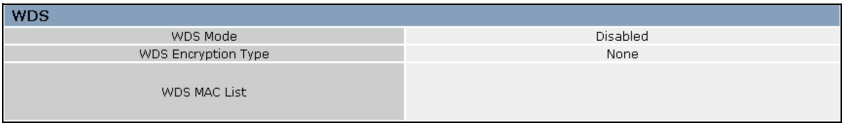


WLAN	
WLAN Status	Enable
WLAN Mode	802.11b/g/n Mixed
Frequency	1
WLAN1 SSID	SMC
WLAN1 MAC Address	00:12:CF:9B:57:C6
WLAN2 SSID	SMC1
WLAN2 MAC Address	N/A

Figure 5-48. System Information - WLAN Statistics

WLAN — Displays the basic WLAN information:

- **WLAN Status** –Displays if the radio is enabled or disabled.
- **Country** – The country for which the wireless AP/Router has been set for use.
- **WLAN Mode** – Displays the radio mode being used.
- **Frequency** – The channel frequency being used by the radio.
- **WLAN1 SSID** – The service set identifier for WLAN1. (Default: mr3305a1)
- **WLAN1 MAC Address** – The physical layer address for WLAN1.



WDS	
WDS Mode	Disabled
WDS Encryption Type	None
WDS MAC List	

Figure 5-49. System Information - WDS Statistics

WDS — Displays the basic WDS information.

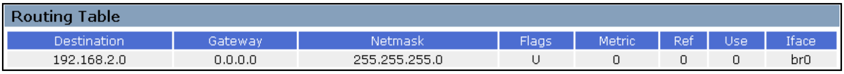
Note: WDS information only applies to WLAN1.

- **WDS Mode** – The WDS mode in which WLAN1 is set to operate.
- **WDS Encryption Type** – The encryption type used by WLAN1.
- **WDS MAC List** – Displays any entries in the WDS MAC list. (Maximum: 4)

Routing Table

This page displays the information necessary to forward a packet along the best path toward its destination. Each packet contains information about its origin and destination. When a packet is received, a network device examines the packet and matches it to the routing table entry providing the best match for its destination. The table then provides the device with instructions for sending the packet to the next hop on its route across the network.

Note: The Routing Table is only available when the wireless AP/Router is set to Router Mode.



Routing Table

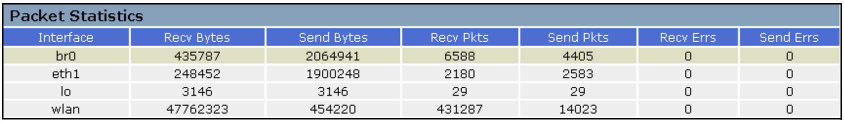
Destination	Gateway	Netmask	Flags	Metric	Ref	Use	Iface
192.168.2.0	0.0.0.0	255.255.255.0	U	0	0	0	br0

Figure 5-50. Routing Table (Router Mode)

- **Destination** – Displays all destination networks or specific hosts to which packets can be routed.
- **Gateway** – Displays the IP address of the router at the next hop to which matching frames are forwarded.
- **Netmask** – Displays the subnetwork associated with the destination.
- **Flags** – Possible flags include: U: route is up, H: target is a host, G: use gateway, C: cache entry, !: Reject route.
- **Metric** – A number used to indicate the cost of the route so that the best route, among potentially multiple routes to the same destination, can be selected.
- **Ref** – Number of references to this route.
- **Use** – Count of lookups for the route.
- **Iface** – Interface to which packets for this route will be sent.

Packet Statistics

The device keeps statistics of the data traffic that it handles. You are able to view the amount of Received and Sent packets that passes through the device on both the WAN port and the LAN ports. The traffic counter will reset when the device is rebooted.



Packet Statistics

Interface	Recv Bytes	Send Bytes	Recv Pkts	Send Pkts	Recv Errs	Send Errs
br0	435787	2064941	6588	4405	0	0
eth1	248452	1900248	2180	2583	0	0
lo	3146	3146	29	29	0	0
wlan	47762323	454220	431287	14023	0	0

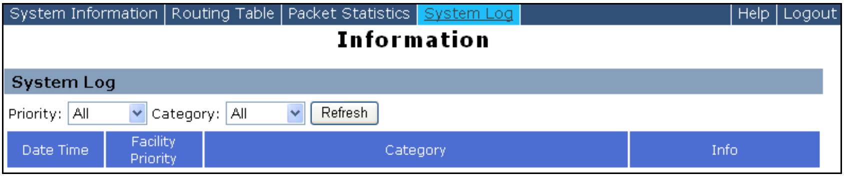
Figure 5-51. Packet statistics

- **Interface** – Displays the name of the interface the packet statistics relate to.
- **Recv Bytes** – The total number of bytes received on the interface.
- **Send Bytes** – The total number of bytes sent from the interface.
- **Recv Pkts** – The total number of packets received on the interface.
- **Send Pkts** – The total number of packets sent from the interface.
- **Recv Errs** – The total number of inbound packets that could not be delivered through the interface due to errors.
- **Send Errs** – The total number of outbound packets that could not be delivered through the interface due to errors.

System Logs

The wireless AP/Router supports a logging process that controls error messages saved to memory or sent to a Syslog server. The logged messages serve as a valuable tool for isolating wireless AP/Router and network problems.

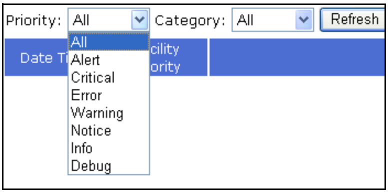
The Events Log page displays the latest messages logged in chronological order, from the newest to the oldest. Log messages saved in the wireless AP/Router's memory are erased when the device is rebooted.



Priority: All Category: All

Figure 5-52. Syslog Settings

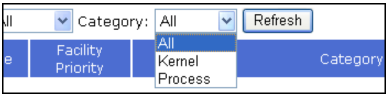
Priority — Select the priority level of syslog messages to be sent to the wireless AP/ Router. (Default: All)



Priority: All Category: All

- **All** – Displays all logging messages.
- **Alert** – An error condition requiring immediate user intervention to prevent a problem.
- **Critical** – An error condition that may require user intervention.
- **Error** – An error condition that does not cause significant problems with normal operation.
- **Warning** – An error condition that does not cause system problems but may require attention.
- **Notice** – A system condition that does not cause system problems but should be noted.
- **Info** – Informational message only.
- **Debug** – Displays the lowest level of system log messages only. Debug messages carry information for debugging software.

Category — Select the category of syslog messages sent to the wireless AP/Router. (Default: All)



Category: All

- **All** – Displays all categories of message.
- **Kernel** – Displays system log messages concerned with Linux Kernel base code problems only.

- **Process** – Displays system log messages concerned with all other process other than the Linux Kernel, including communication through the wireless AP/Router's ports.
- **Refresh** – Refreshes the System Log display to display the most recent messages received.
- **Date Time** – The date and time of receival of the system log message.
- **Facility Priority** – The priority level of the system log message.
- **Category** – The category of system log message.
- **Info** – Additional informative content that may help isolate the cause of the problem that prompted the system log message.

Appendix A: Troubleshooting

Check the following items before you contact local Technical Support.

1. If wireless clients cannot access the network, check the following:
   - Be sure the access point and the wireless clients are configured with the same Service Set ID (SSID).
   - If authentication or encryption are enabled, ensure that the wireless clients are properly configured with the appropriate authentication or encryption keys.
2. If the wireless AP/Router cannot be configured using a web browser:
   - Be sure to have configured the access point with a valid IP address, subnet mask and default gateway.
   - If you are connecting to the wireless AP/Router through the wired Ethernet interface, check the network cabling between the management station and the wireless AP/Router. If you are connecting to wireless AP/Router from a wireless client, ensure that you have a valid connection to the wireless AP/Router.
3. If you forgot or lost the password:
   - Set the wireless AP/Router to its default configuration by pressing the reset button on the bottom panel for 5 seconds or more. Connect to the web management interface using the default IP address 192.168.1.254. Then set up a new user name and password to access the management interface.
4. If all other recovery measure fail, and the wireless AP/Router is still not functioning properly, take any of these steps:
   - Reset the wireless AP/Router's hardware using the web interface or through a power reset.
   - Reset the wireless AP/Router to its default configuration by pressing the reset button on the back panel for 5 seconds or more. Connect to the web management interface using the default IP address 192.168.1.254, then setup a user name and password.

Diagnosing LED Indicators

Troubleshooting Chart	
Symptom	**Action**
POWER LED is Off	• The AC power adapter may be disconnected. Check connections between the wireless AP/Router, the power adapter, and the wall outlet.
WLAN LED is Off	• The wireless AP/Router's radio has been disabled through it's web management interface. Access the management interface using a web browser to enable the radio.
LAN/WAN LED is Off (when port connected)	• Verify that the wireless AP/Router and attached device are powered on. • Be sure the cable is plugged into both the wireless AP/Router and corresponding device. • Verify that the proper cable type is used and its length does not exceed specified limits. • Check the cable connections for possible defects. Replace the defective cable if necessary.
3G LED is Off	• Be sure that your mobile 3G adapter is connected to the USB port.
3G LED is continuously flashing	• You may have entered an incorrect PIN code for the device, or your 3G adapter might be locked. • Be sure to unlock the 3G adapter. • Verify that the correct PIN code is entered for the 3G adapter's network service provider.

Appendix B: Specifications

Operating Frequency

802.11g/n:
2.4 ~ 2.4835 GHz (US, Canada)
2.4 ~ 2.4835 GHz (ETSI, Japan)
2.412 ~ 2.462 GHz (Taiwan)

802.11b:
2.4 ~ 2.4835 GHz (US, Canada)
2.4 ~ 2.4835 GHz (ETSI)
2.4 ~ 2.497 GHz (Japan)
2.412 ~ 2.462 GHz (Taiwan)

Data Rate

802.11b: 1, 2, 5.5, 11 Mbps per channel
802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps per channel
802.11n: 27, 54, 81, 108, 162, 216, 243, 270, 300 Mbps per channel (40MHz)

Operating Channels

802.11b/g and 802.11n (20MHz):
11 channels

802.11n (40MHz):
7 channels

Modulation Type

802.11b/g/n: DSSS, OFDM, OFDM-MIMO

AC Power Adapter

Input: 100 or 240 VAC, 50-60 Hz
Output: 12V/1.5A

LED Indicators

POWER, LAN (Ethernet Link/Activity), WAN, (Ethernet Link/Activity), WLAN (Wireless Link/Activity), WPS (WPS in progress), USB (3G Wireless Link/Activity)

Network Management

Web-browser

Temperature

Operating: 0 to 40 °C (32 to 104 °F)
Storage: -20 to 70 °C (32 to 158 °F)

Humidity

15% to 95% (non-condensing)

Compliances

FCC Part 15B Class B

EN 55022B
EN 55024
EN61000-3-2
EN61000-3-3

Radio Signal Certification

FCC Part 15C 15.247, 15.207 (2.4 GHz)
EN 300 328
EN 301 489-1
EN 301 489-17

Standards

IEEE 802.11b/g
IEEE 802.11n draft v2.0

Physical Size

21.0 x 16.5 x 4.0 cm (8.27 x 6.50 x 1.57 in)

Weight

350 g (12.3 oz)

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Version 2, June 1991

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Glossary

10BASE-T

IEEE 802.3-2005 specification for 10 Mbps Ethernet over two pairs of Category 3 or better UTP cable.

100BASE-TX

IEEE 802.3-2005 specification for 100 Mbps Fast Ethernet over two pairs of Category 5 or better UTP cable.

Access Point

An internetworking device that seamlessly connects wired and wireless networks. Access points attached to a wired network, support the creation of multiple radio cells that enable roaming throughout a facility.

Advanced Encryption Standard (AES)

An encryption algorithm that implements symmetric key cryptography. AES provides very strong encryption using a completely different ciphering algorithm to TKIP and WEP.

Authentication

The process to verify the identity of a client requesting network access. IEEE 802.11 specifies two forms of authentication: open system and shared key.

Backbone

The core infrastructure of a network. The portion of the network that transports information from one central location to another central location where it is unloaded onto a local system.

Beacon

A signal periodically transmitted from the access point that is used to identify the service set, and to maintain contact with wireless clients.

Broadcast Key

Broadcast keys are sent to stations using dynamic keying. Dynamic broadcast key rotation is often used to allow the access point to generate a random group key and periodically update all key-management capable wireless clients.

Dynamic Host Configuration Protocol (DHCP)

Provides a framework for passing configuration information to hosts on a TCP/IP network. DHCP is based on the Bootstrap Protocol (BOOTP), adding the capability of automatic allocation of reusable network addresses and additional configuration options.

Encryption

Data passing between the access point and clients can use encryption to protect from interception and evesdropping.

Ethernet

A popular local area data communications network, which accepts transmission from computers and terminals.

File Transfer Protocol (FTP)

A TCP/IP protocol used for file transfer.

Hypertext Transfer Protocol (HTTP)

HTTP is a standard used to transmit and receive all data over the World Wide Web.

IEEE 802.11b

A wireless standard that supports wireless communications in the 2.4 GHz band using Direct Sequence Spread Spectrum (DSSS). The standard provides for data rates of 1, 2, 5.5, and 11 Mbps.

IEEE 802.11g

A wireless standard that supports wireless communications in the 2.4 GHz band using Orthogonal Frequency Division Multiplexing (OFDM). The standard provides for data rates of 6, 9, 11, 12, 18, 24, 36, 48, 54 Mbps. IEEE 802.11g is also backward compatible with IEEE 802.11b.

IEEE 802.11n

A wireless standard that supports wireless communications in the 2.4 GHz band using Orthogonal Frequency Division Multiplexing (OFDM). The standard provides for data rates of 27, 54, 81, 108, 162, 216, 243, 270, 300 Mbps. IEEE 802.11n is also backward compatible with IEEE 802.11b/g.

Infrastructure

An integrated wireless and wired LAN is called an infrastructure configuration.

Local Area Network (LAN)

A group of interconnected computer and support devices.

MAC Address

The physical layer address used to uniquely identify network nodes.

Network Time Protocol (NTP)

NTP provides the mechanisms to synchronize time across the network. The time servers operate in a hierarchical-master-slave configuration in order to synchronize local clocks within the subnet and to national time standards via wire or radio.

Open System

A security option which broadcasts a beacon signal including the access point's configured SSID. Wireless clients can read the SSID from the beacon, and automatically reset their SSID to allow immediate connection to the nearest access point.

Orthogonal Frequency Division Multiplexing (ODFM)

OFDM allows multiple users to transmit in an allocated band by dividing the bandwidth into many narrow bandwidth carriers.

Repeater and Bridge

Repeater and bridge can provide an extended link to a remote access point from the wired LAN. Access Point working in this mode could connect to another AP in Access Point mode or Repeater and Bridge mode. Whenever there are two APs having wireless link together (one in Access Point or Repeater and Bridge mode, another using Repeater and Bridge mode), and also have wired link separately, these two APs are also working as “bridging” for the two wired links.

Service Set Identifier (SSID)

An identifier that is attached to packets sent over the wireless LAN and functions as a password for joining a particular radio cell; i.e., Basic Service Set (BSS).

Session Key

Session keys are unique to each client, and are used to authenticate a client connection, and correlate traffic passing between a specific client and the access point.

Shared Key

A shared key can be used to authenticate each client attached to a wireless network. Shared Key authentication must be used along with the 802.11 Wireless Equivalent Privacy algorithm.

Simple Network Time Protocol (SNTP)

SNTP allows a device to set its internal clock based on periodic updates from a Network Time Protocol (NTP) server. Updates can be requested from a specific NTP server, or can be received via broadcasts sent by NTP servers.

Temporal Key Integrity Protocol (TKIP)

A data encryption method designed as a replacement for WEP. TKIP avoids the problems of WEP static keys by dynamically changing data encryption keys.

Trivial File Transfer Protocol (TFTP)

A TCP/IP protocol commonly used for software downloads.

Virtual Access Point (VAP)

Virtual AP technology multiplies the number of Access Points present within the RF footprint of a single physical access device. With Virtual AP technology, WLAN users within the device's footprint can associate with what appears to be different access points and their associated network services. All the services are delivered using a single radio channel, enabling Virtual AP technology to optimize the use of limited WLAN radio spectrum.

Wi-Fi Protected Access

WPA employs 802.1X as its basic framework for user authentication and dynamic key management to provide an enhanced security solution for 802.11 wireless networks.

Wired Equivalent Privacy (WEP)

WEP is based on the use of security keys and the popular RC4 encryption algorithm. Wireless devices without a valid WEP key will be excluded from network traffic.

WPA Pre-shared Key (WPA-PSK)

WPA-PSK can be used for small office networks with a limited number of users that may not need a high level of security. WPA-PSK provides a simple security implementation that uses just a pre-shared password for network access.

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