CERIO Corporation

100GX-N

extreme High Power 11n 150Mbps In Wall PoE Access Point

User's Manual

Table of Contents

1. Introduction

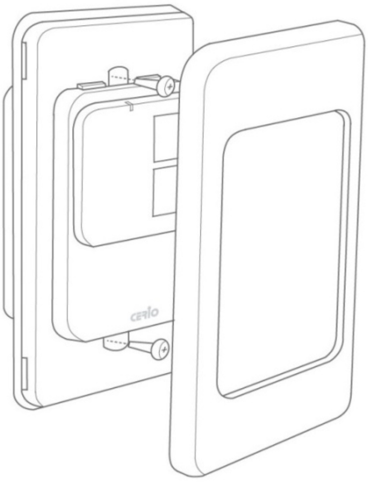
1.1 Overview

The **CERIO 100GX-N eXtreme High Power 11n 150Mbps** In Wall PoE Access Point is an easy-to-install and cost-effective solution for most of indoor wireless deployments, The high class access point perfect for installation including ;hotel , offices, Luxurious house .

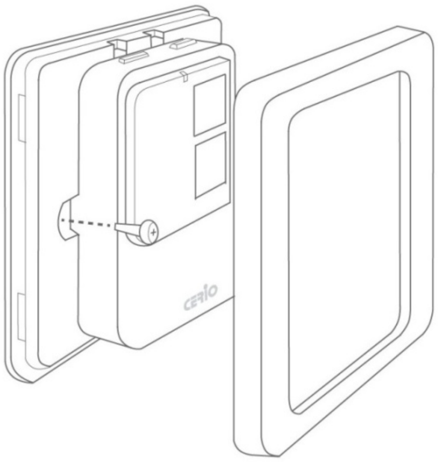
To extend the range and increase the performance of our wireless network. The 100GX-N provide both a RJ-45 wired connection as well as WiFi wireless connection and provide RJ11 Pass-through function , Build in stable 's Cerio Cen-OS 3.0 own software ,a network administrator can centrally manage the 100GX-N via a Web browser an SNMP MIB browser & VLAN tag. With included PoE, power and data are supplied to the unit using CAT5 Ethernet cable. , It use be powered via PoE switch or PoE Injector available.

The Ethernet port support Link-On and Cable Length Power Saving and Link-Down Power Saving also when PoE is not available. The 100GX-N Structure (Form Factor) with bundle US or EU type faceplate set to support In wall Mounting make up and install.

All supports four operational modes, the Pure AP with WDS mode / Pure WDS mode / Client Bridge + Universal Repeater Mode and WISP Repeater +AP mode etc. respectively with built-in remote management features simplify the deployment and reduce cost for continued maintenance of the indoor Access Point .This eXtreme High Power 11n 150Mbps PoE Access Point must be your best choice.



Main Unit with US-Type Faceplate Module
(U.S.A. / Japan Specification)



Main Unit with EU-Type Faceplate Module
(Europe / China Specification)

VLAN Tag / SNMP v2c/v3 and Web Based Management interface

Besides supporting IEEE 802.1Q Tag VLAN priority control ,The users to easily handle network management and maintenance tasks for tthis units . The browser interface permits users to monitor node condition, link quality, traffic flow, and event log of the 100GX-N units.

The web based management interface also allows Network administrators to easily configure , update , and monitor every 100GX-N station . SNMP private MIBs are available for advanced users preferring to manage through their own network manager.

1.2 Package Contents

IW-100GX-N Packages

100GX-N Main Unit	**x1**
RJ-45 UTP Cable	**x1**
In Wall Faceplate Set - 1 (U.S.A Specification)	**x1**
In Wall Faceplate Set - 2 (Europe Specification)	**x1**
Wall Mounting Bracket Set	**x1**
CD Manual	**x1**
Quick Installation Guide	**x1**
Warranty Card	**x1**

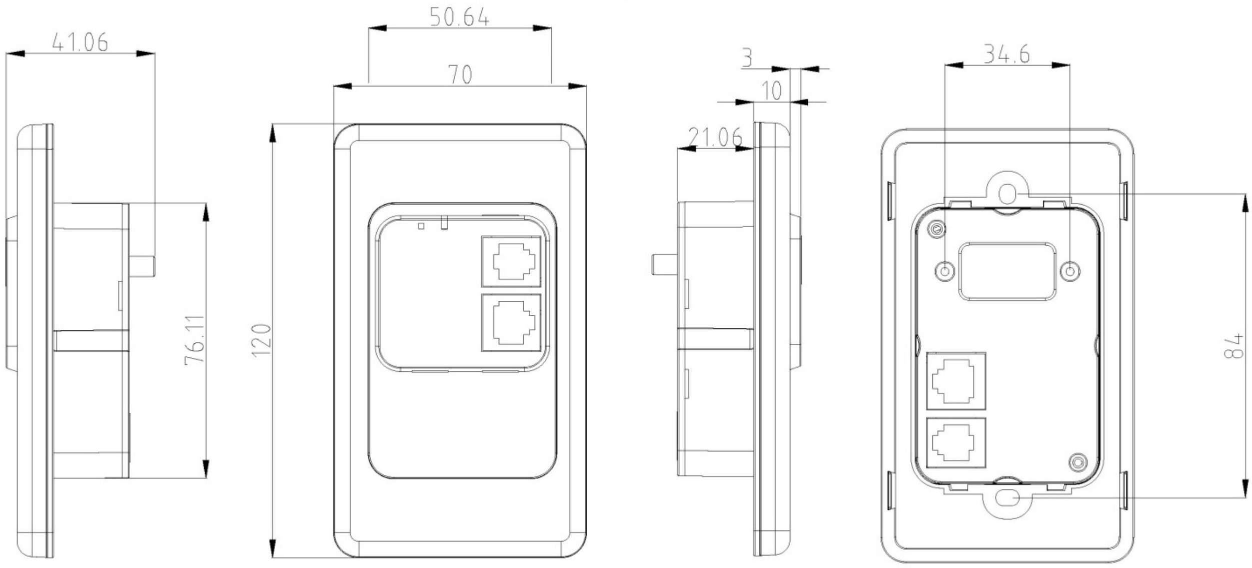
WM-100GX-N Packages

100GX-N Main Unit	**x1**
RJ-45 UTP Cable	**x1**
Power Adapter (Power Supply)	**x1**
PoE Adapter	**x1**
Stand/Mounting Bracket	**x1**
CD Manual	**x1**
Quick Installation Guide	**x1**
Warranty Card	**x1**

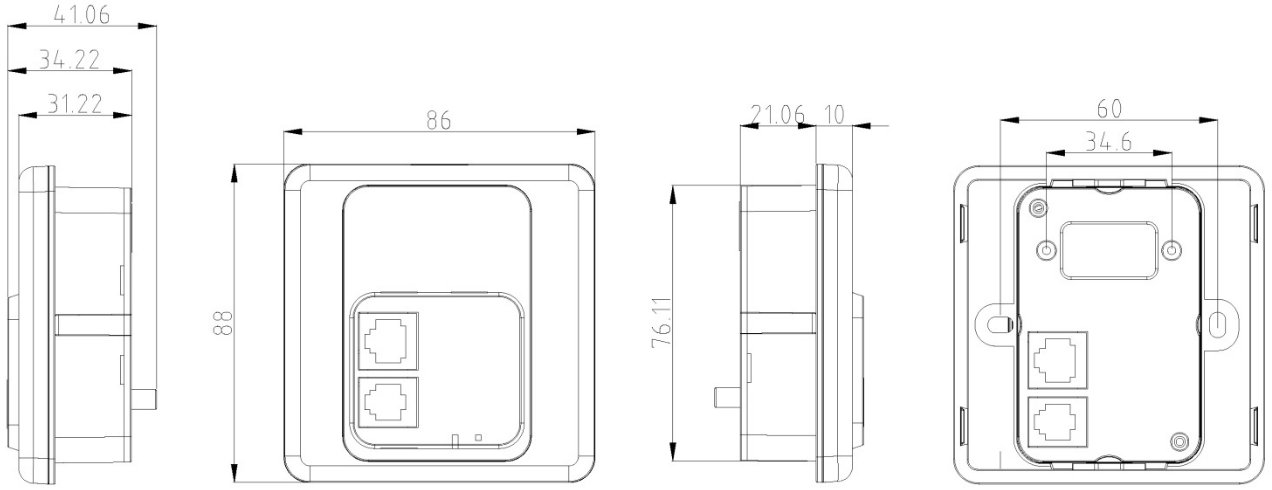
1.3 Size of In wall :

Measure : mm

Main Unit with US-Type Faceplate
For U.S.A. / Japan Specification

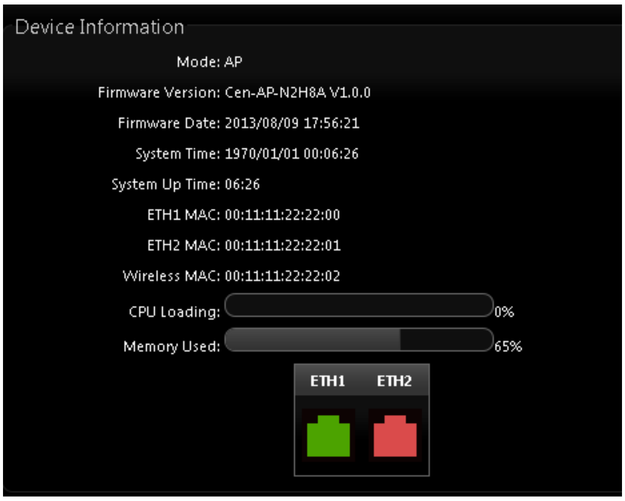


Main Unit with EU-Type Faceplate
For Europe / China Specification



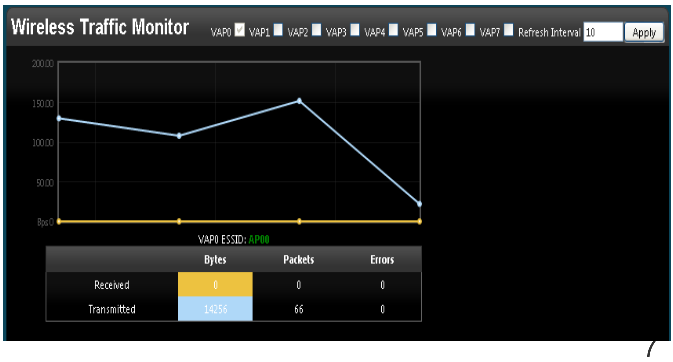
1.4 Features

- Operation Modes : Pure AP+WDS Mode, Pure WDS Mode, Client Bridge Universal Repeater Mode, WISP Repeater + AP Mode
- IEEE 802.11n 1Tx / 1Rx Design, Bandwidth of up to 150Mbps(Tx), 150Mbps(Rx) link rate
- 800mW at 2.4Ghz Output High Power
- Support 8 Multiple-BSSID. And Support IEEE802.11f IAPP
- Maximum Security with 802.1X, WAP, and WPA2
- Integrated IEEE 802.3af Power over Ethernet (PoE).
- Max WDS Link x 8 (Wireless Distribution Service) for Pure WDS Bridge
- Build in Wireless RF Signal Enable and Disable by time scheduling function
- Enable and Disable to Control and scintillation the dazzling LED light
- Support IEEE802.1d Spanning Tree
- Integrated IGMP v1/v2/v3 snooping functions and Support Web management
- IEEE 802.1Q Tag VLAN priority control and SNMP v1/v2c/v3 , SNMP Traps Supported
- Ping Watchdog function support
- Auto Channel Scan and support Scan other AP site survey Single information
- With bundle Stand Bracket support for Desktop & Wall and Ceiling Mountable Form Factor
- Built-in controlled base's Cerio CenOS3.0 software interface allows for communicating with CERIO AM-Series AP Management WLAN Switch or Access Controller of network management servers
- Provide Traffic Monitor and Graphical GUI Status Interface.



Device Information

Mode: AP
Firmware Version: Cen-AP-N2H8A V1.0.0
Firmware Date: 2013/08/09 17:56:21
System Time: 1970/01/01 00:06:26
System Up Time: 06:26
ETH1 MAC: 00:11:11:22:22:00
ETH2 MAC: 00:11:11:22:22:01
Wireless MAC: 00:11:11:22:22:02
CPU Loading: 0%
Memory Used: 65%

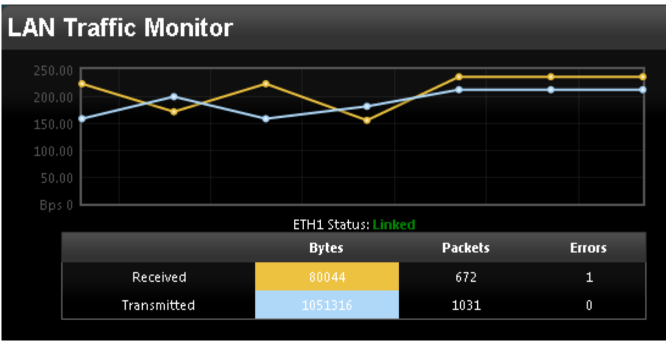


Wireless Traffic Monitor

VAP0 ☑ VAP1 □ VAP2 □ VAP3 □ VAP4 □ VAP5 □ VAP6 □ VAP7 □ Refresh Interval 10 Apply

VAP0 ESSID: AP00

	Bytes	Packets	Errors
Received	0	0	0
Transmitted	14256	66	0



LAN Traffic Monitor

ETH1 Status: Linked

	Bytes	Packets	Errors
Received	80044	672	1
Transmitted	1051316	1031	0

Wireless Feature

- Support IEEE802.11n，HT Tx/Rx Stream selection : 1 for 150Mbps(Tx),and 150Mbps(Rx)
  Transmission power control : Layer 1~9
- Channel selection : Manual or Auto
- IEEE802.11f IAPP : to facilitate faster roaming for the stations among different APs nearby
- No of associated clients per AP : 32
- Support 8 virtual BSSID and associated clients per AP to 32 and the Pure WDS Max. 8
- IEEE 802.11d -Multi country roaming
- IEEE802.1Q VLAN tag support
- IEEE 802.11e WMM QoS ,Diffserv / TOS,IEEE802.1p/COS

Authentication/Encryption (Wireless Security)

- WEP 64/128/152 bit /EAP-TLS + Dynamic WEP , EAP-TTLS + Dynamic WEP, PEAP/MSPEAP + Dynamic WEP
- PA-PSK/TKIP,WPA-802.1x/TKIP, 802.11i WPA2-PSK/CCMP/AES 128/256bit, WPA2 (802.1x /CCMP / AES 128/256bit), No. of registered RADIUS servers : 1
- Setting for TKIP/CCMP/AES 128/256bit (ASCII 63 & HEX 64)key's refreshing period WPA2-PSK/CCMP/AES, WPA2(802.1x /CCMP / AES)
- Hidden SSID broadcast support
- Access Control list (ACL) by MAC and IP Address

Quality of Service

- IEEE802.11e WMM
- IGMP Snooping V3 Support
- DiffServ/TOS , IEEE 802.11p/COS, IEEE 802.1Q Tag VLAN priority control

Management

- On line client status monitoring
- Real time traffic monitor and status reporting supported
- Web-Based management interface, Intuitive Web Management Interface
- Support Firmware Upgrade via Web , Reset to Factory Defaults
- Support SNMP v1/v2c/v3 , MIB II
- SNMP Traps to a List of IP Address
- Support Event log and Administrative Access : HTTP and HTTPS/SSL,SSH and support CLI access via Telnet Management

2. Quick Installation

2.1 Basic Settings

100GX-N supports web-based configuration. Upon the completion of hardware installation, 100GX-N can be configured through a PC/NB by using its web browser such as Internet Explorer 6.0 or later.

- **Default IP Address: 192.168.2.254**
- **Default Subnet Mask: 255.255.255.0**
- **Default Username and Password: root / default**

IP Segment Set-up for Administrator's PC/NB

Set the IP segment of the administrator's computer to be in the same range as 100GX-N for accessing the system. Do not duplicate the IP Address used here with IP Address of 100GX-N or any other device within the network.

Example of Segment: (Windows XP)

Step1 :

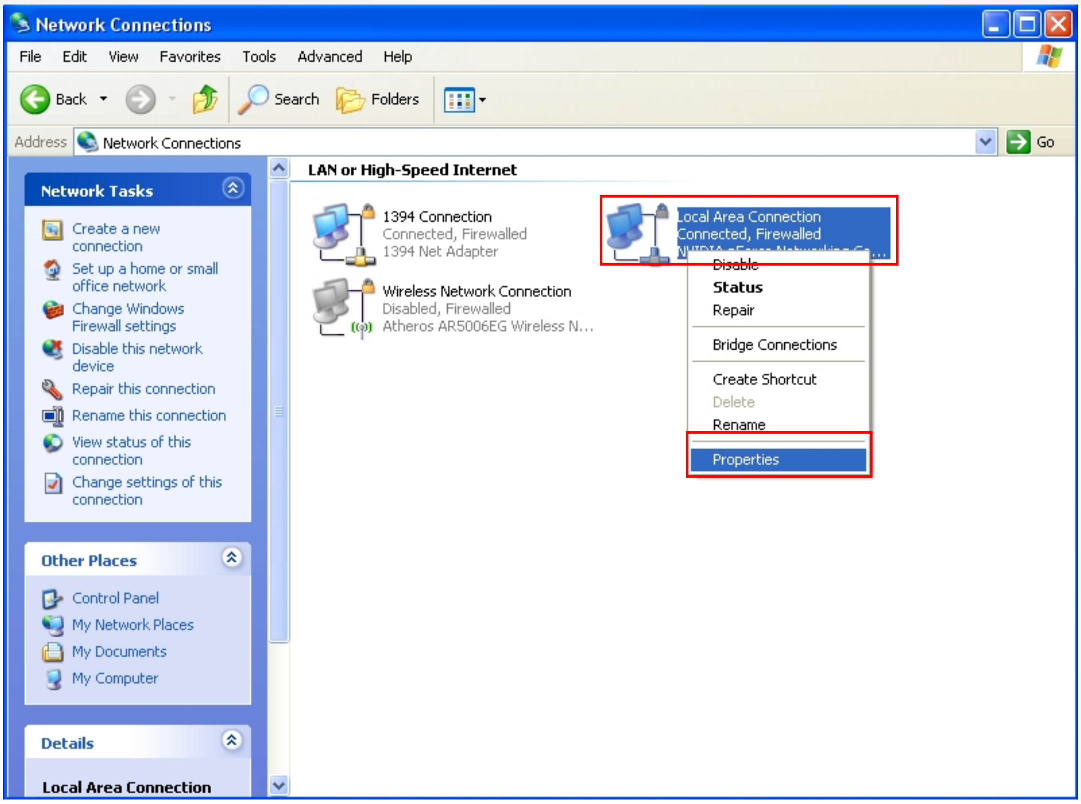
Click **Start -> Settings -> Control Panel,** and then **"Control Panel"** window appears.

Step2 :

Click on **"Network Connections"**, and then **"Network Connections"** window appears.

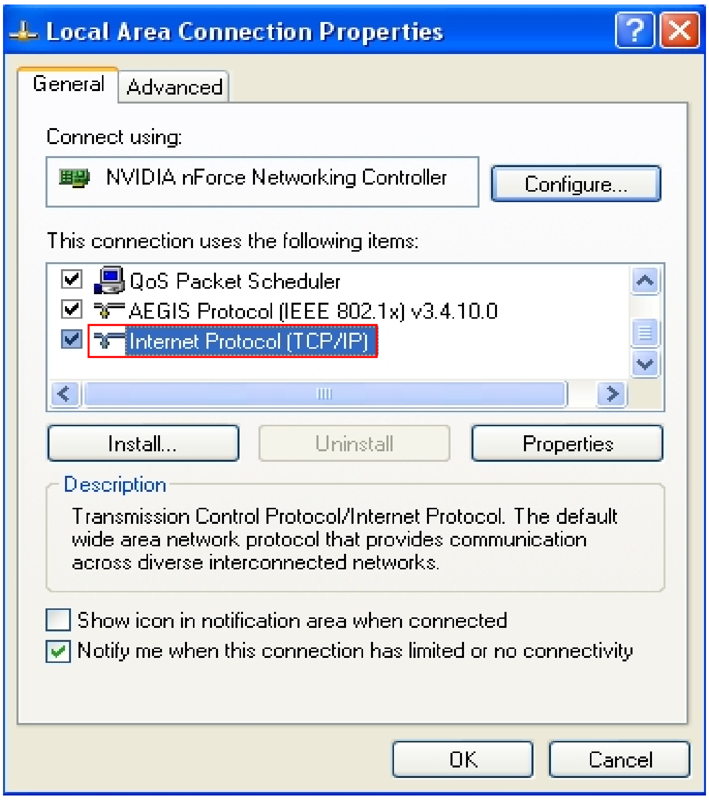
Step3 :

Click right on **"Local Area Connection"**, and select Properties.



Step4 :

In **“Local Area Connection Properties”** window, select **“Internet Protocol (TCP/IP)”** and click on Properties button.



Connect using:
NVIDIA nForce Networking Controller

This connection uses the following items:
☑ QoS Packet Scheduler
☑ AEGIS Protocol (IEEE 802.1x) v3.4.10.0
☑ Internet Protocol (TCP/IP)

Description
Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.

□ Show icon in notification area when connected
☑ Notify me when this connection has limited or no connectivity

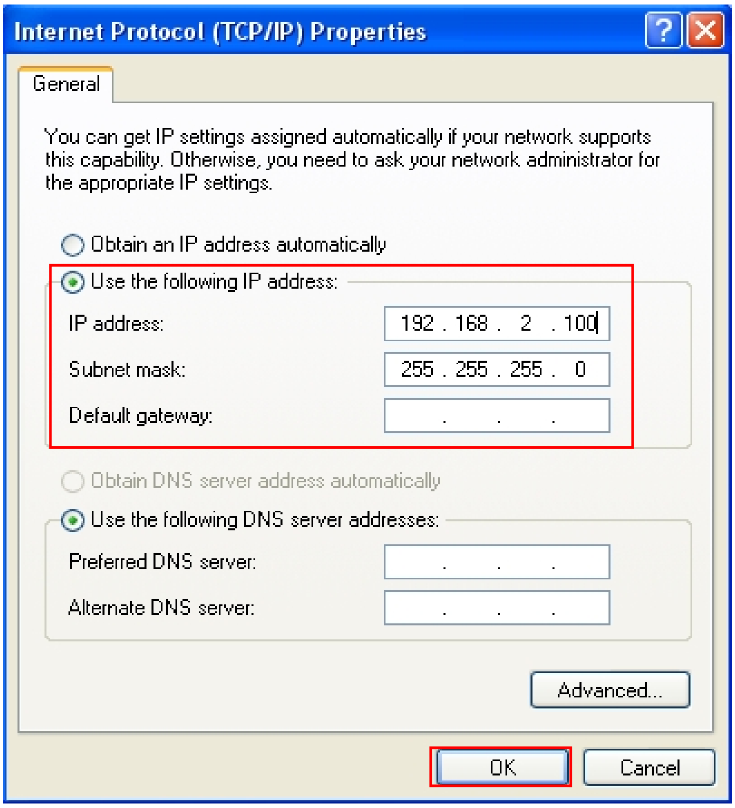
Step5 :

Select **"Use the following IP address"**, and fix in IP Address : 192.168.2.X

ex. The X is any number by 1 to 253

Subnet mask : 255.255.255.0

And Click **"OK"** to complete the fixed computer IP setting



Internet Protocol (TCP/IP) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

○ Obtain an IP address automatically

● Use the following IP address:

IP address: 192 . 168 . 2 . 100

Subnet mask: 255 . 255 . 255 . 0

Default gateway: . . .

○ Obtain DNS server address automatically

● Use the following DNS server addresses:

Preferred DNS server: . . .

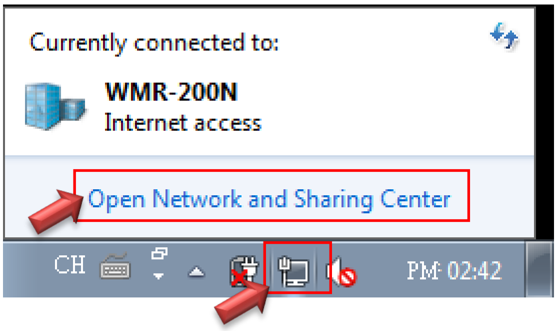
Alternate DNS server: . . .

========END========

Example of Segment: (Windows 7)

Step 1 :

Please click on the computer icon in the bottom right window, and click **"Open Network and Sharing Center"**

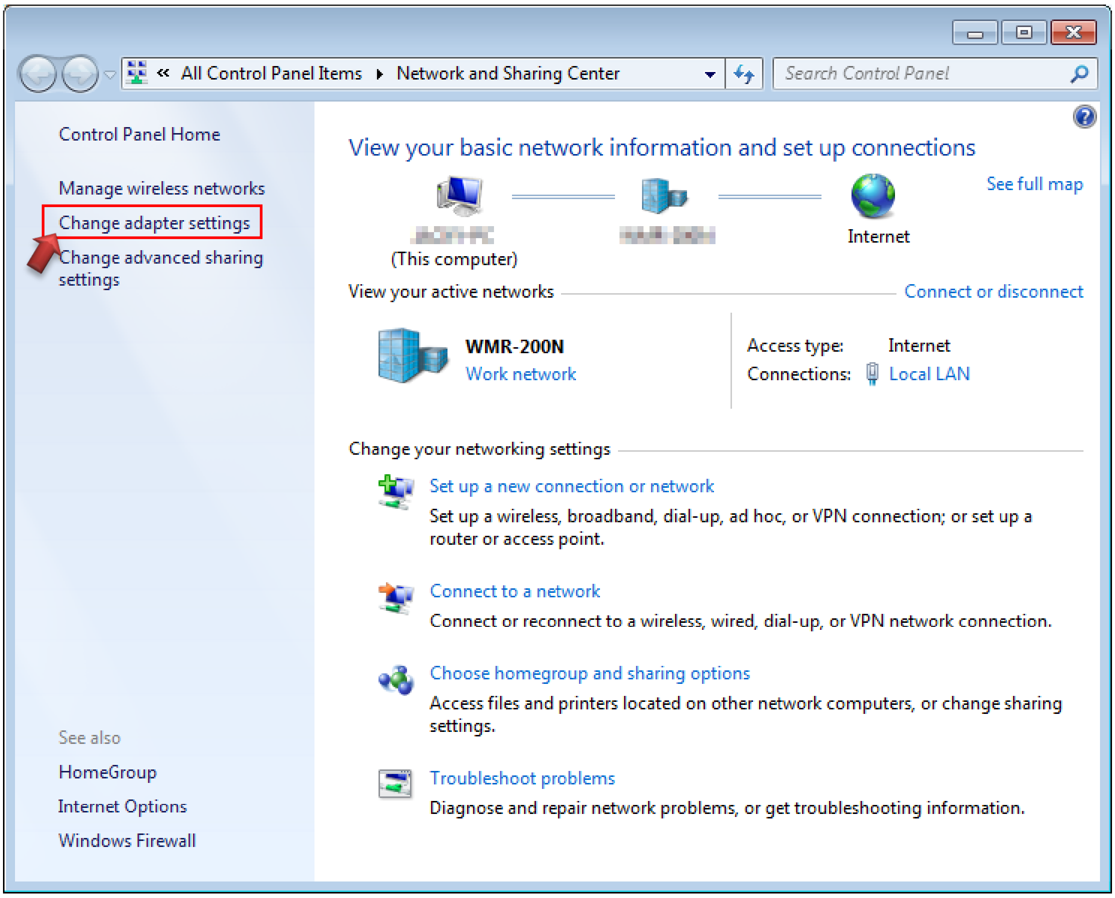


Currently connected to:

WMR-200N
Internet access

Step 2 :

In the Network and Sharing Center page, Please click on the left side of **“Change adapter setting”** button



View your basic network information and set up connections

View your active networks

WMR-200N
Work network

Access type: Internet
Connections: Local LAN

Change your networking settings

Set up a new connection or network
Set up a wireless, broadband, dial-up, ad hoc, or VPN connection; or set up a router or access point.

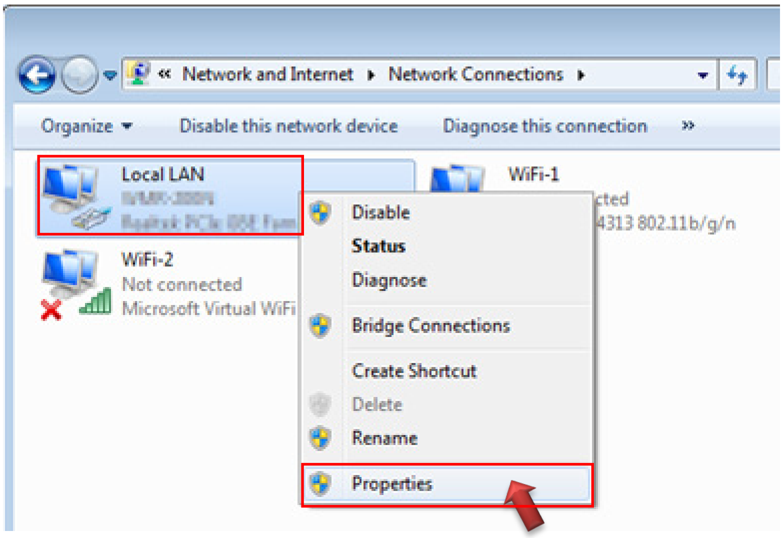
Connect to a network
Connect or reconnect to a wireless, wired, dial-up, or VPN network connection.

Choose homegroup and sharing options
Access files and printers located on other network computers, or change sharing settings.

Troubleshoot problems
Diagnose and repair network problems, or get troubleshooting information.

Step 3 :

In **“Change adapter setting”** Page. Please find Local LAN and Click the right button on the mouse and Click **“Properties”**



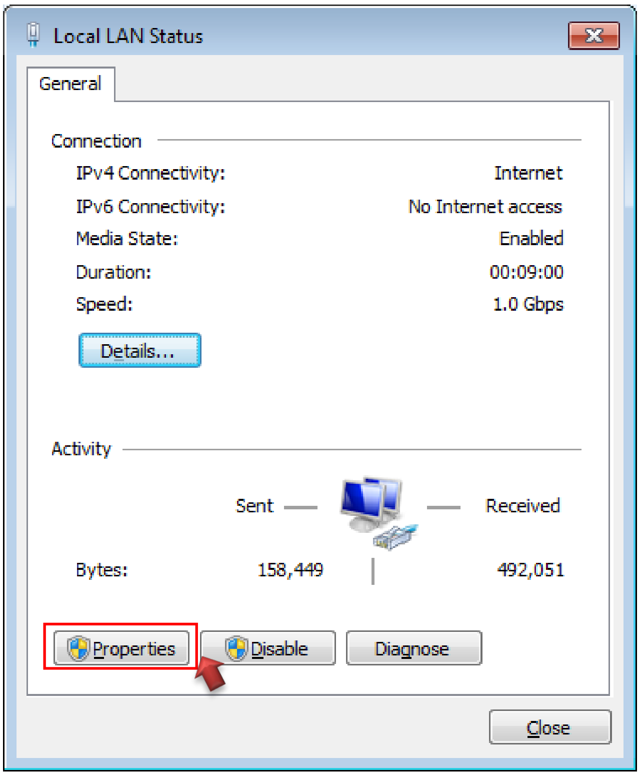
Local LAN
[redacted]
[redacted]

WiFi-1
...cted
...4313 802.11b/g/n

WiFi-2
Not connected
Microsoft Virtual WiFi...

Step 4 :

In **"Properties"** page, please Click **"Properties"** button to TCP/IP setting



Local LAN Status

General

Connection

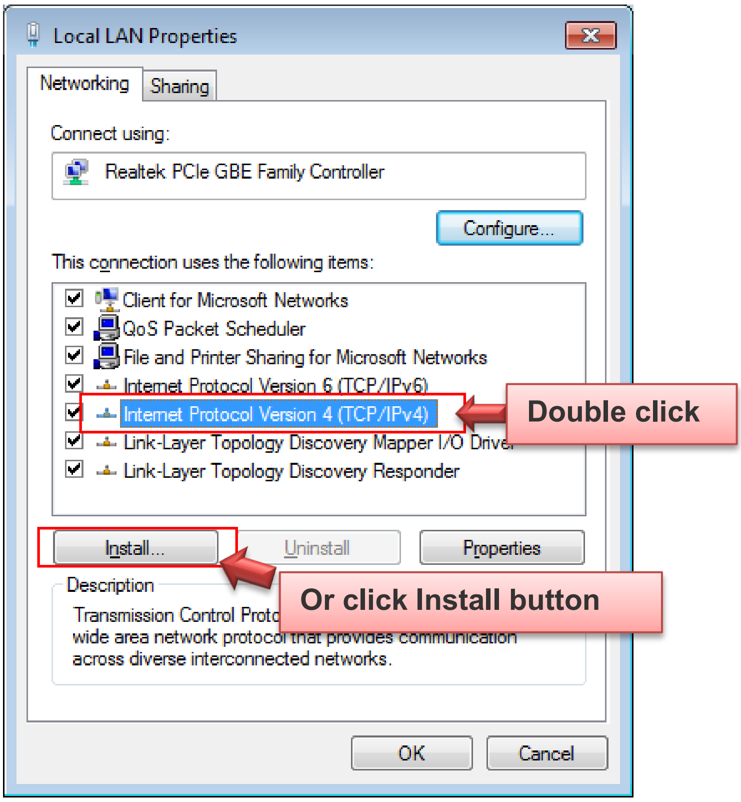
IPv4 Connectivity:	Internet
IPv6 Connectivity:	No Internet access
Media State:	Enabled
Duration:	00:09:00
Speed:	1.0 Gbps

Activity

	Sent	Received
Bytes:	158,449	492,051

Step 5 :

In Properties page to setting IP address, please find **"Internet Protocol Version 4 (TCP/IPv4)"** and double click or click **"Install"** button.



Local LAN Properties

Connect using:

Realtek PCIe GBE Family Controller

This connection uses the following items:

- ☑ Client for Microsoft Networks
- ☑ QoS Packet Scheduler
- ☑ File and Printer Sharing for Microsoft Networks
- ☑ Internet Protocol Version 6 (TCP/IPv6)
- ☑ Internet Protocol Version 4 (TCP/IPv4)
- ☑ Link-Layer Topology Discovery Mapper I/O Driver
- ☑ Link-Layer Topology Discovery Responder

Description

Transmission Control Proto… wide area network protocol that provides communication across diverse interconnected networks.

Double click

Or click Install button

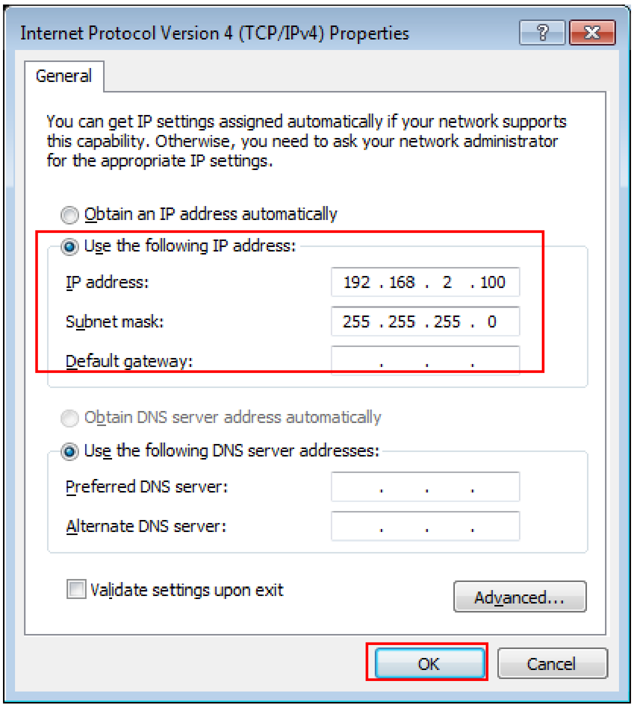
Step 6 :

Select **“Use the following IP address”**, and fix in IP Address : 192.168.2.X

ex. The X is any number by 1 to 253

Subnet mask : 255.255.255.0

And Click **"OK"** to complete the fixed computer IP setting



Internet Protocol Version 4 (TCP/IPv4) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

○ Obtain an IP address automatically

● Use the following IP address:

IP address: 192 . 168 . 2 . 100

Subnet mask: 255 . 255 . 255 . 0

Default gateway: . . .

○ Obtain DNS server address automatically

● Use the following DNS server addresses:

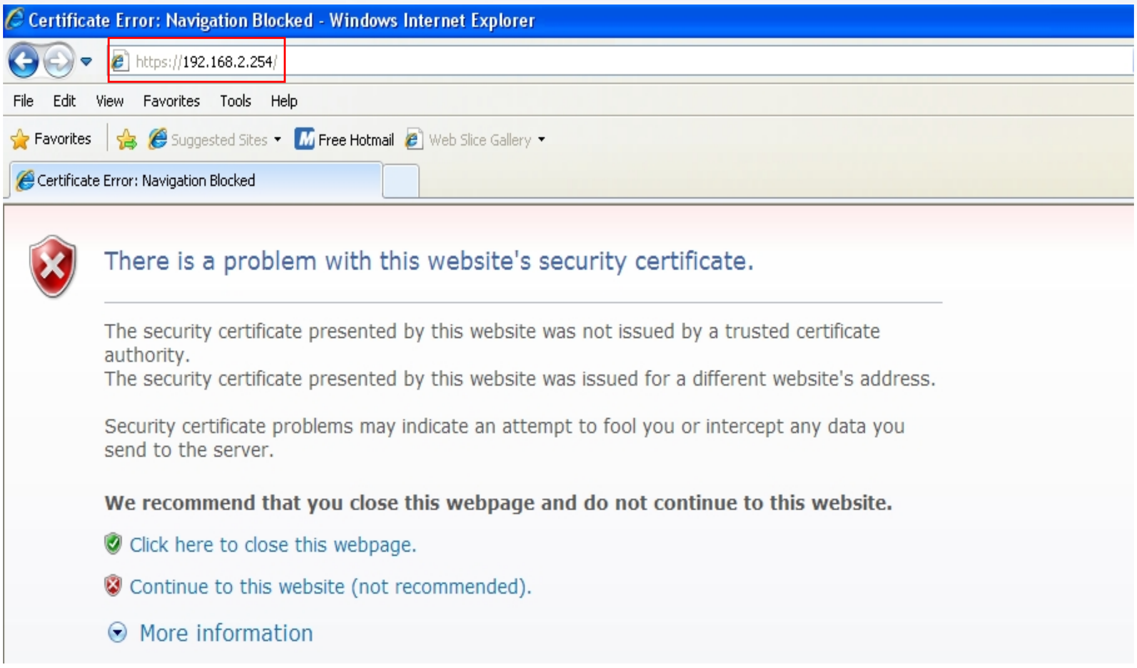
Preferred DNS server: . . .

Alternate DNS server: . . .

□ Validate settings upon exit

Open Web Browser

Without a valid certificate, users may encounter the following problem in IE7 when they try to access system's WMI (https://192.168.2.254). There will be a “Certificate Error”, because the browser treats system as an illegal website.


Certificate Error: Navigation Blocked - Windows Internet Explorer
https://192.168.2.254/
File Edit View Favorites Tools Help
Favorites
Suggested Sites
Free Hotmail
Web Slice Gallery
Certificate Error: Navigation Blocked

There is a problem with this website's security certificate.

The security certificate presented by this website was not issued by a trusted certificate authority.
The security certificate presented by this website was issued for a different website's address.

Security certificate problems may indicate an attempt to fool you or intercept any data you send to the server.

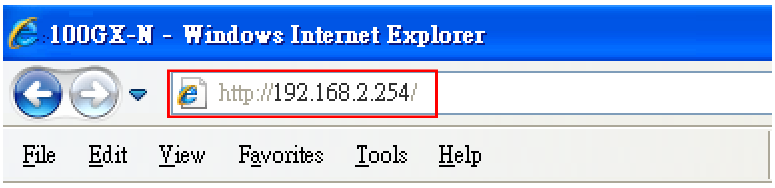
We recommend that you close this webpage and do not continue to this website.

Click here to close this webpage.

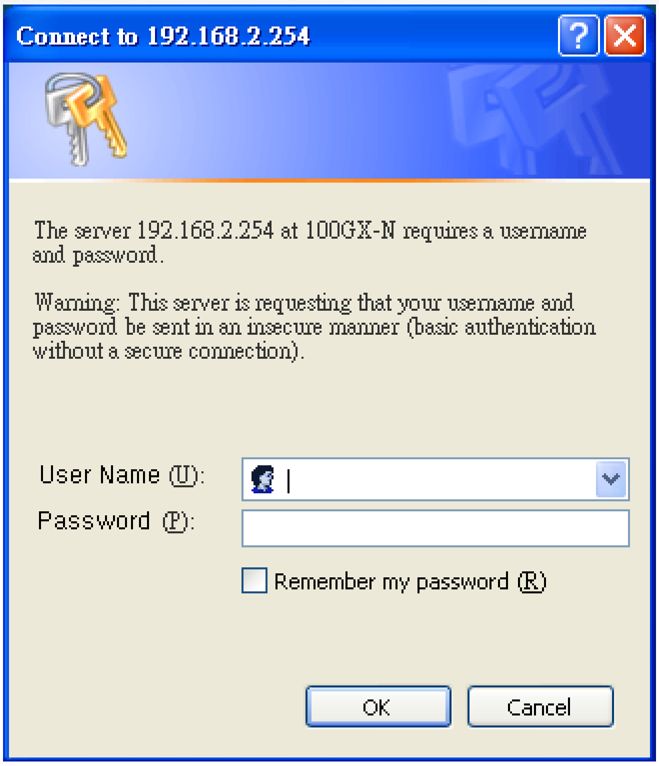
Continue to this website (not recommended).

More information

Click **"Continue to this website"** to access the system's WMI. The system's Overview page will appear.
Launch as web browser to access the web management interface of system by entering the default IP Address, http://192.168.2.254, in the URL field, and then press Enter. Browser will pop up "login" page. Please key in username and password into the system on 100GX-N.


100GX-N - Windows Internet Explorer
http://192.168.2.254/
File Edit View Favorites Tools Help

The system manager Login Page then appears.
Enter **"root"** as User name and **"default"** as Password, and then click OK to login to the system.



Connect to 192.168.2.254

The server 192.168.2.254 at 100GX-N requires a username and password.

Warning: This server is requesting that your username and password be sent in an insecure manner (basic authentication without a secure connection).

User Name (U):

Password (P):

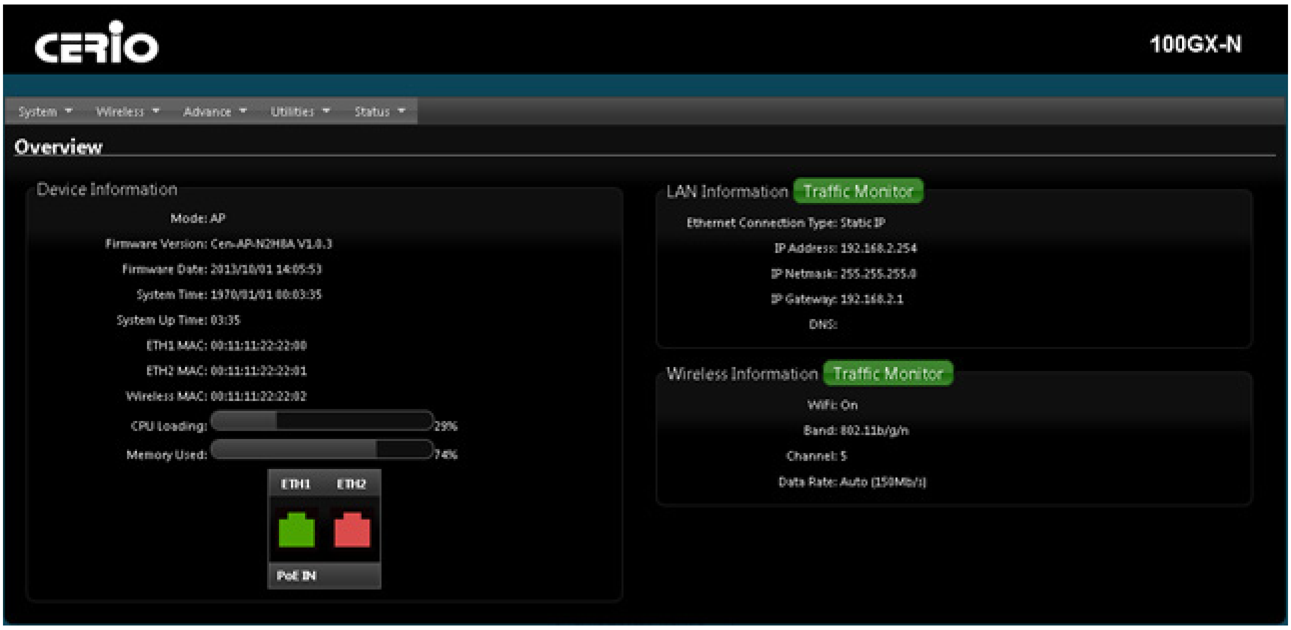
□ Remember my password (R)

The 100GX-N system login default As follows

User Name : **root**

Password : **default**

The 100GX-N System screen



Overview

Device Information

Mode: AP
Firmware Version: Cen-AP-N2H8A V1.0.3
Firmware Date: 2013/10/01 14:05:53
System Time: 1970/01/01 00:03:35
System Up Time: 03:35
ETH1 MAC: 00:11:11:22:22:00
ETH2 MAC: 00:11:11:22:22:01
Wireless MAC: 00:11:11:22:22:02
CPU Loading: 29%
Memory Used: 74%

LAN Information

Ethernet Connection Type: Static IP
IP Address: 192.168.2.254
IP Netmask: 255.255.255.0
IP Gateway: 192.168.2.1
DNS:

Wireless Information

WiFi: On
Band: 802.11b/g/n
Channel: 5
Data Rate: Auto (150Mb/s)

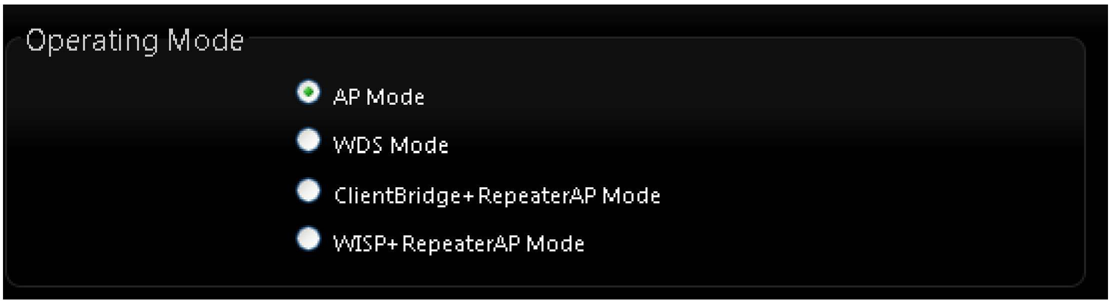
2.2 Wizard Setup

The setup wizard is designed to be an 'easy to use' utility that allows quick modification of the **100GX-N** UI Web-based GUI interface settings. The wizard should take no longer than 5 minutes to use. Please be aware that the wizard doesn't give full access to all the setup options in **100GX-N** Indoor AP.

This is purely because the wizard has been designed for a quick and easy setup aimed at all users. More advanced users can configure the remaining settings using the advanced settings options from the setup menu.

- **Chose Your Operating Mode**

The **100GX-N** supports four operational modes, AP/AP+WDS mode, WDS mode, Client Bridge + Repeater AP mode, WISP and WISP + Repeater AP mode etc. respectively with built-in remote management features. The default is AP mode.

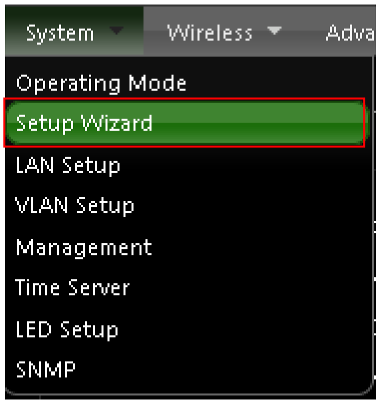


Operating Mode

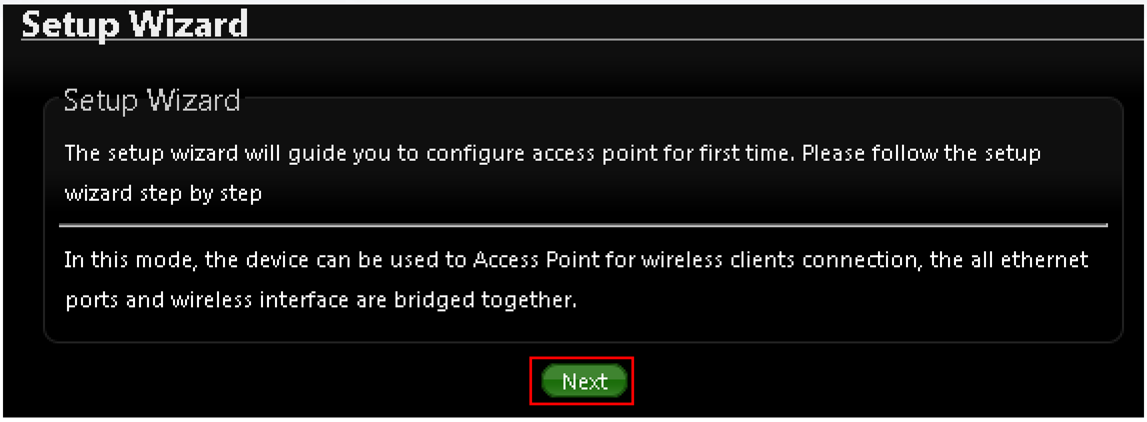
● AP Mode
○ WDS Mode
○ ClientBridge+RepeaterAP Mode
○ WISP+RepeaterAP Mode

- **Wizard Guide**

Please click on **System → Setup Wizard → Next** and follow the below guide.



- **Follow And Guide Continuing Setting**



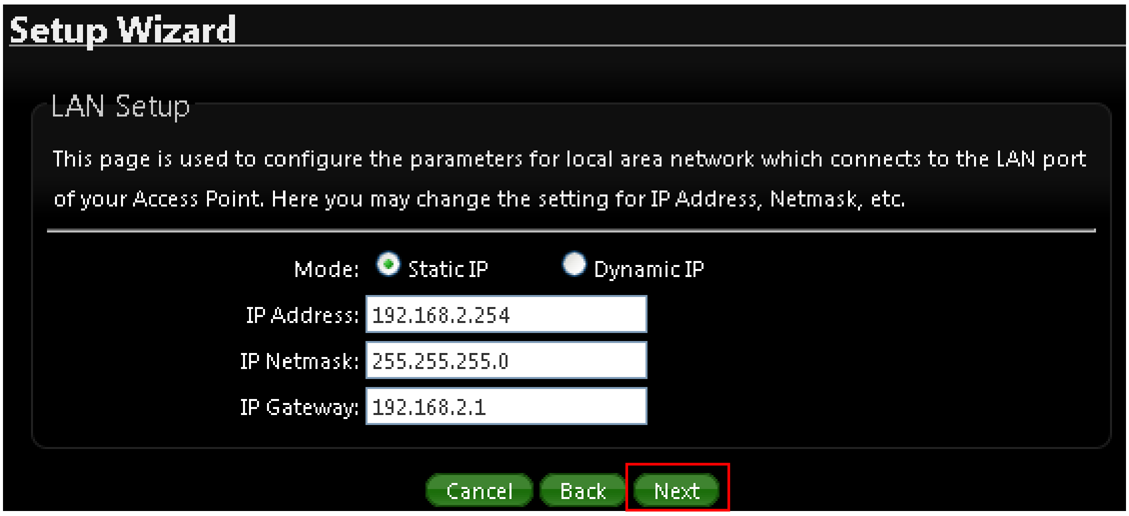
Setup Wizard

Setup Wizard

The setup wizard will guide you to configure access point for first time. Please follow the setup wizard step by step

In this mode, the device can be used to Access Point for wireless clients connection, the all ethernet ports and wireless interface are bridged together.

- **LAN setup →** Here are the instructions for setup your 100GX-N local LAN IP address and netmask. If you don't want change the default 100GX-N IP 192.168.2.254 address, please keep the default and go next setup.



Setup Wizard

LAN Setup

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

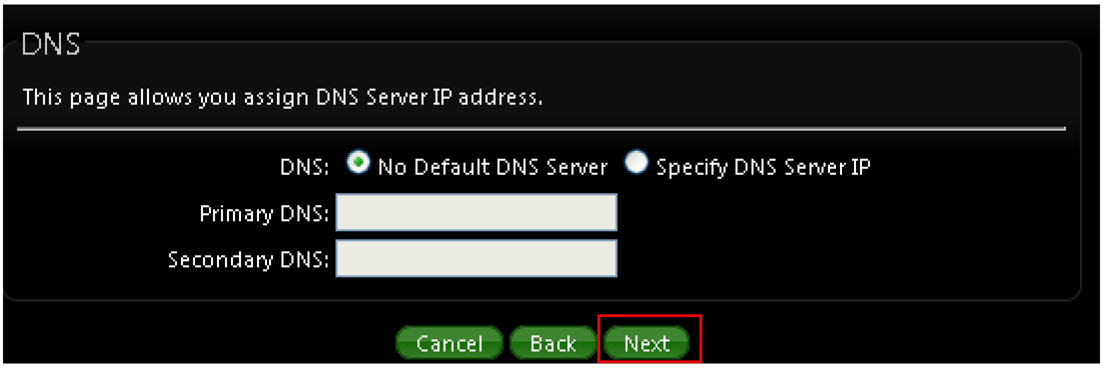
Mode: ● Static IP ○ Dynamic IP

IP Address: 192.168.2.254

IP Netmask: 255.255.255.0

IP Gateway: 192.168.2.1

- **DNS →** If you don't know for your ISP correct DNS IP address, Please click **"No default DNS server"** to follow your ISP DNS related IP address.



DNS

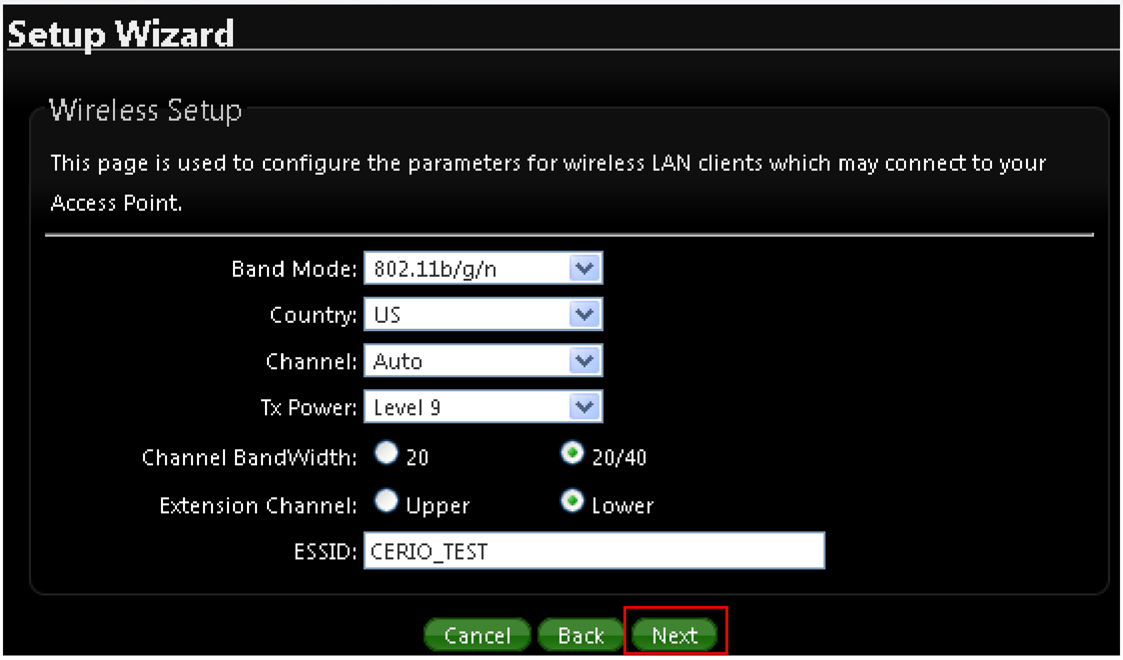
This page allows you assign DNS Server IP address.

DNS: ● No Default DNS Server ○ Specify DNS Server IP

Primary DNS:

Secondary DNS:

- **Wireless Setup →** If you are not sure which setting to choose, Please then the default setting to best WiFi smart channel judgment for auto channel, and adjust the output power to level9 (100%) Extended service set ID indicated the SSID which the clients used to connect to the access point ESSID.



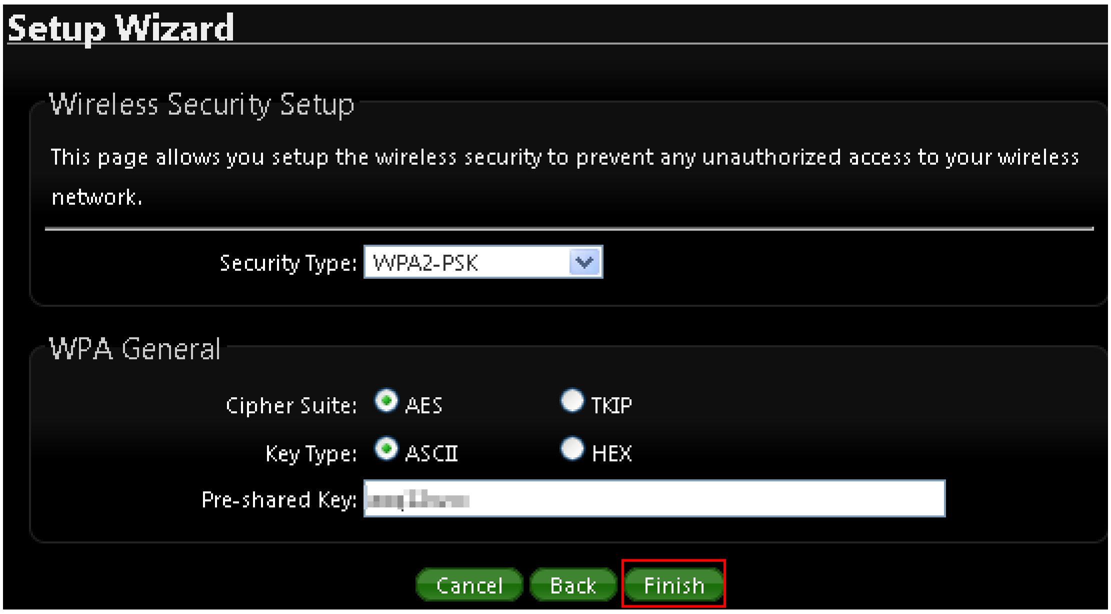
Setup Wizard

Wireless Setup

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

Band Mode:	802.11b/g/n
Country:	US
Channel:	Auto
Tx Power:	Level 9
Channel BandWidth:	○ 20 ● 20/40
Extension Channel:	○ Upper ● Lower
ESSID:	CERIO_TEST

- **Wireless Security setup →** Suggested setting that you use wireless encryption authentication type for security Type : to **"WPA2-PSK"** the cipher suite : to **"AES"**, Key Type : to **"ASCII"** for 11n high speed mode.



Setup Wizard

Wireless Security Setup

This page allows you setup the wireless security to prevent any unauthorized access to your wireless network.

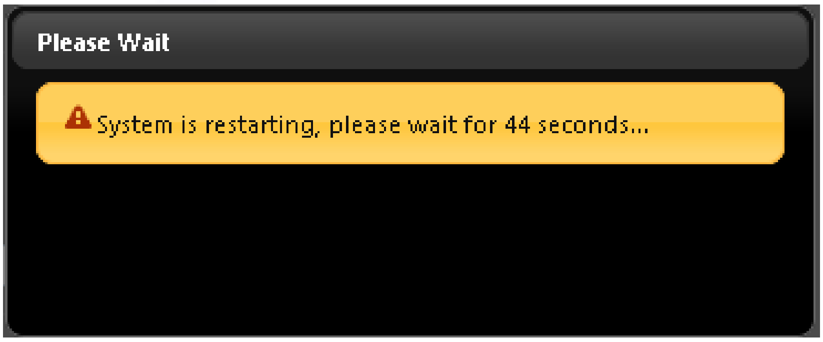
Security Type:	WPA2-PSK

WPA General

Cipher Suite:	● AES ○ TKIP
Key Type:	● ASCII ○ HEX
Pre-shared Key:	[redacted]

- **Pre-shared Key :** Enter the information for pre-shared key; Pre-shared key can be either entered as a 256-bit secret in 64 HEX digits format or 8 to 63 ASCII characters. The Pre-Shared key sample as "xxxxxxxx" wireless encryption key for wireless access.

- **Finishing Wizard**



Please Wait

System is restarting, please wait for 44 seconds...

Click **Finish** button to save your setting. please wait till completion of the reboot process.

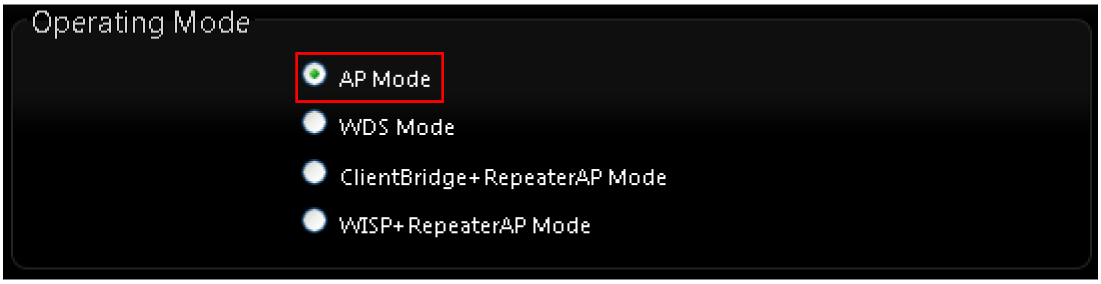
3. AP Mode Configuration

When AP mode is chosen, the system can be configured as an Access Point. This section provides detailed explanation for users to configure in the AP mode with help of illustrations. In the AP mode, functions listed in the table below are also available from the Web-based GUI interface.

3.1 Chose Your Operating Mode (AP Mode)

100GX-N Operating mode support four operational modes, AP mode, the WDS mode, the CPE mode and the Client Bridge + Repeater AP mode, respectively with built-in remote management features.

The system administrator can set the desired mode via this page, and then configure the system according to their deployment needs, Please click on **System -> Operating Mode** and follow the below setting.



Operating Mode

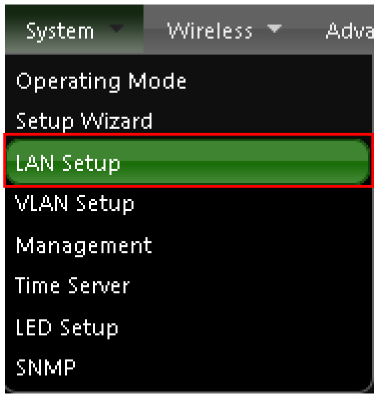
● AP Mode
○ WDS Mode
○ ClientBridge+RepeaterAP Mode
○ WISP+RepeaterAP Mode

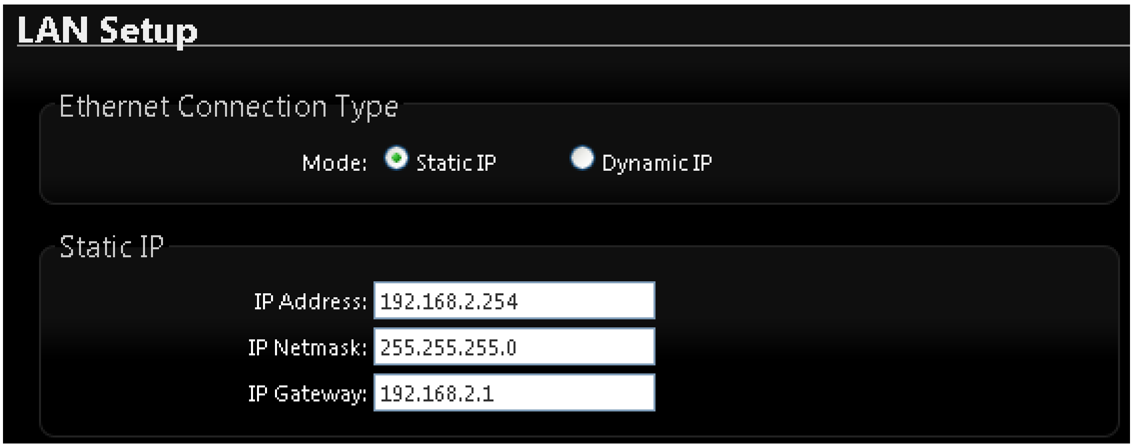
3.2 External Network Connection

Network Requirement
Normally, **100GX-N** connects to a wired LAN and provides a wireless connection point to associate with wireless client. Then, Wireless clients could access to LAN or Internet by associating themselves with **100GX-N** set in AP mode.

3.3 Configure 100GX-N LAN IP Address

Here are the instructions to setup the local IP Address and Netmask
Please click on **System -> LAN** and follow the below setting.





LAN Setup

Ethernet Connection Type

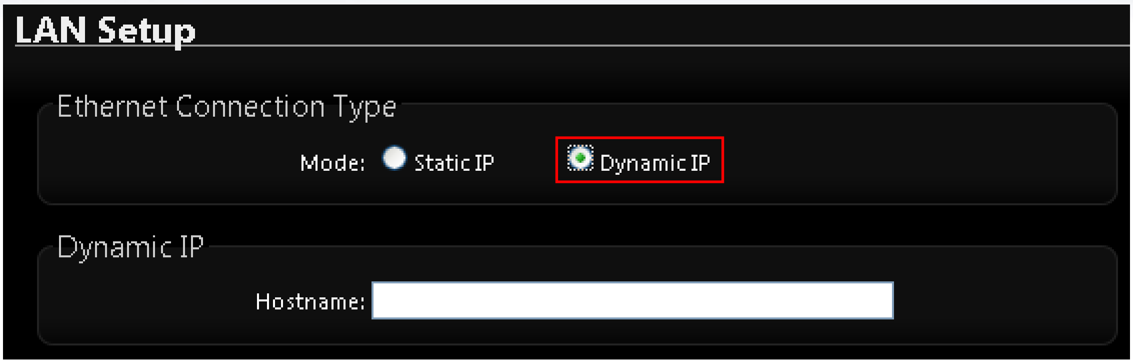
Mode: ● Static IP ○ Dynamic IP

Static IP

IP Address: 192.168.2.254
IP Netmask: 255.255.255.0
IP Gateway: 192.168.2.1

Ethernet Connection Type
Check either **"Static IP"** or **"Dynamic IP"** button as desired to set up the system IP of LAN port.

- **Static IP:** The administrator can manually setup the LAN IP address when static IP is available/ preferred.
  - **IP Address :** The IP address of the LAN port; default IP address is 192.168.2.254
  - **IP Netmask :** The Subnet mask of the LAN port; default Netmask is 255.255.255.0
  - **IP Gateway :** The default gateway of the LAN port
- **Dynamic IP:** This configuration type is applicable when the **100GX-N** is connected to a network with the presence of a DHCP server; all related IP information will be provided by the DHCP server automatically.



LAN Setup

Ethernet Connection Type

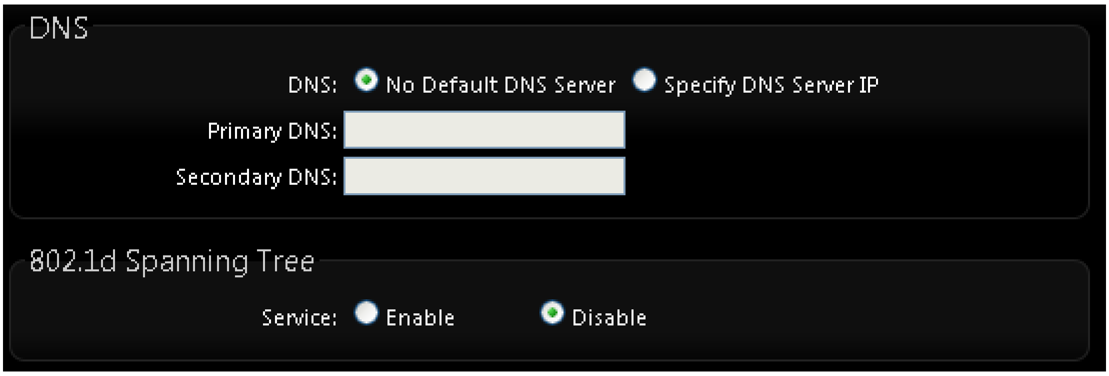
Mode: ○ Static IP ● Dynamic IP

Dynamic IP

Hostname:

- **Hostname :** The Hostname of the LAN port.

➢ **DNS:** Check either **"No Default DNS Server"** or **"Specify DNS Server IP"** button as desired to set up the system DNS.



DNS

DNS: ● No Default DNS Server ○ Specify DNS Server IP

Primary DNS:

Secondary DNS:

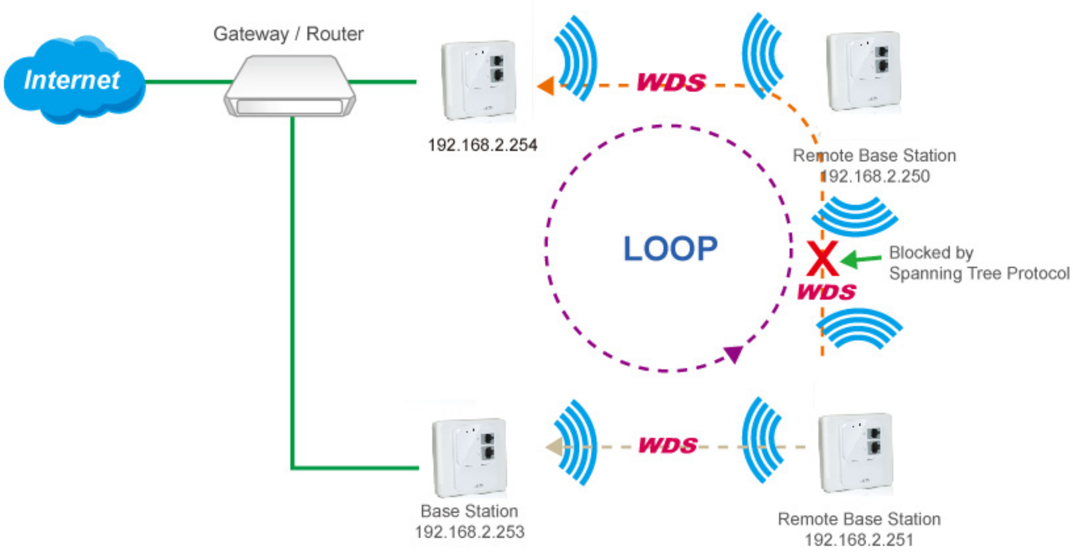
802.1d Spanning Tree

Service: ○ Enable ● Disable

- **Primary :** The IP address of the primary DNS server.
- **Secondary :** The IP address of the secondary DNS server.

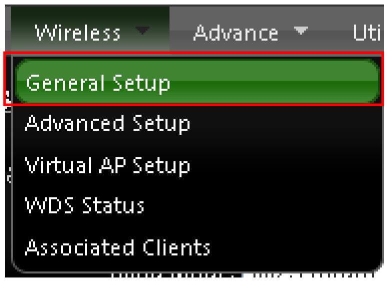
➢ **802.1d Spanning Tree**

The spanning tree network protocol provides a loop free topology for a bridged LAN between LAN interface and 8 WDS interfaces from wds0 to wds7. The Spanning Tree Protocol, which is also referred to as STP, is defined in the IEEE Standard 802.1d

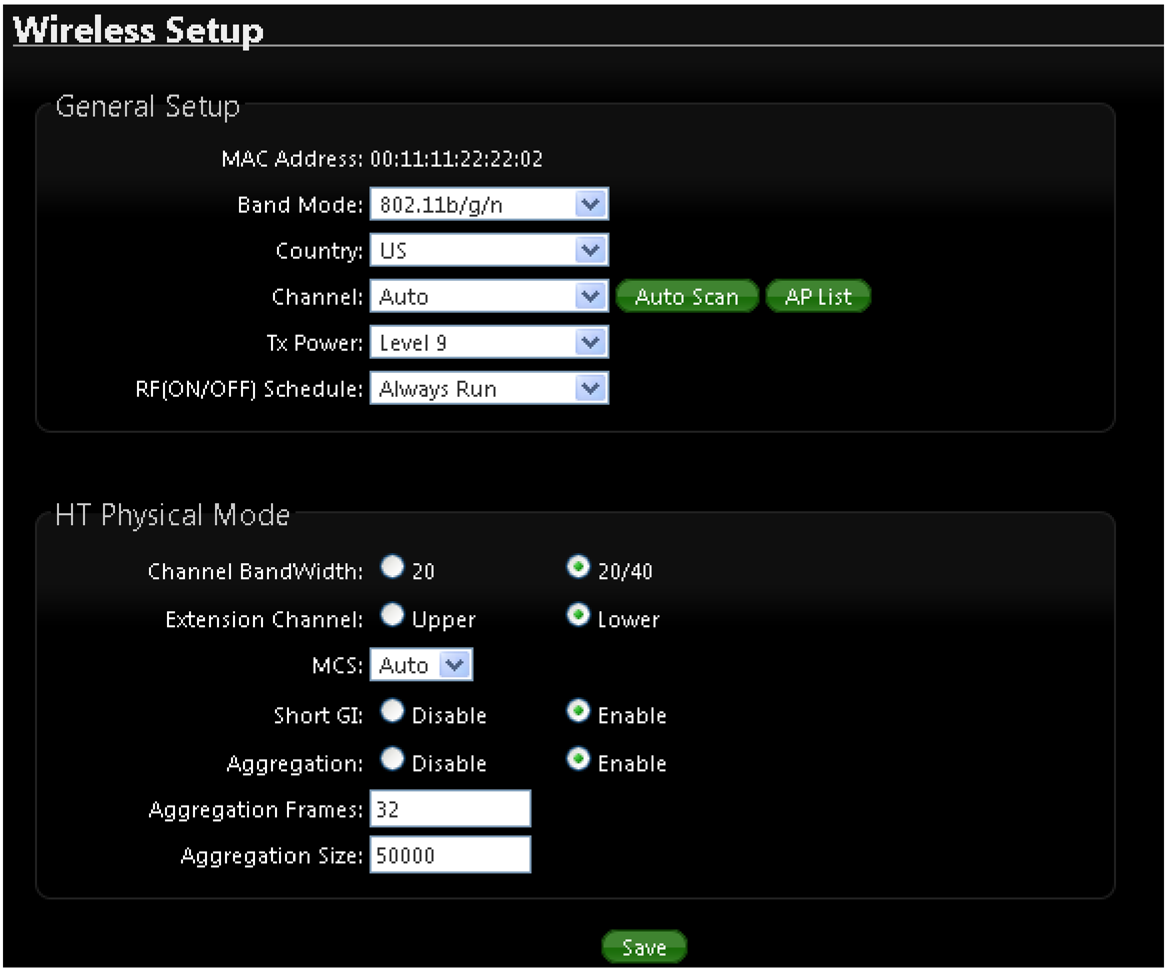


3.4 Wireless General Setup

The administrator can change the data transmission, channel and output power settings for the system. Please click on **Wireless -> General** Setup and follow the below setting.



General Setup



Wireless Setup

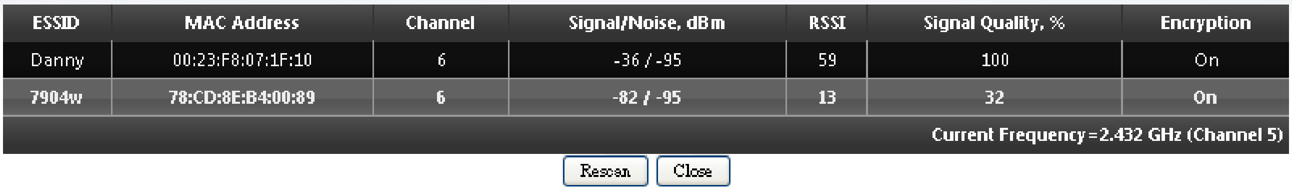
General Setup

MAC Address: 00:11:11:22:22:02
Band Mode: 802.11b/g/n
Country: US
Channel: Auto
Tx Power: Level 9
RF(ON/OFF) Schedule: Always Run

HT Physical Mode

Channel BandWidth: ○ 20 ● 20/40
Extension Channel: ○ Upper ● Lower
MCS: Auto
Short GI: ○ Disable ● Enable
Aggregation: ○ Disable ● Enable
Aggregation Frames: 32
Aggregation Size: 50000

- **MAC Address :** The MAC address of the Wireless interface is displayed here.
- **Band Mode :** Select an appropriate wireless band; bands available are 801.11 b/g/n mixed mode
- **Country :** a region, the 100GX-N support region for US,ETSI and Japan
- **Channel :** Choosing the best WiFi channel
  - ✓ Auto Scan : Smart channel judgment, the function can auto choose use best Channe
  - ✓ AP List : the function support search neighborhood AP and print site survey list



ESSID	MAC Address	Channel	Signal/Noise, dBm	RSSI	Signal Quality, %	Encryption
Danny	00:23:F8:07:1F:10	6	-36 / -95	59	100	On
7904w	78:CD:8E:B4:00:89	6	-82 / -95	13	32	On

Current Frequency=2.432 GHz (Channel 5)

- **TX Power :** You can adjust the output power of the system to get the appropriate coverage for your wireless network. Specify digit numbers between level 1 to level 9 (the unit is %) for your environment. If you are not sure which setting to choose, then keep the default setting level 9 (100%).
- **RF(on/off) schedule :** The 100GX-N can use the schedule control WiFi on or off function.

Please refer 8.7 Time Policy

HT Physical Mode

- **Channel Bandwidth :** The "20/40” MHz option is usually best. The other option is available for special circumstances.
- **Extension Channel :** Only for Channel Bandwidth “40” MHz. Select the desired channel bonding for control.
- **MCS :** This parameter represents transmission rate. By default (Auto) the fastest possible transmission rate will be selected. You have the option of selecting the speed if necessary.
- **Shout GI :** Short Guard Interval, by default, it's “Enable”. it's can increase throughput. However, it can also increase error rate in some installations, due to increased sensitivity to radio-frequency reflections. Select the option that works best for your installation.
- **Aggregation :** By default, it's “Enable”. To “Disable” to deactivated Aggregation.

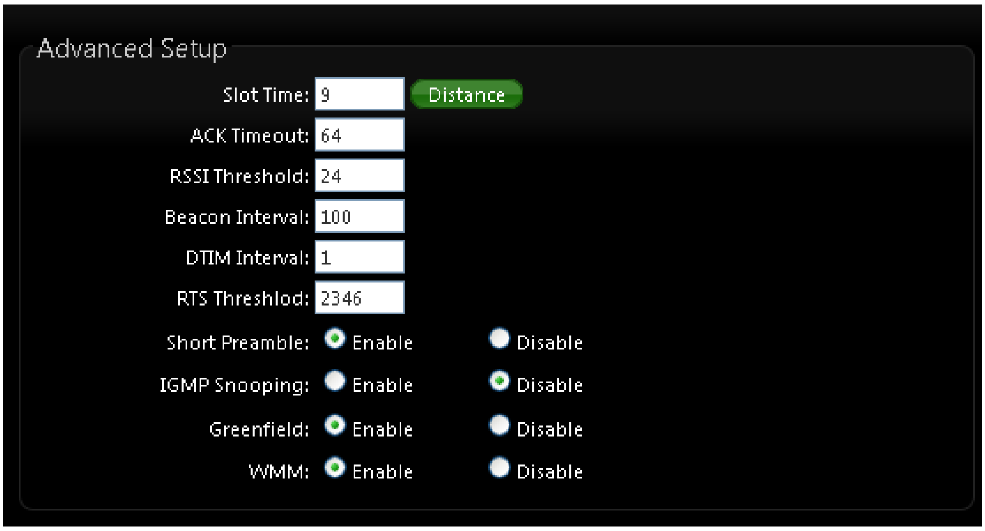
A part of the 802.11n standard (or draft-standard). It allows sending multiple frames per single access to the medium by combining frames together into one larger frame. It creates the larger frame by combining smaller frames with the same physical source and destination end points and traffic class (i.e. QoS) into one large frame with a common MAC header.

- **Aggregation Frames :** The Aggregation Frames is in the range of 2~64, default is 32. It determines the number of frames combined on the new larger frame.
- **Aggregation Size :** The Aggregation Size is in the range of 1024~65535, default is 50000. It determines the size (in Bytes) of the larger frame.

Change these settings as described here and **click Save button** to save your changes. **Click Reboot button to activate your changes.** The items in this page is for AP's RF general settings and will be applied to all VAPs and WDS Link.

3.5 Configure Wireless Advanced Setup

The administrator can change the **Slot Time, ACK Timeout, RTS threshold and fragmentation threshold settings** for the system. Please click on **Wireless -> Advanced** Setup and follow the below setting.



Advanced Setup

Slot Time: 9

ACK Timeout: 64

RSSI Threshold: 24

Beacon Interval: 100

DTIM Interval: 1

RTS Threshlod: 2346

Short Preamble: ● Enable ○ Disable

IGMP Snooping: ○ Enable ● Disable

Greenfield: ● Enable ○ Disable

WMM: ● Enable ○ Disable

- **Slot Time :** Slot time is in the range of 9~1489 and set in unit of microsecond. The default value is 9 microsecond.

  Slot time is the amount of time a device waits after a collision before retransmitting a packet. Reducing the slot time decreases the overall back-off, which increases throughput. Back-off, which is a multiple of the slot time, is the random length of time a station waits before sending a packet on the LAN. For a sender and receiver own right of the channel the shorter slot time help manage shorter wait time to re-transmit from collision because of hidden wireless clients or other causes. When collision sources can be removed sooner and other senders attempting to send are listening the channel(CSMA/CA) the owner of the channel should continue ownership and finish their transmission and release the channel. Then, following ownership of the channel will be sooner for the new pair due to shorter slot time. However, when long duration of existing collision sources and shorter slot time exist the owners might experience subsequent collisions. When adjustment to longer slot time can't improve performance then RTS/CTS could supplement and help improve performance.

- **ACK Timeout :** ACK timeout is in the range of 1~372 and set in unit of microsecond. The default value is 64 microsecond.

  All data transmission in 802.11b/g request an "Acknowledgement" (ACK) send by receiving radio. The transmitter will resend the original packet if correspondent ACK failed to arrive within specific time interval, also refer to as "ACK Timeout".

  ACK Timeout is adjustable due to the fact that distance between two radio links may vary in different deployment. ACK Timeout makes significant influence in performance of long distance radio link. If ACK Timeout is set too short, transmitter will start to "Resend" packet before ACK is received, and throughput become low due to excessively high re-transmission.

ACK Timeout is best determined by distance between the radios, data rate of average environment. The Timeout value is calculated based on round-trip time of packet with a little tolerance, So, if experiencing re-transmissions or poor performance the ACK Timeout could be made longer to accommodate.

Notice	Slot Time and ACK Timeout settings are for long distance links. It is important to tweak settings to achieve the optimal result based on requirement.

- **Beacon Interval :** Beacon Interval is in the range of 40~3500 and set in unit of millisecond. The default value is 100 msec.

Access Point (AP) in IEEE 802.11 will send out a special approximated 50-byte frame, called “Beacon”. Beacon is broadcast to all the stations, provides the basic information of AP such as SSID, channel, encryption keys, signal strength, time stamp, support data rate.

All the radio stations received beacon recognizes the existence of such AP, and may proceed next actions if the information from AP matches the requirement. Beacon is sent on a periodic basis, the time interval can be adjusted.

By increasing the beacon interval, you can reduce the number of beacons and associated overhead, but that will likely delay the association and roaming process because stations scanning for available access points may miss the beacons. You can decrease the beacon interval, which increases the rate of beacons. This will make the association and roaming process very responsive; however, the network will incur additional overhead and throughput will go down.

- **DTIM Interval :** The DTIM interval is in the range of 1~255. The default is 1.

DTIM is defined as Delivery Traffic Indication Message. It is used to notify the wireless stations, which support power saving mode, when to wake up to receive multicast frame. DTIM is necessary and critical in wireless environment as a mechanism to fulfill power-saving synchronization.

A DTIM interval is a count of the number of beacon frames that must occur before the access point sends the buffered multicast frames. For instance, if DTIM Interval is set to 3, then the Wi-Fi clients will expect to receive a multicast frame after receiving three Beacon frame. The higher DTIM interval will help power saving and possibly decrease wireless throughput in multicast applications.

- **RTS Threshold :** TRTS Threshold is in the range of 1~2347 byte. The default is 2347 byte.

The main purpose of enabling RTS by changing RTS threshold is to reduce possible collisions due to hidden wireless clients. RTS in AP will be enabled automatically if the packet size is larger than the Threshold value. By default, RTS is disabled in a normal environment supports non-jumbo frames.

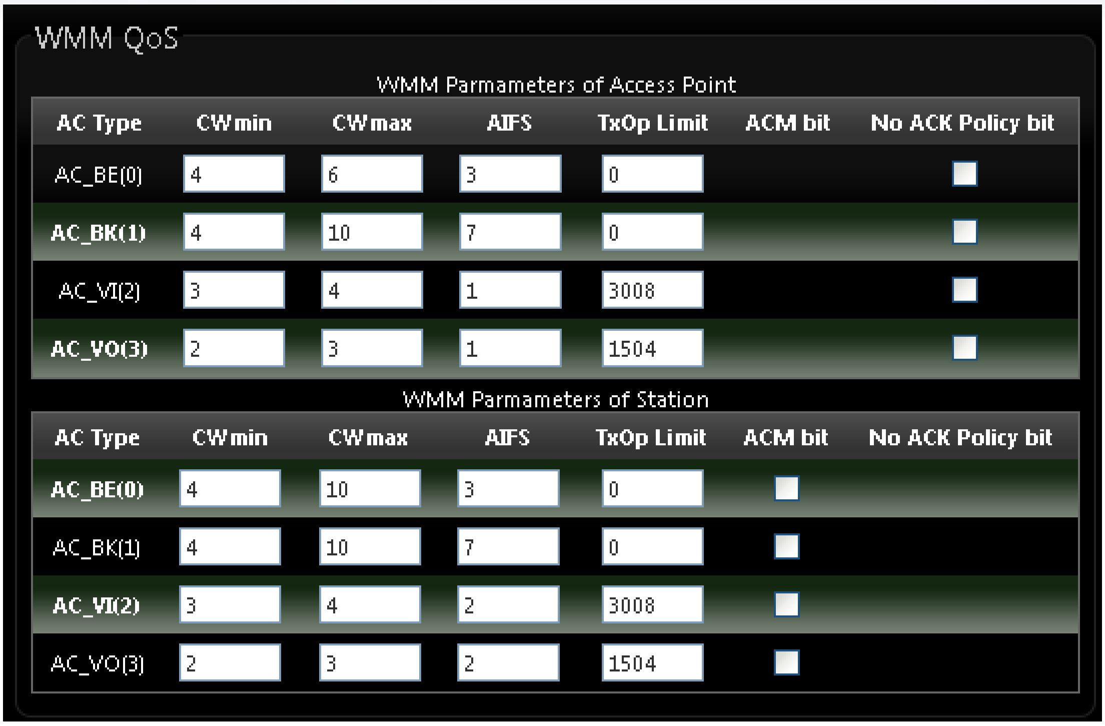
- **Short Preamble :** By default, it's "Enable". To Disable is to use Long 128-bit Preamble Synchronization field.

  The preamble is used to signal "here is a train of data coming" to the receiver. The short preamble provides 72-bit Synchronization field to improve WLAN transmission efficiency with less overhead.
- **IGMP Snooping :** the process of listening to Internet Group Management Protocol (IGMP) network traffic. The feature allows a network switch to listen in on the IGMP conversation between hosts and routers. By listening to these conversations the switch maintains a map of which links need which IP multicast streams. Multicasts may be filtered from the links which do not need them and thus controls which ports receive specific multicast traffic.

- **Greenfield :** In wireless WLAN technology, greenfield mode is a feature of major components of the 802.11n specification. The greenfield mode feature is designed to improve efficiency by eliminating support for 802.11b/g devices in an all draft-n network. In greenfield mode the network can be set to ignore all earlier standards.

- **WMM QoS :** This affects traffic flowing from the access point to the client station. Configuring QoS options consists of setting parameters on existing queues for different types of wireless traffic. You can configure different minimum and maximum wait times for the transmission of packets in each queue based on the requirements of the media being sent. Queues automatically provide minimum transmission delay for Voice, Video, multimedia, and mission critical applications, and rely on best-effort parameters for traditional IP data.

  As an Example, time-sensitive Voice & Video, and multimedia are given effectively higher priority for transmission (lower wait times for channel access), while other applications and traditional IP data which are less time-sensitive but often more data-intensive are expected to tolerate longer wait times.



WMM QoS

WMM Parmameters of Access Point

AC Type	CWmin	CWmax	AIFS	TxOp Limit	ACM bit	No ACK Policy bit
AC_BE(0)	4	6	3	0		□
AC_BK(1)	4	10	7	0		□
AC_VI(2)	3	4	1	3008		□
AC_VO(3)	2	3	1	1504		□

WMM Parmameters of Station

AC Type	CWmin	CWmax	AIFS	TxOp Limit	ACM bit	No ACK Policy bit
AC_BE(0)	4	10	3	0	□	
AC_BK(1)	4	10	7	0	□	
AC_VI(2)	3	4	2	3008	□	
AC_VO(3)	2	3	2	1504	□	

- ✓ **AC Type：**

Queue	Data Transmitted AP to Clients	Priority	Description
AC_BK	Background	Low	High throughput. Bulk data that requires maximum throughput and is not time-sensitive is sent to this queue (FTP data, for example).
AC_BE	Best Effort	Medium	Medium throughput and delay. Most traditional IP data is sent to this queue.
AC_VI	Video	High	Minimum delay. Time-sensitive video data is automatically sent to this queue.
AC_VO	Voice	High	Time-sensitive data like VoIP and streaming media are automatically sent to this queue.

- ✓ **CWmin：**Minimum Contention Window. This parameter is input to the algorithm that determines the initial random backoff wait time ("window") for retry of a transmission. The value specified here in the Minimum Contention Window is the upper limit (in milliseconds) of a range from which the initial random backoff wait time is determined.。
- ✓ **CWmax：**Maximum Contention Window. The value specified here in the Maximum Contention Window is the upper limit (in milliseconds) for the doubling of the random backoff value. This doubling continues until either the data frame is sent or the Maximum Contention Window size is reached. Once the Maximum Contention Window size is reached, retries will continue until a maximum number of retries allowed is reached. Valid values for the "cwmax" are 1, 3, 7, 15, 31, 63, 127, 255, 511, or 1024. The value for "cwmax" must be higher than the value for "cwmin".。

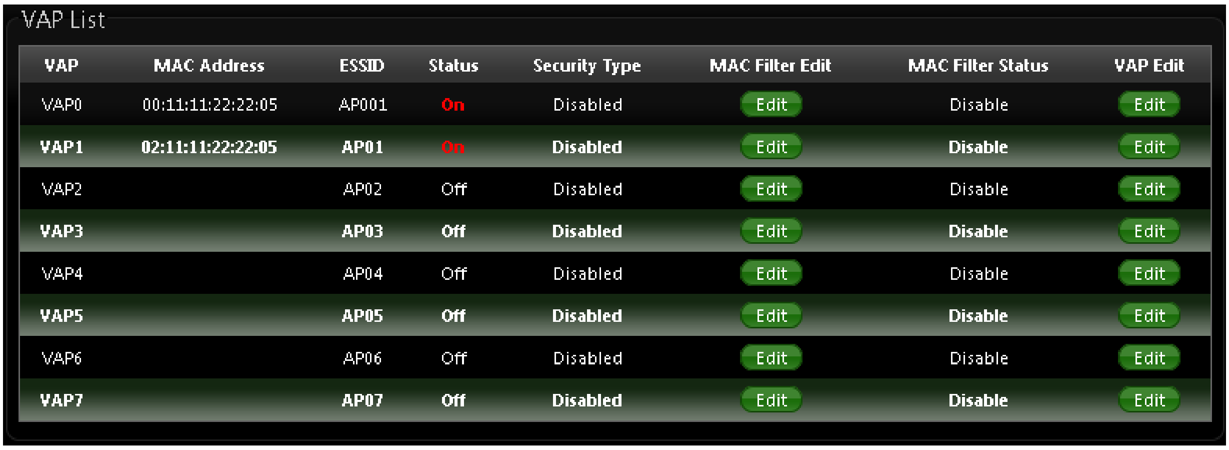
- ✓ **AIFS：**The Arbitration Inter-Frame Spacing Number specifies a wait time (in milliseconds) for data frames。
- ✓ **TxOP Limit：**Transmission Opportunity is an interval of time when a WME AP has the right to initiate transmissions onto the wireless medium (WM). This value specifies (in milliseconds) the Transmission Opportunity (TXOP) for AP; that is, the interval of time when the WMM AP has the right to initiate transmissions on the wireless network.。
- ✓ **ACM bit：**Admission Control Mandatory, ACM only takes effect on AC_VI and AC_VO. When you do not click Checkbox, it means that the ACM is controlled by the connecting AP. If you click Checkbox, it means that the Client is in charge。
- ✓ **No ACK policy bit：**Acknowledgment Policy, WMM defines two ACK policies: Normal ACK and No ACK. Click “Checkbox” indicates “No ACK”

When the no acknowledgement (No ACK) policy is used, the recipient does not acknowledge received packets during wireless packet exchange. This policy is suitable in the environment where communication quality is fine and interference is weak. While the No ACK policy helps improve transmission efficiency, it can cause increased packet loss when communication quality deteriorates. This is because when this policy is used, a sender does not retransmit packets that have not been received by the recipient.
When the Normal ACK policy is used, the recipient acknowledges each received uncast packet.。

Change these settings as described here and **click Save button** to save your changes. **Click Reboot button to activate your changes.**

3.6 Create Virtual AP – Virtual AP Setup

The administrator can create Virtual AP via this page. Please click on **Wireless -> Virtual AP** Setup and follow the below setting.



VAP List

VAP	MAC Address	ESSID	Status	Security Type	MAC Filter Edit	MAC Filter Status	VAP Edit
VAP0	00:11:11:22:22:05	AP001	On	Disabled	Edit	Disable	Edit
VAP1	02:11:11:22:22:05	AP01	On	Disabled	Edit	Disable	Edit
VAP2		AP02	Off	Disabled	Edit	Disable	Edit
VAP3		AP03	Off	Disabled	Edit	Disable	Edit
VAP4		AP04	Off	Disabled	Edit	Disable	Edit
VAP5		AP05	Off	Disabled	Edit	Disable	Edit
VAP6		AP06	Off	Disabled	Edit	Disable	Edit
VAP7		AP07	Off	Disabled	Edit	Disable	Edit

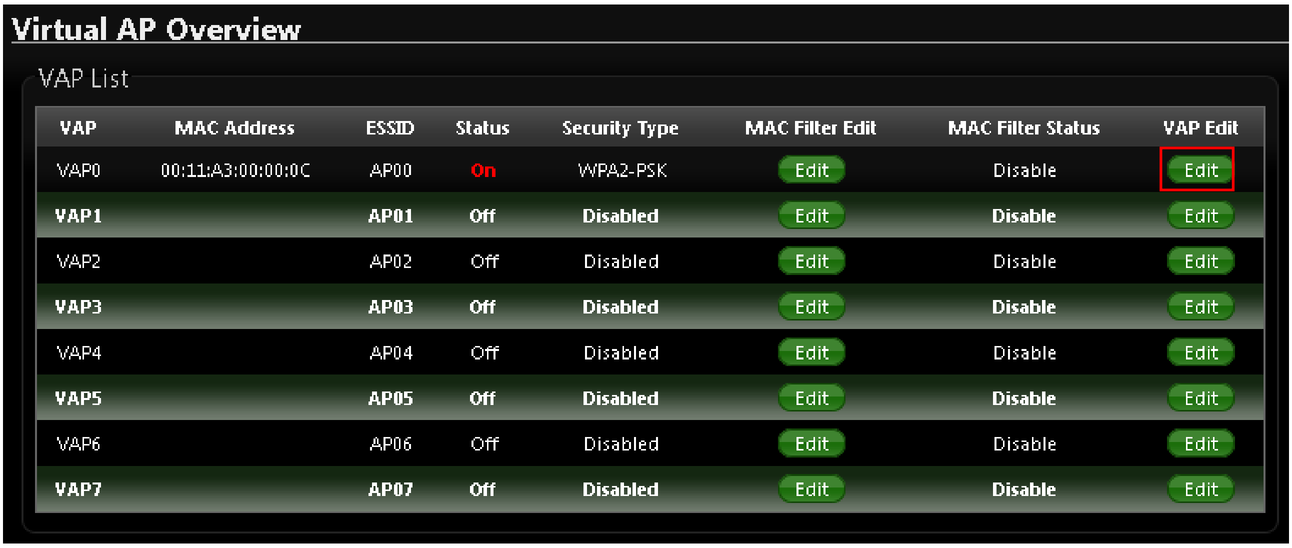
- ➢ **VAP:** Display number of system's Virtual AP.
- ➢ **MAC Address :** The MAC address of the VAP Interface is displayed here. When you enable AP and reboot system, the MAC address will display here

- **ESSID:** Display Virtual AP's ESSID; default is AP00~AP07.
- **Status:** Display VAP status; default VAP0 is always on and only VAP0 can support WPS function.
- **Security Type:** Display Virtual AP's Security Type; default is disabled.
- **MAC Filter Setup:** Click "Setup" button for configuring Virtual AP's Access Control List.
- **VAP Edit:** Click "Edit" button for configuring Virtual AP's settings and security type.

Change these settings as described here and click **Save** button to save your changes. Click **Reboot** button to activate your changes

3.7 Virtual AP General Configuration

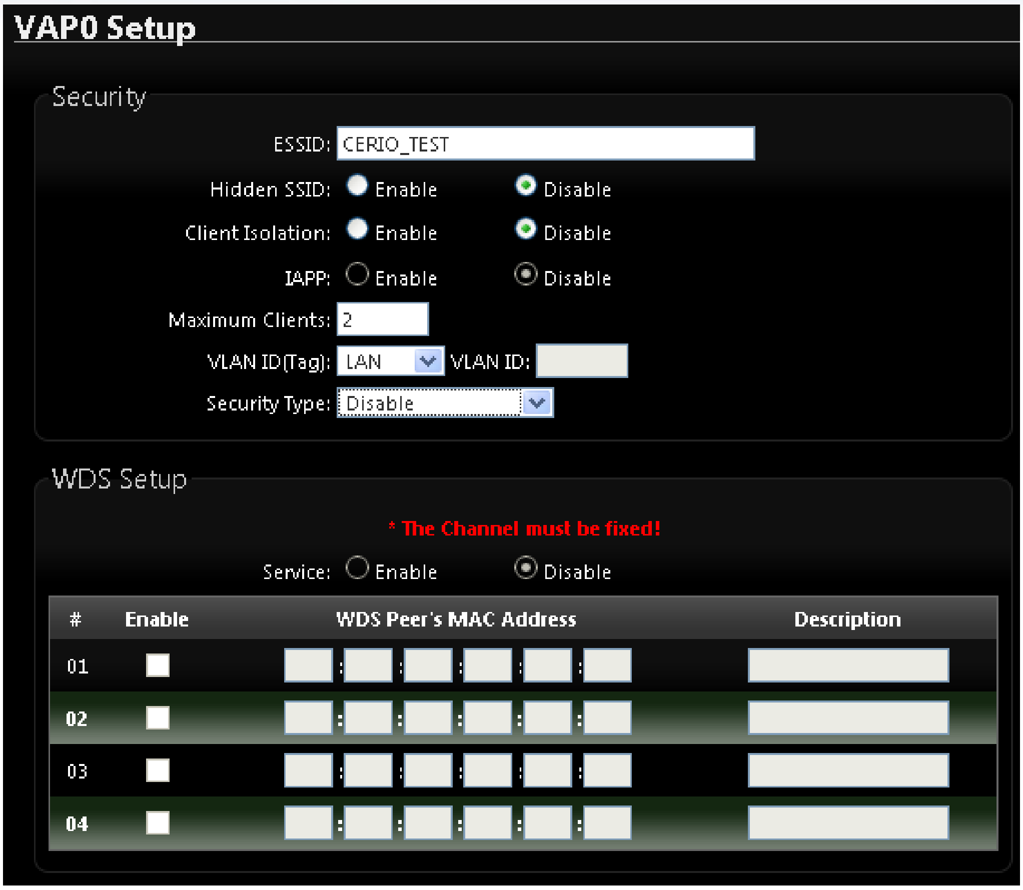
For each Virtual AP, administrators can configure general settings and security type. Click **Wireless -> Virtual AP** Setup, click **"Edit"** of Virtual AP List and then Virtual AP Configuration page appears.



Virtual AP Overview

VAP List

VAP	MAC Address	ESSID	Status	Security Type	MAC Filter Edit	MAC Filter Status	VAP Edit
VAP0	00:11:A3:00:00:0C	AP00	On	WPA2-PSK	Edit	Disable	Edit
VAP1		AP01	Off	Disabled	Edit	Disable	Edit
VAP2		AP02	Off	Disabled	Edit	Disable	Edit
VAP3		AP03	Off	Disabled	Edit	Disable	Edit
VAP4		AP04	Off	Disabled	Edit	Disable	Edit
VAP5		AP05	Off	Disabled	Edit	Disable	Edit
VAP6		AP06	Off	Disabled	Edit	Disable	Edit
VAP7		AP07	Off	Disabled	Edit	Disable	Edit



VAP0 Setup

Security

ESSID: CERIO_TEST

Hidden SSID: ○ Enable ● Disable

Client Isolation: ○ Enable ● Disable

IAPP: ○ Enable ● Disable

Maximum Clients: 2

VLAN ID(Tag): LAN VLAN ID:

Security Type: Disable

WDS Setup

* The Channel must be fixed!

Service: ○ Enable ● Disable

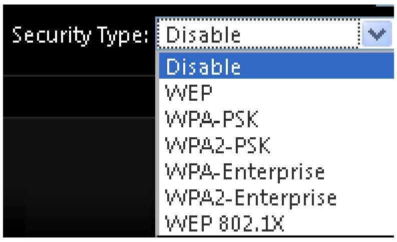
#	Enable	WDS Peer's MAC Address	Description
01	□	: : : : :	
02	□	: : : : :	
03	□	: : : : :	
04	□	: : : : :	

- **ESSID:** Extended Service Set ID indicates the SSID which the clients used to connect to the VAP. ESSID will determine the service type of a client which is assigned to the specified VAP.
- **Hidden SSID:** Select this option to enable the SSID to broadcast in your network. When configuring the network, it is suggested to enable this function but disable it when the configuration is complete. With this enabled, someone could easily obtain the SSID information with the site survey software and get unauthorized access to a private network. With this disabled, network security is enhanced and can prevent the SSID from begin seen on networked.
- **Client Isolation:** Select Enable, all clients will be isolated from each other, that means all clients can not reach to other clients.
- **IAPP:** Inter Access-Point Protocol is designed for the enforcement of unique association throughout a ESS(Extended Service Set) and for secure exchange of station's security context between current access point (AP) and new AP during hand off period.

Notice **Notice: IAPP only used on WPA-PSK and WPA2-PSK security type. Only one of VAPs can be enabled.**

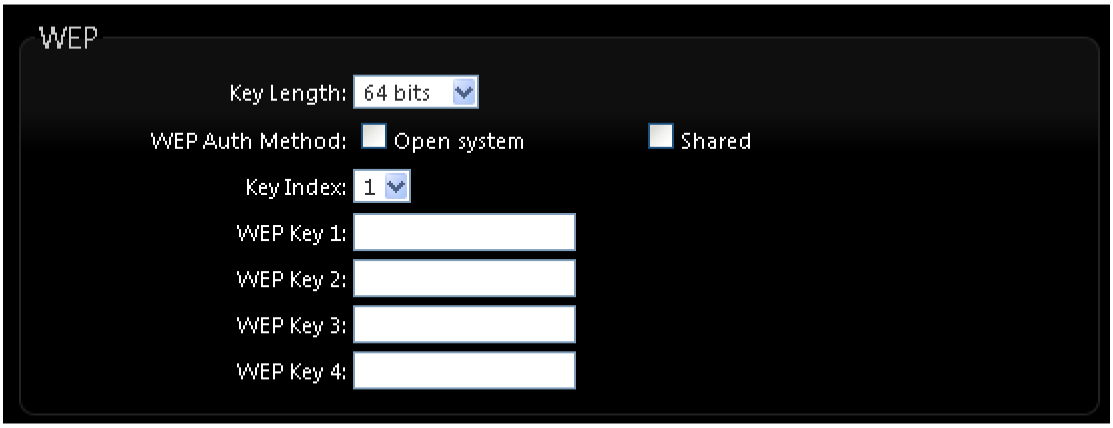
- **Maximum Clients:** Enter maximum number of clients to a desired number. For example, while the number of client is set to 32, only 32 clients are allowed to connect with this VAP.
- **VLAN Tag(ID):** Virtual LAN, the system supports tagged VLAN. To enable VLAN function; valid values are from 0 to 4094.

- **Security Type:** Select the desired security type from the drop-down list; the options are WEP, WPA-PSK, WPA2-PSK, WPA-Enterprise, WPA2-Enterprise and WEP 802.1X.



Security Type: Disable

- ● **Disable:** Data are unencrypted during transmission when this option is selected.
- ● **WEP:** WEP, Wired Equivalent Privacy, is a data encryption mechanism based on a 64-bit, 128-bit or 152-bit shared key. Select WEP as the security type from the drop down list as desired.



WEP

Key Length: 64 bits

WEP Auth Method: □ Open system □ Shared

Key Index: 1

WEP Key 1:

WEP Key 2:

WEP Key 3:

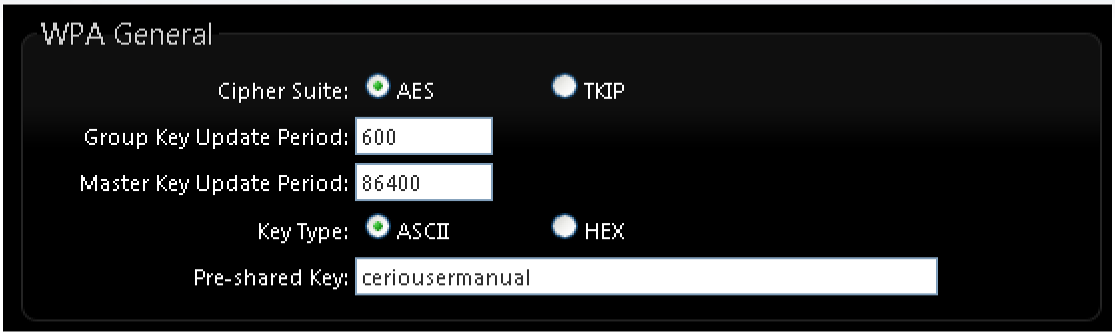
WEP Key 4:

- ✓ **Key Length:** The key size of WEP encryption can be 64bit, 128bit or 152bit.
- ✓ **WEP auth method:** You can select the appropriate value: Open system (If enabling this mode, there is no need authentication to access AP or Wireless NIC) or Shared (Only those who are sharing the same key with the AP can connect with it).
- ✓ **Key Index:** You can select the Key which you want to use. Other wireless station must have the same key value to connect with 100GX-N, 4 different WEP keys can be configured at the same time, but only one is used. Effective key is set with a choice of WEP Key 1, 2, 3 or 4.

- ✓ **WEP Key #:** You can chose either HEX or ASCII for your WEP key value, for 64bit encryption strength can use 10 digits for HEX (0~9, a~f and A-F) or 5 digits for ASCII (0~9, a~z and A~Z), for 128bit encryption strength can use 26 digits for HEX (0~9, a~f and A-F) or 13 digits for ASCII (0~9, a~z and A~Z), for 152bit encryption strength can use 32 digits for HEX (0~9, a~f and A-F) or 16 digits for ASCII (0~9, a~z and A~Z)

- ● **WPA-PSK (or WPA2-PSK):** WPA-PSK is short for W-Fi Protected

Access-Pre-Shared Key. WPA-SPK uses the same encryption way with WPA, and the only difference between them is that WPA-PSK recreates a simple shared key, instead of using the user’s certification.



WPA General

Cipher Suite: ● AES ○ TKIP

Group Key Update Period: 600

Master Key Update Period: 86400

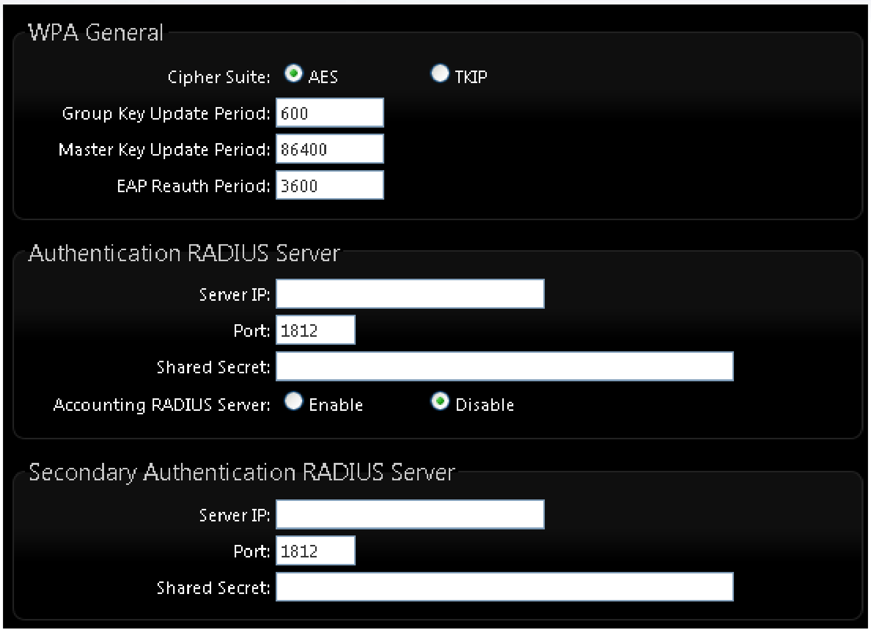
Key Type: ● ASCII ○ HEX

Pre-shared Key: ceriousermanual

- ✓ **Cipher Suite:** You can chose use AES or TKIP with your WPA / WPA2 encryption method
  - ✧ AES is short for “Advanced Encryption Standard”, The AES cipher is specified as a number of repetitions of transformation rounds that convert the input plaintext into the final output of ciphertext. Each round consists of several processing steps, including one that depends on the encryption key. A set of reverse rounds are applied to transform ciphertext back into the original plaintext using the same encryption key.
  - ✧ TKIP is short for “Temporal Key Integrity Protocol”, TKIP scrambles the keys using a hashing algorithm and, by adding an integrity-checking feature, ensures that the keys haven’t been tampered with.
- ✓ **Group Key Update Period:** This time interval for re-keying GTK (broadcast/multicast encryption keys) in seconds. Enter the time-length required; the default time is 600 seconds.
- ✓ **Master Key Update Period:** This time interval for re-keying GMK (master key used internally to generate GTKs) in seconds. Enter the time-length required; the default time is 83400 seconds.
- ✓ **Key Type:** Check on the respected button to enable either ASCII or HEX format for the Pre-shared Key.
- ✓ **Pre-Shared Key:** Enter the information for pre-shared key; the format of the information shall according to the key type selected. Pre-shared key can be either entered as a 256-bit secret in 64 HEX digits format, or 8 to 63 ASCII characters.

- **WPA-Enterprise (or WPA2-Enterprise) General Setting**

The RADIUS authentication and encryption will be both enabled if this selected.



WPA General

Cipher Suite: ● AES ○ TKIP

Group Key Update Period: 600

Master Key Update Period: 86400

EAP Reauth Period: 3600

Authentication RADIUS Server

Server IP:

Port: 1812

Shared Secret:

Accounting RADIUS Server: ○ Enable ● Disable

Secondary Authentication RADIUS Server

Server IP:

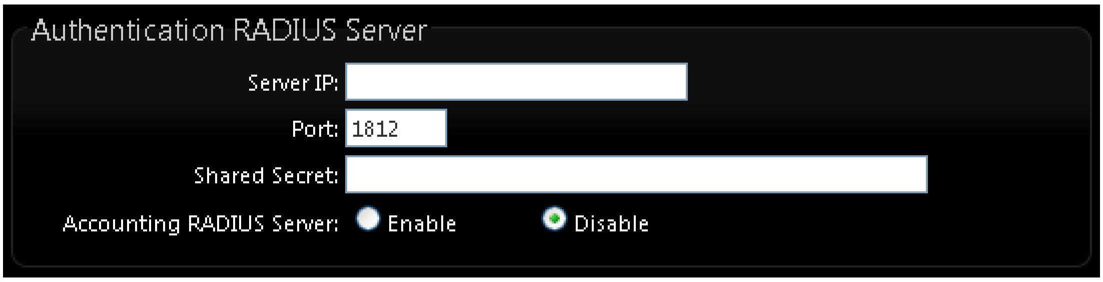
Port: 1812

Shared Secret:

General Setting :

- ✓ **Cipher Suite:** You can chose use AES or TKIP with your WPA / WPA2 encryption method
    - ✧ AES is short for "Advanced Encryption Standard", The AES cipher is specified as a number of repetitions of transformation rounds that convert the input plaintext into the final output of ciphertext. Each round consists of several processing steps, including one that depends on the encryption key. A set of reverse rounds are applied to transform ciphertext back into the original plaintext using the same encryption key.
    - ✧ TKIP is short for "Temporal Key Integrity Protocol", TKIP scrambles the keys using a hashing algorithm and, by adding an integrity-checking feature, ensures that the keys haven't been tampered with.
- ✓ **Group Key Update Period:** This time interval for re-keying GTK (broadcast/multicast encryption keys) in seconds. Enter the time-length required; the default time is 600 seconds.
- ✓ **Master Key Update Period:** This time interval for re-keying GMK (master key used internally to generate GTKs) in seconds. Enter the time-length required; the default time is 83400 seconds.
- ✓ **EAP Reauth Period:** This time interval for re- authentication in seconds. Enter the time-length required; the default time is 3600 seconds; 0 = disable re-authentication.

Authentication RADIUS Server Settings



Authentication RADIUS Server

Server IP:

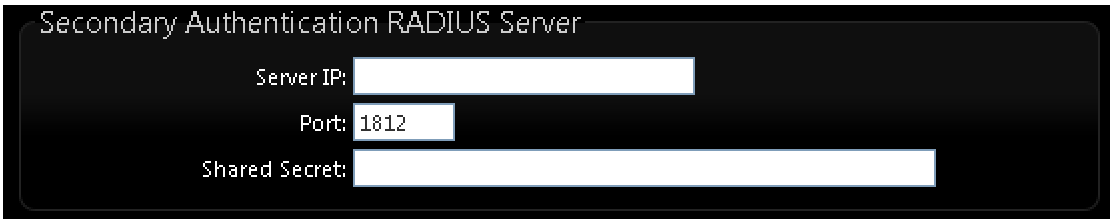
Port: 1812

Shared Secret:

Accounting RADIUS Server: ○ Enable ● Disable

- ✓ **Authentication Server:** Enter the IP address of the Authentication RADIUS server.
- ✓ **Port:** The port number used by Authentication RADIUS server. Use the default 1812 or enter port number specified.
- ✓ **Shared secret:** The secret key for system to communicate with Authentication RADIUS server. Support 1 to 64 characters.
- ✓ **Accounting Server:** Check on the respected button to enable either Enable or Disable accounting RADIUS server.

Secondary Authentication RADIUS Server



Secondary Authentication RADIUS Server

Server IP:

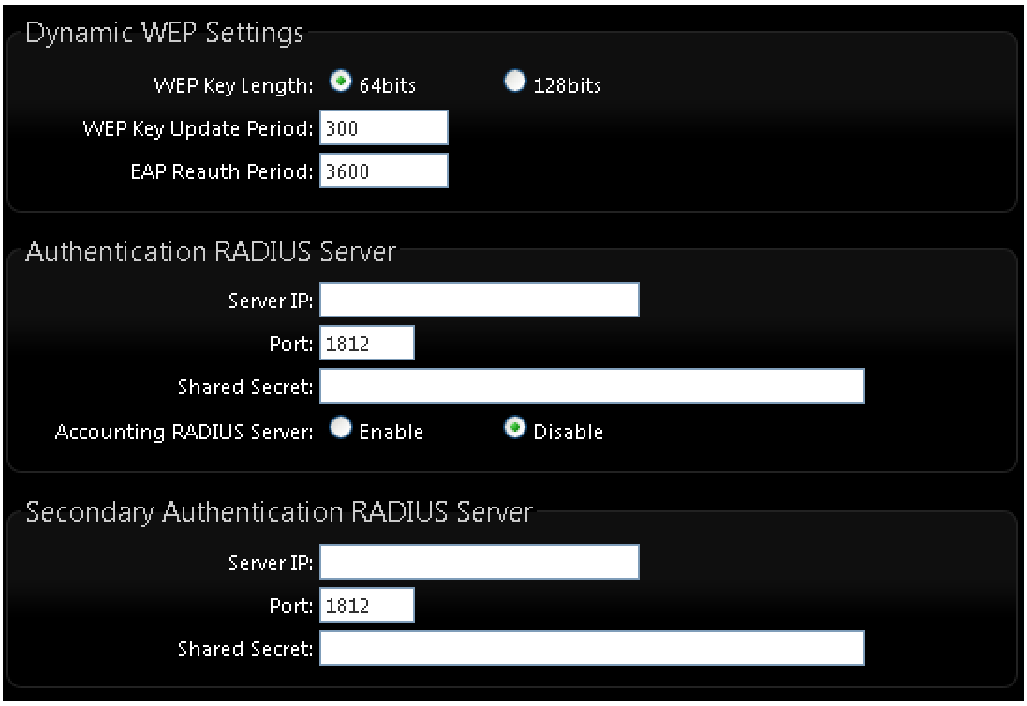
Port: 1812

Shared Secret:

- Server IP: Enter the IP address of the Authentication RADIUS server.
- Port: The port number used by Authentication RADIUS server. Use the default 1812 or enter port number specified.
- Shared secret: The secret key for system to communicate with Authentication RADIUS server. Support 1 to 64 characters.

WEP 802.1x

When WEP 802.1x Authentication is enabled, please refer to the following Dynamic WEP and RADIUS settings to complete the configuration.



Dynamic WEP Settings

WEP Key Length: ● 64bits ○ 128bits

WEP Key Update Period: 300

EAP Reauth Period: 3600

Authentication RADIUS Server

Server IP:

Port: 1812

Shared Secret:

Accounting RADIUS Server: ○ Enable ● Disable

Secondary Authentication RADIUS Server

Server IP:

Port: 1812

Shared Secret:

Dynamic WEP Settings

- **WEP Key length:** Check on the respected button to enable either 64bits or 128bits key length. The system will automatically generate WEP keys for encryption.

- **WEP Key Update Period:** The time interval WEP will then be updated; the unit is in seconds; default is 300 seconds; 0 = do not rekey.
- **EAP Reauth Period:** EAP re-authentication period in seconds; default is 3600; 0 = disable re-authentication.

Authentication RADIUS Server Settings

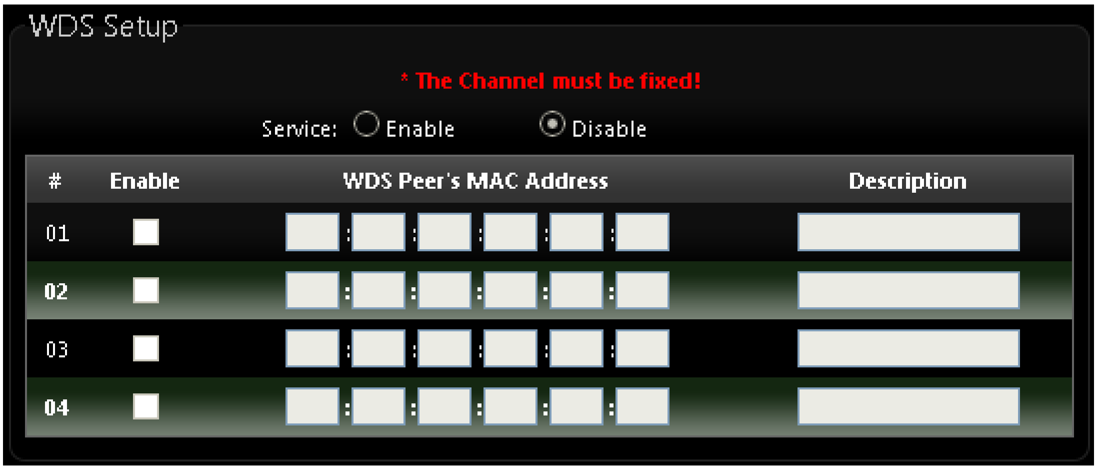
- **Authentication Server:** Enter the IP address of the Authentication RADIUS server.
- **Port:** The port number used by Authentication RADIUS server. Use the default 1812 or enter port number specified.
- **Shared secret:** The secret key for system to communicate with Authentication RADIUS server. Support 1 to 64 characters.
- **Accounting Server:** Check on the respected button to enable either Enable or Disable accounting RADIUS server.

Secondary Authentication RADIUS Server

- **Authentication Server:** Enter the IP address of the Authentication RADIUS server.
- **Port:** The port number used by Authentication RADIUS server. Use the default 1812 or enter port number specified.
- **Shared secret:** The secret key for system to communicate with Authentication RADIUS server. Support 1 to 64 characters.

3.8 WDS Setup - Expand your Wireless Network

In AP mode only supports four WDS function on VAP0



WDS Setup

* The Channel must be fixed!

Service: ○ Enable ● Disable

#	Enable	WDS Peer's MAC Address	Description
01	□	__ : __ : __ : __ : __ : __	
02	□	__ : __ : __ : __ : __ : __	
03	□	__ : __ : __ : __ : __ : __	
04	□	__ : __ : __ : __ : __ : __	

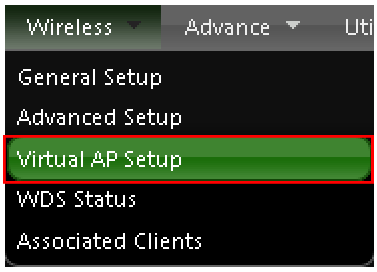
- **Service:** By default, it's “Disable”. To “Enable” to activate WDS
- **Enable:** Click Enable checkbox to create WDS link.
- **WDS Peer's MAC Address:** Enter the MAC address of WDS peer.
- **Description:** Description of WDS link.

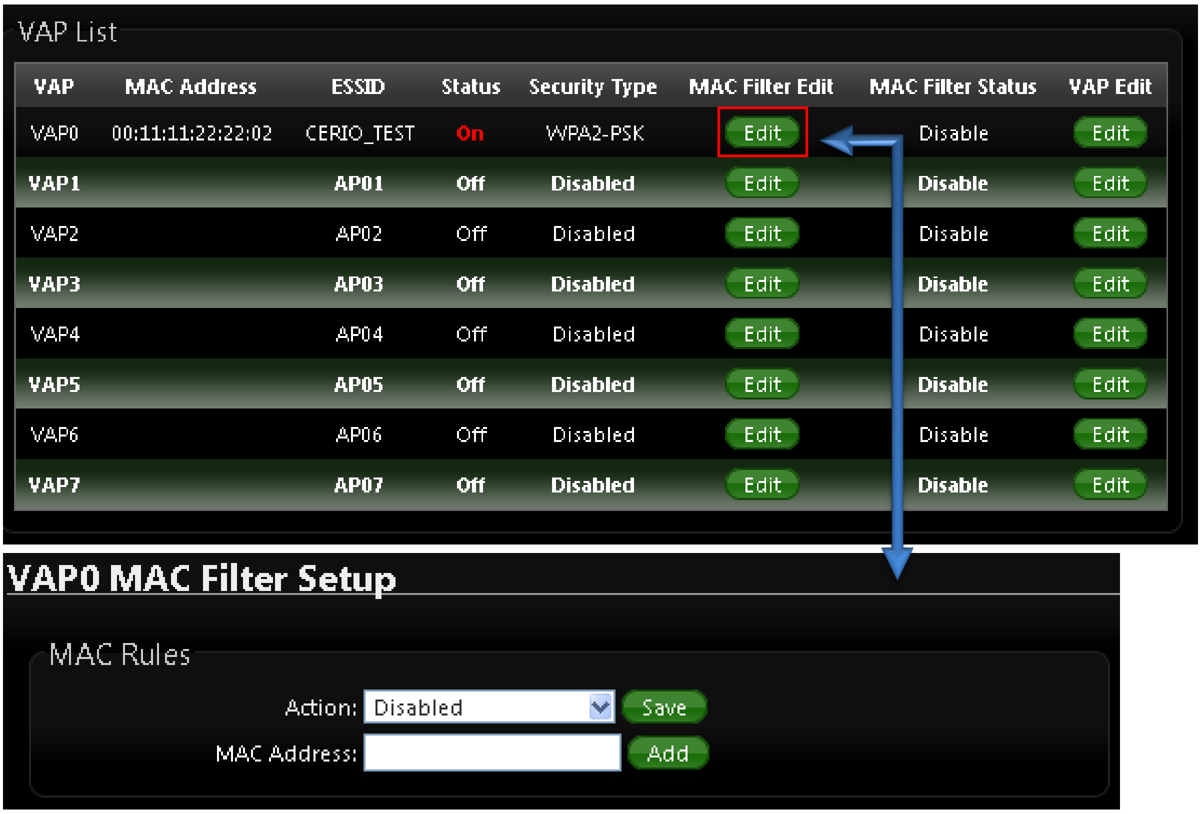
Change these settings as described here and click **Save** button to save your changes. Click **Reboot** button to activate your changes.

3.9 WiFi MAC Filter General Configuration

100GX-N all virtual AP support MAC Filter setting, Major can filter wireless users connected to Access Point.

Click **Wireless -> Virtual AP Setup**, And click MAC Filter **"Edit"** of Virtual AP List and then MAC Filter Configuration page appears.





VAP List

VAP	MAC Address	ESSID	Status	Security Type	MAC Filter Edit	MAC Filter Status	VAP Edit
VAP0	00:11:11:22:22:02	CERIO_TEST	On	WPA2-PSK	Edit	Disable	Edit
VAP1		AP01	Off	Disabled	Edit	Disable	Edit
VAP2		AP02	Off	Disabled	Edit	Disable	Edit
VAP3		AP03	Off	Disabled	Edit	Disable	Edit
VAP4		AP04	Off	Disabled	Edit	Disable	Edit
VAP5		AP05	Off	Disabled	Edit	Disable	Edit
VAP6		AP06	Off	Disabled	Edit	Disable	Edit
VAP7		AP07	Off	Disabled	Edit	Disable	Edit

VAP0 MAC Filter Setup

MAC Rules

Action: Disabled

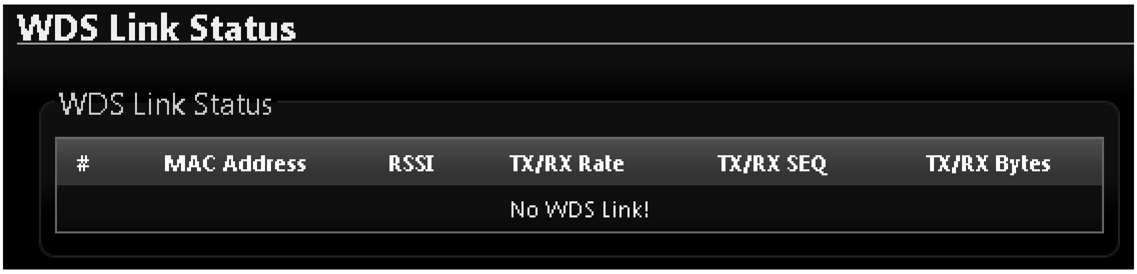
MAC Address:

- **Action:** Select the desired access control type from the drop-down list; the options are **"Disable"**, **"Only Deny List MAC"** or **"Only Allow List MAC"**.
  - ✓ **Disable :** Close the MAC filtering.
  - ✓ **Only Deny List MAC:** Define certain wireless clients in the list which will have denied access to the Access Point while the access will be granted for all the remaining clients - Action Type is set to "Only Deny List MAC".
  - ✓ **Only Allow List MAC:** Define certain wireless clients in the list which will have granted access to the Access Point while the access will be denied for all the remaining clients – Action Type is set to "Only Allow List MAC".

Notice MAC Access Control is the weakest security approach. WPA or WPA2 security methods should be used when possible.

3.10 WDS Status

The Peers MAC Address, antenna 0/1 received signal strength, phy mode and channel bandwidth for each WDS are available.



WDS Link Status

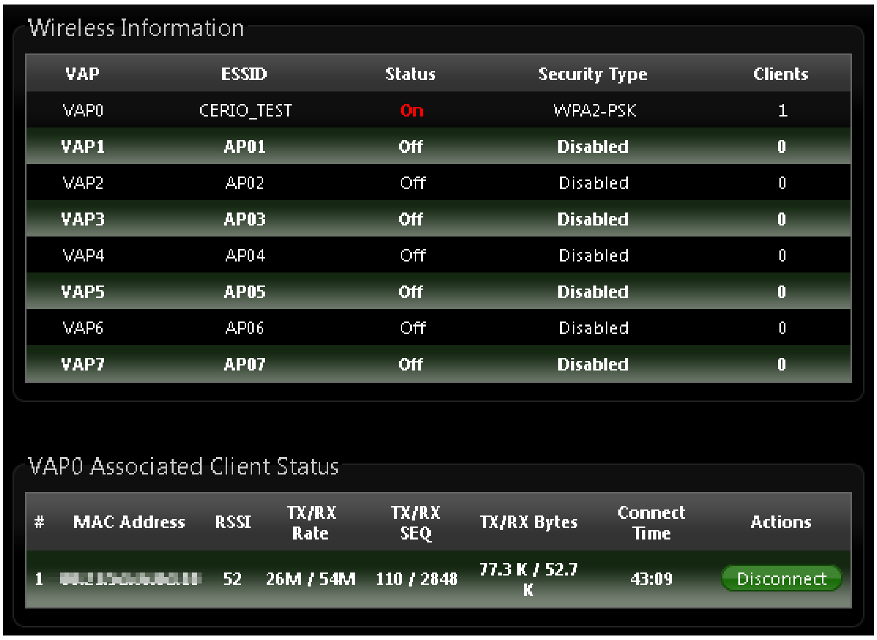
WDS Link Status

#	MAC Address	RSSI	TX/RX Rate	TX/RX SEQ	TX/RX Bytes
			No WDS Link!		

- **MAC Address :** Display MAC address of WDS peer.
- **RSSI :** Indicate the RSSI of the respective WDS's link.
- **TX/RX Rate :** Indicate the TX/RX Rate of the respective WDS's link
- **TX/RX SEQ :** Indicate the TX/RX sequence of the respective WDS's link
- **Disconnect :** Administrator can kick out a specific client, click “Delete” button to kick out specific WDS's link.

3.11 Associated Clients

The administrator can obtain detailed wireless information and all associated clients status via this page. Please click on **Wireless -> Associated Clients.** The the Associated Clients Status appears.



Wireless Information

VAP	ESSID	Status	Security Type	Clients
VAP0	CERIO_TEST	On	WPA2-PSK	1
VAP1	AP01	Off	Disabled	0
VAP2	AP02	Off	Disabled	0
VAP3	AP03	Off	Disabled	0
VAP4	AP04	Off	Disabled	0
VAP5	AP05	Off	Disabled	0
VAP6	AP06	Off	Disabled	0
VAP7	AP07	Off	Disabled	0

VAP0 Associated Client Status

#	MAC Address	RSSI	TX/RX Rate	TX/RX SEQ	TX/RX Bytes	Connect Time	Actions
1	[redacted]	52	26M / 54M	110 / 2848	77.3 K / 52.7 K	43:09	Disconnect

Wireless Information : Display the Virtual AP configuration information of the system.

- VAP : Display number of system's Virtual AP.
- ESSID : Extended Service Set ID of the Virtual AP.
- Status : Display Virtual AP status currently.
- Security Type : Security type activated by the Virtual AP.
- Clients : Number of clients currently associated to the Virtual AP.

VAP0 Associated Client Status

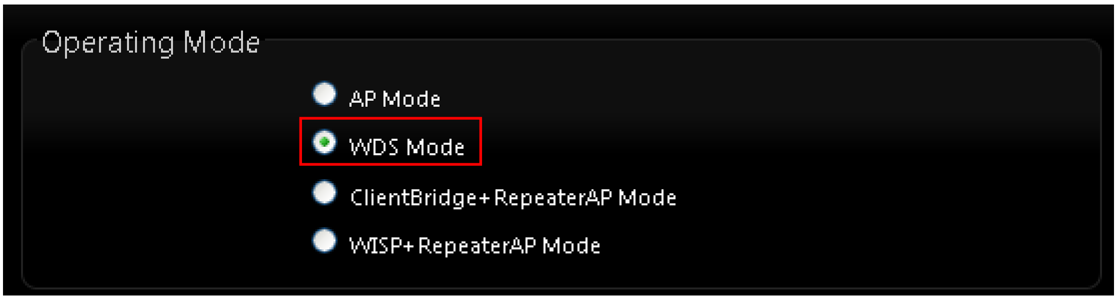
- **MAC Address :** Users already connected to the AP, will display the user's MAC number
- **RSSI :** Show signal quality by users to connect the AP
- **TX/RX Rate :** Show using upload/download the wireless bandwidth Rate
- **TX/RX SEQ :** Show the TX/RX sequence.
- **TX/RX Bytes :** Show Current usage
- **Connect Time :** Show users connect Time.
- **Actions :** The button is excluded at present connected users.

4. WDS Mode Configuration

When WDS mode is chosen, the system can be configured as an WDS mode. This section provides detailed explanation for users to configure in the WDS mode with help of illustrations. In the WDS mode, functions listed in the table below are also available from the Web-based GUI interface.

4.1 Chose Your Operating Mode (WDS Mode)

The system administrator can set the desired mode via this page, and then configure the system according to their deployment needs, Please click on **System -> Operating Mode** and follow the below setting.

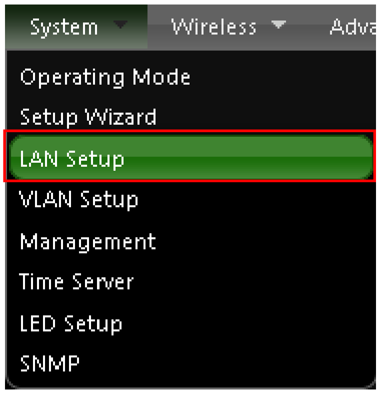


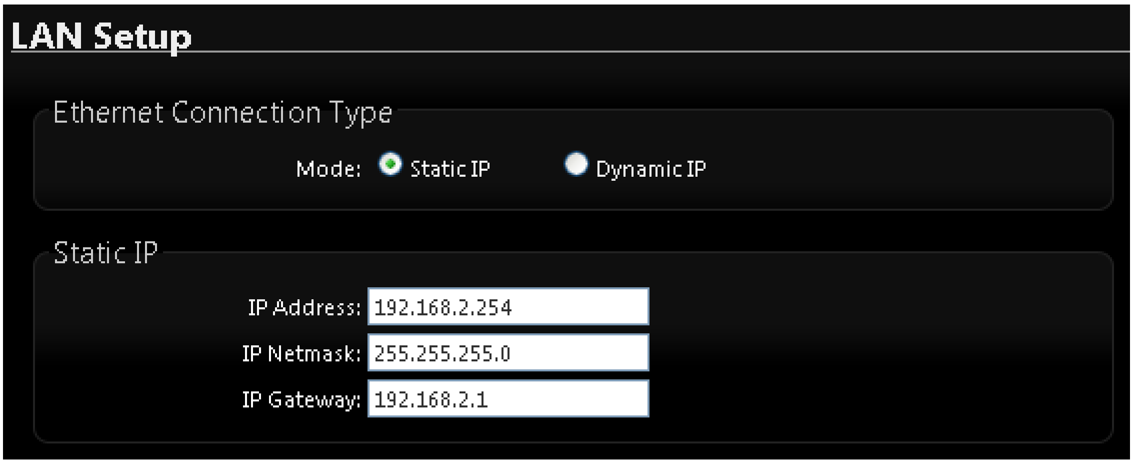
Operating Mode

○ AP Mode
● WDS Mode
○ ClientBridge+RepeaterAP Mode
○ WISP+RepeaterAP Mode

4.2 Configure 100GX-N LAN IP Address

Here are the instructions to setup the local IP Address and Netmask
Please click on **System -> LAN** and follow the below setting.



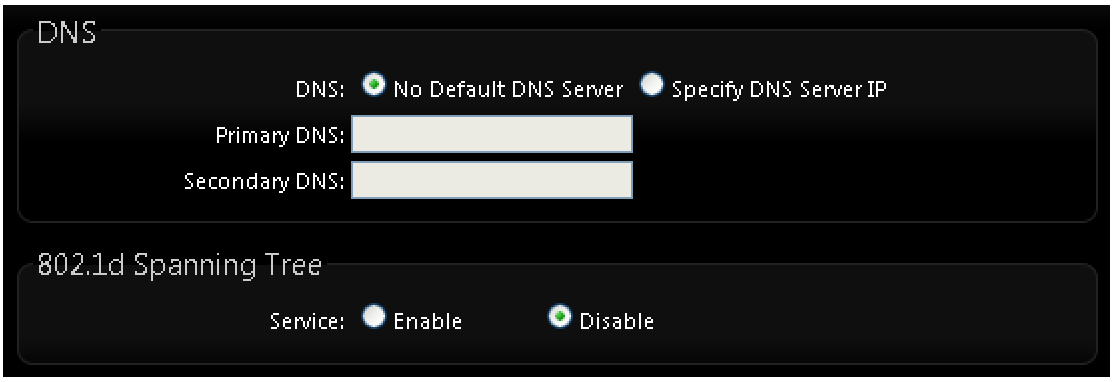

LAN Setup

Ethernet Connection Type

Mode: ● Static IP ○ Dynamic IP

Static IP

IP Address: 192.168.2.254
IP Netmask: 255.255.255.0
IP Gateway: 192.168.2.1


DNS

DNS: ● No Default DNS Server ○ Specify DNS Server IP
Primary DNS:
Secondary DNS:

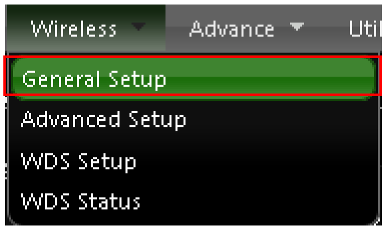
802.1d Spanning Tree

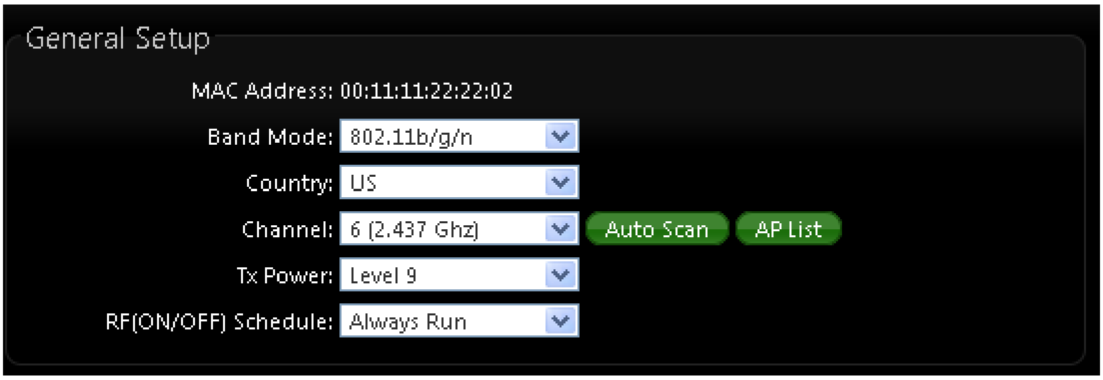
Service: ○ Enable ● Disable

※ **Please refer 3.3 Configure 100GX-N LAN IP Address LAN IP Setting.**

4.3 Wireless General Settings

The administrator can change the data transmission, channel and output power settings for the system. Please click on **Wireless -> General Setup** and follow the below setting.




General Setup

MAC Address: 00:11:11:22:22:02

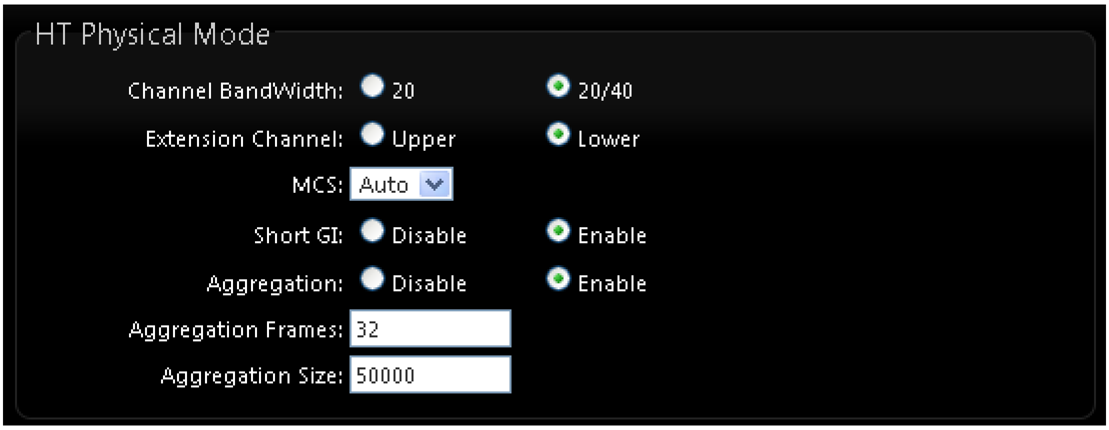
Band Mode: 802.11b/g/n

Country: US

Channel: 6 (2.437 Ghz)

Tx Power: Level 9

RF(ON/OFF) Schedule: Always Run


HT Physical Mode

Channel BandWidth: ○ 20 ● 20/40

Extension Channel: ○ Upper ● Lower

MCS: Auto

Short GI: ○ Disable ● Enable

Aggregation: ○ Disable ● Enable

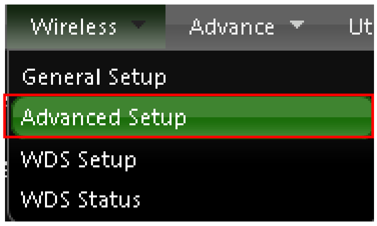
Aggregation Frames: 32

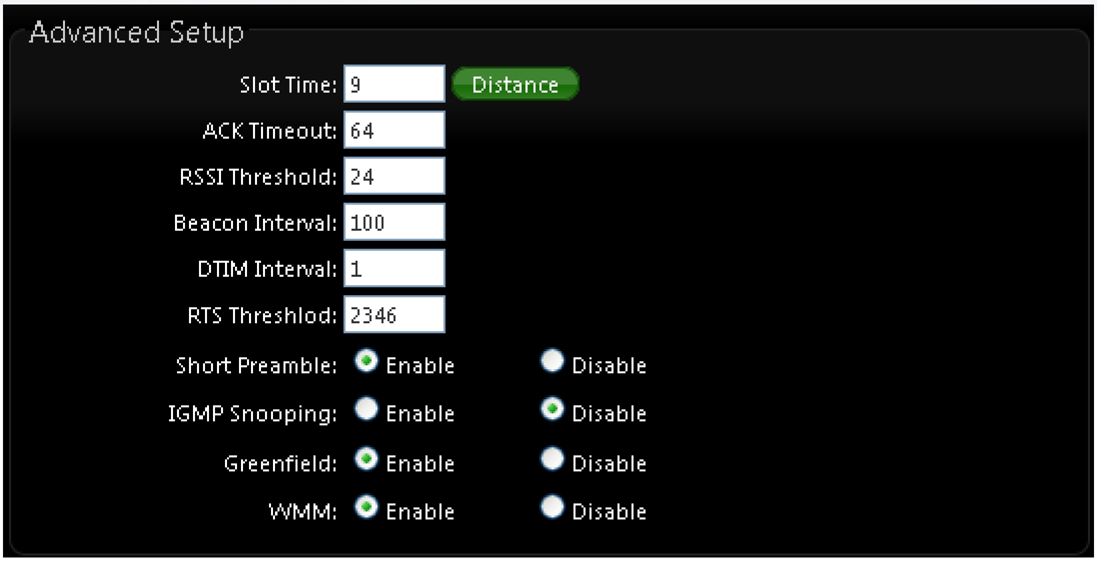
Aggregation Size: 50000

※ **Please refer 3.4 Wireless General Setup**

4.4 Configure Wireless Advanced Setup

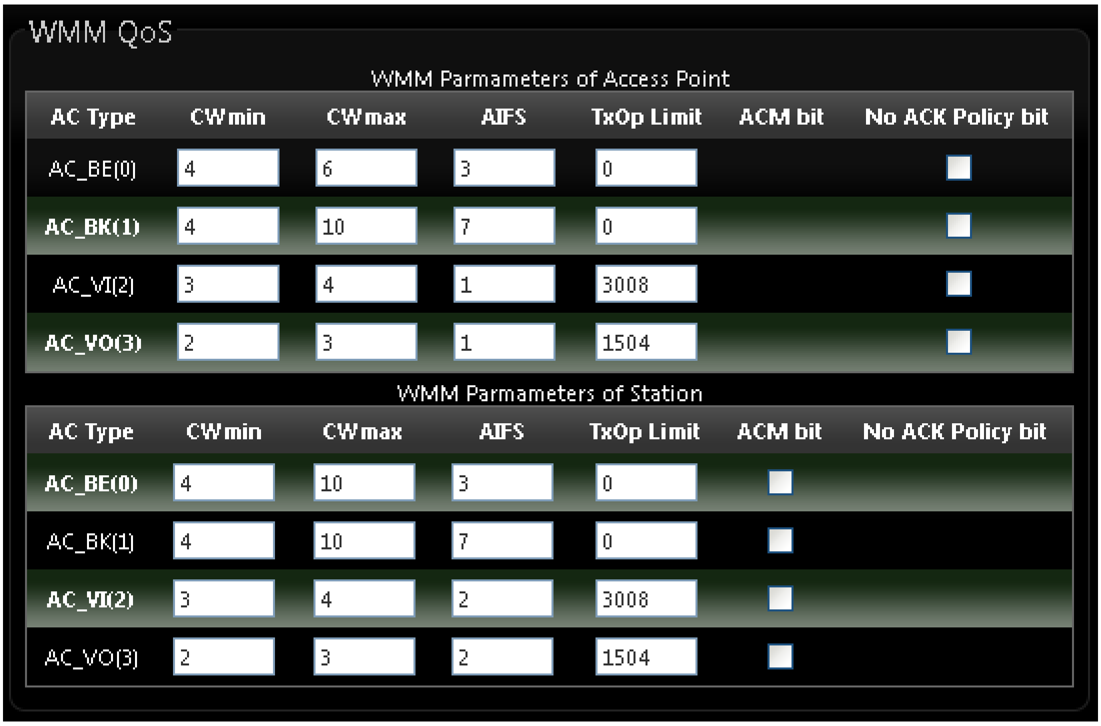
The administrator can change the Slot Time, ACK Timeout, RTS threshold and fragmentation threshold settings for the system. Please click on **Wireless -> Advanced Setup** and follow the below setting.





Advanced Setup

Slot Time:	9 Distance
ACK Timeout:	64
RSSI Threshold:	24
Beacon Interval:	100
DTIM Interval:	1
RTS Threshlod:	2346
Short Preamble:	● Enable ○ Disable
IGMP Snooping:	○ Enable ● Disable
Greenfield:	● Enable ○ Disable
WMM:	● Enable ○ Disable



WMM QoS

WMM Parmameters of Access Point

AC Type	CWmin	CWmax	AIFS	TxOp Limit	ACM bit	No ACK Policy bit
AC_BE(0)	4	6	3	0		□
AC_BK(1)	4	10	7	0		□
AC_VI(2)	3	4	1	3008		□
AC_VO(3)	2	3	1	1504		□

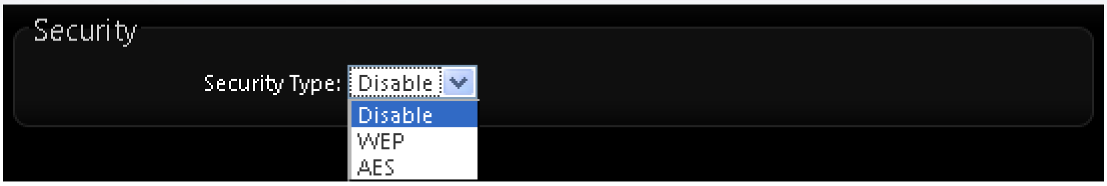
WMM Parmameters of Station

AC Type	CWmin	CWmax	AIFS	TxOp Limit	ACM bit	No ACK Policy bit
AC_BE(0)	4	10	3	0	□	
AC_BK(1)	4	10	7	0	□	
AC_VI(2)	3	4	2	3008	□	
AC_VO(3)	2	3	2	1504	□	

※ **Please refer 3.5 Configure Wireless Advanced Setup**

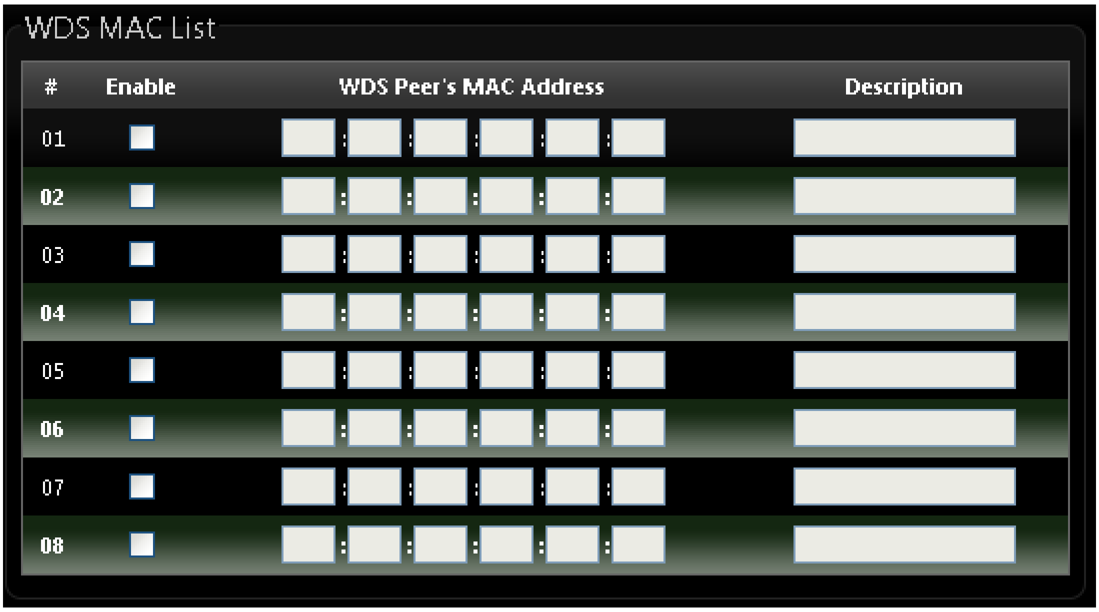
4.5 WDS Setup

The administrator could create WDS Links to expand wireless network. When WDS is enabled, access point functions as a wireless bridge and is able to communicate with other access points via WDS links. A WDS link is bidirectional and both side must support WDS. Access points know each other by MAC Address. In other words, each access point needs to include MAC address of its peer. Ensure all access points are configured with the same channel and own same security type settings.



Security

Security Type: Disable



WDS MAC List

#	Enable	WDS Peer's MAC Address	Description
01	□	: : : : :	
02	□	: : : : :	
03	□	: : : : :	
04	□	: : : : :	
05	□	: : : : :	
06	□	: : : : :	
07	□	: : : : :	
08	□	: : : : :	

➢ **Security Type :** Option is “Disable”, “WEP”, “TKIP”or “AES” from drop-down list. Needs the same type to build WDS links. Security type takes effect when WDS is enabled.

- **WEP Key :** Enter 5 / 13 ASCII or 10 / 26 HEX format WEP key.
- **AES Key :** Enter 8 to 63 ASCII or 64 HEX format AES key.

➢ **WDS MAC List**

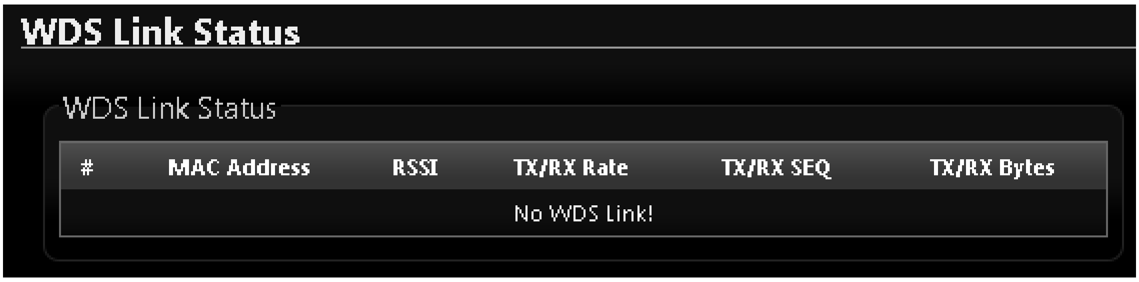
- **Enable :** Check “Enable” to create WDS link.
- **WDS Peer's MAC Address :** Enter the MAC address of WDS peer.
- **VLAN Tag(ID):** Virtual LAN, the system supports tagged VLAN with WDS. To enable VLAN function; valid values are from 0 to 4094; space is disabled.
- **Description :** Description of WDS link.

Notice The WDS link needs to be set at same Channel and with same Security Type.

Click **Save button** to save your changes. Click **Reboot button** to activate your changes.

4.6 WDS Status

The Peers MAC Address, antenna 0/1 received signal strength, phy mode and channel bandwidth for each WDS are available.



WDS Link Status

WDS Link Status

#	MAC Address	RSSI	TX/RX Rate	TX/RX SEQ	TX/RX Bytes
			No WDS Link!		

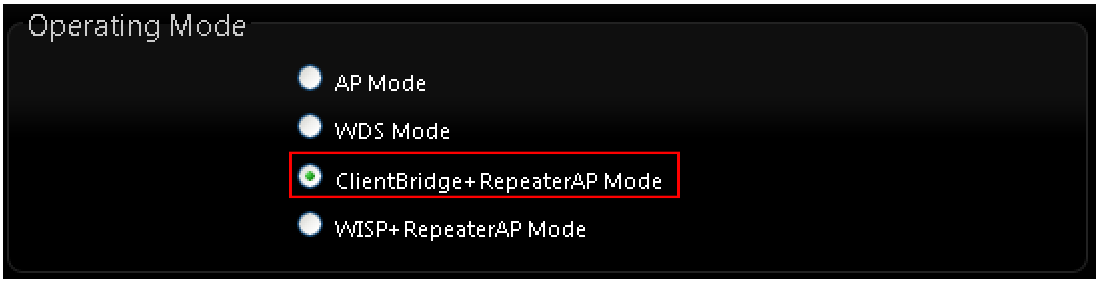
- ➢ **MAC Address :** Display MAC address of WDS peer.
- ➢ **RSSI :** Indicate the RSSI of the respective WDS's link.
- ➢ **TX/RX Rate :** Indicate the TX/RX Rate of the respective WDS's link
- ➢ **TX/RX SEQ :** Indicate the TX/RX sequence of the respective WDS's link

5. Client Bridge + Repeater AP Mode Configuration

When Client Bridge + Repeater AP Mode is chosen, the system can be configured as an Client Bridge + Repeater APMode. This section provides detailed explanation for users to configure in the Client Bridge + Repeater AP Mode with help of illustrations. In the Client Bridge + Repeater AP Mode, functions listed in the table below are also available from the Web-based GUI interface.

5.1 Chose Your Operating Mode(Client Bridge + Repeater AP)

The system administrator can set the desired mode via this page, and then configure the system according to their deployment needs, Please click on **System -> Operating Mode** and follow the below setting.



Operating Mode

○ AP Mode
○ WDS Mode
● ClientBridge+RepeaterAP Mode
○ WISP+RepeaterAP Mode

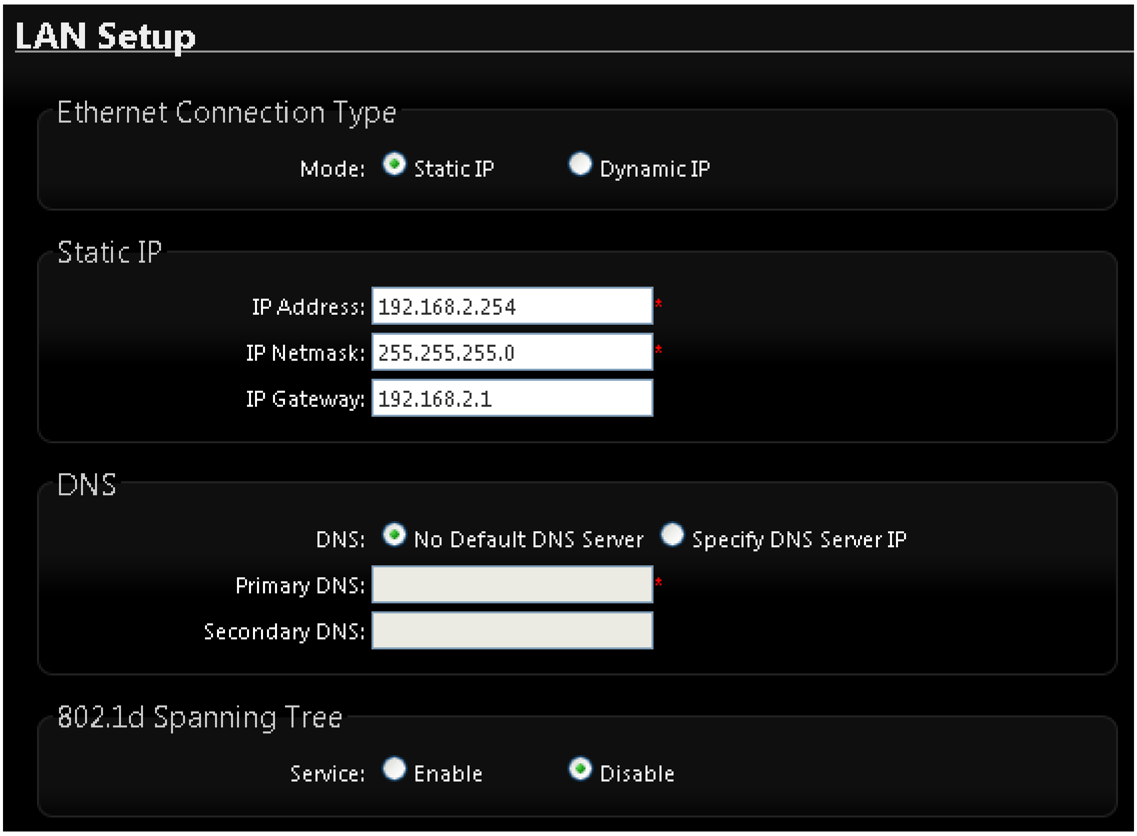
5.2 External Network Connection (Network Requirement)

It can be used as an Client Bridge or Repeater AP to receive wireless signal over last mile applications, helping WISPs deliver wireless broadband Internet service to new residential and business customers. In this mode, 100GX-N is enabled with DHCP Server functions. The wired clients of 100GX-N are in the same subnet from Main Base Station and it accepts wireless connections from client devices.

Notice When the 100GX-N configured as an Access Point and Client Station simultaneously, the Wireless General and Advanced Setup also used simultaneously. But the Security Type can be different. In the other word, the channel or other settings will be the same between 100GX-N to Main Base Station and wireless client to 100GX-N, but security type can be different.

5.3 Configure 100GX-N LAN IP Address

Here are the instructions for how to setup the local IP Address and Netmask. Please click on **System -> LAN** and follow the below setting.


LAN Setup

Ethernet Connection Type

Mode: ● Static IP ○ Dynamic IP

Static IP

IP Address: 192.168.2.254 *

IP Netmask: 255.255.255.0 *

IP Gateway: 192.168.2.1

DNS

DNS: ● No Default DNS Server ○ Specify DNS Server IP

Primary DNS: *

Secondary DNS:

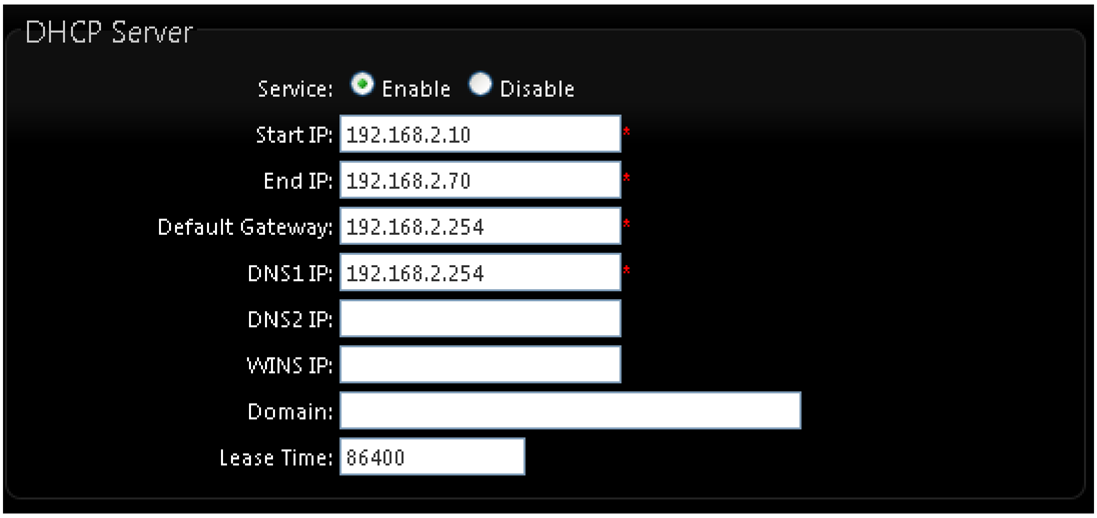
802.1d Spanning Tree

Service: ○ Enable ● Disable

※ **Please refer 3.3 Configure 100GX-N LAN IP Address LAN IP Setting.**

- **DHCP Server**

Devices connected to the system can obtain an IP address automatically when this service is enabled.



DHCP Server

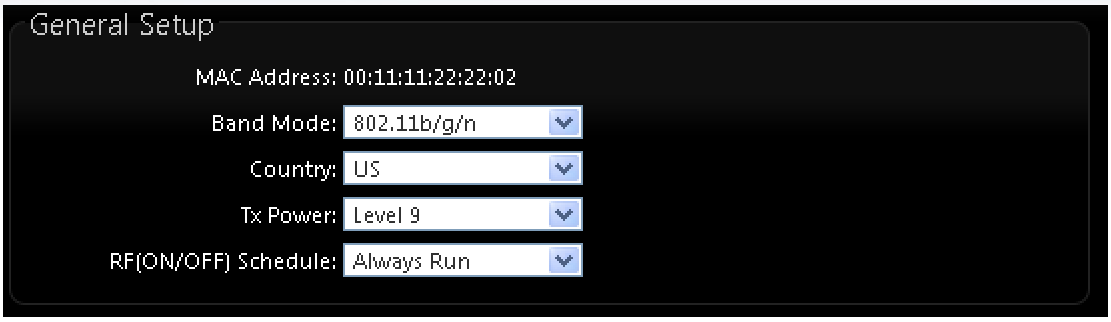
Service:	● Enable ○ Disable
Start IP:	192.168.2.10 *
End IP:	192.168.2.70 *
Default Gateway:	192.168.2.254 *
DNS1 IP:	192.168.2.254 *
DNS2 IP:	
WINS IP:	
Domain:	
Lease Time:	86400

- **DHCP :** Check Enable button to activate this function or Disable to deactivate this service.
- **Start IP / End IP:** Specify the range of IP addresses to be used by the DHCP server when assigning IP address to clients. The default range IP address is 192.168.2.10 to 192.168.2.70, the netmask is 255.255.255.0
- **DNS1 IP :** Enter IP address of the first DNS server; this field is required.
- **DNS2 IP :** Enter IP address of the second DNS server; this is optional.
- **WINS IP :** Enter IP address of the Windows Internet Name Service (WINS) server; this is optional.
- **Domain :** Enter the domain name for this network.
- **Lease Time :** The IP addresses given out by the DHCP server will only be valid for the duration specified by the lease time. Increasing the time ensure client operation without interruptions, but could introduce potential conflicts. Lowering the lease time will avoid potential address conflicts, but might cause more interruptions to the client while it will acquire new IP addresses from the DHCP server. Default is 86400 seconds

Click Save button to save your changes. Click Reboot button to activate your changes

5.4 Wireless General Setup

The administrator can change the data transmission, channel and output power settings for the system. Please click on **Wireless -> General** Setup and follow the below setting.



General Setup

MAC Address: 00:11:11:22:22:02

Band Mode: 802.11b/g/n

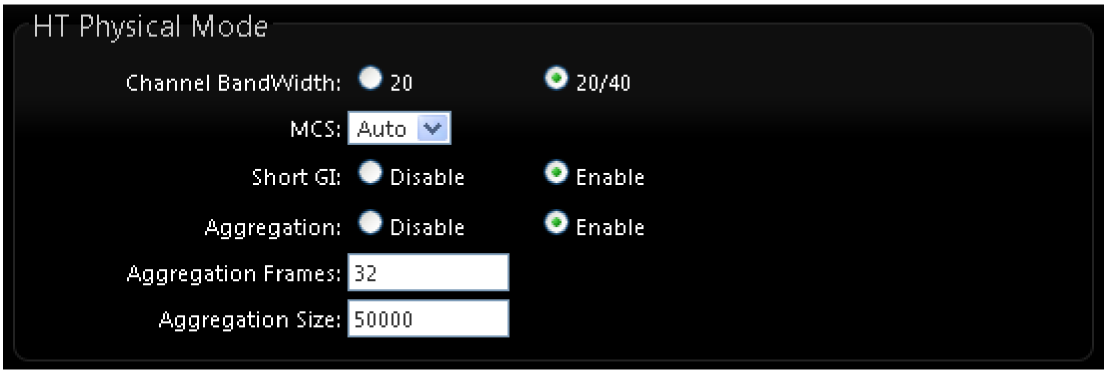
Country: US

Tx Power: Level 9

RF(ON/OFF) Schedule: Always Run

General Setup

- **MAC Address :** The MAC address of the Wireless interface is displayed here.
- **Band Mode :** Select an appropriate wireless band; bands available are 801.11 b/g/n mixed mode
- **Country :** a region, the 100GX-N support region for US,ETSI and Japan
- **TX Power :** You can adjust the output power of the system to get the appropriate coverage for your wireless network. Specify digit numbers between level 1 to level 9 (the unit is %) for your environment. If you are not sure which setting to choose, then keep the default setting level 9 (100%)
- **RF(on/off) schedule :** The 100GX-N can use the schedule control WiFi on or off function. Please refer to the Time Policy setup.



HT Physical Mode

Channel BandWidth: ○ 20 ● 20/40

MCS: Auto

Short GI: ○ Disable ● Enable

Aggregation: ○ Disable ● Enable

Aggregation Frames: 32

Aggregation Size: 50000

HT Physical Mode

- **Channel Bandwidth :** The "20/40" MHz option is usually best. The other option is available for special circumstances.
- **MCS :** This parameter represents transmission rate. By default (Auto) the fastest possible transmission rate will be selected. You have the option of selecting the speed if necessary.
- **Shout GI :** Short Guard Interval, by default, it's “Enable”. it's can increase throughput. However, it can also increase error rate in some installations, due to increased sensitivity to radio-frequency reflections. Select the option that works best for your installation.
- **Aggregation :** By default, it's “Enable”. To “Disable” to deactivated Aggregation.

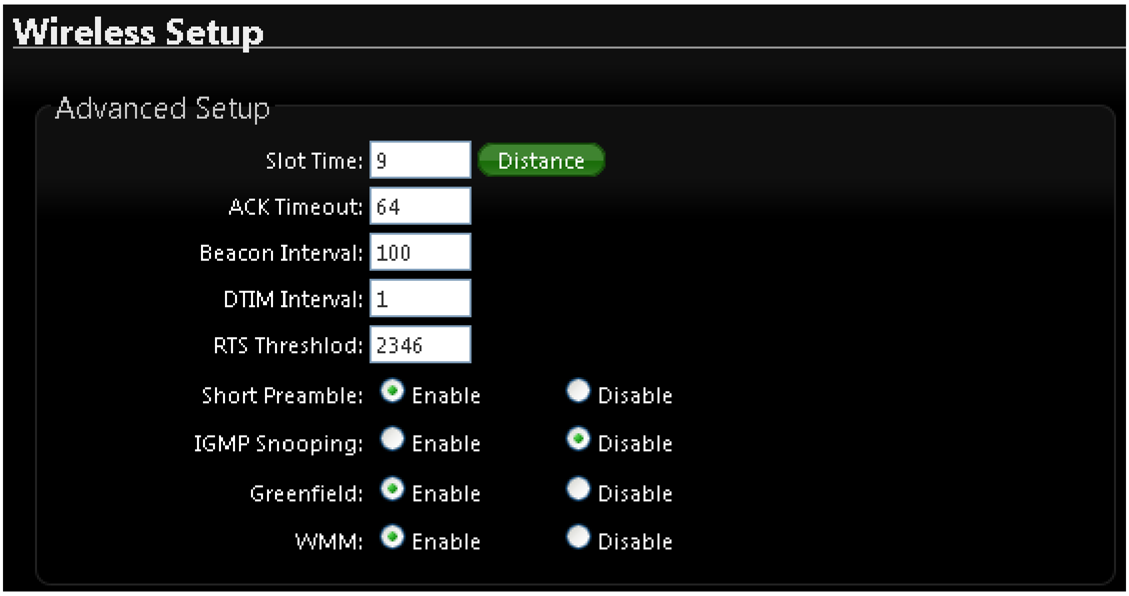
A part of the 802.11n standard (or draft-standard). It allows sending multiple frames per single access to the medium by combining frames together into one larger frame. It creates the larger frame by combining smaller frames with the same physical source and destination end points and traffic class (i.e. QoS) into one large frame with a common MAC header.

- **Aggregation Frames :** The Aggregation Frames is in the range of 2~64, default is 32. It determines the number of frames combined on the new larger frame.

- **Aggregation Size :** The Aggregation Size is in the range of 1024~65535, default is 50000. It determines the size (in Bytes) of the larger frame.

5.5 Configure Wireless Advanced Setup

The administrator can change the Slot Time, ACK Timeout, RTS threshold and fragmentation threshold settings for the system. Please click on **Wireless -> Advanced Setup** and follow the below setting.



Wireless Setup

Advanced Setup

Slot Time: 9 [Distance]

ACK Timeout: 64

Beacon Interval: 100

DTIM Interval: 1

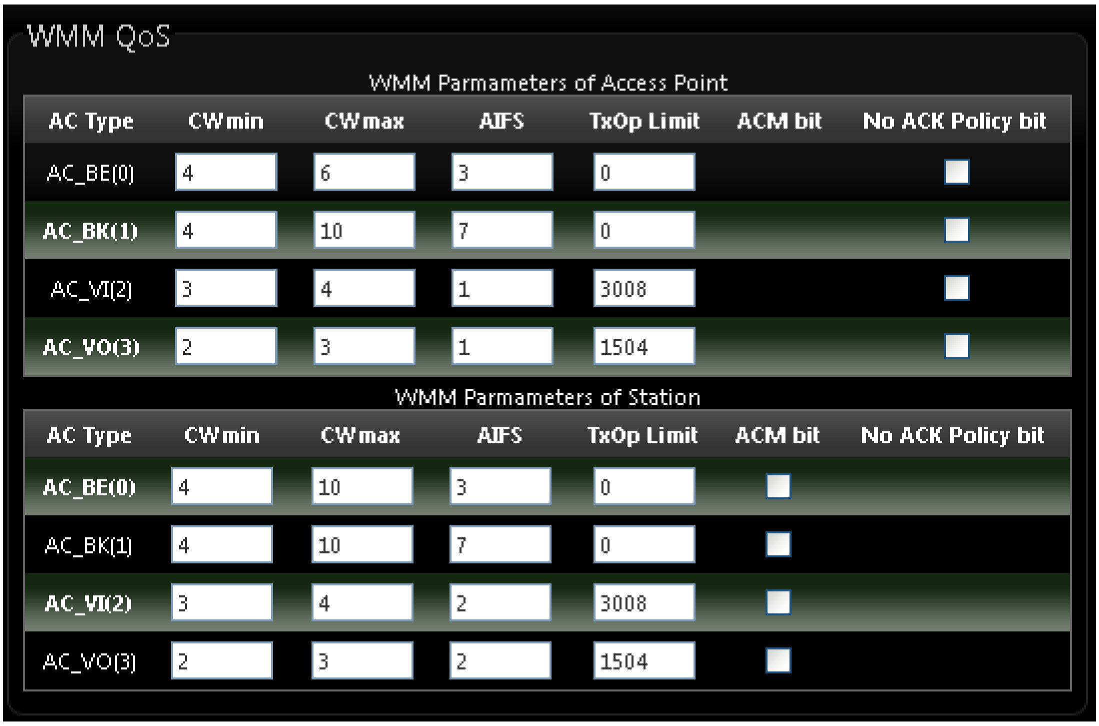
RTS Threshlod: 2346

Short Preamble: ● Enable ○ Disable

IGMP Snooping: ○ Enable ● Disable

Greenfield: ● Enable ○ Disable

WMM: ● Enable ○ Disable



WMM QoS

WMM Parmameters of Access Point

AC Type	CWmin	CWmax	AIFS	TxOp Limit	ACM bit	No ACK Policy bit
AC_BE(0)	4	6	3	0		□
AC_BK(1)	4	10	7	0		□
AC_VI(2)	3	4	1	3008		□
AC_VO(3)	2	3	1	1504		□

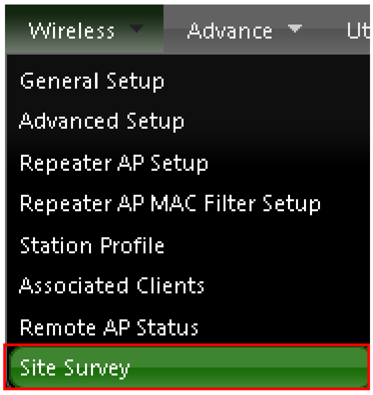
WMM Parmameters of Station

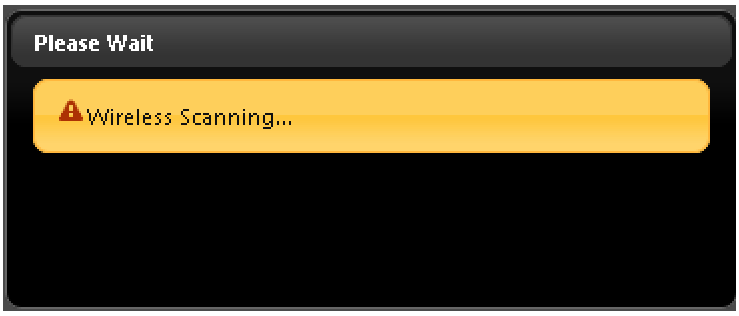
AC Type	CWmin	CWmax	AIFS	TxOp Limit	ACM bit	No ACK Policy bit
AC_BE(0)	4	10	3	0	□	
AC_BK(1)	4	10	7	0	□	
AC_VI(2)	3	4	2	3008	□	
AC_VO(3)	2	3	2	1504	□	

※ **Please refer 3.5 Configure Wireless Advanced Setup**

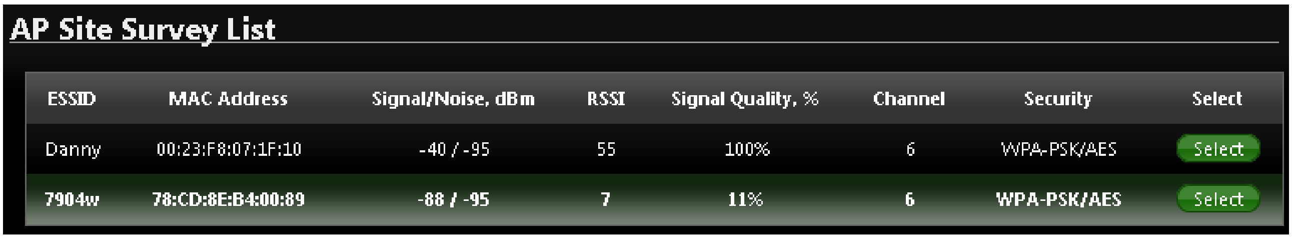
5.6 Site Survey

Use this tool to scan and locate WISP Access Points and select one to associate with. Please click on **Wireless -> Site Survey**. Below depicts an example for site survey.




Please Wait

Wireless Scanning...


AP Site Survey List

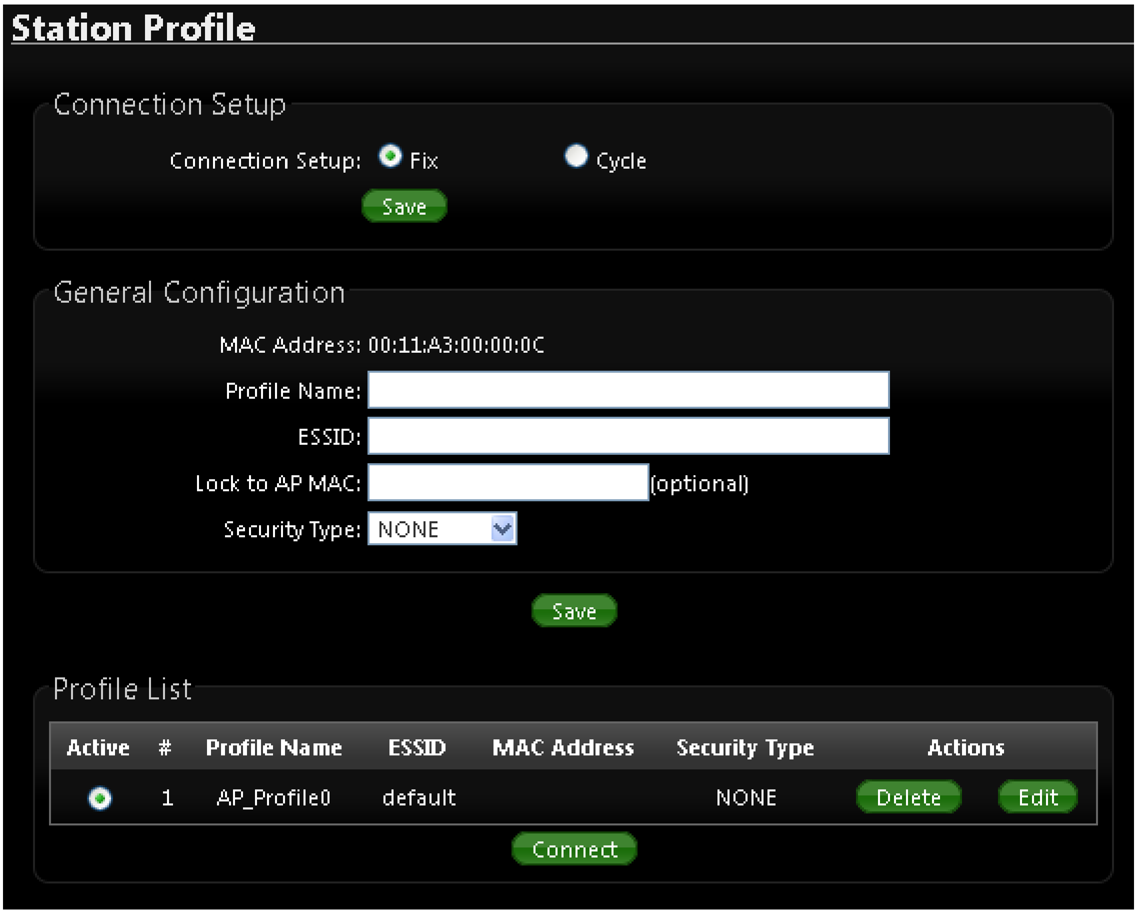
ESSID	MAC Address	Signal/Noise, dBm	RSSI	Signal Quality, %	Channel	Security	Select
Danny	00:23:F8:07:1F:10	-40 / -95	55	100%	6	WPA-PSK/AES	Select
7904w	78:CD:8E:B4:00:89	-88 / -95	7	11%	6	WPA-PSK/AES	Select

- **ESSID :** Available Extend Service Set ID of surrounding Access Points.
- **MAC Address :** MAC addresses of surrounding Access Points.
- **Signal/Noise dBm :** Received signal strength of all found Access Points.
- **RSSI :** Indicate the RSSI of the respective client's association.
- **Signal Quality (%) :** Received signal strength of all found Access Points.
- **Channel :** Channel numbers used by all found Access Points.
- **Security :** Security type by all found Access Points.
- **Select :** Click “Select” to configure settings and associate with chosen AP.

Notice

While clicking “Select” button in the Site Survey Table, the “ESSID” and “Security Type” will apply in the Wireless General Setup. However, more settings are needed including Security Key.

5.7 Station Profile



Station Profile

Connection Setup

Connection Setup: ● Fix ○ Cycle

General Configuration

MAC Address: 00:11:A3:00:00:0C

Profile Name:

ESSID:

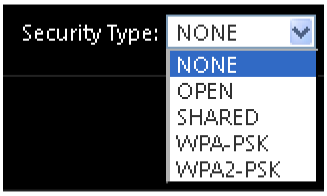
Lock to AP MAC: (optional)

Security Type: NONE

Profile List

Active	#	Profile Name	ESSID	MAC Address	Security Type	Actions
●	1	AP_Profile0	default		NONE	Delete Edit

- ➢ **Connection Setup :** Can you choose Fix or cycle to AP Link.
- ➢ **General Configuration :**
- ● **MAC address :** The remote AP MAC Address
- ● **Profile Name :** Set different profiles for quick connection uses.
- ● **ESSID :** Assign Service Set ID for the wireless system.
- ● **Lock to AP MAC :** the function will lock remote AP MAC Address.
- ● **Security Type :** Select an appropriate security type for association, the Security Type can be selected in “NONE”, “OPEN”, “SHARED”, “WPA-PSK”, or “WPA2-PSK” from drop-down list; the type needs to be the same as that associated access point.



Security Type: NONE

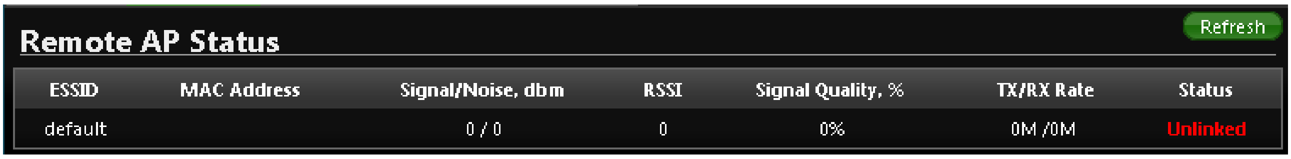
Usually choose to connect an AP site, If the selected AP is an encrypted, If the SSID is selected encryption, General Configuration list will show the AP encryption mode, Managers need to enter the correct SSID password on the password field.

Notice If you only click **“Connect”** button and does not click **“Save”** button. The selected profile would not be saved on the Profile List

Change these settings as described here and click **Save** button to save your changes. Click **Reboot** button to activate your changes.

5.8 Remote AP Status

Show the remote bridge AP whether is link or unlinked



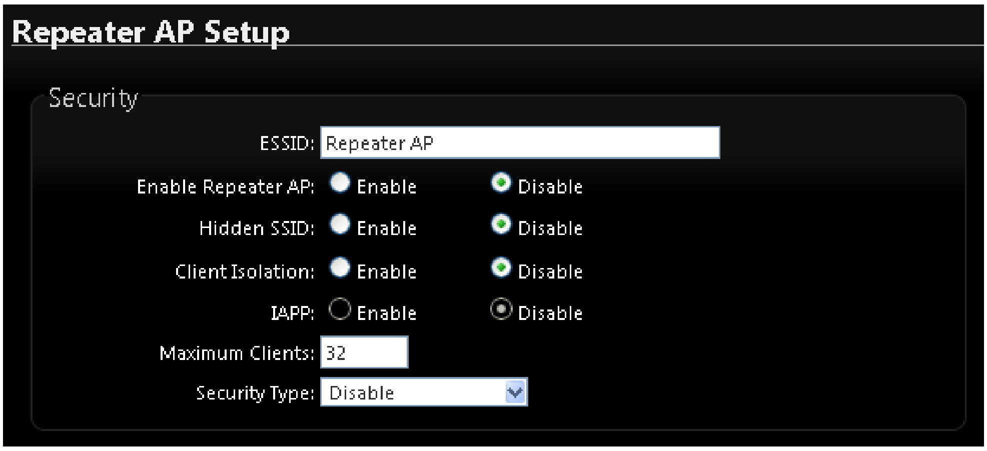
Remote AP Status

ESSID	MAC Address	Signal/Noise, dbm	RSSI	Signal Quality, %	TX/RX Rate	Status
default		0 / 0	0	0%	0M /0M	Unlinked

5.9 Repeater AP Setup

The network manager can configure related wireless settings, AP Setup, Security Settings, and Access Control Settings.

Administrators can configure ESSID, SSID broadcasting, Maximum number of client associations, security type settings and MAC Filter settings.



Repeater AP Setup

Security

ESSID: Repeater AP

Enable Repeater AP: ○ Enable ● Disable

Hidden SSID: ○ Enable ● Disable

Client Isolation: ○ Enable ● Disable

IAPP: ○ Enable ● Disable

Maximum Clients: 32

Security Type: Disable

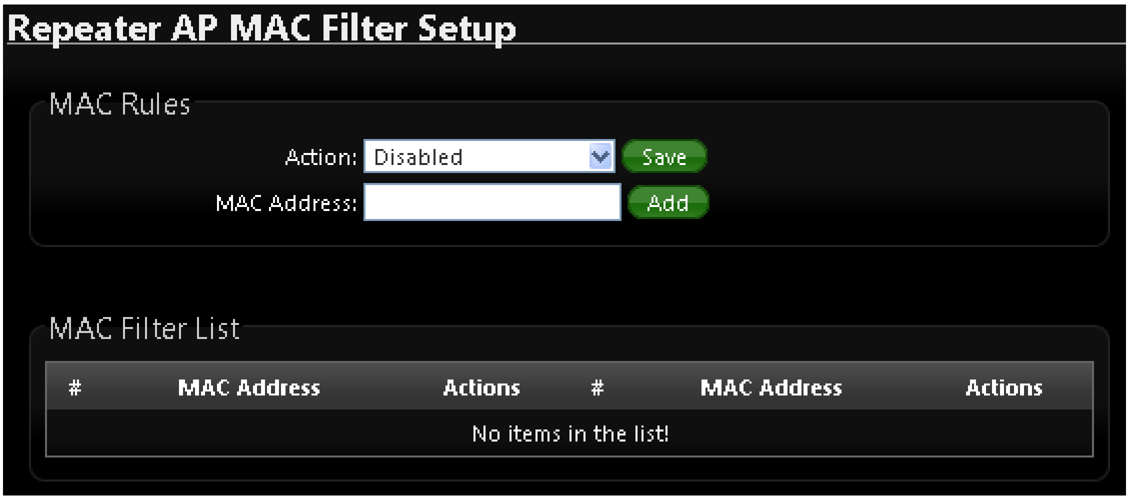
- **ESSID :** Extended Service Set ID, When clients are browsing for available wireless networks, this is the SSID that will appear in the list. ESSID will determine the service type available to AP clients associated with the specified VAP.
- **Enable Repeater AP :** choose Enable or Disable Repeater AP function, the default is Disable
- **Hidden SSID :** By default, it’s “Disable”. Enable this option to stop the SSID broadcast in your network. When disabled, people could easily obtain the SSID information with the site survey software and get access to the network if security is not turned on. When enabled, network security is enhanced. It’s suggested to enable it after AP security settings are archived and setting of AP clients could make to associate to it.

- **Client Isolation :** By default, it's "Disable". Select "Enable", all clients will be isolated from each other, which means they can't reach each other.
- **IAPP :** Inter Access-Point Protocol is designed for the enforcement of unique association throughout a ESS(Extended Service Set) and for secure exchange of station's security context between current access point (AP) and new AP during hand off period.
- **Maximum Clients :** The default value is 32. You can enter the number of wireless clients that can associate to a particular SSID. When the number of client is set to 5, only 5 clients at most are allowed to connect to this VAP.
- **Security Type :** Select the desired security type from the drop-down list; the options are Disable, WEP, WPA-PSK, WPA2-PSK, WPA-Enterprise, WPA2-Enterprise and WEP 802.1X.

※ **The Security Type you can refer 3.7 Virtual AP General Configuration → Security Type**

5.10 Repeater AP MAC Filter Setup

Continue Virtual AP Setup section. For each Virtual AP setting, the administrator can allow or reject clients to access each Virtual AP.



Repeater AP MAC Filter Setup

MAC Rules

Action: Disabled

MAC Address:

MAC Filter List

#	MAC Address	Actions	#	MAC Address	Actions
No items in the list!					

- **Action:** Select the desired access control type from the drop-down list; the options are Disable, Allow or Reject.

- **Only Allow List MAC:** Define certain wireless clients in the list which will have granted access to the Access Point while the access will be denied for all the remaining clients – Action Type is set to "Only Allow List MAC".
- **Only Deny List MAC:** Define certain wireless clients in the list which will have denied access to the Access Point while the access will be granted for all the remaining clients - Action Type is set to "Only Deny List MAC".

Notice **MAC Access Control is the weakest security approach. WPA or WPA2 security methods should be used when possible.**
There are a maximum of 20 clients allowed in this "Enable" List. The MAC

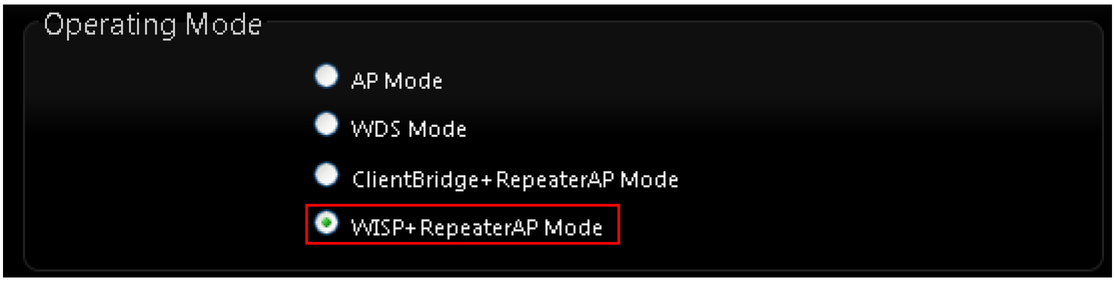
addresses of the wireless clients can be added and removed to the list using the Add and Remove buttons.

6. WISP + AP Mode Configuration

When WISP + AP Mode is chosen, the system can be configured as an WISP + AP Mode. This section provides detailed explanation for users to configure in the WISP + AP Mode with help of illustrations. In the WISP + AP Mode, functions listed in the table below are also available from the Web-based GUI interface.

6.1 Chose Your Operating Mode (WISP + Repeater AP Mode)

The system administrator can set the desired mode via this page, and then configure the system according to their deployment needs, Please click on System -> Operating Mode and follow the below setting.



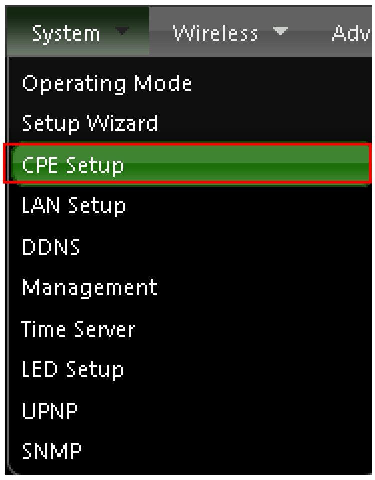
Operating Mode

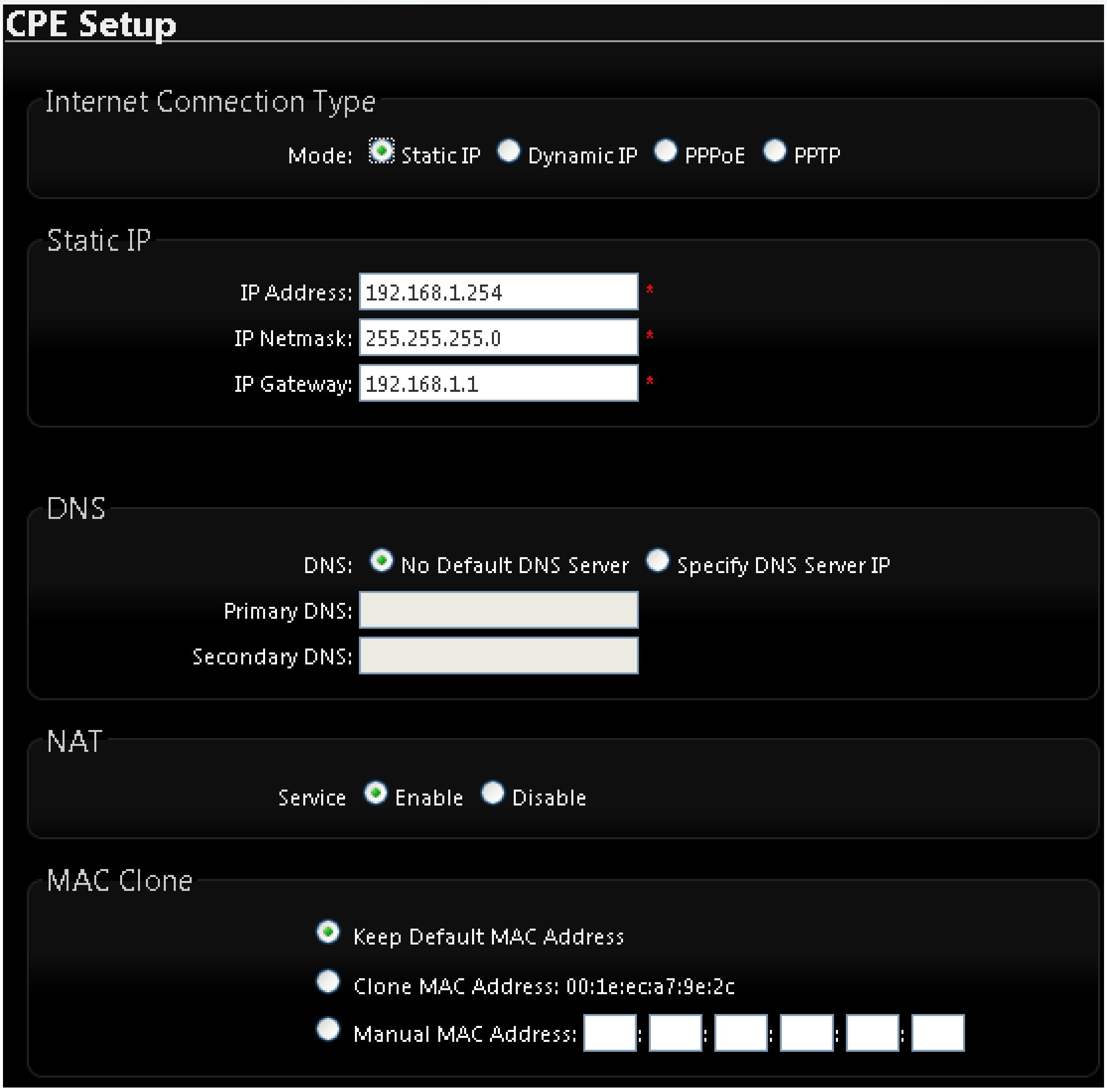
○ AP Mode
○ WDS Mode
○ ClientBridge+RepeaterAP Mode
● WISP+RepeaterAP Mode

6.2 Configure CPE(WAN) Setup

It can be used as an Router AP with WDS function. In this mode, 100GX-N is a gateway enabled with NAT and DHCP Server functions. The wireless clients connected to Internet.

There are Four connection types for the WAN port : **Static IP**, **Dynamic IP**, **PPPoE** and **PPTP**. Please click on **System -> CPE** and follow the below setting.





CPE Setup

Internet Connection Type

Mode: ● Static IP ○ Dynamic IP ○ PPPoE ○ PPTP

Static IP

IP Address: 192.168.1.254 *

IP Netmask: 255.255.255.0 *

IP Gateway: 192.168.1.1 *

DNS

DNS: ● No Default DNS Server ○ Specify DNS Server IP

Primary DNS:

Secondary DNS:

NAT

Service ● Enable ○ Disable

MAC Clone

● Keep Default MAC Address

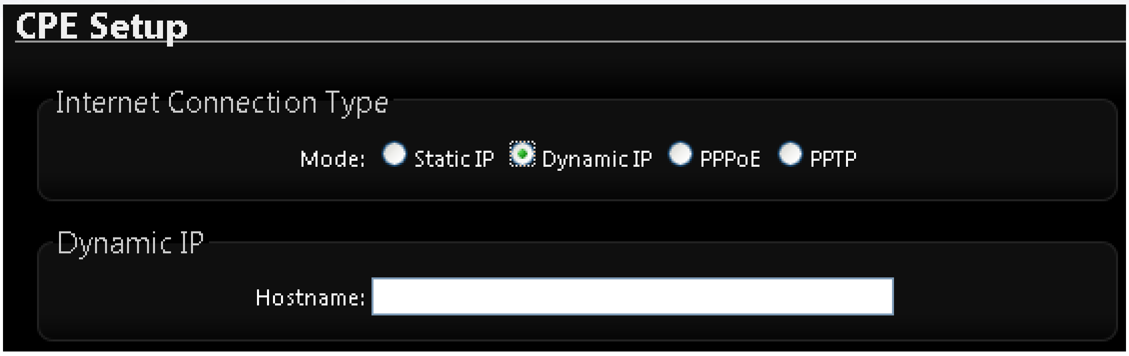
○ Clone MAC Address: 00:1e:ec:a7:9e:2c

○ Manual MAC Address: __ : __ : __ : __ : __ : __

Internet connection Type

- **Static IP :** Users can manually setup the WAN IP address with a static IP provided by WISP.
  - **IP Address :** The IP address of the WAN port; default IP address is 192.168.1.254
  - **IP Netmask :** The Subnet mask of the WAN port; default Netmask is 255.255.255.0
  - **IP Gateway :** The default gateway of the WAN port; default Gateway is 192.168.1.1

- **Dynamic IP :** Please consult with WISP for correct wireless settings to associate with WISP AP before a dynamic IP, along with related IP settings including DNS can be available from DHCP server. If IP Address is not assigned, please double check with your wireless settings and ensure successful association. Also, you may go to "WAN Information" in the Overview page to click Release button to release IP address and click Renew button to renew IP address again.



CPE Setup

Internet Connection Type

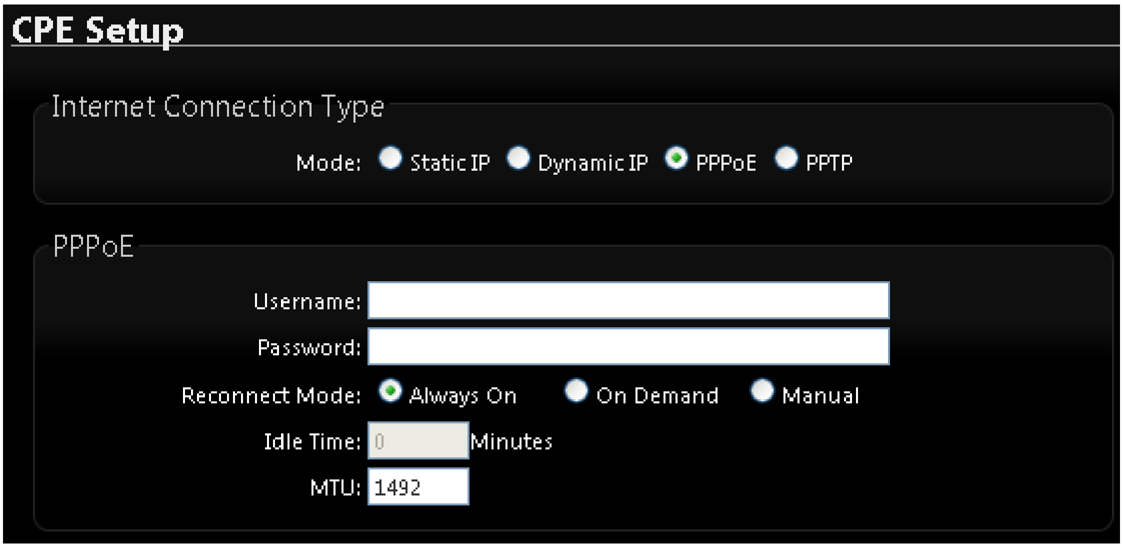
Mode: ○ Static IP ● Dynamic IP ○ PPPoE ○ PPTP

Dynamic IP

Hostname:

- **Hostname :** The Hostname of the WAN port

➢ **PPPoE :** To create wireless PPPoE WAN connection to a PPPoE server in network.



CPE Setup

Internet Connection Type

Mode: ○ Static IP ○ Dynamic IP ● PPPoE ○ PPTP

PPPoE

Username:

Password:

Reconnect Mode: ● Always On ○ On Demand ○ Manual

Idle Time: 0 Minutes

MTU: 1492

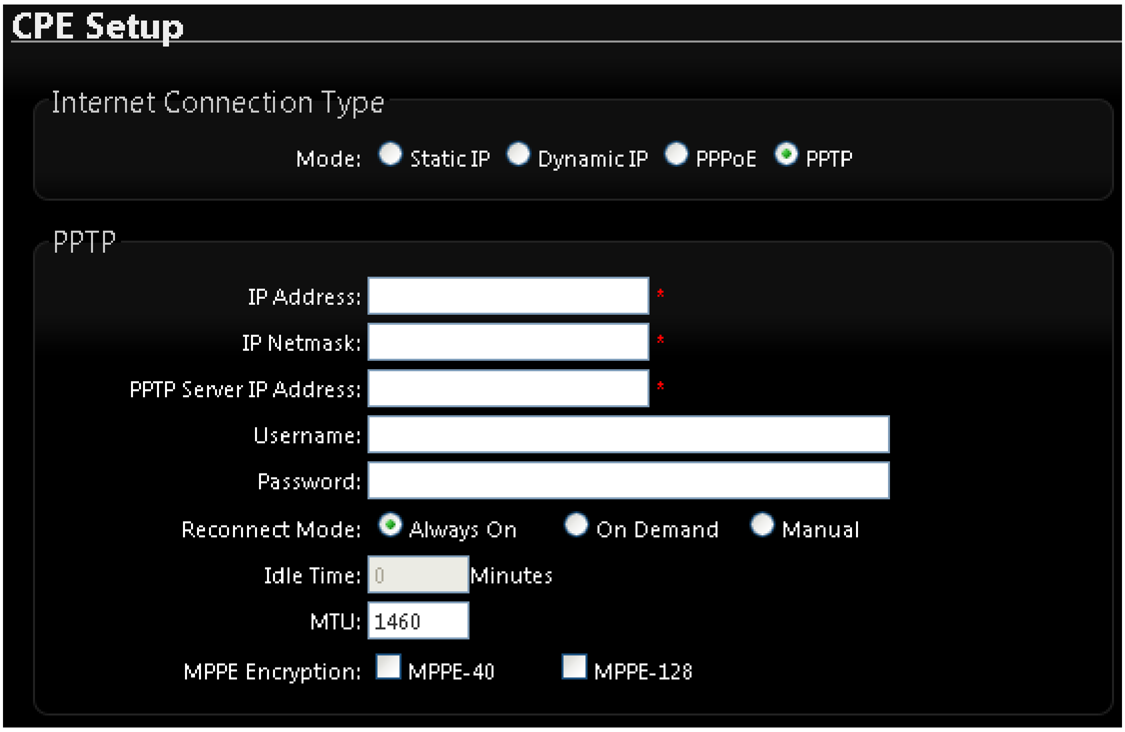
- **User Name :** Enter User Name for PPPoE connection
- **Password :** Enter Password for PPPoE connection
- **Reconnect Mode :**
  - ✓ **Always on –** A connection to Internet is always maintained.
  - ✓ **On Demand –** A connection to Internet is made as needed.

> Notice
>
> When Time Server is enabled at the **"On Demand"** mode, the **"Reconnect Mode"** will turn out **"Always on".**

  - ✓ **Manual –** Click the "Connect" button on "WAN Information" in the Overview page to connect to the Interne

- **Idle Time :** Time to last before disconnecting PPPoE session when it is idle. Enter preferred Idle Time in minutes. Default is "0", indicates disabled. When Idle time is disabled, the "Reconnect Mode" will turn out "Always on"
- **MTU :** By default, it's 1492 bytes. MTU stands for Maximum Transmission Unit. Consult with WISP for a correct MTU setting.t.

- **PPTP :** The Point-to-Point Tunneling Protocol (PPTP) mode enables the implementation of secure multi-protocol Virtual Private Networks (VPNs) through public networks.



CPE Setup

Internet Connection Type

Mode: ○ Static IP ○ Dynamic IP ○ PPPoE ● PPTP

PPTP

IP Address: *

IP Netmask: *

PPTP Server IP Address: *

Username:

Password:

Reconnect Mode: ● Always On ○ On Demand ○ Manual

Idle Time: 0 Minutes

MTU: 1460

MPPE Encryption: □ MPPE-40 □ MPPE-128

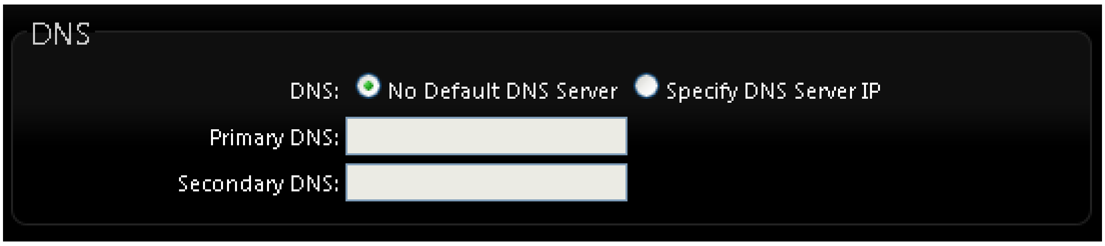
- **IP Address :** The IP address of the WAN port
- **IP Netmask :** The Subnet mask of the WAN port
- **PPTP Server IP Address :** The IP address of the PPTP server
- **User Name :** Enter User Name for PPTP connection
- **Password :** Enter Password for PPTP connection
- Reconnect Mode :
  - ✓ **Always on –** A connection to Internet is always maintained.
  - ✓ **On Demand –** A connection to Internet is made as needed.

Notice When Time Server is enabled at the **"On Demand"** mode, the **"Reconnect Mode"** will turn out **"Always on".**

  - ✓ **Manual –** Click the "Connect" button on "WAN Information" in the Overview page to connect to the Interne

- **Idle Time :** Time to last before disconnecting PPPoE session when it is idle. Enter preferred Idle Time in minutes. Default is "0", indicates disabled. When Idle time is disabled, the "Reconnect Mode" will turn out "Always on"
- **MTU :** By default, it's 1492 bytes. MTU stands for Maximum Transmission Unit. Consult with WISP for a correct MTU setting.t.
- **MPPE Encryption :** Microsoft Point-to-Point Encryption (MPPE) encrypts data in Point-to-Point Protocol(PPP)-based dial-up connections or Point-to-Point Tunneling Protocol (PPTP) virtual private network (VPN) connections. 128-bit key (strong) and 40-bit key (standard) MPPE encryption schemes are supported. MPPE provides data security for the PPTP connection that is between the VPN client and the VPN server.

- **DNS :** Check "No Default DNS Server" or "Specify DNS Server IP" radial button as desired to set up system DNS.



DNS

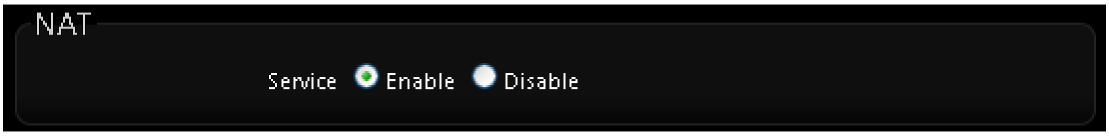
DNS: ● No Default DNS Server ○ Specify DNS Server IP

Primary DNS:

Secondary DNS:

- **Primary :** The IP address of the primary DNS server.
- **Secondary :** The IP address of the secondary DNS server.

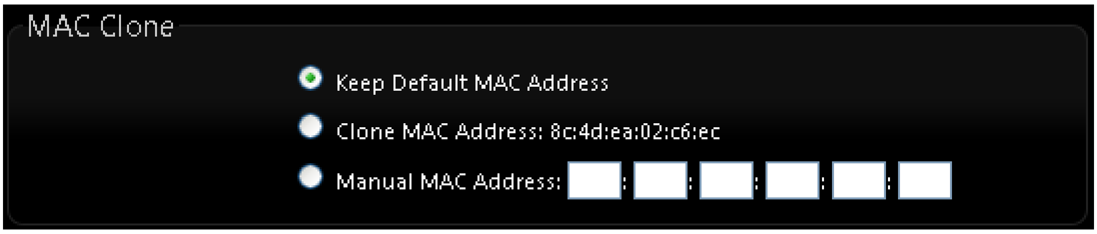
- **NAT :** The NAT support Enable and Disable Service



NAT

Service ● Enable ○ Disable

- **MAC Clone :** The MAC address is a 12-digit HEX code uniquely assigned to hardware as identification. Some ISPs require you to register a MAC address in order to access to Internet. If not, you could use default MAC or clone MAC from a PC.



MAC Clone

● Keep Default MAC Address

○ Clone MAC Address: 8c:4d:ea:02:c6:ec

○ Manual MAC Address: : : : : :

- Keep Default MAC Address : Keep the default MAC address of WAN port on the system.
- Clone MAC Address : If you want to clone the MAC address of the PC, then click the Clone MAC Address button. The system will automatically detect your PC's MAC address.

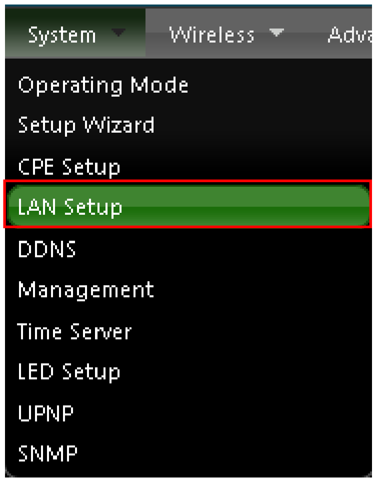
> Notice
>
> The Clone MAC Address field will display MAC address of the PC connected to system. Click "Save" button can make clone MAC effective.

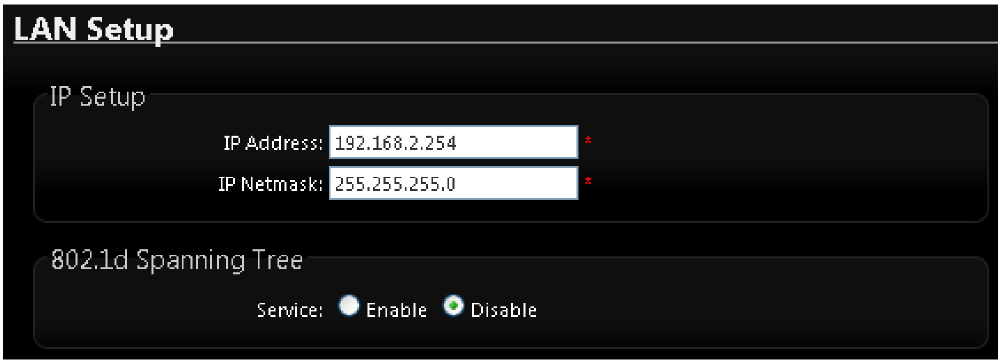
- Manual MAC Address : Enter the MAC address registered with your ISP.

Click **Save** button to save your changes. Click **Reboot** button to activate your changes

6.3 Configure 100GX-N LAN IP Address

Here are the instructions for how to setup the local IP Address and Netmask. Please click on **System -> LAN** and follow the below setting.





LAN Setup

IP Setup

IP Address: 192.168.2.254 *

IP Netmask: 255.255.255.0 *

802.1d Spanning Tree

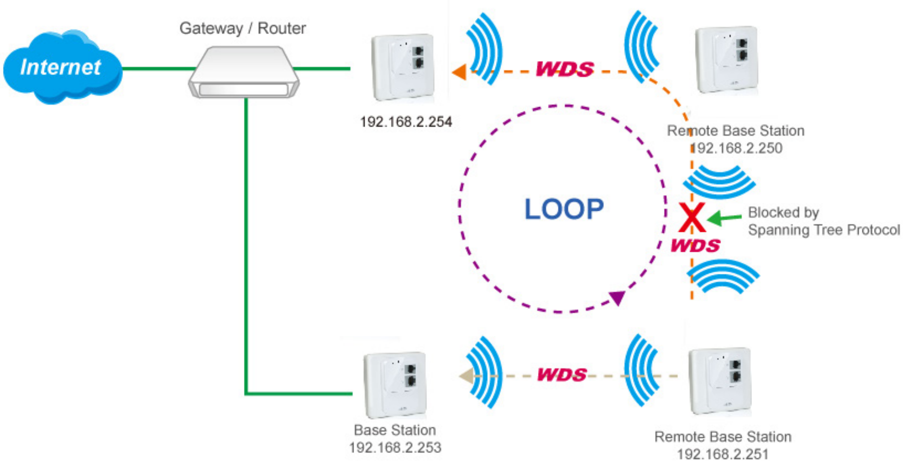
Service: ○ Enable ● Disable

LAN Setup

- **IP Address :** The IP address of the LAN port; default IP address is 192.168.2.254
- **IP Netmask :** The Subnet mask of the LAN port; default Netmask is 255.255.255.0

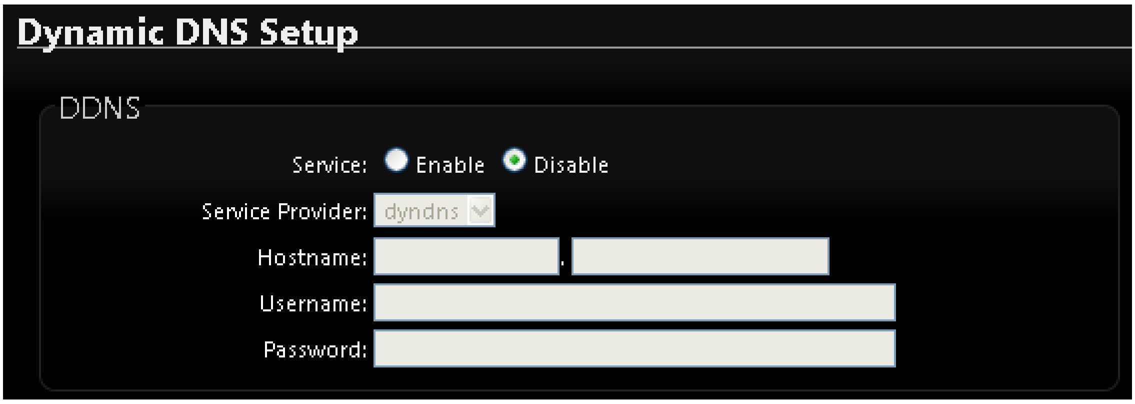
802.1d Spanning Tree

The spanning tree network protocol provides a loop free topology for a bridged LAN between LAN interface and 8 WDS interfaces from wds0 to wds7. The Spanning Tree Protocol, which is also referred to as STP, is defined in the IEEE Standard 802.1d



6.4 Configure DDNS Setup

Dynamic DNS allows you to map domain name to dynamic IP address. Please click on **System -> DDNS** Setup and follow the below setting.



Dynamic DNS Setup

DDNS

Service: ○ Enable ● Disable

Service Provider: dyndns

Hostname: .

Username:

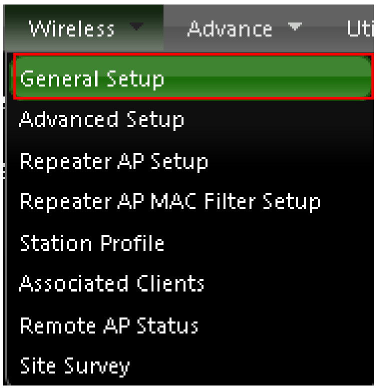
Password:

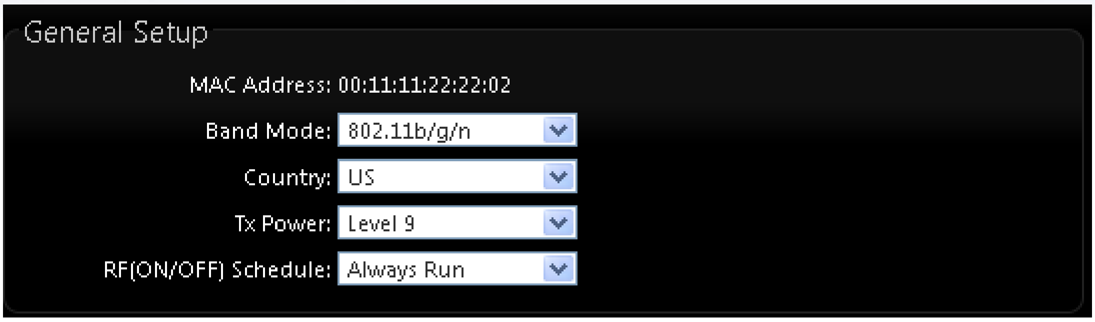
- **Enabled:** By default, it's "Disable". The mapping domain name won't change when dynamic IP changes. The beauty of it is no need to remember the dynamic WAP IP while accessing to it.
- **Service Provider:** Select the preferred Service Provider from the drop-down list including dyndns, dhs, ods and tzo
- **Hostname:** Host Name that you register to Dynamic-DNS service and export.
- **User Name & Password:** User Name and Password are used to login DDNS service.

Click **Save button** to save your changes Click **Reboot button** to activate your changes

6.5 Wireless General Setup

The administrator can change the data transmission, channel and output power settings for the system. Please click on **Wireless -> General** Setup and follow the below setting.





General Setup

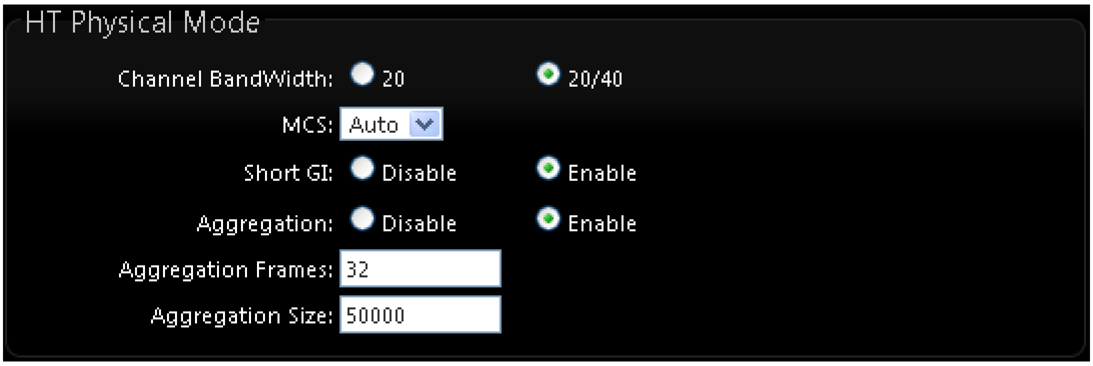
MAC Address: 00:11:11:22:22:02

Band Mode: 802.11b/g/n

Country: US

Tx Power: Level 9

RF(ON/OFF) Schedule: Always Run



HT Physical Mode

Channel BandWidth: ○ 20 ● 20/40

MCS: Auto

Short GI: ○ Disable ● Enable

Aggregation: ○ Disable ● Enable

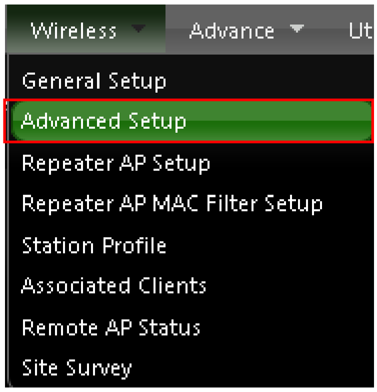
Aggregation Frames: 32

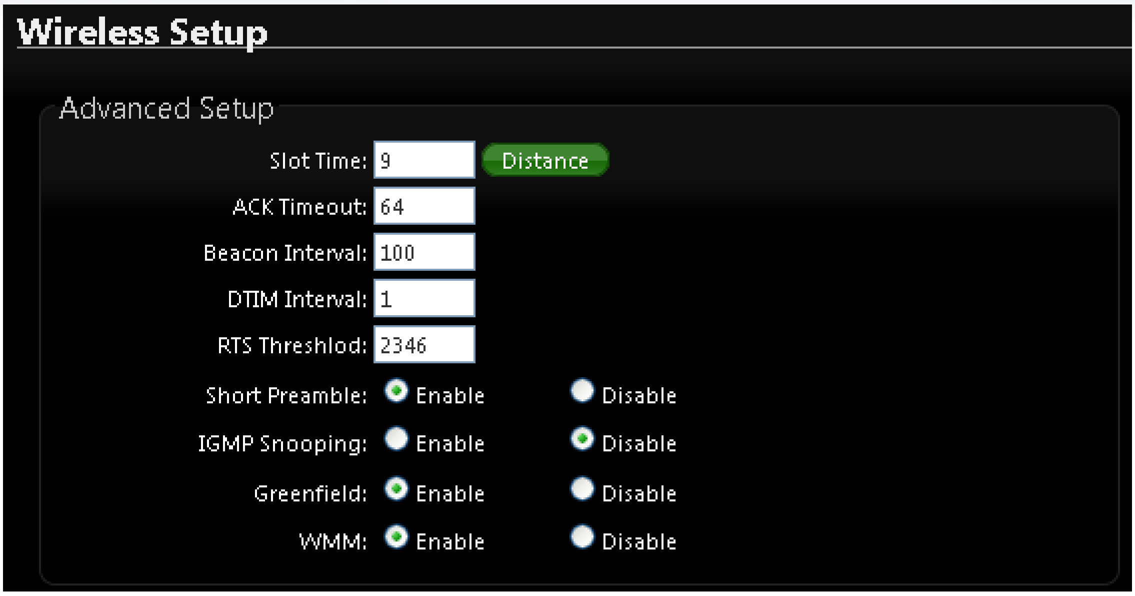
Aggregation Size: 50000

※ **Please refer 3.4 Wireless General Setup Explanation**

6.6 Configure Wireless Advanced Setup

The administrator can change the Slot Time, ACK Timeout, RTS threshold and fragmentation threshold settings for the system. Please click on **Wireless -> Advanced Setup** and follow the below setting.

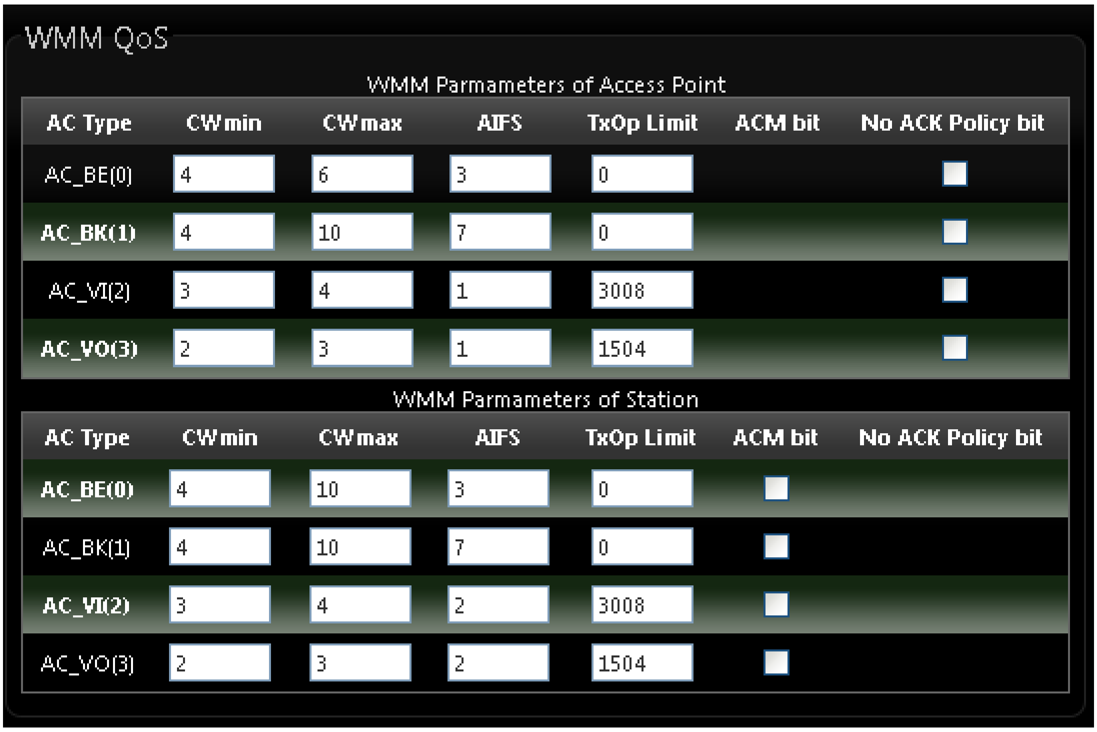




Wireless Setup

Advanced Setup

Slot Time:	9 [Distance]
ACK Timeout:	64
Beacon Interval:	100
DTIM Interval:	1
RTS Threshlod:	2346
Short Preamble:	● Enable ○ Disable
IGMP Snooping:	○ Enable ● Disable
Greenfield:	● Enable ○ Disable
WMM:	● Enable ○ Disable



WMM QoS

WMM Parmameters of Access Point

AC Type	CWmin	CWmax	AIFS	TxOp Limit	ACM bit	No ACK Policy bit
AC_BE(0)	4	6	3	0		☐
AC_BK(1)	4	10	7	0		☐
AC_VI(2)	3	4	1	3008		☐
AC_VO(3)	2	3	1	1504		☐

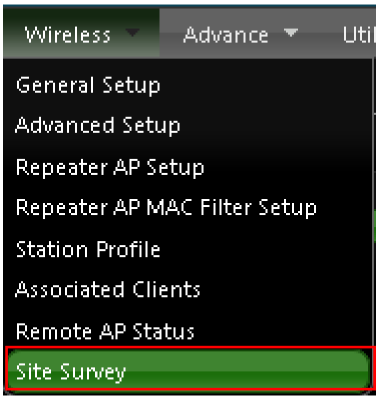
WMM Parmameters of Station

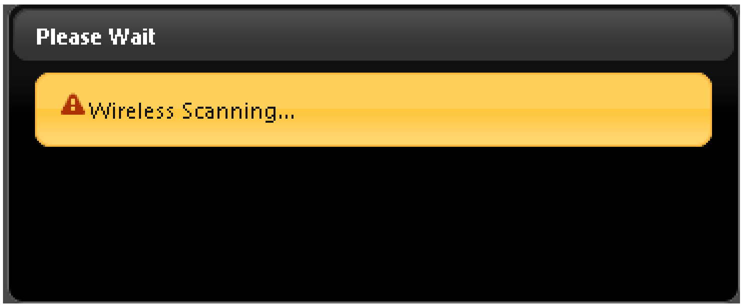
AC Type	CWmin	CWmax	AIFS	TxOp Limit	ACM bit	No ACK Policy bit
AC_BE(0)	4	10	3	0	☐	
AC_BK(1)	4	10	7	0	☐	
AC_VI(2)	3	4	2	3008	☐	
AC_VO(3)	2	3	2	1504	☐	

※ Please refer 3.5 Configure Wireless Advanced Setup Explanation

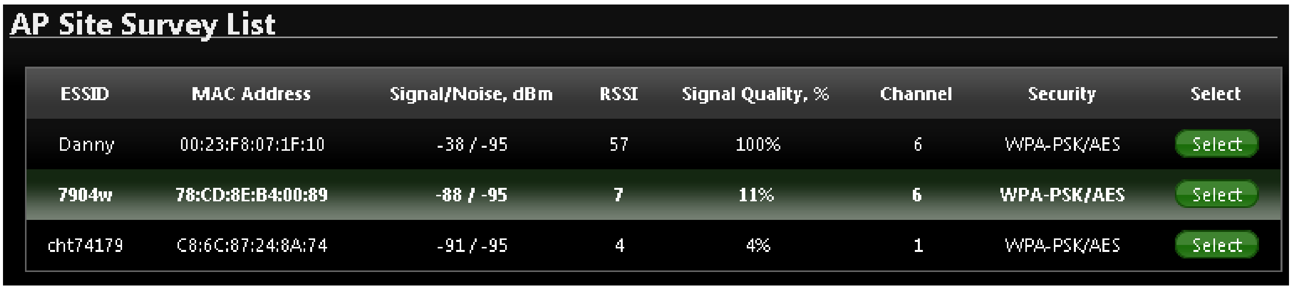
6.7 Site Survey

Use this tool to scan and locate WISP Access Points and select one to associate with. Please click on **Wireless -> Site Survey**. Below depicts an example for site survey.




Please Wait

⚠ Wireless Scanning...


AP Site Survey List

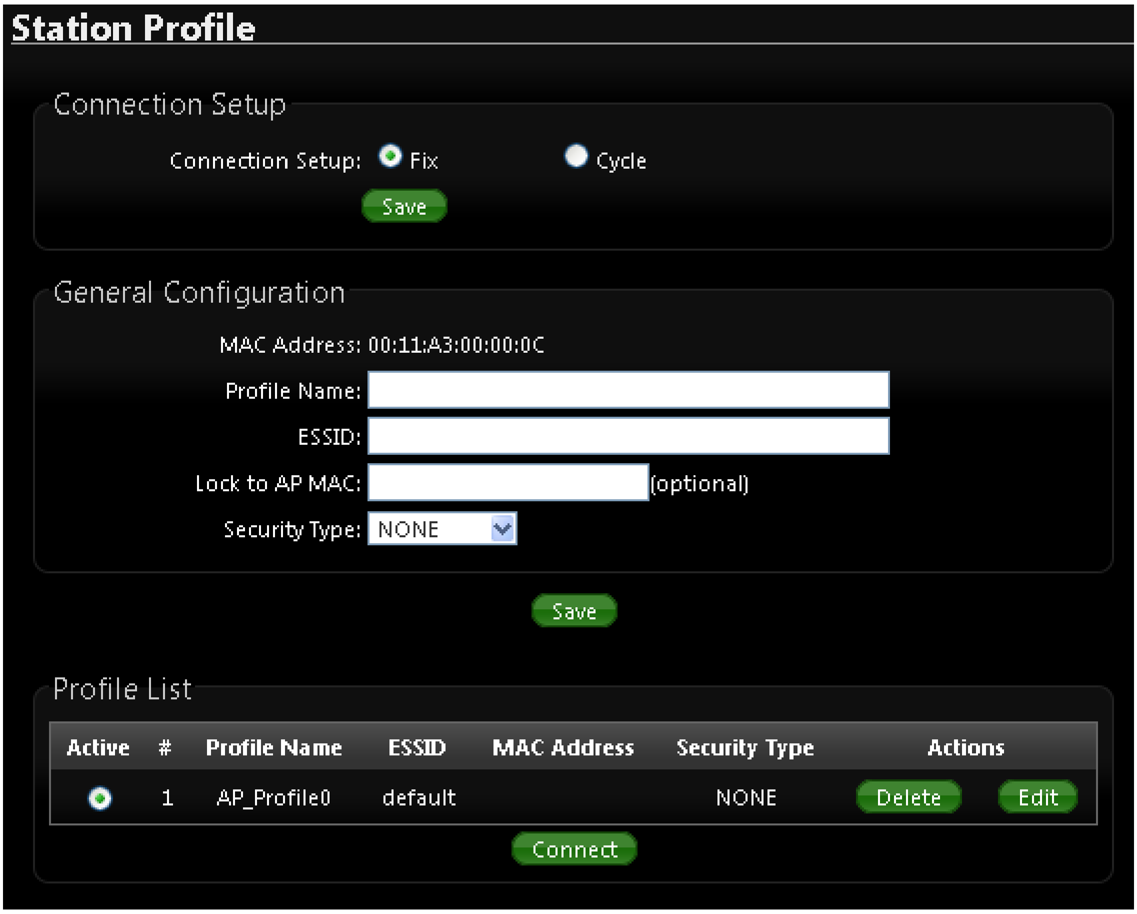
ESSID	MAC Address	Signal/Noise, dBm	RSSI	Signal Quality, %	Channel	Security	Select
Danny	00:23:F8:07:1F:10	-38 / -95	57	100%	6	WPA-PSK/AES	Select
7904w	78:CD:8E:B4:00:89	-88 / -95	7	11%	6	WPA-PSK/AES	Select
cht74179	C8:6C:87:24:8A:74	-91 / -95	4	4%	1	WPA-PSK/AES	Select

- ESSID : Available Extend Service Set ID of surrounding Access Points.
- MAC Address : MAC addresses of surrounding Access Points.
- Signal/Noise dBm : Received signal strength of all found Access Points.
- RSSI : Indicate the RSSI of the respective client's association.
- Signal Quality (%) : Received signal strength of all found Access Points.
- Channel : Channel numbers used by all found Access Points.
- Security : Security type by all found Access Points.
- Select : Click “Select” to configure settings and associate with chosen AP.

Notice

While clicking “Select” button in the Site Survey Table, the “ESSID” and “Security Type” will apply in the Wireless General Setup. However, more settings are needed including Security Key.

6.8 Station Profile



Station Profile

Connection Setup

Connection Setup: ● Fix ○ Cycle

General Configuration

MAC Address: 00:11:A3:00:00:0C

Profile Name:

ESSID:

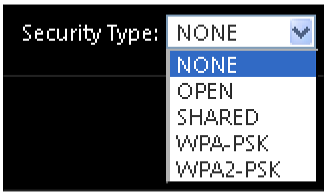
Lock to AP MAC: (optional)

Security Type: NONE

Profile List

Active	#	Profile Name	ESSID	MAC Address	Security Type	Actions
●	1	AP_Profile0	default		NONE	Delete Edit

- ➢ **Connection Setup :** Can you choose Fix or cycle to AP Link.
- ➢ **General Configuration :**
- ● **MAC address :** The remote AP MAC Address
- ● **Profile Name :** Set different profiles for quick connection uses.
- ● **ESSID :** Assign Service Set ID for the wireless system.
- ● **Lock to AP MAC :** the function will lock remote AP MAC Address.
- ● **Security Type :** Select an appropriate security type for association, the Security Type can be selected in “NONE”, “OPEN”, “SHARED”, “WPA-PSK”, or “WPA2-PSK” from drop-down list; the type needs to be the same as that associated access point.



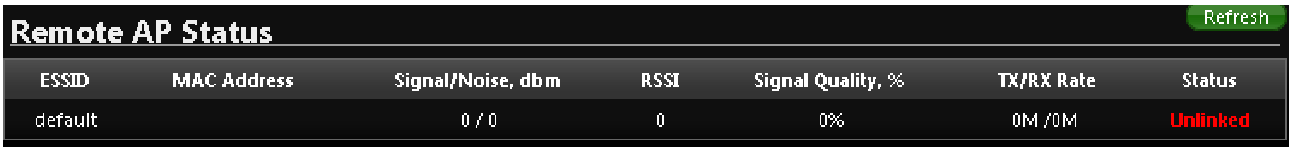
Security Type: NONE

Usually choose to connect an AP site, If the selected AP is an encrypted, If the SSID is selected encryption, General Configuration list will show the AP encryption mode, Managers need to enter the correct SSID password on the password field.

Notice If you only click **"Connect"** button and does not click **"Save"** button. The selected profile would not be saved on the Profile List

6.9 Remote AP Status

Show information of bridge signal link or unlink and remote SSID name by WISP. If set multiple connections, The GUI list will show multiple AP information on "Remote AP Status"



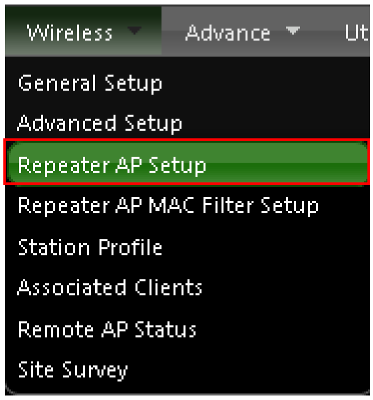
Remote AP Status

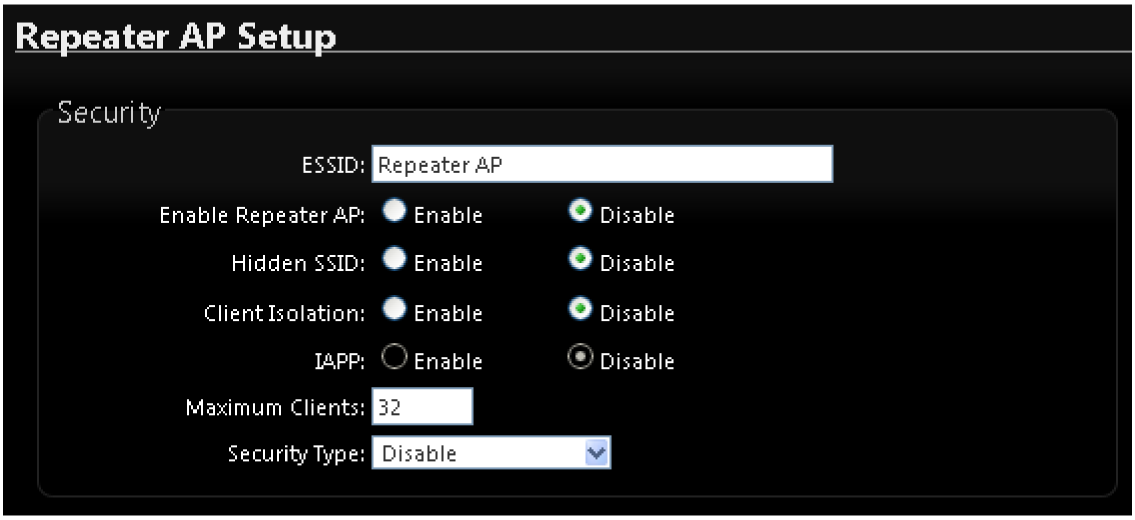
ESSID	MAC Address	Signal/Noise, dbm	RSSI	Signal Quality, %	TX/RX Rate	Status
default		0 / 0	0	0%	0M /0M	Unlinked

6.10 Repeater AP Setup

The network manager can configure related wireless settings, AP Setup, Security Settings, and Access Control Settings.

Administrators can configure ESSID, SSID broadcasting, Maximum number of client associations, security type settings and MAC Filter settings.





Repeater AP Setup

Security

ESSID: Repeater AP

Enable Repeater AP: ○ Enable ● Disable

Hidden SSID: ○ Enable ● Disable

Client Isolation: ○ Enable ● Disable

IAPP: ○ Enable ● Disable

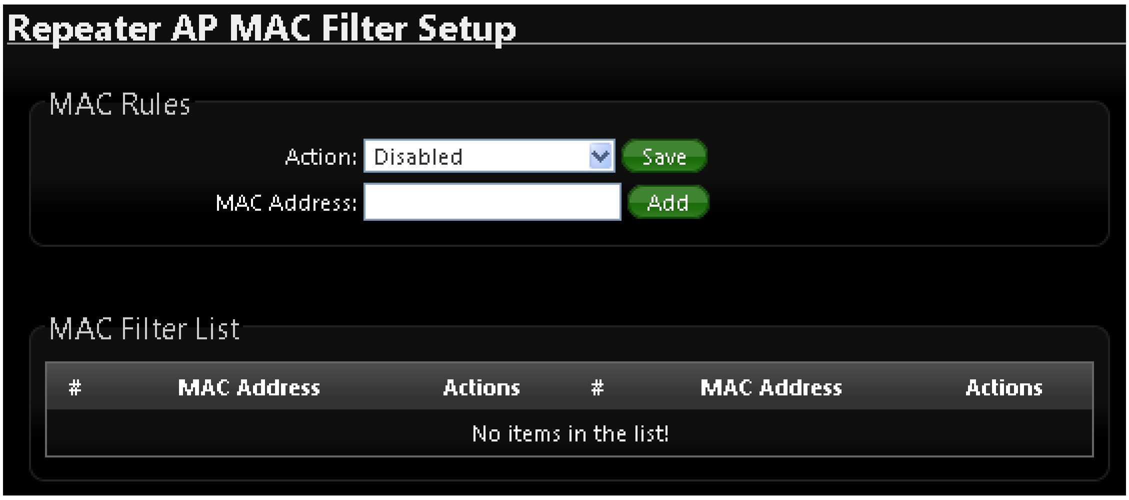
Maximum Clients: 32

Security Type: Disable

※ **Please refer 5.9 Repeater AP Setup Explanation**

6.11 Repeater AP MAC Filter Setup

Continue Virtual AP Setup section. For each Virtual AP setting, the administrator can allow or reject clients to access each Virtual AP.



Repeater AP MAC Filter Setup

MAC Rules

Action: Disabled

MAC Address:

MAC Filter List

#	MAC Address	Actions	#	MAC Address	Actions
No items in the list!					

- **Action:** Select the desired access control type from the drop-down list; the options are Disable, Allow or Reject.
- **Only Allow List MAC:** Define certain wireless clients in the list which will have granted access to the Access Point while the access will be denied for all the remaining clients – Action Type is set to “Only Allow List MAC”.
- **Only Deny List MAC:** Define certain wireless clients in the list which will have denied access to the Access Point while the access will be granted for all the remaining clients - Action Type is set to “Only Deny List MAC”.

Notice

1 MAC Access Control is the weakest security approach. WPA or WPA2 security methods should be used when possible.

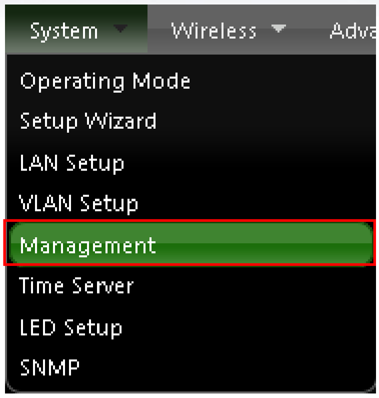
2 There are a maximum of 20 clients allowed in this “Enable” List. The MAC addresses of the wireless clients can be added and removed to the list using the Add and Remove buttons.

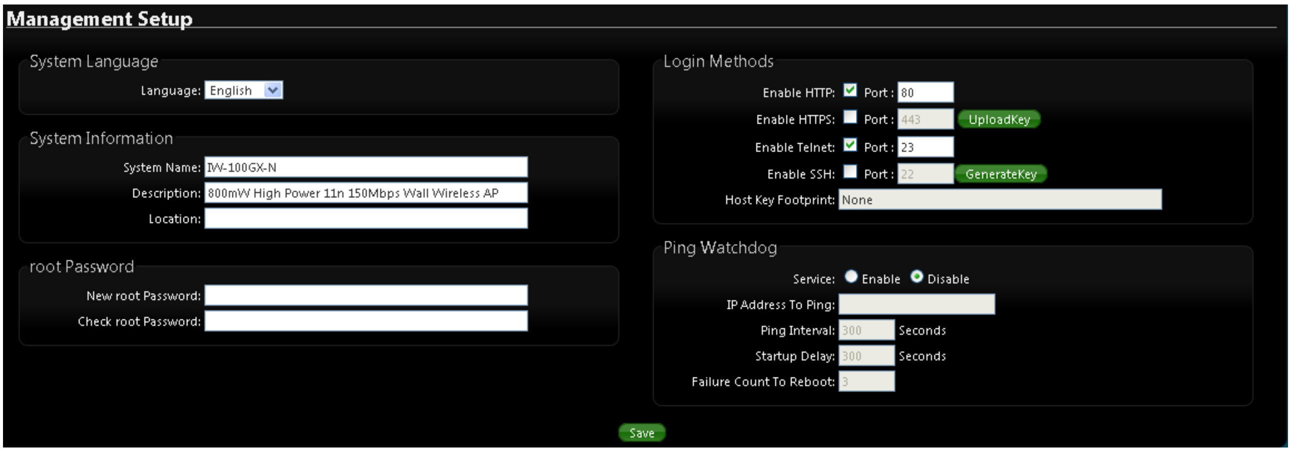
7 System Management

7.1 Configure Management

Administrator could specify geographical location of the system via instructions in this page. Administrator could also enter new Root and Admin passwords and allow multiple login methods.

Please click **System -> Management** and follow the below settings




Management Setup

System Language

Language: English

System Information

System Name: IW-100GX-N

Description: 800mW High Power 11n 150Mbps Wall Wireless AP

Location:

root Password

New root Password:

Check root Password:

Login Methods

Enable HTTP: ☑ Port : 80

Enable HTTPS: □ Port : 443 UploadKey

Enable Telnet: ☑ Port : 23

Enable SSH: □ Port : 22 GenerateKey

Host Key Footprint: None

Ping Watchdog

Service: ○ Enable ● Disable

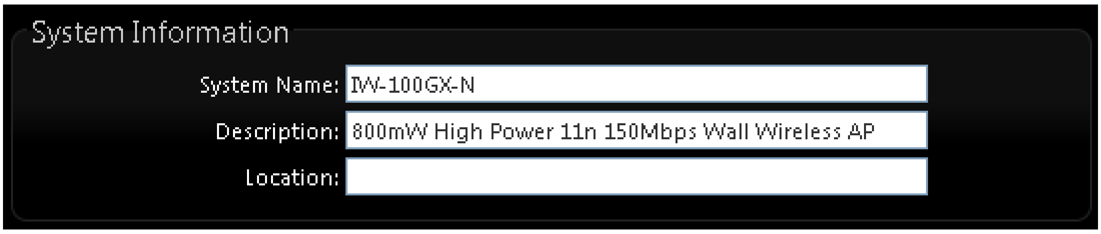
IP Address To Ping:

Ping Interval: 300 Seconds

Startup Delay: 300 Seconds

Failure Count To Reboot: 3

System Information


System Information

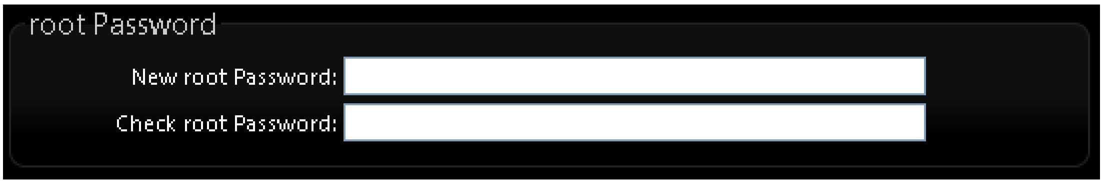
System Name: IW-100GX-N

Description: 800mW High Power 11n 150Mbps Wall Wireless AP

Location:

- **System Name :** Enter a desired name or use the default one.
- **Description :** Provide description of the system.
- **Location :** Enter geographical location information of the system. It helps administrator to locate the system easier.

Root Password : Log in as a root user and is allowed to change its own, plus admin user's password.

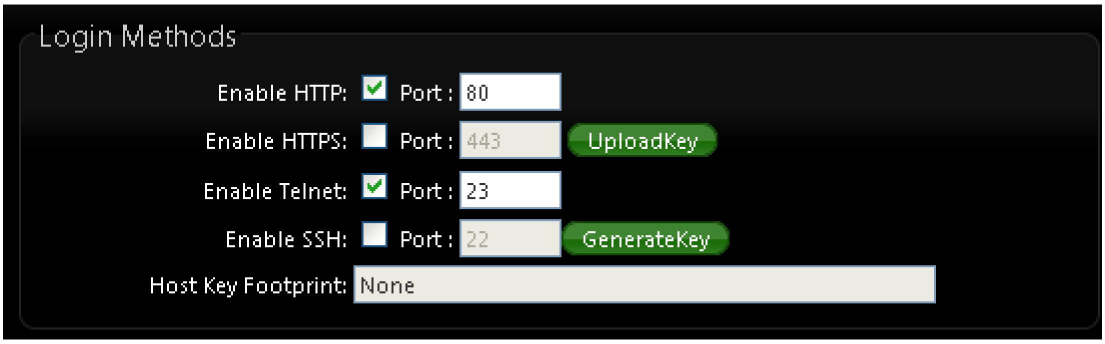

root Password

New root Password:

Check root Password:

- **New Password :** Enter a new password if desired
- **Check New Password :** Enter the same new password again to check.

Login Methods: Only root user can enable or disable system login methods and change services port.



Login Methods

Enable HTTP: ☑ Port : 80

Enable HTTPS: □ Port : 443 UploadKey

Enable Telnet: ☑ Port : 23

Enable SSH: □ Port : 22 GenerateKey

Host Key Footprint: None

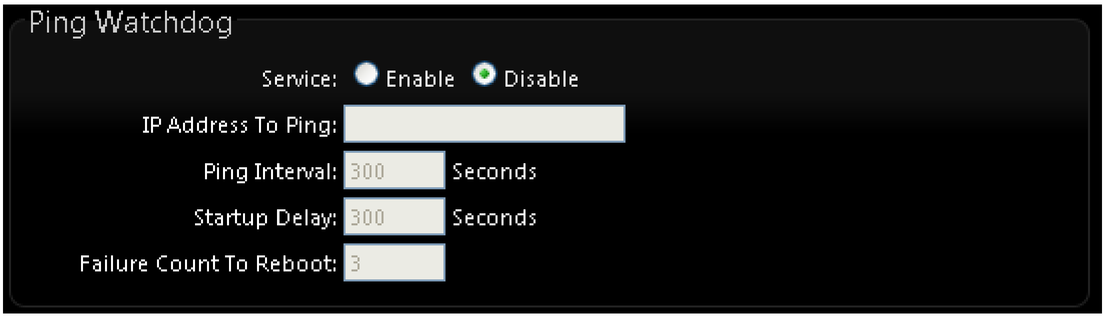
- **Enable HTTP :** Check to select HTTP Service.
- **Enable HTTPS :** Check to select HTTPS Service
- **HTTPS Port :** The default is 443 and the range is between 1 ~ 65535.

Notice If you already have an SSL Certificate, please click “Upload Key” button to select the file and upload it.

- **Enable Telnet :** Check to select Telnet Service
- **Telnet Port :** The default is 23 and the range is between 1 ~ 65535.
- **Enable SSH :** Check to select SSH Service
- **SSH Port :** Please The default is 22 and the range is between 1 ~ 65535.

Notice Click “Generate Key” button to generate RSA private key. The “host key footprint” gray blank will display content of RSA key.

Ping Watchdog : The ping watchdog sets the 100GX-N Device to continuously ping a user defined IP address (it can be the internet gateway for example). If it is unable to ping under the user defined constraints, the 100GX-N device will automatically reboot. This option creates a kind of "fail-proof" mechanism.



Ping Watchdog

Service: ○ Enable ● Disable

IP Address To Ping:

Ping Interval: 300 Seconds

Startup Delay: 300 Seconds

Failure Count To Reboot: 3

Ping Watchdog is dedicated for continuous monitoring of the particular connection to remote host using the Ping tool. The Ping works by sending ICMP “echo request” packets to the target host and listening for ICMP “echo response” replies. If the defined number of replies is not received, the tool reboots the device.

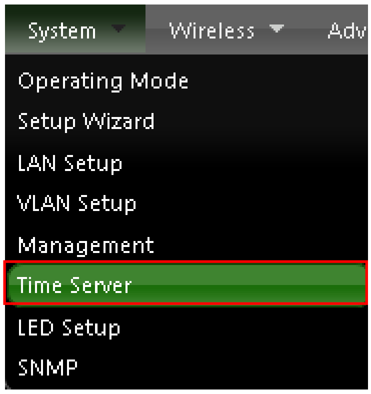
- **Enable Ping Watchdog :** control will enable Ping Watchdog Tool.
- **IP Address To Ping :** specify an IP address of the target host which will be monitored by Ping Watchdog Tool.

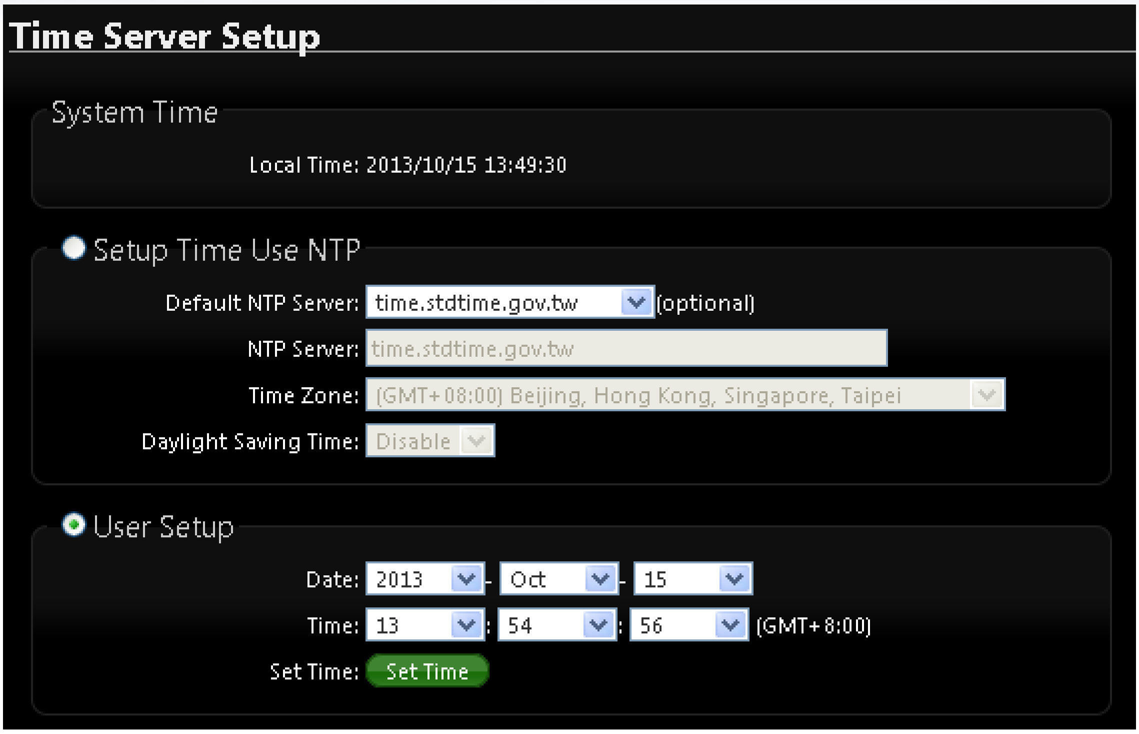
- **Ping Interval :** specify time interval (in seconds) between the ICMP "echo requests" are sent by the Ping Watchdog Tool. Default is 300 seconds.
- **Startup Delay :** specify initial time delay (in seconds) until first ICMP "echo requests" are sent by the Ping Watchdog Tool. The value of Startup Delay should be at least 60 seconds as the network interface and wireless connection initialization takes considerable amount of time if the device is rebooted. Default is 300 seconds.
- **Failure Count To Reboot :** specify the number of ICMP "echo response" replies. If the specified number of ICMP "echo response" packets is not received continuously, the Ping Watchdog Tool will reboot the device.

Click **Save button** to save your changes Click **Reboot button** to activate your changes

7.2 Configure System Time

System time can be configured via this page, and manual setting or via a NTP server is supported.
Please click on **System -> Time Server** and follow the below setting.





Time Server Setup

System Time

Local Time: 2013/10/15 13:49:30

○ Setup Time Use NTP

Default NTP Server: time.stdtime.gov.tw (optional)

NTP Server: time.stdtime.gov.tw

Time Zone: (GMT+08:00) Beijing, Hong Kong, Singapore, Taipei

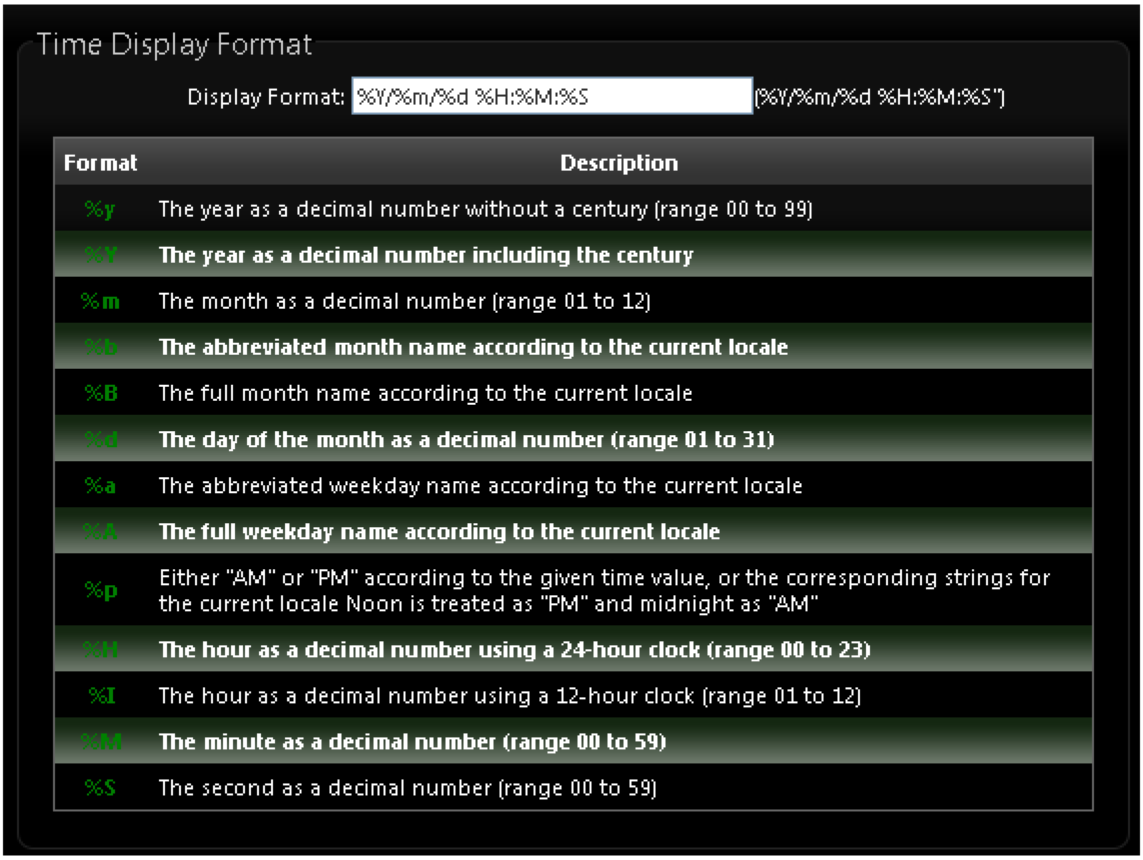
Daylight Saving Time: Disable

● User Setup

Date: 2013 - Oct - 15

Time: 13 : 54 : 56 (GMT+8:00)

Set Time:



Time Display Format

Display Format: %Y/%m/%d %H:%M:%S (%Y/%m/%d %H:%M:%S")

Format	Description
%y	The year as a decimal number without a century (range 00 to 99)
%Y	The year as a decimal number including the century
%m	The month as a decimal number (range 01 to 12)
%b	The abbreviated month name according to the current locale
%B	The full month name according to the current locale
%d	The day of the month as a decimal number (range 01 to 31)
%a	The abbreviated weekday name according to the current locale
%A	The full weekday name according to the current locale
%p	Either "AM" or "PM" according to the given time value, or the corresponding strings for the current locale Noon is treated as "PM" and midnight as "AM"
%H	The hour as a decimal number using a 24-hour clock (range 00 to 23)
%I	The hour as a decimal number using a 12-hour clock (range 01 to 12)
%M	The minute as a decimal number (range 00 to 59)
%S	The second as a decimal number (range 00 to 59)

- **Local Time :** Display the current system time.
- **Setup Time Use NTP :** To synchronize the system time with NTP server.
- **Time Zone :** Select a desired time zone from the drop-down list.
- **Daylight saving time :** Enable or disable Daylight saving.

Notice If the system time from NTP server seems incorrect, please verify your network settings, like default Gateway and DNS settings

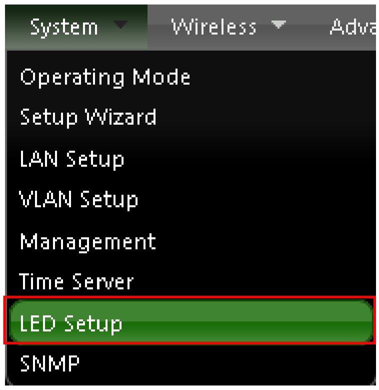
➢ **User Setup :** The management can set time by system time

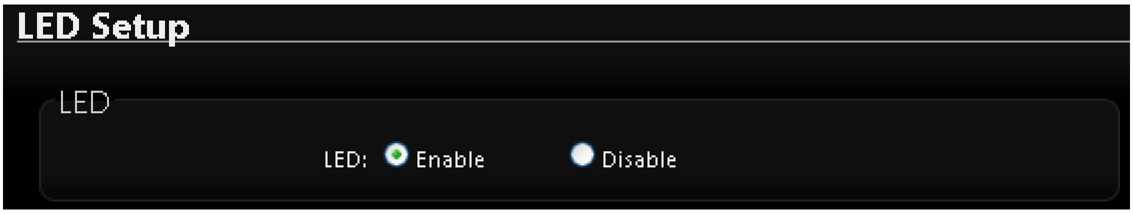
- Date: Setting the date for system.
- Time : Setting the time for system.

Click **"save"** to save your settings. Click **Reboot button** to activate your changes

7.3 LED Setup

This feature can be turned on/off to control LED lights



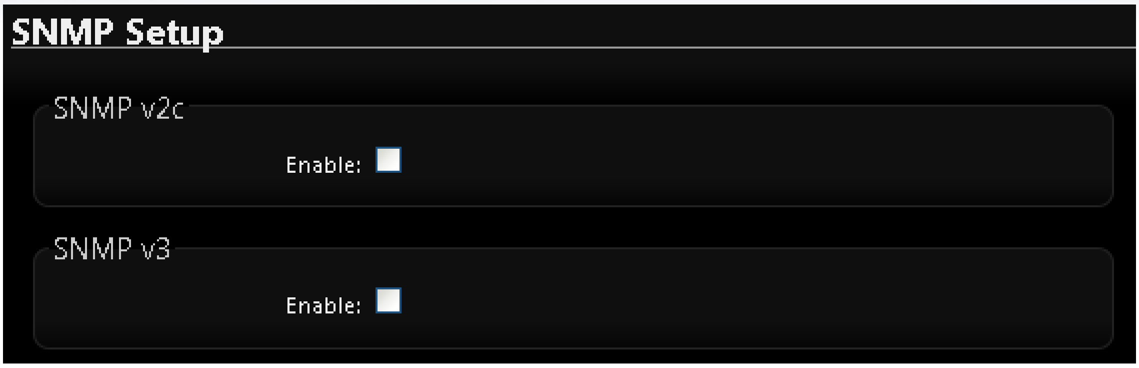

LED Setup

LED

LED: ● Enable ○ Disable

7.4 Configure SNMP Setup

SNMP is an application-layer protocol that provides a message format for communication between SNMP managers and agents. By enabling SNMP function, the administrator can obtain the system information remotely.
Please click on **System -> SNMP** and follow the below setting.



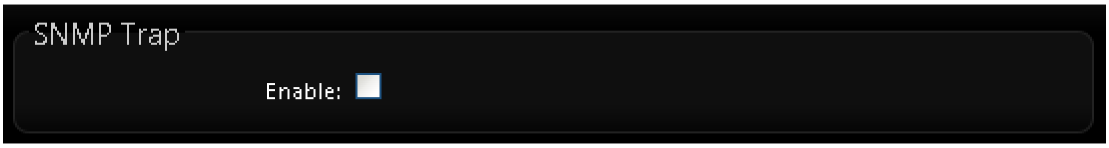
SNMP Setup

SNMP v2c

Enable: □

SNMP v3

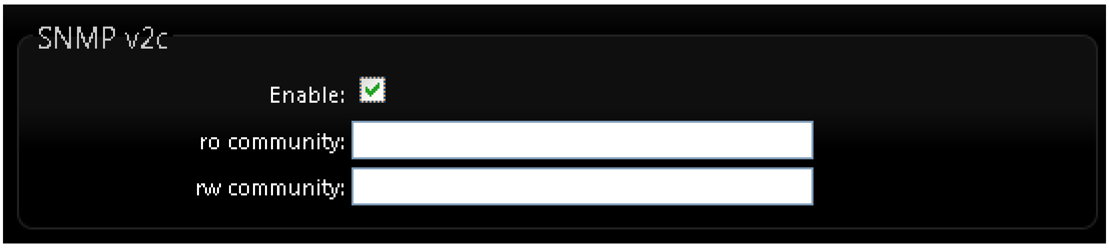
Enable: □



SNMP Trap

Enable: □

➢ **SNMP v2c Enable:** Check to enable SNMP v2c.



SNMP v2c

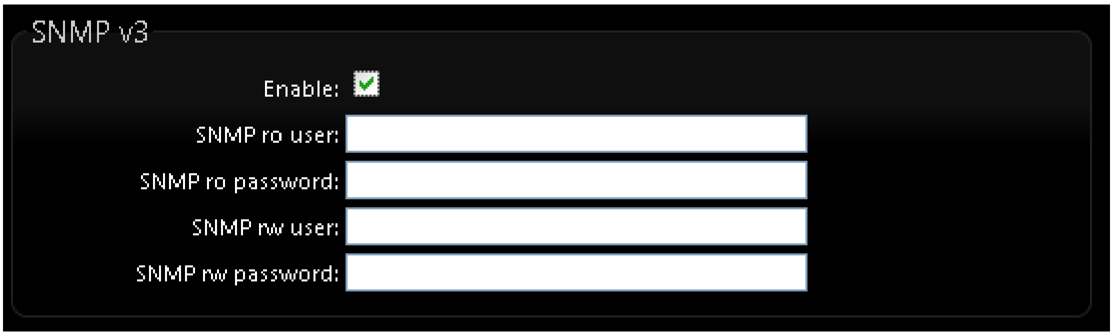
Enable: ☑

ro community:

rw community:

- **ro community :** Set a community string to authorize read-only access.
- **rw community :** Set a community string to authorize read/write access.

➢ **SNMP v3 Enable:** Check to enable SNMP v3. And supports the highest level SNMP security.



SNMP v3

Enable: ☑

SNMP ro user:

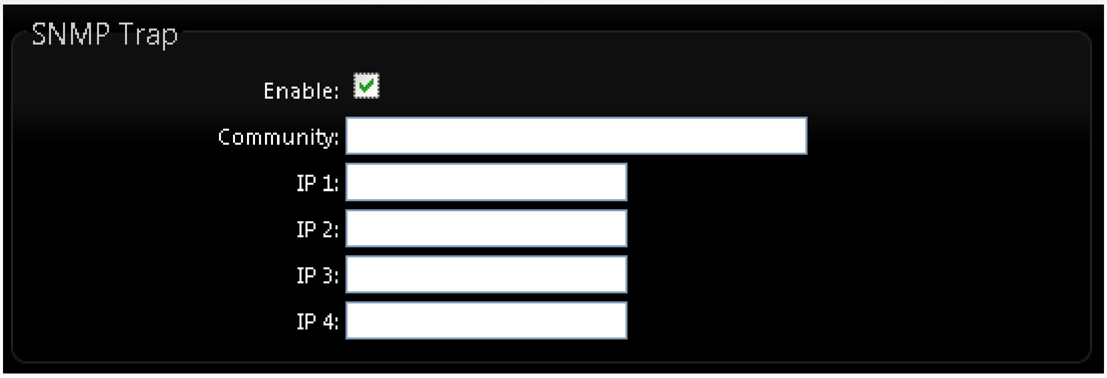
SNMP ro password:

SNMP rw user:

SNMP rw password:

- **SNMP ro user** : Set a community string to authorize read-only access.
- **SNMP ro password :** Set a password to authorize read-only access.
- **SNMP rw user :** Set a community string to authorize read/write access.
- **SNMP rw password :** Set a password to authorize read/write access.

➢ **SNMP Trap :** Events such as col will report to an assigned server. d start, interface up & down, and association & disassociation



SNMP Trap

Enable: ☑

Community:

IP 1:

IP 2:

IP 3:

IP 4:

- **Community :** Set a community string required by the remote host computer that will receive trap messages or notices send by the system.
- **IP(1~4) :** Enter the IP addresses of the remote hosts to receive trap messages.

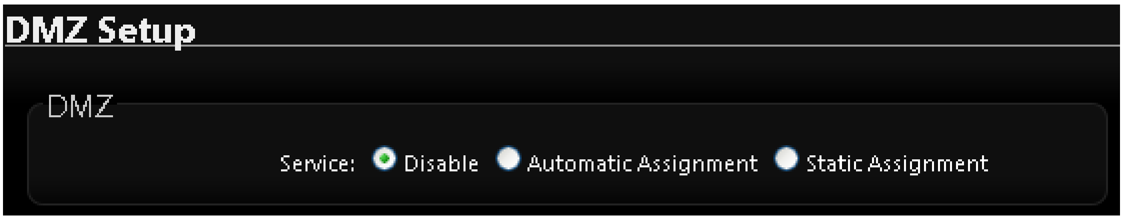
Click **"save"** to save your settings. Click **Reboot button** to activate your changes

8 Configure Advance Setup

8.1 DMZ (This function must be used WISP mode)

DMZ is commonly work with the NAT functionality as an alternative of Virtual Server(Port Forwarding) while wanting all ports of DMZ host visible to Internet users. Virtual Server rules have precedence over the DMZ rule. In order to use a range of ports available to access to different internal hosts Virtual Server rules are needed.

Please click on **Advance -> DMZ** and follow the below setting



DMZ Setup

DMZ

Service: ● Disable ○ Automatic Assignment ○ Static Assignment

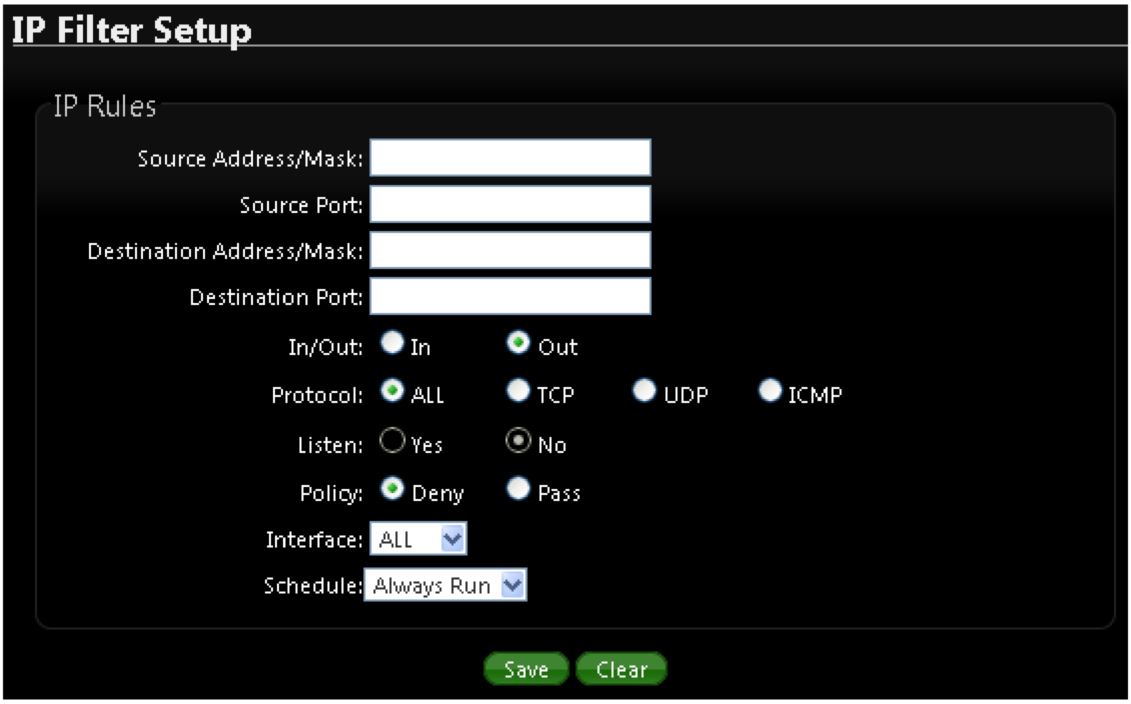
➢ **Service :** The DMZ default by **"Disable"**. Check Enable radial button to enable DMZ.

- Automatic Assignment : Enter Internal IP address of DMZ host and only one DMZ host is supported.
- Static Assignment : Enter external and internal IP address of DMZ host. The function only external IP to Internal IP address

Click **"save"** to save your settings. Click **Reboot button** to activate your changes

8.2 IP Filter (This function must be used WISP mode)

Allows to create deny or allow rules to filter ingress or egress packets from specific source and/or to destination IP address on wired (LAN) or Wireless (WAN) ports. Filter rules could be used to filter unicast or multicast packets on different protocols as shown in the IP Filter Setup. Important to note that IP filter rules has precedence over Virtual server rules.



IP Filter Setup

IP Rules

Source Address/Mask:

Source Port:

Destination Address/Mask:

Destination Port:

In/Out: ○ In ● Out

Protocol: ● ALL ○ TCP ○ UDP ○ ICMP

Listen: ○ Yes ● No

Policy: ● Deny ○ Pass

Interface: ALL

Schedule: Always Run

- **Source Address/Mask :** Enter desired source IP address and netmask. i.e. 192.168.2.10/32.
- **Source Port :** Enter a port or a range of ports as start:end. i.e. port 20:80
- **Destination Address/Mask :** Enter desired destination IP address and netmask. i.e. 192.168.1.10/32
- **Destination Port :** Enter a port or a range of ports as start:end. i.e. port 20:80
- **In/Out :** Applies to Ingress or egress packets.
- **Protocol :** Supports TCP, UDP or ICMP.
- **Listen :** Click Yes radial button to match TCP packets only with the SYN flag.
- **Policy :** Deny to drop and Pass to allow per filter rules
- **Interface :** The interface that a filter rule applies
- **Schedule :** Can choose to use rule by “Time Policy”

Notice

All packets are allowed by default. Deny rules could be added to the filter list to filter out unwanted packets and leave remaining allowed.

Click **“Save”** button to add IP filter rule. Total of 20 rules maximum allowed in the IP Filter List. All rules can be edited or removed from the List. Click **Reboot button** to activate your changes.

When you create rules in the IP Filter List, the prior rules maintain higher priority. To allow limited access from a subnet to a destination network manager needs to create allow rules first and followed by deny rules. So, if you just want one IP address to access the system via telnet from your subnet, not others, the Example 1 demonstrates it, not rules in the Example 2.

Example 1 :

Create a higher priority rule to allow IP address 192.168.2.2 Telnet access from LAN port first, and deny Telnet access from remaining IP addresses in the same subnet.

Rule	Source		Destination		In/Out	Protocol	Listen	Action	Side
	IP/Mask	Port	IP/Mask	Port					
1	192.168.2.2/32		192.168.2.254/32	22	In	TCP	n	Pass	LAN
2	192.168.2.0/24		192.168.2.254/32	22	In	TCP	n	Deny	LAN

Example 2 :

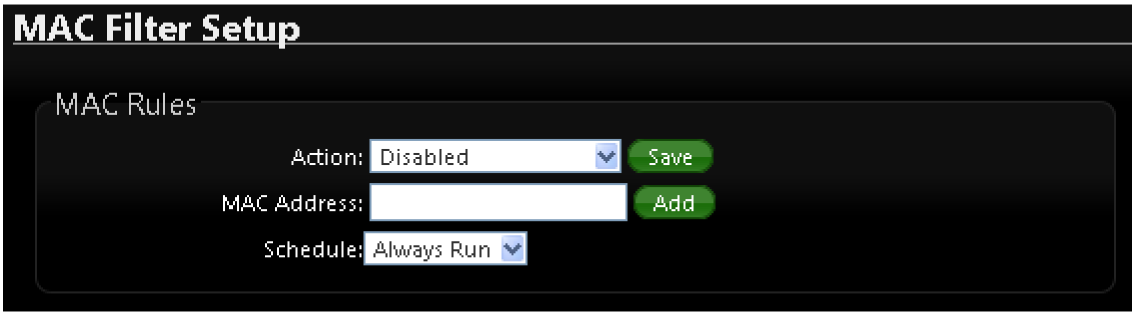
All Telnet access to the system from the IP addresses of subnet 192.168.2.x works with the rule 1 of Example 2. The rule 2 won’t make any difference.

Rule	Source		Destination		In/Out	Protocol	Listen	Action	Side
	IP/Mask	Port	IP/Mask	Port					
1	192.168.2.0/24		192.168.2.254/32	22	In	TCP	n	Pass	LAN
2	192.168.2.2/32		192.168.2.254/32	22	In	TCP	n	Deny	LAN

8.3 MAC Filter (This function must be used WISP mode)

Allows to create MAC filter rules to allow or deny unicast or multicast packets from limited number of MAC addresses. Important and must note. That MAC filter rules have precedence over IP Filter rules.

Please click on **Advance -> MAC Filter Setup** and follow the below setting.



MAC Filter Setup

MAC Rules

Action: Disabled

MAC Address:

Schedule: Always Run

- **MAC Filter Rule :** By default, it's "Disable". Options are Disabled, Only Deny List MAC or Only Allow List MAC.
  - **Action :**
    - ✓ **Only Allow List MAC:** The wireless clients in the MAC Filter List will be allowed to access to Access Point; All others will be denied.
    - ✓ **Only Deny List MAC :** The wireless clients in the MAC Filter List will be denied to access to Access Point; All others will be allowed.
- **MAC Address** :
  - Enter MAC address (e.g. aa:bb:cc:00:00:0a) and click **"Add"** button, then the MAC address should display in the MAC Filter List.
  - There are a maximum of 20 clients allowed in this MAC Filter List. The MAC addresses of the wireless clients can be added and removed to the list using the Add and Delete buttons.
  - **Schedule :** Can choose to use rule by "Time Policy"

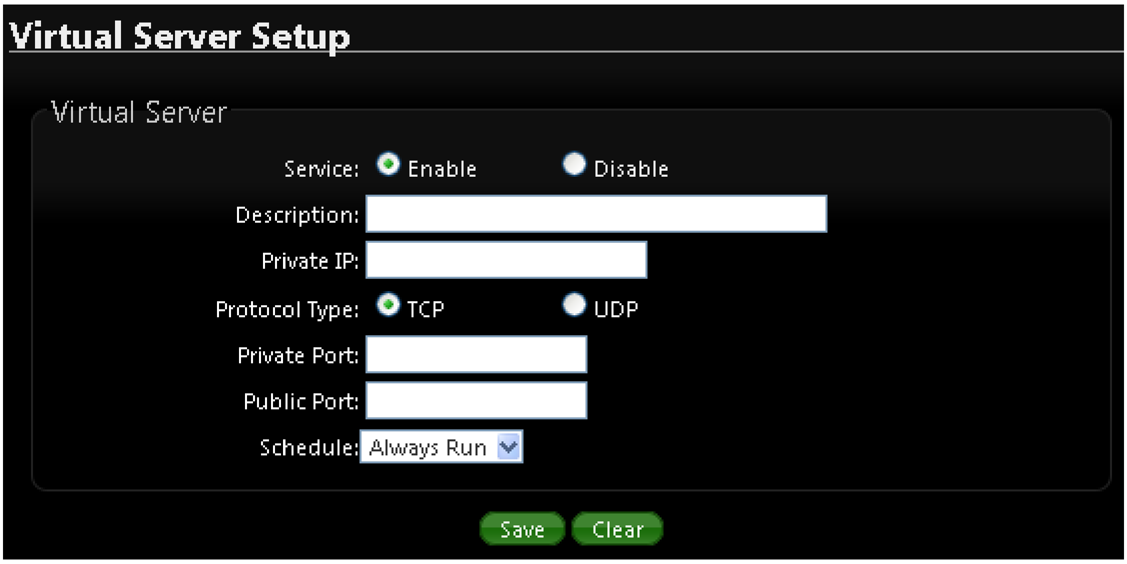
Click **Reboot button** to activate your Setting

8.4 Virtual Server (This function must be used WISP mode)

The **"Virtual Server"** can also referred to as **"Port Forward"** as well and used interchangeably. Resources in the network can be exposed to the Internet users in a controlled manner including on-line gaming, video conferencing or others via Virtual Server setup. Don't repeat ports' usage to avoid confusion.

Suppose you want to assign ports 21-25 to one FTP, Telnet and SMTP server (A in the example), and port 80 to another (B in the example). You assign the LAN IP addresses and the ISP assigns the WAN IP address. The NAT network appears as a single host on the Internet.

Please click on **Advance -> Virtual Server** and follow the below setting.



Virtual Server Setup

Virtual Server

Service: ● Enable ○ Disable

Description:

Private IP:

Protocol Type: ● TCP ○ UDP

Private Port:

Public Port:

Schedule: Always Run

- **Service :** By Default, It’s “Disable”. Check Enable radial button to enable Virtual Server.
- **Description :** Enter appropriate message for resource sharing via Virtual Server.
- **Private IP :** Enter corresponding IP address of internal resource to share.
- **Protocol Type :** Select appropriate sessions, TCP or UDP, from shared host via multiple private ports.
- **Private Port :** A port or a range of ports may be specified as start:end; i.e. port 20:80
- **Public Port :** A port or a range of ports may be specified as start:end; i.e. port 20:80

Notice

The Private Port and Public Port can be different. However, total number of ports need to be the same.
Example : Public Port is 11 to 20 and the Private Port can be a 10 ports range.

Click **“Add”** button to add Virtual Server rule to List. Total of maximum 20 rules are allowed in this List. All rules can be edited or removed from the List.

- **Schedule :** Can choose to use rule by **“Time Policy”**

Other Notes

While creating multiple Virtual Server rules, the prior rules have higher priority. The Virtual server rules have precedence over the DMZ one while both rules exist. Example 1 and 2 demonstrate proper usage of DMZ and Virtual Server rules.

Example 1 :

All connections should be redirected to 192.168.2.12 while DMZ is enabled. Since Virtual Server rules have precedence over the DMZ rule all connections to TCP port 22 will be directed to TCP port 22 of 192.168.2.10 and remaining connections to port TCP 20~80 will be redirected to port TCP 20~80 of 192.168.2.11

Ex.

DMZ Enabled : 192.168.2.12

Rule	Protocol	Private IP	Private Port	Public Port
1	TCP	192.168.2.10	22	22
2	TCP	192.168.2.11	20:80	20:80

Example 2 :

All connections should be redirected to 192.168.2.12 while DMZ is enabled. Since Virtual Server rules have precedence over the DMZ rule all other connections to TCP port 20~80 will be redirected to port 20~80 of 192.168.2.11. The rule 2 won’t take effect.

Ex.

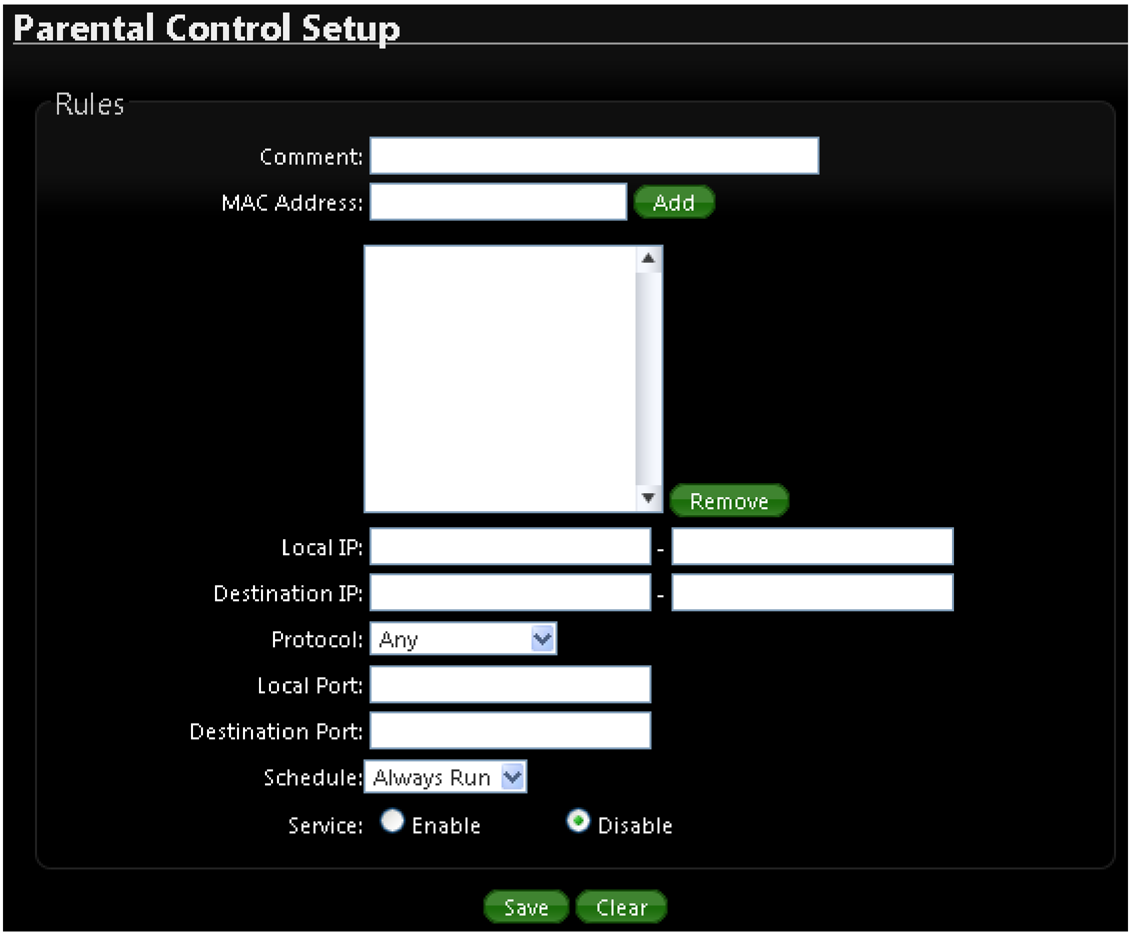
DMZ Enabled : 192.168.2.12

Rule	Protocol	Private IP	Private Port	Public Port
1	TCP	192.168.2.11	20:80	20:80
2	TCP	192.168.2.10	22	22

Click **Reboot button** to activate your changes.

8.5 Parental Control (This function must be used WISP mode)

Parental Control allows you to block or allow specific kinds of Internet usage and traffic, such as Internet access, designated services, and websites.
Please click on **Advance -> Parental Control** and follow the below setting.



Parental Control Setup

Rules

Comment:

MAC Address:

Local IP: -

Destination IP: -

Protocol: Any

Local Port:

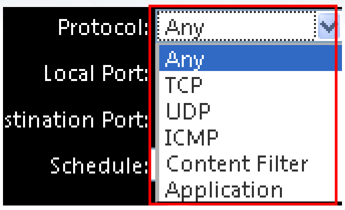
Destination Port:

Schedule: Always Run

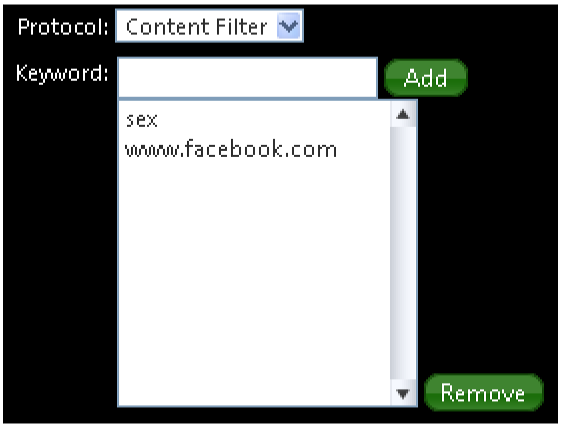
Service: ○ Enable ● Disable

Rules : Control can be managed by a rule. Use the settings on this screen to establish an access policy.

- **Comment :** Enter a descriptive name for this rule for identifying purposes.
- **MAC Address :** Enter MAC address in valid MAC address format(xx:xx:xx:xx:xx:xx) and click “Add” button to add in the MAC group of each rule. Click “Remove” button can remove MAC address in the group of each rule. There are 10 MAC address maximum allowed in each rule.
- **Local / Destination IP :** Specify local(LAN)/ destination IP addresses range required for this rule. If you specify local IP addresses range from 192.168.1.1 to 192.168.2.254. The matches a range of local IP addresses include every single IP address from the first to the last, so the example above includes everything from 192.168.1.1 to 192.168.2.254.
- **Protocol :** Select Any or specify protocol(TCP, UDP, ICMP, Content Filter and Application) from drop-down list. When you select ICMP or Layer 7 Application , the Local(LAN)/ Destination Port can not used.



If you want to block websites with specific URL address or using specific keywords, enter each URL or keyworks in the **"Content Filter"** field and click **"Add"** button to add in the Content Filter list of each rule. Click **"Remove"** button can remove URL or keywords.



sex
www.facebook.com

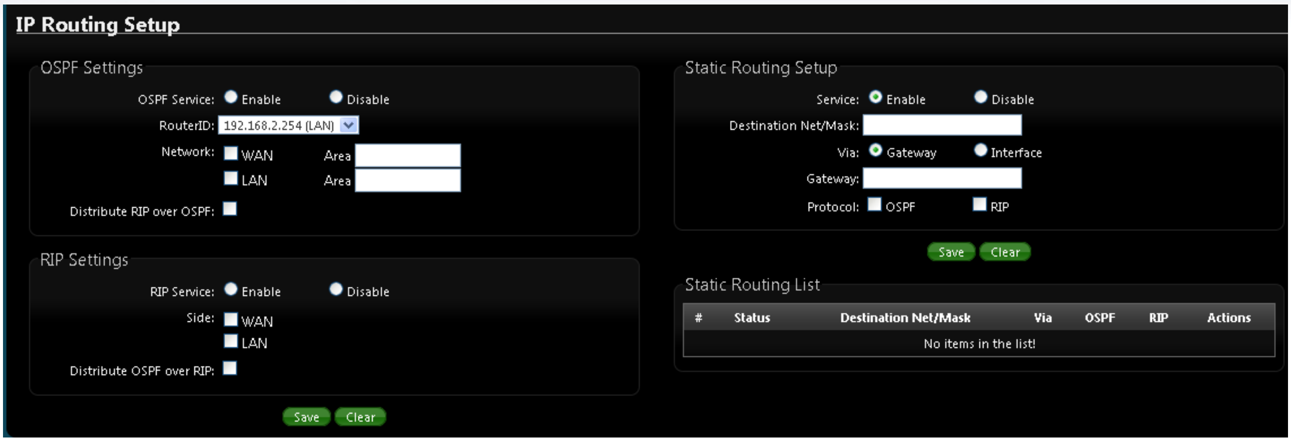
- **Local Port :** Specify local port(LAN port) range required for this rule
- **Destination Port :** Specify destination port range required for this rule
- **Schedule :** Can choose to use rule by "Time Policy"
- **Service :** Check Enable button to activate this rule, and Disable to deactivate.

Click **"Add"** button to add control rule to List. There are 10 rules maximum allowed in this Control List. All rules can be removed or edited on the List.

Click **Reboot button** to activate your changes.

8.6 IP Routing (This function must be used WISP mode)

The IP Routing Settings allows you to configure routing feature in the gateway. The system supports RIP(Routing Information Protocol) and OSPF(Open Shortest Path First) dynamic routing and allows you to manually configure static network routes.
Please click on **Advance -> IP Routing** and follow the below setting.



IP Routing Setup

OSPF Settings

OSPF Service: ○ Enable ○ Disable

RouterID: 192.168.2.254 (LAN)

Network: □ WAN Area
□ LAN Area

Distribute RIP over OSPF: □

RIP Settings

RIP Service: ○ Enable ○ Disable

Side: □ WAN
□ LAN

Distribute OSPF over RIP: □

Static Routing Setup

Service: ● Enable ○ Disable

Destination Net/Mask:

Via: ● Gateway ○ Interface

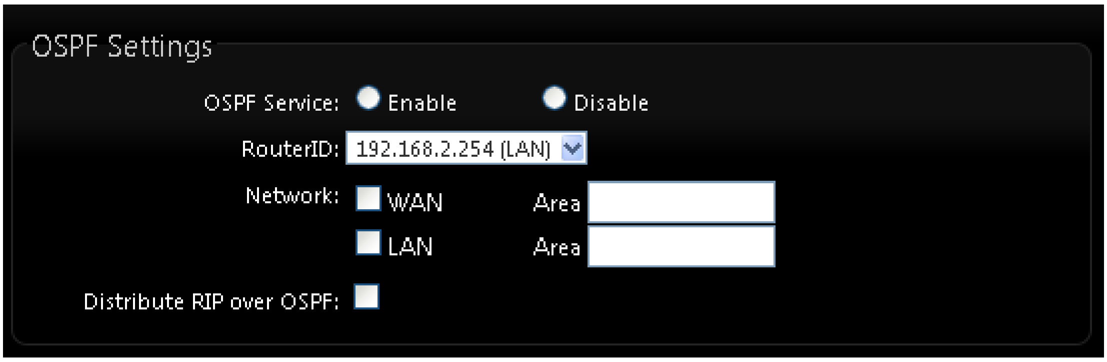
Gateway:

Protocol: □ OSPF □ RIP

Static Routing List

#	Status	Destination Net/Mask	Via	OSPF	RIP	Actions
No items in the list!						

OSPF Settings :



OSPF Settings

OSPF Service: ○ Enable ○ Disable

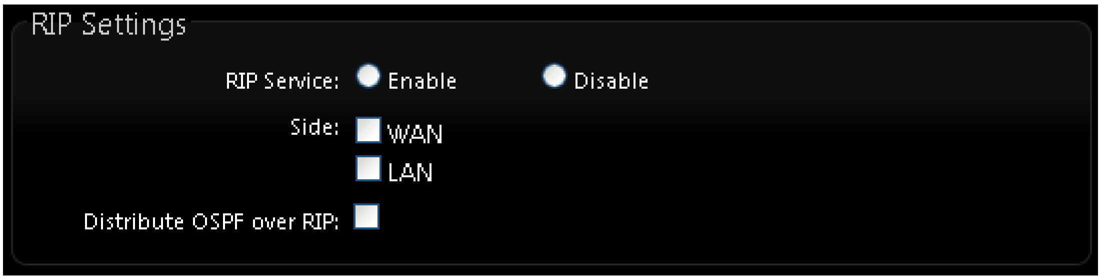
RouterID: 192.168.2.254 (LAN)

Network: □ WAN Area
□ LAN Area

Distribute RIP over OSPF: □

- **OSPF Service :** By default, it's Disable. To Enable to activated OSPF routing service.
- **Route ID :** The router ID is typically derived by each router from its interface IP address.
- **Distribute RIP over OSPF :** Allow RIP routes will redistributed into OSPF.

RIP Settings :



RIP Settings

RIP Service: ○ Enable ○ Disable

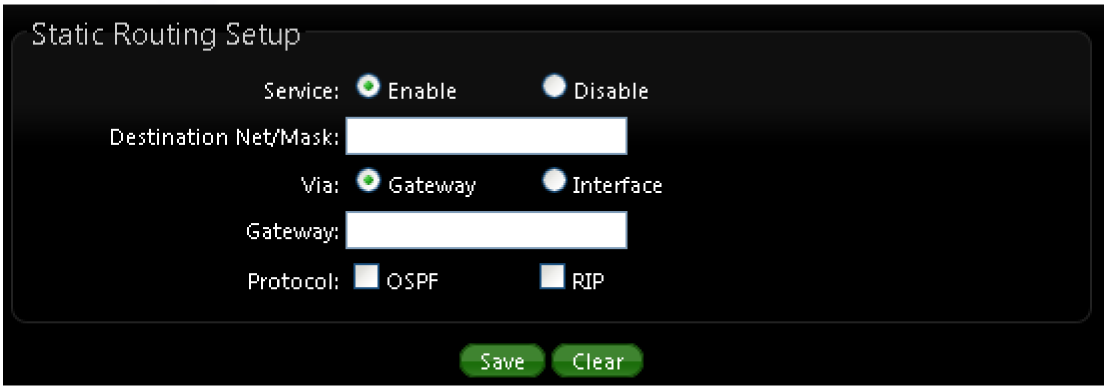
Side: □ WAN
□ LAN

Distribute OSPF over RIP: □

- **RIP Service :** By default, it's Disable. To Enable to activated RIP routing service.
- **Side :** Specify desired interface WAN, LAN for sending and receiving of RIP packets.
- **Distribute OSPF over RIP :** Allow OSPF routes redistributed into RIP.

Change these settings as described here and click **Save button** to save your changes. Click **Reboot button** to activate your changes

Static Routing Setup :



Static Routing Setup

Service: ● Enable ○ Disable

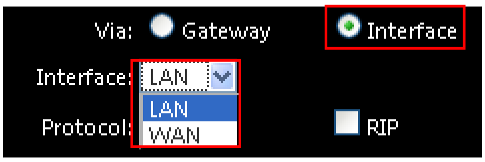
Destination Net/Mask:

Via: ● Gateway ○ Interface

Gateway:

Protocol: □ OSPF □ RIP

- **Service :** Click Enable to activated static routing.
- **Destination Net/Mask :** Specify desired destination IP network address with format of A.B.C.D/M
- **Via :** Select a next hop of Gateway or Interface to the destination IP network.
  - **Gateway :** Enter gateway IP address
  - **Interface :** Choose the interface via LAN or WAN



Via: ○ Gateway ● Interface

Interface: LAN

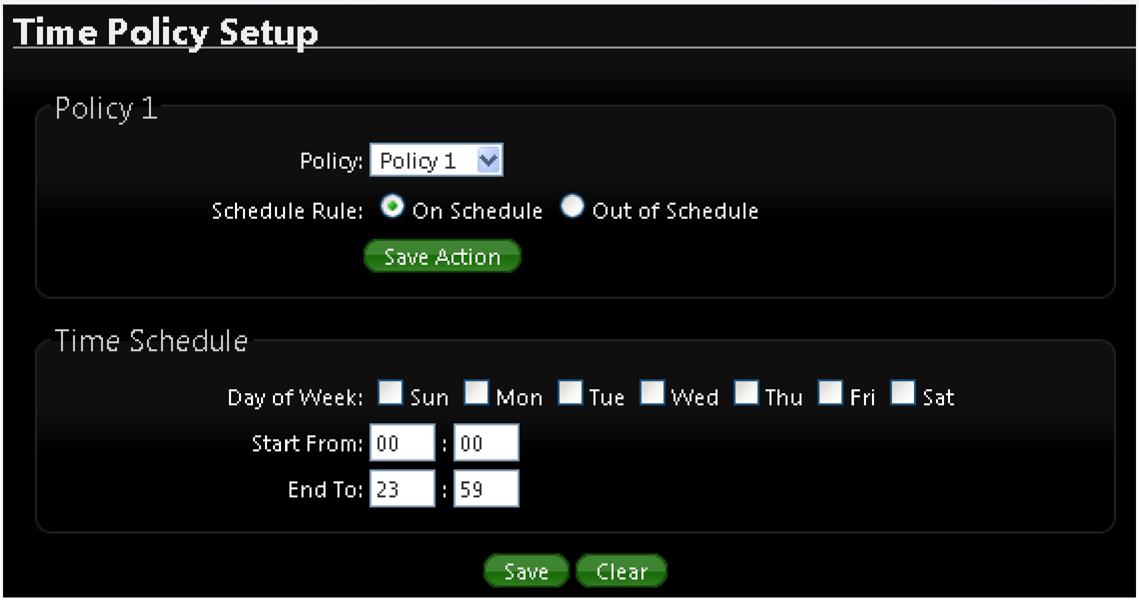
Protocol: □ RIP

- **Protocol :** Set static routing rule to RIP or OSPF network. Select RIP to associate specific network on RIP routing process. Select OSPF to associate specific network with the specified area on OSPF routing process

Click **"Save"** button to add Routing rule to List. There are maximum 20 rules allowed in this List. All rules can be edited or removed on the List. Click **Reboot button** to activate your changes.

8.7 Time Policy

Administrator can define time policy for Service Domain, IP Filtering, MAC Filtering and Virtual Server. There are 10 policy can be defined.
Please click on **Advance →Time Policy** to enter Time Policy Setup page.



Time Policy Setup

Policy 1

Policy: Policy 1

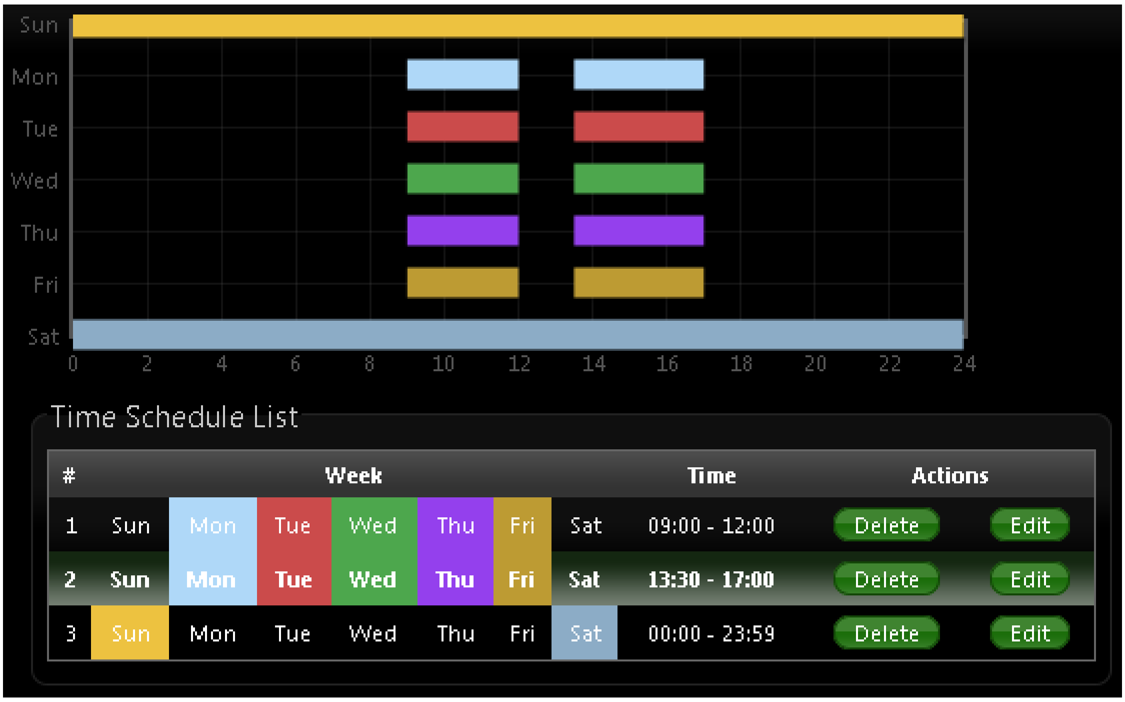
Schedule Rule: ● On Schedule ○ Out of Schedule

Time Schedule

Day of Week: □ Sun □ Mon □ Tue □ Wed □ Thu □ Fri □ Sat

Start From: 00 : 00

End To: 23 : 59



Time Schedule List

#	Week							Time	Actions	
1	Sun	Mon	Tue	Wed	Thu	Fri	Sat	09:00 - 12:00	Delete	Edit
2	Sun	Mon	Tue	Wed	Thu	Fri	Sat	13:30 - 17:00	Delete	Edit
3	Sun	Mon	Tue	Wed	Thu	Fri	Sat	00:00 - 23:59	Delete	Edit

- **Policy :** There are 10 Policy can be selected.
- **Schedule Rule :** Select desired schedule for this policy.
- **On Schedule :** Execution is based on schedule
- **Out of Schedule :** Execution is based outside the schedule

Click **"Save Action"** button to complete

Time Schedule : Day of week setting by timetable

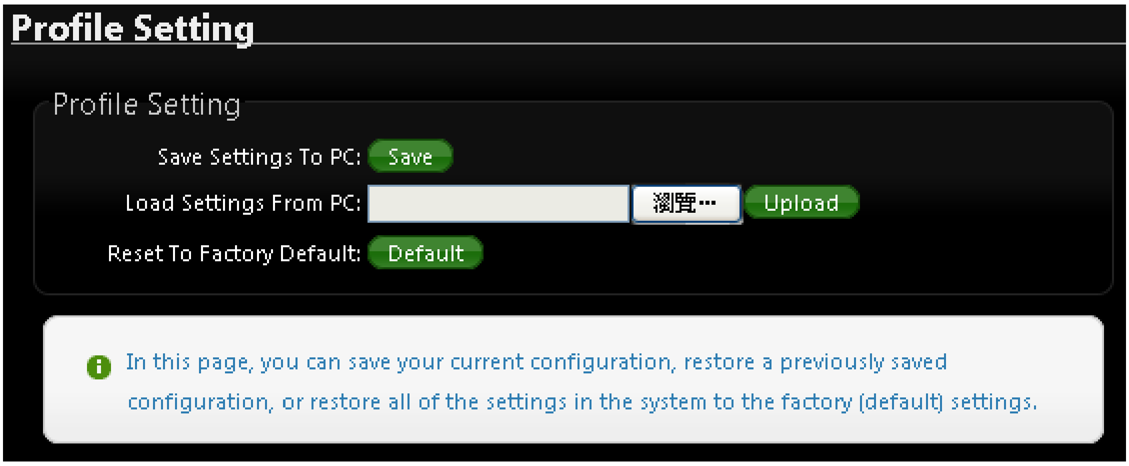
Click **"Save"** button to add schedule to policy. There are 10 schedule maximum allowed in the each time policy. All schedule can be edited or removed in the each time policy. Click **Reboot** button to activate your changes.

9 Configure Utilities Setup

9.1 Profile setting

The Function is backup current configuration, restore prior configuration or reset back to factory default configuration can be executed via this page.

Please click on **Utilities -> Profile Setting** and follow the below setting



Profile Setting

Profile Setting

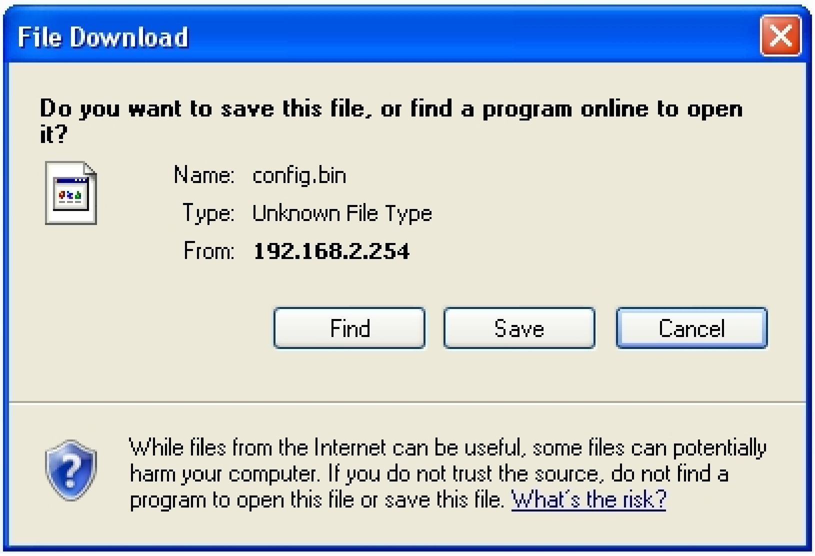
Save Settings To PC:

Load Settings From PC:

Reset To Factory Default:

In this page, you can save your current configuration, restore a previously saved configuration, or restore all of the settings in the system to the factory (default) settings.

- **Save Settings to PC :** Click Save button to save the current configuration to a local disk.



File Download

Do you want to save this file, or find a program online to open it?

Name: config.bin

Type: Unknown File Type

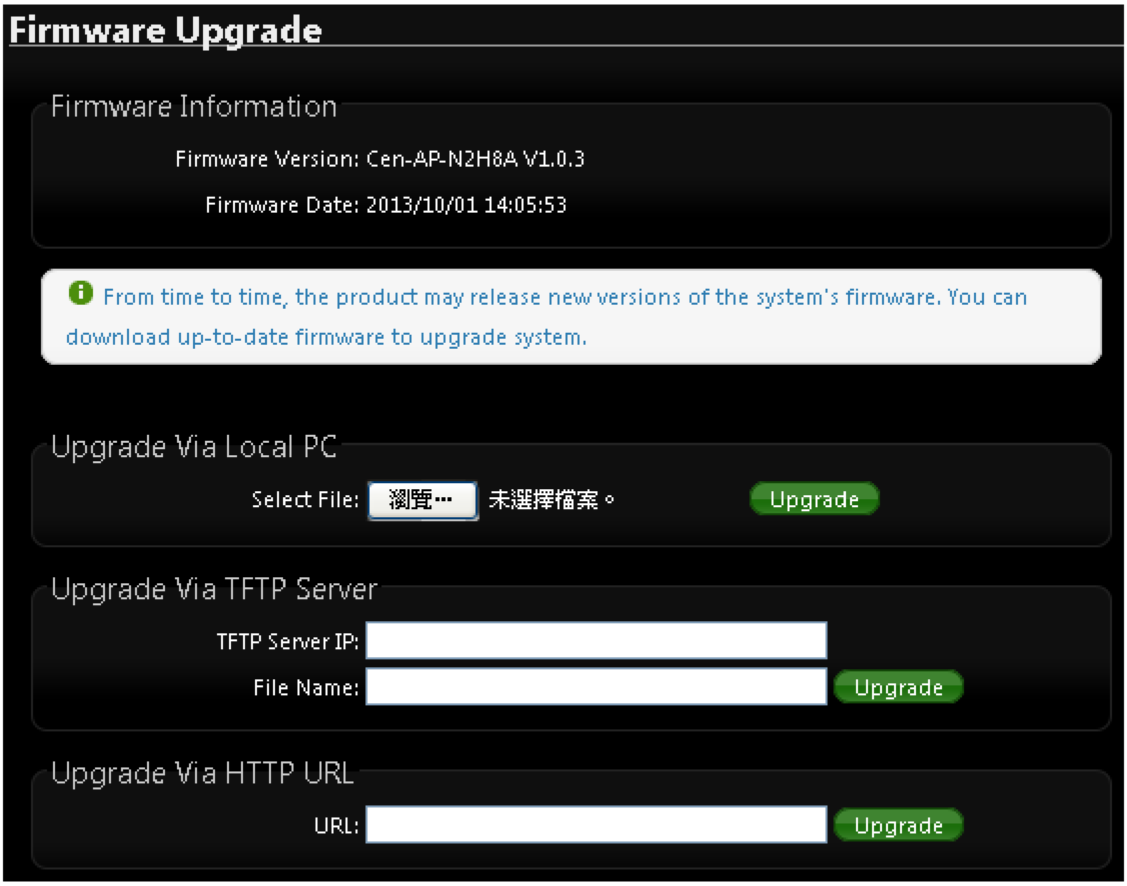
From: 192.168.2.254

While files from the Internet can be useful, some files can potentially harm your computer. If you do not trust the source, do not find a program to open this file or save this file. What's the risk?

- **Load Settings from PC :** Click Browse button to locate a configuration file to restore, and then click Upload button to upload.
- **Reset To Factory Default :** Click Default button to reset back to the factory default settings and expect Successful loading message. Then, click Reboot button to activate.

9.2 Firmware Upgrade

Firmware is the main software image that system needs to respond to requests and to manage real time operations. Firmware upgrades are sometimes required to include new features or bugs fix. It takes around 2 minutes to upgrade due to complexity of firmware. To upgrade system firmware, click Browse button to locate the new firmware, and then click Upgrade button to upgrade.



Firmware Upgrade

Firmware Information

Firmware Version: Cen-AP-N2H8A V1.0.3

Firmware Date: 2013/10/01 14:05:53

From time to time, the product may release new versions of the system's firmware. You can download up-to-date firmware to upgrade system.

Upgrade Via Local PC

Select File: 瀏覽… 未選擇檔案。 Upgrade

Upgrade Via TFTP Server

TFTP Server IP:

File Name: Upgrade

Upgrade Via HTTP URL

URL: Upgrade

Notice

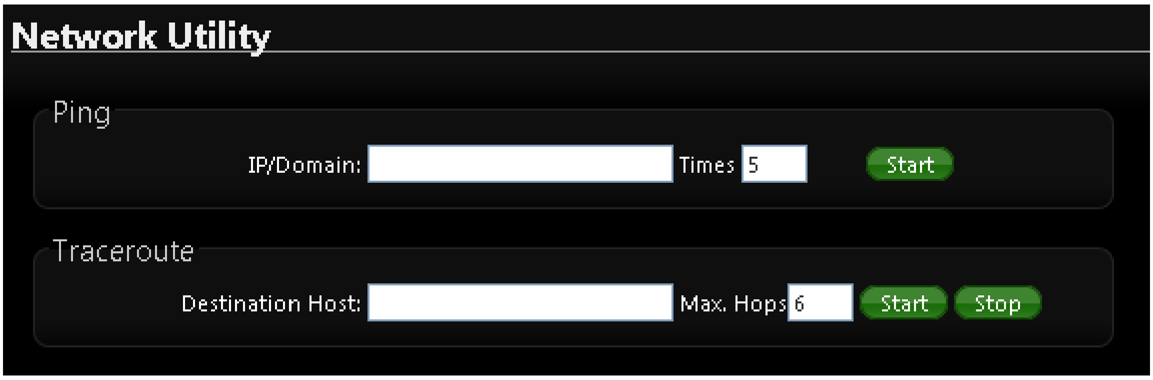
To prevent data loss during firmware upgrade, please back up current settings before proceeding

Do not interrupt during firmware upgrade including power on/off as this may damage system.

- **Firmware Information :**Show currently the 100GX-N of system software version and software date
- **Upgrade firmware :** The upgrade firmware will support via local PC and TFTP Server and HTTP URL to upgrade system

9.3 Network Utility

The administrator can diagnose network connectivity via the PING or TRACEROUTE utility. Please click on **Utilities -> Network Utility** and follow the below setting.



- **Ping :** This utility will help ping other devices on the network to verify connectivity. Ping utility, using ICMP packets, detects connectivity and latency between two network nodes. As result of that, packet loss and latency time are available in the Result field while running the PING test.
- **IP/Domain :** Enter desired domain name, i.e. www.google.com, or IP address of the destination, and click ping button to proceed. The ping result will be shown in the Result field.
- **Count :** By default, it's 5 and the range is from 1 to 50. It indicates number of connectivity test.

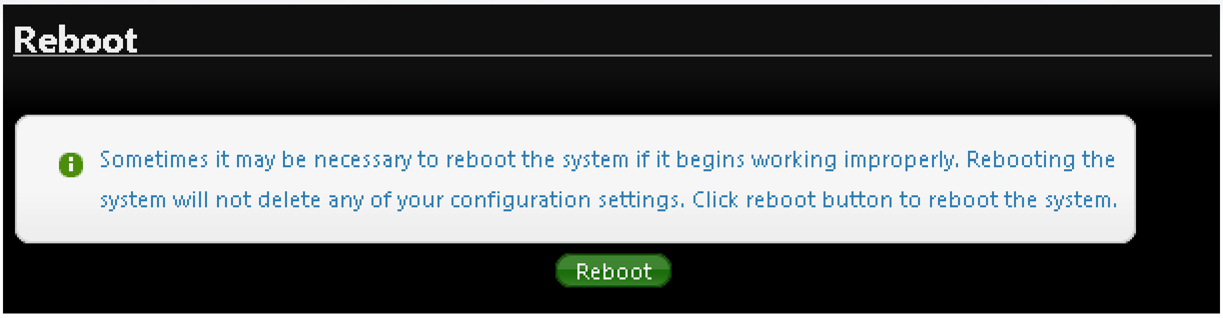
Traceroute

Allows tracing the hops from the 100GX-N device to a selected outgoing IP address. It should be used for the finding the route taken by ICMP packets across the network to the destination host. The test is started using the Start button, click Stop button to stopped test.

- **Destination Host :** Specifies the Destination Host for the finding the route taken by ICMP packets across the network.
- **MAX Hop :** Specifies the maximum number of hops(max time-to-live value) trace route will probe.

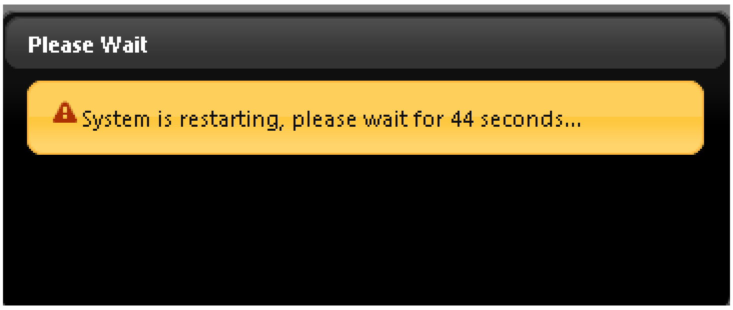
9.4 Reboot

This function allows user to restart system with existing or most current settings when changes are made. Click **Reboot button** to proceed and take around three minutes to complete.



Reboot

Sometimes it may be necessary to reboot the system if it begins working improperly. Rebooting the system will not delete any of your configuration settings. Click reboot button to reboot the system.



Please Wait

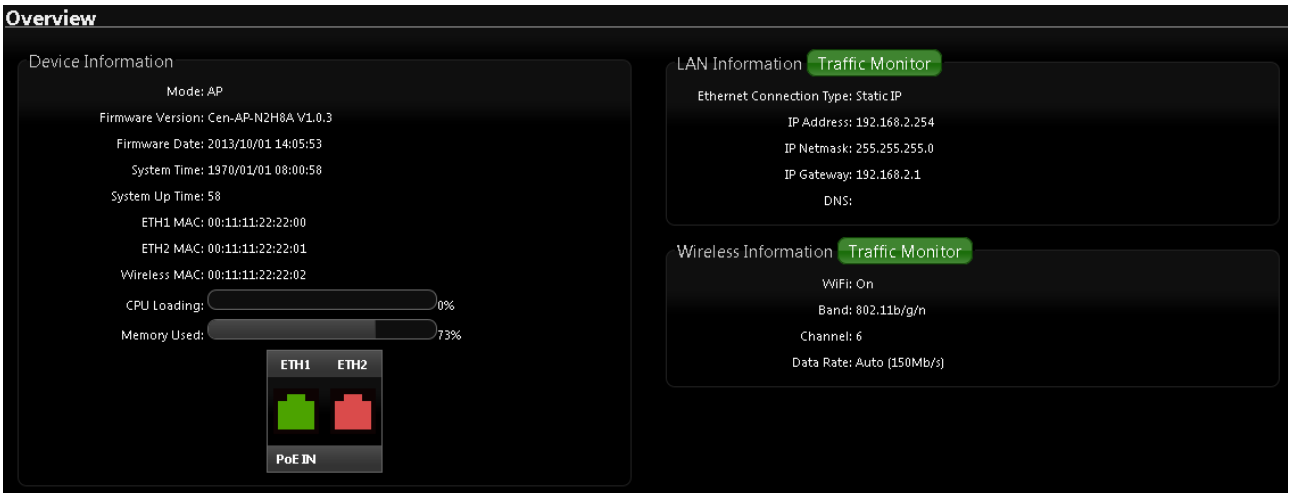
System is restarting, please wait for 44 seconds...

The System Overview page appears upon the completion of reboot.

10 Configure Status

10.1 Overview

Detailed information on System, Network can be reviewed via this page



Overview

Device Information

Mode: AP
Firmware Version: Cen-AP-N2H8A V1.0.3
Firmware Date: 2013/10/01 14:05:53
System Time: 1970/01/01 08:00:58
System Up Time: 58
ETH1 MAC: 00:11:11:22:22:00
ETH2 MAC: 00:11:11:22:22:01
Wireless MAC: 00:11:11:22:22:02
CPU Loading: 0%
Memory Used: 73%

LAN Information

Ethernet Connection Type: Static IP
IP Address: 192.168.2.254
IP Netmask: 255.255.255.0
IP Gateway: 192.168.2.1
DNS:

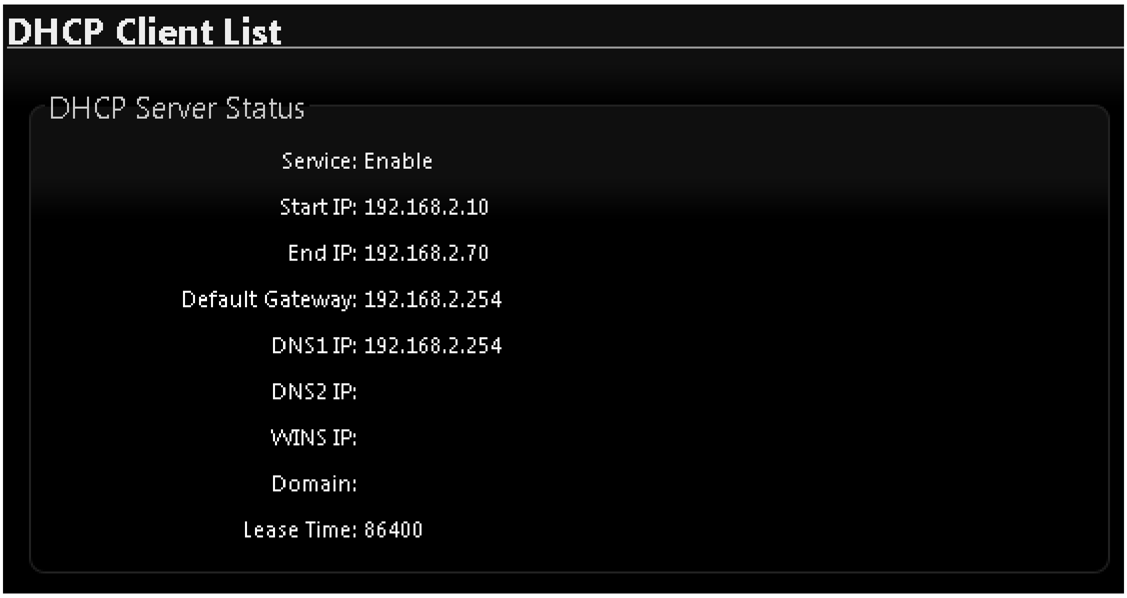
Wireless Information

WiFi: On
Band: 802.11b/g/n
Channel: 6
Data Rate: Auto (150Mb/s)

- **System Information :** Display the information of the system.
- **Device Information :** Display the information of the Port link.
- **CPU Information :** Display the information of the system CPU
- **Memory information :** Display the information of the system Memory.
- **Networking Information :** Display the information of the network.
- **Wireless Clients :** Display the information of the wireless user link.

10.2 DHCP Client (This function must be used WISP mode)

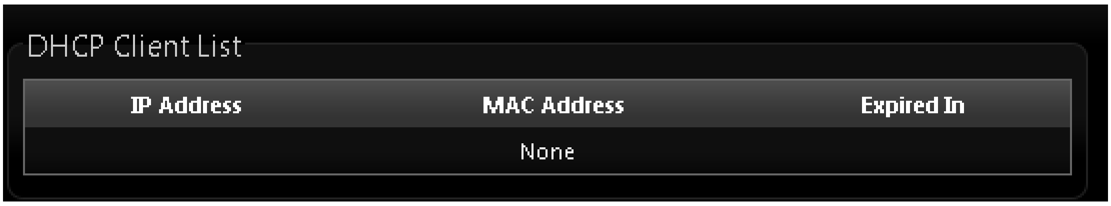
The administrator can view status of all DHCP Client Users on each DHCP Server.
Please click on **Status → DHCP Client** to look DHCP information.



DHCP Client List

DHCP Server Status

Service: Enable
Start IP: 192.168.2.10
End IP: 192.168.2.70
Default Gateway: 192.168.2.254
DNS1 IP: 192.168.2.254
DNS2 IP:
WINS IP:
Domain:
Lease Time: 86400



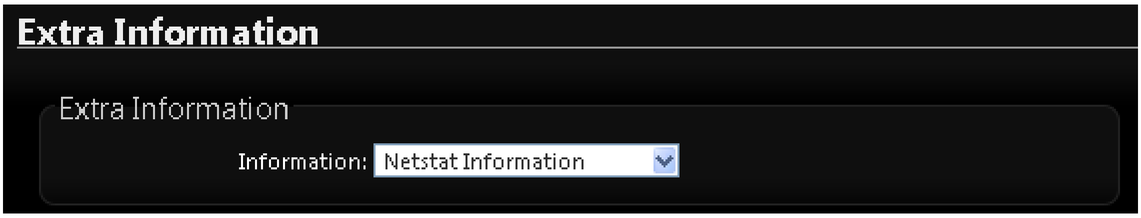
DHCP Client List

IP Address	MAC Address	Expired In
	None	

- **DHCP Server Status :** Display the information of the DHCP Server.
- **DHCP Client List :** Display the information of the DHCP Client users.

10.3 Extra Info

Users could pull out information such as Route table, ARP table, MAC table, Bridge table or STP available in the drop-down list from system. The **"Refresh"** button is used to retrieve latest table information.

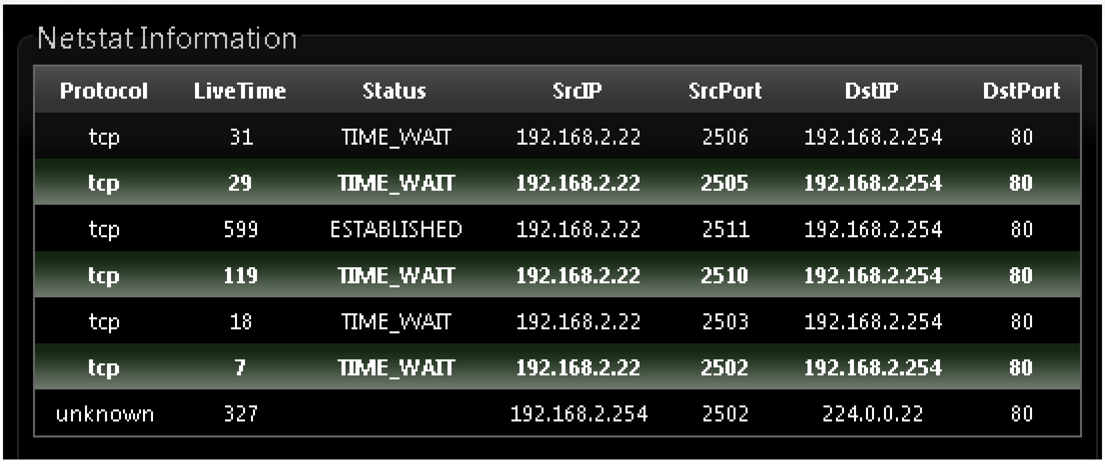


Extra Information

Extra Information

Information: Netstat Information

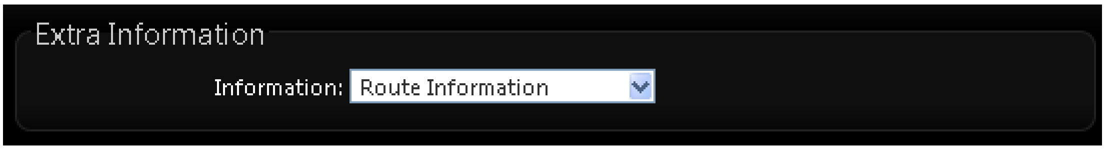
- **Netstat Information :** Select "NetStatus Information" on the drop-down list, the connection track list should show-up. NetStatus will show all connection track on the system, the information include Protocol, Live Time, Status, Source/Destination IP address and Port. *(This function must be used WISP mode)*



Netstat Information

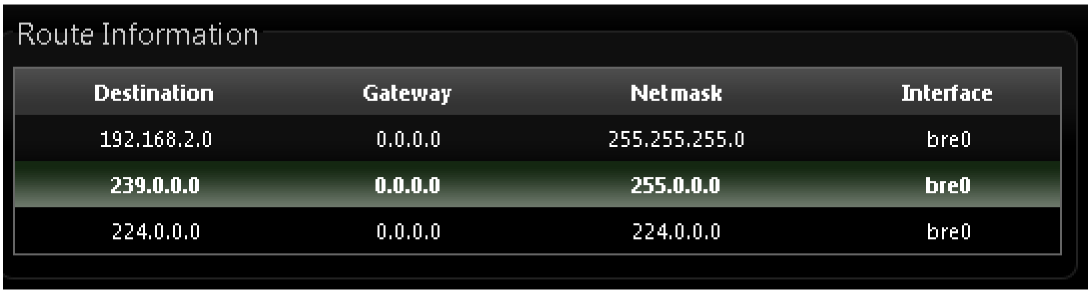
Protocol	LiveTime	Status	SrcIP	SrcPort	DstIP	DstPort
tcp	31	TIME_WAIT	192.168.2.22	2506	192.168.2.254	80
tcp	29	TIME_WAIT	192.168.2.22	2505	192.168.2.254	80
tcp	599	ESTABLISHED	192.168.2.22	2511	192.168.2.254	80
tcp	119	TIME_WAIT	192.168.2.22	2510	192.168.2.254	80
tcp	18	TIME_WAIT	192.168.2.22	2503	192.168.2.254	80
tcp	7	TIME_WAIT	192.168.2.22	2502	192.168.2.254	80
unknown	327		192.168.2.254	2502	224.0.0.22	80

- **Route Information :** Select **"Route Information"** on the drop-down list to display route table. 100GX-N could be used as a L2 or L3 device. It doesn't support dynamic routing protocols such as RIP or OSPF. Static routes to specific hosts, networks or default gateway are set up automatically according to the IP configuration of system's interfaces. When used as a L2 device, it could switch packets and, as L3 device, it's capable of being a gateway to route packets inward and outward.



Extra Information

Information: Route Information

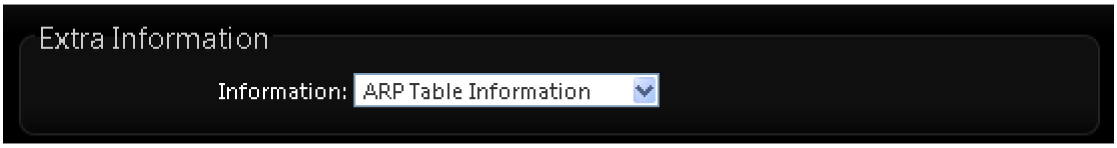


Route Information

Destination	Gateway	Netmask	Interface
192.168.2.0	0.0.0.0	255.255.255.0	bre0
239.0.0.0	0.0.0.0	255.0.0.0	bre0
224.0.0.0	0.0.0.0	224.0.0.0	bre0

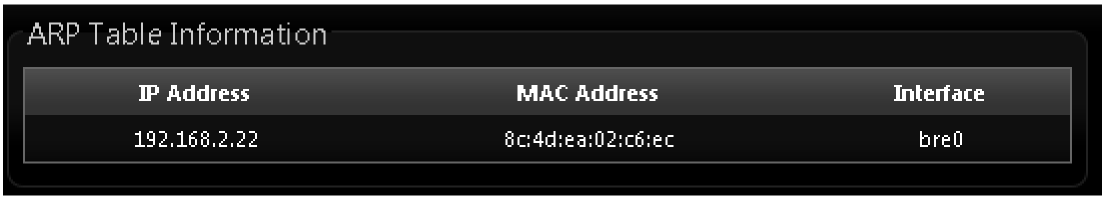
- **ARP Table Information :** Select "ARP Table Information" on the drop-down list to display ARP table.

ARP associates each IP address to a unique hardware address (MAC) of a device. It is important to have a unique IP address as final destination to switch packets to.



Extra Information

Information: ARP Table Information

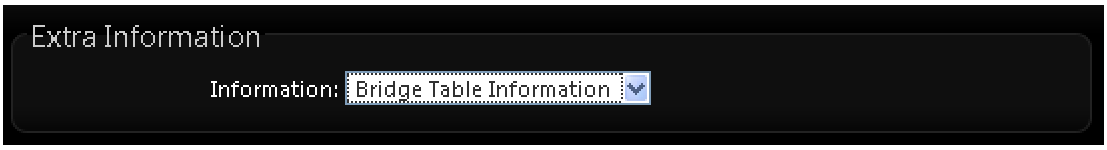


ARP Table Information

IP Address	MAC Address	Interface
192.168.2.22	8c:4d:ea:02:c6:ec	bre0

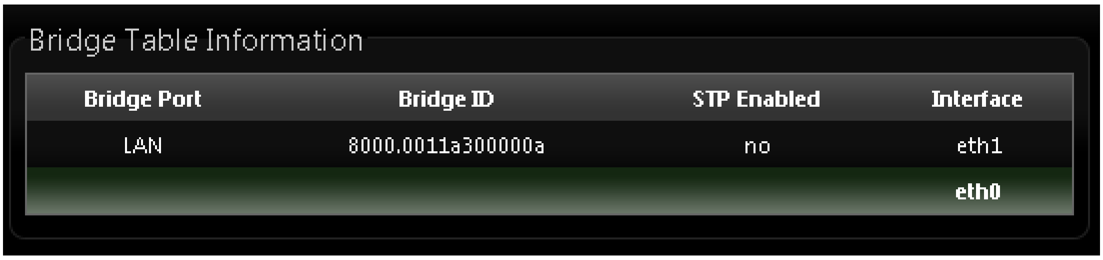
- **Bridge table information :** Select "Bridge Table information" on the drop-down list to display bridge table.

Bridge table will show Bridge ID and STP's Status on the each Ethernet bridge and its attached interfaces, the Bridge Port should be attached to some interfaces (e.g. eth2, ra0~ra7 and wds0~wds3).



Extra Information

Information: Bridge Table Information



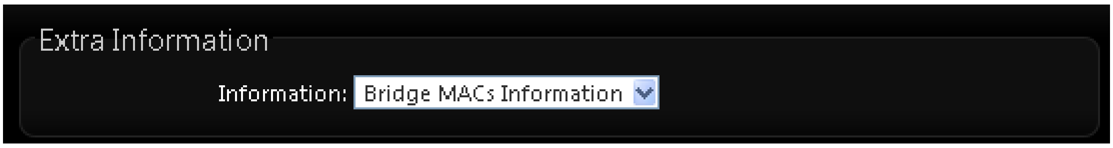
Bridge Table Information

Bridge Port	Bridge ID	STP Enabled	Interface
LAN	8000.0011a300000a	no	eth1
			eth0

- ➢ **Bridge MACs Information :** Select “Bridge MACs Information” on the drop-down list to display MAC table.

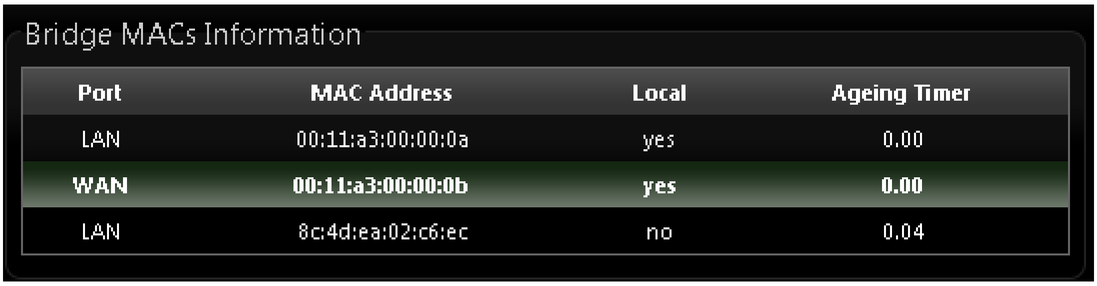
This table displays local MAC addresses associated with wired or wireless interfaces, but also remember non-local MAC addresses learned from wired or wireless interfaces.

Ageing timers will be reset when existing MAC addresses in table are learned again or added when new MAC addresses are seen from wired or wireless interfaces as well. When time runs out for a particular entry, it will be pruned from the table. In that situation, switching packet to that particular MAC address will be dropped.



Extra Information

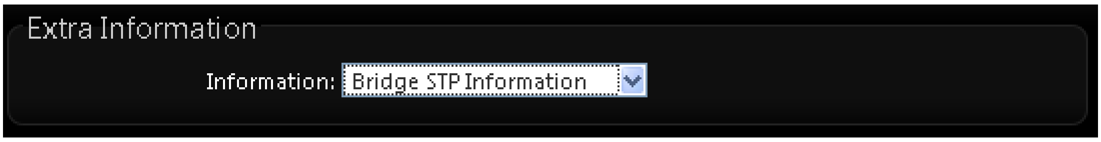
Information: Bridge MACs Information



Bridge MACs Information

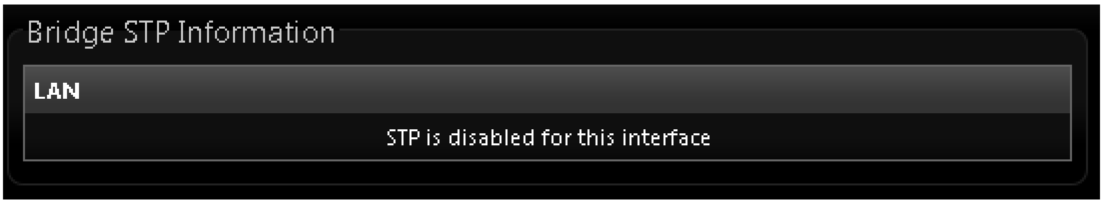
Port	MAC Address	Local	Ageing Timer
LAN	00:11:a3:00:00:0a	yes	0.00
WAN	00:11:a3:00:00:0b	yes	0.00
LAN	8c:4d:ea:02:c6:ec	no	0.04

- ➢ **Bridge STP Information :** Select “Bridge STP Information” on the drop-down list to display a list of bridge STP information.



Extra Information

Information: Bridge STP Information



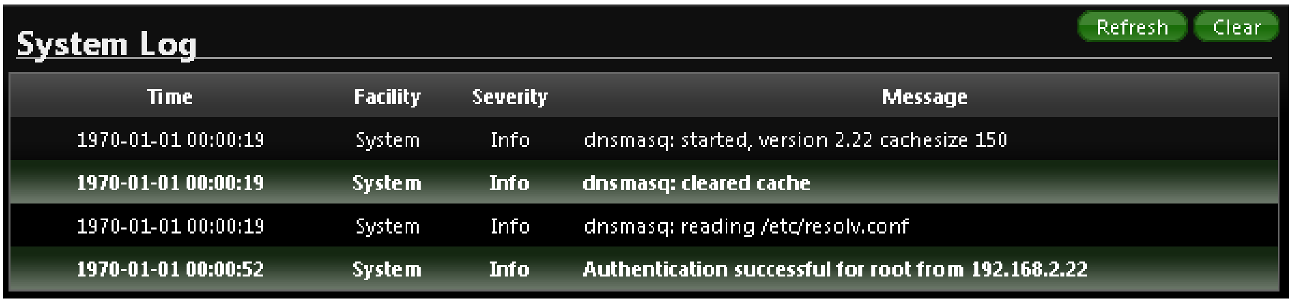
Bridge STP Information

LAN

STP is disabled for this interface

10.4 Event Log

The Event log displays system events when system is up and running. Also, it becomes very useful as a troubleshooting tool when issues are experienced in system.



Time	Facility	Severity	Message
1970-01-01 00:00:19	System	Info	dnsmasq: started, version 2.22 cachesize 150
1970-01-01 00:00:19	System	Info	dnsmasq: cleared cache
1970-01-01 00:00:19	System	Info	dnsmasq: reading /etc/resolv.conf
1970-01-01 00:00:52	System	Info	Authentication successful for root from 192.168.2.22

- **Time :** The date and time when the event occurred.
- **Facility :** It helps users to identify source of events such "System" or "User"
- **Severity :** Severity level that a specific event is associated such as "info", "error", "warning", etc.
- **Message :** Description of the event.

Click **"Refresh"** button to renew the log
Click **"Clear"** button to clear all the record.

Appendix A. WEB GUI Valid Characters

Table B WEB GUI Valid Characters

Block	Field	Valid Characters
LAN	IP Address	IP Format; 1-254
	IP Netmask	128.0.0.0 ~ 255.255.255.252
	IP Gateway	IP Format; 1-254
	Primary DNS	IP Format; 1-254
	Secondary DNS	IP Format; 1-254
	Hostname	Length : 32 0-9, A-Z, a-z ~ ! @ # $ % ^ * ( ) _ + - { } | : < > ? [ ] / ; ` , . =
WAN	Manual MAC Address	12 HEX chars
	IP Address	IP Format; 1-254
	IP Netmask	128.0.0.0 ~ 255.255.255.252
	IP Gateway	IP Format; 1-254
	Hostname	Length : 32 0-9, A-Z, a-z ~ ! @ # $ % ^ * ( ) _ + - { } | : < > ? [ ] / ; ` , . =
	User name	Length : 32 0-9, A-Z, a-z ~ ! @ # $ % ^ * ( ) _ + - { } | : < > ? [ ] / ; ` , . =
	Password	
	MTU	576 ~ 1492 for PPPoE; 1400 ~ 1460 for PPTP
	Idle Time	0 ~ 60 minutes
	Primary DNS	IP Format; 1-254
	Secondary DNS	IP Format; 1-254
DDNS	Hostname	Length : 32 0-9, A-Z, a-z @ - _ .
	User Name	Length : 32 0-9, A-Z, a-z ~ ! @ # $ % ^ * ( ) _ + - { } | : < > ? [ ] / ; ` , . =
	Password	
DHCP Server	Start IP	IP Format; 1-254
	End IP	IP Format; 1-254
	DNS1 IP	IP Format; 1-254
	DNS2 IP	IP Format; 1-254
	WINS IP	IP Format; 1-254

	Domain	Length : 32 0-9, A-Z, a-z ~ ! @ # $ % ^ * ( ) _ + - { } | : < > ? [ ] / ; ` , . =
	Lease Time	600 ~ 99999999

Table B   WEB GUI Valid Characters (continued)

Block	Field	Valid Characters
Management	System Name/ Location	Length : 32 0-9, A-Z, a-z Space ~ ! @ # $ % ^ * ( ) _ + - { } | : < > ? [ ] / ; ` , . =
	Description	32 chars
	Password	Length : 4 ~ 30 0-9, A-Z, a-z ~ ! @ # $ % ^ * ( ) _ + - { } | : < > ? [ ] / ; ` , . =
	HTTP/ HTTPS Port	1 ~ 65535
	Telnet/ SSH Port	1 ~ 65535
SNMP	RO/RW community	Length : 32 0-9, A-Z, a-z ~ ! @ # $ % ^ * ( ) _ + - { } | : < > ? [ ] ; ` , . =
	RO/RW user	Length : 31 0-9, A-Z, a-z ~ ! @ # $ % ^ * ( ) _ + - { } | : < > ? [ ] ; ` , . =
	RO/RW password	Length : 8 ~ 32 0-9, A-Z, a-z ~ ! @ # $ % ^ * ( ) _ + - { } | : < > ? [ ] ; ` , . =
	Community	Length : 32 0-9, A-Z, a-z ~ ! @ # $ % ^ * ( ) _ + - { } | : < > ? [ ] ; ` , . =
	IP	IP Format; 1-254
General Setup	Tx Power	1-100 %
Wireless Profile	Profile Name	32 chars
	ESSID	Length : 31 Space 0-9, A-Z, a-z ~ ! @ # $ % ^ * ( ) _ + - { } | : < > ? [ ] / ; ` , . =
	WEP Key	10, 26 HEX chars or 5, 13 ASCII chars
	Pre-shared Key	8 ~ 63 ASCII chars; 64 HEX chars
Advanced Setup	Beacon Interval	20 ~ 1024
	Date Beacon Rate	1 ~ 255
	Fragment Threshold	256 ~ 2346
	RTS Threshold	1 ~ 2347

Table B WEB GUI Valid Characters (continued)

Block	Field	Valid Characters
Virtual AP Setup	ESSID	Length : 31 Space 0-9, A-Z, a-z ~ ! @ # $ % ^ * ( ) _ + - { } | : < > ? [ ] / ; ` , . =
	Maximum Clients	1 ~ 32
	VLAN ID	1 ~ 4094
	WEP Key	10, 26 HEX chars or 5, 13 ASCII chars
	Group Key Update Period	>=60 seconds
	PMK Cache Period	> 0 minute
	Pre-Shared Key	8 ~ 63 ASCII chars; 64 HEX chars
	Radius Server IP	IP Format; 1-254
	Radius Port	1 ~ 65535
	Shared Secret	8 ~ 64 characters
	Session Timeout	>= 60 seconds; 0 is disable
WDS Setup	WEP Key	10, 26 HEX chars or 5, 13 ASCII chars
	TKIP Key	8 ~ 63 ASCII chars; 64 HEX chars
	AES Key	8 ~ 63 ASCII chars; 64 HEX chars
	Peer's MAC Address	12 HEX chars
	Description	32 chars
IP Filter	Source Address	IP Format; 1-254
	Source Mask	0 ~ 32
	Source Port	1 ~ 65535
	Destination Address	IP Format; 1-254
	Destination Mask	0 ~ 32
	Destination Port	1 ~ 65535
MAC Filter	MAC address	MAC Format; 12 HEX chars
Virtual Server	Description	32 chars
	Private IP	IP Formate; 1-254
	Private/ Public Port	1 ~ 65535
DMZ	IP Address	IP Format; 1-254
QoS/	Comment	32 chars

Block	Field	Valid Characters
Parental Control	MAC Address	MAC Format; 12 HEX chars
	Local/ Destination IP	IP Formate; 1-254
	Local/ Destination Port	1 ~ 65535
	Upload & Download	8 ~ 8192 digital number

Appendix B. MCS Data Rate

The table below shows the relationships between the variables that allow for the maximum data rate

Table C　MCS Data Rate

MCS Index	Modulation	Data Rate (Mb/s)			
		Channel Bandwidth = 20		Channel Bandwidth = 40	
		Long Guard Interval	Short Guard Interval	Long Guard Interval	Short Guard Interval
0	BPSK	6.5	7.2	13.5	15.0
1	QPSK	13.0	14.4	27.0	30.0
2	QPSK	19.5	21.7	40.5	45.0
3	16-QAM	26.0	28.9	54.0	60.0
4	16-QAM	39.0	43.3	81.0	90.0
5	64-QAM	52.0	57.8	108.0	120.0
6	64-QAM	58.5	65.0	121.5	135.0
7	64-QAM	65.0	72.2	135.0	157.5
8	BPSK	13.0	14.4	27.0	30.0
9	QPSK	26.0	28.9	54.0	60.0
10	QPSK	39.0	43.3	81.0	90.0
11	16-QAM	52.0	57.8	108.0	120.0
12	16-QAM	78.0	86.7	162.0	180.0
13	64-QAM	104.0	115.6	216.0	240.0
14	64-QAM	117.0	130.0	243.0	270.0
15	64-QAM	130.0	114.4	270.0	300.0

Note :

When MCS=32, only Short Guard Interval option is supported, Channel Bandwidth=20 is not supported. If Channel Bandwidth=40, the HT duplicate 6Mbps.

When MCS=0~7(One Tx Stream), Guard Interval and Channel Bandwidth are supported
When MCS=8~15(Two Tx Stream), Guard Interval and Channel Bandwidth are supported

Appendix C. Specifications

Hardware Specifications

Standards Conformance	IEEE 802.11 b/g/n compliant
	IEEE 802.3 / IEEE 802.3u
	IEEE 802.3af Power over Ethernet
	IEEE 802.11i Preauth (PMKSA Cache)
	IEEE 802.11d Multi country roaming
	IEEE 802.1Q Tag VLAN
	IEEE802.11f IAPP
	IEEE802.11e WMM
Ethernet Configuration	10/100BASE-TX auto-negotiation Ethernet RJ-45 connector) ;
	Auto MDI/MDI-X WAN * 1 , LAN * 1
Telephone Configuration	RJ-11 Pass Through In x1 connector , Out x1 connector
LED Indicators	(Power / Network Access) LED x 1,

Wireless Specifications

Data Transfer Rate	IEEE802.11b : 1 / 2 / 5.5 / 11Mbps (auto sensing)
	IEEE801.11g : 6/ 9/ 12/ 18/ 24/ 36/ 48/ 54Mbps
	IEEE802.11n : 150Mbps (Tx), 150Mbps (Rx)
Frequency Range	2.412 ~ 2.462GHz (USA)
	2.412 ~ 2.484GHz (Japan)
	2.412 ~ 2.472GHz (Europe ETSI)
	2.457 ~ 2.462 GHz (Spain)
	2.457 ~ 2.472 GHz (France)
Channel Spacing	IEEE802.11b/g/n : 20/40MHz
Media Access Protocol	CSMA / CA with ACK
Modulation Method	IEEE 802.11b: DSSS (DBPK,DQPSK,CCK)
	IEEE 802.11g/n: OFDM (64-QAM,16-QAM,QPSK,BPSK)
Operating Channels	IEEE 802.11b/g/n:
Transmit Power Variation	Max : 29 ± 1 dBm
Receiver Sensitivity	Max : -96dBm

Environmental & Mechanical Characteristics

Operating Temperature	-25 °C ~ 55 °C
Storage Temperature	-25 °C ~ 65 °C
Operating Humidity	
Storage Humidity	5% to 90% Non-Condensing
Antenna	Build in 1x 2.5dBi RF Antenna
Form Factor	Wall / In Wall
System Power Consumption	8 Watt Max.
Input Power Require	803.3af 48V PoE Ethernet Interface Power In
Dimensions (W x H x D)	Main Unit : 52 x 76.2 x 35mm Faceplate Set : 70 x120x10 mm(US-Type) Faceplate Set : 86 x 88 x10 mm(EU-Type)
Unit Weight	72.5g
Certifications	CE ，FCC，NCC、BSMI 、ROHS compliant