Wireless LAN Device Series

802.11n Draft 2.0 Multi-Mode AP

ZW-N5310 User's Manual

Version. 1 (2008.05.14)

TABLE OF CONTENTS

Notice

FCC Warning

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user authority to operate the equipment.

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

The user’s manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures：

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

FCC RF Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body. For product available in the USA/Canada market, only channel 1~11 can be operated.

Selection of other channels is not possible. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. Shielded interface cables must be used in order to comply with emission limits.

Channel

The Wireless Channel sets the radio frequency used for communication.

- Access Points use a fixed Channel. You can select the Channel used. This allows you to choose a Channel which provides the least interference and best performance. In the USA and Canada, 11channel are available. If using multiple Access Points, it is better if adjacent Access Points use different Channels to reduce interference.
- In “Infrastructure” mode, Wireless Stations normally scan all Channels, looking for an Access Point. If more than one Access Point can be used, the one with the strongest signal is used. (This can only happen within an ESS.)
- If using “Ad-hoc” mode (no Access Point), all Wireless stations should be set to use the same Channel. However, most Wireless stations will still scan all Channels to see if there is an existing “Ad-hoc” group they can join.

Note:

This equipment marketed in USA is restricted by firmware to only operate on 2.4GHz channel 1-11, also with UNII band, only band 1 (5.15-5.25G) & band 4 (5.745-5.805G) can be used. In addition, the UNII band 1 (5.15-5.25GHz) can be indoor used only.

CE Statement

ZINWELL, hereby declares that this device is in compliance with the essential requirement and other relevant provisions of the R&TTE Directive 1999/5/EC.

This device will be sold in the following EEA countries：Austria, Italy, Belgium, Liechtenstein, Denmark, Luxembourg, Finland, Netherlands, France, Norway, Germany, Portugal, Greece, Spain, Iceland, Sweden, Ireland, United Kingdom, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Slovakia, Poland, Slovenia, Bulgaria, Romania.

Preface

This guide is for the networking professional who installs and manages the Zinwell ZW-5310 product hereafter referred to as the “device”. To use this guide, you should have experience working with the TCP/IP configuration and be familiar with the concepts and terminology of wireless local area networks.

Ch 1. ZW-5310 Installation

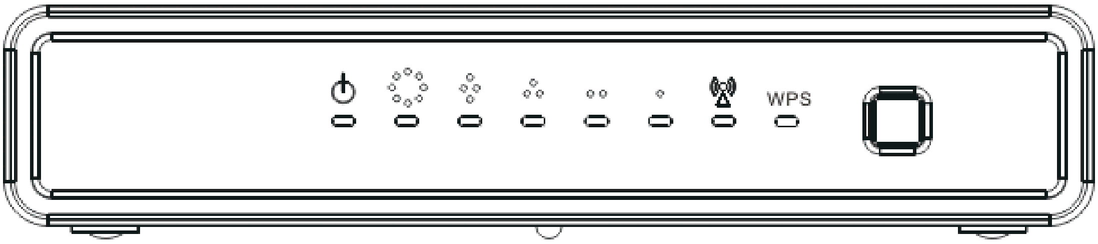
Packing List

Before starting the installation of the device, please make sure the package contains the following items：

- ZW-5310 Multi-Mode AP unit * 1
- Power Adapter * 1
- RJ-45 Cable * 1

Connectors, Buttons and LEDs

Front Panel



From Left to right:

Power LED: Red LED lights when power on.

WAN: Orange LED lights when the Ethernet port is plugged and flashes when it is transmitting.

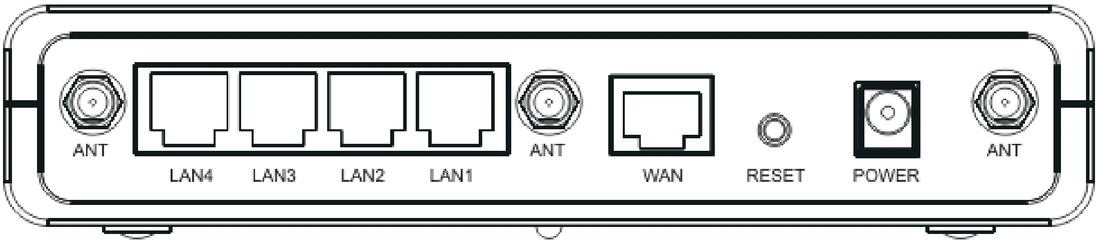
LAN 4/3/2/1: Green LED lights when the respective Ethernet port is plugged and flashes when it is transmitting.

WLAN: Green LED flashes when WLAN is working.

WPS LED: Blue LED lights when the WPS button is pushed.

WPS Button: Press it to enable PBC (Press Button Communication) for WPS authentication.

Back Panel



From left to right:

Antenna port 1/2/3: This SMA Reverse allows the user to connect antenna or RF cable. Please connect all three antennas into it.

LAN 4/3/2/1: 4 Ethernet ports for the LAN connection.

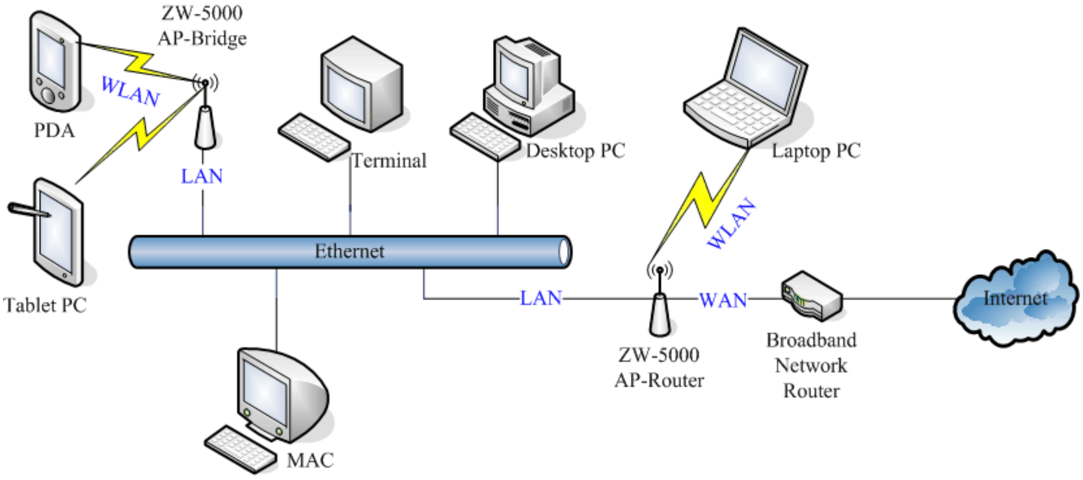
WAN: Connect the Ethernet port from ISP such as Adsl ITU-R, Cable MODEM.

Reset Button: Press Reset button to revert it to factory default.

DC Jack: Please supply the power in 12V and 1A.

Hardware Installation

Once you check everything from the package, you can start to install the device. You can use the wall mount hole on the bottom of the device to mount the device on the wall, or just put the device on the desktop. The administrator can refer to the figure below while in the process of constructing your WLAN environment.



Ch 2. First Time Configuration

Before Start to Configure

The configuration of this device is through web-browser. To access the configuration interfaces, make sure you are using a computer connected to the same network as the device. The default IP address of the device is

192.168.1.254, and the subnet-mask is 255.255.255.0. We Recommend to login with username: **root** and password: **root** for the first time configuration.

Please note that the DHCP server inside the device is default to up and running. Do not have multiple DHCP servers in your network environment, otherwise it will cause abnormal situation.

Knowing the Network Application

The device can act as the following roles, and it supports WDS (Wireless Distribution System) function.

- Access Point
- WDS mode
- Bridge/Router
- WISP
- AP Client

The device provides 3 different operation modes and the wireless radio of device can act as AP/Client/WDS. The operation mode is about the communication mechanism between the wired Ethernet NIC and wireless NIC. Following are the types of operation mode.

Router

The wired Ethernet (WAN) port is used to connect with ADSL/Cable modem and the wireless NIC is used for your private WLAN. The other wired Ethernet (LAN) port bridges to the private WLAN. The NAT is existed between WAN and WLAN/LAN and all the wireless and wired clients share the same public IP address through the WAN port to ISP. The default IP configuration for WAN port is static IP. You can access the web server of device through the default WAN IP address 172.1.1.1 and modify the setting base on your ISP requirement.

Bridge

The WAN port will bridge to the other 4 LAN ports. Once the mode is selected, all the WAN related functions will be disabled.

WISP (Wireless ISP)

This mode can let you access the AP of your wireless ISP and share the same public IP address from your ISP to the PCs connecting with both the wired Ethernet ports of the device. When setup as this mode, the wireless radio will be client mode connecting to the AP of your ISP as the WAN connection and then you can configure the WAN IP configuration to meet your WISP requirement.

The wireless radio of the device acts as the following roles.

AP (Access Point)

The wireless radio of device serves as communications “hub” for wireless clients and provides a connection to a wired LAN.

AP Client

This mode enables the establishment of connection with the other AP using infrastructure/Ad-hoc networking types. With bridge operation mode, you can directly connect one of the wired Ethernet port to your PC and the device becomes a wireless adapter. And with WISP operation mode, you can connect one of the wired Ethernet port to a hub/switch and all the PCs connecting with hub/switch can share the same public IP address from your ISP.

WDS (Wireless Distribution System)

This mode combines up to 8 AP to a single wireless network; the device forwards the packets to another AP with WDS function. When this mode is selected, all the wireless clients can’t survey and connect to the device. The device only allows the WDS connection.

WDS+AP

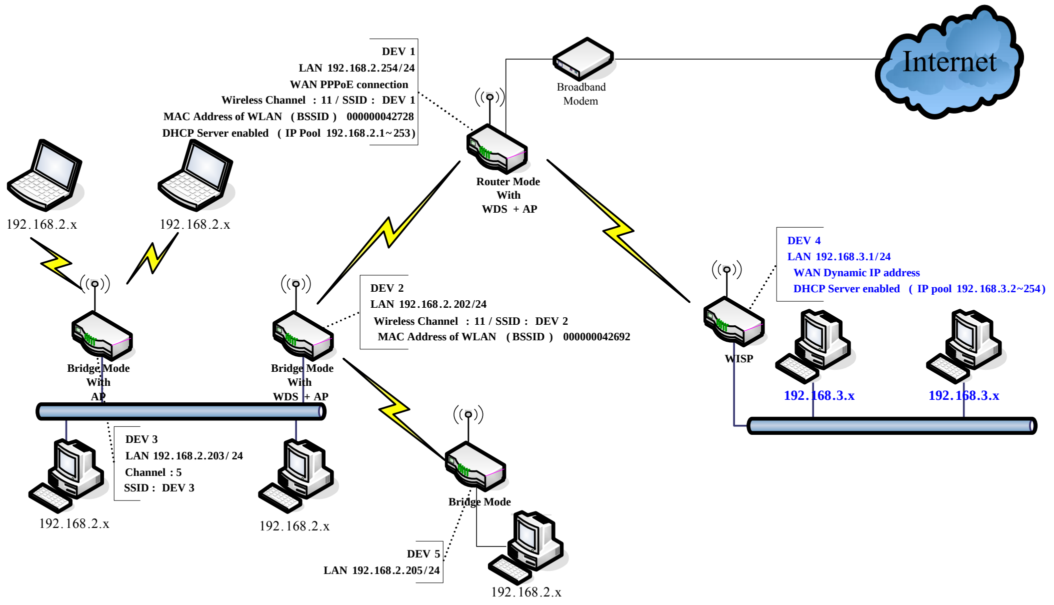
This mode combines WDS plus AP modes, and it not only allows WDS connections but also the wireless clients can survey and connect to the device.

The following table shows the supporting combination of operation and wireless radio modes.

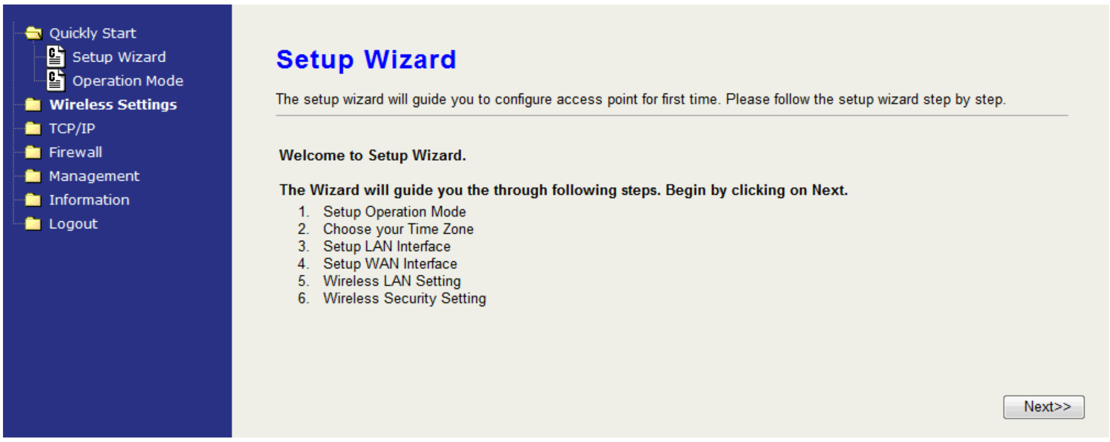
	Bridge	***Router***	***WISP***
AP	V	V	X
WDS	V	V	X
Client	V	X	V

AP+WDS	V	V	X

Hereafter are some topologies of network application for your reference.



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.

Welcome to Setup Wizard.

The Wizard will guide you the through following steps. Begin by clicking on Next.

1. Setup Operation Mode
2. Choose your Time Zone
3. Setup LAN Interface
4. Setup WAN Interface
5. Wireless LAN Setting
6. Wireless Security Setting

When you login the device at the first time, please click the Setup Wizard for configuration. Just follow the instruction of the web page and input every field. It will take you through the settings. However, if you are not familiar with some terms of WLAN, you may want to read the following section for the details of each setting.

0. Welcome—click “Next” to continue.
1. Operation mode—select one mode among the modes below according to your network environment.

- Router
- Bridge
- Wireless ISP

2. Time Zone Setting—input the Internet time setting. This device will update time from NTP server.
   - Time Zone: select your time zone.
   - NTP Update Interval: select the time interval between every update attempt.
   - NTP Server 1: input your favorite NTP server.
   - NTP Server 2: input the backup NTP server.
3. LAN Interface Setup

- IP Address: assign an IP Address for the device.
- Subnet Mask: enter the subnet mask.

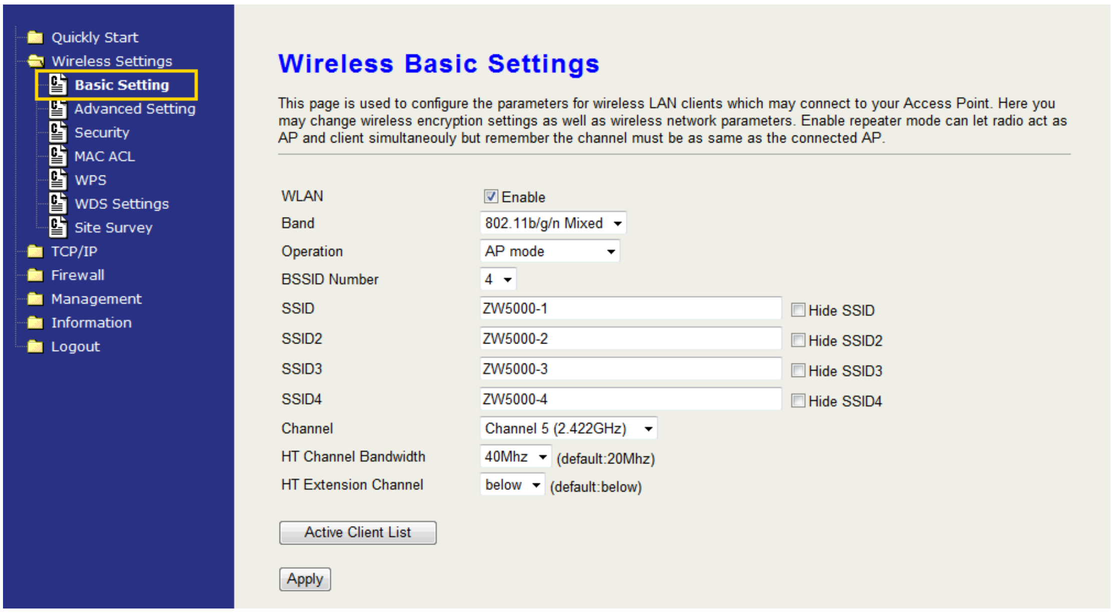
4. WAN Interface Setup

- Static IP, DHCP, PPPoE, PPTP: Select one for your WAN type. Enter the necessary information for each type.
- Allow webpage from WAN: Click to allow login the web configuration from WAN.

5. Wireless Basic settings—setup the information including Band, Operation mode, SSID and Channel.
6. Wireless Security Setup—Setup

Open, Shared, WEP Auto, WPA Personal, WPA2 Personal, WPA/WPA2 Personal

Basic Settings



Wireless Basic Settings

This page is used to configure the parameters for wireless LAN clients which may connect to your Access Point. Here you may change wireless encryption settings as well as wireless network parameters. Enable repeater mode can let radio act as AP and client simultaneouly but remember the channel must be as same as the connected AP.

WLAN	☑ Enable	
Band	802.11b/g/n Mixed	
Operation	AP mode	
BSSID Number	4	
SSID	ZW5000-1	□ Hide SSID
SSID2	ZW5000-2	□ Hide SSID2
SSID3	ZW5000-3	□ Hide SSID3
SSID4	ZW5000-4	□ Hide SSID4
Channel	Channel 5 (2.422GHz)	
HT Channel Bandwidth	40Mhz (default:20Mhz)	
HT Extension Channel	below (default:below)	

WLAN:

Uncheck to disable the wireless interface of device. Default: Checked.

Band:

Click the dropdown box to select one among 802.11b/g/n Mixed, 802.11b/g Mixed, 802.11a Only, 802.11b Only, 802.11g Only, 802.11n Only, 802.11a/n Mixed modes.

Operation:

The radio of device supports different modes as following:

1. AP

   The radio of device act as an Access Point to serves all wireless clients to join a wireless local network. It's only in AP mode, the BSSID number can be configured to 1, 2, 4 BSSID. When configured to 2 or 4 SSID, the same number of corresponding SSID text fields are opened for setting.

2. Client

   Support Infrastructure and Ad-hoc network types to act as a wireless adapter.

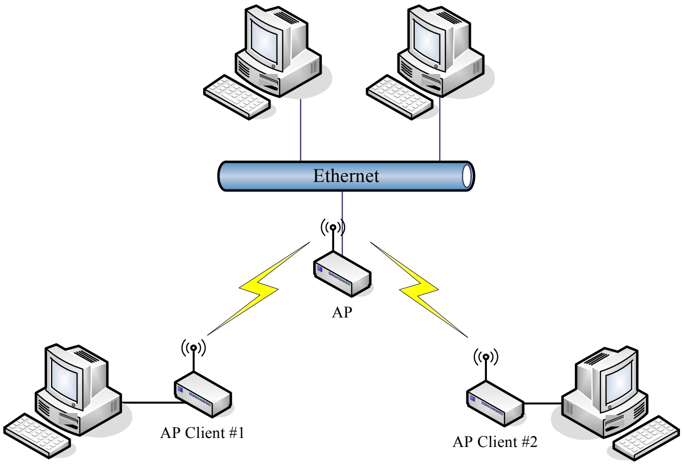
3. WDS

   WDS stands for Wireless Distribution System, this mode joins to a WDS network which combines up to 8 WDS-AP, only devices with WDS function supported can connect to it, all the wireless clients can't survey and connect the device when the mode is selected.

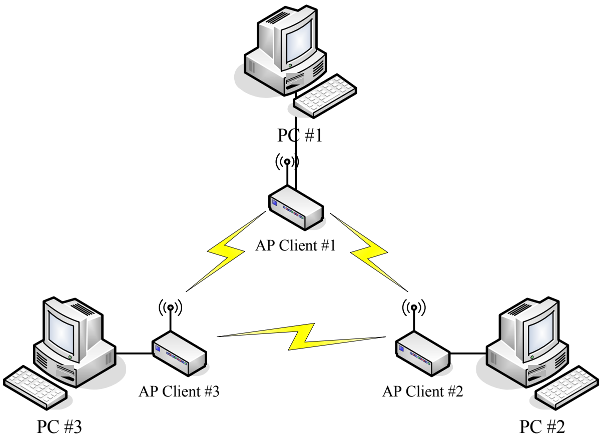
4. AP+WDS

   Support both AP and WDS functions, the wireless clients and devices with WDS function supported can survey and connect to it.

- ***Infrastructure***:
  This type requires the presence of 802.11 a/b/g/n Draft 2.0 Access Point. All communication is done via the Access Point.



- ***Ad Hoc***:
  This type of connection provides a peer-to-peer communication between wireless stations. All the communication is done from Client to Client without any Access Point involved. Ad Hoc networking must use the same SSID and channel for establishing the wireless connection.



In client mode, the device supports the WISP mode function including Firewall and WAN settings.

BSSID Number:

Click the drop down box to select the SSID number. Select 1, 2 or 4 to decide how many BSSID/ESSID to broadcast. This option is only selectable in AP mode. The default number is 1 which broadcasts only 1 SSID.

SSID:

The SSID, which is also called ESSID is a unique identifier that wireless networking devices use in order to establish and maintain wireless connectivity. Multiple access point/bridges on a network or sub-network can use the same SSID. SSIDs are case sensitive and can contain up to 32 alphanumeric characters.

Hide SSID:

Check to hide SSID. With hidden SSID, the AP can't be scanned and the wireless client must input SSID manually to associate this AP.

Channel Number

The following table is the available frequencies (in MHz) for the 2.4 GHz radio:

Channel No.	Frequency	Country Domain
1	2412	Americas, EMEA, Japan, and China
2	2417	Americas, EMEA, Japan, and China
3	2422	Americas, EMEA, Japan, Israel, and China
4	2427	Americas, EMEA, Japan, Israel, and China
5	2432	Americas, EMEA, Japan, Israel, and China
6	2437	Americas, EMEA, Japan, Israel, and China
7	2442	Americas, EMEA, Japan, Israel, and China
8	2447	Americas, EMEA, Japan, Israel, and China
9	2452	Americas, EMEA, Japan, Israel, and China
10	2457	Americas, EMEA, Japan, and China
11	2462	Americas, EMEA, Japan, and China
12	2467	EMEA and Japan
13	2472	EMEA and Japan

※ EMEA (Europe, the Middle East and Africa).

The following table is the available frequencies (in MHz) for the 5 GHz radio for US:

Channel No.	Frequency
36	5180
40	5200
44	5220
48	5240
149	5745
153	5765
157	5785
161	5805

HT Channel Bandwidth:

This option only appears when selecting Band mode in 802.11b/g/n Mixed, 802.11n only, 802.11a/n Mixed. Click the drop down box to choose between 20 MHz or 40MHz. The default value is 20MHz. When choosing 40MHz, the data rate is doubled.

HT Extension Channel: below, above

This option only appears when you select 40MHz as the HT Channel Bandwidth. Select one to decide whether up or down band to expand the bandwidth. When you setup the below or above option, the available channel may change to fit the RF frequency range. For example, the table listed below shows the changes of the available channels.

Channel No.	**20MHz**	**40MHz/below**	**40MHz/above**
1	X	N/A	X
2	X	N/A	X
3	X	N/A	X
4	X	N/A	X
5	X	X	X
6	X	X	X
7	X	X	X
8	X	X	N/A
9	X	X	N/A
10	X	X	N/A
11	X	X	N/A

Active Client List

Show the information of active wireless Stations/Clients that connected to the device. The table below shows the fields of the ACL.

MAC	AID	TxPackets	TxRate	Power Save	BW	Expired	RSSI

MAC: The MAC Address of the WLAN Client/Station.

AID: Active client ID. This is the sequence number of the current active client on the list.

TxPackets: It counts the transmit data packets from this Client/Station.

TxRate: The current data rate mode of this Client/Station.

Power Save: It shows “Yes” or “No” to indicate whether the Power Save mode of this Client/Station is enabled.

BW: It shows 20 or 40MHz to indicate whether the bandwidth mode of this Client/Station.

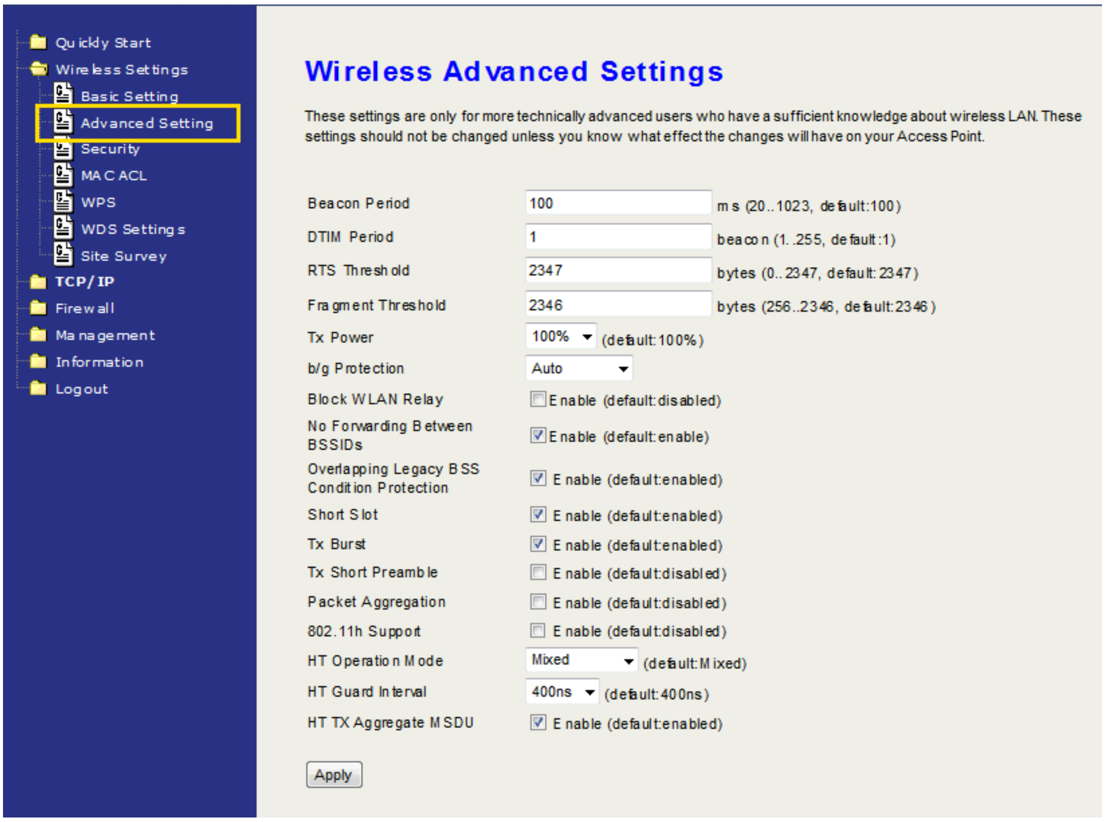
Expired: The default expired time is 300 seconds. When this client/station stops transmitting data packets, it starts to countdown. If any data packet transmits, the countdown stops and the value go back to 300 seconds. When it countdown to zero, this Client/Station will be kicked out from this table.

RSSI: It shows the signal strength of this Client/Station in dBm unit.

Advanced Settings

These settings are only for more technically advanced users who have sufficient knowledge about wireless LAN. These settings should not be changed unless you know what effect the changes will have on your device. The default setting is optimized for the normal operation. For specific application, setting configuration will required highly attention to reach optimistic condition.

Note：
Any unreasonable value change to default setting will reduce the throughput of the device.



Wireless Advanced Settings

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

Beacon Period	100 ms (20..1023, default:100)
DTIM Period	1 beacon (1..255, default:1)
RTS Threshold	2347 bytes (0..2347, default:2347)
Fragment Threshold	2346 bytes (256..2346, default:2346)
Tx Power	100% (default:100%)
b/g Protection	Auto
Block WLAN Relay	□ Enable (default:disabled)
No Forwarding Between BSSIDs	☑ Enable (default:enable)
Overlapping Legacy BSS Condition Protection	☑ Enable (default:enabled)
Short Slot	☑ Enable (default:enabled)
Tx Burst	☑ Enable (default:enabled)
Tx Short Preamble	□ Enable (default:disabled)
Packet Aggregation	□ Enable (default:disabled)
802.11h Support	□ Enable (default:disabled)
HT Operation Mode	Mixed (default:Mixed)
HT Guard Interval	400ns (default:400ns)
HT TX Aggregate MSDU	☑ Enable (default:enabled)

Beacon Interval

Beacons are the packets sending by Access point to synchronize the wireless network. The beacon interval is the time interval between beacons sending by this unit in AP or AP+WDS mode. The default and recommended beacon interval is 100 milliseconds.

DTIM Period

The default value of Delivery Traffic Indication Message is 1 beacon. The DTIM which is in the beacon is to inform clients of the next window for listening to broadcast and multicast messages.

RTS Threshold

The RTS threshold determines the packet size at which the radio issues a request to send (RTS) before sending the packet. A low RTS Threshold setting can be useful in areas where many client devices are associating with the device, or in areas where the clients are far apart and can detect only the device and not each other. You can enter a setting ranging from 0 to 2347 bytes.

Fragment Threshold

The fragmentation threshold determines the size at which packets are fragmented (sent as several pieces instead of as one block). Use a low setting in areas where communication is poor or where there is a great deal of radio interference. This function will help you to improve the network performance.

Tx Power (RF transmit power)

The default Tx power is 100%. In case of shortening the distance and the coverage of the wireless network, click the drop-down box to select the smaller percentage. The level between each value is 10%.

b/g Protection

Default: Auto. You can select the other options including Always On, Always Off. The B/G protection technology is CTS-To-Self. It will try to reserve the throughput for 11g clients from 11b clients connecting to the device as AP mode.

Block WLAN Relay (Client Isolation)

The device supports isolation function. If you are building a public Wireless Network, enable this function can provide better security. The device will block packets between wireless clients (relay). All the wireless clients connected to the device can’t see each other.

No Forwarding Between BSSIDs

The device supports multi-SSID. You can decide whether the clients associated to different SSID on the device can see each other. Enable the option to block it. The Default value is enabled.

Overlapping Legacy BSS Condition Protection

Default: enabled

Enable it to maintain the legacy support while the device is in 11n mode.

Short Slot

Default: enabled. Reduce the waits after the collision time before retransmitting. It will increase the throughput.

Tx Burst

Default: enabled. Enable it and the device will try this function when the other associated AP/Client is available.

Tx Short Preamble

Default: enabled. Only requires disabling it when connecting some old 802.11 b wireless clients.

Packet Aggregation

Default: enabled. This is one of 802.11n technique to increase the data throughput.

802.11h Support

Default: enabled. This function provides Dynamic Frequency Selection (DFS) and the transmit power control (TPC) to 802.11a MAC.

HT Operation Mode

Default: Mixed (Mixed, Green Field).

Mixed mode: In this mode the device transmits the packets with preamble compatible legacy (802.11 a/g), so they can be decoded by legacy devices. The device receives and decodes both Mixed Mode packets and legacy packets.

Green Field mode: the device transmits HT packets without legacy compatible part. But the device receives and decodes both Green Field and legacy packets.

HT Guard Interval

Default: 400ns. The 11n device inserts the Guard Interval into the signal. You can choose the interval between 400ns and 800ns. The available data rate modes are changed according to the Guard Interval.

Guard Interval	Bandwidth	Available Data Rate Mode (Mbps)
400ns	20MHz	144.4/130/115.6/ 86.7/72.2/65/57.8/43.3/28.9/21.7/ 14.4/7.2
	40MHz	300/270/240/180/150/135/120/90/60/45/30/15
800ns	20MHz	130/117/104/78/65/58/52/39/26/19.5/13/6.5
	40MHz	270/243/216/162/135/ 121.5/108/81/54/40.5/27/13.5

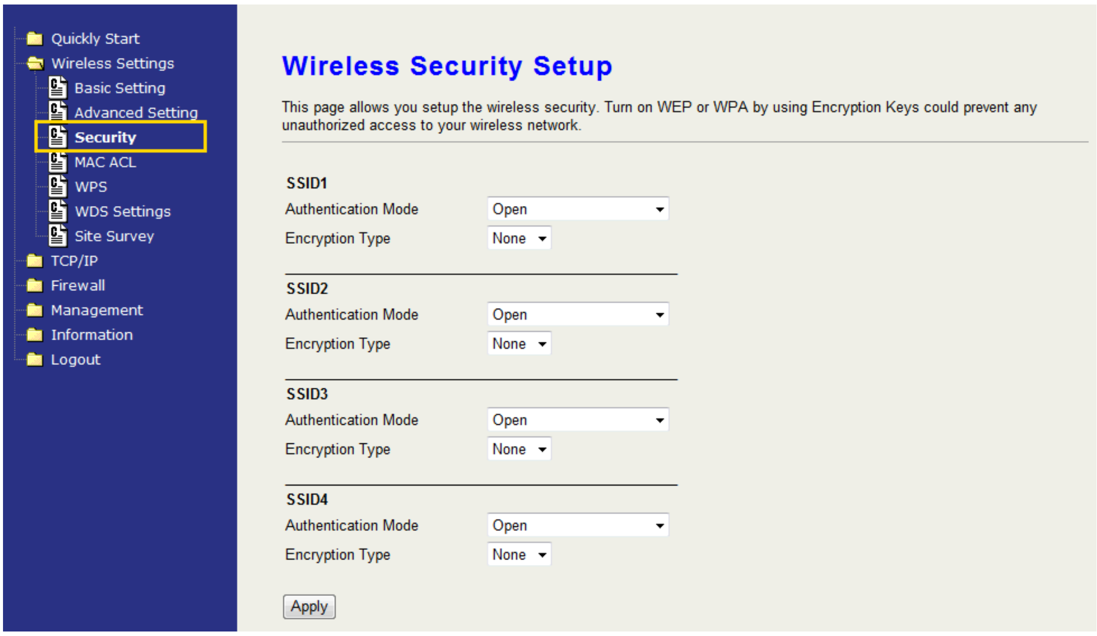
HT TX Aggregation MSDU

Default: enabled. Enable to increase the 11n throughput.

Configuring Wireless Security

This device provides complete wireless security function include WEP, WPA/WPA2 Personal and Enterprise in different mode (see the Security Support Table).

The default security settings of the encryption function are disabled. Choose your preferred security setting depending on what security function you need.



Wireless Security Setup

This page allows you setup the wireless security. Turn on WEP or WPA by using Encryption Keys could prevent any unauthorized access to your wireless network.

SSID1

Authentication Mode: Open

Encryption Type: None

SSID2

Authentication Mode: Open

Encryption Type: None

SSID3

Authentication Mode: Open

Encryption Type: None

SSID4

Authentication Mode: Open

Encryption Type: None

The available options are showed according to the numbers of the BSSID in the Basic Setting. Each SSID can setup different encryption type. For example, set up 4 BSSID and 4 sets of security shows on this page:

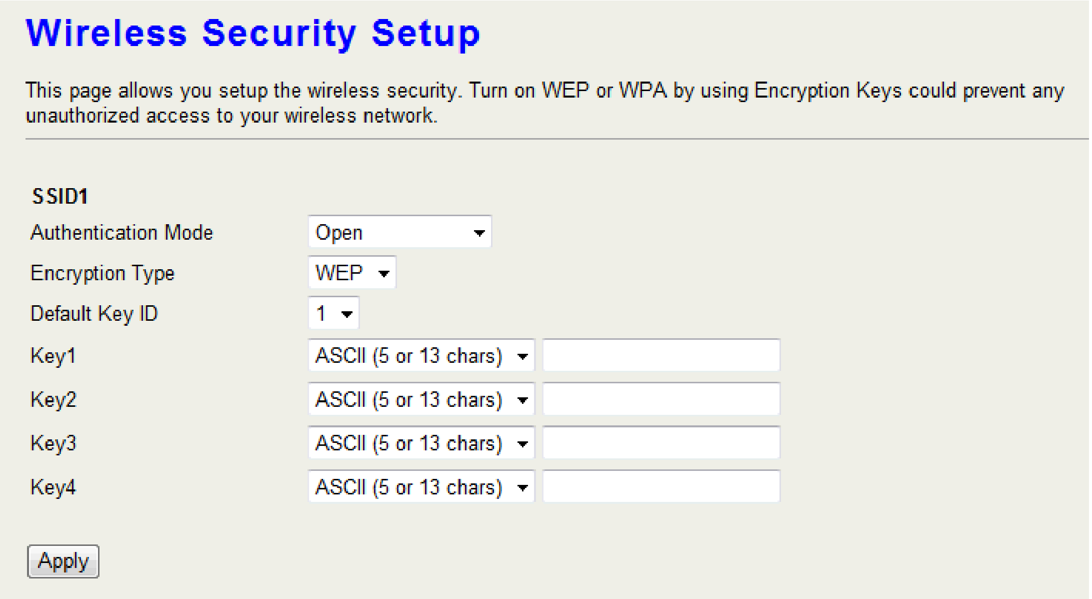
- Authentication Mode: Choose one as the wireless authentication among the following types: Open, Shared, WPA Personal, WPA Enterprise, WPA2 Personal, WPA2 Enterprise, WPA/WPA2 Personal, and WPA/WPA2 Enterprise.
- Encryption Type: Select one for the encryption type. The options vary depending on the Authentication mode. The corresponding options shows below.

Authentication	**Encryption type**	**Key option**

Open	None, WEP	Default Key ID, Key type, Key content
Shared/WEP Auto	WEP	Default Key ID, Key type, Key content
WPA/WPA2 Personal	TKIP, AES, TKIP/AES	Pass Phrase (8..32bytes), Hex (64hex)
WPA/WPA2 Enterprise	TKIP, AES, TKIP/AES	Radius Server Network/Address/Port/Key

WEP Encryption Setting

Wired Equivalent Privacy (WEP) is implemented in this device to prevent unauthorized access to your wireless network. The WEP setting must be as same as each client in your wireless network.



Wireless Security Setup

This page allows you setup the wireless security. Turn on WEP or WPA by using Encryption Keys could prevent any unauthorized access to your wireless network.

SSID1

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

- Authentication Type: Open, Shared and Auto. When choose “Open” or “Shared”, all of the clients must select the same authentication to associate this AP. If select “WEP Auto”, the clients don’t have to use the same “Open” or “Shared” authentication. They can choose any one to authenticate.
- Default Key ID: Select whether the Key ID as the default Key.
- Key 1/2/3/4: Select “ASCII (5 or 13 chars)” or “Hex (10 or 26 Hex)” and then type the key in the text field.
  - ■ 64-bit WEP Encryption：64-bit WEP keys are as same as the

encryption method of 40-bit WEP. When input 10 hexadecimal digits (0-9, a-f or A-F) or 5 ACSII chars as the key, it is using 64-bit WEP encryption.

- 128-bit WEP Encryption：128-bit WEP keys are as same as the encryption method of 104-bit WEP. When input 26 hexadecimal digits (0-9, a-f or A-F) or 10 ACSII chars, it is using 128-bit WEP encryption.

WPA Authentication Mode

This device supports six WPA modes including WPA Personal, WPA Enterprise, WPA2 Personal, WPA2 Enterprise and additional WPA/WPA2 Personal and WPA/WPA2 Enterprise. For individual and residential user, it is recommended to select WPA or WPA2 Personal to encrypt the link without additional RADIUS server. This mode requires only an access point and client station that supports WPA-Pre Shared Key. For Enterprise, authentication is achieved via WPA RADIUS Server. You need a RADIUS or other authentication server on the network.

- **WPA/WPA2 Personal:**
  - Pre-Share Key:

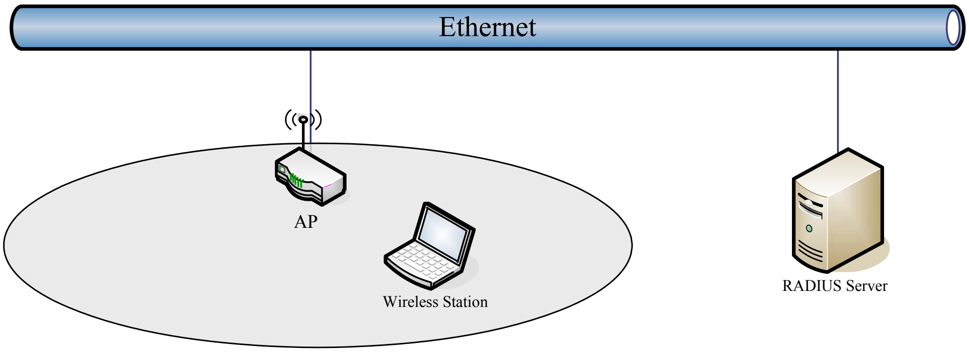
  Option: Pass Phrase (8-32bytes), Hex (64hex). This mode requires only an access point and client station that supports WPA-PSK. The WPA-PSK settings include Key Format, Length and Value. They must be as same as each wireless client in your wireless network. When Key format is Passphrase, the key value should have 8-63 ACSII chars. When Key format is Hex, the key value should have 64 hexadecimal digits (0-9, a-f or A-F).
- **WPA/WPA2 Enterprise (RADIUS):**

When WPA Authentication mode is Enterprise (RADIUS), you have to add user accounts and the target device to the RADIUS Server. In the device, you need to specify the Server Network, Server address, Server Port and Server Key of the target RADIUS server.

- Encryption Type: TKIP, AES, TKIP/AES. Select the encryption type. When selecting TKIP/AES, the client can use whether TKIP or AES for the authentication.
- Pre-Authentication Support option: This option only appears when selecting WPA2 or WPA/WPA2 Enterprise as the authentication mode. Enable it to use this function.
- Radius Server Network: WAN, LAN. Select the WAN or LAN

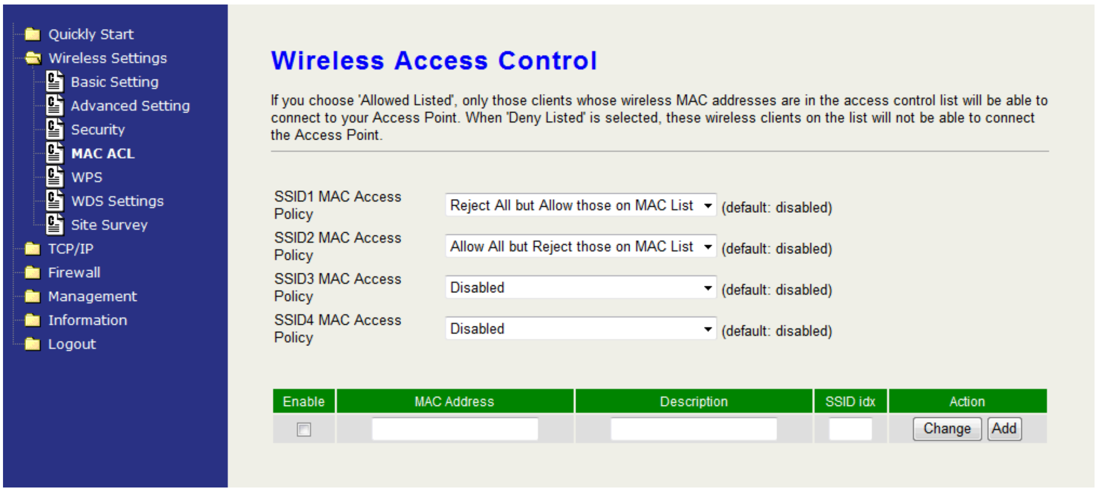
depends on whether the RADIUS server location is.

- Radius Server Address: Input the IP Address of the Radius server.
- Radius Server Port: Input the port of the Radius server. The default port is 1812.
- Radius Server Key: Input the Authentication Key.



MAC ACL

This device can setup Access Control List to allow or reject wireless clients. Select “Reject ALL but Allow those on MAC List” or “Allow ALL but Reject those on MAC List” on each SSID and then input the information in the ACL.



Wireless Access Control

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

SSID1 MAC Access Policy	Reject All but Allow those on MAC List	(default: disabled)
SSID2 MAC Access Policy	Allow All but Reject those on MAC List	(default: disabled)
SSID3 MAC Access Policy	Disabled	(default: disabled)
SSID4 MAC Access Policy	Disabled	(default: disabled)

Enable	MAC Address	Description	SSID idx	Action
□				Change Add

WPS

This device supports two kinds of WPS (Wi-Fi Protected Setup), PIN (Personal Identification) and PBC (Push Button Communication).

- Only first SSID applies WPS setup.

- Only applies in AP mode.

Options explanations

WPS Mode: As Registrar – add other enrollee to this device. The device supports “As Registrar” mode currently.

WPS Config Method:

PIN – Personal Identification Number: input 8-character code. The PIN code setting must be the same as the enrollee’s setting.

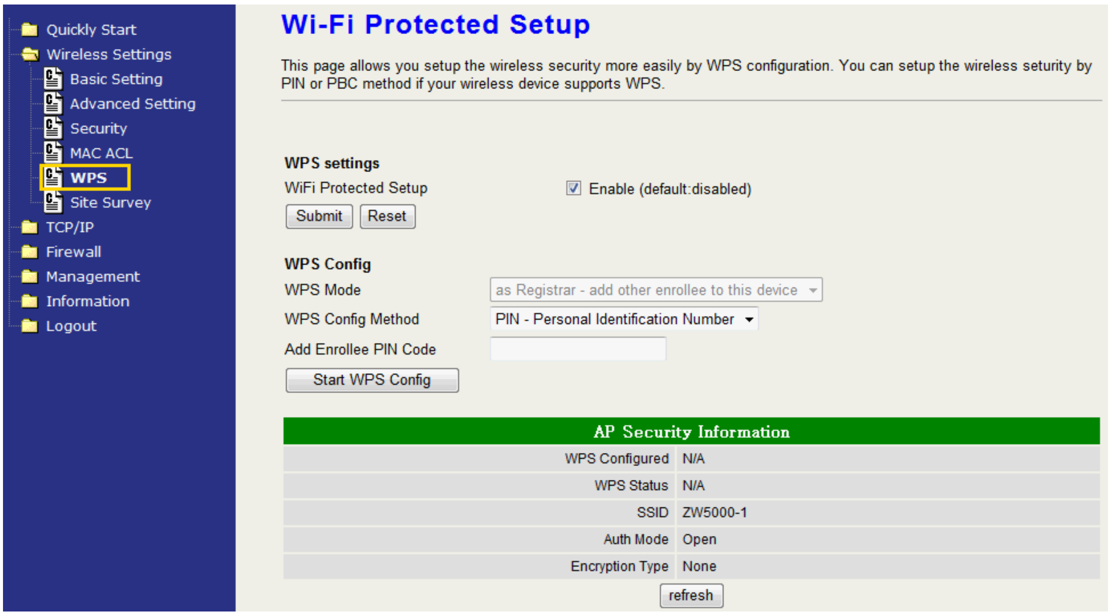
PBC – Push Button communication: When using the PBC, push the WPS button on the device and then connect the wireless client in 5 seconds.

Add Enrollee PIN Code: The text filed only appears when selecting **PIN** for WPS Config Method. Input the PIN code for authentication.

AP Security Information field explanation:

Label	**Description**
WPS Configured	It could be No and Yes. “No”: It is not configured yet. “Yes”: PIN or PBC has been selected to use.
WPS Status	It could be Unused, Idle, Start WSC Process. “Unused”: It is not enable WPS yet. “Idle”: The WPS is enabled but not active yet. “Start WSC Process”: Click “Start WPS Config” button and the process begin. “Configured”: At least one Client connects to the device.
SSID	It shows the supporting ESSID of the current device.
Auth Mode	It could be Open, WPA Personal or WPA2 Personal. Please open the page “Wireless settings, Security” to configure the security options such as authenticate Mode, encryption type and the pre-Shared key.
Encryption Type	TKIP, AES, TKIP/AES.

Note: When the WPS is enabled, the authentication mode is left only Open, WPA Personal and WPA2 Personal for configuration.



Wi-Fi Protected Setup

This page allows you setup the wireless security more easily by WPS configuration. You can setup the wireless seturity by PIN or PBC method if your wireless device supports WPS.

WPS settings

WiFi Protected Setup ☑ Enable (default:disabled)

WPS Config

WPS Mode: as Registrar - add other enrollee to this device

WPS Config Method: PIN - Personal Identification Number

Add Enrollee PIN Code:

AP Security Information	
WPS Configured	N/A
WPS Status	N/A
SSID	ZW5000-1
Auth Mode	Open
Encryption Type	None

WPS Configuration Steps

1. **Setup the Wireless Security**: We recommended you to setup Wireless Security before setting WPS; otherwise it will use no encryption after you setup and start WPS. Please refer to the section of wireless security mentioned in this guide book.
2. **Enable WPS setting:** Check the Enable box and then submit to apply. You can choose either step 3 PIN or step 4 PBC to setup WPS. It only supports the first SSID.
3. **PIN setup:**
   Open the WPS page on the configuration tool of the **WLAN Client (station)** and read the Pin Code for WPS. Select the WPS Config Method “PIN- Personal Identification Number” and enter the Pin Code in the text field “Add Enrollee PIN code”, and then click the button “Start WPS Config”. The WLAN client will get associated in a few seconds.
4. **PBC setup**:
   You could toggle PBC through WPS button in the front panel or click the “Start WPS Config” in the WPS setup page.

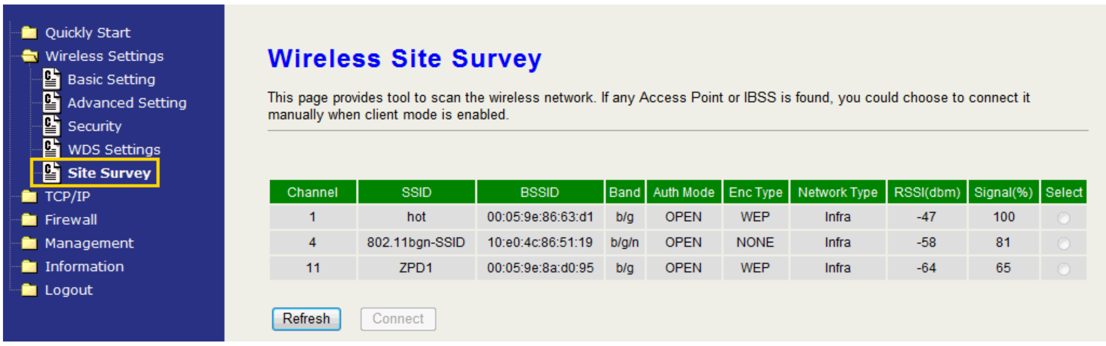
- **WPS button**: Press the button for 5 seconds and then press “PBC” option on the configuration tool of the **WLAN Client (station)**. The client will get associated in a few seconds.
- **Start WPS Config**: Select the option “PBC –Push Button

communication” and then press “PBC” option on the configuration tool of the **WLAN Client (station)**. The client will get associated in a few seconds.

Note: If there isn’t any WPS setting such as Pin code and PBC in your WLAN client tool, perhaps your WLAN client card doesn’t support WPS. You can try to find the latest driver and tool to see if it supports WPS, or just don’t use WPS.

Site Survey

In the Site Survey page, you can scan the SSID in the neighborhood in all modes including AP, Client, WDS, AP+WDS mode. You can see the usage of the Wi-Fi Channel, and then you can setup a different channel for the device accordingly to reduce the overlapping. Please refer to the basic setting section to setup channel. Click “Refresh” to rescan it. In client mode, the Radio button “Select” can be checked to connect. Check the one you want to connect and then click “Connect” to connect.



Wireless Site Survey

This page provides tool to scan the wireless network. If any Access Point or IBSS is found, you could choose to connect it manually when client mode is enabled.

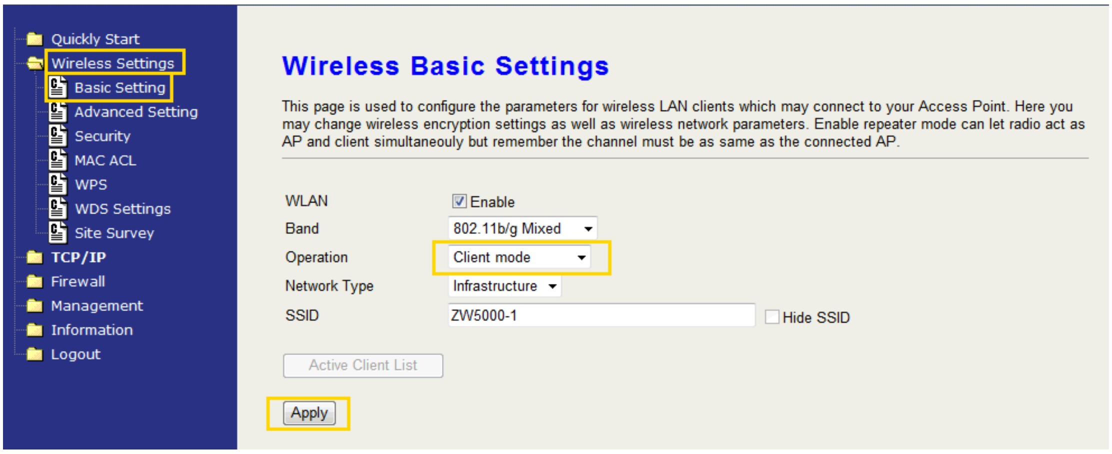
Channel	SSID	BSSID	Band	Auth Mode	Enc Type	Network Type	RSSI(dbm)	Signal(%)	Select
1	hot	00:05:9e:86:63:d1	b/g	OPEN	WEP	Infra	-47	100	○
4	802.11bgn-SSID	10:e0:4c:86:51:19	b/g/n	OPEN	NONE	Infra	-58	81	○
11	ZPD1	00:05:9e:8a:d0:95	b/g	OPEN	WEP	Infra	-64	65	○

Configuring as WLAN Client Adapter

This device can be configured as a wireless Ethernet adapter. In this mode, the device can connect to the other wireless stations (Ad-Hoc network type) or Access Point (Infrastructure network type) and you don’t need to install any driver.

Quick start to configure

Step 1. In “Basic Settings” page, change the Mode to “Client” mode. And key in the SSID of the AP you want to connect then press “Apply Changes” button to apply the change.

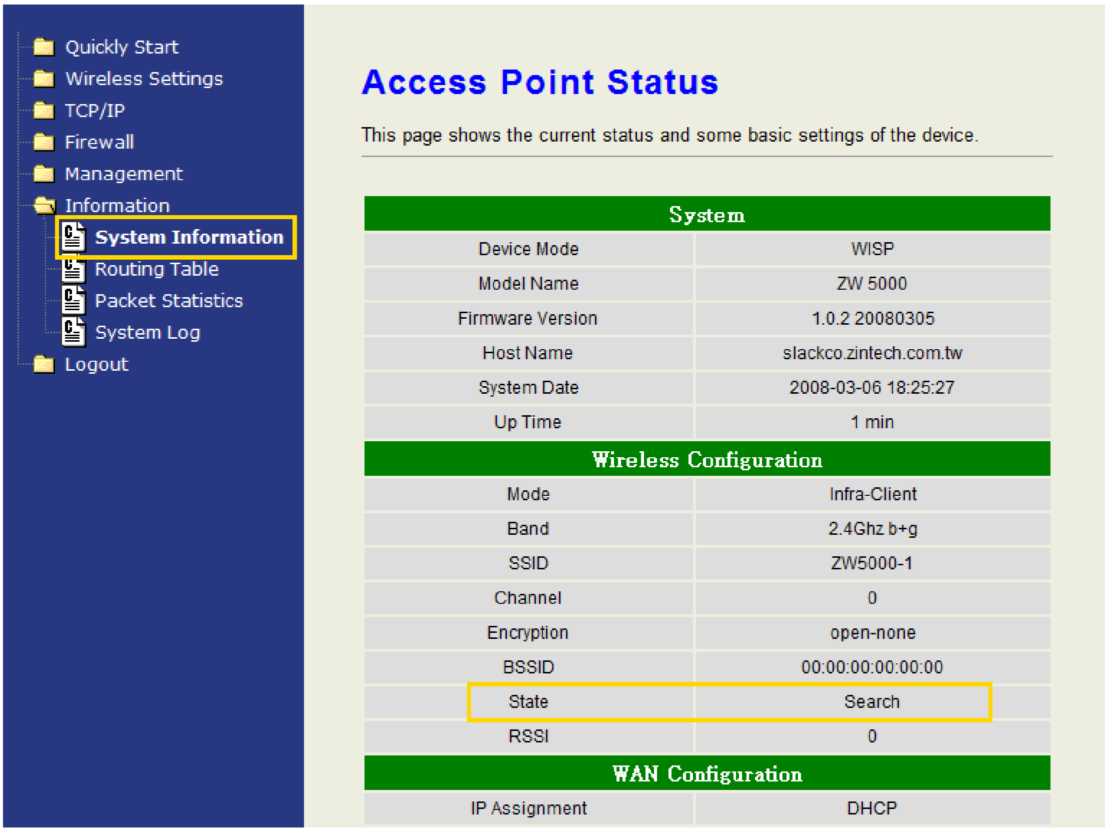


Wireless Basic Settings

This page is used to configure the parameters for wireless LAN clients which may connect to your Access Point. Here you may change wireless encryption settings as well as wireless network parameters. Enable repeater mode can let radio act as AP and client simultaneously but remember the channel must be as same as the connected AP.

WLAN	☑ Enable
Band	802.11b/g Mixed
Operation	Client mode
Network Type	Infrastructure
SSID	ZW5000-1 ☐ Hide SSID

Step 2. Check the state of connection in “Status” web page.



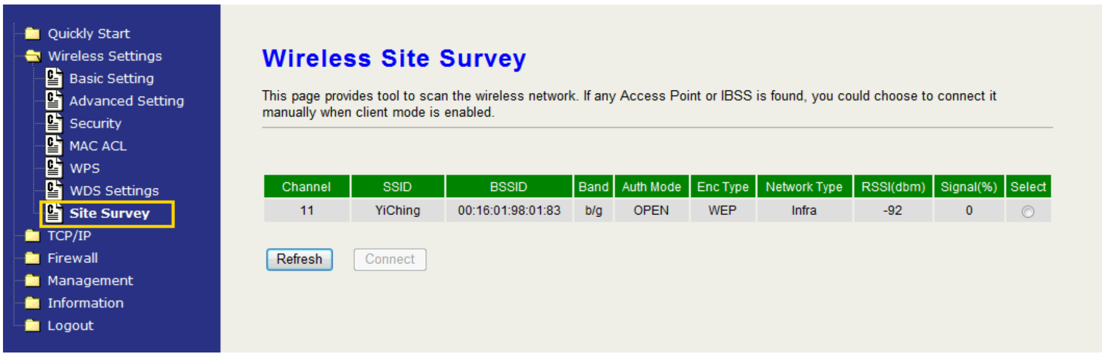
Access Point Status

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

System	
Device Mode	WISP
Model Name	ZW 5000
Firmware Version	1.0.2 20080305
Host Name	slackco.zintech.com.tw
System Date	2008-03-06 18:25:27
Up Time	1 min
Wireless Configuration	
Mode	Infra-Client
Band	2.4Ghz b+g
SSID	ZW5000-1
Channel	0
Encryption	open-none
BSSID	00:00:00:00:00:00
State	Search
RSSI	0
WAN Configuration	
IP Assignment	DHCP

The alternative way to configure as following:

Step 1. In “Wireless Site Survey” page, select one of the SSIDs you want to connect and then press “Connect” button to establish the link.



Wireless Site Survey

This page provides tool to scan the wireless network. If any Access Point or IBSS is found, you could choose to connect it manually when client mode is enabled.

Channel	SSID	BSSID	Band	Auth Mode	Enc Type	Network Type	RSSI(dbm)	Signal(%)	Select
11	YiChing	00:16:01:98:01:83	b/g	OPEN	WEP	Infra	-92	0	○

Step 2. If the linking is established successfully. It will show the message "Connect successfully". Then press "OK".

Step 3. Then you can check the linking information in "Status" page.

Note ：

If the available network requires authentication and data encryption, you need to setup the authentication and encryption before step1 and all the settings must be as same as the Access Point or Station. About the detail authentication and data encryption settings, please refer the security section.

Authentication Type

In client mode, the device also supports two Authentication Types "Open system" and "Shared Key". Although the default setting is "Auto", not every Access Points can support "Auto" mode. If the authentication type on the Access Point is knew by user, we suggest to set the authentication type as same as the Access Point.

Data Encryption

In client mode, the device supports WEP and WPA Personal/Enterprise except WPA2 mixed mode data encryption. About the detail data encryption settings, please refer the security section.

Ch 3. Configuring WDS

Wireless Distribution System (WDS) uses wireless media to communicate with the other devices, like the Ethernet does. This function allows one or more remote LANs connect with the local LAN. To do this, you must set these devices in the same channel and set MAC address of other devices you want to communicate with in the WDS AP List and then enable the WDS.

When you decide to use the WDS to extend your WLAN, please refer the following instructions for configuration.

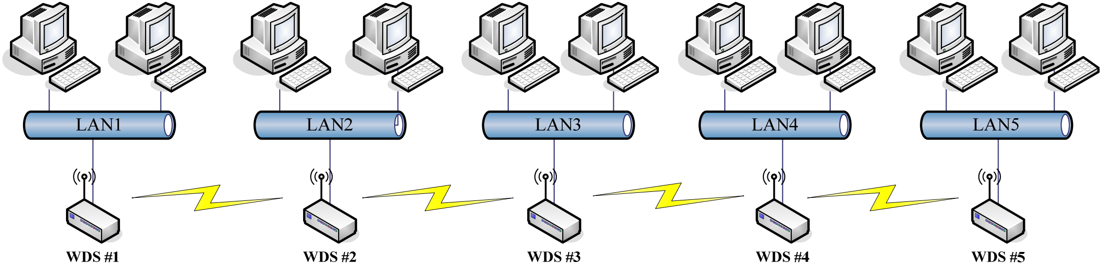
- The bridging devices by WDS must use the same radio channel.
- When the WDS function is enabled, all wireless stations can't connect the device.
- If your network topology has a loop, you need to enable the 802.1d Spanning Tree function.
- You don't need to add all MAC address of devices existed in your network to WDS AP List. WDS AP List only needs to specify the MAC address of devices you need to directly connect to.
- The bandwidth of device is limited, to add more bridging devices will split the more bandwidth to every bridging device.

WDS network topology

In this section, we will demonstrate the WDS network topologies and WDS AP List configuration. You can setup the four kinds of network topologies: namely bus, star, ring and mesh.

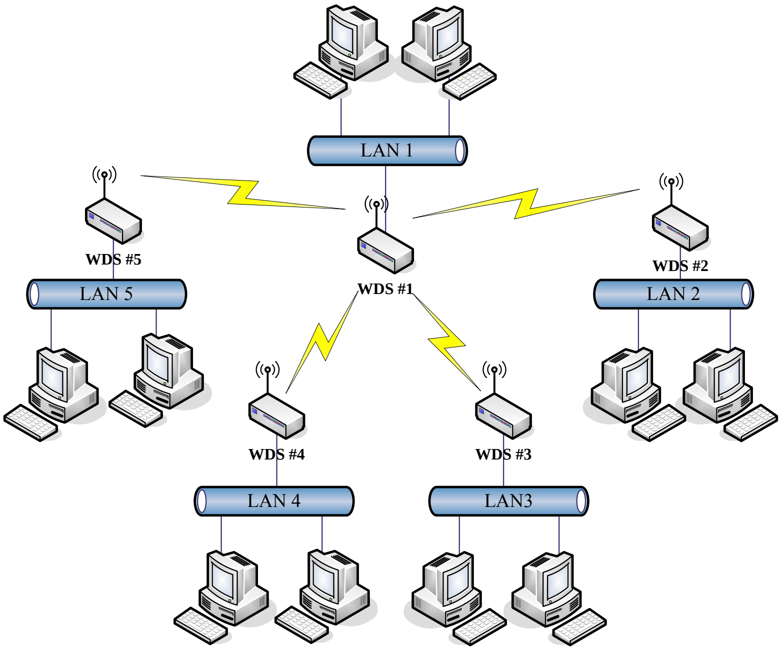
In this case, there are five devices with WDS enabled: WDS1, WDS2, WDS3, WDS4 and WDS5.

Bus topology:



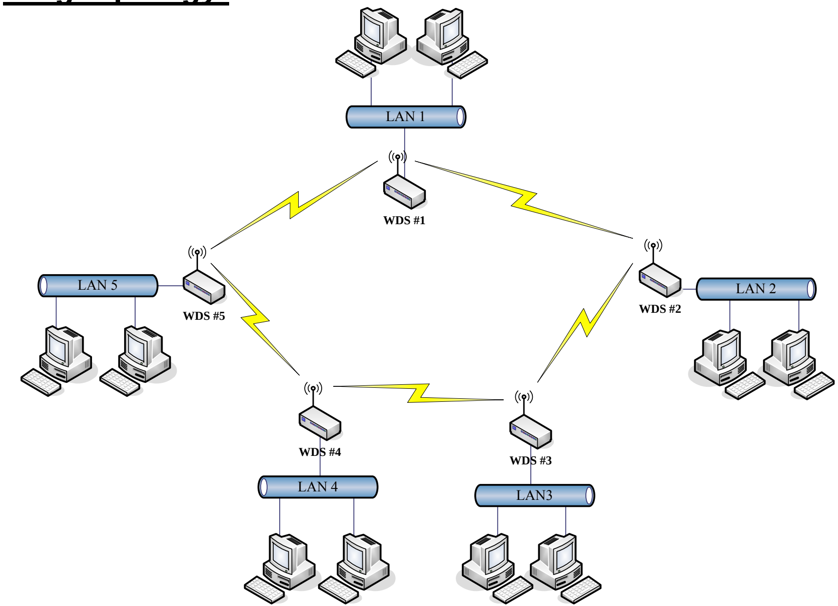
Device	Entries of WDS AP List	Spanning Tree Protocol Required
WDS1	The MAC Address of WDS2	No
WDS2	The MAC Addresses of WDS1 and WDS3	No
WDS3	The MAC Addresses of WDS2 and WDS4	No
WDS4	The MAC Addresses of WDS3 and WDS5	No
WDS5	The MAC Address of WDS4	No

Star topology:



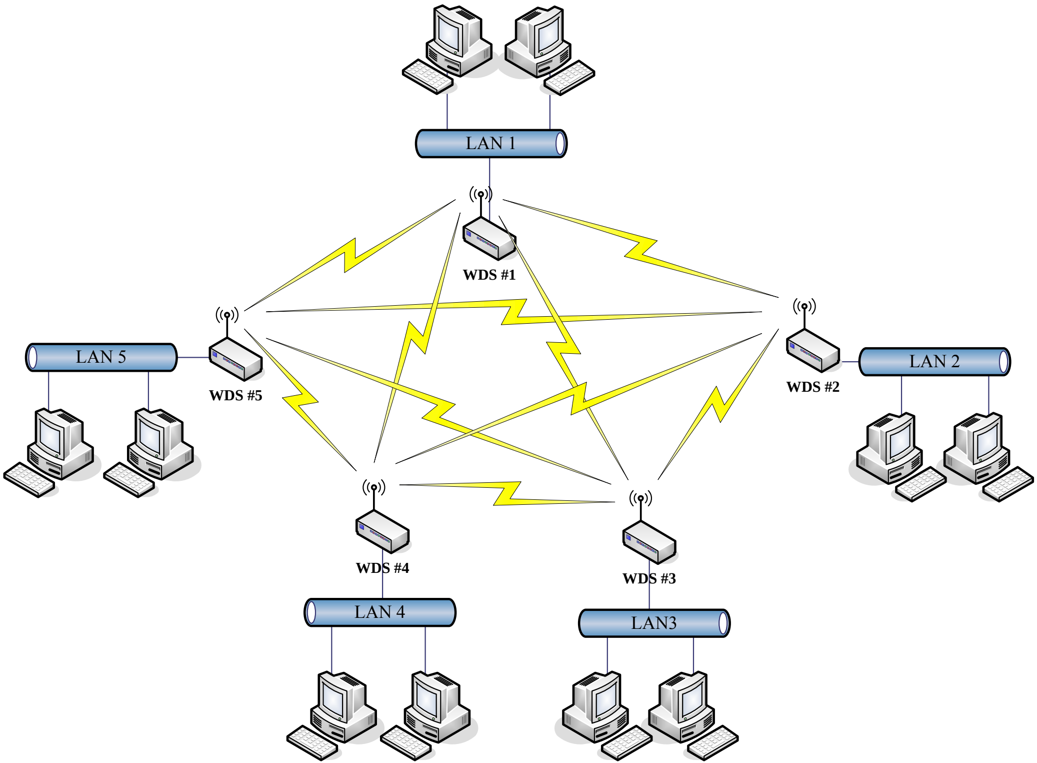
Device	Entries of WDS AP List	Spanning Tree Protocol Required
WDS1	The MAC Addresses of WDS2, WDS3, WDS4 and WDS5	No
WDS2	The MAC Address of WDS1	No
WDS3	The MAC Address of WDS1	No
WDS4	The MAC Address of WDS1	No
WDS5	The MAC Address of WDS1	No

Ring topology:



Device	Entries of WDS AP List	Spanning Tree Protocol Required
WDS1	The MAC Addresses of WDS2 and WDS5	Yes
WDS2	The MAC Addresses of WDS1 and WDS3	Yes
WDS3	The MAC Addresses of WDS2 and WDS4	Yes
WDS4	The MAC Addresses of WDS3 and WDS5	Yes
WDS5	The MAC Addresses of WDS4 and WDS1	Yes

Mesh topology：



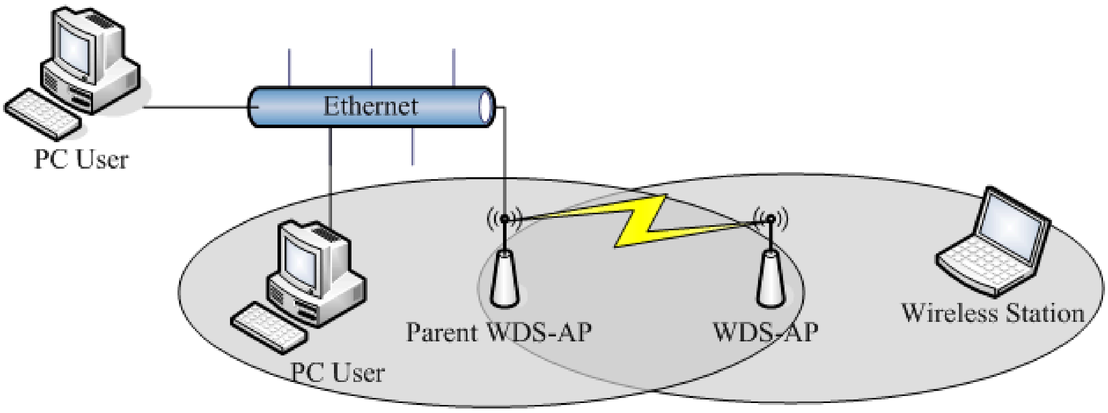
Device	Entries of WDS AP List	Spanning Tree Protocol Required
WDS1	The MAC Addresses of WDS2, WDS3, WDS4 and WDS5	Yes
WDS2	The MAC Addresses of WDS1, WDS3, WDS4 and WDS5	Yes
WDS3	The MAC Addresses of WDS1, WDS2, WDS4 and WDS5	Yes
WDS4	The MAC Addresses of WDS1, WDS2, WDS3 and WDS5	Yes
WDS5	The MAC Addresses of WDS1, WDS2, WDS3 and WDS4	Yes

WDS Application

Peer to Peer connection

WDS-AP can be used to increase the coverage area of another device (Parent WDS-AP). Between the Parent WDS-AP and the WDS-AP, Wireless Stations can move among the coverage areas of both devices. When you decide to use the WDS function to connect another WDS-AP, please refer to the following instructions for configuration.

- In AP mode, enable the WDS function.
- You must set these connected devices with the same radio channel and SSID.
- Choose “WDS+AP” mode.
- Using the bus or star network topology.



Description	Entries of WDS AP List	Spanning Tree Protocol Required
Parent WDS-AP	The MAC Address of WDS-AP	Yes
WDS-AP	The MAC Address of Parent WDS-AP	Yes

Wireless Bridge

Wireless Bridge can establish a wireless connection between two or more Wired LANs. When you decide to use the WDS as a Wireless Bridge, please refer the following instructions for configuration.

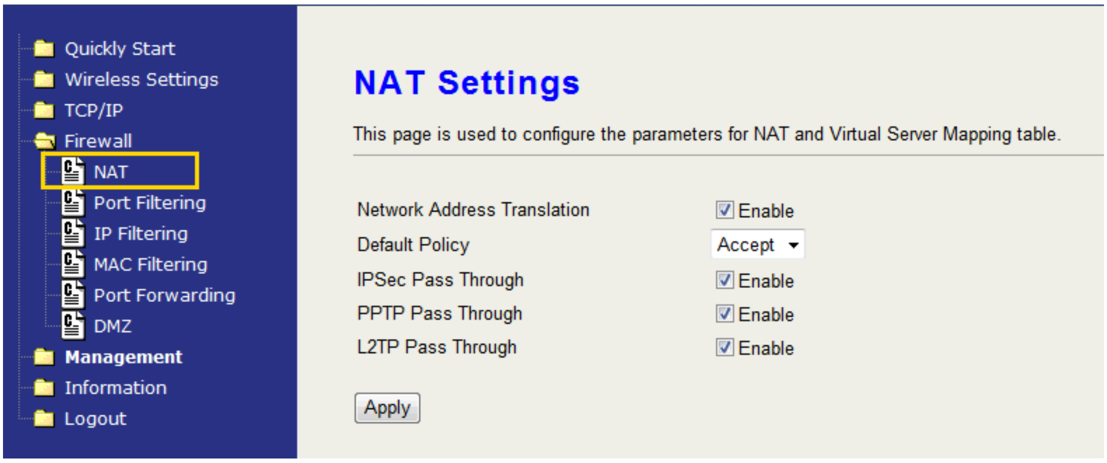
- In AP mode, enable the WDS function.
- You must set these connected devices with the same radio channel, but you may use different SSID.
- Choose “WDS” mode for only wireless backbone extension purpose.
- You can use any network topology, please refer the WDS topology section.

Ch 4. Advanced Configurations

Configuring LAN to WAN Firewall

Filtering function is used to block or permit packets from LAN to WAN. The device supports three kinds of filter Port Filtering, IP Filtering and MAC Filtering. All the entries in current filter table are used to restrict or allow certain types of packets from your local network to through the device. Use of such filters can be helpful in securing or restricting your local network. Denied or Allowed list depends on your IP forwarding default policy in Route page. The IP forwarding default policy is “Accept”.

If you want to block some application from LAN to WAN, you can go to the “Firewall” page, then “NAT” and select “Drop” for IP Forwarding Default Policy. Then go to the Port filtering, IP Filtering, MAC Filtering page option to edit the permit list.



NAT Settings

This page is used to configure the parameters for NAT and Virtual Server Mapping table.

Network Address Translation	☑ Enable
Default Policy	Accept
IPSec Pass Through	☑ Enable
PPTP Pass Through	☑ Enable
L2TP Pass Through	☑ Enable

Port Filtering

When you enable the Port Filtering function, you can specify a single port or port ranges in current filter table. If you select “Accept” for the IP forwarding default policy, once the source port of outgoing packets match the port definition or within the port ranges in the table, the firewall will block those packets form LAN to WAN.

If you select “Drop” for the IP forwarding default policy, once the source port of outgoing packets match the port definition or within the port ranges in the table, the firewall will allow those packets form LAN to WAN.

IP Filtering

When you enable the IP Filtering function, you can specify local IP Addresses in current filter table. If you select “Accept” for the IP forwarding default policy, once the source IP address of outgoing packets match the IP address definition in the table, the firewall will block those packets form LAN to WAN.

When you select “Drop” option for default policy, once the source IP address of outgoing packets match the IP address definition in the table, the firewall will allow those packets form LAN to WAN.

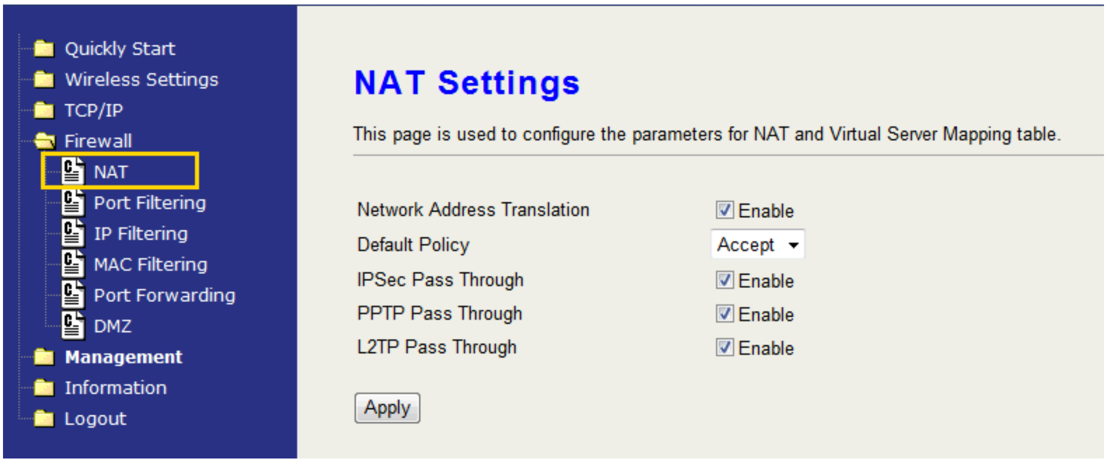
MAC Filtering

When you enable the MAC Filtering function, you can specify the MAC Addresses in current filter table. If you select “Accept” for the IP forwarding default policy, once the source MAC Address of outgoing packets match the MAC Address definition in the table, the firewall will block those packets form LAN to WAN.

If you select “Drop” for the IP forwarding default policy, once the source MAC Address of outgoing packets match the MAC Address definition in the table, the firewall will allow those packets form LAN to WAN.

NAT (Network Address Translation)

NAT is the translation between public IP address and private IP address. While NAT is enabled, you can use port forwarding or DMZ option to redirect your common network services. If you want to disable NAT, you can go to Management-Route page to disable it and the functions of DMZ, Port Forwarding will be disabled.



NAT Settings

This page is used to configure the parameters for NAT and Virtual Server Mapping table.

Network Address Translation	☑ Enable
Default Policy	Accept
IPSec Pass Through	☑ Enable
PPTP Pass Through	☑ Enable
L2TP Pass Through	☑ Enable

Configuring Port Forwarding (Virtual Server)

This function allows you to automatically redirect common network services to a specific machine behind the NAT firewall. These settings are only necessary if you wish to host some sort of server like a web server or mail server on the private local network behind the device's NAT firewall.

The most often used port numbers are shown in the following table.

Services	Port Number
ECHO	7
FTP (File Transfer Protocol)	21
Telnet	23
SMTP (Simple Mail Transfer Protocol)	25
DNS (Domain Name System)	53
Finger	79
HTTP (Hyper Text Transfer Protocol)	80
POP3 (Post Protocol)	110
NNTP (Network News Transport Protocol)	119
SNMP (Simple Network Management Protocol)	161
SNMP trap	162
SIP (Session Initiation Protocol)	5060
PPTP (Point-to-Point Tunneling Protocol)	1723

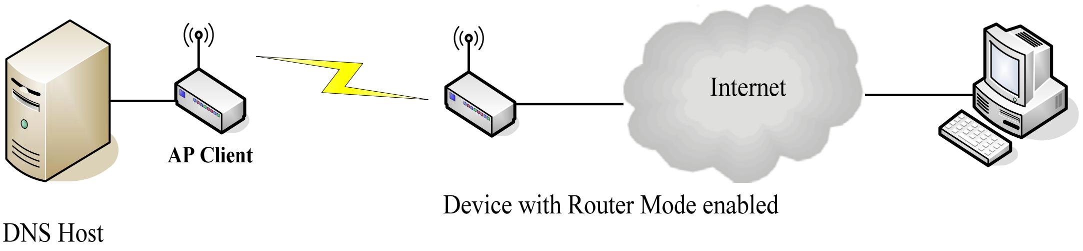
About the other well-known ports, please search in http://www.iana.org/assignments/port-numbers.

Configuring DMZ

A Demilitarized Zone is used to provide Internet services without sacrificing unauthorized access to its local private network. Typically, the DMZ host contains devices accessible to Internet traffic, such as Web (HTTP) servers, FTP servers, SMTP (e-mail) servers and DNS servers. So that all inbound packets will be redirected to the computer you set. It is also useful while you run some applications (ex. Internet game) that use uncertain incoming ports.

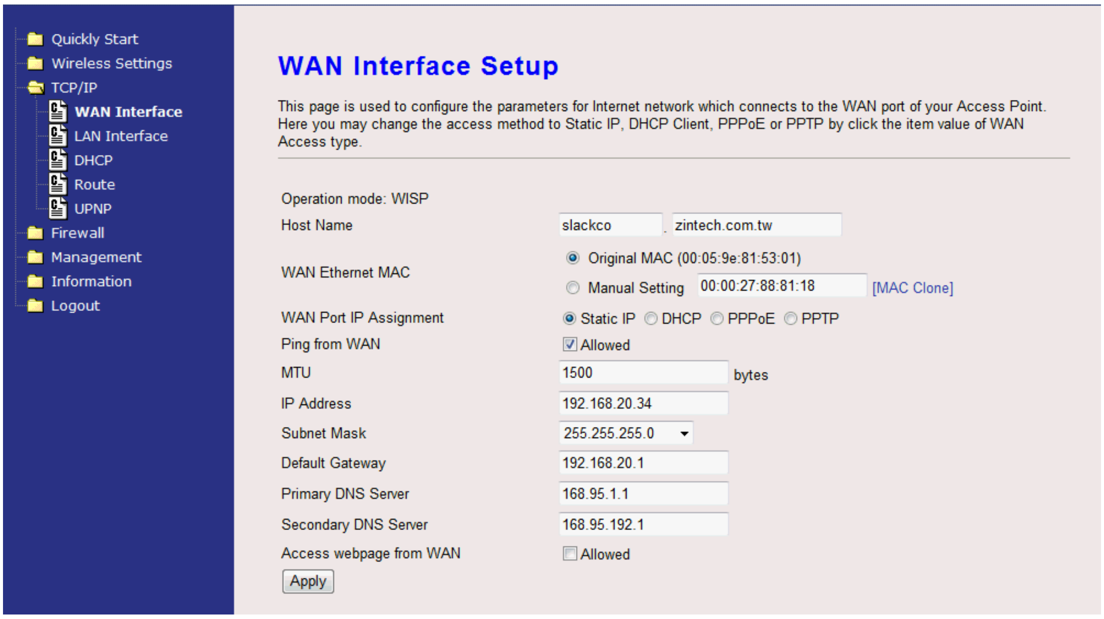
Enable DMZ: Enable the “Enable DMZ”, and then click “Apply Changes” button to save the changes.

DMZ LAN IP: Input the IP Address of the computer that you want to expose to Internet.



Configuring WAN Interface

The device supports four kinds of IP configuration for WAN interface, including Static IP, DHCP Client, PPPoE and PPTP. You can select one of the WAN Access Types depend on your ISP required. The default WAN Access Type is “Static IP”.



WAN Interface Setup

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

Operation mode: WISP

Host Name	slackco . zintech.com.tw
WAN Ethernet MAC	● Original MAC (00:05:9e:81:53:01) ○ Manual Setting 00:00:27:88:81:18 [MAC Clone]
WAN Port IP Assignment	● Static IP ○ DHCP ○ PPPoE ○ PPTP
Ping from WAN	☑ Allowed
MTU	1500 bytes
IP Address	192.168.20.34
Subnet Mask	255.255.255.0
Default Gateway	192.168.20.1
Primary DNS Server	168.95.1.1
Secondary DNS Server	168.95.192.1
Access webpage from WAN	□ Allowed

Apply

Static IP

You can get the IP configuration data of Static-IP from your ISP. You will need to fill the fields of IP address, subnet mask, gateway address, and one of the DNS addresses.

Host Name: Input the host name for the device.

IP Address: The Internet Protocol (IP) address of WAN interface provided by your ISP or MIS. The address will be your network identifier besides your local network.

Subnet Mask: The number used to identify the IP subnet network, indicating whether the IP address can be recognized on the LAN or if it must be reached through a gateway.

Default Gateway: The IP address of Default Gateway provided by your ISP or MIS.
Default Gateway is the intermediate network device that has knowledge of the network IDs of the other networks in the Wide Area Network, so it can forward the packets to other gateways until they are delivered to the one connected to the specified destination.

Primary & Secondary DNS: The IP addresses of DNS provided by your ISP.
DNS (Domain Name Server) is used to map domain names to IP addresses. DNS maintain central lists of domain name/IP addresses and map the domain names in your Internet requests to other servers on the Internet until the specified web site is found.

Manual Setting (MAC Clone): Clone device MAC address to the specify MAC address required by your ISP

MTU size: Input the MTU size according to the requirement of ISP.

Ping from WAN: Check to allow ping from WAN

Access webpage from WAN: Check to allow open the configuration page from WAN.

DHCP Client (Dynamic IP)

All IP configuration data besides DNS will obtain from the DHCP server when DHCP-Client WAN Access Type is selected.

Host Name: Input the host name for the device.

MTU size: Input the MTU size according to the requirement of ISP.

Set DNS server: The IP addresses of DNS provided by your ISP.

DNS (Domain Name Server) is used to map domain names to IP addresses. DNS maintain central lists of domain name/IP addresses and map the domain names in your Internet requests to other servers on the Internet until the specified web site is found.

Manual Setting (MAC Clone): Clone device MAC address to the specify MAC address required by your ISP

Ping from WAN: Check to allow ping from WAN.

Access webpage from WAN: Check to allow open the configuration page from WAN.

PPPoE

When the PPPoE (Point to Point Protocol over Ethernet) WAN Access Type is selected, you must fill the fields of User Name, Password provided by your ISP. The IP configuration will be done when the device successfully authenticates with your ISP.

Host Name: Input the host name for the device.

MTU size: Input the MTU size according to the requirement of ISP.

PPPoE User Name: The account provided by your ISP.

PPPoE Password: The password for your account.

Max Idle Time: The number of inactivity minutes to disconnect from ISP. This setting is only available when "Connect on Demand" connection type is selected.

MTU Size: Maximum Transmission Unit, 1492 is the default setting; you may need to change the MTU for optimal performance with your specific ISP.

Set DNS server: The IP addresses of DNS provided by your ISP.

DNS (Domain Name Server) is used to map domain names to IP addresses. DNS maintain central lists of domain name/IP addresses and map the domain names in your Internet requests to other servers on the Internet until the specified web site is found.

Manual Setting (MAC Clone): Clone device MAC address to the specify MAC address required by your ISP.

Ping from WAN: Check to allow ping from WAN

Access webpage from WAN: Check to allow open the configuration page from WAN.

PPTP

Point to Point Tunneling Protocol (PPTP) is a service that applies to connections in Europe only.

Host Name Input the host name for the device.

IP Address: The Internet Protocol (IP) address of WAN interface provided by your ISP or MIS. The address will be your network identifier besides your local network.

Subnet Mask: The number used to identify the IP subnet network, indicating whether the IP address can be recognized on the LAN or if it must be reached through a gateway.

Server IP Address: (Default Gateway) The IP address of PPTP server.

User Name: The account provided by your ISP

Password: The password of your account

MTU Size: Maximum Transmission Unit, 1412 is the default setting, you may need to change the MTU for optimal performance with your specific ISP.

Manually set DNS: The IP addresses of DNS provided by your ISP.

DNS (Domain Name Server) is used to map domain names to IP addresses. DNS maintain central lists of domain name/IP addresses and map the domain names in your Internet requests to other servers on the Internet until the specified web site is found.

Manual Setting (MAC Clone): Clone device MAC address to the specify MAC address required by your ISP.

Ping from WAN: Check to allow ping from WAN

Access webpage from WAN: Check to allow open the configuration page from WAN.

Configuring DHCP Server

1. To use the DHCP server inside the device, please make sure there is no other DHCP server already existing in the same network as the device.
2. Enable the DHCP Server option and assign the client range of IP addresses as following page.
3. When the DHCP server is enabled and also the device router mode is enabled then the default gateway for all the DHCP client hosts will set to the IP address of device.

DHCP Server Check to enable DHCP Server

Assigned IP Address Input the beginning and the ending IP Address of the DHCP range.

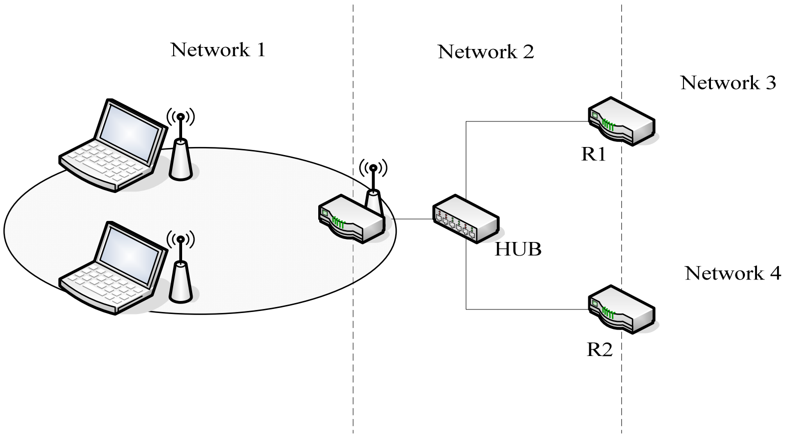
Assigned Gateway Input the gateway of the Assigned IP Address.

DHCP IP Lease Time Input the lease time for assigned IP Address.

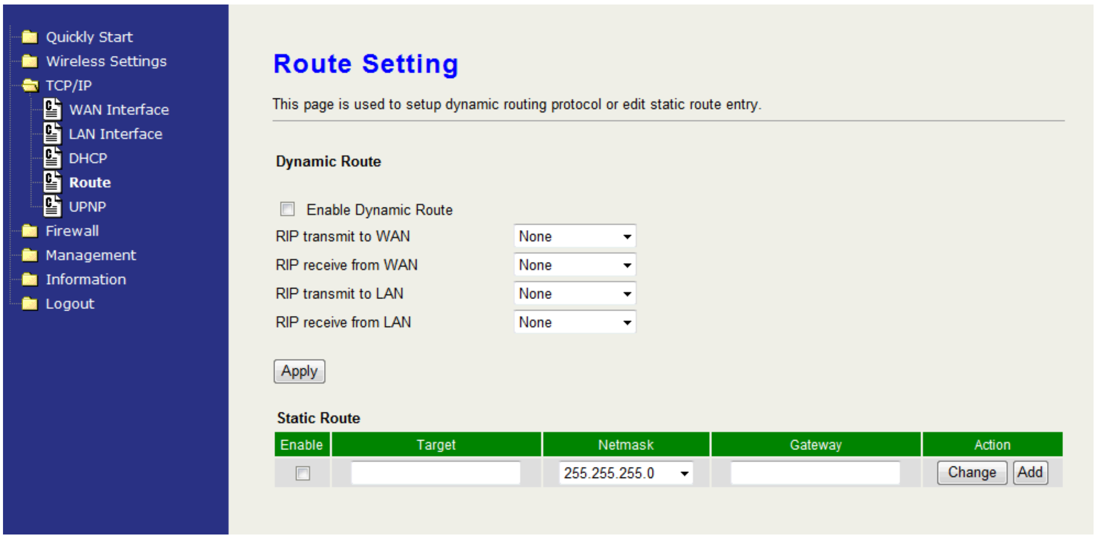
DHCP Static Map Input the reserved IP Address for the certain DHCP clients.

Static Route Setup

User can set the routing information let the Router knows what routing is correct also it can not learn automatically through other means.



For example, if user wants to link the Network 3 and Network 4 separately from Network 1 that Routing Table configuration as below:



Route Setting

This page is used to setup dynamic routing protocol or edit static route entry.

Dynamic Route

☐ Enable Dynamic Route

RIP transmit to WAN	None
RIP receive from WAN	None
RIP transmit to LAN	None
RIP receive from LAN	None

Apply

Static Route

Enable	Target	Netmask	Gateway	Action
☐		255.255.255.0		Change Add

1. Enable Static Route in Route Setup of TCP/IP page and then enter IP Address of Network 3、Subnet Mask and IP Address of Router (R1) in Default Gateway field final click Apply Change button.

2. Enter IP Address of Network 4、Subnet Mask and IP Address of Router (R2) in Default Gateway field final click Apply Change button.

3. In Static Route Table there have two routings for Network 3 and Network 4

Dynamic Route Setup

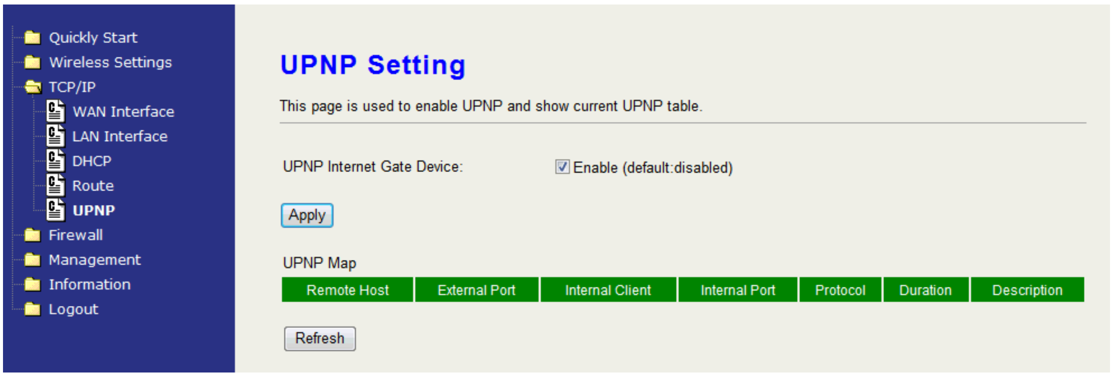
The Dynamic Route utilizes RIP1/2 to transmit and receive the route information with other Routers.

1. Enable Dynamic Route and then select RIP 1 、RIP2 or Both to transmit/receive packets final click Apply Change button.

2. Click Show Route Table button to show Dynamic Route Table.

3. In Dynamic Routing Table there have two routings for Network 3 and Network 4

UPNP



UPNP Setting

This page is used to enable UPNP and show current UPNP table.

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

Apply

UPNP Map

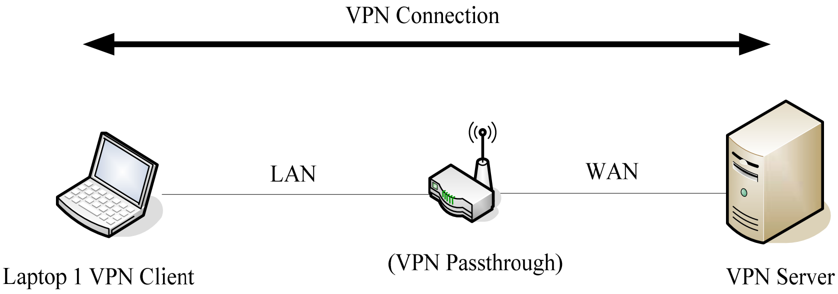
Remote Host	External Port	Internal Client	Internal Port	Protocol	Duration	Description

Refresh

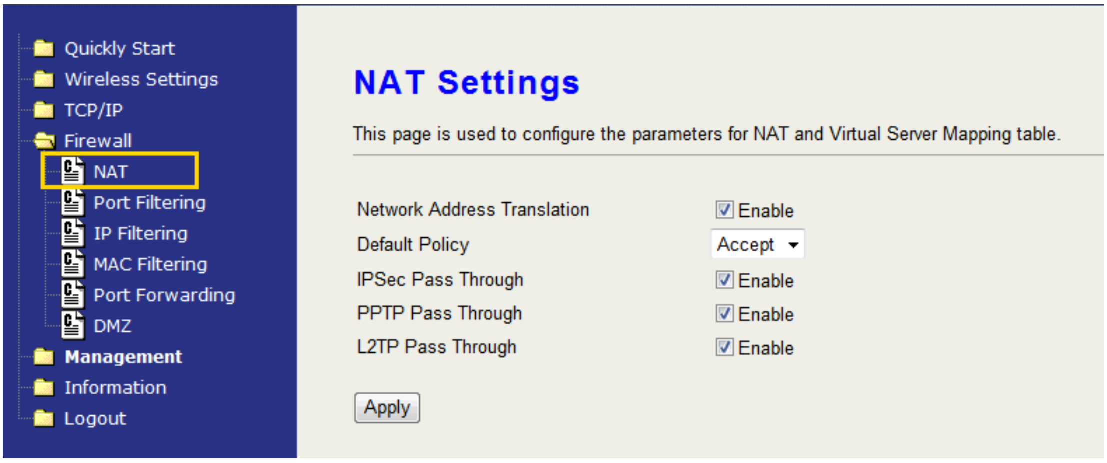
Check to enable the UPNP setting. The UPNP Map will show.

VPN Pass-through

This functionality let the device can Pass-through the VPN packets including PPTP/ L2TP/IPsec VPN Connection.



1. Check the kind of VPN Pass-through in NAT Page that you want and then click Apply Changes button.



NAT Settings

This page is used to configure the parameters for NAT and Virtual Server Mapping table.

Network Address Translation ☑ Enable

Default Policy Accept

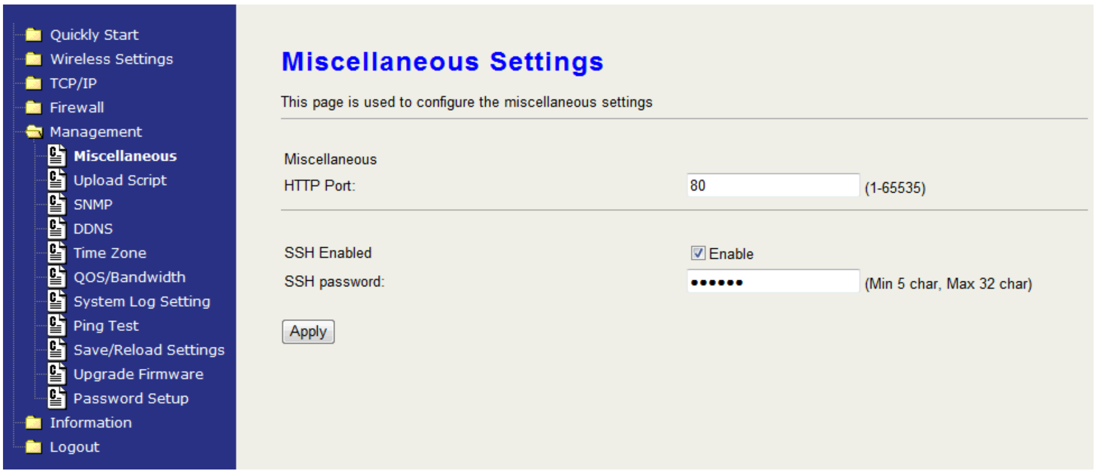
IPSec Pass Through ☑ Enable

PPTP Pass Through ☑ Enable

L2TP Pass Through ☑ Enable

CH5. The Management

Miscellaneous



Miscellaneous Settings

This page is used to configure the miscellaneous settings

Miscellaneous

HTTP Port: 80 (1-65535)

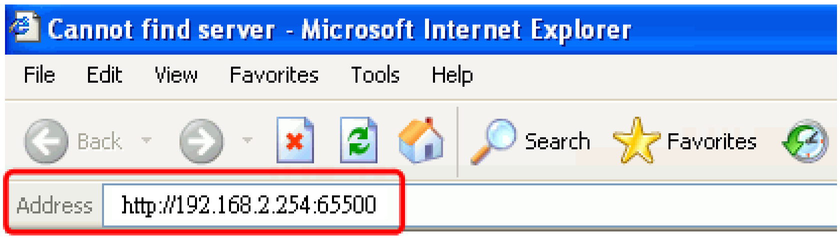
SSH Enabled ☑ Enable

SSH password: •••••• (Min 5 char, Max 32 char)

HTTP Port

The default http port is 80. For security concern, you can change the device’s http port, to protect this web server from intrusion and attack.

1. Entering the port number you want to change in HTTP PORT field, then click Apply Changes button.
2. After apply change, you should re-login the web server. Type http://192.168.2.254:65500/ in URL field.



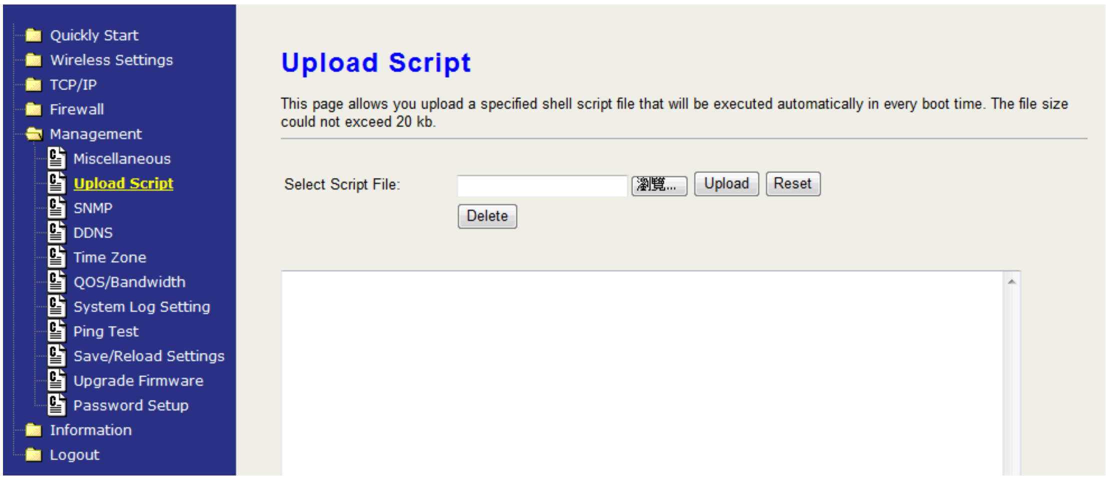
Address http://192.168.2.254:65500

SSH Port

Check to enable SSH login. Input the password for SSH login.

Upload Script

You can upload your private script file or paste your script into the device.



Upload Script

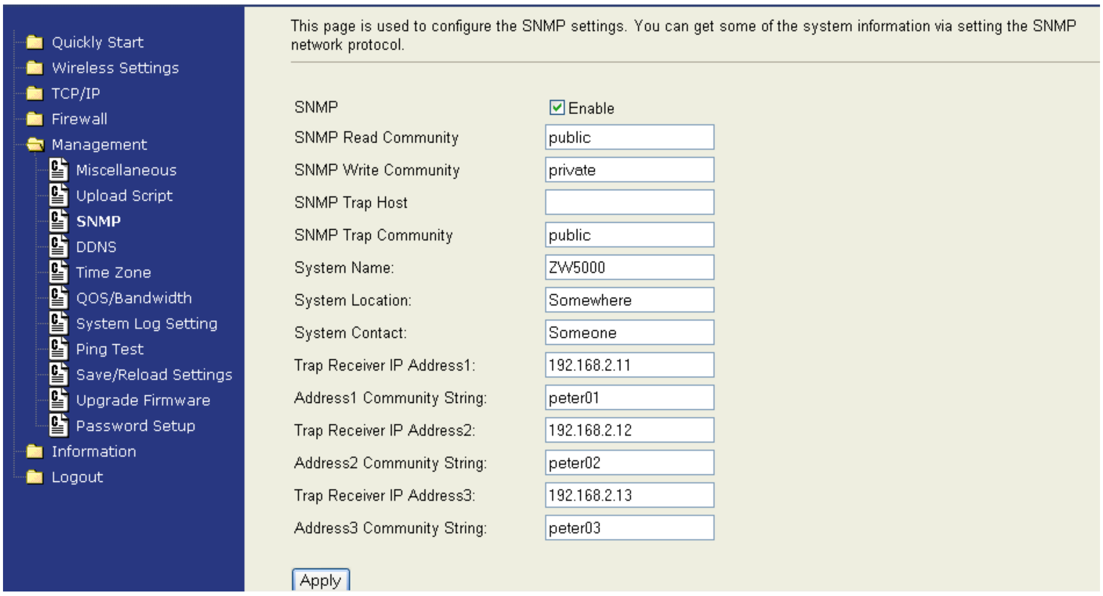
This page allows you upload a specified shell script file that will be executed automatically in every boot time. The file size could not exceed 20 kb.

Select Script File:

SNMP

This device is compatible with SNMP v1/v2c and provides standard MIB II. Currently only the “public” community string is available and the modified settings by SNMP SET request will be lost after rebooting the device.

1. Enable SNMP and then enter IP Address of SNMP Manager in “Trap Receiver IP Address” field and Community String in System Community String field. Finally click Apply Changes button.



This page is used to configure the SNMP settings. You can get some of the system information via setting the SNMP network protocol.

SNMP	☑ Enable
SNMP Read Community	public
SNMP Write Community	private
SNMP Trap Host	
SNMP Trap Community	public
System Name:	ZW5000
System Location:	Somewhere
System Contact:	Someone
Trap Receiver IP Address1:	192.168.2.11
Address1 Community String:	peter01
Trap Receiver IP Address2:	192.168.2.12
Address2 Community String:	peter02
Trap Receiver IP Address3:	192.168.2.13
Address3 Community String:	peter03

2. Following Table describes the SNMP configuration parameter

Label	Description
SNMP Read Community	This string is for SNMP Get-Request for accessing the device.
SNMP Write Community	This string is for SNMP Set-Request for accessing the device.
SNMP Trap Host	Setup the Trap host for sending the SNMP event.
SNMP Trap Community	Setup the string for the trap community.
System Name	Type the Name which is the name of device.
System Location	Type the Location which is location of device
System Contact	Type the Name which is person or group when the device has problem can find they.
Trap Receiver IP Address	Type the IP Address which is address of SNMP Manager. There are three different Trap Receiver IP Addresses allowed.
Addresss1 Community String	This string allows receiving trap from the device. There are three respective string for setup.

3. SNMP Traps

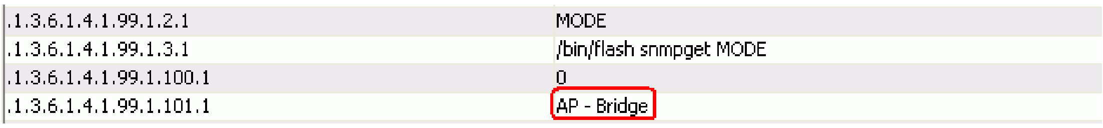
Traps	Description
coldStart(0)	The trap from device after reboot the device
linkDown(2)	The trap is sent when any of the links are down. See the following table.
linkup(3)	The trap is sent when any of the links are UP. See the following table.
authenticationFailure(4)	The trap is sent when the device receiving gets or sets requirement with wrong community.

4. Private MIBs

OID	Description
1.3.6.1.4.1.99.1	Mode, Operation Mode in device.
1.3.6.1.4.1.99.2	SSID, SSID of the device

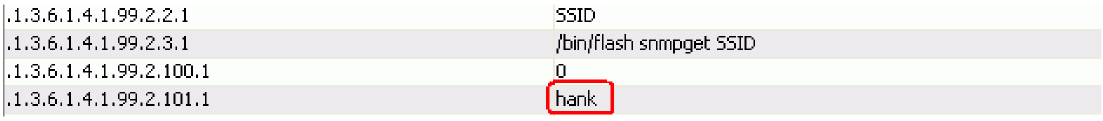
1.3.6.1.4.1.99.3	Channel, Channel of the device in WLAN
1.3.6.1.4.1.99.4	Band, 802.11g / 802.11b only
1.3.6.1.4.1.99.5	RSSI, Receive Signal Strength Index (Support AP and Client RSSI)
1.3.6.1.4.1.99.6	Active_Clients, The number of associate clients
1.3.6.1.4.1.99.7	Active_Clients_List, Client's Information (MAC Address, Data Rate, RSSI…etc)
1.3.6.1.4.1.99.8	Encryption, Encryption type of device in Wireless Network

1.3.6.1.4.1.99.1 - Mode



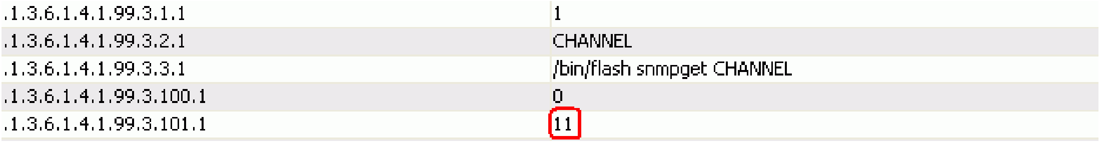
```
.1.3.6.1.4.1.99.1.2.1          MODE
.1.3.6.1.4.1.99.1.3.1          /bin/flash snmpget MODE
.1.3.6.1.4.1.99.1.100.1        0
.1.3.6.1.4.1.99.1.101.1        AP - Bridge
```

1.3.6.1.4.1.99.2 - SSID



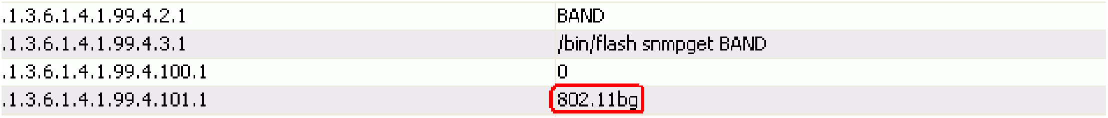
```
.1.3.6.1.4.1.99.2.2.1          SSID
.1.3.6.1.4.1.99.2.3.1          /bin/flash snmpget SSID
.1.3.6.1.4.1.99.2.100.1        0
.1.3.6.1.4.1.99.2.101.1        hank
```

1.3.6.1.4.1.99.3 - Channel



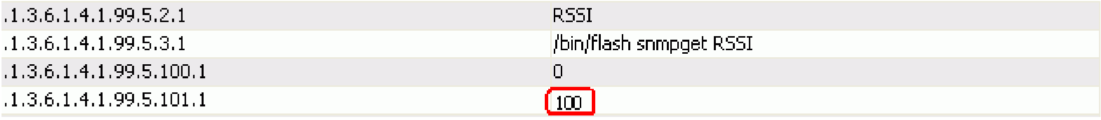
```
.1.3.6.1.4.1.99.3.1.1          1
.1.3.6.1.4.1.99.3.2.1          CHANNEL
.1.3.6.1.4.1.99.3.3.1          /bin/flash snmpget CHANNEL
.1.3.6.1.4.1.99.3.100.1        0
.1.3.6.1.4.1.99.3.101.1        11
```

1.3.6.1.4.1.99.4 - Band



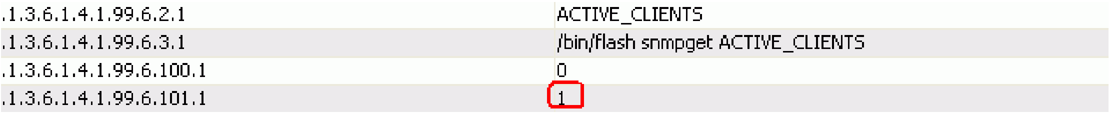
```
.1.3.6.1.4.1.99.4.2.1          BAND
.1.3.6.1.4.1.99.4.3.1          /bin/flash snmpget BAND
.1.3.6.1.4.1.99.4.100.1        0
.1.3.6.1.4.1.99.4.101.1        802.11bg
```

1.3.6.1.4.1.99.5 - RSSI



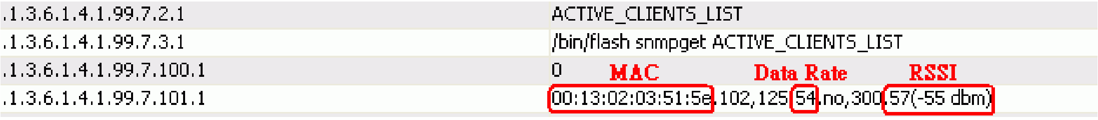
```
.1.3.6.1.4.1.99.5.2.1          RSSI
.1.3.6.1.4.1.99.5.3.1          /bin/flash snmpget RSSI
.1.3.6.1.4.1.99.5.100.1        0
.1.3.6.1.4.1.99.5.101.1        100
```

1.3.6.1.4.1.99.6 - Active_Clients



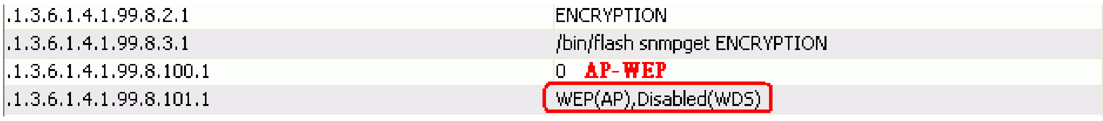
.1.3.6.1.4.1.99.6.2.1	ACTIVE_CLIENTS
.1.3.6.1.4.1.99.6.3.1	/bin/flash snmpget ACTIVE_CLIENTS
.1.3.6.1.4.1.99.6.100.1	0
.1.3.6.1.4.1.99.6.101.1	1

1.3.6.1.4.1.99.7 - Active_Clients_List



.1.3.6.1.4.1.99.7.2.1	ACTIVE_CLIENTS_LIST
.1.3.6.1.4.1.99.7.3.1	/bin/flash snmpget ACTIVE_CLIENTS_LIST
.1.3.6.1.4.1.99.7.100.1	0
.1.3.6.1.4.1.99.7.101.1	00:13:02:03:51:5e,102,125,54,no,300,57(-55 dbm)

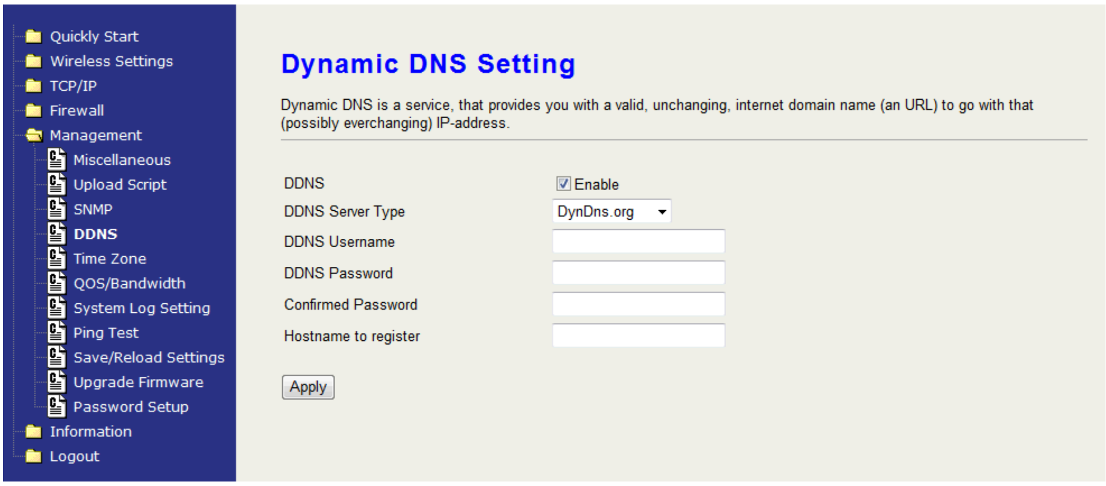
1.3.6.1.4.1.99.8 - Encryption



.1.3.6.1.4.1.99.8.2.1	ENCRYPTION
.1.3.6.1.4.1.99.8.3.1	/bin/flash snmpget ENCRYPTION
.1.3.6.1.4.1.99.8.100.1	0
.1.3.6.1.4.1.99.8.101.1	WEP(AP),Disabled(WDS)

DDNS

If you want to access the device from Internet with the dynamic IP (DHCP, PPPoE) WAN of the device, you can use the DDNS function. First you go to the web site of DDNS to register a DDNS account. Then setup the information in the DDNS page of the device. The device will update the current IP Address when it changes to DDNS site. Through DDNS service, the user can use the same URL to connect to the device even the IP Address is changing.



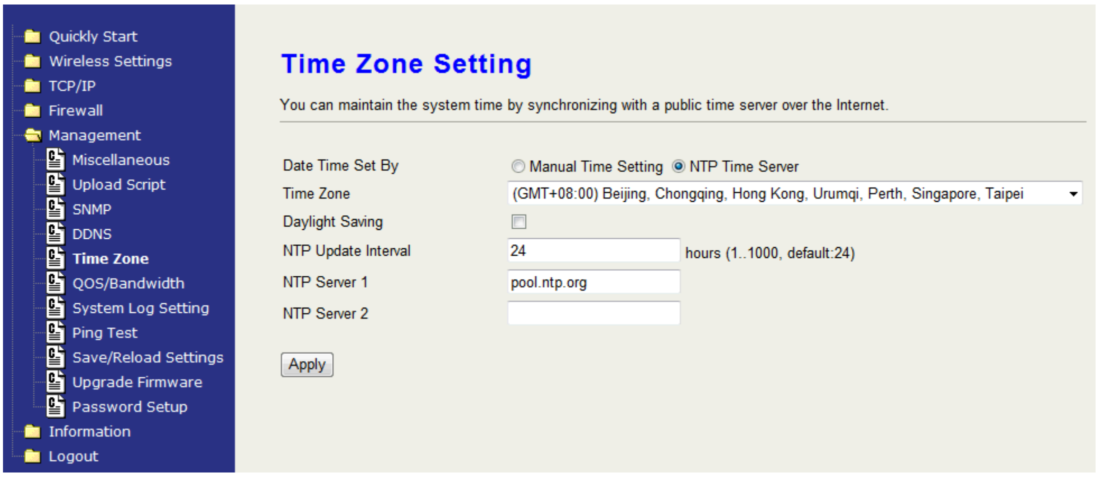
Dynamic DNS Setting

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

DDNS	☑ Enable
DDNS Server Type	DynDns.org
DDNS Username	
DDNS Password	
Confirmed Password	
Hostname to register	

Time Zone

If the device connects to the Internet, it will update the time automatically. If doesn't, you can manually setup the time.



Time Zone Setting

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

Date Time Set By	○ Manual Time Setting ● NTP Time Server
Time Zone	(GMT+08:00) Beijing, Chongqing, Hong Kong, Urumqi, Perth, Singapore, Taipei
Daylight Saving	□
NTP Update Interval	24 hours (1..1000, default:24)
NTP Server 1	pool.ntp.org
NTP Server 2	

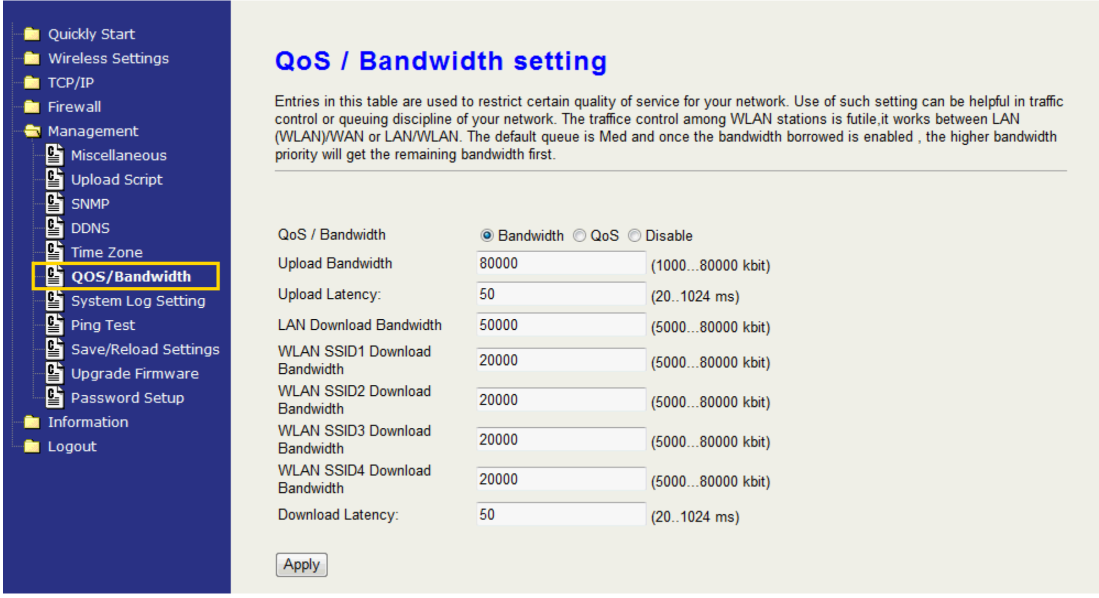
QoS / Bandwidth setting

You can select one between Bandwidth and QoS. Select “Disable” to disable this function.

Bandwidth

This functionality can control Bandwidth of Up/Downstream.

Enable Bandwidth Control and then enter Upload Bandwidth, Latency and Download Bandwidth in the specific field.



QoS / Bandwidth setting

Entries in this table are used to restrict certain quality of service for your network. Use of such setting can be helpful in traffic control or queuing discipline of your network. The traffice control among WLAN stations is futile,it works between LAN (WLAN)/WAN or LAN/WLAN. The default queue is Med and once the bandwidth borrowed is enabled , the higher bandwidth priority will get the remaining bandwidth first.

QoS / Bandwidth	● Bandwidth ○ QoS ○ Disable
Upload Bandwidth	80000 (1000...80000 kbit)
Upload Latency:	50 (20..1024 ms)
LAN Download Bandwidth	50000 (5000...80000 kbit)
WLAN SSID1 Download Bandwidth	20000 (5000...80000 kbit)
WLAN SSID2 Download Bandwidth	20000 (5000...80000 kbit)
WLAN SSID3 Download Bandwidth	20000 (5000...80000 kbit)
WLAN SSID4 Download Bandwidth	20000 (5000...80000 kbit)
Download Latency:	50 (20..1024 ms)

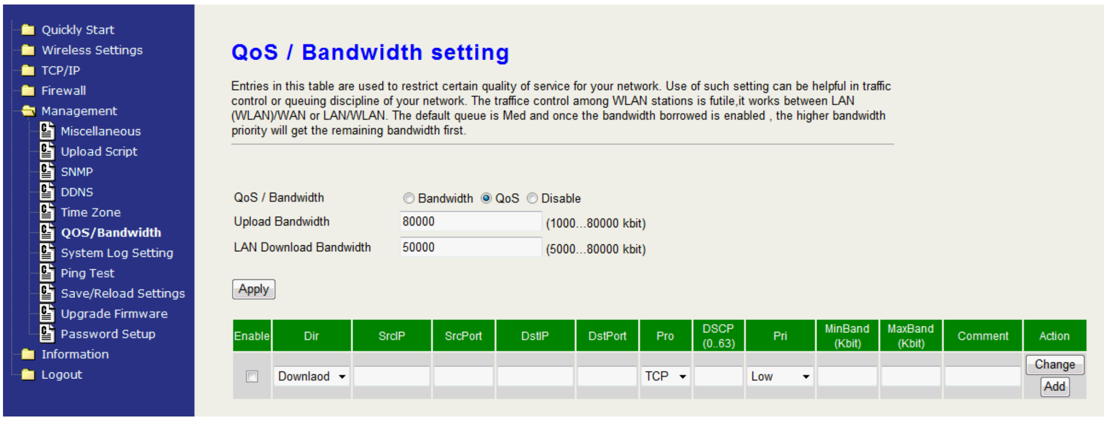
Parameter Definition

Label	Description
Upload Bandwidth	Similar a buffer to limit the Upstream throughput.
Upload Latency	Similar a waiting time the data queuing- time.
LAN Download Bandwidth	Similar a buffer to limit the Downstream throughput for LAN.
WLAN SSID1 Download Bandwidth	Similar a buffer to limit the Downstream throughput for the WLAN. If multi-SSID is enabled, there will be respective text field of

	download bandwidth for every SSID.
Download Latency	Similar a waiting time the data queuing- time.

QoS

QoS allows you to specify some rules, to ensure the quality of service in your network. Such as use Bandwidth Priority concept to allocate bandwidth. This function can be helpful in shaping and queuing traffic from LAN (WLAN) to WAN or LAN to WLAN, but not WLAN to WLAN.



QoS / Bandwidth setting

Entries in this table are used to restrict certain quality of service for your network. Use of such setting can be helpful in traffic control or queuing discipline of your network. The traffice control among WLAN stations is futile,it works between LAN (WLAN)/WAN or LAN/WLAN. The default queue is Med and once the bandwidth borrowed is enabled , the higher bandwidth priority will get the remaining bandwidth first.

QoS / Bandwidth ○ Bandwidth ● QoS ○ Disable
Upload Bandwidth 80000 (1000...80000 kbit)
LAN Download Bandwidth 50000 (5000...80000 kbit)

Apply

Enable	Dir	SrcIP	SrcPort	DstIP	DstPort	Pro	DSCP (0..63)	Pri	MinBand (Kbit)	MaxBand (Kbit)	Comment	Action
□	Downlaod					TCP		Low				Change Add

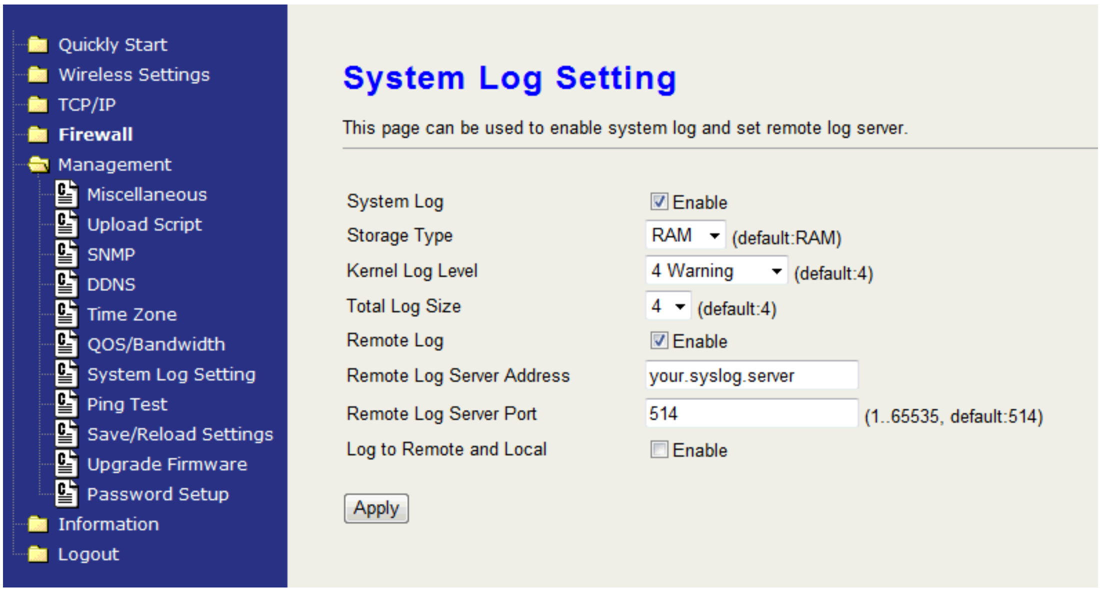
The following table describes the priorities that you can apply to bandwidth.

Option	**Description**
Upload Bandwidth	Speed of transmit data that from Ethernet interface to Wireless interface.
LAN Download Bandwidth	Speed of transmit data that from LAN to WAN.

QoS Item	**Description**
SrcIP	Input the Source IP Address
SrcPort	Input the Source Port
DstIP	Input the Destination IP Address
DstPort	Input the Destination Port
Pro	Select the Protocol between TCP and UDP
DSCP	Select the DSCP from 0 to 63
Pri	Select the Priority among Low, Medium, High and Highest.
MinBand (Kbit)	Input the minimum bandwidth.
MaxBand (Kbit)	Input the maximum bandwidth.

System Log Setting

The device supports the log function. Check the Enable checkbox to setup the details.



System Log Setting

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

System Log ☑ Enable

Storage Type RAM (default:RAM)

Kernel Log Level 4 Warning (default:4)

Total Log Size 4 (default:4)

Remote Log ☑ Enable

Remote Log Server Address your.syslog.server

Remote Log Server Port 514 (1..65535, default:514)

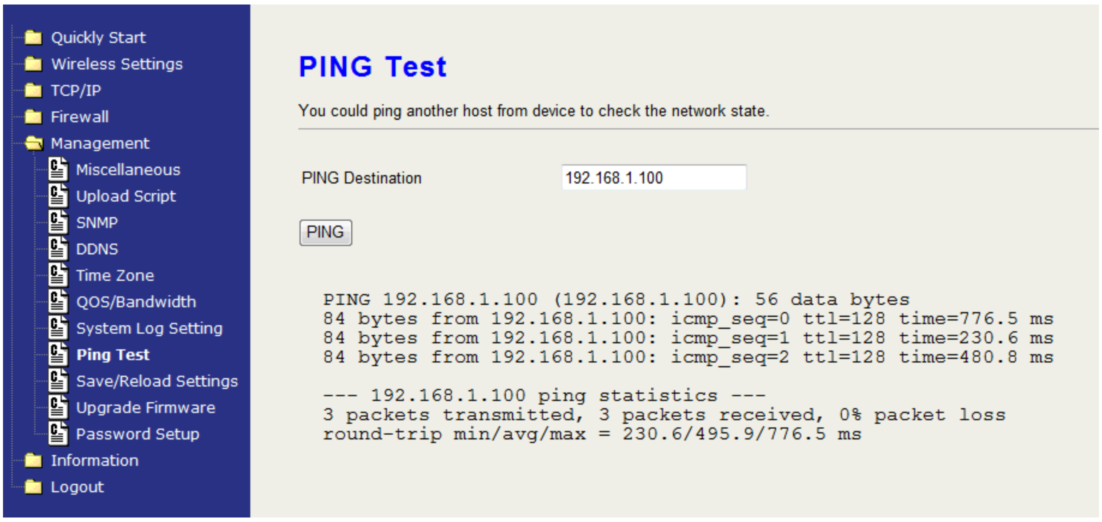
Log to Remote and Local □ Enable

Apply

Options	Description
System Log	Check to enable the log function.
Storage Type	Choose RAM or Flash to storage the log.
Kernel Log Level	Click the drop-down box to choose one log level.
Total Log Size	Choose whether 4 or 8 KB to storage the log.
Remote Log	Check to enable the remote log.
Remote Log Server Address	Enter your Remote Log Server Address.
Remote Log Server Port	Input the port number
Log to Remote and Local	Check save the log into system and remote server.

Ping Test

Input the IP Address of any host in the network, and then click PING to ping it. You will see the ping result as below. You can use this function to check if the network passes through.



PING Test

You could ping another host from device to check the network state.

PING Destination 192.168.1.100

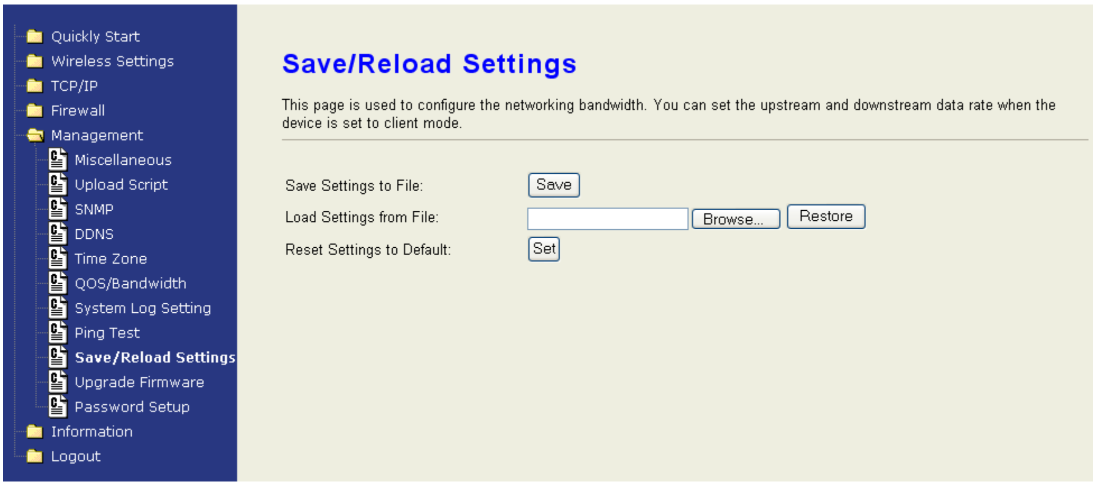
```
PING 192.168.1.100 (192.168.1.100): 56 data bytes
84 bytes from 192.168.1.100: icmp_seq=0 ttl=128 time=776.5 ms
84 bytes from 192.168.1.100: icmp_seq=1 ttl=128 time=230.6 ms
84 bytes from 192.168.1.100: icmp_seq=2 ttl=128 time=480.8 ms

--- 192.168.1.100 ping statistics ---
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max = 230.6/495.9/776.5 ms
```

Save/Reload Settings

Reset Setting to Factory Default:

Besides reset through pressing reset button, this device provides the Web-Browser interface to reset the configuration data. After resetting it, the current configuration data will be lost and restored to factory default value.

Saving & Restoring Configuration Data



Save/Reload Settings

This page is used to configure the networking bandwidth. You can set the upstream and downstream data rate when the device is set to client mode.

Save Settings to File:

Load Settings from File:

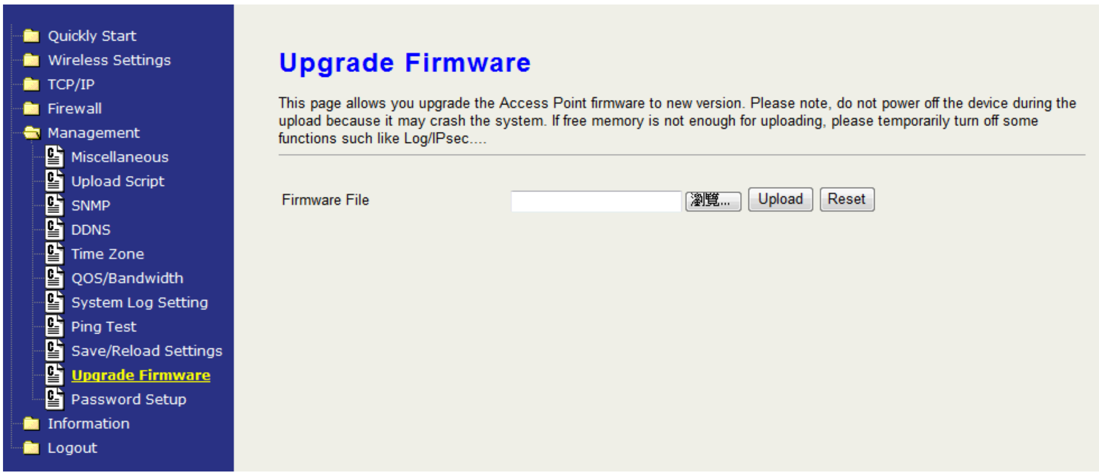
Reset Settings to Default:

To save & restore configuration data of device, just assign the target filename with full path at your local host, then you can backup configuration data to local host or restore configuration data to the device.

Upgrade Firmware

The simplest and safest way for upgrading the firmware for an end-user is the Web-Browser upgrading interface. It will check the firmware checksum and signature, and the wrong firmware won’t be accepted. After upgrading, the device will reboot and please note that depends on the version of firmware, the upgrading may cause the device configuration to be restored to the factory default setting, and the original configuration data will be lost!

To upgrade firmware, just assign the file name with full path then click “Upload” button in the following page.



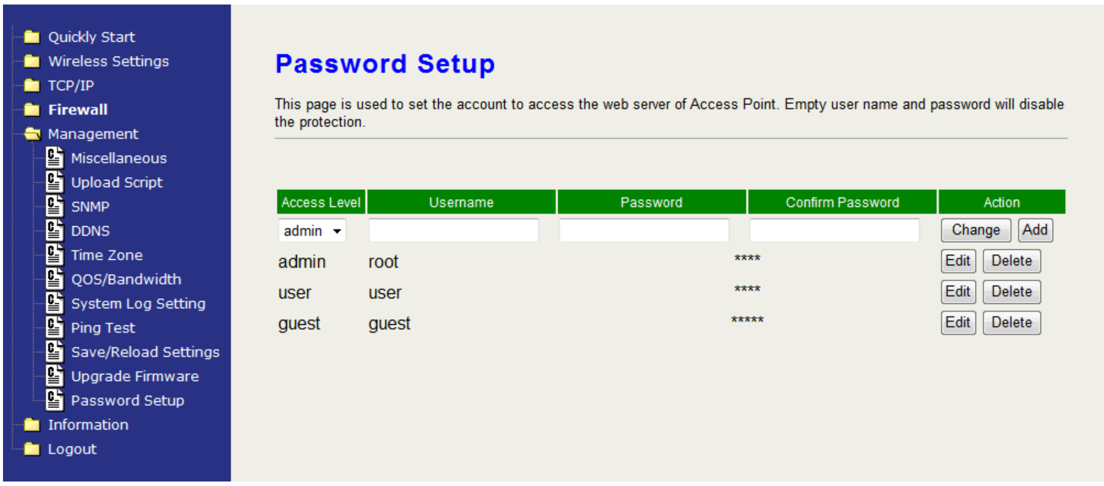
Upgrade Firmware

This page allows you upgrade the Access Point firmware to new version. Please note, do not power off the device during the upload because it may crash the system. If free memory is not enough for uploading, please temporarily turn off some functions such like Log/IPsec....

Firmware File [ ] 瀏覽... Upload Reset

Password Setup

Edit the password for multiple user level login, including admin, user and guest. Each level has different authority for accessing and configures this device. Please refer the tables below for the configurable page for every level.



Password Setup

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

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

The configurable page for “Admin” level account	
Main Category	**Sub page**
All pages are configurable.	All pages are configurable.

The configurable page for “Guest” level account	
Main Category	**Sub page**
Management	Ping Test
Information	System Information Wireless Information Routing Table Packet Statics
Logout	Logout

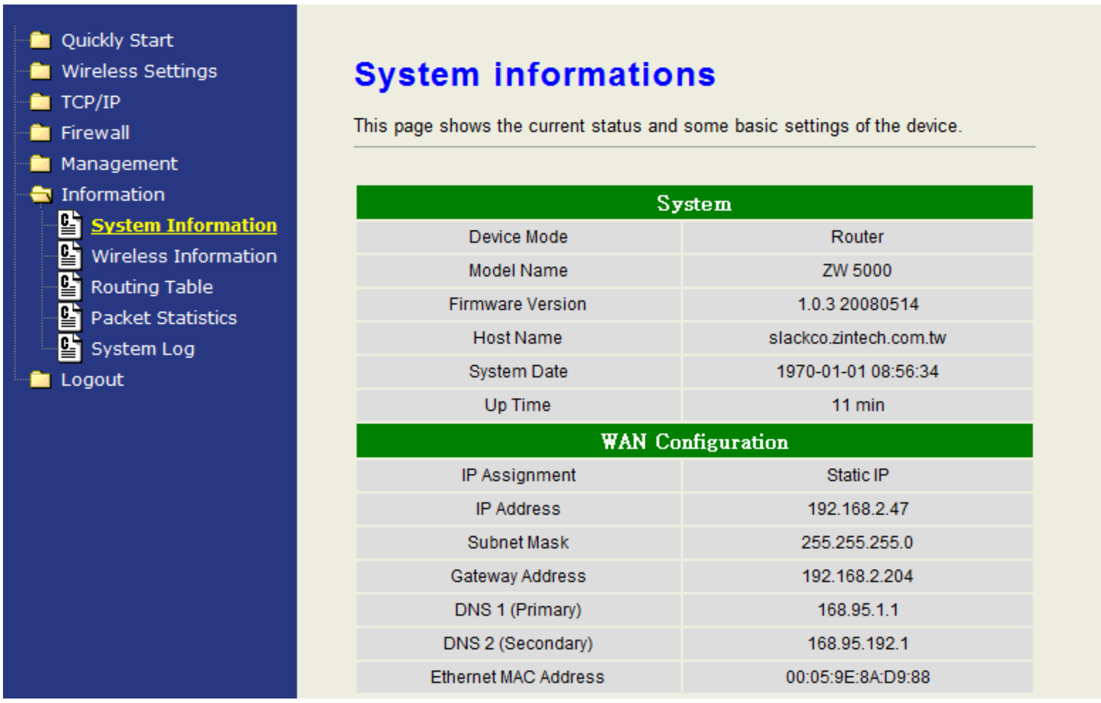
The configurable page for “User” level account	
Main Category	**Sub page**
Wireless Settings	Advanced Settings Site Survey
TCP/IP	UPnP
Management	SNMP DDNS Time Zone System Log Setting Ping Test Password Setup
Information	System Information Wireless Information Routing Table Packet Statics System Log

The Information

You can view the following information’s including: system information, wireless information, Routing Table, Packet Statistics and System log in the category.

System Information

Click to view the information about the device.



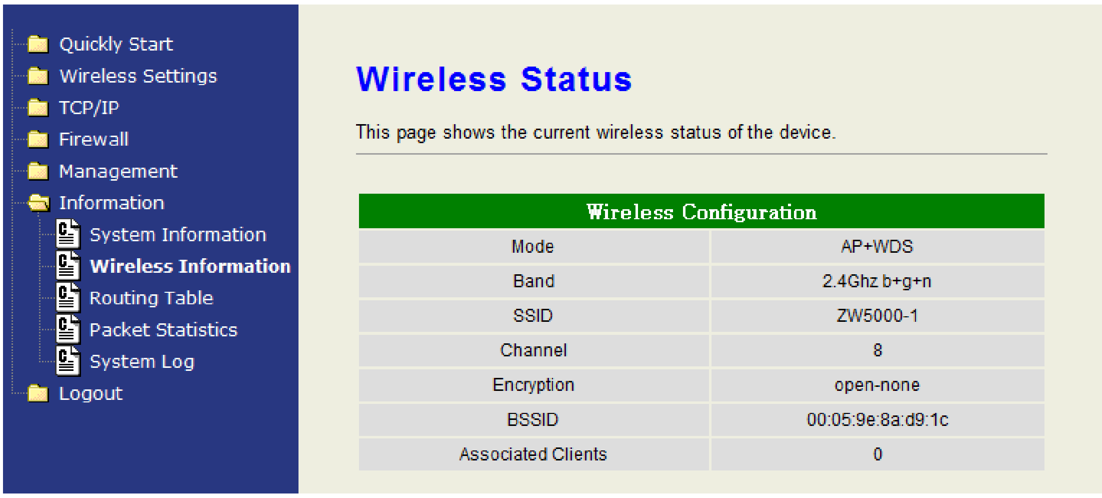
System informations

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

System	
Device Mode	Router
Model Name	ZW 5000
Firmware Version	1.0.3 20080514
Host Name	slackco.zintech.com.tw
System Date	1970-01-01 08:56:34
Up Time	11 min
WAN Configuration	
IP Assignment	Static IP
IP Address	192.168.2.47
Subnet Mask	255.255.255.0
Gateway Address	192.168.2.204
DNS 1 (Primary)	168.95.1.1
DNS 2 (Secondary)	168.95.192.1
Ethernet MAC Address	00:05:9E:8A:D9:88

Wireless Information

Click to view the wireless information about the device.



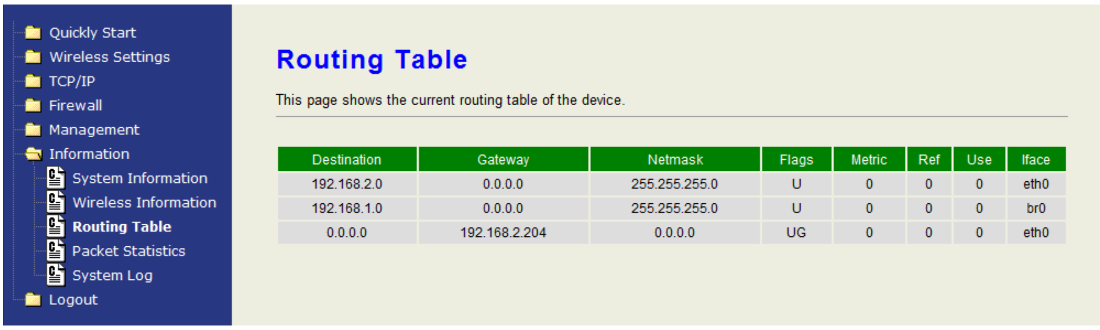
Wireless Status

This page shows the current wireless status of the device.

Wireless Configuration	
Mode	AP+WDS
Band	2.4Ghz b+g+n
SSID	ZW5000-1
Channel	8
Encryption	open-none
BSSID	00:05:9e:8a:d9:1c
Associated Clients	0

Routing Table

Click to view the Routing Table on the device.



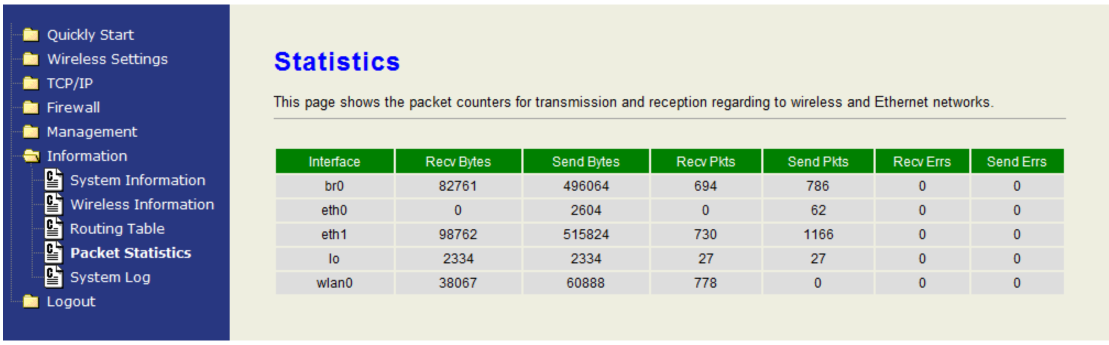
Routing Table

This page shows the current routing table of the device.

Destination	Gateway	Netmask	Flags	Metric	Ref	Use	Iface
192.168.2.0	0.0.0.0	255.255.255.0	U	0	0	0	eth0
192.168.1.0	0.0.0.0	255.255.255.0	U	0	0	0	br0
0.0.0.0	192.168.2.204	0.0.0.0	UG	0	0	0	eth0

Packet Statics

Click to view the packet statics.



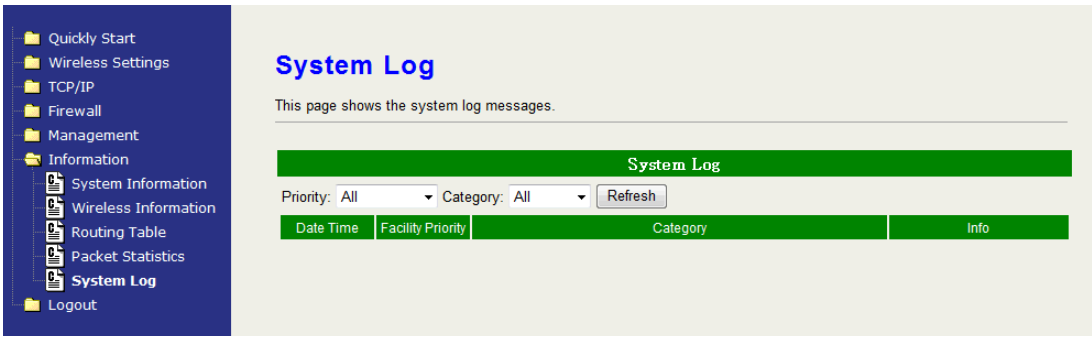
Statistics

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

Interface	Recv Bytes	Send Bytes	Recv Pkts	Send Pkts	Recv Errs	Send Errs
br0	82761	496064	694	786	0	0
eth0	0	2604	0	62	0	0
eth1	98762	515824	730	1166	0	0
lo	2334	2334	27	27	0	0
wlan0	38067	60888	778	0	0	0

System Log

Click to view the log on the device. Click the drop down box of “priority” or “category” to filter the log. Click “Refresh” to apply the filter.



System Log

This page shows the system log messages.

System Log

Priority: All Category: All

Date Time	Facility Priority	Category	Info

Logout

Logout

Click the Logout button to log out the current account.

Reboot

The “Guest” account cannot be seen in this page. Click the reboot button to reboot the device.

ZW-5310 Specification	
RF SPECIFICATIONS	
Frequency range	2.4 ~ 2.484 GHz 5.15~5.26, 5.725~5.825 GHz
802.11g TX power	14dBm ± 1dB @ 54Mbps
802.11b TX power	17dBm ± 1dB @ 11Mbps
802.11a TX power	12dBm ± 1dB @ 54Mbps
802.11n(20MHz) sensitivity	-70dBm ± 2dB @ 130Mbps
802.11n(40MHz) sensitivity	-66dBm ± 2dB @ 270Mbps
802.11g RX sensitivity	-74dBm ± 2dB @ 54Mbps
802.11b RX sensitivity	-89dBm ± 2dB @ 11Mbps
802.11a RX sensitivity	-73dBm ± 2dB @ 54Mbps
Data Rate	
802.11n (20MHz)	130/117/104/78/65/58/52/39/26/19.5/13/6.5Mbps
802.11n (40MHz)	270/243/216/162/135/121.5/108/81/54/40.5/27/13.5Mbps
802.11 a/g	54 / 48 / 36 / 24 / 18 / 12 / 9 / 6Mbps
802.11 b	11 / 5.5 / 2 / 1Mbps
ANTENNA Connector	Reversed Polarity SMA Male X 3
Operating Environment	Temperature 0~50□C Humidity 10~90% (non-condensing)
LED Indicators	WAN(Orange), LAN x 4(Green), WLAN (Green), Power (Red), WPS (Blue)
Button	WPS in the front panel, Reset in the back panel
Ethernet port	WAN: 10/100Mbps x1 port, RJ-45, Auto MDI/MDI-X LAN: 10/100Mbps x4 ports, RJ-45, Auto MDI/MDI-X
Power Consumption	12Vdc +/- 5% ; 1.5A
Standards	WLAN: IEEE 802.11 a/b/g, IEEE 802.11 n Draft 2.0, IEEE 802.11 h LAN: IEEE 802.3, IEEE 802.3u, IEEE 802.3x, IEEE 802.11d
Operating Mode	Wireless Access Point Multi-SSID (Up to 4 SSID) AP Client (WISP or Bridge mode) WDS (P-to-P , P-to-MP Bridge)
Security	Password Protection MAC filtering

	Hidden SSID Broadcast 64 / 128-bit WEP Encryption WPS Push Button and PIN Code WPA for 802.1x and WPA-PSK WPA2 / IEEE 802.11i
Software Feature	WLAN: b/g protection, Block WLAN Relay, Tx Burst, Tx Short Preamble, Packet Aggregation, HT Operation mode, HT Guard Interval, HT Tx Aggregate MSDU, MAC ACL, Site Survey. WAN: MAC Clone, Static IP/DHCP/PPPoE/PPTP, MTU. LAN: DNS relay, 802.11d Spanning Tree, UPNP, DHCP server. Routing: Dynamic Route (RIP 2), Static Route. Firewall: NAT, IPSec Pass Through, PPTP Pass Through, L2TP Pass Through, Port Fielding IP Fielding, MAC Filtering, Port Forwarding, DMZ. Management: configurable http port, SSH, Private Script, SNMP v2c, DDNS, NTP client, QoS/Bandwidth, System log, Ping Test, Upload config file, Firmware upgrade, Multiple password.