JetWave 3200/3300/3400 Series

Industrial 802.11n Multi-Radio

Wireless AP/ 3G Gateway / LTE Gateway

User Manual

V1.2 Jun.15, 2015

Copyright

About This Manual

This user manual is intended to guide professional installer to install the JetWave 3220/3300/3400 and how to build the infrastructure centered on it. It includes procedures to assist you in avoiding unforeseen problems.

Conventions

For your attention on important parts, special characters and patterns are used in this manual:

Note:

This indicates an important note that you must pay attention to.

The Blue Wording is important note that you must pay attention to.

The **Blue Wording with Big Case** is very important note you must pay more attention to.

Warning:

This indicates a warning or caution that you have to abide.

The Red wording is very important you must avoid.

Bold: Indicates the function, important words, and so on.

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

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

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

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. To avoid the possibility of exceeding radio frequency exposure limits, you shall beep a distance of at least 100cm between you and the antenna of the installed equipment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The availability of some specific channels and/or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destination. The firmware setting is not accessible by the end user.

Content

Chapter 1

Introduction

Chapter 1 Introduction

1.1 Introduction

The user manual is applied to Korenix JetWave 3200 Series Industrial IEEE 802.11n 2.4G/5G MIMO Wireless AP/Bridge, JetWave 3300 Series Industrial Ethernet/802.11n WIFI to 3G IP Gateway and JetWave 3400 Series Industrial Ethernet/802.11n WIFI to LTE IP Gateway. The 3 product series equips with the same 802.11n WIFI technology, the same hardware/software platform and the same installation consideration for indoor or outdoor field box.

The WIFI software configuration interface of the products is the same, for example the Web GUI, SNMP and CLI. If there are any specific features of JetWave 3300 and JetWave 3400, they will be specially highlighted in the chapters.

For detail product specification, please download the latest datasheet from Korenix web site.

1.2 JetWave 3220 Series Appearance

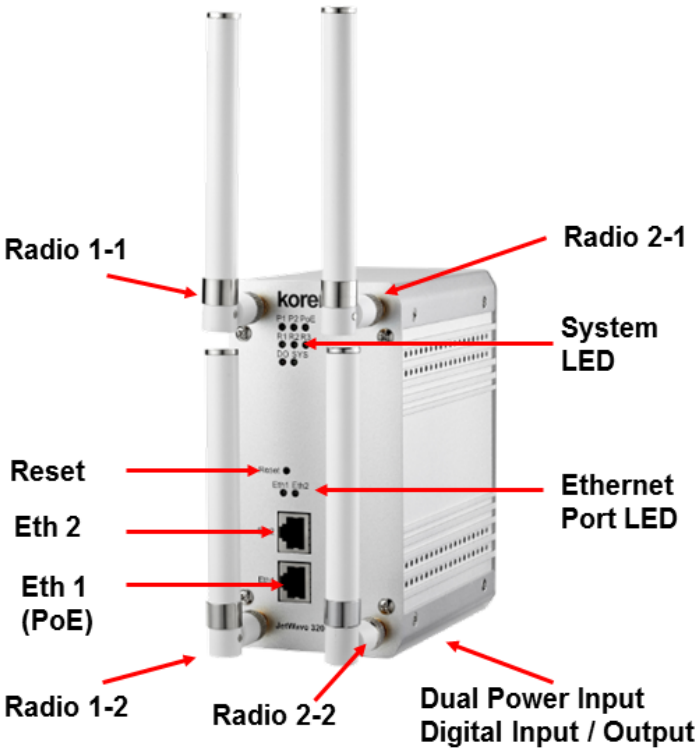


Figure - JetWave 3220 Appearance

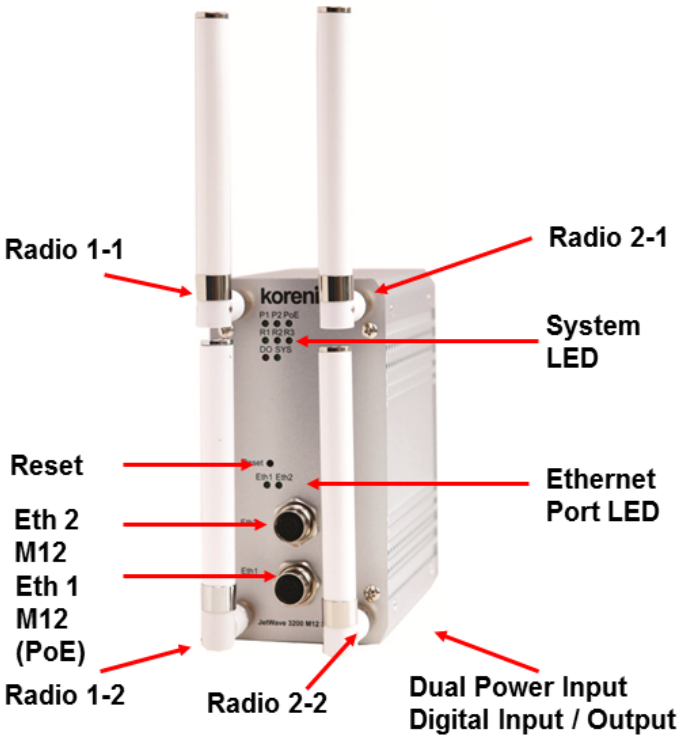


Figure - JetWave 3220-M12 Appearance

1.3 JetWave 3220 Major Features

JetWave 3220: Industrial Dual 802.11n 2T2R WIFI AP with 2x Gigabit LAN

JetWave 3220-M12: Industrial Dual 802.11n 2T2R WIFI AP with 2x Gigabit LAN M12 Connector

802.11n 2x2 MIMO doubles data rate, 300Mbps

Dual 802.11n Radio Design

LAN/WIFI Bridge/Routing

Dual WIFI Redundancy

Link Fault Pass-Through

Clint Based Fast Roaming

Korenix View Utility for Wire & Wireless Management

M12 connector for vehicle installation (JetWave3220-M12)

Gigabit PoE Input and DC 24V (12~48V) Redundant DC power input

Industrial IP31 Aluminum Housing

Digital Input, Relay Output

EN50121-4, -40~70℃ operating temp.

1.4 JetWave 3320 Appearance

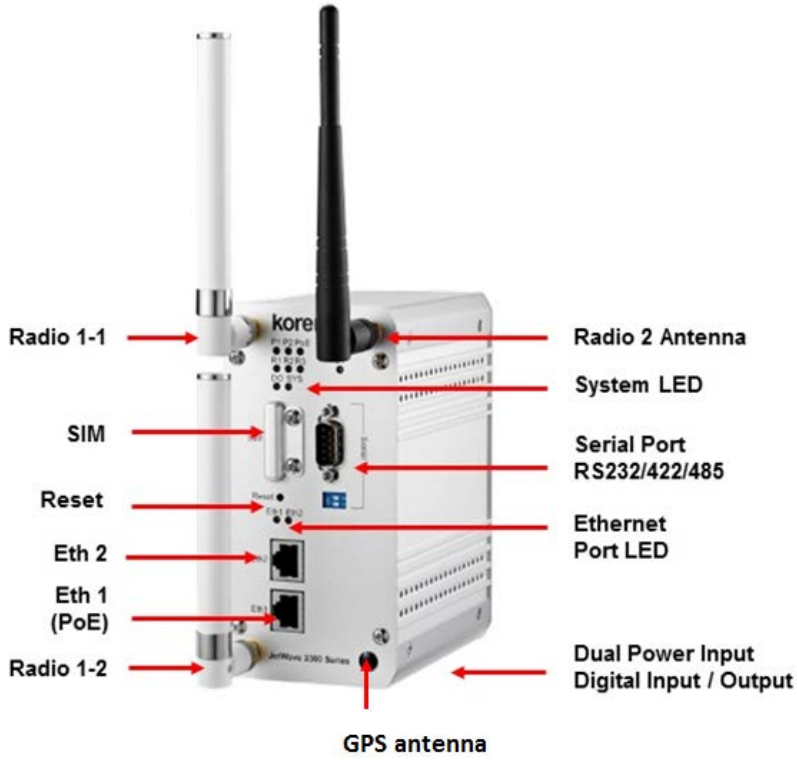


Figure - JetWave 3320 Appearance

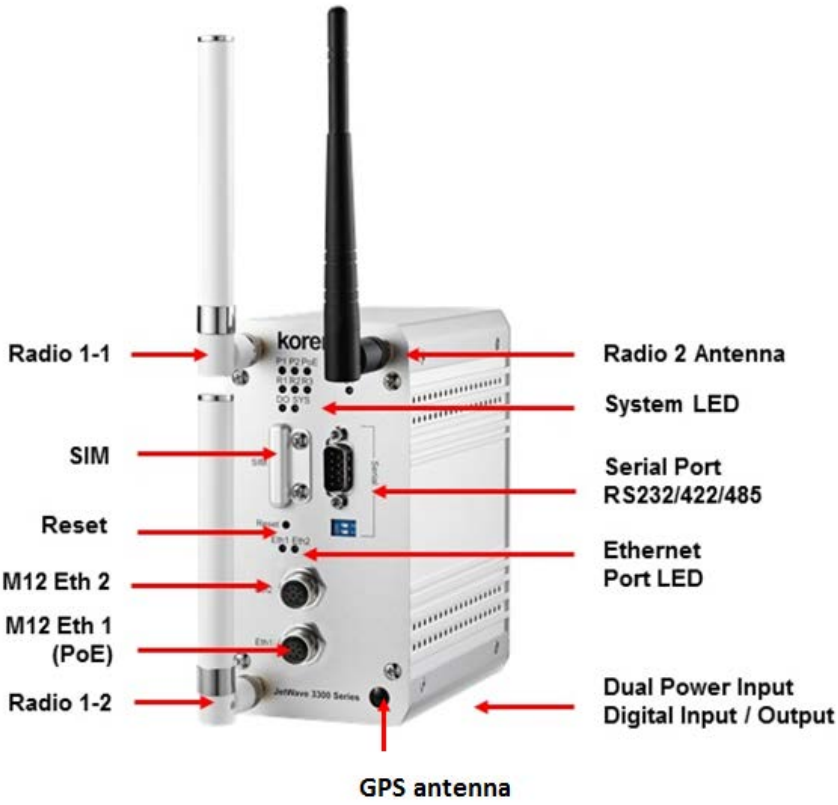
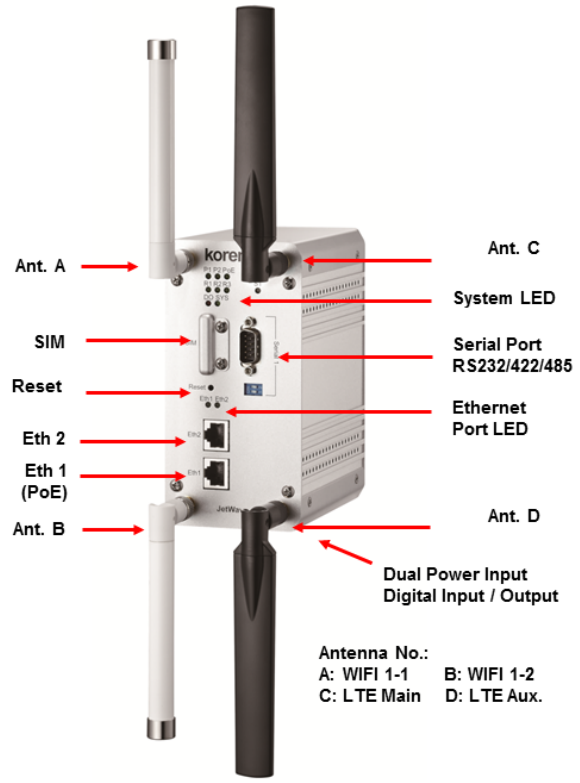
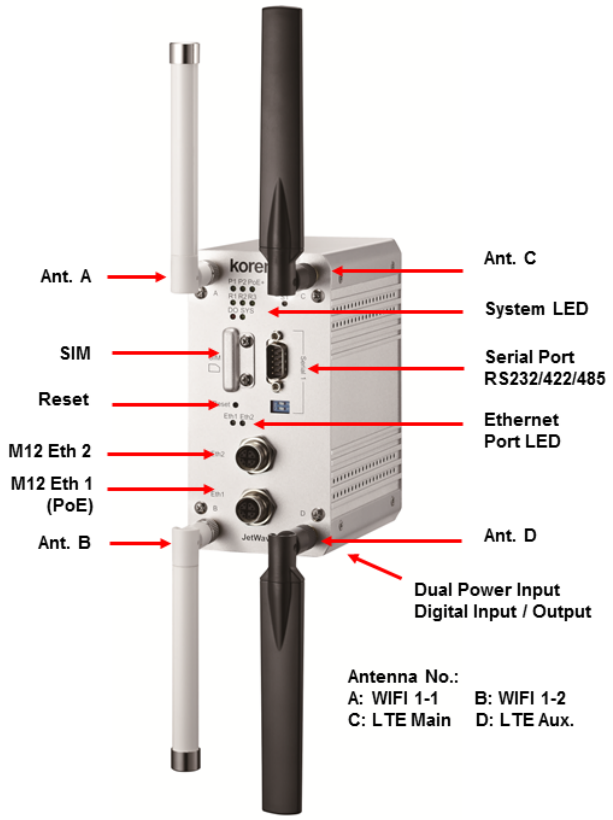


Figure - JetWave 3320-M12 Appearance

1.5 JetWave 3420 Appearance



JetWave 3420 Appearance



JetWave 3420-M12 Appearance

1.6 JetWave 3320/3420 Major Features

Models:

JetWave 3320: Industrial 3G + 802.11n WIFI IP Gateway

JetWave 3320-M12: Industrial 3G + 802.11n WIFI IP Gateway with 2x Gigabit LAN M12 Connector

JetWave 3420-LTE-E: Industrial 4G LTE + 802.11n WIFI IP Gateway, Band 20,8,3,7

JetWave 3420-LTE-U: Industrial 4G LTE + 802.11n WIFI IP Gateway, Band 17,5,4,2

Features:

Connect Ethernet, WLAN & Serial device over 3G or LTE network

Next Generation Long Term Evolution (LTE) technology, 2x2 DL-MIMO, max. 100M DL /50M UL, backward compatible with UMTS/HSPA+ network to avoid connection lost (JetWave 3420 Series)

UMTS/HSPA+ bands, GSM/GPRS/EDGE quad-band support (JetWave 3320 Series)

802.11n 2x2 MIMO doubles data rate, 300Mbps

LAN to 3G/LTE Routing, WIFI to 3G/LTE Routing

3G/LTE and WAN Redundant/Auto-offload

Korenix View Utility for Wire & Wireless Management

One RS-232/422/485 Serial interface, Serial mode includes TCP Server/Client and UDP

Gigabit PoE and DC24V(12~48V) Redundant DC power input

Industrial IP31 Aluminum Housing, Digital Input, Relay Output

M12 connector is available (JetWave 3320-M12/3420-M12)

EN50121-4, -40~70 ℃ Operating temp.

1.7 Product Package

The product package you have received should contain the following items. If any of them are not included or damaged, please contact your local vendor for support.

Package:

JetWave 3220/3220-M12/JetWave 3320/JetWave 3420 Unit (depends on the model you purchase)

Pre-installed Embedded WIFI/3G/LTE Module (depends on the model you purchase)

Default Antenna (JetWave 3220: 4, JetWave 3320: 3, JetWave 3420: 4)

Din-Rail Mounting Kit

4-pin Power/DI+DO connector

Quick Installation Guide

Note: Please download the Utility, User Manual from Korenix Web Site.

Optional External Antenna Mounting Accessory:

4x Antenna Mounting L Plate

4x 90cm RG 316 Extended SMA Type Radio Cable

1x Celling-Mounting Plate

Note 1: Check the Korenix web site order information for new accessories, new version user manual, MIB file, firmware and Utility.

Note 2: Different model needs different number of the accessories. If you are not familiar with the feature of the accessories, please consult with our Sales or Technical Service Engineer.

Chapter 2

Hardware Installation

Chapter 2 Hardware Installation

This chapter describes safety precautions and product information before installing JetWave 3200 Series.

2.1 Professional Installation Required

1. Please seek assistance from a professional installer for field installation or professional IT Engineer for indoor installation. These engineers must be well trained in the RF installation and knowledgeable for the Wireless AP setup and field plan.
2. The JetWave 3200 series is distributed through distributors and system installers with professional technicians and will not be sold directly through retail stores.

Safety Precautions

1. To keep you safe and install the hardware properly, please read and follow these safety precautions.
2. If you are installing JetWave 3200 series in the field box, for your safety as well as others', please seek assistance from a professional installer who has received safety training on the hazards involved. Keep safety as well as performance in mind when selecting your installation site, especially where there are electric power and phone lines. Please note the following things as well:
   - Do not use a metal ladder;
   - Do not work on a wet or windy day;
   - Wear shoes with rubber soles and heels, rubber gloves, long sleeved shirt or jacket.
3. If you are installing JetWave 3200 series in the indoor office or factory, be aware of the power source and grounding must be well installed. The professional Wireless IT Engineer can provide service for AP location, channel and field plan to get better performance and coverage.
4. Users MUST use the safety certificated PoE switch/injector with the JetWave 3200 series. The Industrial PoE Switch/adapter is recommended.
5. When the system is operational with high gain antenna, avoid standing directly in front of it. Strong RF fields are present when the transmitter is on.
6. **Note that Field EMD (Lightning) DAMAGE IS NOT COVERED UNDER WARRANTY.**

2.2 Power Installation

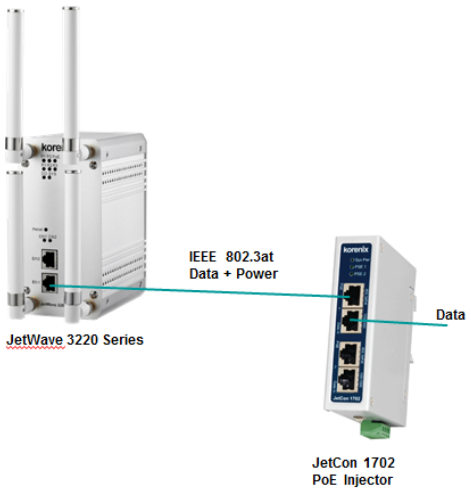
The system provides both DC power input and PoE power input.

2.2.1 DC Input

1. There is one 4-pin terminal block within the package for screwing the DC wires. It is a good practice to turn off the system power, and to unplug power terminal block before making wire connections.
2. Insert the positive and negative wires into the V+ and V- contact on the terminal block connector. Tighten the wire-clamp screws to prevent DC wires from being loosened. The range of the suitable electric wire is from 12 to 24 AWG.
3. The typical and suggest power source is DC 24V, the acceptable range is range from 12~48V. Please note that while you connect 48VDC, make sure the inrush voltage shall be under 10% (52.8V).
4. The dual DC power can be redundant. You can connect one power to typical power source and the other to battery/UPS as backup. However, the DC power input can't redundant with PoE. Please see the note at 2.2.3.

2.2.2 Powered by PoE

1. Connect the Ethernet cable to the Ethernet Port 1 in the front of the JetWave 3200 Series. The Ethernet port 1 is an IEEE 802.3at compliant PoE port.
2. If you are connecting the JetWave 3200 Series, the PoE function is applied to the Radio interface and the Eth 1. Eth 2 is only applied for data transmission.



3. While selecting power source by PoE, connect another end of the Ethernet cable to the PoE Switch or PoE Injector. Then the AP can be powered and user can access its management interface through the cable. The figure in right is an example of Connect AP to the PoE injector.

Note 1: Please choose Korenix Industrial IEEE 802.3at compliant PoE Injector or Switch as the

power input source. Thus Korenix can provide better quality assurance for your network.

Note 2: Please select Industrial IEEE802.3at (PoE+) compliant PoE Injector or Switch as the power input source, it can deliver up to 30W power source. This is in case the system has more power once the power on inrush current is higher than 15W.

2.2.3 Connect both DC input and PoE

Note that the 2 power sources, DC input and PoE port are **NOT** redundant power design. While you connect 2 power sources, for example you connect the DC Power 1 and PoE port. While you power on the DC power 1 as the 1st power source, the 2nd power source, the PoE chipset of the Eth 1 port detects the device is powered already. The PoE port will not request power from PSE switch. In this condition, while the DC power source failure, the PoE chipset of the Eth 1 port re-run PoE connection progress, the device will be reboot at this moment. The 2 power sources can NOT seamlessly redundant. This is current hardware restriction.

2.3 I/O Configuration

2.3.1 Wiring your Ethernet Port

There are two Gigabit Ethernet ports. The 2 ports are standard RJ-45 form factor. They can support 10Base-TX, 100Base-TX and 1000Base-T. The 10/100Base-TX also support both full or half duplex mode. All the Ethernet ports will auto-detect the signal from connected devices to negotiate the link speed and duplex mode. Auto MDI/MDIX allows users to connect another switch, hub or workstation without changing straight through or crossover cables. In some cases, the MDI/MDI-X may requests the connected device support auto-negotiation.

Eth 1: The Eth 1 is also an IEEE 802.3at compliant PoE – Power Device (PD) port. It can accept both power and data transmission from the PSE or PoE injector. Please refer to the 2.2.2 Powered by PoE for PoE installation.

Eth 2: The Eth 2 is an standard 10/100/1000Base-T RJ-45 port. It can transmit data only.

Available Cable Type: (Refer to the appendix for M12 to RJ-45 cable assembly)

10Base-T: 2-pair UTP/STP Cat. 3, 4, 5 cable (100m)

100 Base-TX: 2/4-pair UTP/STP Cat. 5 cable (100m)

1000 Base-T: 4-pair UTP/STP Cat. 5 cable (100m)

PoE Cable Request: CAT 5E/CAT 6 is preferred for PoE power + Data transmission.

Wiring STP Cable: STP (Shielded Twisted Pair) cable is preferred. The device is an EN50121-4 certificated product and usually install in harsh environment, part of the EMS protection are based on STP cable, for example the Surge protection of front Ethernet ports. STP cable can provide better field protection. It is MUST for the device installation in harsh environment.

2.3.2 Reset

There is one Reset button located on the front of the device. This is design for user to reboot the system port or force reset the configuration to default. The function is depended on how much time you press the button.

Press **3 seconds** to **reboot** the device.

Press **more than 7 seconds** can **reset the configuration to default.**

2.3.3 Serial Port

There is one RS232 serial port for serial communication on JetWave 3320/3420. The serial port is designed for Serial over WIFI/Cellular communication. The port supports RS232/422/485 3-in-1, and up to 460.8kbps baud rate. The software supports TCP/UDP connection.

Below figure shows the pin assignment of the serial port.

Pin 1: DCD **Pin 2: RXD** **Pin 3: TXD**

Pin 4: DTR **Pin 5: GND** **Pin 6: DSR**

Pin 7: RTS **Pin 8: CTS** **Pin 9: RI**

Long Distance Termination:

120ohm DIP 

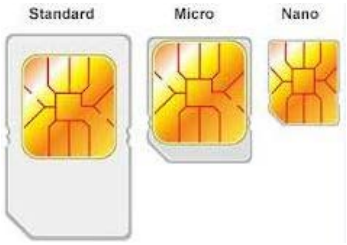
DIP 1	DIP 2	120ohm Termination Configuration
ON	ON	120ohm Terminator for long distance 4-wire RS485/422
ON	OFF	The setting may cause ERROR! Do Not use this.
OFF	ON	120ohm Terminator for long distance 2-wire RS485
OFF	OFF	No Terminator (short distance, Default value)

2.3.4 SIM Socket

The JetWave 3320/3420 provides one external SIM (Subscriber Identity Module) socket to store the 3G/LTE SIM card. Loosen the screw and then you can plug in the SIM card.

The supported SIM card is standard SIM card. If your ISP provide you Micro-SIM or Nano-SIM, please find the SIM card format carry board for the SIM socket.


The example of the JetWave 3320 standard SIM card.



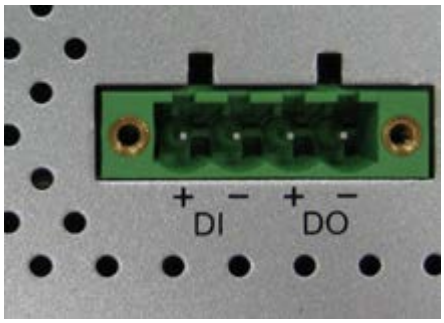
The Major type SIM card.


The micro-SIM carry board. Put the Micro-SIM card to the standard SIM card type carry board and plug into the system.

Note: While you prepare to plug in the SIM card, please remember to power off the system first. This is a **MUST** step, it allows the JetWave 3320/3420 system to detect the SIM card while booting up.

2.3.5 Digital Input

The system provides 1 digital input in the bottom side of the device.



It allows users to connect the termination units' digital output and manage/monitor the status of the connected unit. The Digital Input pin can be pulled high or low; thus the connected equipment can actively drive these pins high or low. The embedded software UI allows you to read and set the value to the connected device. The power input voltage of logic low is DC 0~10V. Logic high is DC 11~30V. Wiring digital input is exactly the same as wiring power input.

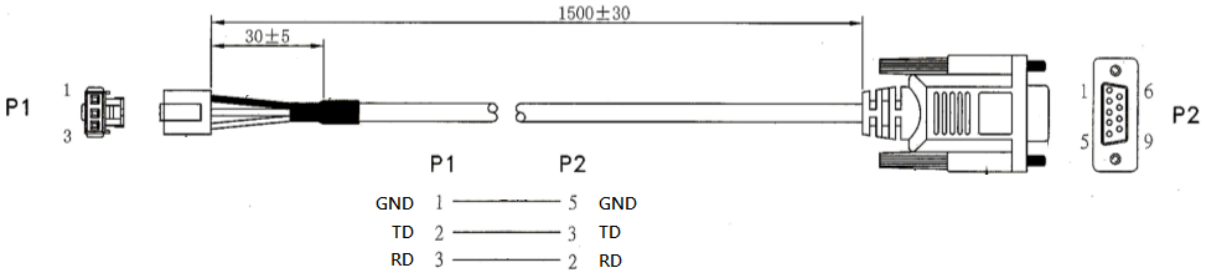
2.3.6 Digital Output

The system provides 1 digital output. It is also known as Relay Output. The relay contacts are energized (open) for normal operation and will close for fault conditions. The fault conditions include power failure, Ethernet port link break or other pre-defined events which can be configured in the management interface. Wiring digital output is exactly the same as wiring power input.

2.3.7 Diag. Console

There is one 3-pin console for diagnostic and command line on the bottom of the device. The 3 pin indicates below pin assignment of the typical RS-232 serial connection. You can wire the cable by yourself or purchase from Korenix.

	Pin 1	Pin 2	Pin 3
Diag. Socket	GND(Ground)	Receive Data (RD)	Transmit Date (TD)
D-Sub 9	GND(Ground)	Transmit Date (TD)	Receive Data (RD)



2.3.8 Ground

To ensure the system will not be damaged by noise or any electrical shock, we suggest you to make exact connection with the Earth Ground. There is one earth ground screw on the bottom side of the device. Loosen the earth ground screw then tighten the screw after earth ground wire is connected.

2.4 WIFI Antenna

The JetWave 3220 series WIFI radio supports IEEE 802.11n 2T2R (2 Transmit 2 Receive) Multiple-input Multiple-output (shot of MIMO) technology, is the use of dual polarization antenna to double the communication performance than traditional 1T1R SISO (Single-in Single-out).

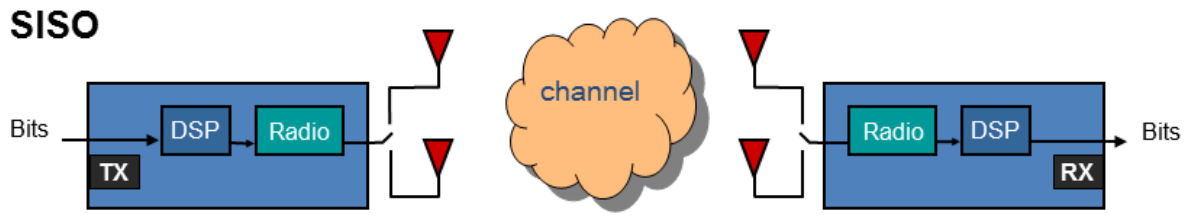
The JetWave 3320 support additional 3G connection. The Radio 2-1 (Top of Front Right) is designed for 3G antenna, the radio 2-2 is reserved for GPS positioning.

2.4.1 MIMO & Dual Polarization

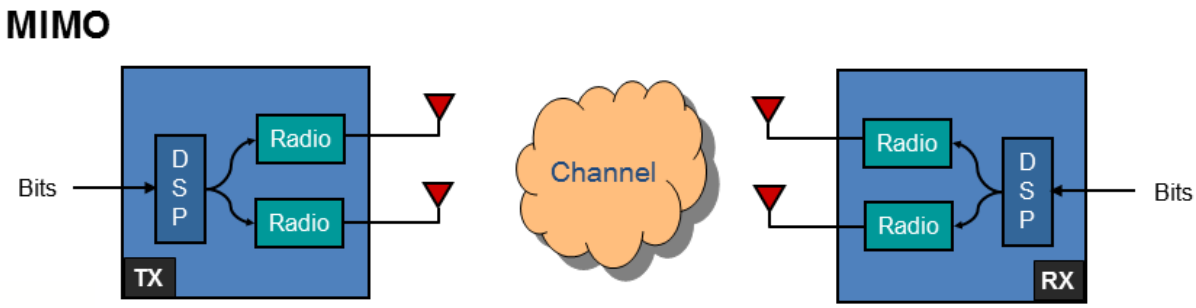
What is MIMO:

With the rising data rates and signal congestion, the MIMO is the proposed radio technology in IEEE 802.11n and accepted popularly. MIMO is short of the Multiple-Input and Multiple-Output, is the use of multiple antennas at both the transmitter and receiver to increase the wireless communication bandwidth, for example the 2T2R means 2 Transmitter and 2 receiver, then the bandwidth is double than SISO. MIMO technology offers significant increases in data throughput without additional bandwidth or increased transmit radio power.

The below figure shows the SISO technology, each transmitter and receiver has single radio.



The below figure shows the MIMO technology, the transmitter and receiver spread the total transmit power to 2 (or more) different radio antenna for communication.



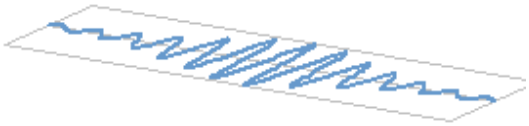
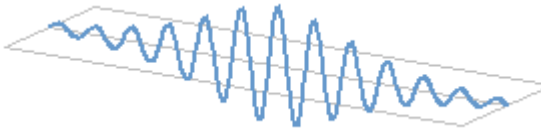
Polarization:

What is polarization

Polarization is a property of wireless antenna, the polarization determines the antennas that can pick up the signal, for example you can set up two antennas in close and pointing to the same direction, but with different polarization. The result is only antennas with the same polarization will be able to communicate with each other, this is important especially in point-to-pint wireless communication.

There are two major polarizations, Vertical and Horizontal. The antenna may support either one, you can choose Vertical or Horizontal polarization for the antenna installation. The result would be that antenna which is vertically polarized would only receive the signal from the vertically transmitting antenna, horizontally polarized antenna would only receive horizontally transmitting antenna.

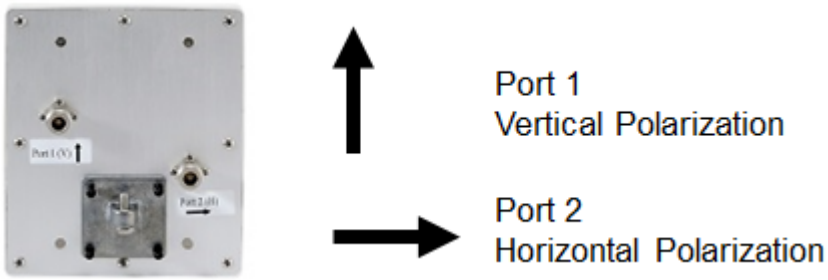
The below figures show the typical Horizontal / Vertical polarization:

Horizontal Polarization	Vertical Polarization
	

Dual Polarization:

There is also “Dual Polarization” antenna which provides two ports to plug in, one for the vertical and the other for the horizontal polarization. The dual polarization antenna can communicate with antennas of both types of polarities at the same time from one antenna.

The below figure is the example of Dual Polarization connectors. There are 2 ports, one is for Vertical polarization, and the other is for Horizontal polarization. While installing the antenna, the 2 ports’ direction of the 2 end must be the same.



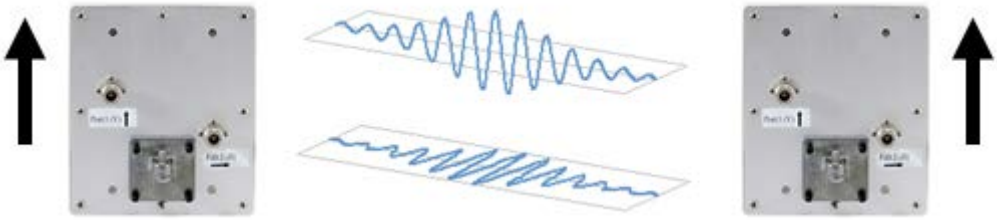
MIMO & Polarization:

To reach the 2T2R MIMO high performance, the antenna with dual polarization (also known as

DP) which supports both Vertical and Horizontal Polarization is necessary. While you select the external antenna, check the Polarization specification of its datasheet or check with the supplier.

Normally, there are 2 connectors of the dual polarization antenna, this is also a way to identify whether this is Dual Polarization or not. Connect the 2 end of the antenna to the antenna socket of the Access Point.

The below figure shows the dual polarization transmitting between the 2 MIMO antennas:



2.4.2 Antenna Socket

The JetWave 3200 Series supports IEEE 802.11n 2T2R MIMO technology. There are 2 SMA Type antenna sockets for one WIFI radio interface. You can connect 1 to 2 WIFI antenna based on your need.

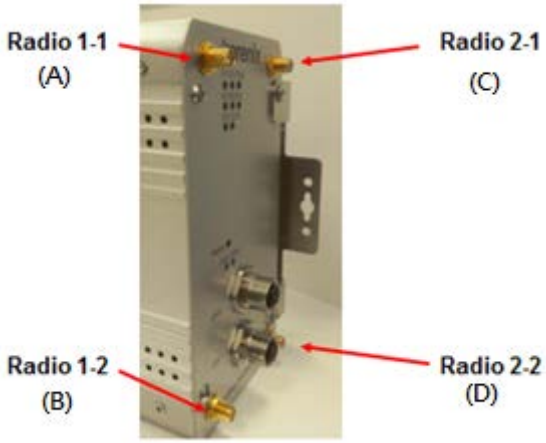
If you just need to connect one single polarization WIFI antenna, you must go to the Web GUI to change the antenna number to 1, and connect it to the 1st antenna socket, Radio 1-1 or Radio 2-1 of the JetWave 3220. Please remind that it is just 1T1R (150Mbps) in such installation.

If you would like to connect dual polarization antenna or 2 antennas for 2T2R, you must connect to the two antenna sockets, Radio 1-1 and Radio 1-2.

The figure indicates the WIFI Radio number.

Radio 1-1(A) and 1-2(B) are applied to the 1st Radio of the JetWave 3220/3320/3420.

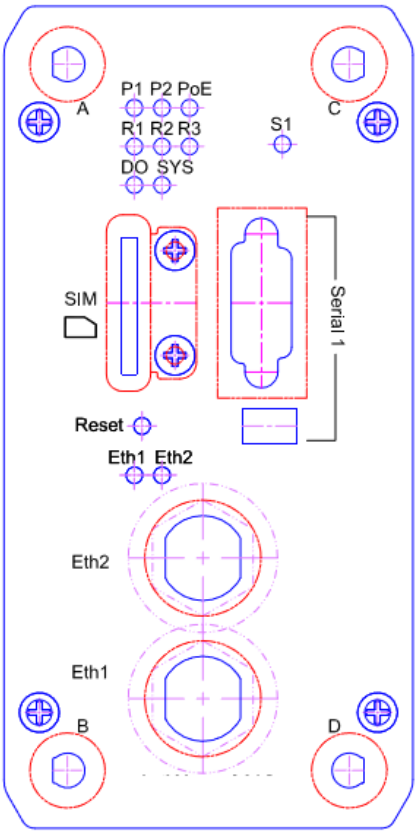
Radio 2-1(C) and 2-1(D) are applied to the 2nd Radio of the JetWave 3220.



Added Number Table

In new version print on front panel, Korenix remove the logo and print the antenna number A, B,

C and D to represent for the Radio 1-1, 1-2, 2-1 and 2-2. Following figure shows the new print of the front panel and the antenna number table shows their functionality.

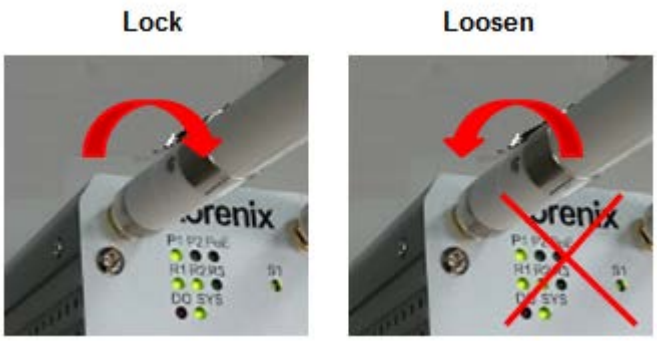


Antenna No.	JetWave 3220	JetWave 3320	JetWave 3420
A	WIFI 1-1	WIFI 1-1	WIFI 1-1
B	WIFI 1-2	WIFI 1-2	WIFI 1-2
C	WIFI 2-1	3G Main	LTE Main
D	WIFI 2-2	GPS	LTE Aux

2.4.3 Antenna Installation

The figure shows the direction to lock the antenna, it is clockwise direction. There is Nylock pasted on the antenna to avoid antenna loosen in vibration environment, please don't often lock/un-lock the antenna, otherwise, the Nylock paste will be damaged.

Use the same way to lock the attached WIFI antennas, it is clockwise direction as well. **Note** that the counter-clockwise direction will loosen the antenna immediately.



For vibration environment, we don't recommend you connect the antenna directly to the device, no matter how heavy you lock it. It is suggested you install the antenna at non-vibration or low vibration place and connect it by extended Radio cable antenna to the device.

In another practical case, we usually mount the device within the field box to protect water, rain or other reasons, and mount its antennas outside the box. This is because the radio signal MUST be filtered by the metal field box if you install the AP within the box.

Korenix provides the external antenna mounting kit, extended radio cable, celling mounting kit as optional accessory. While you need it, you can purchase from Korenix.

For how to mounting the antenna plate and celling-mount plate, please refer to the chapter 2.6.

2.4.4 Default WIFI Antenna Specification:

The following information apply to the Default WIFI Antenna.

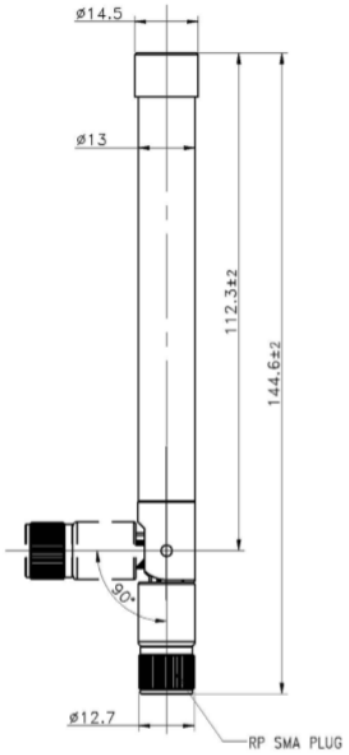
Material of the antenna: The body material is Brass, Insulator is Teflon.

Frequency Range: 0~6GHz

Impedance: 50ohm

VSWR: ≦1.5

Gain: The default WIFI antenna support both 2.4G and 5G band, its gain value is 2.6dbi for 2.4G band, 3.5dBi for 5G band. This gain value is peak value of the antenna.



Antenna Efficiency for Reference:

Frequency (MHz)	2400	2450	2500	5100	5550	5900
Peak Gain (dBi)	2.71	2.63	2.65	3.1	3.57	3.26
Directivity (dBi)	3.62	3.85	3.79	4.18	4.79	4.69
Efficiency (dB)	-0.91	-1.22	-1.14	-1.08	-1.22	-1.43
Efficiency (%)	81.06	75.44	76.99	78.04	75.59	71.92

Dimension: Length: 144.6mm

Directional: Omni-Direction

Operating Temperature: -65℃ ~ +165℃

Reference Distance:

The suggest distance of the default WIFI antenna is 100 meter wide, up to 200 meter in public space. (However, the free space lost may affect the transmitting distance, so that the device may have different performance in different environment.)

Note: Please install the antenna carefully due to the insulator material may be damaged after dropped to the ground. Once you find the insulator is broken, even very small hole or gap, please replace a new one.

2.5 LED Indicator

The following table indicates the LED of your device.

LED	Indication	LED	Indication
P1	**Power 1** Status Green ON = System ON	**R2**	Status of the **Radio Number 2** Green ON = Radio 2 is activated *Note
P2	**Power 2** Status Green ON = System ON	**R3**	Status of the **Radio Number 3** Green ON = Radio 3 is activated *Note
PoE	**IEEE 802.3at PoE+ Status (Eth 1)** Green ON = Powered from the 802.3at PSE Switch. *Note 1 OFF: 802.3af or Not power by PoE	**DO**	**Digital Output** Status Red ON = The Relay is ON. It may indicate the alarm of specific events.
R1	**Radio 1** Status Green ON = Radio 1 is activated	**SYS**	**System Status** Green ON = The system is activated.
Eth 1	**Ethernet Port 1** Status. Green ON = Eth 1 is Link Up. Green Blinking = Eth 1 is Activating	**Eth 2**	**Ethernet Port 2** Status. Green ON = Eth 2 is Link Up. Green Blinking = Eth 2 is Activating
S1	**Serial Port 1** Status (JetWave 3320/3420 Only) Green Blinking = Serial port is transmitting data Red Blinking = Serial port is receiving data		

Note 1: PoE LED is only applied to the IEEE 802.3at PoE+. Current PoE LED can't indicate IEEE802.3af PoE, this is known limitation of the LED display.

Note 2: R2/R3 is the radio number. R1 is the first WIFI Radio, R2 is the 2nd WIFI Radio, R3 is the 3rd 3G/LTE Radio. R3 ON doesn't mean there are 3 radios.

In JetWave 3220, the R2 indicates the 2nd WIFI radio of the JetWave 3220.

In JetWave 3320, the R3 indicates the 3G Radio of the JetWave 3320.

In JetWave 3420, the R3 indicates the LTE radio of the JetWave 3420.

2.6 Mounting

2.6.1 Mounting the AP

The JetWave 3200 series supports **Din-Rail mounting**. The Din-Rail mounting kit is Din 35 compliant and pre-installed in the back of the AP.

The JetWave 3200 series also provide celling-mount plate as optional accessory. The celling-mount plate is available for celling-mount or wall-mount installation, for example the vehicle, railway and warehouse.

Optional Accessory: JetWave 3400/3300/3200 External SMA Antenna Mounting Kit

The package:

4x Antenna Mounting L Plate

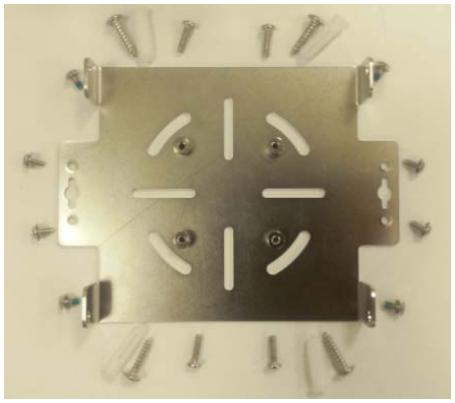
4x 90cm RG316 Extended SMA Type Radio Cable

1x Celling-Mounting Plate

Antenna Mounting L Plate

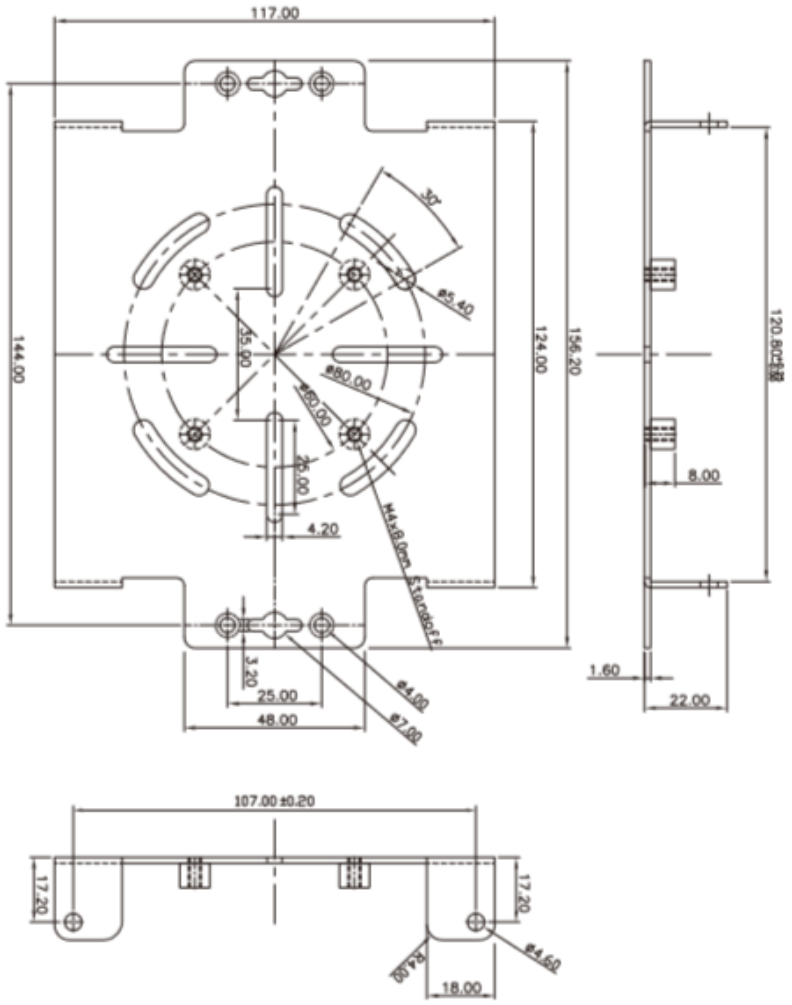
90cm RG316 Extended SMA type Radio cable

Celling-mounting Plate (include screws)



Dimension: 156x117x22mm

Celling-mounting Plate Dimension:

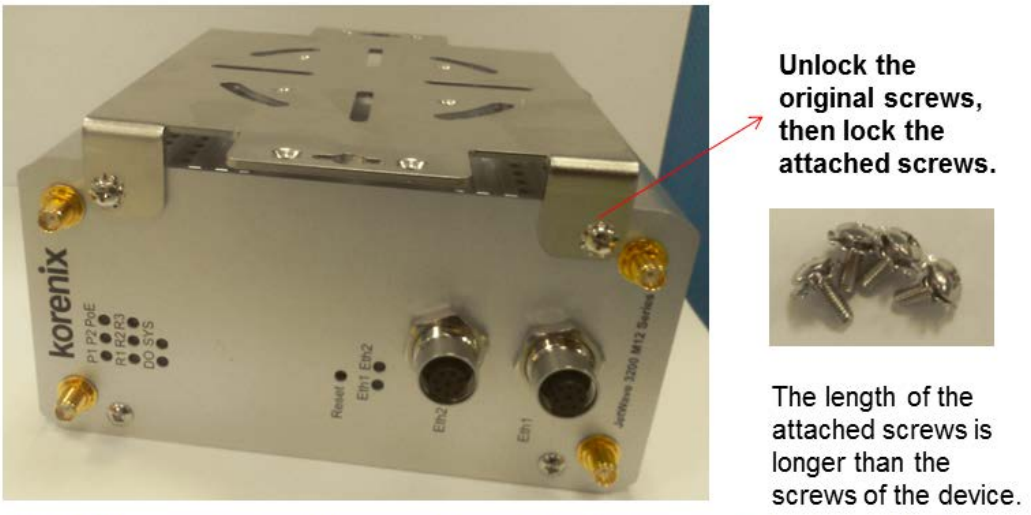


JetWave 3200/3300/3400 Series
Celling-mount Plate Dimension

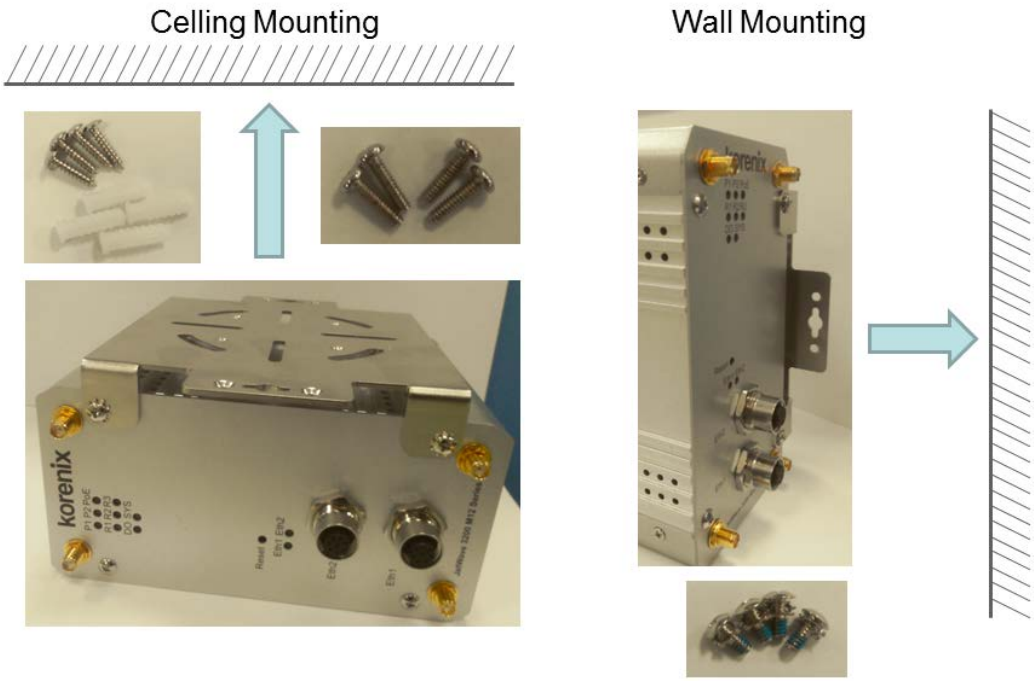
2.6.2 Mounting the AP with Celling-mounting Kit

To mount the AP with celling-mounting plate, you must unlock 4 screws on the front/back of the unit first. Use the new attached screws to lock the device. Then you have some other optional screws for different kinds of celling-mounting.

1. Unlock the original screws, lock the device with new attached screws.
2. The celling mount plate is available for both Celling and Wall mounting.



Note: Please notice that the screw hole on the front panel will be damaged after lock/unlock few times. DO NOT often change the celling mounting kit!



3. The celling mount plate is flexible for different installation. This figure shows the poll-mount

installation by using the celling mount kit. This is applied to the indoor environment.

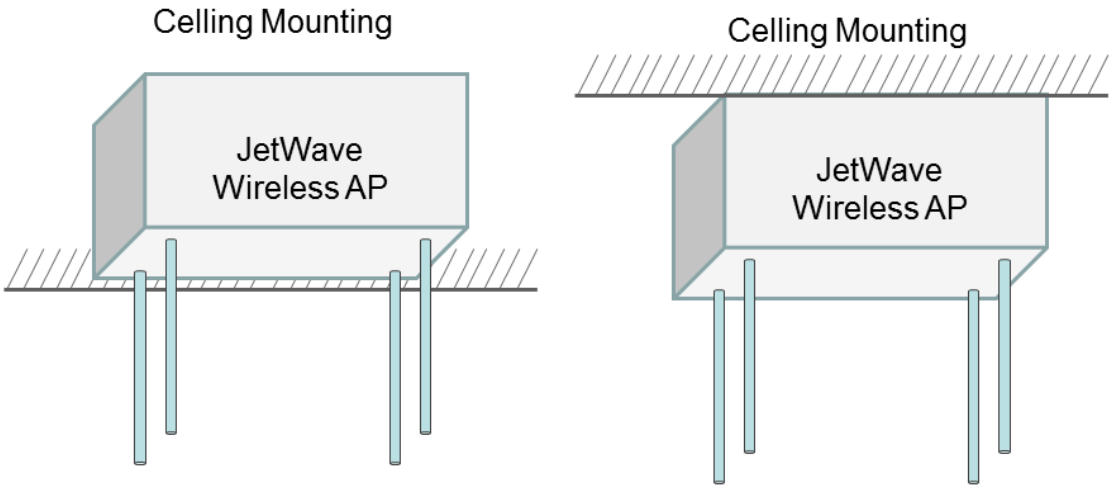
4. In some cases, you may need to install the celling mount plate first then lock the AP/Gateway to the celling-mount plate.

2.6.3 Mounting the default antenna on unit

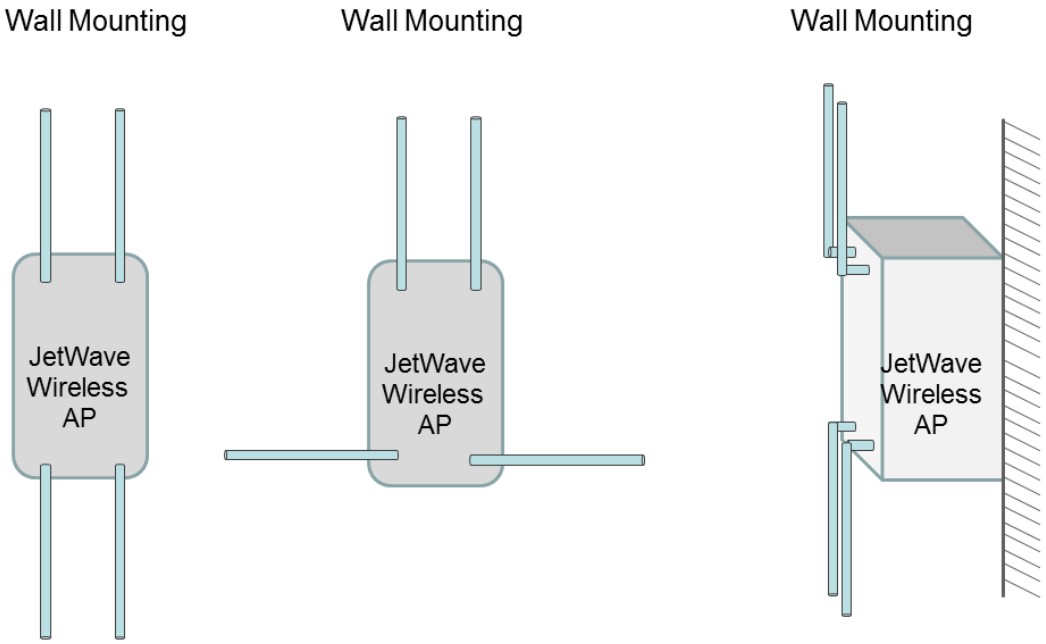
There are dual band antennas for the JetWave3200 Series in the product package. You can install the default antenna to the SMA socket on the front. Each radio supports 2T2R MIMO technology, you must install 2 antennas for one radio.

Since the AP housing material is Aluminum, the antenna zone may be affected if you install the antennas directly in front of the panel. The below figures introduces the suggestion for the default antenna installation. Or you can install the antennas by antenna mounting L plate in other better locations.

Celling-mount (or Desktop)



Din-Rail / Wall-mounting



2.6.4 Mounting the default antenna for vibration environment

You can purchase our external antenna mount kit accessories. There are antenna mounting L plates and extended RF cable package to ease such mounting installation need. The antenna mounting L plate is available for both N-Type and SMA type antenna.

2.6.5 Mounting the SMA-Type external antenna

If the default antenna is not suitable for your environment, you can purchase the external antenna per your environment need. While selecting the SMA-type external antenna, you must notice that the antenna should support Dual Polarization for 2T2R MIMO radio transmission. You can choose SMA-type Dual Polarization antenna and follow the same steps as “Mounting the default antenna on unit” to install your antenna.

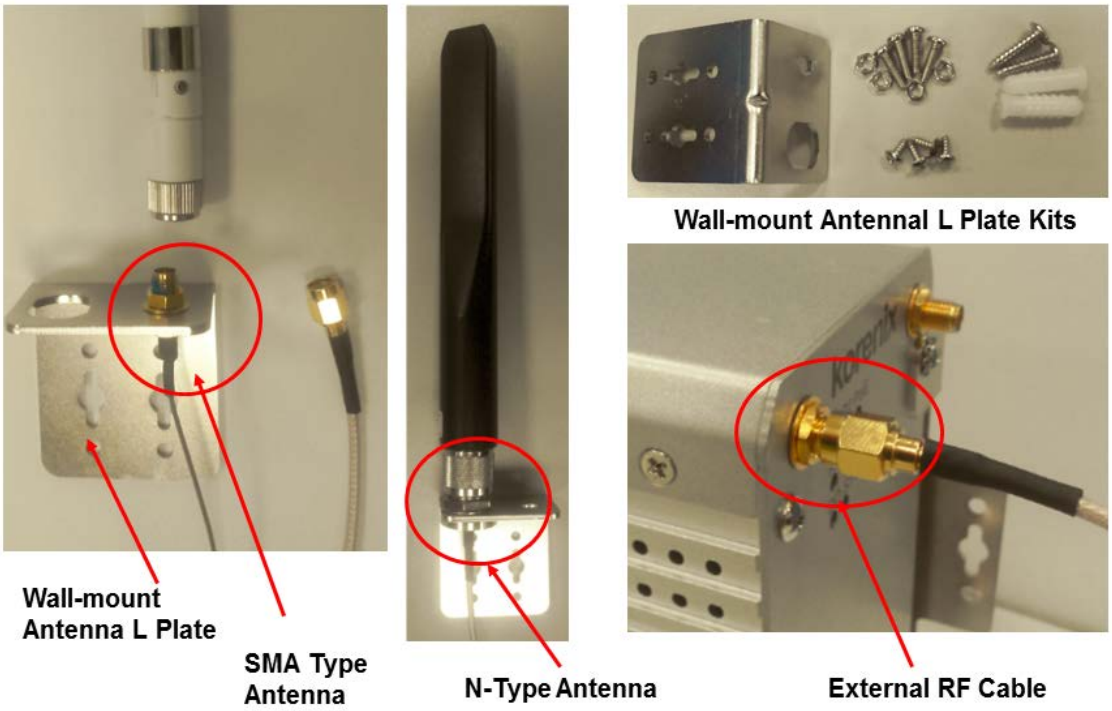
2.6.6 Mounting the N-Type external antenna:

While selecting the N-type external antenna, you must notice that the antenna should support Dual Polarization for 2T2R MIMO radio transmission. The JetWave 3200 series external antenna mounting L plate is available for both SMA and N-Type antenna, purchase the external N-type antenna mounting kit from your sales.

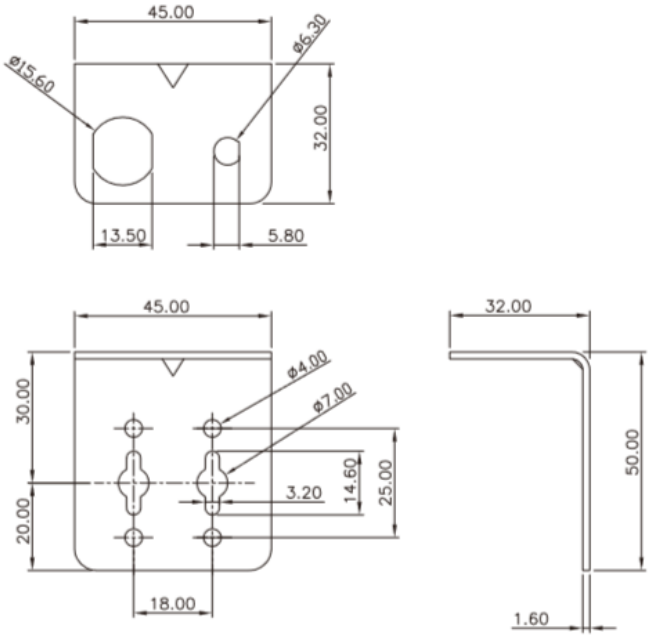
2.6.7 Below figure shows the optional External Antenna Mounting Kit

Wall-mount Antenna L Plate Kits: This plate supports SMA or N-Type connector, you can wall-mount it with the attached screws.

External Radio Cable: The cable is SMA Male Reverse to SMA Female Reverse RF cable.



Wall-mount Antenna L Plate Dimension



JetWave 3200/3300/3400 Series
Wall-mount Antenna L Plate Dimension

2.7 Using the External Antenna

Consult your system integrator or our technical support engineer to choose the suitable external antenna with SMA-type or N-Type connector for your application. Different antenna supports different bands, polarization and different range of coverage.

Antenna Socket of the AP/Gateway:

Front Left: Radio 1 (WLAN 1). There are 2 SMA connectors for 2T2R MIMO.

Front Right: Radio 2 (WLAN 2/3G/4G LTE). There are 1-2 SMA connectors. It may be WIFI MIMO, 3G or LTE antenna connector depends on the model you purchase.

Select the External Antenna:

Gain: It affects the system performance.

Direction: Typical type includes Omni-Directional, Directional or Yagi antenna. Check the antenna zone in its specification.

Polarization: Dual Polarization is MUST for this 2T2R MIMO product.

Connector: Check what type it is, for example N-Type, SMA Male/Female.

Antenna Alignment:

a. Follow the instruction of the antenna installation guide and install the antenna well.

b. Find the remote location of the target AP. The Telescope, GPS positioning tool, Google Map are convenient tool.

c. The polarization of the two ends of the directional antenna MUST be the same. Refer to the label on the antenna, the direction of the "**Port 1(V)** ↑"and "**Port 2(H)**→" must be the same in the 2 ends.

d. Connect the extended Radio Cable from the AP/Gateway to the antenna. The level

e. Go to Web GUI, use the **Antenna Alignment tool** (Refer to the 4.6.5) can help you find the target Antenna.

f. Run the **Data Rate Test** (4.6.4) can help you check the performance between the two ends.

Lightning Arrestor:

While you install the external antenna in outside area, the Arrestor is a must accessory to avoid the environment attack through the antenna. The arrestor protects the insulation and conductors of the system from the damaging effects of lightning. For example the JWA-Arrestor-5803 is 0-6G Arrestor for N-Type Antenna.

Note:

When prepare the external antenna, make sure the antenna can support Dual Polarization.

Most of the high gain directional antenna supports Dual Polarization.

Most of high gain external antenna is installed in higher place than AP, get low power lost antenna cable in advance.

While installing the AP within metal field box, connect the extended antenna cable to outside the box is must to avoid the Radio lost.

Chapter 3

Prepare for Management

Chapter 3 Prepare for Management

The JetWave 3200/3300/3400 Series supports Web GUI Configuration, Simple Network Management Protocol (SNMP), Telnet and Diagnostic Command Line Interface for management and Window Utility helps you discover the device cross network, basic IP setting, firmware management…etc.

This chapter describes the preparation for management. In your first time access the device, you can refer to the Basic Factory Default Settings to know the default settings and the default IP of the device. The chapter also tells you how to login the Web-based interface, Diagnostic Console. If you forget IP address you changed, you can use Korenix View Utility (refer to next chapter) to discover the devices' IP address and then access it.

3.1 Basic Factory Default Settings

We'll elaborate the JetWave 3200/3300 Series basic factory default settings. You can re-acquire these parameters by default. This info is easier for you to find the device and access the switch's configuration interface. For further info, please refer to configuration guide of the feature set.

Table 1 JetWave 3200/3300 Basic Factory Default Settings

Features	Factory Default Settings
Username	admin
Password	admin
Model Name	JetWave3220 (3320/3420 depends on which model you access)
Device Name	korenixXXXXXX (X represents the last 6 digits of Ethernet MAC address)
Network Mode	**Bridge Mode** (JetWave 3220) **Note:** In Bridge mode, only one IP Address (LAN) interface is available. **Router Mode** (JetWave 3320) **Note:** In Router mode, WAN (Eth 1) and LAN (Eth 2) interface has its own IP Address.
Default IP at Bridge Mode (JetWave 3220 Default)	
IP Address	192.168.10.1
Subnet Mask	255.255.255.0
Gateway	0.0.0.0
Default IP at Router Mode (JetWave 3320/3420 Default)	

IP Setup – Eth 1 (WAN)	Access Type	Static IP
	IP Address	192.168.1.1
	Subnet Mask	255.255.255.0
	Gateway	0.0.0.0
	Primary DNS Server	0.0.0.0
	Secondary DNS Server	0.0.0.0
IP Setup – Eth 2 (LAN)	IP Address	192.168.10.1
	Subnet Mask	255.255.255.0
	DHCP Server	Enabled
	DHCP IP Range Start	192.168.10.101
	DHCP IP Range End	192.168.10.150
	DHCP Subnet Mask	255.255.255.0
	DHCP Gateway	192.168.10.1
	(Refer to the System – IP Setting for further info.)	
Wireless Basic Setting	Wireless Mode	AP
	Wireless Network Name (SSID)	JetWave3000_1 (WIFI 1) JetWave3000_2 (WIFI 2)
	Broadcast SSID	Enabled
	802.11 Mode	802.11G/N
	Data Rate	Auto
	(Refer to the Wireless – WLAN Settings – Basic Settings)	
Remote Settings	Remote Management Privacy	Telnet, SNMP, SNMP Trap, Email Alert
	Even Warning Type	WLAN association, Authentication fail, Configuration Changed
SNMP	Version	2
	Server Port:	161
	Get Community	Public
	Set Community	Private
	Trap Destination	0.0.0.0
	Trap Community	Public
Korenix View Utility	Device Search, IP Assign, Basic Tool, Wireless Panel	**Note:** While using Korenix View Utility to search the device, please connect to the Eth 2 (LAN).
Diagnostic CLI	Console Type	3-pin (Tx, Rx, GND) Refer to the appendix B, RS232 to 3-pin pin assignment.
	Baud Rate	115,200
	Parameter	N, 8, 1

Warning:

It is Important to change all the default settings of the Wireless AP, includes the User Name, Password, Default IP Address, Default SSID, SNMP Community Name and configure Wireless Security to secure your network.

3.2 System Requirements

Before configuration, please make sure your system meets the following requirements:

A computer coupled with 10/100/1000 Base-T(X) adapter;

Configure the computer with a static IP address of 192.168.10.x (X cannot be 0, 1, nor 255), as the default IP address of JetWave 3200/3300 Series is 192.168.10.1 (Eth 2 of JetWave 3320).

A Web browser on PC for configuration such as Microsoft Internet Explorer 6.0 or above, Google Chrome or Firefox.

Note: If you want to do throughput test, not just configure the switch, please notice that the throughput of the high performance and low performance CPU must be different.

3.3 How to Login the Web-based Interface

The system provides you with user-friendly Web-based management tool.

Open Web browser and enter the IP address (Default: **192.168.10.1**) into the address field. You will see the WELCOME page as below.

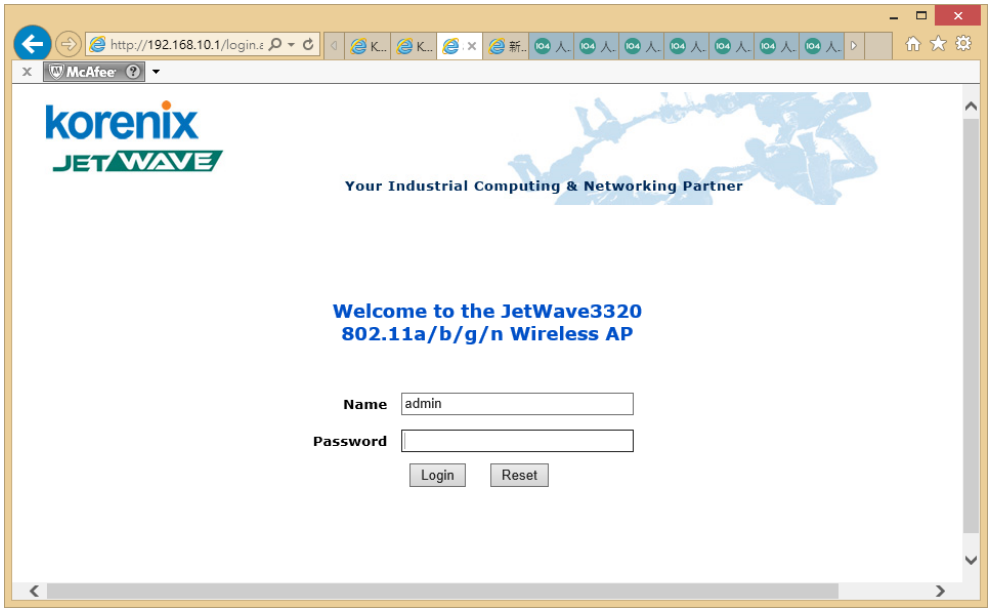


Figure – Web GUI Login Page

Enter the name of Account (Default: **admin**) and password (Default: **admin**) respectively and click "**Login**" to login the main page of the device. As you can see, this management interface provides main options in the above, which are **Status**, **System**, **Wireless**, **Management**, **Tools**, **Device Front Panel, Save, Reboot** and **Logout**.

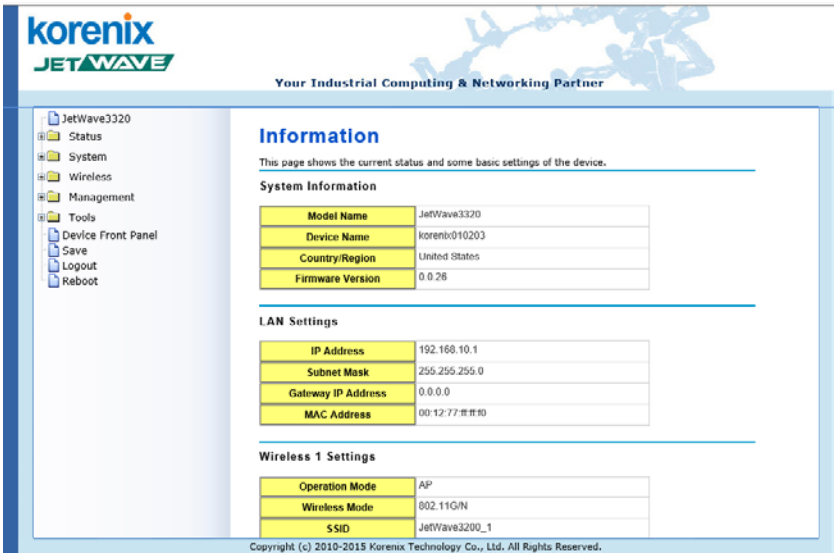


Figure - Main Page

Note:

The username and password are case-sensitive!

3.4 Fail to login the Web GUI

If you failed to login the web GUI, there are something you can do for troubleshooting.

1. Korenix web management page is developed by JAVA. It allows you to use a standard web-browser such as Microsoft Internet Explorer, or Mozila, to configure and interrogate the switch from anywhere on the network. The IE 5.0 or later versions do not allow Java applets to open sockets by default. Users have to directly modify the browser settings to selectively enable Java applets to use network ports.
2. Please disable the firewall setting of your browser. The firewall setting may block the connection from your PC to the device. The firewall may stop the firmware upgrade, configuration backup and restore as well. Note that after finished the setting, re-enable your firewall to protect your PC.
3. Check the IP Setting, your PC and managed device must be located within the same subnet.
4. Check the connected port, the default Eth 1 and Eth 2 equipped with different IP Address.

5. The Web UI connection session of the device will be logged out automatically if you don't give any input after 30 seconds. After logged out, you should re-login and key in correct user name and password again.
6. The new JAVA version may have different security policy in different versions, please contact Korenix engineer (Korecare@korenix.com) once you have problem for login.

3.5 How to login the CLI

You can access the CLI (Command Line Interface) through 3-pin Diagnostic Console or Telnet.

3-pin Diagnostic Console:

There is one 3-pin Diagnostic console for out of band management. If you want to access the AP through the console, please assembly the console cable or purchase from our sales first.

Please attach RS-232 DB-9 connector to your PC COM port, connect another end to the 3-pin socket Console port located in the bottom side.

1. Go to Start -> Program -> Accessories -> Communication -> Hyper Terminal
2. Give a name to the new console connection.
3. Choose the COM name
4. Select correct serial settings. The serial settings of JetWave 3200/3300/3400 series are as below:

   Baud Rate: 115,200 /

   Parity: None /

   Data Bit: 8 /

   Stop Bit: 1
5. After connected, you can see Switch login request.
6. Login the switch. The default username is "admin", password, "admin".

Telnet/SSH:

You can connect to the device by Telnet and the command lines are the same as what you see by RS232 console port. Below are the steps to open Telnet connection to the switch.

1. Go to Start -> Run -> cmd. And then press Enter
2. Type the Telnet 192.168.10.1 (or the IP address of the switch). And then press Enter

Note that the Telnet.exe file is not provided after Window 7. You can download it from Microsoft web

site. Or you can use 3rd Party tool, for example the Putty.

3rd Party tool:

Download PuTTY: http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html

The copyright of PuTTY is belonged to Putty. We don't have any contract with them. Please follow the shareware policy of their company.

1. Open SSH Client/PuTTY In the Session configuration, enter the Host Name (IP Address of your device) and Port number (default = 22).
2. Choose the "Telnet" protocol. Then click on "Open" to start the Telnet session console.
3. If you want remote access the CLI securely, choose the "SSH" protocol. Then click on "Open" to start the SSH session console.
4. For SSH login: After click on Open, then you can see the cipher information in the popup screen. Press Yes to accept the Security Alert.
5. After few seconds, you can see the login screen of the device, the username/password is the same as the Web GUI (Default: admin/admin).

3.6 Discovery Utility – Korenix View Utility

Please download the latest Korenix View Utility from Korenix Web Support page.

The PC with Korenix View Utility can discover the AP/Gateway cross the IP subnet. But, if you want to do further configuration, the PC must be located in the same subnet with your AP/Gateway. Change the IP address of your PC or change the IP address of the AP/Gateway.

The chapter 5.3 introduces how to use Korenix View Utility.

Chapter 4

Web GUI Configuration

Chapter 4 Web GUI Configuration

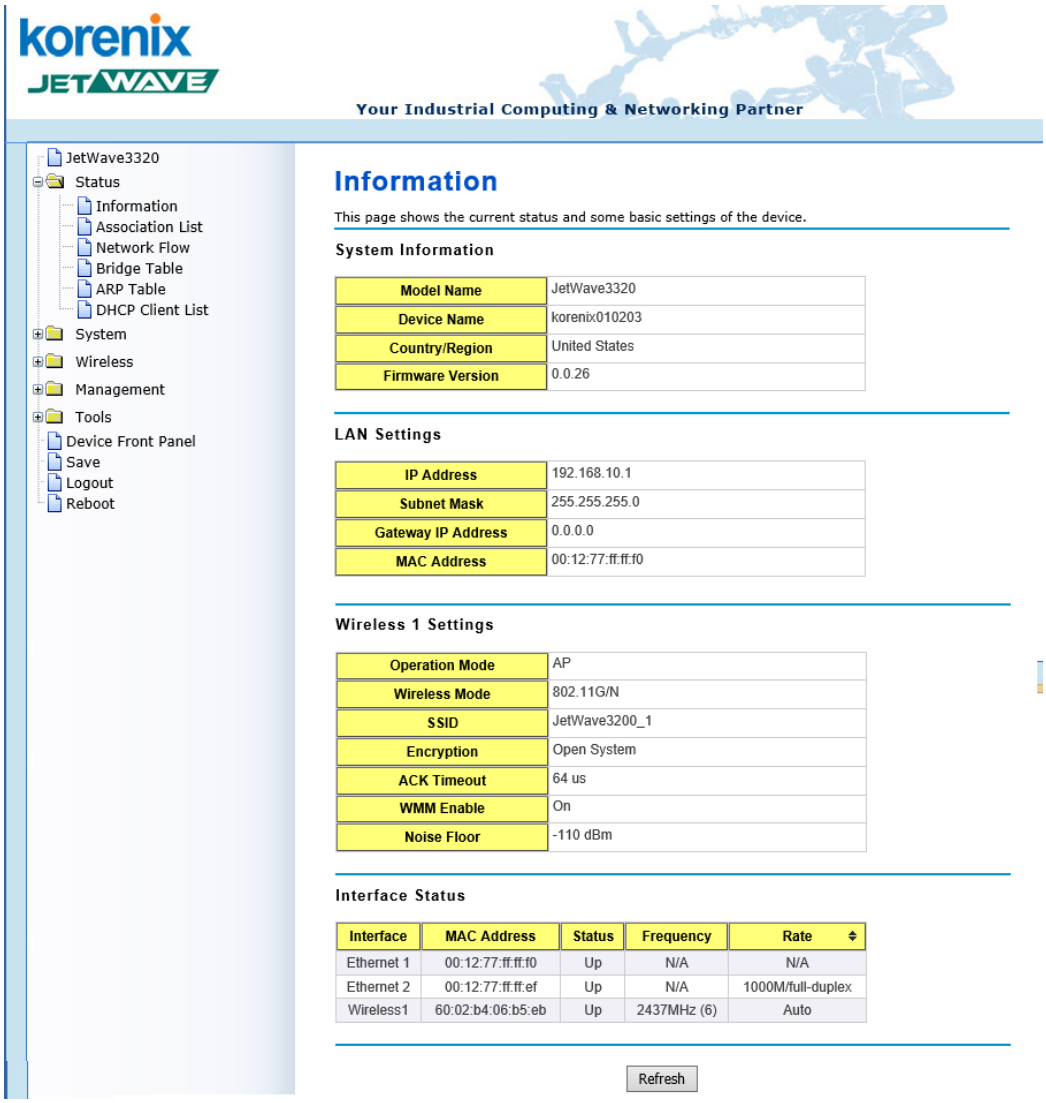
This chapter describes the Web GUI for Software Configuration.

4.1 Status

The Status feature set includes Information, Association List, Network Flow, Bridge Table, ARP Table and DHCP Client List. The information allows you to see the information of the device.

4.1.1 Information

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



System Information: The Model Name, Device Name, Country/Region you selected and Firmware version number.

LAN Setting: It shows the IP Address, Subnet Mask, Gateway IP Address and MAC Address of

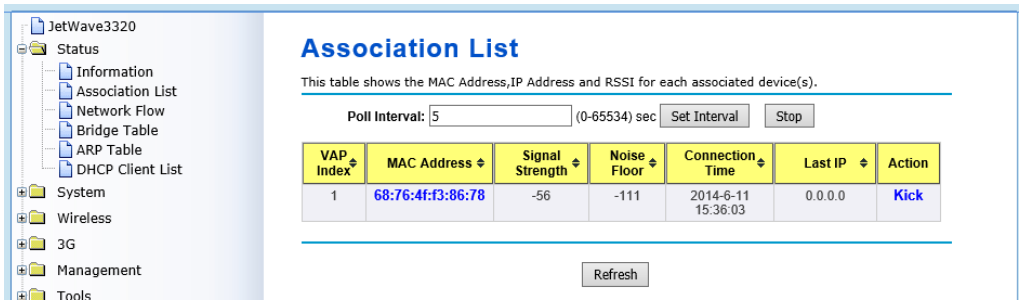
the LAN interface.

Wireless 1 Settings: It shows the Operation Mode, Wireless Mode, SSID, Encryption, ACK Timeout, WMM State, Noise Floor of the Wireless 1. There are 2 Wireless Settings for JetWave 3220 dual radio models.

Interface Status: This table shows the Interface Name, MAC Address, Status, Frequency and Rate.

4.1.2 Association List

This table shows the MAC Address, IP Address and RSSI for each associated devices.



Poll Interval: The poll interval time setting, range from 0~65524 seconds. If you want to change the poll interval time, press “Stop” and then enter new value, press “Set Interval” to activate new setting.

Set Interval: Set new Interval time after enter new poll interval time.

Stop: Stop polling the associated clients.

====Entry Info==========

VAP Index: Virtual AP Index number.

MAC Address: The MAC Address of the associated device.

Signal Strength: The signal strength of the associated device. The value can help you to see the connection quality of AP/WDS-AP and Client/WDS-Client.

Noise Floor: The Noise Floor of the associated device.

Connection Time: The time when the device connected to the AP.

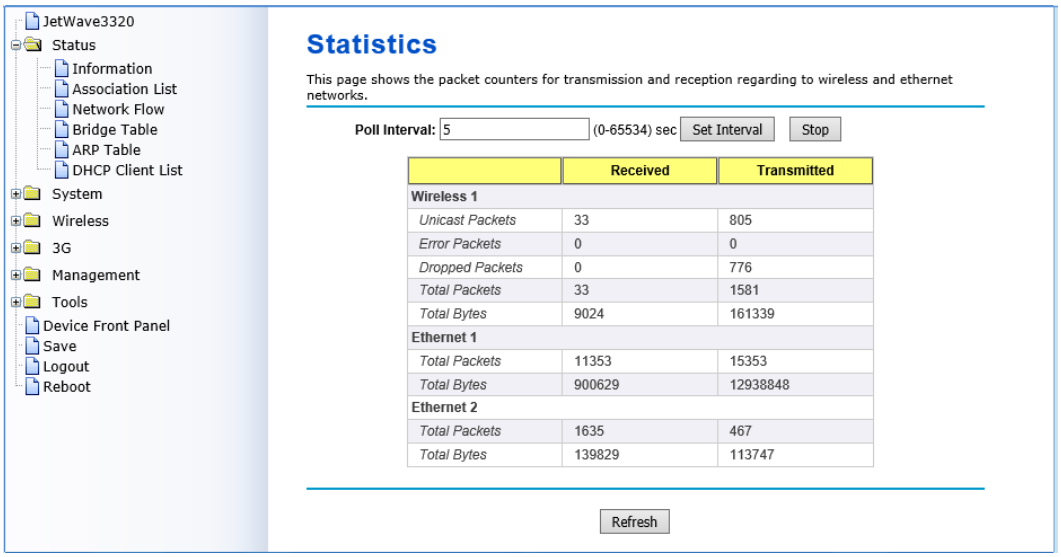
Last IP: The last IP address it had.

Action – Kick: This command allows you force Kick the associated client.

Refresh: The item helps you refresh the table manually.

4.1.3 Network Flow (Statistics):

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



	Received	Transmitted
Wireless 1		
Unicast Packets	33	805
Error Packets	0	0
Dropped Packets	0	776
Total Packets	33	1581
Total Bytes	9024	161339
Ethernet 1		
Total Packets	11353	15353
Total Bytes	900629	12938848
Ethernet 2		
Total Packets	1635	467
Total Bytes	139829	113747

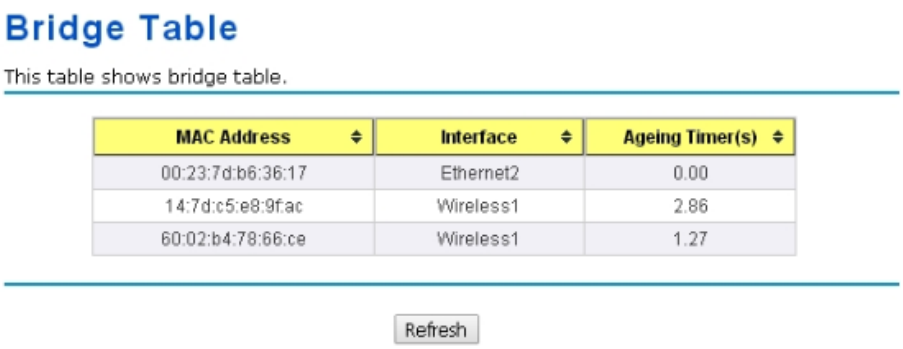
Poll Interval: The poll interval time setting, range from 0~65524 seconds. If you want to change the poll interval time, press “Stop” and then enter new value, press “Set Interval” to activate.

Set Interval: Set new Interval time after enter new poll interval time.

Stop: Stop polling the associated clients.

4.1.4 Bridge Table

This table shows bridge table.



MAC Address: The MAC address of the connected device.

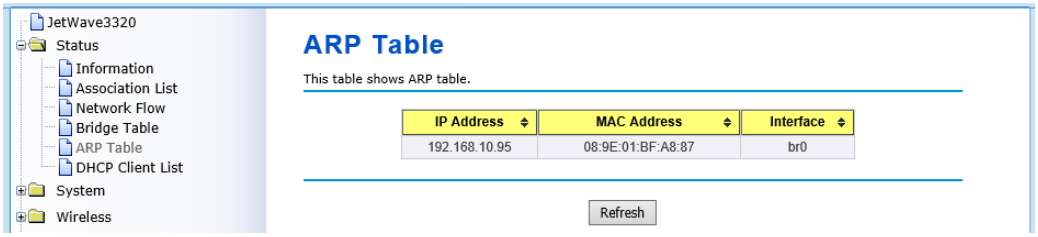
Interface: This field shows the interface which learnt the MAC Address.

Aging Timer(s): The aging time of this entry. If the MAC didn’t transmit any packet, the aging time will start counting, and delete the entry after aging timeout.

Refresh: Refresh the table.

4.1.5 ARP Table

This table shows the ARP table.



IP Address: The IP Address leant from the interface.

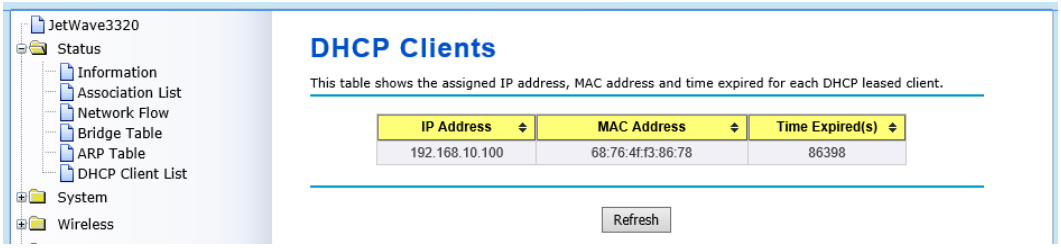
MAC Address: The MAC Address leant from the interface.

Interface: The interface which learnt the ARP packet (IP and MAC Address).

Refresh: Refresh the table.

4.1.6 DHCP Client List

This table shows the assigned IP address, MAC address and expire timer of the connected DHCP client device.



IP Address: The assigned IP address of the connected DHCP client device.

MAC Address: The MAC Address of the connected DHCP client device.

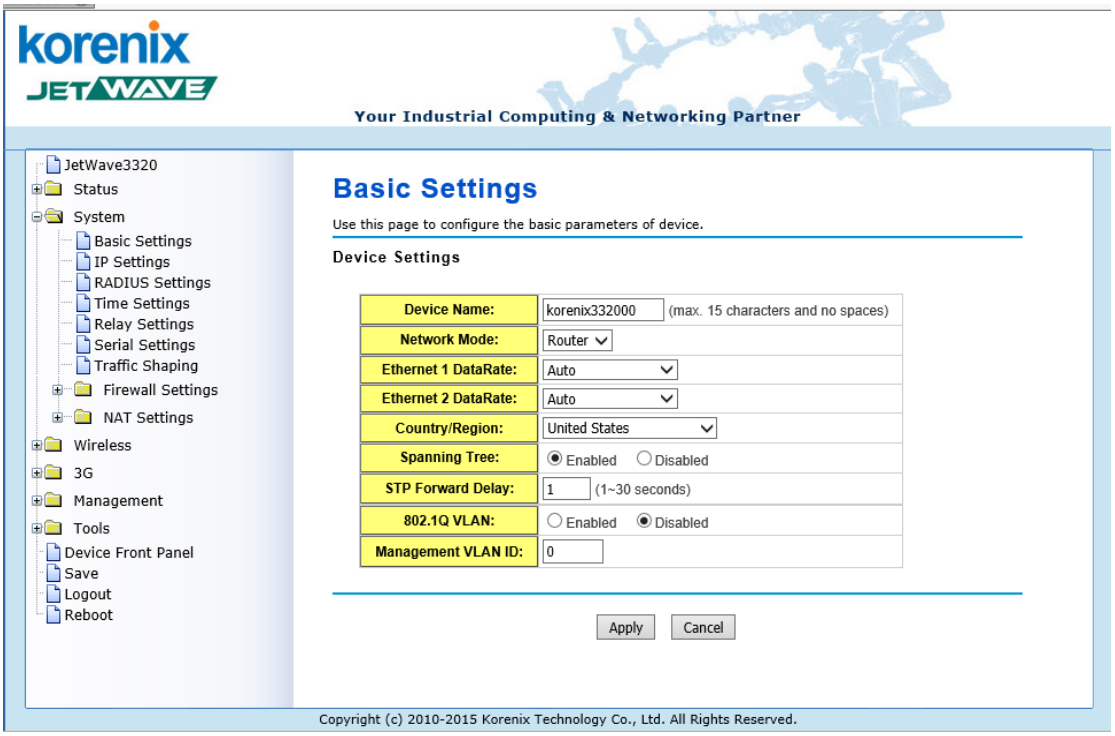
Time Expired(s): The DHCP expire timer connected DHCP client device. Time unit is second. The number can be changed in DHCP Server Lease Time setting.

Refresh: Refresh the table.

4.2 System

For users who use the JetWave 3200/3300 series for the first time, it is recommended that you begin configuration from the "**System**" feature set pages shown below:

In **System** pages, there are some configuration pages for the system settings. These setups are introduced in below pages.



4.2.1 Basic Settings

Use this page to configure the basic parameters of the device.

Device Name: User could give a name for identifying a particular access point here. It allows maximum 15 characters and no spaces.

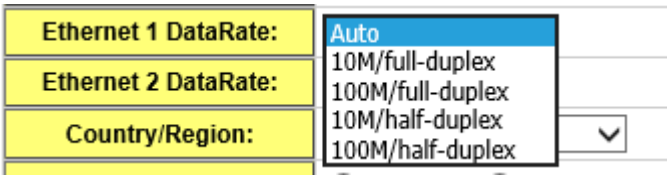
Network Mode: There are 2 modes, Bridge and Router modes. The default setting of JetWave 3220 is Bridge mode. The default setting of JetWave 3320 is Router mode.

Bridge: When configured to Bridge mode, the AP acts as bridge to transmit/receive traffic between LAN (Eth 1 + Eth 2) to Wireless LAN. And there is only one IP address available for the system.

Router: When configured to Router mode, the AP acts as Router/IP Gateway, the Eth 1 and Eth 2 port will be separated to different network. The Wireless LAN and Eth 2 will be located within

the same network. In JetWave 3320 default setting, the LAN/WLAN to 3G connection is working under Router mode as well.

Ethernet 1 Data Rate: Configure the Speed/Duplex of the port Eth 1. The default value, Auto means Auto-Negotiation. Force speed/duplex is available to setup here.



Ethernet 2 Data Rate: Configure the Speed/Duplex of the port Eth 2. The default value, Auto means Auto-Negotiation. Force speed/duplex is available to setup here.

Country/Region: Select the country you are installed. The channel number may be different based on your country.

Spanning Tree:

Spanning Tree Protocol (STP) is a link management protocol for AP which provides path redundancy while preventing loops in a network. STP allows only one active path at a time between the access points but establish the redundant link as a backup if the initial link fails.

STP Forward Delay (1~30 Seconds): This is the Forward Delay value of the Spanning Tree protocol setting. The default value 1 is not comfort to 802.1D STP standard, however, it can shorten the topology change time. But, once you want to connect with other STP device, for example the management Ethernet switch, you must follow STP protocol value. The min. time is range from 4~30.

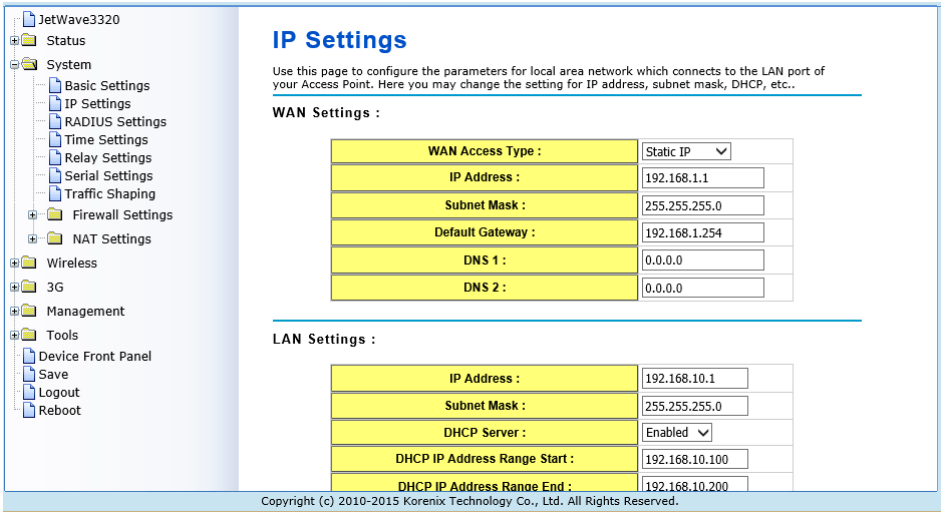
802.1Q VLAN: Enable or Disable 802.1Q VLAN. With 802.1Q enabled, the packet will attach the 1Q VLAN tag inside. To assign the VLAN ID for each AP profile, you should enable 802.1Q VLAN first. Here is the global VLAN Enable setup.

Management VLAN ID: This is the management VLAN ID of the device. Only the client within the same management VLAN can access the device's management interface. To enable Management VLAN ID, you must enable "802.1Q VLAN" and assign "VLAN ID" for each AP profile first.

4.2.2 IP Settings

Use this page to configure the IP related parameters for **WAN (Eth 1)** and **LAN (Eth 2)**

interfaces. Here you may change the setting for IP address, subnet mask, Default Gateway, DNS, Static IP or DHCP…etc.



WAN Settings:

WAN Access Type: Static IP

IP Address: Once **Static IP** is selected, the IP Address field allows you to set the device's WAN IP address manually.

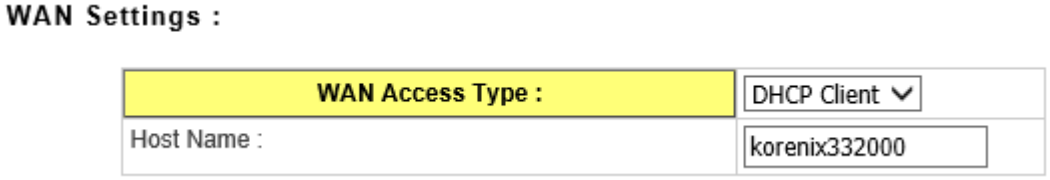
Subnet Mask: This is the subnet mask address for your WAN interface. Set the IP subnet mask manually.

Default Gateway: Set the default gateway IP address manually.

DNS 1 & 2: The Domain Name System (DNS) is how the Internet translates domain or website names into Internet addresses or URLs. Your ISP will provide you with at least one DNS Server IP Address. If you wish to use another, enter that IP Address in **DNS 2** field.

WAN Access Type: DHCP Client.

Once **DHCP Client** is selected, the WAN interface acts as the DHCP Client and automatically search the DHCP

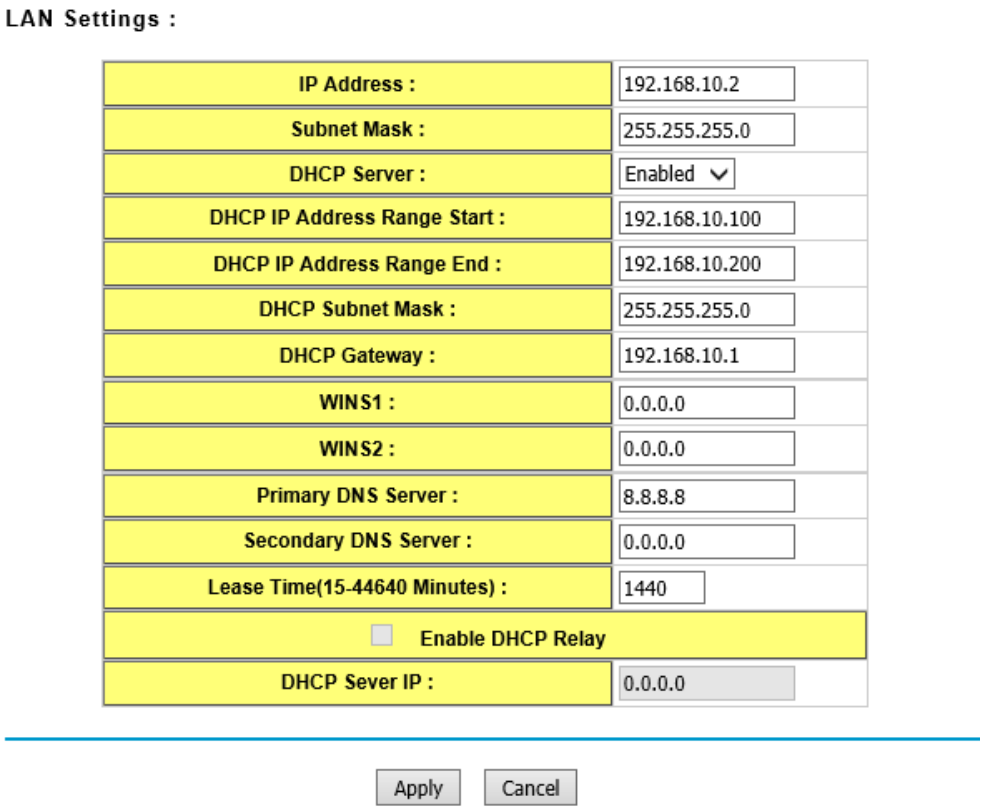


LAN Settings:

IP Address: The IP Address field allows you to set the device's WAN IP address manually.

Subnet Mask: This is the subnet mask address for your WAN interface. Set the IP subnet mask manually.

DHCP Server: Enabled / Disabled



DHCP Server Setting:

In Router mode, you can enable DHCP Server to assign IP address to DHCP clients. And you should define the address pool by configuring the Start IP and End IP. DHCP server will allocate IP address dynamically from the pool. The device allows you to assign up to one Class C, 255 IP Addresses. Since the maximum connection session is 64, configuring 64 IP addresses is enough for the need.

You can also configure the **Subnet Mask, DHCP Gateway, WIS, Primary/Secondary DNS Server**s' IP Address and **Least Time** of the assigned IP addresses.

Enable DHCP Relay:

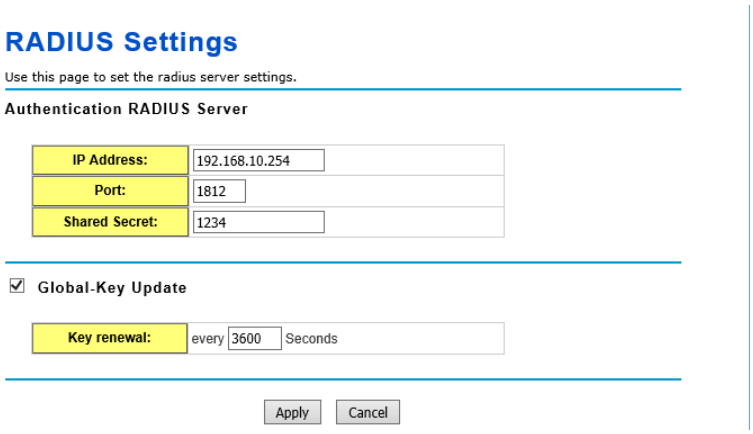
If you already have DHCP server in other subnet, you can "**Disable" DHCP Server** and then check "**Enable DHCP Relay**" to redirect the DHCP request to the DHCP Server. Assign the Server IP address in "**DHCP Server IP"** field to activate the function.

4.2.3 RADIUS Settings

Use this page to configure the **RADIUS** Server Setting.

RADIUS (Remote Authentication Dial-In User Service) is a server for remote user authentication and accounting; it plays a central role in the network in providing the capabilities of authenticating, authorizing, accounting, alarming and etc. It allows an organization to maintain user profiles in a central database that all remote servers can share.

Authentication RADIUS Server



IP Address: Enter the IP address of the Radius Server;

Port: Enter the TCP port number of the Radius Server; the default port number is 1812.

Shared Secret: This secret, which is composed of no more than 31 characters, is shared by the device and RADIUS server during authentication.

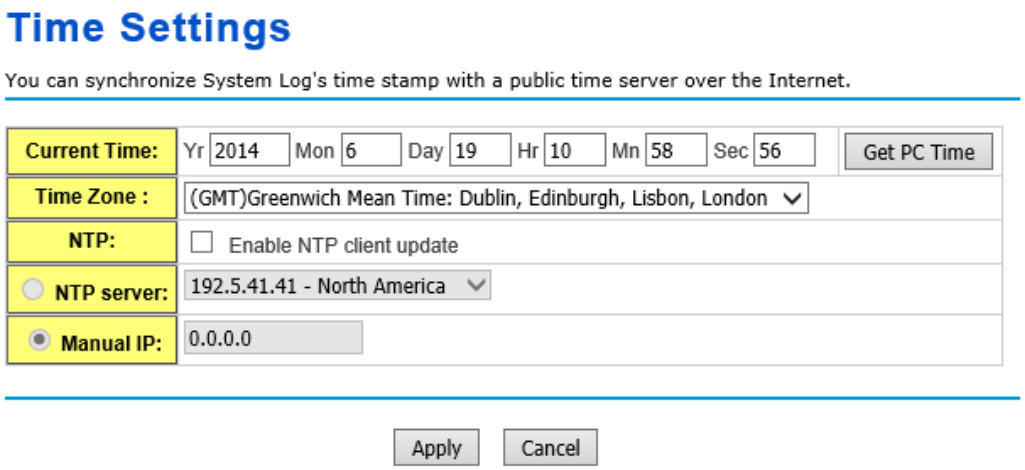
Global-Key Update: Check this option and specify the time interval between two global-key updates.

Re-authentication Time: Set the time interval between two authentications.

For the User Security, please go to Wireless Security Setting page (Refer to the 4.3.2)

4.2.4 Time Settings

Use this page to configure the **Time Settings**. You can configure current time, time zone and configure NTP protocol to synchronize system time with a public time server over the internet.



Current Time: You can manually type the current time or get the time from you PC. Click **"Get PC time"**, the current time will be updated according to your PC's time.

Time Zone Select: Select the time zone of your country from the dropdown list.

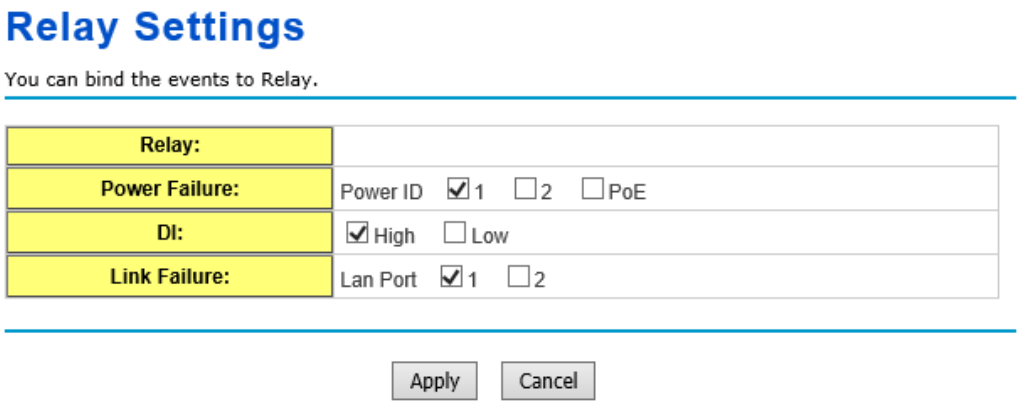
NTP: You can select **"Enable NTP client update"** in this page, then the NTP feature will be activated and synchronize from the remote time server.

NTP Server: Select the time server from the "**NTP Server**" dropdown list or manually input the IP address of available time server into "**Manual IP**".

Press "**Apply**" to activate the settings.

4.2.5 Relay Settings

You can bind the selected events to Relay Output. While the event is activated, the Relay output is changed to "Open" status, the RO LED will turn on to alarm the administrators/technician.



Power Failure: You can bind the power failure event with Relay Output. There are 3 types power input, you can choose one/multiple events as the power failure event.

DI: The **DI** is presented to **Digital Input**. There is one DI design in the bottom of the device. You can bind the Relay Output event to the DI here.

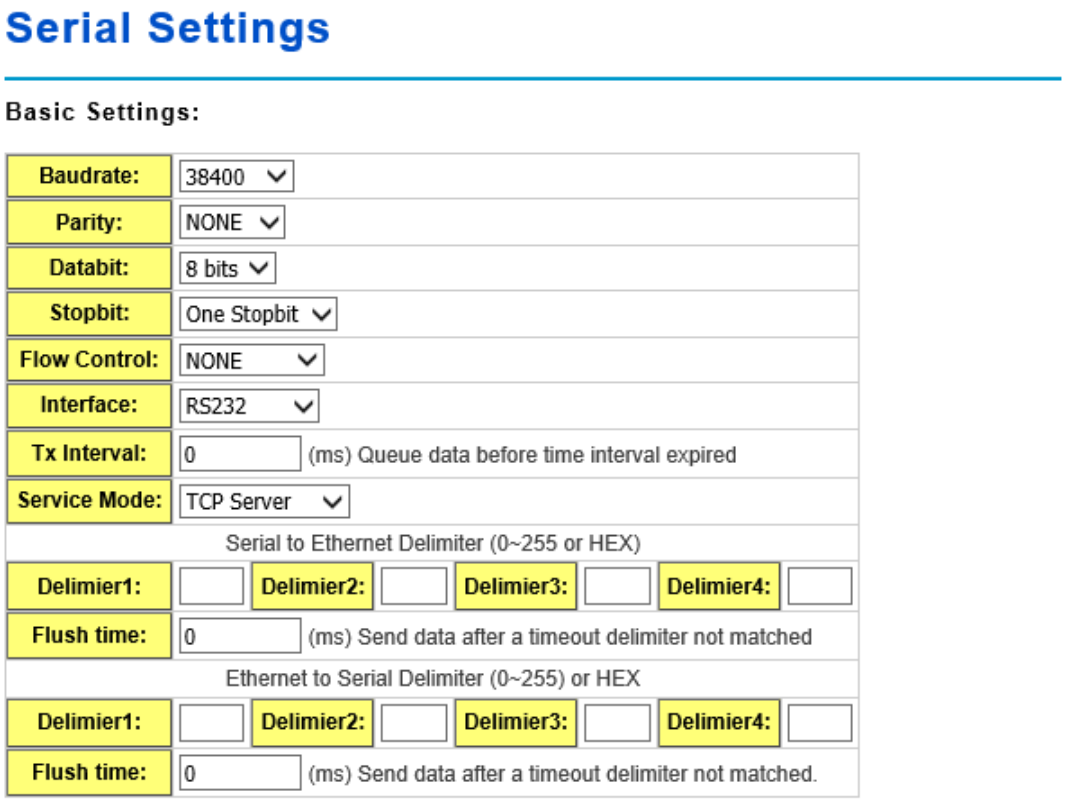
Link Failure: You can bind the Ethernet port failure event with Relay output. Select the Port 1, 2 or 1+2 as the power failure event.

Press "**Apply**" to activate the settings.

4.2.6 Serial Settings

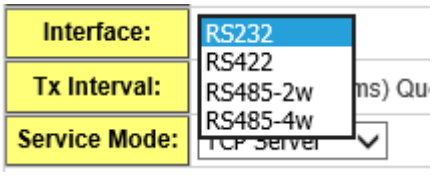
Use this page to configure the **Serial Settings**. The JetWave 3320/3420 series is equipped with one RS-232/422/485 3-in-1 Serial port. It supports TCP Server/Client and UDP for remote connection. This page allows you to configure the Serial interface's parameters.

Basic Settings: This page allows you configure basic settings of the Serial port.



Serial port Settings: You can select the "**Baudrate**", "**Parity**", "**Databit**", "**Stopbit**" and "**Flow control**" settings from the dropdown list.

Interface: Manually choose and change the interface type. The serial port supports the RS232, RS422, RS485-2w, RS485-4w, you can select either one from



the dropdown list.

Tx Interval: Configure the Tx Interval time, the system will queue the transmit data before time interval expired. The time unit is millisecond.

Service mode: You can select TCP Server, TCP Client, and UDP listening.

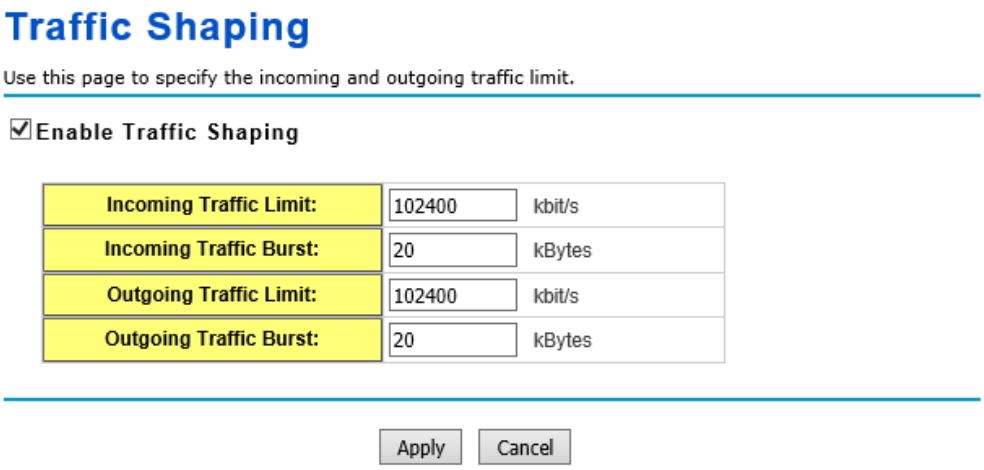
Serial to Ethernet/ Ethernet to Serial Delimiter: Configure the **Delimiter** and **Flush time** (a timeout that the delimiter not matched) setting for Serial to Ethernet or Ethernet to Serial transmission. There are up to 4 delimiters can be configured here. After the Delimiter is configured, the data will be stored in the buffer until hit the Delimiter or the Flush time timeout.

Press "**Apply**" to activate the settings.

4.2.7 Traffic Shaping

Use this page to specify the incoming and outgoing traffic limit.

Enable Traffic Shaping: Select the "**Enable Traffic Shaping**" to activate the feature. After enabled it, you can continue configure the "**Incoming Traffic Limit**", "**Incoming Traffic Burst**", "**Outgoing Traffic Limit**" and "**Outgoing Traffic Burst**" with K bits per second.



Press "**Apply**" to activate the settings.

4.2.8 Outbound Firewall

The follow Firewall Settings pages to configure the Firewall setting. There are different types firewall settings, you can enable the setting, configure the rules, check the table you configured and Delete Select/All rules.

"**Src IP Filtering**": Source IP addresses Filtering from your LAN to Internet through the gateway.

"**Dest IP Filtering**": Destination IP addresses Filtering from the LAN to Internet through the gateway.

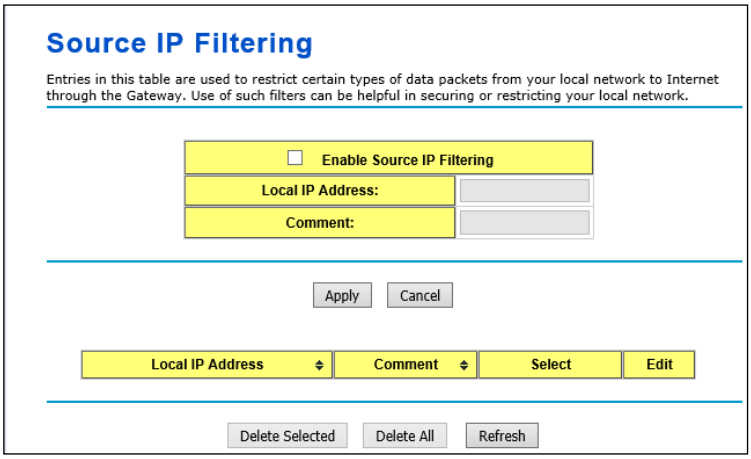
"**Src Port Filtering**": Source Ports Filtering from the LAN to Internet through the gateway.

"**Dest Port Filtering**": Destination Ports Filtering from the LAN to Internet through the gateway.

- **Source IP Filtering**

  Entries in this table are used to restrict certain types of data packets from your local network to internet through the Gateway. Use of such filters can be helpful in securing or restricting your local network.

  Select "**Enable Source IP Filtering**", type the "**Local IP Address**" and "**Comment**" (note for the entry) and then press "**Apply**" to activate the settings.

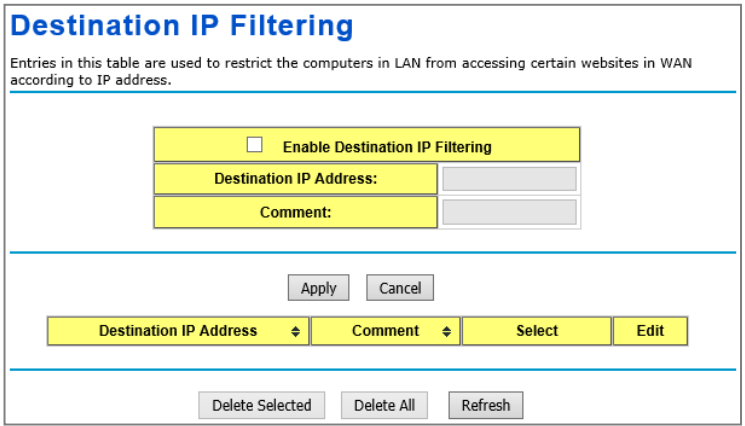


  After applied, the Web GUI will show "**Change settings successfully**". Click "**OK**" and then you can see the new entry shown in the below table.

- **Destination IP Filtering**

  Entries in this table are used to restrict the computers in LAN from accessing certain websites in WAN according to IP address.

  Select "**Enable Destination IP Filtering**", type the "**Destination IP Address**" and "**Comment**"



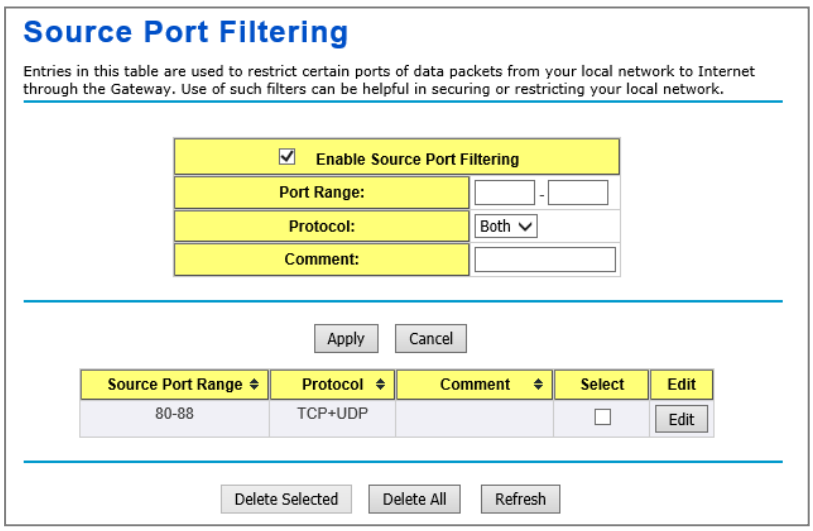
(note for the entry) and then press "**Apply**" to activate the settings.

After applied, the Web GUI will show "**Change settings successfully**". Click "**OK**" and then you can see the new entry shown in the below table.

- **Source Port Filtering**

Entries in this table are used to restrict certain ports of data packets from your local network to Internet through the Gateway. Use of such filters can be helpful in securing or restricting your local network.

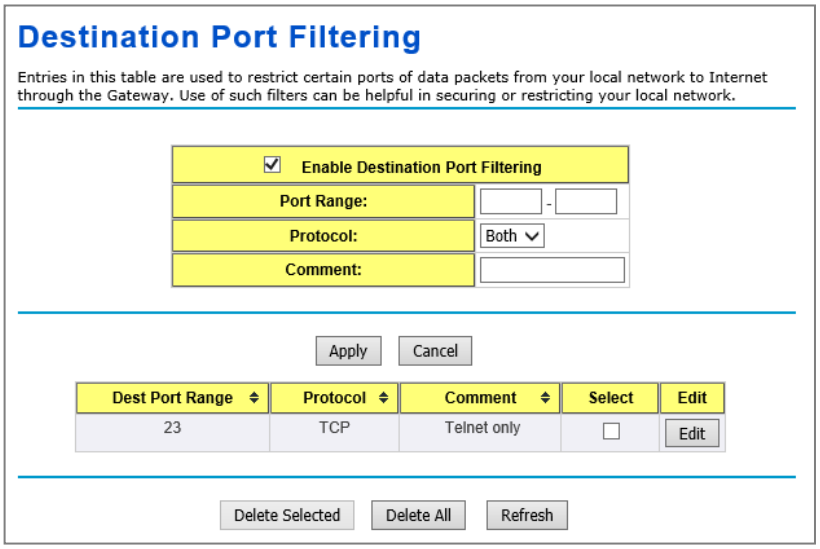
Select "**Enable Source Port Filtering**", type the "**Port Range**" of below "**Protocol**" type, the protocol type can be **UDP, TCP or Both**. Type the "**Comment**" (note for the entry) and then press "**Apply**" to activate the settings.



After applied, the Web GUI will show "**Change settings successfully**". Click "**OK**" and then you can see the new entry shown in the below table.

- **Destination Port Filtering**

Entries in this table are used to restrict certain ports of data packets from your local network to Internet through the Gateway. Use of such filters can be helpful in securing or restricting your local network.



Select "**Enable Destination Port Filtering**", type the "**Port Range**" of below "**Protocol**" type, the protocol type can be **UDP, TCP or Both**. Type the "**Comment**" (note for the entry) and then press "**Apply**" to activate the settings.

After applied, the Web GUI will show "**Change settings successfully**". Click "**OK**" and then you can see the new entry shown in the below table.

4.2.9 Inbound Firewall

"Inbound Filtering": Inbound Filtering is used to restrict any access from Internet to the LAN. Only the applied entries in **Exception** list can access the LAN from Internet through the gateway.

Enable Inbound Firewall: After enabled inbound firewall, it means that all the IP address from the Internet can NOT access the LAN through the gateway.

Exception: The exception table allows you to configure the exception list.

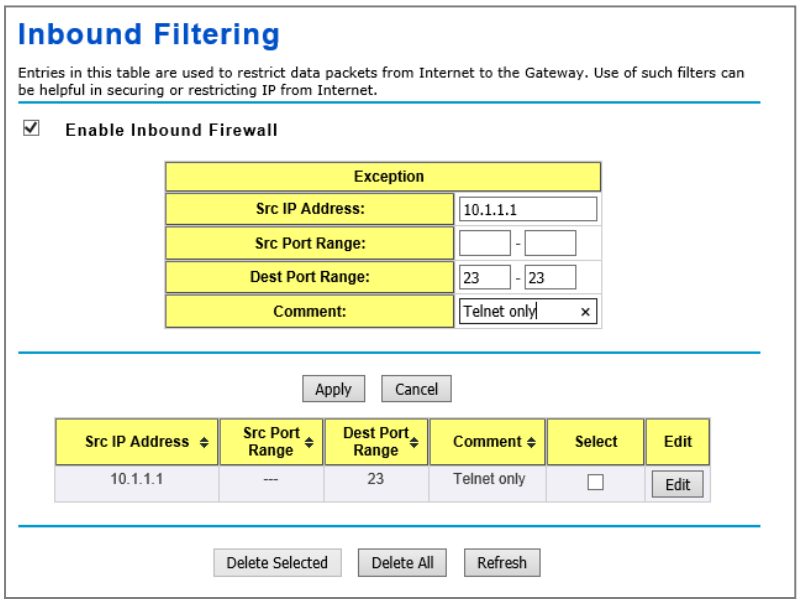
Src IP Address: The entry allows you to configure the source IP address from Internet.

Src Port Range: The source port range of the above IP address.

Dest Port Range: The destination port range of the above IP address. **Destination port range can NOT be empty!** You should set a value between 1~65535.

Comment: Note for the entry.

Press “**Apply**” to activate the settings.



After applied, the Web GUI will show “**Change settings successfully**”. Click “**OK**” and then you can see the new entry shown in the above table.

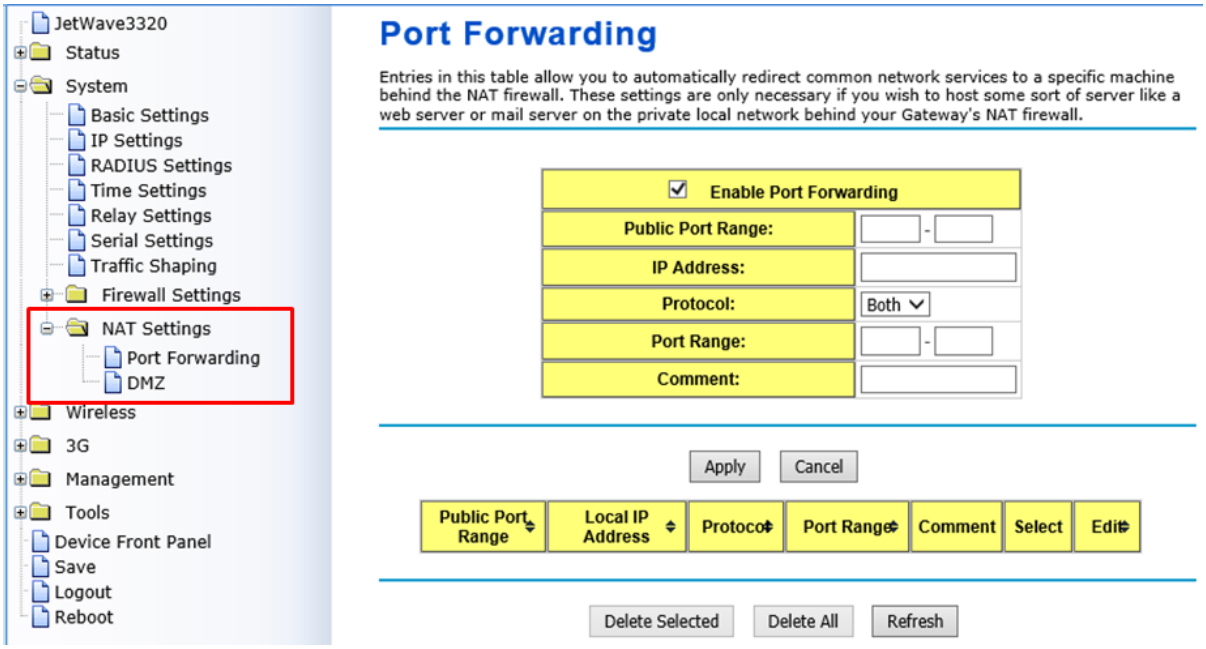
4.2.10 NAT Settings

NAT is the short of **Network Address Translation**, it is a methodology of modifying network address information in IP packet headers while they are in transit across a Gateway/Router for the purpose of remapping one IP address space into another. The simple type of NAT provides one to one translation of IP address. It can be used to interconnect two IP networks, normally one network is for Local Area Network and the other network is for Wide Area Network/Internet.

Use the “**NAT Settings**” pages to configure the NAT setting. There are two main configuration pages, “**Port Forwarding**” and “**DMZ**”.

- **Port Forwarding**

Entries in this table allow 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 your Gateway’s NAT firewall.



Select "**Enable Port Forwarding**" and then type the parameters to create the port forwarding entries.

Public Port Range: Configure the port range which will be public to WAN/Internet. You can configure one or a range of TCP/UDP port number.

IP Address: Configure the IP Address of the LAN PC. The traffic from the public port range will be redirected to this IP address.

Protocol: Configure TCP, UDP or Both (TCP + UDP) protocol type.

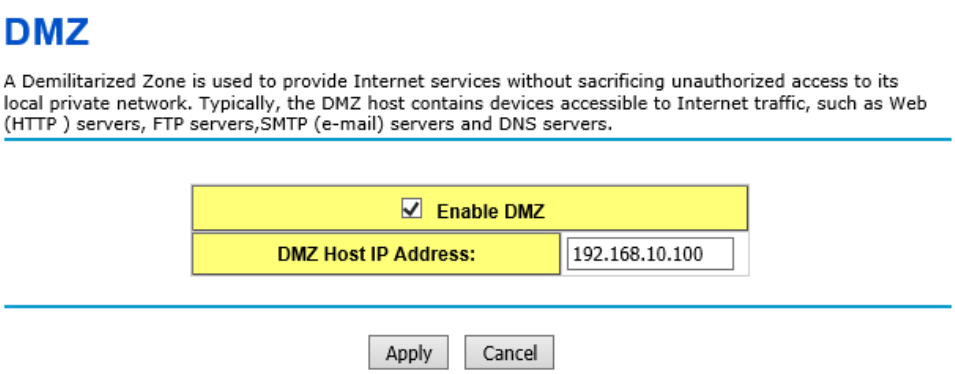
Port Range: Configure the port range of the LAN, the traffic from the public port will be redirected to these port.

Comment: Add information of the entry.

Press "**Apply**" to activate the settings. After applied, there is one popup screen shows you already configured new entry. And then you can see the entries you configure in below.

- **DMZ**

A **Demilitarized Zone** is used to provide Internet services without sacrificing unauthorized access to its local private network. Typically, the DMZ host contains device accessible to Internet traffic, such as Web (HTTP) servers, FTP servers, SMTP (e-mail) servers and DNS servers.



Select "**Enable DMZ**" and assign the IP address of the "**DMZ Host IP Address**". This is the DMZ computer's IP address. If you configure the DMZ function for your office network, please make sure this is agreed by the IT administrator.

Press "**Apply**" to activate the settings.

4.3 Wireless

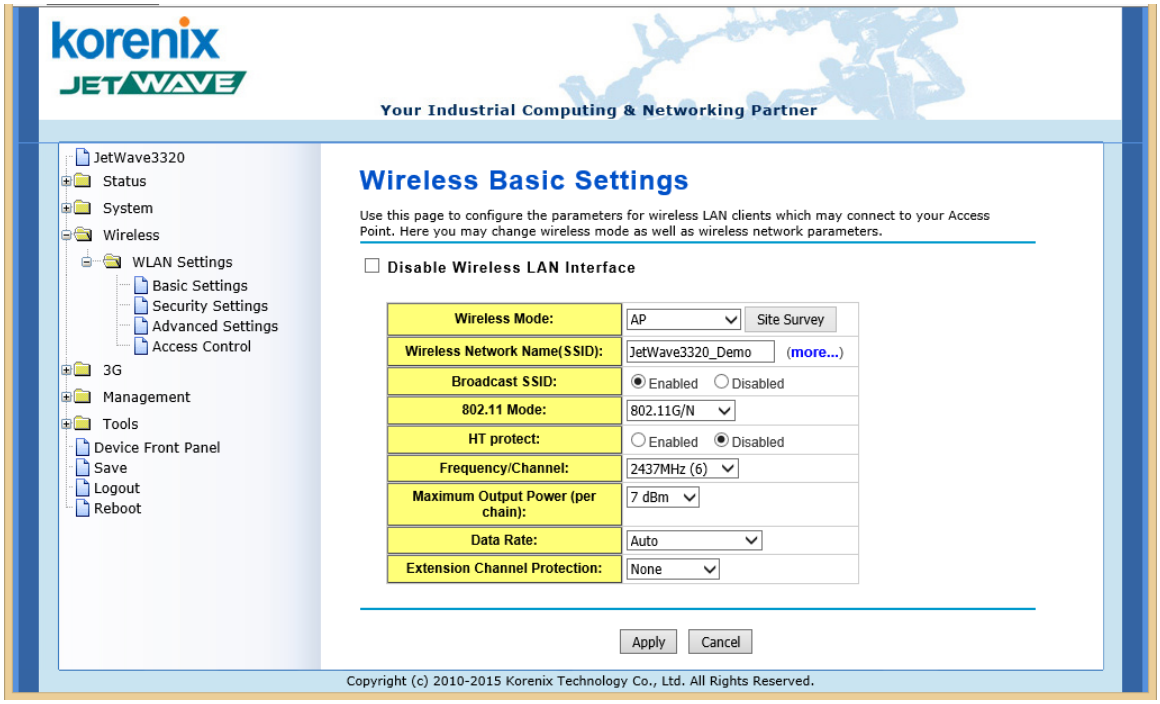
The "**Wireless**" feature set pages allow users to configure the Wireless LAN configuration. The Wireless means the WIFI radio of the device.

JetWave 3220 supports dual WIFI radios, you must configure **Wireless 1** and **Wireless 2**.

JetWave 3320/3420 support one WIFI and one 3G radio, you must configure WIFI features here and go to 3G/4G LTE page to configure other settings.

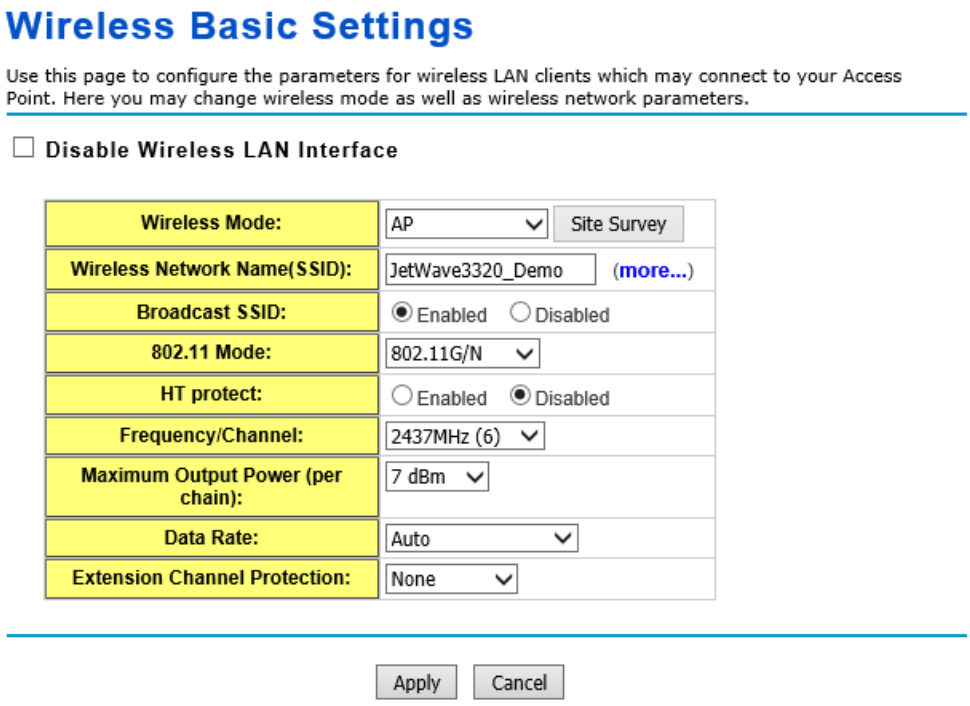
There are several settings such as the **Basic Settings**, **Security Setting**, **Advanced Setting and Access Control** can be configured in the Wireless Configuration.

The figure below shows the Web GUI of the JetWave 3320. The Wireless and 3G settings are separated to different feature set.



4.3.1 Wireless Basic Setting

Use this page to configure the parameters for Wireless LAN Interface of the device. Here you may change wireless interface modes and related parameters.



Disable Wireless LAN Interface: Check this option to disable WLAN interface, then the wireless module of the AP will stop working and no wireless device can connect to it.

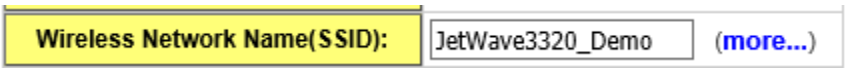
Wireless Mode: The below operating modes are available on this AP/Gateway.

AP: The AP works as the Access Point mode, it establishes a wireless coverage and receives connectivity from other wireless clients devices, the clients can search and connect to it.

In Wireless AP mode, you can configure the Wireless Network Name (SSID), Enable/Disable Broadcast SSID, select the 802.11 mode, HT Protect Enabled/Disabled, Frequency/Channel, Maximum Output Power (per chain), Data Rate and Extension Channel Protection. While the Wireless Client connect to the AP, the client must follow AP settings for communicating.

Virtual AP: The system allows you to create up to 8 SSID, this is known as Virtual AP (VAP) and the Virtual AP table is known as VAP Profile. Each Virtual AP can have its own SSID, Security and VLAN settings.

Click **"more…"** in the Wireless Network Name (SSID) column, then you can go to the VAP Profile Settings page.

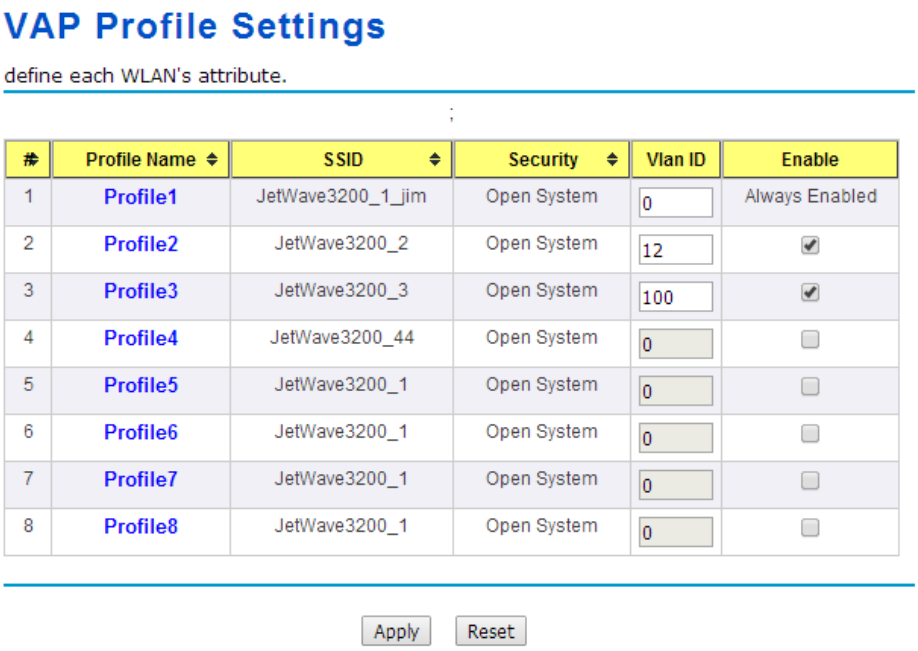


VAP Profile Setting: The VAP Profile Settings page allows you to change the profile name, to

assign the SSID, WIFI Security, VLAN ID to each profile and Enable/Disable the profile. Click the **Profile Name** in blue wording, then you can go to the VAP Profile's configuration page and configure new SSID and WIFI Security settings there. Press "Apply" after configure new settings there, the new profile is created. Click "**Enable**" here to activate the new profile.

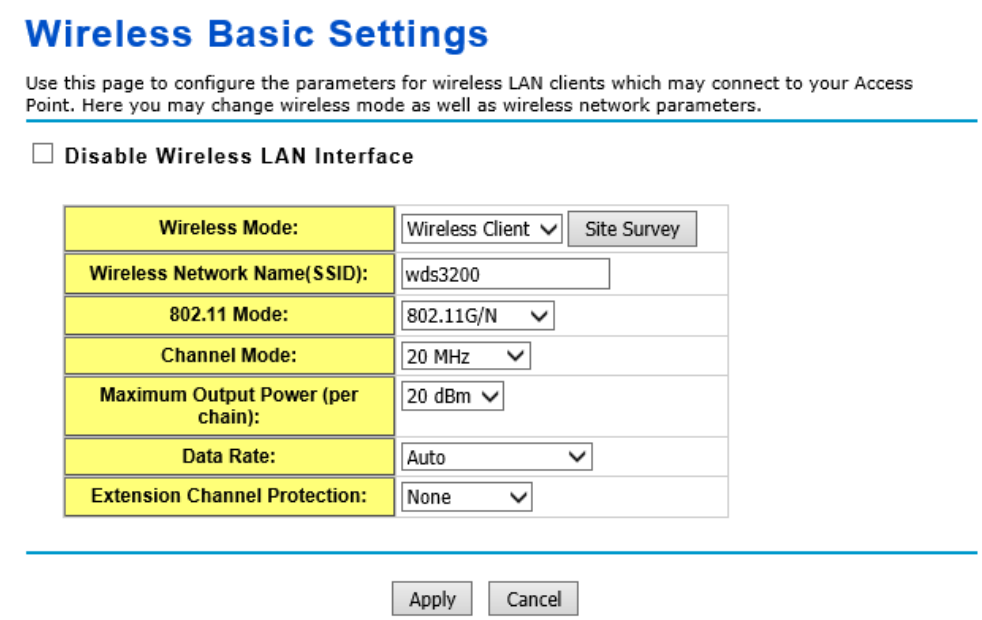
VLAN ID: In VAP profile, you can assign VLAN ID to separate the Wireless clients to different VALN. The clients located in different VLAN will not communicate with each other. This is also kind of Security setting. Before assign new VLAN ID, you should enable global **802.1Q** feature in System Basic Setting (refer to the Chapter 4.2.1) page.

If you configure Management VLAN for your system, and assign VLAN ID for specific VAP profile, please note that only the wireless clients located in Management VLAN can access the AP/Gateway's configuration interface.



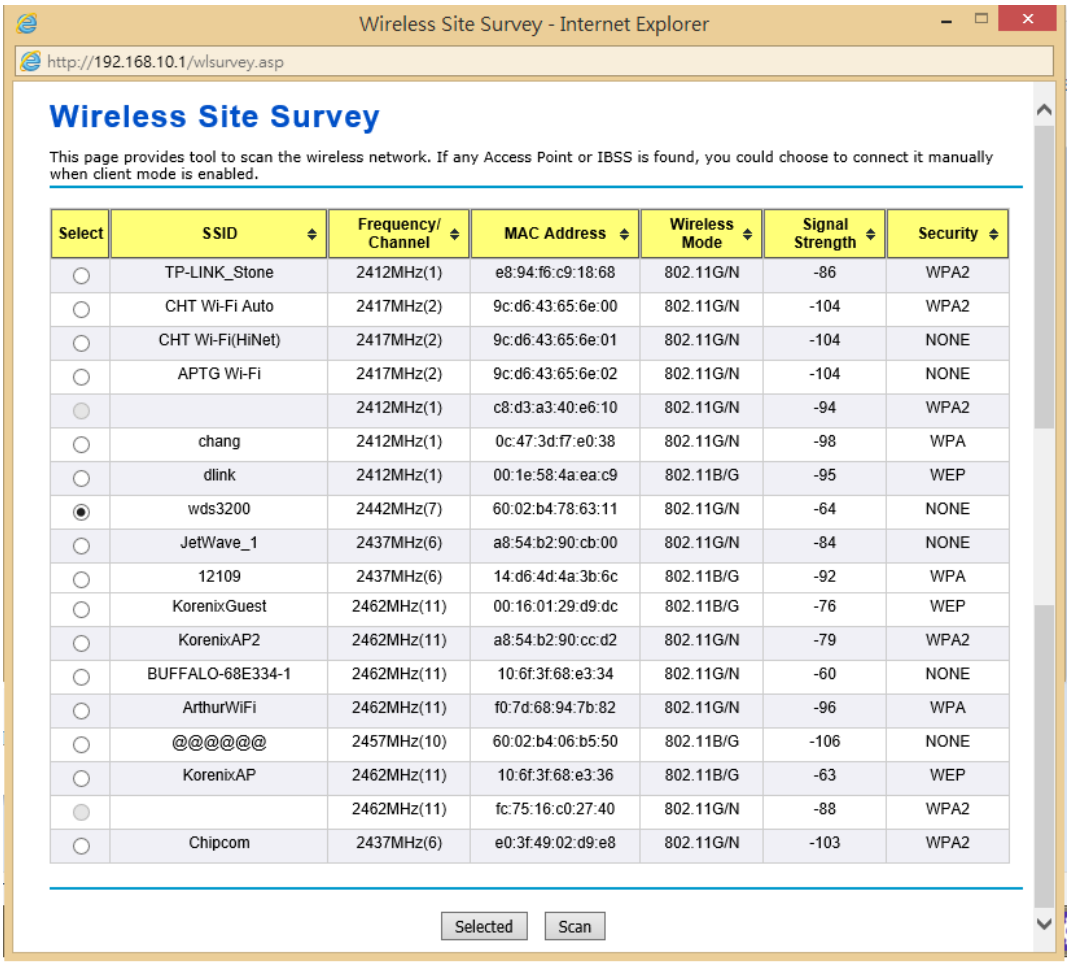
Wireless Client: The AP/Gateway is able to connect to the AP and thus join the wireless network around it. In Wireless Client mode, you can click "**Site Survey**" to find the best signal connected AP per your need. Or you can manually type the SSID you want to connect.

While in wireless client, please **note** that all the rest of Wireless Client settings must be the same as your AP settings.



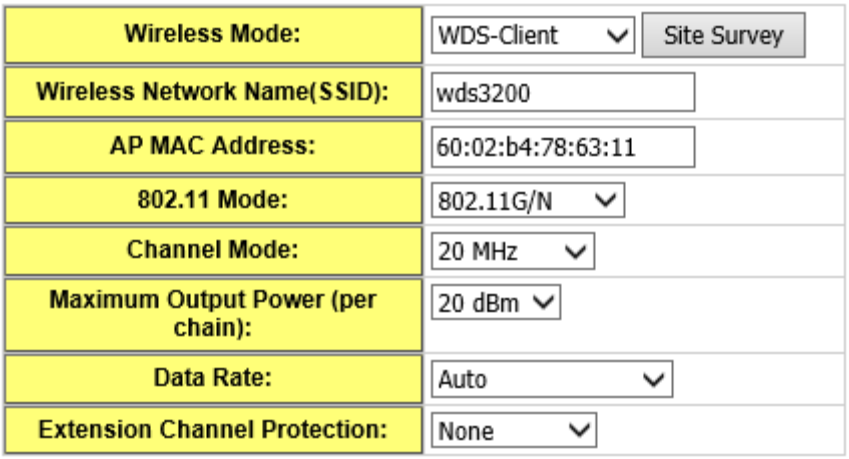
Select **Site Survey** to select the target AP.

In below figure, you can find the **SSID: wds3200** is selected. Press "**Selected**" to activate the new setting, this Site Survey popup screen will then disappear. And the SSID in Wireless Basic Setting will be updated.



WDS-AP: WDS mode is usually implemented in Point to Point (P2P) connection. When configuring P2P, one end should be WDS-AP and the other end should be WDS-Client. WDS-AP can also provide network access to general clients to act as an AP repeater.

WDS-Client: Select the WDS-Client mode. In WDS-Client mode, you must type the target WDS-AP's SSID and MAC address. With the setting, the traffic from the WDS-Client can Only transmit to the WDS-AP. Please note that the rest of other wireless/security settings must the same as the WDS-AP as well.



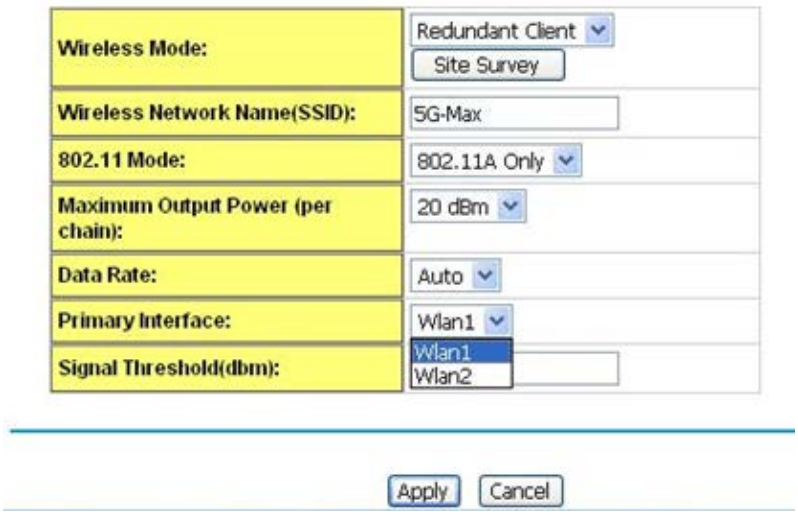
Redundant AP/Client:

JetWave 3220 supports dual WIFI radios and the two radio interfaces can be configured in redundant mode. You can configure a Redundant AP as the base station for Redundant Clients. While you configure Redundant AP/Client, each device should work at either Redundant AP or Redundant Client mode. The mode setting of the dual WIFI radio must be the same so they can backup with each other. In Redundant AP mode, please configure different SSID and channel settings for the two Radio interfaces to avoid interference. In Redundant Client mode, you can select one of the Radio to be primary and the other to be backup. Once the primary radio is failed or the signal quality is lower than the signal threshold you configured, the backup radio can be activated immediately.

While enable Redundant AP/Client mode, the STP protocol must be disabled.

Redundant-AP: Select the Redundant AP mode and press "Apply". The popup screen will alarm you the AP will be rebooted automatically after you click "OK".

Redundant-Client: The Redundant Client mode Settings. The SSID and the other settings of the Redundant Client must be the same as Redundant AP. The additional settings, Primary Interface and Signal Threshold can be setup in this page.



Primary Interface: You can select “Wlan 1” or “Wlan 2” as the primary interface. Wlan 1 is the default primary interface.

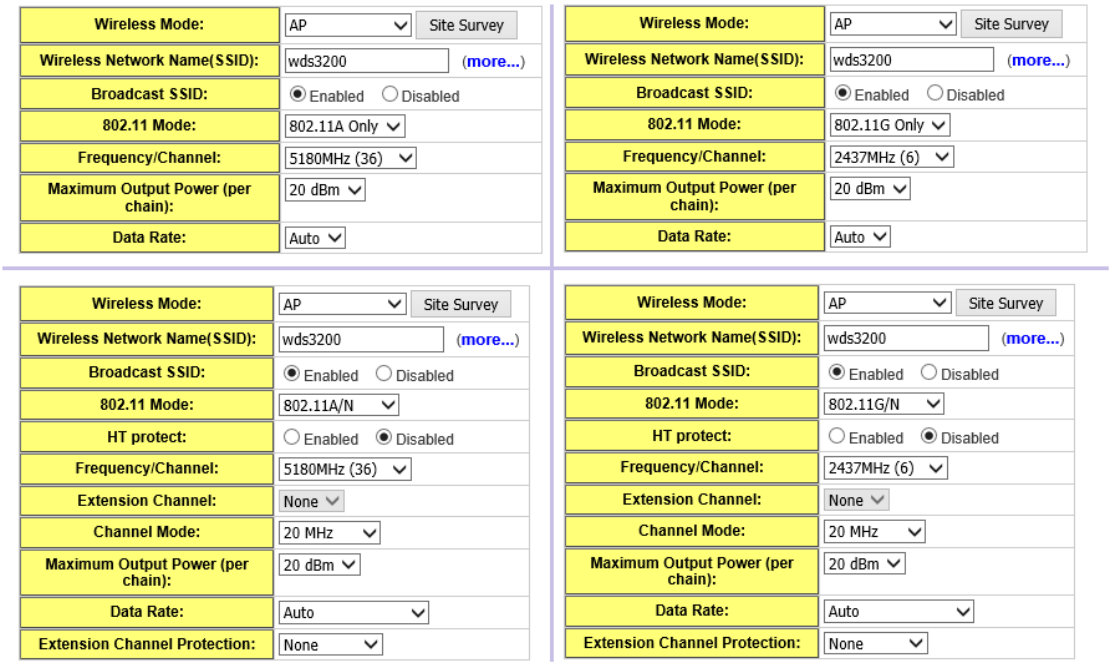
Signal Threshold(dbm): You can assign the signal threshold value, this value is the signal quality between the Redundant AP and Client. You can check the current value of the association list or configure it depends on the field test or experience. Once the signal threshold of primary interface is lower than the value you assigned, the backup interface will be activated. The default value is -60dbm, this is an medium signal quality.

Wireless Network Name (SSID): This wireless network name is shared among all associated devices in your wireless network. Keep it identical on all those devices. Note that the SSID is case-sensitive and can not exceed 32 characters.

Broadcast SSID: Under AP mode, hiding network name is necessary when you are in a wireless environment that may have potential risk. By disabling broadcast SSID, the clients can not scan and find the AP/Gateway, so that malicious attack by some illegal clients could be avoided.

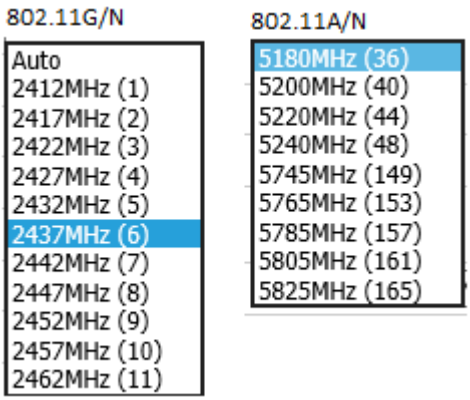
802.11 Mode: The AP/Gateway can communicate with wireless devices of 802.11n/a/g. You can

also select 802.11A Only, 802.11G only, 801.11A/N and 802.11 G/N and make it work under an appropriate wireless mode automatically. Different band has different settings as below.



HT Protect: Enable HT (High Throughput) protect to ensure HT transmission with MAC mechanism. Under 802.11n mode, wireless client can be divided into HT STA and Non-HT STA, among which the one with HT protect enabled gets higher throughput.

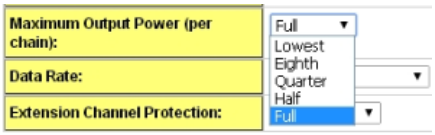
Frequency/Channel: Channel varies much as the available band differs from country to country. Select a proper operating channel in the drop-down list according to your situation.



The 802.11G and 802.11G/N are 2.4G band which supports 12~13 channels.

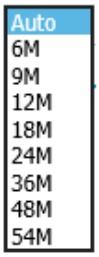
The 802.11A and 802.11A/N are 5.8G band, this product support Band 1 (36, 40, 44, 48) and Band 4 (149, 153, 157, 161, 167)

Maximum Output Power (per chain): Specify the signal transmission power. The higher the output power is, the wider the signal can cover, but the power consumption will be greater accordingly. Usually "**Full**" with proper antenna is preferred.

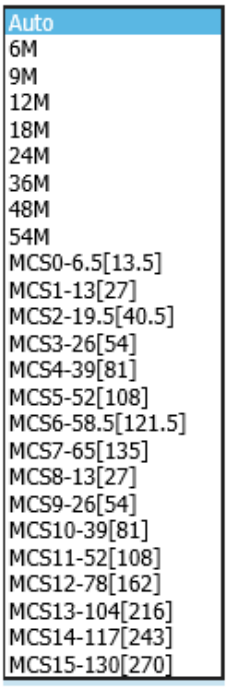


Half: 1/2 of Full (Full -3dBm), **Quarter:** 1/4 of Full (Full -6dBm), **Eighth**: 1/8 of Full (Full –9dBm).

802.11A, 11G

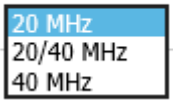


802.11N



Date Rate: Usually "**Auto**" is preferred. Under this rate, the AP/Gateway will automatically select the highest available rate to transmit. In some cases, however, like where there is no great demand for speed, you can have a relatively-low transmit rate for compromise of a long distance.

Channel Mode



Channel Mode: Two levels are available: 20MHz and 20/40MHz. The latter one can enhance the data rate more effectively, but takes more bandwidth, thus cause potential interference.

Extension Channel Protection: This is to avoid conflict with other wireless network and boost the ability of your device to catch all 802.11g transmissions. However, it may decrease wireless network performance. Compared to CTS-Self; the transmission amount of CTS-RTS is much lower.

Press "**Apply**" to activate the settings.

4.3.2 Wireless Security Setting

The page allows you configure the Virtual AP's basic setting and Security Settings.

Basic Setting

Profile Name: The profile name of the settings.

Wireless Network Name(SSID): This is the same SSID of the AP/Gateway.

Broadcast SSID: Normally, the SSID is broadcast and all the clients can search the SSID. For security concern, you can disable the Broadcast SSID function, then the clients can't search it and the client must type the correct AP's SSID to connect the AP. This is a simple security setting.

Wireless Separation: Wireless separation is an ideal way to enhance the security of network transmission. Under the AP mode, enable **"**Wireless Separation**"** can prevent the communication among associated wireless clients.

WMM Support: WMM (Wi-Fi Multimedia) is a subset of 802.11e. It allows wireless communication

to define a priority limit on the basis of data type, thus those time-sensitive data, like video/audio data, may own a higher priority than common one.

Max. Station Num: In Wireless AP mode, you can define the maximum amount of wireless clients allowed to be connected. The maximum client of the system is 64. The most user access at the same time may cause system busy and the performance becomes lower. It is suggested to assign the value depends on how much bandwidth your client generally need, and totally bandwidth suggest is under 250Mbps for TCP based data transmission.

Security Setting

Network Authentication

Open System: It allows any device to join the network without performing any security check.

Shared Key: Data encryption and key are required for wireless authentication.

WPA with RADIUS: With warrant (username, password and etc.) offered by user, this kind of authentication can be realized with specific RADIUS server. This is the common way to be adopted in large enterprise network.

WPA2 with RADIUS: As a new version of WPA, only all the clients support WPA2, can it be available. If it is selected, AES encryption and RADIUS server is required.

WPA-PSK: It is a simplified WPA mode with no need for specific authentication server. In this so-called WPA Pre-Shared Key, all you have to do is just pre-enter a key in each WLAN node and this is the common way to be adopted in large and middle enterprise as well as residential network.

WPA2-PSK: As a new version of WPA, only all the clients support WPA2, can it be available. If it is selected, the data encryption can only be AES and the passphrase is required.

Data Encryption

If data encryption is enabled, the key is required and only sharing the same key with other wireless devices can the communication be established.

None: Available only when the authentication type is open system.

64 bits WEP: It is made up of 10 hexadecimal numbers.

128 bits WEP: It is made up of 26 hexadecimal numbers.

152 bits WEP: It is made up of 32 hexadecimal numbers.

TKIP: Temporal Key Integrity Protocol, which is a kind of dynamic encryption, is co-used with WPA-PSK.

AES: Advanced Encryption Standard, it is usually co-used with WPA2-PSK.

Eap Type: for WPA/WPA2 with Radius. The system supports **TTLS, LEAP, TLS, PEAP** and **MSCHAPv2, GTC** Eap types. Select the Eap type and type the **User Name**, **Password** for the WAP/WPA2 with Radius.

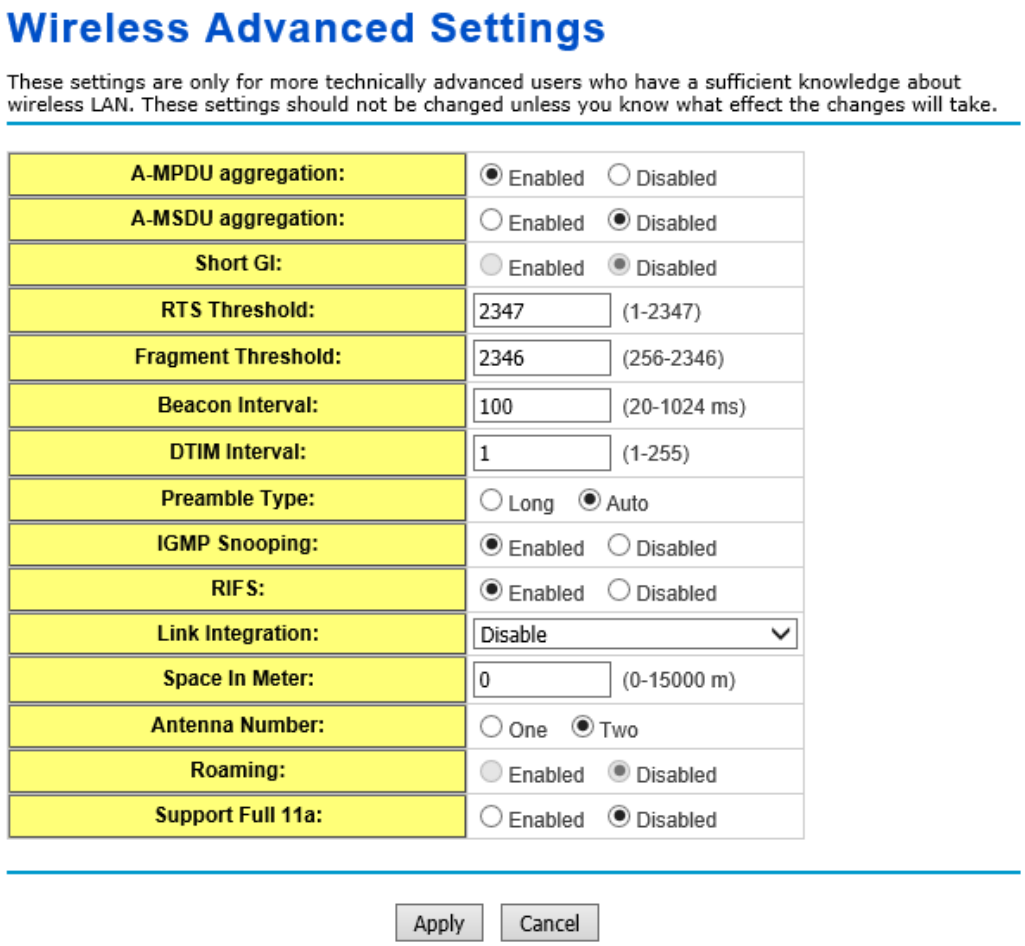
Press **"Apply"** to activate the setting.

Note:

- We strongly recommend you enable wireless security on your network!
- Only setting the same Authentication, Data Encryption and Key in the JetWave and other associated wireless devices, can the communication be established!

4.3.3 Wireless Advanced Setting

The page allows you to configure advanced wireless setting. These settings are only for more technically advanced users who have a sufficient knowledge about wireless LAN. Some of these settings should not be changed unless you know what effect the changes will take. And some of the modification on them may negatively impact the performance of your wireless network.



A-MPDU/A-MSDU Aggregation: Under AP mode, the data rate of your AP could be enhanced greatly with this option enabled; however, if your wireless clients don't support A-MPDU/A-MSDU aggregation, it is recommended not to enable it.

Short GI: Under 802.11n mode, enable it (Short Guard Interval) to obtain better data rate if there is no negative compatibility issue.

RTS Threshold: The AP/Gateway sends RTS (Request to Send) frames to certain receiving station and negotiates the sending of a data frame. After receiving an RTS, that STA responds with a CTS (Clear to Send) frame to acknowledge the right to start transmission. The setting range is 0 to 2347 in byte.

Fragmentation Threshold: Specify the maximum size in byte for a packet before data is fragmented into multiple packets. Setting it too low may result in poor network performance. Leave it at its default of 2346 is recommended.

Beacon Interval: Specify the frequency interval to broadcast packets. Enter a value between 20 and 1024. The default value is 100ms.

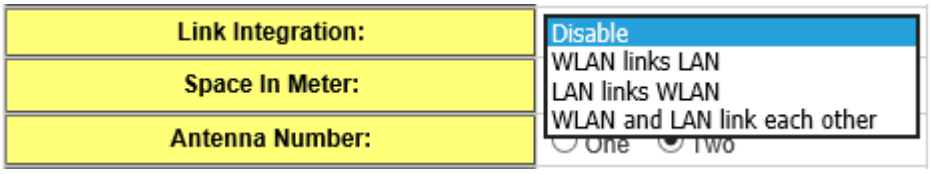
DTIM Interval: DTIM, which stands for Delivery Traffic Indication Message, is contained in the data packets. It is for enhancing the wireless transmission efficiency. The default is set to 1. Enter a value between 1 and 255.

Preamble Type: It defines some details on the 802.11 physical layer. "**Long**" and "**Short**" are available.

IGMP Snooping: IGMP snooping is the process of listening to IGMP network traffic. By enabling IGMP snooping, the AP will listen to IGMP membership reports, queries and leave messages to identify the ports that are members of multicast groups. Multicast traffic will only be forwarded to ports identified as members of the specific multicast group or groups.

RIFS: RIFS (Reduced Interframe Spacing) is a means of reducing overhead and thereby increasing network efficiency.

Link Integration: This is also known as **Link Fault Pass-Through**. This feature allows you to bind the Ethernet port 1 (Eth1) and Wireless LAN interface together. Once one of them fails, the other interface becomes down as well.



Disable: Disable the Link Integration.

WLAN links LAN: Single direction only while the WLAN failure, the binding Ethernet port will become link down.

LAN links WLAN: Single direction only while the LAN Ethernet port failure, the binding WLAN radio will be shut down.

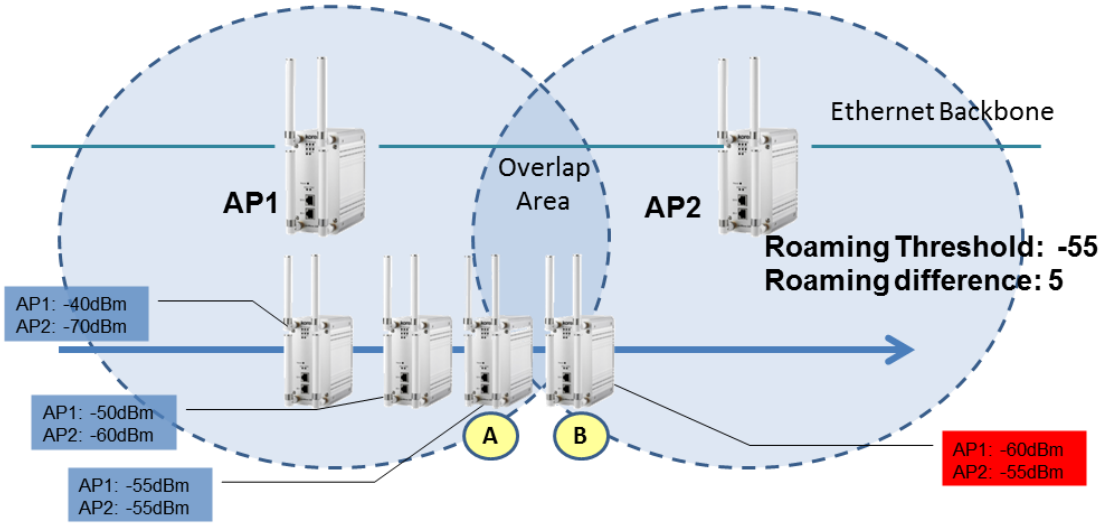
WLAN and LAN link each other: This is Bi-directional integration no matter while LAN Ethernet port failure or WLAN radio failure.

Space in Meter: To decrease the chances of data retransmission at long distance, the

AP/Gateway can automatically adjust proper ACK timeout value by specifying distance of the two nodes. This is very important especially for long distance transmission. Correct Space in Meter helps to get better response time and performance.

Antenna Number: The setting allows you configure One for 1T1R SISO or Two for 2T2R MIMO. The default value is Two. While you change it to one, please connect the antenna to the first antenna of the radio, for example the Antenna 1-1 or 2-1.

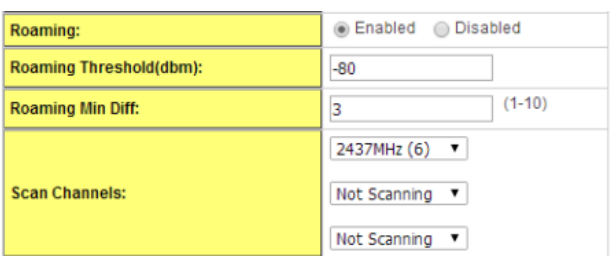
Roaming: This is the setting to enable **Client Based Fast Roaming**. The Client Based Fast Roaming is a non-AP controller type fast roaming, it helps the wireless client (must Korenix Wireless Client) find the new AP with 100ms roaming time.



While the signal value in A = Roaming Threshold, the AP starts Fast Roaming Mechanism.

While the signal difference in B is higher than the roaming difference, the new AP will be selected.

After the roaming is enabled, some of the new setting will appear in below and you must enter the value.



Roaming: You can enable or disable the Fast Roaming feature here.

Roaming Threshold(dbm): While there are some Fast Roaming APs, the roaming threshold means when the client will start switch to new AP from the connected AP.

Roaming Min Diff: In multiple APs overlapping area, the “Roaming Min Diff” is a value similar

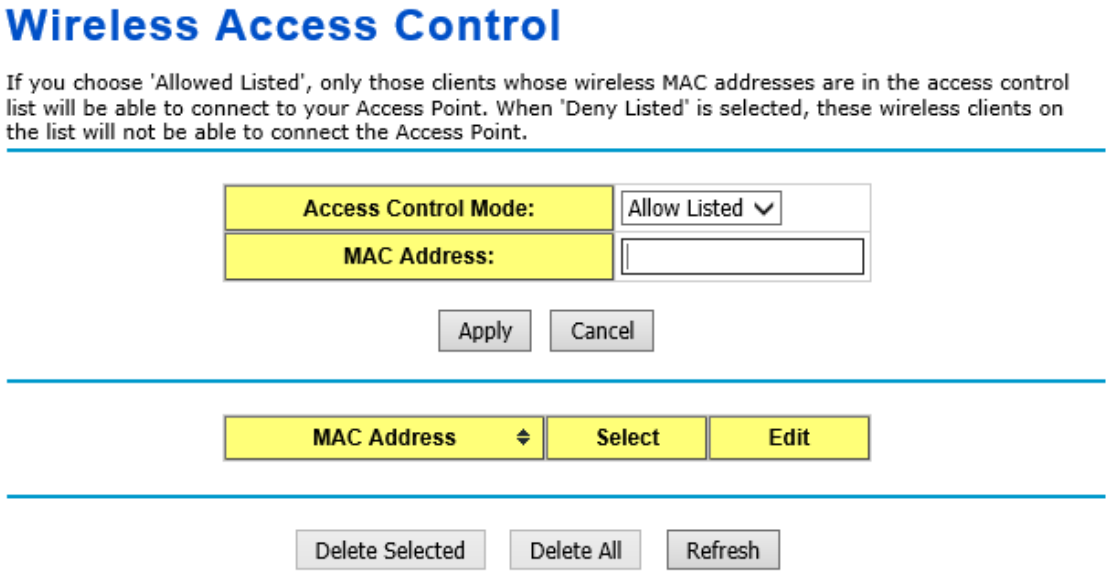
to the delay time. Only while the signal strength difference between the connected AP and New AP is lower than the value, the AP will be switched.

Scan Channels:.This is the setting to configure what is the target scan channels.

Support Full 11a: This setting allows you to enable full 802.11a band. This is not suggested unless your country allows you to use the band 2 and band 3 of 802.11a frequency. Otherwise, the band may conflict and affect by the military usage.

4.3.4 Wireless Access Control

This page allows you configure the **Wireless Access Control** list. You can configure **Allow** list or **Deny** list for your wireless network on the AP/Gateway.



Access Control Mode: Allow Listed or Deny Listed.

MAC Address: Type the MAC address of the client which you want to Allow or Deny.

Press “Apply” to activate the new settings.

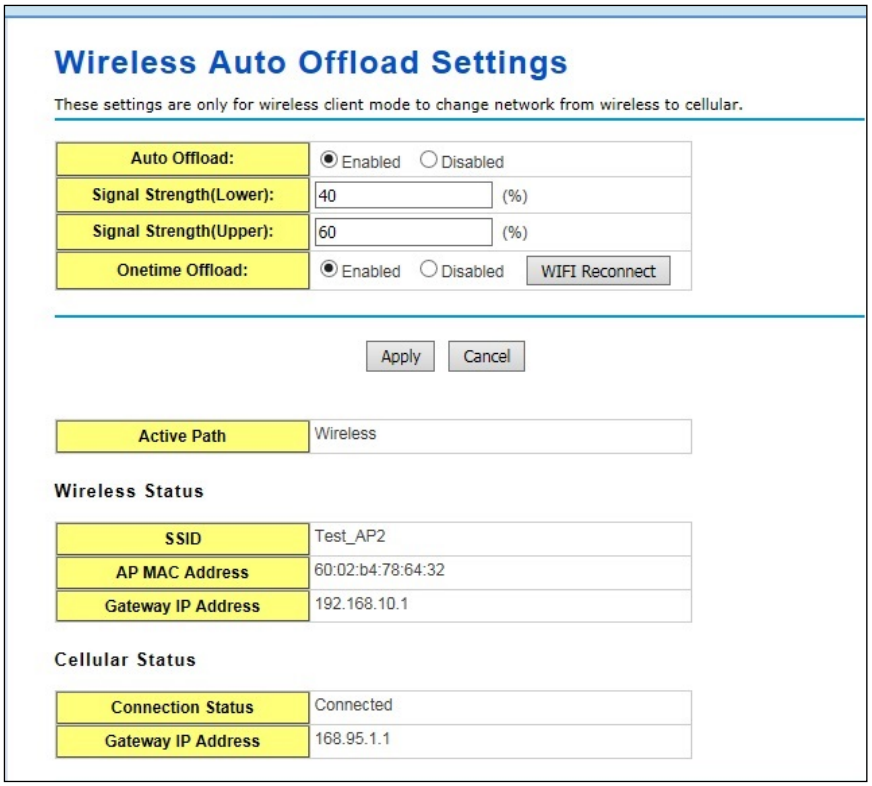
The lower screen shows the Wireless Access Control list you configured. Press “**Delete Selected**” or ‘**Delete All**” to delete part of or all of the entries.

Press “Refresh” to refresh the table.

4.3.5 Wireless Auto Offload Settings

This page helps you to enable Wireless Auto Offload. In addition to 3G/LTE, JetWave 3320/3420 supports 802.11n WIFI Client mode. The loading of data traffic can be shared by 3G/LTE and

WIFI to reduce the cellular cost. When the WIFI signal is poor or not available, the system automatically forwards traffic to the 3G/LTE interface.



Auto Offload: Enable or Disable Auto Offload function.

Auto Offload function can only active (Enable) when meet both conditions as below:

(1) Wireless (WIFI) Interface is configured as "Client" mode and is connected to the AP.

(2) Cellular Interface is already connected to Carrier Provider.

Signal Strength(Lower): When signal strength of WIFI connection lower than the ratio(ex. 40%), the outgoing traffic will be directed to cellular interface.

Signal Strength(Upper): When signal strength of WIFI connection is greater than the ratio (ex. 60%), the outgoing traffic will be directed to WIFI.

The difference between the Lower and Upper signal strength is a value similar to the delay time. While the active path is changed from WIFI to cellular interface, the active path will be changed only while the signal strength of WIFI is better than the value.

Onetime Offload: When enable **Onetime Offload**, it means the Auto Offload mechanism will be directed to cellular one time, it will not go back to WIFI automatically, unless press the "WIFI Reconnect" button. *The "WIFI Reconnect" button only appear when enable **Onetime Offload**.*

Following are the status of the active path and the information of the Wireless and Cellular

interface. These information helps you check whether the connected status easier.

Press **"Apply"** to activate the new settings. After applied, if the current WIFI signal is better than the lower Signal Strength, the WIFI connection will be the active path first.

Information:

Below figure displays the current status.

Active Path shows the current active path is **Wireless** or **Cellular**.

Wireless Status shows the SSID, MAC address of the connected AP, and IP address of gateway.

Cellular Status shows the connection status and IP address of gateway**.**

4.4 3G/Cellular

The "**3G/Cellular**" feature set pages allow users to see the 3G3G/LTE Status, configure the Basic 3G/LTE Setting, SIM Security and download the Debug message. The 3G means the 2nd radio of the JetWave 3320 device. The JetWave 3220 does NOT support this setting. The name of "3G" is changed to "**Cellular**" in JetWave 3420, the settings and operation of the LTE function are the same as in 3G.

4.4.1 Status

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

After the 3G/LTE connected, some of the information will be updated per your ISP (Internet Service Provider).

Provider: The name of the ISP.

APN: The APN (Access Point Name) name provided by your ISP.

Note that some of the ISP asks specific APN name, you have to configure in Basic Settings first, please refer to the instruction in next page.

Service Type: After 3G/LTE connected, the connected ISP will update the service type here. The possible types are GSM, UMTS, GSM w/EGPRS, UMTS w/HSDPA, UMTS w/HSDPA and HSUPA, E-UTRAN, Unknown, No Service(default value)

(Note: The cellular service is mainly applied for HSPA/LTE data communication. The rest of services are backward compatible service to avoid lost while HSPA/LTE is not available.)

IMEI: This item shows the International Mobile Equipment Identity (IMEI) of the 3G/LTE module.

Signal Strength: The signal strength to the remote connected base station. If the signal strength shows low, please change the AP/Gateway location or mounting the antenna in better location.

Below are the signal strength definitions in our system:

0 dBm (Default value while no connection, or Read the Signal Strength error.)

-113 dBm or less (Low)

-51 dBm or greater (Excellent)

Not known or not detectable

SIM Status:

SIM OK: The SIM card is okay to use.

SIM not inserted: The SIM card is not inserted.

SIM PIN Locked: The SIM card is locked due to PIN error. It may be caused by error typing PIN password many times. Please check with your ISP to resolve the issue.

SIM is deactivated: The SIM card may have some problem. Please check with your ISP to resolve the issue.

Connection Status:

Connected: The 3G/LTE interface is connected to the base station.

Not Connected: The 3G/LTE interface is not connected to the base station.

IP Address: The IP Address assigned by the ISP. While the 3G/LTE is connected, the IP address will display here. If there is no 3G/LTE connection, the field will be hidden.)

Refresh: You can press Refresh to refresh the table.

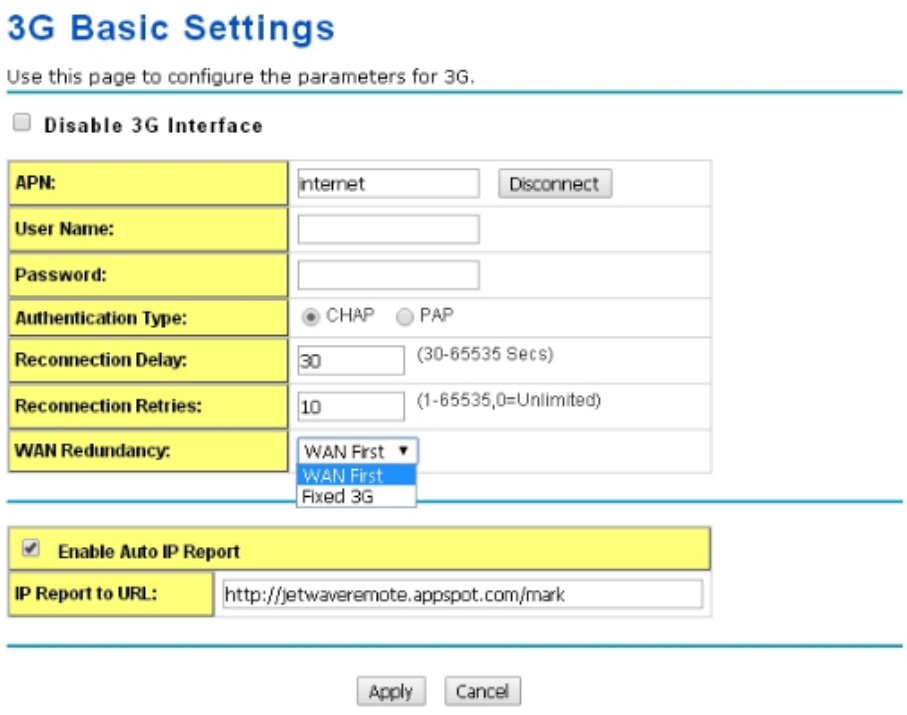
Below is the reference information after connected to UNICOM telecom in China. The service provider is China UNICOM, it provides the APN name, Service Type and assigns IP address for the JetWave 3320.

System Information

Provider	CHN-UNICOM
APN	3gnet
Service Type	GSM w/EGPRS
IMEI	359998040989545
Signal Strength	-85 dBm(Medium)
SIM Status	SIM OK
Connection Status	Connected
IP Address	10.57.167.226

4.4.2 Basic Settings

Normally, you can connect the 3G/LTE Gateway to the ISP cellular network without configuring 3G/LTE setting. However, in some countries, before the 3G/LTE gateway can access the ISP's cellular data network, you may need to enter the APN settings, User Name, Password, Authentication type… on the device. You can use this page to configure the parameters.



Disable 3G/Cellular Interface: You can disable the 3G/LTE interface manually.

APN: Every ISP has a specific APN (Access Point Name) assigned to its cellular network. The system can read this name from the SIM card. You can also find this setting by contacting your

ISP to know this. Once you failed to connect your 3G/LTE cellular network, this is the first way you can check. Please check with your ISP to know the APN and correctly input the setting through the page.

User Name: The user name for the 3G/LTE connection. Normally, this is provided by your ISP.

Password: The password for the 3G/LTE connection. Normally, this is provided by your ISP.

Authentication Type: You can select CHAP or PAP per your ISP request. Normally, this is provided by your ISP.

Reconnection Delay: Reconnection Delay time is the delay time for each 3G/LTE Retry.

Reconnection Retries: This is the times of Reconnection Retry. While 3G/LTE is not connected, the system will retry the connection according to the Reconnection Delay time and Retry times.

WAN Redundancy: The product can support WAN redundancy feature.

In default, the setting is **Fixed 3G/Cellular**, that means you can use 3G/LTE and Ethernet WAN port at the same time.

You can change the settings to **WAN First.** WAN first means the 3G/LTE feature is only activated when the Ethernet WAN port link down or failure.

Auto IP Report:

Most of the ISP assigns the dynamic IP address to the 3G/LTE clients and change the IP address every period of time. While you need to remotely control the gateway, you may need additional information generated from the remote 3G/LTE client device. The Auto IP Report in JetWave 3320/3420 can meet your need while you need to know the IP address from the product.

Enable Auto IP Report: Press Enable Auto IP Report, the system will automatically update the system information to remote server/URL.

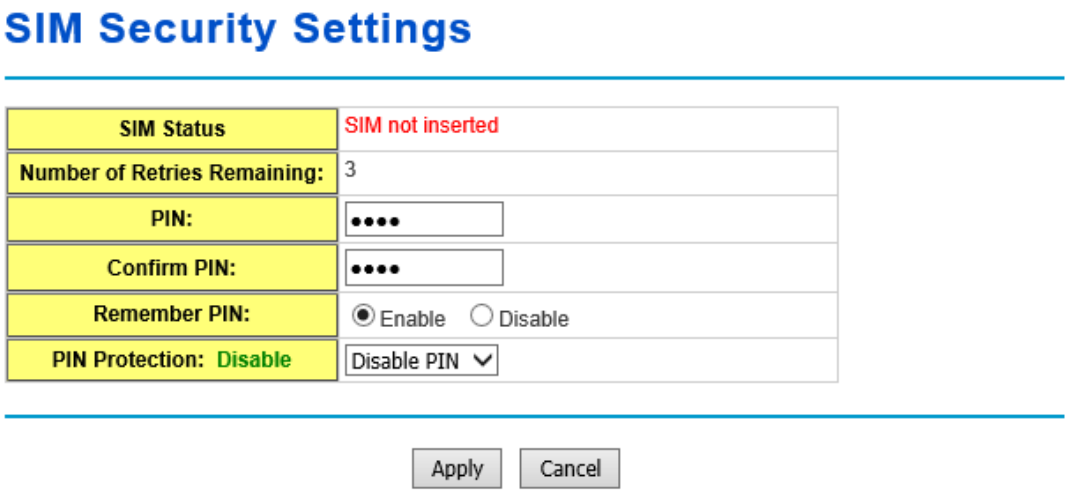
IP Report to URL: Type the correct URL here for your Gateway report to. You can build your own server, rent URL address from ISP or Google Cloud service also supports this functionality. Please check with your ISP or create through Google cloud.

Press **"Apply"** to activate the new setting.

4.4.3 SIM Security

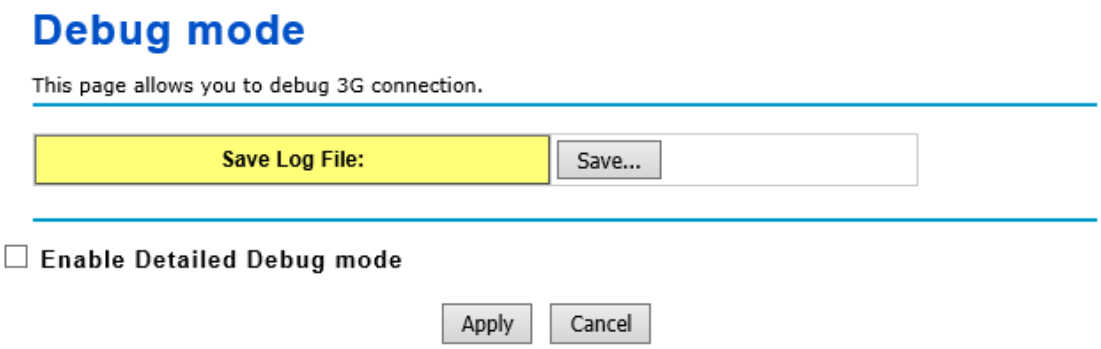
This page allows you to assign the SIM security. If you (or ISP) already apply the PIN number to your SIM card, you need to configure the correct PIN number for your AP/Gateway.

After correctly enter the PID number, you can start the 3G/LTE connection or change the new PIN settings.



4.4.4 Debug Mode

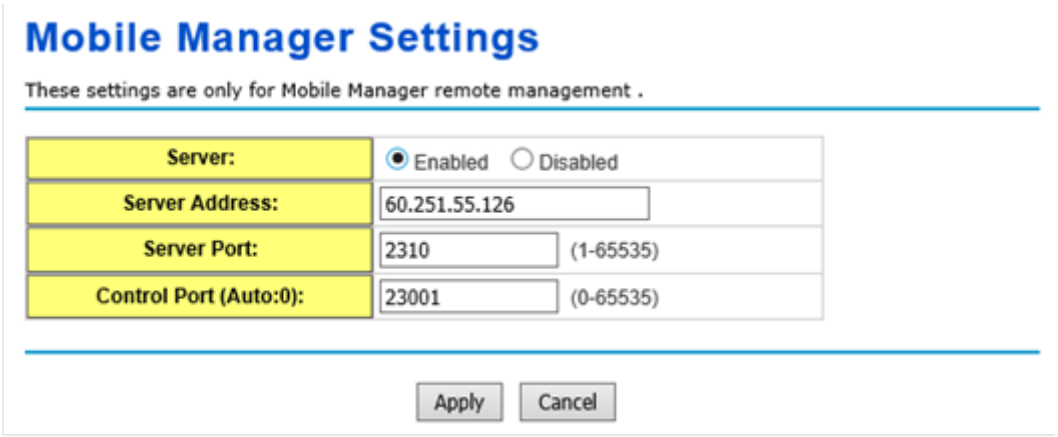
The page allows you to debug 3G/LTE connection.



Press "**Save…**" while the 3G/LTE connection is failure, you can know more about the 3GPP process done while 3G/LTE connection Retry.

4.4.5 Mobile Manager Setting:

With Korenix Mobile Manager Utility can help you collect the IP Address after you installed the cellular devices in the remote field site. You can check the Mobile Manager Utility User Manual for detail operation and configuration. The device acts as the cellular router device, you can assign the target Server IP Address and specific port (TCP port), then the device will automatically update the current IP address and the new IP address once it is changed to the server.



Server: You can Enable or Disable the function. Default value is Disabled.

Server Address: Type the Mobile Manager's IP address in this field.

Server Port: The device will update info to server through this port. You can assign specific TCP port number.

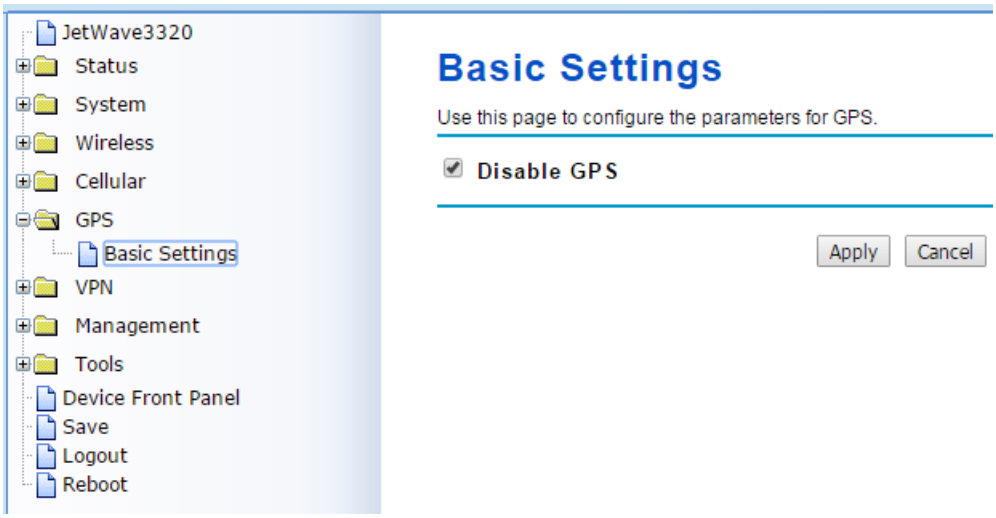
Control Port: The Control Port (TCP port) allows you to connect to the device. You can assign specific TCP port number.

4.5 GPS

The "**GPS**" feature set pages allow users to enable or disable GPS feature. GPS feature is supported by JetWave 3320.

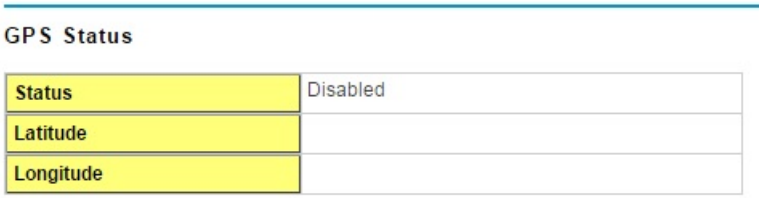
4.5.1 Basic Setting

Use this page to disable or enable GPS feature.

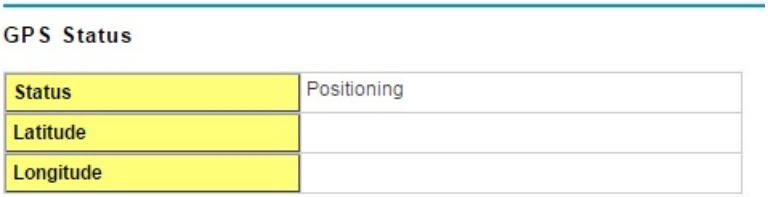


Disable GPS: check to disable GPS and uncheck to enable GPS. Press apply button when setup is done to apply configurations.

The results can be viewed in Status->Information page. When GPS is disabled, this page shows:



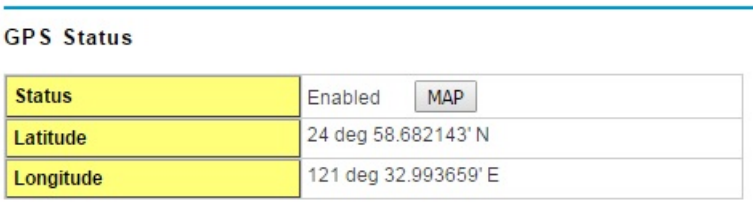
After enabled, GPS will start to position as the following picture. The positioning time ranges from seconds to minutes depends on environment conditions such as the position of antenna, shelter, weather condition, coating etc. Normally it should take about dozens of seconds.



MAP:

When positioning finished, the coordinates will be displayed. Press Map button and browser will

be launched and link to google MAP using the coordinates reported.



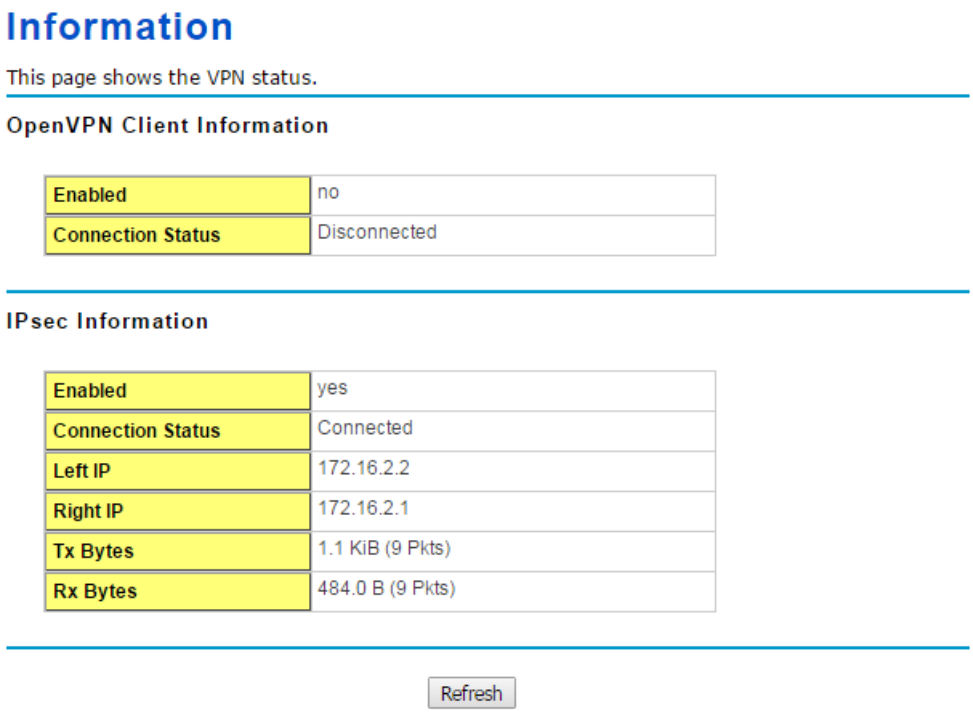
4.6 VPN

The VPN is the new feature released from JetWave 3200/3300/3400 V1.1 firmware. In V1.1, the first VPN type supported is OPEN VPN Client. In V1.2, IPSec is also supported. This page shows how to configure VPN settings and monitor its status.

The "**VPN**" feature set pages allow users to configure the device as VPN client to connect to VPN server.

4.6.1 Status

This page shows the latest status of openVPN client and IPsec.



OpenVPN client:

Enabled:

yes: The VPN function already enabled.

no: The VPN function not enabled yet.

Connection Status:

Connected: The VPN connection already built successfully.

Disconnected: The VPN not connect.

IPsec:

Enabled:

yes: The IPsec function already enabled.

no: The IPsec function not enabled yet.

Connection Status:

Connected: The IPsec connection already built successfully.

Disconnected: The IPsec not connect.

Left IP: left IP corresponds to right IP. The two IPs should be conceptually connected between two JetWave. For example, bridge port IPs in LAN, or public IPs when using cellular network

Right IP: described as above.

Tx bytes: the amount of traffic transmitted in bytes from itself to another side. Number of packet also displayed.

Rx bytes: the amount of traffic received in bytes from itself to another side. Number of packet also displayed.

4.6.2 OpenVPN Client

OpenVPN is a full-featured SSL VPN which implements OSI layer 2 or 3 secure network extension using the industry standard SSL/TLS protocol, supports flexible client authentication methods based on certificates, smart cards, and/or username/password credentials, and allows user or group-specific access control policies using firewall rules applied to the VPN virtual interface.

The first step in building an OpenVPN 2.x configuration is to establish a PKI (public key infrastructure). PKI consists of a separate certificate (also known as a public key) and private key

for the server and each client, and a master Certificate Authority (CA) certificate and key which is used to sign each of the server and client certificates. Please refer to Korenix Jetbox 5630 user manual for example PKI key generation.

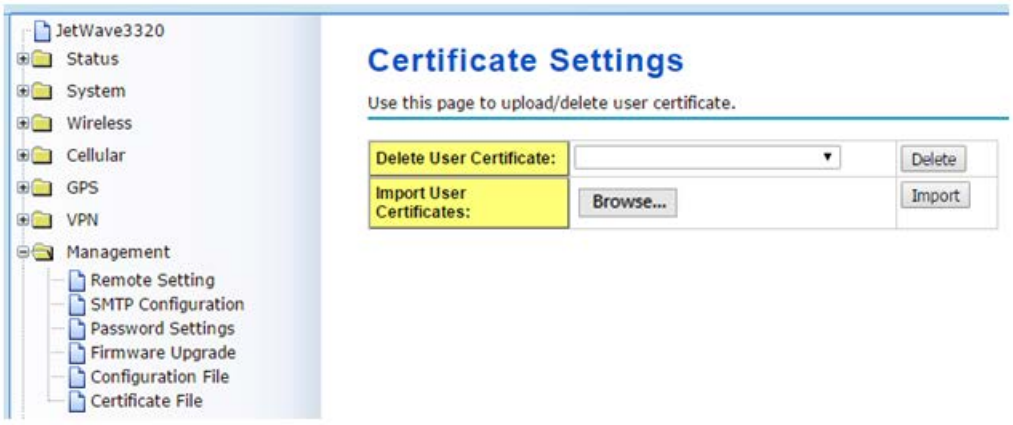
In static encryption mode, each VPN client shares the same static key with OpenVPN server.

In TLS encryption mode, each VPN client needs 3 keys, while VPN server needs 4 keys. The description of the 7 keys listed below.

Filename	Needed By	Purpose	Secret
ca.crt	server + all clients	Root CA certificate	NO
ca.key	key signing machine only	Root CA key	YES
dh{n}.pem	server only	Diffie Hellman parameters	NO
server.crt	server only	Server Certificate	NO
server.key	server only	Server Key	YES
client.crt	client only	Client1 Certificate	NO
client.key	client only	Client key	YES

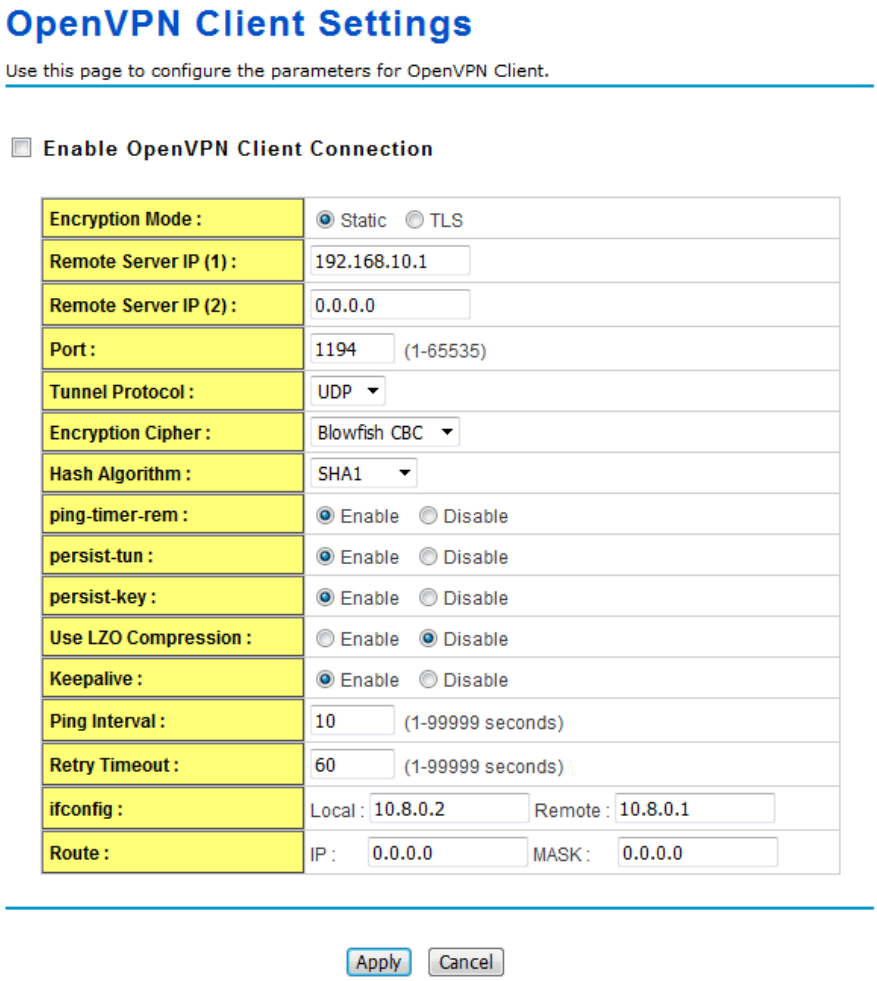
JetWave 3220/3320/3420 acts as OpenVPN client. ca.crt, client.crt and client.key are needed to establish OpenVPN tunnel as OpenVPN client. Notice that the file names of these keys are pre-defined and can't be changed.

Go to management->certificate file Web configuration page to upload these keys. Import keys one by one in the page. Old certificate can also be deleted in the page.



The OpenVPN client configurations can be set in VPN->OpenVPN client Web configuration page. Check Enable OpenVPN client connection checkbox and configure OpenVPN client

configurations. Note that the settings should be consistent with OpenVPN server.



Encryption Mode: Select the encryption is Static or TLS.

Static Key: Use a pre-shared static key.

TLS: Use SSL/TLS + certificates for authentication and key exchange.

Remote Server IP (1): Input the IP address of VPN server.

Remote Server IP (2): Input the second IP address of VPN server if necessary.

Port: Input the port number that your VPN service used.

Note: you may need check your VPN server also has properly port setting.

Tunnel Protocol: You can choose use TCP or UDP to establish the VPN connection.

Encryption Cipher: Select the encryption cipher from Blowfish to AES in Pull-down menus.

Hash Algorithm: Select the hash algorithm.

Ping-timer-rem: Select enable or disable the ping-timer-rem, this function prevent unnecessary restart at server/client when network fail.

Persist-tun: Select enable or disable the persist-tun, enable this function will keep tun(layer 3)/tap(layer 2) device linkup after Keepalive timeout, default value is Enable.

Persist-key: Select enable or disable the persist-key, enable this function will keep the key first use if VPN restart after Keepalive timeout, default value is Enable.

Use LZO Compression: Select use LZO Compression or not, this function compress data to decrease the traffic but also need more CPU effort, default value is Disable.

Keepalive: Select enable or disable keepalive function, this function is use to detect the status of connection, default value is Enable.

Ping Interval: Input the ping interval, the range can from 1~99999 seconds.

Retry Timeout: Input the retry timeout, the range can from 1~99999 seconds.

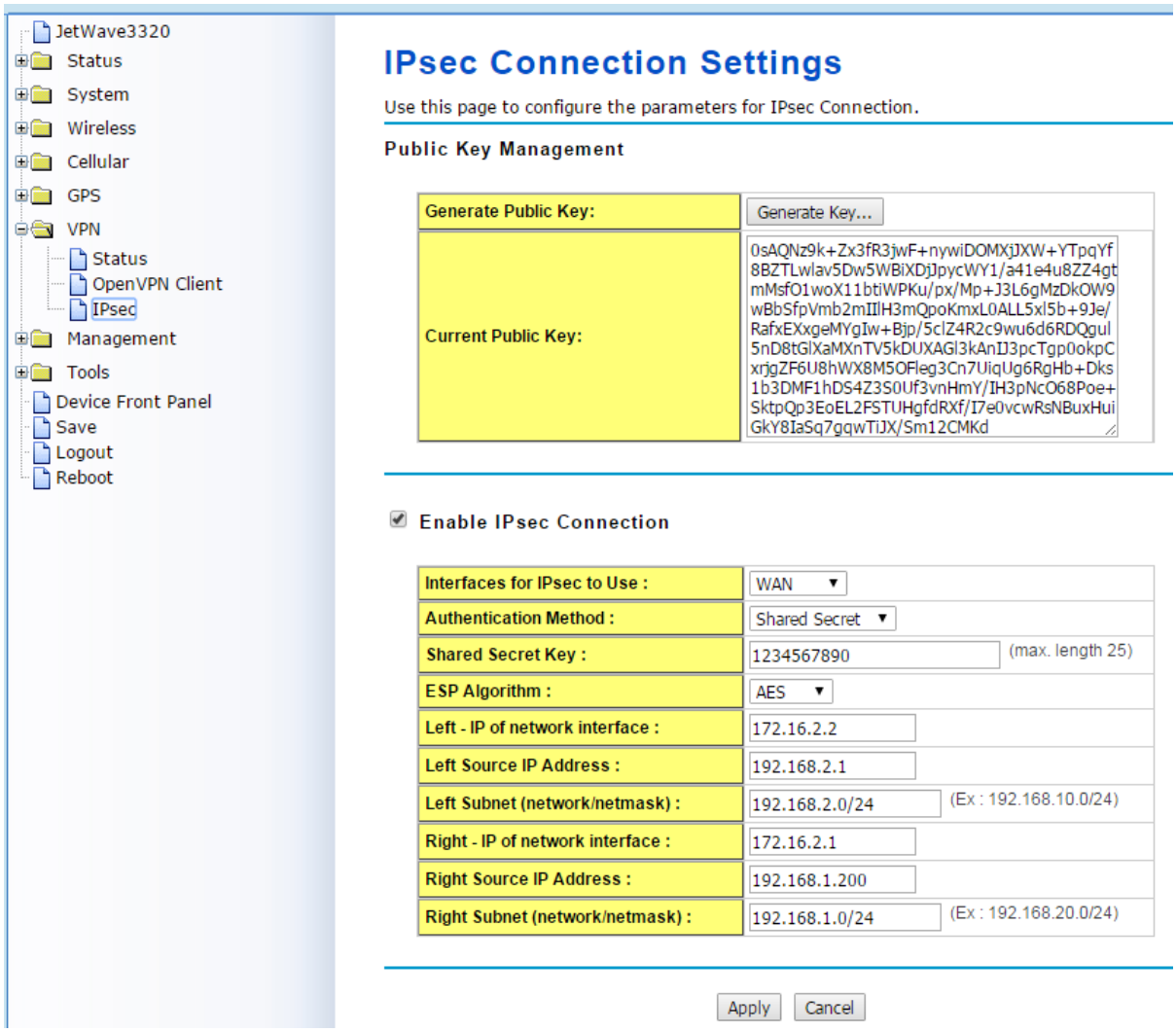
Ifconfig: Input the tunnel IP address that VPN use.

Route: Input the route IP and MASK.

Check VPN-> status Web configuration page after enabled to see the status of OpenVPN connection.

4.6.3 IPsec

Point-to-point IPsec tunnel can be establish in VPN->IPsec Web configuration page. Check Enable IPSec connection checkbox and configure IPSec connection configurations.



The top-half page is a tool to generate public key. The content of current public key is displayed. New public key can be generated by pressing generate key button. An alert will be displayed to confirm the creation of new public key. Public key is used when the authentication method set to RSA key in the configuration of IPsec connection in bottom half of the page.

Interfaces for IPsec to Use: select the interface that can be interworking with VPN server, possible options are WAN/LAN/Cellular.

Authentication method: select authentication method, shared key or RSA key.

Static Key: Use a pre-shared static key.

RSA key: use public/private key for encryption and decryption. Use public key generated in top-half page

Shared secret key: the attribute is displayed when using static key. Maximum length is 25 characters

ESP algorithm: select ESP (Encapsulating Security Payload) desired, AES/DES/3DES.

Left - IP of network interface : Left corresponds to right in IPsec point-to-point connection. The left and right IP settings should be the same in both IPSec endpoints. Enter interface IP address of left endpoint that can directly connected to right endpoint, for example, WAN port IP address in router mode or cellular IP address when using cellular network.

Left Source IP Address: as Left - IP of network interface, enter the LAN port interface IP address of left endpoint.

Left Subnet (network/netmask) : enter subnet mask of left endpoint in CIDR notation, for example, 192.168.10.0/24.

Left RSA key : the attribute is only required when using RSA key authentication method. Using public key generated from top-half page.

Right - IP of network interface : Right corresponds to left in IPsec point-to-point connection. The left and right IP settings should be the same in both IPSec endpoints. Enter interface IP address of right endpoint that can directly connected to left endpoint, for example, WAN port IP address in router mode or cellular IP address when using cellular network.

Right Source IP Address: as Right - IP of network interface, enter the LAN port interface IP address of right endpoint.

Right Subnet (network/netmask) : enter subnet mask of right endpoint in CIDR notation, for example, 192.168.20.0/24.

Right RSA key : the attribute is only required when using RSA key authentication method. Using public key generated from top-half page.

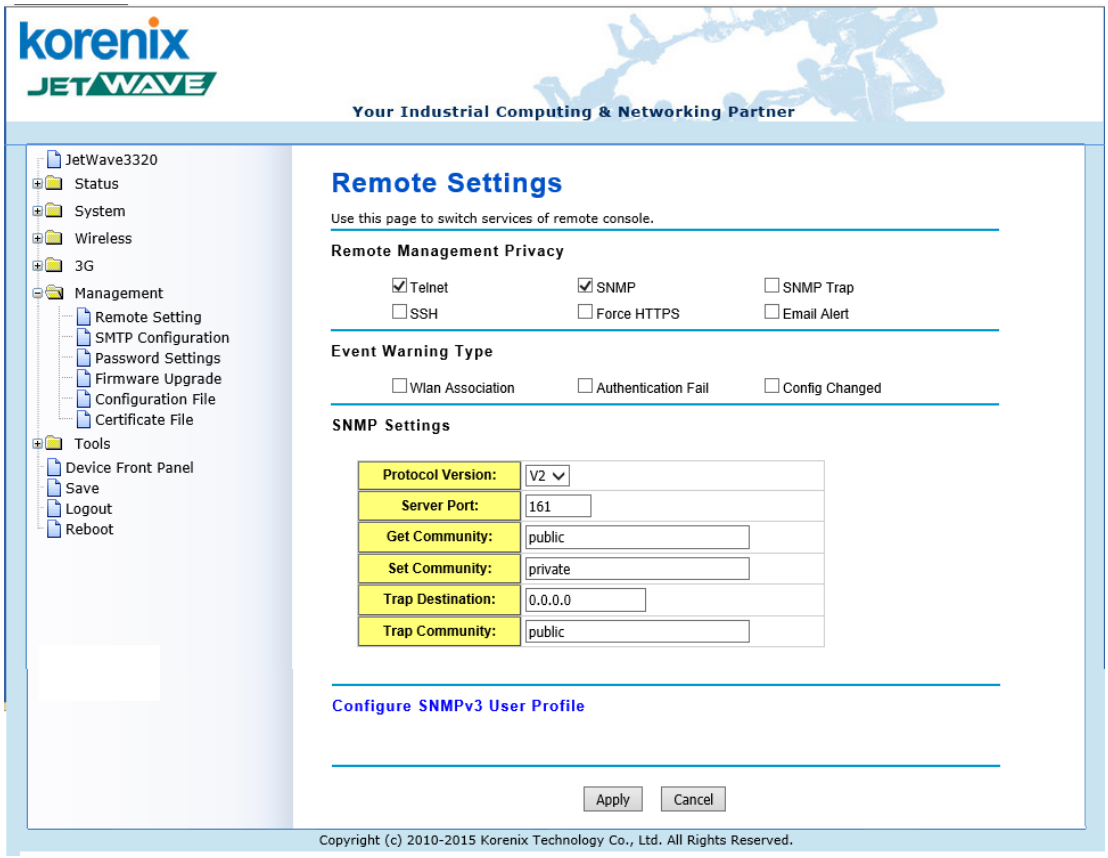
Check VPN-> status Web configuration page after enabled to see the status of IPSec connection.

4.7 Management

The "**Management**" feature set pages allow users to configure the remote settings, event warming type, SNMP, SMTP, password and firmware update, configuration file, certification file upload.

4.7.1 Remote Setting

Use this page to configure the remote management privacy, select the event warming type and SNMP settings.



Remote Management Privacy: You can select which kinds of remote service should be opened in your environment. The services include **Telnet, SNMP, SMP Trap, SSH, Force HTTPS** and **E-mail Alert.** Select the service and press "**Apply**" to activate the settings.

Event Warning Type: The event warming type selection.

Wlan association: The client associated to the AP event.

Authentication Fail: The client failure of authentication event.

Config Changed: The configuration of the AP/Gateway is changed event.

SNMP Settings:

Protocol Version: Select the SNMP version, the product supports SNMP V1, V2c and V3. While selecting the SNMPv3, continue to configure the SNMPv3 User Name and Encryption in lower screen.

Server Port: Change the server port for a service if needed; however you have to use the same port to use that service for remote management.

Get Community: Specify the community name (password) for the incoming SNMP_Get and SNMP_GetNext requests from the management station. By default, it is set to public and allows

all requests.

Set Community: Specify the community name (password) for the incoming SNMP_Set requests from the management station. By default, it is set to private.

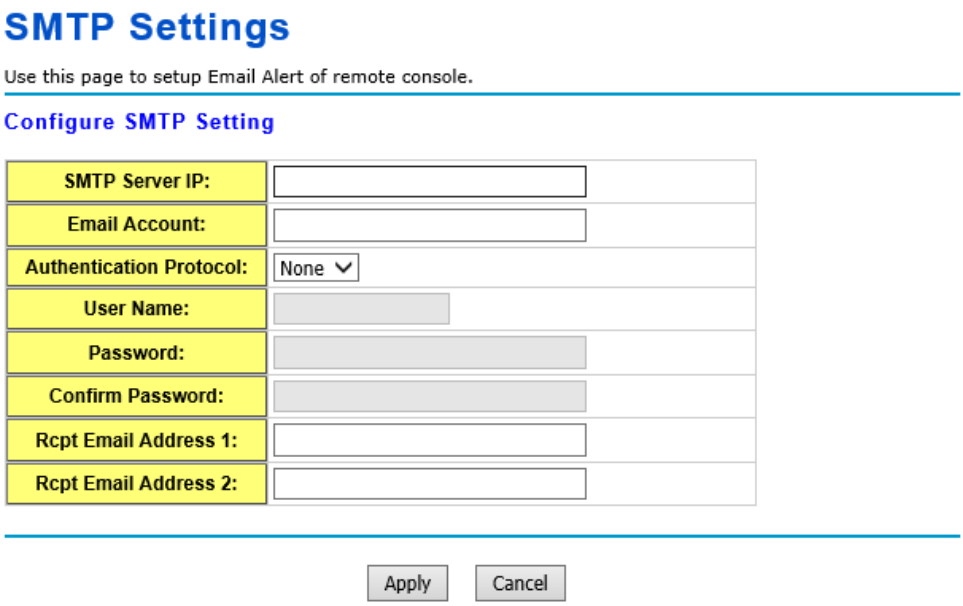
Trap Destination: Specify the IP address of the station to send the SNMP traps to.

Trap Community: Specify the community name (password) sent with each trap to the manager. By default, it is set to public and allows all requests.

Note: For security concern, it is recommended change the Community Name before you connect the AP/Gateway to the network. *The experience engineer who familiar with SNMP protocol can easily discovery and change the configuration of the AP/Gateway through SNMP once you use the default communication name.*

4.7.2 SMTP Configuration

The AP/Gateway supports E-mail Warning feature. The AP/Gateway will send the occurred events to remote E-mail server. The receiver can then receive notification by E-mail. The E-mail warning is conformed to SMTP standard. This page allows you to enable E-mail Alert, assign the SMTP Server IP, Sender E-mail, and Receiver E-mail. If SMTP server requests you to authorize first, you can also set up the username and password in this page.



SMTP Server IP: The IP address of the SMTP Server.

Email Account: The sender's Email Account.

Authentication Protocol: If SMTP server requests you to authorize first, select the Authentication Protocol and following User Name and Password.

User Name: The User Name of the Sender Email account.

Password: The Password of the Sender Email account.

Confirm Password: Confirm the Password of the Sender Email account.

Rcpt Email Address 1: The first Receiver's email address.

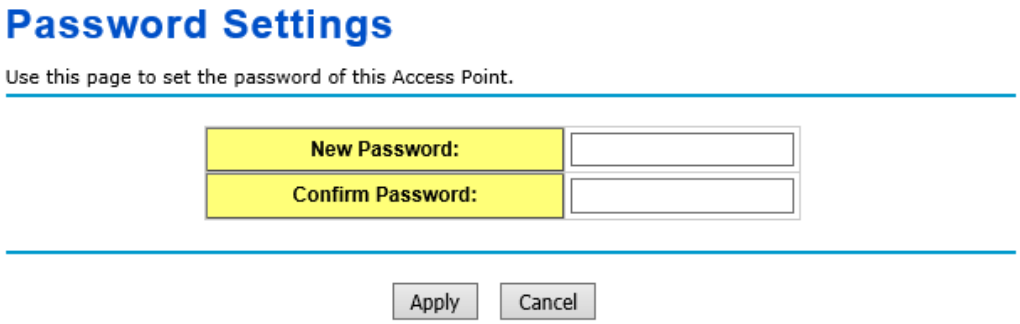
Rcpt Email Address 2: The second Receiver's email address.

Press "**Apply**" to activate the setting.

4.7.3 Password Settings

Use this page to set the password of the AP/Gateway.

Type the **New Password** and **Confirm Password** again. Press **"Apply"** to activate the new password.

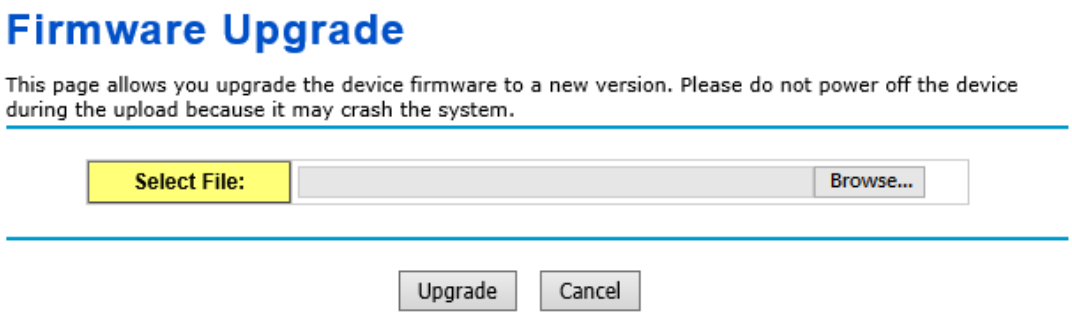


4.7.4 Firmware Upgrade

In this section, you can update the latest firmware for your AP/Gateway. Korenix provides the latest firmware in Korenix Web site. The new firmware may include new features, bug fixes or other software changes. We'll also provide the release notes for the update as well.

From technical viewpoint, we suggest you use the latest firmware before installing the AP/Gateway to the customer site.

Note that the system will be automatically rebooted after you finished upgrading new firmware. Please remind the attached users before you do this.



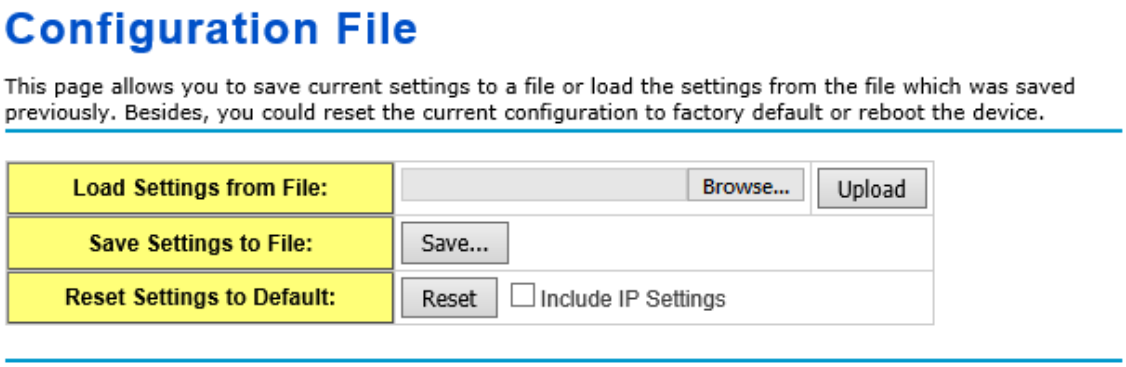
Type the path of the firmware in **Select File:** field. Or click "**Browse…**" to browse the firmware file. Press "**Upgrade**" to upload the firmware file to the AP/Gateway. After finishing transmitting the firmware, the system will copy the firmware file and replace the firmware in the flash. During the progress, please **DO NOT** power off your system.

4.7.5 Configuration File

The AP/Gateway provides Configuration File **Backup (Save Setting to File), Restore (Load Setting from File)** and **Reset Setting to Default** features.

With Backup command, you can save current configuration file saved in the AP/Gateway's flash to admin PC. This will allow you to go to Restore command later to restore the configuration file back to the AP/Gateway. Before you restore the configuration file, you must place the backup configuration file to specific folder in the PC. Users can also browse the target folder and select existed configuration file. The AP/Gateway can then download this file back to the flash.

This **Browse…** mode is only provided by Web UI. For CLI, please type specific path of the configuration file.



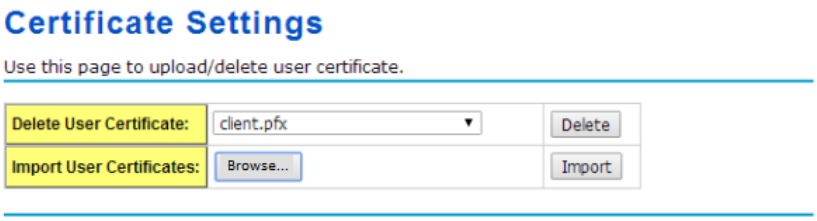
Backup (Save Setting to File): Press "Save…" to backup the configuration file to specific path/folder in your computer.

Restore (Load Setting from File): Type the path of the configuration file or click "**Browse…**" to browse the firmware file. The Browse feature is only supported in Web GUI. Press "**Upload**" after the file is selected.

Reset Settings to Default: Press **"Reset"** can reset all the configurations, but not included default IP address to default settings. If you want to reset the IP address to default value, select "Include IP Settings".

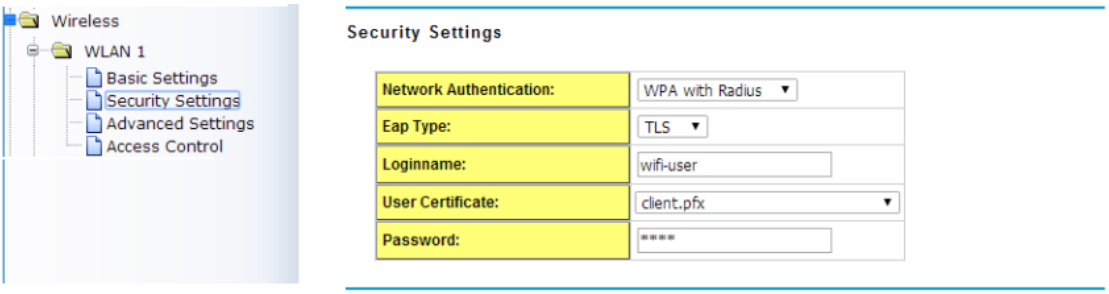
4.7.6 Certificate File

Use this page to import/delete user certificate file.



You can import user certificate file, select "**Browse…**" to select the certificate file and press **"Import"**. You can generate the file by 3rd tool, web site or get from the IT administrator.

Following is the security setting under "WPA with Radius" Authentication mode, the Eap type is TLS. You can see the "User Certificate file" is assigned. The AP must use the same certificate file as your Radius Server under this setting.

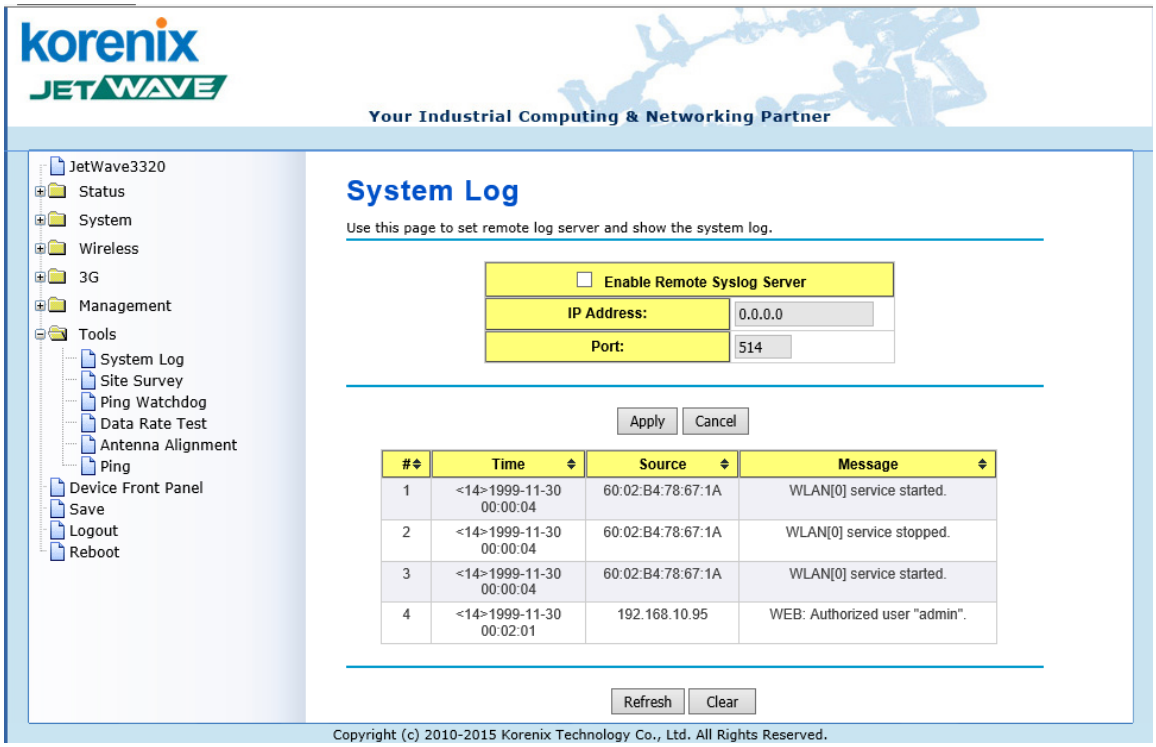


4.8 Tools

The “**Tools**” feature set pages provides some additional useful tools. The System Log help you see the occurred event logs, wireless AP site survey, Ping Watchdog, Data Rate Test, Antenna Alignment and Ping tool.

4.8.1 System Log

Use this pages to set remote log server and show the system log.



Select “**Enable Remote Syslog Server**”, type the **IP Address** and **Port** number of your syslog server. The default port number is 514.

Press “**Apply**” to activate the setting.

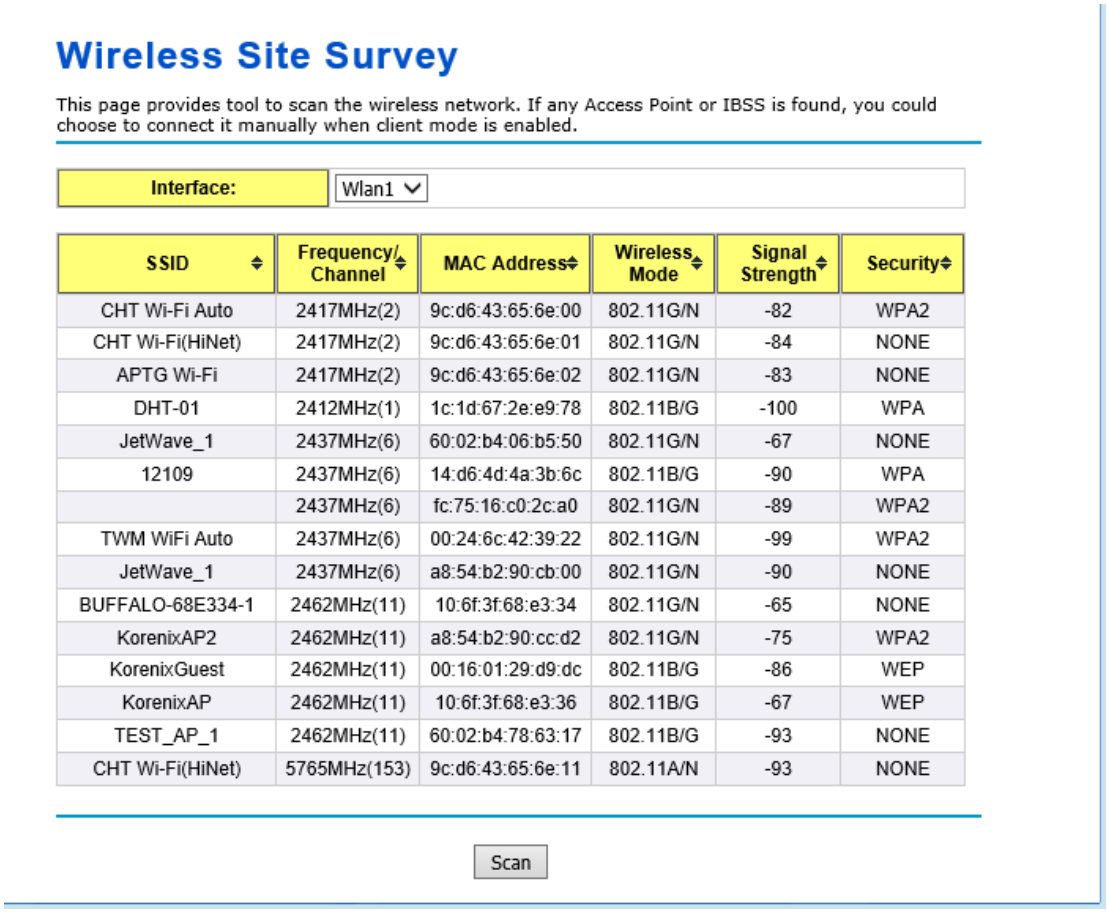
In the lower screen, it displays the occurred system logs. Each entry has the index, occurred time, source MAC address and the message. You can monitor the system by this screen, however, the logs will be removed after system reboot.

Press “**Clear**” allows you to remove all of entries.

Press “**Refresh**” allows you to refresh the table.

4.8.2 Site Survey

While your AP/Gateway is in **Wireless Client** mode, this page provides tool to scan the wireless network. You can monitor current existed wireless network, connect to the SSID with better signal strength…etc.



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.

Interface: Wlan1

SSID	Frequency/ Channel	MAC Address	Wireless Mode	Signal Strength	Security
CHT Wi-Fi Auto	2417MHz(2)	9c:d6:43:65:6e:00	802.11G/N	-82	WPA2
CHT Wi-Fi(HiNet)	2417MHz(2)	9c:d6:43:65:6e:01	802.11G/N	-84	NONE
APTG Wi-Fi	2417MHz(2)	9c:d6:43:65:6e:02	802.11G/N	-83	NONE
DHT-01	2412MHz(1)	1c:1d:67:2e:e9:78	802.11B/G	-100	WPA
JetWave_1	2437MHz(6)	60:02:b4:06:b5:50	802.11G/N	-67	NONE
12109	2437MHz(6)	14:d6:4d:4a:3b:6c	802.11B/G	-90	WPA
	2437MHz(6)	fc:75:16:c0:2c:a0	802.11G/N	-89	WPA2
TWM WiFi Auto	2437MHz(6)	00:24:6c:42:39:22	802.11G/N	-99	WPA2
JetWave_1	2437MHz(6)	a8:54:b2:90:cb:00	802.11G/N	-90	NONE
BUFFALO-68E334-1	2462MHz(11)	10:6f:3f:68:e3:34	802.11G/N	-65	NONE
KorenixAP2	2462MHz(11)	a8:54:b2:90:cc:d2	802.11G/N	-75	WPA2
KorenixGuest	2462MHz(11)	00:16:01:29:d9:dc	802.11B/G	-86	WEP
KorenixAP	2462MHz(11)	10:6f:3f:68:e3:36	802.11B/G	-67	WEP
TEST_AP_1	2462MHz(11)	60:02:b4:78:63:17	802.11B/G	-93	NONE
CHT Wi-Fi(HiNet)	5765MHz(153)	9c:d6:43:65:6e:11	802.11A/N	-93	NONE

Scan

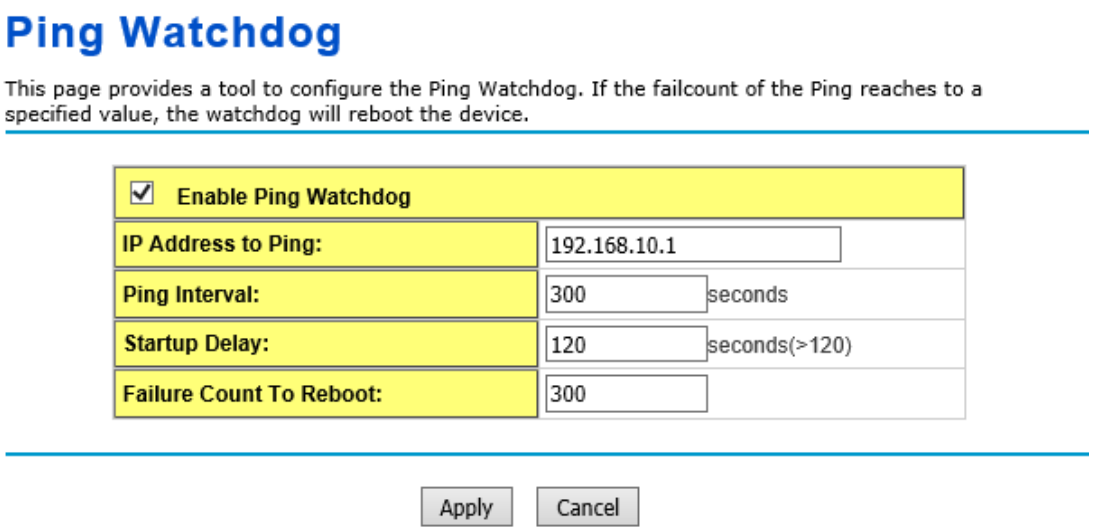
Interface: Select the interface number.

Scan: Press Scan to scan the network again.

This progress takes around 3 seconds and you will see the below info.

4.8.3 Ping Watchdog

This page provides a tool configure the Ping Watchdog. If the failure count of the Ping reaches to a specified value, the watchdog will reboot the device.



Select "**Enable Ping Watchdog**" to enable the function.

IP Address to Ping: This is the target IP address of the Ping Watchdog. Please notice that this IP address MUST be a correct and existed IP address, otherwise, the ping watchdog will reboot your system after couple time.

Ping Interval: The interval time between each Ping packet.

Startup Delay: This is the startup delay time of the ping watchdog. After the time timeout, the system starts to do Ping watchdog checking.

Failure Count to Reboot: After Ping failure count to the volume you assigned here, the system will reboot automatically.

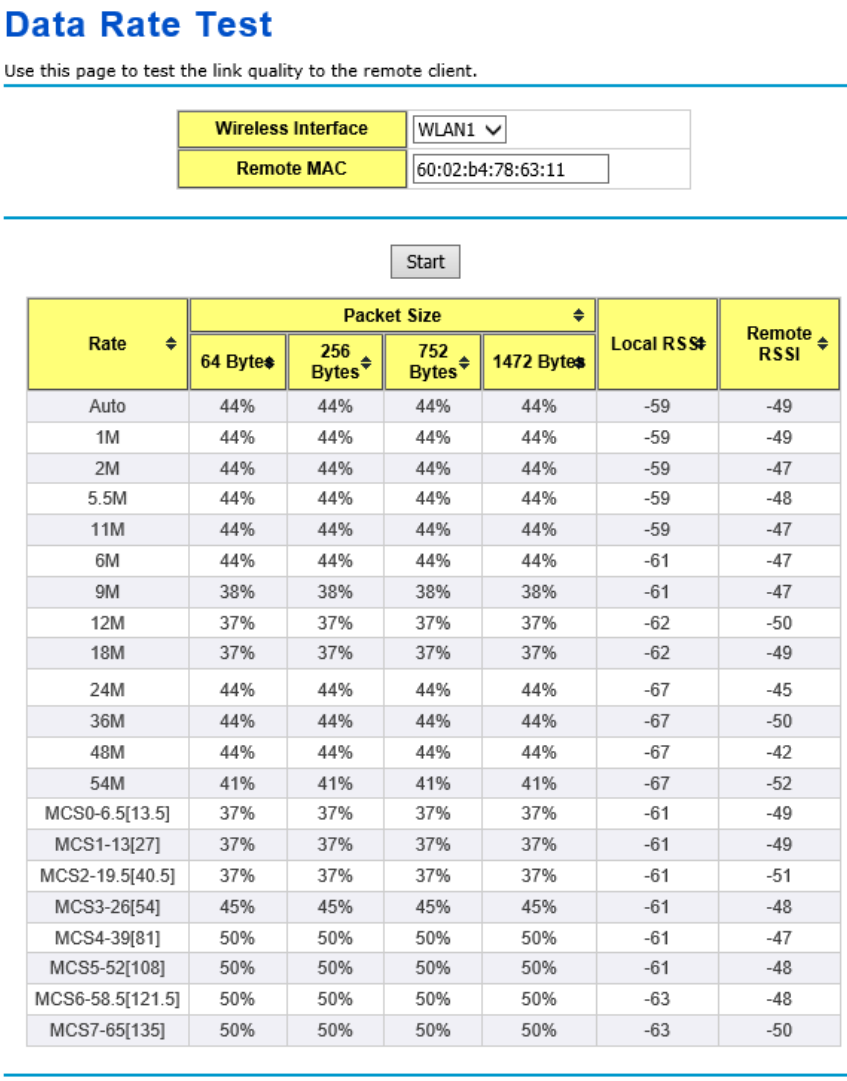
4.8.4 Data Rate Test

This page allows you to do Data Rate test to check the connection performance. This is a reference data for field test. The system will generate packet from one end to the other end.

Wireless Interface: Select the WLAN 1 or WLAN 2. The system will generate the data rate test packet from the interface you select.

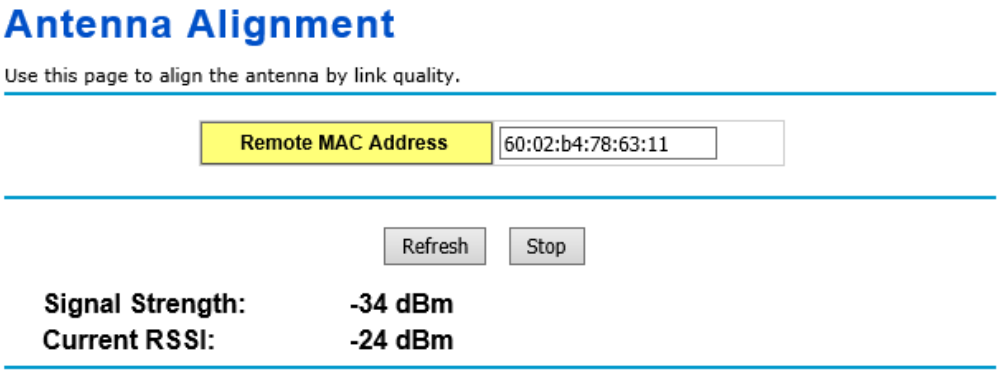
Remote MAC: The MAC Address of the target AP/Gateway you want to check. You must confirm your AP already connects to the remote AP first. You can find remote AP's MAC address from the Site Survey or write the MAC Address print in the target AP's label. The MAC Address format is "60:02:b4:78:63:11".

Press "**Start"** to start the test. This may take couple seconds. Please wait and you will see the below test result. **Note: Stop the test after finished the test, it can save the system resource.**



4.8.5 Antenna Alignment

The Antenna Alignment tool is a convenient tool to find the target AP/Gateway while you install the AP for long distance connection. In long distance transmission, it is not easy to see the remote AP/Gateway clearly, with this tool, you can adjust the direction of the antenna and find out the best direction according to the result.



Type the Remote MAC Address (format: xx:xx:xx:xx:xx:xx) in this page and press 

to start the antenna alignment. Press “Stop” after you find the correct target AP. You can start the tool from one end or both ends of connection to find the target antenna.

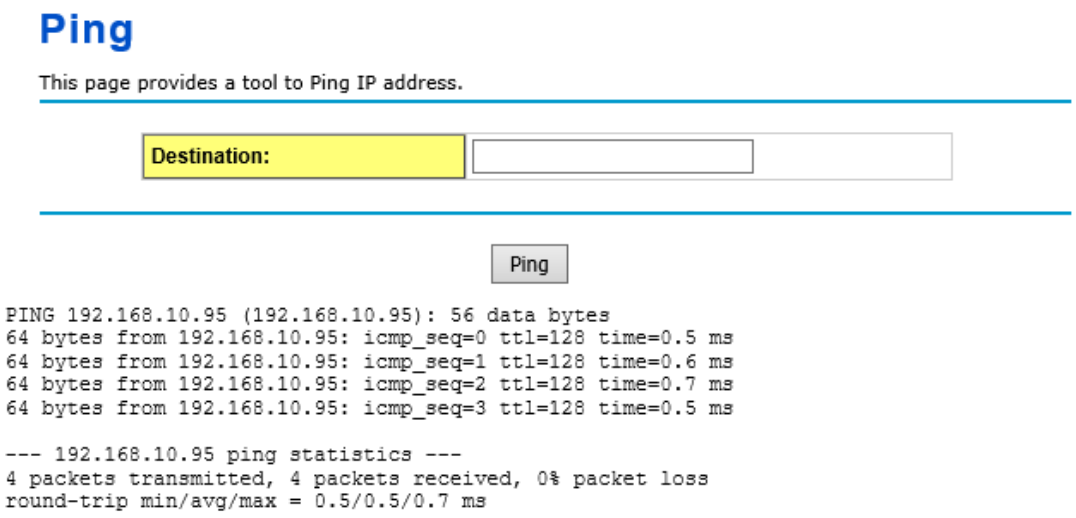
In practical, we often install the same specification antennas for both ends of point to point connection and start the antenna alignment tool from both ends. It can easier helps you find the target AP by checking the signal strength changing.

4.8.6 Ping

This is a simple Ping tool for you to check the status of remote station.

Type the target IP address in the "**Destination:**_____" field then press "**Ping**".

The system will ping the remote station 4 times and list the ping result in the web GUI.



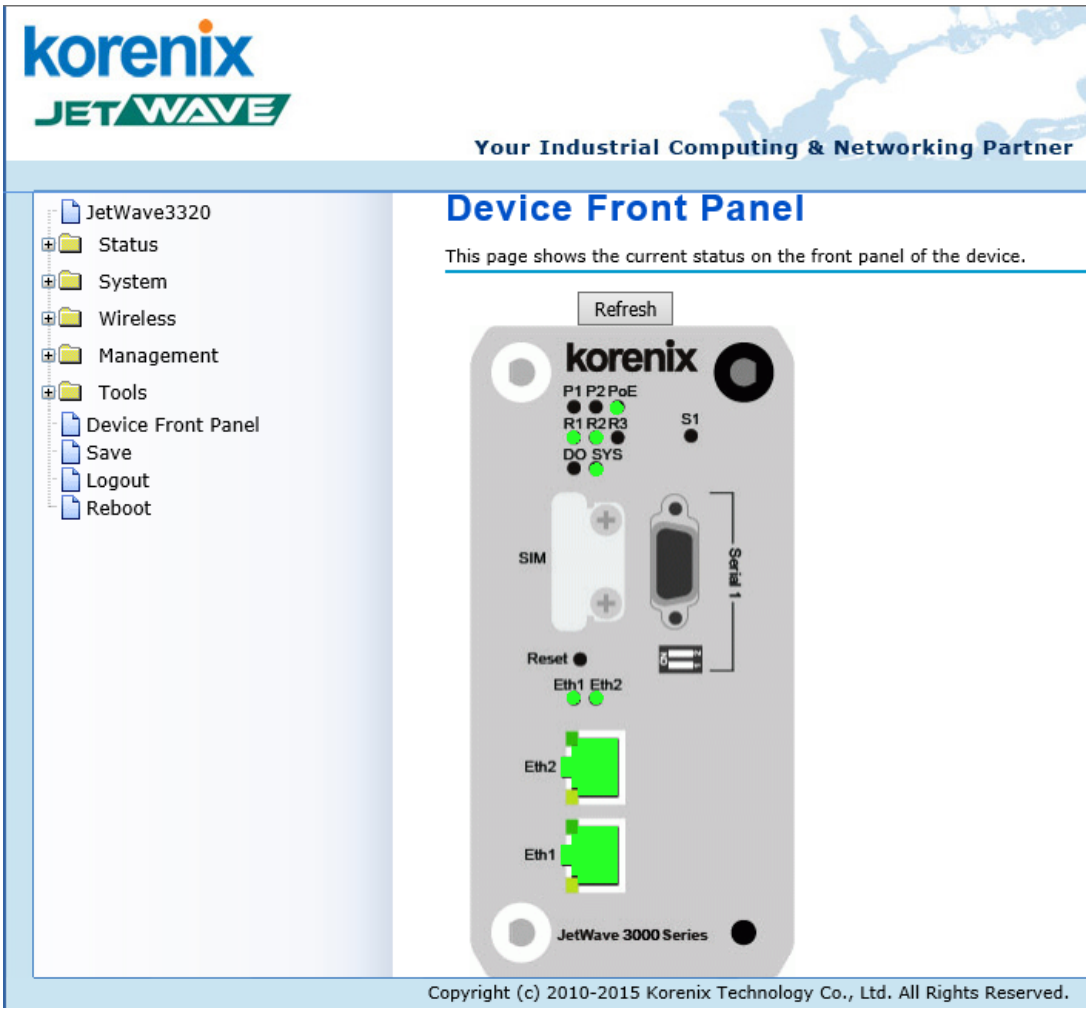
4.9 Main Entry

The main entry provides the system tools, for example the Device Front Panel status, Save the configuration, Logout and Reboot the system.

4.9.1 Device Front Panel

This page shows the current status on the front panel of the device.

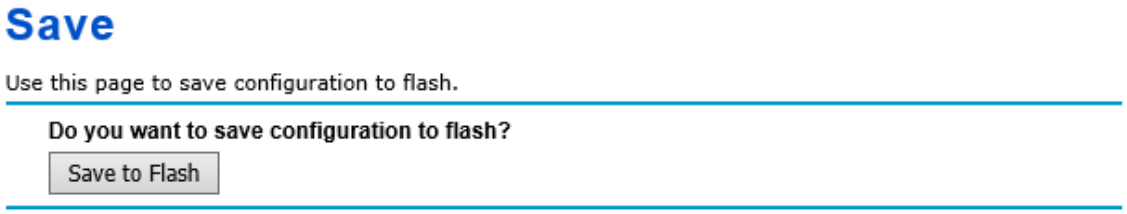
The green color means the interface is in active state. You can monitor and check the interfaces' status of the device remotely. The Serial Port in below figure is applied to JetWave 3320/3420 only.



4.9.2 Save

Use this page to save configuration to flash. Every time while you finished the configuring the

device, please remember to save the configuration to flash. Otherwise, the configuration will lost after reboot the system.



Press "**Save to Flash**" to save the configuration to flash.

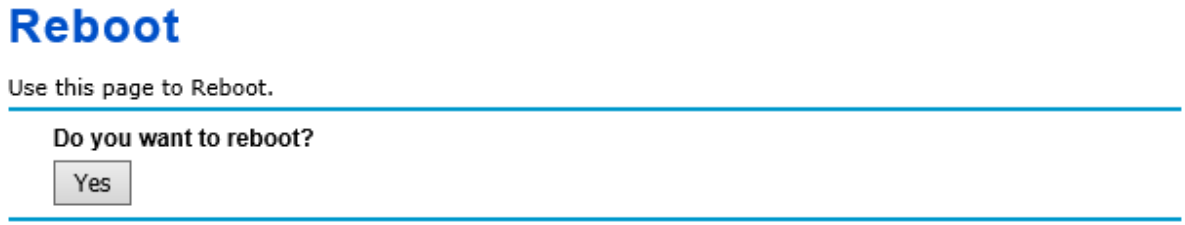
4.9.3 Logout

After finished configuring and leave, please remember to Logout the system. Without Logout the system, the login session will not timeout for couple minutes, it is a risk that other user may login your system without password checking before timeout. Another affect is that the user can NOT access at the same time if someone already login the system.

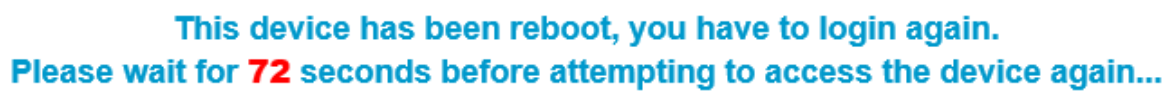
Use this page to logout. Press "**Yes**" to logout.

4.9.4 Reboot

Use this page to reboot the system. Press "**Yes**" to reboot system.



The below warming message will appear after you reboot the system.



Chapter 5

Configuration – SNMP, CLI, View Utility

Chapter 5 Configuration – SNMP, CLI, View Utility

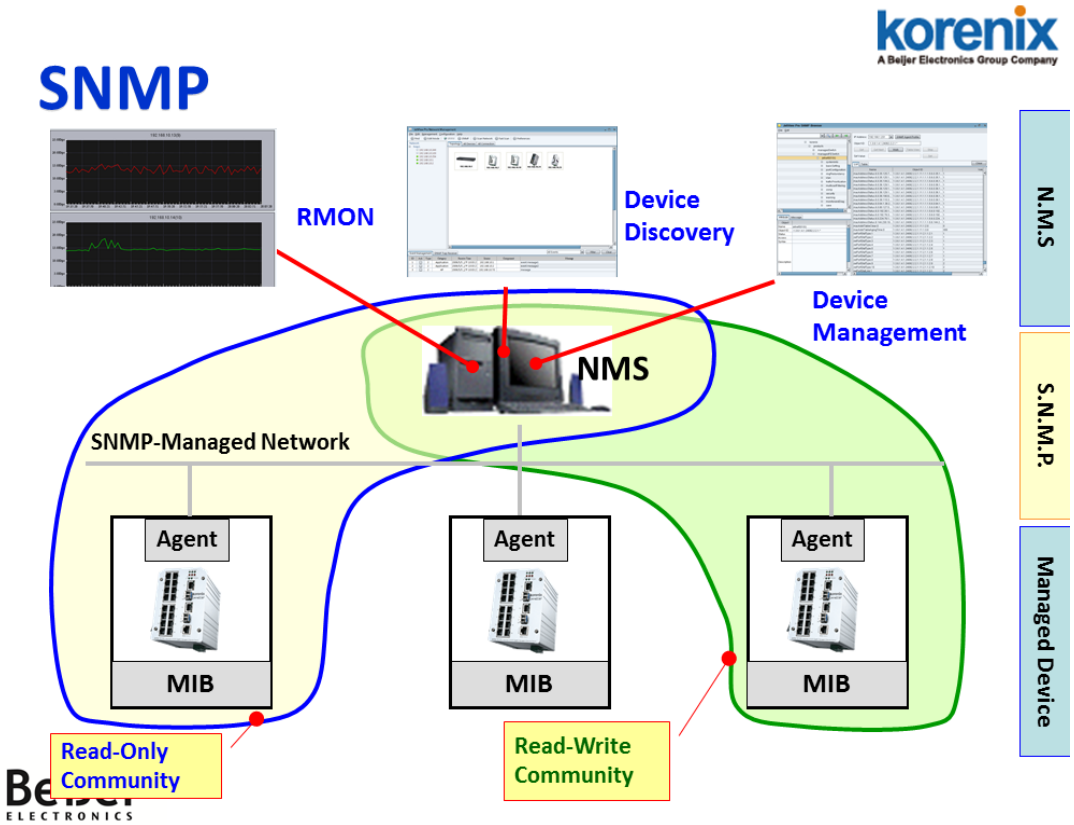
5.1 SNMP

5.1.1 What is SNMP?

Simple Network Management Protocol (SNMP) is a protocol used for exchanging management information between network devices. SNMP is a member of the TCP/IP protocol suite. This product series supports SNMP v1, v2c and V3.

Typical SNMP Architecture:

An SNMP managed network consists of two main components: Agent of the Managed Device and Manager (Network Management System, NMS).



Agent of the Managed Device: An agent is a management software module that resides in AP/Gateway. An agent translates the local management information (Management Information Base, MIB) from the managed device into a SNMP compatible format. In MIB, all the status and settings of the AP/Gateway has its own specific object ID (OID), the manager can read or write the value of the OID.

Manager (Network Management System, NMS): The manager is the console through the network. Network Management System (NMS) is the typical management system to manage the SNMP compatible devices. It normally provides device discovery, management, remote monitoring on network (RMON), trap server…etc.

Community:

The community is similar to the password of SNMP, while the manager wants to manage the target device, they must have the same community name. The community includes 2 privileges, Read Only and Read and Write. With Read Only privilege, you only have the ability to read the values of MIB tables. Default community string is Public. With Read and Write privilege, you have the ability to read and set the values of MIB tables. Default community string is Private.

SNMP Setup:

Please refer to the **4.5.1 Remote Setting.**

5.1.2 Management Information Base (MIB):

Before you want to manage the JetWave 3200 series AP/Gateway through SNMP, please go to download the MIB files from Korenix web site and compile all of them to the NMS. The AP/Gateway supports function based MIB, the same function/parameters in all the models have the same object ID (OID). The benefit is you just need to compile the MIB file one time even you purchase different models. While you purchase our new released models in the future, the MIB file can be applied as well. Once we provide new features for the MIB, you just need one time effort to update the MIB table for all the models.

There are some MIB files which are:

a. JETWAVE-DEVICE-MIB.my: This is the JetWave Device Management object MIB.

b. JETWAVE-EVENT-MIB.my: This is the JetWave Event/Trap MIB.

c. JETWAVE-ROOT-MIB.my: This is the JetWave top level object MIB.

d. JETWAVE-SERIAL-MIB.my: This is the JetWave Serial Port object MIB.

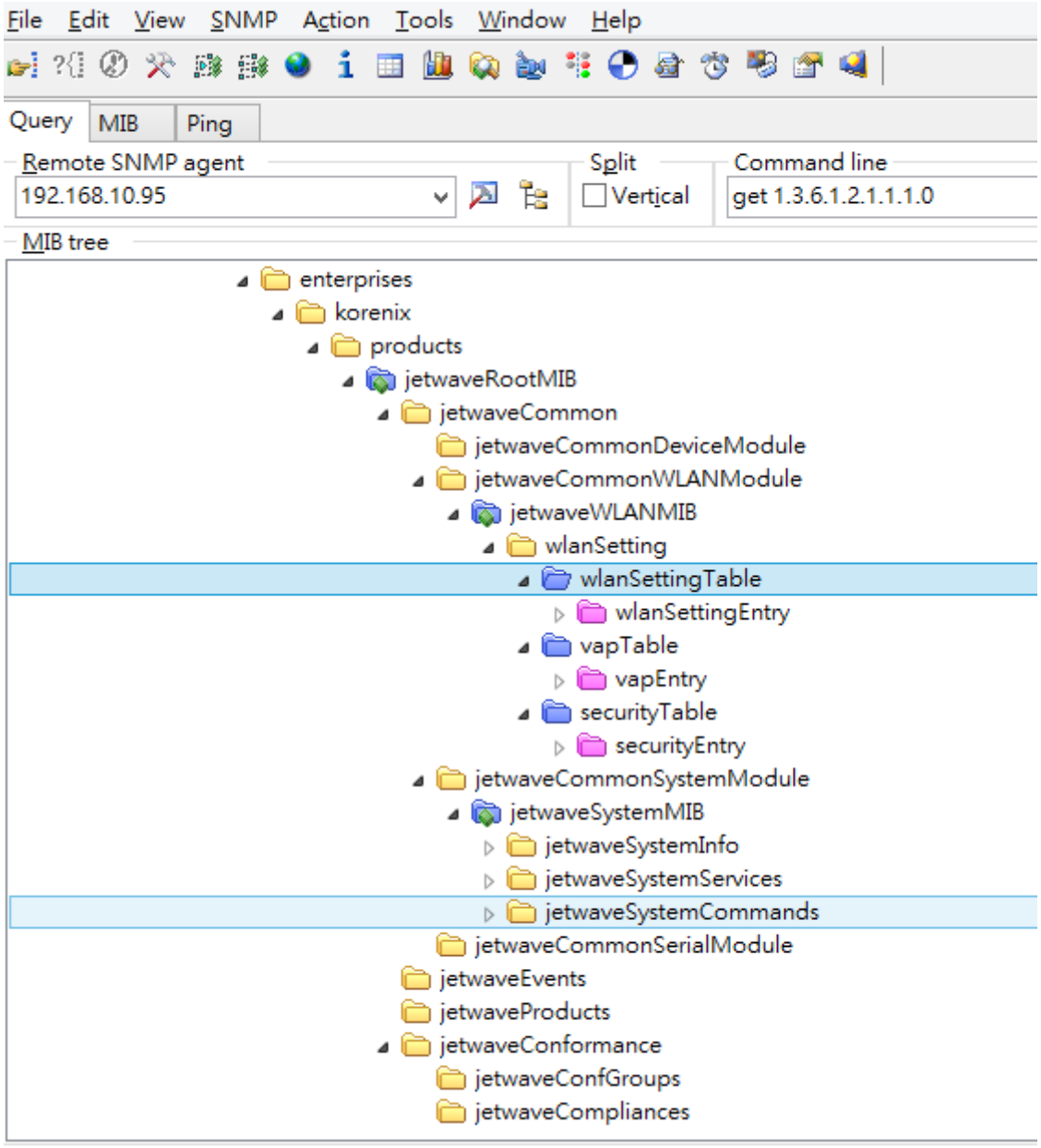
e. JETWAVE-SYSTEM-MIB.my: This is the JetWave System objects MIB.

f. JETWAVE-WALN-MIB.my: This is the JetWave Wireless LAN Setting object MIB.

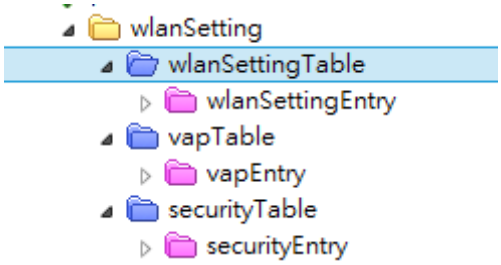
(Please download the latest MIB file from Korenix web site.)

5.1.3 MIB Tree in NMS

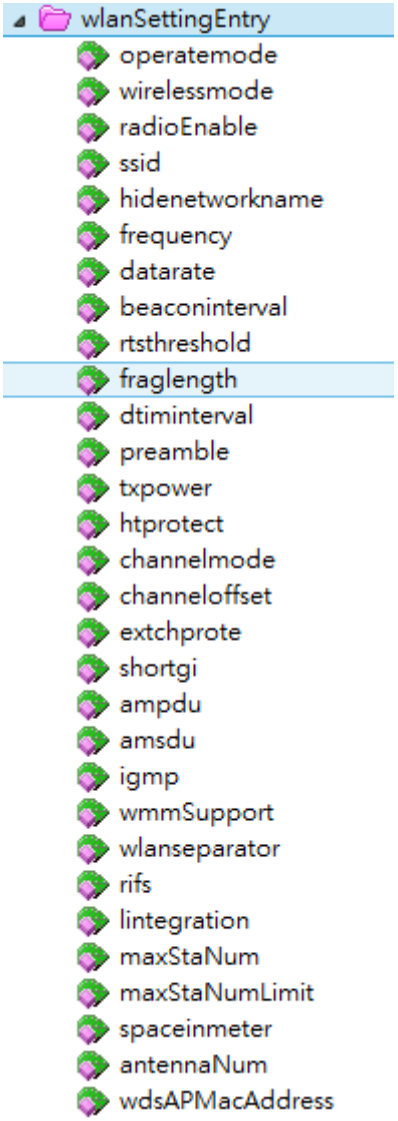
.The below figure shows the MIB tree after compiled in the NMS.



Example: wlanSetting



wlanSettingEntry:



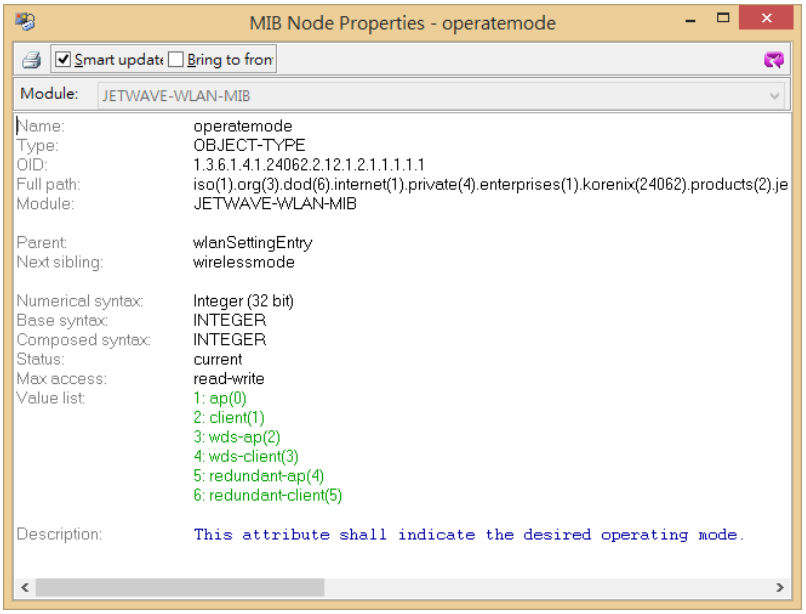
Example of Object in wlanSettingEntry

Operatemode: (Operation Mode)

The OID: 1.3.6.1.4.1.24062.2.12.1.1.1.1.1

Max Access: read-write (Read and Write)

Value list: you can read the value or set a new value according to the value list. This is the same as web GUI and CLI.



Select the OID and press the Right key of the mouse. You can see the tool set to read or write new value.

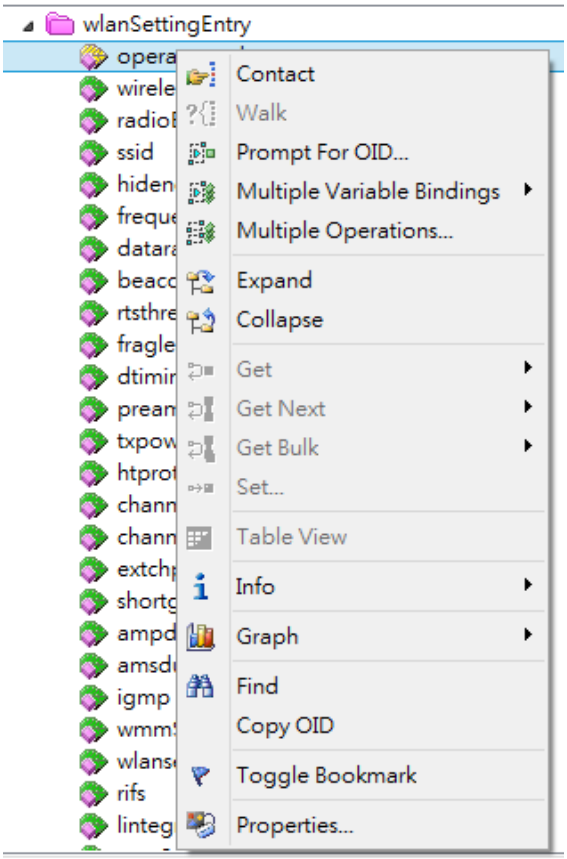
Get: Read the value of the selected OID.

GetNext: Read the value of the next OID.

GetBulk: Read the value of the next 10 OID.

Set: Set new value for the selected OID.

Property: See the MIB Node information.



5.2 Command Line Interface (CLI)

The AP/Gateway provides the Command Line Interface (CLI), you can access it through the console or Telnet. The Command Line Interface (CLI) is the user interface to the AP/Gateway's embedded software system. You can view the system information, show the status, configure the switch and receive a response back from the system by keying in a command.

The below screen is the login screen of the AP/Gateway. The default username/password is admin/admin, it is the same as Web GUI. Once you modified it from other configuration interface, please type the new name/password to login.

There are some different command sets. Each command sets has its own access ability and available command lines. These command sets are:

SHOW: This is Read Only command to show the current setting and status of the AP/Gateway.

SET: This is Write command to change the current setting.

LIST: This is Help command to show the usage information of the command.

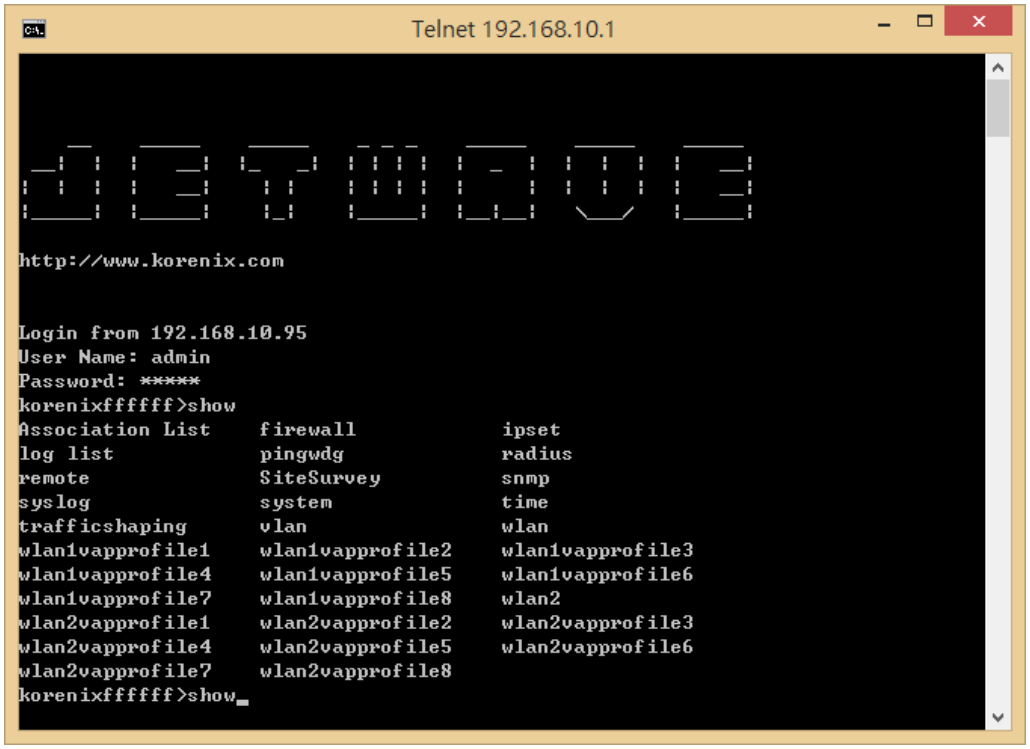
Del: This is Delete command to delete the applied settings.

Exit: To exit the CLI. It is logout command.

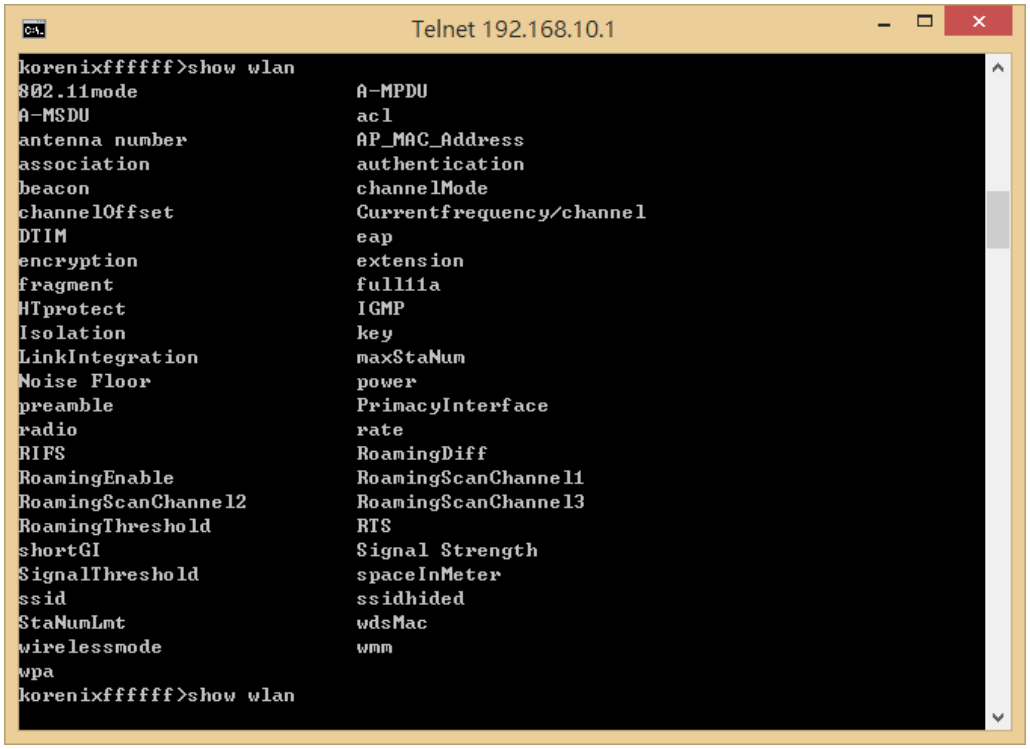
Note: Use **"Tab⇆"** key can help you find the correct command and complete the command no matter you want to Read or Write easier.

5.2.1 SHOW Command Set:

Type **Show** + **"Tab⇆"** to see all the show command sets. The following command lines are available.



Type **Show wlan** + **"Tab⇆"** to see all the show wlan command lines.



Type **Show wlan** + **"Enter"** to see all the wlan information. The console print all the information for reference.

```
korenixffffff>show wlan

wlan wirelessmode          : AP
wlan ssid                  : 3200
wlan ssidhided             : Disabled
wlan radio                 : Enabled
wlan 802.11mode            : 802.11G/N
wlan HTprotect             : Disabled
wlan Currentfrequency/channel: 2442MHz (7)
wlan Noise Floor           : -106 dBm
wlan AP_MAC_Address        : 60:02:b4:78:63:11
wlan power                 : 7
wlan rate                  : Auto
wlan antenna number        : two antenna
wlan wmm                   : Enabled
wlan Isolation             : Disabled
wlan maxStaNum             : 64
wlan StaNumLmt             : Disabled
wlan spaceInMeter          : 0
wlan LinkIntegration       : disabled
wlan channelMode           : 20 MHz
wlan channelOffset         : None
wlan extension             : No Protection
wlan A-MPDU                : Enabled
wlan A-MSDU                : Disabled
wlan shortGI               : Disabled
wlan RIFS                  : Enabled
wlan RTS                   : 2347
wlan fragment              : 2346
wlan beacon                : 100
wlan DTIM                  : 1
wlan preamble              : Auto
wlan IGMP                  : Enabled
wlan authentication        : WPA with Radius
wlan encryption            : TKIP
wlan key type              : None
wlan key default           : 4
wlan wpa psk               : 12345678
wlan wpa keyupdate mode    : Never
wlan wpa keyupdate sec     : 3600
wlan wdsMac remote         : 00:00:00:00:00:00
wlan acl mode              : disabled
wlan acl entry             : NULL
wlan acl list:
                index          MAC address
           ========== ====================
                NULL                NULL

wlan RoamingEnable         : Disabled
wlan RoamingThreshold      : -80
wlan RoamingDiff           : 3
wlan RoamingScanChannel1   : 2437MHz (6)
wlan RoamingScanChannel2   : Not scanning
wlan RoamingScanChannel3   : Not scanning
wlan full11a               : Disabled
```

For example: Type show wlan ra + “Tab” to complete the commands, and then you can see the result.

korenixffffff>show wlan ra (+Tab)

radio rate

korenixffffff>show wlan rad (+Tab)

radio rate

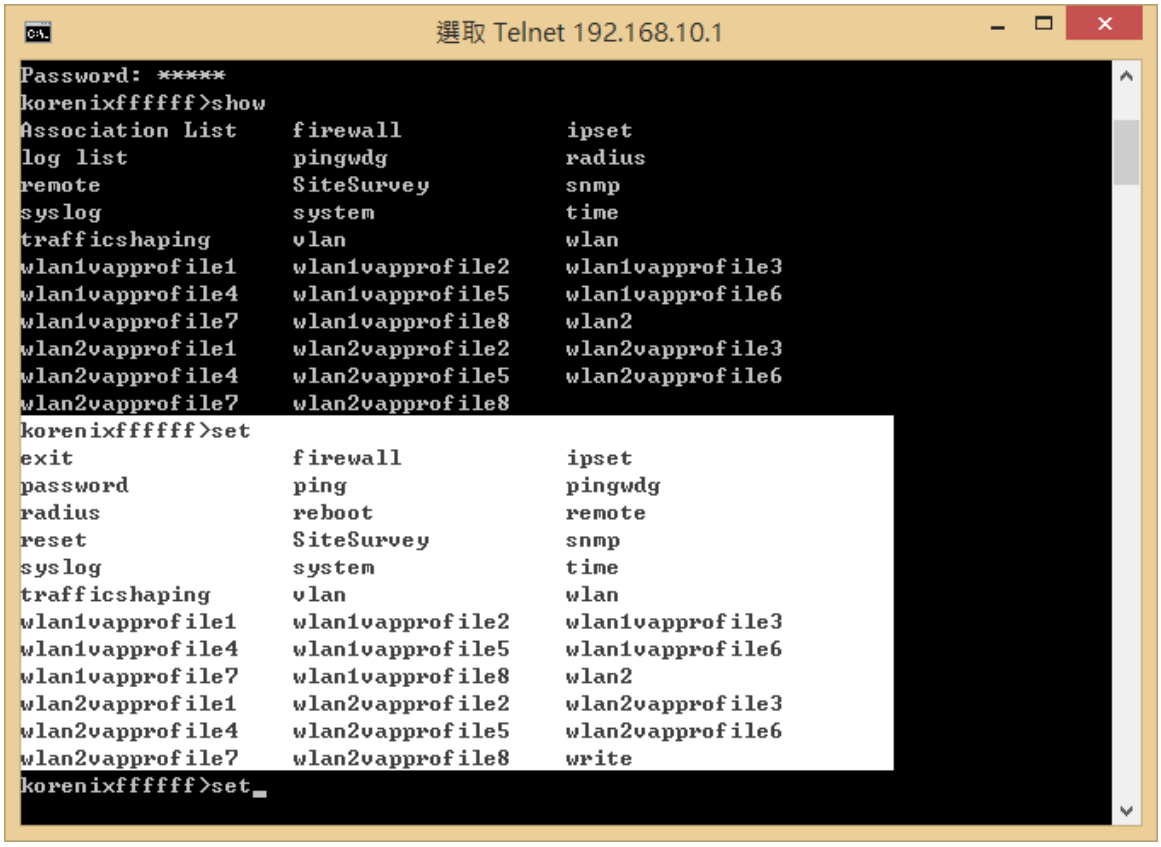
korenixffffff>show wlan radio (+ Enter)

wlan radio : Enabled (This is the result.)

Please check the List command set to know the usage of all commands.

5.2.2 Set Command Set:

Type **Set** + **“Tab⇆”** to see all the write command sets. The following command lines are available.



The most Set comment lines have the same functionality as the the Web GUI configuration we introduce in chapter 4. Please read chapter 4 to know all the features our AP/Gateway supported. And the CLI is a different way for you to complete the setting.

Example: Set the remote configuration (Refer to the 4.5.1 – Remote Configuration)

```
korenixffffff>set remote (+Tab)
email alter       event warning     forcehttps        smtp
snmp              snmptrap          ssh               telnet
```

Example: SNMP Enable/Disable:

```
korenixffffff>set remote snmp
Disabled      Enabled
korenixffffff>set remote snmp Disabled
remote snmp                    : Disabled
korenixffffff>set remote snmp Enabled
remote snmp                    : Enabled
korenixffffff>
```

====SNMP Setting=========

The SNMP command lines and how to set SNMP version, community name, trap server.

```
korenixffffff>set snmp (+Tab)
getCommunity      port              setCommunity      trapcommunity
trapdestination v3Admin             v3User            version
```

```
korenixffffff>set snmp version V2
snmp version                   : V2
```

```
korenixffffff>set snmp getCommunity orwell
snmp getCommunity              : orwell
```

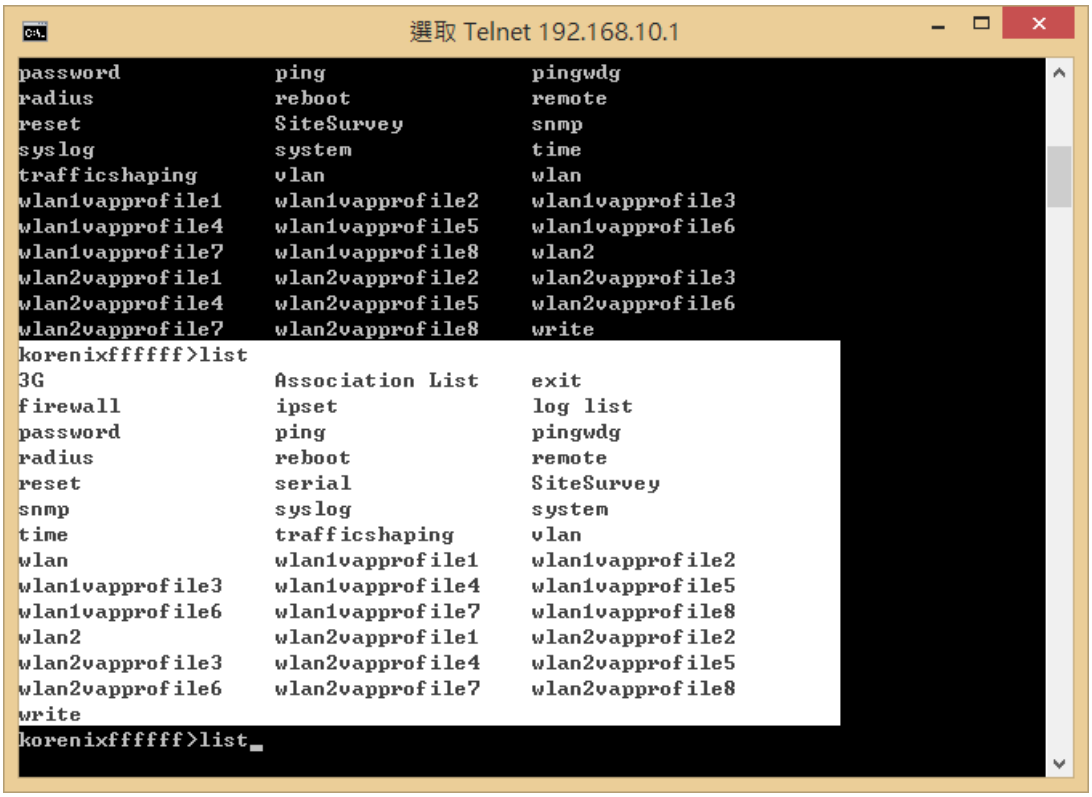
```
korenixffffff>set snmp setCommunity orwell
snmp setCommunity              : orwell
```

```
korenixffffff>set snmp trapdestination 192.168.10.95
snmp trapdestination           : 192.168.10.95
```

```
korenixffffff>set snmp trapcommunity orwell
snmp trapcommunity             : orwell
```

5.2.3 List Command Set:

Type **List** + **"Tab⇆"** to see all the command usage. This is similar to the Help command.



Below command is to list the remote configuration command line and its description.

korenixffffff>list remote

show	set	del	keyword	Description
[X]	[X]		|-telnet	--enable telnet
[X]	[X]		|-snmp	--enable snmp
[X]	[X]		|-ssh	--enable ssh
[X]	[X]		|-forcehttps	--force https
[X]	[X]		|-snmptrap	--enable snmp trap
[X]	[X]		|-email alter	--enable email alert
[X]	[X]		|-event warning	--event warning
[X]	[X]		| |-association	--wlan association
[X]	[X]		| |-authentication	--authentication fail
[X]	[X]		| `-config	--config change
[X]	[X]	[X]	`-smtp	--smtp setting
[X]	[X]		|-sender	--smtp sender
	[X]		|-server	--smtp server
[X]	[X]		|-authType	--authentication type
[X]	[X]		|-username	--mail server username
	[X]		|-password	--mail server password
[X]	[X]	[X]	|-email1	--receiver 1 email
[X]	[X]	[X]	`-email2	--receiver 2 email

show, set and del: Which privilege the command has? [X] means Yes.

Keyword: The command you should enter in the CLI.

Description: Short description of the usage of the command.

5.2.4 Delete Command Set:

Type **del** + **"Tab⇆"** to see all the delete command sets. The following command lines are available.

korenixffffff>del
log list remote wlan wlan2

The log list can be delete through CLI.
korenixffffff>del log list

The configured smtp email addresses can be delete through CLI.
korenixffffff>del remote smtp
email1 email2

The below wlan 1 settings can be delete through CLI. (JetWave 3220/3320 1st Radio)
korenixffffff>del wlan
acl eap key wpa

The below wlan 2 settings can be delete through CLI. (JetWave 3220 2nd Radio)
korenixffffff>del wlan2
acl eap key wpa

5.3 Korenix View Utility

The Korenix View Utility (rename from the JetView V1.5.7) provides you convenient tool to scan the network and configure the AP. Please connect your PC to port Eth 2 (LAN) and start below steps to scan and configure.

5.3.1 Device Discovery:

Step 1: Open the Korenix View Utility. (Must later than V1.5.7)

Step 2: Select the correct NIC (Network Interface Card) from the NIC list or remains the “All Interfaces”.

Step 3: Click **“Discovery”**, and then the Nodes and its IP address can be found and listed in Node list.

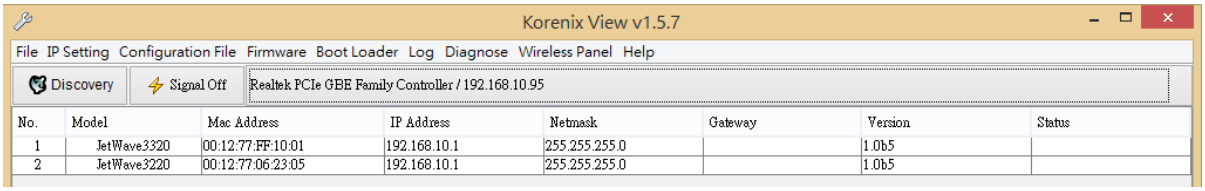
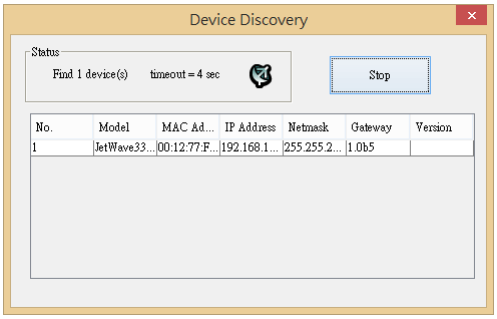


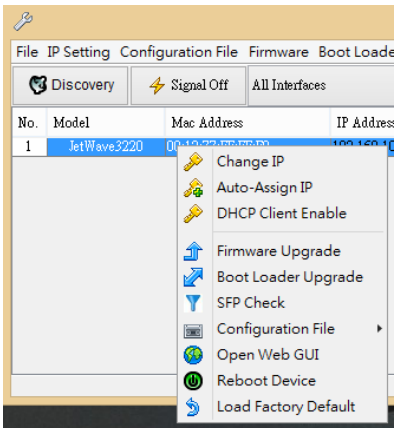
Figure: The main screen of the Korenix View Utility

Figure: The Device Discovery Screen, please wait couple seconds.



5.3.2 Basic Tools Shortcut:

After you scan the network, select the AP/Gateway and click Right key of mouse, you can see some tools.



a. You can modify the IP address/Netmask directly on the field and then click “**Change IP“** to change the IP settings.

b. Select multiple devices and click “**Auto-Assign IP**”, the popup screen will ask you type the IP Address range. You can assign new IP address for the selected devices.

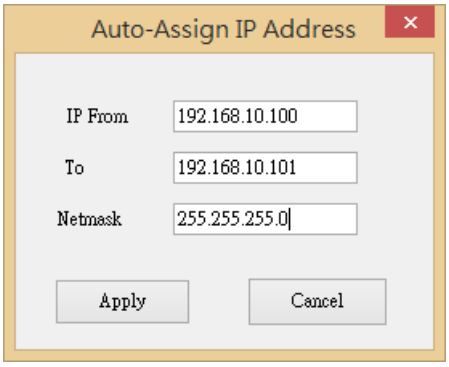
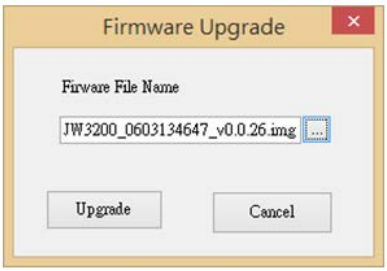


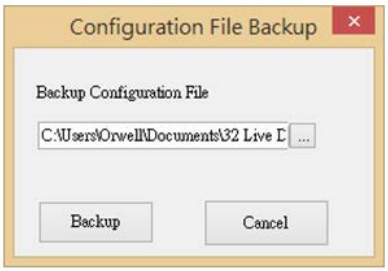
Figure: Assign the Auto-Assign IP Range.

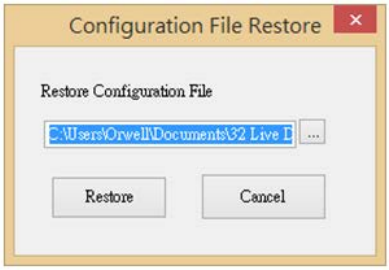
c. You can enable DHCP client by “DHCP Client Enable”.

d. You can upgrade firmware for single or multiple units by **“Firmware Upgrade”**. A popup screen will ask you select the target firmware file you’d like to upgrade.

e. You can Backup/Restore the configuration file by “**Configuration File -> Backup/Restore”**. A popup screen will ask you select target configuration/target folder you’d like to backup or restore.

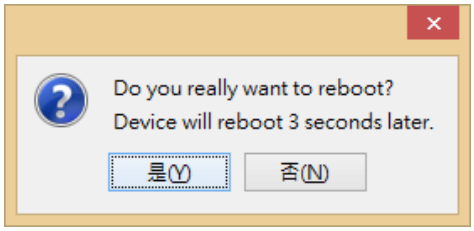




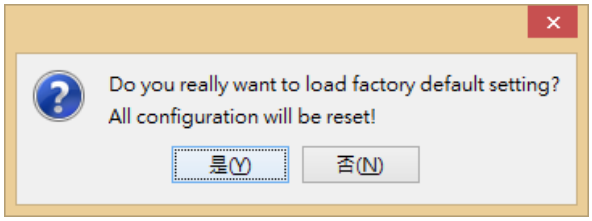


f. Click “**Open Web GUI**” to access the web management interface.

g. You can reboot the device by “**Reboot Device**”. A popup screen will ask you confirm again.



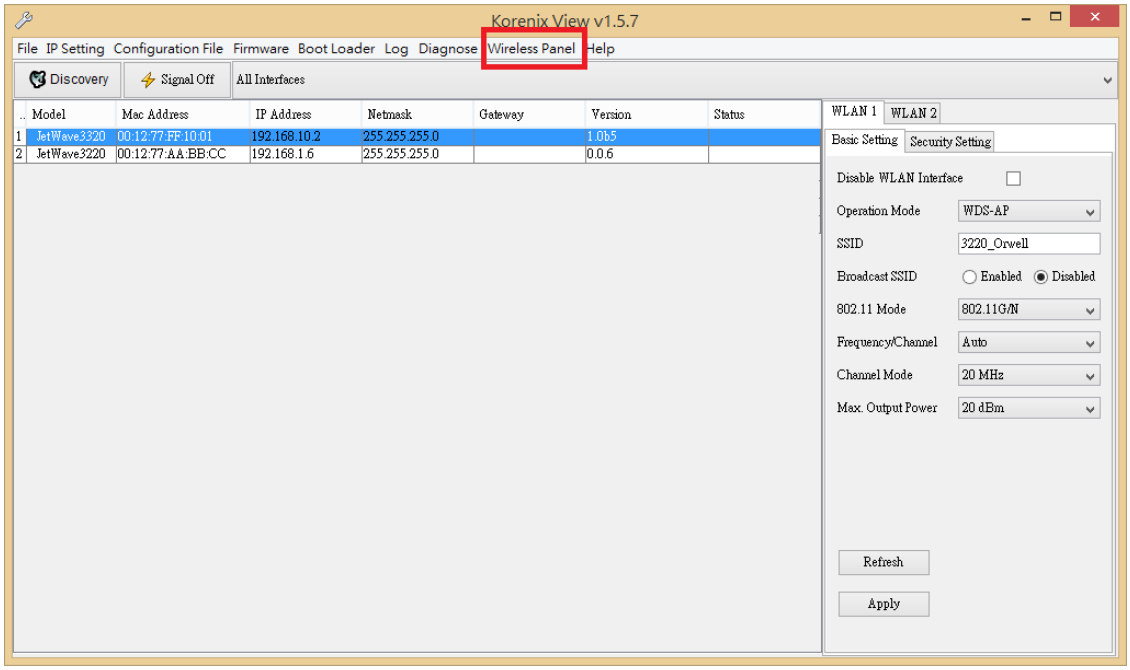
h. You can restore to default configuration by “**Load Factory Default**”. A popup screen will ask you confirm again.



Note: You can also find these commands in the upper menu of the Korenix View Utility.

5.3.3 Wireless Panel

New version Korenix View Utility provides Wireless panel to configure some **Basic Setting** and **Security setting** for Wireless LAN Interfaces. You can use the tool to configure settings for single device or a group of devices. Select the target device/devices for further configuration.

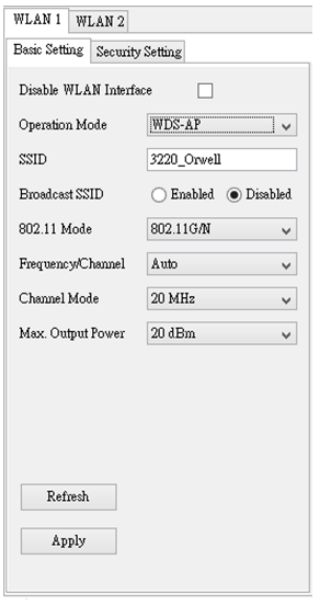


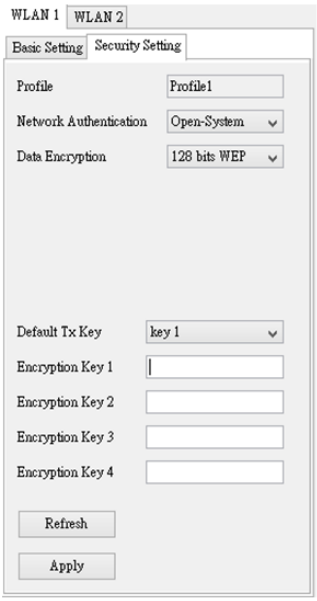
Click **"Refresh"** to load the current configuration of the selected AP/Gateway.

Basic Setting:

The Basic Setting panel allows you Disable WLAN Interface, configure the Operating Mode, SSID, Broadcast SSID Enable/Disable, 802.11 Mode, Frequency/Channel, Channel Mode and Max. output power.

Press "**Apply**" to activate the new settings.





Security Setting:

The Security Setting panel allows you to configure the Network Authentication type and the encryption keys for the AP profile.

Press "**Apply**" to activate the new settings.

Chapter 6

Troubleshooting

Chapter 6 Troubleshooting

This chapter provides troubleshooting procedures for basic problems with the JetWave 3200/3300/3400. For warranty assistance, contact your service provider or distributor for the process.

6.1 General Question

6.1.1 How to know the MAC address of the AP/Gateway?

MAC Address distinguishes itself by the unique identity among network devices. There are two ways available to know it.

Each device has a label posted on the side of the AP. There are MAC addresses for Ethernet and Radio interfaces. On the Web-based management interface, you can view the MAC Address from "**Status**" -> "**Information**". You can also see this in CLI or SNMP OID.

6.1.2 What if I would like to reset the unit to default settings?

You may restore factory default settings by click the "**Reset**" button above 7 seconds. By press Reset button, you will reset the IP address to default IP 192.168.10.1.

Or you can reset the unit to default setting in Web GUI. You can reserve the IP address setting.

6.1.3 What if I can not access the Web-based management interface?

Please check the followings:

- Check whether the IP address of PC is correct (in the same network segment as the unit)
- Login the unit via other browsers such as Firefox, Google Chrome.
- Use Korenix View Utility to scan the AP and check/modify the IP address.
- If everything is correct, but, you still can't access the web GUI, we suggest you connect the console cable to do further checking. Please refer to the pin assignment in hardware installation chapter.
- Check whether the power supply is OK; Try to power on the unit again. If the web GUI can't be accessed issue occurred again, please contact our technical service engineer. We may ask you connect console cable and provide us more information.

6.2 Wireless/Cellular

6.2.1 What if the wireless connection is not stable after associating with an AP under wireless client mode?

- In addition, you can start "**Site Survey**" to check the signal strength. If it is weak or unstable (The smaller the number is, the weaker the signal strength is.), please join other available AP for better connection.
- If you install the directional antenna for point to point/multi-point connection, adjust the antenna and tune the signal strength/performance by Antenna Alignment Tool again. After antenna alignment, the data rate test can help you check the current performance.
- In Wireless client mode, type the connected AP' MAC address to fix the AP for your client. It avoid your wireless client not to connect other AP.

6.2.2 What if the wireless connection performance is not good, how to improve it?

- Once the signal strength RSSI is always under **-65dbm** in long distance transmission, it is suggest you to change antenna's direction or replace antenna with higher gain.
- Check the "**Space in meter**" setting in **"Wireless Advance Setting"**. Correct the distance can help improve the transmission quality.
- If the distance between the wireless client and target AP is short, but, the antenna gain is very high. Reduce the RF power is also an option.

6.2.3 What if the 3G/LTE connection is not stable or poor performance after associating with the base station?

- Please check the signal strength first. Once the signal strength is poor, the connection may be unstable. Even the connection is established, the performance is poor as well.
- You can move the device closed to the window or install external antenna outside the box/room/factory.
- If the distance between the Gateway and base station is far, the high gain antenna is an option to improve the transmission quality.

- Check whether the antenna supports 3G/LTE band or not? Normally, the outlook of the 3G/LTE antenna is the same.
- Check with the ISP and ask them check 3G/LTE connection condition of your site.
- Mark sure the SIM card has enough quota/budget for both data upload and download. Some out-of-quota/budget card is only available for Download stream only.
- Make sure the maximum 3G/LTE speed you applied from ISP. The remote connection will also reduce the performance. Make sure you have enough bandwidth from ISP.
- Download the screen message and debug message to our service engineer.
- Continuously ping one remote IP address through 3G/LTE connection for a while, once the ping is often timeout, check the status before leave the device on site.

6.2.4 What if the 3G/LTE connection is always disconnected, how to resolve it?

- Make sure the SIM card is not damaged and you insert the SIM card before power on the device. Note: If the device supports 3G/LTE redundant, you MUST insert two SIM before power on the device.
- Make sure you insert the SIM card well, check the SIM status on Web GUI.
- Make sure the SIM card is available to support 3G/LTE connection. It is a simple way to insert it to smart phone for trail test.
- Mark sure the SIM card has enough quota/budget for both data upload and download. Some out-of-quota/budget card is only available for voice only.
- Make sure the SIM settings. For example the APN number, SIM security…etc. In some countries, the carrier service provider asks customer input the correct APN name first. The APN name may be different than its original setting. Please check the with your carrier service provider and type them correctly.
- Check whether the antenna supports 3G/LTE band or not? Normally, the outlook of the 3G/LTE antenna is the same.
- Download the screen message and debug message to our service engineer.

6.3 Appendix

6.3.1 ASCII

WEP can be configured with a 64-bit or 128-bit Shared Key (hexadecimal number or ACSII). As defined, hexadecimal number is represented by 0-9, A-F or a-f; ACSII is represented by 0-9, A-F, a-f or punctuation. Each one consists of two-digit hexadecimal.

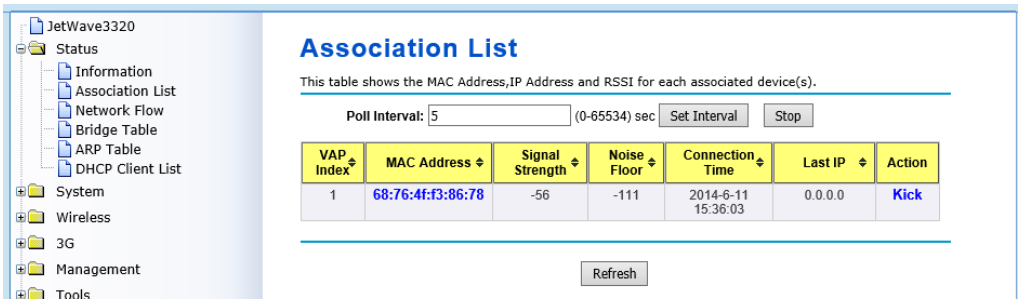
ASCII Table

ASCII Character	Hex Equivalent	ASCII Character	Hex Equivalent	ASCII Character	Hex Equivalent	ASCII Character	Hex Equivalent
!	21	9	39	Q	51	i	69
"	22	:	3A	R	52	j	6A
#	23	;	3B	S	53	k	6B
$	24	<	3C	T	54	l	6C
%	25	=	3D	U	55	m	6D
&	26	>	3E	V	56	n	6E
‘	27	?	3F	W	57	o	6F
(	28	@	40	X	58	p	70
)	29	A	41	Y	59	q	71
*	2A	B	42	Z	5A	r	72
+	2B	C	43	[	5B	s	73
,	2C	D	44	\	5C	t	74
-	2D	E	45	]	5D	u	75
.	2E	F	46	^	5E	v	76
/	2F	G	47	_	5F	w	77
0	30	H	48	`	60	x	78
1	31	I	49	a	61	y	79
2	32	J	4A	b	62	z	7A
3	33	K	4B	c	63	{	7B
4	34	L	4C	d	64	|	7C
5	35	M	4D	e	65	}	7D
6	36	N	4E	f	66	~	7E
7	37	O	4F	g	67		
8	38	P	50	h	68		

6.3.2 RSSI Conversion

RSSI Conversion in JetWave 3220/3320/3420 Series WIFI:

RSSI is short of the **Received Signal Strength Indicator,** is a measurement of the power present in a received radio signal. In Korenix web GUI, you can see the two related values:



Signal Strength: The signal strength of the associated device. The value can help you to see the connection quality of AP/WDS-AP and Client/WDS-Client.

Noise Floor: The Noise Floor of the associated device.

Different suppliers may use different way to display the signal strength. In korenix JetWave 3200/3300 series, the RSSI = Signal Strength – Noise Floor – 95 (defined by chipset provider).

The RSSI example of above figure is -56 – (-111) -95 = 55 -95 = -40

JetWave 3200/3300 series RSSI Conversion:

RSSI_Max = 60

The RSSI of is range from -35dBm (100%) ~ -95dBm (0%).

Ex: From the value in above example, you can convert -40dBm to around 91.3% of maximum radio power. The link quality is very good. The figure in the right is the lookup table for your reference.

Korenix	
RSSI	%
-35	100
-40	91.3
-45	83
-50	74.7
-55	66.4
-60	58.1
-65	49.8
-70	41.5
-75	33.2
-80	24.9
-85	16.6
-90	8.3
-95	0

While comparing Korenix product with other competitors, you can follow the way to convert Korenix RSSI to % of the maximum RF Tx Power of other products.

RSSI Conversion in Cisco for reference:

Cisco has the most granular dBm lookup table.

RSSI_Max = 100, Range from -10~-113dBm

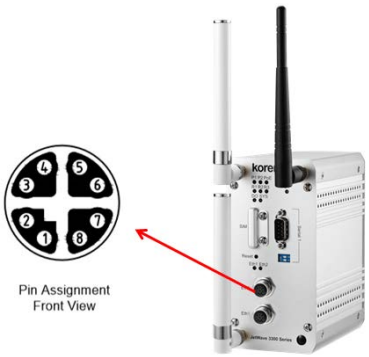
Convert % to RSSI in the following table. The RSSI is on the left, and the corresponding dBm value (a negative number) is on the right.

0	= -113	34	= -78	68	= -41
1	= -112	35	= -77	69	= -40
2	= -111	36	= -75	70	= -39
3	= -110	37	= -74	71	= -38
4	= -109	38	= -73	72	= -37
5	= -108	39	= -72	73	= -35
6	= -107	40	= -70	74	= -34
7	= -106	41	= -69	75	= -33
8	= -105	42	= -68	76	= -32
9	= -104	43	= -67	77	= -30
10	= -103	44	= -65	78	= -29
11	= -102	45	= -64	79	= -28
12	= -101	46	= -63	80	= -27
13	= -99	47	= -62	81	= -25
14	= -98	48	= -60	82	= -24
15	= -97	49	= -59	83	= -23
16	= -96	50	= -58	84	= -22
17	= -95	51	= -56	85	= -20
18	= -94	52	= -55	86	= -19
19	= -93	53	= -53	87	= -18
20	= -92	54	= -52	88	= -17
21	= -91	55	= -50	89	= -16
22	= -90	56	= -50	90	= -15
23	= -89	57	= -49	91	= -14
24	= -88	58	= -48	92	= -13
25	= -87	59	= -48	93	= -12
26	= -86	60	= -47	94	= -10
27	= -85	61	= -46	95	= -10
28	= -84	62	= -45	96	= -10
29	= -83	63	= -44	97	= -10
30	= -82	64	= -44	98	= -10
31	= -81	65	= -43	99	= -10
32	= -80	66	= -42	100	= -10
33	= -79	67	= -42		

(The figure is captured from Internet, it is just for reference only.)

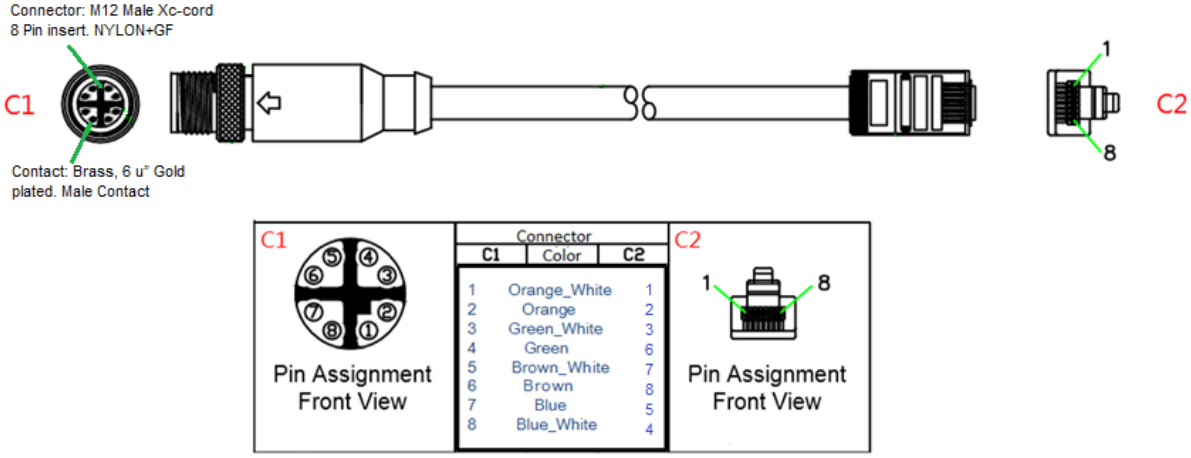
6.3.3 M12 Connector Pin Assignment

X-cord M12 Connector



M12X to RJ-45 (Shielding) Cable Pin Assignment:

Please follow below figure to assembly your cable.



M12 Connector: M12 Male Xc-cord 8 Pin insert. NYLON-GF

Contact: Brass, 6u" Gold plated. Male Contact

M12 (C1)	Color	RJ-45 (C2)	Functionality
1	Orange_White	1	MDX 0+
2	Orange	2	MDX 0-
3	Green_White	3	MDX 1+
4	Green	6	MDX 1-
5	Brown_White	7	MDX 3+
6	Brown	8	MDX 3-
7	Blue	5	MDX 2-
8	Blue_White	4	MDX 2+

6.3.4 JetWave 3420 Web GUI Pages

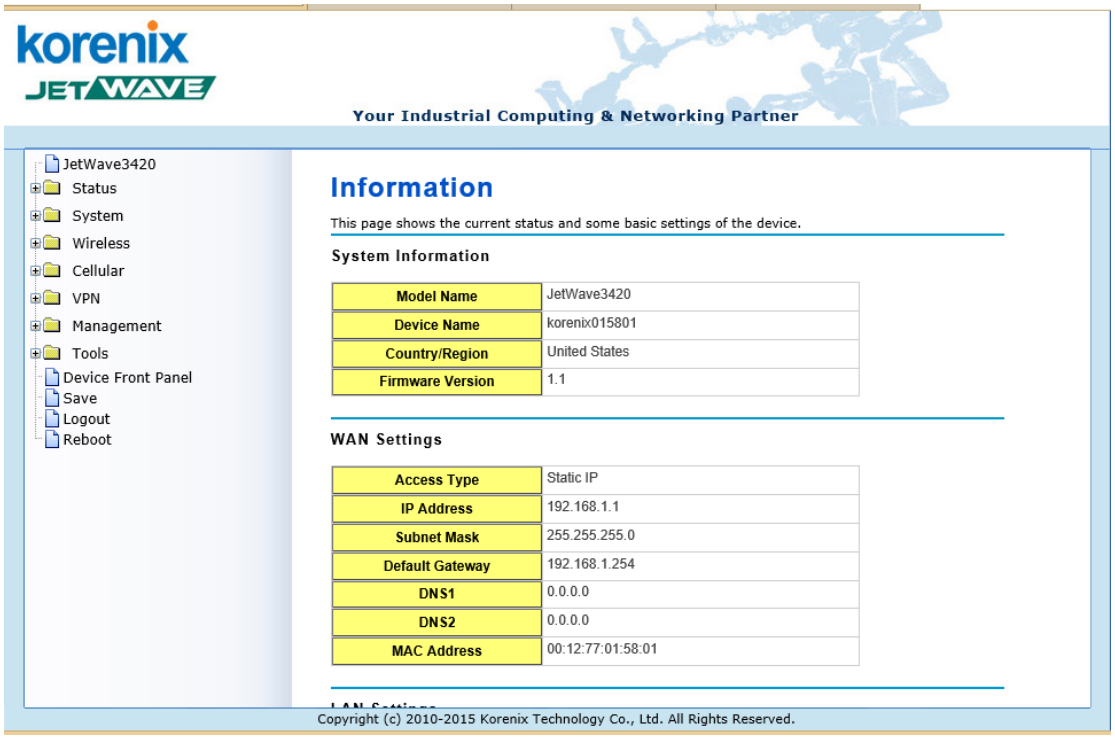
The firmware V1.1 released by Jan. 9, 2015 starts to support JetWave 3420 Series. This appendix shows the JetWave 3420 login page, Information and Main GUI.

The JetWave 3420 Login Page

The JetWave 3420 Main Entries

The 3G setting is changed to “Cellular”.

The system starts to support OpenVPN client in firmware V1.1. VPN Settings is new entry.



Revision History

Version	Description	Date	Editor
V1.0	1st release for JetWave 3220/3220-M12 and JetWave 3320/3320-M12. **Note:** The 3G interface and software features are only available in JetWave 3320 Series. This version is applied to firmware V1.0.	July, 2014	Orwell Hsieh
V1.0a	Add Change Default Setting **"Warning".** Change Bridge Table figure Change Highest Baud Rate = 460.8kbps. Add Firewall may affect firmware upgrade and configuration backup/restore. Add Appendix-RSSI Conversion Change PDF format	Aug., 2014	Orwell Hsieh
1.0b	Add JetWave 3220/3320/3420-M12 M12 connector pin assignment in Appendix 6.3.3.	Aug. 22, 2014	Orwell Hsieh
V1.1	● Add JetWave 3420/3420-M12 product appearance and updated major feature. ● Add Antenna number table in chapter 2.4 Antenna Socket. ● **The firmware V1.1** supports JetWave 3420 LTE, OpenVPN client… new changes and bug fix. (Please refer to the firmware release notes for detail.) The related UI/ feature/ Wordings are changed and updated in chapter 4.4 ● Add 4.8 OpenVPN Setting ● Add 6.3.4 JetWave 3420 Series Web GUI pages for reference. ● Add LTE IOT issue explain and ping UI.	Jan. 9, 2015	Orwell Hsieh
V1.2	● **The firmware V1.2** supports Mobile Manager, GPS function(only for JetWave 3320), inbound filter function, wireless offload function, IPSec VPN, new changes and bug fix. (Please refer to the firmware release notes for detail.) The related UI/ feature/ Wordings are changed and updated in chapter 4.4 ● Add 4.2.9 inbound filter ● Add 4.3.5 wireless auto offload	Jun. 15, 2015	Latrell Wang

	• Add 4.4.5 mobile manager setting • Add 4.5 GPS setting • Modify 4.6.2 OpenVPN • Add 4.6.3 IPSec		