User's Manual

Version: 1.0

WiFi AP Router Module

Copyright Statement

Trademarks

Copyright Statement

Federal Communication Commission Interference Statement

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

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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

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

IMPORTANT NOTE:

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.
This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Contents

Chapter 1 Introduction

1.1 Introduction

Thank you for purchasing AWM002 WiFi AP Router Module Multi-purpose Wireless device.

AWM002 is a tiny WiFi AP/Router Module with up to 150Mbps transmission rate. It supports three working modes: AP Client, and Router.

The default mode is AP Client mode can be easily switched by sliding the side switch.

AWM002 can be powered from either DC 3.3V 460mA and 1.2V 500mW power input. The Base board is powered by DC 12V 1A.

This Module could be installed in any electronic devices for directly controlled.

- Home Automation
  - power switch
  - air conditioner
  - heater

- coffee machine
- television
- water shower for planets
- automation controller
- surveillance camera, baby mornitor

➢ Industrial Control

- Machine control
- Power saving control
- Timer automatic

You can link with internet and do any you want from 3G linking or any place in the world.

1.2 Hardware Features

Standard	IEEE 802.11 b/g/n standards compliant
Wireless LAN	1T1R Mode
Connector Pins Pitch	1.27mm
Antenna	iPex Connector *1 (PIFA optional)
30-pin Interface	USB*1 (Host) UART*1 GPIOs VCC/GND I2S I2C PCM
Frequency Range	2.400 ~ 2.4835GHz (subject to local regulations)
Number of Selectable Channels	802.11n 20MHz/40MHz ; 802.11b/g USA, Canada (FCC):11 channels (2.412GHz~2.462GHz) Europe (CE): 13 channels (2.412GHz~2.472GHz) Japan (TELEC): 14 channels (2.412GHz~2.4835GHz)
Data Rate	802.11n: up to 150Mbps 802.11b: 1, 2, 5,5, 11Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps
Coverage Area	Up to 6 times faster then existing 802.11 b/g products
Transmit Power(EIRP)	11n HT40 MCS7 : +11 dBm 11b CCK: +15 dBm 11g OFDM: +12 dBm
Receiver	-66dBm at HT40 MCS7

Sensitivity	-73dBm at 54Mpbs -86dBm at 11Mpbs
Certifications	FCC/CE by request
Power consumption	Pin input: 3.3V 460mA, 1.2V 500mA(LDO) Total: 5V 550mA Above are the peak, average is like 5V 300mA, depend on the system design.
Weight	30g
Dimension	25x35 mm
Storage Temperature	-20 to 85℃
Storage Humidity	0 to 85%
Operation Temperature	0 to 70℃
Operation Humidity	0 to 80%

1.3 Software Features

WAN	• WiFi WAN • Static IP • DHCP Client • PPPoE (for ADSL) • Transparent Bridge
Networking	• DHCP Client/Relay/Server • Dynamic DNS • NTP Client • DNS Cache/Proxy • Firewall: ➢ PPTP ➢ L2TP ➢ IPSec ➢ MAC/IP/Port Filter ➢ Virtual Server ➢ DMZ ➢ Content Filter ➢ Forbid BT ➢ Forbid Mule
WIFI	• 2 Transmit and 2 Receive paths (2T2R) • 20MHz/40MHz bandwidth • Support Hidden SSID

	• Support WPS • Clock rate up to 400MHz Legacy and High Throughput Modes • High security: WEP64/128,TKIP, WPA,WPA2 AES,mixed, 802.11i • 802.1X Authentication with RADIUS Client • QoS-WMM, WMM-PS

1.4 Package contents

The package contains the following items

- 1 AWM002
- 1 AWM002 Base Board
- 1 AC/DC Adapter
  Input: 110~240V 50/60Hz,
  Output: 12V 1A adapter
- 1 Quick Installation Guide

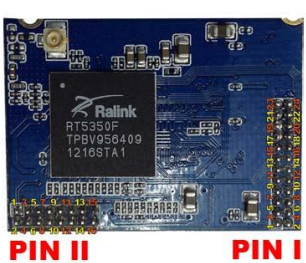
Chapter 2 Hardware Installation

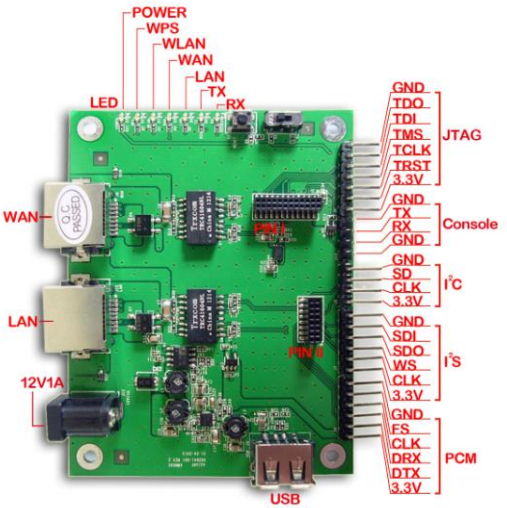
2.1 How to start

After you unpack the box, please make sure all the components are completed.

Follow the below setup to setup the AWM002:

1. Put the AWM002 Module on Base board and linked with a small PCB antenna.
2. Connect Power Adaptor to get the 12V 1A power. LEDs will turn on and flashing.
3. Wait around one minute the WiFi signal start flashing, you can see the WiFi signal from your computer or mobile device with WiFi function.
4. Link WiFi or link RJ45 cable, log into the IP address 10.10.1.1 or 10.10.10.254, input admin/admin log in.




POWER
WPS
WLAN
WAN
LAN
TX
RX
LED
WAN
LAN
12V1A
USB
GND
TDO
TDI
TMS
TCLK
TRST
3.3V
JTAG
GND
TX
RX
GND
Console
GND
SD
CLK
3.3V
I2C
GND
SDI
SDO
WS
CLK
3.3V
I2S
GND
FS
CLK
DRX
DTX
3.3V
PCM

2.2 LED Indicator and Port Description

LED indicators description on front panel: (From R to L)

1. **PWR:** Indicates AWM002 is power on.
2. **WPS:** Flashing indicates AWM002 is negotiating with the client in WPS mode.
3. **WLAN:** Indicates the WIRELESS LAN is connected.
4. **WAN:** Indicates an Ethernet cable is connected into WAN port.
5. **LAN:** Indicate an Ethernet cable is connected into the LAN port.
6. TX: Indicate the data transfer.
7. RX: Indicated the data received.

2.3 Position Slide Switch, Customized by option.

2.4 Reset button

2.5 PIN DEFINITION

I

Description	Pin	Pin	Description
+3.3V	2	1	+3.3V
UART_Rx	4	3	GND
UART_Tx	6	5	Reserved

GND	8	7	WPS/Reset to Default #
LED_WLAN#	10	9	GND
LED_WPS#	12	11	USB_D+
AP/Client selection	14	13	USB_D-
1.2V	16	15	1.2V
GPIO #19	18	17	TX0+
GPIO #18	20	19	TX0-
GPIO #17	22	21	RX0+
LINK0_LED	24	23	RX0-

II

Description	Pin	Pin	Description
I^2SCLK	2	1	PCMFS
I^2SWS	4	3	PCMCLK
I^2SSDO	6	5	PCMDRX
I^2SSDI	8	7	PCMDTX
I^2C_SCLK	10	9	I^2C_SD
RX1+	12	11	TX1+
RX1-	14	13	TX1-
GND	16	15	GND

Size:

1. Size: 25*35 mm

Double row 1.27mm pitch on the 35mm side

2. Reserved: Available for use
3. Reserved is ACTIVE LOW
4. LEDs and WPS/Reset to Default are active LOW

Reset /Reset to default function is share AP/Client selection pin

Chapter 3 Firmware Setup

This chapter is to describe how to configure AWM002 to setup different modes: Wireless Router (Transparent Bridge), AP Client and Wireless AP mode.

Operation Mode:

- **Wireless Router (Transparent Bridge):** In this mode, the Ethernet WAN port is for WAN. The connection type can be setup in WAN page by using Static IP, DHCP (Auto config), PPPoE, and Transparent Bridge. LAN port is for LAN and wireless is LAN also.

- **Wireless AP Client:** In this mode, the device is supposed to connect to internet or the other wireless router via Wireless WAN. The NAT is enabled and PCs in LAN ports share the same IP to ISP through WAN port.

3.1 Default Configuration

IP address	10.10.1.1 or 10.10.10.254
Subnet mask	255.255.255.0
Username	admin
Password	admin
Operation Mode	AP Client

DHCP	On
SSID	AWM002 / WioData
Channel	Smart select
Security	Off

3.2 Configure AWM002

1. Connect the Ethernet cable to the AWM002 LAN port and your notebook/computer.
2. Power up to AWM002.
3. Open Internet Explorer from your notebook/computer
4. Enter: http://10.10.1.1
5. Enter the **Username** and **Password**. If this is the first time use, than enter “admin” and “admin” on both username and password.
6. The following screen will show up and follow the instruction

3.2.1 Status

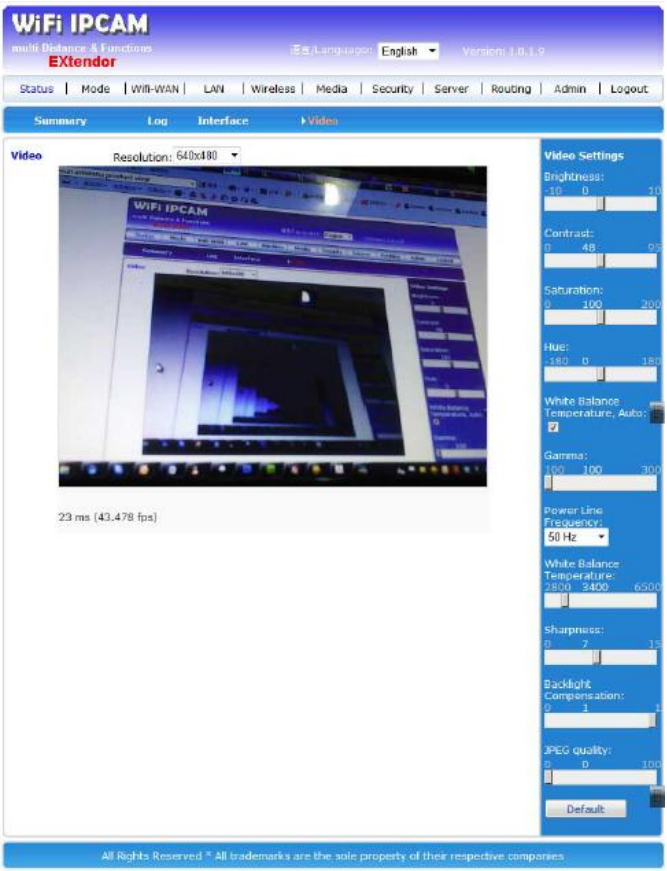
This directory is included Summary, Log, Interface, and Video.

Summary shows the most information of the router.

Log is System Information, System warming, and System Log records can let engineer or user to look the turn on record and other linking devices.

Interface is the statistics of network.

Video you can see the image when you plug the web camera into AWM002 base board USB port as below.



You can adjust Brightness, Contract, Saturation, Hue, White Balance Auto, Gamma, Power line frequency, White Balance Temperature, Sharpness, Backlight Compensation, JPG quality.

3.3 Mode

Three modes you can see, **Wireless Router (Gateway), Wireless AP Client,** and **Standard Wireless AP** mode. By switch, you can see what mode you are using now.

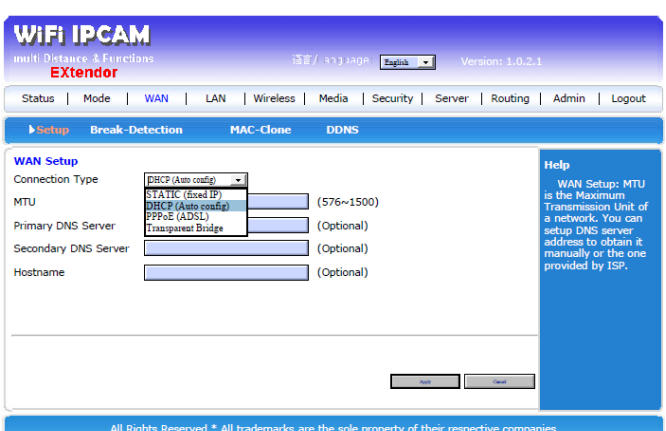
3.4 Wireless Router (Transparent Bridge) Mode

3.4.1 WAN

3.4.1.1 Setup

Default is DHCP, means can get IP address from the main router or ISP. There are four selections:

- Static (fixed IP)
- DHCP (Auto config)
- PPPoE (ADSL)
- Transparent Bridge



3.4.1.2 Break-Detection

Default is disable, it is send a message to Gateway to reboot the linking.

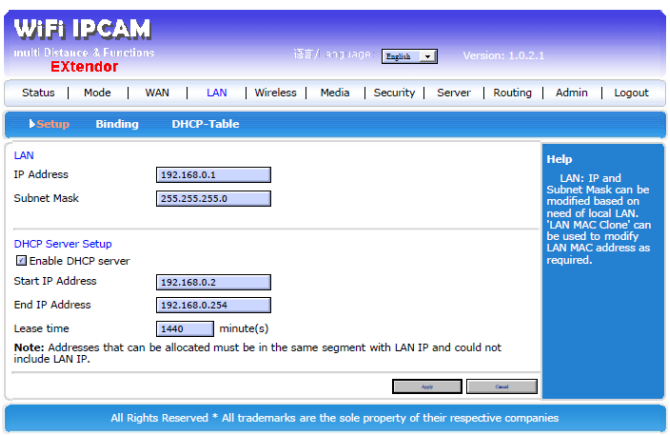
3.4.1.3 MAC-clone

Change MAC address to the other MAC address for fitting ISP's identified.

3.4.1.4 DDNS

Dynamic DNS is for you to register one address in DNS server for you from internet to get link back this router. For more detail, please search in searching engine.

3.4.2 LAN

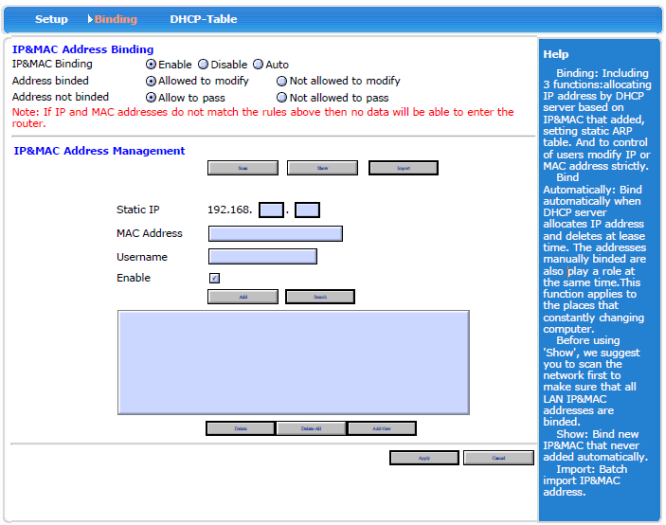


3.4.2.1 Setup

LAN you can set up the IP address and LAN's DHCP server.

3.4.2.2 Binding

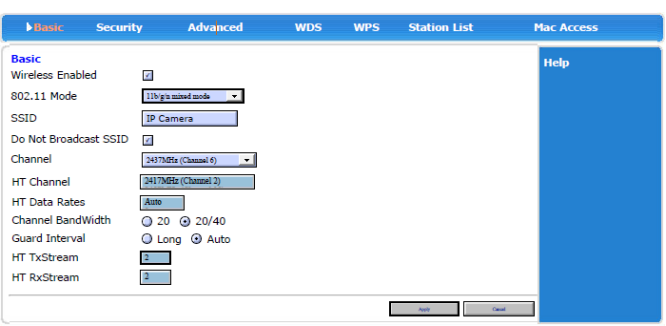
Binding: Including 3 functions: allocating IP address by DHCP server based on IP&MAC that added, setting static ARP table. And to control of users modify IP or MAC address strictly. Bind Automatically: Bind automatically when DHCP server allocates IP address and deletes at lease time. The addresses manually binded are also play a role at the same time. This function applies to the places that constantly changing computer. Before using 'Show', we suggest you to scan the network first to make sure that all LAN IP & MAC addresses are binded. Show: Bind new IP&MAC that never added automatically. Import: Batch import IP&MAC address.



3.4.2.3 DHCP-table

DHCP Table: Display all IP address allocated by current DHCP server.

3.4.3 Wireless



There are Basic, Security, Advanced, WDS, WPS, Station List, and MAC Access.

3.4.3.1 Basic

Set wireless connection basic information, you could set enable and disable wireless function, Broadcast and not broadcast SSID, set SSID name and etc.

3.4.3.2 Security

The types of wireless security mode are as followings, and you couls select as the need.

- Disable
- Open System
- WPA
- WPA-PSK
- WPA2
- WPA2-PSK
- WPAPSKWPA2PSK (WPA-PSK and WPA2-PSK)
- WPA1WPA2(WPAand WPA2)

3.4.3.3 Advanced

Set advanced information of wireless connection.

3.4.3.4 WDS

There are Disable, Lazy mode, Bridge mode, and

Repeater mode.

3.4.3.4 WPS

There are Enable and Disable.

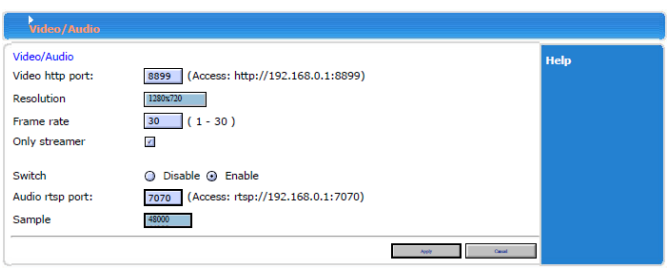
3.4.3.5 Station List

3.4.3.6 MAC Access

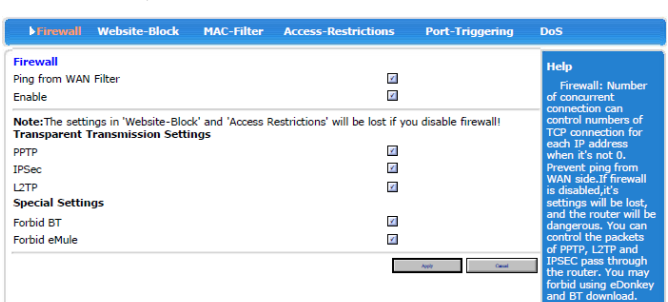
MAC Access can limit the linking of Wireless by MAC. Like allow or deny the MAC list you input here.

3.4.4 Media

You can set up Video and Audio setting here.



3.4.5 Security



3.4.5.1 Firewall

After enabling firewall, it can prevent internet malicious attacks to roter or computers in LAN and ensure safe operation of router computers in LAN. Especilly for some open servers (such as virtual server, DMZ and etc.), enabling router firewall function can block malicious attacks and prevent DoS attack.

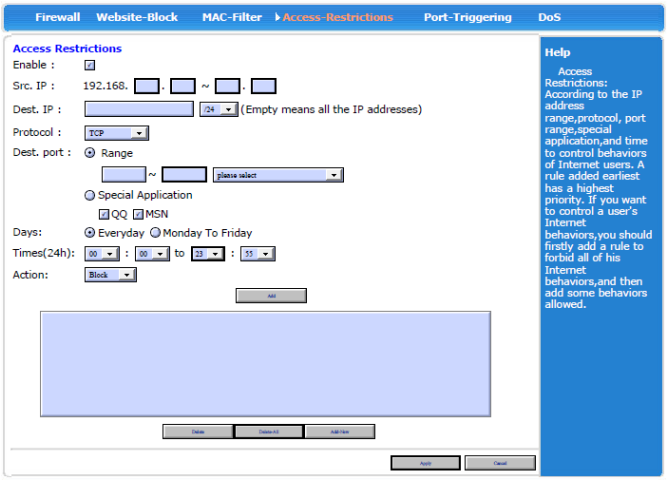
3.4.5.2 Website-Block

Select website block→ Enable, add to the list and click “apply” to save.

3.4.5.3 MAC-Filter

In “MAC filter”, you could forbid the added MAC address and also just allow the added MAC address passing router.

3.4.5.4 Access-Restrictions



In the "Access-Restrictions", you could block or accept some ports passing router and effectively block virus by controlling port range. Notes: The ports here include source port and destination port. So, the data packet will be disposed by discarded by router no matter the source port or destination port of data packet within this range.

3.4.5.5 Port-Triggering

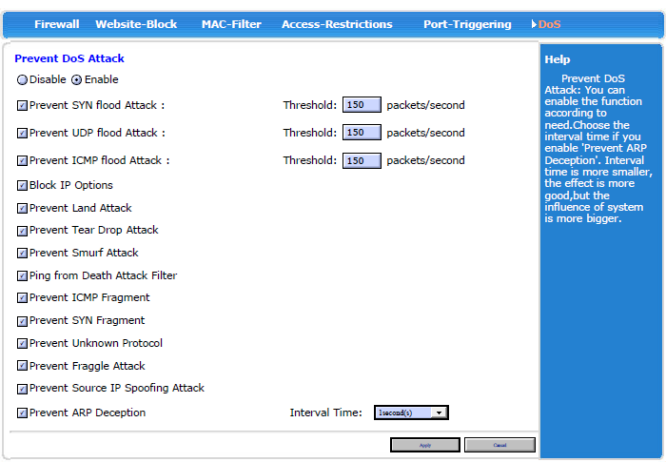
In the "Port block, you could block some ports passing router and effectively block virus by controlling port range. Notes: The ports here include source port and destination port. So, the data packet will be disposed by discarded by router no matter the source port or destination

port of data packet within this range.

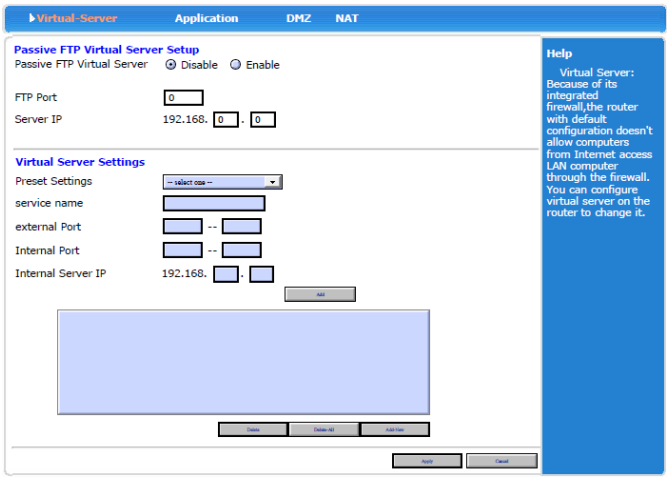
3.4.5.6 DoS

Items	Description
Forbid/Enable	Forbid or Enable the function of preventing DOS attack.
Prevent SYN flood attack	Prevent Syn Flood attack. Set maximum rate of Syn packet according to visit capacity of server in normal situation. Threshold is150 packets/second.
Prevent UDP flood attack	Prevent UDP flood attack. Set maximum rate of UDP packet according to visit capacity of server in normal situation. Threshold is150 packets/second.
Prevent ICMP flood attack	Prevent ICMP flood attack. Set maximum rate of ICMP packet according to visit capacity of server in normal situation. Threshold is150 packets/second.
Prevent IP	Prevent IP attack by enabling this.
Prevent Land attack	Prevent Land attack by enabling this.。
Prevent Tear Drop attack	Prevent Tear Drop attack by enable this.
Prevent Smurf attack	Prevent Smurf attack by enabling this.
Prevent Ping of Death attack	Prevent Ping of Death attack by enabling this.
Prevent ICMP Fragment	Prevent ICMP Fragment attack by enabling this.
Prevent unknown protocol	Prevent unknown protocol attack by enabling this.

Items	Description
Prevent Fraggle Attack	Prevent Fraggle ICMP Fragment attack by enabling this.
Prevent source IP spoofing attack	Prevent source IP spoofing attack attack by enabling this.
Prevent ARP Deception	Enable ARP deception function by enabling this. The shorter the interval is, the better preventing ARP deception virus is. But it influences system a lot. Please select according the need.



3.4.6 Server



3.4.6.1 Visual Server

Virtual Server: Because of its integrated firewall, the router with default configuration doesn't allow computers from Internet access LAN computer through the firewall. You can configure virtual server on the router to change it.

3.4.6.2 Application

Application: Some softwares are needed multiple Internet connections, such as IP telephone, video conference and so on, and normally the firewall will block these connections. In order to make these softwares work normally, the firewall must know what kind of situation need to open multiple connections. Through the definition

of special applications, when the firewall found a 'Trigger Port' to be opened by a computer, it allows connections from Internet to pass through the corresponding 'external port' to be established.

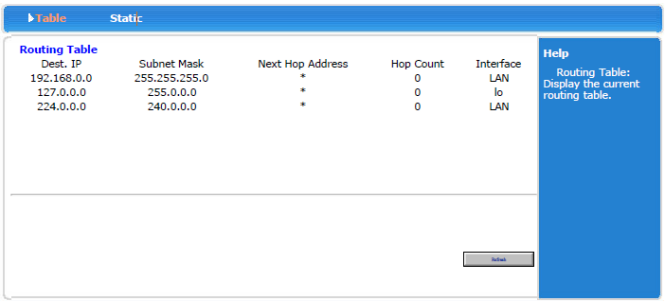
3.4.6.3 DMZ

The DMZ host computer actually is a default virtual server. If the router received a request from the external network, it will check whether there is a virtual server match in the list according to port of the external service firstly, if there is, put forward the corresponding request to the host, if not, put forward the corresponding request to the DMZ host. When the DMZ host is not set, it will discard the request.

3.4.6.4 NAT

Outside network IP address will be one-to-one mapping to inside network address.

3.4.7 Routing



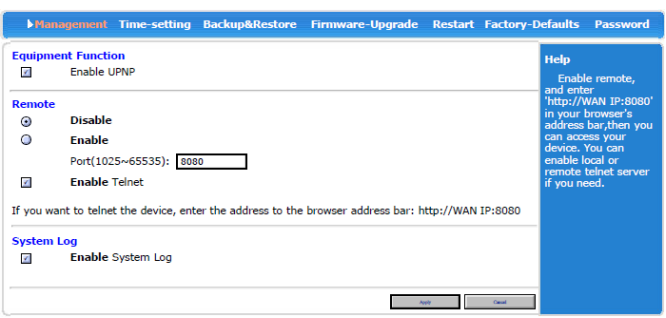
3.4.7.1 Table

Display the current routing table.

3.4.7.2 Static

Allow user define the path routing to the other host or network.

3.4.8 Admin



3.4.8.1 Management

UPnP（Universal Plug and Play）the protocol for

DLNA, the purpose is let smart electronic devices communicated with each other.

Remote is administration from WAN control.

System Log function default is enable.

3.4.8.2 Time-setting

3.4.8.3 Backup & Restore

Setting's backup and restore.

3.4.8.4 Firmware Upgrade

3.4.8.5 Restart

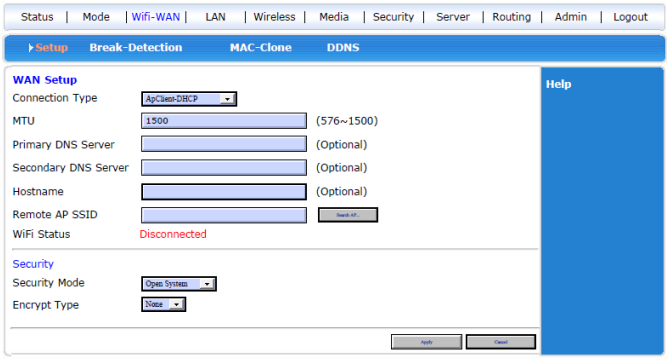
3.4.8.4 Factory Default

3.4.8.5 Password

Administration password setting.

3.5 Wireless AP Client mode

Ethernet and wireless are as a LAN connected with PC or client devices, another Wireless Interface work as a WAN port connected with other wireless AP or router.



3.5.1 WiFi WAN

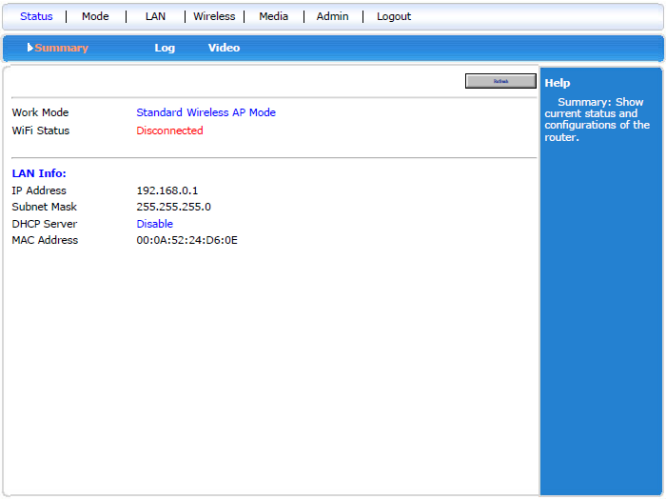
When you have a WiFi network, you can use this as a WiFi repeater. Press “search AP”, there is a window pop up with the list of active WiFi AP router, including the SSID, encryption method.

Click the one you want to link and remember the encryption mode, input the security part and press “Apply”.

The router will be restarted, after restarted, in Status you can see the linked successful or not. If not, do check the encryption setting again.

3.6 Wireless AP mode

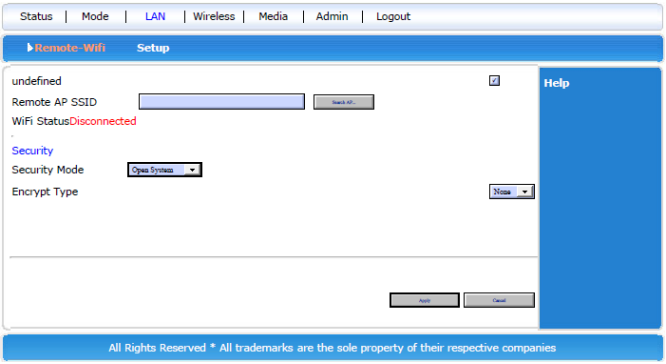
LAN and WAN port work as LAN port only. Wireless is LAN also. All the IP addresses are the same IP section.



3.6 Wireless AP mode

Wireless and all Ethernet ports are in the same IP section.

3.6.1 LAN setting



Chapter 4 Frequently Asked Questions (FAQ)

4.1 What and how to find my PC's IP and MAC address?

IP address is the identifier for a computer or device on a TCP/IP network. Networks using the TCP/IP protocol route messages based on the IP address of the destination. The format of an IP address is a 32-bit numeric address written as four numbers separated by periods. Each number can be zero to 255. For example, 191.168.1.254 could be an IP address.

The MAC (Media Access Control) address is your computer's unique hardware number. (On an Ethernet LAN, it's the same as your Ethernet address.) When you're connected to the Internet from your computer (or host as the Internet protocol thinks of it), a correspondence table relates your IP address to your computer's physical (MAC) address on the LAN.

To find your PC's IP and MAC address,

- ✓ Open the Command program in the Microsoft Windows.
- ✓ Type in ***ipconfig /all*** then press the ***Enter*** button.

- Your PC's IP address is the one entitled IP Address and your PC's MAC address is the one entitled Physical Address.

4.2 What is Wireless LAN?

A wireless LAN (WLAN) is a network that allows access to Internet without the need for any wired connections to the user's machine.

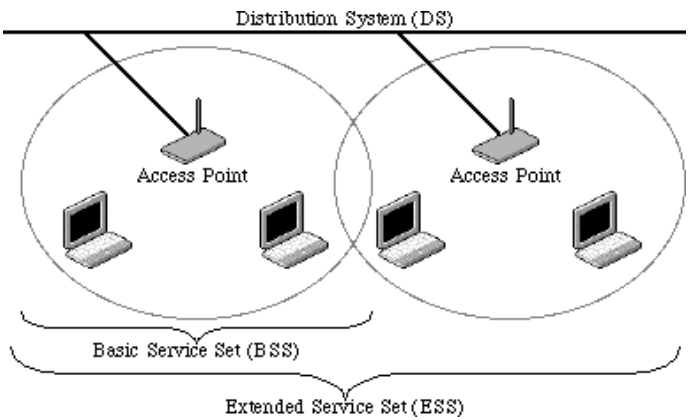
4.3 What are ISM bands?

ISM stands for Industrial, Scientific and Medical; radio frequency bands that the Federal Communications Commission (FCC) authorized for wireless LANs. The ISM bands are located at 915 +/- 13 MHz, 2450 +/- 50 MHz and 5800 +/- 75 MHz.

4.4 How does wireless networking work?

The 802.11 standard define two modes: infrastructure mode and ad hoc mode. In infrastructure mode, the wireless network consists of at least one access point connected to the wired network infrastructure and a set of wireless end stations. This configuration is called a Basic Service Set (BSS). An Extended Service Set (ESS) is a set of two or more BSSs forming a single subnetwork. Since

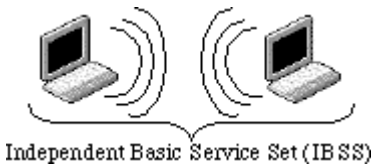
most corporate WLANs require access to the wired LAN for services (file servers, printers, Internet links) they will operate in infrastructure mode.



Example 1: wireless Infrastructure Mode

Ad hoc mode (also called peer-to-peer mode or an Independent Basic Service Set, or IBSS) is simply a set of 802.11 wireless stations that communicate directly with one another without using an access point or any connection to a wired network. This mode is useful for quickly and easily setting up a wireless network anywhere that a wireless infrastructure does not exist or is not required for services, such as a hotel room, convention

center, or airport, or where access to the wired network is barred (such as for consultants at a client site).



Example 2: wireless Ad Hoc Mode

4.5 What is BSSID?

A six-byte address that distinguishes a particular a particular access point from others. Also know as just SSID. Serves as a network ID or name.

4.6 What is ESSID?

The Extended Service Set ID (ESSID) is the name of the network you want to access. It is used to identify different wireless networks.

4.7 What are potential factors that may causes interference?

Factors of interference:

- Obstacles: walls, ceilings, furniture… etc.
- Building Materials: metal door, aluminum studs.
- Electrical devices: microwaves, monitors and electrical motors.

Solutions to overcome the interferences:

- ✓ Minimizing the number of walls and ceilings.
- ✓ Position the WLAN antenna for best reception.
- ✓ Keep WLAN devices away from other electrical devices, eg: microwaves, monitors, electric motors, … etc.
- ✓ Add additional WLAN Access Points if necessary.

4.8 What are the Open System and Shared Key authentications?

IEEE 802.11 supports two subtypes of network authentication services: open system and shared key. Under open system authentication, any wireless station can request authentication. The station that needs to authenticate with another wireless station sends an authentication management frame that contains the identity of the sending station. The receiving station then returns a frame that indicates whether it recognizes the sending station. Under shared key authentication, each wireless station is assumed to have received a secret shared key over a secure channel that is independent from the 802.11

wireless network communications channel.

4.9 What is WEP?

An optional IEEE 802.11 function offers frame transmission privacy similar to a wired network. The Wired Equivalent Privacy generates secret shared encryption keys that both source and destination stations can use to alert frame bits to avoid disclosure to eavesdroppers.

WEP relies on a secret key that is shared between a mobile station (e.g. a laptop with a wireless Ethernet card) and an access point (i.e. a base station). The secret key is used to encrypt packets before they are transmitted, and an integrity check is used to ensure that packets are not modified in transit.

4.10 What is Fragment Threshold?

The proposed protocol uses the frame fragmentation mechanism defined in IEEE 802.11 to achieve parallel transmissions. A large data frame is fragmented into several fragments each of size equal to fragment threshold. By tuning the fragment threshold value, we can get

varying fragment sizes. The determination of an efficient fragment threshold is an important issue in this scheme. If the fragment threshold is small, the overlap part of the master and parallel transmissions is large. This means the spatial reuse ratio of parallel transmissions is high. In contrast, with a large fragment threshold, the overlap is small and the spatial reuse ratio is low. However high fragment threshold leads to low fragment overhead. Hence there is a trade-off between spatial re-use and fragment overhead.

Fragment threshold is the maximum packet size used for fragmentation. Packets larger than the size programmed in this field will be fragmented.

If you find that your corrupted packets or asymmetric packet reception (all send packets, for example). You may want to try lowering your fragmentation threshold. This will cause packets to be broken into smaller fragments. These small fragments, if corrupted, can be resent faster than a larger fragment. Fragmentation increases overhead, so you'll want to keep this value as close to the maximum value as possible.

4.11 What is RTS (Request To Send) Threshold?

The RTS threshold is the packet size at which packet transmission is governed by the RTS/CTS transaction. The IEEE 802.11-1997 standard allows for short packets to be transmitted without RTS/CTS transactions. Each station can have a different RTS threshold. RTS/CTS is used when the data packet size exceeds the defined RTS threshold. With the CSMA/CA transmission mechanism, the transmitting station sends out an RTS packet to the receiving station, and waits for the receiving station to send back a CTS (Clear to Send) packet before sending the actual packet data.

This setting is useful for networks with many clients. With many clients, and a high network load, there will be many more collisions. By lowering the RTS threshold, there may be fewer collisions, and performance should improve. Basically, with a faster RTS threshold, the system can recover from problems faster. RTS packets consume valuable bandwidth, however, so setting this value too low will limit performance.

4.12 What is Beacon Interval?

In addition to data frames that carry information from higher layers, 802.11 includes management and control frames that support data transfer. The beacon frame, which is a type of management frame, provides the "heartbeat" of a wireless LAN, enabling stations to establish and maintain communications in an orderly fashion.

Beacon Interval represents the amount of time between beacon transmissions. Before a station enters power save mode, the station needs the beacon interval to know when to wake up to receive the beacon (and learn whether there are buffered frames at the access point).

4.13 What is Preamble Type?

There are two preamble types defined in IEEE 802.11 specification. A long preamble basically gives the decoder more time to process the preamble. All 802.11 devices support a long preamble. The short preamble is designed to improve efficiency (for example, for VoIP systems). The difference between the two is in the Synchronization field. The long preamble is 128 bits, and the short is 56 bits.

4.14 What is SSID Broadcast?

Broadcast of SSID is done in access points by the beacon. This announces your access point (including various bits of information about it) to the wireless world around it. By disabling that feature, the SSID configured in the client must match the SSID of the access point.

Some wireless devices don't work properly if SSID isn't broadcast (for example the D-link DWL-120 USB 802.11b adapter). Generally if your client hardware supports operation with SSID disabled, it's not a bad idea to run that way to enhance network security. However it's no replacement for WEP, MAC filtering or other protections.

4.15 What is Wi-Fi Protected Access (WPA)?

Wi-Fi’s original security mechanism, Wired Equivalent Privacy (WEP), has been viewed as insufficient for securing confidential business communications. A longer-term solution, the IEEE 802.11i standard, is under development. However, since the IEEE 802.11i standard is not expected to be published until the end of 2003, several members of the WI-Fi Alliance teamed up with members

of the IEEE 802.11i task group to develop a significant near-term enhancement to Wi-Fi security. Together, this team developed Wi-Fi Protected Access.

To upgrade a WLAN network to support WPA, Access Points will require a WPA software upgrade. Clients will require a software upgrade for the network interface card, and possibly a software update for the operating system. For enterprise networks, an authentication server, typically one that supports RADIUS and the selected EAP authentication protocol, will be added to the network.

4.16 What is WPA2?

It is the second generation of WPA. WPA2 is based on the final IEEE 802.11i amendment to the 802.11 standard.

4.17 What is 802.1x Authentication?

802.1x is a framework for authenticated MAC-level access control, defines Extensible Authentication Protocol (EAP) over LANs (WAPOL). The standard encapsulates and leverages much of EAP, which was defined for dial-up

authentication with Point-to-Point Protocol in RFC 2284.

Beyond encapsulating EAP packets, the 802.1x standard also defines EAPOL messages that convey the shared key information critical for wireless security.

4.18 What is Temporal Key Integrity Protocol (TKIP)?

The Temporal Key Integrity Protocol, pronounced tee-kip, is part of the IEEE 802.11i encryption standard for wireless LANs. TKIP is the next generation of WEP, the Wired Equivalency Protocol, which is used to secure 802.11 wireless LANs. TKIP provides per-packet key mixing, a message integrity check and a re-keying mechanism, thus fixing the flaws of WEP.

4.19 What is Advanced Encryption Standard (AES)?

Security issues are a major concern for wireless LANs, AES is the U.S. government's next-generation cryptography algorithm, which will replace DES and 3DES.

4.20 What is Inter-Access Point Protocol (IAPP)?

The IEEE 802.11f Inter-Access Point Protocol (IAPP)

supports Access Point Vendor interoperability, enabling roaming of 802.11 Stations within IP subnet.

IAPP defines messages and data to be exchanged between Access Points and between the IAPP and high layer management entities to support roaming. The IAPP protocol uses TCP for inter-Access Point communication and UDP for RADIUS request/response exchanges. It also uses Layer 2 frames to update the forwarding tables of Layer 2 devices.

4.21 What is Wireless Distribution System (WDS)?

The Wireless Distribution System feature allows WLAN AP to talk directly to other APs via wireless channel, like the wireless bridge or repeater service.

4.22 What is Universal Plug and Play (uPNP)?

UPnP is an open networking architecture that consists of services, devices, and control points. The ultimate goal is to allow data communication among all UPnP devices regardless of media, operating system, programming language, and wired/wireless connection.

4.23 What is Maximum Transmission Unit (MTU) Size?

Maximum Transmission Unit (MTU) indicates the network stack of any packet is larger than this value will be fragmented before the transmission. During the PPP negotiation, the peer of the PPP connection will indicate its MRU and will be accepted. The actual MTU of the PPP connection will be set to the smaller one of MTU and the peer's MRU. The default is value 1400.

4.24 What is Clone MAC Address?

Clone MAC address is designed for your special application that request the clients to register to a server machine with one identified MAC address.

Since that all the clients will communicate outside world through the WLAN Outdoor Broadband Router, so have the cloned MAC address set on the WLAN Outdoor Broadband Router will solve the issue.

4.25 What is DDNS?

DDNS is the abbreviation of Dynamic Domain Name Server. It is designed for user own the DNS server with dynamic WAN IP address.

4.26 What is NTP Client?

NTP client is designed for fetching the current timestamp from internet via Network Time protocol. User can specify time zone, NTP server IP address.

4.27 What is VPN?

VPN is the abbreviation of Virtual Private Network. It is designed for creating point-to point private link via shared or public network.

4.28What is IPSEC?

IPSEC is the abbreviation of IP Security. It is used to transferring data securely under VPN.

Chapter 5 Terminology

3DES	Triple Data Encryption Standard
AES	Advanced Encryption Standard
ANSI	American National Standards Institute
AP	Access Point
CCK	Complementary Code Keying
CSMA/CA	Carrier Sense Multiple Access/ Collision

	Avoidance
CSMA/CD	Carrier Sense Multiple Access/ Collision Detection
DDNS	Dynamic Domain Name Server
DH	Diffie-Hellman Algorithm
DHCP	Dynamic Host Configuration Protocol
DSSS	Direct Sequence Spread Spectrum
EAP	Extensible Authentication Protocol
ESP	Encapsulating Security Payload
FCC	Federal Communications Commission
FTP	File Transfer Protocol
IEEE	Institute of Electrical and Electronic Engineers
IKE	Internet Key Exchange
IP	Internet Protocol
ISM	Industrial, Scientific and Medical
LAN	Local Area Network
MAC	Media Access Control
MD5	Message Digest 5
NAT	Network Address Translation
NT	Network Termination
NTP	Network Time Protocol

PPTP	Point to Point Tunneling Protocol
PSD	Power Spectral Density
RF	Radio Frequency
SHA1	Secure Hash Algorithm
SNR	Signal to Noise Ratio
SSID	Service Set Identification
TCP	Transmission Control Protocol
TFTP	Trivial File Transfer Protocol
TKIP	Temporal Key Integrity Protocol
UPNP	Universal Plug and Play
VPN	Virtual Private Network
WDS	Wireless Distribution System
WEP	Wired Equivalent Privacy
WLAN	Wireless Local Area Network
WPA	Wi-Fi Protected Access

This device complies with the following radio frequency and safety standards.

Important to OEM Manufacturer:

This following FCC Warning must be included in the HOST User Manual.

FCC Warning

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.

NOTE 1: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help.

NOTE 2: Any changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance.

Note 1: This module certified that complies with RF exposure requirment under mobile or fixed condition, this module is to be installed only in portable or mobile or fixed applications.

A mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. Transmitting devices designed to be used by consumers or workers

that can be easily re-located, such as wireless devices associated with a personal computer, are considered to be mobile devices if they meet the 20 centimeter separation requirement.

A fixed device is defined as a device is physically secured at one location and is not able to be easily moved to another location.

Note 2: Any modifications made to the module will void the Grant of Certification, this module is limited to OEM installation only and must not be sold to end-users, end-user has no manual instructions to remove or install the device, only software or operating procedure shall be placed in the end-user operating manual of final products.

Note 3: The device must not transmit simultaneously with any other antenna or transmitter.

Note 4: To ensure compliance with all non-transmitter functions the host manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational. For example, if a host was previously authorized as an unintentional radiator under the Declaration of Conformity procedure without a transmitter certified module and a module is added, the host manufacturer is responsible for ensuring that the after the module is installed and operational the host continues to be compliant with the Part 15B unintentional radiator requirements. Since this may depend on the details of how the module is integrated with the host, AsiaRF Co., Ltd. shall provide guidance to the host manufacturer for compliance with the Part 15B requirements.

Note 5: FCC ID label on the final system must be labeled with “Contains FCC ID: TKZAWM002” or “Contains transmitter module FCC ID: TKZAWM002”.

The transmitter module must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the host product. AsiaRF Co., Ltd. is responsible for the compliance of the module in all final hosts.

WARNING:

This device will only installed in this host device as below:
Manufacturer: Venitek Ltd.
Address: B08, 14/F, WAH HEN COMM CENTRE, NO.383, HENNESSY RD., WANCHAI, HONGKONG
Product Name: WiFi IP Camera & Storage AP Router
Model: AWAPN2411