WitLinc

Connected Machines Anywhere Anytime

WL-430T

3G/4G Wireless Modem

WL-430T-A/LT/G/IO/S/AK

Version 2.1.0.1 Jan 01, 2016

User Manual

Your Feedback Please

We always want you to feel that you made the right decision to use our products. If you have suggestions about our products, documentation, or support, please write or call us.

Witlinc Technology Inc.
Tel: +1 778-300-9900
Fax: +1 778-3009080
www.witlinc.com
support@witlinc.com

WL-430T-A User Manual

Content Disclaimer

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Important Safety Information

WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.

ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.

ATTENTION: This manual is intended for qualified service personnel responsible for setting up and servicing these devices. The user must have previous experience with and a basic understanding of electrical terminology, configuration procedures, required equipment, and safety precautions.

Warning: This equipment is suitable for use in Class I, Division 2, Groups A, B, C, D or Non-Hazardous Locations only. EXPLOSION HAZARD - Substitution of Any Components May Impair Suitability for Class I, Division II, Do not disconnect equipment unless power has been removed or the area is known to be non-hazardous. Module must be powered by a Class 2 Power Source.

Warning: The RS-232 serial connector, Ethernet connector and I/O terminal block are not for use in Hazardous Locations; they are only for diagnostics and set-up only.

Warning: When Antenna is installed into ultimate enclosure, it must be threaded to appropriate port to ensure mechanical securement.

Important Notice:

Due to the nature of wireless communications, data transmission and reception can never be guaranteed. Data maybe delayed, corrupted (that is, it may have errors), or be totally lost. Significant delays or losses of data are rare when wireless devices such as Witlinc Technology Wireless products are used in a normal manner with a well-constructed network. Nevertheless, the WL-430T-A should not be used in situations where failure to transmit or receive data could result in damage of any kind to the user or any other party, including but not limited to personal injury, death, or loss of property. Witlinc Technology accepts no responsibility for damages of any kind resulting from delays or errors in data transmitted or received using Witlinc Technology products, or for failure of the (WL-430T-A) to transmit or receive such data.

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1、Start Here

1.1 About WL-430T-A 3G/4G Wireless Modem with all function

WL-430T-A 3G/4G Wireless Modem can be widely applied to oil & gas, Coal-mining, Iron & Steel, Water, New-Energy and other industrial system. Connected your PLC, VFD, DCS, instrumentation via the modem. Use the GPS function get the machine's Location, the field IO signal can be received by wireless technology.

WL-430T series support the latest 4G/3G high-speed wireless cellular technologies; Supports dynamic or static IP addressed assigned by cell carriers. VPN Client and DDNS Client has been designed for the module, PLC program can be uploaded/downloaded at anyplace. This enables configuration, programming or debugging of almost any industrial device from any location. Whether you're using a GPRS, 3G, EDGE, HSDPA, HSUPA or LTE Connection, you can use your regular configuration software just as you would if you were on site. Allowing HMI, PLCs, sensors etc to communicate with each other. Remote Access removes boundaries, eliminates the need for time consuming site visit and provide a network infrastructure suitable for today's "always-on" society.

All interface and LEDs in the front and with the DIN-Rail in the back make the module well suited for the industry application. In order to protect against issues caused by ground loop, optical isolation was designed between the Ethernet port and Serial port.

Specifications:

3G/4G		
Compatible Mobile Networks	LTE, DC-HSPA+, HSPA+, HSDPA, HSUPA, WCDMA, GSM, GPRS, EDGE,	850/900/1900/2100
	EVDO，CDMA2000 1X	800/1900
	HSUPA/HSDPA/UMTS/EDGE/GPRS/GSM	
Band Width	LTE	UL/DL: 50Mbps/ 150Mbps
	HSDPA+(1)	UL/DL: 5.76Mbps/ 14.4Mbps
	HSDPA+(2)	UL/DL: 5.76Mbps/ 21Mbps
	EVDO(3G)	1.8Mbps/ 3.1Mbps
WiFi		
Standard	Support IEEE 802.11 b/g/n wireless operation standard	
Frequency Band	2.4GHz (ISM Frequency Bands)	
Security	64/128-bit WEP (Wired Equivalent Privacy) WPA & WPA-PSK &WPA2 -PSK(Wi-Fi Protected Access)	
Transmit Power	20dBm	
Data rates	MCS0 -MCS15	
Receiver Sensitivity	-94dBm @ MCS0 & MCS8	
Security	WPA2 & WPA Personal 802.11i AES, TKIP,WEP support	
Others		

Advanced Firewall Features	Network Address Translation (NAT) State full Packet Inspection (SPI) Port Forward, Packets
Media Access Control	CSMA/CA with ACK
GPS	According to the NMEA-0183 protocol
Network Function	WiVPN, DHCP, DNS, DDNS, ICMP
IO Function	DI×2，DO×2，AI（4-20mA）×1
Hardware Specifications	
Size	Width 5.3 inches x Height 3.7 inches x Depth 1.6 inches
Weight	1.2 lbs（543g）
Enclosure	Aluminum DIN-Rail
Interface	2×RJ45（10/100Mbps），1×Rs232，I/O Port(2×DI，2×DO，1×AI)， 3× SMA，1× RS485，1X1.8V/3V SIM slot
Operation Temperature	-20℃ - 65℃
Storage Temperature	-30℃ - 70℃
Humidity	95% Maximum (Non-condensing)
Power	10-31VDC
Power consumption	Idle: 130mA@24VDC ，Max: 250mA@24VDC Average:160mA@12VDC

1.2 Package Contents

The following components are included with theWL-430T-A/AK/LT/G/IO/S, and are required for installation and configuration.

Important: Before beginning the installation, please verify that all of the following items are present

Qty	Part No.	Part Name	PART DESCRIPTION
1	WL-430T-A	3G/4G Industrial Modem	3G/4G Wireless Modem with all function
1	WL-0702-O	3G/4G Antenna	3G/4G Omni Antenna(700MHz-2700MHz)
1	WL-2502-O	2.4GHz/5GHz Antenna	2.4GHz/5GHz 2dBi Omni Antenna
1	WL-003T-A	3-pin Power Plug	Mating connector used for attachment to customer’s power supply
1	WL-010T-A	10-pin IO Plug	Mating connector used for attachment to customer’s IO Signal and Rs485

If any of these components are missing, please contact WitLinc Technology Support for replacement parts.

1.3 System Requirements

The following system requirements are the recommended minimum specifications to successfully install and run:

Software Requirement:

Operating system:

Microsoft Windows XP Professional with Service Pack 1 or 2
Microsoft Windows 7 Professional (32-or 64-bit)
Microsoft Windows 2000 Professional with Service Pack 1, 2, or 3
Microsoft Windows Server 2003

Internet Explore

Internet Explorer 6.0
Internet Explorer 8.0
Google Chrome
Mozilla Firefox

Hardware Requirement:

Ethernet hub with standard RJ45 Ethernet cable or Ethernet port with RJ45 crossover cable for direct connection to module
A Computer with RJ45 Ethernet port
128 Mbytes of RAM minimum, 256 Mbytes of RAM recommended
100 Mbytes of free hard disk space (or more based on application requirements)
256-color VGA graphics adapter, 800 x 600 minimum resolution (True Color 1024 x 768 recommended)

1.4 Power Requirements

The WL-430T-A accepts voltages between 9 and 30 VDC, with an average power draw of 9 watts or less. A detachable power connector comes with the radio, as shown below. The connector terminals are labeled + (positive DC connection) GND (ground connection) - (negative DC connection).

The AC-to-DC power supply adapter may be used. DC power wires must be less than 2 meters in length to meet regulatory requirements.

Important: When wiring the power connector, be sure to observe the proper polarity markings on the power connector. Improper connector wiring can cause serious damage to the WL-430T-A which will not be covered under the Witlinc Technology Warranty.

2、Webpage Configuration

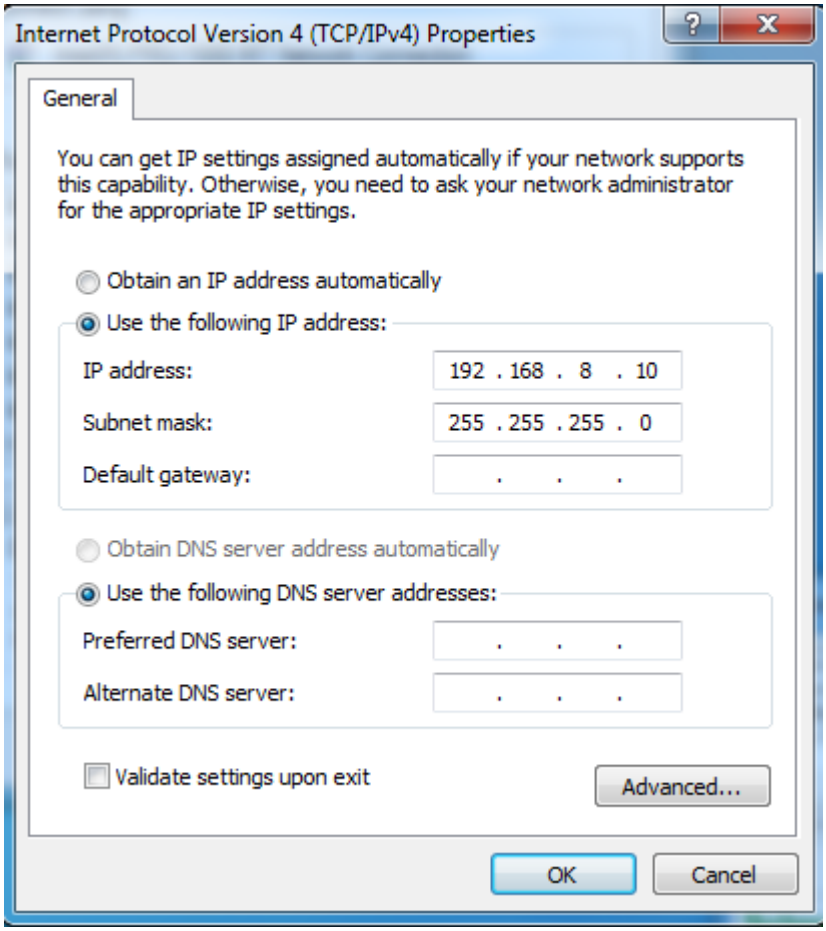
The configuration webpage is used to configure and manage the WL-430T-A. Since the webpage can be accessed remotely as well as local, the WL-430T-A can be configured from any location.

Key benefits of the web based configurator include:

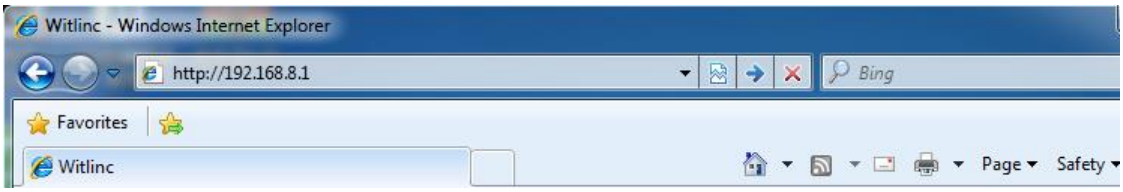
- Login and configure devices parameters
- Connection Status
- Interface Configurations
- Wireless Configurations
- WiVPN Configurations

2.1 Configuration Webpage Setup

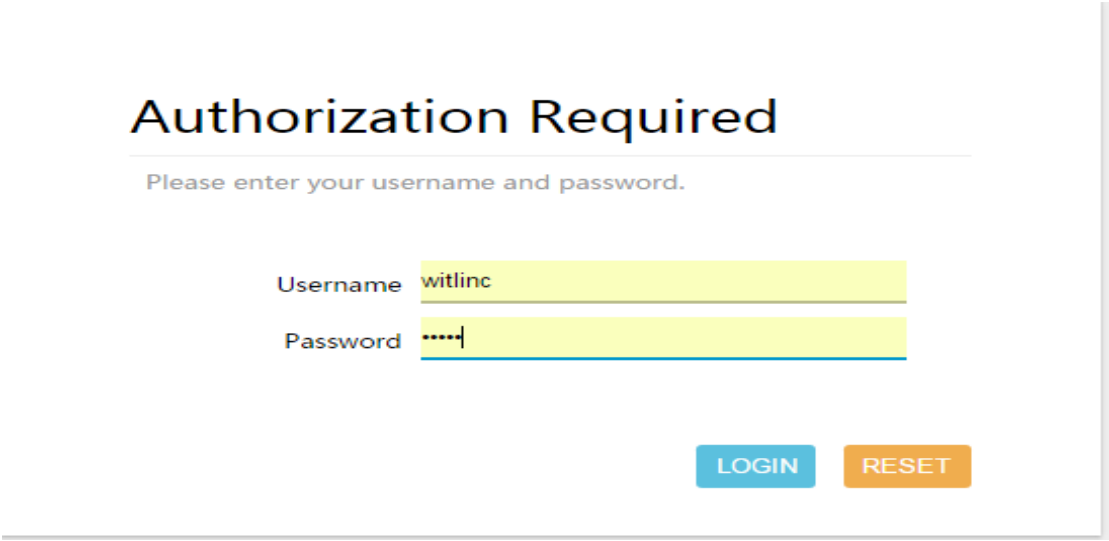
1. The default IP address of the WL-430T-A is 192.168.8.1. And DHCP Server is Enable, normally, your PC will be get an IP address which the modem assigned automatically. If your PC did not receive the IP address, please temporarily set the IP address of your PC to 192.168.8.xxx with a subnet of 255.255.255.0.



2. Open the Internet Explorer and enter the WL-430T-A default IP address of 192.168.8.1

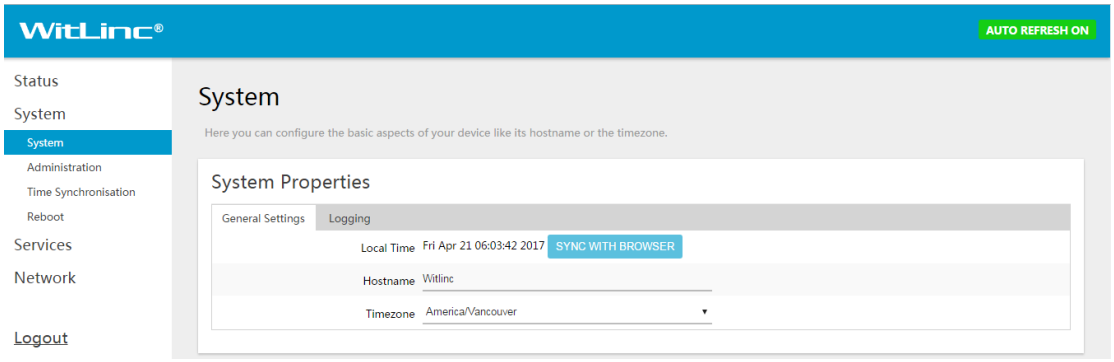


3. Once the WL-430T-A Login Webpage opens, enter the **USERNAME** and **PASSWORD** to login.



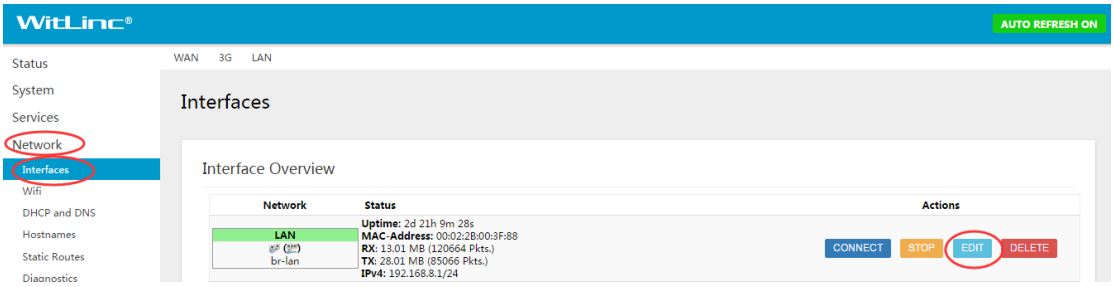
The default Username is "**witlinc**", and the default Password is "**admin**".

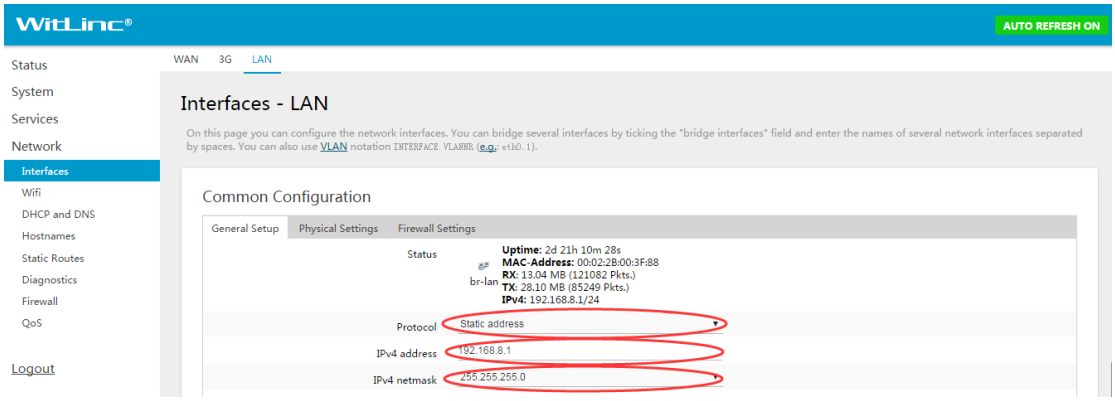
4. After successful login, the main configuration webpage will be displayed.



2.2 Setup the WL-430T-A IP address

1. Scroll down your mouse to the ***Network,Interface*** ,and choose ***LAN,***then click ***EDIT.***





2. Enter the **IPv4 address**, **IPv4 netmask** and **IPv4 gateway** to be assigned to the WL-430T-A. You will not need to edit the **IPv4 broadcast** and **DNS server** of the parameters at this time.

3. Click **Save & Apply**. The module will automatically reboot.

4. Once the reboot is complete, the module's IP address will be changed to the address which you set.

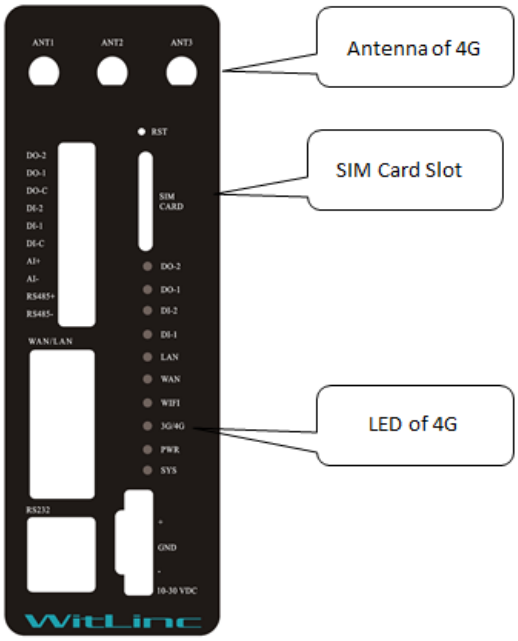
5. Close your browser and open a new session. Enter the new IP address of the WL-430T-A to access the configuration webpage.

2.3 Setup WL-430T-A Cellular Provider

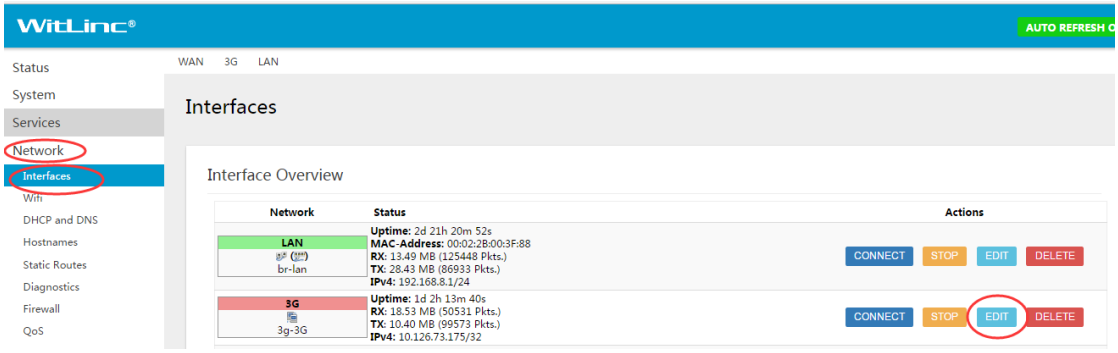
The WL-430T-A supports 4G GSM/HSUPA networks. Only one network will be supported at a time. It uses your cellular provider as an ISP (Internet Service Provider) to connect you to the Internet.

The module using GSM technology, such as AT&T, require a SIM (Subscriber Identity Module) card to be installed in the module.

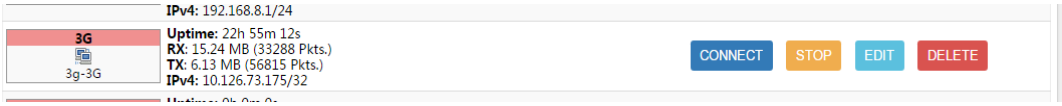
The SIM Card in the WL-430T-A is a smartcard that securely stores the key identifying a cellular subscriber. Generally, you will only need to install a SIM once in the life of the module, and it may be preinstalled by your Witlinc Technology Representative. The SIM card slot is located at the front of the module.



1. Insert the SIM card into the WL-430T-A and cycle power. The SIM card is read by the WL-430T-A upon boot up.
2. Scroll down your mouse to the ***Network,Interface*** ,and choose ***3G,***then click ***EDIT.***



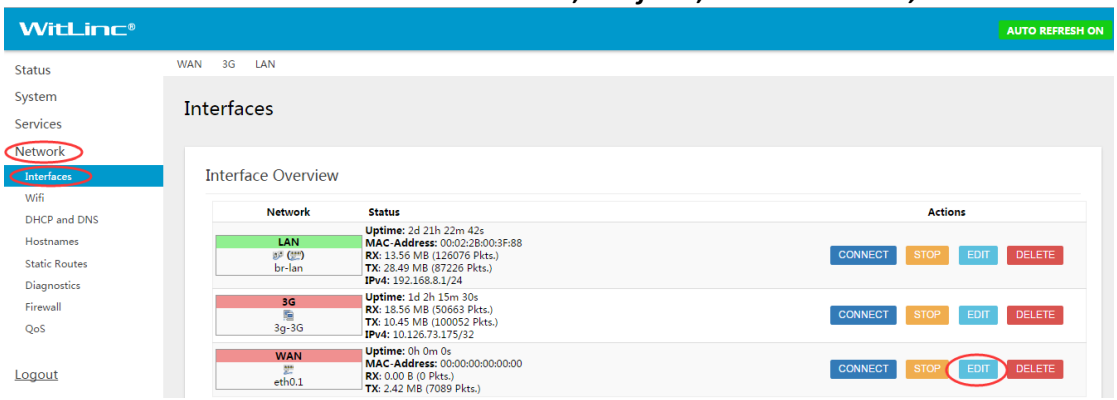
3. Enter the Access Point Name (APN) information in the APN field. This information is provided from your cellular provider. Then Click Save & Apply. The module will reboot.
4.After the module reboots, it establishes a PPP (Point to Point Protocol or "dial" up connection) link to your cellular provider network, also called registering on the network, and receives an IP address.
5.When the module has received its IP address from your cellular provider, a connection to the Internet or the cellular network is also available for computers or other devices to connect directly to the WL-430T-A.
6.The GSM network information is now displayed on the Interface Status on the top of the webpage.

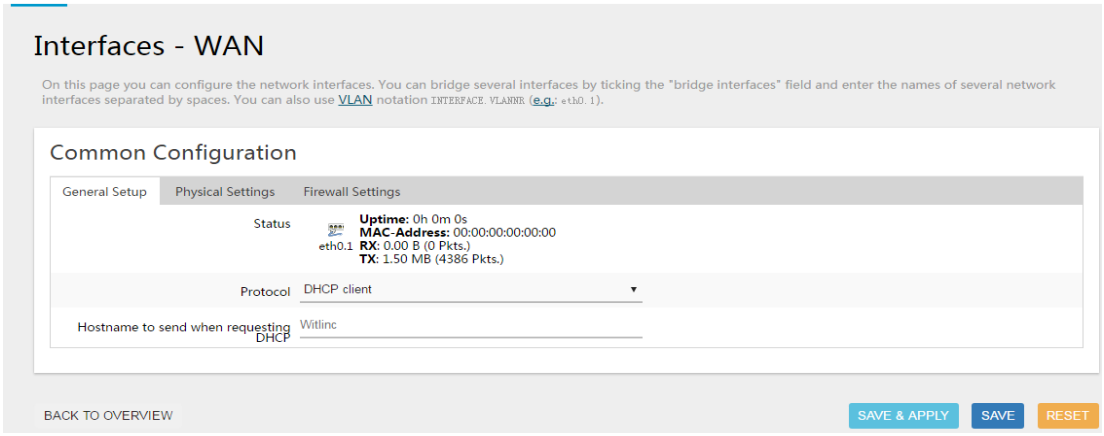


2.4 Setup the WAN Interface

The WL-430T-A support layer3 routing function, Enable the Routing Function WAN interface is needed to be configured. The customer can connect two networks which it was different network segments.

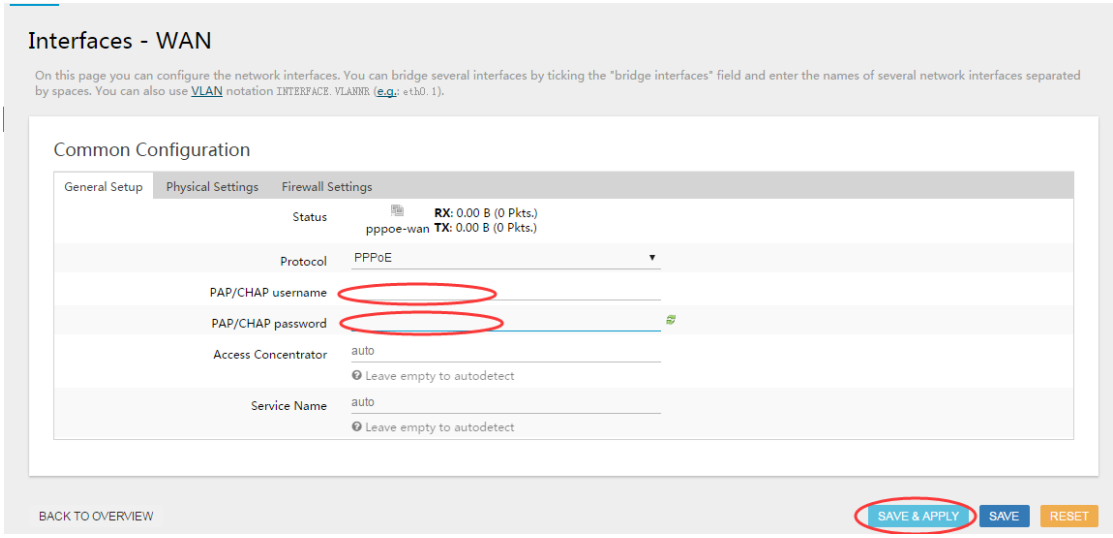
1. Insert the Ethernet Cable from Network-A into the WAN port, and insert the Ethernet Cable from Network-B into the LAN port.
2. Configure the LAN interface IP address refer to the Network B, Configure to the same segment with Network B **(refer to 2.2 Setup the WL-430T-A IP address)**
3. Mouse Scroll down to the ***Network,Interface*** ,and choose ***WAN,***then click ***EDIT.***





Setup the **Protocol**

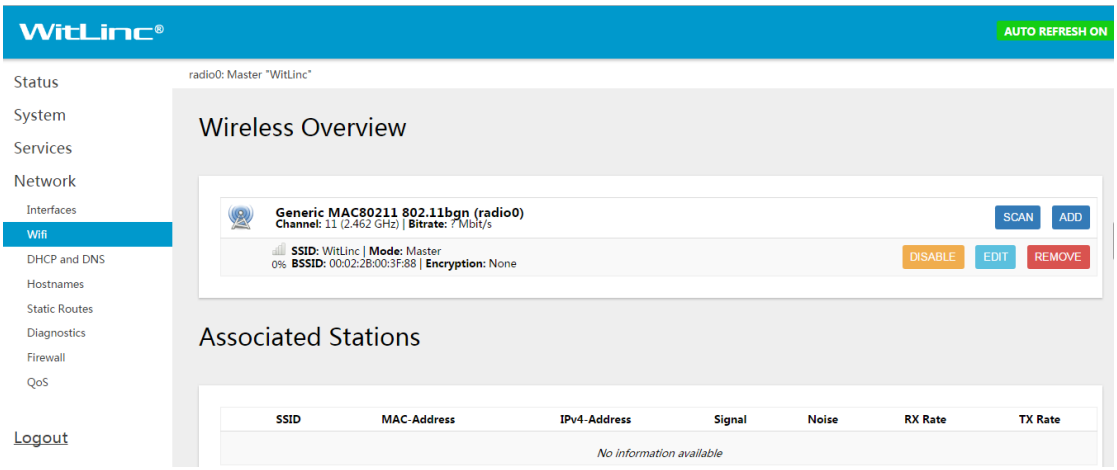
- If the WAN IP address is assigned by the DHCP from Network-A, then set it as DHCP Client， the WAN port can get the IP address from Network-A DHCP Server Automatically.
- If the WAN IP address is assigned by your provider through the PPPOE, then select the PPPOE label. And enter the Username and Password. You can get the Username and Password from the Network-A Provider. Then the WAN Port will receive a static IP address or a dynamic IP address automatically.
- After the Protocol configuration complete, Click the Save & Apply, the module will reboot.



- After the module reboot, the Network-A and Network-B will be connected, and communication to each other.

2.5 Setup the WiFi Function

1. WiFi Function has been integrated into the module, with this function customer can access the module by the mobile devices which has WLAN function. The function is based on 802.11n, Configure the WiFi Function you can scroll your mouse to the ***Network*** then choose ***WiFi***, you can see the webpage as below:

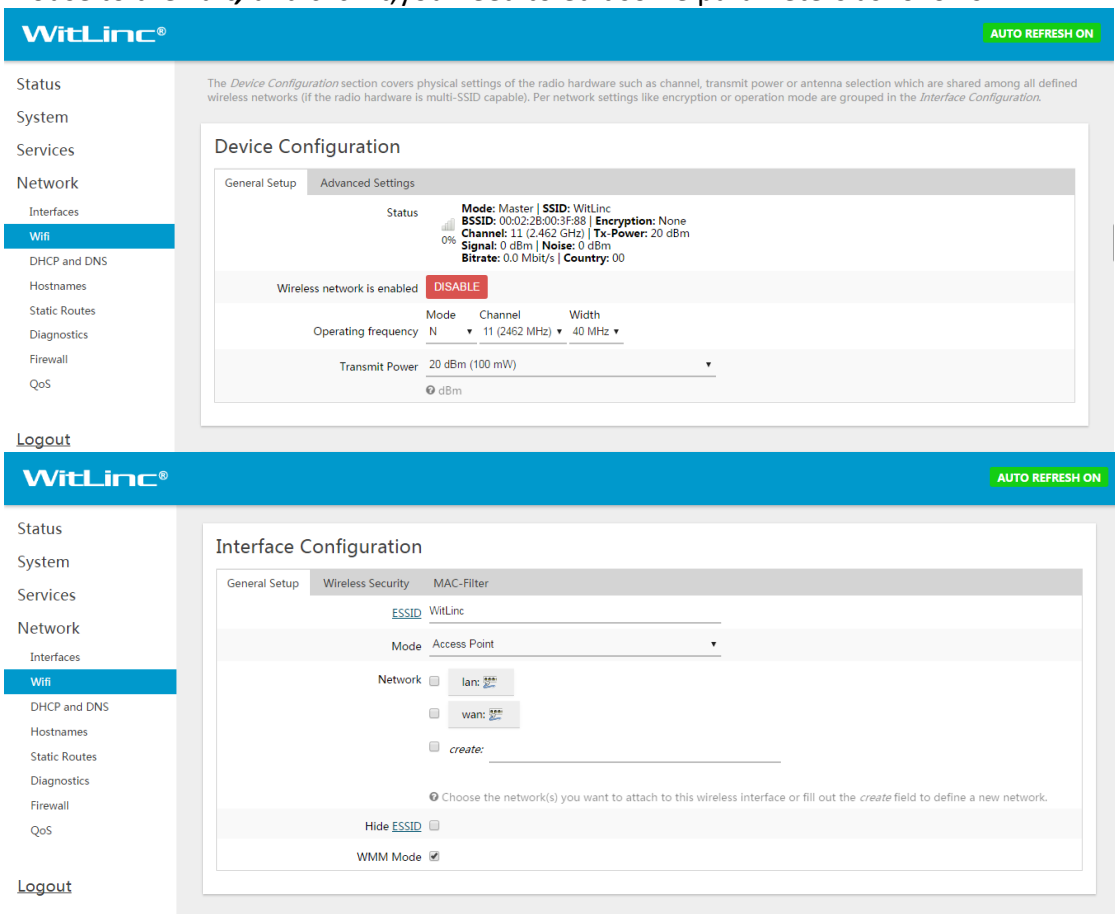


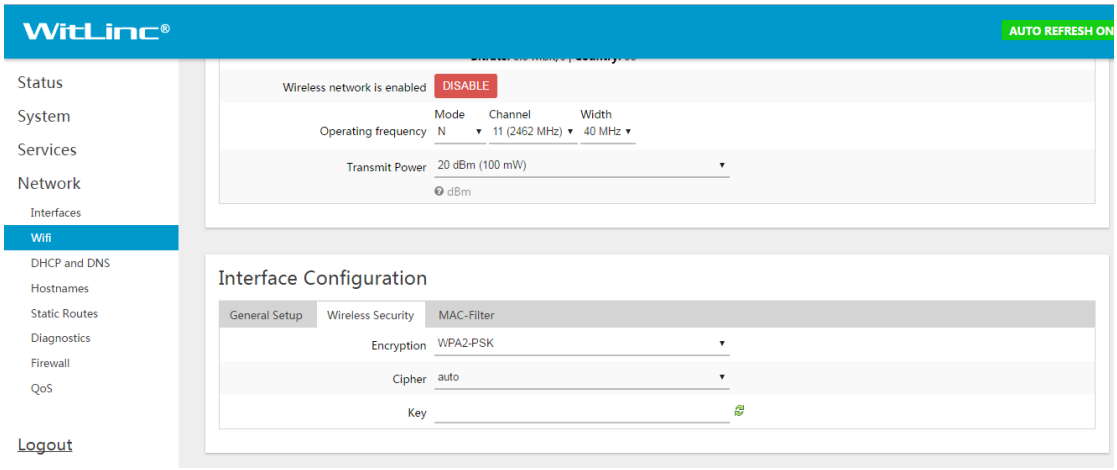
you

2. Enable WiFi Function, Set the Module WiFi mode, SSID, Encryption.

If you want to connect to a excisted WiFi ,please scroll down your mouse to the ***SCAN,*** and click it, then can brows which you need.

If you want want use the module as WiFi master or others,please scroll down your mouse to the ***Edit,*** and click it,you need to edit some parameters as follows.





WiFi	Description
Mode	Configure the WiFi operating frequency
SSID	Assign a network name (SSID) of up to 32 characters. The Module uses this name in all network references. All devices in a network must have the same SSID.
Channel	Select a channel and frequency range for the network or accept the default value. Network channels allow radios to avoid sharing a frequency with other networks in the same location. The channel list indicates the channel number as well as the frequency (2.4 GHz or 5 GHz).

Encryption	Encryption scrambles data so that only intended viewers can decipher and understand it. Although "none" is an available encryption type, Witlinc Technology strongly recommends encrypting all data sent and received from every radio on your network, to help prevent your data from being intercepted and decoded. **WPA-PSK: Preshare key mode** To use WPA-PSK encryption on packets sent between the modules, select WPA-PSK in the Encryption field. Next, in the **key** phrase field, enter a pass phrase of between eight and 63 normal keyboard characters.
	This phrase automatically generates an encryption key of 128 hexadecimal characters. The default pass phrase is "password" (lower case, no quotes). **WPA2-PSK:** based on IEEE 802.11i Use WPA-PSK encryption on packets send between the modules, select WPA-PSK in the Encryption field.
key	You must enter the password in this field, after set the encryption mode.

Important: you must assign the same Network SSID and WPA phrase to the other devices which communication to the master module

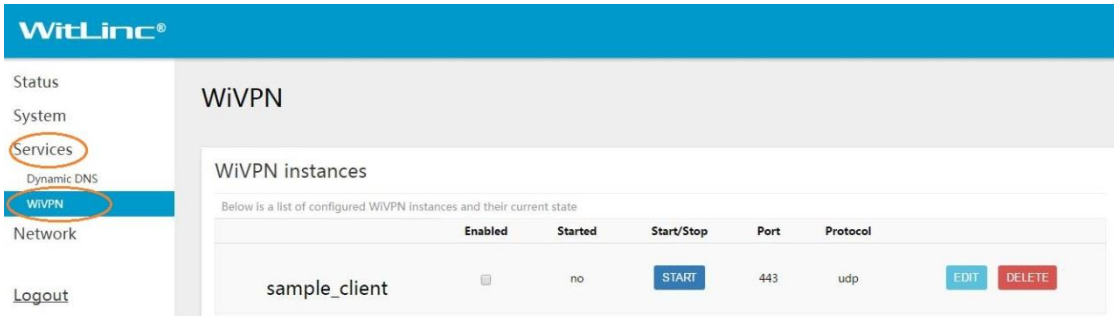
3. All the parameter configured completely, Click **Save & Apply,** the module will reboot

4. After the module reboot, the WiFi parameter will be effective.

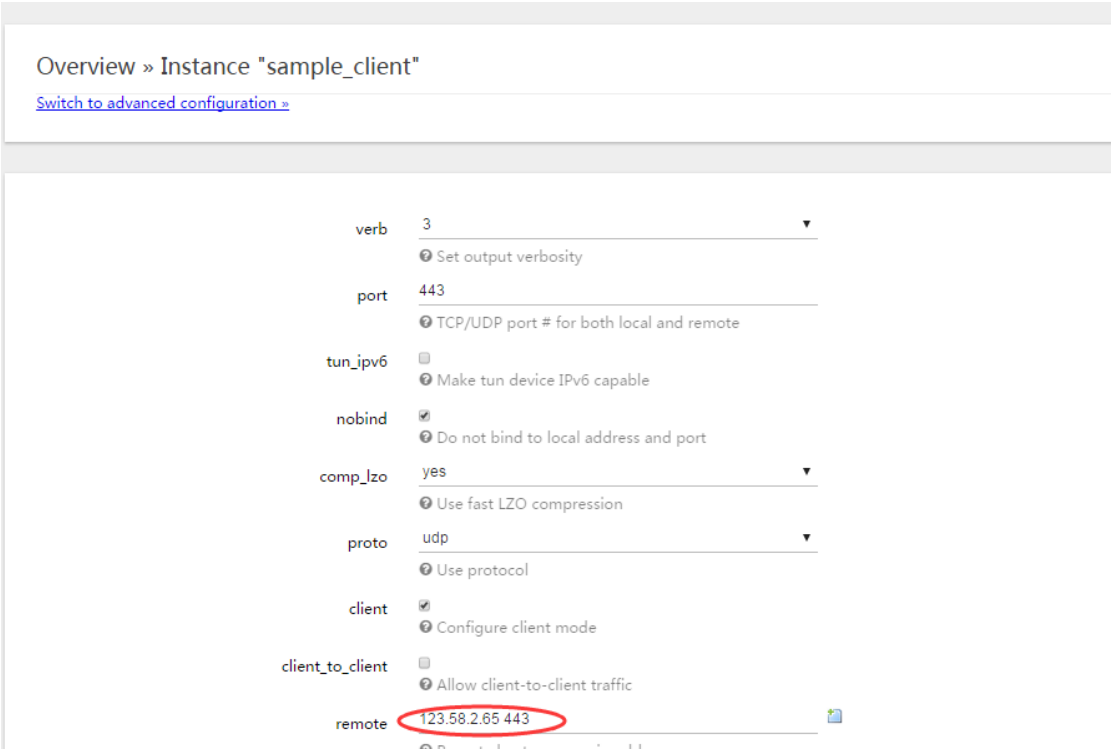
2.6 Setup the WiVPN Function

1. While in client site, WiVPN actively makes connection to the server side, if passed the server authentication, a VPN connection would be established.
Below are steps to make connection to a WiVPN server:

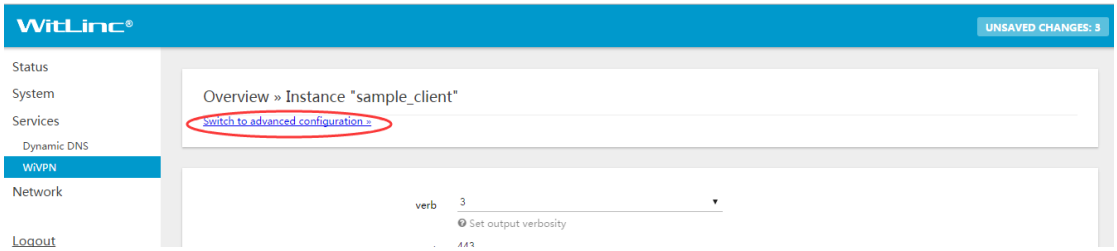
1. Before config WiVPN client, you need to get 3 files from WiVPN server administrator: ca.crt, clientX.crt and clientX.key
2. And ask WiVPN server administrator for parameters about server address, server port and cipher.
3. Through web management interface: ***Services***->***WiVPN***, you can see sample instances as show below.



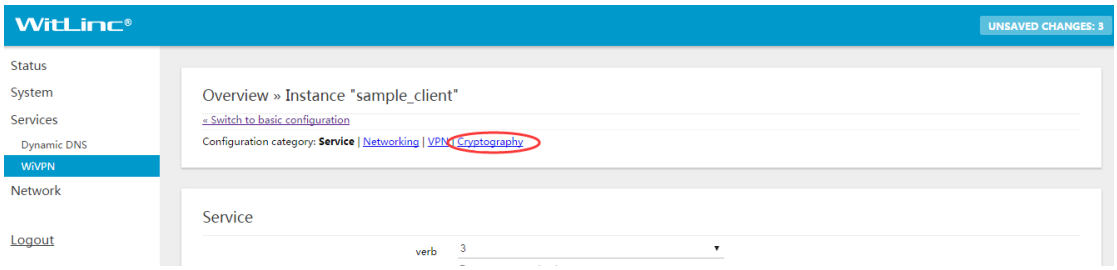
4. Click “EDIT” button corresponded to “sample_client”. And type in WiVPN server address (IP or FQDN) and server port (there must have space between server address and server port). As show below.



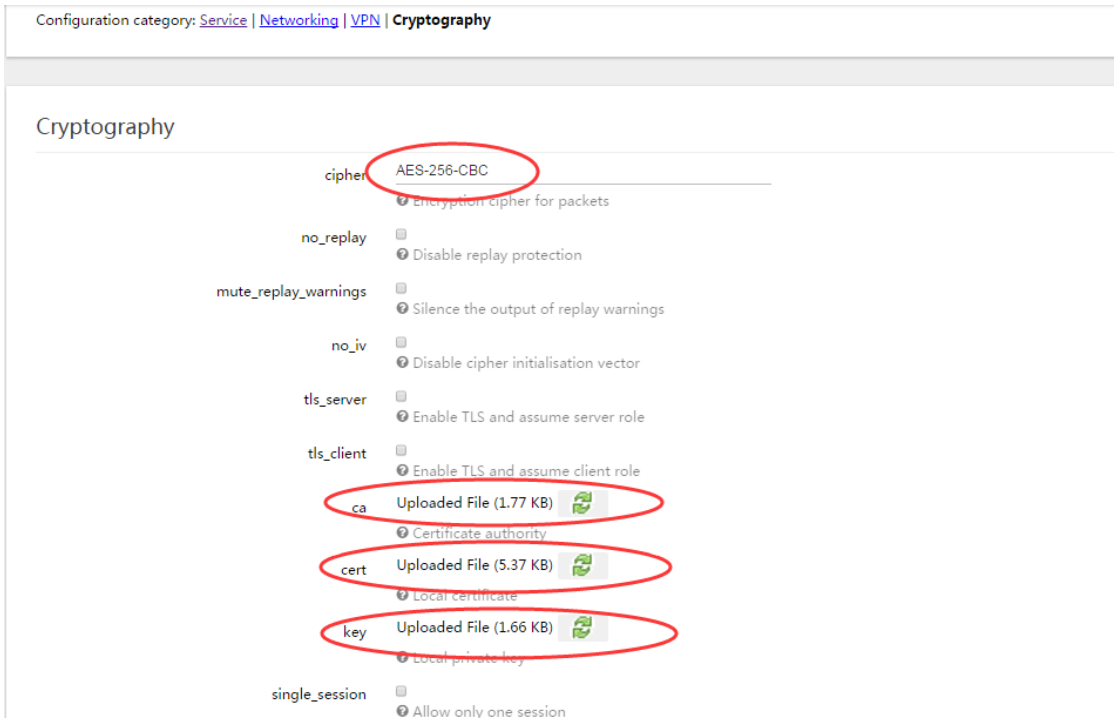
5. Click “***Switch to advanced configuration*** >>” as show below.



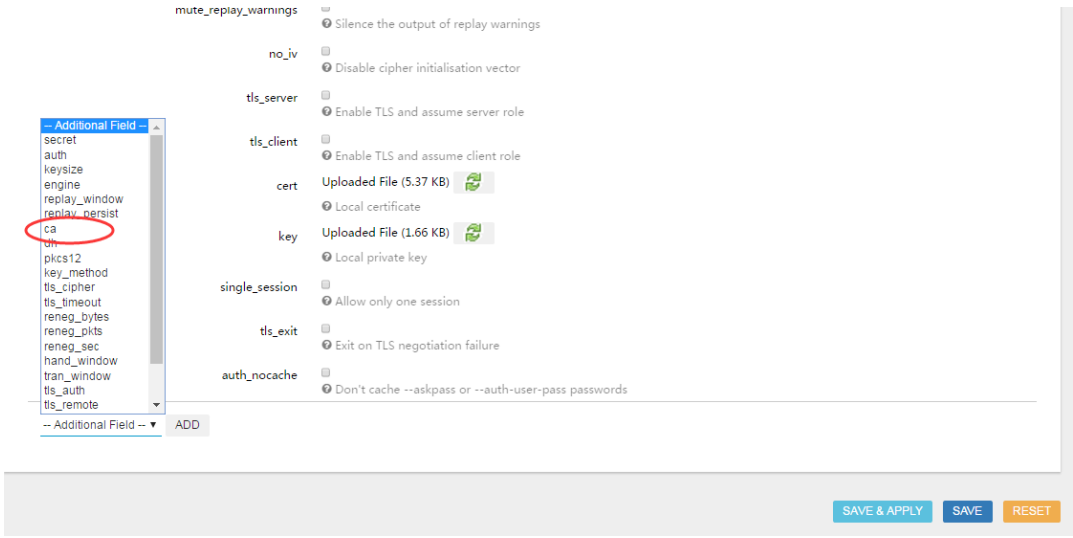
6. Click "***Cryptography***" as show below.



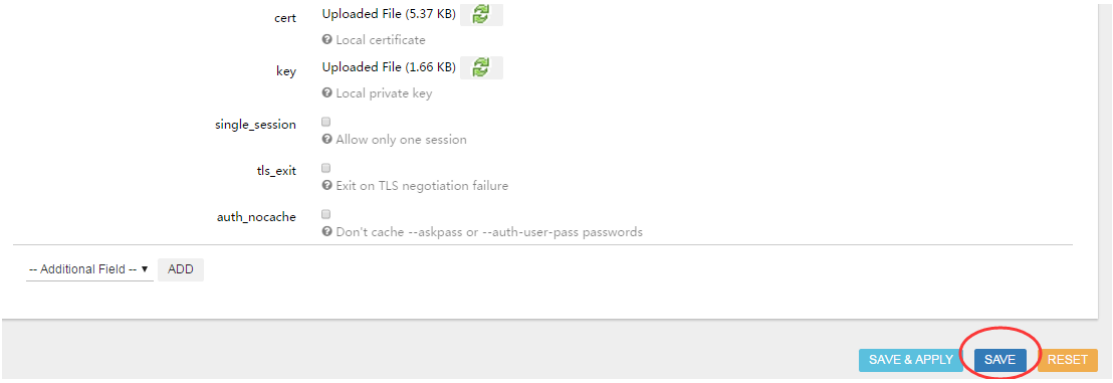
7. Type in cipher, upload ca.crt to ca field, upload clientX.crt to cert field and upload clientX.key to key field. As show below the cipher is "AES-256-CBC".



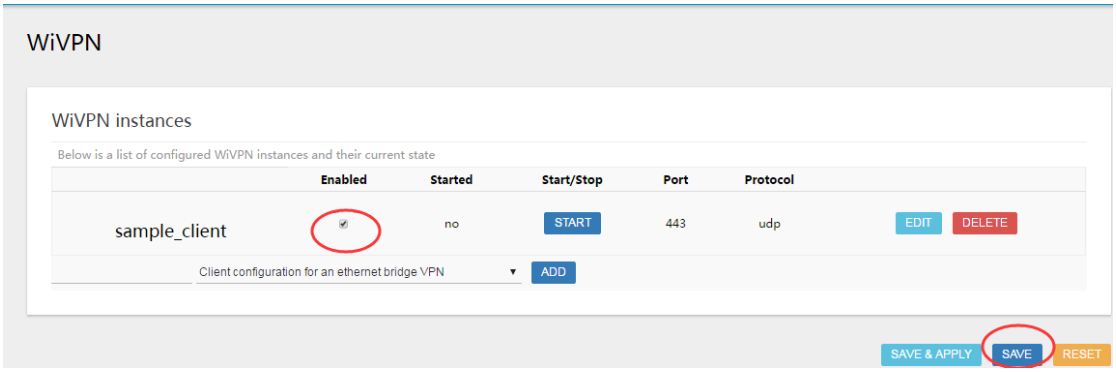
If no corresponded fields exist, scroll down the page and select field from "Additional Field", click "ADD" button to add the field. As show below.



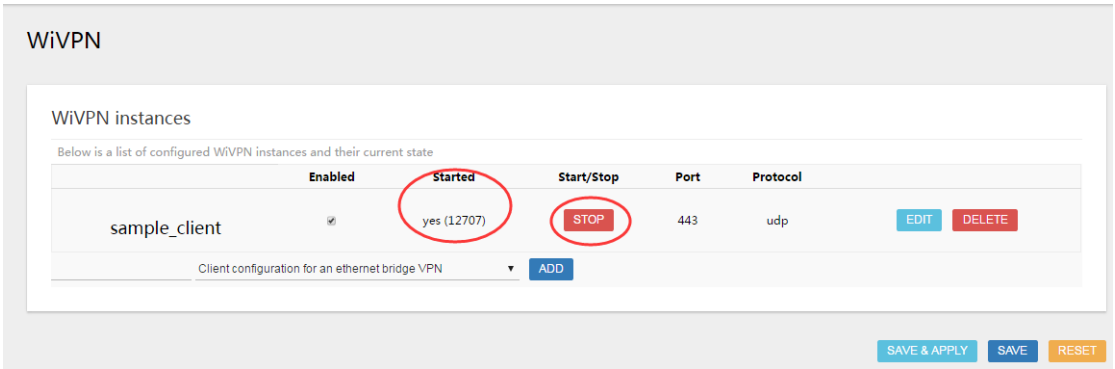
8. Check all your configurations are correct and uploaded the 3 files to corresponded fields, click “SAVE” button as show below.



9. Through web management interface: ***Services***->***WiVPN***, check “***Enabled***” checkbox, and click “***SAVE***” button. As show below.



10. Wait a while, you can see the client started, now the VPN connection is established. By clicking “***STOP***” button you can stop WiVPN client. As show below.



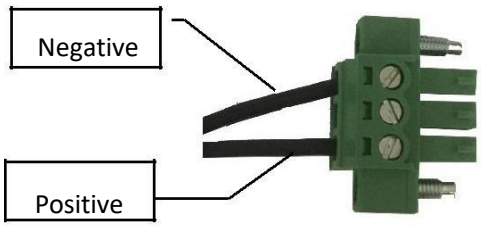
3. Hardware Installation

Power Supplies installation
Antenna Installation
IO Terminal Installation
Rs232 Installation
Rs485 Installation
LED indicators

3.1 Power Supplies installation

The WL-430T-A accepts voltages between 9 - 30 VDC, two step complete the power supply wiring.

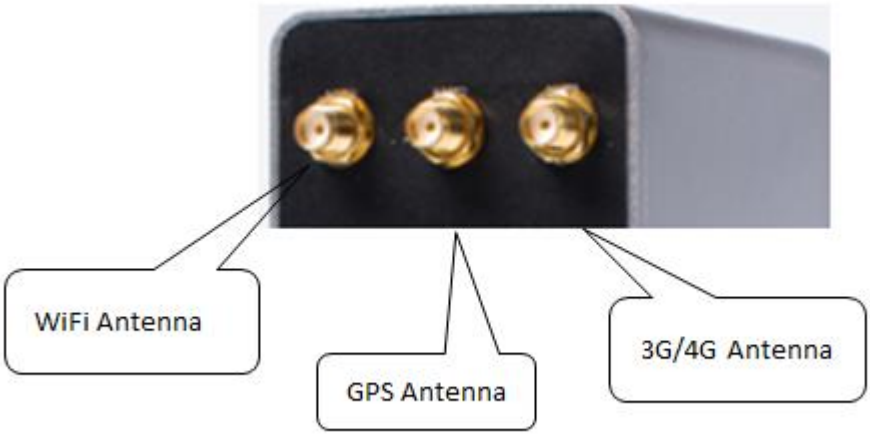
1. Connect the 24VDC cable to the power terminal, Please be careful don't connect the positive to the negative terminal.



2. Insert the Power Terminal into the module, then tighten the screws.

3.2 Antenna installation

The module designed of 3 antenna ports, 3G/4G antenna ports, GPS ports, WiFi ports. Each module must have a 3G/4G antenna connected to the 3G/4G antenna port on the WL-430T-A, without the antenna the module will not connect to the internet. If the WiFi and GPS function will be used, the WiFi and GPS antenna must be connected to the corresponding interface.



1. Small 3G/4G antennas with a reverse polarity SMA connector can be mounted directly on the radio. Screw the antenna onto the antenna port connector until it is snug. The frequency range must between 700MHz – 2700MHz.

2. Screw the WiFi antenna onto the WiFi antenna port connector, the WiFi frequency range must between 2400MHz-2483MHz or 5000MHz-5800MHz.

3. If you want to get the location information from the module, the GPS antenna should be screwed onto the GPS antenna port.

Important: Antennas selected should not exceed a maximum gain of 5 dBi under standard installation configuration. In more complex installations, it is imperative that the installer follow maximum dBi gain guidelines in accordance with the radio communications regulations of the Federal CommunicaCommission (FCC), Industry Canada, or your country's regulatory body (if used outside the Canada).

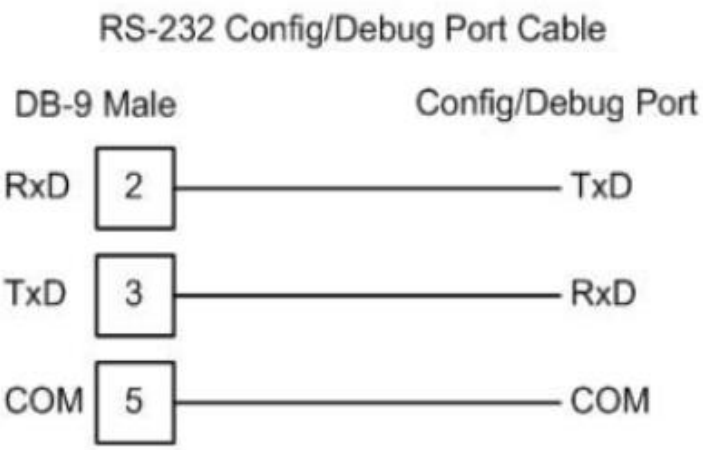
3.3 IO terminal installation

There are two digital input/output and one analog terminals on the module. We can monitor the IO signal by the Serial port. Also the IO signal can be controlled by the serial port.

DO-2	Digital Output Signal No.2 terminal
DO-1	Digital Output Signal No.1 terminal
DO-C	Digital Output ground terminal
DI-2	Digital Input Signal No.2 terminal
DI-1	Digital Input Signal No.1 terminal
DI-C	Digital Input ground terminal
AI+	Analog input positive terminal
AI-	Analog input negative terminal
Rs485 +	Rs485 positive terminal
Rs485 -	Rs485 Negative terminal

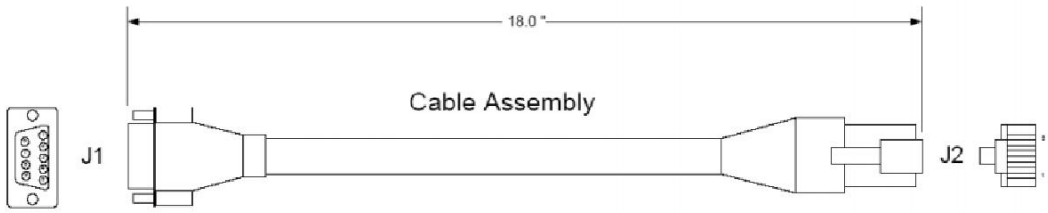
3.4 Rs232 Serial port installation

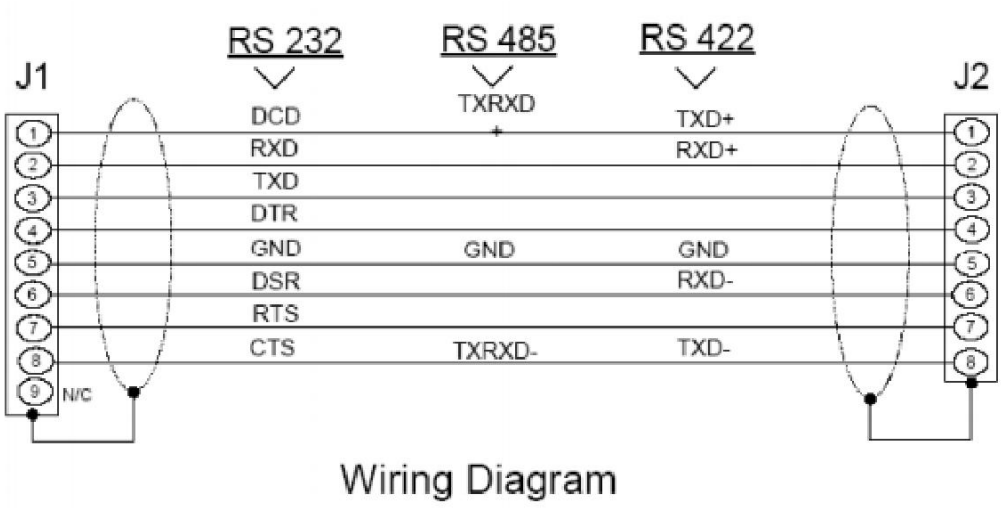
The use of hardware handshaking (control and monitoring of signal lines) depends on the requirements of the networked device. If no hardware handshaking will be used, the cable to connect to the port is as shown below:



With the package there are two serial cable, one cable is RJ45 to DB9 Female connector, and another is the serial Null-Modem cable.

DB9 to RJ45 Cable

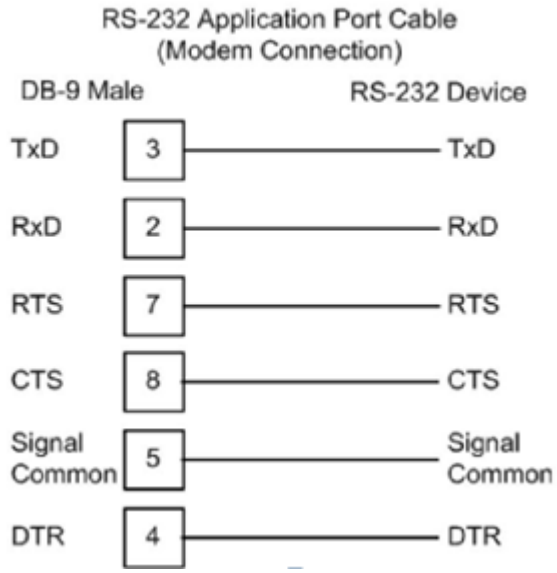




Wiring Diagram

RS-232: Modem Connection (Hardware Handshaking Required)

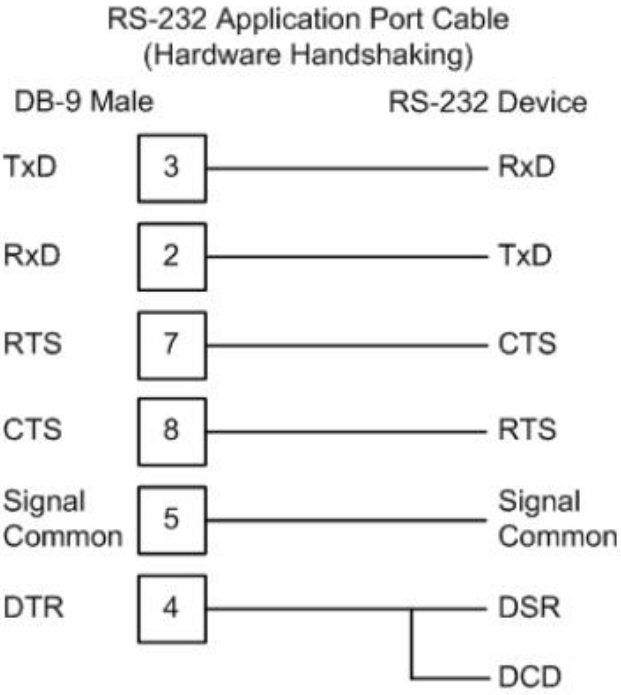
This type of connection is required between the module and a modem or other communication device.



The "Use CTS Line" parameter for the port configuration should be set to 'Y' for most modem applications.

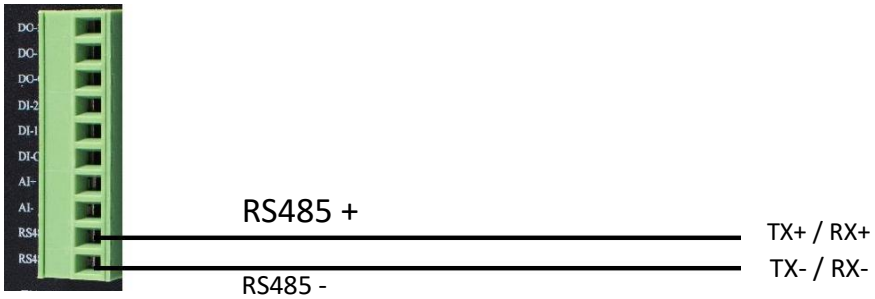
RS-232: Null Modem Connection (Hardware Handshaking)

This type of connection is used when the device connected to the module requires hardware handshaking (control and monitoring of modem signal lines).



3.5 Rs485 Serial port installation

The RS-485 interface requires a single two or three wire cable. The Common connection is optional, depending on the RS-485 network devices used. The cable required for this interface is shown below:



IO Terminal

Note: Terminating resistors are generally not required on the RS-485 network, unless you are experiencing communication problems that can be attributed to signal echoes or reflections. In these cases, installing a 120-ohm terminating resistor between pins Rs485+ and Rs485- on the module connector end of the RS-485 line may improve communication quality.

RS-485 and RS-422 Tip

If communication in the RS-422 or RS-485 mode does not work at first, despite all attempts, try switching termination polarities. Some manufacturers interpret + and -, or A and B, polarities differently.

3.6 LED indicators

LED	Color	Status	Description
DO-2	Green	Steady	Digital Output signal No.2 is Closed
		Unlighted	Digital Output signal No.2 is Open
DO-1	Green	Steady	Digital Output signal No.1 is Closed
		Unlighted	Digital Output signal No.1 is Open
DI-2	Green	Steady	Digital input signal No.2 is Closed
		Unlighted	Digital input signal No.2 is Open

DI-1	Green	Steady	Digital input signal No.1 is Closed
		Unlighted	Digital input signal No.1 is Open
Lan	Green	Steady	Lan Communication Failed
	Green	Flashing	Lan Communication is successful
		Unlighted	No Ethernet Cable has been detected
WAN	Green	Steady	WAN port Communication Failed
	Green	Flashing	WAN port Communication is ok
		Unlighted	No Ethernet Cable has been detected
WiFi	Green	Steady	WiFi Function is enable
		Unlighted	WiFi Function is disable
3G/4G	Green	Steady	3G/4G has connected to the internet
	Green	Flashing	Module is Connecting to the Base Station or the sim card is invalid
PWR	Green	Steady	Power supply is normal
SYS	Green	Steady	System has err occurs

4. Support, Service & Warranty

4.1 Contacting Technical Support

WitLinc Technology, Inc. is committed to providing the most efficient and effective support possible. Before calling, please gather the following information to assist in expediting this process:
1 Product Version Number
2 System architecture
3 Network details
If the issue is hardware related, we will also need information regarding: **1** Module configuration
2 Module operation and any unusual behavior
3 Configuration/Debug status information
4 LED patterns
5 Details about the serial, Ethernet or other interfaced to the module.
Note: For technical support calls within the United States, an emergency after-hours answering system allows 24-hour/7-days-a-week pager access to one of our qualified Technical and/or Application Support Engineers. Detailed contact information for all our worldwide locations is available on the following page.

Internet	Web Site: www.witlinc.com/ E-mail address: support@witlinc.com
Tel	+1 778-300-9900
Fax	+1 778-3009080

4.2 Warranty Information

For complete details regarding WitLinc Technology's TERMS & CONDITIONS OF SALE, WARRANTY, SUPPORT, SERVICE AND RETURN MATERIAL AUTHORIZATION INSTRUCTIONS please see the documents on the Product DVD or go to www.witlinc.com