

# USR-C210

## - Low Power Minisize WiFi Module User Manual

### V1.0



- Support Wi-Fi@2.4 GHz 802.11 b/g/n wireless standards
- Support WEP、WPA/WPA2 security mode
- Support AP / STA / AP+STA working mode
- Fully integrated serial port turn wireless TCP/UDP transmission function
- Search in local area network (LAN) and wireless parameters setting function
- Support TCP/UDP Client registered packet mechanism
- Support Simplelink/usrlink Networking configuration
- Support similar RFC2217 automatic baud rate adaptation function
- Support AT+ simple instruction set configuration
- Single 3.3 V power supply
- Ultra low power mode, support deep dormancy
- Support Internal/External(I-PEX) Antenna Option
- Minisize:18.22mm\*26.65mm\*2.8mm SMT

# Catalogue

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# 1、Module Overview

## 1.1 Module Overview

USR - C210 is a low-cost module of the series wifi module C21x. The module is a low-power 802.11 b/g/n modules that design for achieving the application of the embedded system, wireless network communication. Through the module, the customer can set a physical device connected to a wifi network, so as to realize the control and management of the Internet of IoT.

The hardware of module integrate MAC, baseband chip, rf transceiver unit, as well as the power amplifier; The internal ultra-low power operation mechanism, can run effectively low-power module; Support WiFi protocol and TCP/IP protocol, the user only needs simple configuration, can achieve the function of UART devices connected to the Internet.

Small size, easy to welding in the customer product veneer of hardware circuit. And the module can choose the application of the internal or external antenna, supplying customers multiple choices.

Module size: 18.22 mm \* 26.65 mm \* 2.8 mm SMT assembly

The basic function of the module is described below:

- Can work in AP mode for other WIFI devices access communication, three station can connect it at the same time; can also work in the STA mode, access to the wireless router to realize communication
- With a Socket communication links, can be set to the TCP Server, TCP Client, and UDP Server, UDP Client communication; The Socket in the TCP Server mode, can support up to five TCP Client connection
- Module supports UART translate, can use AT commands to arbitrary switching.

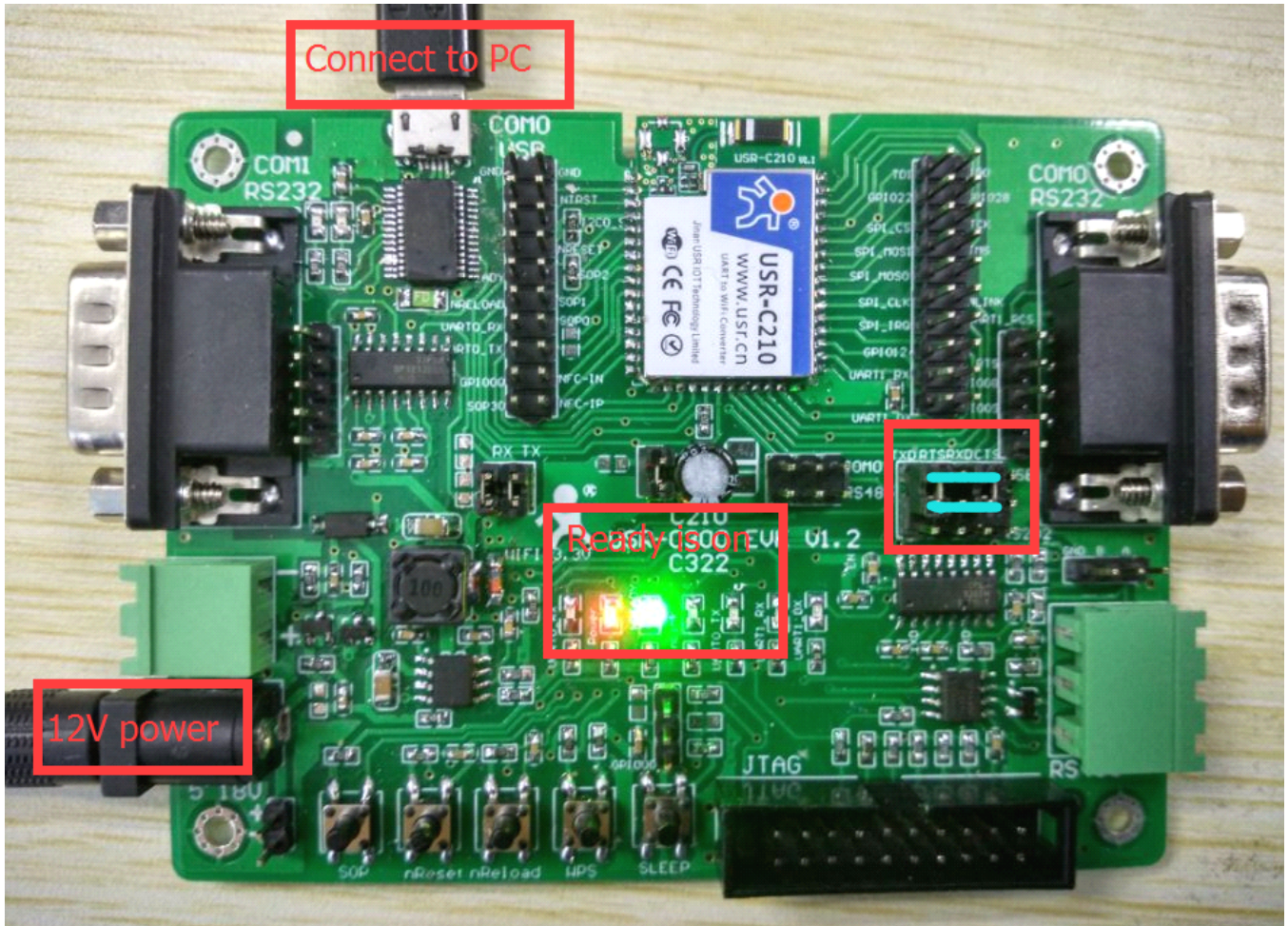
If you have problems when use the module, you can submit the question to <http://h.usriot.com>. We will solve your question at the first time.

## 1.2 Characteristics of Module

- Support Wi-Fi@2.4 GHz 802.11 b/g/n wireless standards
- Support WEP、WPA/WPA2 security mode
- Support AP / STA / AP+STA working mode
- Fully integrated serial port turn wireless TCP/UDP transmission function
- Search in local area network (LAN) and wireless parameters setting function
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- Ultra low power mode, support deep dormancy
- Support Internal/External(I-PEX) Antenna Option
- Minisize: 18.22mm\*26.65mm\*2.8mm SMT

### 1.3 QuickStart

When you receive module, module power supply, if the module to work properly, the Ready indicator will light up. The diagram below:



The wireless network card of a PC's search WiFi, WiFi module by default SSID is: USR - C210, the default is no encryption, connect the SSID, WiFi module is assigned an IP (the default is 10.10.100. XXX).



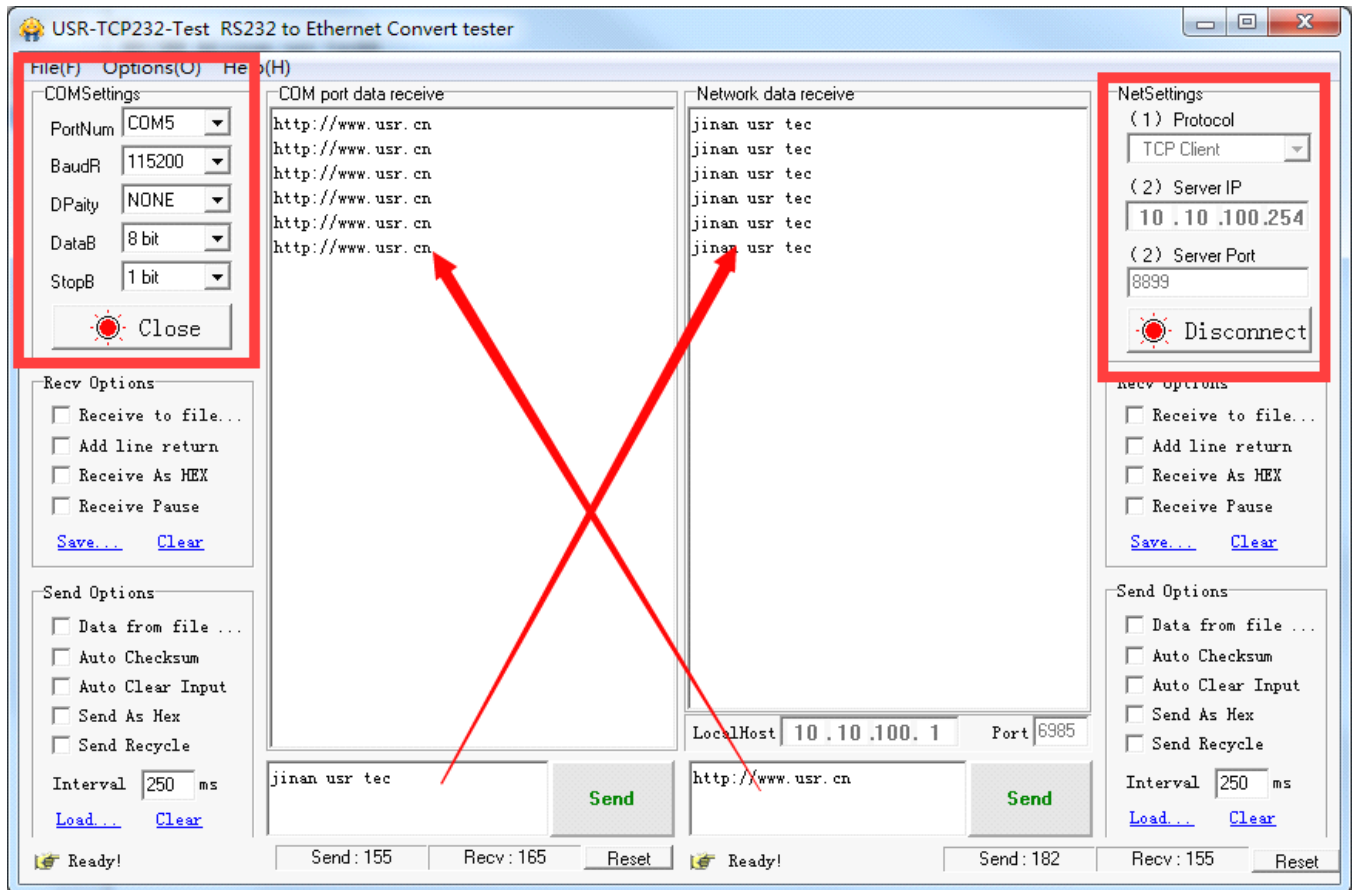
At this time open the serial debugging assistants (download address:

<http://www.usr.cn/Download/27.html>), set the diagram below: Choose the serial port number, set the baud rate: 115200, check digit: NONE, data bits: 8 bit and stop bit 1 bit.

Network Settings, protocol type: TCP Client and server IP address: 10.10.100.254, server port number: 8899.

Click on "send" serial port end, serial data (jinan someone technology co., LTD.) will be through the network side.

Click the "send" network end, network data (<http://www.usr.cn>) through a serial port side.



## 1.4 Product Feature

Module parameters

classify	parameter	value
Wireless Parameter	Wlan Standard	802.11 b/g/n
	Transmit Power	17.0 dBm @ 1 DSSS
		15.0 dBm @ 11 CCK
		13.5 dBm @ 54 OFDM
Receive Sensitivity	-91.5 dBm @ 1 DSSS	
	-87.5 dBm @ 11 DSSS	
	-80.5 dBm @ 54 OFDM	
Antenna	External:I-PEX	

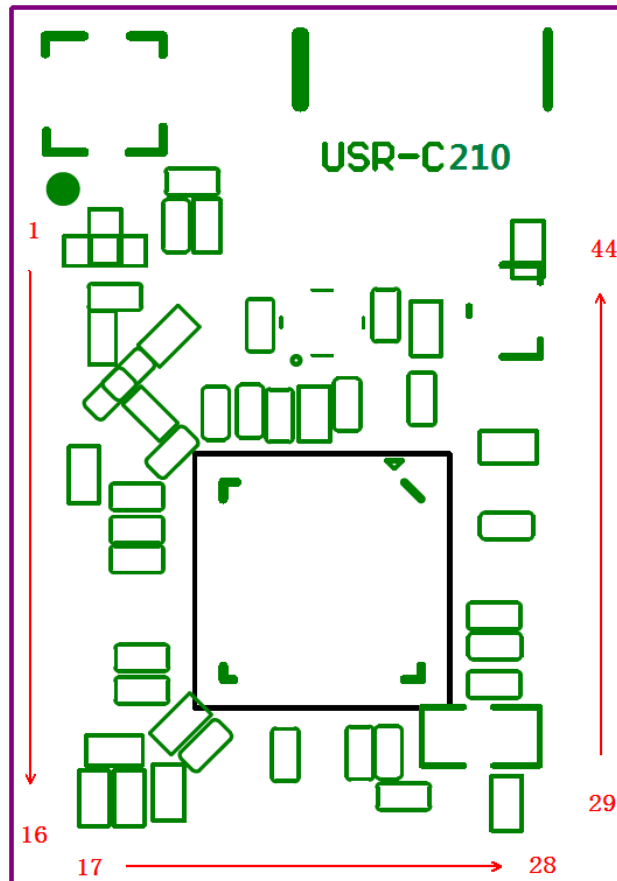
		Internal:On-board ceramic antenna
	Data Interface	UART
Hardware	Working Voltage	3.0V~3.6V
	Working Current	(voltage 3.3 V) normal mode:AP: ~70mA;STA:~30mA In the web:6.5mA Standby:lowest 90uA
	Working Temperature	-20°C- 85°C
	Storage Temperature	-55°C- 125°C
	Size	18.22mm*26.65mm*2.8mm
	Footprint	SMT
	Wireless Network Type	AP/STA/AP+STA
Software	Security Regime	WEP/WPA-PSK/WPA2-PSK
	Encryption Type	TKIP,AES,TKIP/AES
	Networking Protocol	IPv4, TCP/UDP
	User Configuration	AT+ instruction set Web

## 1.5 Application Area

- Cloud Connected
- Home Automation
- Household Appliances
- Access Control
- Security and Protection System
- Smart Energy
- Industrial Control
- Intelligent Electrical Outlet Box/Instrument Measurement
- IPNetwork Sensor Nodes

## 2、Hardware Description

### 2.1 Pin Definitions



The module pin

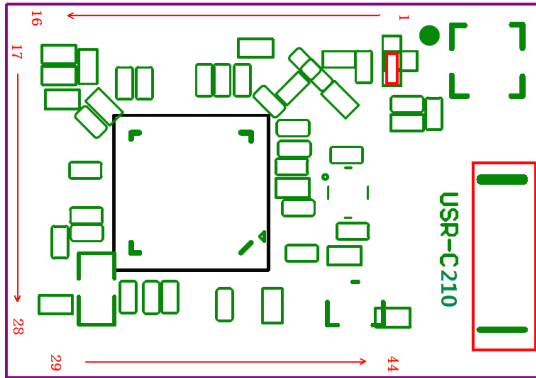
Pin	Net Name	Functional Description
1	GND	GND
2	RFIO_OUT	RF out put
3	GND	GND
4	nReset	Module reset pin, low level effectively
5	NC	NC
6	NC	NC
7	NC	NC
8	GND	GND
9	NFC_IN	NFC_IN(This version is not supported)
10	NFC_IP	NFC_IP(This version is not supported)
11	GND	GND
12	GND	GND
13	VDD_3.3	Power input pin, please connect + 3.3 V
14	VDD_3.3	Power input pin, please connect + 3.3 V



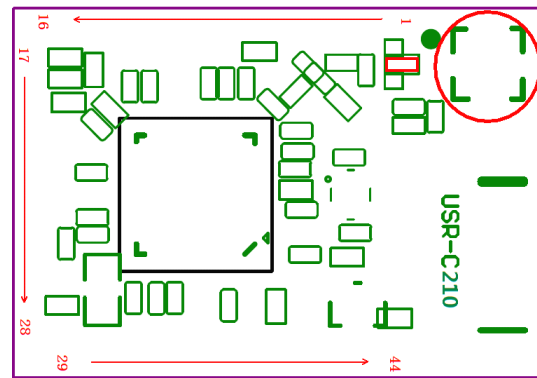
15	NC	NC
16	NC	NC
17	GND	GND
18	GPIO	General GPIO
19	UART TX	UART TX for module
20	UART RX	UART RX for module
21	nReload	Down 1-3 Seconds start simplelink setting. Down more 3 seconds set the Module to factory default setting
22	nReady	Work instructions pin of module, low effective, connect an external LED
23	nLink	WiFi link pin of module, low effective, connect an external LED
24	UART CTS	A serial port flow control pin CTS
25	UART RTS	A serial port flow control pin RTS
26	NC	NC
27	NC	NC
28	GND	GND
29	GND	GND
30	UART_LOG_TX	Log output
31	UART_LOG_RX	Log input
32	NC	NC
33	SPI_IRQ	(This version is not supported)
34	SPI_CLK	(This version is not supported)
35	SPI_MISO	(This version is not supported)
36	SPI_MOSI	(This version is not supported)
37	SPI_CS	(This version is not supported)
38	NC	NC
39	JTAG_TDI	JTAG
40	JTAG_TDO	JTAG
41	JTAG_TRST	JTAG
42	JTAG_CLK	JTAG
43	JTAG_TMS	JTAG
44	GND	GND

## 2.2 Antenna Shows

Module has two antenna version, internal antenna and external IPEX interface respectively:



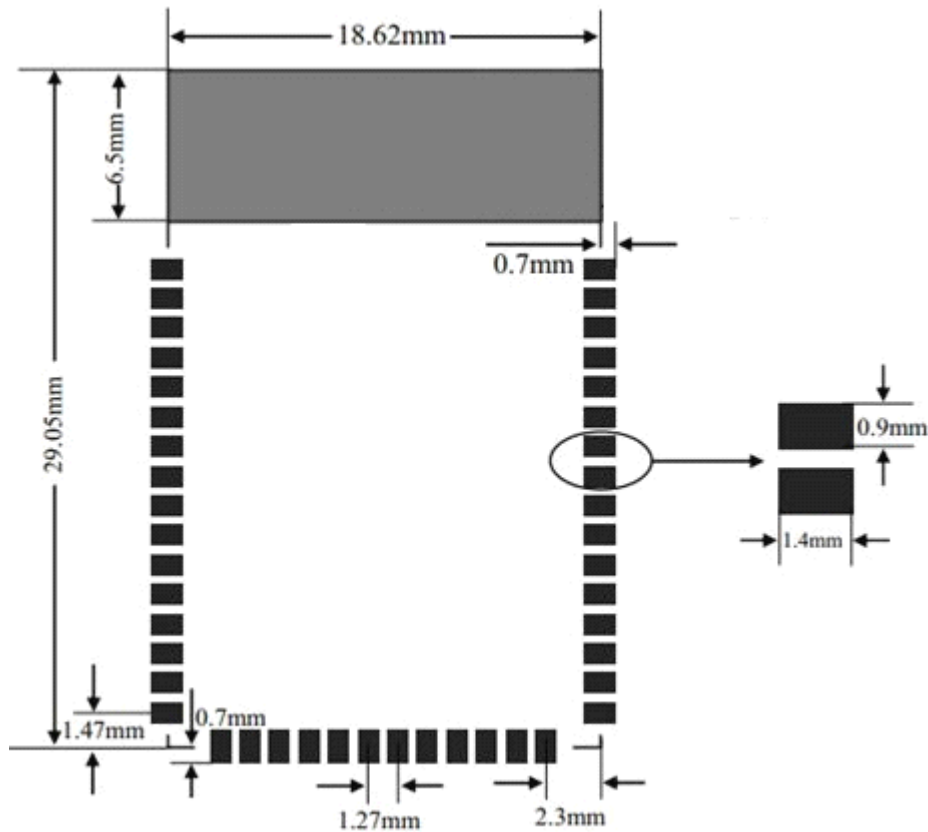
Internal Antenna



External: I-PEX

## 2.3 Size and Layout Recommendations

Advise PCB Footprint:



Cloth plate specification:

### 1) Internal Antenna

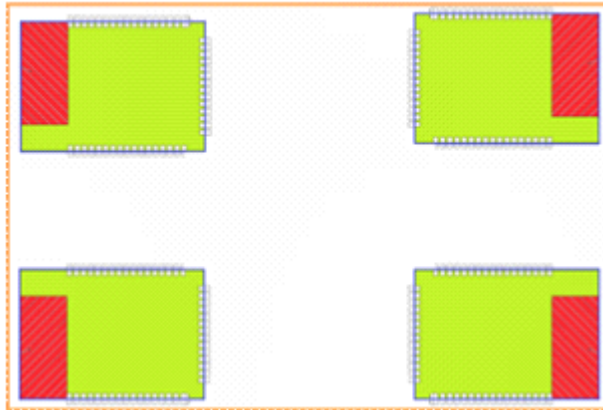
Customers to use the internal antenna, the need to abide by the following considerations and internal antenna module placed general rules:

On the user's PCB, and grey shaded area above the corresponding area cannot be placed components and GND.

- Antennas away from the metal, at least distance with high components around more than 10 mm;

- Antenna part cannot be metal shell, plastic shell need at least more than 10 mm away from the antenna;

It is suggested that module is placed in the following areas of the user's board as far as possible, to reduce the influence of the antenna and wireless signal, and at the same time, please consult someone technical support staff to assist the placement of modules and related areas of the Layout design.



## 2) external antenna

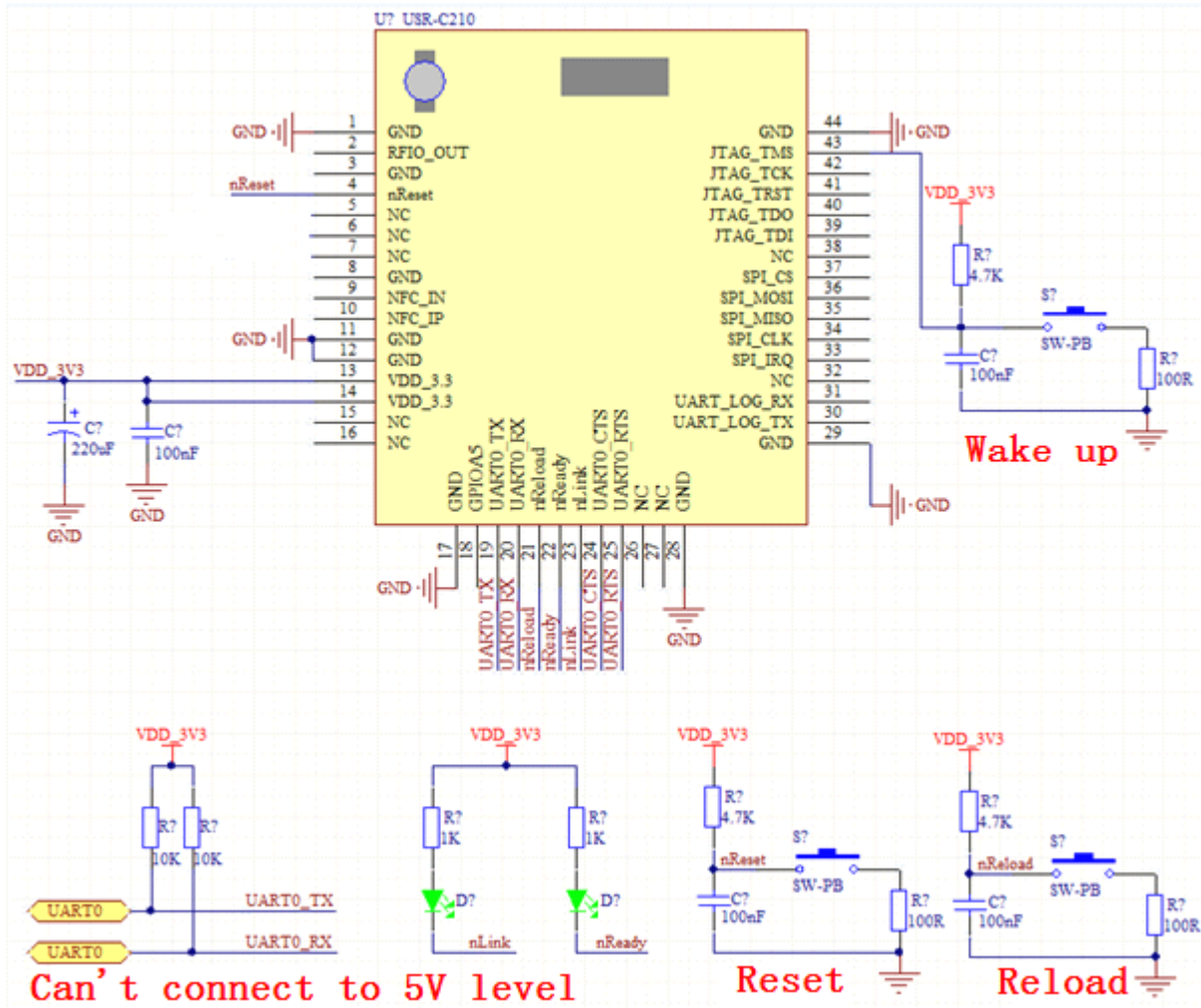
Customers to use external antenna lead, according to the requirement of the IEEE802.11 b/g/n standard, need to connect the 2.4 g external antenna. External antenna using IPEX interface. The parameters of the external antenna requirements in the table below details.

item	paramter
frequency range	2.4~2.5GHz
impedance	50 Ohm
VSWR	2 (Max)
Return Loss	-10dB (Max)
Connection Type	IPEX

## 2.4 The Hardware Circuit Design Reference

The hardware design considerations:

- Reset、Reload need to pick up on the 4.7 K resistor.
- nLink,nReady Effective for low level output.



## 3、Product Function

### 3.1 Work Mode

Module consists of two work modes: translate mode and command mode

- **Translate Mode**

In this mode, the module realizes the UART and transparent transmission between network, realize common serial data transfer between devices and network equipment.

- **Command Mode**

In this mode, the user can through the AT command to UART module and query and network parameters Settings. When using the AT + ENTM exit command mode, the default back to translate mode.

#### 3.1.1 Translate Mode

##### 1. Translate Mode

UART interface can transparent transmission mode has the advantage of UART interface and network communication of the plug and play, which reduce the complexity of the user to a great extent. Modules to work in a transparent transmission mode, the users only need to configure the necessary parameters, UART interface and network communication can be realized. After power on, module automatically connected to the wireless network and server configured.

Transparent transmission mode is fully compatible with your own software platform, reducing the workload of integration of wireless data transmission software development. Users need to preset parameters usually include:

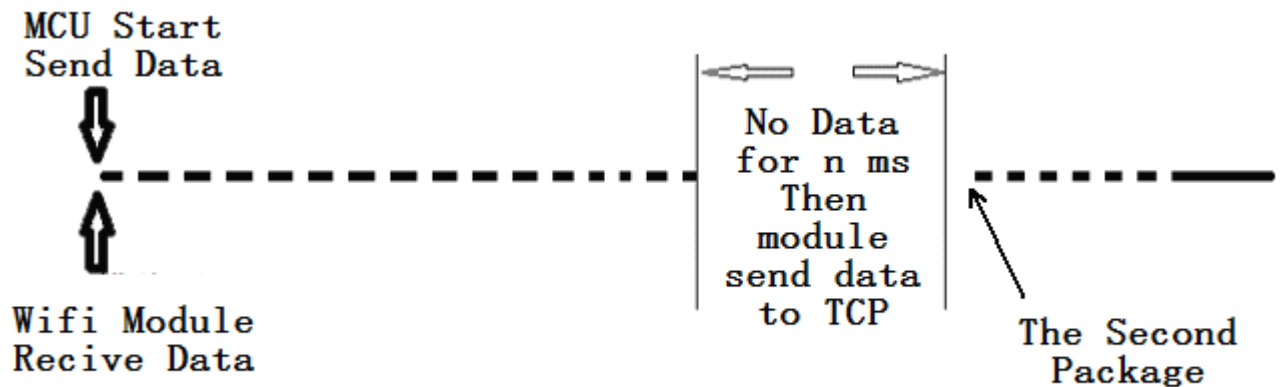
- Wireless network parameters
  - ◆ SSID
  - ◆ security mode
  - ◆ secret key
- TCP/UDP parameter
  - ◆ protel
  - ◆ connection type
  - ◆ destination port
  - ◆ destination address
- UART parameter
  - ◆ Baud rate
  - ◆ data bits
  - ◆ stop bit
  - ◆ parity bit
  - ◆ Hardware flow control

Passthrough mode test routines: annex A.

## 2. UART Frame Scheme

Module in the receiving UART data, will continue to check the time interval of two adjacent bytes. If the time interval is greater than the set packing time (default 5 ms, can be set up by the AT + UARTTE), argues that the end of a frame, or has been receiving data, in command mode is greater than 1 k bytes are discarded the received data, in translate mode is greater than 1 k bytes are sent packing.

Packaging process is as follows: n is packaged interval unit of ms.



### 3.1.2 Command Mode

In command mode, the module will no longer work to translate, UART port AT this time for receiving the AT command, the user can through UART port to send AT commands to module, UART for querying and setting module, network and other related parameters.

## 3.2 Wireless Network Mode

There are three kinds of wireless module WIFI working mode: the STA and AP and AP+STA, can provide users with flexible network mode and the network topology method.

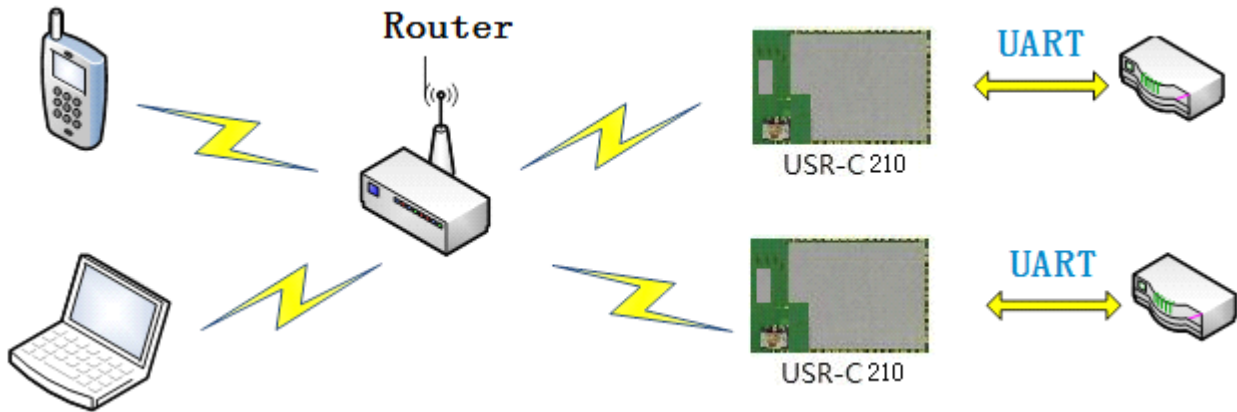
< Nouns that >

AP: The wireless access point, is the center of a wireless network node. Commonly used wireless router is an AP, other wireless terminal can be interconnected by AP

STA: wireless site, is a wireless network terminal. Such as notebook computer, PDA, etc.

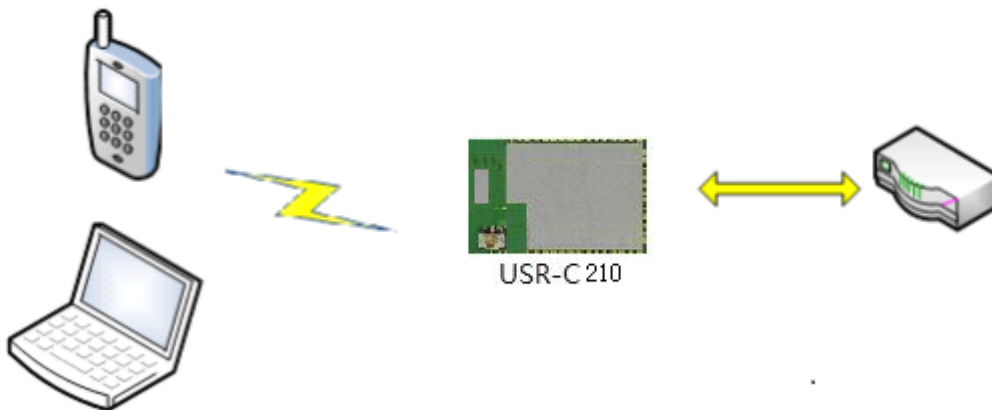
### 3.2.1 Module As a STA

Module as the STA is one of the most commonly used network mode, and is composed of a router AP and many STA, the following figure. Its characteristic is AP in a central position, communication between the STA forward by AP.



### 3.2.2 Module As a AP

Modules as AP mode, can achieve phone/PAD/computer without any configuration, fast access module for data transmission. In addition, you can login module internal web page to set parameters



**< note >** : module in AP mode, can support only 3 STA access devices.

### 3.2.3 Encryption Type

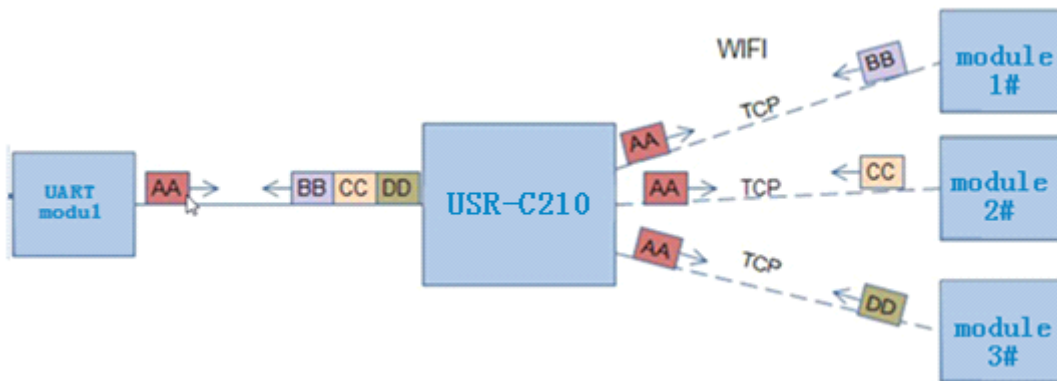
Encryption is scrambling to message data, ensure the security of data transmission, increase the security of communication. Support multiple wireless network encryption methods, including:

- WEP
- WPA-PSK/TKIP
- WPA-PSK/AES
- WPA2-PSK/TKIP
- WPA2-PSK/AES

### 3.3 Socket Communication

- The module has one TCP Socket. When the module in translate mode, to write the data of the UART interface module, module will automatically send a Socket; Module through the Socket received data, send out through the UART interface.

- Socket works include: the TCP Server, the TCP Client, UDP Client, and UDP Server, please refer to the AT command set method in the AT + SOCKA instruction set or through a web page Settings.
- When a TCP Server Socket set, can support up to five TCP Client TCP link connection. In a multiple TCP link connection mode, from the TCP transport data will be forwarded to them one by one on the UART interface. Come from the UART interface data will be copied into a more, in every TCP forwarding a link. Specific data flow diagram shown below:



- When the Socket set to UDP Server, if a serial port receives data first, module sends the data to the already set IP, port (AT + SOCKA set), if the UDP Server receives data, data source address, the module will remember after a serial port, after receipt of the data module will be transmitted to the address data.
- When the module is set to the UDP Client module only to have set the IP and port to send data, and receive only has set the IP and port address data (AT + SOCKA Settings), other address to send more data is not forwarded to the UART.

### 3.4 Search in local area network

Module support within the local area network (LAN) search function, that is, when the module is connected to a wireless router, the user can through to a fixed port sends UDP broadcast way, to get the IP address of the module of the current, in order to realize the search and communications equipment. SEARCH the port and keyword can be set by the AT + SEARCH commands, default: 48899, www.usr.cn.

Search tool operation process:

1. Through the UDP broadcast (broadcast address: xx. Xx. Xx. 255, port: 48899) to send a password, the default password is: "www.usr.cn", the longest can be set up 20 bytes.
2. Module after receiving the password, if the password is correct, the module to enter configuration mode, to the address (unicast, source port) send the local IP address, MAC address, the module name, version number. (IP, MAC, MID, ver 10.10.100.254, D8B04CFC0000, USR - C210, 01.01.10). Module to enter configuration mode set if not



received within 30 seconds after the command, the module will exit the configuration mode, the user needs to send search command word, enter configuration mode.

3. Users can through the network to the port to send AT commands to set up and read the module working state, the AT command format with a serial port the AT command.

Note: search tools and modules must be within the same LAN, if multiple STA even on a router, run the search tools of the computer and even on the router. This search tool to search all of the STA.

### 3.5 TCP/UDP Client Registration Packet Mechanism

When the module working in TCP or UDP Client Client mode, the user can open registration packet mechanism, in order to realize the server to the distinction between the data source, data of different equipment monitoring. MAC and ID registration packet is divided into two kinds, MAC is 6 bytes, ID 0-65535, ID value can be set. Registration packet ID is mainly used for the D2D software of the company..

Registered packet opened and closed by AT + REGENA.

Registered packet implementation mechanism is as follows:

- TCP Client: There are two kinds of TCP Client: registration mechanism:
  - ① Just send a registration packet, when the module is connected to the TCP Server module will send TCP Server MAC (6 bytes) or ID (4 bytes), Server by MAC or ID to distinguish between different devices.
  - ② Every packet of data has registration information, TCP Client after the link to the server, a serial port receives each packet of data to increase MAC or ID, to distinguish between equipment. ID or MAC choice, can be set by the AT + REGENA.
- UDP Client: each module on the sending UDP packets, MAC or ID will increase in each packet header information, and then send.

### 3.6 Fast Access Wi-Fi(usrlink)

When one module works in AP mode, it opens a UDP port used to receive fast access Wi-Fi commands, the port number is 49000. The phone PDA can directly connect to Wi-Fi network of the module, send commands to search router list and set SSID and password. After the completion of set up, module will automatically restart, connected to the router, work in the STA mode at this time.

Protocol format:

Searching command

No	Name	Num of Bytes	Description
1	head	1	fixed value:0xFF

2	length	2	Sum of data bytes from length bytes to check byte(not contain length bytes and check byte).
3	cmd	1	Command type, 0x01
4	check	1	Sum of bytes from head (not contained) byte to check byte (not contained).

#### Response for searching

No	Name	Num of Bytes	Description
1	head	1	fixed value:0xFF
2	length	2	Sum of data bytes from length bytes to check byte(not contain length bytes and check byte).
3	cmd	1	Command type, 0x81
4	AP num	1	The number of AP what module scans
5	SSID1	Unsize	The SSID of router 1
6	separator	1	Separator of SSID1, fixed value:0x00
7	Signal strength1	1	Signal strength of router 1,0~100:0%~100%
8	separator	2	Separator of signal strength1, fixed value:0x0D,0x0A
...	...	...	.....
M	SSID n	Unsize	The SSID of router n
M+1	separator	1	Separator of SSID n, fixed value:0x00
M+2	Signal strength	1	Signal strength of router n,0~100:0%~100%
M+3	separator	2	fixed value:0x0D,0x0A
M+4	check	1	Sum of bytes from head (not contained) byte to check byte (not contained).

Example:

Data from phone PDA to module (HEX): FF 00 01 01 02

Data from module to phone PDA (HEX): FF 00 14 81 02 54 45 53 54 31 00 40 0D 0A 54 45  
53 54 32 00 37 0D 0A 1F

Explanation:

The phone PDA send searching command to module, the response from module is: SSID of router1 is "TEST1", signal strength of router1 is 64%; SSID of router2 is "TEST2", signal strength of router2 is 55%.

Note: The information of routers is ordered by signal strength.

#### a) Setting Command

No	Name	Num of Bytes	Description
1	head	1	fixed value:0xFF
2	length	2	Sum of data bytes from length bytes to check byte (not contain length bytes and check byte).
3	cmd	1	Command type, 0x02
4	reserve	1	fixed value:0x00
5	SSID	Unsize	SSID of router
6	separator	2	fixed value:0x0D,0x0A
7	password	Unsize	Password of router
8	check	1	Sum of bytes from head (not contained) byte to check byte (not contained).

#### Response for Setting

No	Name	Num of Bytes	Description
1	head	1	fixed value:0xFF
2	length	2	Sum of data bytes from length bytes to check byte(not contain length bytes and check byte).
3	cmd	1	Command type, 0x82
4	Check for SSID	1	If the SSID set by PDA exist, check value is 0x01, otherwise is 0x00.
5	Check for	1	If the form of password set by PDA is correct, check

	password		value is 0x01, otherwise is 0x00.
6	check	1	Sum of bytes from head (not contained) byte to check byte (not contained).

Example:

Data from phone PDA to module (HEX): FF 00 0F 02 00 54 45 53 54 31 0D 0A 31 32 33 34  
35 36 CE

Data from module to phone PDA (HEX): FF 00 03 82 01 01 87

Explanation:

The phone PDA send setting command to module, SSID is set to "TEST1", password is set to "123456". The response from module is that the "TEST1" Wi-Fi network exist, the form of password is correct.

### 3.7 Simplelink Configuration

Simplelink function main realization module of intelligent network, namely the quick connect to the AP. Modules work in STA and AP mode, lower Reload pin 1 to 3 seconds, the module get into the Smartconfig configuration, at this time Ready pin output high and low level of 0.5 Hz.

The handheld device connected to the module to connect to the AP, open the APP, enter the password, click on "connect". Module will automatically restart after successfully connect to the AP.

You can refer to :simplelink-C21x Software instruction .Download address :<http://www.usriot.com/>

### 3.8 RFC2217 Automatic Baud Rate Function

#### 3.8.1 RFC2217 Functional Description

1. RFC2217 is an instant change via Ethernet equipment serial port parameters of a standard protocol, this device supports a similar RFC2217 agreement, not a standard RFC2217, realize the same function, but the deal easier.
2. Sends a command to the device after this agreement, if do set serial port parameters meet the requirements, not return anything, if the calibration error or agreement is wrong, will be as a common packet via a serial port forwarding.
3. TCP Client, TCP Server, UDP Client, and UDP Server, and broadcast the several patterns are support this function.
4. This command changes take effect immediately, do not need to restart, when effective, not save, power is lost.

### 3.8.2 RFC2217 Protocol Specification

Protocol length is 8 bytes, specific agreement content as follows, for example the value for the HEX format:

designation	Header	Bps	Data bit	Check
length(bytes)	3	3	1	1
explain	reduce misjudgment	baud rate value, high in the former	Different bits to represent different meanings, see table	Sum of the front four
Example (115200,N,8,1)	55 AA 55	01 C2 00	83	46
Example (9600,N,8,1)	55 AA55	00 25 80	83	28

Attachment: a serial port parameters meaning a bit

Bit num	Explain	Data	describe
1:0	Data bits	00	5 bits
		01	6 bits
		10	7 bits
		11	8 bits
2	Stop bit	0	1 bit
		1	2 bits
3	Enabled check	0	Disable check
		1	Enable check
5:4	Check type	00	ODD
		01	EVEN
		10	Mark
		11	Clear
7:6	NC	00	Write 0

### 3.9 Sleep Mode Introduction

Modules can open low power mode. In module under normal condition, if the network and uart port for certain time 2-240 seconds (AT + SLPTYPE Settings) does not data communication module into low power mode. The user can choose different sleep mode (0 to 2).

The way of wake up is the local GPIO.

For example: set up AT + SLPTYPE = 2,200

When the module network end (refer to the socket end) and a serial port for 200 seconds didn't receive the data, the module into Deepsleep mode (mode 2).

### 3.9.1 Mode Introduction

#### Mode 0: Active Mode

The Active mode, Module running various peripherals. Corresponding mode 0, that is, normal work mode, the module optimal performance.

#### Mode 1: Sleep Mode

Sleep mode. The system stop run, but the wifi is still connected. After awakening the system run from entering sleep place, The response time of waking up is shorter than deepsleep mode. Corresponding mode 1.

#### Mode 2: Deepsleep Mode

Module into deepsleep dormancy, the system stop running and the wifi is closed. It can be waked up by GPIO. The corresponding mode 2.

### 3.9.2 Power Reference Table

No data transmission module, the power consumption mode reference is as follows:

Power mode	Wake up mode	STA	AP
0	none	38 mA	80 mA
1	GPIO	6.5 mA	70 mA
2	GPIO	90 uA	90 uA

Example: low power consumption

- 1、Wifi module online, various peripherals work is normal, the data transmission between the interval of a few seconds, use "pattern 1".
- 2、When the user equipment does not need to be online for a long time, only occasionally arouse initiative to send data to the server, you can use "mode 4" Hibernate mode. A frame to a serial port to send data, wake up module, the module will be according to set the wifi, TCP socket parameters, the active link to the server, translate data, translate is completed according to set the time to sleep.

## 4、Parameter Setting

The parameters of the module configuration page configuration, AT + command configuration in two ways, behind will detail the use of two ways.

### 4.1 Web Page Configuration

#### 4.1.1 The Web Management Page

When using the module for the first time, need some configuration on the module. By PC connection module AP interface, the user can use the web management page configuration.

By default, the module of AP interface SSID, IP address, user name and password are as follows:

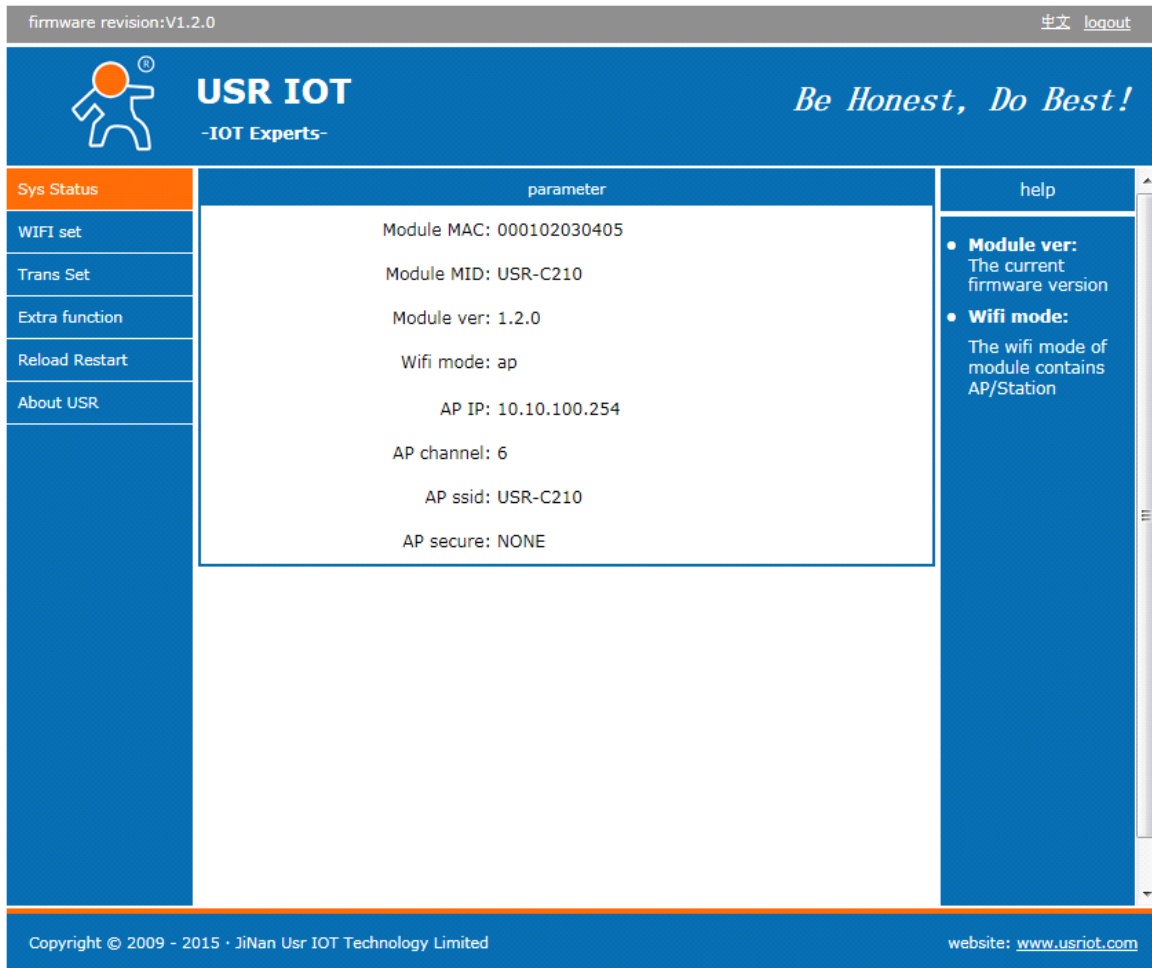
parameter	default setting
SSID	USR-C210
IP address	10.10.100.254
mask	255.255.255.0

#### 4.1.2 Open Management Web Page

Link with PC wireless card first, after waiting for connection is good, open the IE browser, in the address bar enter 10.10.100.254, Then the web management page will appear. Management page including "sys status" and "WiFi Set" "Trans Set" "Extra" "account management" "return to restart Settings" "about someone."

##### 1) The sys status Page

Mainly for the module operation parameters, including: MAC address, MID number, version and WiFi link state.



The screenshot shows the USR IOT management web page. At the top, it displays "firmware revision: V1.2.0" and a "logout" link. The main header features the USR IOT logo and the slogan "Be Honest, Do Best!". A navigation menu on the left includes "Sys Status" (highlighted), "WiFi set", "Trans Set", "Extra function", "Reload Restart", and "About USR". The central content area is titled "parameter" and lists the following system status information:

- Module MAC: 000102030405
- Module MID: USR-C210
- Module ver: 1.2.0
- Wifi mode: ap
- AP IP: 10.10.100.254
- AP channel: 6
- AP ssid: USR-C210
- AP secure: NONE

On the right side, there is a "help" section with two items:

- Module ver:** The current firmware version
- Wifi mode:** The wifi mode of module contains AP/Station

At the bottom of the page, the copyright information "Copyright © 2009 - 2015 · JiNan Usr IOT Technology Limited" and the website "www.usriot.com" are displayed.

##### 2) WiFi Parameter Setting:

###### ① Wifi Mode Select:

Wifi model can choose the model of the STA AP AP+STA, click save Settings, restart to take effect.

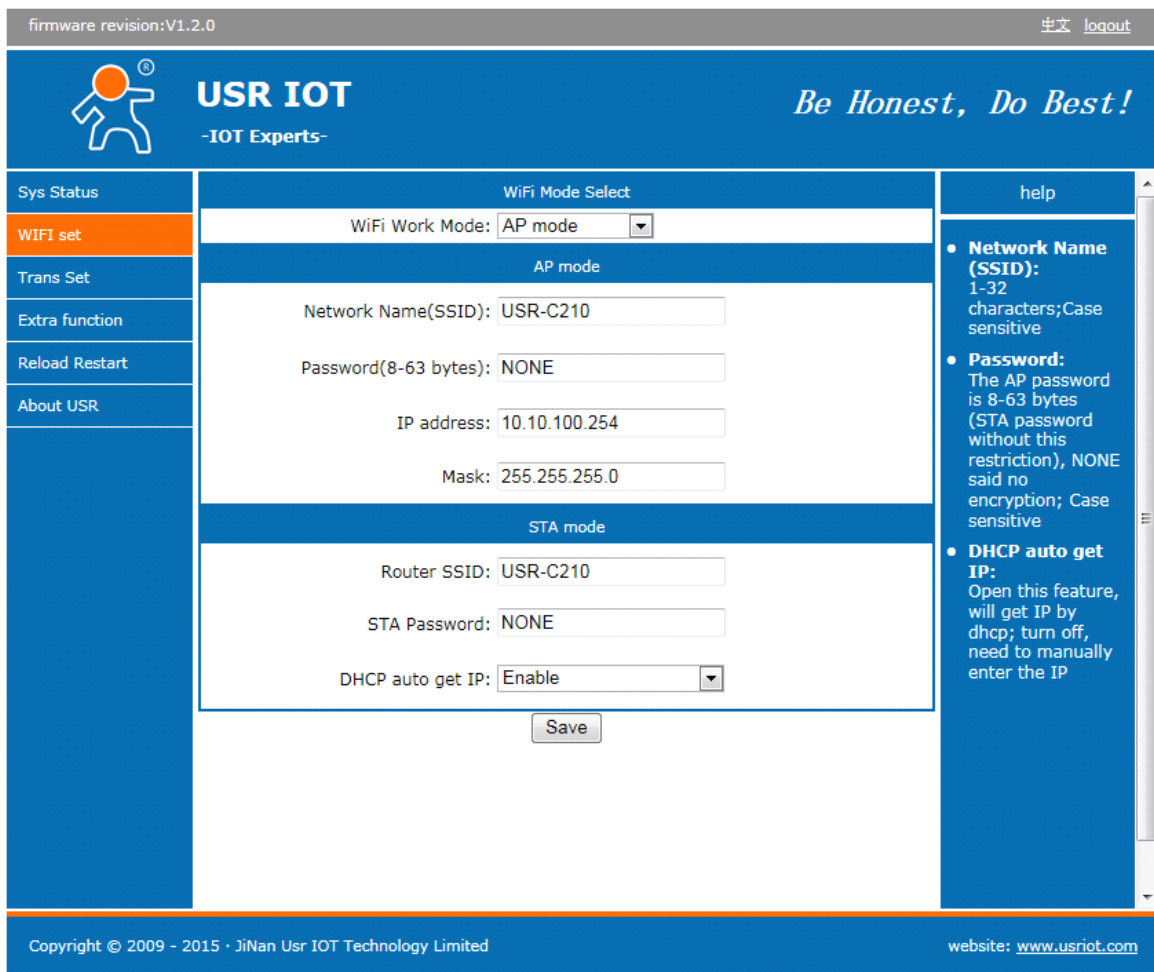
###### ② AP Parameter Setting:

Setting module in AP mode SSID and password (AP mode password for 8-63), encryption mode is WPA2PSK by default mode, click save Settings, restart to take effect.


③ STA Parameter Setting:

Setting module in the STA mode needs to connect AP SSID and password (adaptive encryption module), DHCP is enabled. When the connection of the AP is no encryption, set the password to none. DHCP automatically obtain IP enabled, the module will automatically get the IP, DHCP can ban, through input the IP, subnet mask, gateway, and obtain a static IP, restart to take effect.

**Note:** when the network name and password does not support the double quotes, comma, and, or, greater than, less than and other special characters.



firmware revision:V1.2.0 中文 [logout](#)


USR IOT
Be Honest, Do Best!

Sys Status

WIFI set

Trans Set

Extra function

Reload Restart

About USR

WiFi Mode Select

WiFi Work Mode: AP mode

AP mode

Network Name(SSID):

Password(8-63 bytes):

IP address:

Mask:

STA mode

Router SSID:

STA Password:

DHCP auto get IP: Enable

help

- Network Name (SSID):**  
1-32 characters;Case sensitive
- Password:**  
The AP password is 8-63 bytes (STA password without this restriction), NONE said no encryption; Case sensitive
- DHCP auto get IP:**  
Open this feature, will get IP by dhcp; turn off, need to manually enter the IP

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3) Trans Setting:


Peripherals parameters set mainly set serial port, serial port baud rate can be set to , data bits can set 7-8 bits, parity bit can be set to no check, odd parity, parity, stop bits can be set to 1 to 2, a serial port flow control can be set to enabled.Serial port can open 485 features, pin 25 serial flow control RTS pin is the control pin of 485, up the pin to send data, low the pin to receive data.Effecting after restart.

① Socket set

Transparent transmission mode, the socket protocol, the server address and port.



firmware revision:V1.2.0 中文 [logout](#)



**USR IOT**

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Be Honest, Do Best!


Sys Status	Serial Port Set	help
WIFI set	Baud rate (300-3000000 bps): <input type="text" value="115200"/> bps Data Num: <input type="text" value="8"/> bit Check bit: <input type="text" value="None"/> bit Stop bit: <input type="text" value="1"/> bit CTSRTS/485: <input type="text" value="NFC"/>	<ul style="list-style-type: none"> <li><b>Baud rate:</b> 300~3000000bps</li> <li><b>CTSRTS/485:</b> Default is NFC</li> <li><b>port:</b> 1~65535</li> <li><b>Server IP Address:</b> When the module is Client, the remote server address to be connected; When it's TCP server, the parameter is invalid; The parameter can be IP or domain name</li> </ul>
Trans Set	<input type="button" value="Save"/>	
Extra function	Socket Connect Set	
Reload Restart	protocol: <input type="text" value="TCP-Server"/> port: <input type="text" value="8899"/> Server IP Address: <input type="text" value="10.10.100.254"/>	
About USR	<input type="button" value="Save"/>	

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#### 4) Extra Function

Transparent transmission mode, the socket protocol, the server address and port.

firmware revision:V1.2.0 中文 [logout](#)



**USR IOT**

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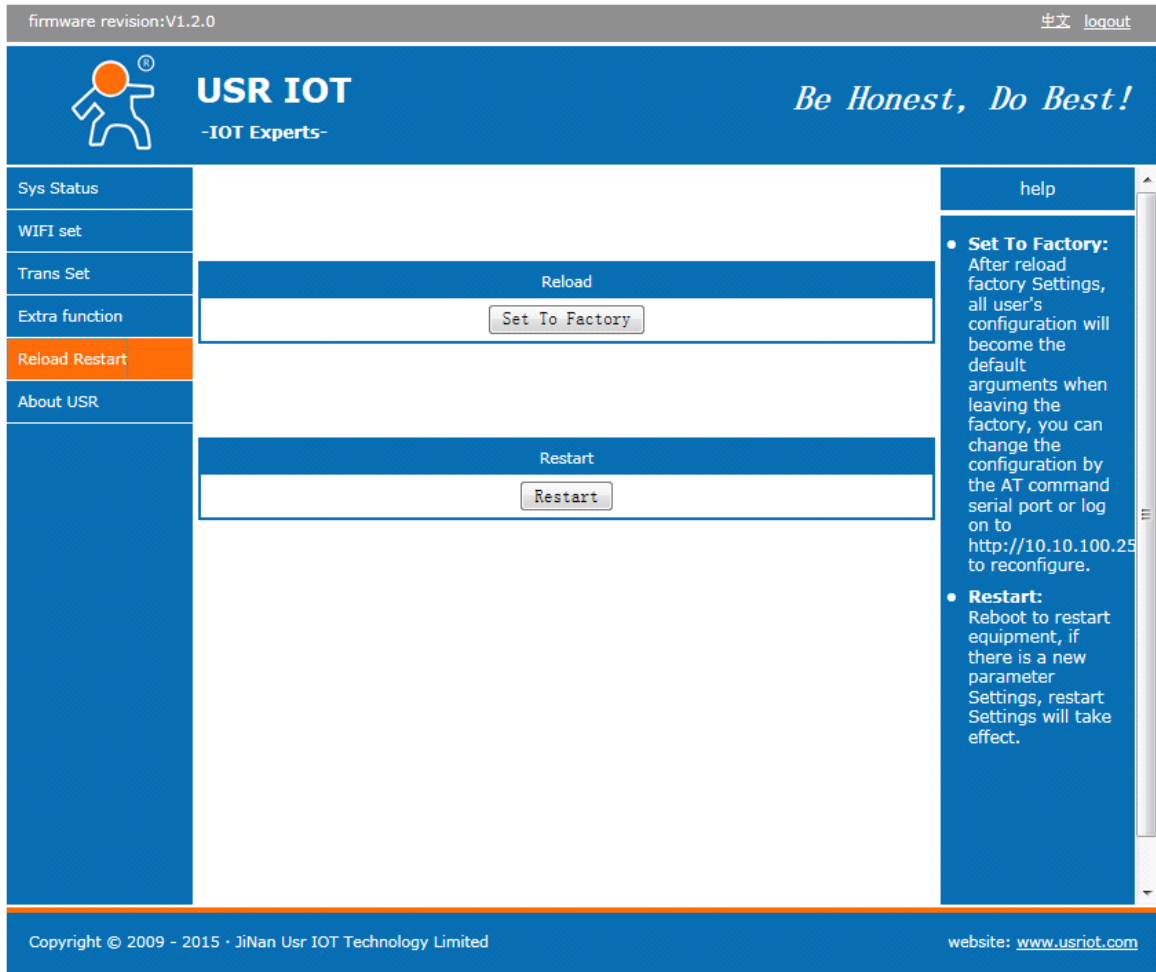
*Be Honest, Do Best!*

Sys Status	RFC2117 function	help
WiFi set	RFC2117: <input type="text" value="Disable"/>	<ul style="list-style-type: none"> <li>● <b>RFC2117:</b> Automatic Baud Rate Function;Please cooperate with "USR-VCOM.exe" to use</li> <li>● <b>search name:</b> Up to 20 bytes</li> <li>● <b>Regist mechanism</b> Registration Packet Mechanism;Used to send the ID/MAC to the server;Work only in TCP client</li> <li>● <b>regist ID</b> 1~65535</li> </ul>
Trans Set	<input type="button" value="Save"/>	
Extra function	search in network	
Reload Restart	search port: <input type="text" value="48899"/>	
About USR	search name: <input type="text" value="www.usr.cn"/>	
	<input type="button" value="Save"/>	
	Regist mechanism	
	regist content: <input type="text" value="OFF"/>	
	regist frequency(just for TCPC): <input type="text" value="FIRST"/>	
	regist ID (0-65535): <input type="text" value="0"/>	
	<input type="button" value="Save"/>	
	module MID	
	MID: <input type="text" value="USR-C210"/>	
	<input type="button" value="Save"/>	

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5) Reload Restar:

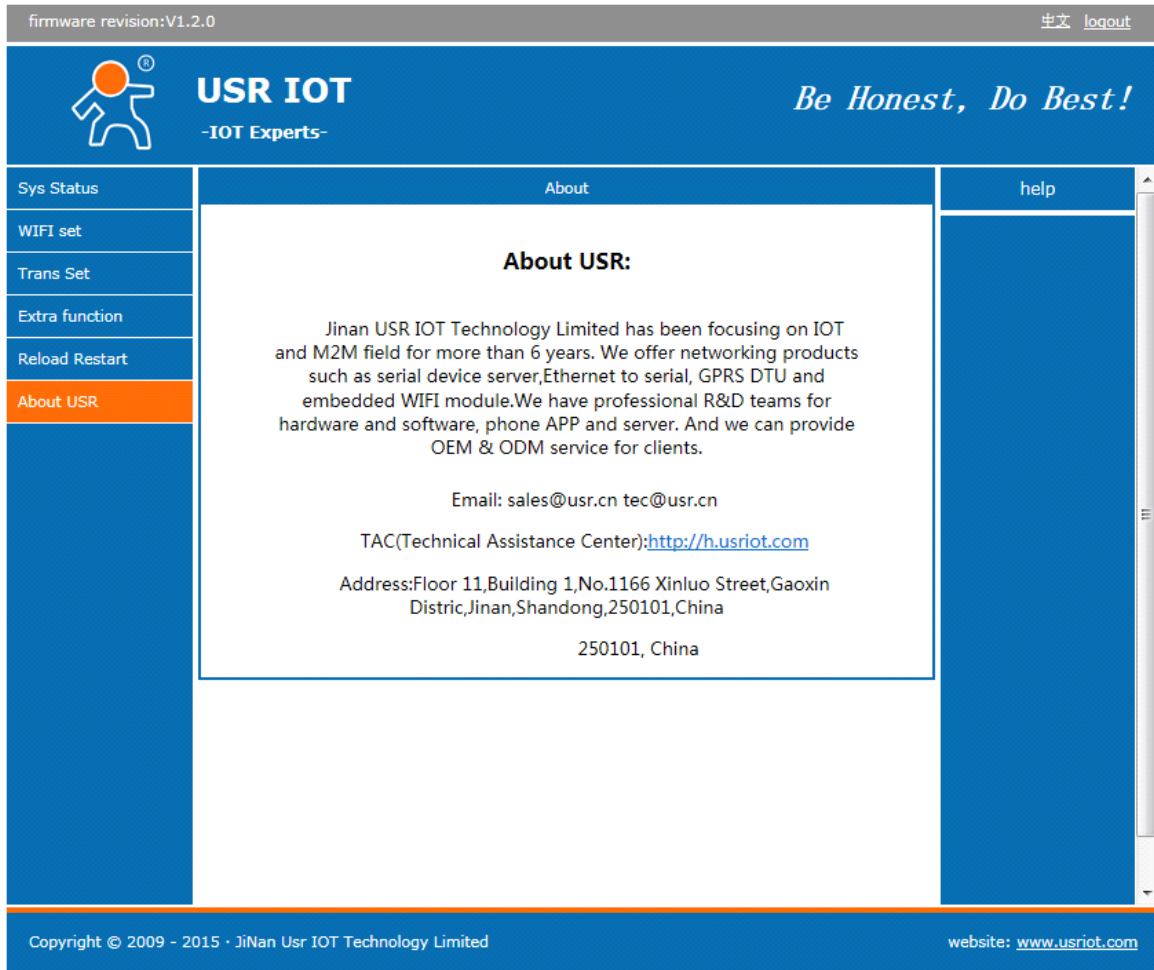
This page includes the module to the factory state and restart the module function.



The screenshot displays the USR IOT web interface. At the top, it shows 'firmware revision:V1.2.0' and a 'logout' link. The main header features the USR IOT logo and the slogan 'Be Honest, Do Best!'. A left sidebar contains navigation links: 'Sys Status', 'WIFI set', 'Trans Set', 'Extra function', 'Reload Restart' (highlighted in orange), and 'About USR'. The main content area is divided into two sections: 'Reload' with a 'Set To Factory' button, and 'Restart' with a 'Restart' button. A right sidebar titled 'help' contains two bullet points: 'Set To Factory' (explaining that factory settings are restored after a reload) and 'Restart' (explaining that a reboot restarts the equipment and applies new settings). The footer includes copyright information for Jinan Usr IOT Technology Limited and the website URL 'www.usriot.com'.

6) About USR:

This page is a simple introduction of Jinan USR IOT Technology Limited.



The screenshot shows a web browser interface for the USR IOT device. At the top, it displays 'firmware revision:V1.2.0' and '中文 logout'. The main header features the USR IOT logo, the slogan 'Be Honest, Do Best!', and the tagline '-IOT Experts-'. A left sidebar contains navigation links: 'Sys Status', 'WIFI set', 'Trans Set', 'Extra function', 'Reload Restart', and 'About USR' (which is highlighted in orange). The main content area is titled 'About' and contains the following text:

**About USR:**

Jinan USR IOT Technology Limited has been focusing on IOT and M2M field for more than 6 years. We offer networking products such as serial device server, Ethernet to serial, GPRS DTU and embedded WIFI module. We have professional R&D teams for hardware and software, phone APP and server. And we can provide OEM & ODM service for clients.

Email: sales@usr.cn tec@usr.cn

TAC(Technical Assistance Center):<http://h.usriot.com>

Address: Floor 11, Building 1, No.1166 Xinluo Street, Gaoxin Distric, Jinan, Shandong, 250101, China

250101, China

At the bottom of the page, it shows 'Copyright © 2009 - 2015 · JiNan Usr IOT Technology Limited' and 'website: [www.usriot.com](http://www.usriot.com)'.

## 4.2 AT+ Commands Configuration

AT+ Instruction refers to, in command mode user by module with UART and SPI command set of instructions, behind will detail the use of AT + instruction format.

After the success of the electric start, can through the UART for setting module.

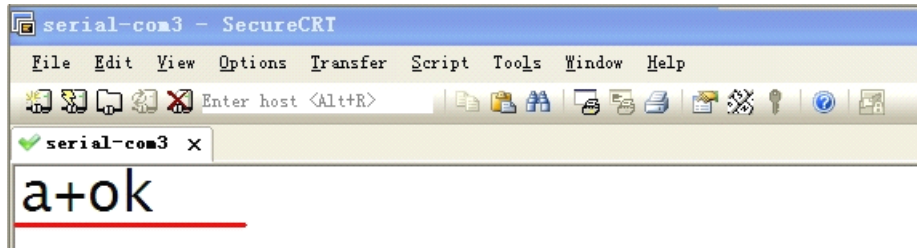
Module of the default UART port parameters for: 115200 baud rate, no check, 8 data bits, one stop bit.

### < explain >

The AT command debugging tools, UART interface is recommended to use SecureCRT software tools or some professional applications. The following is introduced using UART communication and SecureCRT tool demo.

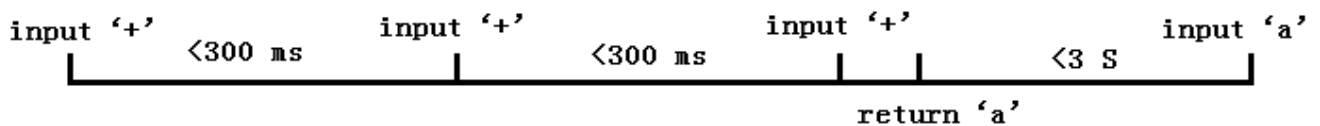
From translate mode switch to the command mode to the following two steps:

- On the UART input "+ + +", module after receiving "+ + +" will return a verification code "a";
- Input validation code "a" on the UART, module after receiving the confirmation, return to the "+" OK "to confirm, enter the command mode;



< **explain** >In the input "+ + +" and "the code" "a", no echo, as shown in the above.

Input "+ + +" and "a" needs to be done in a certain period of time, in order to reduce the probability of normal work, wrongly into command mode. Specific requirements are as follows:



From the command mode to switch to translate mode need to adopt the AT + ENTM command, the command AT + ENTM mode input, end with a carriage return, you can switch to translate mode.

#### 4.2.1 AT+ Summary of Instruction Set

AT+ Instructions can be directly through the super terminal serial debugger such as input, can also be programmed to input.

AT+ Instructions the command line, based on ASCII format is as follows:

➤ Format Specification

<>: A part of must contain

[ ]: the optional parts

➤ Command

**AT+<CMD>[op][para-1,para-2,para-3,para-4...]<CR>**

AT+:Command messages prefix;

CMD:Command string;

[op]:Instruction operator, is specified parameters to set or query;

◆ “=” :parameter Settings

◆ “NULL” :query

[para-n]:Input parameter Settings, such as query is not required;

<CR>:end mark, ENTER, ASCII: 0x0a or 0x0d;

**<NOTICE>: If the user has no closing echo function(AT+E),the command will be sent back from the module,<CR>is not return.**

➤ Response Message

**<CR><LF>+<RSP>[op] [para-1,para-2,para-3,para-4...]<CR><LF>**

+:The response message prefix;

RSP:Response to a string, including:

◆ “OK” :success

◆ “ERR”:fail

[para-n]:The query return parameter error code or error

<CR>:ASCII 0x0d;

<LF>:ASCII 0x0a;

➤ Error Code

error code table

Error Code	Description
-1	Invalid Command Format
-2	Invalid Command
-3	Invalid Operation Symbol
-4	Invalid Parameter
-5	Operation Not Permitted

## 4.2.2 AT Command Introduction

AT+ command

NO	Command	Description
Basic Command		
1	ENTM	Set module into transparent transition mode
2	E	Open/Close show back function
3	Z	Re-start module
4	CFGTF	Copy User Parameters to Factory Default Parameters
5	RELD	Restore to factory default setting
6	MAC	Read the MAC of module
7	SEARCH	Set/query LAN port and keyword search
8	MID	Query module ID information
9	PLANG	Web log in languages
10	VER	Query The module firmware version
11	WSCAN	Scan AP
Wifi Set		
12	WMODE	Set/Query Wi-Fi work mode (AP/STA)
13	WSTA	Set/query associated AP SSID and password;
14	WANN	Set/query STA network parameters;
15	WSLK	Query STA Wi-Fi link status
16	WAP	Set/query AP wi-fi configuration parameters;
17	CHANNEL	Channel module AP mode
18	SOCKA	Set/query network protocol parameters
19	LANN	Set the IP/query module AP mode
20	SOCKLKA	Query whether the TCP link chain has been built
21	REGENA	Can make/registration packet mechanism is prohibited
22	REGID	Registration packet ID set
23	RFCENA	Can make/ban RFC2117 function
Peripheral Parameter Settings		
24	UART	Set/query UART interface parameters
25	UARTTE	Set/query a serial port free framing intervals
26	SLPTYPE	Set the sleep mode

## 1) AT+ENTM

➤ Function: Exit the command mode, enter the translate mode;

➤ Format:

◆ Set

**AT+ENTM<CR>**  
**<CR><LF>+OK<CR><LF>**

➤ Parameters: 无

After the command is executed correctly, module from the command mode switch to translate mode.

## 2) AT+E

➤ Function: Set/query module echo the at command set

➤ Format:

◆ Query

**AT+E <CR>**  
**<CR><LF>+OK=<on/off><CR><LF>**

◆ Set

**AT+E=<on/off><CR>**  
**<CR><LF>+OK<CR><LF>**

➤ Parameters:

◆ on: Open the echo, echo the AT command input command, off: the AT command mode, type the command does not echo.

## 3) AT+Z

➤ Function: Restart the module Format:

◆ Set

**AT+Z<CR>**  
**<CR><LF>+OK<CR><LF>**

➤ Parameters: none

After the command is executed correctly, restart the module.

## 4) AT+CFGTF

➤ Function: After the command is executed correctly, restart the module.

➤ Format:

◆ Set

**AT+CFGTF<CR>**  
**<CR><LF>+OK=<status><CR><LF>**

➤ Parameters:

◆ status: Returns the operating status;  
● SAVED: Set up the success  
● NON-SAVED: Setup failed

## 5) AT+RELD

➤ Function: Recovery module configuration parameters for the user the factory configuration parameters

➤ Format:

◆ Set

**AT+ RELD<CR>**

**<CR><LF>+OK=REBOOTING...<CR><LF>**

- Parameters:none

The command module configuration parameters restore to the user factory Settings, and then restart automatically.

## 6) AT+MAC

- Function:Query MAC

- Format:

- ◆ Query

**AT+MAC<CR>****<CR><LF>+OK=<mac><CR><LF>**

- Parameters:

- ◆ mac:MAC of the modul (example 01020304050A) ;

## 7) AT+SEARCH

- Function:Set/query in LAN port and search module search keywords

- Format:

- ◆ Query

**AT+SEARCH<CR>****<CR><LF>+OK=<port,keywords><CR><LF>**

- ◆ Set

**AT+ SEARCH =<port,keywords><CR>****<CR><LF>+OK <CR><LF>**

- Parameters:

- ◆ port:Search module port;default:48899

- ◆ keywords:Module search keywords.default:www.usr.cn (Up to 20 bytes) .

## 8) AT+MID

- Function:Set the MID/query module

- Format:

- ◆ Query

**AT+MID<CR>****<CR><LF>+OK=<mid><CR><LF>**

- ◆ Set

**AT+MID=<mid><CR>****<CR><LF>+OK<CR><LF>**

- Parameters:

- ◆ mid: Set/query module mids (20 characters), MID the main models of module;

Note: this setting, mid cannot contain a comma ", ".

## 9) AT+PLANG

- Function: Set/query module landing page language version

- Format:

- ◆ Query

**AT+ PLANG <CR>****<CR><LF>+OK=<language><CR><LF>**

- ◆ Set

**AT+ PLANG =< language ><CR>****<CR><LF>+OK<CR><LF>**



- Parameters:
  - ◆ language:CN/EN, CN said landing page default display in Chinese; EN said landing page when the default display in English.

#### 10) AT+VER

- Function:Set/query module firmware version
- Format:
  - ◆ Query
 

```
AT+VER<CR>
<CR><LF>+OK=<ver><CR><LF>
```
  - ◆ Set
 

```
AT+VER=<ver><CR>
<CR><LF>+OK<CR><LF>
```
- Parameters:
  - ◆ ver: Set/query module firmware version:
    - AA.BB.CC;AA on behalf of the big version, BB on behalf of the minor version number, Arthur c. CC represents the hardware version

#### 11) AT+WSCAN

- Function:Search AP :
- ◆ Query
 

```
AT+WSCAN<CR>
<CR><LF>+OK=<LF><CR>SSID,BSSID,Security,Indicator<LF><CR><ap_s
ite_1><LF><CR><ap_site_2><LF><CR><ap_site_3><LF><CR>...<ap_site_
N><CR><LF>
```
- Parameters:
  - SSID:SSID
  - BSSID: MAC ( 11:22:33:44:AA:BB )
  - Security
  - Indicator RSSI

Note: in the AP mode WSCAN command, response will be slightly slower, if has established a TCP connection, the connection will be disconnected, need to restart after the connection is established.

#### 12) AT+WMODE

- Function:Set the query wifi working mode
- Format:
  - ◆ Query
 

```
AT+WMODE<CR>
<CR><LF>+OK=< status ><CR><LF>
```
  - ◆ Set
 

```
AT+WMODE =< status ><CR>
<CR><LF>+OK<CR><LF>
```
- Parameters:
  - ◆ status:
    - AP:The module in the AP mode
    - STA:The module in the STA model
    - APSTA:The module in theAP+STA model

### 13) AT+WSTA

- Function:Set/query associated AP SSID and password;
- Format:
  - ◆ Query
 

```
AT+WSTA<CR>
<CR><LF>+OK=<AP's ssid><key><CR><LF>
```
  - ◆ Set
 

```
AT+ WSTA =<AP's ssid ><key><CR>
<CR><LF>+OK<CR><LF>
```
- Parameters:
  - ◆ AP's ssid:AP SSID (up support 32 bytes);
  - ◆ key: AP password, the default encryption for wpa2psk, no encryption is set to NONE.

Note: the ssid and key does not support " , "special characters.

### 14) AT+WANN

- Function:Set/query module access to IP (DHCP/STATIC);
- Format:
  - ◆ Query
 

```
AT+WANN<CR>
<CR><LF>+OK=<mode,address,mask,gateway,dns ><CR><LF>
```
  - ◆ Set
 

```
AT+WANN=<mode,address,mask,gateway,dns ><CR>
<CR><LF>+OK<CR><LF>
```
- Parameters:
  - ◆ mode:Network IP mode
    - static:static IP
    - DHCP:dynamic IP (address,mask,gateway, DNS are omitted)
  - ◆ address: IP;
  - ◆ mask:mask;
  - ◆ gateway:gateway
  - ◆ dns:DNS

Note: set the module to get the dynamic IP, just set up AT + WANN = DHCP < CR >

### 15) AT+WSLK

- Function:Query the STA wireless link state;
- Format:
  - ◆ Query
 

```
AT+ WSLK<CR>
<CR><LF>+OK=<status,rsi><CR><LF>
```
- Parameters:
  - ◆ status
    - If there is no connection:return“Disconnected”
    - If there is a connection:return“AP SSID (AP MAC) ”
  - ◆ rssi :0-100, When signal strength is required less than 10 weak signal, when the data transmission may lose data.

### 16) AT+WAP

- Function:Set/query AP wi-fi configuration parameters;
- Format:
  - ◆ Query  
**AT+WAP<CR>**  
**<CR><LF>+OK=< ssid,key ><CR><LF>**
  - ◆ Set  
**AT+ WAP =< ssid,key ><CR>**  
**<CR><LF>+OK<CR><LF>**
- Parameters:
  - ◆ ssid:AP SSID;
  - ◆ key:Set the AP encryption password (the default wpa2psk encryption, password length greater than or equal to 8 bytes), set to None is without encryption

Note: the ssid and key does not support ", "special characters.

#### 17) AT+CHANNEL

- Function: Channel Settings/query module AP mode
- Format:
  - ◆ Query  
**AT+CHANNEL <CR>**  
**<CR><LF>+OK=<NUM><CR><LF>**
  - ◆ Set  
**AT+ CHANNEL =<NUM><CR>**  
**<CR><LF>+OK<CR><LF>**
- Parameters:
  - ◆ NUM:channel 1-11.

#### 18) AT+SOCKA

- Function:Set/query network protocol parameters
- Format:
  - ◆ Query  
**AT+SOCKA<CR>**  
**<CR><LF>+OK=<protocol,IP,port ><CR><LF>**
  - ◆ Set  
**AT+SOCKA=< protocol,IP,port ><CR>**  
**<CR><LF>+OK<CR><LF>**
- Parameters:
  - ◆ Protocol:Protocol type, including
    - TCPS TCP server
    - TCPC TCP client
    - UDPS UDP server
    - UDPC UDP client
  - ◆ IP:When the module is set to "CLIENT", the IP address of the server
  - ◆ Port: Protocol port, decimal number, less than 65535

#### 19) AT+LANN

- Function:Set the IP query AP mode;

- Format:
    - ◆ Query  
**AT+LANN<CR>**  
**<CR><LF>+OK=<IP,MASK><CR><LF>**
    - ◆ Set  
**AT+ LANN =<IP,MASK><CR>**  
**<CR><LF>+OK<CR><LF>**
  - Parameters:
    - ◆ IP: ip
    - ◆ MASK:mask
- 20) AT+SOCKLKA
- Function:Query the TCP link is established;
  - Format:  
**AT+ SOCKLKA<CR>**  
**<CR><LF>+OK=<STA><CR><LF>**
  - Parameters
    - ◆ STA: showing if the TCP link is established
      - CONNECT: TCP connected
      - DISCONNECTED: TCP Disconnected
- 21) AT+REGENA
- Function:Set the query registration packet mechanism
  - Format:
    - ◆ Query  
**AT+REGENA<CR>**  
**<CR><LF>+OK=< status, method><CR><LF>**
    - ◆ Set  
**AT+REGENA =< status, method ><CR>**  
**<CR><LF>+OK<CR><LF>**
  - Parameters:
    - ◆ status:
      - ID:packet mechanism can make can make the registration, the registry packet ID is 2 bytes
      - MAC:packet mechanism can make can make the registration, the registry packet is 6 bytes MAC
      - OFF:Ban can register packet mechanism
    - ◆ method
      - EVERY Increase registered before each packet of data packet
      - FIRST Only link to the server sends a registered packet for the first time
- 22) AT+REGID
- Function:Set the query registration packet ID
  - Format:
    - ◆ Query  
**AT+REGID<CR>**  
**<CR><LF>+OK=< NUM><CR><LF>**

- ◆ Set  
**AT+REGID =<NUM ><CR>**  
**<CR><LF>+OK<CR><LF>**

➤ Parameters:

- ◆ NUM:0-65535, Decimal Format, when selecting registration packet ID, it is mainly used for the D2D software of our company.

### 23) AT+RFCENA

➤ Function:Enable/Disable RFC2217 Function

➤ Format:

- ◆ Query  
**AT+RFCENA<CR>**  
**<CR><LF>+OK=< status><CR><LF>**

- ◆ Set  
**AT+RFCENA =< status><CR>**  
**<CR><LF>+OK<CR><LF>**

➤ Parameters:

- ◆ status:
  - ON:Enable RFC2217 Function
  - OFF:Disable RFC2217 Function

### 24) AT+UART

➤ Function:Set/query UART interface parameters

➤ Format:

- ◆ Query :  
**AT+UART<CR>**  
**<CR><LF>+OK=<baudrate,data\_bits,stop\_bit,parity,flowctrl><CR><LF>**

- ◆ Set:  
**AT+UART=<baudrate,data\_bits,stop\_bit,parity,flowctrl><CR>**  
**<CR><LF>+OK<CR><LF>**

➤ Parameters:

- ◆ baudrate:
  - 1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600, 115200, 128000, 153600, 230400 bit/s
- ◆ data\_bits:8 bits
- ◆ stop\_bits:1
- ◆ parity:check
  - NONE
  - EVEN
  - ODD
  - Mask
  - Space
- ◆ flowctrl:CTS RTS
  - NFC:Disable hardware flow control

Note: when the baud rate are subject to change, will automatically change the packaging interval, see 25) AT + UARTTE.

### 25) AT+UARTTE

➤ Function:Set/query free framing intervals

➤ Format:

◆ Query

**AT+ UARTTE<CR>**  
**<CR><LF>+OK=<num><CR><LF>**

◆ Set

**AT+ UARTTE=<num ><CR>**  
**<CR><LF>+OK<CR><LF>**

➤ Parameters:

◆ num:20-250:Free framing mode the interval between two bytes ms.

Note: this parameter will automatically change when set the baud rate, If you want to change the packaging interval, please first set the baud rate:

bps <= 1200, num=250ms;

bps >= 20000, num=5ms;

1200 < bps < 20000, num=1000/bps\*20\*10.

## 26) AT+SLPTYPE

➤ Function:Set the query sleep mode

➤ Format:

◆ Query

**AT+ SLPTYPE<CR>**  
**<CR><LF>+OK=<MODE,TIME><CR><LF>**

◆ Set

**AT+ SLPTYPE=<MODE,TIME><CR>**  
**<CR><LF>+OK<CR><LF>**

➤ Parameters:

◆ MODE:0-2;

0 no sleep mode for setting module (default); 1 set the module to sleep mode; 2 set the module to deepsleep mode;

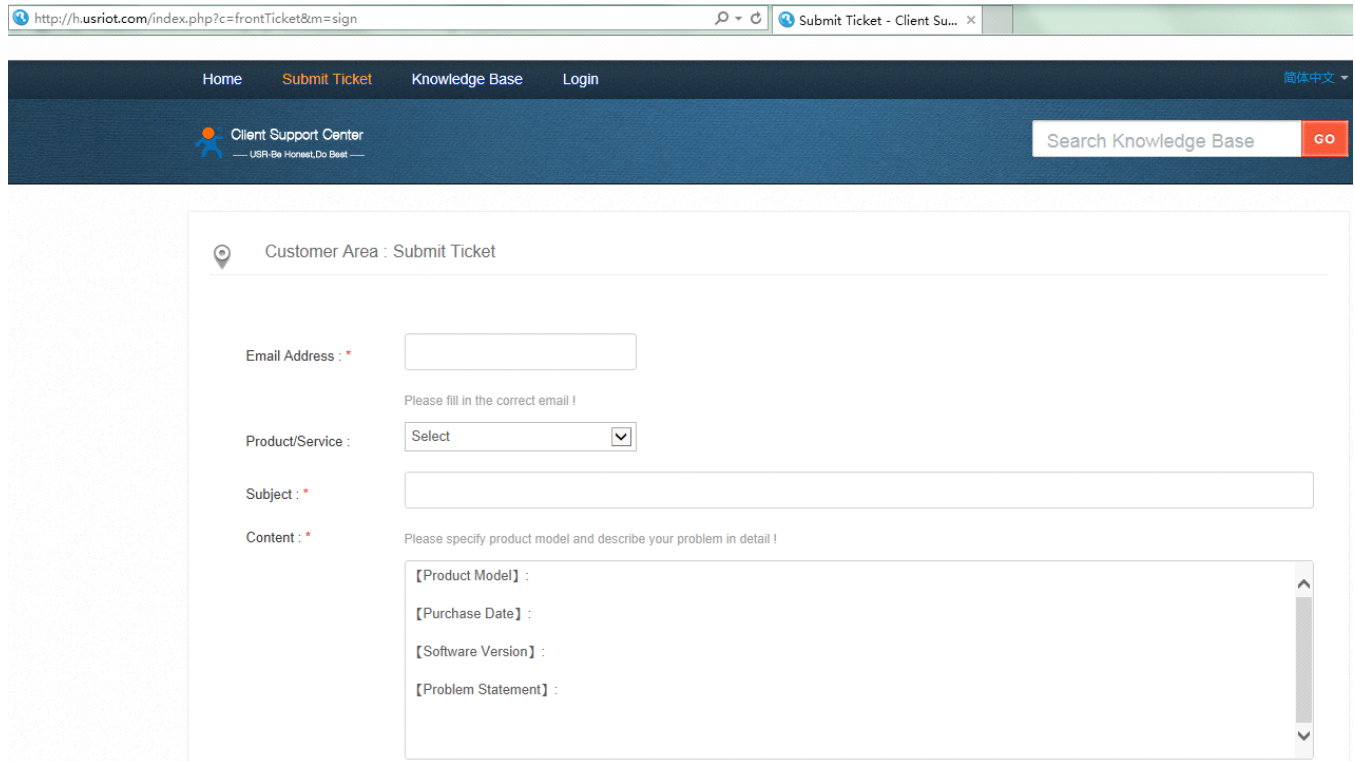
◆ TIME:10-240 seconds.

Set the module without communication last time. When last time no data transmission module, enter the sleep mode, according to the mode patterns into different dormancy.

Note: when set to no sleep, only set **AT + SLPTYPE = 0 < CR >**

## 5、service and support

If you have problems when use the module,you can submit the question to <http://h.usriot.com> .We will solve your question at the first time.



The screenshot shows a web browser window with the URL <http://h.usriot.com/index.php?c=frontTicket&m=sign>. The page title is "Submit Ticket - Client Su...". The navigation menu includes "Home", "Submit Ticket", "Knowledge Base", and "Login". The "Client Support Center" logo is visible, along with the slogan "Be Honest, Do Best!". A search bar for the "Knowledge Base" is present with a "GO" button. The main content area is titled "Customer Area : Submit Ticket" and contains the following form fields:

- Email Address :** \* [Text input field]
- Product/Service :** Select [Dropdown menu]
- Subject :** \* [Text input field]
- Content :** \* [Text area with instructions: "Please specify product model and describe your problem in detail !"]

The content field contains the following text:

- 【Product Model】 :
- 【Purchase Date】 :
- 【Software Version】 :
- 【Problem Statement】 :

## Appendix A: Contact Information

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Company: Jinan USR IOT Technology Limited  
Address: 11th Floor, No.1 Building, Aosheng Square, No.1166 Xinluo Street, Jinan, China  
Tel: 86-531-55507297, 86-531-88826739  
Web: <http://www.usriot.com>  
Support : <http://h.usriot.com>  
Email: [sales@usr.cn](mailto:sales@usr.cn)

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## Appendix B: Disclaimer

This document provides information about USR-C321 modules, this document does not grant any license to intellectual property rights. Except the responsibility declared in the product sale clause, USR does not assume any other responsibilities. In addition, USR does not make any warranties for the sale and use of this product, including the suitability of the product for a particular purpose, merchantability or fitness for any patent, copyright or other intellectual property infringement, etc. USR may make changes to specifications and product descriptions without notice.

## Appendix C: Update History

V 1.0 28-10-2015. First Version

**<END>**