

USR-TCP232-304 User Manual

File version:V1.0



USR-TCP232-304 User Manual.....	1
1. Quick Start.....	4
1.1. Hardware Testing Environment.....	4
1.2. Connection.....	4
1.3. Default Parameter.....	6
1.4. Data Transmission Testing.....	6
2. Overview.....	7
2.1. Brief Introduction.....	7
2.2. Features.....	7
2.3. Parameters.....	8
2.4. Size.....	9
3. Module Function.....	10
3.1. Work Mode.....	10
3.1.1. TCP Client Mode.....	10
3.1.2. TCP Server Mode.....	11
3.1.3. UDP Client Mode.....	13
3.1.4. UDP Server Mode.....	14
3.1.5. HTTPD Client Mode.....	15
3.1.6. TCP and UDP Mechanism.....	15
3.2. DHCP and DNS Function.....	16
3.3. VCOM.....	17
3.3.1. TCP232-304 Works as Client.....	17
3.3.2. TCP232-304 Works as Server.....	18
3.3.3. Other Ways to Create VCOM.....	19
3.4. Special Function.....	21
3.4.1. Factory Reset.....	21
3.4.2. Link Function.....	21
3.4.3. Reset Function.....	21
3.4.4. ID Function.....	22
3.4.5. Index Function.....	22
3.4.6. RFC2217 Function.....	22
3.5. Additional Function.....	22
3.5.1. Display IP and Data.....	22
3.5.2. Serial Port Parameter Setting.....	22
3.5.3. Set Client Number in TCP Server Mode.....	22
3.5.4. Defined MAC Address.....	22
3.5.5. Defined DNS Server IP.....	22
3.5.6. Defined Registration Package.....	23
3.5.7. Defined Heartbeat Package.....	23
3.6. Firmware Upgrade.....	23
4. Parameter Setting.....	24
4.1. Webpage Setting.....	24

4.2. Log in.....	24
4.3. State Configuration.....	25
4.4. Local IP.....	25
4.5. Serial Port.....	26
4.6. Expand Function.....	27
4.7. Misc Configuration.....	28
4.8. Reboot.....	29
4.9. Software Setting.....	29
5. Contact Information.....	32
6. Disclaimer.....	32
7. Undated History.....	33

1. Quick Start

USR-TCP232-304 is used for data bidirectional transparent transmission between RS485 and Ethernet .

TCP232-304 itself complete protocol conversion, parameter can be set by built-in webpage or software.

Once set, permanent preservation.

This chapter is quick start for using USR-TCP232-304 ,we advice users to read it carefully and operate personally, it can help you know about module generally.

Here is application case for inference:

<http://www.usriot.com/support/application-case/usr-tcp232-series-application-case/>

You can also email it to Customer Support Center:

<http://h.usriot.com/>

1.1. Hardware Testing Environment

To test TCP232-304 conversion function, user should connect RS485 to computer by USB to serial line, then connect its LAN port to computer LAN port by internet cable.

Here is schematic diagram for hardware link .

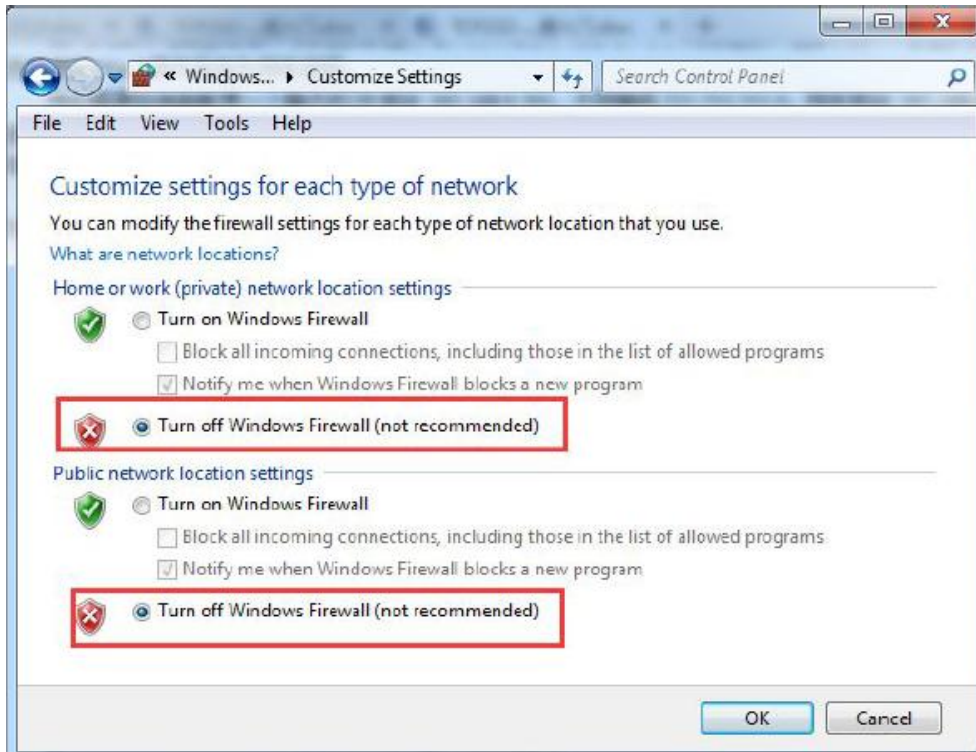


Diagram 1.1-1 Hardware Link

1.2. Connection

Computer should be set as follows:

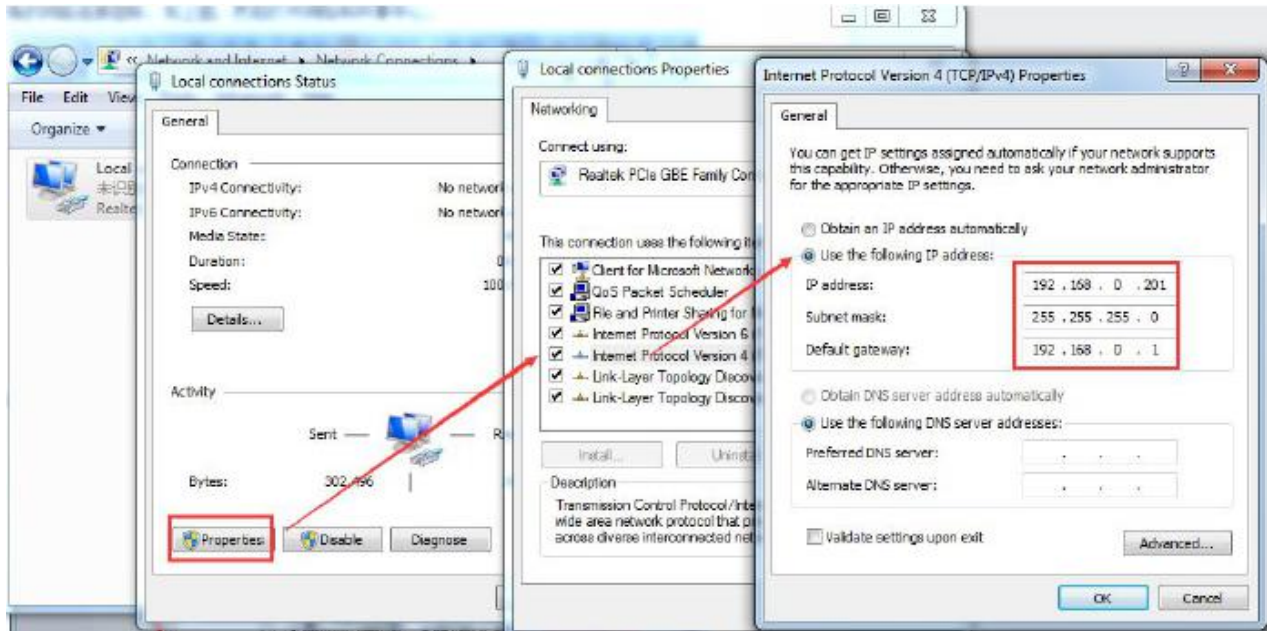
- 1) Shut down firewall and anti-virus software .



2) Shut down unrelated network card, just use one local connection.



3) If you want connect module to PC directly, user should set static IP for computer which is in the same network segment with module.



1.3. Default Parameter

Item	Content
User name	admin
Password	admin
IP address	192.168.0.7
Subnet mask	255.255.255.0
Default gateway	192.168.0.1
Serial baud rate	115200
Serial parameter	None, 8 ,1
Local port	20108
Target IP	192.168.0.201
Target port	8234

Diagram 1.3-1 TCP232-304 Default Parameter

1.4. Data Transmission Testing

Steps for network communication parameters:

- 1) Install USR-TCP232-Test.exe .
- 2) Connect UART to PC, LAN to PC.
- 3) Protocol: TCP Server
 Server IP: 192.168.201 (PC Static IP)
 Server Port No: 8234

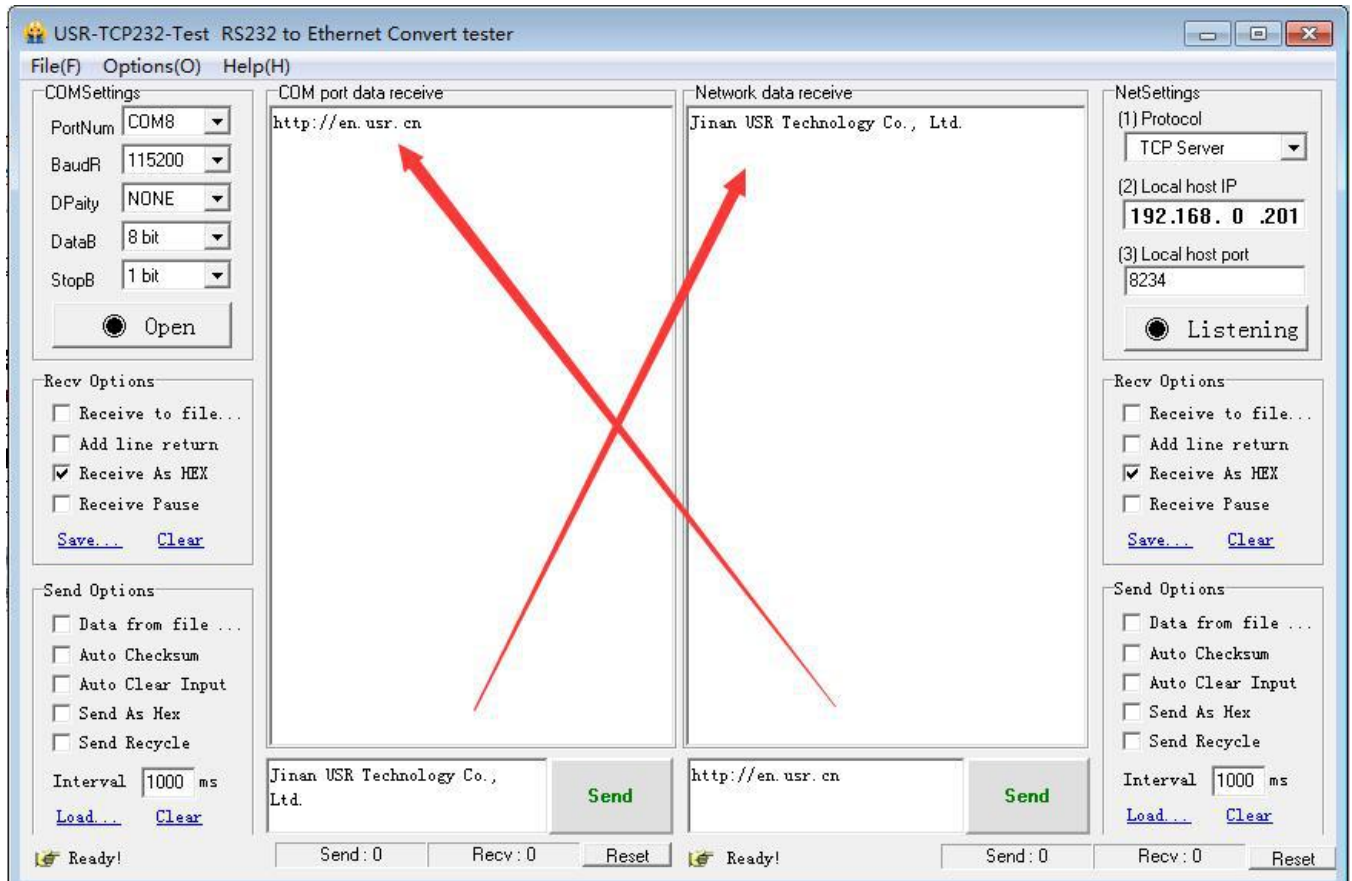


Diagram 1.4-1 Port to LAN Test

2. Overview

2.1. Brief Introduction

TCP232-304 is a new serial to Ethernet device server which realizes data bidirectional transparent transmission between RS485 and RJ45 Port. It is equipped with ARM core with characters of low power, fast speed, high stability.

It integrates internal TCP/IP Protocol, it also has some industry characteristic function.

2.2. Features

- Support DHCP (Dynamic Host Configuration Protocol), obtain an IP address automatically;
- Support DNS (Domain Name System), server address can be defined, domain name resolution;
- Web-set: Setting parameters through web;
- Upgrade firmware via network;
- Support AUTO MDI/MDIX, can use a crossover cable or parallel cable connection;
- Serial port baud rate 600 bps ~230.4 Kbps, and None, Odd, Even, Mark, Space, five check bits;
- Work mode: TCP Server, TCP Client, UDP Client, UDP Server, HTTPD Client;
- Working model related parameters can be set via a serial port or network, setting protocol is available;

user can integrate it into software;

- Support virtual serial port, self-developed USR-VCOM software;
- Heartbeat package mechanism to ensure connection is reliable, put an end to connect feign death;
- User-defined registration package mechanism, check the status of connection;
- Under TCP Server , Client number is 1-16, default value is 4, the IP connected to Client is visible;
- Support User-defined MAC address;
- Restore factory default;
- Across the gateway, switches, routers;
- Across the gateway, across switches, routers;
- Provide(socket), VB, C++, Delphi, Android, IOS;
- Download application cases;
- Support customization;

2.3. Parameters

Parameter	Parameter Value
Voltage	DC 4.75~7V
Current	150mA
Consumption	<1W
Temperature	Working temp: -25 ~ 75 °C Storage temp: -40 ~ 105 °C Storage humidity: 5% ~ 95% RH

Diagram 2.3-1 USR-TCP232-304 Parameters

3. Module Function

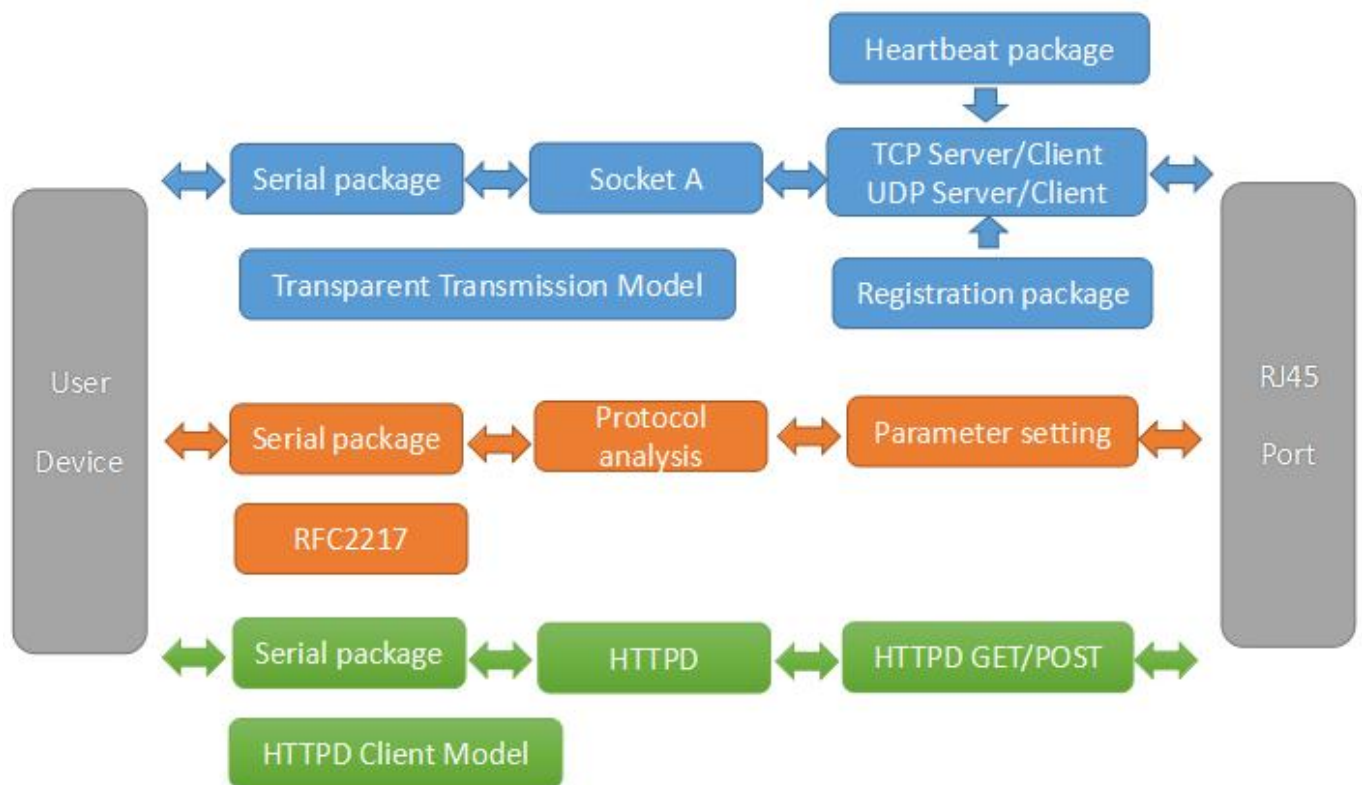


Diagram 3-1 Functional flow

3.1. Work Mode

- TCP Client
- TCP Server
- UDP Client
- UDP Server
- HTTPD Client

3.1.1. TCP Client Mode

It has to be connected before transferring data.

- 1) In TCP Client Mode, TCP232-304 connects TCP Server actively, establish a connection to transmit data
- 2) In TCP Client Mode, It has function of identifying disconnected link. When connected, it will send keepalive package every 15s. If unconnected, it can be detected timely and enforce TCP232-304 to disconnect the former link to establish a new one.
- 3) When TCP232-304 try to connect remote server, if the local port number is not "0", it will establish a connection with the same source port every time.
- 4) It has synchronizing function of baud rate, user should install USR VCOM Software.

5) When local port number is "0" , it means local port is random.

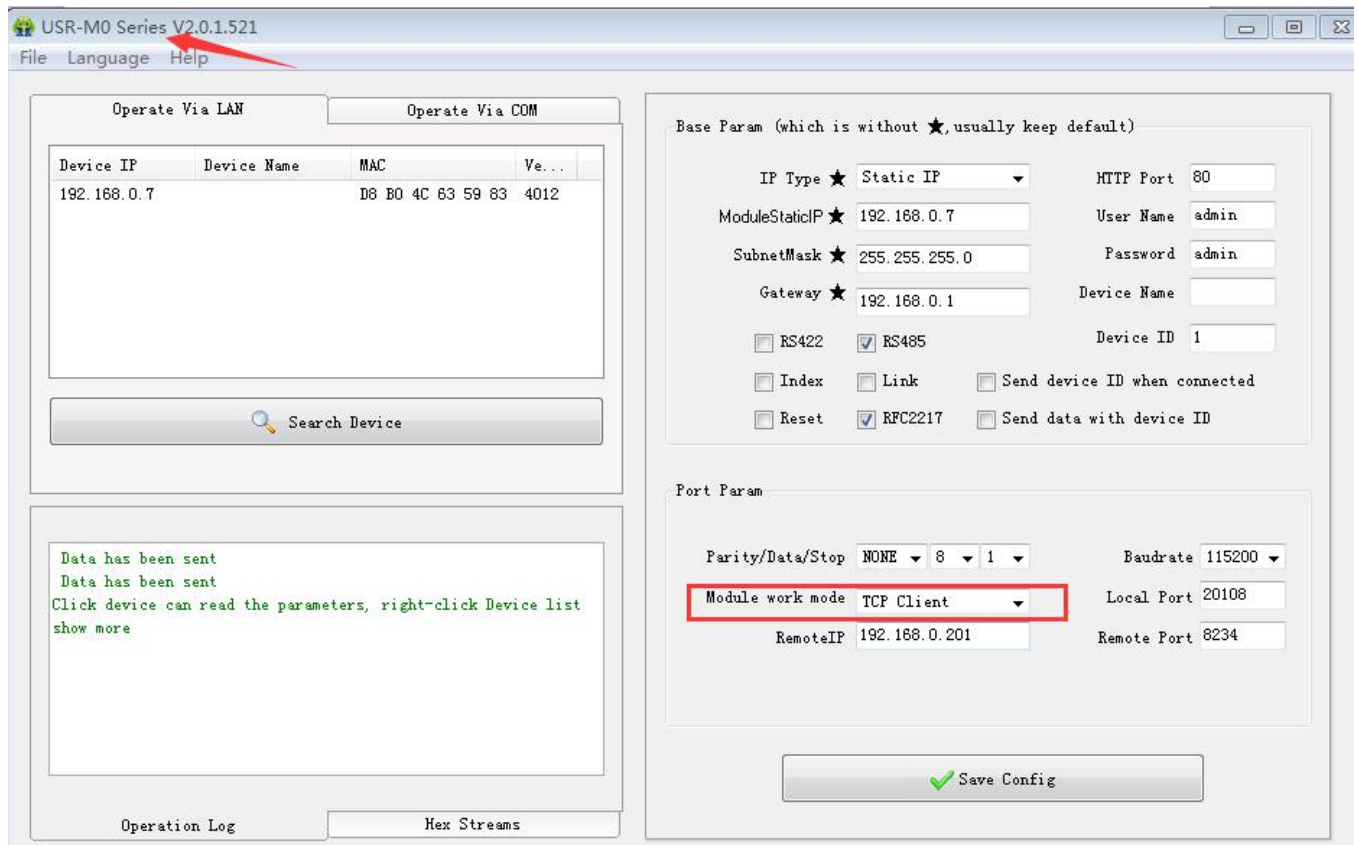


Diagram 3.1.1-1 TCP Client Setting

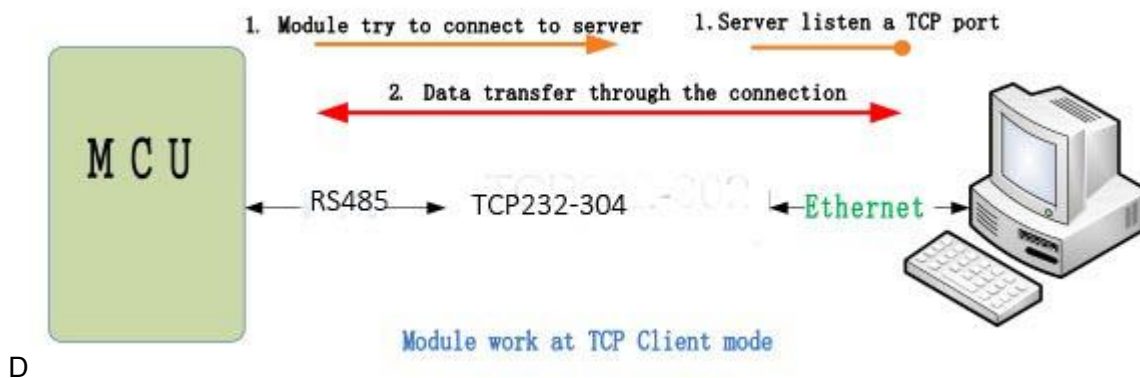
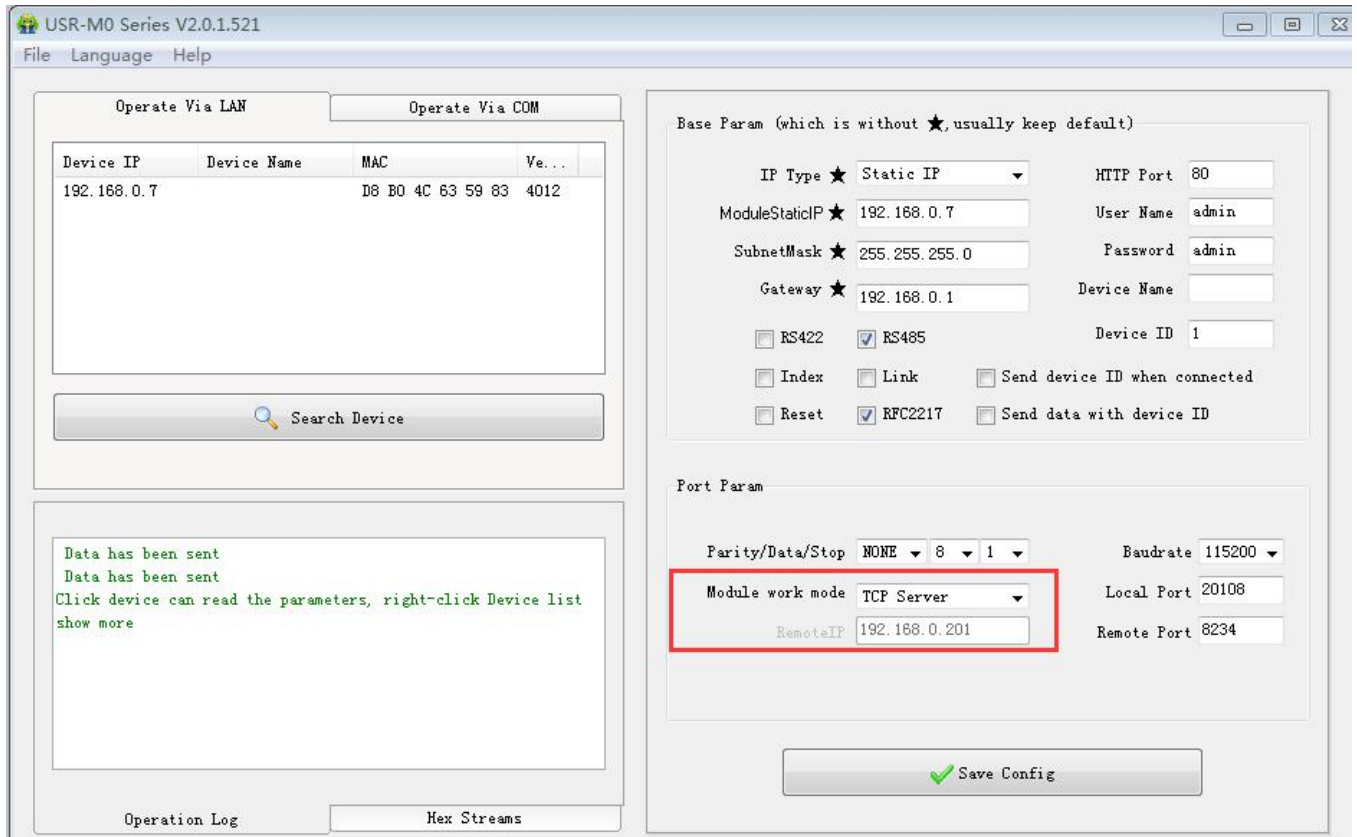


Diagram 3.1.1-2 TCP Client Mode

3.1.2. TCP Server Mode

- 1) It has to be connected before transferring data.
- 2) In TCP Server Mode, 304 monitors local port, it will response and establish a connection when there is a request. Up to 4 links at the same time. Once received data, 304 serial port will send data to all the devices which connect to TCP232-304.
- 3) It has synchronizing function of baud rate, user should install USR VCOM Software.

4) In TCP Server Mode, TCP Client number: 1-16, default value 4. When the Client link is more than 16, the new link will replace the former link from Link 1 .



The screenshot shows the USR-M0 Series V2.0.1.521 configuration window. The 'Operate Via LAN' tab is selected. The 'Base Param' section is configured with the following values:

- IP Type: Static IP
- ModuleStaticIP: 192.168.0.7
- SubnetMask: 255.255.255.0
- Gateway: 192.168.0.1
- RS422: ☐ RS422, ☒ RS485
- Index: ☐ Index, ☐ Link
- Reset: ☐ Reset, ☒ RFC2217
- HTTP Port: 80
- User Name: admin
- Password: admin
- Device Name: (empty)
- Device ID: 1
- Send device ID when connected: ☐
- Send data with device ID: ☐

The 'Port Param' section is configured with the following values:

- Parity/Data/Stop: NONE / 8 / 1
- Baudrate: 115200
- Local Port: 20108
- Remote Port: 8234
- Module work mode: TCP Server (highlighted with a red box)
- RemoteIP: 192.168.0.201 (highlighted with a red box)

The 'Save Config' button is visible at the bottom right.

Diagram 3.1.2-1 TCP Server Setting

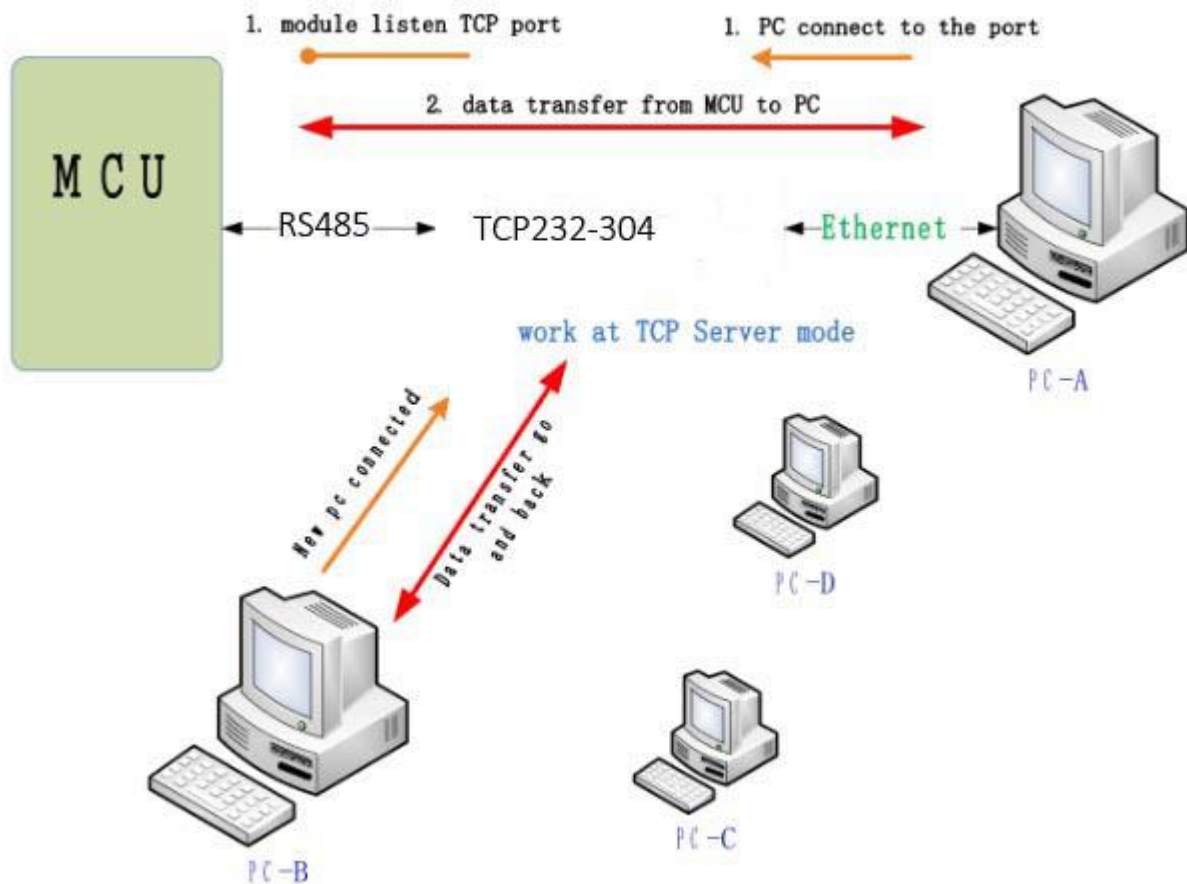


Diagram 3.1.2-2 TCP Server Mode

3.1.3. UDP Client Mode

- 1) The Model belongs to UDP Protocol.
- 2) In UDP Client Mode, TCP232-304 won't establish the connection actively. It can only communicate with the target port whose IP has been set. When serial port receive data, it send data to target IP and port. If data doesn't come from this channel, it will not be accepted by TCP232-304.
- 3) In UDP Client Mode, if target IP is set as 255.255.255.255, it can realize function of entire network broadcast, also can receive broadcast data. If broadcast in network segment ,eg.192.168.0.255, it can only send data ,can't receive data.
- 4) Under UDP Client, maximum data length is 1460 (MCU to 304)

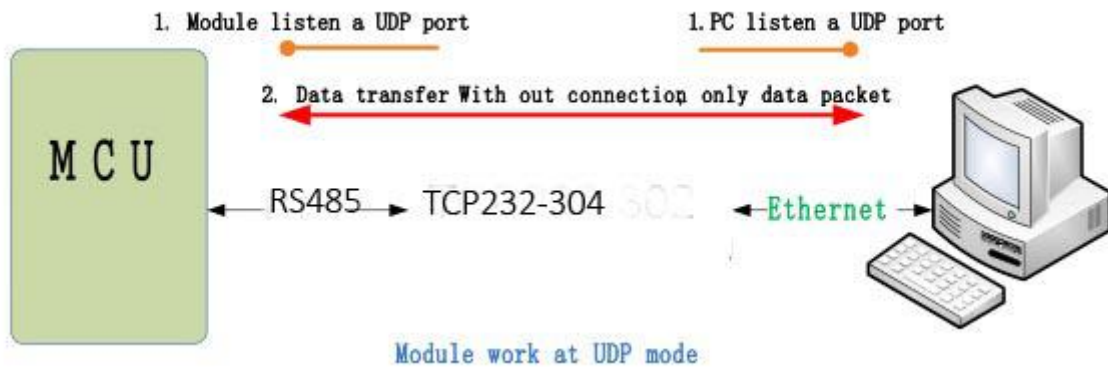


Diagram 3.1.3-1 UDP Client Mode

3.1.4. UDP Server Mode

1) UDP Server is based on normal UDP, it doesn't validate the source of IP address. Once received UDP data, it convert target IP to data source IP, similar to TCP Server.

2) In UDP Server Mode, TCP232-304 records an IP, Once it receives data, it will send data to record IP. TCP232-304 also works as a server, can receive data from Ethernet and convert target IP to data source IP.

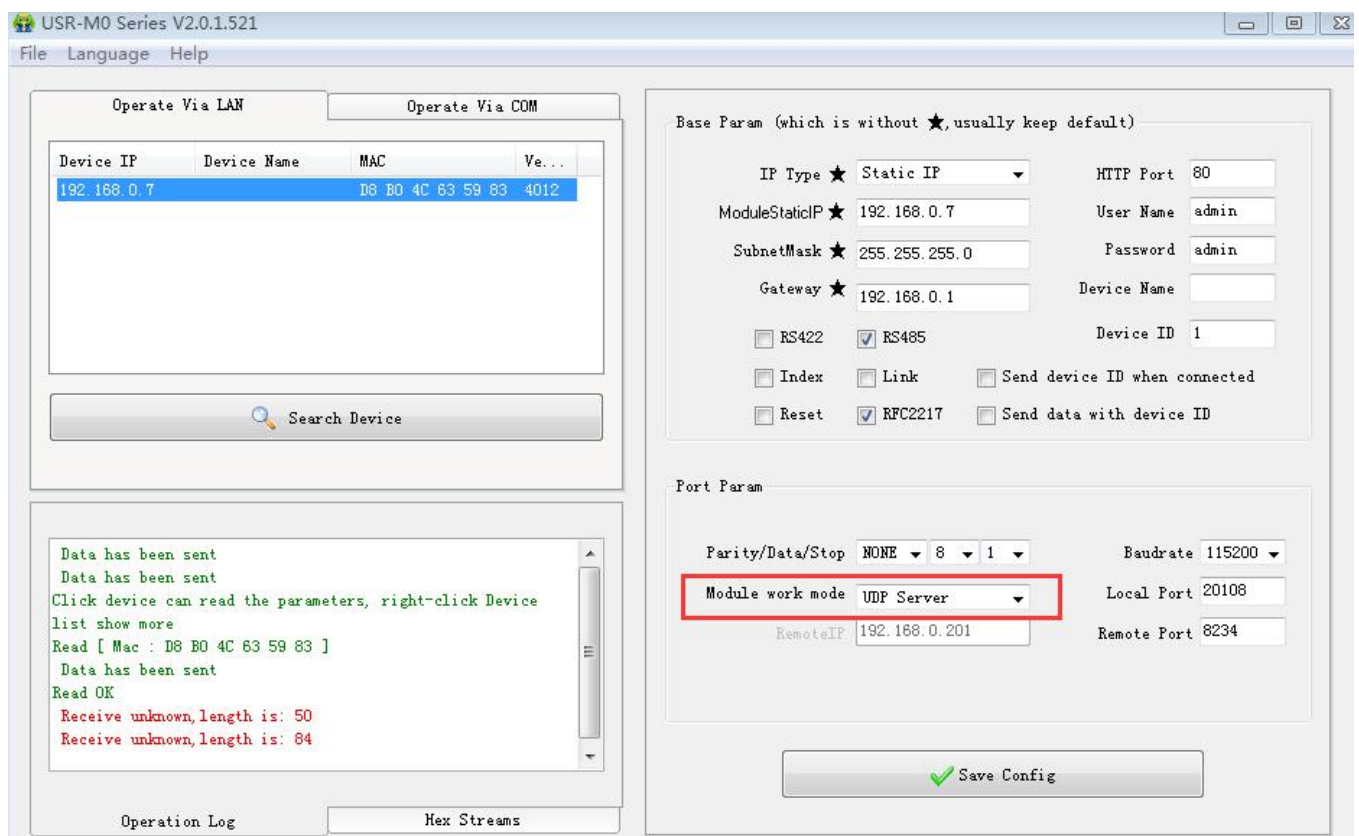


Diagram 3.1.4-1 UDP Server Setting

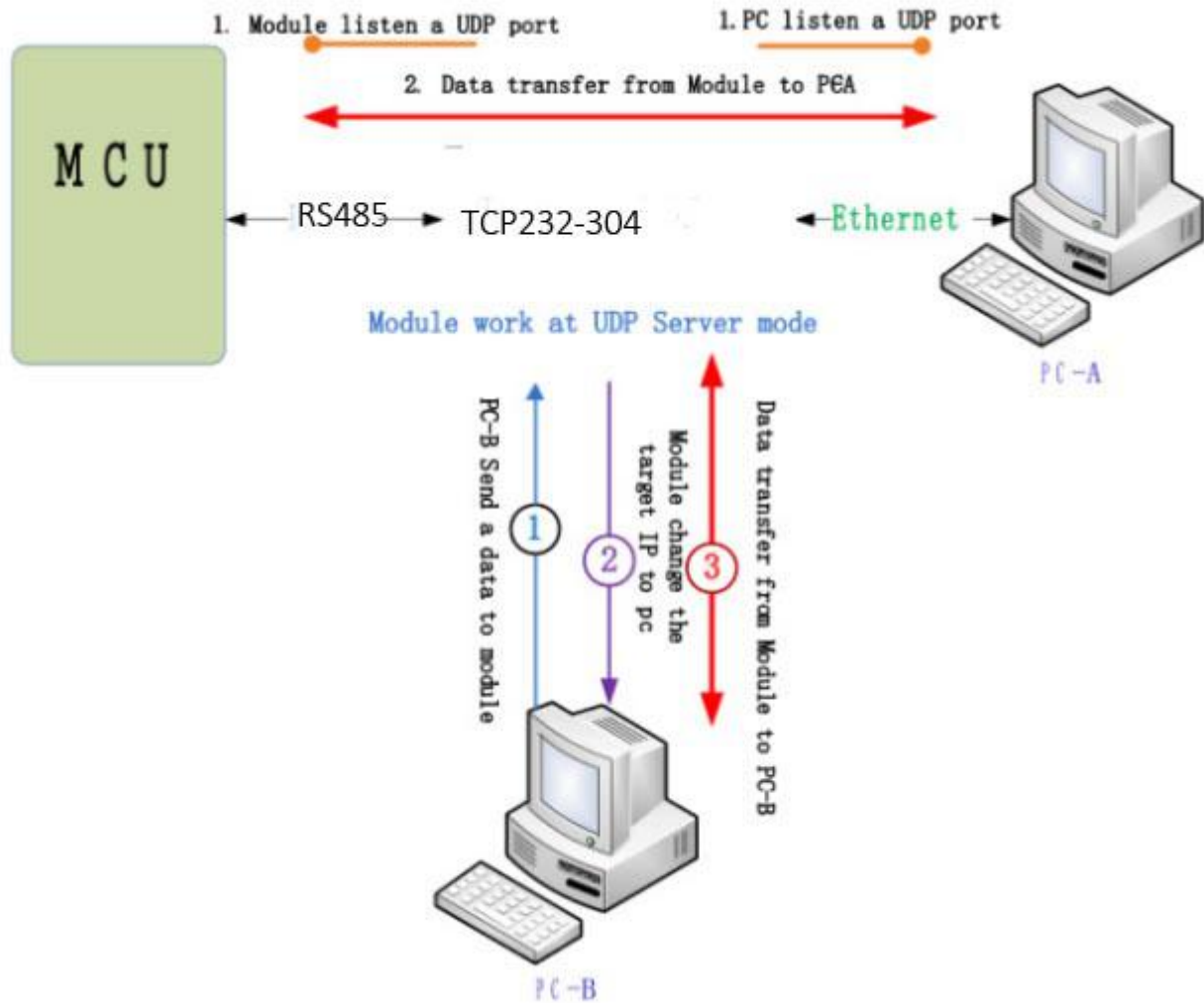


Diagram 3.1.4-2 UDP Server Mode

3.1.5. HTTPD Client Mode

- 1) In HTTPD Client Mode, TCP232-304 send data to HTTP Server or receive data from HTTP Server, complex HTTP protocol will be done by TCP232-304, it is convenient for user to programming.
- 2) TCP232-304 received data from HTTP Server will send to serial port without process.
- 3) According to demand, user can define HTTP content. If the request type is POST, TCP232-304 will add Connection and Content-Length.
- 4) In HTTPD Client Mode, it supports GET and Post Function .

3.1.6. TCP and UDP Mechanism

	TCP	UDP
Advantages	Stable; Not easy to lose data package; Reliable connection mechanism;	No connection mechanism; Easy and flexible; Transmission interval is accurate;
Disadvantage	Easy to block up Information; Because of check and resend mechanism, interval isn't accurate	Under bad network condition, it is high risky to losing data package

3.2. DHCP and DNS Function

DHCP: Dynamic Host Configuration Protocol

When T2 connects to remote server, it can obtain an IP address automatically which router or gateway distributed. If you don't know how to set IP address or it can't connect because of the set IP is not in the same segment, the function is helpful. IP address obtained from DHCP can be checked ,but can't be modified.

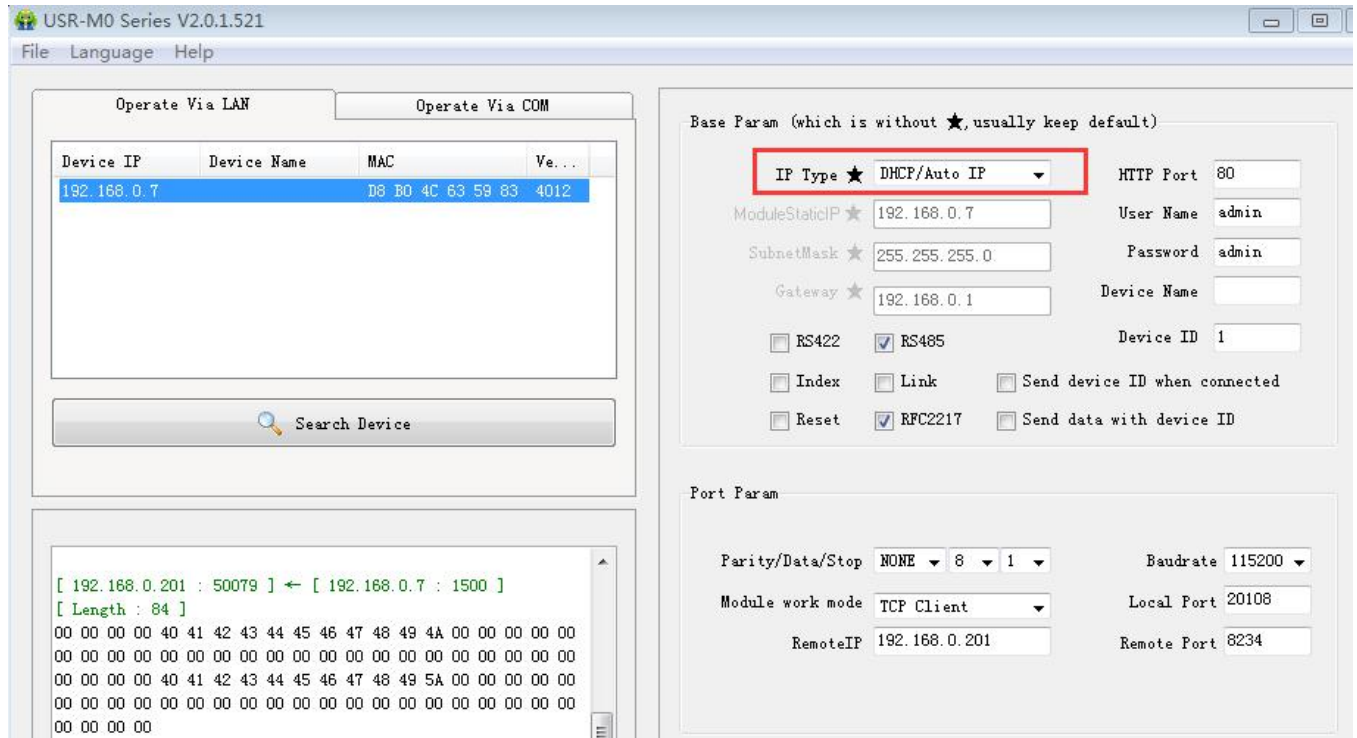


Diagram 3.2-1 DHCP

DNS: Domain Name System

e.g. domain name sever is cloud usr.cn, when we don't know Server IP or Server IP changed, this function plays an important role, it can connect remote server by resolving server domain name

Note: when use NDS function, gateway must be same as router IP or choose DHCP function.

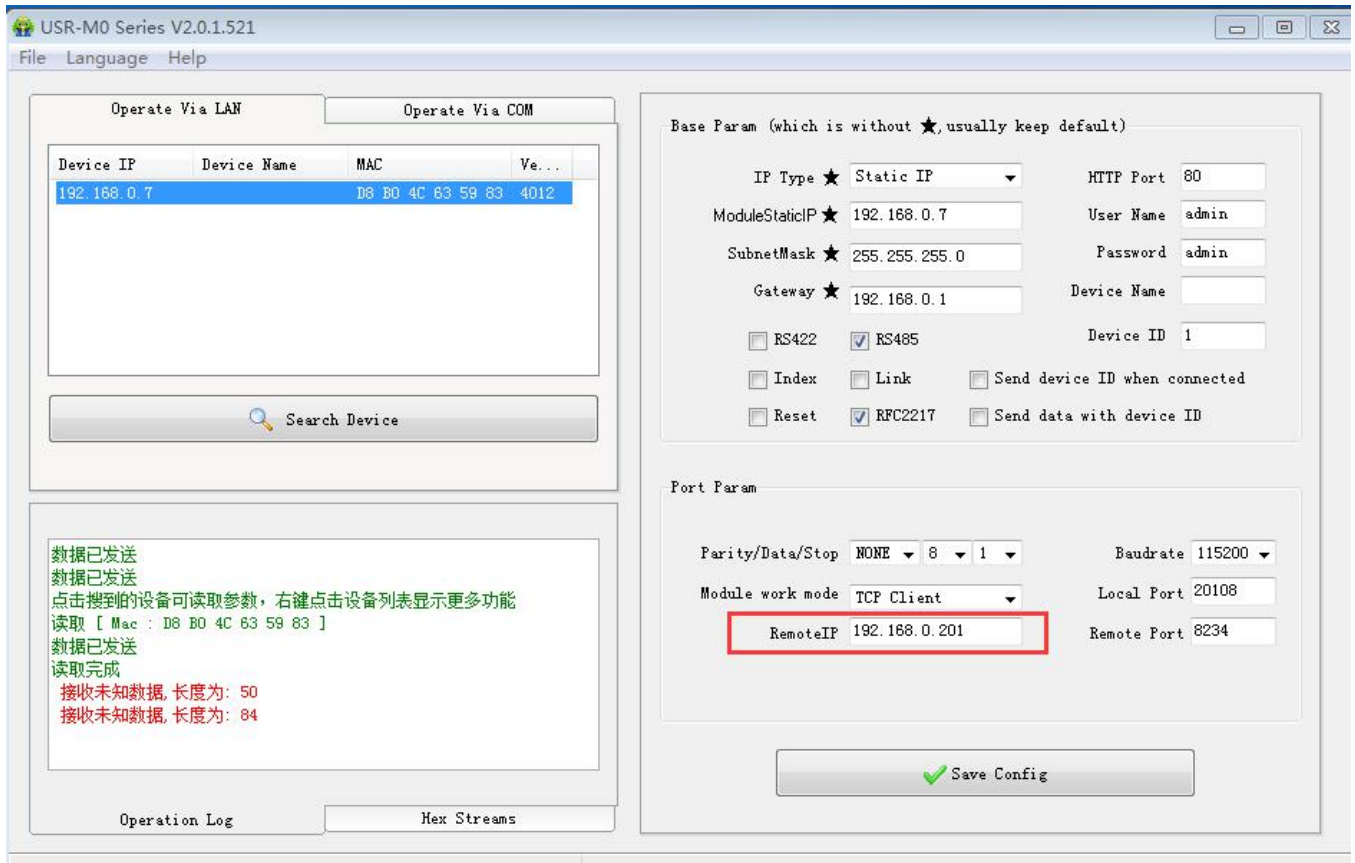


Diagram 3.2-2 DNS

3.3. VCOM

USR-VCOM Download: <http://www.usriot.com/usr-vcom-setup-software-v3-7-1-520/>

USR-VCOM Manual: <http://www.usriot.com/usr-vcom-setup-software-user-manual-v3-5-2/>

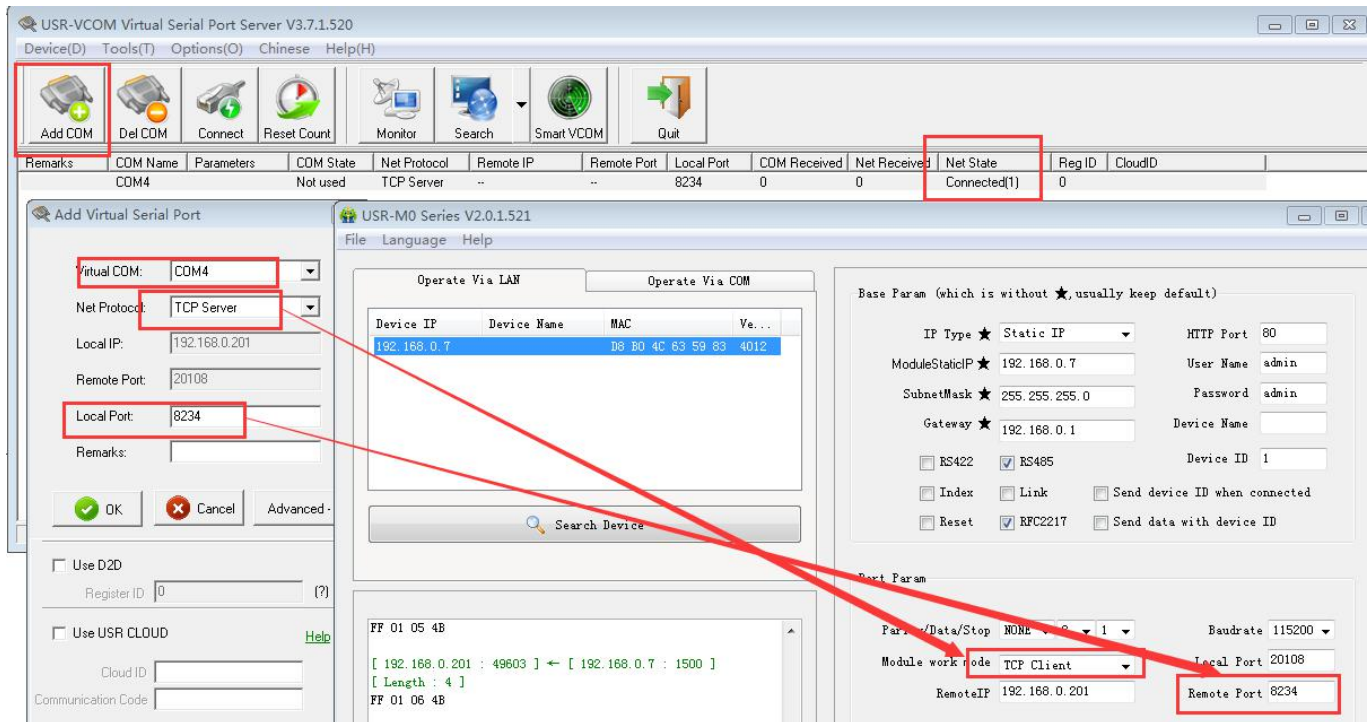
If user's upper computer and device are all connect by serial port, user can create a COM which has TCP/IP to realize remote control by USR-VCOM software.

- 1) Turn off firewall and anti-virus software.
- 2) Install USR-VCOM.

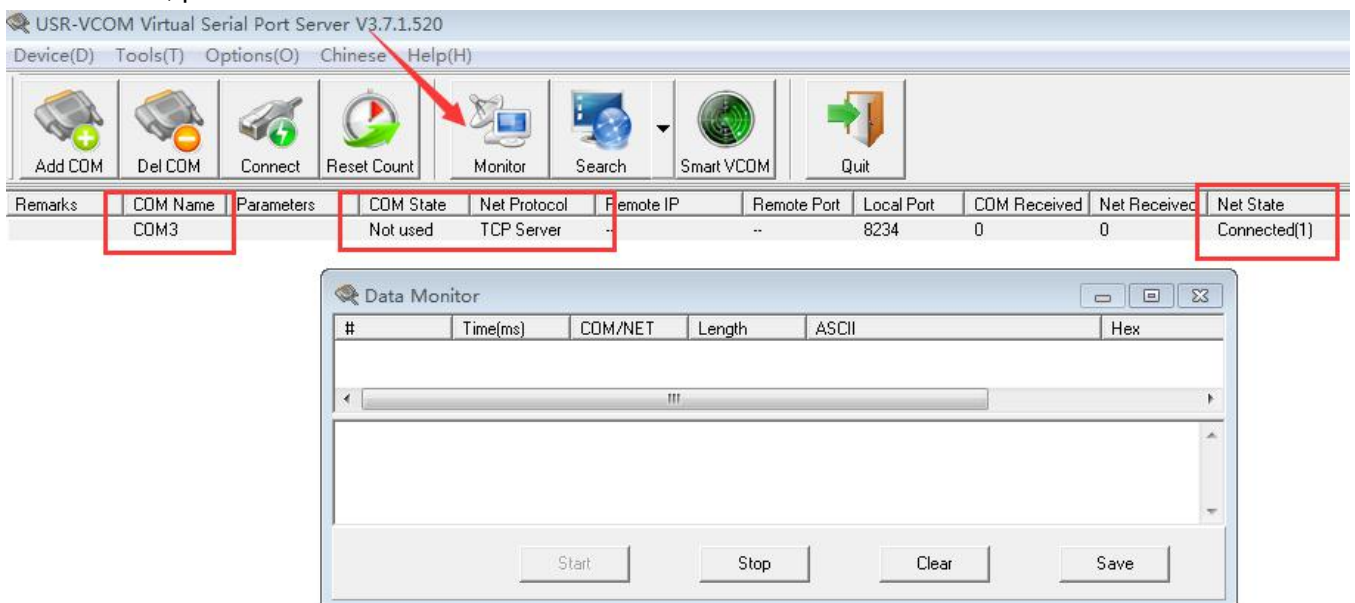
I advise user to select "Search" or "Smart vcom" to create virtual port. **Please refer to 3.3.3**

3.3.1. TCP232-304 Works as Client

- 1) Set module parameters. T2 work model: TCP Client.
- 2) Open USR-VCOM, set virtual port as follows :


Diagram 3.3.1-1 Create Server Virtual Port

3) If the work mode and parameter is correct , TCP232-304 will connect automatically. If user want to monitor sent data, please click “Monitor”. It is used to check whether the data is correct .


Diagram 3.3.1-2 Monitor Date

3.3.2. TCP232-304 Works as Server

- 1) Set TCP232-304 work mode: TCP Server.
- 2) Set virtual port as follows:

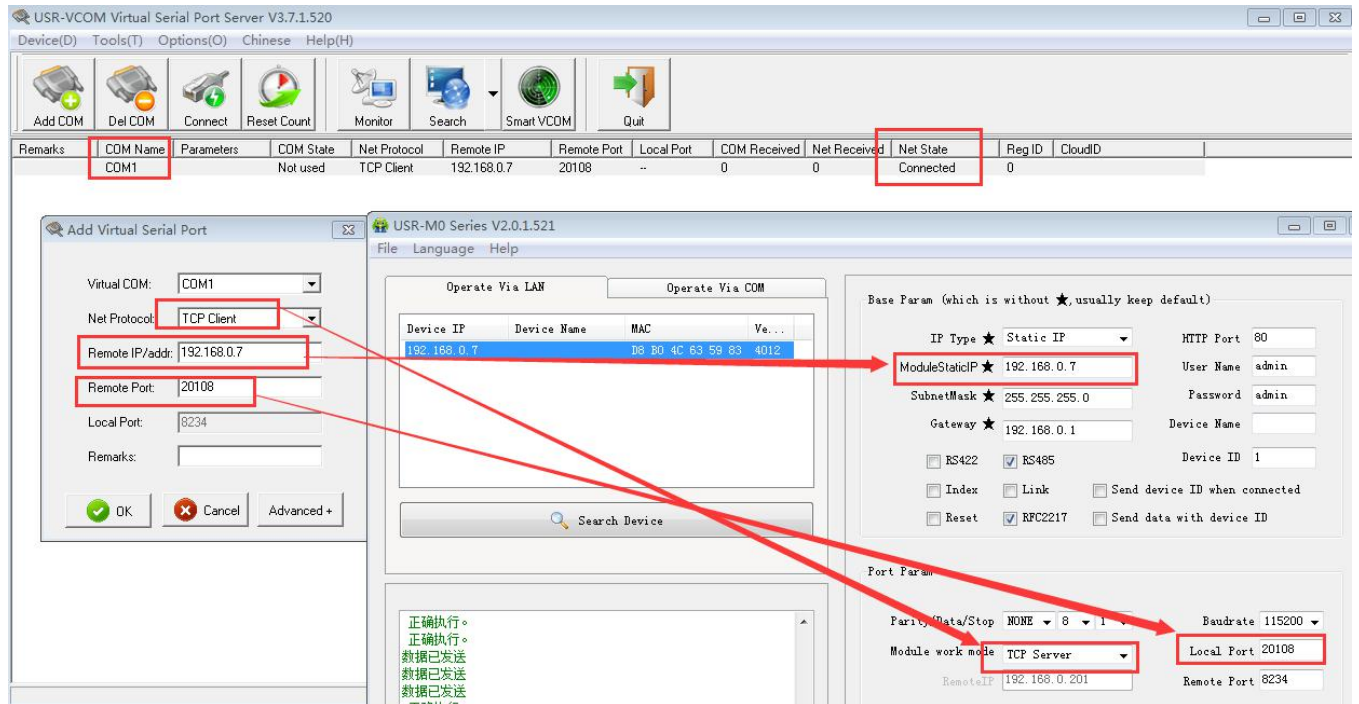


Diagram 3.3.2-1 Create Client Virtual Port

3.3.3. Other Ways to Create VCOM

1) Create VCOM by “search” button.



Diagram 3.3.3-1 Search Function

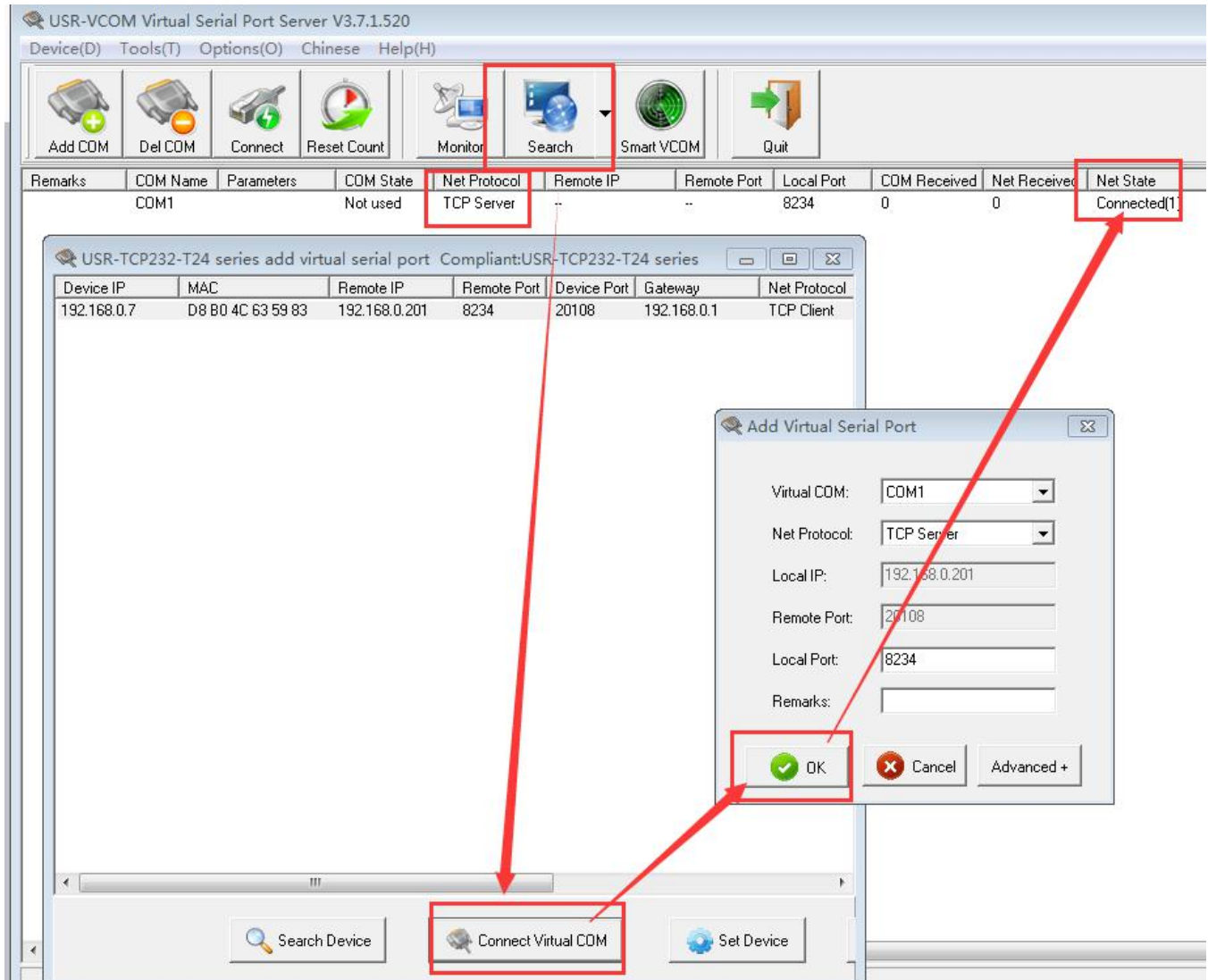


Diagram 3.3.3-2 Search Function

2) Automatically Create

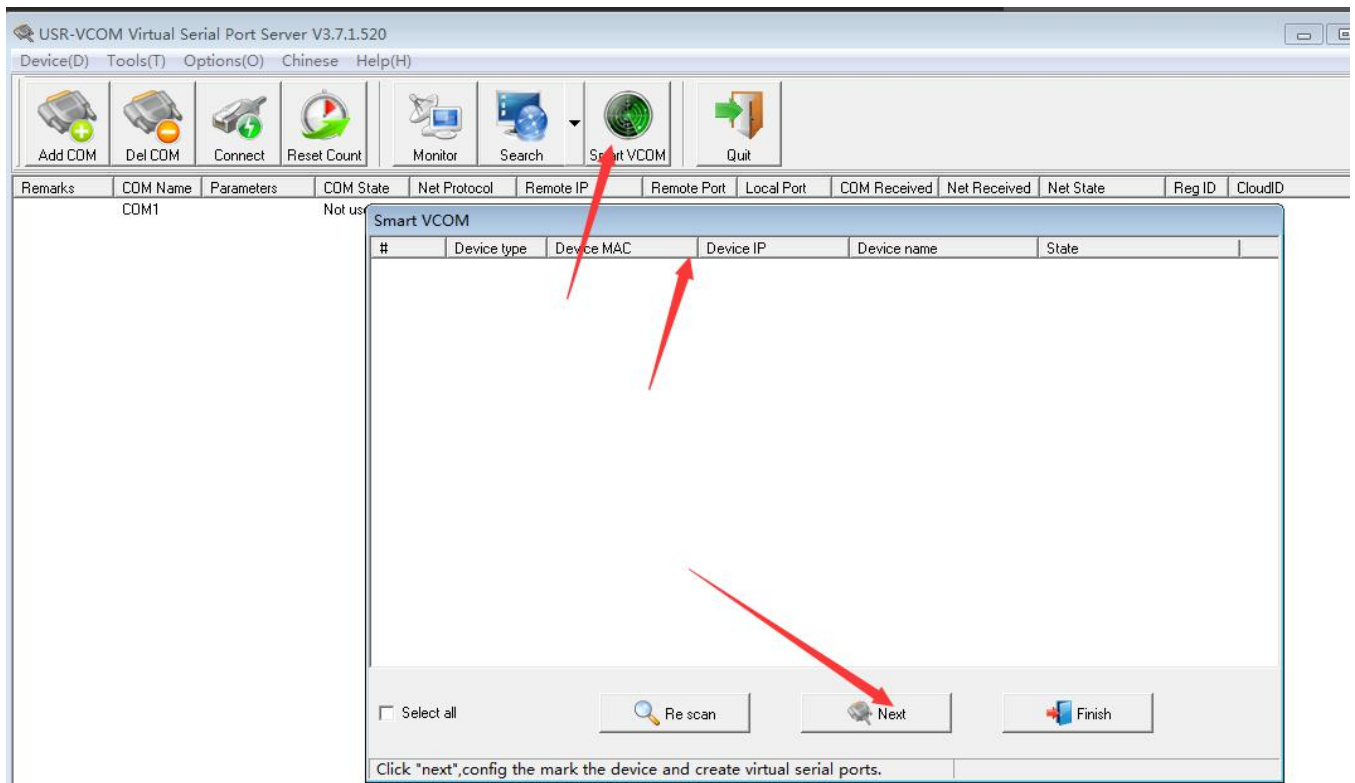


Diagram 3.3.3-1 Smart VCOM

3.4. Special Function

3.4.1. Factory Reset

- 1) Hardware: pull "Reload" down to 0 V level for 5 seconds then pull CFG(Reload) up to 3.3 V or don't connect it, resetting is finished.
- 2) Software: finish it by set-up software.

3.4.2. Link Function

Link pin can be used as indication pin for TCP connection status.

When connected, it output low level; When unconnected, high level.

When TCP232-304 is in TCP mode, after connection, Link pin will pull down automatically. Otherwise, Link pin will pull up.

When TCP232-304 is in DUP model, Link pin will always pull down.

Note: Reserved Link pin of TCP232-304 can be used as Link indication.

As Link pin doesn't stretch out of shell, to realize the function, user can only use TCP232-304-PCBA

3.4.3. Reset Function

When TCP232-304 works as TCP Client, it connects to TCP Server actively. When start Reset function, TCP232-304 try to connect TCP Server for 30 times, if failed, TCP232-304 will restart automatically.

By default, this function is not checked.

3.4.4. ID Function

When TCP232-304 works as TCP Client, it can send ID when establish a connection or carry ID when sending data. TCP232-304 ID is decimal .1-65535

(ID function and transparent transmission can't work at same time)

3.4.5. Index Function

When TCP232-304 works as TCP Server, it can establish 16 links simultaneously at most. Default is 4 .

Take 4 link as example, Server send data to 4 Client simultaneously or Server can't distinguish the data source, Index can realize the choice of data source of sending or receiving.

Index function can be set by software or web-page.

3.4.6. RFC2217 Function

By this function , TCP232-304 port parameter can be modified when working . E.g. change baud rate from 115200bps to 9600bps. The function can be set by software or webpage. By default , it is checked.

When RFC2217 function of TCP232-304 is checked, RFC2217 function of USR-VCOM software is also checked, the baud rate of software on PC will automatically matched with the baud rate of TCP232-304.

3.5. Additional Function

3.5.1. Display IP and Data

On the webpage of TCP232-304, it can display the IP of device and sent/received data byte, and the total data byte of TCP232-304.

In TCP Mode, it can display the TOP 5 device IP and sent/received data byte. In UDP Mode, it only display sent/received data byte.

3.5.2. Serial Port Parameter Setting

For TCP232-304 parameter setting, it doesn't need CFG (Reload) pin and specific baud rate.

3.5.3. Set Client Number in TCP Server Mode

In TCP Server Mode, TCP Client number: 1-16, default value 4. When the Client link is more than 16, the new link will replace the former link from Link 1 .

3.5.4. Defined MAC Address

Mac address can be modified. Factory Mac address is exclusive.

3.5.5. Defined DNS Server IP

To resolve server domain name, user should send data by gateway or router, then gateway or router Distributes IP address, it can show IP in the webpage. User can set specific domain name resolution IP, to specific gateway or router to resolve domain name.

3.5.6. Defined Registration Package

The content of registration package can be defined, 40 bytes at most.

It includes sending registration package when connecting and carrying registration package when sending data. It can be used singly or together.

It is set by webpage, support decimal input and hexadecimal input. By default ,this function isn't checked.

3.5.7. Defined Heartbeat Package

The content of heartbeat package can be defined, 40 bytes at most. Time set from 1s to 255s

It can ensure connection is reliable, put an end to connect feign death; It can send to LAN Port or Serial Port singly or at same time.

3.6. Firmware Upgrade

When Module T2 IP and PC IP is in the same segment , click here, then click “firmware upgrade”

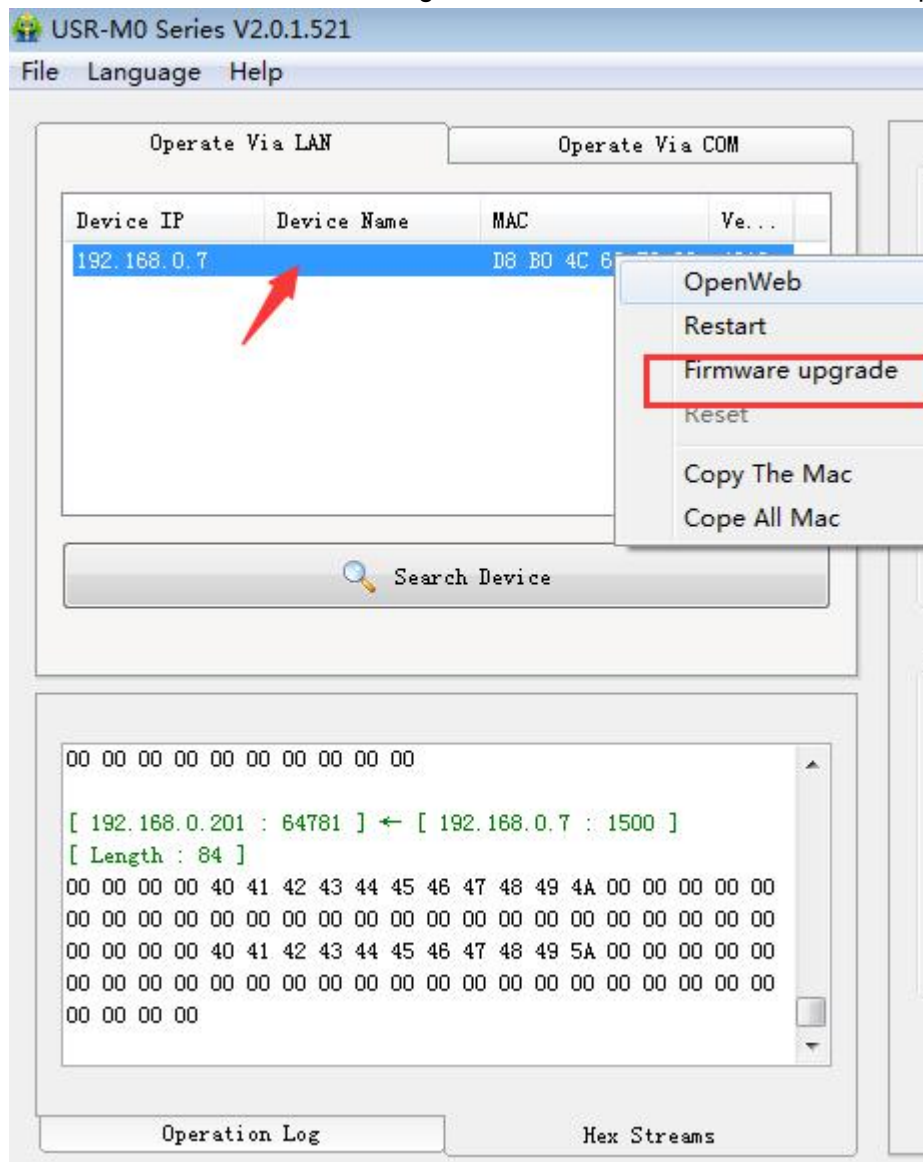


Diagram 3.6-1 Firmware Update

4. Parameter Setting

Parameter setting can be done by webpage and software.

- 1) TCP232-304 connects PC by LAN (TCP232-304 IP and PC IP should in the same network segment)
- 2) TCP232-304 connects PC by Router. Under this situation ,one PC can connect several TCP232-304 or one TCP232-304 can connect several devices.

4.1. Webpage Setting

Parameters need to be set:

- 1) Work Mode
 - ◆ TCP Client/ TCP Server/ UDP Client/ UDP Server
- 2) TCP/UDP parameter:
 - ◆ Connection Type : Server/ Client / HTTPD Client
 - ◆ Remote Port and IP
 - ◆ Local Port
- 3) Serial Parameter
 - ◆ Baud rate/Data bit/ Check bit/ Stop bit
 - ◆ RS485
- 4) IP and Server setting

Note : After setting parameter, please save and restart.

4.2. Log in

Open a browser, type 192.168.0.7 , Name and password: admin

User can also log in by software.

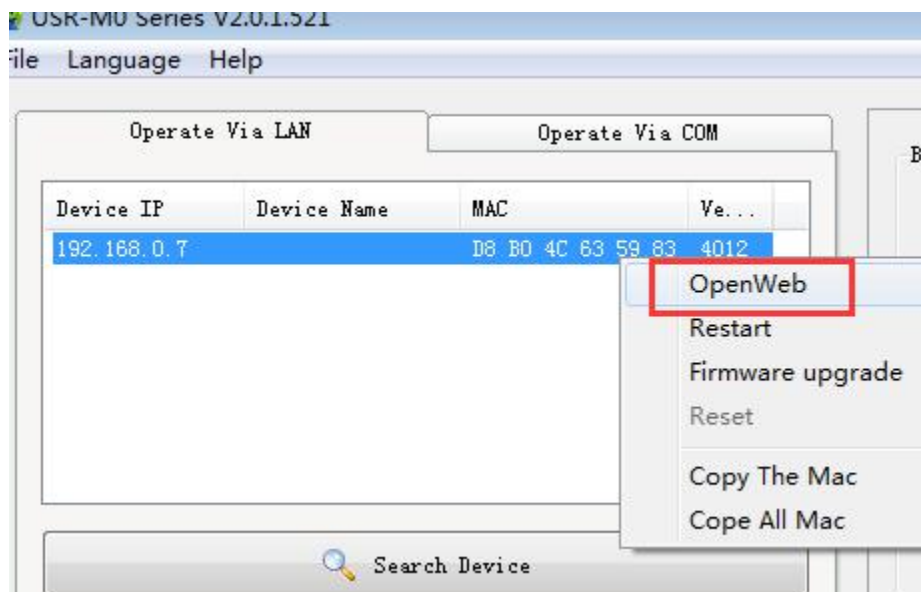
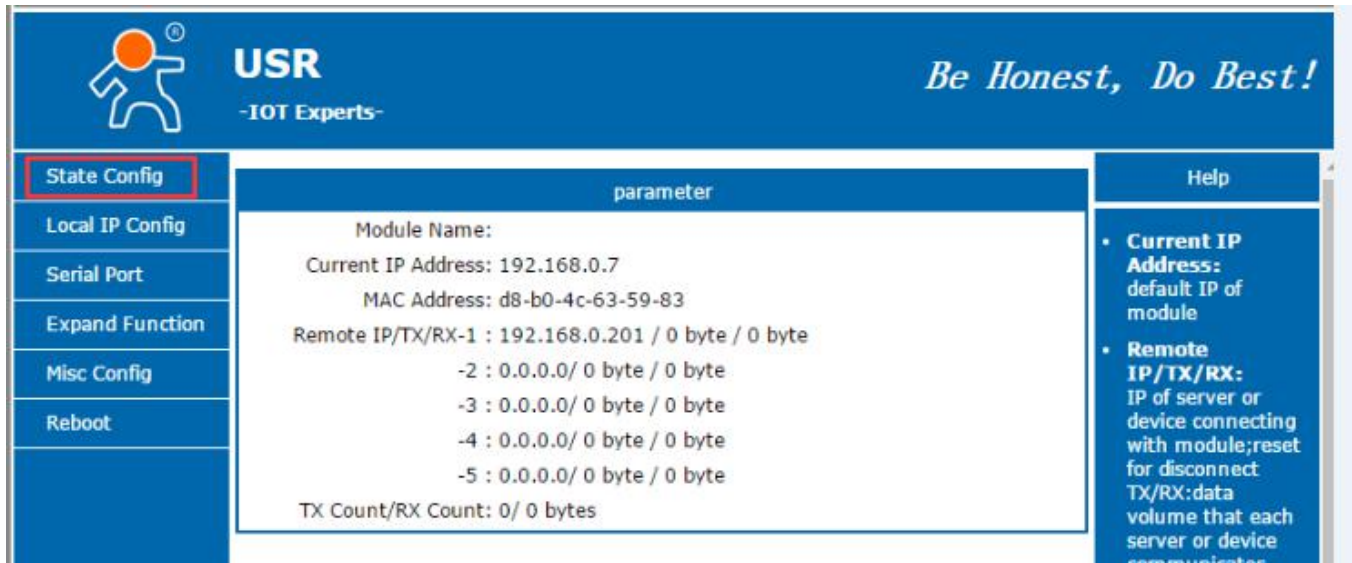


Diagram 4.2-1 Open Web

4.3. State Configuration

Current IP ,Mac, Remote IP/ TX/RX, TX Count/RX Count



parameter	Help
Module Name:	
Current IP Address: 192.168.0.7	• Current IP Address: default IP of module
MAC Address: d8-b0-4c-63-59-83	
Remote IP/TX/RX-1 : 192.168.0.201 / 0 byte / 0 byte	• Remote IP/TX/RX: IP of server or device connecting with module;reset for disconnect TX/RX:data volume that each server or device communicates
-2 : 0.0.0.0/ 0 byte / 0 byte	
-3 : 0.0.0.0/ 0 byte / 0 byte	
-4 : 0.0.0.0/ 0 byte / 0 byte	
-5 : 0.0.0.0/ 0 byte / 0 byte	
TX Count/RX Count: 0/ 0 bytes	

Diagram 4.3-1 State Configuration

4.4. Local IP

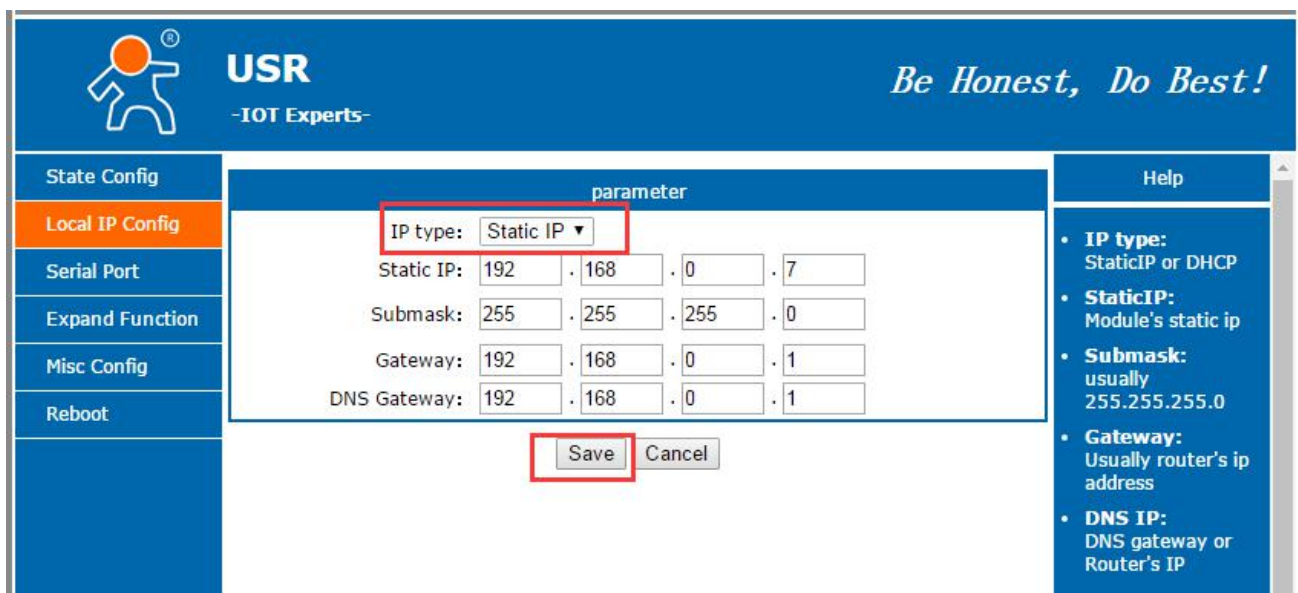
IP type: Static IP (TCP232-304 Fixed IP)and DHCP (obtain an IP address automatically)

Static IP: don't set it the same as local network IP

Submask: aims to distinguish network segment, default is 255.255.255.0

Gateway: Router IP

DNS Gateway: default IP is module gateway when gateway or router is resolving domain name



parameter	Help
IP type: Static IP	• IP type: StaticIP or DHCP
Static IP: 192 . 168 . 0 . 7	• StaticIP: Module's static ip
Submask: 255 . 255 . 255 . 0	• Submask: usually 255.255.255.0
Gateway: 192 . 168 . 0 . 1	• Gateway: Usually router's ip address
DNS Gateway: 192 . 168 . 0 . 1	• DNS IP: DNS gateway or Router's IP

Diagram 4.4-1 Local IP

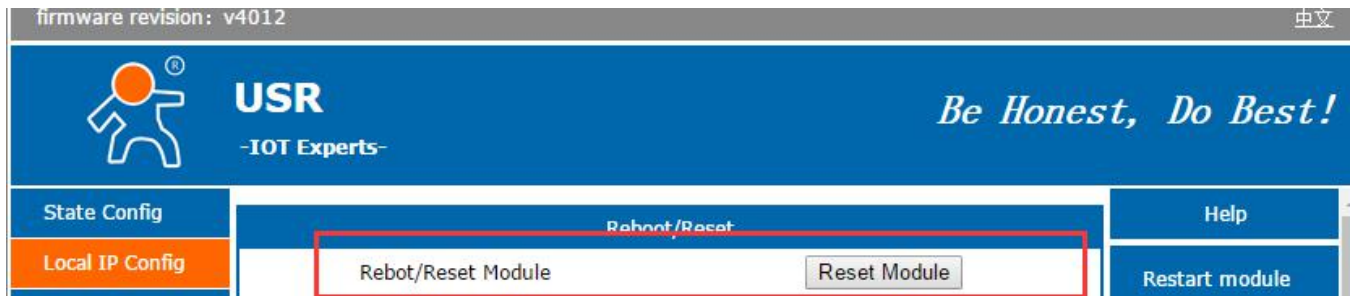
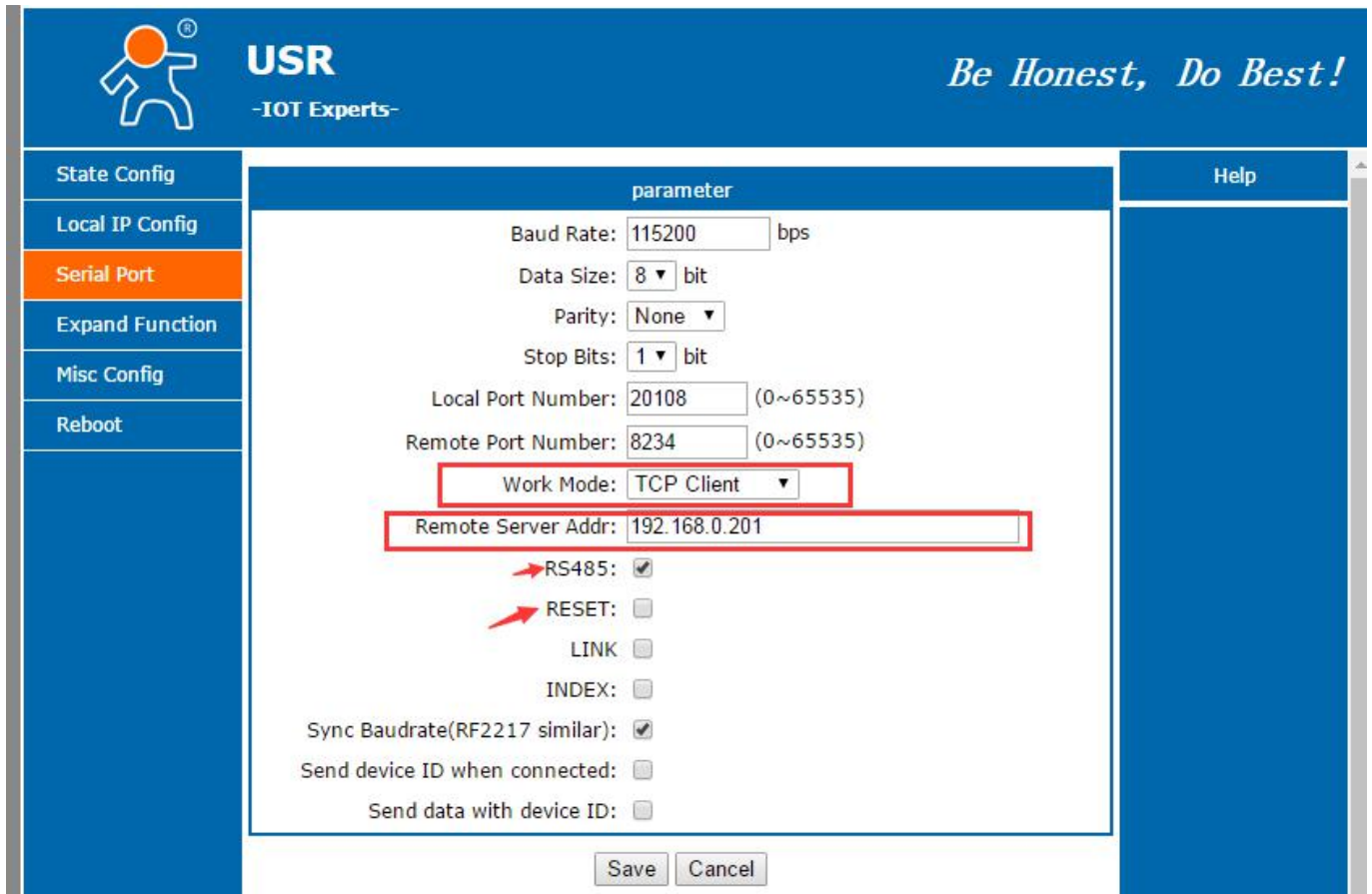


Diagram 4.4-2 Local IP

4.5. Serial Port

- 1) Baud rate: 600bps~230.4Kbps
- 2) Stop bit :1, 2
- 3) Data bit :5, 6, 7, 8
- 4) Check bit : NONE, ODD, EVEN, MARK, SPACE
- 5) Local Port Number : Fixed port number by default, It can be set "0" when router is connecting Extranet
- 6) Remote Port number
- 7) Work Mode: TCP Client/ TCP Server/ UDP Client/ UDP Server/ HTTPD Client
- 8) Remote Server Address: IP address or Domain name.
- 9) HTTPD: HTTPD Get or HTTPD Post



parameter
Baud Rate: 115200 bps
Data Size: 8 bit
Parity: None
Stop Bits: 1 bit
Local Port Number: 20108 (0~65535)
Remote Port Number: 8234 (0~65535)
Work Mode: TCP Client
Remote Server Addr: 192.168.0.201
RS485: <input checked="" type="checkbox"/>
RESET: <input type="checkbox"/>
LINK: <input type="checkbox"/>
INDEX: <input type="checkbox"/>
Sync Baudrate(RF2217 similar): <input checked="" type="checkbox"/>
Send device ID when connected: <input type="checkbox"/>
Send data with device ID: <input type="checkbox"/>

Save Cancel

Diagram 4.5-1 Serial Port

4.6. Expand Function

Defined registration package and Defined registration package

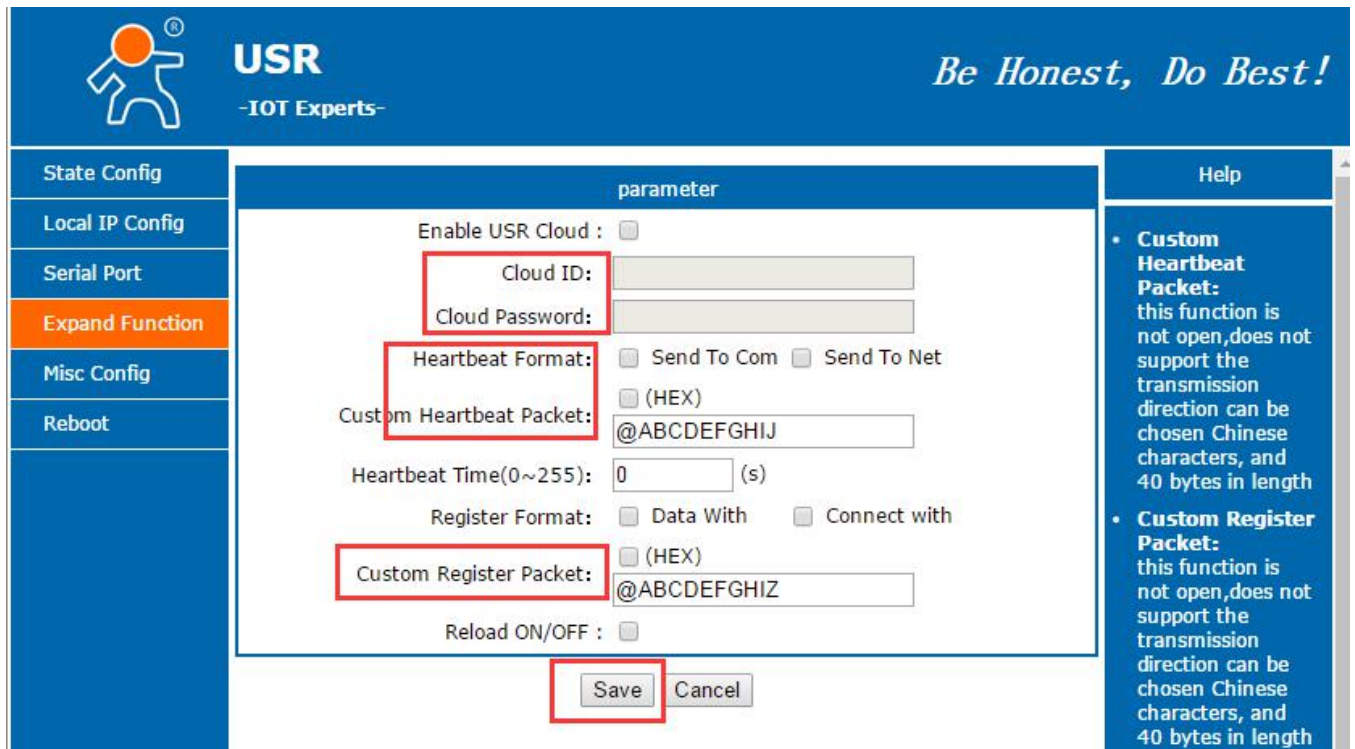


Diagram 4.6-1 Expand Function

4.7. Misc Configuration

Set module name, user name, pass word, MAC.

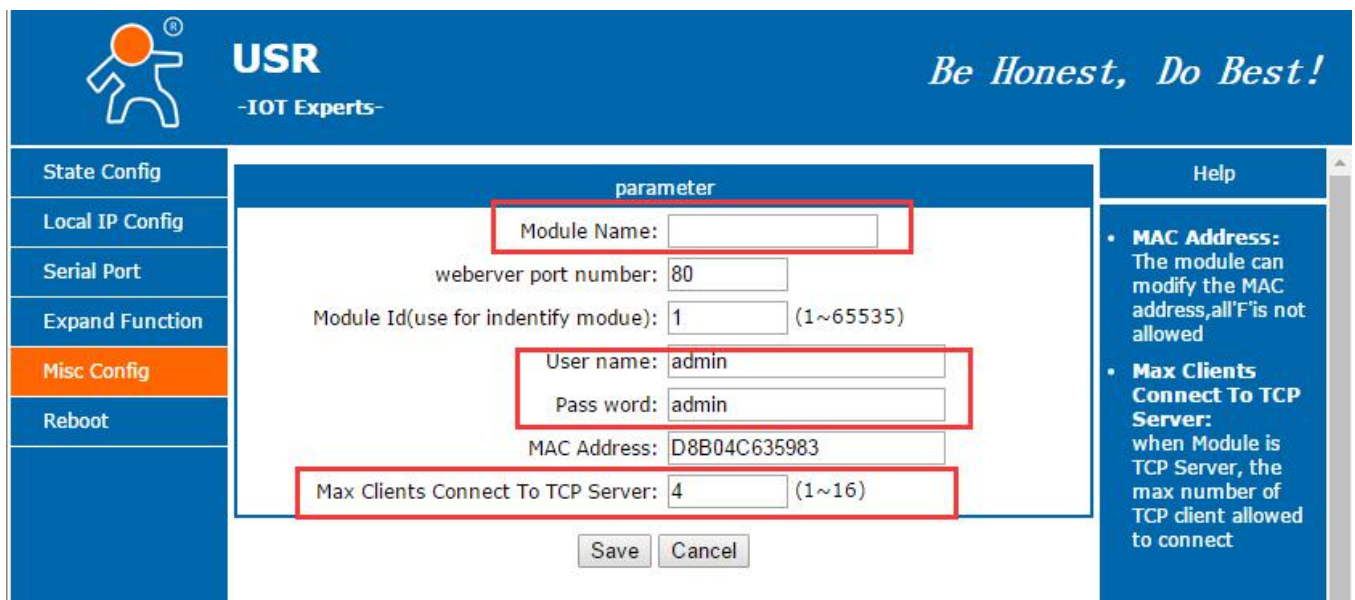


Diagram 4.7-1 Misc Setting

4.8. Reboot

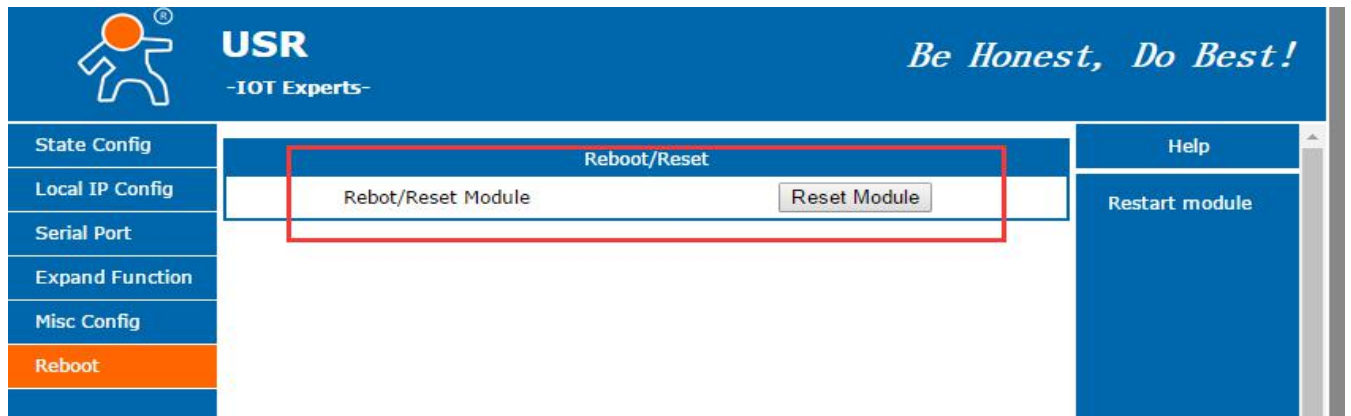


Diagram 4.8-1 Reboot Setting

4.9. Software Setting

1) Search device

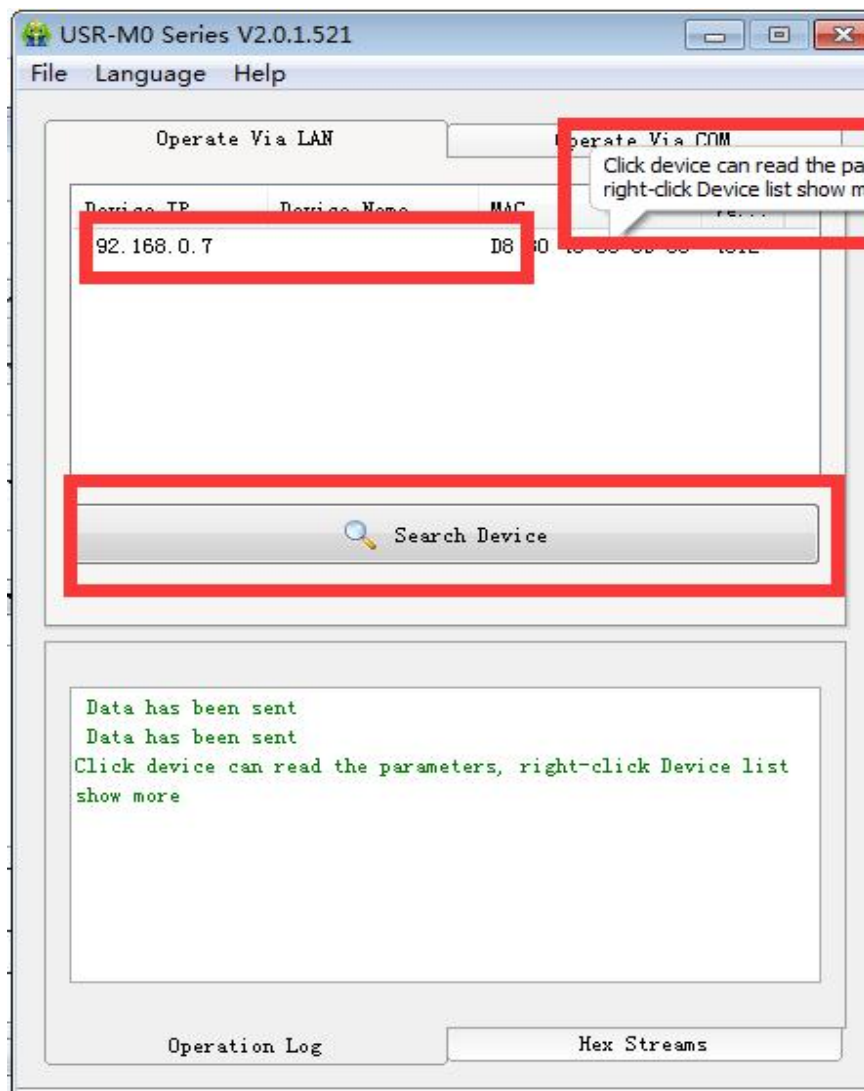
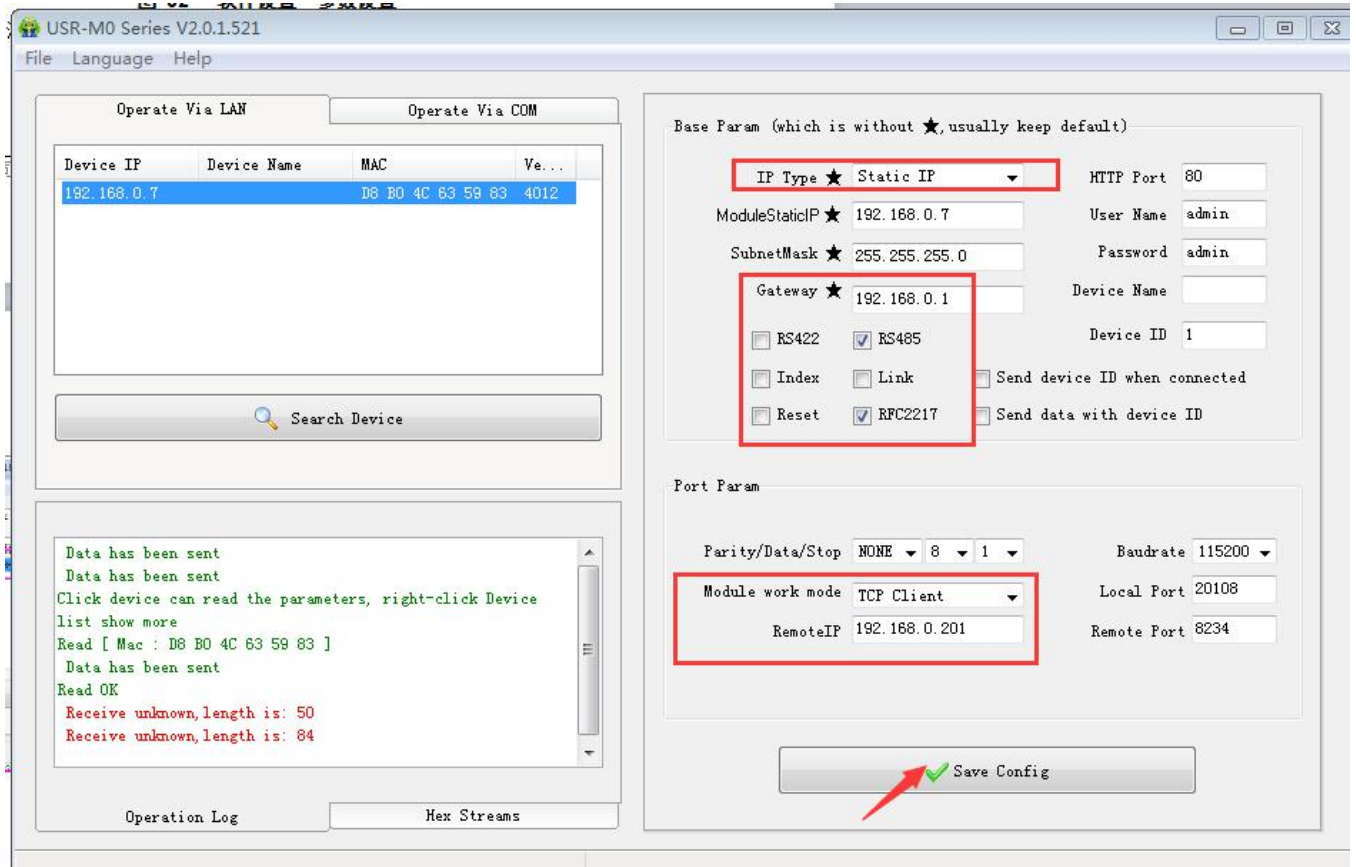


Diagram 4.9-1 Search

2) Set parameters


Diagram 4.9-2 Parameter setting

3) Check data

Click “Hex Stream” , it's helpful to understand the protocol and check data by observing data.

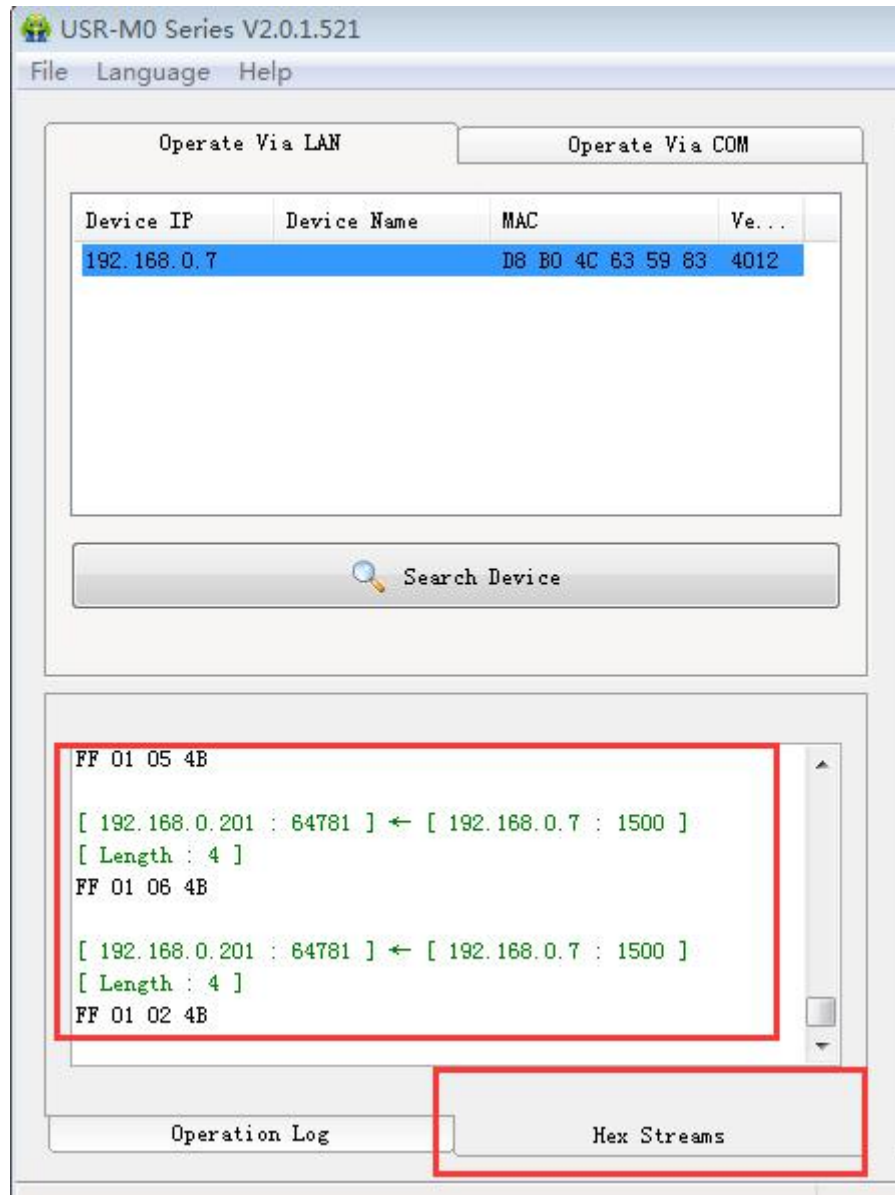


Diagram 4.9-3 Check Streams

4) Press CFG (Reload) and click “operate via COM” → select serial port→ Read Configuration, user can also set parameters by this way.

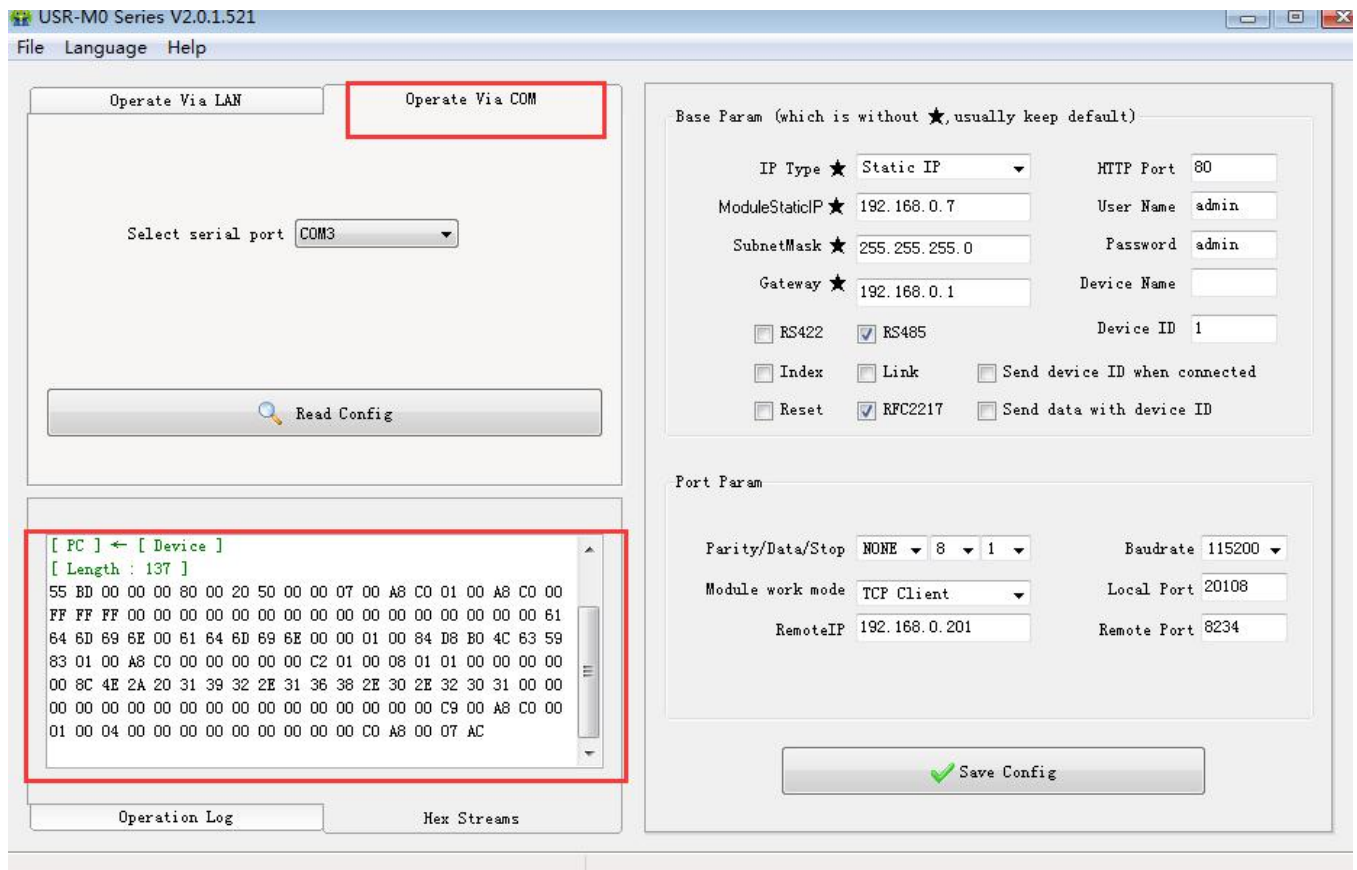


Diagram 4.9-4 Port Setting

5. Contact Information

Company: Jinan USR IOT Technology Limited.

Address: Floor 11,Building1,No.1166 Xinluo Street, Gaoxin Distric, Jinan, Shandong, 250101 China.

Tel: 86-531-55507297 86-531-88826739-803

Web: <http://www.usriot.com/>

Support:<http://h.usriot.com/>

Email: sales@usr.cn

6. Disclaimer

The document provides information about USR-TCP232-T2 module, it doesn't grant any license to the intellectual property rights. Except the responsibility declared in the product sale clause, USR does not assure any other responsibilities. In addition, USR does not make any warranties for the sale and use of this product, including the suitability of products for a particular purpose, merchant ability or fitness for any patent, copyright or other intellectual property infringement.USR may make changes to specifications and products description without notice.

7. Undated History

V 1.0 2016-5-13 First Version