USR-TCP232-T2 User Manual

File version:V1.0

1. Quick Start

USR-TCP232-T2 is used for data bidirectional transparent transmission between TTL and Ethernet. T2 module 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-T2 module,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 T2 conversion function, user should connect T2 UART to computer by USB to TTL serial line, then connect T2 LAN port to computer LAN port by internet cable. If you want to use T2 evaluation board, use USB to RS232 serial line instead of USB to TTL serial line.

Here is schematic diagram for hardware link .

Diagram 1.2-1 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 1.4-1 T2 Module 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

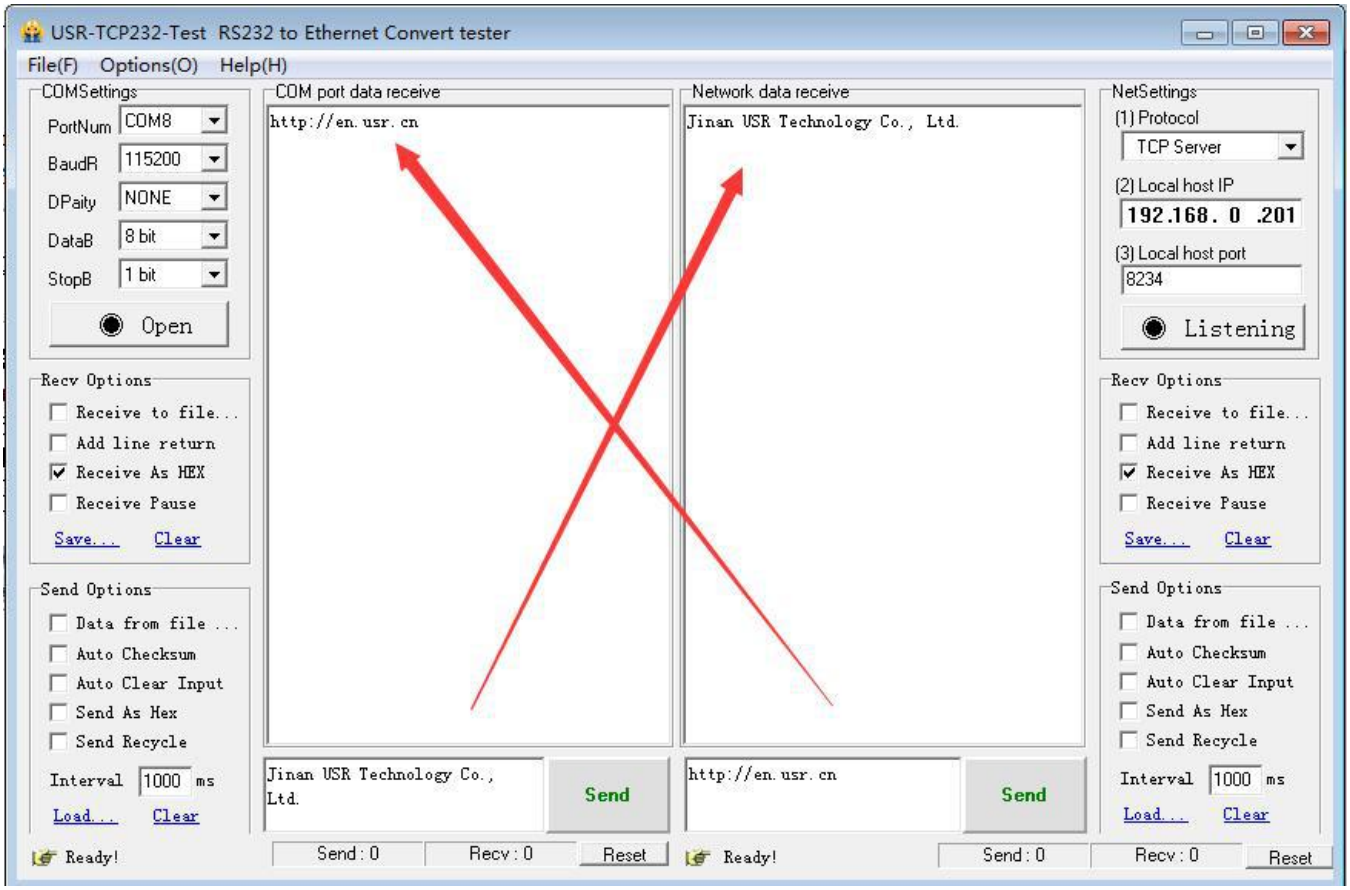


Diagram 1.4-1 Port to LAN Test

2. Overview

2.1. Brief Introduction

TCP232-T2 is a new and tiny size serial to Ethernet module which realizes data bidirectional transparent transmission between TTL Port and RJ45 Port, it can also used in RS232/ RS485 by level shift circuit.

T2 is equipped with Cortex-M0 core. It has characters of low power, fast speed, high efficiency, strong compatibility, it is easy to use.

2.2. Features

- ●Support DHCP (Dynamic Host Configuration Protocol);
- ●Support DNS (Domain Name System);
- ●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 ~460.8Kbps, 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;

●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 model, Client number rangefrom1 to 16, default value is 4;
●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	VCC: DC 3.3V, 3.15V~3.45 V VDD: DC 5V, 4.75V~5.5V
Current	130mA
Consumption	<1W
Serial Level	TTL
LAN Port	RJ45 with electromagnetism isolation
Packing	DIP
Size	PCB: 50.5*22.6mm(L*W) Module: 55.0*22.6*23.1mm (L*W*H)
Temperature	Working temp: -25 ~ 75 °C Storage temp: -40 ~ 105 °C Storage humidity: 5% ~ 95% RH

Diagram 2.3-1 USR-TCP232-T2 Parameters

3. Hardware

3.1. Hardware Information

3.1.1. Pin Definition

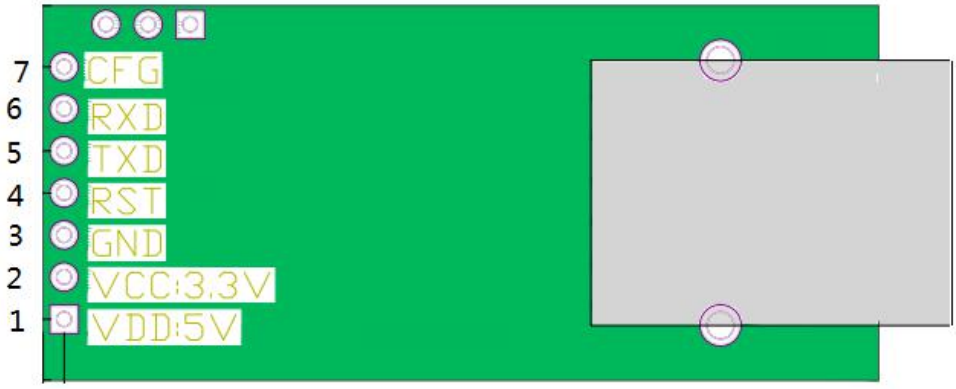
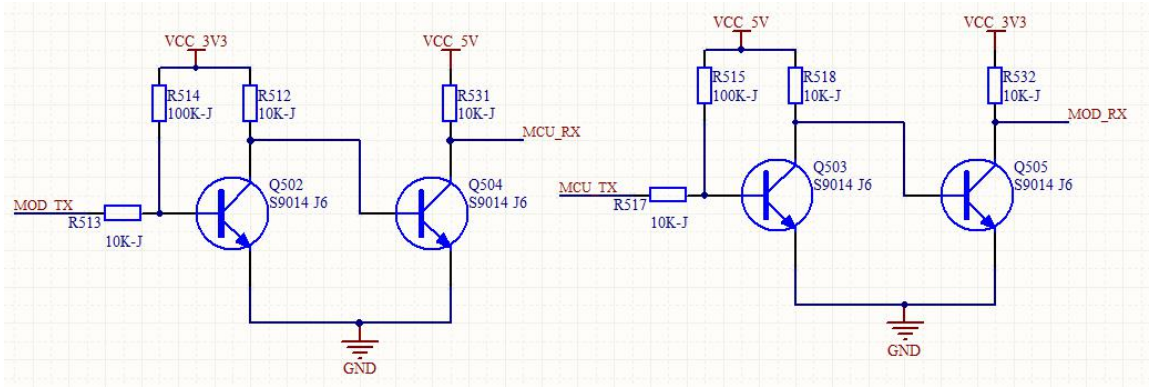


Diagram 3.1.1-1 T2 Interface Definition

NO	Pin	Function	Description
1	VDD	Power supply	Typical value 5V @ 200mA
2	VCC	Power supply	Typical value 3.3V @ 200mA
3	GND	Ground signal	Connect to ground
4	RST	Reset	Pin receive current below 200ms ,it can reset module. If unneeded, don't connect the pin . (Power on , reset means restart the module)
5	TXD	Send data	TTL connect to 3.3v MCU (For 5V, **refer to Diagram 3.1.1-2**)
6	RXD	Receive data	TTL connect to 3.3v MUC (For 5V, refer to Diagram 3.1.1-2)
7	CFG (Reload)	Pin for module configuration and restore factory default	When normal working , don't connect the pin or connect to high level. Under low level, the pin is used for module configuration, access to power then pull down"Reload" pin **Refer to 4.4.3 Factory Reset**

Form 3.1.1-1 T2 Pin Definition



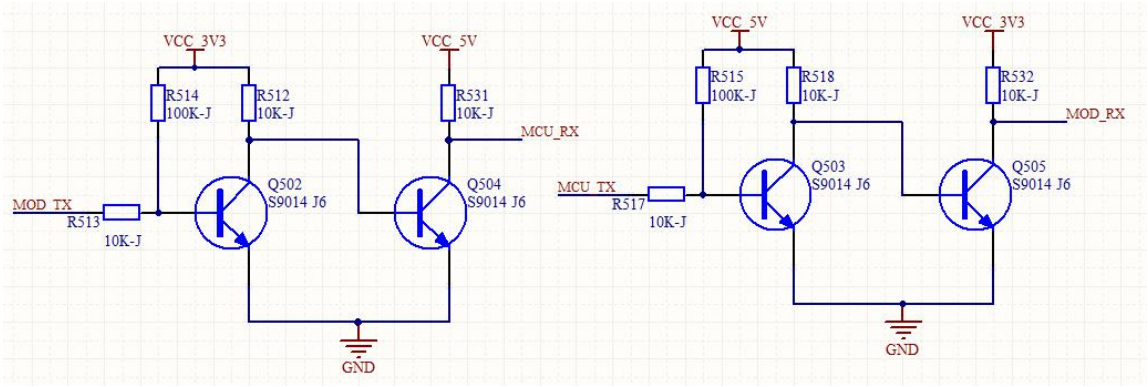


Diagram 3.1.1-2 3.3V to 5V voltage conversion circuit

Diagram 3.1.1-3 Reserved Pin

1	485_en	Reserved	RS485 reserved pin
2	Link	Reserved	Used as indication pin for TCP connection status. **Refer to 4.4.2 Link Function**
3	ISP	Reserved	Hasn't use

Form 3.1.1-2 T2 Reserved Pin Definition

3.1.2. Pin Dimension

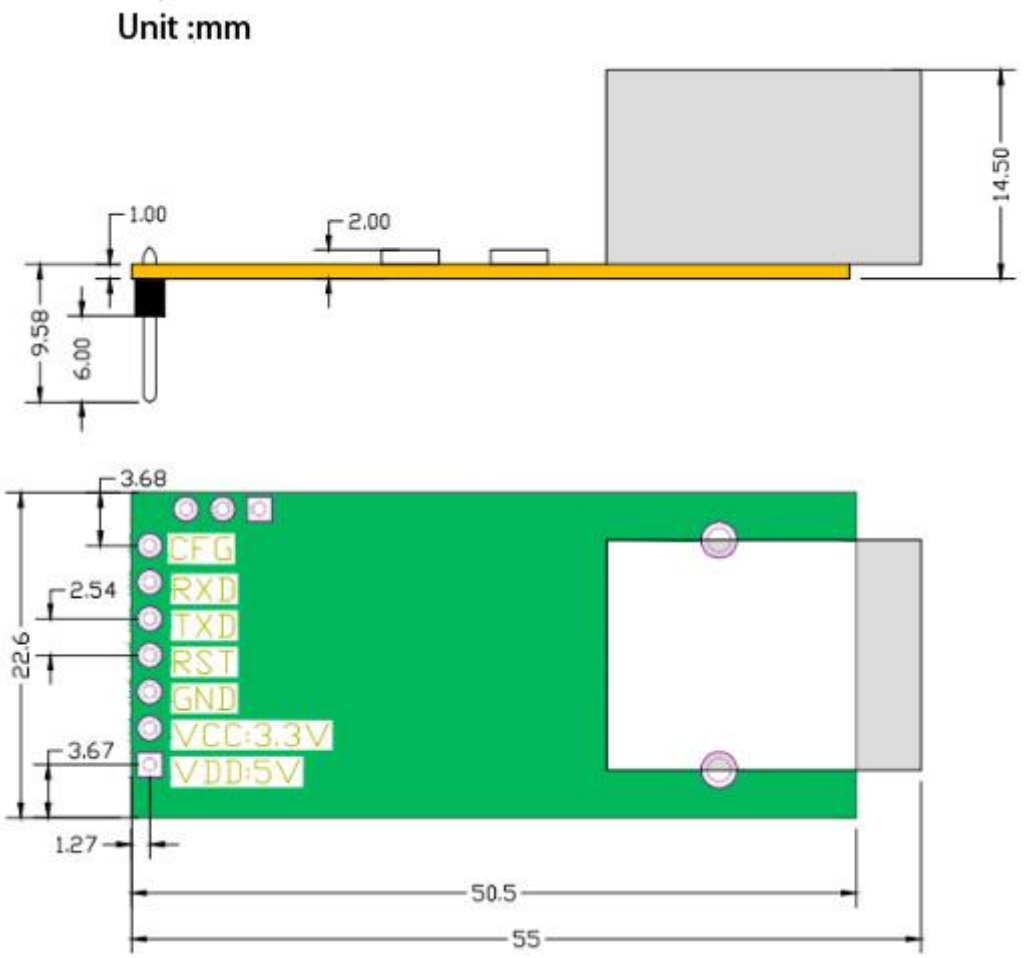


Diagram 3.1.2-1 T2 Dimension

3.1.3. Evaluation Kit

USR-TCP232-EVK evaluation board can be used for TCP232-T2

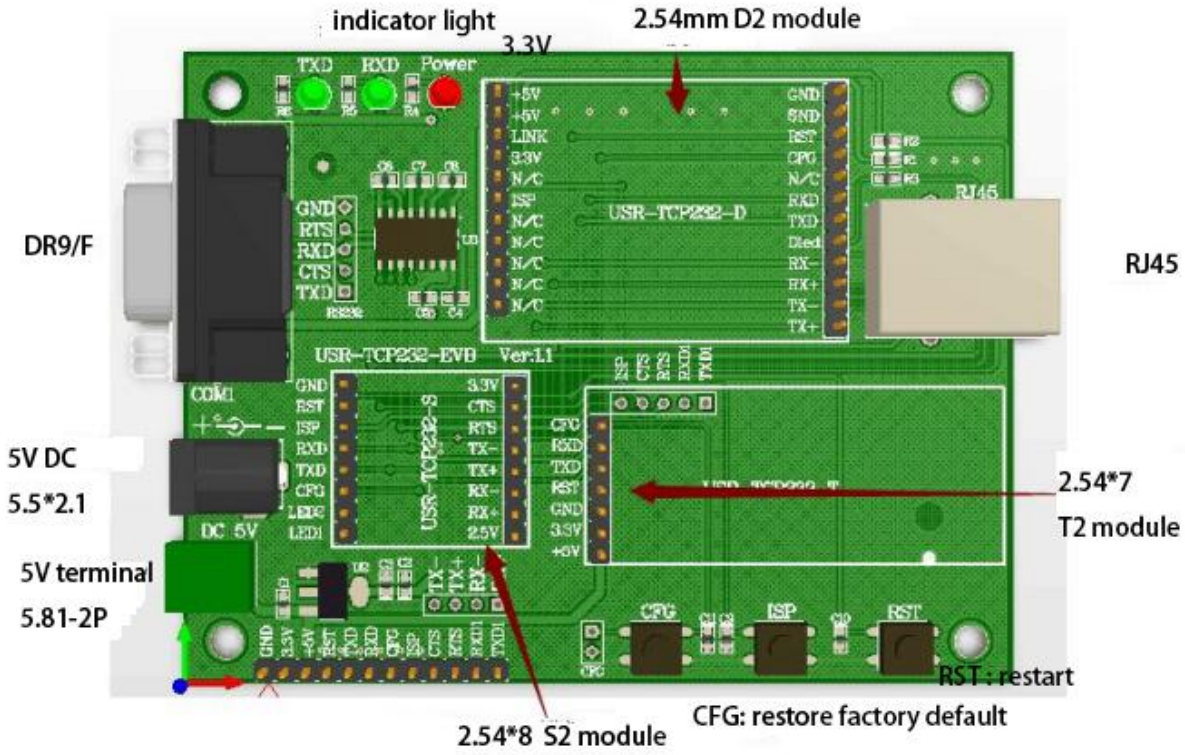


Diagram 3.1.3-1 Evaluation Kit

3.2. Hardware Reference Design

3.2.1. Typical Application Connection

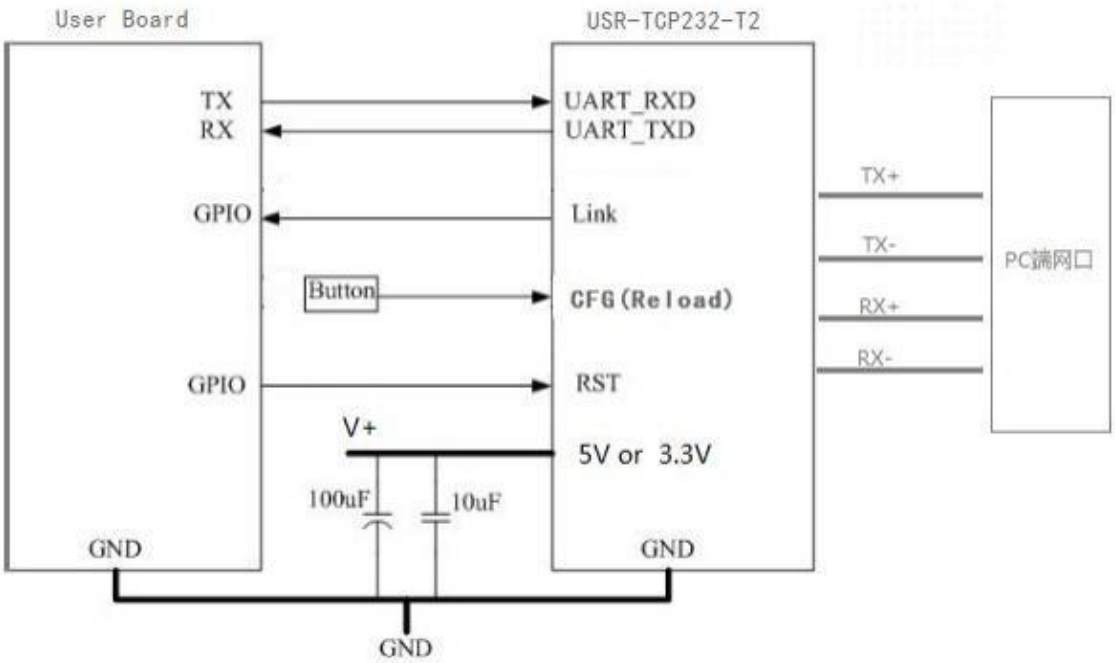


Diagram 3.2.1-1 Typical Application Connection

Note:

1) RST: Restart button. It works at low level, 3.3V, 10K pull-up resistor inside. When it access to power or breakdown, pull down 300ms then high level.

2) Link: connection indication.Can be used as indication pin for net connection, when connected, it outputs low level; When unconnected, it output high level.

3) CFG(Reload): connect to external button or configuration pin. 3.3V, 10K pull-up resistor inside. Press it and pull to low level, then release hands after 3 seconds, module restores factory default and restart.

4) UART_TXD/RXD: data rend/ receive signal(10K pull-up resistor inside)

3.2.2. Power Interface

USR-TCP232-T2 has dual power supply interface, 5.5 v and 3.3 v (only choose one)

Working current 150 mA, max current 200mA .

VCC: typical value DC 3.3V, 3.15V~3.45 V. It is used for 3.3 V MCU.

VDD: typical value DC 5V, 4.75V~5.5V. When connect to 5V MUC, **refer to Diagram 3.2.3 -2 3.3V to 5V voltage conversion circuit**

3.2.3. UART Interface

UART can connect RS232 chip, UART has TXD/RXD signal wire. Take RS232 for example.

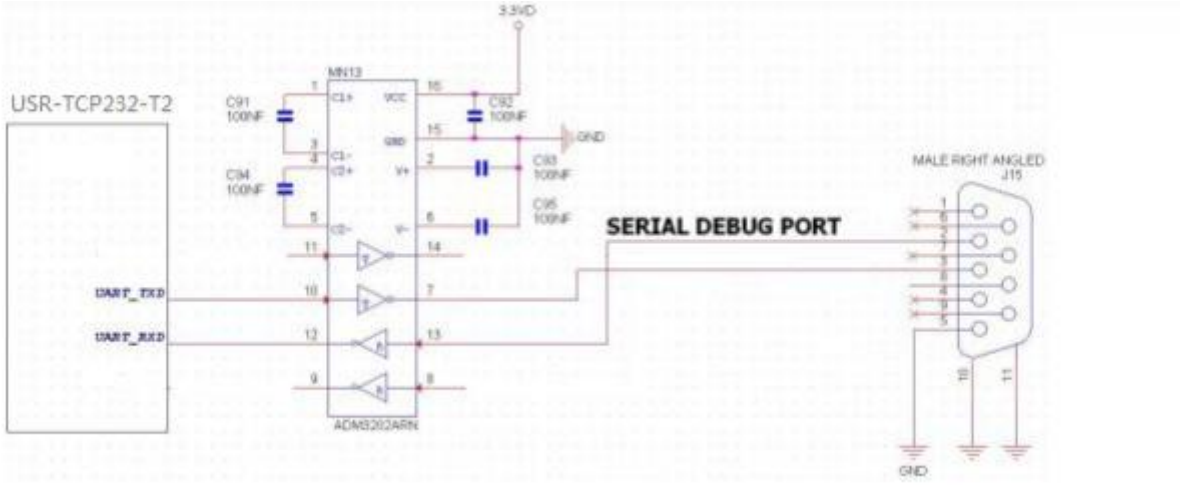


Diagram 3.2.3-1 UART Interface Design

If communicated with MCU (3.3V TTL), connect module's TXD to MCU'S RXD, modules' RXD to MCU'S TXD. If MCU 5V TTL, need voltage conversion circuit, as follows:

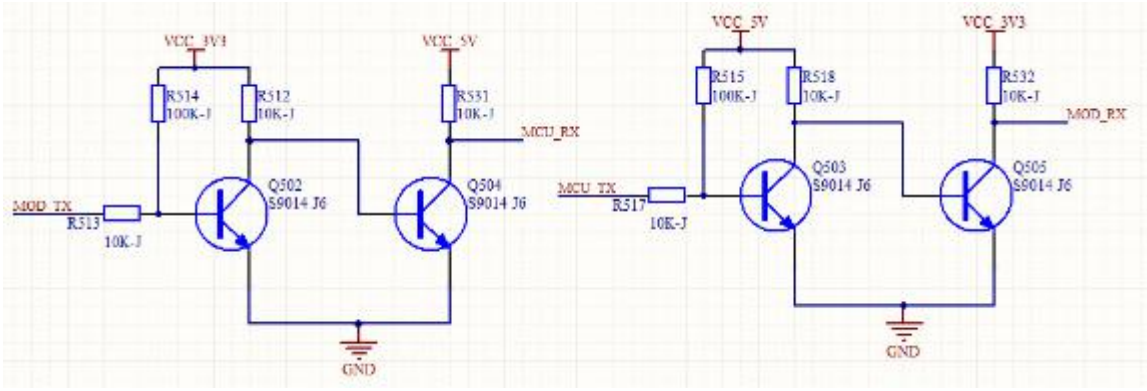


Diagram 3.2.3-2 UART Level Switch Design

4. Module Function

4.1 Work Model

4.1.1. TCP Client Model

1) Under TCP Client Model, T2 connects TCP Server actively, establish a long connection to data transparent transmission.

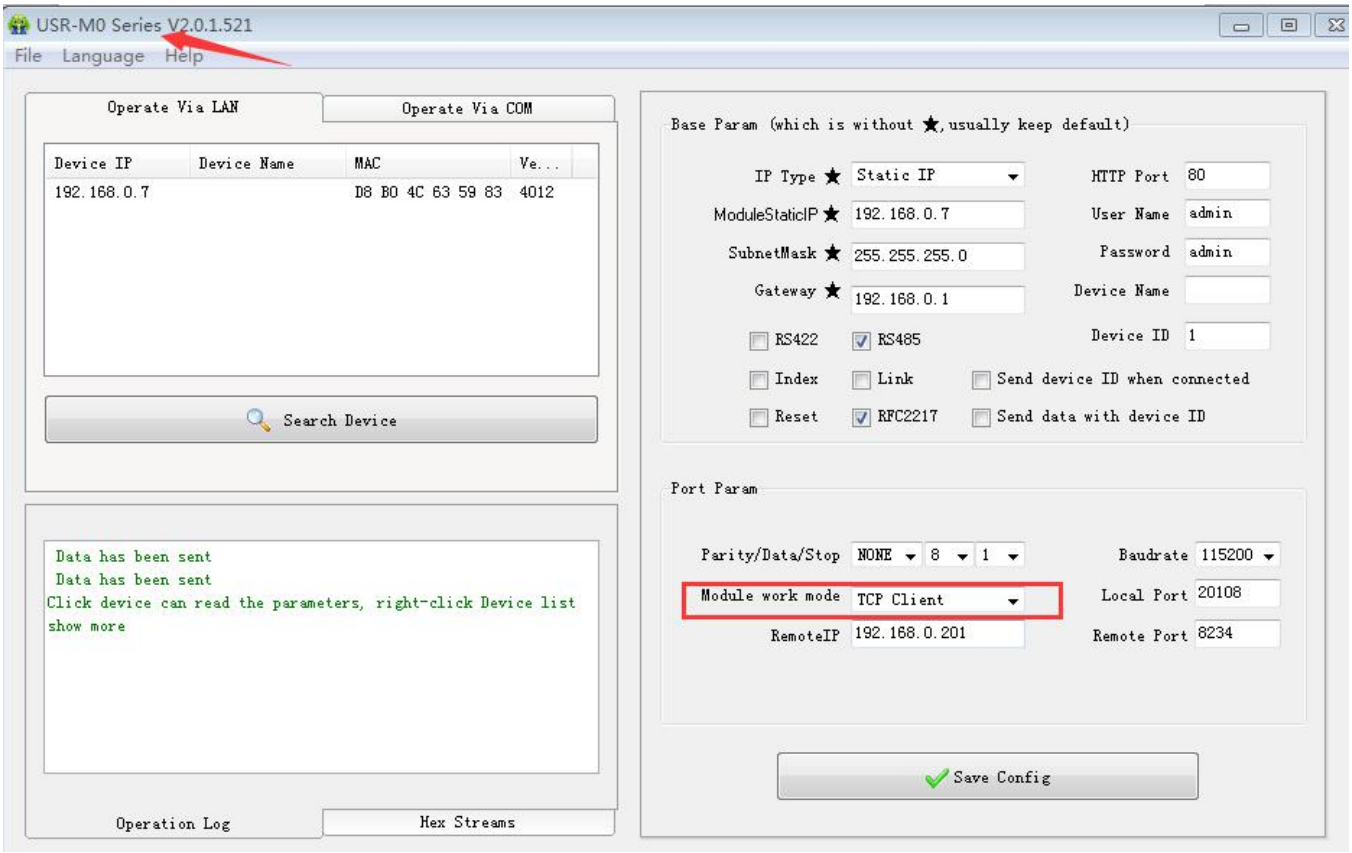


Diagram 4.1.1-1 TCP Client Setting

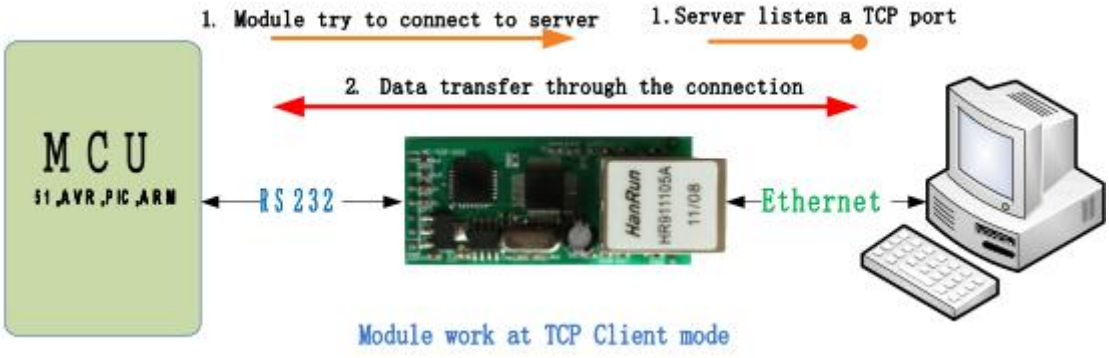


Diagram 4.1.1-2 TCP Client Model

4.1.2. TCP Server Model

1) Under TCP Server Model, T2 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, T2 serial port will send data to all the devices which connect to the link.

2) Under TCP Server Model, TCP Client number: 1-16, default value 4.

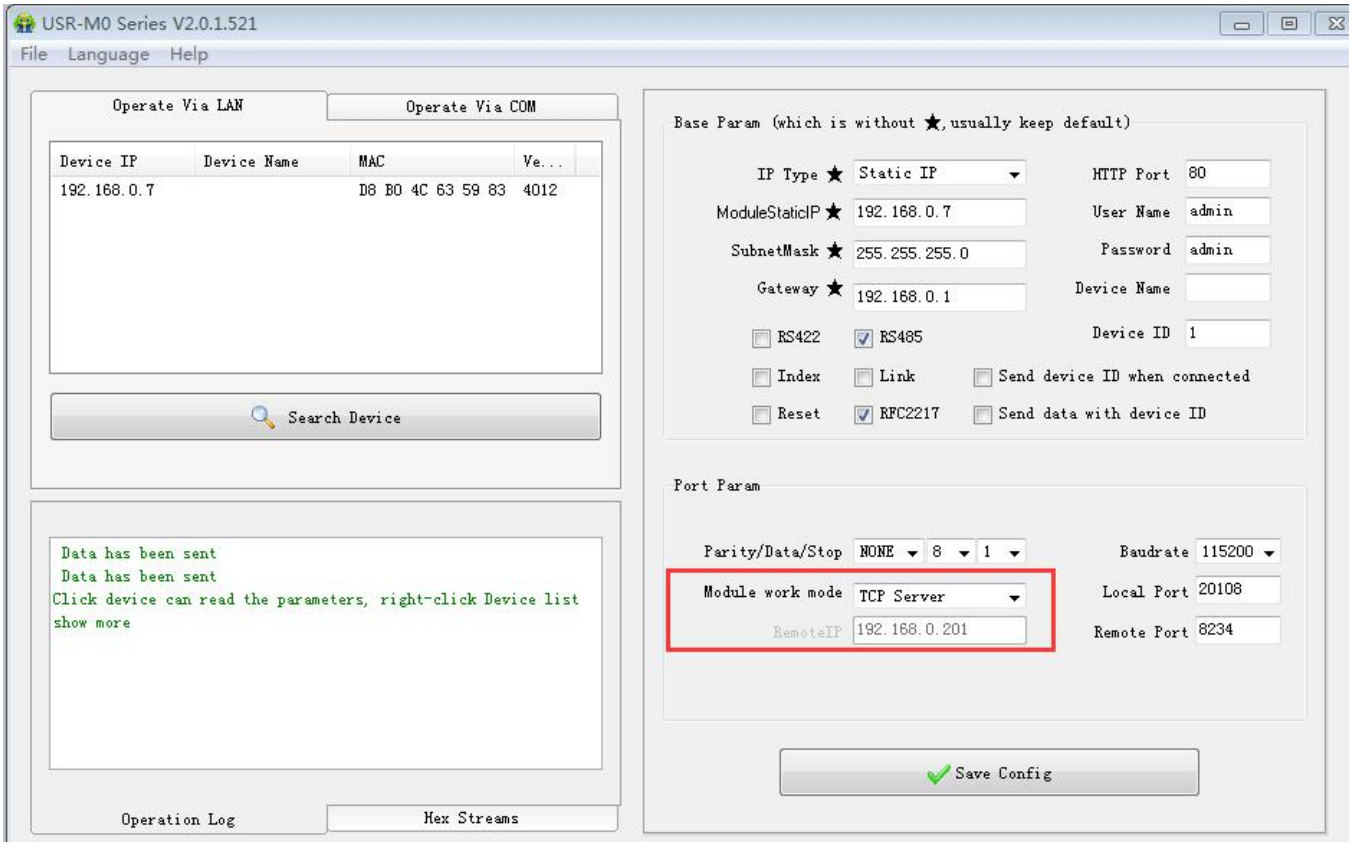


Diagram 4.1.2-1 TCP Server Setting

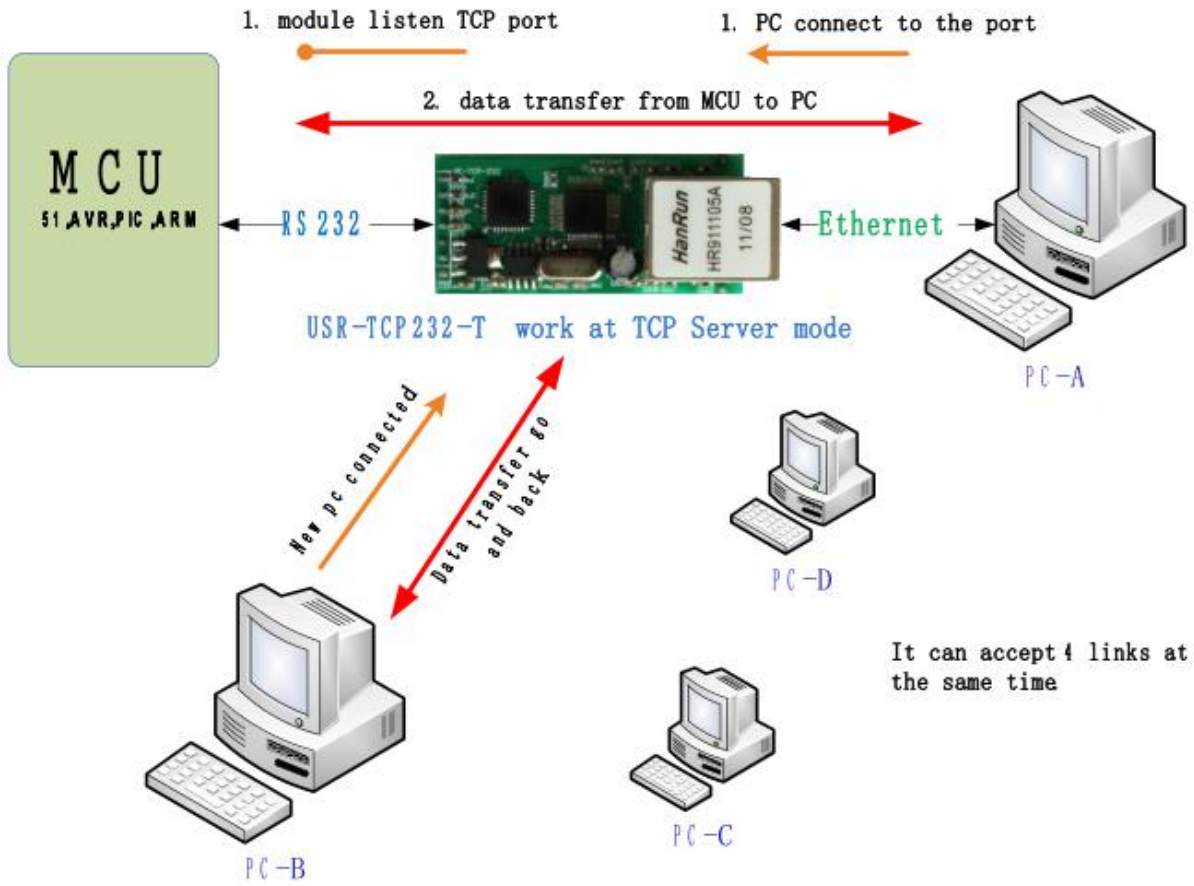


Diagram 4.1.2-2 TCP Server Model

4.1.3. UDP Client Model

1) Under UDP Client, Module T2 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 T2.

2) Under UDP Client, if target IP is set as 255.255.255.255, it can realize function of broadcast, also can receive broadcast data.

3) Under UDP Client, maximum data length is 1460 (MCU to T2)

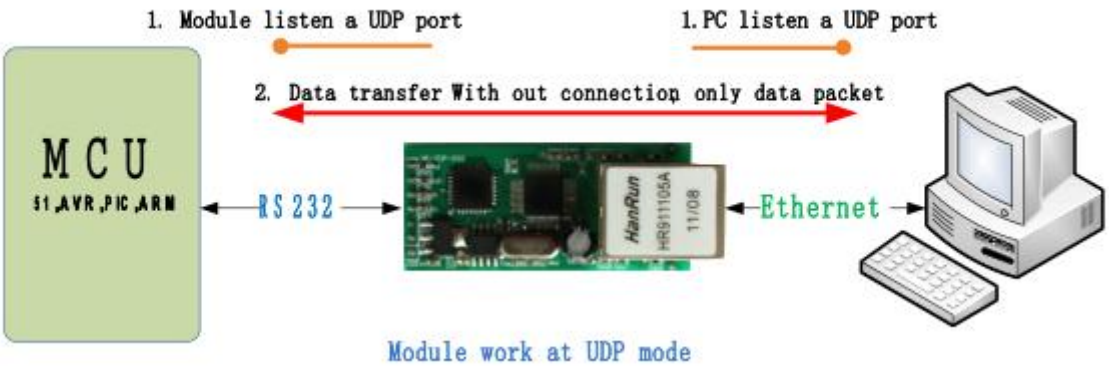


Diagram 4.1.3-1 UDP Client Model

4.1.4. UDP Server Model

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) Under UDP Server, T2 module record an IP, when T2 receives data, it send to record IP. T2 also works as a server, can receive data from Ethernet, convert target IP to data source IP.

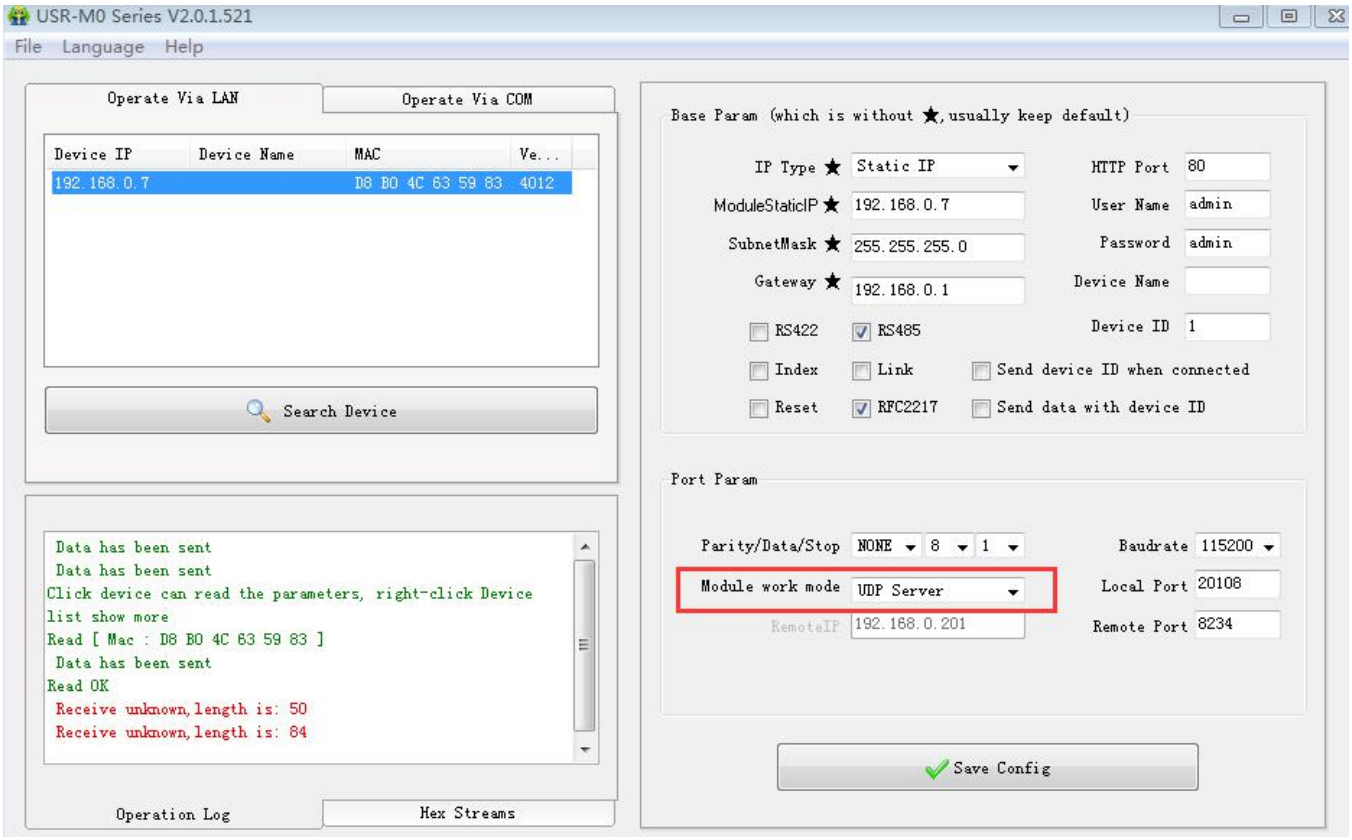


Diagram 4.1.4-1 UDP Server Setting

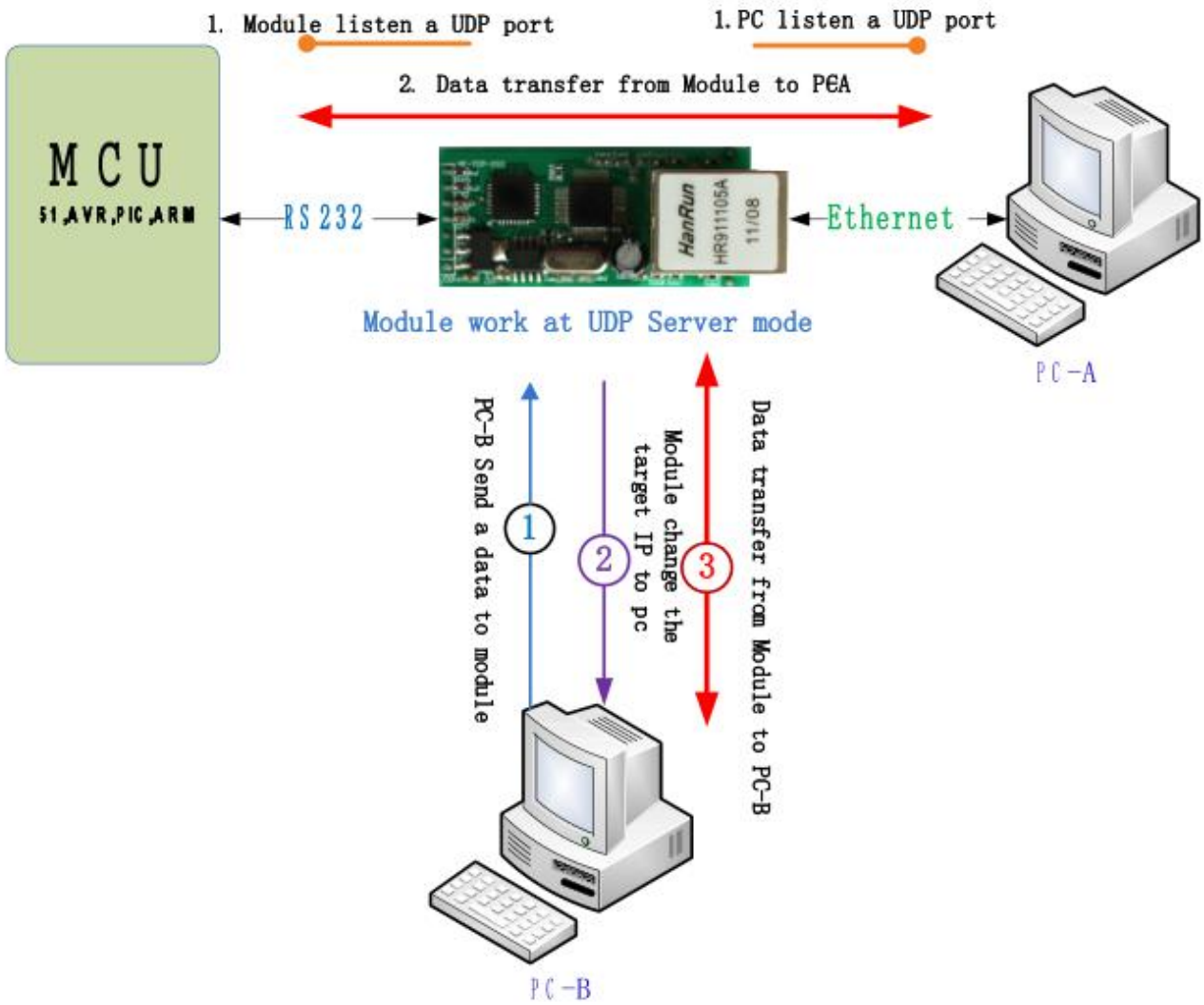


Diagram 4.1.4-2 UDP Server Model

4.1.5. HTTPD Client

This function is used for developer.

1) Module T2 send data to HTTP Server or receive from HTTP Server, complex HTTP protocol will be done by T2, it is convenient for user to programming.
2) T2 received data from HTTP Server will send to serial port without process.
3) According to demand, user can define HTTP content.

4.1.6. TCP VS UDP

	TCP	UDP
Advantages	Stable; Not easy to lose data package; Reliable connection mechanism;	Transmission interval is accurate; No connection mechanism; Easy and flexible;
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

4.2. 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 for you.

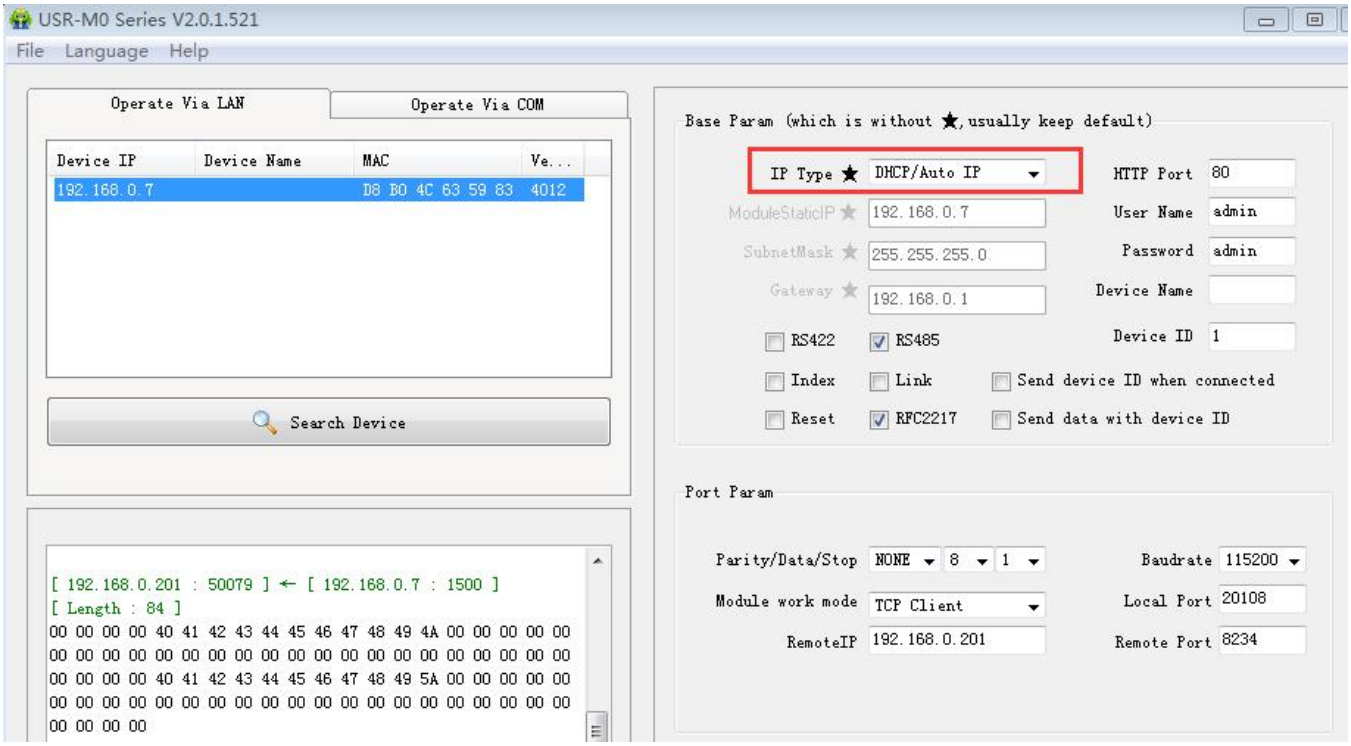


Diagram 4.2-1 DHCP

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.

Note: when use NDS function, T2 gateway must be same as router IP or choose DHCP function.

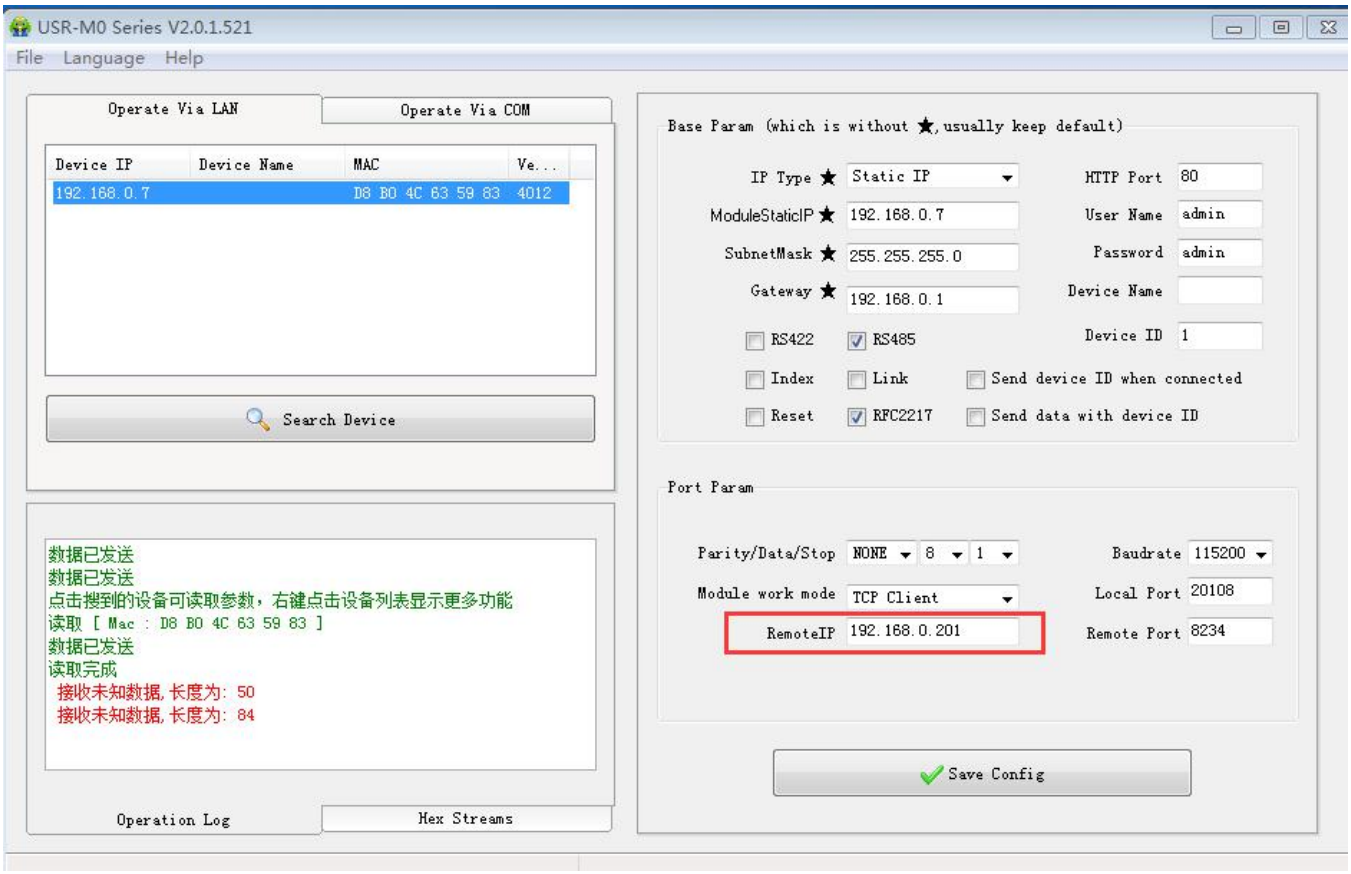


Diagram 4.2-2 DNS

4.3. 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 choose "Search"or "Smart vcom" to create virtual port. **Please refer to 4.3.3**

4.3.1. Module Works as Client

1) Set module parameters. T2 work model: TCP Client.

2) Open USR-VCOM, set virtual port as follows :

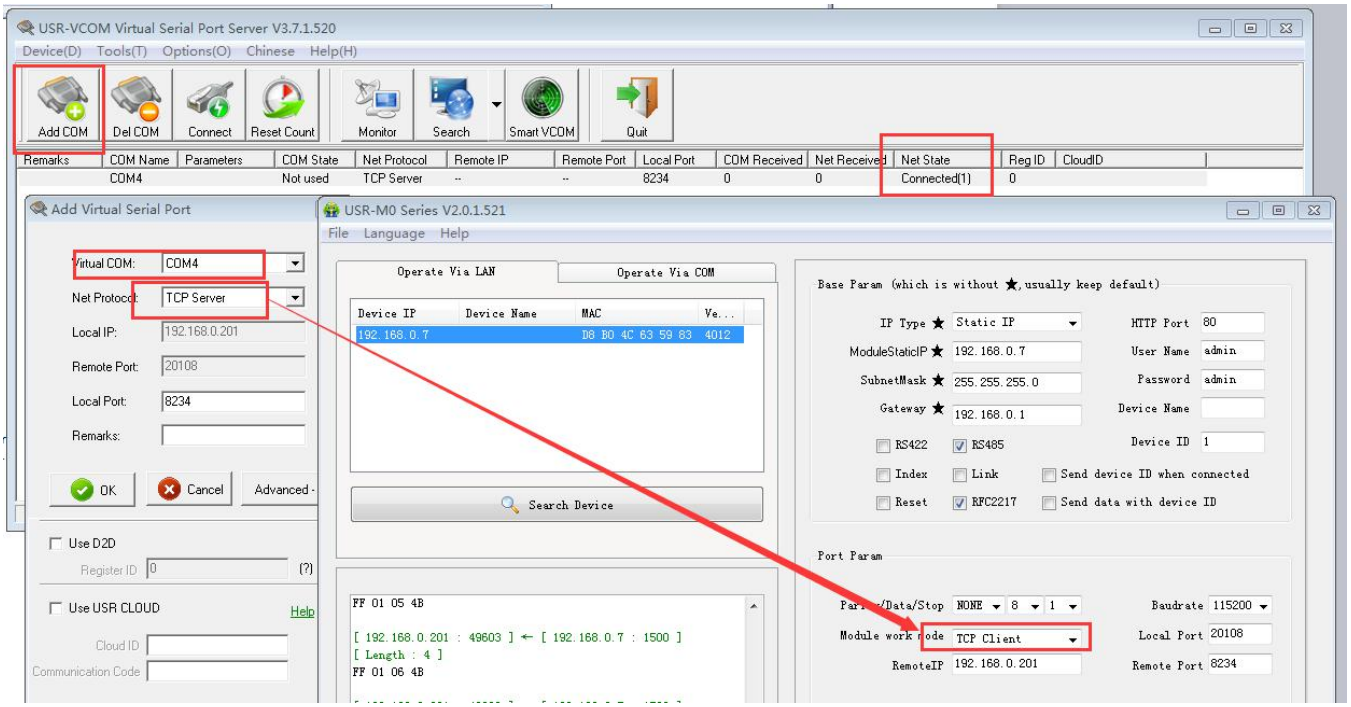


Diagram 4.3.1-1 Create Server Virtual Port

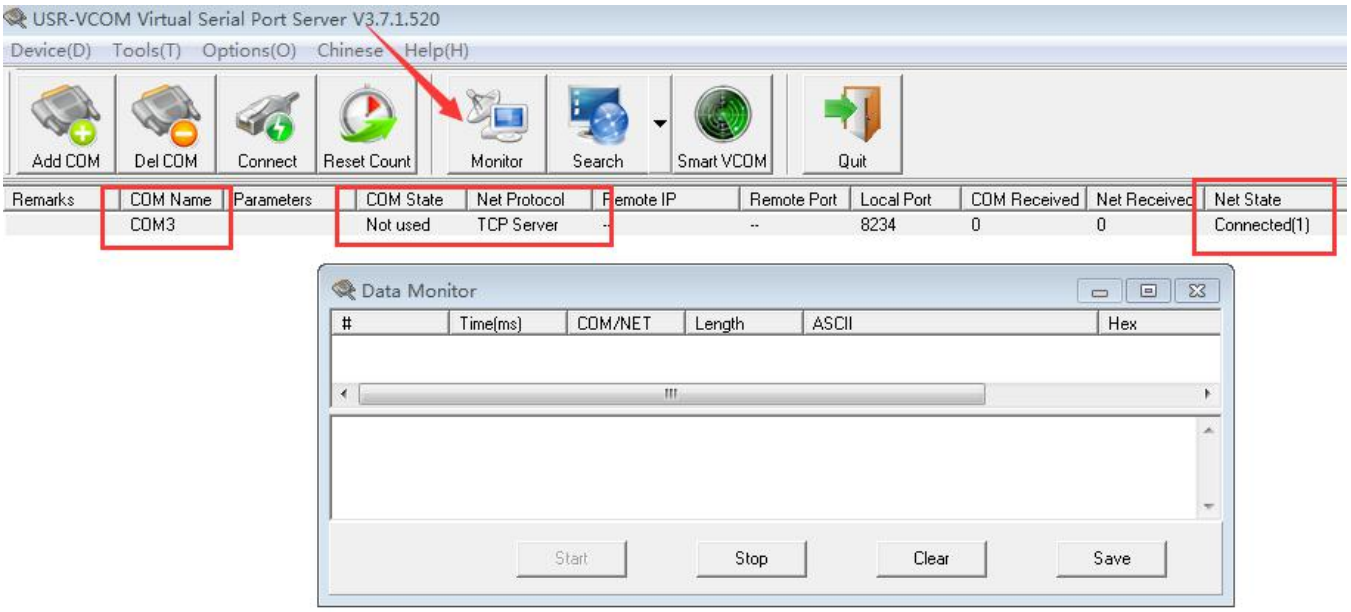


Diagram 4.3.1-2 Monitor Date

4.3.2. Module Works as Server

1) Set T2 work model: TCP Server.
2) Set virtual port as follows:

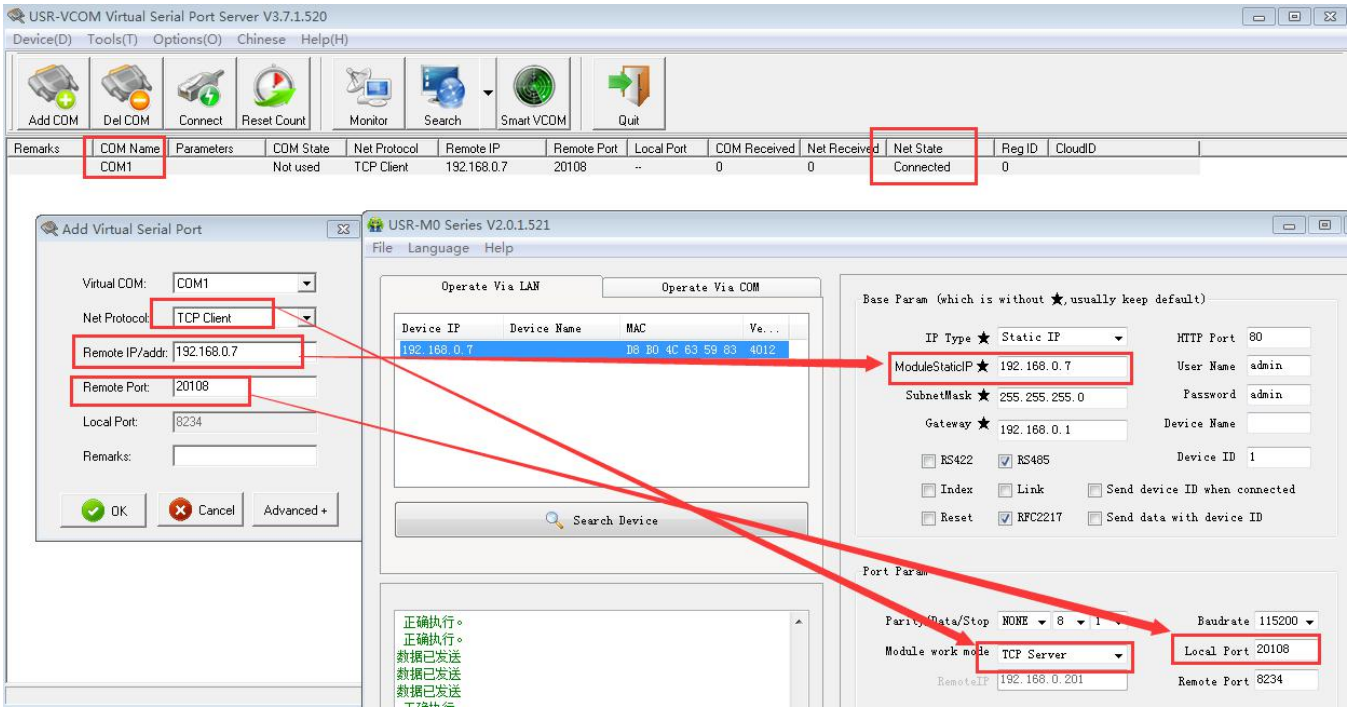


Diagram 4.3.2-1 Create Client Virtual Port

4.3.3. Create VCOM

1) Create VCOM by “search” button.

Diagram 4.3.3-1 Search Function

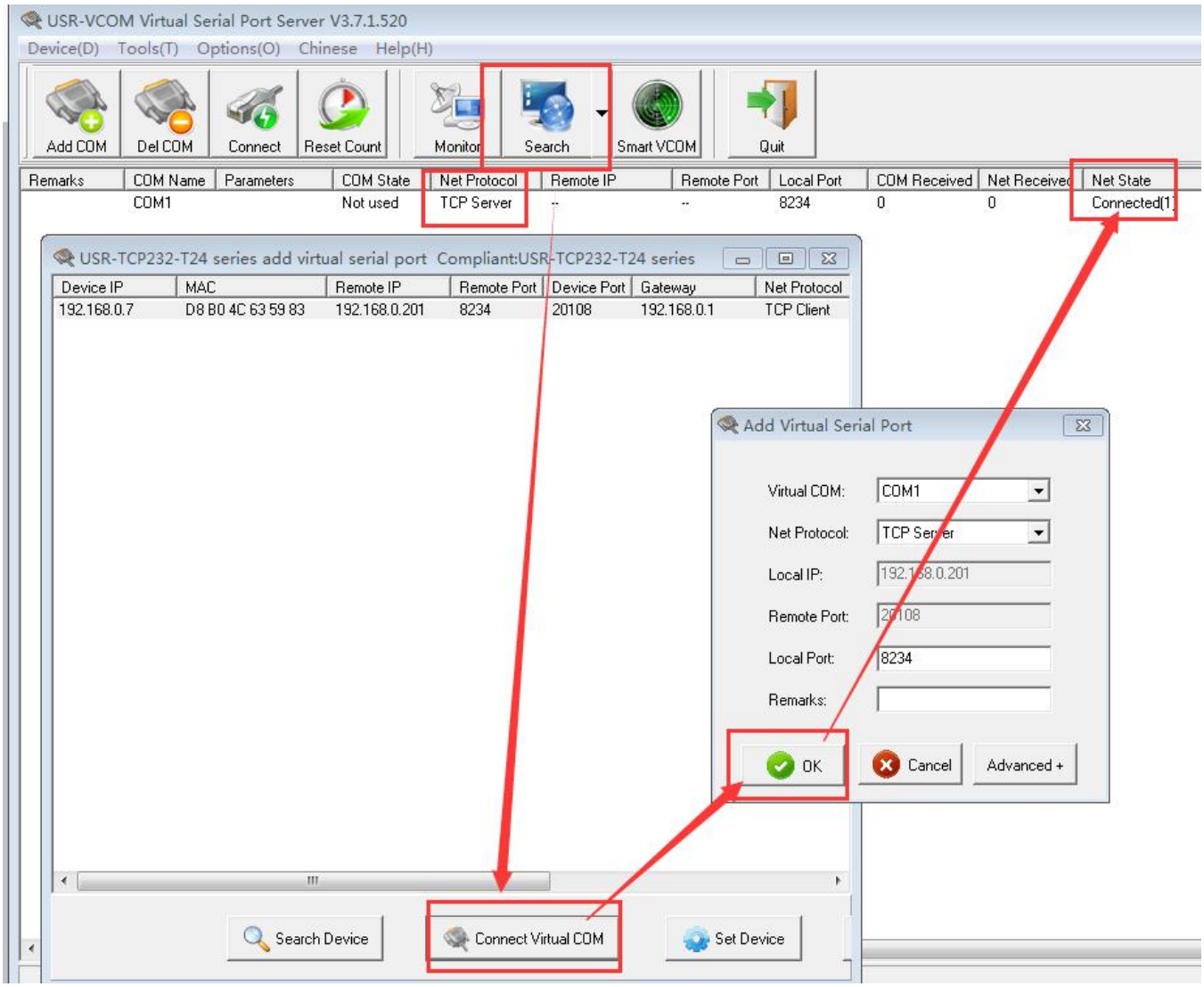


Diagram 4.3.3-2 Search Function

2) Automatically Create

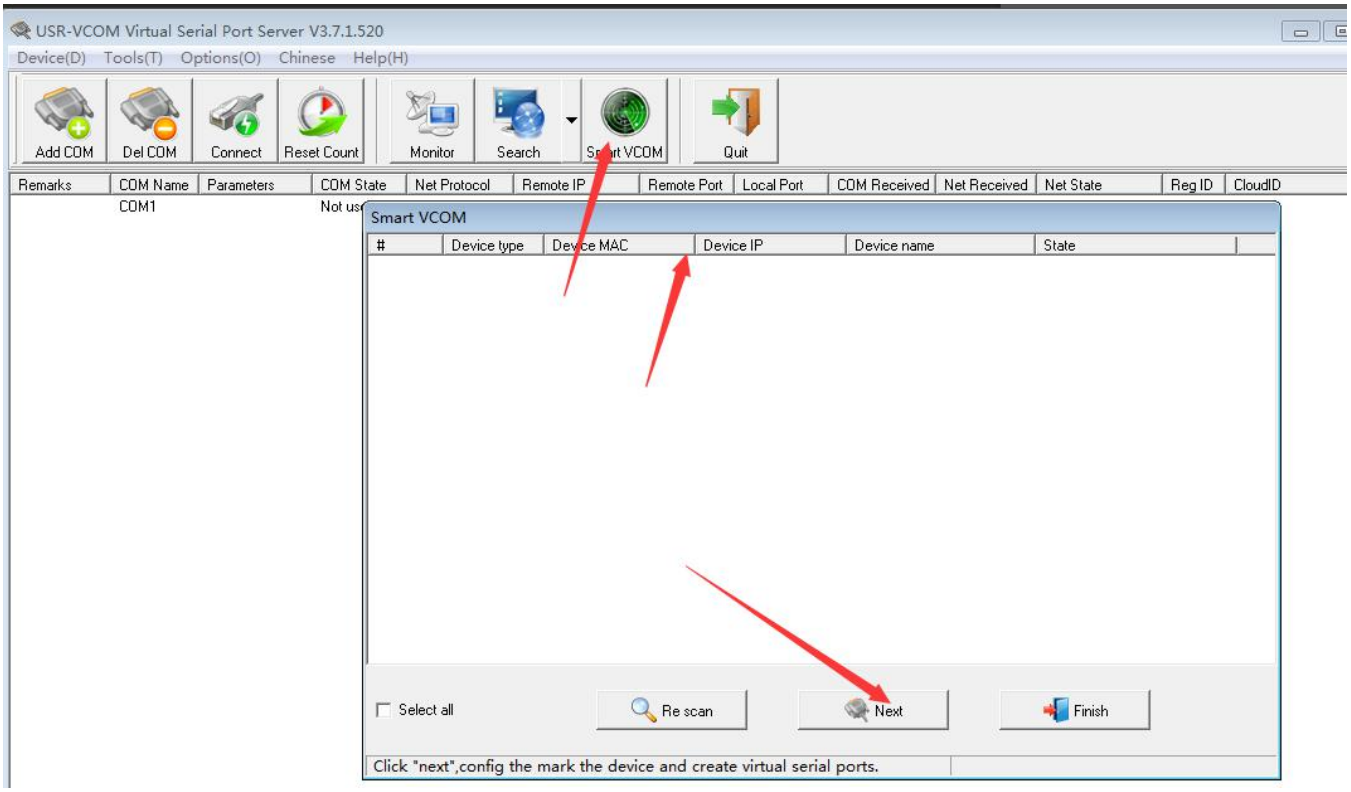


Diagram 4.3.3-1 Smart VCOM

4.4. Special Function

4.4.1. RS485 Function

T2 reserved 485 pin, this function can be set by software, won't effect RS232 communication.

4.4.2. 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 T2 is under TCP model, Link pin will pull down.
When T2 is under DUP model, Link pin will always pull down.

4.4.3. 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) AT Demand: AT+ clear.

4.4.4. Reset Function

When T2 works as TCP Client, T2 connects to TCP Server actively. When start Reset function, T2 try to

connect to TCP Server for 30 times. If failed, T2 will restart automatically. By default, it won't be chose.

4.4.5. ID Function

When T2 works as TCP Client, it send module ID or carry ID, T2 ID is decimal .1-65535 (ID function and transparent transmission can't work at same time)

4.4.6. Index Function

When T2 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.

4.4.7. Firmware Upgrade

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

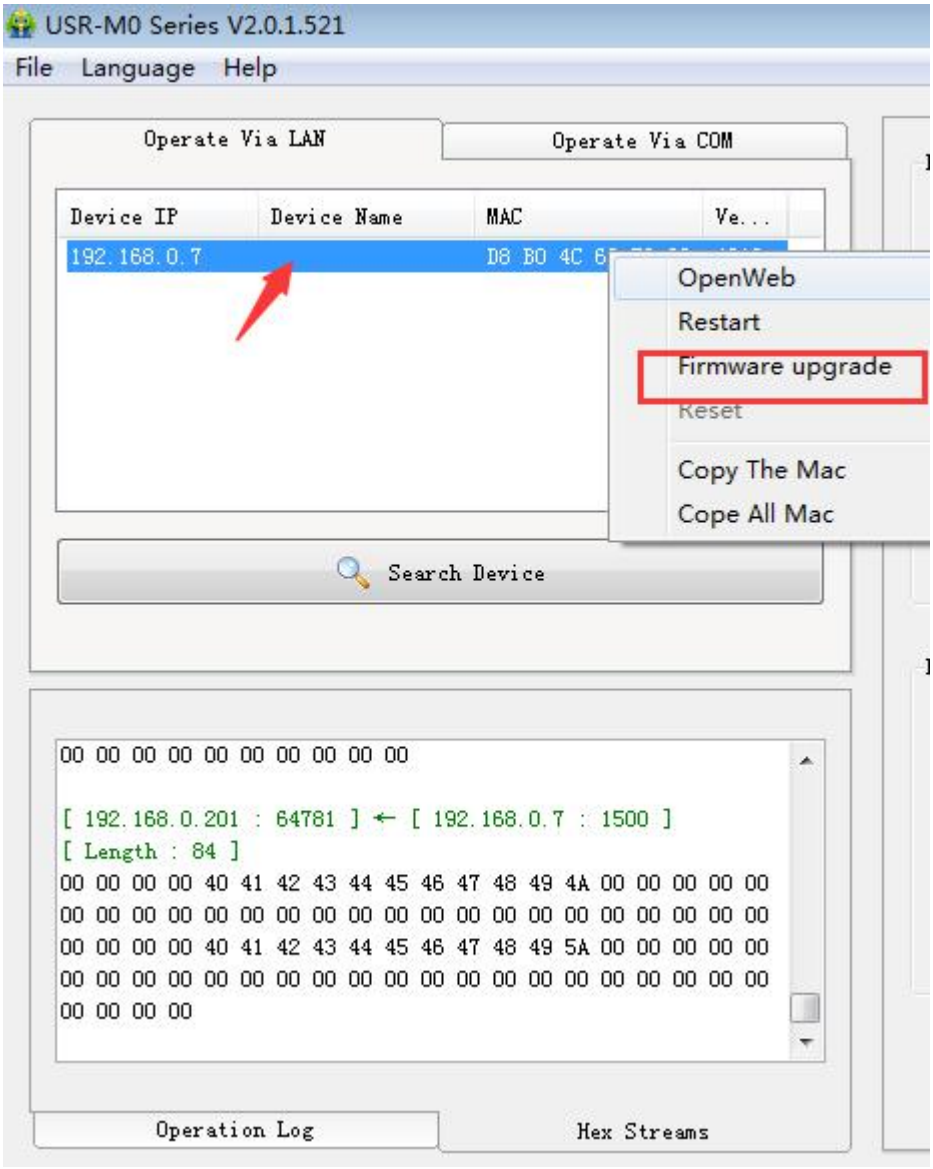


Diagram 4.1.7-1 Firmware Update

5. Parameter Setting

5.1. Webpage Setting

5.1.1. Log in

Open a browser, type 192.168.07 , Name and password：admin
User can also log in by software.

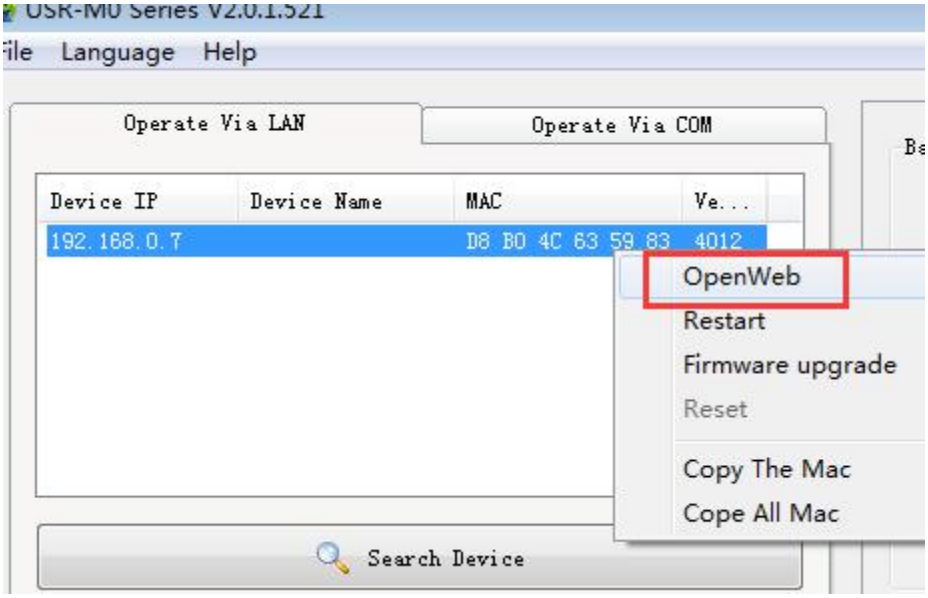


Diagram 5.1.1-1 Open Web

5.1.2. State Configuration

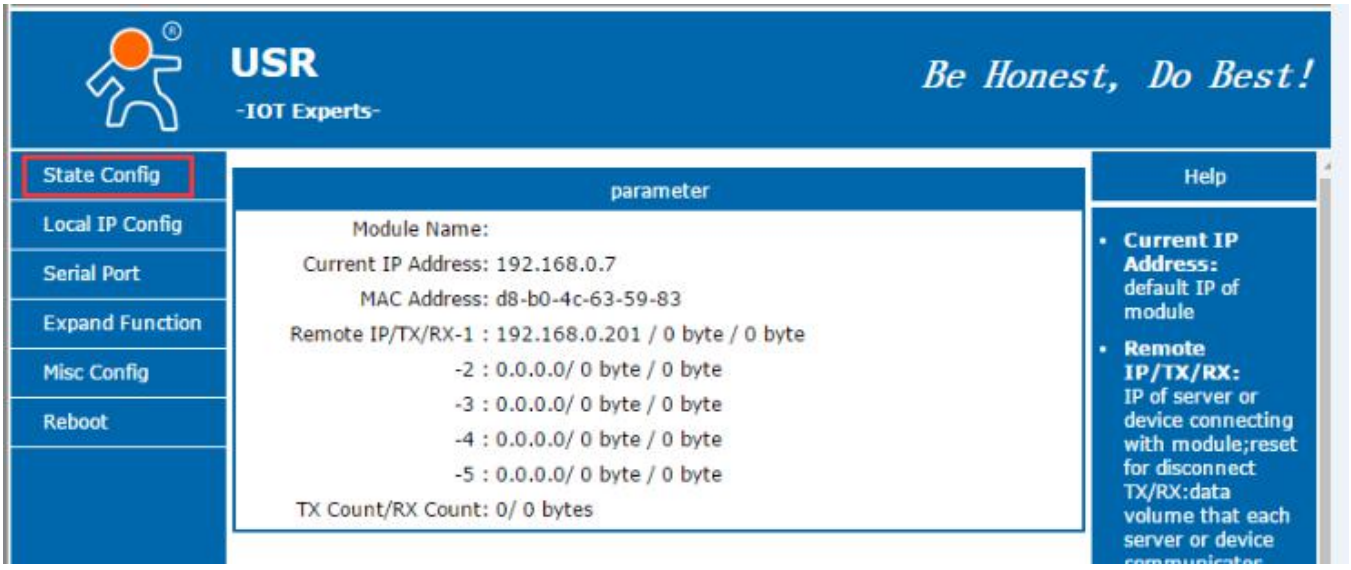


Diagram 5.1.2-1 State Configuration

5.1.3. Local IP

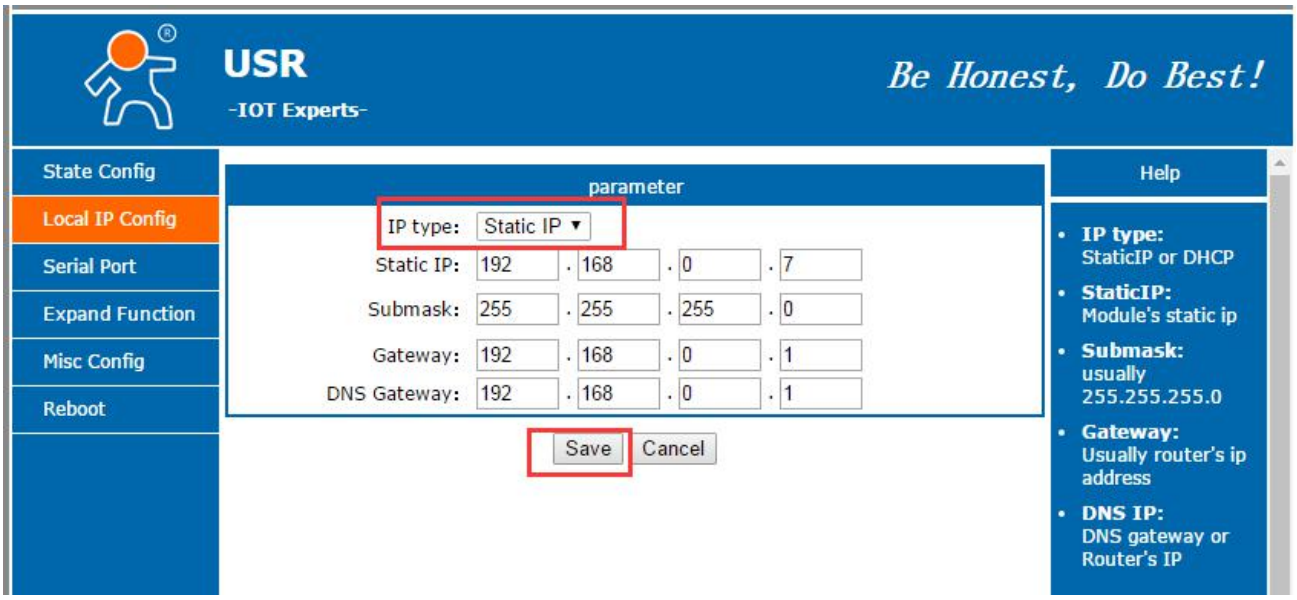


Diagram 5.1.3-1 Local IP

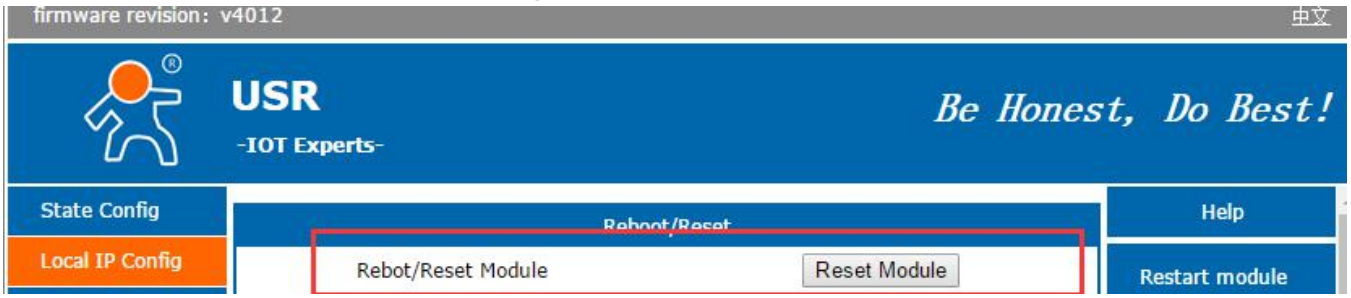


Diagram 5.1.3-2 Local IP

5.1.4. Serial Port

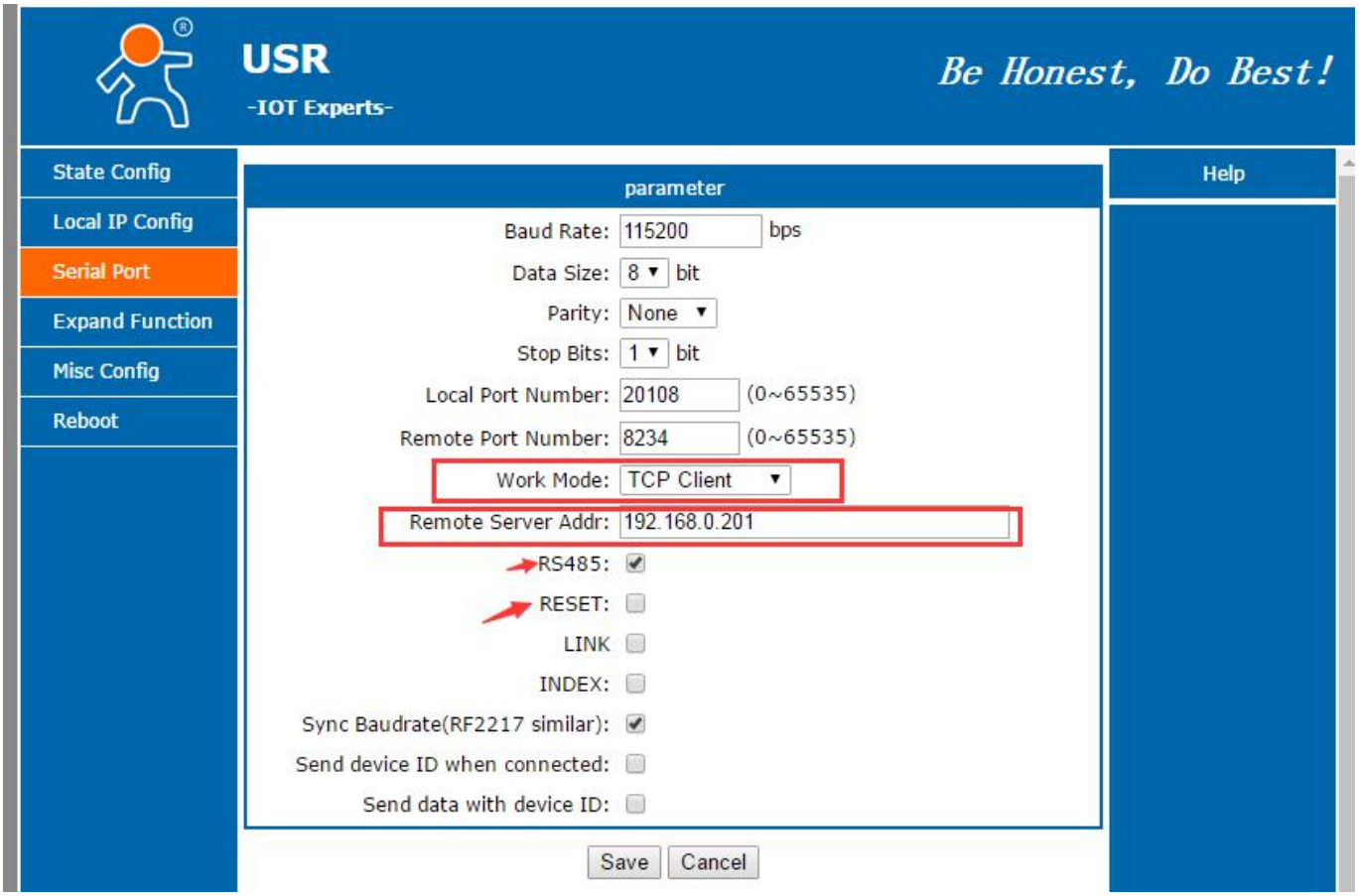


Diagram 5.1.4-1 Serial Port

5.1.5. Expand Function

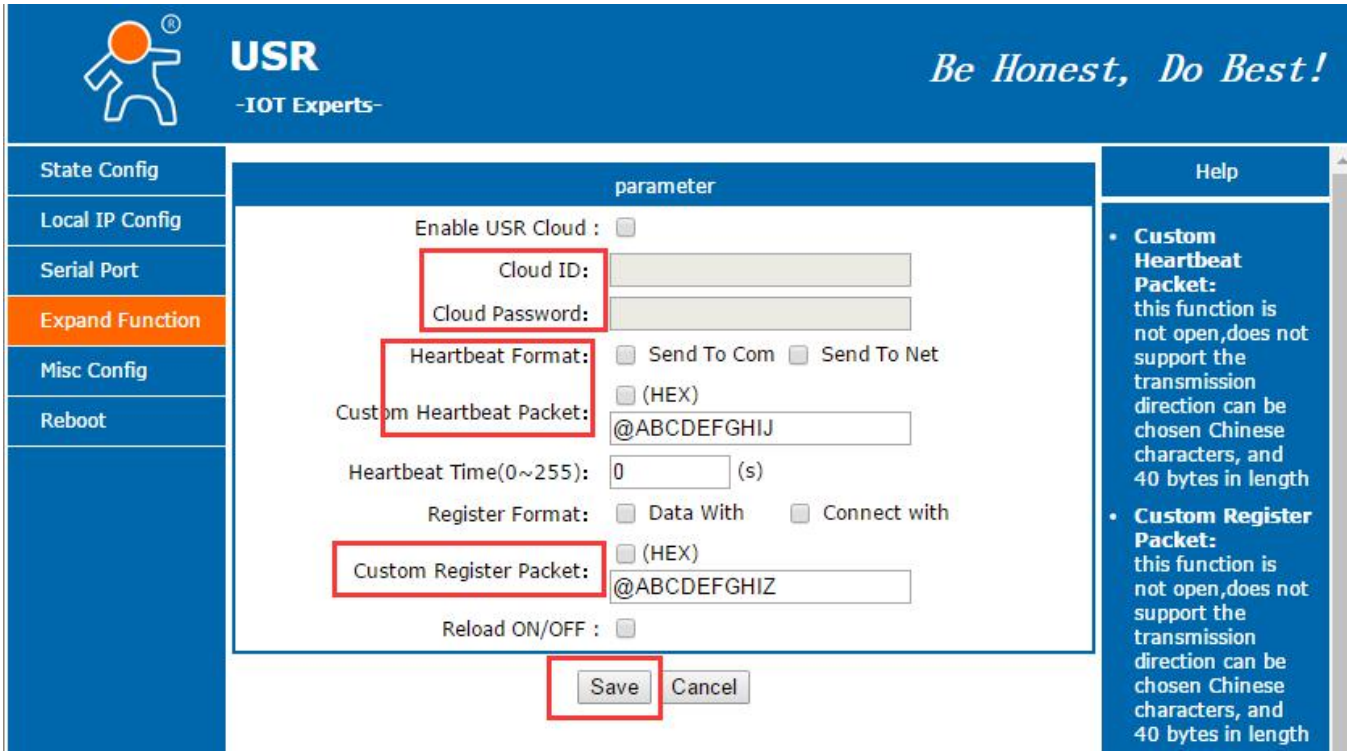


Diagram 5.1.5-1 Expand Function

5.1.6. Misc Configuration

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

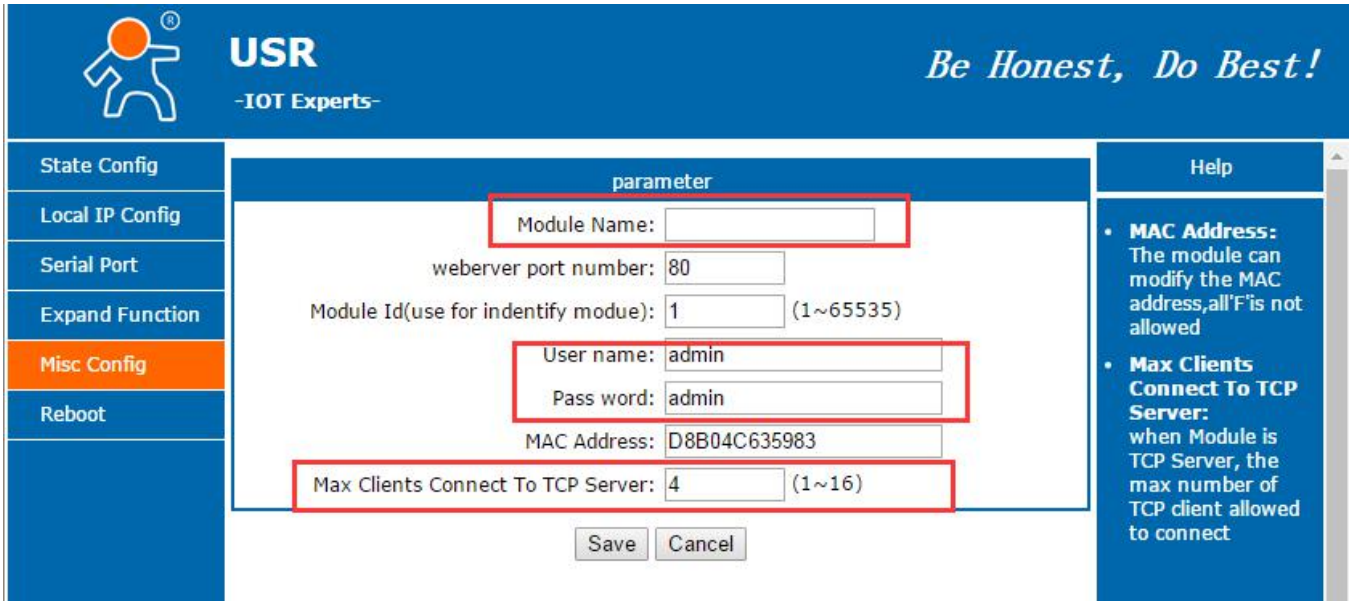


Diagram 5.1.6-1 Misc Setting

5.1.7. Reboot

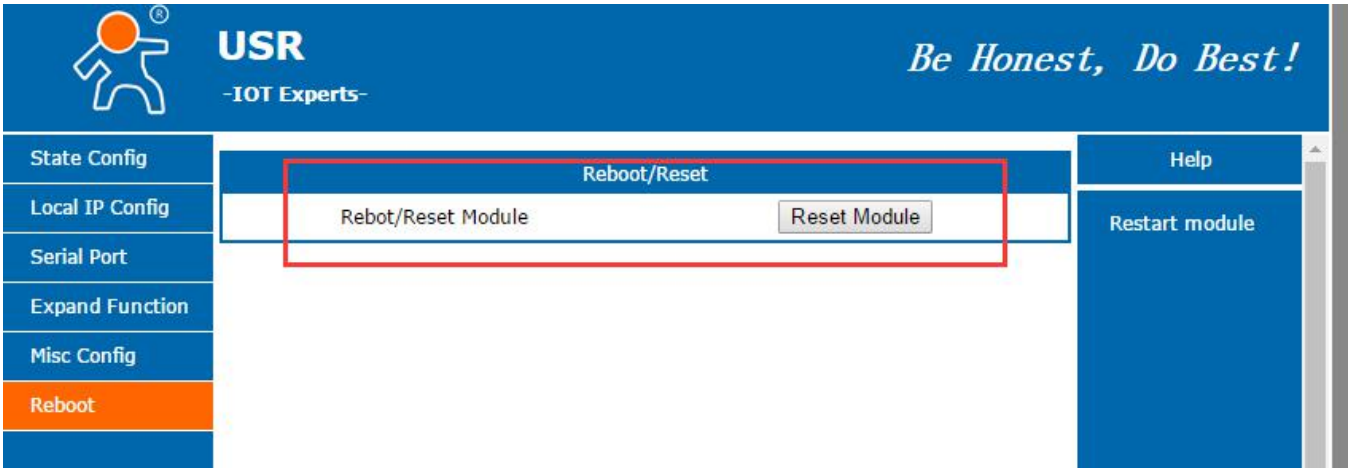


Diagram 5.1.7-1 Reboot Setting

5.2. Software Setting

1) Search device

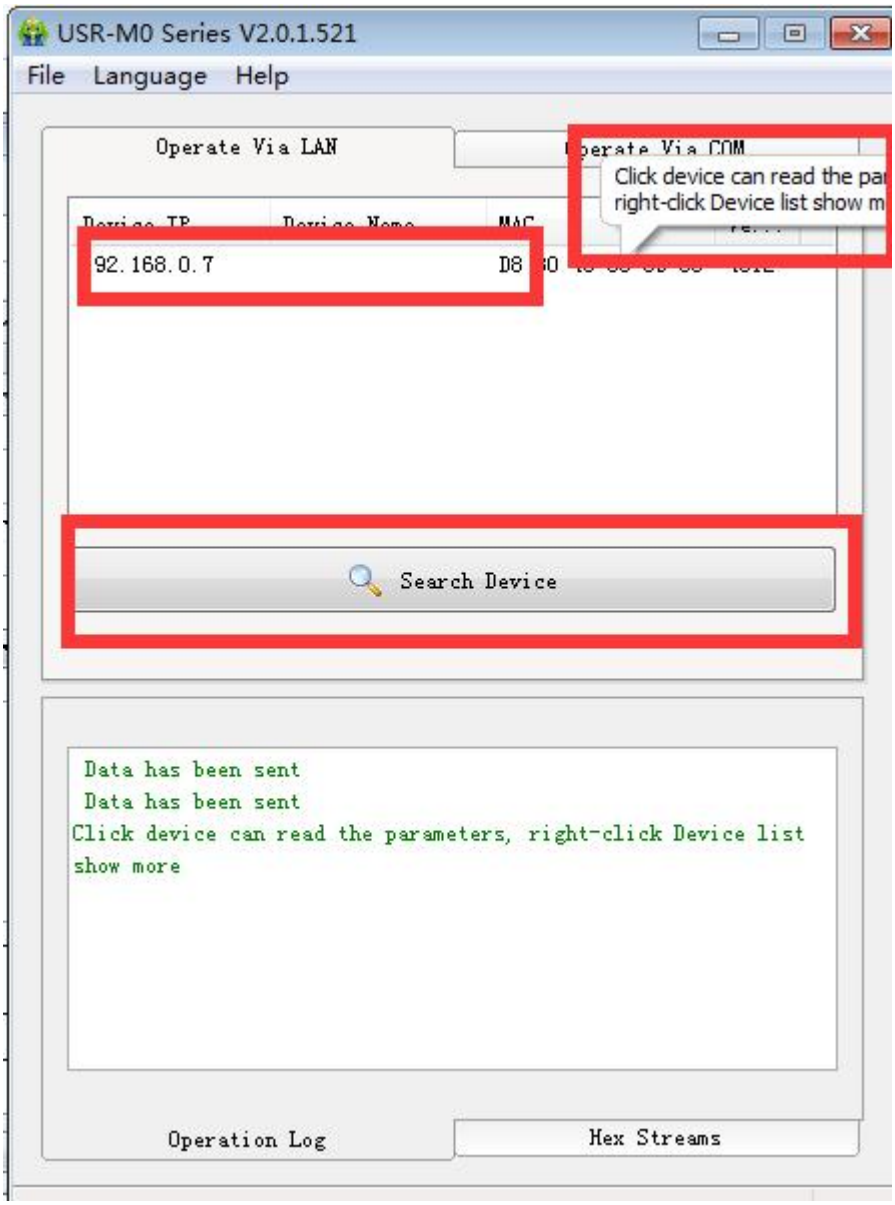


Diagram 5.2-1 Search

2) Set parameters

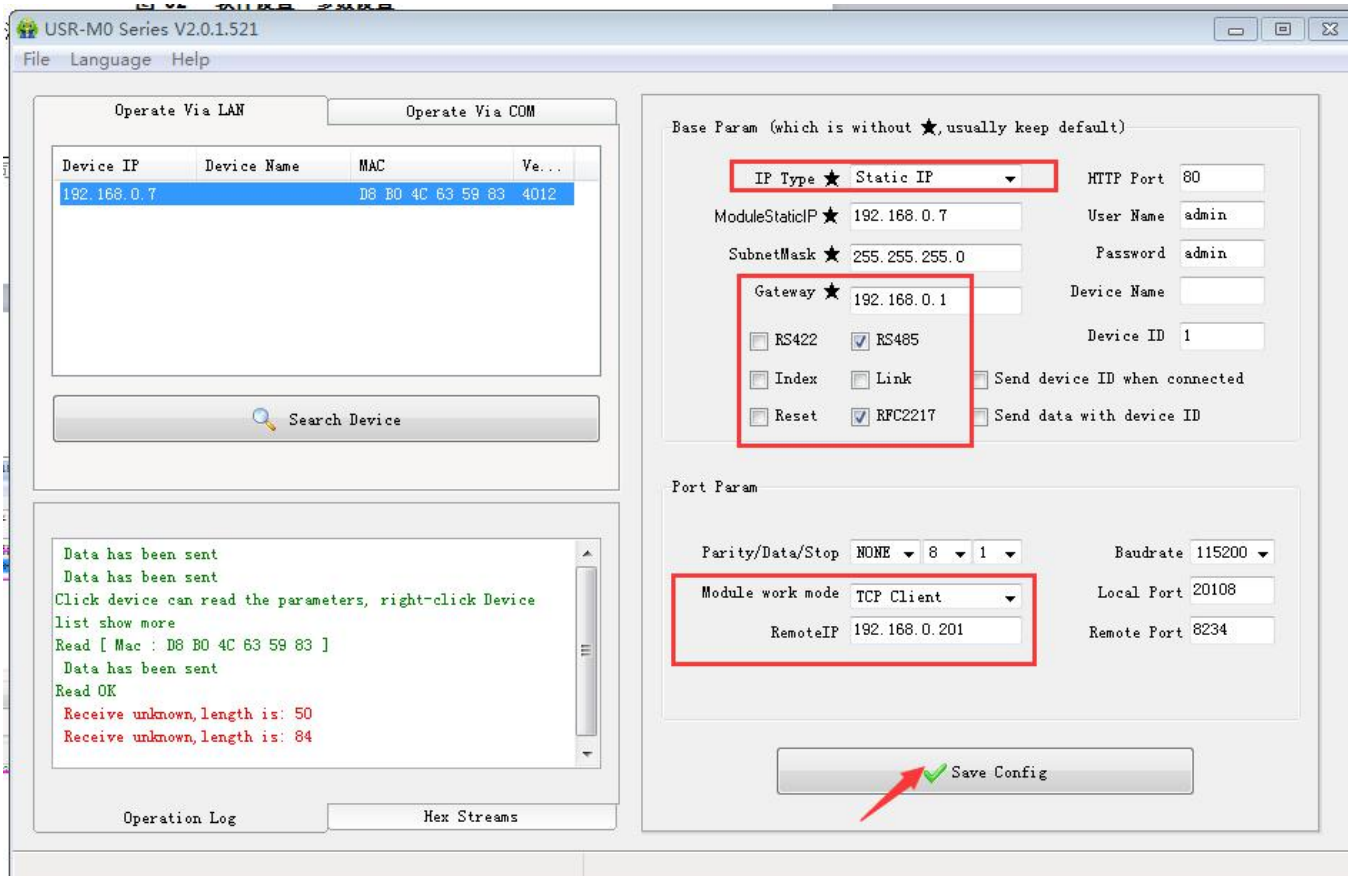


Diagram 5.2-2 Parameter setting

3) Check data

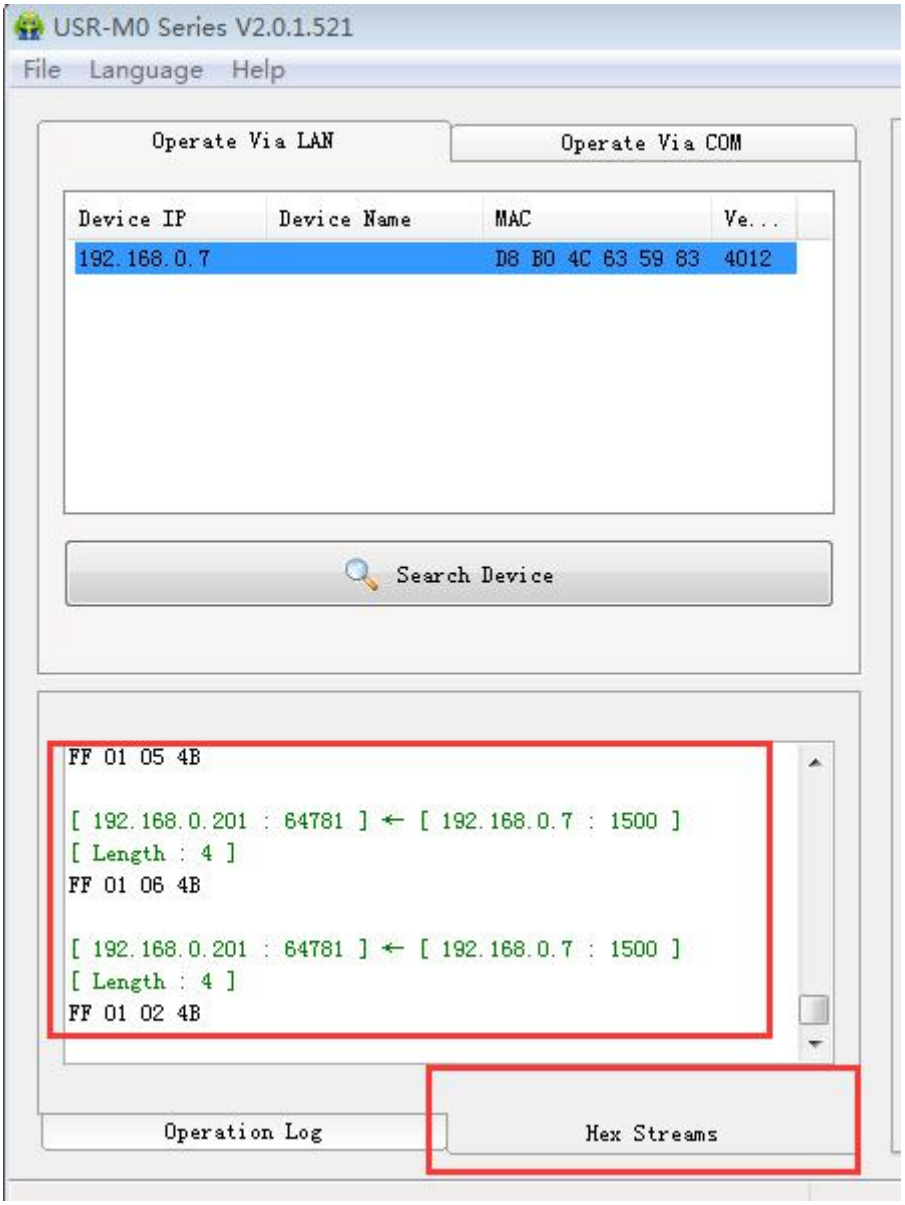


Diagram 5.2-3 Check Streams

4) Press CFG (Reload) and click “operate via COM”

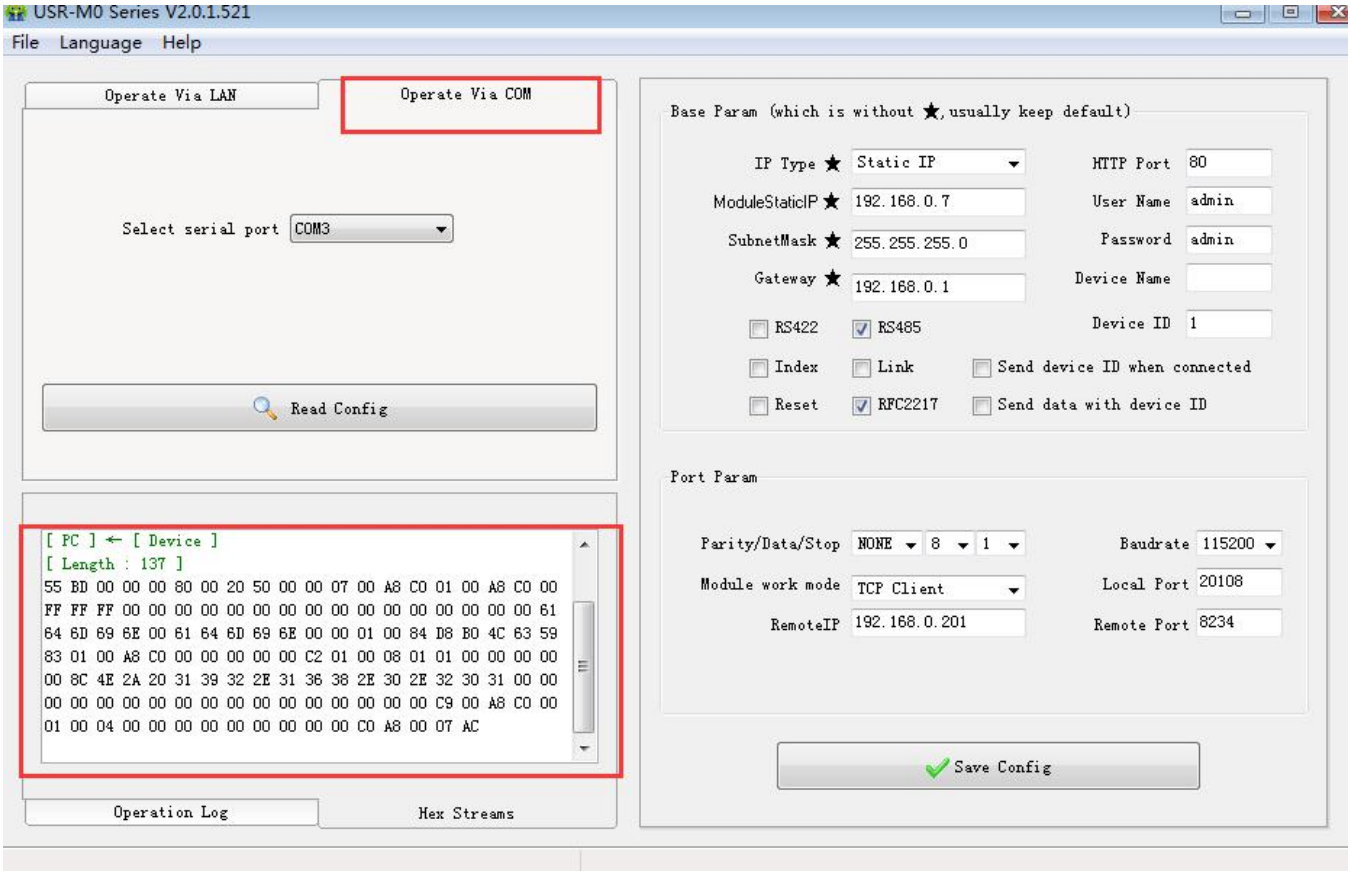


Diagram 5.2-4 Port Setting

5.3. AT Command

5.3.1. AT Command Model

1) Send +++ to T2 module from serial port, T2 send ”a “
2) Send “a” in 3s after receiving “a”.
3) T2 return to + OK , enter into AT Demand Model.

5.3.2. AT Command Set

5.3.2.1. AT +ENTM

Function: enter into transparent transmission
Format:

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

5.3.2.2. AT+Z

Function: restart module
Format :
Set
AT+Z<CR>
<CR><LF>+OK<CR><LF>

5.3.2.3. AT+MAC

Function: query module MAC
Format:
Query
AT+MAC<CR>
<CR><LF>+OK=<MAC><CR><LF>

5.3.2.4. AT+CLEAR

Function: factory default
Format:
Set
AT+CLEAR<CR>
<CR><LF>+OK<CR><LF>

5.3.2.5. AT+WANN

Function: set/query WAN IP
Format:
Query:
AT+WANN<CR>
<CR><LF>+OK=<mode,address,mask,gateway><CR><LF>
Set:
AT+WANN=<mode,address,mask,gateway><CR>
<CR><LF>+OK<CR><LF>

6. Contact Information

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7. Disclaimer

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8. Undated History

V 1.0 2016-4-29 First Version