

USR-TCP232-302 User Manual

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Features

- 10/100Mbps Ethernet port, support Auto-MDI/MDIX.
- Support TCP Server, TCP Client, UDP Client, UDP Server, HTTPD Client.
- Support Baud rate from 600bps to 230.4bps; Support None, Odd, Even, Mark, Space.
- Support heartbeat packet and identity packet.
- Support web server, AT command and setup software to configure module.
- Support timeout reset function.
- Support TCP Client non-persistent function.
- Support DHCP/Static IP.
- Support software/hardware reload.
- Support virtual serial port with USR-VCOM software.

1. Get Start

Product link:

<http://www.usriot.com/p/rs232-to-ethernet-converters/>

Setup software:

<http://www.usriot.com/usr-m0-setup-software/>



Serial RS232 to Ethernet Converters, DHCP/DNS

USR-TCP232-302 is a low-cost serial device server, whose function is to realize bidirectional transparent transmission between RS232 and Ethernet.

Share



- 1 RS232 serial port
- Low Voltage range of 4.75-7v DC
- Data Rates range of 600~230.4kbps



Figure 1 Download Page

If you have any question, please submit it back to customer center: <http://h.usriot.com>

1.1. Application Diagram



Figure 2 Application diagram

1.2. Hardware Design

1.2.1. Hardware Dimensions

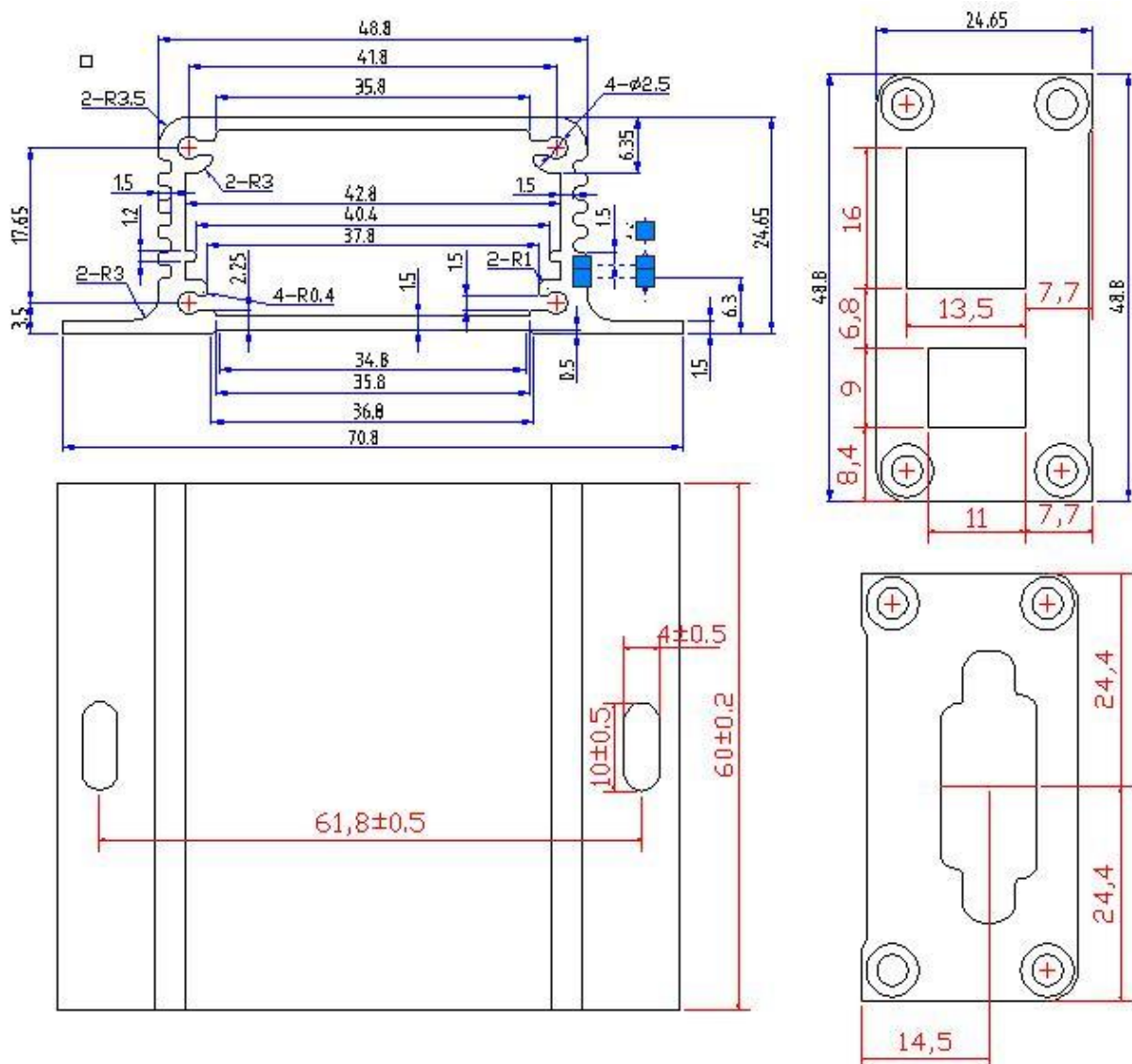
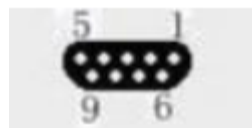


Figure 3 Hardware dimensions

1.2.2. DB9 Pin definition



Pin	2	3	5	1, 4, 6, 7, 8
Definition	TXD	RXD	GND	NC

Figure 4 DB9 Pin

2. Product Functions

This chapter introduces the functions of USR-TCP232-302 as the following diagram shown, you can get an overall knowledge of it.

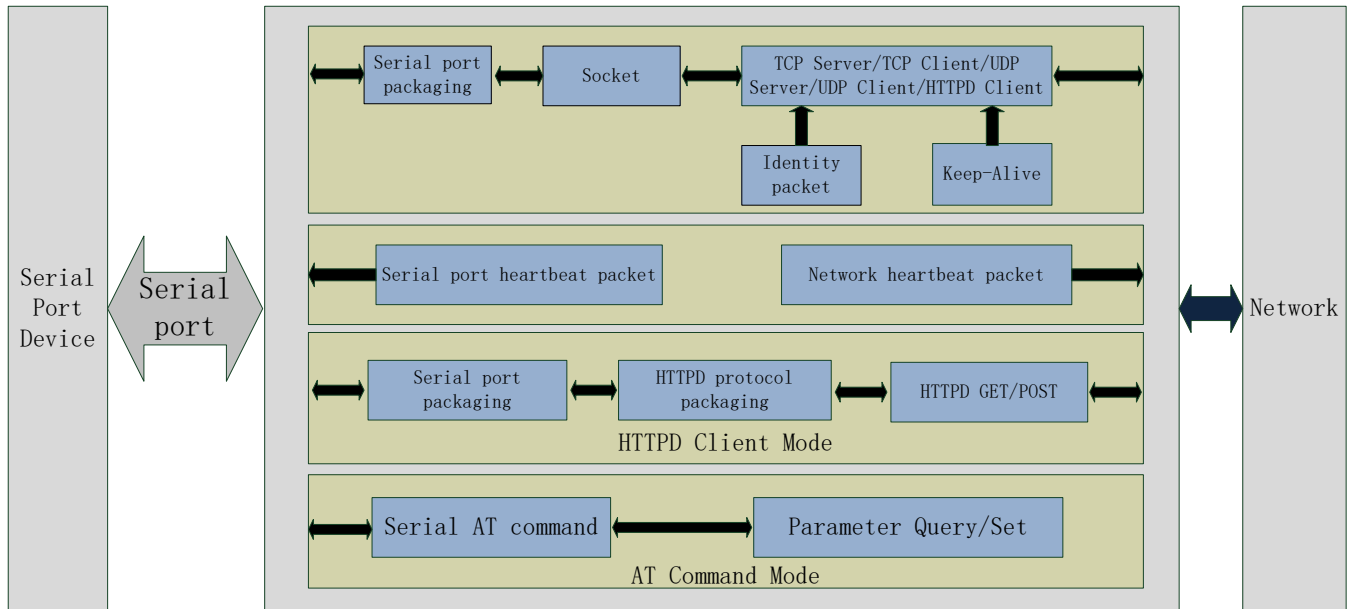


Figure 5 Product Functions diagram

2.1. Basic Functions

2.1.1. Static IP/DHCP

There are two ways for module to get IP address: Static IP and DHCP.

Static IP: Default setting of module is Static IP and default IP is 192.168.0.7. When user set module in Static IP mode, user need set IP, subnet mask and gateway and must pay attention to the relation among IP, subnet mask and gateway.

DHCP: Module in DHCP mode can dynamically get IP, Gateway, and DNS server address from Gateway Host. When user connect directly to PC, module can't be set in DHCP mode. Because common computer does not have the ability to assign IP addresses.

User can change Static IP/DHCP by setup software. Setting diagram as follow:

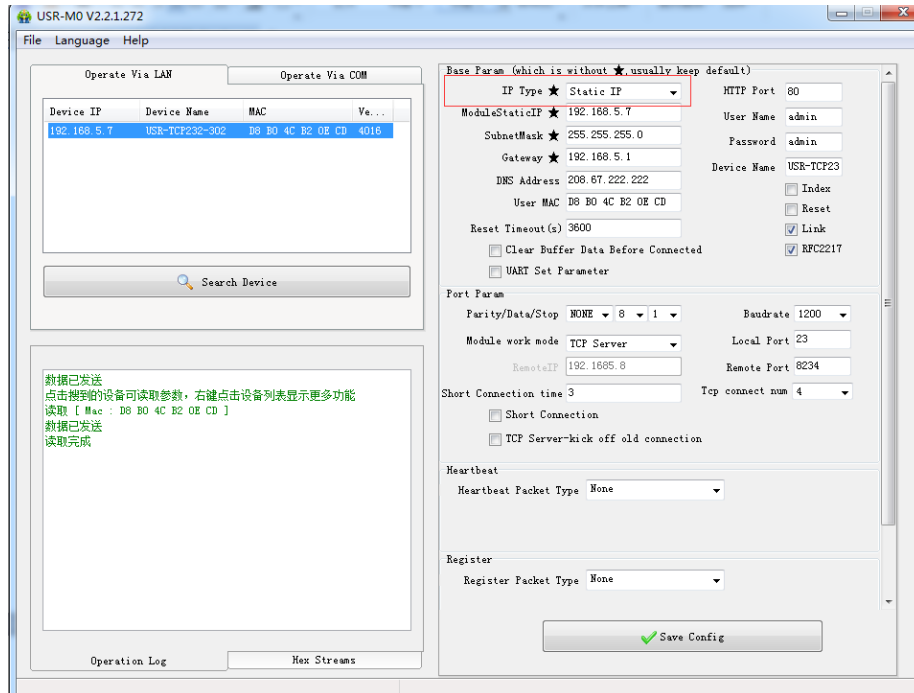


Figure 6 Static IP/DHCP

2.1.2. Restore default settings

Hardware: User can press Reload over 5 seconds and less than 15 seconds then release to restore default settings.

Software: User can use setup software to restore default settings.

AT command: User can enter AT command mode and use AT+RELD to restore default settings.

2.1.3. Upgrade Firmware Version

User can contact to salespersons for needed firmware version and upgrade by setup software as follow:

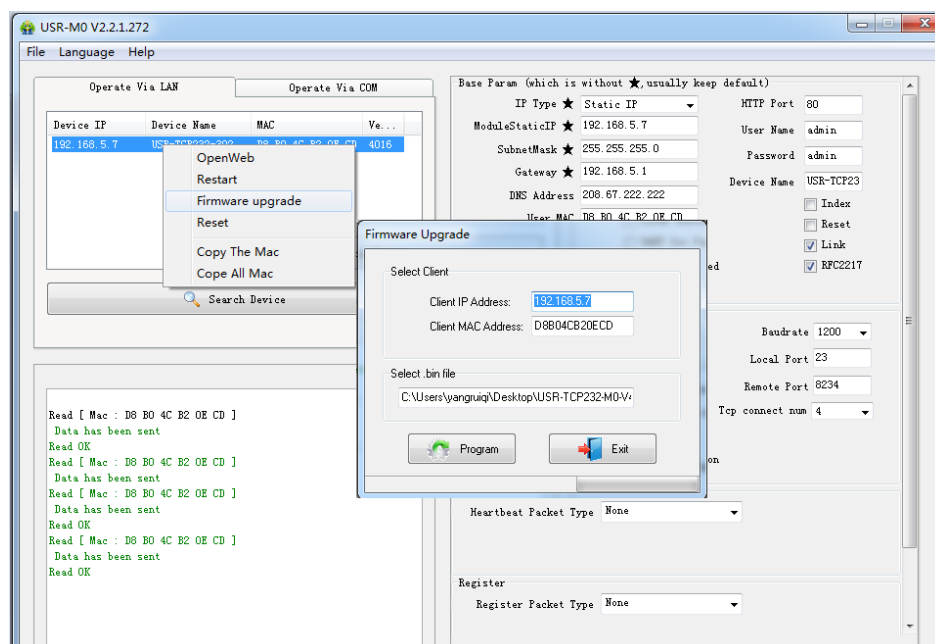


Figure 7 Upgrade firmware version

2.2. Socket functions

TCP232-302 socket support TCP Server, TCP Client, UDP Server, UDP Client and HTTPD Client.

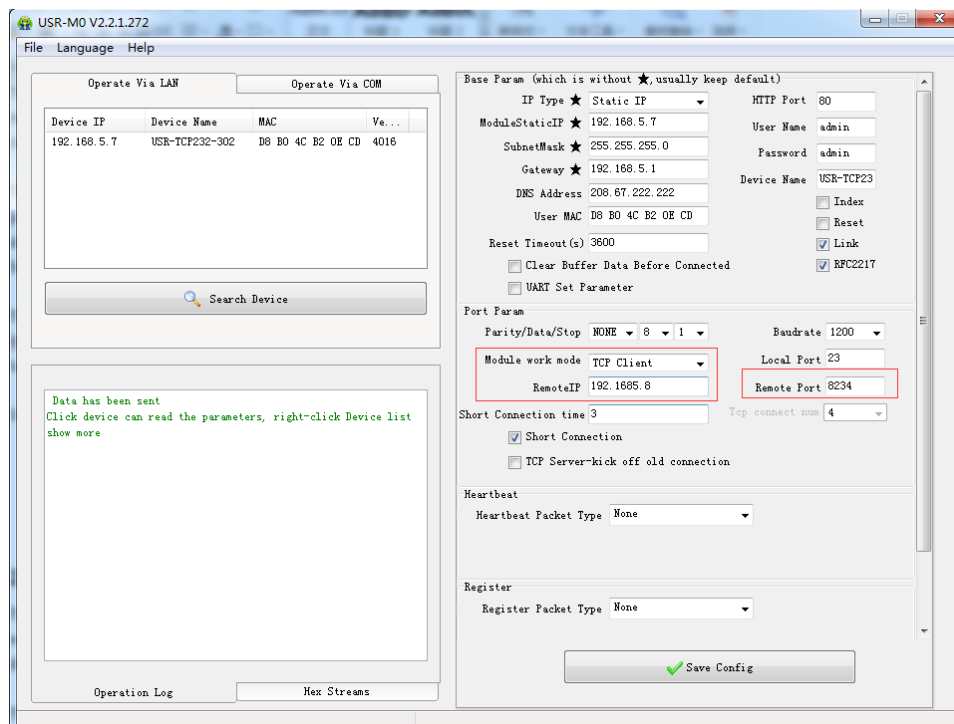
2.2.1. TCP Client

TCP Client provides Client connections for TCP network services. TCP Client device will connect to server to realize data transmission between the serial port and server. According to the TCP protocol, TCP Client has connection/disconnection status differences to ensure reliable data transmission.

TCP Client mode support Keep-Alive function: After connection is established, module will send Keep-Alive packets about every 15 seconds to check the connection and will disconnect then reconnect to TCP server if abnormal connection is been checked by Keep-Alive packets. TCP Client mode also support non-persistent function.

TCP232-302 work in TCP Client mode need connect to TCP Server and need set the parameters: Remote Server Addr and Remote Port Number. TCP232-302 work in TCP Client won't accept other connection request except target server and will access server with random local port if user set local port to zero.

User can set TCP232-302 in TCP Client mode and related parameters by setup software or web server as follows:



Firmware Version: V4016
中文



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Current Status

Local IP Config

Serial Port

Expand Function

Misc Config

Reboot

parameter

Baud Rate: bps

Data Size: bit

Parity:

Stop Bits: bit

Local Port Number: (0~65535)

Remote Port Number: (1~65535)

Work Mode:

Remote Server Addr:
[198.149.0.8]

RESET: ☐

LINK: ☒

INDEX: ☐

Similar RFC2217: ☒

Help

- HTTPD URL:** Module add GET/POST and HTTP/1.1 in URL automatically according to user's setting.
- HTTPD Packet Header:** Module add HOST automatically according to user's setting. Add "Content Length" automatically in POST mode.

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Figure 8 TCP Client

2.2.2. TCP Server

TCP Server will listen network connections and build network connections, commonly used for communication with TCP clients on a LAN. According to the TCP protocol, TCP Server has connection/disconnection status differences to ensure reliable data transmission.

TCP Server mode also support Keep-Alive function.

TCP232-302 work in TCP Server mode will listen local port which user set and build connection after receiving connection request. Serial data will be sent to all TCP Client devices connected to TCP232-302 in TCP Server mode simultaneously.

TCP232-302 work in TCP Server support 16 client connections at most and will kick off oldest connection beyond maximum connections(User can enable/disable this function by web server).

User can set TCP232-302 in TCP Server mode and related parameters by setup software or web server as follows:

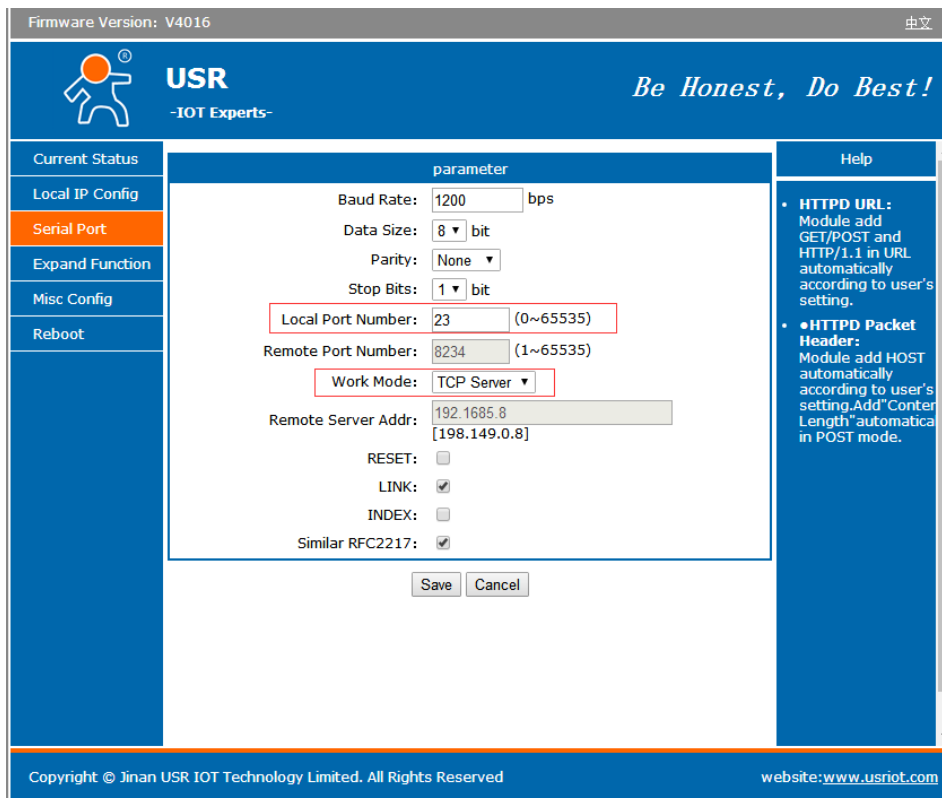
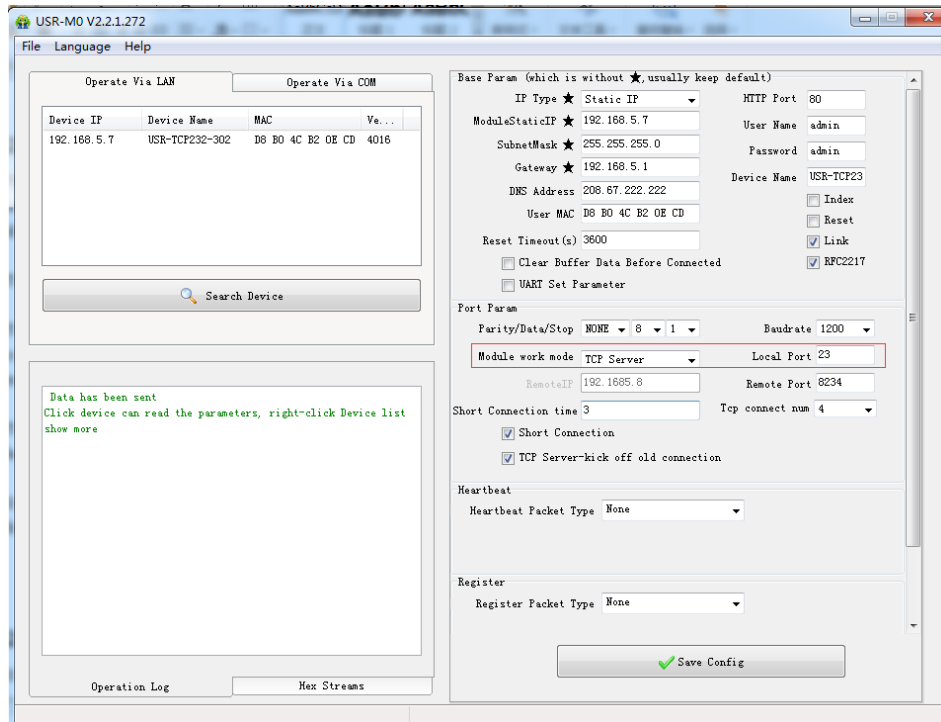


Figure 9 TCP Server

2.2.3. UDP Client

UDP transport protocol provides simple and unreliable communication services. No connection connected /disconnected.

In UDP Client mode, TCP232-302 will only communicate with target IP/Port. If data not from target IP/Port, it won't be received by TCP232-302.

In UDP Client mode, if user set remote IP as 255.255.255.255, TCP232-302 can broadcast to entire network segment and receive broadcast data. After firmware version 4015, 302 support broadcasting in same network segment.(Such like xxx.xxx.xxx.255 broadcasting way).

User can set TCP232-302 in UDP Client mode and related parameters by setup software or web server as follows:

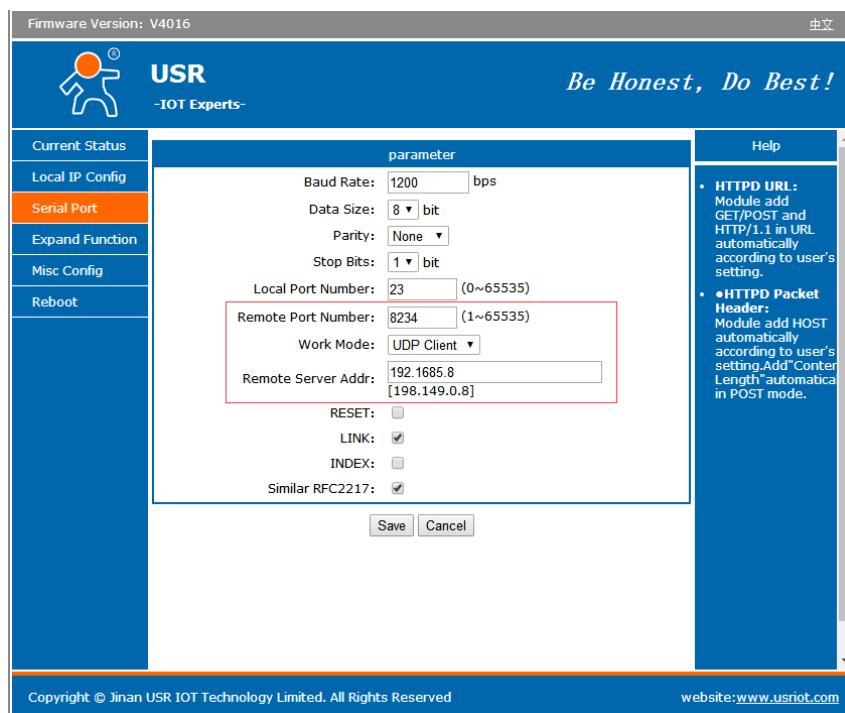
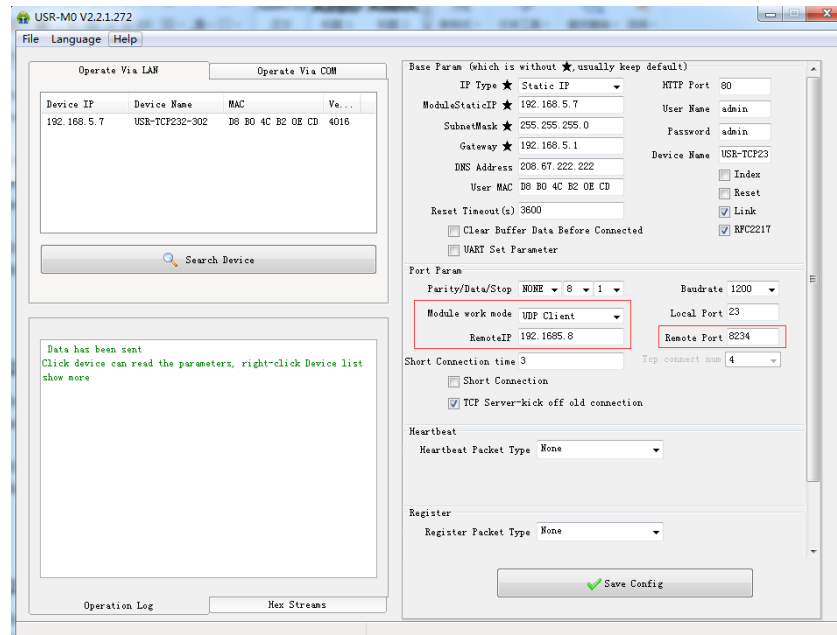


Figure 10 UDP Client

2.2.4. UDP Server

In UDP Server mode, TCP232-302 will change target IP every time after receiving UDP data from a new IP/Port and will send data to latest communication IP/Port.

User can set TCP232-302 in UDP Server mode and related parameters by setup software or web server as follows:

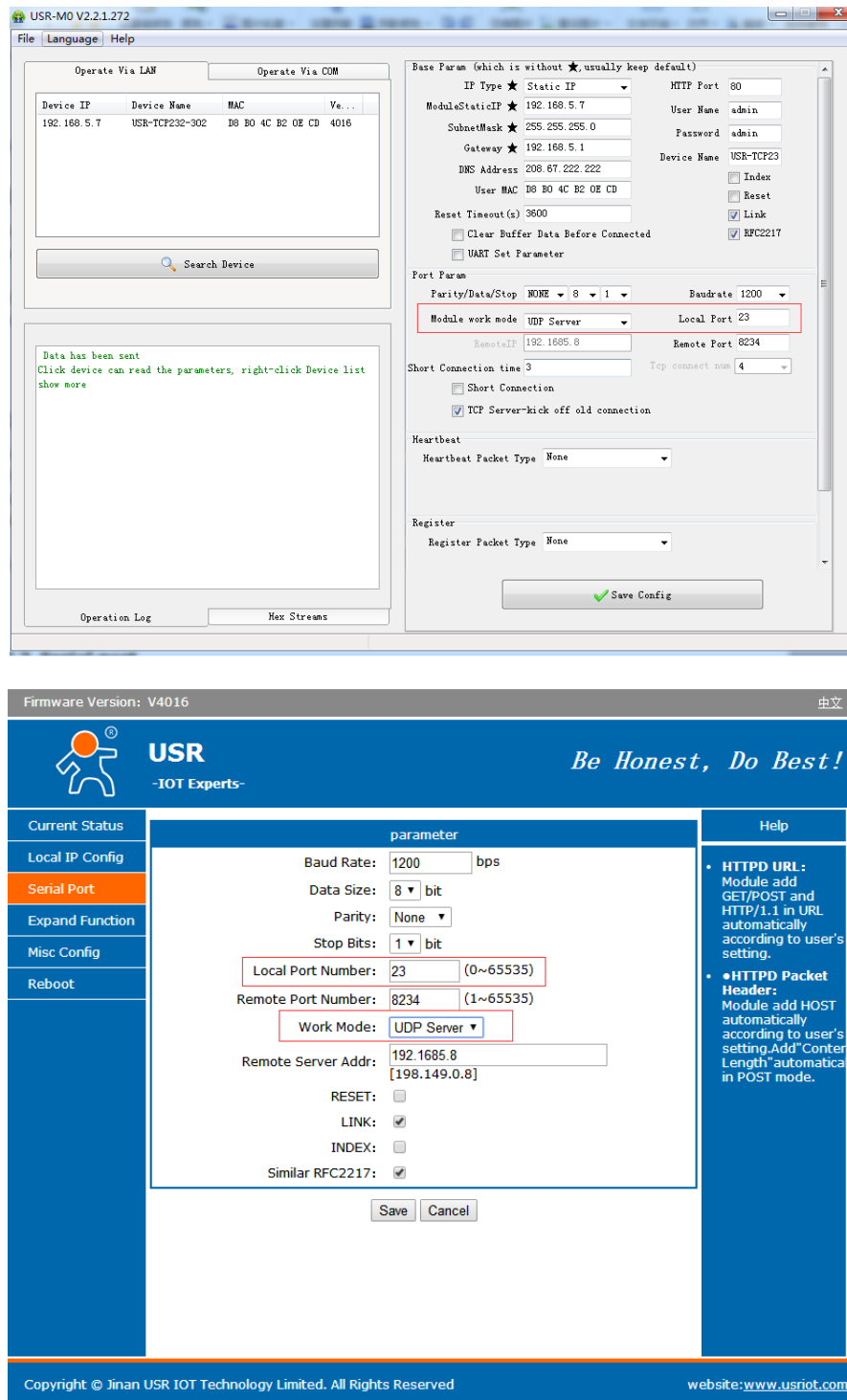
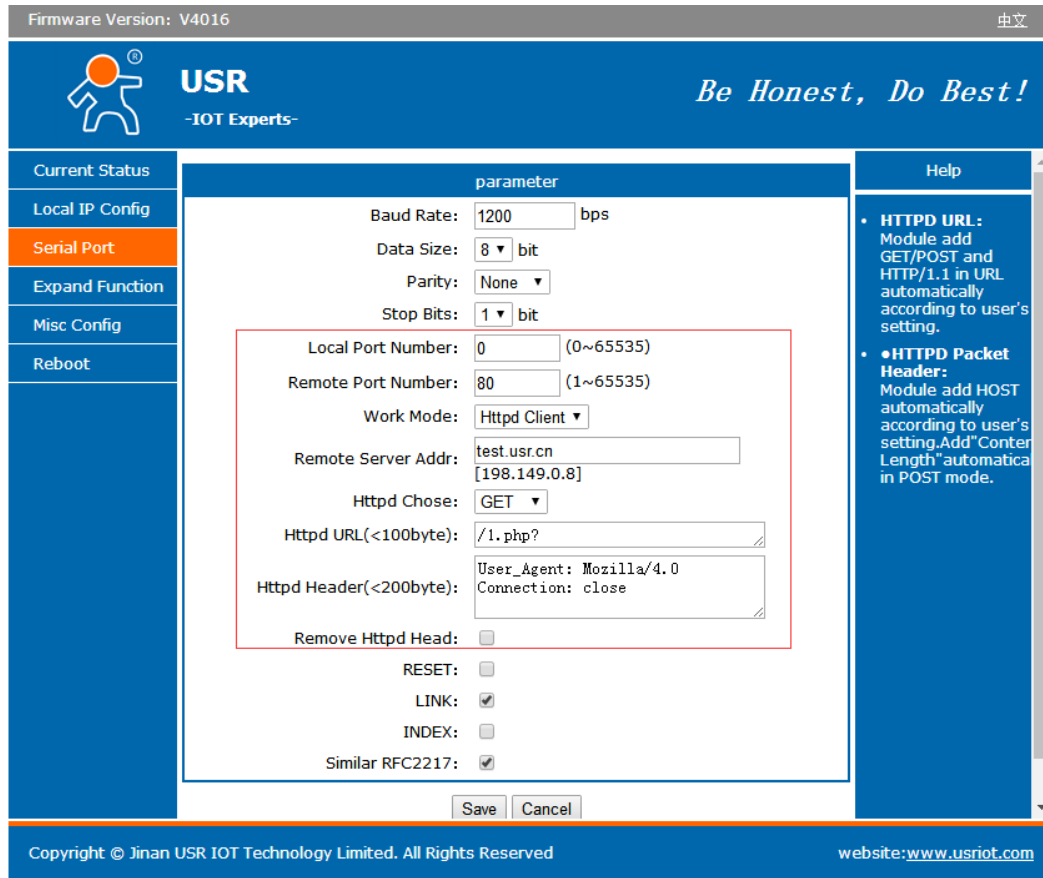


Figure 11 UDP Server

2.2.5. HTTPD Client

In HTTPD Client mode, TCP232-302 can achieve data transmission between serial port device and HTTP server. User just need set TCP232-302 in HTTPD Client and set the HTTPD header, URL and some other related parameters, then can achieve data transmission between serial port device and HTTP server and don't need care about the HTTP format of data.

User can set TCP232-302 in HTTPD Client mode and related parameters by web server as follow:



Firmware Version: V4016 中文

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Current Status
Local IP Config
Serial Port
Expand Function
Misc Config
Reboot

parameter

Baud Rate: 1200 bps
Data Size: 8 bit
Parity: None
Stop Bits: 1 bit

Local Port Number: 0 (0~65535)
Remote Port Number: 80 (1~65535)
Work Mode: Httpd Client
Remote Server Addr: test.usr.cn [198.149.0.8]
Httpd Chose: GET
Httpd URL(<100byte): /1.php?
Httpd Header(<200byte): User_Agent: Mozilla/4.0
Connection: close
Remove Httpd Head: ☐

RESET: ☐
LINK: ☒
INDEX: ☐
Similar RFC2217: ☒

Save Cancel

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Help

- **HTTPD URL:**
Module add GET/POST and HTTP/1.1 in URL automatically according to user's setting.
- **HTTPD Packet Header:**
Module add HOST automatically according to user's setting. Add "Content Length" automatically in POST mode.

Figure 12 HTTPD Client

2.3. Serial port

2.3.1. Serial port basic parameters

Parameters	Default	Range
Baud rate	115200	600~230.4Kbps
Data bits	8	5~8
Stop bits	1	1~2
Parity	None	None, Odd, Even, Mark, Space

Figure 13 Serial port parameters

2.3.2. VCOM Application

User can download VCOM software from <http://www.usriot.com/usr-vcom-virtual-serial-software/>. Through this software user can set up connection between TCP232-302 and virtual serial to solve the problem that traditional equipment PC software used in serial port communication way.

2.3.3. Serial Package Methods

For network speed is faster than serial. Module will put serial data in buffer before sending it to network. The data will be sent to Network as Package. There are 2 ways to end the package and send package to network - Time Trigger Mode and Length Trigger Mode.

TCP232-302 adopt fixed Package time (four bytes sending time) and fixed Package length (400 bytes).

2.3.4. Baud Rate Synchronization

When module works with USR devices or software, serial parameter will change dynamically according to network protocol. Customer can modify serial parameter by sending data conformed to specific protocol via network. It is temporary, when restart module, the parameters back to original parameters.

User can adopt Baud Rate Synchronization function by setup software as follows:

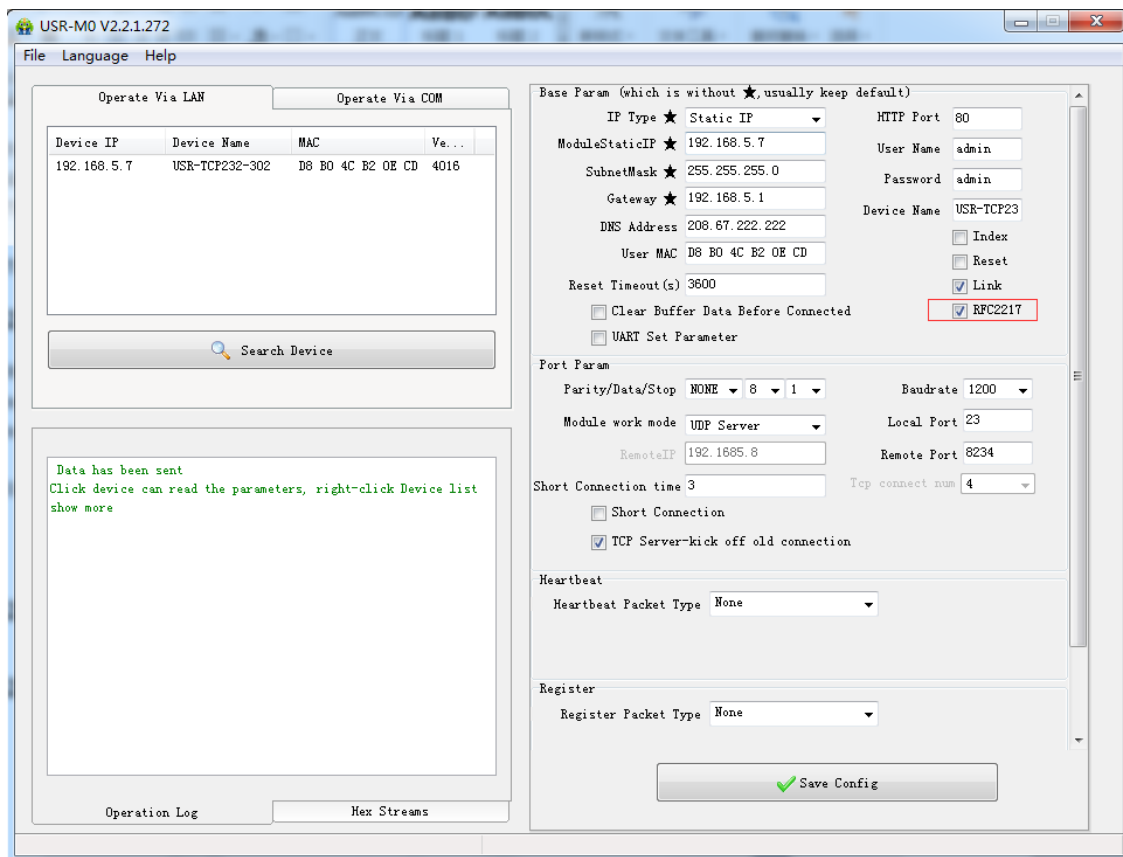


Figure 14 Baud Rate Synchronization

2.4. Features

2.4.1. Identity Packet Function

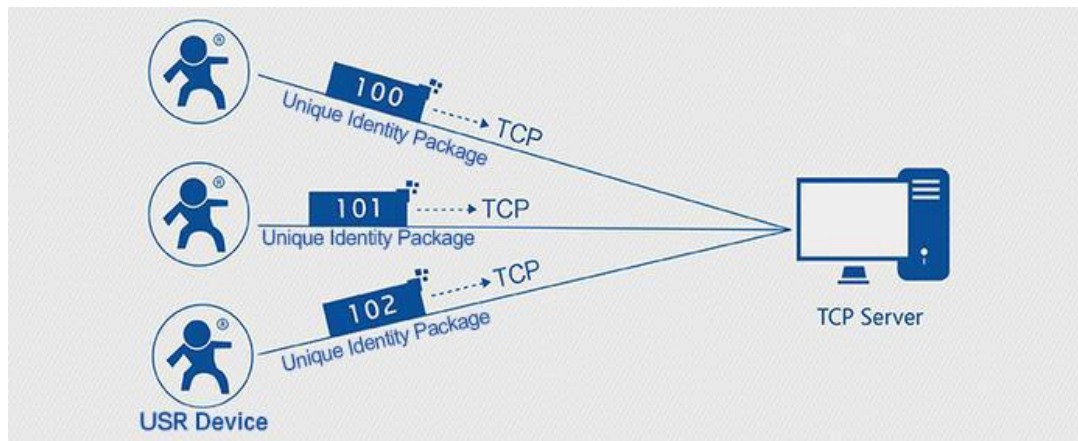


Figure 15 Identity Packet application diagram

Identity packet is used for identify the device when module works as TCP client/UDP client. There are two sending methods for identity packet.

- Identity data will be sent when connection is established.
- Identity data will be add on the front of every data packet.

Identity packet can be MAC address or user editable data (User editable data at most 40 bytes). User can set TCP232-302 with Identity Packet function by web server as follow:

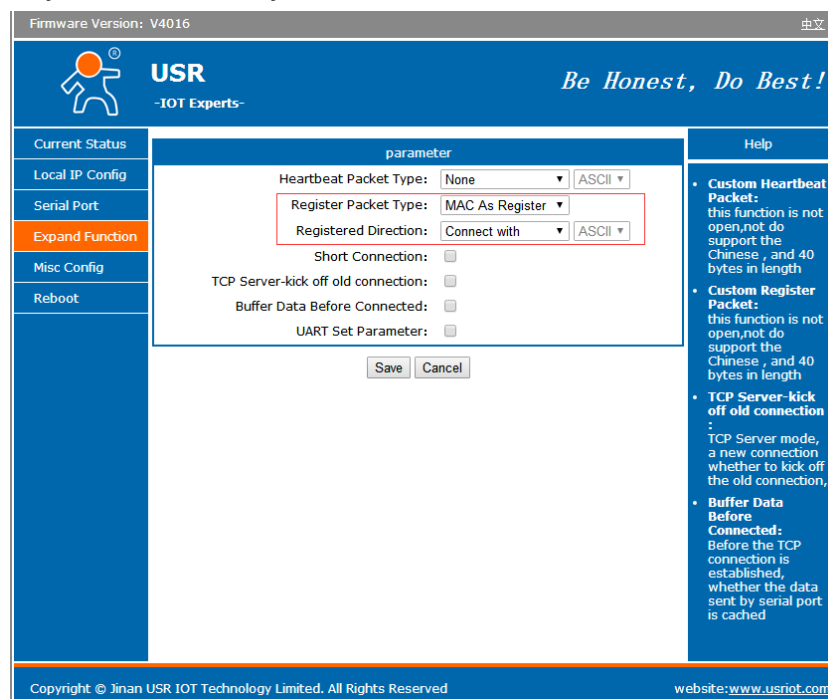


Figure 16 Identity Packet

2.4.2. Heartbeat Packet Function

Heartbeat packet: Module will output heartbeat data to serial or network periodic. User can configure the heartbeat data and time interval. Serial heartbeat data can be used for polling Modbus data. Network heartbeat data can be used for showing connection status and keep the connection (only take effect in TCP/UDP Client mode).

User can set TCP232-302 with Heartbeat Packet function by web server as follow:

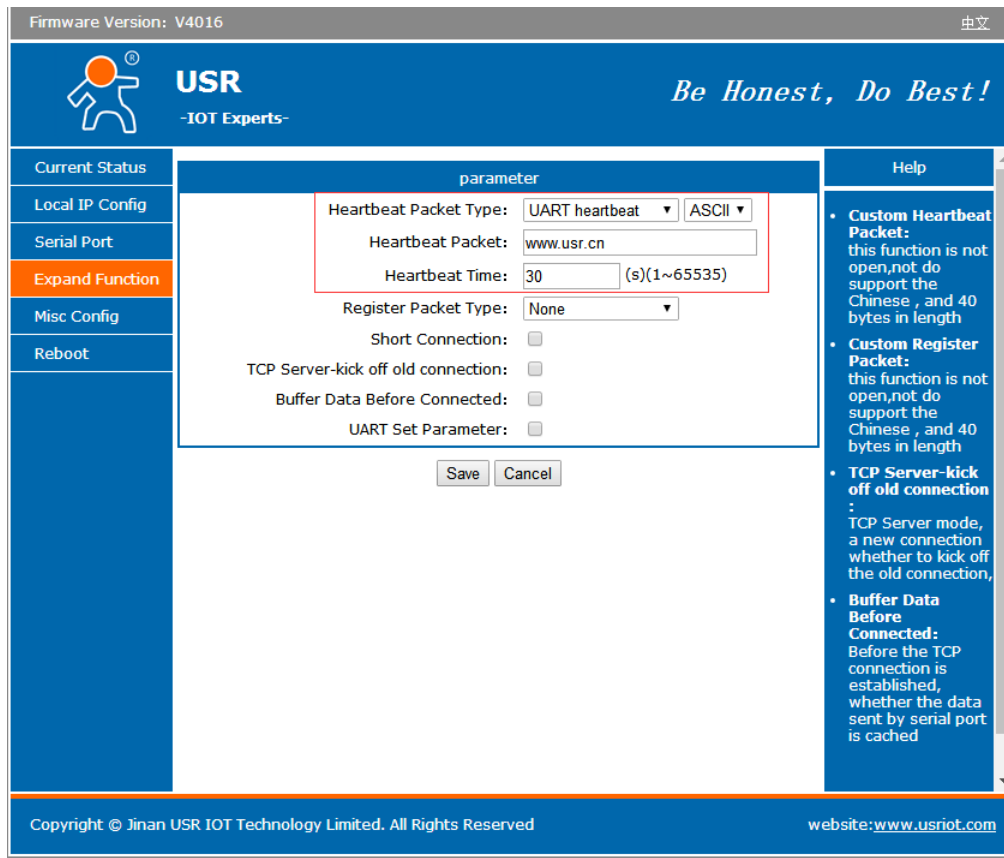


Figure 17 Heartbeat Packet

2.4.3. Editable Web server

TCP232-302 support user modify the web server based on template according to needs, then use related tool to upgrade. If user have this demand can contact to our salespersons for web server source and tool.

2.4.4. Reset function

When 302 work in TCP Client mode, 302 will connect to TCP Server. When user open Reset function, 302 will restart after trying connecting to TCP Server 30 times but still can't connect to.

User can enable/disable the Reset function by setup software as follow:

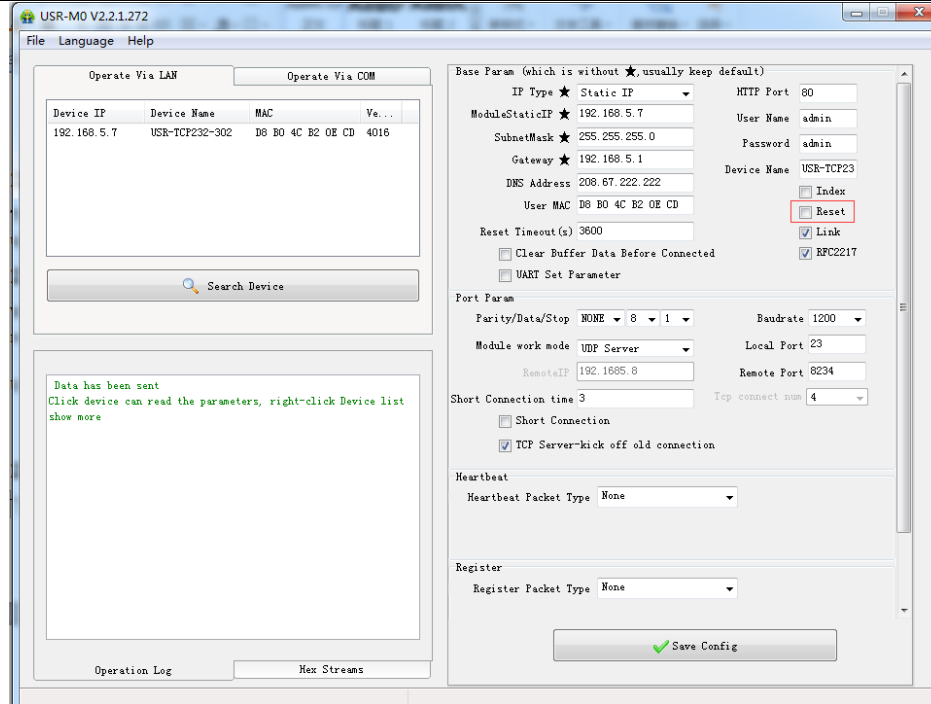


Figure 18 Reset function

2.4.5. Index function

Index function: Used in situation when 302 work in TCP Server mode and establish more than one connection to TCP Client. After open Index function, 302 will mark every TCP Client to distinguish them. User can send/receive data to/from different TCP Client according to their unique mark.

User can enable/disable the Index function by setup software as follow:

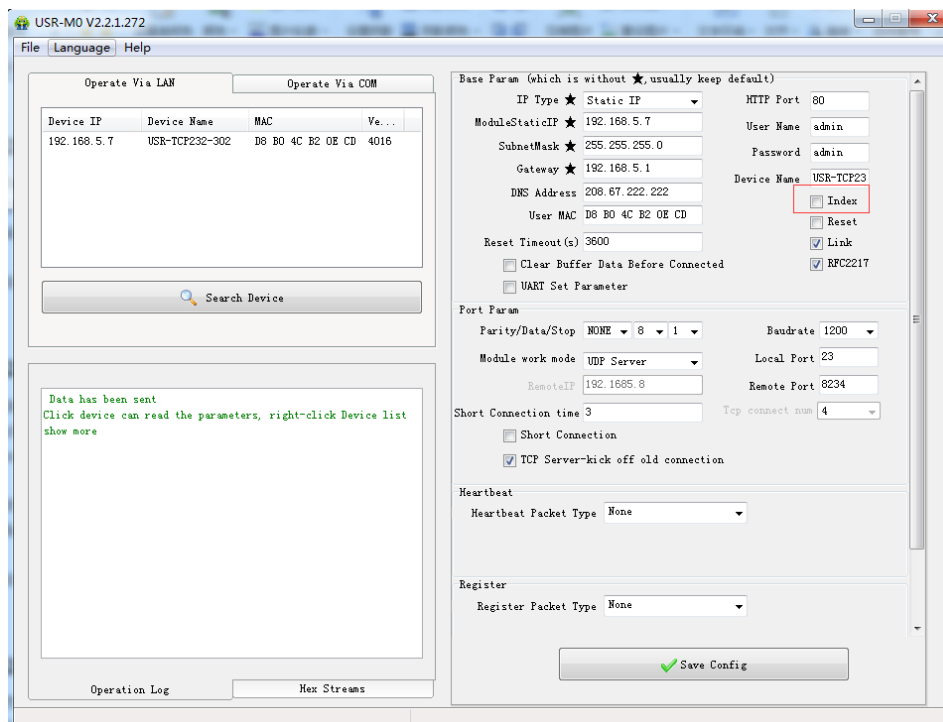


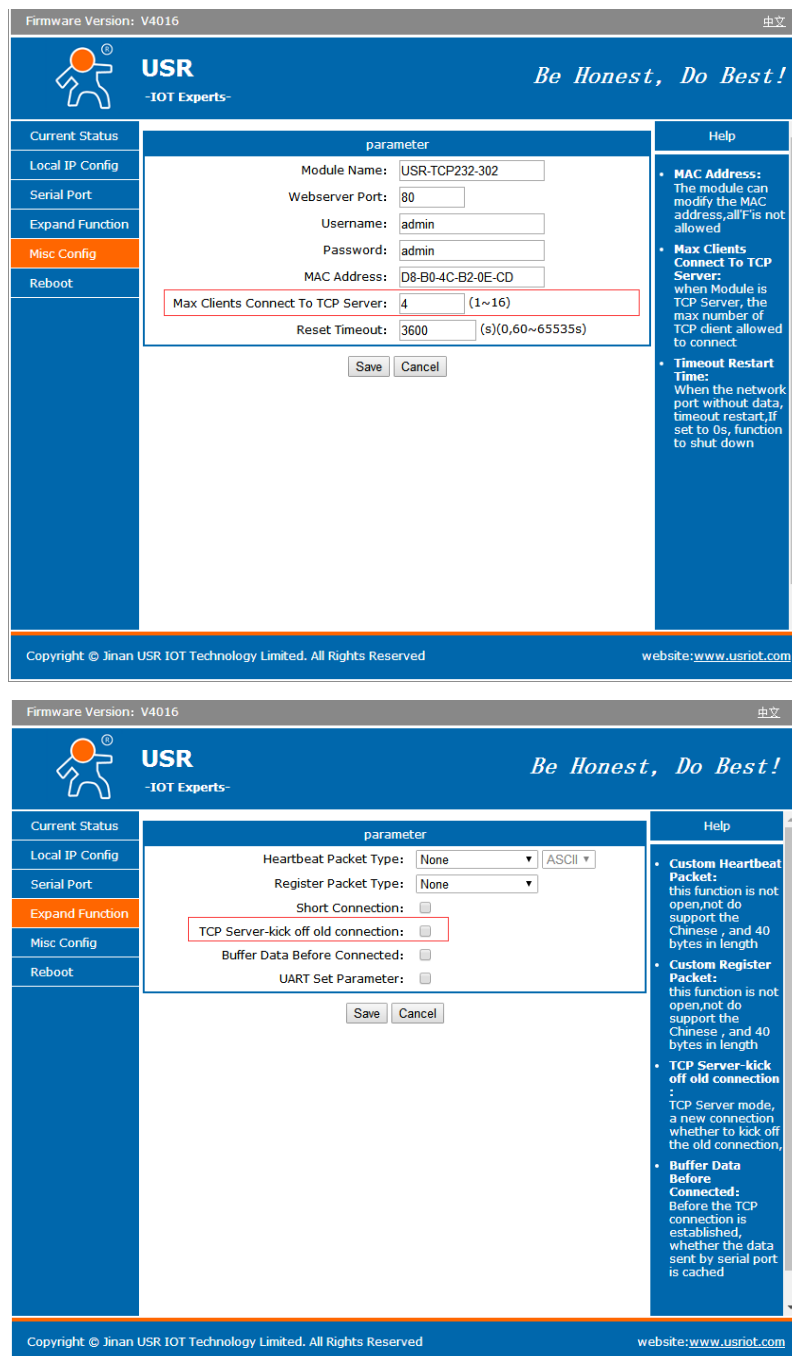
Figure 19 Index function

2.4.6. TCP Server setting

302 work in TCP Server mode allow at most 16 TCP Clients connection. Default is 4 TCP Clients and user can change maximum TCP Clients connection by web server. When TCP Clients more than 4, user need make every connection data less than 200 bytes/s.

If TCP Clients connected to 302 exceed maximum TCP Clients, user can enable/disable kick off old connection function by web server.

User can set above TCP Server settings by web server as follow:



The figure displays two screenshots of the USR IOT web interface, showing the configuration settings for the TCP Server mode.

Top Screenshot: Misc Config

- Current Status:** Local IP Config, Serial Port, Expand Function, **Misc Config**, Reboot.
- parameter:**
 - Module Name: USR-TCP232-302
 - Webserver Port: 80
 - Username: admin
 - Password: admin
 - MAC Address: D8-B0-4C-B2-0E-CD
 - Max Clients Connect To TCP Server: 4 (1~16)
 - Reset Timeout: 3600 (s)(0,60~65535s)
- Save** **Cancel**
- Help:**
 - MAC Address:** The module can modify the MAC address, all F is not allowed
 - Max Clients Connect To TCP Server:** when Module is TCP Server, the max number of TCP client allowed to connect
 - Timeout Restart Time:** When the network port without data, timeout restart, if set to 0s, function to shut down

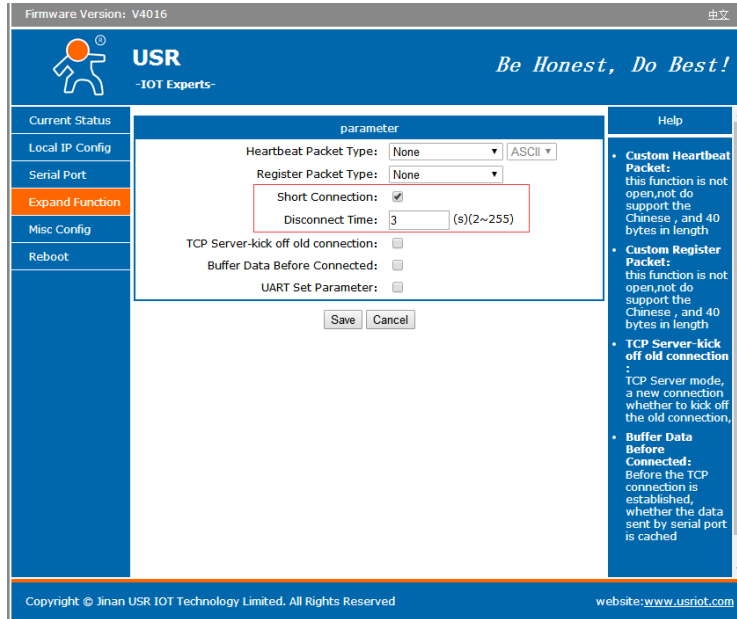
Bottom Screenshot: Expand Function

- Current Status:** Local IP Config, Serial Port, **Expand Function**, Misc Config, Reboot.
- parameter:**
 - Heartbeat Packet Type: None (ASCII)
 - Register Packet Type: None
 - Short Connection: ☐
 - TCP Server-kick off old connection:** ☒
 - Buffer Data Before Connected: ☐
 - UART Set Parameter: ☐
- Save** **Cancel**
- Help:**
 - Custom Heartbeat Packet:** this function is not open, not do support the Chinese, and 40 bytes in length
 - Custom Register Packet:** this function is not open, not do support the Chinese, and 40 bytes in length
 - TCP Server-kick off old connection:** TCP Server mode, a new connection whether to kick off the old connection.
 - Buffer Data Before Connected:** Before the TCP connection is established, whether the data sent by serial port is cached

Figure 20 TCP Server setting

2.4.7. Non-persistent Connection

TCP232-302 support non-persistent connection function in TCP Client mode. When TCP232-302 adopt this function, TCP232-302 will connect to server and send data after receiving data from serial port side and will disconnect to server after sending all the data to server and no data from serial port side or network side over a fixed time. This fixed time can be 2~255s, default is 3s. User can set TCP232-302 with non-persistent connection function by web server as follow:

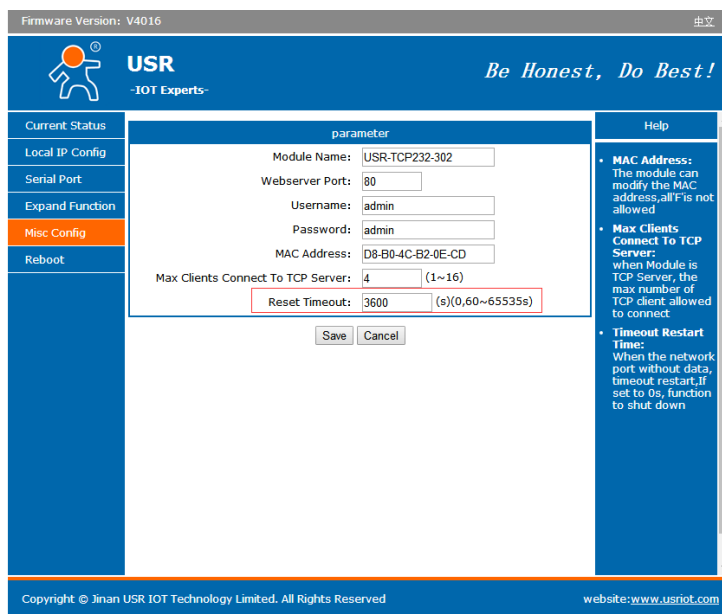


The screenshot shows the USR web interface for the TCP232-302 module. The 'Expand Function' tab is selected. In the 'parameter' section, the 'Short Connection' checkbox is checked, and the 'Disconnect Time' is set to 3 seconds (s) with a range of (2~255). Other parameters like 'Heartbeat Packet Type', 'Register Packet Type', 'TCP Server-kick off old connection', 'Buffer Data Before Connected', and 'UART Set Parameter' are shown but not modified. The 'Help' section on the right provides details about the 'Custom Heartbeat Packet', 'Custom Register Packet', 'TCP Server-kick off old connection', and 'Buffer Data Before Connected' functions.

Figure 21 Non-persistent Connection

2.4.8. Timeout Reset function

Timeout reset function(no data reset): If network side no data transmission beyond a fixed time(User can set this fixed time between 60~65535s, default is 3600s. If user set a time less than 60s, this function will be disable), 302 will reset. User can set the Timeout Reset function by web server as follow:



The screenshot shows the USR web interface for the TCP232-302 module. The 'Misc Config' tab is selected. In the 'parameter' section, the 'Reset Timeout' is set to 3600 seconds (s) with a range of (0,60~65535s). Other parameters like 'Module Name', 'Webserver Port', 'Username', 'Password', 'MAC Address', and 'Max Clients Connect To TCP Server' are shown but not modified. The 'Help' section on the right provides details about the 'MAC Address', 'Max Clients Connect To TCP Server', and 'Timeout Restart Time' functions.

Figure 22 Timeout Reset function

3. Parameter Setting

There are three ways to configure USR-TCP232-302. They are setup software configuration, web server configuration and AT command configuration.

3.1. Setup software Configuration

User can download setup software from <http://www.usriot.com/usr-m0-setup-software/>. When user want to configure the TCP232-302 by setup software, user can run setup software, search TCP232-302 in same LAN and configure the TCP232-302 as follow:

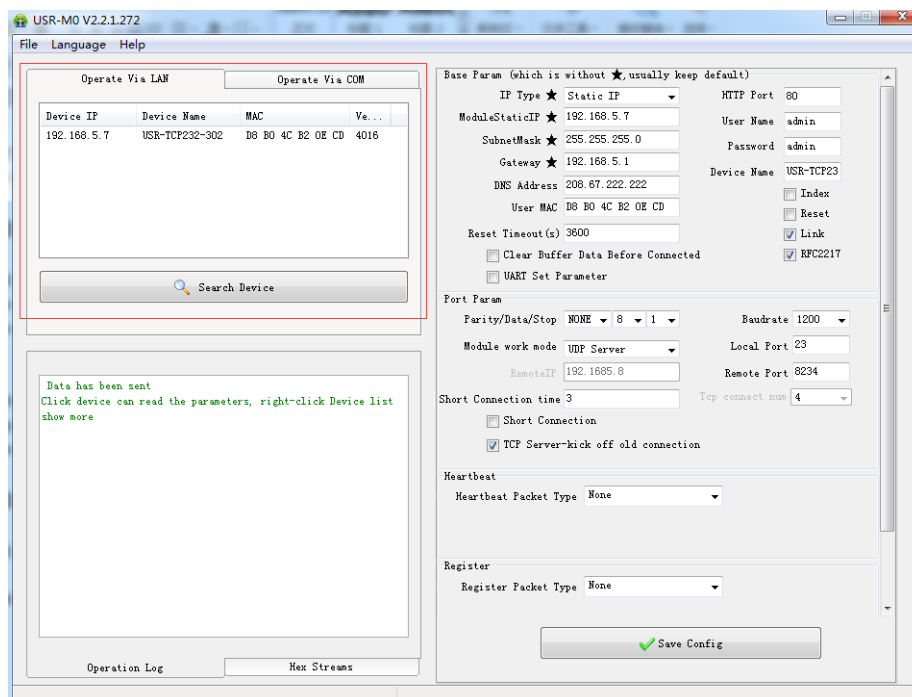


Figure 23 Setup software

After researching TCP232-302 and clicking TCP232-302 to configure, user need log in with user name and password. Default user name and password both are admin. If user keep the default parameters, it is not necessary to log in.

3.2. Web Server Configuration

User can connect PC to TCP232-302 through LAN port and enter web server to configure.

Web server default parameters as follow:

Parameter	Default settings
Web server IP address	192.168.0.7
User name	admin
Password	admin

Figure 24 Web server default parameters

After firstly connecting PC to TCP232-302, user can open browser and enter default IP 192.168.0.7 into address bar, then log in user name and password, user will enter into web server. Web server screenshot as follow:



parameter	Help
Module Name: USR-TCP232-302	
Current IP Address: 192.168.5.7	• Current IP Address: default IP of module
MAC Address: d8-b0-4c-b2-0e-cd	
Remote IP/TX/RX-1 : 0.0.0.0 / 0 byte / 0 byte	• Remote IP/TX/RX: IP of server or device connecting with module;reset for disconnect
-2 : 0.0.0.0/ 0 byte / 0 byte	TX/RX:data volume that each server or device communicates with module;reset for disconnect
-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	• TX Count/RX Count: a total of data volume that servers or devices communicate with module;reset for power off

Figure 25 Web Server

3.3. AT Command

We have specific user manual for AT commands.

3.3.1. Serial AT Command

In transparent mode, user can enter AT command mode, then user can send AT command to module. For entering AT command mode, please refer to this FAQ: <http://www.usriot.com/enter-serial-command-mode/>.

4. Contact Us

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Support: h.usriot.com

Email: sales@usr.cn

Tel: 86-531-88826739/86-531-55507297

5. Disclaimer

This document provide the information of USR-TCP232-302 products, it hasn't been granted any intellectual property license by forbidding speak or other ways either explicitly or implicitly. Except the duty declared in sales terms and conditions, we don't take any other responsibilities. We don't warrant the products sales and use explicitly or implicitly, including particular purpose merchantability and marketability, the tort liability of any other patent right, copyright, intellectual property right. We may modify specification and description at any time without prior notice.

6. Update History

2017-09-13 V1.0.3.01 Established.