RS485 TO ETH

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: https://www.waveshare.com/wiki/RS485_TO_ETH
- Setup software: https://www.waveshare.com/wiki/RS485_TO_ETH_Software
- Demo codes: https://www.waveshare.com/wiki/File:PC_Socket_Demo.zip

1.1. APPLICATION DIAGRAM



Figure 1 Application

1.2. HARDWARE DESIGN

HARDWARE DIMENSIONS

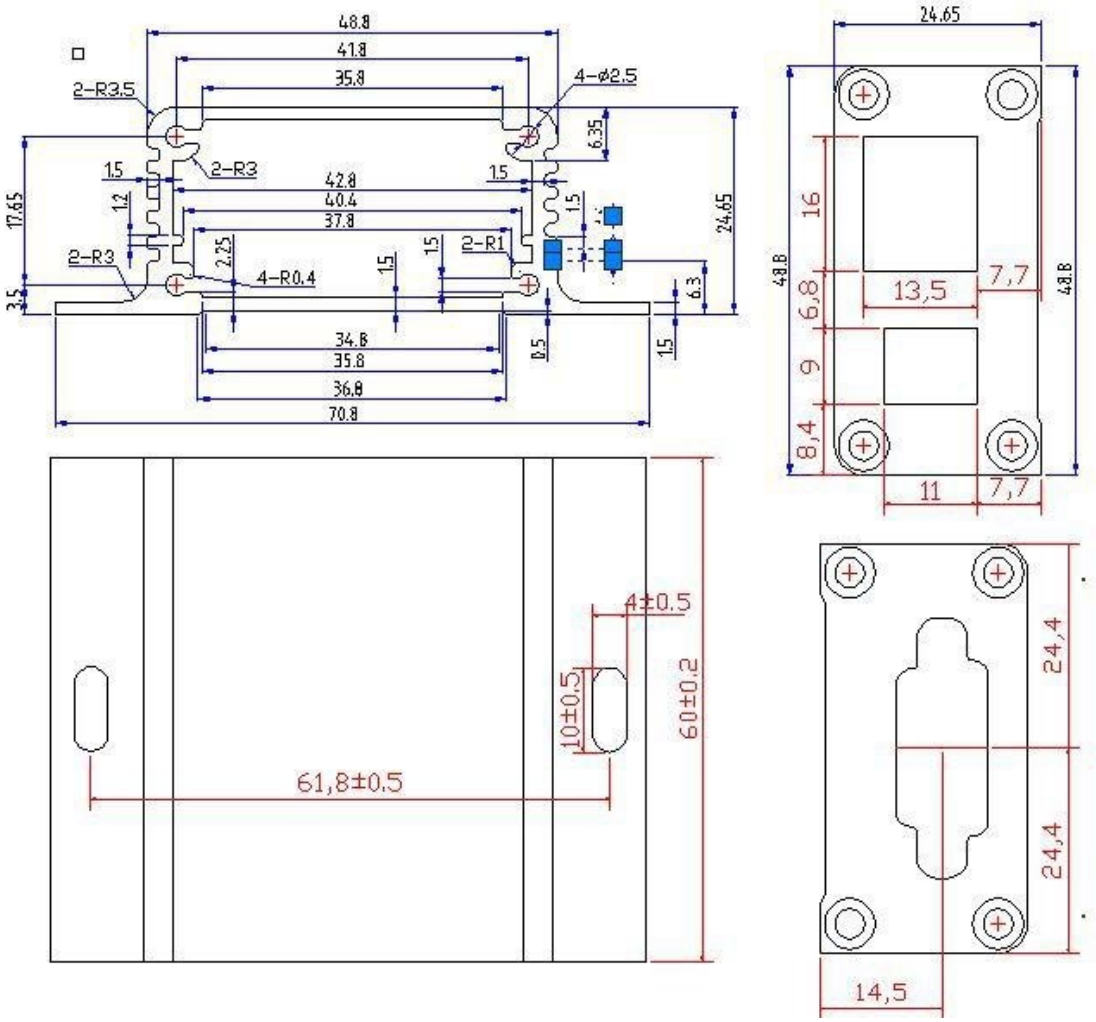


Figure 2 Hardware Dimension

2. PRODUCT FUNCTIONS

This chapter introduces the functions of RS485 TO ETH as the following diagram shown, you can get an overall knowledge of it.

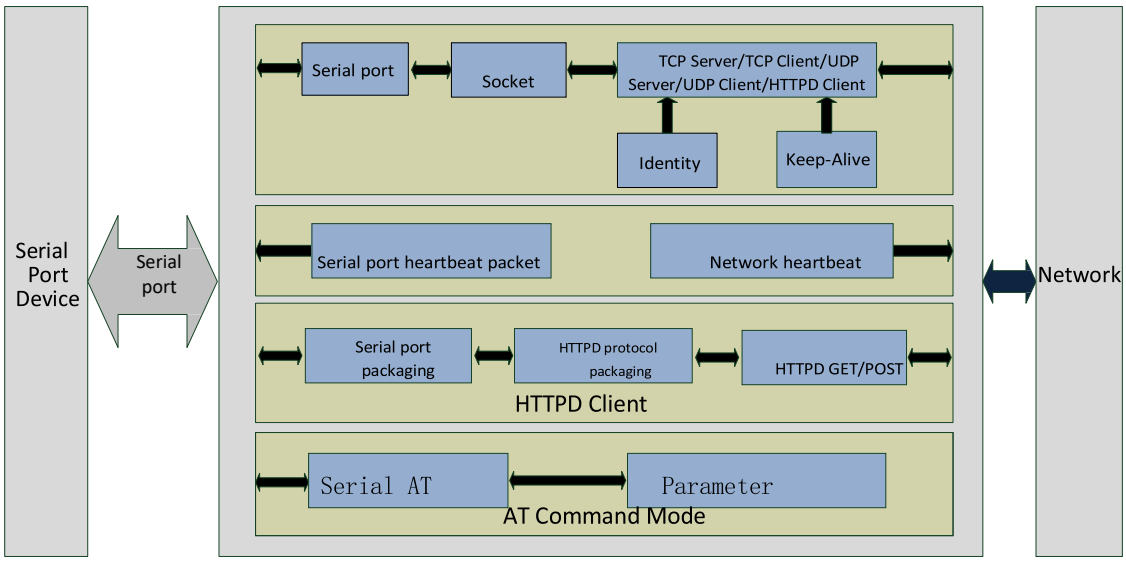


Figure 3 Product Functions diagram

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:

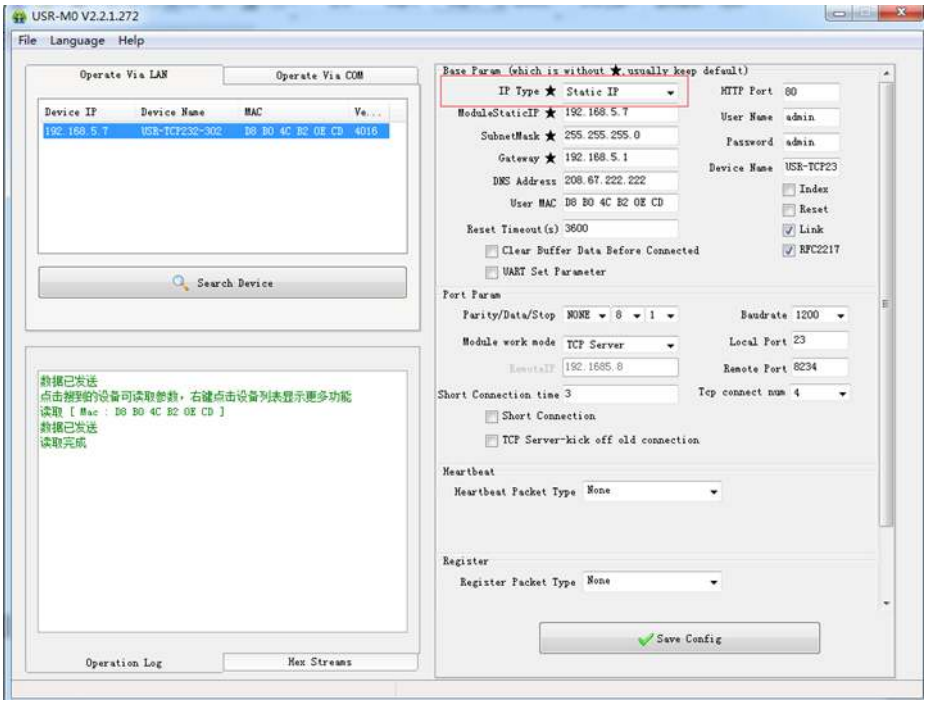


Figure 4 Static IP/DHCP

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:

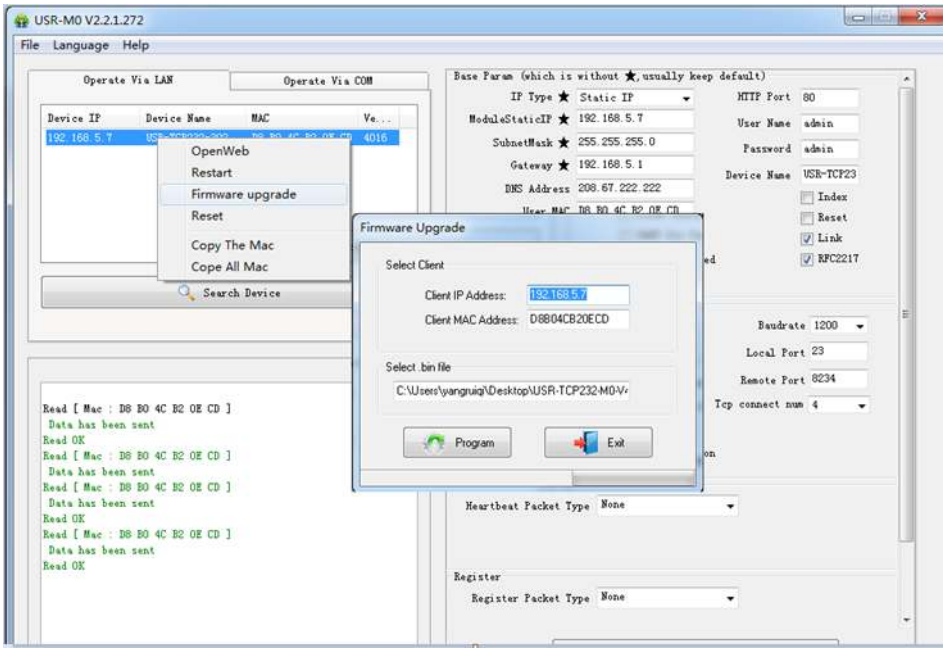


Figure 5 Upgrade Firmware Version

2.2.SOCKET FUNCTIONS

RS485 TO ETH socket support TCP Server, TCP Client, UDP Server, UDP Client and HTTPD Client.

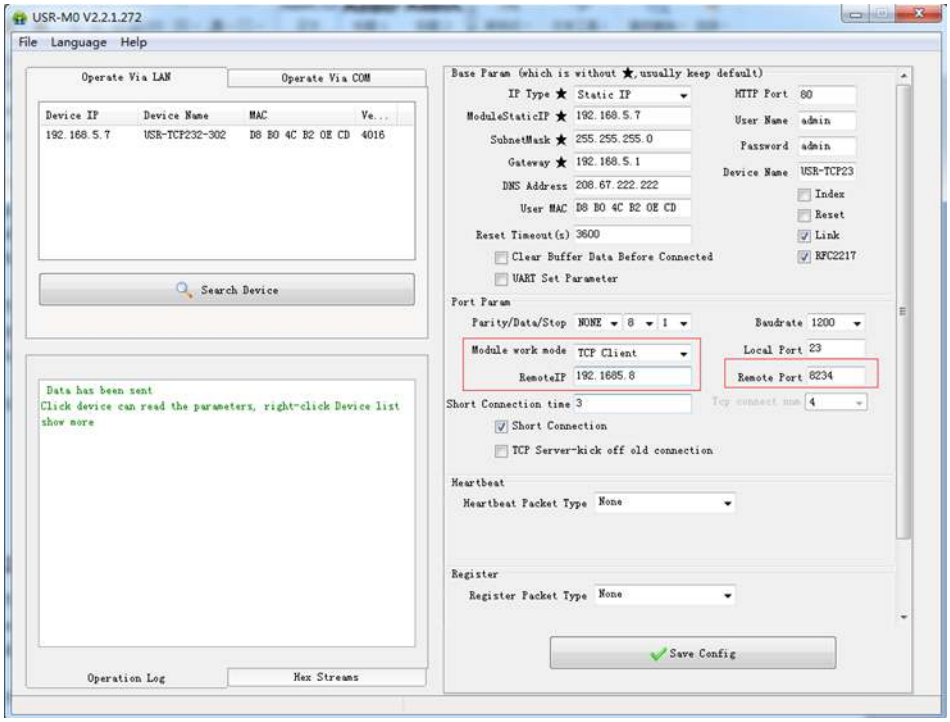
2.2.1. TCP CLIENT

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.

RS485 TO ETH work in TCP Client mode need connect to TCP Server and need set the parameters: Remote Server Addr and Remote Port Number. RS485 TO ETH 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 RS485 TO ETH in TCP Client mode and related parameters by setup software or web server as follows:



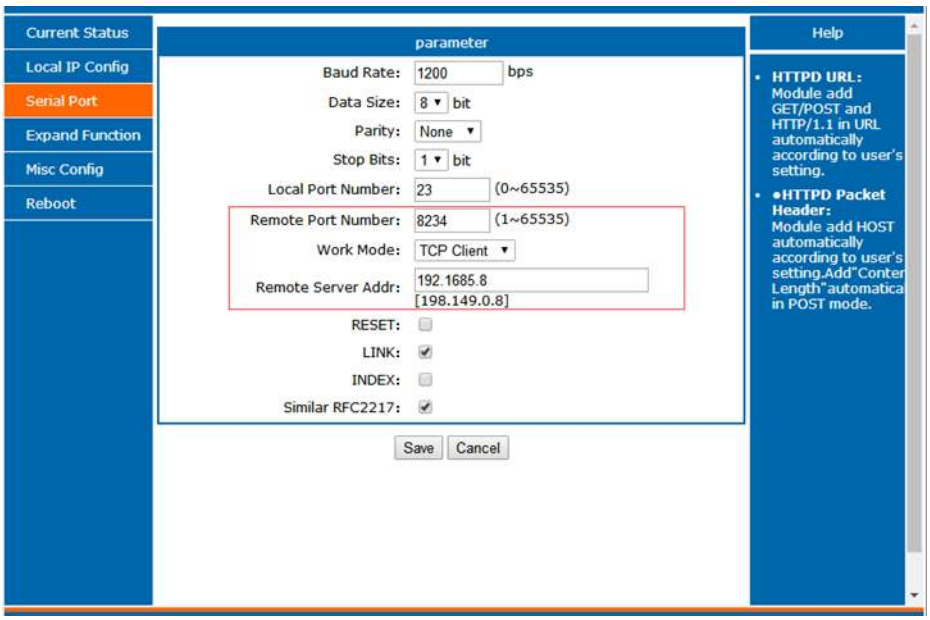


Figure 6 TCP Client

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.

RS485 TO ETH 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 RS485 TO ETH in TCP Server mode simultaneously.

RS485 TO ETH 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 RS485 TO ETH in TCP Server mode and related parameters by setup software or web server as follows:

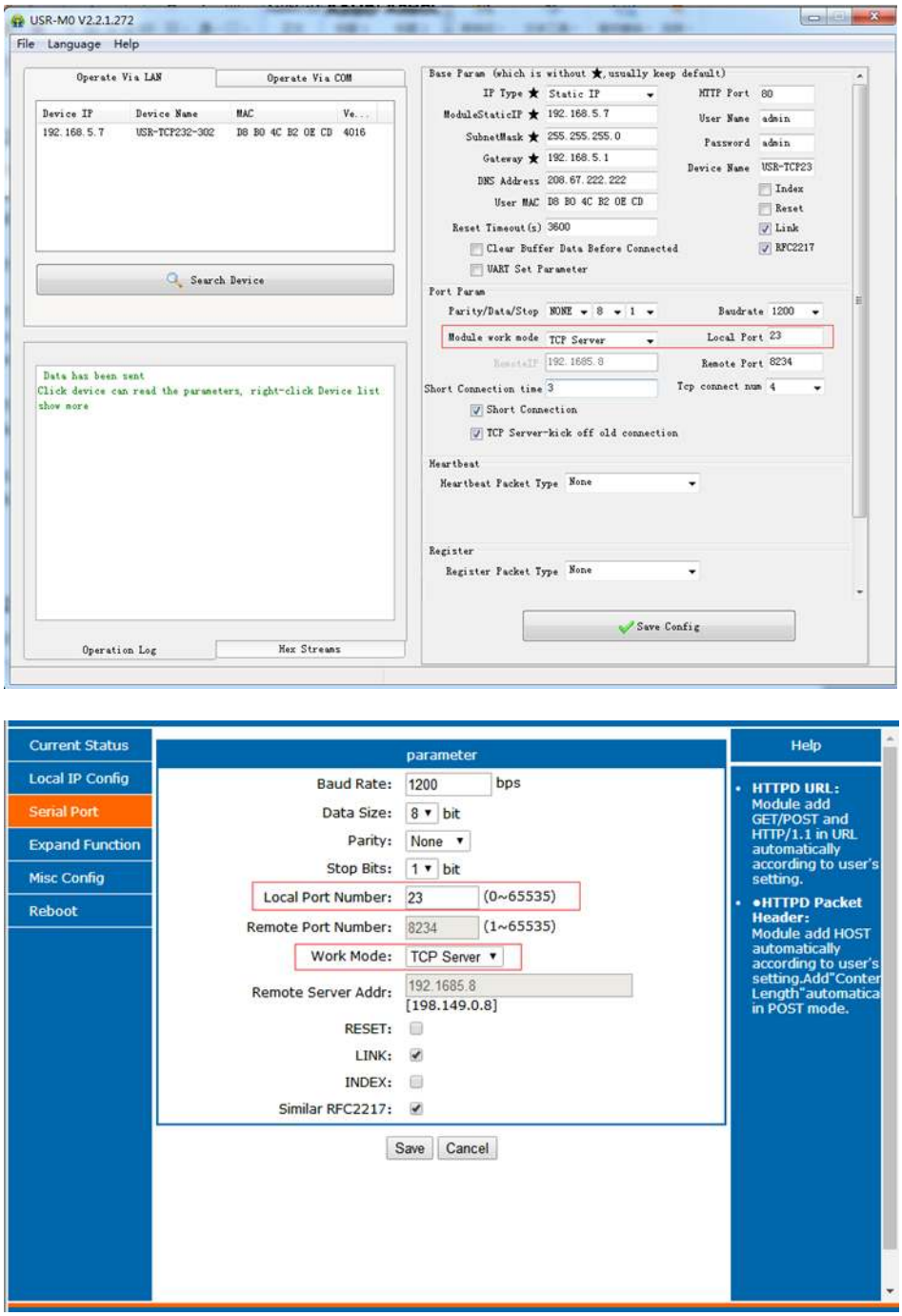


Figure 7 TCP Server

2.2.3. UDP CLIENT

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

In UDP Client mode, RS485 TO ETH will only communicate with target IP/Port. If data not from target IP/Port, it won't be received by RS485 TO ETH.

In UDP Client mode, if user set remote IP as 255.255.255.255, RS485 TO ETH can broadcast to entire network segment and receive broadcast data. After firmware version 4015, 304 support broadcasting in same network segment.(Such like xxx.xxx.xxx.255 broadcasting way).

User can set RS485 TO ETH in UDP Client mode and related parameters by setup software or web server as follows:

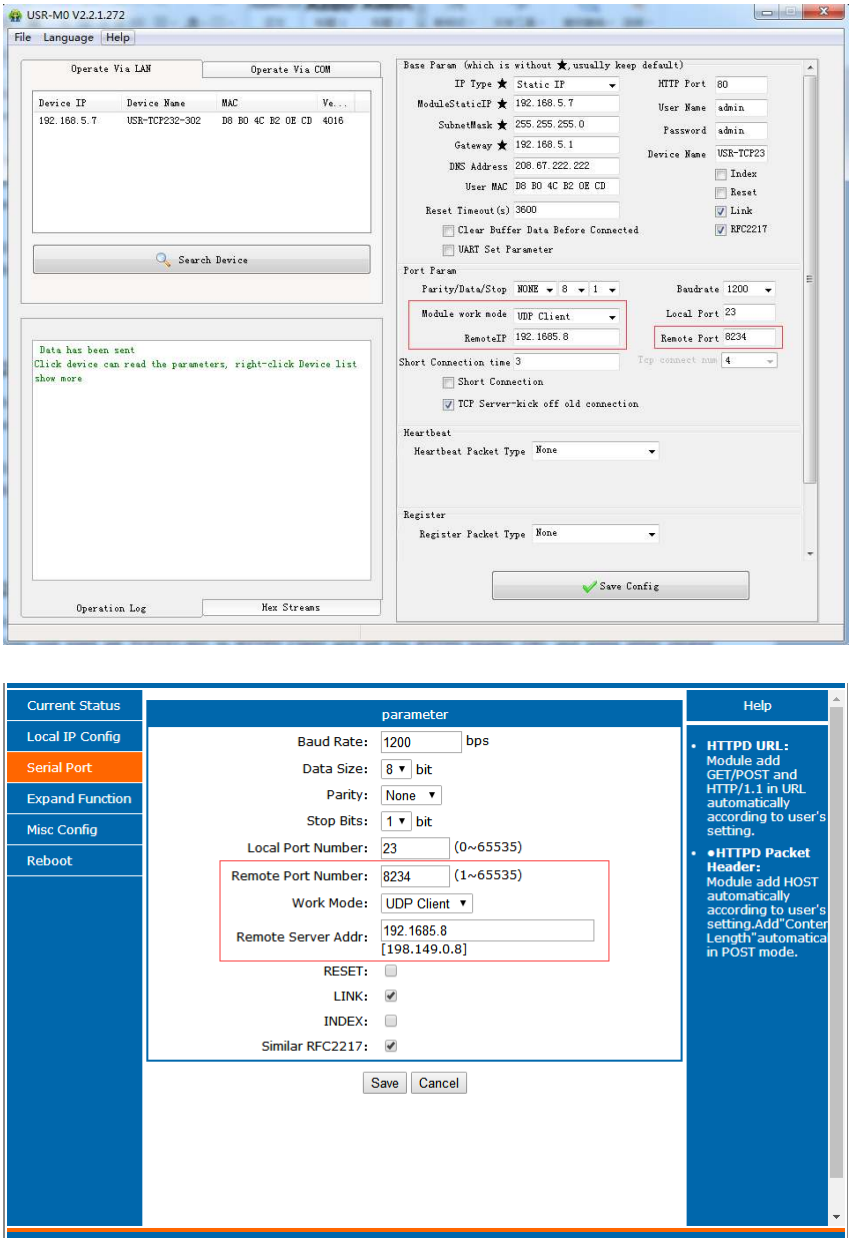


Figure 8 UDP Client

2.2.4. UDP SERVER

In UDP Server mode, RS485 TO ETH 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 RS485 TO ETH in UDP Server mode and related parameters by setup software or web server as follows:

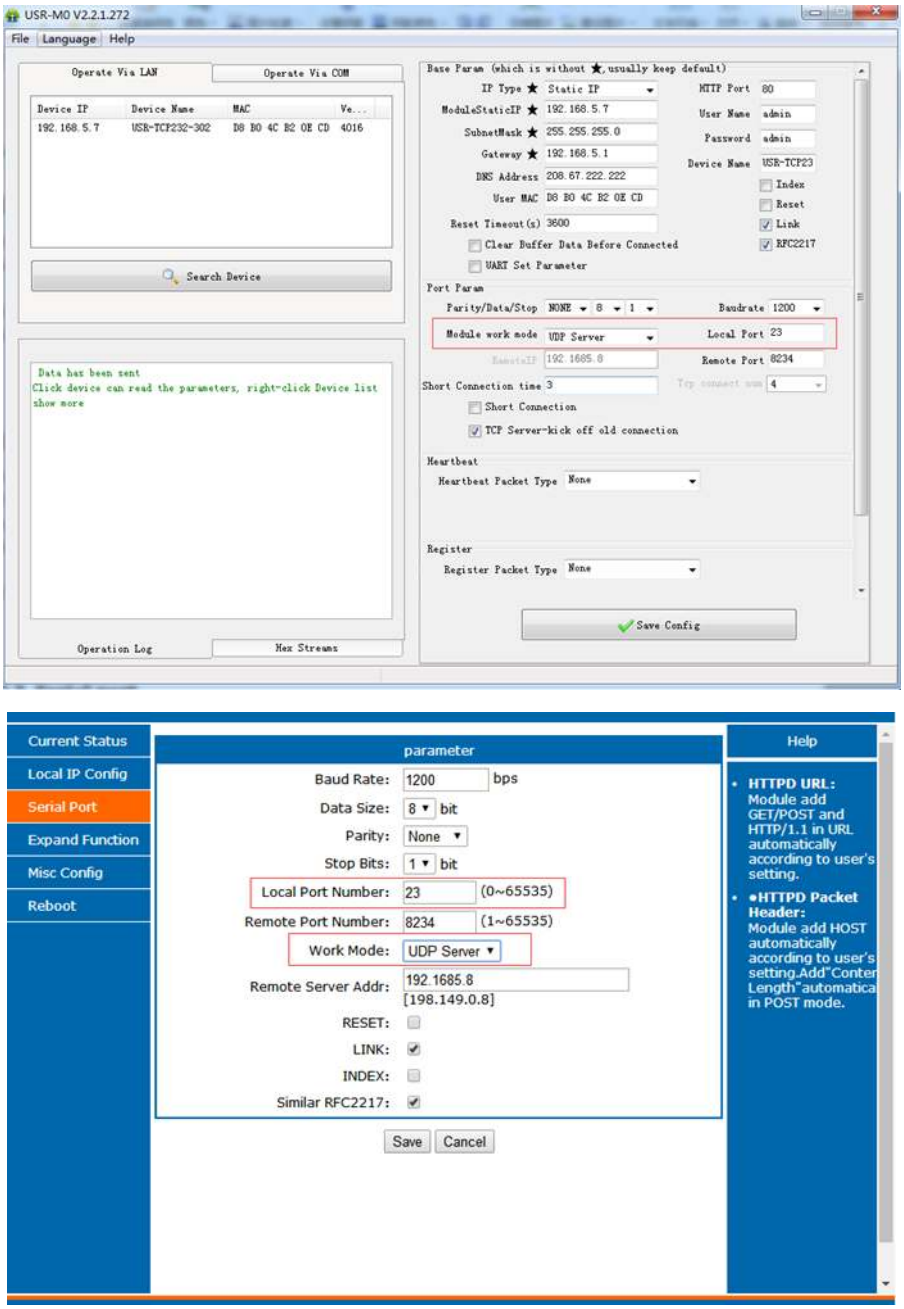


Figure 9 UDP Server

2.2.5. HTTPD CLIENT

In HTTPD Client mode, RS485 TO ETH can achieve data transmission between serial port device and HTTP server. User just need set RS485 TO ETH 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 RS485 TO ETH in HTTPD Client mode and related parameters by web server as follow:

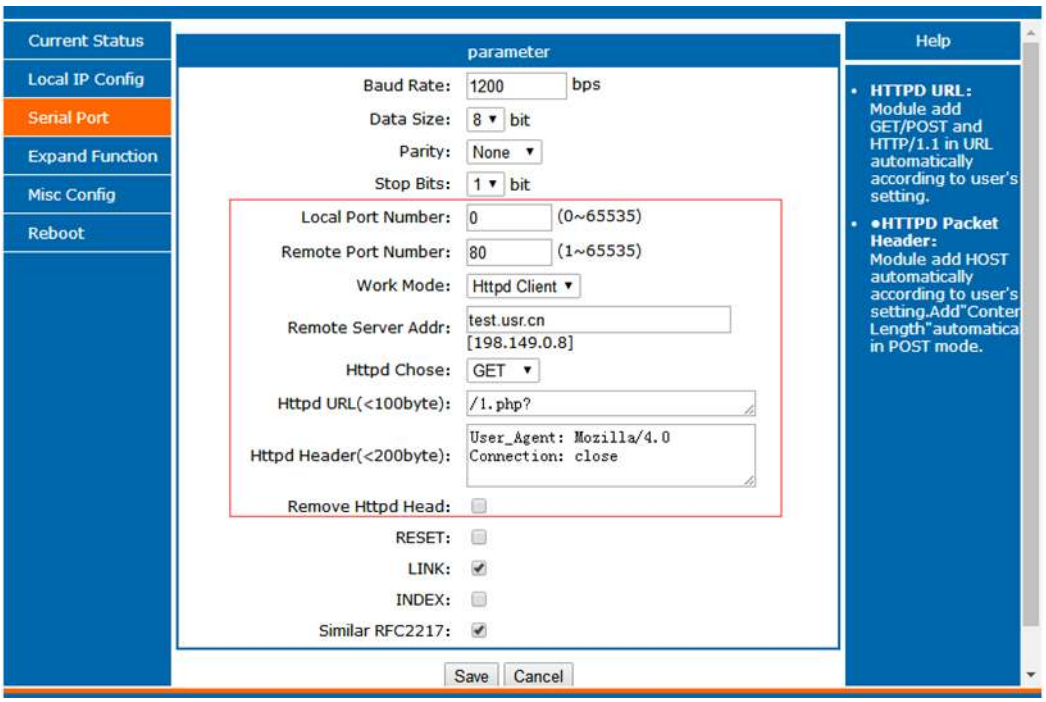


Figure 10 HTTPD Client

2.3.SERIAL PORT

2.3.1. SERIAL PORT BASIC PARAMETERS

Table 1 Serial Port 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

2.3.2. VCOM APPLICATION

User can download VCOM software from Waveshare Wiki. Through this software user can set up connection between RS485 TO ETH 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.

RS485 TO ETH 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:

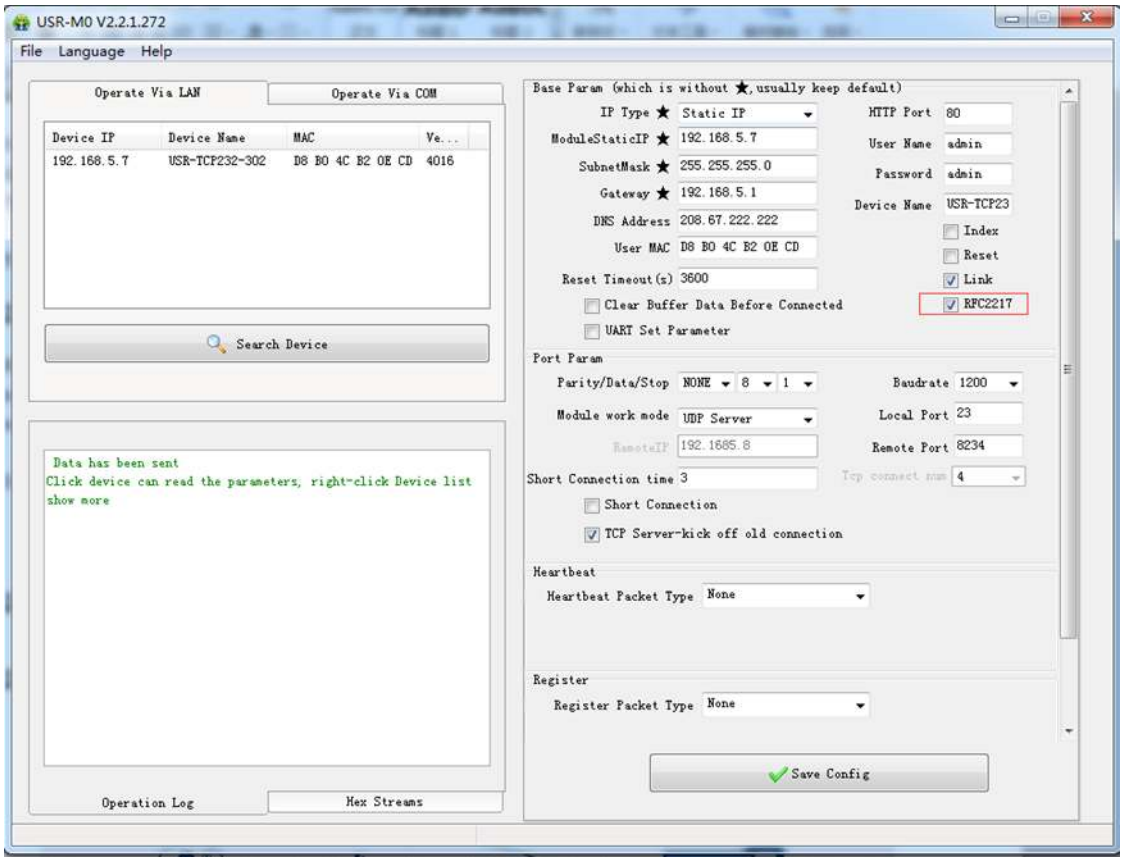


Figure 11 Baud Rate Synchronization

2.4. FEATURES

2.4.1. IDENTITY PACKET FUNCTION

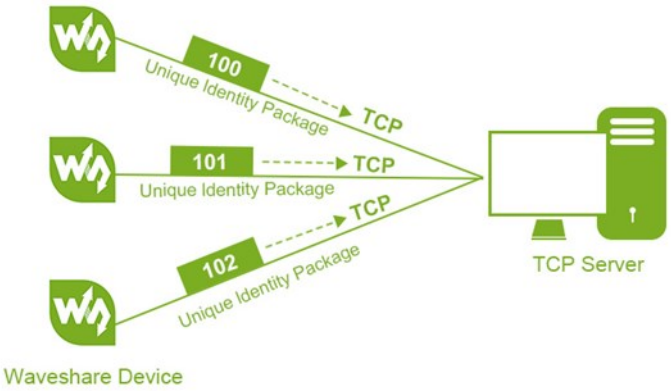


Figure 12 Identity Packet Application Diagram

Identity packet is used for identifying 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 RS485 TO ETH with Identity Packet function by web server as follow:

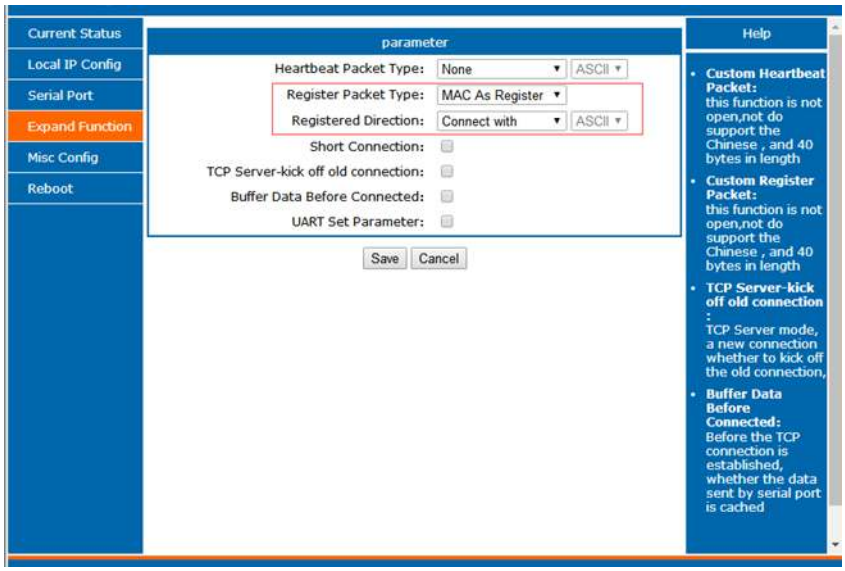


Figure 13 Identity Packet

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. 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 RS485 TO ETH with Heartbeat Packet function by web server as follow:

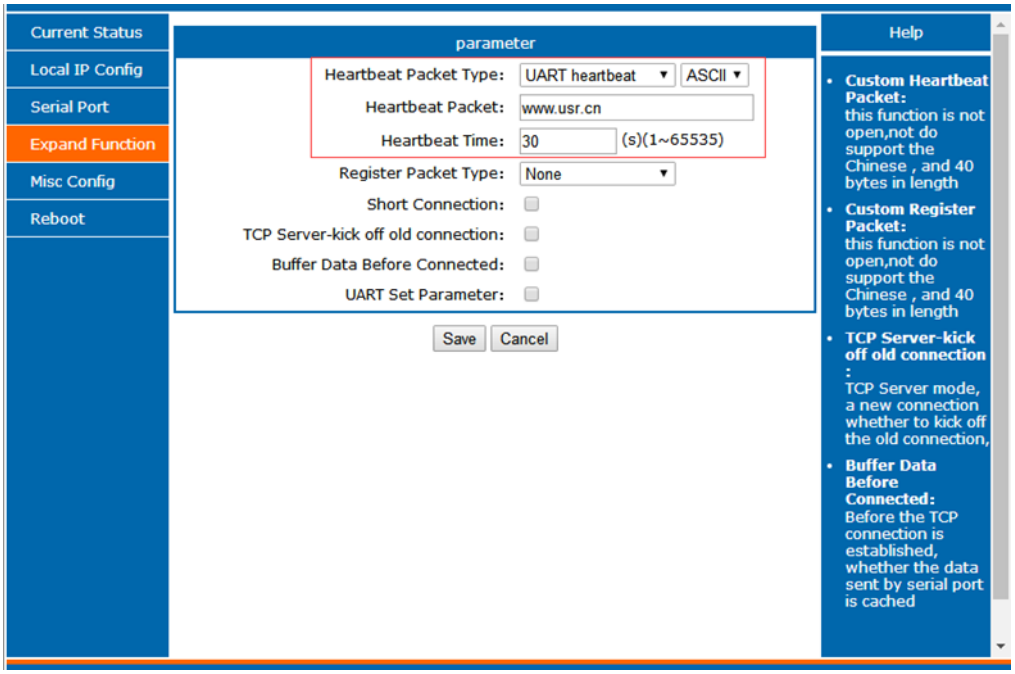


Figure 14 Heartbeat Packet

2.4.3. EDITABLE WEB SERVER

RS485 TO ETH 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 304 work in TCP Client mode, 304 will connect to TCP Server. When user open Reset function, 304 will restart after trying to connect to TCP Server 30 times but still can’t connect to.

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

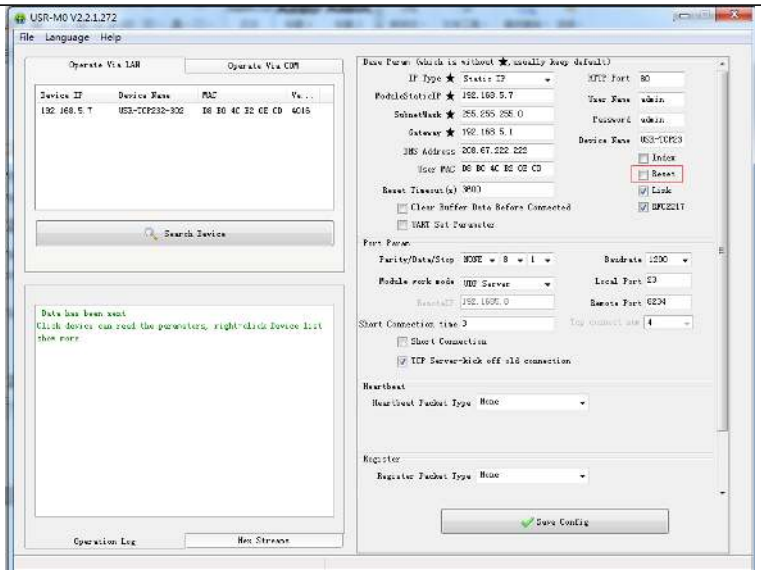


Figure 15 Reset Function

2.4.5. INDEX FUNCTION

Index function: Used in situation when 304 work in TCP Server mode and establish more than one connection to TCP Client. After open Index function, 304 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:

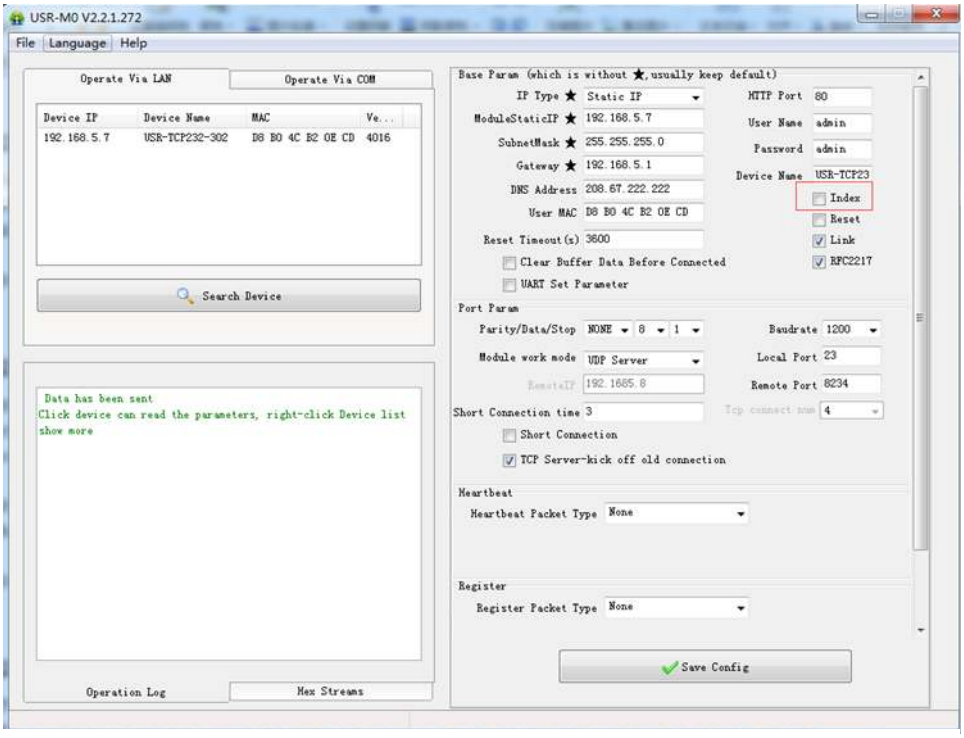


Figure 16 Index Function

2.4.6. TCP SERVER SETTING

304 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 304 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:

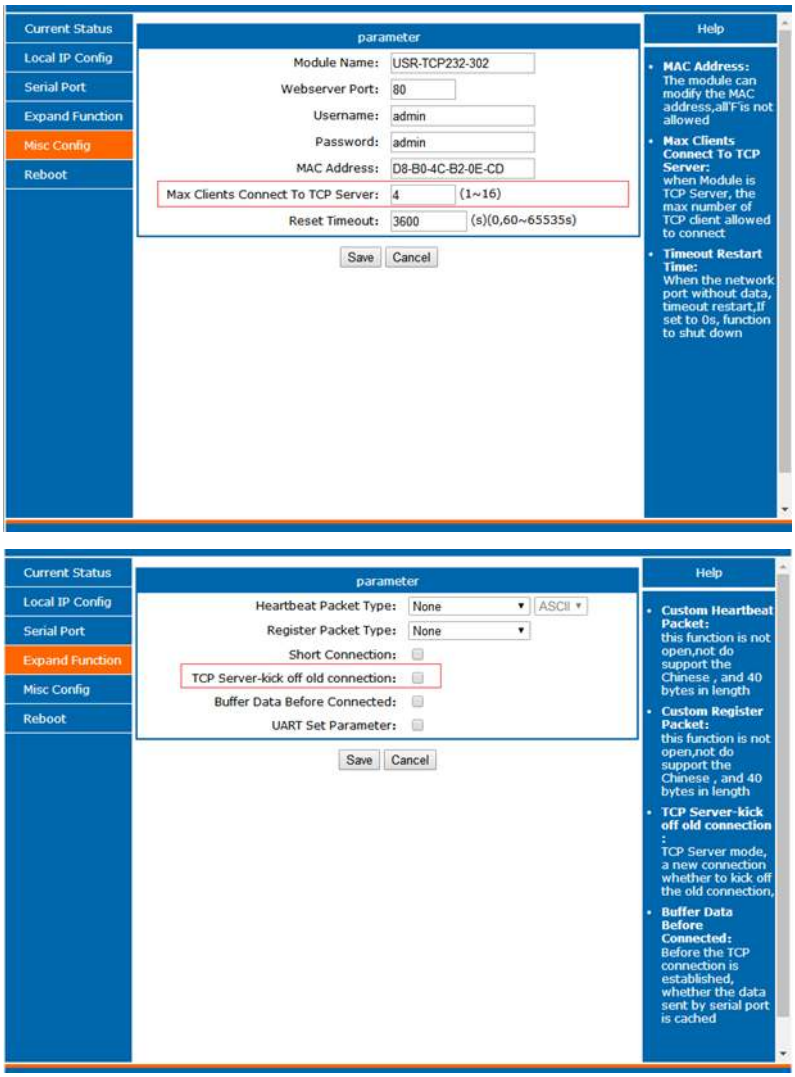


Figure 17 TCP Server Setting

2.4.7. NON-PERSISTENT CONNECTION

RS485 TO ETH support non-persistent connection function in TCP Client mode. When RS485 TO ETH adopt this function, RS485 TO ETH 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 RS485 TO ETH with non-persistent connection function by web server as follow:

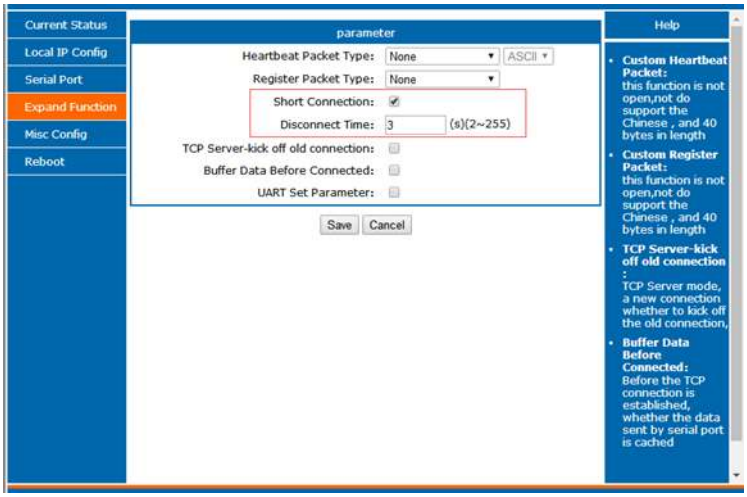


Figure 18 Non-persistent Connection

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), 304 will reset. User can set the Timeout Reset function by web server as follow:

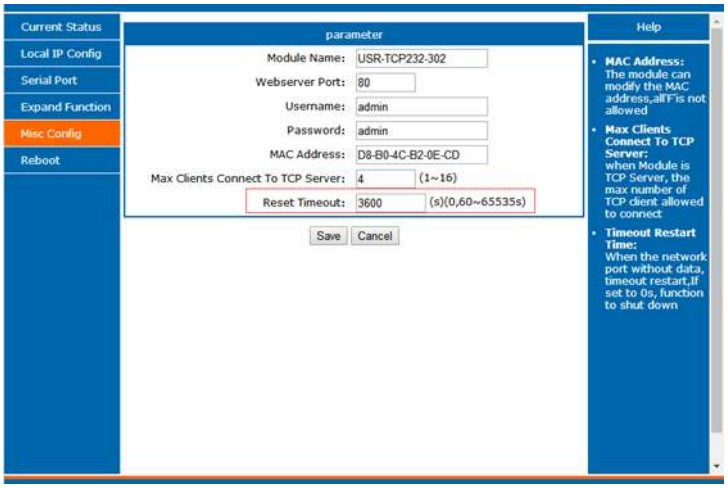


Figure 19 Timeout Reset Function

3. PARAMETER SETTING

There are three ways to configure RS485 TO ETH. They are setup software configuration, web server configuration and AT command configuration.

3.1. SETUP SOFTWARE CONFIGURATION

User can download setup software from Waveshare Wiki. When user want to configure the RS485 TO ETH by setup software, user can run setup software, search RS485 TO ETH in same LAN and configure the RS485 TO ETH as follow:

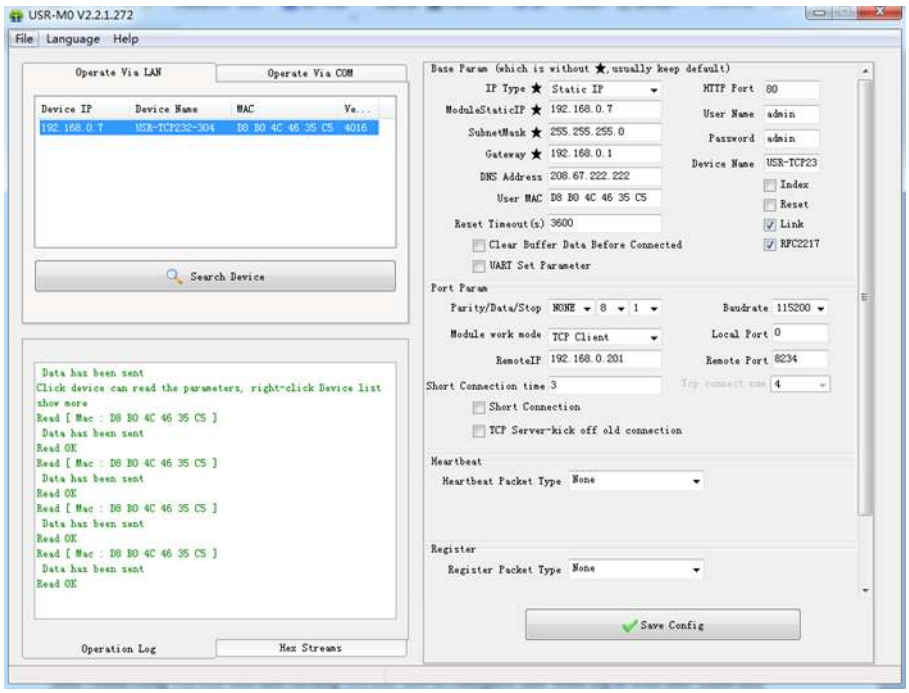


Figure 20 Setup Software

After researching RS485 TO ETH and clicking RS485 TO ETH 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 RS485 TO ETH through LAN port and enter web server to configure. Web server default parameters as follow:

Table 2 Web Server Default Parameters

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

After firstly connecting PC to RS485 TO ETH, 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:

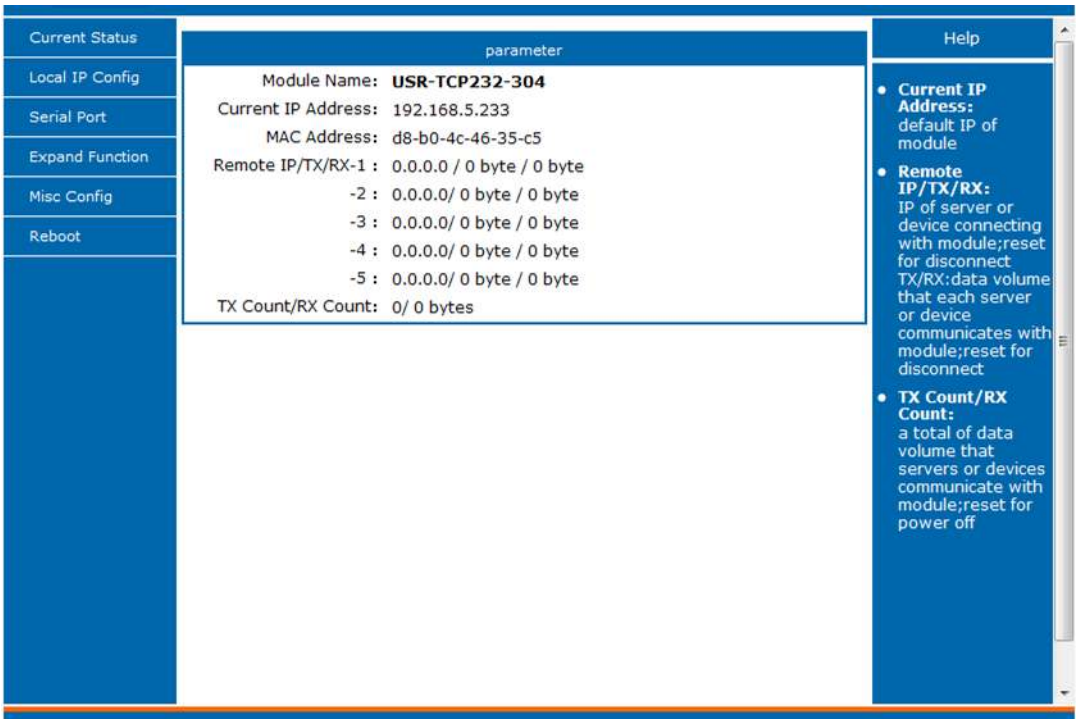


Figure 21 Web Server

3.3. AT COMMAND

For AT commands, please refer to specific AT command manual.

3.3.1. SERIAL AT COFMMAND

In transparent mode, user can enter AT command mode, then user can send AT command to module.

Enter AT Command Mode:

- Connect module to PC via UART interface (a UART to USB module is required)
- Open Serial Assistant software on PC, and set it to 115200 8N1
- Send “+++” to module, it responses “a”
- Send “a” to confirm, and you will get a response “+OK”. Now you enter the Command Mode successfully.

4. CONTACT US

Email:

(order/shipment) sales@waveshare.com

(tech support) service@waveshare.com

(complaint) complaint@waveshare.com

(apply for distributor) distributor@waveshare.com

Skype:

(order/shipment) sales@waveshare

(tech support) service@waveshare

Whatsapp: 86-13148830755

Phone: 86-755-82807524

Fax: 86-755-83042572

Address: Waveshare Electronics 10F, International Science & Technology Building, Fuhong Rd, Futian District, Shenzhen, China

Website: www.waveshare.com

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