



## WAVESHARE Ethernet Converter EU Head User Manual

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RS232/485 TO ETH  
User Manual



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## FEATURES

- 10/100Mbps Ethernet interface and support Auto-MDI/MDIX.
- Support TCP Server, TCP Client, UDP Client, UDP Server, HTTP Client.
- Support configuring through Web Server
- Support RS232 and RS485 and they can work independently.
- Support RTS/CTS hardware flow control and Xon/Xoff software flow control.
- Support USR-VCOM.
- Support Modbus Gateway.
- Support serial port baud rate 600bps~230.4K bps; support None, Odd, Even, Mark, Space parity way.
- Support Static IP or DHCP.
- Support Websocket function.
- Support Reload button to reset to default settings by hardware way.
- Support Keep-alive.
- Support timeout restart function and timeout reconnect function

## GET START

Product link: [https://www.waveshare.com/wiki/RS232/485\\_TO\\_ETH](https://www.waveshare.com/wiki/RS232/485_TO_ETH)

Setup software: [https://www.waveshare.com/wiki/RS232/485\\_TO\\_ETH\\_Software](https://www.waveshare.com/wiki/RS232/485_TO_ETH_Software)

Demo Code: [https://www.waveshare.com/wiki/File:PC\\_Socket\\_Demo.zip](https://www.waveshare.com/wiki/File:PC_Socket_Demo.zip)

### 1.1. APPLICATION DIAGRAM



Figure 1 Application Diagram

## 1.2. HARDWARE DESIGN

### 1.2.1. HARDWARE DIMENSIONS



Unit:mm

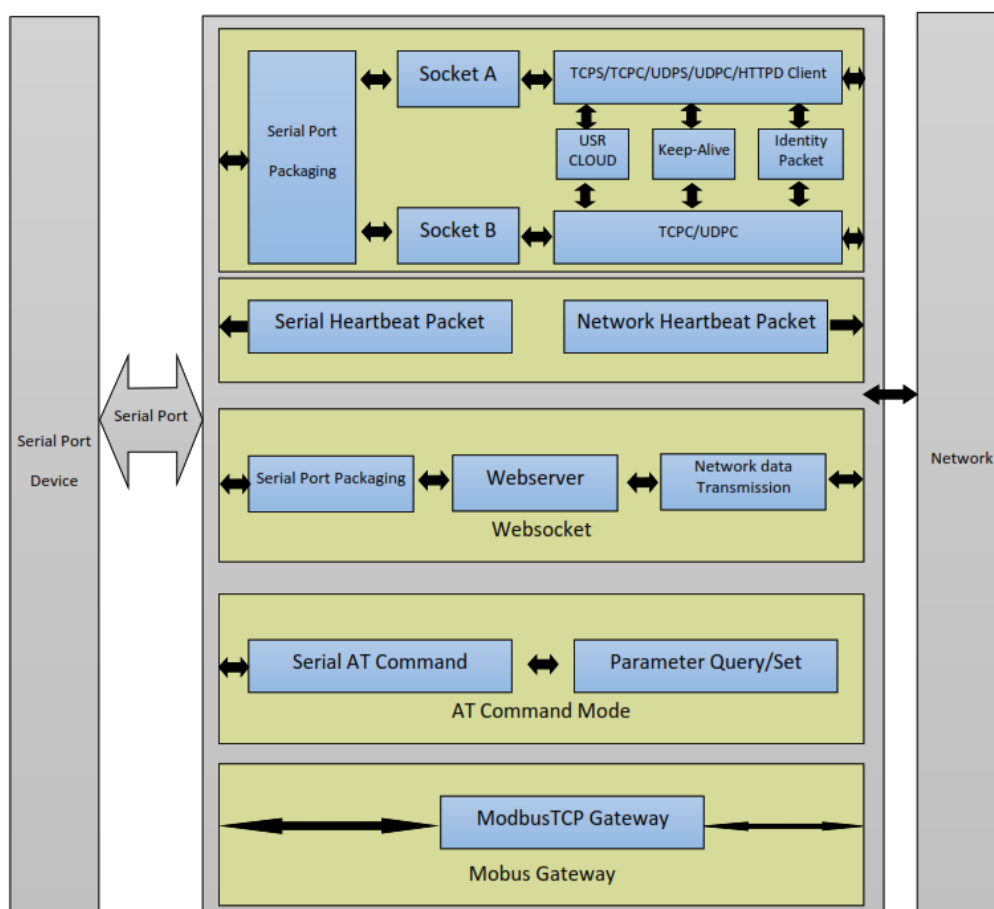
Figure 2 Hardware Dimensions

### 1.2.2. LED

LED	Status
POWER	Light: Power on
	Off: Power off
WORK	Blink: Working normally
	Off or light: Not working normally
232TX	Blink: Sending data to serial(RS232)
	Off: No data sending to serial(RS232)
232RX	Blink: Receiving data from serial(RS232)
	Off: No data receiving from serial(RS232)
485TX	Blink: Sending data to serial(RS485)
	Off: No data sending to serial(RS485)
485RX	Blink: Receiving data from serial(RS485)
	Off: No data receiving from serial(RS485)

## PRODUCT FUNCTIONS

This chapter introduces the functions of USR-TCP232-RS232/485 TO ETH as the following diagram shown, you can get an overall knowledge of it.



## BASIC FUNCTIONS

## STATIC IP/DHCP

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

**Static IP:** The default setting of the module is Static IP and the default IP is 192.168.0.7. When the user configures the module in Static IP mode, the user needs to 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 a user connects RS232/485 TO ETH directly to PC, the module can't be set in DHCP mode. Because the common computer does not have the ability to assign IP addresses.

## RESET TO DEFAULT SETTINGS

**Hardware:** Power off the RS232/485 TO ETH and press Reload button, then power on the RS232/485 TO ETH and keep pressing Reload button over 5 seconds can reset to default settings. **Software:** User can also reset to default settings through setup software for RS232/485 TO ETH.

**AT command:** User can send AT+RELD to reset to default settings.

## SOCKET FUNCTIONS

RS232/485 TO ETH supports dual sockets mode. Socket A supports TCP Server, TCP Client, UDP, Server, UDP Client and HTTP Client. Socket B supports TCP Client and UDP Client.

### TCP CLIENT

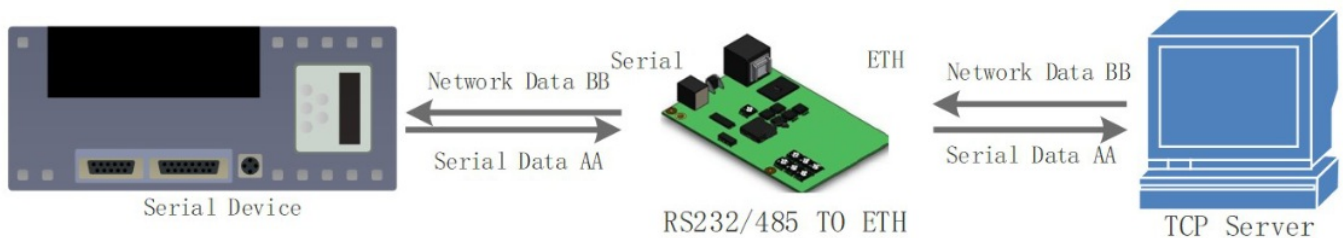


Figure 4 TCP Client

TCP Client provides Client connections for TCP network services. TCP Client device will connect to the server to realize data transmission between the serial port device and server. According to the TCP protocol, TCP Client has connection/disconnection status differences to ensure reliable data transmission. TCP Client mode supports Keep-Alive function: After establishing a connection, RS232/485 TO ETH will send Keep-Alive package in every 15 seconds to check TCP connection and RS232/485 TO ETH will disconnect and reconnect to the server if any connection exception occurs. TCP Client mode also supports baud rate synchronization, USR Cloud, and Modbus gateway. RS232/485 TO ETH works in TCP Client mode needs connect to TCP Server and needs set the parameter: Remote IP/Port. RS232/485 TO ETH works in TCP Client won't accept another connection request except for target server and will access server with random local port if configuring the local port to 0.

### TCP SERVER

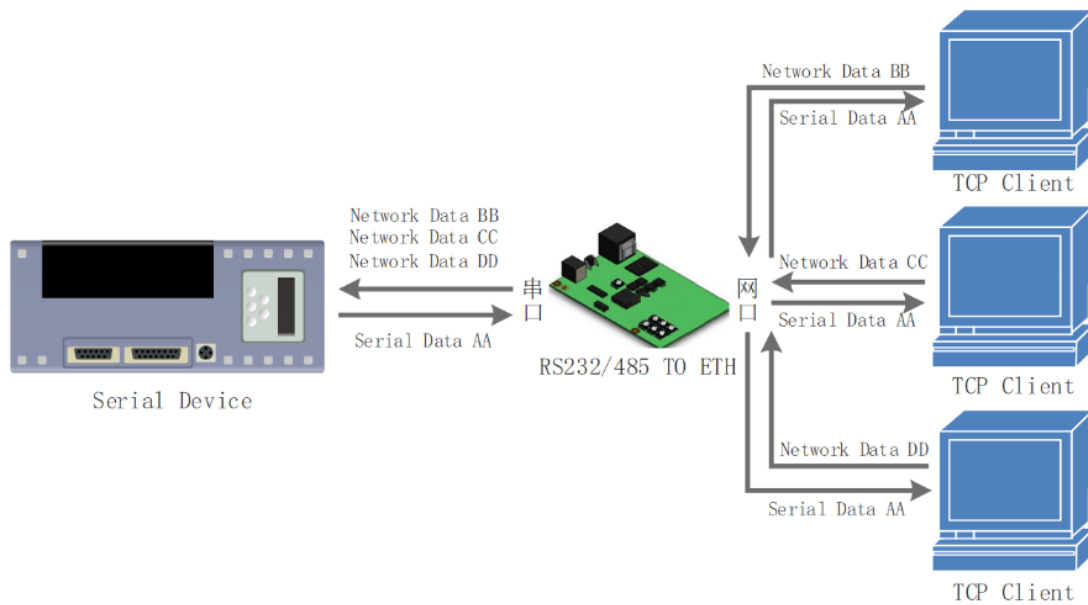


Figure 5 TCP Server

RS232/485 TO ETH works in TCP Server mode will listen to network connections and build network connections, commonly be 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. RS232/485 TO ETH works 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 RS232/485 TO ETH in TCP Server mode simultaneously. RS232/485 TO ETH works in TCP Server mode supports 8 client connections at most. RS232/485 TO ETH also supports the Keep-Alive function, baud rate synchronization, and Modbus gateway.

## UDP CLIENT

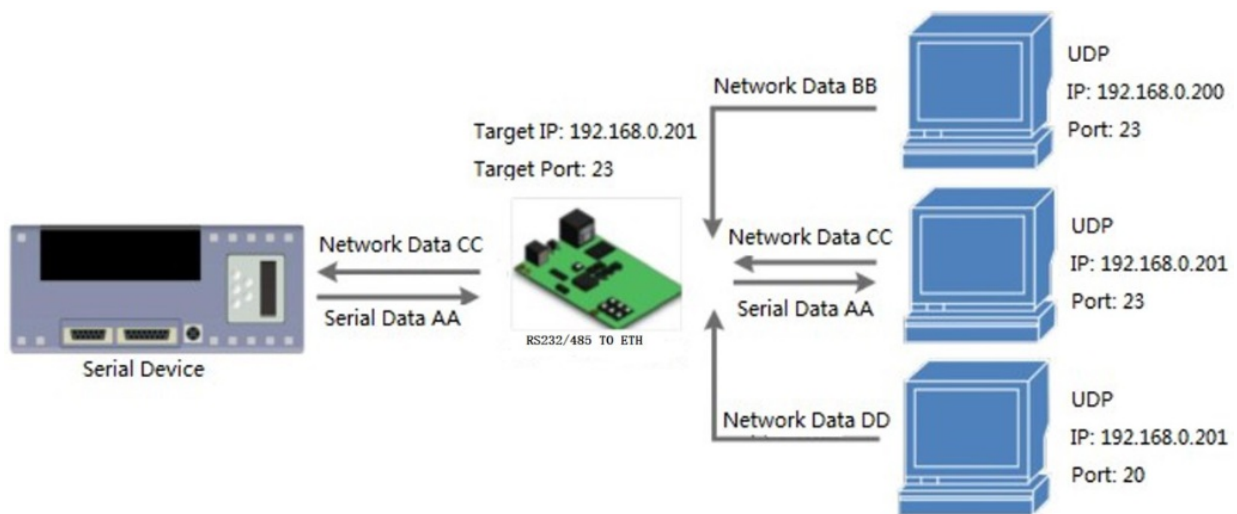


Figure 6 UDP Client

UDP transport protocol provides simple and unreliable communication services. No connection connected /disconnected. The user only needs to configure Remote IP/Port then can realize data transmission.

In UDP Client mode, RS232/485 TO ETH will only communicate with Remote IP/Port. If data don't from Remote IP/Port, it won't be received by RS232/485 TO ETH.

In UDP client mode, if the user configures Remote IP to 255.255.255.255, RS232/485 TO ETH can achieve UDP broadcast to all network segments and receive broadcast data. Users can also configure Remote IP to xxx.xxx.xxx.255 to realize UDP broadcast in the same network segment.

## UDP SERVER



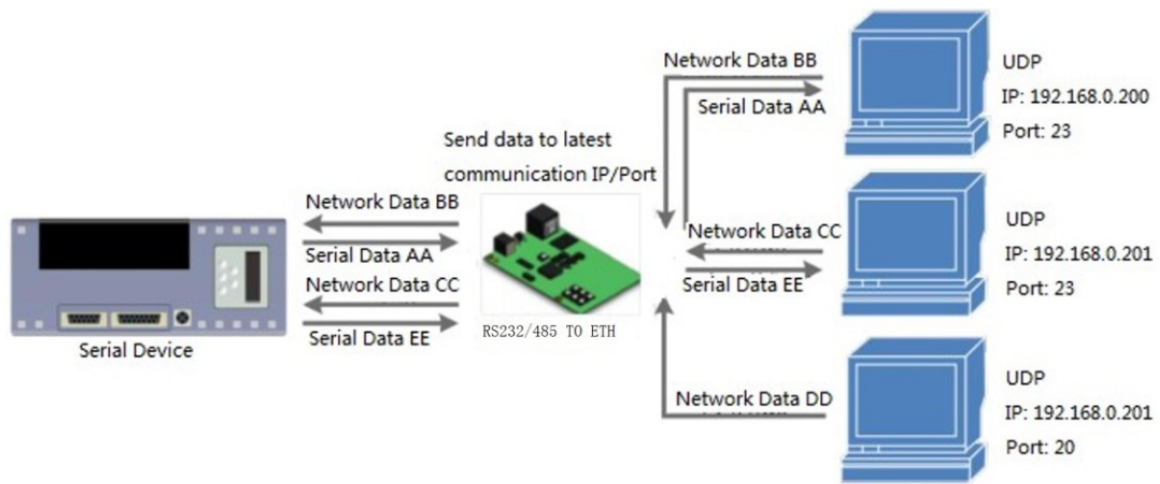


Figure 7 UDP Server

In UDP Server mode, RS232/485 TO ETH will change Remote IP every time after receiving UDP data from a new IP/Port and will send data to the latest communication IP/Port.

## HTTP CLIENT



Figure 8 HTTP Client

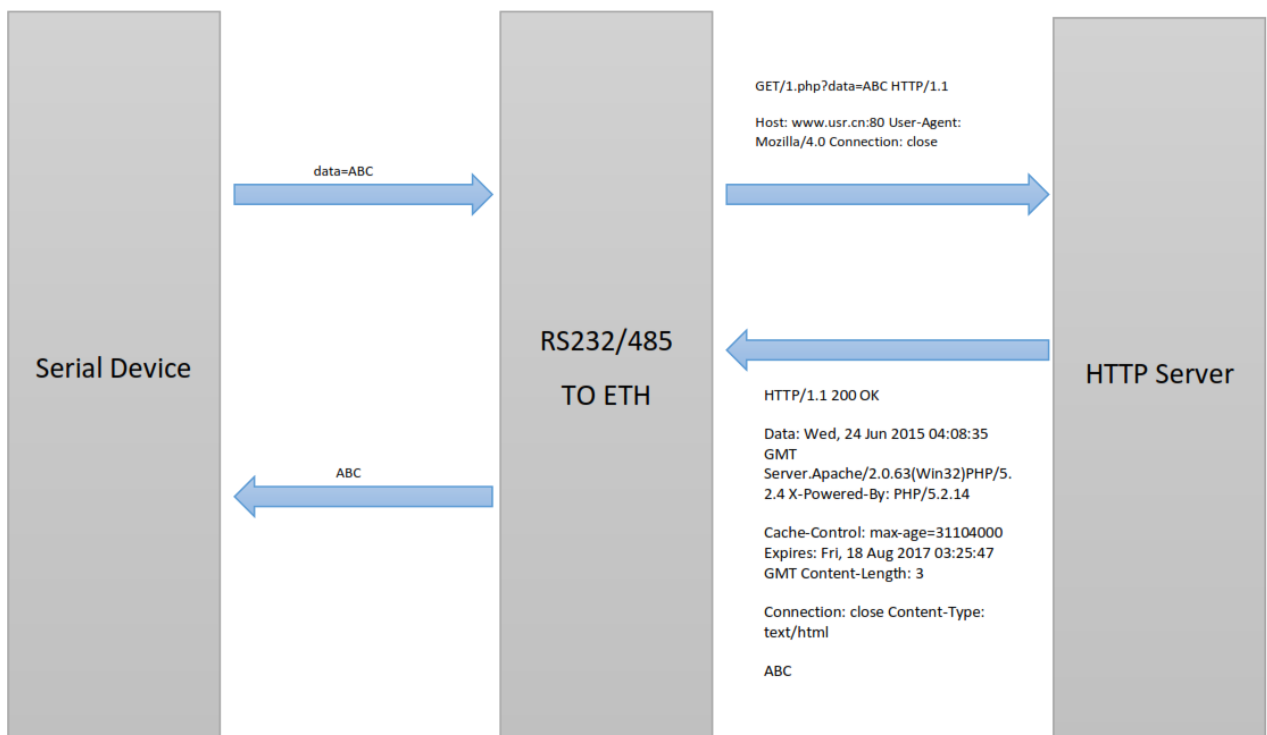


Figure 9 HTTP Client

In HTTP Client mode, RS232/485 TO ETH can achieve data transmission between the serial port device and HTTP server. The user just needs to configure RS232/485 TO ETH in HTTP Client and configure the HTTP header, URL, and some other related parameters, then can achieve data transmission between the serial port device and HTTP server and don't need to care about the HTTP format of data.

## WEBSOCKET



Figure 10 WebSocket

WebSocket function can achieve real-time interaction between RS232 interface and Web Server and display user data on Web Server.

## SERIAL PORT

### SERIAL PORT BASIC PARAMETERS

Parameters	Range
Baud Rate	600~230.4Kbps
Data Bits	5, 6, 7, 8
Stop Bits	1, 2
Parity Bits	None, Odd, Even, Mark, Space

## VCOM APPLICATION

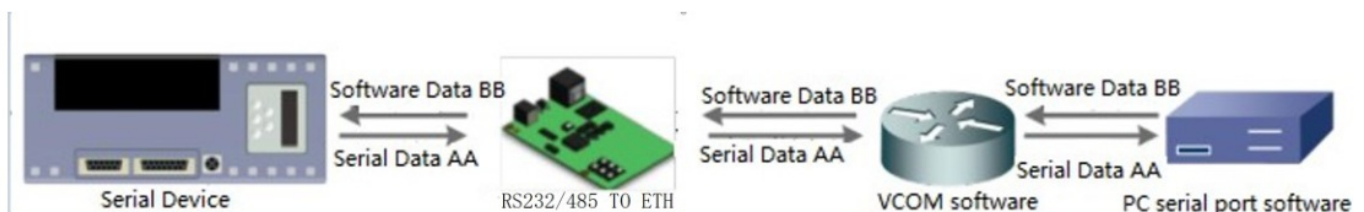


Figure 11 Serial port basic parameters

User can download VCOM software from Figure 14 VCOM application

[https://www.waveshare.com/wiki/RS232/485\\_TO\\_ETH\\_Software](https://www.waveshare.com/wiki/RS232/485_TO_ETH_Software).

Through this software, the user can set up a connection between RS232/485 TO ETH and virtual serial to solve the problem that traditional equipment PC software used in serial port communication way.

## FLOW CONTROL



RS232/485 TO ETH supports hardware flow control way ( RTS/CTS, only take effect in RS232 mode ) and software flow control way Xon/Xoff.

## SERIAL PACKAGE METHODS

For network, speed is faster than serial. The module will put serial data in the buffer before sending it to the network. The data will be sent to the network side as a data package. There are 2 ways to end the package and send the package to the network side – Time Trigger Mode and Length Trigger Mode.

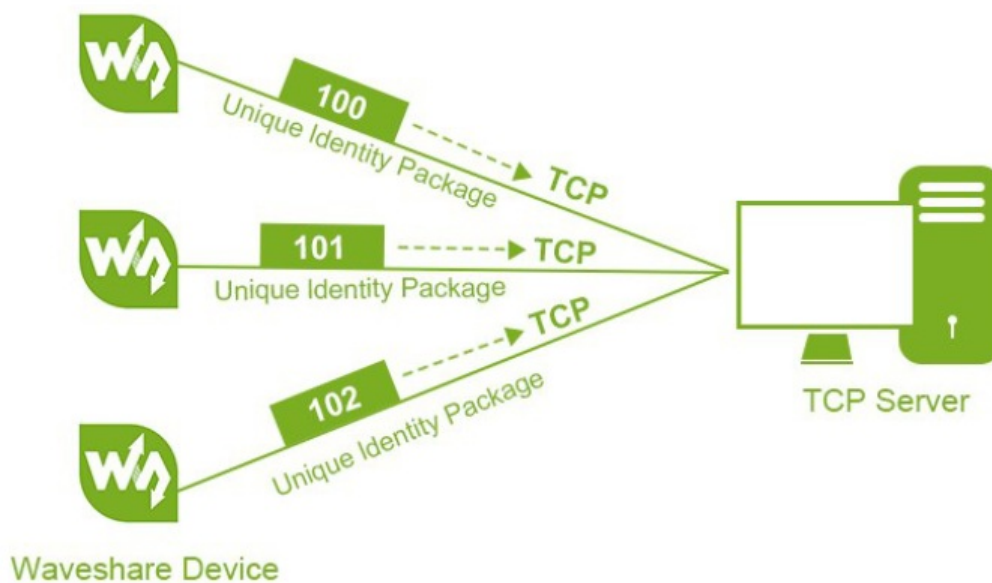
- RS232/485 TO ETH serial package time: Default is 4 bytes sending time, range from 0 to 255.
- RS232/485 TO ETH serial package length: Default is 1460 bytes, range from 0 to 1460.

## BAUD RATE SYNCHRONIZATION

When the module works with USR devices or software, serial parameters will change dynamically according to the network protocol. Users can modify serial parameters by sending data conformed to the specific protocol via a network. It is temporary, after restarting DTU, the parameters will back to the original parameters.

## FEATURES

### IDENTITY PACKET FUNCTION



**Figure 12 Identity Packet application diagram**

Identity packet is used for identifying the device when RS232/485 TO ETH works as TCP client/UDP client. There are two methods to send identity packets.

- Identity packet will be sent after the connection is established.
- Identity packet will be added on the front of every data package.

Identity packets can be MAC addresses or user-editable identity packets. User editable identity packet should less than 40 bytes.

### HEARTBEAT PACKET FUNCTION

Heartbeat packet: RS232/485 TO ETH will output heartbeat packet to the serial side or network side periodic. Users can configure the heartbeat packet data and sending interval. A serial heartbeat packet can be used for polling Modbus data. Network heartbeat packet can be used for showing connection status and keeping the connection (only take effect in TCP/UDP Client mode).

## NON-PERSISTENT CONNECTION

RS232/485 TO ETH support non-persistent connection function in TCP Client mode. When RS232/485 TO ETH adopts this function, RS232/485 TO ETH will connect to the server and send data after receiving data from the serial port side and will disconnect to the server after sending all the data to the server and no data from the serial port side over 3s.

## MODBUS GATEWAY

Modbus gateway includes Modbus RTU transparent transmission, Modbus ASCII transparent transmission, Modbus RTU<=>Modbus TCP protocol conversion, Modbus polling, and serial port query.

Modbus RTU<=>Modbus TCP: Set RS232/485 TO ETH in TCP Server or TCP Client mode, the user can set RS232/485 TO ETH with Modbus RTU<=>Modbus TCP function. Data transmission diagram as follow:



Figure 13 Modbus RTU<=>Modbus TCP

Modbus polling: RS232/485 TO ETH support Modbus polling function.

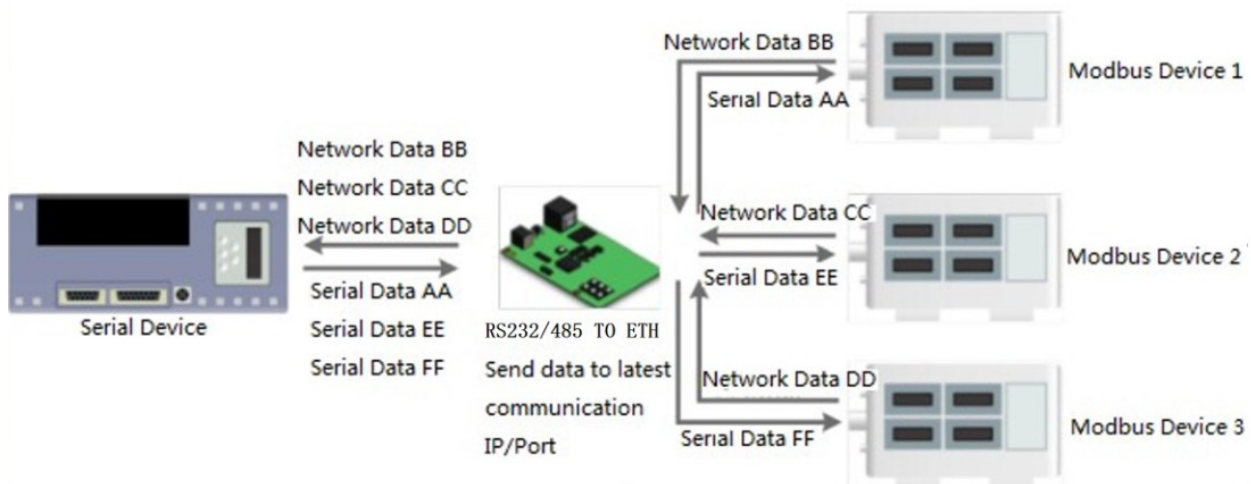


Figure 14 Modbus polling

## NETWORK PRINTING

The network printing function is similar to the printer server. Through the existing printing driver, it can be modified slightly and realize the network printing function by the original serial printer.

## EDITABLE WEB SERVER

RS232/485 TO ETH supports modifying the Web Server based on template according to needs, then using the related tools to upgrade. If the user has this demand can contact our salespersons for Web Server source and tool.

## PARAMETER SETTING

There are three ways to configure RS232/485 TO ETH. They are set up the software, Web Server, and AT

command.

## SETUP SOFTWARE

User can download setup software from

[https://www.waveshare.com/wiki/RS232/485\\_TO\\_ETH\\_Software](https://www.waveshare.com/wiki/RS232/485_TO_ETH_Software)

When the user wants to configure the RS232/485 TO ETH by setup software, the user can run setup software, search RS232/485 TO ETH in the same LAN and configure the RS232/485 TO ETH as follow:

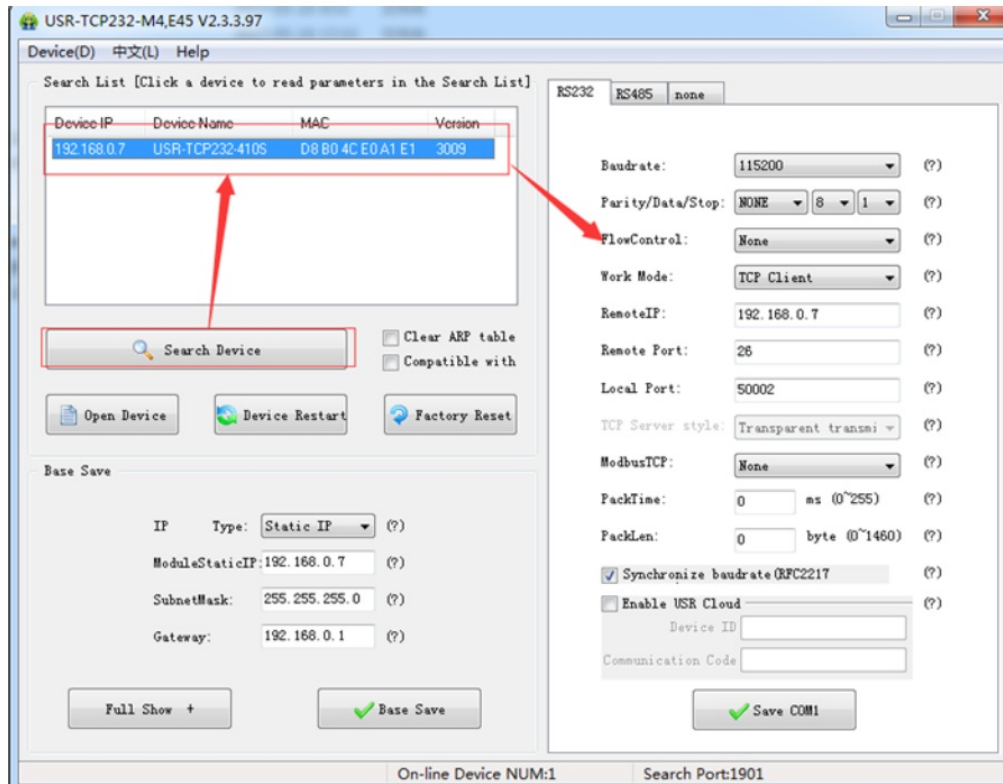


Figure 15 Setup software

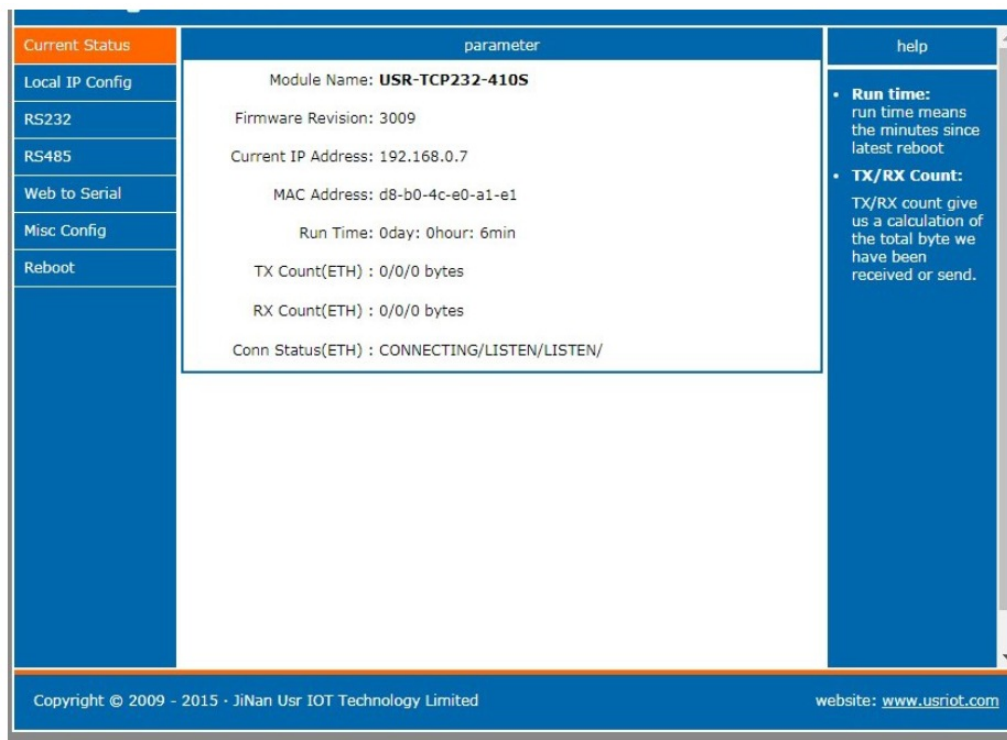
After researching RS232/485 TO ETH and clicking RS232/485 TO ETH to configure, the user needs to log in with the user name and password. Default user name and password both are admin. If the user keeps the default parameters, it is not necessary to log in.

## WEBSERVER

Users can connect PC to RS232/485 TO ETH 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

After firstly connecting the PC to RS232/485 TO ETH, the user can open a browser and enter the default IP 192.168.0.7 into the address bar, then log in user name and password, the user will enter Web Server. Web Server screenshot as follow:



**Figure 16 Web Server**

## AT COMMAND

We have a specific user manual for AT commands.

### SERIAL AT COMMAND

In work mode, the user can enter AT command mode and send AT commands to the module to configure the module.

### NETWORK AT COMMAND

Network AT command is to send a search keyword by broadcast, then set the parameters in a single broadcast way (If a user wants to use network AT command, module, and PC which send the network AT command must in same network segment). If the user enters network AT command mode but doesn't send any command over 30 seconds, the module will exit network AT command mode. User can enter network AT command mode as the following way:

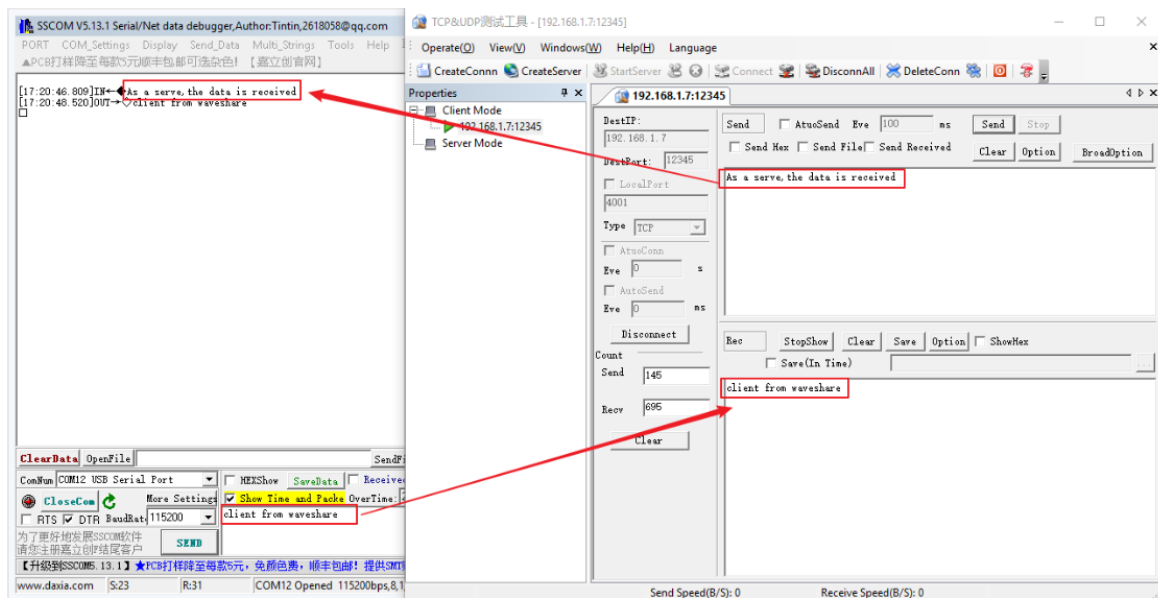


Figure 17 Network AT Command

## CONTACT US

Email:

(order/shipment) : [sales@waveshare.com](mailto:sales@waveshare.com)

(tech support) : [service@waveshare.com](mailto:service@waveshare.com)

(complaint) : [complaint@waveshare.com](mailto:complaint@waveshare.com)

(apply for distributor) : [distributor@waveshare.com](mailto:distributor@waveshare.com)

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Fuhong Rd, Futian District, Shenzhen, China.

Website: [www.waveshare.com](http://www.waveshare.com)

## DISCLAIMER

This document provides the information of USR-TCP232-RS232/485 TO ETH products, it hasn't been granted any intellectual property license by forbidding speak or other ways either explicitly or implicitly. Except for the duty declared in sales terms and conditions, we don't take any other responsibilities. We don't warrant the product's sales and use explicitly or implicitly, including particular purpose merchant-ability and marketability, the tort liability of any other patent right, copyright, intellectual property right. We may modify specifications and descriptions at any time without prior notice.

## UPDATE HISTORY

- 2019-05-06 V1.0.0 Established.

[www.waveshare.com/wiki](http://www.waveshare.com/wiki)

## Documents / Resources



**WAVESHARE Ethernet Converter EU Head** [pdf] User Manual  
Ethernet Converter EU Head, RS232, 485 TO ETH

## References

- [🚶\\_4G\\_DTU\\_5G\\_ / /Lora/WIFI -](#)
- [📶Waveshare Electronics](#)
- [📶Waveshare Wiki](#)