USR-N510 User Manual

File Version: V1.0.8.01



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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 two sockets.
- 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 web server configuration.
- Support Websocket function.
- Support hardware Reload.
- Support Keep-alive.
- Support RS232/RS485/RS422.

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1. Get Start

Product link:
http://www.usriot.com/p/rs232rs485rs422-serial-ethernet-converter/
Setup software:
http://www.usriot.com/usr-tcp232-m4k3-setup-software



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

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1.2. Basic Test

1.2.1. Default Parameters

item	parameter
User name	admin
Password	admin
IP	192.168.0.7
Subnet mask	255.255.255.0
Network segment	192.168.0.1
Work mode	TCP Server
Local port	8899
Baudrate	115200
Parameter	None/8/1

Basic communication test:

1. Connect the N510 and pc with serial port line, users can connect the Ethernet port of N510 and pc with network cable directly, or connect the Ethernet port of N510 to the switchboard. Set the IP of N510 in the same network segment with pc;
2. Search N510 by USR-TCP232-M4,E45.exe , the parameters of N510 keep default;
3. Open USR-TCP232-Test.exe, set PC work at TCP Client mode

Now data can transmission from serial port to Ethernet port.

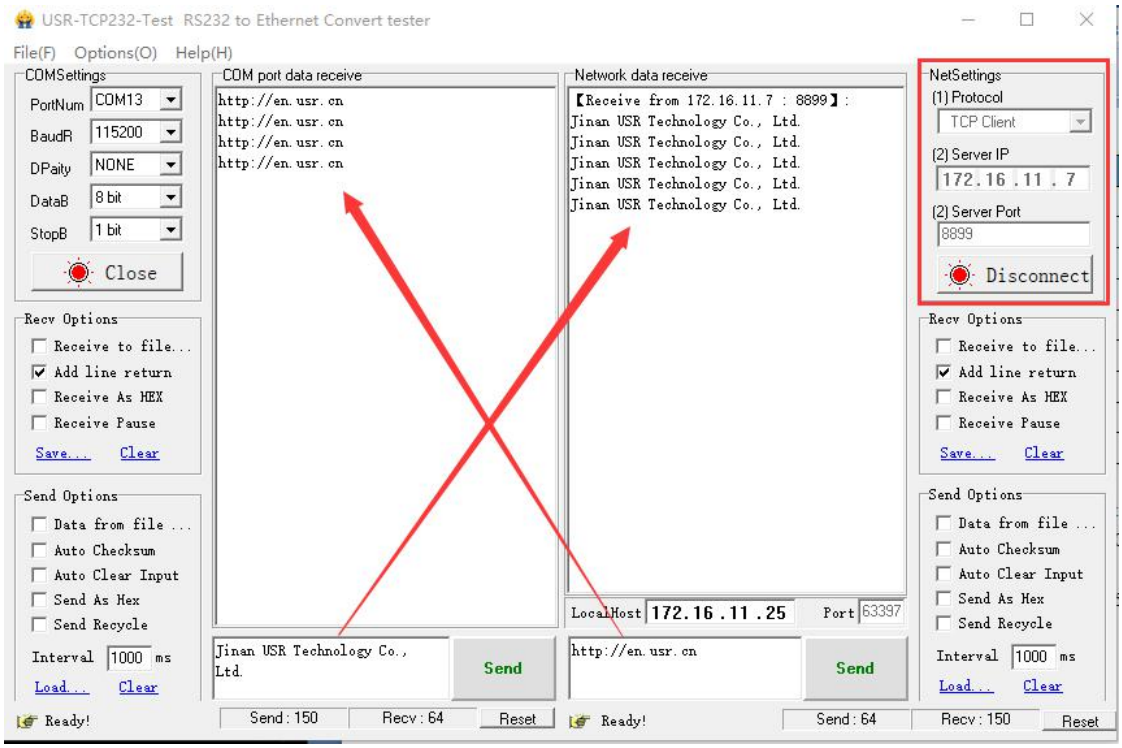


Figure 3 data transmission

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1.3. Hardware Design

1.3.1. Dial Switch

1.3.1.1. RS232 Mode

Dial switches are both down, the number 00. (up means 1, down means 0)



Figure 4 RS232

1.3.1.2. RS485 Mode

Dial switches are both up, the number 11. (up means 1, down means 0)



Figure 5 RS485

1.3.1.3. RS422 Mode

The left dial switch is up, the right side is down, the number 10. (up means 1, down means 0)



Figure 6 RS422

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1.3.2. Hardware Dimensions

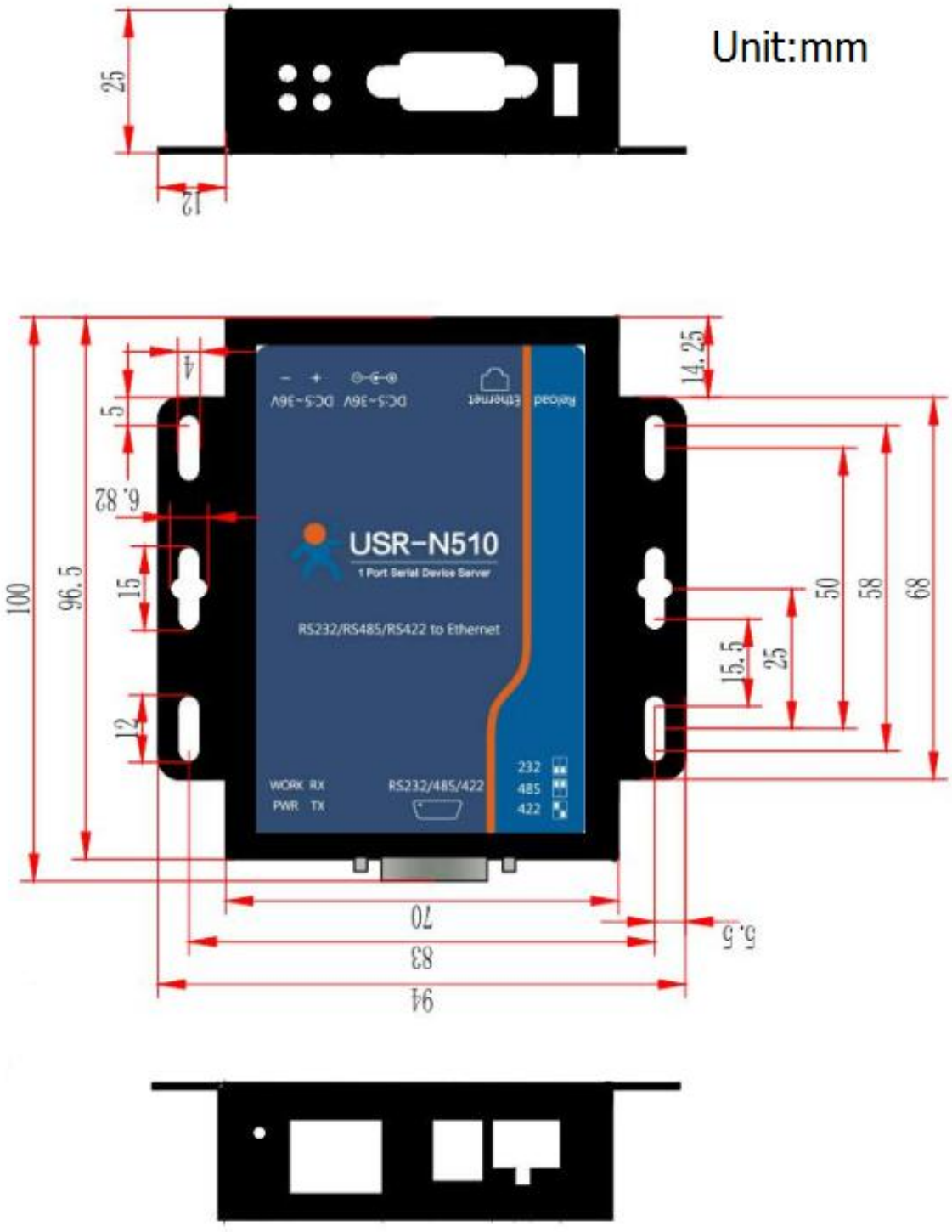


Figure 7 Hardware dimensions

1.3.3. LED Indicator

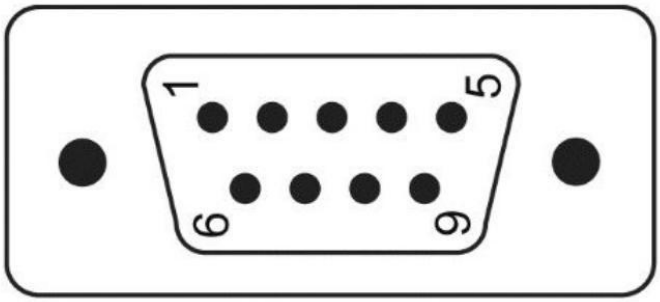
Indicator	Status
PWR	On: Power on

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	Off: Power off
WORK	On: Working
	Off: Not working
TX	On: Sending data to serial
	Off: No data sending to serial
RX	On: Receiving data from serial
	Off: No data receiving from serial

Figure 8 Hardware Indicator

1.3.4. DB9 Pin Definition



Pin Number	RS232	RS422	RS485
1			
2	RXD	RX+	
3	TXD	TX-	B-
4			
5	GND		
6			
7	RTS	TX+	A+
8	CTS	RX-	
9			

Figure 9 DB9 Pin definition

1.3.5. DB9 Pin-board

We provide DB9 pinboard for user to use terminal connection.

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Type	1	2	3	4	5
RS232		TX	RX		GND
RS485	A+	B-			GND
RS422	T+	T-	R+	R-	GND

Figure 10 DB9 pinboard

2. Product Functions

This chapter introduces the functions of USR-N510 as the following diagram shown, you can get an overall knowledge of it.

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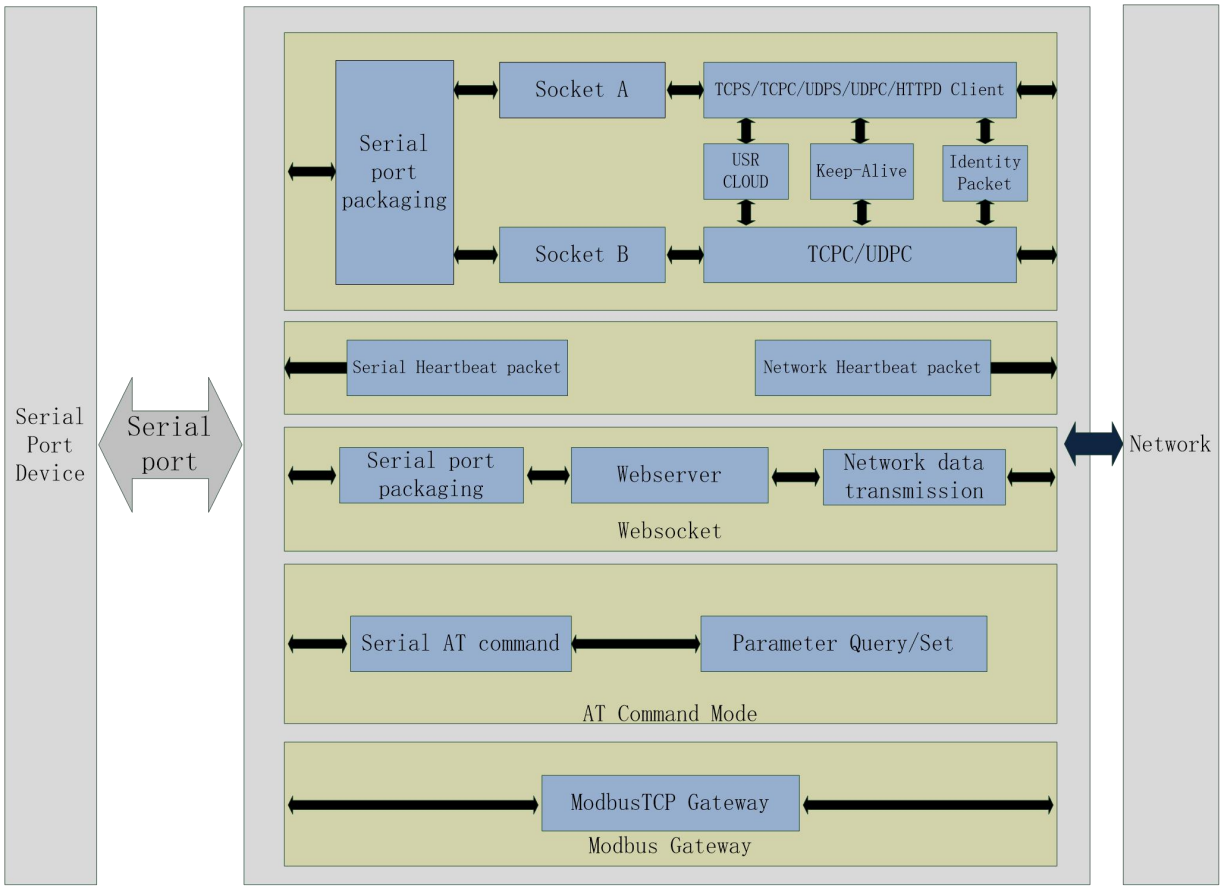


Figure 11 Product Functions diagram

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:

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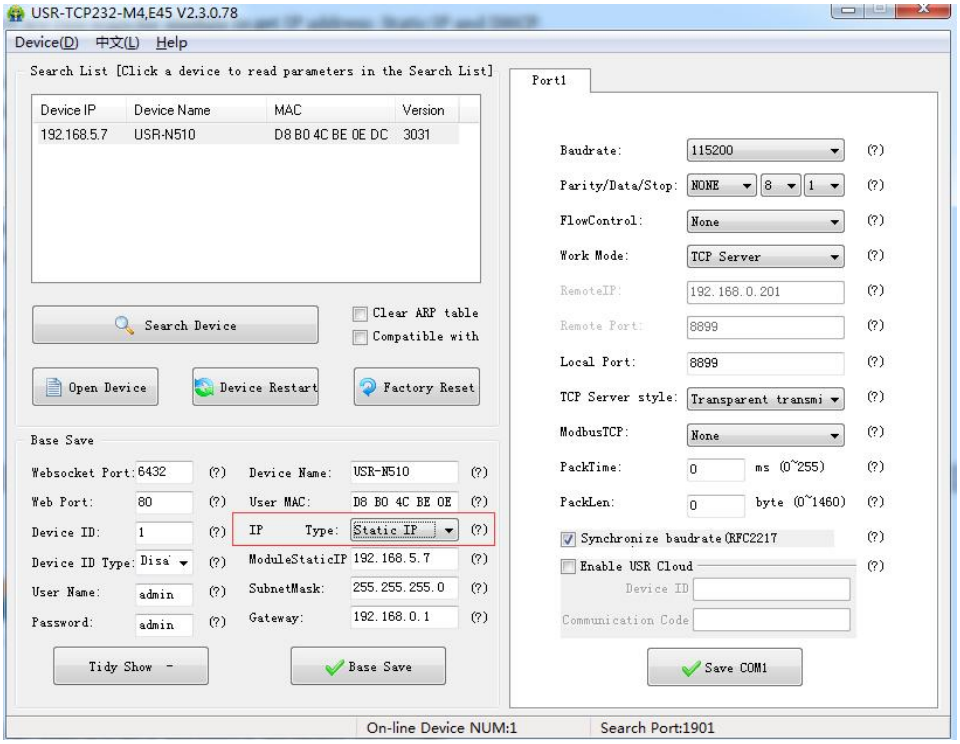


Figure 12 Static IP/DHCP

2.1.2. Hardware Restore Default Settings

User can press Reload over 5 seconds then release 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:

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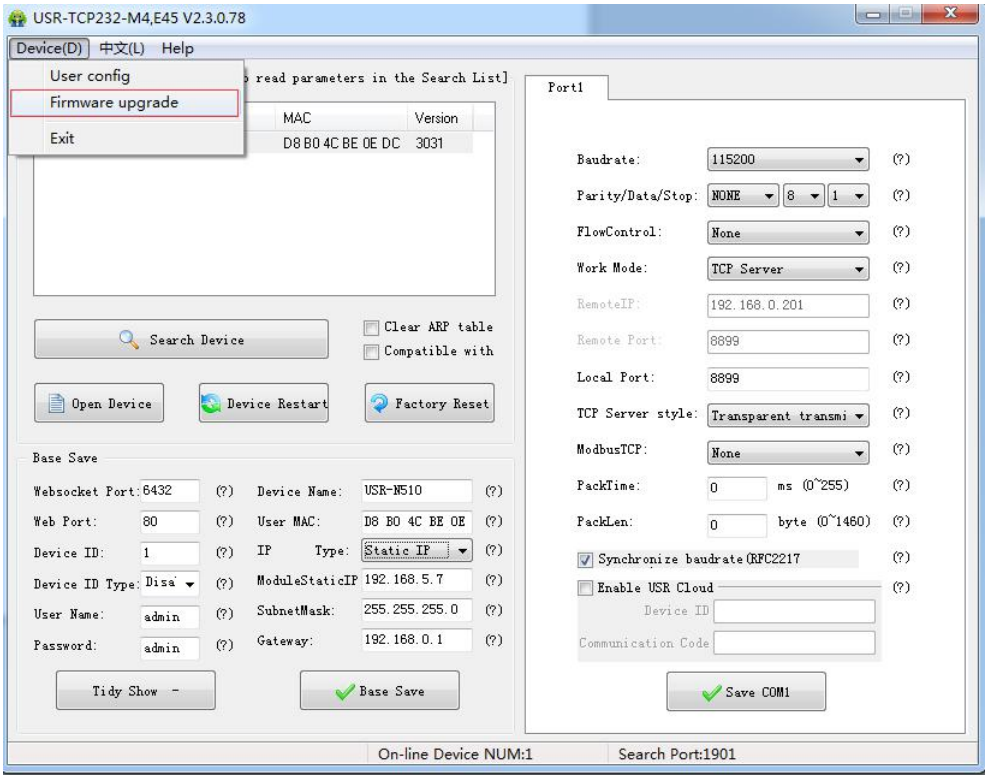




Figure 13 Upgrade firmware version

2.2. Socket Function

N510 support dual sockets mode. Socket A supports TCP Server, TCP Client, UDP Server, UDP Client and HTTPD Client. Socket B supports TCP Client and UDP Client.

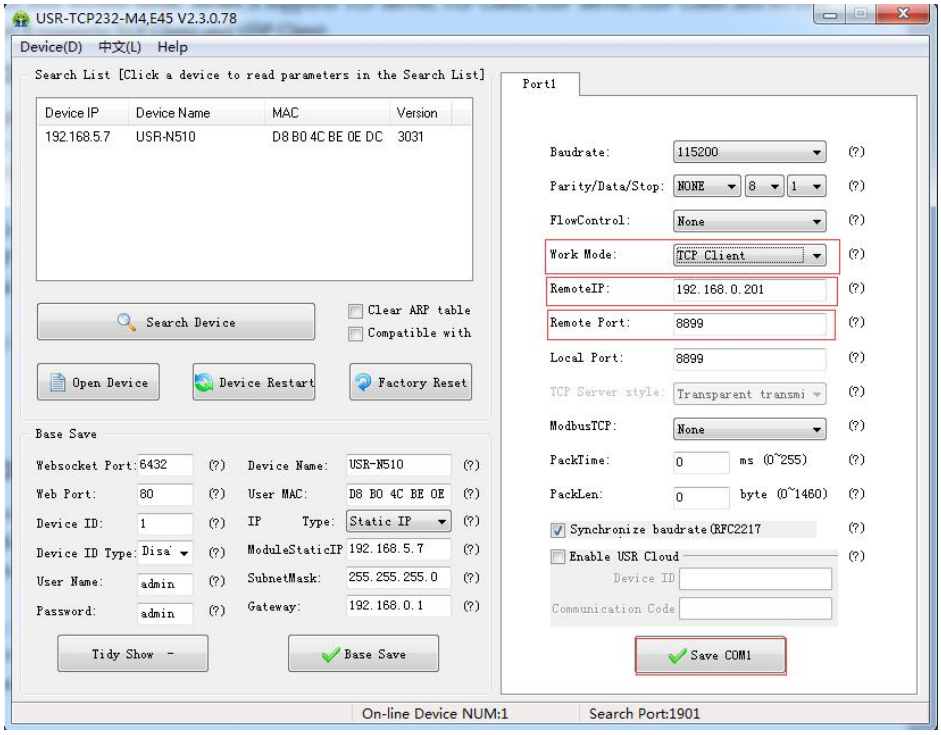
2.2.1. TCP Client

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.

N510 work in TCP Client mode need connect to TCP Server and need set the parameter: Remote IP/Port. N510 work in TCP Client won't accept other connection request except target server and will access server with random local port.

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User can set N510 in TCP Client mode and related parameters by setup software or web server as follows:



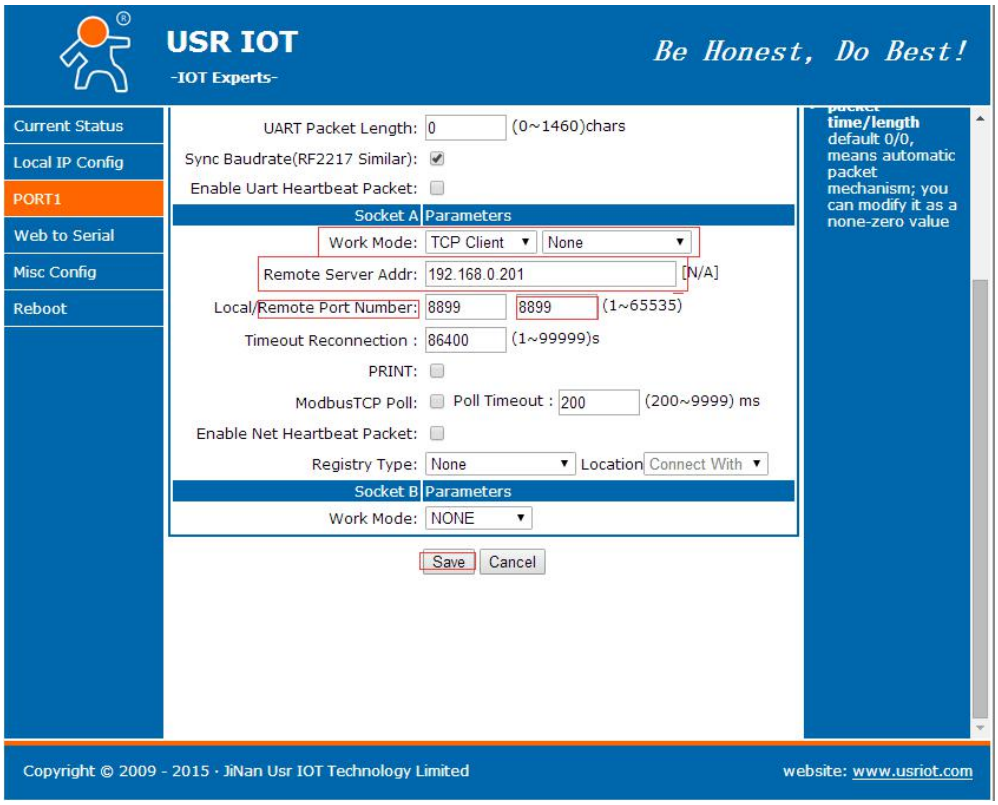


Figure 14 TCP Client

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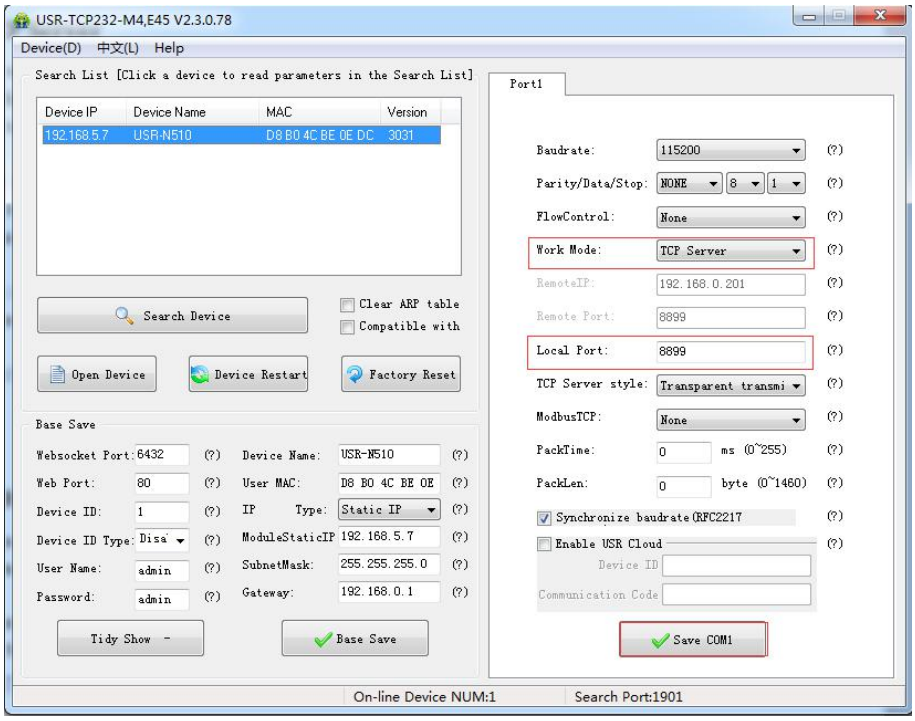
2.2.2. TCP Server

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.

N510 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 N510 in TCP Server mode simultaneously.

N510 work in TCP Server support 8 client connections at most and will kick off oldest connection beyond maximum connections.

User can set N510 in TCP Server mode and related parameters by setup software or web server as follows:



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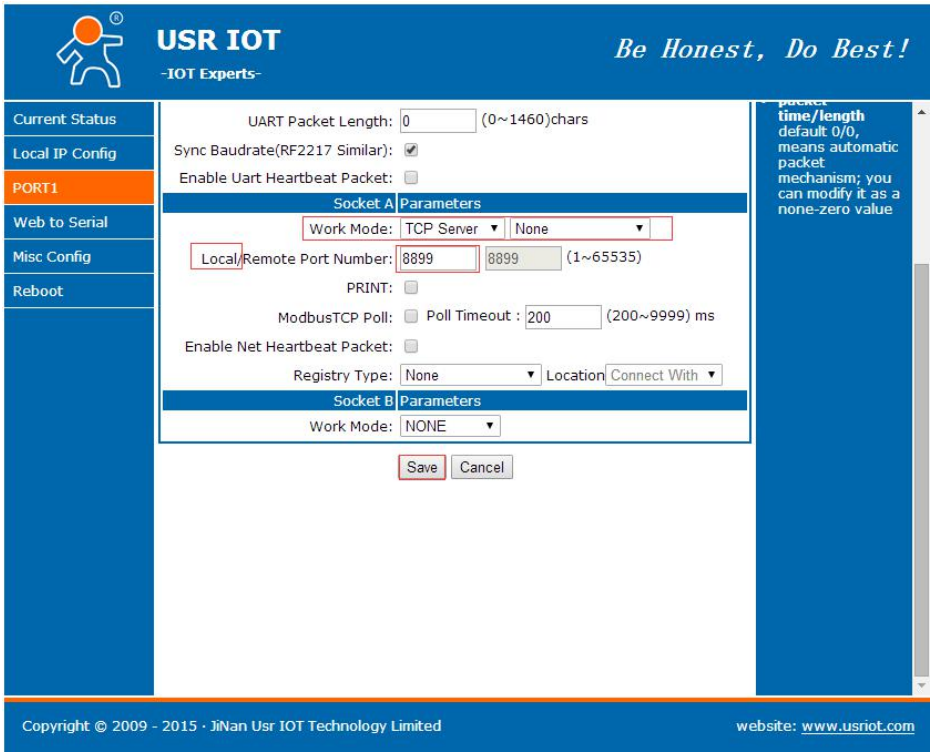


Figure 15 TCP Server

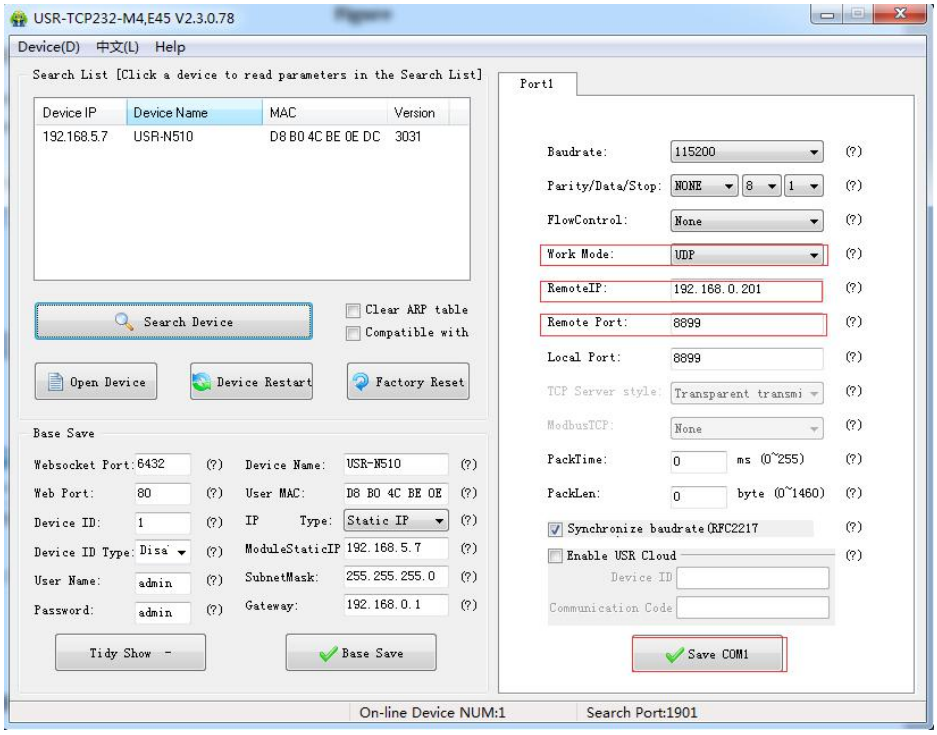
2.2.3. UDP Client

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

In UDP Client mode, N510 will only communicate with target IP/Port. If data not from target IP/Port, it won't be received by N510.

User can set N510 in UDP Client mode and related parameters by setup software or web server as follows:

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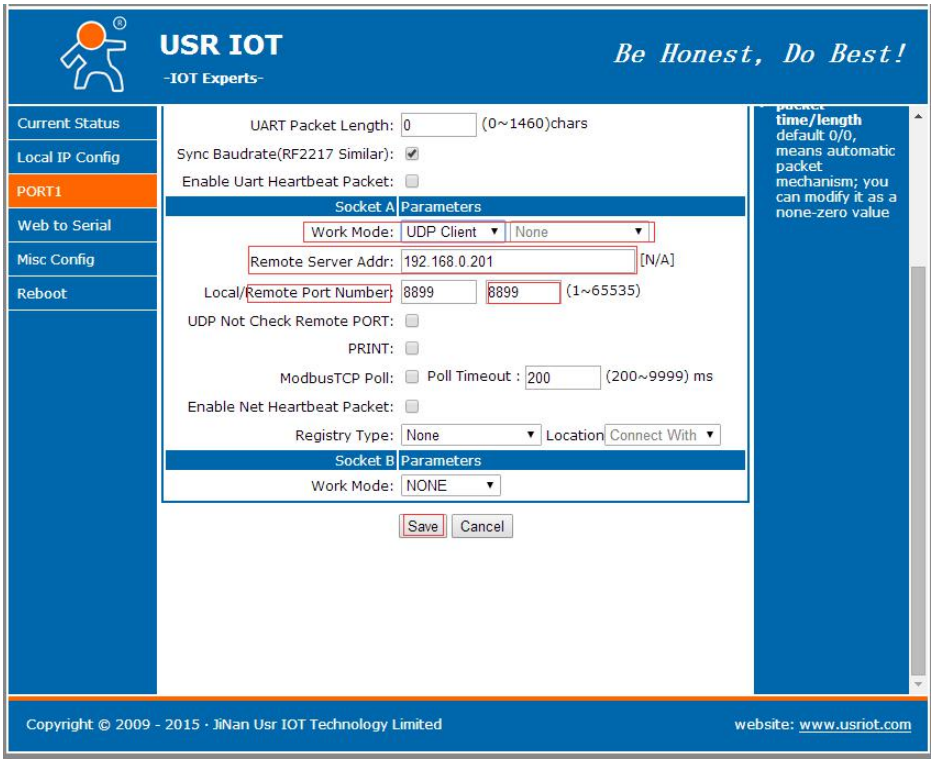


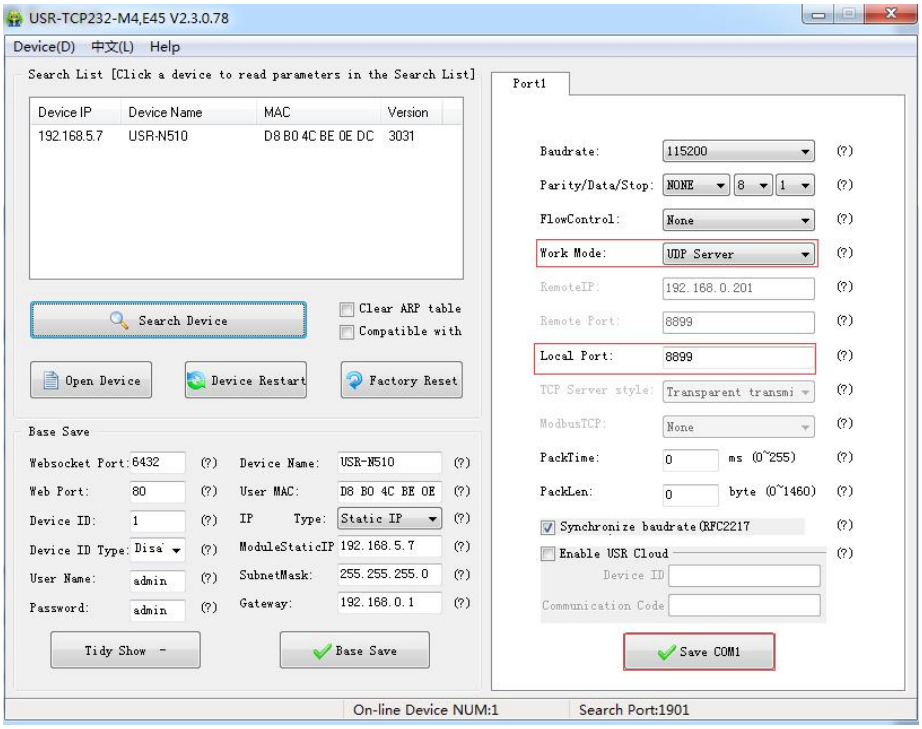
Figure 16 UDP Client

2.2.4. UDP Server

In UDP Server mode, N510 will change target IP every time after receiving UDP data from a new IP/Port and will send data to latest communication IP/Port.

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User can set N510 in UDP Server mode and related parameters by setup software or web server as follows:



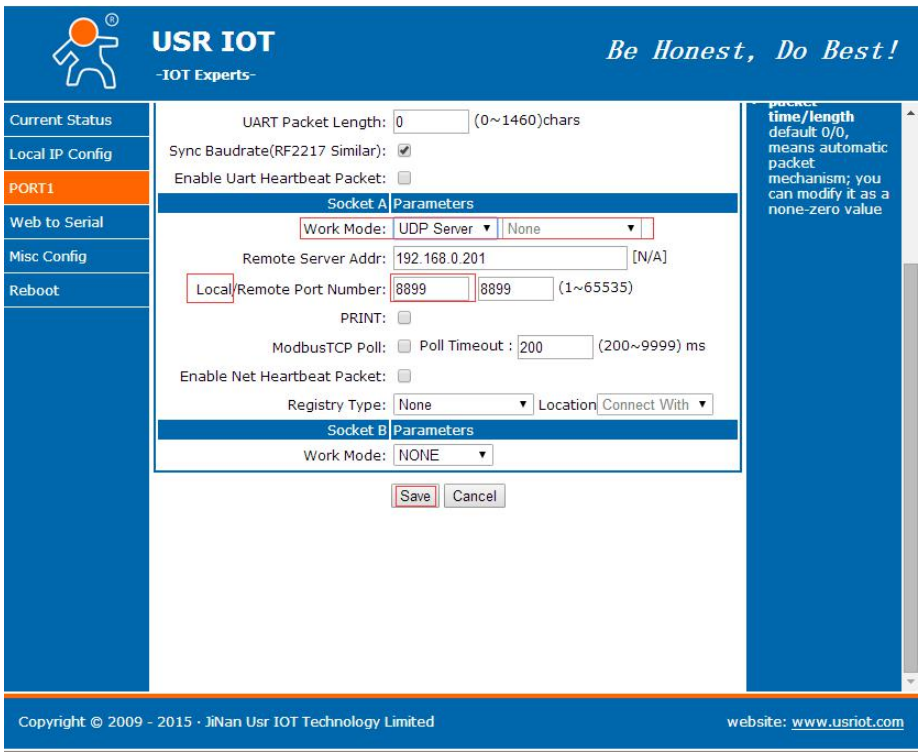


Figure 17 UDP Server

2.2.5. HTTPD Client

In HTTPD Client mode, N510 can achieve data transmission between serial port device and HTTP server. User just need set N510 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

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the HTTP format of data.User can set N510 in HTTPD Client mode and related parameters by web server as follow:

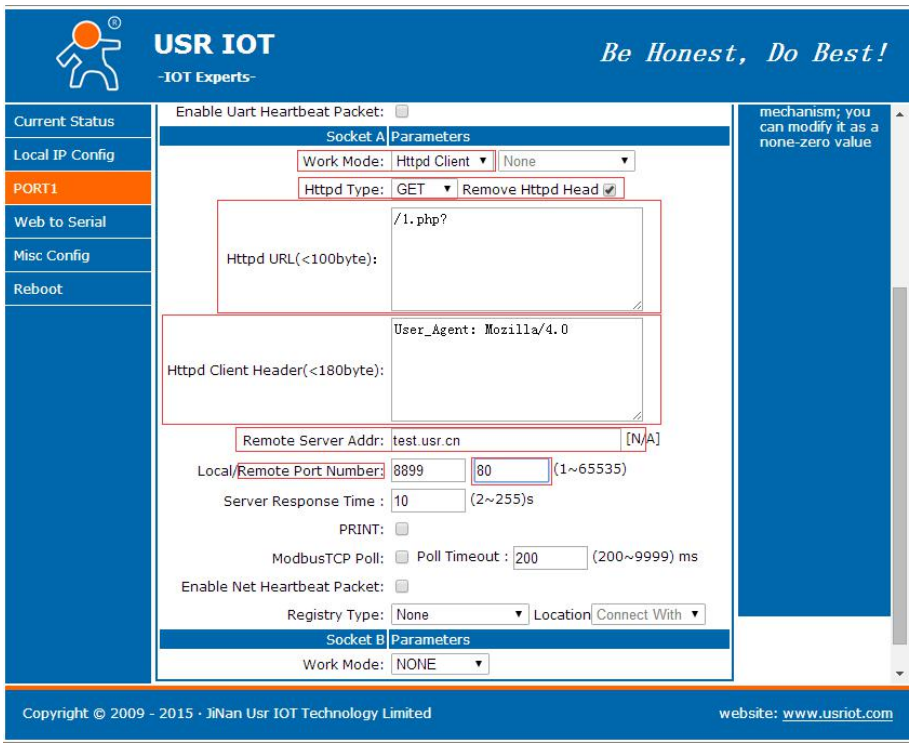
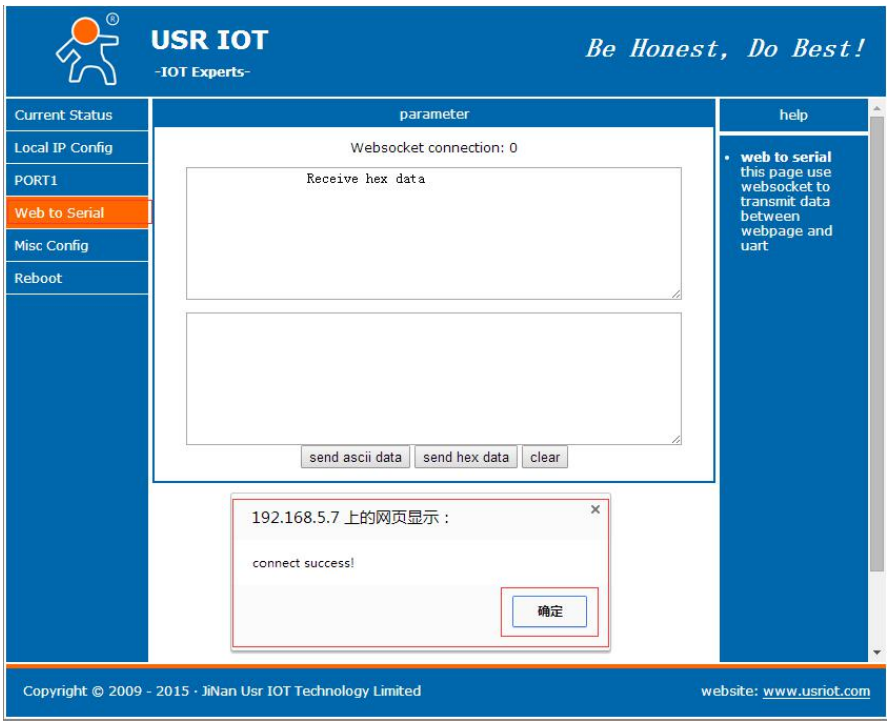


Figure 18 HTTPD Client

2.2.6. Web Socket

WebSocket function can achieve real-time interaction between serial port and webpage and display user data on webpage. User can set N510 with WebSocket function by web server as follow:



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Figure 19 Web-Socket

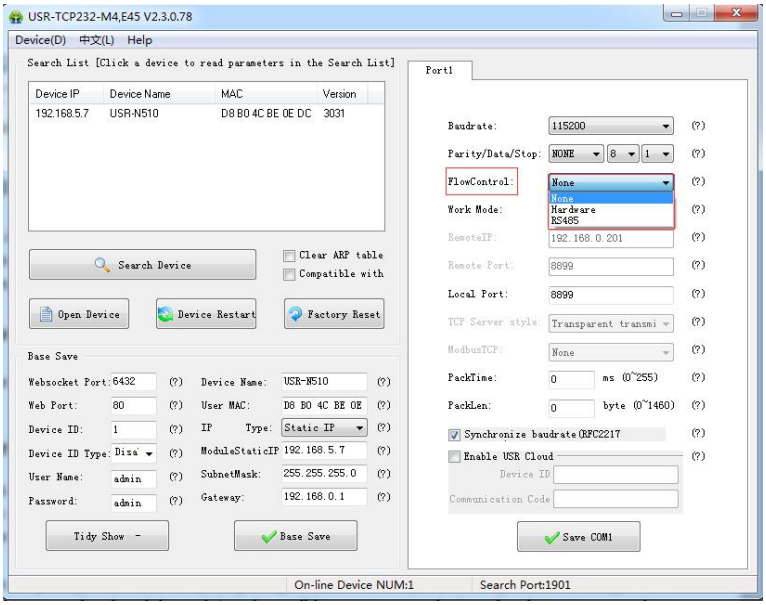
2.3. Serial Port

2.3.1. 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 N510 and virtual serial to solve the problem that traditional equipment PC software used in serial port communication way.

2.3.2. Flow Control

N510 support hardware flow control way (RTS/CTS, only take effect in RS232 mode) and software flow control way Xon/Xoff. User can select Flow Control method by setup software or web server as follows:



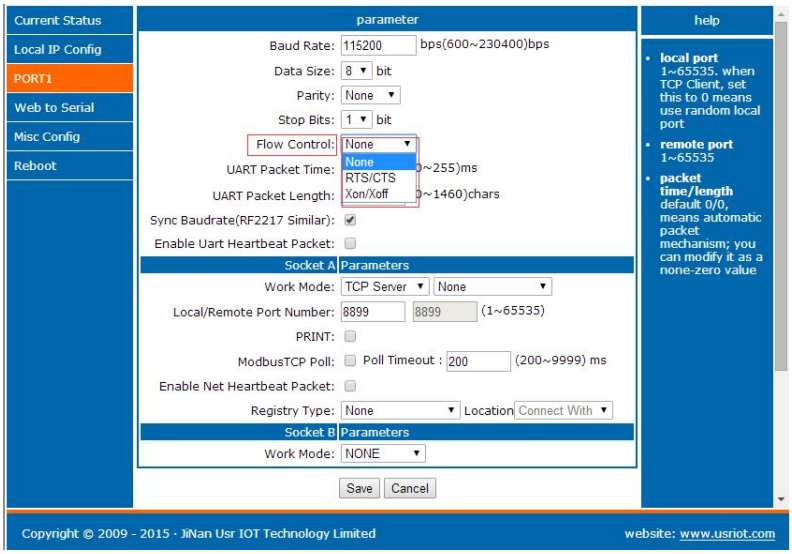


Figure 20 Flow Control

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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.

For example, set package time 10ms and package length 512, after serial port receiving data, if receiving interval time beyond 10ms or data length beyond 512, data will be sent to network. One of package time or package length is 0, N510 will adopt the method which is not 0. User can set package time and package length by setup software or web server as follows:

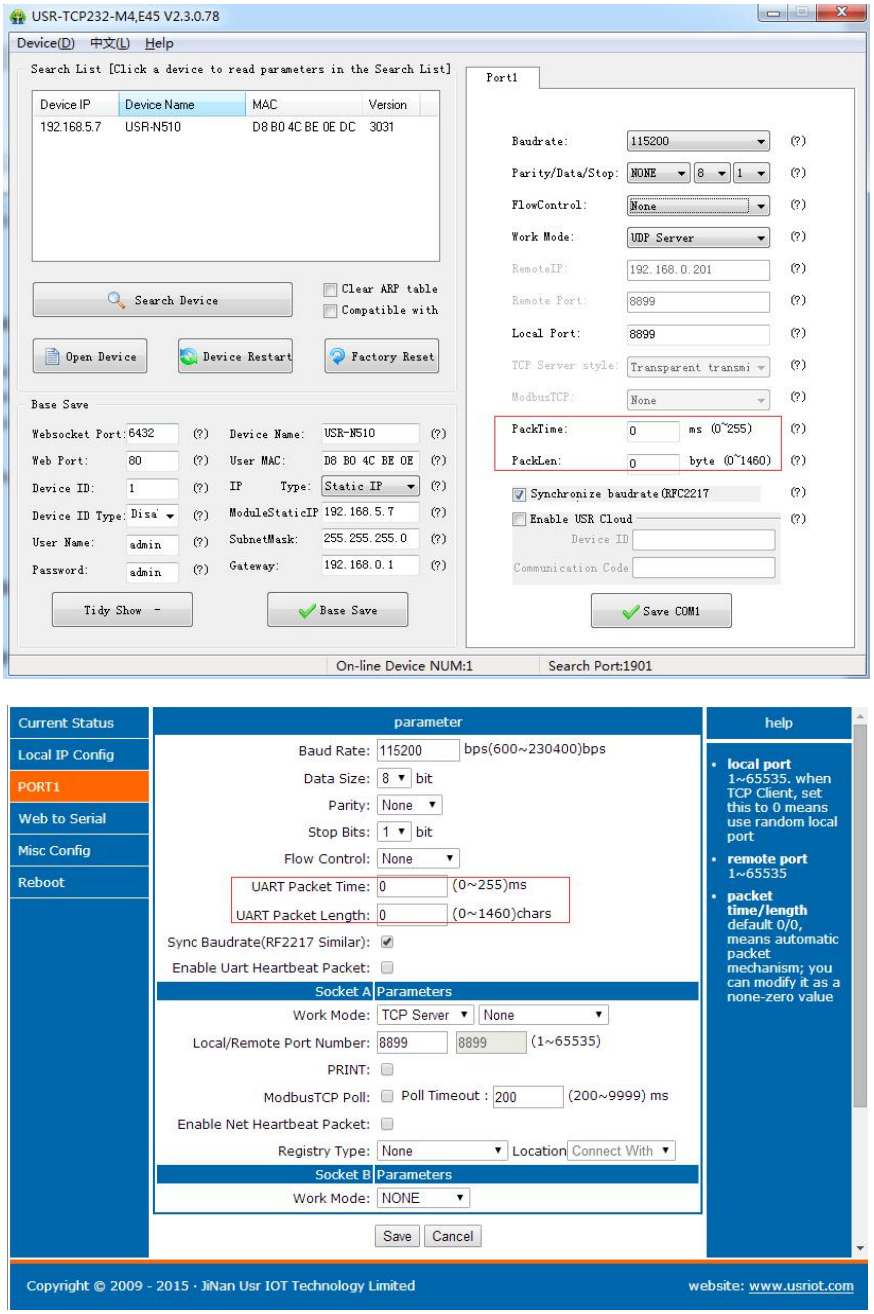


Figure 21 Serial Package

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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 DTU, the parameters back to original parameters.

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

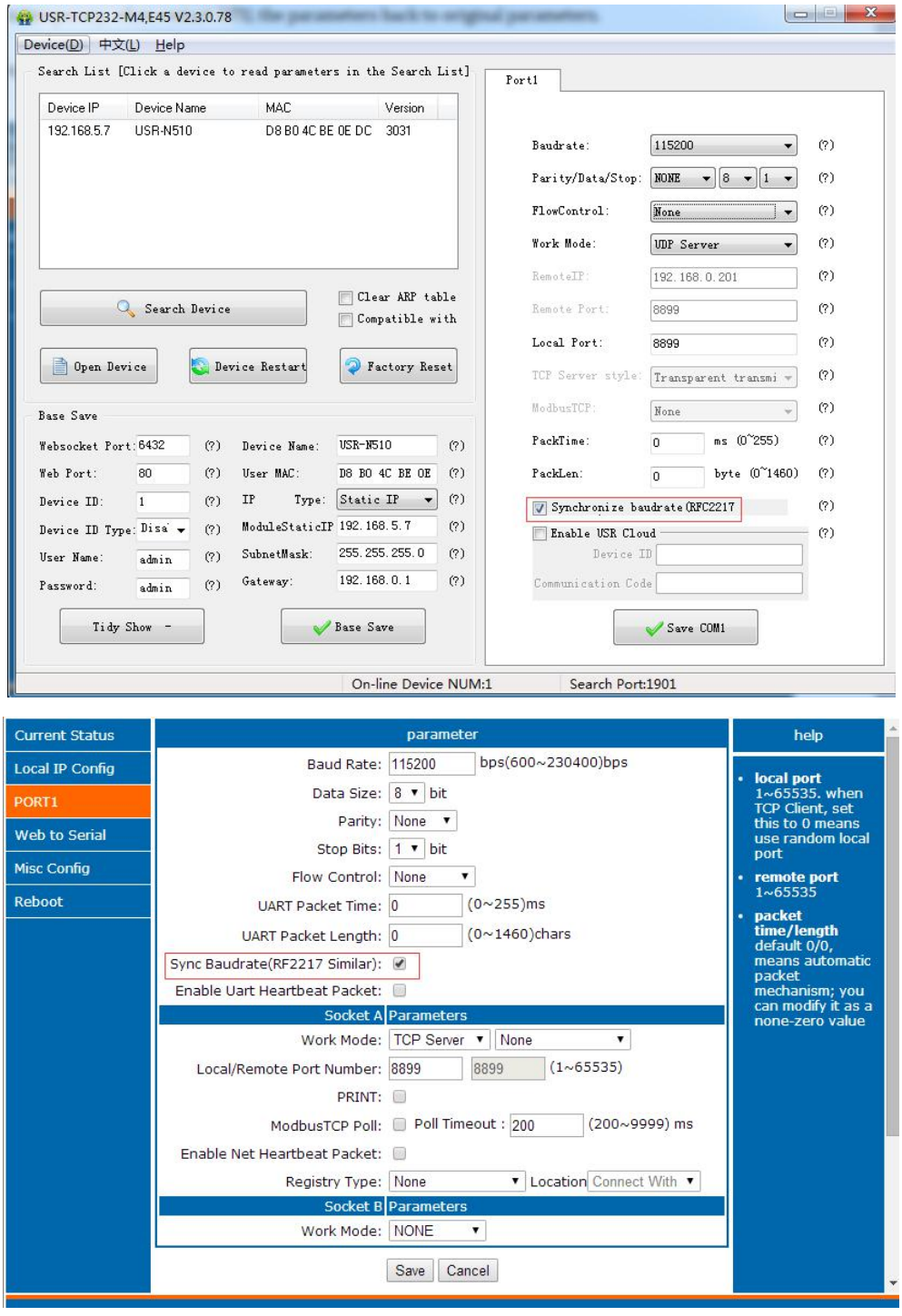


Figure 22 Baud Rate Synchronization

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2.4. Features

2.4.1. Identity Packet Function

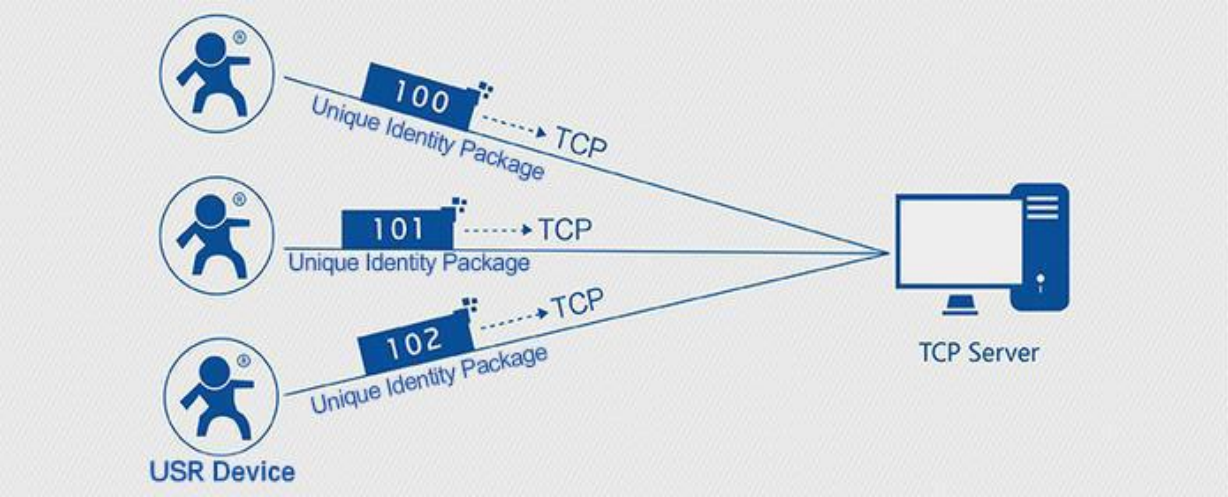


Figure 23 Identity Packet application diagram

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

User can set N510 with Identity Packet function by web server as follow:

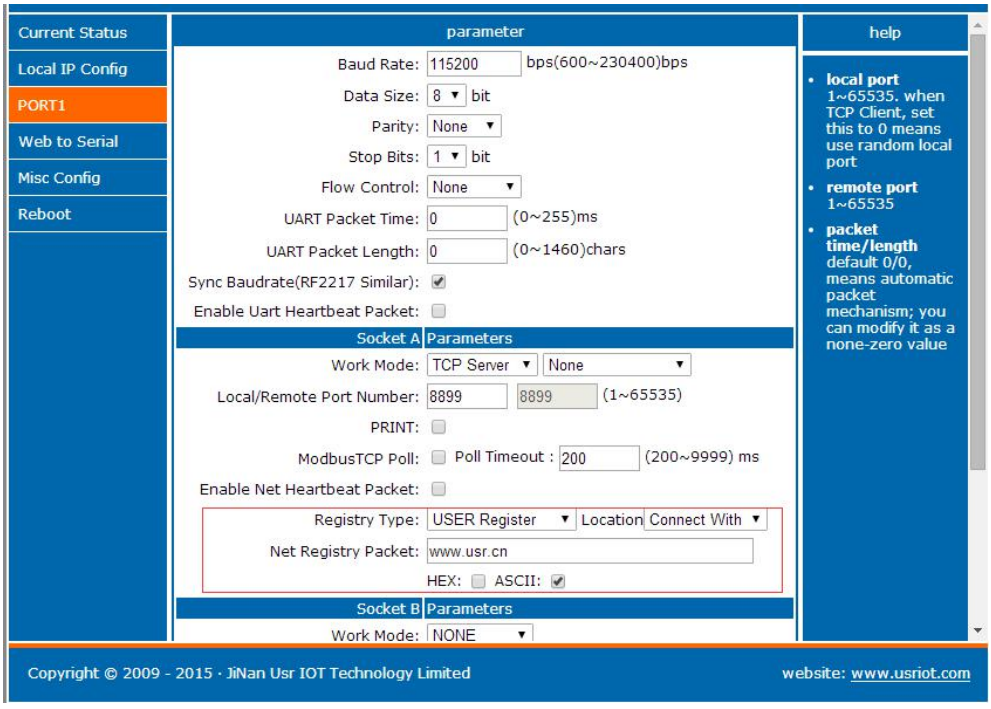


Figure 24 Identity Packet

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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 N510 with Heartbeat Packet function by web server as follow:

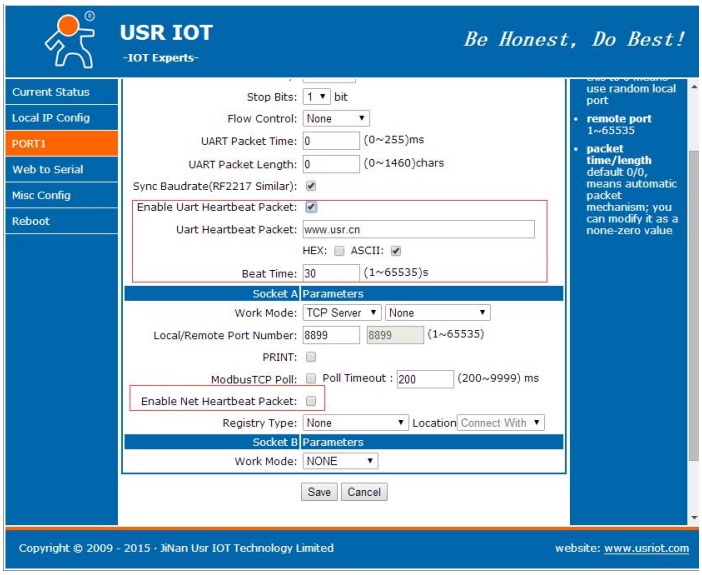


Figure 25 Heartbeat Packet

2.4.3. Short Connection

N510 support impersistent connection function in TCP Client mode. When N510 adopt this function, N510 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 over 3s. User can set N510 with impersistent connection function by web server as follow:

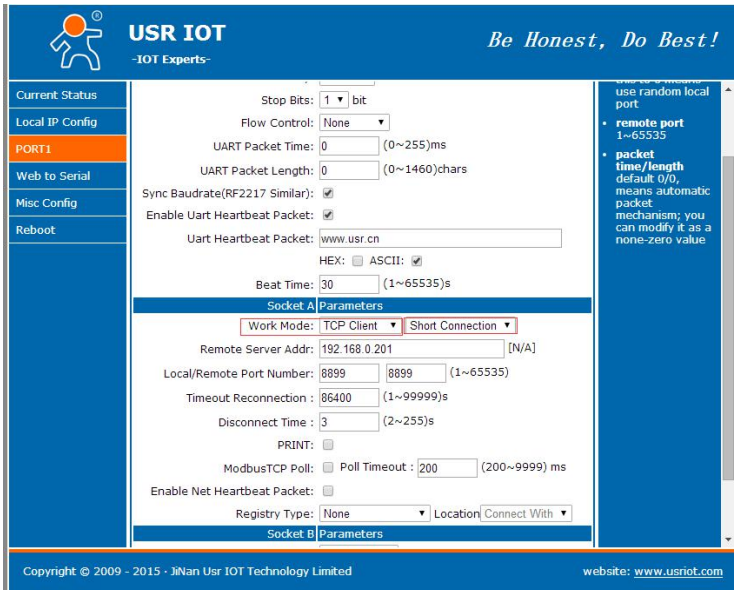


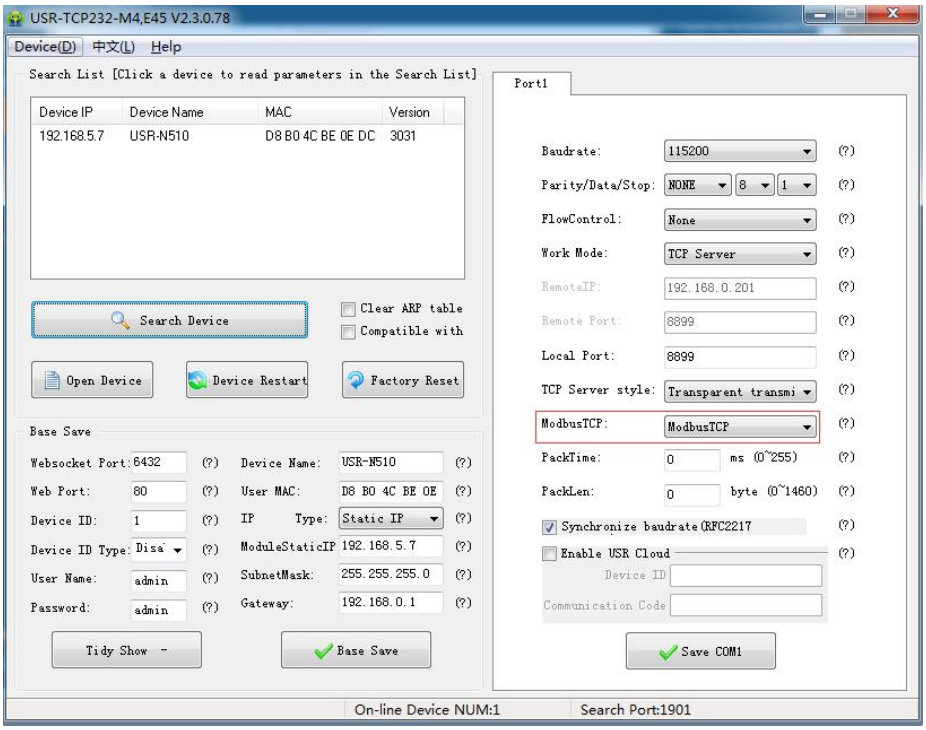
Figure 26 Impersistent Connection

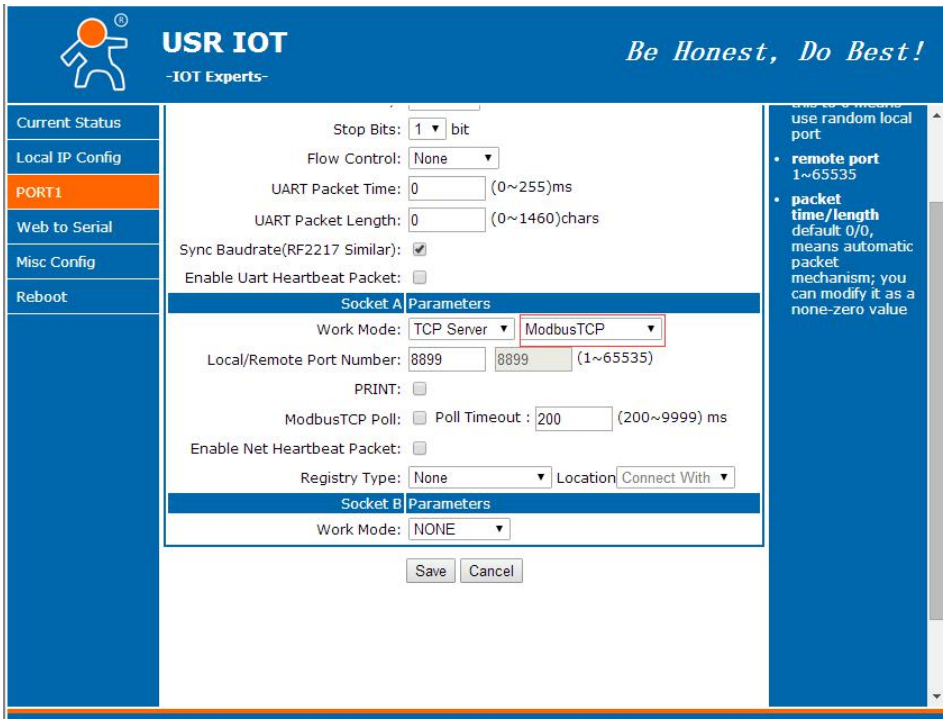
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2.4.4. Modbus Gateway

Modbus Gateway include: 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 N510 in TCP Server or TCP Client mode, then user can set N510 with Modbus RTU<=>Modbus TCP function by setup software or web server as follows:





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Figure 27 Modbus RTU<=>Modbus TCP

Modbus polling: N510 support Modbus polling function and user can set N510 with Modbus polling function by web server as follow:

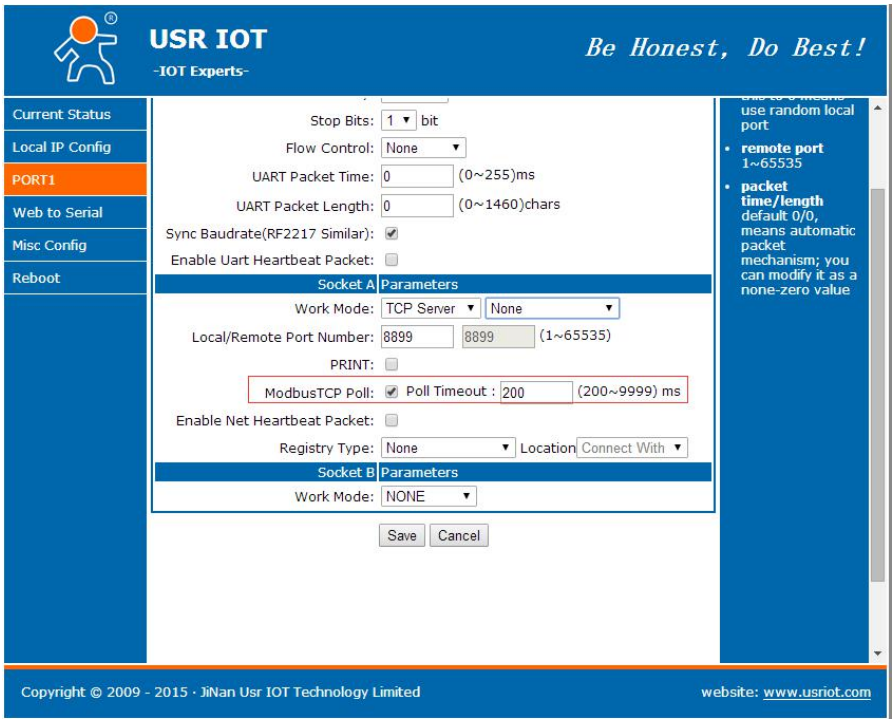


Figure 28 Modbus polling

2.4.5. 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. User can set N510 with Network Printing function by web server as follow:

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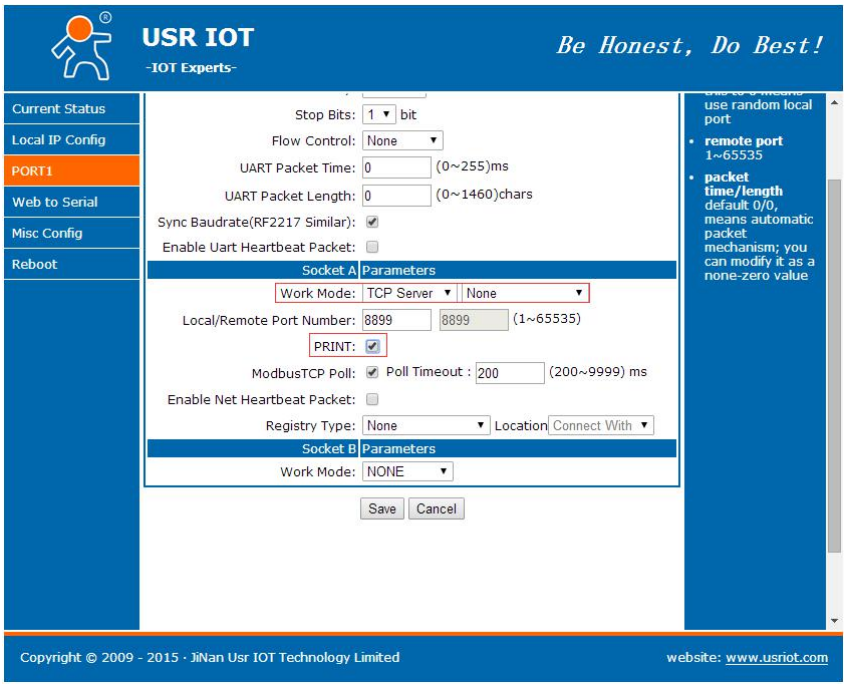


Figure 29 Network Printing

2.4.6. Customize webpage

N510 support customize webpage function,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.

3. Parameter Setting

There are three ways to configure USR-N510. 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-tcp232-m4k3-setup-software/. When user want to configure the N510 by setup software, user can run setup software, search N510 in same LAN and configure the N510 as follow:

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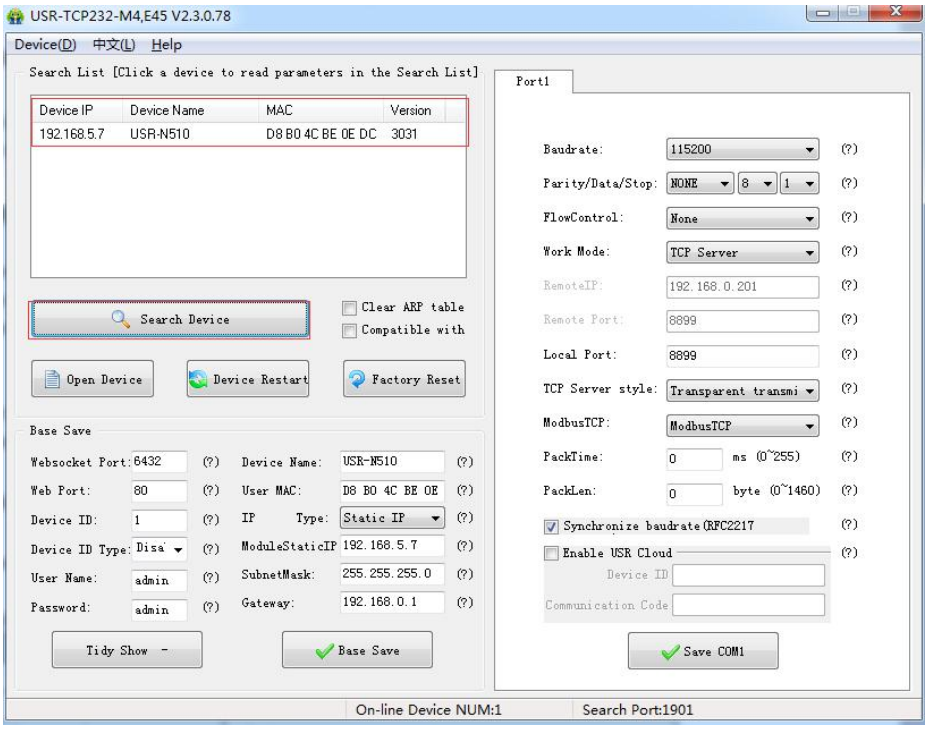


Figure 30 Setup software

After researching N510 and clicking N510 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 N510 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 31 Web server default parameters

After firstly connecting PC to N510, 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:

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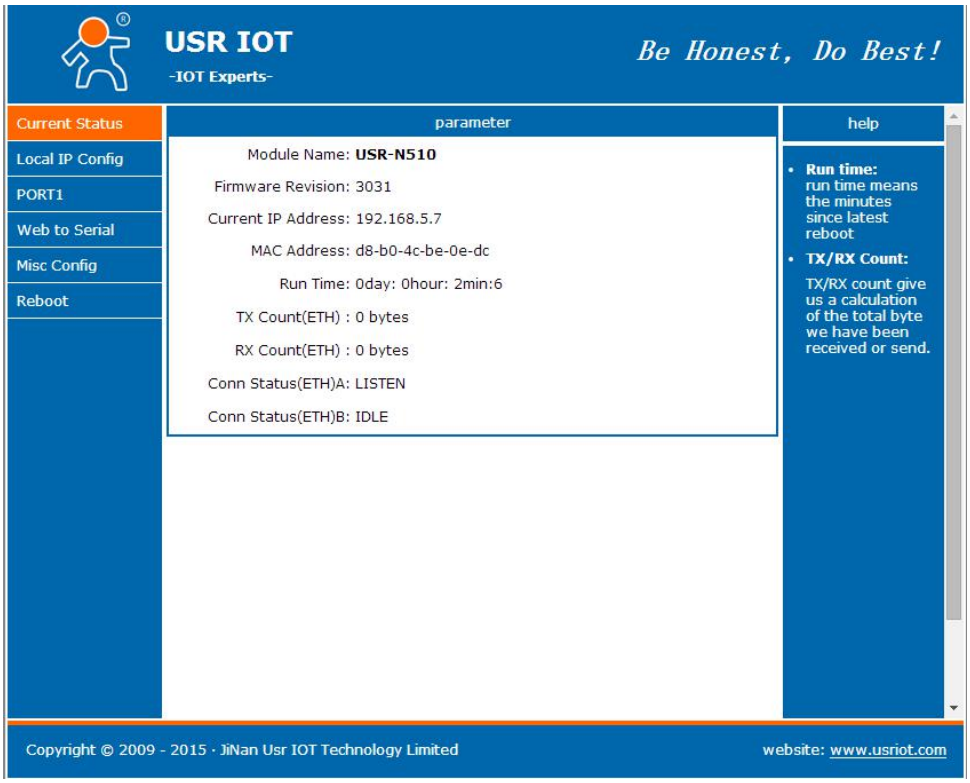


Figure 32 Web Server

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/.

3.3.2. Network AT Command

Network AT command is to send a search keyword by broadcast, then set the parameters in a single broadcast way. Default keyword is **WWW.USR.CN** and default port number is 48899. User can enter Network AT command as follow:

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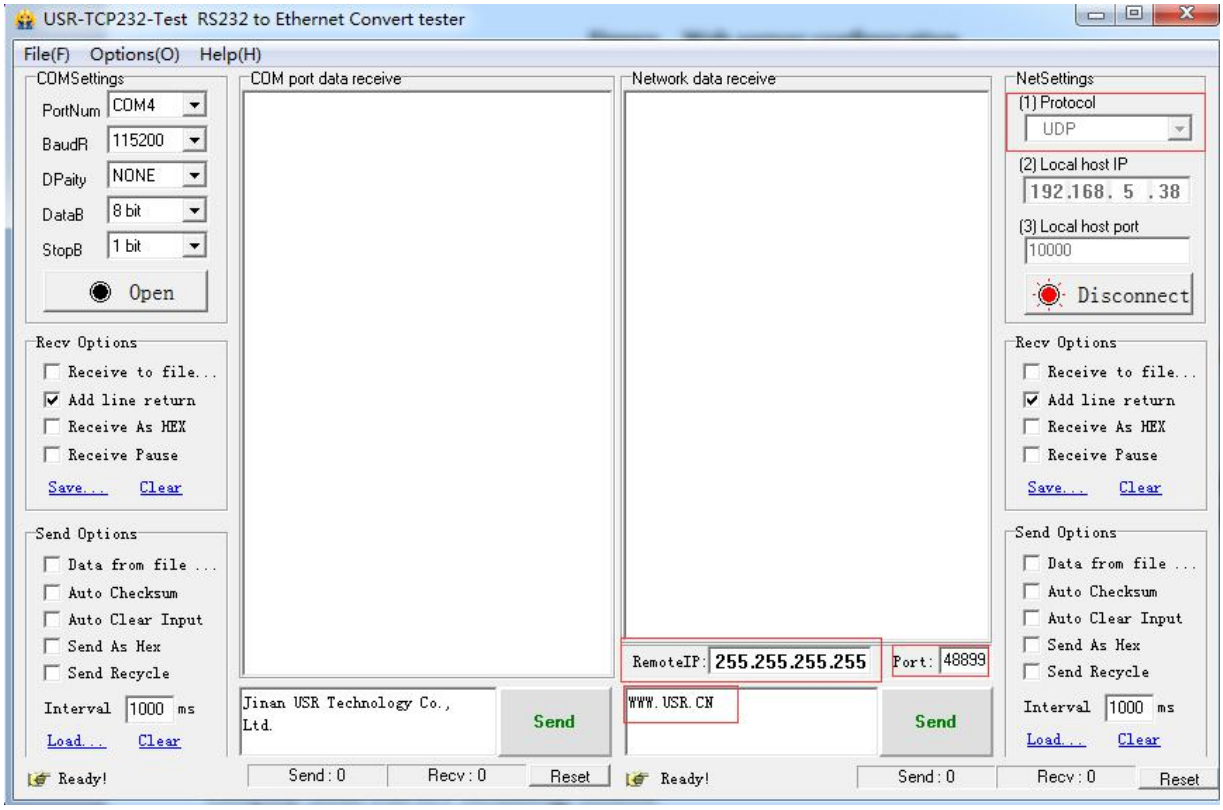


Figure 33 Network AT Command

3.3.3. Error Code

Error code	Intro
-1	Invalid command format
-2	Invalid command
-3	Invalid operator
-4	Invalid parameter
-5	Operation not permitted

3.3.4. Commands Table

AT+command

Command	Intro
E	Query/setting display function
Z	Reboot
VER	Query firmware version
ENTM	Enter transparent mode
MAC	Query/setting MAC
RELD	Restore factory settings
WANN	Query/setting WAN parameters
DNS	Query/setting DNS
WEBU	Query/setting webpage account and password

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WEBPORT	Query/setting webpage port
SEARCH	Query/setting search keyword
PLANG	Query/setting the webpage language
UART1	Query/setting parameters of UART1
UARTTL1	Query/setting package parameters of UART1
SOCKA1	Query/setting parameters of socketA
SOCKB1	Query/setting parameters of socketB
SOCKLKA1	Query status of connection
WEBSOCKPORT	Query/setting port number of websocket
REGEN1	Query/setting type of UART1 register package
REGTCP1	Query/setting sending type of UART1 register package
REGUSR1	Query/setting UART1 custom registry pack content
REGCLOUD1	Query/setting parameters of USR-Cloud
HTPTP1	Query/setting work type of httpd client
HTPURL1	Query/setting URL of httpd client
HTPHEAD1	Query/setting head of httpd client
HTPCHD	Query/setting filter the head returned by http or not
HEARTEN	Query/setting enable/disable heartbeat package
HEARTTP	Query/setting send type of heartbeat package
HEARTDT	Query/setting customize heartbeat package content
HEARTTM	Query/setting heartbeat package time

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6. Update History

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