

USR-N540 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 4 serial ports and 4 serial ports can work independently.
- 4 serial ports all 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 serial port 1 websocket function.
- Support hardware Reload.
- Support Keep-alive.
- 4 serial ports LED(TX/RX).
- 4 serial ports all support RS232/RS485/RS422.

1. Get Start

Product link:

<http://www.usriot.com/p/4-ports-serial-ethernet-converter/>

Setup software:

<http://www.usriot.com/usr-tcp232-m4k3-setup-software>



4 ports Serial Device Converter, Serial RS232/RS485/RS422 to Ethernet Converter

USR-N540 - 4 Serial port RS232 RS485 RS422 Ethernet Converter. It supports Modbus RTU to Modbus TCP.

Share

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- 4 serial port: RS-232/422/485 which works independently at the same time
- Power 5V~36V, anti-reverse connection, anti-surge, anti-pulse
- ESD 8KV Protection on Serial/Ethernet port

General Details | Parameter | Inquiry | Download

Figure 1 Download Page

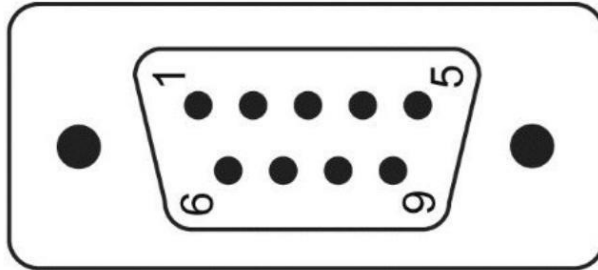
If you have any question, please submit it back to customer center: <http://h.usriot.com>

1.1. Application Diagram



Figure 2 Application diagram

1.2.3. 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 5 DB9 Pin definition

1.2.4. DB9 Pinboard

We provide DB9 pinboard for user to use terminal connection.



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

Figure 6 DB9 pinboard

2. Product Functions

This chapter introduces the functions of USR-N540 as the following diagram shown, you can get an overall knowledge of it.

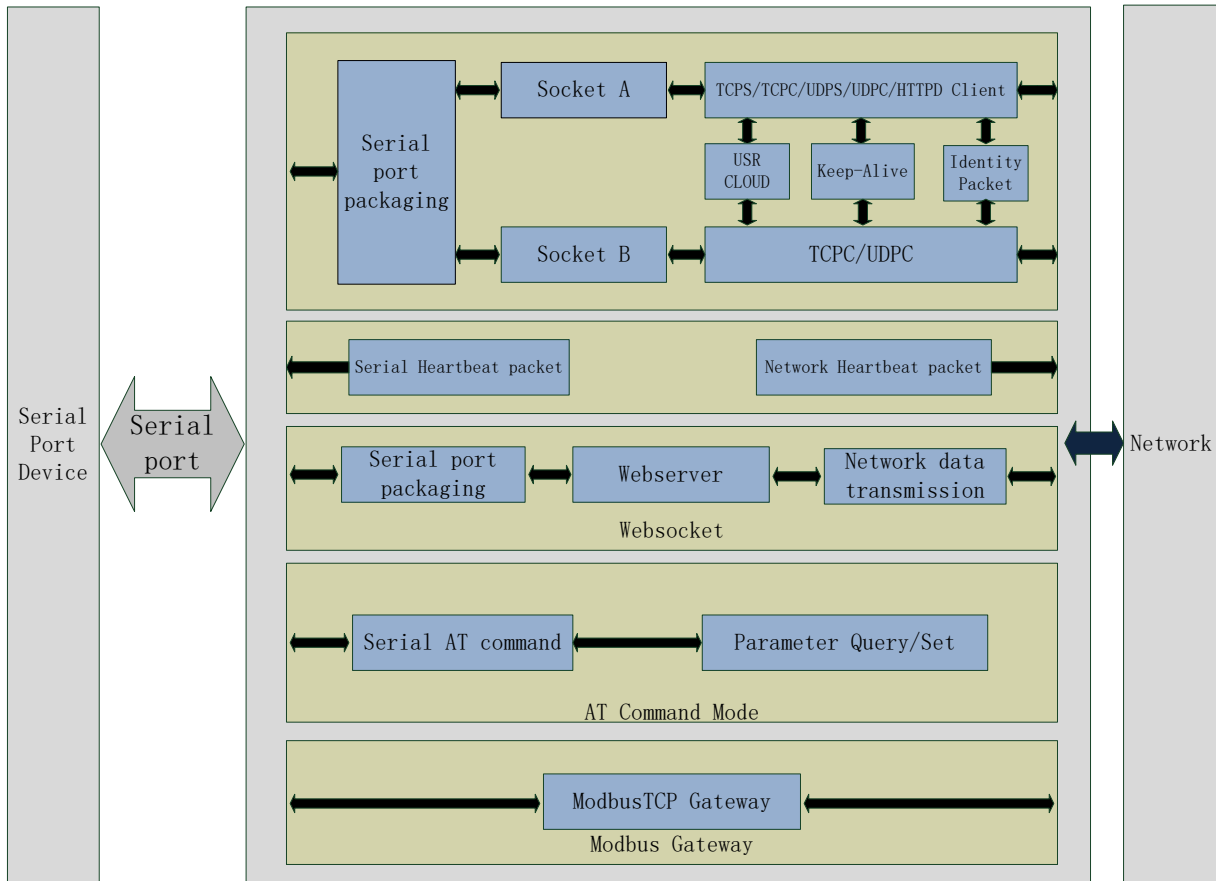


Figure 7 Product Functions diagram

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:

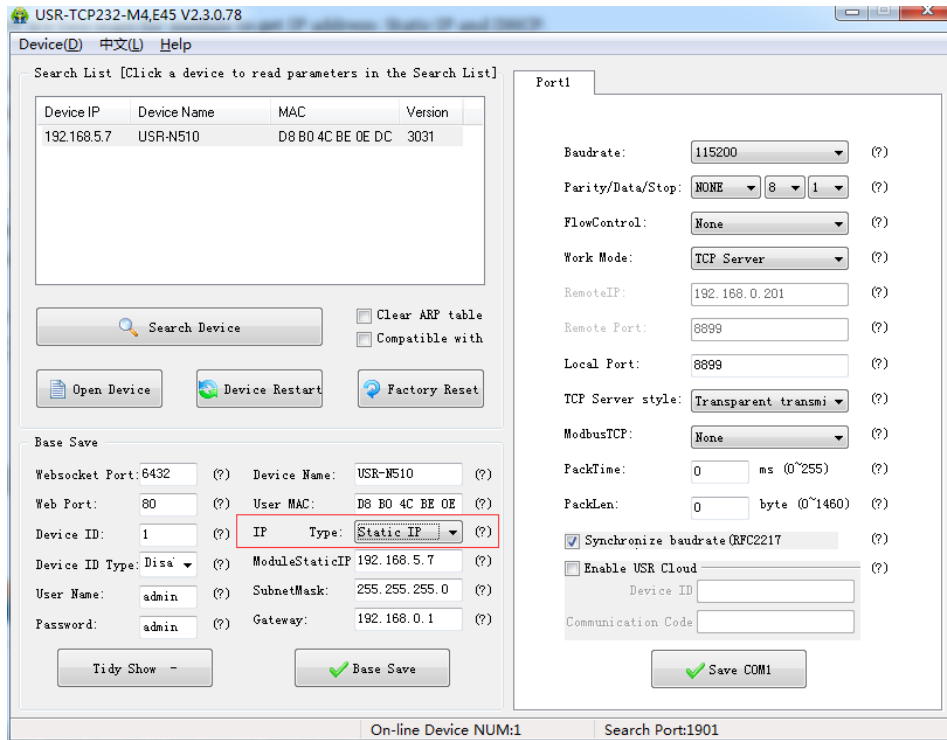


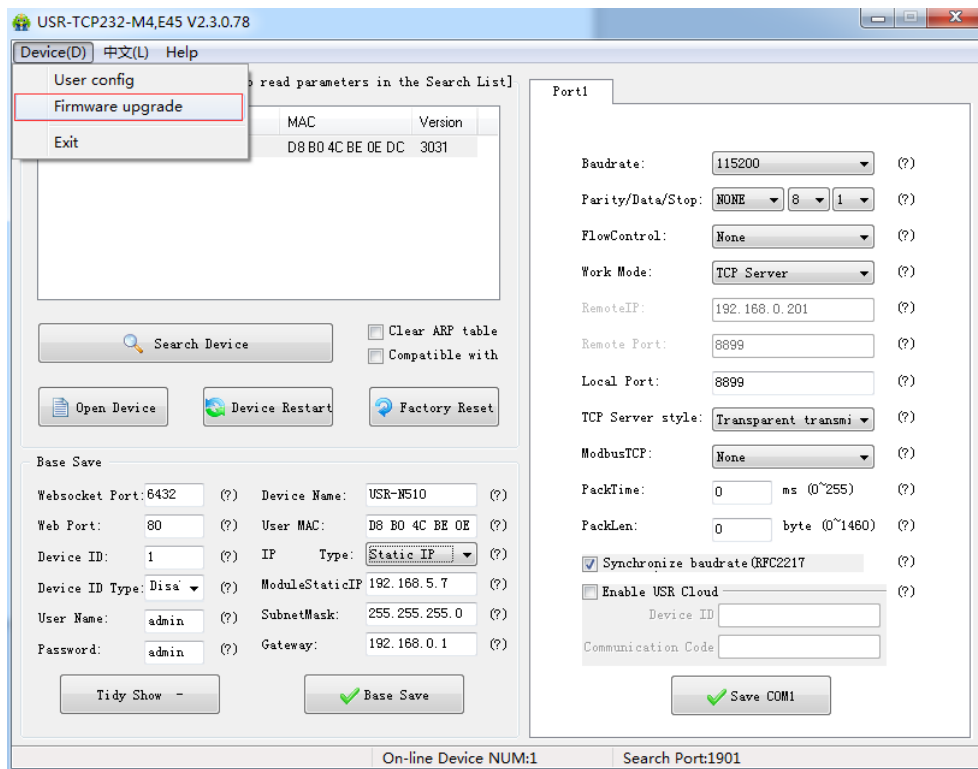
Figure 8 Static IP/DHCP

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:



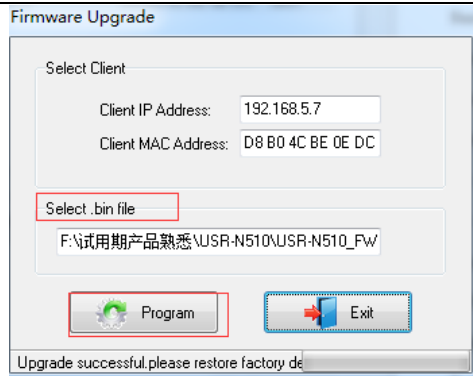


Figure 9 Upgrade firmware version

2.2. Socket functions

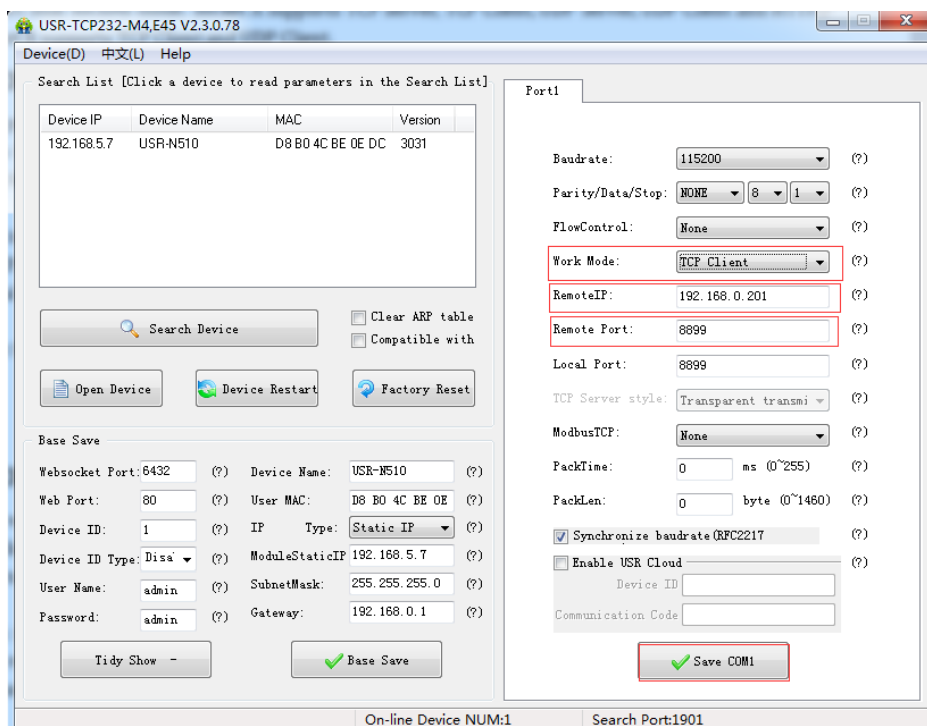
N540 support dual sockets mode. Socket A supports TCP Server, TCP Client, UDP Server, UDP Client and HTTPD Client. Socket B supports TCP Client and UDP Client.

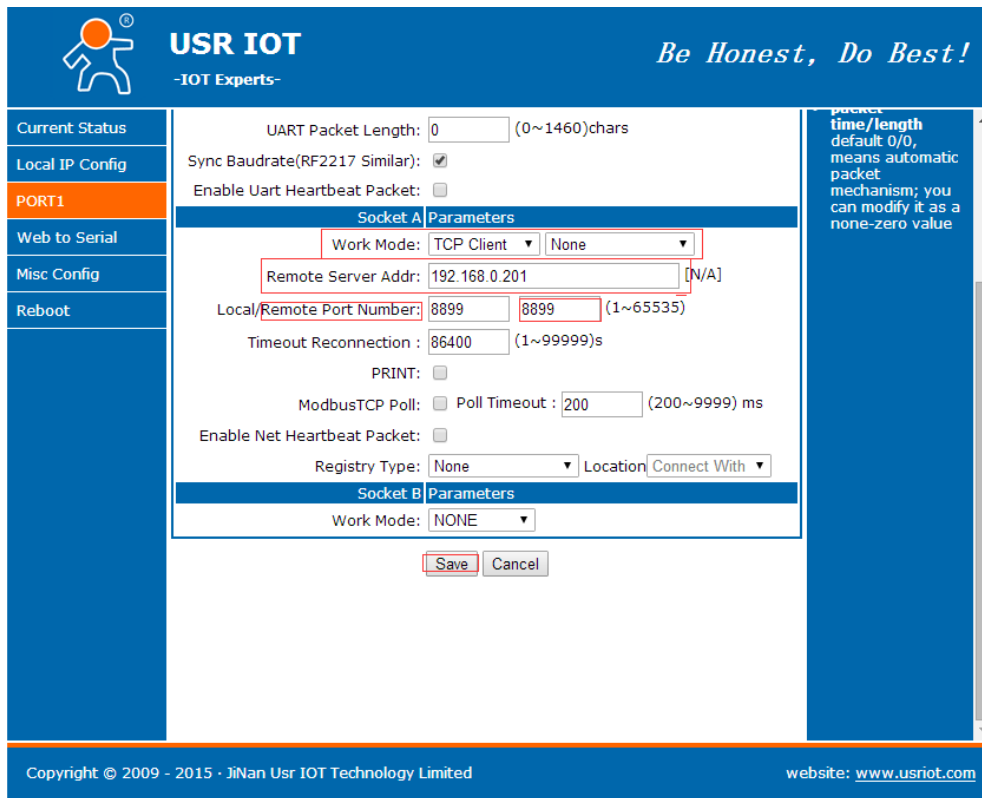
2.2.1. TCP Client

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.

N540 work in TCP Client mode need connect to TCP Server and need set the parameter: Remote IP/Port. N540 work in TCP Client won't accept other connection request except target server and will access server with random local port.

User can set N540 in TCP Client mode and related parameters by setup software or web server as follows:





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Current Status
Local IP Config
PORT1
Web to Serial
Misc Config
Reboot

UART Packet Length: (0~1460)chars

Sync Baudrate(RF2217 Similar):

Enable Uart Heartbeat Packet:

Socket A Parameters

Work Mode:

Remote Server Addr: [N/A]

Local/Remote Port Number: (1~65535)

Timeout Reconnection : (1~99999)s

PRINT:

ModbusTCP Poll: Poll Timeout : (200~9999) ms

Enable Net Heartbeat Packet:

Registry Type: Location

Socket B Parameters

Work Mode:

time/length default 0/0, means automatic packet mechanism; you can modify it as a none-zero value

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website: www.usriot.com

Figure 10 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.

N540 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 N540 in TCP Server mode simultaneously.

N540 work in TCP Server support 8 client connections at most and will kick off oldest connection beyond maximum connections.

User can set N540 in TCP Server mode and related parameters by setup software or web server as follows:

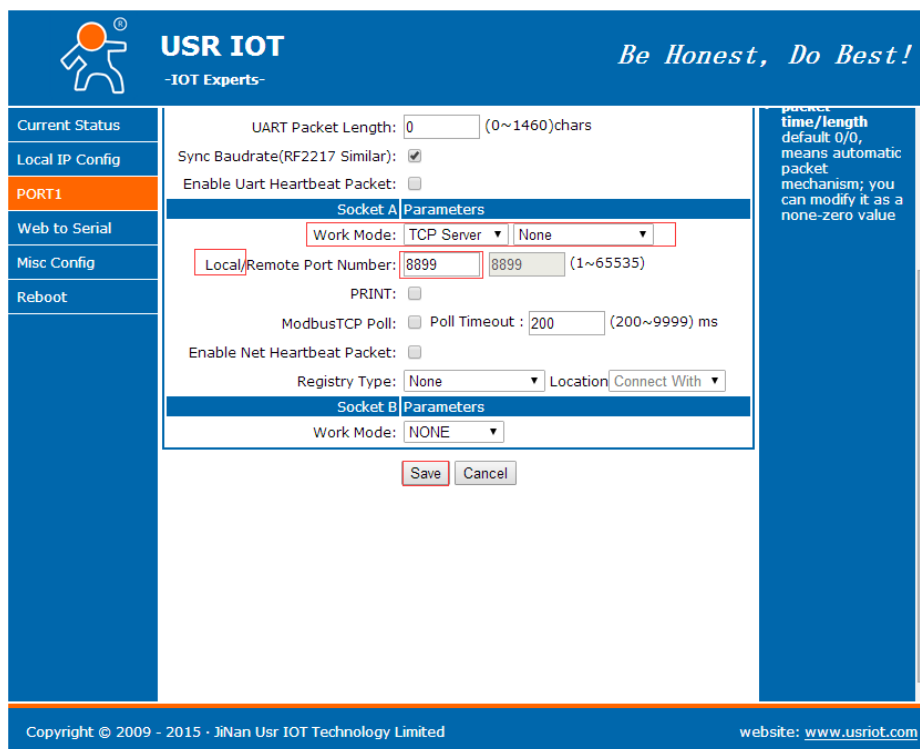
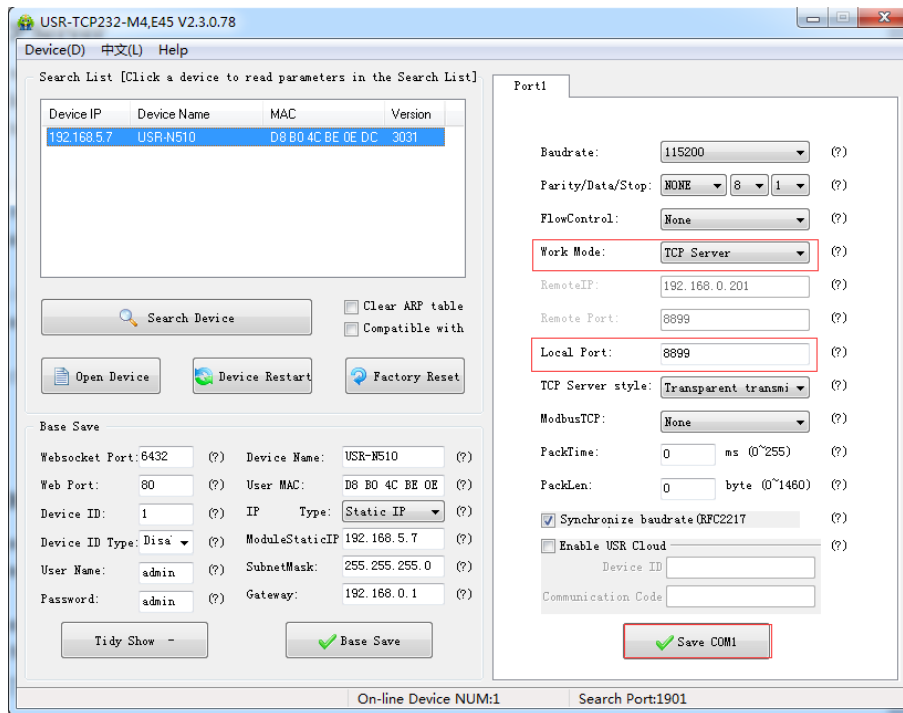


Figure 11 TCP Server

2.2.3. UDP Client

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

In UDP Client mode, N540 will only communicate with target IP/Port. If data not from target IP/Port, it won't be

received by N540.

User can set N540 in UDP Client mode and related parameters by setup software or web server as follows:

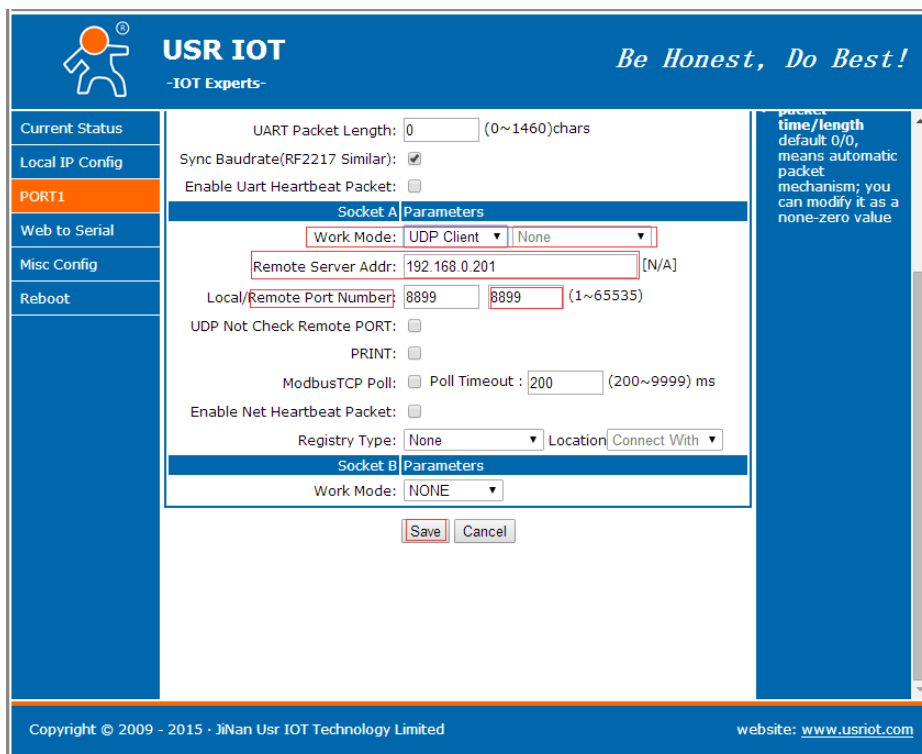
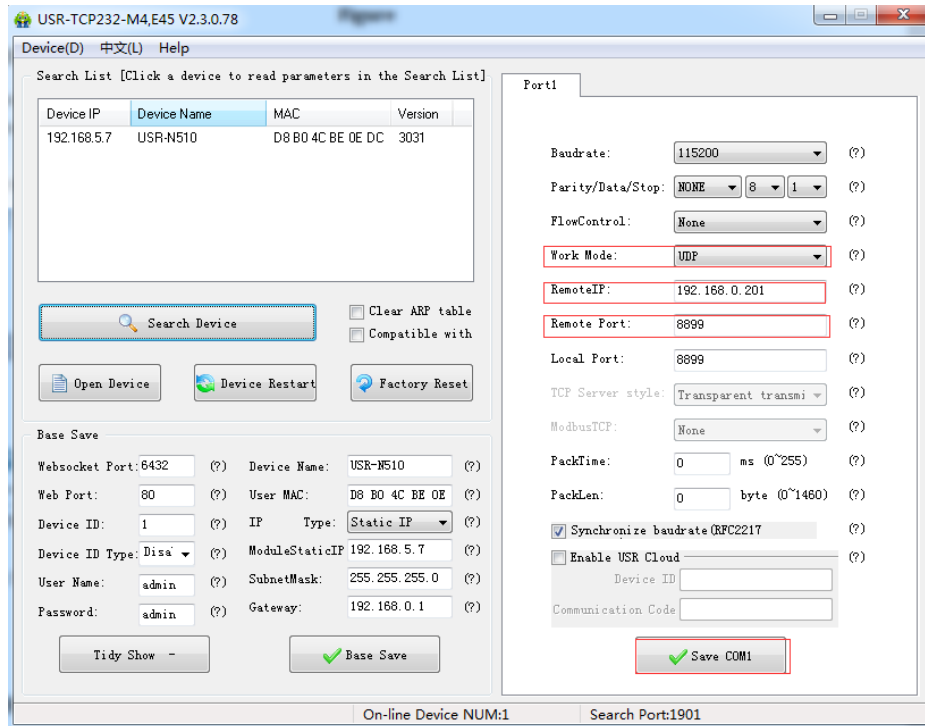


Figure 12 UDP Client

2.2.4. UDP Server

In UDP Server mode, N540 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 N540 in UDP Server mode and related parameters by setup software or web server as follows:

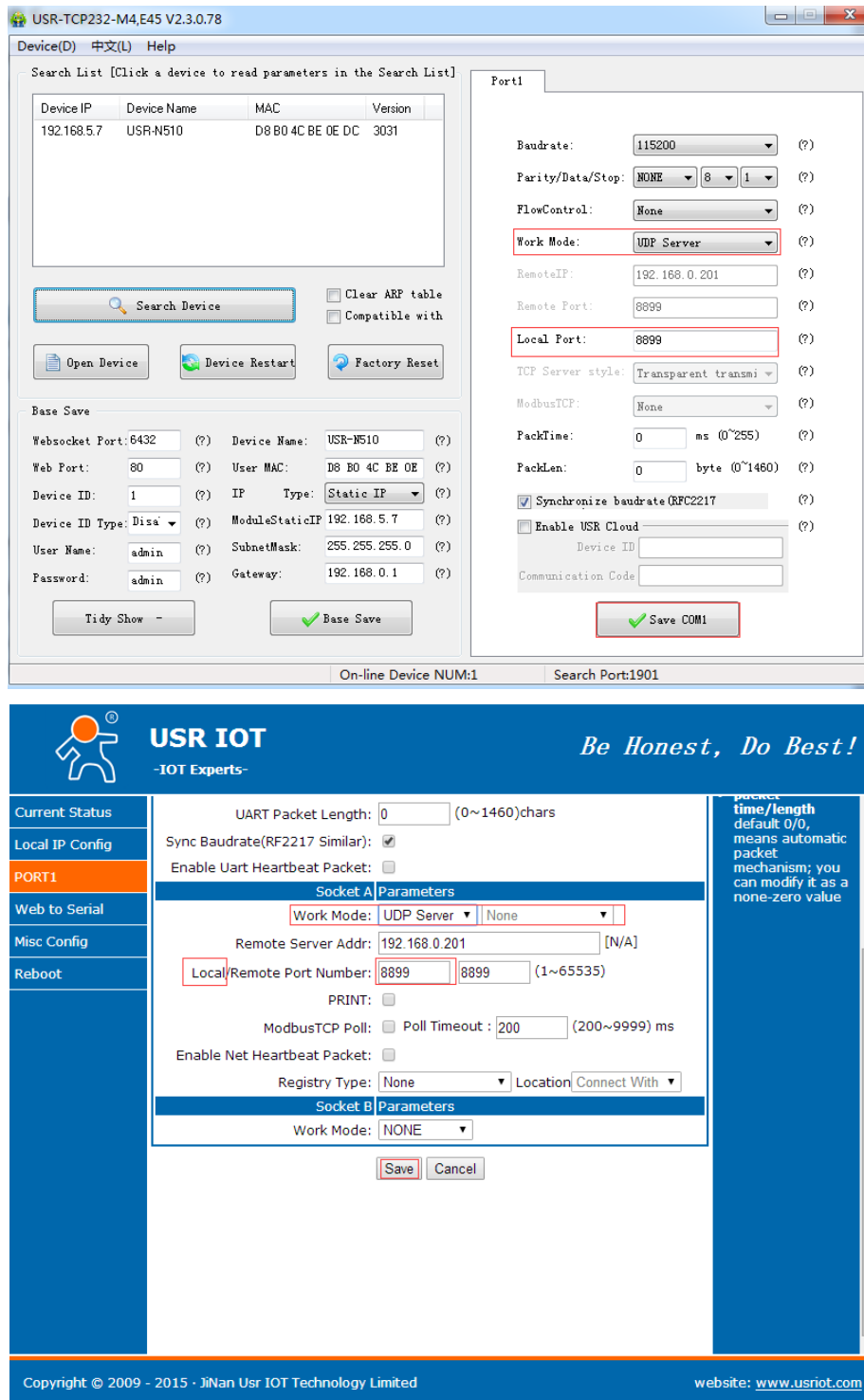


Figure 13 UDP Server

2.2.5. HTTPD Client

In HTTPD Client mode, N540 can achieve data transmission between serial port device and HTTP server. User just need set N540 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 N540 in HTTPD Client mode and related parameters by web server as follow:

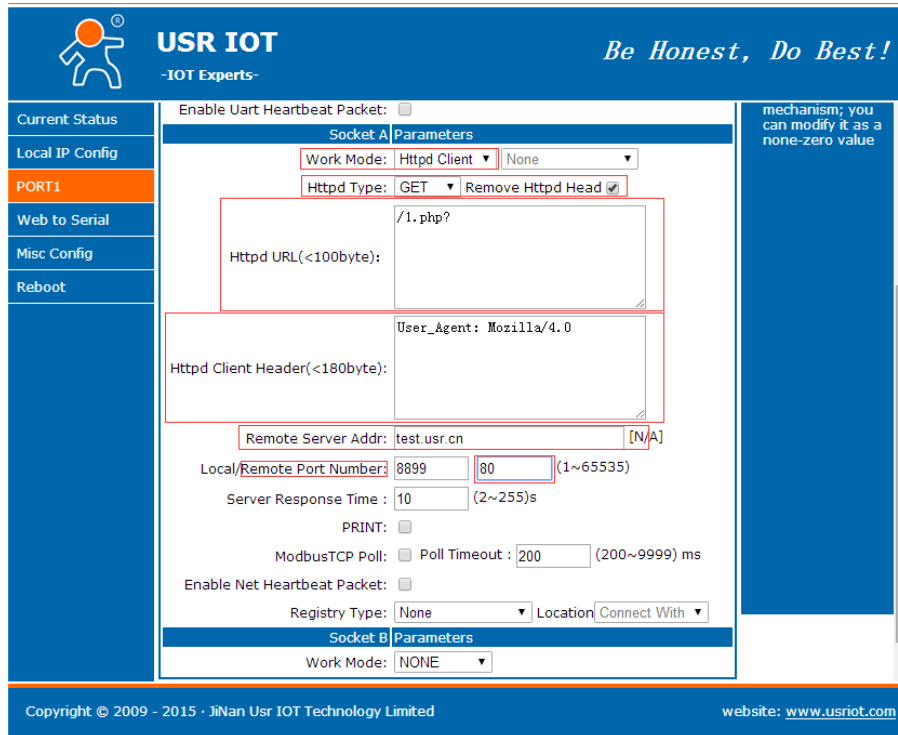


Figure 14 HTTPD Client

2.2.6. WebSocket

WebSocket function can achieve real-time interaction between serial port and webpage and display user data on webpage. User can set N540 with WebSocket function by web server as follow:



Figure 15 WebSocket

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 N540 and virtual serial to solve the problem that traditional equipment PC software used in serial port communication way.

2.3.2. Flow Control

N540 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:

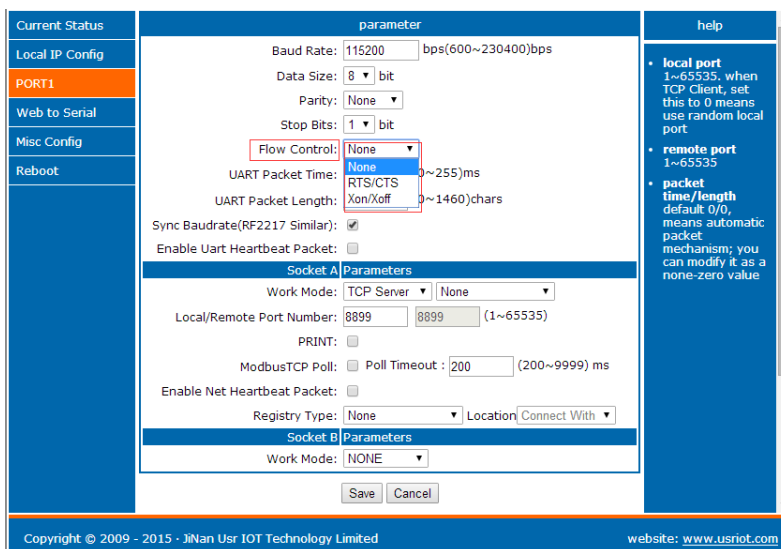
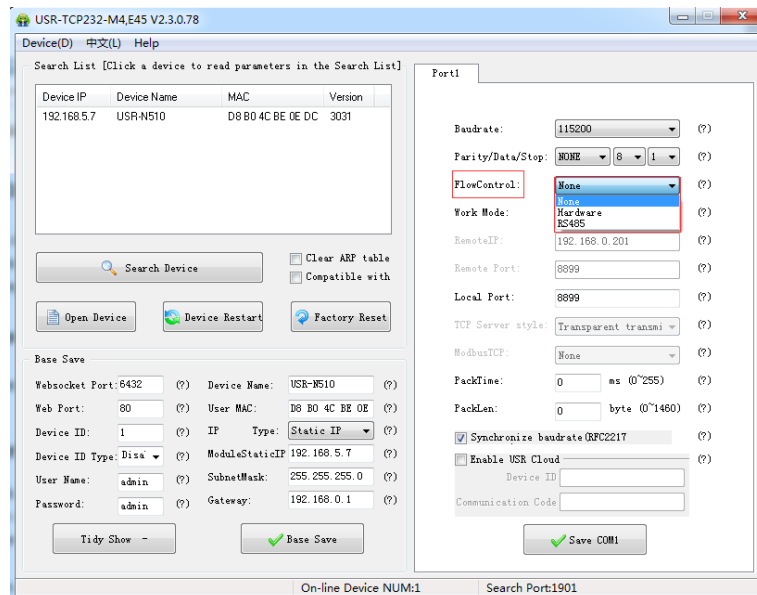


Figure 16 Flow Control

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, N540 will adopt the method which is not 0. User can set package time and package length by setup software or web server as follows:

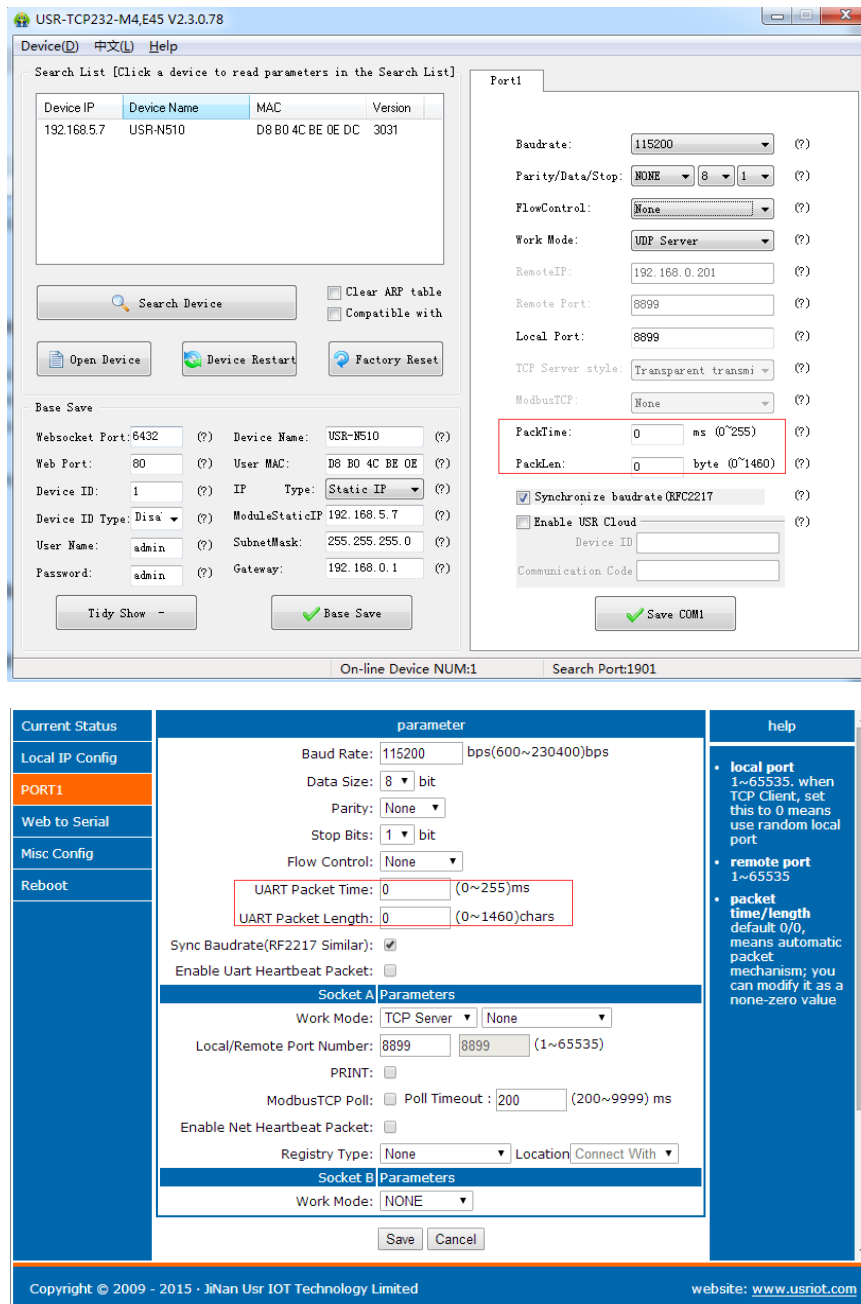


Figure 17 Serial Package

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:

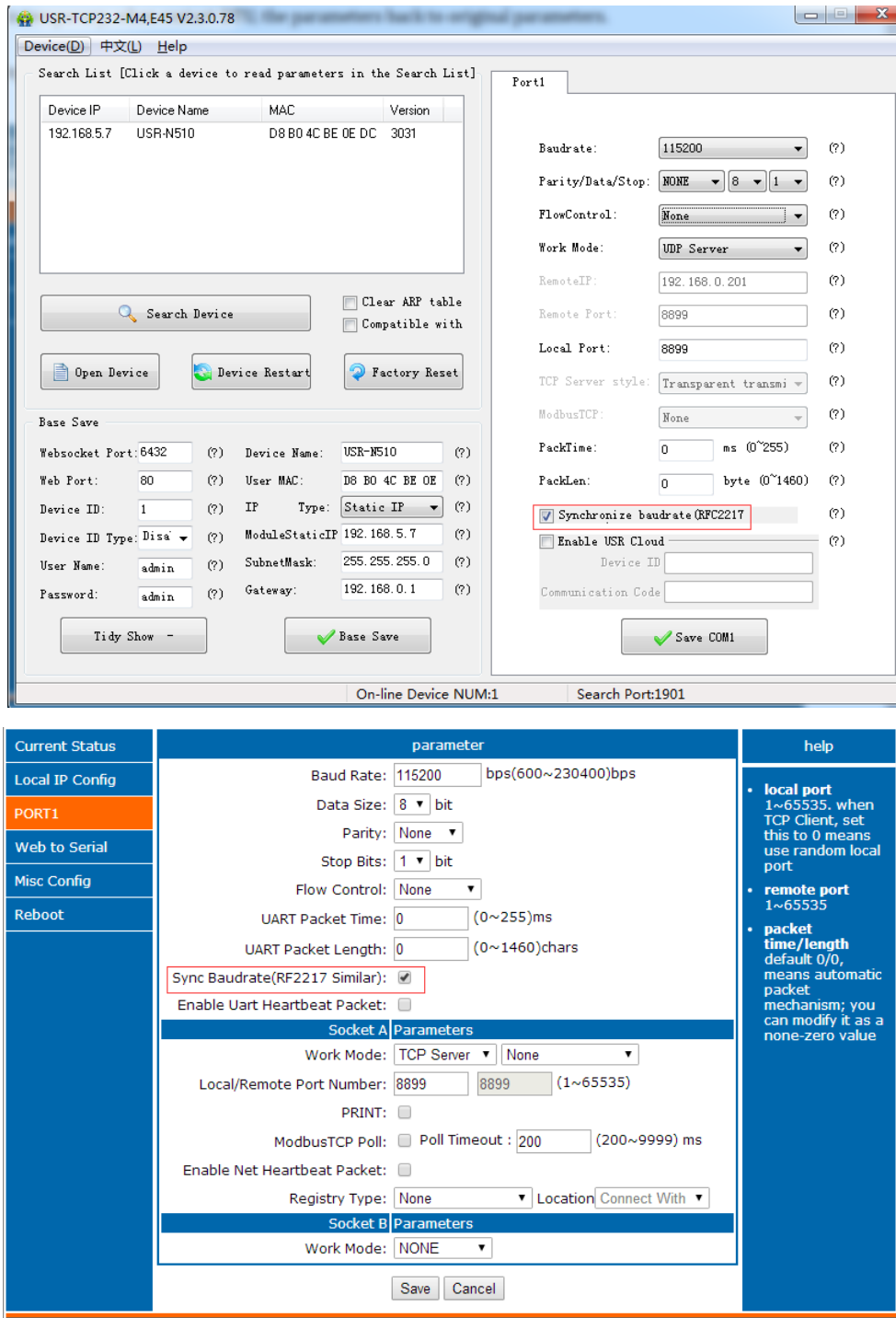


Figure 18 Baud Rate Synchronization

2.4. Features

2.4.1. Identity Packet Function

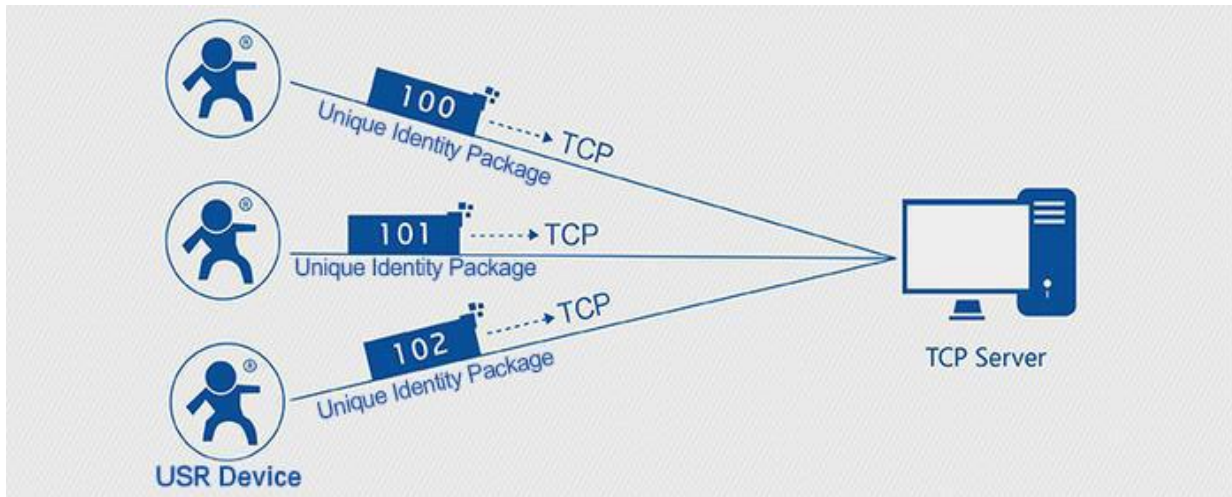


Figure 19 Identity Packet application diagram

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.

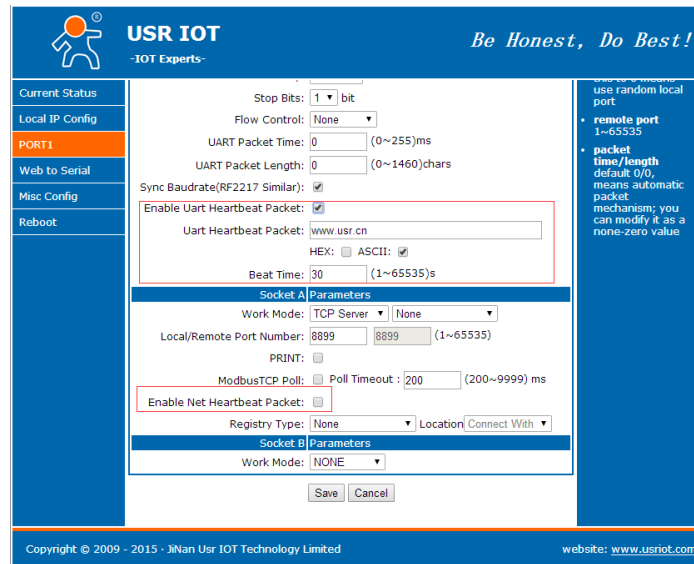
User can set N540 with Identity Packet function by web server as follow:

Current Status	parameter	help
Local IP Config	Baud Rate: 115200 bps(600~230400)bps	<ul style="list-style-type: none"> • local port 1~65535, when TCP Client, set this to 0 means use random local port • remote port 1~65535 • packet time/length default 0/0, means automatic packet mechanism; you can modify it as a none-zero value
PORT1	Data Size: 8 bit	
Web to Serial	Parity: None	
Misc Config	Stop Bits: 1 bit	
Reboot	Flow Control: None	
	UART Packet Time: 0 (0~255)ms	
	UART Packet Length: 0 (0~1460)chars	
	Sync Baudrate(RF2217 Similar): <input checked="" type="checkbox"/>	
	Enable Uart Heartbeat Packet: <input type="checkbox"/>	
	Socket A Parameters	
	Work Mode: TCP Server None	
	Local/Remote Port Number: 8899 8899 (1~65535)	
	PRINT: <input type="checkbox"/>	
	ModbusTCP Poll: <input type="checkbox"/> Poll Timeout: 200 (200~9999) ms	
	Enable Net Heartbeat Packet: <input type="checkbox"/>	
	Registry Type: USER Register Location Connect With	
	Net Registry Packet: www.usr.cn	
	HEX: <input type="checkbox"/> ASCII: <input checked="" type="checkbox"/>	
	Socket B Parameters	
	Work Mode: NONE	
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Figure 20 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 N540 with Heartbeat Packet function by web server as follow:

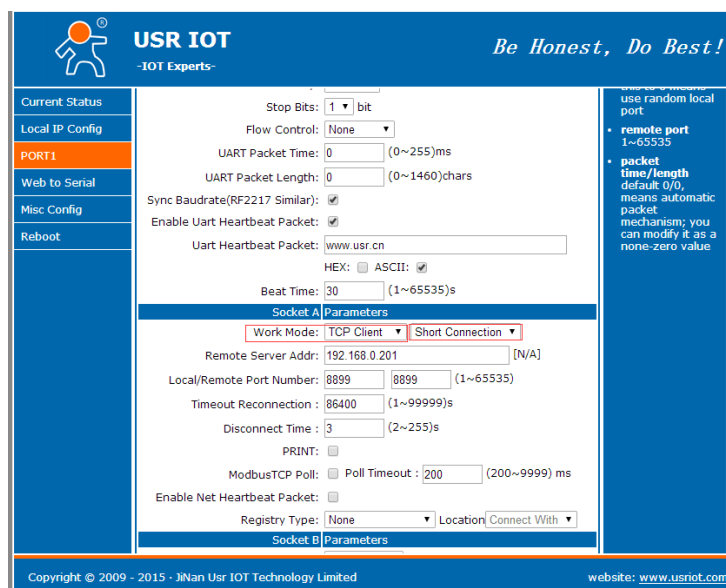


The screenshot shows the USR IOT web interface for configuring the Heartbeat Packet function. The 'PORT1' tab is active. In the 'Uart Heartbeat Packet' section, the 'Enable Uart Heartbeat Packet' checkbox is checked, and the 'Uart Heartbeat Packet' field is set to 'www.usr.cn'. The 'Beat Time' is set to 30. In the 'Socket A Parameters' section, the 'Work Mode' is set to 'TCP Server' and the 'Local/Remote Port Number' is set to 8899. The 'Enable Net Heartbeat Packet' checkbox is unchecked. The 'Socket B Parameters' section shows 'Work Mode' set to 'NONE'. The interface includes a sidebar with navigation options like 'Current Status', 'Local IP Config', 'PORT1', 'Web to Serial', 'Misc Config', and 'Reboot'. The footer contains copyright information and the website URL 'www.usriot.com'.

Figure 21 Heartbeat Packet

2.4.3. Impersistent Connection

N540 support impersistent connection function in TCP Client mode. When N540 adopt this function, N540 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 N540 with impersistent connection function by web server as follow:



The screenshot shows the USR IOT web interface for configuring the Impersistent Connection function. The 'PORT1' tab is active. In the 'Socket A Parameters' section, the 'Work Mode' is set to 'TCP Client' and 'Short Connection' is selected. The 'Remote Server Addr' is set to 192.168.0.201. The 'Disconnect Time' is set to 3. The 'Enable Net Heartbeat Packet' checkbox is unchecked. The 'Socket B Parameters' section shows 'Work Mode' set to 'NONE'. The interface includes a sidebar with navigation options like 'Current Status', 'Local IP Config', 'PORT1', 'Web to Serial', 'Misc Config', and 'Reboot'. The footer contains copyright information and the website URL 'www.usriot.com'.

Figure 22 Impersistent Connection

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 N540 in TCP Server or TCP Client mode, then user can set N540 with Modbus RTU<=>Modbus TCP function by setup software or web server as follows:

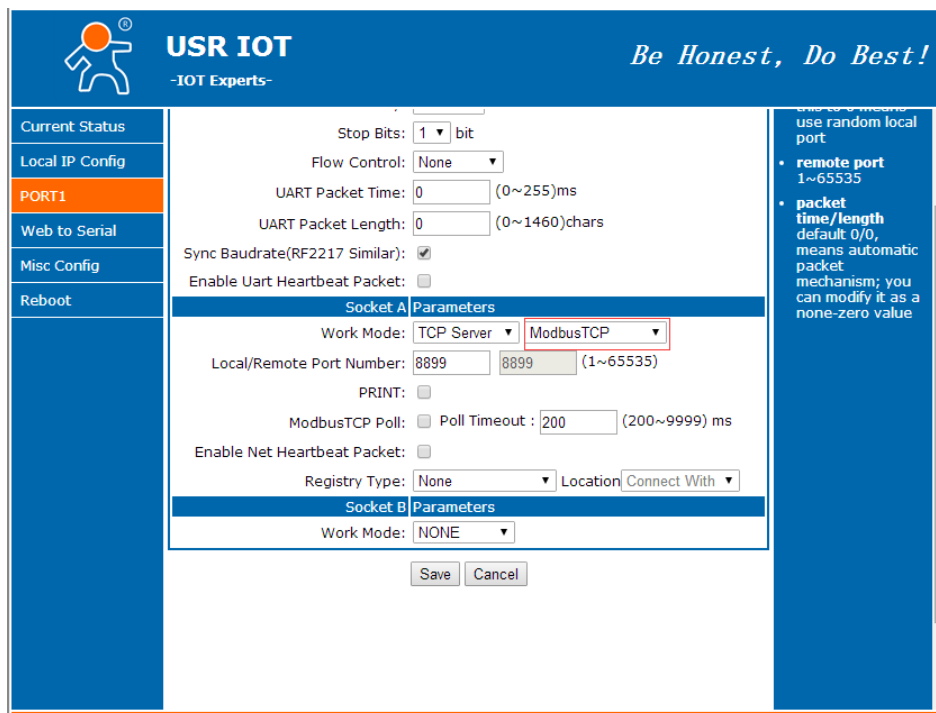
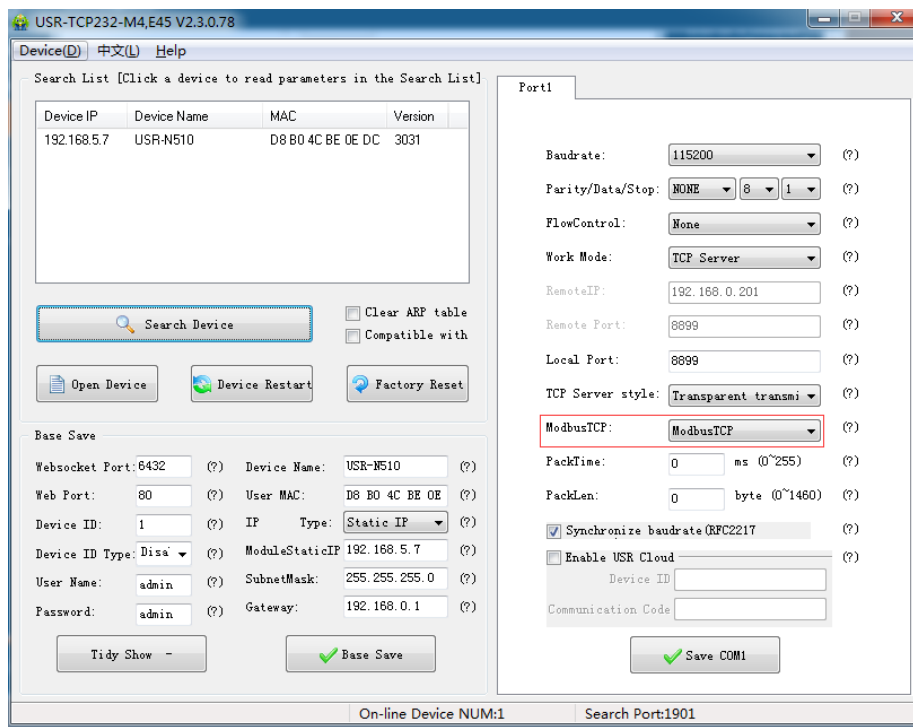


Figure 23 Modbus RTU<=>Modbus TCP

Modbus polling: N540 support Modbus polling function and user can set N540 with Modbus polling function by web server as follow:

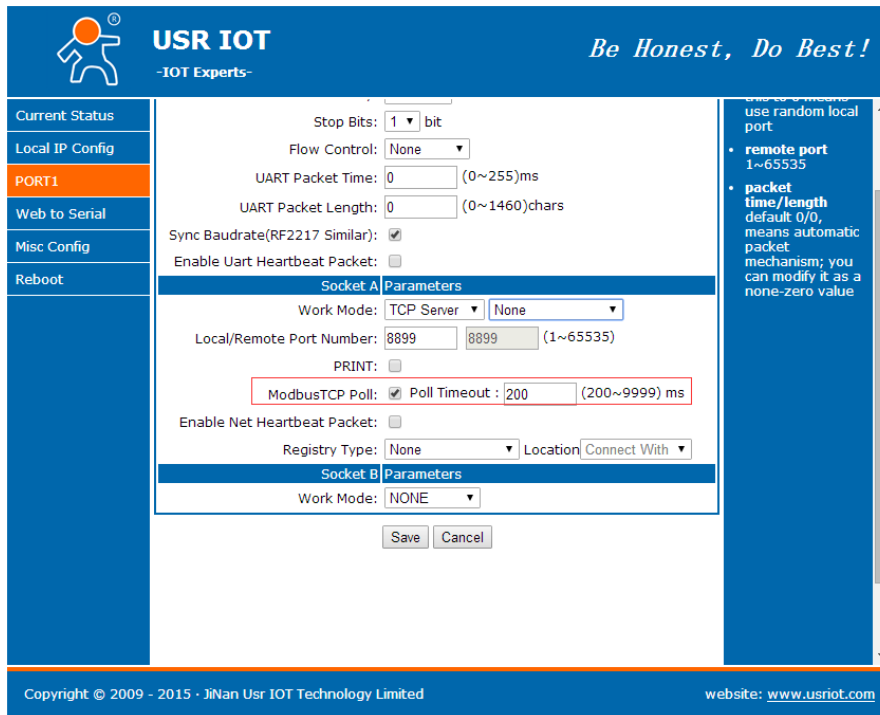


Figure 24 Modbus polling

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 N540 with Network Printing function by web server as follow:

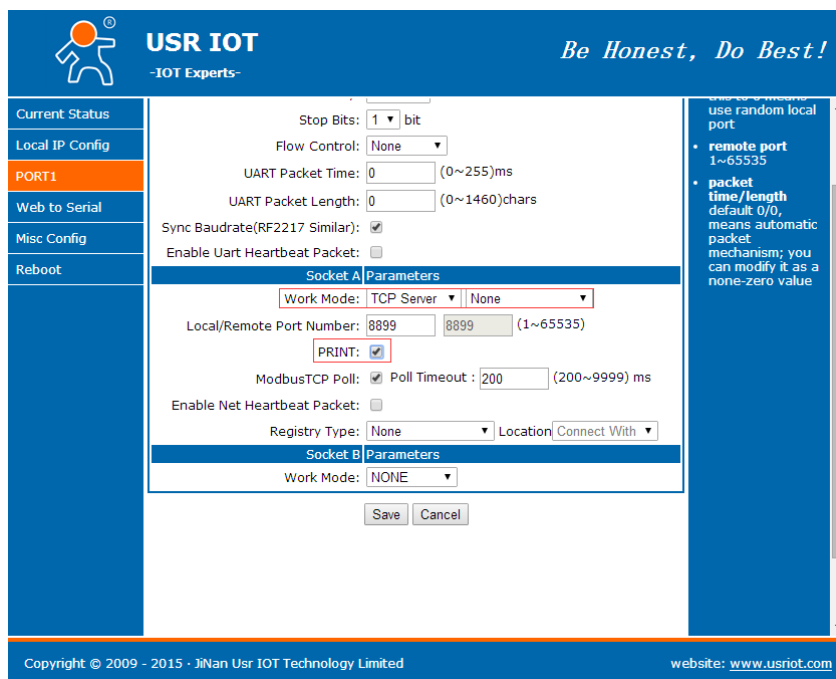


Figure 25 Network Printing

2.4.6. Editable Web server

N540 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.

3. Parameter Setting

There are three ways to configure USR-N540. 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 N540 by setup software, user can run setup software, search N540 in same LAN and configure the N540 as follow:

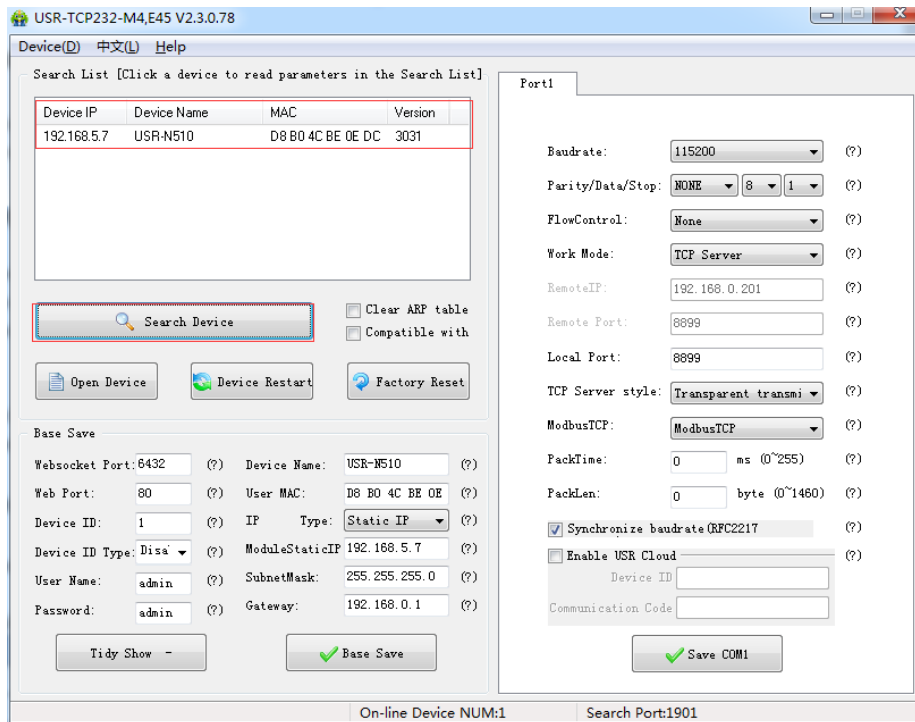


Figure 26 Setup software

After researching N540 and clicking N540 to configure, user need log in with user name and password. Default user name and password both are admin. If user keep the default user name and password, it is not necessary to log in.

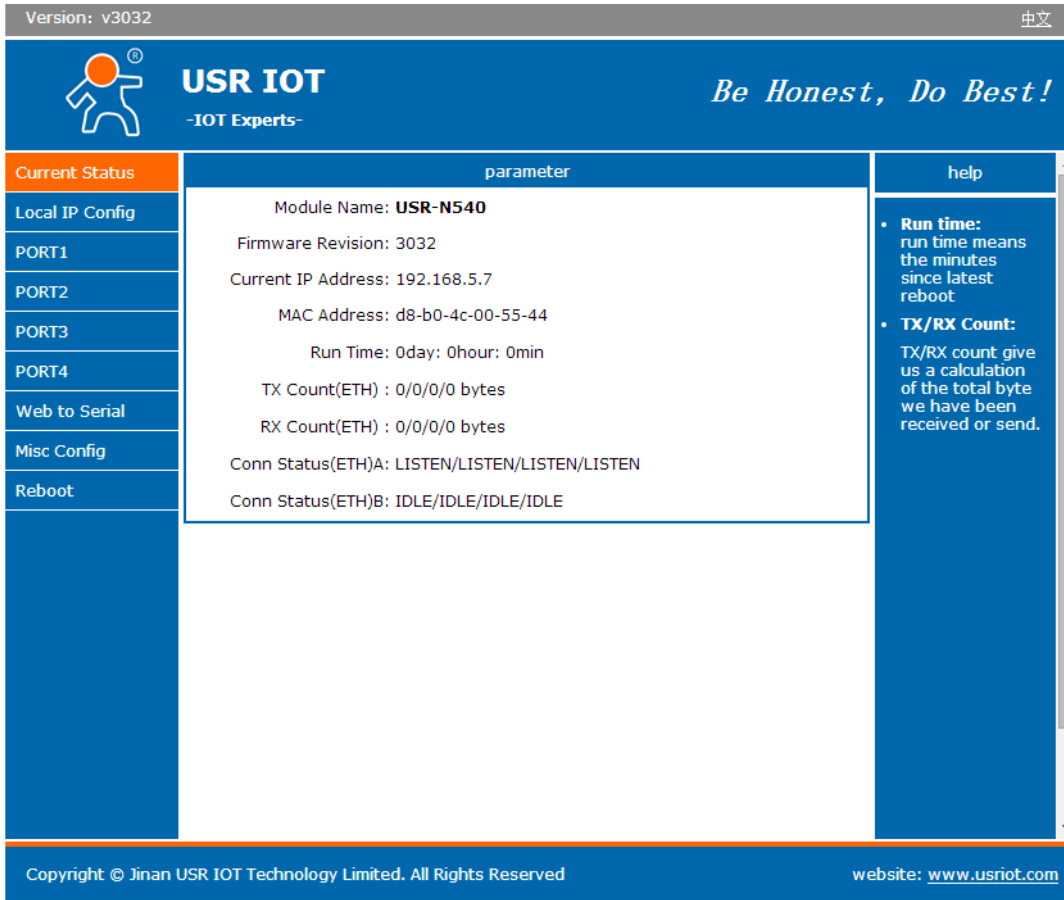
3.2. Web Server Configuration

User can connect PC to N540 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 27 Web server default parameters

After firstly connecting PC to N540, 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:



The screenshot shows the USR IOT web server interface. At the top, it displays 'Version: v3032' and a language selector '中文'. The header features the USR IOT logo and the slogan 'Be Honest, Do Best! - IOT Experts -'. The main content area is divided into three columns: 'Current Status', 'parameter', and 'help'. The 'Current Status' column contains a menu with options like 'Local IP Config', 'PORT1', 'PORT2', 'PORT3', 'PORT4', 'Web to Serial', 'Misc Config', and 'Reboot'. The 'parameter' column displays system information: Module Name: USR-N540, Firmware Revision: 3032, Current IP Address: 192.168.5.7, MAC Address: d8-b0-4c-00-55-44, Run Time: 0day: 0hour: 0min, TX Count(ETH) : 0/0/0/0 bytes, RX Count(ETH) : 0/0/0/0 bytes, Conn Status(ETH)A: LISTEN/LISTEN/LISTEN/LISTEN, and Conn Status(ETH)B: IDLE/IDLE/IDLE/IDLE. The 'help' column contains two bullet points: 'Run time: run time means the minutes since latest reboot' and 'TX/RX Count: TX/RX count give us a calculation of the total byte we have been received or send.' The footer includes 'Copyright © Jinan USR IOT Technology Limited. All Rights Reserved' and the website 'www.usriot.com'.

Figure 28 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:

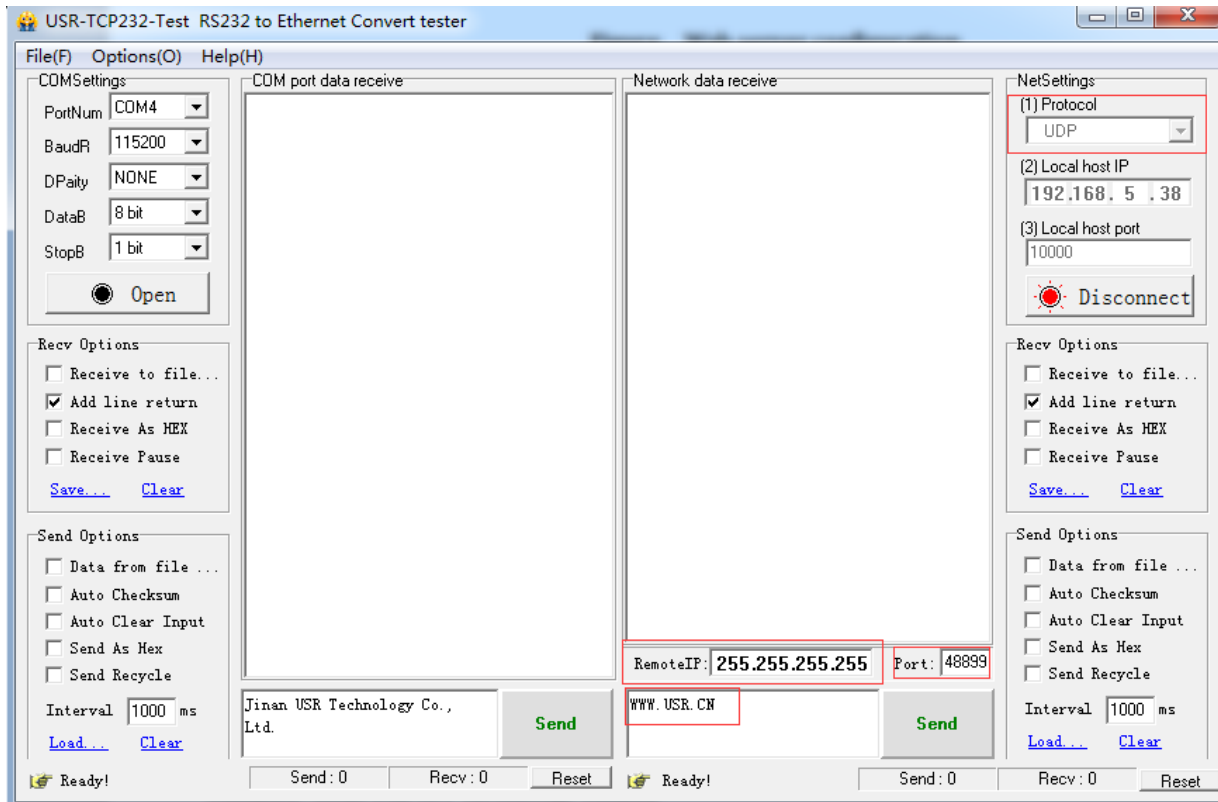


Figure 29 Network AT Command

4. Contact Us

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Web: www.usriot.com

Support: h.usriot.com

Email: sales@usr.cn

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

5. Disclaimer

This document provide the information of USR-N540 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

2017-08-22 V1.1.0.01 Established.