

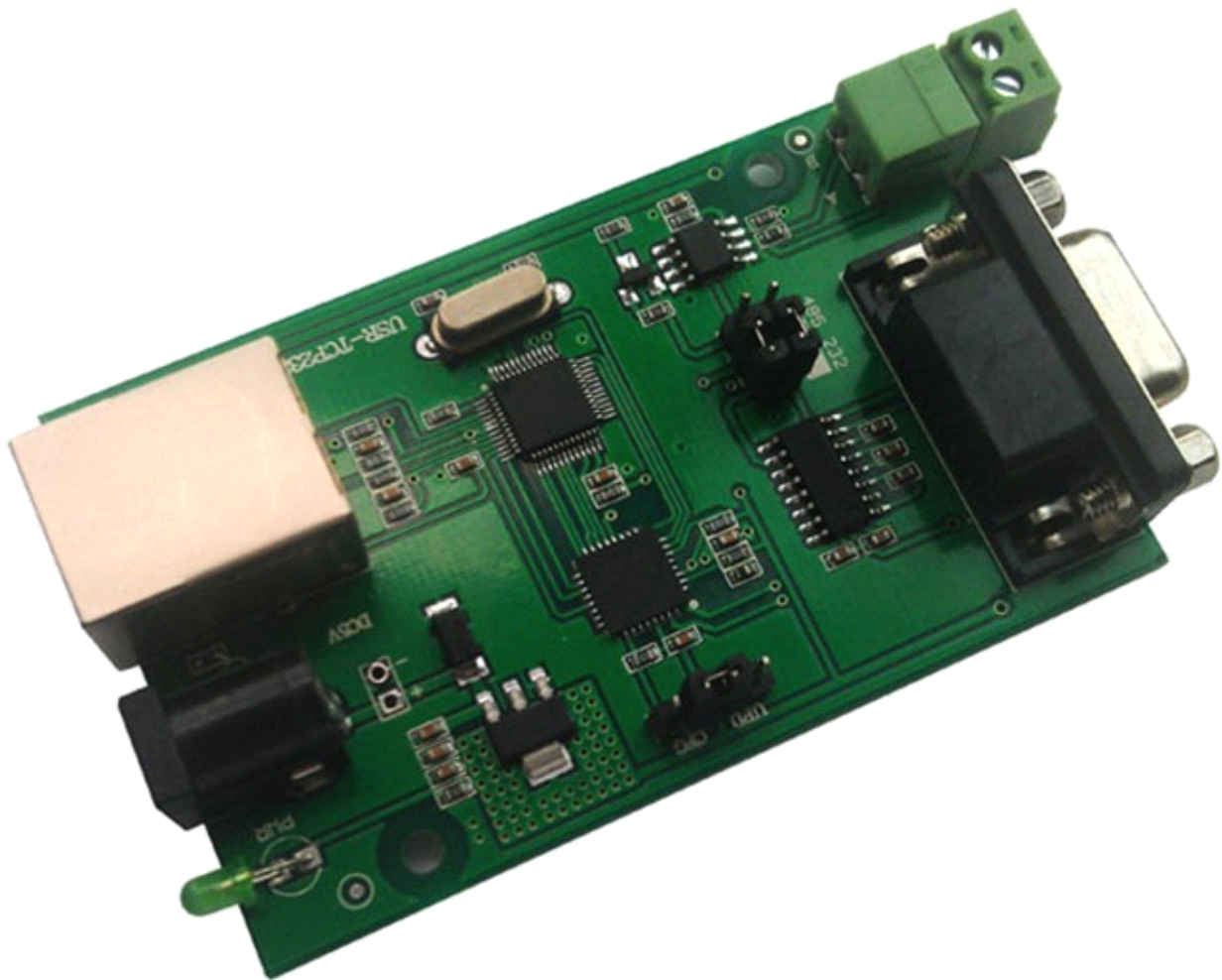
# RS232/RS485 to Ethernet convert module

USR-TCP232-24

Hard version: V1.1

File version: V1.2

2011-08-18



RS232/RS485 to Ethernet convert module is an Equipment for convert TCP or UDP socket data to RS232 or RS485, easy to use, small size, low power, 32 bits arm on board, high speed , high Stability.

Our concept: simple functions, stable performance, reasonable price.

We can supply Custom services, hardware, software and Server, welcome to contact us.

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# 1. Product introduce

## 1.1 Introduction

RS232/RS485 to Ethernet convert module is an Equipment for convert TCP or UDP socket data to RS232 or RS485, easy to use, small size, low power, 32 bits arm on board, high speed , high Stability.

This is a multi-functional embedded Ethernet serial data conversion device that integrates a TCP / IP protocol stack, the user can easily use it to network functionality of embedded devices, upgrade the existing serial devices into a network function, saving human and material resources and development time, make the product faster to market, enhance their competitiveness.

There is 10/100M auto detected RJ45 interface, RS232 bound rate up to 230.4Kbps, can work at TCP Server, TCP Client, UDP and UDP server mode, setup easily via RS232 or RJ45.

## 1.2 Function Features

- 100M high speed Ethernet card, 10/100M auto detect interface;
- support AUTO MDI/MDIX, Can use a crossover cable or parallel cable connection;
- RS232 bound rate can set up from 300 to 256000
- RS485 bound rate can set up from 300 to 115200
- Work mode TCP Server, TCP Client, UDP, UDP Server
- Virtual serial port supported;
- across the gateway, across switches, routers
- Can work in LAN, also can work on the Internet (external network)
- Working port, destination IP address and port can be easily set up;
- Automatically connection to ensure a reliable network to establish the TCP connection;
- Transmission distance: RS232 - 15 meters, RS485 - 1000 meters, cable 200 meters (after the switches together through the Internet, no distance limit)

## 1.3 Product Features

- 32 bits ARM CPU inside;
- LAN : 10/100Mbps; protect: Built-2KV isolated electromagnetic;
- RS232 x 1: TXD RXD GND;
- RS485 x 1: A (Data+) B (Data-); 120 Ohms Termination Resistance on board.
- network protocol: ETHERNET ARP IP UDP TCP ICMP;
- Software tool: configuration software, TCP/UDP test soft, RS232 debug soft.
- Configuration method: RS232 or via Ethernet, free software available.
- Power : 5V
- Size (L×W×H): 90×50×18(mm) Including terminals and pin
- Operating temperature: -25~75°C.
- Save the environment: -40~85°C, 5~95%RH.

## 1.4 Applications Area

Serial device server module for connecting serial industrial automation equipment such as PLC, sensors, meters, motors, drives, bar code readers and displays and design. Serial server module is widely used in attendance, access control systems, Canteen machines, POS systems, building control, fire control, the banking system, engine room monitoring, UPS monitoring, power, oil, environmental monitoring, industrial applications and other areas all need to serial devices Data network management where you can use a serial device server solution.

## 1.5 Order information

Name	Model	interface	Explain
Ethernet card for MCU	USR-TCP232-T	TTL	For PCB embedded customers use, with RJ45 Block
RS232 to Ethernet convert module	USR-TCP232-2	RS232	
RS232/RS485 to Ethernet convert module (this product)	USR-TCP232-24	RS485/RS232	RS232/RS485 choose via Jumper
Ethernet to TTL module	USR-TCP232-D	TTL	DIP module, For PCB embedded customers use, with out RJ45
Serial Device Server	USR-TCP232-300	RS232/RS485	With shell serial servers, network setting parameters

Model Description: USR is our brand, TCP232 that TCP/IP to serial module product, 2/4/T that serial-side level in the form.

## 1.6 Electrical parameters

Operating voltage: 5V

Operating current: 200mA

Operating Temperature: -25 ~ 75 ° C

Storage Temperature: -40 ~ 85 ° C

Storage Humidity: 5% ~ 95% RH

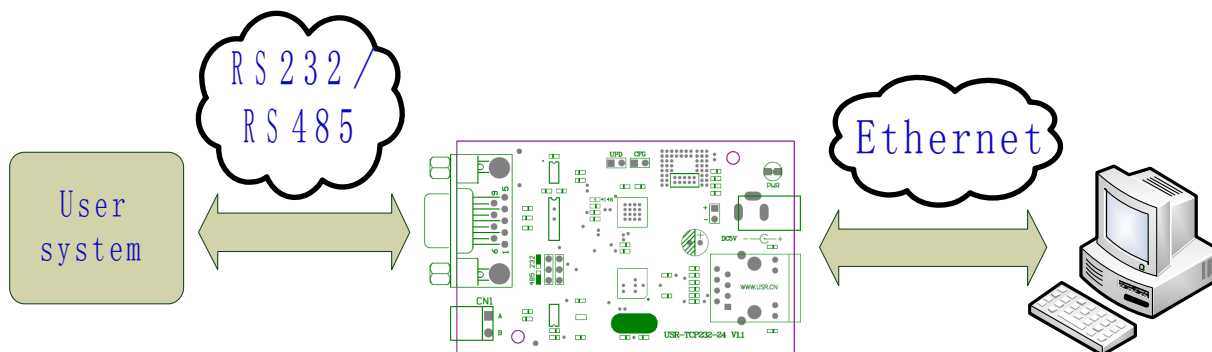
## 1.7 Packet list

- 1. RS232/RS485 to Ethernet convert module \* 1
- 2. CD with soft and user guide \*1

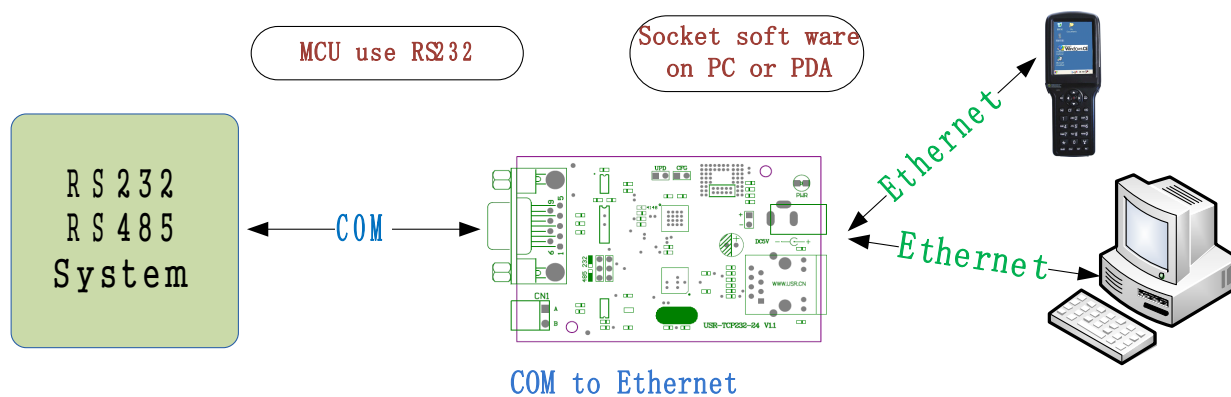
## 2. Work mode

### 2.1 System Block Diagram

USR-TCP232-24 is bridge to connect the network to Serial device, with the RS232/RS485 to Ethernet convert module; users can easily manage and control network devices, application diagram below.

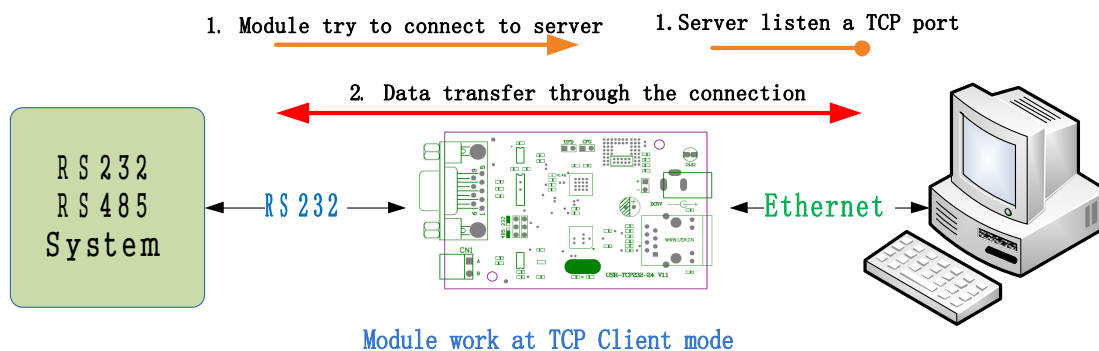


The detail like below:

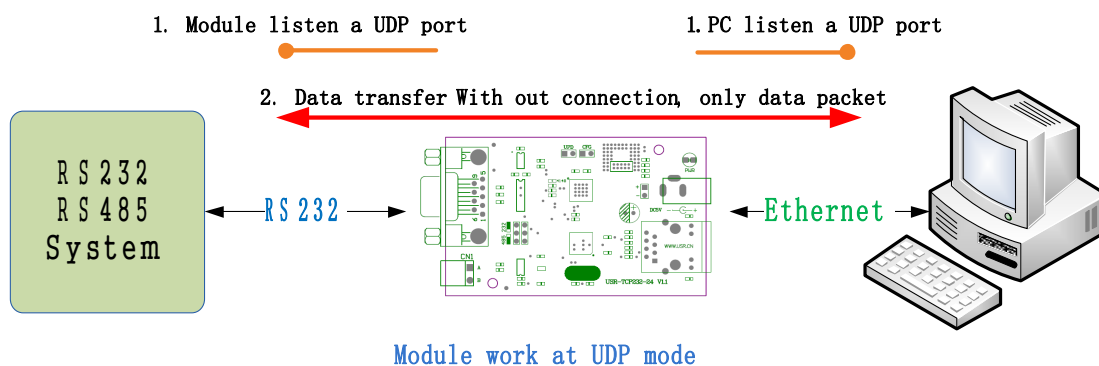


### 2.2 TCP Client mode

When work at TCP client mode, the module auto connect to destination IP and port, make a TCP connection for send or receive data. Destination IP can be a WAN IP or Ethernet IP.

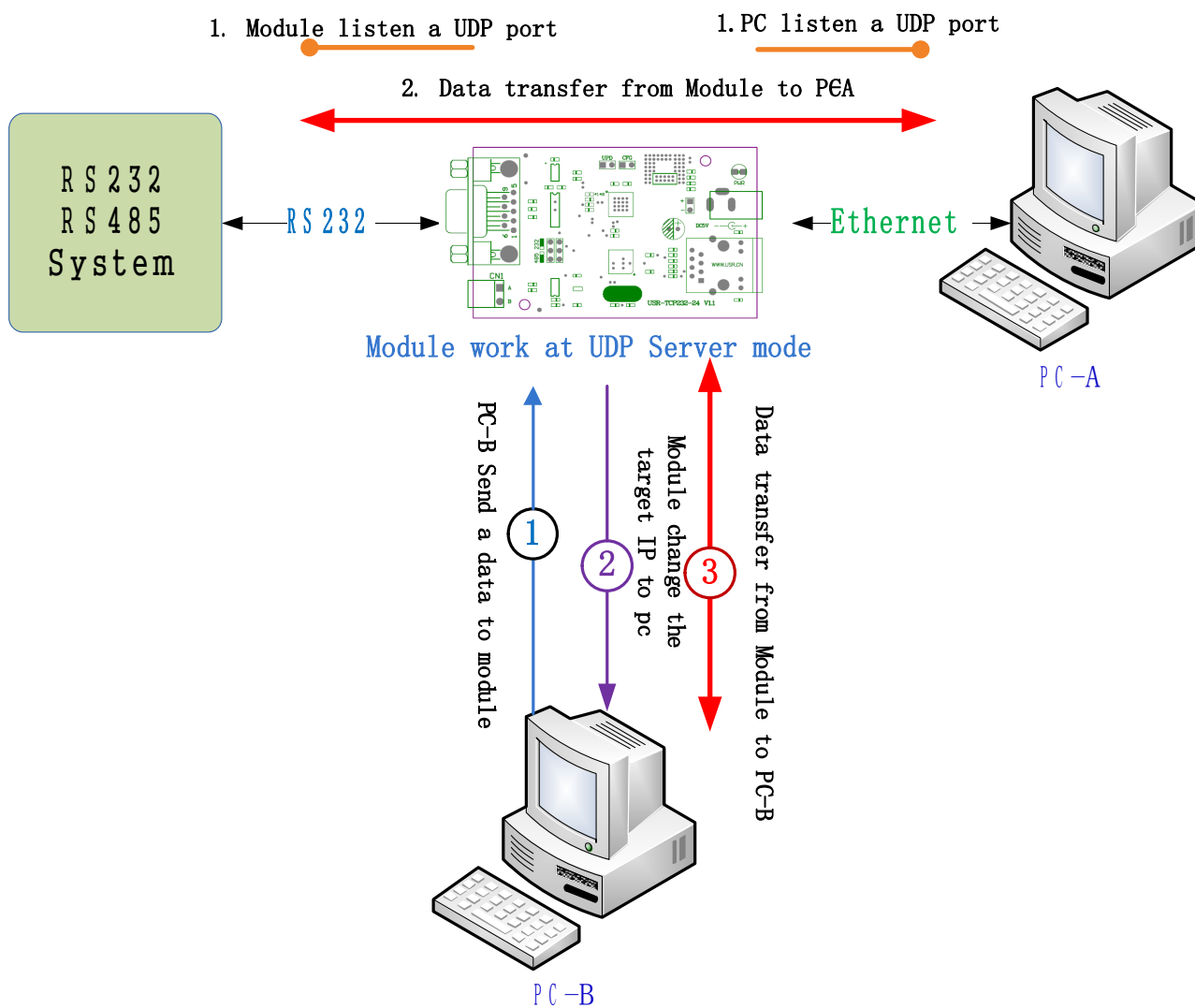


## 2.3 UDP client mode

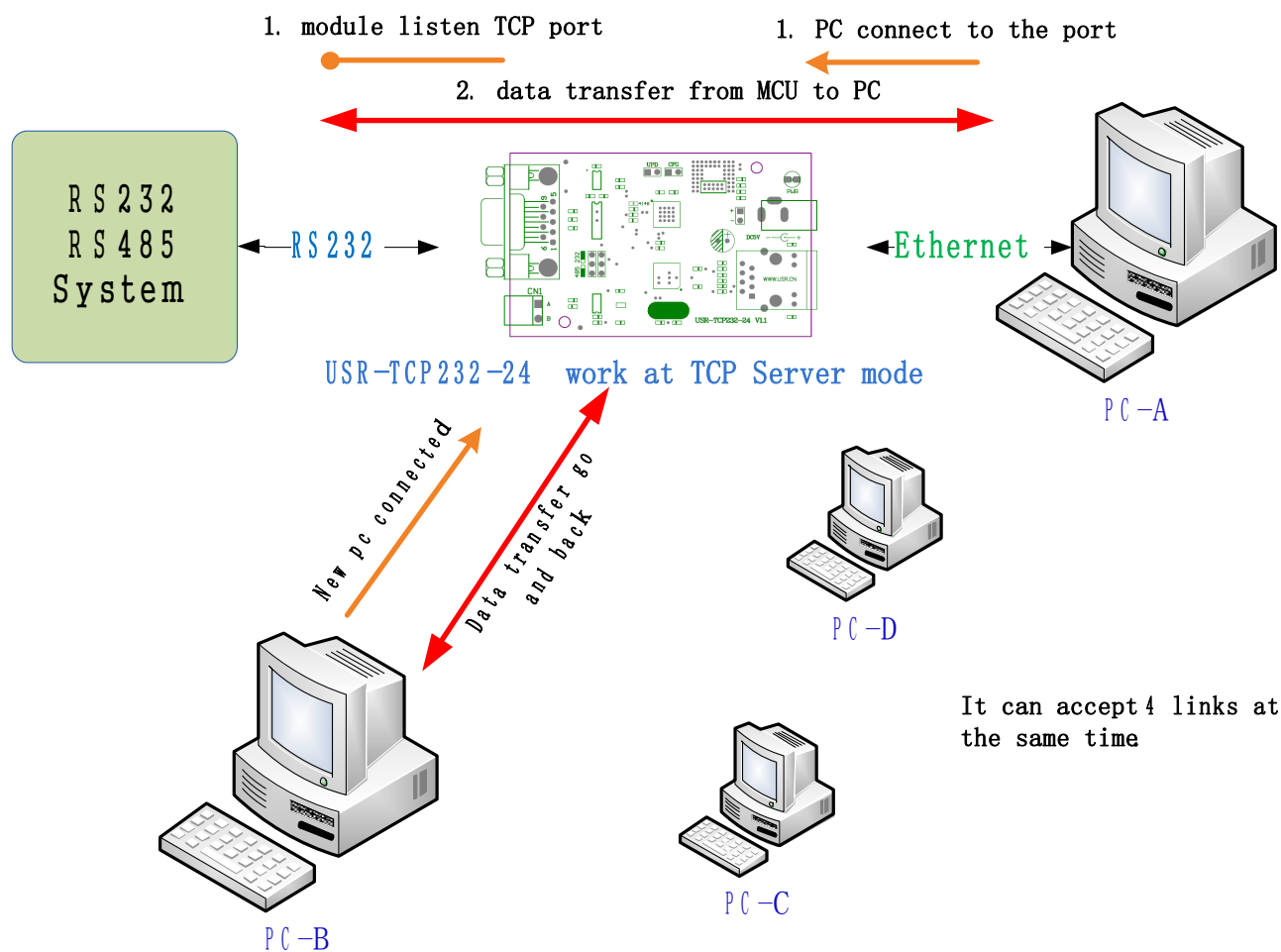


## 2.4 UDP server Mode

Like the socket UDP server in pc API. Many to one data transfer supported, the data from uart/232/485 part will be transformed to the last UDP packet's address.



## 2.5 TCP server Mode



USR-tcp232-24 listen TCP port and accept connect from ethernet.



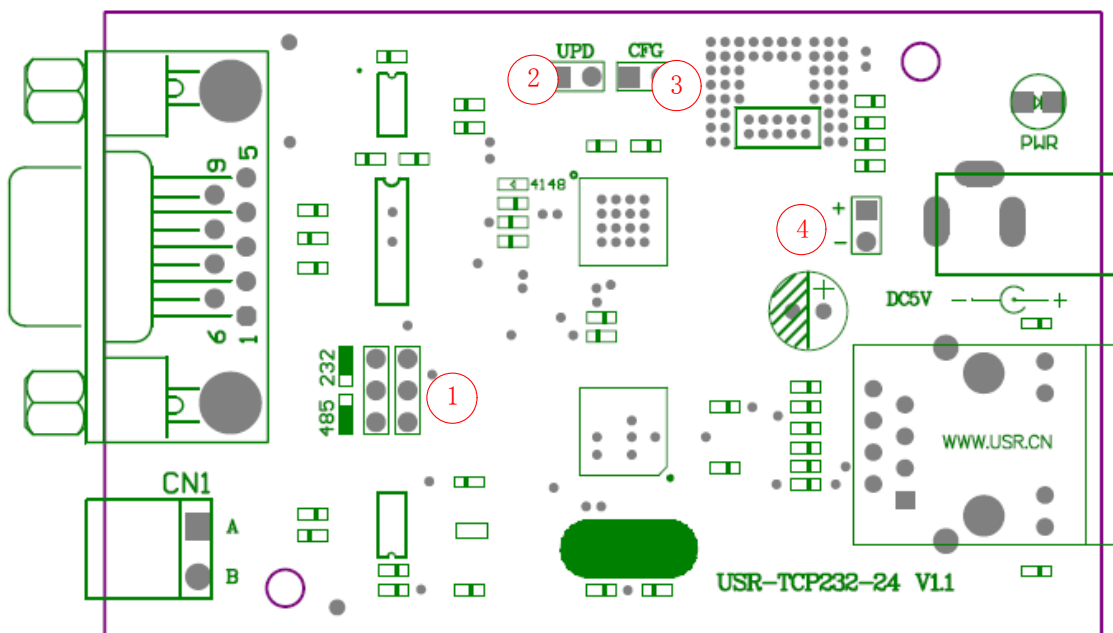
## 3. Hardware Description

### 3.1 LED status

There is two leds in RJ45 connector, one is green, and the other is yellow. And 1 power led.

LED	name	description
red	Power	Light When Power on
green	Link state	Light when 100Mbps network linked
yellow	Data transfer	Blink when there is data in or out

### 3.2 Jumper use age



There are three jumpers and one Welding hole:

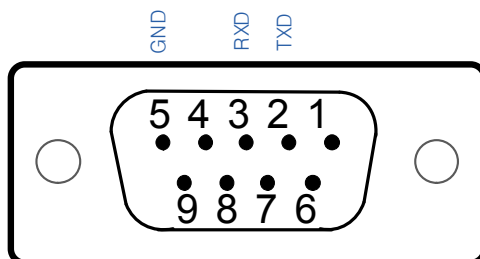
1. RS232 and RS485choose: connect the up pins for RS232, and down for RS485, RS232 by default.
2. UPD: Update jumper, connect it and then power on the module to make module into update mode.
3. CFG: configuration jumper, when use RS232 for configuration, connect it to configuration mode ,and leave it free to go work mode.
4. Power input Welding hole.

Notice: CFG is needed only When config via RS232, when config via RJ45, it is no use.

### 3.3 Interface Description

#### RS232 interface:

RS232 use 9 pin female (hole), only 3 pins in use, others are NC, the detail is below.



ID	Mark	Description
2	TXD	RS232 Send of module
3	RXD	RS232 Receive of module
5	GND	Ground

We can offer two kinds of serial lines, if needed, please choose to buy:

1. Male to Female direct serial cable: connect serial server and the computer directly to debugging and Testing.
2. Male to Male and Cross Pin2 and Pin3 serial cable: used to connect RS232 serial port server and general user equipment.

#### RS485 interface:

RS485 has two lines A(data+) and B(data-), 120 Ohms Termination Resistance on board.

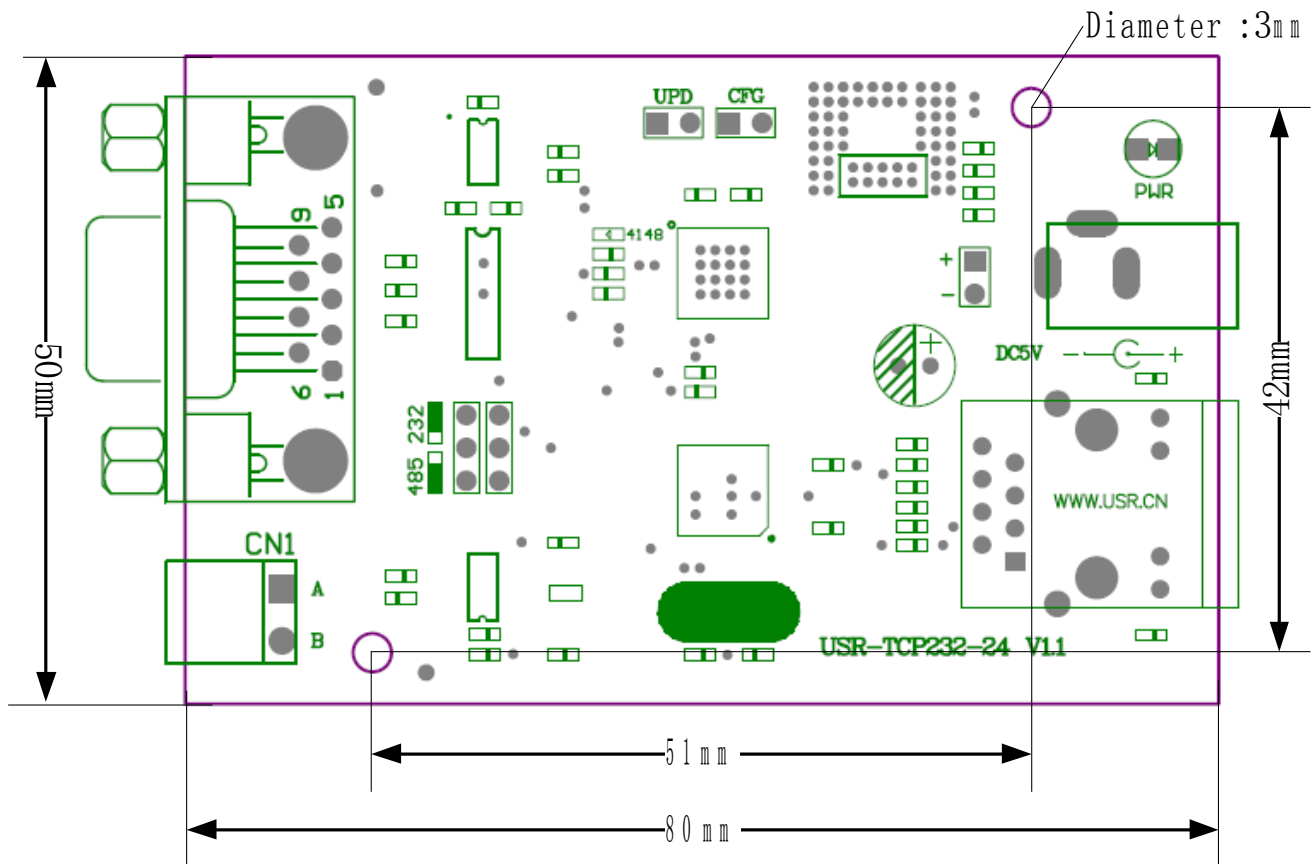
**Notice:** this module user Jumpers to change work for RS232 or RS485, by default it work at RS232 mode.

#### RJ45 internet interface:

Auto detected 10M/100M RJ45 interface, support AUTO MDI/MDIX, that is to say you can use crossover cable or a straight cable to connect it to PC for test.

Pin	Name	Description
1	TX+	Transceiver Data+
2	TX-	Transceiver Data-
3	RX+	Receive Data+
4	n/c	Not connected
5	n/c	Not connected
6	RX-	Receive Data-
7	n/c	Not connected
8	n/c	Not connected

### 3.4 Mechanical Dimensions



## 4. Configure

parameters: work mode, source IP, source port, net mask, gateway, UART baud rate, destination IP, destination port.  
Configure command is 24byte length.

Connect the CFG jumper to change the module into configuration mode.

### 4.1 configure command format

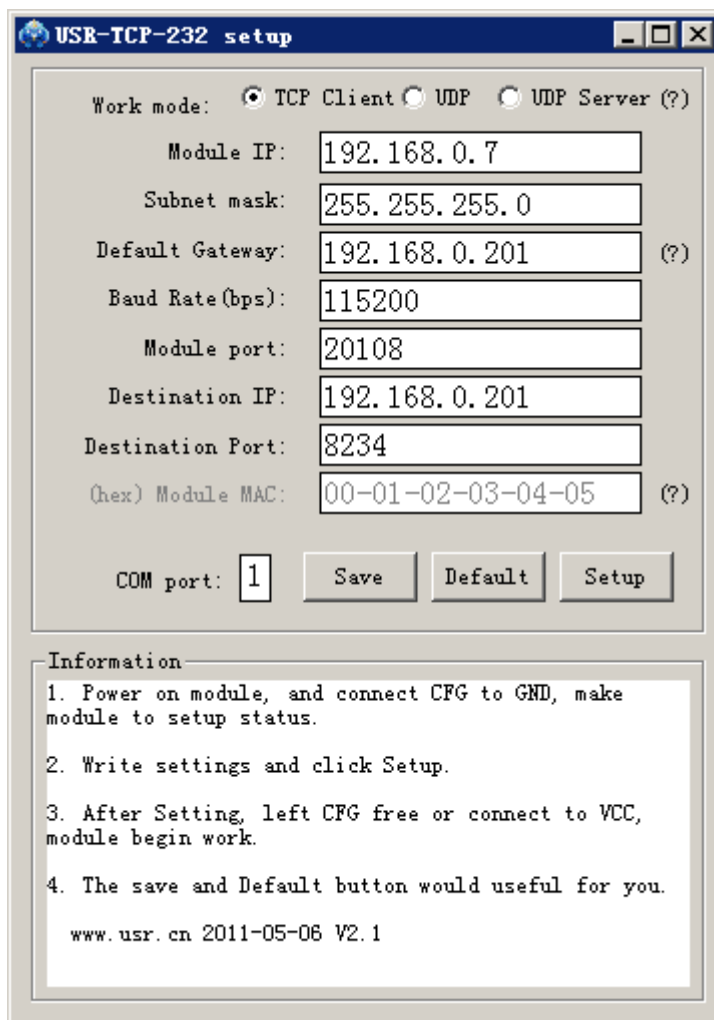
Configure mode UART interface: 9600bps,n,8,1

part	bytes	description	example	hex
prefix	2	0x55 0xAA	0x55 0xAA	0x55 0xAA
destination IP	4	destination IP	192.168.0.201	0xC9 0x00 0xA8 0xC0
destination port	2	Destination port	8234	0x2A 0x20
Host IP	4	The IP module hold	192.168.0.7	0x07 0x00 0xA8 0xC0
Host port	2	TCP/UDP source port	20108	0x8C 0x4E
Gateway	4	Gateway IP	192.168.0.201	0xC9 0x00 0xA8 0xC0
Work mode	1	0x01: TCP Client 0x00: UDP 0x02: UDP Server	TCP mode	0x01
baud rate	3	UART baud rate	115200	0x00 0xC2 0x01
Reserved	1	Reserved	00	0x00
checksum	1	Sum(destination IP, destination port, host IP, host port, gateway, work mode, baud rate, reserved)	0xB9	0xB9
Full example: 00 A8 C0 2A 20 07 00 A8 C0 8C 4E C9 00 A8 C0 01 00 C2 01 00 B9				

\* once in configure mode, the UART parameter change to 9600bps,n,8,1, and a 'U' ascii character is send out to ensure the control MCU that in the configure mode. If the 24byte command has effect, a 'K' ascii character is send back to control MCU. If configure command format error, an 'E' character will be send back to control MCU. If the error is the checksum not match , the 1 byte right checksum will be send back to control MCU also.

## 4.2 configure through rs232

1. Power on module, and connect CFG to GND, make module to setup status.
2. Write settings and click Setup.
3. After Setting, left CFG free or connect to VCC, module begin work.
4. The save and Default button would useful for you.



The screenshot shows the 'USR-TCP-232 setup' window. It has a title bar with a globe icon and the text 'USR-TCP-232 setup'. The window contains several input fields and buttons. At the top, there are three radio buttons for 'Work mode': 'TCP Client' (selected), 'UDP', and 'UDP Server (?)'. Below these are input fields for 'Module IP' (192.168.0.7), 'Subnet mask' (255.255.255.0), 'Default Gateway' (192.168.0.201), 'Baud Rate (bps)' (115200), 'Module port' (20108), 'Destination IP' (192.168.0.201), 'Destination Port' (8234), and '(hex) Module MAC' (00-01-02-03-04-05). There are three buttons at the bottom: 'Save', 'Default', and 'Setup'. Below the input fields is an 'Information' section with a list of four steps and a version number 'www.usr.cn 2011-05-06 V2.1'.

Work mode: ☒ TCP Client ☐ UDP ☐ UDP Server (?)

Module IP: 192.168.0.7

Subnet mask: 255.255.255.0

Default Gateway: 192.168.0.201 (?)

Baud Rate (bps): 115200

Module port: 20108

Destination IP: 192.168.0.201

Destination Port: 8234

(hex) Module MAC: 00-01-02-03-04-05 (?)

COM port: 1 Save Default Setup

Information

1. Power on module, and connect CFG to GND, make module to setup status.
2. Write settings and click Setup.
3. After Setting, left CFG free or connect to VCC, module begin work.
4. The save and Default button would useful for you.

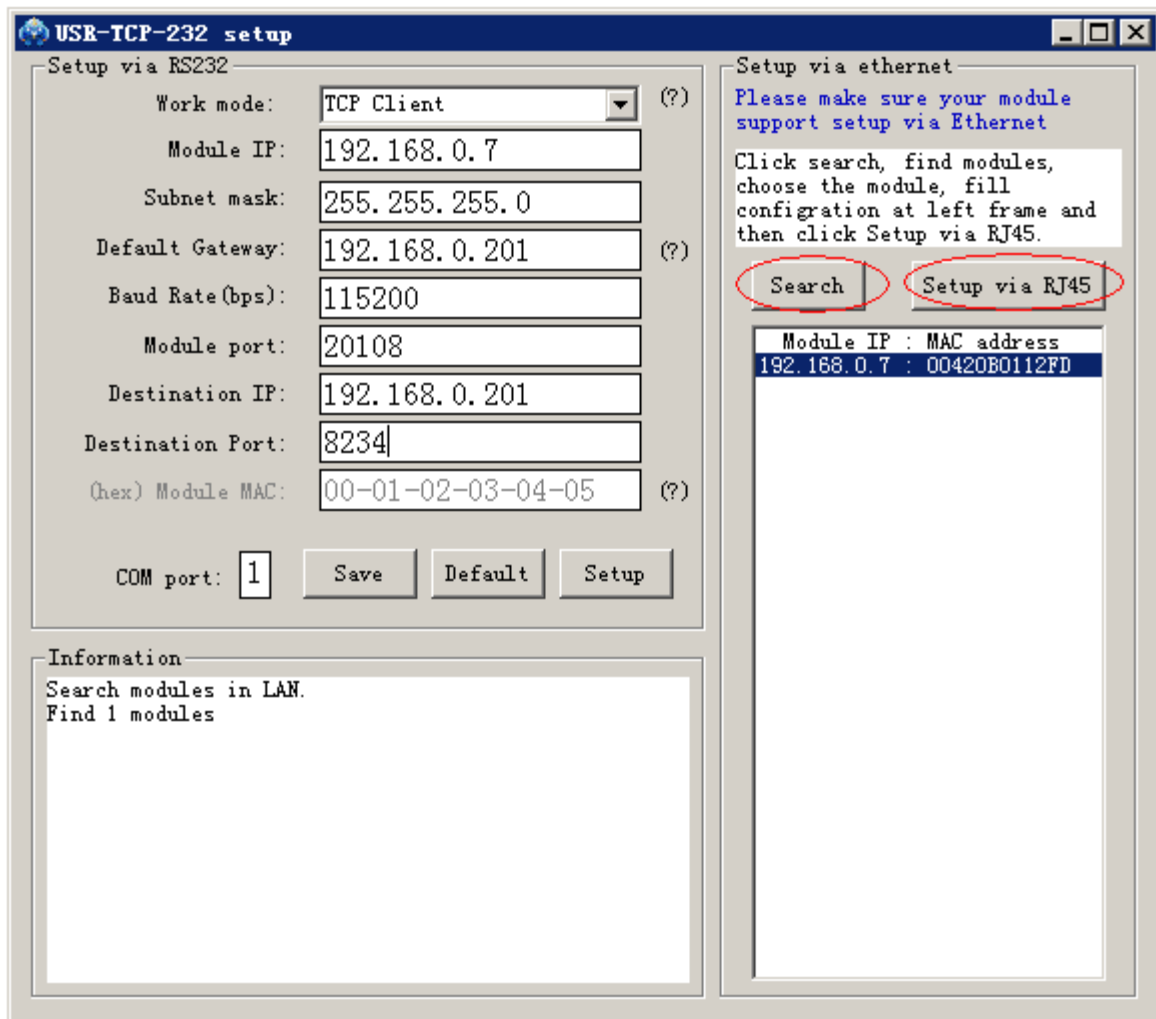
www.usr.cn 2011-05-06 V2.1

## 4.3 Configure through RJ45

Since 2011-08-02, the new version modules support Setup via RJ45.

The steps for setting via RJ45:

1. Connect the module to the LAN with PC or connect to PC, power on the module.
2. Open the setup software, click Search, find modules, and choose the one you want to change settings.



The screenshot shows the 'USR-TCP-232 setup' window. It has two main sections: 'Setup via RS232' on the left and 'Setup via ethernet' on the right. The 'Setup via RS232' section contains fields for Work mode (TCP Client), Module IP (192.168.0.7), Subnet mask (255.255.255.0), Default Gateway (192.168.0.201), Baud Rate (115200), Module port (20108), Destination IP (192.168.0.201), Destination Port (8234), and (hex) Module MAC (00-01-02-03-04-05). There are also buttons for 'Save', 'Default', and 'Setup', and a 'COM port' dropdown set to '1'. The 'Setup via ethernet' section has instructions to click 'Search' and 'Setup via RJ45'. Below these instructions is a table showing the search results.

Module IP	MAC address
192.168.0.7	00420B0112FD

Information  
Search modules in LAN.  
Find 1 modules

3. Fill the settings you want at the left frame, and click **Setup via RJ45**.
4. (Optional step) after setup, the module will restart in 5 seconds; you can re click Search to check new config.
5. Power down the module and Power on, the module will work at new configuration.

## 5. Model test

### 5.1 Default work mode test

The default work mode is TCP Client and the setting is same as the picture show on last page.

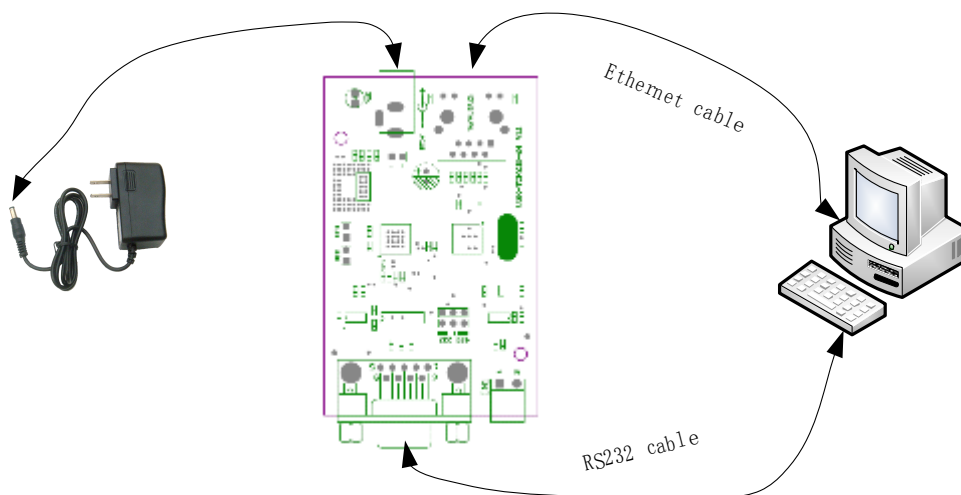
First, you can ping the module, if you are in the same LAN with the module.

```
Pinging 192.168.0.7 with 32 bytes of data:

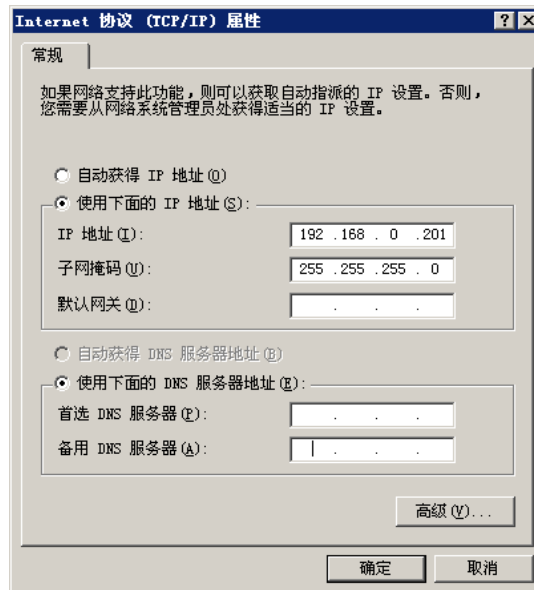
Reply from 192.168.0.7: bytes=32 time<1ms TTL=128
Reply from 192.168.0.7: bytes=32 time<1ms TTL=128
Reply from 192.168.0.7: bytes=32 time<1ms TTL=128
Reply from 192.168.0.7: bytes=32 time<1ms TTL=128
Reply from 192.168.0.7: bytes=32 time<1ms TTL=128
Reply from 192.168.0.7: bytes=32 time<1ms TTL=128
Reply from 192.168.0.7: bytes=32 time<1ms TTL=128
Reply from 192.168.0.7: bytes=32 time<1ms TTL=128
Reply from 192.168.0.7: bytes=32 time<1ms TTL=128
Reply from 192.168.0.7: bytes=32 time<1ms TTL=128
```

Default work mode test:

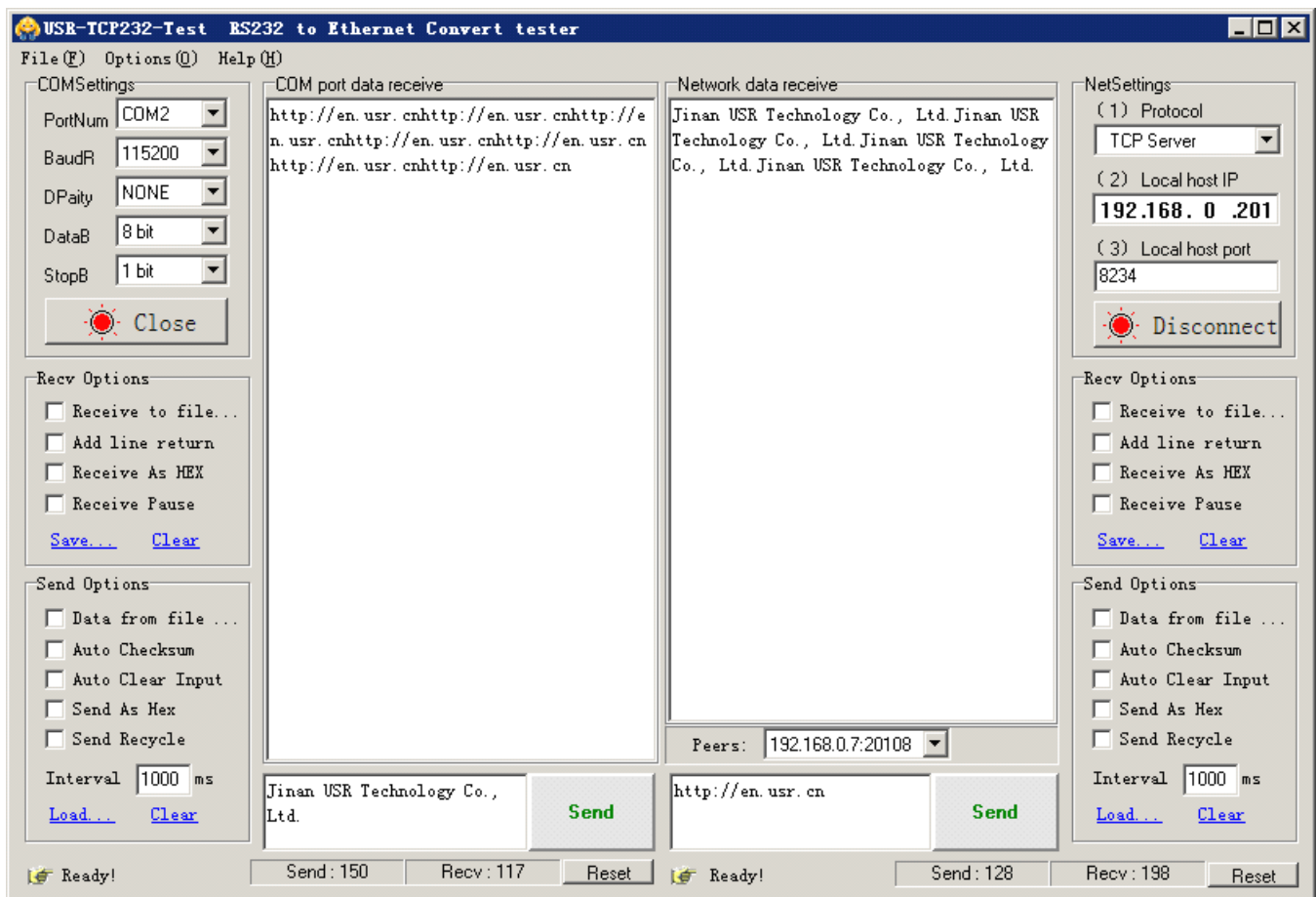
1. What you need for test, A PC with a RS232 interface, 5V Power adapter, RS232 cable, Ethernet Cable, Test software. If your PC has no RS232 interface, you can use a USB to RS232 convert product.
2. Hardware connects: Connect the module to your PC, RS232 to PC's RS232 and Ethernet RJ45 to PC's RJ45 Ethernet, you can use the Cross or Directly Connect net cable, because the module support AUTO MDI/MDIX.



3. Setup the PC's IP address to 192.168.0.201



4. Open the test software, choose right COM port, open com port, listen TCP port.



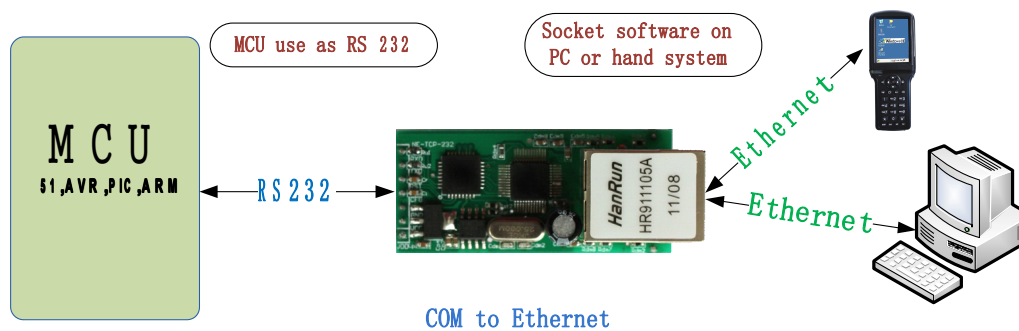
5. After a short while, the module will connect to the software, as you can see 192.168.0.7:20108.
6. Now you can send from RS232, receive from Ethernet; and send from Ethernet, receive from RS232.



## 6. Apps

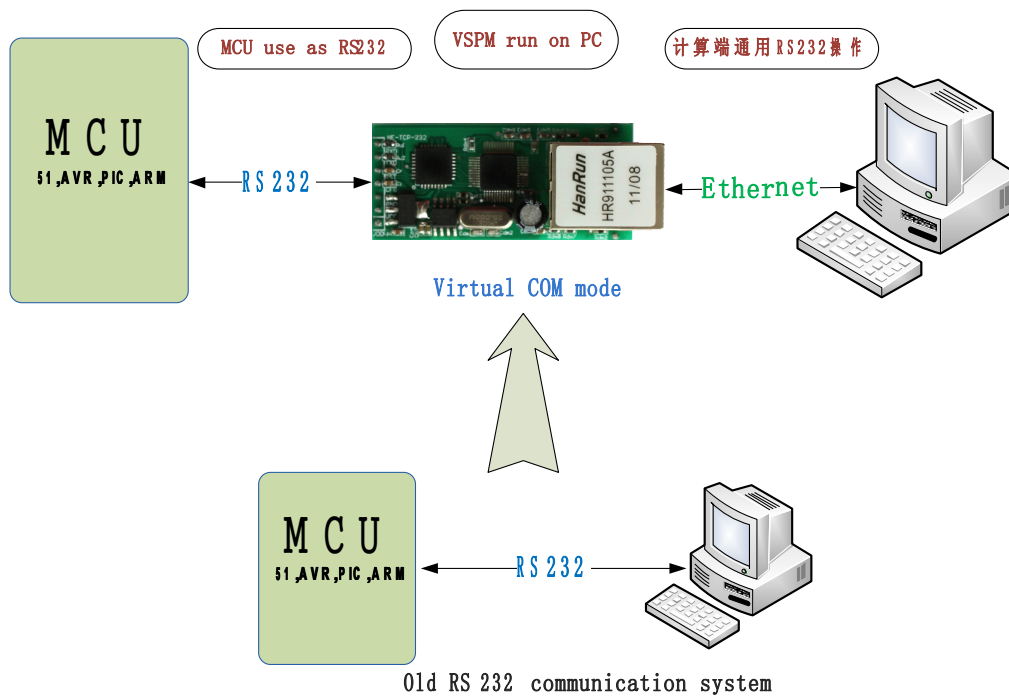
Note: use the picture of USR-TCP232-T here.

### 6.1 COM<->TCP/UDP<->server

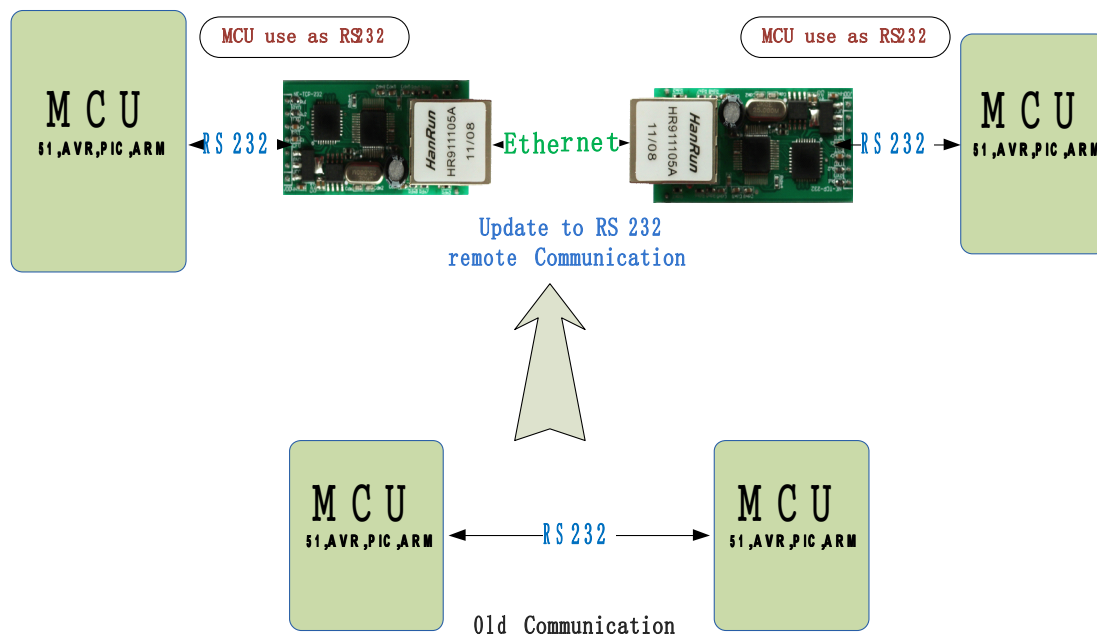


### 6.2 Virtual COM

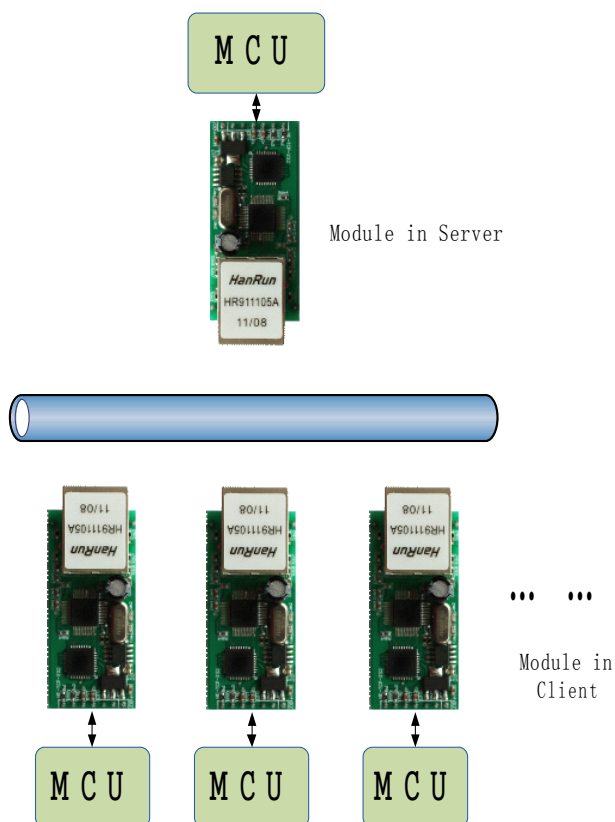
Install VSPM software. The COM like installed in the pc.



## 6.3 COM <-> TCP/UDP <-> COM



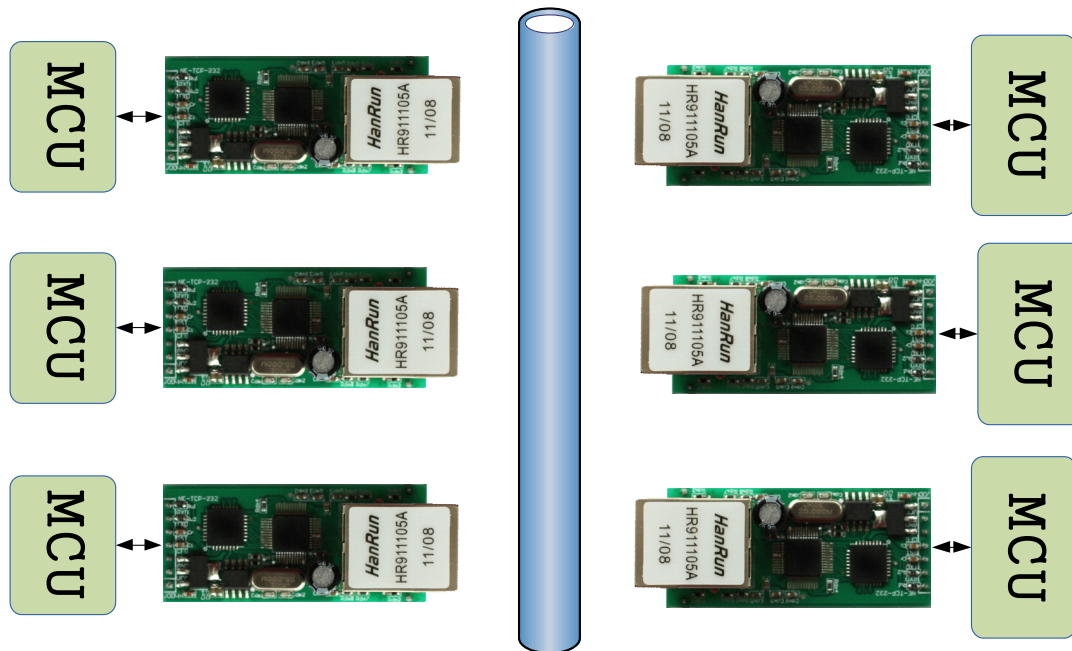
## 6.4 many COM <-> UDP server <-> COM



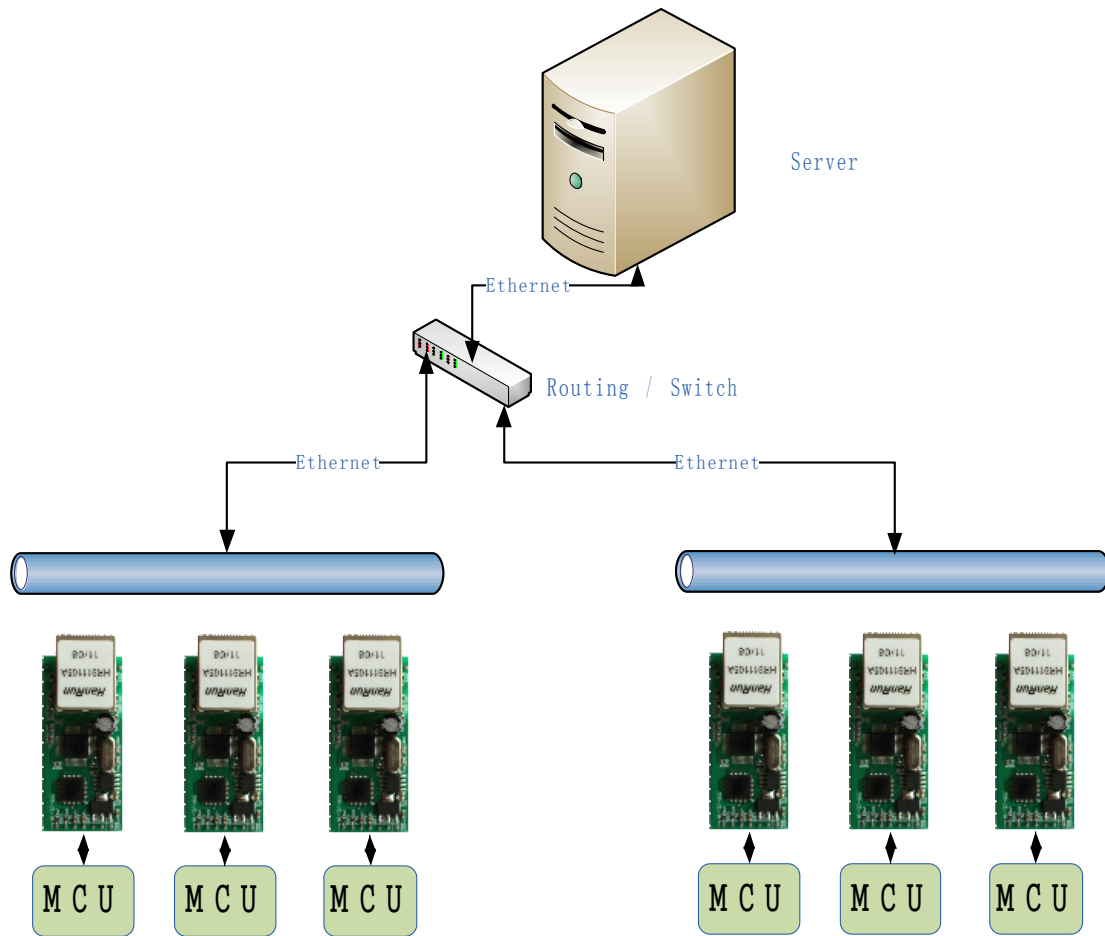
When the UDP server COM transfer data to one of the many COM, the last COM that transferred data will be choose.

## 6.5 COM<-> TCP/UDP<->proxy server <->TCP/UDP<->COM

You can use a proxy server to treat the data form one module to other, or just use you MCU to control the module IP and destination IP Real-time. The method is pull CFG PIN to GND, and send the new configuration data, then pull CFG pin to VCC to use new settings.



## 6.6 COM <-> TCP/UDP <-> server



## 7. Contact us

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## 8. Doc History

Version 1.0 2011-05-26

Version 1.1 2011-06-30 add new test software

Version 1.2 2011-08-18 add TCP Server mode