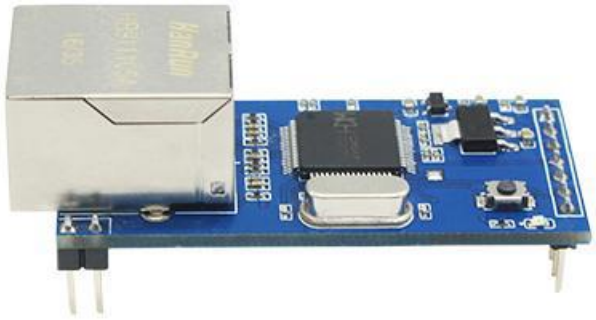
ETH-01

UART (TTL) to Ethernet Adapter



H-2 Technik UG (haftungsbescgränkt)

www.h-2technik.com

Version Information

Version	Date	Modified By	Introduction
1.1	04.2017	Kim	Release

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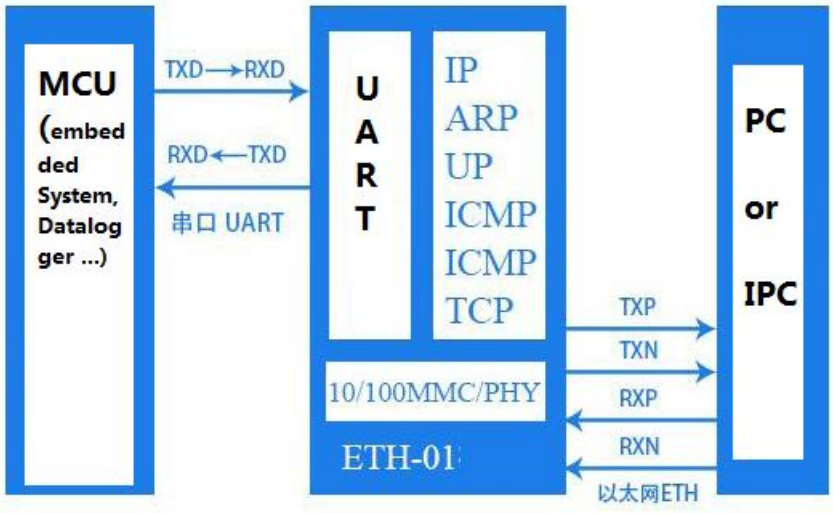
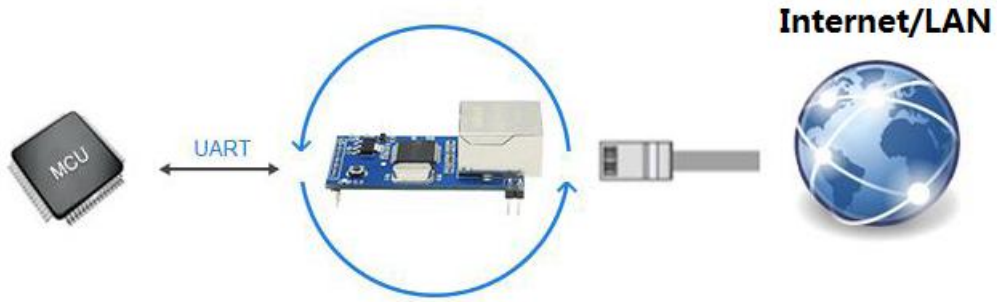
1. Overview

ETH-01 module is Ethernet to serial data transmission module. The module integrates the TCP / IP protocol stack, which enables bidirectional transparent transmission of network packets and serial data. The module is equipped with 10 / 100M Ethernet media transport layer (MAC) and physical layer (PHY), fully compatible with IEEE802.3 Protocol, TCP Client, TCP Server, UDP Client, UDP Server 4 working modes, serial port baud rate can support up to 921600bps. By using PC software or AT command module mode, baud rate, IP address, etc. Parameters can be configured quickly.

Typical application:



Transparent transmission between UART TTL and Ethernet



2. Detail parameters

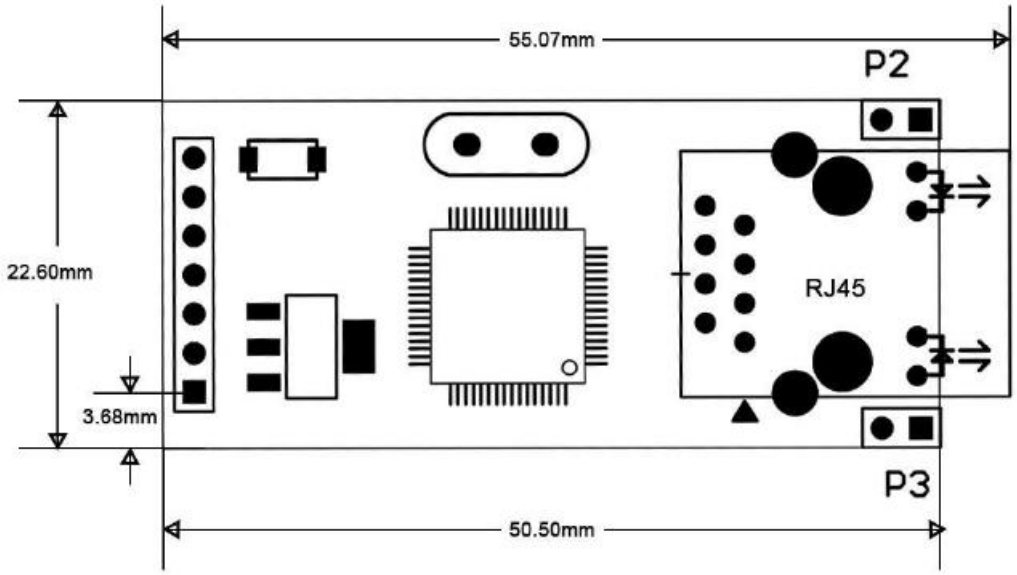
2.1 Parameters

Parameter Table of ETH-01	
Physical data (PCB Board)	1. 2 level PCB 2. 55.07 x 22.6 mm 3. RJ45 Interface & 2.54mm pins 4. FR-4 (Board material)

Features	1. Power suppler 5v or 3.3 2. MAC and PHY integrated 3. Support 10/100M, full duplex / half duplex adaptive Ethernet interface, compatible with 802.3 protocol 4. Atuo-MDI/MIDX, auto switching/detecting straight-through or crossover cable 5. Support DHCP, DNS 6. Support UDP broadcasting(querying devices) 7. TPC Client /Server, UOD Client/Server (4 working modes). RJ45 Status-LED, RJ45 interface built-in isolation transformer, 2KV isolation 8. Serial support full-duplex and half-duplex serial communication 9. Baud rate 300bps ～ 921600bps 10. Working current 120~200mA
Configuration	1. Support AT Command 2. PC Software configuration 3. Setting auto-save after power off

Parameter	Condition	Min. Value	Typical Value	Max. Value	Unit
Storage Temp. Range		-40		85	°C
Max. Welding Temp.	IPC/JEDEC J-STD-020	-	-	260	°C
Working Voltag		-	3.3v or 5v		-
Electrostatic discharge (human body model)	TAMP=25°C	-	-	2	KV
Electrostatic discharge (machine model)	TAMP=25°C	-	-	0.5	KV

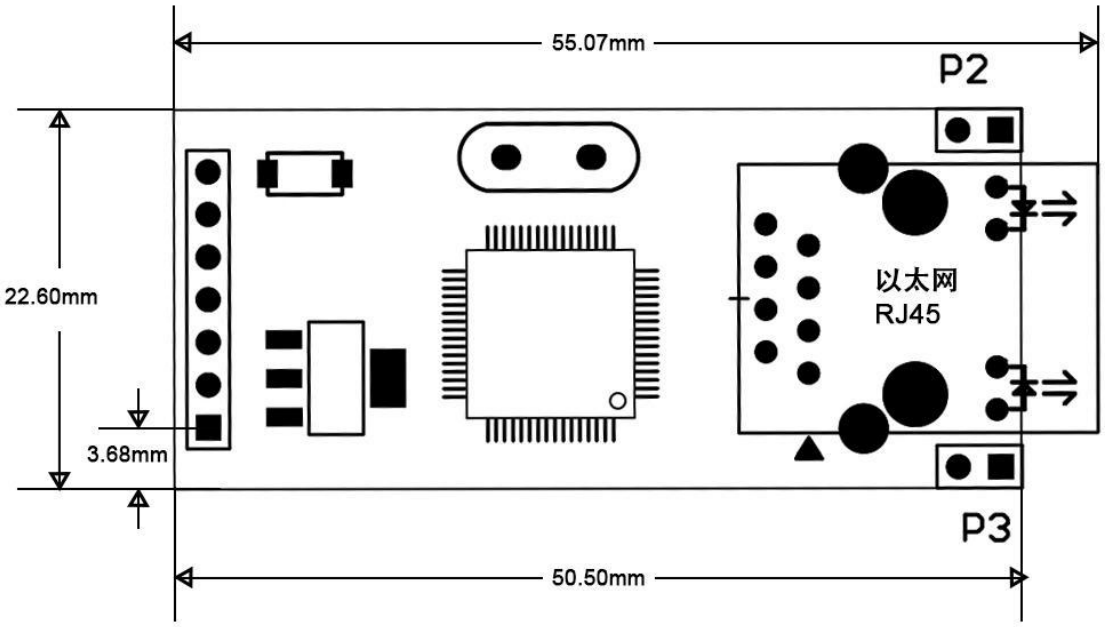
2.2 Pinout and description



Pin	I/O	Function
5v	-	External power supply pin, 3.3V or 5V power supply
3.3V	-	
GND	-	The external controller needs to be in common with the module's GND
TXD	TX	Module serial port transmitter UART_TX, connected to the external controller serial port RX side
RXD	RX	Module serial port receiver UART_RX, connect the external controller serial port TX terminal
CFG	I	Serial port configuration mode: built-in pull-up, detected low level, entering the serial port configuration mode; high-level exit configuration mode
TCPCS	O	TCP client mode, connection status indication: H: not connected L: connected
RESET	I	Restore factory settings: low-level active on powering on
RST	I	External reset input: low-level, built-in pull-up resistor

note:

1. RST, CFG pins can be unconnected when the module works normally neither resetting nor serial configuration module.



2.3 Factory settings

The module is set to TCP Client as default (factory setting), other relevant settings as below:

Factory setting	
Network	IP: 192.168.1.200
	Subnet-Mask: 255.255.255.0
	Gateway(default): 192.168.1.1
	Port: 2000
	Target IP: 192.168.1.100
	Target Port: 1000
	Number of reconnection: unlimited
Serial	Baud rate: 9600
	Timeout: 0
	Data Bit: 8, Stop Bit: 1, Parity: None
	Clear Buffer: Never

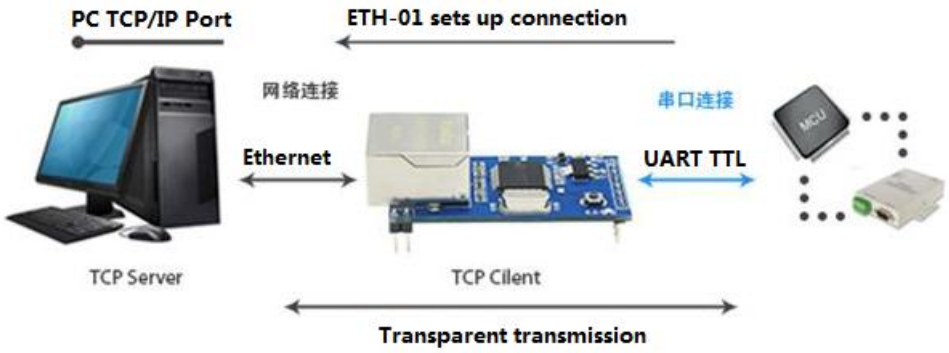
3. Configuration and working modes

ETH-01 support DHCP and manual Ethernet setting. Serial port Setting can be performed by either PC Software “NetModuleConfig.exe” or AT command. To use AT command to

configure module, CFG pin must be pulled down and keeping at low level. AT Command configuration is turned off by default.

3.1 TCP Client Mode

In the TCP client mode, after the module is powered on, it will automatically connect to the TCP server. After the connection is established, the two-way transparent transmission of network data and serial data can be realized. In this mode, the IP of the TCP server needs to be visible to the module. That means module can reach TCP server by "PING". TCP Client supports random local ports, accessing server through Domain Name, "Keep Alive" activated.

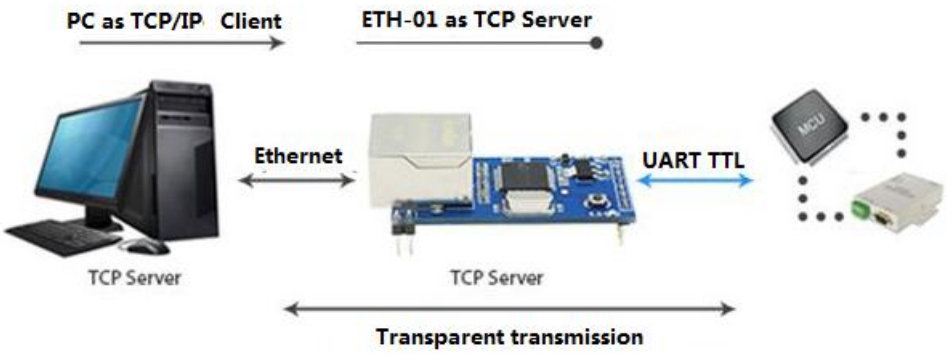


Typical application: Data acquisition from onsite and transmit to server

3.2 TCP Server Mode

In TCP Server mode, after the module is powered on, it will monitor whether the local port has a client request connection. After the connection is established, the two-way transparent transmission of network data and serial data can be realized. In this mode, the IP of the TCP client needs to be visible to the module. That means Client can reach module by pinging its IP address.

ETH-01 needs to configure following network parameters: working mode, module IP, subnet mask, default gateway, module port, client IP, client port. **At the same time only one TCP client can be connected.**



3.3 UDP Client Mode

In the UDP client mode, after module is powered on, it forwards the local port data (from the target IP and port) transparently to serial port. Similarly, module sends serial data (from connected serial peripherals) to target IP and port. In this mode, following parameters have to be configured: working mode, IP address, subnet mask, default gateway, port, target IP, target port.

3.4 UDP Server Mode

In UDP server mode, all the data sent to the local IP and port is forwarded to the serial port. The data sent to the module from serial port is also forwarded to UDP client which is configured as target. In this mode, the module needs to configure following parameters: working mode, IP, subnet mask, default gateway, port.

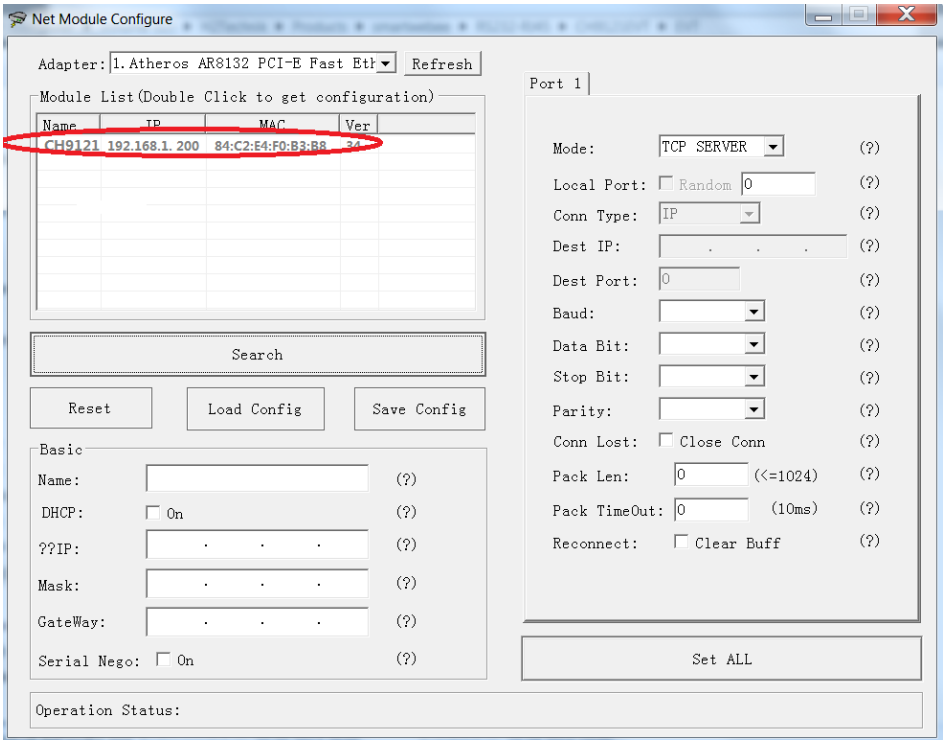
4. Instructions for use

4.1 Configure Module using PC Software

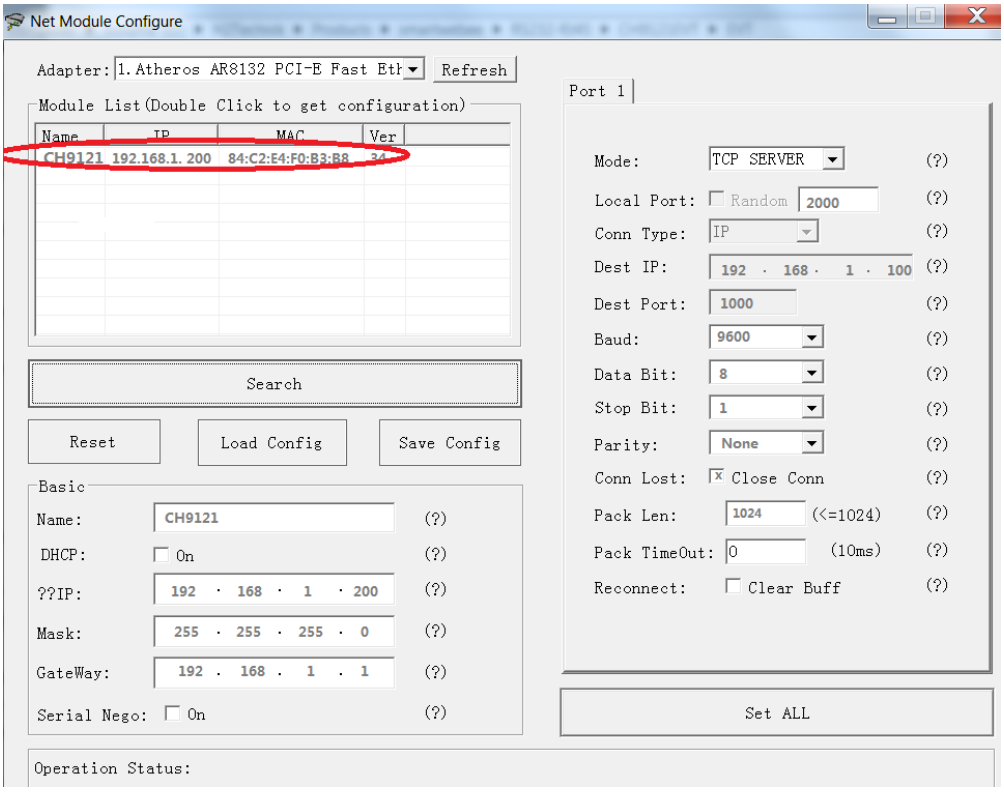
Using "NetModuleConfig.exe" the module can be easily configured. Please connect module with your PC through either straight-through/crossover cable or connect both in same LAN.

ETH-01 is set as TCP Client as default. On Server side, you have to detect server IP address and determine TCP/IP port in your application. You can download Socket Test application from here.

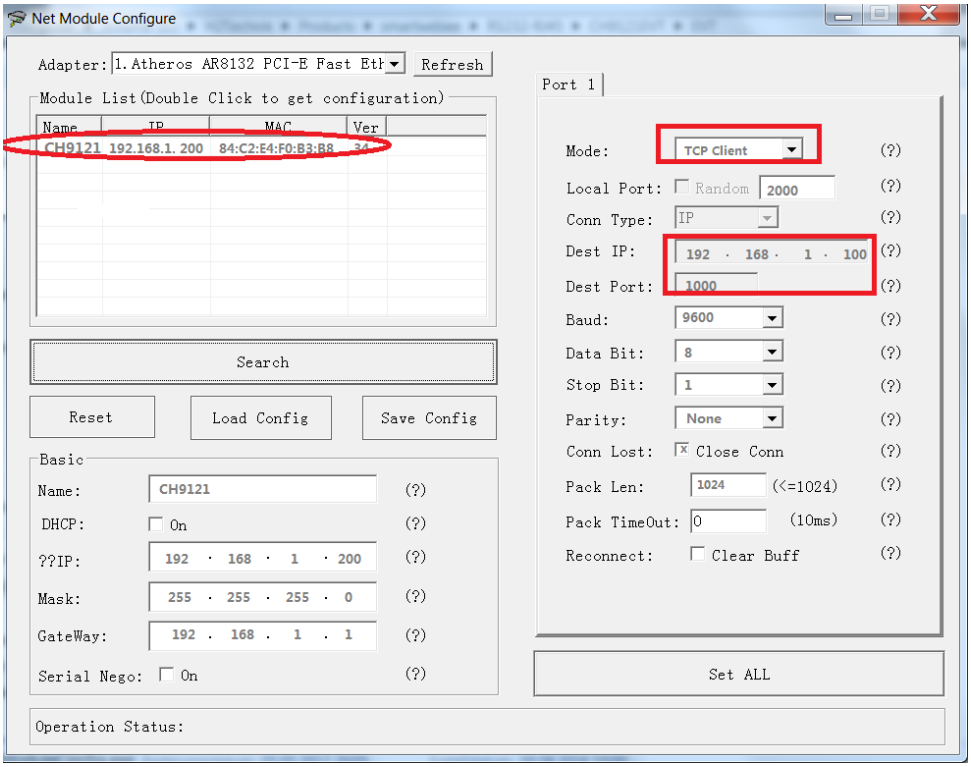
After module is powered on, You can start "NetModuleConfig.exe" and press "Search" button. If module is found and double clicked, its configuration is loaded in mask as below.



ETH-01 is found. Double Click item to load its configuration detail as below.



Changing Mode to “TCP Client”, setting “Dest IP” “Dest Port” to your TCP Server IP and port, If necessary changing serial parameters as well (refer to picture below). To confirm and save your setting, please click button “Set All” .



From now on, you can test this connection.

4.2 Configure Module using AT Command

After module is powered on, if module detected that the CFG pin is low level, the serial data received by the module is considered as configuration data. When the CFG pin is pulled high, the configuration mode is exited.

ETH-01 module serial port configuration command format: <**0x57,0xAB, command code, data**>.

4.2.1 Write/update configuration

Command Code	Function	Example (description)
Write/Update: Send command code 1 (0x57 0xab + command code 1+ data) + wait CH9121 ACK (0xAA) + send command code 2 (0x57 0xab + command code 2+ data) + wait CH9121 ACK (0xAA) + ... + send command code (0x57 0xab 0x0d) + wait for CH9121 ACK (0xAA) + send execute command (0x57 0xab 0x0e) + wait for CH9121 ACK (0xAA) + send execute command (0x57 0xab 0x0e) + wait for CH9121 ACK (0xAA)		
0x0e	Execute command	0x57 0xab 0x0e （command execute）
0x5e	Exit for setting	0x57 0xab 0x5e （exit from serial configuration）
0x02	Reset	0x57 0xab 0x02 （chip reset）
0x11	Setting IP	IP 0x57 0xab 0x11 0xc0 0xa8 0x01 0xc8(192.168.1.200)
0x12	Setting subnet mask	0x57 0xab 0x12 0xff 0xff 0xff 0x00 (255.255.255.0)
0x13	Setting gateway	0x57 0xab 0x13 0xc0 0xa8 0x01 0x01(192.168.1.1)

0x10	Working mode: 00: TCP Server 01: TCP Client 02:UDP Server 03: UDP Client	0x57 0xab 0x10 0x01 (TCP Client mode)
0x14	Setting local port	0x57 0xab 0x14 0xd0 0x07(Port-Nr. 2000)
0x15	Setting target IP	0x57 0xab 0x15 0xc0 0xa8 0x01 0x64 (Target IP: 192.168.1.100)
0x16	Setting target Port	0x57 0xab 0x16 0xe8 0xe3 (Target Port-Nr.1000)
0x21	Setting Baud rate	0x57 0xab 0x21 0x80 0x25 0x00 0x00 (Baud rate: 9600)
0x22	Setting parity: 00: odd 01: even 02: mark 03: Space 04: None	0x57 0xab 0x22 0x01 0x04 0x08 (1 stop-bit,no-parity， 8 data-bit ，)

4.2.2 Read configuration

Command Code	Function	Example (description)
Read: get configuration (0x57 0xab + command code, such as send: 0x57 0xab 0x60 query chip working mode)		
0x60	Read working mode and return 1 byte	0x01 (TCP client)
0x61	Read local IP address, return 4 bytes	0xC0 0xA8 0x01 0x6F(IP Address: 192.168.1.111)
0x62	Read local Subnet mask address, return 4 bytes	-
0x63	Read gateway, return 4 bytes	-
0x64	Read port, return 2 bytes	-
0x65	Read target IP address, return 4 bytes	-
0x66	Read target port, return 2 bytes	-
0x67	Read number of reconnection, return 1 byte	-
0x71	Read baud rate	0x80 0x25 0x00 0x00(Baud rate: 0x00002580: 9600)
0x72	Read parity, data bit, stop-bit, return 3 bytes	-
0x73	Read timeout, return 1 byte	-
0x81	Read MAC address, return	-

	6 bytes	
0x03	Read TCP connection status (in TCP client mode), return 1 byte 1: connected 0: disconnected	-

5. Troubleshooting

Trouble	Solution
Module can not be found by PC	Check whether the module is directly connected to the PC or in the same subnet. For example, when the subnet mask is 255.255.255.0, 192.168.1.1 and 192.168.1.2 in the same subnet, and 192.168.1.1 and 192.168.2.1 are in different subnet. Check the card selection is correct on PC. This is mainly for multi-card PC, such as notebooks generally have a wired card and a wireless card. In oder to configure ETH-01, you need to select the wired network card instead of the wireless card.
Module (TCP Client) can not be connected to TCP Server	Check that the module destination port and IP are consistent with the server port and IP. Try to reach ETH-01 by ping command (checking RJ45 Interface). Firewall is recommended to turn off.
Serial data transmission abnormal	Module serial is TTL level, compatible with 3.3V and 5V, can be directly connected with the microcontroller serial port. ETH-01 should not be connected with the R232 level. ETH-01 and microcontroller serial port connection need to cross, TXD to RXD, RXD to TXD.