

WT32-ETH01

Specifications

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modification record

version number	Drafter/ Edited by	Proposed/Revised Date	Change Reason	Main changes (Just write the main points)
V1.0	Mark	2019.10.21	First create document	
V1.1	linfulang	2019.10.23	Improve the document and	add the product function part

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1. Overview

WT32-ETH01 is an embedded serial-to-Ethernet module based on ESP32 series launched by Shenzhen Qiming Cloud Co., Ltd.

The optimized TCP/IP protocol stack is integrated, which is convenient for users to easily complete the networking function of embedded devices, greatly reducing the development time and cost.

In addition, the module is compatible with half-pad and connector through-hole designs, and the board width is a universal width. The module can be directly soldered on the board, or connected by soldering. Connectors can also be used on breadboards, which is convenient for users to use in different scenarios.

ESP32 series IC is an SOC integrating 2.4GHz Wi-Fi and Bluetooth dual-mode, with ultra-high RF performance, stability, versatility and reliability, and ultra-low power consumption.

2. Characteristics

Table-1. Product Specifications

category	project	product specification
Wi-Fi	RF certification	FCC/CE/RoHS
	protocol	802.11 b/g/n/e/i (802.11n, speeds up to 150 Mbps)
		A-MPDU and A-MSDU aggregation, support 0.4_s guard interval
Frequency Range	2.4~2.5 GHz	
Bluetooth	protocol	Compliant with Bluetooth v4.2 BR/EDR and BLE standards
	radio frequency	NZIF receiver with -97 dBm sensitivity
hardware	Network port specification	RJ45, 10/100Mbps, crossover direct connection self-adaptation
	Serial baud rate	80~5000000
	Onboard Flash	32Mbit
	Operating Voltage	5V or 3.3V power supply (choose one)
	Working current	Average: 80mA
	supply current	Minimum: 500mA
	range of working temperature	-40°C~+85°C
	Ambient temperature range	normal temperature
	encapsulation	Half pad/connector through-hole connection (optional)
software	Wi-Fi model	Station/softAP/SoftAP+station/P2P
	Wi-Fi Security Mechanism	WPA/WPA2/WPA2-Enterprise/WPS
	encryption type	AES/RSA/ECC/SHA
	firmware upgrade	Remote OTA upgrade via network
	software development	SDK is used for user secondary development
	Network protocol	IPv4/TCP/UDP
	IP acquisition method	Static IP, DHCP (default)
	Simple transparent transmission method	TCP Server/TCP Client/UDP Server/UDP Client
user configuration	AT+ command set	

3. Hardware specifications

3.1 System block diagram

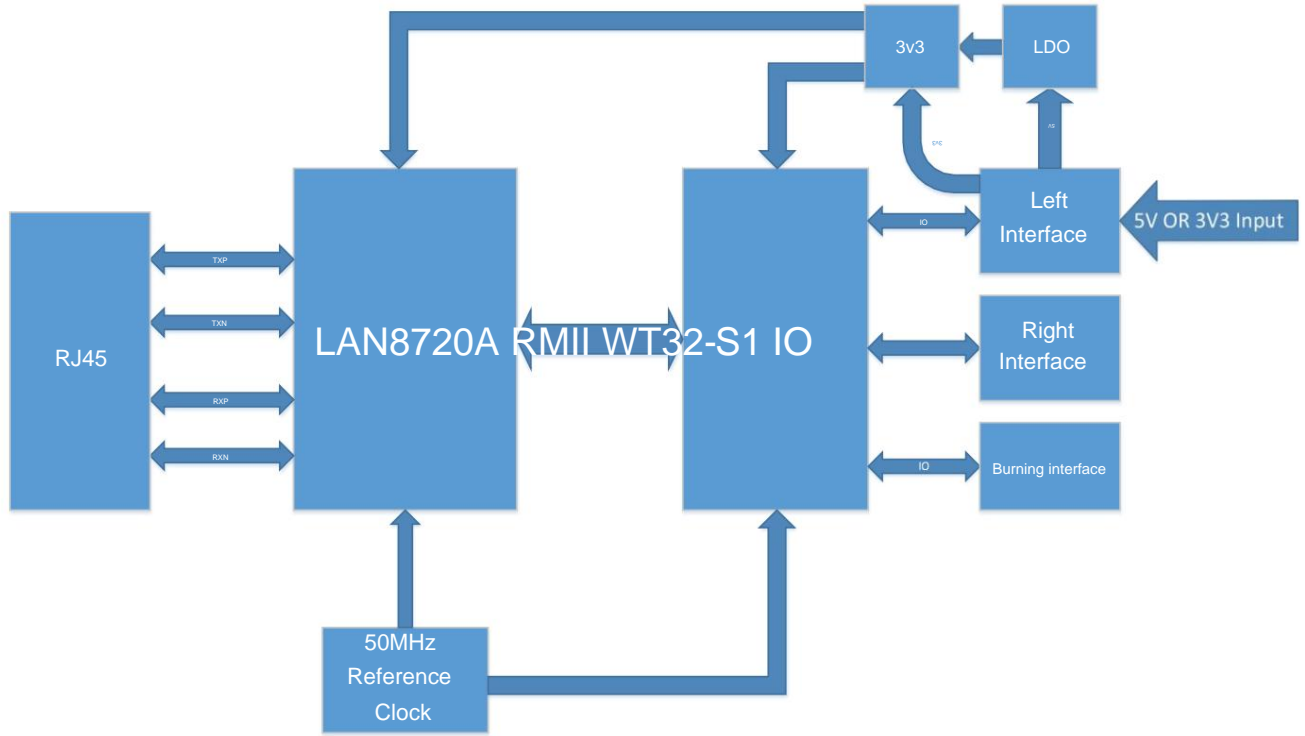
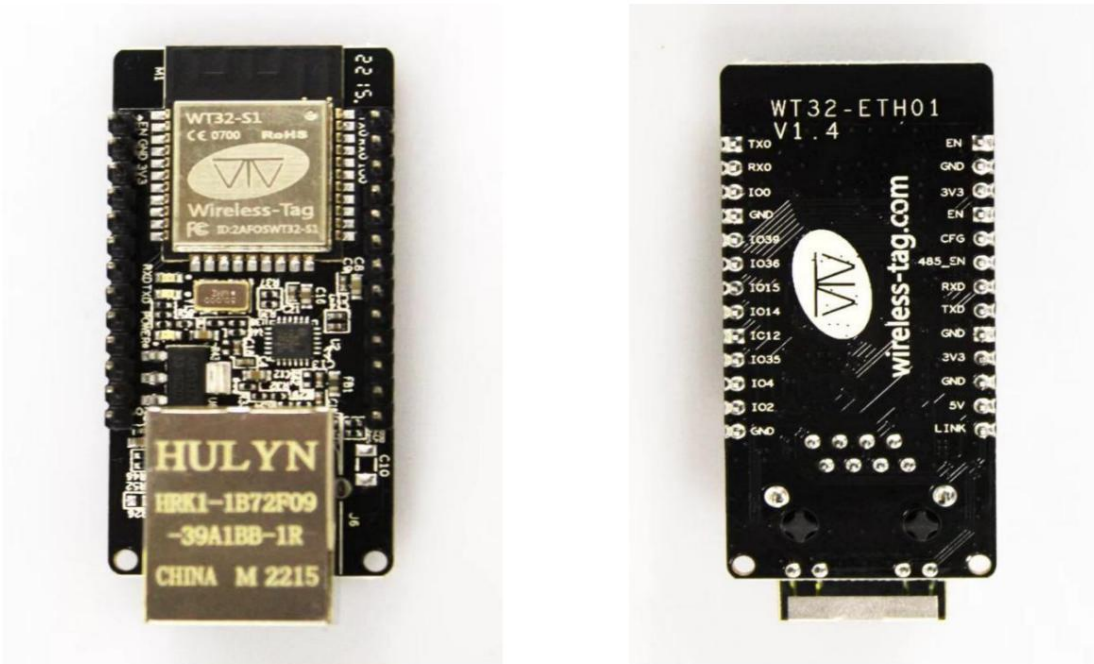


Figure-1 System Block Diagram

3.2 Physical map



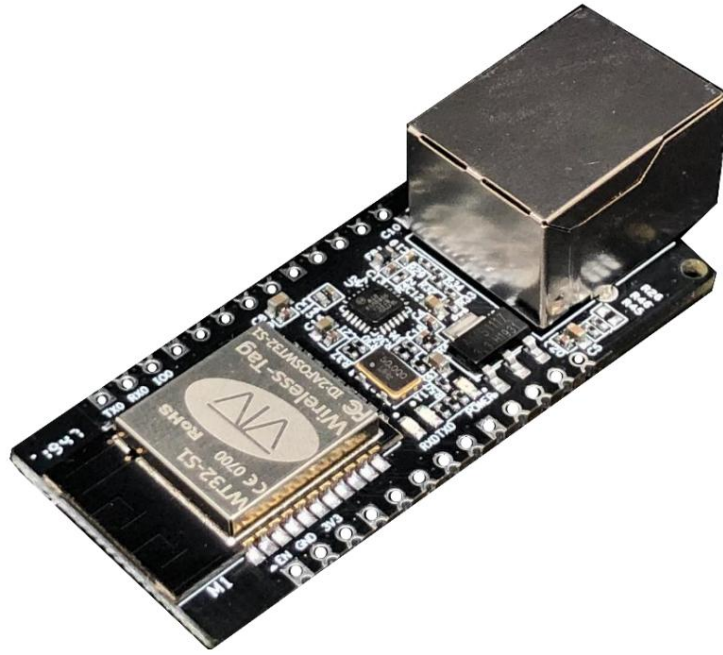


Figure-2 Product physical map

3.3 Pin description

Table-1 Debugging and burning interface

pin name	describe
1	IN 1 Reserved for debugging and programming interface; enable, active high
2	GND is reserved for debugging and burning interface; GND
3	3V3 reserved debugging programming interface; 3V3
4	TXD is reserved for debugging and programming interface; IO1, TXD0
5	RXD is reserved for debugging and burning interface; IO3, RXD0
6	IO0 is reserved for debugging and burning interface; IO0

Table-2 Module IO description

pin name	describe
1	IN 1 enable, active high
2	CFG IO32, CFG
3	485_EN IO33, enable pin of RS485
4	RXD IO5, RXD2
5	TXD IO17, TXD2
6	GND GND
7	3v3 ² 3V3 power supply
8	GND GND

9	5V ²	5V power supply
10	LINK network	connection indicator pin
11	GND GND	
12	IO39 ³	IO39, only supports input
13	IO36 ³	IO36, only supports input
14	IO15	IO15
15	IO14	IO14
16	IO12	IO12
17	IO35	IO35 only supports input
18	IO4	IO4
19	IO2	IO2
20	GND GND	

Note 1: The module enables high level by default.

Note 2: 3V3 power supply and 5V power supply, only one of them can be selected! !

Note 3: IO39, IO35 and IO36 only support input.

3.4 Power characteristics

3.4.1 Supply voltage

The power supply voltage of the module can be 5V or 3V3, only one of them can be selected.

3.4.2 Power supply mode

Users can freely choose according to their needs:

- 1) Through hole (solder header):
 - Using DuPont line connection for power supply;
 - Power supply by means of breadboard connection;
- 2) Half pad (welded directly on the board): power supply for the user board.

4. Instructions for use

4.1 Power On Instructions

If using the DuPont line: find the 3V3 or 5V power input port, connect the corresponding voltage, the indicator light (LED1) lights up, indicating that the

The electricity was successful.

4.2 Indicator light description

- LED1: power indicator light, the power is normal, and the light is on;
- LED3: serial port indicator light, when RXD2 (IO5) has data flow, the light is on;
- LED4: serial port indicator light, when TXD2 (IO17) has data flow, the light is on;;

4.3 Description of usage

Three ways of use, users can choose according to their needs:

- 1) Through hole (soldering pin header): use Dupont wire to connect;
- 2) Through hole (soldering pin header): use it on a breadboard;

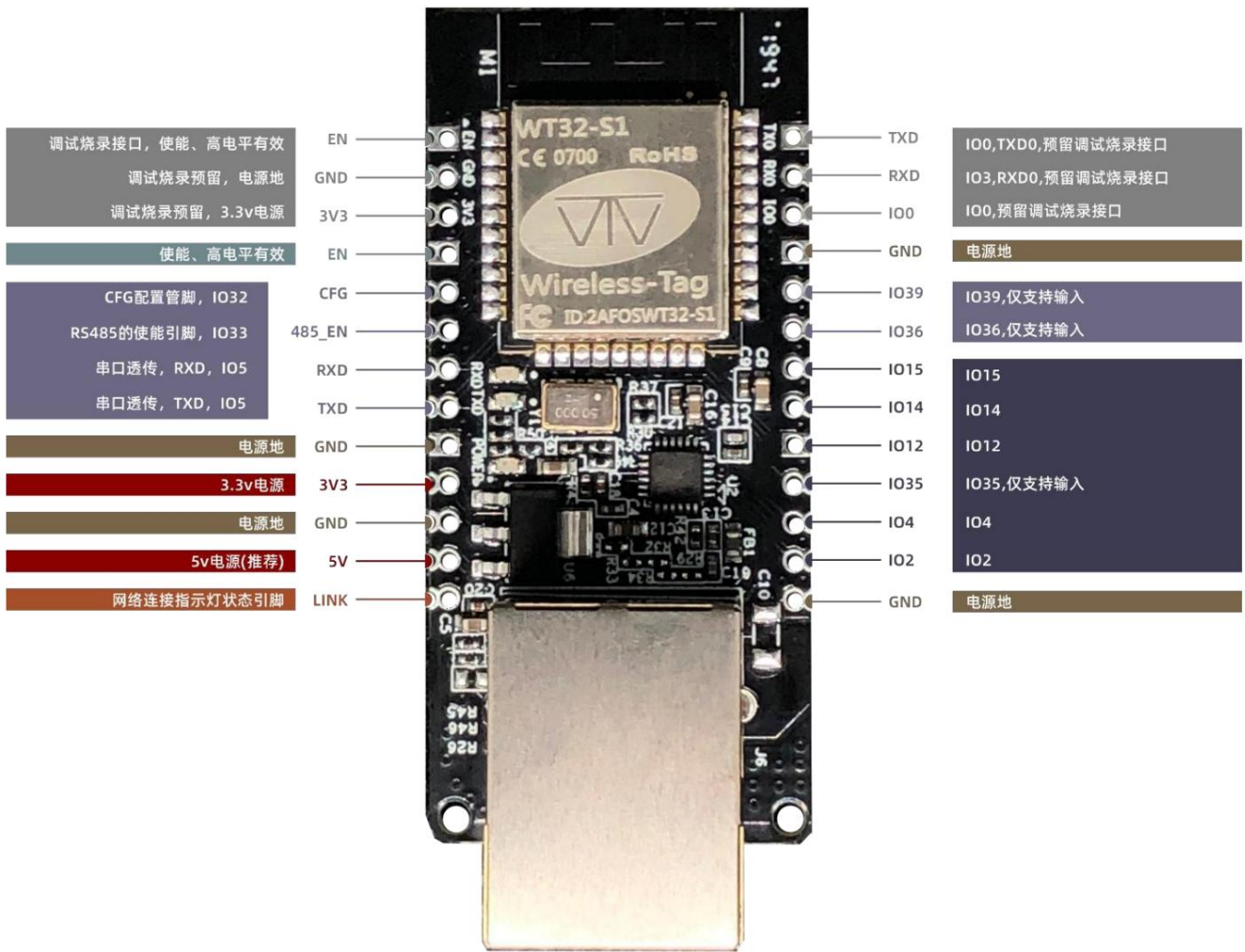
3) Half pad: users can directly solder the module on their own board.

4.4 Description of network port working indicator light

Table-3 Description of network port working indicators

Network port indicator	Function	illustrate
Green light connection	status indicator	When connected to the network correctly, the green light is on
Yellow light data indication		The module blinks when receiving or sending data, including the module receiving network broadcast packets

5. Interface description



6. Product function

6.1 Default parameters

project	content
Serial baud rate	115200
Serial parameters	None/8/1
Transparent channel	Serial Ethernet transparent transmission channel

6.2 Basic functions

6.2.1 Set IP/Subnet Mask/Gateway

1. The IP address is the identity of the module in the local area network. It is unique in the local area network, so it cannot be duplicated with other devices in the same local area network.

The IP address of the module can be obtained in two ways: static IP and DHCP/dynamic IP.

a.Static IP

Static IP needs to be set manually by the user. During the setting process, please pay attention to write in IP, subnet mask and gateway at the same time. Static IP is suitable for scenarios where statistics need to be calculated on IP and devices and one-to-one correspondence is required. Pay attention to the corresponding relationship between IP address, subnet mask and gateway when setting. use static IP needs to be set for each module, and ensure that the IP address is not duplicated with other network devices in the LAN.

b.DHCP /Dynamic IP

The main function of DHCP/Dynamic IP is to dynamically obtain information such as IP address, Gateway address, and DNS server address from the gateway host, thereby eliminating the cumbersome steps of setting the IP address. It is suitable for scenarios where there is no requirement for IP, and the one-to-one correspondence between IP and modules is not required.

Note: The module cannot be set to DHCP when it is directly connected to the computer. Generally, the computer does not have the ability to assign IP addresses. transparent transmission work. The module defaults to a static IP: 192.168.0.7.

2. The subnet mask is mainly used to determine the network number and host number of the IP address, to indicate the number of subnets, and to determine whether the module is in the subnet. The subnet mask must be set. Our commonly used class C subnet mask: 255.255.255.0, the network number is the first 24 digits, the host number is the last 8 digits, the number of subnets is 255, and the module IP is in the range of 255 If it is within this subnet, the module IP is considered to be in this subnet.

3. Gateway refers to the network number of the network where the current IP address of the module is located. If you connect to a device such as a router when connecting to the external network, the gateway is the IP address of the router. If the setting is wrong, you will not be able to access the external network correctly.

6.2.2 Restore factory settings

1. AT command to restore factory settings: restore factory settings through AT+ RESTORE.

2. Restore factory settings by hardware: ground the CFG pin and restart the module.

6.2.3 Firmware upgrade

The way to upgrade the firmware of the module is OTA remote upgrade. By upgrading the firmware, more application functions can be obtained.

a. Firmware upgrade can be connected to the network through wired network or wifi.

b. Operate GPIO2 to ground, restart the module, and enter OTA upgrade mode.

c. After the upgrade is complete, disconnect the connection of GPIO2 to the ground, restart the module, and the module enters the normal working mode.

OTA firmware upgrade instructions: the firmware is being downloaded, the serial TXD indicator flashes quickly; the download is complete and the upgrade is in progress, the serial TXD indicator is always on; the upgrade is successful, the serial TXD and RXD indicators are always on; the upgrade fails, the serial TXD indicator flashes slowly.

6.2.4 AT command function setting

The user can set the function of the module by inputting the AT command through the serial port.

For details, please refer to the AT command set of esp32 wired module.

6.2.5 Data transparent transmission function

The module has four data transmission ports: serial port, wifi, Ethernet and Bluetooth.

Users can combine the four data ports in pairs through AT commands for data transparent transmission.

Set/query the transparent transmission channel of the module through AT+PASSCHANNEL command. After the setting is completed, the module needs to be restarted to take effect.

6.3 socket function

The Socket working mode of the module is divided into four types: TCP Client, TCP Server, UDP Client, and UDP Server, which can be set through AT commands.

Please refer to esp32 wired module AT command routine v1.2 for AT command operation.

6.3.1 TCP Client

1. TCP Client Provides client connections for TCP network services. Actively initiate a connection request to the server and establish a connection to realize the interaction between serial port data and server data. According to the relevant regulations of the TCP protocol, the TCP Client has the difference between connection and disconnection, so as to ensure the reliable exchange of data. It is usually used for data interaction between devices and servers, and is the most commonly used networking communication method.
2. When the module connects to the TCP Server as a TCP Client, you need to pay attention to parameters such as the target IP/domain name and target port number. The target IP can be a local device in the same local area, or an IP address of a different LAN or an IP across a public network. If connecting to a server across the public network, the server is required to have a public IP.

6.3.2 TCP Server

Usually used for communication with TCP clients in LAN. It is suitable for there is no server in the local area network and there are multiple computers or mobile phones to serve. Scenarios where the server requests data. Like TCP Client, there is a difference between connection and disconnection to ensure reliable exchange of data.

6.3.3 UDP Client

UDP Client is a connectionless transmission protocol that provides transaction-oriented simple and unreliable information transmission services. There is no connection establishment and disconnection, and data can be sent to the other party only by specifying IP and port. It is usually used in the data transmission scenario where there is no requirement on the packet loss rate, the data packet is small and the sending frequency is fast, and the data is to be transmitted to the specified IP.

6.3.4 UDP Server

UDP Server means that it does not verify the source IP address on the basis of ordinary UDP. After receiving a UDP data packet, it changes the target IP to the IP and port number of the data source. When sending data, it will be sent to the IP and port number of the latest communication.

This mode is usually used in data transmission scenarios where multiple network devices need to communicate with the module and do not want to use TCP due to the high speed and frequency.

6.4 Serial port function

6.4.1 AT command setting

The user can set the function of the module by inputting the AT command through the serial port.

6.4.2 Transparent transmission of serial port data

The user makes the module enter the data transparent transmission mode through the AT command, and the module can directly transmit the serial port data through the transparent transmission channel that has been set. Pass it to the corresponding data transmission end (wifi, ethernet and bluetooth).

6.5 Bluetooth function

6.5.1 Transparent transmission of Bluetooth data

Through the existing Bluetooth function of the module, the module can obtain Bluetooth data, and the Bluetooth data can be directly transmitted through the set transparent transmission channel. Pass it to the corresponding data transmission end (wifi, Ethernet and serial port).

6.6 WiFi function

6.6.1 Internet access

The module wifi connects to the Internet or LAN through a router, and the user configures the socket function through the AT command, and the module can be established TCP/UDP connection can access the user's designated server.

6.7 Wired network port access function

A stable network connection can be obtained through a wired network to ensure stable network data.

6.7.1 Internet access

The module is connected to the Internet or LAN through a wired network, and the user configures the socket function through AT commands, and the module can establish TCP/UDP Connect, you can access the user's designated server.