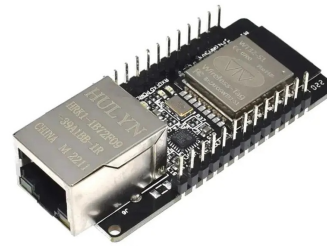**Manuals+** — User Manuals Simplified.

ESP32 WT32-ETH01 Development Board

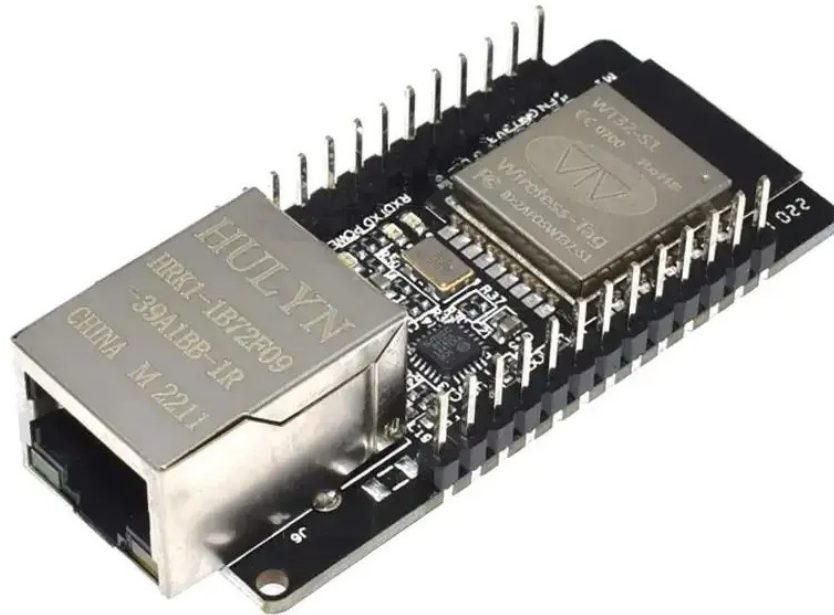# ESP32 WT32-ETH01 Development Board User Manual

Contents

ESP32

ESP32 WT32-ETH01 Development Board

Product Information

Specifications

- **Product Name:** ESP32-WT32-ETH01
- **Version:** 1.2 (October 23, 2020)
- **RF Attestation:** FCC/CE/RoHS
- **Wi-Fi Protocol:** 802.11b/g/n/e/i (802.11n, speed up to 150 Mbps)
- **Frequency Range:** 2.4~2.5 GHz
- **Bluetooth:** Bluetooth v4.2 BR/EDR and BLE standards
- **Network Outlet Specifications:** RJ45, 10/100Mbps
- **Working Voltage:** 5V or 3.3V
- **Operating Temperature Range:** Normal temperature

Features

- Ultrahigh RF performance
- Stability and reliability
- Ultra-low power consumption
- Supports Wi-Fi security mechanisms like WPA/WPA2/WPA2-Enterprise/WPS
- Firmware upgrade via remote OTA
- User secondary development using SDK
- Supports IPv4 TCP/UDP networking protocol
- Multiple Wi-Fi patterns are available (Station/SoftAP/SoftAP+Station/P2P)

Pin Description

Pin	Name
1	EN1

Product Usage Instructions

Setting Up the ESP32-WT32-ETH01

1. Connect the ESP32-WT32-ETH01 to a power supply (5V or 3.3V).
2. Ensure proper network outlet connection using the RJ45 port.

Configuring Wi-Fi and Bluetooth Settings

1. Access the device settings through the provided software or web interface.
2. Select the desired Wi-Fi network and enter the password if required.

Frequently Asked Questions (FAQ)

Q: How do I perform a firmware upgrade on the ESP32-WT32-ETH01?

- **A:** You can upgrade the firmware remotely via OTA using the network connection.

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specification

amendment record

version number	Composed person/modifier	Date of formulation / modification	Change the reason	Main changes (Write the key points.)
V 1.0	Mark	2019.10.21	The first time to create	Create a document
V 1.1	infusing	2019.10.23	Perfect the document	Add the product functional section

An Overview

- WT 32-ETH 01 is an embedded serial port to an Ethernet module based on the ESP 32 series. The module integrates the optimized TCP / IP protocol stack, which facilitates users to easily complete the networking function of embedded devices and greatly reduces the development time cost. In addition, the module is compatible with the semi-pad and the connector through-hole design, the plate width is the general width, the module can be directly welded on the boarding card, can also be welded connector, can also be used on the breadboard, convenient for users to use in different scenarios.
- ESP 32 Series IC is a SOC integrating 2.4GHz Wi-Fi and Bluetooth dual mode, with ultrahigh RF performance, stability, versatility, and reliability, as well as ultra-low power consumption.

Features

Table-1. Product specifications

class	project	size of product
Wi-Fi	RF attestation	FCC /CE /RoHS
	protocol	802.11 b / g / n / e / i (802.11n, speed up to 150 Mbps)
		A-MPDU and A-MSDU aggregation, supporting the 0.4 _s protection interval
	frequency range	2.4~2.5 G Hz
PDA	protocol	Comply with the Bluetooth v 4.2 BR / EDR and BLE standards
	radio frequency	An NZIF receiver with a-97 dBm sensitivity
hardware	Network outlet specifications	RJ 45,10 / 100Mbps, cross-direct connection and self-adaptation
	Serial port rate	80~5000000
	Onboard, Flash	32M bit
	working voltage	5V or 3.3V power supply (choose either one)
	working current	Mean: 80 mA
	supply current	Minimum: 500 mA
	operating temperature range	-40°C ~+85°C
	Ambient temperature range	normal temperature
	package	Half-pad / connector through-hole connection (optional)
software	Wi-Fi pattern	Stat ion /softAP /SoftAP +station /P 2P
	The Wi-Fi security mechanism	WPA /WPA 2/WPA2-Enterprise/WPS
	Encryption type	AES /RSA/ECC/SHA
	firmware upgrade	Remote OTA upgrade via the network
	software development	The SDK is used for user-secondary development
	networking protocol	IPv 4 TCP/UDP

The IP acquisition method	Static IP, DHCP (the default)
Simple and transparent, trans mission way	TCP Server/TCP Client/UDP Server/UDP Client
User configuration	AT+ order set

Hardware specifications
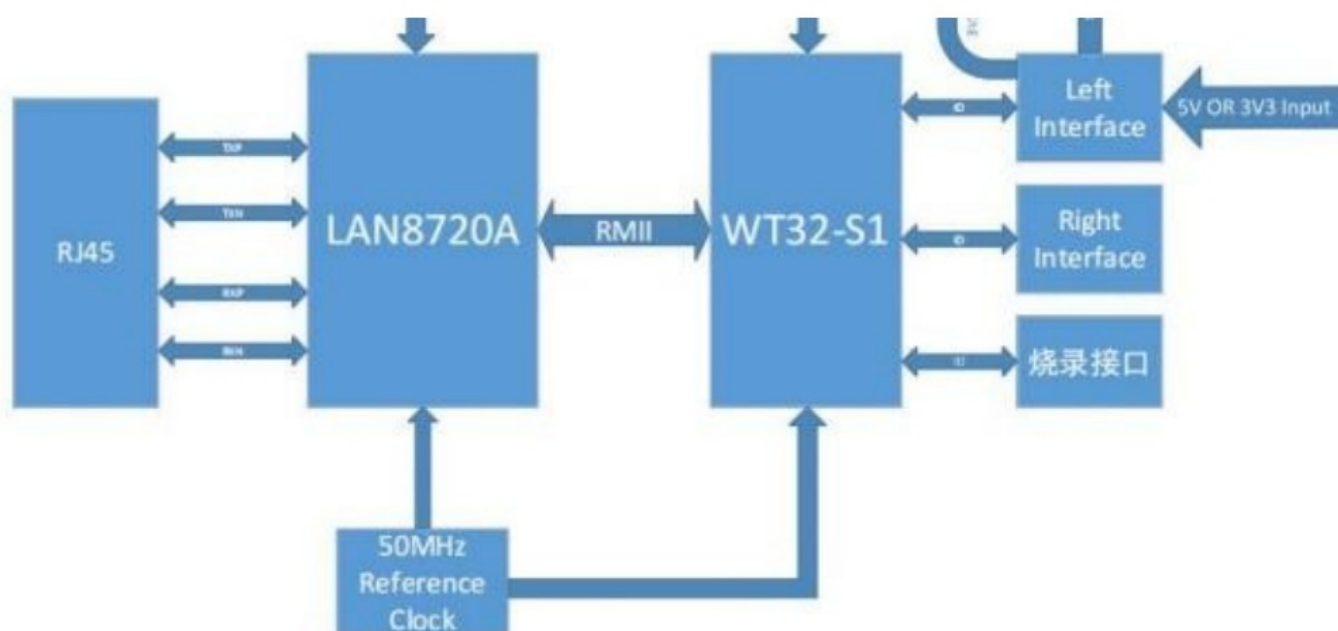
System block diagram

Figure 1-1 Block diagram of the system

physical picture

Figure-2 Product physical picture

Pin description

Table 1 Debug the burning interface

pin	name	description
1	E N1	Reserved debugging burning interface; enabling, high-level effective
2	GND	Reserved debugging and burning interface; GND
3	3V3	Reserved debugging and burning interface; 3V3
4	TXD	Reserve the debugging and burning interface; IO 1, TX D 0
5	R XD	Reserve the debugging and burning interface; IO3, RXD 0
6	IO 0	Reserved debugging and burning interface; IO 0

Table 2 for module IO description

pin	name	description
1	EN1	Enabling, and the high level is effective
2	CFG	IO32, CFG
3	485_EN	IO 33, RS 485 of the enabling pins
4	RDX	IO 35, RXD 2
5	TXD	IO17, T XD 2
6	GND	G ND
7	3V3	3V3 power supply
8	GND	G ND

9	5V2	5V power supply
10	LINK	Network connection indicator pins
11	GND	GND
12	IO 393	IO 39, with support for input only
13	IO 363	IO 36, with support for input only
14	IO 15	IO15
15	I014	IO14
16	IO 12	IO12
17	IO 5	IO 5
18	IO 4	IO 4
19	IO 2	IO 2
20	GND	G ND

1. **Note**: The module by default enables a high level.
2. **Note**: 3V3 power supply and 5V power supply, two can only choose one!!!
3. **Note**: Only inputs are supported for IO39 and IO36.

Power supply characteristics

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

Power supply mode

Users can choose freely according to their needs

1. Through-hole (welding needle):
    - The power supply is connected by the DuPont line;
    - Using the breadboard connection way of power supply;
2. Half welding pad (directly welded in the board card): the user board card power supply.

Instructions for use

Power-on instructions

- If the DuPont line: find the 3V 3 or 5V power input, connect the corresponding voltage, the indicator light (LED 1) light, indicating the success of the power.

Description of the indicator light

- **LED1:** power indicator light, normal power on, light on;
- **LED3:** serial port indicator, RXD 2 (IO35) data flow, the light on;
- **LED4:** serial port indicator light, when TXD 2 (IO 17) has data flow, the light is on;

Description of the use mode

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

1. Through-hole (welding needle): use DuPont wire connection;
2. Through-hole (welding needle): put on the breadboard;
3. Semi-pad: the user can directly weld the module on their board card.
4. Description of the network port working indicator light

Table 3 Description of port port indicator

The RJ 45 indicator light	function	explain
green light	Connection status indication	The green light is on when properly connected to the network
yellow light	Data indicating	The module has data flashing when received or sent, including the module receiving the network broadcast package

Interface description
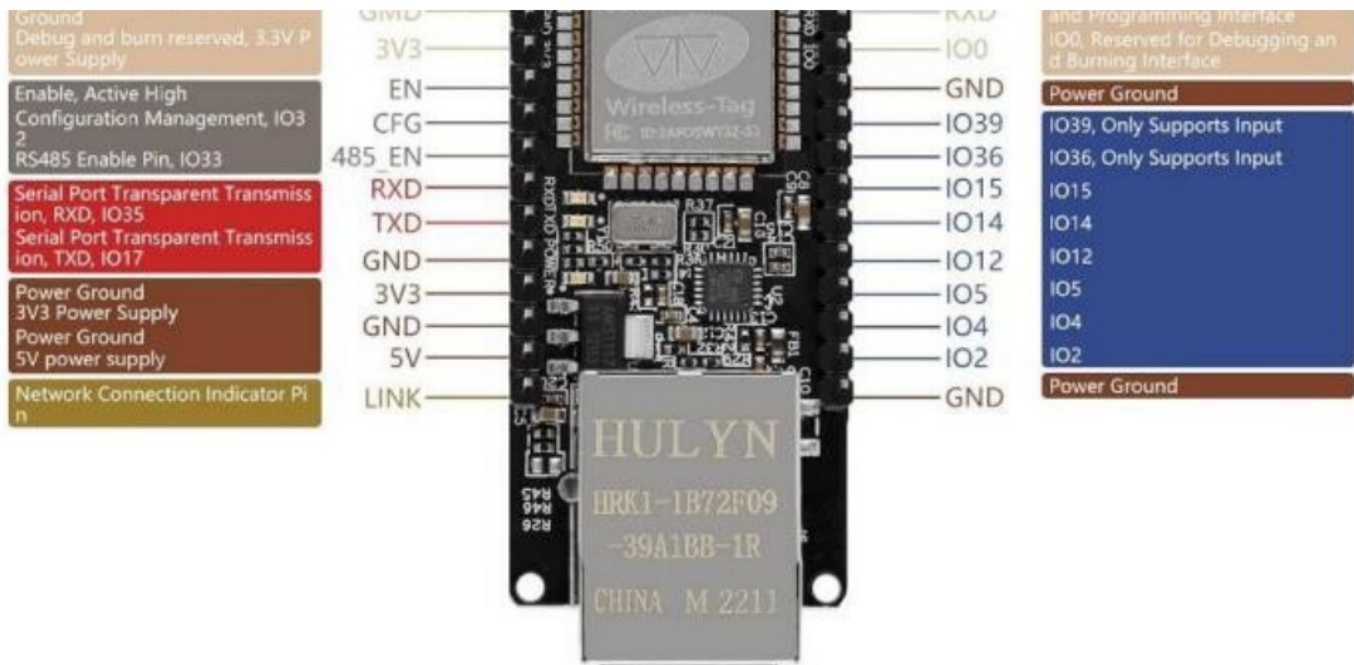
product function

Default parameter

project	content
Serial port rate	115200
Serial port parameters	None /8/1
Transmission channel	Serial port Ethernet transmission

Basic functions

Set the IP / subnet mask/gateway

1. The IP address is the identity representation of the module in the LAN, which is unique in the LAN, so it cannot be repeated with other devices in the same LAN. The IP address of the module has two acquisition methods: static IP and DHCP / dynamic IP.
   - **a .static state IP**
   - Static IP needs to be set manually by users. In the process of setting, pay attention to writing IP, subnet mask, and gateway at the same time. Static IP is suitable for scenarios that need the statistics of IP and devices and need to correspond one-to-one.
   - Pay attention to the corresponding relationship of IP address, subnet mask, and gateway when setting. Using a static IP requires setting up for each module and ensuring that the IP address is not repeated within the LAN and on other network devices.
   - **b . DHCP / dynamic IP**
   - The main function of DHCP / dynamic IP is to dynamically obtain an IP address, Gateway address, DNS server address, and other information from the gateway host, to avoid the cumbersome steps of setting an IP address. It applies to scenarios where there are no requirements for IP, and it does not require IP to correspond to modules one by one.

- **Note:** The module cannot be set to DHCP when directly connected to the computer. Generally, the computer cannot assign an IP address. If the module is set to DHCP directly connected to the computer, the module will be waiting for IP address assignment, which will cause the module to carry out normal transtransmission work. The module default is 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, indicate the number of subnets, and judge whether the module is in the subnet.
   The subnet mask must be set. The commonly used class C subnet mask: 255.255.255.0, the network number is the first 24, the host number is the last 8, the number of networks is 255, the module IP is within 255, the module IP is considered in this subnet.

3. Gateway is the network number of the network where the current IP address is located. If the device like the router is connected to the external network, the gateway is the IP address of the router. If the setting is wrong, the external network cannot be connected correctly. If the router is not connected, there is no need to set it.

Restore the factory Settings

- AT instruction to restore factory setting: restore factory through AT + RESTORE.

Firmware upgrade

- The way to upgrade the module firmware is the OTA remote upgrade, and by upgrading the firmware, you can get more application functions.
- **a .** The firmware upgrade connects the network through either a wired road or a wifi.
- **b** . Operation GPIO2 ground, restart the module, and enter OTA upgrade mode.
- **c** . Complete the upgrade, disconnect the GPIO 2 to the ground, restart the module, and the module enters normal working mode.

Function setting of AT instruction

- The user can enter the AT command to set the function of the module.
- Refer to the esp32 wired module AT instruction set for details.

Data transmission function

- The module has four data transmission ports: serial port, wifi, Ethernet, and Bluetooth.
- Users can combine the four data ports through AT instructions for data transmission transmission.
- Set up / query the transmission channel of the module through the AT + PASSCHANNEL instruction.
- The setup is complete and requires a restart module to take effect.

The socket function

- The Socket working mode of the module is divided into TCP Client, TCP Server, UDP Client, and UDP Server, which can be set by AT instruction.
- Please refer to the esp32 cable module AT command routine v 1.0.

TCP Client

1. TCP Client Provides a client connection for the TCP network services. Proactively initiate connection requests and establish connections to the server to realize the interaction between serial port data and server data. According to the relevant provisions of TCP protocol, the TCP Client is the difference between connection and disconnection, thus ensuring the reliable exchange of data. Usually used for data interaction between devices and servers, it is the most commonly used way of network communication.
2. When the module is connected to the TCP Server as a TCP Client, it needs to pay attention to the parameters such as the target IP / domain name and the target port number. The target IP can be a local device with the same local area or the IP address of a different LAN or the IP across the public network. If the server is connected across the public network, the server is required to have a public network IP.

TCP Server

- Usually used for communication with the TCP clients within the LAN. Suitable for a LAN where there are no servers and multiple computers or mobile phones request data from the server. There is a difference between connection and disconnection as TCP
- Client to ensure reliable exchange of data.

UDP Client

- UDP Client A non-connected transmission protocol that provides a simple and unreliable information transmission service oriented to transactions.
- Without connection establishment and disconnection, you only need to make an IP and port to send the data to the other party.
- It is usually used for data transmission scenarios with no requirement for packet loss rate, small packets and fast transmission frequency, and data to be transmitted to the specified IP.

UDP Server

- UDP Server Means not verifying the source IP address based on ordinary UDP. After receiving each UDP packet, the target IP is changed to the data source IP and port number. The data is sent to the IP and port number of the nearest communication.
- This mode is usually used for data transmission scenarios where multiple network devices need to communicate with modules and do not want to use TCP due to their fast speed and frequency… Serial port function

AT instruction setting

- The user can enter the AT command to set the function of the module.

Transmission of serial port data

Through AT instructions, the user can make the module into the data transmission mode, and the module can directly transfer the serial port data to the corresponding data transmission end (wifi, Ethernet, and Bluetooth)

through the set data transmission channel.

Bluetooth function Bluetooth data transmission

- Through the existing Bluetooth function of the module, the module can obtain Bluetooth data, and can directly transfer the Bluetooth data to the corresponding data transmission end (wifi, Ethernet, and serial port) through the set transtransmission channel.

Wifi function Internet access

- Module wifi is connected to the Internet or local area network through the router, and the user has to configure the socket function through AT instructions.
- The module can establish a TCP / UDP connection, which can access the user's specified server.

Cable and network port access function

- A stable network connection can be obtained through the wired network to ensure the acquisition of stable network data.

Internet access

- The module is connected to the Internet or LAN through the wired network, and the user configures the socket function through the AT instructions.
- The module can establish a TCP / UDP connection and access the user's specified server.

Documents / Resources

Embedded serial port to Ethernet module **ESP32-WT 32-ETH01** Openform all specs Firmware Software by Jianhua, 32, 2021	**ESP32 WT32-ETH01 Development Board** [pdf] User Manual WT32-ETH01 Development Board, WT32-ETH01, Development Board, Board

References

- **User Manual**