WT32-ETH02

Datasheet

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Revision History

Version	Modified By	Date	Reason	Main changes
V1.0	Pail	2023.10.31	First Creation	Creating Documents

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1. Overview

WT32-ETH02 is an embedded serial-to-Ethernet development board based on ESP32 series launched by Wireless-Tag Technology Co., Limited with the development board's module internal integration of the optimized TCP/IP stack, which facilitates the user to easily complete the networking function of the embedded device and greatly reduces the development time and cost. Moreover, the board is compatible with half-pad and connector through-hole design, and the board width is universal, which is convenient for users to use in different scenarios.

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

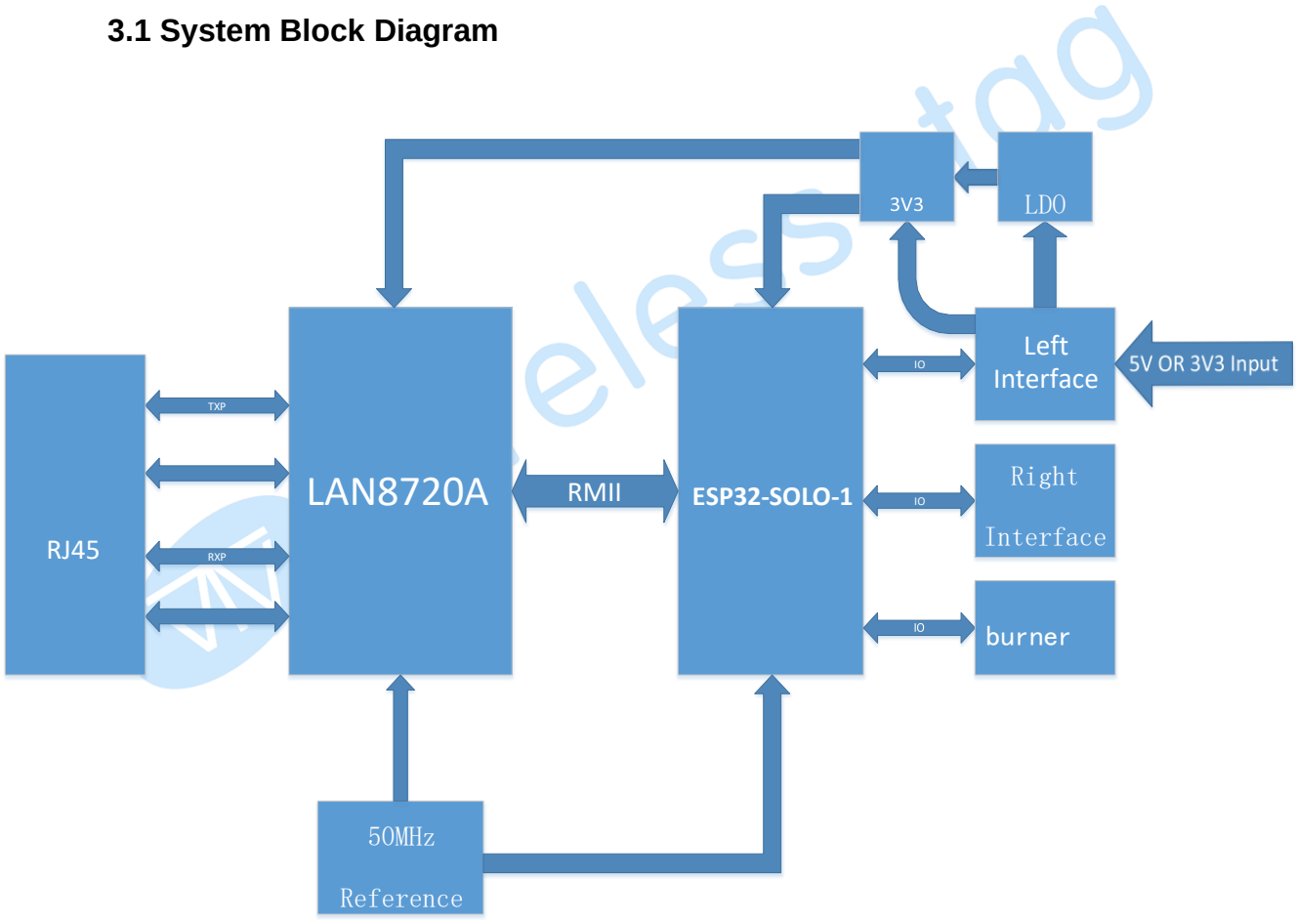
2. Features

Form	Sports event	Product Specification
WiFi	RF certification	FCC/CE/RoHS
	Pact	802.11 b/g/n/e/i (802.11n at speeds up to 150
		A-MPDU and A-MSDU aggregation with 0.4 _s
	Frequency range	2.4~2.5 GHz
Bluetooth	Pact	Compliant with Bluetooth v4.2 BR/EDR and BLE
	Radio frequency	NZIF receiver with -97 dBm sensitivity
Software	Mesh specification	RJ45, 10/100Mbps, Cross Direct Adaptive
	Serial port baud rate	80~5000000
	Onboard Flash	128Mbit
	Operating voltage	5V or 3.3V supply (either)
	Operating Current	Average: 80mA
	Supply Current	Minimum: 500 mA
	Operating Temperature	-40°C~+85°C
	Ambient temperature	normal temperatures
	Seal inside	Half-pad/connector through-hole connection
Hardware	Wi-Fi Mode	Station/softAP/SoftAP+station/P2P

	Wi-Fi security mechanisms	WPA/WPA2/WPA2-enterprise/WPS
	Encryption Type	AES/RSA/ECC/SHA
	Firmware Upgrade	Remote OTA upgrade over the network
	Software development	SDK for secondary user development
	network protocol	IPV4, TCP/UDP
	IP acquisition method	Static IP, DHCP (default)
	Simple Transmission	TCP Server/TCP Client/UDP Server/UDP Client
	User configuration	AT+ Instruction Set

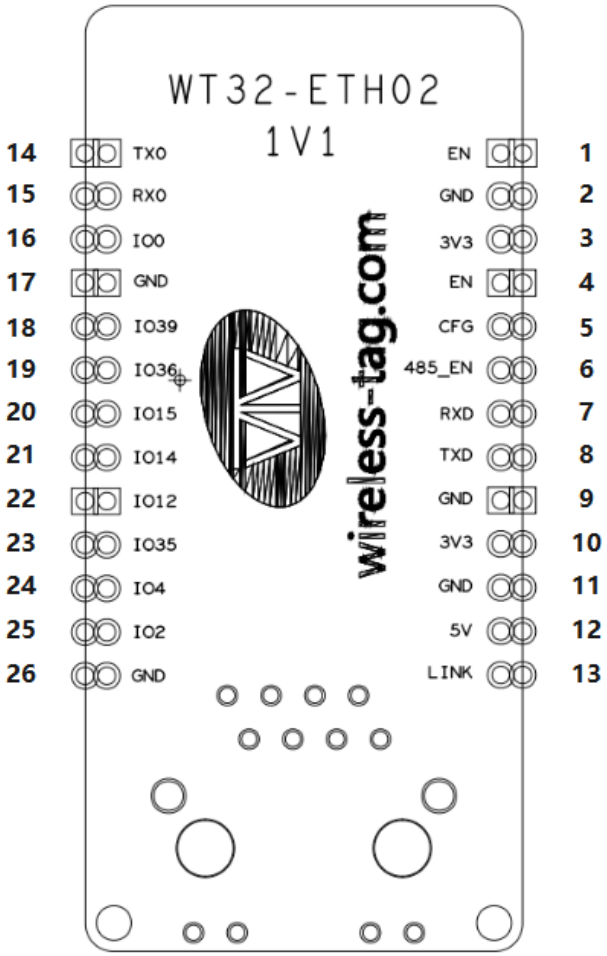
3. Hardware Specifications

3.1 System Block Diagram



3.2 Product image

3.3 Pin Description



Pin	Name	Descriptive
1	EN1	Reserved debug burn-in interface; enable, active high
2	GND	Reserved for debug burn-in interface; GND
3	3V3	Reserved debug burn-in interface; 3V3

4	EN1	Enable, active high
5	CFG	IO32, CFG
6	485_EN	IO33, enable pin for RS485
7	RXD	IO5, RXD2
8	TXD	IO17, TXD2
9	GND	GND
10	2	3V3 power supply
11	GND	GND
12	5V2	5V power supply
13	LINK	Network Connection Indicator Pin
11	GND	GND
12	5V2	5V power supply
13	LINK	Network Connection Indicator Pin
14	TXD	Reserved for debug burn-in interface; IO1, TXD0
15	RXD	Reserved for debug burn-in interface; IO3, RXD0
16	IO0	Reserved for debug burn-in interface; IO0
17	GND	GND
18	IO393	IO39, input only
19	IO363	IO36, input only
20	IO15	IO15
21	IO14	IO14
22	IO12	IO12
23	IO35	IO35 supports only input
24	IO4	IO4
25	IO2	IO2
26	GND	GND

3.4 Power supply characteristics

3.4.1 Supply voltage

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

them can be selected.

3.4.2 Power supply modes

Users are free to choose according to their needs:

1）Through-hole (soldered row of pins): breadboard connection / Dupont wire connection for power supply.

2）Half-pad (soldered directly to the board): User board power supply.

4. Instructions

4.1 Power-on instruction

If the DuPont cable is used: find the 3V3 or 5V power input port and connect the corresponding voltage, the indicator light (LED1) will be on to indicate successful power-up.

4.2 Indicator Instruction

- LED1: Power indicator, power on normal, light on;
- LED3: Serial port indicator, lighted when there is data streaming from RXD2 (IO5);
- LED4: Serial port indicator, lighted when TXD2 (IO17) has data stream;

4.3 Usage Instruction

Three ways of use, the user can choose according to the needs of their own:

1) Through-hole (soldered row of pins): Connect using Dupont wire;

2) Through-hole (soldering row of pins): placed on the breadboard for use;

3) Half-pad: Users can directly solder the module to their own boards.

4.4 Network Port Indicator Instruction

NIC Indicator	Functionality	Clarification
green light	Connection Status Indication	Green light on when correctly connected to the network
yellow light	Data Indication	Blinks when the module has data to receive or send, including when the module receives a network broadcast packet

5.Product Functions

5.1 Default parameters

Sports event	Element
serial port baud rate	115200
serial port parameter	None/8/1
transmission channel	Serial Ethernet pass-through channel

5.2 Basic Functions

5.2.1 Set IP/ Subnet Mask / Gateway

The IP address is the identity representation of the module in the LAN and is unique in the LAN, so it cannot be duplicated with other devices in the same LAN. The IP address of the module can be obtained in two ways: static IP and DHCP/dynamic IP.

(1) Static IP needs to be set manually by the user. During the setting process, pay attention to write IP, subnet mask and gateway at the same time, static IP is suitable for the scenario that needs to count IP and devices and corresponds to each other one by one. Pay attention to the correspondence between IP address, subnet mask and gateway when setting. To use static IP, you need to set up each module and make sure that the IP address is not duplicated with other network devices in the LAN.

(2) DHCP/Dynamic IP The main function is to get the IP address, Gateway address, DNS server address and other information from the gateway host dynamically, so as to avoid the tedious steps of setting IP address. It is suitable for the scenarios where there is no requirement for IP and the IP is not forced to correspond with the module one by one.

Note: The module cannot be set to DHCP when it is directly connected to a computer. Generally, computers do not have the ability to assign IP addresses, so if the module is set to DHCP when it is directly connected to a computer, it will cause the module to be in a state of waiting for an IP address to be assigned, which will result in the module not being able to carry out normal work in the pass-through. The module defaults to static IP: 192.168.0.7.

5.2.2 Restore factory settings

(1) AT command to restore factory settings: Restore factory via AT+ RESTORE.

(2) Hardware restoration of factory settings: Ground the CFG pin and reboot the module.

5.2.3 Firmware upgrade

The module upgrades the firmware by OTA remote upgrade, by upgrading the firmware, you can get more application functions.

(1) Firmware upgrade can be done via wired network or wifi.

2) Operate GPIO2 to ground, reboot the module and enter OTA upgrade mode.

(3) Upgrade is completed, disconnect GPIO2 from ground, restart the module, and the module enters the normal working mode.

OTA Firmware Upgrade Indication Description: Firmware is being downloaded, serial port TXD indicator is flashing fast; download is completed and upgrading is in progress, serial port TXD indicator is always on; upgrading is successful, serial port TXD and RXD indicators are always on; upgrading is failed, serial port TXD indicator is flashing slowly.

5.2.4 AT Command Function Settings

Users can set the function of the module by inputting AT command through the serial port. For details, please refer to esp32 wired module AT command set.

5.2.5 Date Transmission Function

The module has four data transmission ports: serial, wifi, Ethernet and Bluetooth. Users can combine the four data ports two by two through the AT command for data transmission. Set/query the pass-through channel of the module through AT+PASSCHANNEL command. After setting, the module needs to be restarted to take effect.

5.3 Socket Function

The socket operation modes of the module are divided into four types: TCP Client, TCP Server, UDP Client, and UDP Server, which can be set by the AT command.

For AT command operation, please refer to esp32 wired module AT command routine v1.2.

5.3.1 TCP Client

TCP Client provides client connection for TCP network service. It initiates a connection request to the server and establishes a connection, which is used to realize the interaction between serial port data and server data. According to the relevant provisions of the TCP protocol, the TCP Client has the difference between connecting and disconnecting, 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.

When the module connects to TCP Server as a TCP Client, you need to pay attention

to the parameters such as 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 local area network (LAN) or an IP of a cross-public network; if you connect to a server of a cross-public network, it is required for the server to have a public network IP.

5.3.2 TCP Server

Usually used for communication with TCP clients on a LAN. It is suitable for the scenario that there is no server in the LAN and there are many computers or cell phones requesting data from the server. Like TCP Client, there is a difference between connecting and disconnecting to ensure reliable data exchange.

5.3.3 UDP Client

UDP Client is a connectionless transport protocol that provides a simple, transaction-oriented, unreliable messaging service. There is no connection to make or break, and all that is needed is an IP and port to send data to the other party. It is usually used in data transmission scenarios where there is no requirement for packet loss, where packets are small and sent quickly, and where the data is destined for a specified IP.

5.3.4 UDP Server

UDP Server means that on the basis of ordinary UDP, without verifying the source IP address, every time it receives a UDP packet, it will change the destination IP to the data source IP and port number, and when it sends data, it will send it to the most recently communicated IP and port number. 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.

5.4 Serial Port Function

5.4.1 AT Command Settings

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

5.4.2 Transmit serial data

The user can make the module enter the data transmission mode by AT command, and the module can directly transmit the serial data to the corresponding data transmission terminal (wifi, Ethernet and Bluetooth) through the already set transmission channel.

5.5 Bluetooth function

Through the existing Bluetooth function of the module, the module can acquire Bluetooth data, and through the transmitting channel that has been set up, it can directly transfer Bluetooth data to the corresponding data transmission terminal (wifi, Ethernet and serial port).

5.6 WiFi function

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

5.7 Wired Port Access Function

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