ESP32-S3-WROOM Series Development Board User Manual

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Contents

Disclaimer and Copyright Notice 1
1. Module introduction 2
1.1 Feature introduction 2
1.2 Parameter introduction 2
2. Brief description of functions 3
2.1 Component Introduction 3
2.2 Pin definition 4
2.3 Function introduction 6
3 . Notes for developing applications 6
4 . Revision History 7

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1. Module introduction

1.1 Feature introduction

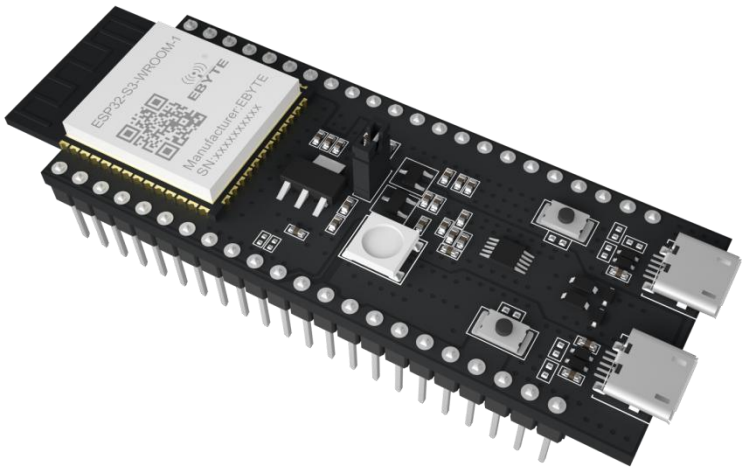


Figure 1 Actual picture of the module

ESP32-S3-WROOM-1-TB & ESP32-S3-WROOM-1U-TB are two entry-level development boards equipped with Wi-Fi + Bluetooth® LE modules ESP32-S3-WROOM-1, ESP32-S3-WROOM-1U . This development board has complete Wi-Fi and low-power Bluetooth functions , and most of the pins of the modules on the board have been led to pin headers on both sides. Developers can easily connect various peripherals through jumpers according to actual needs. equipment, and the development board can also be used on a breadboard.

1.2 Parameter introduction

serial number	parameter name	parameter value	Comment
1	Support module	ESP32-S3-WROOM-1 ESP32-S3-WROOM-1U	WiFi serial port module
2	Module size	62.74 * 25.4mm _	With USB connector
3	Production Process	Lead-free process, machine-mounted	Wireless products must be machine-mounted to ensure batch consistency and reliability.
4	power supply interface	USB	-
5	Communication Interface	TTL	-
6	Operating temperature	-40 ~ +85℃	industrial grade
7	Working humidity	10% ~ 90%	relative humidity, non-condensing
8	Storage temperature	-40 ~ +125℃	industrial grade

2. Brief description of functions

2.1 Component Introduction

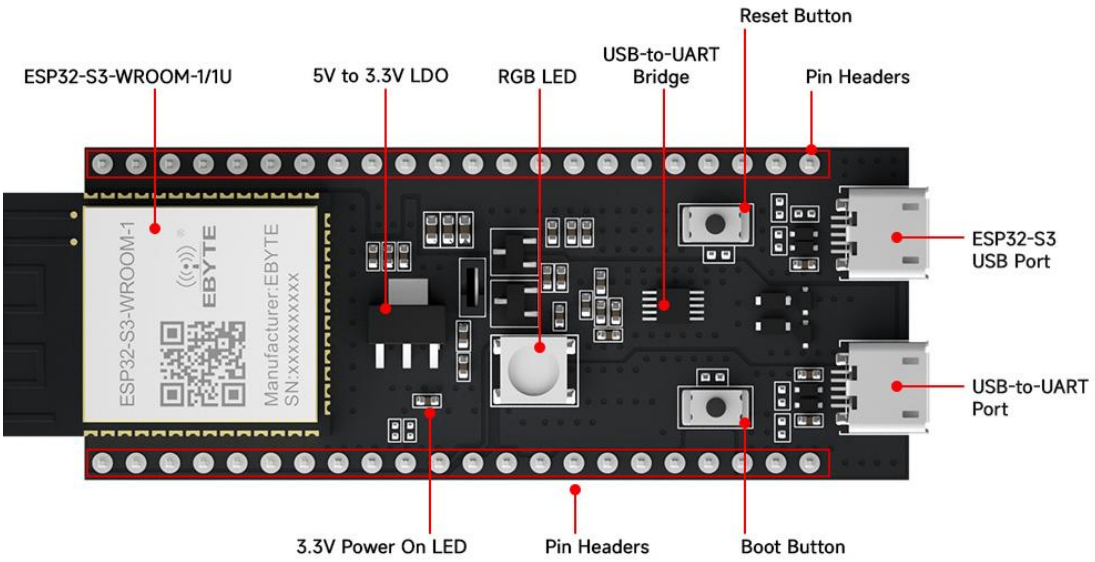


Figure 2 Main Component Diagram

serial number	main firmware	introduce
1	ESP32-S3-WROOM-1 & ESP32-S3-WROOM-1 U	ESP32-S3-WROOM-1, ESP32-S3-WROOM-1U and ESP32-S3-WROOM-2 are general-purpose Wi-Fi + Bluetooth low-power MCU modules with rich peripheral interfaces and powerful neural network operations capabilities and signal processing capabilities, specifically built for the artificial intelligence and AIoT markets. ESP32-S3-WROOM-1 and ESP32-S3-WROOM-2 use PCB on-board antennas, and ESP32-S3-WROOM-1U uses a connector to connect to an external antenna.
2	5 V to 3.3 V LDO	Power converter, input 5 V, output 3.3 V.
3	Pin	All available GPIO pins (except the SPI bus of the flash) have been led out to the pin headers of the development board. Please see Pin Headers for more information.
4	USB to UART interface	The Micro-USB interface can be used as the power supply interface of the development board, can burn firmware to the chip, and can also be used as a communication interface to communicate with the chip through the onboard USB-to-UART bridge.
5	Boot key	Download button. Press and hold the Boot button and press the Reset button to enter the "firmware download" mode and download the firmware through the serial port.
6	ESP32-S3 USB interface	ESP32-S3 USB OTG interface supports full-speed USB 1.1 standard. The ESP32-S3 USB interface can be used as the power supply interface of the development board, can burn firmware to the chip, can communicate with the chip through the USB protocol, and can also be used for JTAG debugging.

7	Reset key	Reset button.
8	USB to UART bridge	Single-chip USB to UART bridge providing transfer rates up to 3 Mbps.
9	RGB LEDs	Addressable RGB LEDs driven by GPIO38.
10	3.3 V Power LED	After the development board is connected to the USB power supply, the indicator light turns on.

Note: In the development board of the onboard ESP32-S3-WROOM-1/1U module series (using 8-line SPI flash/PSRAM), the pins GPIO35, GPIO36 and GPIO37 have been used for the internal ESP32-S3 chip and SPI flash/PSRAM Communication between PSRAMs is not available externally.

2.2 Pin definition

The picture below shows the front view of ESP32-S3-WROOM-1-TB&ESP32-S3-WROOM-1U-TB:

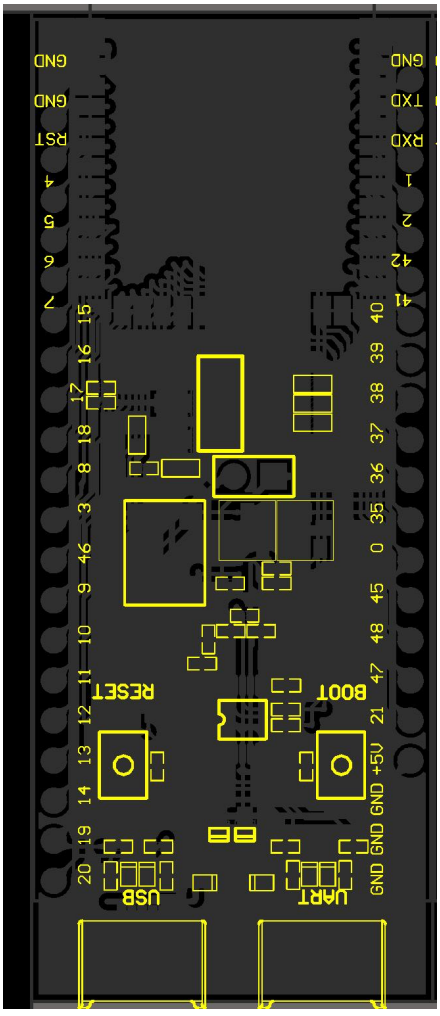


Figure 3 Current test interface diagram

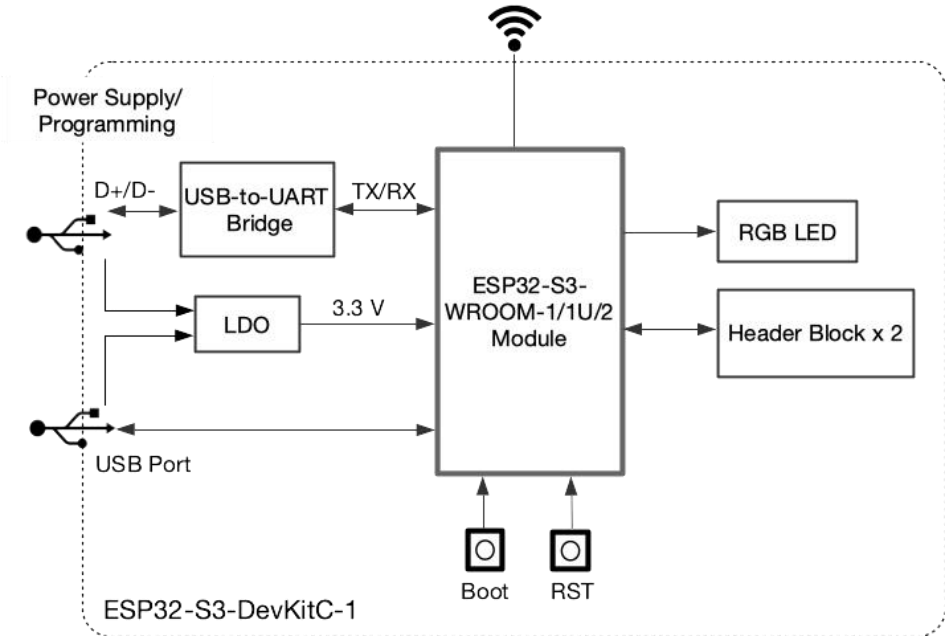
pin number	Pin name	type	Pin usage
1	G	G	grounding
2	G	G	grounding
3	RST	I	EN
4	4	I/O/T	RTC_GPIO4, GPIO4, TOUCH4, ADC1_CH3
5	5	I/O/T	RTC_GPIO5, GPIO5, TOUCH5, ADC1_CH4
6	6	I/O/T	RTC_GPIO6, GPIO6, TOUCH6, ADC1_CH5
7	7	I/O/T	RTC_GPIO7, GPIO7, TOUCH7, ADC1_CH6
8	15	I/O/T	RTC_GPIO15, GPIO15, U0RTS, ADC2_CH4, XTAL_32K_P
9	16	I/O/T	RTC_GPIO16, GPIO16, U0CTS, ADC2_CH5, XTAL_32K_N
10	17	I/O/T	RTC_GPIO17, GPIO17, U1TXD, ADC2_CH6
11	18	I/O/T	RTC_GPIO18, GPIO18, U1RXD, ADC2_CH7, CLK_OUT3
12	8	I/O/T	RTC_GPIO8, GPIO8, TOUCH8, ADC1_CH7, SUBSPICS1
13	3	I/O/T	RTC_GPIO3, GPIO3, TOUCH3, ADC1_CH2
14	46	I/O/T	GPIO46
15	9	I/O/T	RTC_GPIO9, GPIO9, TOUCH9, ADC1_CH8, FSPIHD, SUBSPIHD
16	10	I/O/T	RTC_GPIO10, GPIO10, TOUCH10, ADC1_CH9, FSPICS0, FSPIIO4, SUBSPICS0
17	11	I/O/T	RTC_GPIO11, GPIO11, TOUCH11, ADC2_CH0, FSPID, FSPIIO5, SUBSPID
18	12	I/O/T	RTC_GPIO12, GPIO12, TOUCH12, ADC2_CH1, FSPICLK, FSPIIO6, SUBSPICLK
19	13	I/O/T	RTC_GPIO13, GPIO13, TOUCH13, ADC2_CH2, FSPIQ, FSPIIO7, SUBSPIQ
20	14	I/O/T	RTC_GPIO14, GPIO14, TOUCH14, ADC2_CH3, FSPIWP, FSPIDQS, SUBSPIWP
twenty one	19	I/O/T	RTC_GPIO19, GPIO19, U1RTS, ADC2_CH8, CLK_OUT2, USB_D-
twenty two	20	I/O/T	RTC_GPIO20, GPIO20, U1CTS, ADC2_CH9, CLK_OUT1, USB_D+
twenty three	G	G	grounding
twenty four	TX	I/O/T	U0TXD, GPIO43, CLK_OUT1
25	RX	I/O/T	U0RXD, GPIO44, CLK_OUT2
26	1	I/O/T	RTC_GPIO1, GPIO1, TOUCH1, ADC1_CH0
27	2	I/O/T	RTC_GPIO2, GPIO2, TOUCH2, ADC1_CH1
28	42	I/O/T	MTMS, GPIO42
29	41	I/O/T	MTDI, GPIO41, CLK_OUT1
30	40	I/O/T	MTDO, GPIO40, CLK_OUT2
31	39	I/O/T	MTCK, GPIO39, CLK_OUT3, SUBSPICS1
32	38	I/O/T	GPIO38, FSPIWP, SUBSPIWP, RGB LEDs

33	37	I/O/T	SPIDQS, GPIO37, FSPIQ, SUBSPIQ
34	36	I/O/T	SPIIO7, GPIO36, FSPICLK, SUBSPICLK
35	35	I/O/T	SPIIO6, GPIO35, FSPID, SUBSPID
36	0	I/O/T	RTC_GPIO0, GPIO0
37	45	I/O/T	GPIO45
38	48	I/O/T	GPIO48, SPICLK_N, SUBSPICLK_N_DIFF
39	47	I/O/T	GPIO47, SPICLK_P, SUBSPICLK_P_DIFF
40	twenty one	I/O/T	RTC_GPIO21, GPIO21
41	5V	P	5 V power supply
42	G	G	grounding
43	G	G	grounding
44	G	G	grounding

Note: 1. P: power supply; I: input; O: output; T: can be set to high impedance .

2.3 Function introduction

ESP32-S3-WROOM-1-TB&ESP32-S3-WROOM-1U-TB The main components and connections are shown in the figure below:



3 . Notes for developing applications

- Before powering on, please make sure that ESP32-S3-WROOM-1-TB & ESP32-S3-WROOM-1U-TB are intact.
- Preparation tools: ESP32-S3-MINI-1-TB or ESP32-S3-MINI-1U-TB, USB 2.0 data cable (standard A type to Micro-B type , computer (Windows, Linux or macOS). (Please make sure to use Appropriate USB data cable, some data cables can only be used for charging and cannot be used for data transfer and programming.)

4 . Revision History

Version	Revision date	Revision Notes	Maintenance man
1.0	2022-10-27	initial version	Hao

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