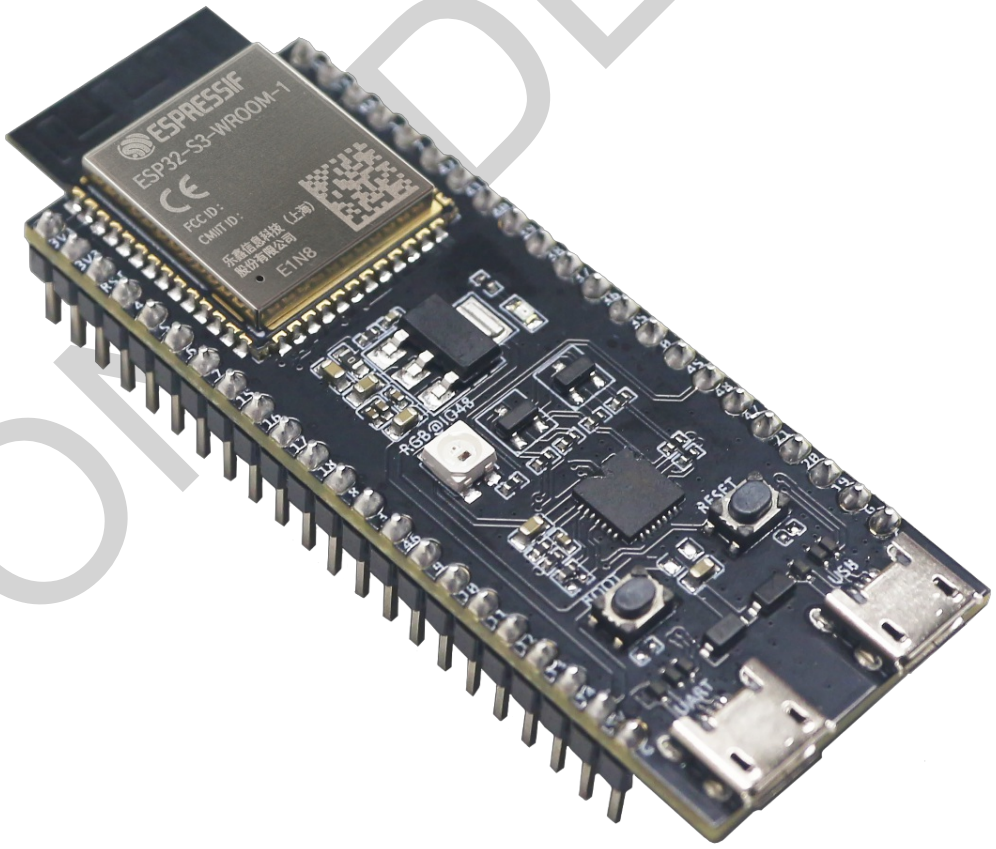
ESP32-S3-DevKitC-1

This user guide will help you get started with ESP32-S3-DevKitC-1 and will also provide more in-depth information.

The ESP32-S3-DevKitC-1 is an entry-level development board equipped with either ESP32-S3-WROOM-1 or ESP32-S3-WROOM-1U, a general-purpose Wi-Fi + Bluetooth LE MCU module that integrates complete Wi-Fi and Bluetooth LE functions.

Most of the I/O pins on the module are broken out to the pin headers on both sides of this board for easy interfacing. Developers can either connect peripherals with jumper wires or mount ESP32-S3-DevKitC-1 on a breadboard.



ESP32-S3-DevKitC-1

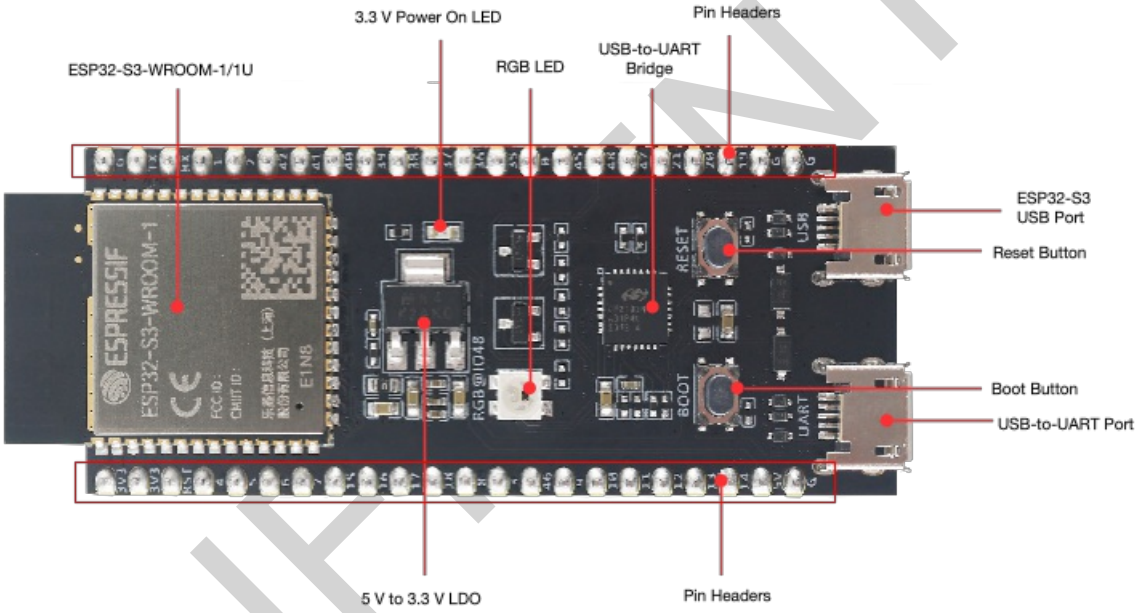
The document consists of the following major sections:

- Getting started: Overview of the board and hardware/software setup instructions to get started.
- Hardware Reference: More detailed information about the board's hardware.
- Hardware Revision Details: Revision history, known issues, and links to user guides for previous versions (if any) of the board.

Getting Started

This section provides a brief introduction of ESP32-S3-DevKitC-1, instructions on how to do the initial hardware setup and how to flash firmware onto it.

Description of Components



ESP32-S3-DevKitC-1 - front

The key components of the board are described in a counter-clockwise direction.

Key Component	Description
ESP32-S3-WROOM-1/1U	ESP32-S3-WROOM-1 and ESP32-S3-WROOM-1U are two powerful, generic Wi-Fi + Bluetooth LE MCU modules that have a rich set of peripherals. They provide acceleration for neural network computing and signal processing workloads.
5 V to 3.3 V LDO	Power regulator that converts a 5 V supply into a 3.3 V output.
Pin Headers	All available GPIO pins (except for the SPI bus for flash) are broken out to the pin headers on the board for easy interfacing and programming. For details, please see Header Block.

Key Component	Description
USB-to-UART Port	A Micro-USB port used for power supply to the board, as well as the communication with the ESP32-S3 chip via the on-board USB-to-UART bridge.
Boot Button	Download button. Holding down **Boot** and then pressing **Reset** initiates Firmware Download mode for downloading firmware through the serial port.
Reset Button	Press this button to restart the system.
ESP32-S3 USB Port	ESP32-S3 full-speed USB OTG interface, compliant with the USB 1.1 specification.
USB-to-UART Bridge	Single USB-to-UART bridge chip provides transfer rates up to 3 Mbps.
RGB LED	Addressable RGB LED, driven by GPIO48.
3.3 V Power On LED	Turns on when the USB power is connected to the board.

Start Application Development

Before powering up your board, please make sure that it is in good condition with no obvious signs of damage.

Required Hardware

- ESP32-S3-DevKitC-1
- USB 2.0 cable (Standard-A to Micro-B)
- Computer running Windows, Linux, or macOS

Note

Be sure to use an appropriate USB cable. Some cables are for charging only and do not provide the needed data lines nor work for programming the boards.

Software Setup

Please proceed to Get Started, where Section Installation Step by Step will quickly help you set up the development environment and then flash an application example onto your board.

Contents and Packaging

Retail orders

If you order a few samples, each board comes in an individual package in either antistatic bag or any packaging depending on your retailer.

For retail orders, please go to https://www.espressif.com/en/company/contact/buy-a-sample.

Wholesale Orders

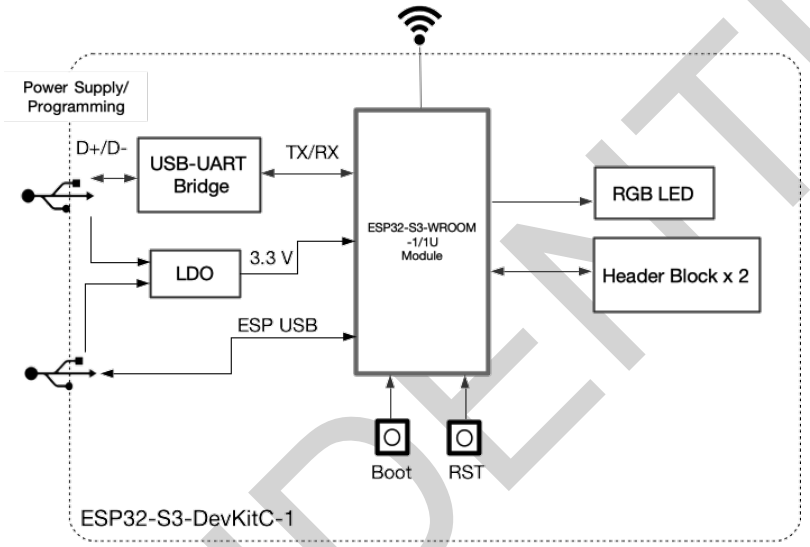
If you order in bulk, the boards come in large cardboard boxes.

For wholesale orders, please go to https://www.espressif.com/en/contact-us/sales-questions.

Hardware Reference

Block Diagram

The block diagram below shows the components of ESP32-S3-DevKitC-1 and their interconnections.



ESP32-S3-DevKitC-1 (click to enlarge)

Power Supply Options

There are three mutually exclusive ways to provide power to the board:

- USB-to-UART Port, default power supply (recommended)
- 5 V and GND pins
- 3V3 and GND pins

Header Block

The two tables below provide the **Name** and **Function** of the pins on both sides of the board (J1 and J3). The pin names are shown in ESP32-S3-DevKitC-1 - front. The numbering is the same as in the Board Schematic (PDF).

J1

No.	Name	Type [1]	Function

No.	Name	Type	Function
1	3V3	P	3.3 V power supply
2	3V3	P	3.3 V power supply
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
21	5V	P	5 V power supply
22	G	G	Ground

J3

No.	Name	Type	Function
1	G	G	Ground
2	TX	I/O/T	U0TXD, GPIO43, CLK_OUT1

No.	Name	Type	Function
3	RX	I/O/T	U0RXD, GPIO44, CLK_OUT2
4	1	I/O/T	RTC_GPIO1, GPIO1, TOUCH1, ADC1_CH0
5	2	I/O/T	RTC_GPIO2, GPIO2, TOUCH2, ADC1_CH1
6	42	I/O/T	MTMS, GPIO42
7	41	I/O/T	MTDI, GPIO41, CLK_OUT1
8	40	I/O/T	MTDO, GPIO40, CLK_OUT2
9	39	I/O/T	MTCK, GPIO39, CLK_OUT3, SUBSPICS1
10	38	I/O/T	GPIO38, FSPIWP, SUBSPIWP
11	37	I/O/T	SPIDQS, GPIO37, FSPIQ, SUBSPIQ
12	36	I/O/T	SPIIO7, GPIO36, FSPICLK, SUBSPICLK
13	35	I/O/T	SPIIO6, GPIO35, FSPID, SUBSPID
14	0	I/O/T	RTC_GPIO0, GPIO0
15	45	I/O/T	GPIO45
16	48	I/O/T	GPIO48 [2], SPICLK_N, SUBSPICLK_N_DIFF
17	47	I/O/T	GPIO47, SPICLK_P, SUBSPICLK_P_DIFF
18	21	I/O/T	RTC_GPIO21, GPIO21
19	20	I/O/T	RTC_GPIO20, GPIO20, U1CTS, ADC2_CH9, CLK_OUT1, USB_D+
20	19	I/O/T	RTC_GPIO19, GPIO19, U1RTS, ADC2_CH8, CLK_OUT2, USB_D-
21	G	G	Ground
22	G	G	Ground

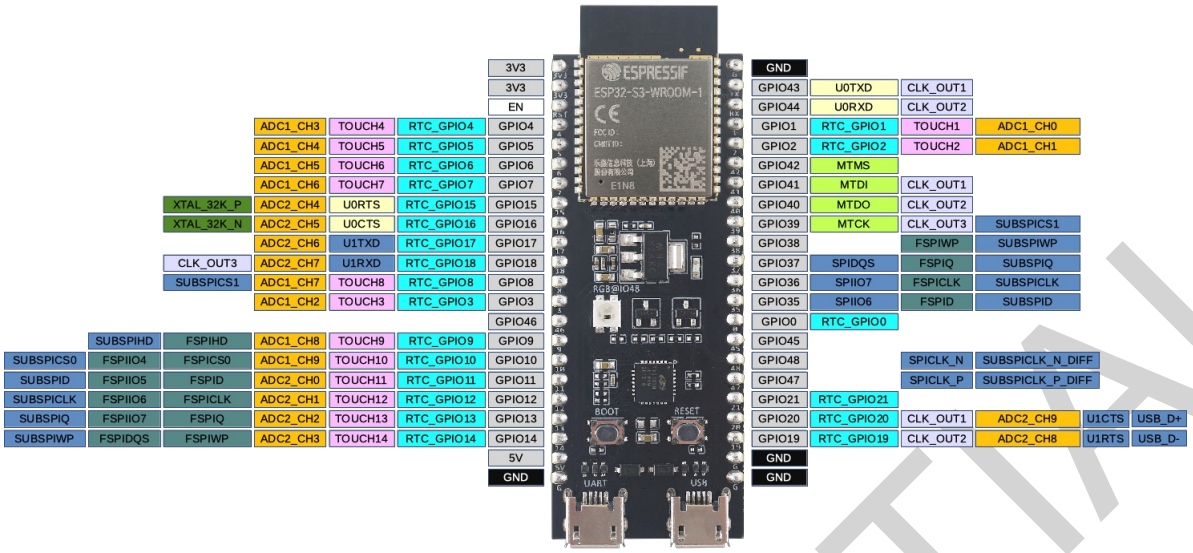
1

P: Power supply; I: Input; O: Output; T: High impedance.

2

Used to drive the RGB LED.

Pin Layout



ESP32-S3-DevKitC-1 Pin Layout (click to enlarge)

Hardware Revision Details

No previous versions available.

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