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ESP32-DevKitC V4 Getting Started Guide

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This guide shows how to start using the ESP32-DevKitC V4 development board. For description of other versions of ESP32-DevKitC check [ESP32 Hardware Reference](#).

What You Need

- ESP32-DevKitC V4 board
- USB A / micro USB B cable
- Computer running Windows, Linux, or macOS

You can skip the introduction sections and go directly to Section [Start Application Development](#).

Overview

ESP32-DevKitC V4 is a small-sized ESP32-based development board produced by [Espressif](#). Most of the I/O pins are broken out to the pin headers on both sides for easy interfacing. Developers can either connect peripherals with jumper wires or mount ESP32-DevKitC V4 on a breadboard.

To cover a wide range of user requirements, the following versions of ESP32-DevKitC V4 are available:

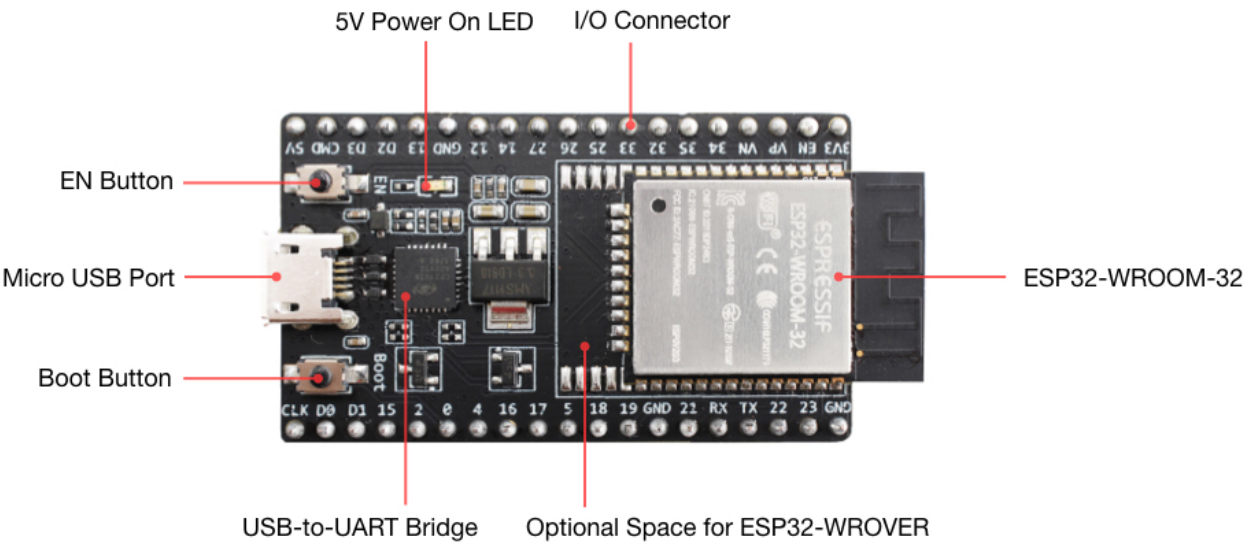
- different ESP32 modules

- [ESP32-WROOM-32E](#)
 - [ESP32-WROOM-32UE](#)
 - [ESP32-WROOM-32D](#)
 - [ESP32-WROOM-32U](#)
 - [ESP32-SOLO-1](#)
 - [ESP32-WROVER-E](#)
 - [ESP32-WROVER-IE](#)
- male or female pin headers.

For details please refer to [Espressif Product Ordering Information](#).

Functional Description

The following figure and the table below describe the key components, interfaces and controls of the ESP32-DevKitC V4 board.



ESP32-DevKitC V4 with ESP32-WROOM-32 module soldered

Key Component	Description
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ESP32-WROOM-32	A module with ESP32 at its core.
EN	Reset button.
Boot	Download button. Holding down Boot and then pressing EN
USB-to-UART Bridge	Single USB-UART bridge chip provides transfer rates of up to
Micro USB Port	USB interface. Power supply for the board as well as the core
5V Power On LED	Turns on when the USB or an external 5V power supply is connected
I/O	Most of the pins on the ESP module are broken out to the pins

ⓘ Note

The pins D0, D1, D2, D3, CMD and CLK are used internally for communication between ESP32 and SPI flash memory. They are grouped on both sides near the USB connector. Avoid using these pins, as it may disrupt access to the SPI flash memory / SPI RAM.

ⓘ Note

The pins GPIO16 and GPIO17 are available for use only on the boards with the modules ESP32-WROOM and ESP32-SOLO-1. The boards with ESP32-WROVER modules have the pins reserved for internal use.

Power Supply Options

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

- Micro USB port, default power supply
- 5V / GND header pins
- 3V3 / GND header pins

⚠ Warning

The power supply must be provided using **one and only one of the options above**, otherwise the board and/or the power supply source can be damaged.

Header Block

The two tables below provide the **Name** and **Function** of I/O header pins on both sides of the board, as shown in [ESP32-DevKitC V4 with ESP32-WROOM-32 module soldered](#). The numbering and names are the same as in the [ESP32-DevKitC V4 schematics](#) (PDF).

J1

No.	Name	Type	Function
1	3V3	P	3.3 V power supply
2	EN	I	CHIP_PU, Reset
3	IO36	I	GPIO36, ADC1_CH0, S_VP
4	IO39	I	GPIO39, ADC1_CH3, S_VN
5	IO34	I	GPIO34, ADC1_CH6, VDET_1
6	IO35	I	GPIO35, ADC1_CH7, VDET_2
7	IO32	I/O	GPIO32, ADC1_CH4, TOUCH_CH9, XTAL_32K_P
8	IO33	I/O	GPIO33, ADC1_CH5, TOUCH_CH8, XTAL_32K_N
9	IO25	I/O	GPIO25, ADC1_CH8, DAC_1
10	IO26	I/O	GPIO26, ADC2_CH9, DAC_2
11	IO27	I/O	GPIO27, ADC2_CH7, TOUCH_CH7
12	IO14	I/O	GPIO14, ADC2_CH6, TOUCH_CH6, MTMS
13	IO12	I/O	GPIO12, ADC2_CH5, TOUCH_CH5, MTDI
14	GND	G	Ground

15	IO13	I/O	GPIO13, ADC2_CH4, TOUCH_CH4, MTCK
16	IO9	I/O	GPIO9, D2
17	IO10	I/O	GPIO10, D3
18	IO11	I/O	GPIO11, CMD
19	5V0	P	5 V power supply

J3

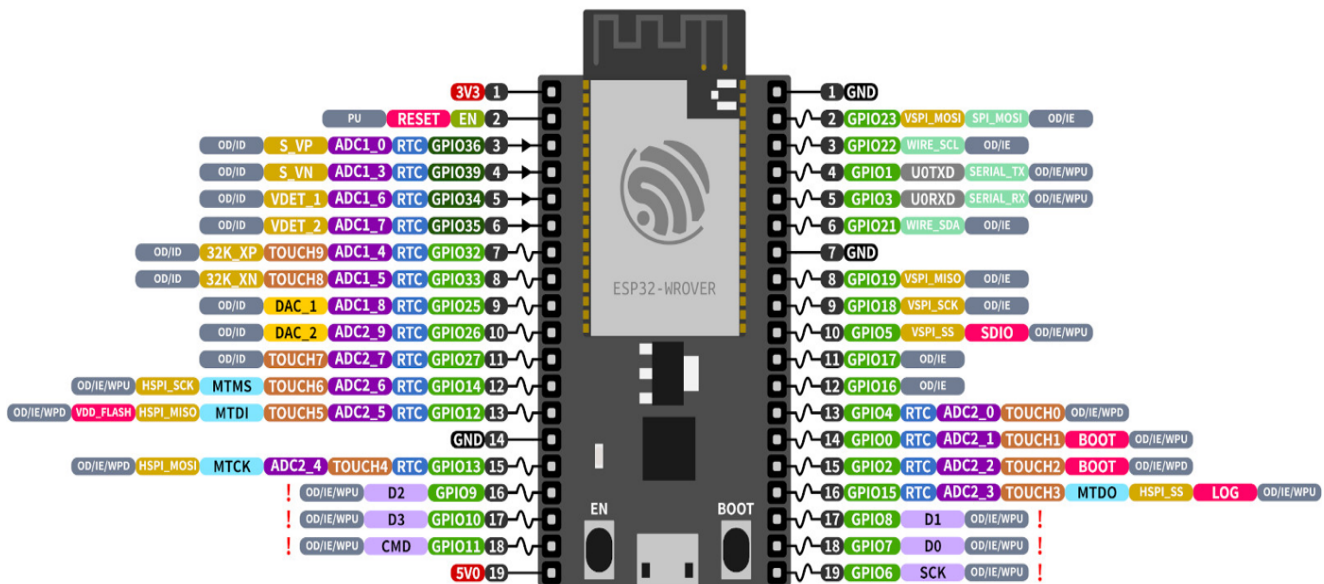
No.	Name	Type	Function
1	GND	G	Ground
2	IO23	I/O	GPIO23
3	IO22	I/O	GPIO22
4	IO1	I/O	GPIO1, U0TXD
5	IO3	I/O	GPIO3, U0RXD
6	IO21	I/O	GPIO21
7	GND	G	Ground
8	IO19	I/O	GPIO19
9	IO18	I/O	GPIO18
10	IO5	I/O	GPIO5
11	IO17	I/O	GPIO17
12	IO16	I/O	GPIO16
13	IO4	I/O	GPIO4, ADC2_CH0, TOUCH_CH0
14	IO0	I/O	GPIO0, ADC2_CH1, TOUCH_CH1, Boot
16	IO2	I/O	GPIO2, ADC2_CH2, TOUCH_CH2

17	IO15	I/O	GPIO15, ADC2_CH3, TOUCH_CH3, MTDO
17	IO8	I/O	GPIO8, D1
18	IO7	I/O	GPIO7, D0
19	IO6	I/O	GPIO6, SCK

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

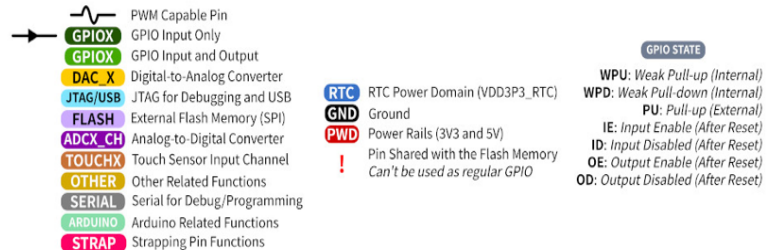
Pin Layout

ESP32-DevKitC



ESP32 Specs

32-bit Xtensa® dual-core @240MHz
 Wi-Fi IEEE 802.11 b/g/n 2.4GHz
 Bluetooth 4.2 BR/EDR and BLE
 520 KB SRAM (16 KB for cache)
 448 KB ROM
 34 GPIOs, 4x SPI, 3x UART, 2x I2C,
 2x I2S, RMT, LED PWM, 1 host SD/eMMC/SDIO,
 1 slave SDIO/SPI, TWAI®, 12-bit ADC, Ethernet



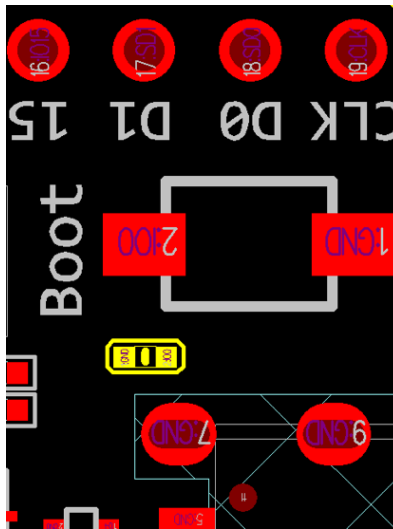
ESP32-DevKitC Pin Layout (click to enlarge)

Note on C15

The component C15 may cause the following issues on earlier ESP32-DevKitC V4 boards:

- The board may boot into Download mode
- If you output clock on GPIO0, C15 may impact the signal

In case these issues occur, please remove the component. The figure below shows C15 highlighted in yellow.



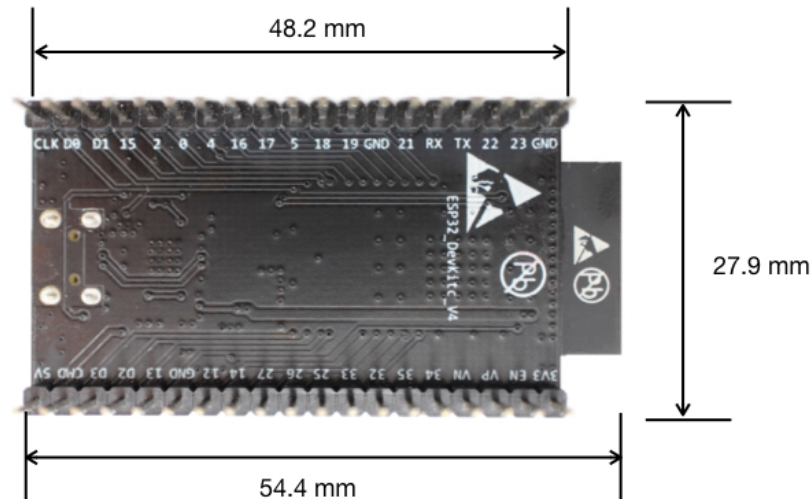
Location of C15 (yellow) on ESP32-DevKitC V4 board

Start Application Development

Before powering up your ESP32-DevKitC V4, please make sure that the board is in good condition with no obvious signs of damage.

After that, proceed to [Get Started](#), where Section [Installation Step by Step](#) will quickly help you set up the development environment and then flash an example project onto your board.

Board Dimensions



ESP32 DevKitC board dimensions - back

Related Documents

- [ESP32-DevKitC V4 schematics](#) (PDF)
- [ESP32 Datasheet](#) (PDF)
- [ESP32-WROOM-32 Datasheet](#) (PDF)
- [ESP32-WROOM-32D and ESP32-WROOM-32U Datasheet](#) (PDF)
- [ESP32-WROVER Datasheet](#) (PDF)
- [ESP32-WROVER-B Datasheet](#) (PDF)
- [Espressif Product Ordering Information](#) (PDF)

For further design documentation for the board, please contact us at sales@espressif.com.

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