ESPRESSIF ESP32-C6-DevKitC-1 Development Board User Guide

Contents

ESPRESSIF ESP32-C6-DevKitC-1 Development Board

ESP32-C6-DevKitC-1 v1.2

Specifications

- Module: ESP32-C6-WROOM1 or ESP32-C6WROOM-1U
- Supported Features: Wi-Fi 6 (2.4 GHz band), Bluetooth 5, IEEE 802.15.4 (Zigbee 3.0 and Thread 1.3)
- Flash Memory: 8 MB SPI flash
- Power Supply: 5 V to 3.3 V LDO
- USB Port: USB Type-C compliant with USB 2.0 full speed (12 Mbps transfer speed)
- GPIO Pins: All available GPIO pins (except for the SPI bus for flash) are broken out to pin headers on the board
- LED: 3.3 V Power On LED
- Buttons: Boot Button, Reset Button
- RGB LED: Addressable RGB LED driven by GPIO8

Product Usage Instructions

Initial Hardware Setup

1. Inspect the ESP32-C6-DevKitC-1 for any signs of damage.
2. Connect the power supply to the USB Type-C port on the board.

Flashing Firmware

1. Make sure the ESP32-C6-DevKitC-1 is powered on and connected to your computer via USB.
2. Hold down the Boot button and then press the Reset button to enter Firmware Download mode.
3. Use the appropriate software tool to flash the firmware onto the chip through the serial port.

Application Development

1. Follow the ESP-IDF Get Started guide to set up the development environment.
2. Once set up, you can develop and flash your own applications onto the ESP32-C6-DevKitC-1 board.

FAQ

Q: How do I order retail samples of ESP32-C6-DevKitC-1?
A: For retail orders, please visit **https://www.espressif.com/en/company/contact/buy-a-sample**.

Q: How do I place wholesale orders for ESP32-C6-DevKitC-1?
A: For wholesale orders, please refer to Espressif Product Ordering Information (PDF).

Q: How can I measure the current drawn by the ESP32-C6-WROOM-1(U) module?
A: The J5 headers on ESP32-C6-DevKitC-1 can be used for current measurement. Refer to the details in the “Current Measurement” section.

ESP32-C6-DevKitC-1 v1.2 The older version: ESP32-C6-DevKitC-1 v1.1 This user guide will help you get started with ESP32-C6-DevKitC-1 and will also provide more in-depth information. ESP32-C6-DevKitC-1 is an entry-level development board based on ESP32-C6-WROOM-1(U), a general-purpose module with a 8 MB SPI flash. This board integrates complete Wi-Fi, Bluetooth LE, Zigbee, and Thread functions. 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-C6-DevKitC-1 on a breadboard.

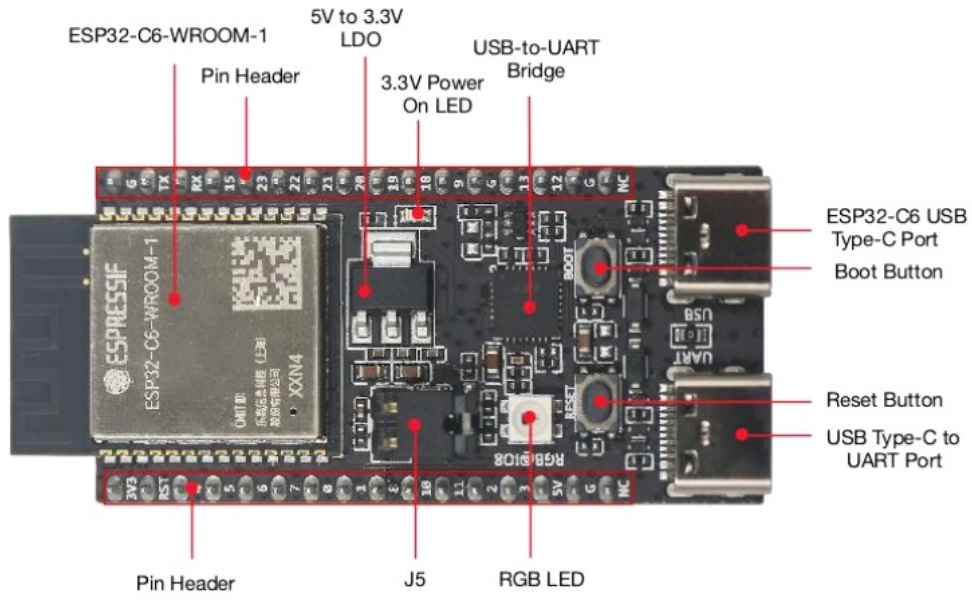
The document consists of the following major sections:

- Getting Started: Overview of ESP32-C6-DevKitC-1 and hardware/software setup instructions to get started.
- Hardware Reference: More detailed information about the ESP32-C6-DevKitC-1's hardware.
- Hardware Revision Details: Revision history, known issues, and links to user guides for previous versions (if any) of ESP32-C6-DevKitC-1.
- Related Documents: Links to related documentation.

Getting Started

This section provides a brief introduction of ESP32-C6-DevKitC-1, instructions on how to do the initial hardware setup and how to flash firmware onto it.

Description of Components



ESP32-C6-DevKitC-1 - front

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

Key Component	Description
ESP32-C6-WROOM- 1 or ESP32-C6- WROOM-1U	ESP32-C6-WROOM-1 and ESP32-C6-WROOM-1U are general- purpose modules supporting Wi-Fi 6 in 2.4 GHz band, Bluetooth 5, and IEEE 802. 15.4 (Zigbee 3.0 and Thread 1.3). They are built around the ESP32-C6 chip, and c omes with a 8 MB SPI flash. ESP32-C6- WROOM-1 uses on-board PCB antenna, whereas ESP32-C6-WROOM- 1U uses external antenna connector. For more info rmation, see **ESP32- C6-WROOM-1 Datasheet.**
Pin Header	All available GPIO pins (except for the SPI bus for flash) are broken out to the pin headers on the board.
5 V to 3.3 V LDO	Power regulator that converts a 5 V supply into a 3.3 V output.
3.3 V Power On LED	Turns on when the USB power is connected to the board.
USB-to-UART Bridge	Single USB-to-UART bridge chip provides transfer rates up to 3 Mbps.
ESP32-C6 USB Type-C Port	The USB Type-C port on the ESP32-C6 chip compliant with USB 2.0 full speed. It i s capable of up to 12 Mbps transfer speed (Note that this port does not support th e faster 480 Mbps high-speed transfer mode). This port is used for power supply t o the board, for flashing applications to the chip, for communication with the chip using USB protocols, as well as for JTAG debugging.
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.
USB Type-C to UART Port	Used for power supply to the board, for flashing applications to the chip, as well as the communication with the ESP32-C6 chip via the on- board USB-to-UART bridg e.
RGB LED	Addressable RGB LED, driven by GPIO8.
J5	Used for current measurement. See details in Section **Current Measurement.**

Start Application Development

Before powering up your ESP32-C6-DevKitC-1, please make sure that it is in good condition with no obvious signs of damage.

Required Hardware

Software Setup

Please proceed to ESP-IDF Get Started, which will quickly help you set up the development environment then flash an application example onto your board.

Contents and Packaging

Retail orders

If you order a few samples, each ESP32-C6-DevKitC-1 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**.

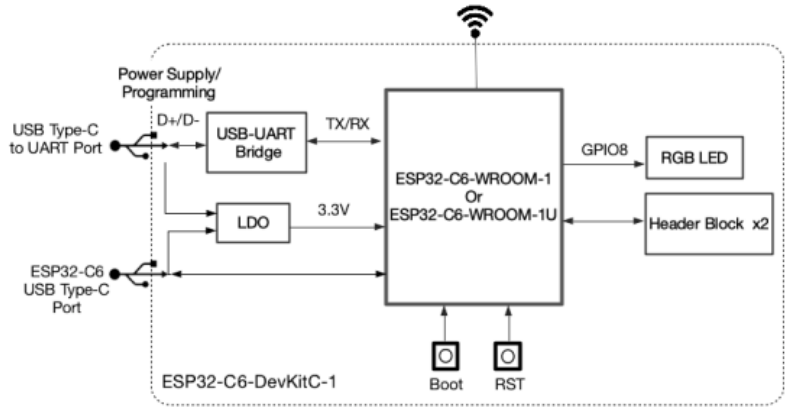
Wholesale Orders

If you order in bulk, the boards come in large cardboard boxes.
For wholesale orders, please check Espressif Product Ordering Information (PDF)

Hardware Reference

Block Diagram

The block diagram below shows the components of ESP32-C6-DevKitC-1 and their interconnections.



ESP32-C6-DevKitC-1 (click to enlarge)

Power Supply Options

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

- USB Type-C to UART Port and ESP32-C6 USB Type-C Port (either one or both), default power supply (recommended)
- 5V and GND pin headers
- 3V3 and GND pin headers
    - **Current Measurement**

      The J5 headers on ESP32-C6-DevKitC-1 (see J5 in Figure ESP32-C6-DevKitC-1 – front) can be used for measuring the current drawn by the ESP32-C6-WROOM-1(U) module:
- Remove the jumper: Power supply between the module and peripherals on the board is cut off. To measure the module's current, connect the board with an ammeter via J5 headers.
- Apply the jumper (factory default): Restore the board's normal functionality.

Note

When using 3V3 and GND pin headers to power the board, please remove the J5 jumper, and connect an ammeter in series to the external circuit to measure the module's current.

Header Block

The two tables below provide the Name and Function of the pin headers on both sides of the board (J1 and J3). The pin header names are shown in Figure ESP32-C6-DevKitC-1 – front. The numbering is the same as in the ESP32-C6-DevKitC-1 Schematic (PDF).

J1

No.	Name	Type [1]	Function
1	3V3	P	3.3 V power supply
2	RST	I	High: enables the chip; Low: disables the chip.
3	4	I/O/T	MTMS [3], GPIO4, LP_GPIO4, LP_UART_RXD, ADC1_CH4, FSPIHD
4	5	I/O/T	MTDI [3], GPIO5, LP_GPIO5, LP_UART_TXD, ADC1_CH5, FSPIWP
5	6	I/O/T	MTCK, GPIO6, LP_GPIO6, LP_I2C_SDA, ADC1_CH6, FSPICLK
6	7	I/O/T	MTDO, GPIO7, LP_GPIO7, LP_I2C_SCL, FSPID
7	0	I/O/T	GPIO0, XTAL_32K_P, LP_GPIO0, LP_UART_DTRN, ADC1_CH0
8	1	I/O/T	GPIO1, XTAL_32K_N, LP_GPIO1, LP_UART_DSRN, ADC1_CH1
9	8	I/O/T	GPIO8 [2] [3]
10	10	I/O/T	GPIO10
11	11	I/O/T	GPIO11
12	2	I/O/T	GPIO2, LP_GPIO2, LP_UART_RTSN, ADC1_CH2, FSPIQ
13	3	I/O/T	GPIO3, LP_GPIO3, LP_UART_CTSN, ADC1_CH3
14	5V	P	5 V power supply
15	G	G	Ground
16	NC	–	No connection

J3

No.	Name	Type	Function
1	G	G	Ground
2	TX	I/O/T	U0TXD, GPIO16, FSPICS0
3	RX	I/O/T	U0RXD, GPIO17, FSPICS1
4	15	I/O/T	GPIO15 [3]
5	23	I/O/T	GPIO23, SDIO_DATA3
6	22	I/O/T	GPIO22, SDIO_DATA2
7	21	I/O/T	GPIO21, SDIO_DATA1, FSPICS5
8	20	I/O/T	GPIO20, SDIO_DATA0, FSPICS4
9	19	I/O/T	GPIO19, SDIO_CLK, FSPICS3
10	18	I/O/T	GPIO18, SDIO_CMD, FSPICS2
11	9	I/O/T	GPIO9 [3]
12	G	G	Ground
13	13	I/O/T	GPIO13, USB_D+
14	12	I/O/T	GPIO12, USB_D-
15	G	G	Ground
16	NC	–	No connection

1. P: Power supply; I: Input; O: Output; T: High impedance.
2. Used to drive the RGB LED.
3. (1,2,3,4,5) MTMS, MTDI, GPIO8, GPIO9, and GPIO15 are strapping pins of the ESP32-C6 chip. These pins are used to control several chip functions depending on binary voltage values applied to the pins during chip power-up or system reset. For description and application of the strapping pins, please refer to ESP32-C6 Datasheet > Section Strapping Pins.

Documents / Resources

	ESPRESSIF ESP32-C6-DevKitC-1 Development Board [pdf] User Guide ESP32-C6-DevKitC-1 Development Board, ESP32-C6-DevKitC-1, Development Board, Board

References

- Get Started - ESP32-C6 - — ESP-IDF Programming Guide latest documentation
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- User Manual