



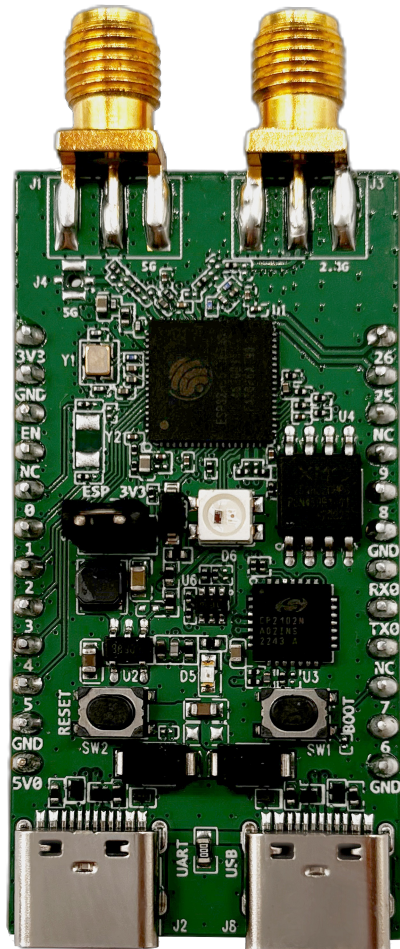
ESP32-C5 Test Board

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This user guide will help you get started with ESP32-C5 Test Board and will also provide more in-depth information.

ESP32-C5 Test Board is an entry-level development board with a 4 MB SPI flash. This board supports 2.4 and 5 GHz dual-band Wi-Fi 6, Bluetooth LE 5, Zigbee 3.0, and Thread 1.3.

Most of the I/O pins of the on-board ESP32-C5-BETA3 chip are broken out to the pin headers on both sides for easy interfacing. Developers can either connect peripherals with jumper wires or mount ESP32-C5 Test Board on a breadboard.



ESP32-C5 Test Board (On-board ESP32-C5-BETA3 Chip)

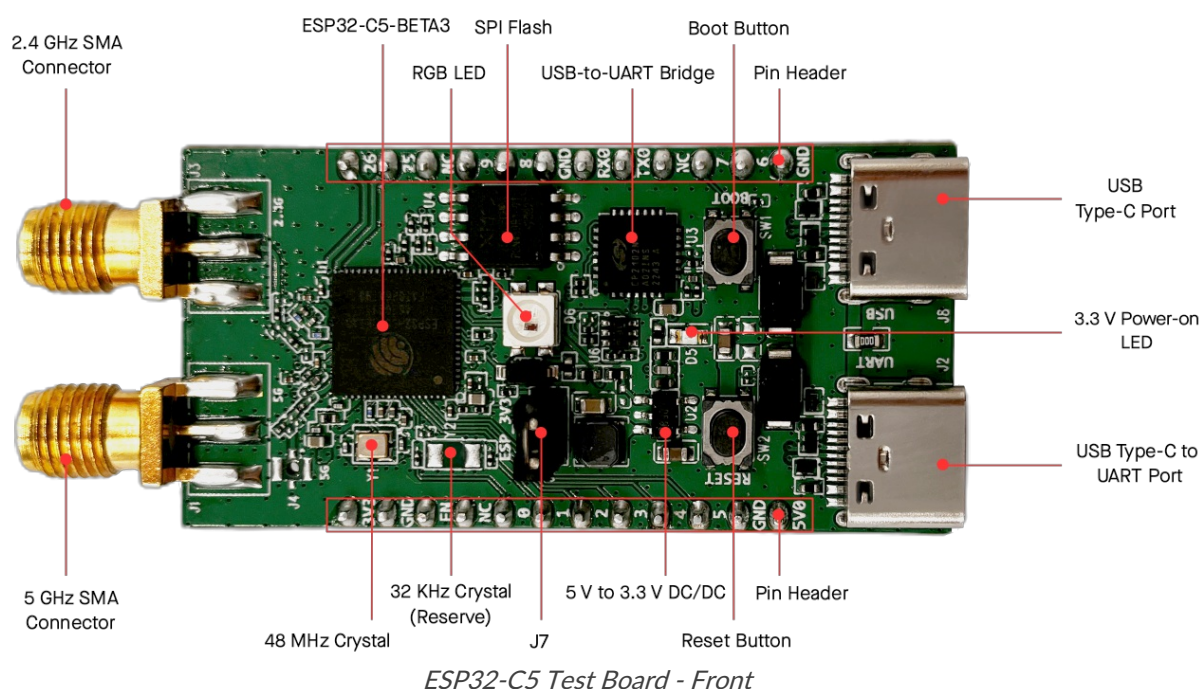
The document consists of the following sections:

- [Getting Started](#): How to set up hardware/software to develop applications.
- [Hardware Reference](#): More detailed information about the board's hardware.
- [Related Documents](#): Links to related documentation.

Getting Started

This section provides a brief introduction of ESP32-C5 Test Board, instructions on how to do the initial hardware setup, and how to flash firmware onto it.

Description of Components



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

Key Component	Description
2.4 GHz SMA Connector	Supports external connection to a 50-Ohm rod antenna or testing via RF cable when integrated with the instrument.
ESP32-C5-BETA3	SoC that supports 2.4 and 5 GHz dual-band Wi-Fi 6, Bluetooth LE 5, Zigbee 3.0, and Thread 1.3.
RGB LED	Addressable RGB LED, driven by GPIO6.
SPI Flash	On-board 4 MB SPI flash.
USB-to-UART Bridge	Single USB-to-UART bridge chip provides transfer rates up to 3 Mbps.
Boot Button	Download button. Holding down Boot and then pressing Reset initiates Firmware Download mode for downloading firmware through the serial port.
Pin Header	J5 and J6. All available GPIO pins are broken out to the pin headers on the board.

Key Component	Description
USB Type-C Port	The USB Serial/JTAG port for the ESP32-C5-BETA3 chip compliant with USB 2.0 full speed. It is capable of up to 12 Mbps transfer speed. Note that this port does not support the faster 480 Mbps high-speed transfer mode. This port is used for power supply to the board, for flashing applications to the chip, for communication with the chip using USB protocols, as well as for JTAG debugging.
3.3 V Power-on LED	Turns on when the USB power is connected to the board.
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-C5-BETA3 chip via the on-board USB-to-UART bridge.
Reset Button	Press this button to restart the system.
5 V to 3.3 V DC/DC	DC/DC switching regulator that converts a 5 V supply into a 3.3 V output.
J7	Used for current measurement. See details in Section Current Measurement .
32.768 KHz Crystal	External 32.768 KHz RTC crystal for the ESP32-C5-BETA3 chip, though not mounted by default. Currently, XTAL_32K_P and XTAL_32K_N are used as GPIO0 and GPIO1.
48 MHz Crystal	The external main crystal for the ESP32-C5-BETA3 chip.
5 GHz SMA Connector	Supports external connection to a 50-Ohm rod antenna or testing via RF cable when integrated with the instrument.

Start Application Development

Before powering up your ESP32-C5 Test Board, please make sure that it is in good condition with no obvious signs of damage.

Required Hardware

- ESP32-C5 Test Board
- USB-A to USB-C cable
- Computer running Windows, Linux, or macOS

Note

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

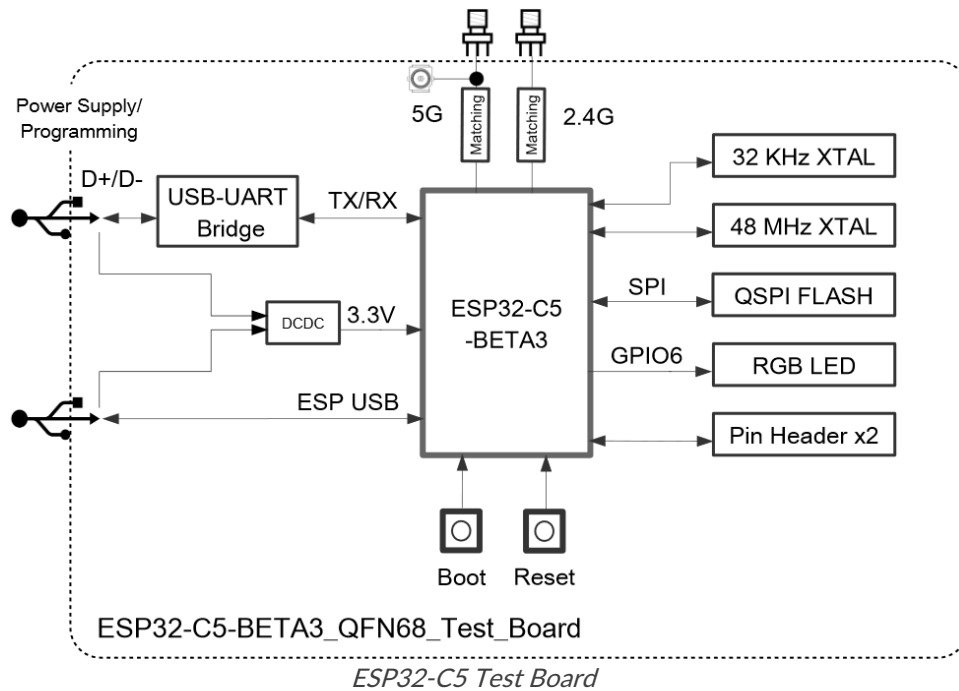
Software Setup

Please check the sample notes for details about ESP-IDF support.

Hardware Reference

Block Diagram

The block diagram below shows the components of ESP32-C5 Test Board and their interconnections.



Power Supply Options

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

- USB Type-C to UART Port and 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 J7 headers on the board (see J7 in Figure [ESP32-C5 Test Board - Front](#)) can be used for measuring the current drawn by the ESP32-C5-BETA3 chip:

- Remove the jumper: Power supply between the chip and peripherals on the board is cut off. To measure the chip's current, connect the board with an ammeter via J7 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 J7 jumper, and connect an ammeter in series to the external circuit to measure the chip's current.

Pin Header

The two tables below provide the **Name** and **Function** of the pin headers on both sides of the board (J5 and J6). The pin header names are shown in Figure [ESP32-C5 Test Board - Front](#). The numbering is the same as in the [ESP32-C5 Test Board Schematics](#) (PDF).

J5

J5 Pin Allocation

No.	Name	Type ¹	Function
1	3V3	P	3.3 V power supply
2	GND	P	Ground
3	EN	I	High: Enables the chip; Low: Disables the chip; connected to the internal pull-up resistor by default
4	NC	-	No connection
5	0	I/O/T	GPIO0, XTAL_32K_P
6	1	I/O/T	GPIO1, ADC1_CH0, XTAL_32K_N
7	2	I/O/T	GPIO2, ADC1_CH1, MTMS
8	3	I/O/T	GPIO3, ADC1_CH2, MTDI
9	4	I/O/T	GPIO4, ADC1_CH3, MTCK
10	5	I/O/T	GPIO5, ADC1_CH4, MTDO
11	GND	P	Ground
12	5V0	P	5 V power supply

J6

J6 Pin Allocation

No.	Name	Type ¹	Function
1	26	I/O/T	GPIO26, USB_D+
2	25	I/O/T	GPIO25, USB_D-
3	NC	-	No connection
4	9	I/O/T	GPIO9
5	8	I/O/T	GPIO8
6	GND	P	Ground
7	RX0	I/O/T	GPIO11, U0RXD
8	TX0	I/O/T	GPIO10, U0TXD
9	NC	-	No connection
10	7	I/O/T	GPIO7
11	6	I/O/T	GPIO6 ²
12	GND	P	Ground

[1] (1,2):

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

[2] :

Used to drive the RGB LED.

Related Documents

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

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