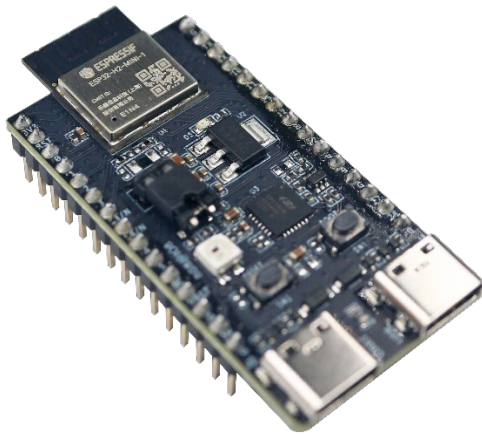


ESP32-H2-DevKitM-1

This user guide will help you get started with ESP32-H2-DevKitM-1 and will also provide more in-depth information.

ESP32-H2-DevKitM-1 is an entry-level development board based on Bluetooth® Low Energy and IEEE 802.15.4 combo module ESP32-H2-MINI-1 or ESP32-H2-MINI-1U.

Most of the I/O pins on the ESP32-H2-MINI-1/1U 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-H2-DevKitM-1 on a breadboard.

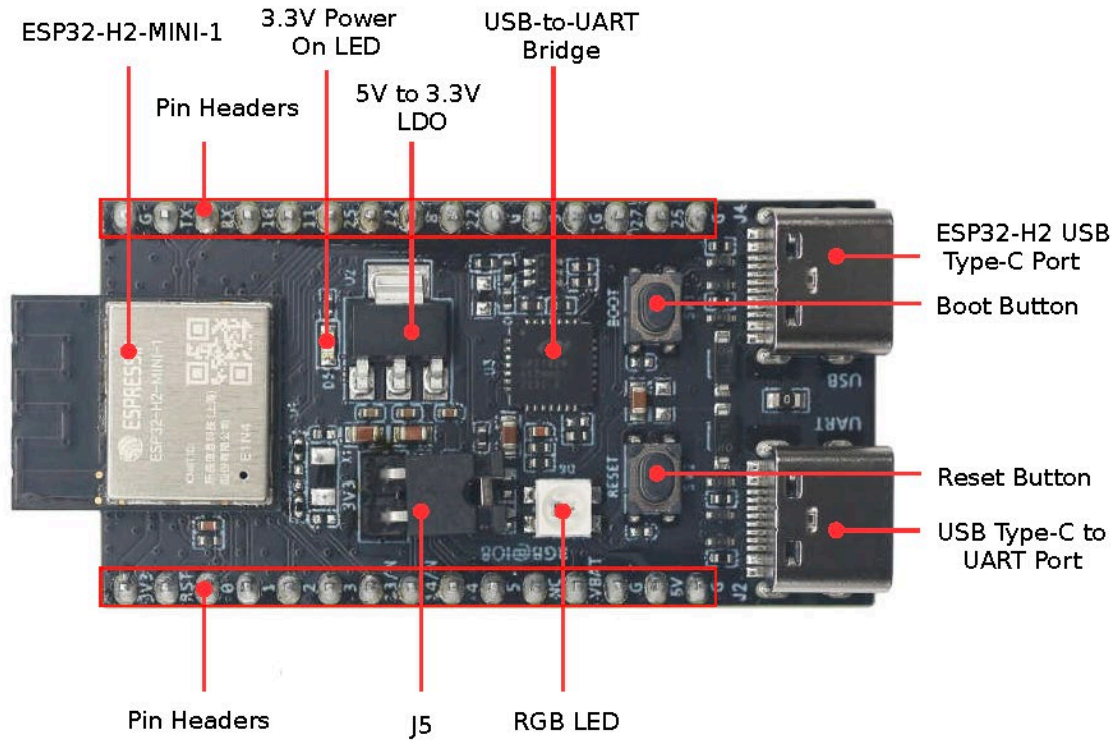


ESP32-H2-DevKitM-1 (with ESP32-H2-MINI-1 on board)

Getting Started

This section provides a brief introduction of ESP32-H2-DevKitM-1, instructions on how to do the initial hardware setup and how to flash firmware onto it.

Description of Components¶



ESP32-H2-DevKitM-1 - Front

The description of components starts from the ESP32-H2-MINI-1/1U module on the left side and then goes clockwise.

Key Component	Description
ESP32-H2-MINI-1 or ESP32-H2-MINI-1U	ESP32-H2-MINI-1/1U, with ESP32-H2 inside which integrates a 2.4 GHz transceiver compliant with Bluetooth® Low Energy and IEEE 802.15.4-based technologies, supporting Bluetooth 5 (LE), Bluetooth mesh, Thread, Matter, and Zigbee. This module is specially designed for all kinds of low-power IoT applications.
Pin Headers	All available GPIO pins (except for the SPI bus for flash) are broken out to the pin headers on the board. For details, please see Header Block.
3.3 V Power On LED	Turns on when the USB power is connected to the board.

Key Component	Description
5 V to 3.3 V LDO	Power regulator that converts a 5 V supply into a 3.3 V output.
USB-to-UART Bridge	Single USB-UART bridge chip provides transfer rates up to 3 Mbps.
ESP32-H2 USB Type-C Port	The USB Type-C port on the ESP32-H2 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).
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	Power supply for the board as well as the communication interface between a computer and the ESP32-H2 chip via USB-to-UART bridge.
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-H2-DevKitM-1, please make sure that it is in good condition with no obvious signs of damage.

Required Hardware

- ESP32-H2-DevKitM-1
- USB-A to USB-C (Type C) cable
- Computer running Windows, Linux, or macOS

Note

Some USB cables can only be used for charging, not data transmission and programming. Please choose accordingly.

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 ESP32-H2-DevKitM-1.

Contents and Packaging

Ordering Information

The development board has a variety of variants to choose from, as shown in the table below.

Ordering Code	On-board Module	Flash [A]	PSRAM	Antenna
ESP32-H2-DevKitM-1-N4	ESP32-H2-MINI-1	4 MB	0 MB	PCB on-board antenna
ESP32-H2-DevKitM-1U-N4	ESP32-H2-MINI-1U	4 MB	0 MB	External antenna connector

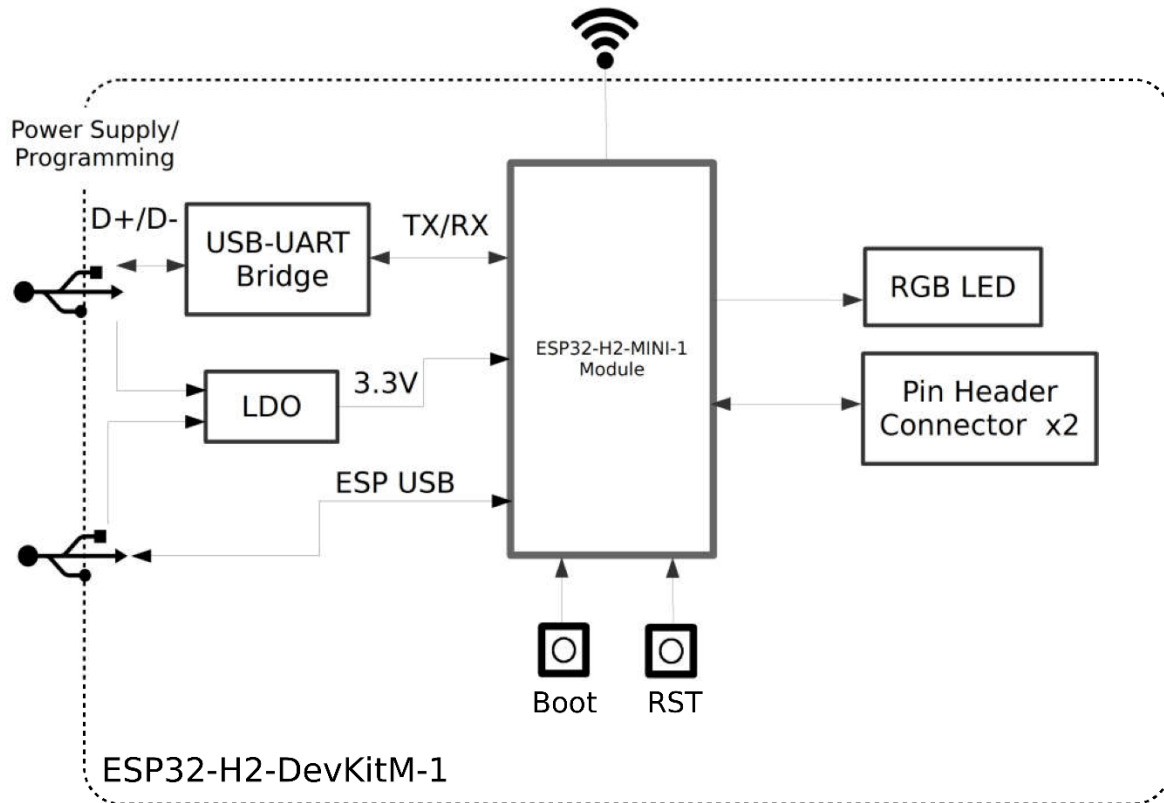
A

The flash is integrated in the chip's package.

Hardware Reference

Block Diagram

The block diagram below shows the components of ESP32-H2-DevKitM-1 and their interconnections.



ESP32-H2-DevKitM-1

Power Supply Options

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

- USB Type-C to UART port, default power supply
- 5V and GND pin headers
- 3V3 and GND pin headers

Current Measurement

The J5 headers on ESP32-H2-DevKitM-1 (see J5 in Figure ESP32-H2-DevKitM-1 - Front) can be used for measuring the current drawn by the ESP32-H2-MINI-1/1U 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 the Pin Layout. The numbering is the same as in the ESP32-H2-DevKitM-1 Schematic. (see attached PDF).

J1

No.	Name	Type 1	Function
1	3V3	P	3.3 V power supply
2	RST	I	High: enables the chip; Low: the chip powers off; connected to the internal pull-up resistor by default
3	0	I/O/T	GPIO0, FSPIQ
4	1	I/O/T	GPIO1, FSPICS0, ADC1_CH0
5	2	I/O/T	GPIO2, FSPIWP, ADC1_CH1, MTMS
6	3	I/O/T	GPIO3, FSPIHD, ADC1_CH2, MTDO
7	13/N	I/O/T	GPIO13, XTAL_32K_P 2
8	14/N	I/O/T	GPIO14, XTAL_32K_N 3
9	4	I/O/T	GPIO4, FSPICK, ADC1_CH3, MTCK

No.	Name	Type 1	Function
10	5	I/O/T	GPIO5, FSPID, ADC1_CH4, MTDI
11	NC	–	NC
12	VBAT	P	3.3 V power supply or battery
13	G	P	Ground
14	5V	P	5 V power supply
15	G	P	Ground

J3

No.	Name	Type 1	Function
1	G	P	Ground
2	TX	I/O/T	GPIO24, FSPICS2, U0TXD
3	RX	I/O/T	GPIO23, FSPICS1, U0RXD
4	10	I/O/T	GPIO10, ZCD0
5	11	I/O/T	GPIO11, ZCD1
6	25	I/O/T	GPIO25, FSPICS3
7	12	I/O/T	GPIO12
8	8	I/O/T	GPIO8 4, LOG
9	22	I/O/T	GPIO22
10	G	P	Ground
11	9	I/O/T	GPIO9, BOOT
12	G	P	Ground
13	27	I/O/T	GPIO27, FSPICS5, USB_D+
14	26	I/O/T	GPIO26, FSPICS4, USB_D-
15	G	P	Ground

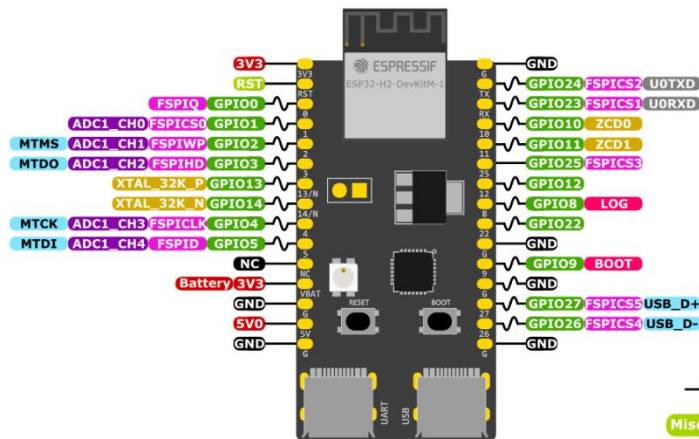
1(I,2): P: Power supply; I: Input; O: Output; T: High impedance.

2: When connected to XTAL_32K_P inside the module, this pin cannot be used for other purposes.

- 3 When connected to XTAL_32K_N inside the module, this pin cannot be used for other purpose.
- 4 Used for driving RGB LED inside the module.

Pin Layout

ESP32-H2-DevKitM-1



ESP32-H2 Specs
 32-bit RISC-V single-core @96MHz
 IEEE 802.15.4 supporting Thread and Zigbee
 Bluetooth® Low Energy supporting Bluetooth 5 and Bluetooth mesh
 128 KB SRAM, 320 KB ROM, 4 KB LP Memory, 2/4 MB Flash
 19 GPIOs, 3x SPI, 2x UART, 2x I2C, 1x I2S, RMT, LEDPWM, MCPWM, PCNT, TWAI, USB Serial/JTAG, GDMA, ETM, PARLIO, SAR ADC, Temp Sensor, Timers

- PWM Capable Pin
- Miscellaneous/Secondary Functions
- General Purpose Input and Output
- Other Related Functions
- JTAG for Debugging and/or USB
- Analog-to-Digital Converter
- Serial for Debug/Programming
- Ground Plane
- Power Rails (3V3, 5V, Battery)
- Strapping Pin Functions
- Fast SPI Functions

ESP32-H2-DevKitM-1 Pin Layout¶