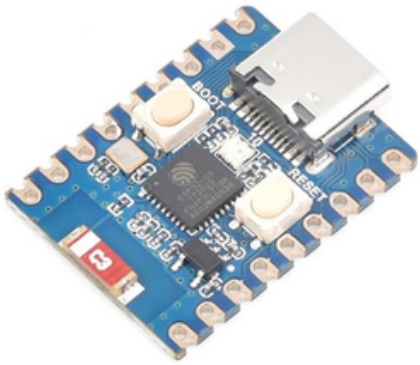


ESP32 C3 Zero

Development Board Code name: **ESP32C3_DEV**

ESP32C3 ZERO

ESP32 C3 Zero is a development board based on the **ESP32C3 microcontroller** using RISCV32 architecture.

This board features a maximum CPU frequency of 160 MHz and 4MB flash memory.

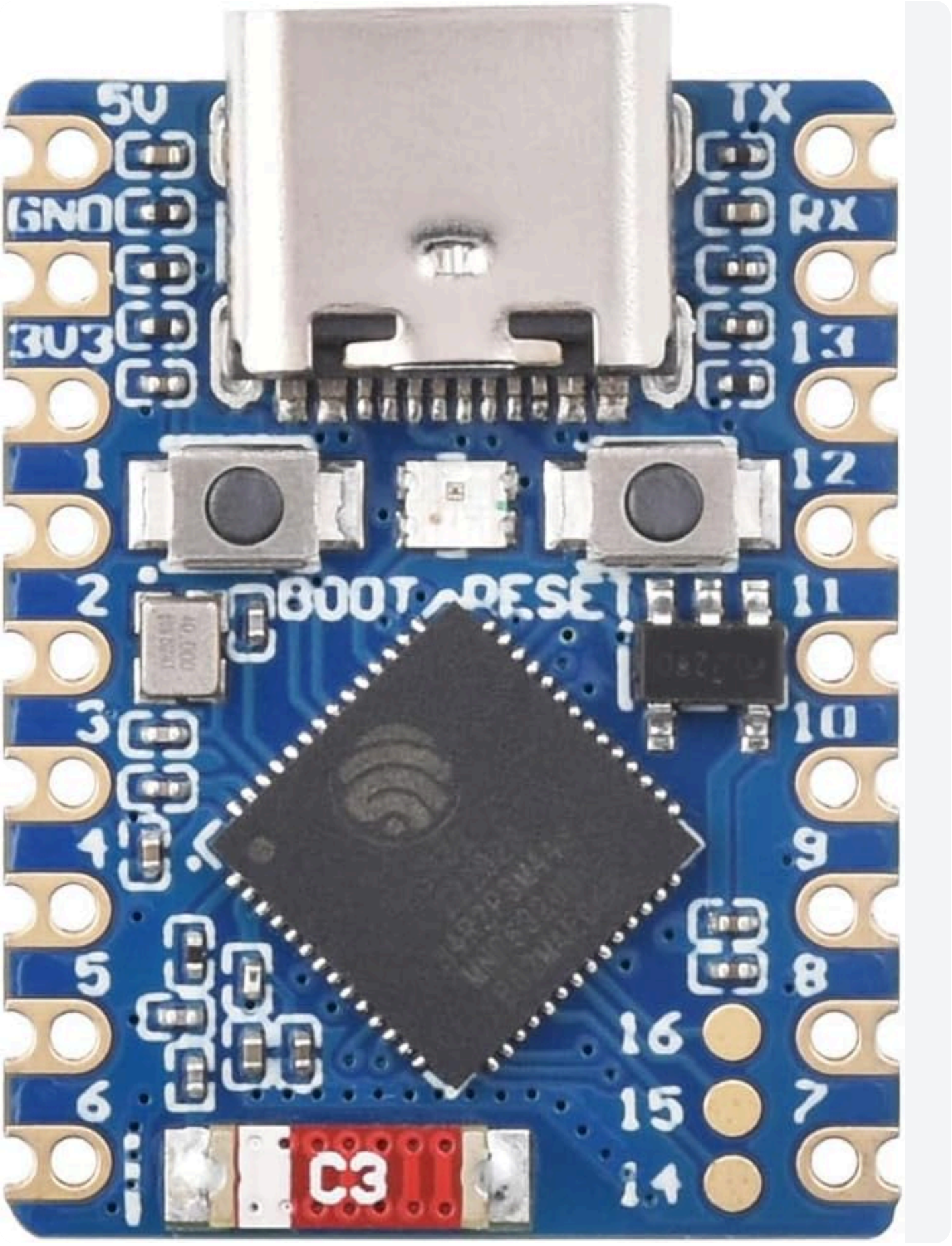
About ESP32 C3 Zero

The **ESP32-C3-Zero** is a compact development board featuring the **Espressif ESP32-C3FN4** chip. It offers **2.4GHz Wi-Fi (802.11 b/g/n)** and **Bluetooth 5 (LE)**, making it ideal for IoT projects needing reliable wireless connectivity. 📶

Its **small form factor** makes it easy to integrate into space-constrained projects, and the **onboard ceramic antenna** ensures stable wireless performance without requiring an external antenna.

For ease of use, it includes a **BOOT button** and a **RESET button**, simplifying development and debugging. 🚀

With **15 GPIO pins** and support for multiple interfaces (**SPI, I2C, UART, I2S, ADC**), the **ESP32-C3-Zero** is a flexible choice for your next embedded project!


5V
GND
3V3
1
2
3
4
5
6
TX
RX
13
12
11
10
9
8
16
15
14
7
BOOT
RESET
C3

📋 Technical Specifications

Complete technical specification details for ESP32 C3 Zero

Connectivity

WiFi	802.11 b/g/n (2.4 GHz)
Bluetooth	5.0
BLE	5.0

Microcontroller

Model	ESP32C3
Clock Speed	160 MHz
Flash Size	4MB
Architecture	RISCV32

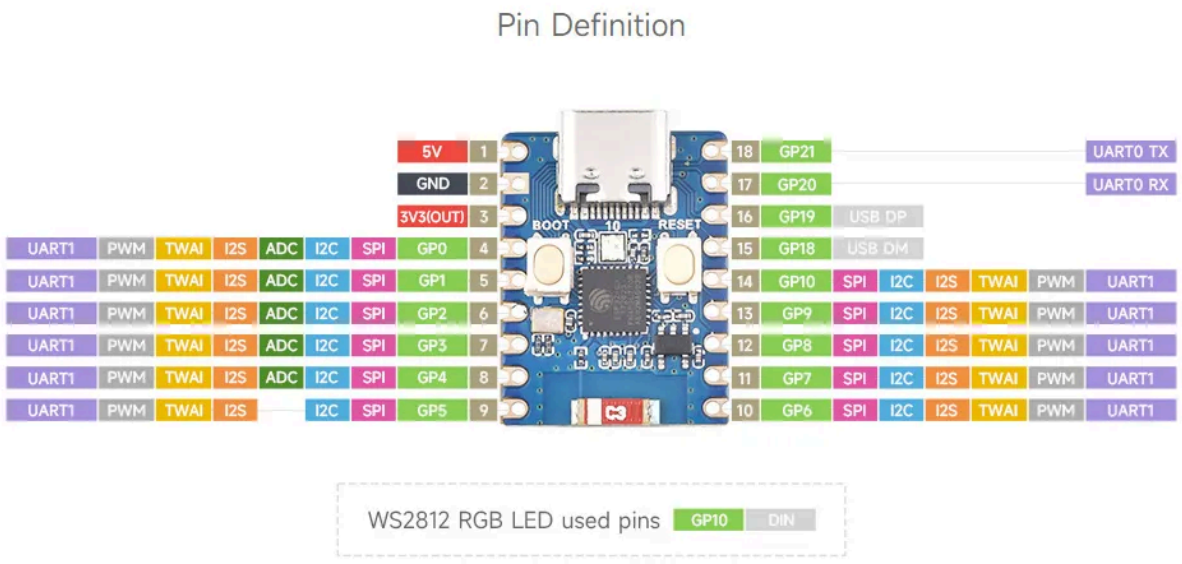
Features & Pins

Digital IO	15
Analog Input	6
PWM	15
Interrupts	22

- Ultra-compact size: 23.5 × 18 mm
- Low power consumption: deep sleep current ~43μA
- Onboard WS2812 RGB LED (GPIO8)

ESP32 C3 Zero Pinout Diagram

Complete pin reference for ESP32 C3 Zero



The **ESP32-C3-Zero** pinout is designed for maximum versatility in a compact size. Key power pins include **5V**, **3.3V**, and **GND**, ensuring stable power for various peripherals.
The board features multiple communication interfaces:
UART: RX, TX
I2C: SDA, SCL
SPI: SCK, MISO, MOSI, SS
For analog input, it provides **ADC** pins suitable for reading sensor data or voltage levels.

✅ Safe Pins to Use

These pins are safe for general GPIO usage without boot or system conflicts

IO0	IO1	IO3	IO10

💡 Why Are These Pins Safe?

✓ No boot sequence involvement

✓ No flash/PSRAM connections

✓ No USB or JTAG conflicts

✓ Freely assignable without issues

⚠️ Pins to Avoid or Use with Caution

Reserved for critical functions. Misuse may cause boot failures, programming issues, or system conflicts.

🔄 Strapping Pins

Boot behavior & flash voltage

🐛 JTAG Debugging

Low-level debugging interface

🔌 USB Pins

USB Serial/JTAG communication

💾 Flash/SPI Pins

Memory & PSRAM connections

📡 UART Serial

Debugging & firmware uploads

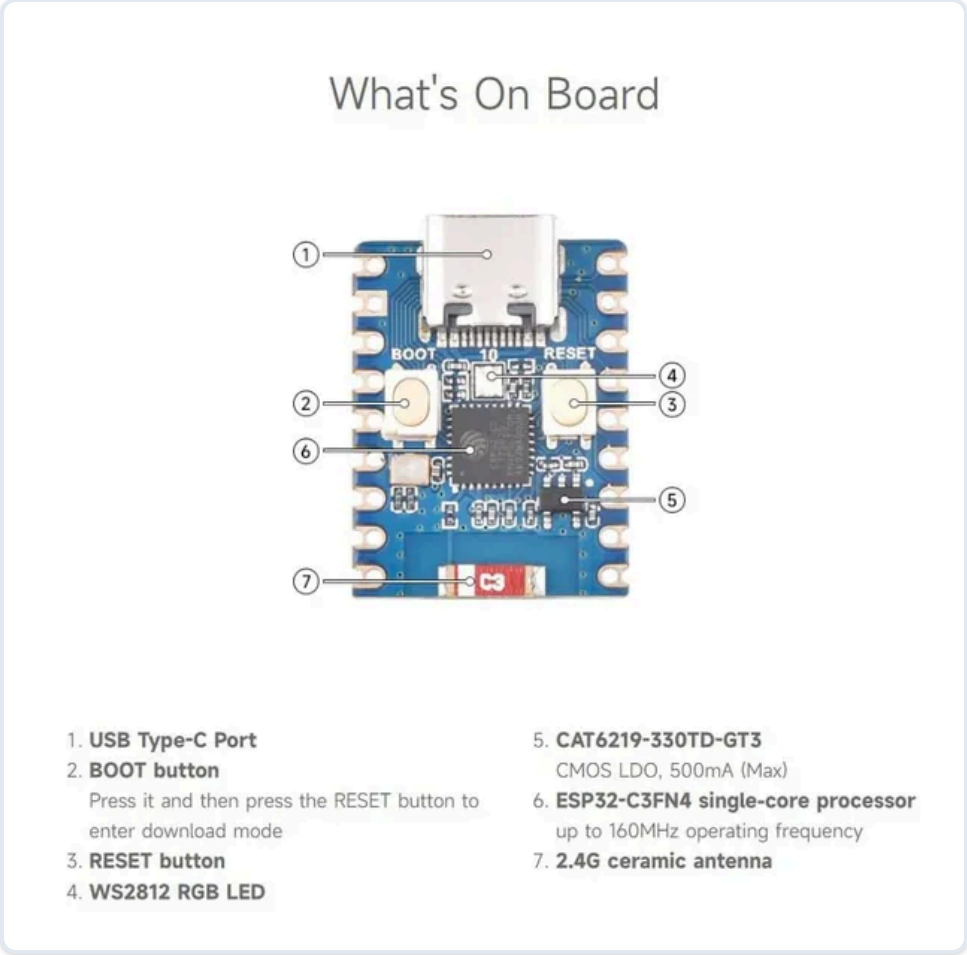
PIN	Label	Why Avoid	Type
IO2	GPIO2	Must be held high during boot (if low on reset, normal flash boot may fail)	🛠 Strapping
IO4	MTMS	Used during boot; JTAG TMS for debugging; acts as Quad-SPI flash IO (hold data line) in internal-flash variants	🔗 JTAG
IO5	MTDI	Used during boot; JTAG TDI for debugging; acts as Quad-SPI flash IO (write-protect data line) in internal-flash variants	🔗 JTAG

PIN	Label	Why Avoid	Type
IO6	MTCK	Used during boot; JTAG TCK for debugging; provides flash clock in internal-flash variants	JTAG
IO7	MTDO	Used during boot; JTAG TDO for debugging; acts as Quad-SPI flash IO (data line) in internal-flash variants	JTAG
IO8	GPIO8	Must be held high during reset (if low, UART flashing/boot may not work)	Strapping
IO9	GPIO9	Controls boot mode on reset (HIGH for normal flash boot, LOW enters serial download mode)	Strapping
IO18	USB_D-	By default connected to on-chip USB Serial/JTAG controller; to use as GPIO it must be reconfigured from its USB function	USB
IO19	USB_D+	By default connected to on-chip USB Serial/JTAG controller; not available for GPIO use unless USB functionality is disabled or remapped	USB
IO20	U0RXD	Used as UART0 receive (console/bootloader); repurposing may disable serial programming and debug logs	UART
IO21	U0TXD	Used as UART0 transmit (console/bootloader); repurposing may disable serial console output and printing	UART

Show Less

ESP32 C3 Zero Additional Information

More details about ESP32 C3 Zero



ESP32 C3 Zero Custom Pin Mapping

Pin configuration and GPIO mapping for ESP32 C3 Zero

15
Digital I/O Pins

22
Interrupt Pins

6
Analog Inputs

15
PWM Pins

Pin	Function	ESP Pin	I/O Type	Description
1	5V	5V	POWER INPUT	5V power input for the board

Pin	Function	ESP Pin	I/O Type	Description
2	GND	GND	POWER GROUND	Ground connection
3	3V3	3.3V	POWER OUTPUT	3.3V power output
4	IO0	IO0	BIDIRECTIONAL	GPIO, ADC
5	IO1	IO1	BIDIRECTIONAL	GPIO, ADC
6	IO2	IO2	BIDIRECTIONAL	GPIO, ADC
7	IO3	IO3	BIDIRECTIONAL	GPIO, ADC
8	IO4	IO4	BIDIRECTIONAL	GPIO, ADC
9	IO5	IO5	BIDIRECTIONAL	GPIO
10	IO6	IO6	BIDIRECTIONAL	GPIO
11	IO7	IO7	BIDIRECTIONAL	GPIO
12	IO8	SDA	BIDIRECTIONAL	GPIO
13	IO9	SCL	BIDIRECTIONAL	GPIO
14	IO10	RX	BIDIRECTIONAL	GPIO, LED
15	IO18	RX	BIDIRECTIONAL	USB DP
16	IO19	RX	BIDIRECTIONAL	USB DM
17	IO20	RX	BIDIRECTIONAL	GPIO, UART Receive (secondary)

Pin	Function	ESP Pin	I/O Type	Description
18	IO21	TX	BIDIRECTIONAL	GPIO, UART Transmit

LEGEND

Function Pin role

GPIO ESP32 pin

I/O Direction

Pin number

Pin Mappings

Complete pinout and GPIO mapping for ESP32 C3 Zero

15
Digital I/O Pins

22
Interrupt Pins

6
Analog Inputs

15
PWM Pins

Pin	Analog	Touch	PWM	Other
0				IO0
1				IO1
2				IO2
3				IO3
4				SCK IO4

Pin	Analog	Touch	PWM	Other
5				MISO IO5
6				MOSI IO6
7				SS IO7
8				LED_BUILTIN SDA IO8
9				SCL IO9
20				RX IO20
21				TX IO21

LEGEND

- A0 Analog input
- T0 Touch sensor
- PWM PWM capable
- RX/TX Serial pins
- LED Built-in LED
- # Pin number

Default Tools & Configuration

Build and upload settings for ESP32 C3 Zero

Setting	Value
Bootloader tool	esptool_py
Uploader tool	esptool_py

Setting	Value
Network uploader tool	esp_ota
Bootloader address	0x0
Flash mode	qio
Boot mode	qio
Maximum upload size	**1280 KB** (1310720 bytes)
Maximum data size	**320 KB** (327680 bytes)

CONFIGURATION SUMMARY

The **ESP32 C3 Zero** uses **esptool_py** for uploads , **esp_ota** for OTA updates, and **esptool_py** bootloader at `0x0` .

Flash mode: **qio** | Boot mode: **qio**

Max sketch size: **1280 KB** | Max data size: **320 KB**