

✂ Common ESP32-C6 Features Across Dev Boards

These ESP32-C6 boards are built around the **ESP32-C6 SoC**, which offers:

- **32-bit RISC-V single-core MCU**, up to ~160 MHz.
- **2.4 GHz Wi-Fi 6 (802.11ax)** with OFDMA for efficiency.
- **Bluetooth Low Energy 5.x (LE)**.
- **IEEE 802.15.4 support** for Thread/Zigbee/Matter ecosystems.

Rich peripheral support (GPIO, SPI, I2C, UART, PWM, ADC).

Feature	Specification
MCU	ESP32-C6 RISC-V Single-Core
Clock	Up to 160 MHz
Flash	Typically 8 MB (DevKitC-1-N8)
Wireless	Wi-Fi 6 (2.4 GHz), BLE, Thread/Zigbee
Interfaces	GPIO, SPI, I2C, UART, ADC, PWM
USB	USB-C (UART/Flash)
Power	3.3 V regulator onboard
Buttons	Reset & Boot/Flash

Table 3-1. Pin Definitions

Name	No.	Type ¹	Function
GND	1	P	Ground
3V3	2	P	Power supply
EN	3	I	High: on, enables the chip. Low: off, the chip powers off. Note: Do not leave the EN pin floating.
IO4	4	I/O/T	MTMS, GPIO4, LP_GPIO4, LP_UART_RXD, ADC1_CH4, FSPIHD
IO5	5	I/O/T	MTDI, GPIO5, LP_GPIO5, LP_UART_TXD, ADC1_CH5, FSPIWP
IO6	6	I/O/T	MTCK, GPIO6, LP_GPIO6, LP_I2C_SDA, ADC1_CH6, FSPICLK
IO7	7	I/O/T	MTDO, GPIO7, LP_GPIO7, LP_I2C_SCL, FSPID
IO0	8	I/O/T	GPIO0, XTAL_32K_P, LP_GPIO0, LP_UART_DTRN, ADC1_CH0
IO1	9	I/O/T	GPIO1, XTAL_32K_N, LP_GPIO1, LP_UART_DSRN, ADC1_CH1
IO8	10	I/O/T	GPIO8
IO10	11	I/O/T	GPIO10
IO11	12	I/O/T	GPIO11
IO12	13	I/O/T	GPIO12, USB_D-
IO13	14	I/O/T	GPIO13, USB_D+
IO9	15	I/O/T	GPIO9
IO18	16	I/O/T	GPIO18, SDIO_CMD, FSPICS2
IO19	17	I/O/T	GPIO19, SDIO_CLK, FSPICS3
IO20	18	I/O/T	GPIO20, SDIO_DATA0, FSPICS4
IO21	19	I/O/T	GPIO21, SDIO_DATA1, FSPICS5
IO22	20	I/O/T	GPIO22, SDIO_DATA2
IO23	21	I/O/T	GPIO23, SDIO_DATA3
NC	22	—	NC
IO15	23	I/O/T	GPIO15
RXDO	24	I/O/T	U0RXD, GPIO17, FSPICS1
TXDO	25	I/O/T	U0TXD, GPIO16, FSPICS0
IO3	26	I/O/T	GPIO3, LP_GPIO3, LP_UART_CTSN, ADC1_CH3
IO2	27	I/O/T	GPIO2, LP_GPIO2, LP_UART_RTSN, ADC1_CH2, FSPIQ
GND	28	P	Ground
EPAD	29	P	Ground

¹ P: power supply; I: input; O: output; T: high impedance.

1 Install Arduino IDE

- Use **Arduino IDE 1.8.19** (*recommended*) or **Arduino IDE 2.x**
- Download from: [arduino.cc](https://www.arduino.cc) → Software

2 Add ESP32 Board Manager URL

Open Arduino IDE

Go to:

File → Preferences

In Additional Boards Manager URLs, paste:

https://espressif.github.io/arduino-esp32/package_esp32_index.json

👉 If already something is there, **add with comma**.

Click **OK**

3 Install ESP32 Boards Package

Go to:

Tools → Board → Boards Manager

Search:

esp32

Install:

esp32 by Espressif Systems

✅ **Version:** latest stable (2.x or newer)

4 Select ESP32-C6 Board (IMPORTANT)

Go to:

Tools → Board → ESP32 Arduino

Choose one of these (depending on your board):

Your Board	Select This
ESP32-C6 DevKitC-1	ESP32C6 Dev Module
ESP32-C6 WROOM-1-N8	ESP32C6 Dev Module
ESP32-C6 Mini / Generic	ESP32C6 Dev Module

👉 Arduino IDE does **not list brand-wise boards**, only **generic SoC boards**.

5 Correct Tools Settings (Very Important)

After selecting board, set these:

Tools →

✅ **Recommended Settings**

USB CDC On Boot → Enabled

CPU Frequency → 160MHz

Flash Size → 4MB / 8MB (as per board)

Flash Mode → QIO

Flash Frequency → 80MHz

Partition Scheme → Default

Upload Speed → 921600

Port → COMx (your board)

💡 **If upload fails** → **reduce upload speed to 460800**

6 Select COM Port

Connect board with USB cable

Go to:

Tools → Port → COMx

(Windows: COM3, COM5, etc)

7 Test With Basic Code (LED Blink)

```
void setup() {  
  pinMode(8, OUTPUT); // change pin if needed  
}  
  
void loop() {  
  digitalWrite(8, HIGH);  
  delay(500);  
  digitalWrite(8, LOW);  
  delay(500);  
}
```

Click **Upload** ►

8 If Upload Stuck or Error Comes

Try this:

1. Hold **BOOT** button
2. Click **Upload**
3. Release **BOOT** when “Connecting...” appears