

ESP32-C6 Zigbee Range Extender (Router) Tutorial

This document describes how to flash and use an ESP32-C6-DevKitC-1U as a Zigbee Range Extender

(router) using Arduino and Zigbee2MQTT or ZHA.

Hardware Used

- ESP32-C6-DevKitC-1U (external antenna required)
- 2.4 GHz u.FL / IPEX antenna (2–3 dBi recommended)
- USB-C data cable
- Windows PC
- Zigbee coordinator (e.g. CC2652, Sonoff, etc.)

Step 1 – Install Arduino IDE and ESP32 Support

1. Install Arduino IDE 2.x
2. Open File → Preferences
3. Add the ESP32 board URL:
https://raw.githubusercontent.com/espressif/arduino-esp32/gh-pages/package_esp32_index.json
4. Open Boards Manager and install “esp32 by Espressif Systems”

Step 2 – Connect the ESP32-C6

Connect the board using the USB-C connector on the DevKit.

Windows Device Manager should show: USB JTAG/serial debug unit

Step 3 – Arduino Tool Settings

- Board: ESP32C6 Dev Module
- Port: COMx
- USB CDC On Boot: ENABLED
- Zigbee Mode: Zigbee ZCZR (coordinator/router)
- Partition Scheme: Zigbee ZCZR 4MB with spiffs
- Flash Size: 4MB (32Mb)
- Upload Speed: 921600 (or 460800 if needed)

Step 4 – Open Example

Open File → Examples → Zigbee → ep_range_extender

Do not modify the code.

Step 5 – Upload Firmware

Click Upload.

If it hangs on “Connecting...”:

Hold BOOT → press RESET → release RESET → release BOOT.

Step 6 – Attach Antenna (Mandatory)

The ESP32-C6-DevKitC-1U has no internal antenna.

Attach a 2.4 GHz u.FL antenna before continuing.

Step 7 – Serial Monitor (Optional)

Open Serial Monitor at 115200 baud.

You should see “Connecting to network” messages.

Step 8 – Pair with Zigbee Network

Enable Permit Join in Zigbee2MQTT or ZHA.

Press RESET on the ESP32-C6.

The device will join as a Zigbee Router.

Step 9 – Verify

In Zigbee2MQTT the device appears as:

- Type: Router
- Model: ZigbeeRangeExtender
- Manufacturer: Espressif

Factory Reset

Hold BOOT for more than 3 seconds to reset Zigbee and rejoin another network.

Result

You now have a stable Zigbee Range Extender based on the ESP32-C6.