DORHEA ESP32-C6-DevKitM-1

DORHEA ESP32-C6-DevKitM-1 Development Board User Manual

MODEL: ESP32-C6-DEVKITM-1

1. Introduction

This manual provides essential information for setting up and operating the DORHEA ESP32-C6-DevKitM-1 development board. The board integrates the ESP32-C6-WROOM-1 module, offering comprehensive Wi-Fi 6, Bluetooth 5, and IEEE 802.15.4 (Zigbee 3.0 and Thread 1.3) connectivity for Internet of Things (IoT) applications.

2. Product Features

- Integrated ESP32-C6-WROOM-1 module with 16 MB SPI flash.

- Supports 2.4 GHz Wi-Fi 6, Bluetooth 5, and IEEE 802.15.4 (Zigbee 3.0, Thread 1.3).

- Onboard PCB antenna for reliable wireless communication.

- Dual USB Type-C interfaces: one for ESP32-C6 native USB (USB 2.0 full-speed mode up to 12 Mbps) and another for USB-to-UART bridge.

- All available GPIO pins (except SPI bus of flash) are exposed via pin headers for easy peripheral connection.

- Onboard 5V to 3.3V LDO for stable power supply.

- Includes Boot and Reset buttons for firmware management.

- Addressable RGB LED driven by GPIO8.

3. Board Components Overview

The ESP32-C6-DevKitM-1 board features several key components for its operation and interaction:
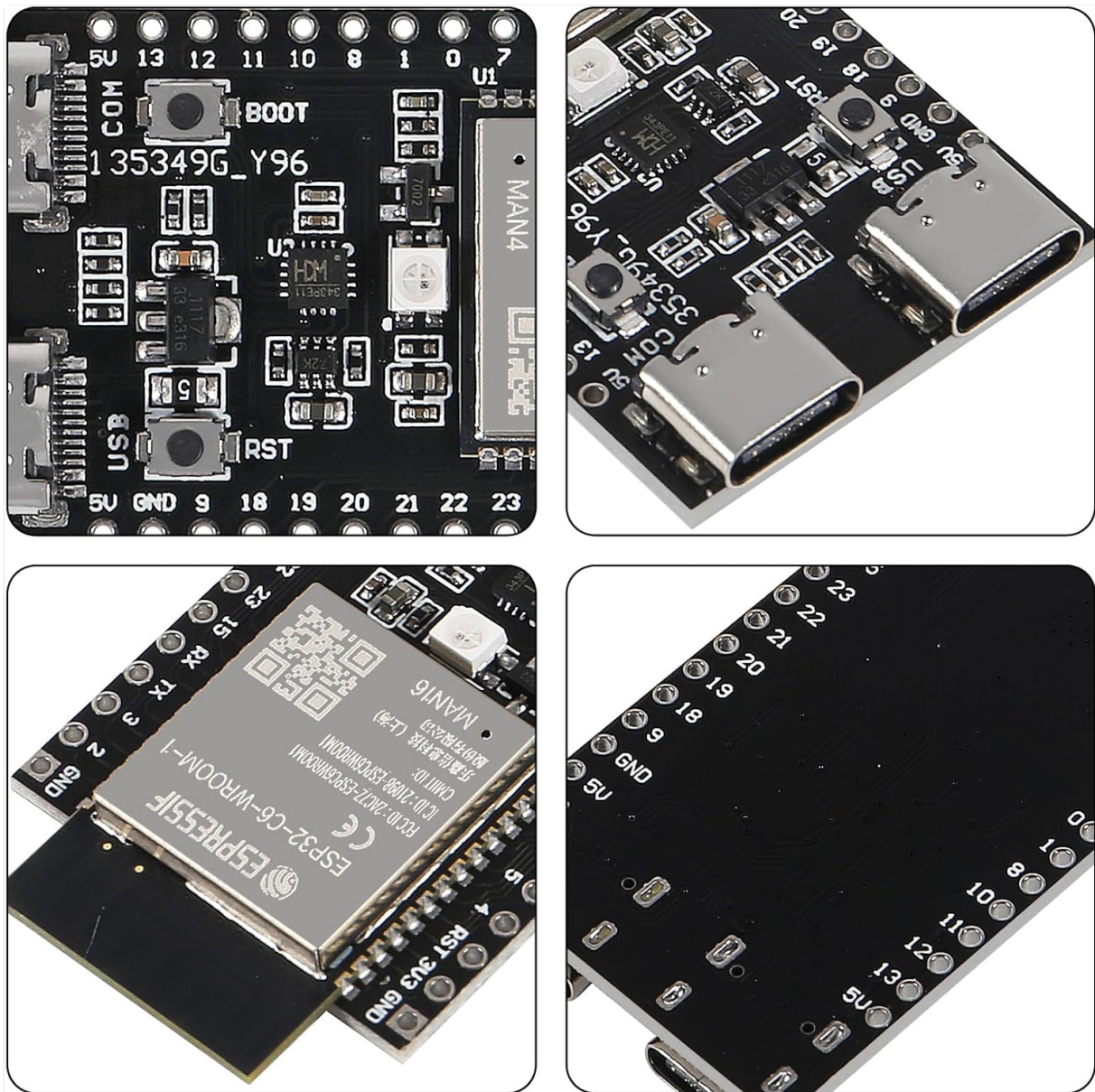
Figure 1: Detailed view of the board's USB-C ports, Boot and Reset buttons, and power components.

- **ESP32-C6 USB Type-C Port:** Supports USB 2.0 full-speed mode (up to 12 Mbps). Used for power supply, firmware burning, USB protocol communication, and JTAG debugging.

- **USB Type-C to UART Port:** Functions as a power supply interface, firmware burning interface, and communication interface via the onboard USB-to-UART bridge.

- **Boot Button:** Used to enter firmware download mode. Press and hold this button, then press the Reset button to activate.

- **Reset Button:** Resets the ESP32-C6 chip.

- **5V to 3.3V LDO:** Converts 5V input to a stable 3.3V for the board's components.

- **3.3V Power On LED:** Illuminates when the board receives power via USB.

- **USB-to-UART Bridge:** A single-chip solution providing serial communication up to 3Mbps.

- **RGB LED:** An addressable RGB LED connected to GPIO8.

- **Pin Headers:** All available GPIO pins are broken out to pin headers on both sides of the board for external connections.
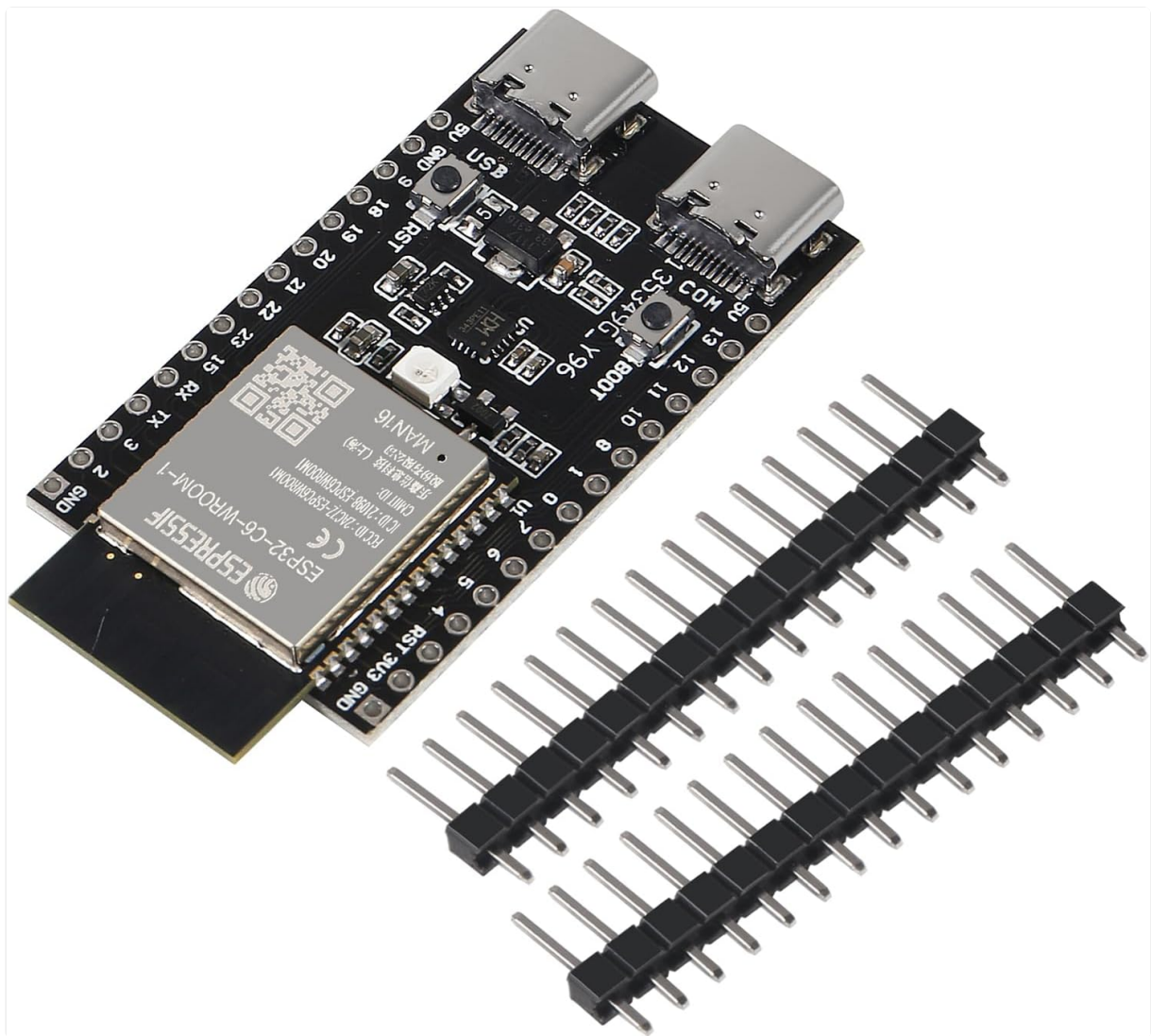
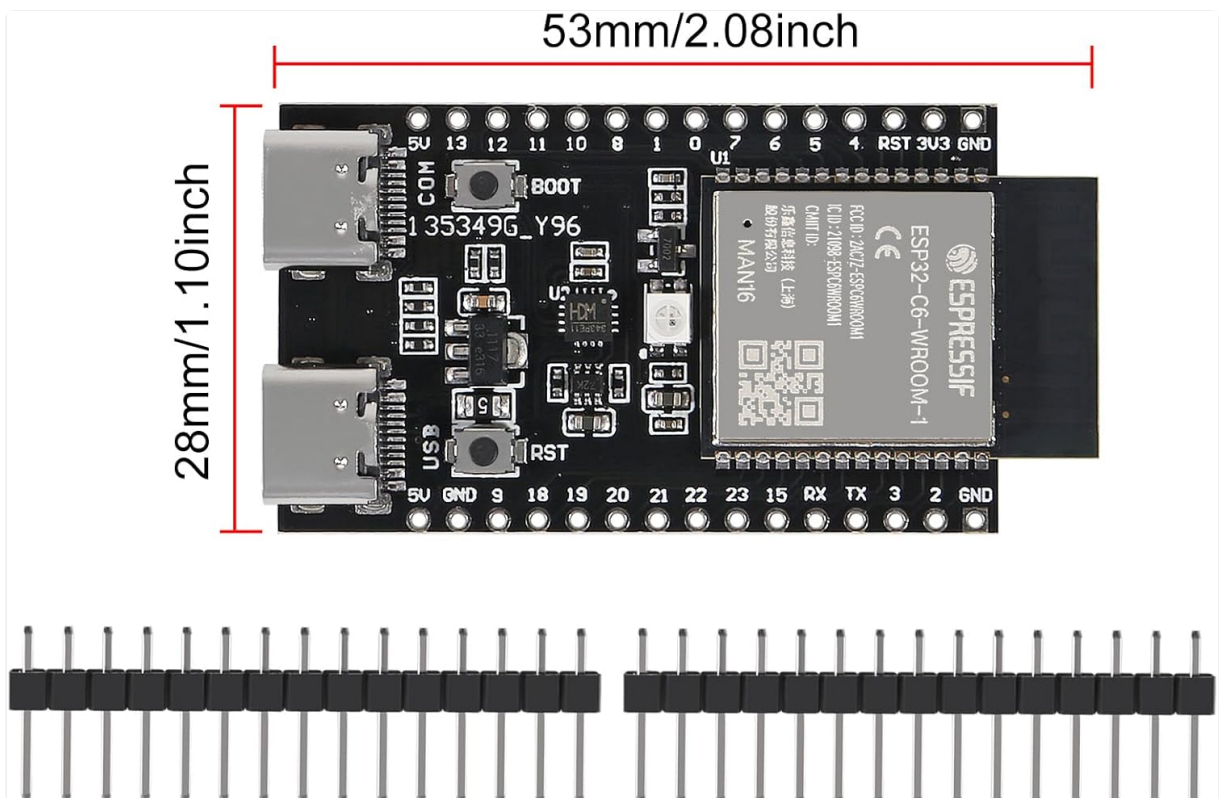**Figure 2:** Close-up of the ESP32-C6-WROOM-1 module.

Figure 3: Board dimensions (53mm x 28mm).

4. Setup

4.1 Power Supply Options

The ESP32-C6-DevKitM-1 can be powered using one or more of the following methods:

1. **USB Type-C to UART Interface or ESP32-C6 USB Type-C Interface:** Connect a USB Type-C cable to either of these ports. This is the recommended and default power supply method.

2. **5V and GND Pin Headers:** Provide a 5V power supply directly to the designated 5V and GND pins.

3. **3.3V and GND Pin Headers:** Provide a 3.3V power supply directly to the designated 3.3V and GND pins.

4.2 Connecting to a Computer

To connect the development board to your computer for programming and communication, use a high-quality USB Type-C data cable. Ensure the cable supports data transmission, not just charging.
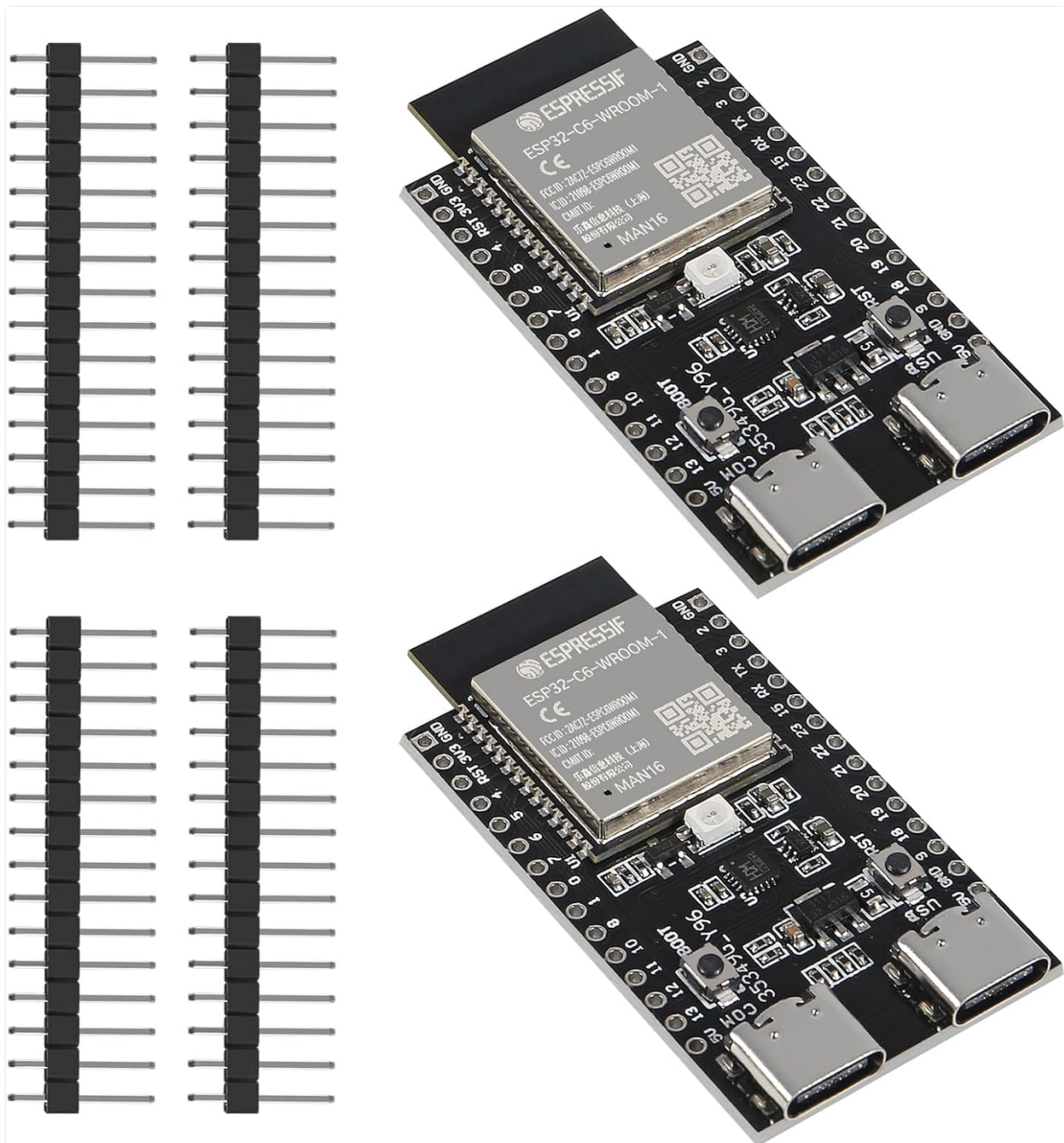

Figure 4: Two ESP32-C6-DevKitM-1 boards with pin headers.

5. Operating Instructions

5.1 Firmware Download Mode

To upload new firmware to the ESP32-C6 chip:

1. Press and hold the **Boot** button.
2. While holding the Boot button, briefly press the **Reset** button.
3. Release the Boot button. The board is now in "firmware download" mode, and you can use your preferred development environment (e.g., ESP-IDF, Arduino IDE) to flash new firmware via the serial port.

5.2 Communication

The USB Type-C to UART interface allows communication with the ESP32-C6 chip through the onboard USB-to-UART bridge. This is typically used for serial debugging output and command input from a host computer.

5.3 RGB LED Control

The onboard RGB LED is addressable and controlled via GPIO8. Refer to the ESP-IDF or Arduino documentation for controlling addressable LEDs to integrate this feature into your projects.

6. Specifications

Feature	Detail
Model Name	ESP32-C6-DevKitM-1
Module	ESP32-C6-WROOM-1
Memory Storage Capacity	16 MB SPI Flash
Connectivity Technology	Wi-Fi 6, Bluetooth 5, IEEE 802.15.4 (Zigbee 3.0, Thread 1.3), USB 2.0
Operating System	FreeRTOS (typically used with ESP-IDF)
Manufacturer	DORHEA
Item Weight	0.32 ounces
Package Dimensions	0.9 x 0.6 x 0.2 inches

7. Troubleshooting

- **Board not recognized or failing to program:** Ensure you are using a high-quality USB data cable that supports data transfer, not just charging. Some cables are charge-only.
- **Measuring module current with 3.3V power supply:** When powering the board via the 3.3V and GND pin headers, you must remove the J5 jumper and connect an ammeter in series with the external circuit to accurately measure the module's current consumption.
- **Difficulty finding documentation:** For specific pinout details or advanced usage, searching for "nanoesp32-c6" online may yield relevant community-contributed documentation or discussions.

- **Power-on LED behavior:** The 3.3V Power On LED should light up when the board is connected to a USB power supply. If it does not, verify the power connection and cable integrity.

8. Maintenance

The ESP32-C6-DevKitM-1 development board requires minimal maintenance. Keep the board clean and free from dust and moisture. Avoid exposing it to extreme temperatures or static electricity. When not in use, store it in an anti-static bag.

9. Warranty and Support

Specific warranty information for this product is not provided in the available documentation. For warranty claims, technical support, or further inquiries, please contact DORHEA directly through their official channels or the retailer from whom the product was purchased.