YEJMKJ ESP32-S3-DevKitC-1-N16R8

YEJMKJ ESP32-S3-DevKitC-1-N16R8 Development Board User Manual

Model: ESP32-S3-DevKitC-1-N16R8

1. Introduction

This manual provides essential information for setting up, operating, and maintaining your YEJMKJ ESP32-S3-DevKitC-1-N16R8 Development Board. This board is designed for embedded system development, integrating Wi-Fi and Bluetooth capabilities for a wide range of applications.
The ESP32-S3-DevKitC-1-N16R8 is a powerful microcontroller unit (MCU) module equipped with an ESP32-S3 chip, offering enhanced processing capabilities for complex tasks. Its user-friendly design, compact size, and compatibility with popular development tools make it suitable for both beginners and experienced developers.

2. Key Features

- **Powerful Performance:** Equipped with an ESP32-S3 chip for enhanced processing capabilities.
- **Seamless Connectivity:** Built-in Wi-Fi and Bluetooth 5 for effortless device connection and control.
- **User-Friendly Design:** Compact size, easy-to-use interface, and compatibility with popular development tools.
- **Dual Type-C Ports:** Provides versatile connectivity for data communication, power supply, and firmware debugging/uploading.

3. Board Components Overview

The following diagram illustrates the key components of the ESP32-S3-DevKitC-1-N16R8 development board:

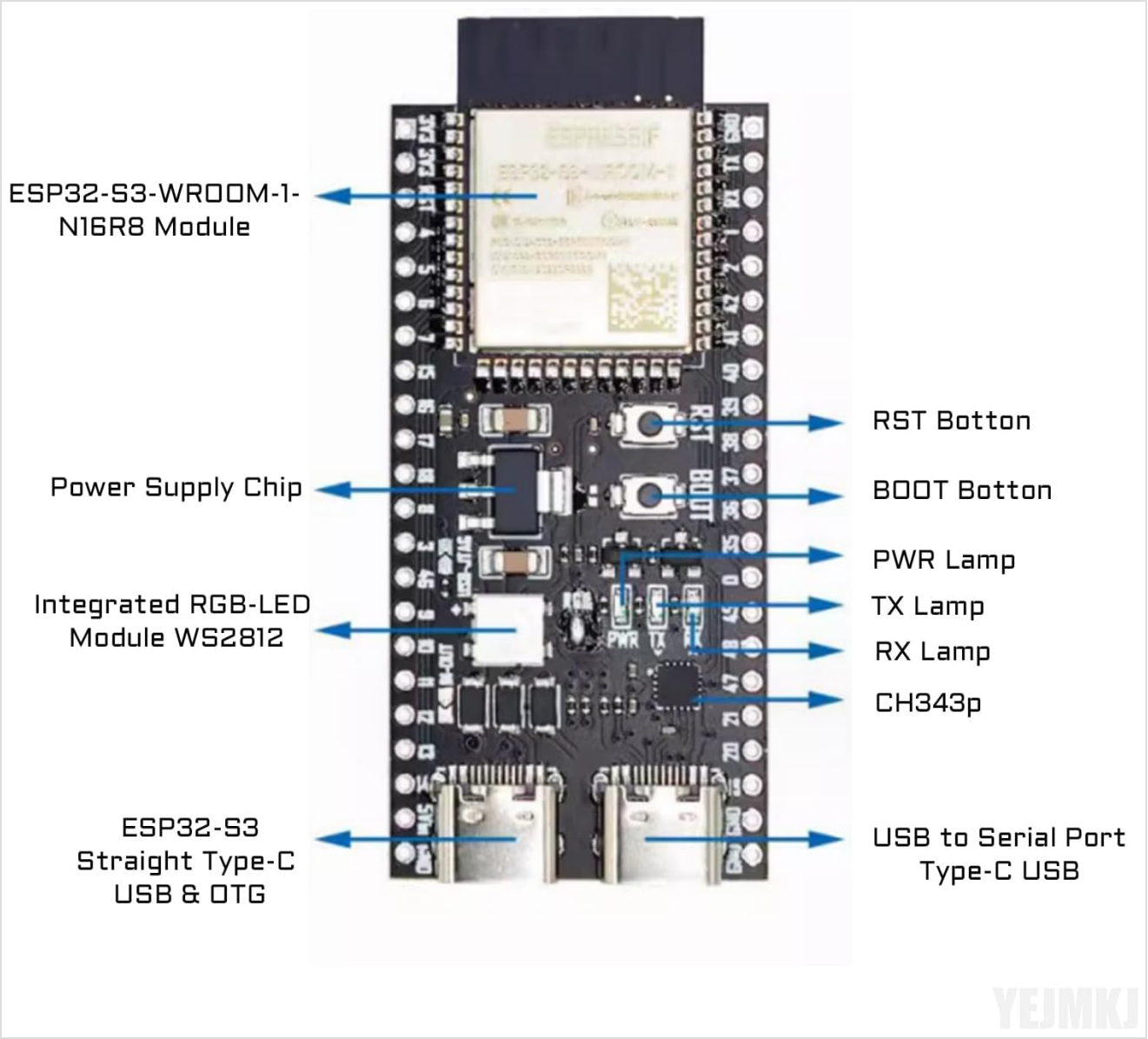

Figure 1: Labeled components of the ESP32-S3-DevKitC-1-N16R8 board.

- **ESP32-S3-WROOM-1-N16R8 Module:** The core module containing the ESP32-S3 chip, Wi-Fi, and Bluetooth functionalities.
- **Power Supply Chip:** Regulates the power supplied to the board.
- **Integrated RGB-LED Module WS2812:** A programmable RGB LED for visual feedback and projects.
- **ESP32-S3 Straight Type-C USB & OTG:** One of two Type-C ports, supporting USB On-The-Go functionality.
- **USB to Serial Port Type-C USB:** The second Type-C port, primarily used for serial communication and firmware uploading.
- **RST Button:** Reset button to restart the ESP32-S3 module.
- **BOOT Button:** Boot button, typically used in conjunction with the RST button to enter firmware upload mode.
- **PWR Lamp:** Power indicator LED.
- **TX Lamp:** Transmit data indicator LED for serial communication.
- **RX Lamp:** Receive data indicator LED for serial communication.
- **CH343p:** USB-to-serial converter chip.

4. Pinout Diagram

Understanding the pinout is crucial for connecting peripherals and developing applications. The board features

various GPIO pins, power pins, and communication interfaces.

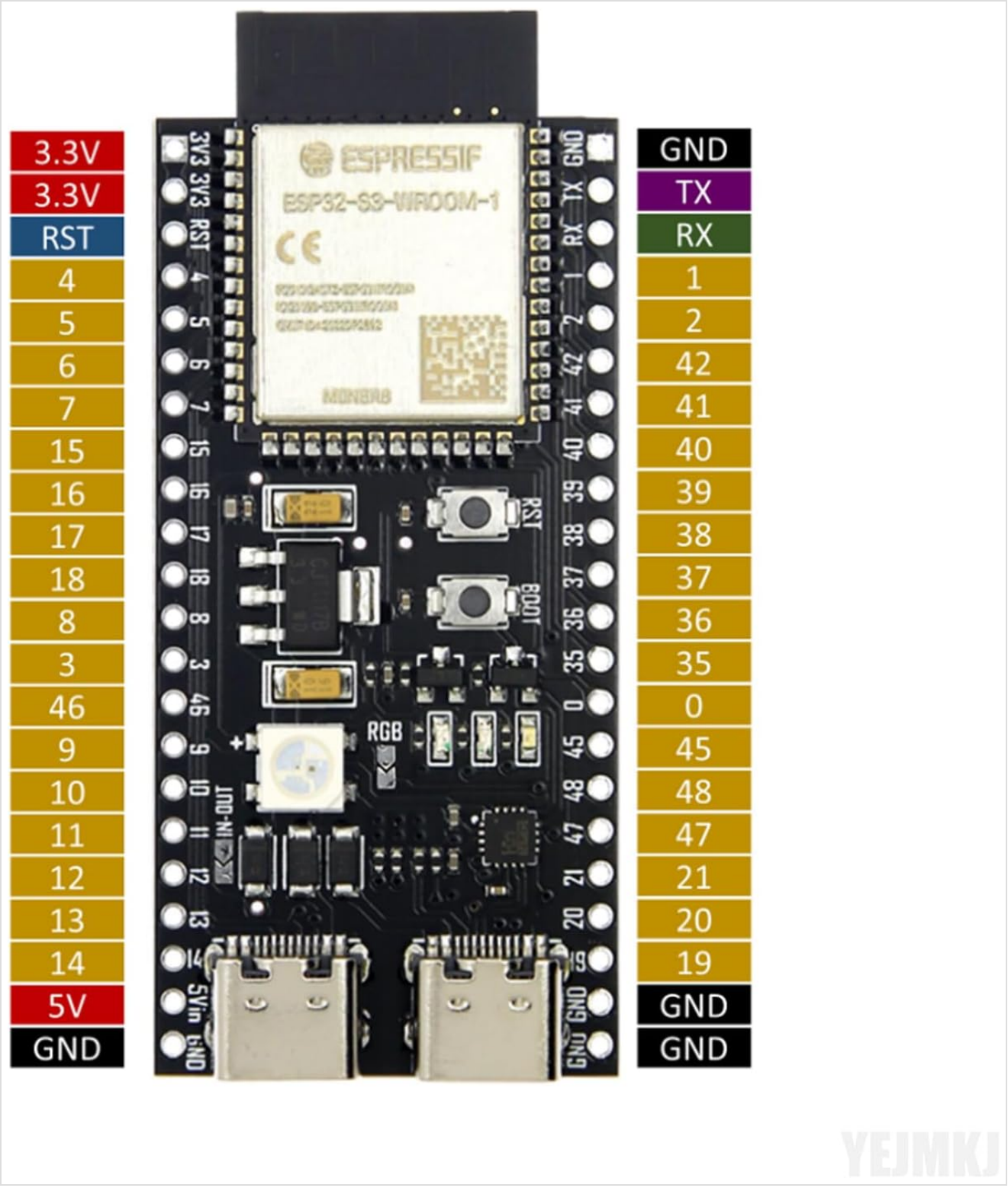

Figure 2: Pinout of the ESP32-S3-DevKitC-1-N16R8 board.

Key pin categories include:

- **Power Pins:** 3.3V, 5V, and GND (Ground) for power supply and common ground connections.
- **GPIO Pins:** General Purpose Input/Output pins (e.g., 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 35, 36, 37, 38, 39, 40, 41, 42, 45, 46, 47, 48) for digital and analog I/O.
- **Communication Pins:** TX (Transmit) and RX (Receive) for serial communication.
- **Control Pins:** RST (Reset) for hardware reset.

5. Technical Specifications

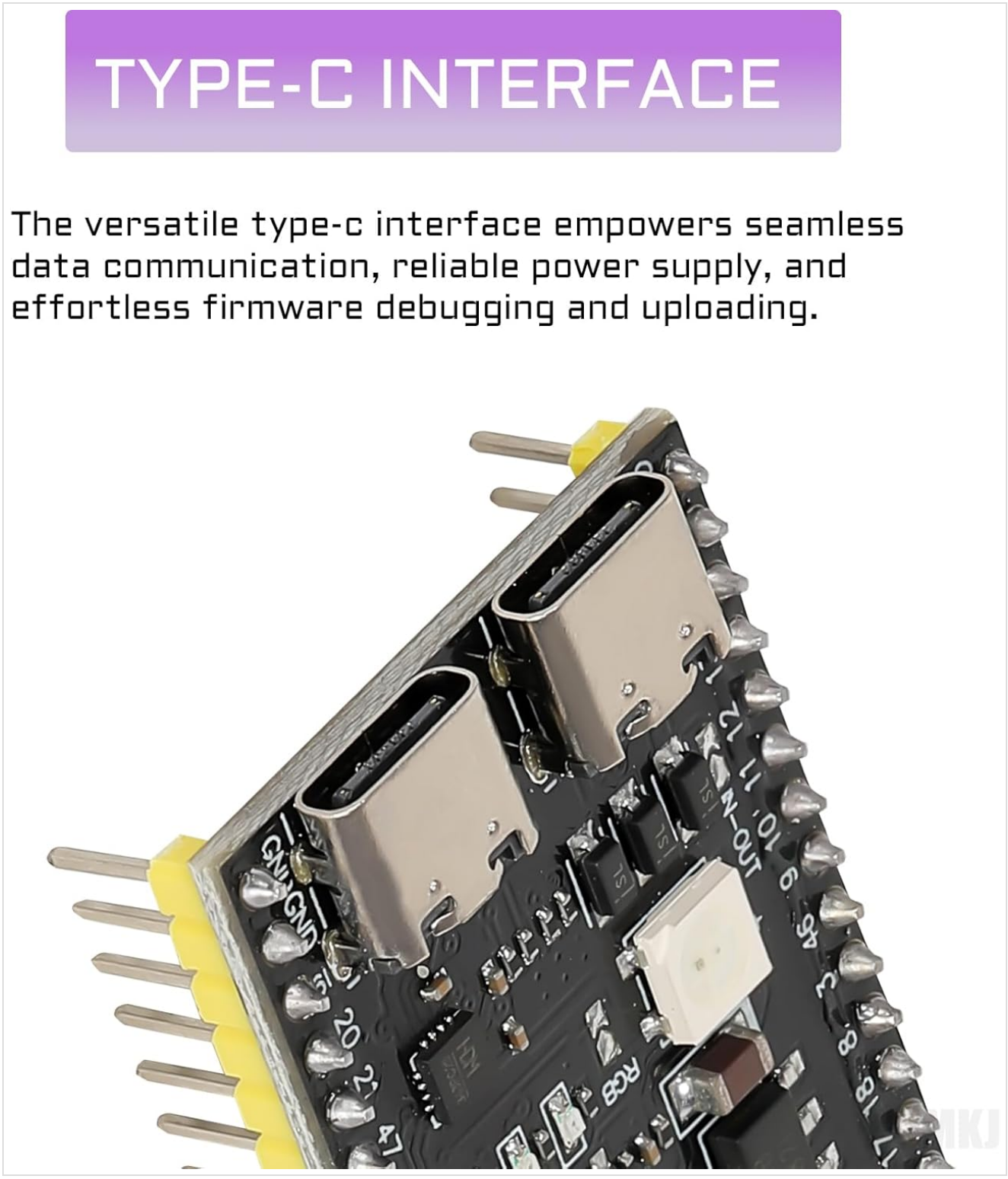

Figure 3: Detail of the Type-C interface.

Specification	Value
Processor	Espressif ESP32-S3, Dual-core 240 MHz
Wireless Connectivity	Wi-Fi (2.4 GHz), Bluetooth 5 (BLE)
RAM	LPDDR3 or LPDDR4 (specific configuration may vary)
Flash Memory	16 MB

Specification	Value
Operating System Support	FreeRTOS
USB Interface	Dual Type-C (USB to Serial, USB OTG)
Dimensions (LxWxH)	2.56 x 1.18 x 0.78 inches (65 x 30 x 20 mm)
Item Weight	1.13 ounces (32 grams)

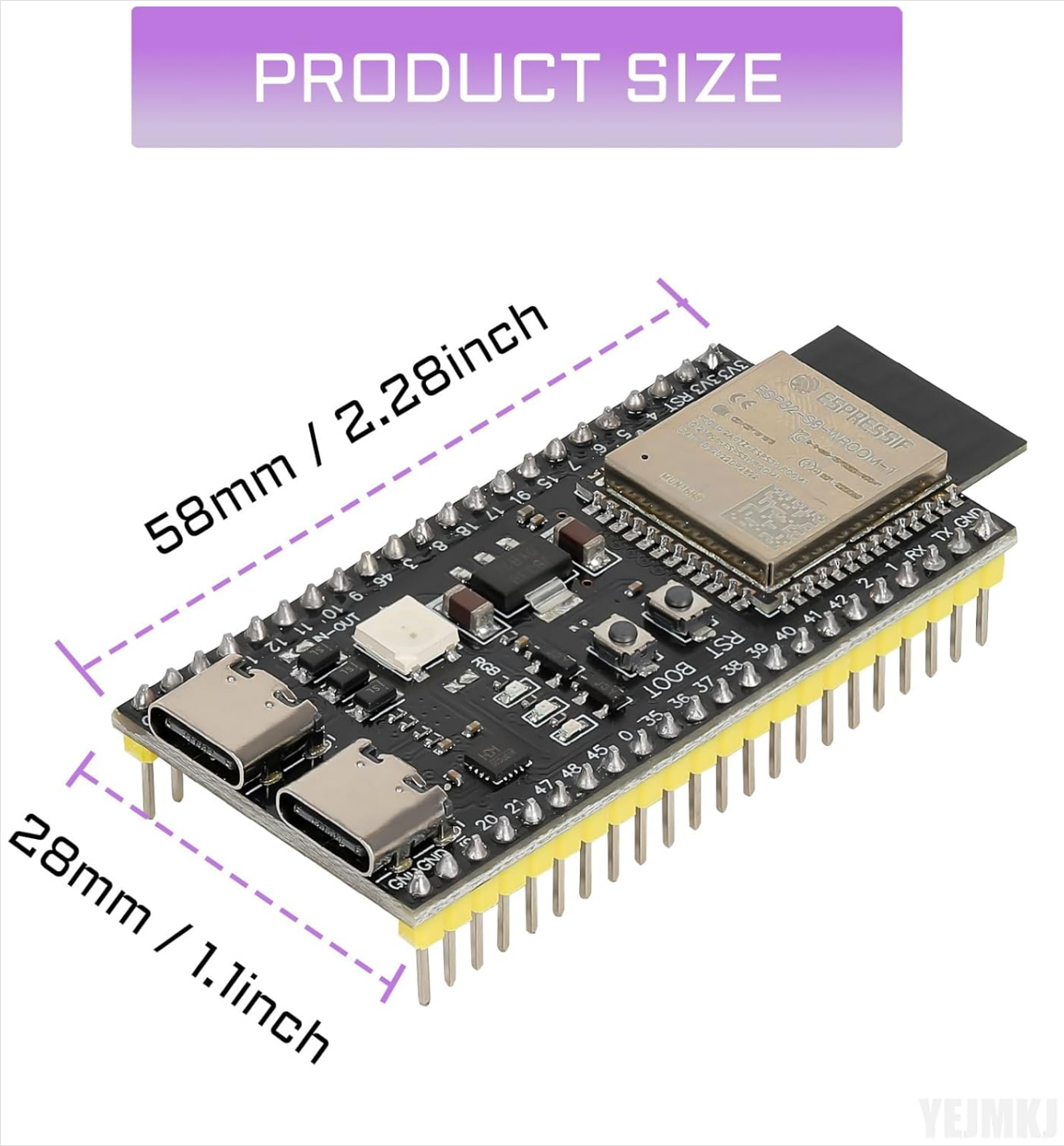

Figure 4: Product dimensions.

6. Setup Instructions

To begin using your ESP32-S3-DevKitC-1-N16R8 board, follow these general steps:

1. **Connect the Board:** Use a high-quality USB Type-C data cable to connect the board to your computer. Ensure you are using the USB to Serial Port Type-C for programming.
2. **Install USB Drivers:** The board uses a CH343p USB-to-serial converter. You may need to install the appropriate drivers for your operating system. These drivers are typically available from the CH343p manufacturer's website or through common driver packages for development boards.
3. **Install Development Environment:**
    - **Arduino IDE:** Download and install the Arduino IDE (version 2.x or later is recommended). Then, add the ESP32 board support package through the Boards Manager. Refer to Espressif's official documentation for detailed instructions on setting up the ESP32-S3 in the Arduino IDE.
    - **ESP-IDF:** For more advanced development, install the Espressif IoT Development Framework (ESP-IDF). Follow the official ESP-IDF Getting Started Guide for your operating system.
4. **Select Board and Port:** In your chosen IDE, select the correct board model (e.g., "ESP32S3 Dev Module") and the serial port corresponding to your connected board.

7. Operating the Board

Once your development environment is set up, you can upload and run code on your ESP32-S3 board.

1. **Write or Load Code:** Open an example sketch or write your own code in the Arduino IDE or ESP-IDF.
2. **Compile and Upload:** Compile your code. To upload, you may need to press and hold the **BOOT** button, then briefly press and release the **RST** button, and finally release the **BOOT** button to put the board into download mode. Some IDEs and configurations might automatically handle this.
3. **Monitor Serial Output:** Use the Serial Monitor in your IDE to view output from your program and debug.

8. Maintenance and Care

To ensure the longevity and proper functioning of your development board, observe the following:

- **Handle with Care:** Avoid dropping the board or subjecting it to excessive physical stress.
- **Static Electricity:** Take precautions against electrostatic discharge (ESD) when handling the board.
- **Power Supply:** Use a stable 5V power supply. Avoid over-voltage or reverse polarity connections.
- **Storage:** Store the board in a dry, cool environment, away from direct sunlight and moisture.
- **Cleaning:** If necessary, gently clean the board with a soft, dry brush or compressed air. Avoid using liquids.

9. Troubleshooting

Here are solutions to common issues you might encounter:

- **Board Not Detected / Upload Fails:**
    - Ensure you are using a USB Type-C **data cable**, not just a charging cable.
    - Try flipping the USB-C connector on both ends.
    - Verify that the correct USB drivers (CH343p) are installed and the serial port is selected in your IDE.
    - Confirm the board is in download mode (press BOOT, then RST, release RST, then release BOOT).
- **No Documentation Found:**
    - Refer to the official Espressif documentation for the ESP32-S3 series, which provides comprehensive technical details and programming guides.

    - Community forums and online resources for ESP32 development are also valuable.

- **PSRAM Not Available or Enabled:**
    - Even if the module is marked N16R8 (indicating 8MB PSRAM), ensure that PSRAM is explicitly enabled in your development environment's board settings (e.g., Arduino IDE's 'PSRAM' option).
    - Verify your partition scheme supports PSRAM usage.
- **RGB LED Not Working:**
    - The integrated RGB LED (WS2812) is typically connected to GPIO 48. Ensure your code addresses this GPIO pin.
    - Some boards may require bridging specific pads near the RGB LED for it to function correctly. Consult community resources or the manufacturer for specific details if needed.
- **Unexpected Resets on GPIO 31/33:**
    - Certain GPIO pins might be internally connected or have specific functions that can cause resets if improperly used. Avoid probing or using GPIO 31 and 33 without understanding their potential internal connections or conflicts.

10. Warranty and Support

YEJMKJ is committed to providing high-quality products and customer satisfaction. For any inquiries, technical support, or concerns regarding your ESP32-S3-DevKitC-1-N16R8 Development Board, please contact our customer service team. We are available to provide assistance and support.