Diymore AM03UK-GXFB0473-AAG

Diymore ESP32 S3 DevKitC 1 N16R8 Development Board User Manual

Model: AM03UK-GXFB0473-AAG

1. Introduction

This manual provides essential information for the setup, operation, and maintenance of your Diymore ESP32 S3 DevKitC 1 N16R8 Development Board with Expansion Board Kit. This powerful microcontroller unit (MCU) is designed for Internet of Things (IoT) applications, offering integrated Wi-Fi and Bluetooth 5.0 (LE) connectivity. Please read this manual thoroughly before using the product to ensure proper functionality and safety.

2. Product Overview

The Diymore ESP32 S3 DevKitC 1 N16R8 is a versatile development board featuring the ESP32-S3-WROOM-1 module. It comes with an expansion board designed to simplify connections to various peripherals and components, making it ideal for prototyping and educational projects.

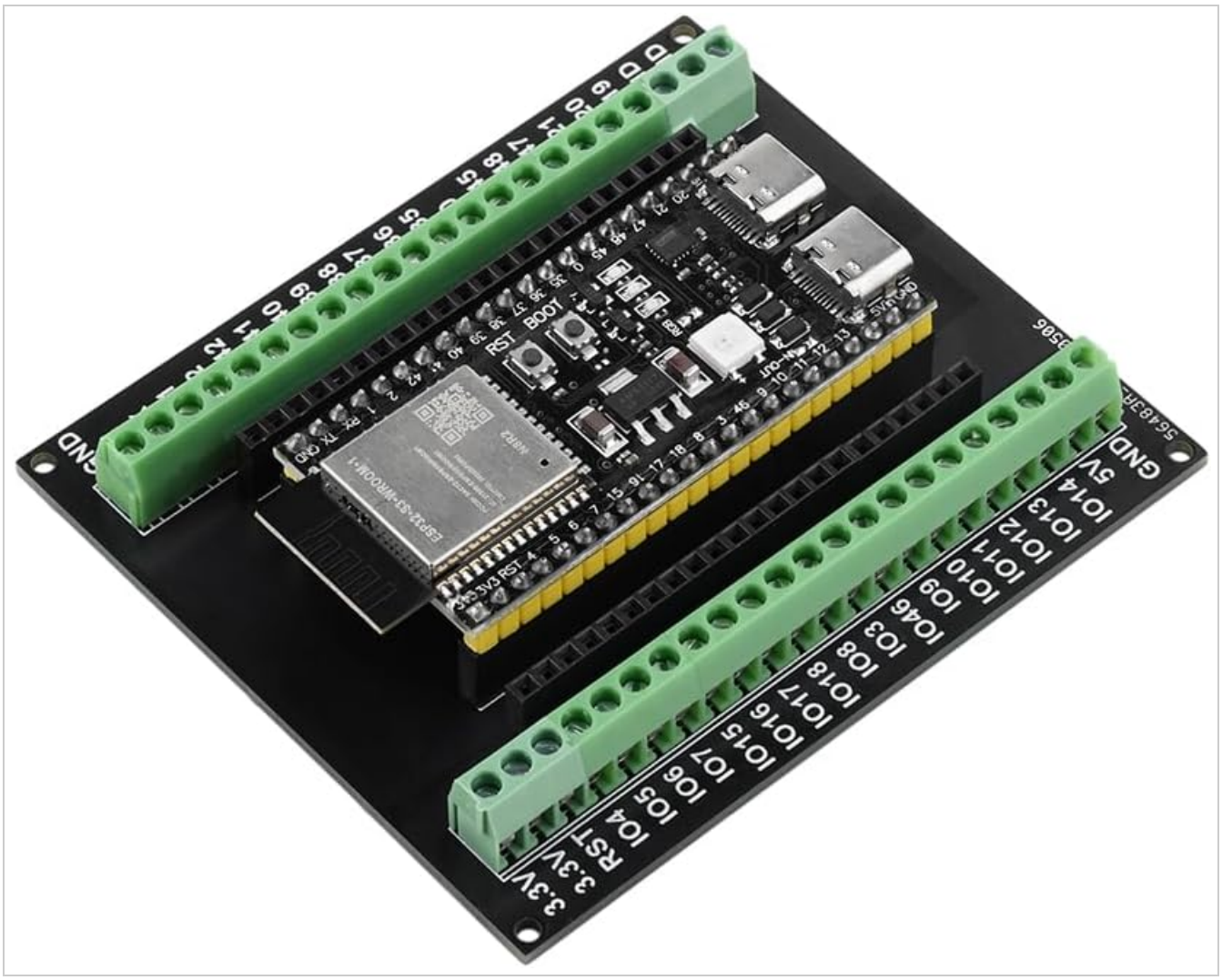

Figure 2.1: Diymore ESP32 S3 DevKitC 1 N16R8 Development Board mounted on the expansion board.

The kit includes the ESP32-S3 module, which integrates 2.4 GHz Wi-Fi (802.11b/g/n) and supports 40 MHz bandwidth, along with Bluetooth 5 (LE) and Bluetooth Mesh. The expansion board provides easy access to the module's extensive I/O interfaces.

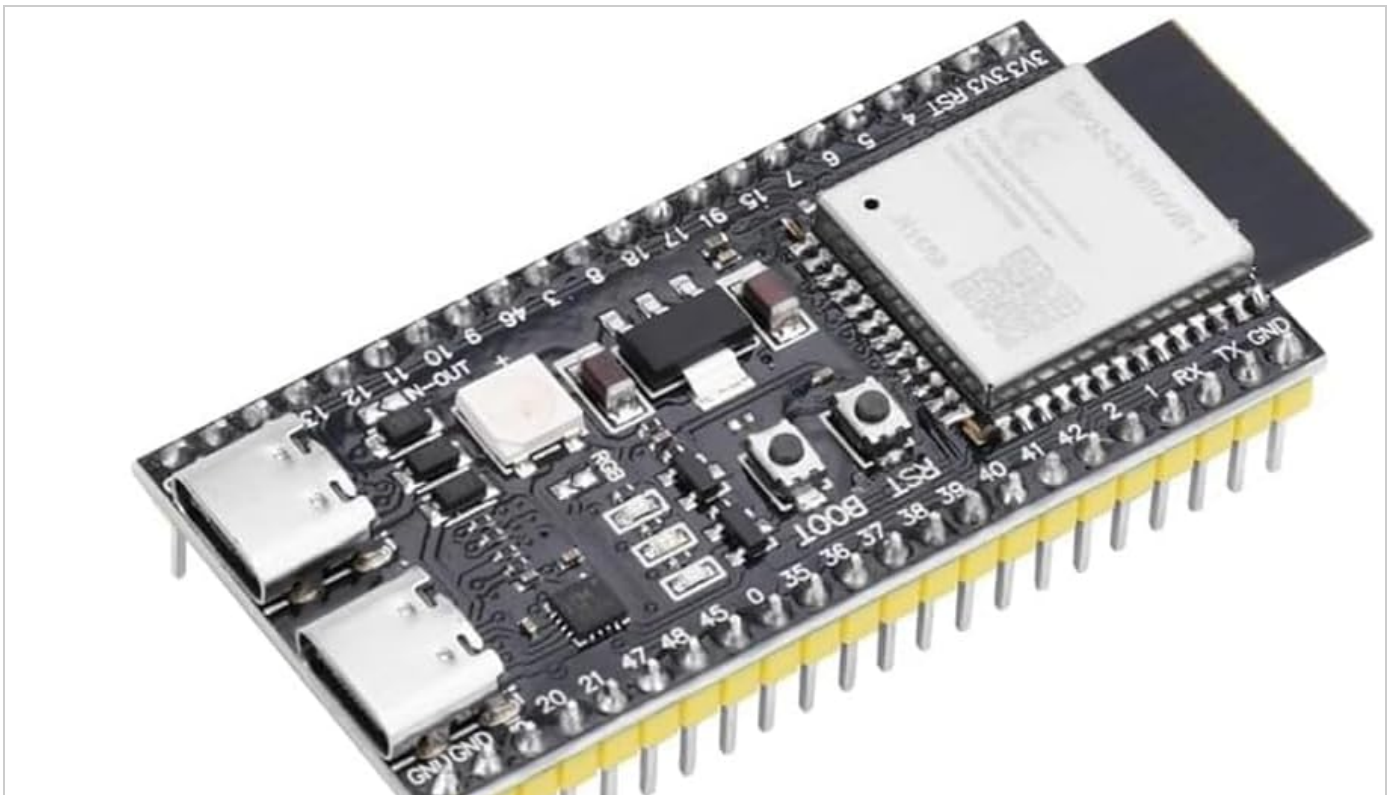

Figure 2.2: Close-up view of the Diymore ESP32 S3 WROOM-1 module.

3. Key Features

- **Integrated Connectivity:** Features 2.4 GHz Wi-Fi (802.11b/g/n) with 40 MHz bandwidth support and Bluetooth 5 (LE) with Bluetooth Mesh capabilities.
- **Extensive I/O Interfaces:** Equipped with 45 programmable GPIOs and common peripheral interfaces including SPI, I2S, I2C, PWM, RMT, ADC, UART, SD/MMC host controller, and TWAITM controller.
- **Powerful Performance:** Powered by an Xtensa 32-bit LX7 dual-core processor, operating at up to 240 MHz. Includes 512 KB integrated SRAM and 384 KB ROM for storage. Supports various external SPI, Dual SPI, Quad SPI, Octal SPI, QPI, OPI flash, and off-chip RAM.
- **Flexible Wi-Fi Modes:** Supports infrastructure BSS (station mode), SoftAP mode, and a hybrid Station + SoftAP mode for diverse network applications.

- **Ultra-Low Power (ULP) Coprocessor:** Includes an ULP coprocessor, enabling multiple low-power modes suitable for energy-efficient applications.

4. Setup Guide

Follow these steps to set up your Diymore ESP32 S3 DevKitC 1 N16R8 development board:

1. **Hardware Connection:**
    - Ensure the ESP32-S3 module is securely seated on the expansion board.
    - Connect the development board to your computer using a compatible USB-C cable. The board features two USB-C ports; typically, the one labeled "UART" or "USB" is used for programming and serial communication.
2. **Driver Installation:**
    - Depending on your operating system, you may need to install USB-to-UART bridge drivers (e.g., CP210x or CH340 drivers). These drivers facilitate communication between your computer and the ESP32-S3. Refer to the official Espressif documentation or the driver manufacturer's website for the latest versions.
3. **Development Environment Setup:**
    - Install a suitable Integrated Development Environment (IDE) such as Arduino IDE or VS Code with PlatformIO extension.
    - Add ESP32 board support to your chosen IDE. For Arduino IDE, this typically involves adding the ESP32 board manager URL in preferences and installing the ESP32 boards package.
    - Select the correct board model (e.g., "ESP32S3 Dev Module") and the appropriate COM port (Windows) or /dev/ttyUSBx (Linux/macOS) in your IDE's tools menu.
4. **First Program (Blink Test):**
    - Load a simple "Blink" example sketch from your IDE to verify the setup. This will typically flash an onboard LED.
    - Compile and upload the sketch to the board. If successful, the LED should blink according to the program.

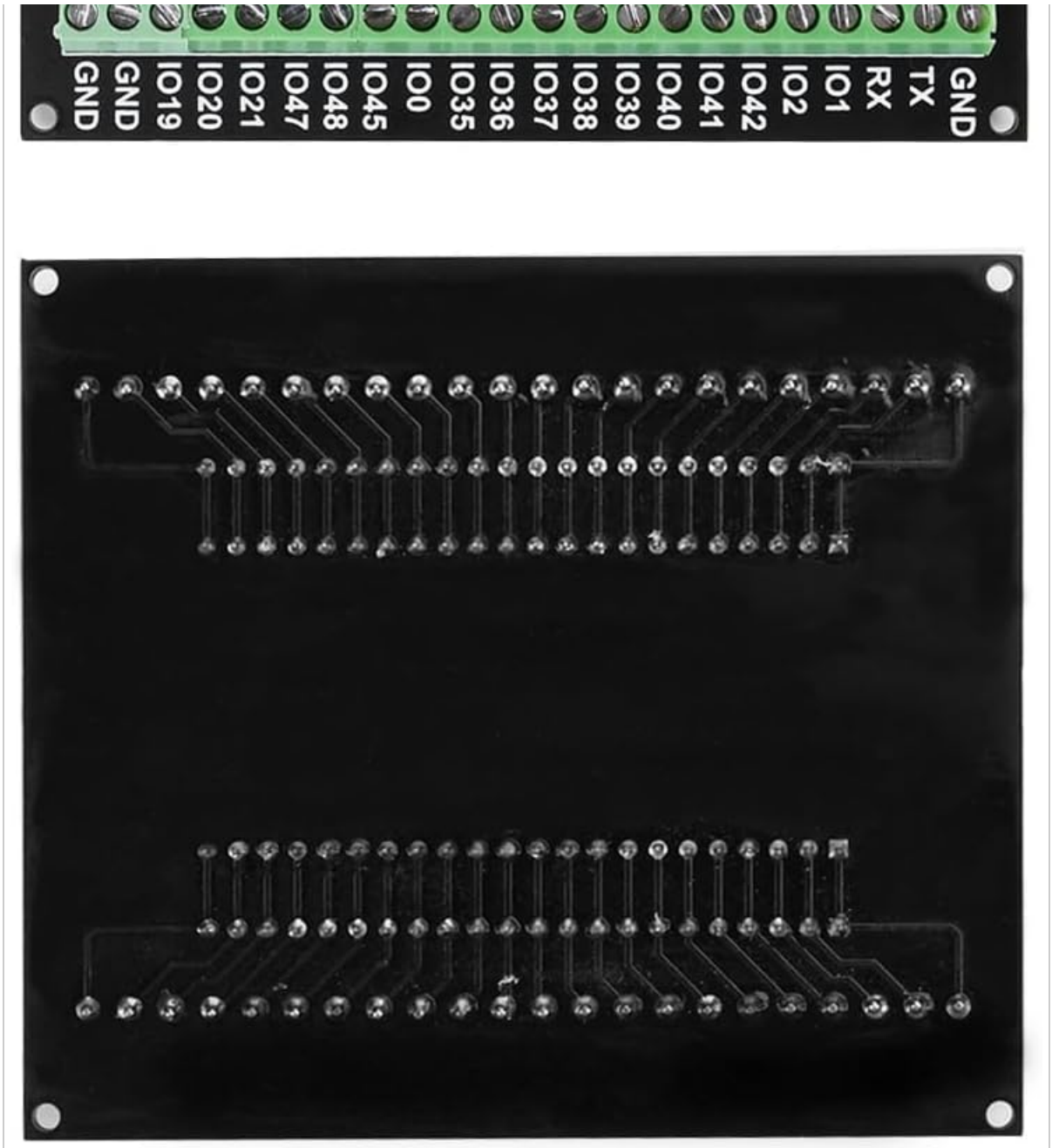

Figure 4.1: Pinout diagram of the ESP32 S3 expansion board, showing accessible GPIOs and power pins.

5. Operating Instructions

The ESP32 S3 DevKitC 1 N16R8 is operated by programming it with custom firmware. Here are general guidelines for operation:

- **Programming:** Use your configured IDE (Arduino IDE, PlatformIO) to write and upload code. The board supports C/C++ programming.
- **Power Supply:** The board can be powered via the USB-C port (5V) or through the 3.3V/5V pins on the expansion board. Ensure the power supply voltage is within the specified limits to prevent damage.
- **GPIO Usage:** Refer to the pinout diagram (Figure 4.1) for available General Purpose Input/Output (GPIO) pins. These pins can be configured as inputs or outputs to interface with sensors, actuators, and other electronic components.
- **Wi-Fi and Bluetooth:** Utilize the integrated Wi-Fi and Bluetooth capabilities for network communication, data transfer, and IoT applications. Libraries for Wi-Fi and Bluetooth are available within the ESP32 development framework.

- **Reset and Boot Buttons:** The board includes a "RST" (Reset) button to restart the module and a "BOOT" button, often used in conjunction with the RST button to enter bootloader mode for firmware uploading.

6. Maintenance

Proper maintenance ensures the longevity and reliable operation of your development board.

- **Handling:** Handle the board by its edges to avoid touching components, especially the Wi-Fi antenna, which can be sensitive to electrostatic discharge.
- **Storage:** Store the board in an anti-static bag when not in use, in a cool, dry environment away from direct sunlight and extreme temperatures.
- **Cleaning:** If necessary, gently clean the board with a soft, dry brush or compressed air to remove dust. Avoid using liquids or abrasive materials.
- **Power Safety:** Always disconnect power before making or changing connections to the board. Ensure correct voltage and polarity when connecting external power sources.

7. Troubleshooting

This section addresses common issues you might encounter.

- **Board Not Detected by Computer:**
  - Verify that the USB-C cable is functional and properly connected to both the board and your computer.
  - Ensure that the necessary USB-to-UART bridge drivers are installed correctly for your operating system.
  - Try a different USB port on your computer.
- **Firmware Upload Fails:**
  - Check if the correct board model and COM port are selected in your IDE.
  - Ensure the board is in bootloader mode. This often involves holding down the "BOOT" button while pressing and releasing the "RST" button, then releasing "BOOT".
  - Verify that your code compiles without errors.
- **Wi-Fi/Bluetooth Connectivity Issues:**
  - Confirm that your code correctly initializes and configures the Wi-Fi or Bluetooth module.
  - Check for proper antenna connection (if external) or ensure the onboard antenna is not obstructed.
  - Ensure the network credentials (SSID, password) are correct for Wi-Fi connections.
  - Test in an environment with minimal wireless interference.
- **Unexpected Behavior/Crashes:**
  - Review your code for logical errors, memory leaks, or incorrect pin assignments.
  - Ensure your power supply is stable and provides sufficient current for the board and any connected peripherals.
  - Check for short circuits or incorrect wiring on the expansion board.

8. Specifications

Feature	Detail
Brand	Diymore

Feature	Detail
Model Number	AM03UK-GXFB0473-AAG
CPU Model	Xtensa 32-bit LX7 dual-core
CPU Manufacturer	Espressif
Number of Processors	2
Memory Storage Capacity	512 KB SRAM, 384 KB ROM
Connectivity Technology	Bluetooth, I2C, Wi-Fi
Wireless Communication Standard	Bluetooth 5 (LE), Wi-Fi (802.11b/g/n)
Total USB Ports	1 (USB-C for programming/power)
Included Components	ESP32 S3 DevKitC 1 N16R8 Development Board, Expansion Board

Figure 8.1: Dimensions of the ESP32 S3 expansion board (84.5mm x 73.7mm).

9. Support

For further assistance, technical support, or inquiries regarding your Diymore ESP32 S3 DevKitC 1 N16R8 Development Board, please refer to the official Diymore website or contact their customer service.

Online Resources: Search for "ESP32-S3 documentation" on Espressif's official website for detailed technical specifications, datasheets, and programming guides. Community forums and online tutorials are also valuable resources for development.