HiLetgo ESP32-S3 N16R8

HiLetgo ESP32-S3 N16R8 Development Board User Manual

Model: ESP32-S3 N16R8

1. Introduction

This manual provides comprehensive instructions for the HiLetgo ESP32-S3 N16R8 Development Board. It covers hardware overview, setup procedures, operational guidelines, technical specifications, and troubleshooting tips to assist users in developing Internet of Things (IoT) applications with Wi-Fi and Bluetooth 5.0 connectivity.

2. Product Features

- Integrated ESP32-S3-WROOM-1-N16R8 module for stable performance.
- Dual USB-C ports for power and data communication.
- 2.4 GHz Wi-Fi connectivity.
- Bluetooth 5.0 (LE) for low-energy applications.
- Designed for Artificial Intelligence of Things (AIoT) applications.
- Powerful AI computing capabilities.
- Secure encryption mechanisms.
- 512 KB RAM and 8 MB flash memory.
- CPU Speed: 240 MHz.

3. Hardware Overview

The HiLetgo ESP32-S3 N16R8 board features a compact design with accessible pins and dual USB-C ports. Below is an image illustrating the board's layout.

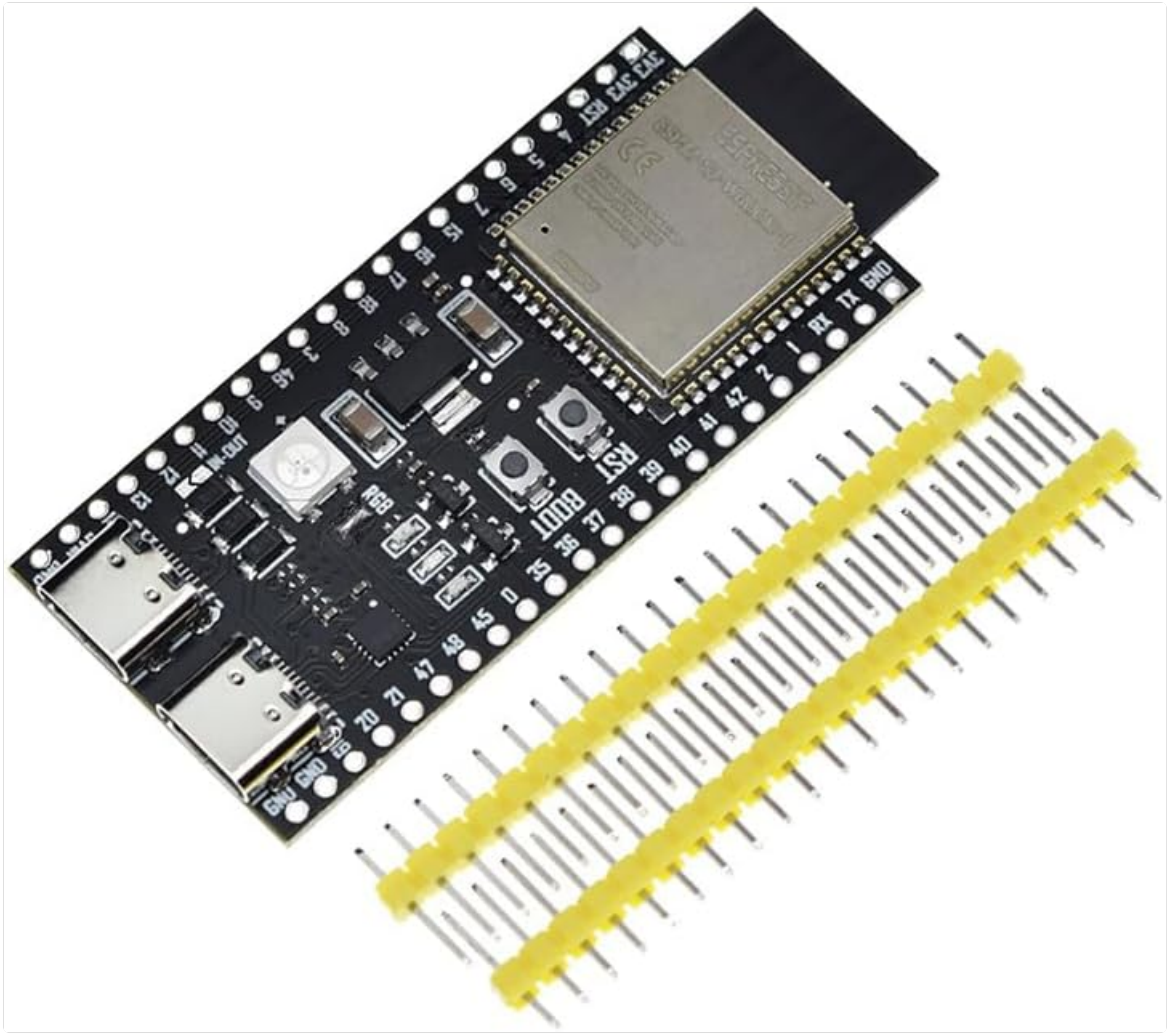


Figure 3.1: Top view of the HiLetgo ESP32-S3 N16R8 Development Board, showing the ESP32-S3 module, buttons, USB-C ports, and pin headers.

The board includes two buttons: a RST (Reset) button and a BOOT button. The dual USB-C ports allow for flexible power and data connections.

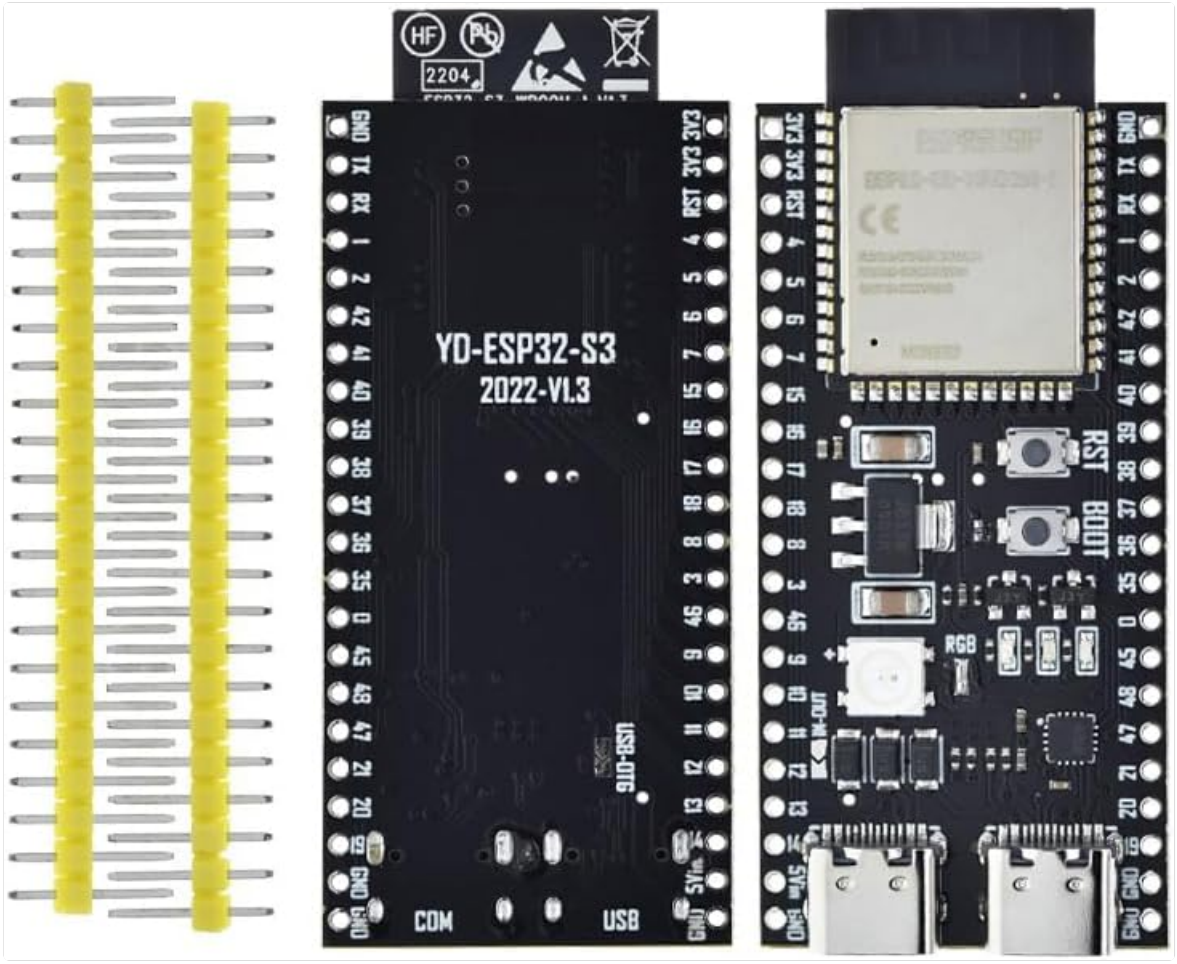


Figure 3.2: Top and bottom views of the development board, highlighting the pin labels and component placement on both sides.

Dimensions of the board are provided for integration into projects.

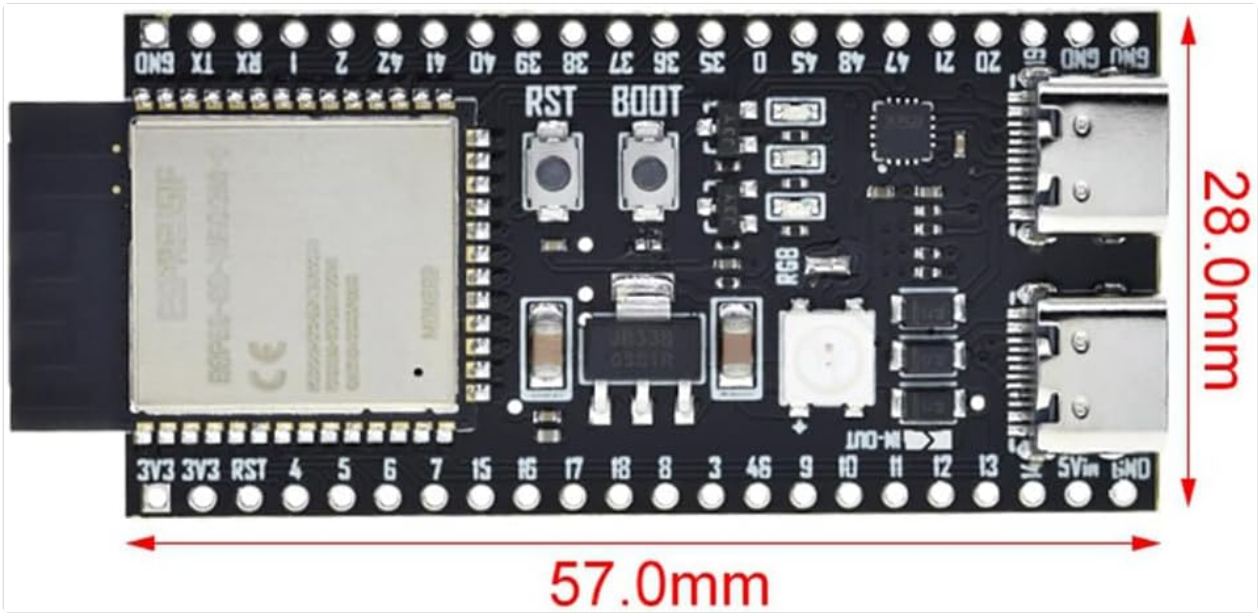


Figure 3.3: Dimensional drawing of the ESP32-S3 N16R8 board, showing a length of 57.0mm and a width of 28.0mm.

4. Setup Instructions

4.1. Required Materials

- HiLetgo ESP32-S3 N16R8 Development Board

- USB-C to USB-A or USB-C to USB-C cable
- Computer with internet access
- Integrated Development Environment (IDE) such as Arduino IDE or ESP-IDF

4.2. Driver Installation

Most modern operating systems (Windows 10/11, macOS, Linux) include built-in drivers for the USB-to-Serial chip (typically CP210x or CH340) used on ESP32 boards. If the board is not recognized upon connection, you may need to manually install the appropriate driver. Refer to the chip manufacturer's website (e.g., Silicon Labs for CP210x, WCH for CH340) for the latest drivers.

4.3. IDE Setup (Arduino IDE Example)

1. **Install Arduino IDE:** Download and install the latest version of the Arduino IDE from the official Arduino website.
2. **Add ESP32 Board Manager URL:**
    - Go to *File > Preferences* (Windows/Linux) or *Arduino > Preferences* (macOS).
    - In the "Additional Boards Manager URLs" field, add: `https://raw.githubusercontent.com/espressif/arduino-esp32/gh-pages/package_esp32_index.json`
    - Click "OK".
3. **Install ESP32 Boards:**
    - Go to *Tools > Board > Boards Manager...*
    - Search for "ESP32" and install the "esp32 by Espressif Systems" package.
4. **Select Board:**
    - Go to *Tools > Board > ESP32 Arduino* and select "ESP32S3 Dev Module".
5. **Select Port:**
    - Connect the ESP32-S3 board to your computer using a USB-C cable.
    - Go to *Tools > Port* and select the serial port corresponding to your ESP32-S3 board (e.g., COMx on Windows, /dev/cu.usbserial-xxxx on macOS, /dev/ttyUSBx on Linux).

5. Operating Instructions

5.1. Uploading Your First Program (Blink Example)

1. Open the Arduino IDE.
2. Go to *File > Examples > 01.Basics > Blink*
3. The Blink sketch will open in a new window. This program makes an LED connected to a specific pin blink. The ESP32-S3 N16R8 board has an onboard RGB LED, which can be controlled. You might need to adjust the LED pin number in the sketch if the default is not for the onboard LED (often GPIO48 for the RGB LED on ESP32-S3 DevKits).
4. Click the "Upload" button (right arrow icon) in the Arduino IDE.
5. If the upload fails, press and hold the **BOOT** button on the ESP32-S3 board, then press the **RST** button, release **RST**, and then release **BOOT**. Try uploading again.
6. Upon successful upload, the onboard LED should begin blinking.

5.2. Wi-Fi and Bluetooth Connectivity

The ESP32-S3 N16R8 supports 2.4 GHz Wi-Fi and Bluetooth 5.0 (LE). You can use the respective libraries in Arduino IDE (e.g., WiFi.h, BluetoothSerial.h, BLE.h) or ESP-IDF to develop applications that utilize these features. Refer to Espressif's official documentation and examples for detailed programming guides.

5.3. Pinout Reference

The board exposes numerous GPIO pins for connecting external sensors, actuators, and other peripherals. Consult the official ESP32-S3 datasheet and pinout diagrams for specific pin functions (ADC, DAC, I2C, SPI, UART, PWM, etc.).

6. Maintenance and Care

- **Handling:** Handle the board by its edges to avoid touching components, especially the ESP32-S3 module, which can be sensitive to electrostatic discharge (ESD).
- **Power Supply:** Always use a stable 5V power supply via the USB-C port. Avoid over-voltage or reverse polarity connections.
- **Environment:** Store and operate the board in a dry, non-condensing environment. Protect it from dust, moisture, and extreme temperatures.
- **Cleaning:** If necessary, gently clean the board with a soft, dry brush or compressed air. Avoid using liquids.

7. Troubleshooting

- **Board Not Detected by Computer:**
  - Ensure the USB-C cable is functional and properly connected.
  - Check if the necessary USB-to-Serial drivers are installed (see Section 4.2).
  - Try a different USB port on your computer.
- **Upload Fails:**
  - Verify that the correct board (ESP32S3 Dev Module) and serial port are selected in the IDE.
  - Ensure no other application is using the serial port.
  - Try the BOOT button sequence: Hold BOOT, press RST, release RST, release BOOT, then attempt upload.
  - Check for syntax errors in your code.
- **Wi-Fi/Bluetooth Connection Issues:**
  - Double-check SSID and password for Wi-Fi.
  - Ensure the device you are trying to connect to is within range and discoverable.
  - Verify that your code correctly initializes and uses the Wi-Fi/Bluetooth modules.
- **Board Not Powering On:**
  - Confirm the USB-C cable is connected to a powered USB port or a 5V power adapter.
  - Inspect the board for any visible damage.

8. Technical Specifications

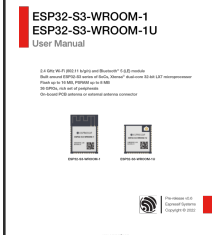
Feature	Specification
Brand	HiLetgo
Module	ESP32-S3-WROOM-1-N16R8
Connectivity	2.4 GHz Wi-Fi, Bluetooth 5.0 (LE)
RAM Memory Installed Size	512 KB
Memory Storage Capacity	8 MB Flash
CPU Speed	240 MHz
USB Interface	Dual Type-C

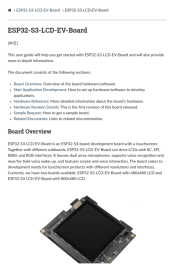
9. Warranty and Support

HiLetgo products are designed for reliability and performance. For technical support, warranty information, or any product-related inquiries, please visit the official HiLetgo website or contact their customer service. You can also refer to the HiLetgo Store on Amazon for additional resources.

Figure 9.1: Example of HiLetgo product packaging, which typically includes contact information for support.

Related Documents - ESP32-S3 N16R8

	[ESP8266 User Manual] User manual for the ESP8266 module, detailing its features, parameters, and pin descriptions. Includes FCC compliance information and RF exposure considerations.
	[ESP32-S3 Development Kits Documentation | Espressif Systems] Comprehensive documentation for Espressif Systems' ESP32-S3 series development kits, covering DevKitC-1, DevKitM-1, USB-OTG, LCD-EV-Board, and USB-Bridge. Includes hardware guides, features, and getting started information.
	[ESP32-S3 Development Boards Documentation | Espressif Systems] Comprehensive documentation for Espressif Systems' ESP32-S3 development boards, including DevKitC-1, DevKitM-1, USB-OTG, LCD-EV-Board, and USB-Bridge. Guides cover setup, hardware, and application development.
	[ESP32-S3 DevKits Documentation] Comprehensive documentation for Espressif's ESP32-S3 series development boards, including the ESP32-S3-DevKitC-1, ESP32-S3-DevKitM-1, ESP32-S3-USB-OTG, and ESP32-S3-LCD-EV-Board. This guide provides getting started instructions, hardware references, revision details, and related resources for developers.
	[ESP32-S3-WROOM-1 & ESP32-S3-WROOM-1U User Manual] User manual for Espressif Systems' ESP32-S3-WROOM-1 and ESP32-S3-WROOM-1U modules. These powerful Wi-Fi and Bluetooth LE modules are built around the ESP32-S3 SoC, featuring a dual-core LX7 microprocessor, extensive peripherals, and support for AIoT applications.



🏠 » ESP32-S3-LCD-EV-Board » ESP32-S3-LCD-EV-Board

ESP32-S3-LCD-EV-Board

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This user guide will help you get started with ESP32-S3-LCD-EV-Board and will also provide more in-depth information.

The document consists of the following sections:

- Board Overview: Overview of the board hardware/software.
- Start Application Development: How to set up hardware/software to develop applications.
- Hardware Reference: More detailed information about the board's hardware.
- Hardware Revision Details: This is the first revision of this board released.
- Sample Request: How to get a sample board.
- Related Documents: Links to related documentation.

Board Overview

ESP32-S3-LCD-EV-Board is an ESP32-S3-based development board with a touchscreen. Together with different subboards, ESP32-S3-LCD-EV-Board can drive LCDs with IIC, SPI, 8080, and RGB interfaces. It houses dual array microphones, supports voice recognition and near/far-field voice wake-up, and features screen and voice interaction. The board caters to development needs for touchscreen products with different resolutions and interfaces. Currently, we have two boards available: ESP32-S3-LCD-EV-Board with 480x480 LCD and ESP32-S3-LCD-EV-Board with 800x480 LCD.

[ESP32-S3-LCD-EV-Board: Development Board User Guide]

Comprehensive user guide for the Espressif ESP32-S3-LCD-EV-Board, detailing its features, hardware components, LCD subboards, software support, and development setup.