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M5Stack K010

M5Stack Core2 IoT Development Kit User Manual

Model: K010

1. Introduction

The M5Stack Core2 is a versatile IoT development kit designed for rapid prototyping and deployment of various applications. It features an ESP32-D0WDQ6-V3 microcontroller, a 2-inch TFT LCD touch screen, and integrated Wi-Fi and Bluetooth connectivity. This manual provides essential information for setting up, operating, and maintaining your Core2 device.

Figure 1.1: M5Stack Core2 IoT Development Kit, showcasing its compact design and display.

2. What's in the Box

Verify that all items listed below are included in your package:

- 1 x M5Stack Core2 Unit
- 1 x USB Type-C Cable (20cm)
- 1 x Hex Wrench

Figure 2.1: Contents of the M5Stack Core2 package, including the Core2 unit, USB-C cable, and hex wrench.

Figure 2.2: Visual representation of the shipping list for the M5Stack Core2.

3. Product Overview

The M5Stack Core2 is built around the ESP32-D0WDQ6-V3 chip, offering robust performance for various applications. Key features include:

- **Powerful Performance:** Equipped with an ESP32-D0WDQ6-V3 microcontroller for high computing performance.
- **Touch Screen Display:** Features a 2-inch TFT LCD touch screen (320x240 resolution) for intuitive user interaction.
- **Wireless Connectivity:** Integrated Wi-Fi and Bluetooth capabilities for seamless communication.

- **Expandable Functionality:** Multiple expansion ports (GPIO, I2C, SPI, UART) for connecting additional modules and sensors.
- **Built-in Speaker:** For audio output.
- **Vibration Motor:** Provides haptic feedback.
- **Microphone:** For audio input.
- **SD Card Slot:** For expandable storage.

Figure 3.1: Annotated diagram of the M5Stack Core2, highlighting its main components and interfaces.

Figure 3.2: Key features of the M5Stack Core2, including memory and display type.

4. Specifications

The following table details the technical specifications of the M5Stack Core2:

Specification	Parameter
SoC	ESP32-D0WDQ6-V3, 240MHz dual core, 600 DMIPS, 520KB SRAM, Wi-Fi
Flash	16MB
PSRAM	8MB
Input Voltage	5V @ 500mA
Host Interface	Type-C x 1, GROVE(I2C+I/O+UART) x 1
LED	Green power indicator light
Buttons	Power button, RST button, screen virtual buttons x 3
Vibration Alert	Vibration motor

Specification	Parameter
Item Weight	2.82 ounces (approx. 80 grams)
Package Dimensions	3.19 x 2.28 x 0.87 inches
Batteries	1 Lithium Ion battery (included)

Figure 4.1: M5Stack Core2 weight measurement.

Figure 4.2: M5Stack Core2 dimensions.

5. Setup

To begin using your M5Stack Core2, follow these initial setup steps:

1. **Charging:** Connect the M5Stack Core2 to a 5V USB power source using the provided USB Type-C cable. The device will begin charging.
2. **Power On:** Press and hold the power button (usually located on the side) for approximately 6 seconds to turn on the device.
3. **Software Environment:** The Core2 supports various development environments, including UIFlow, Arduino, and MicroPython. Choose your preferred environment and set up the necessary drivers and IDE on your computer.
4. **First Program:** Refer to the official M5Stack documentation for guides on uploading your first program or firmware to the Core2.

6. Operating Instructions

The M5Stack Core2 is designed for flexible operation depending on your application. Here are general guidelines:

- **Touch Screen Interaction:** Navigate menus and interact with applications using the 2-inch capacitive touch screen.
- **Virtual Buttons:** The three virtual buttons below the screen can be programmed for various functions within your applications.
- **Physical Buttons:** The physical RST (Reset) button can be used to restart the device. The power button can be used for power cycling.
- **External Modules:** Connect compatible M5Stack modules and sensors to the GROVE port to expand functionality. Ensure proper connection and power supply for external modules.
- **SD Card Usage:** Insert a microSD card into the designated slot for additional storage. Ensure the card is formatted correctly (e.g., FAT32).

7. Maintenance

Proper maintenance ensures the longevity and optimal performance of your M5Stack Core2:

- **Cleaning:** Use a soft, dry cloth to clean the device. Avoid using liquid cleaners or abrasive materials.
- **Storage:** Store the device in a cool, dry place away from direct sunlight and extreme temperatures.
- **Battery Care:** Avoid fully discharging the battery frequently. If storing for extended periods, charge the battery to about 50-70% to preserve its lifespan.
- **Firmware Updates:** Regularly check the official M5Stack website for firmware updates to ensure your device has the latest features and bug fixes.
- **Physical Protection:** While durable, avoid dropping the device or exposing it to excessive force or moisture.

8. Troubleshooting

This section addresses common issues you might encounter with your M5Stack Core2.

Q1: What is the maximum supported capacity of the SD card, and why is there no response when the SD card is inserted?

Theoretically, devices based on ESP32 support up to 16GB. We recommend using a SD card model SDSQUNC-016G-ZN6MA. Ensure the SD card is properly inserted and formatted.

Q2: Using the battery in either of the battery ports on the USB unit or the Core2 forces the unit to stay powered on continuously. Any attempt to shut down using the side button causes the device to restart after.

We have found that the reason is that the filter capacitor capacity of the USB 1.2 module is too large. If you still need to use batteries to power the Core2 + USB 1.2 solution, to avoid frequent restarts, the following two solutions can be adopted:

- Remove the filter capacitor.
- Replace it with a smaller capacity filter capacitor (10uF is recommended).

Q3: How to extend the Core2 with an extension module?

You must remove the original bottom and battery of the Core2, then you can stack another module extension.

Figure 8.1: Common questions and solutions for the M5Stack Core2.

9. Scope of Application

The M5Stack Core2 is suitable for a wide range of applications, including but not limited to:

- **Smart Home Devices:** Control and monitor home automation systems.
- **STEM Education:** An excellent tool for learning about IoT, programming, and electronics.
- **IoT Controller:** Serve as a central controller for various Internet of Things projects.
- **DIY Projects:** Ideal for custom electronic projects and rapid prototyping.

Figure 9.1: Examples of M5Stack Core2 applications.

Figure 9.2: Further illustration of the M5Stack Core2's versatile applications.

10. Support and Resources

For more detailed tutorials, documentation, and community support, please visit the official M5Stack website:

www.m5stack.com

Figure 10.1: Guide to accessing online tutorials and documentation.

Figure 10.2: Official M5Stack website for support.

Related Documents

M5STACK-CORE2 M5STACK	M5Stack CORE2: ESP32 Development Board Overview and Quick Start Guide Comprehensive guide to the M5Stack CORE2, an ESP32-based development board featuring a 2-inch TFT screen, detailing its hardware, functions, power management, and UIFlow quick start.

	M5StickC Plus2 Operation Guidance Comprehensive operation guidance for the M5StickC Plus2 IoT development board. This guide covers common troubleshooting scenarios, including boot failures and battery issues, and provides detailed, step-by-step instructions for flashing official firmware using the M5Burner tool, including essential USB driver installation and port selection procedures.
	M5STACK STAMPS3 Datasheet and Technical Specifications Explore the M5STACK STAMPS3 development board, featuring the ESP32-S3 chip with Wi-Fi and Bluetooth 5 (LE). This datasheet details its hardware composition, pin descriptions, functional capabilities, and electrical characteristics for IoT projects.
	M5Stack AtomS3-Lite ESP32-S3 Development Board Explore the M5Stack AtomS3-Lite, a compact ESP32-S3 development board featuring Wi-Fi, integrated antenna, and versatile interfaces for IoT and microcontroller projects. Learn about its specifications, features, and development options with Arduino IDE and UiFlow2.

Documents - M5Stack – K010

[pdf] Datasheet

Description M5Stack Technology 01102024 K010 V11 3387181 mouser datasheet 2 1117 |||

HOME CORE CORE2 V1.1 Core2 v1.1 SKU:**K010**-V11 Description Core2 V1.1 is an iterative version of Core, with upgraded power IC and a continuation of the classic design of Core2. It is a powerful and user-friendly development board. Core2 V1.1 is equipped with ESP32-D0WDQ6-V3, featuring two independ...

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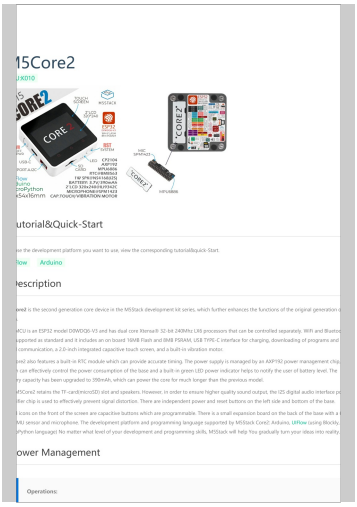

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M5Stack Technology co., ltd 5F, Tangwei Stock commercial Building, Youli Road, Baoan District 518103 ... Educational development kit Apparatus model/Product: Core series: K001-V26, K006-V26, K007-V26, **K010**, K048, K036-B, K014-E, K017-C, K024-B, A072, K023, K028, **K010**-AWS, K034, K049-B, K051, K051-B...

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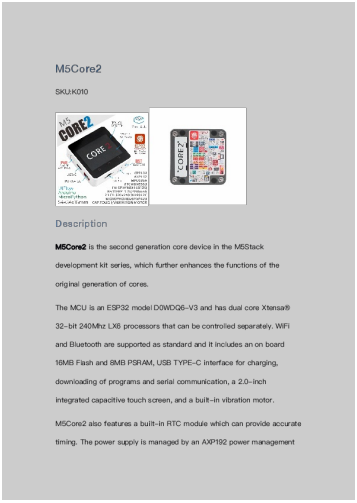

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M5Core2 SKU:**K010** Description M5Core2 is the second generation core device in the M5Stack development kit series, which further enhances the functions of the original generation of cores. The MCU is an ESP32 model D0WDQ6-V3 and has dual core Xtensa 32-bit 240Mhz LX6 processors that can be controlled ...

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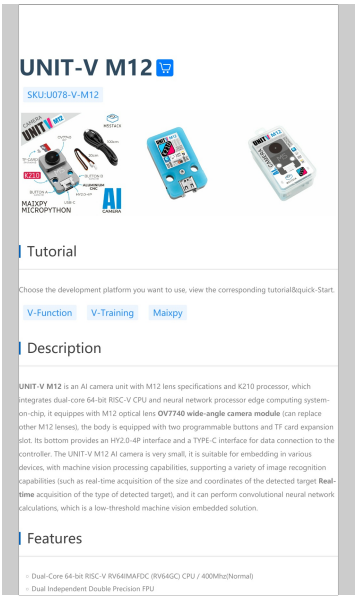

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UNIT-V M12 SKU:U078-V-M12 Tutorial Choose the development platform you want to use, view the corresp ... 40* 24* 16.4mm 70* 50* 30mm 13.9g 52.6g Products related to this item RoverC.Pro K036-B CORE2 **K010** CoreS3 K128 AtomS3 C123 StampS3 S007 CORE2 FOR AWS **K010**-AWS BASIC K001 Related Link ...

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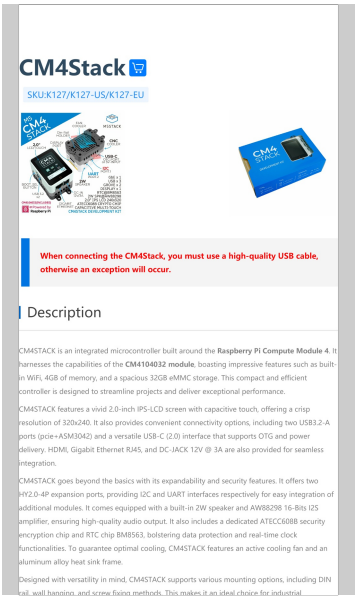

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CM4Stack SKU:K127/K127-US/K127-EU When connecting the CM4Stack, you must use a high-quality USB cabl ... /ac 59*46*44mm 160mm*107mm*47mm 118.8g 353.4g Products related to this item CoreS3 K128 CORE2 **K010** CORE2 FOR AWS **K010**-AWS TOUGH K034 STATION 485 K123 BASIC-V27 K001-V27 M5StickC PLUS K...

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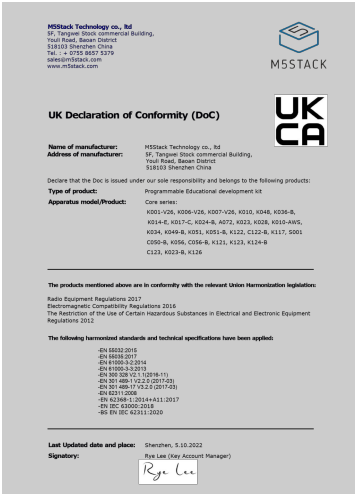

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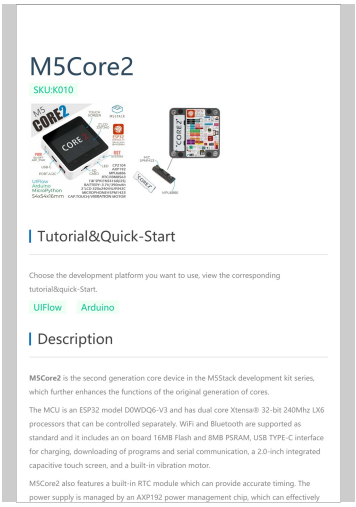

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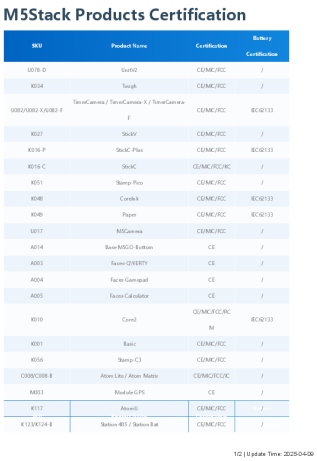

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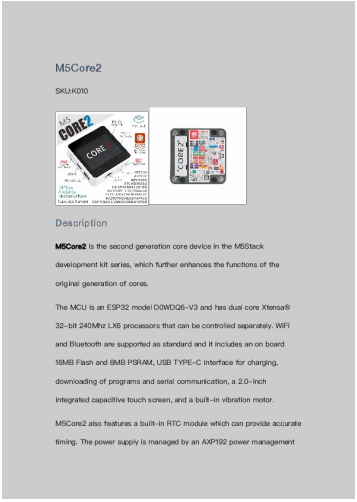

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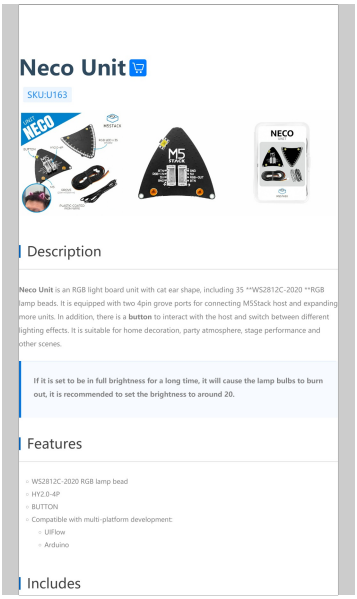

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Neco Unit Distrelec It is equipped with two 4pin grove ports for connecting M5Stack host and expanding more units In addition there a button to interact the and U163 eng tds media distrelec Web Downloads t ds |||

Neco Unit SKU:U163 Description Neco Unit is an RGB light board unit with cat ear shape, including 35 ... 16777216 colors 41*46*1mm 95*65*25mm 9.2g 34.7g Products related to this item CoreS3 K128 CORE2 **K010** BASIC-V27 K001-V27 M5StickC PLUS K016-P AtomS3 C123 StampS3 S007 Related Link WS2812...

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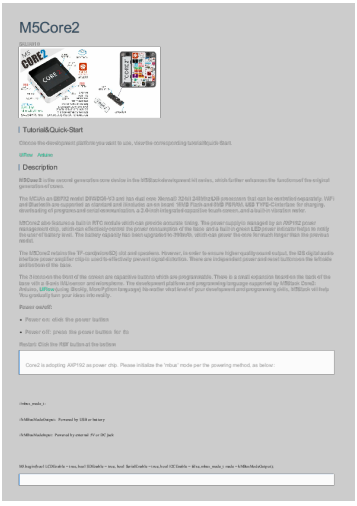

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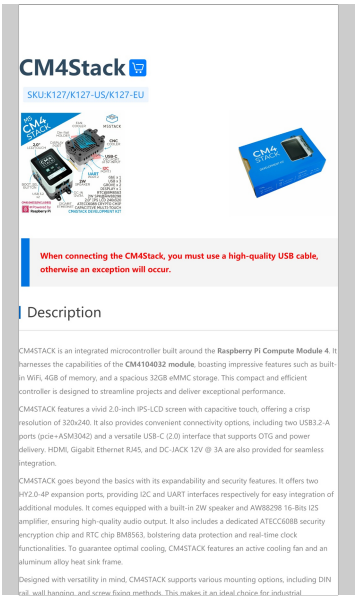

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Description K127 EU US mouser Docs CM4StackDescription1 x CM4Stack Power Adapter input 100 240VAC output DC 12V 3A 1 Hex power connector Gigabit Ethernet RJ45 port for connecting to Descriptionv1K127 USmouser srsltid AfmBOoq4JFzP4XR8h3ZVW0iKaUk9wR0hEz0If8y9Y5KD4EjmrCOGbpBkmouser ||| ||| CM4Stack SKU:K127/K127-US/K127-EU When connecting the CM4Stack, you must use a high-quality USB cable, otherwise an exception will occur. Description CM4STACK is an integrated microcontroller built around the Raspberry Pi Compute Module 4.

CM4Stack SKU:K127/K127-US/K127-EU When connecting the CM4Stack, you must use a high-quality USB cabl ... /ac 59*46*44mm 160mm*107mm*47mm 118.8g 353.4g Products related to this item CoreS3 K128 CORE2 **K010** CORE2 FOR AWS **K010**-AWS TOUGH K034 STATION 485 K123 BASIC-V27 K001-V27 M5StickC PLUS K...

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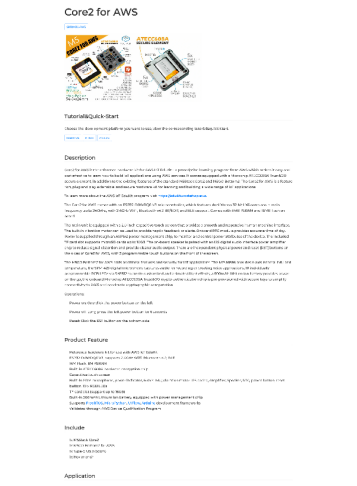

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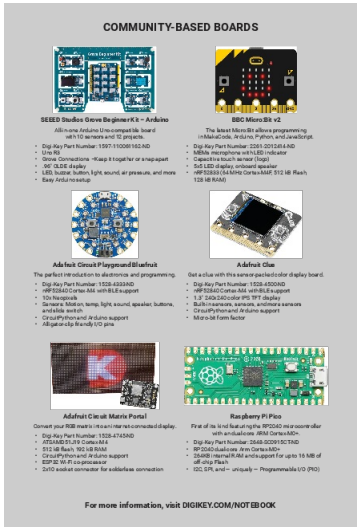

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