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US

🏠 Home   Controllers-Core   Core2 v1.1

Product Name / SKU

Searc

Core2 v1.1

SKU:K010-V11

Description

Core2 v1.1 is the iterative version of the second-generation host in the M5Stack developm series, further enhancing the functionality based on the original generation host. It ures power management chip solution of AXP2101+INA3221, offering more comprehen ard functions, adding an RTC battery to meet the needs of low-power applications and precise functions. Its core controller is equipped with an ESP32-D0WDQ6-V3, featuring two independently controllable Xtensa® 32-bit LX6 processors, with a main frequency of up to 240Mhz, supporting WiFi functionality, and onboard 16MB Flash and 8MB PSRAM. Program be downloaded via the TYPE-C interface, and the robust configuration meets the resource

demands of complex applications. The front is equipped with a 2.0-inch integrated capaciti touch screen, providing users with a smoother human-computer interaction experience.

The body has a built-in vibration motor, providing tactile feedback and vibration alert funct The built-in RTC module and battery dedicated to RTC power supply offer precise timing functions. The power section features an AXP2101 power management chip for effective co of body power consumption, with a built-in blue power indicator light. Additionally, the bod equipped with a TF-card (microSD) slot and speaker. To ensure higher quality sound effects digital audio interface amplifier chip is used to effectively prevent signal distortion. The left and bottom of the body have independent power and reset (RST) buttons, and the three do the front of the screen are part of the touch screen, which can be programmed to map hot as three virtual buttons. The expansion board on the back of the body integrates a 6-axis IM sensor and microphone.

Tutorial

UIFlow

This tutorial shows how to control the Core2 v1.1 device via the UIFlow graphical programming platforr

UiFlow2

This tutorial shows how to control the Core2 v1.1 device via the UiFlow2 graphical programming platform.

Arduino IDE

This tutorial shows how to program and control the Core2 v1.1 device using the Arduino IDE.

Note

- When stacking Core2 V1.1 with M5 modules, you need to remove the battery bottom o
  Core2 V1.1. If you want to retain the I2S microphone, IMU, and battery functions of the

while stacking other modules, the M5GO Bottom2 is recommended. The PCB of Core2 V
has reserved interfaces for the CH910F chip and a lithium battery connector.

- The built-in vibration motor of Core2 V1.1 interferes structurally with the M5 Base series bases. To avoid equipment damage, do not stack Core2 V1.1 with any M5 Base series functional bases.

- Some screens may have non-linear touch response at the edges. You can try upgrading screen firmware using M5Tool to resolve this issue.

Features

- Developed based on ESP32, supports Wi-Fi
- 16MB Flash, 8MB PSRAM
- Built-in speaker, power indicator light, vibration motor, RTC, I2S amplifier, capacitive tou screen, power button, reset button
- microSD slot
- Built-in lithium battery, equipped with a power management chip
- Independent board with built-in 6-axis IMU, PDM microphone
- M5-Bus interface
- Development Platform
  - UiFlow1
  - UiFlow2
  - Arduino IDE
  - ESP-IDF
  - PlatformIO

Includes

- 1 x Core2 V1.1
- 1 x USB Type-C Cable (20cm)
- 1 x Hex Key L-Shape 2.0mm (For M2.5 Screw)

Applications

- IoT controller
- STEM education
- DIY projects

○ Smart home devices

Specifications

Specification	Parameter
SoC	ESP32-D0WDQ6-V3 @ Dual-core processor, 240MHz ma frequency
DMIPS	600
SRAM	520KB
Flash	16MB
PSRAM	8MB
Wi-Fi	2.4 GHz Wi-Fi
Input Voltage	5V@500mA
Host Interface	USB Type-C x 1, GROVE (I2C+I/O+UART) x 1
LED	Blue power indicator LED
Button	Power button, RST button, screen virtual buttons * 3
Vibration Alert	Vibration motor
IPS LCD Screen	2.0"@320 x 240 ILI9342C
Capacitive Touch IC	FT6336U
Speaker Amplifier	1W (Size: 0928)
Microphone	SPM1423
I2S Amplifier	NS4168
IMU	MPU6886
RTC	BM8563

Specification	Parameter
PMU	AXP2101
Current Meter	INA3221
USB Chip	CH9102F
DC-DC Boost	SY7088
Lithium Battery	500mAh @ 3.7V
Antenna	2.4G 3D antenna
Operating Temperature	0 ~ 60°C
Base Screw Spec	Hex socket countersunk head M3
Reserved Internal PCB Ports	Battery port (Spec: 1.25mm-2P) USB cable port (Spec: 1.25m
Case Material	Plastic (PC)
Product Size	54.0 x 54.0 x 16.5mm
Product Weight	45.1g
Package Size	80.0 x 59.9 x 21.6mm
Gross Weight	74.3g

Learn

Power Management

- Power On: Single click the left power button
- Power Off: Long press the left power button for 4 seconds
- Reset: Single click the bottom RST button

Expansion Module/Compatibility

When stacking Core2 V1.1 with M5 modules, you need to remove the battery bottom of Core2 V1.1. If you want to keep the I2S microphone, IMU, and battery functions of the base while stacking other modules, it is recommended to use [M5GO Bottom2](). The PCB Core2 V1.1 has reserved interfaces for the CH910F chip and lithium battery interface.

The vibration motor of Core2 V1.1 interferes structurally with the M5 Base series base. To prevent damage to the device, do not stack Core2 V1.1 with M5 Base series functional bases.

There may be touch non-linearity issues on some screen edges. You can try using [M5To]() to upgrade the screen firmware to solve this problem.

Schematics

- [Core2 v1.1 Schematics PDF]()

SoC:ESP32-D0WDQ6-V3

1/5
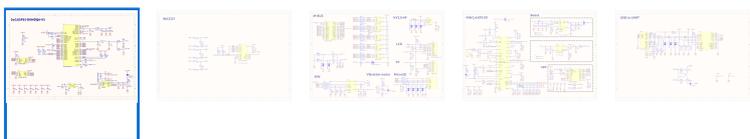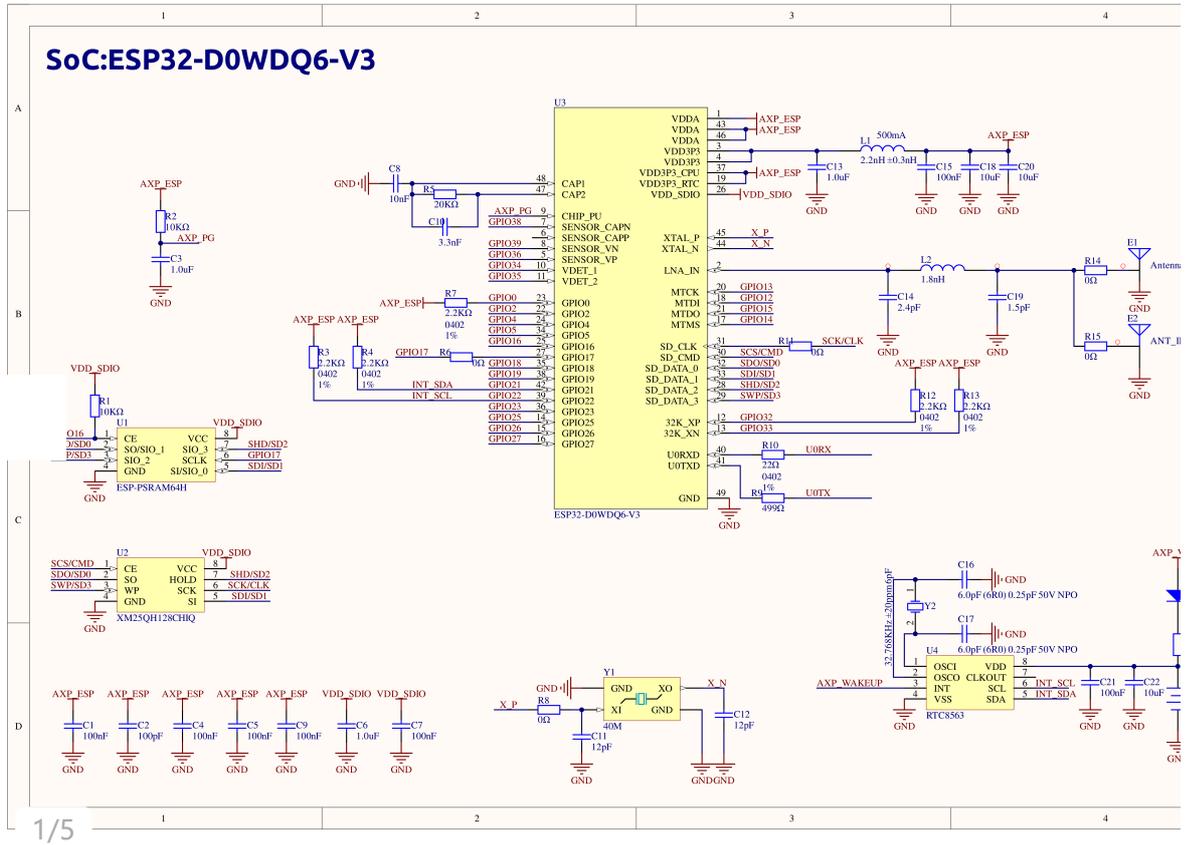
PinMap

LCD & microSD (LCD :320x240)

ESP32-D0WDQ6-V3	G38	G23	G18	G5	G1
ILI9342C	MISO	MOSI	SCK	CS	D

AXP2101	AXP_ALDO2	AXP_BLDO1	AXP_ALDO4
ILI9342C	RST	BL	PWR

microSD

ESP32-D0WDQ6-V3	G38	G23	G18	G4
microSD	MISO	MOSI	SCK	CS

CAP.TOUCH (I2C Addr: 0x38)

ESP32-D0WDQ6-V3	G21	G22	G39
FT6336U (0x38)	SDA	SCL	INT

AXP2101	AXP_ALDO2
FT6336U	RST

Mic & NS4168(Speaker)

ESP32-D0WDQ6-V3	G12	G0	G2	G34
NS4168	BCLK	LRCK	DATA	
Mic		CLK		DATA

AXP2101	AXP_ALDO3
NS4168	SPK_EN

AXP Power Indicator Light

AXP2101	VRTC	DLDO1
Bule LED	Vcc	
Vibration motor		Vcc

RTC

ESP32-D0WDQ6-V3	G21	G22	\
BM8563 (0x51)	SDA	SCL	

AXP2101		AXP_IRQ	
BM8563		INT	

IMU(3-axis gyroscope & 3-axis accelerometer)

ESP32-D0WDQ6-V3	G21	G22
MPU6886 (0x68)	SDA	SCL

USB to serial chip

ESP32-D0WDQ6-V3	G1	G3
CH9102F	RXD	TXD

Internal I2C connection

ESP32-D0WDQ6-V3	G21	G22
MPU6886	SDA	SCL
AXP2101 (0x34)	SDA	
BM8563	SDA	SCL
FT6336U	SDA	
INA3221 (0x40)	SDA	SCL

HY2.0-4P

HY2.0-4P	Black	Red	Yellow	White
PORT.A	GND	5V	G32	G33
PORT.B	GND	5V	G26	G36
PORT.C	GND	5V	G14	G13

M5-Bus

FUNC	PIN	LEFT	RIGHT	PIN	FUNC
	GND	1	2	G35	ADC
	GND	3	4	G36	ADC
	GND	5	6	RST	EN
MOSI	G23	7	8	G25	DAC
MISO	G38	9	10	G26	DAC
SCK	G18	11	12	3V3	
RXD0	G3	13	14	G1	TXD0
RXD2	G13	15	16	G14	TXD2
Int SDA	G21	17	18	G22	Int SCL
PORT.A SDA	G32	19	20	G33	PORT.A SCL
GPIO	G27	21	22	G19	GPIO
I2S_DOUT	G2	23	24	G0	I2S_LRCK
	NC	25	26	G34	I2S_DATA
	NC	27	28	5V	
	NC	29	30	BAT	

Core2 v1.1 BUS (Compared with M5Stack)

M5Stack

LCD	
GPIO23	MOSI
GPIO18	SCK
GPIO14	CS
GPIO27	R/S
GPIO33	RST#
GPIO32	Backlight

Button	
GPIO37	Btn C
GPIO38	Btn B
GPIO39	Btn A

SDCard	
GPIO23	SDDI
GPIO19	SDDO
GPIO18	SDCLK
GPIO4	SDCS

Speaker	
GPIO25	INP

M5Core2 Bus / M5Stack Bus

M5Stack			M5Core2	#	#	M5Core2		M5Stack		
GND			GND	1	2	ADC1	GPIO35	GPIO35	ADC	
GND			GND	3	4	ADC2	GPIO36	GPIO36	ADC	
GND			GND	5	6	RESET	EN	EN	RST	
MOSI	GPIO23	GPIO23	MOSI	7	8	AUDIO_L	GPIO25	GPIO25	DAC	
MISO	GPIO38	GPIO19	MISO	9	10	AUDIO_R	GPIO26	GPIO26	DAC	
SCK	GPIO18	GPIO18	SCK	11	12	3.3V			3.3V	
RXD0	GPIO3	GPIO3	RXD1	13	14	TXD1	GPIO1	GPIO1	TXD0	
RXD2	GPIO13	GPIO16	RXD2	15	16	TXD2	GPIO17	GPIO14	TXD2	
intSDA	GPIO21	GPIO21	SDA	17	18	SCL	GPIO22	GPIO22	intSCL	
PA_SDA	GPIO32	GPIO2	IO6	19	20	IO7	GPIO5	GPIO33	PA_SCL	
GPIO	GPIO27	GPIO12	IIS_SCLK	21	22	IIS_WS	GPIO13	GPIO19	GPIO	
I2S_OUT	GPIO2	GPIO15	IIS_OUT	23	24	IIS_MCLK	GPIO0	GPIO0	2S_LRCLK	
NC			HPWR	25	26	IIS_EN	GPIO34	GPIO34	PDM_DAT	
NC			HPWR	27	28	5V			5V	
NC			HPWR	29	30	BATTERY			BAT	

GPIOXX same
GPIOXX M5Stack only
GPIOXX M5Core2 only
GPIOXX moved

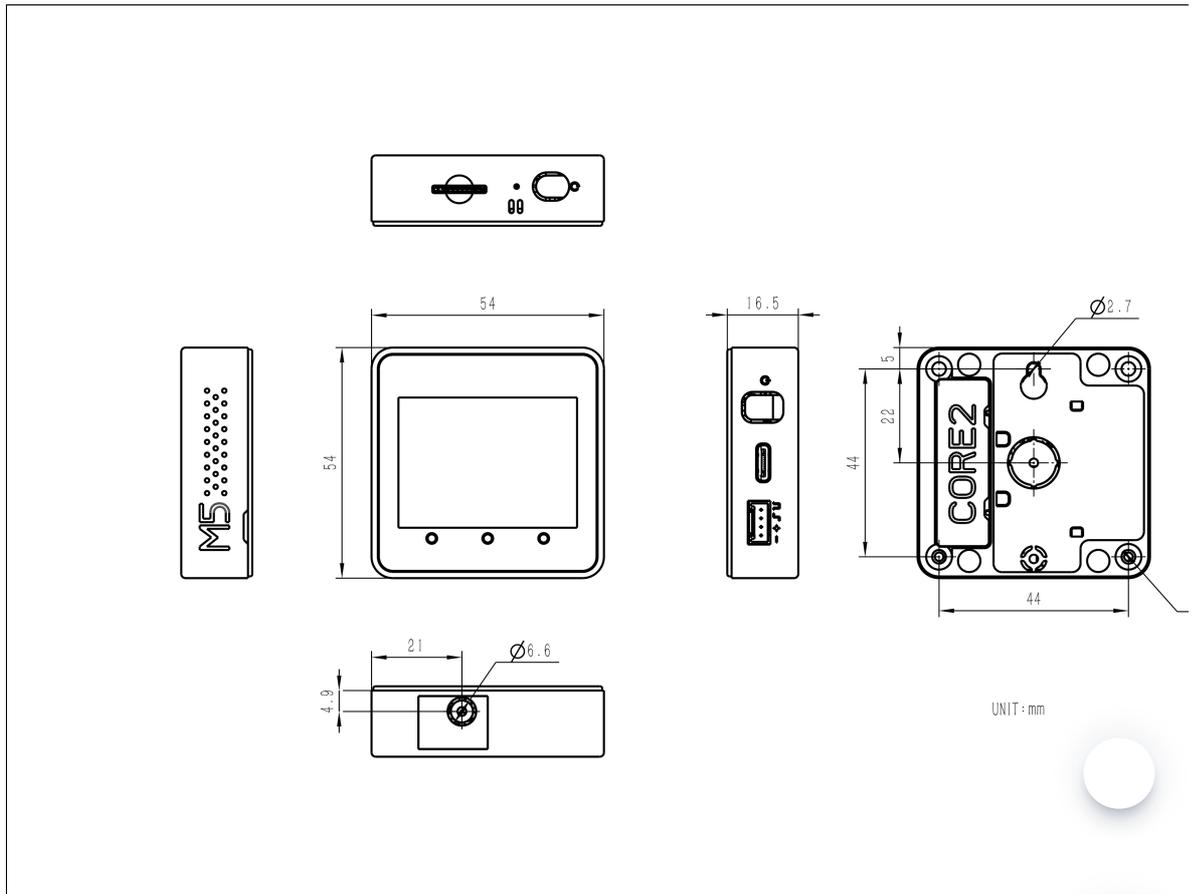| Flash 1)	
GPIO6	SCLK
GPIO7	SO
GPIO8	SI
GPIO9	HOLD#
GPIO10	WP#
GPIO11	CS#

1) M5Stack and M5Core2

PSRAM 2)	
GPIO17	SCLK
GPIO7	SO/SIO1
GPIO8	SI/SIO0
GPIO9	SIO3
GPIO10	SIO2
GPIO16	CS#

2) Also present in M5Stack Fire

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M5Core2

LCD	
GPIO23	MOSI
GPIO38	MISO
GPIO18	SCK
GPIO5	CS
GPIO15	D/C
AXP_IO4	Reset
AXP_DCDC3	Backlight

Touch	
GPIO21	SDA
GPIO22	SCK
GPIO39	INT

SDCard	
GPIO23	CMD/MOSI
GPIO38	DAT0/MISO
GPIO18	CLK/SCK
GPIO4	DAT3/CS

Speaker	
GPIO0	LRCK
GPIO12	BCLK
GPIO2	SADTA
AXP_IO2	Enable

RTC/AXP	
GPIO21	SDA
GPIO22	SCK

SYS_LED	
AXP_IO1	on

Model Size

UNIT : mm

Structure

- Core2 v1.1 Structure Files

Datasheets

- ESP32
- FT6336U
- NS4168
- MPU6886
- ILI9342C
- SPM1423
- BM8563
- SY7088
- AXP2101
- 1027DC Motor
- INA3221

Softwares

Arduino

- Core2 v1.1 Arduino Quick Start
- Core2 v1.1 Arduino Driver Library
- Core2 v1.1 Arduino M5GFX Driver Library
- Core2 v1.1 Arduino M5Unified Driver Library

UiFlow1

- Core2 v1.1 UiFlow1 Quick Start

UiFlow2

- Core2 v1.1 UiFlow2 Quick Start

PlatformIO

```
[env:m5stack-core2]
platform = espressif32@6.7.0
board = m5stack-core-esp32
```

```
framework = arduino
upload_speed = 1500000
monitor_speed = 115200
build_flags =
    -DBOARD_HAS_PSRAM
    -mfix-esp32-psram-cache-issue
    -DCORE_DEBUG_LEVEL=5
lib_deps =
    M5Unified=https://github.com/m5stack/M5Unified
```

Easyloader

Easyloader	Download Link	Note
Core2 v1.1 Factory Test Easyloader	download	/

USB Driver

Click the link below to download the driver matching your operating system. There are currently two driver chip versions, CP34X (for **CH9102** version) driver package. After extracting the package, select the installation package corresponding to your operating system's bit version for installation. (If you are unsure which USB chip your device uses, you can install both drivers. **CH9102_VCP_SER_MacOS v1.7** may report an error during installation, but it is actually installed, just ignore it.) If you encounter issues with downloading programs (timeout or Failed to write to target RAM), try reinstalling the device driver.

Driver Name	Applicable Driver Chip	Download L
CH9102_VCP_SER_Windows	CH9102	Download
CH9102_VCP_SER_MacOS v1.7	CH9102	Download

Video

- This example will perform hardware operation tests for the speaker, Wi-Fi, buttons, accelerometer, microSD, screen, etc.

0:00 / 1:34

Product Comparison

To compare information on the controller series products, you can visit the Product Selectic Table, check the target products, and get the comparison results. The selection table covers information such as core parameters and functional features, and supports comparison of multiple products simultaneously.

AXP2101 (Core2 v1.1) vs AXP192 (Core2) Parameter Comparison

Feature	AXP2101 (Core2 v1.1)	AXP192 (Co
Battery Voltage	0.7V ~ 4.2V	0.7V ~ 4.2
Battery Charging Current	100mA	500mA
Battery Charging Efficiency	94%	%
Battery Charging Termination Current	10mA	50mA
Battery Discharge Efficiency	96%	%
Power Output Current	300mA	500mA
Power Output Efficiency	95%	90%

Core2 vs Core2 v1.1 Differences

Comparison Item	Core2	Core2 v1.1
Power Management Solution	AXP192 chip only	AXP2101 + INA3221 combine solution
Power Indicator Color	Green	Blue
RTC Timing Function	No independent backup battery, inaccurate after power-off	Equipped with RTC chip backu battery, accurate timing after pov

> AXP192 and AXP2101 have different IDs, which the program uses as a flag to distinguish versions.

Version Change

Release Date	Product Change	Note
/	Initial release of Core2	/
2023.11	Core2 v1.1	Changed PMU power management chip to AXP2101+INA3221/added RTC power supply ba /po indicator light changed to blue

Version Comparison

The differences between Core2 and Core2 v1.1 are as follows:

1. The power management solution has been iterated from Core2 (AXP192) to Core2 v1.
(AXP2101+INA3221), with different IDs for AXP192 and AXP2101, used as a version
distinction marker in programs,

2. The power indicator light has changed from green to blue;

3. Added an RTC chip power supply battery to ensure precise timing even when powere
off.

FAQ

Q1: Core2 How to Extension Module?

**Q2: If the memory card fails to read, you can add the following cod
during initialization to enhance the host's memory card reading
capability.**

**Q3: Can I use the M5Stack Core2 for a long period (around 6 hours)
while powering/charging it from an external battery? Is this usage
safe, or should I separate charging time from usage time? If needed
can I remove the internal battery and power the device only from a
external battery?**

Get More FAQ >>

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