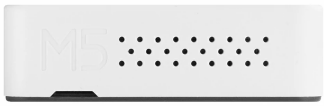
Core2 v1.3

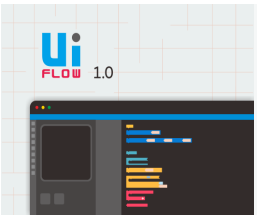
SKU:K010-V13



Description

Core2 v1.3 is a highly integrated controller designed for IoT applications. It features the ESP32-D0WDQ6-V3 core with an Xtensa dual-core 32-bit LX6 processor running at 240 MHz. The board includes 16MB of Flash, 8MB of PSRAM, and supports 2.4 GHz Wi-Fi. This version is an iteration of Core2 v1.0, retaining the AXP192 power management IC while upgrading the 6-axis IMU on the rear expansion board to a BMI270, which improves pose detection accuracy and overall performance without compromising system architecture or compatibility. For human-machine interaction, the device features a 2.0" color capacitive touchscreen. The three dot-shaped touch zones on the front panel are programmable and can be mapped to three virtual buttons. A built-in vibration motor provides tactile feedback. For storage and audio, the board includes a microSD card slot and a speaker, with audio output delivered via an I2S digital interface through the NS4168 amplifier to minimize distortion and enhance sound quality. The device also integrates an RTC real-time clock IC and a 500mAh lithium battery. The rear expansion board incorporates a BMI270 6-axis IMU and a microphone, supporting motion sensing and audio capture. This product is well-suited for IoT terminals, human-machine interaction devices, pose detection, and embedded multi-function development applications.

Tutorial



UiFlow

This tutorial explains how to control the Core2 device using the UiFlow graphical programming platform.

UiFlow2

This tutorial explains how to control the Core2 device using the UiFlow2 graphical programming platform.

Arduino IDE

This tutorial explains how to program and control the Core2 device using the Arduino IDE.

Notes

- The built-in vibration motor of Core2 v1.3 has a structural interference with Base series bases. To prevent damage to the device, do not stack Core2 v1.3 with any Base series expansion base.
- When stacking Core2 v1.3 with M5 modules, you will need to remove the battery bottom of Core2 v1.3. If you need to retain the I2S microphone, IMU, and battery functions of the base while stacking additional modules, it is recommended to use the M5GO Bottom2.
- Some screen edges may exhibit touch non-linearity. You can try using M5Tool to upgrade the screen firmware to resolve this issue.

Features

- ESP32-D0WDQ6-V3 Core:
  - 16MB Flash
  - 8MB PSRAM
  - 2.4 GHz Wi-Fi
- Human-Machine Interaction
  - 2.0" Color Capacitive Touchscreen
  - Built-in Speaker
  - Vibration Motor
- Standalone Peripheral Expansion Board
  - BMI270 6-Axis IMU
  - PDM Microphone
- AXP192 Power Management
- RTC Clock
- Built-in 500mAh Lithium Battery
- HY2.0-4P Expansion Interface
- microSD Card Slot
- Development Platforms
  - UiFlow1
  - UiFlow2
  - Arduino IDE
  - ESP-IDF
  - PlatformIO

Includes

- 1 x Core2 v1.3
- 1 x USB Type-C Cable (20cm)
- 1 x Hex Key L-Shape 2.0mm (For M2.5 Screw)

Applications

- IoT Controller
- DIY Projects
- Smart Home Devices

Specifications

Specification	Parameter
SoC	ESP32-D0WDQ6-V3@Dual-Core Processor, 240MHz
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	Green Power Indicator
Buttons	Power Button, RST Button, Screen Virtual Buttons x 3
Vibration Alert	Vibration Motor
IPS LCD Screen	2.0"@320 x 240 ILI9342C
Capacitive Touch IC	FT6336U
Microphone	SPM1423
I2S Amplifier	NS4168
IMU	BMI270
RTC	BM8563
PMU	AXP192
USB-TTL	CH9102F
Lithium Battery	3.7V @ 500mAh
RTC Battery	MS412FE 3V 1.0mAh Rechargeable Micro Lithium Battery
Charging Parameters	Charging Current: 0.219A Current After Full Charge (Power Off): 0.055A Current When Fully Charged (Power On): 0.147A
Antenna	2.4G 3D Antenna
Operating Temperature	0 ~ 60°C
Base Screw Specification	Hex Countersunk M3
Internal PCB Reserved Interface	Battery Interface (Spec: 1.25mm-2P), USB Line Interface (Spec: 1.25mm-4P)
Product Size	54.0 x 54.0 x 16.5mm

Specification	Parameter
Product Weight	58.8g
Package Size	80.0 x 59.9 x 21.6mm
Gross Weight	88.2g

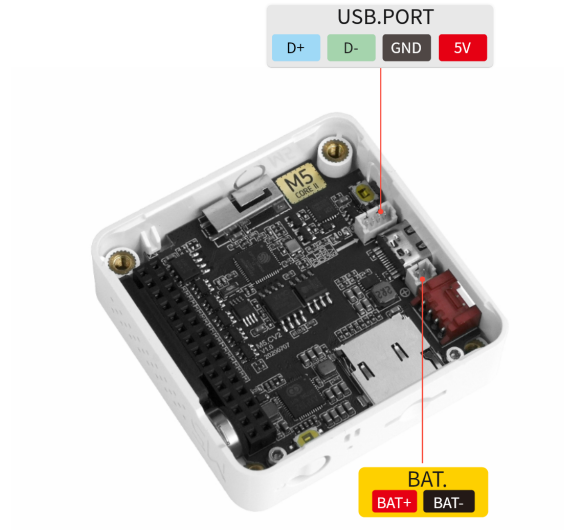
Learn

Power On/Off

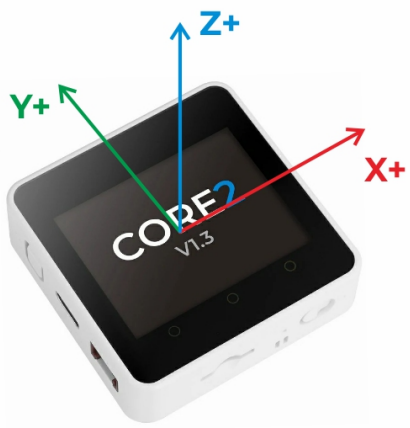
- Power On: Single-click the left power button
- Power Off: Long-press the left power button
- Reset: Single-click the RST button on the bottom

Onboard Reserved Interface

The PCB of Core2 v1.3 is reserved with a USB-TTL chip interface and a lithium battery interface.



IMU Triaxial Direction Schematic Diagram



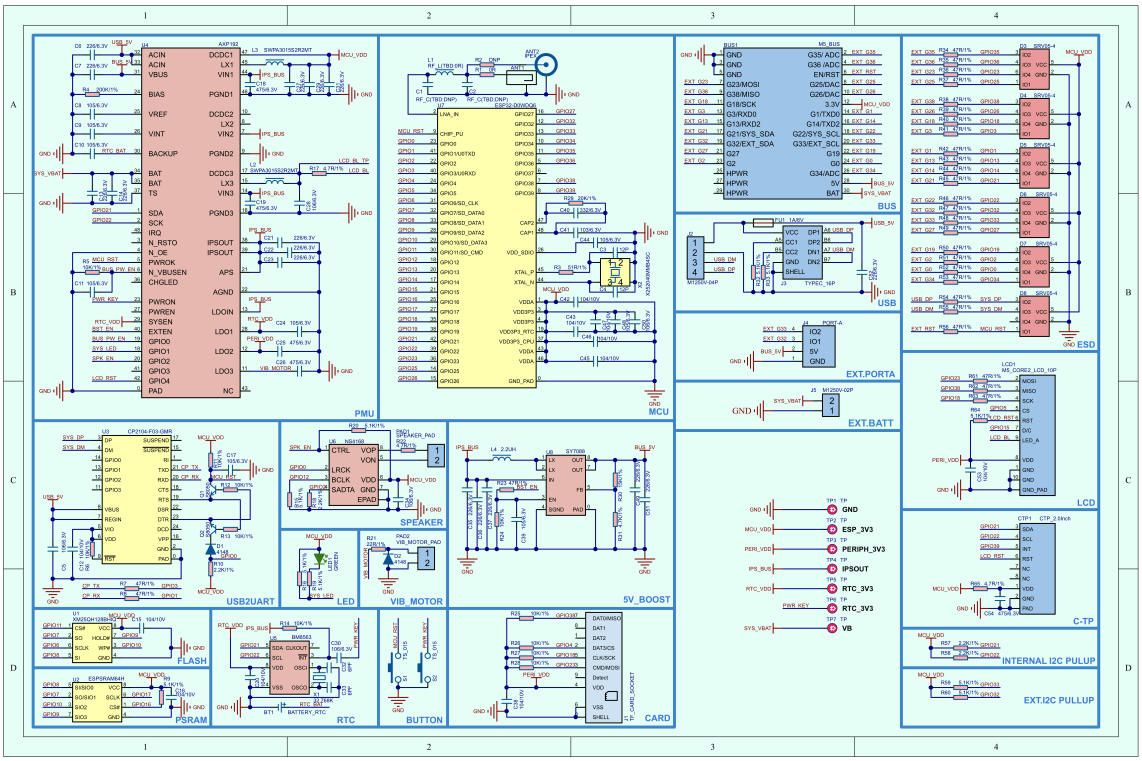
IMU ORIENTATION OF AXES

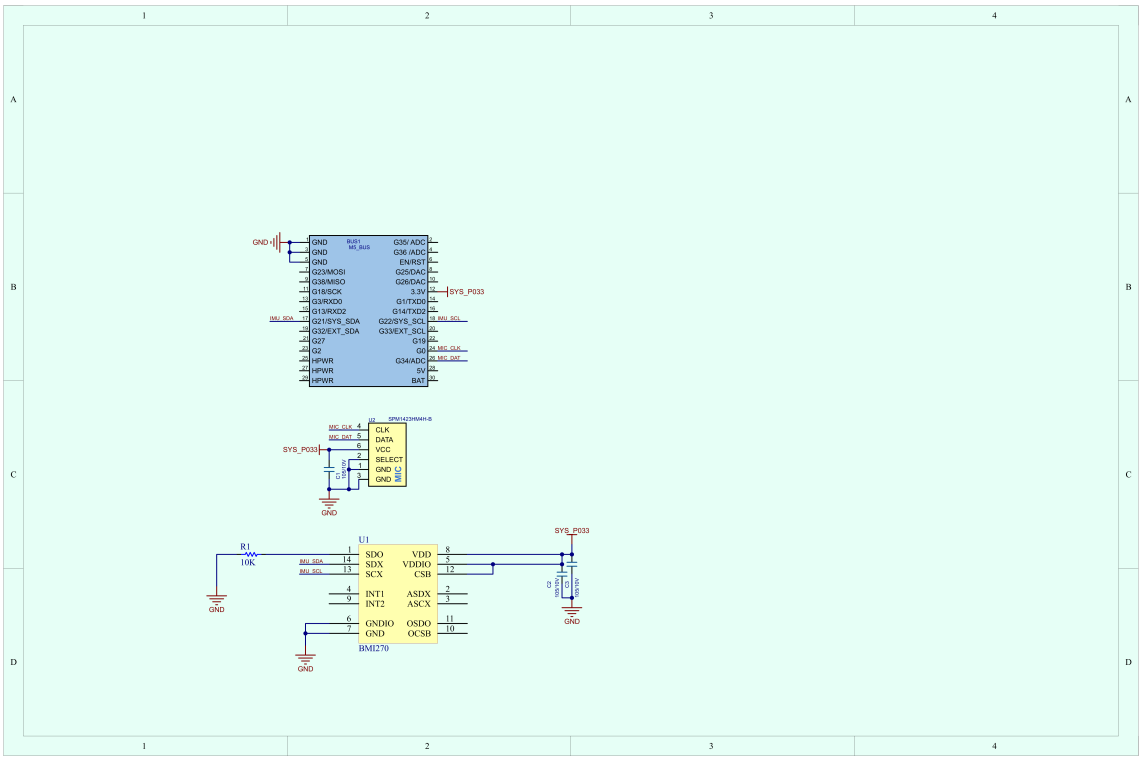
Certifications

- CE/MIC/FCC/RCM
- IEC62133

Schematics

- Core2 v1.3 Core Section Schematics PDF
- Core2 v1.3 Expansion Board Section Schematics PDF


PMU
MCU
BUS
USB
ESD
EXT.PORTA
EXT.BATT
LCD
C-TP
INTERNAL I2C PULLUP
EXT.I2C PULLUP
USB2UART
SPEAKER
LED
VIB_MOTOR
5V_BOOST
FLASH
PSRAM
RTC
BUTTON
CARD
GND
ESP_3V3
PERIPH_3V3
IPSOUT
RTC_3V3
VB


SYS_P033
BMI270

PinMap

LCD

ESP32-D0WDQ6-V3	G38	G23	G18	G5	G15
ILI9342C	MISO	MOSI	SCK	CS	DC

AXP192	AXP_IO4	AXP_DC3	AXP_LDO2
ILI9342C	RST	BL	PWR

microSD

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

Touch

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

AXP192	AXP_IO4
FT6336U	RST

Audio

ESP32-D0WDQ6-V3	G12	G0	G2	G34
NS4168	BCLK	LRCK	DATA	
SPM1423		CLK		DATA

AXP192	AXP_IO2
NS4168	SPK_EN

AXP Power Indicator & Vibration Motor

AXP192	AXP_IO1	AXP_LDO3
Green LED	VCC	
Vibration Motor		VCC

RTC

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

AXP192	AXP_PWR
BM8563	INT

IMU (3-Axis Gyroscope + 3-Axis Accelerometer)

ESP32-D0WDQ6-V3	G21	G22
BMI270 (0x68)	SDA	SCL

Internal I2C Connections

ESP32-D0WDQ6-V3	G21	G22
BMI270 (0x68)	SDA	SCL
AXP192 (0x34)	SDA	SCL
BM8563 (0x51)	SDA	SCL
FT6336U (0x38)	SDA	SCL

HY2.0-4P

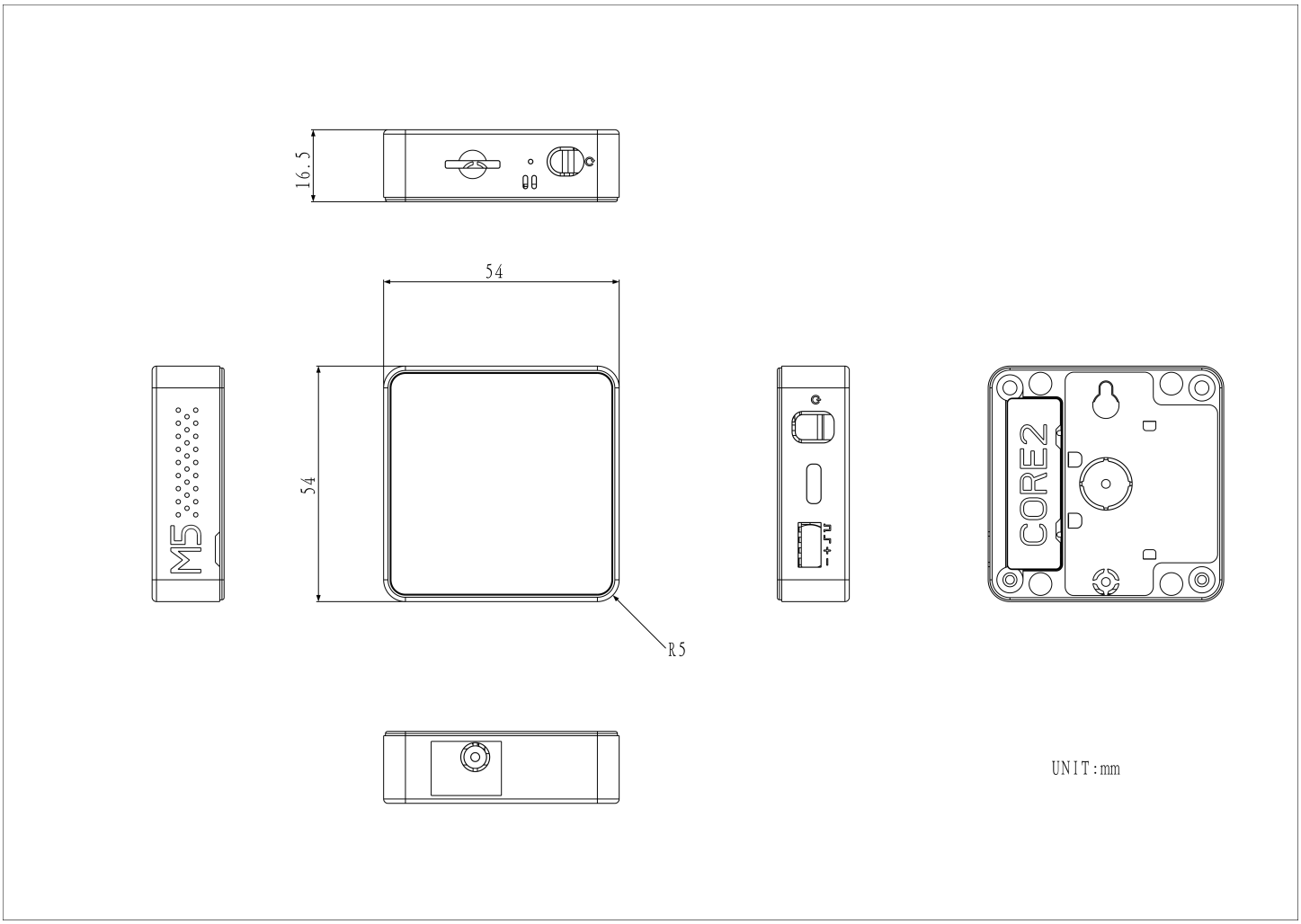
HY2.0-4P	Black	Red	Yellow	White
PORT.A	GND	5V	G32	G33

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	

Model Size

- Core2 v1.3 Model Size PDF



PCB

- Core2 v1.3 Structural Files

Datasheets

- ESP32
- FT6336U
- NS4168
- BMI270
- ILI9342C
- SPM1423
- BM8563
- SY7088
- AXP192 Datasheet
- 1027DC Motor

Softwares

Arduino

- Core2 v1.3 Arduino Quick Start

- Core2 v1.3 Arduino Library
- Core2 v1.3 Arduino API

UiFlow1

- Core2 v1.3 UiFlow1 Quick Start

UiFlow2

- Core2 v1.3 UiFlow2 Quick Start

PlatformIO

```
[env:m5stack-core2]
platform = espressif32@6.12.0
board = m5stack-core2
framework = arduino
upload_speed = 921600
monitor_speed = 115200
board_build.partitions = default_16MB.csv
build_type = debug
build_flags =
    -DBOARD_HAS_PSRAM
    -DCORE_DEBUG_LEVEL=5
lib_deps =
    M5Unified=https://github.com/m5stack/M5Unified
```

ESP-IDF

- Core2 v1.3 ESP-IDF BSP Guide

USB Driver

Download and install the **CH9102** USB serial (VCP) driver from the table below according to your operating system. When installing **CH9102_VCP_SER_MacOS v1.7**, the installer may display an error message, which is typically a false positive — the driver is usually installed correctly and you can safely dismiss the prompt and proceed. If firmware flashing or downloading fails, times out, or returns errors such as `Failed to write to target RAM`, try reinstalling the driver or switching to a different USB cable or port.

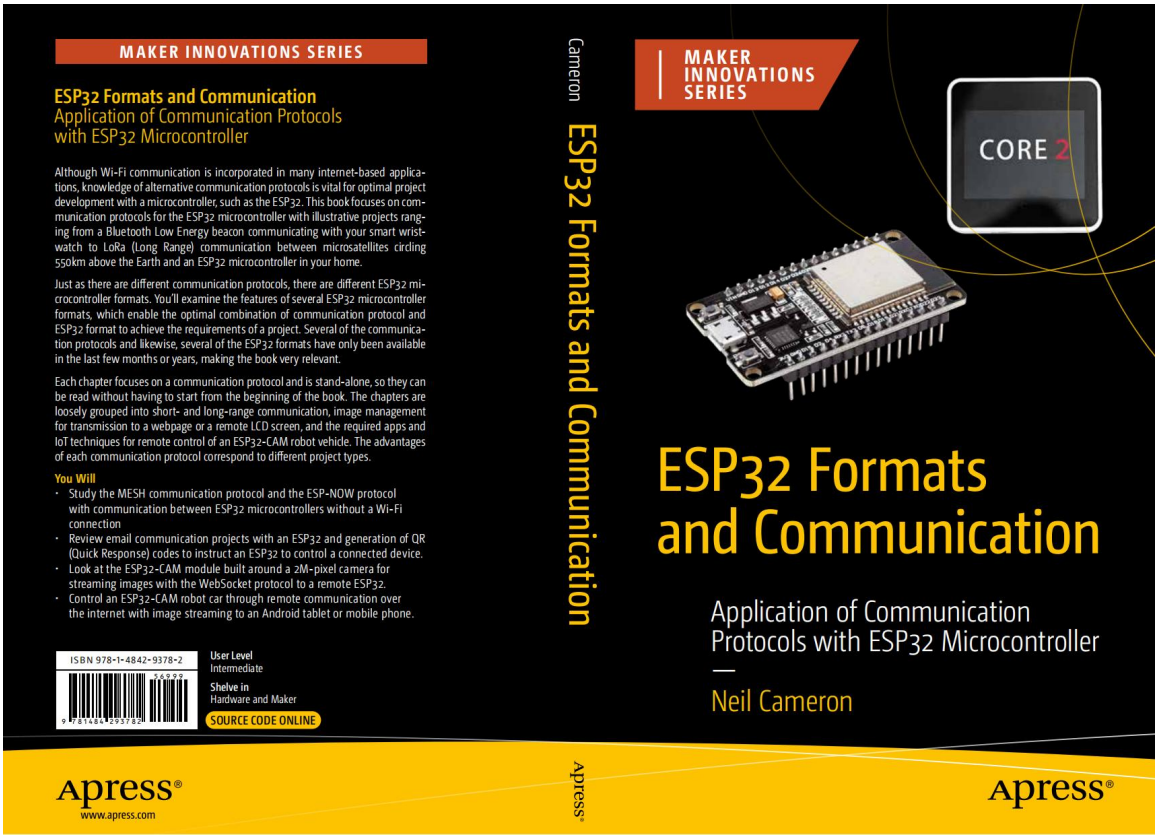
Driver Name	Compatible Chip	Download
CH9102_VCP_SER_Windows	CH9102	Download
CH9102_VCP_SER_MacOS v1.7	CH9102	Download

Easyloader

Easyloader	Download	Note
Core2 Factory Firmware	Download	/

Other

- ESP32 Formats and Communication Protocols



> *ESP32 Formats and Communication Protocols* dedicates several chapters to the M5Stack Core2 module. The M5Stack Core2 integrates a touch LCD screen with Wi-Fi connectivity, a microphone and speaker, as well as an accelerometer and gyroscope, making it an exceptionally versatile platform. The book uses communication protocols to build a variety of projects — ranging from connecting a smartwatch to a smartphone (BLE) and long-range communication with satellites orbiting Earth (LoRa), to audio signal transmission between devices (I2S). It also covers the use of QR codes for controlling external devices over the internet, as well as ESP-MESH and ESP-NOW protocols for enabling communication between microcontrollers without an internet connection.

Video

- Core2 v1.3 Product Introduction and Feature Demonstration

K010-V13-Core2-v1.3-video-EN.mp4

Product Comparison

Product Compare			
	Core2 v1.3	**Core2 v1.1**	**Core2**
IMU	BMI270	MPU6886	MPU6886
PMIC	AXP192	AXP2101	AXP192
USB-TTL	CH9102	CH9102	CP2104/CH9102
Power Indicator Color	Green	Blue	Green

To compare products across the controller series, visit the Product Selection Table and select the target products to view a side-by-side comparison. The table covers key parameters and feature highlights, supporting simultaneous comparison of multiple products.