

Basic v2.7

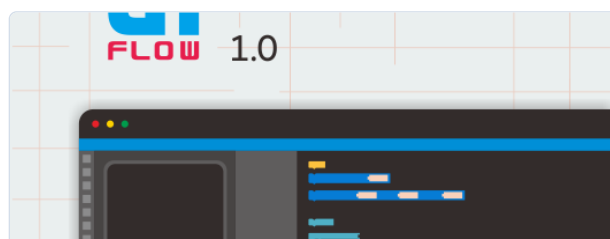
SKU:K001-V27



Description

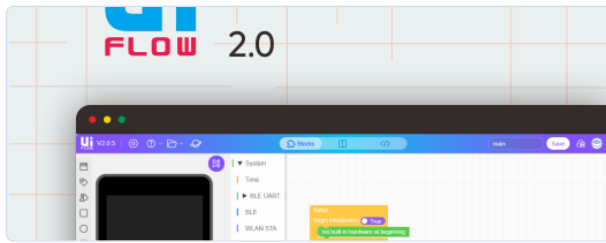
Basic v2.7 is a cost-effective IoT entry-level main controller. It uses the Espressif **ESP32** chip, equipped with 2 low-power **Xtensa® 32-bit LX6** microprocessors, with a main frequency of up to **240 MHz**. It has onboard **16 MB FLASH** memory, integrated with a **2.0-inch full-color high-definition IPS display panel**, **speaker**, **TFCard slot**, and other peripherals. The full-cover casing ensures the **stability** of circuit operation even in complex industrial application scenarios. The internal bus provides multiple common interface resources (ADC/DAC/I2C/UART/SPI, etc.), with 15 x IO leads on the bottom bus, offering strong expandability. It is suitable for various product prototype development, industrial control, and smart building application scenarios.

Tutorial



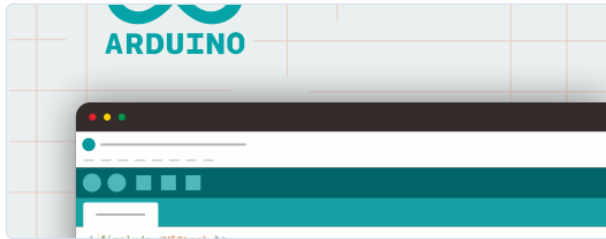
UIFlow

This tutorial introduces how to control the Basic device using the UIFlow1 graphical programming platform.



UiFlow2

This tutorial introduces how to control the Basic device through the UiFlow2 graphical programming platform.



Arduino IDE

This tutorial introduces how to program and control the Basic device using the Arduino IDE.

Features

- **Highly Productized:**
 - Exquisite appearance design, directly corresponding to product landing from prototype development
 - Product-level full-cover casing for more stable circuit operation
- **Low-Code Development:**
 - Supports UIFlow graphical programming platform, scripting, no compilation, cloud push
 - Fully compatible with mainstream development platforms like Arduino, ESP-IDF
 - Supports FreeRTOS, efficiently organizing task logic and optimizing program execution efficiency through dual-core and multitasking mechanisms
- **High Integration:**
 - 2.0-inch IPS display panel, speaker, customizable buttons x3
 - Built-in lithium battery power supply, integrated power management chip, supports Type-C interface
 - Professionally modulated RF circuit provides stable and reliable wireless communication quality
- **Strong Expandability:**
 - 15 x IO leads
 - Easily integrate into M5Stack's hardware and software system, stackable module design, plug-and-play sensor expansion
- Developed based on ESP32
- 16M Flash
- Integrated full-color high-definition IPS display panel and various hardware peripherals
- Rich resource interfaces, compatible with M5Stack stackable module system and sensor system, extremely expandable
- Uses [M5CORE BOTTOM base](#) with built-in lithium battery, 15 x IO leads
- Development Platform
 - UiFlow1
 - UiFlow2
 - Arduino IDE
 - ESP-IDF
 - PlatformIO

Includes

- 1 x Basic v2.7
- 10 x Dupont wires
- 1 x USB Type-C cable (20cm)
- 1 x User manual

Applications

- IoT Controller

- Maker DIY Projects
- Smart Home Control

Specifications

Specification	Parameter
SoC	ESP32-D0WDQ6-V3 @ Xtensa® 32-bit LX6 dual-core processor, clock frequency 240MHz
DMIPS	600
SRAM	520KB
Flash	16MB
Wi-Fi	2.4 GHz Wi-Fi
Input Power	5V@500mA
Interface	USB Type-C x1, I2C x1
IO	G21, G22, G23, G19, G18, G3, G1, G16, G17, G2, G5, G25, G26, G35, G36
Buttons	Physical buttons x 3
LCD Screen	2.0"@320 x 240 ILI9342C IPS panel, max brightness 853nit
Speaker	1W-0928
USB Chip	CH9102F
Antenna	2.4G 3D antenna
Battery	110mAh @ 3.7V
Casing Material	Plastic (PC)
Product Size	54.0 x 54.0 x 17.0mm
Product Weight	49.4g
Package Size	88.0 x 56.0 x 22.0mm
Gross Weight	76.0g

Learn

Power On/Off Operations

Power On: Toggle the bottom switch to **1**, single-click the red power button on the left

Power Off: Without USB power, quickly double-click the red power button on the left, or toggle the bottom switch to **0**.

USB Power: By default, when USB powered, the device cannot be turned off.

Schematics

- [Basic v2.7 Schematics PDF](#)

REV	DESCRIPTION	DATE	BY
A13	OFFICIAL RELEASE VERSION	10/11/2017	Han

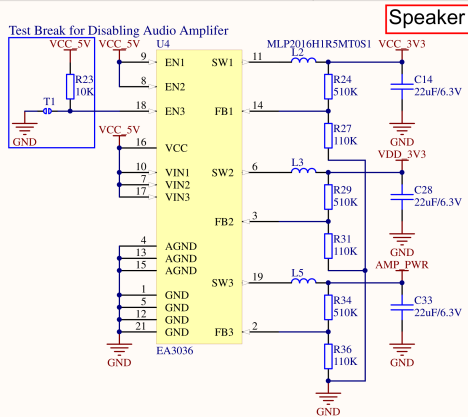
M5 STACK

PAGE NO.	SCHEMATIC PAGE
1	COVER PAGE
2	POWER MANAGEMENT
3	ESP32 SUBSYSTEM
4	USB-UART & ACCESSORY
5	M.BUS DEFINITION
6	AUDIO AMPLIFIER

M5 STACK CORE

Title M5 STACK CORE COVER

Size	Number	Revision
A4	013-0000-001	A
Date:	2017/12/6	Sheet of
File:	C:\Users\AA1-COVER.SchDoc	Drawn By: Han Shihao



Link for Datasheet: http://198.13.102.98/bjingenic_support/X1000_X1000E_X150002_HW/00_Halley2/Halley2_coreV3.0_baseV2.0/06Datasheet/PMIC/EA3036_1.0_2014_Sep.pdf

Application Information

Output Voltage Setting
Each of the regulators output voltage can be set via a resistor divider (ex. R1, R2). The output voltage is calculated by following equation:

$$V_{OUT} = 0.6 \times \frac{R1}{R2} + 0.6 \text{ V}$$

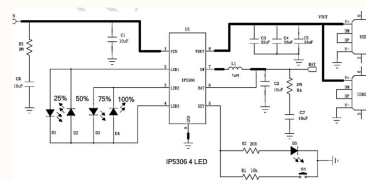
The following table lists common output voltage and the corresponding R1, R2 resistance value for reference.

Output Voltage	R1 Resistance	R2 Resistance	Tolerance
3.3V	510KΩ	110KΩ	1%
1.8V	200KΩ	100KΩ	1%
1.5V	150KΩ	100KΩ	1%
1.2V	100KΩ	100KΩ	1%

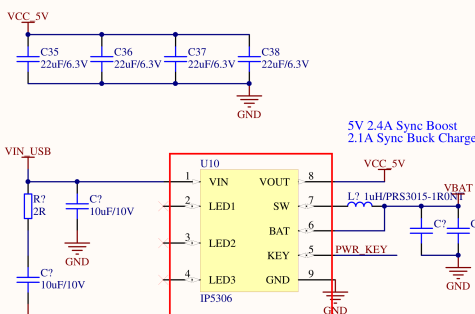
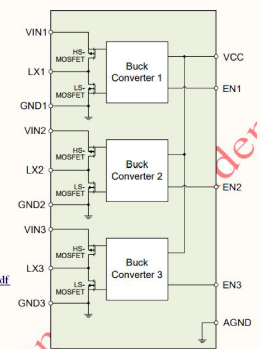
Link for DCDC Buck Inductor: http://www.mouser.com/ds/2/400/inductor_commercial_power_mlp2016_en-838407.pdf

Type	Thickness T (mm)max.	L (μH)	tolerance	Measuring frequency (MHz)	DC resistance (Ω)	Rated current* (mA)max.	Part No.
Low resistance	1.0	0.47	±20%	2	0.05±25%	1700	MLP2016H1R5MT051
	1.0	1.0	±20%	2	0.09±25%	1300	MLP2016H1R8MT051
	1.0	1.5	±20%	2	0.11±25%	1200	MLP2016H1R8MT051
Low core loss	1.0	2.2	±20%	2	0.11±25%	1200	MLP2016H1R8MT051
	1.0	3.3	±20%	2	0.12±25%	1200	MLP2016H1R8MT051
	1.0	4.7	±20%	2	0.16±25%	1100	MLP2016H1R8MT051
Emphasized DC bias characteristics	1.0	0.47	±20%	2	0.05±25%	1300	MLP2016H1R8MT051
	1.0	1.0	±20%	2	0.12±25%	1200	MLP2016H1R8MT051
	1.0	1.5	±20%	2	0.14±25%	1150	MLP2016H1R8MT051
	1.0	2.2	±20%	2	0.17±25%	1000	MLP2016H1R8MT051

Datasheet for IP5306: <http://www.injoinic.com/doc/IP5306/C2%A0datasheet/C2%A0x1.01.pdf>



Function Block Diagram

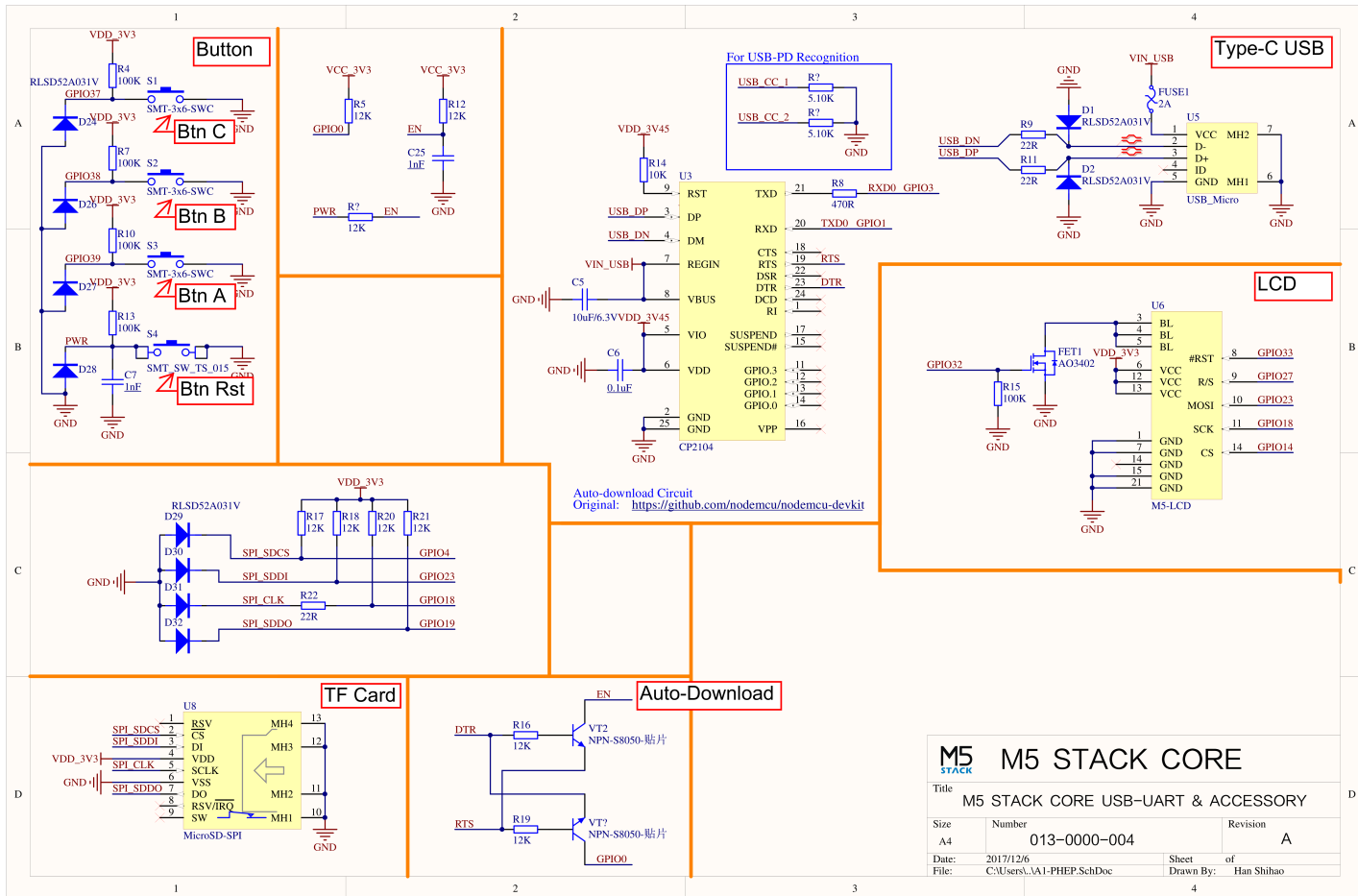
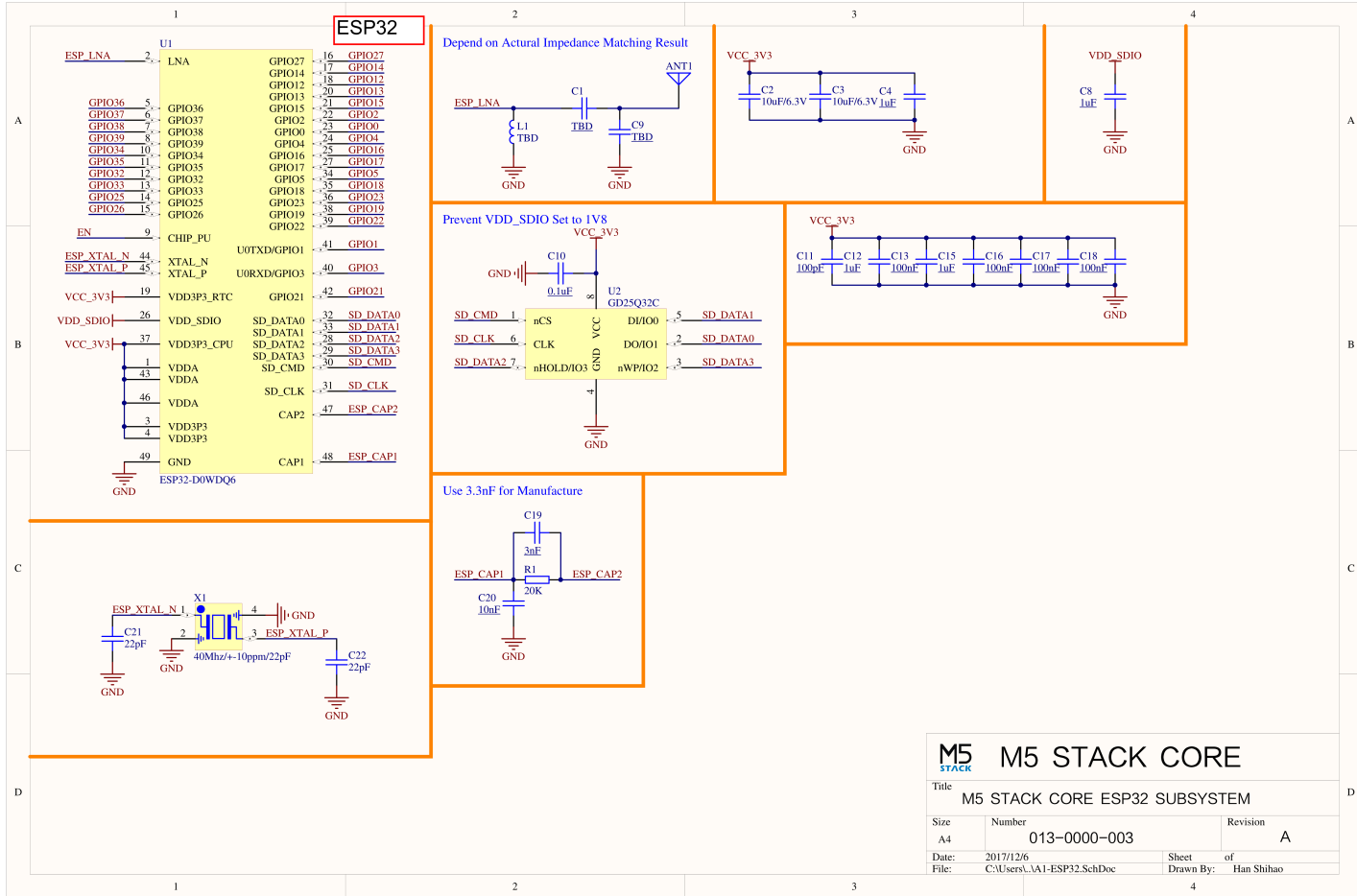


Be careful that this customized IP5306 was designed to communication with ESP32 through IIC. IIC address is 0x75.

M5 STACK CORE

Title M5 STACK CORE POWER MANAGEMENT

Size	Number	Revision
A4	013-0000-002	A
Date:	2017/12/6	Sheet of
File:	C:\Users\AA1-PWR.SchDoc	Drawn By: Han Shihao



LCD Screen & TF Card

LCD Pixels: 320x240 TF Card supports up to 16GB

ESP32-D0WDQ6-V3	G23	G19	G18	G14	G27	G33	G32	G4
ILI9342C	MOSI/MISO		CLK	CS	DC	RST	BL	
TF Card	MOSI	MISO	CLK					CS

Buttons & Speaker

ESP32-D0WDQ6-V3	G39	G38	G37	G25
Button Pin	BUTTON A	BUTTON B	BUTTON C	
Speaker				Speaker Pin

GROVE Interface A & IP5306

The power management chip (IP5306) is a custom I2C version with an I2C address of 0x75. Click [here](#) to view the IP5306 register manual.

ESP32-D0WDQ6-V3	G22	G21	5V	GND
GROVE A	SCL	SDA	5V	GND
IP5306 (0x75)	SCL	SDA	5V	GND

IP5306 Charge/Discharge, Voltage Parameters

Charging	Discharging
0.00 ~ 3.40V -> 0%	4.20 ~ 4.07V -> 100%
3.40 ~ 3.61V -> 25%	4.07 ~ 3.81V -> 75%
3.61 ~ 3.88V -> 50%	3.81 ~ 3.55V -> 50%
3.88 ~ 4.12V -> 75%	3.55 ~ 3.33V -> 25%
4.12 ~ / -> 100%	3.33 ~ 0.00V -> 0%

ESP32 ADC/DAC

ADC1	ADC2	DAC1	DAC2
8 Channels	10 Channels	2 Channels	2 Channels
G32-39	G0/2/4/12-15/25-27	G25	G26

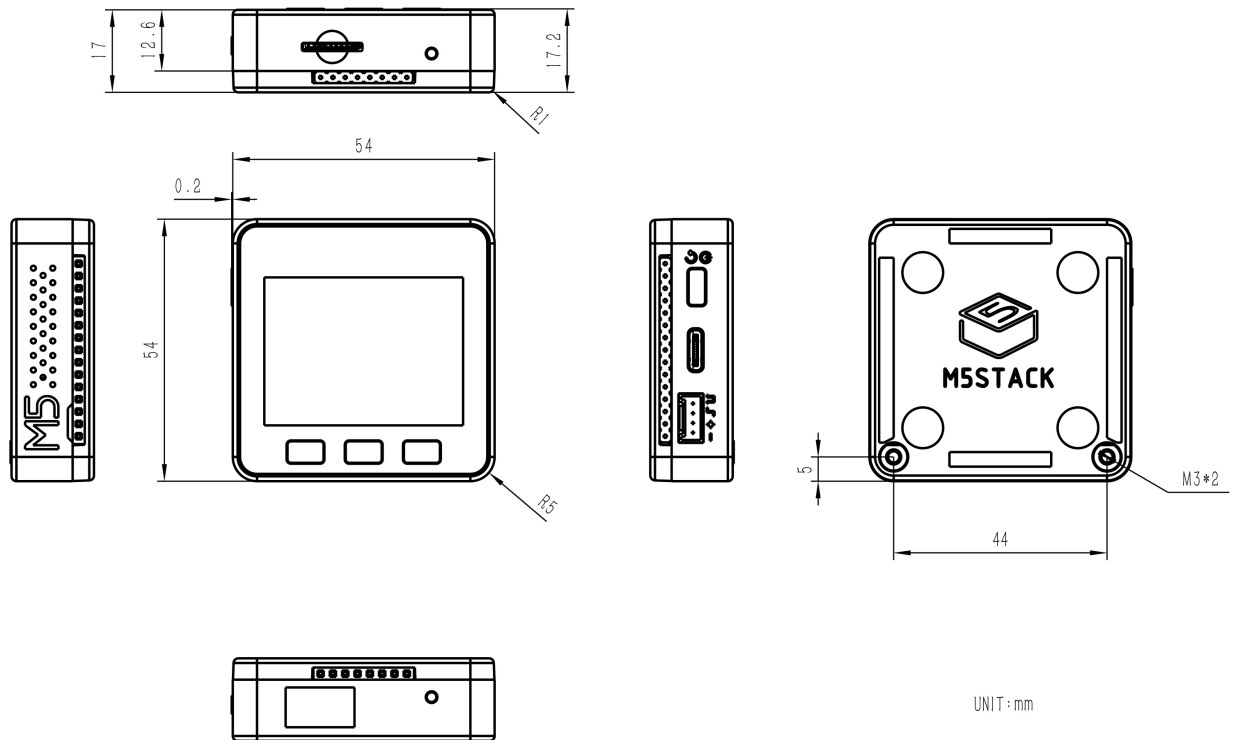
HY2.0-4P

HY2.0-4P	Black	Red	Yellow	White
PORT.A	GND	5V	G21	G22
PORT.B	GND	5V	G26	G36
PORT.C	GND	5V	G17	G16

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/SPK
MISO	G19	9	10	G26	DAC
SCK	G18	11	12	3V3	
RXD0	G3	13	14	G1	TXD0
RXD2	G16	15	16	G17	TXD2
Int SDA	G21	17	18	G22	Int SCL
GPIO	G2	19	20	G5	GPIO
I2S_SK	G12	21	22	G13	I2S_WS
I2S_OUT	G15	23	24	G0	I2S_MK
	HPWR	25	26	G34	I2S_IN
	HPWR	27	28	5V	
	HPWR	29	30	BAT	

Model Size



Structure

- [Basic v2.7 Structure Files](#)

Datasheets

- [ESP32](#)
- [ILI9342C](#)
- [IP5306](#)

Softwares

Arduino

- [Basic v2.7 Arduino Quick Start](#)
- [Basic v2.7 Arduino Driver Library](#)
- [Basic v2.7 Arduino API](#)

UiFlow1

- [Basic v2.7 UiFlow1 Quick Start](#)

UiFlow2

- [Basic v2.7 UiFlow2 Quick Start](#)

PlatformIO

```
[env:m5stack-core]
platform = espressif32@6.7.0
board = m5stack-core-esp32
framework = arduino
upload_speed = 1500000
monitor_speed = 115200
build_flags =
    -DCORE_DEBUG_LEVEL=5
lib_deps =
    M5Unified=https://github.com/m5stack/M5Unified
```

USB Driver

Driver Download

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

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

Easyloader

Easyloader	Download Link	Note
Basic v2.7 Test Easyloader	download	/

Video

Product Comparison

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



Version Change

Release Date	Product Changes	Note
2023.4	Upgraded to v2.7	The screen was changed to glass for a clearer display; the Grove port added a boost function for stable 5.1V output and better load stability; added a battery power switch
2021.10	Upgraded to v2.6, changed CP2104 to CH9102, optimized structural details (Core2.6)	/
2020.6	Flash size changed from 4MB to 16MB (Core2.5)	/
2020.3	Battery capacity changed from 150mAh to 110mAh (Core2.4)	/
2019.7	TN screen changed to IPS screen (Core2.2)	Please upgrade your M5Stack library to the latest version (v0.2.8 or above) to solve the screen color inversion problem
2017.7	First release (Core1.4)	/

Note

Devices with **2018.2A** PCB version do not support C2C (Type-C to Type-C) connection or PD power supply.

