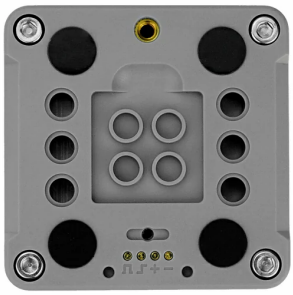
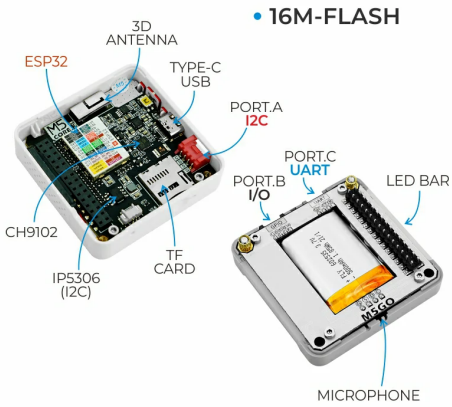
M5GO IoT Kit v2.7

SKU:K006-V27

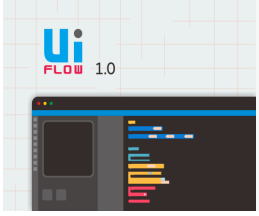




Description

M5GO IoT Kit v2.7 is a high cost-performance entry-level IoT development kit. The kit includes a **Core Controller M5GO** plus **6 expansion units with different functions** (sensors / actuators / splitter). The core controller **M5GO** adopts the Espressif **ESP32** chip, equipped with two low-power **Xtensa® 32-bit LX6** microprocessors, with a main frequency of up to **240MHz**. It features an onboard **16MB Flash** large-capacity memory, capable of accommodating larger program sizes. While boasting powerful hardware performance, this MCU also supports **Wi-Fi**, enabling the development of applications such as smart wearables and **smart home** solutions.

Tutorial



UIFlow

This tutorial shows you how to control the M5GO device using the UIFlow graphical programming platform.

UiFlow2

This tutorial shows you how to control the M5GO device using the UiFlow2 graphical programming platform.

Arduino IDE

This tutorial shows you how to program and control the M5GO device with the Arduino IDE.

Features

- ESP32-based development
- 16MB Flash
- Integrated full-color high-definition IPS display panel and multiple hardware peripherals
- Rich I/O interfaces, compatible with the M5Stack stacking module and sensor ecosystem, offering excellent scalability
- Base shell openings compatible with 8 mm LEGO bricks for fun structural building
- Microsoft Azure Certified Device
- Development Platform
  - UiFlow1
  - UiFlow2
  - Arduino IDE
  - ESP-IDF
  - PlatformIO

M5GO IoT Controller

- **Low-code development**:
  - Supports UIFlow graphical programming, scripting, compilation-free workflow, and cloud pushing
  - Fully compatible with Arduino, ESP32-IDF and other mainstream development platforms
  - Supports FreeRTOS; dual-core and multitasking mechanisms help organize task logic efficiently and optimize program performance
- **High integration**:
  - 2.0-inch IPS display, 6-axis IMU, programmable RGB LEDs ×10, microphone, speaker, and 3 customizable buttons
  - Built-in Li-ion battery, integrated power-management chip, power supply via Type-C and POGO PIN interfaces
  - Professionally tuned RF circuit for stable and reliable wireless communication
- **Great expandability**:
  - GROVE expansion ports ×3 (I2C, GPIO, UART)
  - Easily connect to the M5Stack software and hardware ecosystem, stackable module design, plug-and-play sensor expansion

6× Expansion Units

- Unit ENV-III: **Temperature, humidity & barometric pressure sensor** using I2C interface to quickly collect environmental data
- Unit PIR: **Human body sensor**, passive infrared principle for body detection, digital signal output
- Unit Angle: **Rotary potentiometer**, analog input for music/light adjustment
- Unit IR: Integrated **infrared emitter & receiver**, freely programmable for IR transmission and reception
- Unit RGB: 3× **programmable RGB LEDs**, support arbitrary color control via programming
- Unit Hub: **I2C splitter**, expands one I2C bus into three, allowing devices with different **I2C addresses** to be connected

Includes

- 1 × M5GO-CORE1 V2.7 main host

- 1 × M5GO BASE (charging dock)
- 1 × M5GO battery base
- 1 × M5GO charger
- 6 × Units (Unit ENV-III, Unit PIR, Unit Angle, Unit IR, Unit RGB, Unit Hub)
- 2 × LEGO nine-hole long plastic bricks
- 2 × LEGO five-hole long plastic bricks
- 12 × LEGO friction pins
- 2 × HY2.0-4P Grove Cables (20 cm)
- 2 × HY2.0-4P Grove Cables (10 cm)
- 1 × USB Type-C Cable (20 cm)
- 1 × M2 × 12 mm machine screw
- 1 × Hex Key L-Shape 1.5 mm (For M2 Screw)
- 1 × Quick Start Guide

Applications

- STEM education
- IoT controller
- Smart home
- Smart weather station

Specifications

Specification	Parameter
SoC	ESP32-D0WDQ6-V3@dual-core processor, 240MHz main frequency
DMIPS	600
SRAM	520KB
Flash	16MB
Wi-Fi	2.4 GHz Wi-Fi
Input Voltage	5V@500mA
Host Interface	USB Type-C x1, POGO PIN x1, I2C x1, GPIO x1, UART x1
IPS Display	2 inch, 320x240 Colorful TFT LCD, ILI9342C, 853nit max brightness
Buttons	Custom Keys x 3
Speaker	1W-0928
Microphone	Analog BSE3729 Microphone
IMU	6-axis MPU6886
USB Chip	CH9102F
LED	SK6812 RGB LED x 10
Antenna	2.4G 3D antenna
Battery	500mAh@3.7V
Operating Temperature	0 ~ 40°C
Case Material	Plastic (PC)
Product Size	54.0 x 54.0 x 28.6mm
Product Weight	87.7g
Package Size	159.3 x 91.5 x 41.1mm
Gross Weight	262.5g

Operation Instructions

Power On/Off

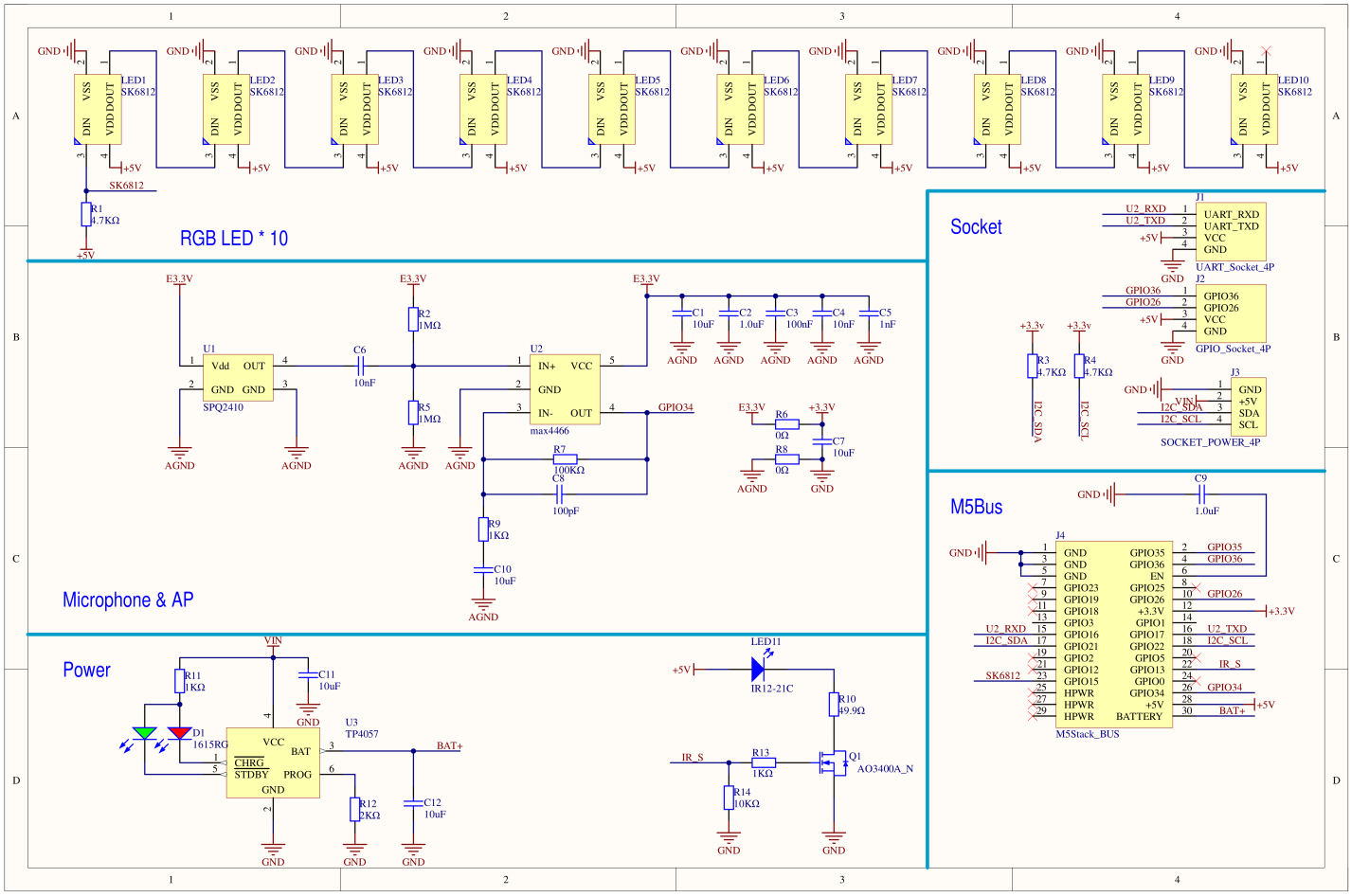
- Power on: single-click the red power button on the left side
- Power off: quick double-click the red power button on the left side
- USB power: by default, the device cannot be powered off while USB powered

M5GO Base

Click for detailed parameters

Schematics

- Base M5GO Bottom Schematics PDF
- M5Core Schematics PDF



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

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

M5 STACK

M5 STACK CORE

Title: M5 STACK CORE COVER

Size	Number	Revision
A4	013-0000-001	A

Date: 2017/12/6 | Sheet of

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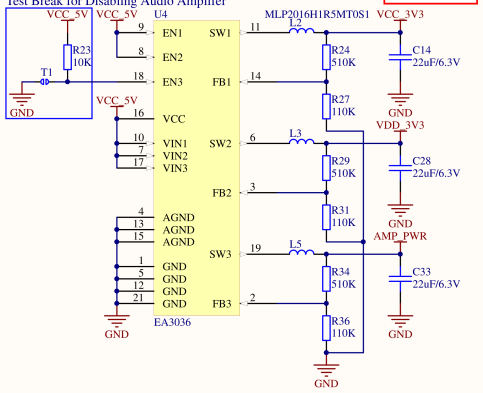
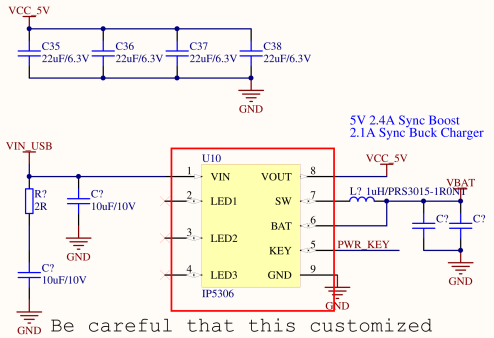
Speaker

Test Break for Disabling Audio Amplifer



Power



5V 2.4A Sync Boost
2.1A Sync Buck Charger

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

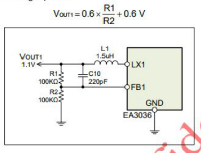
Link for Datasheet: http://198.13.102.98/bj/ingenic_support/X1000_X1000E_X1500/02_HW/00_Halley2/Halley2_coreV3.0_baseV2.0/06Datasheet/PMIC/EA3036_1.0_2014_Sep.pdf

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:

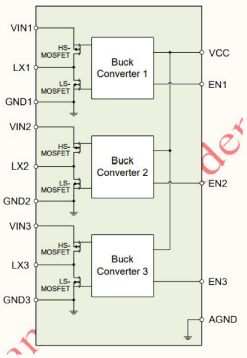
$$V_{OUT1} = 0.6 \times \frac{R1}{R2} + 0.6\ V$$



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%

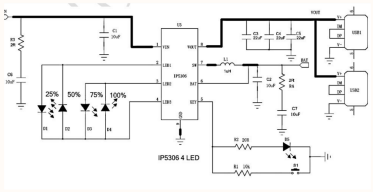
Function Block Diagram



Link for DCDC Buck Inductor: http://www.mouser.com/ds/2/400/nductor_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 core loss	Low resistance	1.0	0.47	±20%	2	0.055±25%	1700	MLP2016HF47MT0S1
		1.0	1.0	±20%	2	0.09±25%	1300	MLP2016H1R0MT0S1
		1.0	1.5	±20%	2	0.11±25%	1200	MLP2016H1R5MT0S1
		1.0	2.2	±20%	2	0.11±25%	1200	MLP2016H2R2MT0S1
		1.0	3.3	±20%	2	0.12±25%	1200	MLP2016H3R3MT0S1
	Emphasized DC bias characteristics	1.0	4.7	±20%	2	0.16±25%	1100	MLP2016H4R7MT0S1
		1.0	0.47	±20%	2	0.07±25%	1500	MLP2016VF47MT0S1
		1.0	1.0	±20%	2	0.12±25%	1200	MLP2016V1R0MT0S1
		1.0	1.5	±20%	2	0.14±25%	1150	MLP2016V1R5MT0S1
		1.0	2.2	±20%	2	0.17±25%	1000	MLP2016V2R2MT0S1

Datasheet for IP5306:
http://www.injoinic.com/doc/IP5306%C2%A0datasheet%C2%A0v1.01.pdf



M5 STACK CORE

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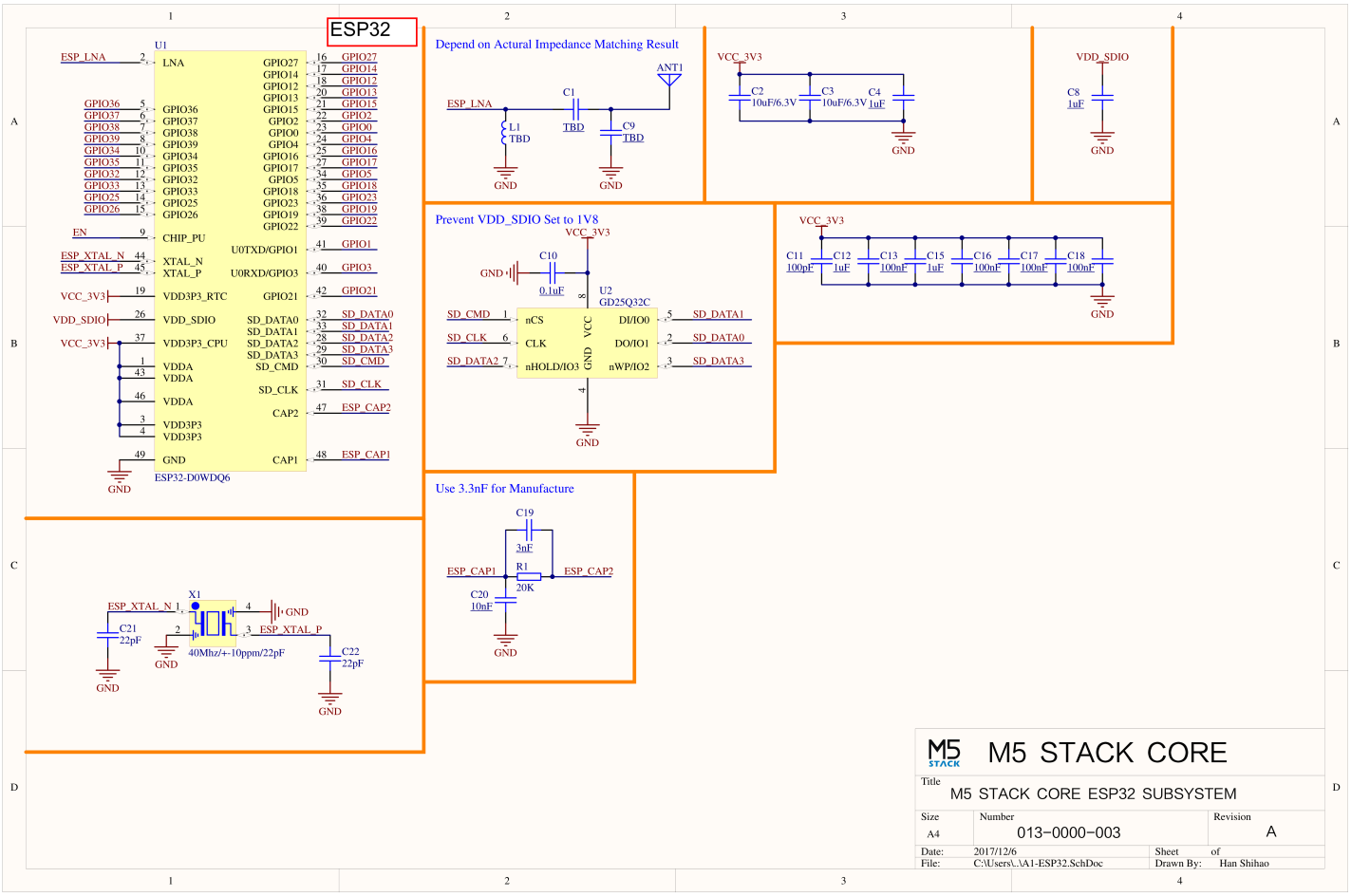
Confidential


ESP32
U1
ESP-DOWDQ6
Depend on Actural Impedance Matching Result
ANT1
C1
TBD
L1
TBD
C9
TBD
VCC_3V3
C2
10uF/6.3V
C3
10uF/6.3V
C4
1uF
VDD_SDIO
C8
1uF
Prevent VDD_SDIO Set to 1V8
C10
0.1uF
U2
GD25Q32C
C11
100pF
C12
1uF
C13
100nF
C15
1uF
C16
100nF
C17
100nF
C18
100nF
Use 3.3nF for Manufacture
C19
3nF
R1
20K
C20
10nF
X1
40Mhz/+-10ppm/22pF
C21
22pF
C22
22pF
GND
M5 STACK CORE
Title
M5 STACK CORE ESP32 SUBSYSTEM
Size
A4
Number
013-0000-003
Revision
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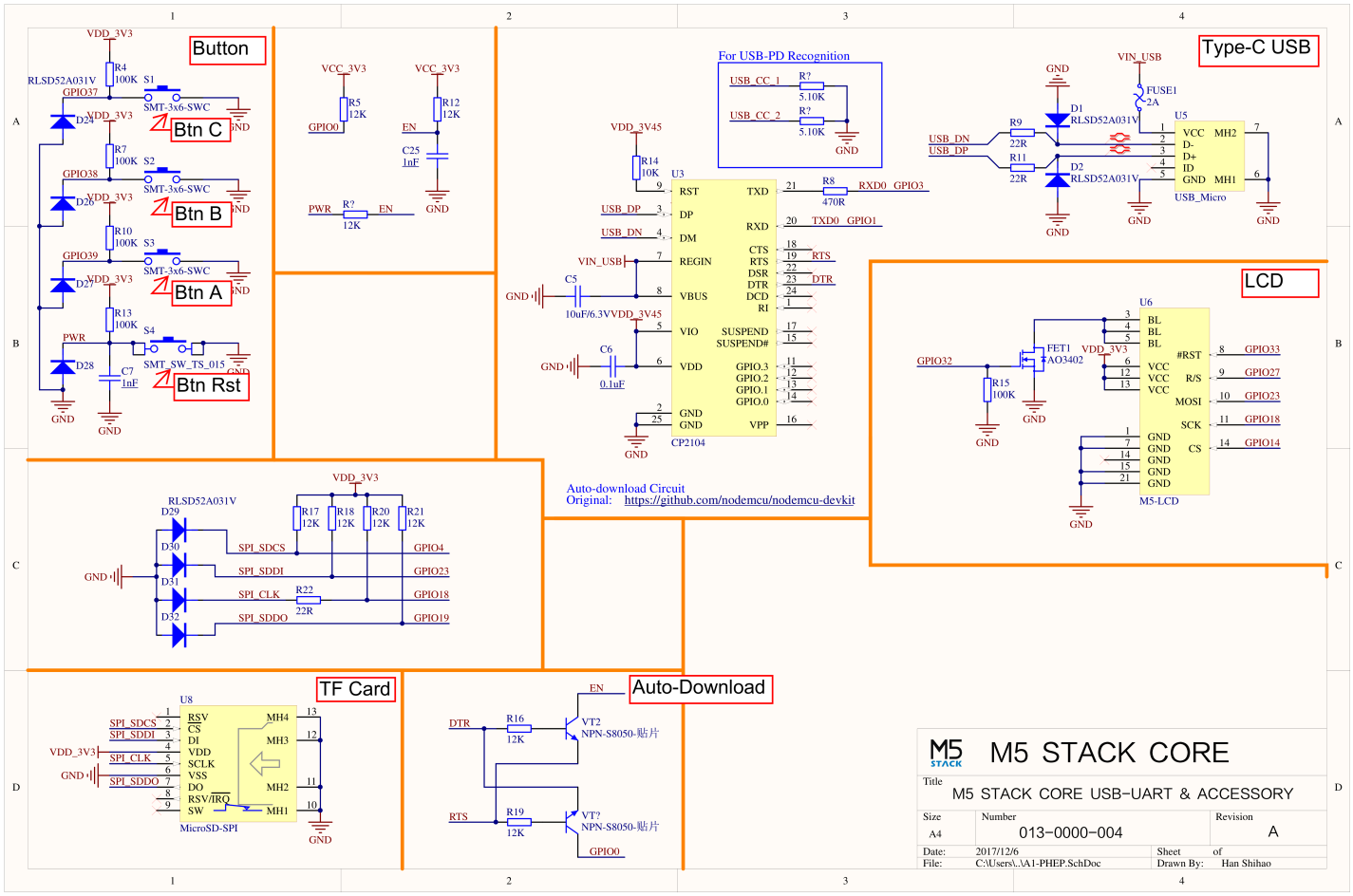
Drawn By:
Han Shihao


Button
Btn C
Btn B
Btn A
Btn Rst
For USB-PD Recognition
Type-C USB
USB_Micro
Auto-download Circuit
Original: https://github.com/nodemcu/nodemcu-devkit
LCD
M5-LCD
TF Card
MicroSD-SPI
Auto-Download
M5 STACK CORE
M5 STACK CORE USB-UART & ACCESSORY
013-0000-004
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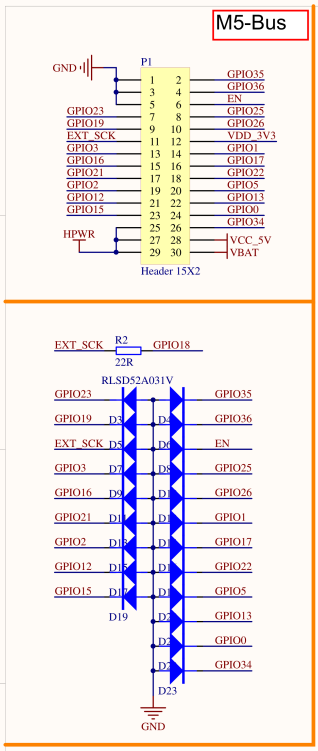
Han Shihao



	GND	1	2	ADC1	GPIO35
	GND	3	4	ADC2	GPIO36
	GND	5	6	RESET	EN
GPIO23	MOSI	7	8	DAC0/AUDIO_L	GPIO25
GPIO19	MISO	9	10	DAC1/AUDIO_R	GPIO26
GPIO18	SCK	11	12	3.3V	
GPIO3	IO0/RXD1	13	14	IO1/TXD1	GPIO1
GPIO16	IO2/RXD2	15	16	IO3/TXD2	GPIO17
GPIO21	IO4/SDA	17	18	IO5/SCL	GPIO22
GPIO2	IO6	19	20	IO7	GPIO5
GPIO12	IO8/IIS_SCLK	21	22	IO9/IIS_WS	GPIO13
GPIO15	IO10/IIS_OUT	23	24	IO11/IIS_MCLK/BOOT	GPIO0
	HPWR	25	26	ADC0/IIS_IN	GPIO34
	HPWR	27	28	5V	
	HPWR	29	30	BATTERY	

M5 STACK CORE

Title	M5 STACK CORE M.BUS DEFINATION	
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Date: 2017/12/6	Sheet: of	
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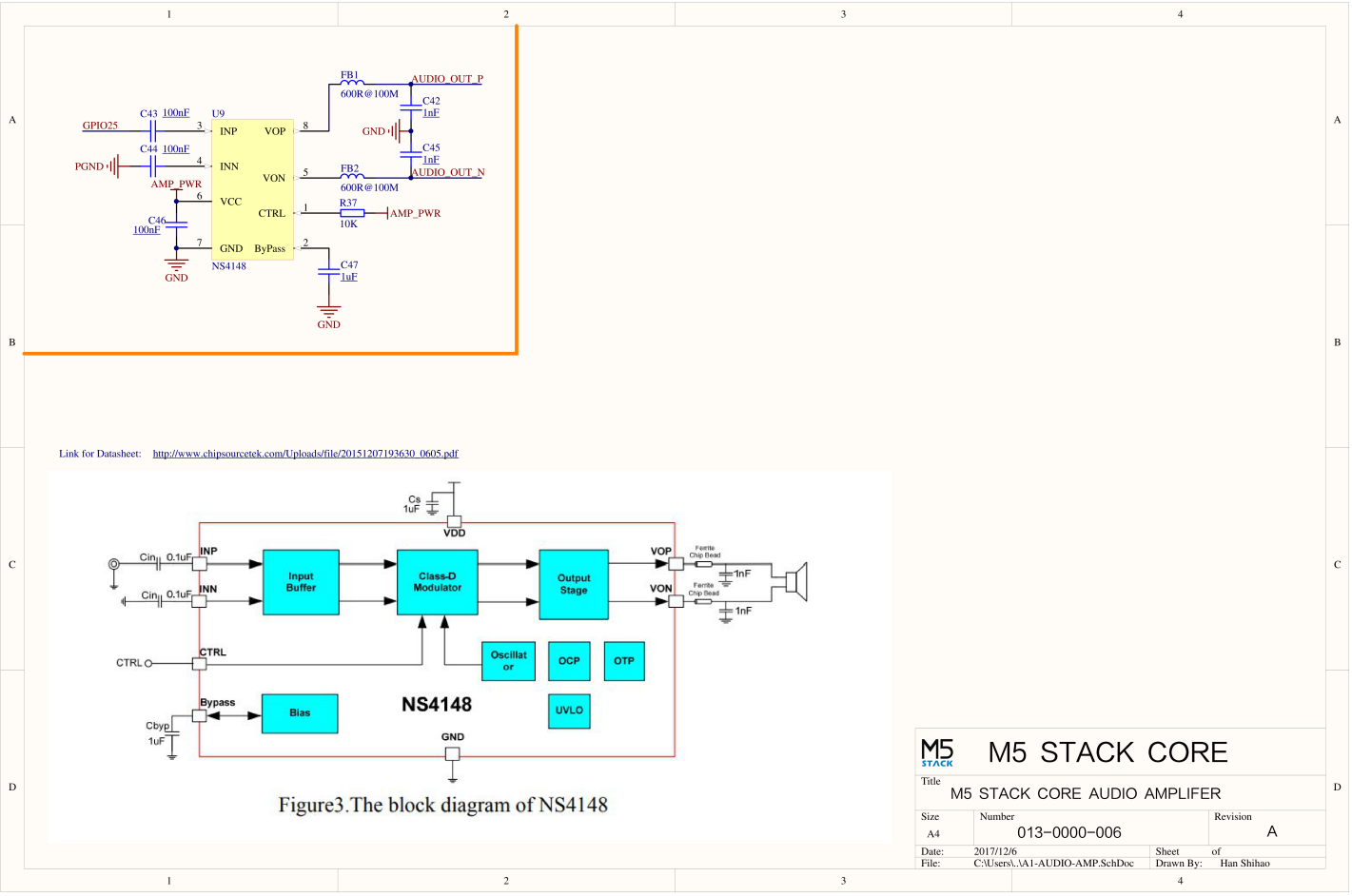


PinMap

LCD Screen & TF Card

LCD resolution: 320 × 240

TF card supports up to 16 GB

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 Pins	BUTTON A	BUTTON B	BUTTON C	
Speaker				Speaker Pin

GROVE Port A & IP5306

The power management chip (IP5306) is a customized I2C version with address 0x75. Click here to view the IP5306 register manual.

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

IP5306 Charge/Discharge Voltage Parameters

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

MPU6886 Gyroscope & Accelerometer

MPU6886 I2C address 0x68

ESP32-D0WDQ6-V3	G22	G21	5 V	GND
MPU6886 (0x68)	SCL	SDA	5 V	GND

M5GO Base PinMap

LED Strip & Microphone MIC

ESP32-D0WDQ6-V3	G15	G34	G25
LED Strip	Signal Pin		
Microphone MIC		MIC Pin	

ESP32 ADC/DAC

ADC1	ADC2	DAC1	DAC2
8 ch	10 ch	2 ch	2 ch
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	G16	G17

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	

When using the RGB LED on G15, it is recommended to initialize the pin with `pinMode(15, OUTPUT_OPEN_DRAIN)`.
For more information on pin assignment and remapping, please refer to the ESP32 datasheet.

Datasheets

- ESP32
- ILI9342C
- MPU6886
- IP5306

Softwares

Arduino

- M5GO Arduino Quick Start
- M5GO Sensor Kit Arduino Example Programs
- M5GO IoT Kit v2.7 Arduino Test Programs
- M5GO Arduino API

UiFlow1

- M5GO UiFlow1 Quick Start

UiFlow2

- M5GO UiFlow2 Quick Start

USB Driver

Click the links below to download the driver for your operating system. Two driver chip versions are available: CP210X (for **CP2104**) / CP34X (for **CH9102**). After extracting the archive, install the package matching your OS bit-version.
(If you are unsure which USB chip your device uses, you may install both drivers. **CH9102_VCP_SER_MacOS v1.7** may report an error during installation, but the driver is actually installed—just ignore the message.)
If you encounter download errors (timeout or "Failed to write to target RAM"), please try reinstalling the driver.

Driver Name	Supported Chip	Download
CP210x_VCP_Windows	CP2104	Download
CP210x_VCP_MacOS	CP2104	Download
CP210x_VCP_Linux	CP2104	Download
CH9102_VCP_SER_Windows	CH9102	Download
CH9102_VCP_SER_MacOS v1.7	CH9102	Download

MacOS Port Selection

Two ports may appear in MacOS. Please select the one named **wchmodem**.

Easyloader

EasyLoader is a lightweight firmware flasher with a built-in demo program for quick functional verification.

Easyloader	Download	Note
M5GO IoT Kit v2.7 User Demo Easyloader	download	/

Video

Introduction to M5Stack

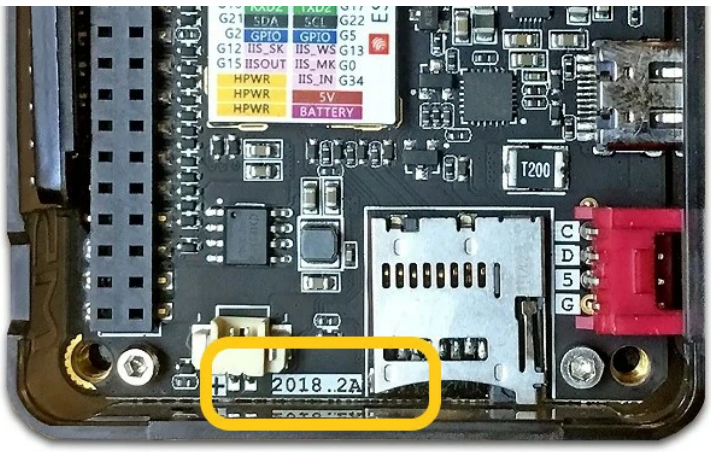
Introducing M5Stack.mp4

M5GO.mp4

Demo Description: The pre-loaded UIFlow firmware includes demo programs for testing the accelerometer, LED bar, microphone, buttons, and some peripheral sensors. The firmware can be used for UIFlow graphical programming.

Product Comparison

Version Change

Release Date	Change Description	Note
2018.4	First release	/
2019.6	MPU9250 replaced by MPU6886 + BMM150	/
2019.7	TN display replaced by IPS display	Please update your M5Stack library to the latest version (v0.2.8 or above) to fix the inverted color issue.
2019.11	Battery capacity changed from 600 mAh to 500 mAh	/
2020.6	ENV Unit in the kit changed to Unit ENV-II	/
2021.8	Upgraded to v2.6: BMM150 magnetometer removed, CP2104 changed to CH9102, structural details optimized, ENV Unit changed to Unit ENV-III	/
2023.2	Packaging updated	/
2023.6	Host upgraded to v2.7	Display changed to glass panel for clearer visuals; Grove port added boost function for stable 5.1 V output under load

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