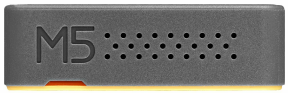
CoreS3-Lite

SKU:K128-Lite



Description

CoreS3-Lite is a programmable IoT controller packed with rich peripherals. Powered by an ESP32-S3 at its core, it features a 240 MHz Xtensa® 32-bit LX7 dual-core processor with 16 MB Flash and 8 MB PSRAM on board. On the front, a 2.0" capacitive touch IPS display is integrated, along with a 0.3 MP GC0308 camera and an LTR-553ALS-WA proximity/ambient-light sensor, enabling basic face-detection and recognition applications. The built-in BMI270 6-axis IMU plus BMM150 3-axis magnetometer provide additional interaction possibilities. With the AXP2101 power-management IC and BM8563 RTC, the device supports real-time power monitoring and low-power timed wake-up. For audio interaction, it offers a high-fidelity 16-bit I2S amplifier AW88298 paired with a 1 W speaker, and a full-duplex audio solution based on the ES7210 codec with dual-microphone input. A microSD card slot is included for development and data storage. The unit contains a 200 mAh LiPo battery and adopts a magnetic back cover for easy mounting and fixation. Typical scenarios include smart-home control, desktop robot companions, and more.

Tutorial

UiFlow2

This tutorial shows how to control the CoreS3-Lite with the UiFlow2 graphical-programming platform.

Arduino IDE

This tutorial shows how to program and control the CoreS3-Lite with the Arduino IDE.

Features

- Based on the ESP32-S3
  - 240 MHz Xtensa® 32-bit LX7 dual-core
  - 2.4 GHz Wi-Fi
  - 16 MB Flash + 8 MB PSRAM
- 2.0" capacitive-touch IPS display
- 0.3 MP camera (GC0308)
- Integrated digital ambient-light & proximity sensor: LTR-553ALS-WA
- 6-axis IMU (BMI270) + 3-axis magnetometer (BMM150)
- AXP2101 power management
- BM8563 RTC with low-power timed wake-up
- AW88298 16-bit I2S amplifier + 1 W speaker
- ES7210 codec + dual-microphone array
- microSD card slot
- USB-OTG support
- Magnetic back cover

Includes

- 1 × CoreS3-Lite
- 1 × Hex Key L-Shape 2.5 mm (For M3 Screw)

Applications

- DIY project development
- Smart-home systems
- Desktop voice assistant
- Educational interactive robots
- Industrial equipment status monitor

Specifications

Specification	Parameter
SoC	ESP32-S3 240 MHz Xtensa® 32-bit LX7 dual-core, 2.4 GHz Wi-Fi, USB-OTG
Flash	16 MB
PSRAM	8 MB
Display	2.0" @ 320 × 240, ILI9342C
Touch	FT6336U
Camera	GC0308 @ 0.3 MP
Proximity	LTR-553ALS-WA
PMU	AXP2101
IMU	BMI270
Magnetometer	BMM150
RTC	BM8563
Speaker	AW88298 16-bit I2S amplifier @ 1 W
Audio Codec	ES7210, dual-mic input
Product Size	54.0 × 54.0 × 16.5 mm
Product Weight	54.0 g
Package Size	133.0 × 93.5 × 22.5 mm
Gross Weight	71.5 g

Learn

BMM150 Magnetic Interference

Products containing magnets may interfere with the BMM150 magnetic-field sensor, resulting in abnormal readings. When used with M5 controllers that contain magnets, remove the magnets and avoid placing the BMM150 near strong magnetic fields.

Download Mode

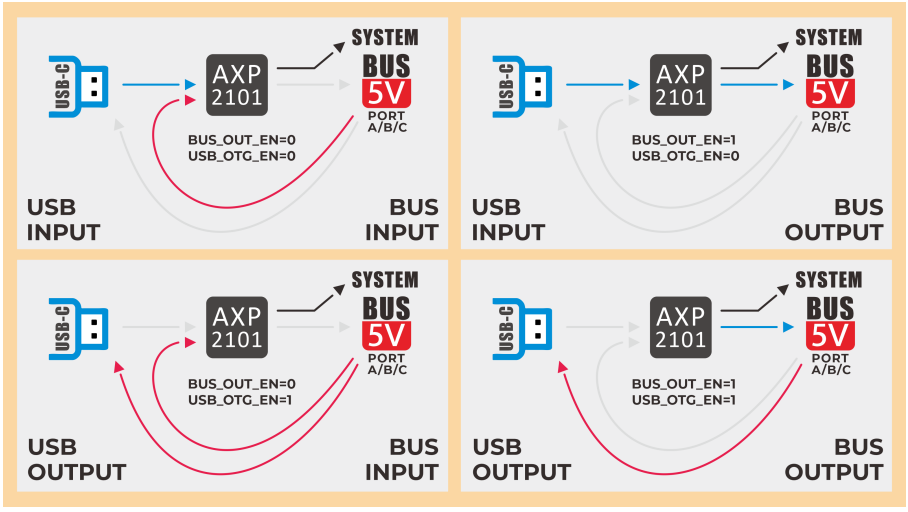
Before flashing, press and hold the reset button for 3 s (green LED on) to enter download mode.

Power On/Off

- Power on: click the left-side power button once
- Power off: press and hold the left-side power button for 6 s
- Reset: click the bottom RST button once

Power Management

CoreS3-Lite uses the AXP2101 PMU together with the AW9523B IO expander to control power input/output directions. Refer to the pin states of `BUS_OUT_EN` and `USB_OTG_EN` in the figure below and check the example code in M5Unified.

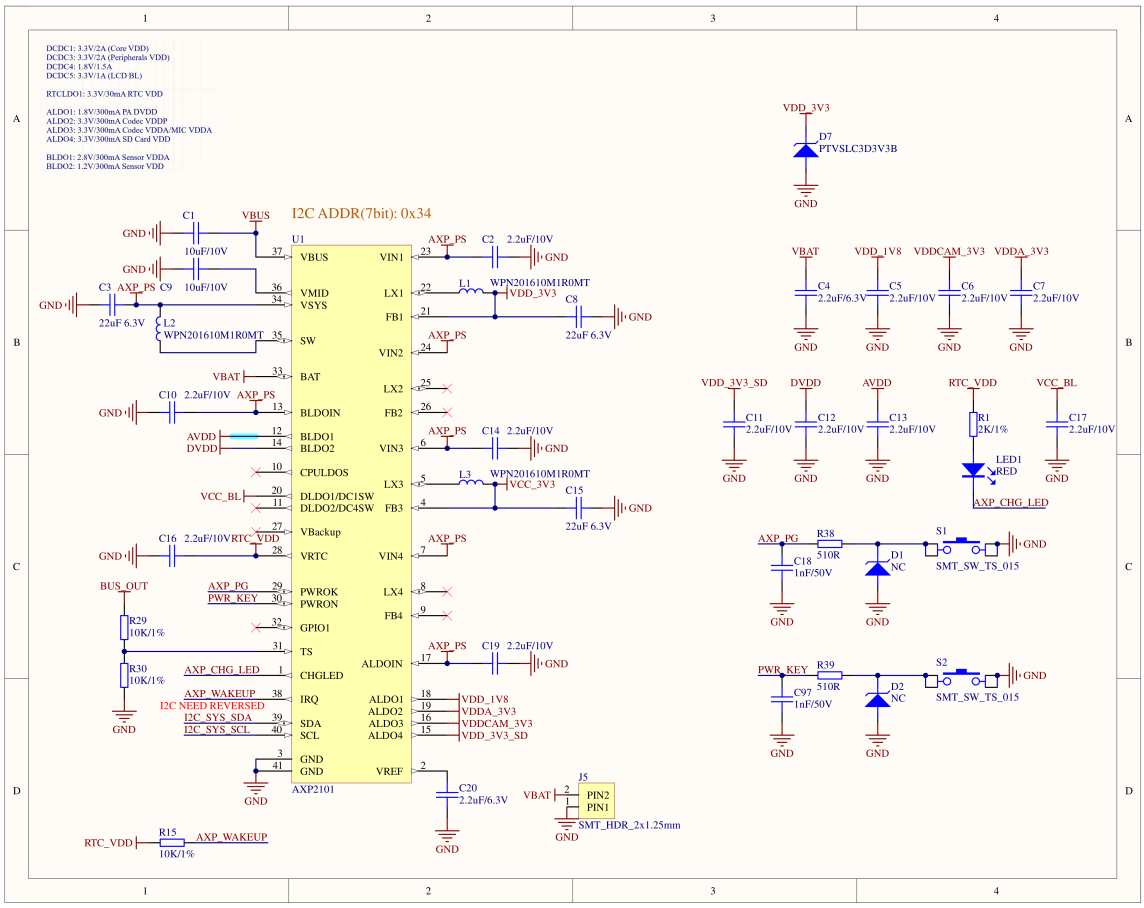


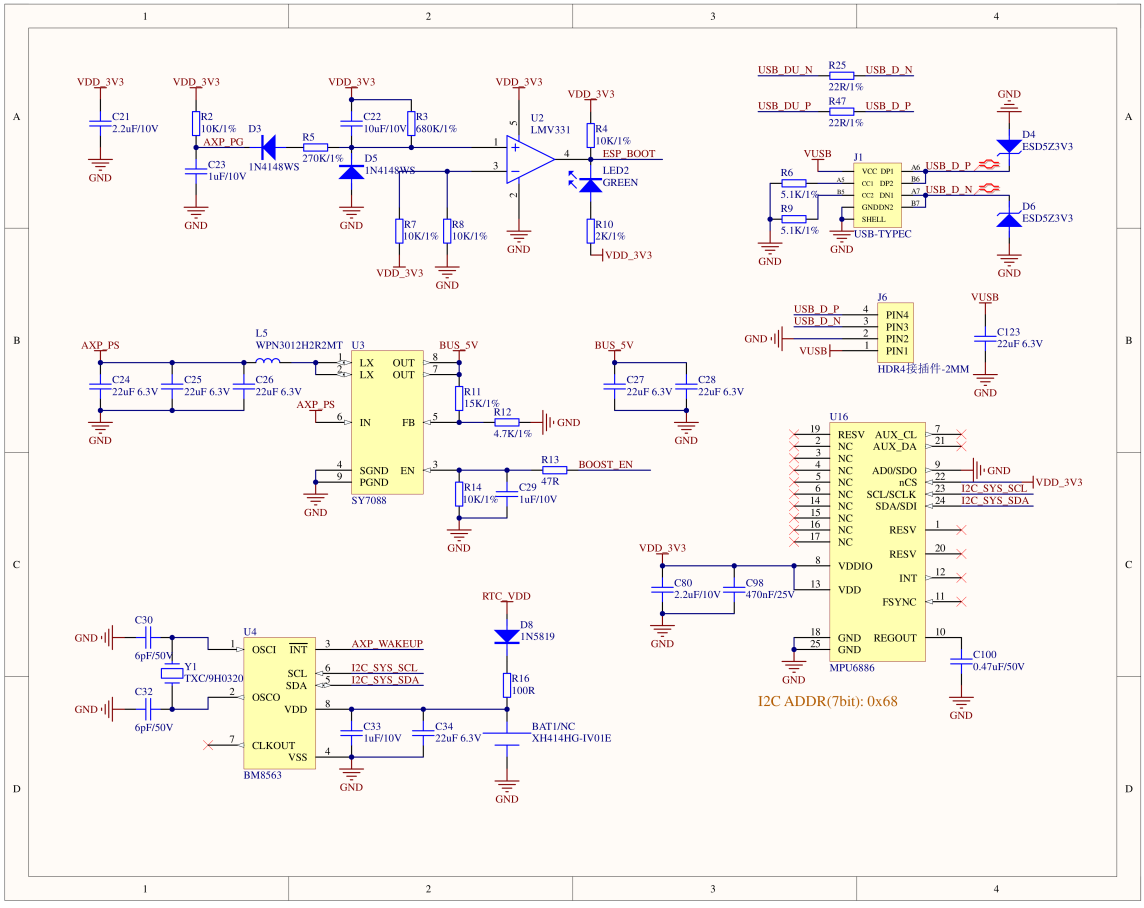
Certifications

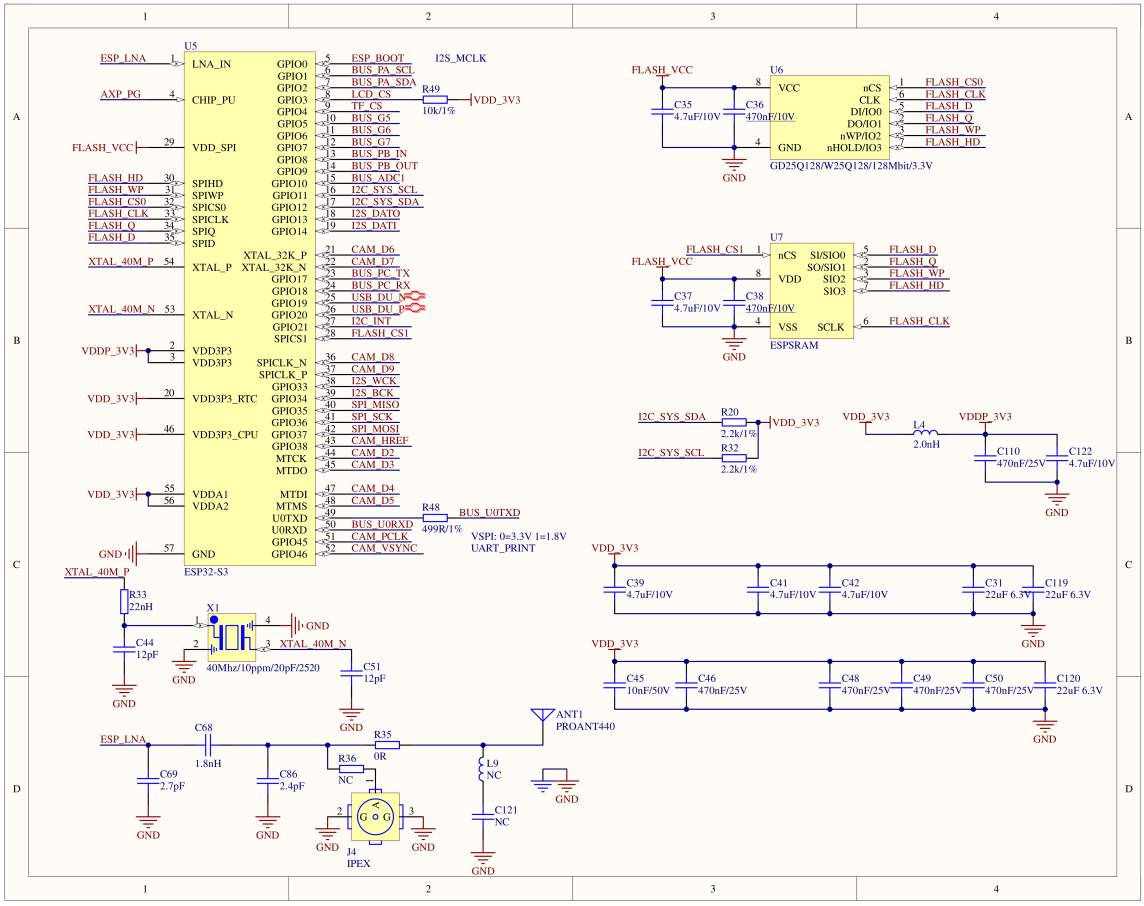
- CE / MIC / FCC / SAR

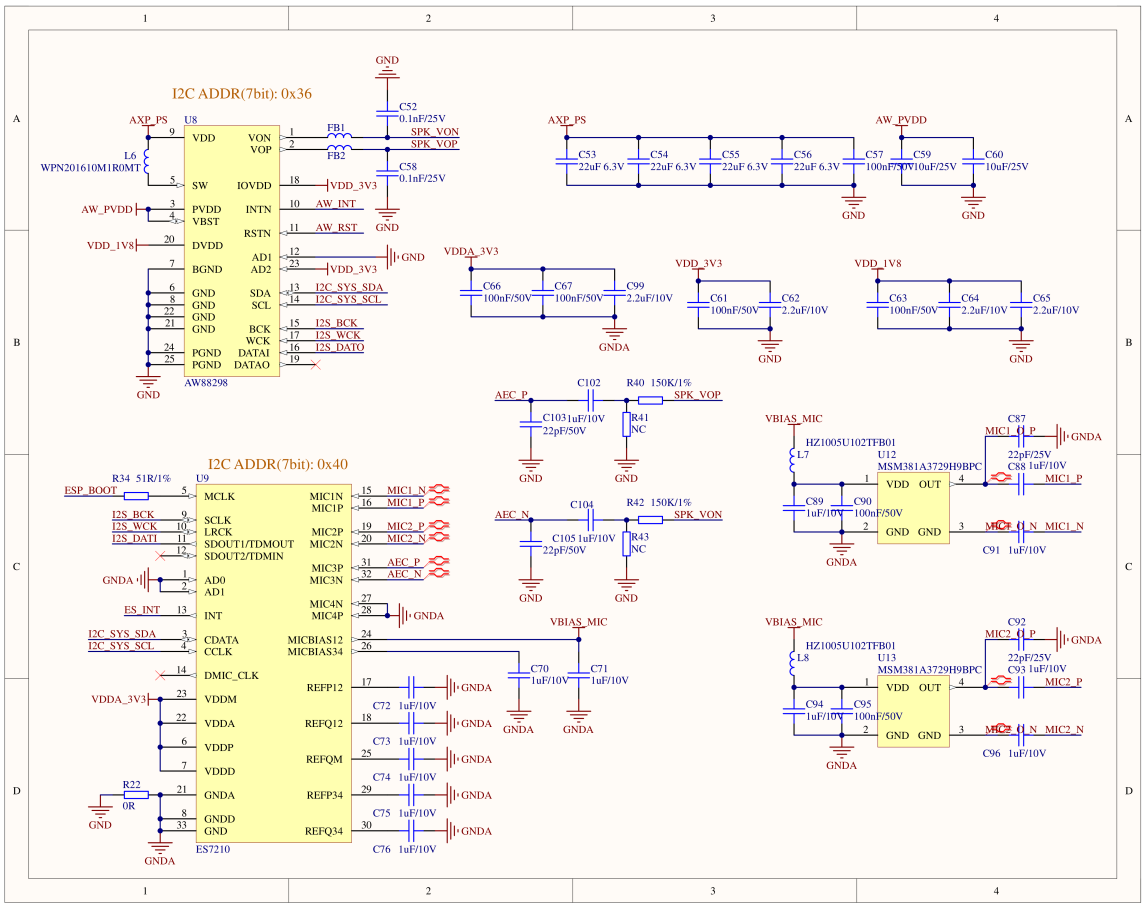
Schematics

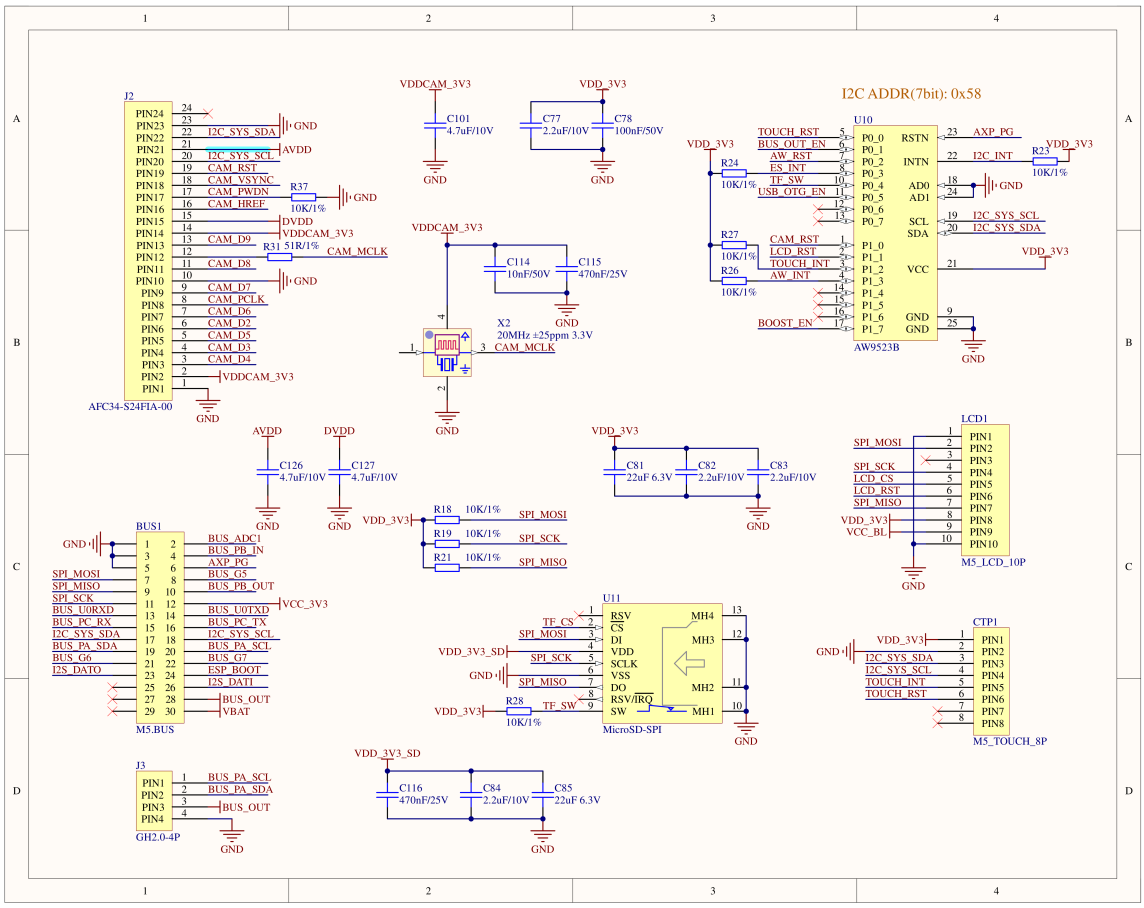
- CoreS3-Lite Schematics PDF

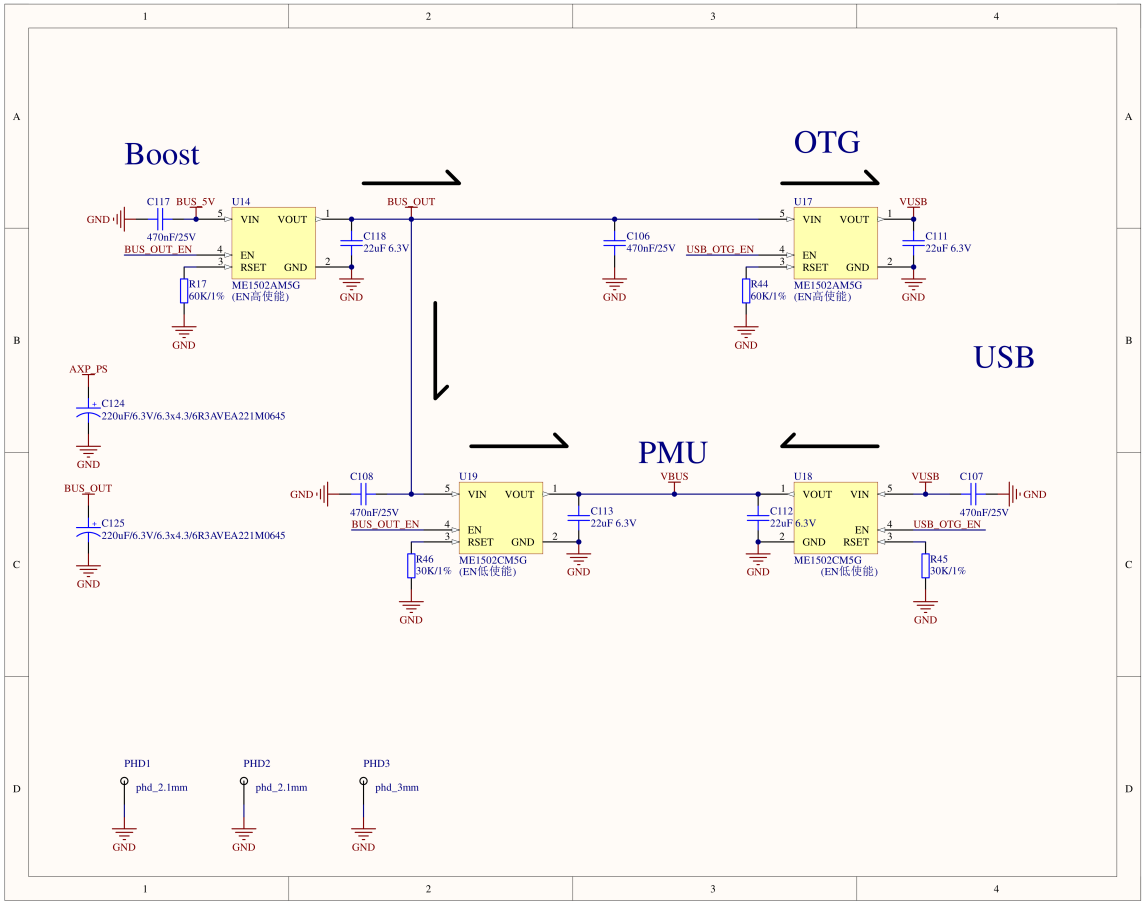

DCDC1: 3.3V/2A (Core VDD)
DCDC3: 3.3V/2A (Peripherals VDD)
DCDC4: 1.8V/1.5A
DCDC5: 3.3V/1A (LCD BL)
RTCLDO1: 3.3V/30mA RTC VDD
ALDO1: 1.8V/300mA PA DVDD
ALDO2: 3.3V/300mA Codec VDDP
ALDO3: 3.3V/300mA Codec VDDA/MIC VDDA
ALDO4: 3.3V/300mA SD Card VDD
BLDO1: 2.8V/300mA Sensor VDDA
BLDO2: 1.2V/300mA Sensor VDD
I2C ADDR(7bit): 0x34
AXP2101
SMT_HDR_2x1.25mm
SMT_SW_TS_015
LED1
RED
AXP_CHG_LED
I2C NEED REVERSED

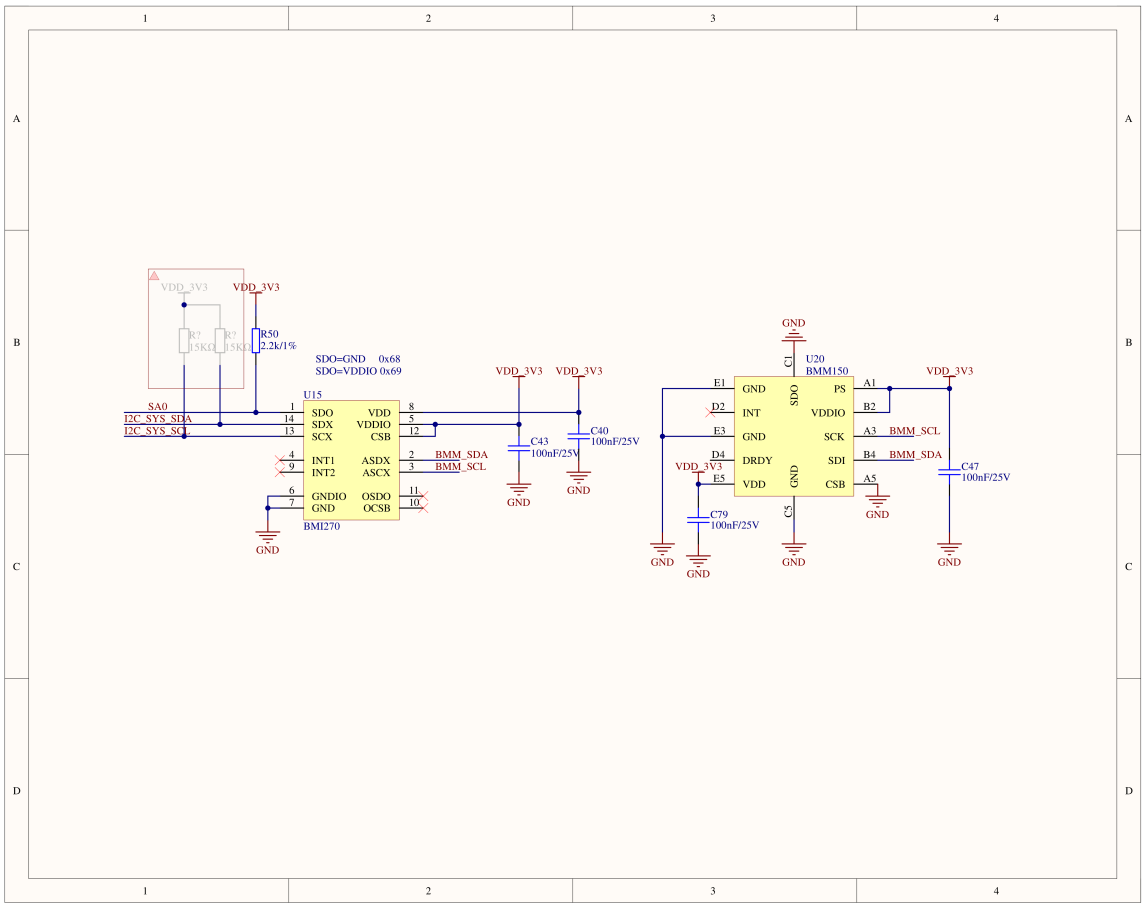

LMV331
ESP_BOOT
LED2
GREEN
USB-TYPEC
HDR4接插件-2MM
SY7088
BOOST_EN
BM8563
MPU6886
I2C ADDR(7bit): 0x68


U5
ESP32-S3
U6
GD25Q128/W25Q128/128Mbit/3.3V
U7
ESPSRAM
ANT1
PROANT440
J4
IPEX
X1
40Mhz/10ppm/20pF/2520


I2C ADDR(7bit): 0x36
I2C ADDR(7bit): 0x40
U8
AW88298
U9
ES7210
U12
U13
MSM381A3729H9BPC


I2C ADDR(7bit): 0x58
J2
AFC34-S24FIA-00
U10
AW9523B
BUS1
M5.BUS
U11
MicroSD-SPI
LCD1
M5_LCD_10P
CTP1
M5_TOUCH_8P
J3
GH2.0-4P
X2
20MHz ±25ppm 3.3V
VDDCAM_3V3
VDD_3V3
AVDD
DVDD
VDD_3V3_SD


Boost
OTG
USB
PMU
U14
ME1502AM5G
(EN高使能)
U17
ME1502AM5G
(EN高使能)
U19
ME1502CM5G
(EN低使能)
U18
ME1502CM5G
(EN低使能)
BUS_5V
BUS_OUT
VUSB
VBUS
AXP_PS
PHD1
PHD2
PHD3
phd_2.1mm
phd_2.1mm
phd_3mm



PinMap

LCD

LCD resolution: 320 × 240

ESP32-S3	GPIO37	GPIO36	GPIO3	GPIO35
ILI9342C	MOSI	SCK	CS	DC

AW9523B	P1_1
ILI9342C	RST

AXP2101	DLDO	LX1
ILI9342C	BL	PWR

microSD

ESP32-S3	GPIO35	GPIO37	GPIO36	GPIO4
microSD	MISO	MOSI	SCK	CS

Camera & Proximity Sensor LTR-553ALS-WA

ESP32-S3	GPIO12	GPIO11	GPIO45	GPIO46	GPIO38
GC0308	I2C_SYS_SDA	I2C_SYS_SCL	CAM_PCLK	CAM_VSYNC	CAM_HREF
LTR-553ALS-WA	I2C_SYS_SDA	I2C_SYS_SCL			

AW9523B	P1_0
GC0308	CAM_RST

CAP.TOUCH (I2C Addr: 0x38)

ESP32-S3	GPIO12	GPIO11
FT6336U	I2C_SYS_SDA	I2C_SYS_SCL

AW9523B	P0_0	P1_2
FT6336U	TOUCH_RST	TOUCH_INT

Microphone & Amplifier

ESP32-S3	GPIO12	GPIO11	GPIO34	GPIO33	GPIO13	GPIO14	GPIO0
ES7210 (0x40)	I2C_SYS_SDA	I2C_SYS_SCL	I2S_BCK	I2S_WCK	I2S_DATO		I2S_MCLK
AW88298(0x36)	I2C_SYS_SDA	I2C_SYS_SCL	I2S_BCK	I2S_WCK		I2S_DAT1	

AW9523B	P0_2	P1_3
AW88298	AW_RST	AW_INT

AXP Power LED

AXP2101	AXP_CHG_LED
Red LED	RTC_VDD

RTC

ESP32-S3	GPIO12	GPIO11
BM8563	I2C_SYS_SDA	I2C_SYS_SCL

AXP2101	IRQ
BM8563	AXP_WAKEUP

IMU (3-axis Gyro + 3-axis Accel + 3-axis Magnetometer)

ESP32-S3	GPIO12	GPIO11
BMI270	I2C_SYS_SDA	I2C_SYS_SCL

Internal I2C Bus

ESP32-S3	GPIO12	GPIO11
BMI270	I2C_SYS_SDA	I2C_SYS_SCL
AXP2101	I2C_SYS_SDA	I2C_SYS_SCL
BM8563	I2C_SYS_SDA	I2C_SYS_SCL
ES7210	I2C_SYS_SDA	I2C_SYS_SCL
AW88298	I2C_SYS_SDA	I2C_SYS_SCL

BMM150

BMI270	BMI270_ASDx	BMI270_ASCx
BMM150	BMM_SDA	BMM_SCL

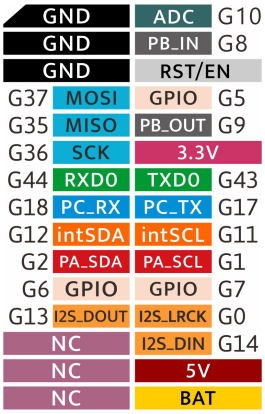
BMM150 Mounted on BMI270

Connected via BMI270' s Sensor Hub auxiliary I2C interface, enabling unified 9-axis sensor data acquisition.

HY2.0-4P

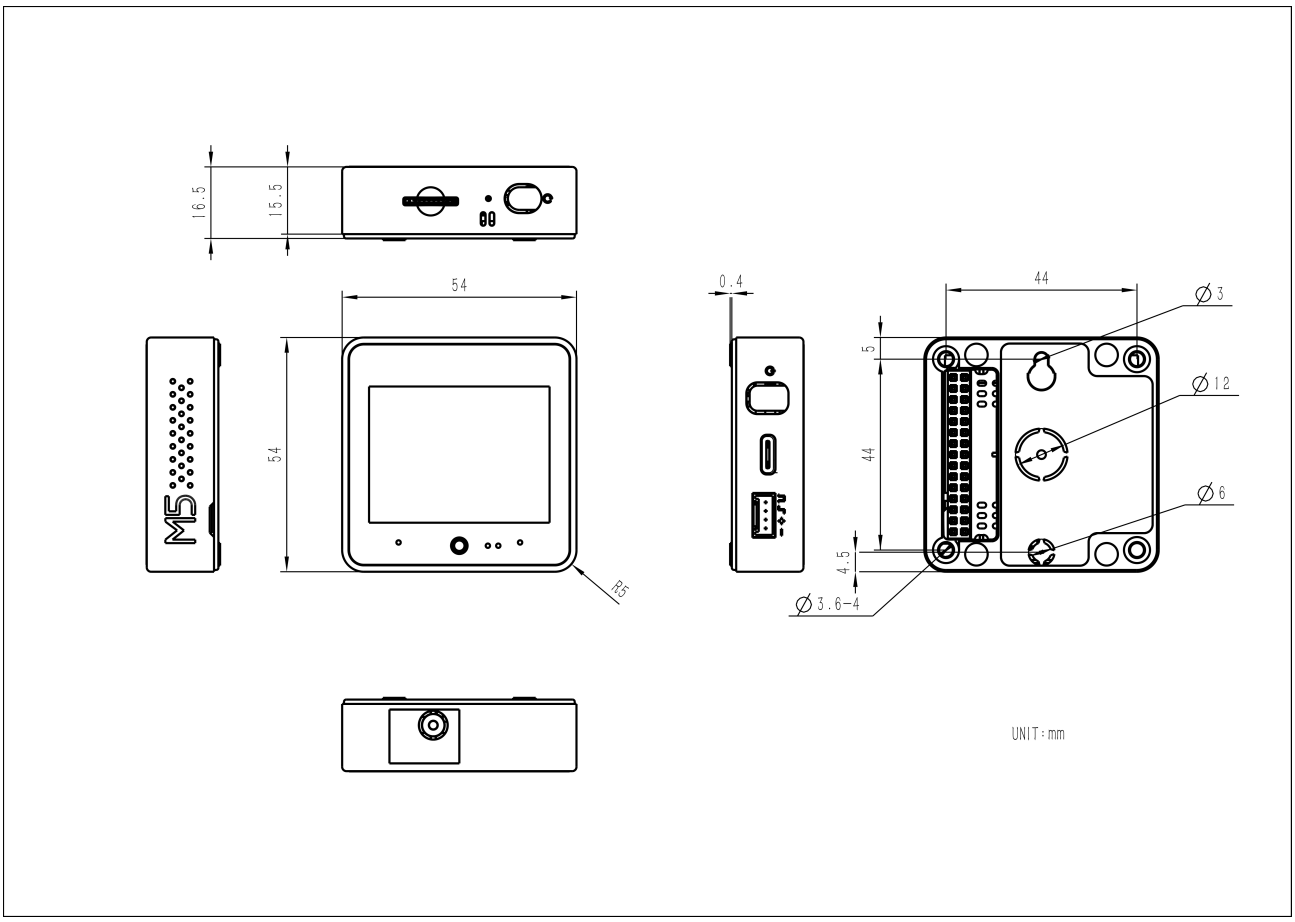
HY2.0-4P	Black	Red	Yellow	White
PORT.A	GND	5V	G2	G1

M5-BUS



Model Size

CoreS3-Lite Model Size PDF



Datasheets

- ESP32-S3
- LTR-553ALS-WA
- GC0308
- ES7210
- BMM150
- BMI270
- BM8563
- AXP2101
- AW88298
- AW9523B

Softwares

Arduino

- CoreS3-Lite Arduino Quick Start
- CoreS3-Lite Arduino CoreS3 Driver Library
- CoreS3-Lite Arduino M5Unified Library
- CoreS3-Lite Arduino M5GFX Library

UiFlow2

- CoreS3-Lite UiFlow2 Quick Start
- CoreS3-Lite UiFlow2 Developer Manual

PlatformIO

- CoreS3-Lite Factory Firmware

```
[env:m5stack-cores3]
platform = espressif32@6.7.0
board = esp32-s3-devkitc-1
framework = arduino
upload_speed = 1500000
monitor_speed = 115200
build_flags =
    -DESP32S3
    -DBOARD_HAS_PSRAM
    -mfix-esp32-psram-cache-issue
    -DCORE_DEBUG_LEVEL=5
    -DARDUINO_USB_CDC_ON_BOOT=1
    -DARDUINO_USB_MODE=1
lib_deps =
    M5Unified=https://github.com/m5stack/M5Unified
```

ESP-IDF

- Espressif's Board Support Packages - CoreS3
- CoreS3 ESP-IDF BSP Guide

Easyloader

Easyloader	Download	Note
CoreS3-Lite Factory Firmware Easyloader	download	/

Other

- CoreS3 OpenAI XiaoZhi Voice Assistant
- CoreS3 XiaoZhi Voice Assistant
- CoreS3 Home Assistant XiaoZhi Voice Assistant
- CoreS3 Factory Firmware Restore Guide

I2C Address Map

Chip	ADDRESS
GC0308	0x21
LTR553	0x23
AXP2101	0x34
AW88298	0x36
FT6336	0x38
ES7210	0x40
BM8563	0x51
AW9523	0x58
BMI270	0x69
BMM150	0x10

Video

- CoreS3-Lite Product Introduction

K128-Lite-CoreS3-Lite_video.mp4

Product Comparison

Hardware Peripheral			
	CoreS3-Lite	**CoreS3**	**CoreS3-SE**
Camera (GC0308)	√	√	×
Proximity Sensor (LTR-553ALS-WA)	√	√	×
IMU (BMI270)	√	√	×
Compass (BMM150)	√	√	×
RTC	√	√	√
Microphone	√	√	√
Speaker	√	√	√
PMIC (AXP2101)	√	√	√
16 MB Flash & 8 MB PSRAM	√	√	√
Touch	√	√	√
Back Cover	Cover For CoreS3	Base DIN	×
Battery Capacity	200 mAh	500 mAh	×

Mouser Electronics

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M5Stack:

K128-Lite