CoreS3-SE

SKU:K128-SE







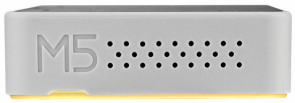
















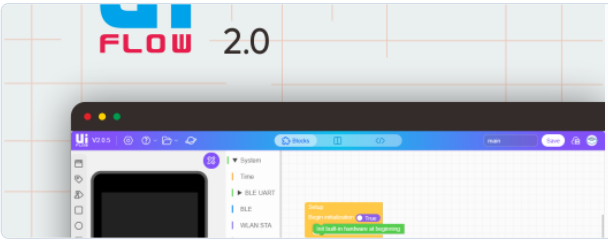
Description

CoreS3-SE is a lightweight version of the third-generation CoreS3 main controller in the M5Stack development kit series. It is powered by the ESP32-S3 solution, featuring a dual-core Xtensa LX7 processor with a main frequency of 240 MHz, and integrates (2.4G) Wi-Fi connectivity. The board is equipped with 16MB Flash and 8MB PSRAM. Programs can be downloaded via the USB Type-C interface, which supports OTG and CDC functions, making it convenient for connecting external USB devices and flashing firmware.

The front side features a 2.0-inch capacitive touch IPS display, with a panel made of high-strength glass material. The power system uses the AXP2101 power management chip along with four power path control circuits, adopting an overall low-power design. A built-in microSD card slot is included. The board integrates a BM8563 RTC chip, providing accurate timekeeping and sleep–timed wake-up functions.

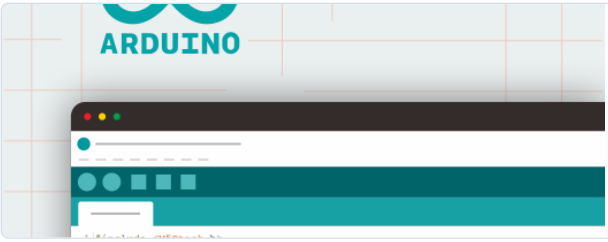
For audio output, it uses a high-fidelity 16-bit I2S amplifier chip AW88298, with a built-in 1W speaker. Audio input is handled by an ES7210 audio codec chip combined with dual-microphone input. On the side of the device, there are independent power and reset (RST) buttons, along with a built-in delay circuit; long-pressing the reset button allows entry into program download mode. This finished product is suitable for IoT development, various DIY projects, smart home control systems, and industrial automation control systems.

Tutorial



UiFlow2

This tutorial will show you how to control the CoreS3-SE device through the UiFlow2 graphical programming platform



Arduino IDE

This tutorial introduces how to program and control the CoreS3-SE device using Arduino IDE.

Features

- Based on ESP32-S3 development, supports Wi-Fi @16MB Flash, 8MB PSRAM
- Speaker, dual microphones
- Capacitive touch screen
- microSD card slot
- High-strength glass panel
- Supports OTG and CDC functionality

- Uses AXP2101 power management, with a low power consumption design
- Development Platform
  - UiFlow2
  - Arduino IDE
  - ESP-IDF
  - PlatformIO

Includes

- 1 × CoreS3-SE
- 1 × Hex Key L-Shape 2.0mm (For M2.5 Screw)

Applications

- IoT development
- Various DIY project development
- Smart home control systems
- Industrial automation control systems

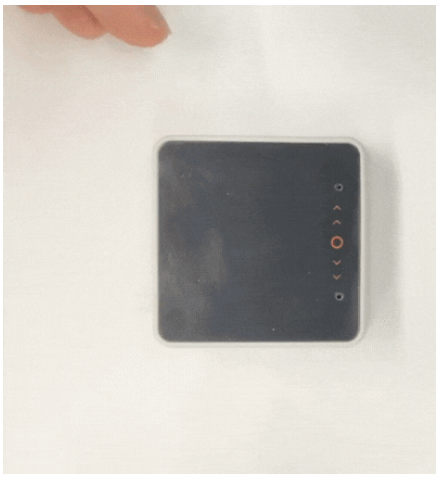
Specifications

Specification	Parameter
SoC	ESP32-S3 @ Xtensa® 32-bit LX7 dual-core processor, clock frequency 240MHz
USB	USB OTG, USB Serial/JTAG
Flash	16MB
PSRAM	8MB Quad
Wi-Fi	2.4 GHz Wi-Fi
Touch	FT6336U@Capacitive touch, touch area pixels 320 x 280
LCD Screen	2.0"@320 x 240 ILI9342C, SPI communication
Power Management Chip	AXP2101
RTC	BM8563
Speaker	1W@9028
Amplifier	16bits-I2S amplifier chip AW88298
Audio Decoder Chip	ES7210, Dual-microphone input
BUS Pins	G0/G1/G2/G5/G6/G7/G8/G9/G10/G11/G12/G13/G14/G17/G18/G35/G36/G37/G43/G44
Lithium Battery Charging Current	5V@198mA
Max Grove Output Current (Battery Power)	DC 4.2V@940mA
Max Grove Output Current (USB Power)	DC 5V@680mA
Operating Temperature	0 ~ 40°C
Power Consumption	Battery Power: Standby Mode: DC 4.2V@104.64uA; Working Mode: DC 4.2V@109.67mA USB Power: Working Mode: DC 5V@166.27mA
Product Size	54.0 x 54.0 x 15.5mm
Product Weight	37.8g
Package Size	133.0 x 93.5 x 22.5mm
Gross Weight	54.5g

Learn

Download Mode

Press and hold the reset button for 3 seconds. When the green indicator LED turns on, release the button. After release, the green indicator LED turns off, indicating that the device has entered download mode.



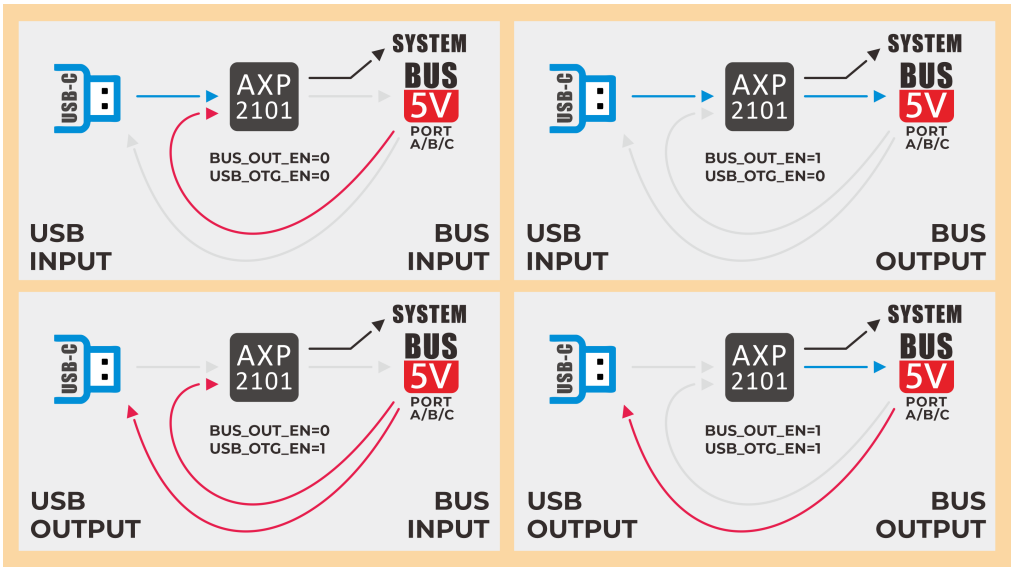
Power On/Off

- Power On: Click the left power button
- Power Off: Press and hold the left power button for 6 seconds①
- Reset: Click the bottom RST reset button②



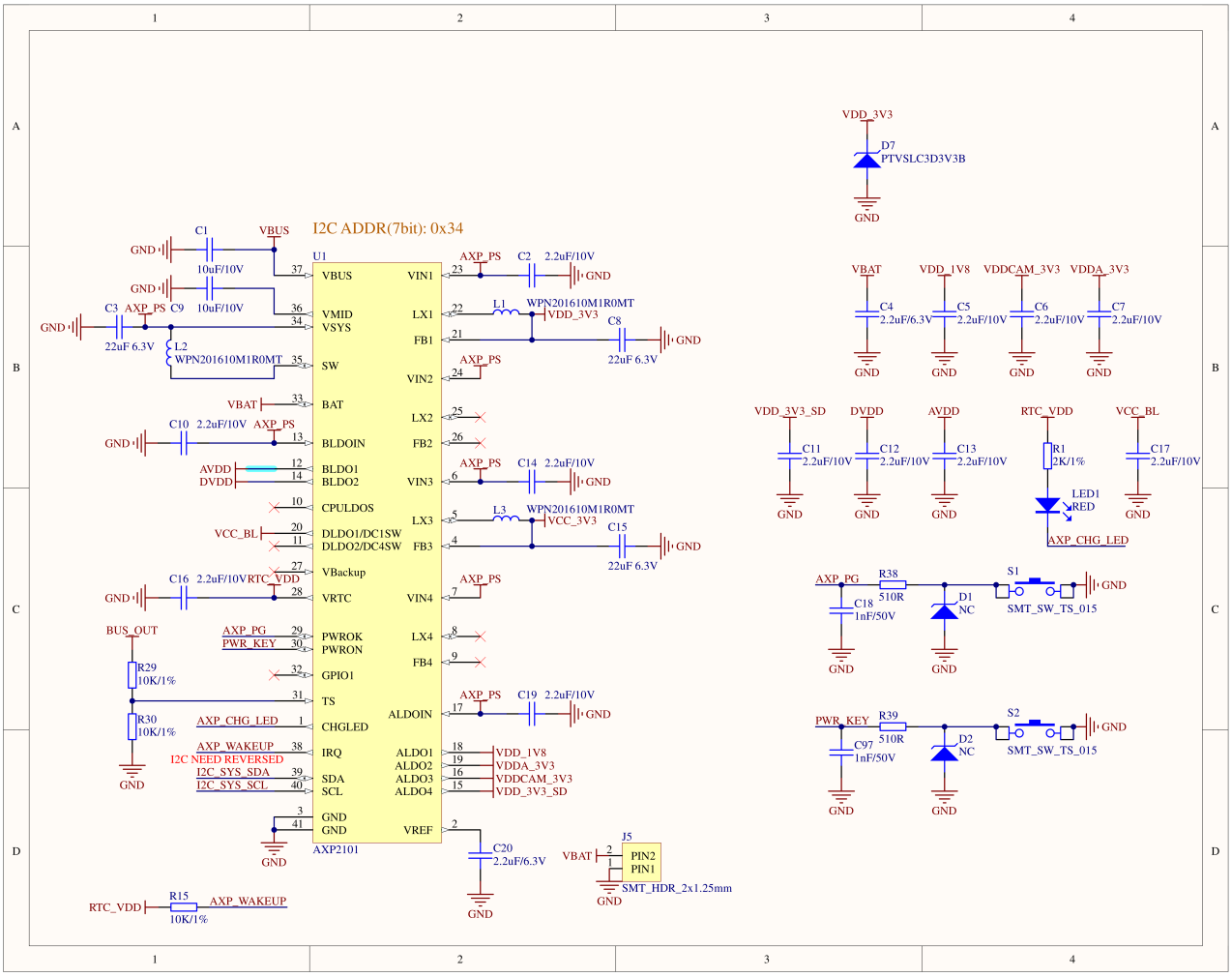
Power Management

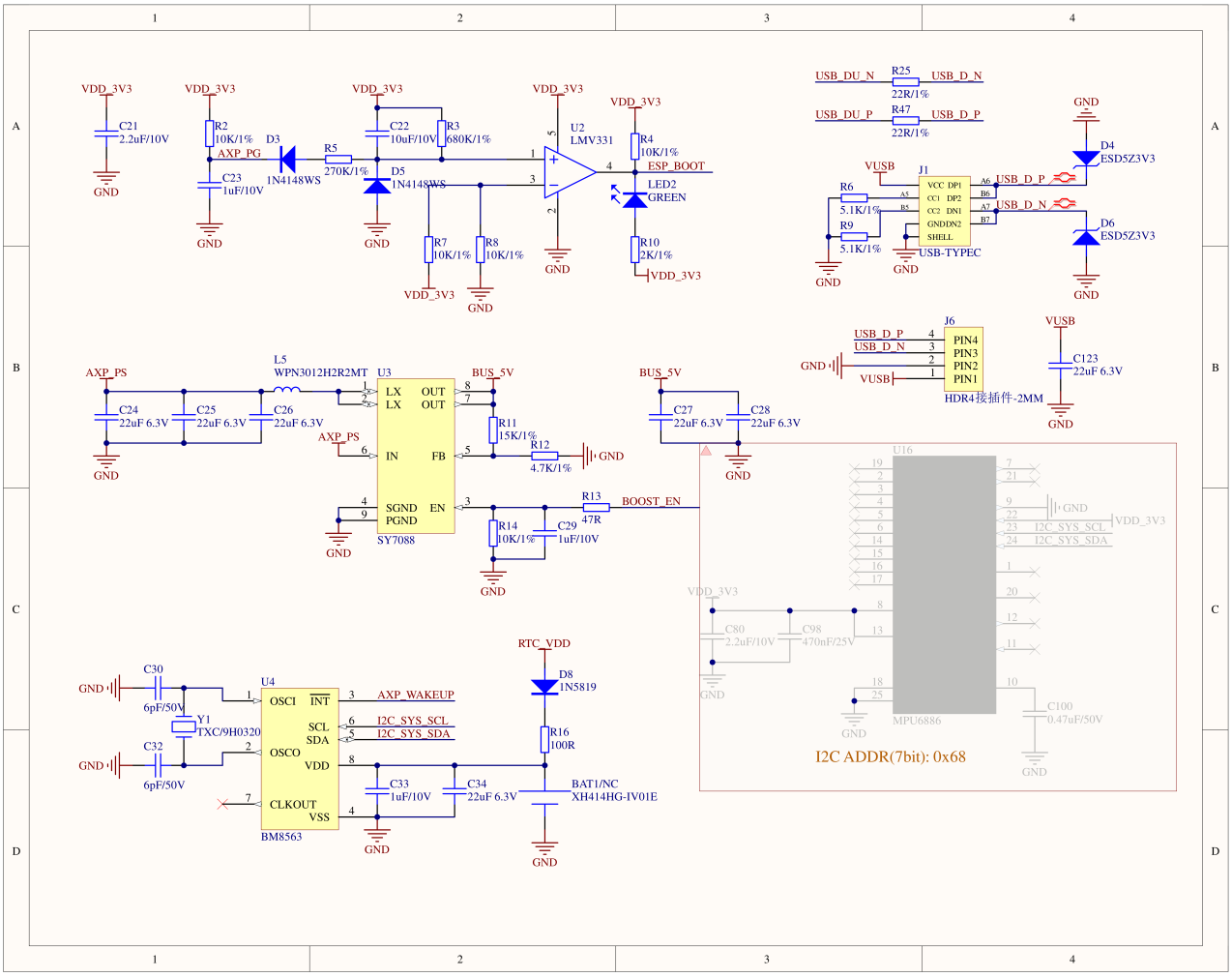
CoreS3-SE uses the AXP2101 power management chip together with the AW9523B IO expansion chip to control the direction of power input and output. Please refer to the pin states of `BUS_OUT_EN` and `USB_OTG_EN` below to set the power input and output directions. For specific settings, please refer to CoreS3 Power Management Example.

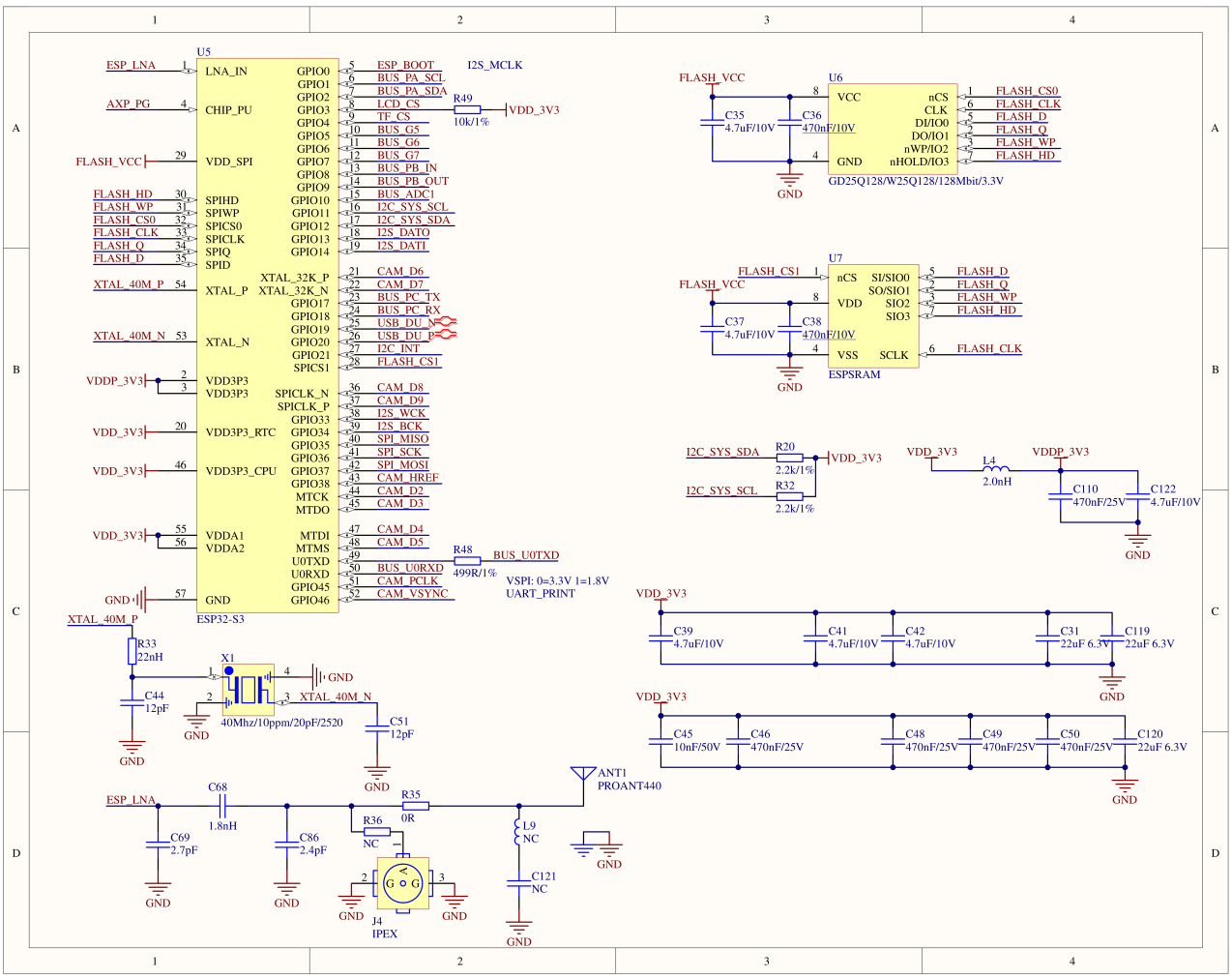


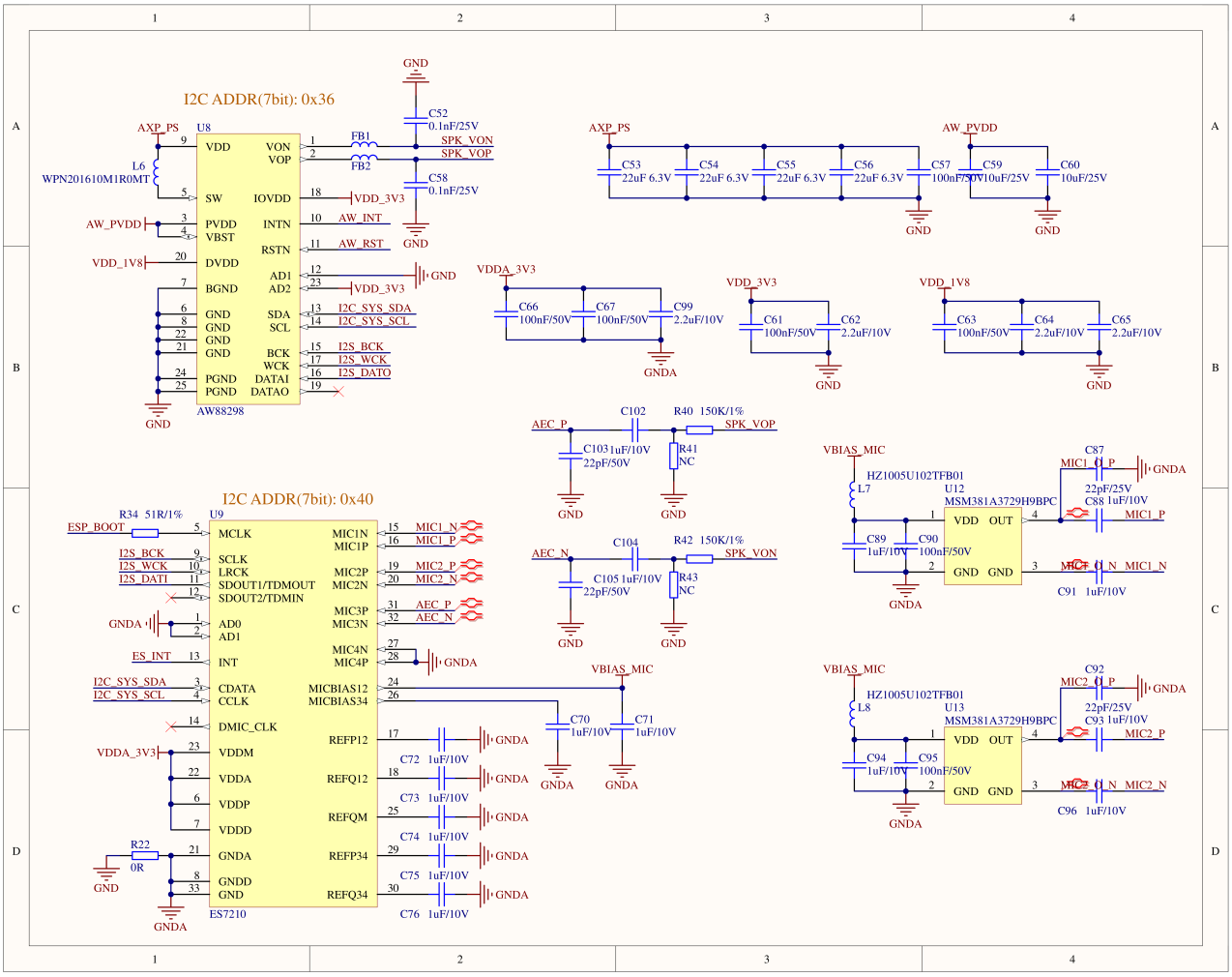
Schematics

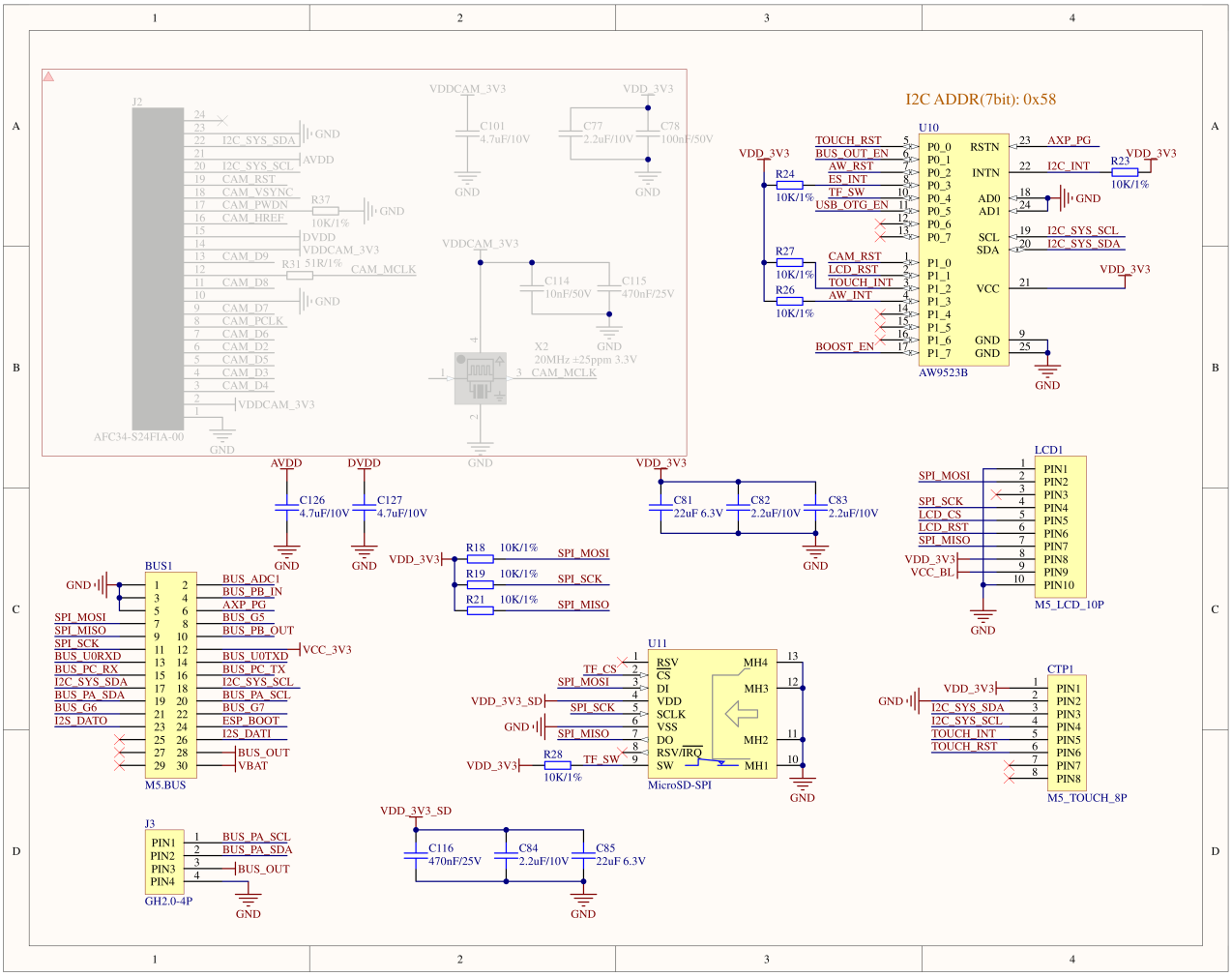
- CoreS3-SE Schematics PDF

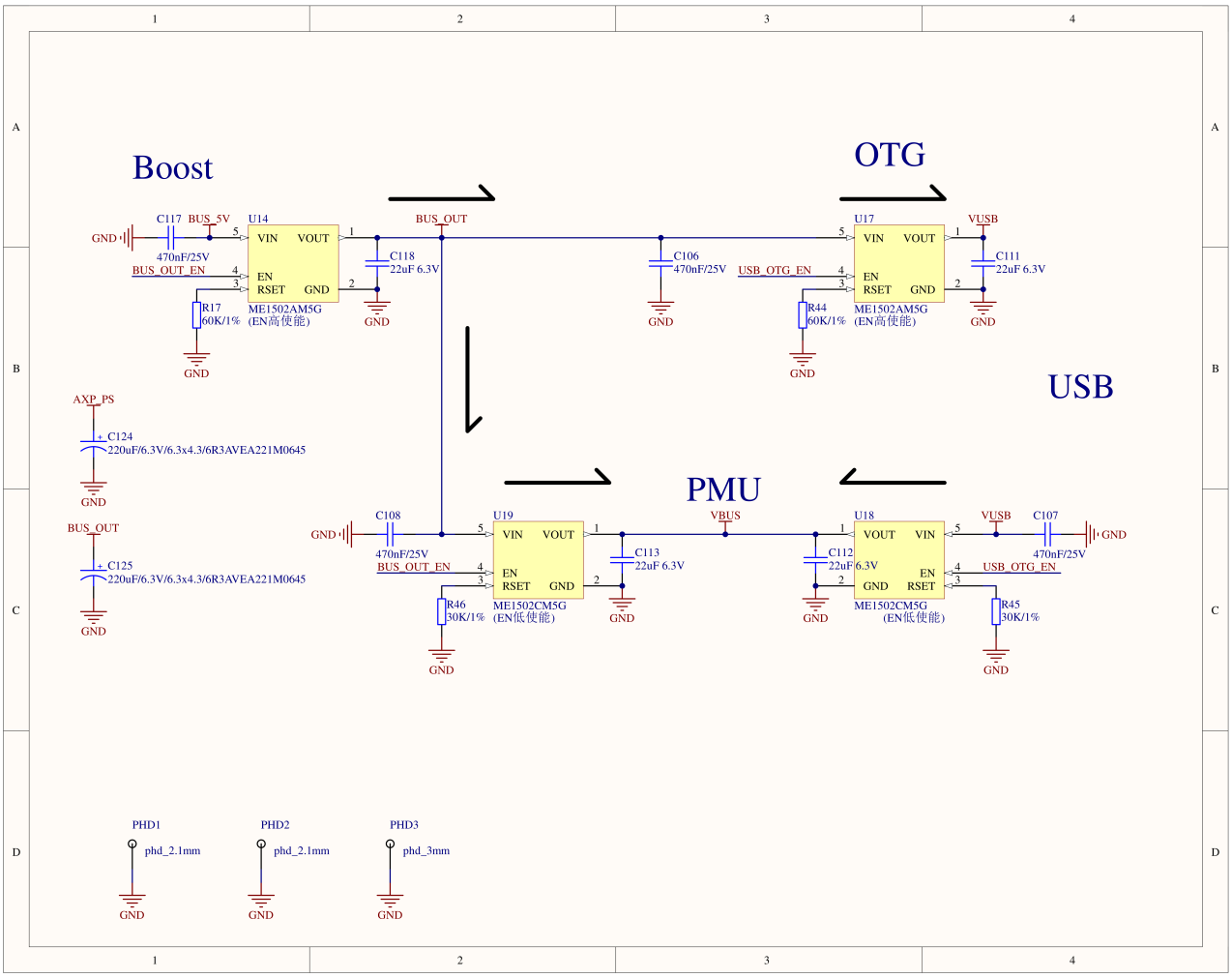


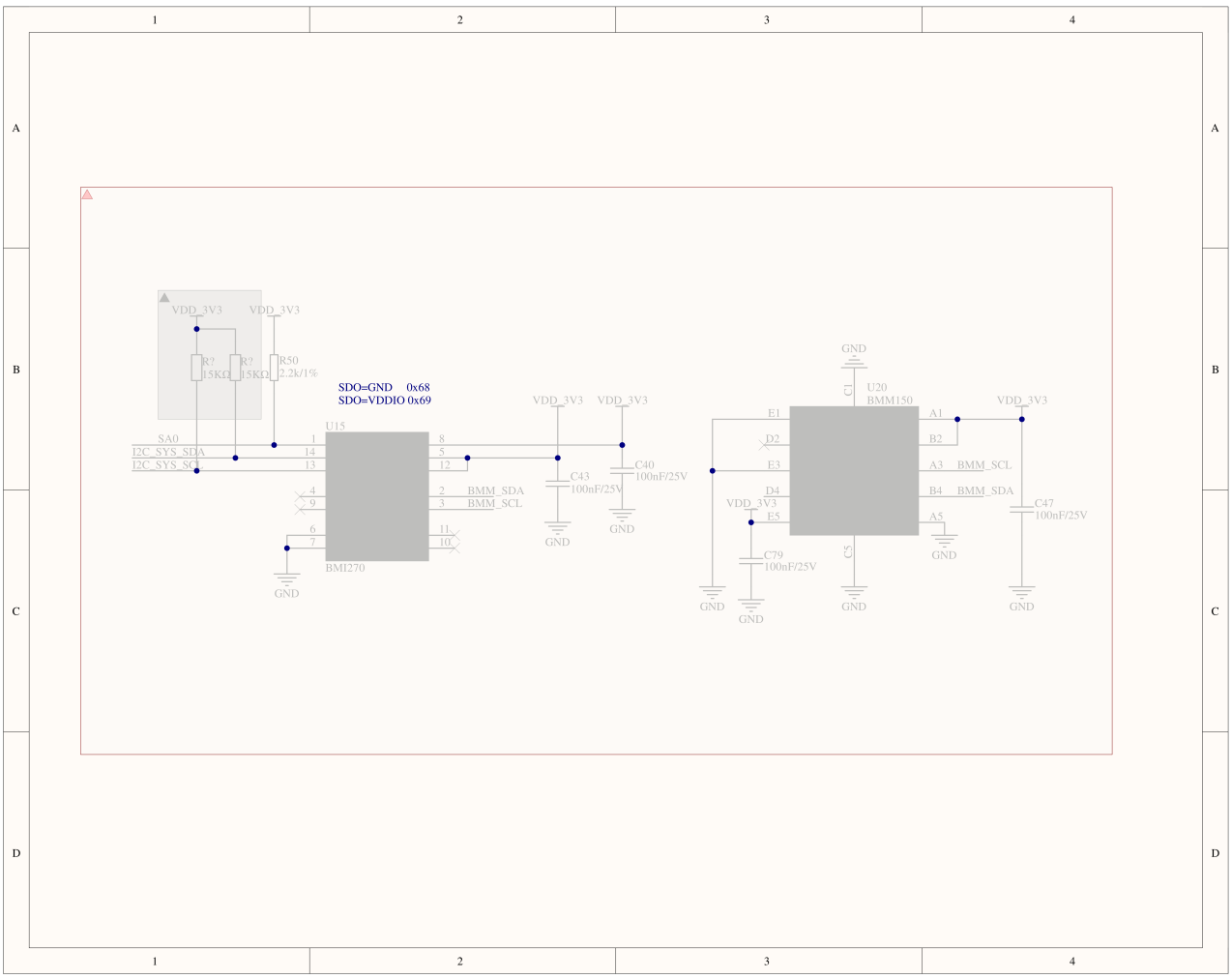

VDD_3V3
C21 2.2uF/10V
GND
R2 10K/1%
AXP_PG
C23 1uF/10V
D3 1N4148WS
R5 270K/1%
C22 10uF/10V
R3 680K/1%
D5 1N4148WS
R7 10K/1%
R8 10K/1%
U2 LMV331
R4 10K/1%
ESP_BOOT
LED2 GREEN
R10 2K/1%
USB_DU_N
USB_DU_P
R25 22R/1%
R47 22R/1%
USB_D_N
USB_D_P
VUSB
J1
R6 5.1K/1%
R9 5.1K/1%
USB-TYPEC
D4 ESD5Z3V3
D6 ESD5Z3V3
J6
HDR4接插件-2MM
C123 22uF 6.3V
AXP_PS
L5 WPN3012H2R2MT
U3
LX OUT
IN FB
SGND EN
PGND
SY7088
BUS_5V
R11 15K/1%
R12 4.7K/1%
C24 22uF 6.3V
C25 22uF 6.3V
C26 22uF 6.3V
C27 22uF 6.3V
C28 22uF 6.3V
R13 47R
BOOST_EN
R14 10K/1%
C29 1uF/10V
U16
MPU6886
I2C_SYS_SCL
I2C_SYS_SDA
C80 2.2uF/10V
C98 470nF/25V
C100 0.47uF/50V
I2C ADDR(7bit): 0x68
C30 6pF/50V
C32 6pF/50V
Y1 TXC/9H0320
U4
OSCI INT
SCL
SDA
OSCO
VDD
CLKOUT
VSS
BM8563
AXP_WAKEUP
C33 1uF/10V
C34 22uF 6.3V
RTC_VDD
D8 1N5819
R16 100R
BAT1/NC XH414HG-IV01E


U5
ESP32-S3
ESP_LNA
AXP_PG
FLASH_VCC
FLASH_HD
FLASH_WP
FLASH_CS0
FLASH_CLK
FLASH_Q
FLASH_D
XTAL_40M_P
XTAL_40M_N
VDDP_3V3
VDD_3V3
GND
I2S_MCLK
R49 10k/1%
BUS_U0TXD
R48 499R/1%
VSPI: 0=3.3V 1=1.8V
UART_PRINT
U6
GD25Q128/W25Q128/128Mbit/3.3V
U7
ESPSRAM
I2C_SYS_SDA
I2C_SYS_SCL
R20 2.2k/1%
R32 2.2k/1%
L4 2.0nH
R33 22nH
X1
40Mhz/10ppm/20pF/2520
C44 12pF
C51 12pF
C68 1.8nH
C69 2.7pF
C86 2.4pF
R35 0R
R36 NC
L9 NC
C121 NC
ANT1 PROANT440
J4 IPEX


I2C ADDR(7bit): 0x36
AW88298
I2C ADDR(7bit): 0x40
ES7210


I2C ADDR(7bit): 0x58
AW9523B
M5_LCD_10P
M5_TOUCH_8P
M5.BUS
MicroSD-SPI
GH2.0-4P


Boost
OTG
USB
PMU
C117 BUS_5V
U14
VIN VOUT
EN RSET GND
ME1502AM5G
(EN高使能)
470nF/25V
BUS_OUT_EN
R17
60K/1%
C118
22uF 6.3V
BUS_OUT
C106
470nF/25V
U17
USB_OTG_EN
R44
60K/1%
C111
22uF 6.3V
VUSB
AXP_PS
C124
220uF/6.3V/6.3x4.3/6R3AVEA221M0645
BUS_OUT
C125
220uF/6.3V/6.3x4.3/6R3AVEA221M0645
C108
U19
ME1502CM5G
(EN低使能)
C113
22uF 6.3V
R46
30K/1%
VBUS
U18
C112
22uF 6.3V
C107
470nF/25V
R45
30K/1%
PHD1
phd_2.1mm
PHD2
phd_2.1mm
PHD3
phd_3mm
GND


VDD_3V3
R?
15KΩ
R50
2.2k/1%
SDO=GND 0x68
SDO=VDDIO 0x69
U15
BMI270
SA0
I2C_SYS_SDA
I2C_SYS_SCL
BMM_SDA
BMM_SCL
C43
100nF/25V
C40
100nF/25V
U20
BMM150
C47
100nF/25V
C79
100nF/25V
GND

PinMap

LCD Screen & microSD

LCD pixels: 320x240

> **microSD Capacity Requirement**
>
> microSD card supports up to 16GB.

ESP32-S3	G37	G36	G3	G35	G4
ILI9342C	MOSI	SCK	CS	DC	
TF Card	SPI_MOSI	SPI_SCK		SPI_MISO	TF_CS

AW9523B (0x58)	P1_1
ILI9342C	LCD_RST

AXP2101 (0x34)	DCDO1	LX1
ILI9342C	BL	PWR

CAP.TOUCH

ESP32-S3	G12	G11	AW9523B_P1_2	AW9523B_P0_0
FT6336U (0x38)	I2C_SYS_SDA	I2C_SYS_SCL	TOUCH_INT	TOUCH_RST

ESP32-S3	G12	G11
FT6336U	I2C_SYS_SDA	I2C_SYS_SCL

AW9523B	P0_0	P1_2
FT6336U	TOUCH_RST	TOUCH_INT

Microphone & Amplifier

ESP32-S3	G12	G11	G34	G33	G13	G14	G0
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_DATI	

AW9523B	P0_2	P1_3
AW88298	AW_RST	AW_INT

AXP Power Indicator Light

AXP2101	AXP_CHG_LED
Red LED	RTC_VDD

RTC

ESP32-S3	G12	G11
BM8563 (0x51)	I2C_SYS_SDA	I2C_SYS_SCL

AXP2101	IRQ
BM8563	AXP_WAKEUP

Internal I2C Connection

ESP32-S3	G12	G11
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

HY2.0-4P

HY2.0-4P	Black	Red	Yellow	White
PORT.A	GND	5V	G2	G1
PORT.B	GND	5V	G9	G8
PORT.C	GND	5V	G17	G18

CoreS3-SE M5-Bus Diagram

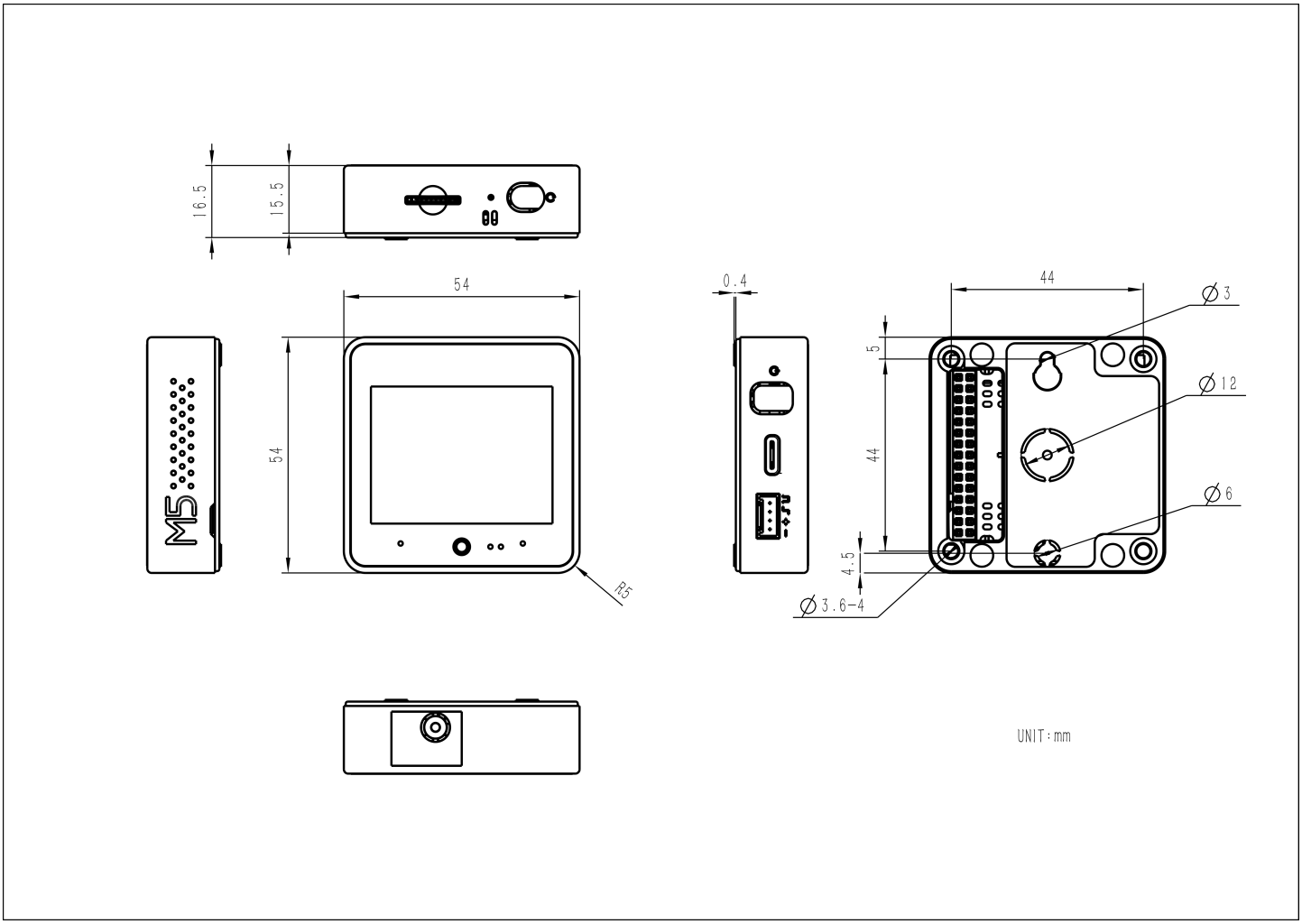
FUNC	PIN	LEFT	RIGHT	PIN	FUNC
	GND	1	2	G10	ADC
	GND	3	4	G8	PB_IN
	GND	5	6	RST	EN
MOSI	G37	7	8	G5	GPIO
MISO	G35	9	10	G9	PB_OUT
SCK	G36	11	12	3V3	
RXD0	G44	13	14	G43	TXD0
PC_RX	G18	15	16	G17	PC_TX
Int SDA	G12	17	18	G11	Int SCL
PORT.A SDA	G2	19	20	G1	PORT.A SCL
GPIO	G6	21	22	G7	GPIO
I2S_DOUT	G13	23	24	G0	I2S_LRCK
	NC	25	26	G14	I2S_DIN
	NC	27	28	5V	
	NC	29	30	BAT	

Core Series Host PinMap Comparison

CoreMP135_Bus		M5CORES3_Bus/M5CORES3_SE_Bus		M5CORE2_Bus		M5Basic_Bus											
GND	GND	GND	GND	GND	GND	GND	GND	1	2	ADC	G35	ADC	G35	ADC	G10	GPIO	PA0
GND	GND	GND	GND	GND	GND	GND	GND	3	4	ADC	G36	ADC	G36	PB_IN	G8	PB_IN	PD3
GND	GND	GND	GND	GND	GND	GND	GND	5	6	RST_EN		RST_EN		RST_EN		AXP-PWR-OK	
PE11	SPI4M0	G37	MOSI	G23	MOSI	G23	MOSI	7	8	DAC/SPK	G25	DAC	G25	GPIO	G5	GPIO	PB13
PE13	SPI4MI	G35	MISO	G38	MISO	G19	MISO	9	10	DAC	G26	DAC	G26	PB_OUT	G9	PB_OUT	PE9
PB4	SPI4SCK	G36	SCK	G18	SCK	G18	SCK	11	12	3.3V		3.3V		3.3V		3.3V	
PH8	U2RX	G44	RXD0	G3	RXD0	G3	RXD0	13	14	TXD0	G1	TXD0	G1	TXD0	G43	U2TX	PF11
DS-USB1-N		G18	PC_RX	G13	RXD2	G16	RXD2	15	16	TXD2	G17	TXD2	G14	PC_TX	G17	DS-USB1-P	
PE8	I2C1-SDA	G12	intSDA	G21	intSDA	G21	intSDA	17	18	intSCL	G22	intSCL	G22	intSCL	G11	I2C1-SCL	PB8
PG9	I2C2-SDA	G2	PA_SDA	G32	PA_SDA	G2	GPIO	19	20	GPIO	G5	PA_SCL	G33	PA_SCL	G1	I2C2-SCL	PF2
PA6	GPIO	G6	GPIO	G27	GPIO	G12	I2S_SK	21	22	I2S_WS	G13	GPIO	G19	GPIO	G7	GPIO	PB10
PA5	GPIO	G13	I2S_DOUT	G2	I2S_DOUT	G15	I2S_DOUT	23	24	I2S_MK	G0	I2S_LRCK/PDM_CLK	G0	I2S_LRCK	G0	GPIO	PC13
NC		NC		NC		NC		25	26	I2S_DIN	G34	PDM_DAT	G34	I2S_DIN	G14	GPIO	PA1
NC		NC		NC		NC		27	28	5V		5V		5V		5V	
NC		NC		NC		NC		29	30	BAT		BAT		BAT		BAT	

Model Size

CoreS3-SE Model Size PDF



Structure

- CoreS3-SE Structure Files

Datasheets

- esp32-s3
- ES7210
- BM8563
- AXP2101
- AW88298
- AW9523B

Softwares

Quick Start

- CoreS3-SE OpenAI Voice Assistant
- CoreS3-SE Xiaozhi Voice Assistant

Arduino

> **Note**
>
> There are hardware differences between CoreS3-SE and CoreS3. Code sections in the library involving Camera, Proximity sensor, IMU, and Magnetometer are not compatible with CoreS3-SE.

- CoreS3-SE Arduino Quick Start
- CoreS3-SE Arduino Library

UiFlow2

- CoreS3-SE UiFlow2 Quick Start

PlatformIO

- CoreS3-SE Factory Firmware (pio)

Easyloader

Easyloader	Download	Note
CoreS3-SE Factory Firmware Easyloader	download	/

Video

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	Cover For CoreS3
Battery Capacity	200 mAh	500 mAh	❌

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.