TOUGH

SKU:K034

| Description

M5Stack just expanded its M5 controller series with the introduction of the M5Stack TOUGH. Incorporating ESP32 **Wi-Fi** & **Bluetooth** MCU and full coverage, The M5 TOUGH operates at frequencies up to **240 MHz** include **8M PSRAM** with **16M FLASH** memory, Each M5 TOUGH integrates 2 inches IPS capacitive touchscreen that is sensitive to the human touch. The low-power M5 TOUGH is ideal for Industrial control and Smart buildings which require outdoor node data acquisition.

○ BEST-IN-CLASS UV resistant enclosure design protection: Water-resistant with an o-ring sealing contains **Waterproof** M12 Connectors can complete against solid objects, dust, sand, dirt, and against the effects of immersion in water under pressure for a period of time. A variety of installations such as Screw/Rolled strip/Magnetic/Adhesive Back.

○ HIGH INTEGRATION: AXP192 Power management with HY8563 RTC allows M5 TOUGH to provide advanced low power techniques. M5 TOUGH comes with 2 inches LCD capacitive Multi-touch screen,1W/NS4168 I2S speaker, TF card slot. Delicate RF circuit delivers robust and consistent wireless communication.

○ STRONG EXPANDABILITY: Programable Expansion Board 3x Grove Interface.Effortless access to M5Stack's hardware and software ecosystem: rich sensor extensions. M5 TOUGH is supplied from 12v->5V flexible DC/DC converter with RS485 Converter Circuits.

○ LOW-CODE DEVELOPMENT: M5 TOUGH supports UIFlow graphical programming platform, scripting-free, cloud push; and fully compatible with Arduino, ESP32-IDF, and other mainstream development platforms. Executing Dual-core processor on FreeRTOS to run multiple tasks for better performance.

| Product Features

○ ESP32-D0WD-V3

○ 16MB Flash + 8MB PSRAM

○ Waterproof and Dustproof

○ UV resistant enclosure design protection

○ 2 inches LCD capacitive Multi-touch screen

○ Advanced low power techniques: Wake Up with an RTC Alarm Clock

○ Integrated with 12v->5V flexible DC/DC converter. Flexible power supply

○ RS485/I2C/GPIO/UART interface

- Development platform：
  - Arduino/UIFlow/ESP-IDF

Included

- 1x M5Stack TOUGH
- 1x Type-C USB(1m)
- 1x 2.5mm hexagon wrench
- 1x 1.25-2P single head terminal line
- 1x 1.25-4P single head terminal line
- 1x Waterproof O-ring

Applications

- IoT controller
- Data acquisition/display terminal
- Timing controller

Specifications

Specifications	Parameters
ESP32-D0WDQ6-V3	240MHz dual core, 600 DMIPS, 520KB SRAM, Wi-Fi, dual mode Bluetooth
Flash	16MB
PSRAM	8MB
Protection level	Waterproof/Dustproof
Input voltage	USB(5V @ 500mA) RS485 DC Input (12V @ 1A)
Interface	TypeC x 1, GROVE x4 (RS485/I2C/G/UART interface)
IPS LCD	2.0"@320*240 ILI9342C full color display, maximum brightness 853nit
Touch Panel Driver Chip	CHSC6540
Speaker configuration	NS4168 16bit I2S amplifier + 1W speaker
RTC clock chip	HY8563
PMU	AXP192
USB chip	CH9102 USB-TTL serial port/program download circuit
TF card slot	Maximum support 16GB memory card
Antenna	3D-WiFi/BLE Antenna
Shell material	UV-resistant plastic
Net weight	108g
Gross weight	139g

Specifications	Parameters
Product size	58 * 76 * 41 mm
Packing size	99 * 80 * 45 mm

Pin Mapping

Display

ESP32 Chip	/	G23	G18	G5	G15			
AXP192 Chip	/					AXP_IO4	AXP_LDO3	AXP_LDO2
ILI9342C	MISO	MOSI	SCK	CS	DC	RST	BL	PWR

Cap.Touch

ESP32 Chip	G22	G21	G39
Cap.Touch	SCL	SDA	INT

TFCard

ESP32 Chip	G38	G23	G18	G4	
AXP192 Chip					AXP_LDO2
TFCard	MISO	MOSI	SCK	CS	PWR

NS4168

ESP32 Chip	G12	G0	G2	
AXP192 Chip				AXP_IO2
NS4168	BCLK	LRCK	DATA	SPK_EN

RTC-HY8563

ESP32 Chip	GPIO22	GPIO21		
AXP192			PWRKEY	AXP_LDO1

RTC-HY8563	SCL	SDA	INT	PWR

PORTA

ESP32	G33	G32	VCC	GND
PORTA	SCL	SDA	VCC	GND

PORTB

ESP32	G36	G26	VCC	GND
PORTB	INPUT	OUTPUT	VCC	GND

PORTC

ESP32	G13	G14	VCC	GND
PORTC	RX	TX	VCC	GND

RS485

M5BUS	G27	G19	(DCDC 12->5V)	GND
RS485	RX	TX	12V	GND

HY2.0_RESET

M5BUS	EN	G25	VCC	GND
RESET	EN	G25	5V	GND

ESP32 ADC/DAC

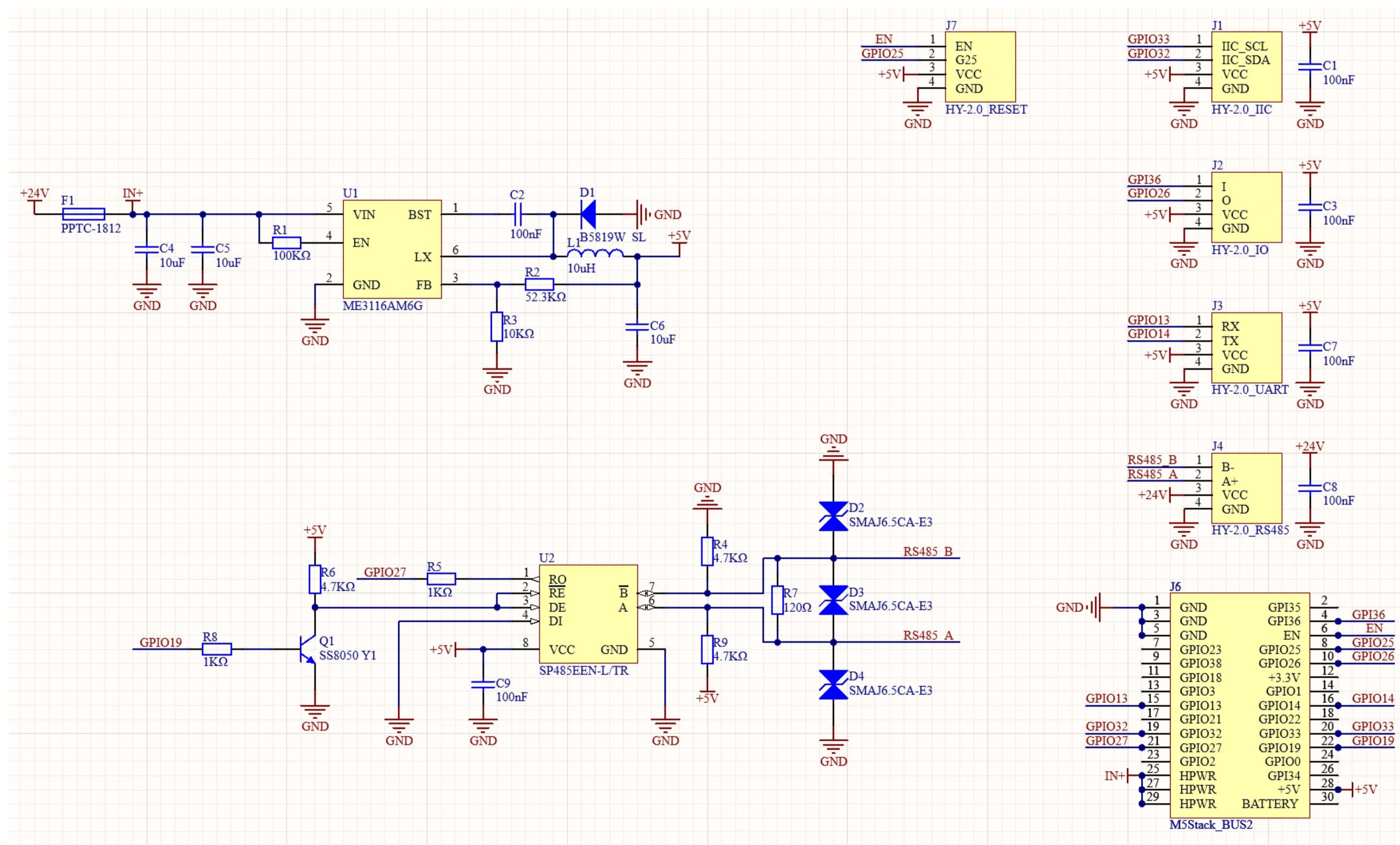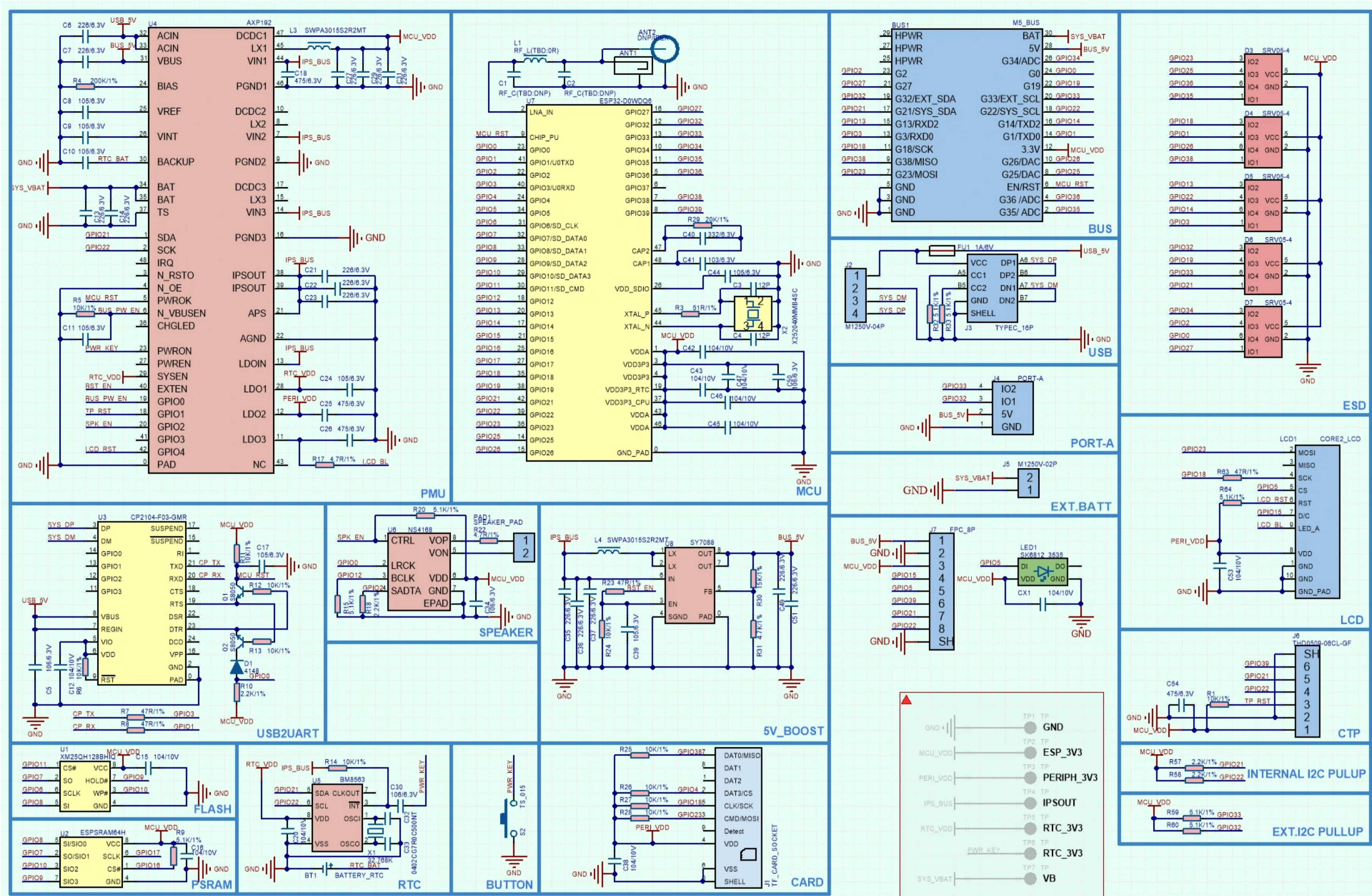| ADC1	ADC2	DAC1	DAC2
8 channel	10 channel	2 channel	2 channel
G32-39	G0/2/4/12-15/25-27	G25	G26

For more information on pin assignment and pin remapping, please refer to ESP32 datasheet

Related Links

- Datasheet
  - ESP32
  - NS4168
  - ILI9342C
  - HYM8563

  - SY7088
  - AXP192 datasheet
  - AXP192 register

Schematics

Examples

Arduino

- M5Tough-Tools
- M5Tough-Lib