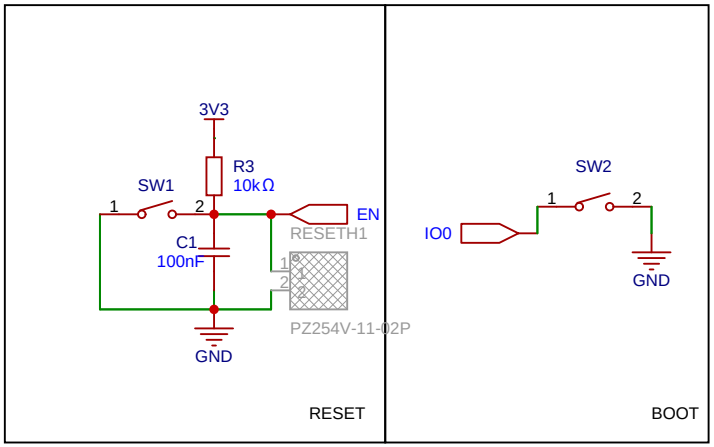
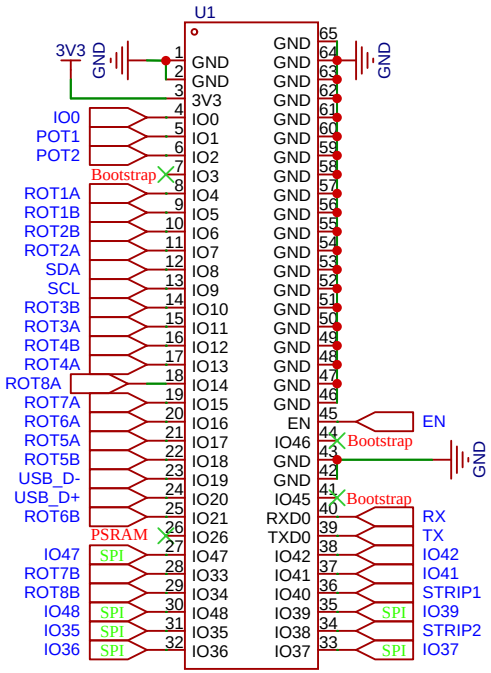




Notes

IO26 is not usable in modules with embedded PSRAM.
Not used to allow the replacement of the ESP32S3 module if required.

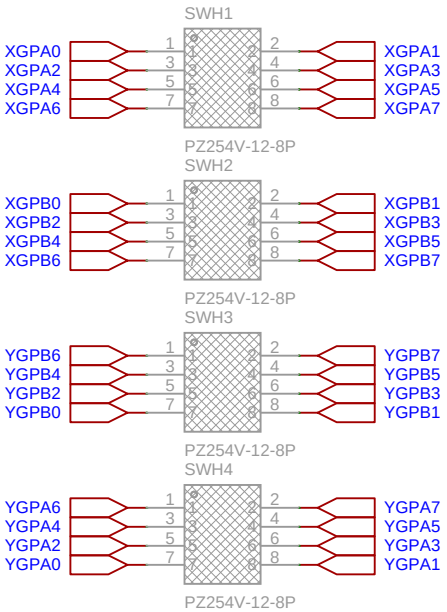
IO3, IO45 and IO46 are bootstrap pins. We avoid any other usage.
IO0 = Boot button

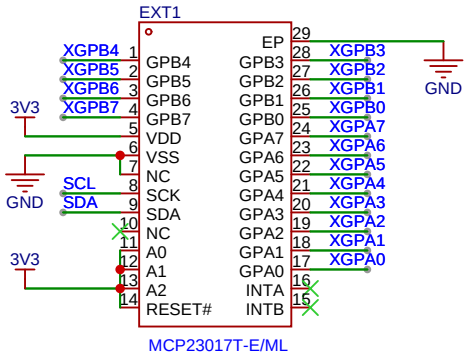
All ESP32-S3-Mini modules use QUAD flash/PSRAM, so IO 33-37 are usable.

USB is assigned to GPIO 19 and 20 and can not be reasigned.

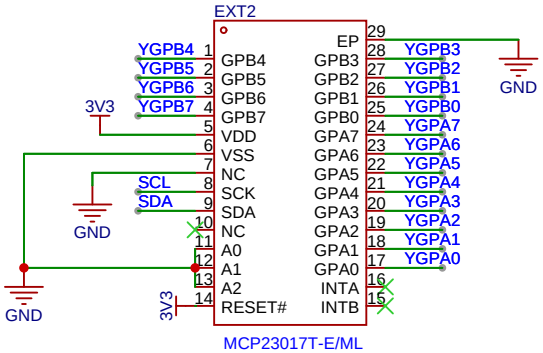
The primary I2C bus is assigned to GPIO 8 and 8 by default.

Schematic	SimWheelKit_unified_REV2	Create at	2025-08-03
		Update at	2025-08-20
Board	SimwheelKit_unified_REV2	Page	CPU
Drawn	Afpineda	SimWheelKit_ESP32_unified	
Reviewed			
		Version	Size
EasyEDA		REV2	A4
		Page 1 Total 10	
		ESP32SimWheel	



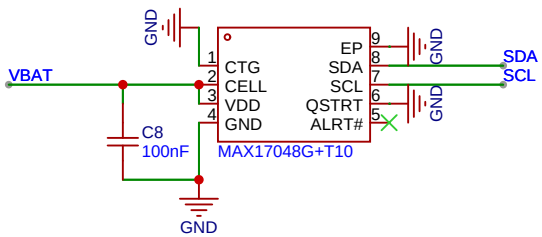


I2C hardware address 0x07

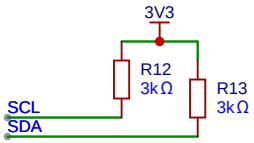


I2C hardware address 0x00

Schematic	SimWheelKit_unified_REV2	Create at	2025-08-03
		Update at	2025-08-20
Board	SimwheelKit_unified_REV2	Page	GPIOExpanders
Drawn	Afpineda	SimWheelKit_ESP32_unified	
Reviewed			
		Version	Size	Page 2 Total 10
EasyEDA		REV2	A4	ESP32SimWheel



Schematic	SimWheelKit_unified_REV2	Create at	2025-08-03
		Update at	2025-08-03
Board	SimwheelKit_unified_REV2	Page	Fuel Gauge
Drawn	Afpineda	SimWheelKit_ESP32_unified	
Reviewed			
		Version	Size	Page 3 Total 10
EasyEDA		REV2	A4	EasyEDA.com



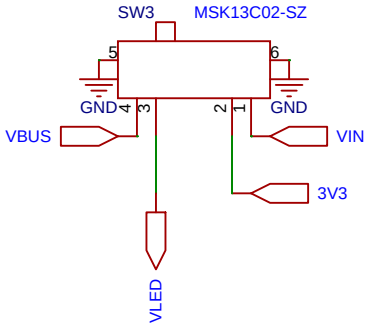
I2C calculations

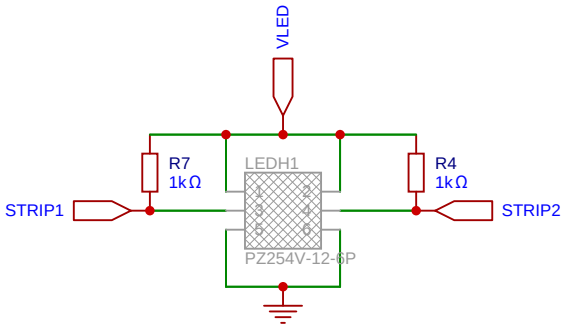
Parameter	Symbol	Value	Source
Supply voltage	Vdd	3.3V	System
Max. low voltage	Vol(max)	0.4V	I2C spec.
Max. sink current	Iol	3mA	I2C spec.
Max rise time	Tr	300ns=300*10^-9s	I2C spec. for 400Khz as target
Bus length (net)	L	1841mil=4.675cm	PCB design
Bus capacitance	Cbus	60pF=60*10^-12F	Estimation based on PCB design and reference table
Min. pullup impedance	Rp(min)	967ohm	RP(min)=Vdd Vol(max)*Iol
Max. pullup impedance	Rp(max)	5902ohm	RP(max)=Tr/(0.8473×Cbus)
Bus frequency	F	400Khz	Max I2C frequency (high speed)
Max bus trace length	L(max)	2950mil	L(max) = (1/10)*c/F [c=light speed]

https://www.tech-sparks.com/pcb-trace-length/
https://magellancircuits.com/does-i2c-require-length-matching/

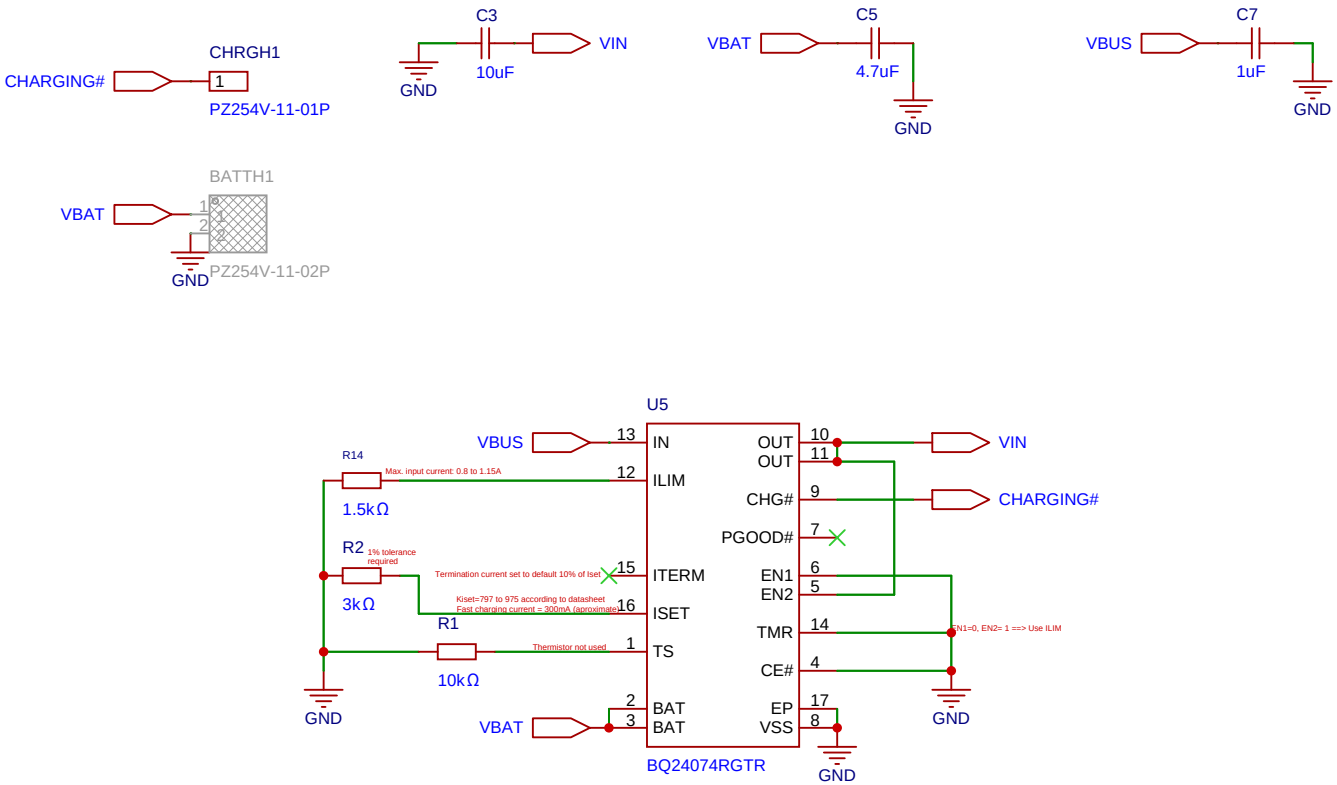
Source	Capacitance
Pin	10pF / pin
Trace	1pF / cm
Via	1pF / via

Schematic	SimWheelKit_unified_REV2	Create at	2025-08-03
		Update at	2025-08-03
Board	SimwheelKit_unified_REV2	Page	I2C bus
Drawn		SimWheelKit_ESP32_unified	
Reviewed			
		Version	Size	Page 4 Total 10
EasyEDA		REV2	A4	EasyEDA.com





Schematic	SimWheelKit_unified_REV2	Create at	2025-08-03
		Update at	2025-08-20
Board	SimwheelKit_unified_REV2	Page	LED strips
Drawn		SimWheelKit_ESP32_unified	
Reviewed			
		Version	Size	Page 5 Total 10
EasyEDA		REV2	A4	EasyEDA.com

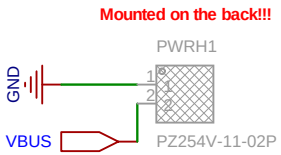


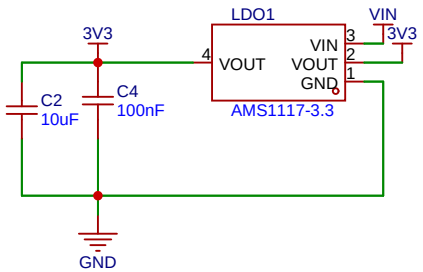
Battery charger and power path manager

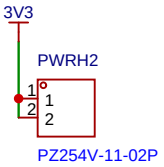
Table 7-2. EN1/EN2 Settings

EN2	EN1	MAXIMUM INPUT CURRENT INTO IN PIN
0	0	100 mA. USB100 mode
0	1	500 mA. USB500 mode
1	0	Set by an external resistor from ILIM to VSS
1	1	Standby (USB suspend mode)

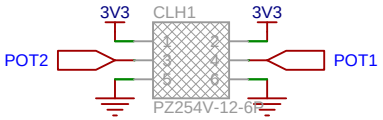
Schematic	SimWheelKit_unified_REV2	Create at	2025-08-03
		Update at	2025-08-20
Board	SimwheelKit_unified_REV2	Page	Battery
Drawn		SimWheelKit_ESP32_unified	
Reviewed			
		Version	Size
EasyEDA	REV2	A4	EasyEDA.com



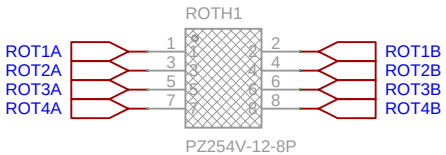


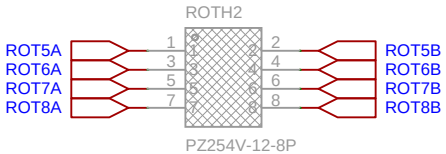


Schematic	SimWheelKit_unified_REV2	Create at	2025-08-03
		Update at	2025-08-20
Board	SimwheelKit_unified_REV2	Page	Power
Drawn	Afpineda	SimWheelKit_ESP32_unified	
Reviewed			
		Version	Size	Page 7 Total 10
EasyEDA		REV2	A4	ESP32SimWheel

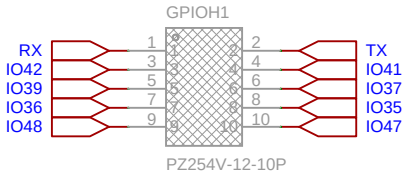


Clutch



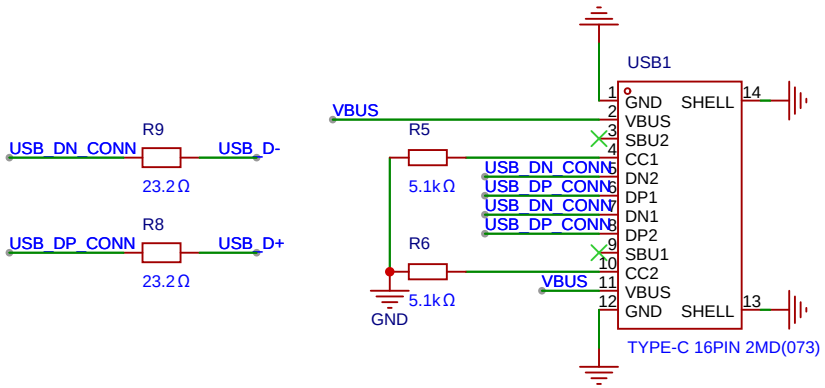


Rotary enc.



GPIO

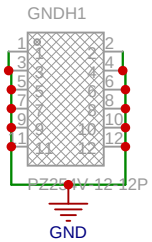
Schematic	SimWheelKit_unified_REV2	Create at	2025-08-03
		Update at	2025-08-20
Board	SimwheelKit_unified_REV2	Page	Connectors
Drawn	Afpineda	SimWheelKit_ESP32_unified	
Reviewed			
		Version	Size	Page 8 Total 10
EasyEDA		REV2	A4	ESP32SimWheel

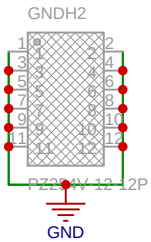


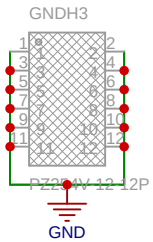
USB-C

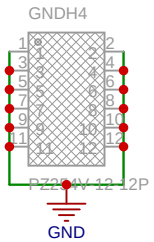
Quote from https://docs.espressif.com/projects/esp-hardware-design-guidelines/en/latest/esp32s3/schematic-checklist.html#usb:
It is recommended to populate 22/33 ohm series resistors between the mentioned pins and the USB connector.
Also, reserve a footprint for a capacitor to ground on each trace.
Note that both components should be placed close to the chip.

Schematic	SimWheelKit_unified_REV2	Create at	2025-08-03
		Update at	2025-08-03
Board	SimwheelKit_unified_REV2	Page	USB
Drawn		SimWheelKit_ESP32_unified	
Reviewed			
		Version	Size	Page 9 Total 10
EasyEDA		REV2	A4	EasyEDA.com









Common GND

Schematic	SimWheelKit_unified_REV2	Create at	2025-08-03
		Update at	2025-09-03
Board	SimwheelKit_unified_REV2	Page	Ground
Drawn		SimWheelKit_ESP32_unified	
Reviewed			
		Version	Size	Page 10 Total 10
EasyEDA		REV2	A4	EasyEDA.com