

# Power Design Documents

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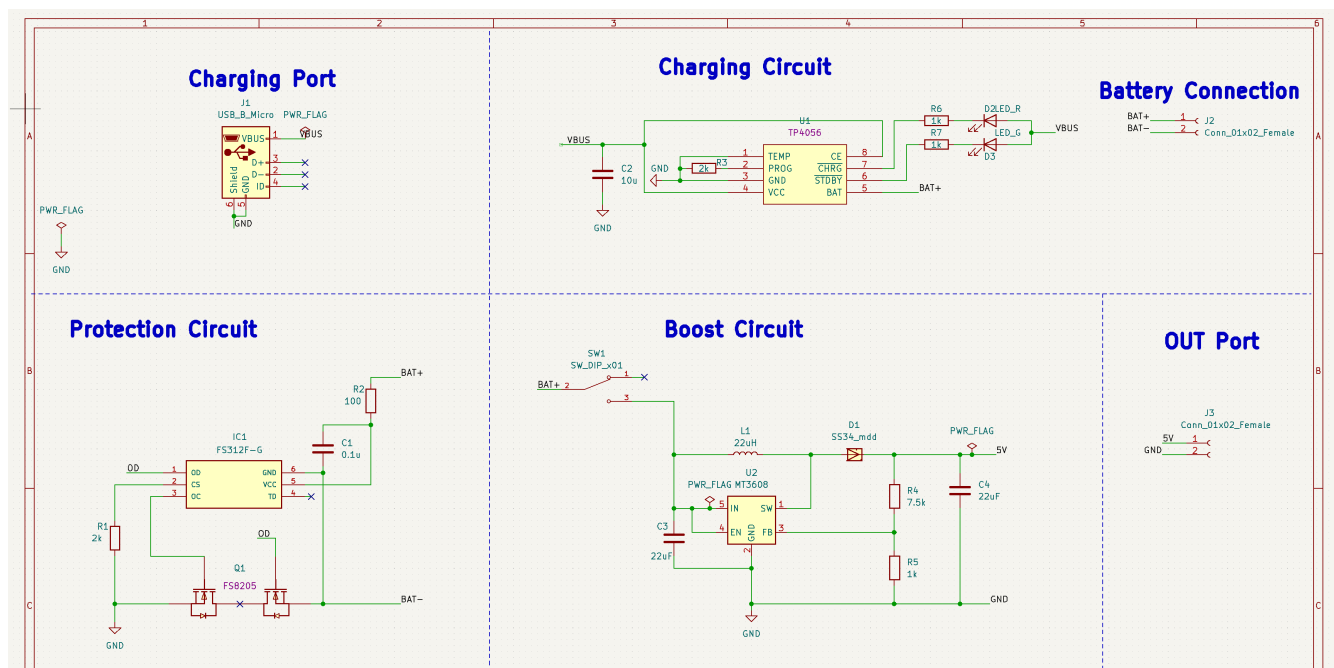
## General

This part illustrates the design of the power associated with the project. There are two KiCAD project folders. One of them is "403\_charger\_v1," and another one is "403\_charger\_v2". "403\_charger\_v1" is the initial design of the power, but it has some problems with the design. "403\_charger\_v2" is the design that problems got corrected. In the description of the documents, "403\_charger\_v2" will be described.

## Description

In the KiCAD project folder, there are three main files, which are "403\_charger\_v2.kicad\_pcb", "403\_charger\_v2.kicad\_pro", "403\_charger\_v2.kicad\_sch". "403\_charger\_v2.kicad\_pcb" is the PCB file of the power. "403\_charger\_v2.kicad\_pro" is the project file of the power. "403\_charger\_v2.kicad\_sch" is the schematic file of the power. These three files can only be opened by the KiCAD.

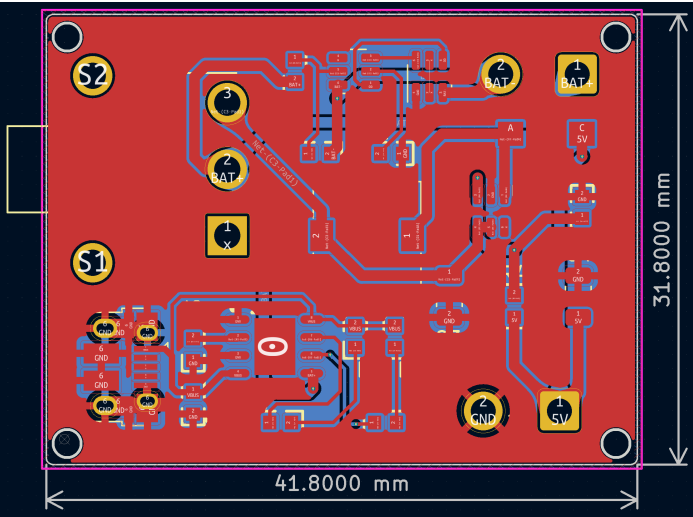
## Schematic



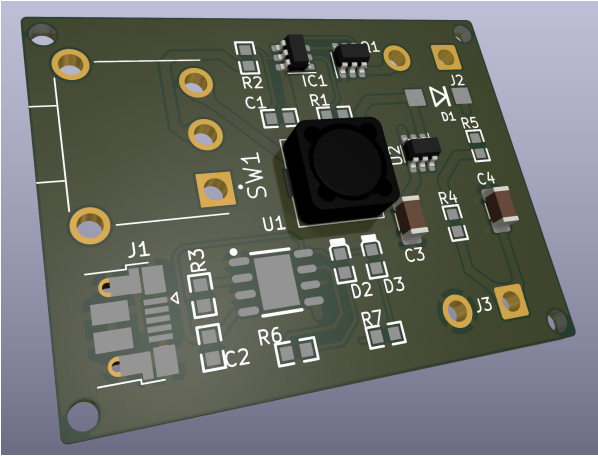
Schematic Preview of the Power

The circuit consists of 3 main circuits: the charging circuit, the protection circuit, and the boost circuit. Details of all components in the schematic will be shown below.

PCB



PCB Preview of the Power



3D Preview of the PCB

Three different track widths are used in the PCB design. They are 0.250mm, 0.500mm, and 0.750mm. The track of 0.250mm is used to transfer the signals around the chips. The track of 0.500 mm is used to connect pins involved with the output of the battery. The track of 0.750mm is used to be paths involved with boosted output. Additionally, two copper pour planes of GND are on the front and the back.

Bill of Material

Number	References	Value	Footprint	Quantity	Price
1	C3, C4	22uF	C_1206_3216Metric	2	US\$1.06
2	C1	0.1u	0603_R	1	US\$0.0026
3	C2	10u	0603_R	1	US\$0.0063
4	R5, R6, R7	1k	0603_R	3	US\$0.0033
5	R1, R3	2k	0603_R	2	US\$0.0018
6	R2	100	0603_R	1	US\$0.0012
7	R4	7.5k	0603_R	1	US\$0.0013
8	L1	22uH	75_75_4	1	US\$0.1676
9	D1	SS34_mdd	SS34	1	US\$0.0342

Number	References	Value	Footprint	Quantity	Price
10	D2	LED_R	0603_LED_S1	1	US\$ 0.0381
11	D3	LED_G	0603_LED_S1	1	US\$ 0.0381
12	U1	TP4056_[C16581]	SOP-8_EP_150MIL	1	US\$ 0.2303
13	U2	MT3608	SOT-23-6	1	US\$ 0.1627
14	SW1	SW_DIP_x01	SW_500SSP3S1M6QEA	1	US\$3.89
15	IC1	FS312F-G	SOT-23-6	1	US\$ 0.16
16	Q1	FS8205	SOT-23-6	1	US\$ 0.1763
17	J2, J3	Conn_01x02_Female	SolderWire-1sqmm_1x02_P5.4mm_D1.4mm_OD2.7mm	2	free
18	J1	USB_B_Micro	USB_Micro-B_Ampheno1_10103594-0001LF_Horizontal	1	free

There is also another interactive BOM in the files. The path is "403\_charger\_v2\bom\ibom.html". In the "ibom.html," you can click the component on the PCB then the corresponding information of the component will be highlighted at the side. The following figure is the preview of the interactive BOM.

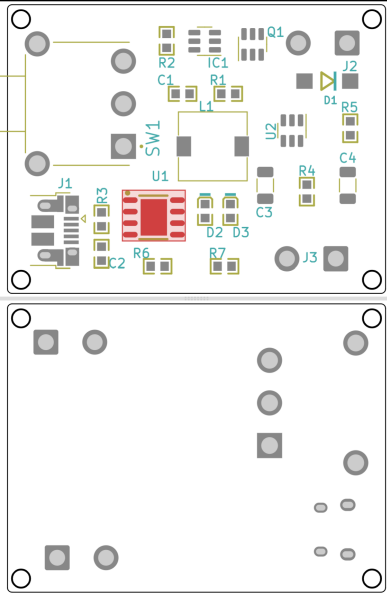
403\_charger\_v2

Rev: 2022-10-26 23:24:19

Ref lookup

Filter

	Sour ced	Plac ed	References	Value	Footprint	Quantity
1	<input type="checkbox"/>	<input type="checkbox"/>	C3, C4	22uF	C_1206_3216Metric	2
2	<input type="checkbox"/>	<input type="checkbox"/>	C1	0.1u	0603_R	1
3	<input type="checkbox"/>	<input type="checkbox"/>	C2	10u	0603_R	1
4	<input type="checkbox"/>	<input type="checkbox"/>	R5, R6, R7	1k	0603_R	3
5	<input type="checkbox"/>	<input type="checkbox"/>	R1, R3	2k	0603_R	2
6	<input type="checkbox"/>	<input type="checkbox"/>	R2	100	0603_R	1
7	<input type="checkbox"/>	<input type="checkbox"/>	R4	7.5k	0603_R	1
8	<input type="checkbox"/>	<input type="checkbox"/>	L1	22uH	75_75_4	1
9	<input type="checkbox"/>	<input type="checkbox"/>	D1	SS34_mdd	SS34	1
10	<input type="checkbox"/>	<input type="checkbox"/>	D2	LED_R	0603_LED_S1	1
11	<input type="checkbox"/>	<input type="checkbox"/>	D3	LED_G	0603_LED_S1	1
12	<input type="checkbox"/>	<input type="checkbox"/>	U1	TP4056_[C16581]	SOP-8_EP_150MIL	1
13	<input type="checkbox"/>	<input type="checkbox"/>	U2	MT3608	SOT-23-6	1
14	<input type="checkbox"/>	<input type="checkbox"/>	SW1	SW_DIP_x01	SW_500SSP3S1M6QEA	1
15	<input type="checkbox"/>	<input type="checkbox"/>	IC1	FS312F-G	SOT-23-6	1
16	<input type="checkbox"/>	<input type="checkbox"/>	Q1	FS8205	SOT-23-6	1
17	<input type="checkbox"/>	<input type="checkbox"/>	J2, J3	Conn_01x02_Female	SolderWire-1sqmm_1x02_P5.4mm_D1.4mm_OD2.7mm	2
18	<input type="checkbox"/>	<input type="checkbox"/>	J1	USB_B_Micro	USB_Micro-B_Ampheno1_10103594-0001LF_Horizontal	1



Preview of the Interactive BOM