Department of Electronics & Telecommunication Engineering

UNIVERSITY OF MORATUWA

EN3023: ELECTRONIC DESIGN REALIZATION

MINI-UPS

DESIGN DOCUMENT

Group 03

This report is submitted in partial fulfilment of the requirements for module EN3023.

12/06/2022

Group Member	Index Number
H. D. M. P. Ariyarathne	180045P
P. M. N. S. Bandara	180066F
N. G. K. M. Dayasekara	180112U
H. K. R. L. Gunasekara	180205H
S.S. Hettiarachchi	180237G
D. N. Kannangara	180301A
P. D. Mahawela	180378M
K. R. Y. Nagasinghe	180411K
H. D. M. Premathilaka	180497C
K. M. R. Wijitharathna	180717E

Table of Contents

1.0 Manage Phase

The guidelines given in the inclusive design toolkit are used to determine what to do next and when to move on to the next stage.

1.1 Reviewing Progress and Planning Next Steps

1.1.1 What have we got?

Currently, the team members are designing the schematics and layouts of the circuits as well as the enclosure for the final product. Altium is used to design the schematics whereas Solidworks is used to design the enclosure.

1.1.2 What are we missing?

We are yet to build a working prototype of the proposed product. Moreover, the designed enclosures are still to be subjected to a proper heat flow simulation. In addition, the quality of the electronic components to be used must be assessed.

1.1.3 What resources are available?

Skills, experience and the knowledge of the team members in utilizing the EDA and CAD tools & the assistance of the lecturers are the main resources available.

1.1.4 What are the deadlines?

The project is to be finished by the mid of May 2022.

1.1.5 What are the risks?

With the current economic situation and regular power cuts, the user expects to buy a device with high battery life at a relatively low price. Hence, there is a risk that our product would underperform in the market due to the over-expectations of the consumers.

1.1.6 What should we do next?

Given the risk factors and user expectations, our priority is to improve the battery life by optimizing the circuit designs and/or increasing the battery capacity to achieve a longer battery life.

1.2 Refining Product Goals

1.2.1 What problem are we trying to solve?

Facilitating the consumers' need to maintain an uninterrupted internet connection, during a power cut.

1.2.2 What are the big issues?

The main issue is the compromise between factors such as battery life, battery capacity and price of the device.

1.2.3 What is the proposed solution?

Our proposed solution for the aforementioned problem is a mini-UPS that could power a router enabling the consumer to stay connected to the internet even during power cuts, for a considerable period.

1.2.4 Why is the proposed solution different?

The following facts will emphasize why our proposed solution stands out.

- Highly efficient SMPS, charging and boost converter operation being greater than 80%.
- Usage of user-selectable, easily replaceable batteries. (UPSs suffer immensely from issues related to batteries. As a result, our solution is giving the user the luxury to replace and use batteries as per his/her wish. It is as easy as replacing the batteries of a TV remote)
- High power capability (12V/ 2A, 24W) – Surpasses most of the consumer products available in the market
- Compact device with long operation time.

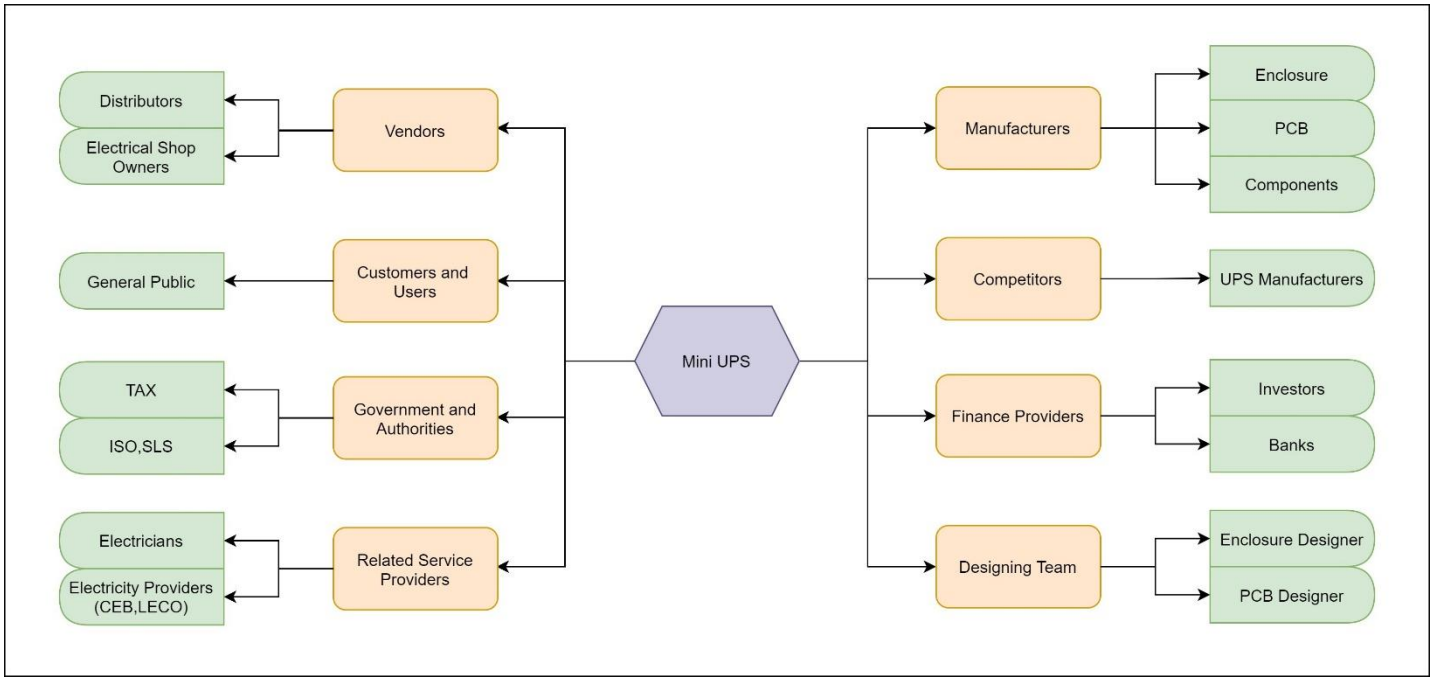
1.3 Initial Impact Assessment

Initial impact assessment

Project Name: 'Speedy' - Mini UPS **Date: 28/02/2022**

Impact Factor Descriptions				
Stakeholder	**Impact Factor**	**Type of Cost / Benefit** (choose from drop-down list)	**Rationale**	**Size of Impact** (choose from drop-down list)
Operations	Maintanence Cost	Decreased cost	Inclusive structures are frequently higher established and for that reason less complicated to maintain.	Medium
	Cost of returns	Decreased cost	The design process about on consumer satisfaction and this reduces return of products	High
Manufacturing	Production Cost	Increased cost	Cost for generating every item	Medium
	Material Cost	Increased cost	Suitable materials to balance the product price must be utilized in producing the product.	High
	Tooling Cost	Decreased cost	Cost for fabrication of the tooling set-ups can save the producing price in the long run	High
Development	Documentation Cost	Decreased cost	Proper documentation reduces the cost	Low
	Cost of Change	Decreased cost	Detecting required modifications early on will assist to make modifications a good deal less difficult and cheaper.	High
	Development Cost	Decreased cost	Identifying and specializing in applicable fuctionalities that requier adjustments will assist to lessen the want of rework.	High
	Risk management	Decreased cost	Proper risk management at some point in the manufacturing phase will assist to lower needless expenses.	High
Sales	Sales	Increased revenue	A user friendly layout that caters to the requirement will enhance the sales	High
	Customer base	Intangible	A design that caters the consumer desires will help to enlarge the customer base	Low
	Advertising	Decreased cost	Depending on the consumer reaction and through selecting the target crowd nicely marketing and marketing value can be minimized	High

1.4 Stakeholder Map



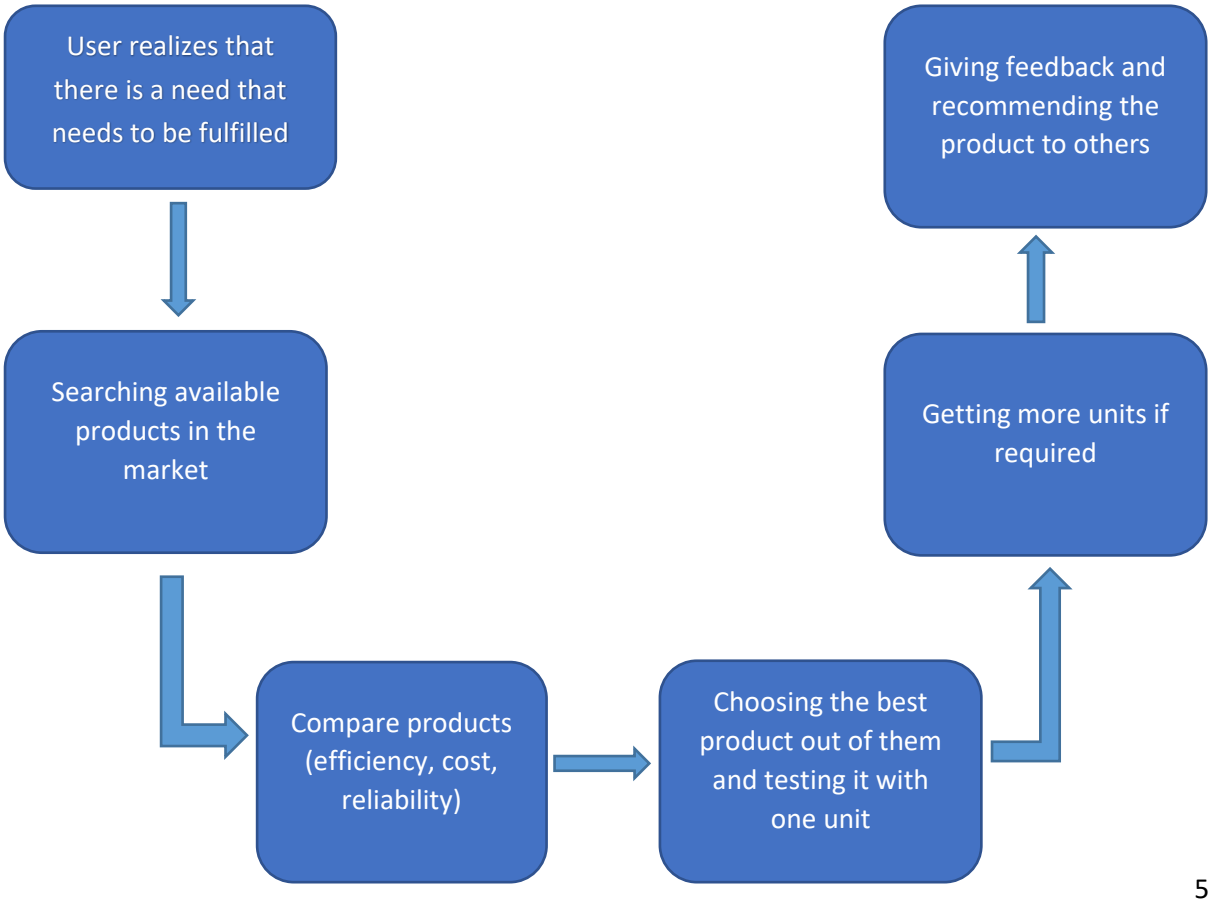
2.0 Explore Phase

2.1 User Observation (Using Online Resources)

Our product was proposed based on user observation. Due to the pandemic situation, we had to take online surveys. Moreover, we extended the scope by going through online resources. After collecting data from user observation, we concluded the following,

- Due to regular power cuts, many people who work from home need to use a UPS as it is well suited to stay online during online meetings and video calls. Also, software engineers who have to stay in touch with online resources can experience uninterrupted internet connections during power cuts.
- University students, as well as school students, can do exams without any issue, with the assistance of a Mini UPS. Many students who don't use a UPS for routers say that they panic and lose composure if a power failure happens during an exam.
- With the increased duration of power cuts, demand for the Mini UPSs has increased and it has become very rare to find such a custom device even if a consumer manages to find such a device, they claim that the cost is too high.
- On the other hand, because of the pandemic, people hesitate to buy power backups via online shopping because there are issues involving shipping and fraud.

2.2 Describing User Journey



2.3 Capturing Needs List

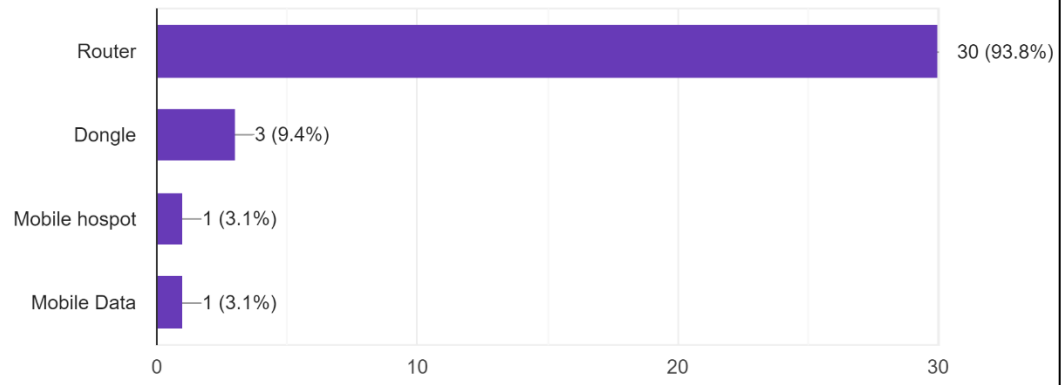
User	Requirement	Reason
Shop owner	A product that has an awesome profit margin and may attract customers.	Can market the product to customers and earn an awesome profit.
	A product with top quality could have excessive demand in the market.	Can make investments in the product and make certain that clients can have a demand of the product with the given features.
	A marketable product that can be bought with confidence.	Can persuade a huge amount of customers to shop for the product.
Customer	A product that is user-friendly and may be effortlessly handled.	Can fulfil necessities with much less attempt by the use of this product.
	A durable and reliable product.	Can use the product for an extended period with no malfunctions or replacements.
	A product that might decrease the attempt is taken to do a selected task.	It would make daily activities easier.
	A product for an affordable price given all of the functionalities.	Should capable of buying the product without hesitance and recommend others to shop for it.

By observing the above user observations, it is clear that there's a timely requirement for a Mini UPS which assists with Router battery backup functionality.

2.4 Results of End-User Survey

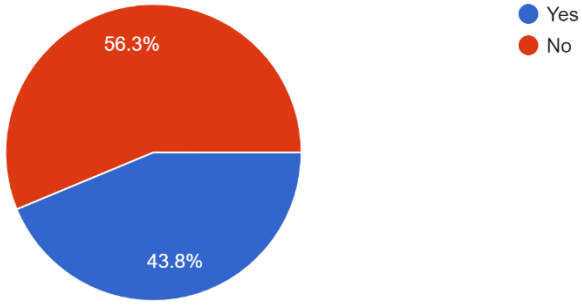
Which device/s do you use to connect to the internet?

32 responses



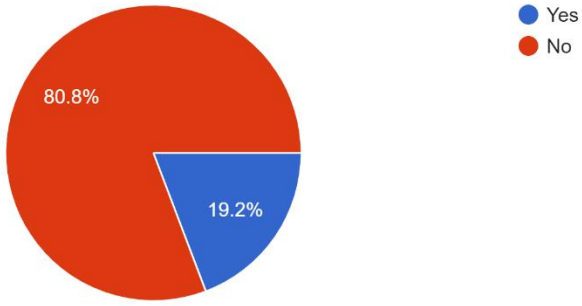
Do you have a device that could stay connected to the internet even during a power cut?

32 responses



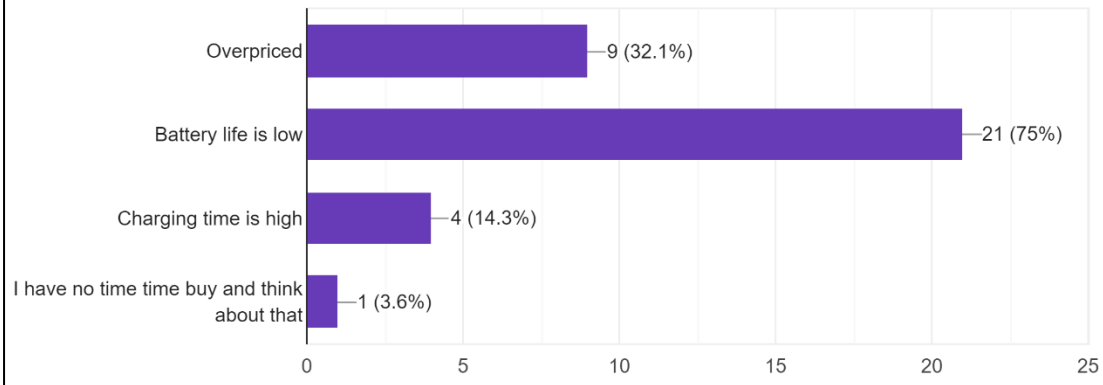
If you are using such a device, are you satisfied with it?

26 responses



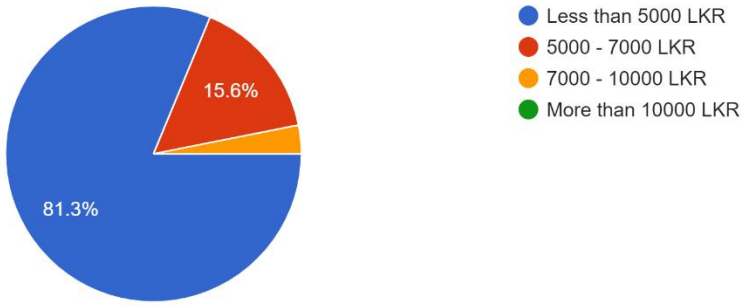
If you are not, please select reason/s from the list below,

28 responses



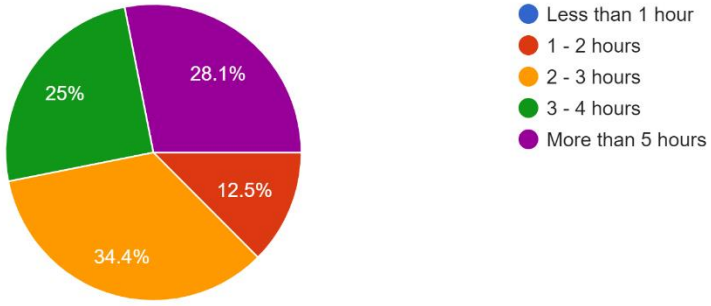
If you are willing to buy a new device, what is your price expectation?

32 responses



What is the expected battery life of the device?

32 responses

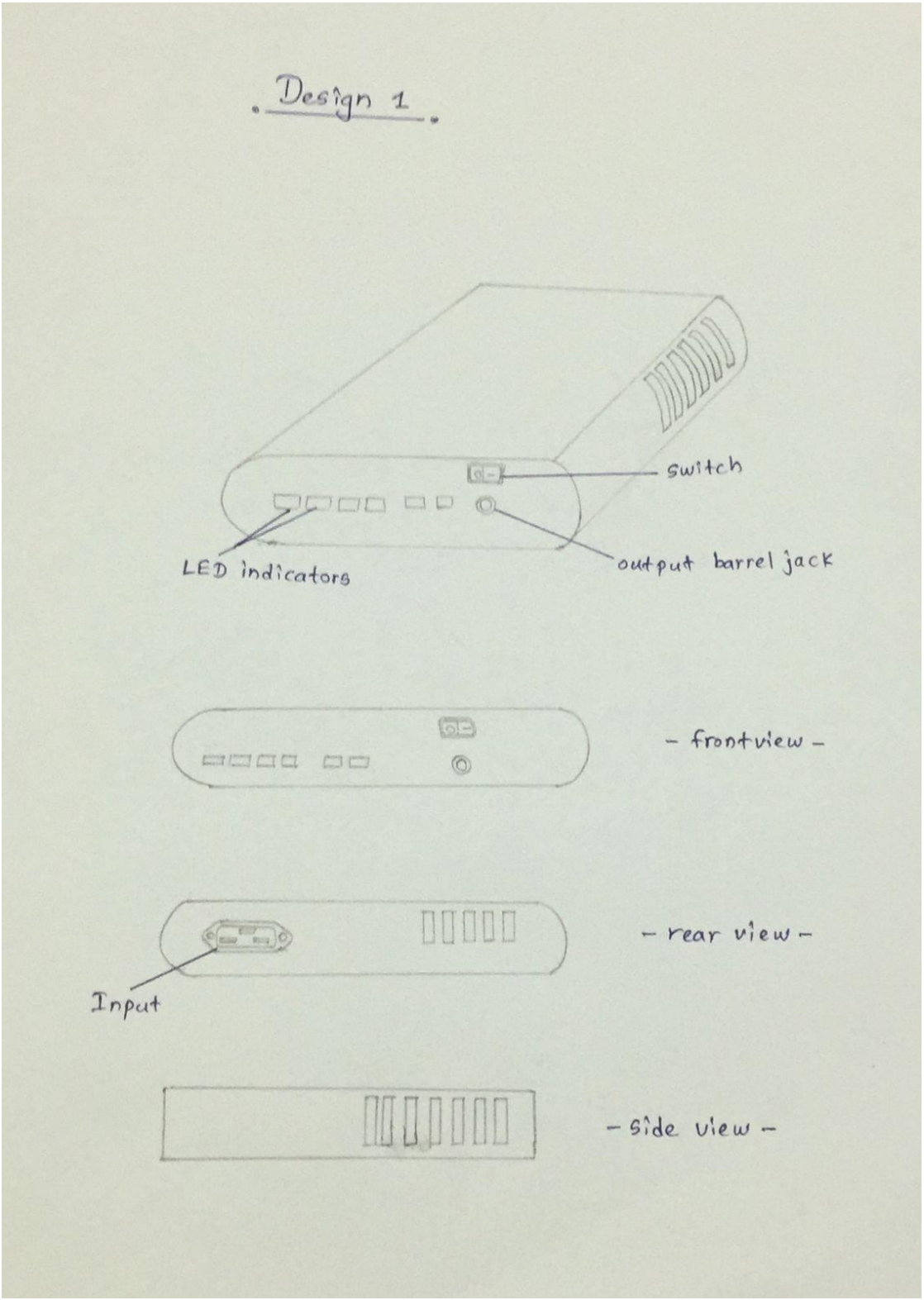


3.0 Create Phase

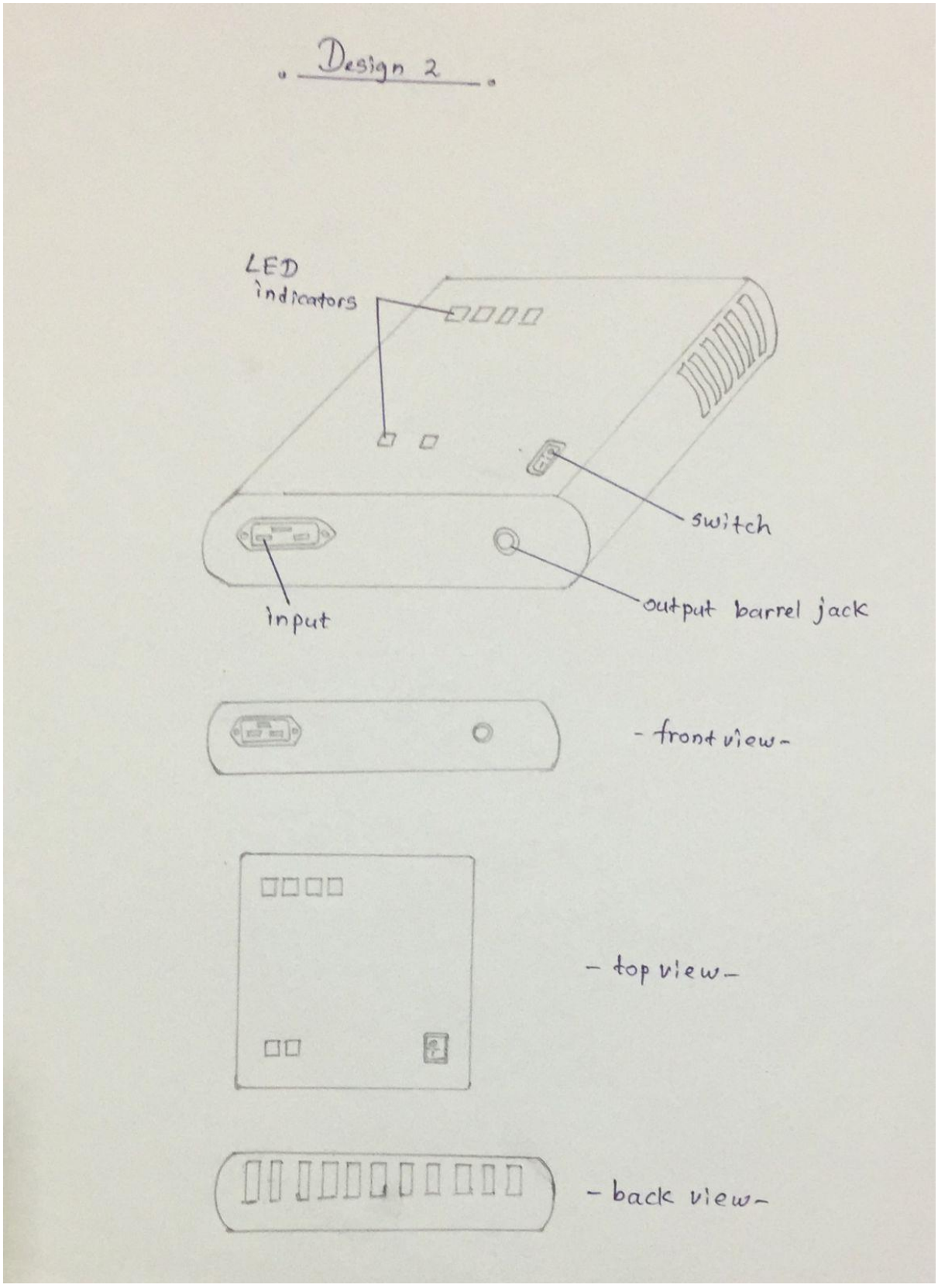
3.1 Preliminary Designs

3.1.1 Conceptual Designs

3.1.1.1 Conceptual Design 1

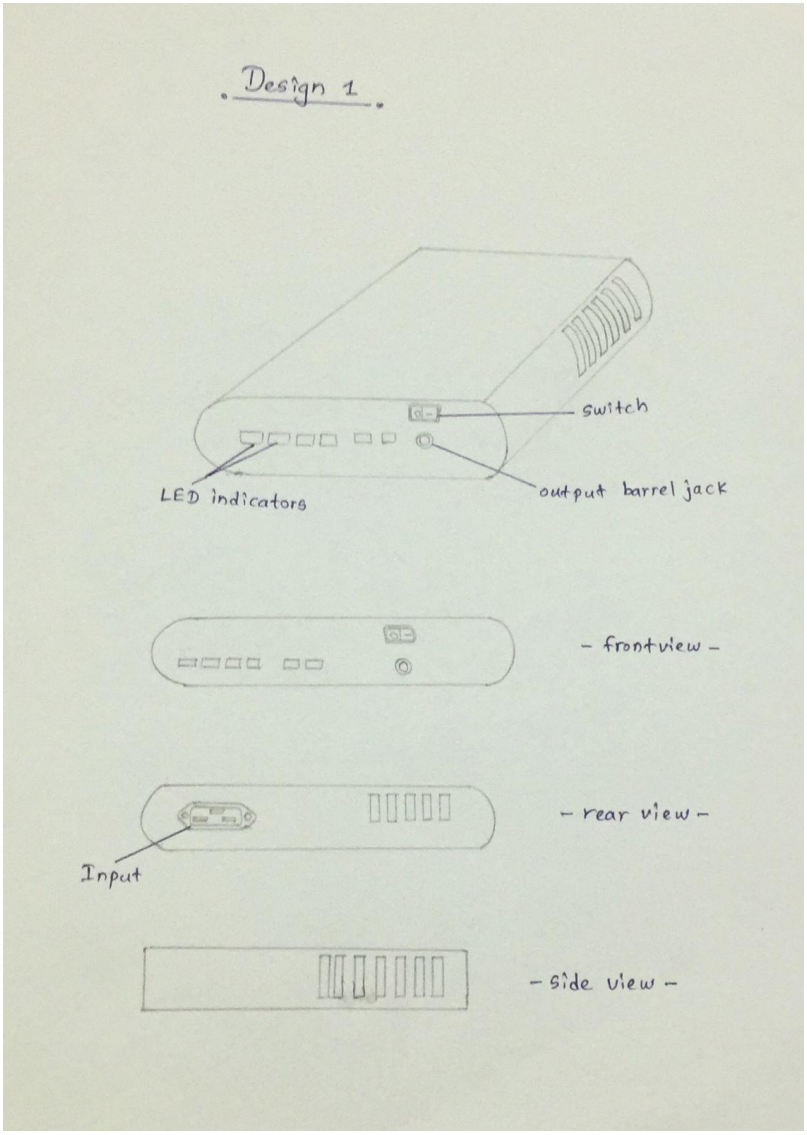


3.1.1.2 Conceptual Design 2

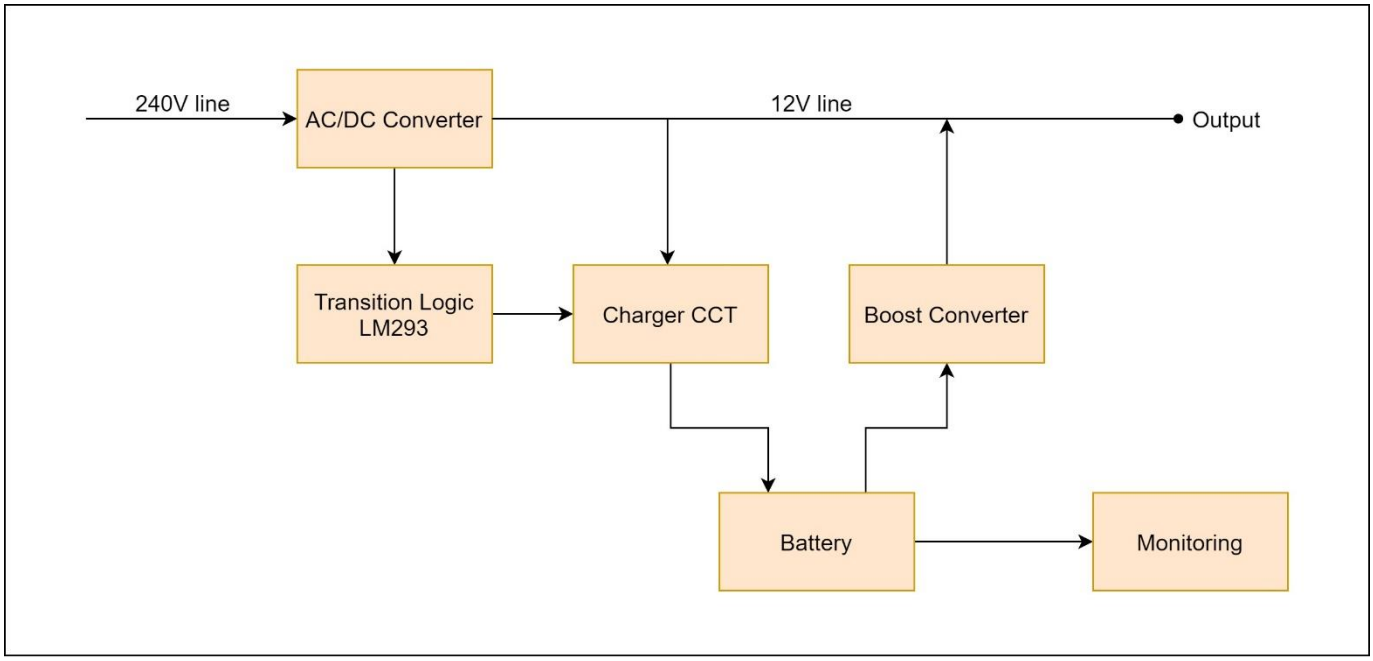


3.2 Selected Design

3.2.1 Preliminary Design – Conceptual Design 1



3.2.3 Preliminary Design – Block Diagram



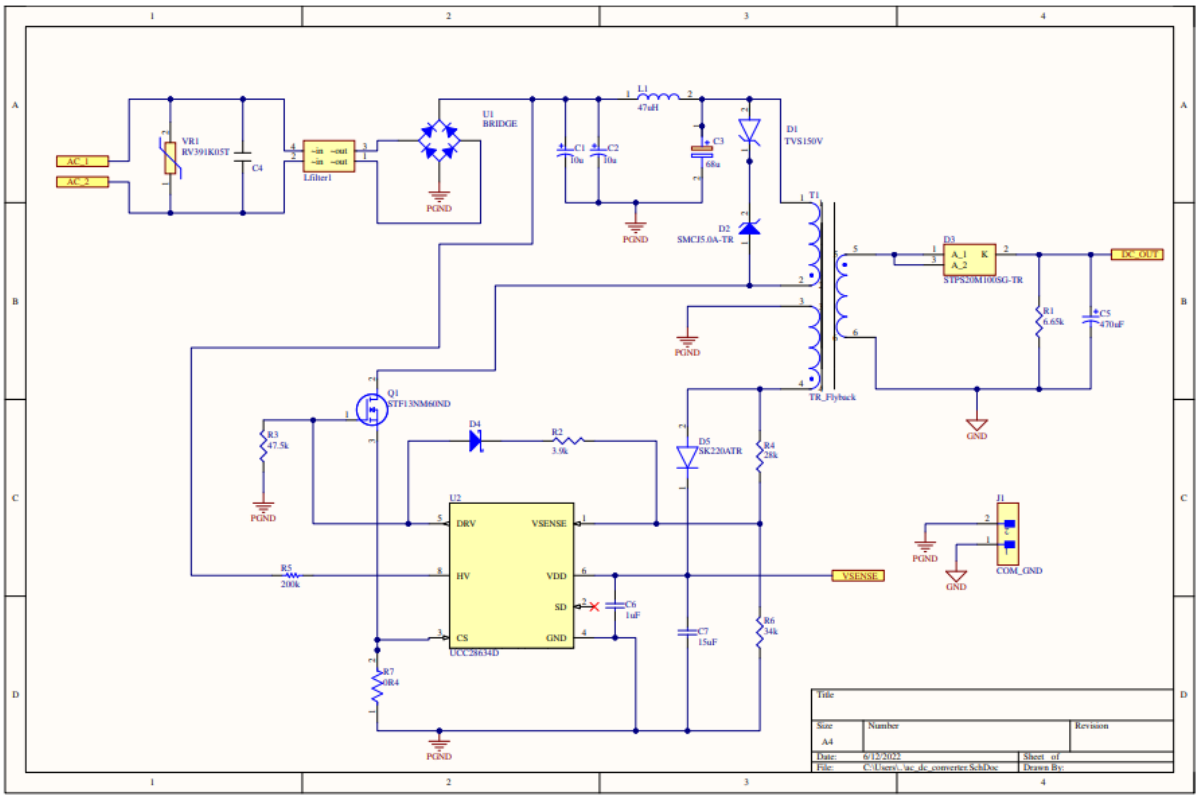
The functionality of the blocks

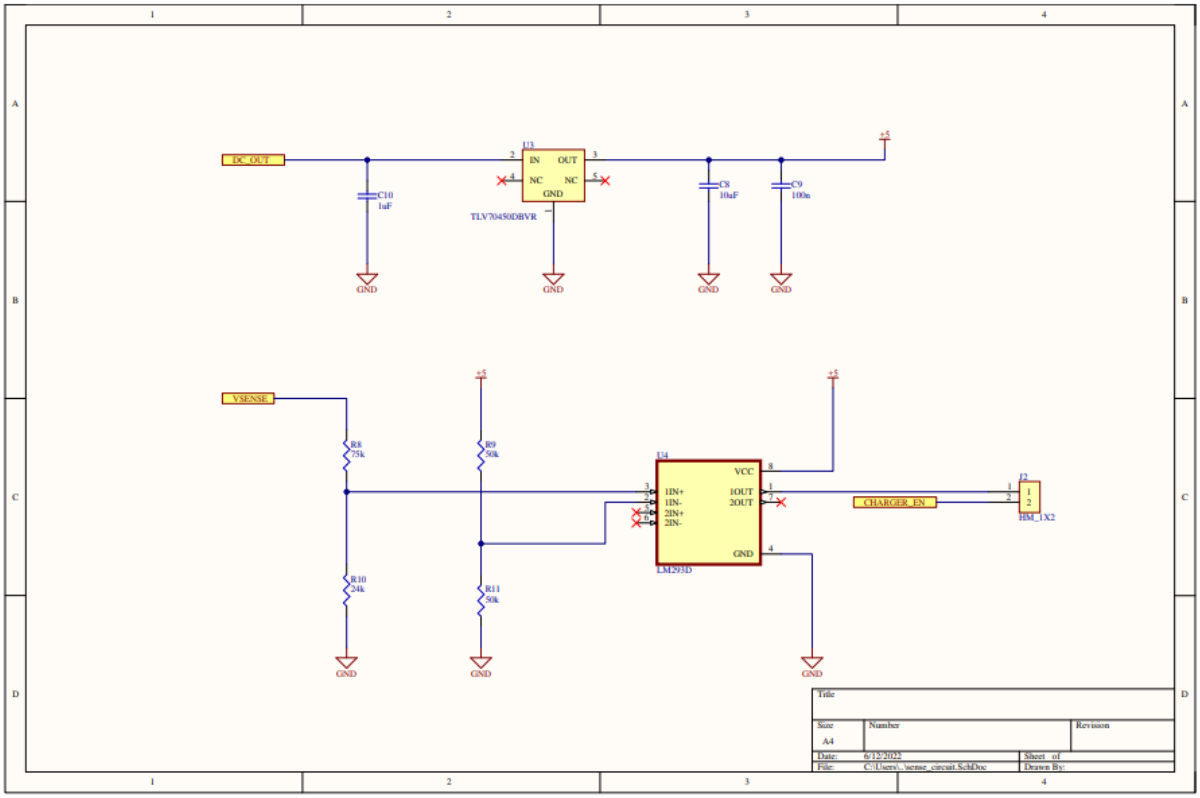
1. AC/DC converter:
    a. Convert and step down the AC main supply to the router supply of 12V
    b. This 12V supply will charge the battery and power up the router simultaneously when the AC main supply is present
    c. The designed circuit can supply up to 4A, which is adequate for charging and operation
2. Transition logic:
    a. The charger must only operate when there is the main supply.
    b. To simplify the design, we have designed the system to use only one voltage (12V)
    c. To detect the main supply and start 'charging only' when the main supply is present, we use this circuitry consisting of an OPAMP.
3. Charger circuit
    a. Charge 2 Li-ion polymer cells in series connection at the recommended C rating.
    b. Our system uses 2 Li-ion cells in series.
    c. It will indicate when it is being charged and when the battery is full.
4. Boost converter
    a. The battery voltage is between 6.5 – 8.4V.
    b. The boost converter circuits step up the voltage to 12V, and it is capable of handling currents up to 2A.
    c. When the main supply is present, the boost converter will operate in a low power state.
5. Monitoring
    a. The battery level is monitored in this block such that the user can an idea as to how much of the battery is left.

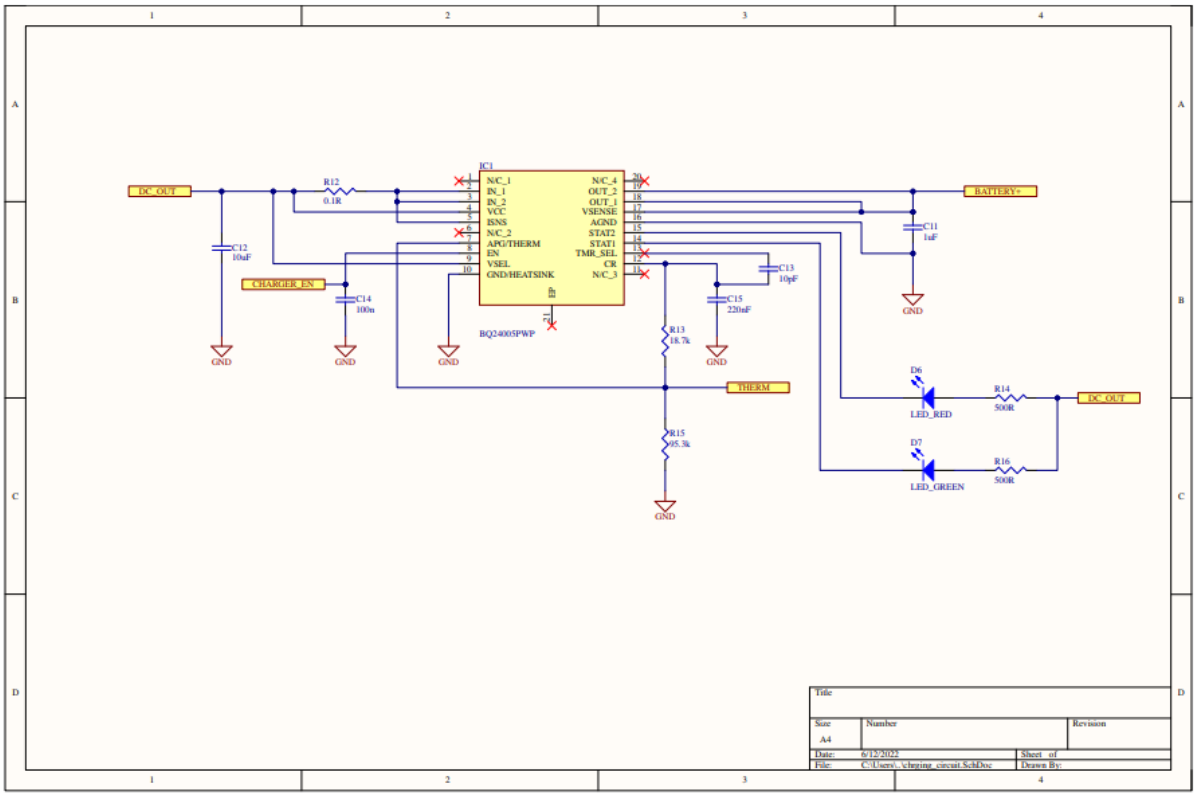
3.3 Detailed Design

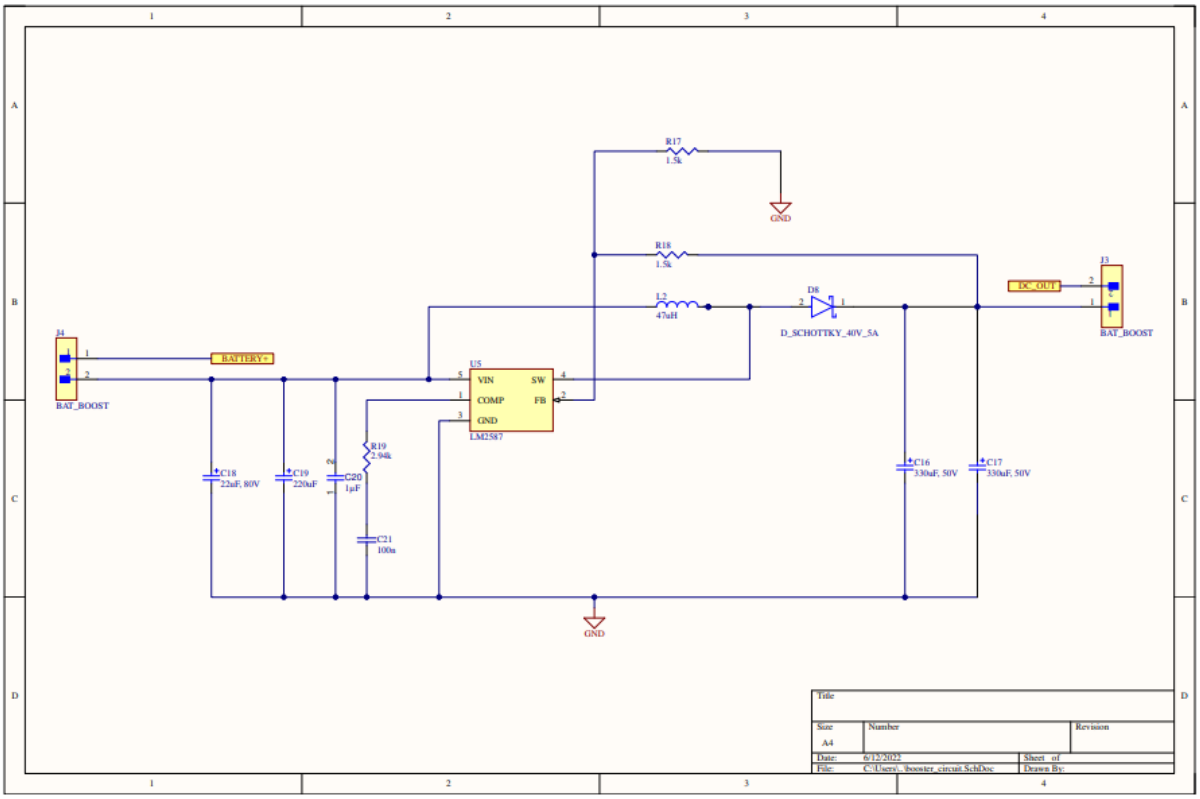
3.3.1 PCB

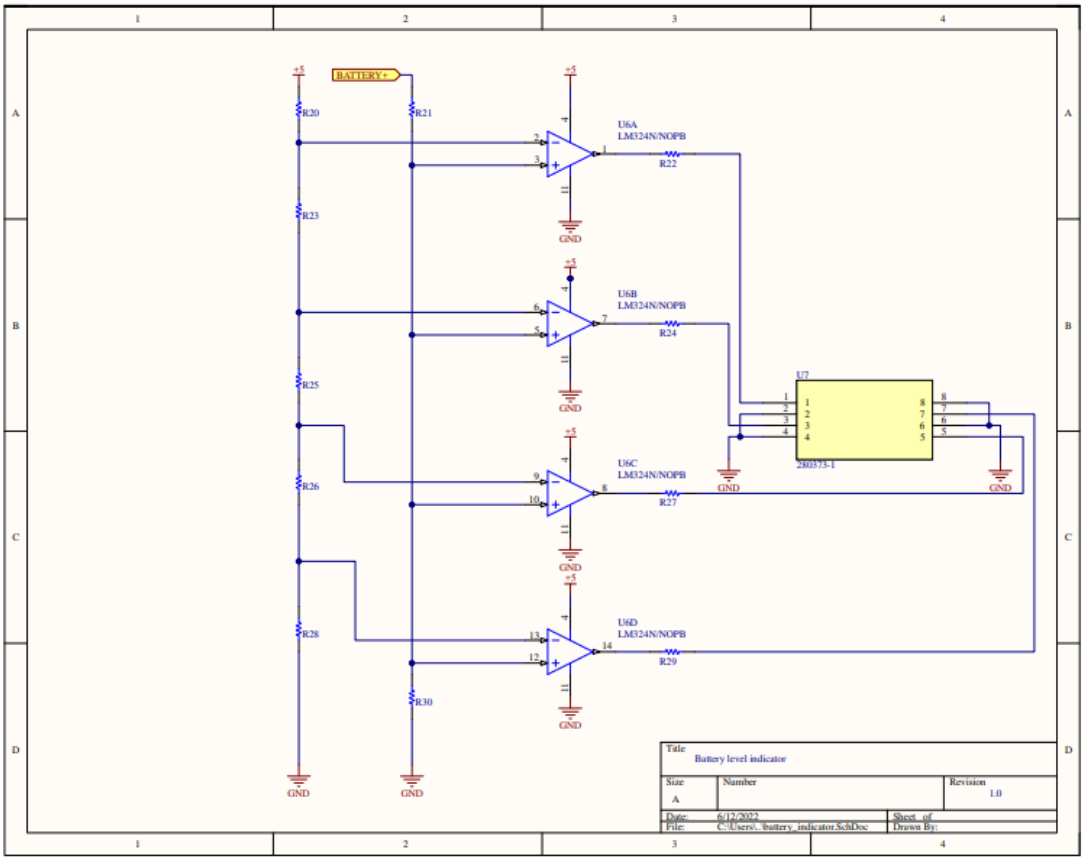
3.3.1.1 Schematics

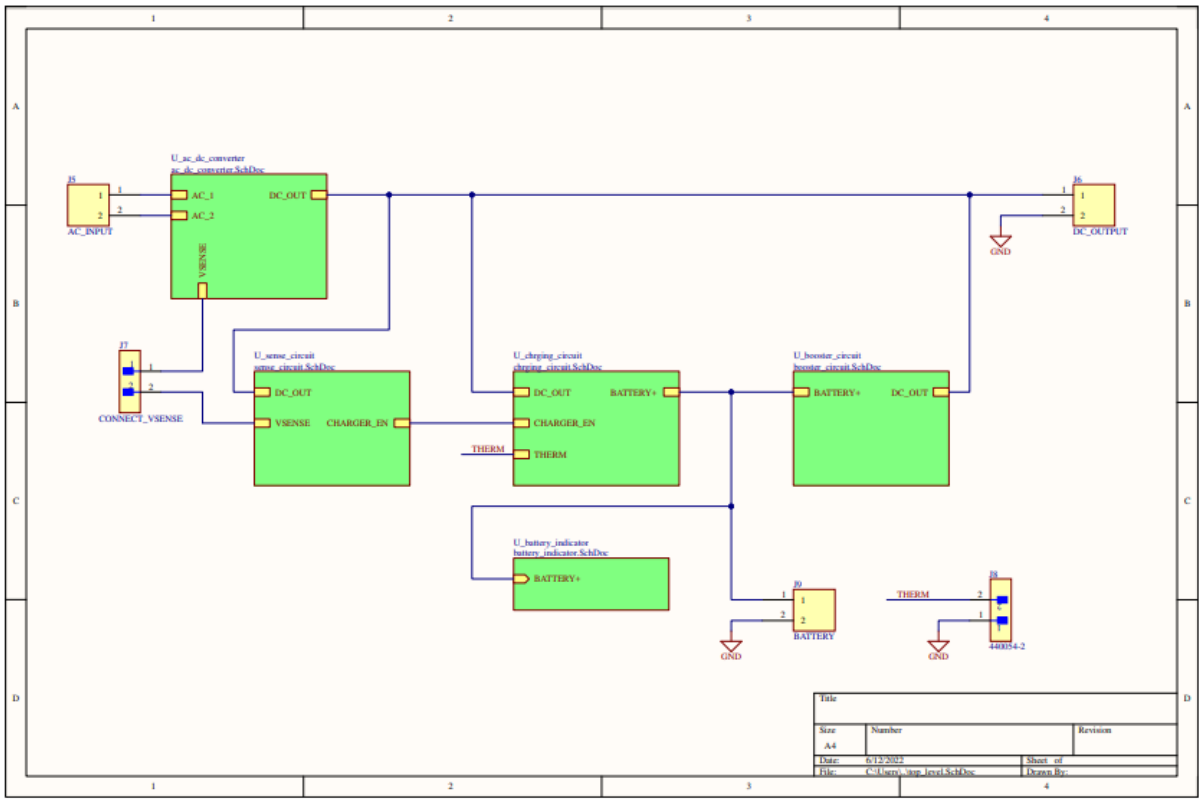




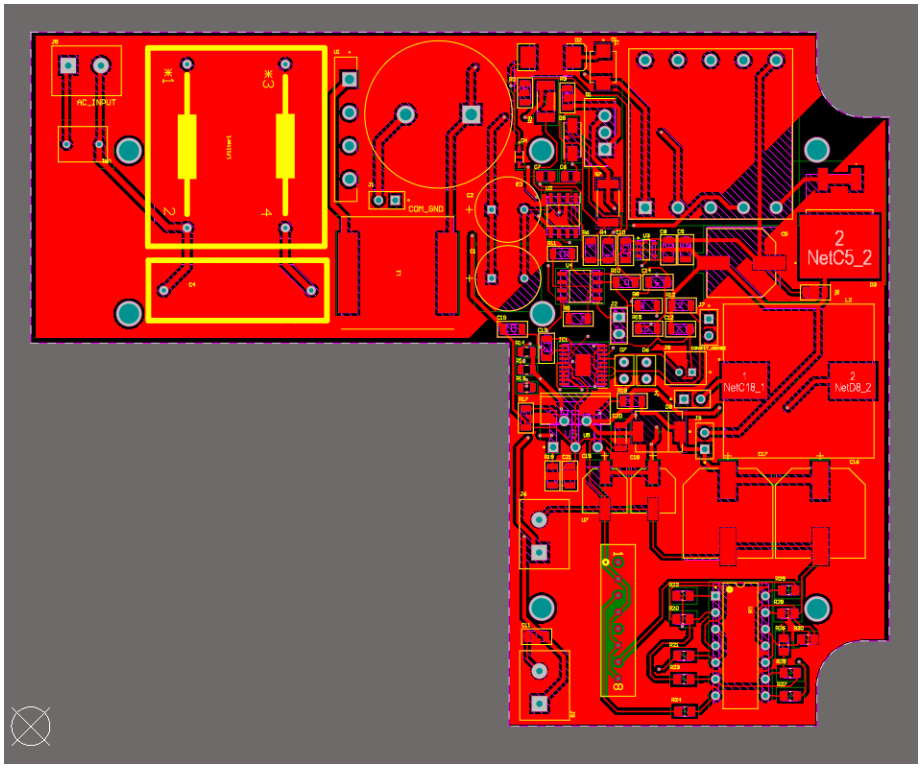

DC_OUT
R12
0.1R
IC1
N/C_1
IN_1
IN_2
VCC
ISNS
N/C_2
APG/THERM
EN
VSEL
GND/HEATSINK
N/C_4
OUT_2
OUT_1
VSENSE
AGND
STAT2
STAT1
TMR_SEL
CR
N/C_3
BQ24005PWP
BATTERY+
C11
1uF
C12
10uF
C13
10pF
C14
100n
C15
220nF
CHARGER_EN
R13
18.7k
R15
85.3k
THERM
D6
LED_RED
R14
500R
DC_OUT
D7
LED_GREEN
R16
500R
GND
Title
Size
A4
Number
Revision
Date:
6/12/2022
Sheet of
File:
C:\Users\...\charging_circuit.SchDoc
Drawn By:

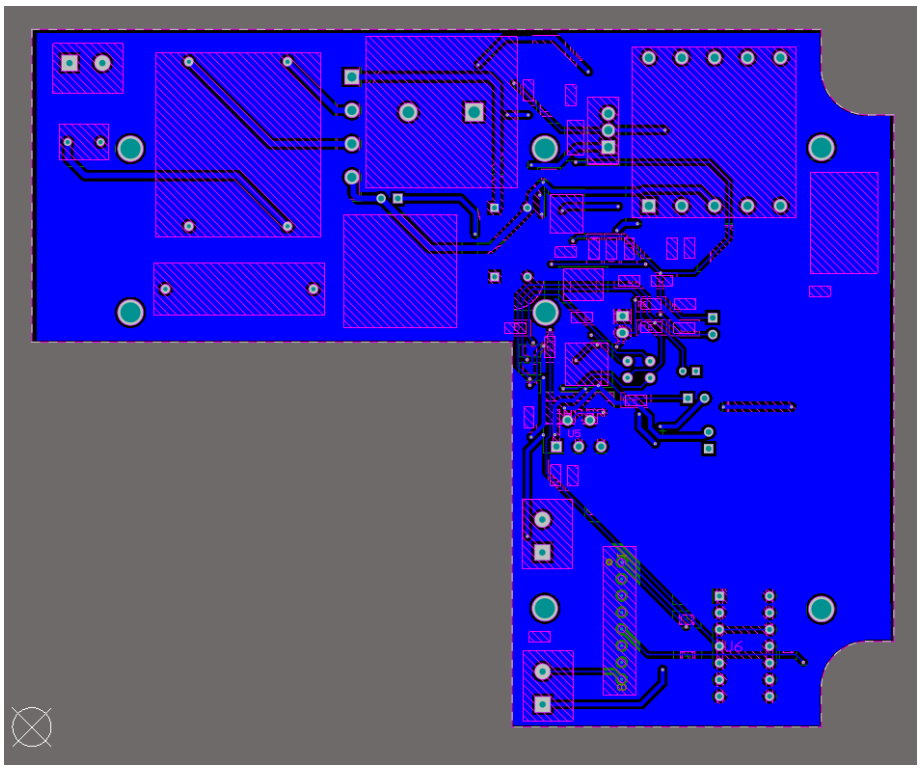

R17
1.5k
R18
1.5k
L2
47uH
D8
D_SCHOTTKY_40V_5A
DC_OUT
J3
BAT_BOOST
J4
BAT_BOOST
BATTERY+
U5
VIN
SW
COMP
FB
GND
LM2587
R19
2.94k
C18
22uF, 80V
C19
220uF
C20
1µF
C21
100n
C16
330uF, 50V
C17
330uF, 50V
GND
Title
Size
A4
Number
Revision
Date:
6/12/2022
Sheet of
File:
C:\Users\...\booster_circuit.SchDoc
Drawn By:

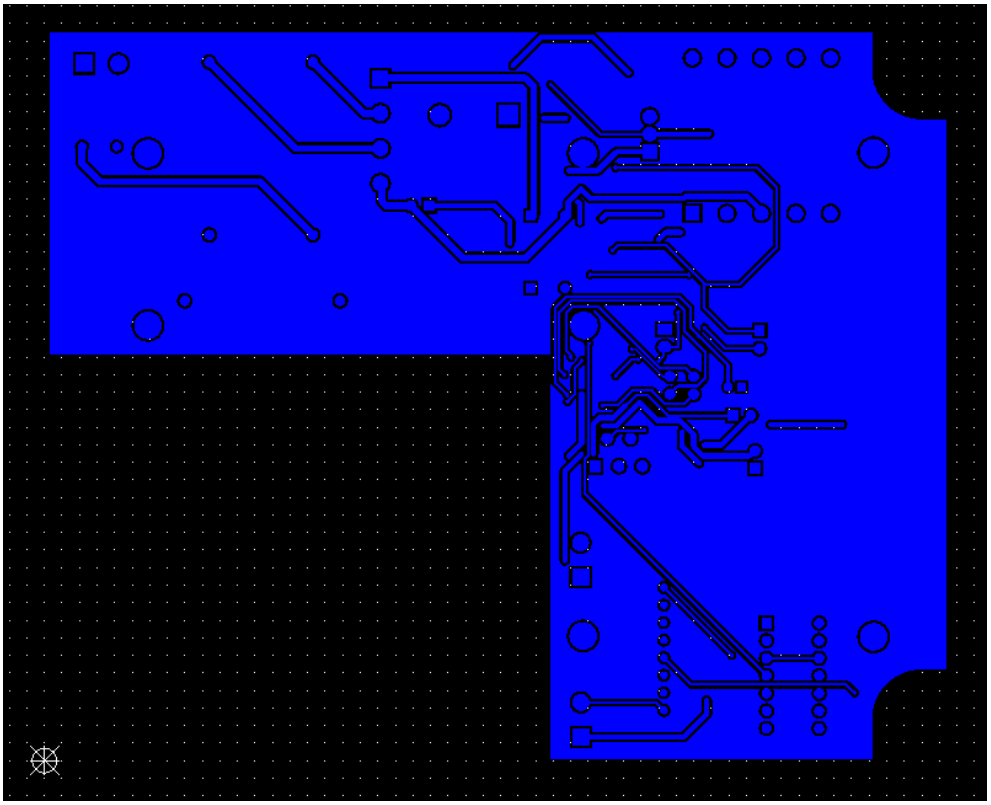

BATTERY+
+5
R20
R21
R22
R23
R24
R25
R26
R27
R28
R29
R30
U6A
LM324N/NOPB
U6B
LM324N/NOPB
U6C
LM324N/NOPB
U6D
LM324N/NOPB
U7
2803573-1
GND
Title
Battery level indicator
Size
A
Number
Revision
1.0
Date: 6/12/2022
File: C:\Users\...\battery_indicator.SchDoc
Sheet of
Drawn By:

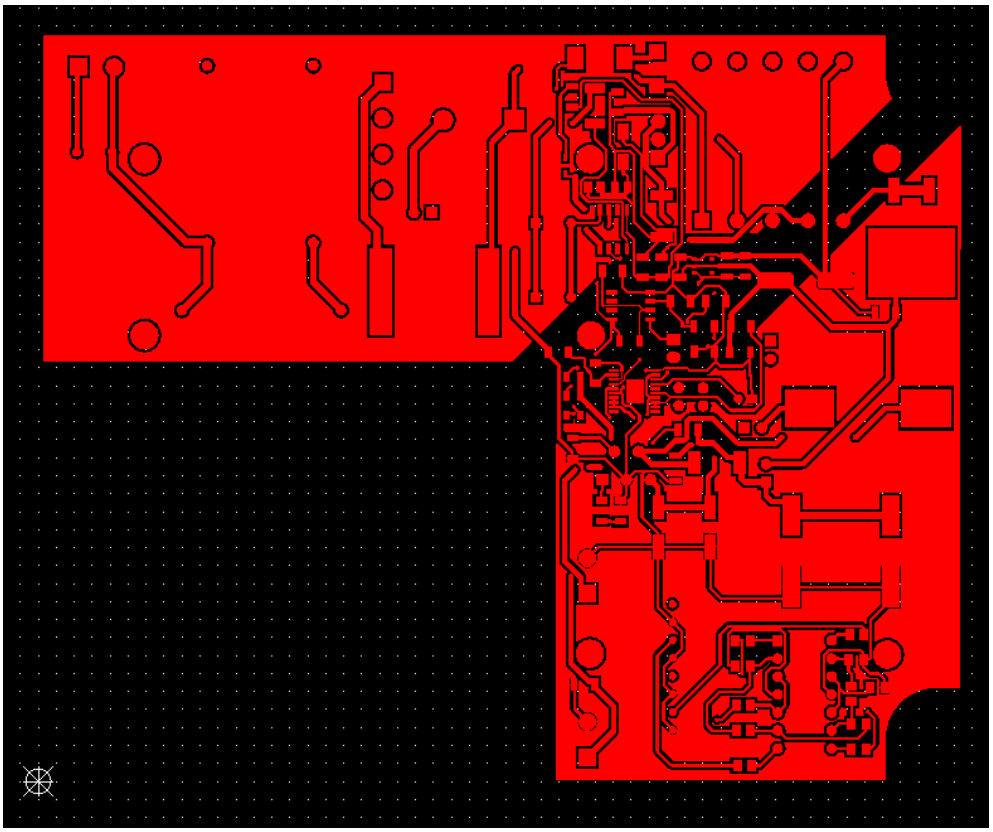

U_ac_dc_converter
ac_dc_converter.SchDoc
J5
AC_INPUT
AC_1
AC_2
DC_OUT
VSENSE
J6
DC_OUTPUT
GND
J7
CONNECT_VSENSE
U_sense_circuit
sense_circuit.SchDoc
DC_OUT
VSENSE
CHARGER_EN
U_charging_circuit
charging_circuit.SchDoc
DC_OUT
BATTERY+
CHARGER_EN
THERM
U_booster_circuit
booster_circuit.SchDoc
BATTERY+
DC_OUT
U_battery_indicator
battery_indicator.SchDoc
BATTERY+
J9
BATTERY
J8
440054-2
Title
Size
A4
Number
Revision
Date: 6/12/2022
File: C:\Users\...\tmp_level.SchDoc
Sheet of
Drawn By:

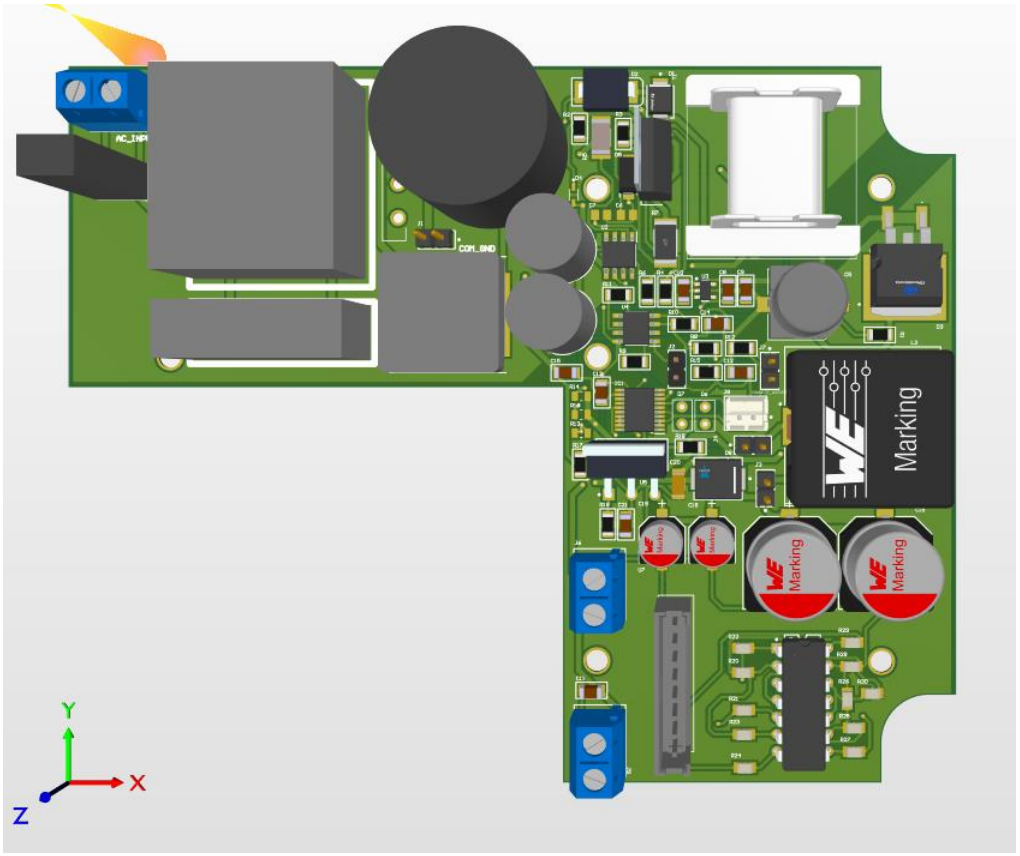
3.3.1.2 Layouts and Gerber Views

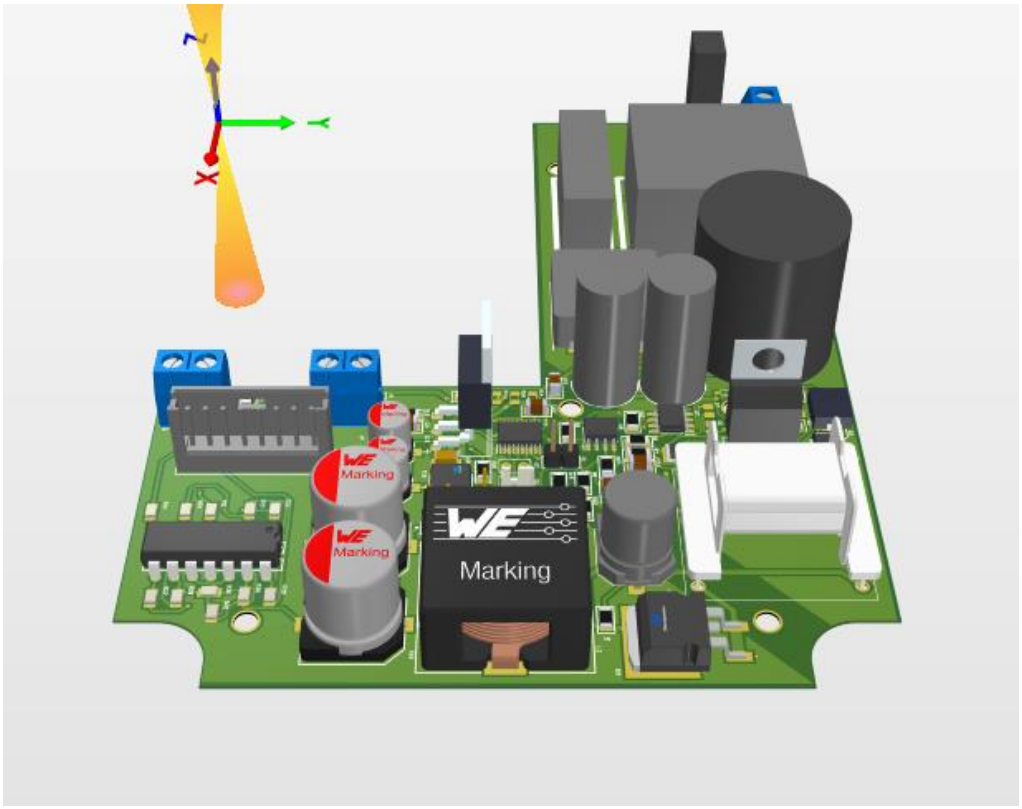









Marking
Y
X
Z


Marking

3.3.1.3 Bill of Materials

Comment	Description	Designator	Footprint	LibRef	Quantity
EEU-EE2G100	Aluminum Electrolytic Capacitor, 10 uF +/- 20%, 400 V, -25 to 105 degC, 2-Pin 10 x 10 x 22 mm Through-hole, RoHS, Tape and Reel	C1, C2	PNSC-EEU-EE2G100-2_V	CMP-0736-00002-1	2
68u	Capacitor Polarised	C3	CAPPRD1000W170D2250H2500	380LX680M400H012	1
ECQ-UAAV334Q1-ND	Film Capacitor	C4	ECQ-UAAV334Q1-ND-Footprint-1	CMP-001-00084-4	1
470uF	Cap Alum Poly 470UF 20% 25V SMD	C5	RADIAL_CAN_SMD_10D	C_470u_25V	1
1uF	C Series 0805 15 uF 35 V ±20 % Tolerance X5R SMT Multilayer Ceramic Capacitor	C6	C0805	C0805_15u	1
15uF	C Series 0805 15 uF 35 V ±20 % Tolerance X5R SMT Multilayer Ceramic Capacitor	C7	C0805	C0805_15u	1
10uF	贴片陶瓷电容 10uF ±10% 25V 1206, Ceramic Capacitor, Multilayer, Ceramic, 25V, 20% +Tol, 20% -Tol, X7R, 15% TC, 1uF, Surface Mount, 1206	C8, C12	C1206	C1206_10u, C1206_1u	2
100n	TDK - CGA5L2C0G1H104J160AA - SMD Multilayer Ceramic Capacitor, 0.1 µF, 50 V, 1206 [3216 Metric], ± 5%, C0G / NP0, CGA Series	C9, C14, C21	C1206	C1206_0.1u	3

1uF	Ceramic Capacitor, Multilayer, Ceramic, 25V, 20% +Tol, 20% -Tol, X7R, 15% TC, 1uF, Surface Mount, 1206	C10, C11	C1206	C1206_1u	2
10pF	Cap Ceramic 1pF 50V C0G 0.5pF SMD 1206 125°C Plastic T/R	C13	C1206	C1206_1p	1
220nF	Cap Ceramic 0.22uF 25V U2J 5% SMD 1206 125°C Plastic T/R	C15	C1206	C1206_0.22u	1
330uF, 50V	WCAP-ASLI Aluminum Electrolytic Capacitor, V-Chip, SMT, D12.5xH14mm, 330uF, 50V	C16, C17	WCAP-ASLI_D12.5H14	C_330u_50V_865080662019	2
22uF, 80V	WCAP-ASLI Aluminum Electrolytic Capacitor, V-Chip, SMT, D6.3xH7.7mm, 22uF, 80V	C18	WCAP-ASLI_D6.3H7.7	C_22u_80V_865081745006	1
220uF		C19	WCAP-ASLI_D6.3H7.7	C_220u_16V_86508034512	1
Capacitor 1 uF +/- 10% 25 V 1206	Chip Capacitor, 1 uF, +/- 10%, 25 V, 1206 (3216 Metric)	C20	CAPC3216X180X20ML20	CMP-001-00006-6	1
TVS150V	TVS DIODE 33V 53.3V DO214AA	D1	FP-SMBJ-MFG	CMP-2000-07095-2	1
SMCJ5.0A-TR	SMCJ Transil Series Zener Diode, 5V, 5W	D2	STM-SMC_V	CMP-0433-00001-1	1
STPS20M100SG-TR	Schottky Diode	D3	STB20N95K5	STPS20M100SG-TR	1
D_SCHOTTKY_70V	VR=70V IF=15mA 2pF P=150mW	D4	SOD_323	D_SCHOTTKY_70V	1

SK220ATR	Diode	D5	DIOM5226X295N	SK220ATR	1
LED_RED	645nm Red LED; 3x3x4.8mm Through-Hole Mount with Ice Cube (Square Diffused), Square Lens	D6	LED_3MM	LED_3mm_RED	1
LED_GREEN	515nm Green LED; 3x3x4.8mm Through-Hole Mount with Ice Cube (Square Diffused), Square Lens	D7	LED_3MM	LED_3mm_GREEN	1
D_SCHOTTKY_40V_5A	SSC54 Series 40 V 5 A Surface Mount Schottky Rectifier - DO-214AB	D8	FP-95402-MFG	D_SCHOTTKY_40V_5A	1
BQ24005PWP	Integrated Circuit	IC1	SOP65P640X120-21N	BQ24005PWP	1
COM_GND	CONN HEADER VERT 2POS 2.54MM	J1	FP-TSW-102-07-G-S-MFG	CMP-02766-000084-1	1
HM_1X2		J2	HM_1X2	HM_1X2	1
BAT_BOOST	CONN HEADER VERT 2POS 2.54MM	J3, J4	FP-TSW-102-07-G-S-MFG	CMP-02766-000084-1	2
AC_INPUT		J5	TERMINALBLOCK_2	Terminal_Block_2pin	1
DC_OUTPUT		J6	TERMINALBLOCK_2	Terminal_Block_2pin	1
CONNECT_VSENSE	CONN HEADER VERT 2POS 2.54MM	J7	FP-TSW-102-07-G-S-MFG	CMP-02766-000084-1	1

440054-2	CONN HEADER VERT 2POS 2MM	J8	FP-440054-2-MFG	CMP-03369-000005-1	1
BATTERY		J9	TERMINALBLOCK_2	Terminal_Block_2pin	1
47uH	Inductor	L1	INDPM172172X700N	IHLP6767GZER470M11	1
47uH	WURTH ELEKTRONIK - 74435584700 - INDUCTOR, HIGH CURRENT, 47UH, SMD	L2	L_47U_9A	L_47u_9A	1
RN122-2.5-02-5M6	Choke/Filter Common Mode 2.5A 5.6mH 110mOhm Horizontal RN Series	Lfilter1	RN122-2.5-02-5M6-Footprint-1	CMP-006-00022-2	1
STF13NM60ND	MOSFET (N-Channel)	Q1	TO255P460X1020X2030-3P	STF13NM60ND	1
6.65k	贴片电阻 6.65KΩ ±1% 1/4W ±100ppm/℃ 1206	R1	R1206	R1210_6.65k	1
3.9k	贴片电阻 3.9KΩ ±1% 1/4W ±100ppm/℃ 1206	R2	R1206	R1206_3.9k	1
47.5k	Chip Resistor Automotive Grade Thick Film 1206 47.5kOhm 1% Paper T/R	R3	R1206	R1206_47.5k	1
28k	Res Thick Film 1206 28K Ohm 1% 0.25W(1/4W) ±100ppm/C Molded SMD Paper T/R	R4	R1206	R1206_28k	1
200k	200K 0.75W 1% 2010 (5025 Metric) SMD	R5	RESC2010(5025)_M	CMP-1017-00768-1	1

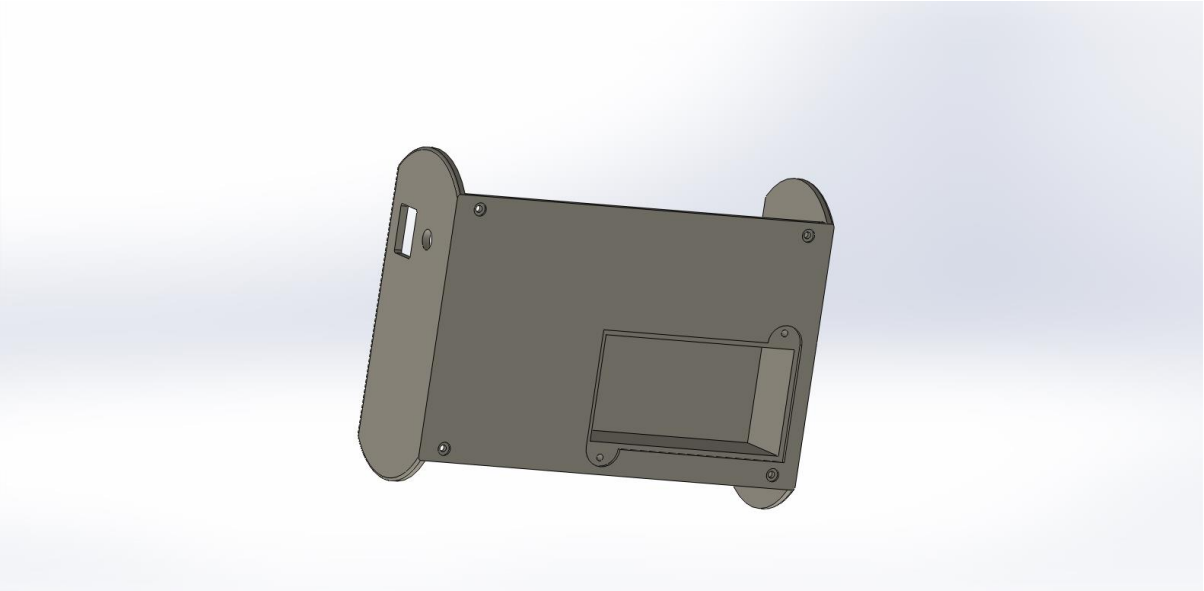
34k	贴片电阻 34000Ω ± 1.00% 0.25W ± 100ppm/℃ 1206	R6	R1206	R1206_34k	1
0R4	Res Thick Film 2512 0.4Ω 1% 2W ±200ppm/°C Molded SMD Plastic T/R	R7	FP-CSRN2512-IPC_B	CMP-26527-004101-1	1
75k	贴片电阻 75KΩ ±1% 1/4W ±100ppm/℃ 1206	R8	R1206	R1206_75k	1
50k		R9, R11	R1206	R1206_50k	2
24k	贴片电阻 24000Ω ± 1.00% 0.25W ± 100ppm/℃ 1206	R10	R1206	R1206_24k	1
0.1R	Res Thick Film 1206 0.1 Ohm 1% 1/2W ±100ppm/°C Molded SMD SMD Paper T/R	R12	R1206	R2512_0.1R	1
18.7k	贴片电阻 18700Ω ± 1.00% 0.125W ± 100ppm/℃ 0805	R13	r0805	R1206_18.7k	1
500R	Res Thin Film 0805 500 Ohm 0.05% 0.125W(1/8W) ±5ppm/C Sulfur Resistant Pad SMD Automotive T/R	R14, R16	r0805	R0805_500R	2
95.3k	Res Thick Film 1206 95.3K Ohm 1% 1/4W ±100ppm/°C Molded SMD SMD Paper T/R	R15	R1206	R1206_95.3k	1
1.5k	Res Thick Film 1206 1.5K Ohm 5% 1/4W ±100ppm/°C Molded SMD SMD Paper T/R	R17, R18	R1206	R1206_1.5k	2
2.94k	Res Thick Film 1206 2.94K Ohm 1% 1/4W ±100ppm/°C Molded SMD SMD Paper T/R	R19	R1206	R1206_2.94k	1

CRCW080516R0JNEA		R20, R21, R22, R23, R24, R25, R26, R27, R28, R29, R30	RESC2013X50X30ML20T20	CMP-1013-00031-2	11
TR_Flyback		T1	FLYBACK_EFD_25X13X9	TR_Flyback_UCC28634DR	1
BRIDGE	Diode Rectifier Bridge Single 800V 4A 4-Pin Case GBU Tube	U1	GBU4/SIP_4	BRIDGE RECT 1PHASE 800V 3A GBU	1
UCC28634D	High power Flyback controller with PSR, peak power mode, Adj CC limit and Frequency Dither 7-SOIC -40 to 125	U2	SOIC127P600X175-8N	IC_UCC28634D	1
TLV70450DBVR		U3	SOT_23_5	TLV70450DBVR	1
LM293D		U4	SOIC127P600X175-8N	LM293D	1
LM2587		U5	NDH0005D	LM2587	1
LM324N/NOPB	Low Power Quad Operational Amplifier, 14-pin MDIP, Pb-Free	U6	NFF0014A	CMP-0055-00116-3	1
280373-1	No Description Available	U7	280373-1_TYC	280373-1	1
RV391K05T	Varistor	VR1	RV391K05T	RV391K05T	1

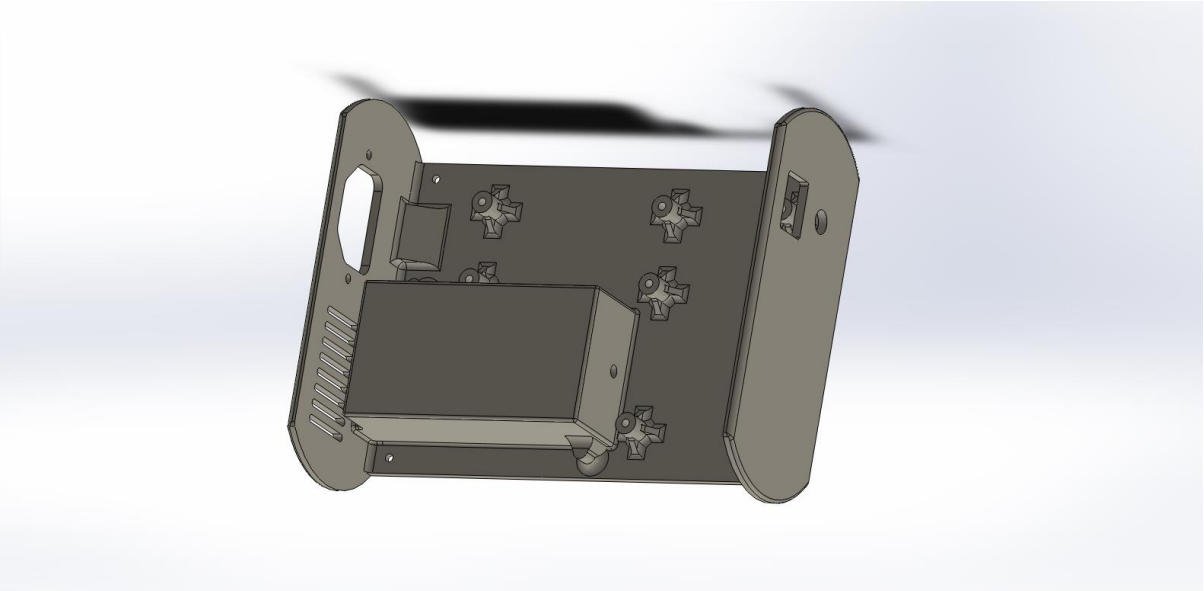
3.3.2 Solidwork Designs

3.3.2.1 Parts

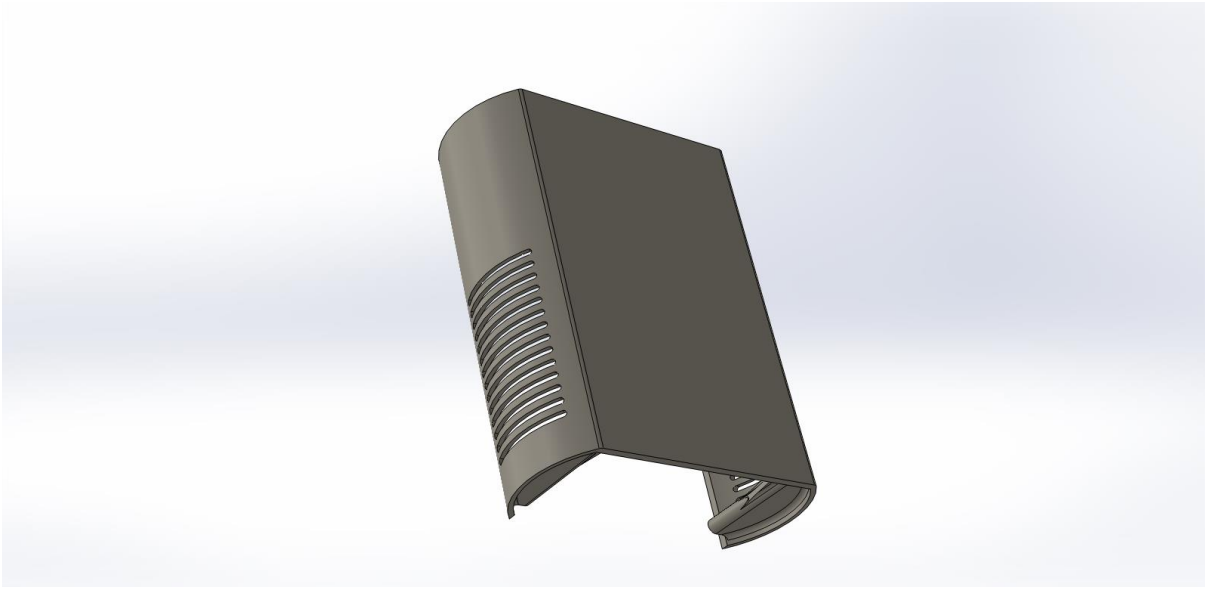
1. Back Cover
    a. Outer View



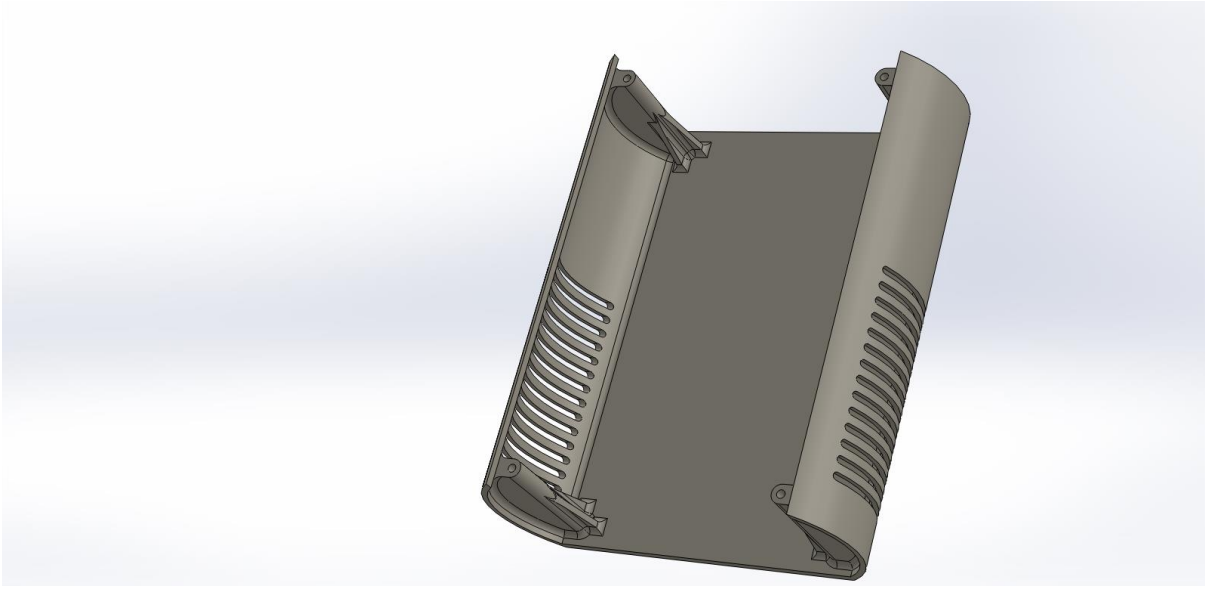
b. Inner View



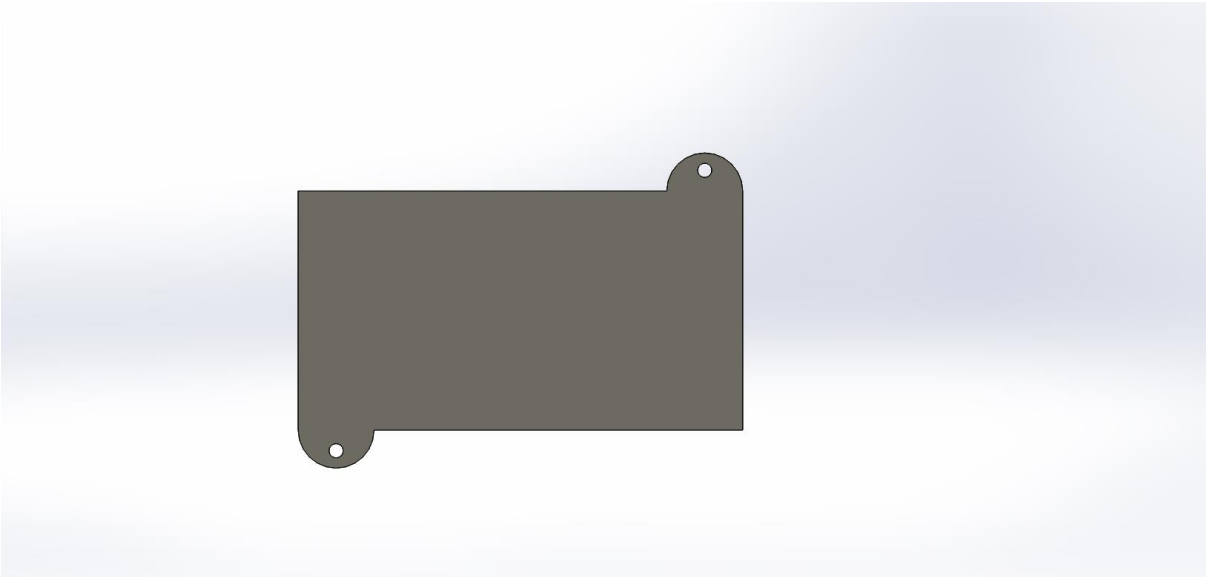
2. Lid
    a. Outer View



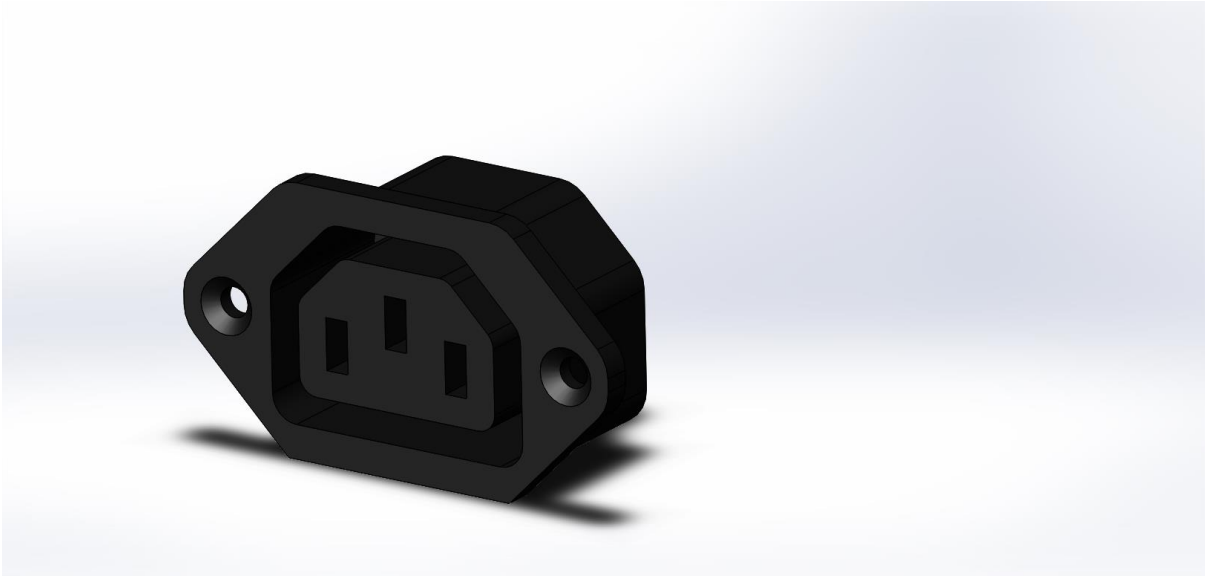
    b. Inner View



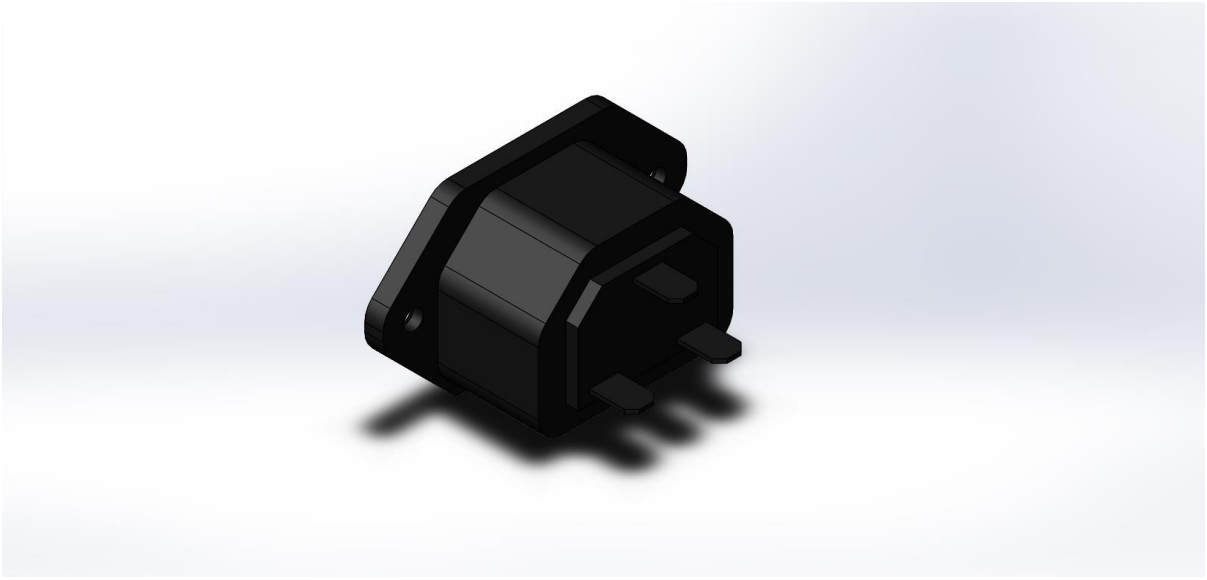
3. Battery Lid



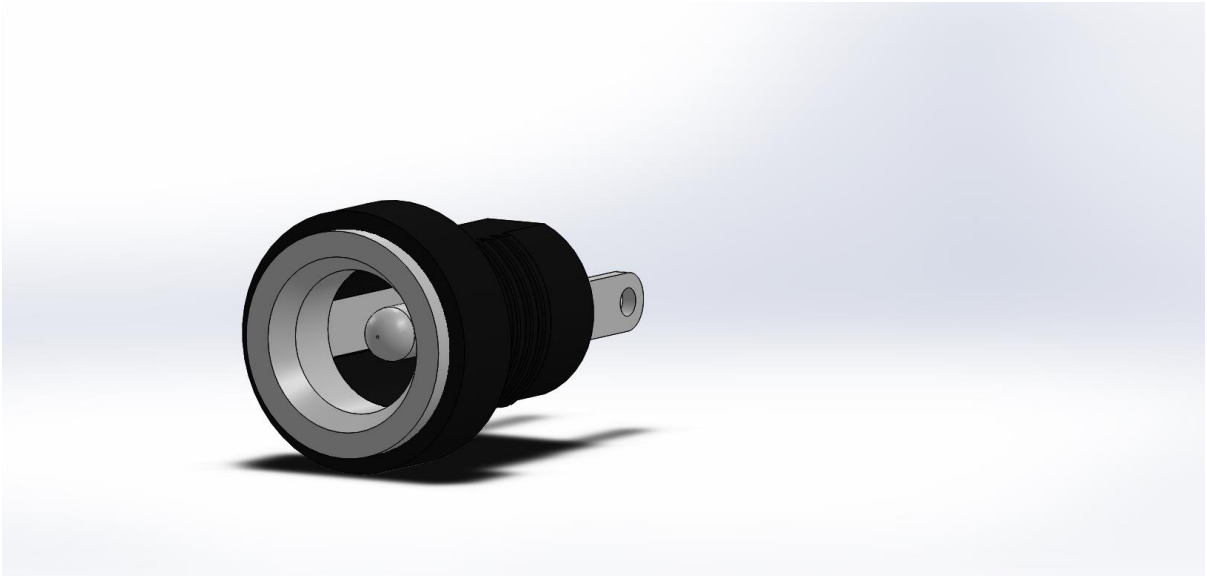
4. AC Panel Mount Socket
    a. Top View



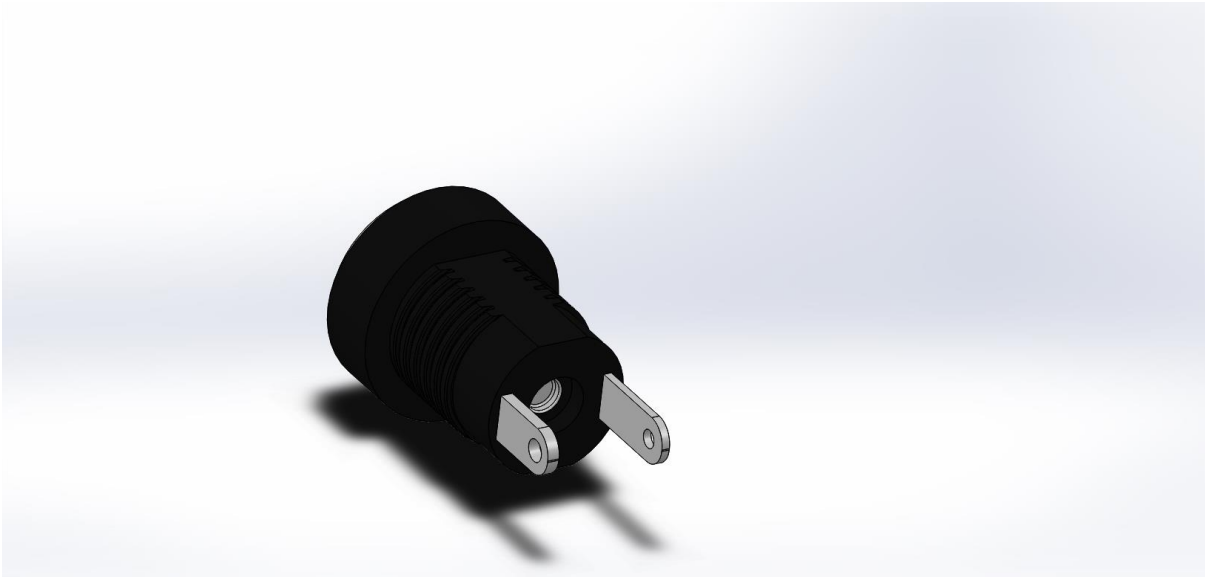
b. Bottom View



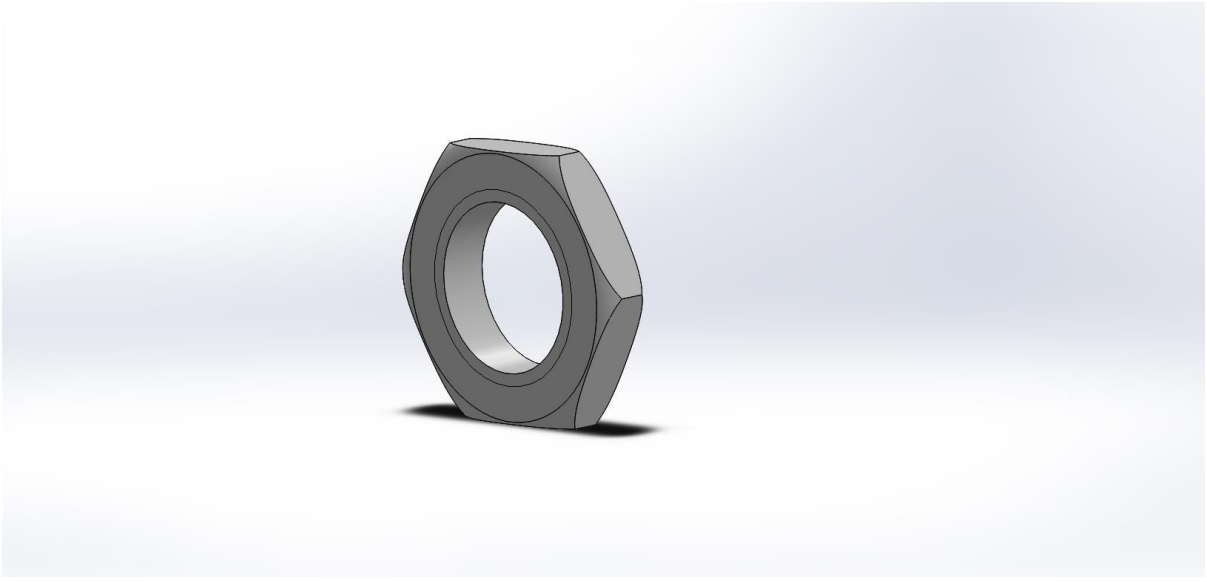
5. DC Jack Panel Mount Base
    a. Front View



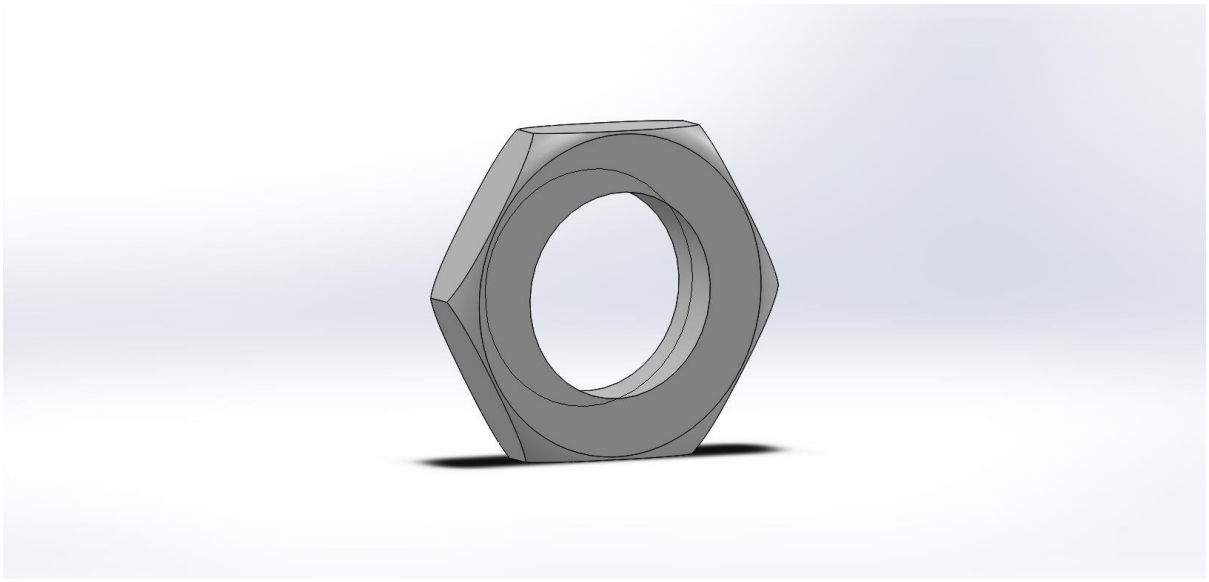
b. Rear View



6. DC Jack Panel Mount Nut
    a. View 1

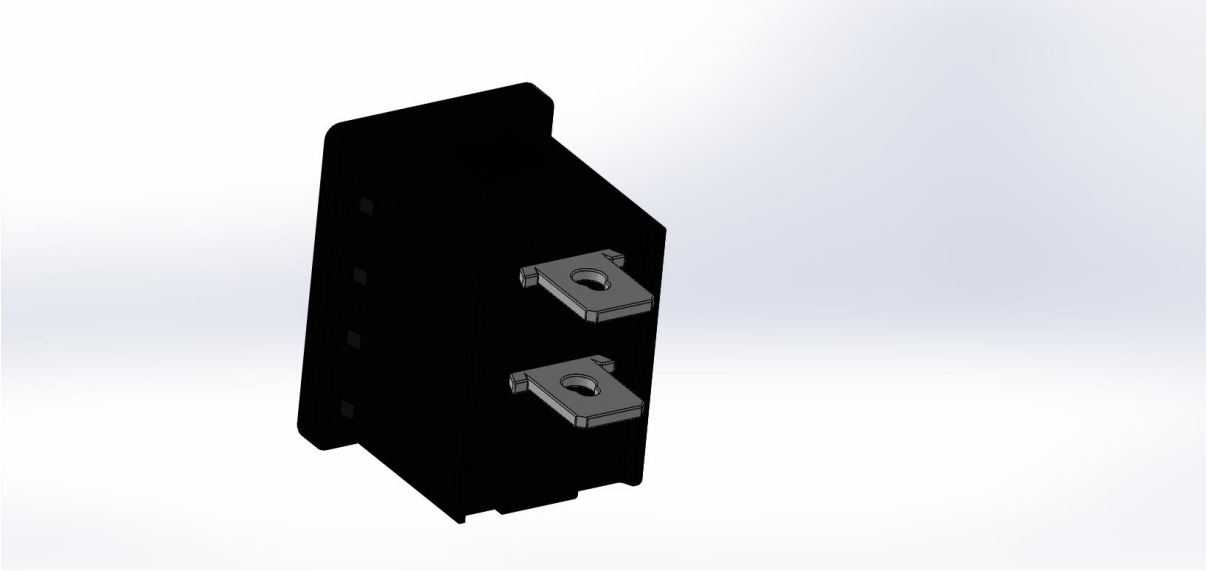


b. View 2



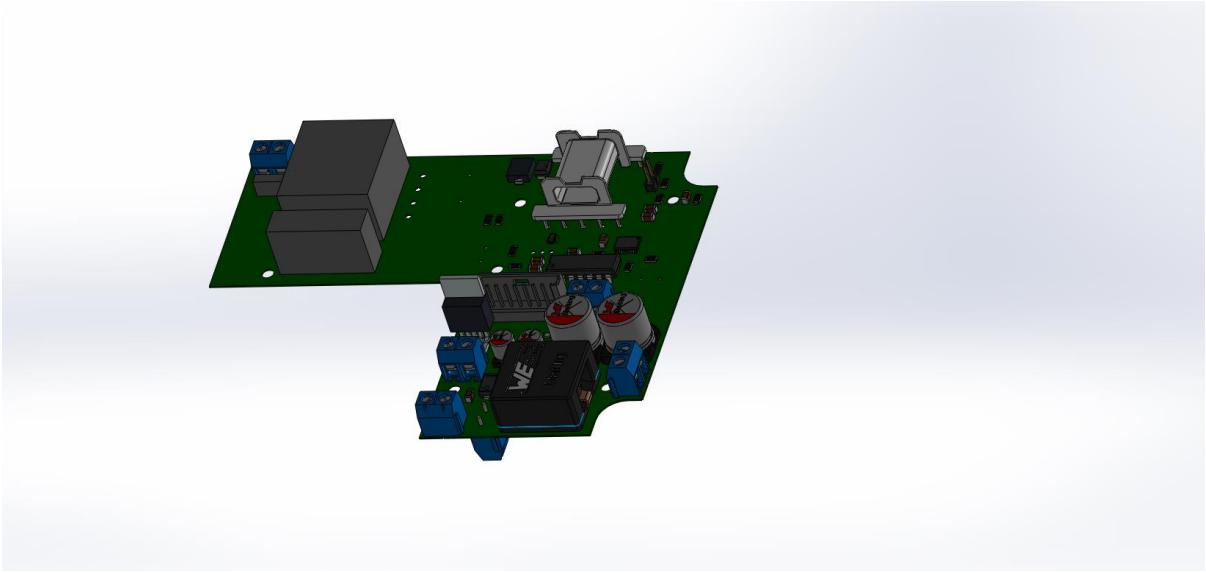
7. Rocker
    a. Top View

b. Bottom View

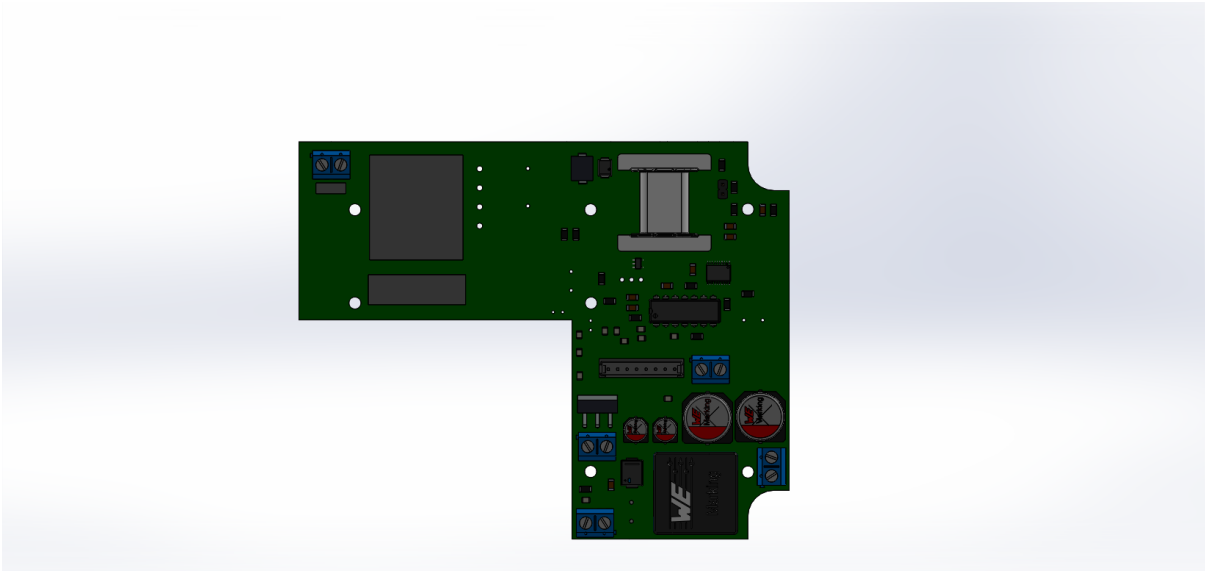


3.3.2.2 PCB Model

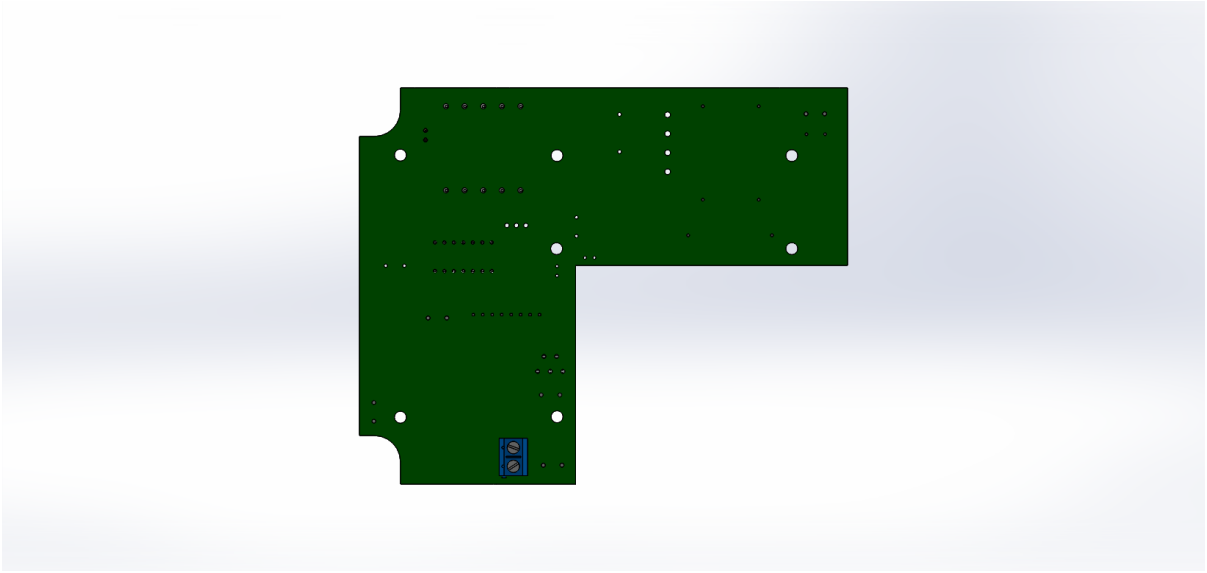
1. View 1



2. Top View

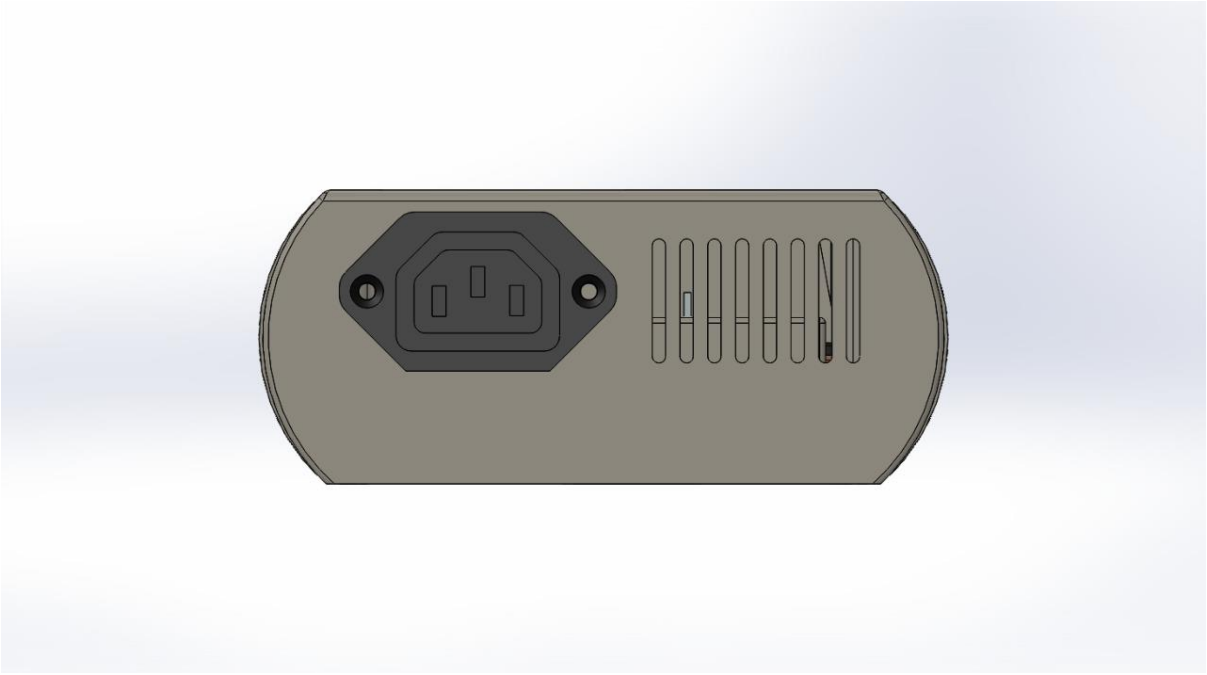


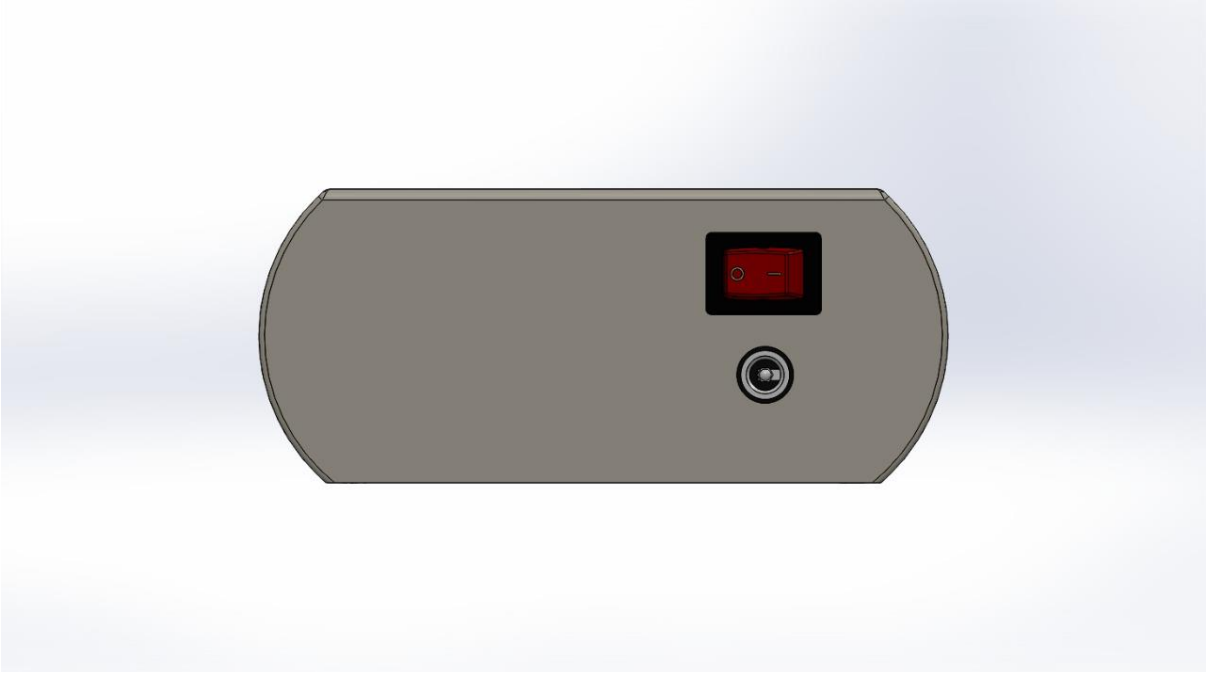
3. Bottom View



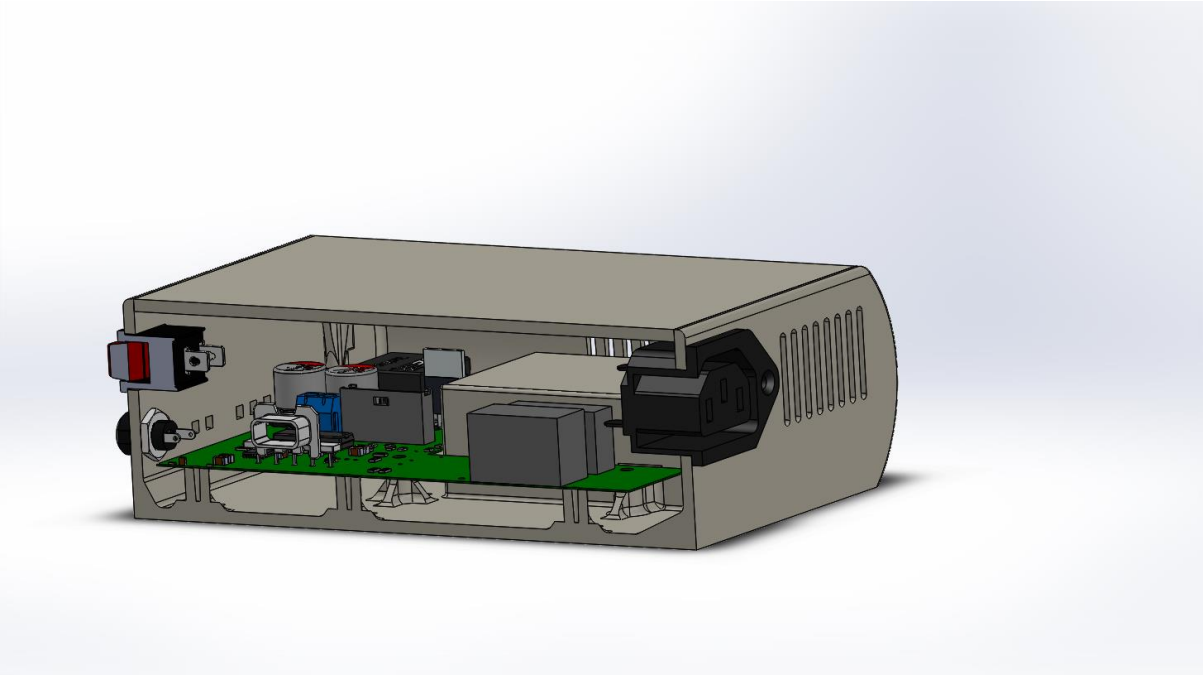
3.3.2.3 Assembly

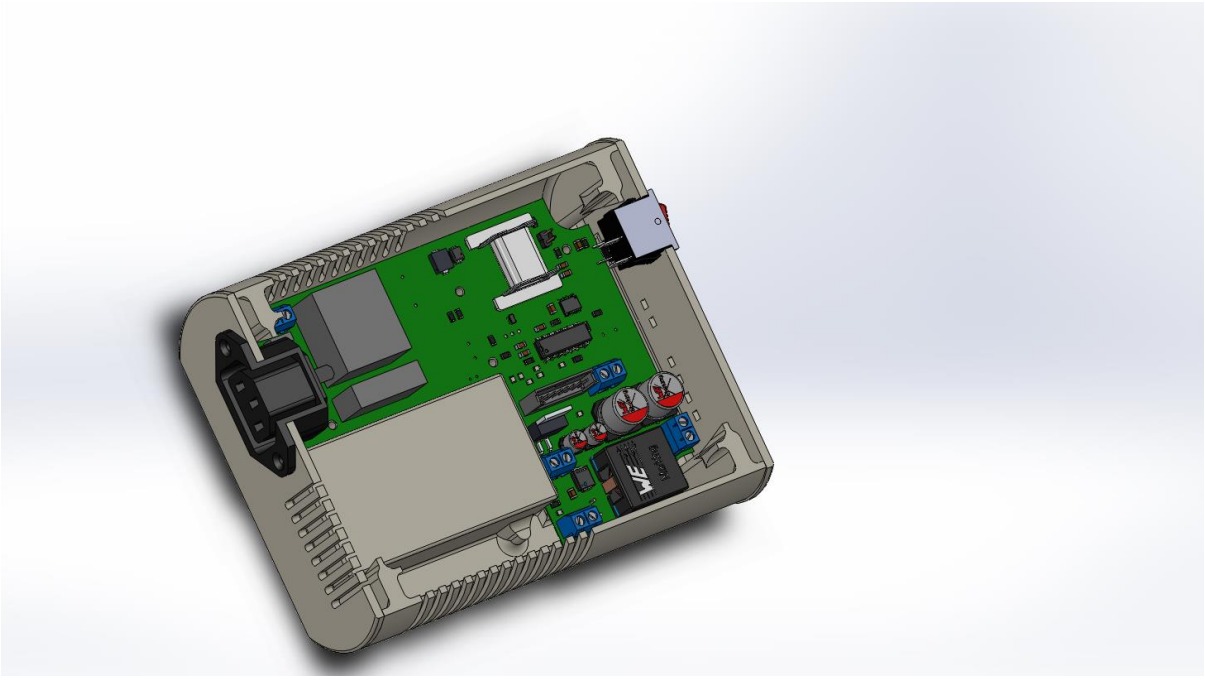
1. Outer View



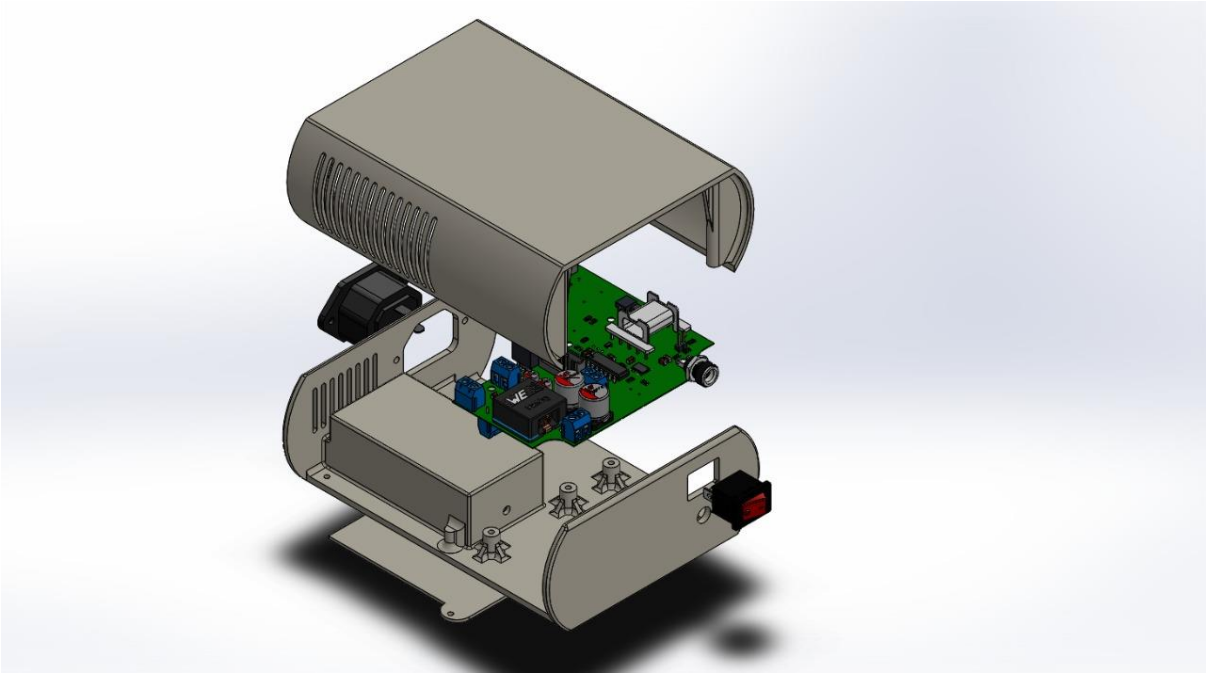


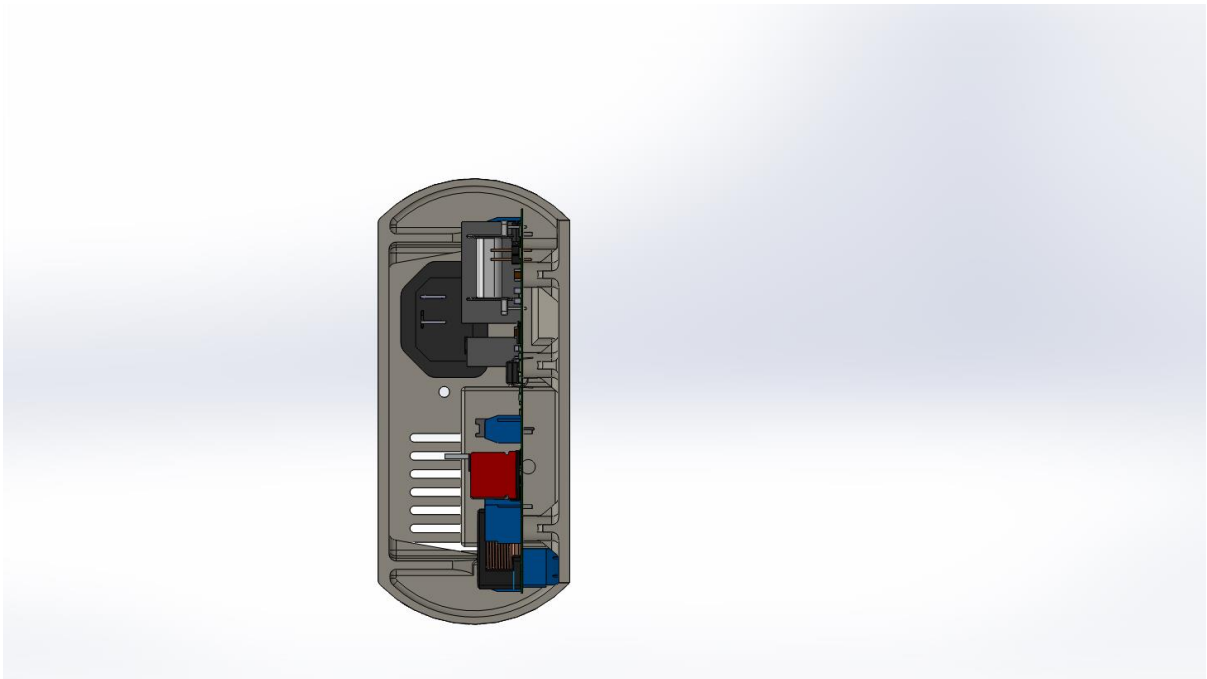
2. Inner View

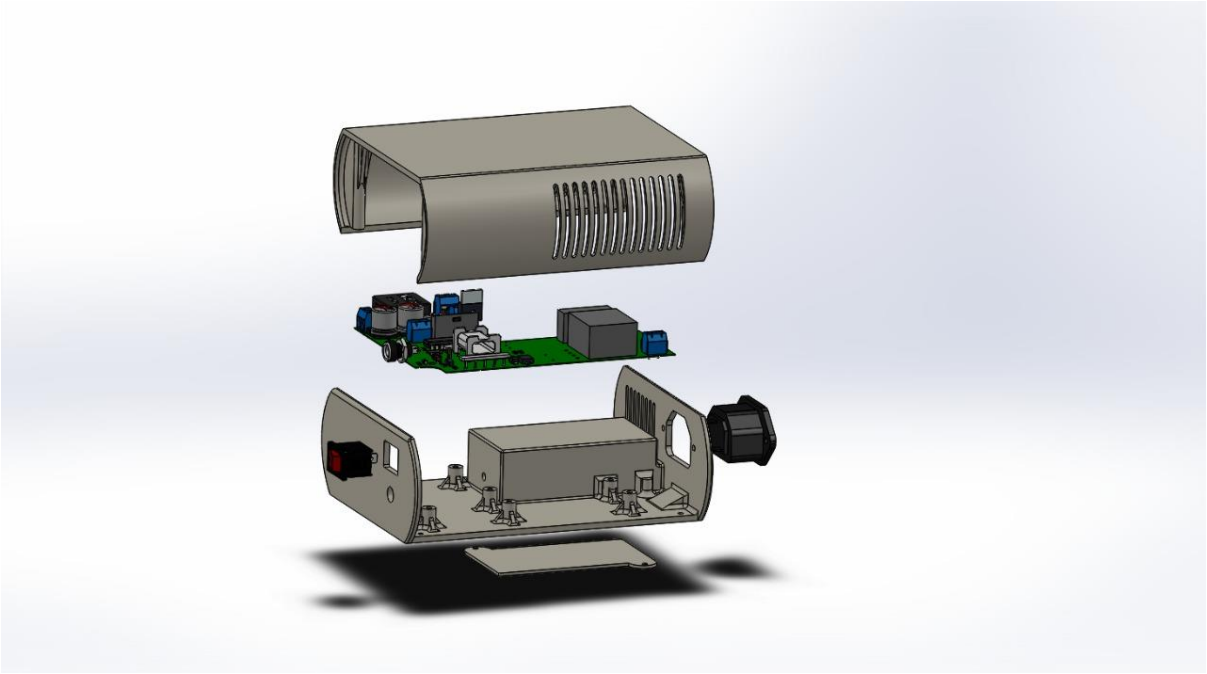


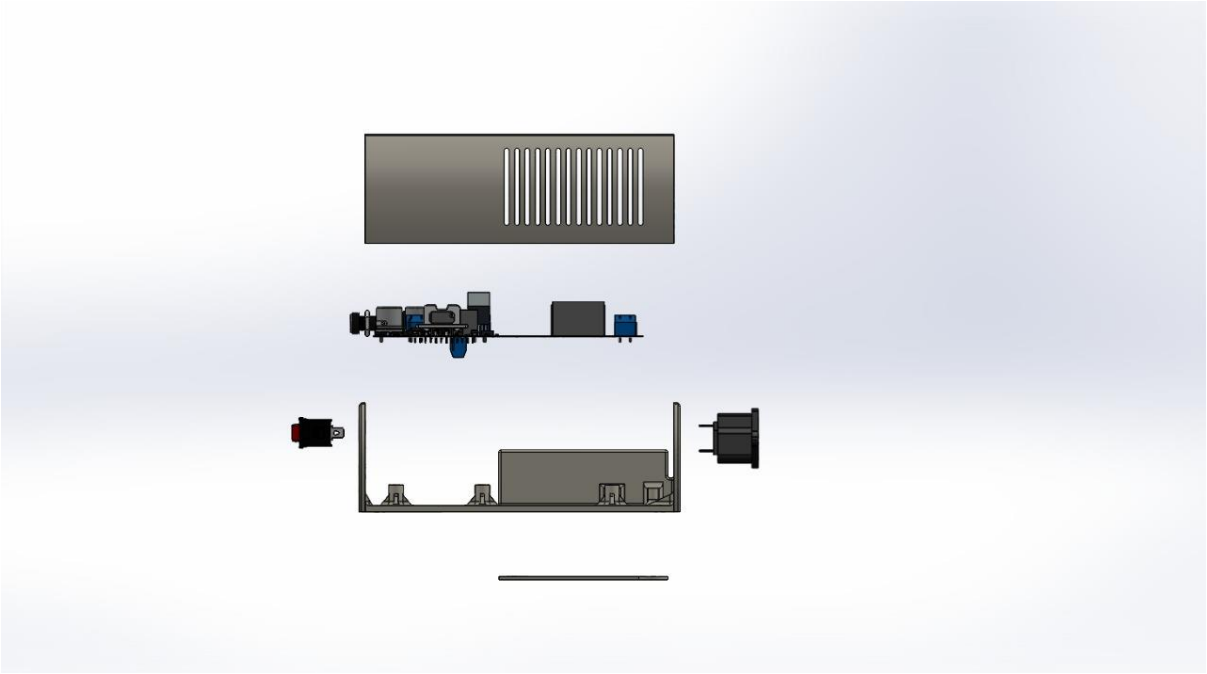


3. Exploded View









3.3.3 Estimated Cost of Production

Expense	A single unit (without shipping)	Unit cost (If produced as a bulk of 500 units)
3D print	2000	1300
PCB	2050	1350
TI order	2161	1740
Digikey order	24045	10500
Total (LKR)	**30256**	**14890**

4.0 User Manual

4.1 Overview

After the covid pandemic broke out human lives changed drastically by changing the daily work of human lives including the way we do our jobs, learning, business management and many other turnings into work from homework which is done through the internet. Due to its simpleness and effectiveness, this work-from-home strategy could be a permanent strategy in many fields. To cope up with this new world uninterrupted internet connection is a vital factor. Even in a power breakout period having an uninterrupted internet will be hugely helpful. That is where our product UPS for routers comes in. This is manufactured to give uninterrupted current to routers in case of a power failure. So that people can stay connected with each other to cope up with this new norm.

4.2 Problem Statement

If a student is conducting his or her learning through online-based techniques as we all do in this period if a power failure occurs at a vital time (during an exam, during a viva, during a lecture) it can cause man problems for the student. This fact is universal to any profession and field as now almost every field relies on the internet. We all have experienced problems like this. Therefore, it is an obvious fact that people need uninterrupted power in this new norm.

4.3 Presentation of the Solution

Our solution to the above-mentioned problem is to have a UPS to the router as the desktop has UPS and laptops have batteries. In this way, we have extra power stored in the UPS which will be used to power up the router for another extra reasonable time.

4.4 Getting Started

4.4.1 Description

Say goodbye to disconnects. Steedy router UPS will provide an uninterrupted power supply for your crucial network devices. Large output power allows you to connect to a large range of devices worry-free.

Scheduled power cuts? No worries! Steedy can power your devices for up to 4 hours without any hassle*****. You can even go further with user-selectable batteries.

The compact design, easy to access battery compartment makes Steedy ideal for your home environment. Easy plug and play operation, no configuration required!

*** 2200mAh batteries with a router current consumption of ~ 400mA (Typical power of consumption of the router)**

4.4.2 Features

- Uninterrupted power supply for WiFi routers
- User has access to replace the batteries if needed
- UPS status indication (charging or running on battery)
- Battery level indication

4.4.3 Requirements

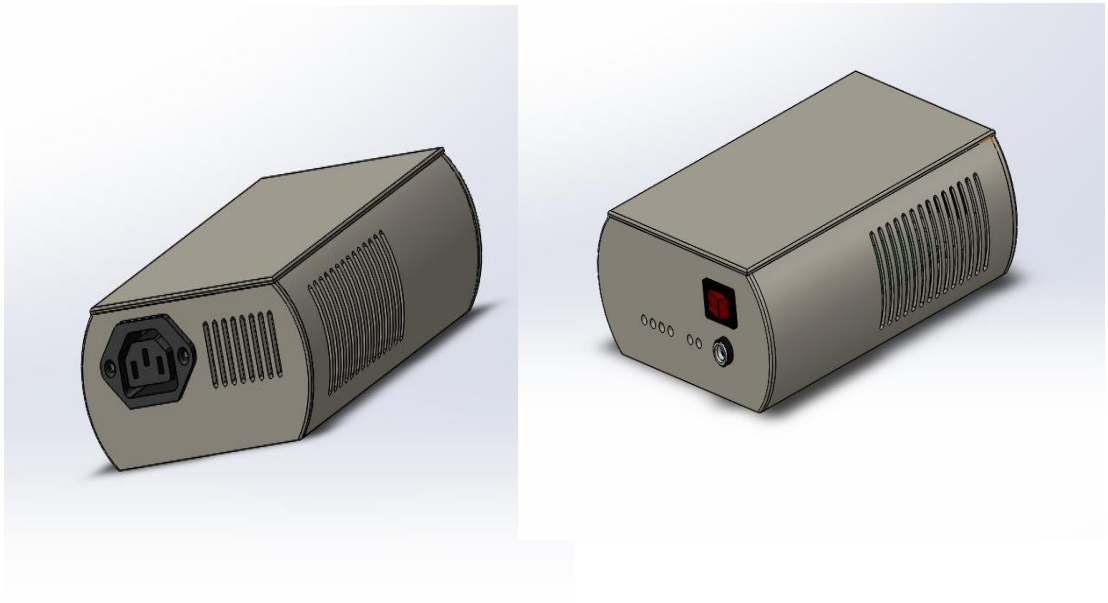
- A router which operates on 12V and below 2A.
- A place near the router to position the device

4.4.4 Packaged Items

- Steedy router UPS
- User Manual

4.5 Model

4.5.1 Steedy Router UPS



4.5.2 Specifications

Specification	Value
Operating Voltage (AC)	220V
Operating Frequency	50Hz
Rated Power	50W
Battery Capacity	9.24Wh
Dimensions	160mm x 125mm x 53mm

4.6 Safety Precautions

The user is advised to follow the safety precautions given below to increase the life span of the product and for the safety of the user.

- **DO NOT** pour any liquid onto the UPS, as it could cause fire or electric shock.
- **DO NOT** use the device in outdoor environments.
- **DO NOT** use liquid or spray detergent for cleaning
- **DO NOT** use strong solvents such as thinners, benzene, or other chemicals on the product.

4.7 Usage Instructions

- Turn off router from its power switch.
- Connect the 12V power output of the ups to the router.
- Connect the mains power to the router. (Make sure ups power switch is off).
- Turn on mains supply.
- Turn on the UPS.
- Turn on the router.

4.8 Troubleshooting

If this device is not working properly.

- Make sure the connectors have connected in proper order and tight them up properly.
- Make sure the buttons work properly
- If those items are functioning properly contact authorized personnel

4.9 Warranty Information

The 12 months warranty of our company's product only applies in scenarios where all the operation complies with the instructions. The following situations are not covered by the device warranty.

- Malfunction caused by damage, incorrect connection, or misusage.
- Any change, correction, or illegal handwriting on the purchase tags or product instructions.
- Undesirable phenomena due to extreme environmental conditions such as lightning, flood, fire, etc.
- The product has been disassembled.
- Appearance deformation, appearance damage or any other physical damage caused by external forces.

4.10 Disposal

The device is made up of materials like plastic, LED, etc. Hence, the disposal must be done with care at the end of the device's life span as most of the raw materials used in the production are not eco-friendly. However, undegradable parts of the product could be recycled and reused again.

- If the product has a fault but the warranty period is not over, please hand over the product to us or contact us to repair it.
- If the warranty period is over and the product is not functioning anymore, give the product to qualified recyclers.
- If the enclosure is broken, use safe packaging methods to transport the product to recycling centres and follow safety precautions.
- You will be entitled to a discount when you buy any other services or products after bringing us the previous expired products.
- DO NOT dispose of the electrical and electronic appliances as unsorted municipal waste.
- If you are disposing of the product on your own, take necessary safety precautions. Wear a mask and leather gloves.