University of Moratuwa

Department of Electronics and Telecommunication

EN2160 – Engineering Design Realization

Report – Preliminary Design

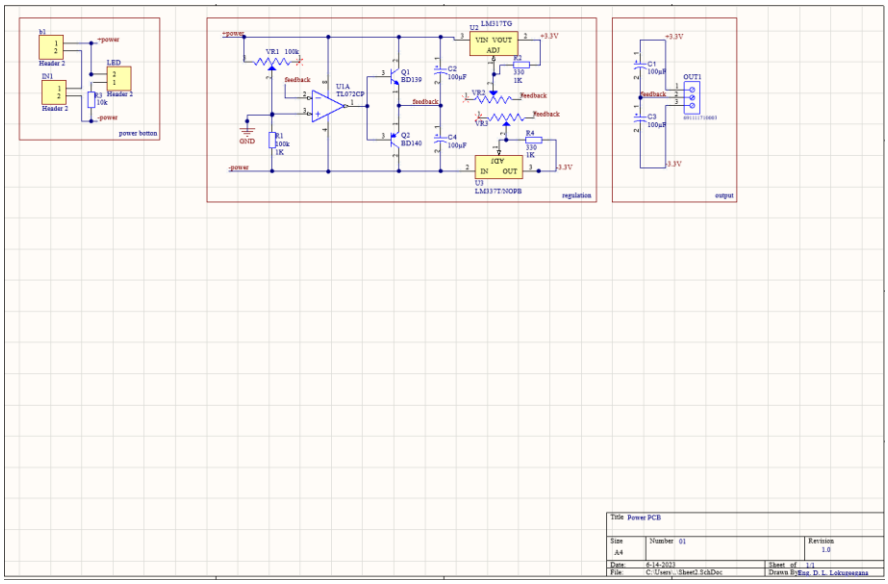
Noise Cancelling Adapter

200356A

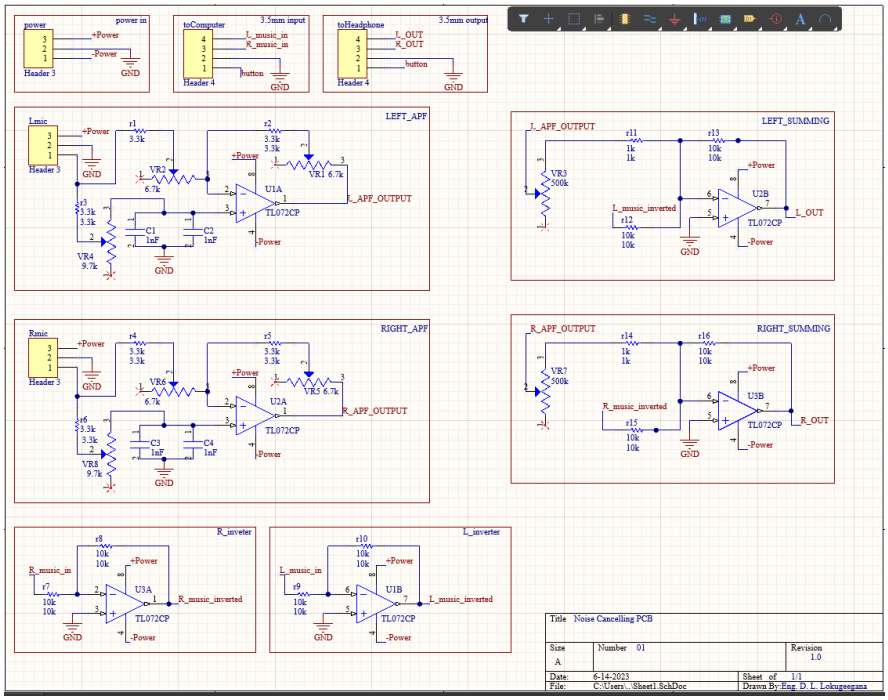
Contents

Schematic and Solidworks

Power circuit Schematic

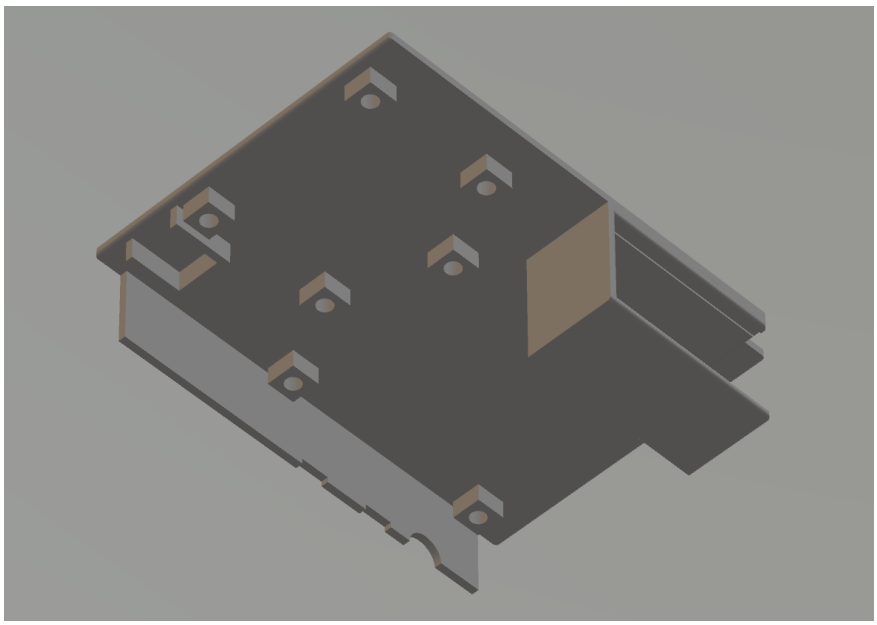


Main PCB Schematic

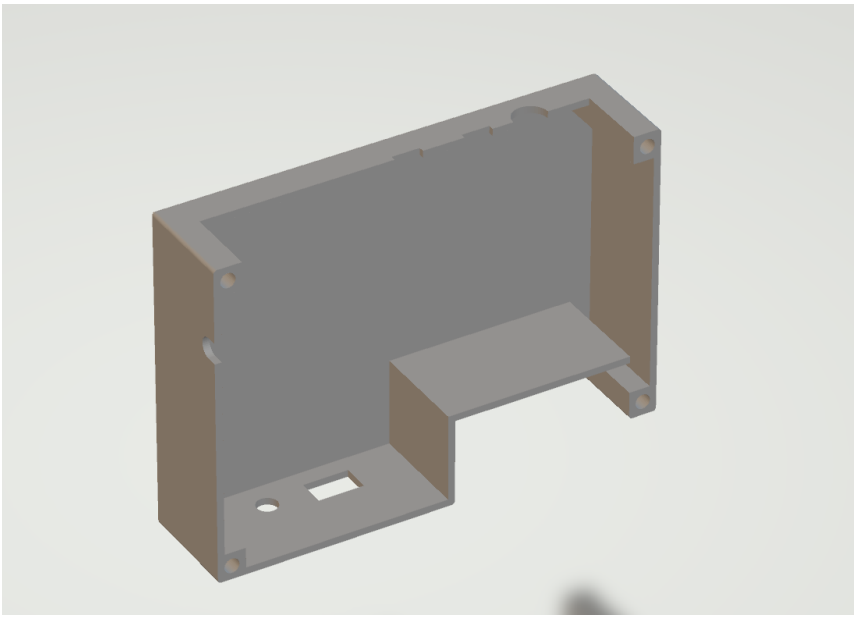


Implemented SolidWorks

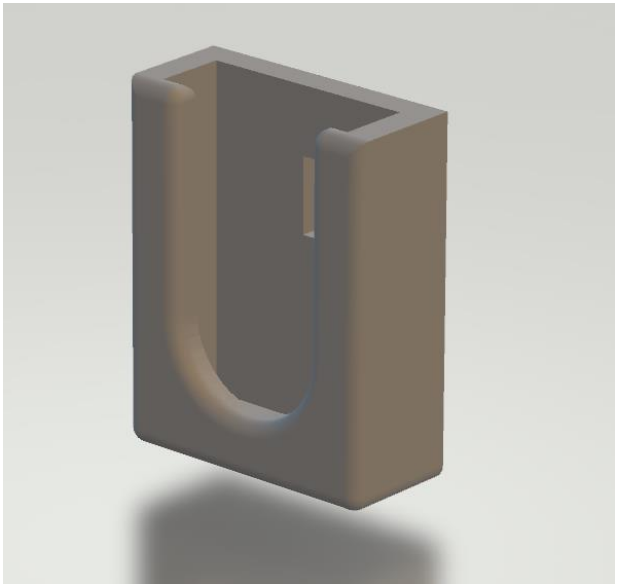
Lower Part



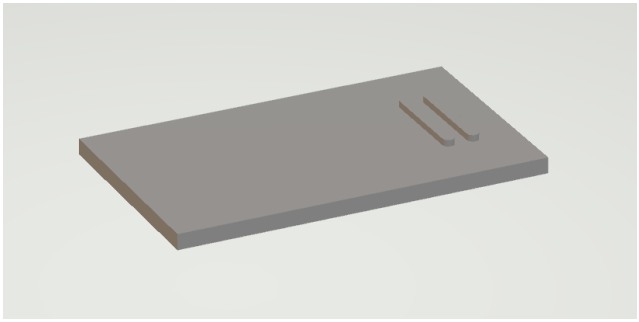
Upper Part



Ear part



Battery lid



Problems Identified

1. Schematic is not done in professional manner.
    a. Status box filling.
    b. Naming components from top to bottom for eazy identification.
    c. Minimizing usage of wires (instead use net labels).

2. Encloser moldability
    a. Draft angle analysis.
    b. Design in a way which can be moldable.
    c. Injection molding process.

3. Appearance for marketing
    a. Importance of final appearance for marketing.
    b. Attractiveness by colour and texture.

4. User need analysis
    a. Take user feedback for better product implementation.
    b. User feedback analysis methods.

5. Design cycle implementation
    a. How to do proper design.
    b. How the product gets improved by design cycles.

6. Product manual and documentation
    a. User manual.
    b. Maintenance manual.
    c. How to keep proper and complete documentation.

Problems and Improvements Provided by Group Members

Problems Identified

1. Size (how to make small as possible)
2. External wire minimization.
3. Analog circuit accuracy.

Improvements

1. Using Mics in the device to capture noise.
2. Digital noise cancelling circuit.

Problems and Improvements Provided by Users

Problems Identified

1. Size (how to make small as possible)

2. Attractiveness.

3. External wire minimization

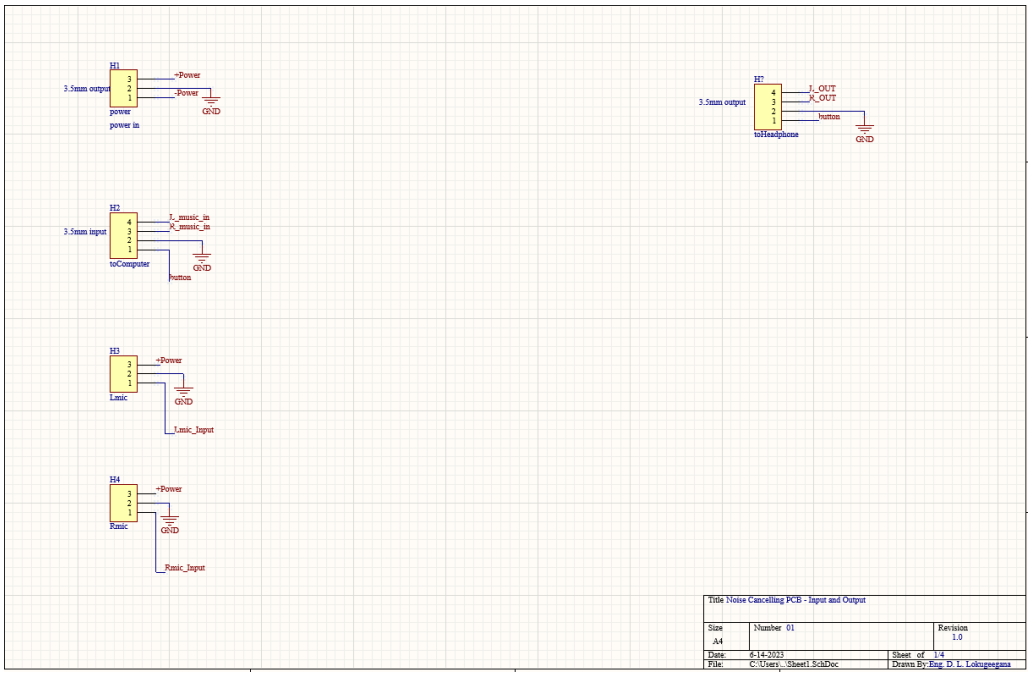
Improvements

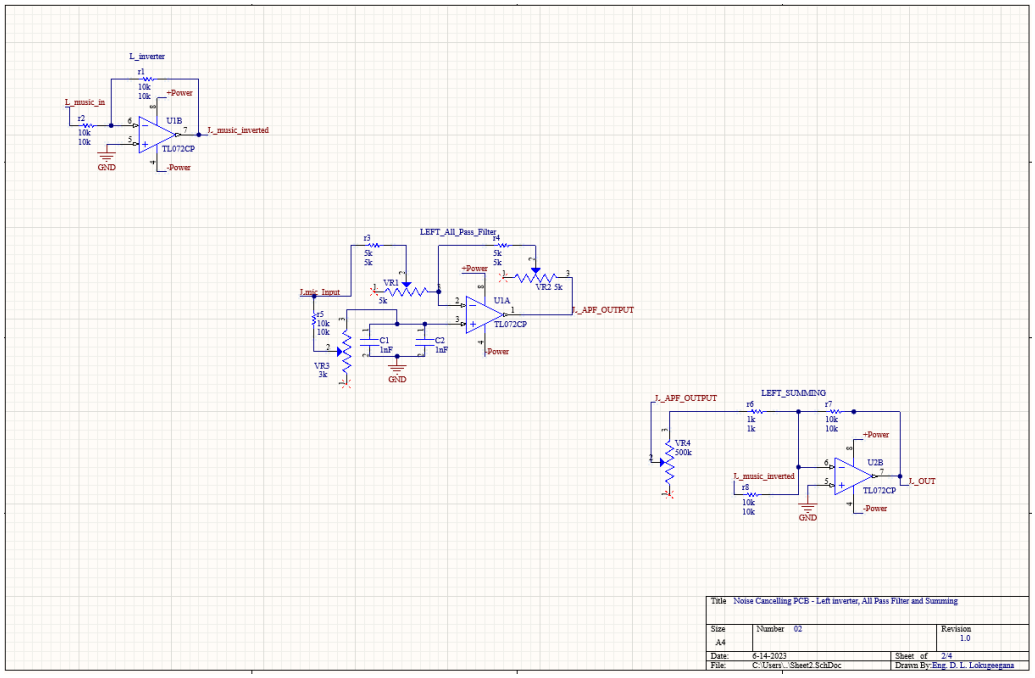
1. Using Mics in the device to capture noise.
2. Make it more user friendly shape.

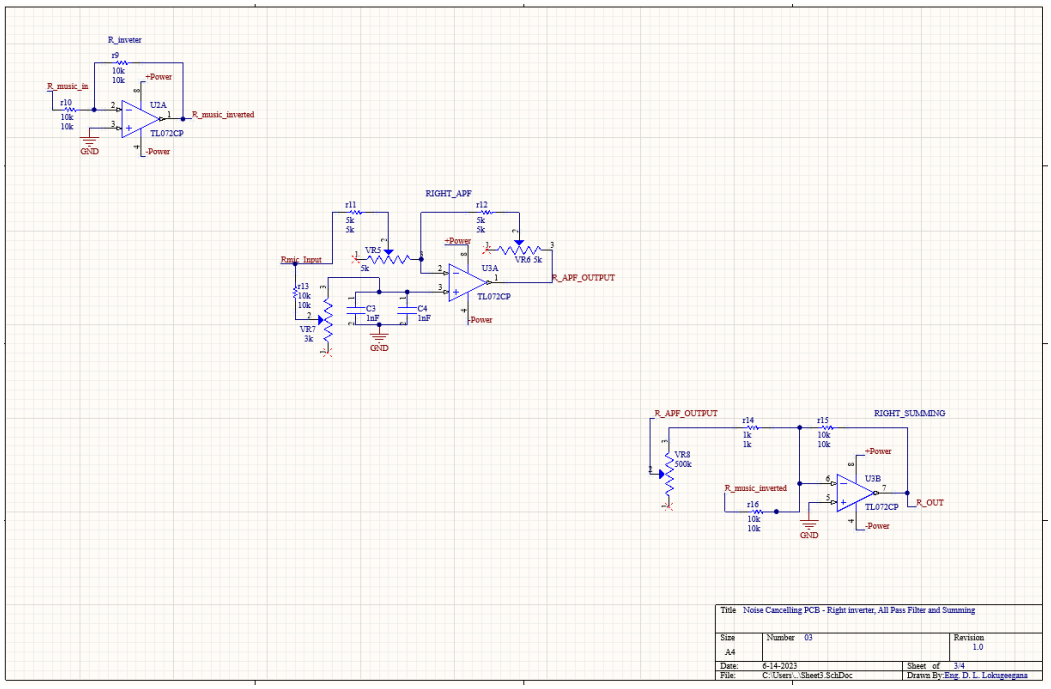
Schematic and Solidworks of Improved Design

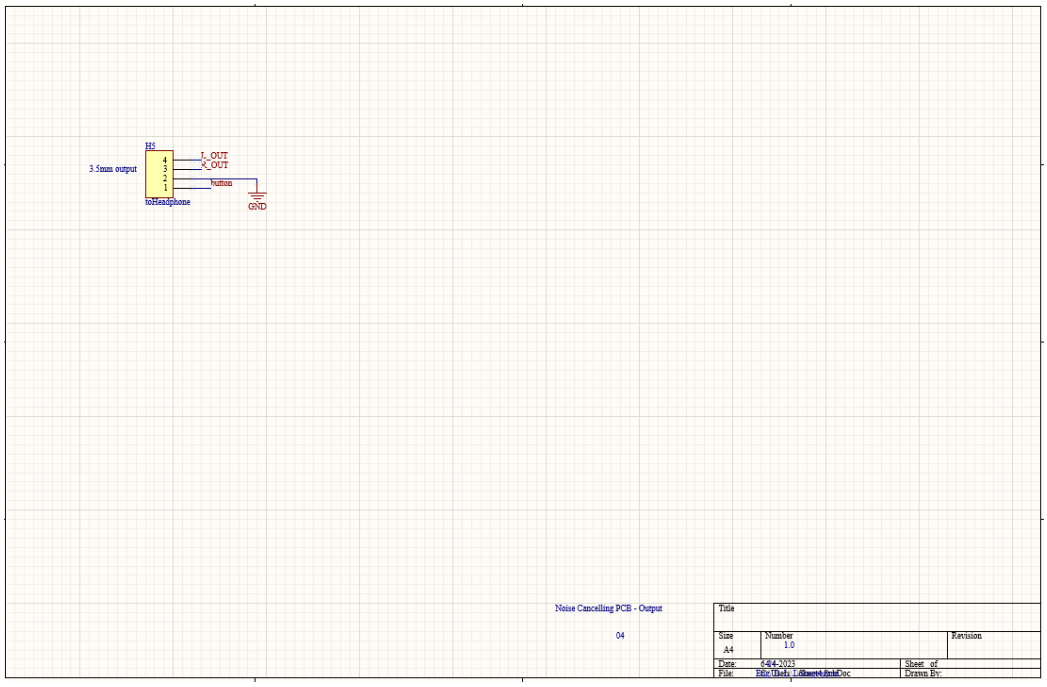
Schematic

Main Schematic






R_inveter
r9
10k
10k
+Power
R_music_in
r10
10k
10k
U2A
TL072CP
R_music_inverted
GND
-Power
RIGHT_APF
r11
5k
5k
r12
5k
5k
+Power
Rmic_Input
VR5
5k
VR6 5k
U3A
TL072CP
R_APF_OUTPUT
r13
10k
10k
C3
1nF
C4
1nF
VR7
3k
GND
-Power
R_APF_OUTPUT
r14
1k
1k
r15
10k
10k
RIGHT_SUMMING
VR8
500k
+Power
U3B
TL072CP
R_OUT
R_music_inverted
r16
10k
10k
GND
-Power
Title Noise Cancelling PCB - Right inverter, All Pass Filter and Summing
Size A4
Number 03
Revision 1.0
Date: 6-14-2023
Sheet of 3/4
File: C:\Users\...\Sheet3.SchDoc
Drawn By: Eng. D. L. Lokugeegana


H5
3.5mm output
4
3
2
1
L_OUT
R_OUT
button
toHeadphone
GND
Noise Cancelling PCB - Output
04
Title
Size A4
Number 1.0
Revision
Date: 6/4/2023
Sheet of
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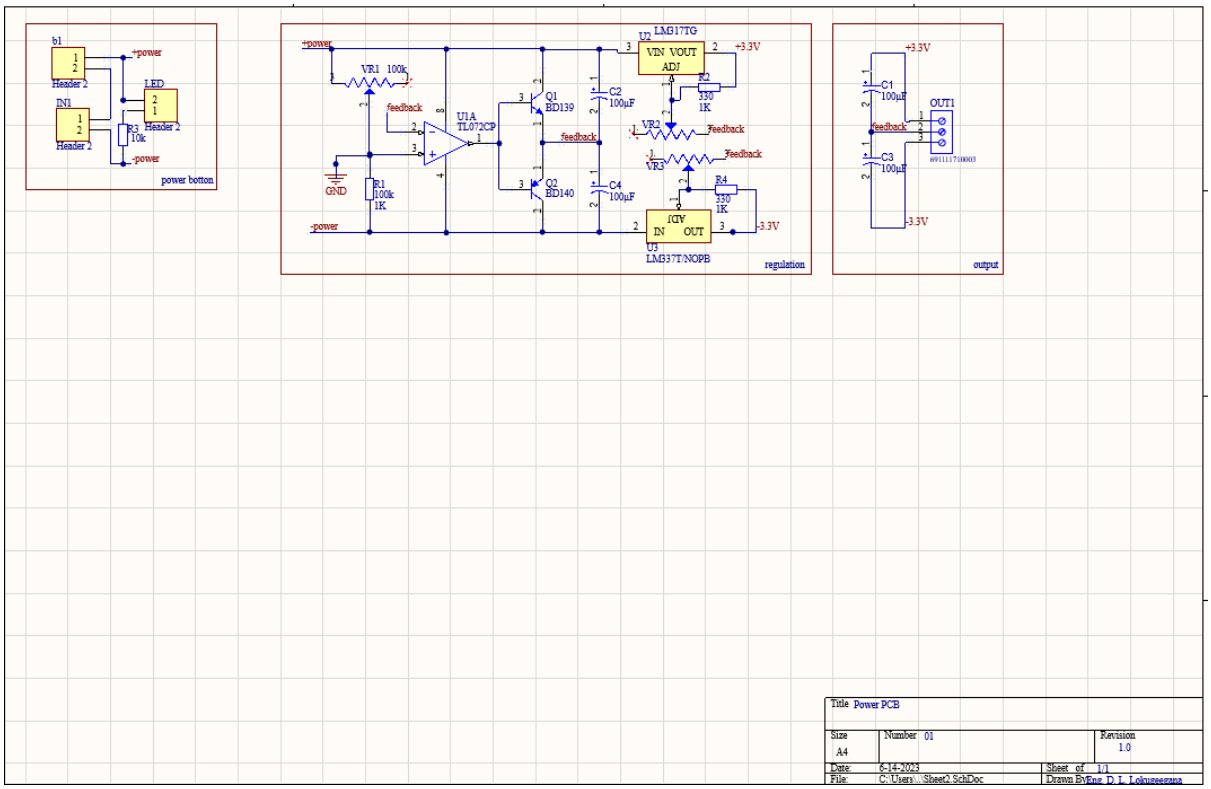
Drawn By:


b1
Header 2
+power
LED
IN1
Header 2
R3
10k
Header 2
-power
power botton
+power
VR1 100k
feedback
U1A
TL072CP
GND
R1
100k
1K
-power
Q1
BD139
Q2
BD140
C2
100µF
C4
100µF
U2
LM17TG
VIN VOUT
ADJ
+3.3V
R2
330
1K
VR2
feedback
VR3
feedback
R4
330
1K
IN OUT
-3.3V
U3
LM337T/NOPB
regulation
+3.3V
C1
100µF
feedback
OUT1
C3
100µF
-3.3V
output
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Size A4
Number 01
Revision 1.0
Date: 6-14-2023
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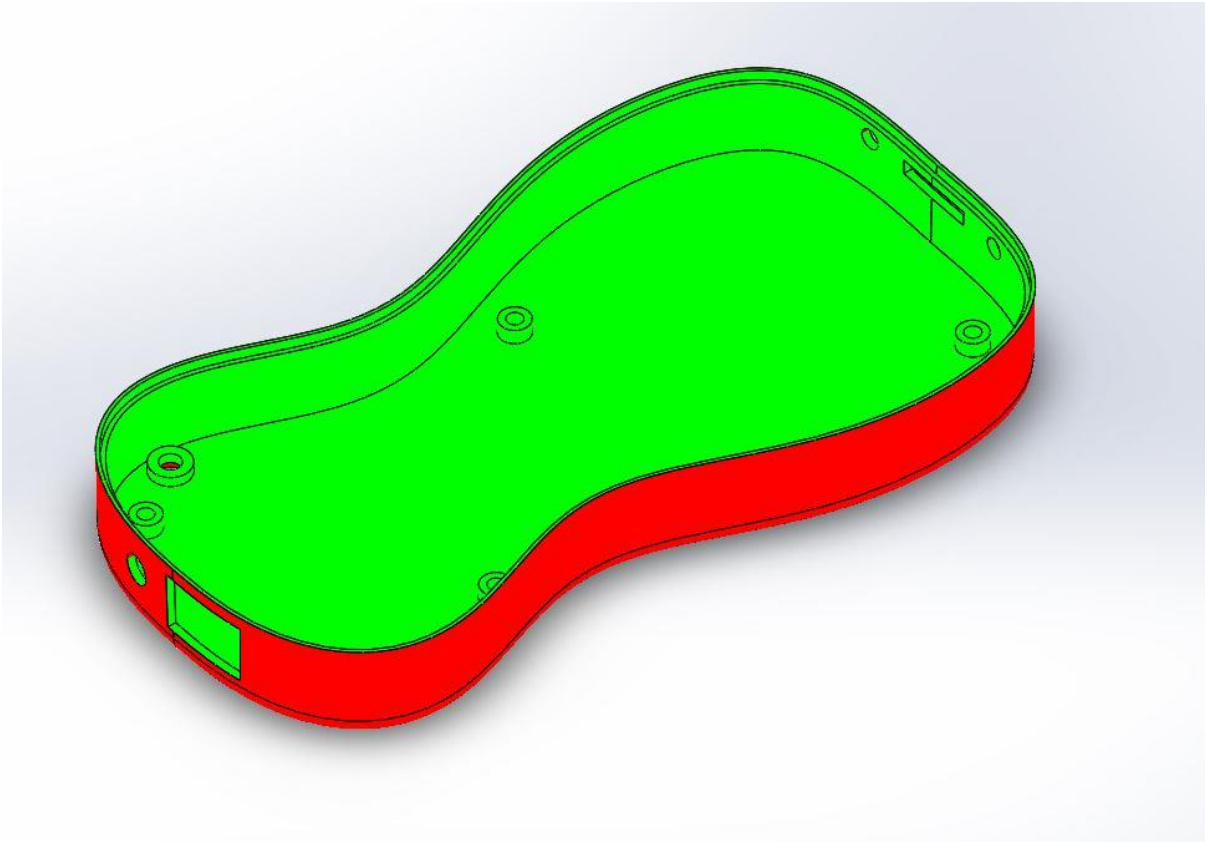
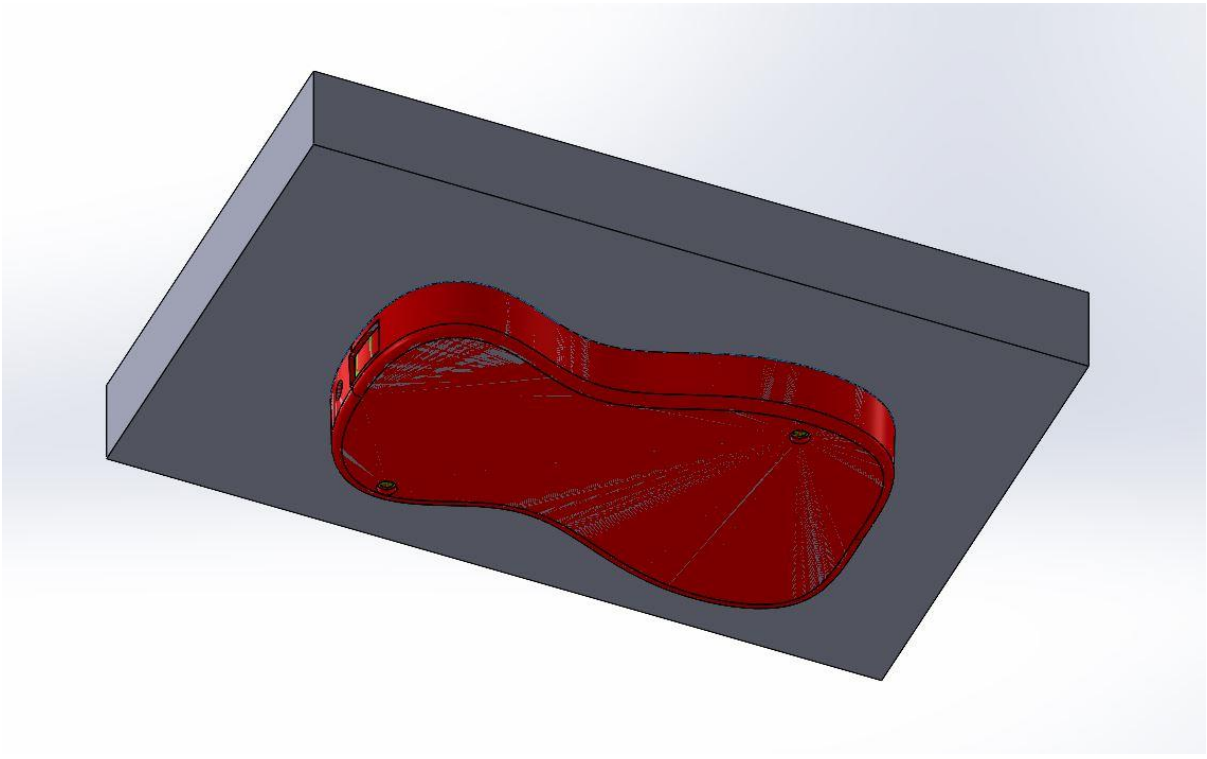
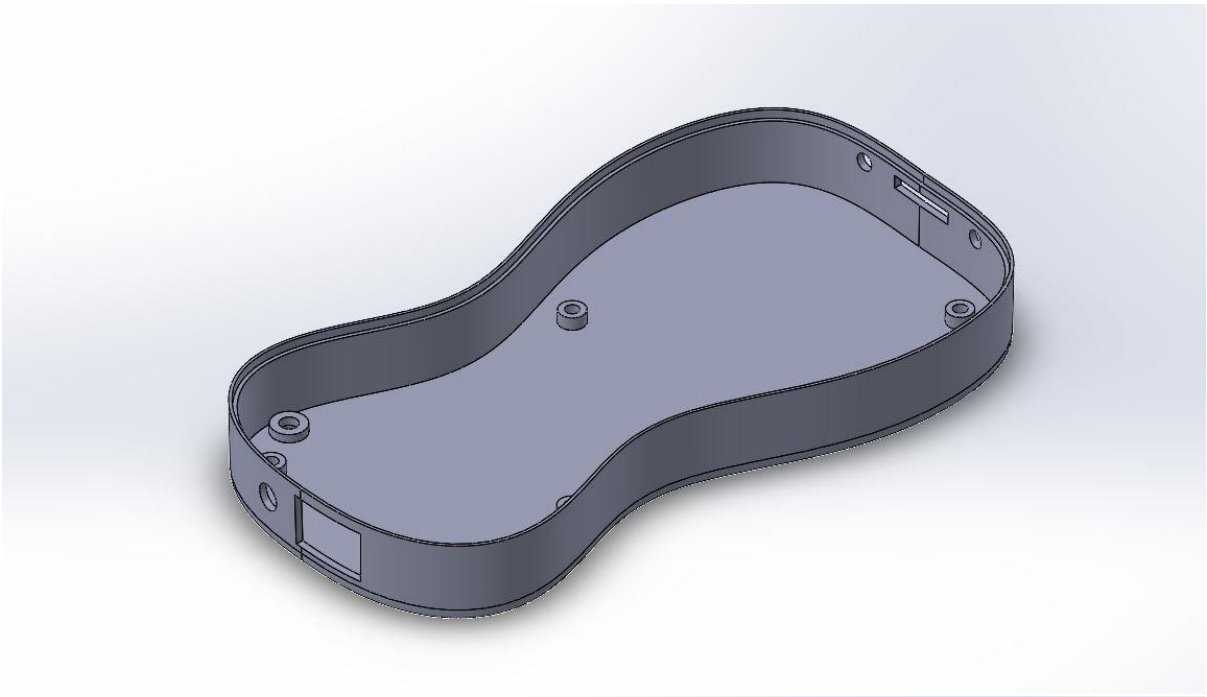
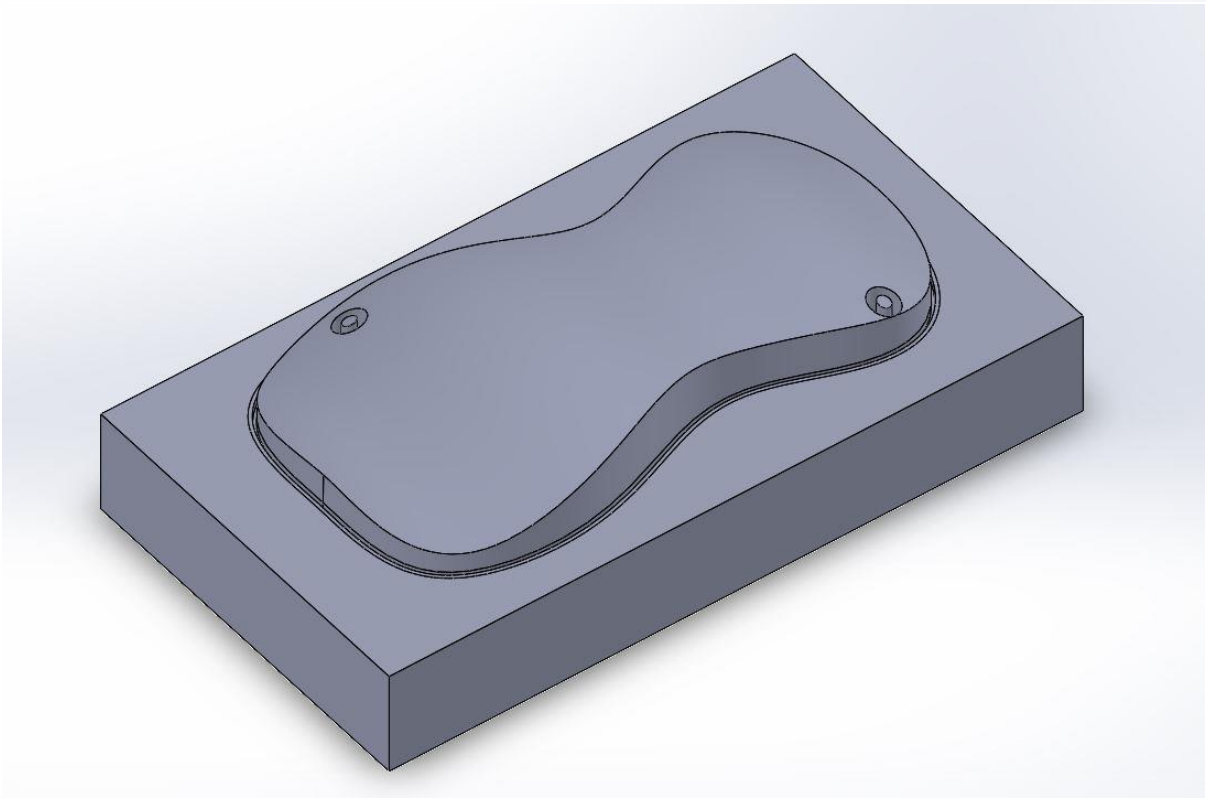
Sheet of 1/1
Drawn By: Eng. D. L. Lokuseeeana

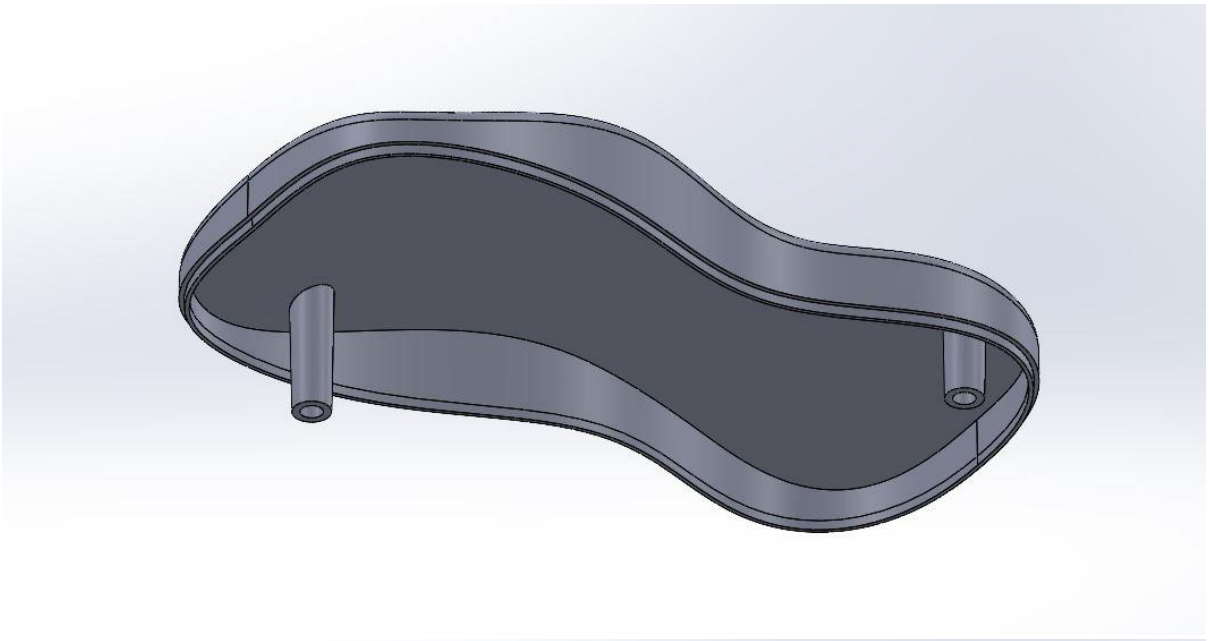
SolidWorks

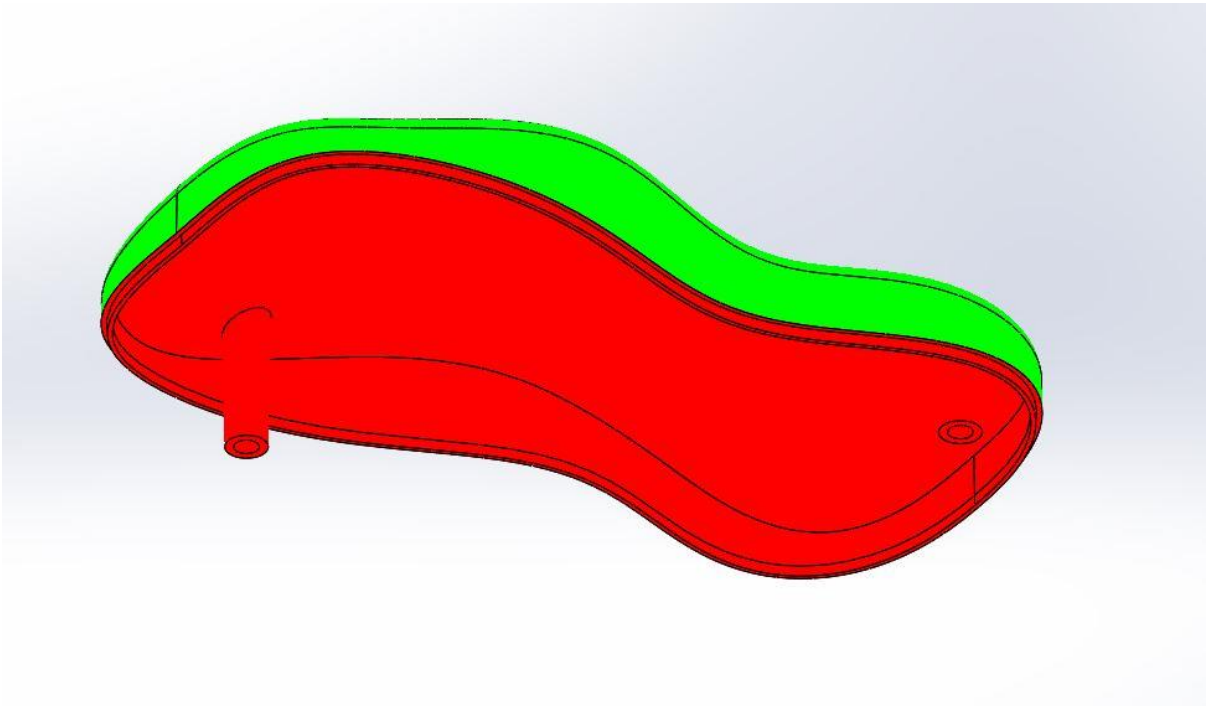


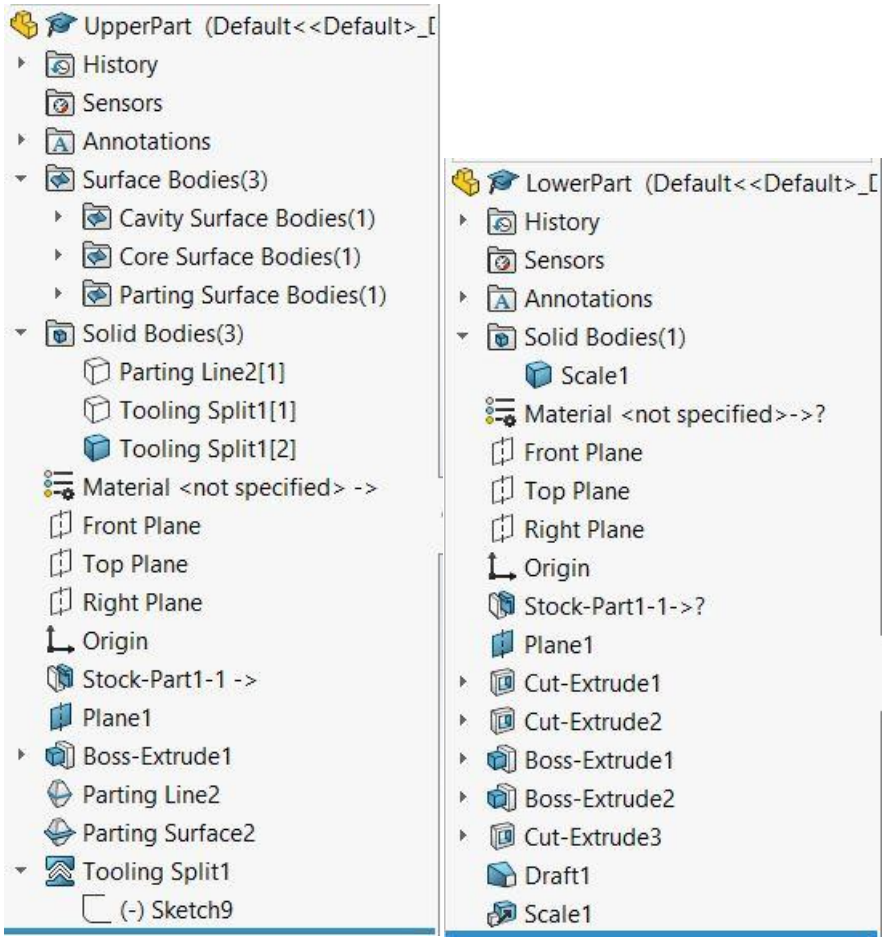











UpperPart (Default<<Default>_[
History
Sensors
Annotations
Surface Bodies(3)
Cavity Surface Bodies(1)
Core Surface Bodies(1)
Parting Surface Bodies(1)
Solid Bodies(3)
Parting Line2[1]
Tooling Split1[1]
Tooling Split1[2]
Material <not specified> ->
Front Plane
Top Plane
Right Plane
Origin
Stock-Part1-1 ->
Plane1
Boss-Extrude1
Parting Line2
Parting Surface2
Tooling Split1
(-) Sketch9
LowerPart (Default<<Default>_[
History
Sensors
Annotations
Solid Bodies(1)
Scale1
Material <not specified>->?
Front Plane
Top Plane
Right Plane
Origin
Stock-Part1-1->?
Plane1
Cut-Extrude1
Cut-Extrude2
Boss-Extrude1
Boss-Extrude2
Cut-Extrude3
Draft1
Scale1