Department of Electronic and Telecommunication Engineering
University of Moratuwa

EN2160 – Preliminary Design Report
Morse Code Encoder Decoder

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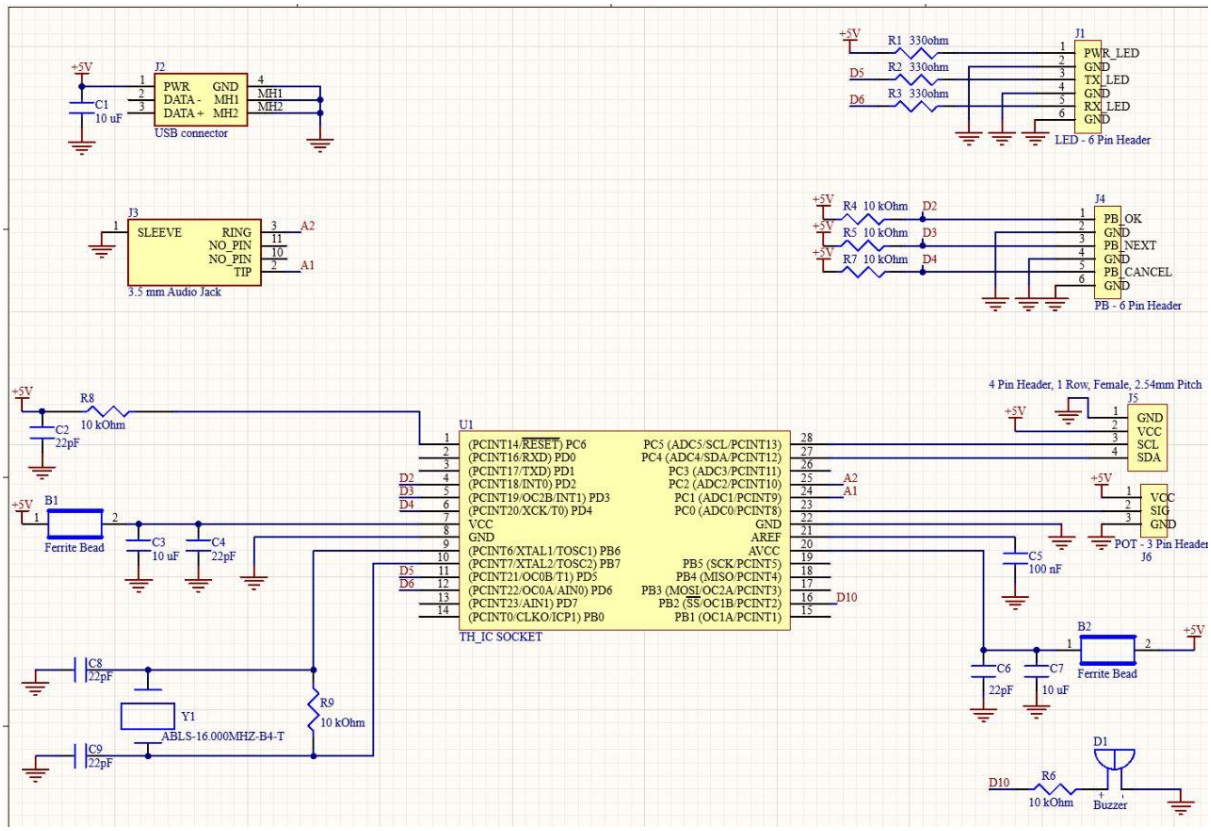
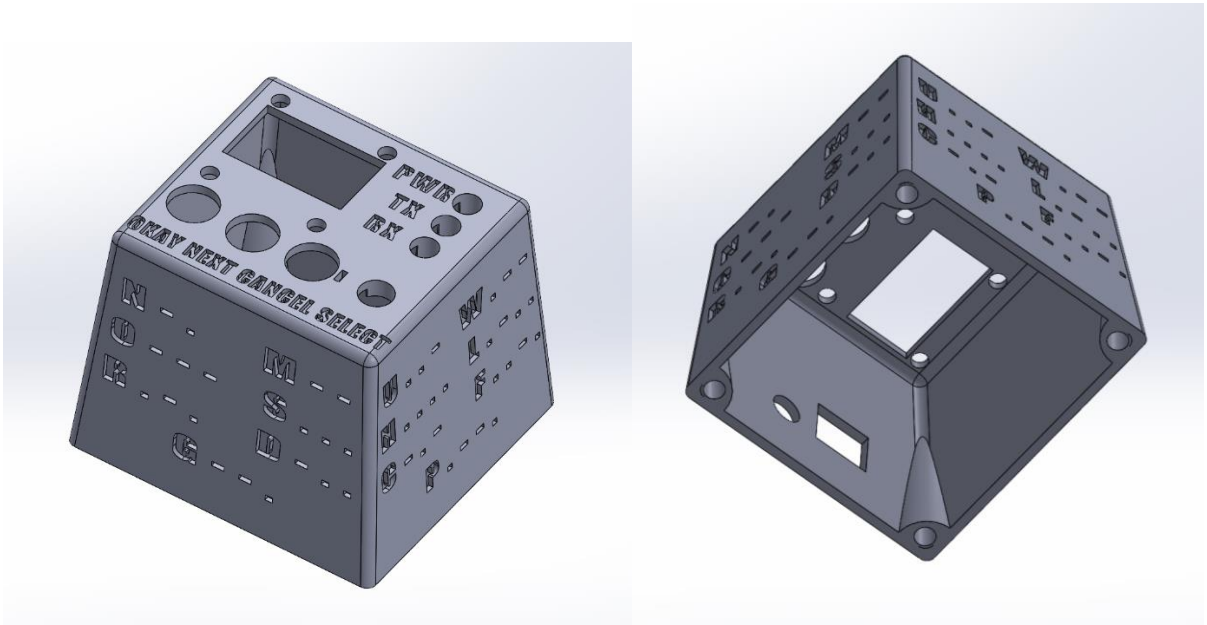
This report is submitted as partial fulfilment of the module EN2160 - Electronic Design Realization
16 June 2023

Schematic and Solid work design of the implemented design

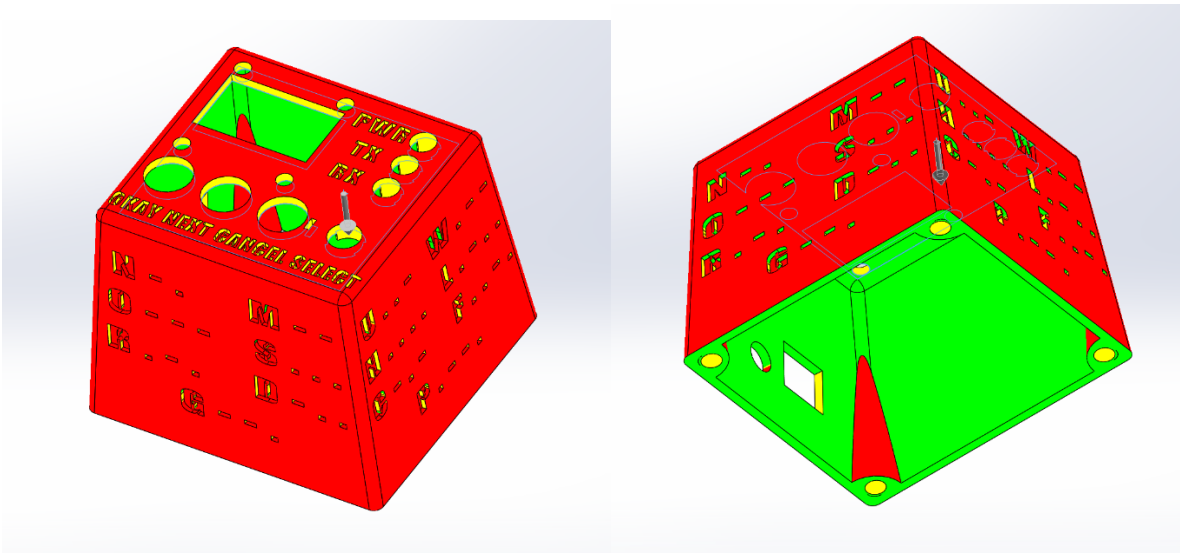
Schematic



Solid work design



According to the draft analysis, this cannot be injection moulded.



Problems identified by you considering the course contend delivered by Prof. Jayasinghe

Schematic

- The annotations do not adhere to the expected professional standards as mentioned by Prof. Jayasinghe. Specifically, they are not arranged in a sequential manner from left to right and top to bottom as required.
- The placement of inputs and outputs is incorrect. Prof. Jayasinghe recommended that inputs be positioned on the right side, while outputs should be positioned on the left side.
- The schematic is hard to read and comprehend. It should be simplified. The example schematic design provided by Prof. Jayasinghe is a proper reference to how a professional schematic should be.

Solid work design

- I was previously unaware of the intricacies involved in injection moulding and the manufacturing process of a product. However, thanks to the invaluable teachings of Prof. Jayasinghe, I have gained a newfound understanding. Upon examining the draft analysis, I have come to the realization that the enclosure of my product is unsuitable for injection moulding. Notably, the yellow-coloured areas depicted in the images present challenges as they cannot be effectively moulded, particularly the intricate lettering.

Problems/Improvements identified/proposed by members of your group

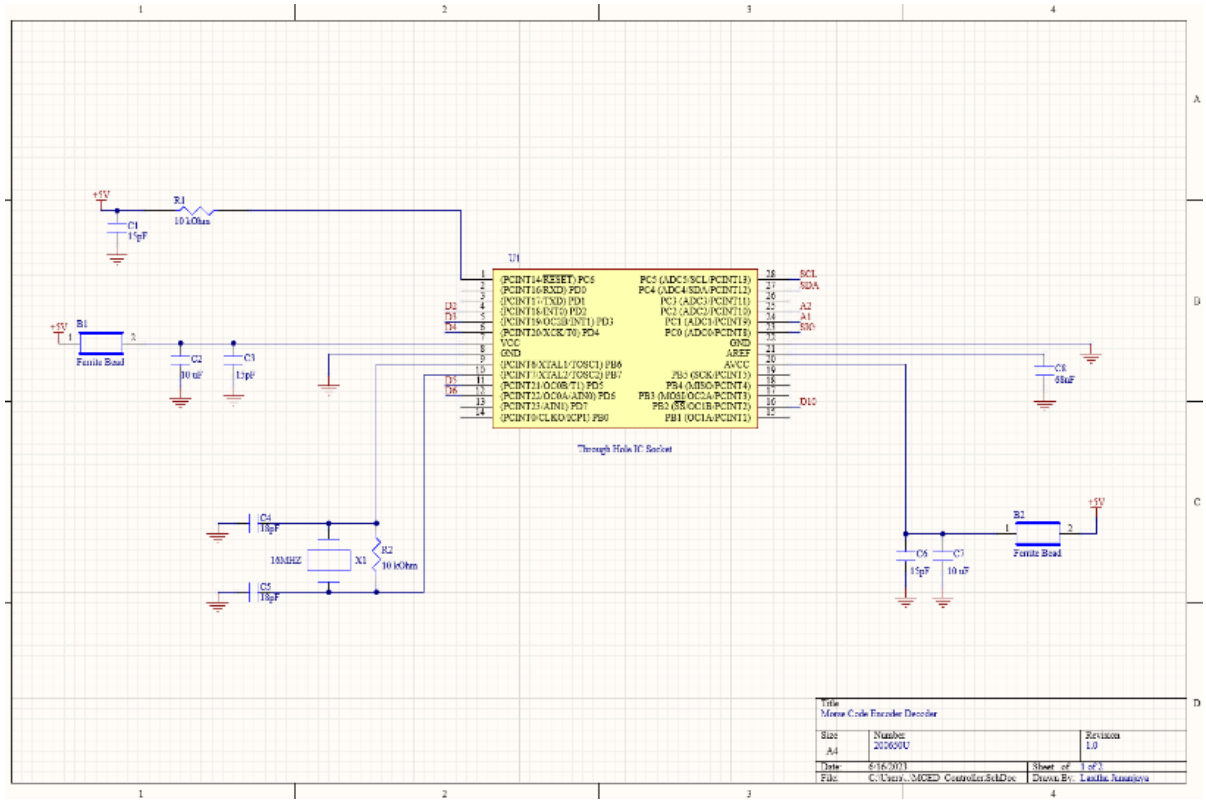
- One suggestion was made to increase the volume of the buzzer. The resistance value of the resistor which connects to the buzzer was then reduced.
- Another suggestion was made to increase the button debounce time. Since that typically causes errors. That was adjusted as required.

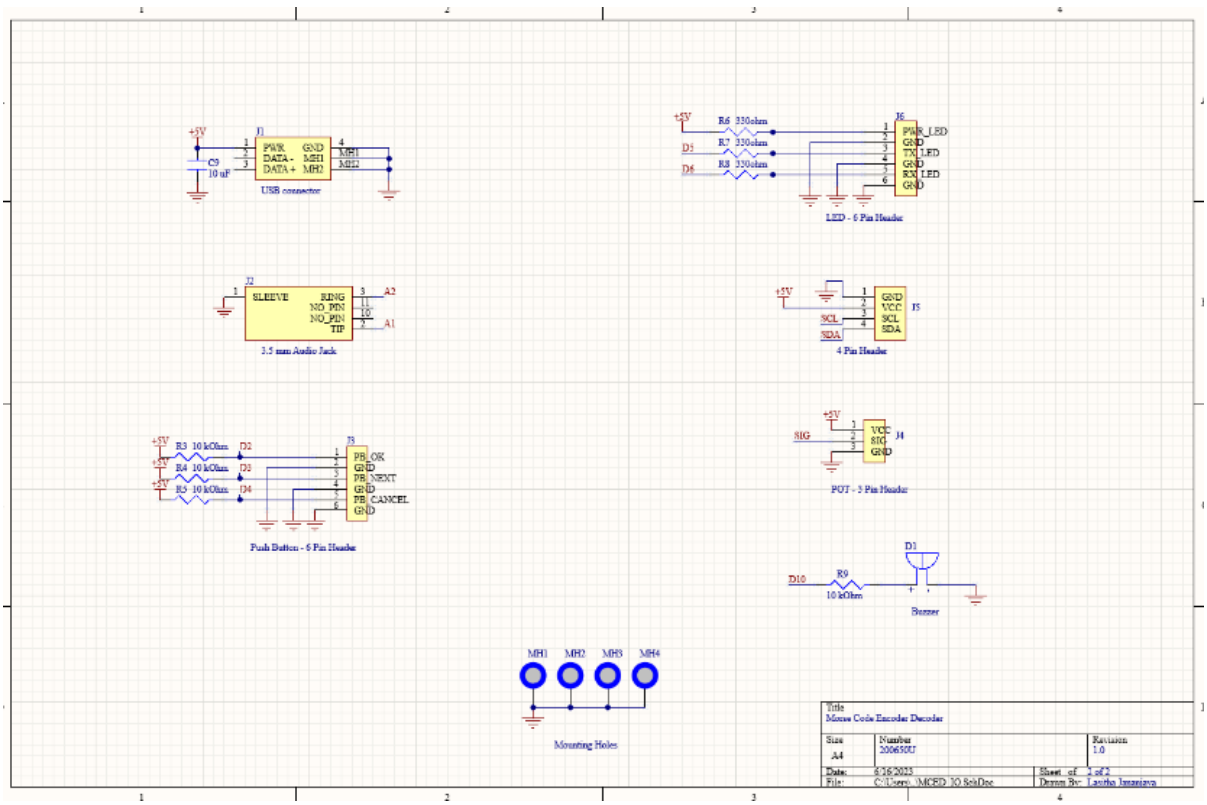
Problems/Improvements identified/proposed by users

- One user suggested to make the ports reside a little bit inwards. (Not to make them pop out of the enclosure.) That was adjusted as required.

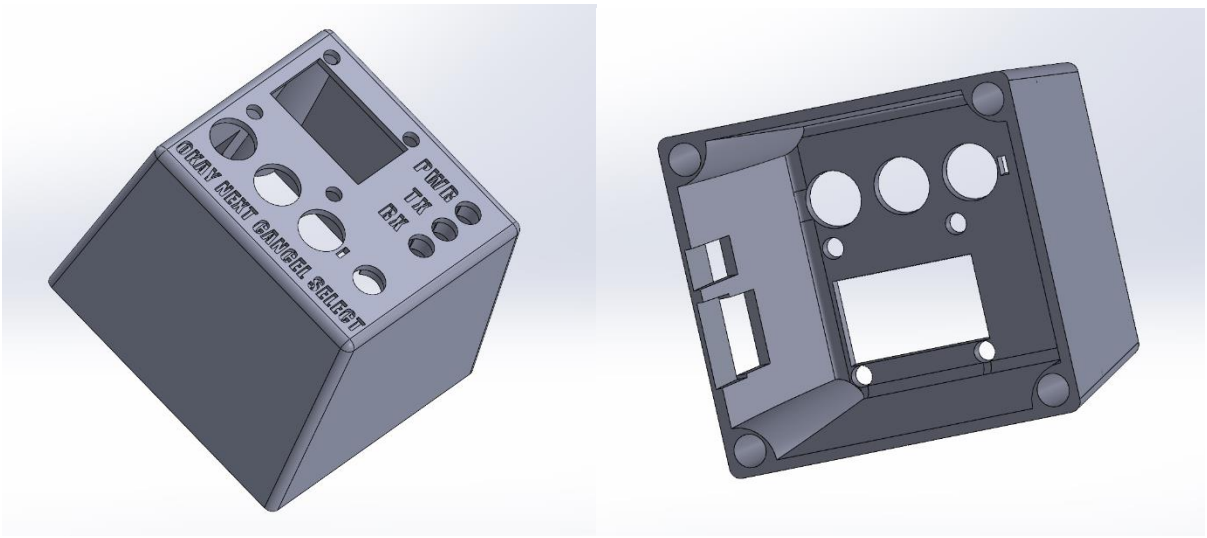
Schematic and Solid work design of the improved design

Schematic – Simplified to 2 pages. Corrected all the mistakes.


+5V
R1
10 kOhm
C1
15pF
U1
(PCINT14-RESET) PC6
(PCINT16/RXD) PD0
(PCINT17-/TXD) PD1
(PCINT18-INT0) PD2
(PCINT19/OC2B/INT1) PD3
(PCINT20/XCK/T0) PD4
VCC
GND
(PCINT6/XTAL1/TOSC1) PB6
(PCINT7/XTAL2/TOSC2) PB7
(PCINT21/OC0B/T1) PD5
(PCINT22/OC0A/AIN0) PD6
(PCINT23/AIN1) PD7
(PCINT0/CLKO/ICP1) PB0
PC5 (ADC5/SCL/PCINT13)
PC4 (ADC4/SDA/PCINT12)
PC3 (ADC3/PCINT11)
PC2 (ADC2/PCINT10)
PC1 (ADC1/PCINT9)
PC0 (ADC0/PCINT8)
GND
AREF
AVCC
PB5 (SCK/PCINT5)
PB4 (MISO/PCINT4)
PB3 (MOSI/OC2A/PCINT3)
PB2 (SS/OC1B/PCINT2)
PB1 (OC1A/PCINT1)
SCL
SDA
A2
A1
SW1
D10
Through Hole IC Socket
B1
Ferrite Bead
C2
10 uF
C3
15pF
C4
18pF
16MHZ
X1
R2
10 kOhm
C5
18pF
C6
68nF
B2
Ferrite Bead
C8
15pF
C7
10 nF
Title
Morse Code Encoder Decoder
Size
A4
Number
2006500U
Revision
1.0
Date:
6/16/2023
Sheet of
1 of 2
File:
C:\Users\..\MCED_Controller.SchDoc
Drawn By:
Lantha Innaiyya


+5V
C9
10 uF
J1
PWR
DATA -
DATA +
GND
MH1
MH2
MH3
MH4
USB connector
J2
SLEEVE
RING
NO_PIN
TIP
A2
A1
3.5 mm Audio Jack
R3 10 kOhm
R4 10 kOhm
R5 10 kOhm
D2
D3
D4
J3
PB_OK
PB_NEXT
PB_CANCEL
Push Button - 6 Pin Header
R6 330ohm
R7 330ohm
R8 330ohm
D5
D6
J6
PWR_LED
TX_LED
RX_LED
LED - 6 Pin Header
J5
SCL
SDA
4 Pin Header
SIG
J4
POT - 3 Pin Header
D10
R9
10 kOhm
D1
Buzzer
MH1
MH2
MH3
MH4
Mounting Holes
Title
Morse Code Encoder Decoder
Size
A4
Number
2006500U
Revision
1.0
Date:
6/16/2023
Sheet of
2 of 2
File:
C:\Users\..\MCED_IO.SchDoc
Drawn By:
Lantha Innaiyya

Solid work design



Draft analysis – There are no yellow-coloured regions now