Department of Electronic and Telecommunication Engineering

University of Moratuwa

B. Sc. Eng. Semester 2

EN1070 Electronic Product Design and Manufacture

Project Report

RAIN SENSING AUTOMATIC CAR WIPER

Group No : 16

Group members:

K. A. G. D. Maheekumara	180379R
B. M. D. S. Karunarathna	180308C
T. M. S. Nayanajith	180417J
P. S. C. Jayapala	180265N
K. L. G. J. Chandula	180092F
H. V. Darsha Randitha	180241M

Content

Product Goals

Main function of the product is to automate the wiper system of a car. It sensors when rain falls and automatically switches ON and processes the wiper and stops when rain stops.

Volume:

At initial stage we planned to manufacture 500 units per month. If the response to the product in the market increases we will increase batch size to 1500 per month.

Approximated Cost:

Demand for this rain sensing automatic car wiper is high among vehicle owners. They would like to buy this product around the price Rs. 2800

Allowable cost per unit: Rs.1800

Profit: Rs.250

Labor charge: Rs. 300

Value Added Tax (VAT): Rs. 150

Selling Price: Rs.2500

Specifications

Requirements

- Can detect rain and rotate the viper of the vehicle.
- Indicate whether the viper is working or not by a led.
- Wiper should always stop at one corner of the windscreen.
- Circuit system should be waterproof.

Wishes

- Sensor should withstand to any climate and whether.
- It should weigh light.
- Sensor can be easily replaced
- Should have heat control variation system

Production

- Initial Production about 500 wipers.
- General wipers are acquired from the market and will be developed.
- Electronic components are bought from outside.
- In house manufacturing of PCB and assembling.
- Enclosure made outside.

Distribution

- Introduced to existing shops.

Quality

- User Friendly
- Expected life time should be greater than 2 years.

Performance

- Function with the car battery.

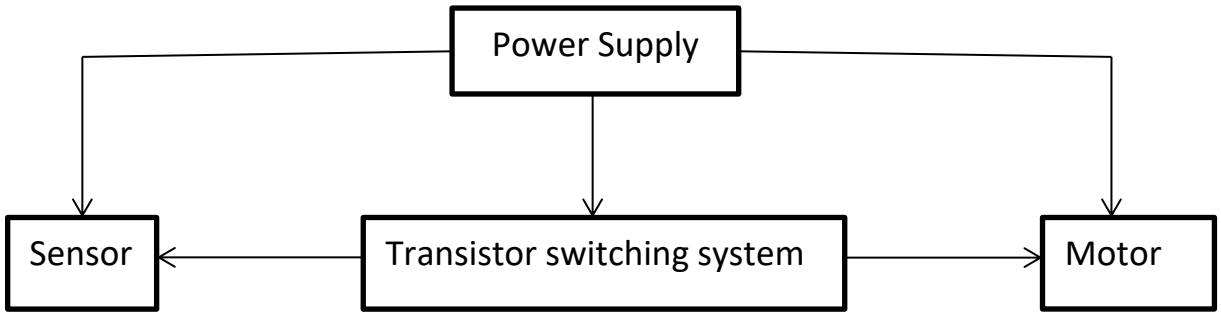
Usage

- Attachable to the windscreen
- Even untrained person can install the device

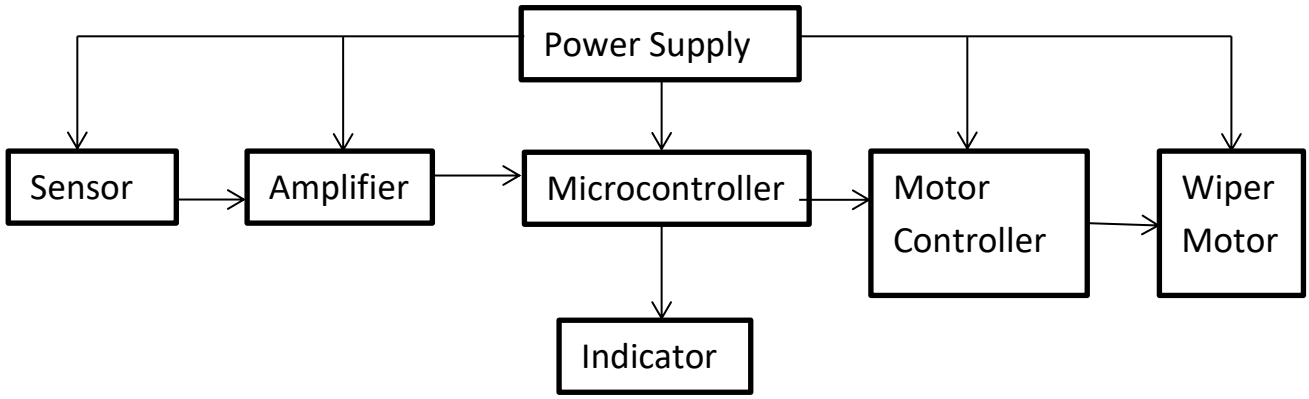
Conceptual Designs

Circuit designs

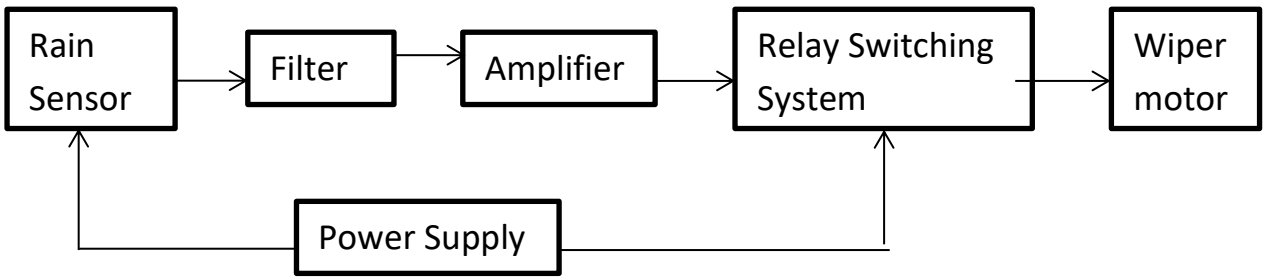
Design 1



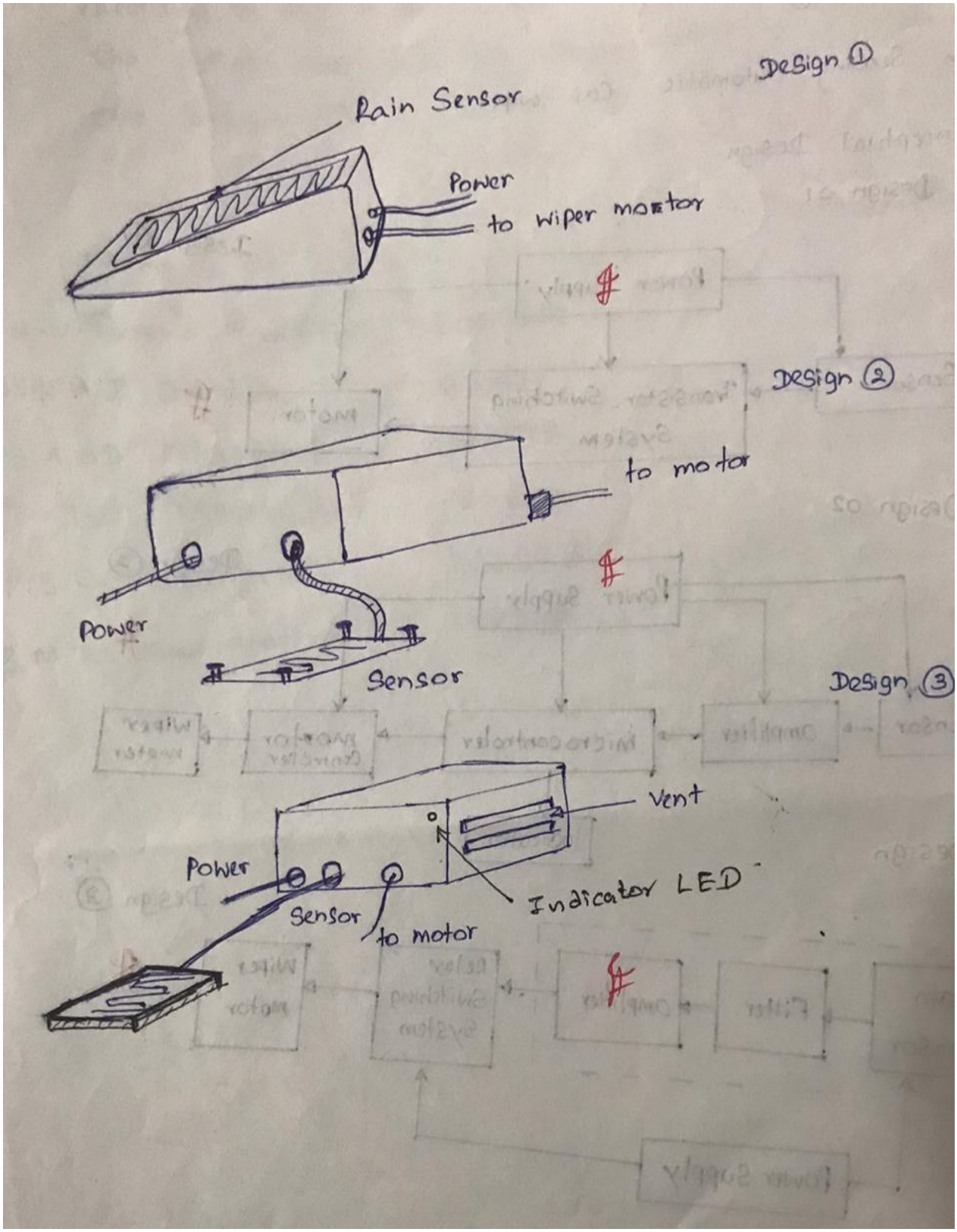
Design 2



Design 3



Enclosure design hand sketches



Criteria for conceptual designs

Circuit

	Criteria	Design 01	Design 02	Design 03
01	Can detect rain and rotate the viper	05	10	10
02	Indicate whether the wiper is working or not by a LED	Not Relevant	10	Not Relevant
03	Wiper should always stop at the corner of the windscreen	03	10	07
04	Sensor should withstand to any climate and whether	05	05	08
05	Even untrained person can install the device	08	08	08
	Total	21	43	33

Enclosure

	Criteria	Design 01	Design 02	Design 03
01	Should be waterproof	08	05	02
02	Attachable to the windscreen	05	02	10
03	Suitable shape to attach the dashboard	Not relevant	08	07
04	Heat control ventilation system	Not relevant	03	10
05	Sensor can be easily replaced	Not Relevant	05	08
	Total	13	23	37

Suitable Circuit and Enclosure Designs according to the Criteria Evaluation

Circuit / *Enclosure*	***Design 01***	***Design 02***	***Design 03***
Design 01	34	56	46
Design 02	44	66	56
Design 03	58	80	70

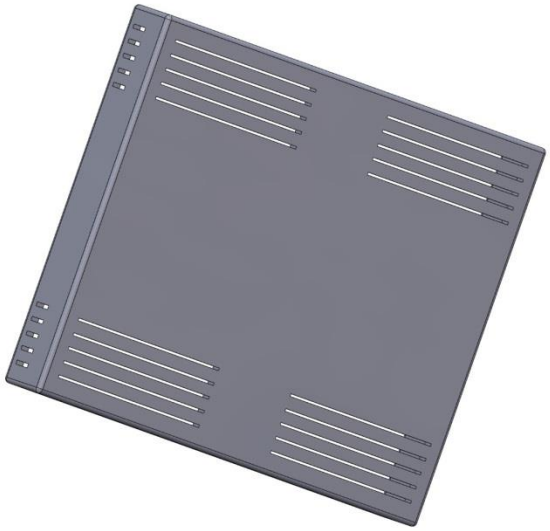
- According to the above evaluation ,
  - Circuit – Design 02
  - Enclosure – Design 03

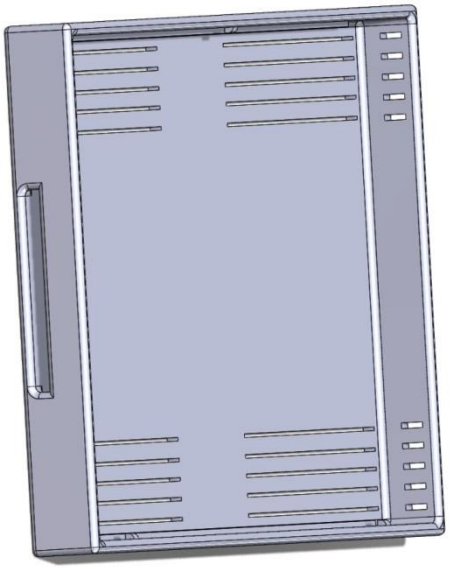
are implemented.

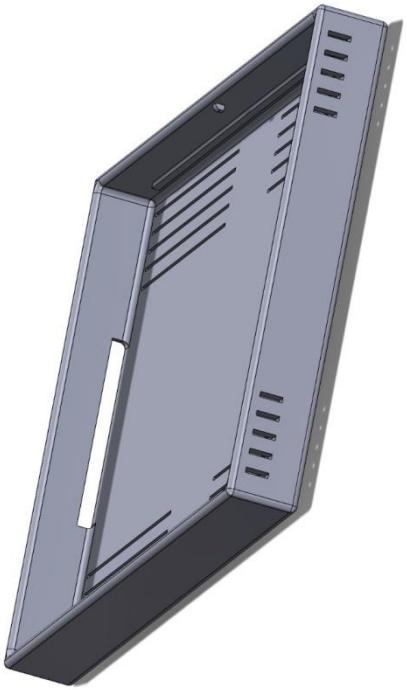
Preliminary Designs

- ***Orcad Schematics***
- ***PCB layout***

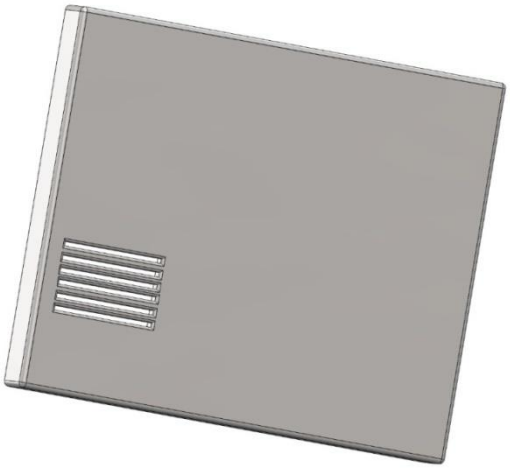
- ***<u>Solidwork Enclosure Design</u>***
  - *<u>Sensor Panel Holder</u>*

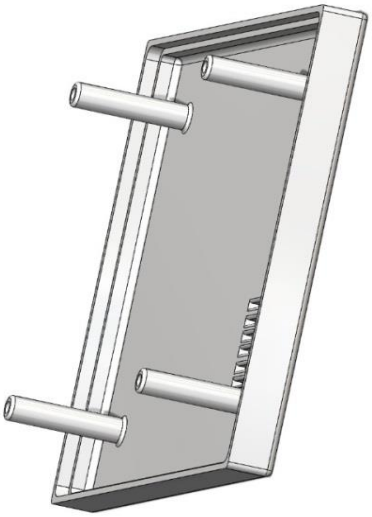




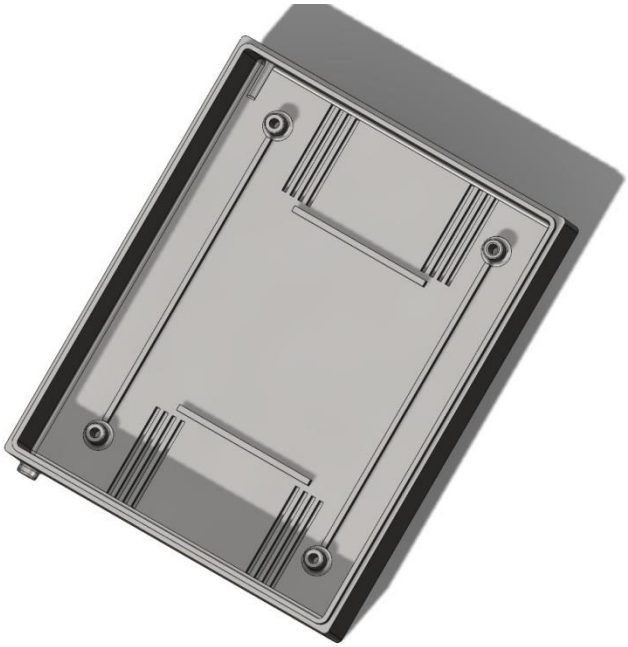


- *<u>Circuit Board Enclosure</u>*
  - *Top part*





- *Bottom Part*



- *Assembly*

Cross Section View