

Department of Electronic & Telecommunication Engineering

University of Moratuwa

EN2160 Electronic Design Realization



Conceptual Design Report

200087A

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1. Introduction

The initial stage of the design process is known as Conceptual Design, which involves exploring ideas, generating concepts, and creating preliminary design proposals. Design-Driven Innovation and User-Centered Design are two effective design approaches that play a crucial role in guiding product design, ensuring that it aligns with user needs and business objectives. This report examines the execution of the conceptual design cycle for the "Digital Temperature and Humidity Meter" product, employing these two design approaches.

2. Design Driven Innovation Approach

In the context of Design Driven Innovation, the conceptual design process involves the development of new designs based on ideas generated during brainstorming sessions. As a result of these sessions, we were able to generate three alternative designs, considering block diagrams and enclosure designs as key components.

2.1 Block Diagrams

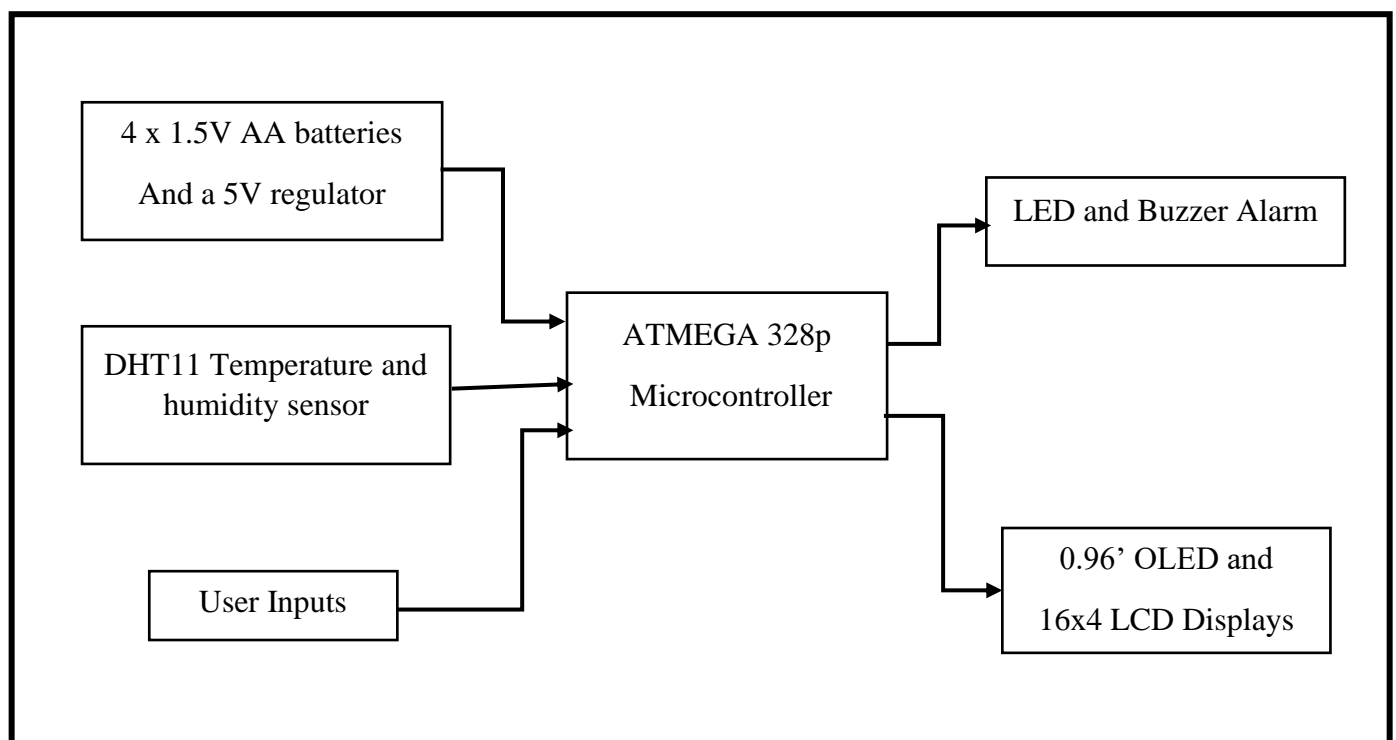


Figure: Block Diagram 1

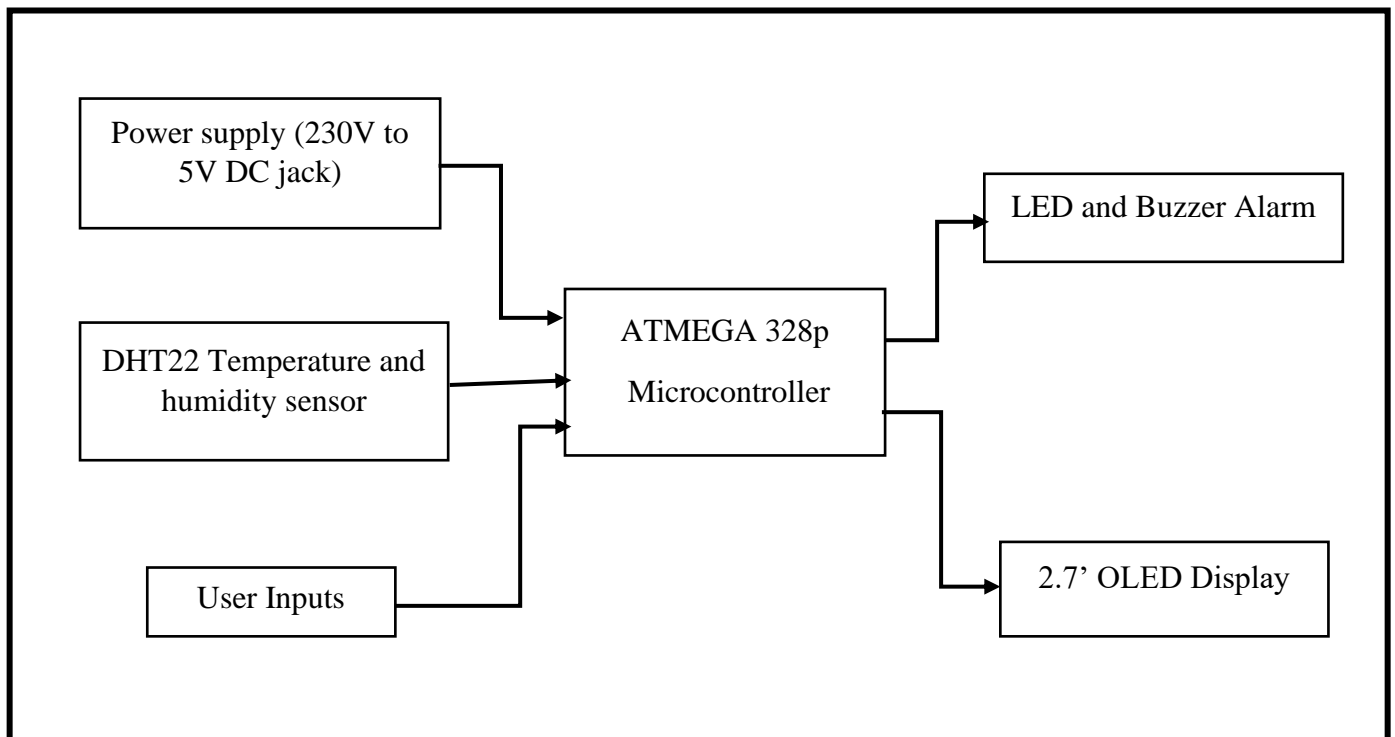


Figure: Block Diagram 2

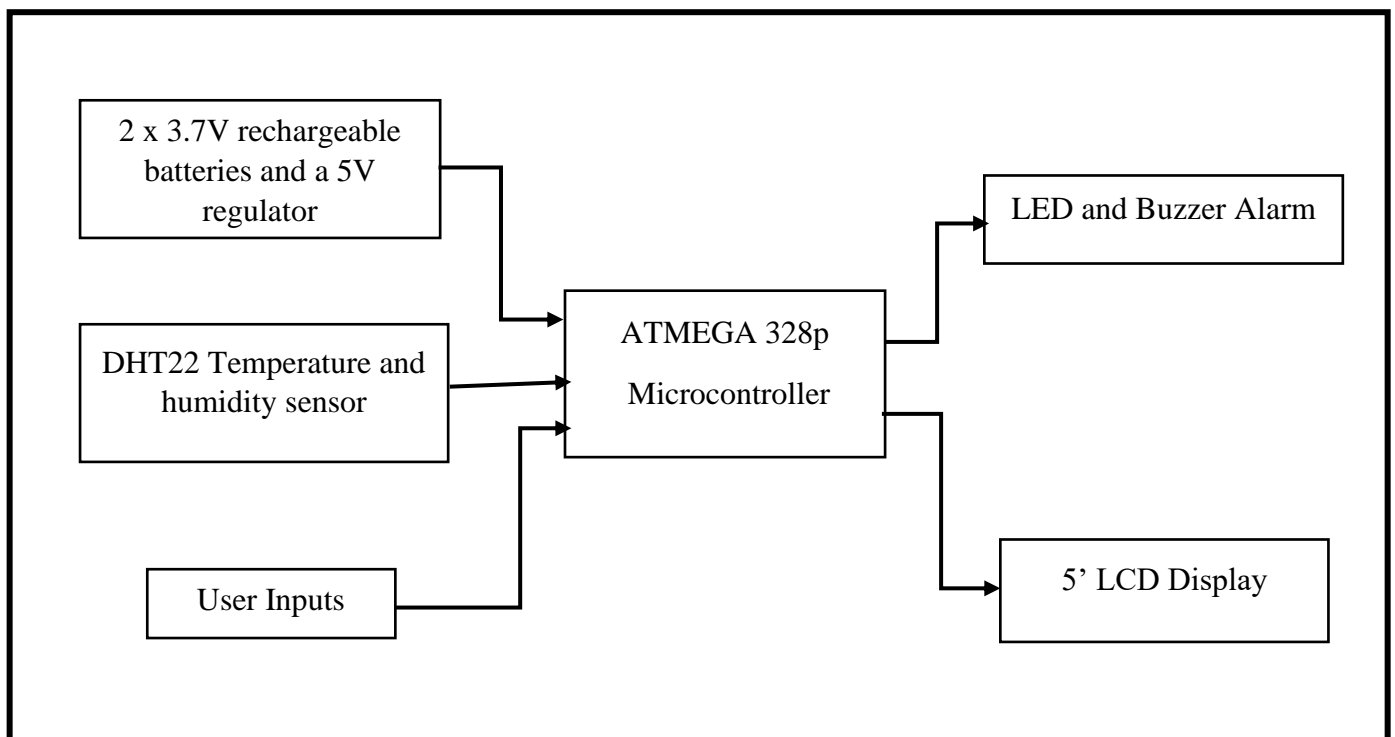


Figure: Block Diagram 3

2.2 Enclosure Designs

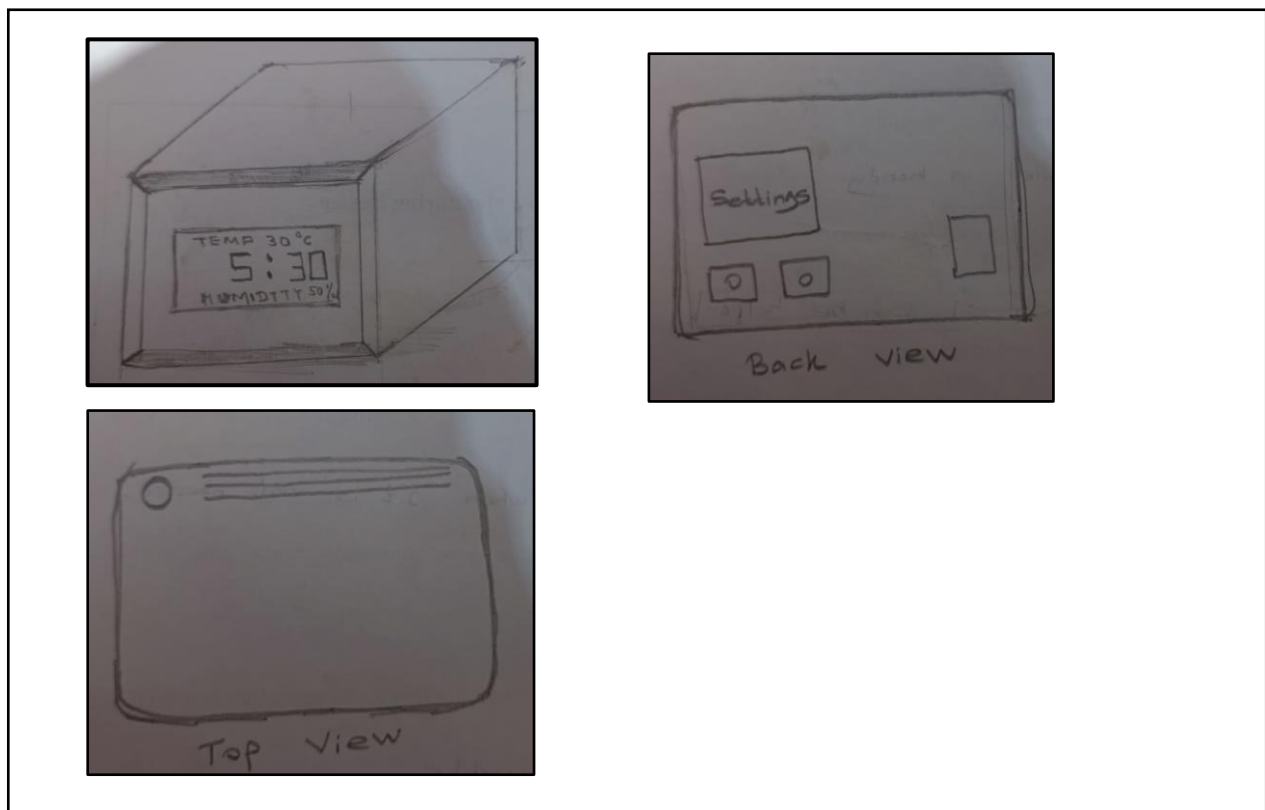


Figure: Enclosure 1

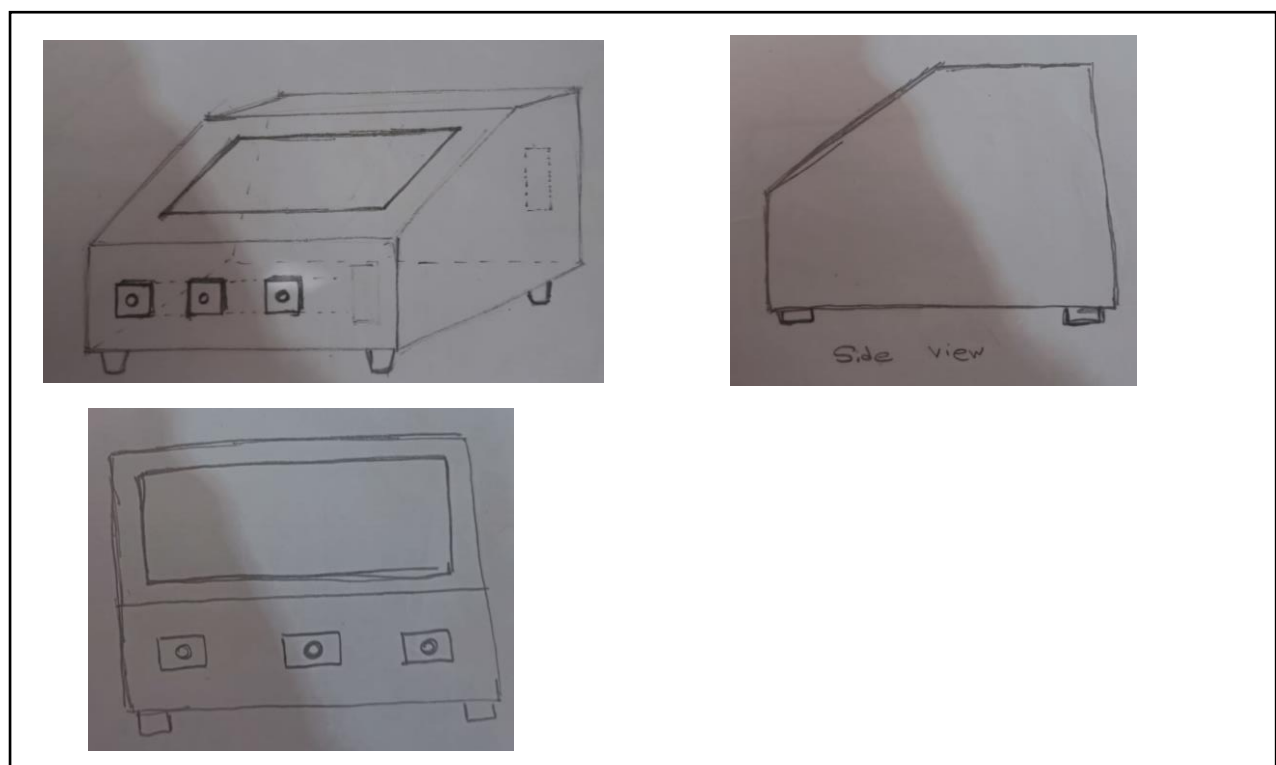


Figure: Enclosure 2

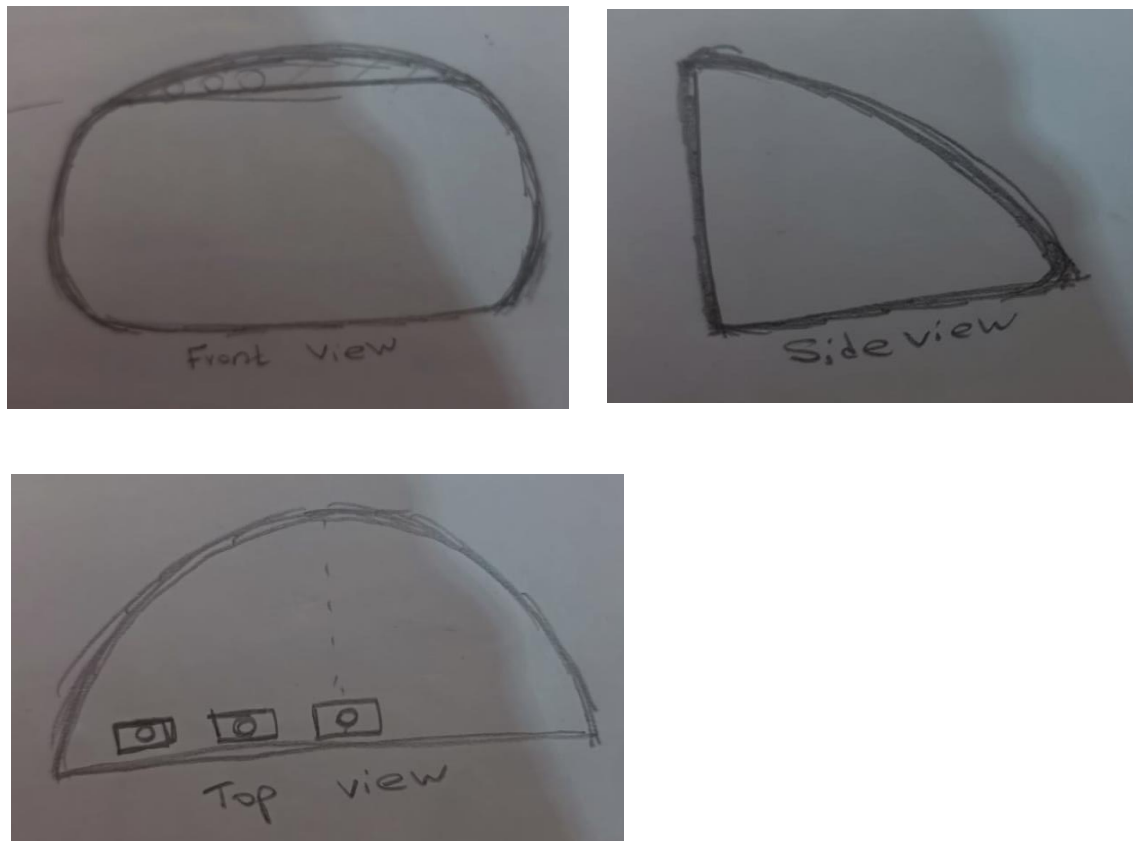


Figure: Enclosure 3

3. Design Focused on the User

In designing with a user-centered approach, we prioritize incorporating user feedback to enhance our design. This involves presenting our initial design to users and gathering their preferences and suggestions. If they express approval for our concept, we proceed to implement their suggestions. However, if users do not demonstrate a genuine need for the product we have designed, we explore alternative options. Below are the suggestions we received from the public survey for the "Smart Energy Meter" and the corresponding improvements:

User Survey Recommendations:

- Adding feature of displaying air quality
- Connecting the device to mobile phone via Wi-Fi or Bluetooth then users can see the measurements using an app remotely.
- Predicting the temperature and humidity in the future by analyzing previous data
- Adding more than one threshold value to temperature to ensure that temperature is in a safe value.

There is no considerable change in the enclosure.

3.1 Block Diagram according to the user feedback

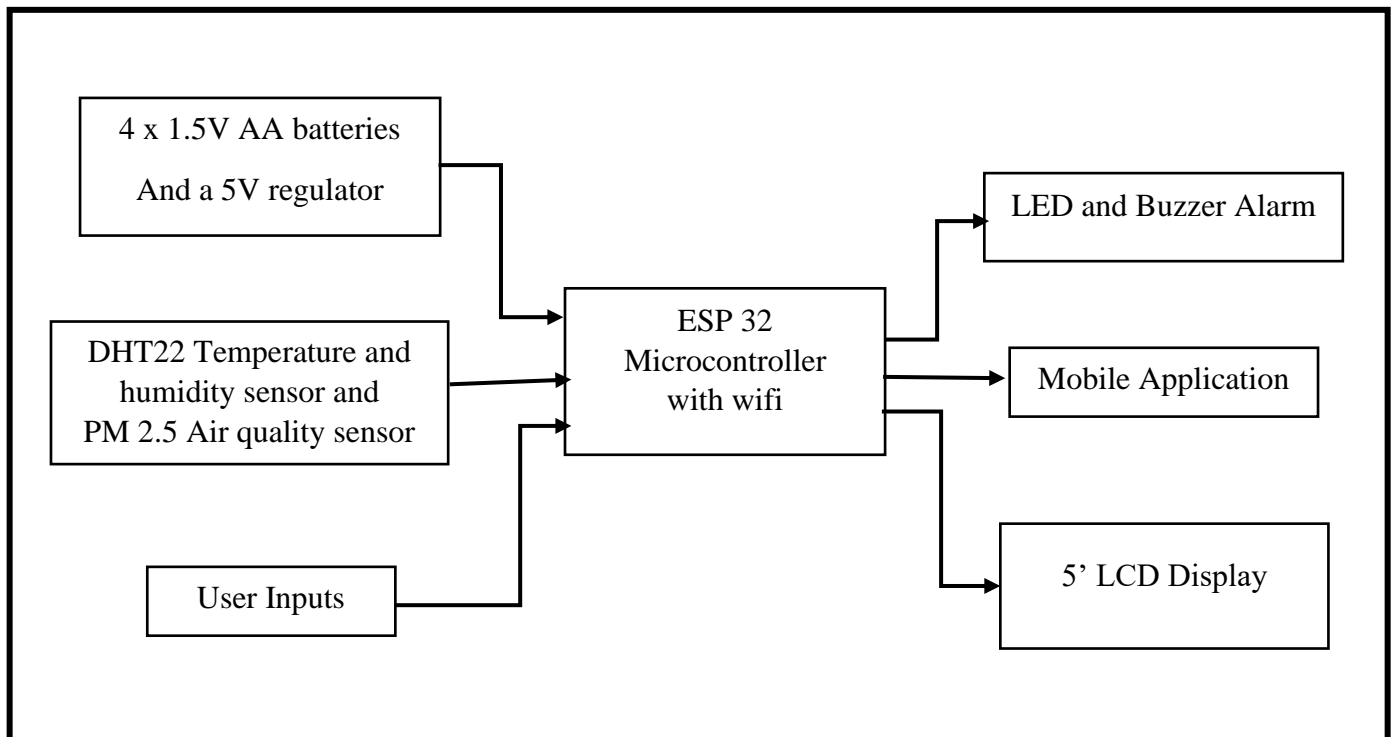


Figure: Block Diagram 4

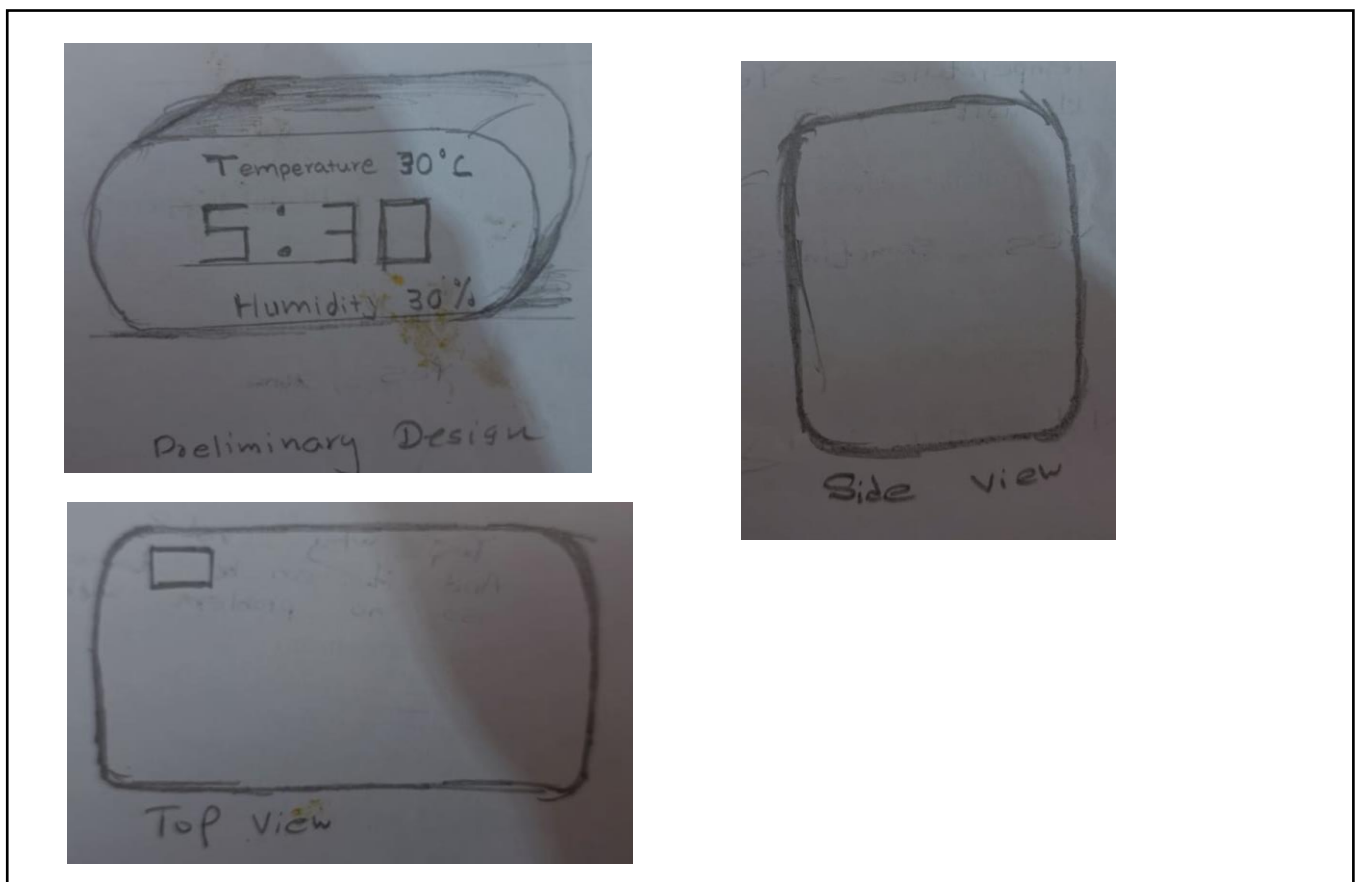


Figure: Enclosure 4

4. Evaluation

4.1 Evaluation of Block Diagram

Criteria

1. Functionality – (To what extent the design meets the intended needs)
2. Accuracy
3. User Friendliness
4. Cost
5. Power Consumption
6. Reliability
7. Compatibility – (capability of replacing devices or systems that perform the same process or part of the process)

	Block Diagram 1	Block Diagram 2	Block Diagram 3	Block Diagram 4
Functionality	8	8	8	10
Accuracy	8	10	10	10
User Friendliness	6	7	9	10
Cost Effectiveness	9	9	8	6
Power Efficiency	7	9	8	7
Reliability	10	10	10	10
Compatibility	9	9	8	9
Total	57	62	61	62

4.2 Enclosure Evaluation

Criteria

- 1) Durability
- 2) Attractiveness
- 3) Cost Effectiveness
- 4) User Safety – Prevention from electric leakage
- 5) Compatibility – Capability of attaching the device to a certain place
- 6) Repairability
- 7) Weight and Hardness

	Enclosure 1	Enclosure 2	Enclosure 3	Enclosure 4
Durability	10	8	9	9
Attractiveness	4	6	8	10
Cost Effectiveness	10	8	7	6
User Safety	8	8	8	8
Compatibility	8	8	9	9
Repairability	10	8	10	10
Weight and Hardness	7	8	9	9
Total	57	54	60	61

Conclusion: Product 4 is best

Team Contribution

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