

Department of Electronic and Telecommunication Engineering  
University Of Moratuwa



Conceptual Design Report

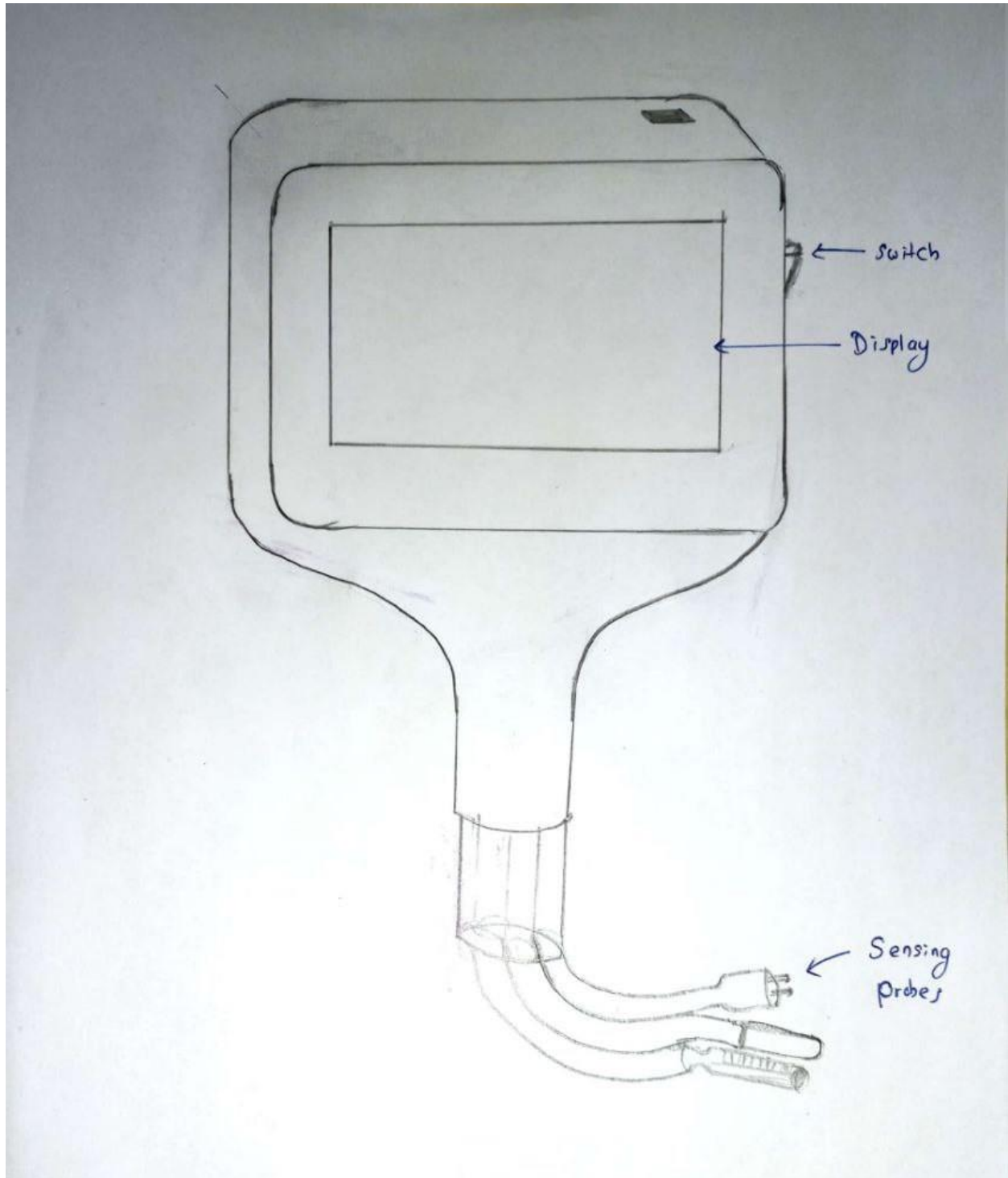
Index No.	Name
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This assignment is submitted as a partial fulfillment of the module EN2160 – Electronic Design & Realization

# Design Driven Innovation

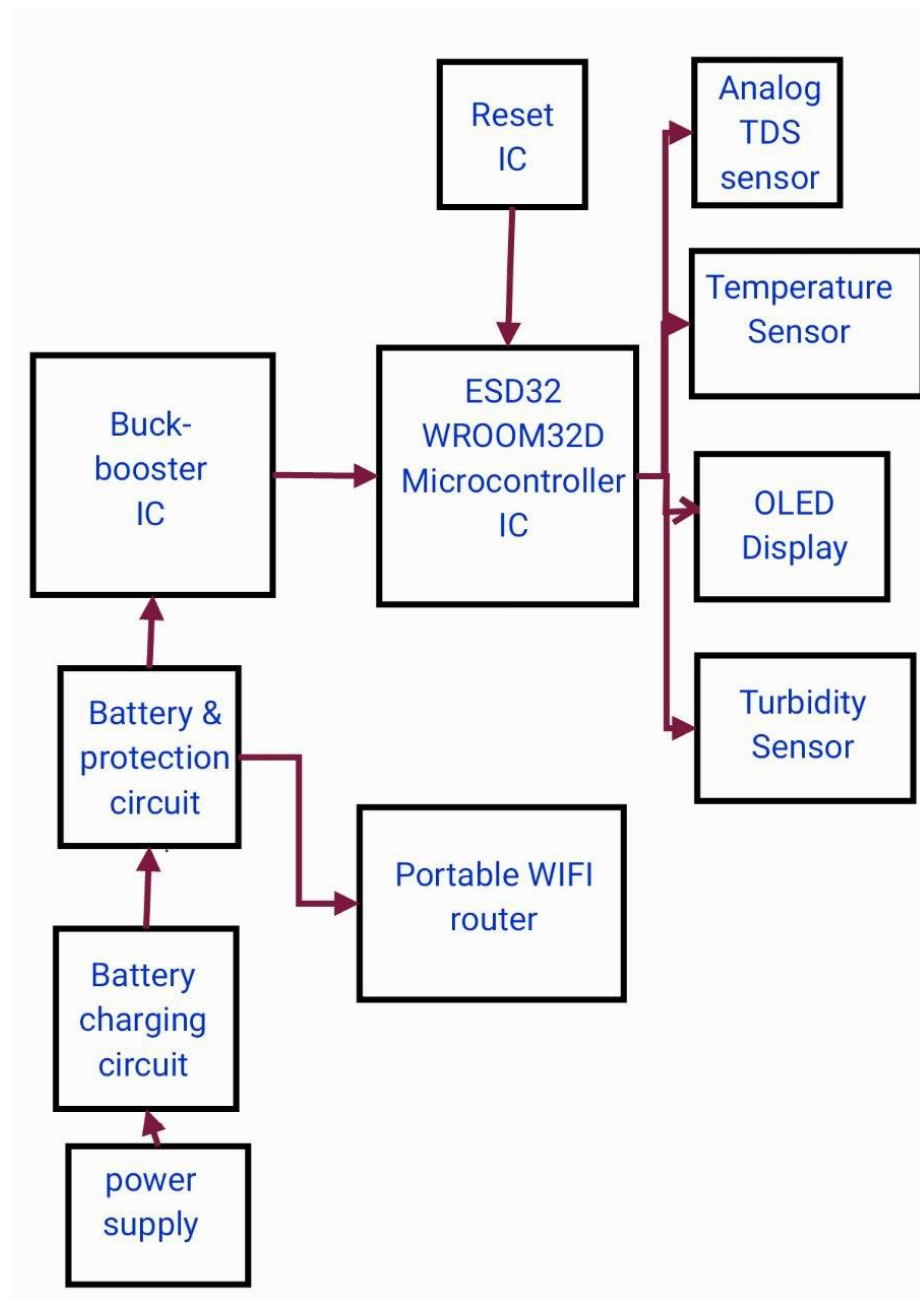
## Design 01

### Sketch



In this sketch, it is added a new shape which is more looks like an actual measuring device. It only takes space from the enclosure to place a small PCB and the display. To male the device as shown in this device ,it is needed to transform all the components into SMD components and make the PCB way too smaller. Probes of sensors are coming out through some kind of a tube

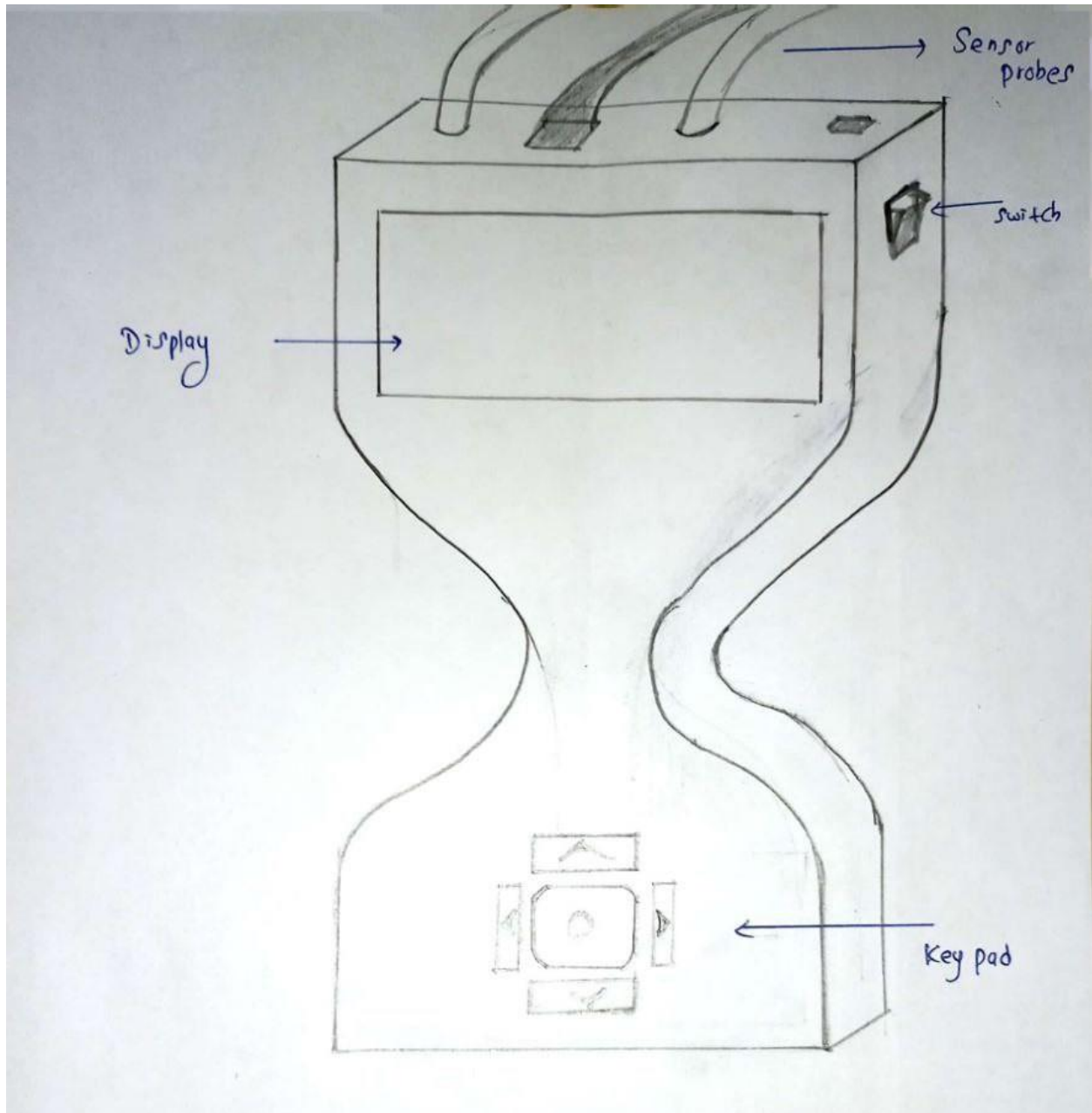
## Block Diagram



In this block diagram it is used a small portable router in built with the PCB rather than using an outside Wi-Fi device. Also added a turbidity sensor to take more data from the sample.

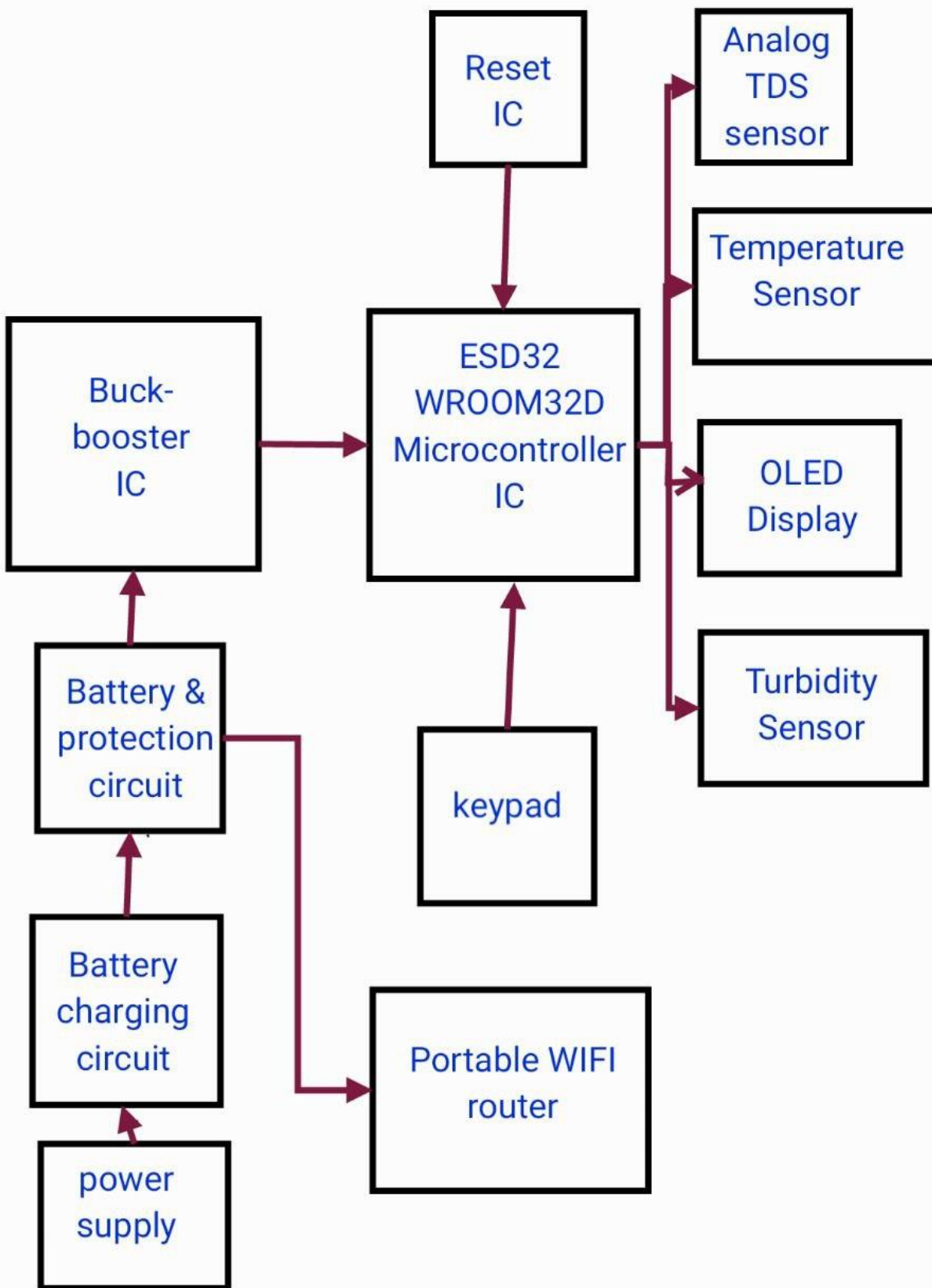
## Design 02

### Sketch



In here design came up with a handier way to grab easily for users. Also it is added a key board to scroll between values in the Display.

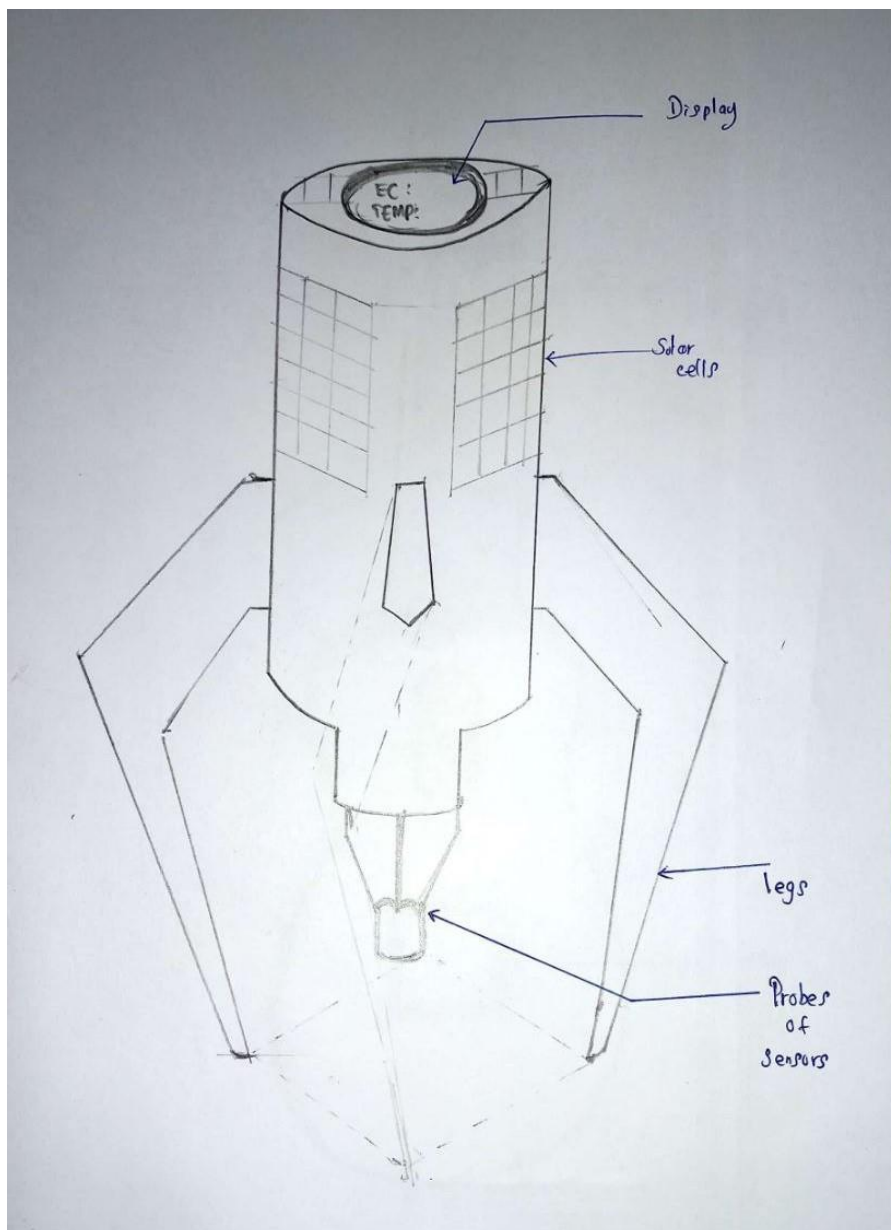
### Block Diagram



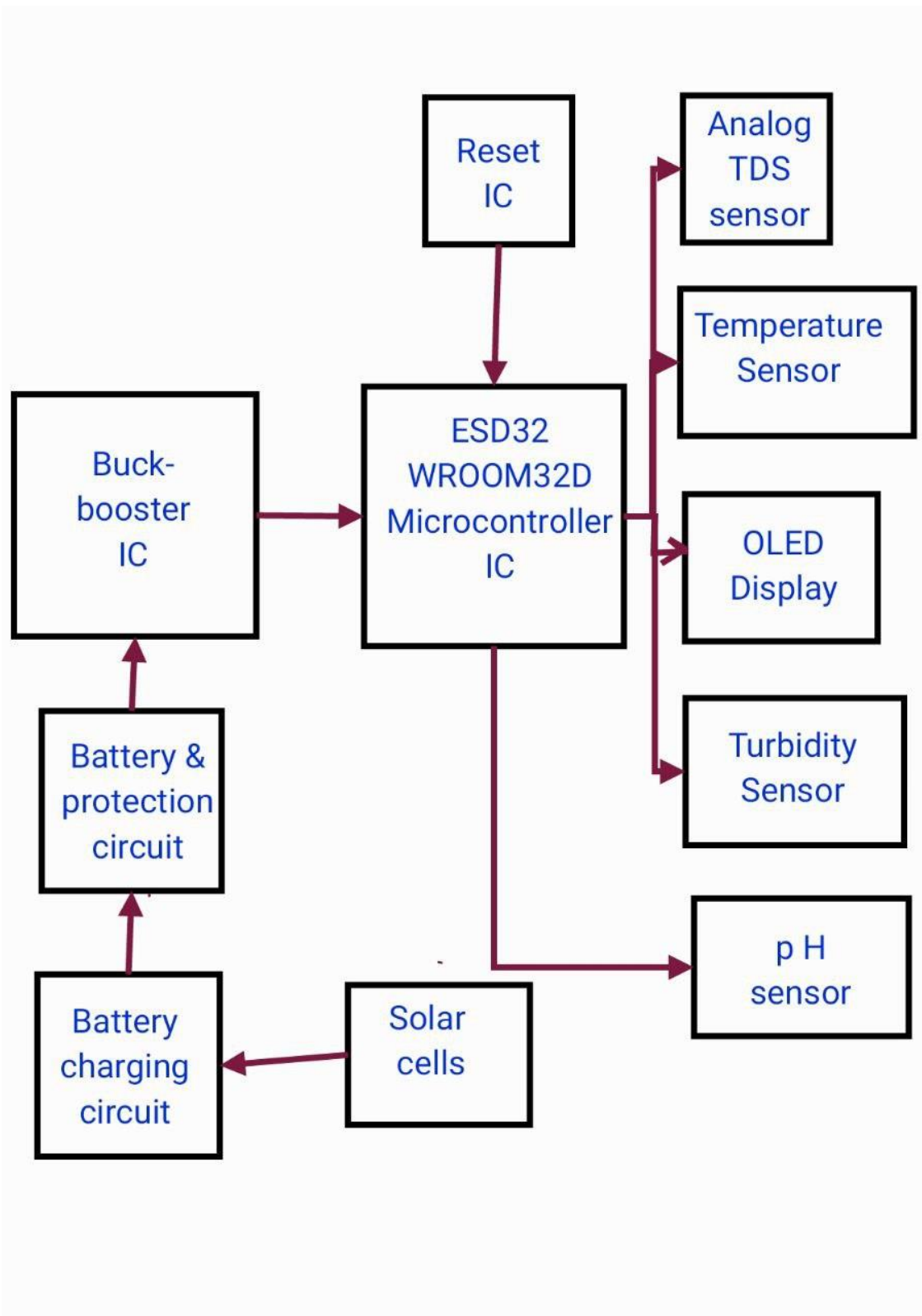
In this block diagram it is used a small portable router in built with the PCB rather than using an outside Wi-Fi device. Also added a turbidity sensor to take more data from the sample. Also added a keyboard to make user more interactive with the device and give a better view of the output

Above two designs are more into the laboratory level and designed to use for such purposes. But the 3<sup>rd</sup> one is for use outside of the laboratories such as unrecognized water resources. So that it comes with some more supporting legs and solar panels. This will help to identify the quality of water resources before use them for public usage.

## Design 03



## Block diagram

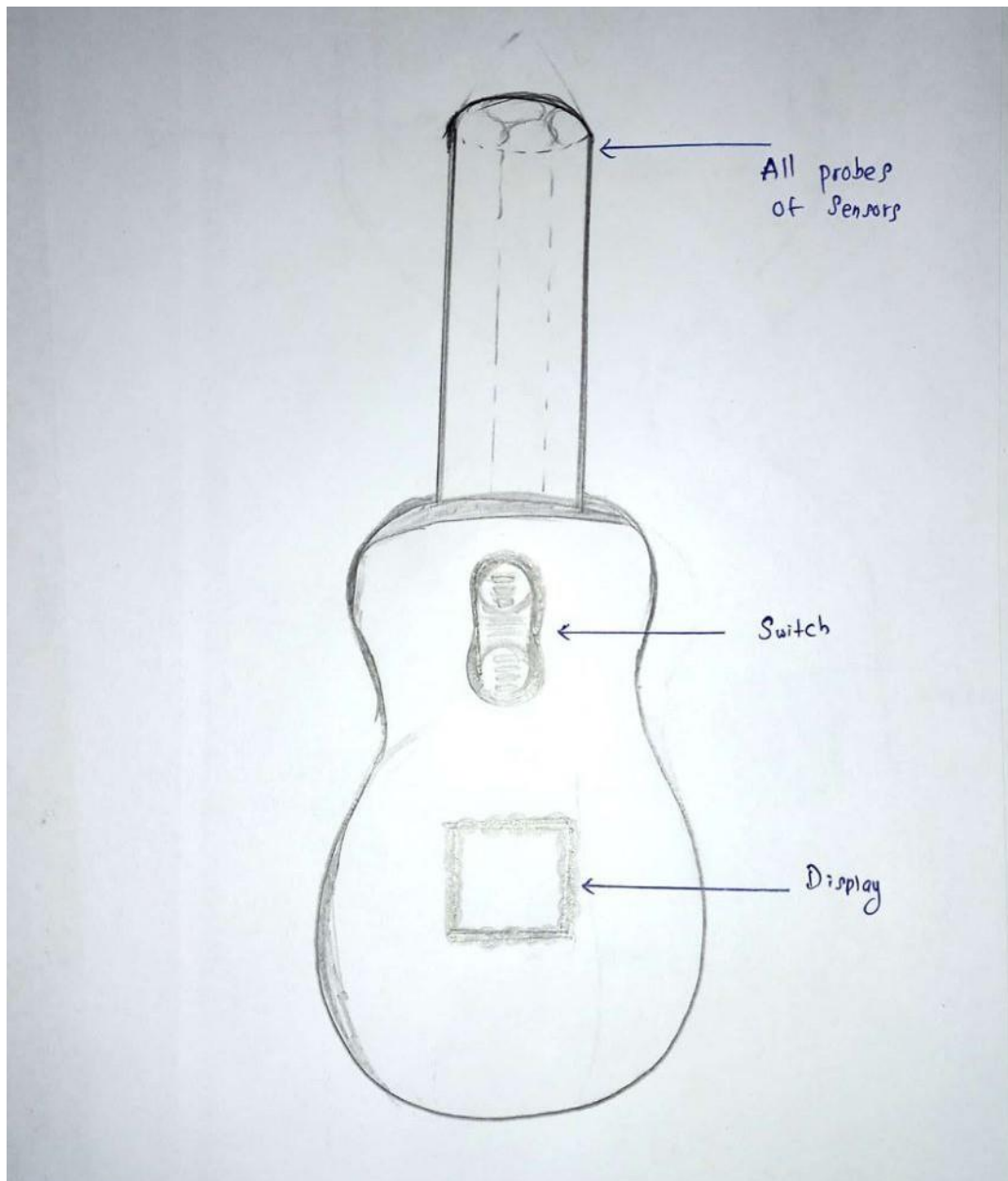




For this block diagram, solar cells are added additionally. It is decided to do communication using Bluetooth. Also added pH sensor to measure that because we don't know the combination of compounds of the soil or water around that area.

## User Centered Design

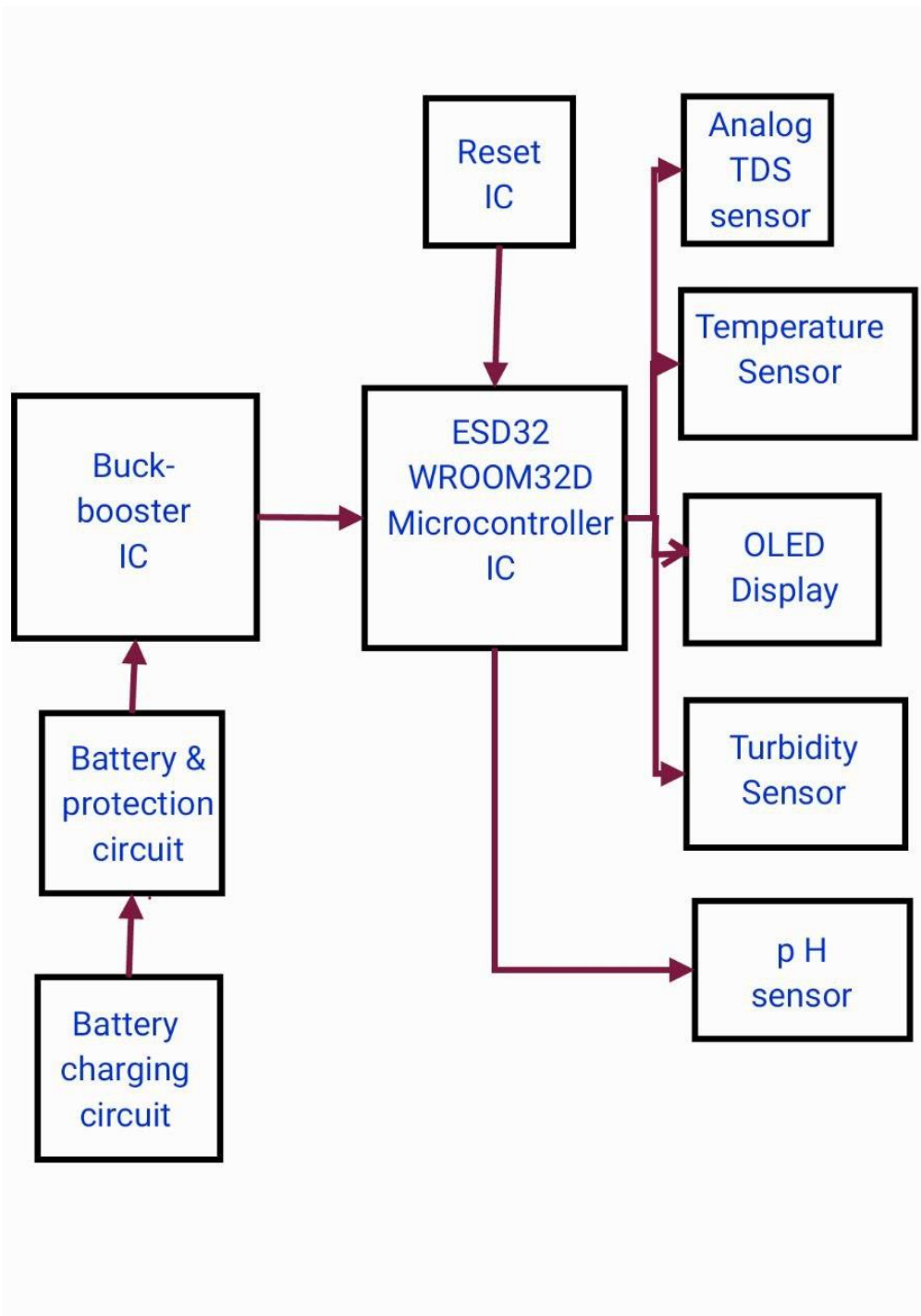
### Sketch





According to the above design it is more easy to use as a domestic device. For travelers and camping people can use this data easily to check whether the water resources they find while wandering are suitable to use or not. It is more like a small device can be handled easily and it is portable.

## Block diagram



When we consider the schematic, nothing changes but all possible water parameters will be checked through the sensors and data will be gathered in a cloud service using IOT. So it is much simpler. To reduce the design to this size PCB will be upgraded with all SMD components.

Evaluation matrix for Design sketch

	Design 01	Design 02	Design 03	Design 04
<b>Realistic</b>	Design is realistic and can made it in industry level 5	Design is realistic and can made it in industry level 5	Design is realistic and can made it in industry level 5	Design is realistic and can made it in industry level 5
<b>3D printable/designable</b>	Since a cross section can be found for a monotonous design it is printable  5	Since a cross section can be found for a monotonous design it is printable  5	Since a cross section can be found for a monotonous design it is printable. Legs have to be printed as separate parts 3	Since a cross section can be found for a monotonous design it is printable  5
<b>Cost effective</b>	More cost effective than the initial design  4	This is bit expensive because of the area used to insert a keyboard  3	Here cost is relatively high regarding the size and the difference of the usage of raw materials for the enclosure  2	Here the amount of raw materials used is reduced since cost will be lesser but the design is bit complex in order to make it user friendly 5
<b>Raw materials amount used</b>	Average amount 4	More than design 01 3	Relatively higher 2	Very less amount 5
<b>User friendly</b>	Can be used as an laboratory equipment	Can be used as an laboratory equipment	Kind of bulky and a little hard to work with that	Very easy to use. Just like a simple device domestically used (e.g. : gas lighter).Easy to

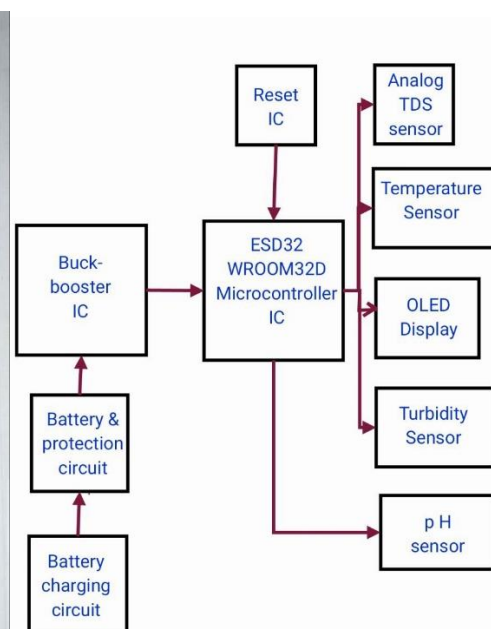
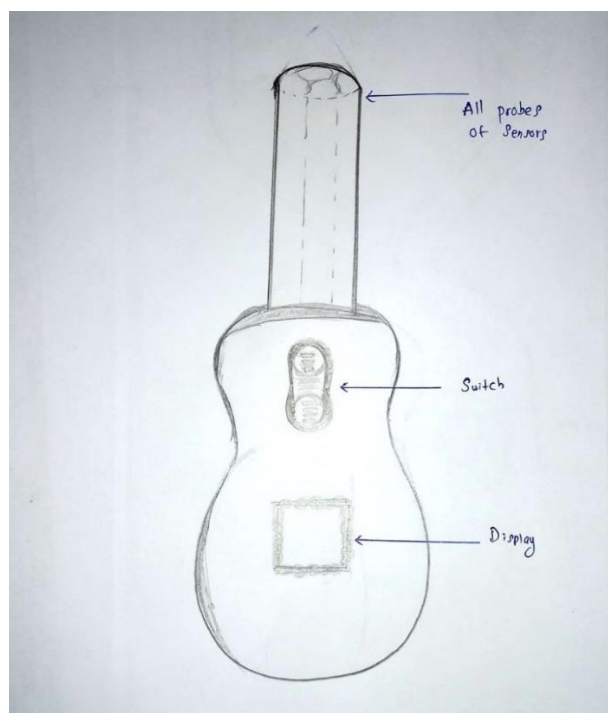
	5	5	3	grab with the modified shape 5
<b>Clumsiness</b>	Compacted all the parts in the enclosure. Only the probes of sensors comes out with wires  3	Compacted all the parts in the enclosure. Only the probes of sensors comes out with wires  3	No wires and probes running around all are compacted to a single probe but all the sensor probes are connected to its terminal. But it is little clumsy with legs  4	Least clumsiness among all these designs. All the sensor probes are connected and coming out from the device as a single solid probe  5
<b>Time take to design</b>	Average time will be taken  5	Average time will be taken  5	Some higher time will be taken based on the size and the shape. 2	Time is also average since, even the size is reduced design complexity has increased 4
	31	29	21	34

#### Evaluation matrix for Block diagrams

	Diagram 01	Diagram 02	Diagram 03	Diagram 04
Size of PCB	Average; much lesser with 100% SMD components 4	Average; much lesser with 100% SMD components 4	Relatively large; much lesser with 100% SMD components 3	Relatively very small 5
cost	Average cost 4	An amount near to 1 <sup>st</sup> diagram 4	Little bit higher 2	Very low 5
Complexity of PCB	Will be almost same as earlier 5	Bit complex 3	Average amount 4	Sometimes that can be Hard to deal with the naked eye 4

Space change of the enclosure	Existing space is reduced but with the new parts, no much space is needed as probes are keep outside 4	Existing space is reduced but with the new parts, no much space is needed as probes are keep outside .small space for the keyboard 4	Little more space needed because of the allocated space or solar cells . good if there is a mechanism to shrink the component 3	Space used is greatly reduced 5
Power usage	Low power 5	Low power 5	Taken through solar cells ; Low 4	Low 5
Manufacturing considerations	Printable to a PCB 5	Printable to a PCB 5	Printable to a PCB. Using multiple PCBs for each session is recommended 4	Printable and complete SMD components are better 5
complexity	Average 5	Average 5	Bit complex 4	Average 5
	32	30	24	34

## Selected design and sketch



## People who contributed for design driven innovation

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200126U	Dharmasri N.T.S.
200310E	K.A.W.T. Kodithuwakku