Multimeter Redesign

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BACKGROUND

- In the professional engineering industry, mainly focused in the electrical side of things there is a demand for high quality multimeters that can function for a variety of tasks, such as, voltage measurement, current measurement, continuity values, and inductance measurement.
- For current multimeters that can do all the desired function above it really is hit or miss in the fact that current multimeters are either accurate but super expensive or it could be very poor quality and have very poor accuracy

A multimeter with great accuracy and decent hardware material 179$ USD

A multimeter of poor accuracy and average build material

Figure 1

Figure 2

PROPOSED SOLUTION

- Our solution or the substitute to this issue is to make a much more cost-effective solution to the expensive multimeter for the DIY homeowner or even some electricians and mechanics who might want a cheaper multi-purpose multimeter without the unnecessary features that may never be used.
- Our goal is to design a cheaper but still maintain a good quality multipurpose multimeter that can let the user know if the power is on

- We also aim to get values that match the expected value that come from the measured area.

- Our protype is shown in figure 3

SYSTEM DESIGN

- **OLED (Screen)**
- For our OLED choice we went with a crystalfontz OLED 128x64 full color screen
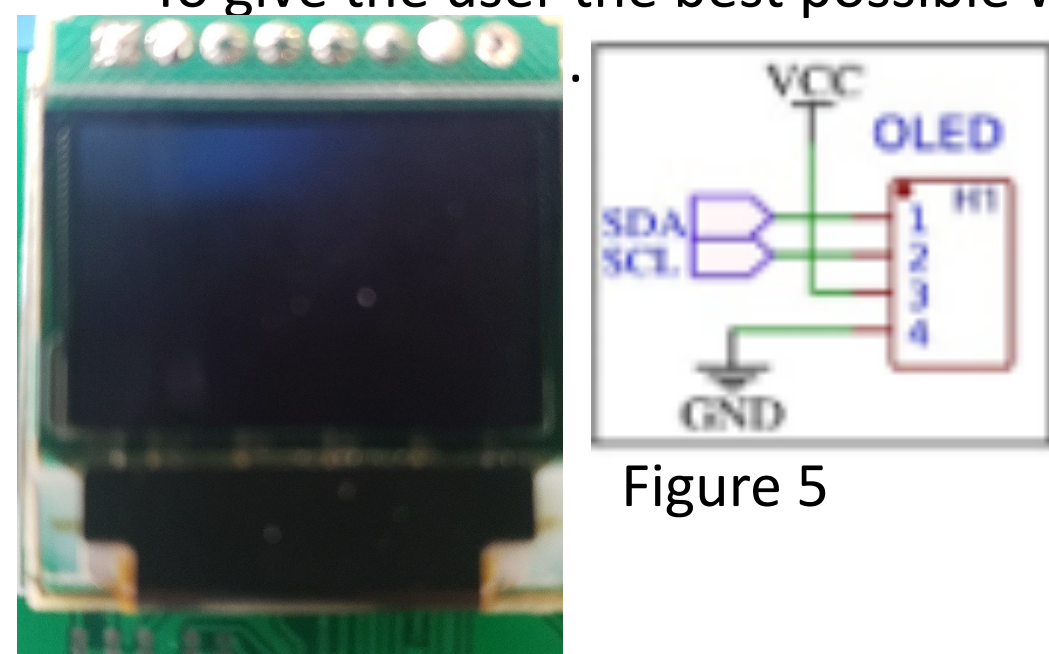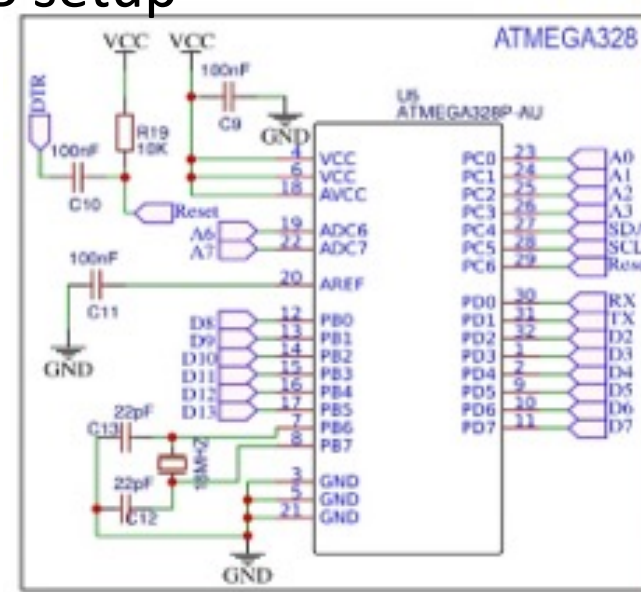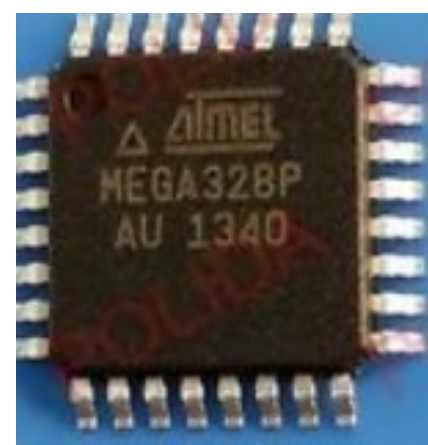- To give the user the best possible way

Figure 4

Figure 5

Multicontroller

- For this project it was suggested that we go with Arduino compatible hardware so we decided on the ATXMEGA328 controller.
- Below are picture of the chip itself and the schematic for the PCB setup

Power Supply

- With our power supply we decided to go with a 3.7V Lipo battery that cn be recharged via the usb type b charging port located on the side of the PCB.
- We figured that rather than having to replace the power supply constantly , it would be better to charge it by plugging it into a wall like most devices today (figure 6)
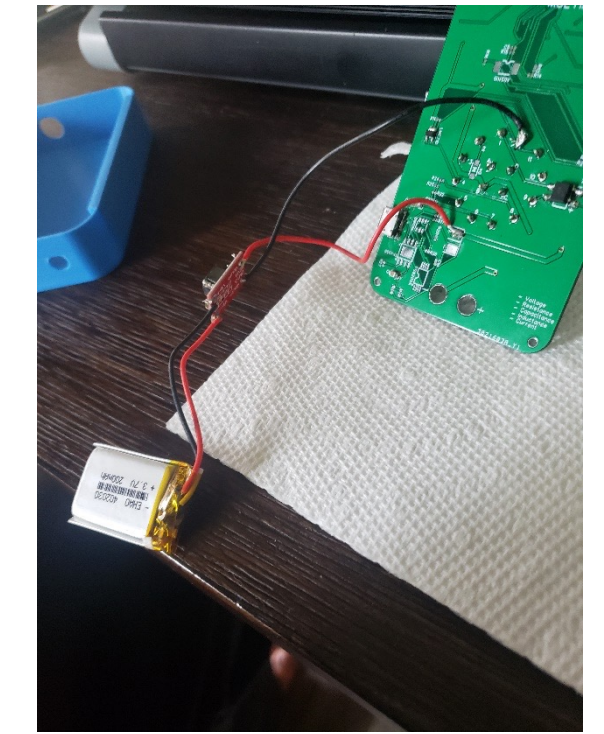
Figure 6

Power Supply (part 2)

- We also planned for the power supply to not be used all the time. So we changed the way the power feeds into the system by converting the DC battery to AC via ACDC chip (see figure 7)
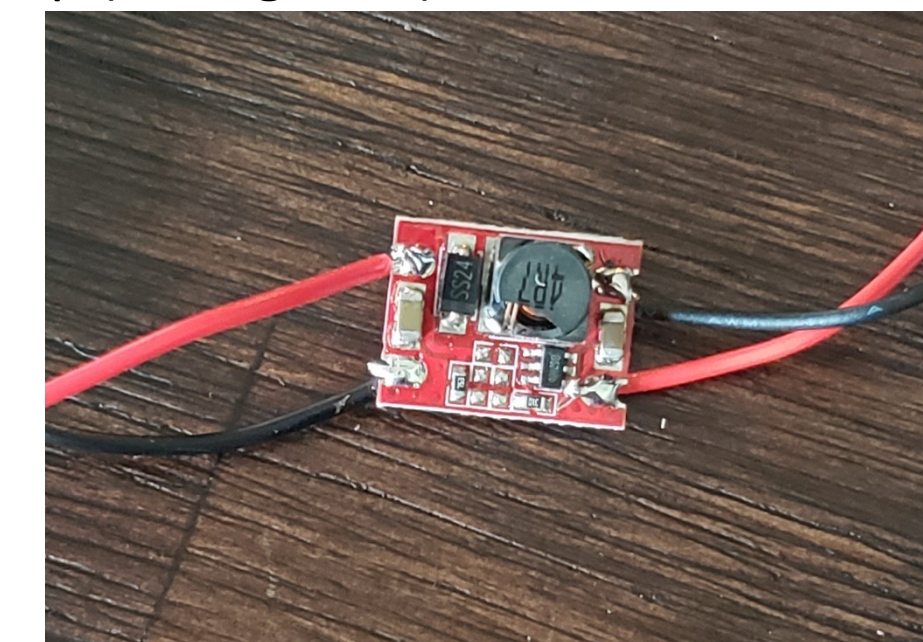

Figure 7

Figure 3

FUTURE DIRECTION

- Explore the possibility of getting instrumentation to further increase accuracy
- Get a bigger battery to allow for even longer run time
- Implement more functions that other possible clientele would want

REFERENCES

Pictures provided by:
https://www.amazon.com/Neiko-40508-Digital-Multimeter/dp/B00066ZZO4/ref=sr_1_8?dchild=1&keywords=multimers&qid=1588351564&sr=8-8

https://www.ebay.com/itm/16500-9-6V-800mAh-EL-6P-Plug-15C-Battery-For-RC-High-Speed-Toys-Car-9115-S912/193263339332?hash=item2cff648744:g:L4gAAOSwMi5d-zEw

https://www.amazon.com/Fluke-115-Compact-True-RMS-Multimeter/

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