

Second Generation Charging Station

Midpoint Review Presentation

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March 12, 2015

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Overview

- **What has been Completed so far**
 - Alternator Mounting System
 - Electric Control System
 - Enclosure
 - Aesthetics
- **Testing Results**
 - Maximum Watts produced so far
 - Number of Devices that can be charged at once
- **What needs to be completed**
 - Design and complete display system
 - Build a new alternator wheel and checklist procedure
 - De-bug and touch-up aesthetics

Project Summary

This year's team was assigned the project of completing and improving last year's design of the 2nd Generation Charging Station. The station must

- Be mobile and therefore lightweight
- Charge the majority of small electronic devices
- Display the data of the power output in an easy to understand manner

Tasks Completed

- Alternator Mounting System has been fully designed and implemented
- Electric control system has been completed and is fully operational
- Enclosure has been designed, built, and installed onto the charging station
- The charging station has been painted and NAU decal stickers have been added

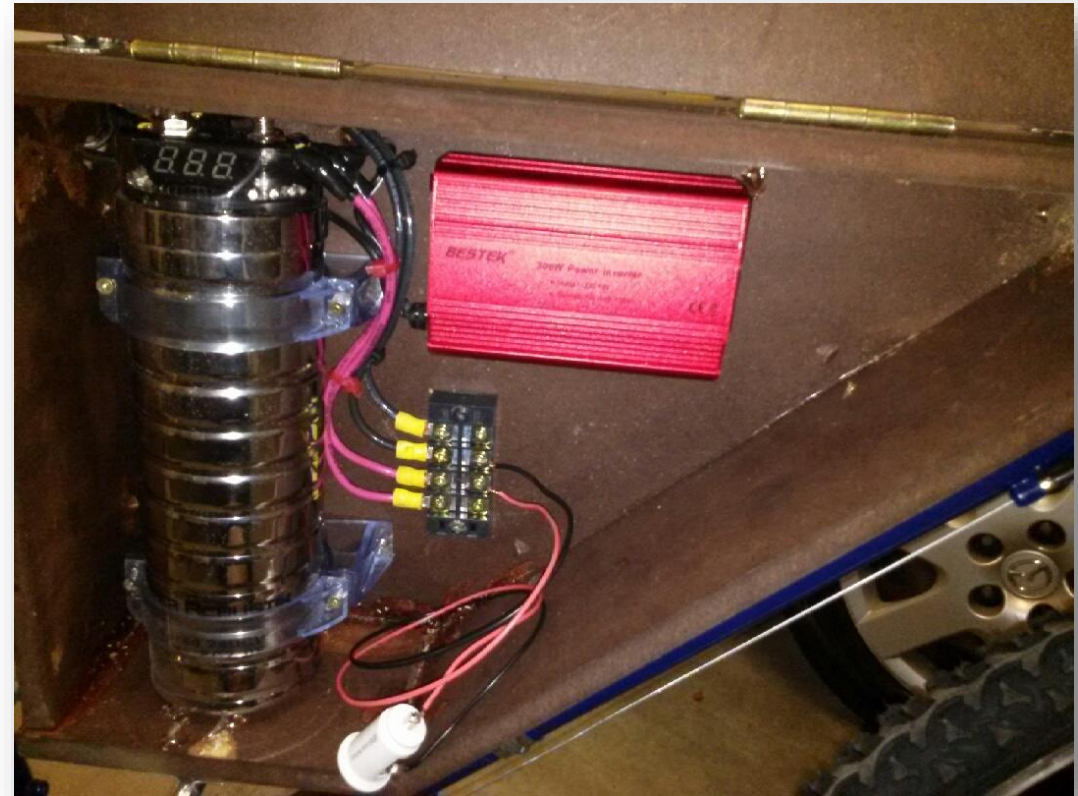
Alternator Mounting System

- System utilizes the mounting bracket already attached to the bike stand
- Can easily disengage the alternator from the rear wheel by loosening a wing nut
- Adjustments to the system can easily be made to make the alternator closer to the bike wheel



Electric Control System

- Capacitor has been installed and is fully functional
- Inverter has been installed and is undergoing testing
- A terminal block has been added for additional outputs



Enclosure

- Enclosure has been completely built and safely houses all electrical components
- It has been coated with varnish for protective and aesthetic purposes
- A lock has been installed on the bottom to prevent the door from accidentally opening



Aesthetics of the Project

- The bike has been painted navy blue and the bike stand painted golden yellow (NAU colors)
- Entire system has been painted in clear coat for additional protection
- NAU decals have been installed all around the bike to make the bike look more pleasing



Testing Results

- Maximum power produced from the alternator was calculated based off of voltage and amperage readings using the equation shown below

$$V(\text{Voltage}) * A(\text{Current}) = W(\text{Power})$$



X



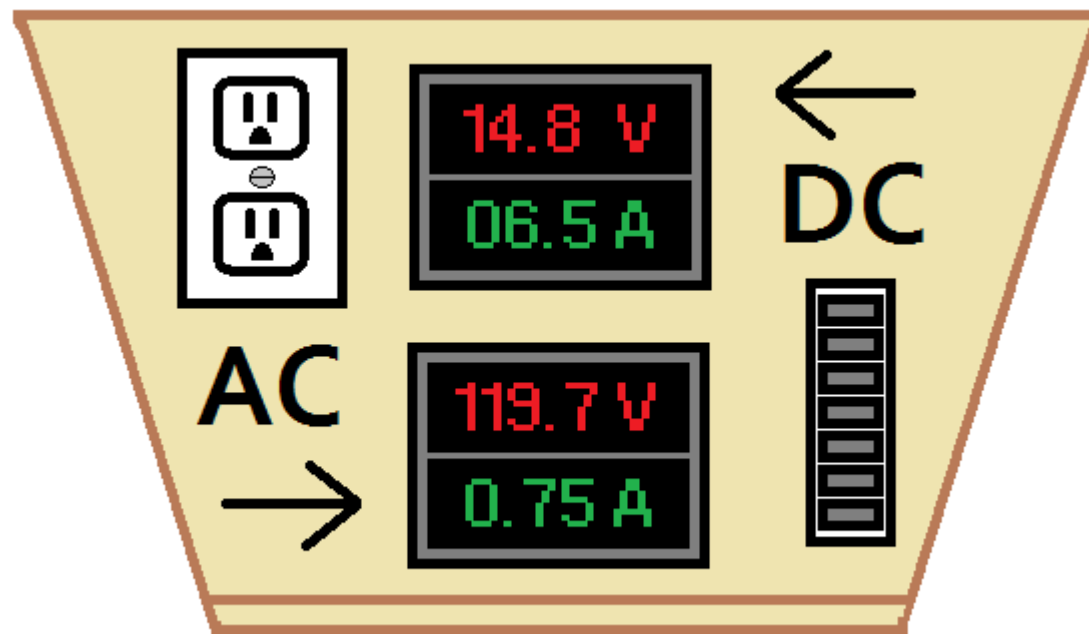
= 136.5W

What Needs to be Completed

- The Display System needs to be designed, built, and installed onto the bike
- Build a new alternator wheel and create a checklist procedure to prevent premature degradation of the alternator wheel
- De-bug any remaining issues and complete the rest of the aesthetics on the bike

New Display Screen Design Concept

- The new design would incorporate voltage/amp displays that can be easily purchased on Amazon and are inexpensive
- The design will be much simpler than the previous design which will increase durability as well as accuracy of the measurements



Build Alternator Wheel and Checklist

- Build new alternator wheel to replace the worn out wheel
- Create procedures checklist that will prevent slipping of the rear wheel and thus prevent premature degradation



De-Bug and Touch Up Aesthetics

- Additional testing needs to be done to increase reliability of the system
- Paint touch ups will be done to both the bike frame, bike stand, and enclosures to increase aesthetic appeal
- Additional tasks will be carried out to increase reliability of the entire system
- Add on safety components to the system

In Conclusion

- The Alternator Mounting System, Electric Control System, Enclosure, and Aesthetics have completed or are near completion
- Testing showed that plenty of power was easily producible from the station
- Display System, new alternator wheel, de-bugging, and touch up aesthetics need to be completed in the near future

Questions or Comments

