

EE 491: Wireless Recharging System

Client: National Carwash Solutions

**Weekly Report #10
11/16/18 - 11/30/18**

Team:

**Benjamin Gisler
Miguel Hennemann
Kyle Henricksen
Doruk Er**

Faculty Advisor: Craig Rupp

Weekly Summary:

With a more complete prototype made, we were able to do more realistic testings of our creations operations. Additionally, our other prototype for power management was turning into a more refined piece. Our team gave advice on how we could better the power management system and its applicability to our project. We also discussed what we would plan on doing for next semester as well as plans for the final presentation.

Past Week Accomplishments:

Name	Accomplishments
Miguel Hennemann	Designed our resonator circuit by calculating necessary capacitor values and connecting them to the coils. We now have a transmitter and a receiver pair that is capable of transmitting wireless power efficiently around 200kHz.
Benjamin Gisler	Able to get stable voltages at the gates of our H-bridge transistors. We determined the resistance values needed to drive the gates was 10 ohms. Additionally, the H-bridge was tested completely and performed correctly at a frequency of 20kHz.
Kyle Henricksen	Tested Code, it works, but I'm getting weird readings from the arduino, such as negative voltage, need to consult team.
Doruk Er	Calculated and evaluated the results of the busiest day load estimation and the battery pack set up.

Pending Issues:

Name	Issues
Miguel Hennemann	Our H-Bridge circuit works perfectly when no power is supplied to the VDD pins on the MOSFETs. Through testing on the

	oscilloscope, it is evident that a high frequency gate voltage is applied at the gates. As a result, we know that the MOSFETs are switching on and off. We will need to perform more tests on the circuit to understand exactly what's going on. I am in talks right now with the manufacturer of the IC to determine potential paths we could take to solve the issue.
Benjamin Gisler	Putting more power through the H-Bridge would be a better test of our prototype. However, with high power comes a greater risk of overheating and damaging components, so we plan to tread lightly when increasing power throughput.
Kyle Henricksen	Scale of test was too small, doesn't draw enough energy for reasonable testing intervals (I.E. 27 hour wait to drain battery), seeking out more powerful loads for the battery to have more regular test intervals.
Doruk Er	Need to decide whether to get a pre-build battery pack protection and charging unit or to build one ourselves, and to choose parts accordingly. Start evaluating the voltage rectification/amplification block circuits.

Individual Contributions:

<u>Name</u>	<u>Individual Contributions</u>	<u>Hours this week</u>	<u>Hours Cumulative</u>
Miguel Hennemann	Tested H-bridge circuit extensively with new resistor values. Confirmed that the MOSFETs are switching on and off appropriately. Spent	10	63

	even more time trying to understand why the circuit doesn't work as intended when a voltage is applied to the VDD pins at the top MOSFETs.		
Benamin Gisler	Measured, tested, and confirmed the operation of our H-bridge and its controller via a test resistor load. This was observed using a scope.	6	54
Kyle Henricksen	Rectified the incorrect output errors from the circuit, now reading the proper values, turns out it was power from the arduino being fed to transistors.	5	31
Doruk Er	Calculated battery pack capacity again with the help of the busiest day load estimation.	6	56

Plans for the Upcoming semester/week:

Name	Plans
Miguel Hennemann	Early next semester we will have to understand why our circuit is not working as expected. I am communicating with the manufacturer of the IC to determine if they can give us advice on solving the problem. The end goal is to design a set of PCBs. One for the transmitter and one for the receiver.

Benjamin Gisler	Increasing power output and getting higher rated components to handle the current we plan to use. So ordering heat sinks and those components will be a task to be completed as soon as possible
Kyle Henricksen	Get a stronger load so I can test the code more than once a day, possibly using a small DC motor.
Doruk Er	Decide between getting a pre-built battery protection and charging unit and building one. Sketch a diagram for the battery pack and the protection/charging unit with the suitable component options.

Summary of Weekly Advisor Meeting:

Unfortunately, our advisor was busy so we were not able to have an advisor meeting this week. We did communicate with him however, and let him know of our progress we made this week (which can be read in the statements above).

