

EE 491: Wireless Recharging System

Client: National Carwash Solutions

**Weekly Report #5
10/15/18 - 10/22/18**

Team:

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

Faculty Advisor: Craig Rupp

Weekly Summary:

This week we did extensive research pertaining to what exact components go into the design of our prototype, aside from the transmitter and receiver coils. We got the coils ordered from a reputable coil manufacturer and are awaiting their arrival for testing within the next week or so.

Past Week Accomplishments:

Name	Accomplishments
Miguel Hennemann	Last week I talked with faculty from the Magnetics Research Group to confirm whether we can actually transfer 24W wirelessly. Researched components that would go into the design of the prototype we are trying to design.
Benjamin Gisler	Created a basic design plan of what we were going to make both with determined and TBD components.
Kyle Henricksen	Refined the Pseudo-code to account for load and how that might affect the drain rate on the multiple batteries. Logic is as follows Take measurement of current battery level during charge cycle. After doing this 4 times, find average change between cycles, store rate, if the rate of depletion increases dramatically, depending on how much the depletion rate changes to mitigate that, modulate the power to the LEDs to some degree to make up the power differential.
Doruk Er	Decided on using a pre-built frequency controller, helped choosing the coils. Modified our initial test plan for the H-bridge and the coils.

Pending Issues:

Name	Issues
Miguel Hennemann	Currently, we are waiting on the coils that I ordered. We are not sure how they will perform or how reliable they are. Based on the datasheets of the coils, they seem very promising. However we will have to wait for them to arrive so we can test them in the lab under a variety of conditions.
Benjamin Gisler	Since most of our components are going to be in transit for a week or more, there is going to be a gap in physical circuitry work we can do. However, we should still be able to further plan out our circuit from our research and datasheets in the meantime.
Kyle Henricksen	Group decided to use singular battery pack solution, so I'll need to go back to the drawing board for the power management system. Was unable to figure out how to modulate the power flow using code for the LEDs.
Doruk Er	Check whether the battery pack design needs modification with the changed components' capabilities. Research suitable rectifying circuit designs/ideas to decide on feasibility of creating one on our own.

Individual Contributions:

<u>Name</u>	<u>Individual Contributions</u>	<u>Hours this week</u>	<u>Hours Cumulative</u>
Miguel Hennemann	Found a variety of possible components to use in our design. Decided on purchasing the 555 Timer IC	6	26

	to generate high frequency voltage signal to drive MOSFET gates. Also ordered the transmitter and receiver coils from Würth Electronics. The order should be coming from Germany, so it could take some time to arrive.		
Benamin Gisler	Found some of the circuits we may want to order and updated our design with them. Prepared breadboard and other electronics for new circuits.	6	24.5
Kyle Henricksen	Made a program based on previous algorithmic design, but that's going to need to get refactored.	5	21
Doruk Er	Assisted in modifying the circuit design in accordance with the changed components.	5.5	26.5

Individual plans for next week:

Name	Plans
Miguel Hennemann	While we are waiting for the coils to arrive, I will keep looking into what is needed for our system. I have been digging through many IEEE articles and references in order to get a broad perspective into how a high power wireless charger is designed. So far, based on our understanding we need 4 MOSFETs, resistors, the 555 Timer IC, and the coils for our prototype. Our prototype is intended to be a proof of concept that we can in fact generate a

	high power and high frequency signal which can then be wireless transferred.
Benjamin Gisler	Confirm the parts we want to get and in the event parts are not ordered or are ordered but don't come in time, I will further investigate the limitations, applications, and applicability of what we decide on, so i can be ready for prototype assembly.
Kyle Henricksen	Work on the Design Document, Refactor Code. Help others understand web design.
Doruk Er	Find alternative sources of components to avoid extra delays in shipment. Seek suitable power generation & amplification possibilities for testing. Start initial research on power rectification & amplification components for our system.

Summary of Weekly Advisor Meeting:

We talked to Craig about ordering the coils from Wurth Electronics. He expressed to us that this is a trustworthy company. We discussed that the coils should be promising based on datasheets and conversations with their representatives. Craig also talked to us about creating a test plan for when we decide to build our prototype.

