EE / CprE / SE 491 – sdmay20-10
Power Scraping Module
Week 3 Report
10/5/2019 -10/13/2019
Client: Honeywell FM&T
Faculty Advisor: Gary Tuttle

Team Members/Role:

Jordan Fox — Chief Engineer
Xiangyu Cao — Design Engineer
Andesen Ande — Design Engineer
Ahmed Salem — Test Engineer
Ben Yoko — Test Engineer
Shahzaib Shahid — *Team Leader*

Weekly Summary

This week we created a schematic for our system and explored multiple designs. For each design we assessed the drawbacks and feasibility. During the design review process we browsed components for our circuit. This was done to get better insight into the quality of each design. In addition we documented our past work and created a timeline of anticipated deadlines for each technical task.

Past Week Accomplishments

Source Parts:

- Goal was to find components for our design to build an initial prototype as well as get an idea of which design is supported by pre-existing parts. Our approach of having a primary design with the intent of building and testing different designs. This is made possible due to the low cost of each design.
- Supercapacitor (Digi-Key):
    - The supercapacitor will be used to store the charge of our system. This component is a constant in every design. .
    - Important characteristics provided by datasheet: Voltage rating is 5.5 V DC with capacitance of 1F.

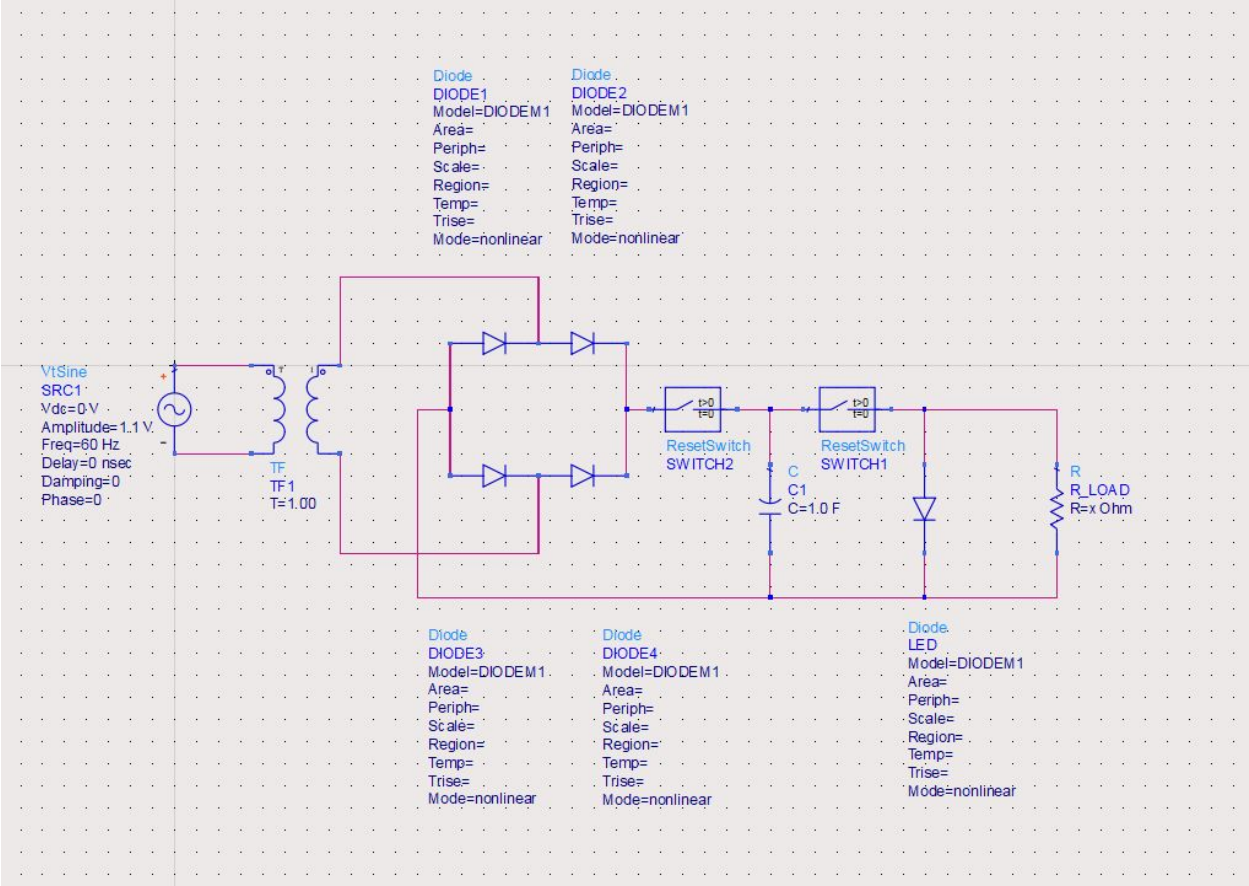
- Schottky Diode (Digi-Key):
    - For our bridge rectifier configuration we wanted to find a practical diode with the smallest forward voltage drop. This is important in our system given that the input has to be 1.1 V or lower.
    - Important characteristics provided by datasheet: Forward Voltage drop is approximately 31 mV.
- DC-DC Boost Converter (Texas Instruments):
    - A DC-DC boost converter steps up the voltage which in our case needs to be stepped up to at least 3V.
    - Important characteristics provided by datasheet: Fixed and adjustable output voltages of 1.8 to 5.5 V, and recommended input voltage range of .3-5.5 V.

Timeline:

- Our client requested an excel document that outlines the work we have done and plan on doing. This document will serve as a reference when tracking the group's progress.

Dates	Week	Tasks to Accomplish
26th to 31st August	1	Project Descriptions and Senior Design Intro, Team Formations
2nd to 7th September	2	Reflection Team Expectation and Setting Roles, Project Assigned
9th to 13th September	3	Weekly Status Report 1, Meeting with Faculty and Design Document Formation
16th to 20th September	4	Design Document, Project Description and Ligthining Talk for Discussion on the Project, Weekly Status Report 2
23rd to 27th September	5	Pre-liminary Design Schematic, Weekly Status Report 3, Design Document Expansion
30th Sep to 4th October	6	Look For Parts, Confirm and Discuss Design with Faculty and Client
7th to 11th October	7	Contact Client, Discuss Design, Look For more Parts,Confirm Budget, Confirm Timeline and Schedule
14th to 18th October	8	Order Parts, Build a Complete Schematic after discussion with Faculty on design options, Contact Facuty
21st to 25th October	9	Weekly Status Report 4, Design Document Version 2 (near completion), Contact Client
28th Oct to 1 Nov	10	Get Parts, Build Prototype on Breadboards, Weekly Status Report 5, Contact Faculty
4th Nov to 8th Nov	11	Build Prototype on Breadboards, Design Document V3, Contact Client
11th Nov to 15th Nov	12	Testing of the Breadboard Prototype, Weekly Status Report 6. Contact Faculty
18th Nov to 29th Nov	13	Check For Issues, Testing For Improvments, Design Efficiency Check. Design Improvments
2nd Dec to 6th Dec	14	Final Prototype Design and Testing. Final Design Documnet
9th to 13th Dec	15	Final Presentation for the Design.

System Schematic:



- Above is a schematic of our primary design. The system takes in an AC input and utilizes a transformer to step the voltage up to above 3V. This is to account for the voltage loss across the next stage. This stage is comprised of schottkey diodes that are used to rectify the AC voltage from the secondary side of the transformer. The switches shown are meant to separate the charge storing stage (comprised of supercapacitor) and the load stage. We plan to use transistors as switches so that the system can remain independent.

Individual Contributions

Name	**Hours this week**	**Hours Cumulative**
Jordan Fox	6.5	19
Xiangyu Cao	6.5	19
Andesen Ande	6.5	18.5
Ahmed Salem	6.5	19
Ben Yoko	6.5	18.5
Shahzaib Shahid	6.5	18.5

*Reported times are rough estimates.

Plans for the upcoming week

1. Our first objective for the upcoming week is to meet with our faculty adviser to discuss our schematic and discuss any past week obstacles.- All team members
2. After the faculty advisor meeting we will finalize our design and order parts. - All team members
3. Find a transformer that meets our design needs and order. - All team members