sdmay20-39: High Speed Magnetic Field Generator

Week 11 Report
March 13 – April 2

Team Members

Jason Cheng — *Technology Lead*
Ben Colson — *Test Lead*
Zach Higgs — *Project Lead*
Harel Cohen — *Hardware Lead*
Craig Philipp — *Communications Lead*

Weekly Summary

Due to spring break and the coronavirus, we are starting to run into roadblocks with progress. Turns out lack of access to labs and materials will severely limit progress of a completely hardware-based project. As a result, this past week has been mainly spent scrambling to find ways we can salvage the project and evaluate what we can do versus what we have already done.

Past Week Accomplishments

The big thing we did this week was to figure out exactly where we sat in our testing and simulation and figure out what goals and criterion we had already accomplished for our project. As a result, we feel that we have met the main goals for this project with our second revision based on testing and simulation. However, it seems increasingly likely we will not be able to get a second revision out, and though we have the parts for another revision of the board, we do not have the PCB itself quite yet, as COVID-19 had stopped the shipment of boards from our main supplier. As a result, we are sitting in a position where we have the final design of our second revision and have the parts locked in Durham, and we need to see what we can do. After a lengthy planning meeting, we have decided our best course of action is to try and salvage this second revision and convert it into our final by removing the testing additions and trying to get it before the end of the year. While not ideal, as this version of the circuit is untested, these are not ideal circumstances, so we feel it is in our best interests to give it a shot, as even if it fails, we can reevaluate and still test with this board.

Our timeline is completely shot. We need to reevaluate what we can do with the project, and what has to be left in simulation. Most of this past week that was not spent in meetings was spent refining our p-spice circuit so that we have a testbed to simulate our oscillations on, since we know that's our main problem, and having isolated the components, we know roughly about what we need from our currently simulated parts. This means we will have more of a focus on theoretical circuit impacts, and beyond our second revision, can write up guidelines for further progress, though for obvious reasons, there's not going to be an easy way to test our theories. Beyond this, after settling down what we expect from a group going forward, and what we can present to our advisor. Obviously, he has had his own problems with this transition, so after we flesh out what we can deliver, we need to evaluate steps going forward with him.

Pending Issues

- Refine second revision, explore ordering second revision as final board w/ much increased lead time
- Evaluate progress up to this point, and plan our future goals accordingly
- Plan for virtual IRP and presentations
- Inform our advisor of what we plan to do, and what can realistically be accomplished in this time
- Start writing up very through documentation, as it seems we'll have to sluff off some work onto the next group in terms of hardware and testing verification

Individual Contributions

Team Member	Contribution	Bi-Weekly Hours	Total Hours
Jason Cheng	Organized meetings and tried to figure out exactly what the hell to do with the COVID situation and the final project as a whole. Sourced a supplier for PCBs that is willing to ship to USA from China at a price we can afford. Started documentation over our projects and tried to mark out exactly what we had done, and what is realistic to accomplish without labs.	12	151
Ben Colson	Further researched parts and MOSFETs to see what we can bring from testing back into simulation. Helped with meetings to figure out what we can do and where we are at with testing. Figured out what we can do with p-spice circuit with individual components to see if we can isolate testing individual parts and individual signals to better understand where the signal isolations are coming from.	10	138
Zach Higgs	During this time, I have been working on simulating the response of our circuit with P-spice and ADC. It is hard to test anything because we do not have access to the lab where our project materials and tools are located. This is a huge set back, but we are making the best of things. I have also been researching ways to reduce the oscillations in our circuit. Using the simulation tools, I have played with different ways for reducing the oscillations and have been semi successful in simulation, but it would be great to test this in real life soon! We will see.	10	152
Harel Cohen	These past few weeks have not been the easiest to handle. With the spread of the Coronavirus, it became hard working with the team and on the project from a distance. But instead of working on the project itself, which required a more hands-on approach, we started thinking about how we would present the solution we have at hand. We began talks about the final presentations and the	10	146

	"cardboard presentation" design we wanted to showcase.		
Craig Philipp	Since we could not go into the lab in durham, I worked on things that were available off campus. I worked on researching/shopping for new parts to see if there was one with more desirable characteristics that we might have missed before. I also helped beginning the design of our poster. I am also looking into some possible free trial software we can use to make our poster design look more professional. I helped consolidate our information from trial testing so that we can access it more easily when creating our final presentation.	12	151

Plans for Upcoming Reporting Period

- Reach out to Wei-Shen and Mani with plans moving forward
- Flesh out testing circuit on ADC and P-SPICE to continue progress
- See if we can source a PCB and order (if priced correctly, and useful to project)
- Plan out rest of semester as best we can
- Start presentations and documentations