

Fast, Compact, High Strength Magnetic Pulse Generator

EE 492 Weekly Report

May 15-30

Week 7

Advisors: Mani Mina, John Pritchard, Robert Bouda
Client: High Speed Systems Engineering Lab
Members: Team Leader – Adam Kaas
Team Webmaster – Gregory Fontana, Meiyong Himmtann
Team Communication Leader – Brittany Duffy
Team Key Concept Holder – Megan Sharp, Brandon Dixon
Team Commissioner – Alain Ndoutoume
Website: <http://may1530.ece.iastate.edu>

Weekly Summary

Early on in this week, our team discovered the issue with our prototype. The cables connecting our input to the circuit board were faulty. Once we inserted different cables and fixed a “cold solder” issue, the circuit’s output performed as expected. Now that we have overcome this roadblock, we need to push this project forward as quickly as possible. Various coils were made with the opportunity to test inductance levels in our circuit. Our focus for the end of this week and moving into next week will be discovering which coil is most appropriate to meet design specifications.

Meeting Notes

2/22 Testing with John

Duration: 3.5 hours **Members Present:** Adam, Alain, Brandon, Brittany, Greg, Megan

Purpose and Goals: Find a way to get our circuit to perform correctly.

Achievements:

Discovered we had bad cables which is why our circuit wasn’t performing. Discovered by soldering leads to the SMA connectors and using a breadboard to perform the testing.

Obtained data to create a graph that shows circuit performance for V_{gs} values from 3V-5V in 0.5V increments.

Destroyed one coil by increasing the duty cycle way too high while attempting to figure out when our circuit starts to die off.

Discovered there was a “cold solder” situation on our diode that preventing the diode from connecting to the drain of the MOSFET which is why our circuit wasn’t performing as intended. We jumped a wire from the MOSFET drain to the diode to fix this problem.

New parts were found for our board that will be easier to solder and more uniform plus an appropriate package size.

2/25 Meeting with John

Duration: 1.75 hours **Members Present:** Adam, Greg, Megan

Purpose and Goals: Make new coils, measure inductance of coils, gain understanding of optics.

Achievements: Coils were created and inductance was measured. Greg and Megan discussed optics with John.

2/25 Meeting with John

Duration: 0.5 hrs **Members Present:** Brandon

Purpose and Goals: Create a board including the new parts, discuss challenges of a professional PCB.

Achievements: Began creating a new PCB, got a barrel jack for our DC input.

2/26 Core Team Meeting

Duration: 1 hr **Members Present:** All Members

Purpose and Goals: Give all members an update on the large progress made on our board this week.

Achievements: Discussion was brought up if our prototype was up to specs. We are aiming for a faster rise time meaning a lower inductance value is needed for the coil. We will be doing heavy testing on the coil this upcoming week. After discussing it over with our client, we have decided that an enclosure for our device is unnecessary because our client will be providing one. It is our responsibility to have the circuit have the capability of inserting an enclosure on it. More appropriate, professional looking components for our circuit will be ordered (such as the smaller wire to board connector, the barrel jack DC power source, etc).

2/26 Meeting with John

Duration: 0.5 hrs **Members Present:** Alain, Meiyong

Purpose and Goals: Discuss using the reflow soldering technique for our next board.

Achievements: Timeline created about the next steps. Contacted Lee Harker to learn the reflow process and practice on different boards.

2/27 Inductance Testing on New Coils

Duration: 1.5 hrs **Members Present:** Meiyong, Brittany, Adam, Greg

Purpose and Goals: Discover inductance for new coils created by Megan and Greg.

Achievements: The new coils now have inductance values that will be used for later testing.

Pending Issues

N/A

Plans for Next Week

Adam: Get Vgs graphs. Update coil labels.

Greg: Get some Vgs graphs for the new coils using our current circuit.

Meiyong: Research more on reflow soldering. Meet with Lee Harker to practice reflow soldering. Help obtain the Vgs graphs for the coils.

Brittany: Obtain Vgs graphs for all coils. Confirm our circuit is up to all necessary design specifications. Choose coil for final design. Begin to look at documentation.

Megan: Create more coils and obtain Vgs graphs.

Brandon: Meet with John. Finalize current version of PCB and have sent out to be created.

Alain: Work on reflow soldering, meet with to solder some boards using reflow soldering, meet with team and order new parts.

Individual Contributions This Week

Adam: 2/22 Testing (3.5 hrs), 2/25 Meeting with John (1.75 hrs), Core Team Meeting (1 hr), 2/27 Inductance Testing on New Coils (1.5 hrs)

Greg: 2/22 Testing (2 hrs), 2/25 Meeting with John (1.75 hrs), Core Team Meeting (1 hr), 2/27 Inductance Testing on New Coils (1 hr)

Meiyong: 2/26 Meeting with John (.5 hr), Solder wire to board connector onto prototype (.5 hr), Researched reflow soldering (1.5hrs), Core Team Meeting (1 hr), 2/27 Inductance Testing on New Coils (1.5 hrs),

Brittany: 2/22 Testing (2 hrs), Core Team Meeting (1 hr), 2/27 Inductance Testing on New Coils (1.5 hrs), Documentation (0.5 hrs)

Megan: 2/22 Testing (2.5 hrs), 2/25 Meeting with John (1.75 hrs), Core Team Meeting (1 hr)

Brandon: 2/22 Testing (3.5 hrs), 2/25 Meeting with John (.5 hr), Creating new board layout (10 hrs), Core Team Meeting (1 hr)

Alain: 2/22 Testing (3.5 hrs), 2/26 Meeting with John (0.5 hr), Core Team Meeting (1 hr), Researched on reflow soldering (1hr)

Total Contributions for Project (This Week / Total for Semester)

Adam: 7.75 hrs/ 16.25 hrs

Greg: 5.75 hrs / 13.75 hrs

Meiyong: 5 hrs/ 14.25 hrs

Brittany: 5 hrs / 16 hrs

Megan: 5.25 hrs / 12.25 hrs

Brandon: 15 hrs / 22 hrs

Alain: 6 hrs / 12.5 hrs