

# Fast, Compact, High Strength Magnetic Pulse Generator

EE 491 Weekly Report

May 15-30

Week 8 (10/20/14-10/27/14)

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>

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## Weekly Summary

This week, our members made a lot of progress in their specific roles. Megan was able to meet with our advisor to get a better sense on where to go from here with the coil. Greg and Brittany met to make progress on the OrCAD schematic and work on simulation. Core group meetings and work via Google Docs were vital to progress on the design document. Please view our meeting notes below to get a better sense of progress made this week.

## Meeting Notes

### 10/20 Group meeting with core members

**Duration:** 1 hour

**Members Present:** Megan, Brittany, Adam, Alain, Brandon

**Purpose and Goals:** Discuss design document (DD) work. Set up To-Do List. Assign tasks for various project necessities. Discuss individual reports.

**Achievements:** Created To-Do List on Google Drive. Assigned DD tasks to all team members with due dates. Created new format for team meetings where individual reports are required.

### 10/21 OrCAD meeting with Greg and Brittany

**Duration:** 2 hours

**Members Present:** Brittany, Greg

**Purpose and Goals:** Enhance our understanding of ORCAD and its simulation software. Simulate our blinking light circuit with an inductor instead of an LED. Import a MOSFET spice file to simulate a specific MOSFET.

**Achievements:** Successfully simulated the blink circuit with an imported MOSFET spice file. An example of the blink circuit with simulations can be viewed below.

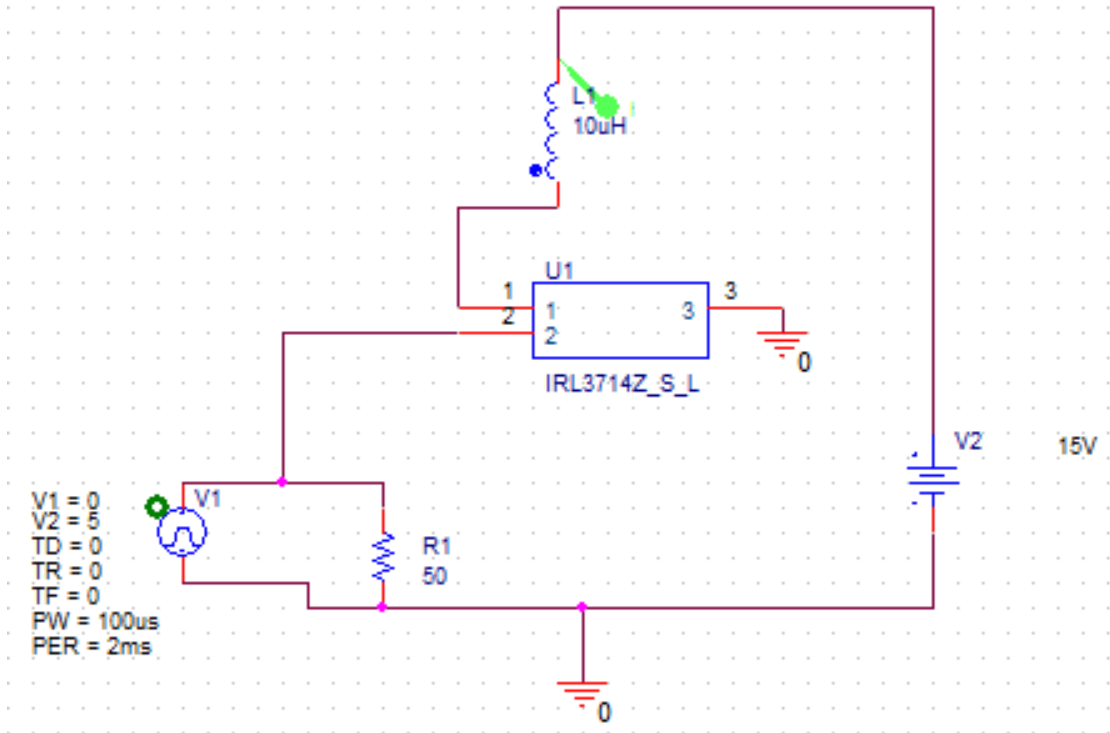


Figure 1: OrCAD Schematic

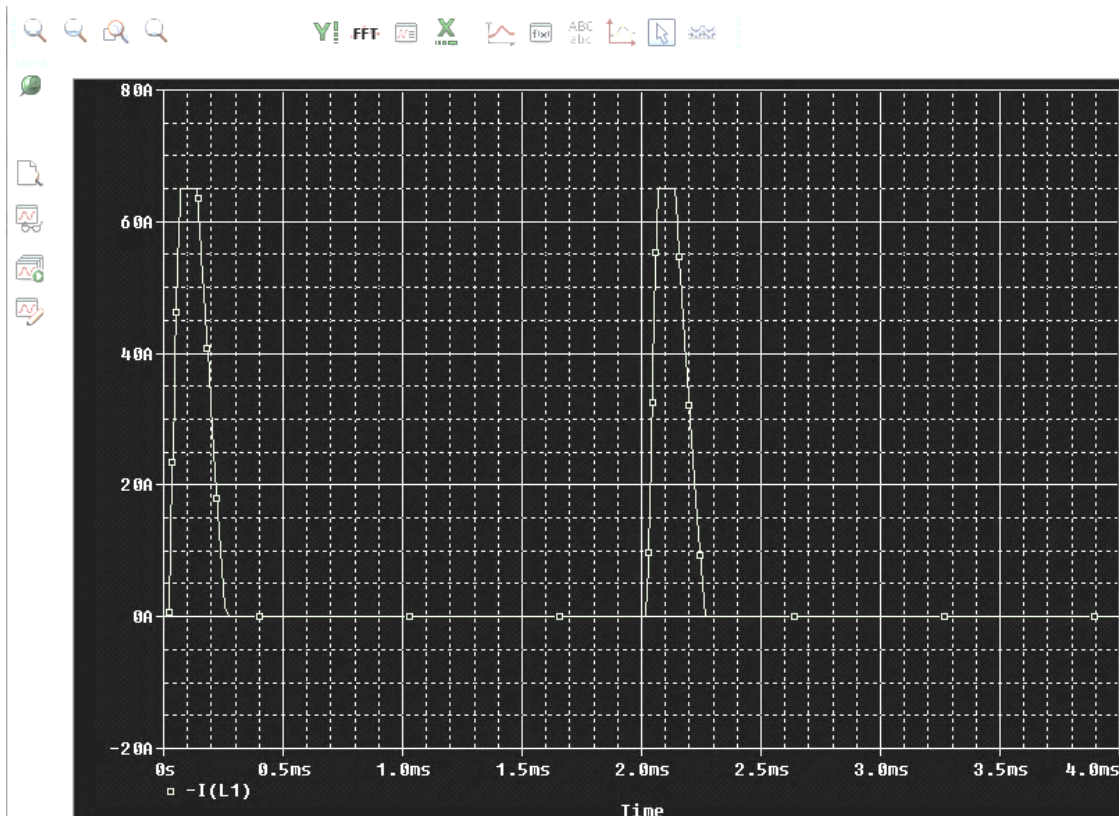


Figure 2: OrCAD Simulation Results

10/22 Group meeting with core members + John

**Duration:** .5 hours

**Members Present:** Adam, Greg, Brandon, Alain, Meiyong + Advisor:

John

**Purpose and Goals:** Discuss progress on blinking circuit/show John the PCB we created. Discuss surface mount soldering and populating our PCB. Discuss Design Document submission.

**Achievements:** All purposes and goals were met.

#### 10/24 Coil meeting with John

**Duration:** .75 hours                      **Members Present:** Megan + Advisor: John

#### **Purpose and Goals:**

Gain practice in making the physical coils we will use for prototyping and perhaps a final design.

#### **Achievements:**

Megan met with John about the coils. John gave some suggestions and supplies. They made a couple coils for practice. Megan had determined ahead of time that a single coil should be used instead of helmholtz - base on the MFG paper.

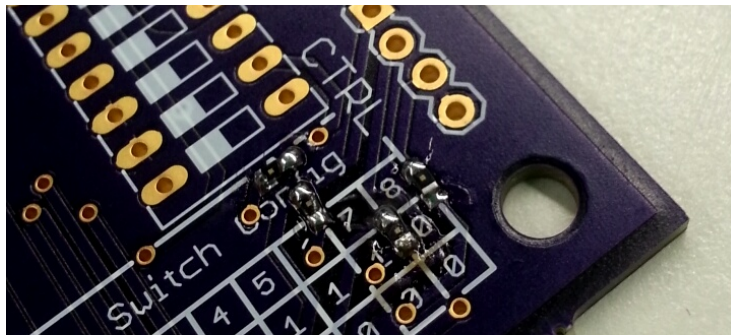
The main thing Megan is working on now is determining how many turns and what length we want the coil to be. She believes the # of turns will be small (maybe smaller than 30) and is looking into the relationship between # of turns, length, and inductance. This website has been helpful: <http://www.electronics-tutorials.ws/inductor/inductance.html>

#### 10/25 Critical Tinkers Solder and PCB education session

**Duration:** 3 hours                      **Members Present:** Brittany, Meiyong + Advisor: John

**Purpose and Goals:** This education session gave students the ability to see a project through different stages in its design. During this time we learned how to surface mount solder.

**Achievements:** Brittany and Meiyong learned how to surface mount solder by watching and then practiced on a PCB board. We will be using these skills on our prototype and final design PCBs.



#### **Pending Issues**

N/A

#### **Plans for Next Week**

**Adam:** Continue researching challenges we may run into including inductive coupling, arcing, and heat distribution. Finalize Design Document for first draft submission.

**Greg:** Play with Gauss Meter

**Meiyong:** Meet with Alain and Lee to create a second prototype, update website design, build and test out current prototype

**Brittany:** Finalize Design Document. Work with Greg to continue familiarizing ourselves with OrCAD in hopes to create a circuit that is compatible with Megan's coil.

**Megan:** Help to finalize design document, work with Greg and Brittany to decide what size coil will work within the overall design based on calculations and research. Continue to research MO materials. Once a decision is made about the coil size - create a couple that will be appropriate for the prototype.

**Brandon:** Review and finalize design document, research challenges related to soldering surface mount components, update Eagle schematic and layout.

**Alain:** Meet with Leland, meet with John, work on John feedbacks on design documentation. Try to test our circuit. Work on a to-do list for next step with team members.

### **Individual Contributions This Week**

**Adam:** Weekly team meeting (1 hr), Add content to Design Document (3.5 hrs), Review Design Document (3 hrs), Research challenges associated with project (1 hr), Enhanced To-Do List by adding conditional formatting script for dates (.5 hrs), Wednesday Meeting with John (.5 hr)

**Greg:** Work on simulating in OrCad (1.5 hrs), Worked with Brittany on OrCad (.5hrs), Explored OrCAD Results With Brittany (1.5hrs), researched MOSFET specs (.5hrs) meeting with john(.5hr)

**Meiyong:** Attended Wednesday's meeting (.5hr), Looked at example Design Documents/Worked on Design Document (1.5hr), Worked on changing website layout (1hr), Talked with Lee Harker about current prototype and scheduling to make a second prototype (.5hr), Critical Tinkers soldering and PCB education session (3hr)

**Brittany:** Weekly team meeting (1 hr), Work with Greg on Setting up OrCad (.5 hr), Meet with Greg on Thursday to get results from OrCad (1.5), Work on Design Document template and organization while referring to examples (3 hr), Work on Design Document content (5.5 hrs), Critical Tinkers soldering and PCB education session (3hr), weekly report (.8 hr)

**Megan:** Weekly team meeting (1hr), research into inductance and how it relates to the coil size (1 hr), meeting with John for physical coil construction (.75 hr), design document - mostly coil section (2 hr)

**Brandon:** Weekly team meeting (1hr), worked on design document (.75hr), talked to Lee Harker about picking/buying surface mount components as well as scheduling a meeting to make a second circuit (.5hr), researched how to download libraries and parts into Eagle (.75hr)

**Alain:** Met with team members Monday and Wednesday, met with John, made a to-do list with team members (2hrs), meet with Lee Harker to make sure our circuit would work properly and working on scheduling another meeting to make a second circuit (0.5hr), worked on design document (1.5hr)

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

**Greg:** 4.5hrs. /29.75hrs

**Adam:** 9.5 hrs / 35.15 hrs

**Meiyong:** 6.5 hrs/ 32.75 hrs

**Brittany:** 15.3 hrs/ 43.8 hrs

**Megan:** 4.75 hrs/ 29 hrs

**Brandon:** 3hrs/ 32.75 hrs

**Alain:** 4 hrs / 28.25 hrs