

*Group number: 18*

*Project title: Radio Frequency Readout Device (RFRD)*

*Client &/Advisor: Dr. Qiao*

*Team Members/Role: Brandon Baxter/Team Leader, Vaughn Dorsey/Team Webmaster, Luke Myers/Team Communication Leader, Kurt Turner/Team Key Concept Holder, Aaron Haywood, Robert Buckley, Mehdy Faik, Kellen Yoder, Michael Miller*

### **O Weekly Summary**

Over the past couple of weeks our team has started to work on our preparations for our final presentation. We also received our parts and have done some initial prototype work on the capacitor sensor and mux components of the tag. Further developments on the website have also been completed.

### **O Past week accomplishments**

- Brandon Baxter: Has helped make sure parts were ordered as well as began initial testing of the prototype (the multiplexer portion)
- Vaughn Dorsey: Over the last two weeks, most of my time for this project was spent finishing up the website's info pages and gather images for the website. I also assisted with documents and presentation prep as needed. Attended meetings as well.
- Luke Myers: I did some initial prototyping for the capacitor sensor and also helped with preparations for the final presentation.
- Kurt Turner: Worked on simulation testing of capacitive sensor circuitry. Tested capacitor charging with power MOSFET. Assisted with final document and presentation.
- Aaron Haywood: RF power design efficiency concerns
- Robert Buckley: Over the last two weeks I have spent time working on the powerpoint, and working with the parts we got in.
- Mehdy Faik: Experimented with diode pspice model. I didn't get correct results with the way I was initially viewing the diode in the circuit. I tested with "Harmonic Balance" simulation, though, and it looks like there is now a way of optimizing the

source impedance for optimal dc voltage and current output. The trick was that the diode's input impedance is a function of the power it's taking in.

- Kellen Yoder: I have created the template for the final presentation PowerPoint and am now getting things finalized for that. Also attended weekly meetings and worked with the reader team on agenda items for working with the parts that have now arrived.
- Michael Miller: These past weeks I began prototyping the mux logic on a breadboard. I also worked on the documents and presentation prep.

**o Pending issues**

- Brandon Baxter: None
- Vaughn Dorsey: None that I know of
- Luke Myers: Not at the moment
- Kurt Turner: Need a few more parts for prototype, including discrete MOS devices, and logic devices.
- Aaron Haywood:
- Robert Buckley:
- Mehdy Faik: dc power out is pretty low; I'm pretty sure I did this diode simulation correctly but I'll want to check the docs on the ADS tools I've been using.
- Kellen Yoder: none
- Michael Miller:

**o Individual contributions**

<b><u>NAME</u></b>	<b><u>Individual Contributions</u></b>	<b><u>Hours this week</u></b>	<b><u>HOURS cumulative</u></b>
Brandon Baxter	Meeting with group as well as finishing up our document; prototyping of our project	4	39
Vaughn Dorsey	Gathering photos, bios, and info for the website and making it available  Document and presentation prep  Meetings with professor and group	4.5	43
Luke Myers	Meeting with advisor, prototyping for capacitor sensor, and work on presentation preparation.	3.5 hours	42

Kurt Turner	Tested physical and simulation of capacitive sensor.	5.5	47
Aaron Haywood	Meeting RF power issues	7	40
Robert Buckley	Worked on powerpoint and hardware.	4	55
Mehdy Faik	Simulated diode rectification; looks like I have a correct way to match antenna impedance to rectifier input impedance.	4.5	40.5
Kellen Yoder	PowerPoint presentation Weekly meetings Agenda	6	55
Michael Miller	Prototyping and testing	6	50

**o Comments and extended discussion**

**o Plan for coming week**

- Brandon Baxter: Finish prototype and get presentation ready
- Vaughn Dorsey: Try to get some app design considerations for next semester started and finish up the website. Also help out with documents as needed.
- Luke Myers: Do further prototyping. Work on final versions of the planning and design documents. Help prepare for our final presentation.
- Kurt Turner: Figure out the remaining parts needed, and place order.
- Aaron Haywood:
- Robert Buckley:
- Mehdy Faik: Get into HFSS and experiment with variations on the square spiral antenna geometry. Get an idea from the simulation for what the received power will be over distances of interest.

- Kellen Yoder: Finalize presentation PowerPoint and speaking notes. Work with Hardware on reader team.
- Michael Miller: Continue working on prototyping and simulation in Cadence

### **o Summary of weekly advisor meeting**

There were five members of our group at our meeting on Monday, 11/28, along with Dr. Qiao and Dr. Song. We updated Dr. Qiao on the parts that we had received shortly before break. Mehdy proceeded to present some of his recent work on rectification for the antenna team and some of the difficulties he has run into with the diode he is relying on. He is going to contact a couple of different people to get more information on rectification. Kurt talked about his discovery that the MOSFETs we used for our first prototype of the capacitor sensor experience too much leakage. We discussed a possible solution for testing purposes of using a resistor in place of the MOSFET. Kurt presented his current model for testing the capacitor sensor in Cadence. Robert touched on how things are going for the reader side and how he is hoping to get something working by next week. He was going to try to meet up with Mehdy to discuss the possibility of getting some antennas together for testing the model reader with the basic RFID tag we purchased. Finally, we discussed the material we want to include in our presentation for next week. We are planning to have a rehearsal next Monday during our final advisor meeting of the semester.