

*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**

During our advisor meeting we discussed the roles each of our team members are currently taking in addition to re-assigning some people to different teams.

### **o Past week accomplishments**

- Brandon Baxter: Worked on prototyping the reader as well as reviewing work done on the cadence models that we will use for fabrication (if we were to fabricate).
- Vaughn Dorsey: This week, I worked on developing the interface some more and began considering a database structure for the backend.
- Luke Myers: I looked into the necessary deliverables for the semester to get a better idea of what we need to be working on as we continue to progress. I also looked further into EEPROM options for the memory of our IC tag.
- Kurt Turner: Worked on breadboard prototype. Shift register is working.
- Aaron Haywood: improved ADS oscillator/amplifier model
- Robert Buckley: Assisted in finishing a 13.56 MHz ring oscillator to act as a clock for simulation in Cadence. Created the verilog files for the data generation portion of our IC.
- Mehdy Faik: Developed final layout for rectifier.
- Kellen Yoder: Worked on reader, attempting to figure out best way to go about getting this part of the project finished.
- Michael Miller: Worked on the crystal oscillator, Cadence components

### **o Pending issues**

- Brandon Baxter: None to note currently
- Vaughn Dorsey: Need to gain access to a server that I can use for database and web

development.

- Luke Myers:
- Kurt Turner: Shift register doesn't read sensor low value.
- Aaron Haywood: Demodulator and Filter design
- Robert Buckley: We want to use Encounter and RTL synthesis to change verilog files into a Cadence Layout, creating our IC. However, to my knowledge the new version of Cadence installed at ISU cannot import the stream files from Encounter...
- Mehdy Faik: It's just a matter of time, maybe a week now - I underestimated how long it would take to put out the rectifier layout but it won't be long.
- Kellen Yoder:
- Michael Miller: Create TB for various files, fine tune oscillator

**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	Meetings with advisor and team Prototyping Reader	3	5
Vaughn Dorsey	Meetings with advisor and team Software Development	3	7
Luke Myers	Investigated necessary deliverables for the semester. I also looked further into EEPROM options for the memory of our project.	3	8.5
Kurt Turner	Worked on breadboard prototype.	3.5	9
Aaron Haywood	Streamlined Oscillator/amplifier model	2	7
Robert Buckley	Assisted with 13.5MHz oscillator. created verilog files for cadence simulation.	5	13
Mehdy Faik		10.25	24.25

Kellen Yoder	Reader Advisor meeting	4	5
Michael Miller	Got a 13.56 MHz signal from breadboard prototype, Created ring oscillator in Cadence		

### **o Plan for coming week**

- Brandon Baxter: Order and finish prototype for the Reader
- Vaughn Dorsey: Obtain access to a server that I can do back-end development on, if possible. Otherwise, create a local virtual machine that I can develop against.
- Luke Myers: Continue looking into EEPROM
- Kurt Turner: Adjust sensor output so it can be read by the register.
- Aaron Haywood: investigate demodulator
- Robert Buckley:
- Mehdy Faik: Get the final rectifier layout put down and get a professor to put it on a board. Get the parts ordered. It's only a matter of time; these goals can probably get done this week.
- Kellen Yoder: Continue working reader, also assist IC team in any way.
- Michael Miller: Continue working on Cadence simulation

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

Brandon presented the information for the reader team from Mehdy (who was not able to make it to the meeting). At a distance of 10 cm, Mehdy calculated that we would be able to obtain a 25% efficiency rate for 100 mW power transmission (enough to drive our IC circuitry). However, most of the efficiency was lost in rectification (with only 20% being lost over the distance of 10 cm).

On the reader team, Robert is hoping to get everything working in simulation down to the transistor level over the next two weeks.

Kurt then presented some of the waveform stills we captured from our prototype testing (for the capacitance sensor) on an oscilloscope. The capacitor took approximately 100 ns to charge while operating at 13.56 MHz. Discussed the issues we are currently running into with noise and possible solutions such as taking the average value of the voltage.

Robert discussed the roles that each of us are currently taking.

