*EE 491 WEEKLY REPORT 21* *Date: 3/21/17-3/27/17*

*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*

- **Weekly Summary**

This week further study was conducted on antenna possibilities. We also conducted initial testing with our RF mixer for signal modulation. We were able to successfully modulate our data signal with the carrier wave for data transmission across the antennas. Further work was also done on the Cadence design.

- **Past week accomplishments**
    - Brandon Baxter: Prepared to move schedule around to finish the IC soldering when it comes in
    - Vaughn Dorsey: Fixed the issue I was having with the database and continued software development.
    - Luke Myers: Performed testing of the IC with the RF mixer chip. Found that modulation was working properly and we were able to transmit the modulated signal across our antennas.
    - Kurt Turner: Worked on revision B additions and corrections to IC prototype PCB.
    - Aaron Haywood: Continued on reader and poster
    - Robert Buckley: Worked on replacing ideal parts of Cadence design with real parts. improved modulation feedback, lost capacitive sensing for the moment.
    - Mehdy Faik: Transplanted project to 2017 HFSS. Concretely ruled out possibility of 3” x 3” to 3” x 3”. Met with machinist in Sukup; learned what I need for machining. Visited thermal power harvesting presentation. Researched copper sheeting.
    - Kellen Yoder: Looked over poster information and began a layout
    - Michael Miller:
- **Pending issues**

- Brandon Baxter: PCB still not in
- Vaughn Dorsey: None at the moment.
- Luke Myers: None at the moment.
- Kurt Turner: First version of board was not ordered when I thought it was, due to confusion in the parts shop.
- Aaron Haywood: Produce data for poster
- Robert Buckley: Capacitive sensors broke when switching from static capacitors inside charge/discharge signal creator to caps outside component.
- Mehdy Faik: 10" x 10" to 3" x 3" is workable but just has a lot of variables to cover one by one for getting anywhere near acceptable power transfer. We have to think about this as charging a capacitor which in turn provides the necessary energy to the IC to transmit its signal back, instead of just an issue of constantly providing power at greater than or equal to the rate at which the IC consumes it.
- Kellen Yoder:
- Michael Miller:

**o Individual contributions**

| **NAME** | **Individual Contributions** | **Hours this week** | **HOURS cumulative** |
|---|---|---|---|
| Brandon Baxter | Meeting with advisor and soldering prep | 2 | 35 |
| Vaughn Dorsey | Software Development | 2 | 24.5 |
| Luke Myers | Did initial modulation testing with the RF mixer | 3.5 | 39 |
| Kurt Turner | IC prototype PCB modification and testing | 7 | 56 |
| Aaron Haywood | Reader | 7 | 38 |
| Robert Buckley | Cadence Design<br>Ideal → Real | 5 | 59 |
| Mehdy | See above, under "Past Week | 9.5 | 51.5 |

| | | | |
|---|---|---|---|
| Faik | Accomplishments” | | |
| Kellen Yoder | poster<br>Meeting | 2.5 | 33.5 |
| Michael Miller | Meetings<br>Schmidt Trigger | 3 | 33 |

- **Plan for coming week**
  - Brandon Baxter:
  - Vaughn Dorsey: Continue working on software as much as possible. Try to get the rest of the UI work finished, or at least much further along. Assist with the final report as necessary.
  - Luke Myers: Conduct further work on the design document
  - Kurt Turner: PCB should arrive by Monday, potentially Friday. We will assemble it asap, and test revisions to finalize revision B, order for this board will hopefully be placed by next Tuesday.
  - Aaron Haywood: contribute to design document and poster
  - Robert Buckley:
  - Mehdy Faik: Optimize 10” x 10” to 3” x 3” setup in HFSS and export it to the machinist. Exporting the files and attaining the copper should be the easy part.
  - Kellen Yoder:
  - Michael Miller:

- **Summary of weekly advisor meeting**

Weekly meeting March 21, 2017. Dr. Qiao and six group members present

Robert discussed further simulation results and plan for when we receive our actual PCB board for the IC. We have unfortunately yet to receive our first PCB, but are hoping to get that this week.

We went over Mehdy’s work on the rectifier and antenna from our presentation. Discussed the need to use a laser jet to produce the hardware implementation of the antenna itself. Also looked at the measurements obtained with the power rectifier.

We are planning to add a second clock divider to version B of our PCB board. Will take approximately 2-3 ms to read the necessary capacitance data in version B.