EE/CprE/SE 491 WEEKLY REPORT 08

10/30/17 – 11/03/17

Group number: 11

Project title: RFRD Phase II

Client &/Advisor: Dr. Daji Qiao and Dr. Nathan Neihart

Team Members/Role:

Bailey Akers - Facilitator/RFRD Tag Design/Fabrication Engineer
Colin Sunderman - RFRD Tag Design/Fabrication Engineer
Lyle Bishop - Principal Antenna Engineer
Pengyu Qu – Antenna/Power Harvesting Engineer
Nathan Mulbrook - RFRD Wireless Communications Engineer

o Past week accomplishments

Team Member 1: Bailey Akers
Developed three tests to better understand using the washers as capacitors. Generated weekly report.

Team Member 2: Colin Sunderman
Developed three tests to better understand using the washers as capacitors.

Team Member 3: Pengyu Qu
Antenna calculations using Friis Equation. Presented on material

Team Member 4: Lyle Bishop
Antenna calculations using Friis equation.

Team Member 5: Nathan Mulbrook
Research and presentation of using a software controller radio transmitter for testing of our design.

o Weekly Summary

11/2 - Colin Sunderman and Bailey Akers simulated the following circuits using OrCad Capture:

- TSU10X op amp as an non-inverting amp with gain of 2
  - Obtained a correct output
- TS88 comparator IC as a comparator
  - Obtained a correct output
- TSU10X op amp as an integrator
  - Obtained a correct output

- Relaxation Oscillator with TSU10X and TS88
    - Obtained an incorrect output

11/2 - Pengyu Qu and Lyle Bishop met to look through research papers on actual measured received power from an RF circuit.

Nathan Mulbrook throughout the week made progress with picking out a software defined radio program.

11/3 - Met with advisors Dr. Daji Qiao and Dr. Nathan Neihart.

- Bailey Akers and Colin Sunderman presented on the SPICE simulations
    - Neihart suggested that we look further into what is causing the relaxation oscillator to output incorrectly
    - For next week, have some ideas and try a couple different resistor values in the SPICE simulation
- Pengyu Qu and Lyle Bishop presented on actual measured results for received power
    - Found that one paper received ~0.45 mW @ 1meter distance.
    - This gave us great progress on the subject
    - Advisors agreed with the findings
    - Capacitance Measuring group will size op amps under the 0.45 mW power consumption limit.

This Week:

NAME	Individual Contributions Summary	Hours This Week	Hours Cumulative
Bailey Akers	SPICE simulations. Generated weekly report.	4	47
Colin Sunderman	SPICE simulations.	3	41
Pengyu Qu	Research into measured received power.	5	37
Lyle Bishop	Research into measured received power.	5	37
Nathan Mulbrook	Research to find a software defined radio program to use.	4	36

***Details of weekly contributions are noted in above Weekly Summary section.**

o Plan for coming week

Goals for next week's advisor meeting (11/10): Details also listed in Weekly Summary section.

Capacitive Sensing Circuit Design: Colin Sunderman and Bailey Akers

- Figure out issues with relaxation oscillator simulation.
- Pick out op amp with power constraints given.

Antenna Design: Pengyu Qu and Lyle Bishop

- Simulate an antenna using Momentum sofware.

Communications, Tx/Rx Module: Nathan Mulbrook

- Further research into implementation software defined radio program.

o Team Difficulties

The main difficulties were with the relaxation oscillator SPICE design. Since it wasn't outputting what we expected. Further analysis of the circuit will prove the issues.

Grading criteria

Each weekly report is worth 10 points. Scores will be awarded as follows:

• 8 – 10: Progress for your project seems to be suitable. Documentation and hours reported by team members are adequate.

• 6 – 8: There is scope of improvement both in your report and your project progress. Can consult with instructor/TA after class for further inputs.

• < 6: Please talk to instructors/TA after class hours about any difficulties that you/your team is facing.