

EE/CprE/SE 491 WEEKLY REPORT 06

10/09/17 – 10/13/17

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

Revisited relaxation oscillator spreadsheet. Designed op amp criteria ranking spreadsheet. Soldered capacitor. Researched microcontrollers. Presented on results.

Team Member 2: Colin Sunderman

Revisited relaxation oscillator spreadsheet. Designed op amp criteria ranking spreadsheet. Researched microcontrollers. Presented on results.

Team Member 3: Pengyu Qu

Team Member 4: Lyle Bishop
Antenna research.

Team Member 5: Nathan Mulbrook

Microcontroller research. Planned on presenting.

o Weekly Summary

10/10 - Colin Sunderman and Bailey Akers met to research and compile a list of op amps for the relaxation oscillator capacitance sensing circuit.

We decided on STMicroelectronics as the best supplier for very low power op amps. We specifically picked the TSU 104 op amp for our oscillator design and the TS 881 op amp for the comparator design.

We presented on our choices to our advisors. We decided to keep these op amps in mind once we have an idea on how much power we can harvest from a RFRD wireless signal.

10/13 - Bailey Akers and Colin Sunderman presented on STMicroelectronics low power op amps.

10/13 - Lyle Bishop and Pengyu Qu planned on presenting on antennas. Lyle wasn't able to present due to illness. Pengyu didn't present because he missed the advisor meeting.

10/5 - Nathan Mulbrook researched using very low power microcontrollers to implement the wireless communications between reader and tag. He looked at specific microcontrollers.

10/13 - Met with advisors Dr. Daji Qiao and Dr. Nathan Neihart.

- Bailey Akers and Colin Sunderman presented on STMicroelectronics low power op amps.
 - Determined to keep low power op amps on hold till we have an idea on how much power we can receive wirelessly using RFRD. (Antenna group)
 - We decided for 10/20 to look further into using our washer design as capacitors.
 - We will do the following tests for 10/20:
 - Testing washers to see how well they hold charge
 - Use a LCR meter to take series and parallel measurements of the washers (modeled as a capacitor)
 - SPICE model of the relaxation oscillator using the STMicroelectronics op amps.
- Lyle Bishop wasn't able to present due to illness. Pengyu Qu wasn't able to present due to not attending the advisor meeting.
 - Determined that this topic needed to be revisited for 10/20.
 - Determined that we NEED to get progress on this subject for 10/20.
 - Determined that we NEED to meet as a group on 10/16 to verify our plans for the week before the advisor meeting.
- Nathan Mulbrook presented on a very low power microcontroller that we can use for the RFRD communication protocol and we can use as a means to measure capacitance.
 - Determined we will order the microcontroller dev board. We will then test the microcontroller to determine how much power it consumes on a regular basis.
 - Determined we need to have an idea on how much power we can receive wirelessly using RFRD. (Antenna group)

This Week:

NAME	Individual Contributions Summary	Hours This Week	Hours Cumulative
Bailey Akers	Researched and presented on STMicroelectronics very low power op amps. Developed weekly report.	5	38
Colin Sunderman	Researched and presented on STMicroelectronics very low power op amps.	4	34

Pengyu Qu		5	27
Lyle Bishop	Antenna research.	5	27
Nathan Mulbrook	Microcontroller research and presentation.	5	27

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

o Plan for coming week (please describe as what, who, when)

Goals for next week's advisor meeting (10/6): Details also listed in Weekly Summary section.

Capacitive Sensing Circuit Design: Colin Sunderman and Bailey Akers

- Testing washers to see how well they hold charge
- Use a LCR meter to take series and parallel measurements of the washers (modeled as a capacitor)
- SPICE model of the relaxation oscillator using the STMicroelectronics op amps.

Antenna Design: Pengyu Qu and Lyle Bishop

- Get results for how much power we can receive wirelessly using RFRD.
- Show up and present results on 10/20.

Communications, Tx/Rx Module: Nathan Mulbrook

- Order microcontroller devboard. Research further into microcontrollers.

o Team Difficulties

The main difficulties were with Lyle and Pengyu not being able to present. The antenna group needs results for received power for the next week, otherwise the capacitance design and microcontroller groups progress will be halted.

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.