

EE/CprE/SE 492 BIWEEKLY REPORT 07

4/1/18 – 4/14/18

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 two weeks accomplishments

Team Member 1: Bailey Akers

Worked on the poster and design document. Tested the PCB with the rectifier and microcontroller, then performed final system tests.

Team Member 2: Colin Sunderman

Tested PCB with varying voltage input and varying capacitances. Worked on the poster and design document. Tested the PCB with the rectifier and microcontroller, then performed final system tests.

Team Member 3: Pengyu Qu

Worked on getting proper metal size and layout in ADS. Found the parts that are to be used for rectifier PCB.

Team Member 4: Lyle Bishop

Lyle did not participate or attend the meetings.

Team Member 5: Nathan Mulbrook

Changed the microcontroller code to output to an onboard LED and to run in low power mode. Set up the microcontroller for tests with the rectifier and with the whole system.

o Biweekly Summary

4/2/18 - Weekly advisor meeting. Pengyu presented on the progress of the layout of the rectifier PCB. It was decided to look into if it would be possible to mill a PCB here on campus to save time. An issue with the microcontroller clock speed at low power was discussed. It may not be possible to have accurate readings of period in low power mode of operation.

4/3/18 - Bailey, Pengyu, Nathan, and Colin met for the weekly team meeting and discussed the progress that needs to be made on the microcontroller frequency problems, PCB design of antenna, and working on the poster and design document.

4/4/18 - Pengyu, Bailey, and Colin met to work on the ADS design. Pengyu should Colin and Bailey the basics of ADS in hopes that they would be able to help with current problems.

4/6/18 - Bailey and Colin met to begin work on the poster. Colin performed tests to find how the voltage input changes the period of the output of the relaxation oscillator and to test the effect of capacitance on power at a constant voltage. Both of these tests should that there was little effect. Pengyu and Colin met with Dr. Neihart to discuss problems with the ADS PCB. Pengyu then began working on getting the proper spacing and metal widths in the PCB design.

4/9/18 - Weekly advisor meeting. Bailey and Colin presented the test results from the week. Nathan presented on his solution to the microcontroller frequency problems. He told the group how he had found a frequency to the microcontroller could operate at with low power and accuracy. Pengyu presented on progress of the ADS PCB. The current design has proper metal layout and distance. It was decided by the group that was not enough time left in the semester to finish the rectifier and antenna PCB and to be able to ensure that it would work. Pengyu will finish the layout and simulations and present on those. The group will begin final tests using grad student Scott Melvin's antenna and rectifier.

4/13/18 - Bailey, Colin, and Nathan met with Scott Melvin to perform final system testing using his antenna. The system was able to be completely powered by the rectifier and correctly measures capacitance.

4/14/18 - Colin, Baily, and Pengyu worked on the design document and poster.

Last Two Weeks:

NAME	Individual Contributions Summary	Hours 1 st week	Hours 2 nd week	Hours Cumulative
Bailey Akers	Worked on documentation. Performed final system tests.	8	9	67
Colin Sunderman	Performed relaxation oscillator tests. Performed final system test.	10	7	68
Pengyu Qu	Updated rectifier PCB layout for proper sizing.	5	5	64
Lyle Bishop	Lyle did not participate or attend the meetings.	0	0	29
Nathan Mulbrook	Modified code for low power and LED output.	4	4	59

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

o Plan for coming week

Goals for next couple weeks:

The final testing of the system is complete. The main focus for the rest of the semester will be preparing the poster and slideshow for the presentation and on completing the design document. We also need to finish the rectifier PCB design and make some modifications to the microcontroller to allow for a better-defined output. We are planning on demoing the system to our advisors at the following meeting.

o Team Difficulties

One of the main issues the past two weeks were with the output of the microcontroller. The team was worried that the microcontroller would not be able to properly read the period when it was running in a low enough power mode. Nathan worked on changing the code so that it had the proper balance between power and accuracy of readings. The other issue with the microcontroller was with determining what is the best way to output our results. In low power mode it can trigger a led but can't perform serial output to a computer. It was determined that the best solution was to have a LED trigger at a certain threshold while the microcontroller runs in lower power mode so that the team can demonstrate the power harvesting aspect of the project.