

EE/CPRE/SE 492 WEEKLY REPORT 01

INTRODUCTION

Date: 9/13/2019

Group Number: 21

Project Title: Battery-less IoT Devices

Advisor: Dr. Henry Duwe

Clients: Dr. Nathan Neihart, Dr. Daji Qiao

Team Members:

Derek Nash – *Meeting Scribe, Power Systems Engineer, Test Engineer*

Matt Goetzman – *RF Systems Engineer, Test Engineer*

Mohamed Gesalla - *RF Systems Engineer, Test Engineer*

Adithya Basnayake – *Report Manager, Power Systems Engineer, Test Engineer*

Mohammed-Al-Mukhaini – *Meeting Facilitator, Embedded Systems Engineer, Test Engineer*

Bradley Rhein – *Embedded Systems Engineer, Test Engineer*

PAST WEEK ACCOMPLISHMENTS

This week the team gave a presentation on their current progress and future plans for the project. Each subgroup also worked on several things.

Embedded Systems Team

- Completed code related to recording and storing temperature readings.
- Tested/verified that our code works on the launchpad

RF and Antenna Team

- Requested access to ECPRE Machine Shop for etching antenna.
- Looked into buying an antenna pre-built rather than making one.

Power Circuit Team

- Soldered buck converter and attempted to solder CW rectifier (2-stage)

- Found and ordered parts for future buck converters and improved CW rectifier (2-stage)
- Researched prices and leakage current of large (1000uF) capacitors
- Researched a suitable boost converter between CW rectifier and cap bank
- Plotted output voltage vs. # of stages of CW rectifier

PENDING ISSUES

ETG is taking a while to get parts here.

Need to evaluate rectifier design before proceeding.

INDIVIDUAL CONTRIBUTIONS

Team Member	Contribution	Weekly Hours (2 weeks)
Derek Nash	<ul style="list-style-type: none"> • Designed boards for 2-stage CW and 5-stage CW • Soldered buck converter • Found and ordered parts for future buck converters and improved CW rectifier (2-stage) • Researched prices and leakage current of large (1000uF) capacitors 	15
Matt Goetzman	<ul style="list-style-type: none"> • Researched Antenna Alternatives 	4
Mohamed Gesalla	<ul style="list-style-type: none"> • Looked into the chemical etching process vs commercial fabrication 	2
Adithya Basnayake	<ul style="list-style-type: none"> • Soldered rectifier circuit components • Researched into ultra low boost converters that can be used with the rectifier circuit 	10
Mohammed-Al-Mukha ini	<ul style="list-style-type: none"> • Researched what type of breakout board and package type for the MSP430 would be the best for our design. • Worked with Bradley on embedded software. Code now records and stores temperature readings into non volatile memory. • Organized weekly meeting 	11

Bradley Rhein	<ul style="list-style-type: none"> • Researched what type of breakout board and package type for the MSP430 would be the best for our design. • Worked with Mohammed on embedded software. Code now records and stores temperature readings into non volatile memory. 	10
---------------	---	----

PLANS FOR THE UPCOMING WEEK

Embedded Systems Team

- Find the total energy needed to turn MSP430 on, take a measurement, log it in FRAM, and safely power down
- Conclude on a breakout board to order
- Mohammed: arrange meetings with Dr. Niehart & Dr. Qiao

RF and Antenna Team

- Supply Power Circuit Team with values for "CW rectifier, output voltage vs. stages" graph
- get access to etcher

Power Circuit Team

- inspect 5-stage CW rectifier board before ordering
- order breakout board for MSP430 and parts for CW rectifier and boost converter

SUMMARY OF WEEKLY ADVISOR MEETING

Dr. Duwe emphasized the importance of having physical prototypes for measurement, testing, and analysis.