EE/CPRE/SE 492 BI-WEEKLY REPORT 4

Introduction

Date: 10/25/2019
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

Embedded Systems Team

- Tested voltage regulators

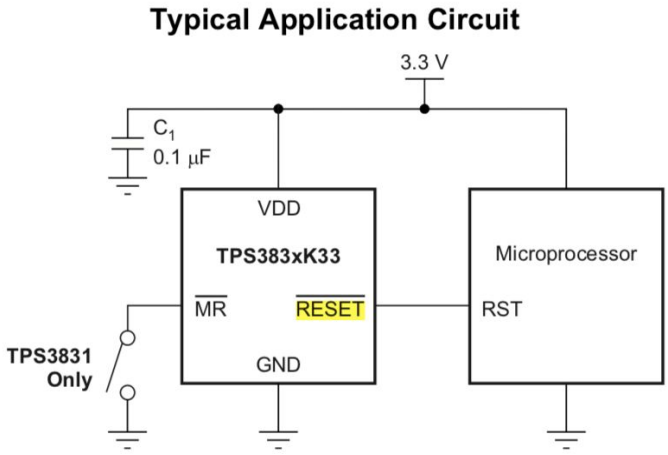
RF and Antenna Team

- Took measurements to characterize components for use with impedance matching.
- Retook antenna measurements to obtain accurate results (Center frequency was shifted too far off the bandwidth)

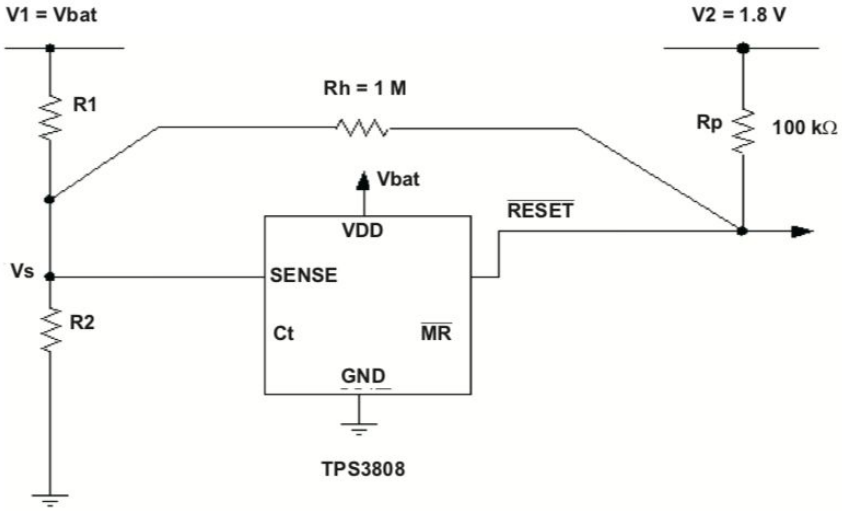
Power Circuit Team

- Tested the 2-stage rectifiers (powered by the function generator)
    - Plotted I-V curve and documented test procedure

- Brainstormed on incorporating a voltage supervisor in design
    - TPS383X : Will need to include external hysteresis



- Sample circuit with external hysteresis



Pending issues

- Most voltage supervisors do not perform the way we'd need it to, were we to have the supervisor's reset pin hooked directly to the regulator's enable pin.
    - Most supervisors require a steady Vdd. So far, all are designed to output high all the time until they die, which would prevent the capacitor from charging to a higher voltage (like 1V)
    - Solution: to keep the voltage regulator on at all times and have its RESET pin going straight to the MSP430. Hopefully, the RESET pin would only have to be on briefly for the MSP430 to initiate.

Individual Contributions

Team Member	Contribution	Weekly Hours
Derek Nash	● Soldered 5-stage rectifiers ● Researched voltage supervisors	5
Matt Goetzman	● Took measurements	6
Mohamed Gesalla	● Took antenna measurements using the spectrum analyzer ● Did characterization of rectifier components	6
Adithya Basnayake	● Researched about voltage comparators and voltage supervisors	5
Mohammed-Al-Mukhaini	● Help with testing voltage rectifiers ● Help with obtaining measurements reading from the antenna	5
Bradley Rhein	● Help with testing voltage rectifiers ● Help with obtaining measurements reading from the antenna	6

Plans for the upcoming week

- Test the 5-stage rectifier boards with the voltage regulator board
- Find the best load resistance for the 5-stage rectifier board
- Design the voltage supervisor circuit
- Create stand-in capacitor and inductor models using measured components. Start creating rectifier.

- Analyze antenna measurement data

Summary of Weekly Advisor Meeting

During our weekly meeting, Dr.Duwe advised us to test the 5 stage rectifier board with the voltage regulator board and check for the power output. We looked into WiSP project with voltage supervisors to get an idea of what kind of design we should incorporate into our project.