EE / CPR E / SE 492

Wake-up Harvester Design for Batteryless IoT System

sdmay21-14 (3/15 – 3/29)

Client & Advisor: Prof. Duwe

Team Members:

Edmund (Eddie) Duan - Powercast Harvester Team, Project Lead
Jacob Bernardi - MCU Team
Douglas Zuercher - Transceiver Team
Kwanghum (Ted) Park - MCU Team
Bryce Staver - Powercast Harvester Team
Zacharias (Zack) Komodromos - Transceiver Team

Weekly Summary

Over the past two weeks, we were able to get the transceivers in our CC1352 Launchpads to communicate with each other and are currently working on making them work reliably and debugging issues specified later in the report. In addition, we are finalizing the PCB layout and planning to have it ordered this week as well as beginning work on final documentation.

Past week accomplishments

Transceiver Team (Zack and Douglas)

The below achievements were contributed to evenly by Zack and Douglas. Work was done together, at the same time, so contribution is approximately 50/50.

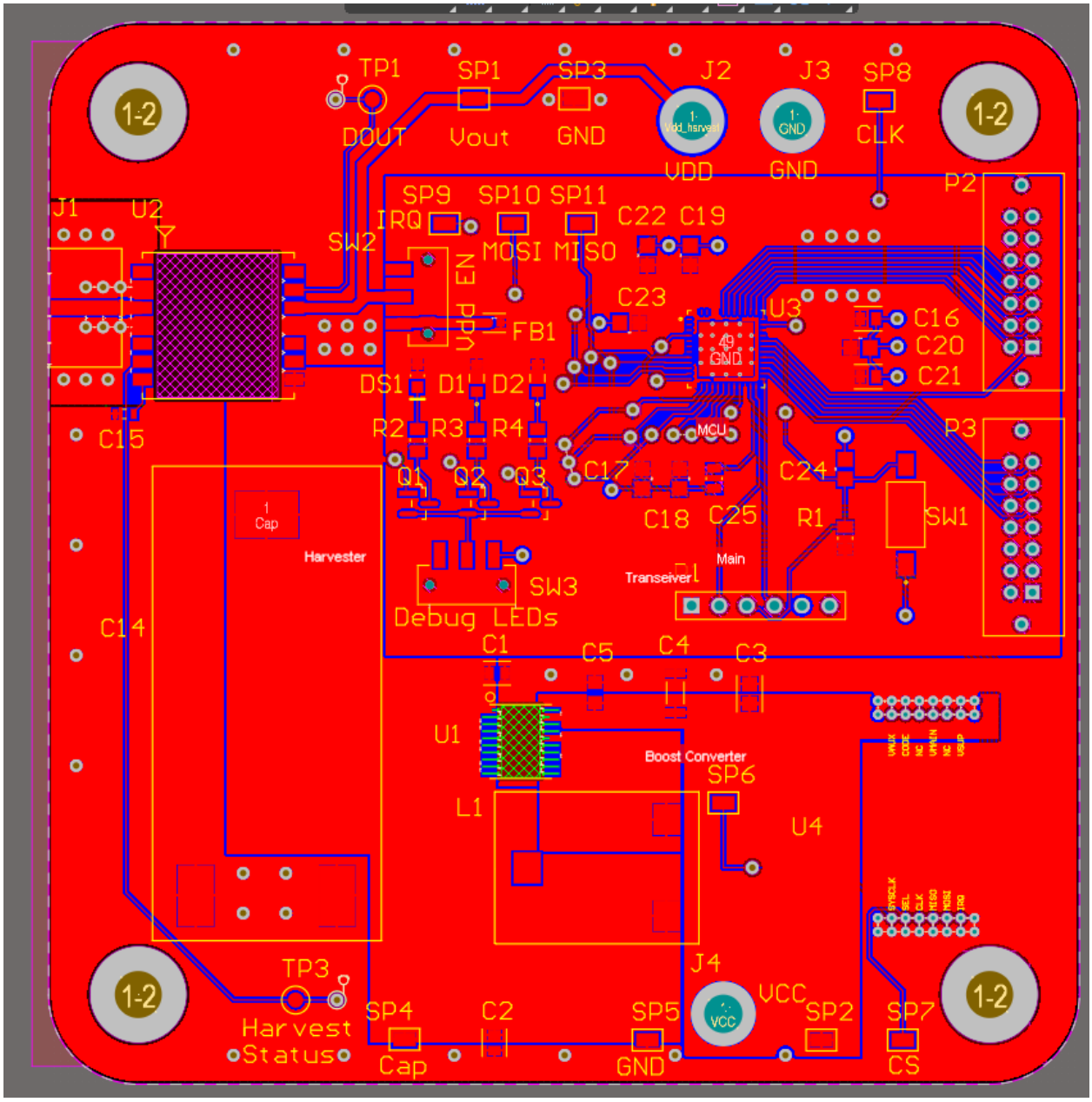
- We managed to configure two transceivers built into the CC1352 Launchpads and communicate between them, with the goal being to use these working transceivers to test the transceivers used in our project. For example, to test our project's transmit function, we'll use one of the working transceivers as the receiver.
- Identified a number of problems in our Tx register configurations which were preventing us from transmitting. We have fixed these and are now very confident that we are able to transmit data whenever we want
    - Working on testing this using a CC1352 LaunchPad transceiver
- Identified a number of problems in our Rx register configurations which were preventing us from receiving. We have fixed these, but are as of yet still unable to receive.
- Measured the power consumption of the TCXO used by our transceivers and learned that the TCXO power consumption may be high. A potential fix has been identified, although that fix will not be implemented until we have core functionality working.
- Confirmed the functionality of the transceiver interrupt pin
- Improved existing SPI communication test functions.

Altium Work (Bryce, Ted, and Eddie)

- Transceiving parts researched and implementation started

Project Poster and Final Report (Ted, Eddie, Bryce)

- Made Bill of Materials, began proofreading preexisting design document



Current PCB layout

Pending issues

- One of the transceivers does not function like the other one when put into TX or RX mode.
- We haven't been able to receive our transmitted signal.

Individual contributions

The below hours include a rough estimate of hours worked over the last week.

NAME	**Individual Contributions** (Quick list of contributions. This should be short.)	**Hours this week**	**Hours cumulative**
Bryce Staver	Altium PCB layout	15	57
Douglas Zuercher	Worked on CC1352 LaunchPad Tx/Rx capabilities for testing Identified issues in Tx/Rx setup Measured power consumption of TCXO on transceiver	15	61
Edmund Duan	Altium PCB layout	15	54
Jacob Bernardi	Helped interface MCU and transceiver Researched JTAG programming	15	53
Zack Komodromos	Rewrote transceiver configuration, tx and rx functions Tested communication between 2 of the transceivers Testest communication between 1 transceiver and an MCU operating in RF FSK mode	25	72
Kwanghum Park	Altium PCB layout	15	47

Plans for the upcoming week

MCU / Transceiver Testing (Douglas, Zack and Jacob)

- Continue debugging the current Tx/Rx code to determine why we cannot transmit and receive between the project transceivers
    - Test Tx capability using a transceiver that we know works
    - Test Rx capability using a transceiver that we know works
- Flesh out the details of the TCXO power consumption improvement
    - This item is lower priority than debugging, may be pushed off depending on debugging progress

Altium Work (Bryce, Ted, Eddie)

- Add 14 dBm 900 MHz transceiver parts

Project Poster and Final Report (Ted, Eddie, Bryce)

- Revise Senior Design Document
- Make poster