

EE/CprE/SE 492 WEEKLY REPORT 5

10/26/2021-11/8/2021

Group number: 18

Project title: Batteryless Game Device

Client &/Advisor: Henry Duwe

Team Members/Role:

Shivam Vashi- Software Lead

John Brose - Power Systems Engineer

Daniel Lamar - Test Engineer

Franklin Bates - Microcontroller Engineer

Jake Larimore - Integration Engineer

o Weekly Summary (Short summary about what the group did for the week. This should be about a paragraph in length. These are just a few questions to help you get started. What was the overall objective for the week? In general, what tasks were completed? Were there any changes made to the project?)

Team is putting together entire power generation circuit. Confirmed we are able to power microcontroller and refresh E-ink screen up to 10 times with fully charged super cap. Will finish testing and PCB design within 2 weeks. GPIO button functionality and further game development will also be done in this time.

o Past week accomplishments (Please describe/summarize as to what was done, by whom, when and, collectively as a group. This should be about a paragraph or two in length. Bulleted points are acceptable as well. Please keep only your technical details related to your project. Figures, schematics, flow diagrams, pseudocode, and project related results are acceptable, but please ensure that they are legible (clear enough to read) and to provide an explanation. If researching a topic, please add a few details about what was learned and how it is relevant to the project. If two or more people worked on a single task, be sure to distinguish how each member contributed to the task. Specific details relating to the assistance provided to other members may be included here. Do not include classwork, such as individual reflection assignments, and group meetings as part of your duties.)

Shivam Vashi: Ran into some issues with the compute through power loss, but the proof of concept is now properly done so the device will save states through hard resets and power loss
Franklin Bates: Performed some testing with the MCU and power delivery subsystem with E-Ink display troubleshooting lingering power consumption from the display. Continued coding for GPIO and Partial refresh APIs.

Jake Larimore: Soldered and tested booster board. Was not able to get the output I was hoping for, although John is soldering and testing a different IC to see if he can get better results. I

ordered two different sets of parts these past two weeks. Did some testing and helped make testing plans for this upcoming week.

John Brose:

Daniel Lamar: Helped with testing the power system generation/storage/ and consumption via the e-ink display. Began writing the testing framework for integrating and tweaking our final design.

o Pending issues (If applicable: Were there any unexpected complications? Please elaborate.)

Shivam: The compute through power loss library was broken upon importing. The default settings have a typo in them that needed to be fixed before any progress could be made on the code.

Franklin: The display was consuming power while in sleep mode, issue was traced to the rst pin that was set high for operation and never set low for sleep. Low Power Modes need to be ironed out still to make use of turning off the MCU between state changes.

Jake Larimore: We need to see if we can get the booster board to properly output around 3.3V. We would also like to test different super cap sizes that would better fit the game's power up and power down functionality. We also need to work on circuitry for combining hand crank and button power generation.

Daniel Lamar: We are unsure of what size capacitor to use for our power management IC so we are conducting tests to determine this value. Depending on our decision, this may affect the gameplay especially if we largely limit our energy storage.

John Brose:

o Individual contributions (Creating this section is optional, but it is Required to include the

“Hours Worked for the Week” and their “Total Cumulative Hours” for the project for each member somewhere relevant in your report. Your individual weekly hours should be at a minimum of 6-8 hours for this course. So please manage your time well. Also, ensure that individual contributions support your claim to the weekly hours. Be honest with the reports.)

Name	Contributions	Hours Worked this Week	Hours Cumulative
Shivam		8	38
Jake Larimore	Ordered parts, built/tested booster board, began testing implementation	7	28
Daniel Lamar	Helped with testing the power	4	23

	system-e-ink compatibility.		
John Brose		5	20
Franklin Bates	Help with testing power delivery Super Capacitor, troubleshooting errant power consumption by display, coding towards partial refresh and GPIO	4	48

o Comments and extended discussion (Optional)

Feel free to discuss non-technical issues related to your project.

o Plans for the upcoming week (Please describe duties for the upcoming week for each member. What is(are) the task(s)?, Who will contribute to it? Be as concise as possible.)

Shivam Vashi: Implement GPIO, create proper tests

Franklin Bates: Create basic static images for game states to use in software. Work towards partial refresh capability implementation for E-Ink Display and Software integration with Display API and GPIO interrupt service routines.

Jake Larimore: Test power generation with different super cap values. Test booster board functionality with buttons and output to power IC if we can get it working this week. Find ways to limit voltage of hand crank and combine hand crank power generation with button power generation.

John Brose: Issue of getting stuff on time that needs to be ordered, such as future boards or new ICs/components to make ICs work, create board that incorporates all modules.

Danie Lamar: Begin testing our final designs using the framework I create with Jake this week. Determine which Capacitor value works best for our final design. Progress through 3D-modeling of the casing as the physical model of our final design is known.

o Summary of weekly advisor meeting (If applicable/optional)

(Provide a concise summary on the contents and progress made during the advisor meeting.)