

PowerSlice Sprint 3

Team A1_26 Ryan Rosenberger

Goals for this sprint

- Identify commercially available USB PD interfaces and converters to use
- Research potential simulation methods to verify stable operation with various converters and loads onboard
 - Simulate converter interactions
- Put together preliminary schematic with ports, converters, and interfaces

Identifying Commercially Available Converters

- Chips for interfacing with Laptop Charger over USB-C PD do exist
- Would likely require some kind of I2C control from a different microprocessor/IC to implement
- Evaluation boards appear to be expensive/not easy to get
- TO DO: Look for more plug and play options with easy implementation: physical realization with remaining time is a concern

Research potential simulation methods

- SPICE Simulations seem to be the best route
- Issue is that these USB PD controllers/converters are very specialized, hard to find/model them in SPICE simulations
- Would likely need to manually recreate chips in some spice simulations, concerns about feasibility/accuracy of simulation
- Alternative would be MATLAB simulink, this would require even more abstraction however
- TO DO: Construct a simplified SPICE/Simulink model to at least show power flow, potentially show varied behavior with changing loads

Put together schematic with ports, converters, interfaces

- Was not able to construct schematic during this sprint
- Was focusing on finding specific hardware solutions first (desired controllers/converters) then creating a more accurate schematic with the desired final part
- Considering that part choice is still undetermined, go for a more general solution next sprint
- TO DO: construct a generalized schematic and put in more specific part choices later

Goals for next sprint

1. Create a simplified model for power flow in the product in a simulation software to be chosen later (Intended Demo)
 - a. Run through a few potential use cases to show theoretical device operation
 - b. Vary input power and output loads to look at potential load arbitration cases
 - c. This also serves to generate a basic schematic to show system behavior, a more realistic schematic can be created pending some hardware decisions
2. Continue to search for hardware options
 - a. Given limited remaining timeline, a decision needs to be made as to whether or not a physical implementation will be approached moving forward this semester
 - b. Hardware needs to be rapidly obtained, implemented, and assembled