

*Title:* FlexCharge USB

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Our goal in this project is to design a USB charger that can run off of any battery from at least 1.5V to 12V. To do this we will build a boost-buck converter in either a two-stage topology (boost into buck) or design logic to choose which one will be needed depending on the power source. To get our project to work we will need to use components that run off of voltages ranging from our lowest expected input (1.5V) to our highest expected input (12V) as our input will be the only source of power for the entire circuit. These components will also have to be able to handle the high power levels that may be experienced in response to high current draws and high voltage levels.

Should we finish our initial described setup with time to spare we could add various expansions to our project. For instance, we could add an option for it to be plugged into a wall outlet. This would require the addition of a rectifying block that would bring the AC wall voltage down to a DC voltage within our original projects operating specs. Our project could also be expanded to work as a solar charger, taking advantage of the low input voltage capabilities. Beyond being just a simple USB charger, the output could also be configured to power devices like the ECG we built earlier in the course with some modification to the ECG's design.