**ELE 391 Project Proposal**

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**Project Focus:** LiPo Battery Charger and Fuel Gauge with external battery connection

**Project Summary:**  The overall goal of this project is to create a circuit capable of powering all four daughter-boards as well as the Metro Mini itself. Due to the size of the PCB being constrained to 1.7” x 0.7” we will not be able to integrate a battery into the PCB itself and instead will connect a LiPo battery externally using a JST connector. In order to charge the battery, we will be using a LiPO specific battery charger which also integrates some useful power management features. The primary concern that we previously faced was how to switch between USB charging, USB power, or battery power. The specific power management IC that we chose is able to automatically switch between these based on some parameters that we will later set. Now, in order to measure the remaining capacity of the battery we will be using a LiPO fuel gauge IC which is specifically designed to measure and report the status of a LiPO battery. This is advantageous to directly measuring the battery voltage and setting up a scale based on maximum and minimum values because LiPo battery voltages (at load) are not entirely linear curves. This fuel gauge IC communicates through I2C and by default will switch on an LED at a point where the LiPo battery is about to “die”. By adding some code to the provided code examples we will be able to have the fuel gauge IC switch on some LEDs to indicate different states in the charge/voltage level of the battery. Instead of being limited to exclusively when the battery is about to “die” we can also report when the battery is at optimal voltage levels and when the battery is below optimal levels but still providing power as expected.

In general, we expect to be able to produce a schematic and PCB with these capabilities and functions by the due date. More details about the specific parts and general function of the system can be found in the attached files.

**Min Reqs:**

-1700 x 700 mils x 62 mils thick

-80 mil radius rounded corners

-4 non-plated mounting holes, 75x75 mils from corners, 2.2mm dia, 0.125” standoff on each

-Pinout to match metro mini

-Envelope:

-0.400” stacking height

-0.280” top clearance

-0.100” bottom clearance

-Battery board output, VIN (6V+) (Current req. TBD per system)

-Current sense resistor on power rails (shunts) on bottom of board: CSR1206FTR100

-50 mil round test points (on bottom of board)

-Fiducial on tope side, 1mm pad, 0.5mm SM exp