Signal Conditioning and Amplification for Shock Dyno

Milestones:

- M1: Make readable measurements from LDS and FT, to confirm functionality, wiring
- M2: Determine how to integrate system into total electrical system (how will components connect to MCU, wiring layouts, find and test ancillary hardware…)
- M3: Determine procedure for proper calibration of both sensors (may involve creating plan to use 3057 labs…)
- M4: Calibrate sensors
- M5: Troubleshoot and refine signals (quantify noise and uncertainty) of system in application (actually inserted into shock dyno) and do first test runs
- M6: Create documentation/instructions for repair/maintenance/how things work
    - Completion deadline: **October 22 2019**

Deliverables/Explanation:

- Must determine the proper way to measure FT signals, to amplify and potential filter them so that they can be quickly and easily read by the MCU. This will involve researching, prototyping and refining use of electrical hardware/circuits to condition signals, in addition to making sure signals are readable to the MCU
- Must work with the LDS and S-beam FT we already have
- Conditioning system must be able to integrate into shock dyno electrical platform. This means considering power sources available, how the system interfaces with an MCU. The goal is to be able to put the conditioning system within a single PCB or protoboard circuit (where the MCU, control...other circuits are as well)
- Must be as foolproof, reliable as possible
- Must be well documented for future (uninformed) users

Tips, details and pertinent information:

- LDS we have: (the 200mm travel one?) http://www.activesensors.com/datasheet/general-purpose-linear-potentiometers/WS-SLS1300.pdf
- FT we have: (2000 lbf model) https://www.omega.com/en-us/sensors-and-sensing-equipment/load-and-force/load-cells/lc103b/p/LC103B-2K
- MCU to be used: Either the Arduino Nano: https://store.arduino.cc/usa/arduino-nano
  Or the Teensy 3.2: https://www.pjrc.com/store/teensy32.html
- DAQ GitHub: https://github.com/GTOR-BajaSAE/DAQ
- Purchasing spreadsheet: https://docs.google.com/spreadsheets/d/1ILN35p0WuqsaUOu9AnwBnsDROKAHuUL8cqE_y23wues/edit#gid=1937511476

- Use line item number “21” and “DAQ shock dyno” for purpose. Ask Billy before adding anything to the list. Visit the invention studio/Hive to see if they have hardware before buying anything.