IPRO 324:
NO STRAIN NO GAIN

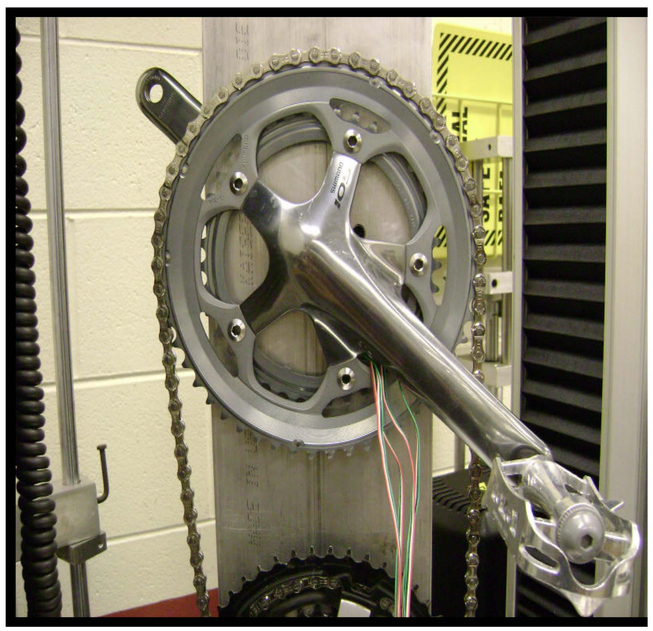
OBSTACLES

Mechanical Team:

- Finding discrete location for strain gages and complete system
- Choosing strain gage locations which provide accurate results
- Applying gages without destroying them
- Calculating crank angle
- Creating an algorithm which provides power measurements

Electrical Team:

- Using a quarter bridge setup forces the signal amplifier to be saturated. Replace with full bridge.
- Long connecting wires produce lower quality signals
- Need for switches on each bridge when using only one amplifier
- Output impedance for the op-amp must be very low when used with ADC
- Problems with microcontroller operations



(Crankset Testing)

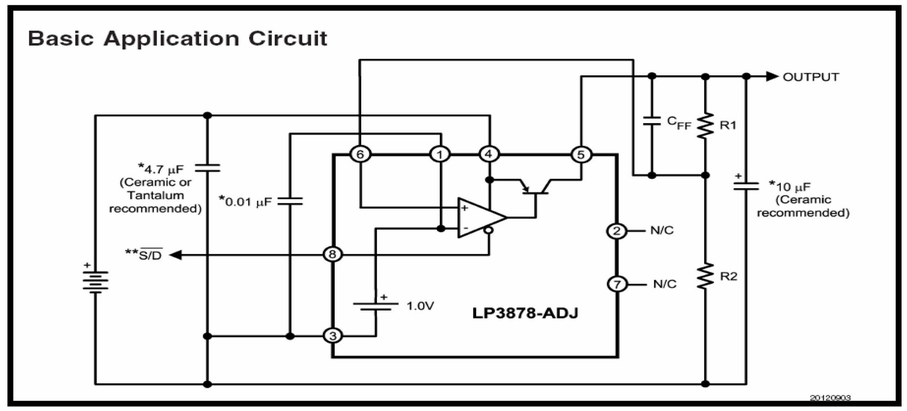
RESULTS/CONCLUSIONS

Mechanical Team:

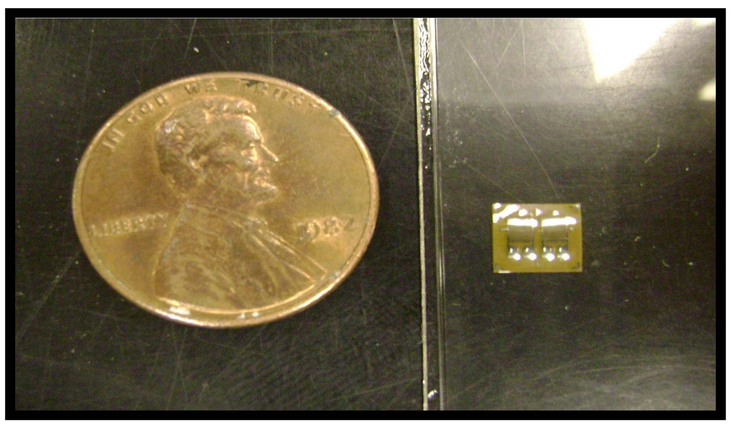
- Designed working system of bridges
- Measured strain for each bridge, pedal, and chain ring as well as the associated crank angle
- Found coefficients that are to be used in formulated algorithm

Electrical Team:

- Full bridge design provides accurate measurements of power produced
- Successful design and implementation of a circuit which measures RPM's
- Wireless transmission of results has been successfully acquired



(Electrical Circuit)



(Penny vs. Strain Gauge Size)

(Measuring Crank Angle with Force)

TEAM

Project Leader: Henrietta Tsosie

- Mechanical
  - Team Leader
    - Brandon Marcellis
  - Team Members
    - Brian Lam
    - Henrietta Tsosie
    - Ivan Voukadinov
    - Rebecca Martin
    - Stefan Stevanovic
- Electrical
  - Team Leader
    - Bryan Kaminski
  - Team Members
    - Arkadiusz Ziomek
    - Edumaregbemiro Odunaiya
    - Stephanus Halim
    - Tarun Anupoju