University of Hawaii at Manoa SCEL

Dragon Fruit
Critical Design Review (CDR)

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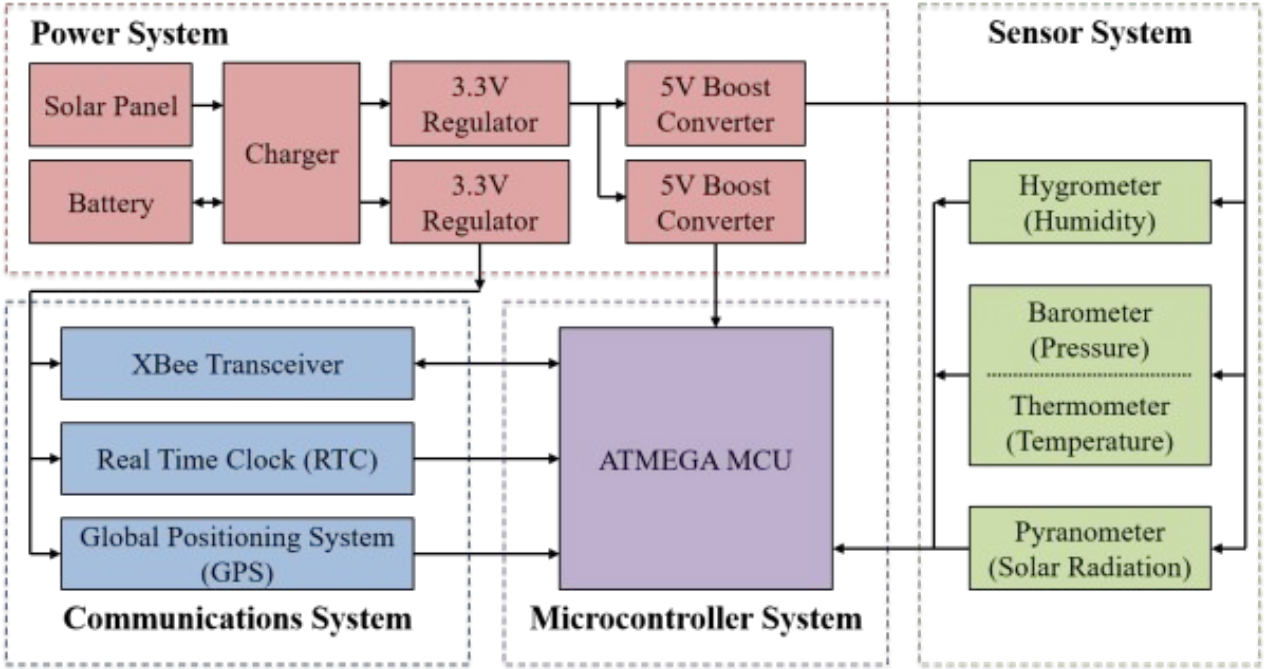
Overview

- Overall Block Diagram
- Detailed Block Diagram
- Power Budget (Theoretical)
- Problems Encountered
- Potential Solutions
- Team Progress
- Schedule

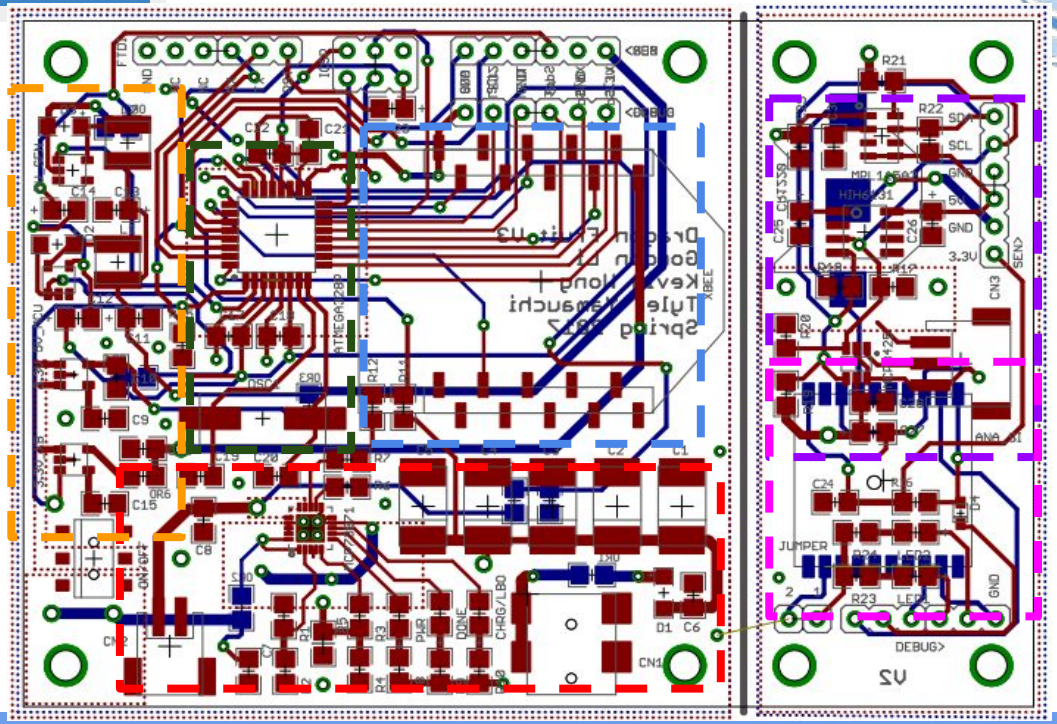
Overall Block Diagram



Detailed Block Diagram

Version 3 Board

- 0 Ohms resistors
- 4 - Power Section
- 2 - Solar Charging Circuit
- GPS Sensor



Power Budget

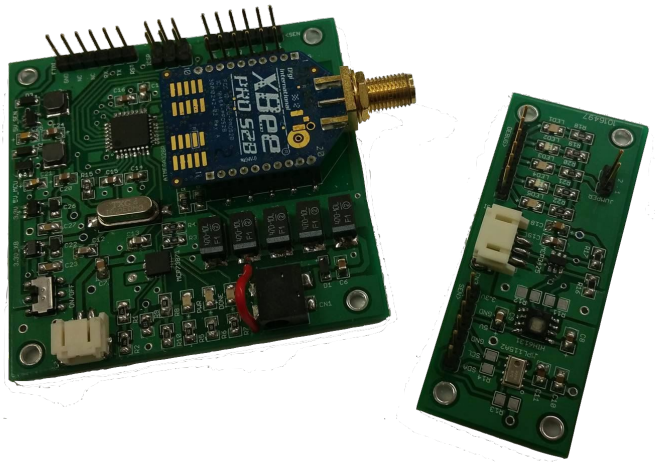
Part	Typical current draw (mA)	Average Current Draw (mA)	Average Power Consumed (mW)	Max Power Consumed (mW)
Xbee	205 mA	16.33 mA	49.568552	49.568552
Vreg 3.3V	0.35	0.175	0.5775	2.97
Atmega 328P (5V)	5.2	5.2	26	45
Solar Irradiance	0.3	0.3	1.5	1.5
Vreg 5v (Atmega)	0.07	0.07	0.35	0.5
ADC 16bit	0.155	0.07775	0.38875	0.95
Barometer	0.005	0.2525	0.83325	0.03
Humidity - HIH6131	0.65	0.3255	1.07415	5

Problems

- 5V boost converter parts ran out in the lab
  - Also part discontinued
- Deployed board stopped transmitting (Version 2)
  - Taken down this Thursday
- No SMD Diode for GPS circuitry
- Roof top access

Solutions

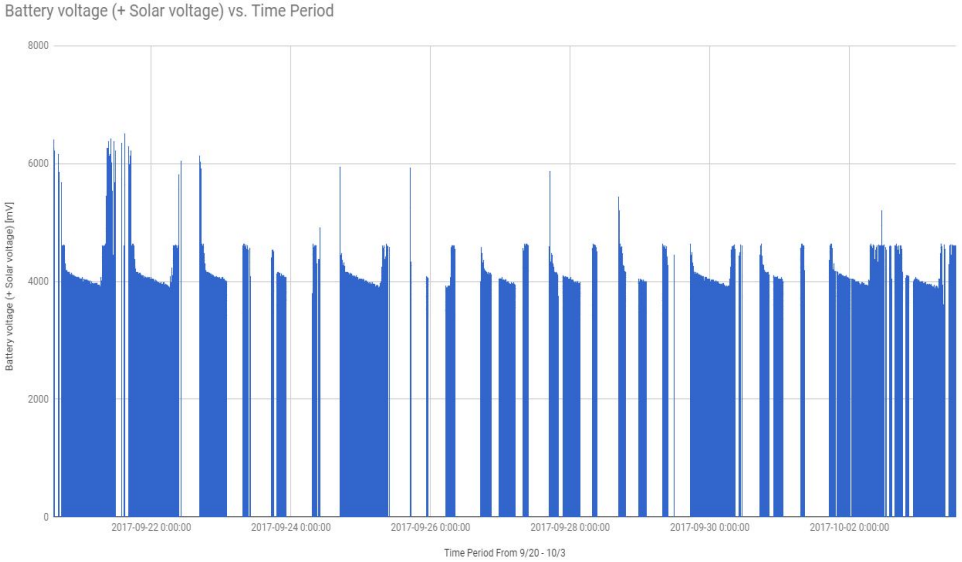
- Desoldered 5V boost converters from the Sparkfun step up breakout
- Desolder diode from GPS breakout board or use through hole part



Team Progress

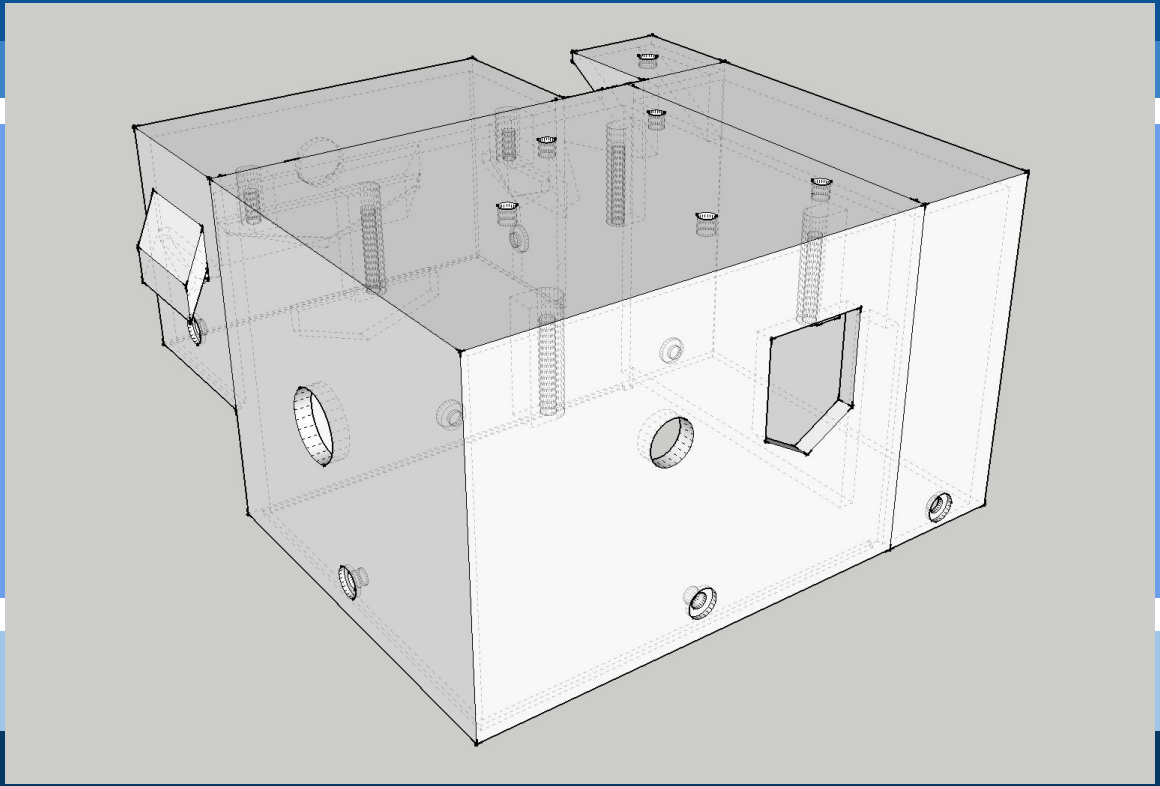
- Completed soldering of main board
- Working with Andrew to get Version 3 board programmed
- Completed edits to housing

Observations from Version 2 board

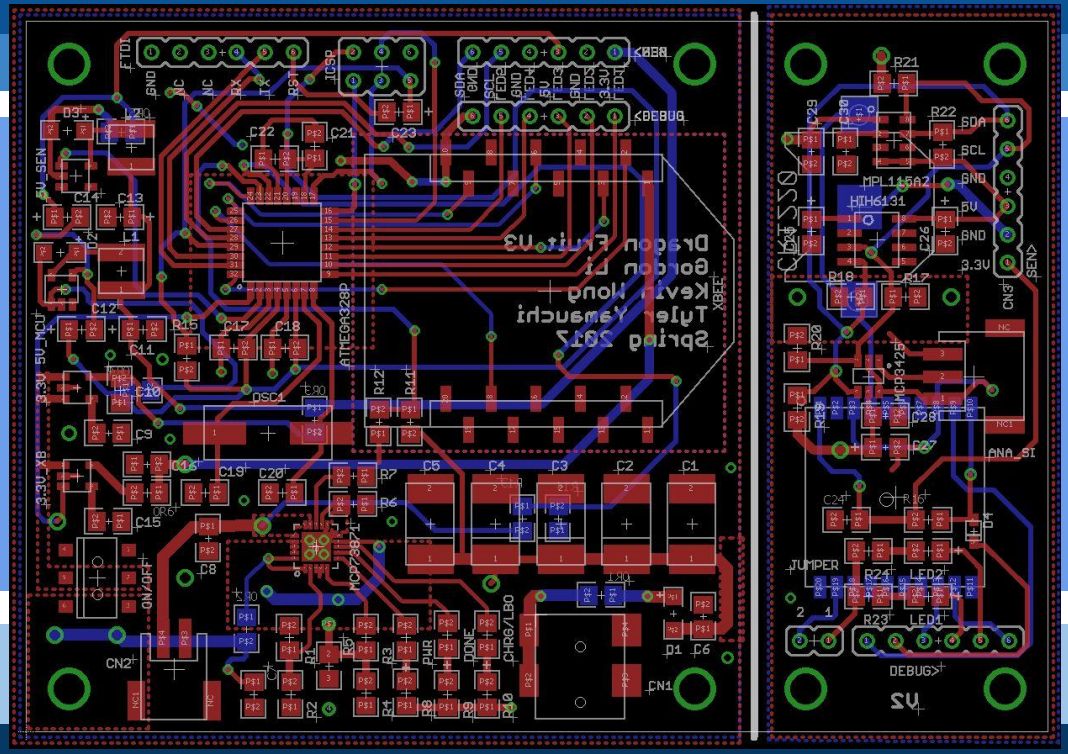


- Battery Voltage never decreases below ~3.8-3.9V, yet we see packet loss during the night time
- Packet loss at the spikes (daytime around noon)
- After the board retransmits, the voltage usually starts higher than when it stopped transmitting, meaning the board was “alive” and charging during the packet loss

Housing



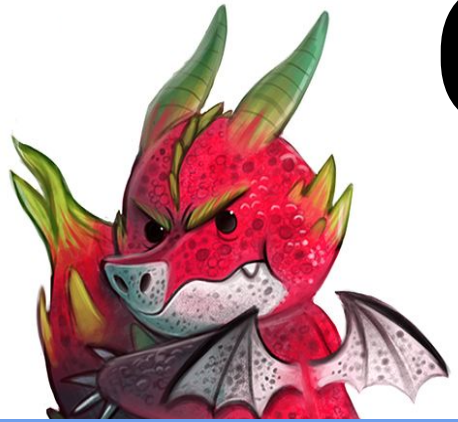
PCB



- Version 3
  - 3.59 in (dimension x)
  - 2.5 in (dimension y)
- Future Improvements
  - New package for 5V booster
  - 3.3V for Microcontroller and sensors instead of 5V

Schedule

	Project (Gantt Chart)					
Week	11	12	13	14	15	16
Date	11/6/2017	11/13/2017	11/20/2017	11/27/2017	12/4/2017	12/11/2017
Presentations						
Proposal						
Preliminary Design (PDR)						
Critical Design (CDR)						
Final Design (FDR)						
Test + New Version						
Test Deployment (Version 2)						
Solder New Board (Version 3)						
Test (Version 3)						
Deployment (Version 3)						
Power Analysis (Version 2+3)						
Housing						
Edit Housing Design (Version 3)						
Report						



Questions?

Image Sources

http://cryptid-creations.deviantart.com/art/Daily-Paint-1081-Dragon-Fruit-Keeper-570702189

http://www.michaelleestallard.com/wp-content/uploads/Hello-My-Name-Is-Name-Badge.jpg