Cranberry

EE396 Preliminary Design Review

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Overview

- Block Diagram
- Power Budget
- Progress
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- Future Improvements
- Questions

Block Diagram

Power Budget

Cranberry Version 3.2 & 3.5 Power Budget

3.3 Volt Module	Datasheet Values			XBee Characteristics	
Device Name	Idle (mA)	Typical Current Draw (mA)	Max Current Draw (mA)	Transmit Time	Idle Time
XBee Transmit	15.00	205.00	220.00	0.0109%	99.9891%
XBee Recieve					
Barometer	0.01	0.01	0.01		
Humidity (HIH6031)	0.00	0.65	1.00		
V. Reg 3.3V (Main)		0.35	0.90		
V. Reg 3.3V (Xbee)		0.35	0.90		
Atmega 328P MCU	0.70	1.70	2.70		
Irradiance ADC	0.01	0.15	0.30		
Irradiance Op Amp		0.80	2.20		
Total Current Draw (mA)	15.72	209.01	228.01		
Supply Voltage (V)	3.30	3.30	3.30		
Total Power Consumption (mW)	51.86	689.72	752.42		

	Rechargeable Li-Po Batteries (3.7V)		
Battery	Voltage (V)	Current (mAH)	Useable Energy (%)
6600 mAH Li-ion 3.7V	3.7	6600	80.0%

	Estimated Battery Running Time				
Battery	Energy (mWH)	V. Reg Efficiency (%)	Max Power Consuption (mW)	Max (Hrs)	Max w/ V. Reg Efficiency (Hrs)
6600 mAH Li-ion 3.7V	19536	80.0%	75.99	257.1	205.67

Cranberry Notes and Documentation

Revision: R1.0

* Current Draw (mA) and Avg. Power (mW) calculations assume sensors (barometer, etc.) are polling 1/2 of time.
* V. Reg current values are taken from datasheet values for loads of Iout = 50mA, because total average system current draw is approximately 57mA for the 3.3V regulator.
* Assume XBee leakage currents are negligible (µA << mA).
* Assume XBee only operates in transmit/idle mode (i.e. does not receive data from the server).
* For XBee Transmit/Idle Time, use given parameters: 82bytes (Transmit Rate = 250 kbps), sent to the server every 3 seconds.

Progress

- Completed housing
- Worked on 3 boards
- Version 3.2 Current State:
  - No longer useable
- Version 3.5 Current State:
  - 1 programmed: correct sensor readings
    - Crimping solar irradiance sensor
  - 1 doesn't program
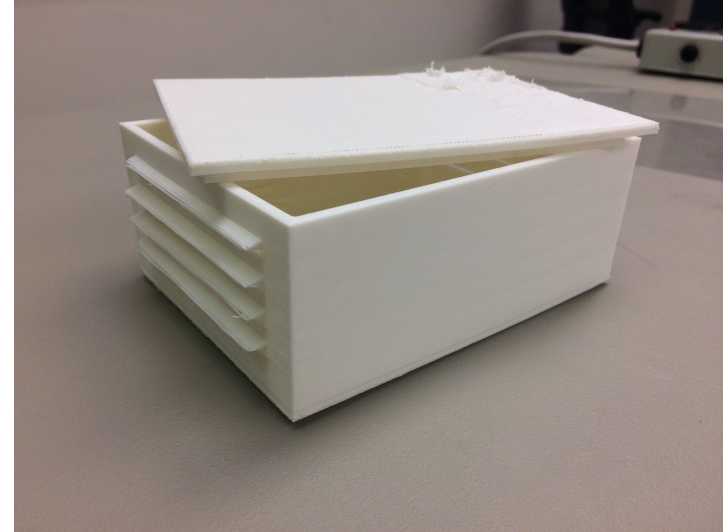
Problems & Solutions

- Wrong clock so the board wouldn't program
    - Changed the clock to an 8 Mhz
- Firmware got stuck at pressure sensor
    - Fixed pressure sensor by moving it
- Solar Irradiance sensor invalid readings
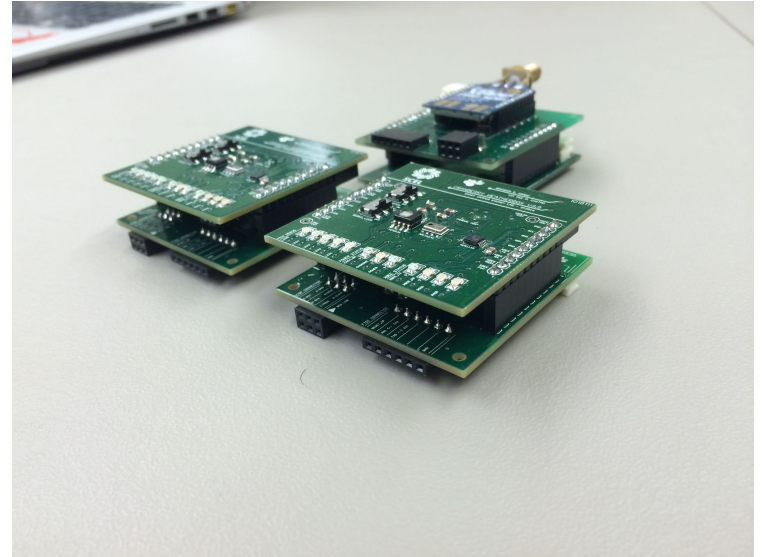   - Rewired the sensor correctly

Updated Schedule

	10/3	10/10	10/17	10/24	10/31	11/7	11/14	11/21	11/28	12/5	Finals
Finish Debug 3.5	████	████									
Deploy		████									
Research Improvements			████								
Improve PCB Layout				████	████	████					
Build Board							████	████			
Test Sensors									████		
Deploy										████	

Future Improvements

- Change charging chip package
- Get rid of MCU debug lights
- Take of the AVRISP header pins
  - FTDI is used to program it

Any Questions?