Cranberry

Experimental Weatherbox Platform

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Preliminary Design Review (PDR) Presentation
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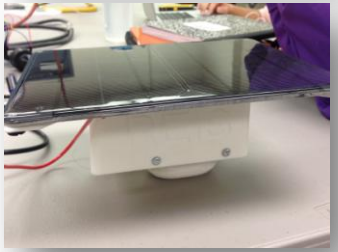
Project Overview

- *Cranberry* - Experimental Weatherbox Platform
  - Weather Sensor Module - Measures barometric pressure, humidity, temperature, and luminosity.
  - Improvements over *Apple* design:
    - ✓ More efficient power system
    - ✓ Reduction in cost and size
- Current State: Inoperable
    - ✓ Charging Chip
    - ✓ Invalid Sensor Readings



Motivation and Goals

Motivation

- Understand more about renewable energy related fields
- Apply engineering and design skills and use of relevant tools

Goals

- Update *Cranberry* Documentation
- Troubleshoot problems with current design and fabricate operational board
- Improve upon *Cranberry* board layout and implement personal design preferences

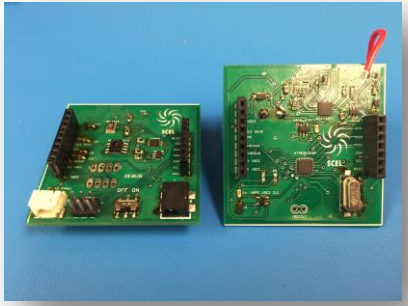
Team Approach

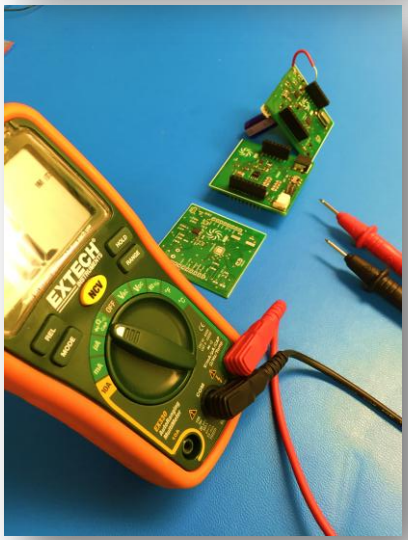
Phase One: Test / Fix Current Design

- Understand design - connections, parts, etc.
- Update documentation - part library and schematic
- Assemble parts onto a working board
- Debug and fix problems
- Produce a working *Cranberry* board

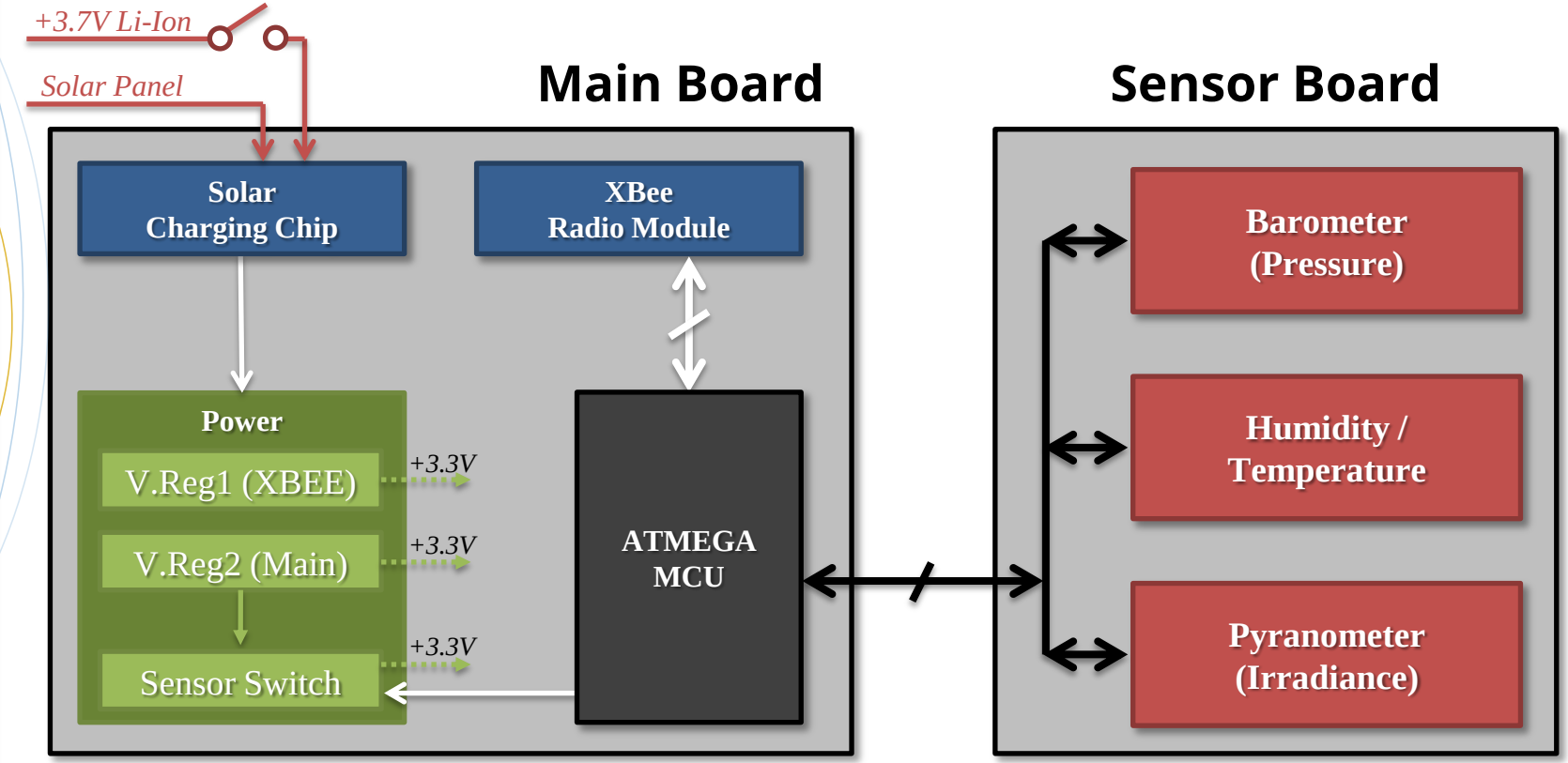
Phase Two: 2nd Iteration Design

- More efficient use of PCB space
- Consider different IC packages
- Manufacture revised PCB



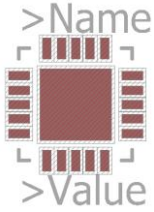


Hardware Block Diagram

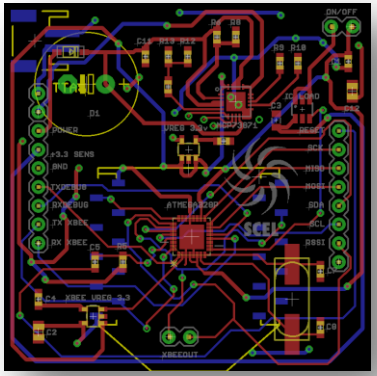


Parts Library and Schematic Update

Completed Parts

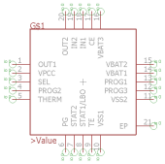


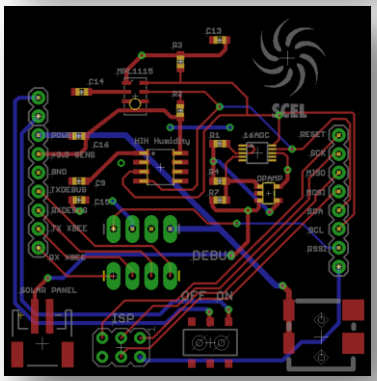
- Freescale I2C Digital Barometer
- Microchip Solar Panel Charging Chip
- Honeywell Relative Humidity / Temperature Sensor



Remaining Parts

- XBee
- Atmel Microcontroller
- Apogee Pyranometer (Solar Irradiance)
- Voltage Regulators
- Discrete Components



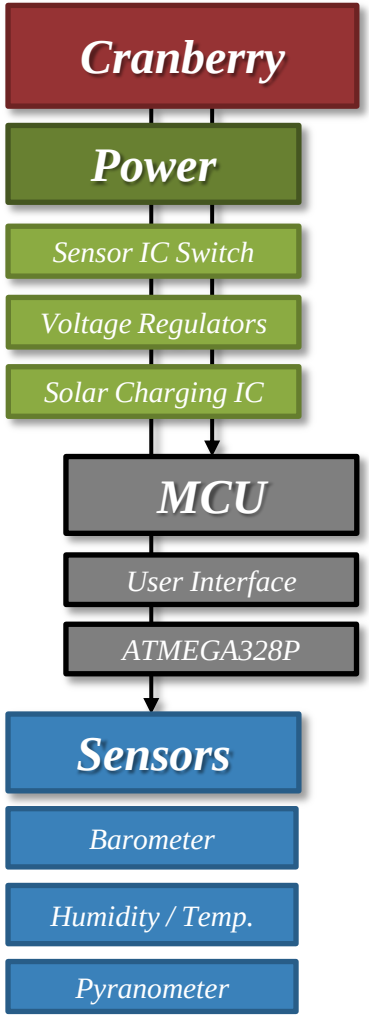


Testing Procedure

Incremental Approach – For each module:

- Verify schematics from datasheet to EAGLE layout.
- Solder on appropriate components.
- Perform continuity checks.
- Ensure proper PWR and GND connections.
- Test the validity of I/O values.

Add next module and repeat testing / debugging steps.

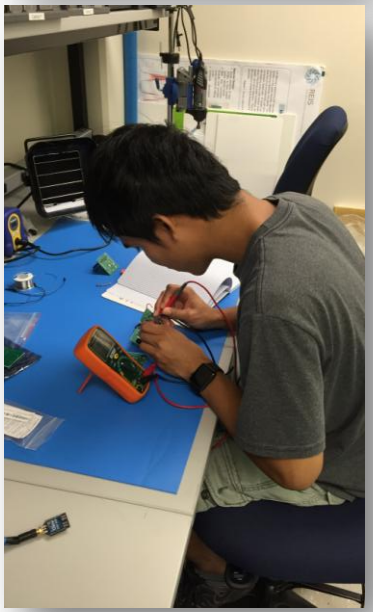


Potential Problems and Issues

- Time Management

Hardware Problems:

- Inexperience with SMD Soldering
- Inexperience with PCB Design Software
  - Translation of datasheet package dimensions into EAGLE.
  - Unfamiliarity with EAGLE tools and interface.



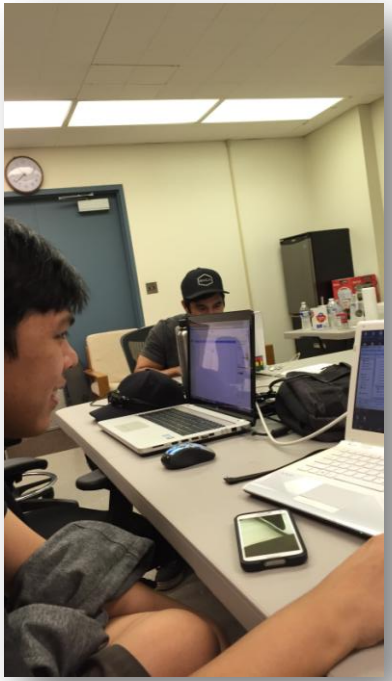
Software Problems

- Programming the MCU and getting sensor readings

Current Progress and Updated Schedule

Current Progress:

- Took inventory and ordered parts
- Begun creating library of EAGLE parts
- Read Cranberry documentation and schematics
- Comparing datasheets to EAGLE layout



Upcoming Deadlines:

- *Oct. 23rd* – Finish library and power/charging chip module
- *Nov. 6th* – Finish MCU and Sensor ICs

Any Questions?

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