

TEAM CHOCOLATE COSMOS

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WITH MENTORSHIP FROM EMILY LUM



OVERVIEW

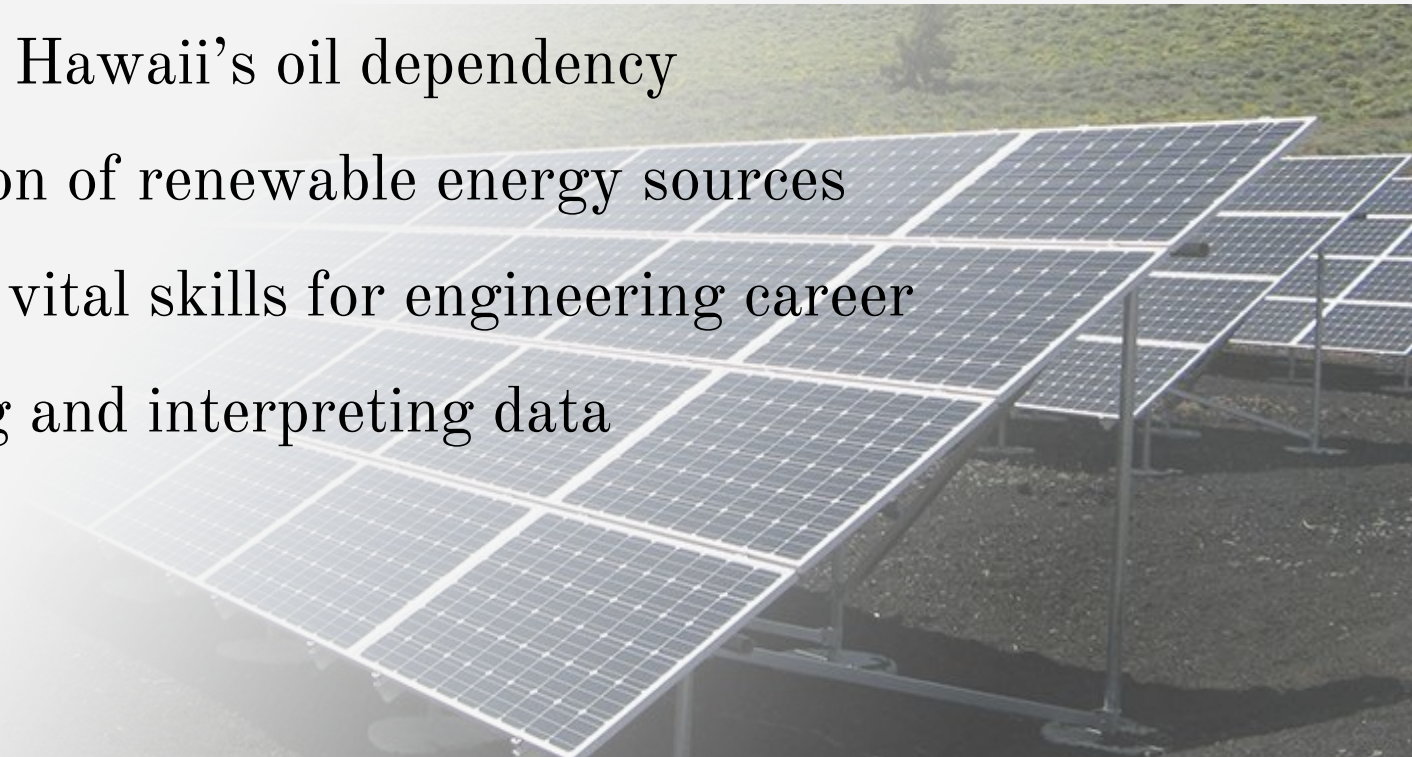
- Motivation/Goals
- Block Diagrams
- Pseudocode/algorithms
- Progress since CDR
- Problems
- Final Status/Future Improvements





MOTIVATION

- ❖ Reducing Hawaii's oil dependency
- ❖ Integration of renewable energy sources
- ❖ Learning vital skills for engineering career
- ❖ Acquiring and interpreting data



GOALS

Short-term goals:

- To gain hardware/software skills
- Time management
- Leadership
- Communication
- Better knowledge of renewable energy
- Soldering skills
- Become proficient in various programs

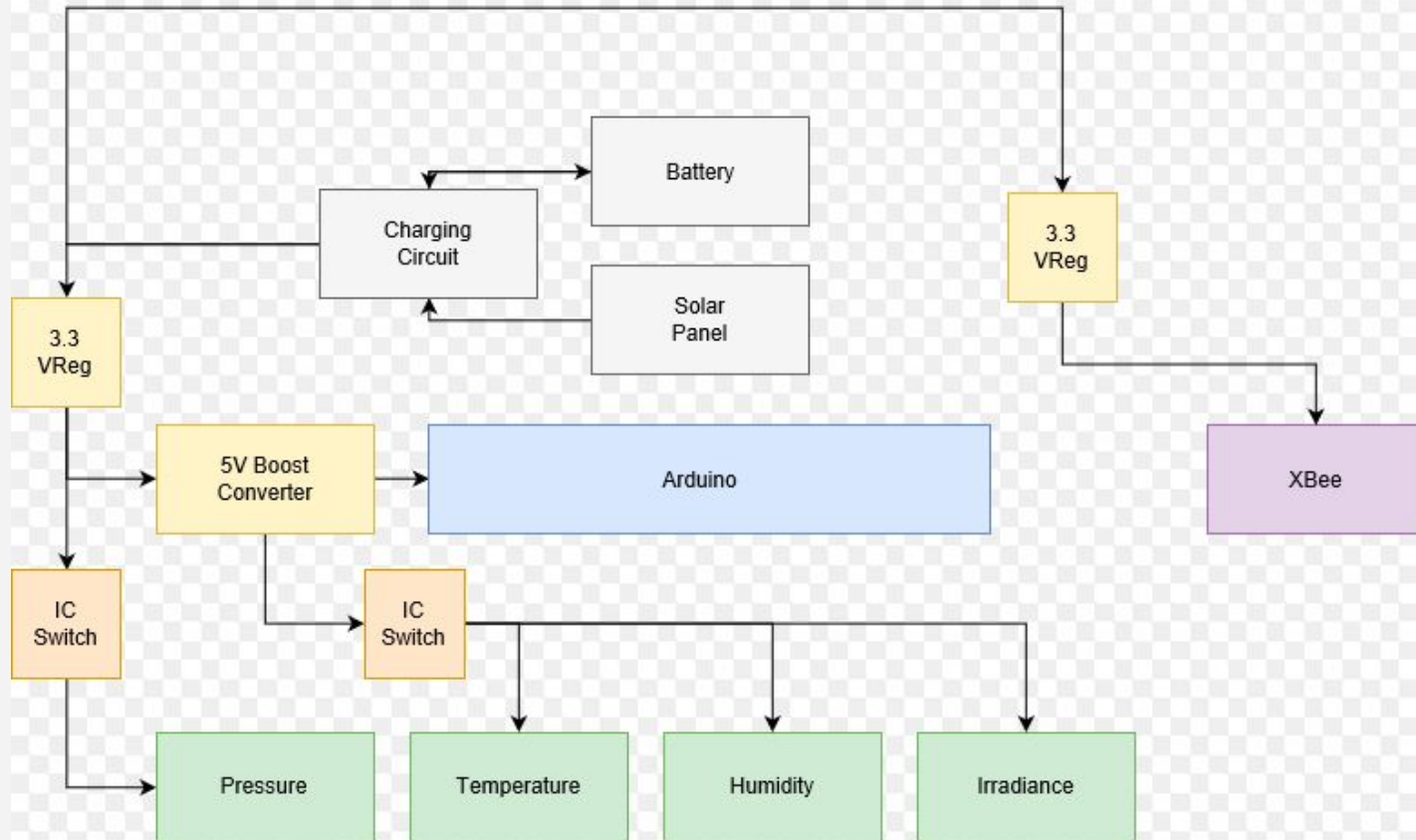
Long-term goal:

- Make a weatherbox that works



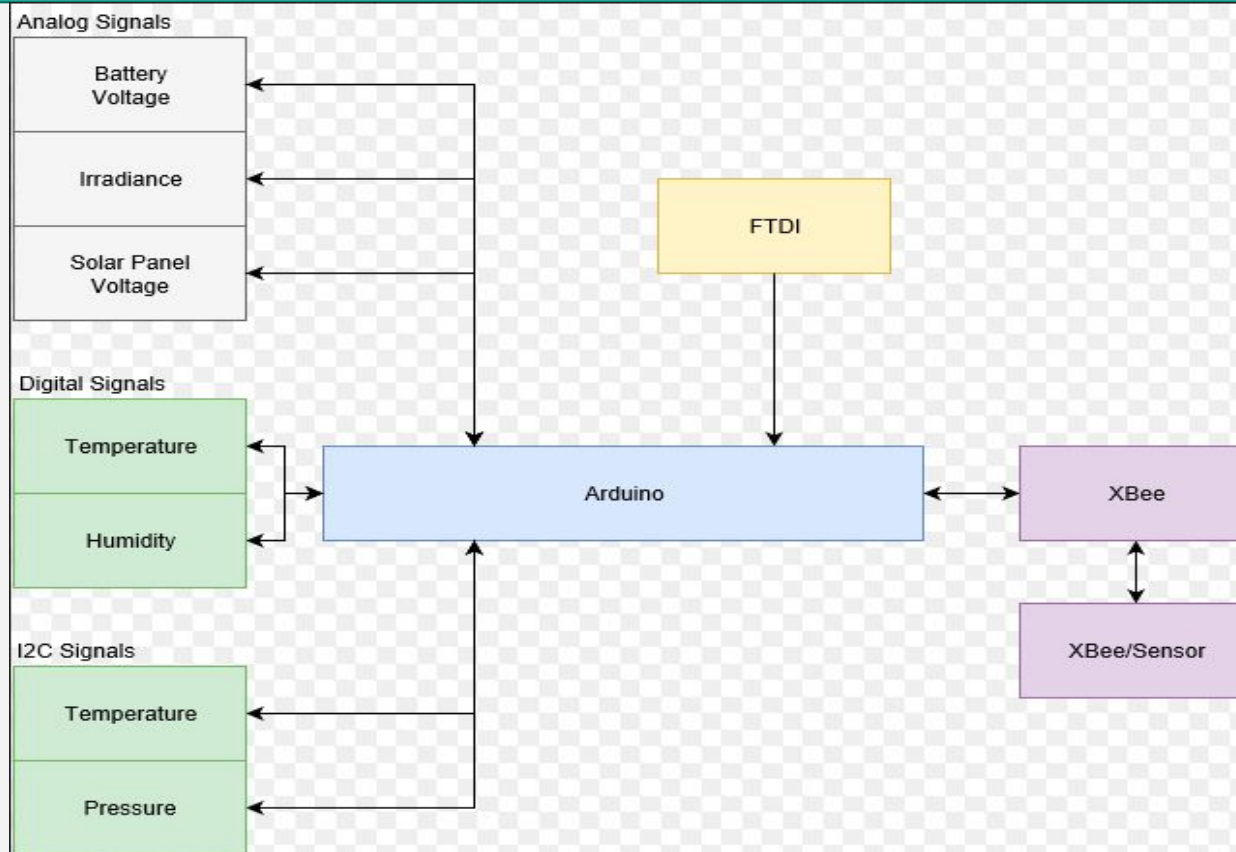


Block Diagram-Power





Block Diagram-Signal





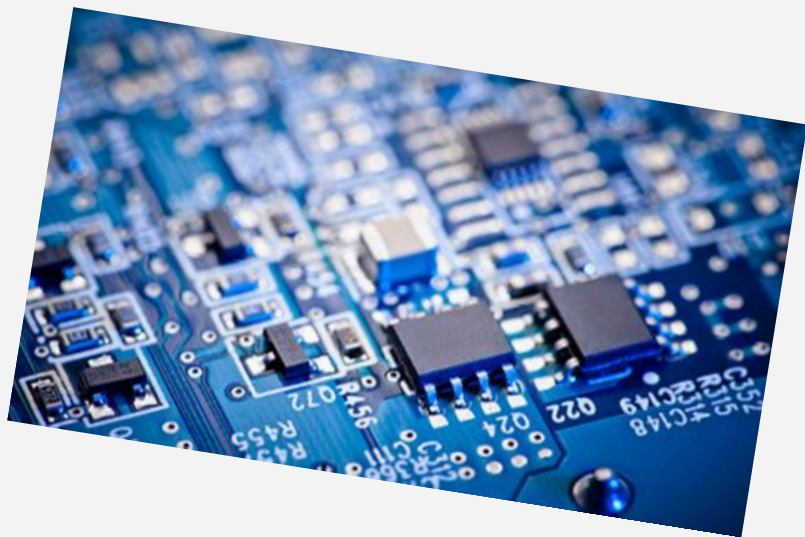
Software Block Diagram





Pseudocode/Algorithms

- ❖ Initialize sensor classes
- ❖ After every t seconds:
 - Pull data from sensors
 - Make a packet with sensor data
 - Obtain XBee Address
 - Clear payload
 - Find length(size?) of packet
 - Load payload
 - Send packet via XBee functions
 - Clear packet





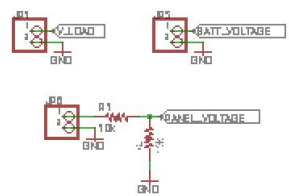
Progress

- ❖ Board
- ❖ Housing
- ❖ Firmware

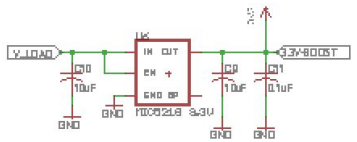


POWER

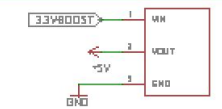
Battery Charging Chip



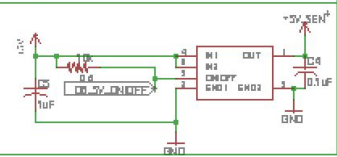
3.3V Voltage Regulator



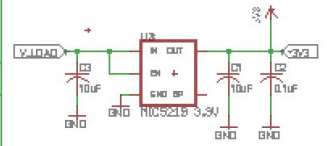
5V Boost Converter



5V ON/OFF Sensor Switch

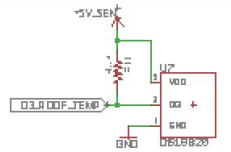


3.3V Voltage Regulator

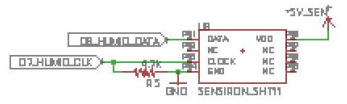


SENSORS

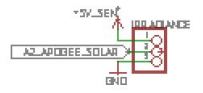
TEMPERATURE



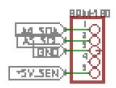
HUMIDITY



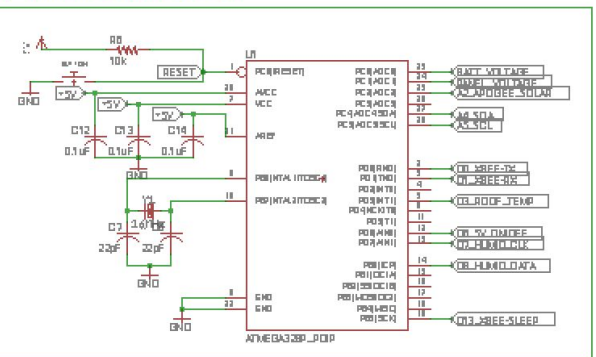
IRRADIANCE



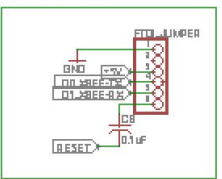
PRESSURE



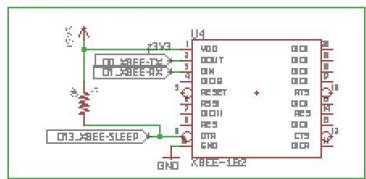
ATMEGA328P



FTDI



XBEE

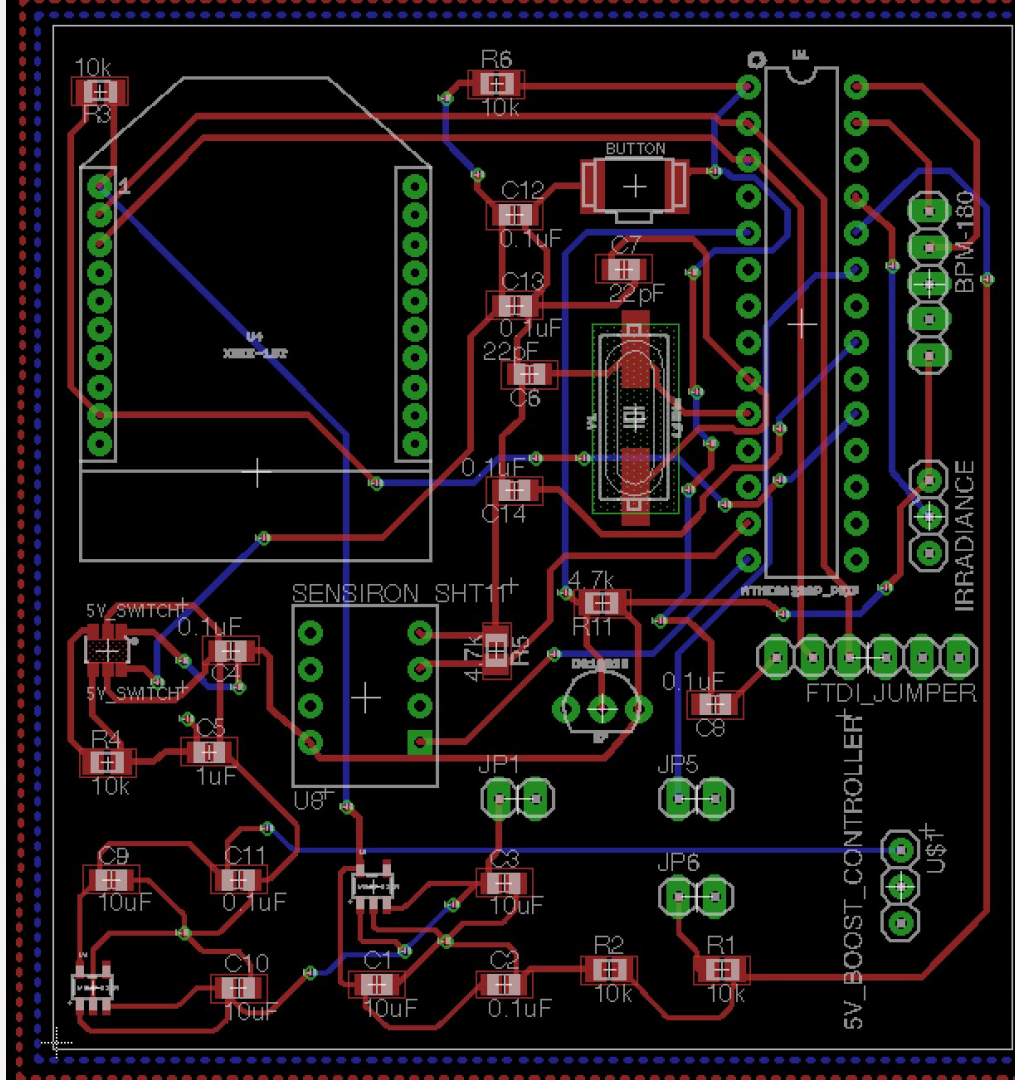


Rooftop Sensor Board

TITLE: Schematic	
Document Number:	REV:
Date: 4/11/17 1:35 PM	Sheet: 1/1

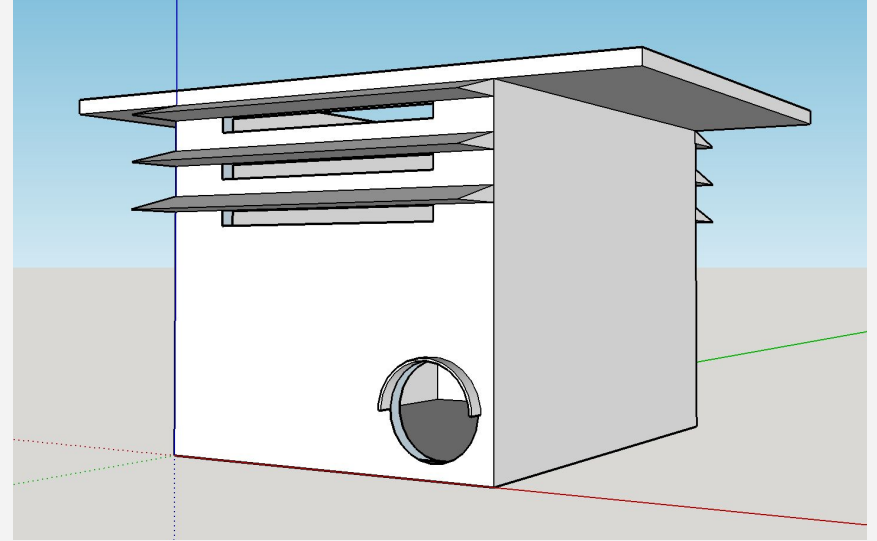
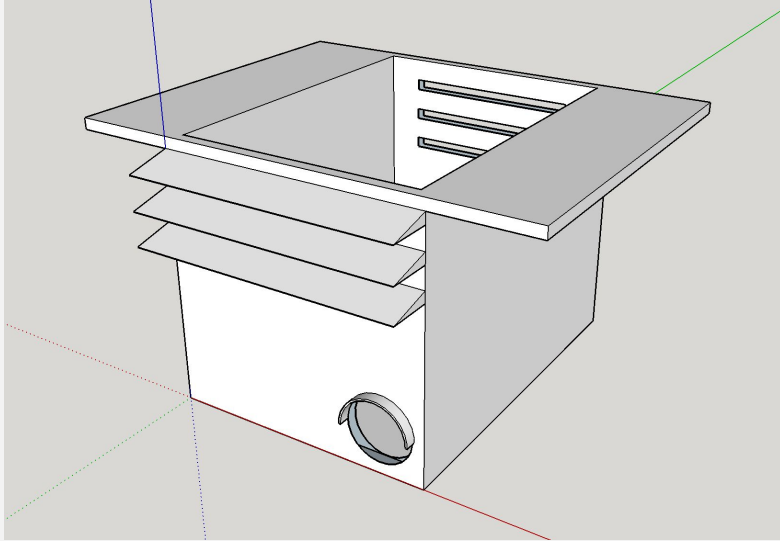
PCB Design

- ❖ Cleaned up our board
- ❖ Reduced number of vias
- ❖ Tested DRC -no errors





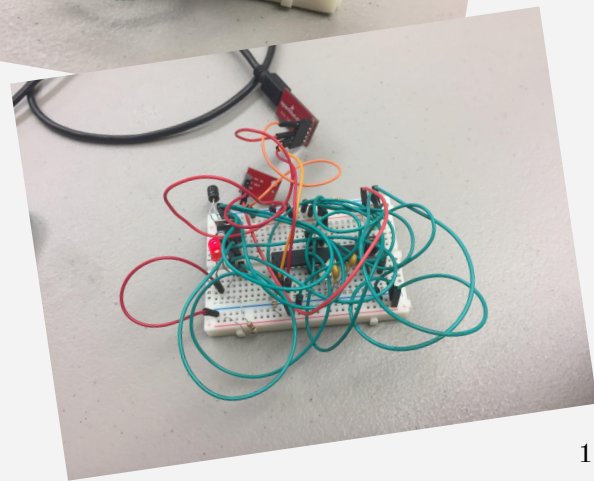
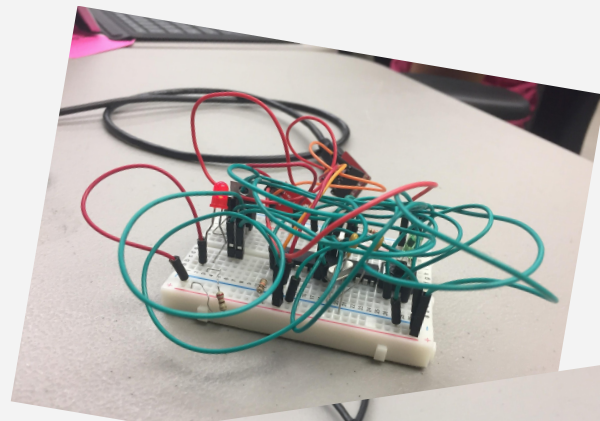
Housing





Firmware & System Integration

- ❖ System Integration
 - All sensors can be read and displayed at the same time
 - Charging circuit needs to be implemented
- ❖ Firmware
 - XBee can send packets
 - Figure out 'status' packet
 - Implement everything in one *routine* function
 - Data received isn't correct. Something in the .send XBee function.





Problems

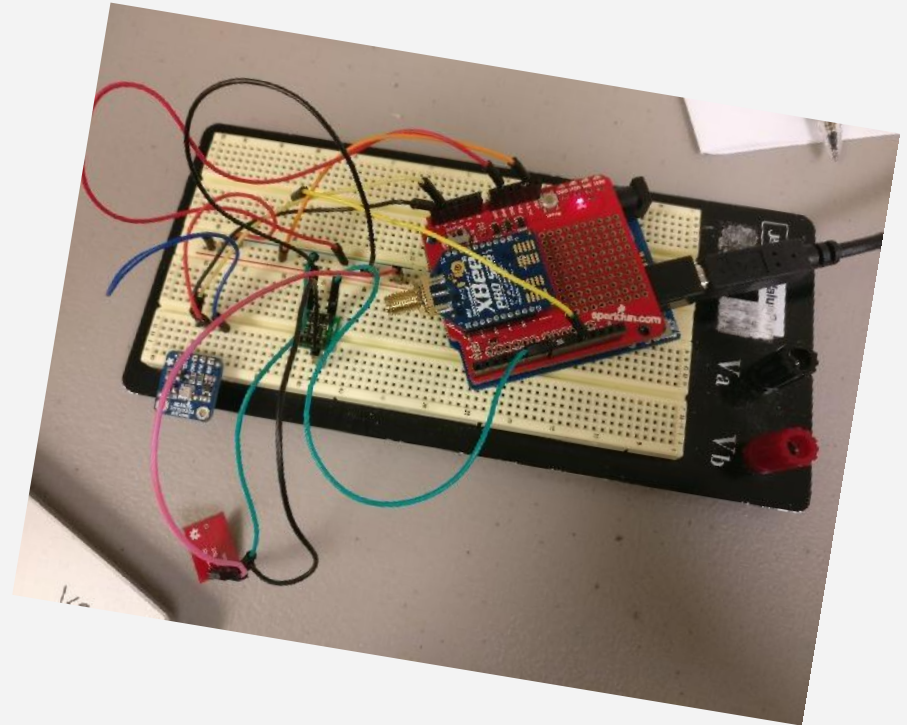
- ❖ Board
 - Routing
 - Airwires
- ❖ Housing
 - Rotating parts
- ❖ Firmware
 - Bare Arduino Problems
 - Debugging
 - Wrong SHT1x pin assignments





Final Status/Future Improvements

- ❖ Final Status
 - Finished everything except charging circuit integration
 - Need to print housing and board
- ❖ Future Improvements
 - Housing design
 - Board size



END

QUESTIONS?



IMAGES CITED

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