

Team Apple Proposal



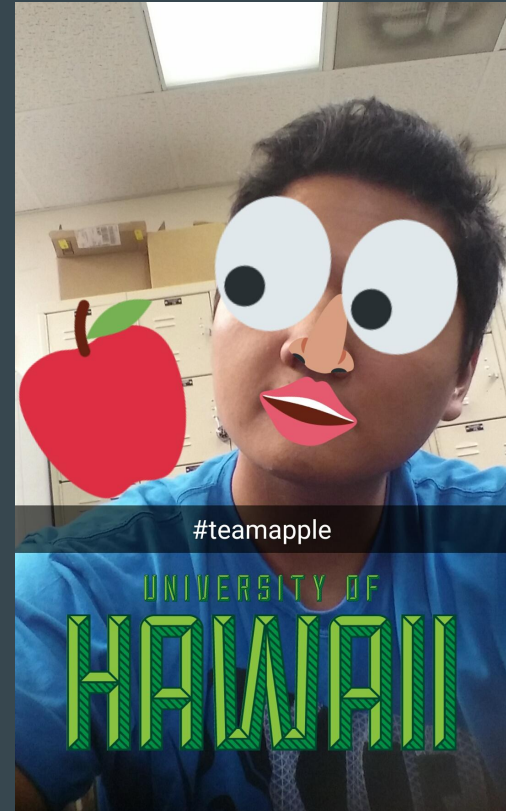
Tyrin-Neal Besas
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Kaeo Villa - Team Lead

Junior in Electrical Engineering

396 Project

Interested in renewable energy



Tyrin Besas - Hardware

Junior in Electrical Engineering

396 Project

Interested in hardware design and renewable energy

“ The revolution is not an apple that falls when it is ripe.
You have to make it fall.”

-Ernesto ‘Che’ Guevara



Tryston Fagarang - Hardware

Junior in Electrical Engineering

396 Project

Interested in renewable energy and hardware design.

“Our Apple will fall FAR from the tree”

- Tryston



Overview of Apple Project (What it does)

The first stable platform in the weatherbox lineage

Collect weather sensor data and send it back to a database

The data will assist in planning future renewable energy installations

Our Objectives

What we hope to accomplish both long term and short term?

Create multiple efficient functionable boxes

Identify and resolve problems with the current design

Our Approach

Document the current Apple design

Fix what is currently not working with Apple

Find things that we can change and improve

Get the most economic and efficient design

Possibly add new functionalities

Potential Problems with Apple

Housing

Board Layout

Power Consumption

Programming Circuit

Learning Expectations

Short Term:

Technical skills like understanding Eagle and I²C

Long Term:

How knowing weather conditions can affect power saving/consumption

Inner Workings of Apple

Arduino Uno R3

GPS Sensor (Ultimate GPS Breakout V3)

Pressure Sensor (Barometric Pressure Sensor BMP085)

Solar Radiance Sensor (Silicon-Cell Pyranometer SP-100)

Transmitter/Receiver (Digi International XBee Pro S2B)

Current Sensor (INA219 High Side DC Current Sensor Breakout 26V \pm 3.2 A Max)

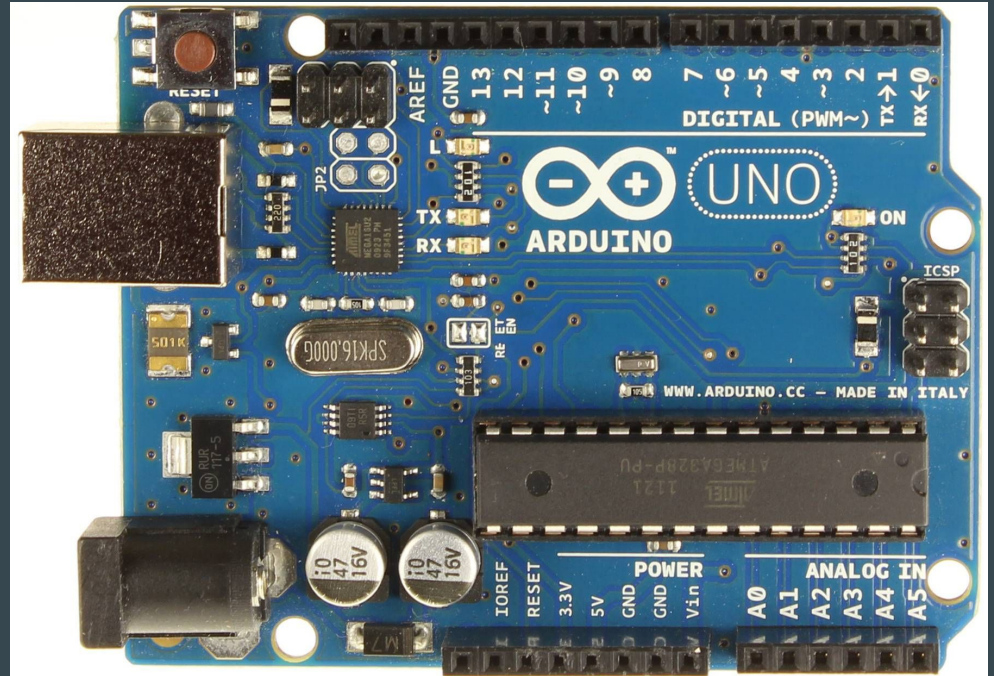
Power System (3.7V Li-Ion 6600 mAh, Li/Li-Ion Charger (3.7/4.2V) MCP 73871, Large 6V 3.4W Solar Panel)

Arduino Uno R3

Brain of the System

Microcontroller board based

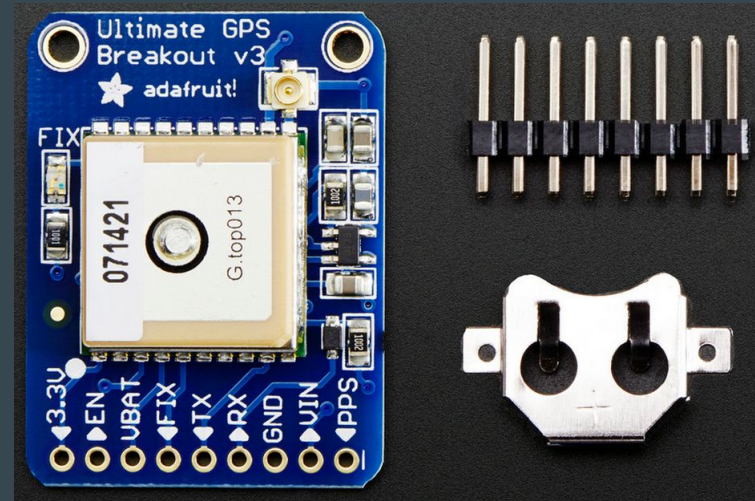
Open-source prototyping platform



GPS Sensor

Used to track and log location

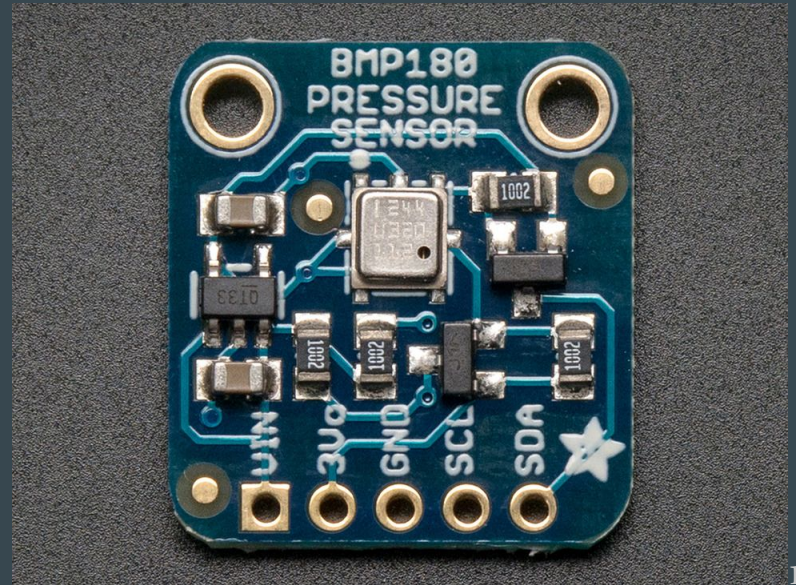
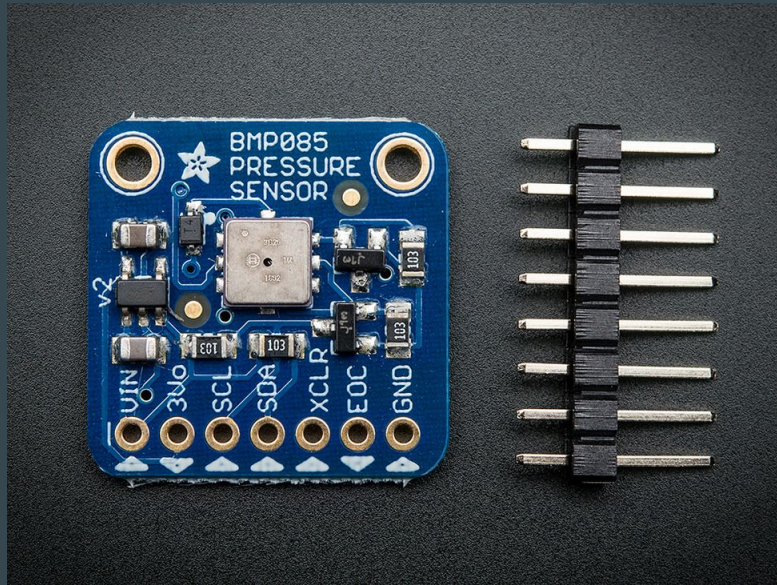
Easily find a specific weatherbox in a network of weatherboxes



Pressure Sensor

Barometric Pressure Sensor BMP085 recently discontinued

BMP180 is the newer model (smaller, cheaper, more efficient)



Solar Radiance Sensor

(Silicon-Cell Pyranometer SP-100)

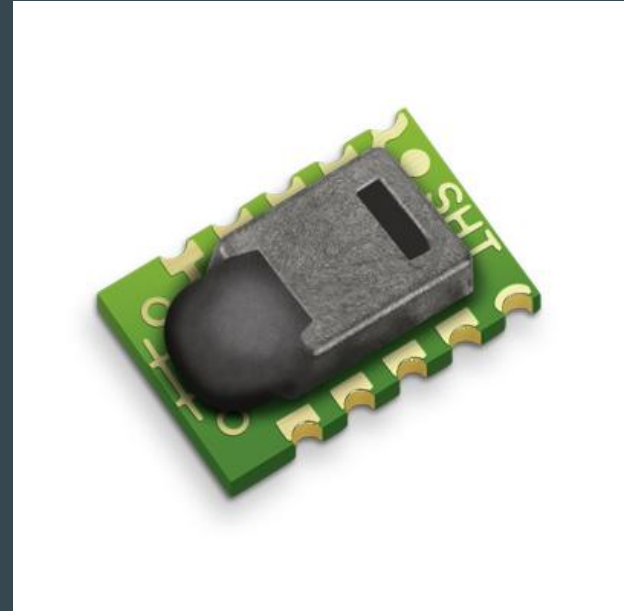
Measures broadband solar irradiance



Humidity Sensor

Pressure and current connected to i²c

Humidity sensor and gps have their own protocols



Problems with the Current Design

List of current known problems

Power distribution

Programming Arduino

Overall Box Structure

Our Planned Improvements

What we plan to change and try to see if it works

A design that supports remote programming

Easy to assemble and disassemble

Implement parent module data retrieving

Conclusion

We hope to come out of REIS knowing a lot of technical SCEs.