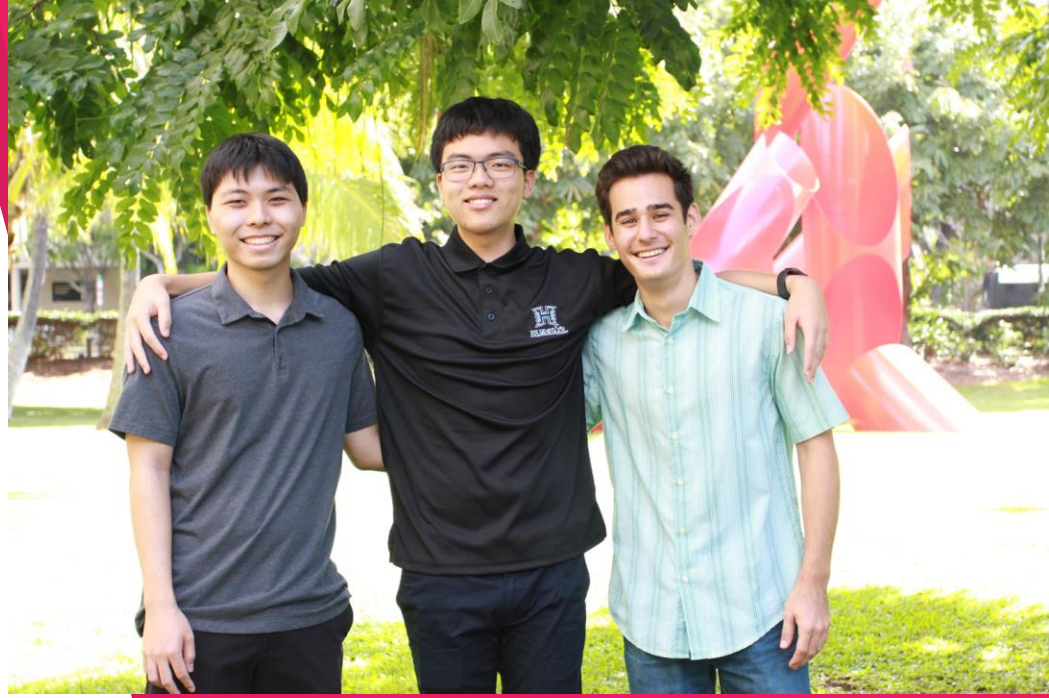
Team Guava

Preliminary Design Presentation

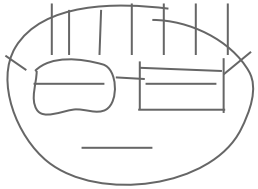
F20



Presentation Overview

- Block Diagram
- Goals
- Progress
- Future Work
- Potential Problems
- Gantt Chart
- Questions

Team Guava Introductions



Diwen Lin

Junior - 496

3rd semester

EE-System

Max Mochizuki

Junior - 396

2nd semester

EE - EP

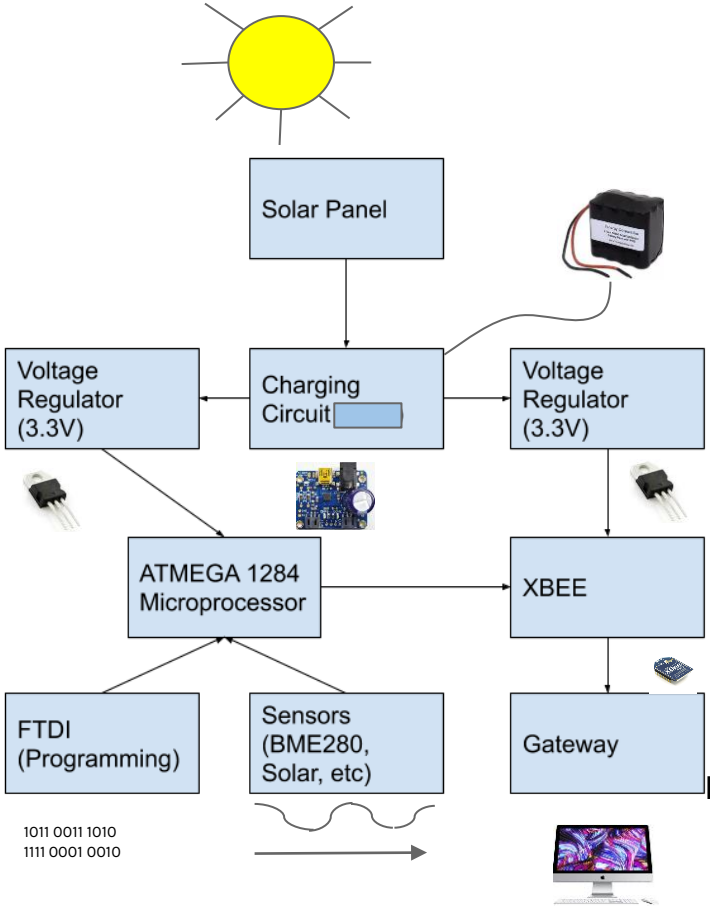
Riley Sodetani

Junior - 396

1st Semester

CENG

Block Diagram



Project Goals

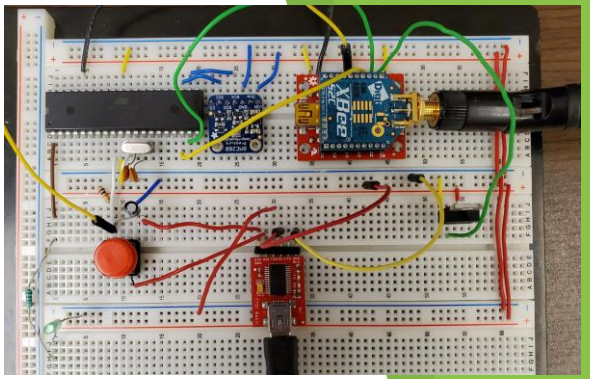
Produce a self-sustaining environmental sensor module that will collect meteorological data

- Finish up the Bare Guava (All components)
- Update the Solar Charging Chip Schematic
- Get design to work all in 3.3V @8MHz

Guava Progress

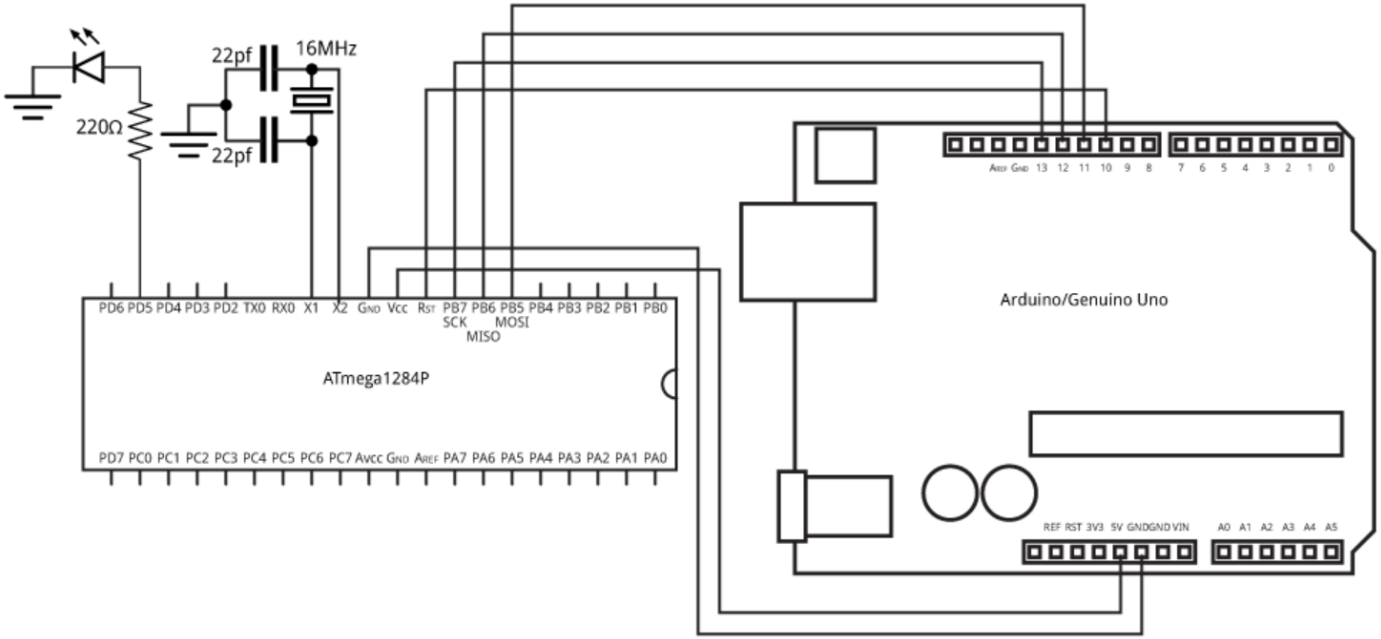
Progress since Proposal

- Correctly boot-loaded ATMega1284P at 5v 8MHz
- Integrated BME280 and SP215 on Bare Guava
  - BME values a little strange
- XBEE communicated with Bare Guava and REV C



Guava Boot-Loading

Connect the Arduino Uno to the ATmega1284P on the breadboard as follows:



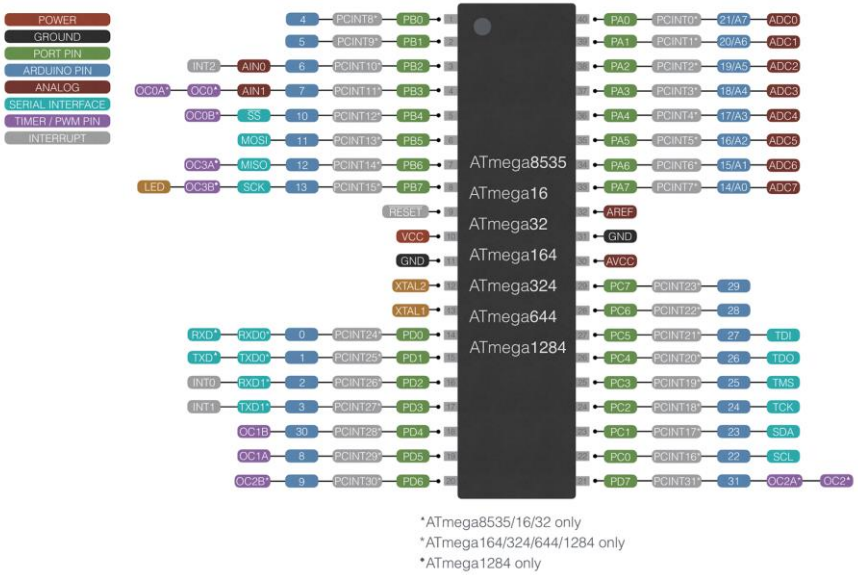
Connecting an Arduino Uno to an ATmega1284 for ISP programming.

Guava ATMega1284 Pinout

4	1 (T0) (PCINT8)		40 (ADC0) (PCINT0	21			Debug
5	2 (T1) (PCINT9)		39 (ADC1) (PCINT1)	20			14
6	3 (AIN0) (PCINT10)		38 (ADC2) (PCINT2)	19			32
7	4 (AIN1) (PCINT11)		37 (ADC3) (PCINT3)	18			33
10	5 (SS) (PCINT12)		36 (ADC4) (PCINT4)	17			34
11	6 (MOSI) (PCINT13)		35 (ADC5) (PCINT5)	16			35
12	7 (MISO) (PCINT14		34 (ADC6) (PCINT6)	15			36
13	8 (SCK) (PCINT15)		33 (ADC7) (PCINT7)				37
	9 (RESET)		32 (AREF)	AREF missing			38
	10 (VCC)	ATMega1284p	31 (GND)				39
	11 (GND)		30 (AVCC)	30 5V			40
	12 (XTAL2)		29 (TOSC2) (PCINT23)	29			
	13 (XTAL1)		28 (TOSC1) (PCINT22)	28			
	14 (RXD0) (PCINT24)		27 (TDI) (PCINT21)	27			
1	15 (TXD0) (PCINT25) xb		26 (TDO) (PCINT20)	26			
2	16 RXD1) (PCINT26) xb		25 (TMS) (PCINT19)	25			
3	17 (TXD1) (PCINT27)		24 (TCK) (PCINT18)	24			
30	18 (OC1B) (PCINT28)		23 (SDA) (PCINT27)	23			
8	19 (OC1A) (PCINT29)		22 (SCL) (PCINT26)	22			
9	20 (OC2B) (PCINT30)		21 (OC2A) (PCINT25)	31			

Guava ATMega1284 Pinout

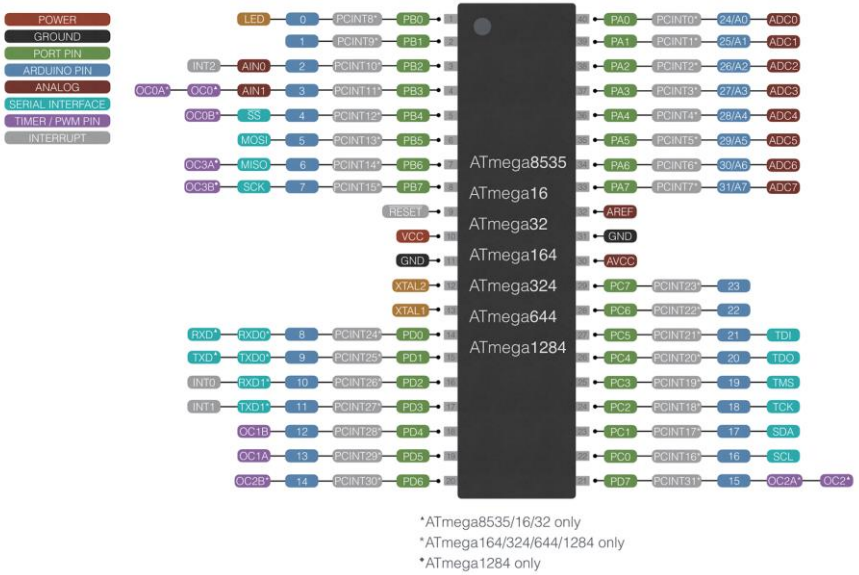
MightyCore DIP40 Bobuino pinout



*ATmega8535/16/32 only
*ATmega164/324/644/1284 only
*ATmega1284 only

http://github.com/MCUdude/MightyCore

MightyCore DIP40 Standard pinout



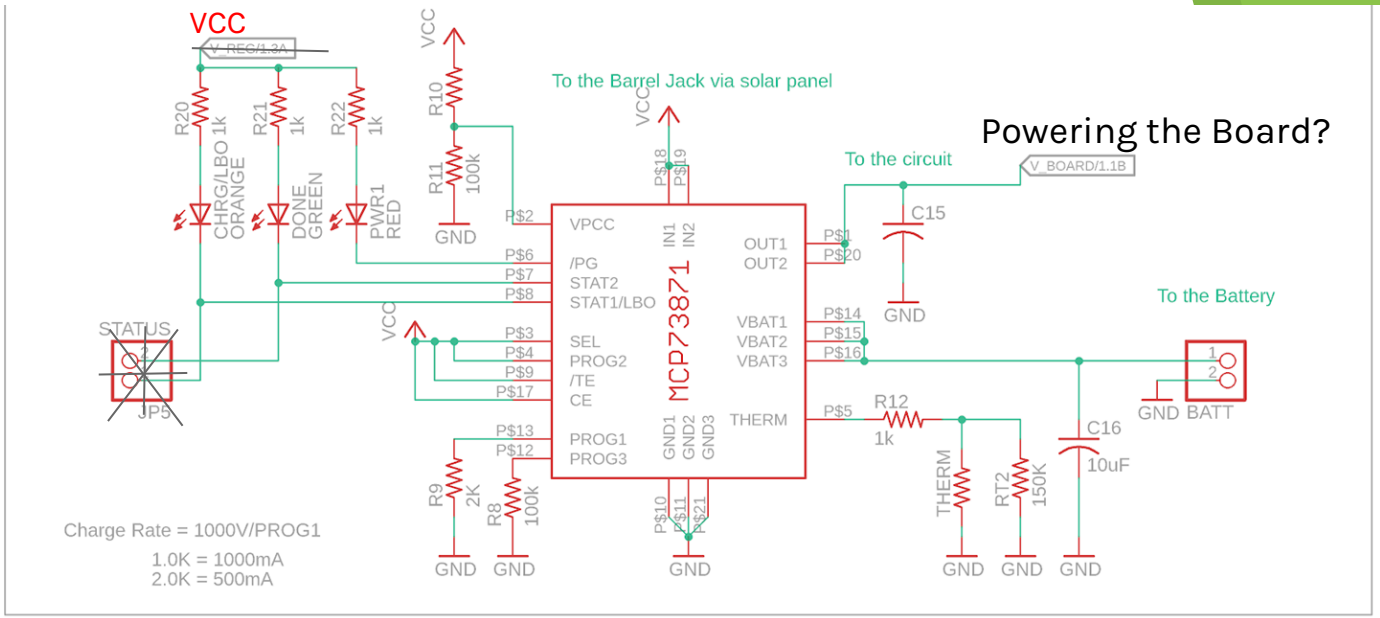
*ATmega8535/16/32 only
*ATmega164/324/644/1284 only
*ATmega1284 only

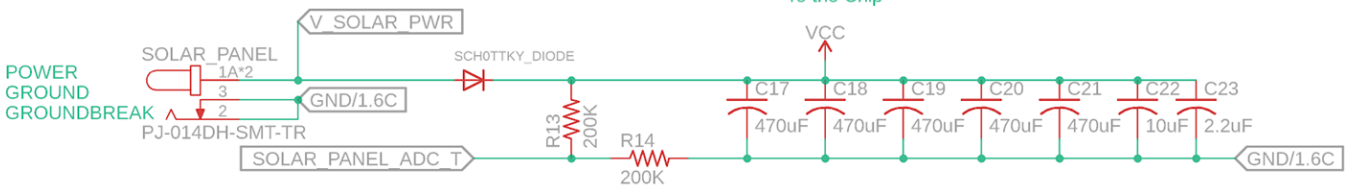
http://github.com/MCUdude/MightyCore

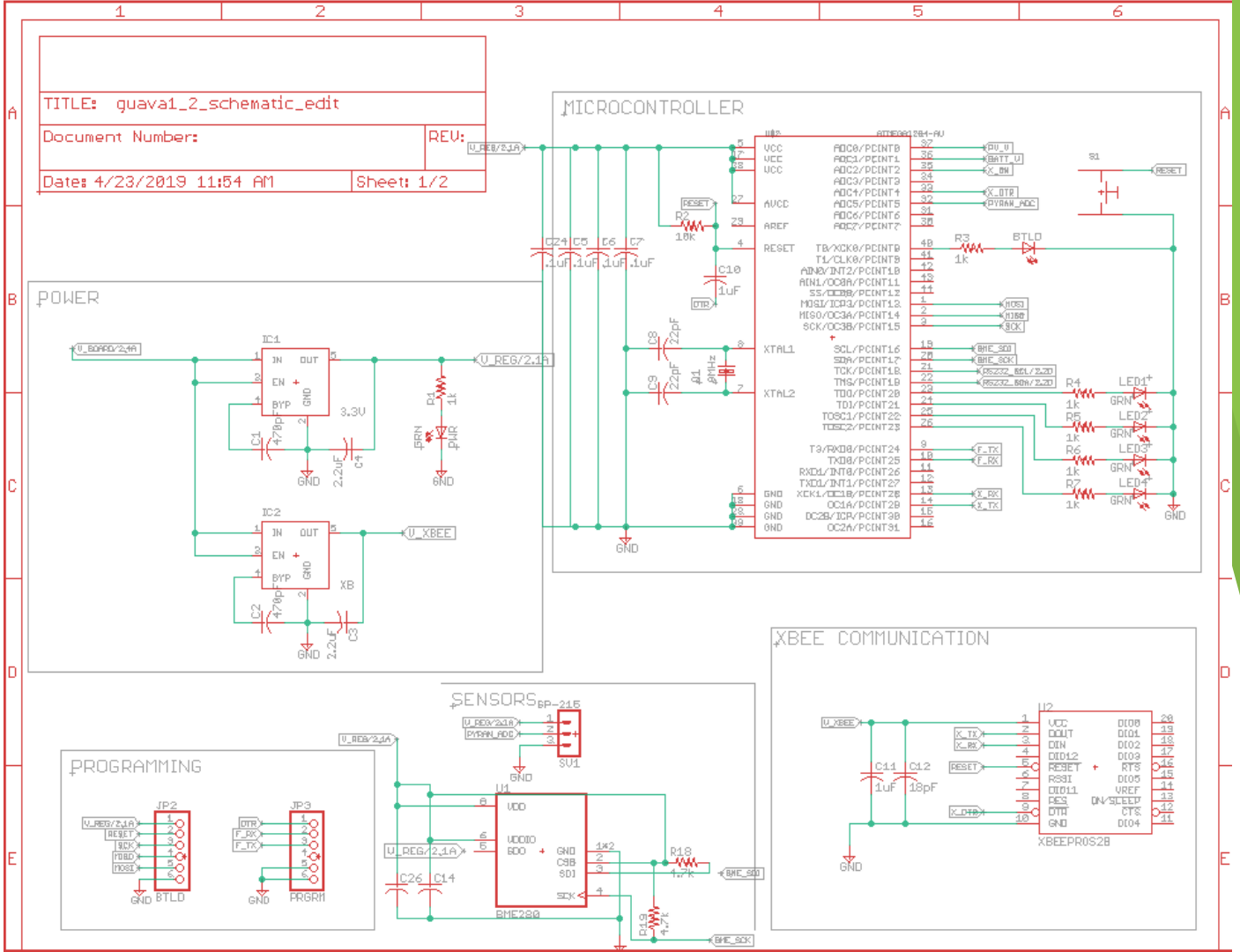
Guava Progress with Kenneth

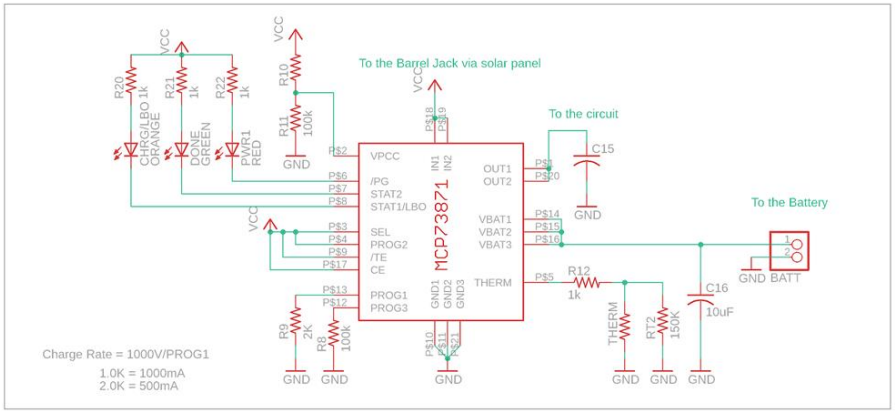
- Learned Proper way to Boot-load and Program
- Tested the solar charging ability on REV C
  - Shorts when solar panel being connected with the lamp
- REV C sends certain amount of packages and then stops

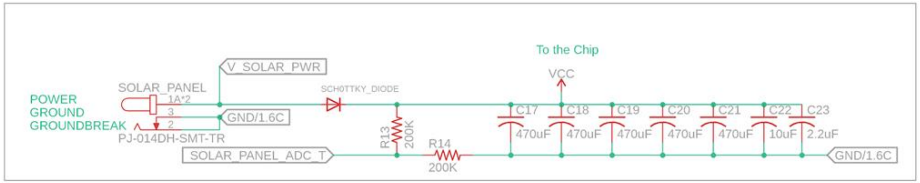
Powering the Board?

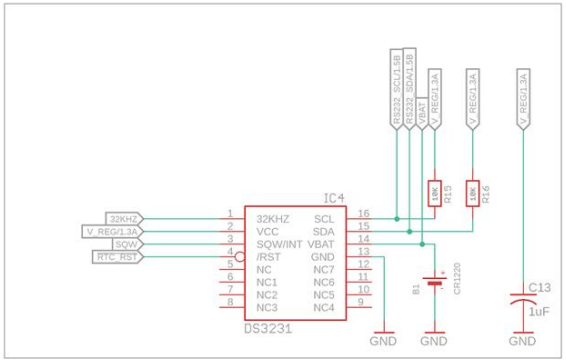





TITLE: guava1_2_schematic_edit
Document Number:
REV:
Date: 4/23/2019 11:54 AM
Sheet: 1/2
MICROCONTROLLER
POWER
PROGRAMMING
SENSORS
XBEE COMMUNICATION
ATMEGA1284-AU
BME280
XBEEPRO S2B
BP-215
BTLD
PRGRM
3.3V
GND


To the Barrel Jack via solar panel
To the circuit
To the Battery
MCP73871
VPCC
/PG
STAT2
STAT1/LBO
SEL
PROG2
/TE
CE
PROG1
PROG3
IN1
IN2
OUT1
OUT2
VBAT1
VBAT2
VBAT3
THERM
GND1
GND2
GND3
R20 1k
R21 1k
R22 1k
R10
R11 100k
R9 2K
R8 100k
R12 1k
RT2 150K
C15
C16 10uF
CHRG/LBO ORANGE
DONE GREEN
PWR1 RED
GND BATT
Charge Rate = 1000V/PROG1
1.0K = 1000mA
2.0K = 500mA


To the Chip
V_SOLAR_PWR
SOLAR_PANEL
1A*2
POWER
GROUND
GROUNDBREAK
PJ-014DH-SMT-TR
GND/1.6C
SCH0TTKY_DIODE
SOLAR_PANEL_ADC_T
R13 200K
R14 200K
C17 470uF
C18 470uF
C19 470uF
C20 470uF
C21 470uF
C22 10uF
C23 2.2uF


IC4
DS3231
32KHZ
VCC
SQW/INT
/RST
NC
NC1
NC2
NC3
SCL
SDA
VBAT
GND
NC7
NC6
NC5
NC4
32KHZ
V_REG/1.3A
SQW
RTC_RST
DS3231_SCL/1.5B
DS3231_SDA/1.5B
VBAT
V_REG/1.3A
R15 10K
R16 10K
B1
CR1220
C13 1uF

Future Work

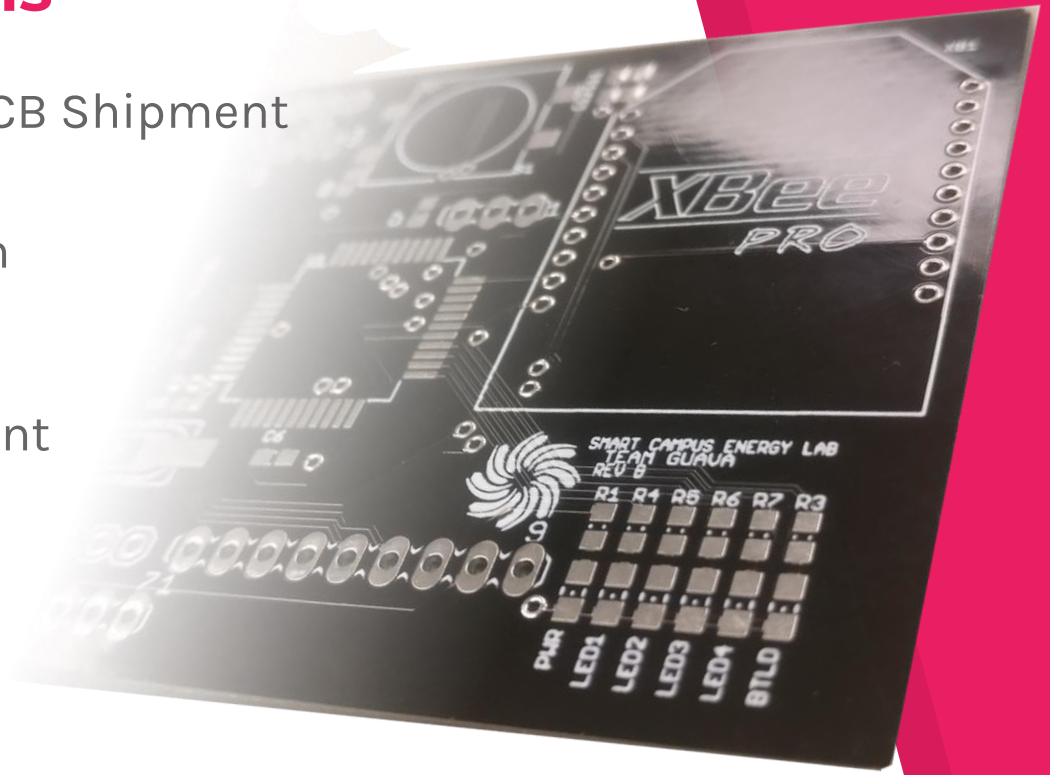
- Work to Debug REV C
- Refine Rev C IV Design (REV D)
- Work with firmware team & Kenneth to ensure that board gets programmed
- Document all procedures and improvements implemented by Team Guava

Potential Problems

- Coronavirus delays PCB Shipment
- EAGLE Design
- XBEE Communication

Other

- Forgetting to document
- Finishing in time to Deploy



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Date	1/12 - 1/18	1/19 - 1/25	1/26 - 2/1	2/2 - 2/8	2/9 - 2/15	2/16 - 2/22	2/23 - 2/29	3/1 - 3/7	3/8 - 3/14	3/15 - 3/21	3/22 - 3/28	3/29 - 4/4	4/5 - 4/11	4/12 - 4/18	4/19 - 4/25	4/26 - 5/2	5/3 - 5/9	5/10 - 5/16
Presentation										S								
Proposal										p								
PDR										r								
CDR										i								
Final										n								
										g								
Review																		
Development										B								
Deploy										r								
Test & Debug										e								
Parts Order and Billing										a								
Build										k								
Final Report										!								

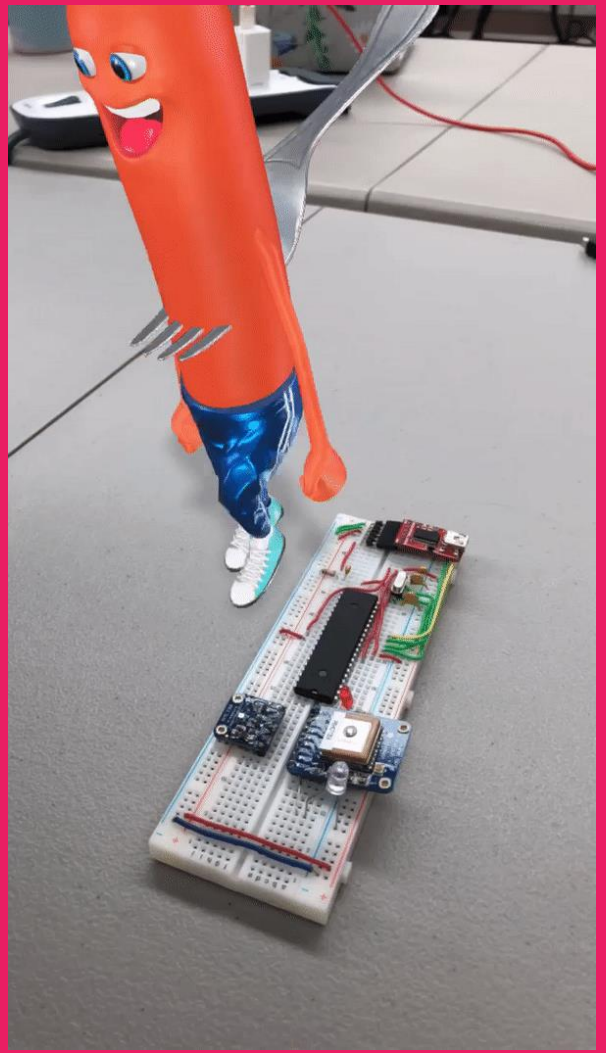
Gantt Chart
Spring 20

Thank you!

Any Questions?

https://github.com/scel-hawaii/guava

https://wiki.scel-hawaii.org/doku.php?id=weatherbox:guava:start



CREDITS

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