

Weather Balloon

Data Collection Circuit board

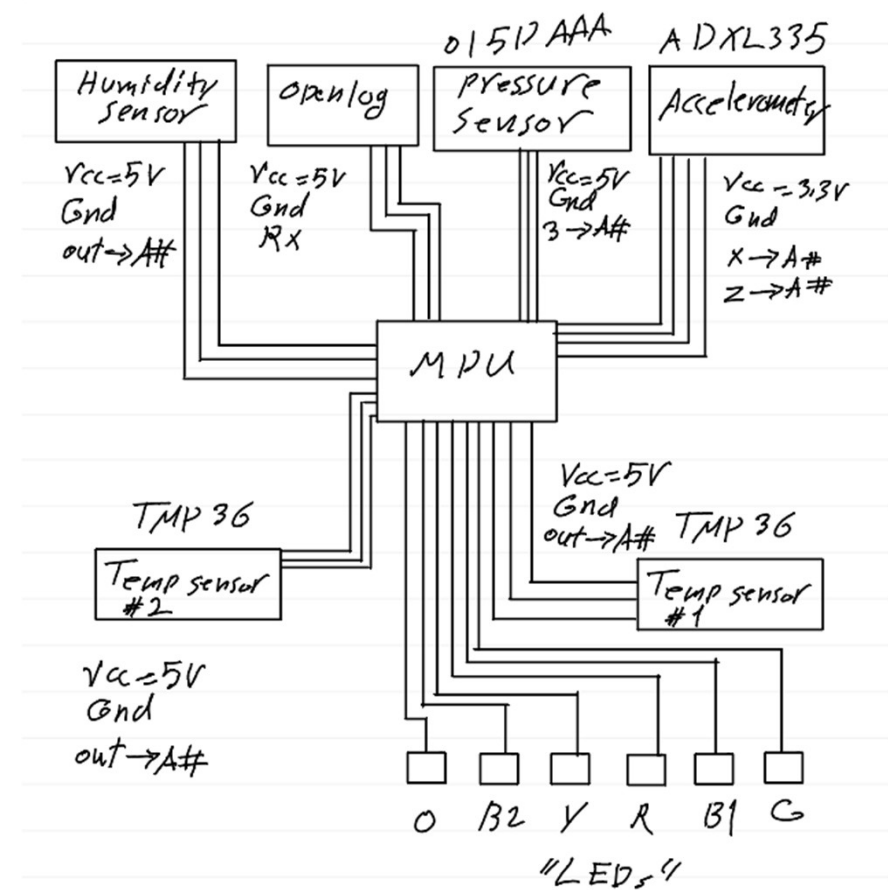
Presented by: Ali Alalwia

Date: March 14th, 2025



Phase 1:

- System was made using Arduino Uno
- Arduino Uno shield that holds the sensors
- System Estimated Weight is : 200g

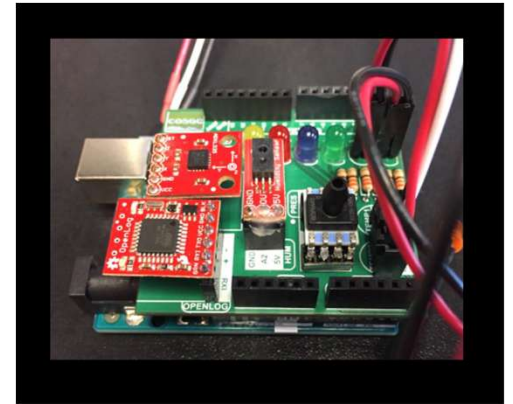


System Power Consumption, Cost & Weight :

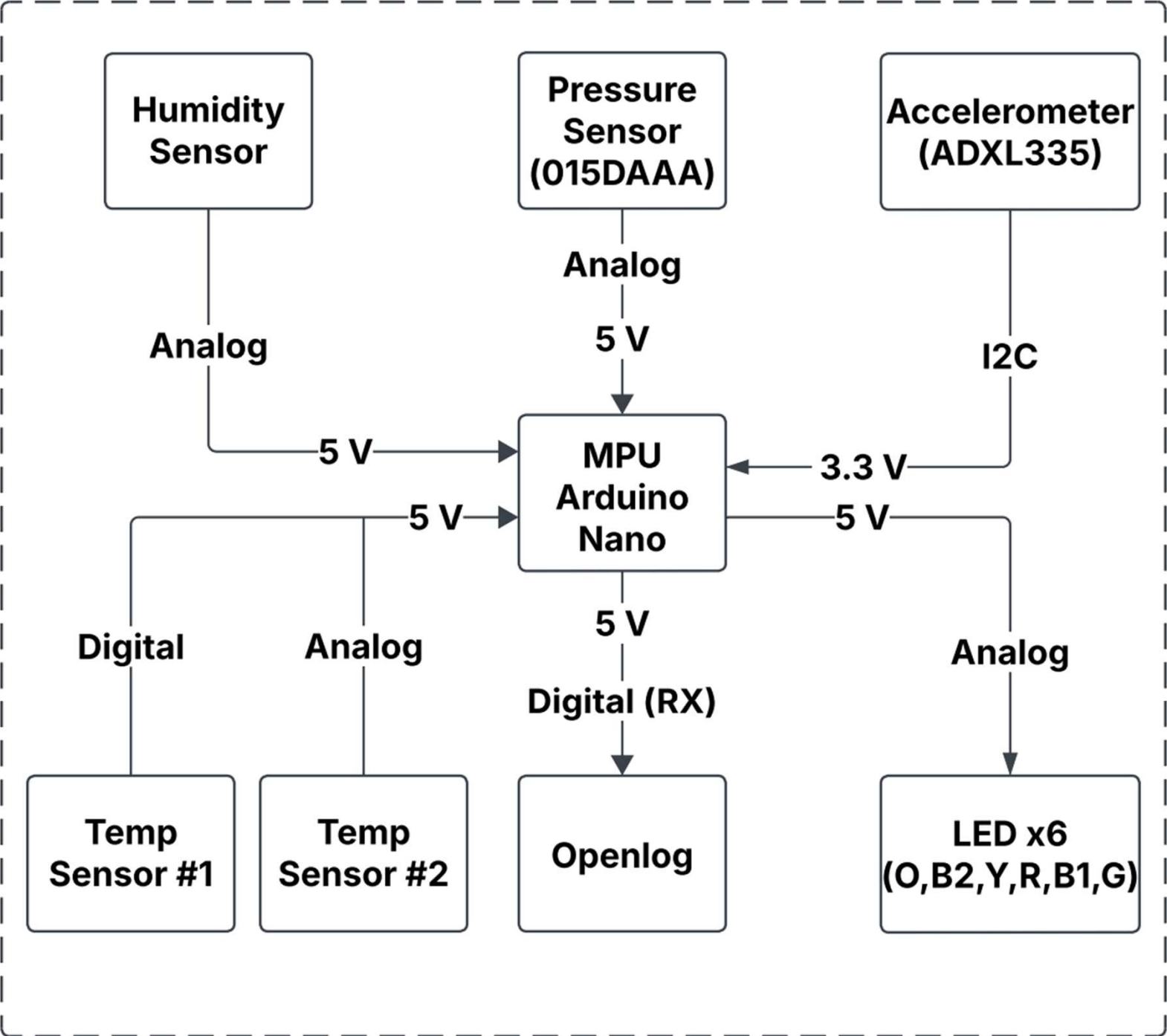
Item	Current Draw	Price	Weight
HH4030	200μA	EOL	0.0246918 oz
open log (SD Card Module)	6mA	\$16.95	0.063493 oz
ADXL335(Gyro Module)	320μA	\$16.95	1.600000 oz
Arduino Uno	75mA	\$13.00	2.08000 oz
SSCDANV015PAAA5	2.7mA	\$48.67	0.035274 oz
4GB SD Card	-----	\$9.00	0.070547 oz
PCB	-----	\$7.00	3.00000 oz
LEDS + Resistors	120mA	\$2.00	0.127800 oz
TMP36GT9Z(Temp2)	50μA	\$1.00	0.007408 oz
DS18B2(Temp1)	1mA	\$5.00	1.230000 oz
9V Lithium Battery	-----	\$7.35	1.600000 oz
Total:	205.27mA	\$126.92	9.839214 oz

System Feasibility:

- The system is not feasible without substituting a certain components:
 - Humidity sensor other components are expensive which increases the total cost of the system and depending on the budget system might not be feasible if the available budget is less than the total cost of the system.
- **Total Power consumption :**
 - Total system current draw = 207.27mA
 - Arduino Uno consumes 75 mA * 9 volts = 675mW
 - Sensors power consumption = 130.27 at 5 volts = 651.35mW
 - Total power consumption 675mW + 651.36mW = 1326.36mW
 - Using a 9v (1200mAh) Lithium battery we get
 $1200\text{mAh}/207.27\text{mA} = 5.79 \text{ hours}$
- **Total Weight of the system:** 9.839214 oz or 278.94g
- **Total cost of the system:** was estimated at \$126.92



Phase 2: Block Diagram:

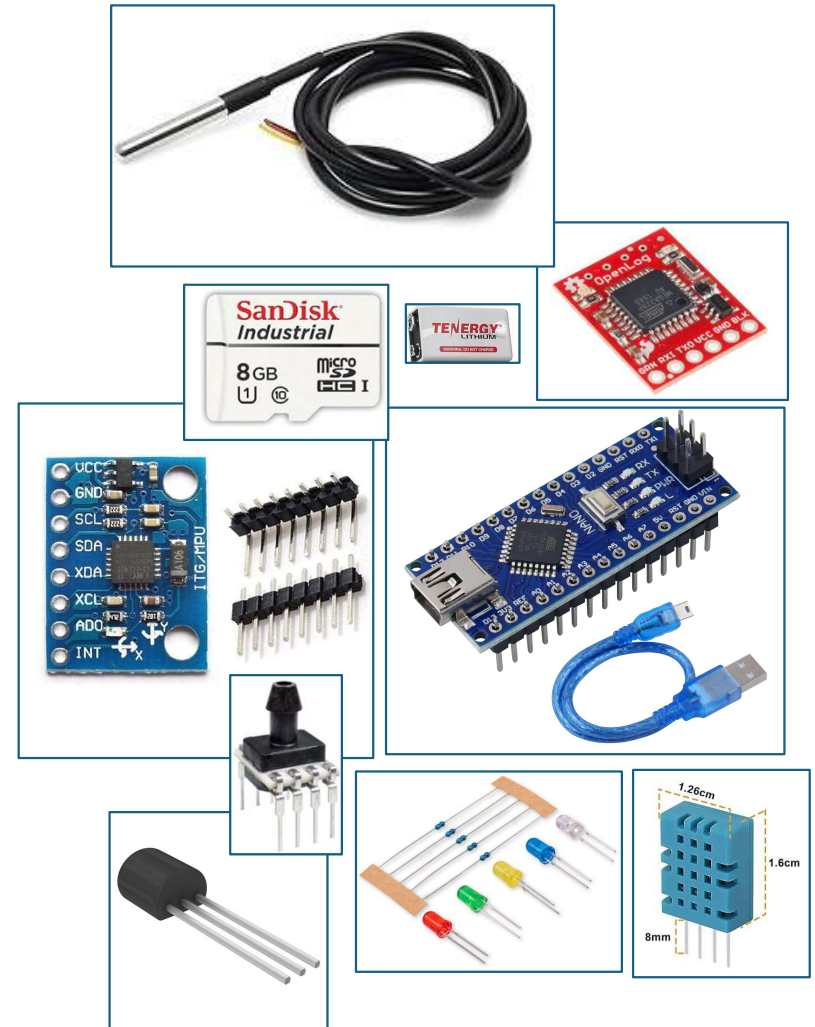


System Parts:

- **Function** : measure temp, humidity and orientation.
- **Weight** : must not exceed 200g.
- **Cost** : system budget is \leq \$149.

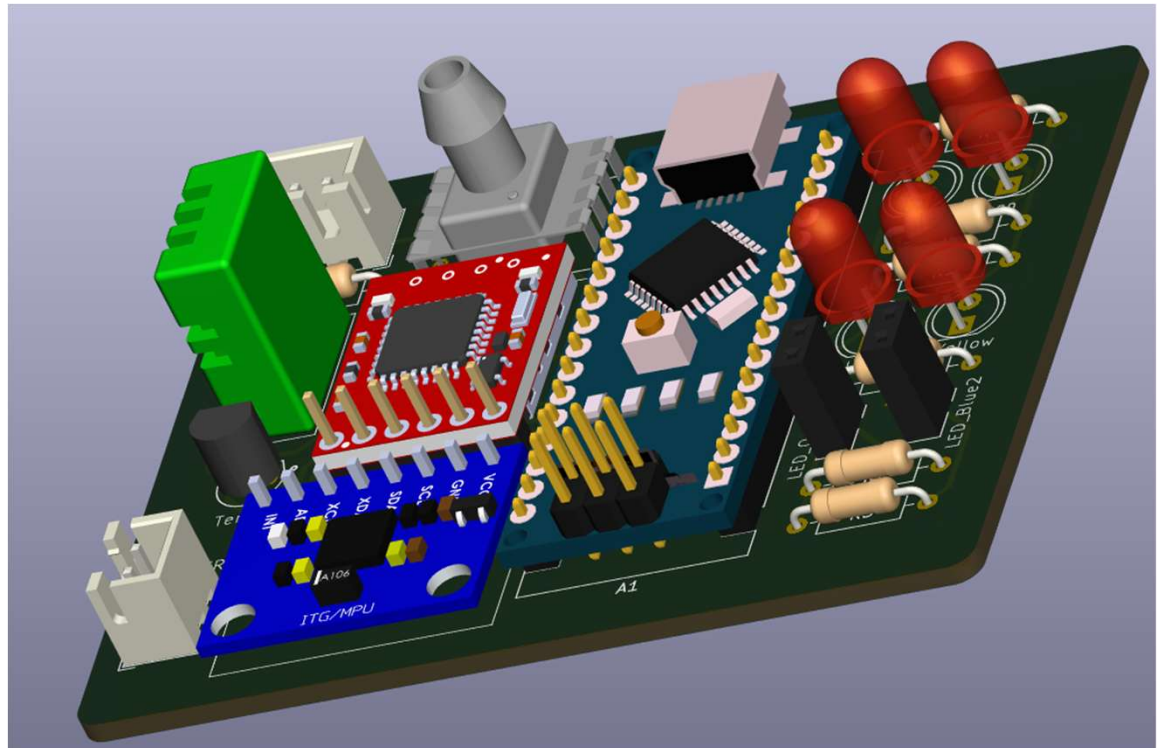
Components:

- 1K resistors x 6, 4.7K resistor x 1.
- DS18B20 External Temperature Sensor
- TMP36GT9 Internal Temperature Sensor
- (red, green, yellow, Orange)x1 and (blue)x2 LEDs.
- Arduino nano V3.
- Spark fun Open Log (SD card Module).
- 4GB Sd card .
- Honeywell SSCDANV015PAAA5 Pressure Sensor
- MPU6050 Gyro Sensor
- 9v Lithium Batteries (1200mAh)



System Requirements Calculation:

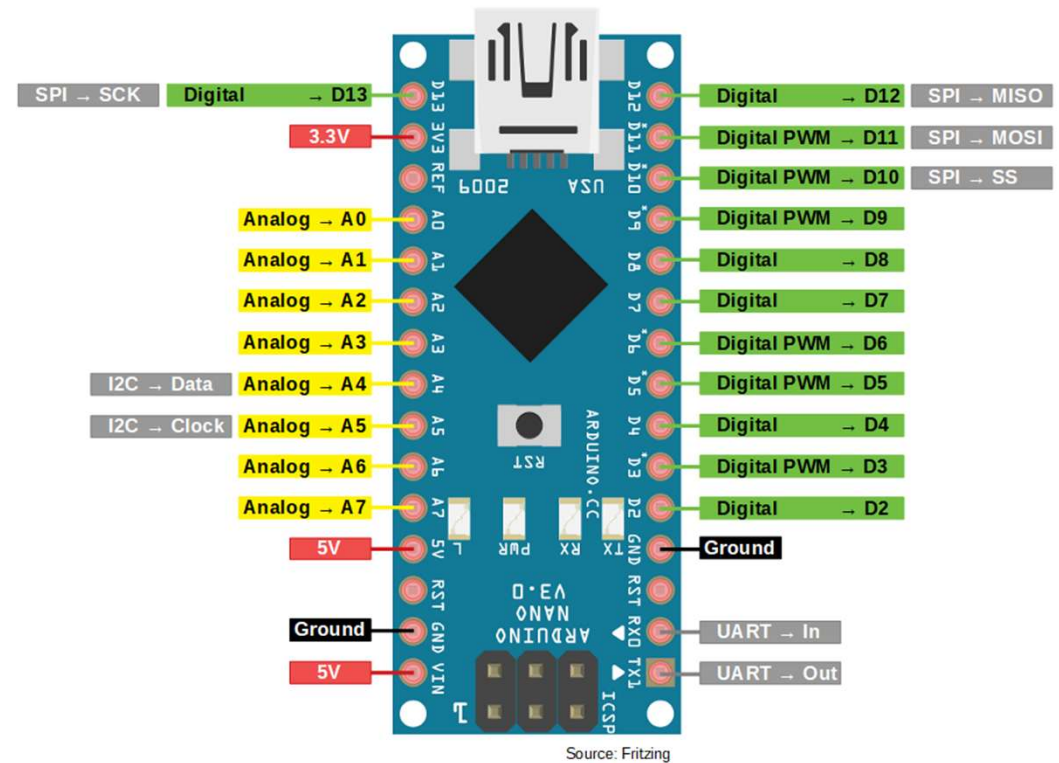
- **Total Power Consumption :**
 - Arduino nano consumes $20\text{ mA} * 9\text{ volts} = 180\text{mW}$
 - Sensors consumes $135.105\text{ at } 5\text{ volts} = 675.5\text{mW}$
 - Total power consumption $180\text{mW} + 675.5\text{mW} = 855.525\text{mW}$
 - Total system current draw 155.105mA
 - Using a 9v (1200mAh) Lithium battery we get
 $1200\text{mAh}/155.105\text{mA} = 7.74\text{ hours}$
- **Total Weight of the system = 6.379333 oz or 180.85g**
- **Total cost of the system $\approx \$105.97$**



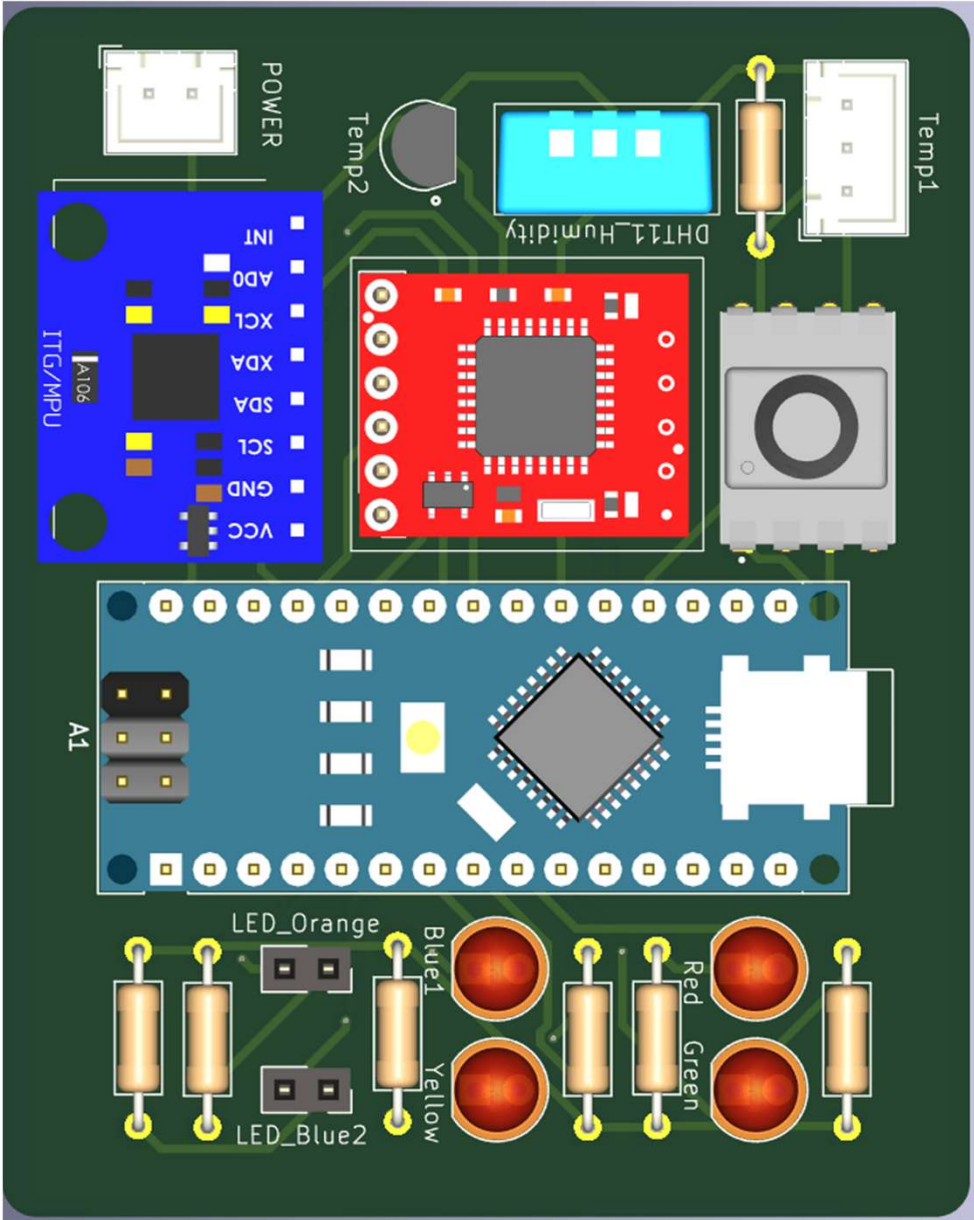
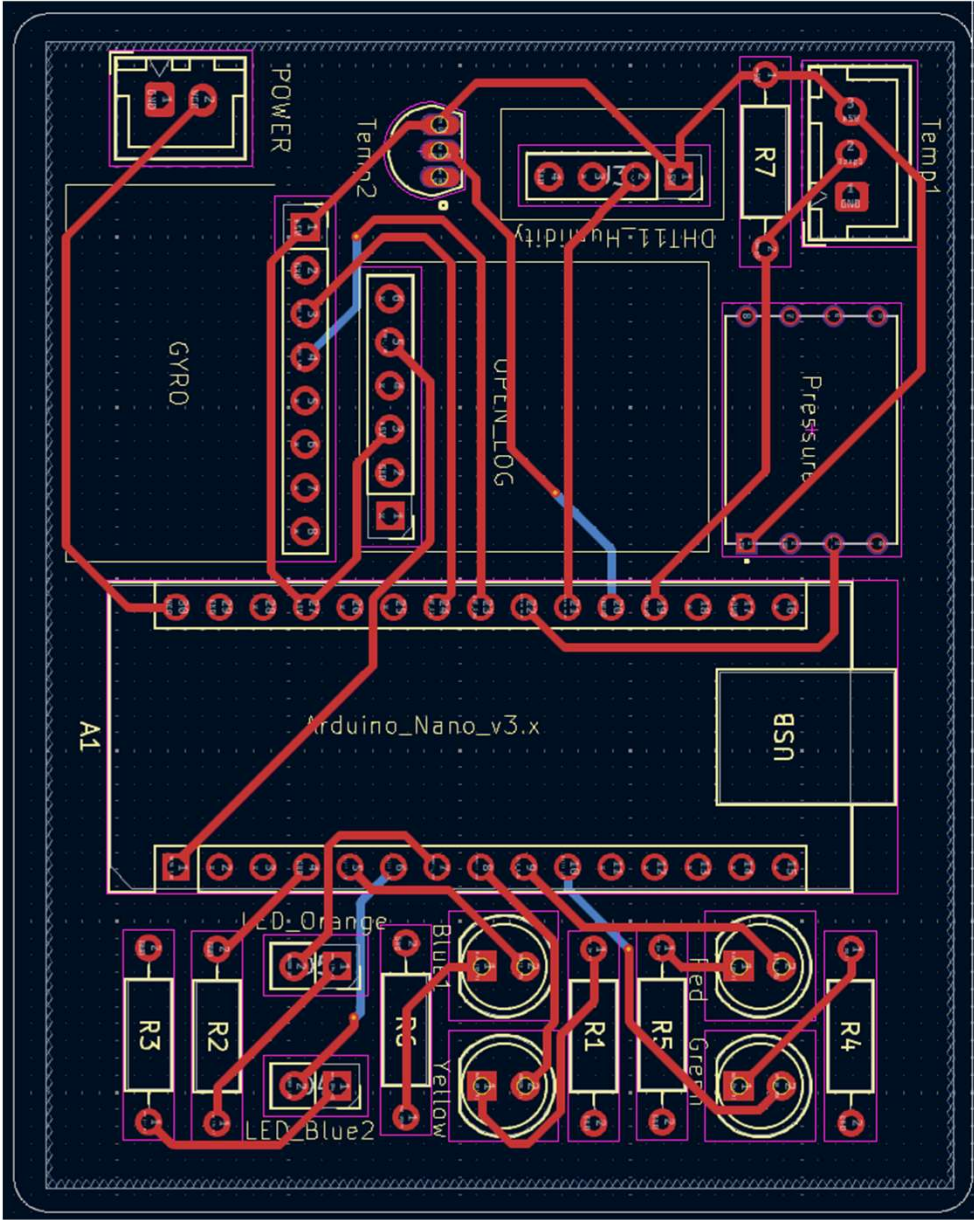
System MPU:

Arduino nano specification:

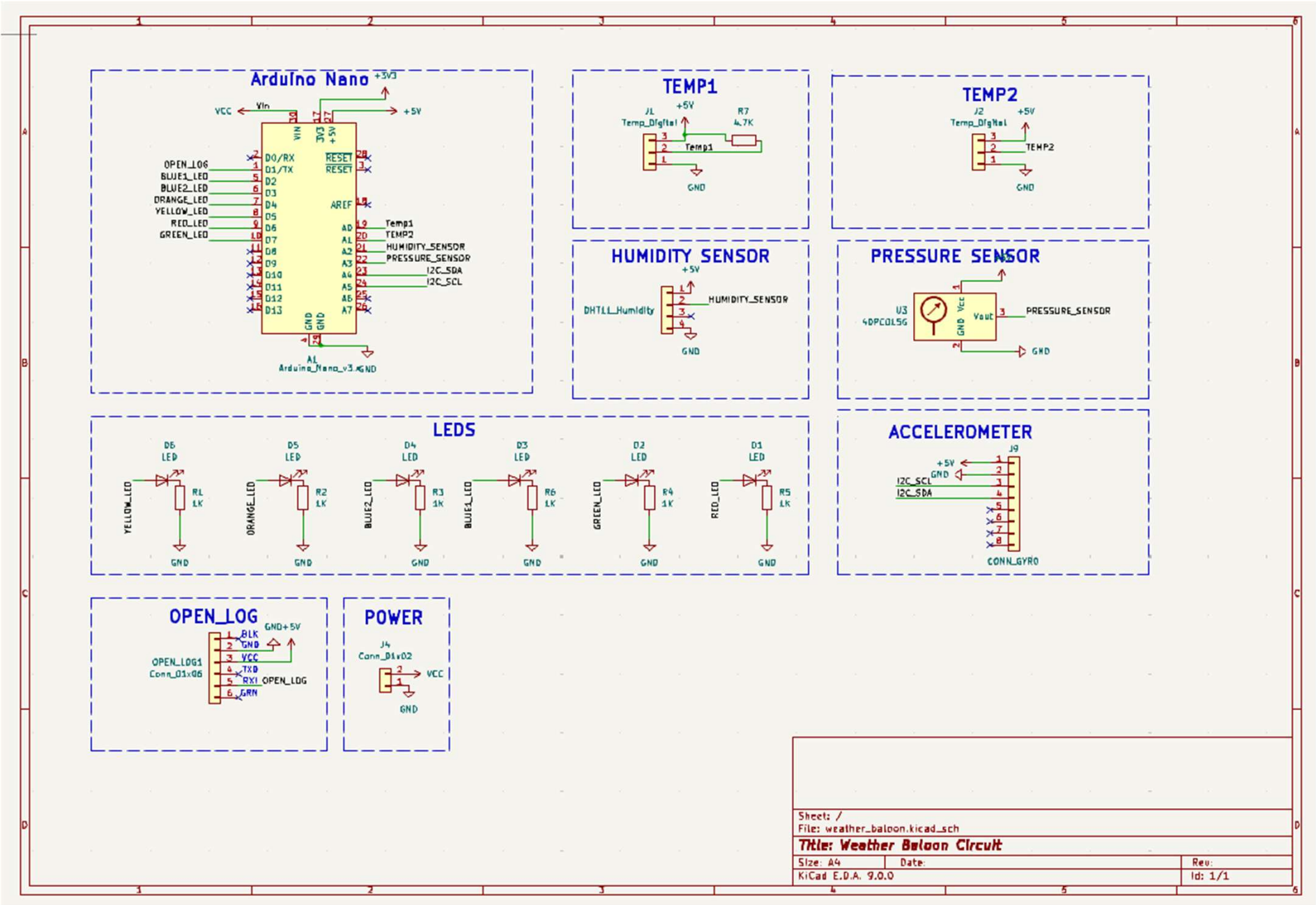
- Low cost and small footprint.
- Adequate digital and analog pins for the sensors and the LEDs.
- 5v and 3.3v out Pins.



PCB Design:



System Schematic Kicad:



System Power Consumption, Cost & Weight :

Item	Current Draw	Price	Weight
DHT11 (Humidity Sensor)	0.3mA	\$1.00	0.141096 oz
open log (SD Card Module)	6mA	\$16.95	0.063493 oz
MPU6050(Gyro Module)	5.1mA	\$3.00	0.352740 oz
Arduino nano V3(MPU)	20mA	\$5.00	0.358383 oz
SSCDANV015PAAA5	2.7mA	\$48.67	0.035274 oz
4GB SD Card	-----	\$9.00	0.070547 oz
PCB	-----	\$7.00	2.400000 oz
LEDS + Resistors	120mA	\$2.00	0.127800 oz
TMP36GT9Z(Temp2)	50μA	\$1.00	0.007408 oz
DS18B2(Temp1)	1mA	\$5.00	1.230000 oz
9V Lithium Battery	-----	\$7.35	1.600000 oz
Total:	155.105mA	\$105.97	6.379333 oz

Thank You