Week 05

Keel Bone Chicken Project

9/25/2025

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Progress

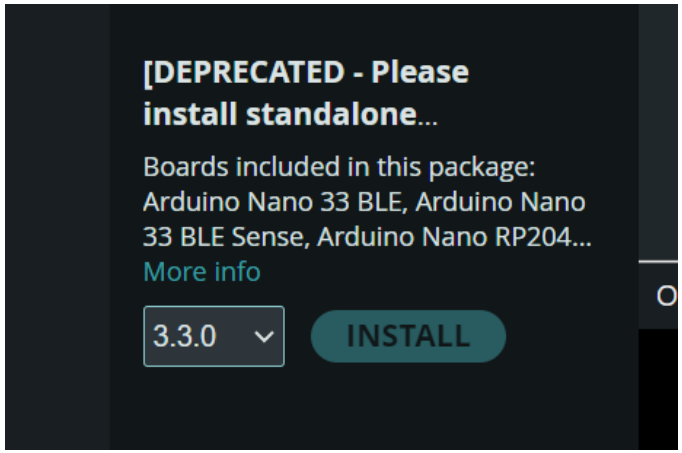
Began Arduino Programming and PCB Design

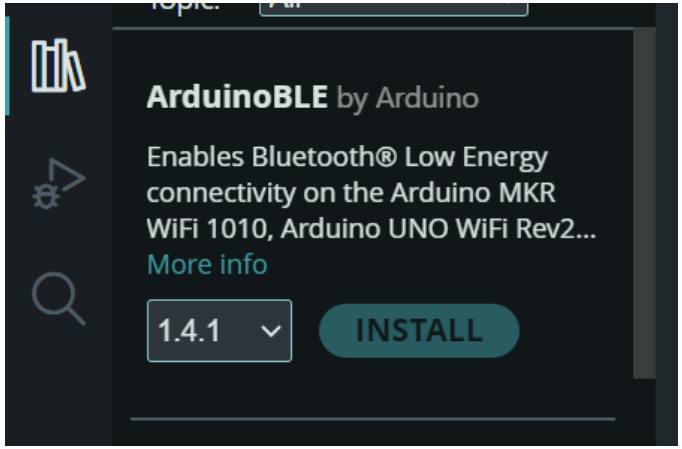
- Programming Arduino
- GitHub Organization/Formulization
- Schematic Creation
- Circuit Board Creation

Libraries Needed

Several Libraries are needed to start the Arduino code

- Install Deprecated version of Arduino Software
- Install ArduinoBLE for Bluetooth communication
- Install Arduino_BL2Y for communication to Arduino Nicla Sense ME





Tester code for Modules (Working)

Gyroscope

Gyroscope.ino

```ino
#include <Arduino_BHY2.h>
#include <BQ25120A.h>
#include <Nicla_System.h>
#include <RGBled.h>

SensorXYZ gyroscope(SENSOR_ID_GYRO);

void setup() {
  Serial.begin(115200);
  BHY2.begin();
  gyroscope.begin();
}

void loop() {
  BHY2.update();

  int16_t valueX = gyroscope.x();
  int16_t valueY = gyroscope.y();
  int16_t valueZ = gyroscope.z();

```

IMU

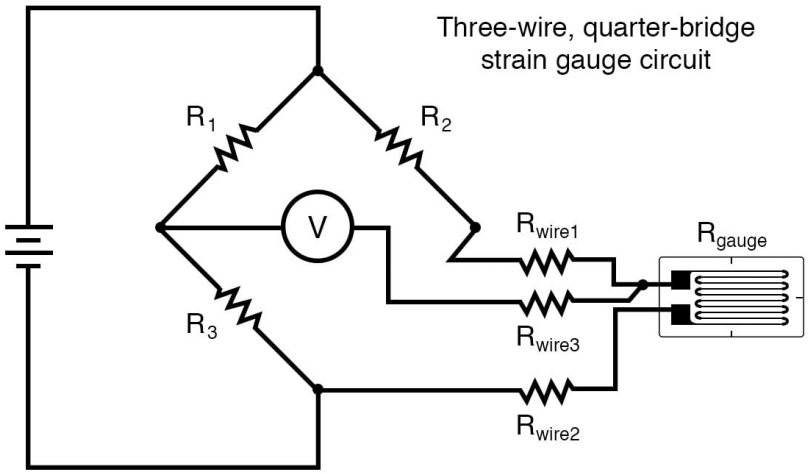
```ino
void setup() {
  Serial.begin(9600);

  while(!Serial);

  if (!IMU.begin()) {
    Serial.println("Failed to initialize IMU!");
    while (1);
  }

  Serial.print("Accelerometer sample rate = ");
  Serial.print(IMU.accelerationSampleRate());
  Serial.println("Hz");
  Serial.println();

  Serial.print("Gyroscope sample rate = ");
  Serial.print(IMU.gyroscopeSampleRate());
  Serial.println("Hz");
  Serial.println();

}
```

Temperature

```ino
#include "Arduino_BHY2.h"

  Sensor temperature(SENSOR_ID_TEMP);
  float temperatureValue = 0;

  void setup(){
    Serial.begin(115200);
    BHY2.begin();
    temperature.begin();
  }

  void loop(){
    BHY2.update();
    temperatureValue = temperature.value();

    Serial.print("Temperature :");
    Serial.println(temperatureValue);
  }
```

Strain Gauge

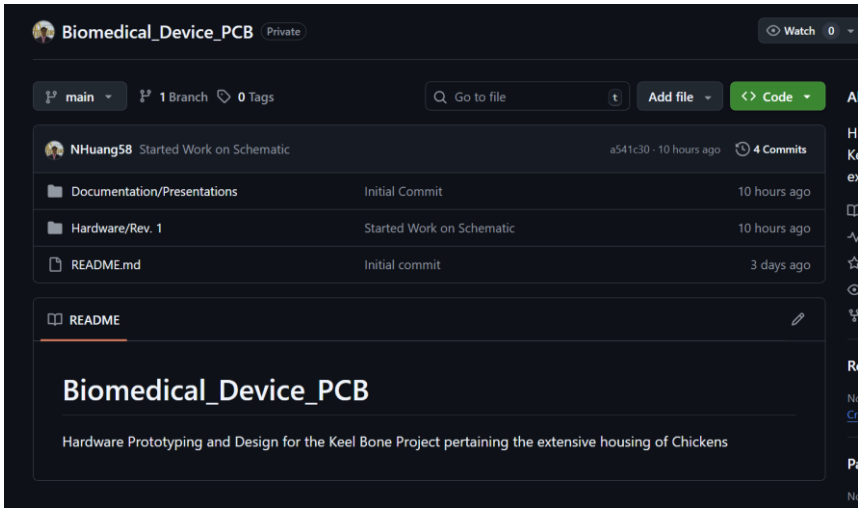
Needs to be created on the schematic



GitHub

Organization Metric for Next ~2 Semesters

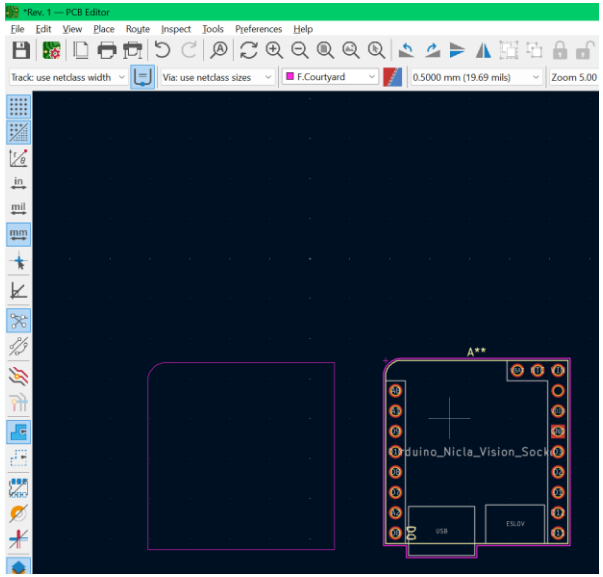
- https://github.com/NHuang58/Biomedical_Device_PCB.git

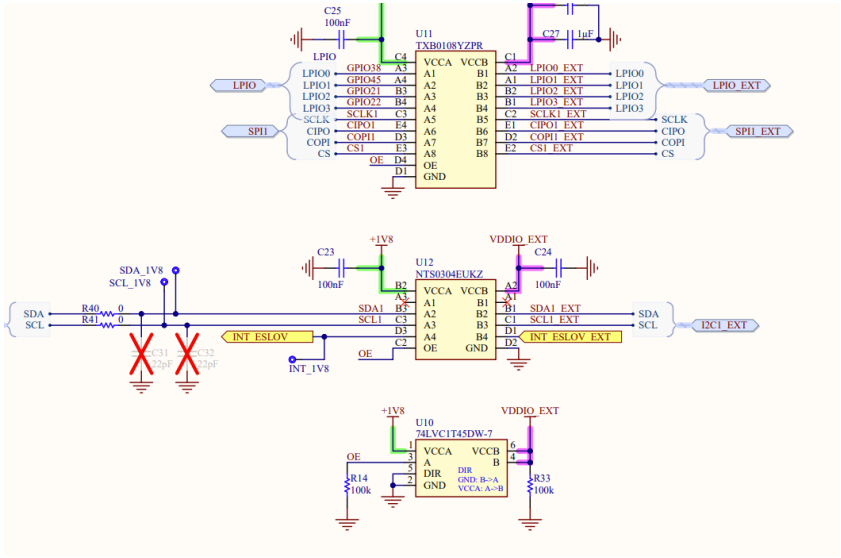


PCB & Schematic Creation

Started developing on KiCad: https://www.kicad.org/download/

- Conventional Nicla Sense ME Schematics NOT available for download:
- Schematics made available online however: https://docs.arduino.cc/resources/schematics/ABX00050-schematics.pdf
- Needed to create own layout within PCB editor





Thank You

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