

Week 07

Keel Bone Chicken Project

10/03/2025

This Week

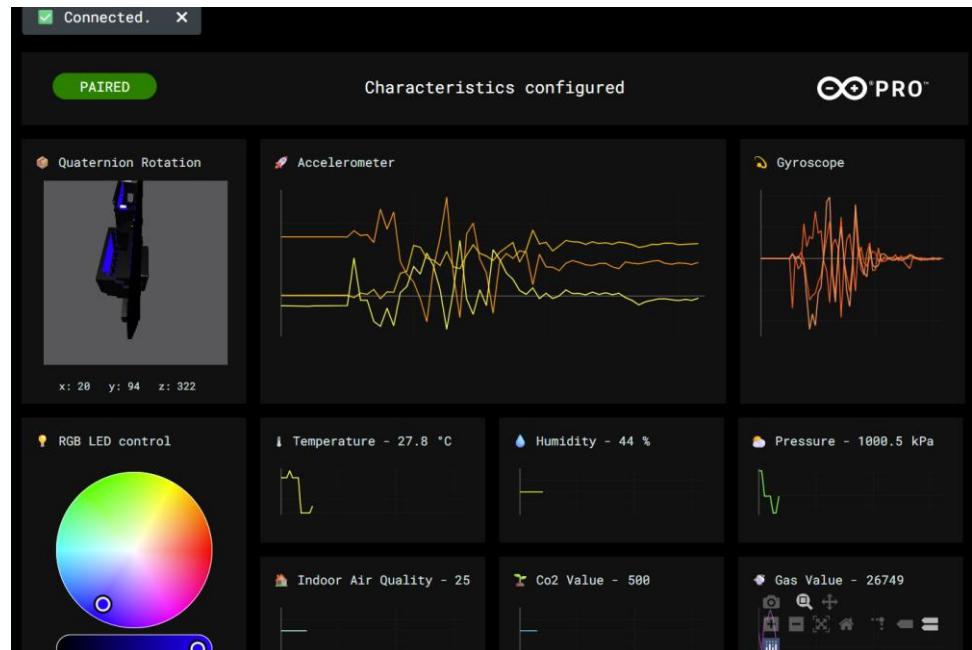
Progress & issues faced this week

- Got Bluetooth Connection working over Nicla
- Set up and soldered development board
- Tested remote operation of BLE
- Schematic changes

Bluetooth Connectivity

Able to connect with Arduino Nicla Sense over Bluetooth

- Compile basic BLE functionality monitor
- Review GitHub repository to make modifications for specific application
 - <https://github.com/arduino/ArduinoAI>
- Able to view on Web Browser:
 - <https://arduino.github.io/ArduinoAI/NiclaSenseME-dashboard/>
 - <https://docs.arduino.cc/tutorials/nicla-sense-me/web-ble-dashboard/>



Battery

Battery Implemented for Remote Operation with Nicla Sense

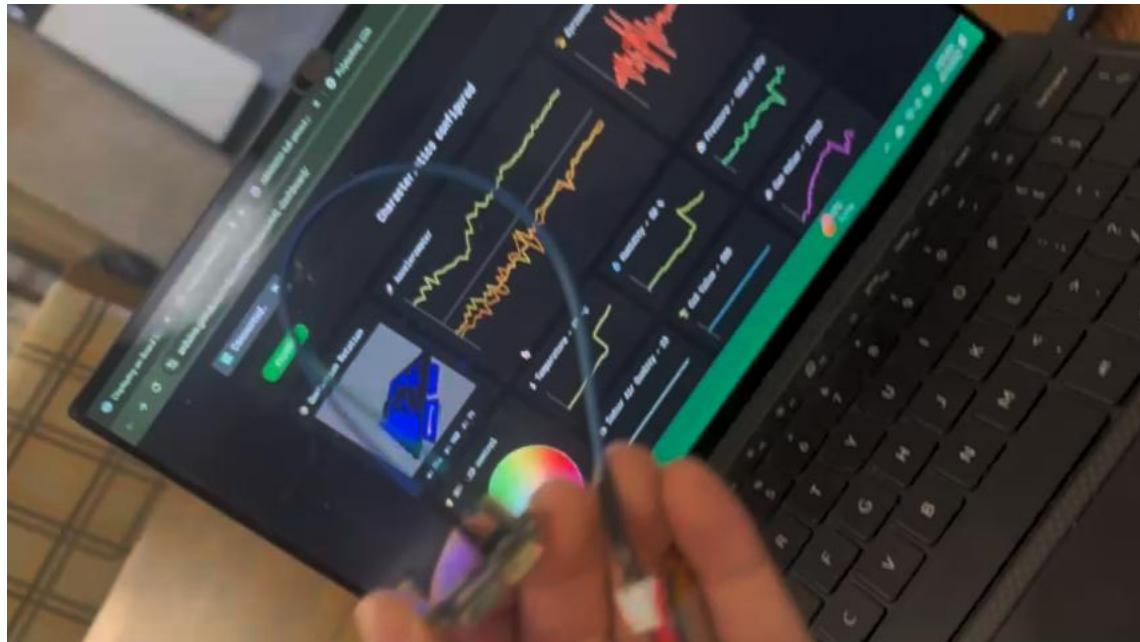
- Arduino code (implemented)
- Remote battery operation tested

```
BLEService service(BLE_SENSE_UUID("0000"));

BLEUnsignedIntCharacteristic versionCharacteristic(BLE_SENSE_UUID("1001"), BLERead);
BLEFloatCharacteristic temperatureCharacteristic(BLE_SENSE_UUID("2001"), BLERead);
BLEUnsignedIntCharacteristic humidityCharacteristic(BLE_SENSE_UUID("3001"), BLERead);
BLEFloatCharacteristic pressureCharacteristic(BLE_SENSE_UUID("4001"), BLERead);

BLECharacteristic accelerometerCharacteristic(BLE_SENSE_UUID("5001"), BLERead | BLENotify, 3 * sizeof(float));
BLECharacteristic gyroscopeCharacteristic(BLE_SENSE_UUID("6001"), BLERead | BLENotify, 3 * sizeof(float));
BLECharacteristic quaternionCharacteristic(BLE_SENSE_UUID("7001"), BLERead | BLENotify, 4 * sizeof(float));

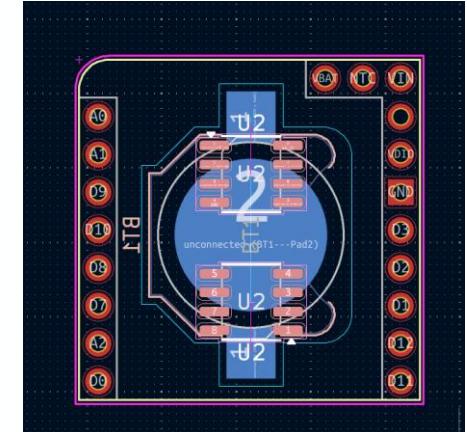
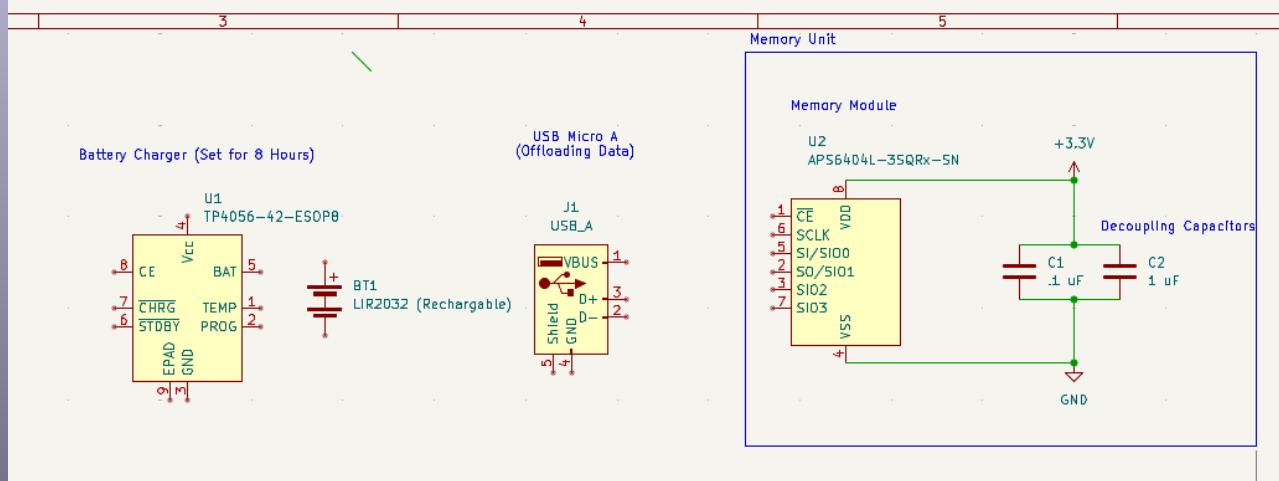
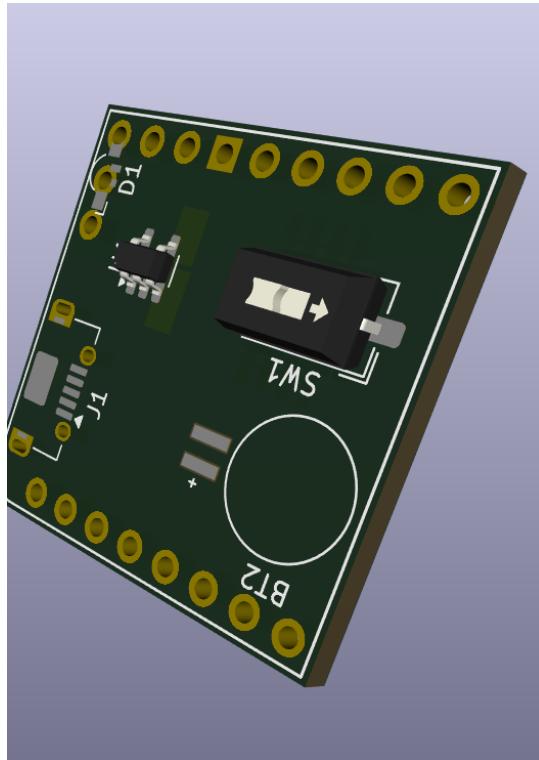
BLECharacteristic rgbLedCharacteristic(BLE_SENSE_UUID("8001"), BLERead | BLEWrite, 3 * sizeof(byte)); //
```



Schematic Changes

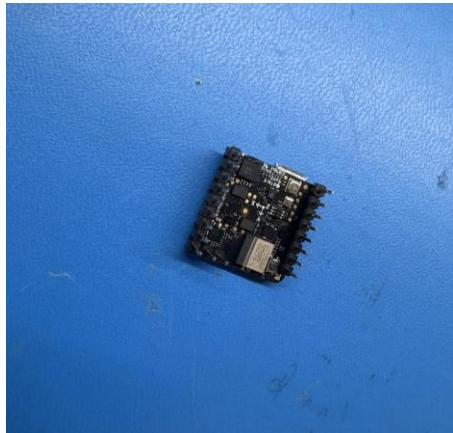
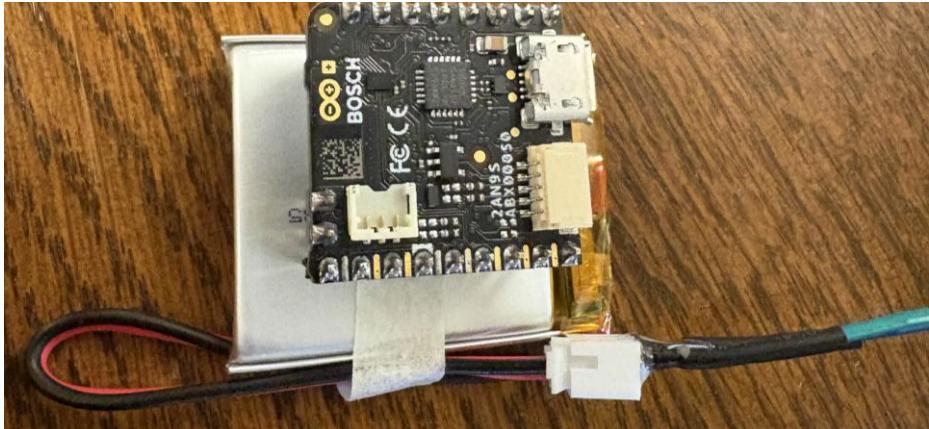
Added Rechargeable Battery IC Circuit + 64 MB Flash Memory

- New Battery Management IC: TP4056 (Lifetime during charges ~10 hrs)
- New Flash IC: APS6404L-3SQR QSPI PSRAM
- Layout & Schematic



PCB Changes

All IC(s) placed on current PCB



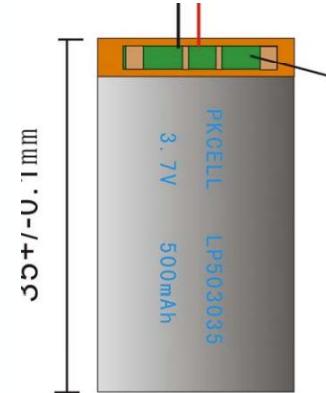
Routing needs to be completed:

- Soldering complete for development board:
- Battery currently too large for device (Looking into smaller batteries)

Next Week

Blockers & brief summary of next week's work

- Want to find a smaller area battery
- Current Battery: Li-Polymer 503035 500mAh 3.7V with PCM
 - 35 mm x 30 mm (Need 22.86 mm x 22.86 mm)
 - Rechargeable, but very large size:
- Looking for short male pin headers (Minimize size)



8	Maximum continuous discharge current	1 C ₅ A	
9	Operation temperature range	Charge: 0~45°C Discharge:-20~60°C	60±25%R.H
10	Cycle life	>500cycles	Charging/discharging in the below condition: Charge: standard charge Discharge:0.2C ₅ A to 3.0V Rest time between charge/discharge:30min Until the discharge capacity <60% of NC
11	Storage temperature	During 1 month: -5 ~ 35°C During 6 months: -20 ~ 45°C	60±25%R.H



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3/31/23

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Thank You

Purdue Polytechnic Institute