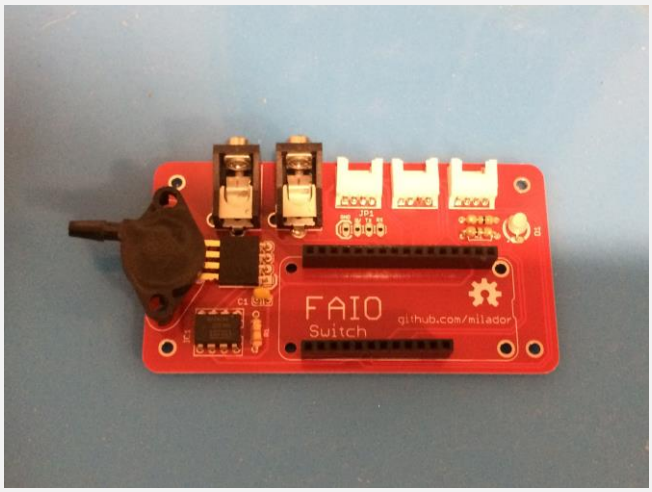

FAIO SWITCH MANUAL

What if you could have a universal switch interface that could support different types of switches all-in-one device?

Milador

https://github.com/milador/FAIO

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4. Developer version 21

All versions 22

Components List

1. GROVE 2MM 4PIN R/A CONN 10PACK **x 1**
2. IC OPAMP INSTR 120KHZ 8DIP **x 1**
3. CONN FEMALE 4POS .100" R/A GOLD **x 1**
4. CONN JACK MONO 3.5MM R/A **x 2**
5. CONN HEADER FMALE 12POS .1" GOLD **x 1**
6. CONN HEADER FMALE 16POS .1" GOLD **x 1**
7. RES 2.4K OHM 1/4W 5% AXIAL **x 1**
8. LED GRN/RED DIFF 3MM ROUND T/H **x 1**
9. RES 300 OHM 1/4W 5% AXIAL **x 2**
10. CAP CER 0.1UF 50V Y5V RADIAL **x 1**
11. ADAFRUIT FEATHER 32U4 BLUEFRUIT **x 1**
12. BATTERY LITHIUM 3.7V 400MAH **x 1**
13. SENSOR GAUGE PRESS 1.45PSI MAX **x 1 (Sip-and-Puff switch version)**
14. SWITCH TACTILE SPST-NO 0.05A 12V **x 6 (Braille version)**
15. GROVE 4PIN CABLES 5PACK 20CM **x 1 (Braille version)**
16. HEX STANDOFF M2.5 BRASS 20MM **x 4 (Braille version)**
17. MACHINE SCREW PAN SLOTTED M2.5 **x 8 (Braille version)**

The FAIO_BOM or FAIO Switch bill of materials can also be downloaded from GitHub repository under main directory.

https://github.com/milador/FAIO/blob/master/FAIO_BOM.xlsx

Software

The firmware **(FAIO_Firmware)** can be downloaded from the GitHub repository under software directory.

https://github.com/milador/FAIO/tree/master/Software/FAIO_Firmware

The firmware includes three files:

- BluefruitConfig.h
- BluefruitRoutines.h
- FAIO_Firmware.ino

Note: Make sure all three files are included in your local copy of FAIO_Firmware directory before uploading it to the Adafruit Feather 32u4 Bluefruit LE board.

The downloaded firmware can be uploaded to the Adafruit Feather 32u4 Bluefruit LE board in FAIO Switch using Arduino IDE which you can download from Arduino official website.

https://www.arduino.cc/en/Main/Software

There is a great instructions manual on how to use Arduino IDE and Adafruit Feather 32u4 Bluefruit LE board which can help you get started using Arduino IDE and install necessary Adafruit drivers.

https://learn.adafruit.com/adafruit-feather-32u4-bluefruit-le/using-with-arduino-ide

FAIO Switch is using nRF51 Bluetooth chip to communicate with host devices. Bluetooth communication might seem complicated but Adafruit has made the bluetooth communication process less challenging by providing Adafruit nRF51 BLE Library which you can download from Adafruit and import it to your locally installed Arduino directory under libraries directory.

https://github.com/adafruit/Adafruit_BluefruitLE_nRF51

The instructions on how to install Adafruit nRF51 BLE Library can be found in following link:

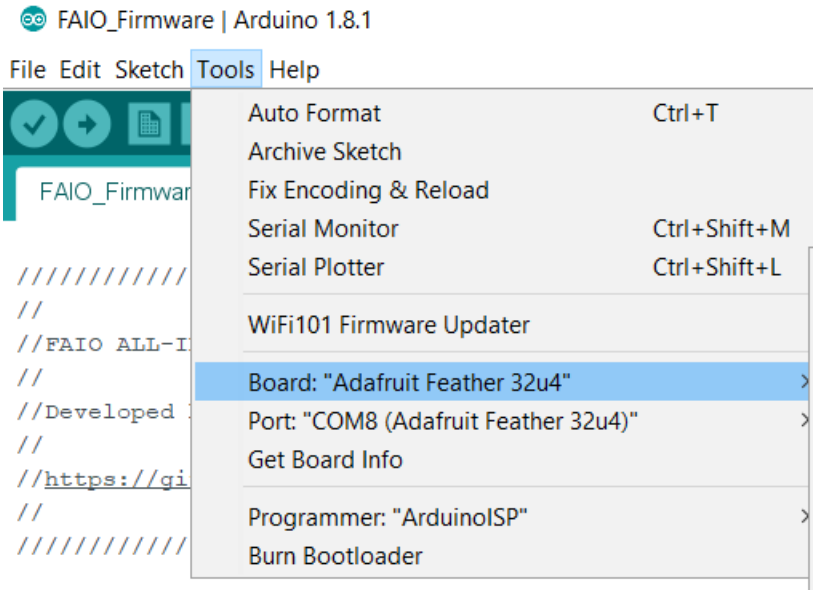
https://learn.adafruit.com/adafruit-feather-32u4-bluefruit-le/installing-ble-library

You can go ahead and upload the downloaded firmware **(FAIO_Firmware.ino)** to Adafruit Feather 32u4 Bluefruit LE board using Arduino IDE once all the necessary libraries are installed.

It's very important to make sure the correct Board and port number are selected as selecting the wrong board may result problems with bootloader of Adafruit Feather 32u4 Bluefruit LE board.

Here you can see an example of my selected Board and port number.

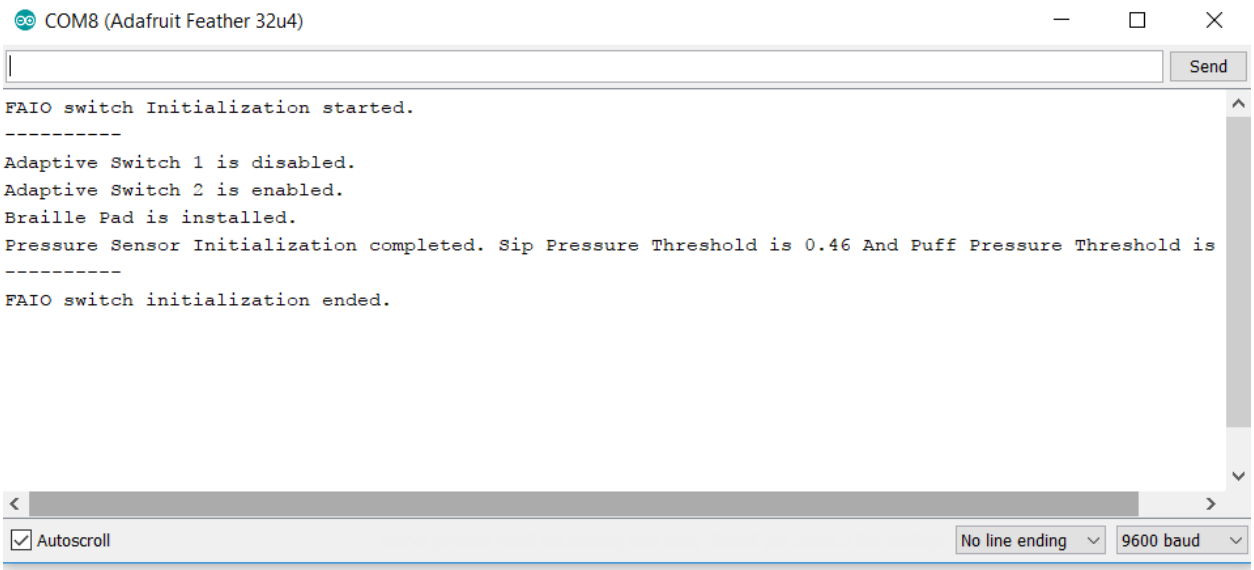
Note: Your port number won't be the same



You can now go ahead and upload the firmware. Arduino IDE will show you a "Don uploading" message indicating the firmware is uploaded to your FAIO Switch.

The LED on the FAIO main board blinks two times in red and green to indicate the start of initialization process has been started and it will blink again two times in red and green to indicate end of the initialization process.

You can also open the Serial Monitor in Arduino IDE ON 9600 baud rate to read initialization information.



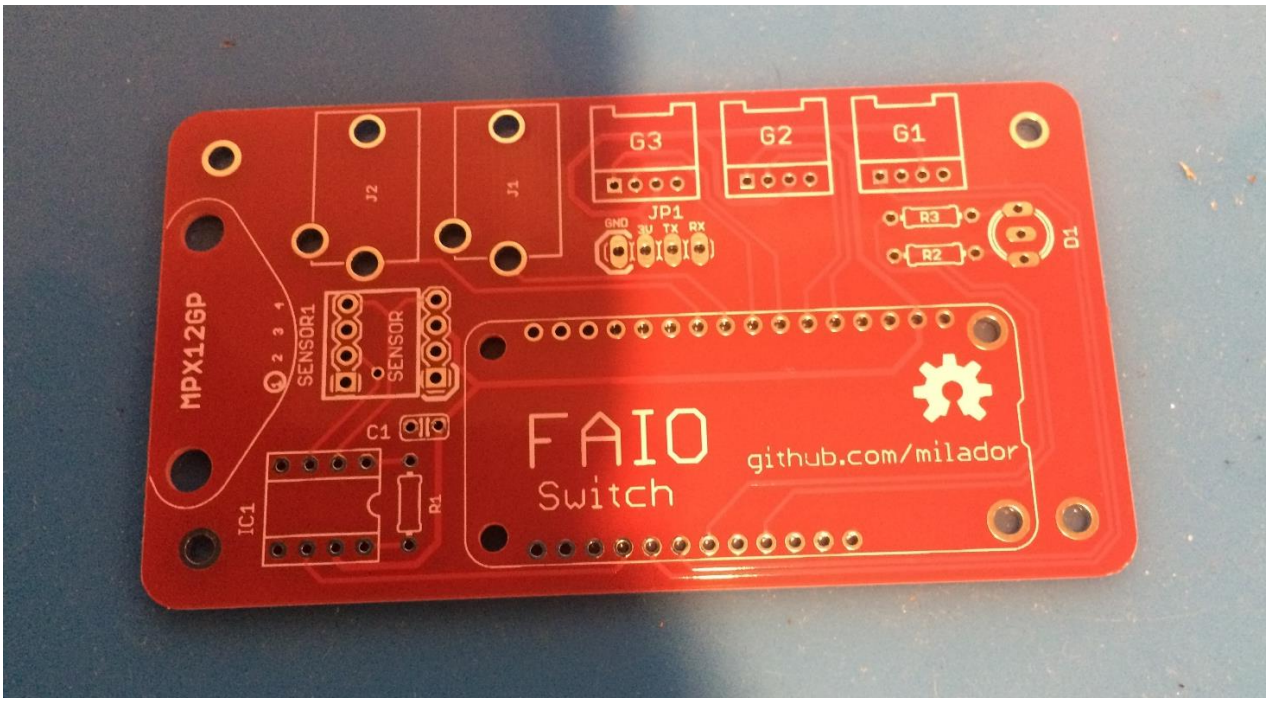
Hardware Installation

1. Adaptive switch version
2. Sip-and-Puff switch version
3. Braille version
4. Developer version

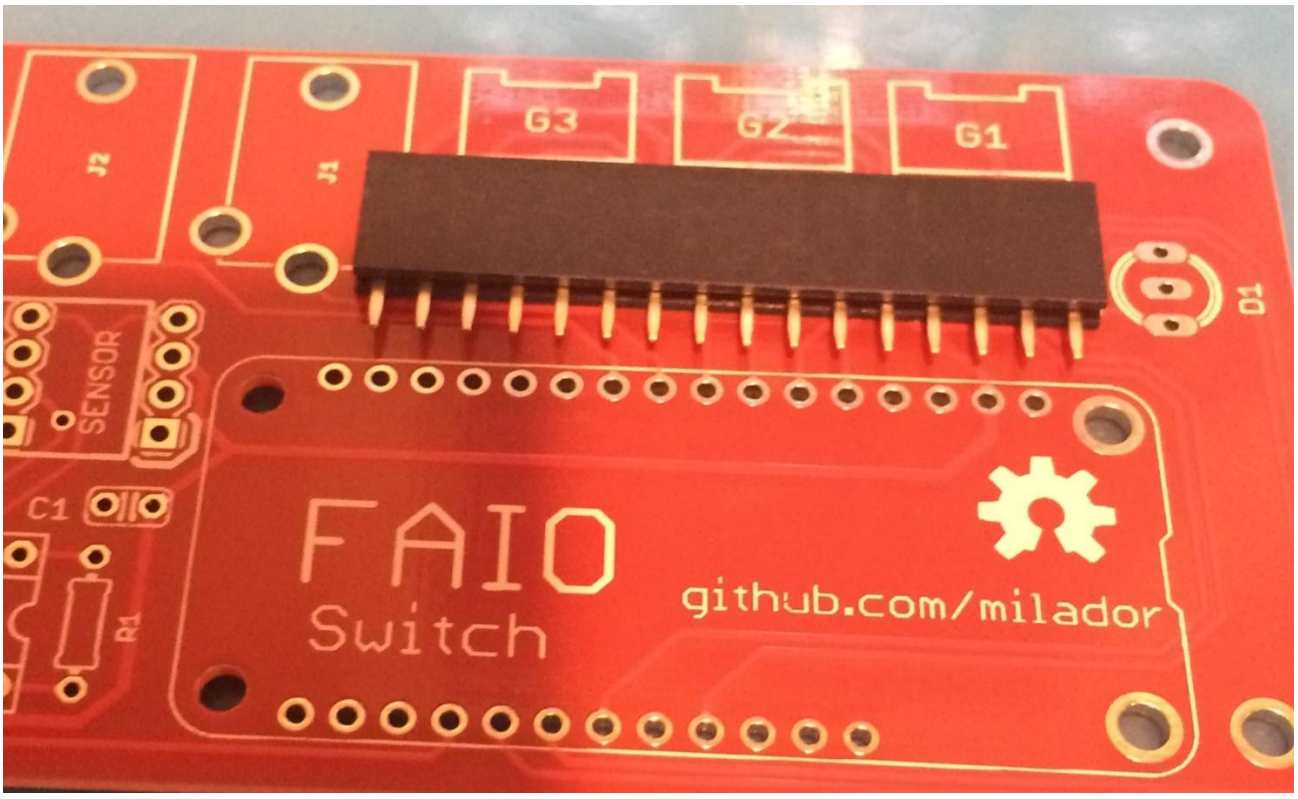
The printed circuit boards (PCB) can be downloaded from GitHub repository under Hardware directory.

https://github.com/milador/FAIO/blob/master/Hardware

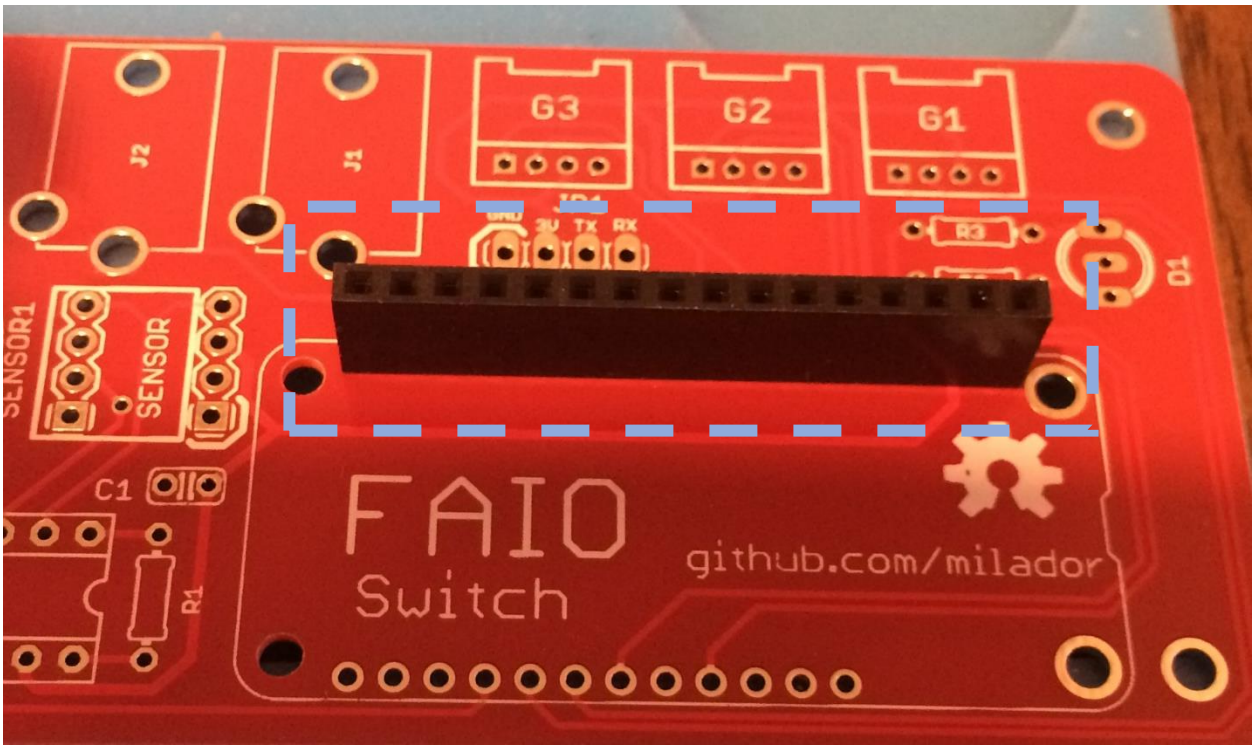
1. Adaptive switch version



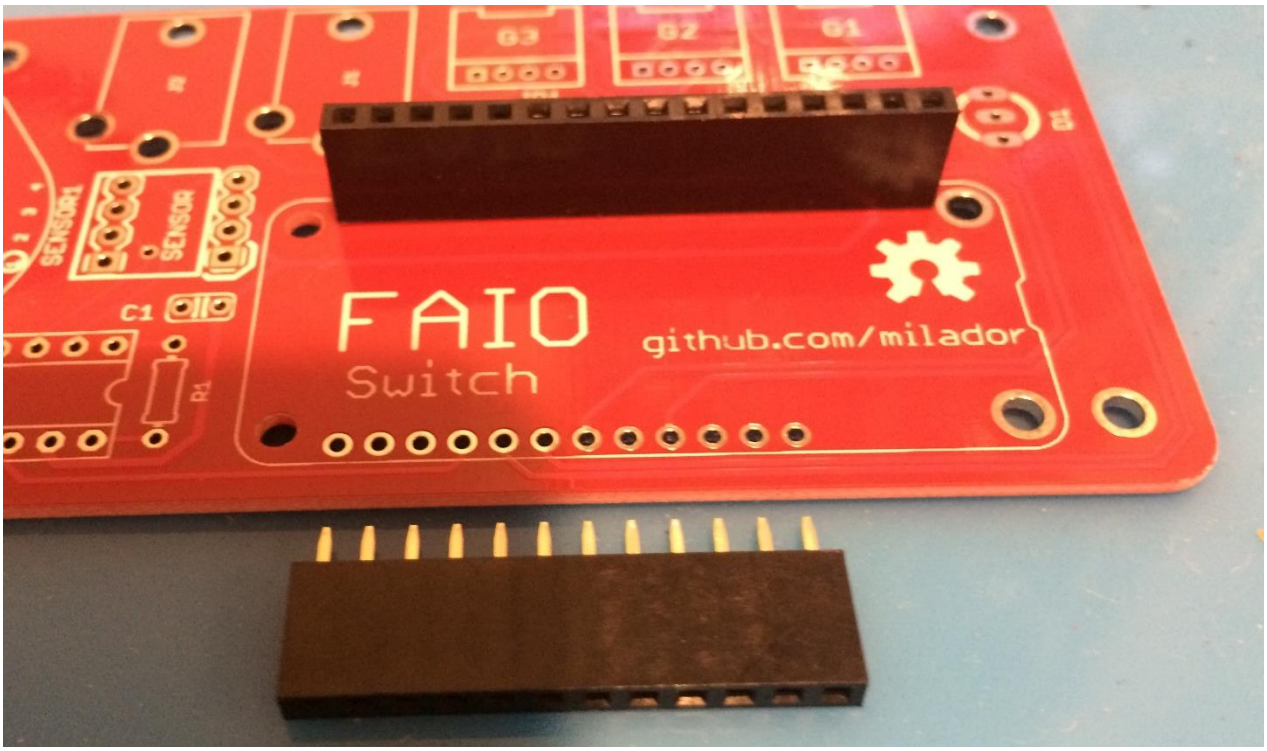
Step 1 – FAIO Switch main board x 1



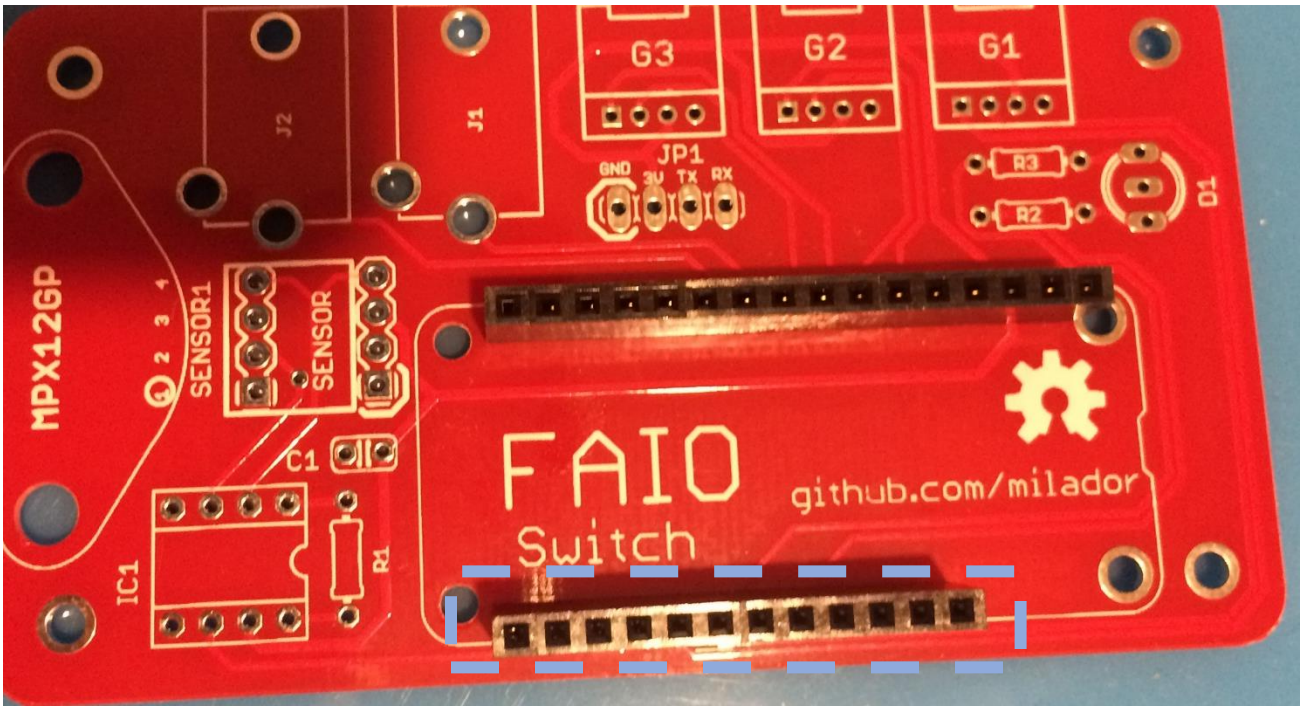
Step 2 – 16 position female header connector x 1



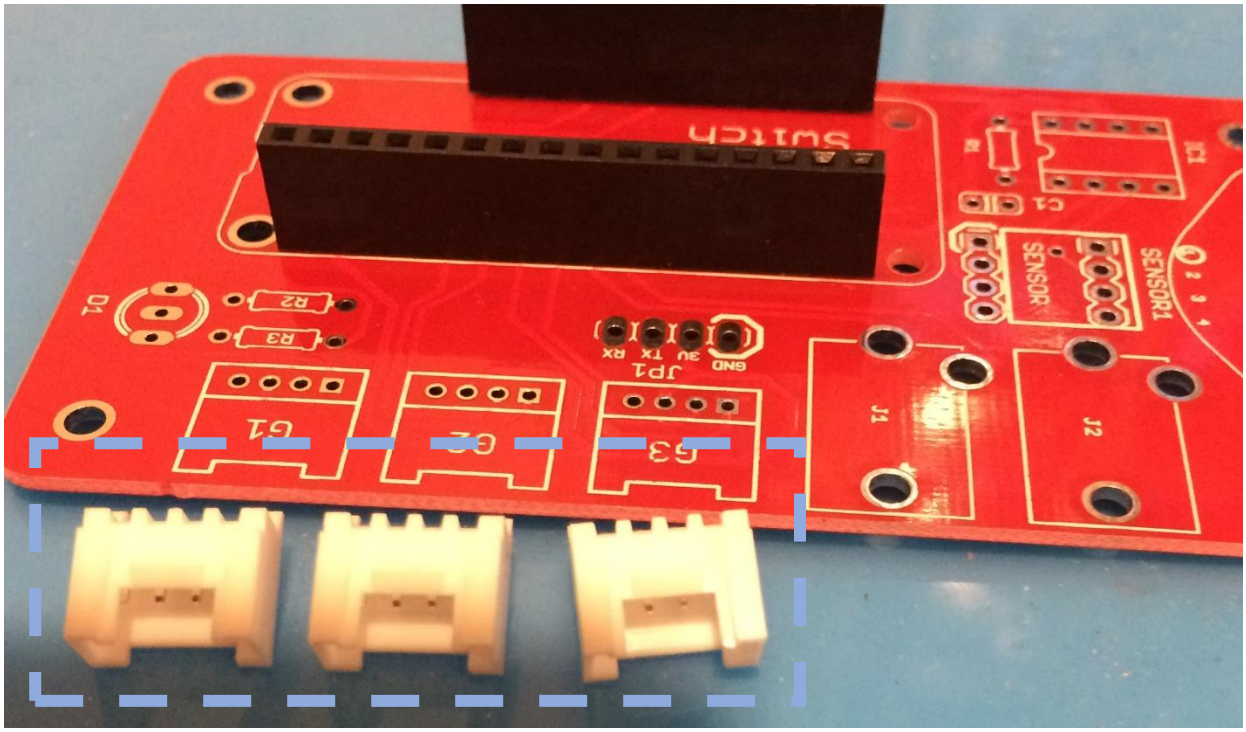
Step 3 – Solder 16 position female header connector



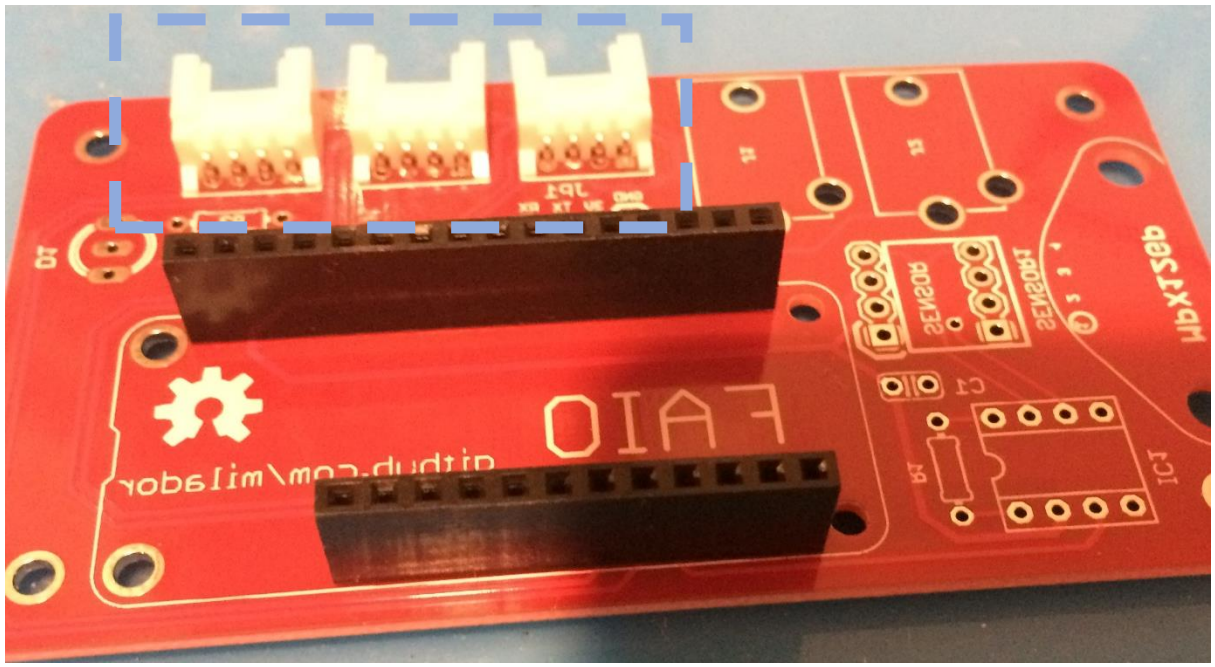
Step 4 – 12 position female header connector x 1



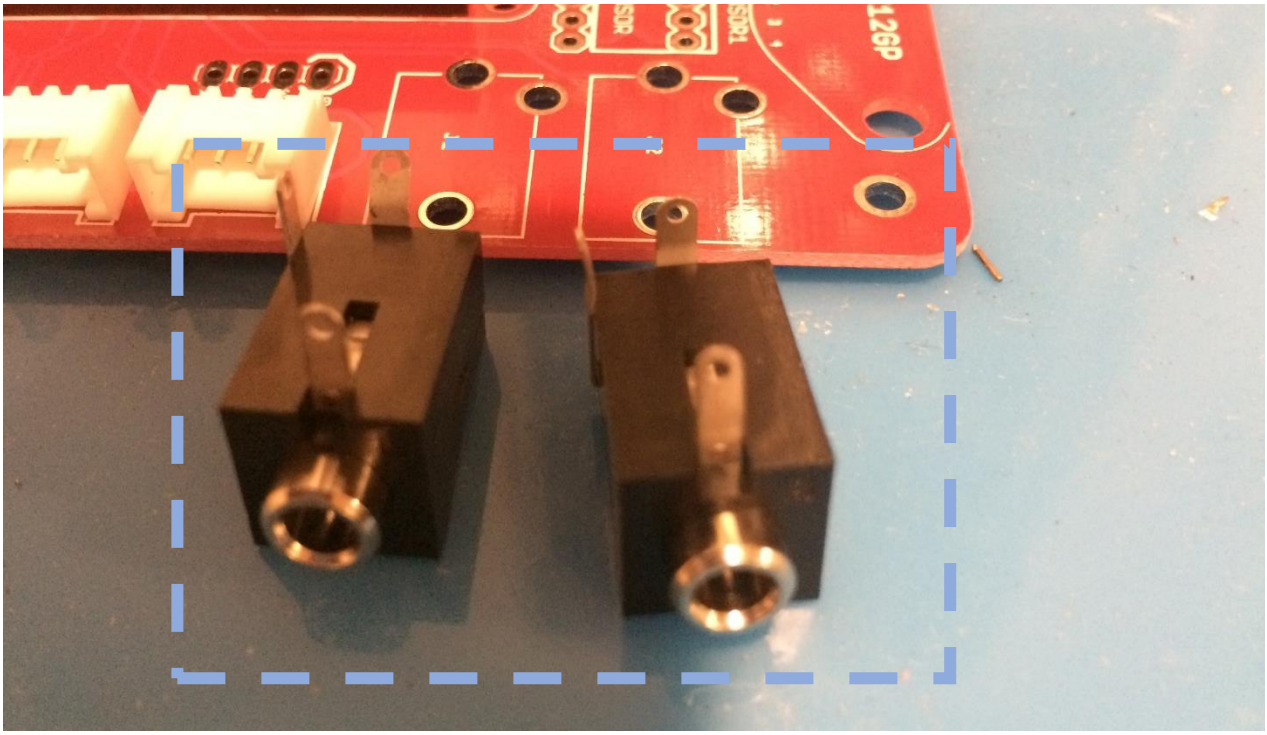
Step 5 – Solder 14 position female header connector



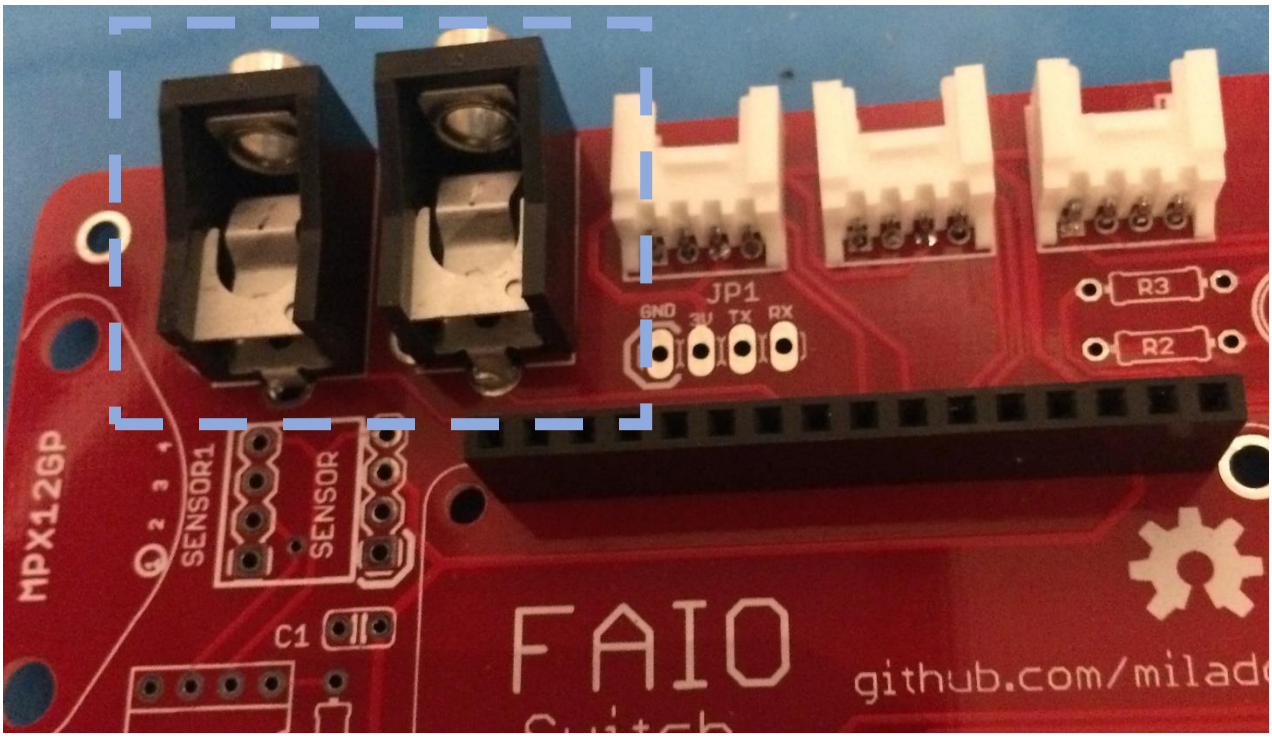
Step 6 – GROVE 2MM 4 pin right angle connector x 3



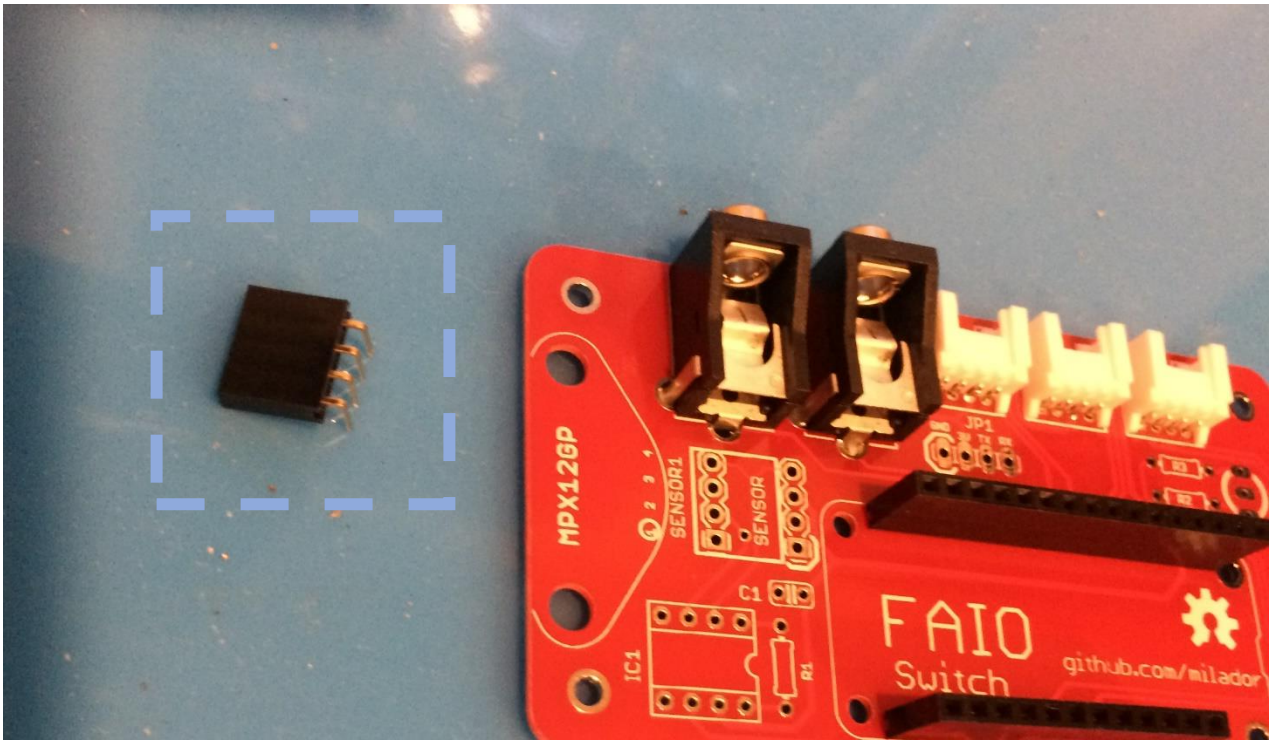
Step 7 – Solder GROVE 2MM 4 pin right angle connectors



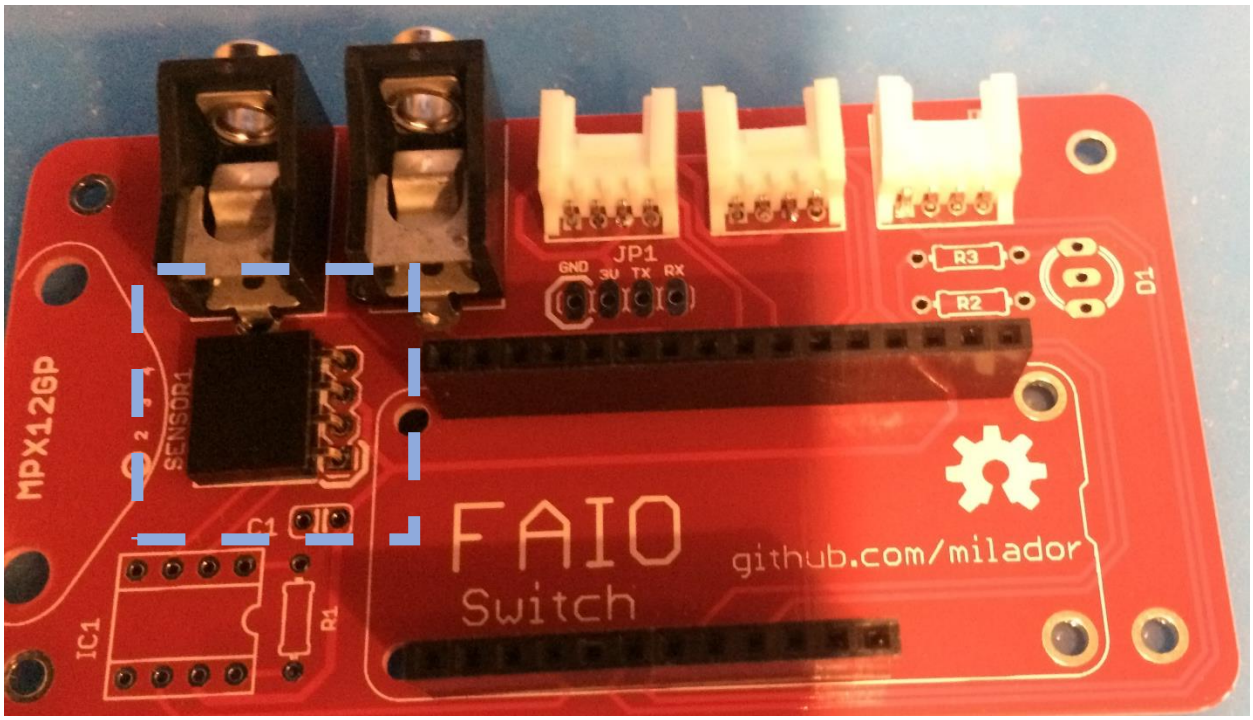
Step 8 – 3.5MM JACK MONO connector x 2



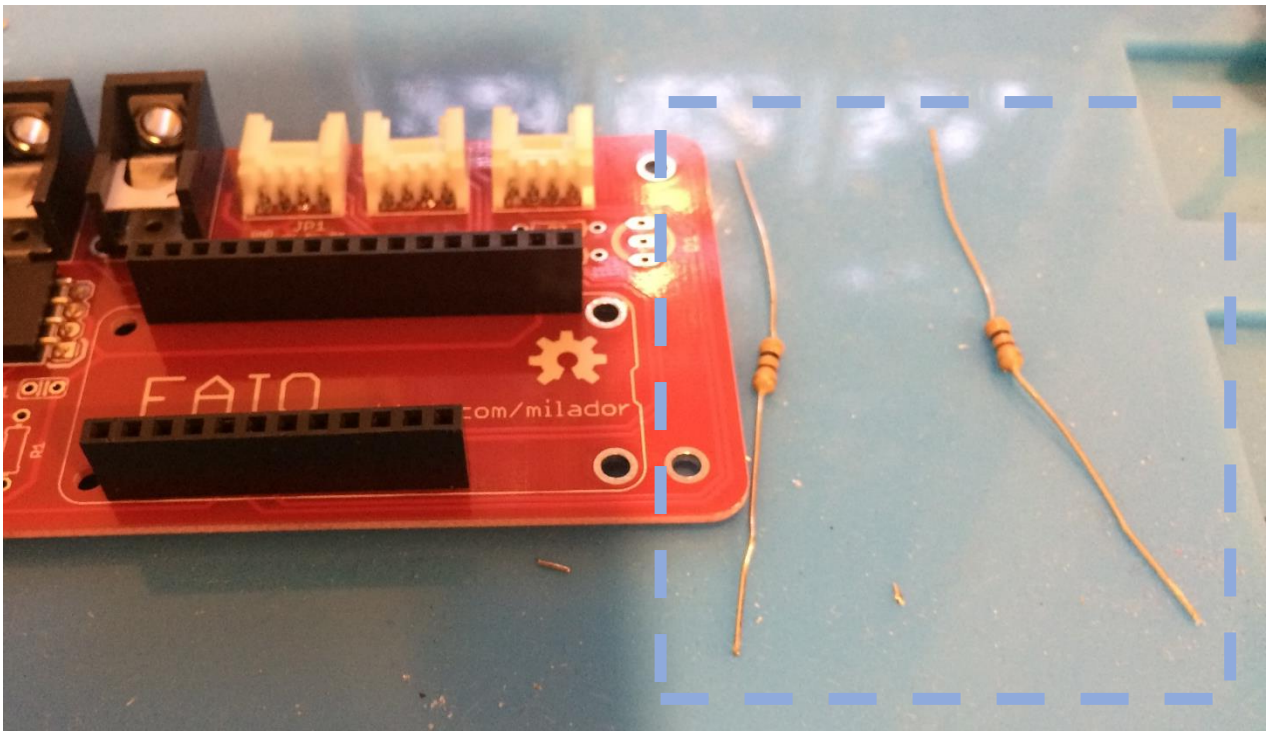
Step 9 – Solder 3.5MM JACK MONO connectors



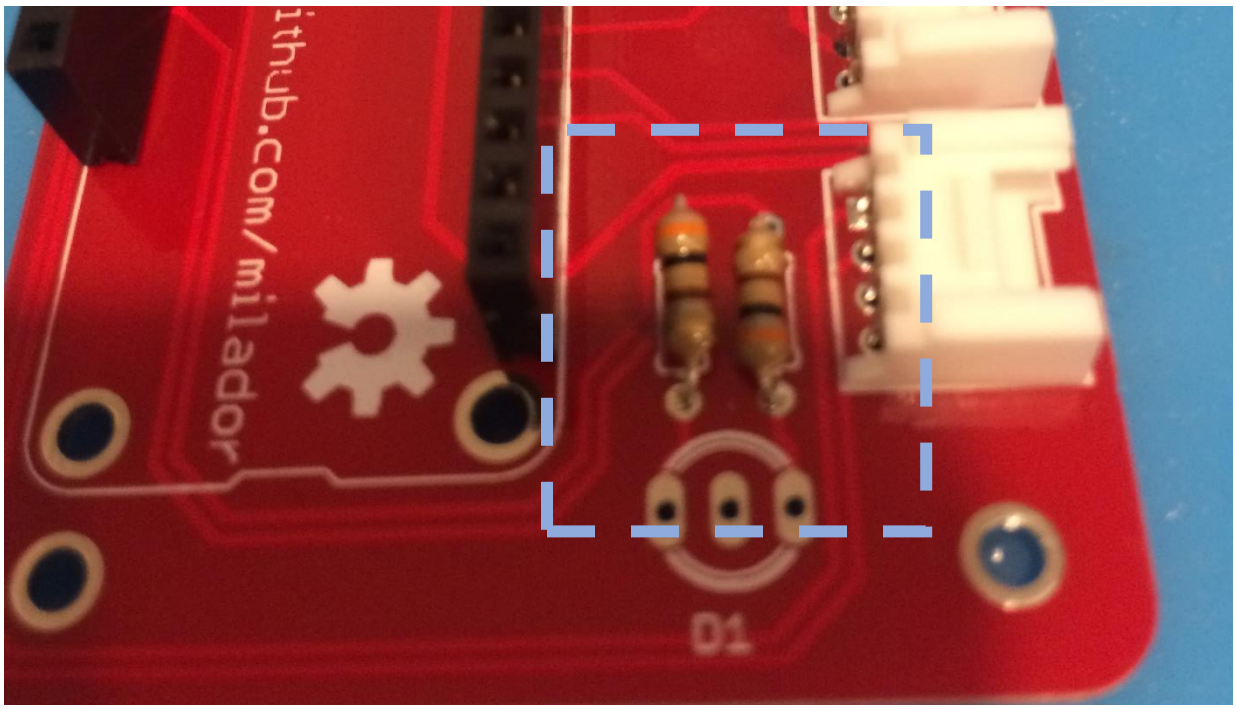
Step 10 – 4 position right angle female header connector x 1



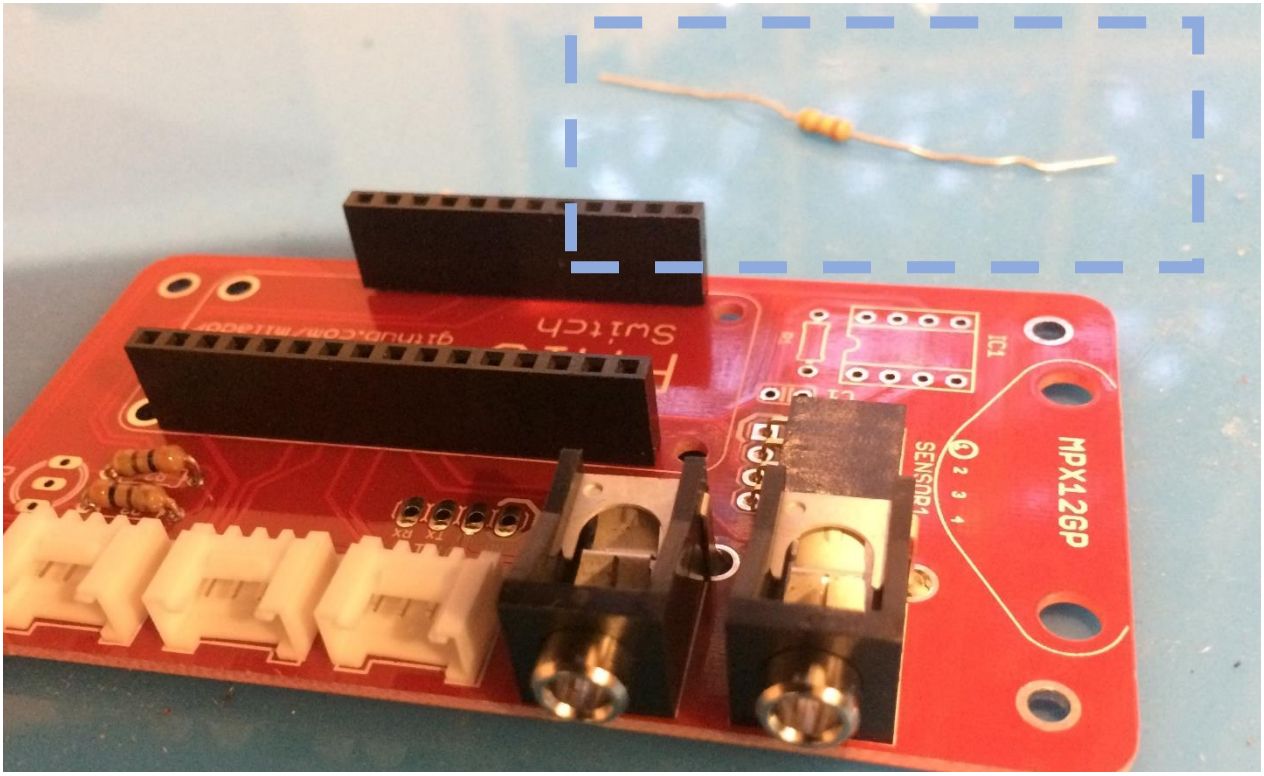
Step 11 – Solder 4 position right angle female header connector



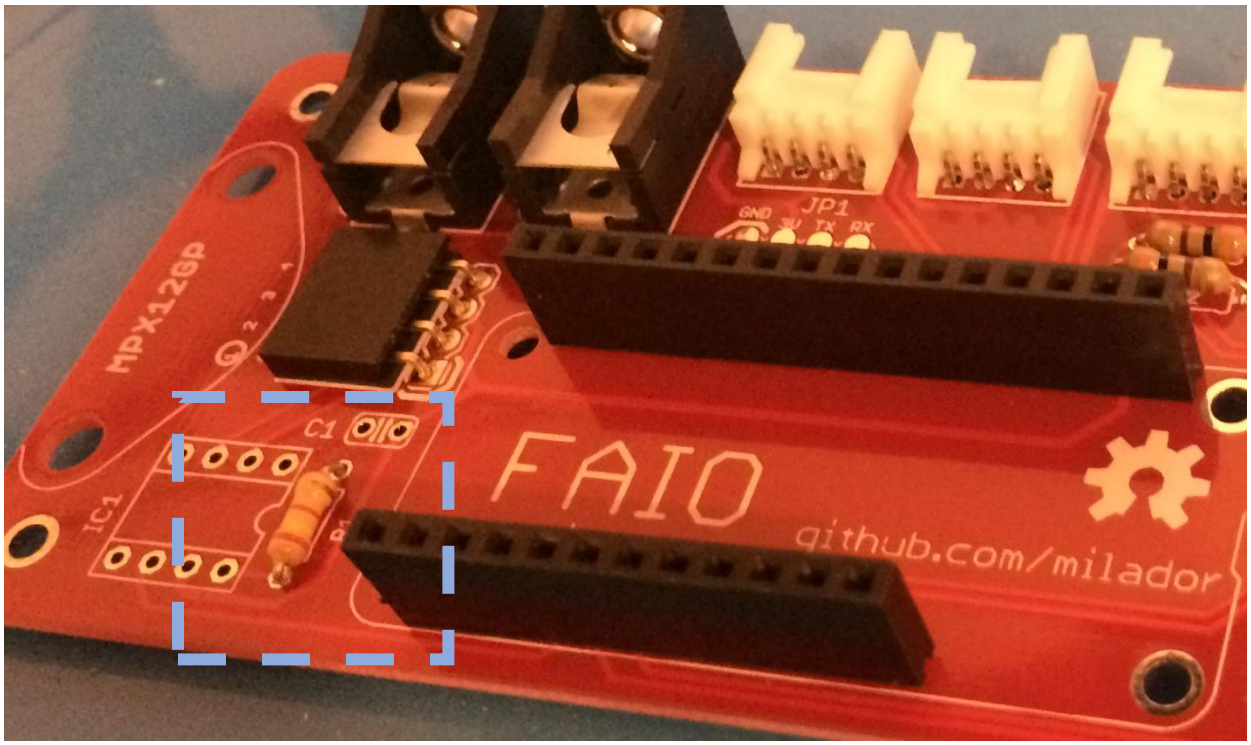
Step 12 – 300 OHM Resistor x 2



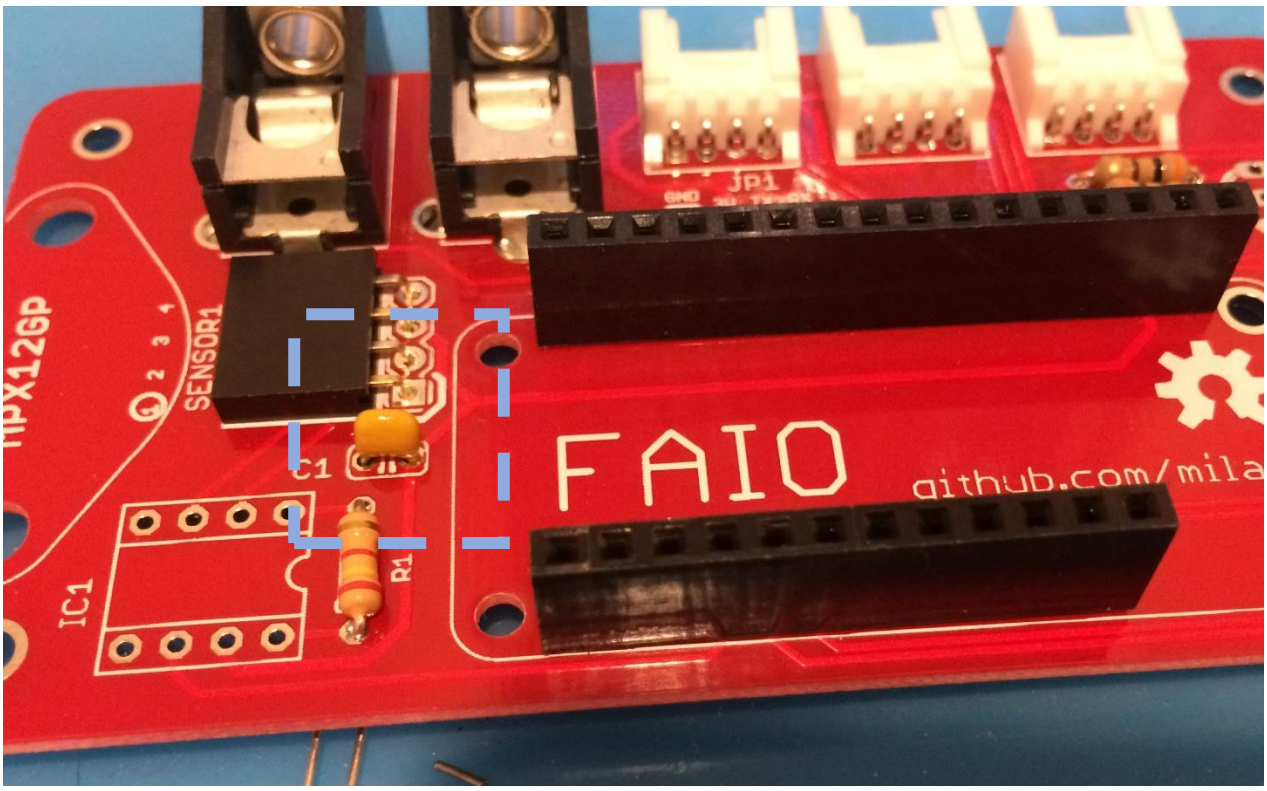
Step 13 – Solder 300 OHM Resistors



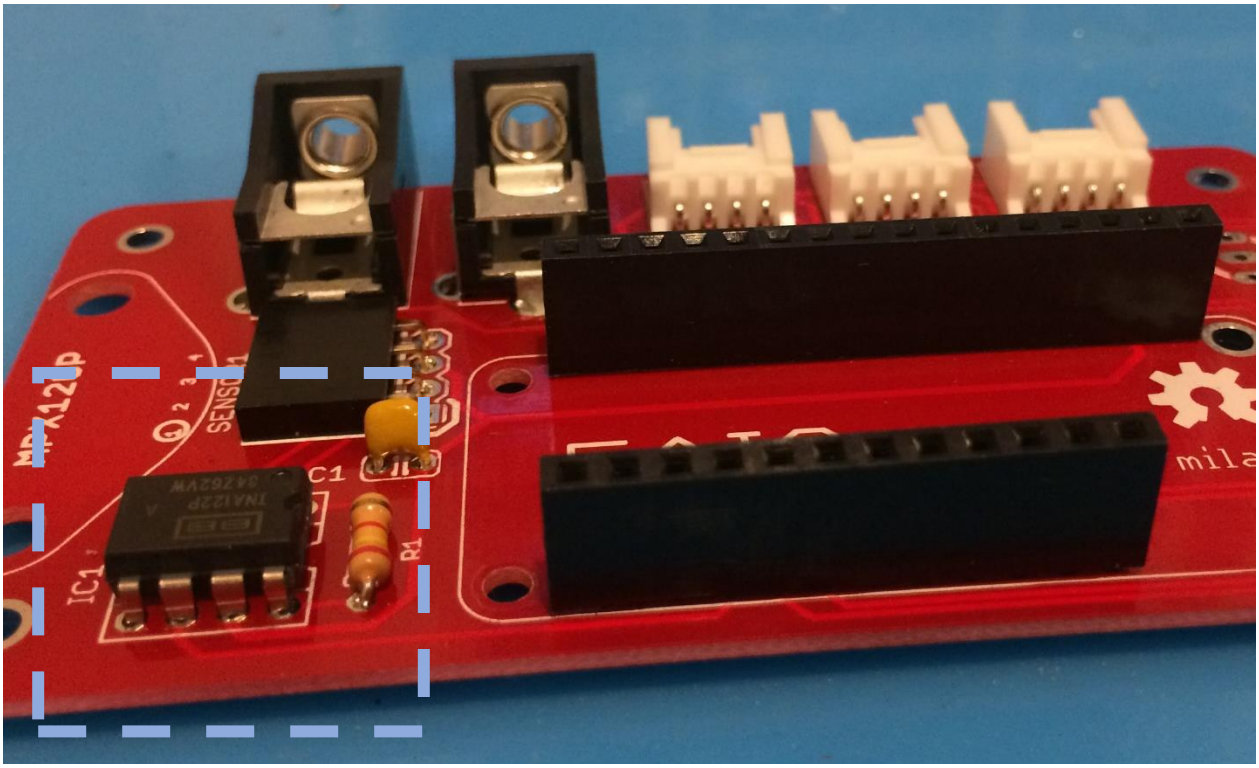
Step 14 – 2.4K OHM Resistor x 1



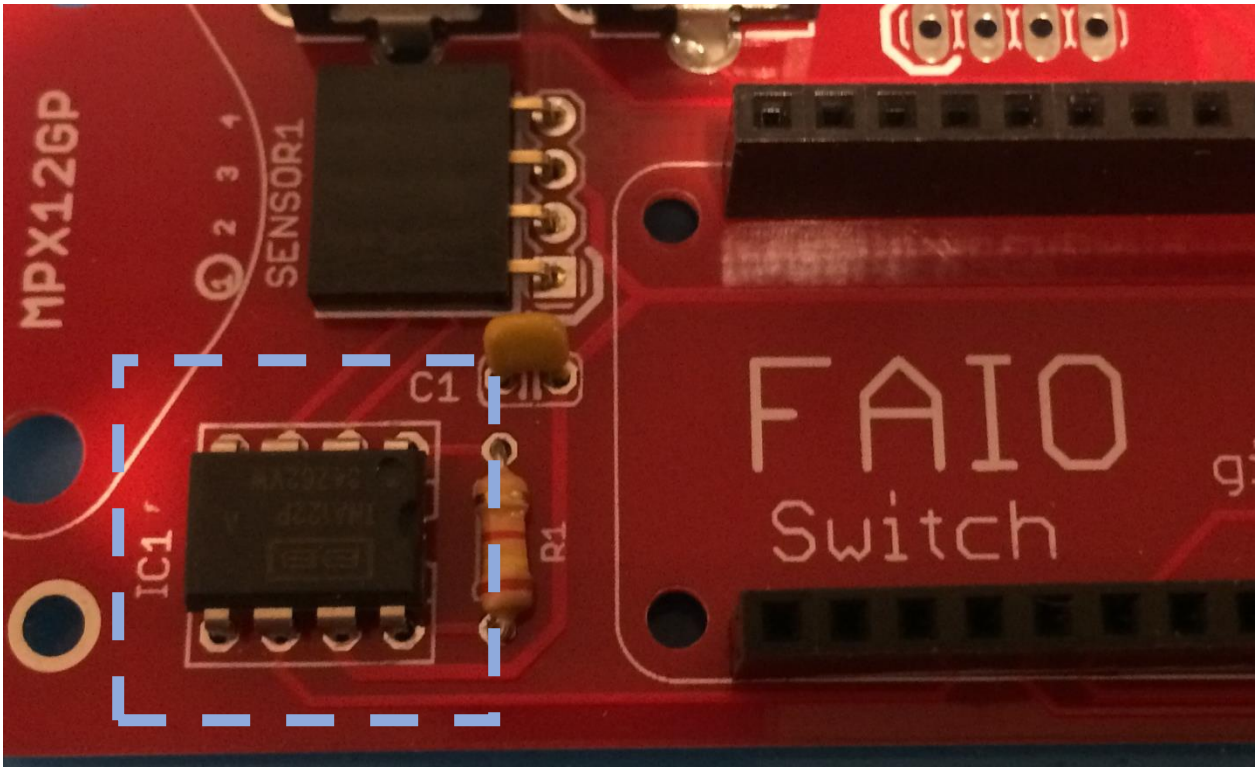
Step 15 – Solder 2.4K OHM Resistor



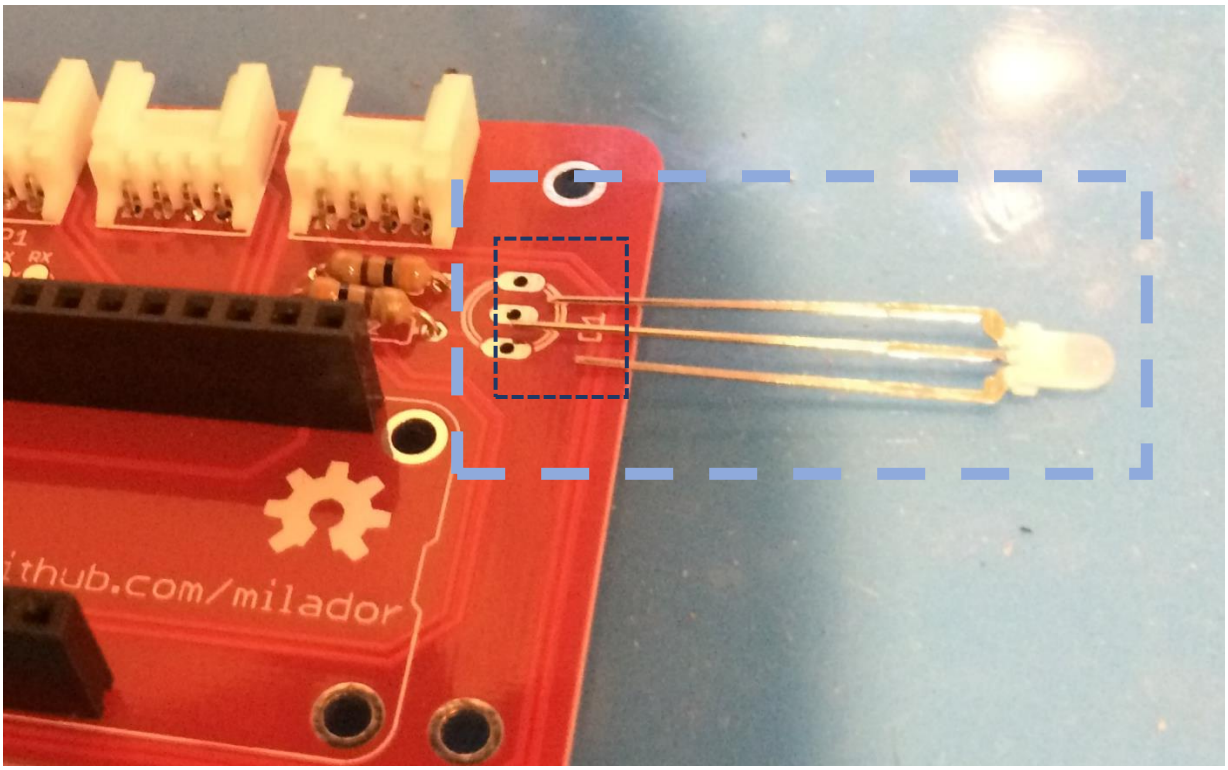
Step 16 – Solder 0.1UF Capacitor x 1



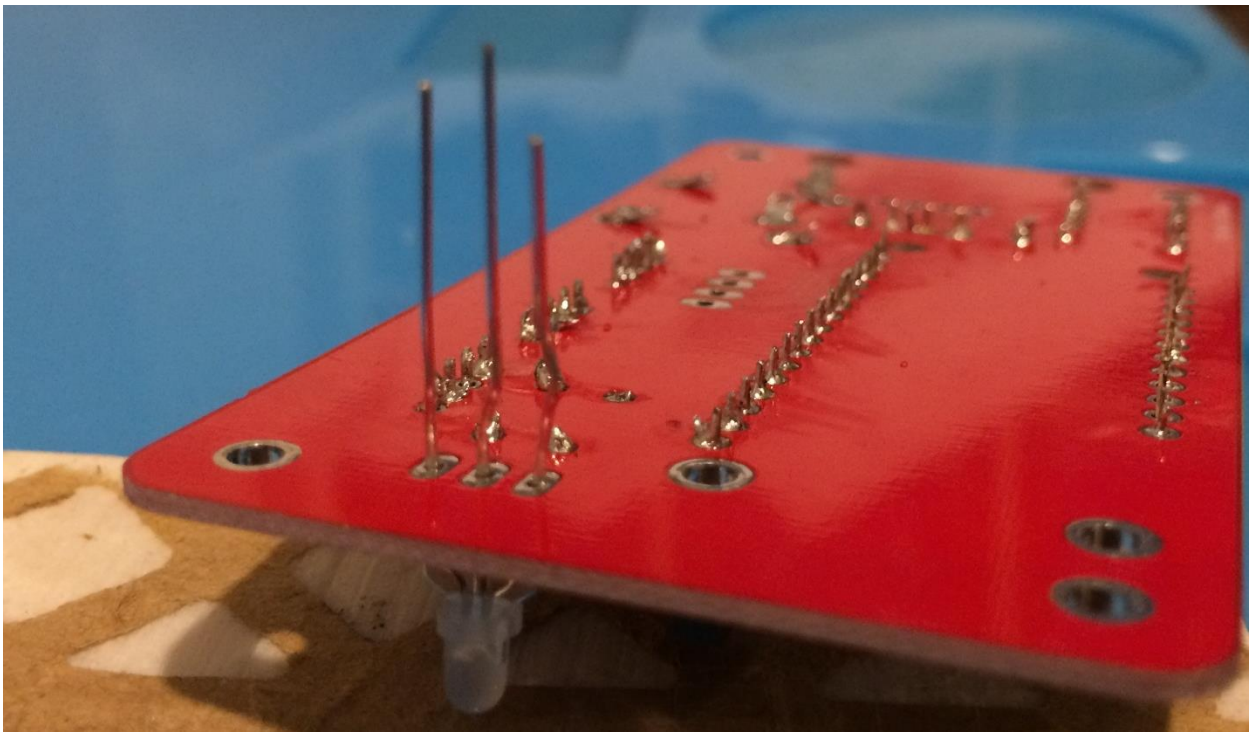
Step 17 – INA122PA Amplifier x 1



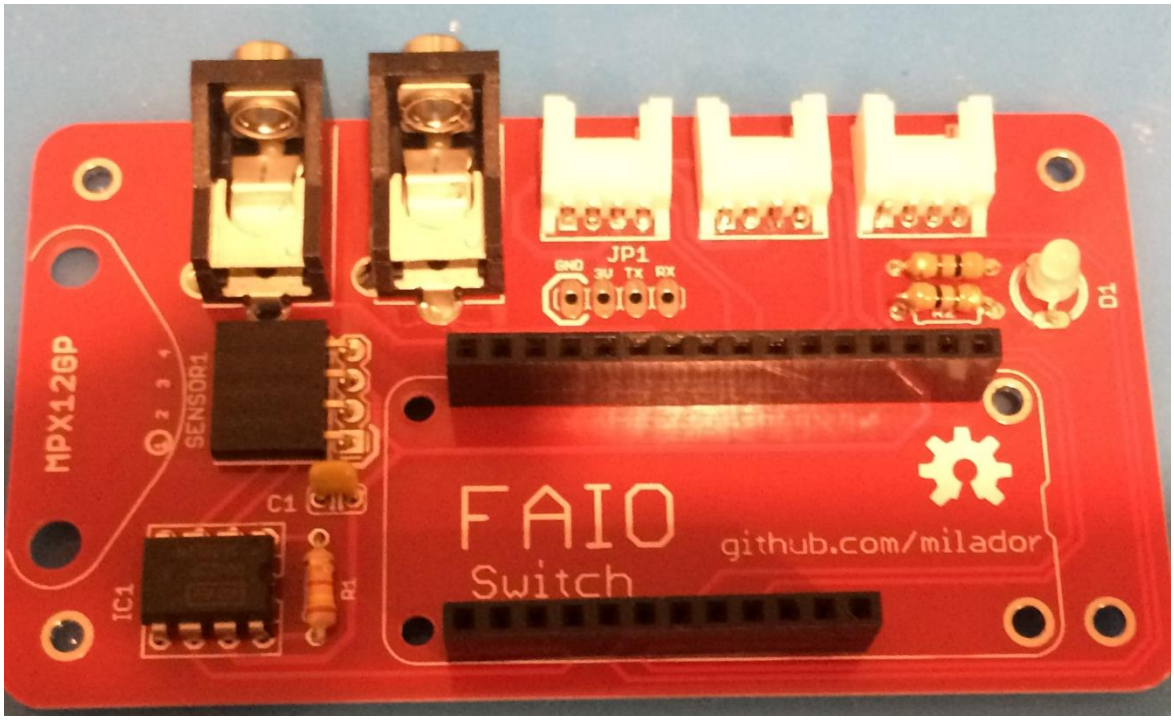
Step 18 – Solder INA122PA Amplifier



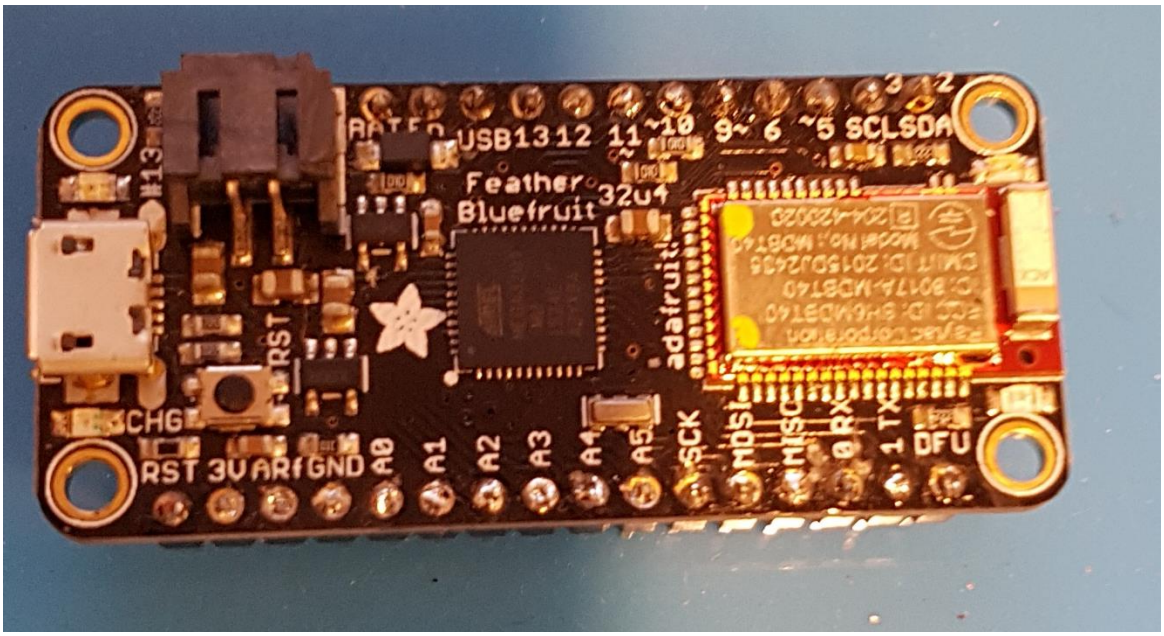
Step 19 – 3MM Bi-Color LED x 1



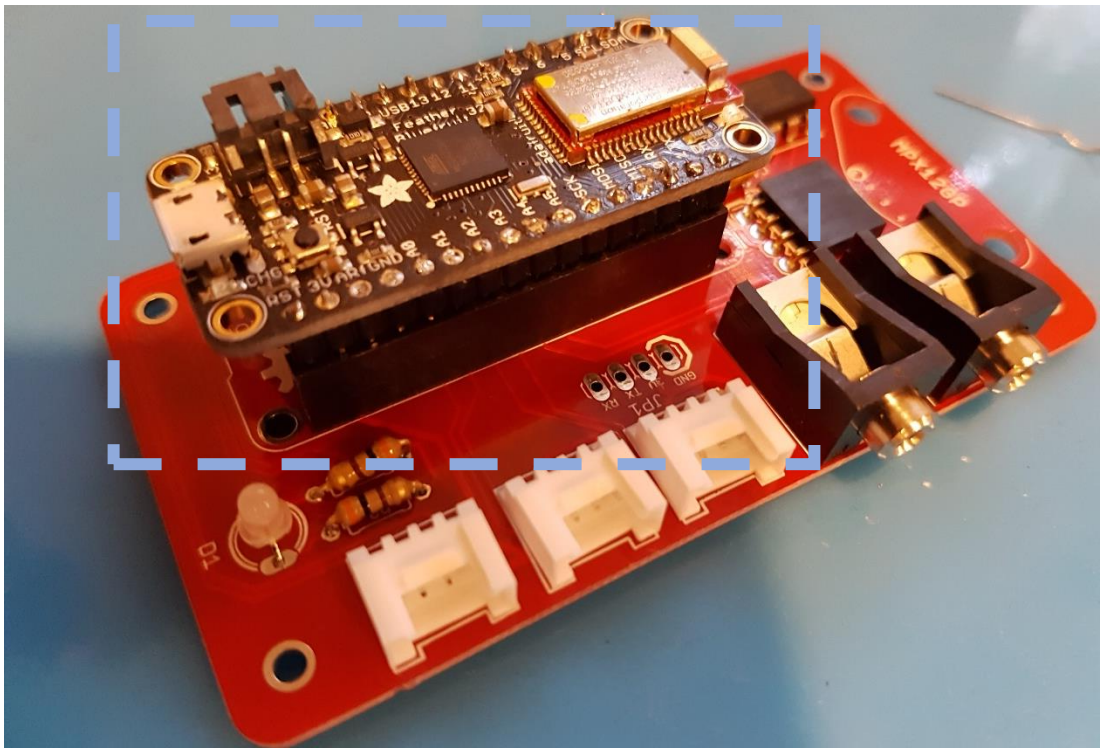
Step 20 – Solder 3MM Bi-Color LED



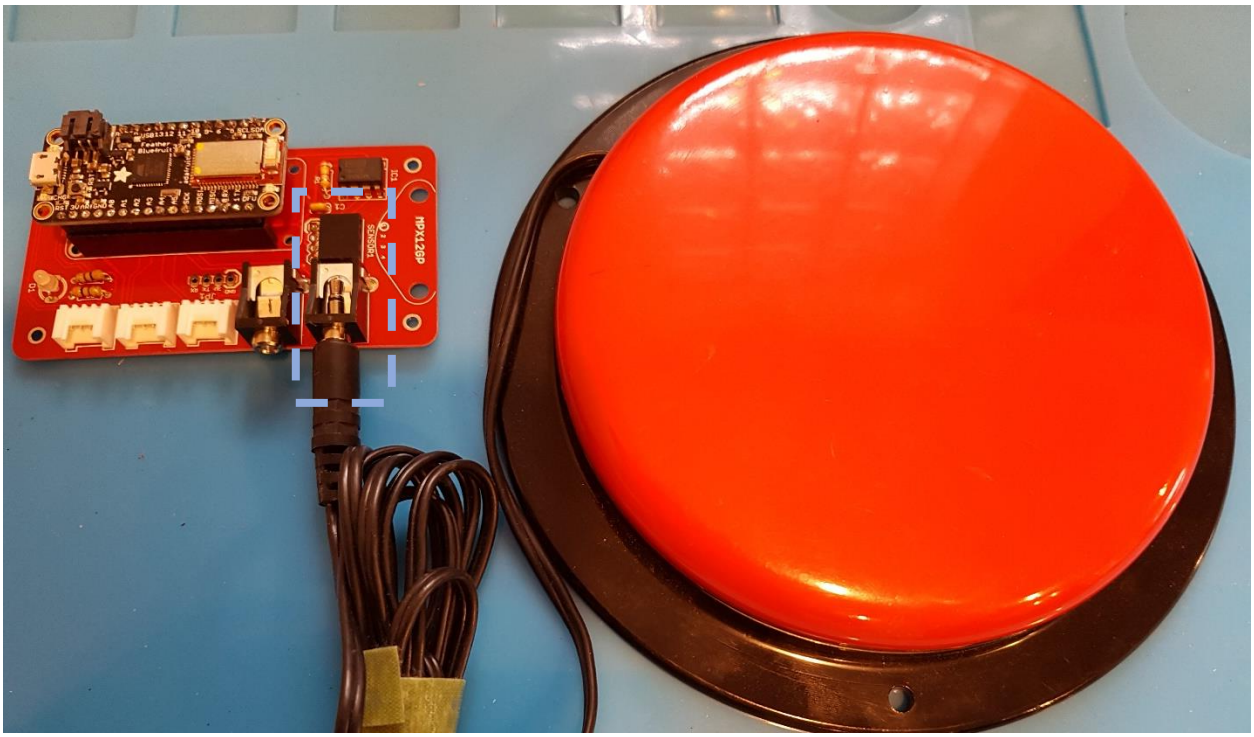
Step 21 – Soldered FAIO Switch main board



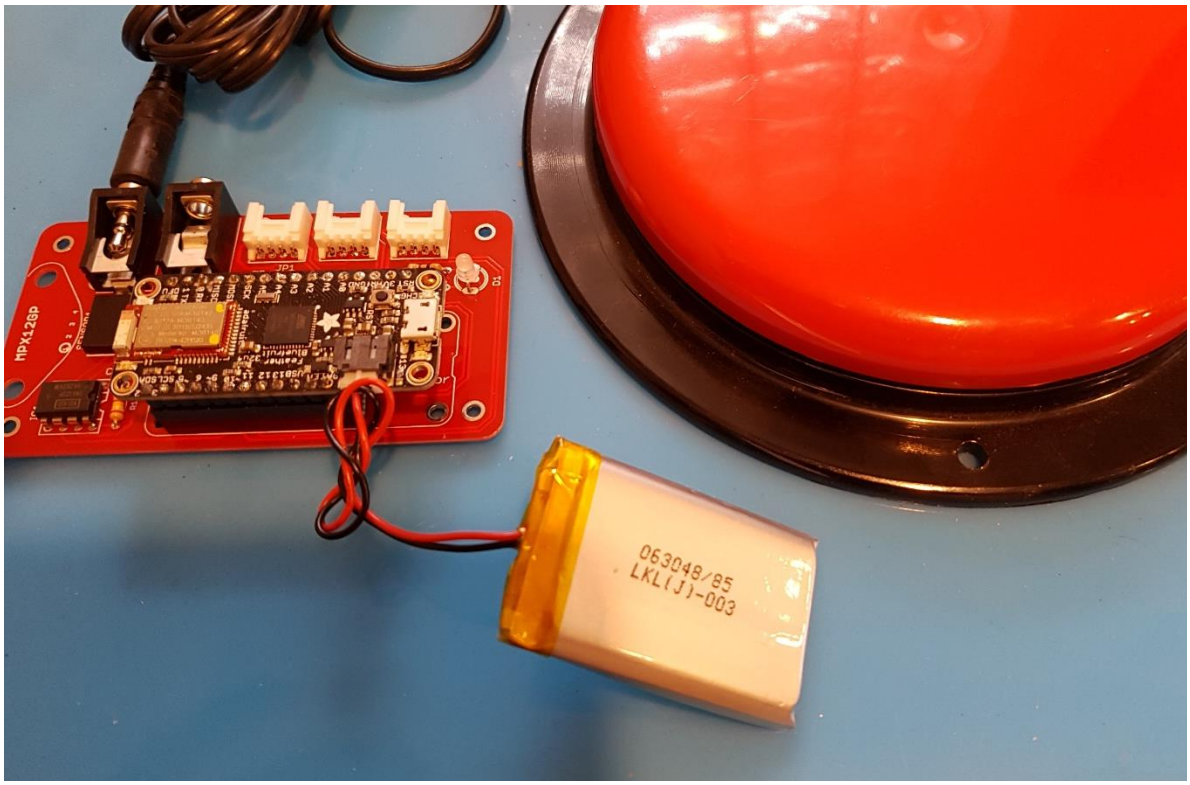
Step 22 – Solder male header pins to Adafruit Feather 32u4 Bluefruit LE



Step 23 – Stack Adafruit Feather on FAIO Switch main board

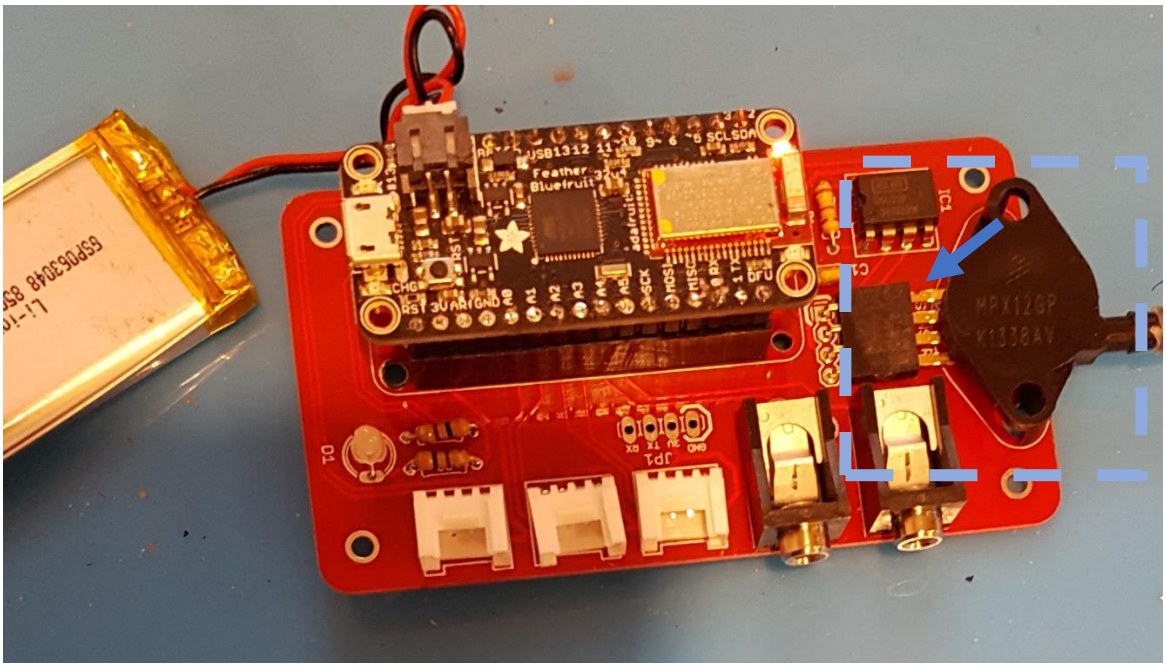


Step 24 – Connect your switch to FAIO Switch main board



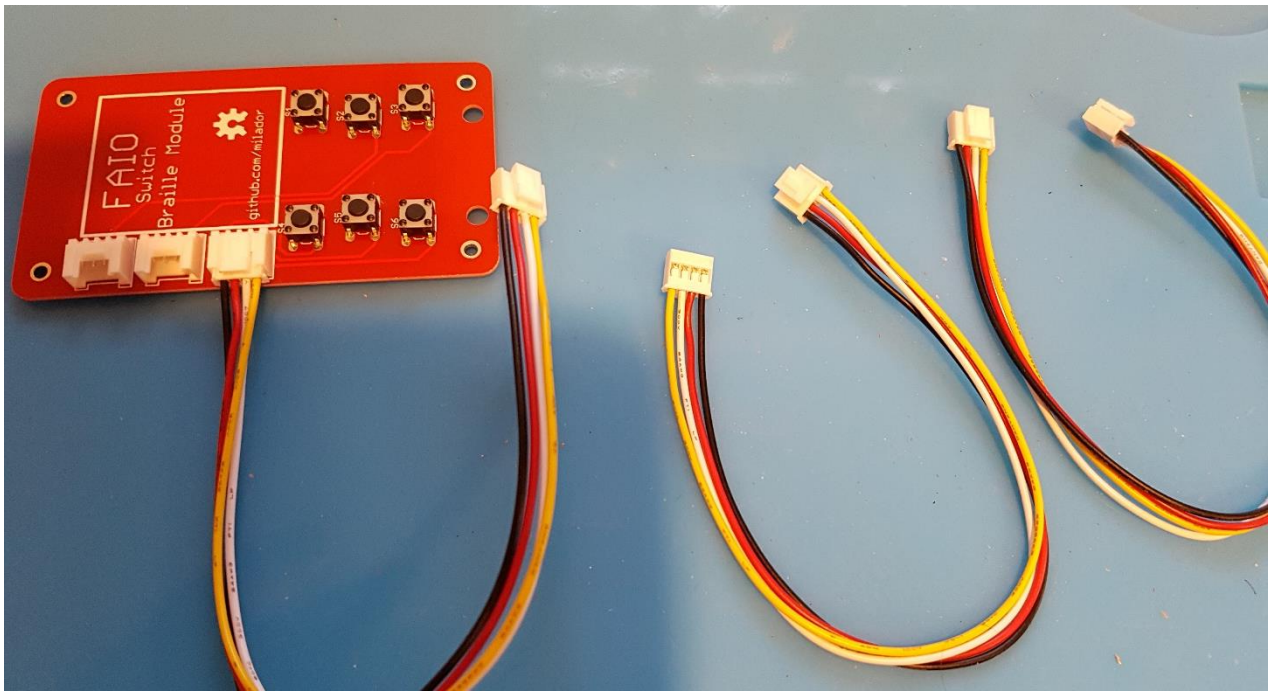
Step 25 – Connect a Lithium Ion Polymer Battery to Adafruit Feather 32u4 Bluefruit LE

2. Sip-and-Puff switch version

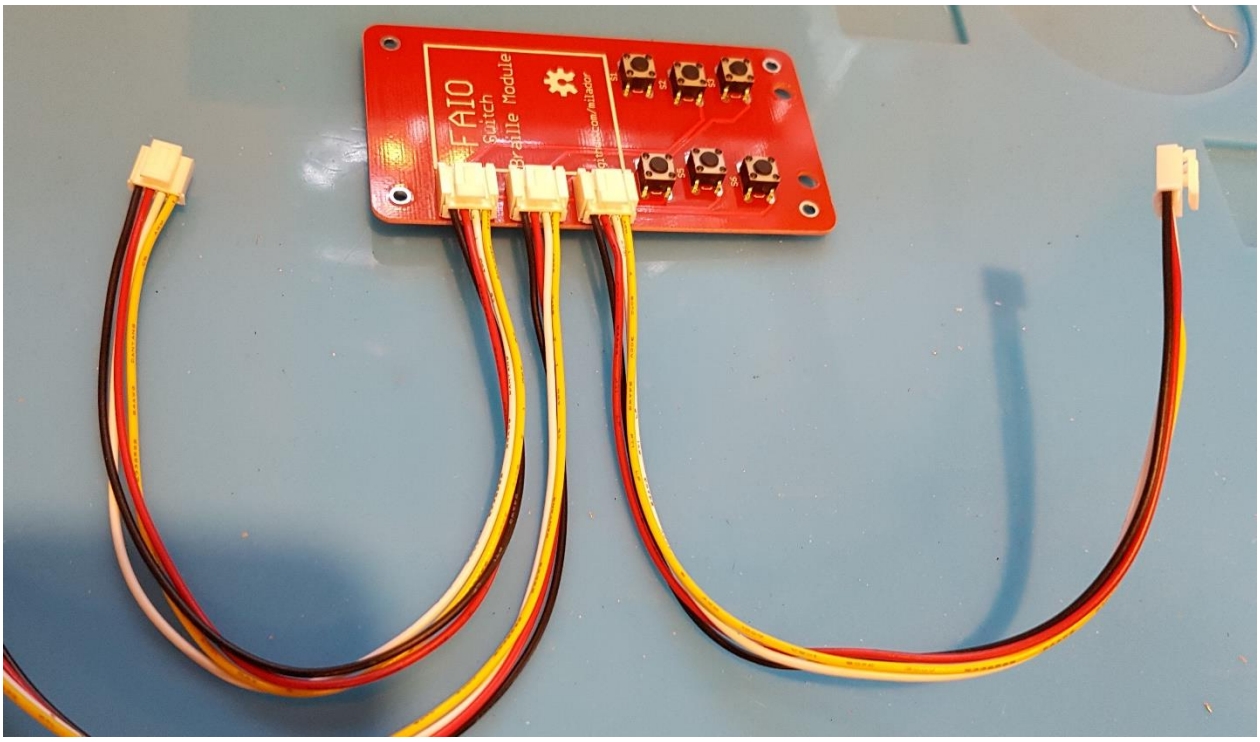


Step 26 – Connect Pressure Sensor to FAIO Switch main board

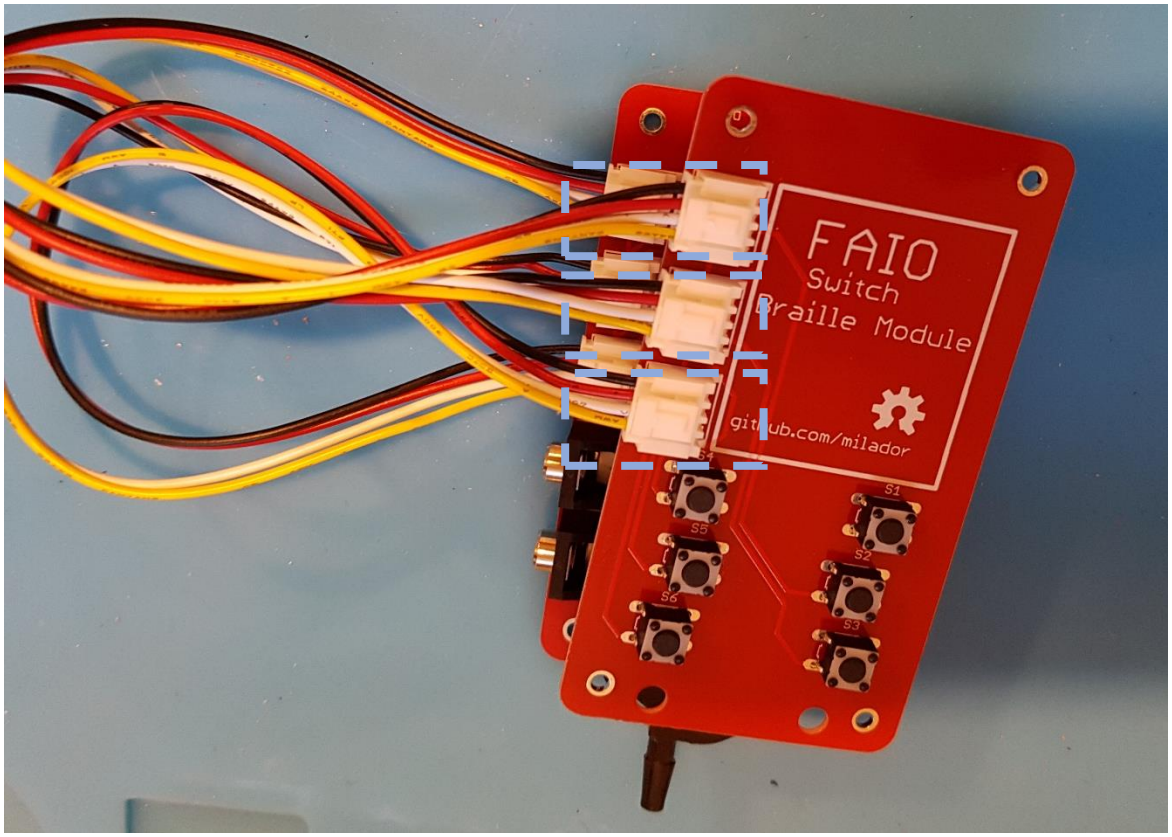
3. Braille version



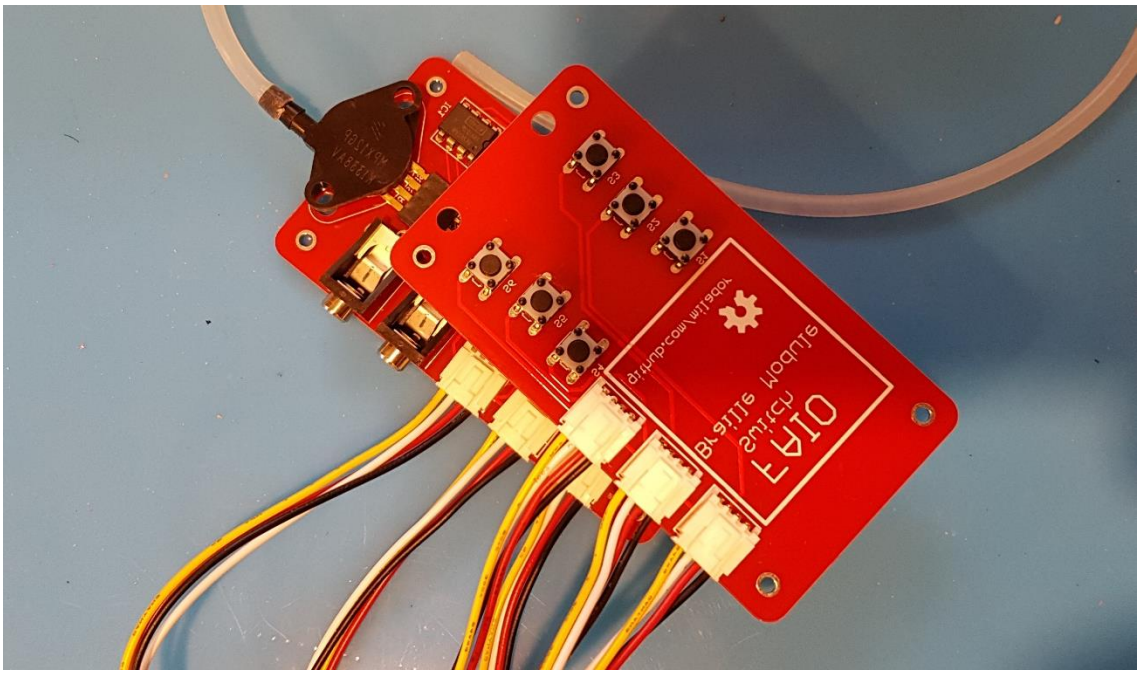
Step 27 – Connect a 4 pin Grove cable to Grove connectors on Braille Board



Step 28 – Connect other 4 pin Grove cables to Grove connectors on Braille Board

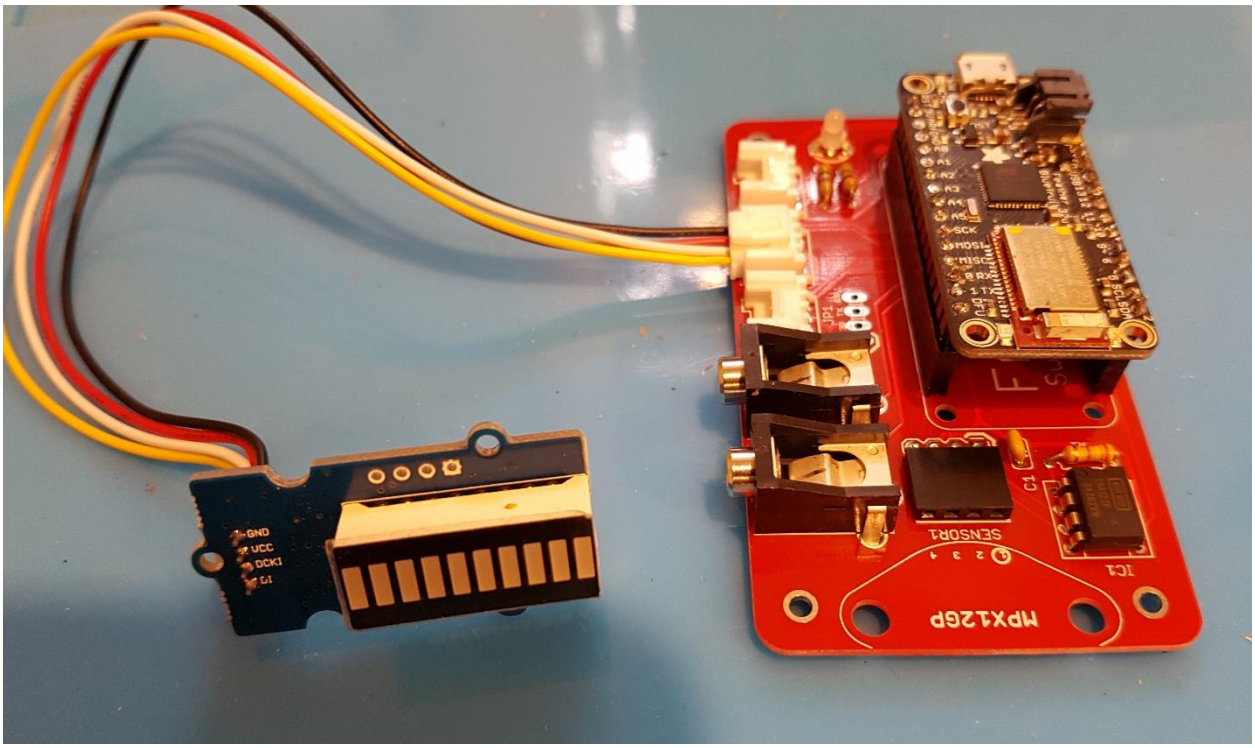


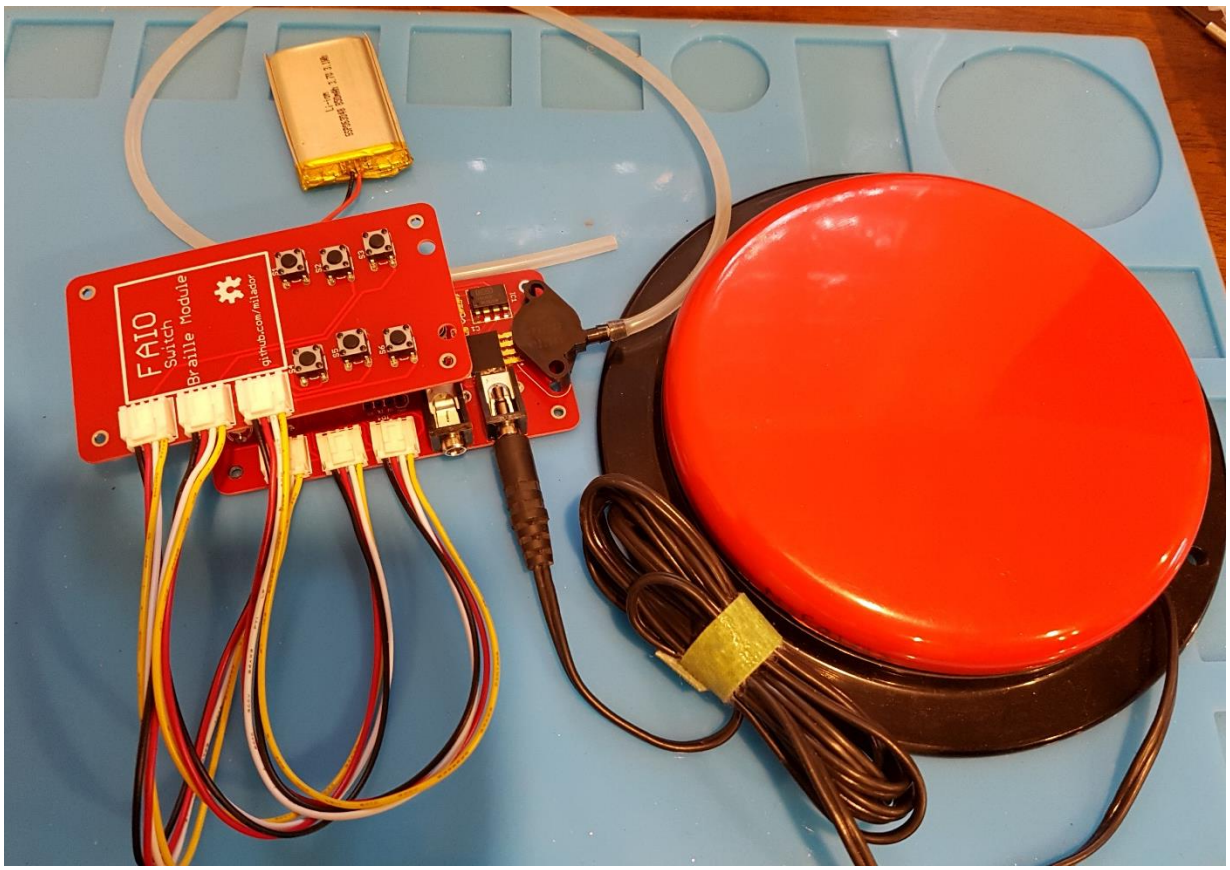
Step 29 – Connect other end of 4 pin Grove cables to Grove connectors on FAIO main Board



Step 30 – Make sure 4 pin Grove cables are connected in the correct order

4. Developer version



Step 31 – Add your Grove module of choice to FAIO main board

All versions