Project: ARMATRON v1.0

DATE: 12 April 2022

Congratulations on surviving the nuclear apocalypse! We here at SHED TECH commend you on navigating your way through the nuclear winter and into this brave new world!

In order to help you thrive in this new environment, we here at SHED TECH have compiled this document to guide you through making your very own Personal Information Processor, THE ARMATRON v1.0

This project is broken into 4 main part groupings:

1. 3d printed parts. Make sure the printer you use does not give you radiation poisoning. We recommend taking some rad-x and using adequate ventilation.
2. Electronic parts. These parts are the internals of the ARMATRON. Please make sure you get these from a reputable provider to avoid post apocalyptic raiders from trying to take your life!
3. Sensors. For ease of use these sensors should use the Pimoroni I2C breakout plugs to allow quick and easy swapping of devices. Afterall you don't want to be trying to swap your infrared thermometer for a torch while being chased down by a wild Deathclaw now do you?
4. The code. The code linked here will only work for the sensors mentioned here. Different sensors will mean you will need to write different code!

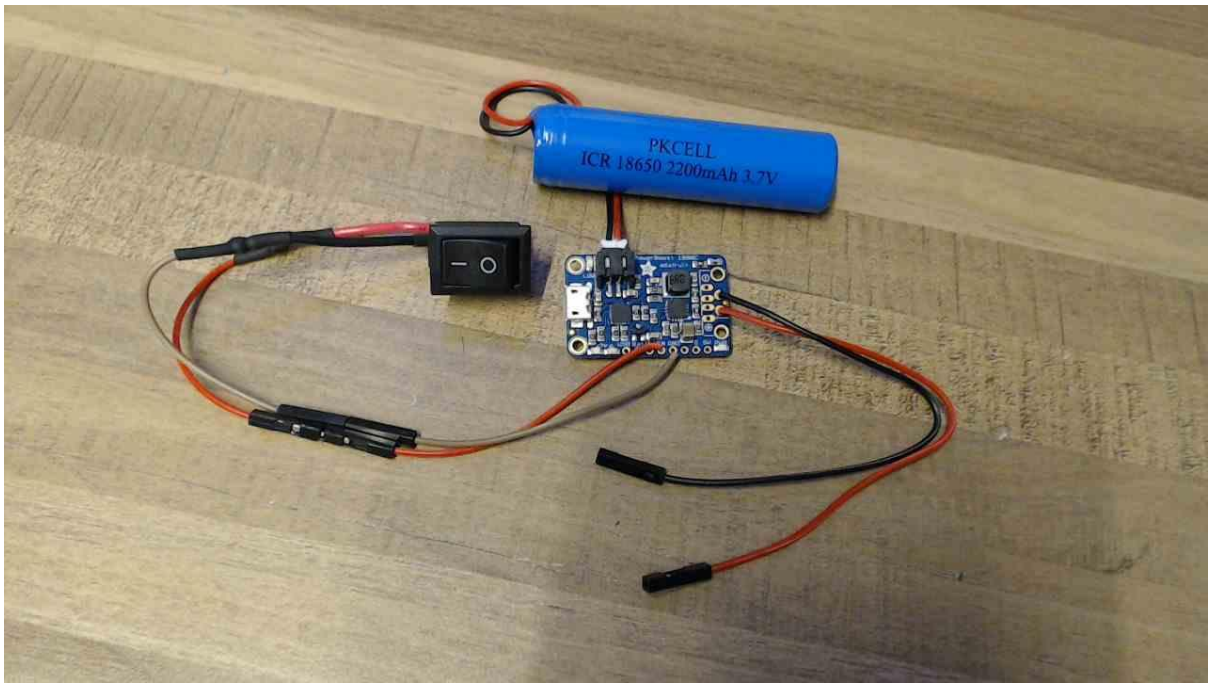
Parts required:

1. Raspberry pi zero (I used the version 2 which has wifi built in)
2. Oled display https://shop.pimoroni.com/products/adafruit-2-23-monochrome-oled-bonnet-for-raspberry-pi?variant=31962445643859
3. USB-C breakout * 2 https://shop.pimoroni.com/products/usb-2-0-type-c-connector-breakout-board-usb07b?variant=39353845022803
4. Power board https://shop.pimoroni.com/products/powerboost-1000-charger-rechargeable-5v-lipo-usb-boost-1a-1000c?variant=3226459969
5. Battery https://shop.pimoroni.com/products/lithium-ion-battery-pack?variant=23417820359
6. MX switches https://shop.pimoroni.com/products/kailh-mechanical-switches-pack-of-12?variant=32056315347027
7. NEO Pixel 1x4 i2c switch socket https://shop.pimoroni.com/products/neokey-1x4-qt-i2c-four-mechanical-key-switches-with-neopixels-stemma-qt-qwiic?variant=39374753923155
8. Power switch https://www.amazon.co.uk/gp/product/B08ZHY42WD/ref=ppx_yo_dt_b_asin_title_o09_s00?ie=UTF8&psc=1
9. Pimoroni I2C breakout x 2 https://shop.pimoroni.com/products/breakout-garden-extender-kit?variant=13600510312531
10. Nuts and bolts (something like this will do if you haven't got a supply) https://www.amazon.co.uk/1080Pcs-Stainless-Assortment-Storage-Wrenches/dp/B08K8QPG6F/ref=sr_1_14?crid=300SXQ9KBZ2T6&keywords=hex+nuts+and+bolts&qid=1649767493&sprefix=hex+nuts+%2Caps%2C77&sr=8-14
11. superglue
12. hot glue
13. USB Micro OTG cables x 2 (or a usb micro male breakout board) https://www.amazon.co.uk/Rankie-R-1170-Female-Adapter-Convertor-Black/dp/B00YOX4JU6/ref=sr_1_4?crid=2SAMKGXIV6N1Q&keywords=micro+usb+otg&qid=1649768384&sprefix=micro+usb+otg%2Caps%2C63&sr=8-4
14. Magnets https://www.amazon.co.uk/gp/product/B07Q5R1ZLJ/ref=ppx_yo_dt_b_asin_title_o08_s00?ie=UTF8&psc=1
15. GPS sensor https://shop.pimoroni.com/products/pa1010d-gps-breakout?variant=32257258881107
16. 11x7 LED Matrix Breakout https://shop.pimoroni.com/products/11x7-led-matrix-breakout?variant=21791690752083
17. IR thermometer https://thepihut.com/products/gravity-i2c-non-contact-ir-temperature-sensor-for-arduino-mlx90614-dcc?variant=39824759783619
18. BME688 4-in-1 Air Quality Breakout https://thepihut.com/products/bme688-4-in-1-air-quality-breakout-gas-temperature-pressure-humidity?variant=40247361994947
19. STEMMA QT Qwicc 4 pin cables https://thepihut.com/products/stemma-qt-qwiic-jst-sh-4-pin-cable?variant=31257729073214

Wiring

The I2C bus should be taken from the OLED display using a STEMMA QT Qwicc cable. It should be plugged into one side of the neopixel MX board. The other socket of the neopixel board should be used to feed the i2c bus to the 3 Pimoroni i2c breakout sockets. You will also need to solder a wire from pin4 of the raspberry pi to the “int” pin of the 3 Pimoroni sockets.

Charging Circuit



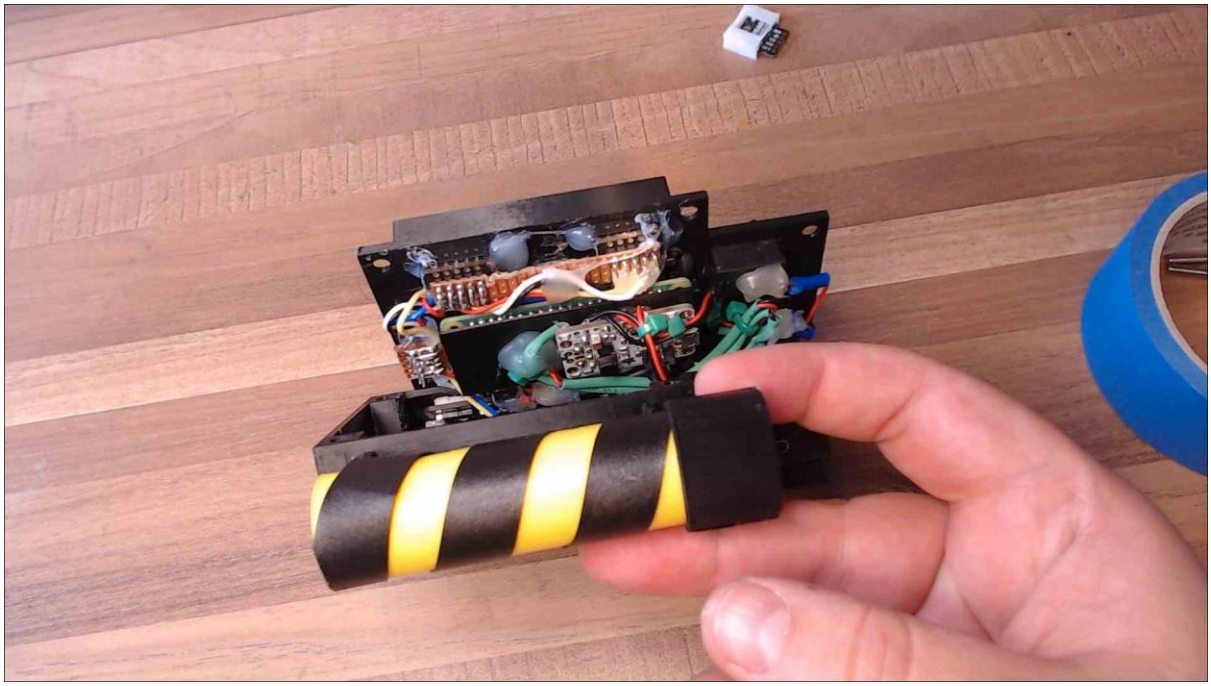
The USB connections on the power board should be soldered to the power connections on one of the USB breakout

Use hot glue to glue the power board to the raspberry pi (put a plastic barrier in between to avoid shorts)

Glue the charging port in place with hot glue, same with the USB C data port. Also use hot glue to secure the Pimoroni i2c breakout sockets.

Tip for soldering wires to the Pimoroni socketrs

Use a breadboar strip with wire jumpers to join these together. Also make sure that from left to right on the outwards face you have the pins in the following order – GND, INT, SCL, SDA, 3-6V



3d Print files available at:

https://www.printables.com/model/168957-armatron-pip-device

Code available at:

https://github.com/billy-osullivan/armatron.git