

EB-6 Electronics

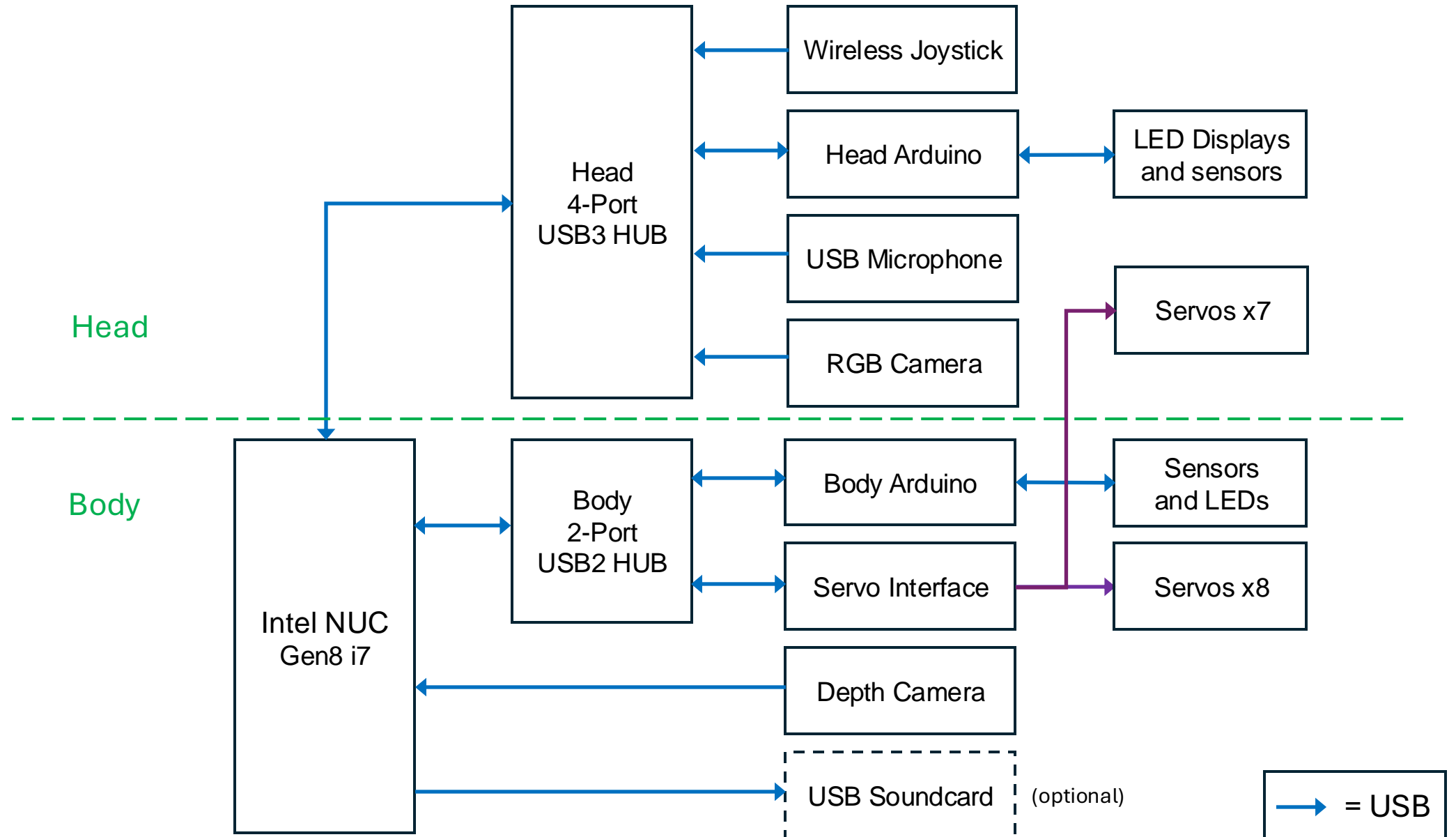
Dave Shinsel

www.shinsel.com

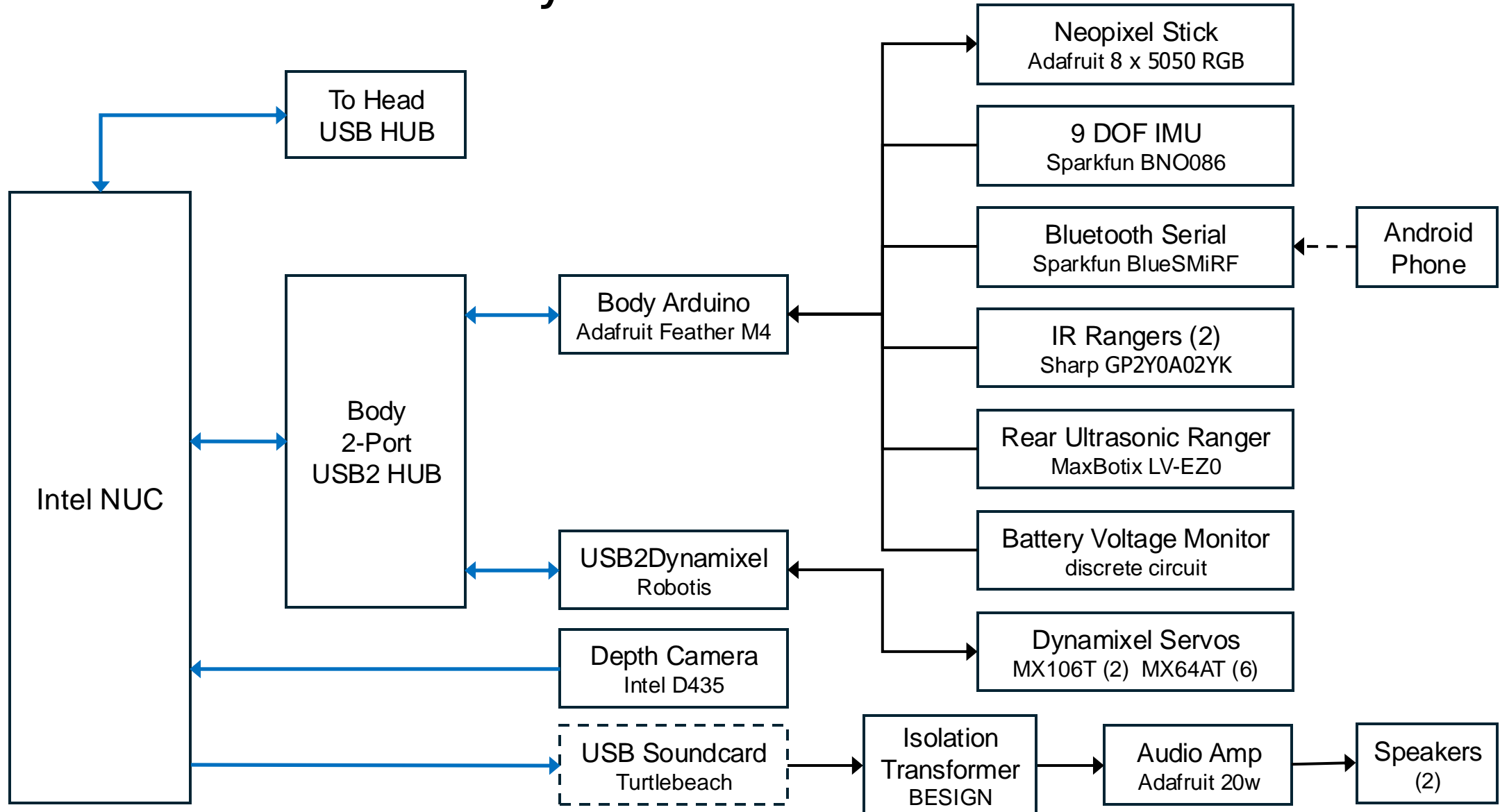
shinsel.robots@gmail.com



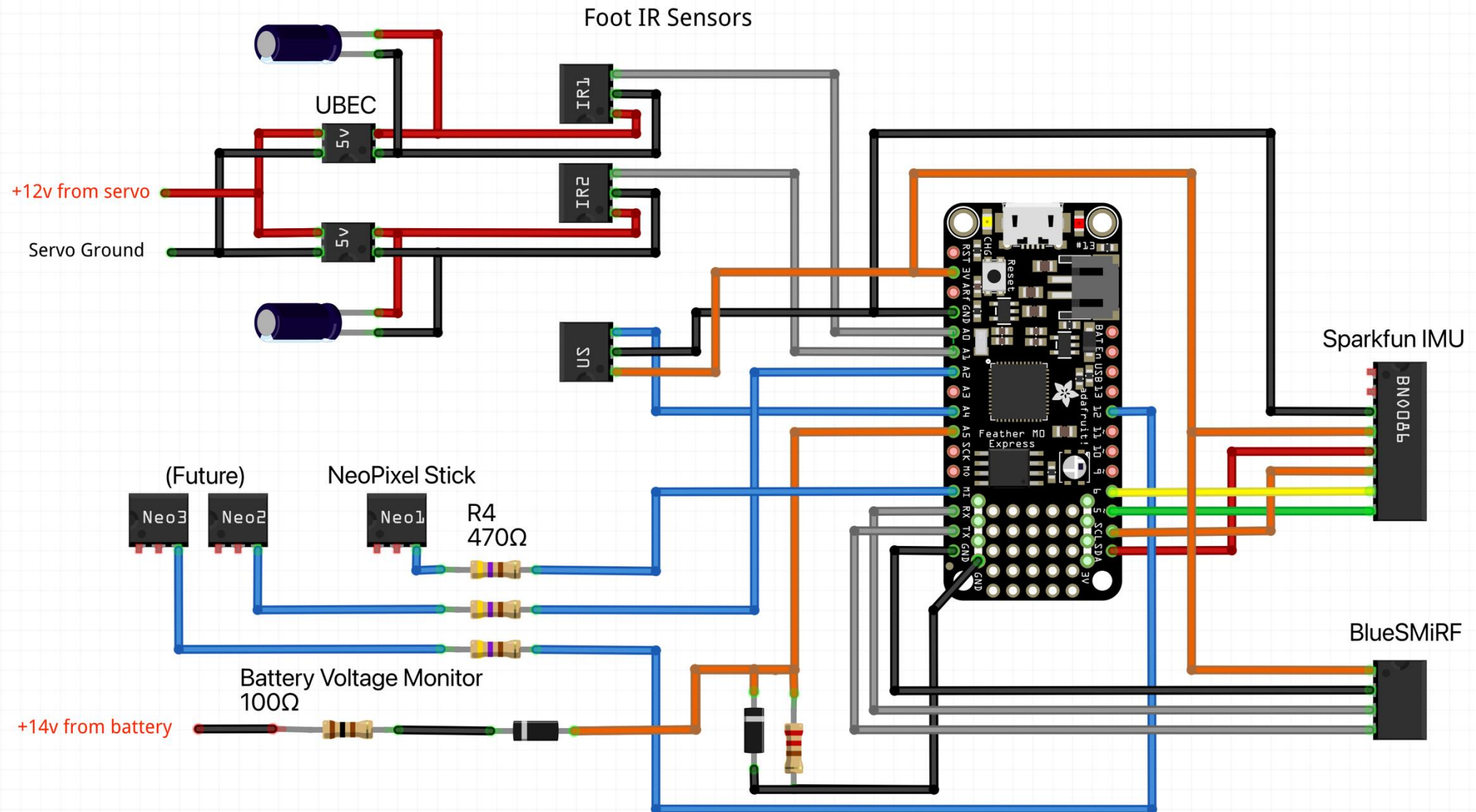
EB-6 Electronics - Overview



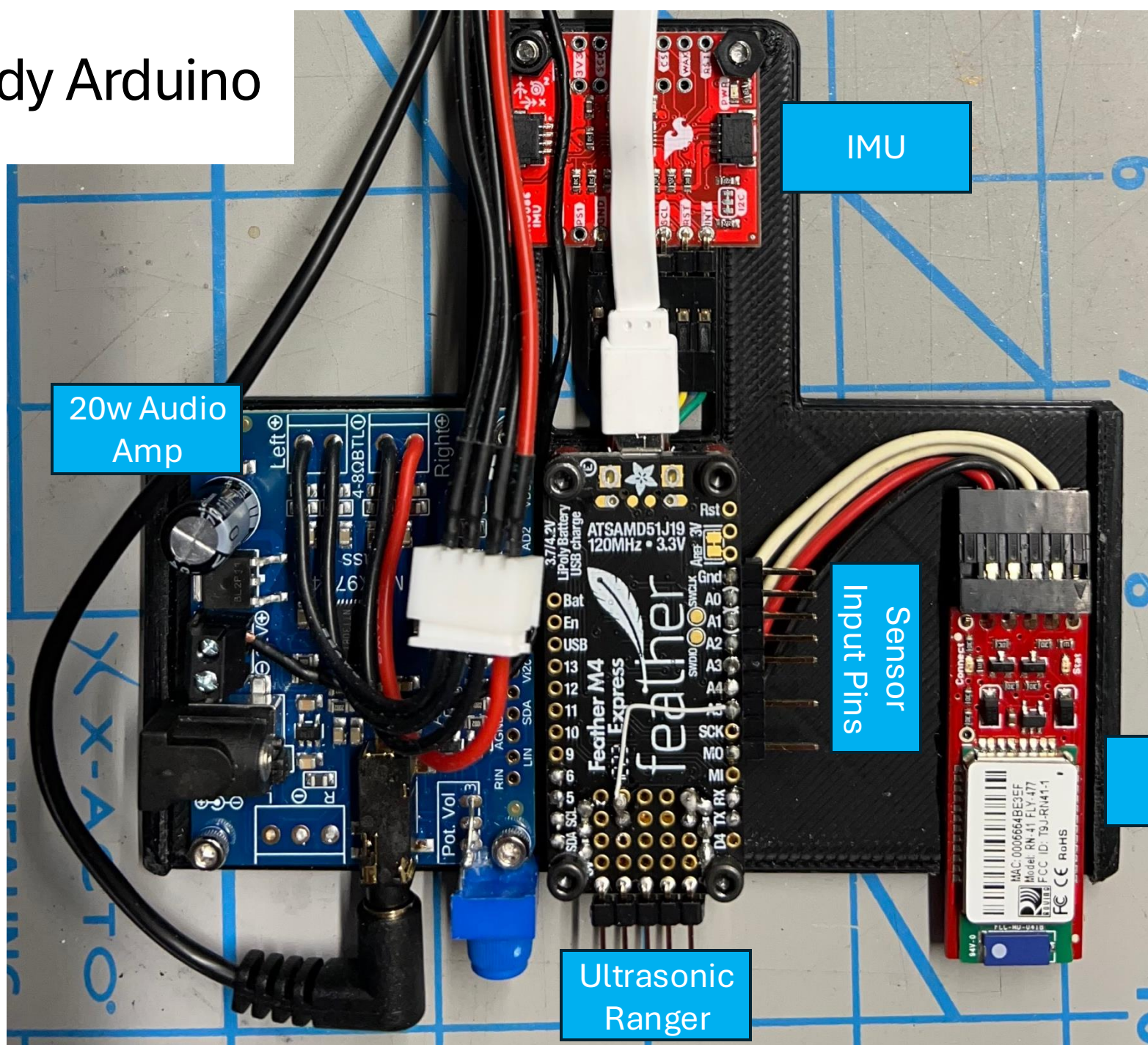
EB-6 Electronics - Body



EB-6 Body Arduino



EB-6 Body Arduino



20w Audio Amp

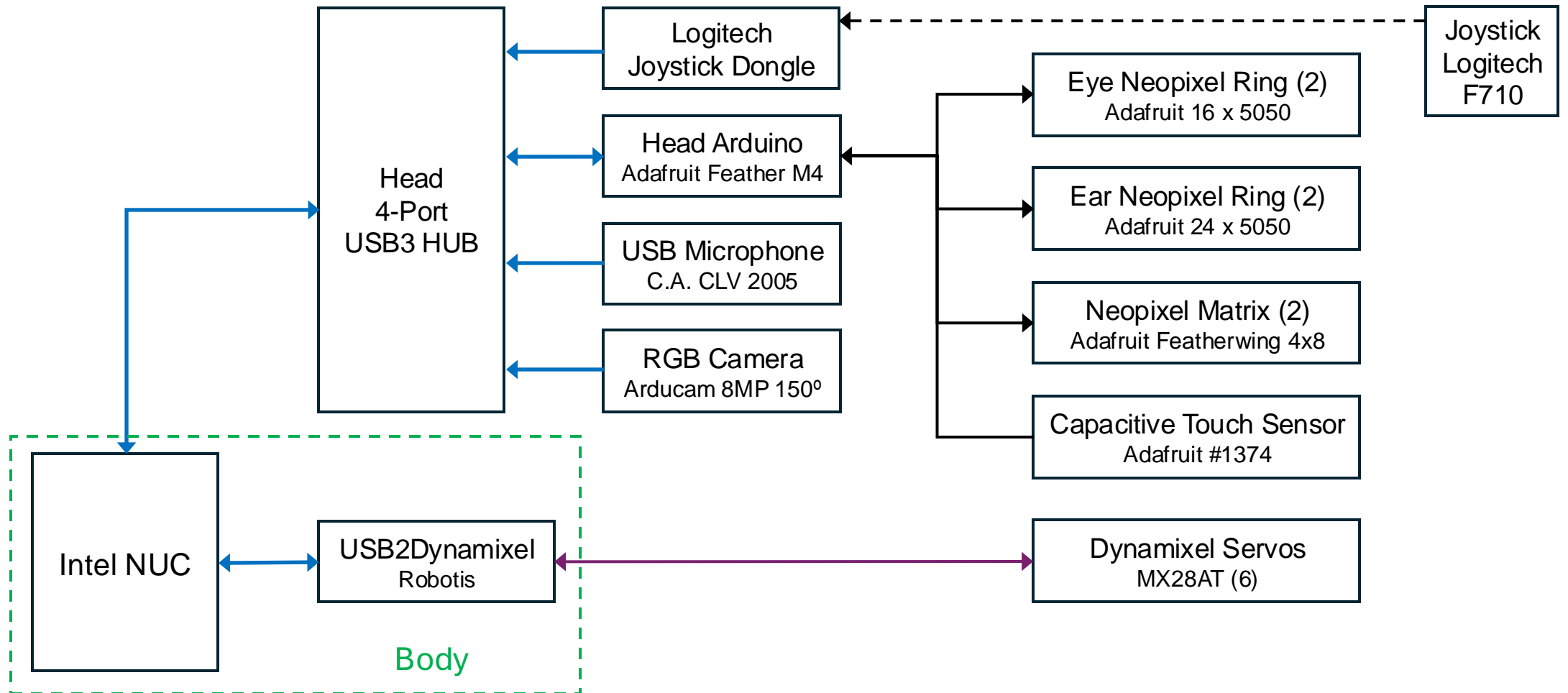
IMU

Sensor Input Pins

Blue SMiRF

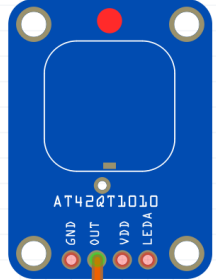
Ultrasonic Ranger

EB-6 Electronics - Head



EB-6 Head Arduino

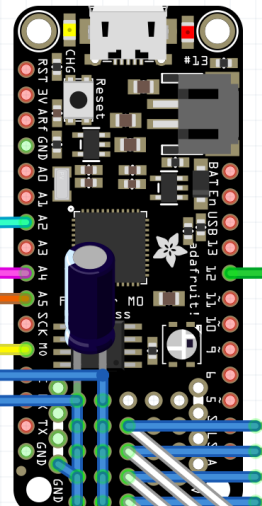
Touch Sensor
Adafruit #1374



+12v from servo
Servo Ground

UBEC

5V

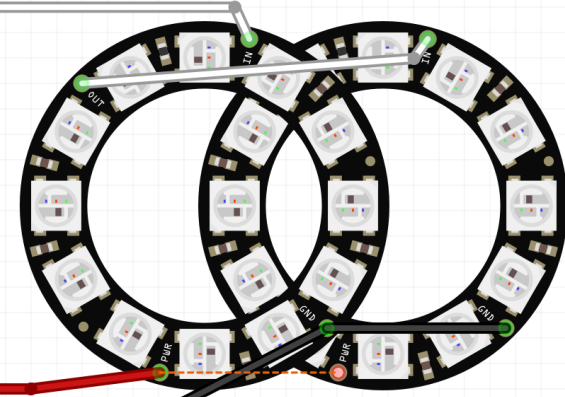
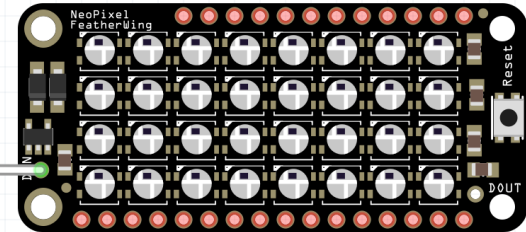
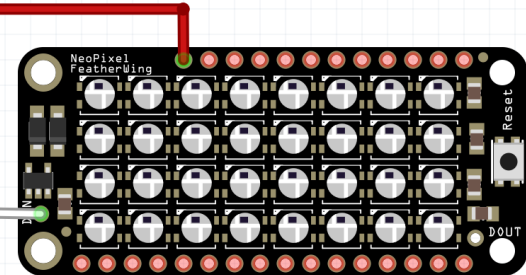


R5
470Ω

To Matrix
To Ears
Signals
To Eyes

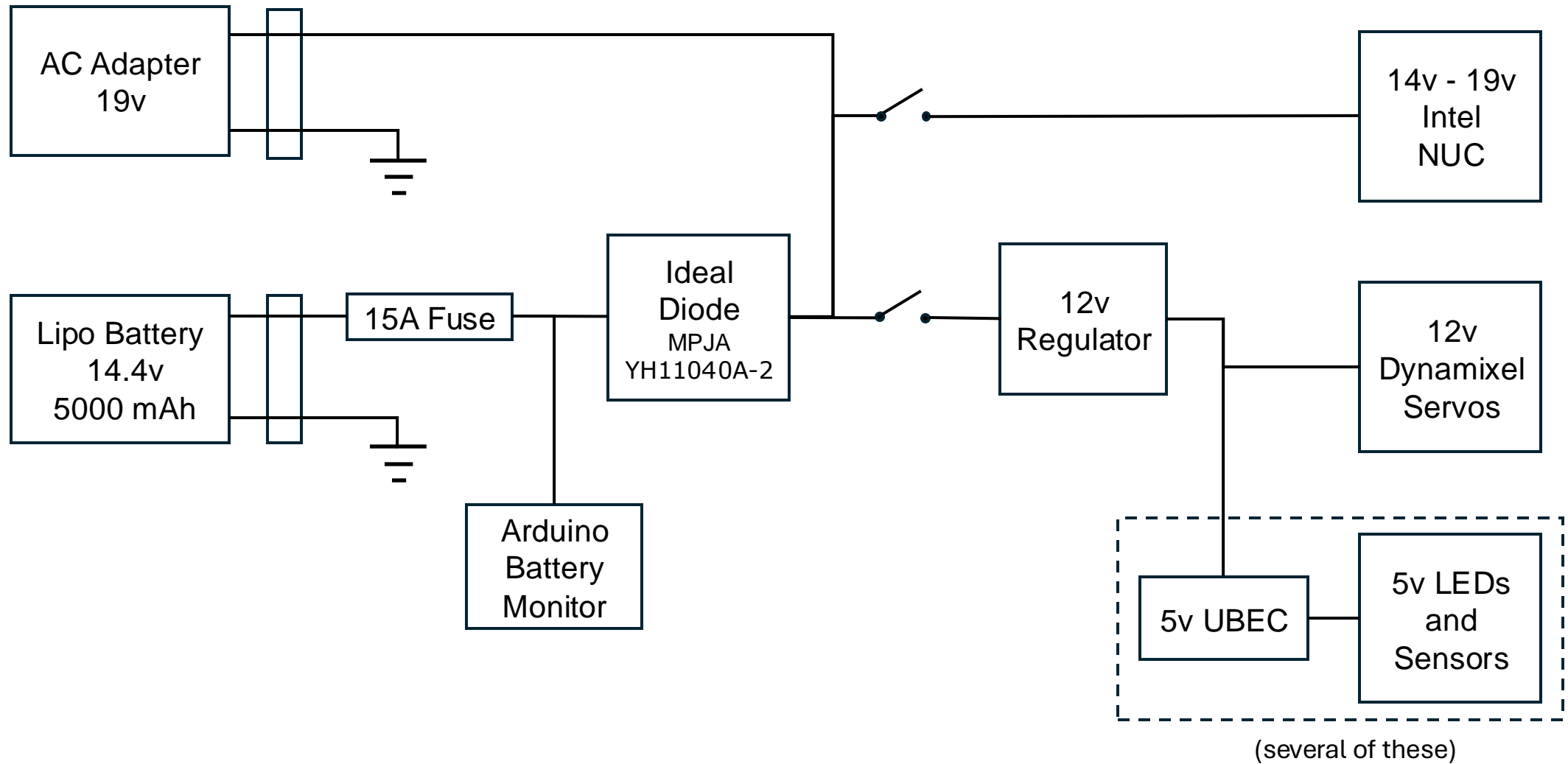
5v 3A

GND

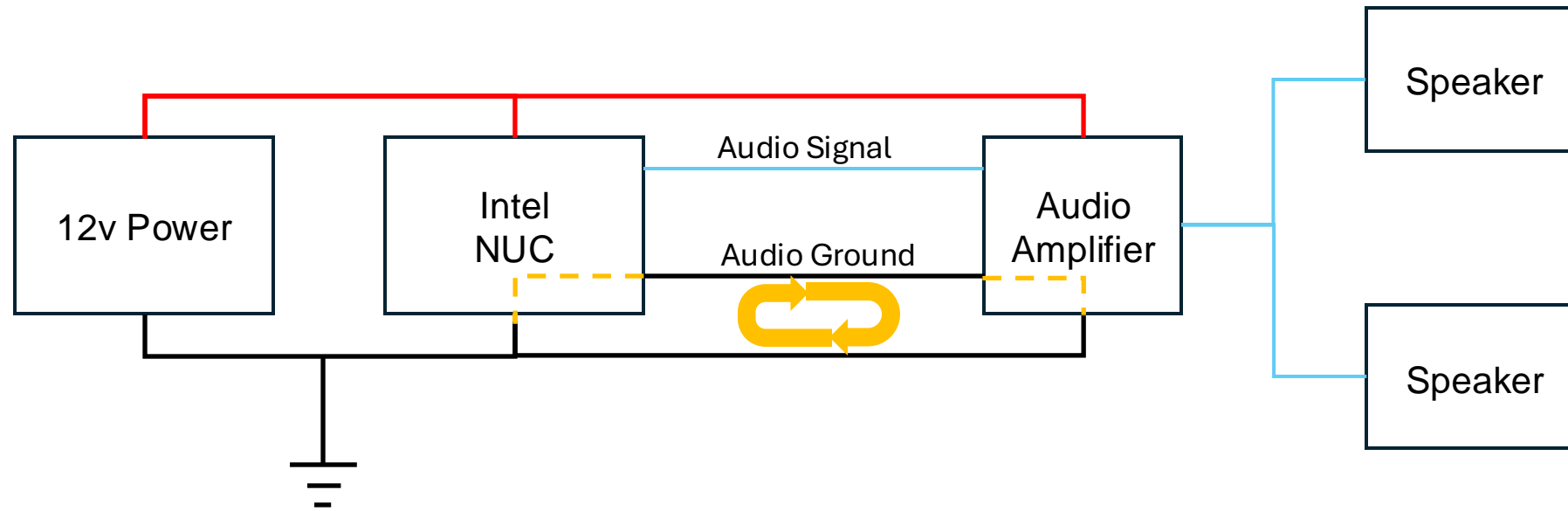


NeoPixel Eyes
(Ears are the same)

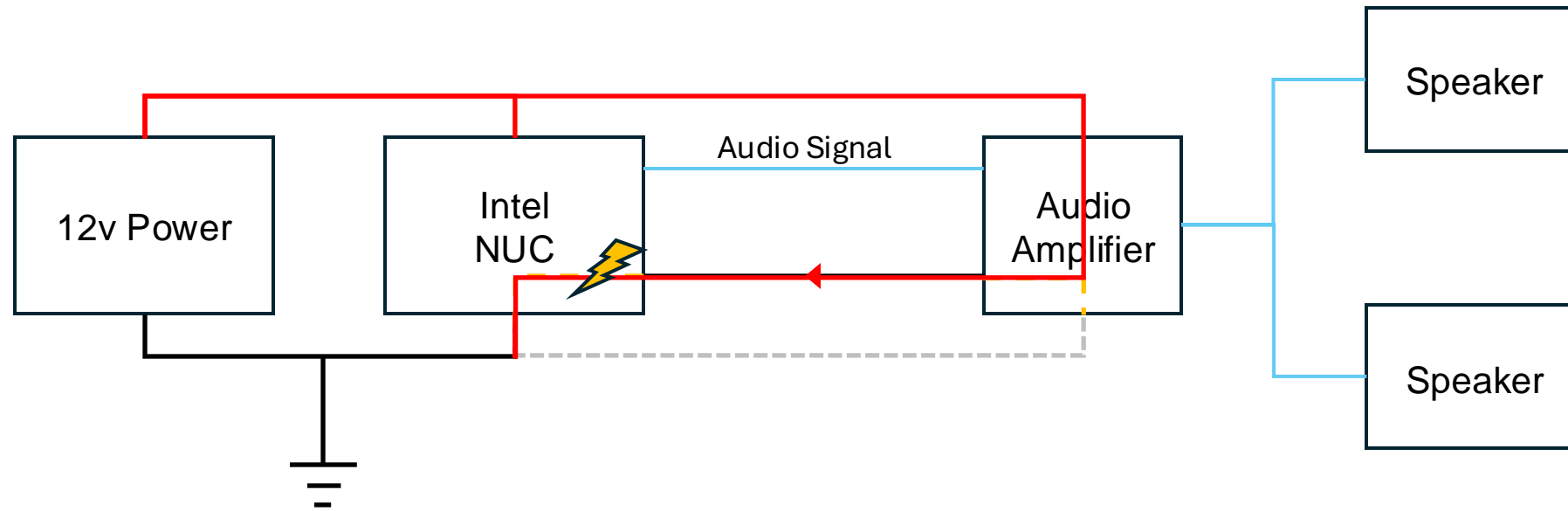
EB-6 Electronics – Power Supply



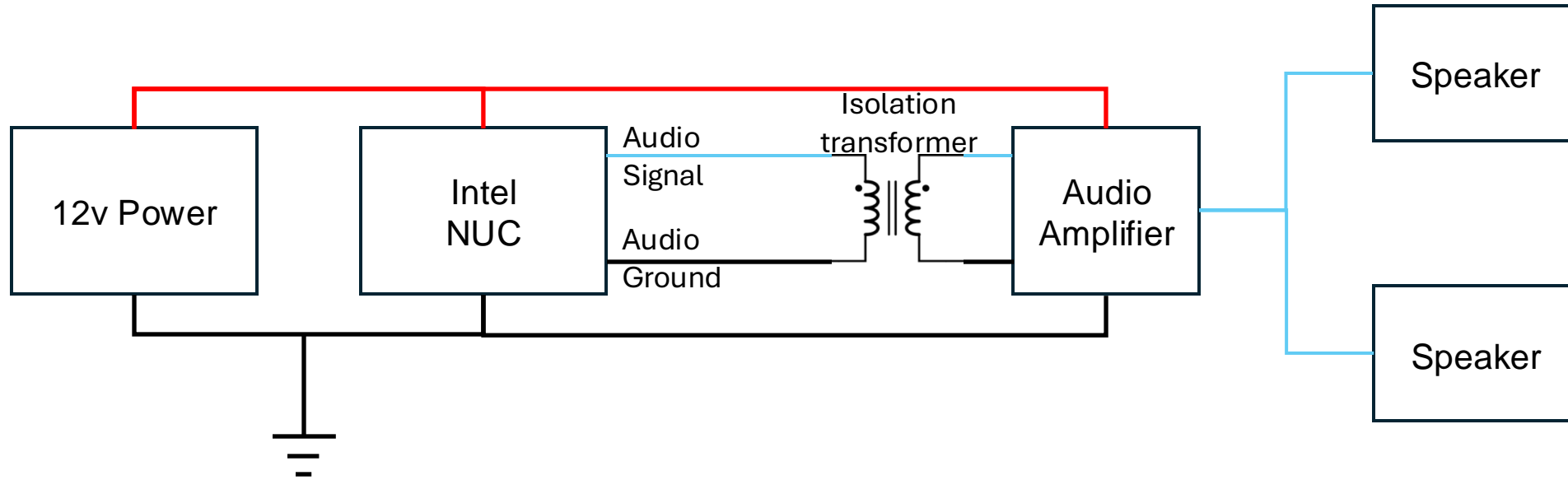
EB-6 Electronics – Audio Ground Loop (initial design)



EB-6 Electronics – Removed Ground



EB-6 Electronics – Audio Isolation Transformer



Key learnings - Electronics

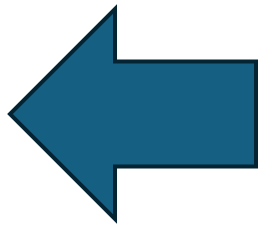
- Use of Ideal Diode for safe automatic battery switching
- Inexpensive 5v 3A BEC's for 5v where needed
- High-efficiency 12v 20A power supplies are cheap on Amazon
- Audio isolation transformer to eliminate ground loop buzz
- Removing ground from 12v amplifier is a bad idea! (fried NUC)
- Cramming everything into a small robot is hard
 - Standard USB connectors are big!
- Flaky connectors are a real pain
- Don't put power switch on front of robot

Key learnings – Software Environment

- Two Arduinos: Can upload sketch to the wrong board
- Ubuntu sound settings: grabs microphone, causing code to fail!
- Auto start on Ubuntu has “gotcha” in .bashrc
 - Workaround: `eval "$(cat ~/.bashrc | tail -n +10)"`

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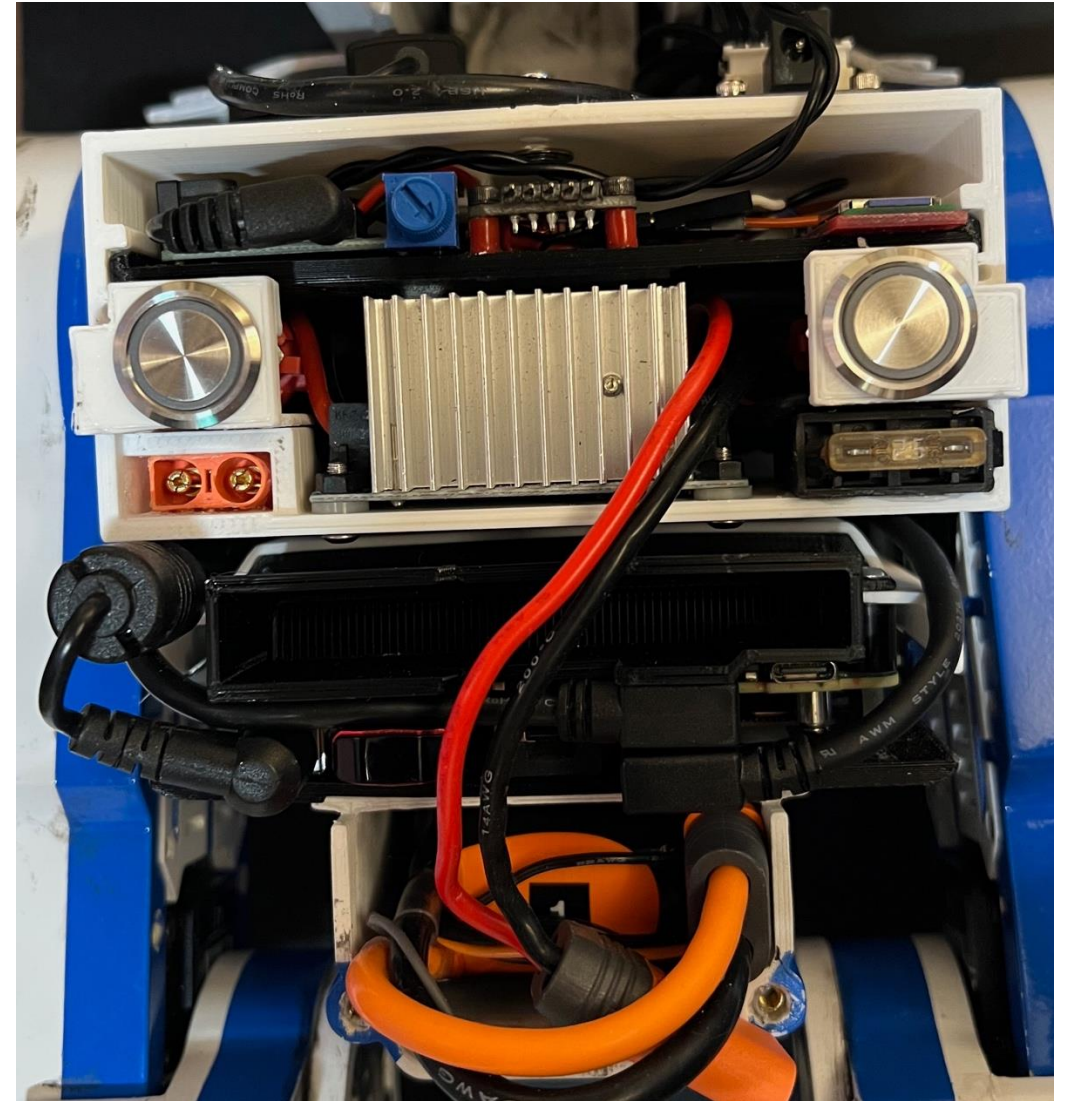


This is me

EB-6 Electronics – Cramped Space!

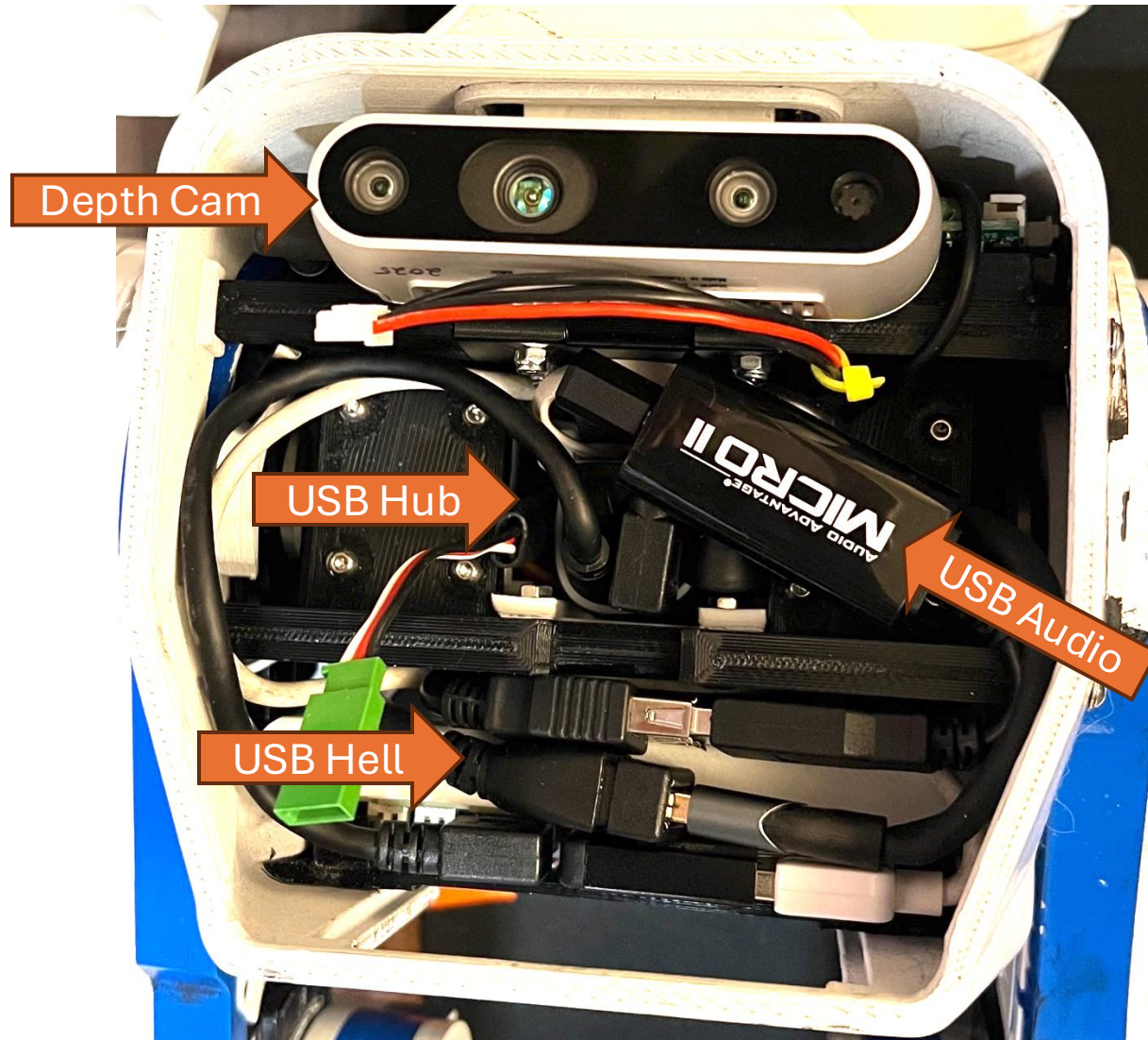


Body Front

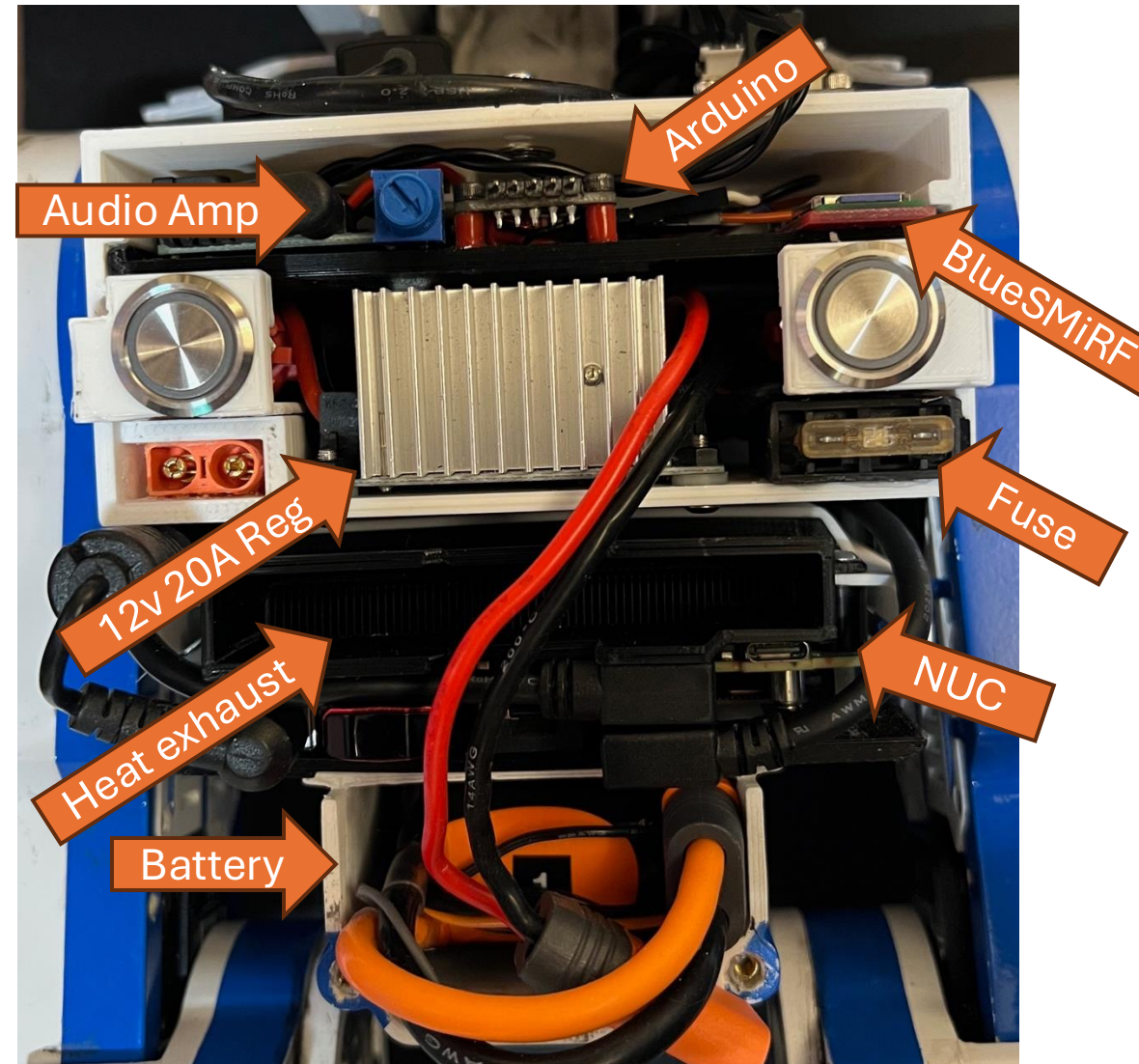


Body Rear

EB-6 Electronics – Cramped Space!

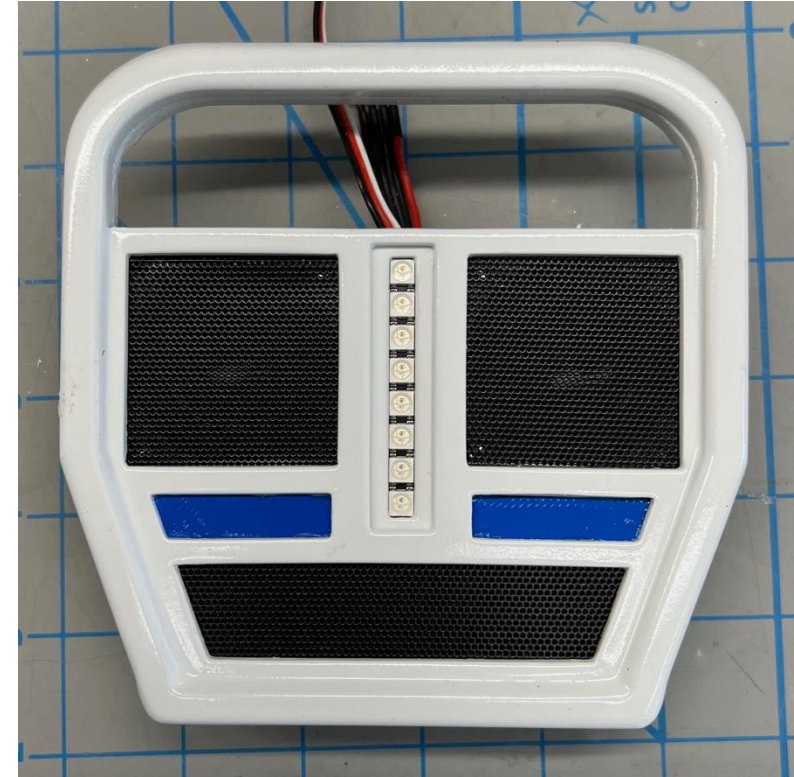
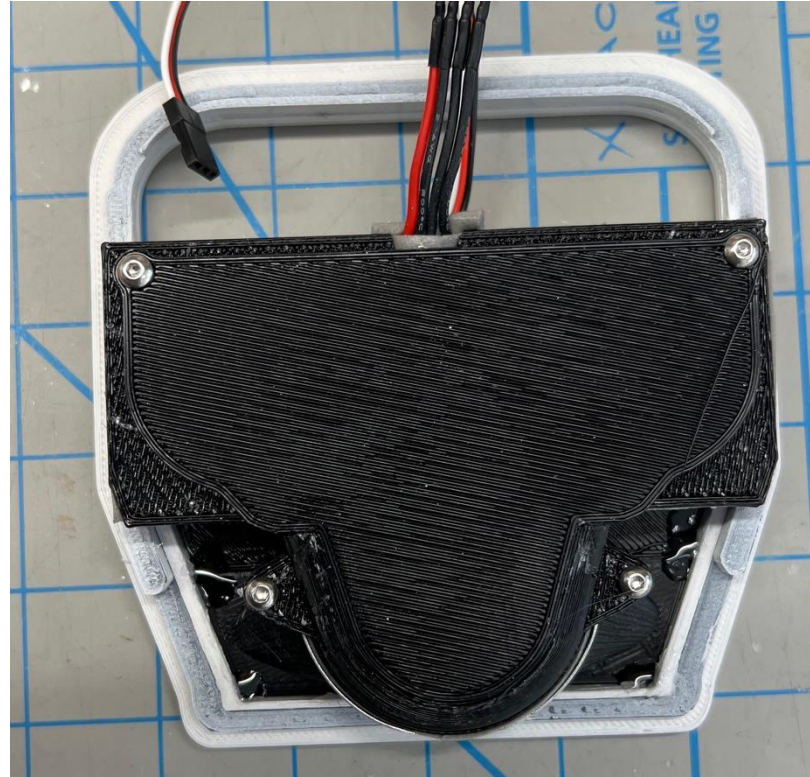
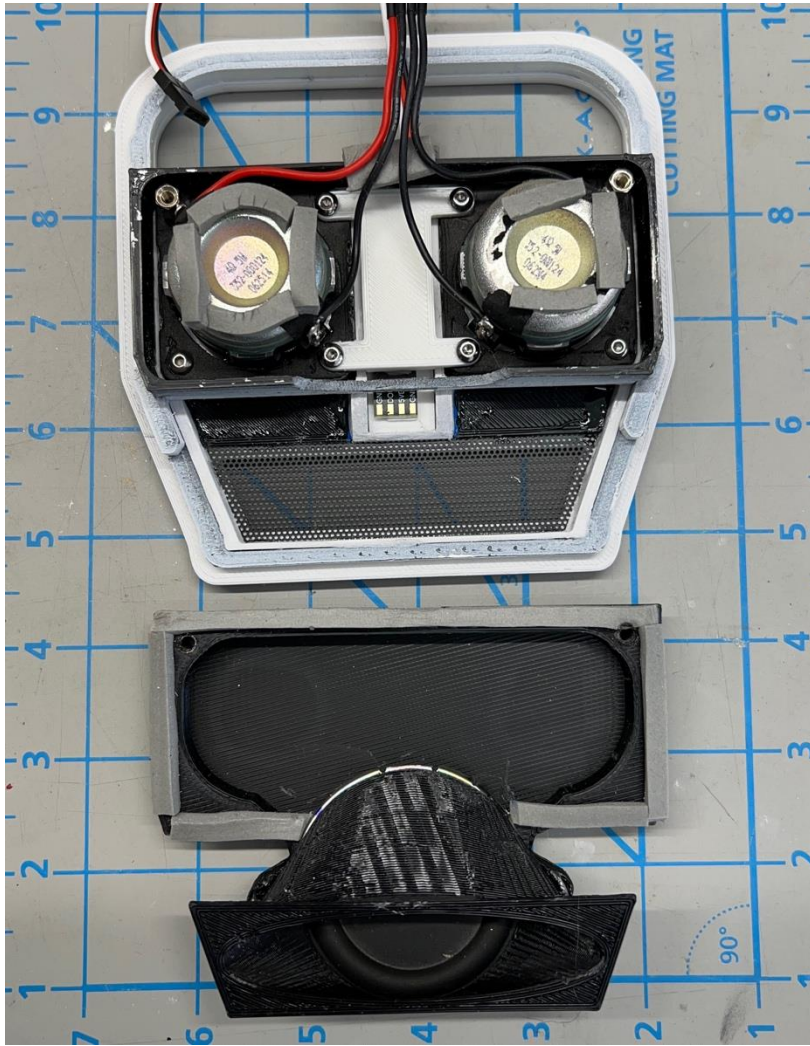


Body Front



Body Rear

EB-6 Speaker housing



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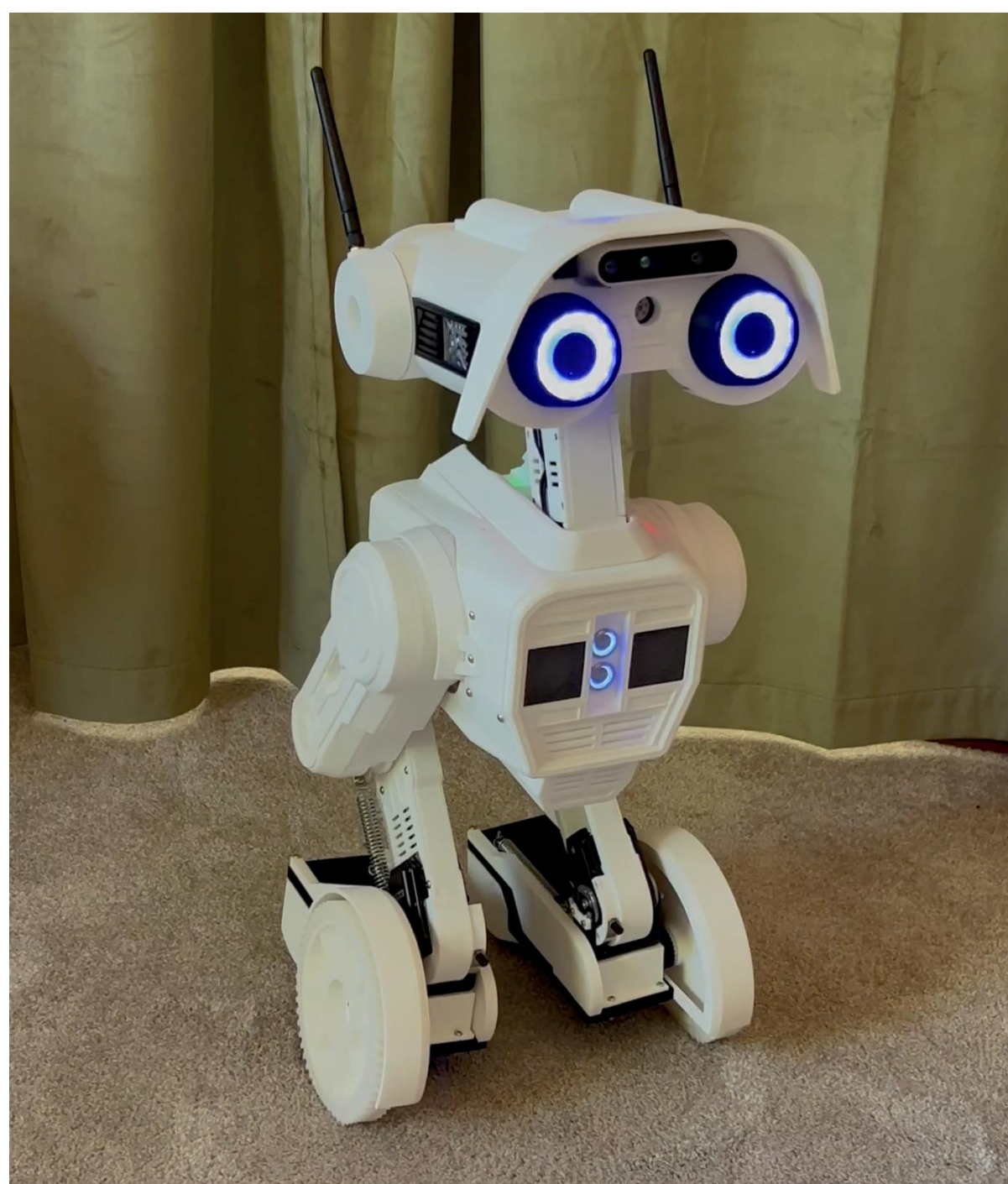
Walking Prototype



Wheel Balancing



Hybrid Wheels



Hybrid Wheels

- No oscillations
- Faster speed
- Better balance (wip)
- Better battery life



EB-6 Electronics - full block diagram

