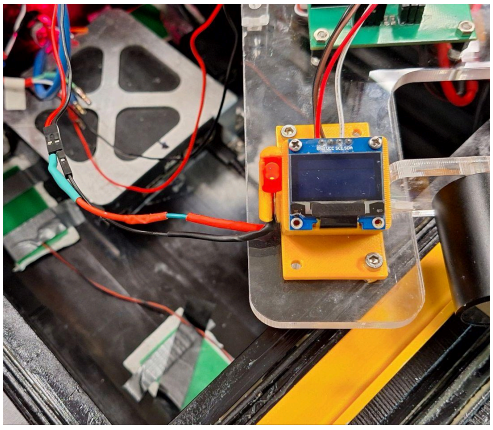
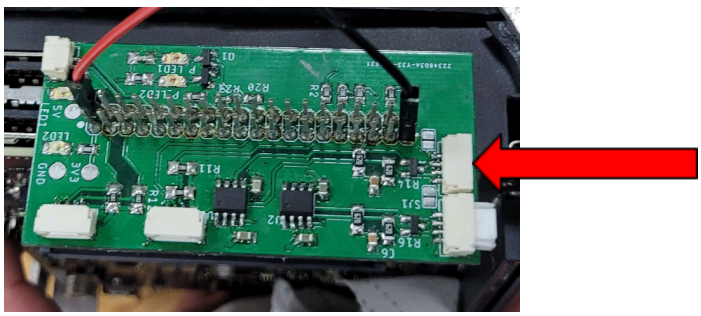
Always plan for more time, assemble the day before important pool tests. THINGS WILL BREAK.

IF ORIN IS NOT INSTALLED:

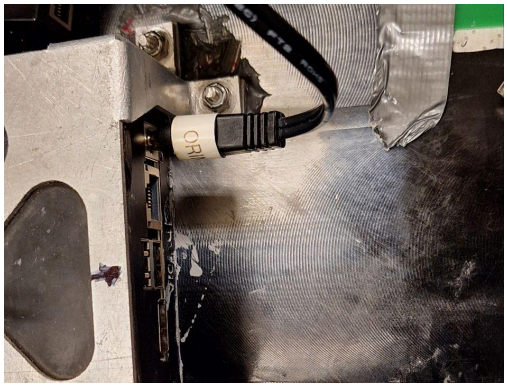
1. **Tell Mechanical to take out pressure sensor from the hull to lessen risk of damage to CAN wire.**
2. **ORIN Light:** Ensure LED indicator jumper cables are connected to the **back of Orin**. See Figure 1.2 for necessary pins (+5V to top left, GND to bottom right - in reference to the image below). Ensure the LED indicator on the top tray has a resistor connected. Ensure that ORIN is powered via USB-C.
    a. Confirm that you got it right by grabbing your top tray and plug it into the Orin light and see that the red LED lights up. Disconnect it for now but we will wire it up to ORIN light later.
    Figure 1.1: Orin Light (Top Tray)
    
    b. Remove ORIN power via USB-C, remove ORIN from the clubroom ethernet cable. **Always ask software and give a minimum 30 seconds warning to make sure no one is currently working on ORIN.**

3. **CAN Bus:** Plug in CAN bus to the proper connector as indicated below by red arrow, top left. Also behind Orin.
    Figure 1.2: Back of ORIN
    

4. Apply thermal paste to Orin and mount to the base of the hull. PLEASE ASK MECHANICAL TEAM TO HELP IF YOU HAVE NEVER DONE THIS BEFORE.

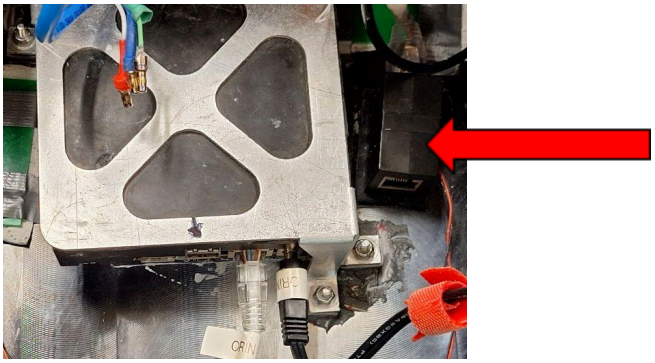
After Orin Installation:

1. Ensure Orin's barrel-jack power cable is plugged.
   Figure 1.3: Orin Barrel-Jack



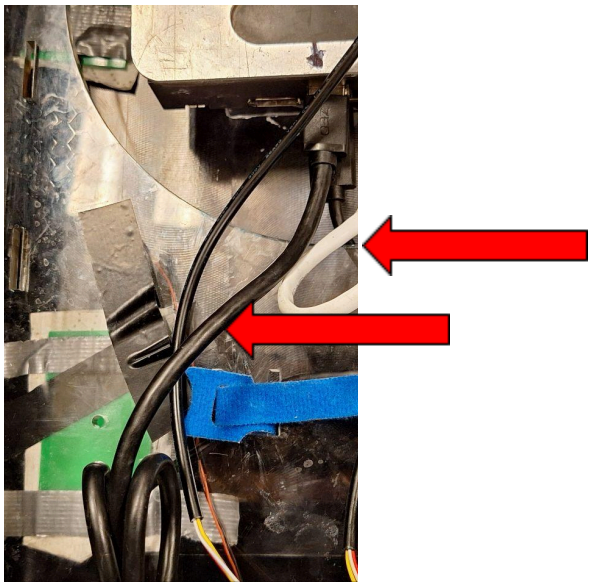
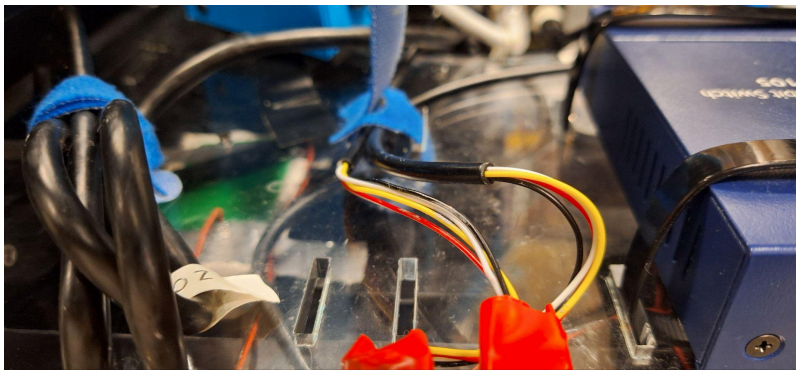
2. Put the bottom tray in half-way for easier access.
   Figure 1.4: Bottom Tray

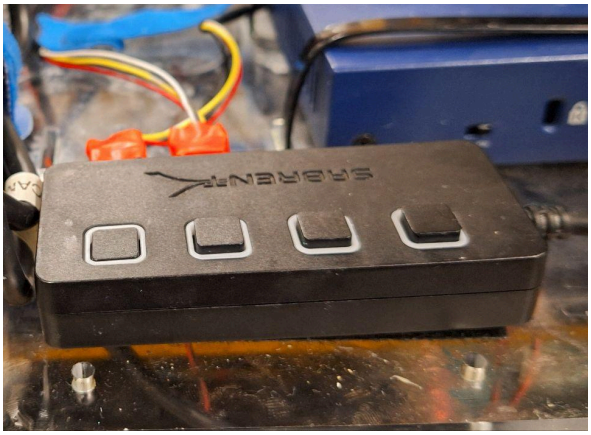
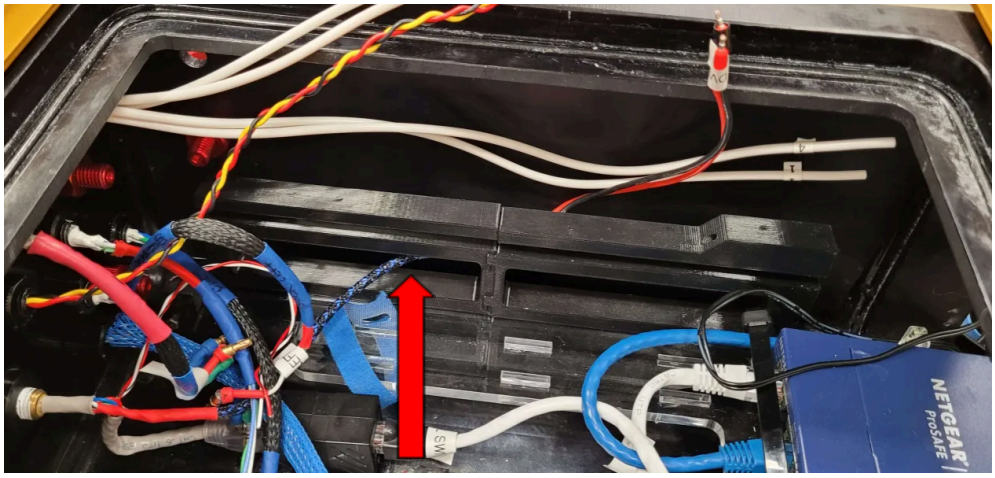
3. Connect gray DVL ethernet cable from the penetrator to its coupler.
   a. If the black coupler isn't there, find it and velcro it on.
      Figure 1.5: DVL Ethernet Coupler



4. Ensure you can see two other ethernet cables (DVL and tether)
    a. IF YOU CANNOT, CONSULT THE ELECTRICAL LEADS FOR HELP

Inserting Bottom Tray:

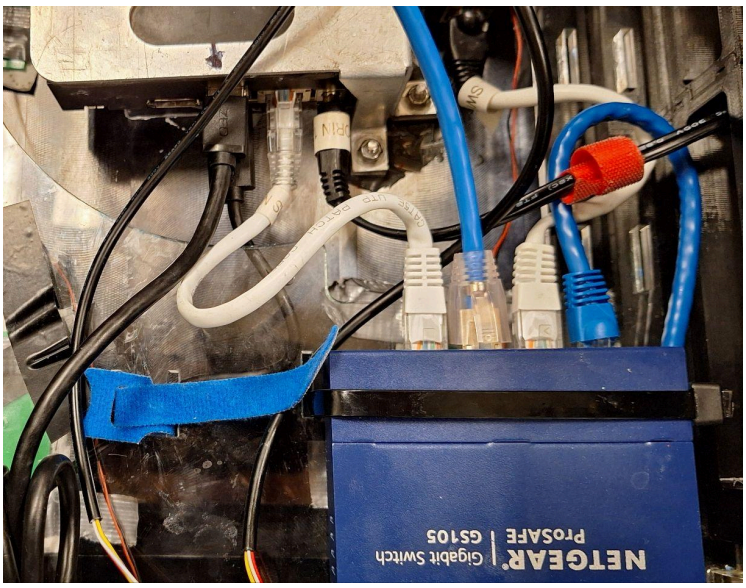
1. Plug in the “Sabrent” USB switch cable to Bottom USB port on Orin, routing the cable underneath the bottom tray.
   Figure 1.6: Threading Sabrent and Zed USB cables from Orin
   
2. Disconnect Zed camera cable from the camera.
3. Plug in the “Zed” USB cable to the Top USB port on Orin, routing the cable on the bottom tray.
4. Currently the two USB cables that go to the USB switch should be tied to the top of the bottom tray.
   Figure 1.7: USB Camera Ties
   

5. Plug in the two camera USB cables (coming from the back right) into the USB switch, and ensure the respective buttons are pressed on the USB switch (they should be depressed and not sticking out)
   Figure 1.8: Sabre Button Toggles
   
6. Ensure all necessary wires are accessible before sliding in the tray:
   a. Orin power cable
   b. DVL power cable
   c. Orin indicator LED wire
7. Route the DVL power cable, the Orin power cable, and ethernet switch power cable, all through the right side rail to connect to the power rails on the top tray (See Picture. Note: The picture only contains one set of power cables)
   Figure 1.9: Right Side Rail
   

8. Ensure all 4 leak sensor cables are out of the way (dangling out the bottom of the bot is perfectly okay)
9. Slide the tray in all the way.
10. Plug-in remaining ethernet cables to the ethernet switch (order is not important) There should be 4 ethernet cables in total
    a. Orin (White)
    b. DVL (Grey)

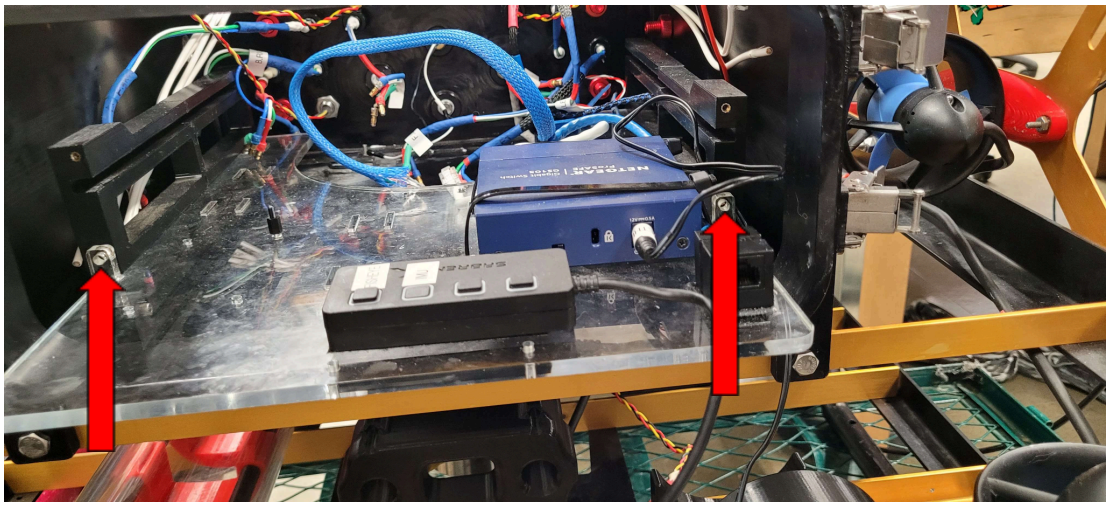
c. Tether (Light Blue)
d. Out-of-water tether (blue ethernet cable attached to the bottom tray)

Figure 1.10: Ethernet Switch



11. Screw in the bottom tray to the rails at both locations (See Picture)

Figure 1.11: Bottom Tray Rails



12. Before putting in the top tray ensure the following cables are accessible
    a. Orin power cable
    b. DVL power cable
    c. Ethernet switch power cable
    d. Orin indicator LED
    e. CAN Bus cable
        i. Be extremely careful with this cable, it can hang over the back end of the robot while preparing to slide in the top tray
    f. 4 subsystem servo cable bundles

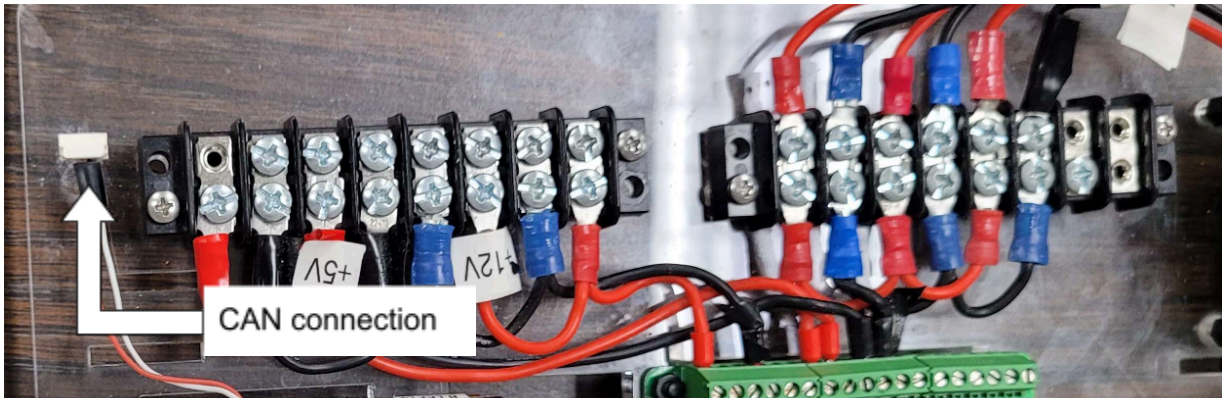
i. Torpedo
ii. Dropper
iii. Left Claw
iv. Right Claw

Top Tray:

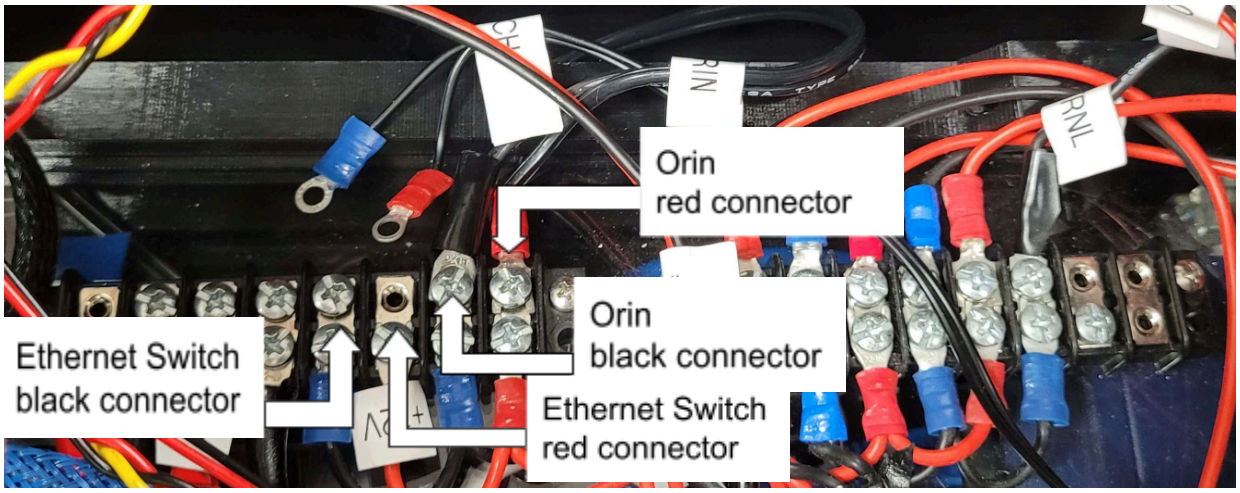
Before inserting the top tray, be aware of the CAN Bus cable. It is a very small red and white cable that must remain out of the tray's sliding path the whole time. Additionally, be aware of the screws on the bottom layer. If the cables on the underside of the top layer are not physically held up, they will catch on the screws and can be damaged. It is recommended to have two people inserting the top tray; 1 person holds the cables up from the left side (Power connections to the battery monitoring board) while the second person pushes the tray in with their right and has their left hand underneath, holding on to yellow XT60 ESC power wires).

Insert the top tray MOST of the way in, leaving enough room to access the bottom row of ESC's

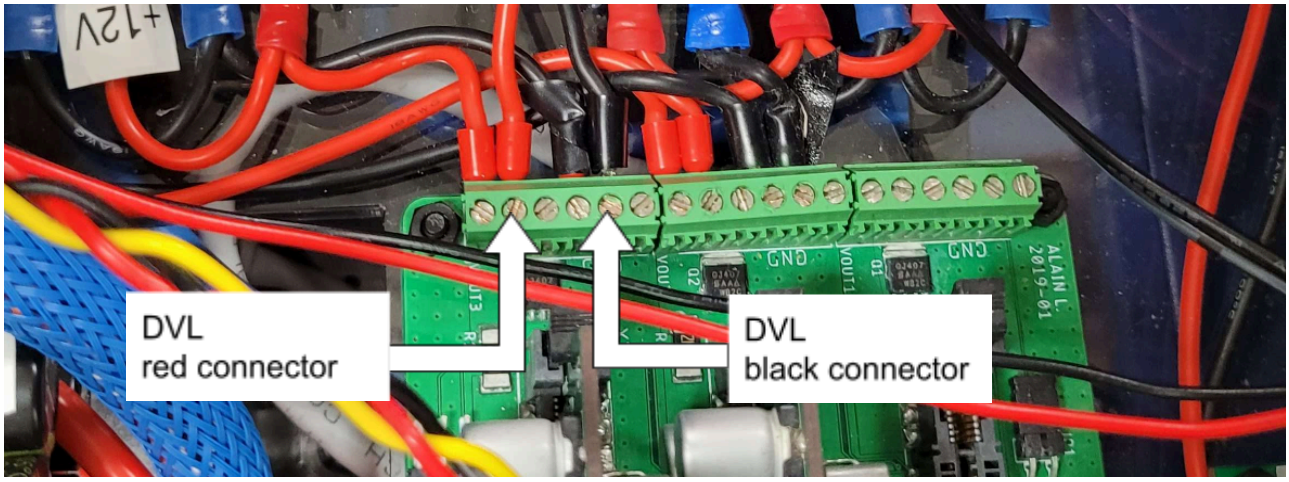
1. ENSURE THE SAFETY OF THE CAN CABLE
2. Route the CAN cable underneath all of the ESC connectors to limit the chance of accidents but DO NOT PLUG IN YET
3. Connect bottom row of ESCs (ensure no exposed metal)
    a. Be careful not to move the female connectors on the ESC too much, use pliers to hold the connector still if necessary
    b. Additional electrical tape may need to be added to cover exposed metal after connecting the ESC's (This may be tedious but it is imperative to avoid accidental shorts between connectors)
4. Connect top row of ESCs
    a. Additional electrical tape may need to be added
5. Fully slide in tray
6. Screw the top tray into the rails on both sides
7. CAREFULLY insert CAN wire applying pressure to the connector only
    a. DO NOT PUSH ON THE WIRES - CAN IS ANNOYING TO CRIMP



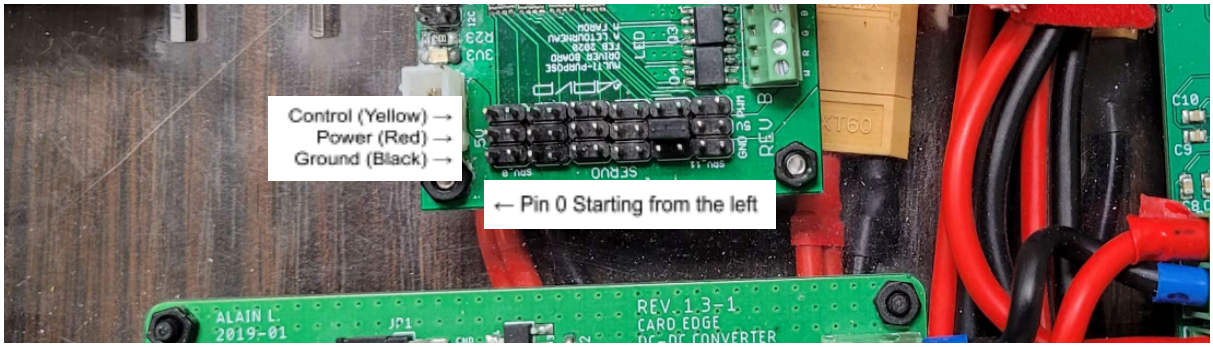
8. Connect Orin power cable and the ethernet switch power cable to 12V supply
    a. Both connectors connect on the top row of the power rails in reference to the picture across from the “12V” label



9. Connect the DVL into the carrier board power supply (Note: the first three ports are all power ports, the next three ports are all ground ports)

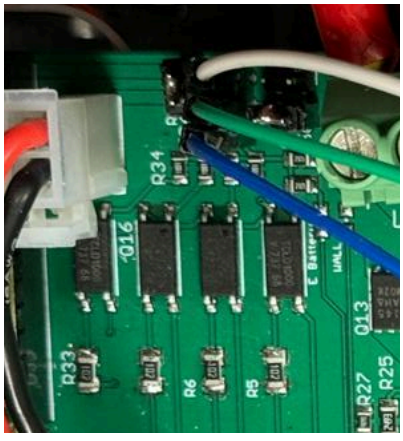


10. Connect the subsystems (dropper, torpedo, and two claws)
    a. All the subsystems are a bundle of 3 wires
        i. Power (red)
        ii. Ground (Black)
        iii. Signal (Yellow)
    b. The subsystems connect to the actuation board to the follow pins
        i. Dropper - Pin 0
        ii. Torpedo - Pin 1
        iii. EMPTY (Broken) - Pin 2
        iv. Left Claw {Claw 1} - Pin 3
        v. Right Claw {Claw 2} - Pin 4



11. Ensure the kill switch is taped to the back of the hull
12. If the kill switch needs to be taped to the back and you have not done it before, consult an Electrical Lead to make sure it is taped in the correct position and orientation. See left picture below for proper wiring at the back of the interior.

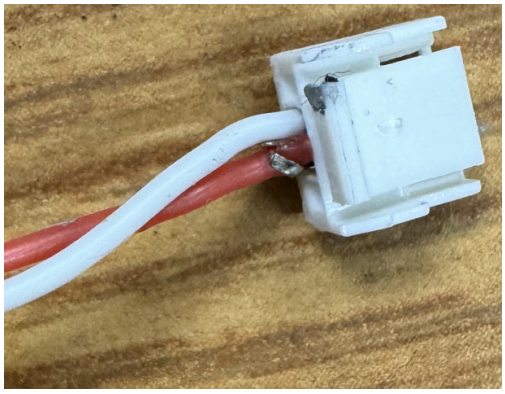
13. Connect kill switch wires to the monitoring board
    a. The order of wires from left to right (from the front of the bot) is white, green, blue. See right picture below
    b. To connect to the Battery Monitoring Board, the shaded side faces the outside



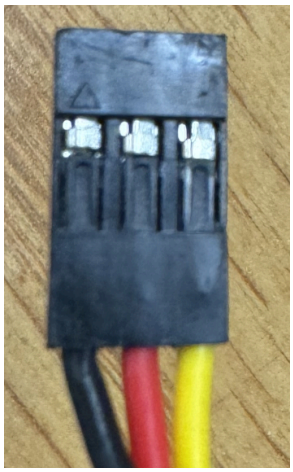
14. The Zed camera cable can be connected at this point
15. The 4 leak sensors can also be connected to the internal environment board (order does not matter

Appendix

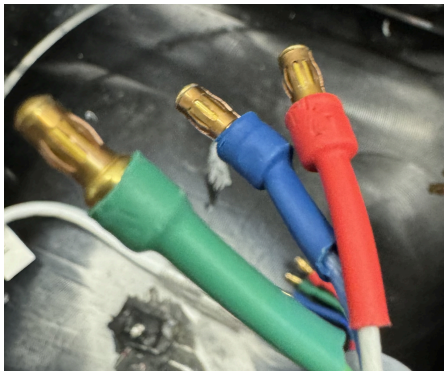
- CAN Cable (Molex connector)



- Servo - Torpedo/Claw/Dropper Cables

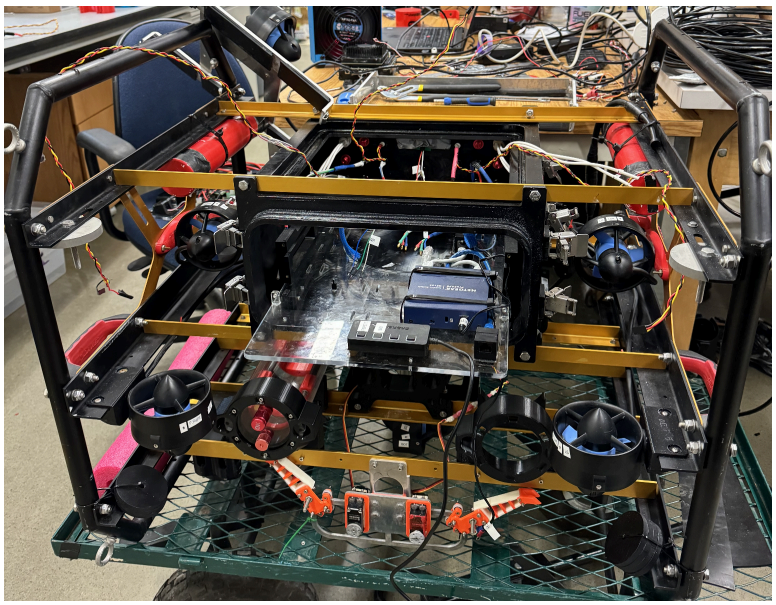


- ESC Cables



- Anderson Connectors

- Notation used for the Electrical Team (Front of Arctos):
  As in the front…… NOT THE BACK



Troubleshooting Notes

Batt Screen or Internal env screen not working

- Cut power to the PCBA and plug it back in
- or remove and put back in the teensy if first step did not work

Electric internals not working when plugging in external power
Rapidly connect and disconnect **anderson** connection for external power.