

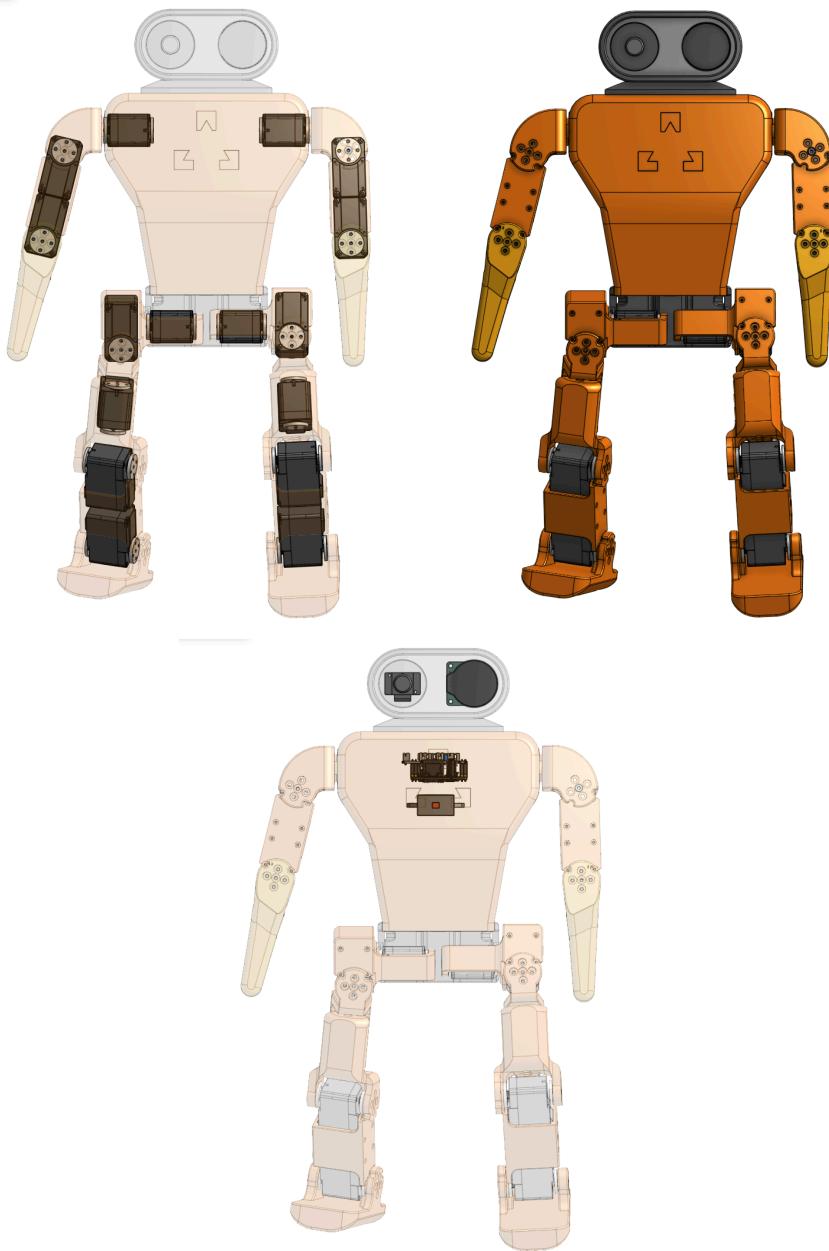
Welcome to YOUR ZBot assembly Doc

TLDR: We are building a robot!

There will be a lot of screwing parts together, so get good ergonomic supplies and some good podcasts ready. Order is important in a few steps, as is attention to detail as called out!

Read through before diving in!

Always reach out with questions @ discord. Please add comments here if you have any questions.



0. Gather tools

- Hex set including (fix it kits are great for this!)
 - Hex Drive 2.5 mm (For M3 Socket head) with reach (15 mm > ideally)
 - Hex Drive 1.5 mm (For M3 Socket head) with reach (15 mm > ideally)
 - Ideally an automatic driver driver
- Tools to get support off parts

- Soldering Iron to heat set plastic parts

BOM: // add details later

- Fasteners
- Printed Parts (via bambu build plates)
- Electronics
 - Camera
 - Milk
 - Custom PCBS
- Servos
- Cables
 - 2 X 150 mm 3 pin PH-2 mm Spacing
 - Included Servo Motor Cables with data + power lines twisted

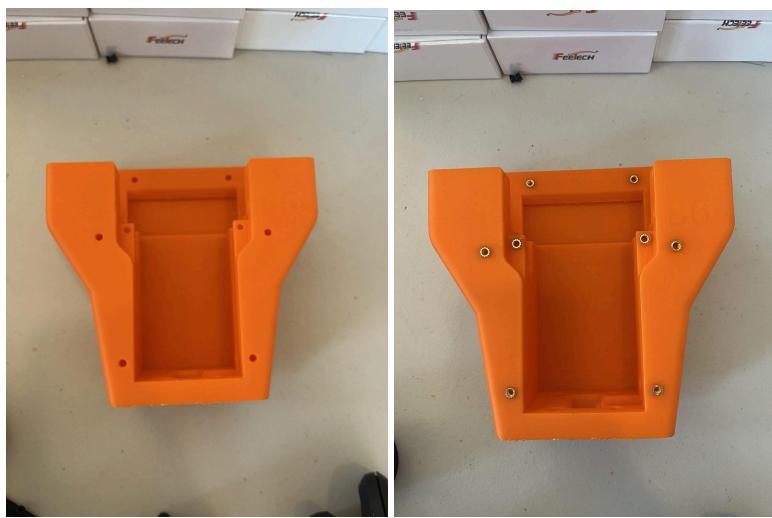
1. Prep Steps

Step	Picture
0. Remove supports from all parts paying special attention to inner cases where the motor fits or the rotor connects (shown right)	

1. Gather supplies



2. Torso:
M3 Heat sets



3. Neck:
headset M3



4. Hip heat sets:
4 X M3

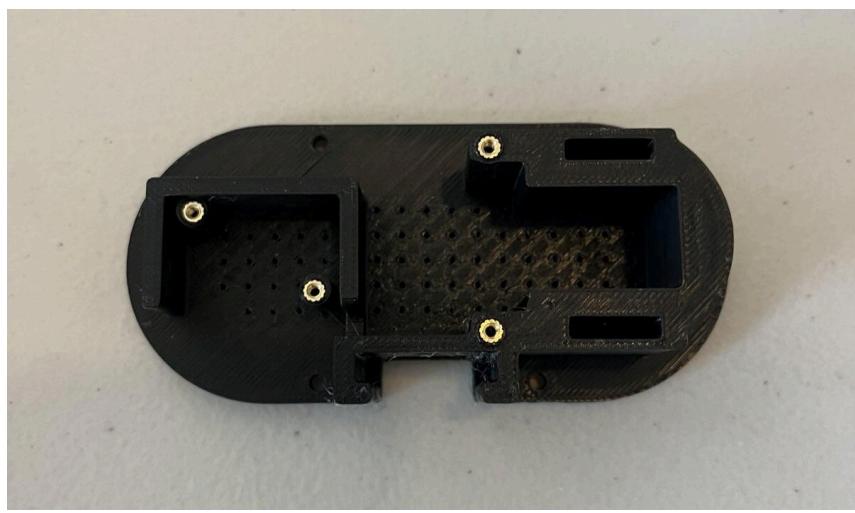


NOTE: These should be as perpendicular as possible => very important later

5. Electronics
mount:
14 X M2



6. Neck
Adaptor:
4 X M2

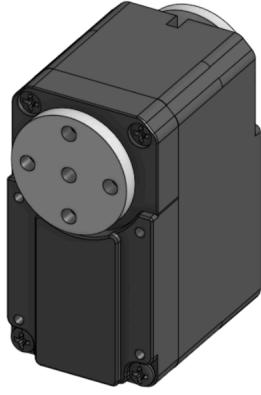
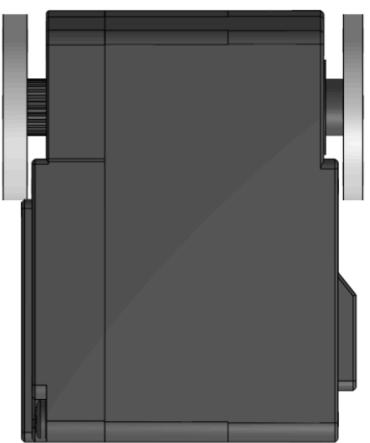
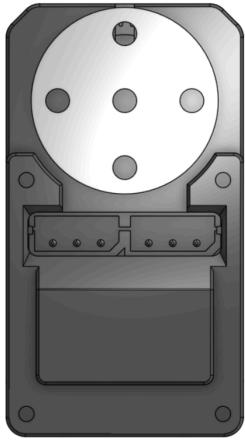


7. Head Case: 4
X M2



2. Screw together

Buf first, a quick overview of motors:

		
Front of Rotor (Aluminum Rotor plates attached)	Side View (Note: geared rotor interface on front, and slip interface to rotor plate on back)	Back View: Cable Plug locations!

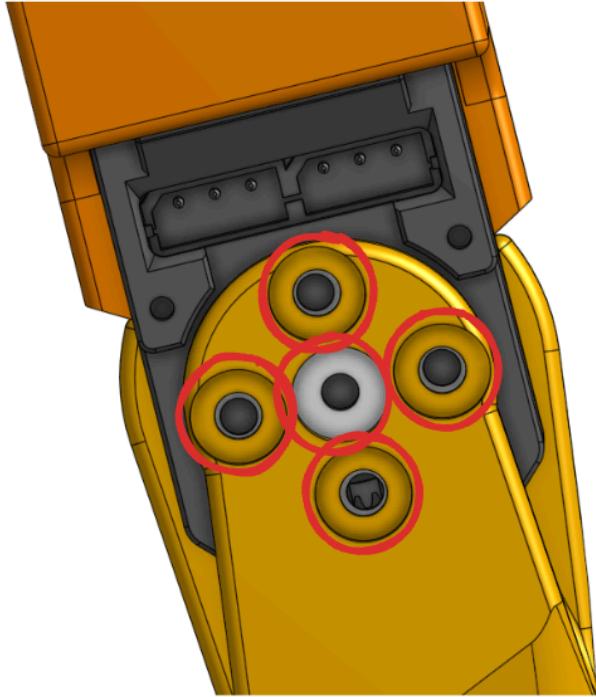
Rotor assembly:

Rotor Attachments refer to attaching to the two metal plates which go on either side of the motor shaft.

 M3 X 5 w/ Split Washer

 M3 X 10 w/ Split Washer

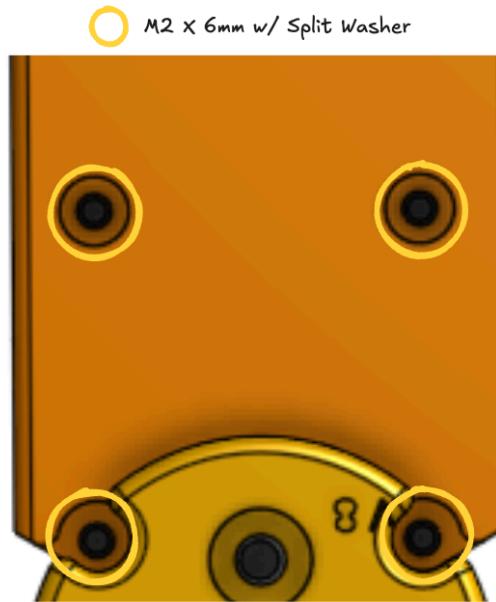
Back of Motor



Front of Motor



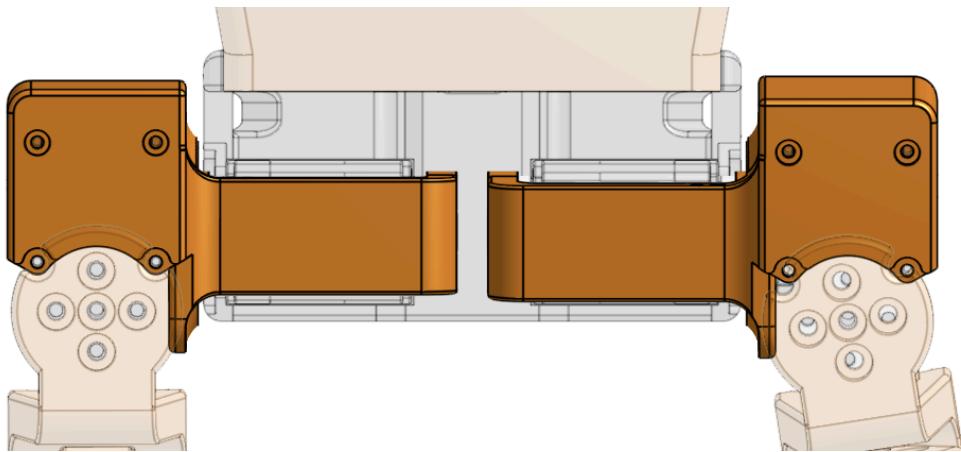
Case Assembly:



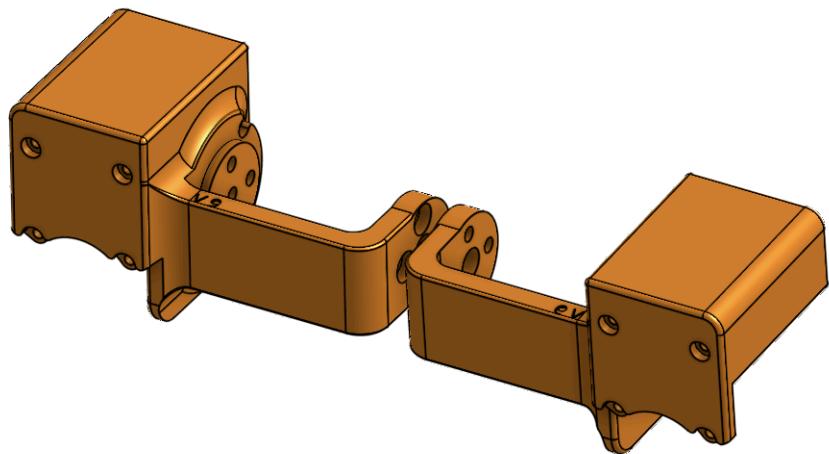
Assembly steps printed parts

Notes: These parts are right and left handed. Pay attention to which side is which.

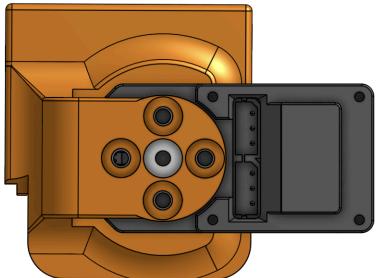
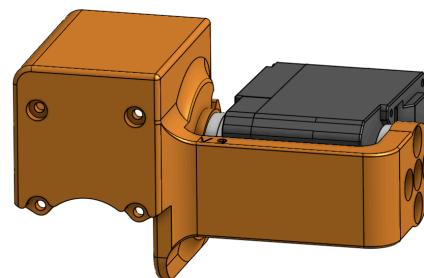
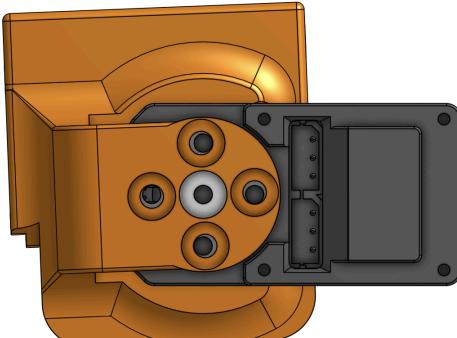
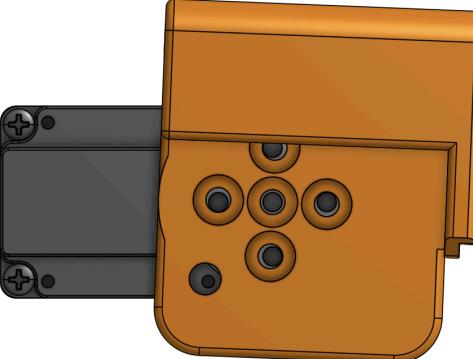
Step	Picture
1. Connect motors into the hip yaw components	Here is where the hips will be:

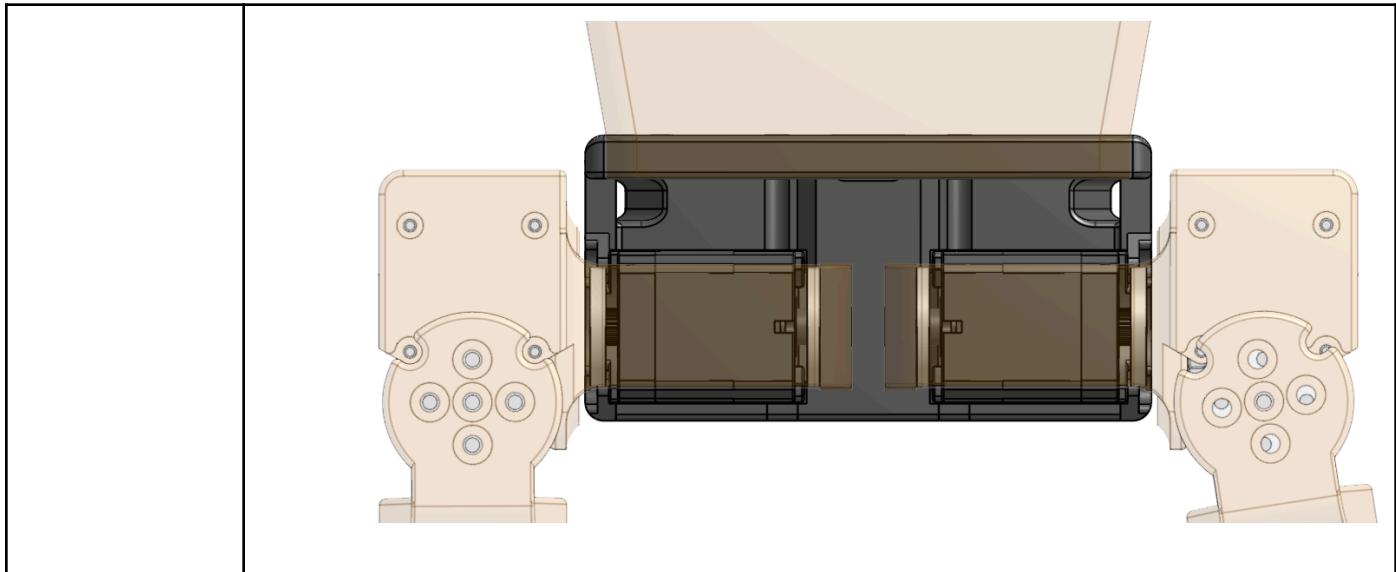


Here is what the hip parts look like

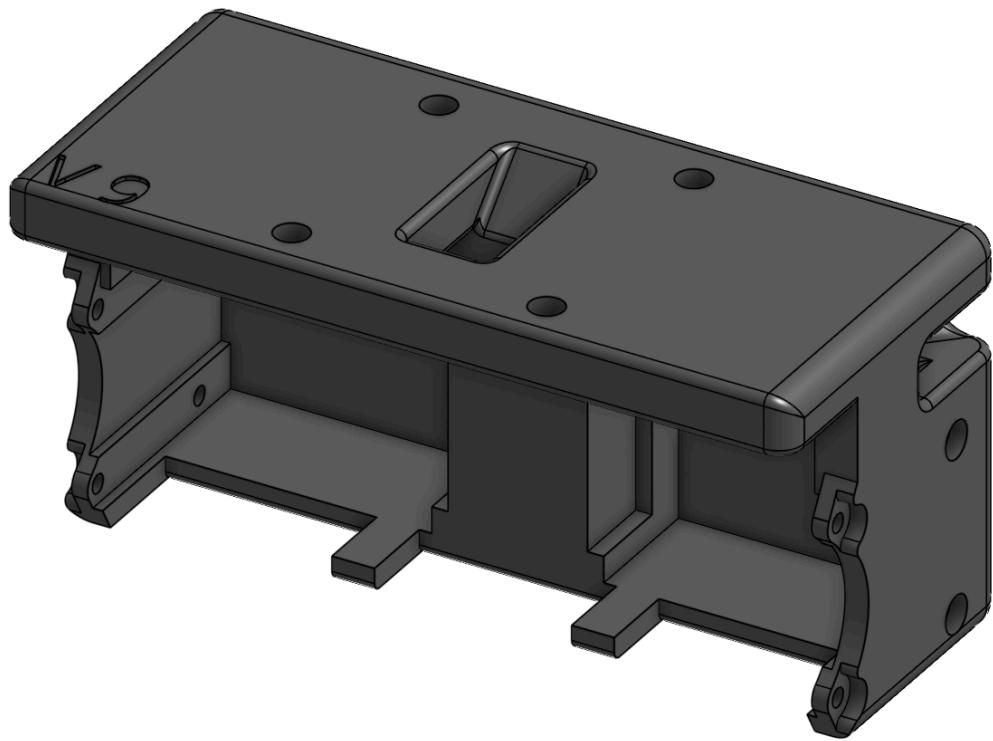


Insert the motor into each part as shown below:

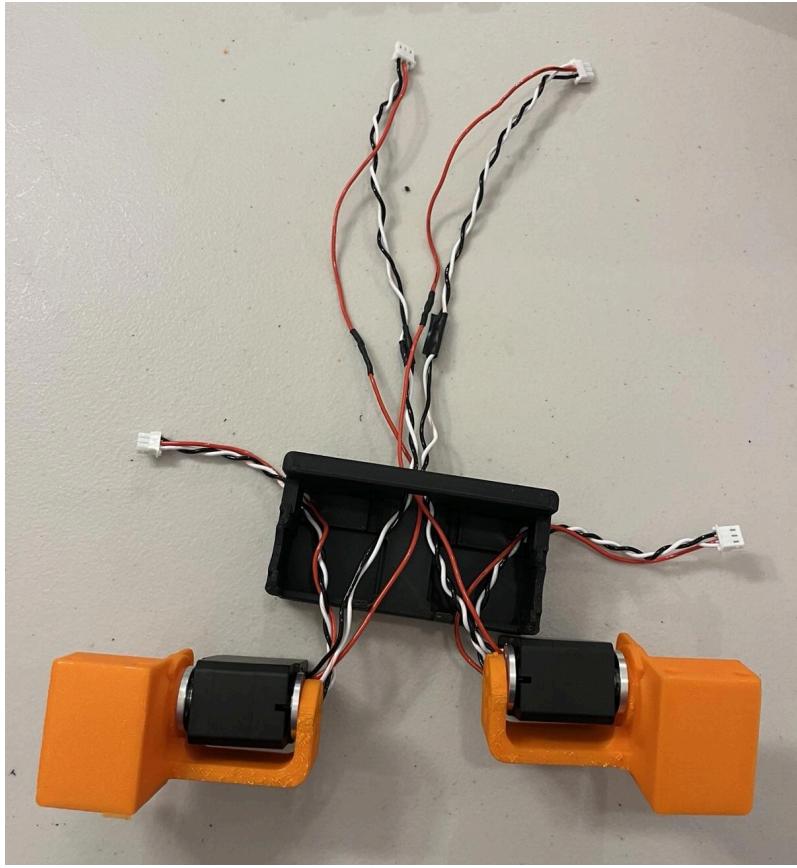
		
	Attach Rotor Side 1	Attach rotor Side 2
		
<p>Connect Cables:</p> <ul style="list-style-type: none"> - Use one of each of the long twisted cables - And a standard short cable 		
2. Connect to hip	Here's what the hip part looks like:	



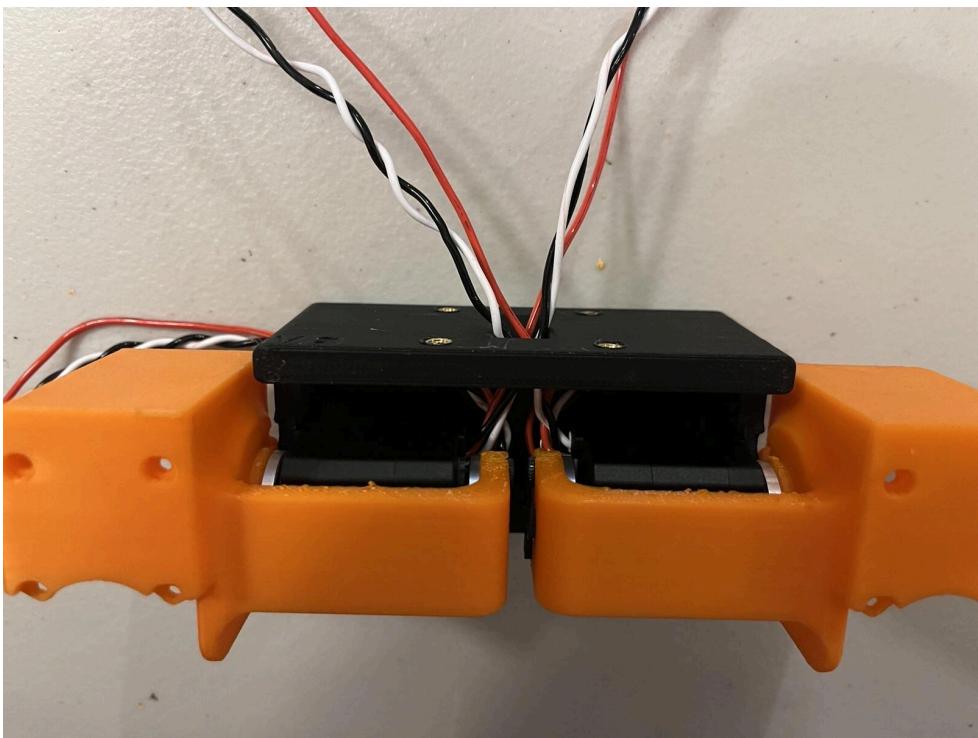
Find the part



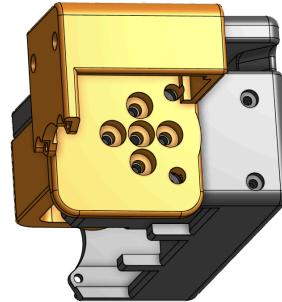
Thread cables through hips with long cable going through the top and smaller cables going through the sides:



Place motors in sockets (should slide in easily)

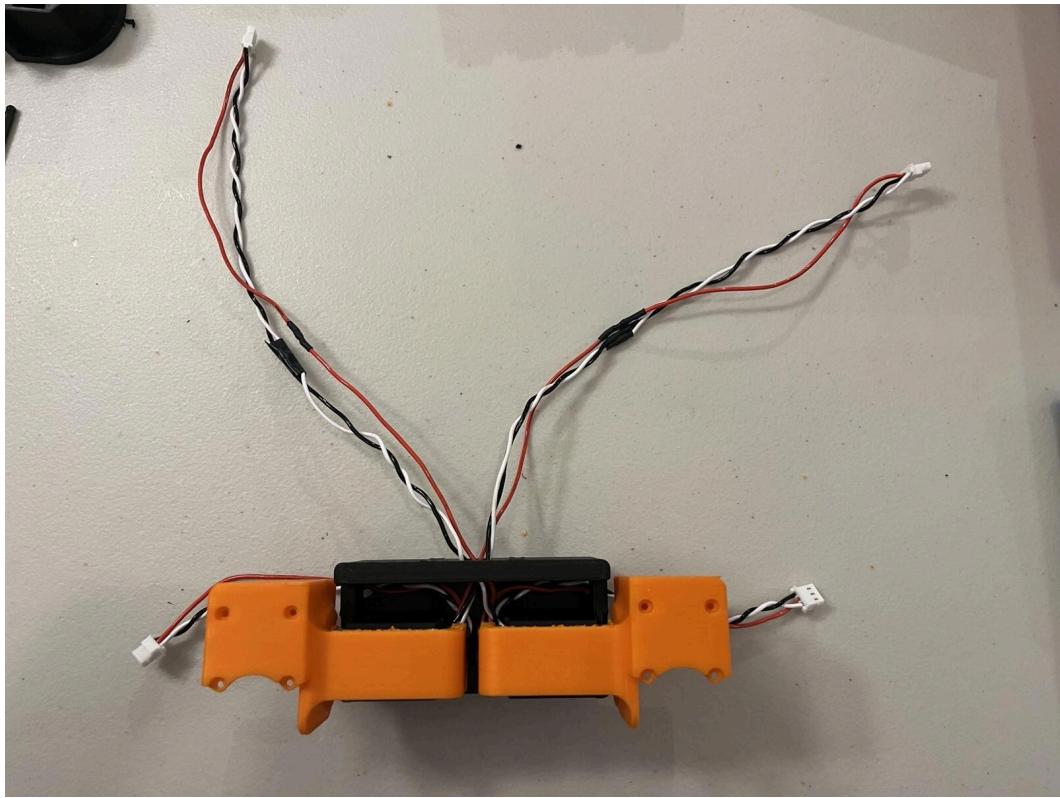


Do a standard case fastening (4 X M2's + Split washers)



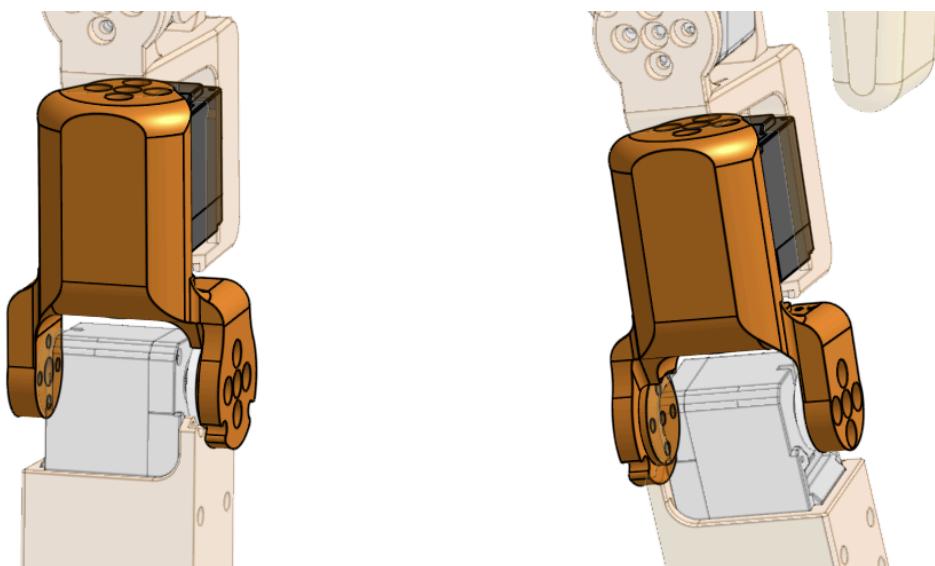
Reaching the top left M2 is probably the most tricky part of the assembly. The M2 should fit through these holes and into the body of the motor.

Part will look like this when done:

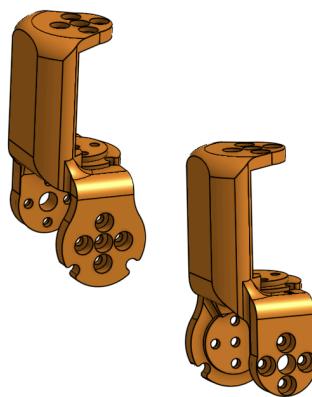


3. Knees

Here's what the knees look like

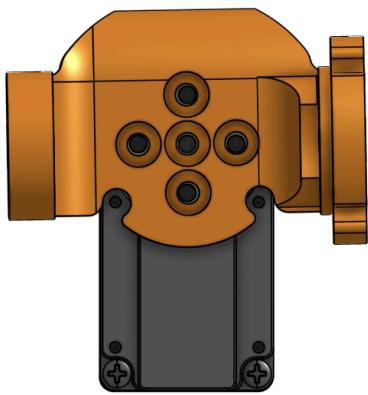
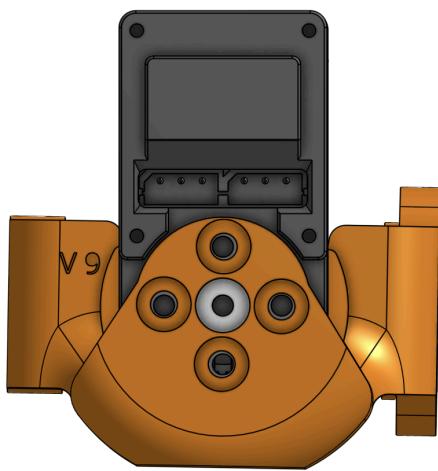


Pic of the knees, locate them

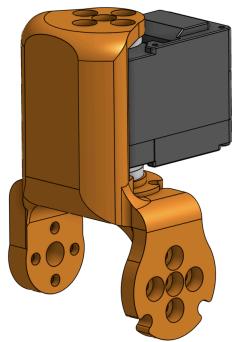


[Fasten both sides of the rotor](#)

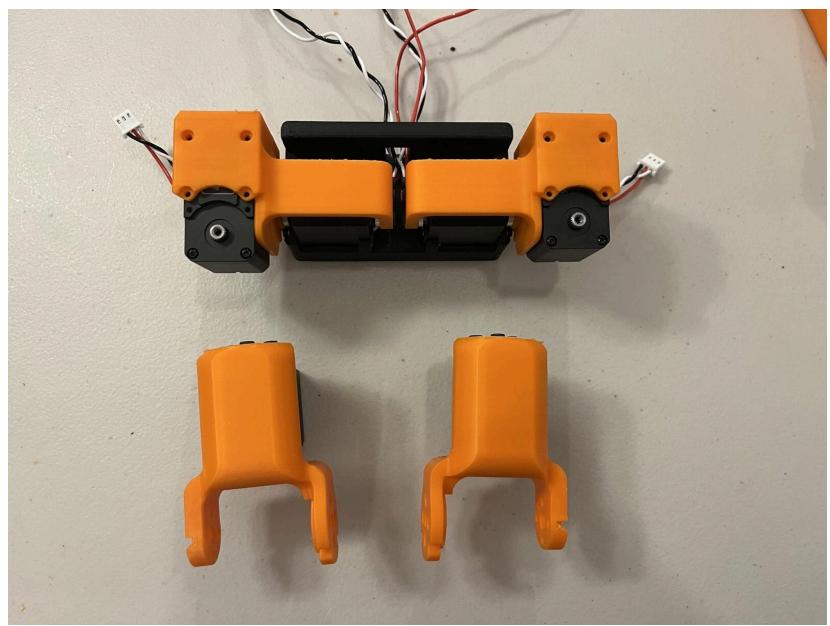
[Fasten both sides of the rotor](#)



Should look like this when done! Add 2 X short cables

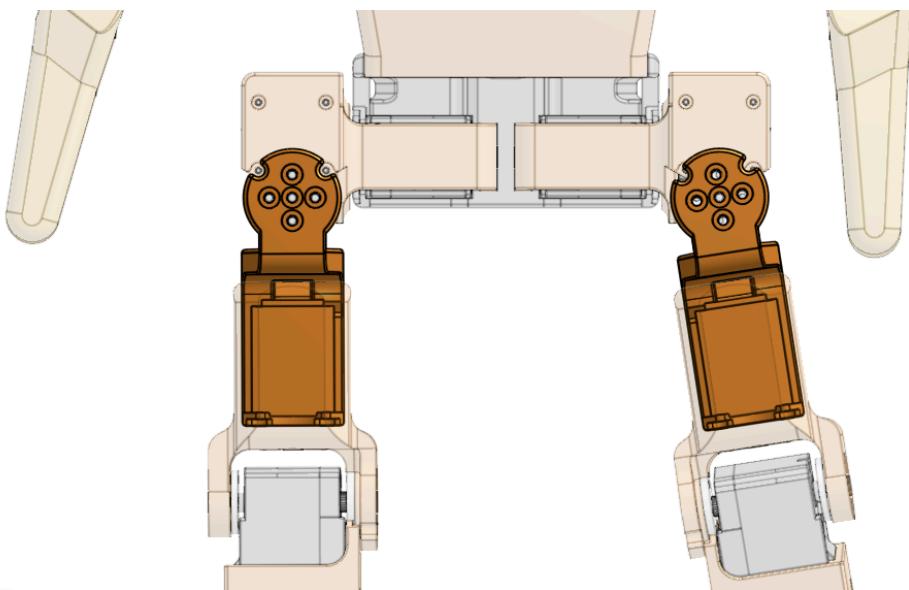


You should now have the following parts assembled:

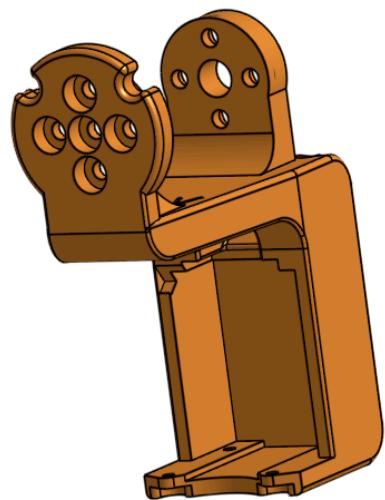
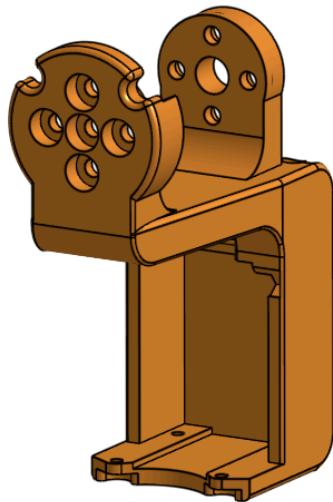


4. Thighs

Thigh components look as follows:



Find these parts. Note right and left sides are important and can be determined by the text on top, (*version number forwards if the robots right, Backwards version number is robots left*)

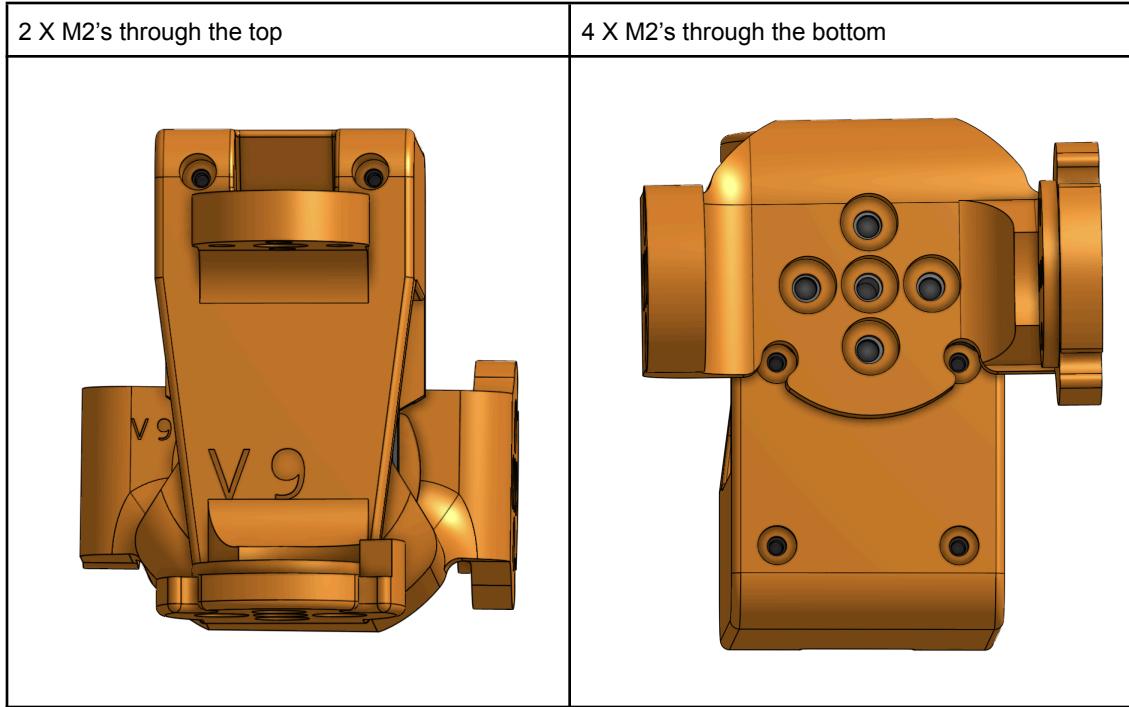


Slide Knee part into the case of the thigh part, sliding ONLY one cable out the back, and pulling one cable out the side. Photo **incorrectly** has **both** cables threaded through the back.



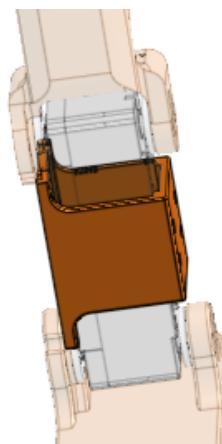
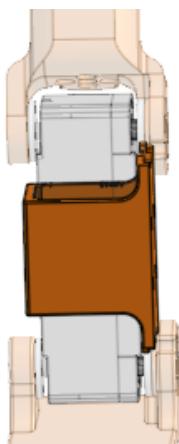
🟡 Ensure that the right knee is connected to the right thigh. 🟡

Fasten the motor into the body:

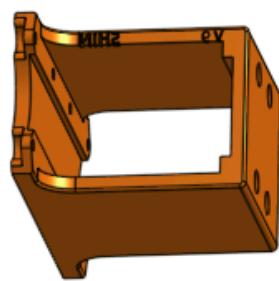
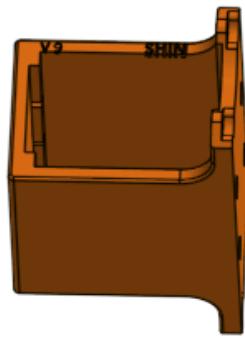


WHEW: These are the most critical steps in order of assembly ! The rest of the parts can be put together with // without regard for order. I still recommend the following:

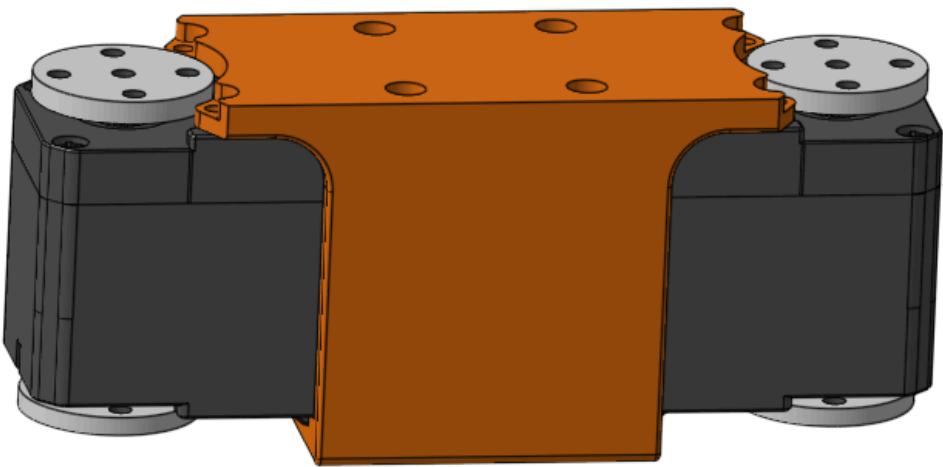
5. Shins:

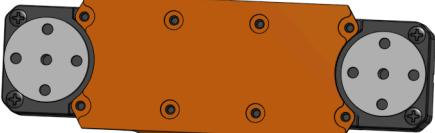
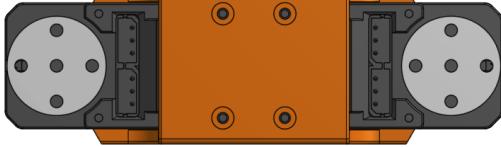


Shin Parts: NOTE: these are identical in shape but not LENGTH to the arm brackets. If you can't read the SHIN writing on the part just know **these are both LONGER** than the arm brackets.

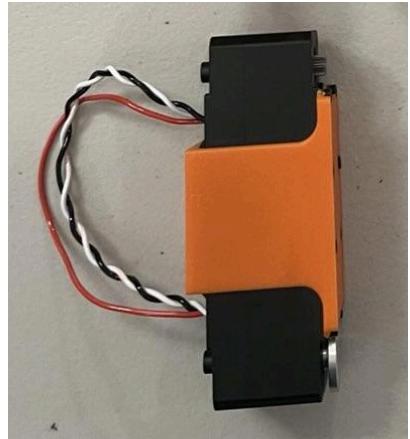


Attach Two motors into either side:

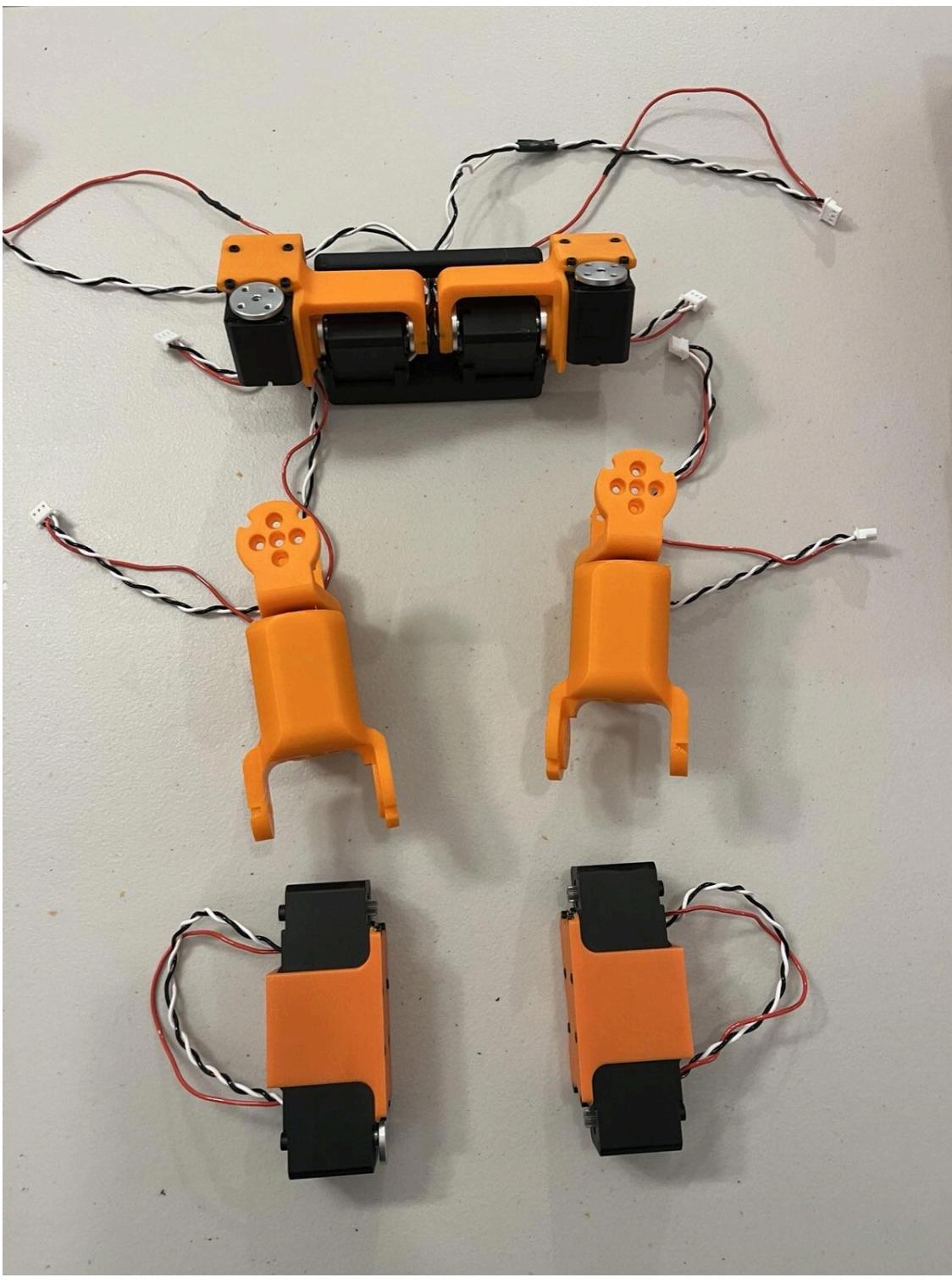


Front Fasten 8 X M2's	Back Fasten 4 X Ms
	

Attach One cable between the two motors. Should look like this:
(ignore rotors, they will be added next step)

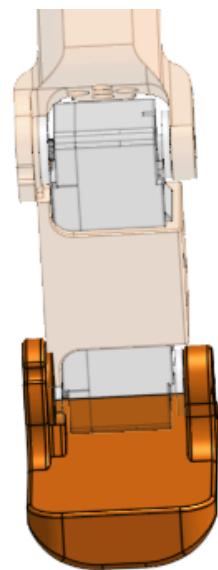
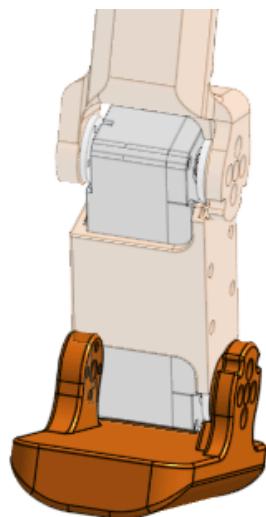


Before moving onto the next step you should have the following parts:

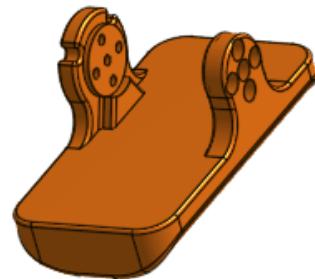
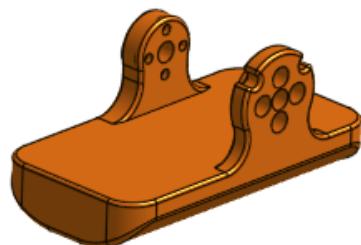


6. Feet

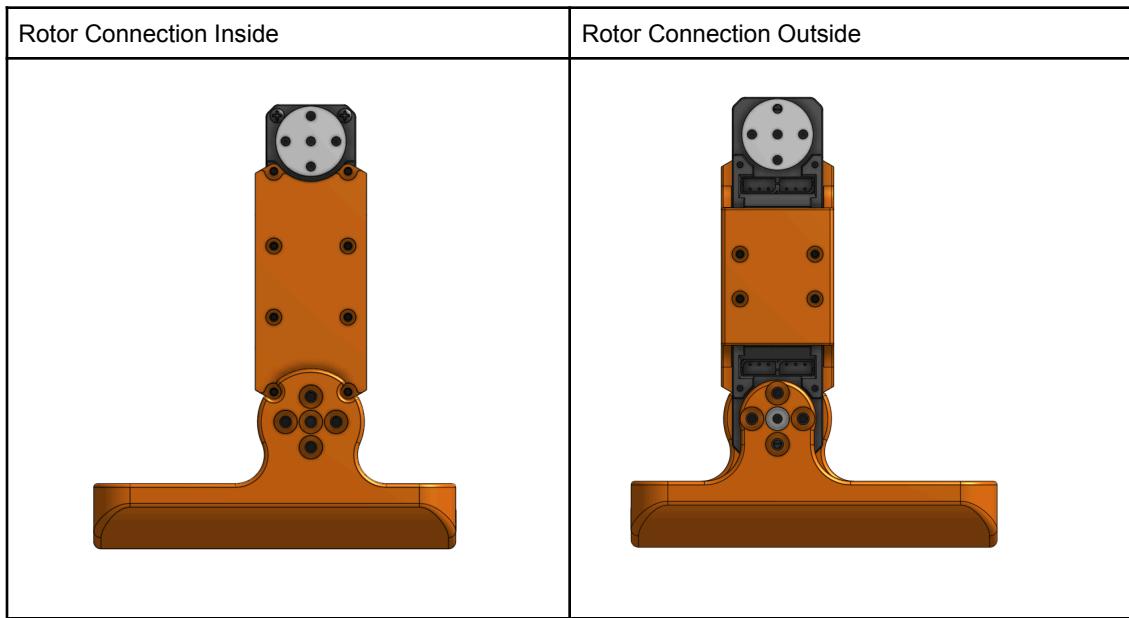
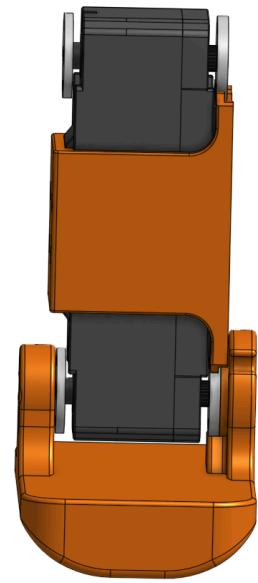
Find the feet:



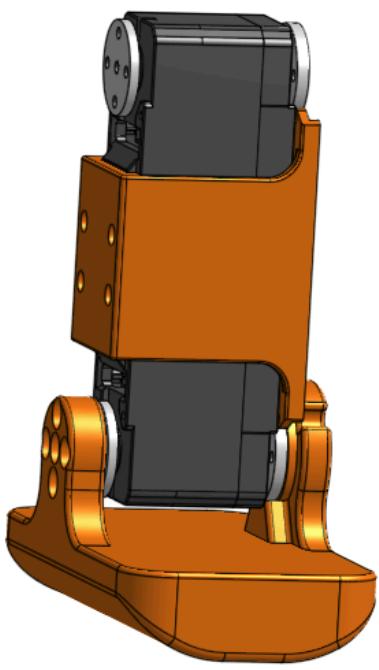
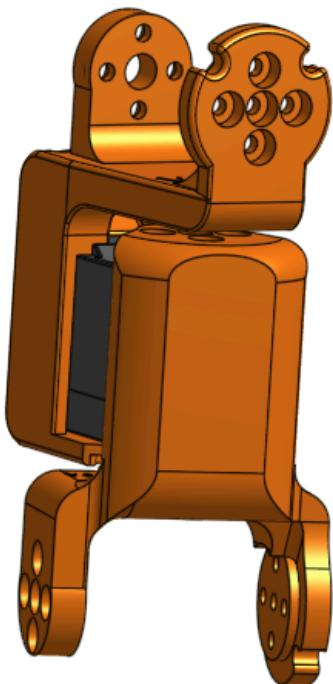
Note, as with all parts, the larger rotor connector is on the inside.



Make sure rotors are attached to the bottom part of the "shin block" Slide in shin block and slide into position

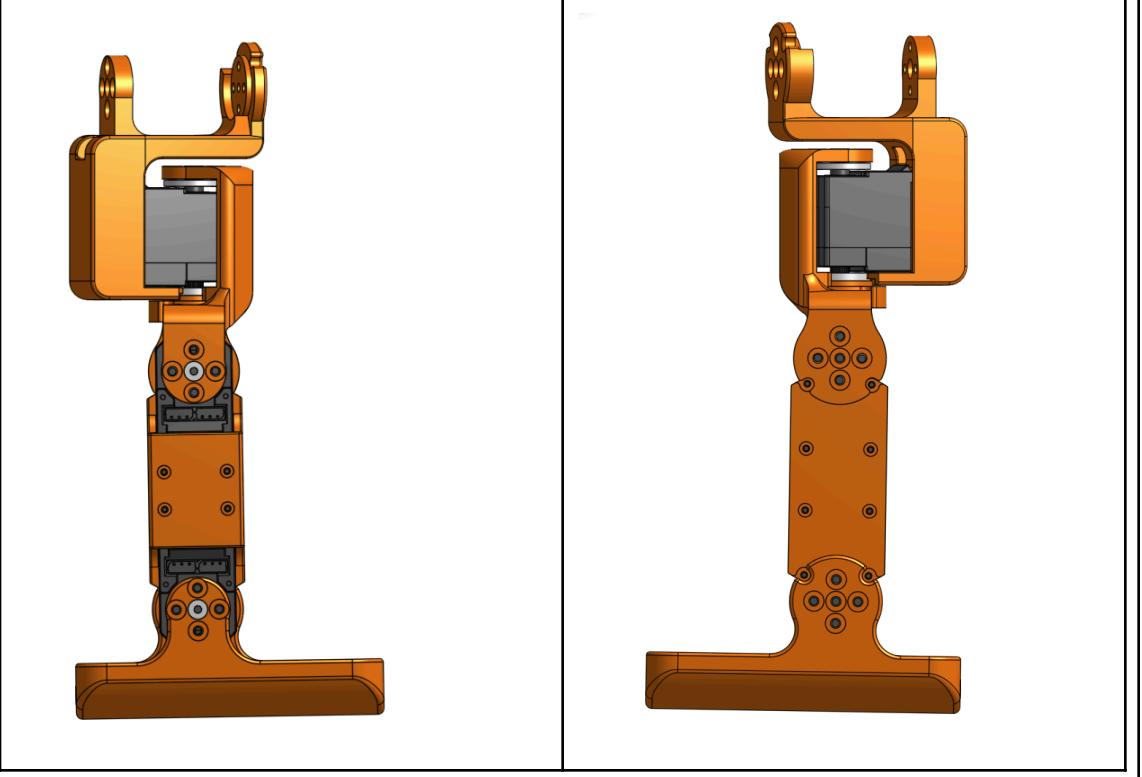


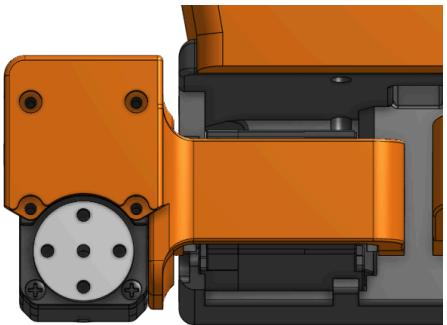
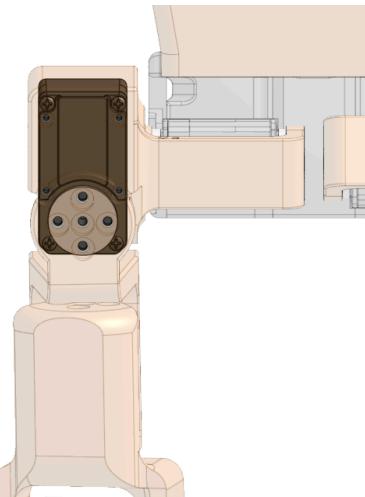
7. Connect Shin and Foot block to Knee block	Block 1.	Block 2
---	----------	---------



Rotor Connection outside

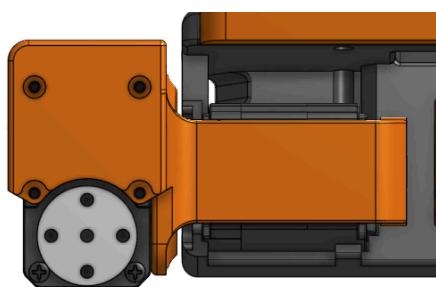
Rotor Connection inside

		
8. Motor into Hip yaw case	Slide motor into hip yaw case:	
	Context	No context

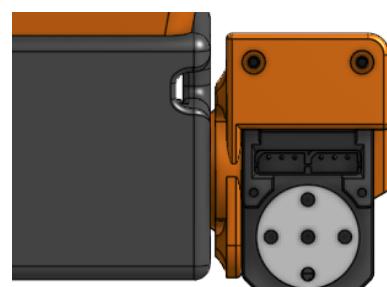


Motor Case attachment

Front 4 X M2's



Back 2 X m2's

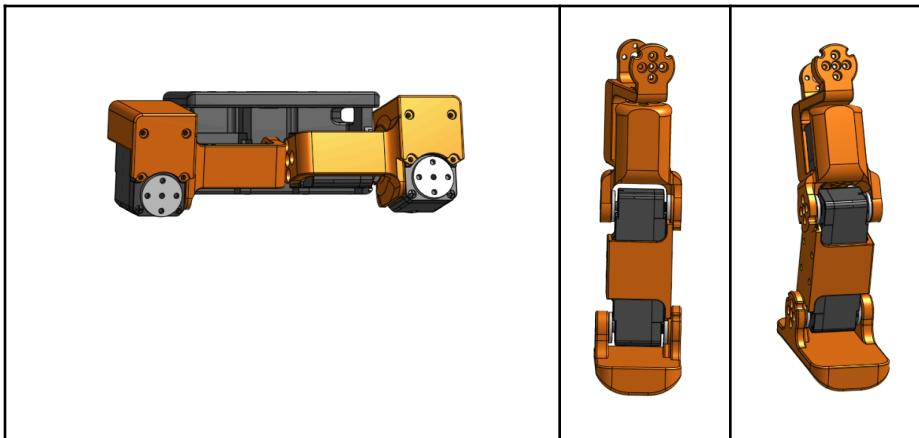


9. Fasten Hip yaw Motor into leg block(s)

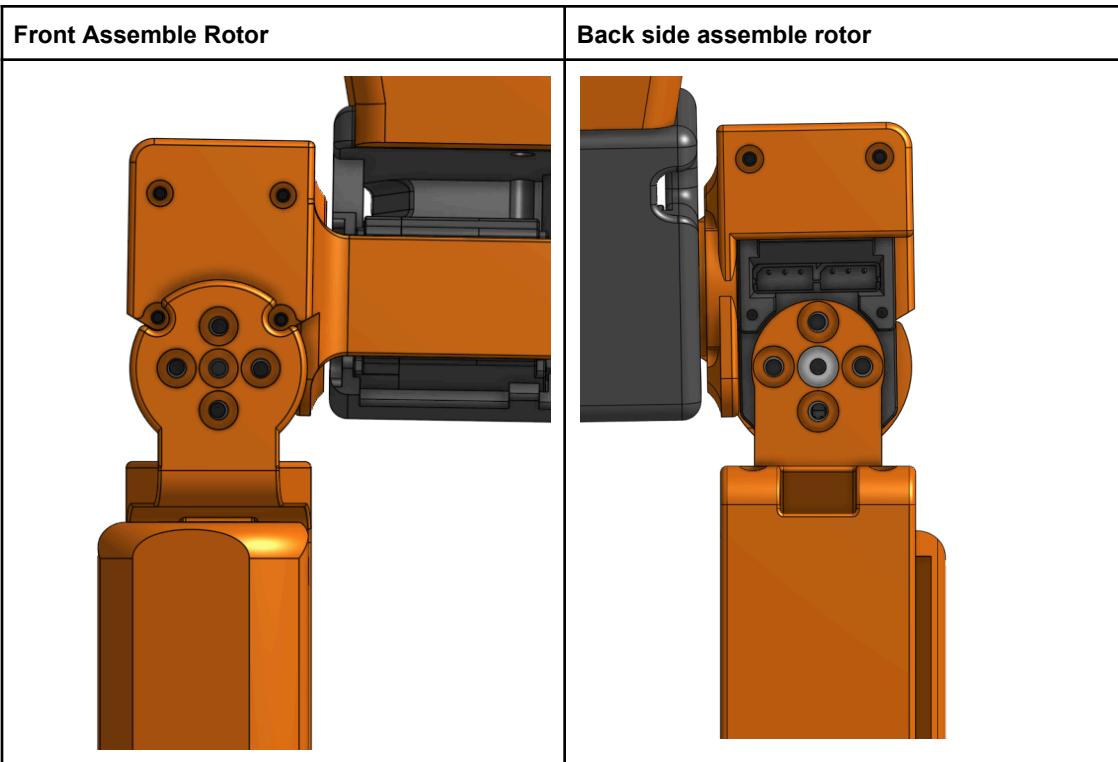
Torso Block:

Leg Block 1

Leg Block 2:

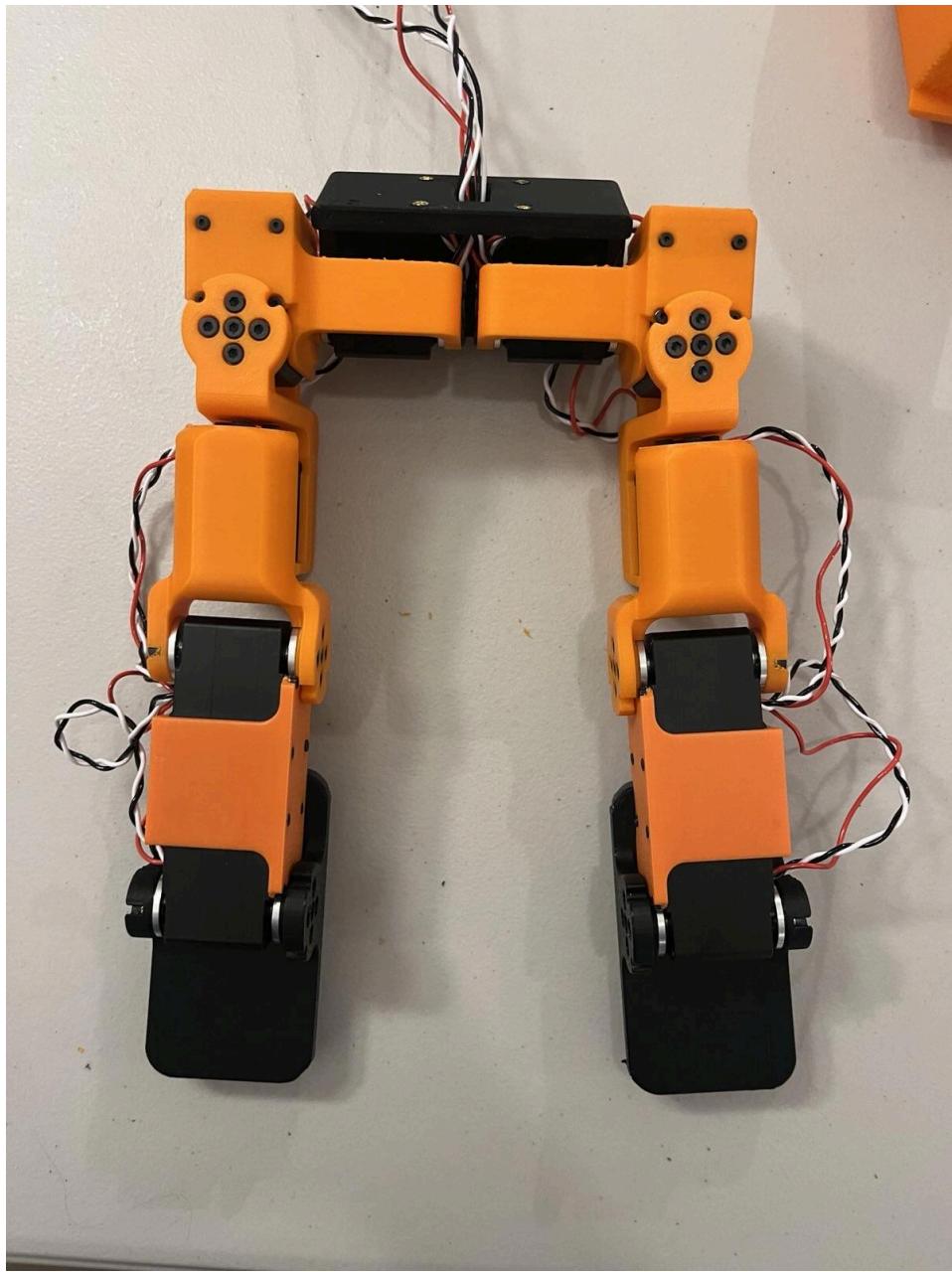


On each side:



Should look like this:

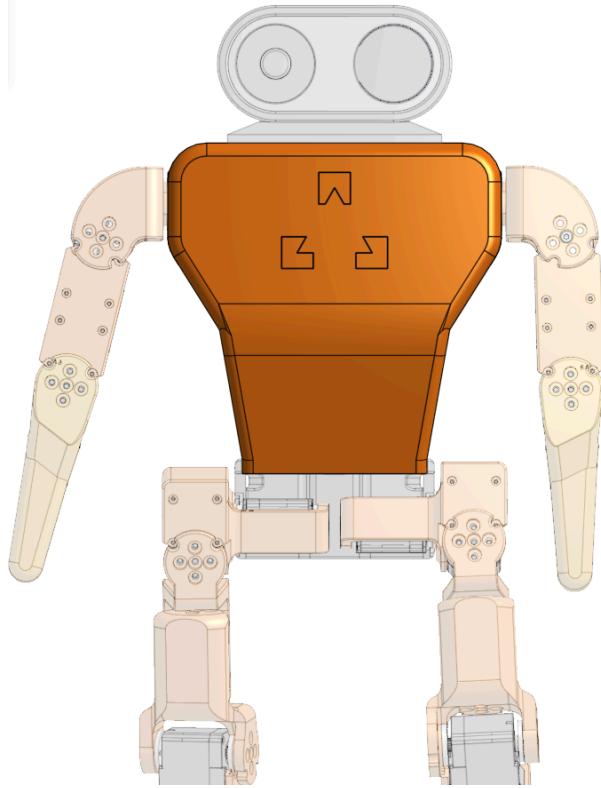
Insert all cables until you have two cable chains, one for each leg



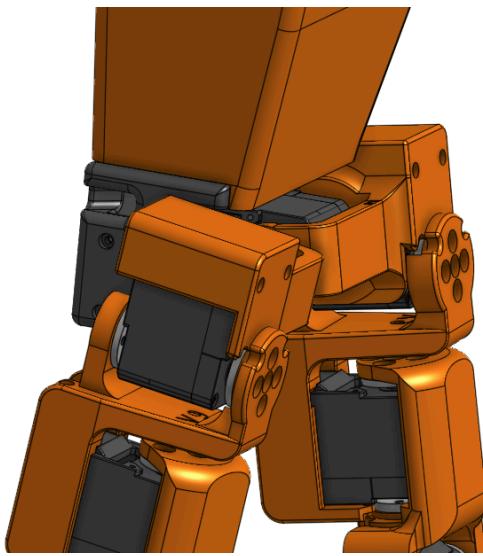
 Legs are complete! 

10. Attach Torso to hips

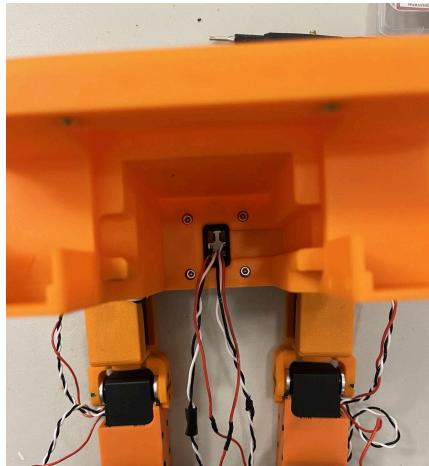
Locate torso



Attach to hips so that the lip of the torso sticks over the front of the hips:

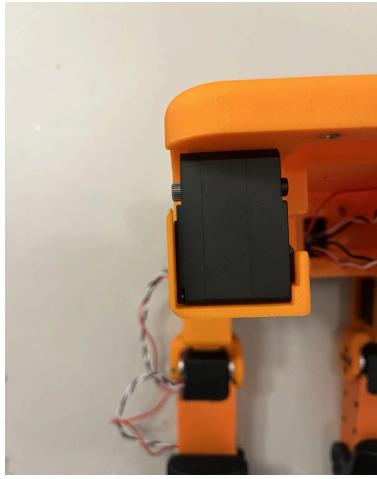


Pull Cables through base:



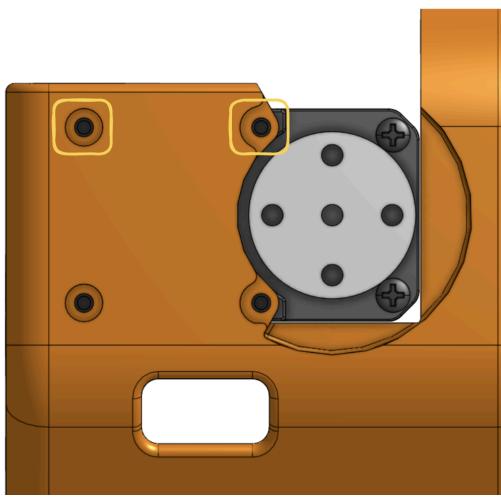
💡 Use 4 X M10's to attach to the black hip mount through the top of the body cavity 💡

11. Attach shoulder motors to torso	Drop in motor without front or back rotor
-------------------------------------	---



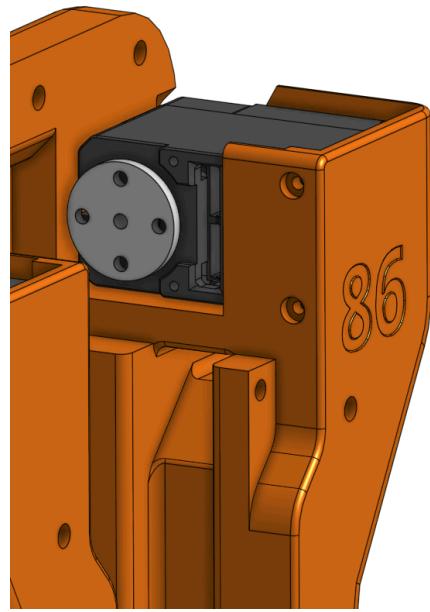
Add rotor only to the face facing out

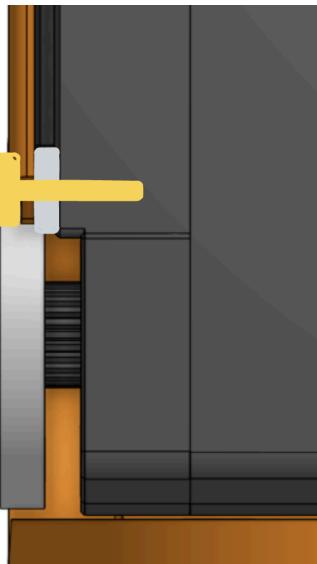
Body Case Attachment M2's 4 X



Top View: Note for yellow boxes, option to put washer between top case and motor (there will be room as this moder is added from the top)

2 X M2's Back

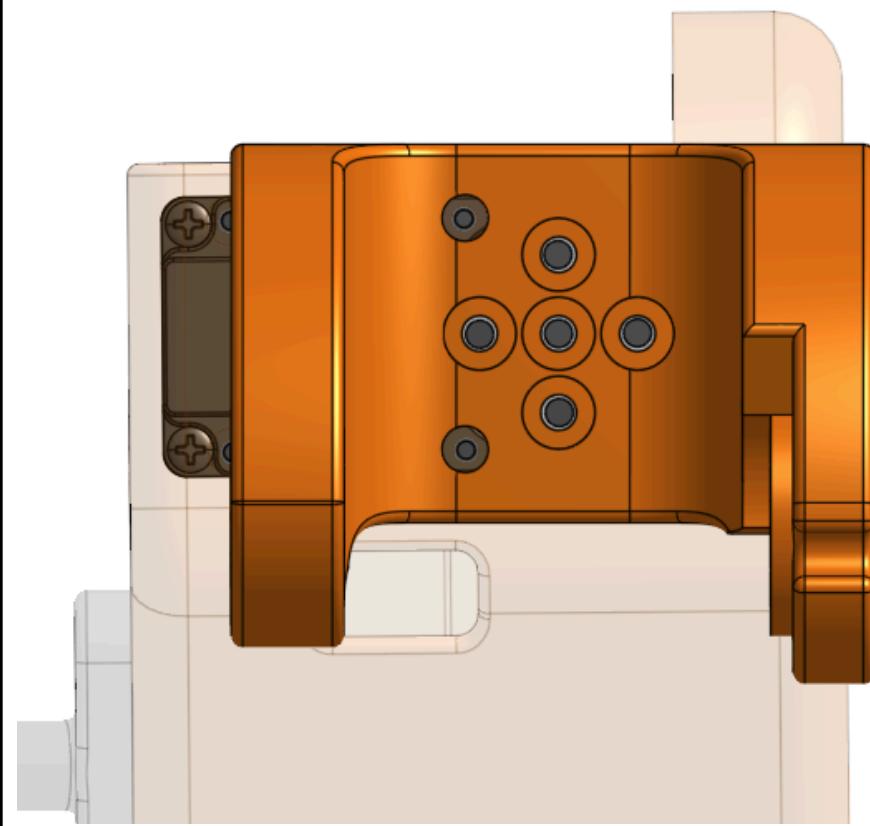




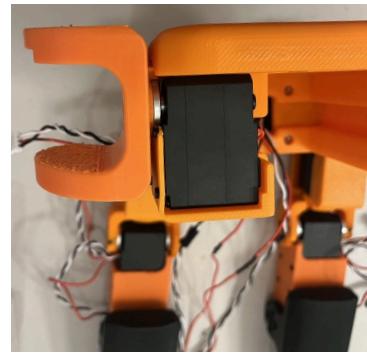
12. Attach shoulder parts to torso

Context	No Context
	<p>Note: Notches around rotor interface face outwards towards front of robot</p>

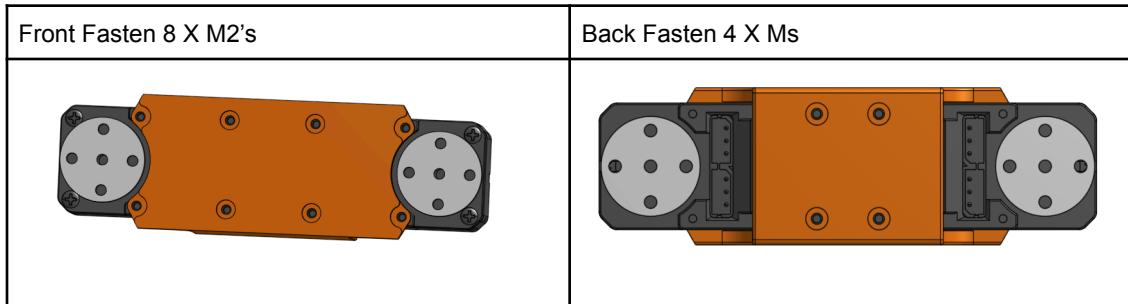
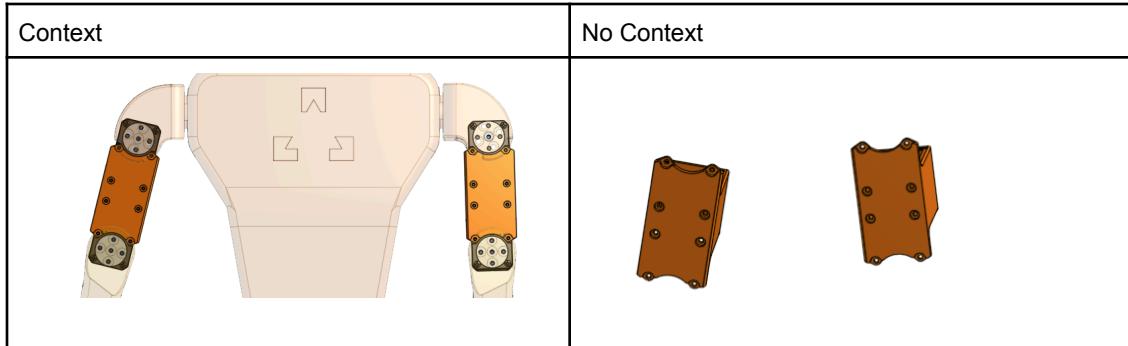
Motor Rotor Connection: 1 Side only



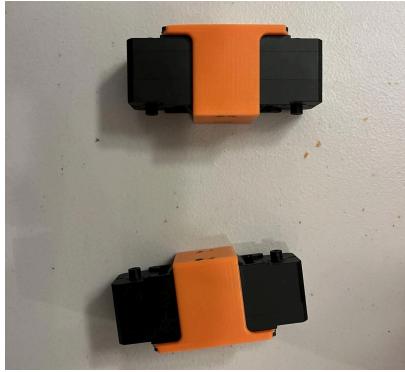
Should look like this:



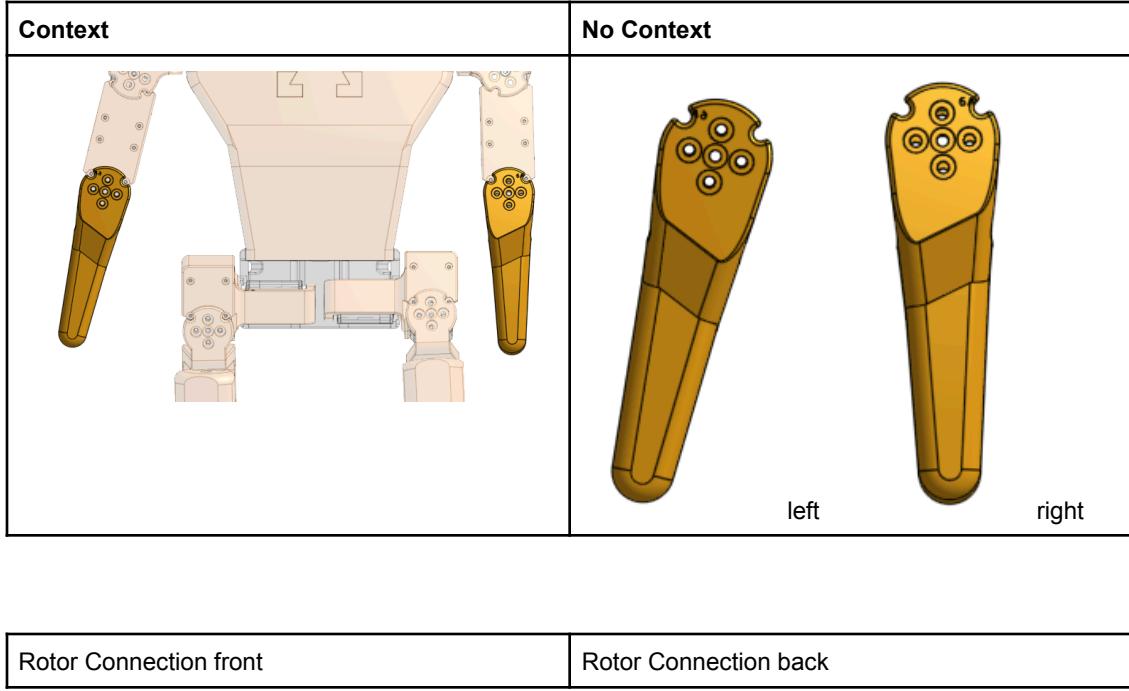
13: Assemble
Elbow brackets

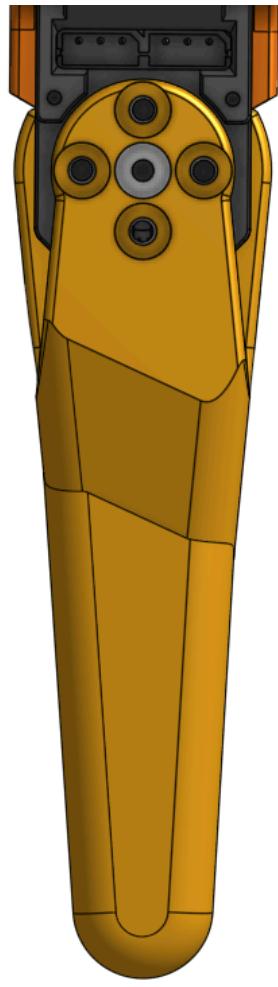
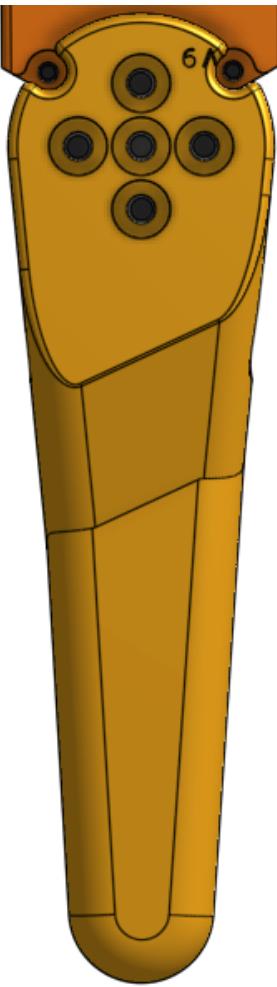


Should look like this!:



15. Attach Hands to
Elbow brackets

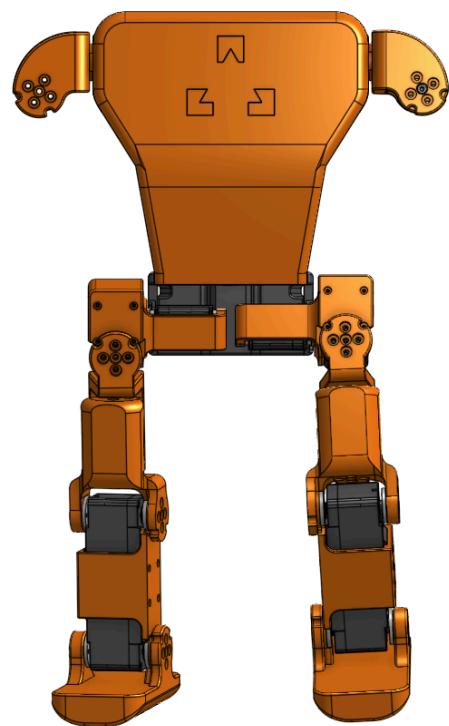
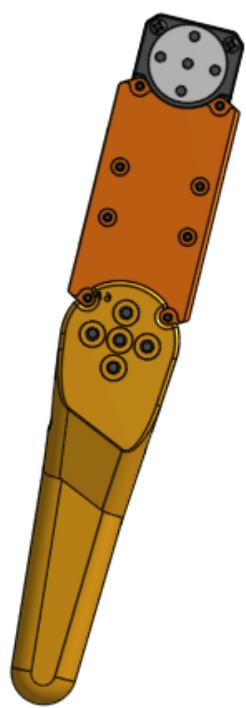




14. Attach arms to shoulders

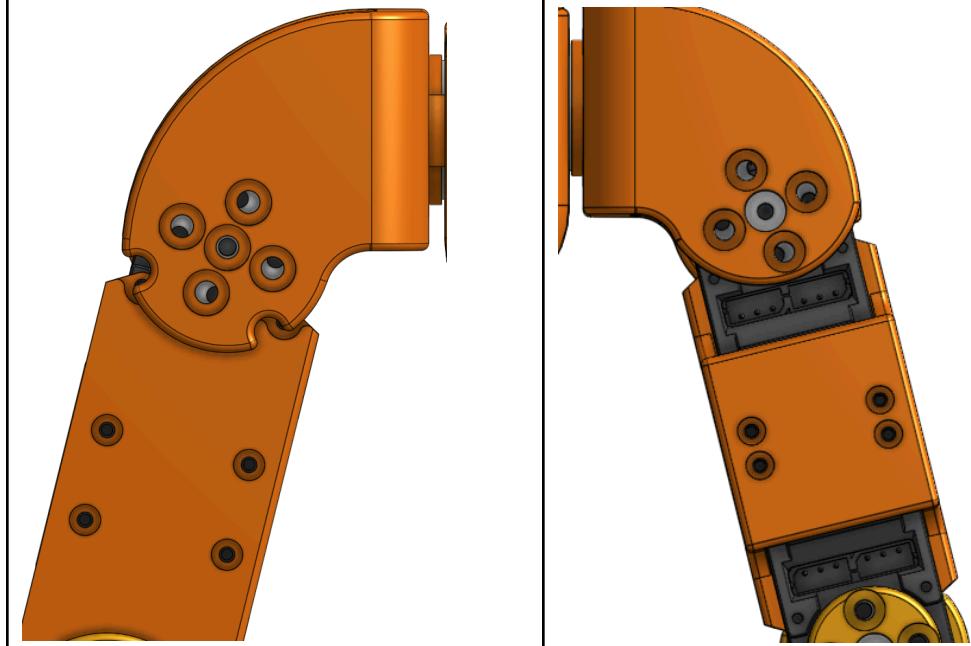
Block 1

Block 2



Rotor Connection Front

Rotor Connection Back



Robot should look like this!



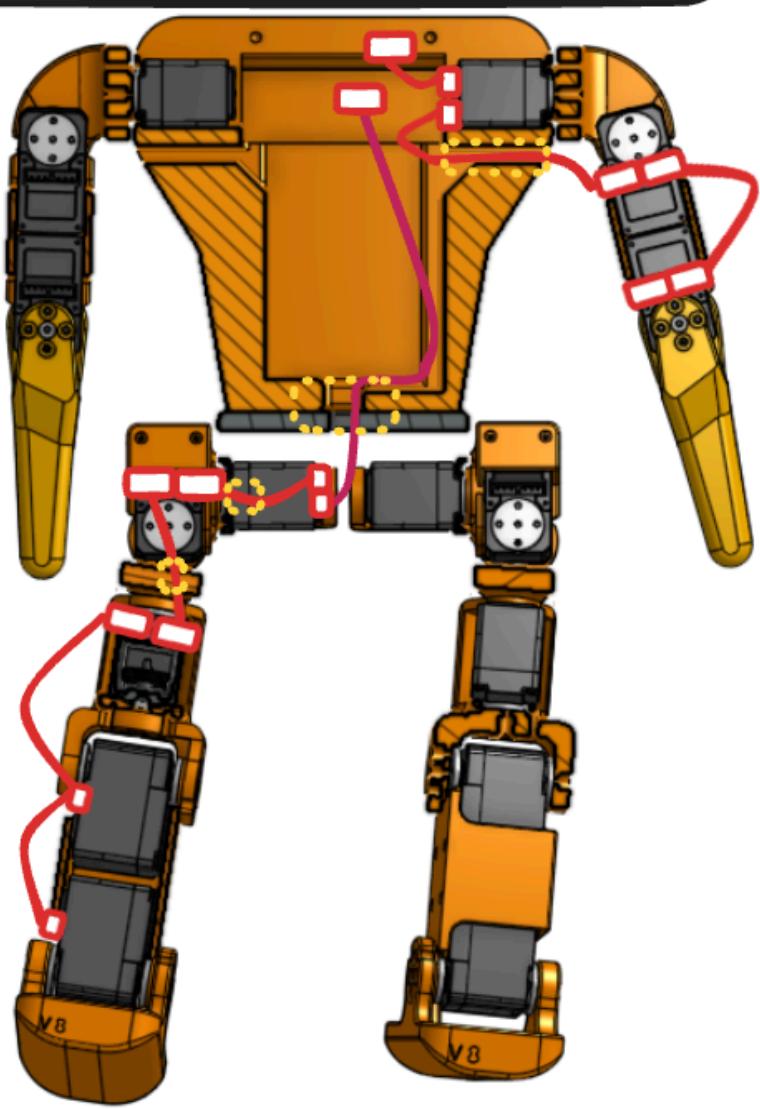
Small cabling diagram	Device should look as such:

Cable Overview

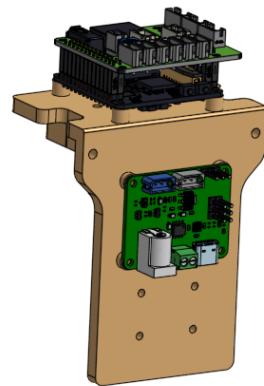
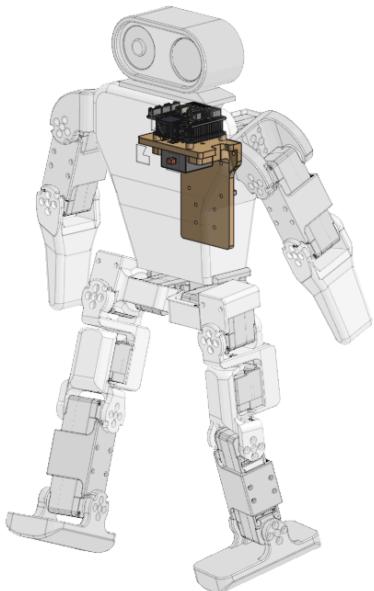
Key

Showing only half of Cabling

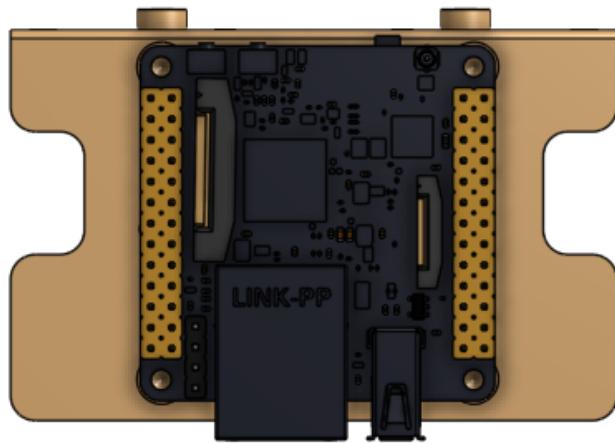
- Cable Pass Thru
- Servo Cable (standard Length)
- Servo Cable (Long Length)



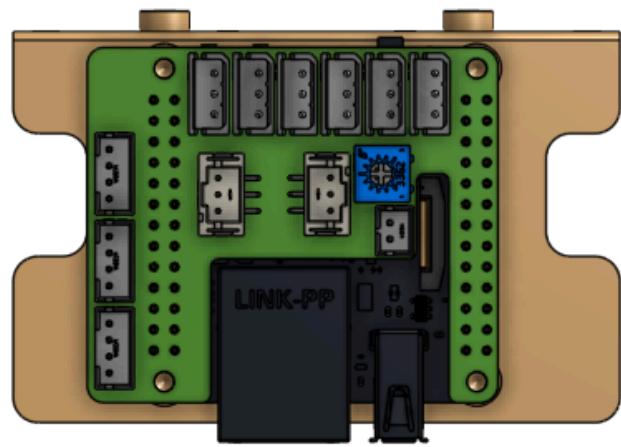
Electronics Mount			
Electronics Overview	<p>The Milk Hat: As labeled on the PCB</p> <p>The Head</p> <p>PCB 1: 5 V IMU + Display Mic</p> <p>Torso Cavity</p> <p>PCB 2: Milk Board Hat Brain (Milk) 12 => 5 Boost Amplifier Motor Driver 3.3 V IMU Battery</p>		
Body Electronics	<p>Get the following electronic components</p> <ul style="list-style-type: none"> - Milk hat - Milk board - Servo Driver - Speaker - Electronics mount <table border="1"> <tr> <td>Context</td> <td>No Context</td> </tr> </table>	Context	No Context
Context	No Context		



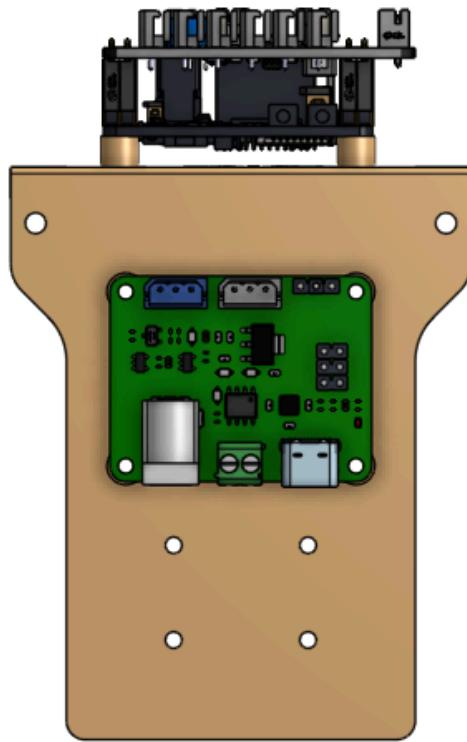
- Screw in M2X4 screws w/Split washers with JUST the milk into the electronics mount



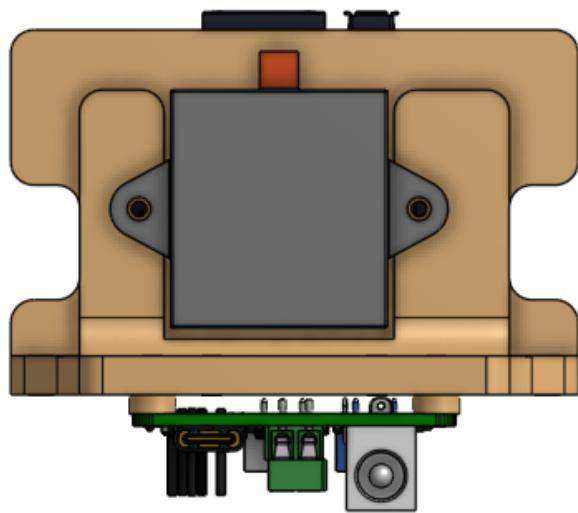
- Mount the milk Hat M2X4 screws w/Split washers



- Attach Motor Servo board M2X4 screws w/Split washers



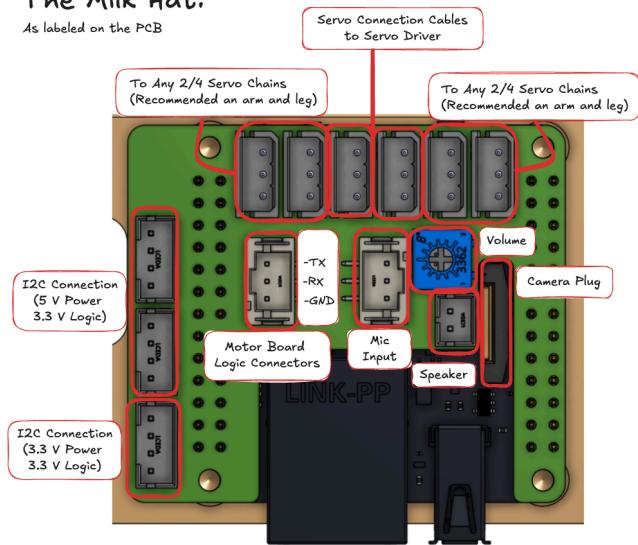
- Attach Speaker, facing up 2 X M2 X 4



- Plug in logic cable between the labeled "motor connection cable on the milk hat" and the logic pins in the wavestride board:
 - Follow the connection diagram above

The Milk Hat:

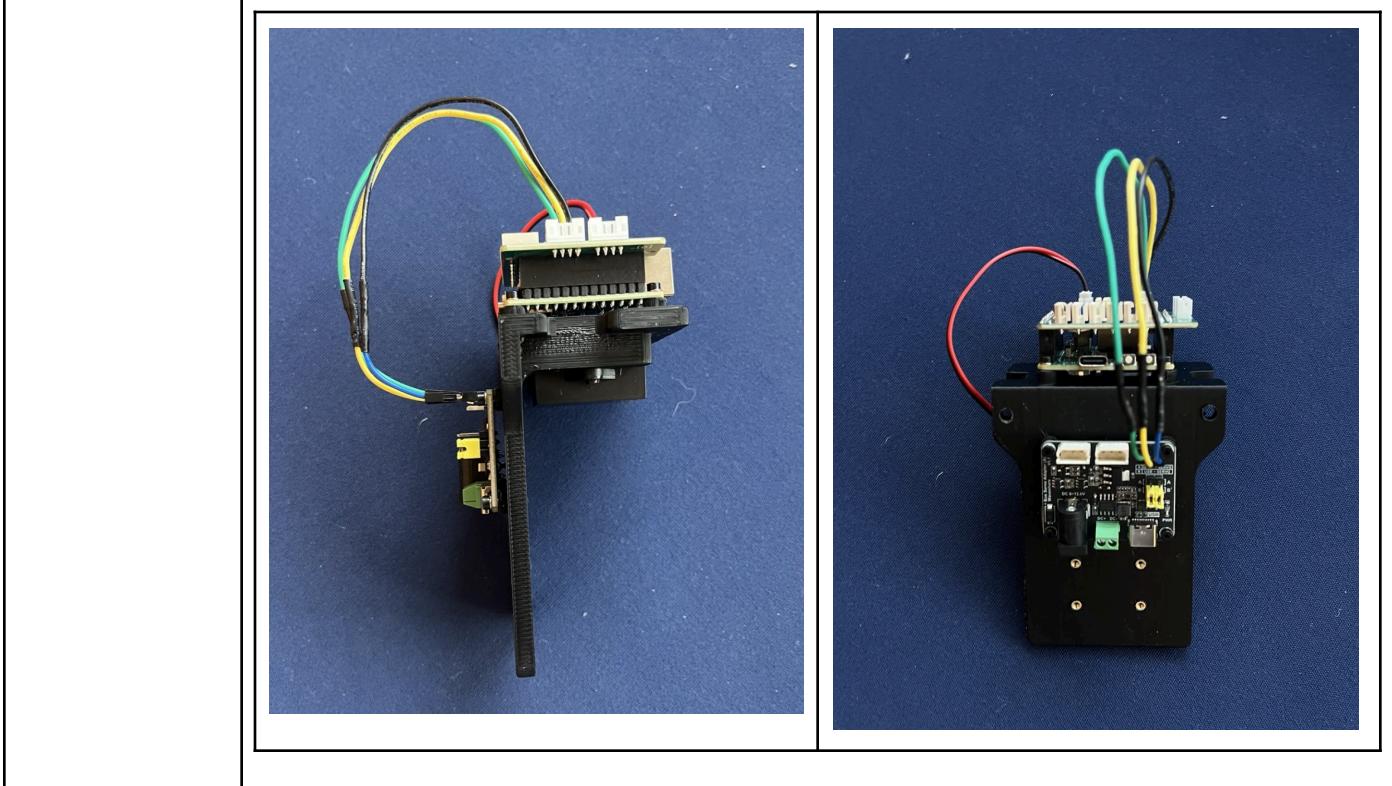
As labeled on the PCB



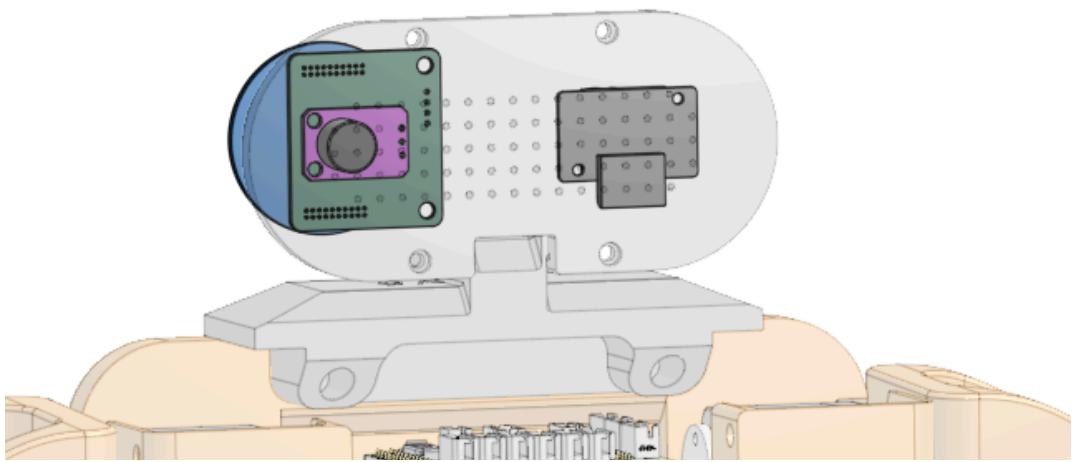
Should look like this:

Side View

Front View



Head Electronics	<ul style="list-style-type: none">- Find<ul style="list-style-type: none">- the Display IMU,- the Mic- 3 and 4 pin PH-2 cables
------------------	--



Connect as shown

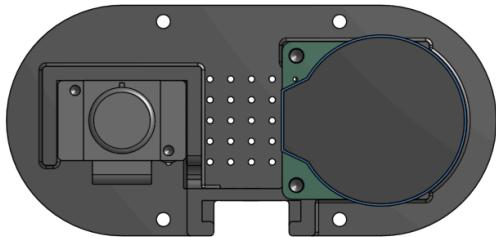


Thread cables through cable hole



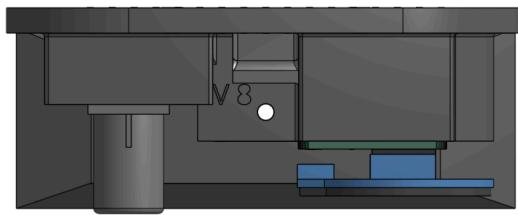
Attach the electronics into the head mount plate using m2x4 + Split washer:

- IMU Mount with cables
- Camera with cables.



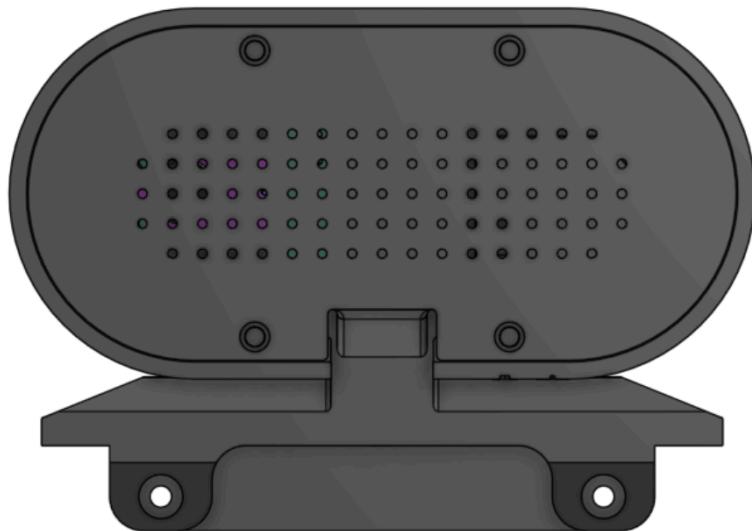
Attach Head components together

Attach Head to neck using 1x (M3 x 5 + Split washer)



Slide on head cover:

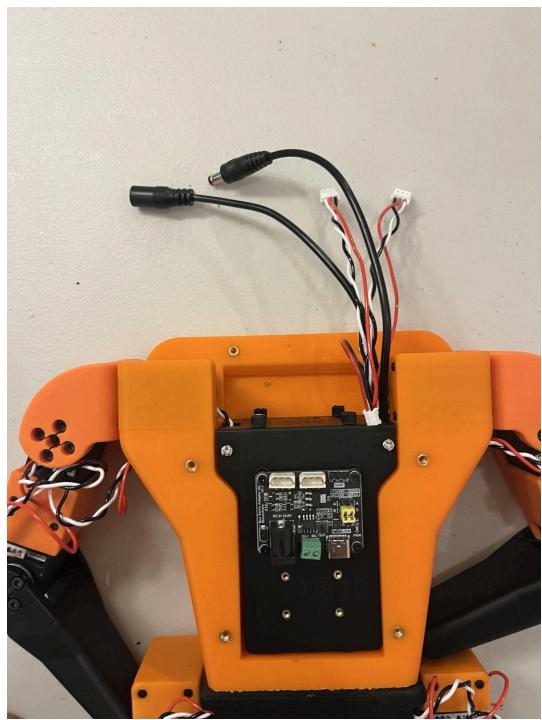
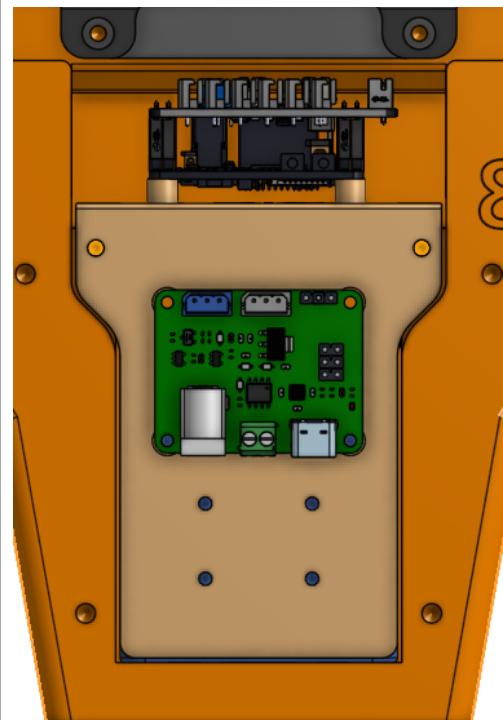
And fasten in back with 4 X m2X6 screws + split washer



Electronics into body

Place battery in body Cavity (note: should be 4, not two servo cables exposed. Thread cables long cable path in right inside of the body)

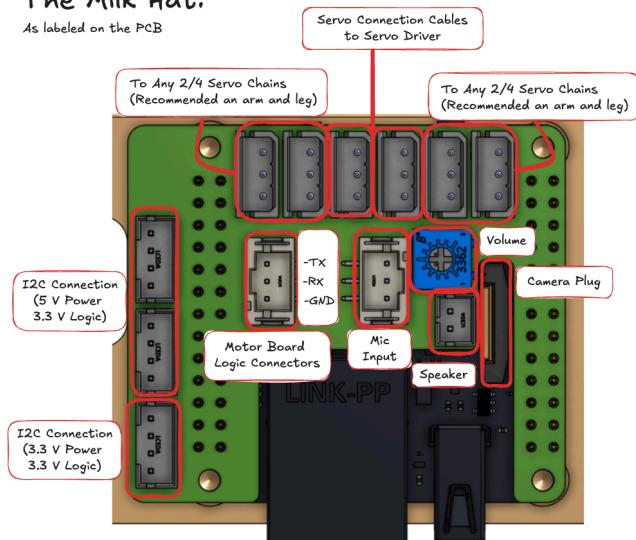
Attach electronics mount into body	2 X(M3 X 10)		
	<table border="1"> <tr> <td>CAD</td><td>Reality</td></tr> </table>	CAD	Reality
CAD	Reality		



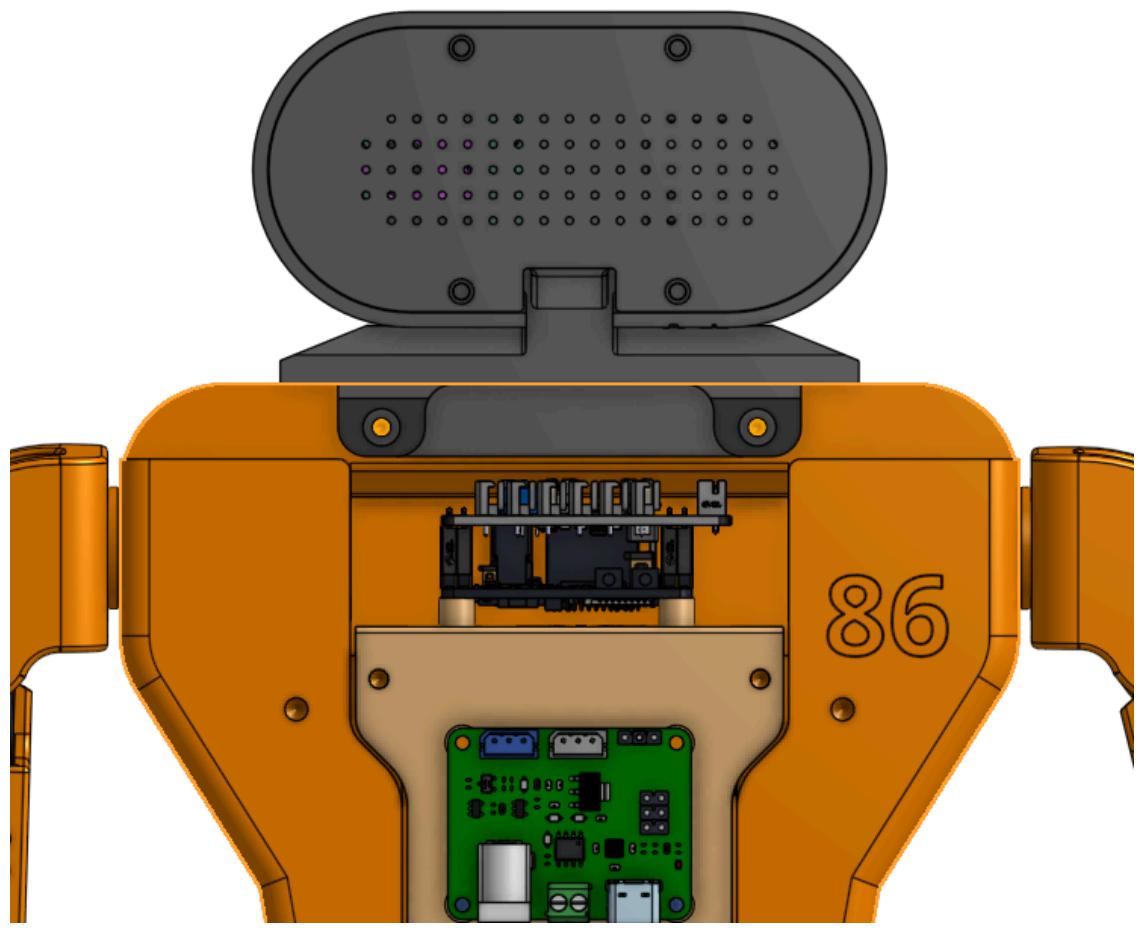
Move head assembly nearby and connect all cables

The Milk Hat:

As labeled on the PCB



Screw in Neck



Screw in
backpack!

