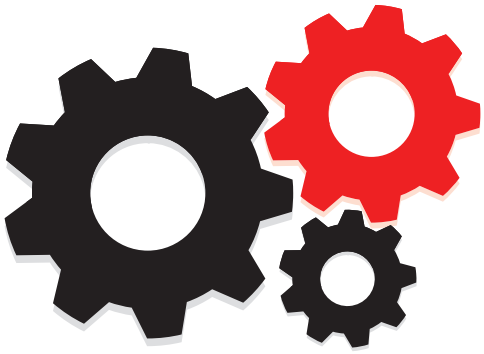

ORION
ROBOTICS

Robotron
Assembly Guide

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Introduction
All our brackets are made in the USA. They are fabricated using a large in house industrial laser. We anodized all our brackets to prevent corrosion and to give them that shinny new robot look. Anodizing also keeps the brackets looking better longer.

Servos
The Orion Robotics robots are built around a special robotics servo developed in house. These new servos give us greater control and the ability to further push the envelope of what these robots can do. In addition the custom servos allow us to better control cost.

Tools
There are some basic tools you will need to get started. A good set of Phillips screw drivers and small pliers. Typically needle nosed pliers work best.

Safety
When working with robots some basic safety rules should be followed:

1. Eye protection should be worn at all times.

2. Some bracket edges can be sharp and can easily cut you.

3. The robots are powered from Lion batteries with high discharge rates. If shorted or incorrectly connected the can easily cause fire or other damaged.

4. The servos in these robots are high power and can easily cause injury. Make sure you are clear of the robot on first power up or during operation.

5. When working with the robots there are several pinch points. Be aware as this will hurt.

6. Don’t be in a rush when assembly your robots. Injury or damaged parts can easily result. Take your time and double check each step.

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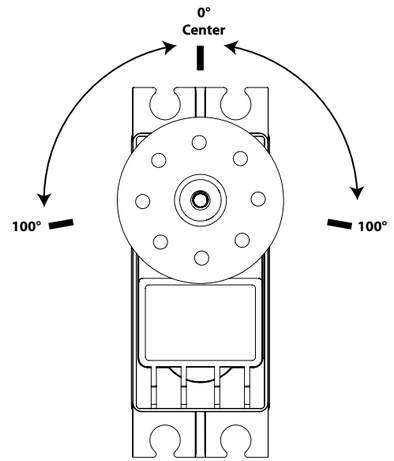
Servo Setup
Servos will typically have a center point with a maximum degree of rotation from that center. If your using the Orion Robotics HV-220 it has a range of 100 +/- degrees of rotation CCW and CW from the center. Each servo must be set to its center point before installation. Any part that is attached to the servo horn must be done at the proper angle so the range of motion is not limited.

If your using the HV-220R it is a full 360 degree rotation servo and has no center point until set in software. This makes assembly easier since the servo does not need to be positioned before assembly.



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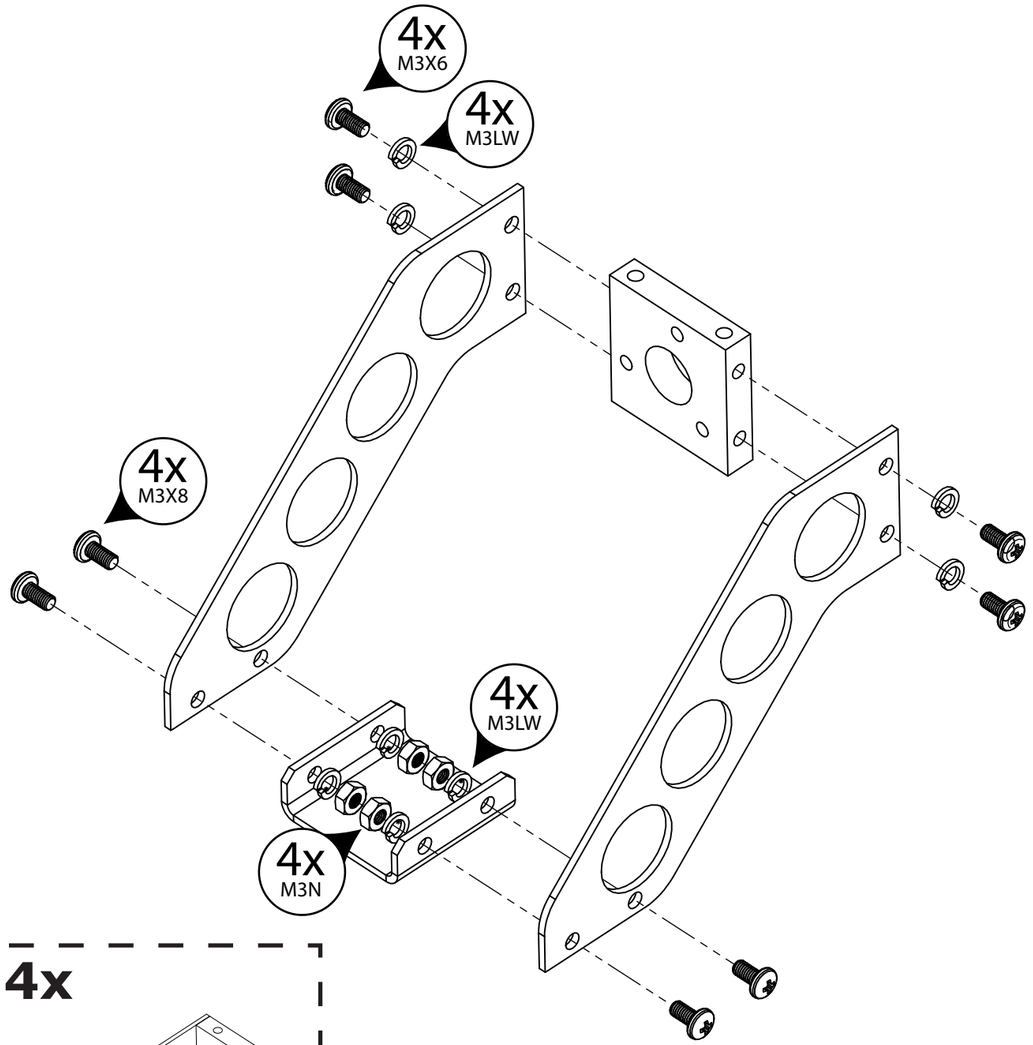

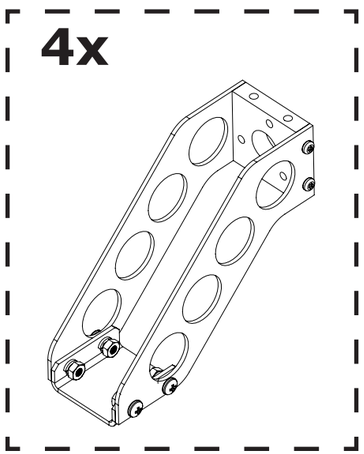

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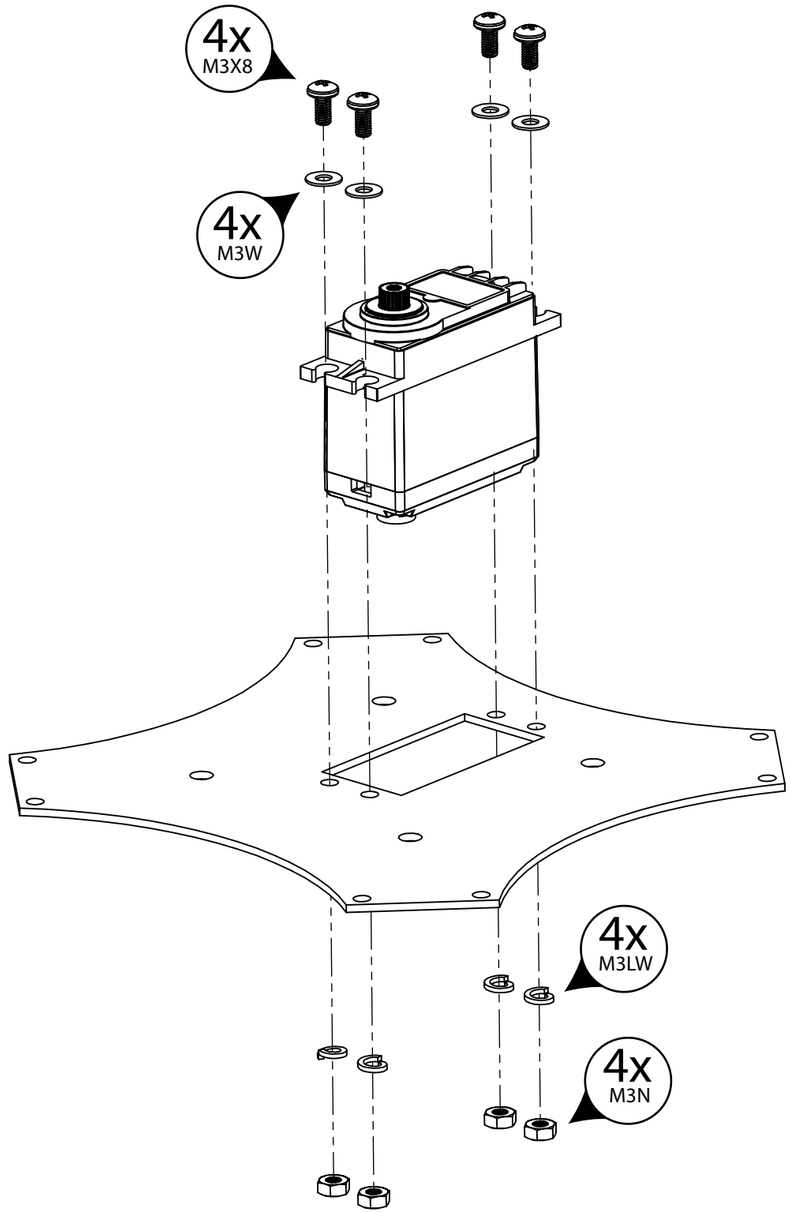

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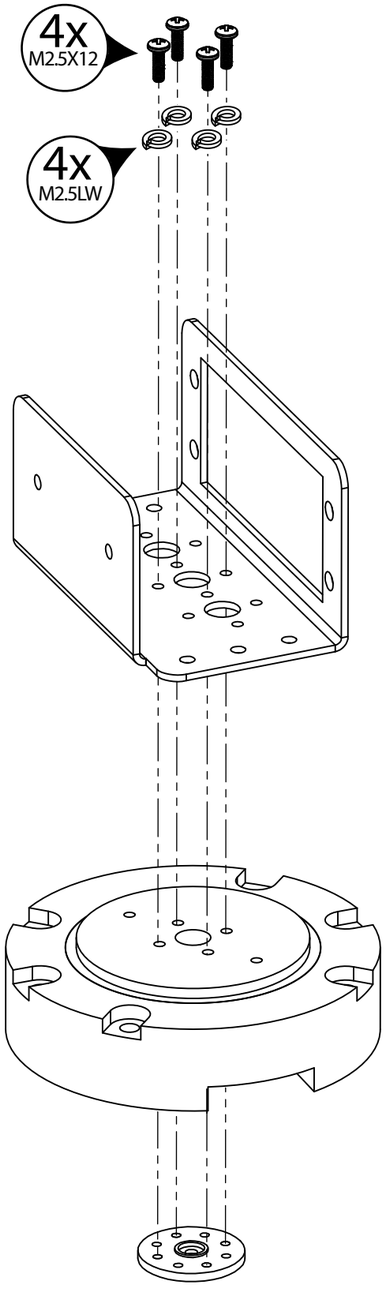

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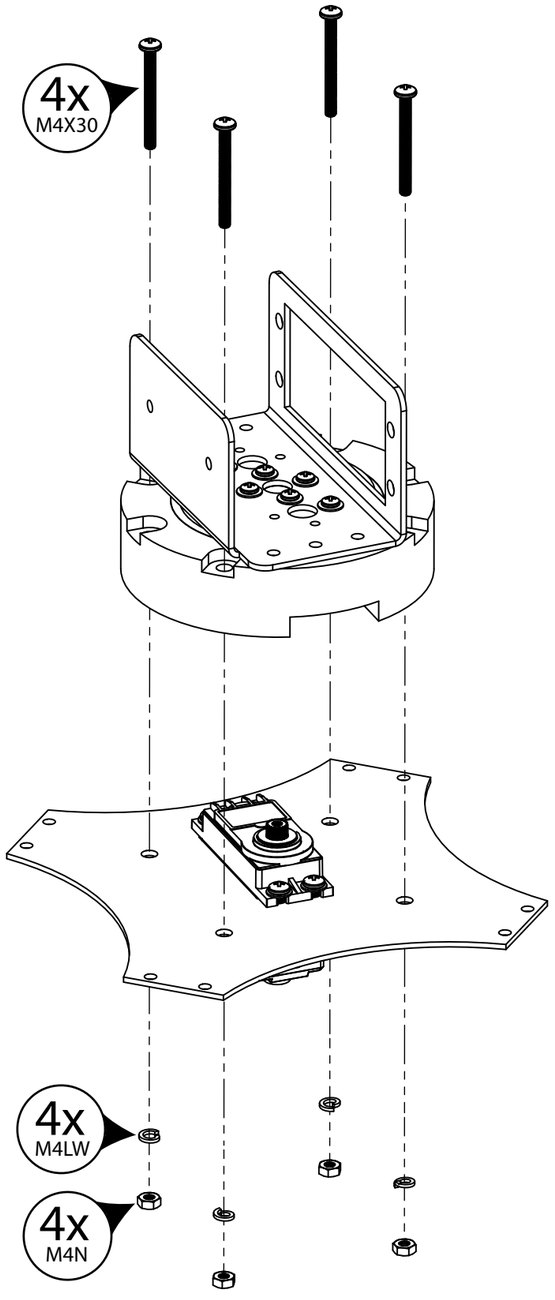

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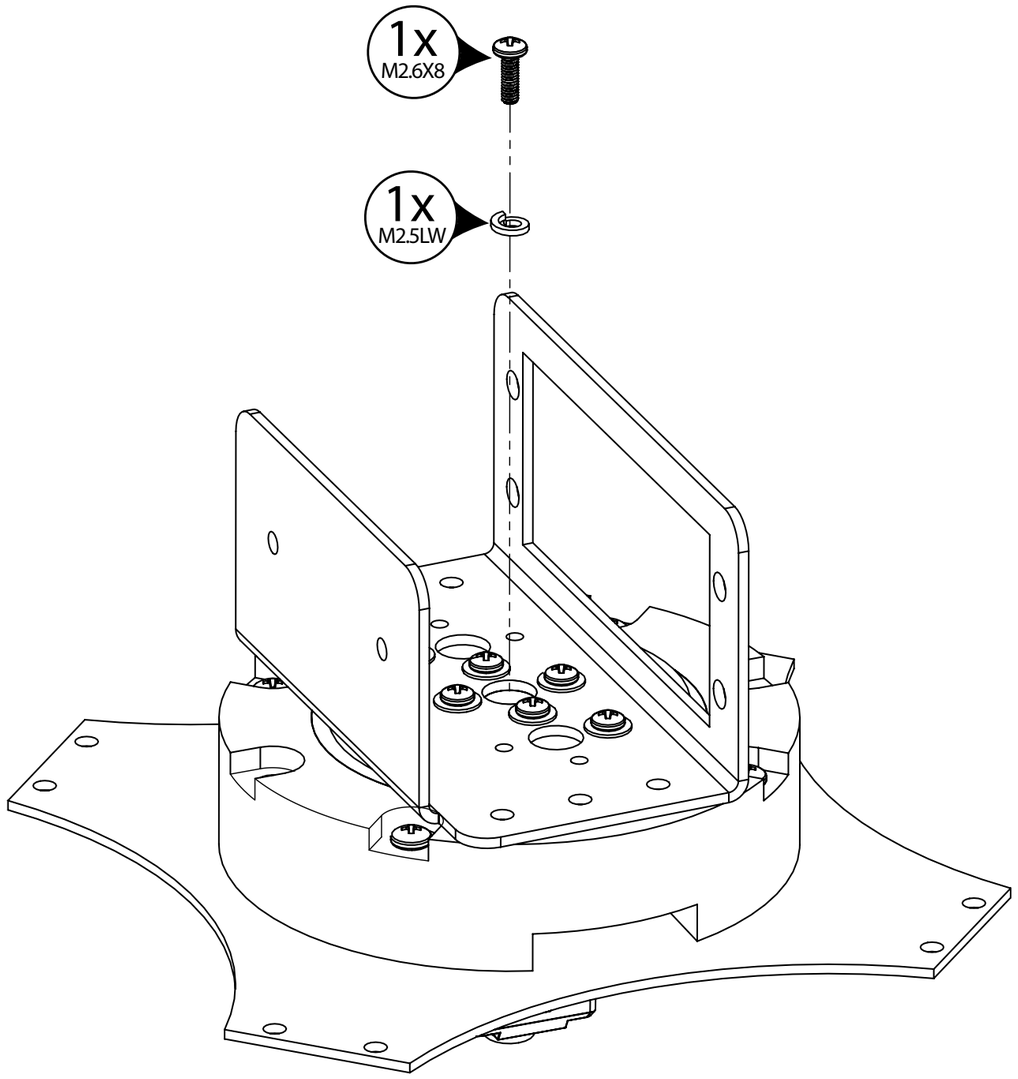

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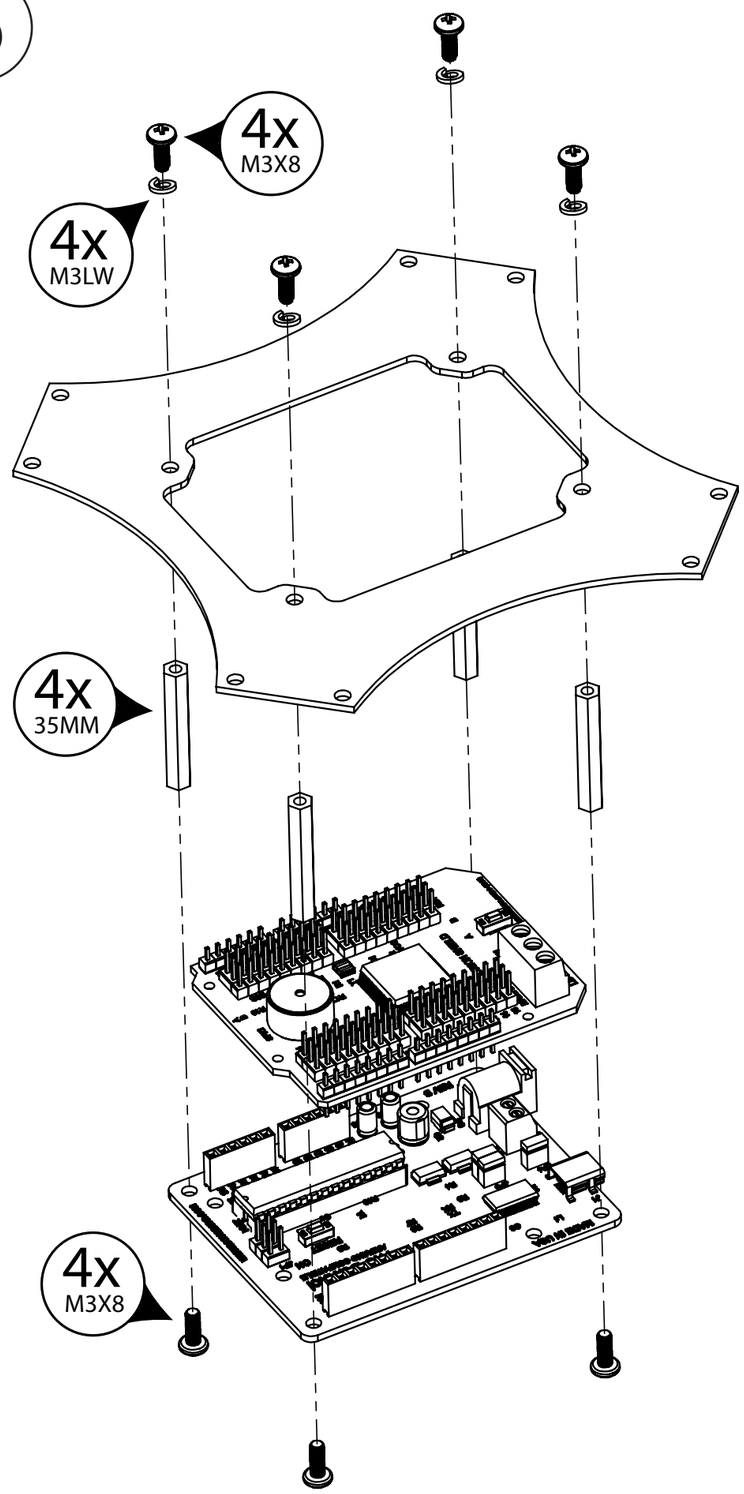

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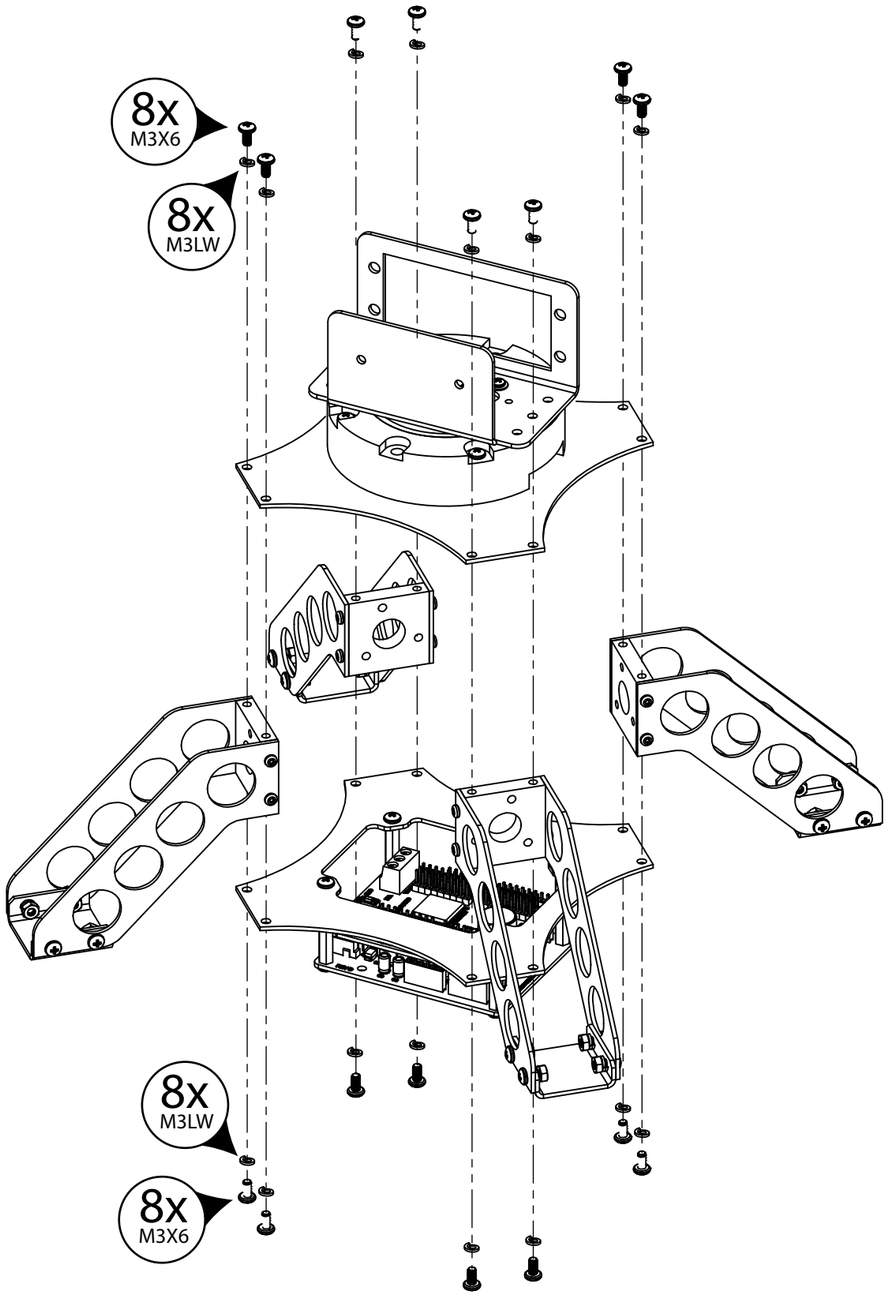

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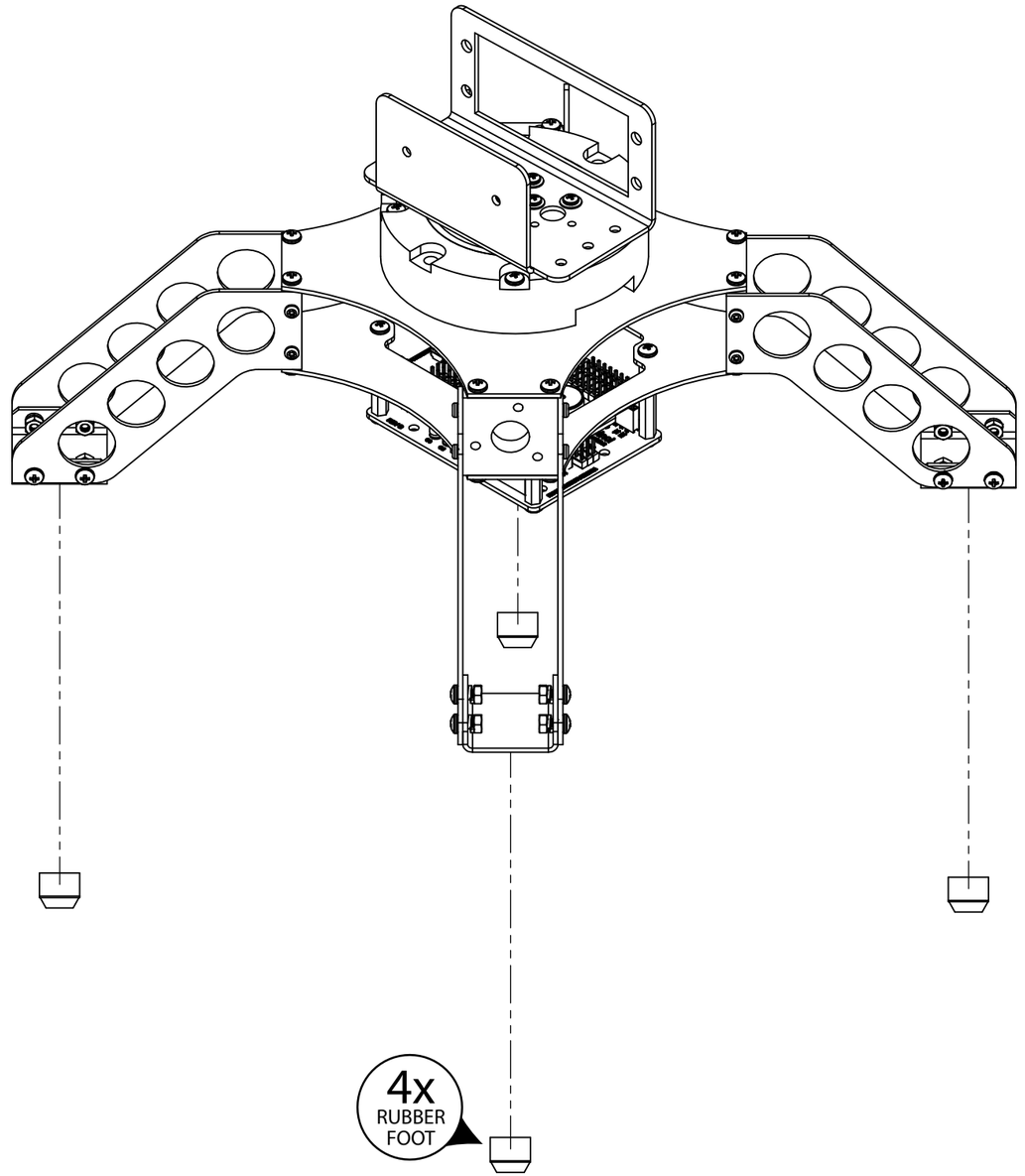

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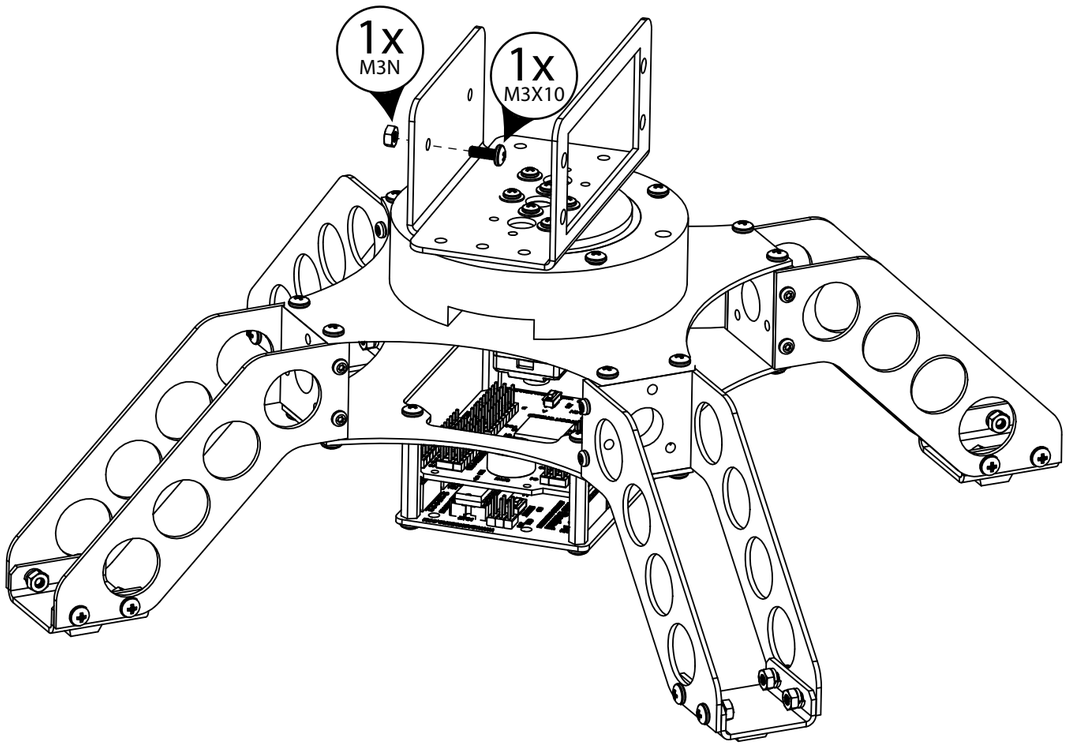

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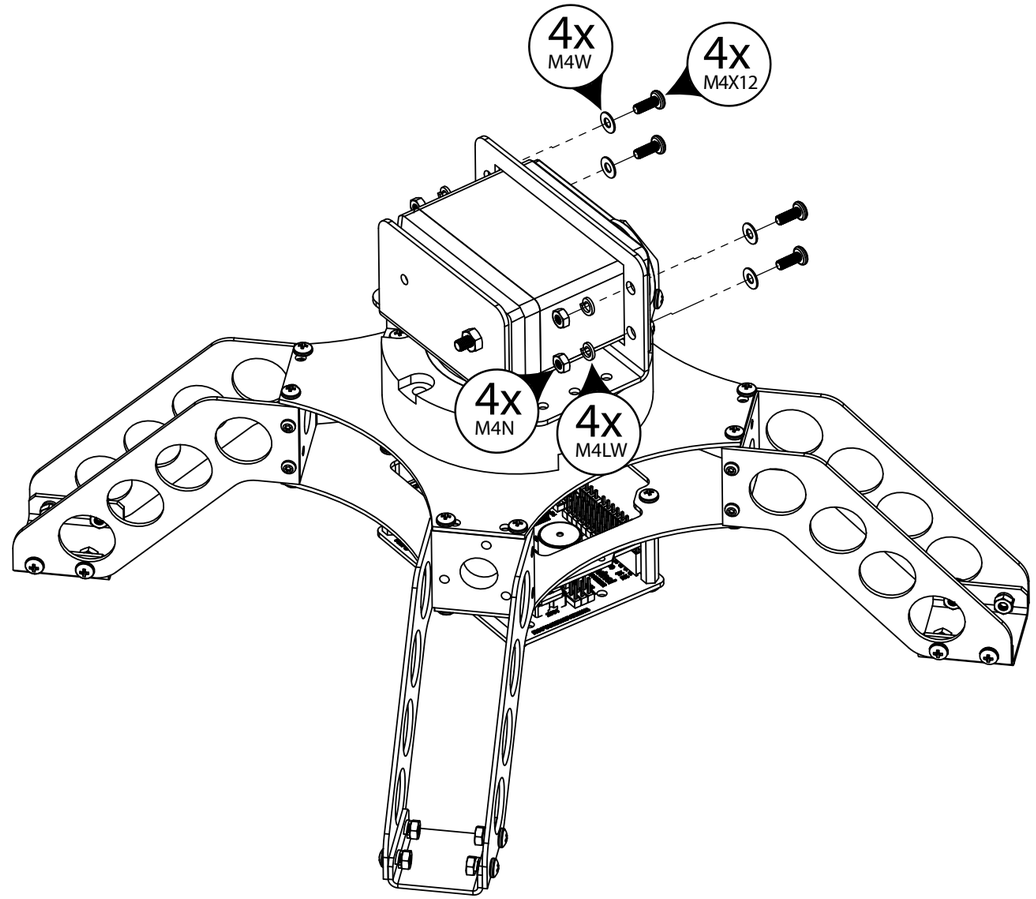

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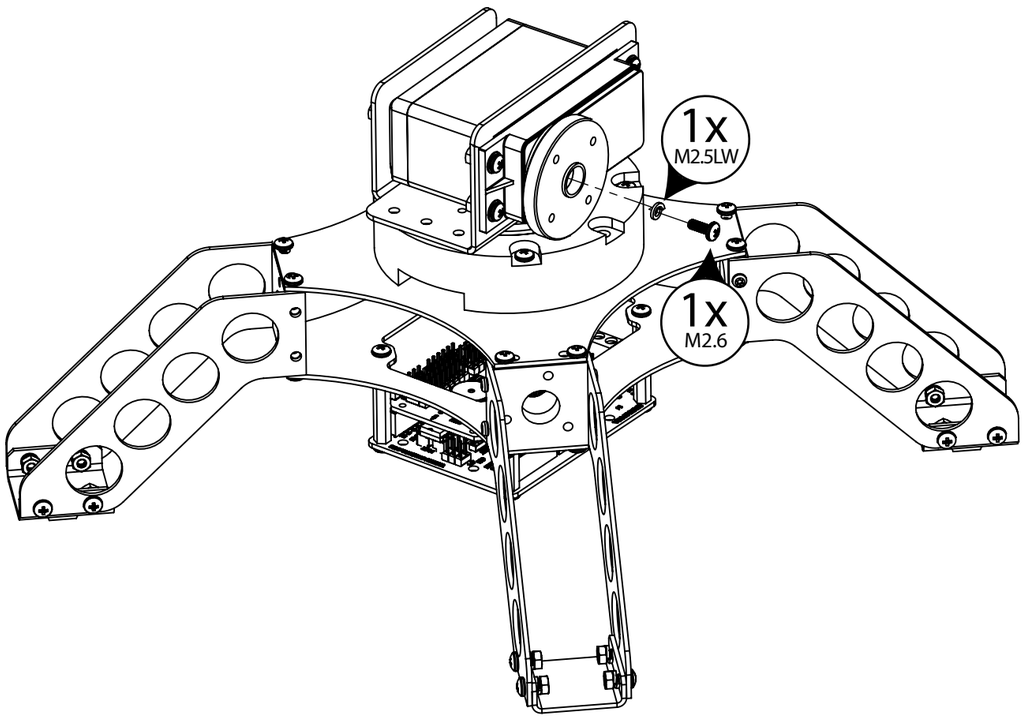

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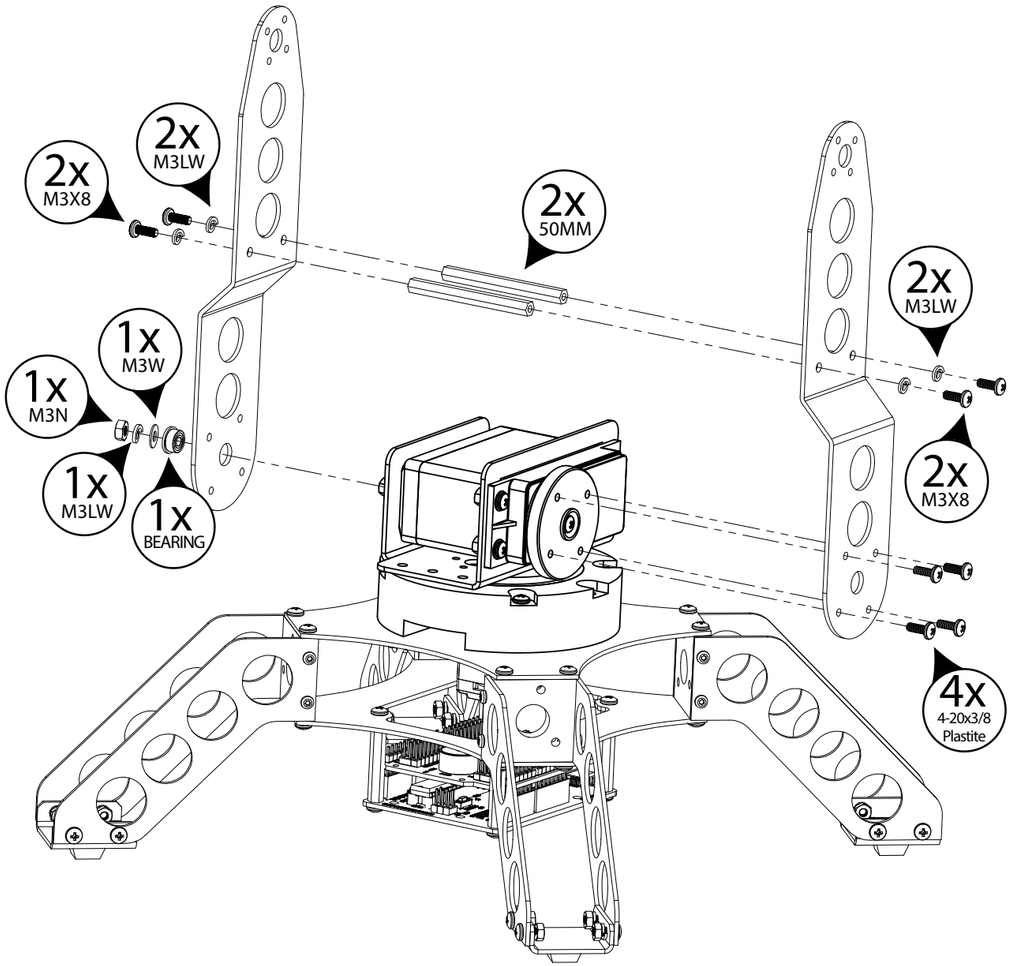

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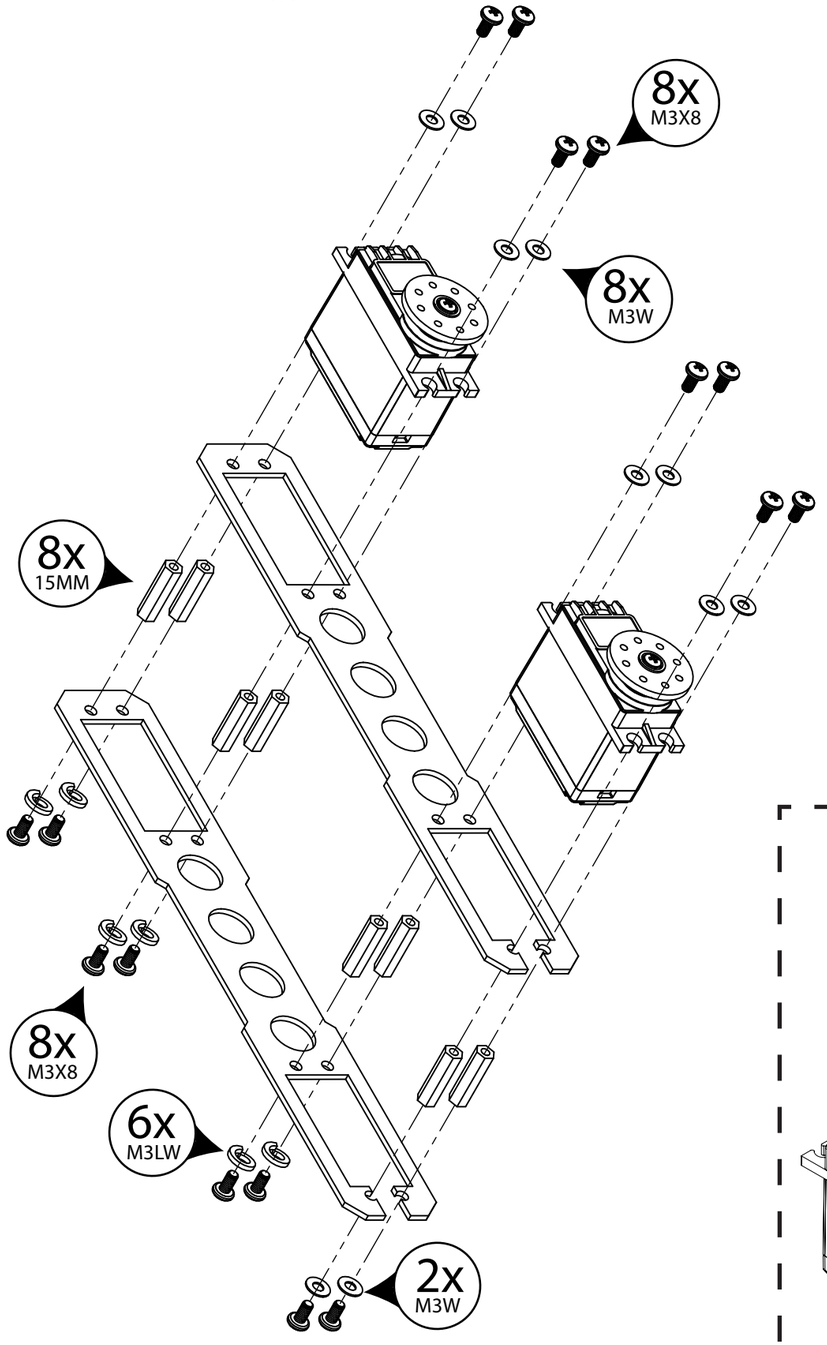

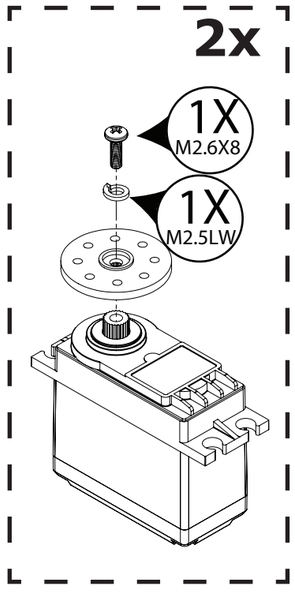

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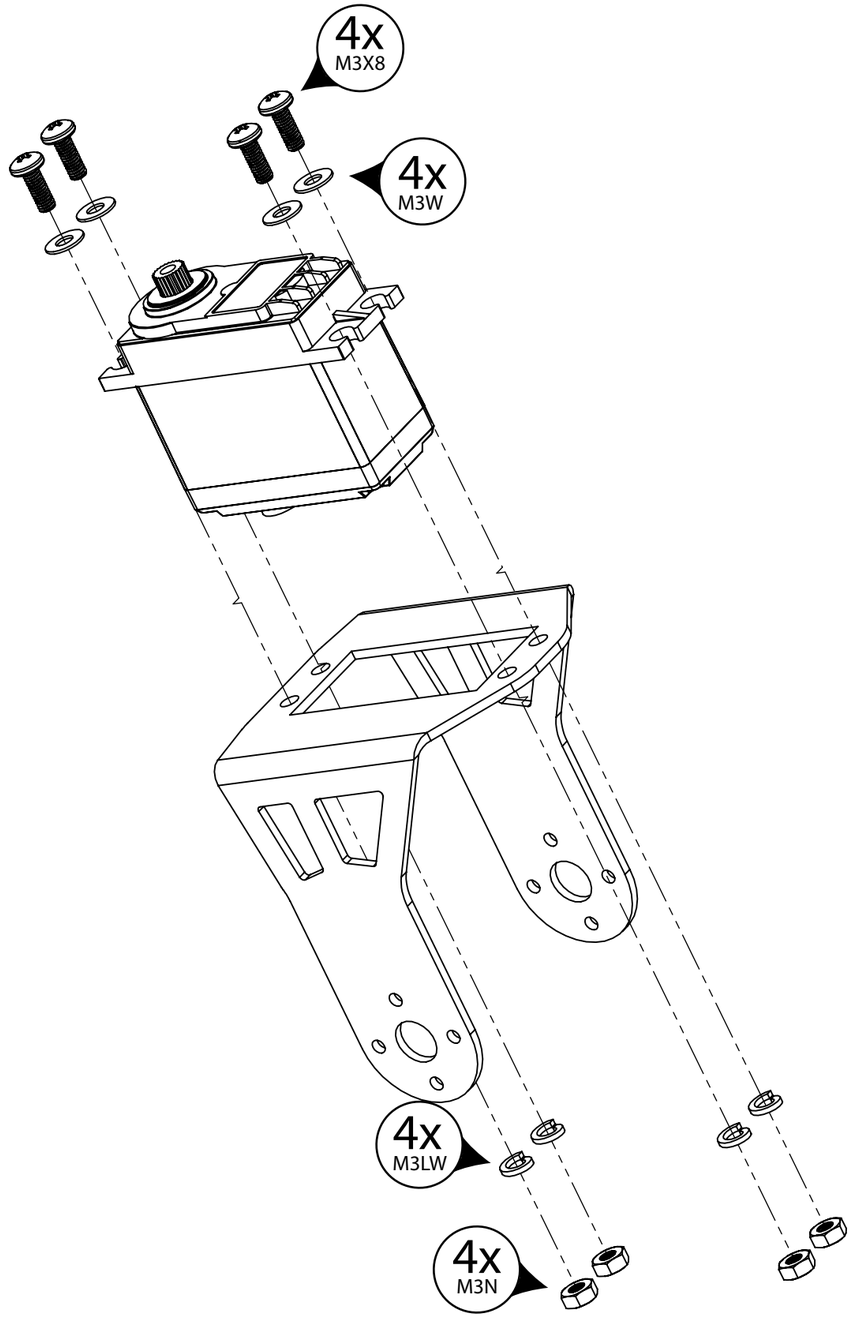

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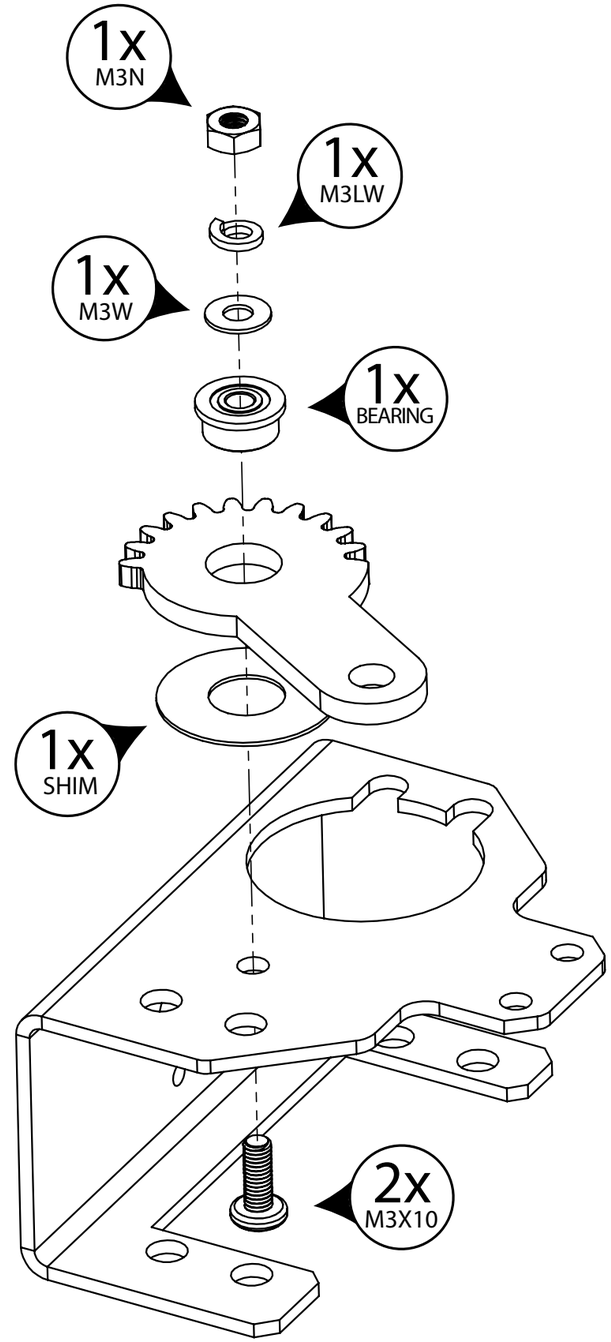

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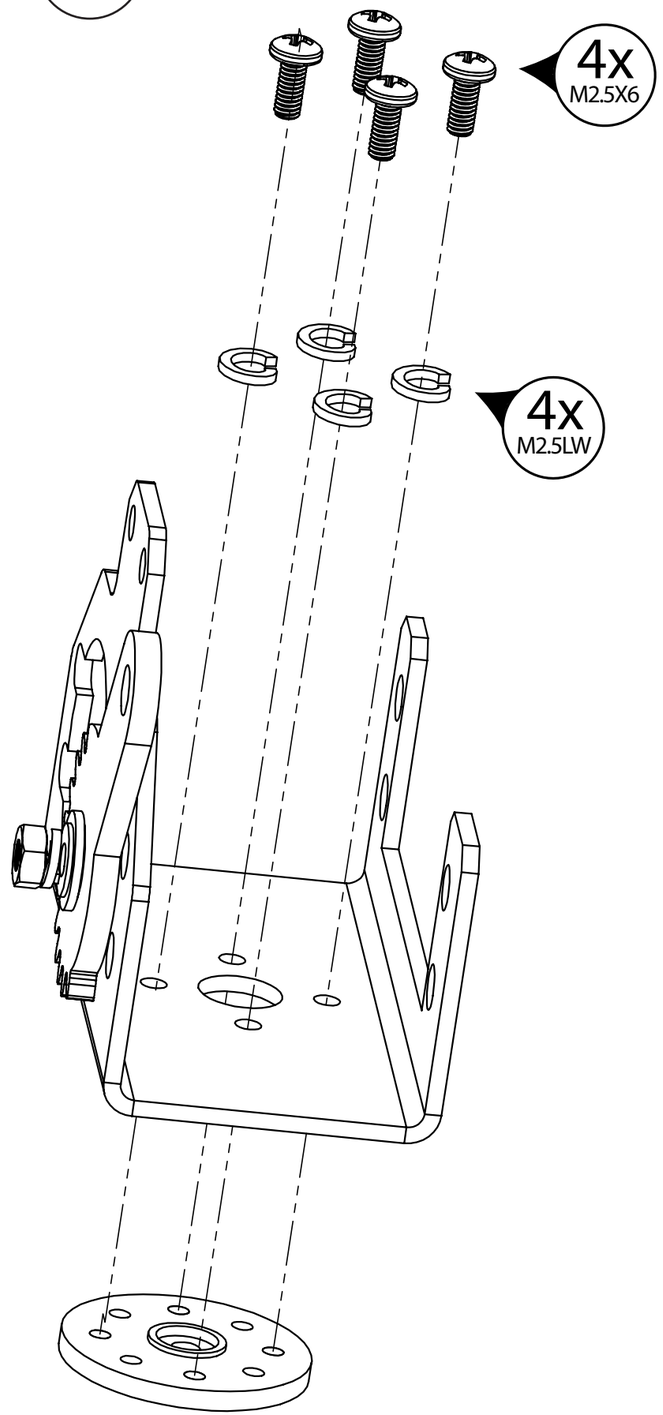

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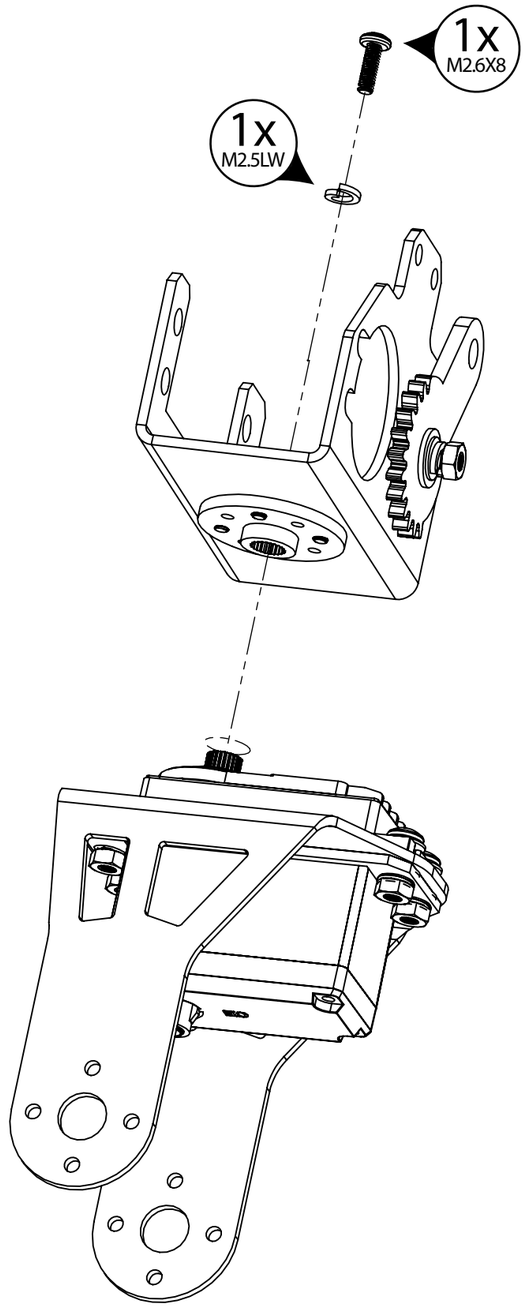

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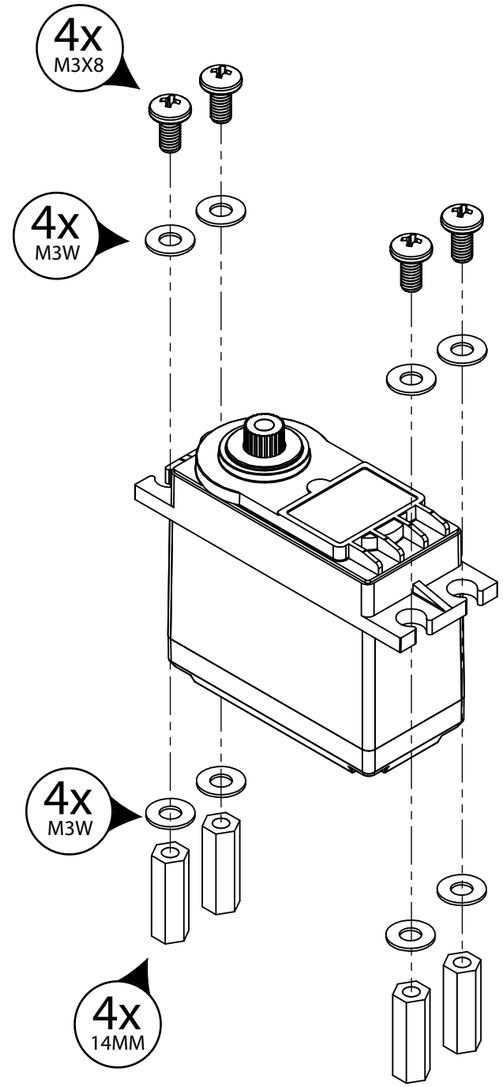

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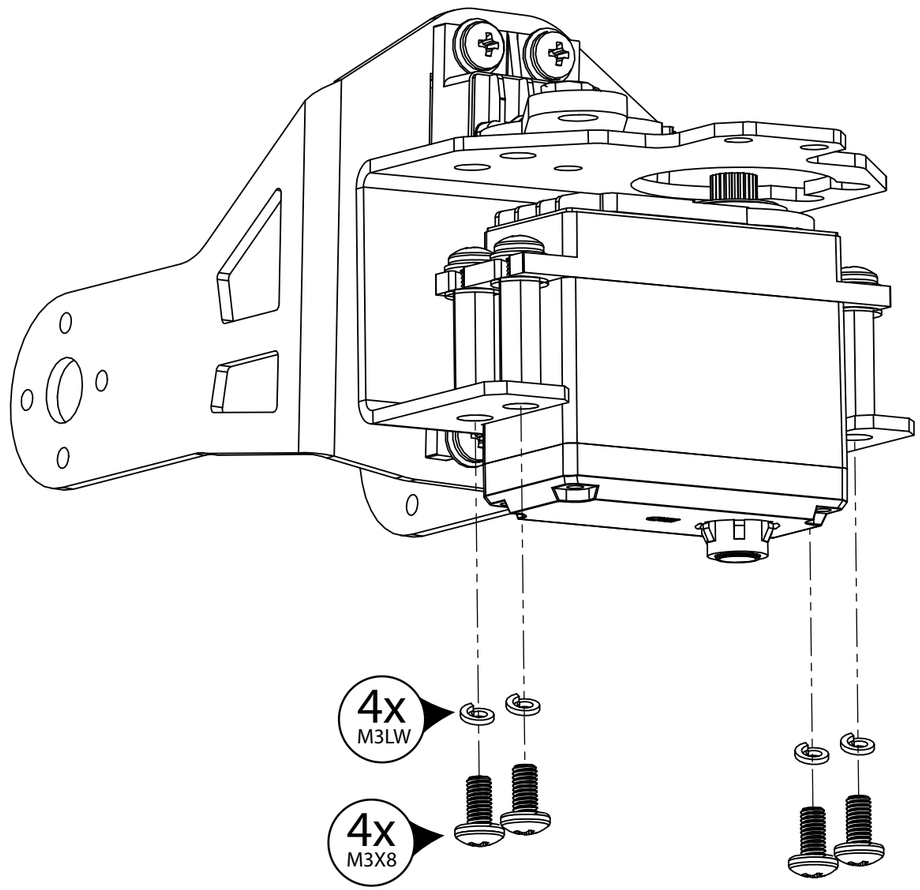

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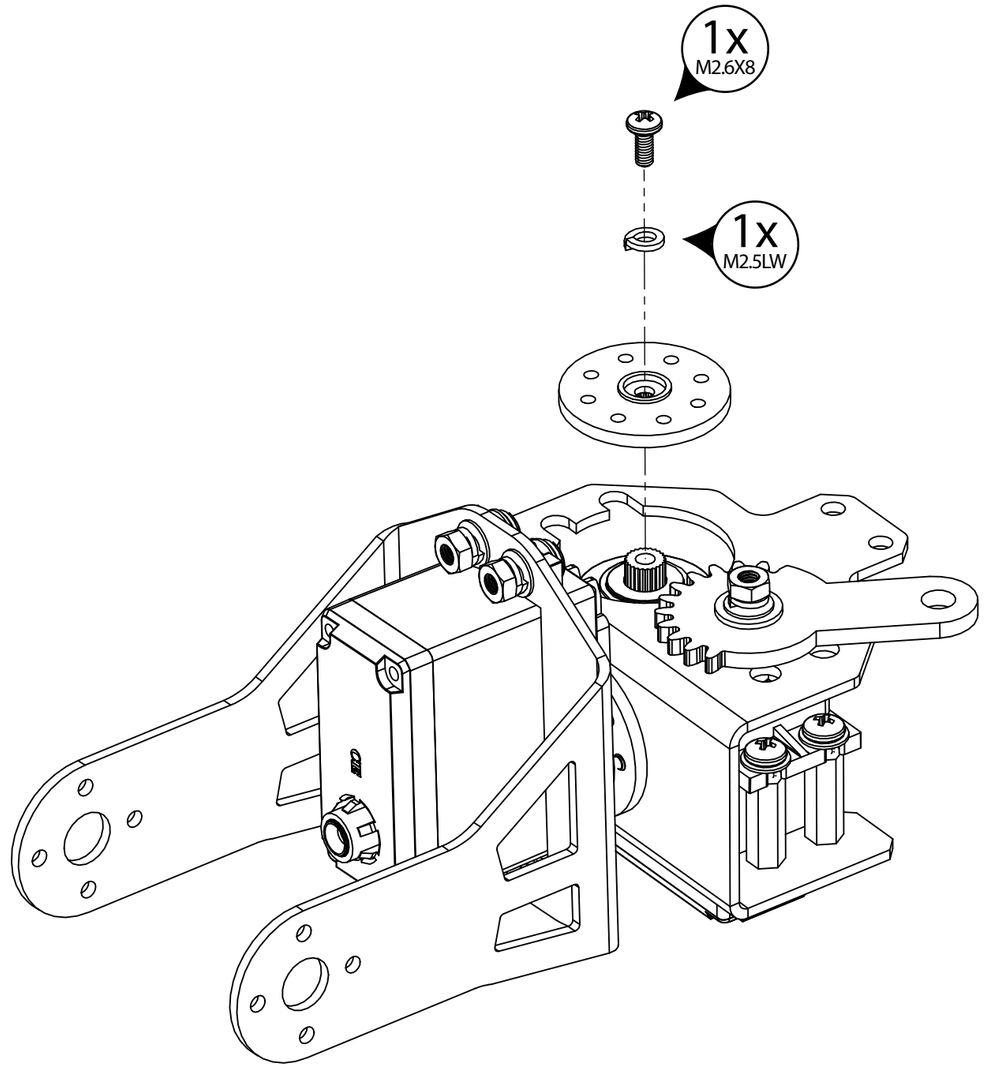

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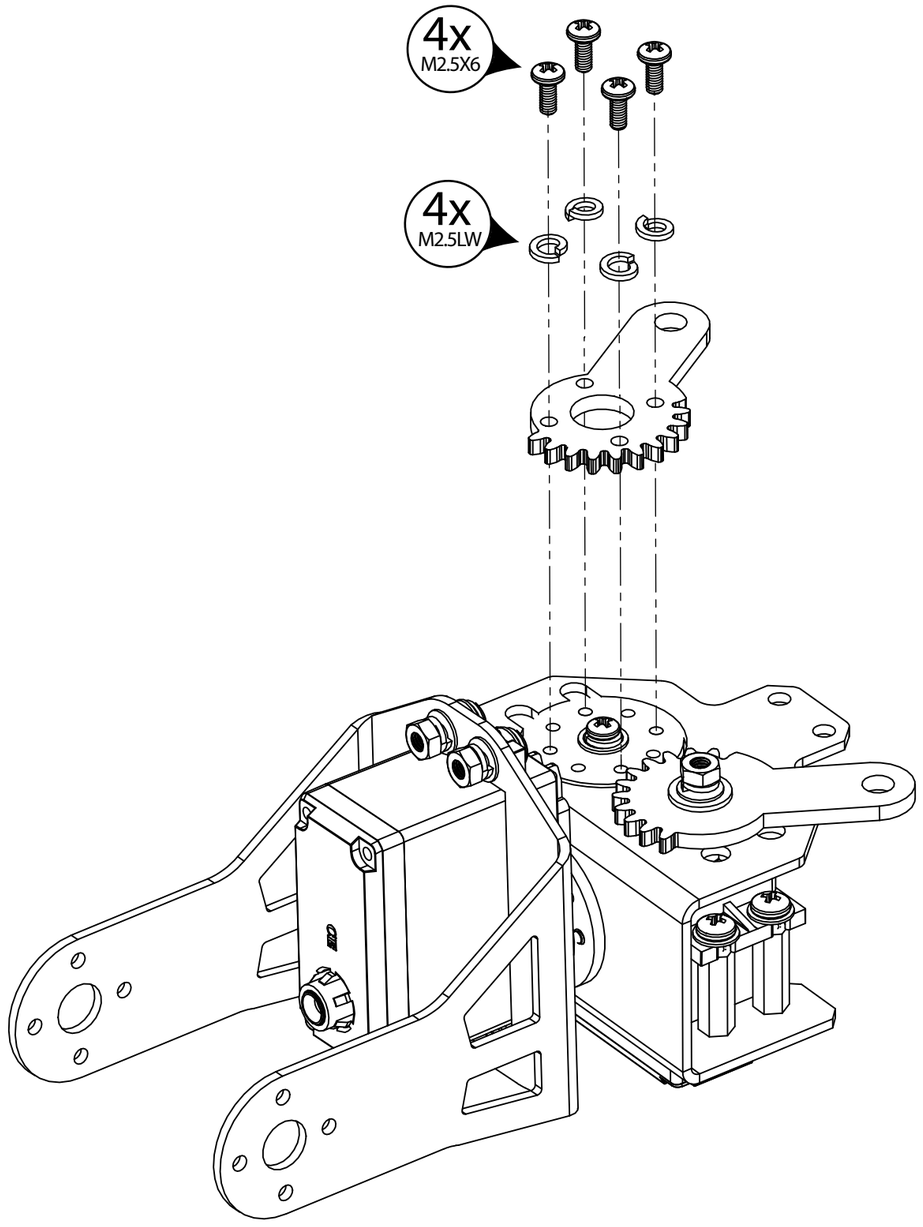

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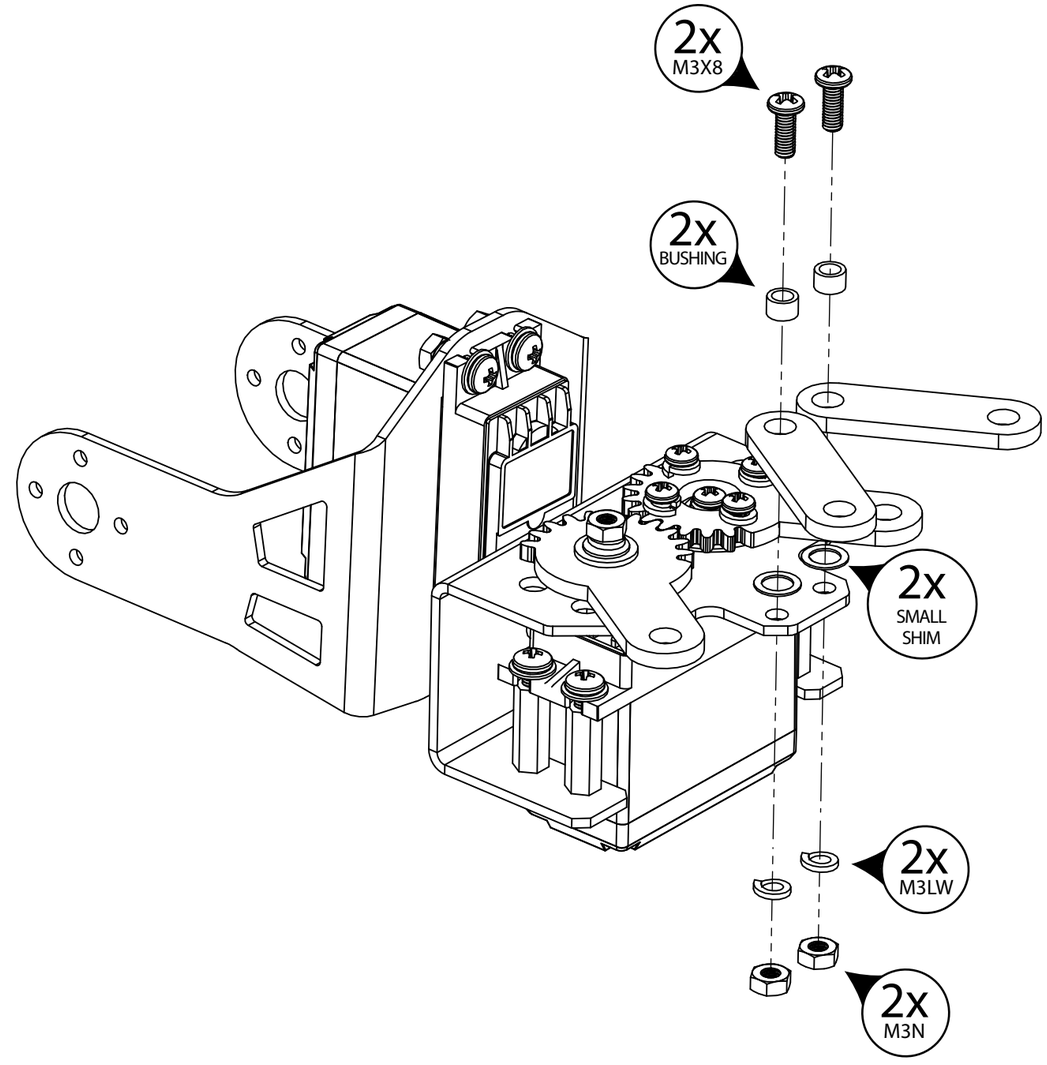

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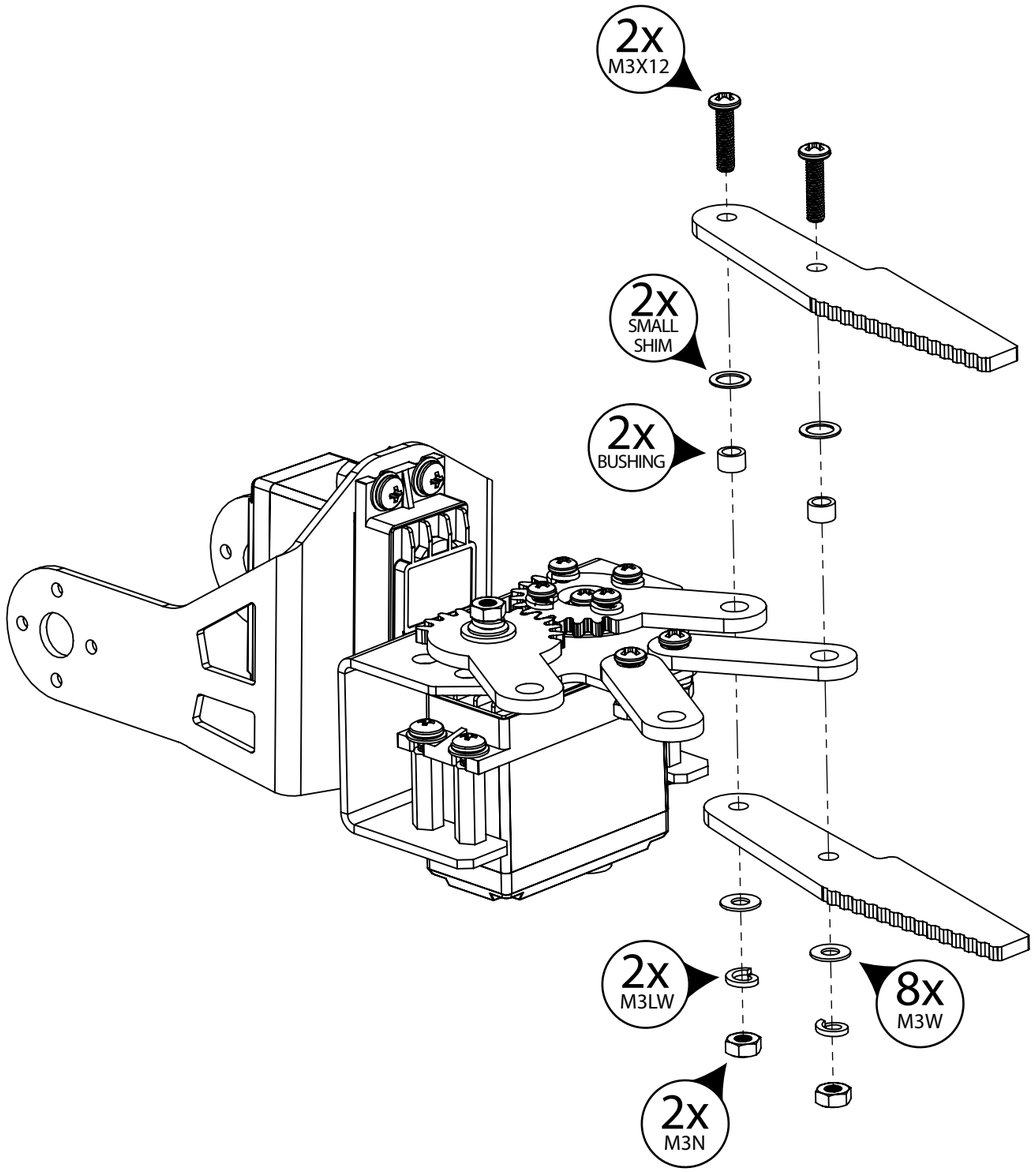

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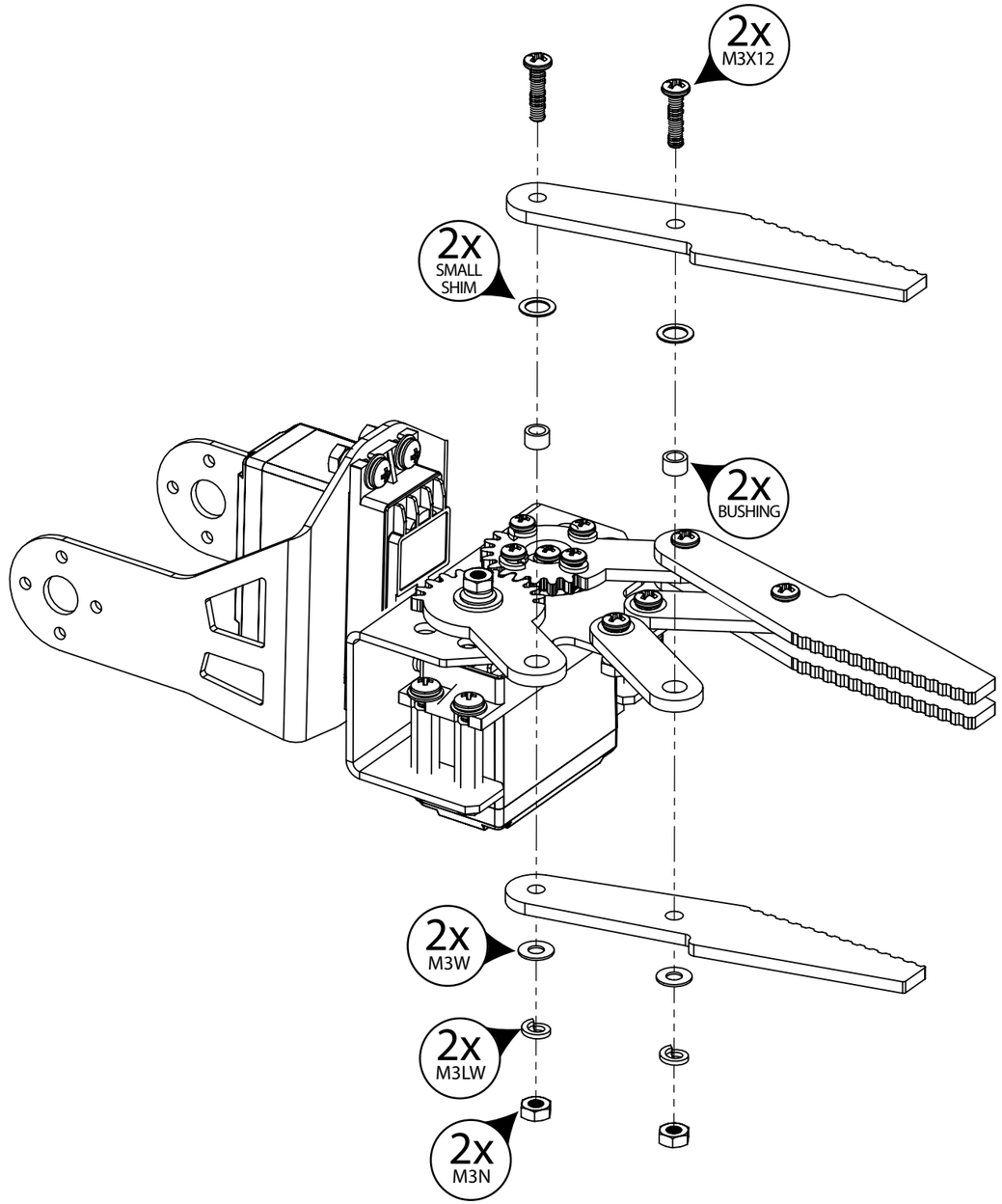

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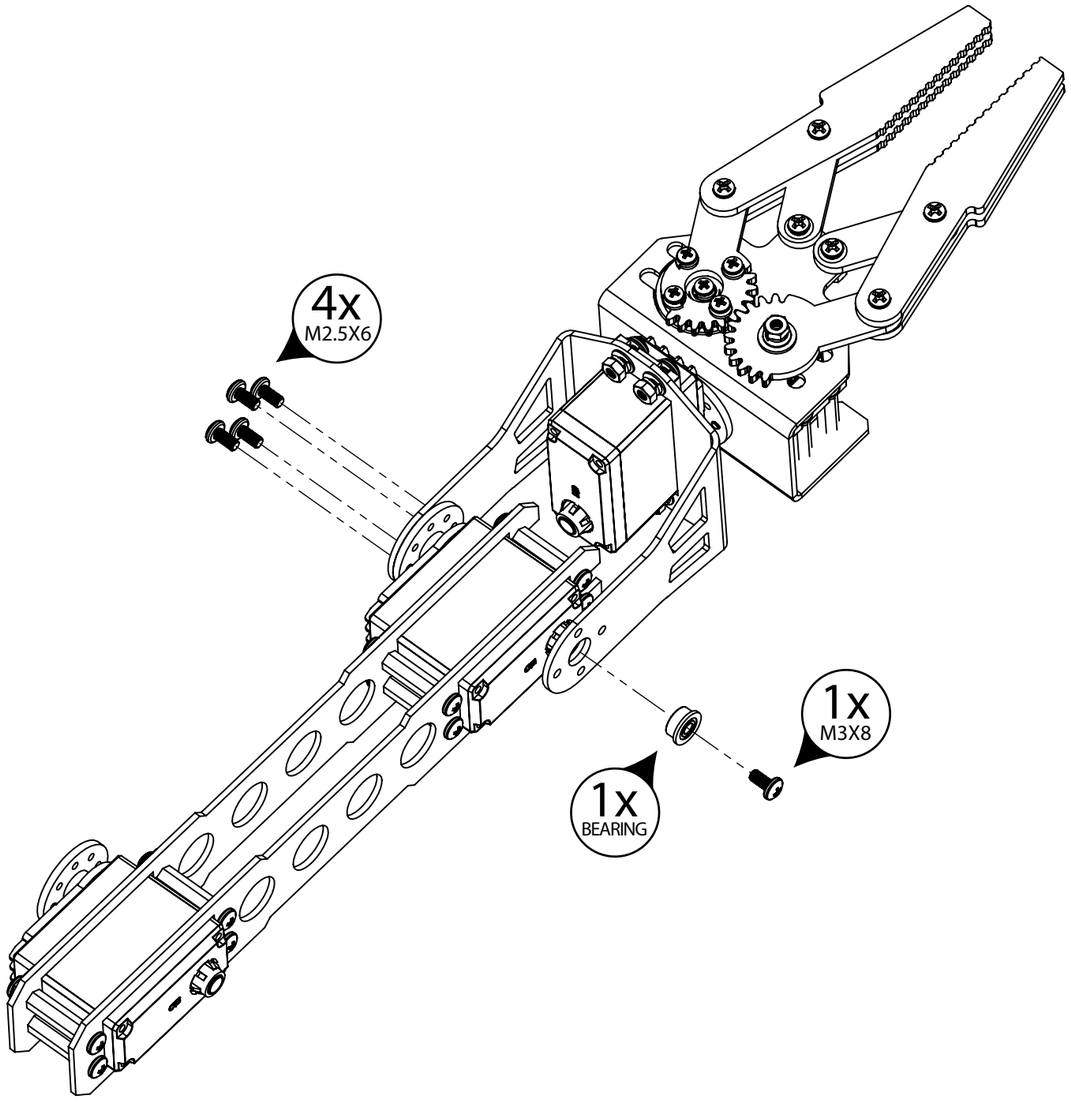

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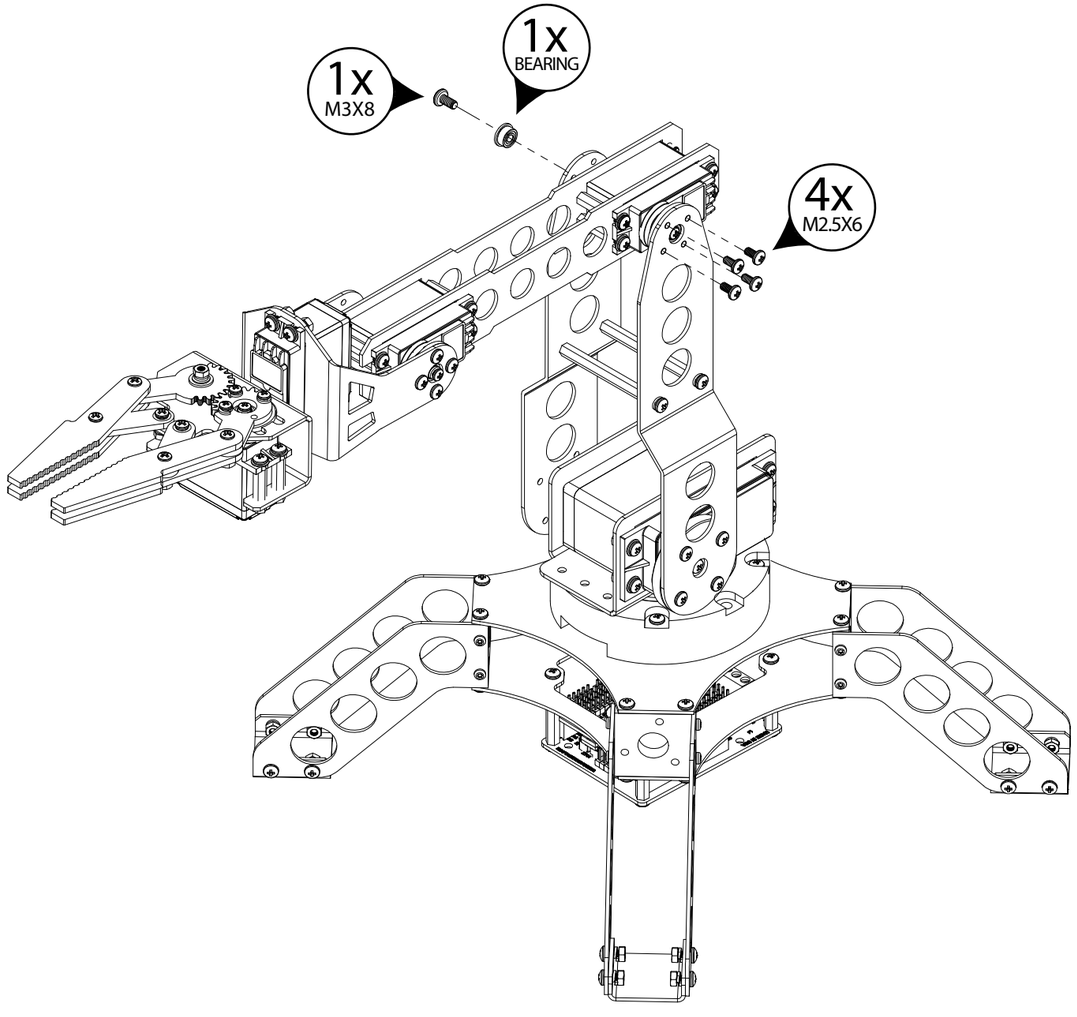

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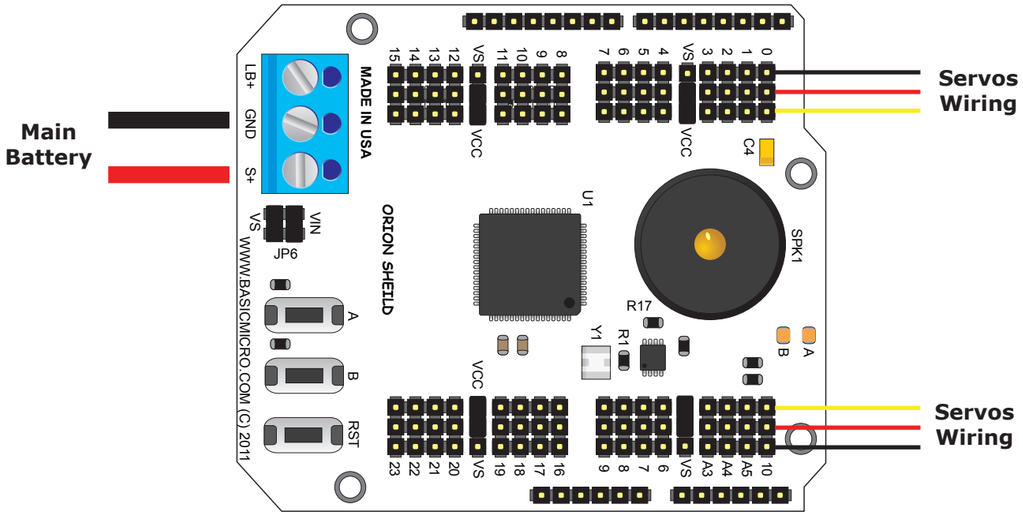
Servo Wiring
After the mechanical assembly of the robot is done all the servo need to be routed to the control electronics. The control electronics has no idea which servos is where on the robot. A default wiring configuration is provided in the main program loop. The robot has to be wire based on the default configuration. This configuration can be changed. However it is not recommended unless you fully understand what your doing.

Servo Wire Routing
When routing servo wires it is important to ensure the wire has enough slack to accommodate the robots full range of movements. You can use the zip ties to secure each servo cable. Some servos will require an extension cable which has been provided. When securing the servo wire make sure it is not on the edge of a bracket or in an area where over the time the servo wire can be damaged.

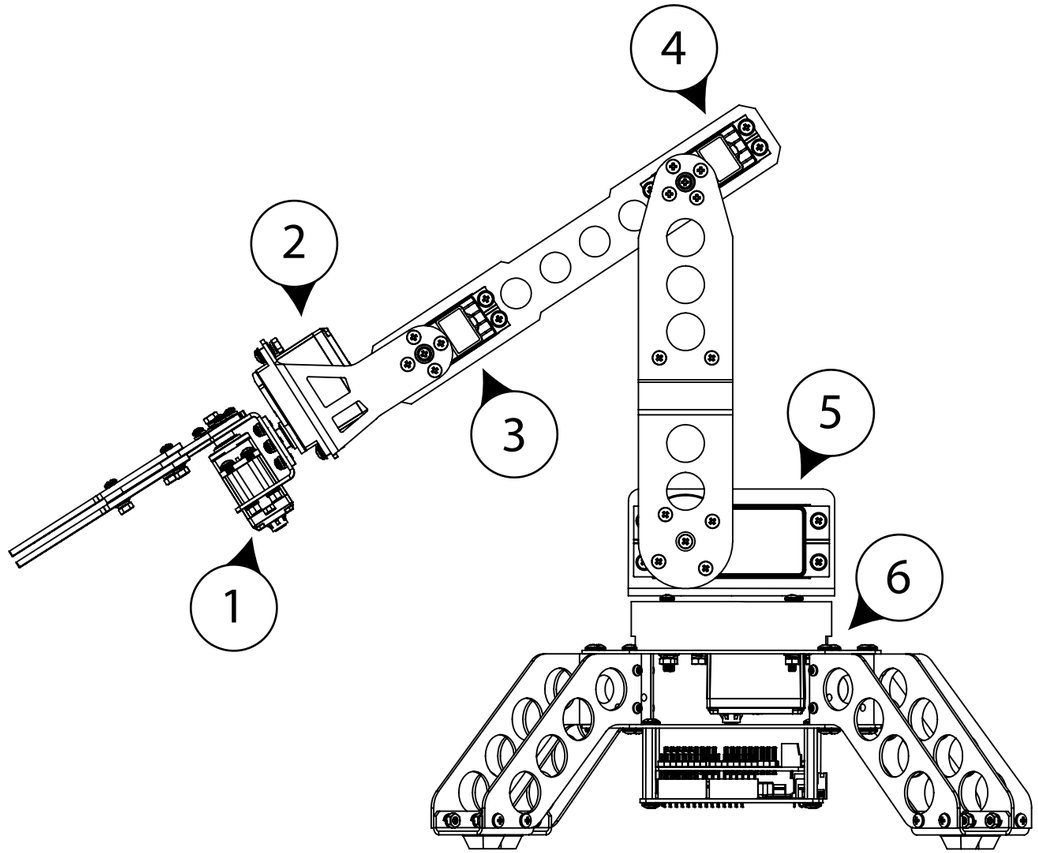
Orion Setup
Set all the VS / VCC jumpers to VS. This puts the main input voltage (VIN) on the servo power pin. For most configurations wire the main battery to GND / S+. Make sure JP6 are jumpered in the correct orientation. JP6 combines the logic power and servo power. This minimizes wiring. In some applications you make need to supply a separate logic battery. This is caused by the servos drawing to much power for a brief period and the battery drops out. Which then causes logic to reset.



Servo Names
The servo names are referenced in the program code and are used to set which servo header is used to control a given servo.

Wiring Table

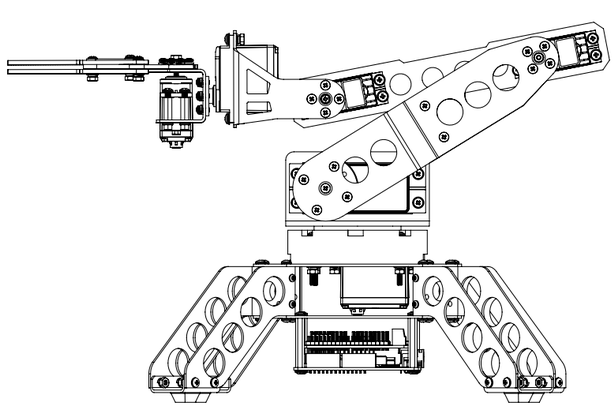
Name	Number	Orion Header
Gripper	1	0
Wrist Rotate	2	1
Wrist	3	3
Elbow	4	4
Shoulder	5	5
Base	6	6
PS2		Arduino 6

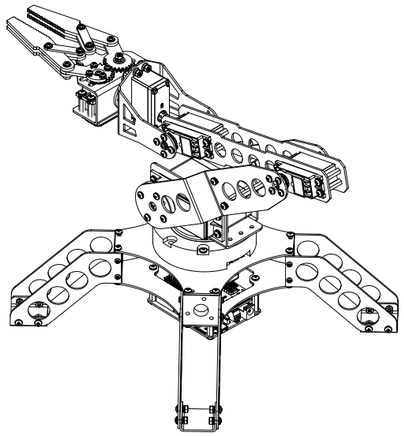


Enter Calibration Mode
Press the Select button to enter Calibration mode. All servos will deactivate when Calibration Mode is started.

Calibrate Joint Positions
Press the Green/Triangle button to start position calibration. You will hear a beep when pressing the button which indicates the robot is ready for you to adjust the positions.

Move the robot arm joints so they match the diagrams below.
Press the Start button to save the settings or press Select to cancel.





Calibrate Joint Ranges (HV220 only)
Press the Blue/Cross button to start range calibration. You will hear a beep when pressing the button which indicates the robot is ready for you to adjust the positions.

Rotate each joint within its full range. The robot microprocessor is tracking these movements and calculating the maximum range for each joint. For example rotate the wrist rotate joint clockwise until it stops and then counter clockwise until it stops. Repeat on the other 4 joints and gripper. Press the Start button to save or Select to cancel.

Exit Calibration Mode
Press the Red/Circle button to exit from Calibration mode.

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Warranty
Basic Micro warranties its products against defects in material and workmanship for a period of 90 days. If a defect is discovered, Basic Micro will, at our discretion, repair, replace, or refund the purchase price of the product in question. Contact us at support@basicmicro.com. No returns will be accepted without the proper authorization.

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Contacts

Email: sales@basicmicro.com
Tech support: support@basicmicro.com
Web: http://www.basicmicro.com

Discussion List
A web based discussion board is maintained at http://www.basicmicro.com**.**

Technical Support
Technical support is made available by sending an email to support@basicmicro.com. All email will be answered within 48 hours. All general syntax and programming questions, unless deemed to be a software issue, will be referred to the on-line discussion forums.

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