2025-26 REV DUO FTC Starter Bot Build Guide

SKU	Name	QTY	SKU	Name	QTY
REV-41-1365	#25 Roller Chain - 56 Link Loop	4	REV-41-1319	15mm Plastic Servo Bracket	1
REV-41-1267	90mm Grip Wheel	4	REV-41-1307	15mm Plastic 45 Degree Bracket	8
REV-41-1354	90mm Traction Wheel	2	REV-31-1302	12V Slim Battery	1
REV-41-1615	UltraPlanetary Female 5mm Hex Output V2	3	REV-41-1317	15mm Bearing Pillow Block	2
REV-41-1607	UltraPlanetary 550 Motor Plate	3	REV-41-1433	15mm Metal Bent Core Hex Motor Bracket V2	1
REV-41-1291	HD Hex Motor No Gearbox	3	REV-41-1623	UltraPlanetary Bent Mounting Bracket	2
REV-41-1608	UltraPlanetary 550 Motor Pinion Gear - 13 Tooth	3	REV-41-1315	15mm Gearbox Motion Bracket	1
REV-41-1603	UltraPlanetary Cartridge - 5:1	2	REV-41-1431	15mm Extrusion - 225mm - 90° Ends	8
REV-41-1602	UltraPlanetary Cartridge - 4:1	2	REV-41-1432	138mm cut from - 15mm Extrusion - 420mm - 90° Ends	2
REV-41-1609	UltraPlanetary Hardware Pack	3	REV-41-1432	154mm cut from - 15mm Extrusion - 420mm - 90° Ends	2
REV-41-1348	5mm x 90mm Hex Shaft	6	REV-41-1432	90mm cut from - 15mm Extrusion - 420mm - 90° Ends	2
REV-41-1326	Through Bore Bearing - Short	14	REV-41-1568	15mm Extrusion - 120mm - 90° Ends	2
REV-41-1305	15mm Plastic 90 Degree Bracket	23	REV-41-1318	15mm Plastic Variable Angle Bracket	4
REV-41-1492	M3 Standoff - 40mm	8	REV-41-1360	M3 x 16mm Hex Cap Screw	18
REV-41-1762	45mm x 15mm C Channel - 408mm	4	REV-41-1432	266mm cut from - 15mm Extrusion - 420mm - 90° Ends	1
REV-41-1324	3mm Spacer	19	REV-41-1303	15mm Plastic Motion Bracket	2
REV-41-1702	Tensioning Bushing - 39mm	8	REV-41-1311	15mm Plastic 120 Degree Bracket	3
REV-41-1338	10 Tooth #25 Sprocket	8	REV-41-1820	Aluminum Double Servo Arm	1
REV-41-1327	Shaft Collars	38	REV-41-3334	Smart Robot Servo V2 - Balanced (REV-41-3334)	1
REV-41-1190	90mm Omni Wheel	2	REV-41-2702	Medium (Dark Gray) - 5mm Hex Bore - Flap Wheel	2
REV-41-1329	Through Bore Bearing - Long	6	REV-41-1337	90 Tooth Plastic Gear	4
REV-41-1687	U Channel Endcap	4	REV-41-1683	5mm Hex Bearing Block	1
REV-41-1323	15mm Spacer	2	REV-41-2150	Soft (Light Gray) - 5mm Hex Bore - 1in Grip Wheel	3
REV-41-1621	UltraPlanetary Outside Mounting Bracket	2	REV-41-1300	Core Hex Motor	1
REV-41-1767	45mm x 15mm C Channel - 248mm	1	REV-41-1362	5mm x 400mm Hex Shaft	2
REV-41-1432	15mm Extrusion - 420mm - 90° Ends	7	REV-41-1839	Centering Guides cut from Corrugated Plastic Sheet	2
REV-41-1359	M3 x 8mm Hex Cap Screw	411	REV-41-1163	Surgical Tubing - 3mm	4
REV-41-1361	M3 Nyloc Nut	351	REV-41-1839	Hood Connector cut from Corrugated Plastic Sheet	1
REV-41-1321	15mm Plastic Lap Corner Bracket	24	REV-41-1161	Zip Ties - Black - 160mm	32
REV-41-1320	15mm Plastic Inside Corner Bracket	15	REV-41-1839	Lower Hood cut from Corrugated Plastic Sheet	1
REV-31-1387	Switch Cable and Bracket	1	REV-41-1839	Hopper Side cut from Corrugated Plastic Sheet	1
REV-31-1595	Control Hub	1	REV-41-1839	Upper Hood cut from Corrugated Plastic Sheet	1
REV-41-1166	Battery Holder Plate	2	REV-41-1839	Hopper Backing cut from Corrugated Plastic Sheet	1

Cut List

Extrusion can be cut with either a hand-held hacksaw or with a band saw. Be sure that the pieces are properly secured, ideally with clamps, before cutting. Using a circular or chop saw is NOT recommended.

Cut from 15mm Extrusion - 420mm - 90° Ends

Length	QTY	Assembly
138 mm	2	Launcher
90 mm	2	Launcher
154 mm	2	Launcher
266 mm	1	Launcher

Cut from Corrugated Plastic Sheets

Piece Name	QTY	Assembly
Centering Guides	4	Hood/Hopper
Hopper Backing	1	Hood/Hopper
Hopper Side	1	Hood/Hopper
Upper Hood	1	Hood/Hopper
Hood Connector	1	Hood/Hopper
Lower Hood	1	Hood/Hopper

Corrugated Plastic Cutting and Assembly

Paper Template for Corrugated Plastic

https://www.revrobotics.com/content/docs/StarterBot-Template_25-26.pdf

Related Guides

Chain Tool instructions

https://docs.revrobotics.com/how-to-chain

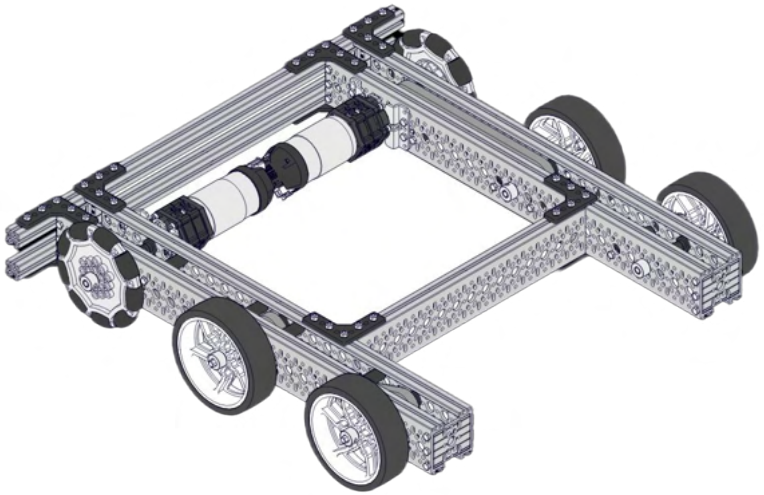
Ultra Planetary Assembly Instructions

http://docs.revrobotics.com/build-up-gearbox

Channel Drivetrain

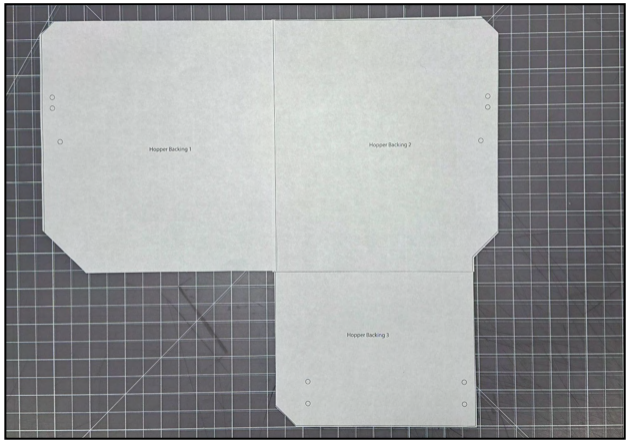
Before beginning this Build Guide, you will need to assemble a Channel Drivetrain. Follow these instructions to build one.

Note: Both the Channel Drivetrain and the 2025-26 REV DUO FTC Starter Bot can be constructed from a FTC Starter Kit V3.1.

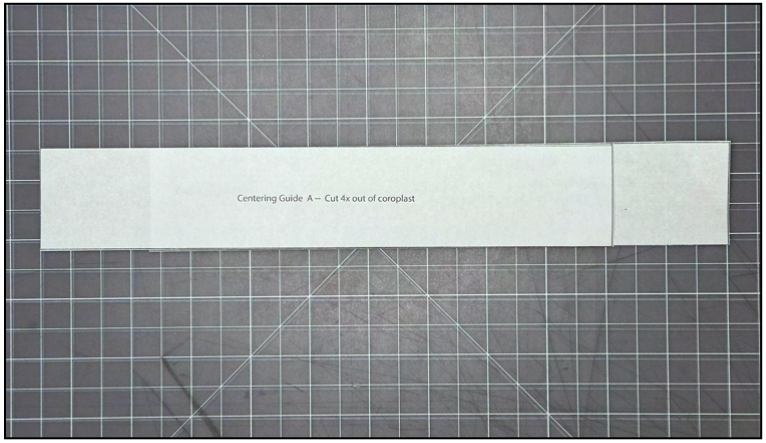


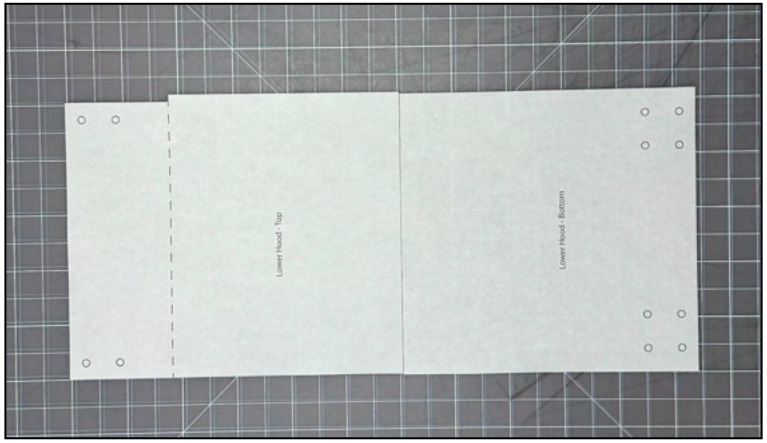
http://docs.revrobotics.com/build-channel-drivetrain

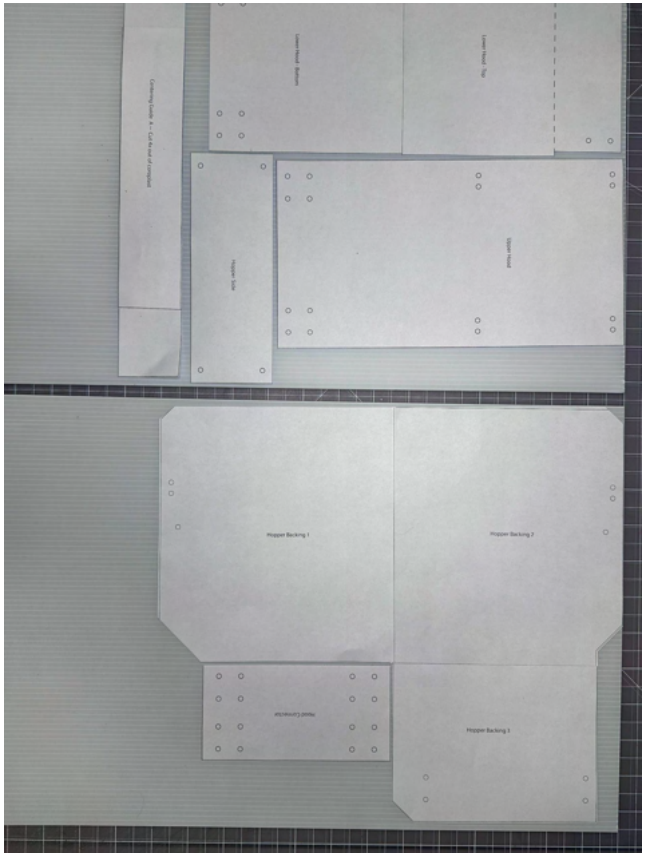
1



Print and cut out the Hooper and Hood Corrugated Plastic template. Tape the pieces together as shown.





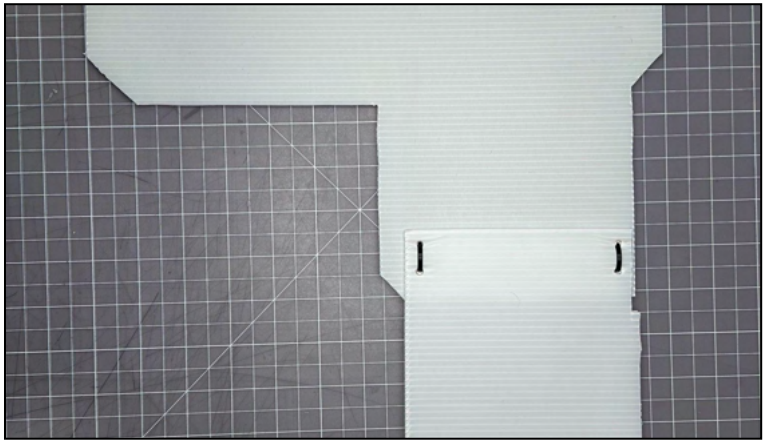


Get

- 2 - Corrugated Plastic Sheet

Align the template guides as shown onto the Corrugated Plastic Sheets. Cut out the Hooper and Hood pieces. Use the Centering Guide to cut four Centering Guide pieces.

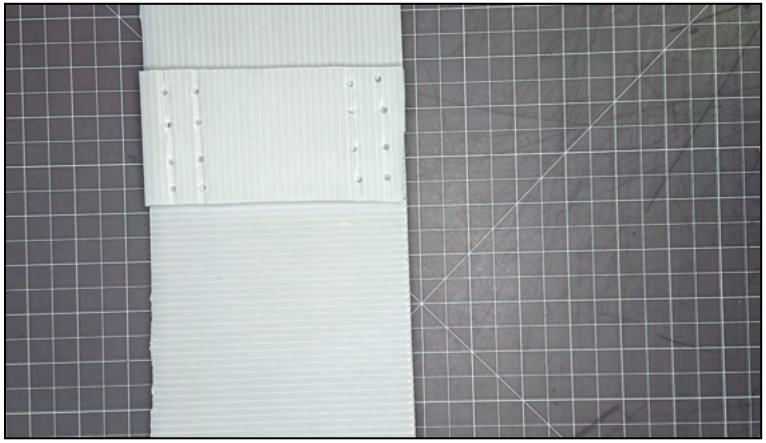
3

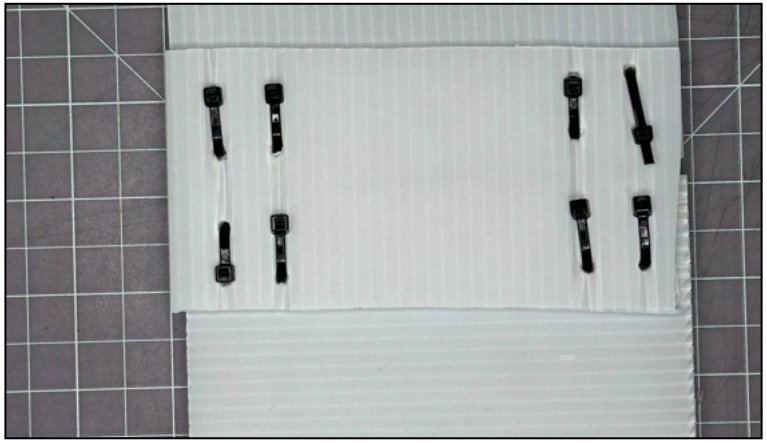


Get

- 10 - Zip Ties - 160mm

Attach the Lower Hood to the Hopper as shown.
Attach the Hood connector to the back of the Lower Hood and Upper Hood as shown.





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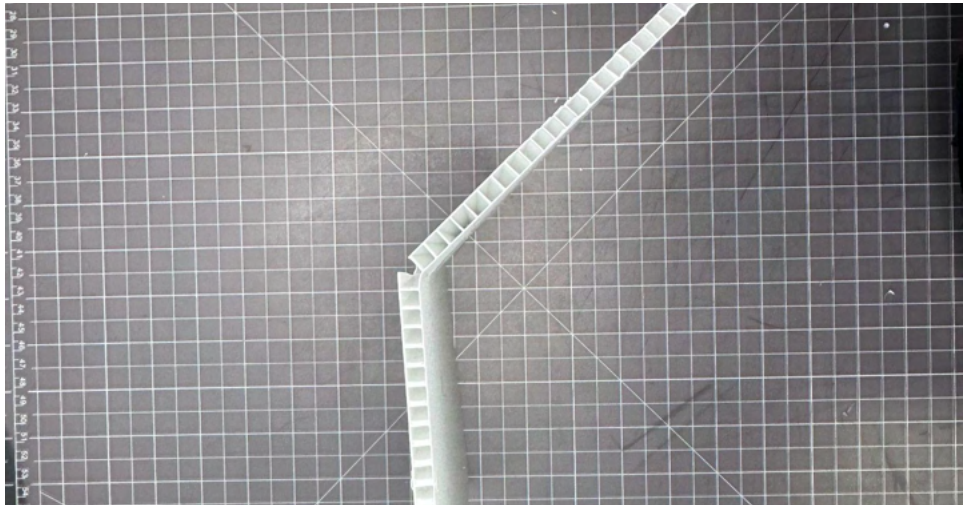
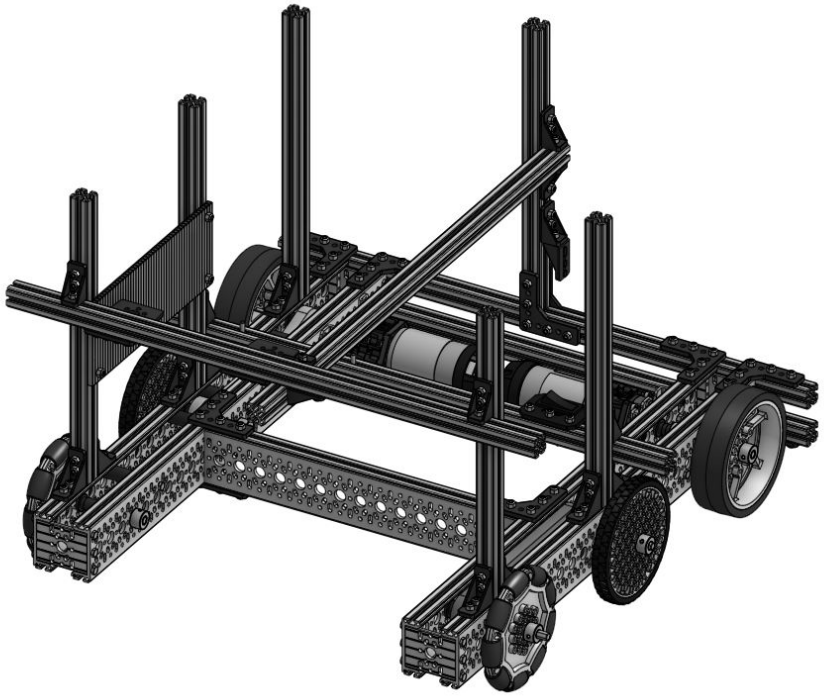
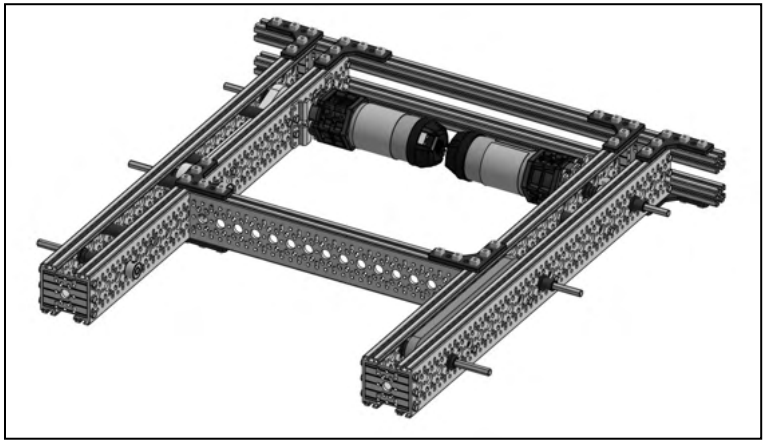
From the angle indicated in the photo, measure up 33mm and cut one side of Corrugated Plastic Sheet to allow for a smooth bend and form the Hopper.



Superstructure



1

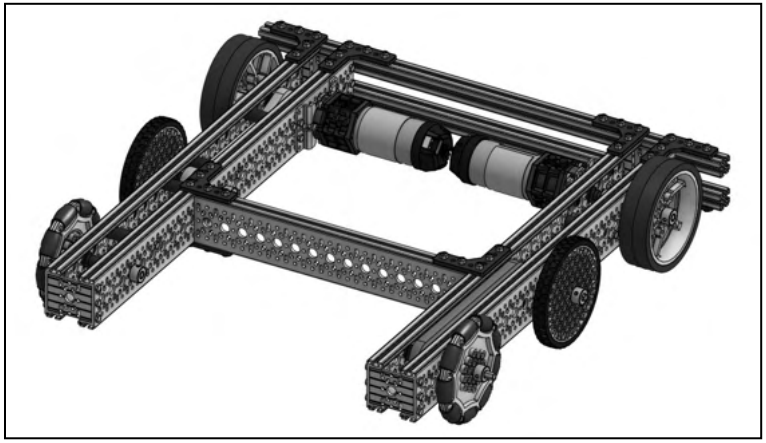


Get:

- 1 - Channel Drivetrain

Remove all wheels from the Channel Drivetrain.

2

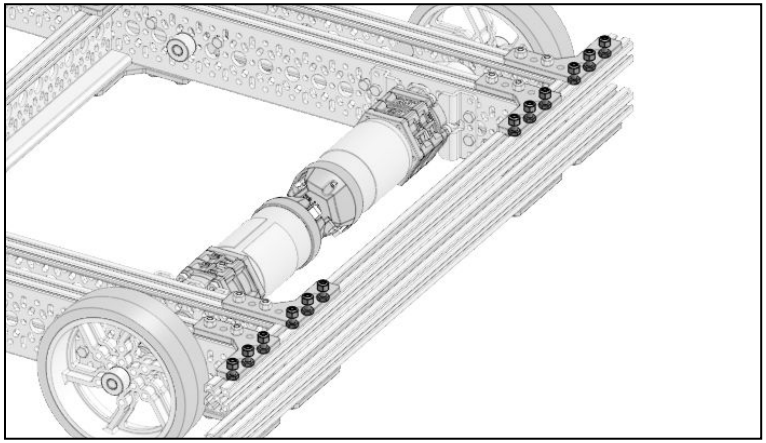


Get:

- 2 - 90mm Traction Wheels
- 2 - 90mm Grip Wheels
- 2 - 90mm Omni Wheels
- 6 - Shaft Collar

Place 6 wheels on the Channel Drivetrain, Grip Wheels by the motor, Traction Wheels in the middle, and Omni Wheels at the end. Secure them to each Hex Shaft with a Shaft Collar.

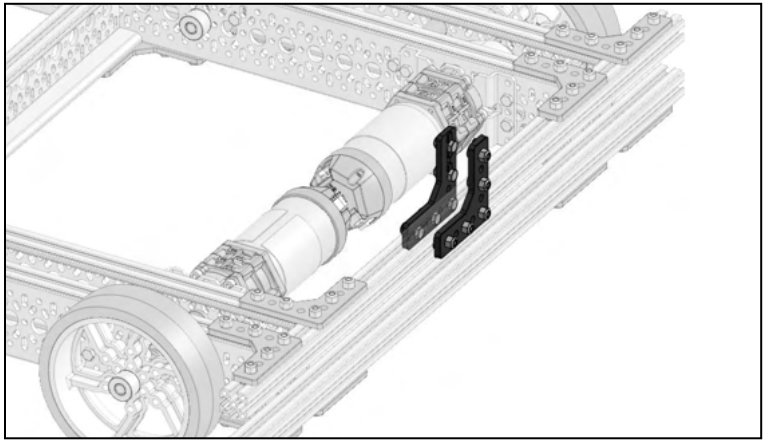
3



Loosen 12 screws on the back side of the Channel Drivetrain. Do not fully remove the nyloc nuts.

Slide this piece of extrusion so that the end is accessible to add on an additional bracket.

4

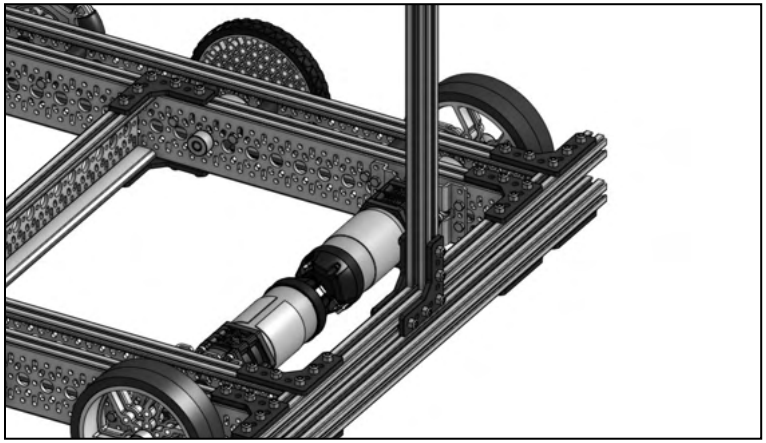


Get:

- 2 - 15mm Plastic 90 Degree Bracket
- 10 - M3 x 8mm Hex Cap Screw
- 10 - Nyloc Nut

Pre-load two Plastic 90 Degree Brackets with Screws and Nuts, then slide them into the center of the extrusion. Then, slide the extrusion back into place on the Channel Drivetrain and secure all brackets.

5



Get:

- 1 - 15mm Extrusion - 225mm

Place the 255mm long piece of Extrusion in the open slot of the 90 Degree brackets and secure by tightening the nuts.

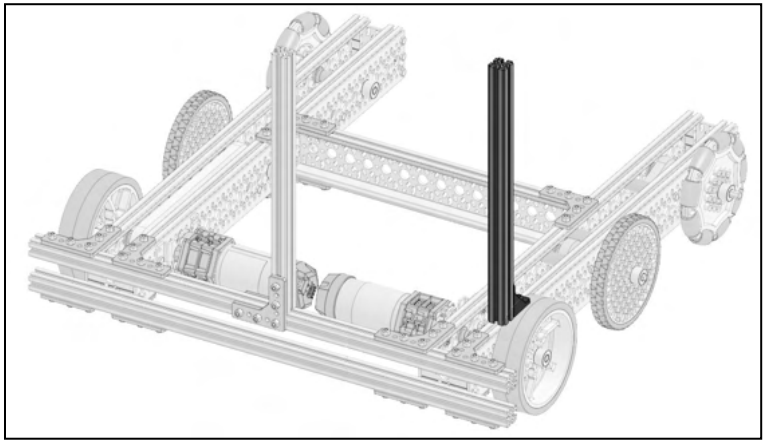
6

Get:

- 1 - 15mm Extrusion - 225mm
- 1 - 15mm Plastic Inside Corner Bracket
- 4 - M3 x 8mm Hex Cap Screw
- 4 - Nyloc Nut

Pre-load an Inside Corner Bracket with Screws and Nuts, then attach one piece of 255mm long Extrusion to the bracket as shown.

7



Slide the Inside Corner Bracket and Extrusion assembly on to the outer right rail of the Channel Drivetrain and secure.

8

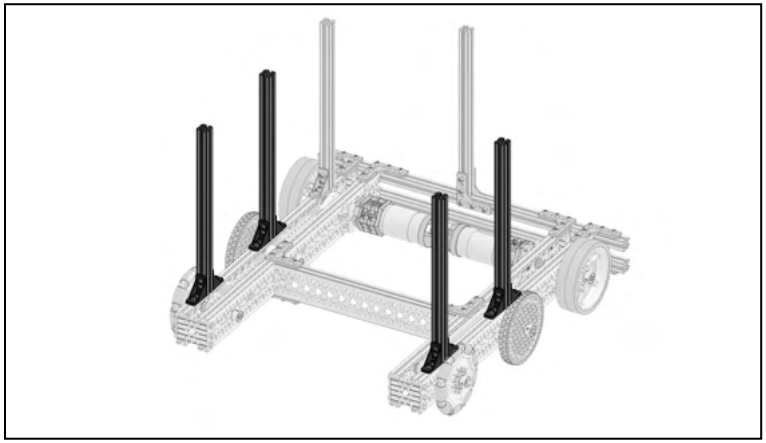
Get:

- 4 - 15mm Extrusion - 225mm
- 8 - 15mm Plastic Inside Corner Bracket
- 32 - M3 x 8mm Hex Cap Screw
- 32 - Nyloc Nut

Pre-load two Inside Corner Brackets with Screws and Nuts, then attach one piece of 255mm long Extrusion to the brackets as shown.

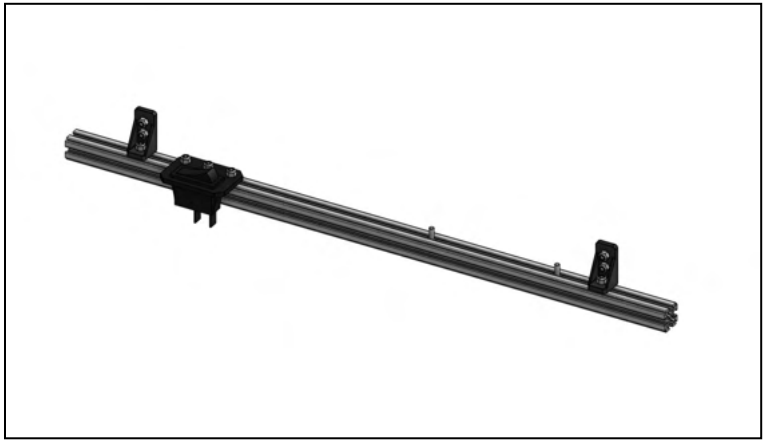
Make 4 of these assemblies.

9



Slide on two Extrusion and Corner Bracket assemblies to each outer rail. Secure them in line with the centers of the Traction Wheels and Omni Wheels.

10



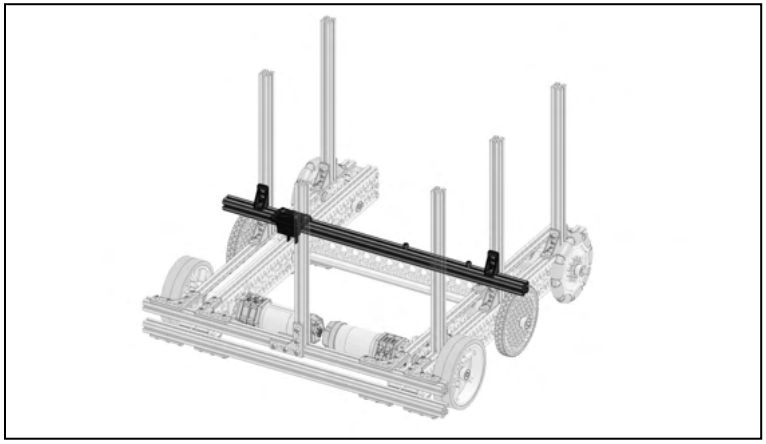
Get:

- 1 - 15mm Extrusion - 420mm
- 2 - 15mm Plastic Lap Corner Bracket
- 1 - Switch Cable and Bracket
- 11 - M3 x 8mm Hex Cap Screw
- 9 - Nyloc Nut

Pre-load the brackets with screws and nuts, then slide them along the extrusion and loosely secure.

Note: the two floating screws can be left loose

11



Slide the assembly from the previous step onto the extrusion as shown.

Secure the Lap Corner Brackets.

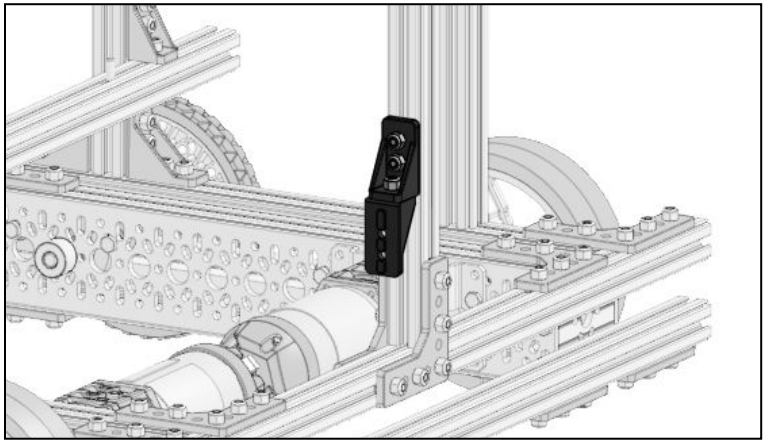
12

Get:

- 2 - 15mm Plastic Lap Corner Bracket
- 3 - M3 x 8mm Hex Cap Screw
- 3 - Nyloc Nut

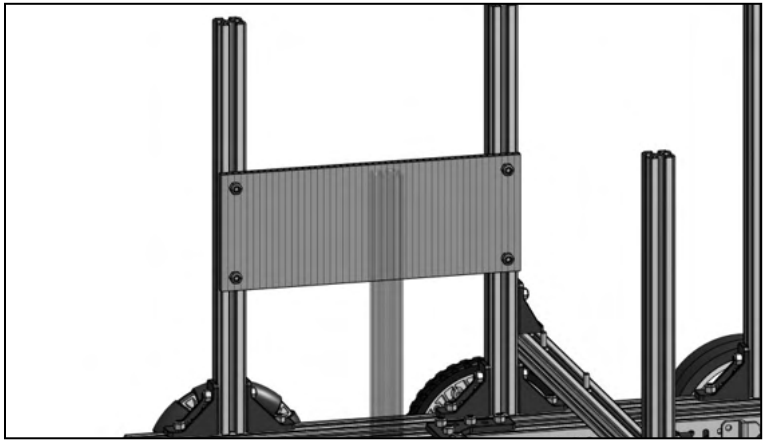
Attach two Lap Corner Brackets as shown, on the upper bracket, pre-load two screws with nuts.

13



Slide on and secure the Lap Corner Bracket assembly from the previous step onto the Extrusion piece on the Drivetrain's back rail.

14

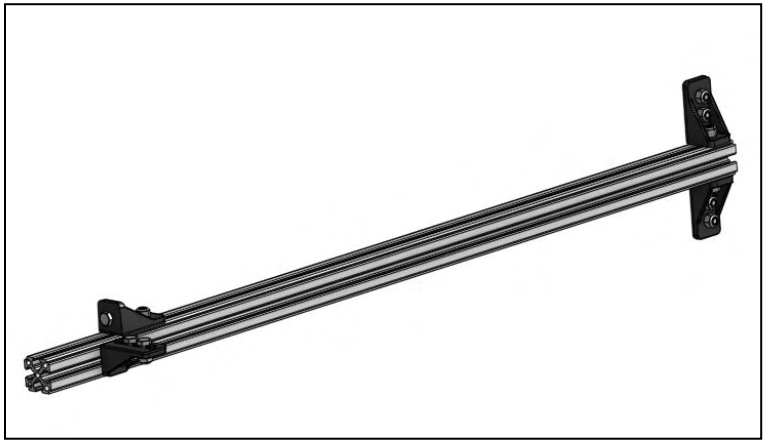


Get:

- 1 - Hopper Side
- 4 - M3 x 8mm Hex Cap Screw
- 4 - Nyloc Nut

Attach the Hopper Side panel to the Extrusion as shown using Screws and Nuts.

15



Get:

- 1 - 15mm Extrusion - 420mm
- 4 - 15mm Plastic Lap Corner Bracket
- 12 - M3 x 8mm Hex Cap Screw
- 12 - Nyloc Nut

Pre-load 4 Plastic Lap Corner Brackets and mount them to the Extrusion piece as shown.

Note: the screw located on the short side of the Lap Bracket may be hard to access.

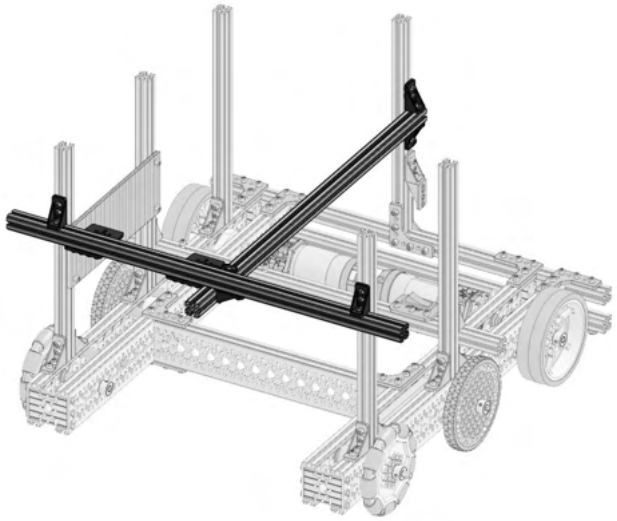
16

Get:

- 1 - 15mm Extrusion - 420mm
- 2 - 15mm Plastic Lap Corner Bracket
- 2 - 15mm Plastic Motion Bracket
- 12 - M3 x 8mm Hex Cap Screw
- 12 - Nyloc Nut

Pre-Load the Lap Brackets and Motion Brackets. Then, slide them onto the empty Extrusion.

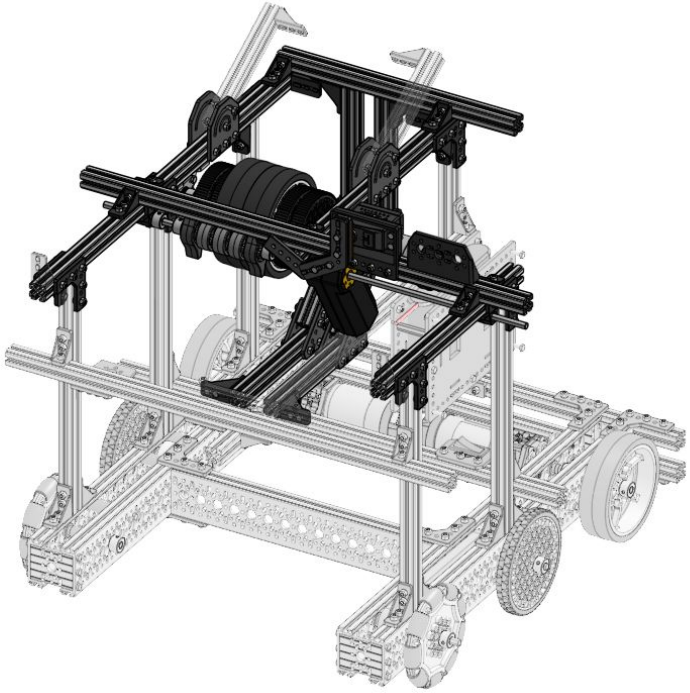
Next, slide the new assembly on to the one from the previous step so that the motion brackets are on the left side of the connecting lap corner bracket.



Slide this assembly onto the superstructure already mounted to your robot.

Loosen brackets as needed to secure. Then, once everything is connected as shown, tighten all nuts.

Launcher



1

Get:

- 1 - 15mm Plastic Servo Bracket
- 4 - M3 x 8mm Hex Cap Screw
- 4 - Nyloc Nut

Pre-load the Plastic Servo Bracket with Screws and Nuts.

2

Get:

- 1 - Smart Robot Servo
- 4 - M3 x 16mm Hex Cap Screw
- 4 - Nyloc Nut

Attach the Smart Robot Servo to the Servo Bracket using Screws and Nuts as shown.

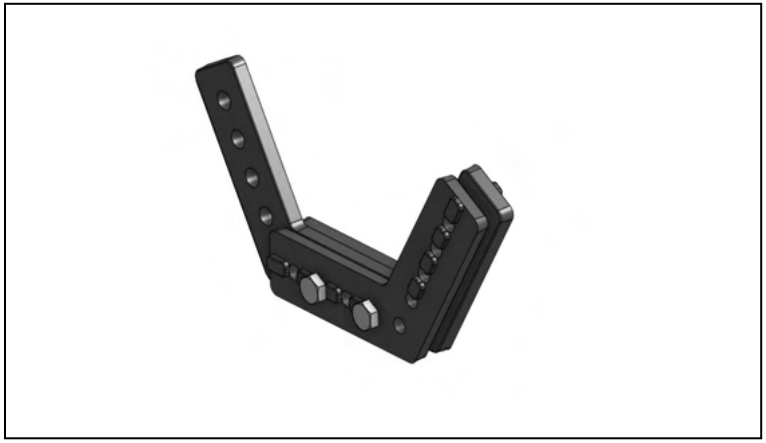
3

Get:

- 1 - Aluminum Double Servo Arm
- 1 - M3 x 8mm Hex Cap Screw

Mount the Aluminum Double Servo Arm to the Smart Robot Servo using a screw.

4



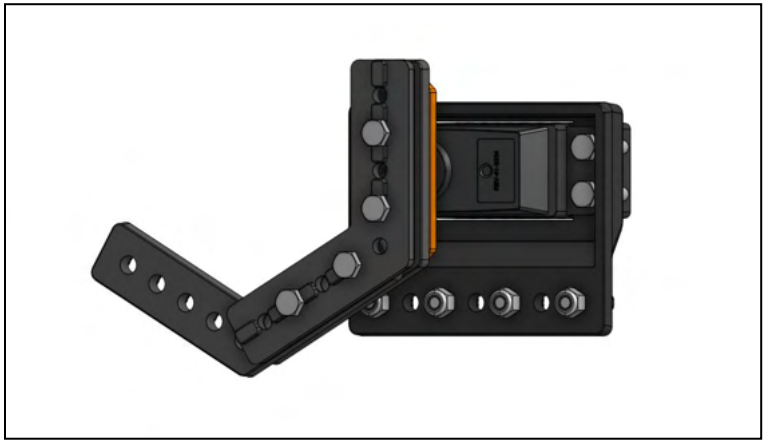
Get:

- 3 - 15mm Plastic 120 Degree Bracket
- 2 - M3 x 16mm Hex Cap Screw
- 2 - Nyloc Nut

Stack the 3 Plastic 120 Degree Brackets so that the outer two are facing the same direction and the inner one is opposite.

Secure them together with two Screws and Nuts

5



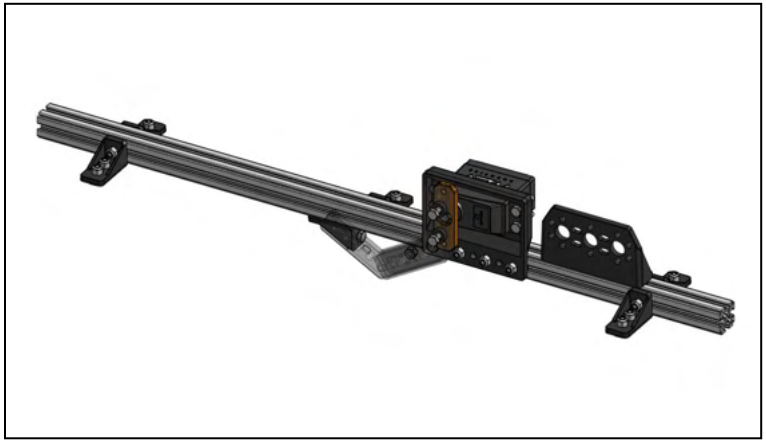
Get:

- 2 - M3 x 16mm Hex Cap Screw
- 2 - Hex Shaft Spacer - 3mm

Attach the 120 Degree Bracket stack to the Aluminum Double Servo Arm.

Use the 3mm Hex Shaft Spacers in between the outer brackets to support the assembly and prevent crushing.

6



Get:

- 1 - 15mm Extrusion - 420mm
- 6 - 15mm Plastic Lap Corner Bracket
- 1 - 15mm Gearbox Motion Bracket
- 22 - M3 x 8mm Hex Cap Screw
- 22 - Nyloc Nut

Pre-load 6 Lap Corner Brackets and One Gearbox Motion Bracket.

Then, slide the Servo Bracket Assembly and pre-loaded brackets onto the Extrusion as shown.

7

Get:

- 1 - 15mm Extrusion - 420mm
- 1 - 15mm Extrusion - Cut to 266
- 1 - 15mm Extrusion - 225mm

Attach 3 Extrusion pieces to the Servo/Agitator assembly using the Lap Corner Brackets.

8

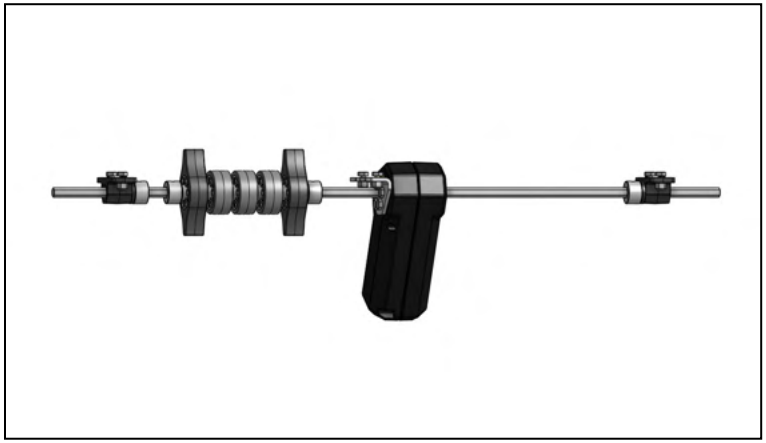
Get:

- 1 - Core Hex Motor
- 1 - 15mm Metal Bent Core Hex Motor Bracket
- 6 - M3 x 8mm Hex Cap Screw
- 2 - Nyloc Nut

Attach a Metal Bent Core Hex Motor Bracket to the side of a Core Hex Motor using 4 screws as shown.

Then, use the remaining two screws and nuts to pre-load the bracket.

9



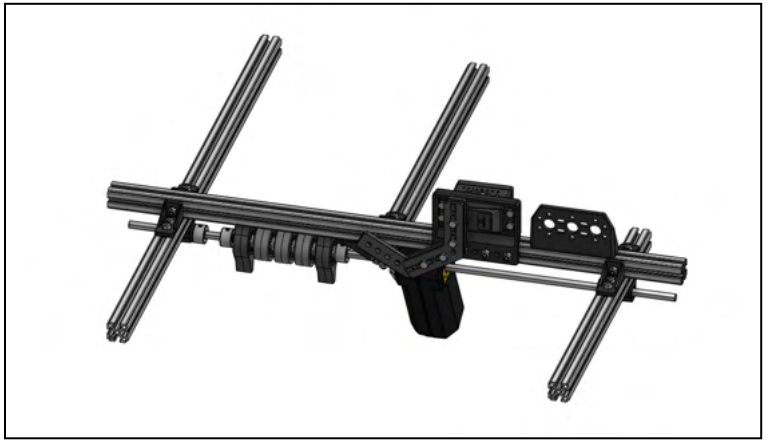
Get:

- 1 - 400mm Hex Shaft
- 2 - 15mm Bearing Pillow Block
- 2 - Medium - Flap Wheel Trimmed
- 3 - Soft - 1in Grip Wheel
- 4 - Shaft Collar
- 4 - M3 x 8mm Hex Cap Screw
- 4 - Nyloc Nut

Slide the following on to the Hex Shaft from left to right:

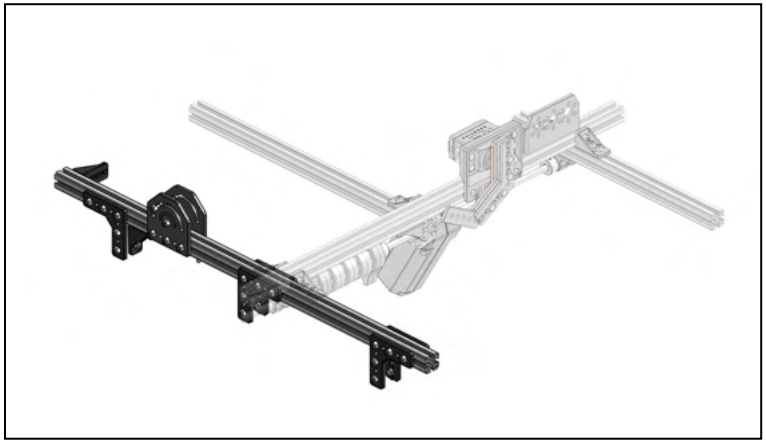
- 1- Pre-loaded Pillow Block, 2 - Shaft Collars, 1 - Flap Wheel, 3 - 1in Grip Wheels, 1 - Flap wheel, 1 - Shaft Collar, 1 - Core Hex Motor, Shaft Collar, 1 - Pre-loaded Pillow Block

10



Slide Core Hex assembly on to the Agitator Assembly using the two Pillow Blocks to connect to the Extrusion.

11



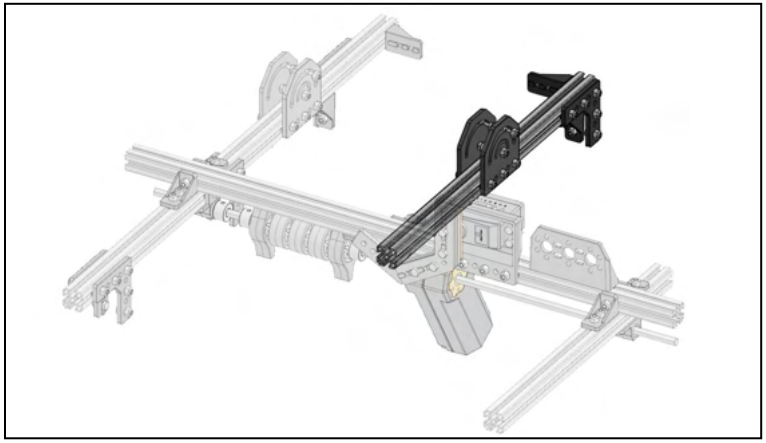
Get:

- 5 - 15mm Plastic 90 Degree Bracket
- 1 - 15mm Plastic Lap Corner Bracket
- 1 - 15mm Plastic Inside Corner Bracket
- 2 - 15mm Plastic Variable Angle Bracket
- 44 - M3 x 8mm Hex Cap Screw
- 42 - Nyloc Nut

Pre-load each bracket with screws and nuts. Then, attach them to the extrusion as shown.

Note: the two floating screws opposite from the Variable Angle Bracket can be left loose

12



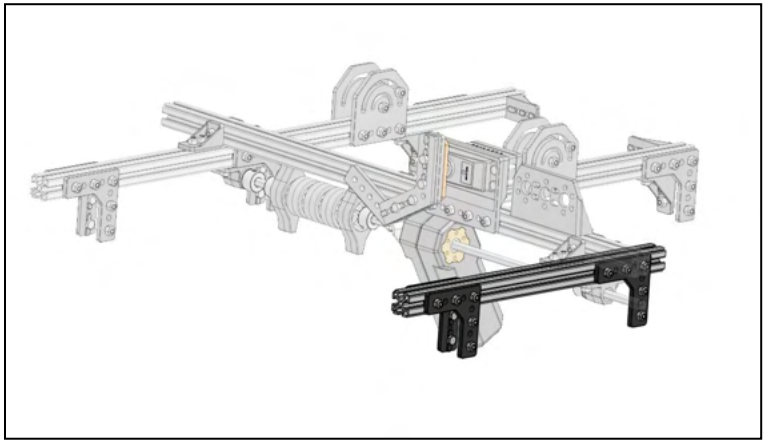
Get:

- 1 - 15mm Plastic 90 Degree Bracket
- 1 - 15mm Plastic Lap Corner Bracket
- 1 - 15mm Plastic Inside Corner Bracket
- 2 - 15mm Plastic Variable Angle Bracket
- 24 - M3 x 8mm Hex Cap Screw
- 22 - Nyloc Nut

Pre-load each bracket with screws and nuts. Then, attach them to the extrusion as shown.

Note: the two floating screws opposite from the Variable Angle Bracket can be left loose

13

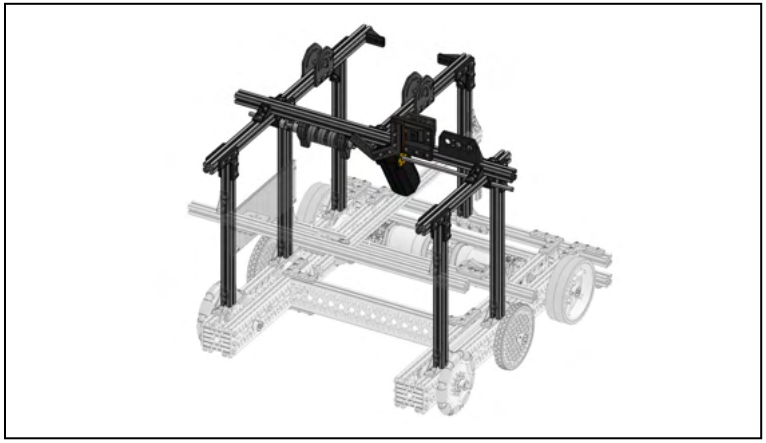


Get:

- 3 - 15mm Plastic 90 Degree Bracket
- 15 - M3 x 8mm Hex Cap Screw
- 15 - Nyloc Nut

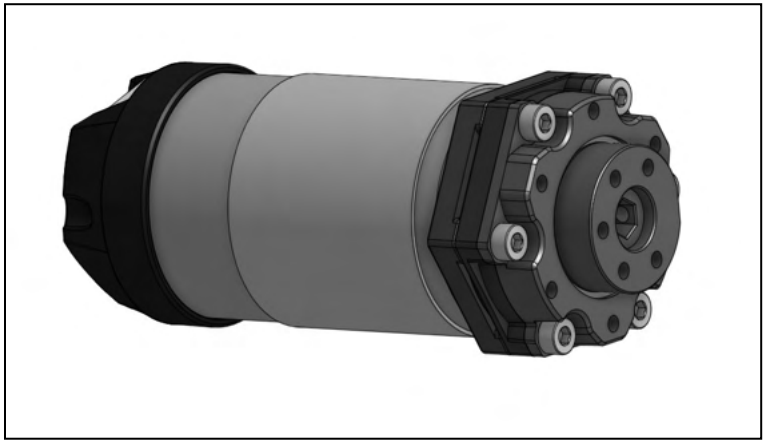
Pre-load each bracket with screws and nuts. Then, attach them to the extrusion as shown.

14



Slide Launcher Structure assembly on to the onto the Super Structure using the eight Plastic 90 Degree Brackets and two Inside Corner Brackets to connect to the Extrusion.

15



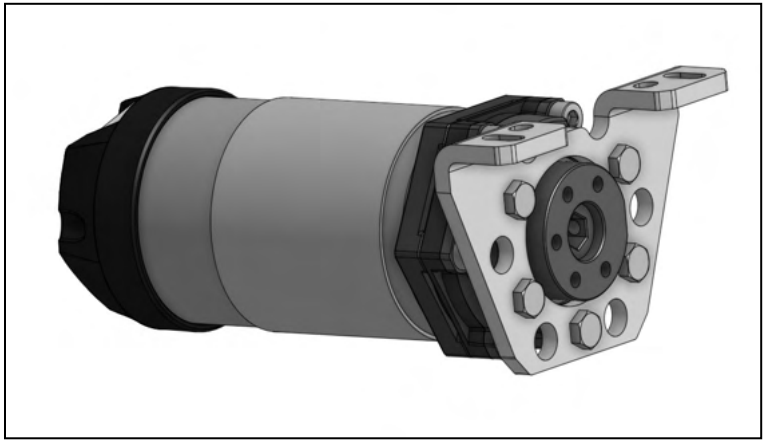
Get:

- 1 - UltraPlanetary Gearbox & HD Hex Motor Kit

Assemble 1 UltraPlanetary Gearbox with a 1:1 output using the instructions found at:

- docs.revrobotics.com/build-up-gearbox

16

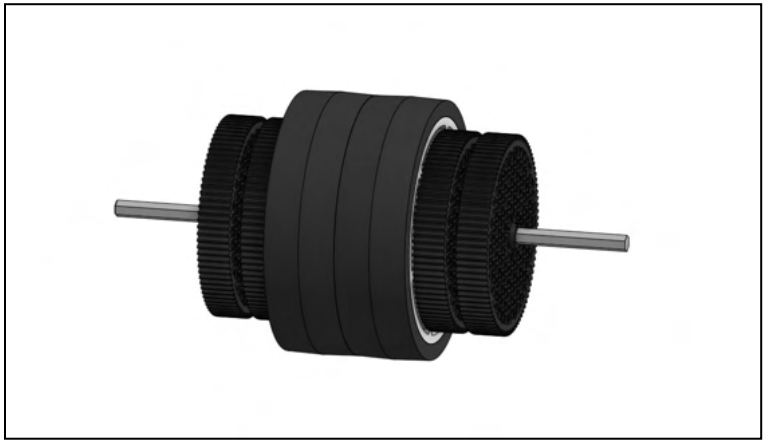


Get:

- 1 - UltraPlanetary Bent Mounting Bracket
- 5 - M3 x 8mm Hex Cap Screw

Attach an UltraPlanetary Bent Mounting Bracket to the HD Hex Motor and UltraPlanetary Gearbox using 5 screws.

17

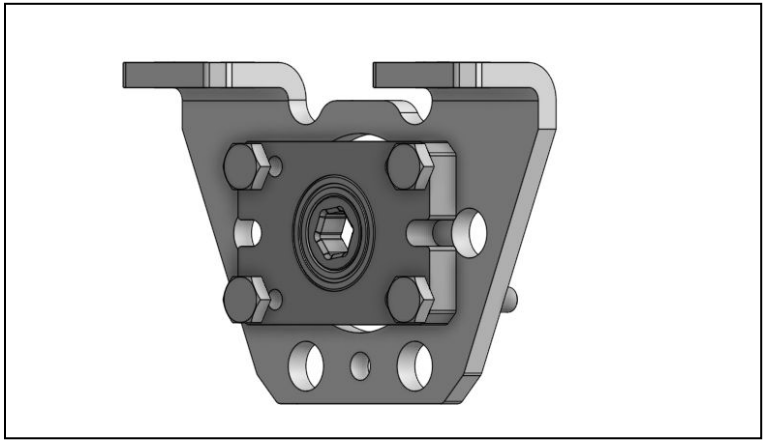


Get:

- 1 - Hex Shaft Cut to 180mm
- 4 - 90 Tooth Plastic Gear
- 2 - 90 Grip Wheels

Slide two Grip Wheels onto the center of the Hex Shaft. Then slide on two 90 Tooth Gears on both sides of the Grip Wheels.

18

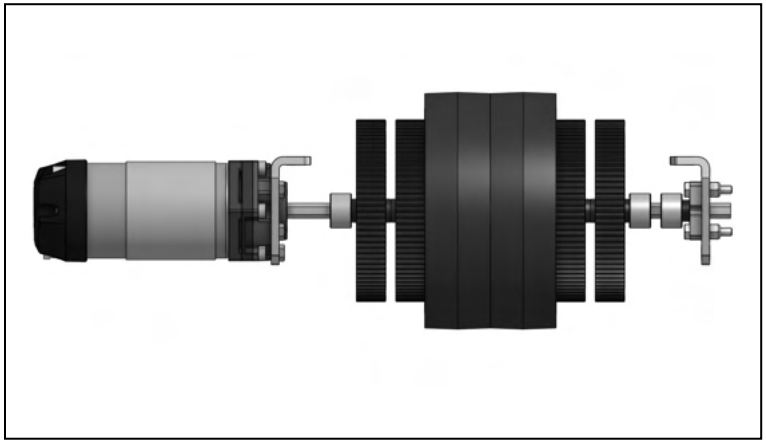


Get:

- 1 - UltraPlanetary Bent Motor Bracket
- 1 - 5mm Hex Bearing Block
- 4 - M3 x 16mm Hex Cap Screw
- 4 - Nyloc Nuts

Connect the 5mm Hex Bearing Block to the UltraPlanetary Bent Bracket with screws and nuts in the orientation shown. The nuts should be opposit of the bent part of the bracket.

19

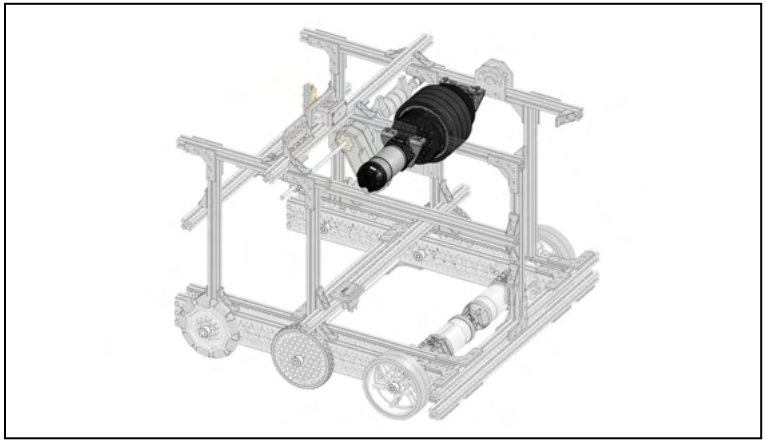


Get:

- 3 - Shaft Collars
- 1 - 3mm Hex Shaft Spacer

Connect all parts of the Flywheel Assembly as shown. Slide a 3mm Hex Shaft Spacer in between the Bearing Block opposite the HD Hex Motor and the Shaft Collar.

20

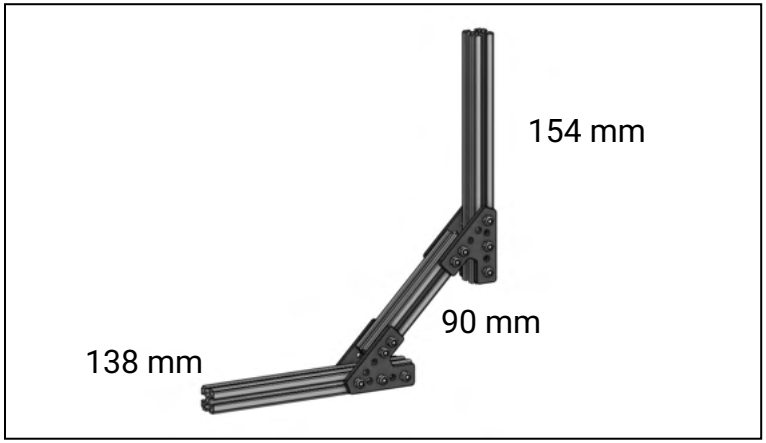


Get:

- 4 - Nyloc Nuts

Use the loose floating Screws to attach the Flywheel Assembly to the Superstructure using the two UltraPlanetary Bent Motor Brackets and 4 additional Nuts.

21



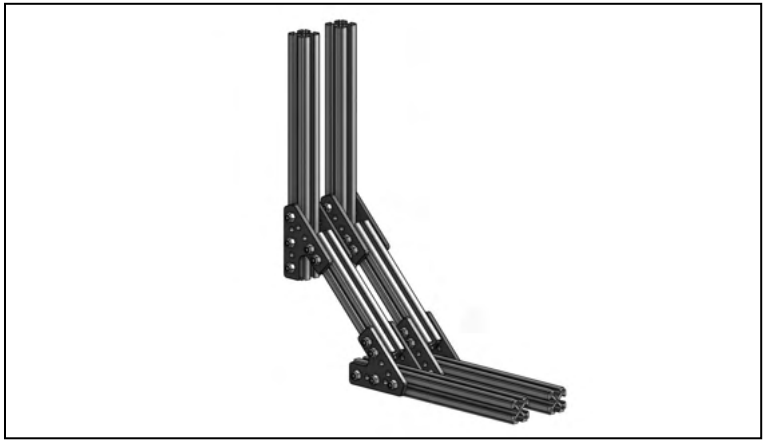
Get:

- 1 - 15mm Extrusion - Cut to 154mm
- 1 - 15mm Extrusion - Cut to 138mm
- 1 - 15mm Extrusion - Cut to 90mm
- 4 - 15mm Plastic 45 Degree Bracket
- 20 - M3 x 8mm Hex Cap Screw
- 20 - Nyloc Nut

Connect the three pieces of Extrusion using 45 Degree Brackets that have been pre-loaded.

Use the image as a guide for the location of each unique length of extrusion.

22



Get:

- 1 - 15mm Extrusion - Cut to 154mm
- 1 - 15mm Extrusion - Cut to 138mm
- 1 - 15mm Extrusion - Cut to 90mm
- 4 - 15mm Plastic 45 Degree Bracket
- 20 - M3 x 8mm Hex Cap Screw
- 20 - Nyloc Nut

Build the previous assembly for supporting the hood again. You should now have two of the same part.

23

Get:

- 1 - 15mm Extrusion - 225mm
- 2 - 15mm Plastic Inside Corner Bracket
- 8 - M3 x 8mm Hex Cap Screw
- 8 - Nyloc Nut

Pre-load two Inside Corner Brackets and slide the hood support assemblies onto the 225mm section of Extrusion.

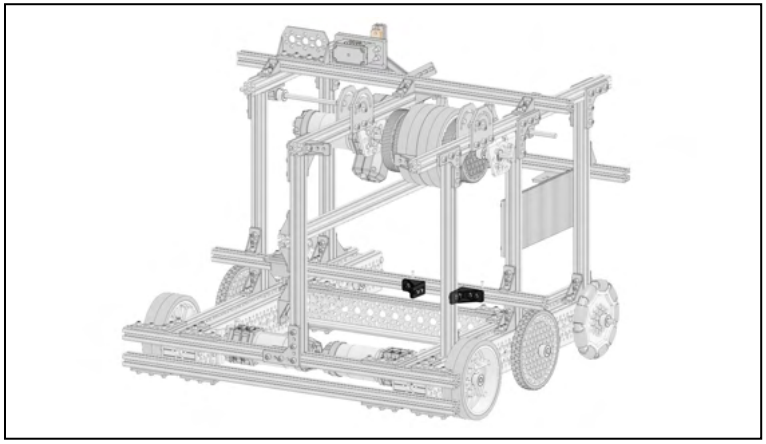
24

Get:

- 2 - 15mm Plastic Lap Corner Bracket
- 6 - M3 x 8mm Hex Cap Screw
- 6 - Nyloc Nut

Pre-load and mount two Lap Corner Brackets to the section of 225mm Extrusion facing the same direction as the hood supports.

25

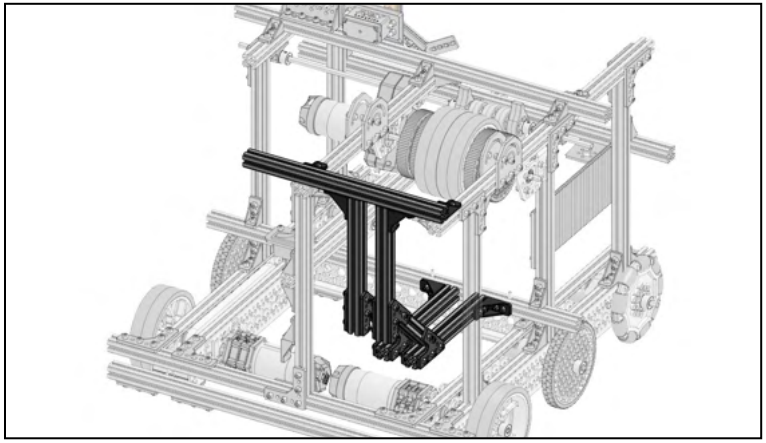


Get:

- 2 - 15mm Plastic Inside Corner Bracket
- 8 - M3 x 8mm Hex Cap Screw
- 8 - Nyloc Nut

Slide two pre-loaded Plastic Inside Corner Brackets onto the middle piece of Extrusion on the lower part of the superstructure.

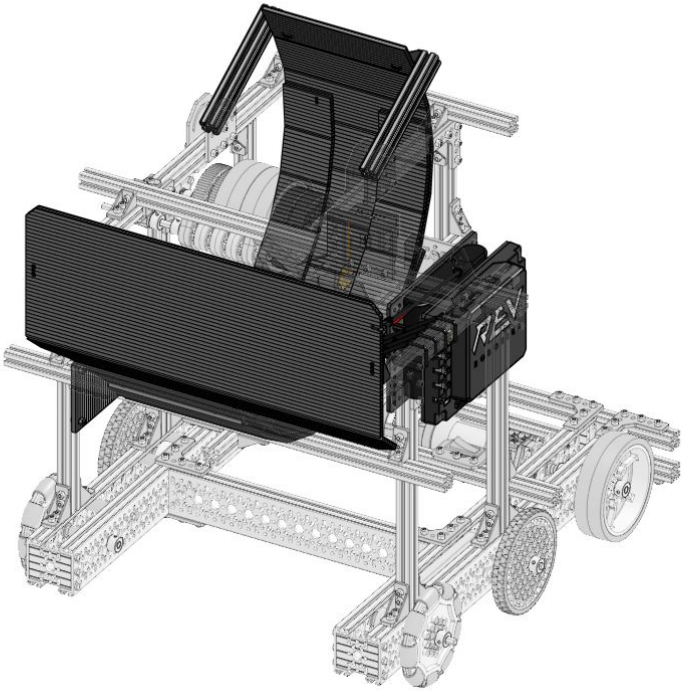
26



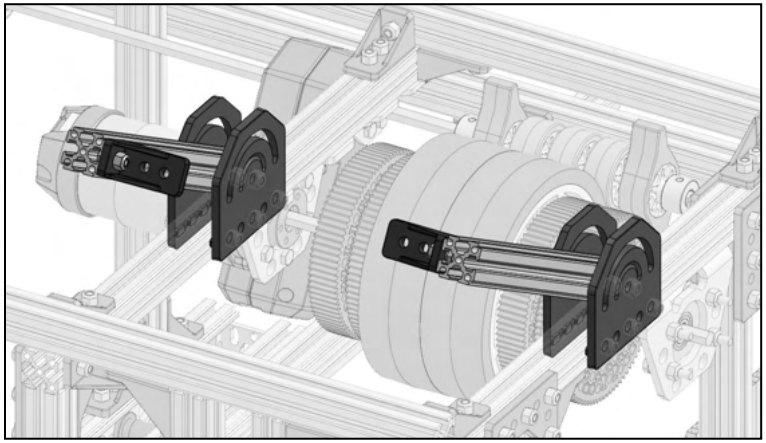
Slide the Hood Support assembly on to the onto the Super Structure using the two Inside Corner Brackets and two Lap Corner Bracket mounted in the previous step.

Make sure that the Lap Corner Brackets on the upper portion of the Hood Support Assembly also slot into the upper part of the superstructure.

Hopper and Electronics



1

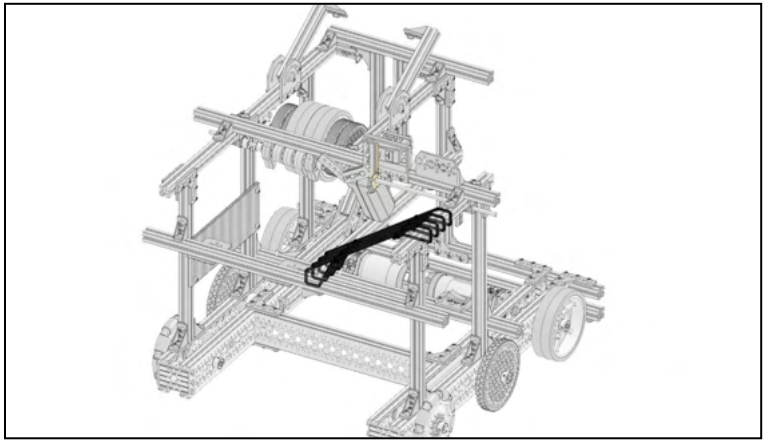


Get:

- 2 - 15mm Extrusion - 120mm
- 2 - 15mm Plastic Lap Corner Bracket
- 1 - M3 x 8mm Hex Cap Screw
- 1 - Nyloc Nut

Pre-load the short side of 2 Lap Corner Brackets with one screw and nut each. Then, attach the Lap Corner Brackets to the end of the Extrusion. Slide the opposite end of each extrusion piece into the free floating screws, one in each pair of Variable Angle Brackets. Tighten until firm, but not tight- these are used to adjust your launch angle.

2

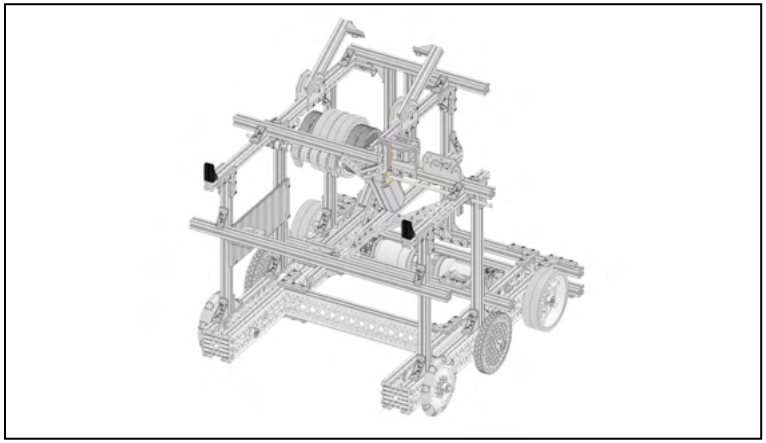


Get:

- Surgical Tubing
- 8 - Zip Ties - 160mm

Create 4 loops of surgical tubing, pull until slightly stretched and then secure to Extrusion with Zip Ties.

3

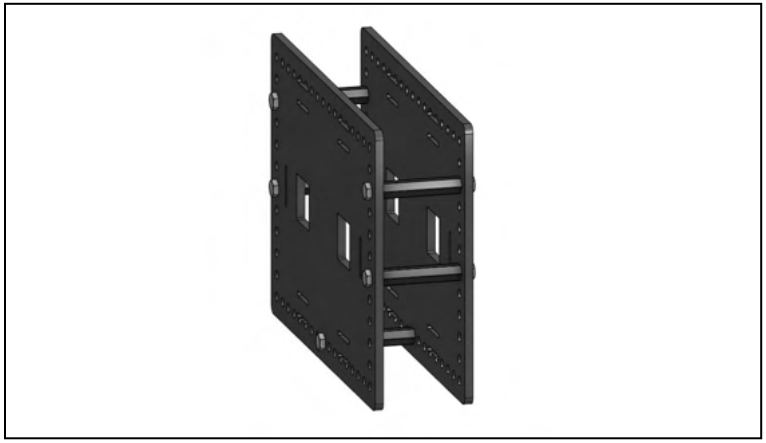


Get:

- 2 - 15mm Plastic Lap Corner Bracket
- 2 - M3 x 8mm Hex Cap Screw
- 2 - Nyloc Nut

Pre-load the short side of 2 Lap Corner Brackets with one screw and nut each. Then, attach the Lap Corner Brackets to the end of the Extrusion as shown in the image.

4



Get:

- 2 - Battery Holder Plate
- 5 - M3 Standoff - 30mm
- 10 - M3 x 8mm Hex Cap Screw

Connect 2 Battery Holder Plates using standoffs and screws. The short sides get two standoffs each and the bottom side's standoff should be roughly centered.

5

Get:

- 1 - Control Hub
- 1 - M3 Standoff - 30mm
- 3 - M3 x 16mm Hex Cap Screw
- 1 - M3 x 8mm Hex Cap Screw
- 2 - Nyloc Nut

Secure your Control Hub to the Battery Plate using a 16mm screw and nuts for each top corner. In the lower corner, secure using a standoff, 16mm screw on the Hub side, and an 8mm screw on the back.

Note: Tighten until secure, but do not over tighten to avoid damage to your Control Hub.

6

Get:

- 1 - M3 Standoff - 30mm
- 1 - M3 x 16mm Hex Cap Screw
- 1 - M3 x 8mm Hex Cap Screw

Add an additional standoff at the other bottom corner of the assembly. On one side, use 16mm screws to also attach your Control Hub to the Battery Plate.

Note: Tighten until secure, but do not over tighten to avoid damage to your Control Hub.

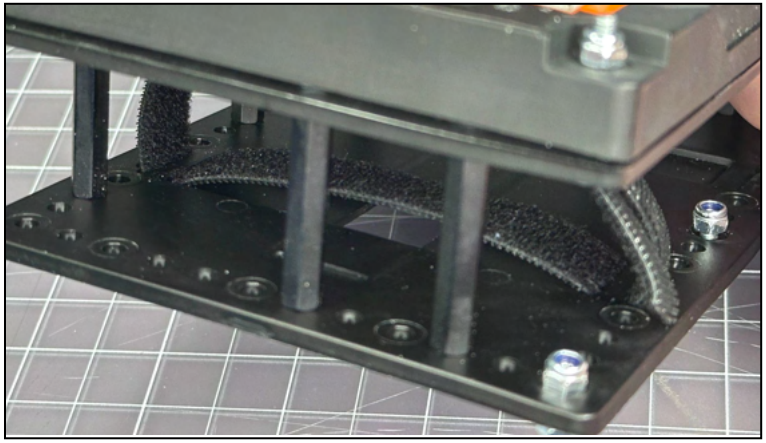
7

Get:

- 3 - M3 x 8mm Hex Cap Screw
- 3 - Nyloc Nut
- 1 - Hook and Loop Fastener

Pre-load three hex cap screws and nyloc nuts into the Battery Holder Plate. Feed strips of hook and loop fastener through the battery plate to use to secure the battery.

8

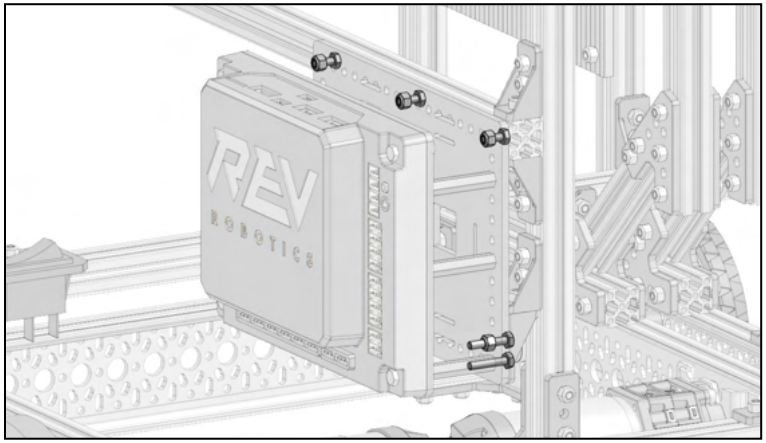


Get:

- 1 - Hook and Loop Fastener

Feed strips of hook and loop fastener through the battery plate to use to secure the battery.

9

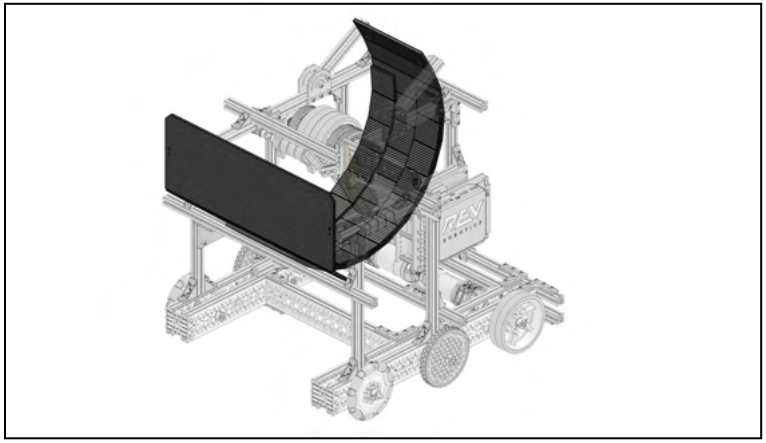


Get:

- 2 - M3 x 16mm Hex Cap Screw
- 1 - Nyloc Nut

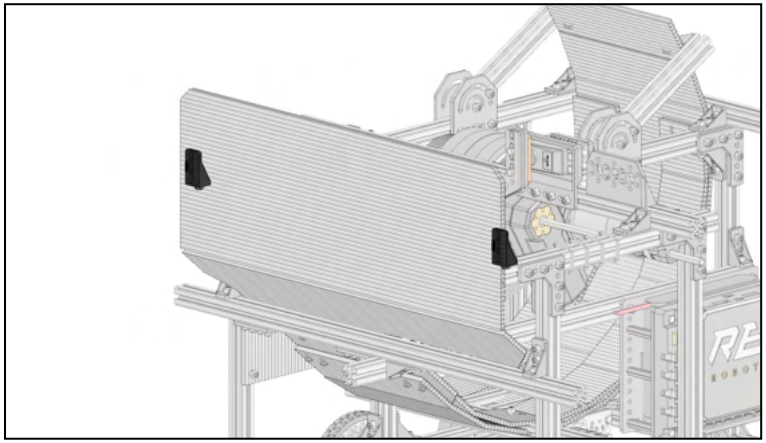
Slide the Electronics assembly onto the extrusion as shown. Secure the battery plate to the lap corner bracket as shown. Tighten the the 16mm Hex Cap Screw and Nyloc nut first then insert the 16mm Hex Cap Screw into the standoff as shown.

10



Insert the Corrugated Plastic Hopper and Hood as shown.

11

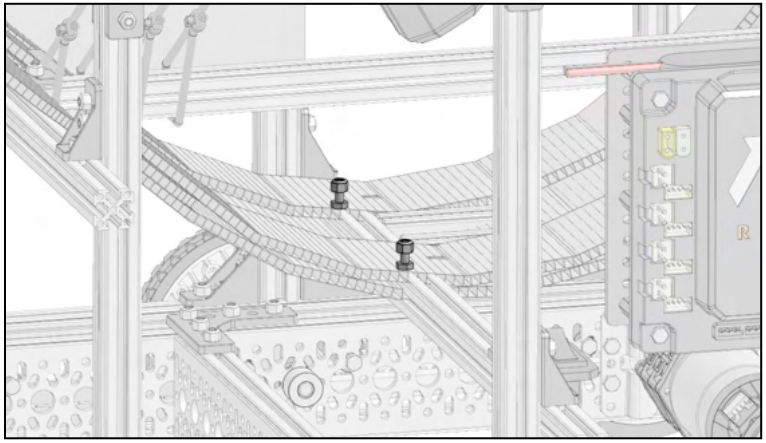


Get:

- 2 - Zip Ties - 160mm

Secure the hopper to the Lap Corner Brackets with two zip ties as shown.

12

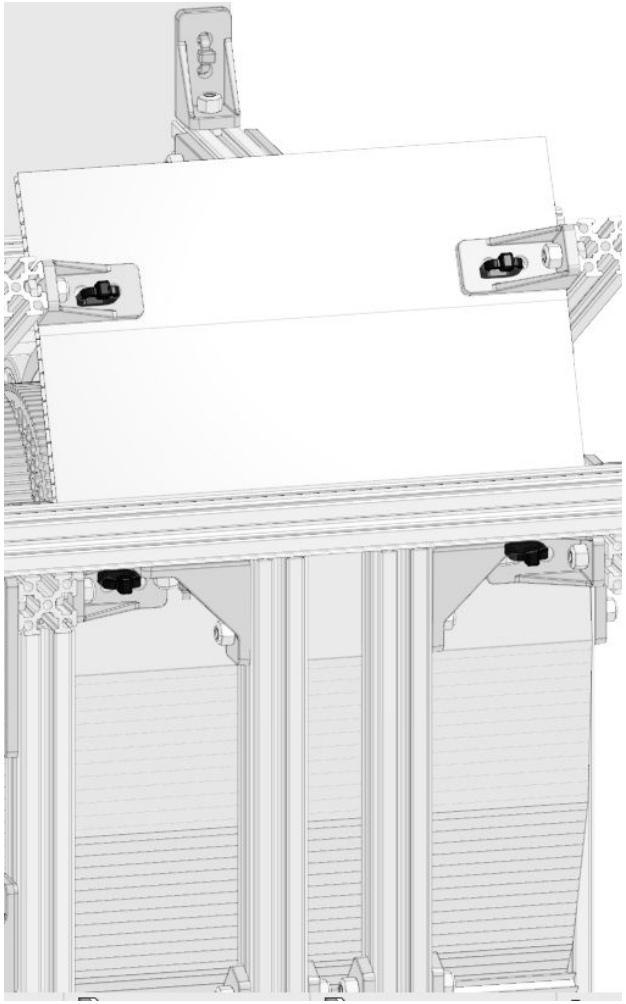


Get:

- 2 - Nyloc Nut

Secure the bottom of the hood with the two screws from step 10.

13

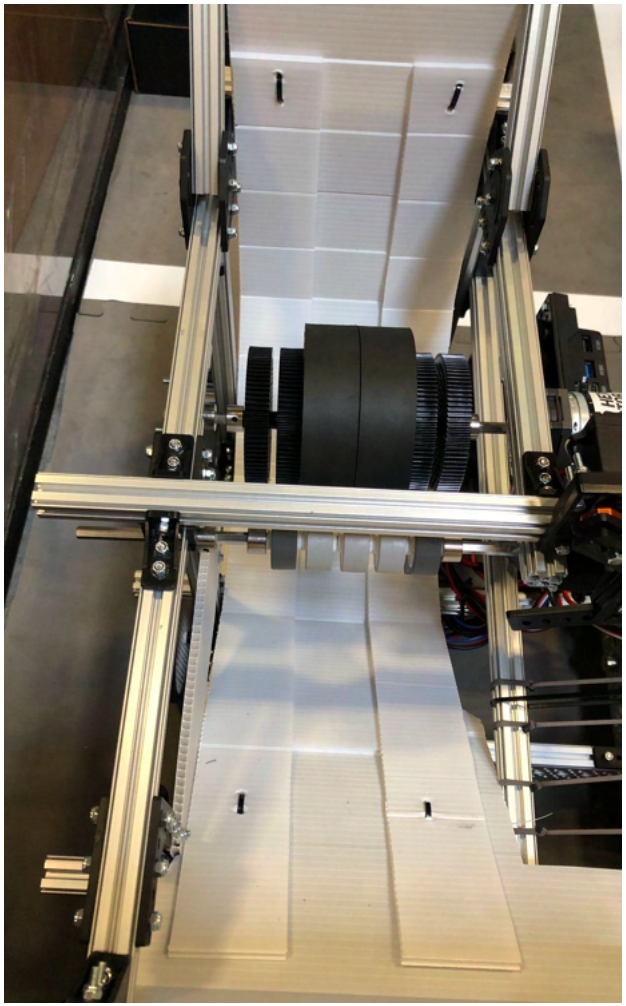


Get:

- 4 - Zip Ties - 160mm

Secure the hopper to the Lap Corner Brackets with four zip ties as shown.

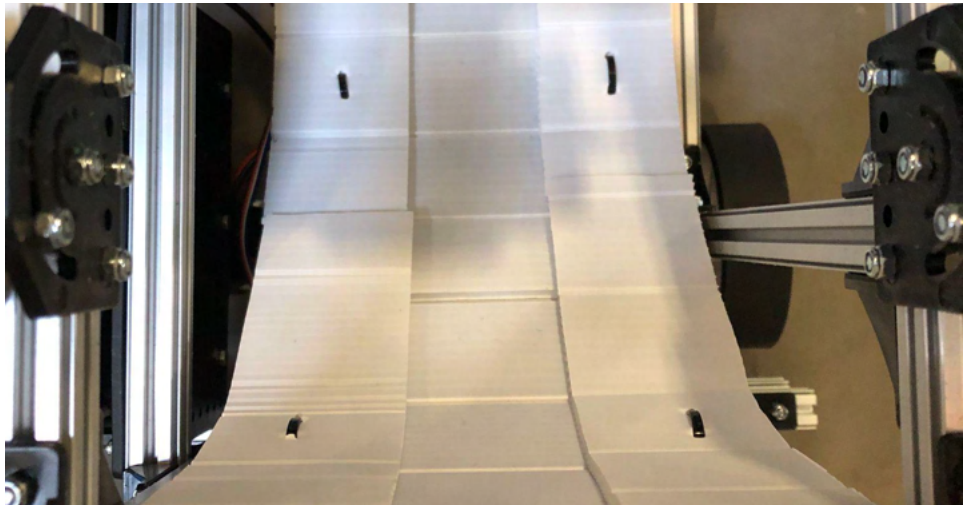
14



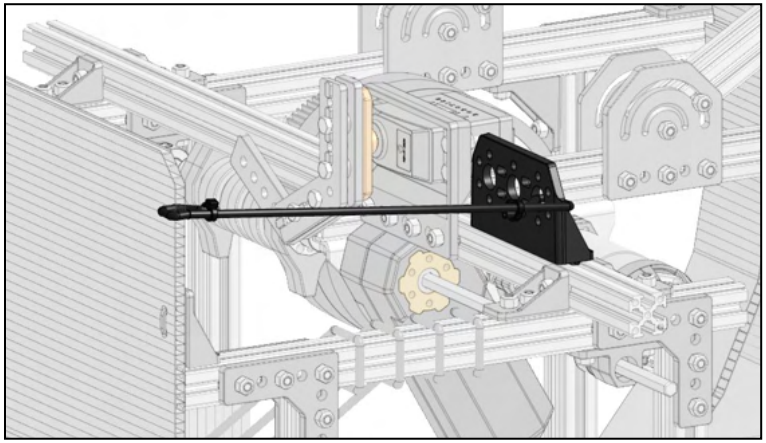
Get:

- 8 - Zip Ties - 160mm

Secure the centering guides with zip ties so that the Artifact travels under the center of your flywheel.



15



Get:

- Surgical Tubing
- 2 - Zip Ties - 160mm

Create a loop of surgical tubing, pull until slightly stretched and then secure to Extrusion with Zip Ties.

Congratulations! You are done!

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