Base Kit Gear Drivetrain Build Guide

August 11, 2017

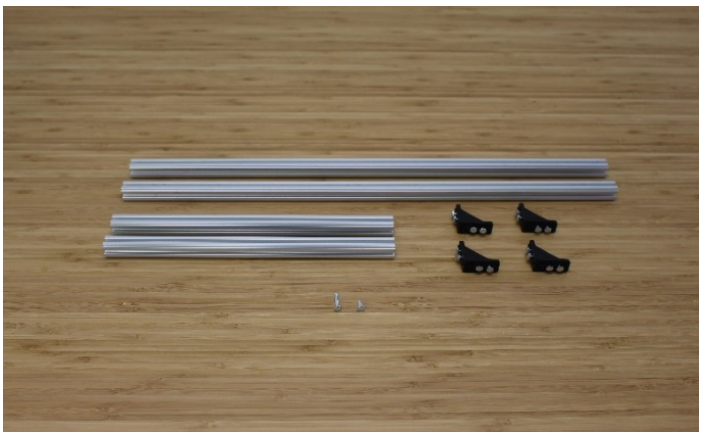
1.1 Description

This document outlines the steps required to build a six wheel, chain based drive train. This design should be treated a starting point and will require modification in order to address the specific needs of the robot being designed. It should be noted for best performance the center of gravity should be centered on the middle Traction wheels to ensure the robot rotates about the axis at the midpoint between the middle Traction wheels.

1.2 Bill of Matrials

PART NUMBER	DESCRIPTION	QTY.
REV-41-1432	420mm REV Extrusion	6
REV-41-1431	225mm REV Extrusion	4
REV-41-1321	15mm Plastic Lap Corner Bracket	16
REV-41-1360	M3 X 16MM HEX CAP SCREWS	4
REV-41-1359	M3 X 8mm Hex Cap Screws	126
REV-41-1361	Nyloc Nut	124
REV-41-1320	15mm Plastic Inside Corner Bracket	8
REV-41-1317	15mm Bearing Pillow Block	16
REV-41-1313	15MM PLASTIC INDEXABLE MOTION BRACKET	4
REV-41-1322	End Cap Bearing	18
REV-41-1347	5mm X 75mm Hex Shaft	9
REV-41-1300	Core Hex Motor	2
REV-41-1349	5mm X 135mm Hex Shaft	2
REV-41-1354	90mm Traction Wheel	6
REV-41-1324	3mm Spacer	16
REV-41-1337	90 TOOTH GEAR	6
REV-41-1327	Shaft Collar	8
REV-41-1336	72 TOOTH GEAR	4
REV-41-1323	15mm Spacer	4
REV-41-1166	BATTERY HOLDER PLATE	2
REV-31-1153	REV ROBOTICS EXPANSION HUB	1

1.3 Build Instructions



Collect Parts:

- 2x REV-41-1432
- 2x REV-41-1431
- 4x REV-41-1320
    - Pre-load with REV-41-1359 and REV-41-1361
- 1x REV-41-1359

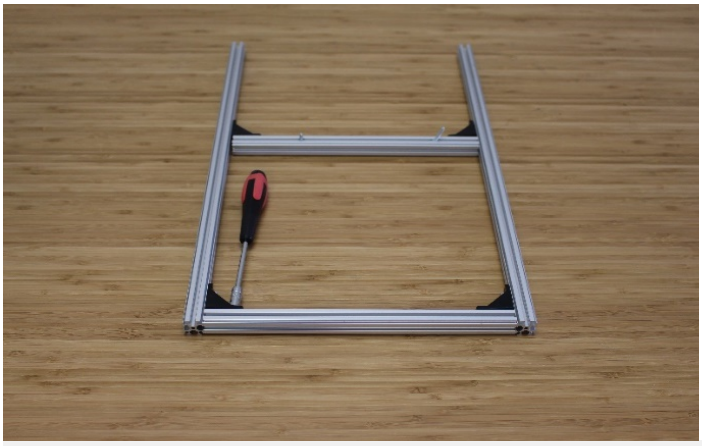
1x REV-41-1360

Slide REV-41-1320 on the ends of REV-41-1431 such that the brackets and Extrusion are flush.

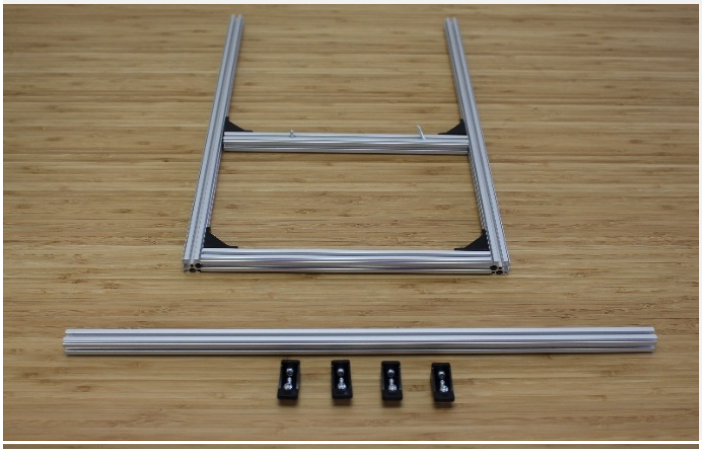
Tighten nuts.

Slide REV-41-1359 and REV-41-1360 on to the one of the REV-41-1431 assemblies. Ensure REV-41-1360 is to the right of REV-41-1359 when the brackets are pointing away from the user.

Slide the REV-41-1432 pieces onto the REV-41-1431 assemblies.

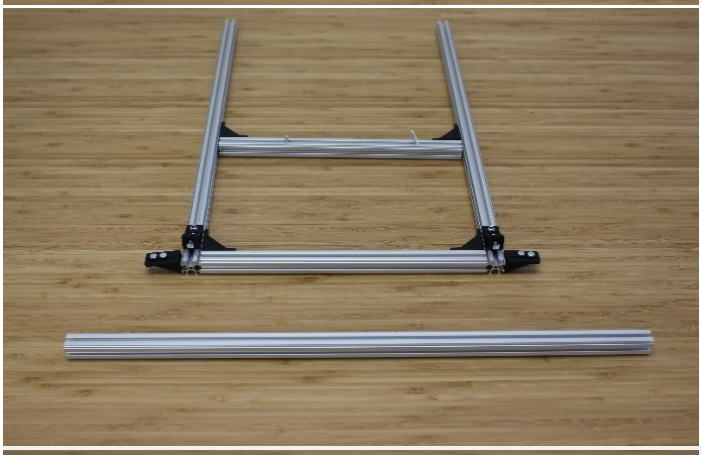


Make the ends of REV-41-1432 flush with the lower REV-41-1431 assembly.
Tighten only the bottom corners.

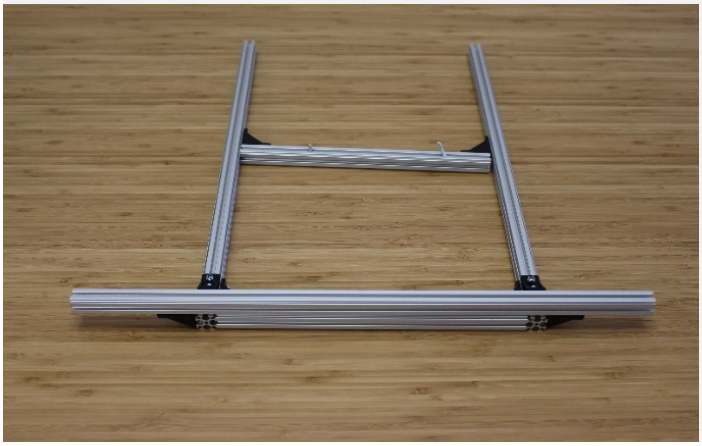


Collect Parts:

- 1x REV-41-1432
- 4x REV-41-1321
    - Pre-load with REV-41-1359 and REV-41-1361

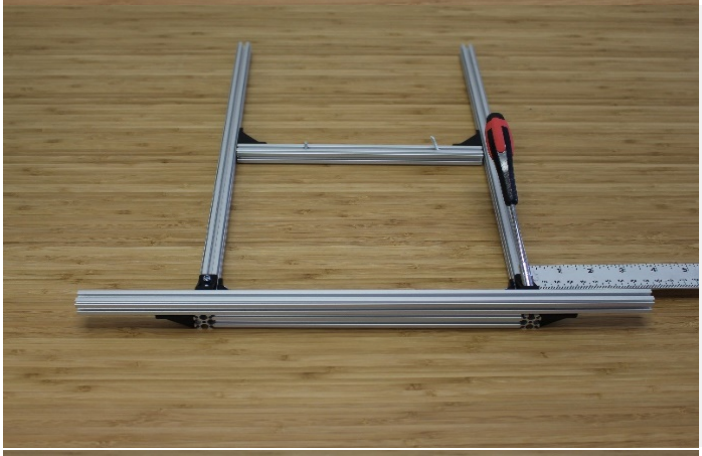


Place REV-41-1321 brackets as shown. Leave screw loose.



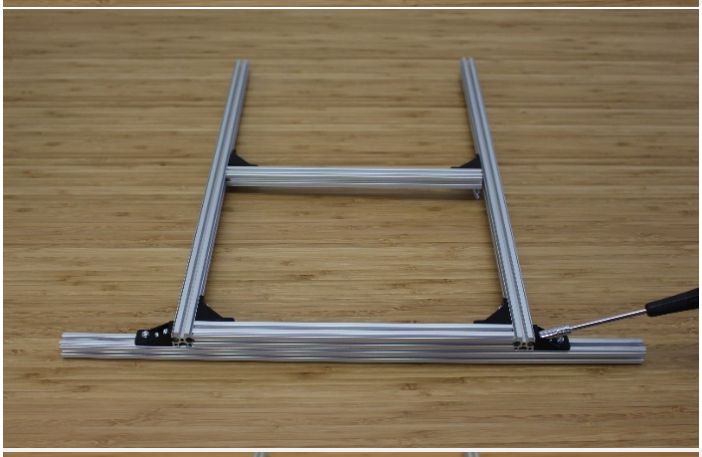
Slide REV-41-1432 onto REV-41-1321 brackets.

Make REV-41-1432 flush with the REV-41-1431 assembly.

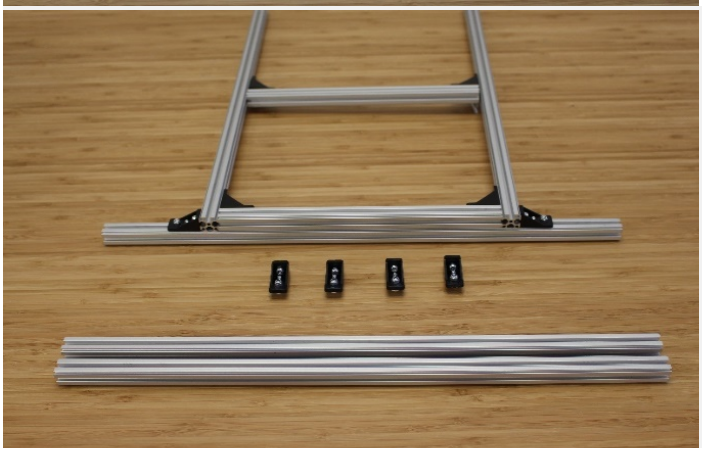


Measure 82.5mm from the outside edge of top REV-41-1432 to the vertical REV-41-1432 extrusion. This will center the top REV-41-1432 extrusion to frame.

Tighten REV-41-1321 bracket nuts.

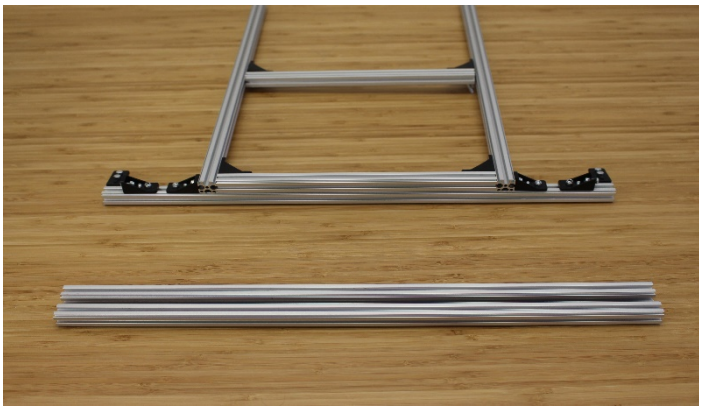


Flip and tighten REV-41-1321 bracket nuts.

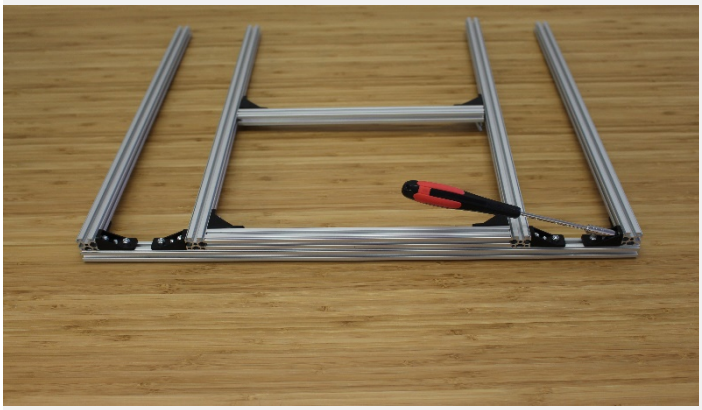


Collect Parts:

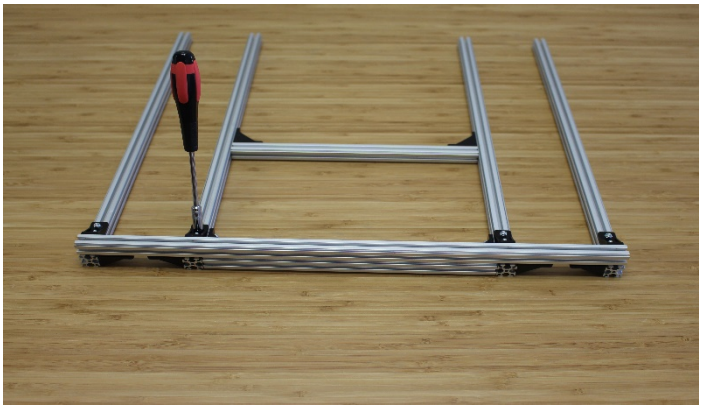
- 2x REV-41-1432
- 4x REV-41-1321
    - Pre-load with REV-41-1359 and REV-41-1361



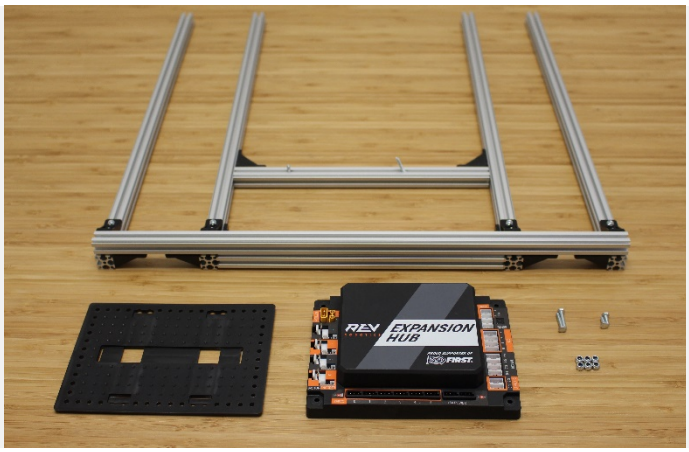
Place REV-41-1321 brackets as shown. Leave screw loose.



Slide REV-41-1432 onto REV-41-1321 brackets so that corners are flush.

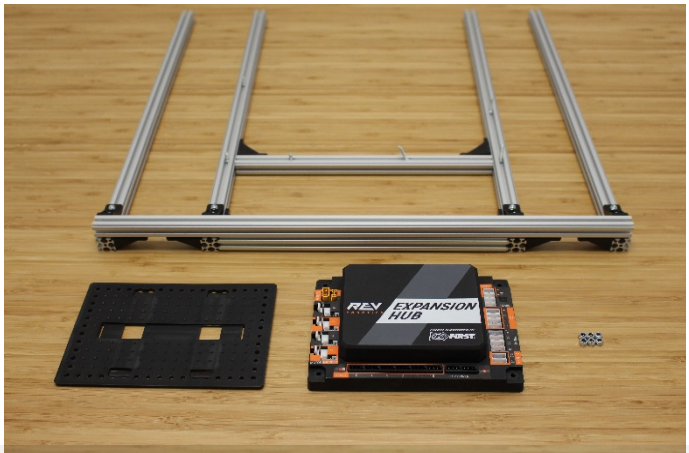


Tighten lap brackets

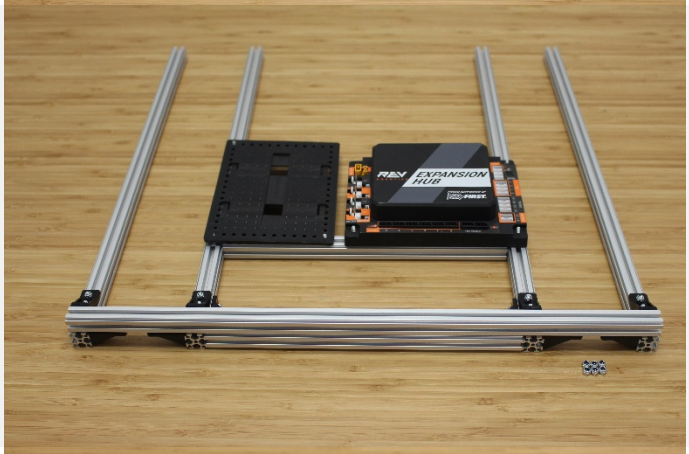


Collect Parts:

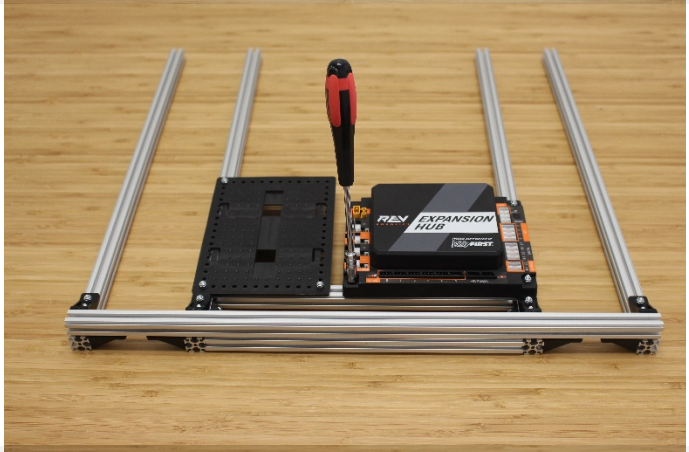
- 1x REV-41-1166
- 1x REV-41-1153
- 2x REV-41-1359
- 2x REV-41-1360
- 6x REV-41-1361



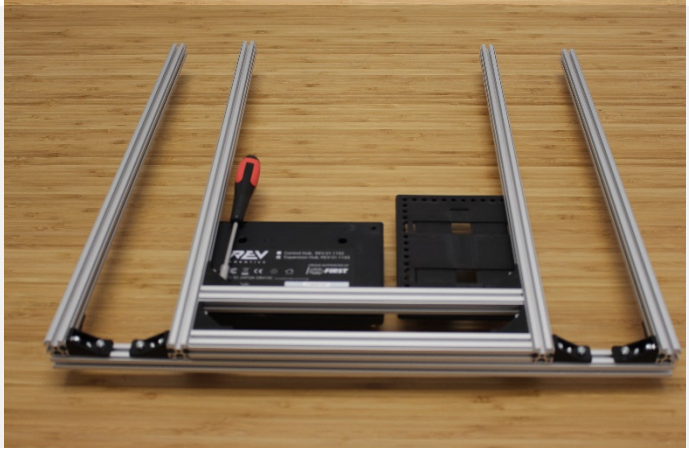
Slide REV-41-1359 and REV-41-1359 screws onto screws inside vertical REV-41-1432.



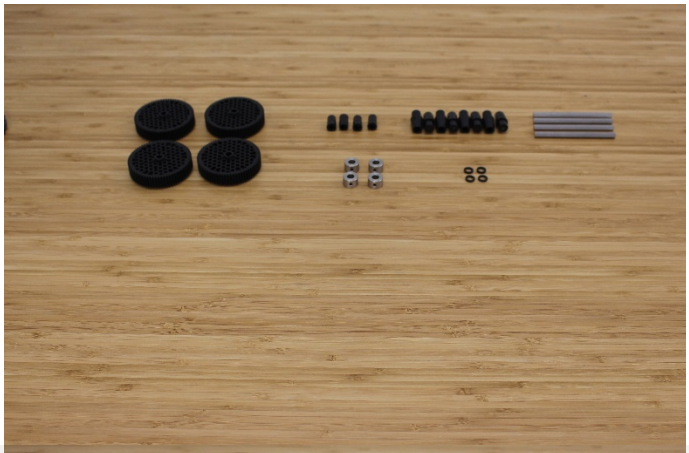
Place the REV-41-1153 and REV-41-1166 on as shown.



Add REV-41-1361 nuts and tighten down then the REV-41-1153 hub and REV-41-1166 plate so they are touching the REV-41-1321 brackets.

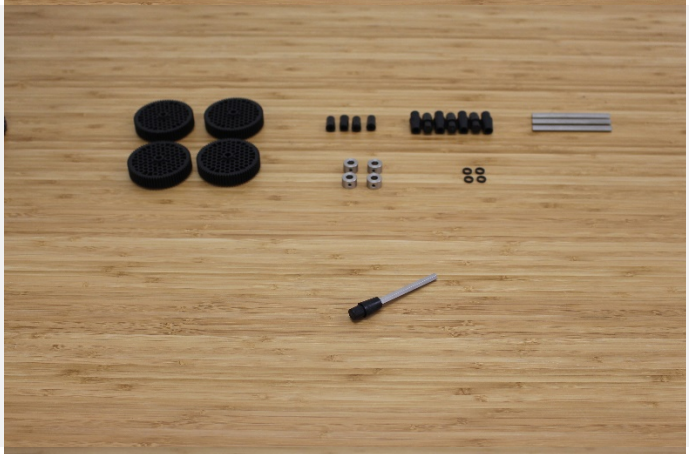


Flip over and tighten REV-41-1320 brackets

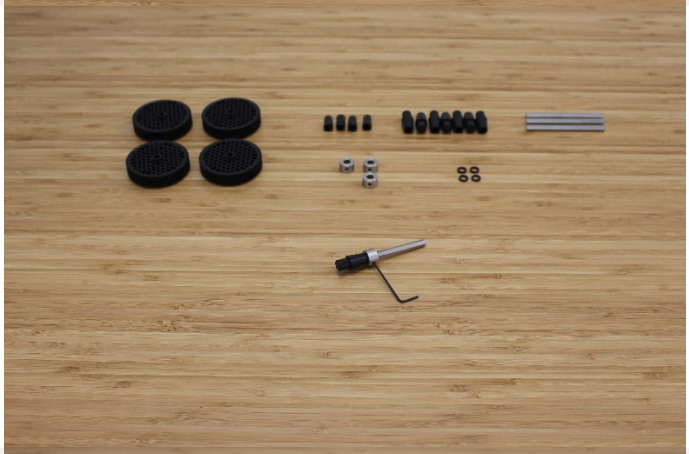


Collect Parts:

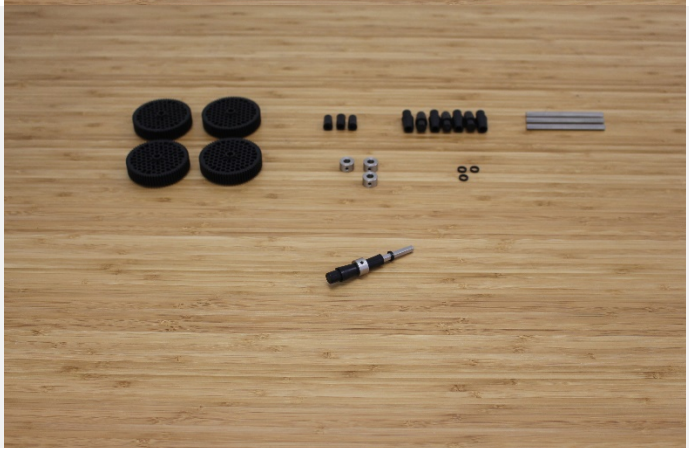
- 4x REV-41-1336
- 4x REV-41-1323
- 4x REV-41-1327
- 8x REV-41-1322
- 4x REV-41-1325
- 4x REV-41-1347



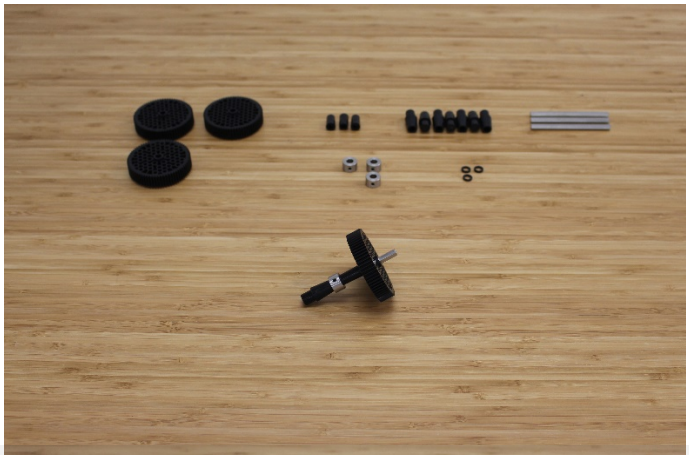
Place REV-41-1322 end cap bearing onto REV-41-1347 shaft.



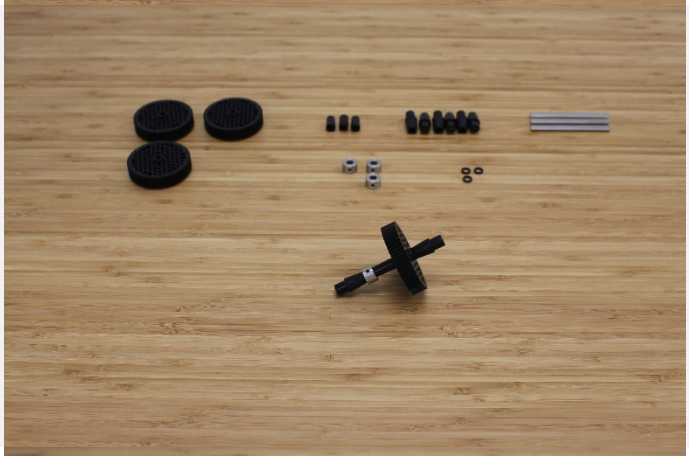
Add the REV-41-1327 shaft collar and tighten down.



Slide on REV-41-1323 and REV-41-1325.

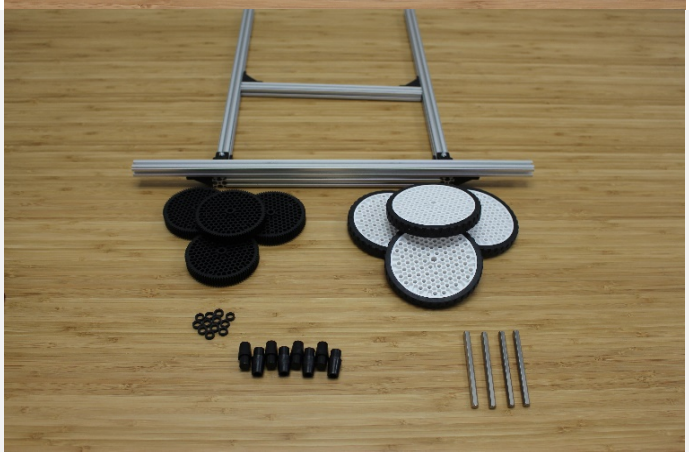


Slide on REV-41-1336.



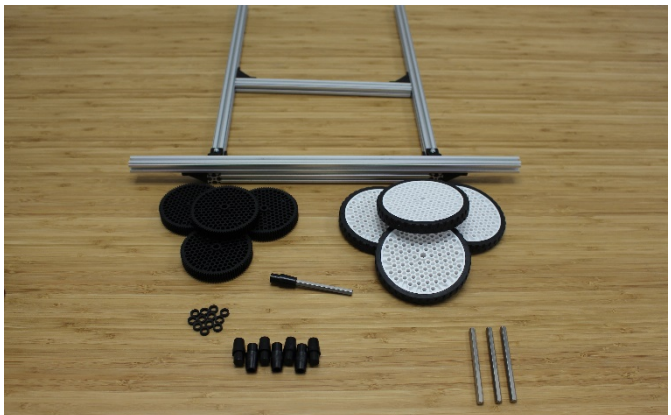
Place REV-41-1322 end cap bearing onto shaft.

Repeat 4 times to finish the Gear shaft assemblies.

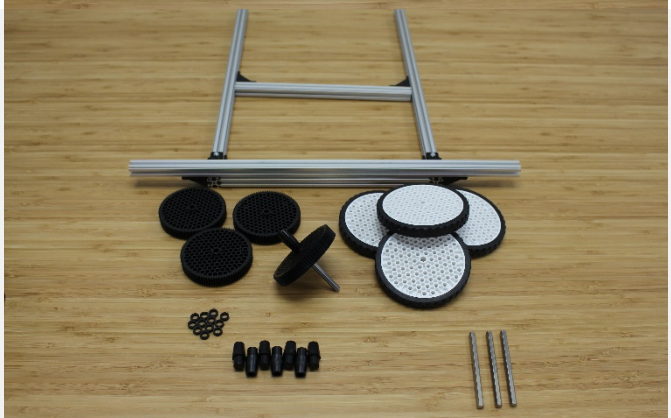


Collect Parts:

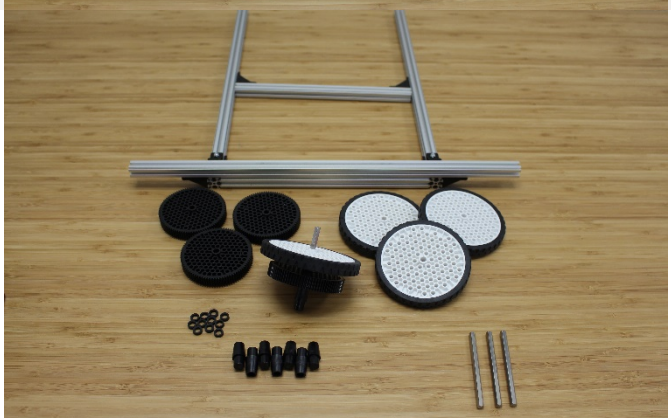
- 4x REV-41-1337
- 4x REV-41-1354
- 4x REV-41-1324
- 8x REV-41-1322
- 4x REV-41-1347



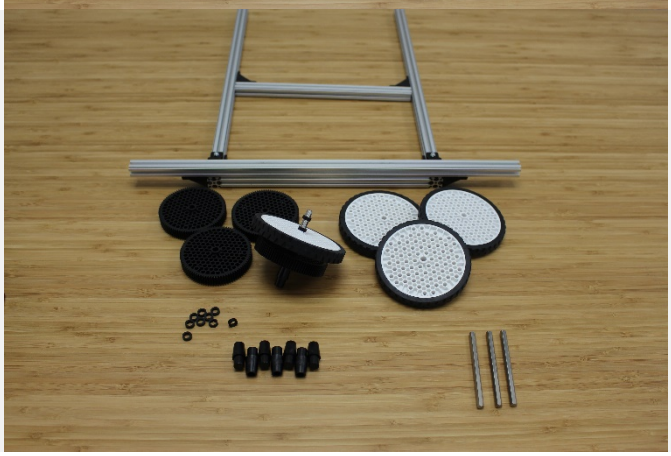
Place the REV-41-1322 end cap bearing onto the REV-41-1347 shaft.



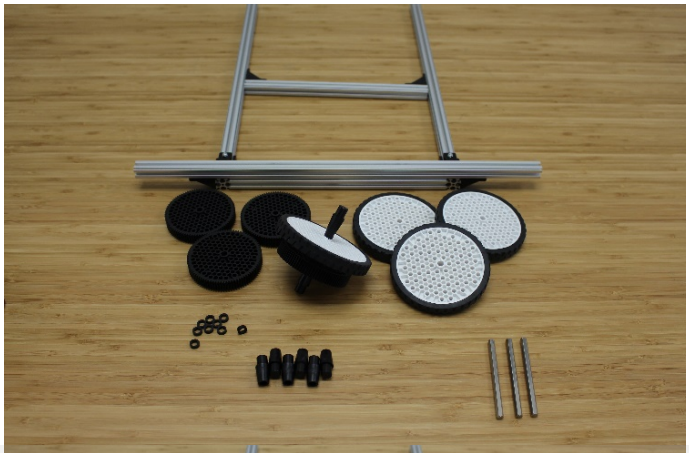
Add REV-41-1337 gear to shaft.



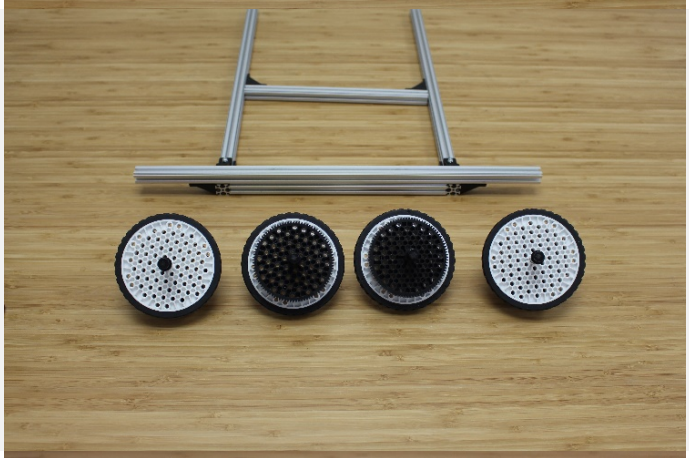
Add REV-41-1354 wheel to shaft.



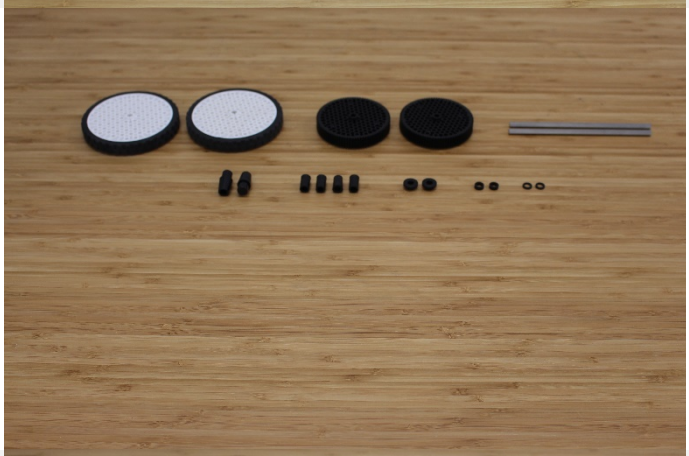
Add two REV-41-1324 spacers to shaft.



Add REV-41-1322 end cap bearing to shaft.

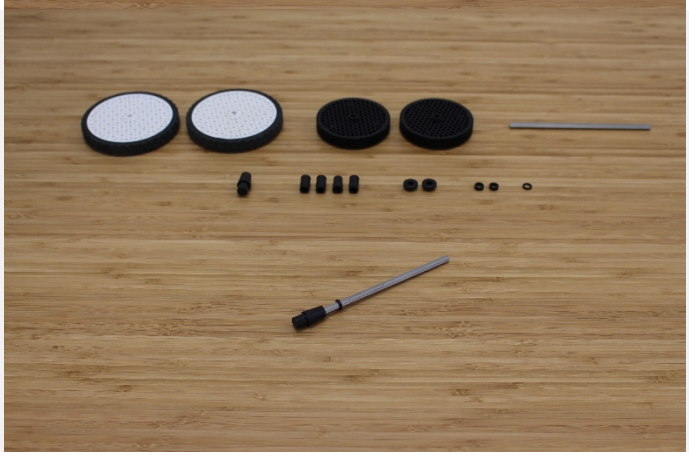


Repeat 4 times to finish the wheel shaft assemblies.

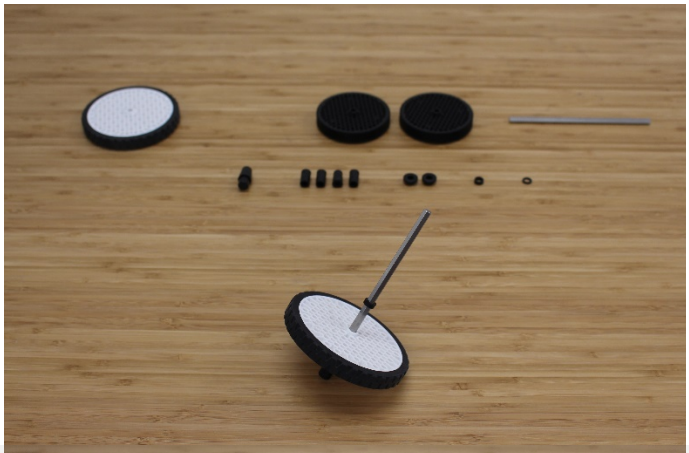


Collect Parts:

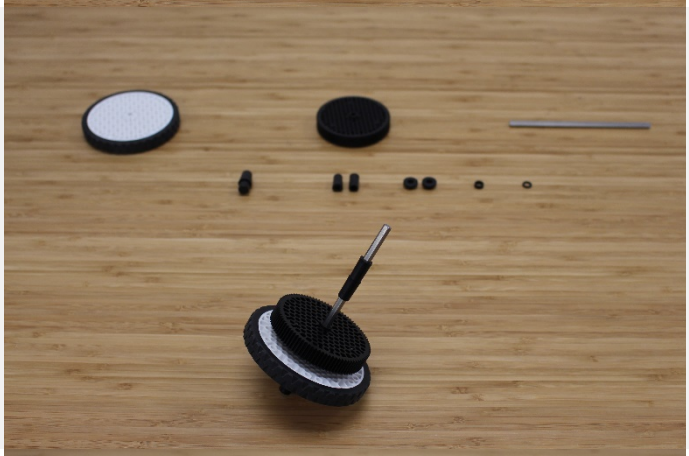
- 2x REV-41-1354
- 2x REV-41-1337
- 2x REV-41-1322
- 4x REV-41-1323
- 2x REV-41-1323
- 2x REV-41-1325
- 2x REV-41-1349



Place REV-41-1322 end cap bearing and REV-41-1325 spacer onto REV-41-1348 shaft.



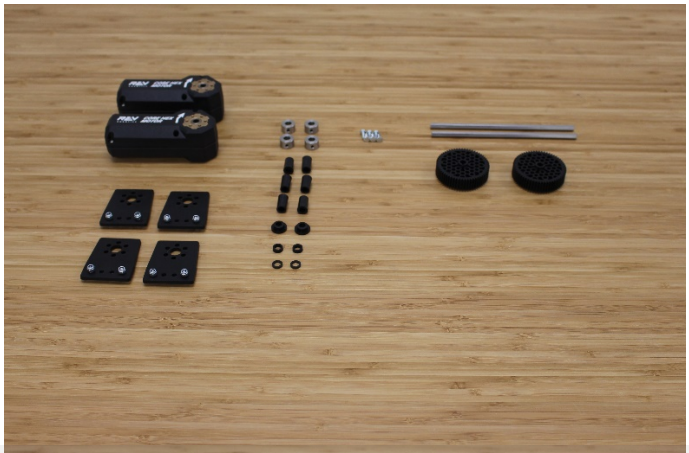
Add REV-41-1354 wheel and REV-41-1324 spacer onto REV-41-1348 shaft.



Place REV-41-1337 gear and two REV-41-1323 spacers onto REV-41-1348 shaft.

Place REV-41-1326 short bearing onto REV-41-1348 shaft.

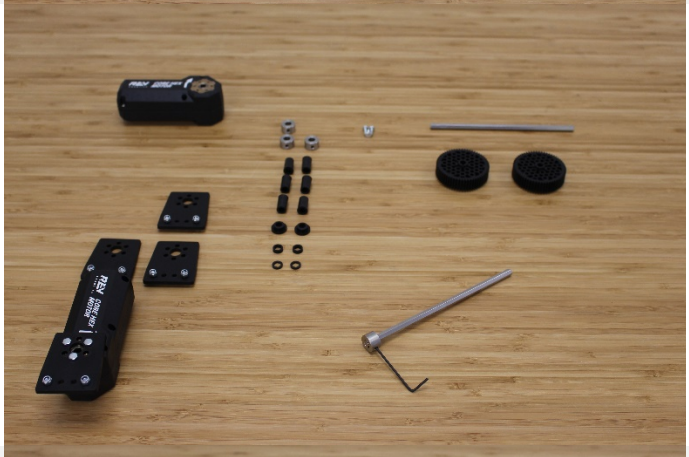
Repeat 2 times to finish the center wheel shaft assemblies.



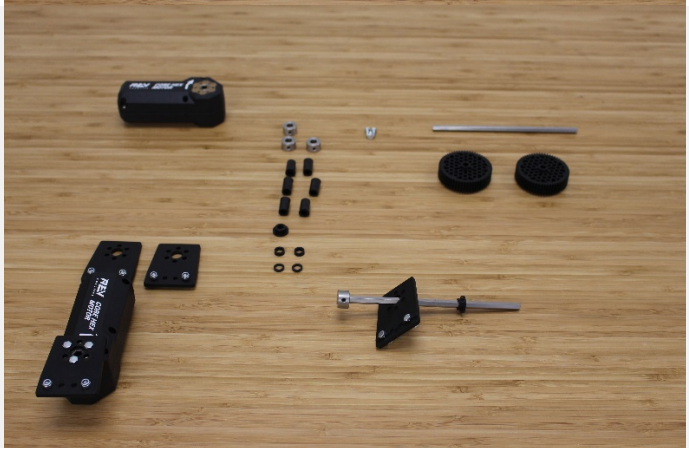
Collect Parts:

- 2x REV-41-1300
- 4x REV-41-1303
    - Pre-load with REV-41-1359 and REV-41-1361
- 4x REV-41-1327
- 6x REV-41-1323
- 2x REV-41-1126
- 2x REV-41-1324
- 6x REV-41-1359
- 2x REV-41-1335
- 2x REV-41-1348

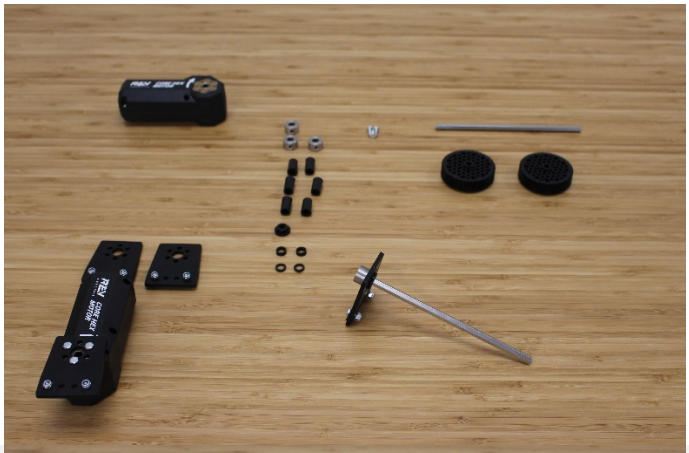
Add REV-41-1303 bracket to REV-41-1300 motor using REV-41-1359 screw.



Attach the REV-41-1327 shaft collar to the end of the REV-41-1348 shaft.



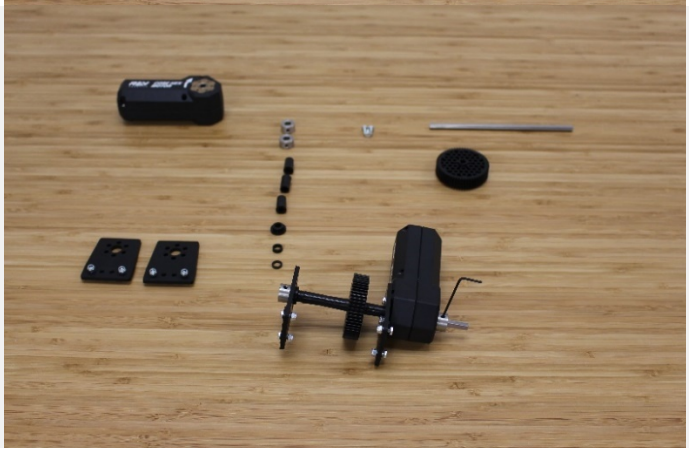
Add REV-41-1303 bracket and REV-41-1326 to the shaft.



Push together.

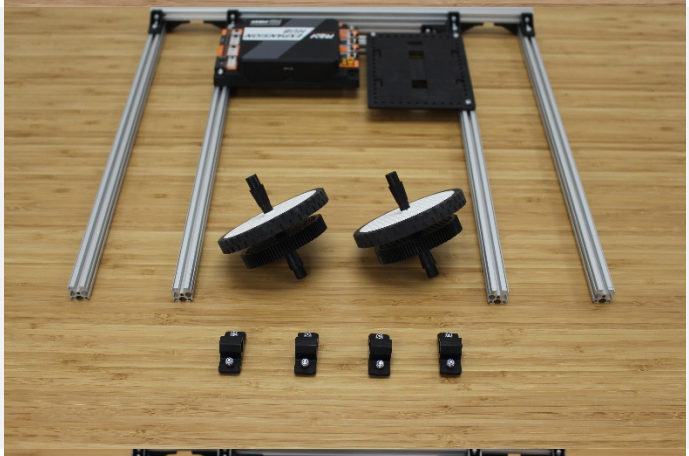
Add REV-41-1325, REV-41-1324 and two REV-41-1323 onto the shaft.

Add REV-41-1335 gear and REV-41-1323 spacer.



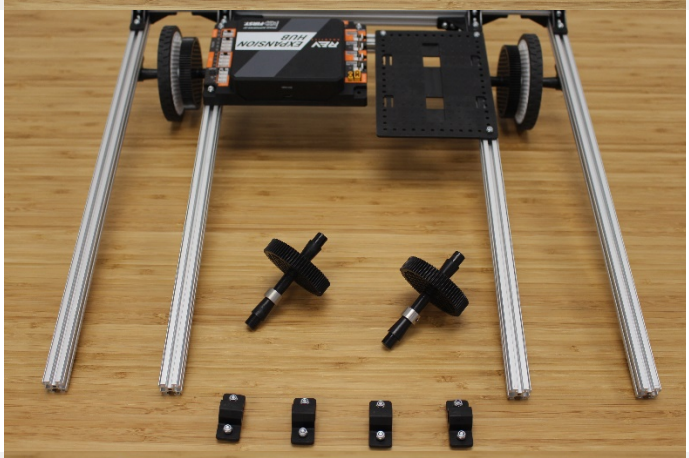
Add the REV-41-1300 motor assembly and REV-41-1327 to the shaft.

Repeat 2 times to finish the motor assemblies.



Collect Parts:

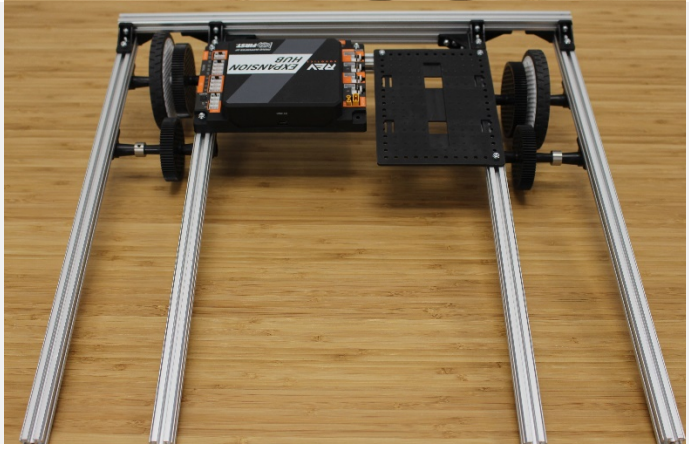
- 4x REV-41-1317
  - Pre-load with REV-41-1359 and REV-41-1361
- 2x Wheel shaft assemblies



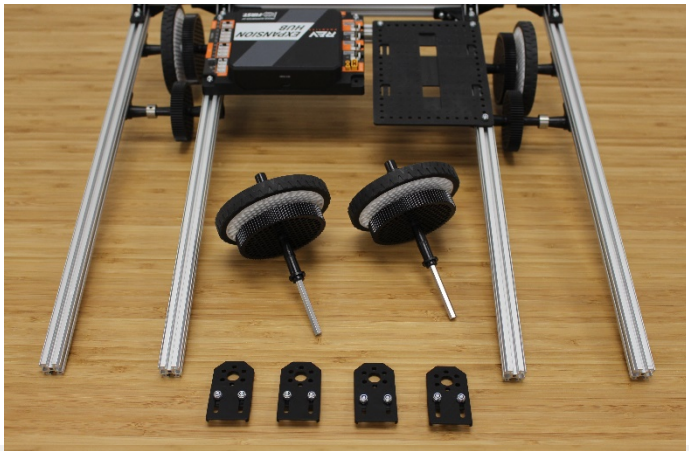
Slide REV-41-1317 pillow brackets and Wheel shaft assemblies onto frame.

Collect Parts:

- 4x REV-41-1317
  - Pre-load with REV-41-1359 and REV-41-1361
- 2x Gear shaft assemblies

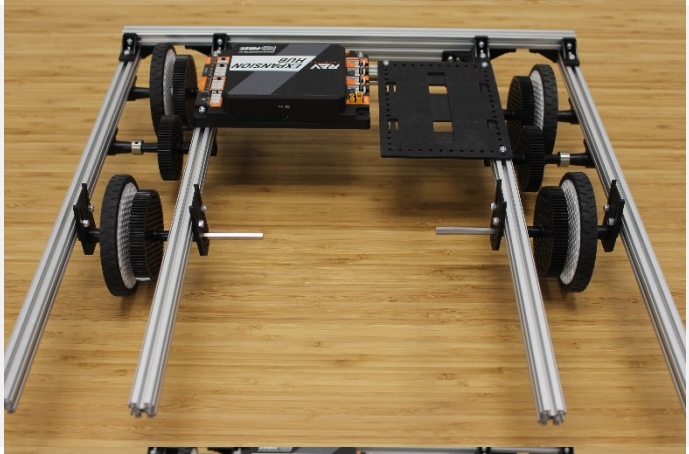


Slide REV-41-1317 pillow brackets and Gear shaft assemblies onto frame.

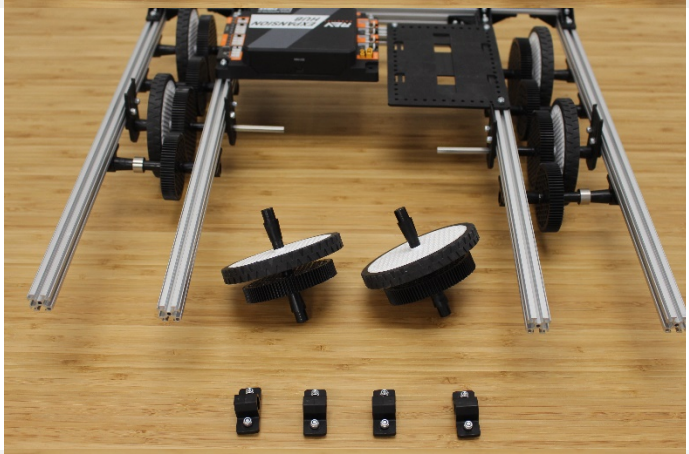


Collect Parts:

- 4x REV-41-1313
  - Pre-load with REV-41-1359 and REV-41-1361
- 2x Center Wheel shaft assemblies

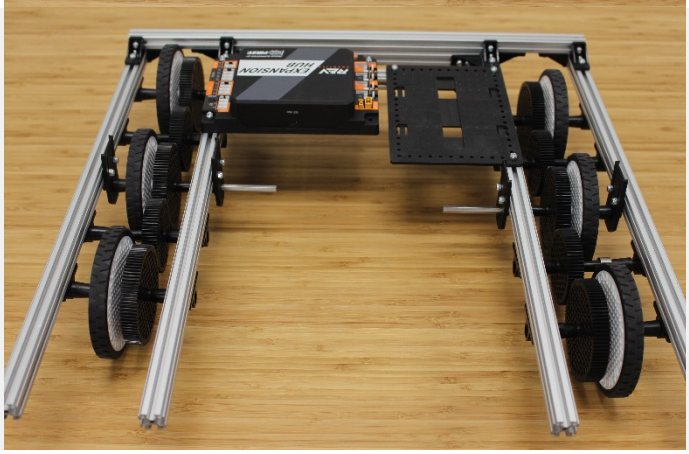


Slide REV-41-1313 bracket and center wheel shaft assemblies onto frame.



Collect Parts:

- 4x REV-41-1317
  - Pre-load with REV-41-1359 and REV-41-1361
- 2x Wheel shaft assemblies



Slide REV-41-1317 pillow brackets and Wheel shaft assemblies onto frame.

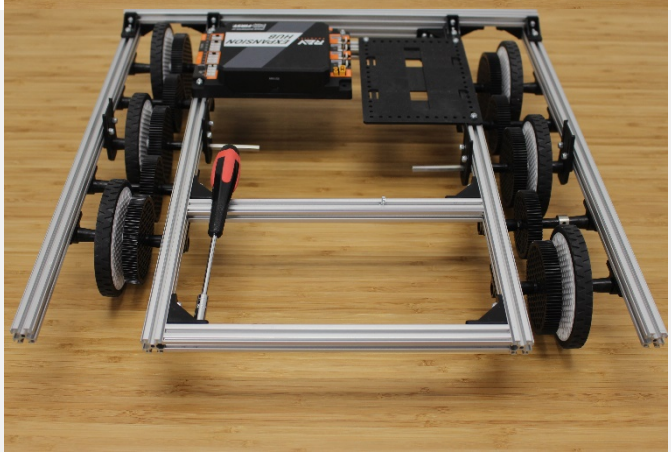
Collect Parts:

- 2x REV-41-1431
- 4x REV-41-1320
    - Pre-load with REV-41-1359 and REV-41-1361
- 1x REV-41-1359

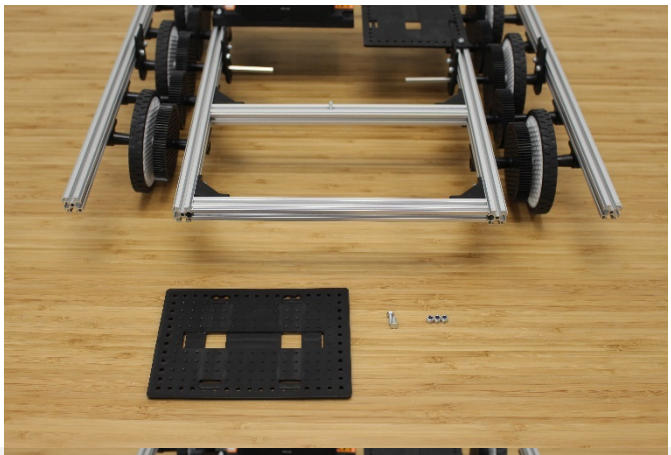
Slide REV-41-1320 on the ends of REV-41-1431 such that the brackets and Extrusion are flush.

Tighten nuts.

Slide REV-41-1359 onto the one of the REV-41-1431 assemblies.

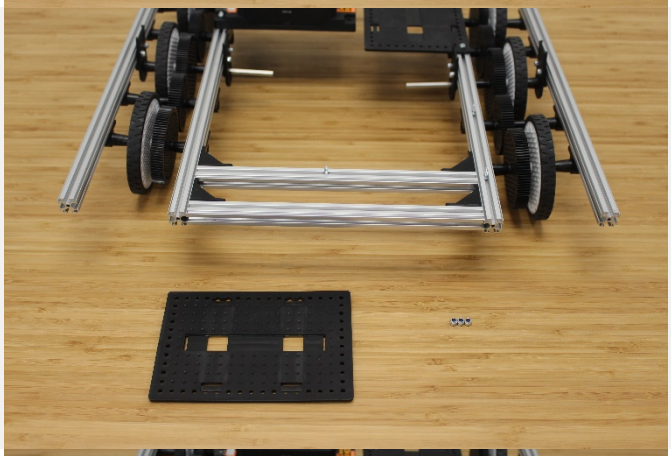


Slide on REV-41-1431 assemblies such that front set is flush. Tighten only the front set of REV-41-1320 brackets.

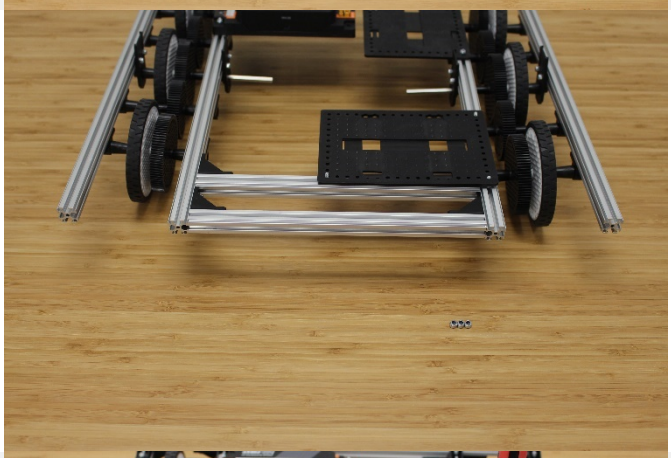


Collect Parts:

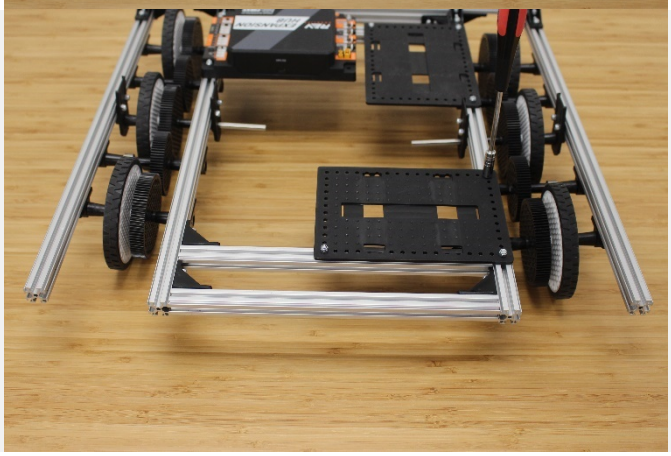
- 1x REV-41-1166
- 2x REV-41-1359
- 3x REV-41-1361



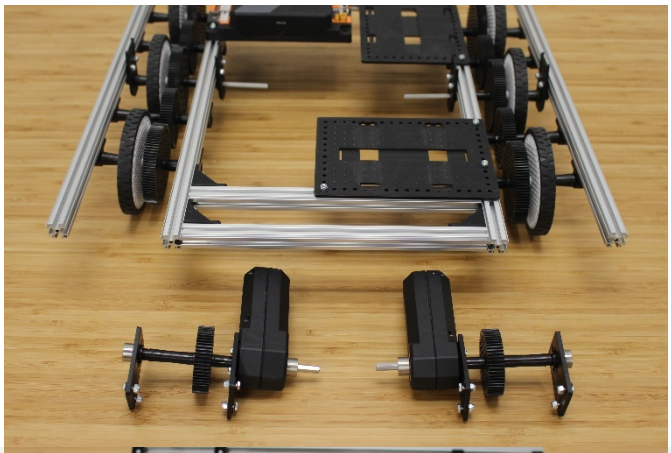
Slide REV-41-1359 screws onto frame.



Add REV-41-1166.

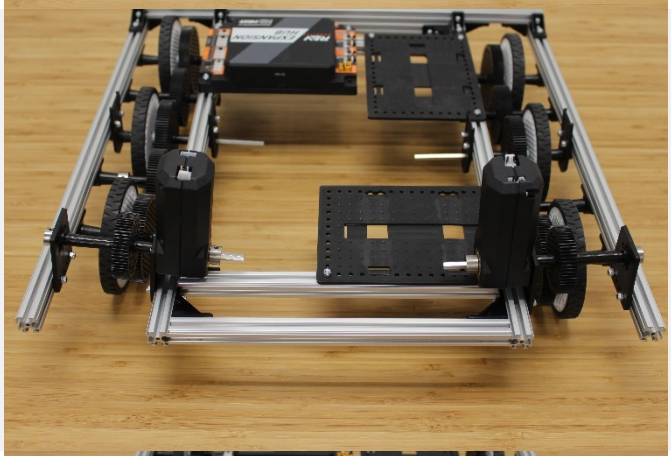


Finger tighten REV-41-1361 nuts.

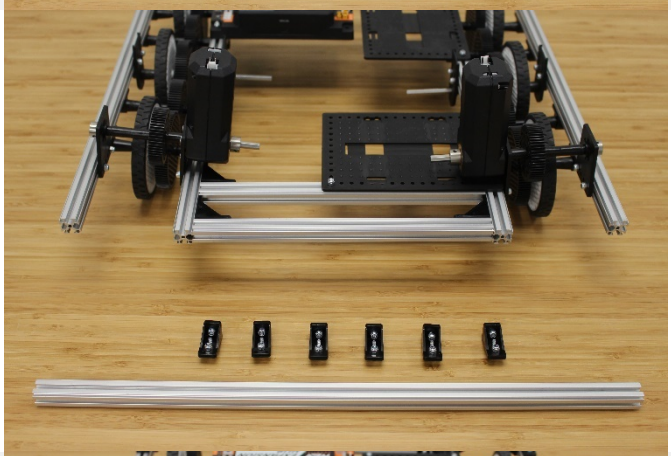


Collect Parts:

- 2x Motor Assemblies

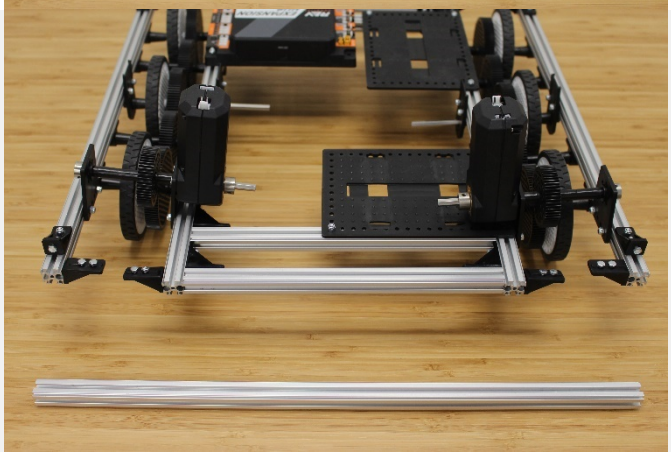


Side motor assemblies onto frame.

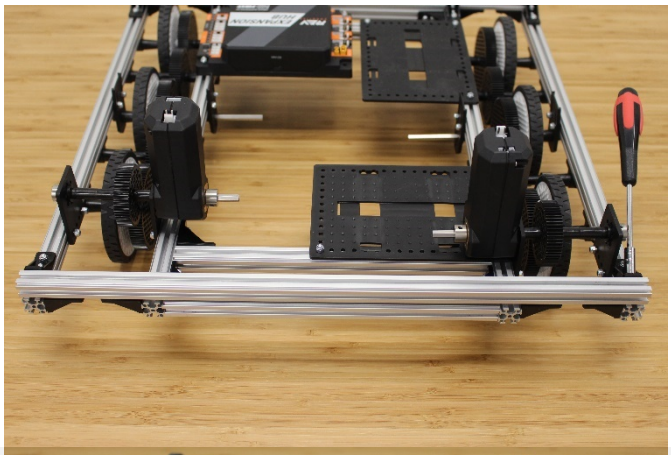


Collect Parts:

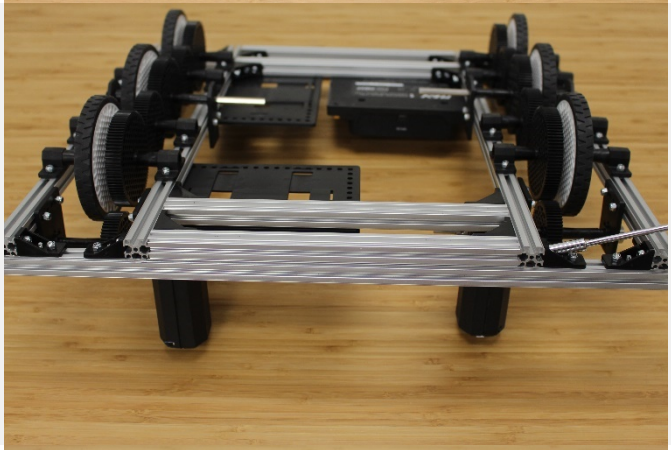
- 1x REV-41-1432
- 6x REV-41-1321
    - Pre-load with REV-41-1359 and REV-41-1361



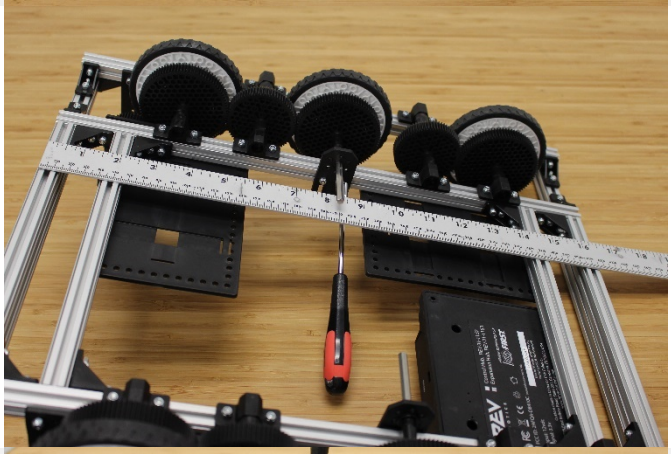
Place REV-41-1321 brackets as shown. Leave screw loose.



Slide REV-41-1432 onto REV-41-1321 brackets. Make REV-41-1432 flush with the REV-41-1431 assembly.



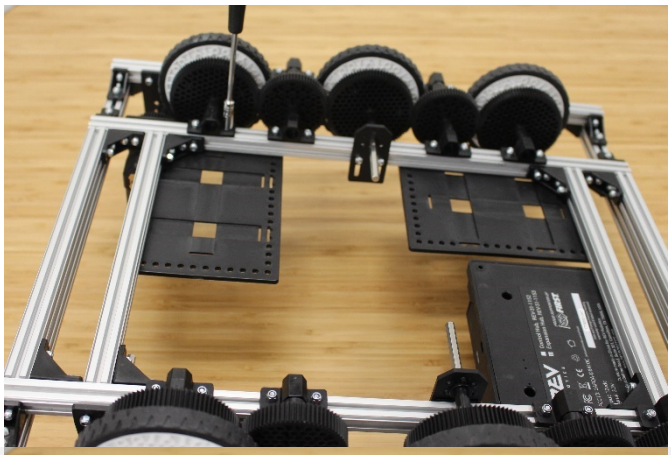
Tighten REV-41-1321 bracket nuts. From the outside inwards. Be sure to keep the frame square while tightening nuts.



Adjust Center Wheel shaft assemblies so the axel 210mm from the front and back of the frame. Tighten down nuts. Take care to ensure the axle is square to the frame and brackets.

Bring the Gear shaft assemblies into position. The gears need to be parallel to each other such that the gears mesh uniformly with each other.

Tighten the nuts down.

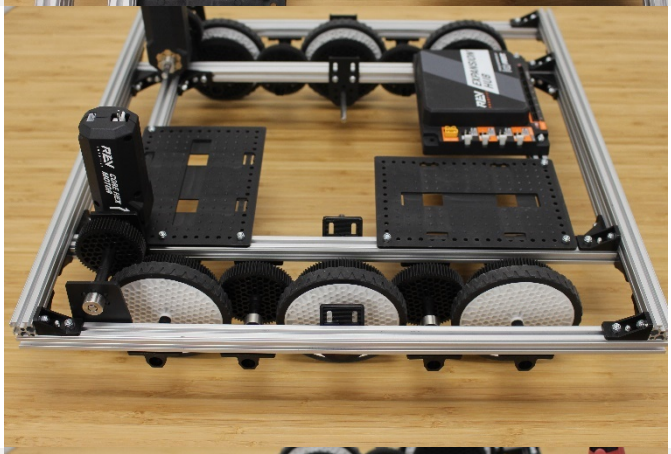


Bring the Wheel shaft assemblies into position. The gears need to be parallel to each other such that the gears mesh uniformly with each other.

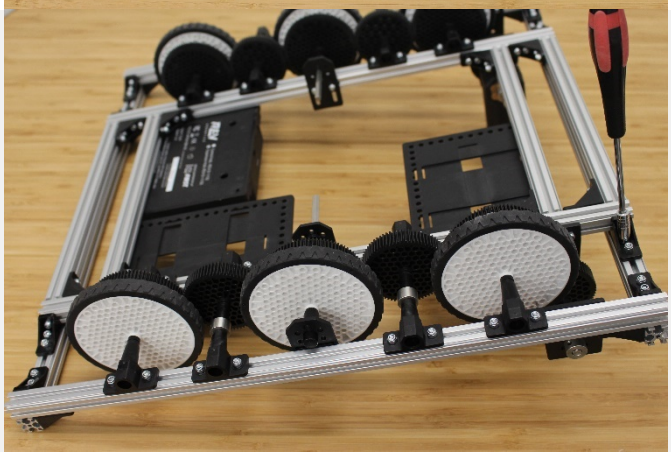
Tighten the nuts down.

Bring the Motor shaft assemblies into position. The gears need to be parallel to each other such that the gears mesh uniformly with each other.

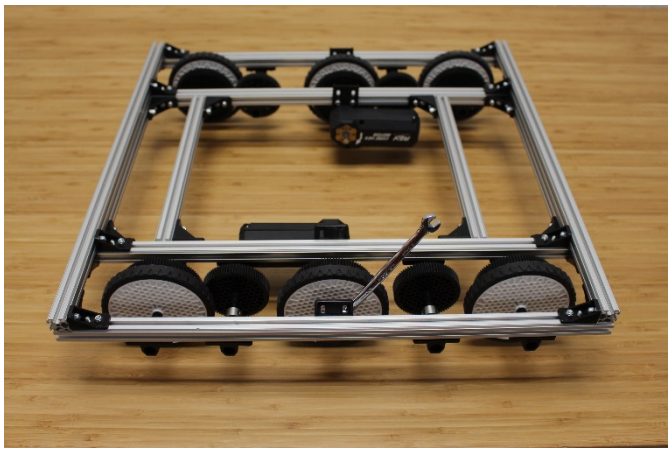
Tighten the nuts down.



Repeat for the other side.



Adjust the frame as needed for optimal operation.



Modify the frame as needed.