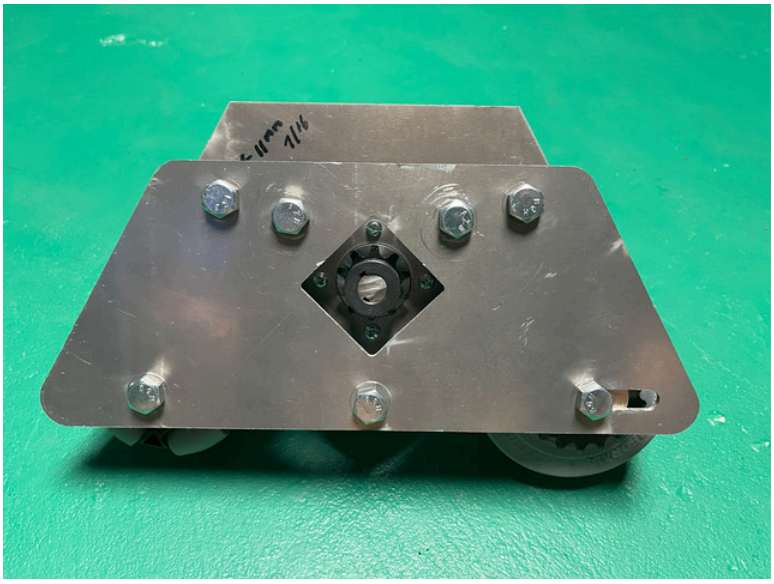
Scavenger Drive 2.0 Assembly Guide

Part: Drive 2.0
Rev 2024.07.28

Video Assembly Guide
https://www.youtube.com/watch?v=9trqxNJQiQ0

DXF files have been updated with compatibility to the AmpFlow E30 motors, new Coulson wheels, and the Baddeley remixed 3D printed foot shells.

Drive Frames



Finished Scavenger Drive

Parts List (Single foot, will be assembling two)

1. Aluminum plates - 5052 Aluminum, 0.125” (1/8)
    a. Front plate & Rear plate
    b. Motor mount plate
    c. 2ea Ankle mount plates (aka Dog Bone)
2. BattleKit Robot Wheel (4” Colson wheel with integrated 19-tooth sprocket)
3. Vex Omni Wheel
4. Assembled Roller Chain (#35, approx 19 links)
5. AmpFlow E30-150 motor
6. Jeremywell #35 Roller Chain Sprocket 1/2" Bore 10 Tooth
7. 4ea #10-24 machine screws, 3/4 inch length
8. 2ea zinc plated cut washer 1/2"
9. 5ea 3/8"-16 zinc plated hex bolt 3-1/2"
10. 2ea 3/8"-16 zinc plated hex bolt 1-1/2"
11. Aluminum spacers (mostly ½” and some ¾”)
12. ⅜” nylock nuts (basic from hardware store)
13. ⅜” low-profile nylock nuts
14. Loctite blue or red

1. Mount Sprocket to Motor

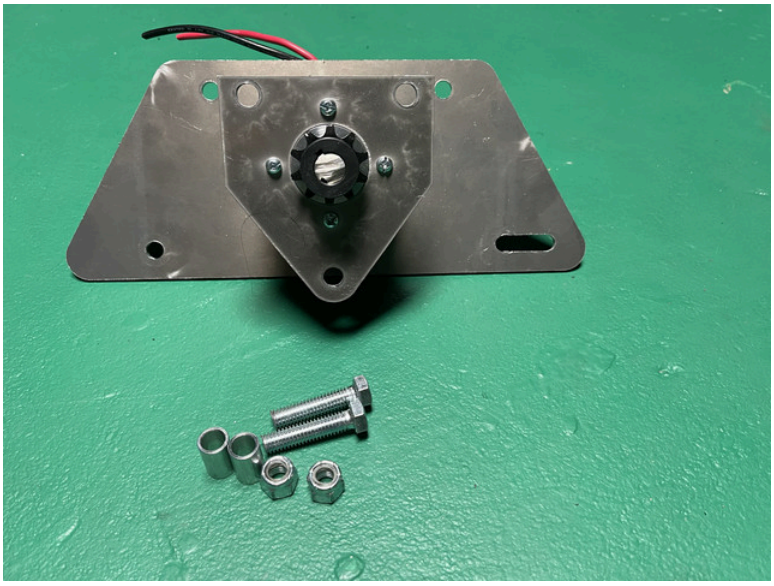
Mount the sprocket with the teeth facing the motor. The flat end of the sprocket, where you turn the set screws, will be about 1” away from the end of the shaft where it meets the motor plate.

You can cut the motor shafts at this point, but leave ⅛” to ¼” past the sprocket just in case you need to make minor adjustments.The smaller end of the shaft (side with the wires) can be cut flush.

2. Rear Frame Plate & Motor Mount

Slide the rear frame plate onto the motor then Mount the motor plate to the Motor with 4 screws. Use machine screws (#10, 3/4” length) with Loctite. Ensure the motor wires are facing up.

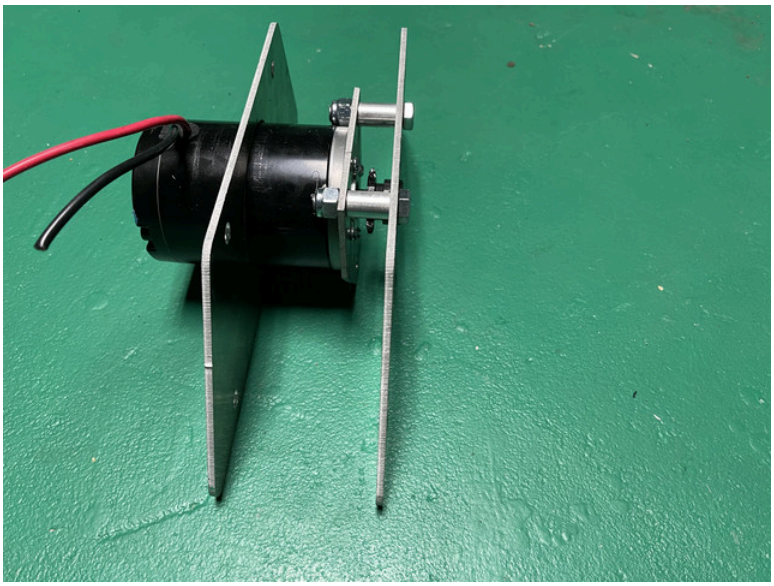
Mount the chain loosely to the sprocket at this point (not shown).



Step 2 complete: adding back frame plate and motor mount plate

3. Spacers & Front Frame Plate

Use two ⅜” bolts at 1-¾” length. Slide the bolts through the front frame plates and through the 13/16” [20mm] spacer, then attach to the motor plate using nylock nuts.

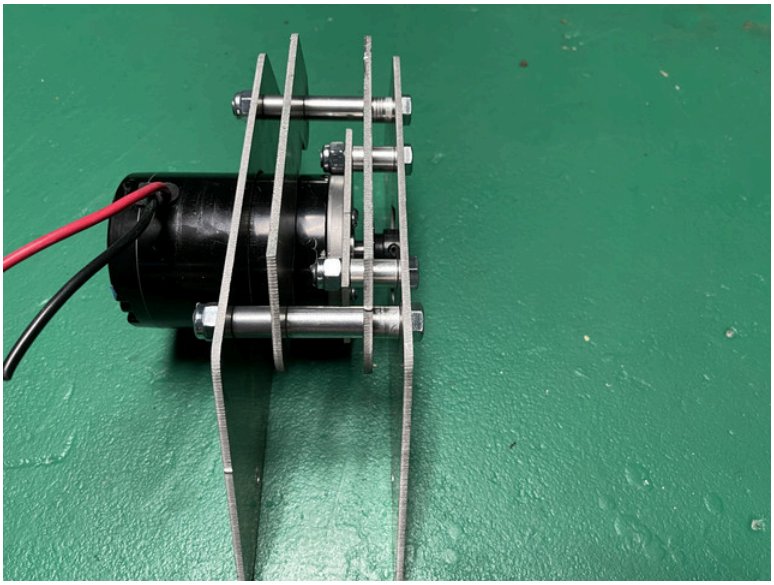


Step 3 complete: adding front frame to motor mount

4. Ankle Mounting Brackets aka Dog Bones

Use two of the long ⅜” bolts. Slide the bolts through the front frame plates. Add the 7/16” [11mm] spacer then one of the ankle brackets. Next, slide on the 1-3/16” [30mm] spacer then the other ankle plate. Finally pass it through the 11/16” [17mm] spacer and bolt to the rear frame plate using the low profile nylock nuts. You will need to cut these bolts down so they are flush with the end of the nut.

Ankle Brackets with hardware



Step 4 complete: adding Ankle Brackets to top

5. Ankle Mounting Brackets aka Dog Bones

Flip the assembly over. Slide a 1-1/2 in [38mm] and the 1 inch [25mm] spacer through the Vex omniwheel. Alternatively, you can cut a 2.5 inch [63mm] spacer yourself. You may need to sand down the ½” spacers to ensure they slide through the Vex wheel without any resistance.

Slide the 7/16” [11mm] thicker 3/4" spacer over the smaller 1/2" spacers on either side and add the additional 7/32 [5mm] 3/4" spacer on one side as shown in the image. These larger spacers will keep the Omni wheel slightly off centered without sliding around on the ½” spacers. Secure together with a 3/8" bolt and nylock nut. You will need to cut these bolts down to be flush with the nut.

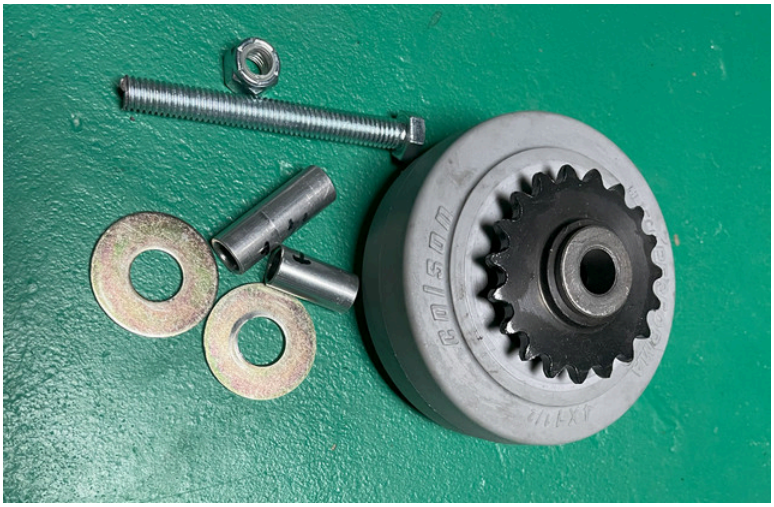
Step 5 complete: adding Vex Omniwheel to the rear

6. Front (Drive) Wheel

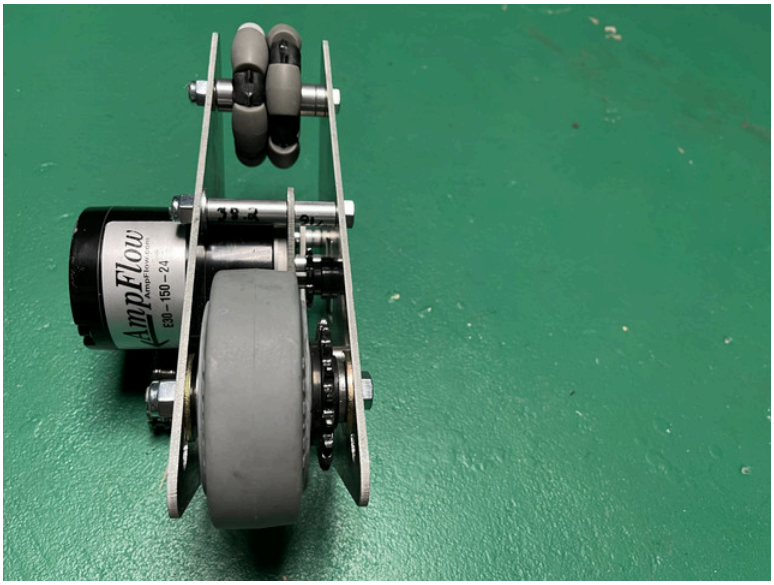
Slide the 1 1/2 inch [38mm] spacer and the 1 inch spacer [25mm] into the Colson wheel. Again, sand the spacers down if necessary to ensure the wheel spins freely. Slide the bolt through the first plate, add a ½" fender washer, then the wheel while you slide the chain on (not pictured).

Push the bolt through the wheel, add another fender washer, then tighten the assembly with a nylock nut. You will cut down the bolt flush with the nut.

Finally, add the center bolt with the two remaining spacers.

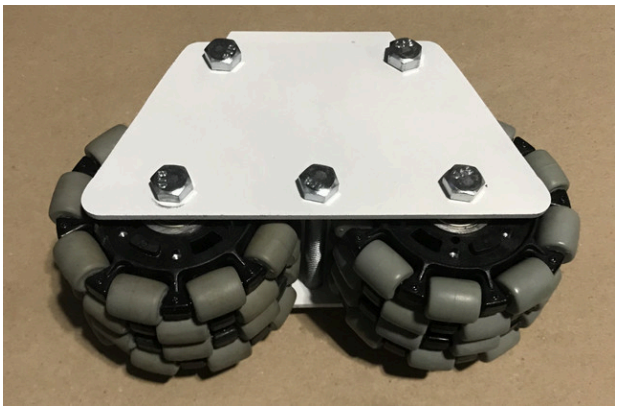


Colson wheel with sprocket and mounting hardware



Scavenger Drive completed

Center Frame

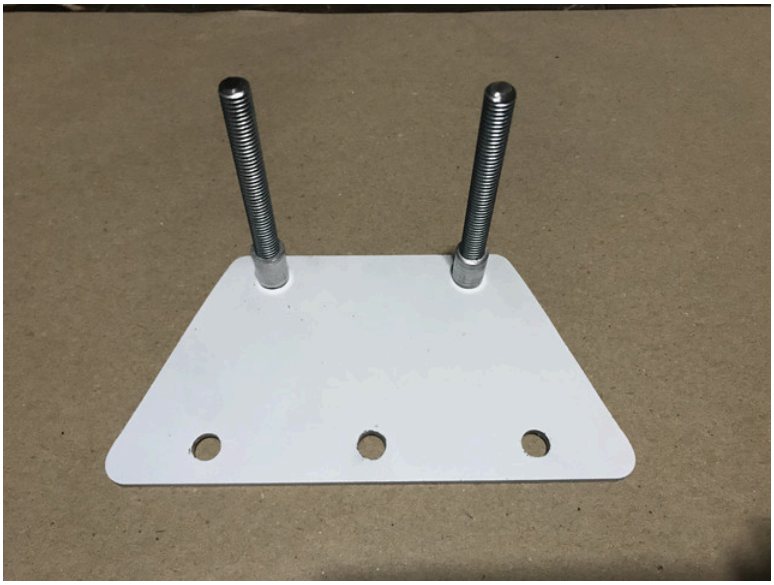


Parts List (Center Frame)

1. Aluminum plates - 5052 Aluminum, 0.125” (⅛”)
    a. Left plate
    b. Right plate
    c. 2ea Small Ankle mount plates (aka Dog Bone)
2. 4ea Vex Omni Wheel 4 inch
3. 2ea Vex VersaHub Spacers ¼”
4. 4ea Vex Flanged Bearings
5. 5ea hex bolts ⅜” 4 inch length
6. 5ea lock nuts ⅜”
7. Aluminum spacers

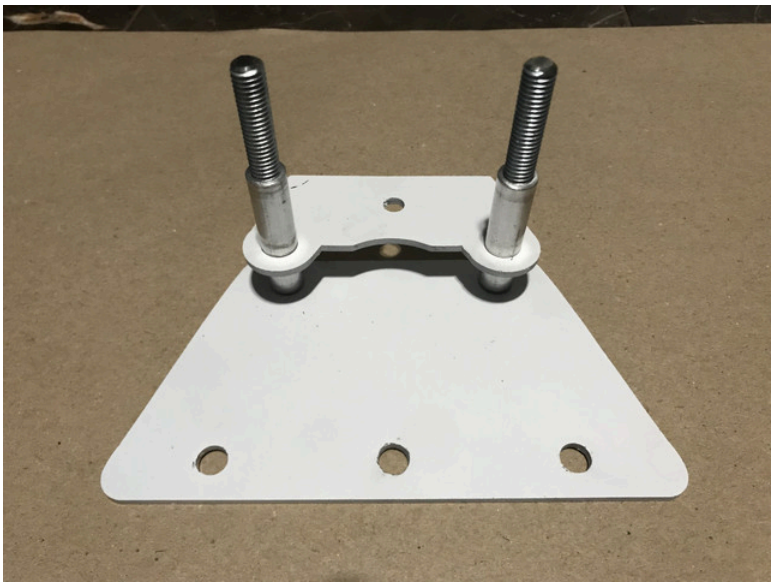
1. Top Bolts and Spacers

Take one of the side frames and slide two of the bolts through. Add the ¾” [19mm] spacers.



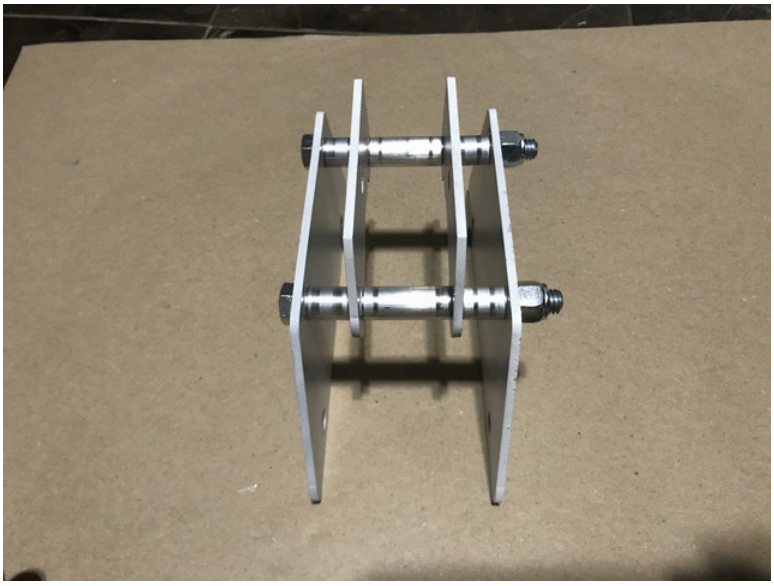
2. Ankle Plate & Middle Spacer

Add the Ankle Dogbone Plate and the 1-⅜” [35mm] spacers.



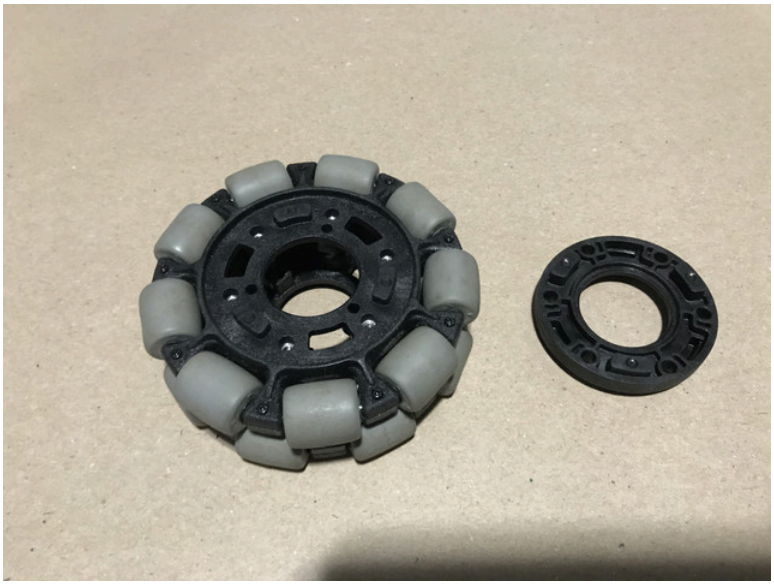
3. Ankle Plate, Spacer, End Plate

Add the Ankle Dogbone Plate and the other ¾” [19mm] spacers. Then add the other frame plate and attach using the nylock nut.

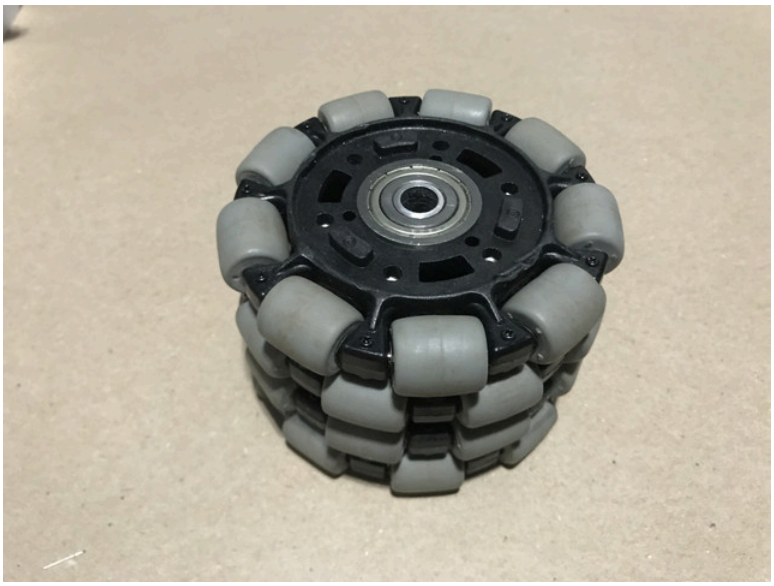


4. Assemble Omniwheels

Place the ¼” versahub spacer between two of the wheels.



Then add the flanged bearings on each side. Build the second set, as well.



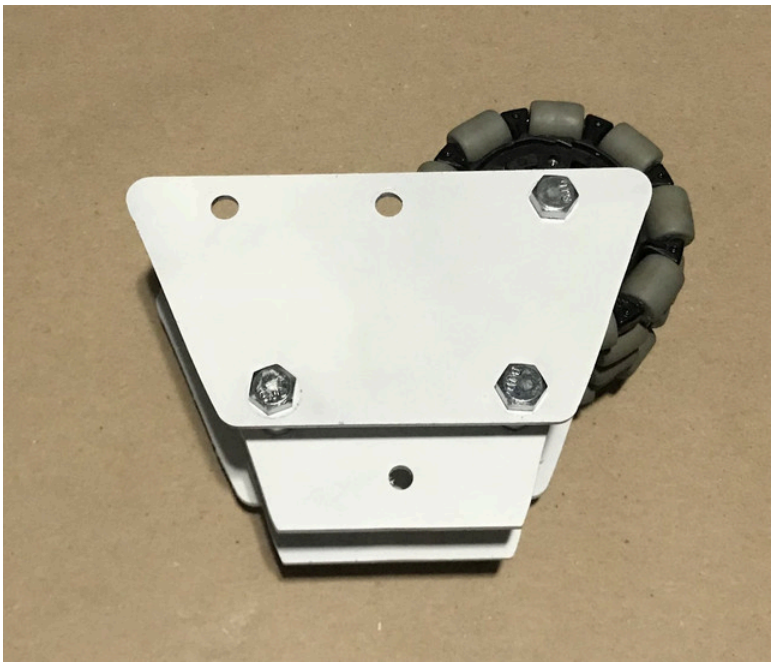
5. Add Spacers Through Wheels

Add a 1.5” [38mm], then 1/8" [3mm] and finally another 1.5” [38mm] spacer through the wheel. This will give you a total of 3-1/8" [41mm] which will protrude about an eighth of an inch on each side of the flange bearing, giving it enough space to spin without touching the plates.

Alternatively, you can cut your own 3.125” [41mm] spacers from ½” aluminum tubing. You will need to sand this down to fit through the bearings.

6. Attach Wheels

Add bolt through the bottom of the plate passing through the wheel assembly and attach using a nylock nut.



Do the same for the other wheel, and finally add a bolt and nut to the middle hole.

CHANGE LOG

2024-07-28
Updated materials list

2024-07-18
Added mm measurements to spacers.

2024-07-07
Added standard footer, publish date, versioning.

2024-07-02
Formatting updates.