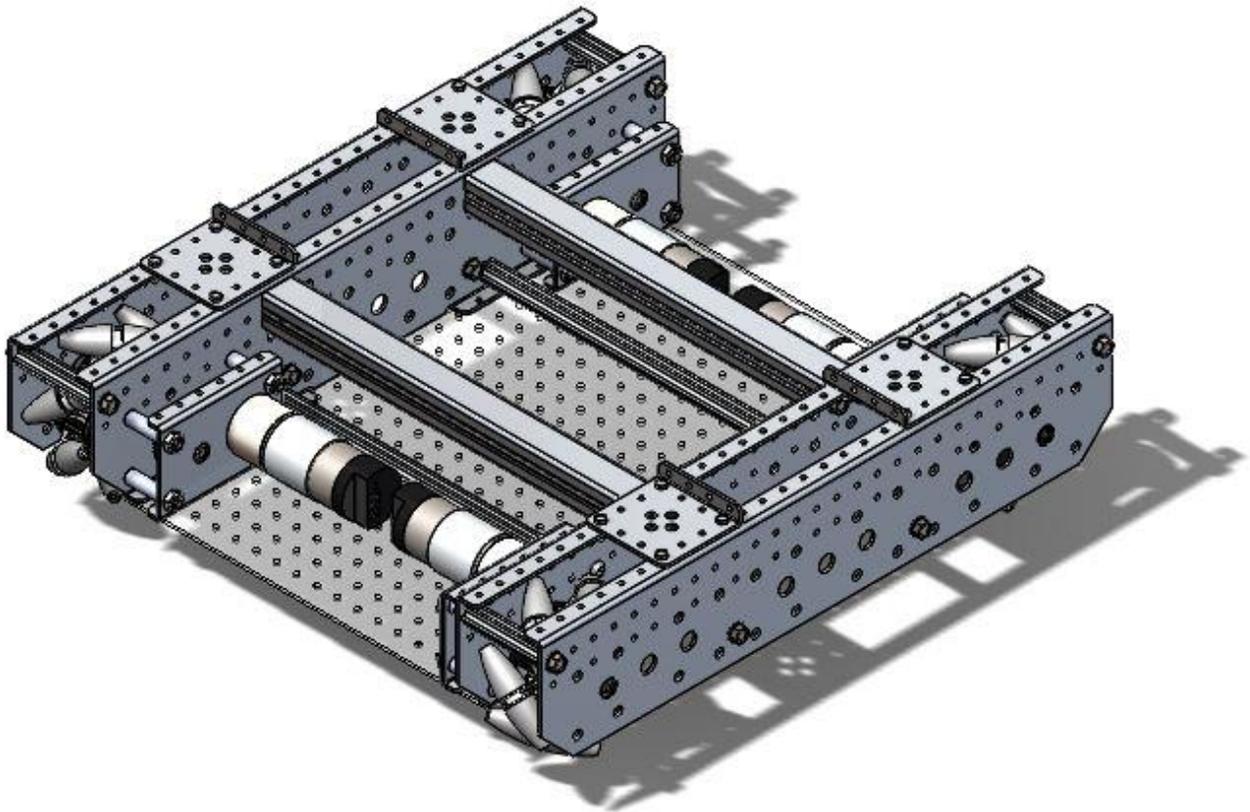


# User Guide

## TileRunner Mecanum

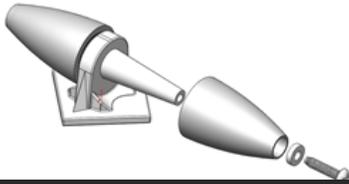


Part Number	Description	Quantity
am-3392_Inside	Chassis Inside Plate	2
am-3392_Outside	Chassis Outside Plate	2
am-3393	4x4 Plate for TileRunner	4
am-3394	Belly Pan for Chassis	1
am-3395	11.25" Peanut	2
am-3398	11.25" Churro	2
am-3399	63mm Churro	8
am-2538	4" Mecanum Wheel Single Wheel Kit	4
am-1317	PPHS 4-40x500 Thread Forming Screw	12
am-1328	0.25" Flat Nylon Washer	12
am-2540_half	4" Mecanum Wheel Body Half	2
am-2541	4" Mecanum Wheel Roller	12
am-2610	4" Mecanum Wheel Spindle	6
am-1250	PPHS 4-40 x 1000 Thread Forming Screw	1
am-2964a	NeveRest 40	4
am-2992	Hall Effect Encoder Cable	4
kit-TR17-Bearing	Bearing Kit	1
am-3377	6x12x4 Flanged Bearing	14
am-3215a	6mm D Bore Double Boss Nub	12
am-1310_28	1/4-20 x 750 Thread Forming Screw	1
am-1419	6-32 Nylock Jam Nut	24
kit-TR17_Gear	Gear Kit	1
am-3407	40T Gear for PicoBox	6
am-3408	35T Gear for PicoBox	4
am-3409	45T Gear for PicoBox	4

Tools Needed	Part Number
5/32" Allen Driver	am-2751
5mm Allen Driver	am-1180
3/8" Nut Setter	am-2755
3/8"-7/16" Wrench	am-2745
10mm Nut Driver	am-1286

## 4" Mecanum Wheel (am-2626)

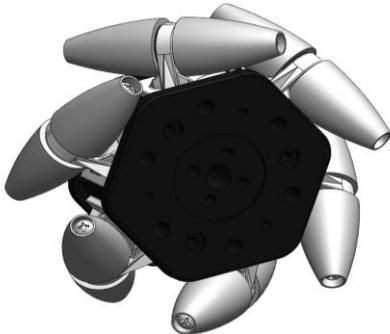
**Step 1:** Place the Roller (am-2541) onto the arm of the Spindle (am-2610), add a 0.25" Nylon Washer (am-1328) and secure with PPHS 4-40 x 500 Thread Forming Screw (am-1317).



**6X**

**NOTE:** Be sure to tighten the screw until the roller can no longer wiggle along the axle but rolls freely

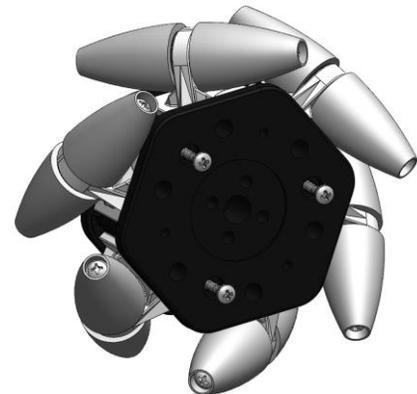
**Step 3:** Take another 4" Mecanum Wheel Body Half (am-2540\_half) and press it into the bases of the spindles. The large clearance holes will line up with the smaller holes.



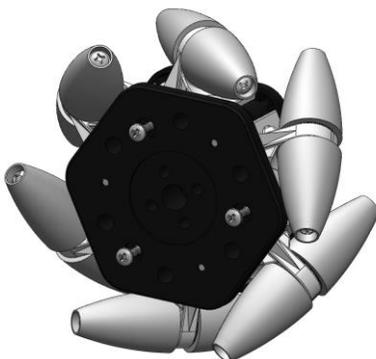
**Step 2:** With the assembled spindles, place into slots on one 4" Mecanum Wheel Body Half (am-2540\_half).



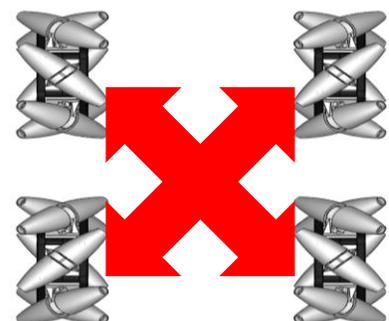
**Step 4:** Secure the two Wheel Body halves together with PPHS 4-40 x 1000 Thread Forming Screw (am-1250).



**Step 5:** Flip the wheel over and secure with PPHS 4-40 x 1000 Thread Forming Screw (am-1250).



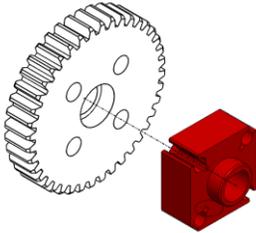
**Step 6:** Assemble 4 Mecanum Wheels. Two right and two left handed wheels are needed. When looking at the robot from the top, the top most rollers should form an "X".



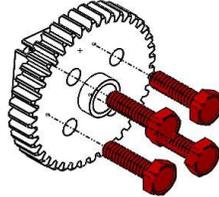
## PicoBox Uno (am-3447)

### Gear Assembly

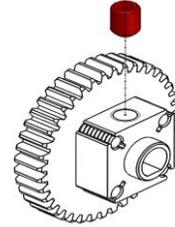
**Step 1:** Install a 6mm D-Bore Double Boss Nub (am-3215) on a 40T gear (am-3407)



**Step 2:** Use four 6-32 x 0.500" long Hex Head Screws (am-1436) to attach the gear to the nub.

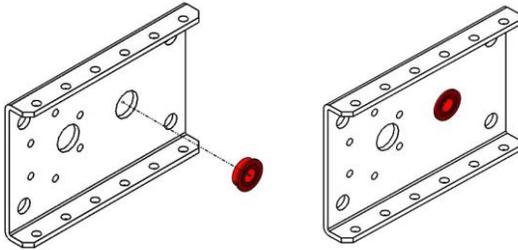


**Step 3:** Thread a 10-32 Set Screw (am-1342) partially into the nub.

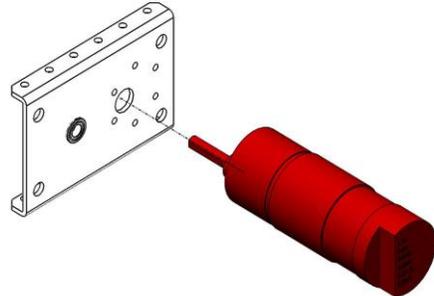


2X

**Step 1:** Press a 6x12x4 Flanged Bearing (am-3377) into the center 12mm hole of a PicoBox Uno gearbox plate (am-3423).

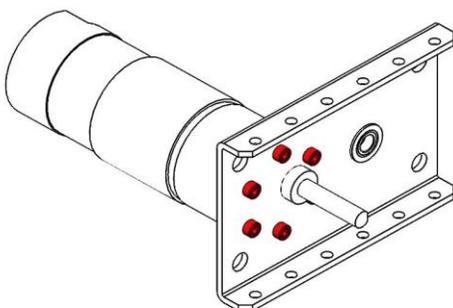


**Step 2:** Insert a NeveRest motor into the remaining 12mm holes of the PicoBox Uno gearbox plate, opposite of the flanges on the gearbox, and line up the threaded holes on the end of the motor with the bolt-circle holes of the gearbox plate.

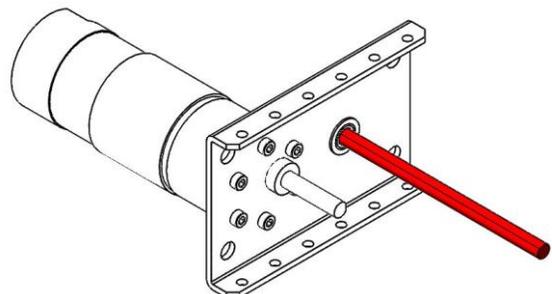


**NOTE:** Make sure the flange of the bearing is flush against the sheet metal of the gearbox plate.

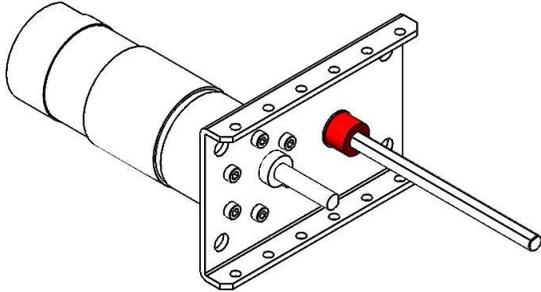
**Step 3:** Install six M3-0.5 x 6mm long socket head screws (am-1254) in each NeveRest motor to secure it to the gearbox plate.



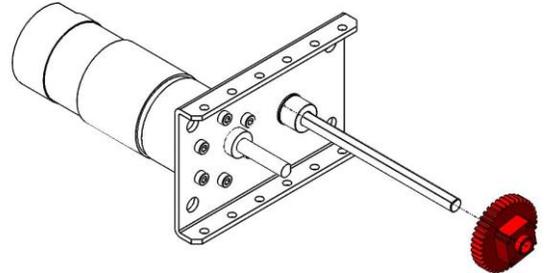
**Step 4:** Install the 6mm D-Shaft (am-3226-100) into the center bearing such that the end of the shaft is flush with the end of the bearing.



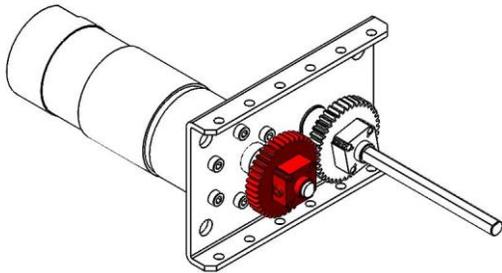
**Step 5:** Install the 9mm long Aluminum Spacer (am-3426) on the center axle up against the previously installed bearing.



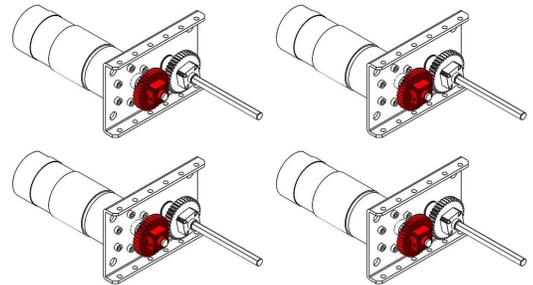
**Step 6:** Install one Gear Assembly onto the center axle of the gearbox. Be sure to place the boss of the Gear against the spacer. Tighten the #10-32 set screw to lock the Gear Assembly in place.



**Step 7:** Install a Gear Assembly onto each of the NeveRest Motor shafts such that all of the gears in the Gear Assemblies are lined up. Tighten the #10-32 Set screws to lock all the gear assemblies in place.

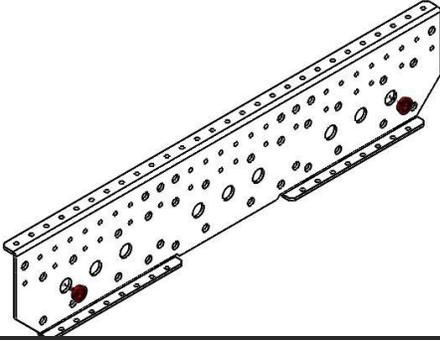


**Step 8:** Assemble four PicoBox Unos for the drive train.



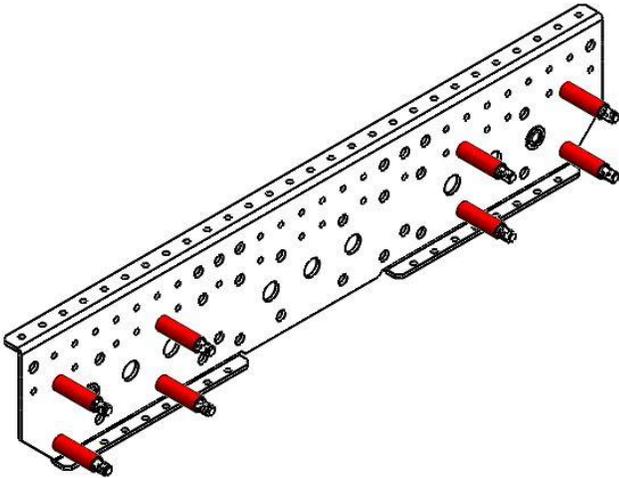
## **TileRunner Mecanum (am-3437)**

**Step 1:** Press two 6x12x4 Flanged Bearings (am-3377) into the indicated 12mm holes of the TileRunner inside Plate (am-3392\_Inside).

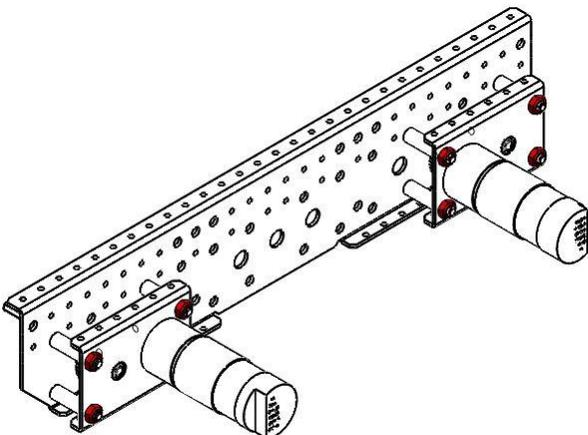


*NOTE: Make sure the flange of the bearing is flush against the sheet metal of the gearbox plate.*

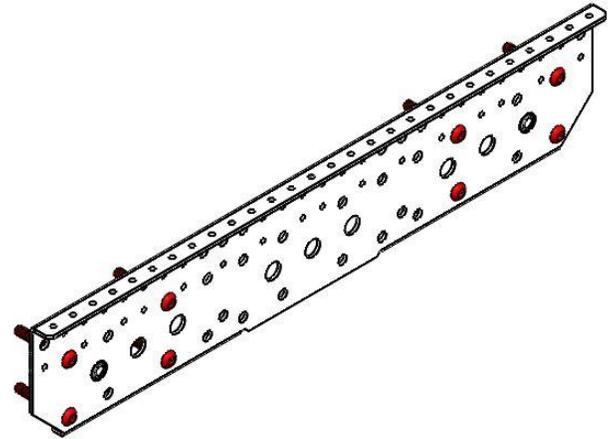
**Step 3:** Place a PicoBox Spacer (am-3406) over all the 1/4-20 screws on the side of the Inside Plate with two flanges.



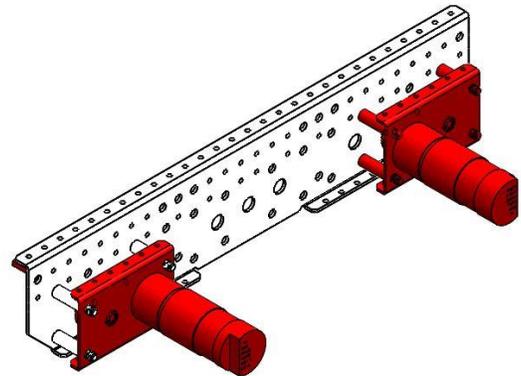
**Step 5:** Secure with 1/4-20 Nylock Jam Nuts (am-1102).



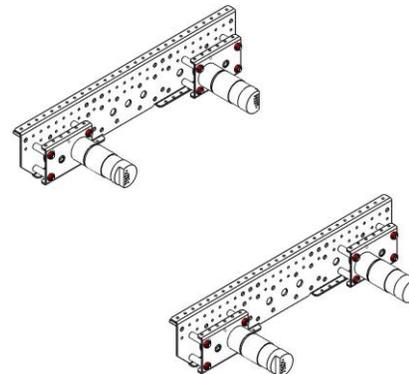
**Step 2:** Insert 1/4-20 x 1.75" Button Head Screws (am-1420) into the side of the Inside Plate with a single solid flange.



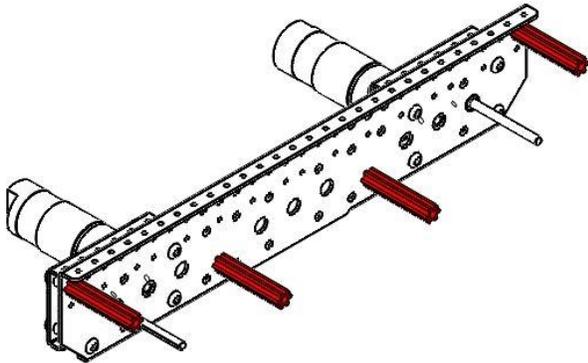
**Step 4:** Insert the Center Axle of the Gearbox Assembly into the center bearing on the TileRunner Inside Plate. Align the four 1/4-20 screws with the four 1/4" holes on the PicoBox Uno Plate, and push the assembly together.



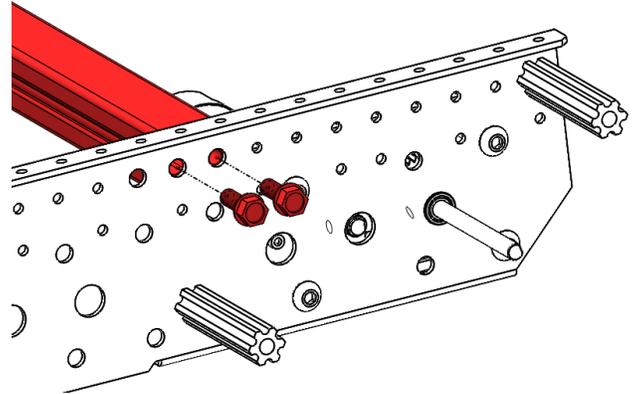
**Step 6:** Repeat Steps 9-14 to create two completed Inside Plates.



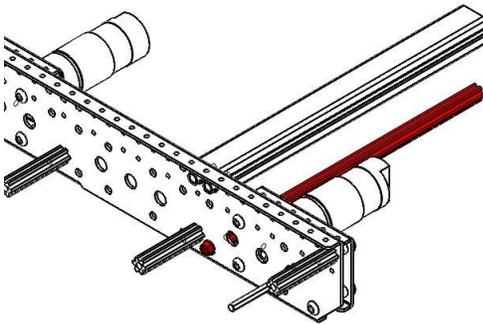
**Step 7:** Attach four 63mm Churro (am-3399) to one of the Inside Plates using 1/4-20 Self Threading Screws (am-1310).



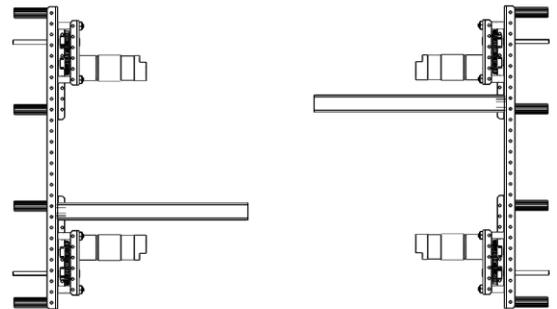
**Step 8:** Attach one 11.25" Peanut (am-3395) to one of the sub-assemblies, on the same side of the plate as the PicoBox Unos. Using two 1/4-20 x 750 Thread Forming Screw (am-1310).



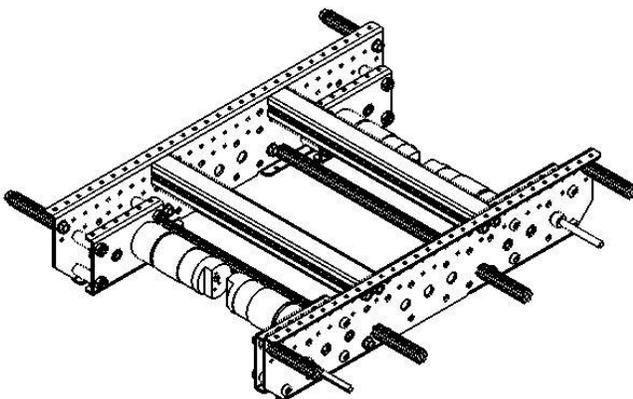
**Step 9:** Attach one 11.25" Churro Extrusion (am-3398) to one of the sub-assemblies, on the same side of the plate as the PicoBox Unos. Using one 1/4-20 x 750 Thread Forming Screw (am-1310).



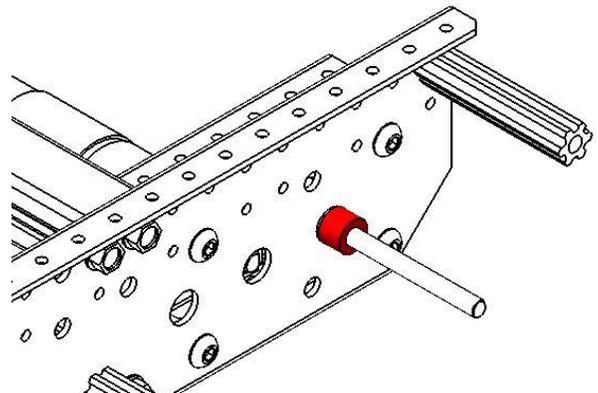
**Step 10:** Repeat steps 16-18 on the other Inside Plate assembly. These should be identical, so that they can be rotated into their final orientation on the robot.



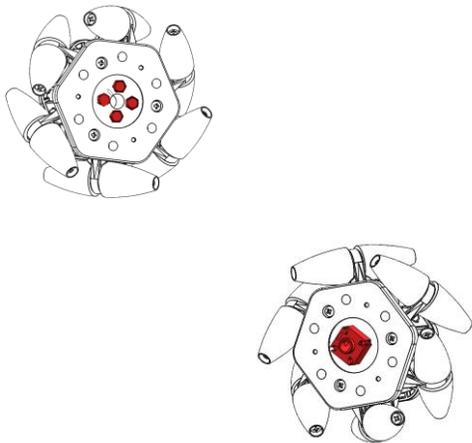
**Step 11:** Join the two sub-assemblies together with six 1/4-20 x 750 Thread Forming Screw (am-1310).



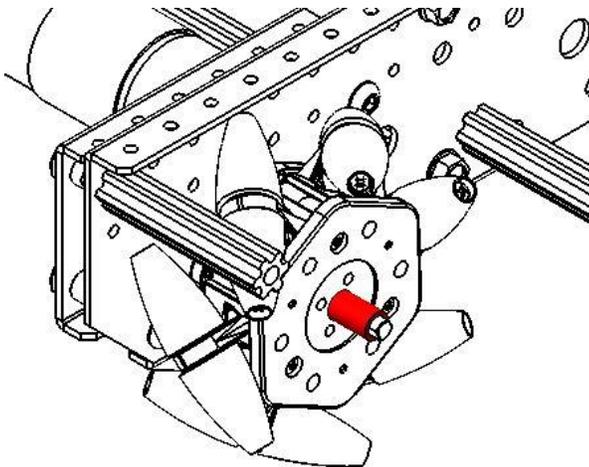
**Step 12:** To each of the 6mm axles, install a 9mm long aluminum spacer (am-3426).



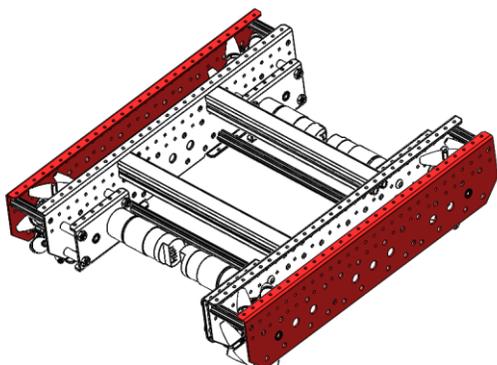
**Step 13:** On each of the 4 Mecanum wheels, secure 6mm D Bore Double Boss Nub (am-3215a) with HHCS 6-32 x 1.250" (am-1436)



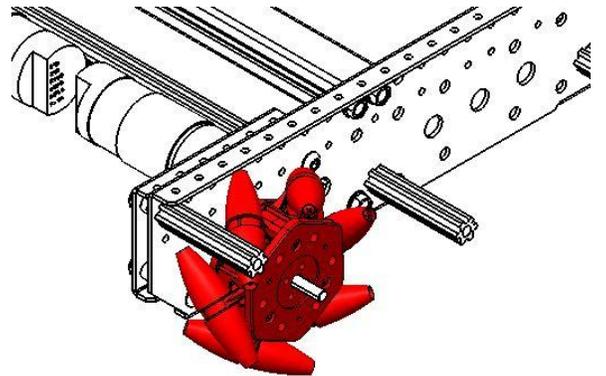
**Step 15:** To each of the 6mm axles, install a 0.594" long aluminum spacer (am-1290).



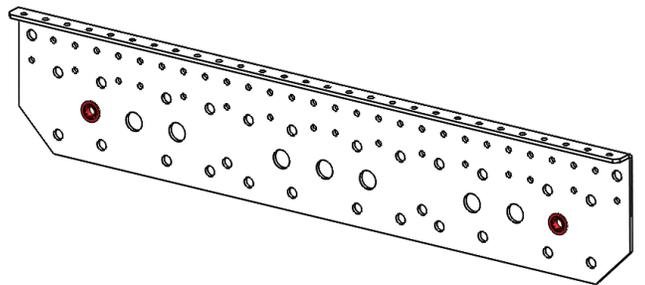
**Step 17:** Slide the 6mm Axles into the bearings installed in the Outside Plate and make sure the flange of the Outside Plate points towards the chassis.



**Step 14:** Slide a wheel onto each of the 6mm axles, nub side first. When the wheel is up against the spacers, tighten the setscrew in the Nub. Remember the rollers should form an 'X' when viewed from above.

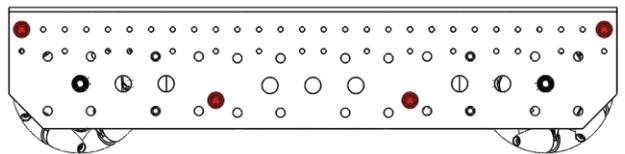


**Step 16:** Press two 6x12x4 Flanged Bearings (am-3377) into the indicated 12mm holes of the TileRunner Outside Plate (am-3392\_Outside).

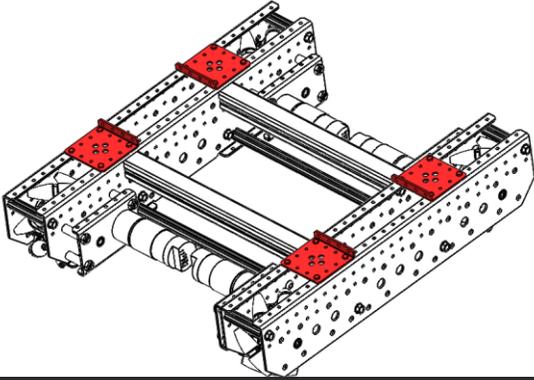


*NOTE: Make sure the flange of the bearing is flush against the sheet metal of the gearbox plate.*

**Step 18:** Secure the Outside Plate to the chassis by threading four 1/4-20 x 750 Thread Forming Screw (am-1310) into the four 63mm Churro Extrusions on the Drive Module.



**Step 19:** Add the 4x4 Brackets (am-3393) to the top of the drive modules. Secure the brackets with HHCS 6-32 x 1.250" (am-1436) and lock nuts.



*NOTE:* These can be placed anywhere along the module to help add strength and provide mounting options for additional systems

**Step 20:** Bolt the Belly Pan (am-3394) to the Inside Plates of the chassis using HHCS 6-32 x 1.250" (am-1436) and lock nuts.

