Studica® ROBOTICS

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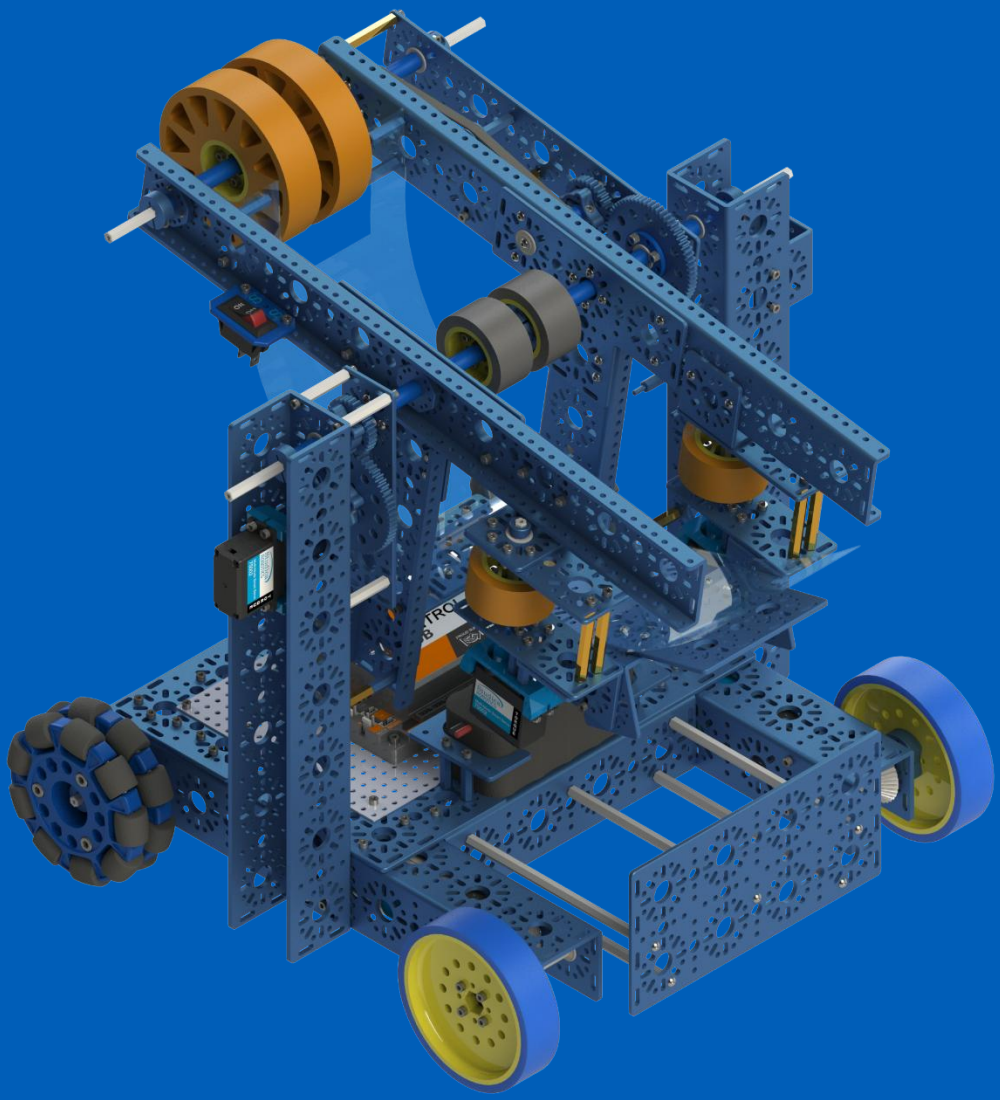
Studica Starter Bot 2025 / 2026 Build Guide



Document History

Release	Date	Note
0.1	15 August 2025	• Initial draft
0.2	05 September 2025	• Pre-Release
0.9	14 September 2025	• Pre-Release 2

Welcome to the 2025/2026 Season

Studica is excited to offer this starter bot to all teams competing or not competing in the FTC 2025/2026 season. We wish all teams the best and hope everyone has a great experience this year.

This guide was designed for a rookie starter bot but can be used by more developed teams. More developed teams might find purchasing other kits, such as the FTC Drive Base V2 or the soon-to-be V3, a better option.

All FTC teams are encouraged to register their FTC accounts with our US office and receive a 25% discount on most FTC-related products. There are also grant programs that teams can apply for. We are excited to share that we now offer structure in a variety of colors. Structure samples are also available. Please check out https://www.studica.com/first-tech-challenge for more information.

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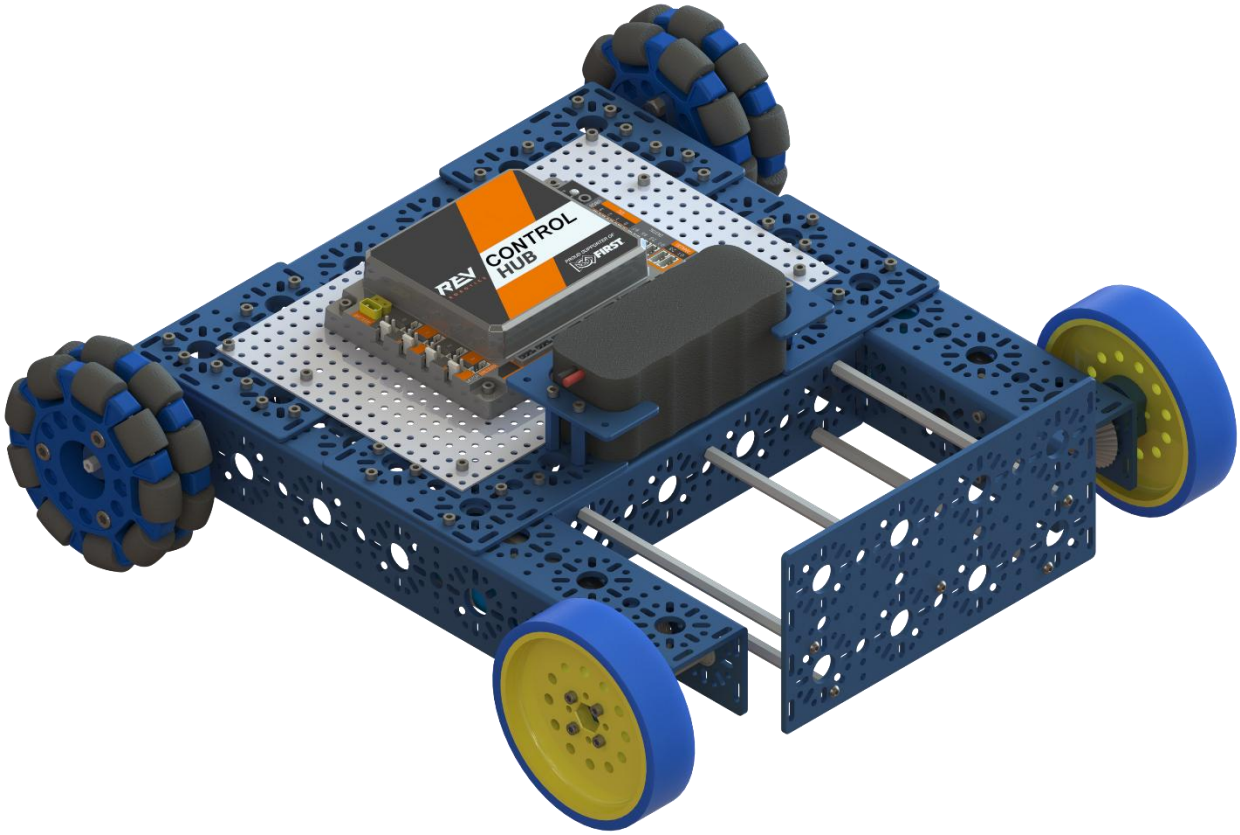
Drive Base



Tools Required

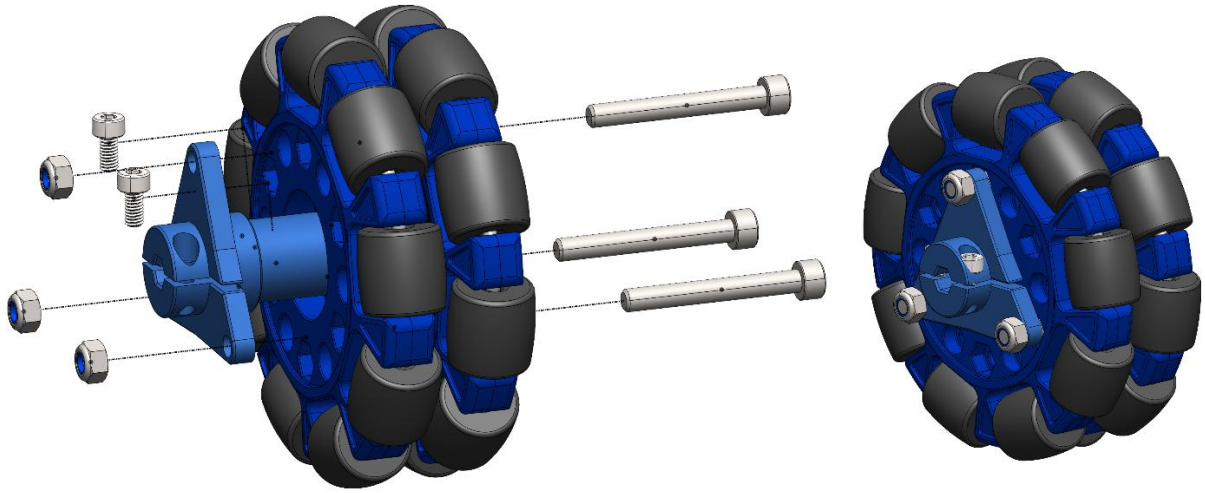
- Hex Key Metric 7 Piece Set, Part # 70144-7
- Combination Wrench, Part # 70145
- 8mm Wrench, Part # 70901
- 5.5mm Nut Driver, Part # 70146
- Scissors (Not in Kit)

CONTROL HUB NOT INCLUDED IN KIT

Step 1:

Parts:

- 1 x Omni Wheel
- 3 x M5 x 40mm SHCS
- 2 x M4 x 8mm SHCS
- 3 x M5 Nyloc Nuts
- 3 mm Hex Key (Blue)
- 4 mm Hex Key (Yellow)
- 1 x Enhanced Wheel Hub



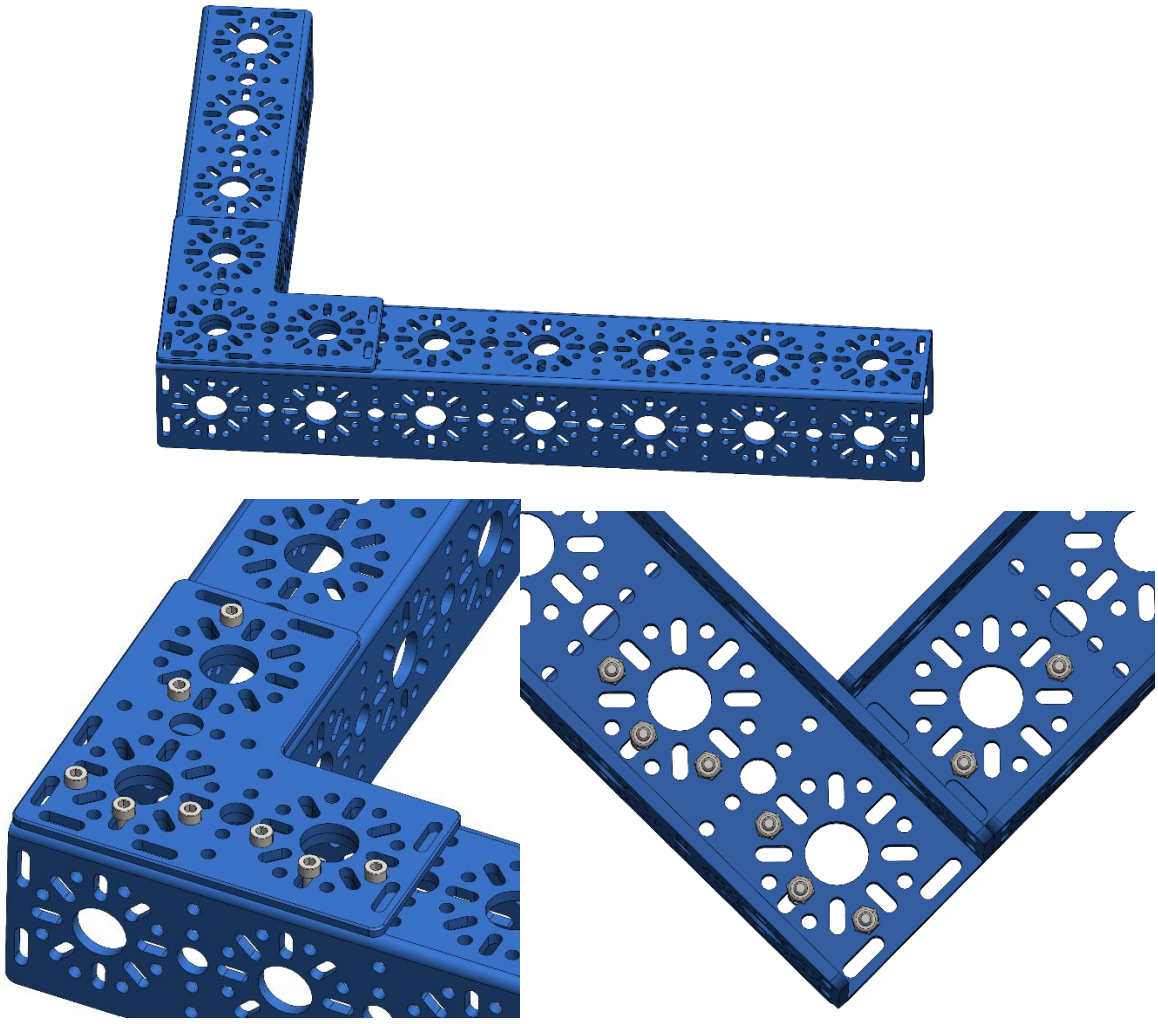
Using the blue 3mm hex key, screw the M4 x 8mm SHCS into the screw ports of the enhanced wheel hub clamping section. **NOTE TO DO TIGHTEN THE SCREWS DOWN YET**. Using the M5 SHCS slot them through the Omni Wheel and into the Enhanced Wheel Hub. The socket head should be inside the cavity of the omni wheel screw area. Use your hand to lightly turn the M5 nyloc nuts on the M5 SHCS. Using the 8mm wrench and yellow 4mm hex key, fully tighten the screws into the nyloc nuts.

Repeat step 1 to create another Omni Wheel assembly.

Step 2:

Parts:

- 1 x 336 mm U-Channel
- 1 x 192 mm U-Channel
- 1 x 90 Degree Bracket
- 8 x M3 x 12 SHCS
- 8 x M3 Nyloc Nuts
- 2.5 mm Hex Key (Green)
- 5.5 mm Nut Driver

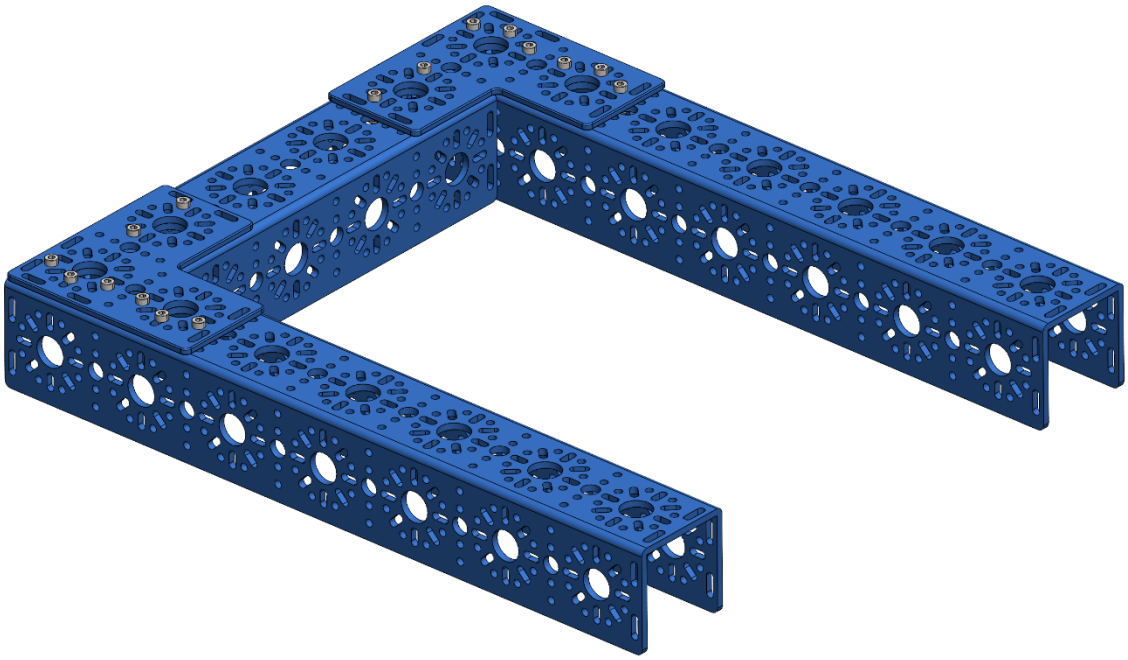


Using the green 2.5 mm hex key, screw the M3 x 12mm SHCS through the 90-degree bracket into the 336 mm U-Channel and 192mm U-Channel into M3 Nyloc nuts. Try to make sure that this is as square as possible. This can be completed by slowly tightening each screw in a circular pattern.

Step 3:

Parts:

- 6 x M3 x 12mm SHCS
- 2.5mm Hex Key (Green)
- 5.5mm Nut Driver
- 1 x 336mm U-Channel
- 1 x 90 Degree Bracket
- Assembly from Step 2



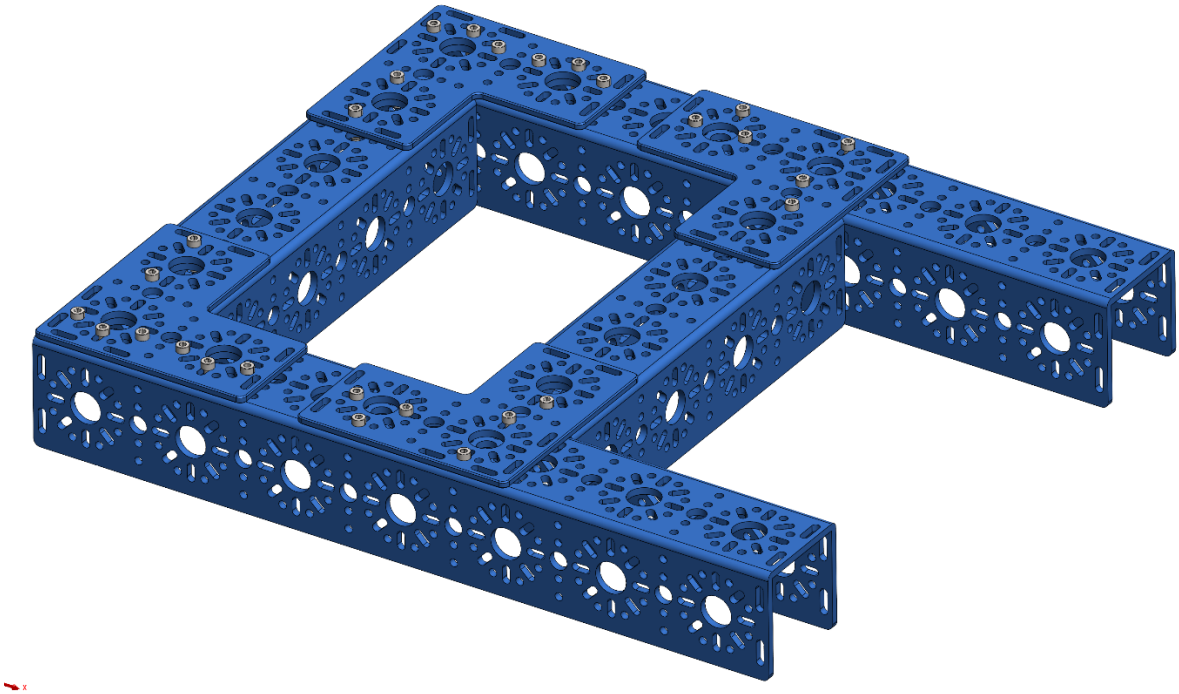
Repeat step 2 but for the other side of the 192mm U-Channel.

Side Tip: The squarer your drive base, the more accurate your movements in auto and teleop will be.

Step 4:

Parts:

- 1 x Assembly from step 3
- 2 x 90 Degree Bracket
- 1 x 192 mm U-Channel
- 12 x M3 x 12mm SHCS
- 12 x M3 Nyloc Nuts
- 1 x 2.5 mm Hex Key (Green)
- 1 x 5.5 mm Nut Driver

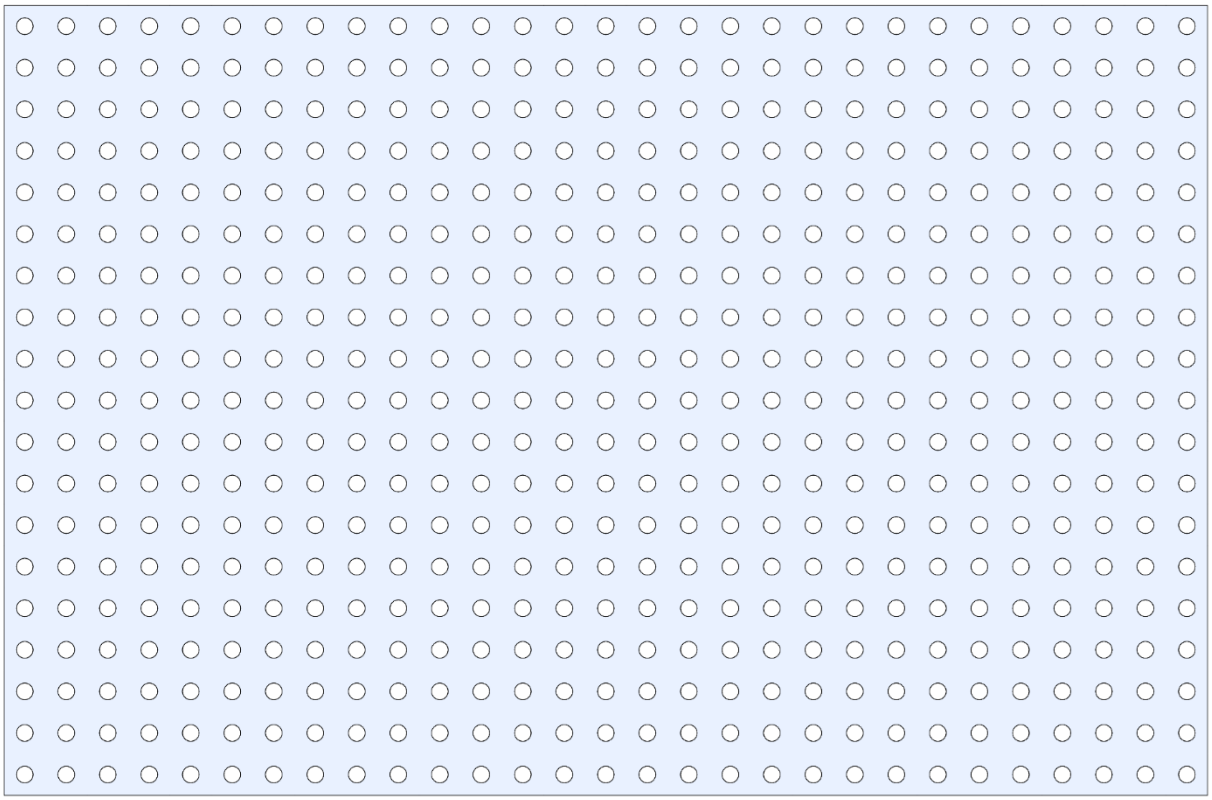


Repeat the similar process from step 2 and 3 for the middle section of the drive base. The 90 degree brackets middle 14mm hole should be over the 8mm hole of the 336mm U-Channel.

Step 5:

Parts:

- 1 x Polycarbonate Sheet
- Scissors

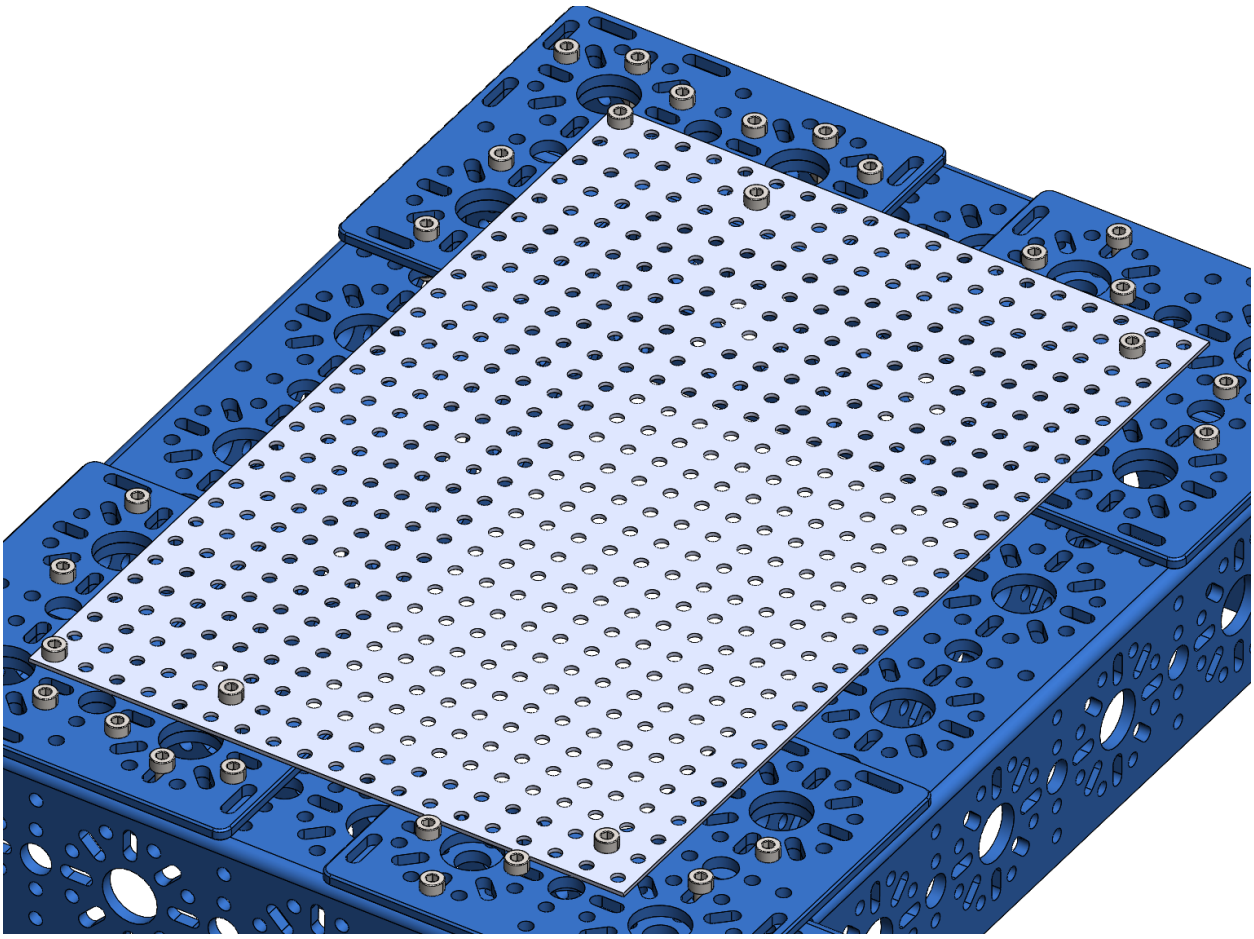


With one of the polycarbonate sheets count 29 holes and using scissors cut down the middle between the 29 and 30th hole. This should give you a 29 x 19 hole sheet.

Step 6:

Parts:

- Assembly from Step 4
- Sheet from Step 5
- 6 x M3 x 12 mm SHCS
- 6 x M3 Nyloc
- 1 x 2.5mm Hex Key (Green)
- 1 x 5.5mm Nut Driver

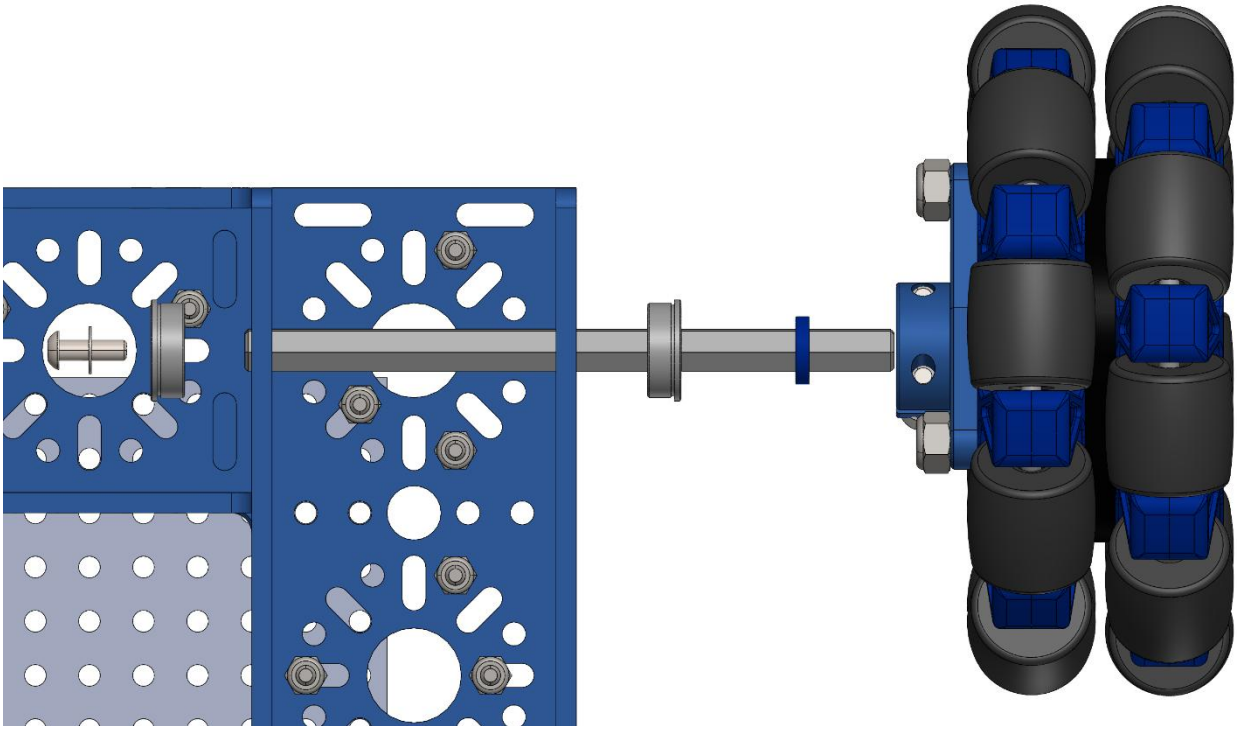


Using the 6 x M3 SHCS, screw the polycarbonate sheet into the drive base. The sheet will hold the control hub.

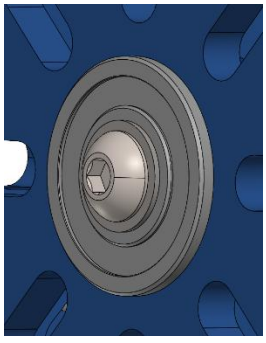
Step 7:

Parts:

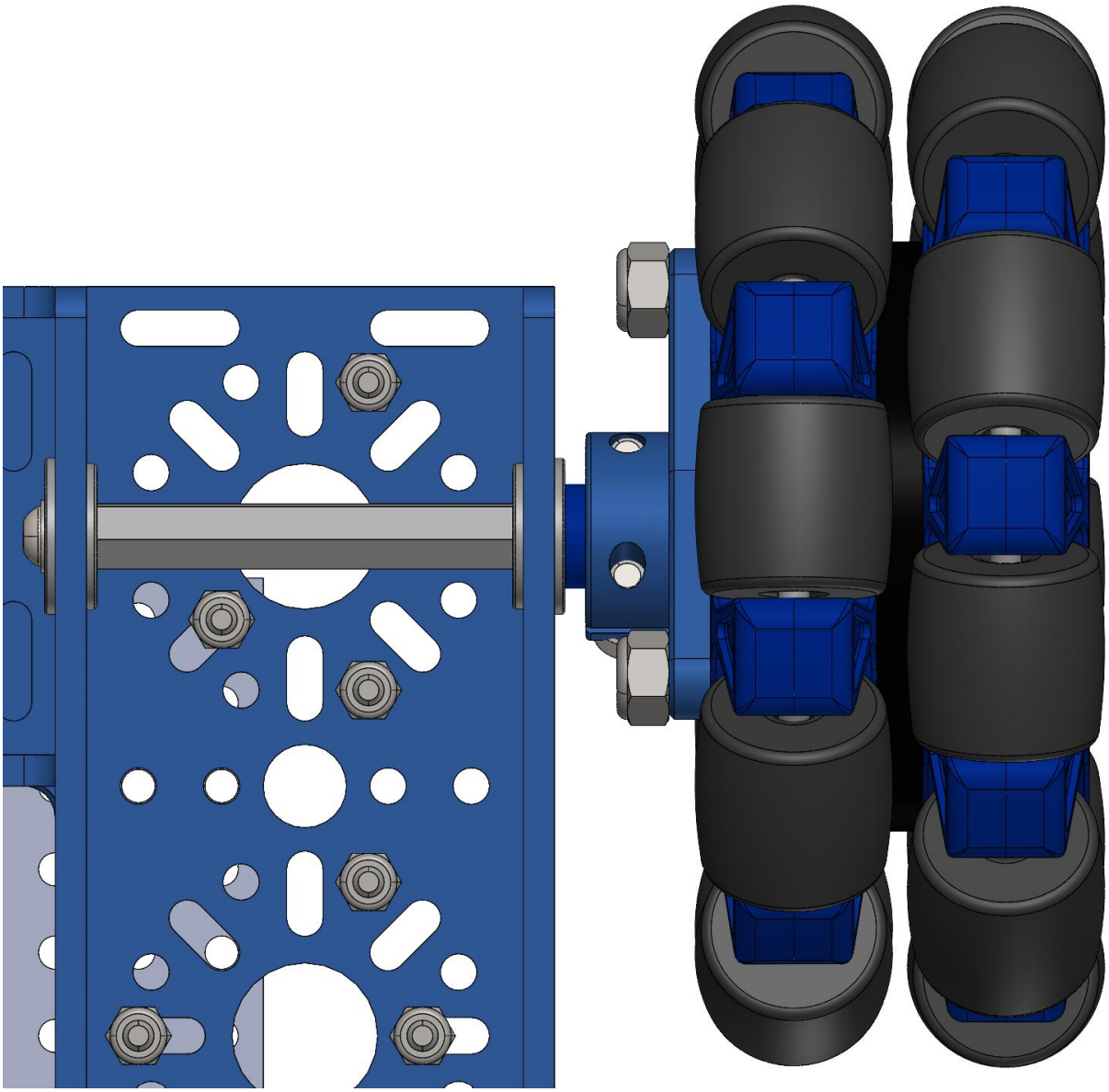
- 1 x M3 x 10mm BHCS with blue thread lock pre-applied
- 1 x M3 Washer
- 1 x 96 mm Hex Shaft
- 2 x Flanged Bearing
- 1 x 2 mm Spacer
- 1 x 2mm Hex Key (Pink)
- 1 x 3mm Hex Key (Yellow)
- 1 x Omni Wheel assembly from step 1



Above is the stack up of the omni wheel assembly on the robot drive base. For easy assembly first screw the special M3 x 10mm BHCS into one end of the hex shaft. Ensure the washer is placed between the hex shaft and the head of the BHCS as you are screwing it in. The thread locking compound on the screw will keep this screw locked into place.



Slide the shaft from the inside of the 192mm U-Channel into a flanged bearing. On the outside of the base should be another bearing, spacer and the omni wheel assembly. When happy with the location, tighten the M4 screws on the omni wheel enhanced wheel hub to clamp the wheel to the shaft.

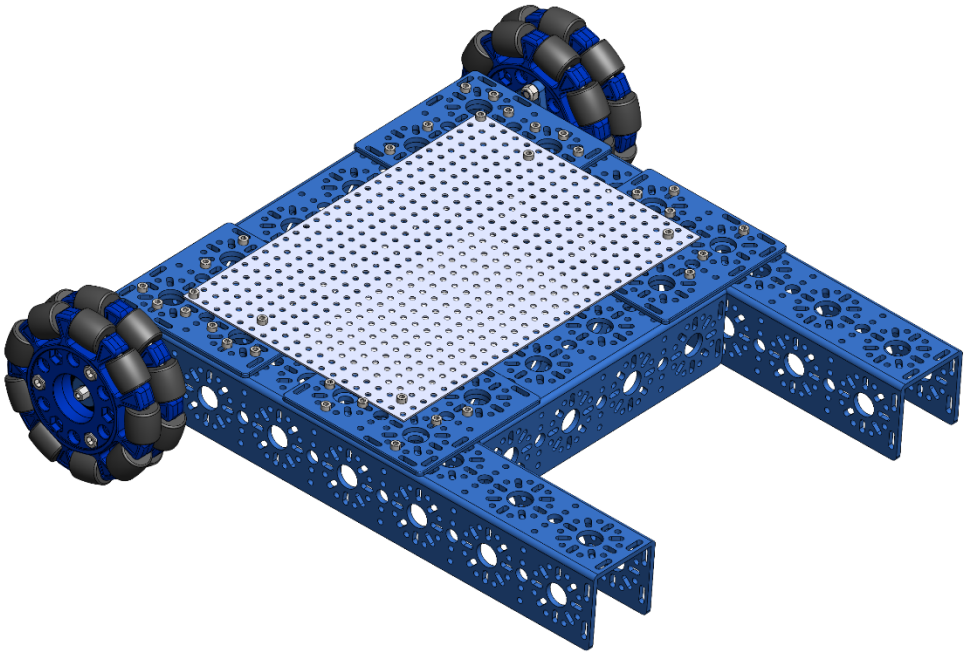


The wheel should be completely free spinning. To ensure it spins freely, spin the wheel with your hand. It should spin fast and for a long time, like a fidget spinner. If it does not spin freely you will need to loosen the M4 screws and reduce the tightness of the wheel against the spacer and bearing. Repeat until you can spin the wheel freely and fast.

Step 8:

Parts:

- 1 x Omni wheel assembly from step 1
- 1 x Assembly from step 7
- 1 x M3 x 10mm BHCS with blue thread lock pre-applied
- 1 x M3 Washer
- 1 x 96 mm Hex Shaft
- 2 x Flanged Bearing
- 1 x 2 mm Spacer
- 1 x 2mm Hex Key (Pink)
- 1 x 3mm Hex Key (Yellow)

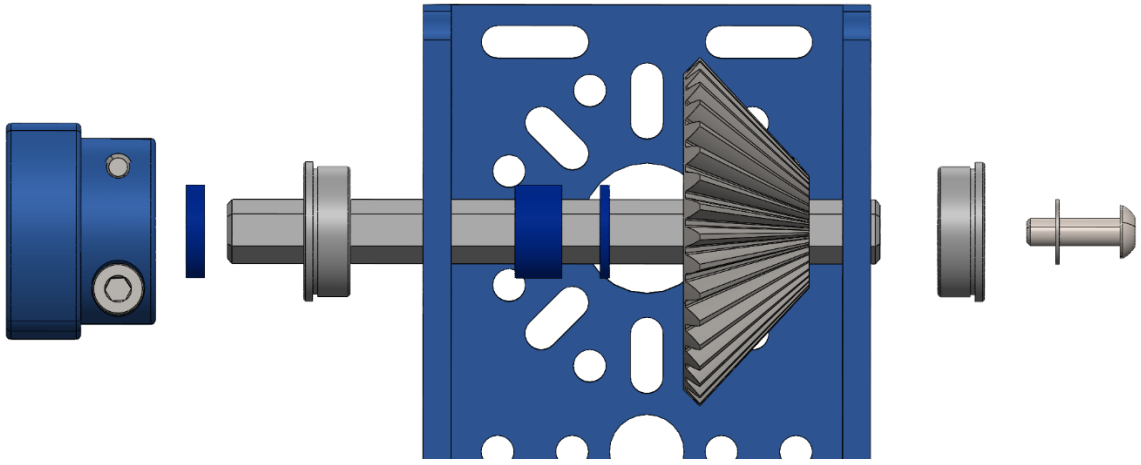


Repeat step 7 for the other side of the drive base. When complete you should have a robot that looks like the above picture.

Step 9:

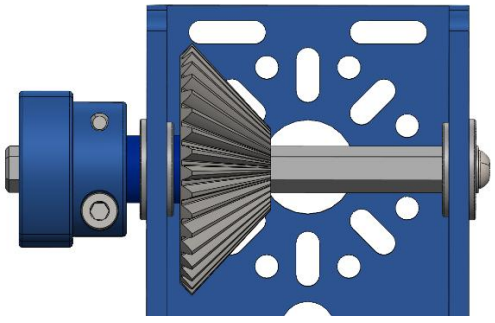
Parts:

- 1 x M3 x 10mm BHCS with blue thread lock pre-applied
- 1 x M3 Washer
- 1 x 70 mm Hex Shaft
- 2 x Flanged Bearing
- 1 x 1 mm Spacer
- 1 x 2 mm Spacer
- 1 x 5 mm Spacer
- 1 x Clamping Shaft Hub
- 1 x 36T Bevel Gear
- 1 x 2mm Hex Key (Pink)
- 1 x 2.5mm Hex Key (Green)



NOTE: THE 36T BEVEL GEAR IS HELICAL AND HAS 2 GEARS IN EACH PACK. THE GEARS ARE TWISTED IN DIFFERENT DIRECTIONS. IT DOES NOT MATTER WHICH GEAR GOES WHERE IN THE SINGLE ASSEMBLY BUT YOU NEED ONE BENT ONE WAY AND ANOTHER BENT THE OTHER WAY FOR SUCCESSFUL MESH.

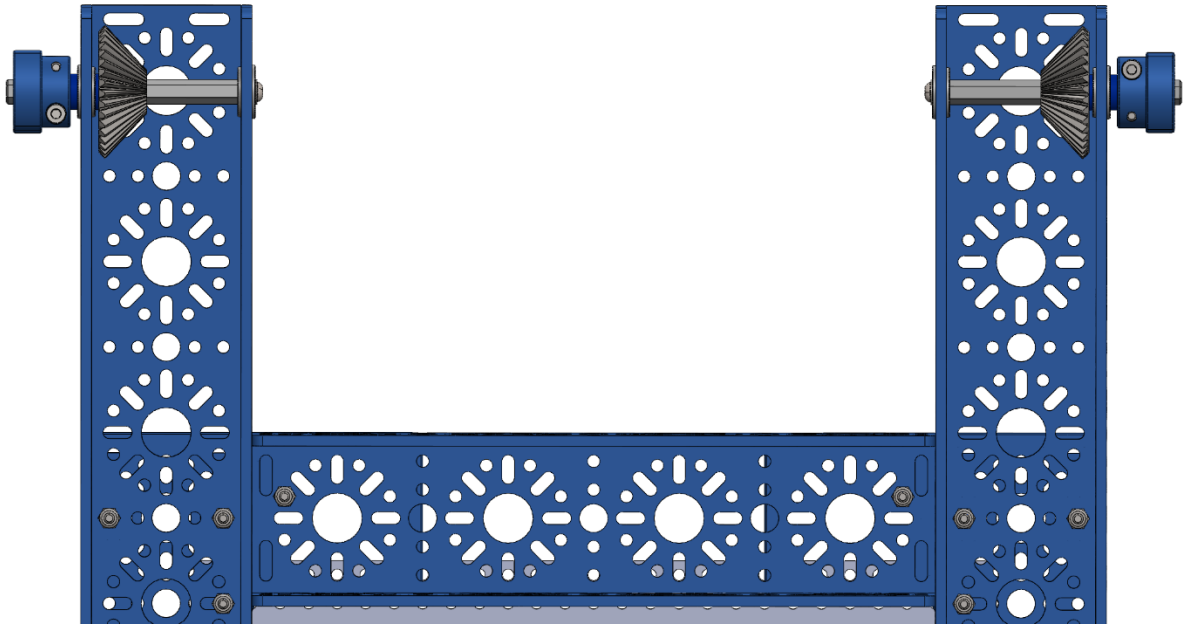
This is for the front of the drive base where we will install the motors and the drive wheels for the robot. The stack up is shown above. As with step 7 and 8 we use a thread locked BHCS here with a washer. Also following step 7 and 8 make sure the shaft can spin freely.



Step 10:

Parts:

- 1 x M3 x 10mm BHCS with blue thread lock pre-applied
- 1 x M3 Washer
- 1 x 70 mm Hex Shaft
- 2 x Flanged Bearing
- 1 x 1 mm Spacer
- 1 x 2 mm Spacer
- 1 x 5 mm Spacer
- 1 x Clamping Shaft Hub
- 1 x 36T Bevel Gear
- 1 x 2mm Hex Key (Pink)
- 1 x 2.5mm Hex Key (Green)

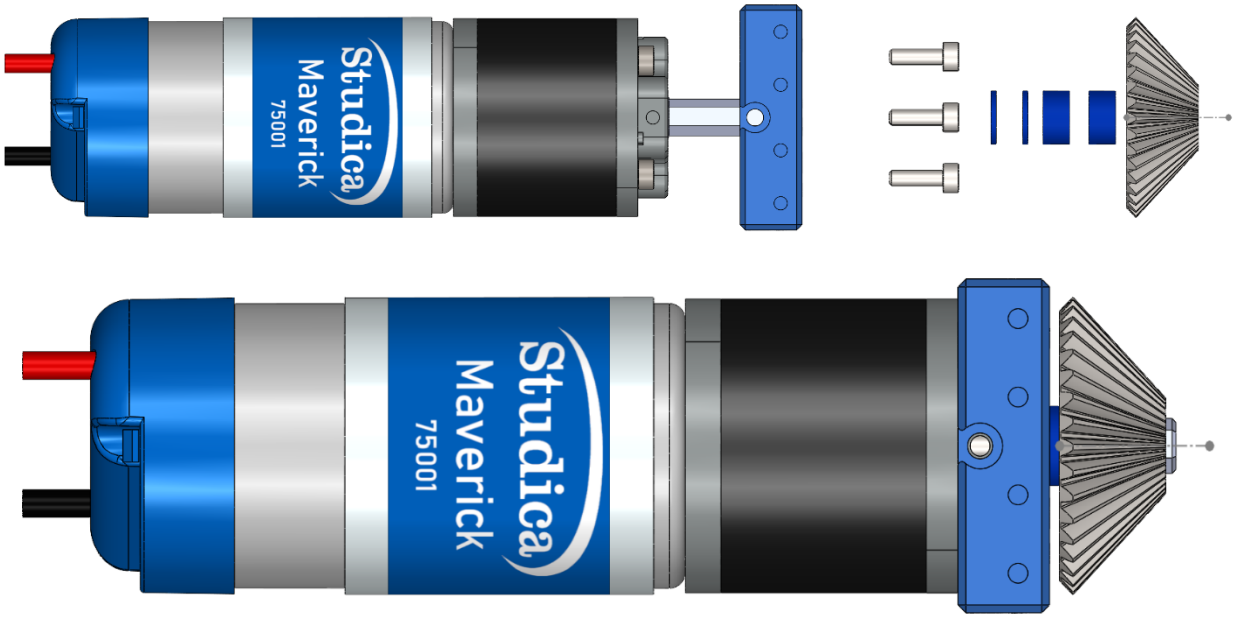


Repeat step 9 for the other side.

Step 11:

Parts:

- 2 x Maverick Motor with 50.9:1 Clover Gearbox
- 2 x Clover Mount
- 8 x M3 x 10mm SHCS
- 4 x 1mm Spacer
- 4 x 5mm Spacer
- 2 x 36T Bevel Gear
- 1 x 2.5 mm Hex Key (Green)



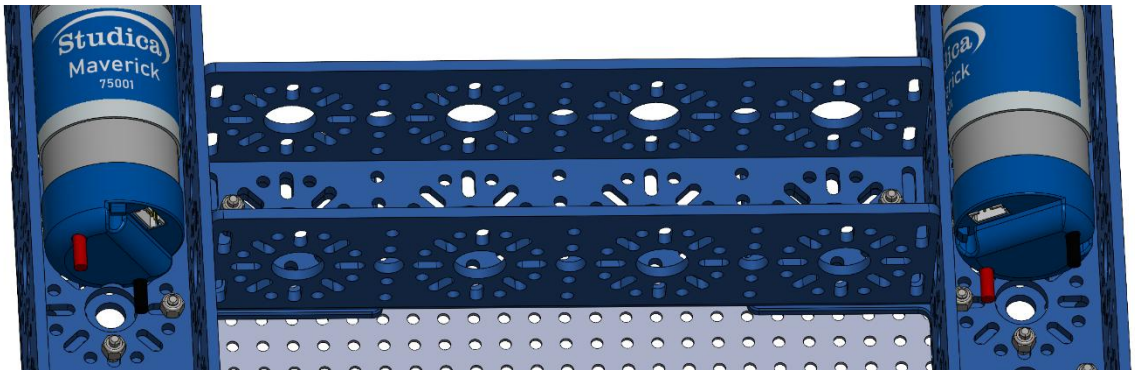
This step is for the motor assembly. Slide the motor into the clover mount. Use the SHCS to screw the motor into the clover mount. Slide the spacers and the bevel gear onto the shaft of the motor. **NOTE: THE BEVEL GEAR MUST BE THE OPPOSITE BEND OF THE BEVEL GEAR FROM STEP 9 and 10. THE BEVEL GEAR AND SPACERS WILL ALSO BE LOOSE UNTIL THE MOTOR IS ASSEMBLED IN THE CHANNEL AND CAN EASILY FALL OFF.**

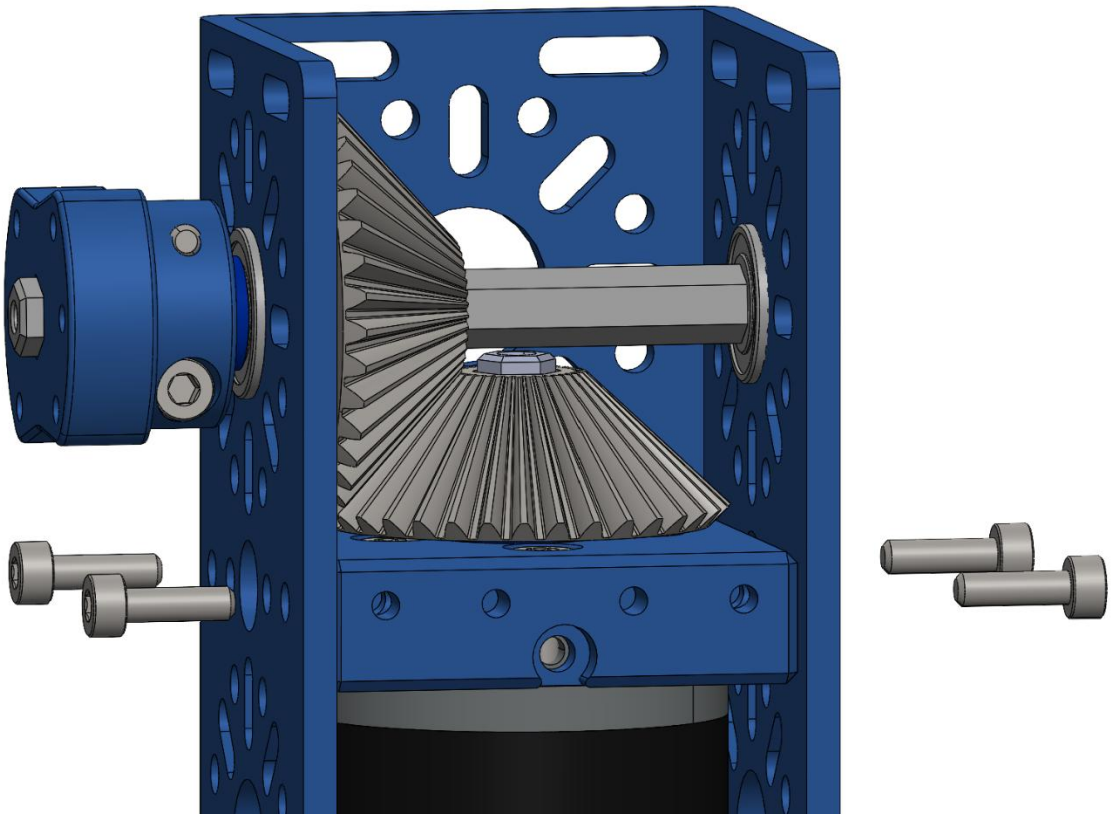
Repeat this step again to have two motors.

Step 12:

Parts:

- 1 x Motor Assembly from step 11
- 1 x Drive Base Assembly
- 4 x M3 x 10 mm SHCS
- 1 x 2.5 mm Hex Key (Green)



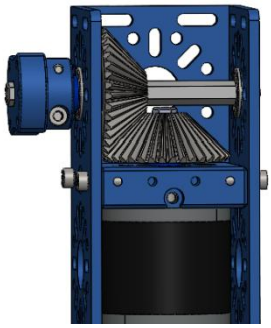


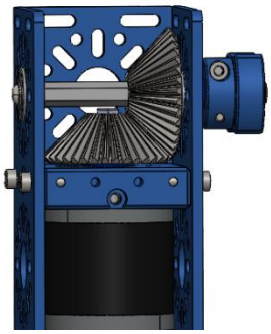
Ensure when putting the motor assembly into the channel the encoder port of the motor is easily accessible. Slide the motor into the bevel gear from steps 9 or 10 and secure with the SHCS.

Step 13:

Parts:

- 1 x Drive Base Assembly
- 1 x Motor Assembly from step 11
- 4 x M3 x 10 mm SHCS
- 1 x 2.5 mm Hex Key (Green)



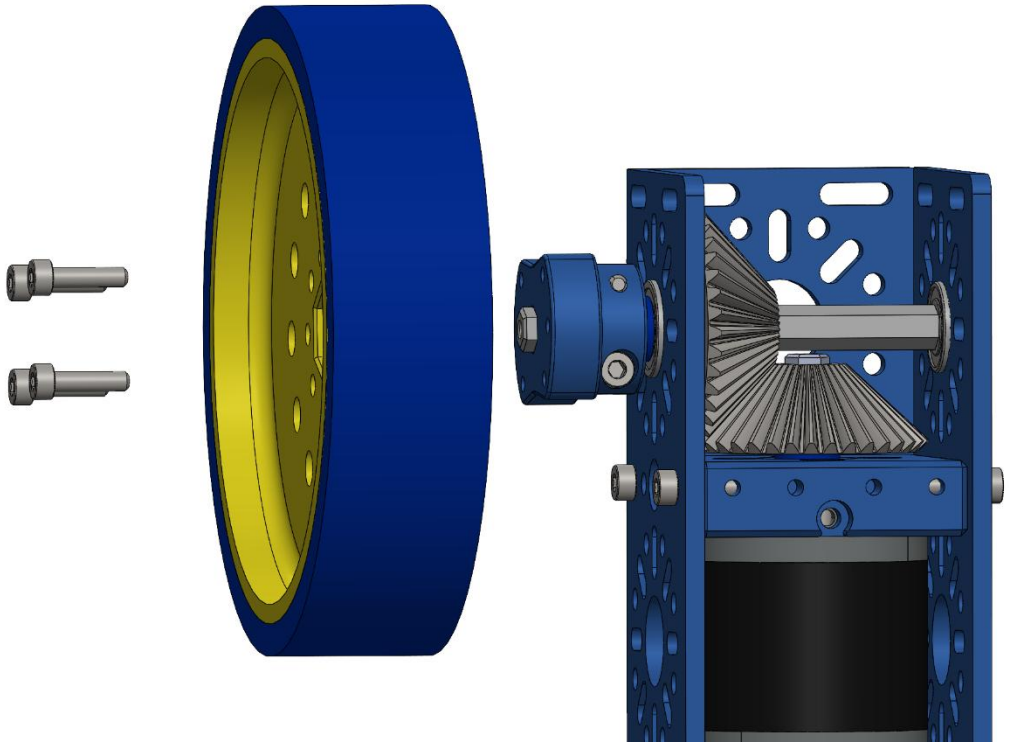


Repeat step 12 for the other side.

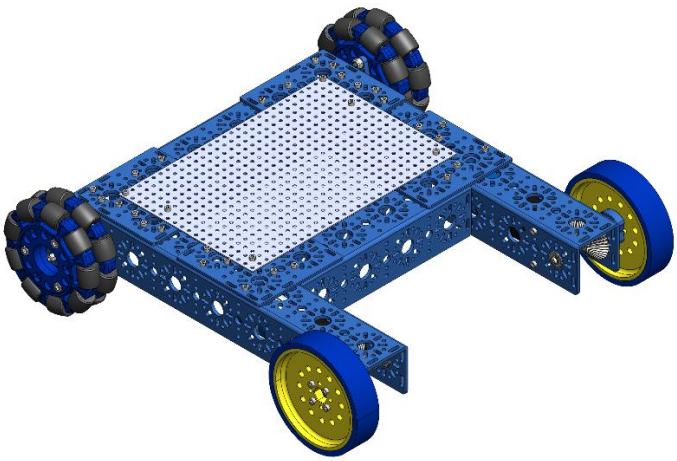
Step 14:

Parts:

- 1 x Drive Base Assembly
- 2 x Drive Wheel
- 8 x M3 x 12 mm SHCS
- 1 x 2.5 mm Hex Key (Green)



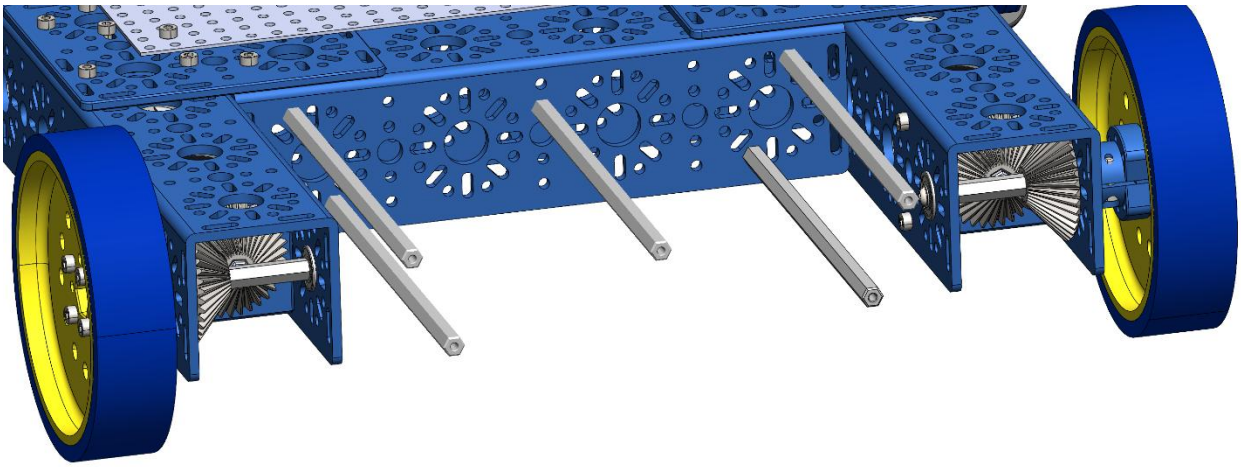
Screw the drive wheel with the M3 x 12mm SHCS into the clamping shaft hub of the drive assembly. Repeat for the other wheel on the other side of the robot.

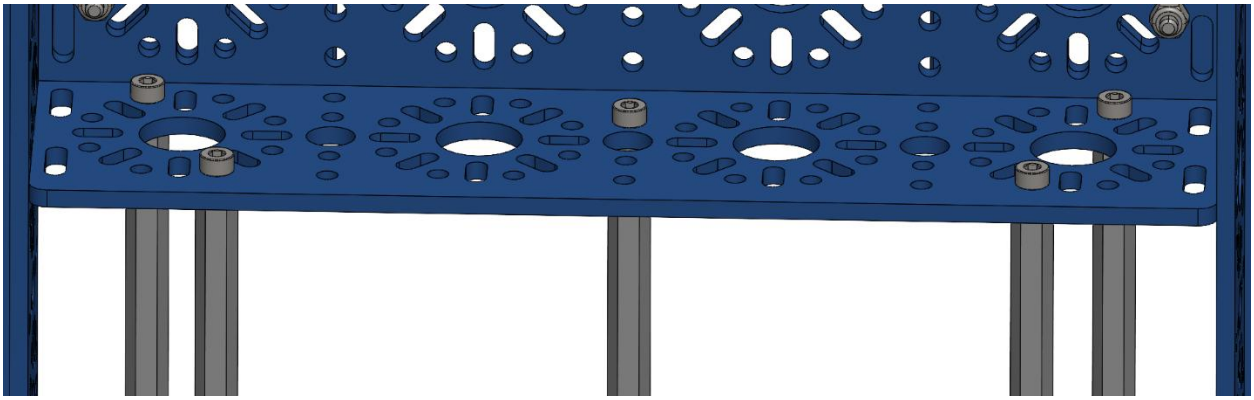


Step 15:

Parts:

- 1 x Drive Base
- 5 x 140mm Hex Shaft
- 5 x M3 x 10 mm SHCS
- 1 x 2.5mm Hex Key (Green)



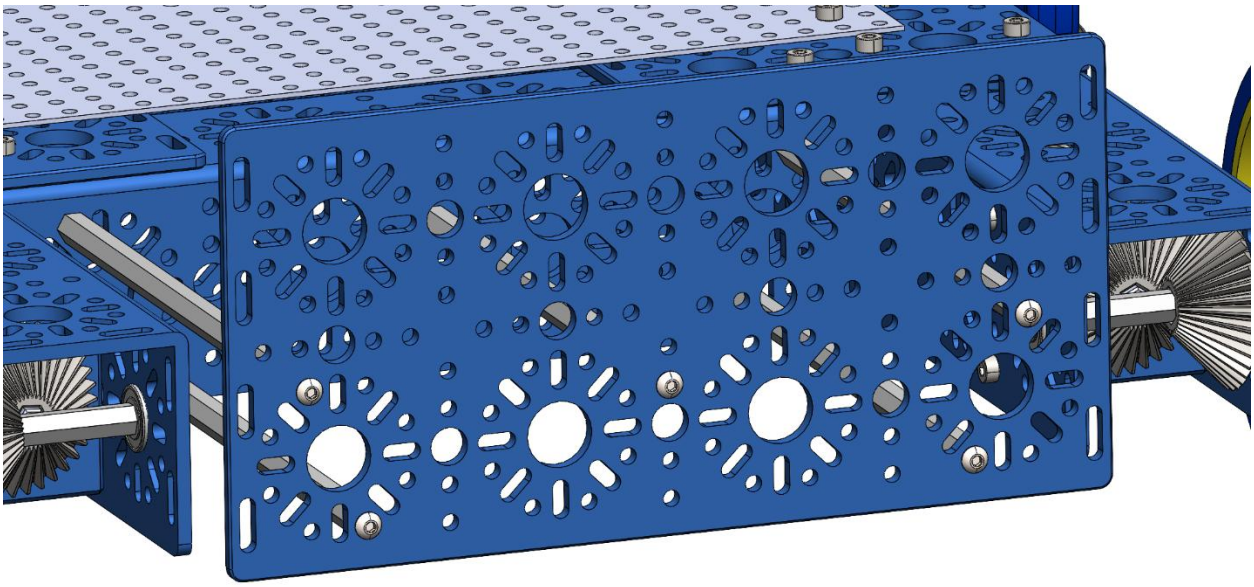


Using the SHCS screw the 140mm hex shaft into the locations above on the robot front.

Step 16:

Parts:

- 1 x Drive Base
- 1 x 96 mm x 192 mm Flat Bracket
- 6 x M3 x 10mm BHCS
- 1 x 2 mm Hex Key (Pink)

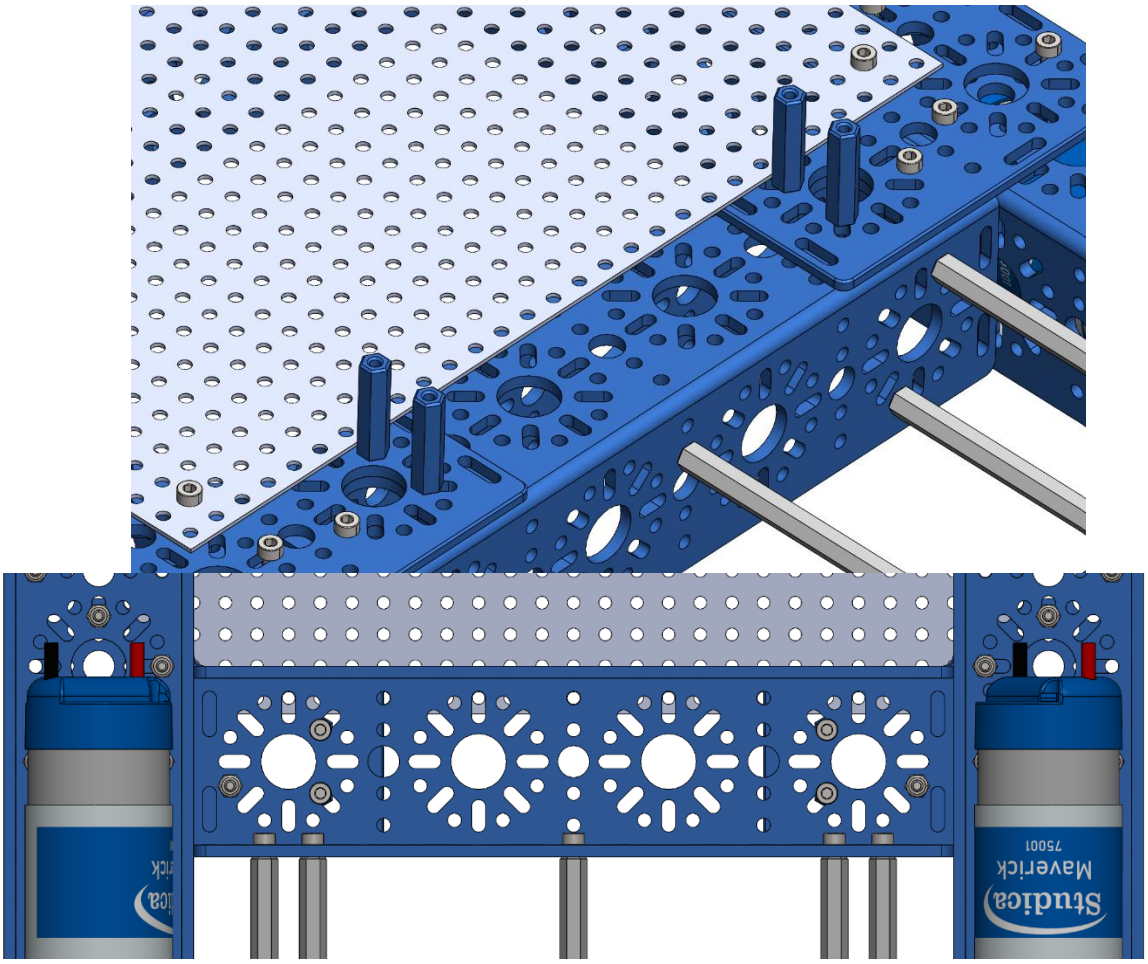


Screw the bracket to the 5 hex shafts using the BHCS.

Step 17:

Parts:

- 1 x Drive Base
- 4 x 25 mm Standoffs
- 4 x M3 x 10 mm SHCS
- 1 x 2.5 mm Hex Key (Green)

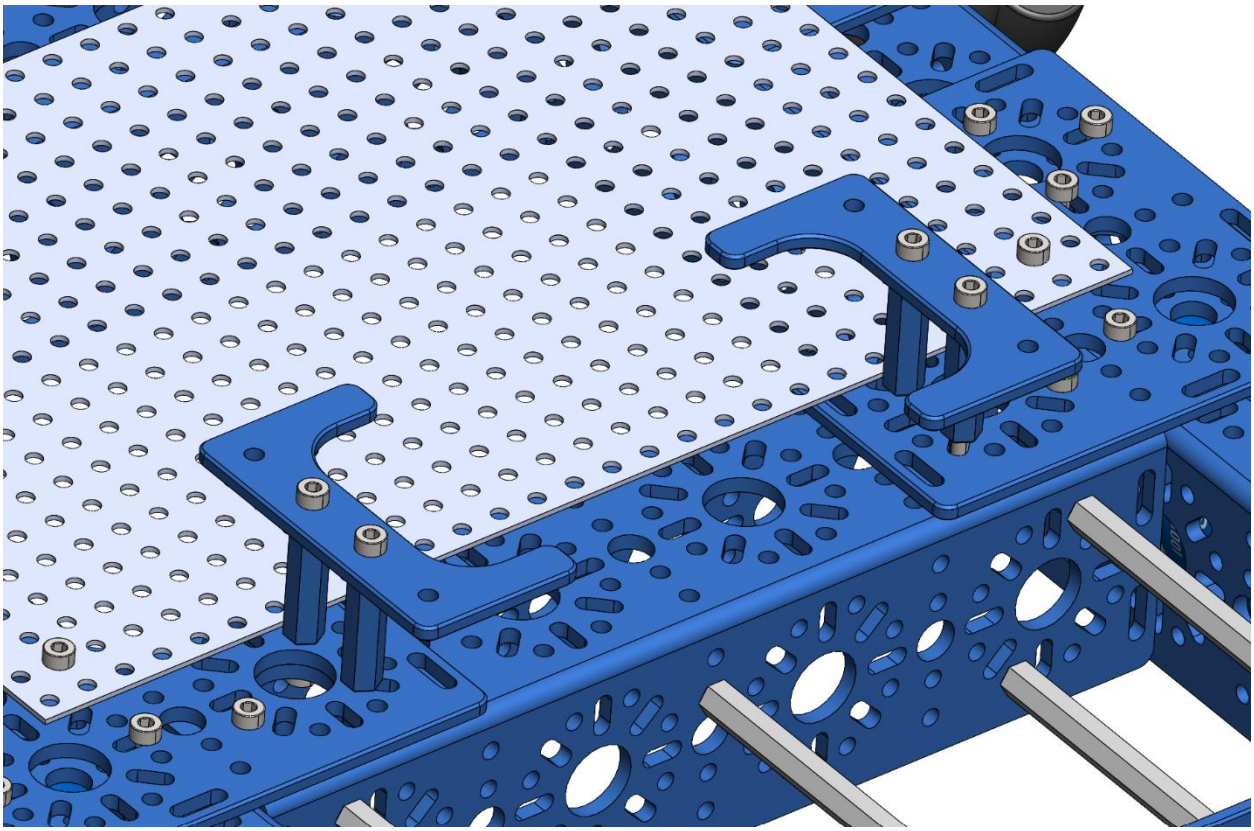


Screw the standoffs to the center 192mm U-Channel with the M3 x 10mm SHCS.

Step 18:

Parts:

- 1 x Drive Base
- 4 x M3 x 10mm SHCS
- 2 x Battery Clips
- 1 x 2.5 mm Hex Key (Green)



Finish the battery holder by screwing the battery clips into the standoffs from step 17.

Step 19:

Parts:

- 1 x Drive Base
- 1 x Control Hub (**Not included in Kit**)
- 4 x M3 x 20 mm SHCS
- 4 x M3 Nyloc Nuts
- 1 x 2.5 mm Hex Key (Green)
- 1 x 5.5 mm Nut Driver or Wrench

Screw the control hub into place with the 4 SHCS. The drive base for the starter bot is now complete!

Left Side Main Frame

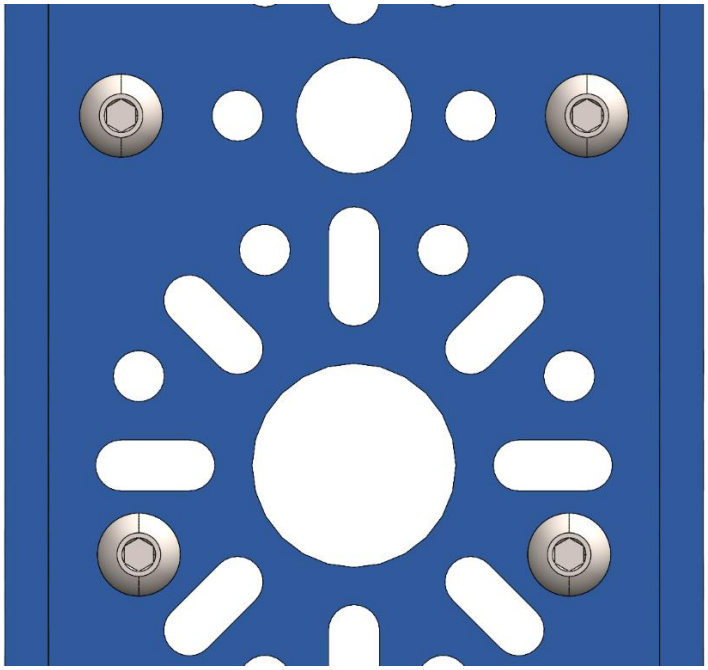
Tools Required:

- Hex Key Metric 7 Piece Set, Part # 70144-7
- Combination Wrench, Part # 70145

Step 1:

Parts:

- 1 x 336 mm U-Channel
- 4 x 25 mm Male to Female Standoff
- 4 x M3 x 10mm BHCS
- 1 x 2 mm Hex Key (Pink)

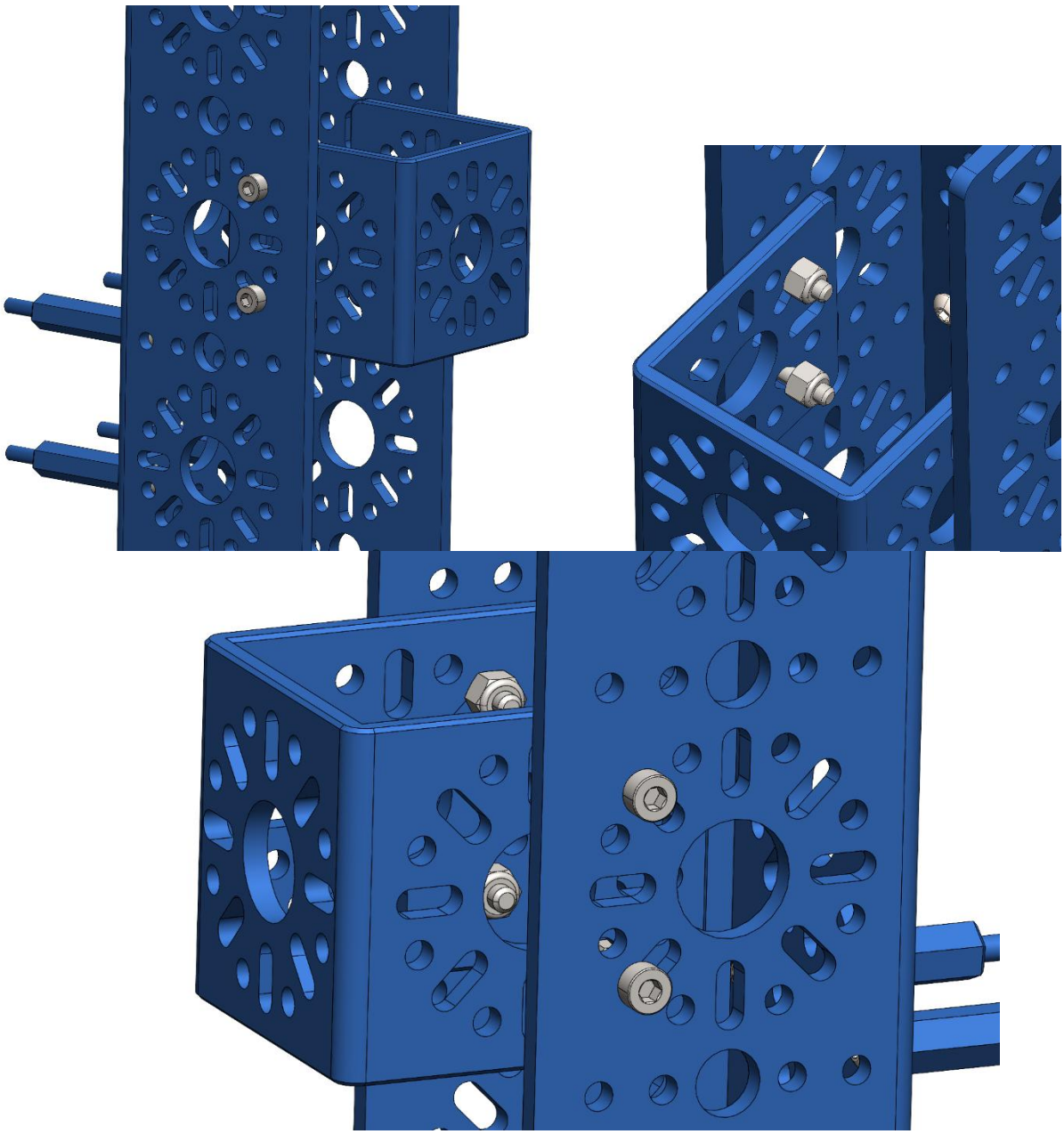


Using the BHCS screw into the female end off the standoff.

Step 2:

Parts:

- 1 x Assembly from Step 1.
- 1 x Inside U Bracket
- 4 x M3 x 10mm SHCS
- 4 x M3 Nyloc
- 1 x 2.5mm Hex Key (Green)

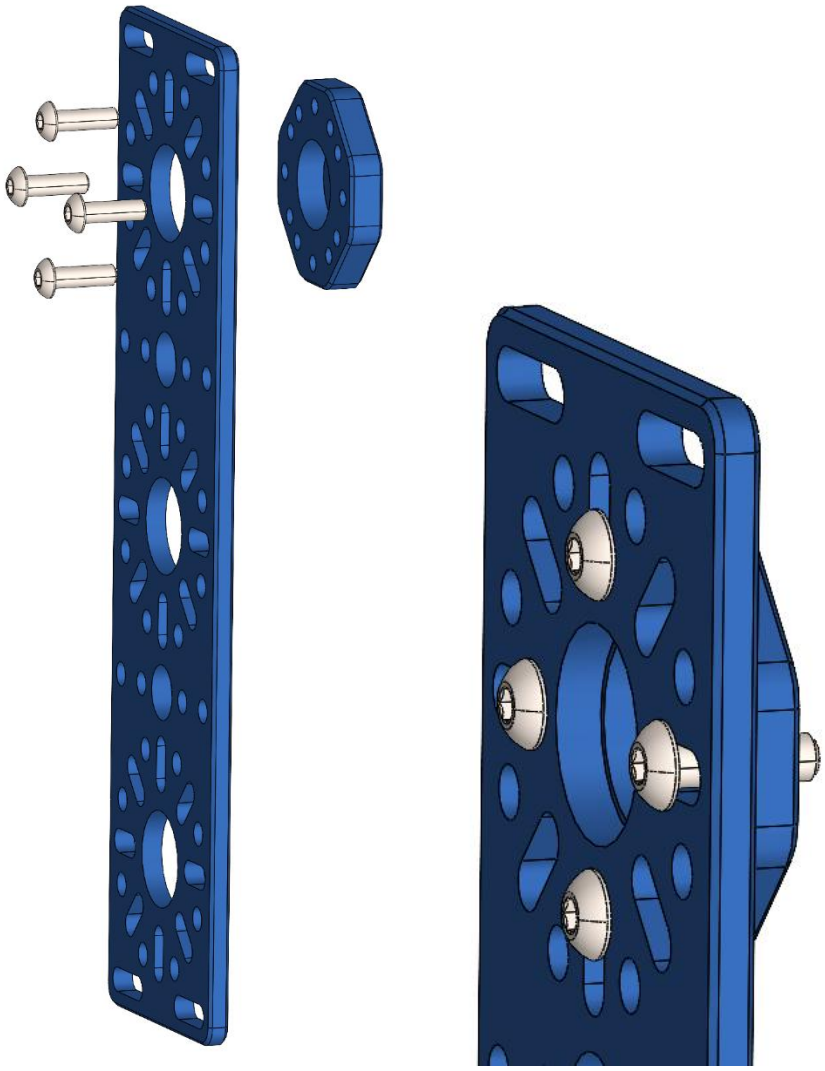


Attach the inside U-Channel with the screws and nyloc in the 2nd 14 mm hole from the top of the channel.

Step 3:

Parts:

- 1 x 144 mm Flat
- 1 x Bearing Block
- 4 x M3 x 10 mm BHCS
- 1 x 2 mm Hex Key (Pink)

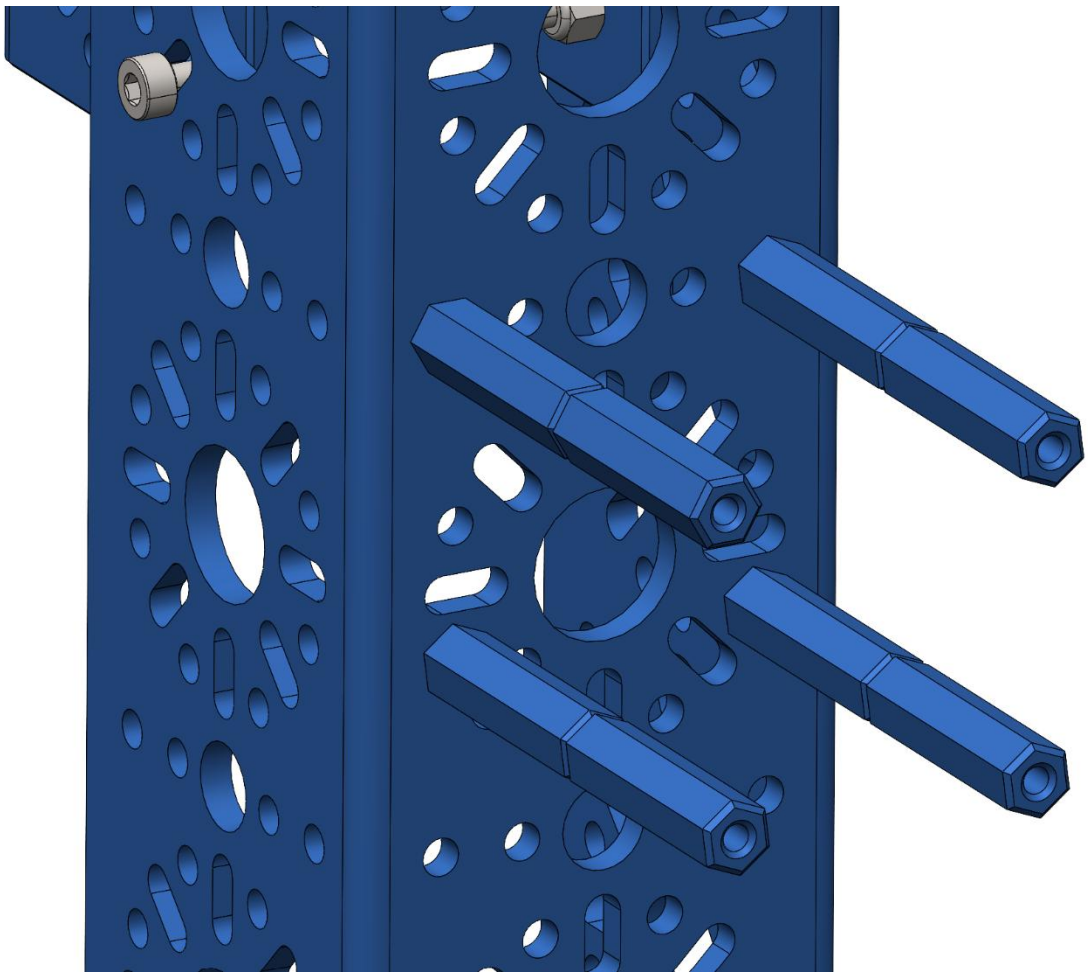


Screw the bearing block into the flat. The bearing side of the block should face the flat.

Step 4:

Parts:

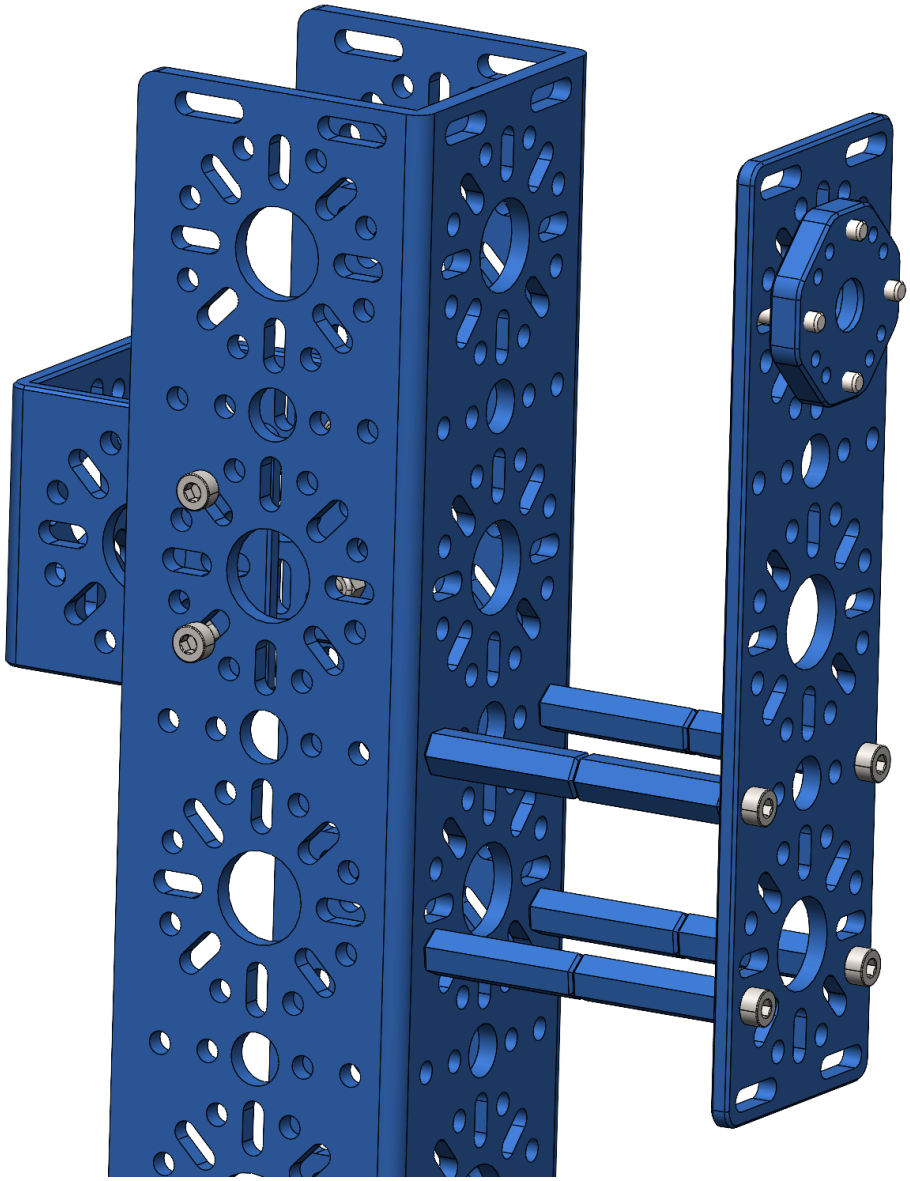
- 1 x Left Frame Assembly
- 4 x 25mm Standoffs



Step 5:

Parts:

- 1 x Left Frame Assembly
- 1 x Assembly from step 3
- 4 x M3 x 10 mm SHCS
- 1 x 2.5mm Hex Key (Green)

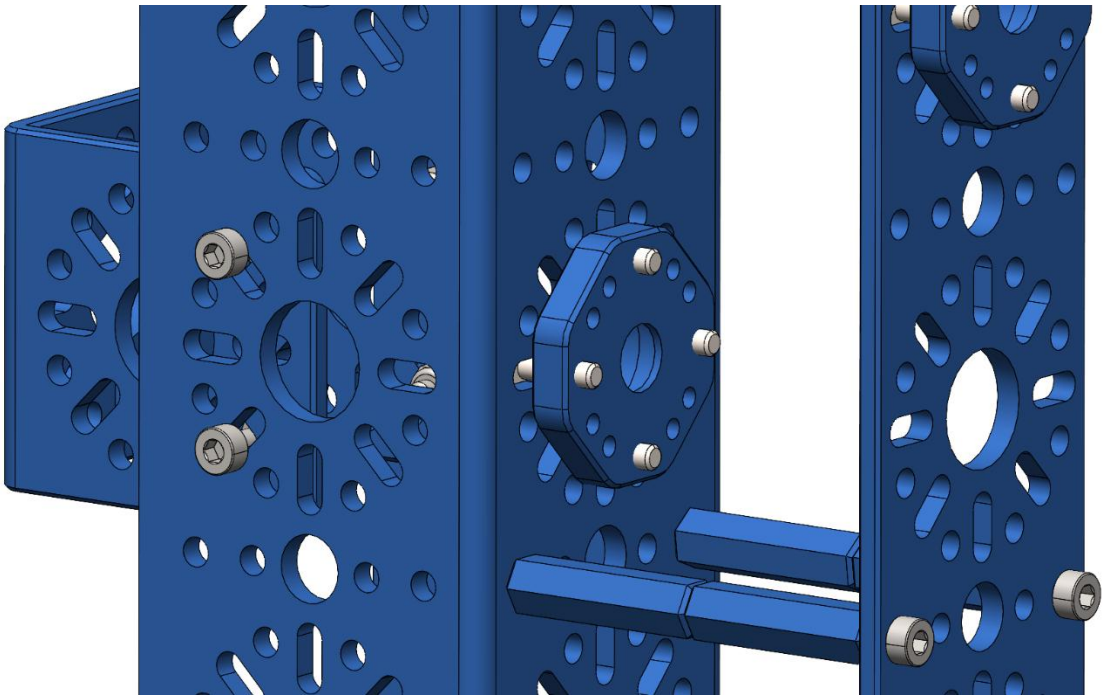


Screw the flat into the standoffs from the main assembly.

Step 6:

Parts:

- 1 x Left Frame Assembly
- 4 x M3 x 10 mm BHCS
- 1 x Bearing Block
- 1 x 2 mm Hex Key (Pink)

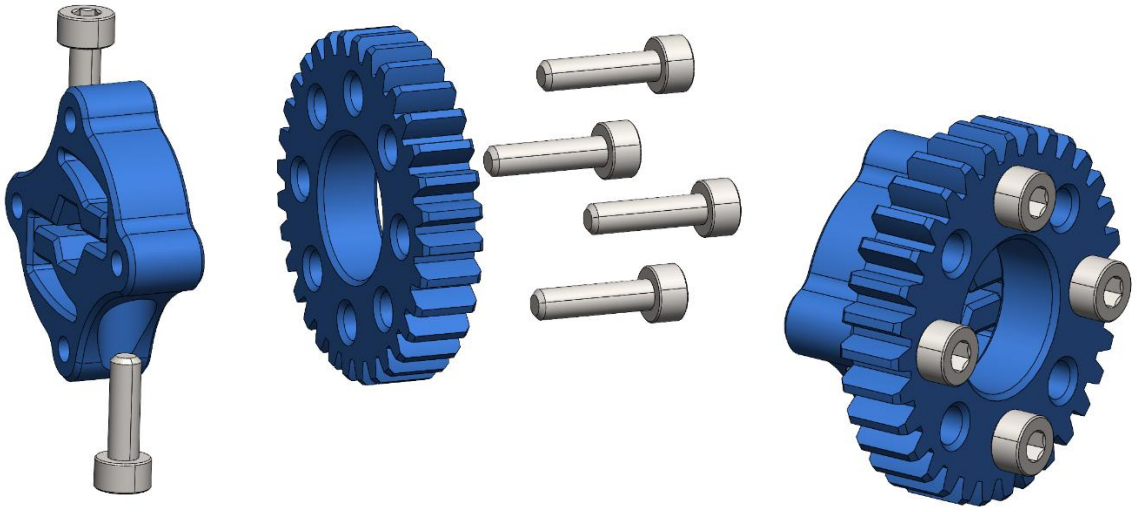


Screw the bearing block into the 336 U-Channel. The BHCS should be on the inside of the channel. If you are struggling to put the block in you can remove the inside U-Channel and replace it after.

Step 7:

Parts:

- 1 x Low Profile Clamping Shaft Hub
- 4 x M3 x 12 mm SHCS
- 2 x M3 x 10 mm SHCS
- 1 x 32 Tooth Gear
- 1 x 2.5mm Hex Key (Green)



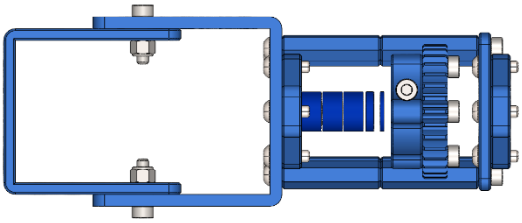
Note do not tighten the 10mm SHCS inside the clamping shaft hub.

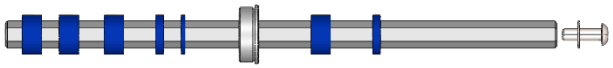
SOME VERSIONS OF THE KIT WILL COME WITH A 2 PC LOW PROFILE CLAMPING SHAFT HUB.

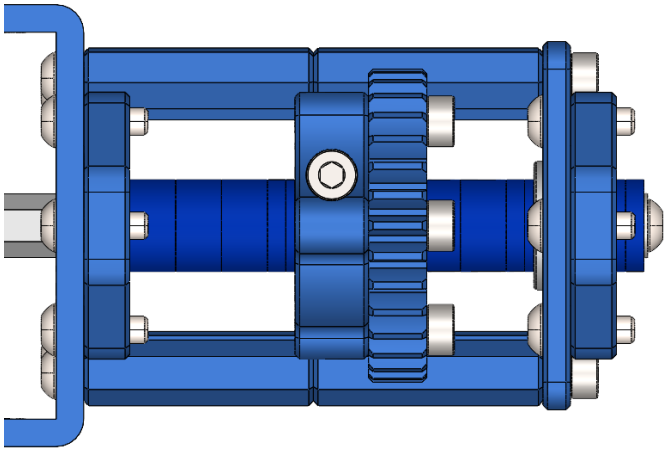
Step 8:

Parts:

- 1 x M3 x 10 mm BHCS with thread locking compound
- 1 x M3 Washer
- 1 x 140mm Hex Shaft
- 1 x Left Frame Assembly
- 1 x Assembly from Step 7
- 1 x Flange Bearing
- 2 x 1 mm Spacer
- 3 x 2 mm Spacer
- 7 x 5 mm Spacer
- 1 x 2.5 mm Hex Key (Green)
- 1 x 2 mm Hex Key (Pink)





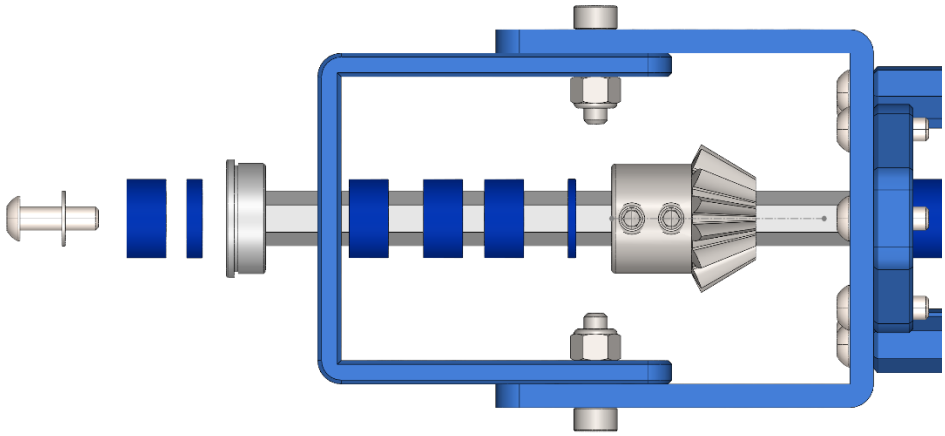


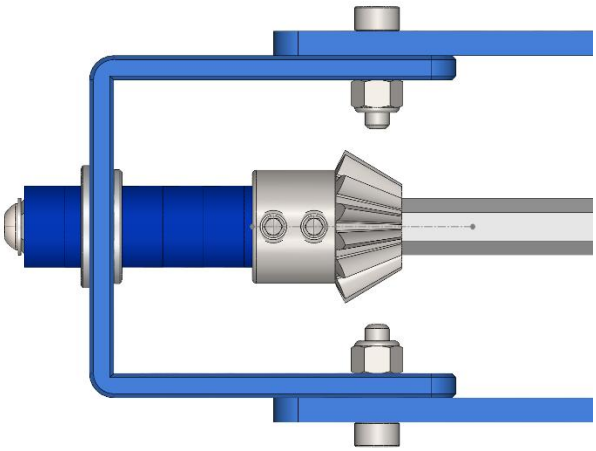
With the spacers put in and spaced properly you can tighten then screws in the low profile clamping shaft hub fully.

Step 9:

Parts:

- 1 x M3 x 10 mm BHCS with thread locking compound
- 1 x M3 Washer
- 1 x Flange Bearing
- 1 x 1 mm Spacer
- 1 x 2 mm Spacer
- 4 x 5 mm Spacer
- 1 x Collar Clamp
- 1 x 2 mm Hex Key (Pink)
- 1 x 13T Bevel Pinion Gear



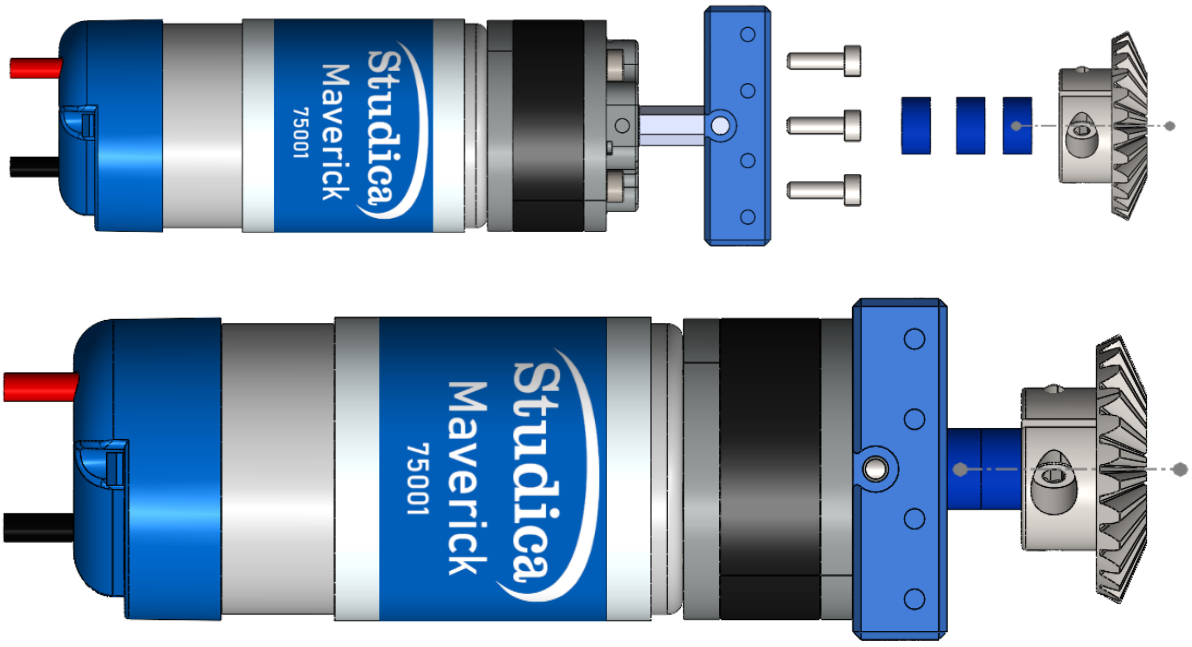


This step follows the other side of the shaft in step 8. Do not fully tighten the sets screws on the bevel gear yet.

Step 10:

Parts:

- 1 x Studica Maverick with 3.7:1 Clover Gearbox
- 1 x Clover Mount
- 5 x M3 x 10 mm SHCS
- 3 x 5 mm Spacer
- 1 x 26T Bevel Gear
- 1 x 2.5 mm Hex Key (Green)

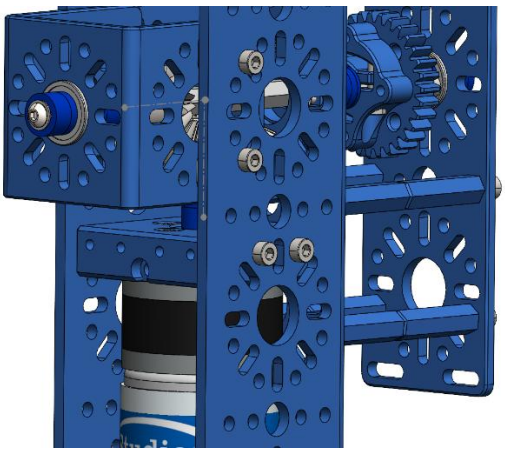


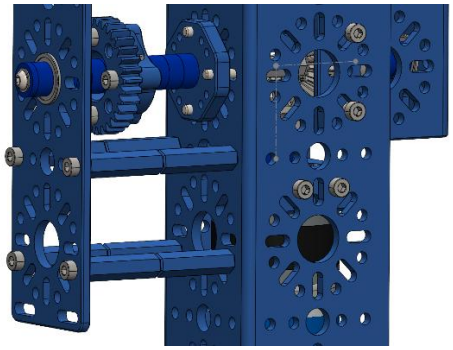
Slide the Maverick motor into the clover mount and secure with 4 SHCS. Slide 3 of the 5 mm spacers on with the 26T bevel gear to follow. Do not fully tighten the bevel gear clamp yet.

Step 11:

Parts:

- 1 x Left Frame Assembly
- 4 x M3 x 10 mm SHCS
- 1 x Assembly from Step 10
- 1 x 2.5 mm Hex Key (Green)
- 1 x 2 mm Hex Key (Pink)





Slide the motor into the slot shown. Just like before with the drive motors ensure the encoder port is facing outwards for ease of access. Using the SHCS screw the clover mount into the channel. Once the mount is screwed in mesh the bevel gears together that they make good contact and do not bind. Once complete fully tighten the screws on both bevel gears.

Tip: The shooter will experience a lot of vibration as it is operating at a very fast speed. Using thread locker found in the kit on the setscrews holding the bevel gear will ensure it does not come loose during operation.

Right Side Main Frame

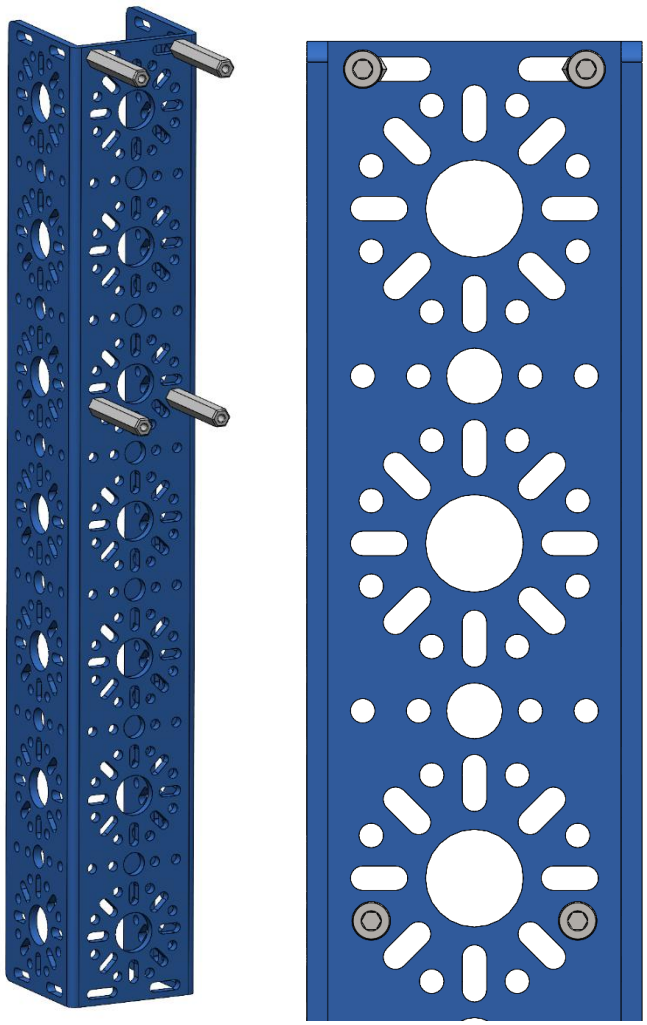
Tools Required:

- Hex Key Metric 7 Piece Set, Part # 70144-7
- Combination Wrench, Part # 70145

Step 1:

Parts:

- 1 x 336 mm U-Channel
- 4 x 35 mm Hex Shaft
- 4 x M3 x 10 mm SHCS
- 1 x 2.5 mm Hex Key (Green)

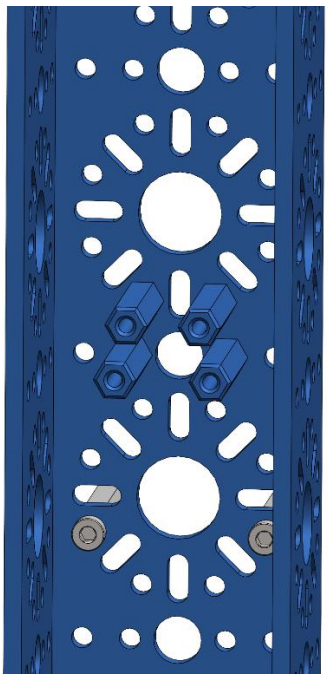


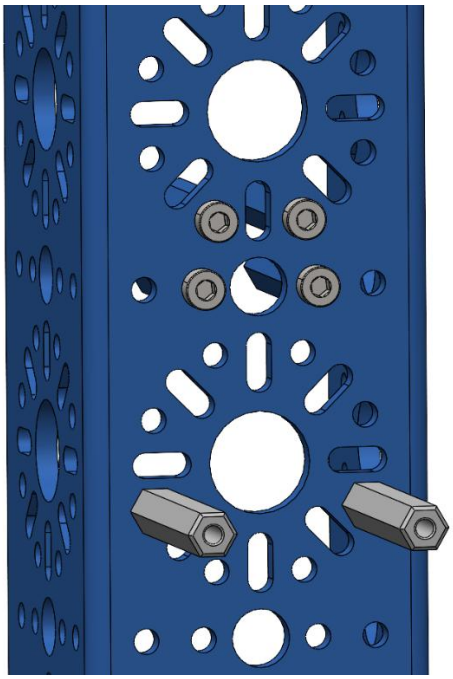
Screw the 35 mm hex shaft into place using the 4 SHCS.

Step 2:

Parts:

- 1 x Right Frame Assembly
- 4 x 25 mm Standoffs
- 4 x M3 x 10mm SHCS
- 1 x 2.5 mm Hex Key (Green)



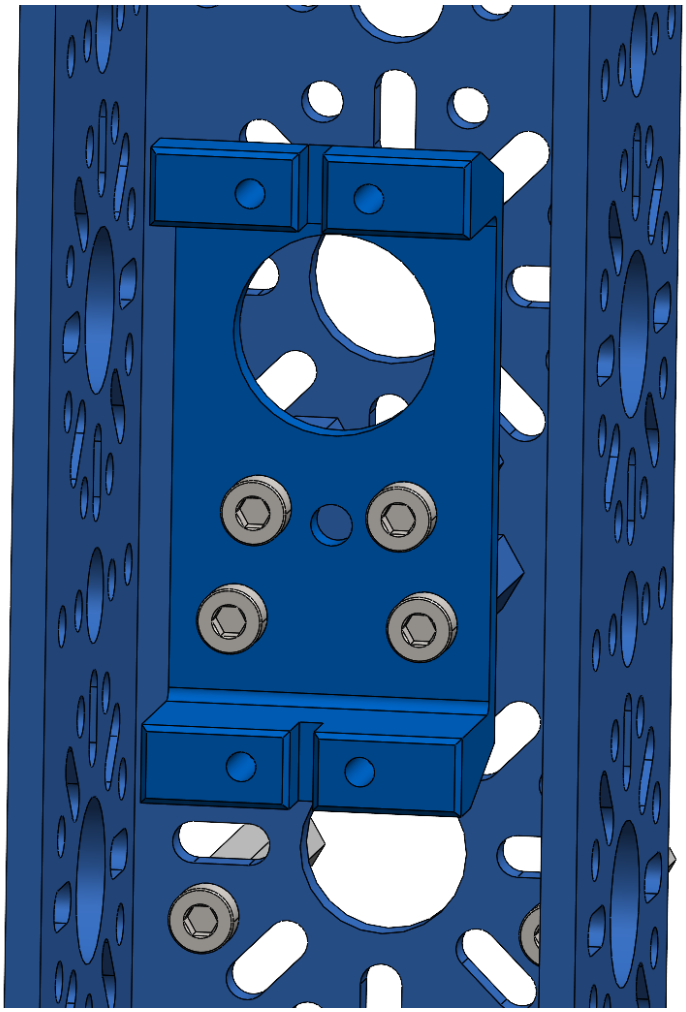


Screw the 25mm standoffs in with the 4 SCHS. Screws should be on outside of channel.

Step 3:

Parts:

- 1 x Right Frame Assembly
- 1 x Standard Servo Front Mount
- 4 x M3 x 10 mm SHCS
- 1 x 2.5 mm Hex Key (Green)

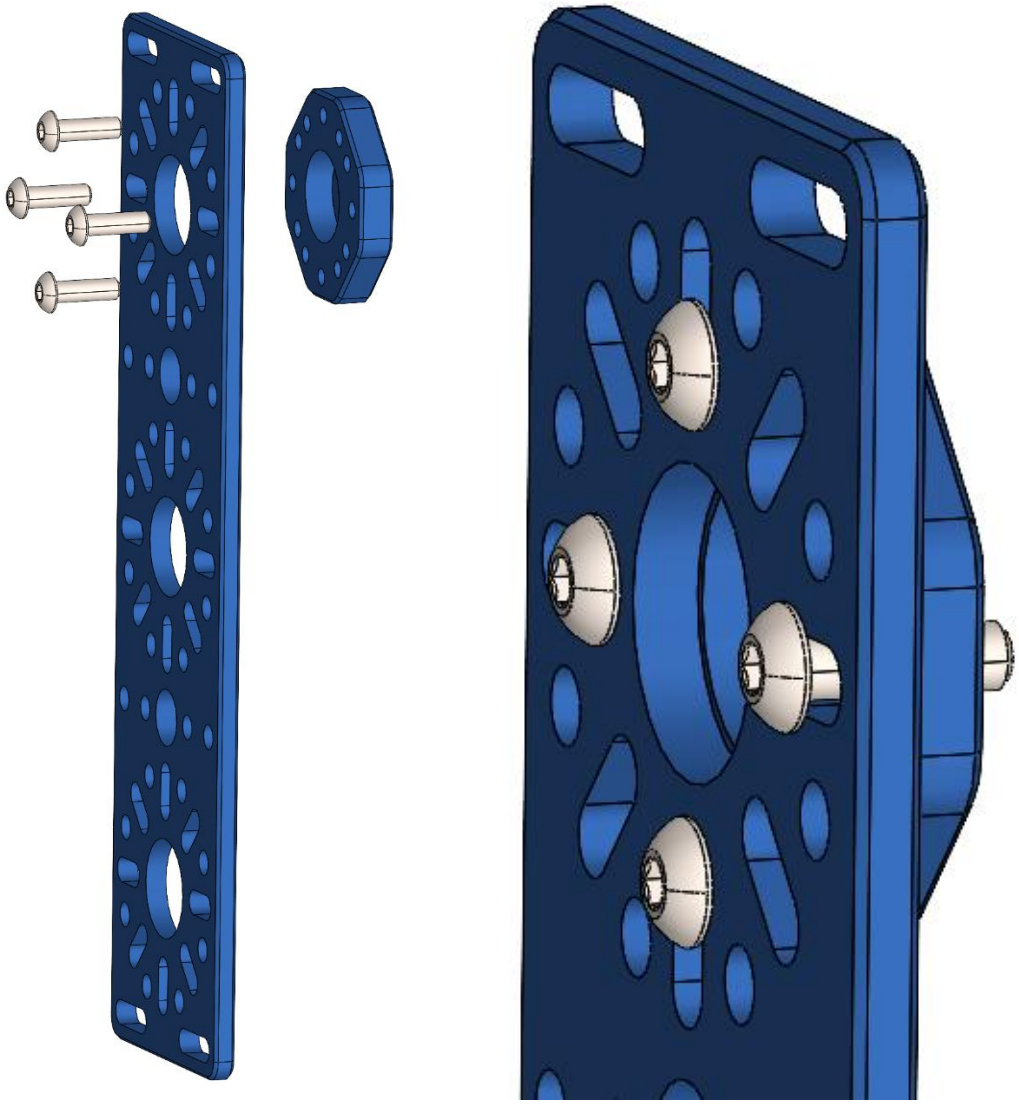


Screw the servo mount into the standoffs.

Step 4:

Parts:

- 1 x 144 mm Flat
- 1 x Bearing Block
- 4 x M3 x 10 mm BHCS
- 1 x 2 mm Hex Key (Pink)

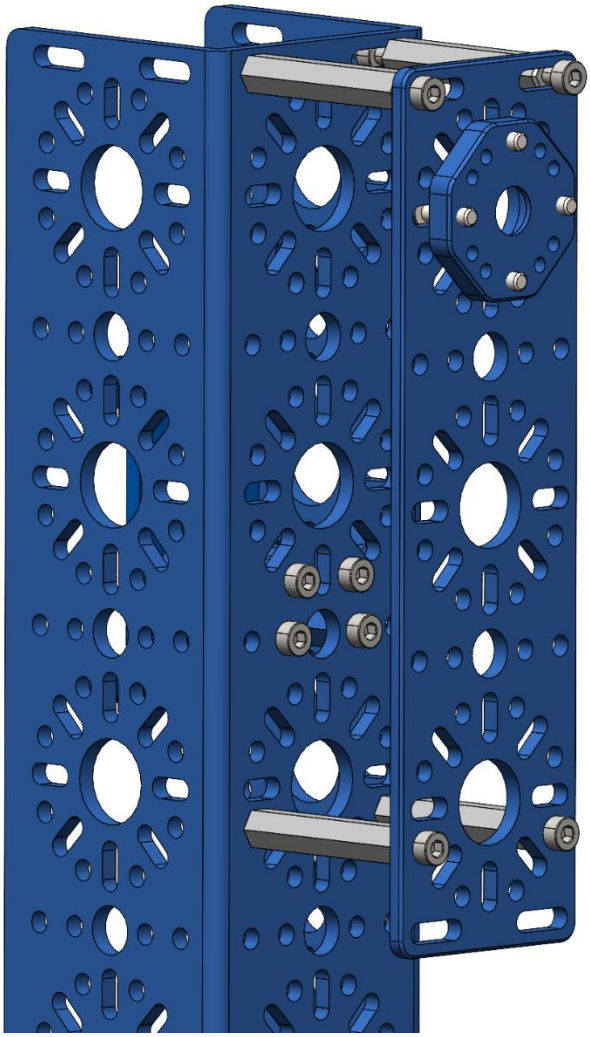


Screw the bearing block in with the bearing facing the flat.

Step 5:

Parts:

- 1 x Right Frame Assembly
- 1 x Assembly from step 4
- 4 x M3 x 10 mm SHCS
- 1 x 2.5 mm Hex Key (Green)



Screw the flat plat assembly to the hex shafts.

Step 6:

Parts:

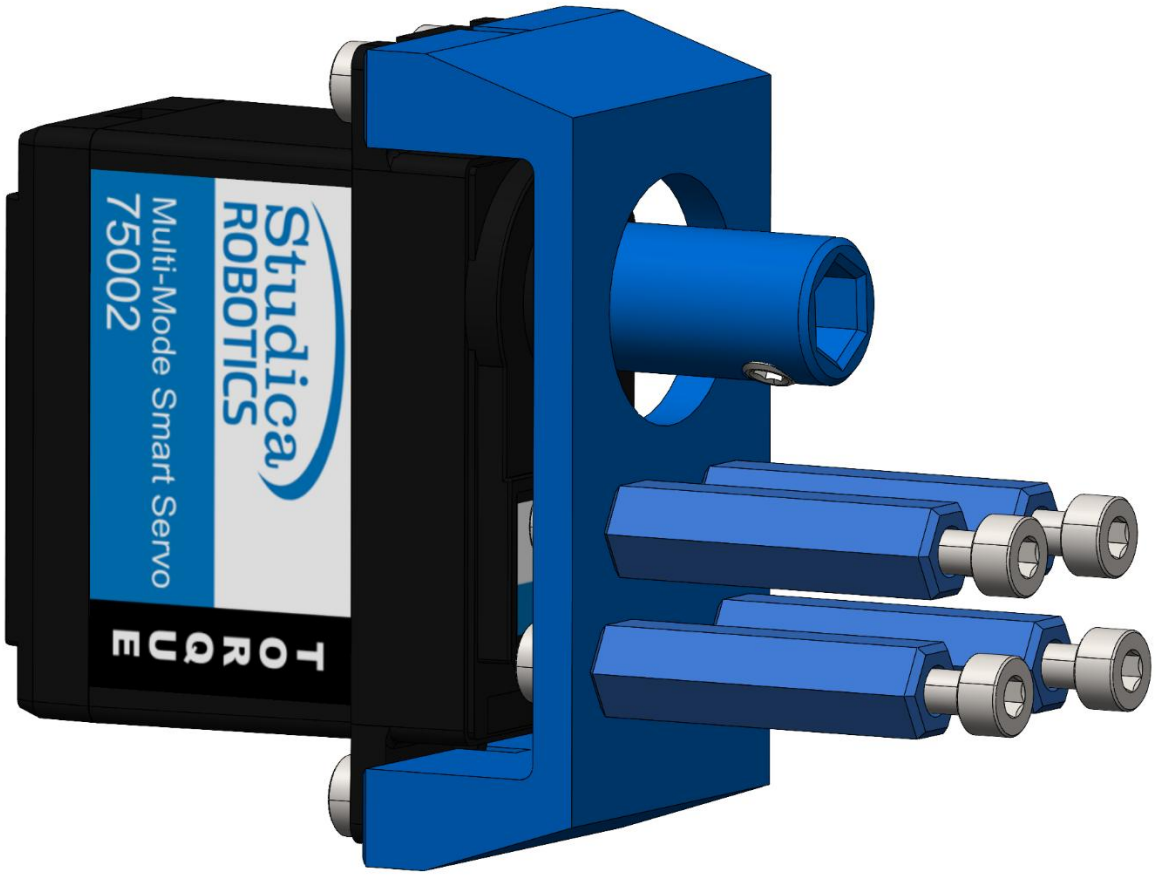
- 1 x Right Frame Assembly
- 1 x Torque Servo
- 4 x M3 x 10 mm SHCS
- 1 x 2.5 mm Hex Key (Green)

Screw the servo into the servo mount.

Step 7:

Parts:

- 1 x Right Frame Assembly
- 1 x 6mm Hex to 25T Spline Servo Adapter
- 1 x 2 mm Hex Key

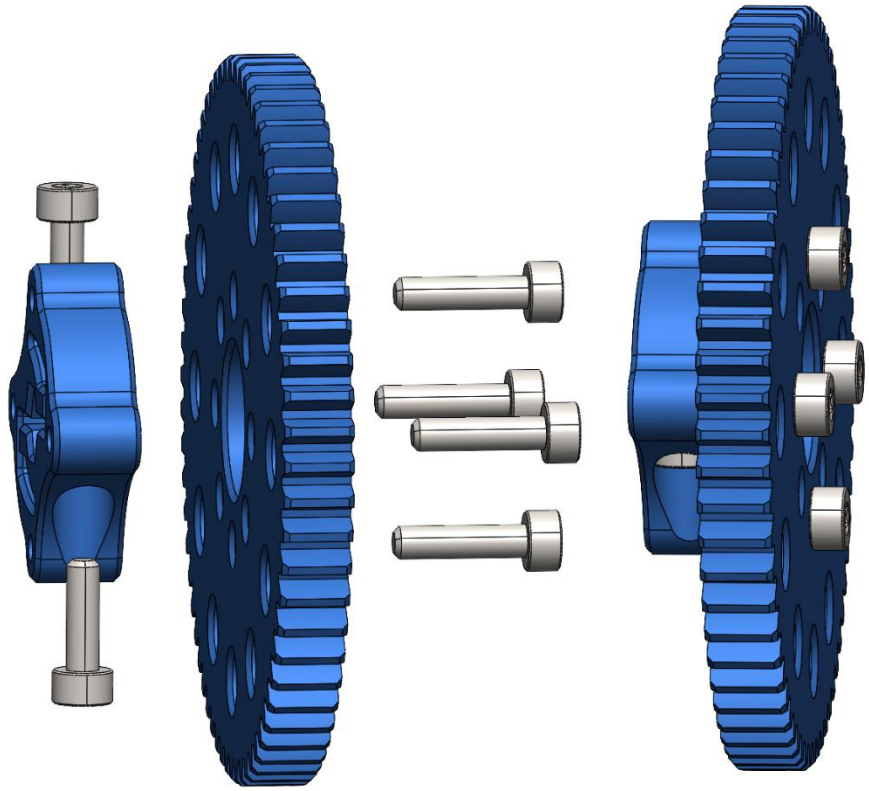


Hid the channel here for better visuals. Slide the hub onto the servo shaft. Lightly screw in the set screw but do not fully insert as the shaft still needs to be placed inside.

Step 8:

Parts:

- 1 x Low Profile Camping Shaft Hub
- 1 x 64 Tooth Gear
- 4 x M3 x 12 mm SHCS
- 2 x M3 x 10 mm SHCS
- 1 x 2.5 mm Hex Hey (Green)



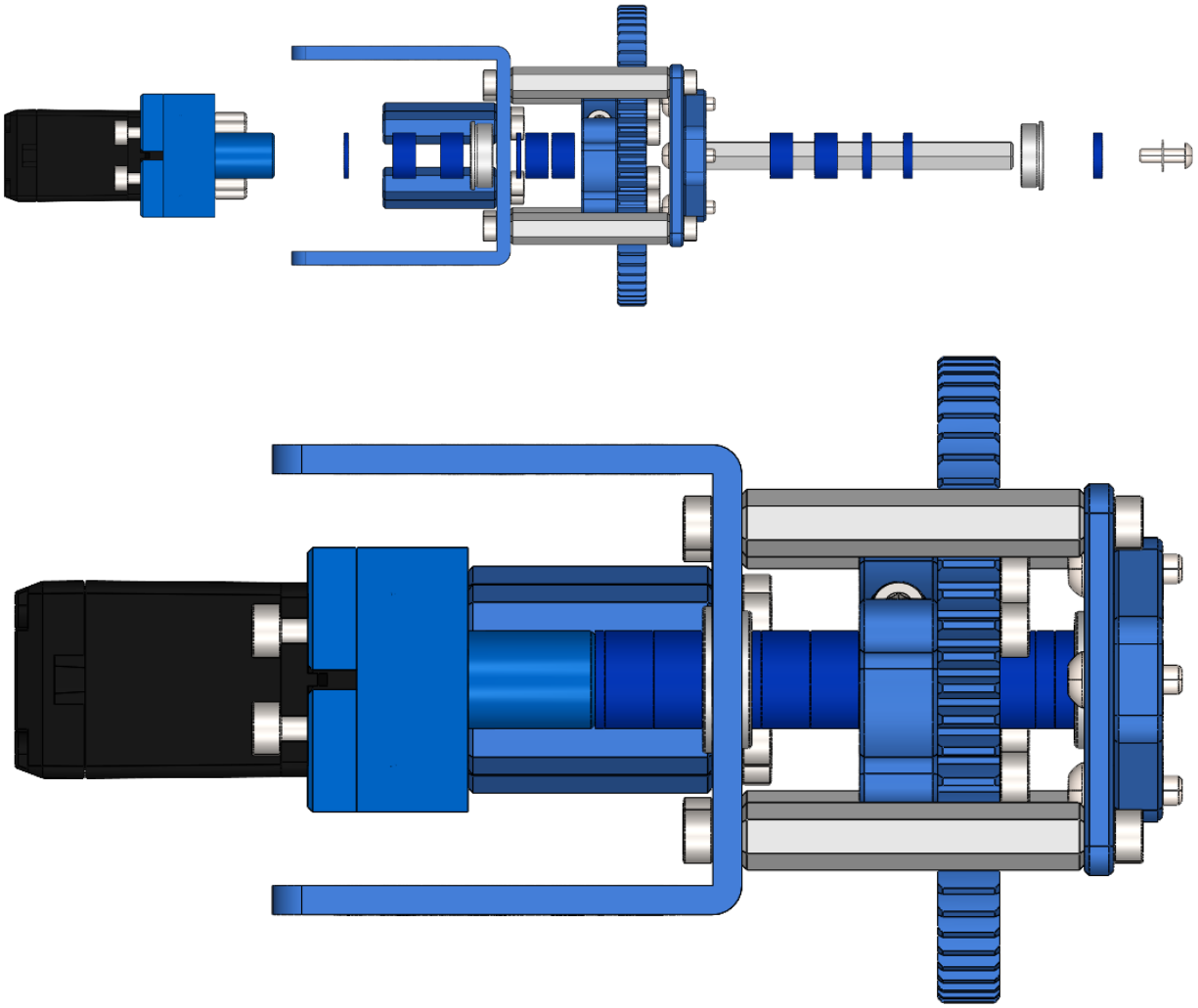
Similar to the steps with the 32-tooth gear on the Left Side Frame Assembly we repeat it here with the 64-tooth gear.

Note: Some kits might receive a 2 pc Low Profile Clamping Shaft Hub.

Step 9:

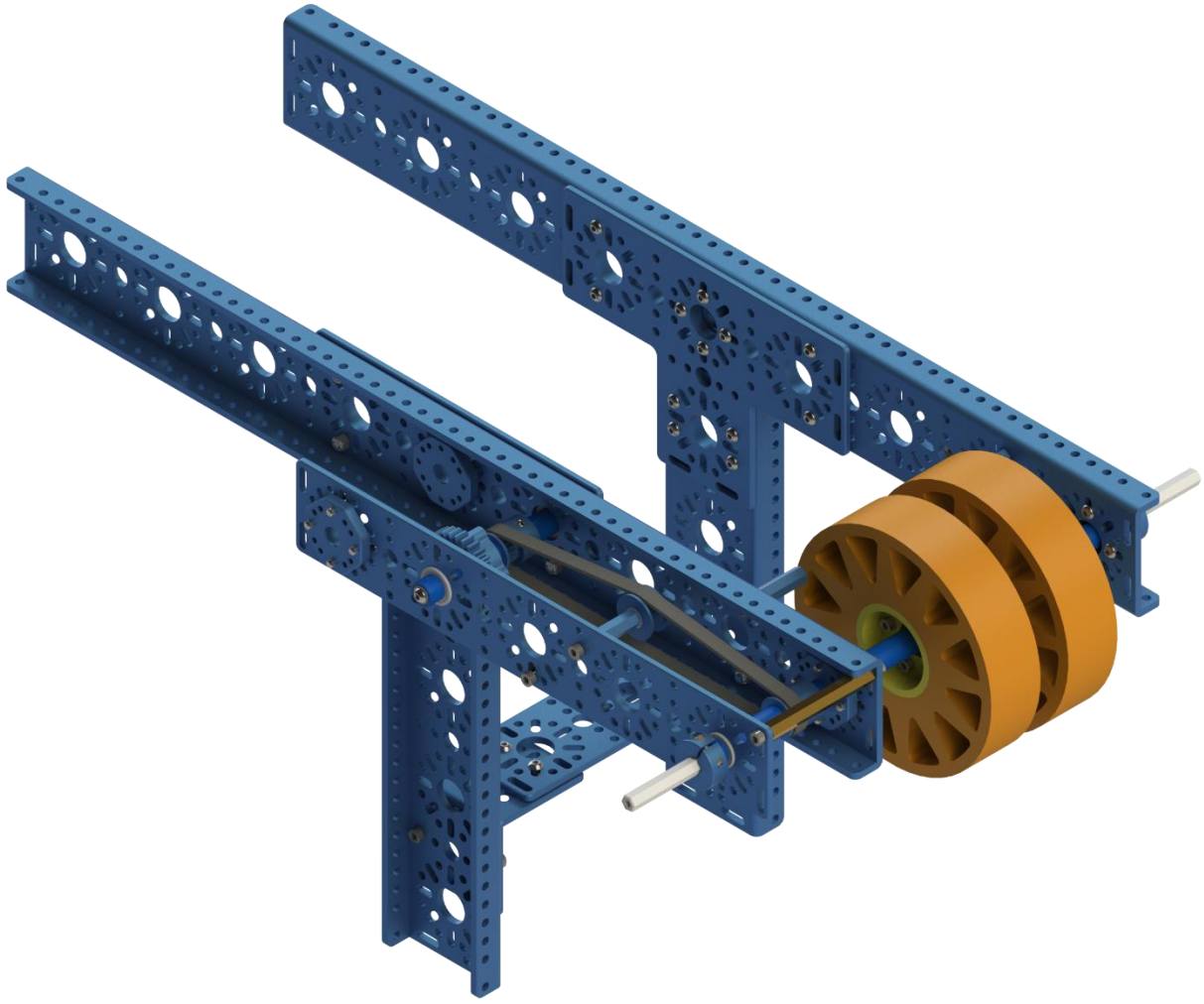
Parts:

- 1 x Right Frame Assembly
- 2 x 1 mm Spacer
- 3 x 2 mm Spacer
- 6 x 5 mm Spacer
- 2 x Flange Bearing
- 1 x M3 x 10 mm BHCS with thread locking compound
- 1 x M3 Washer
- 1 x 70 mm Hex Shaft
- 1 x 2 mm Hex Key (Pink)



The stack up for the main shaft of the right frame. Once complete the screw on the servo hub can be fully tightened for secureness.

Flywheel Shooter



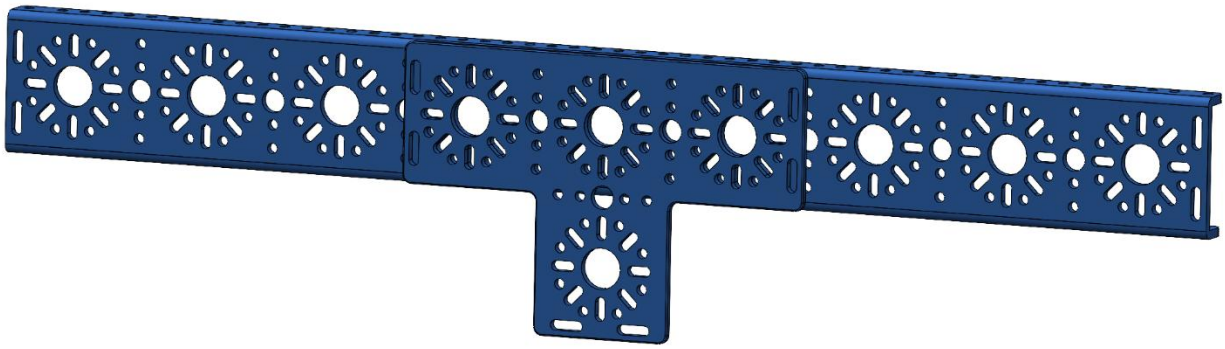
Tools Required:

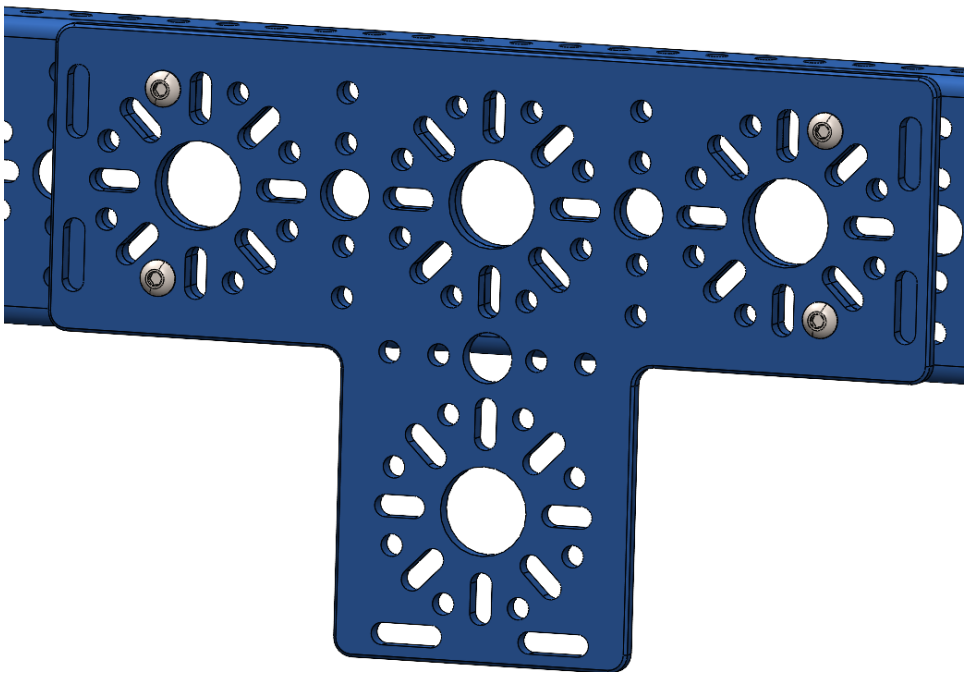
- Hex Key Metric 7 Piece Set, Part # 70144-7
- Combination Wrench, Part # 70145
- 5.5 mm Nut Driver, Part # 70146

Step 1:

Parts:

- 1 x 432 mm Low Profile U-Channel
- 1 x T Bracket
- 4 x M3 x 10 mm BHCS
- 4 x M3 Nyloc Nuts
- 1 x 2 mm Hex Key (Pink)
- 1 x 5.5 mm Nut Driver





Screw the T-Bracket to the 432 Low Profile Channel using 4 BHCS and nyloc nuts.

Step 2:

Parts:

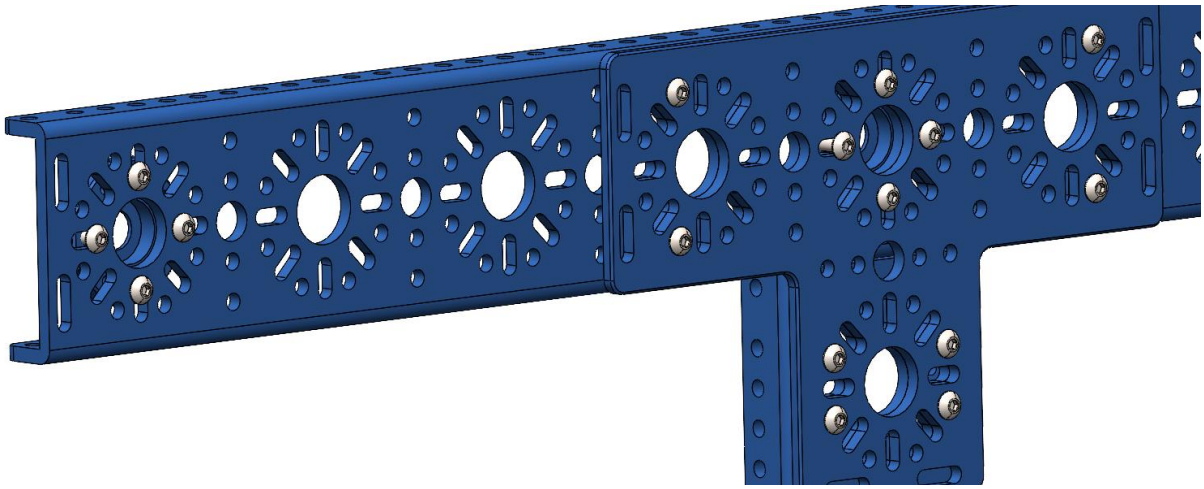
- 1 x Assembly from Step 1
- 1 x 192 mm Low Profile U-Channel
- 4 x M3 x 10 mm BHCS
- 4 x M3 Nyloc Nuts
- 1 x 2 mm Hex Key (Pink)
- 1 x 5.5 mm Nut Driver

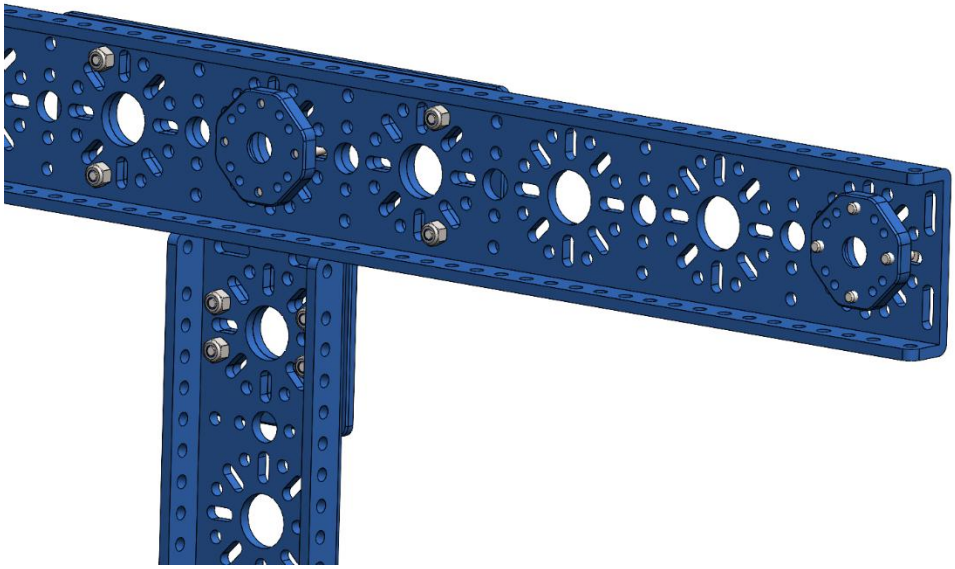
Use the 192 mm Low Profile channel to create a full t frame.

Step 3:

Parts:

- 1 x Assembly from Step 2
- 2 x Bearing Blocks
- 4 x M3 x 10 mm BHCS
- 1 x 2 mm Hex Key (Pink)



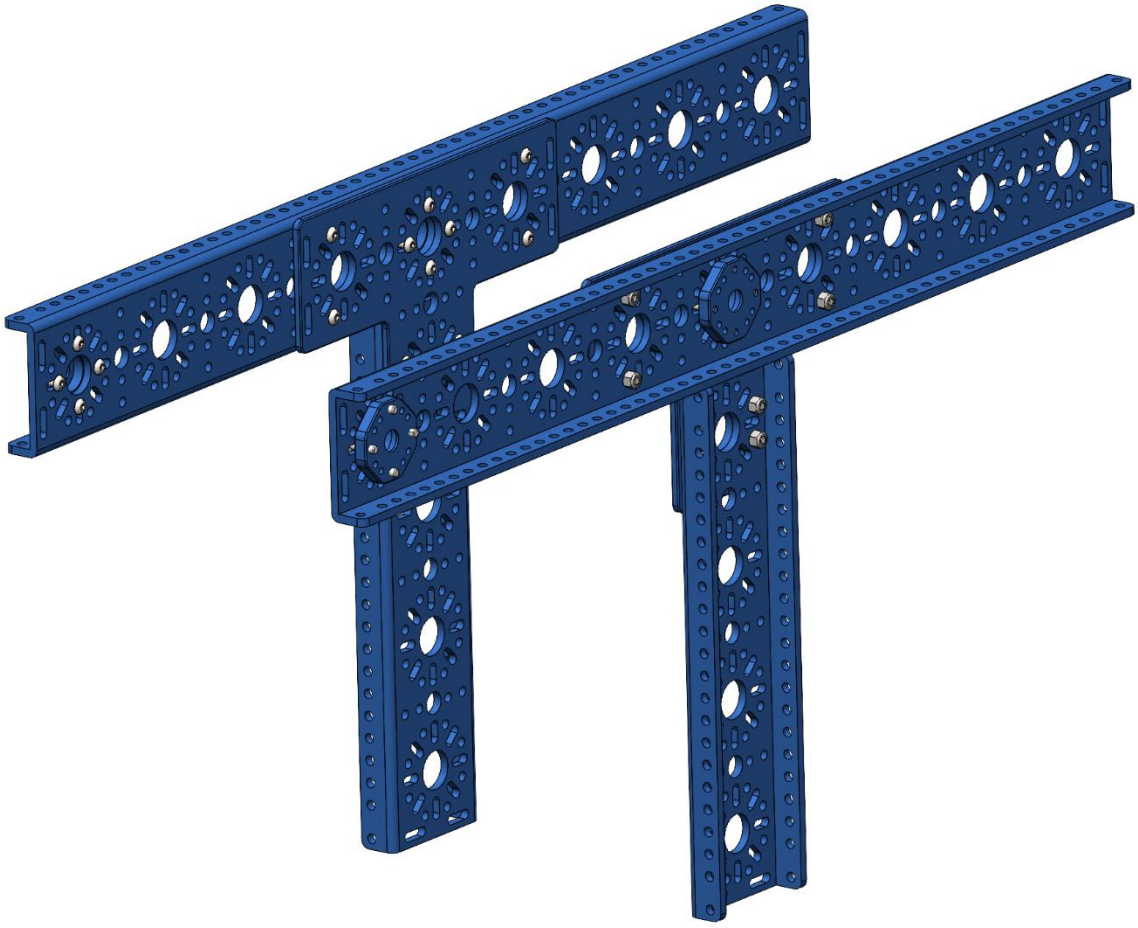


Screw two bearing blocks into the inside of the 432 mm Low Profile Channel using M3 BHCS.

Step 4:

Parts:

- 1 x 432 mm Low Profile U-Channel
- 1 x 192 mm Low Profile U-Channel
- 1 x T Bracket
- 16 x M3 x 10 mm BHCS
- 8 x M3 Nyloc Nuts
- 2 x Bearing Blocks
- 1 x 2 mm Hex Key (Pink)
- 1 x 5.5 mm Nut Driver

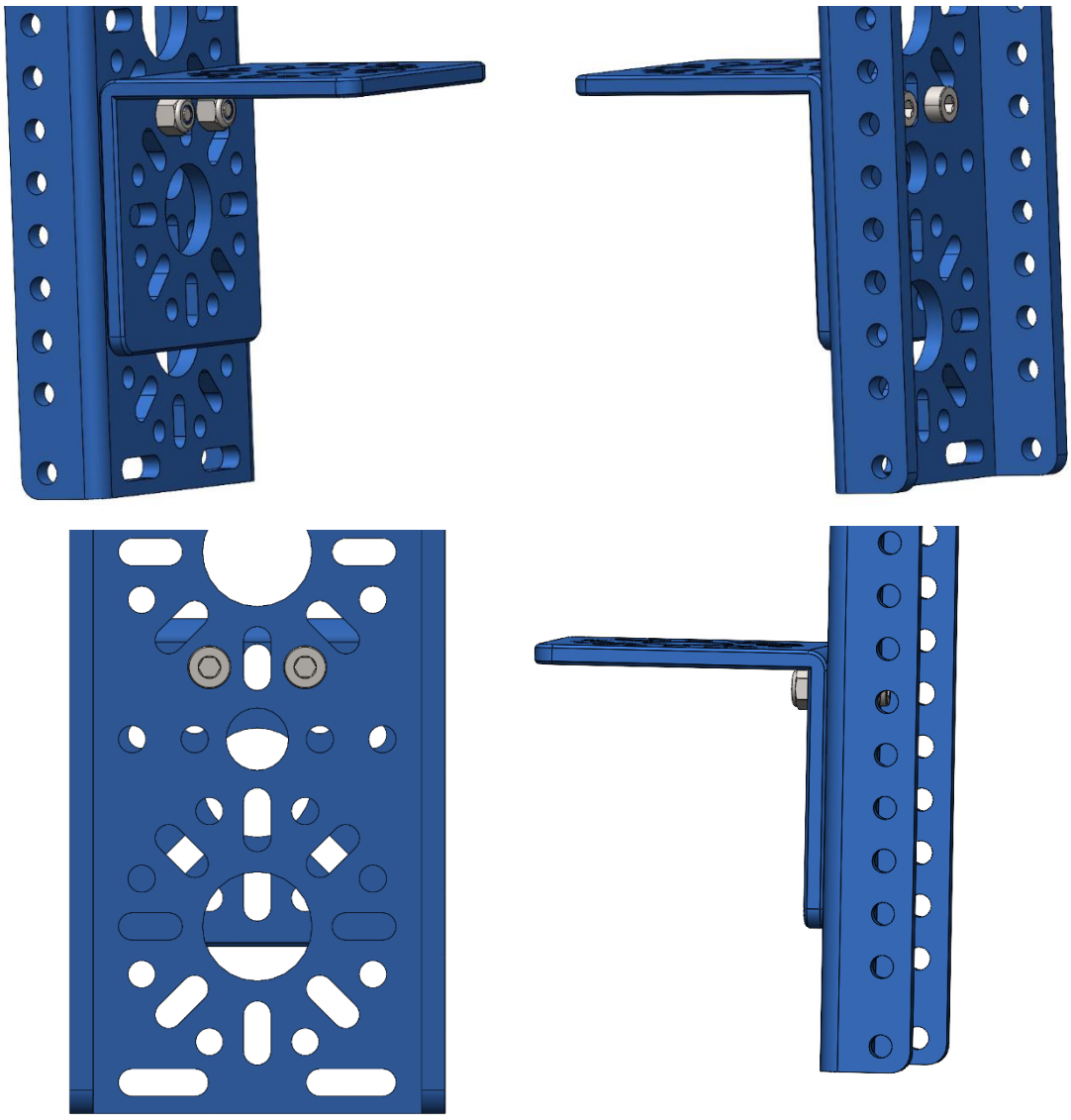


Repeat steps 1 – 3 to create another t frame assembly.

Step 5:

Parts:

- 2 x Inside L Brackets
- 4 x M3 x 12 mm SHCS
- 4 x M3 Nyloc Nuts
- 1 x 2.5 mm Hex Key (Green)
- 1 x 5.5 mm Nut Driver or Wrench

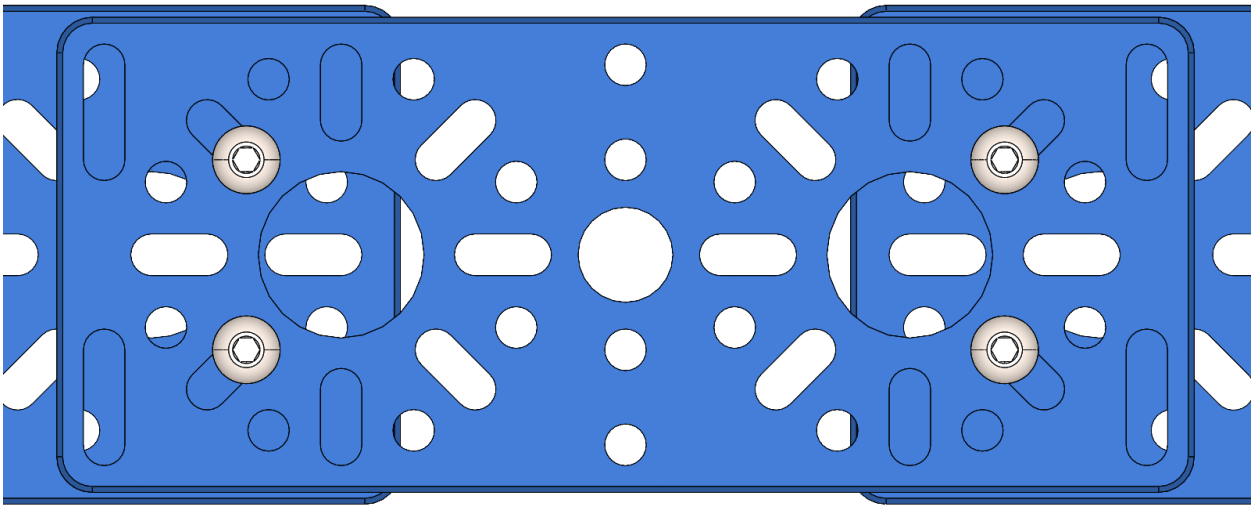


Attach the inside l brackets to the bottom of the 192 mm Low Profile Channel.

Step 6:

Parts:

- 4 x M3 x 10 mm BHCS
- 1 x 96 mm Flat
- 4 x M3 Nyloc Nuts
- 1 x 2 mm Hex Key (Pink)
- 1 x 5.5 mm Nut Driver or Wrench

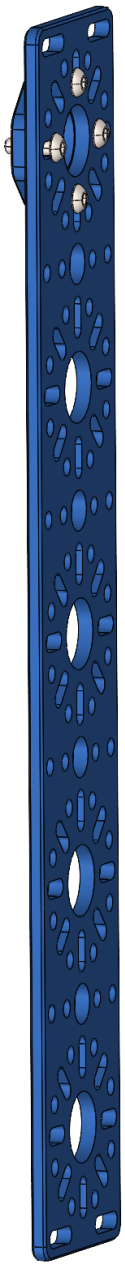


Screw the 96 mm flat into the two inside l brackets. This will combine the two t frames.

Step 7:

Parts:

- 1 x Bearing Block
- 4 x M3 x 10 mm BHCS
- 1 x 240 mm Flat
- 1 x 2 mm Hex Key (Pink)

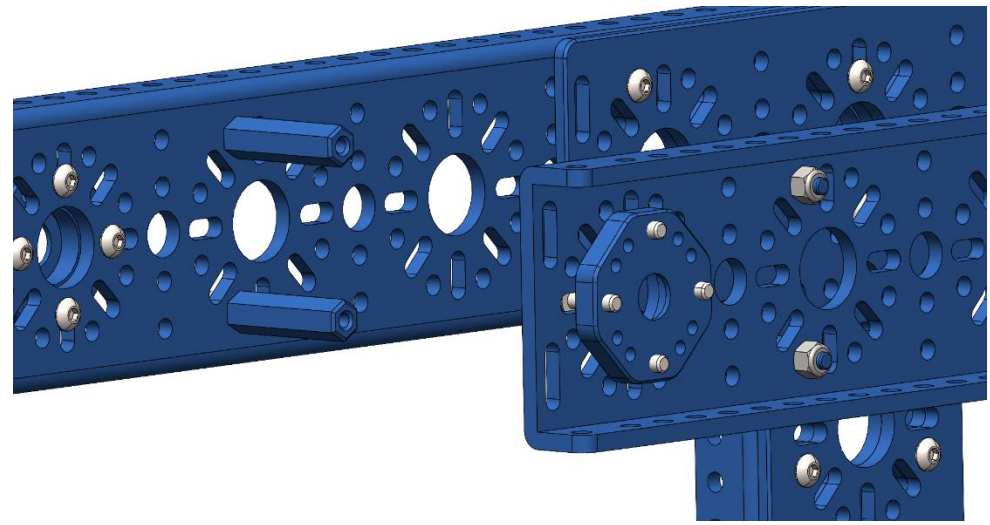


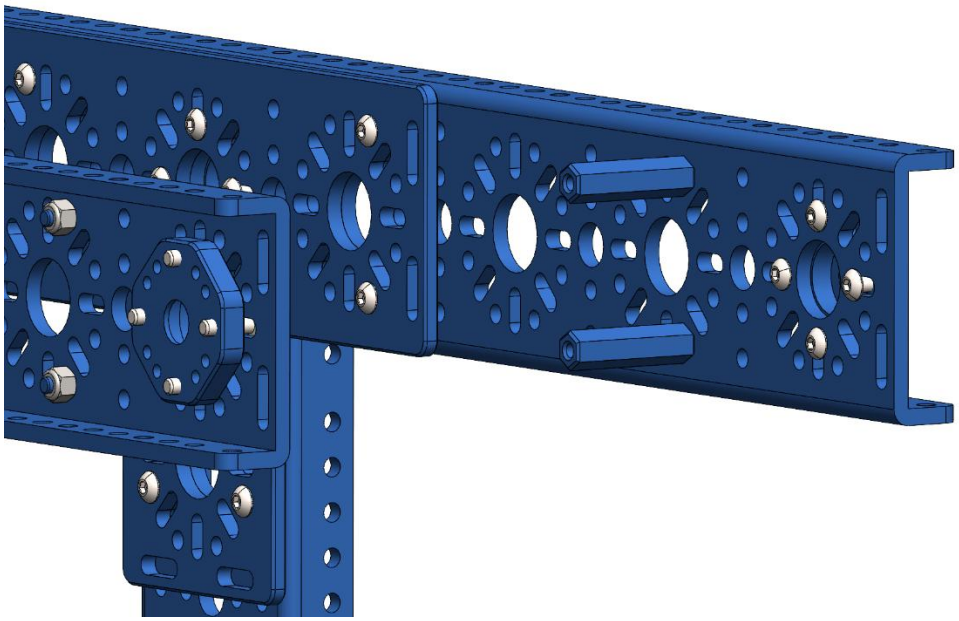
Screw a bearing block into a 240 mm flat.

Step 8:

Parts:

- 4 x 25 mm Male to Female Standoffs
- 4 x M3 Nyloc Nuts
- 1 x 5.5 mm Nut Driver



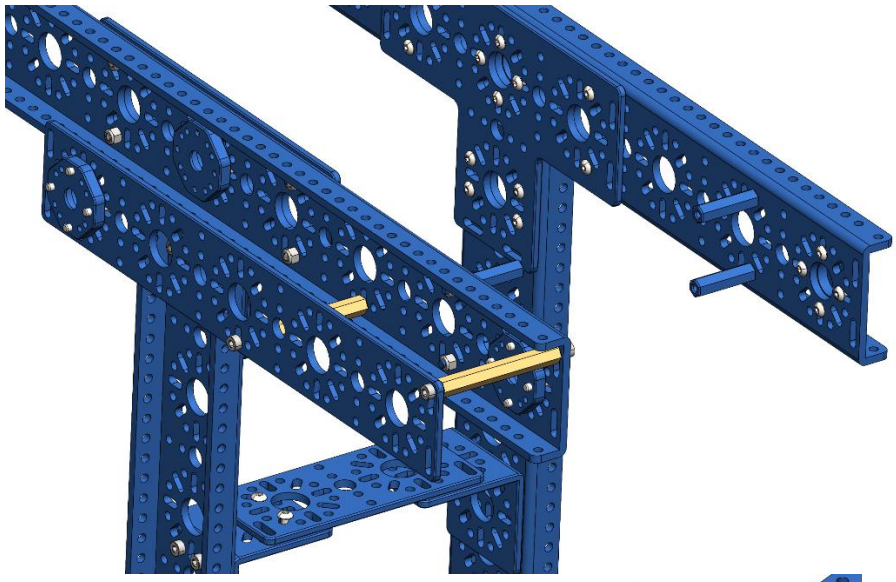


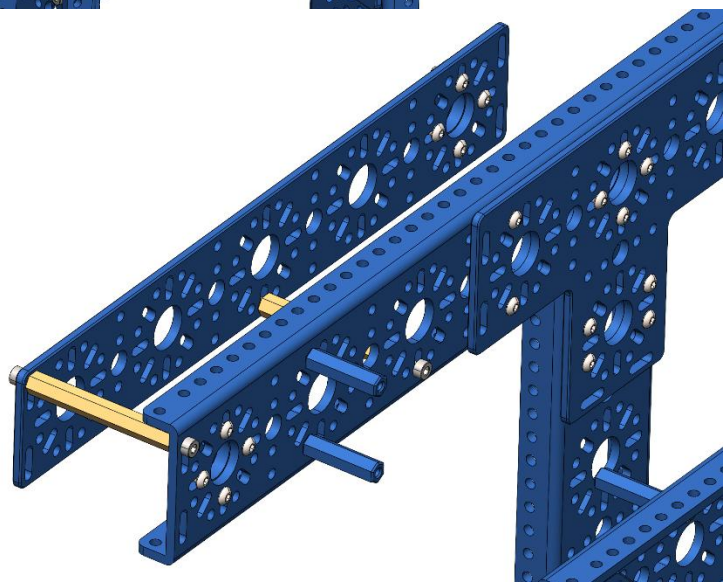
Attach the standoffs to the nuts in locations shown.

Step 9:

Parts:

- 1 x Assembly from Step 7
- 2 x 52 mm Standoffs
- 4 x M3 x 10 SHCS
- 1 x 2.5 mm Hex Key (Green)



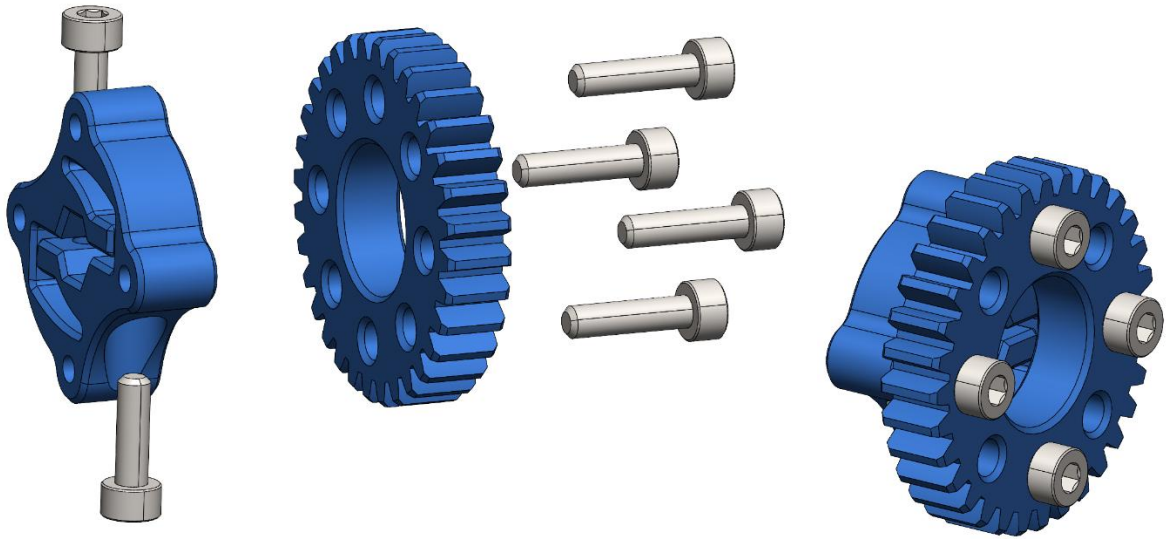


Using the 52 mm standoffs, attach the 240mm flat to the main assembly.

Step 10:

Parts:

- 2 x M3 x 10 mm SHCS
- 4 x M3 x 12 mm SHCS
- 1 x Low Profile Clamping Shaft Hub
- 1 x 32T Gear
- 1 x 2.5 mm Hex Key (Green)

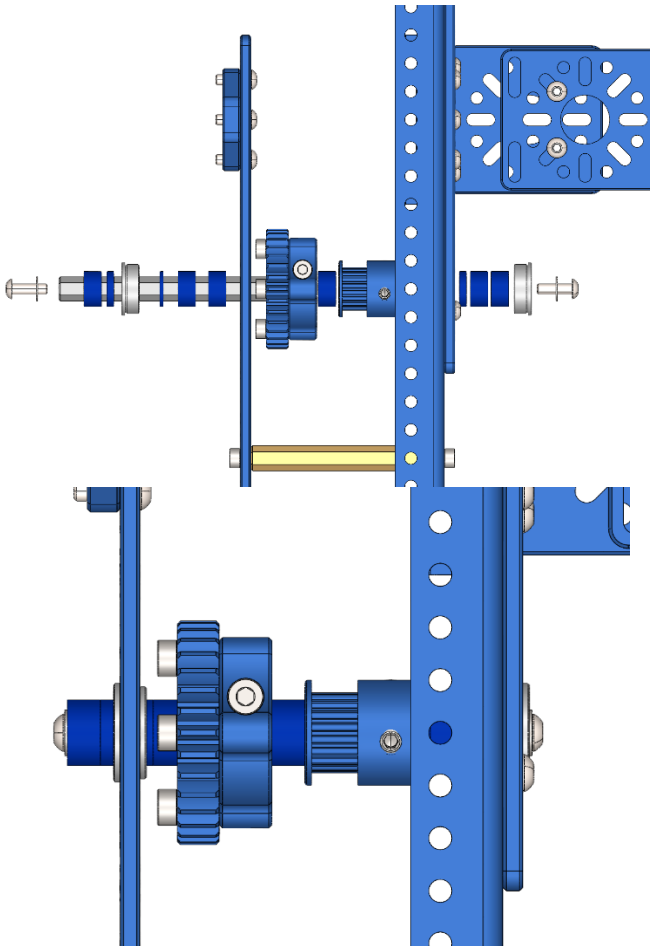


Similar to previous steps in other assemblies screw the 32T gear into the hub.

Step 11:

Parts:

- 1 x 70 mm Hex Shaft
- 2 x M3 x 10 mm BHCS with Thread Locking Compound
- 2 x M3 Washer
- 1 x 1 mm Spacer
- 2 x 2 mm Spacer
- 6 x 5 mm Spacer
- 2 x Flanged Bearing
- 1 x Assembly from Step 10
- 1 x 20T GT2 Timing Pulley
- 1 x Timing Belt
- 1 x 2 mm Hex Key (Pink)
- 1 x 2.5 mm Hex Key (Green)

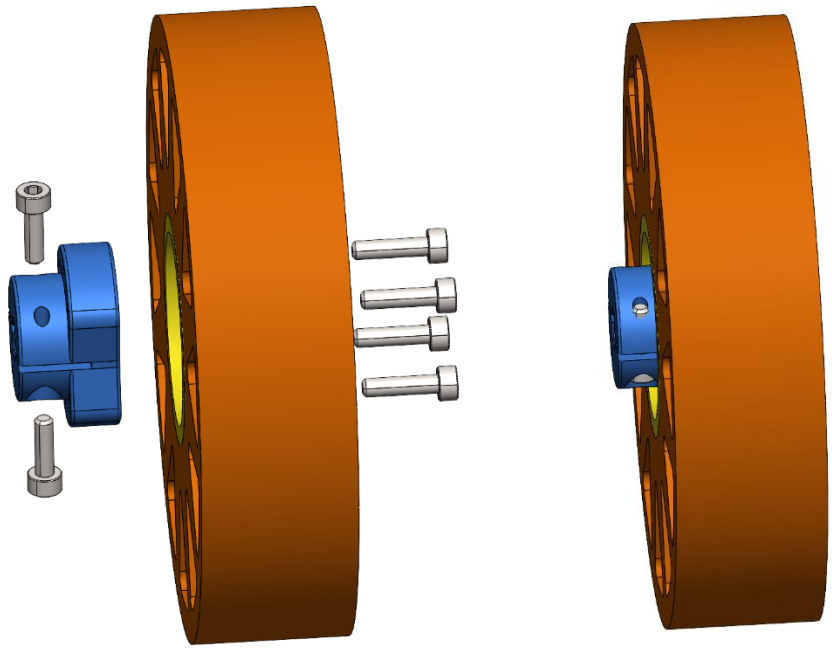


NOTE: SLIDE THE BELT OVER THIS SHAFT DURING THIS STEP IT WILL BE LOOSE BUT THAT IS OK.

Step 12:

Parts:

- 2 x Flex Wheel Orange
- 2 x Clamping Shaft Hub
- 4 x M3 x 10 mm SHCS
- 8 x M3 x 12 mm SHCS
- 1 x 2.5 mm Hex Key (Green)

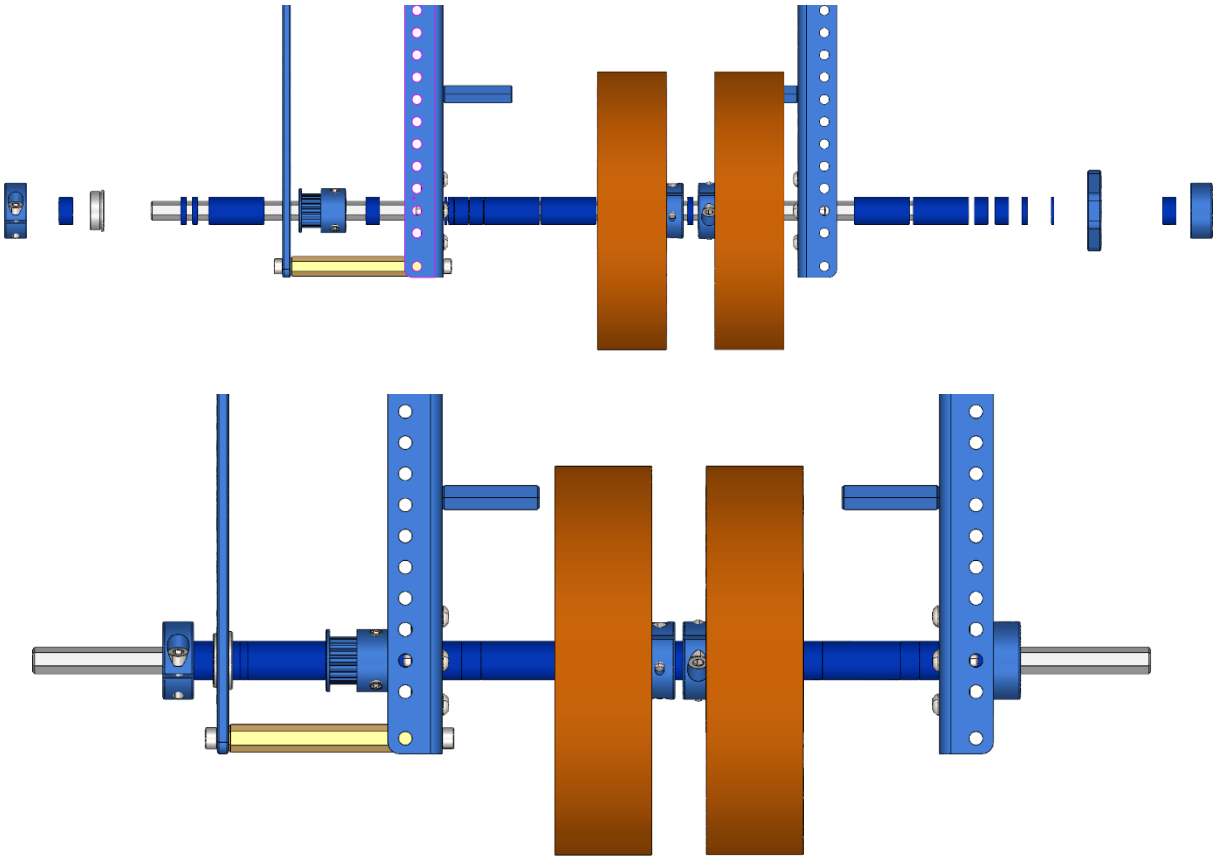


Create 2 flex wheel assemblies.

Step 13:

Parts:

- 2 x Flex Wheel Assemblies from Step 12
- 2 x M3 x 10 mm SHCS
- 2 x Collar Clamp
- 1 x Flanged Bearing
- 2 x 1 mm Spacer
- 5 x 2 mm Spacer
- 7 x 5 mm Spacer
- 5 x 20 mm Spacer
- 1 x 20T GT2 Pulley
- 1 x 288 mm Hex Shaft (Some kits will be 432 mm)
- 1 x 2.5 mm Hex Key (Green)
- 1 x 2 mm Hex Key (Pink)
- 1 x Timing Belt

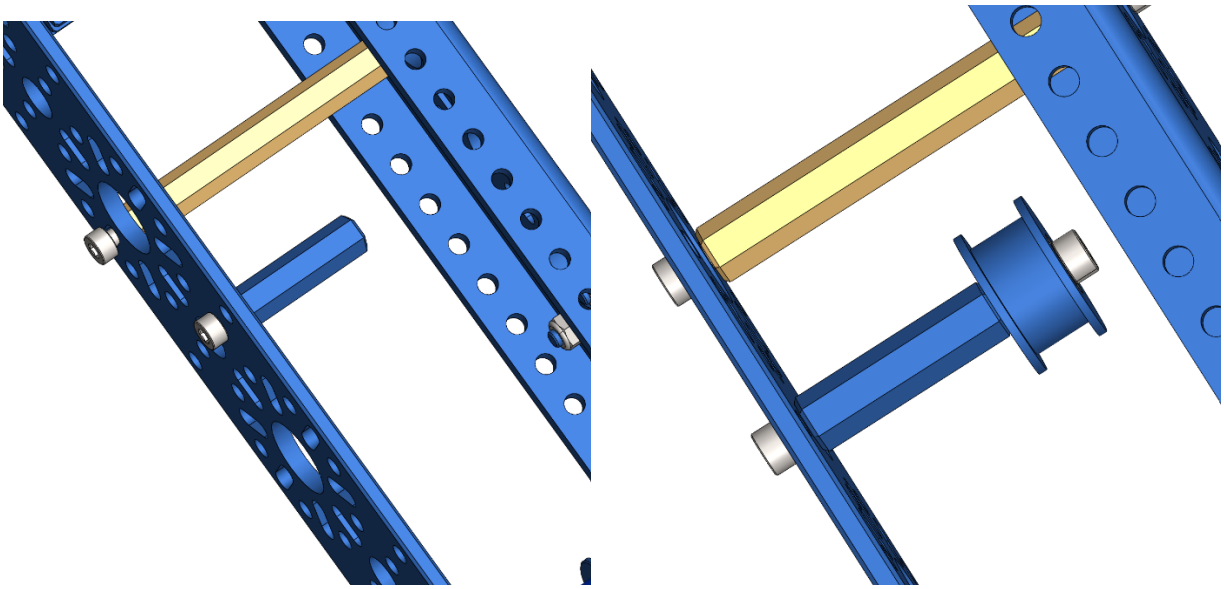


NOTE: SLIDE THE OTHER END OF THE BELT OVER THE SHAFT. THE BELT SHOULD NOW BE OVER BOTH PULLEYS. IT WILL BE LOOSE.

Step 14:

Parts:

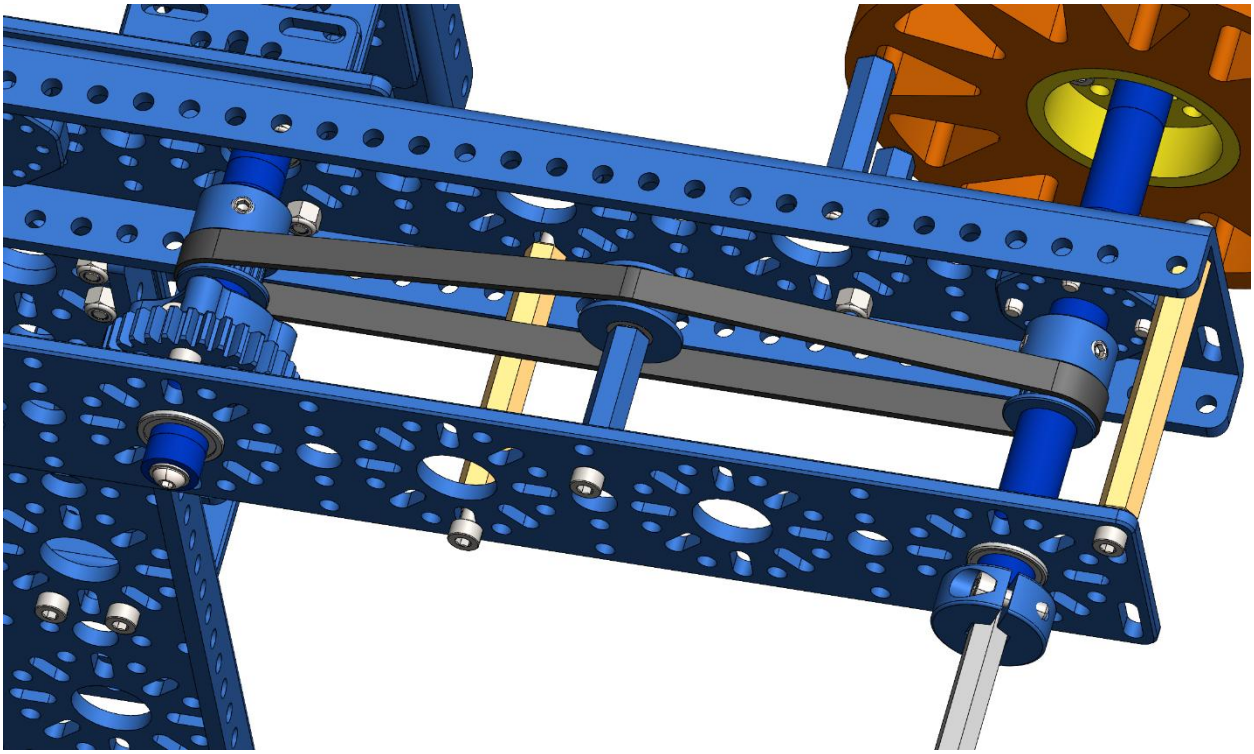
- 1 x 25 mm Standoff
- 2 x M3 x 10 mm SHCS
- 1 x Timing Belt Idler
- 1 x 2.5 mm Hex Key (Green)



Screw the timing belt idler into the end of the standoff. **MAKE SURE THE IDLER CAN STILL SPIN!**

Step 15:

Ensure the belt follows the correct path.

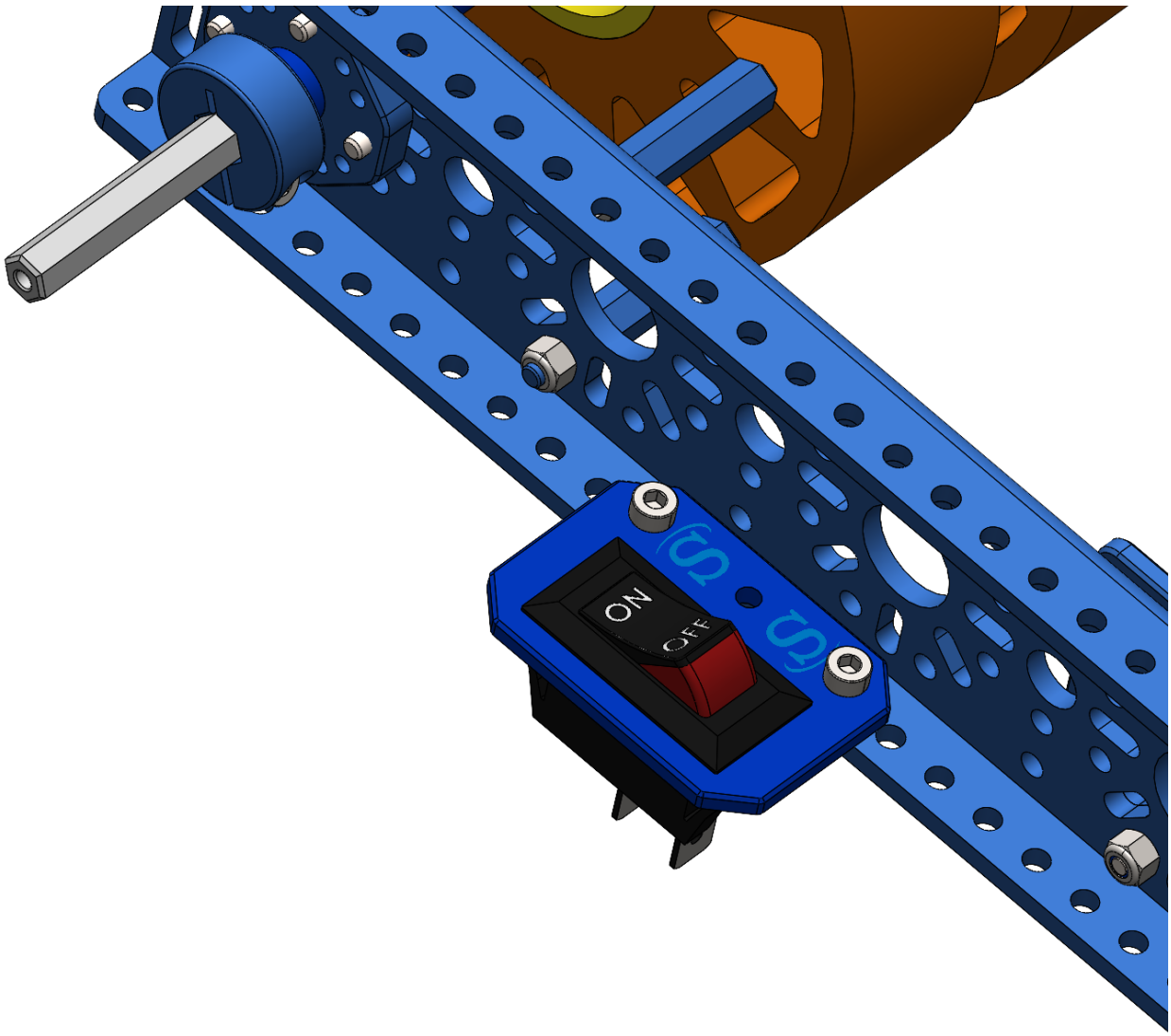


Turing the flywheels should turn the belt and the 32T gear with no issues.

Step 16:

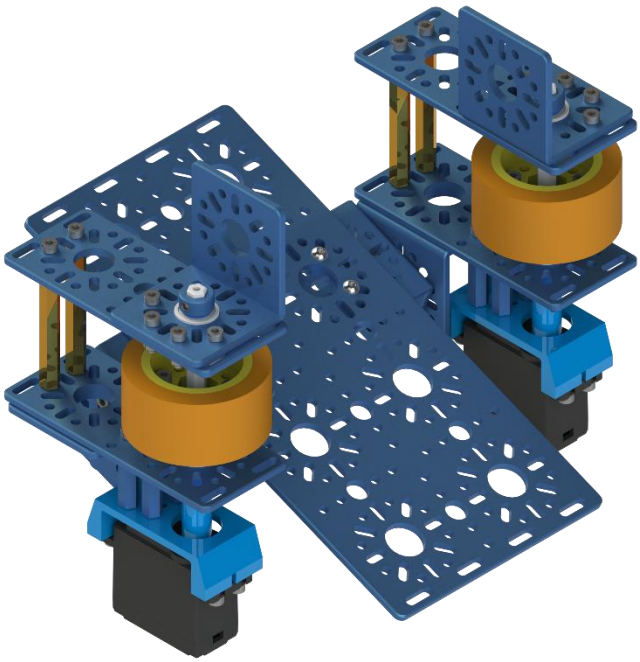
Parts:

- 1 x Power Switch
- 2 x M3 x 12 mm SHCS
- 2 x M3 Nyloc Nuts
- 1 x 2.5 mm Hex Key (Green)
- 1 x 5.5 mm Nut Driver or Wrench



Screw the power switch into the other side t frame.

Indexer



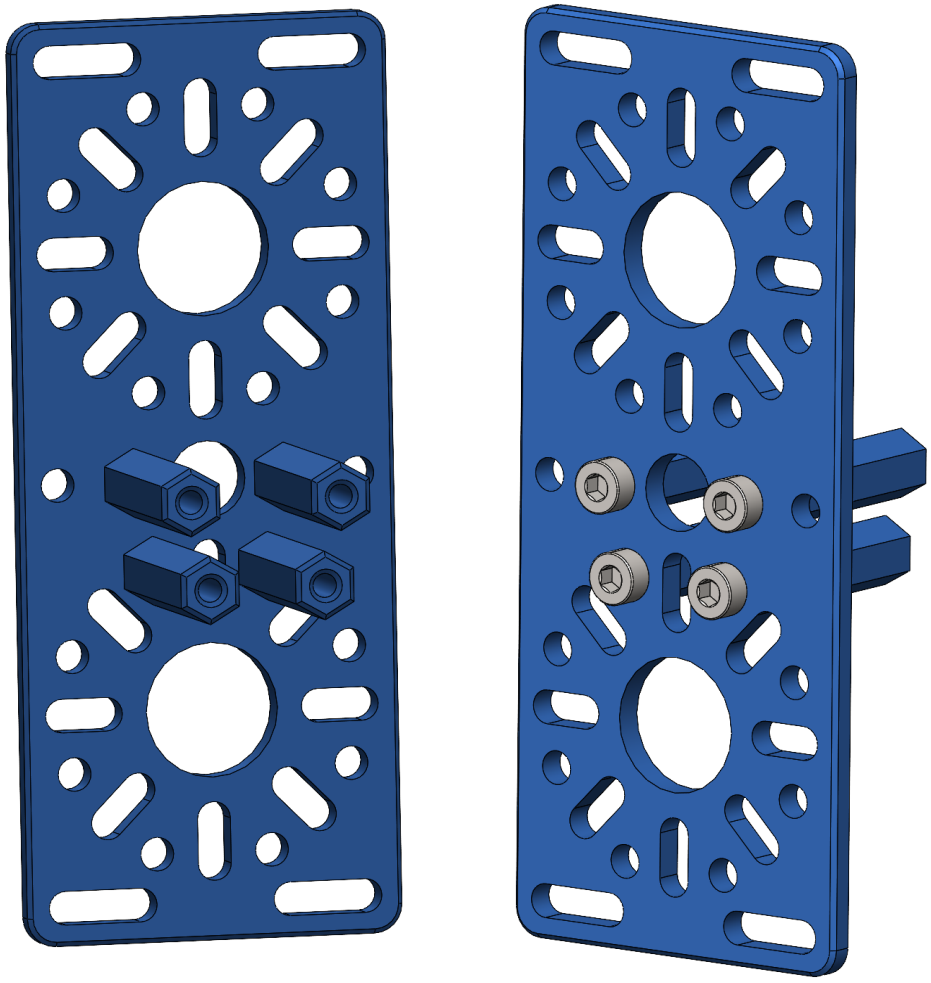
Tools Required:

- Hex Key Metric 7 Piece Set, Part # 70144-7
- Combination Wrench, Part # 70145
- 5.5 mm Nut Driver, Part # 70146

Step 1:

Parts:

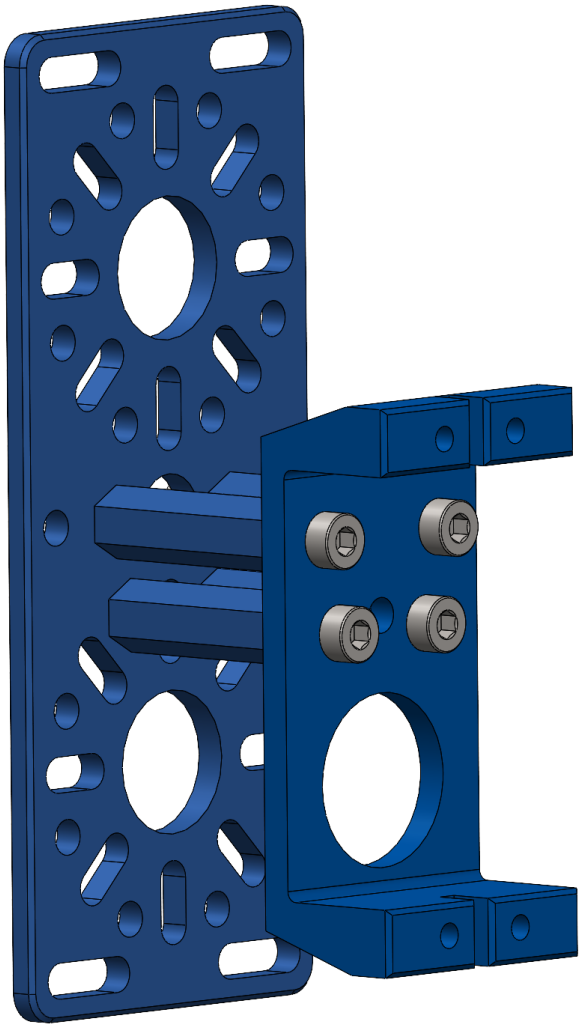
- 1 x 96 mm Flat
- 4 x 25 mm Standoffs
- 4 x M3 x 10 mm SHCS
- 1 x 2.5 mm Hex Key (Green)



Step 2:

Parts:

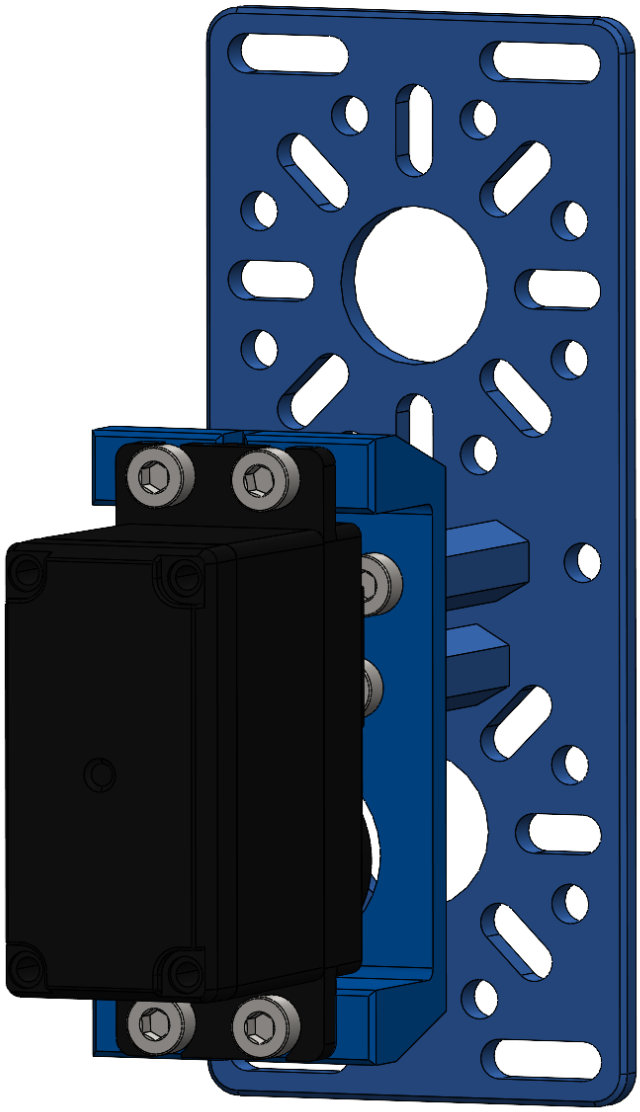
- 1 x Servo Standard Front Mount
- 4 x M3 x 10 mm SHCS
- 1 x 2.5 mm Hex Key (Green)



Step 3:

Parts:

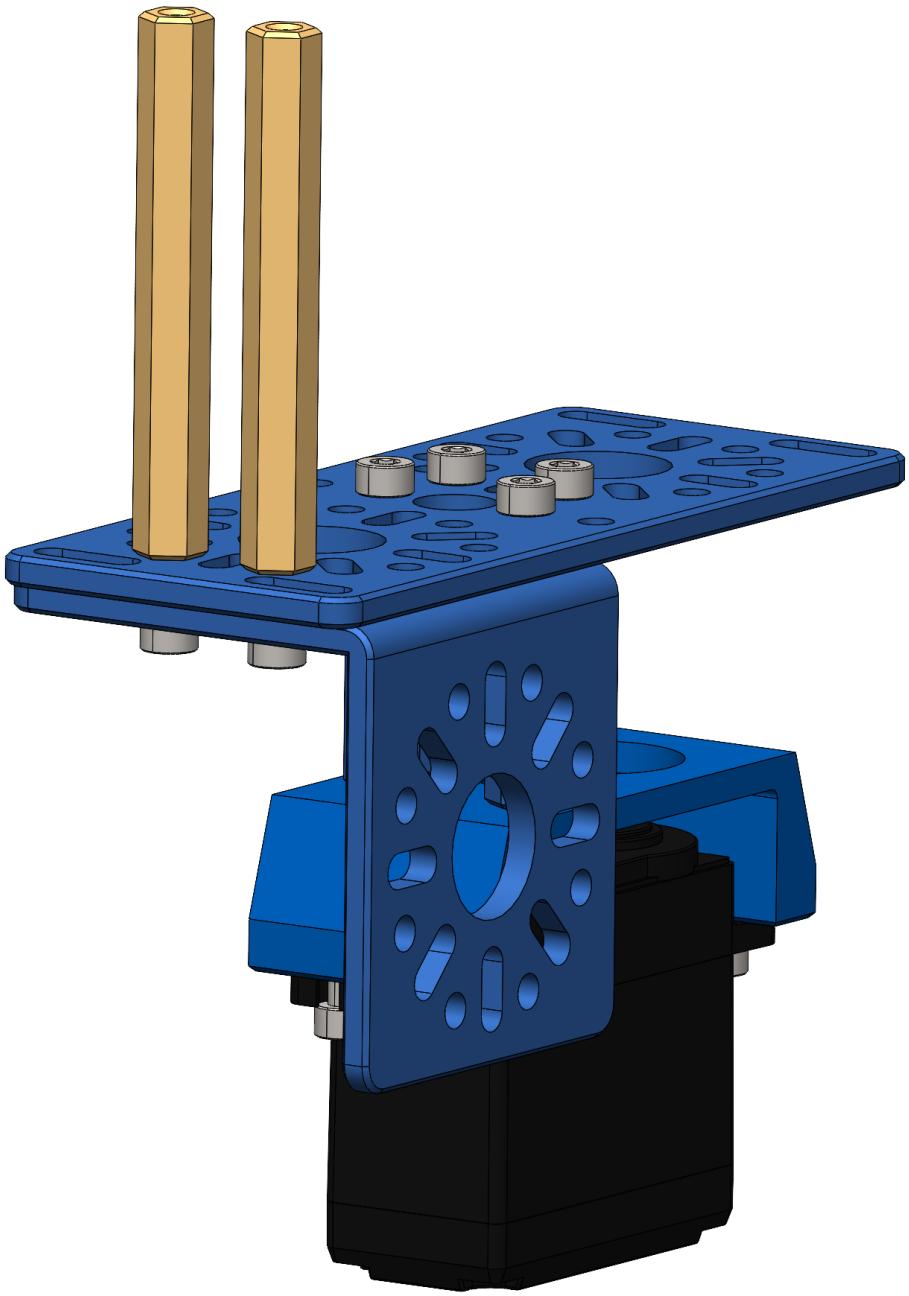
- 1 x Fast Servo
- 4 x M3 x 10 mm SHCS
- 1 x 2.5 mm Hex Key (Green)



Step 4:

Parts:

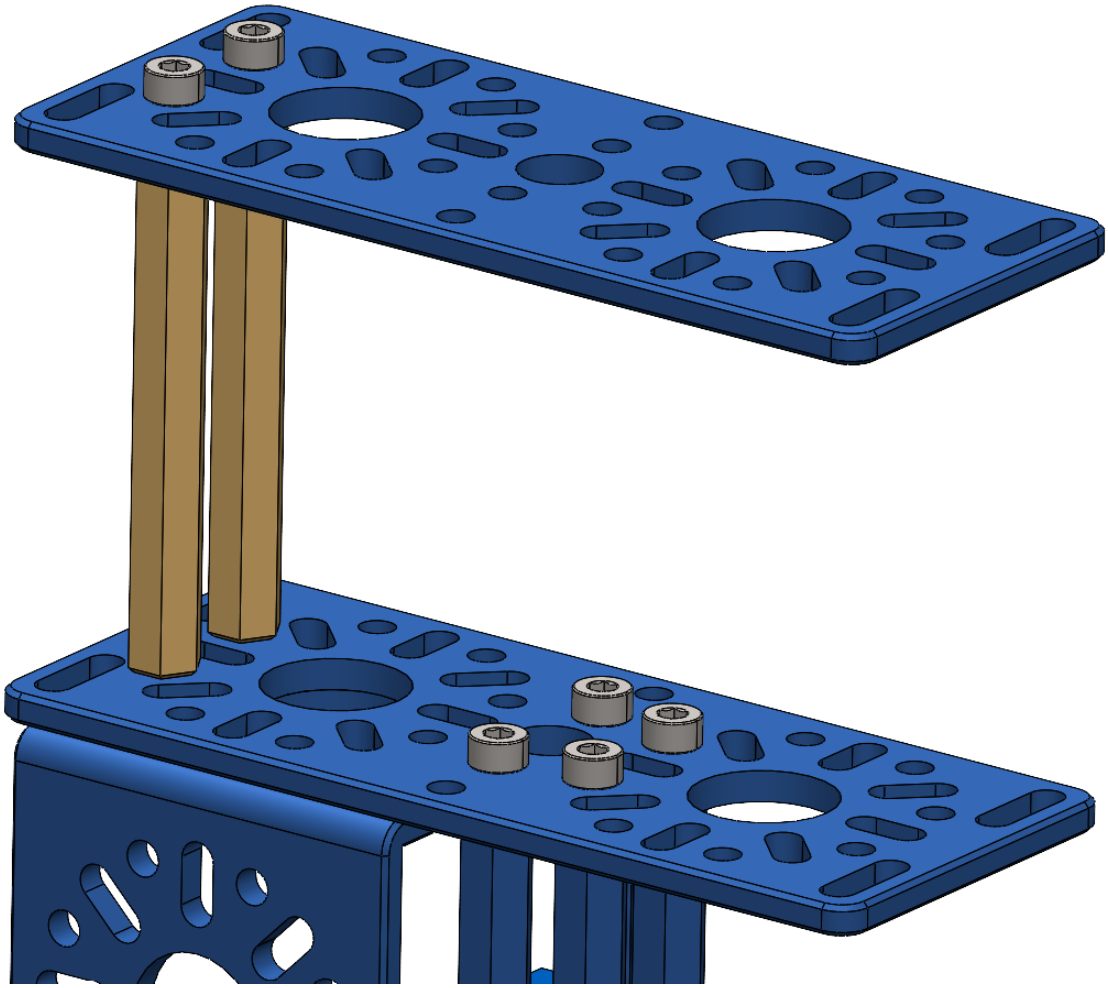
- 2 x 52 mm Standoffs
- 1 x Inside L Bracket
- 2 x M3 x 10 mm SHCS
- 1 x 2.5 mm Hex Key (Green)



Step 5:

Parts:

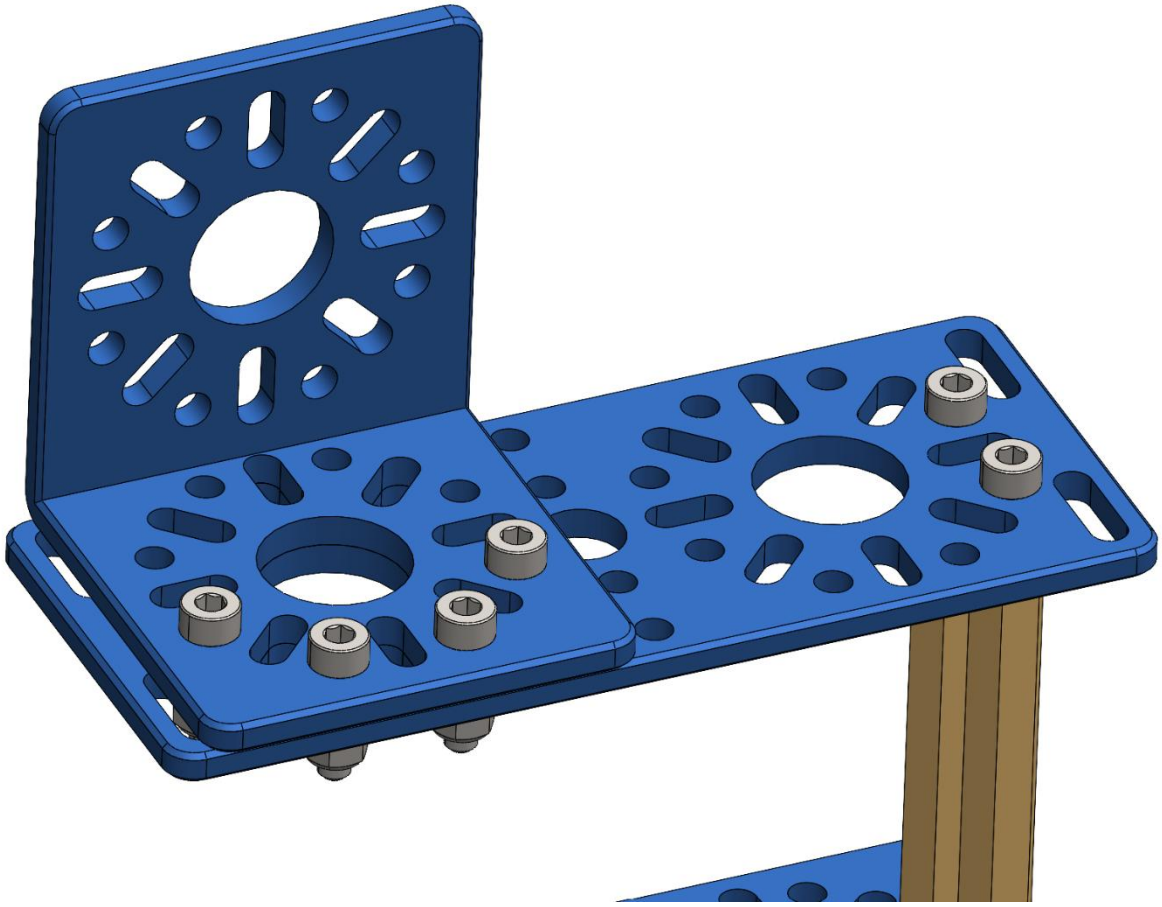
- 1 x 96 mm Flat
- 2 x M3 x 10 mm SHCS
- 1 x 2.5 mm Hex Key (Green)



Step 6:

Parts:

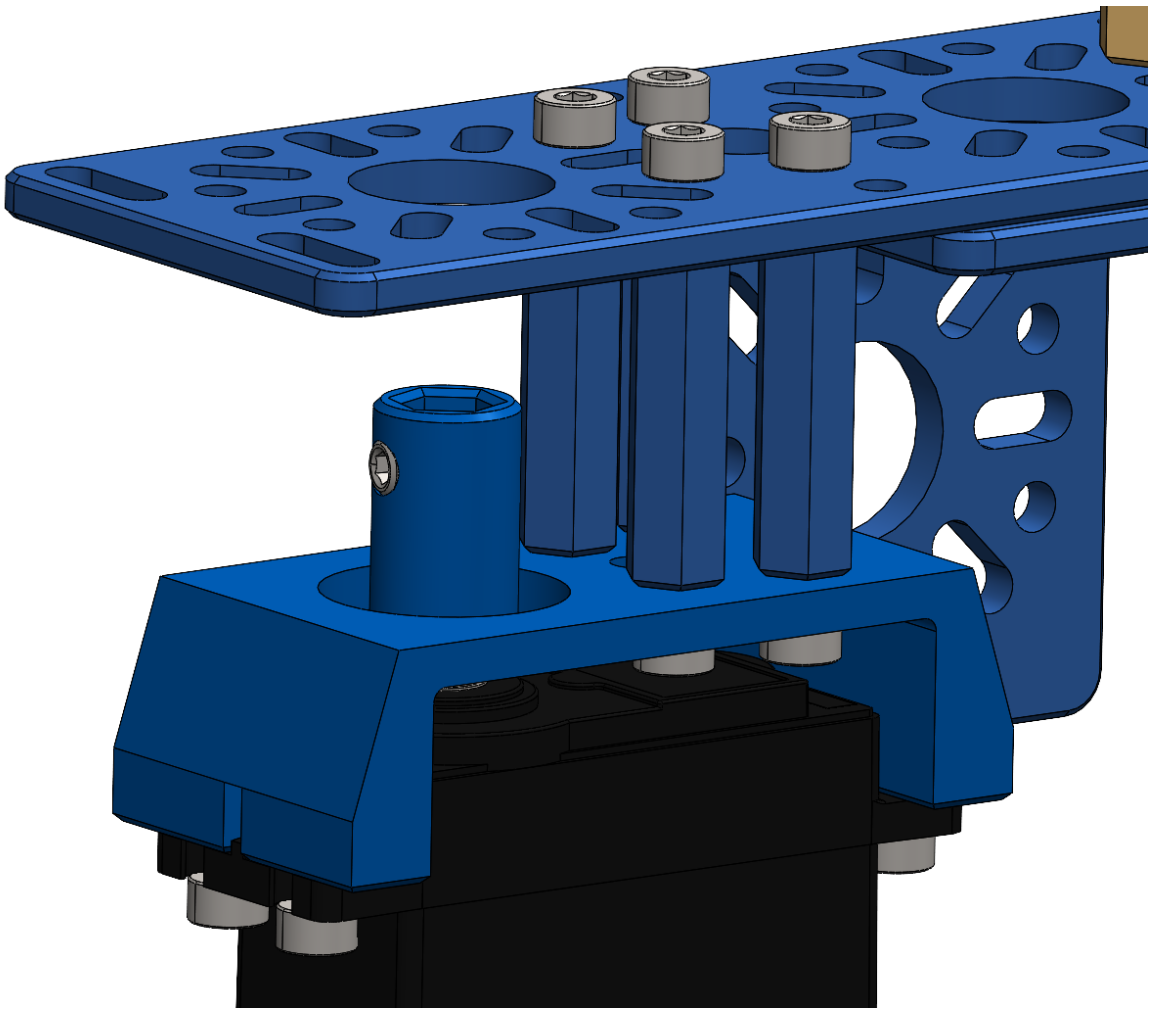
- 1 x Inside L Bracket
- 4 x M3 x 12 mm SHCS
- 4 x M3 Nyloc Nuts
- 1 x 2.5 mm Hex Hey (Green)
- 1 x 5.5 mm Wrench



Step 7:

Parts:

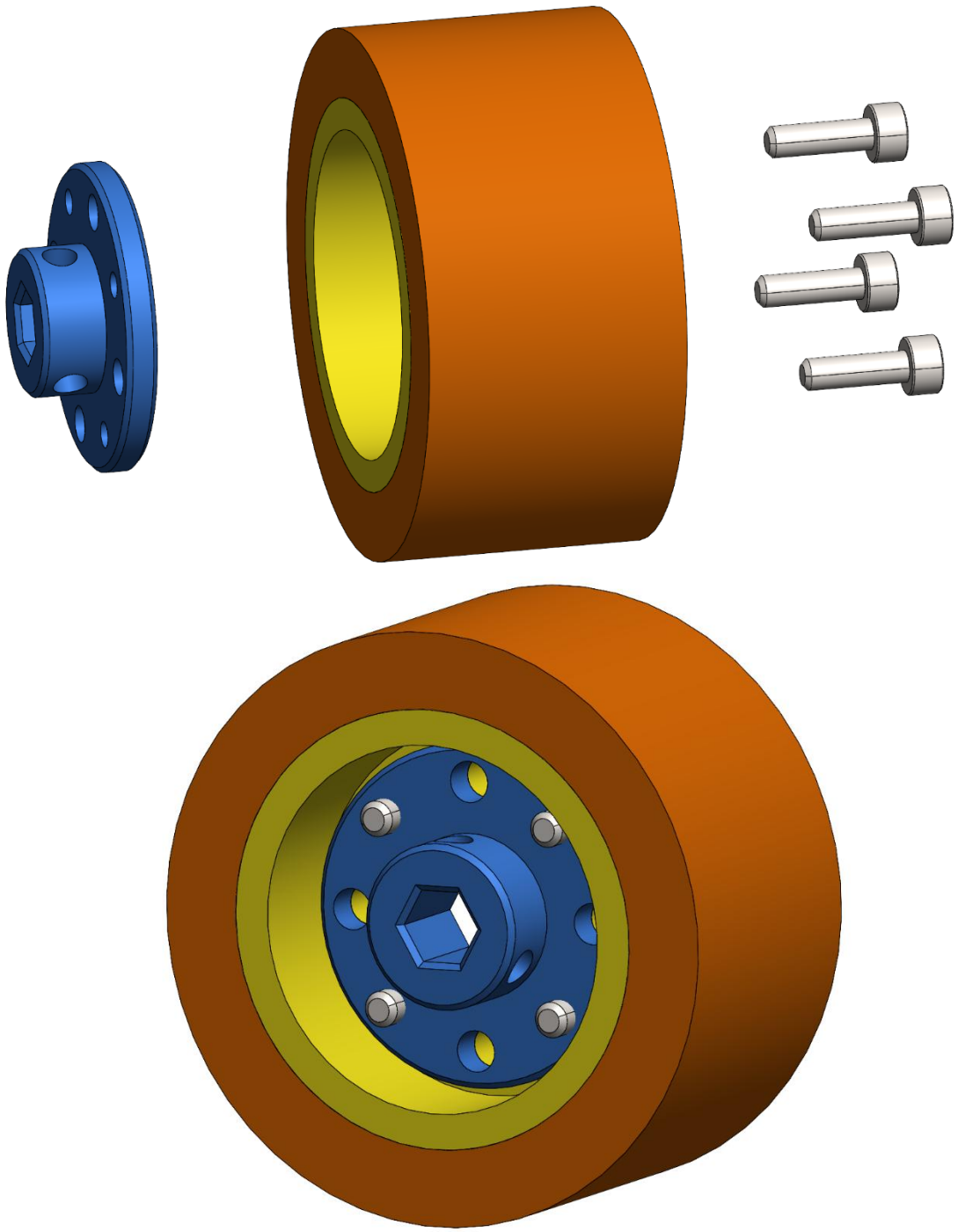
- 1 x 25T to 6mm Hex Servo Hub
- 1 x 2 mm Hex Key (Pink)



Step 8:

Parts:

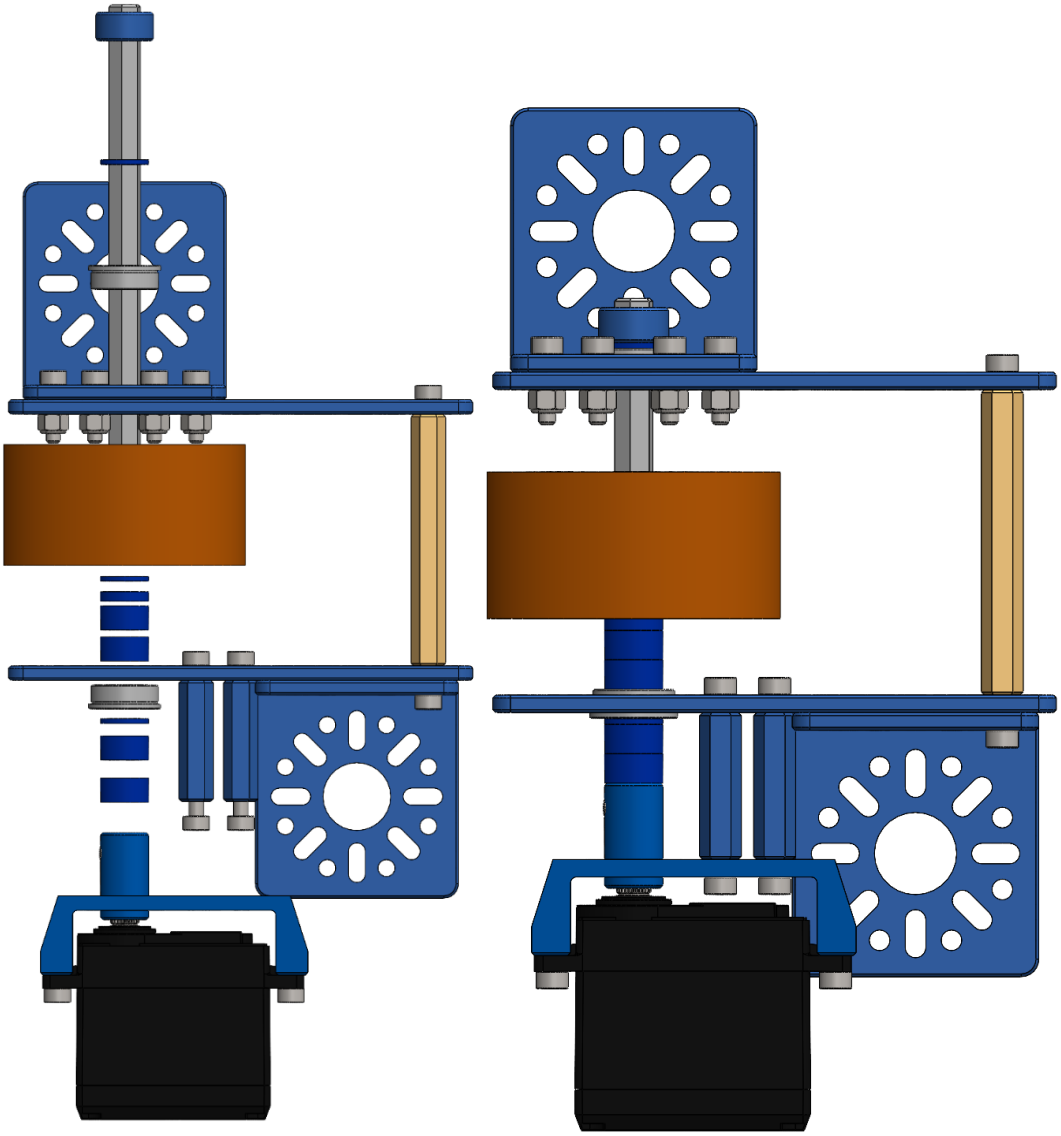
- 1 x Shaft Hub
- 1 x 50 mm Orange Wheel
- 4 x M3 x 12 mm SHCS
- 1 x 2.5 mm Hex Key (Green)



Step 9:

Parts:

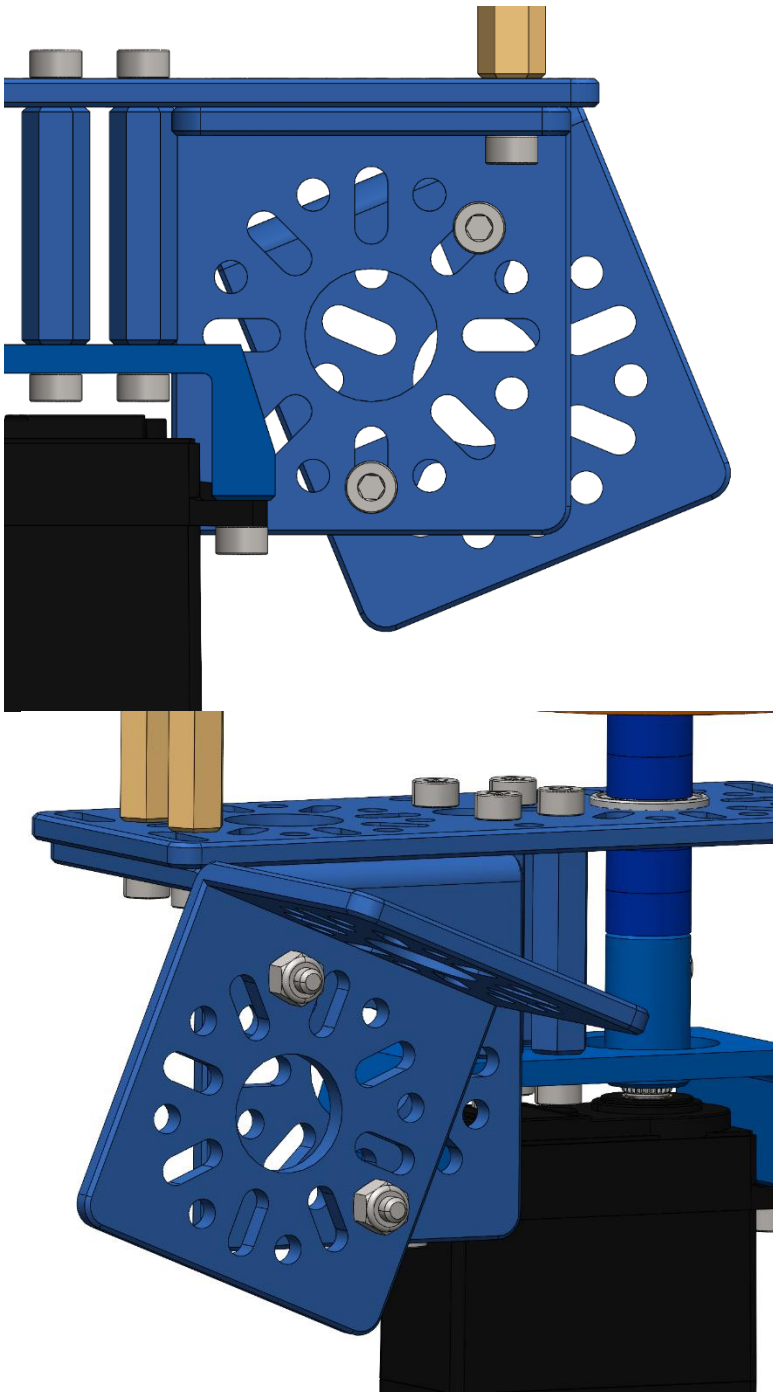
- 1 x 96 mm Hex Shaft
- 1 x Collar
- 3 x 1 mm Spacer
- 1 x 2 mm Spacer
- 4 x 5 mm Spacer
- 2 x Flanged Bearing
- 1 x 2 mm Hex Key (Pink)



Step 10:

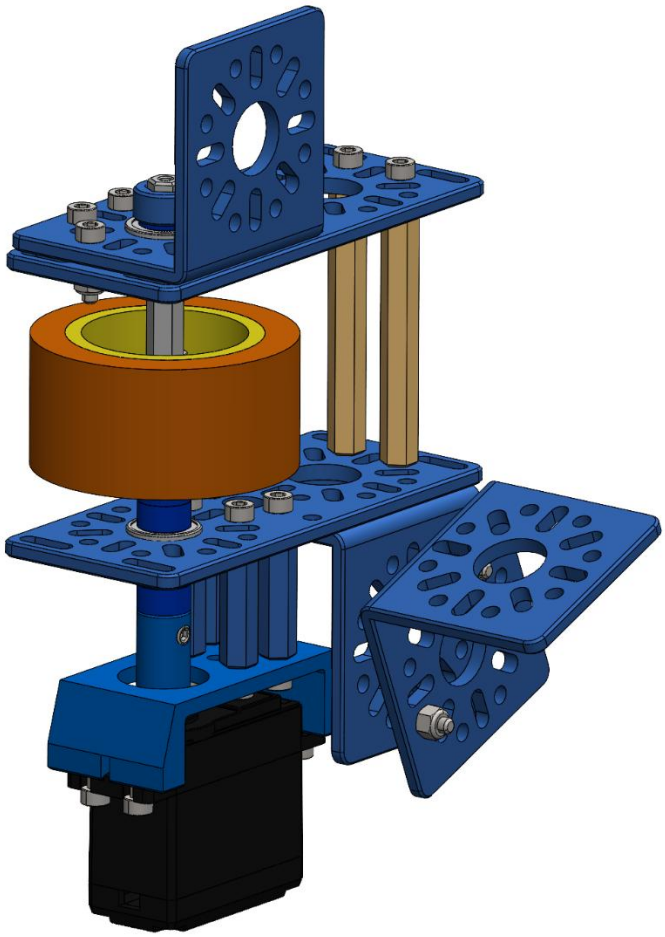
Parts:

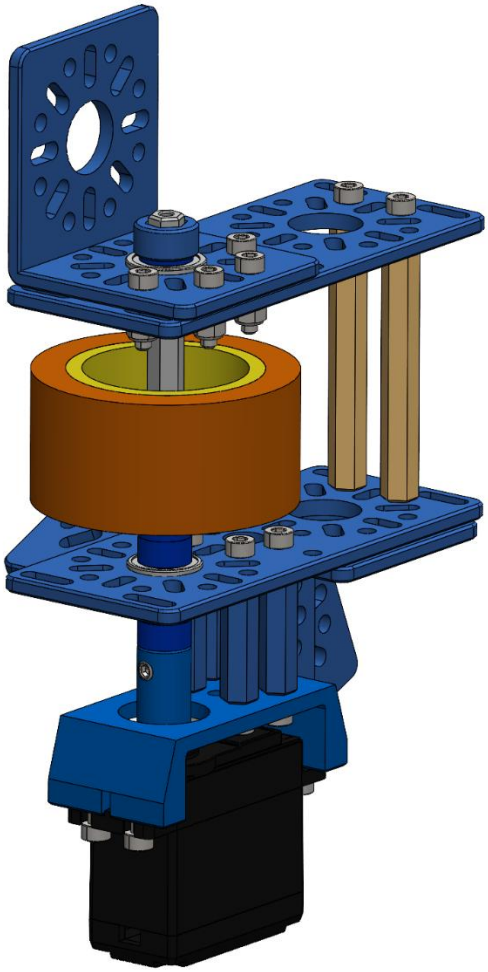
- 1 x Inside L Bracket
- 2 x M3 x 12 mm SHCS
- 2 x M3 Nyloc Nuts
- 1 x 2.5 mm Hex Key (Green)
- 1 x 5.5 mm Nut Driver or Wrench



Step 11:

Repeat steps 1 – 10 for the inverted other side indexer.

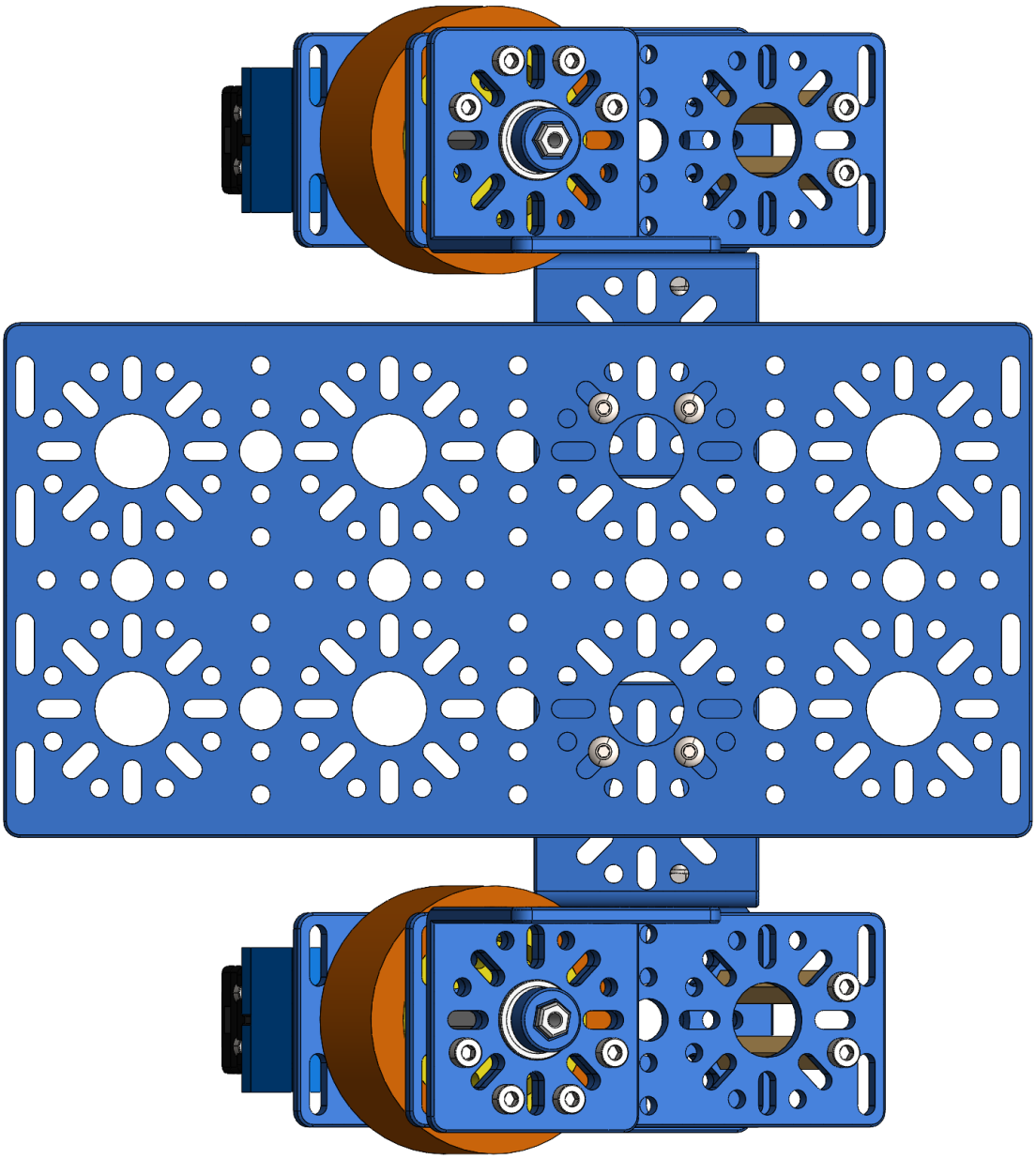




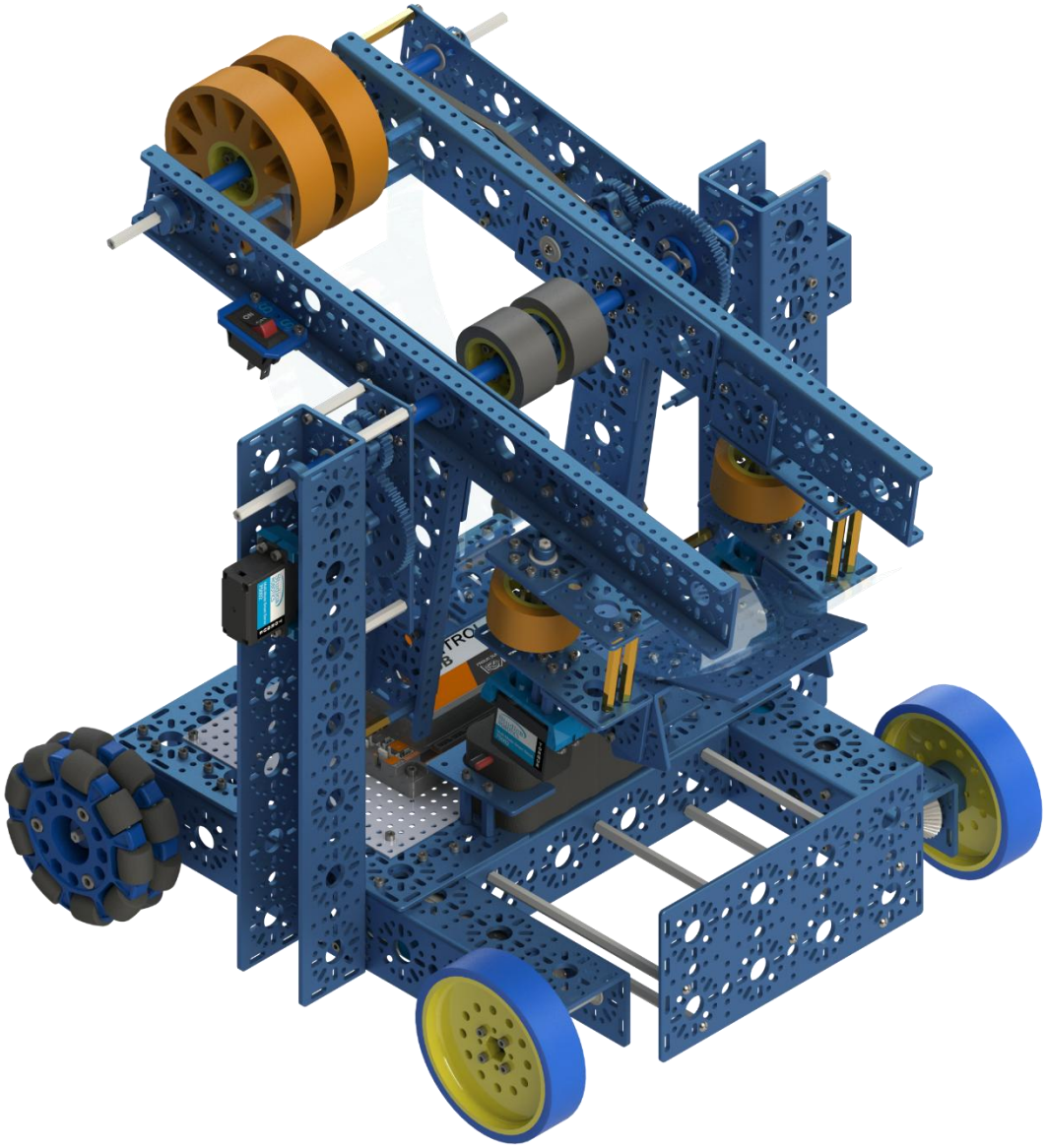
Step 12:

Parts:

- 1 x 96 mm x 192 mm Flat
- 4 x M3 x 10 mm BHCS
- 4 x M3 Nyloc Nuts
- 1 x 2 mm Hex Key (Pink)
- 1 x 5.5 mm Nut Driver or Wrench



Final Assembly



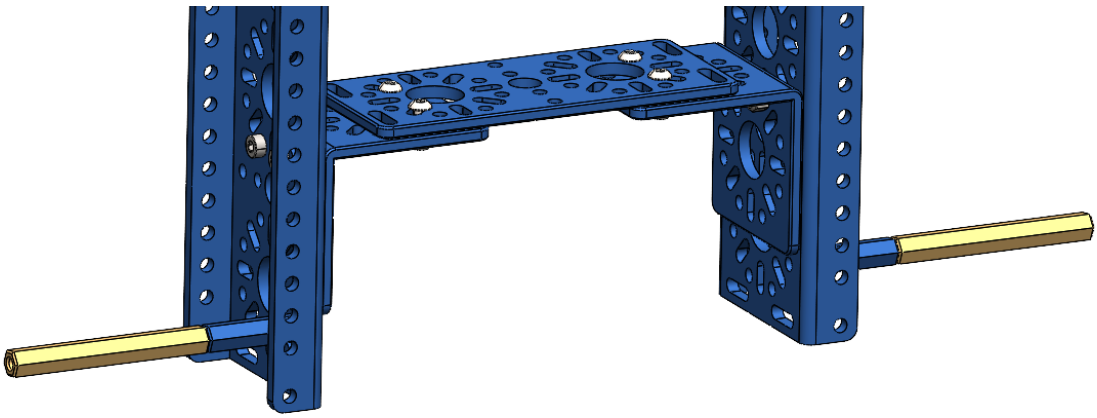
Parts:

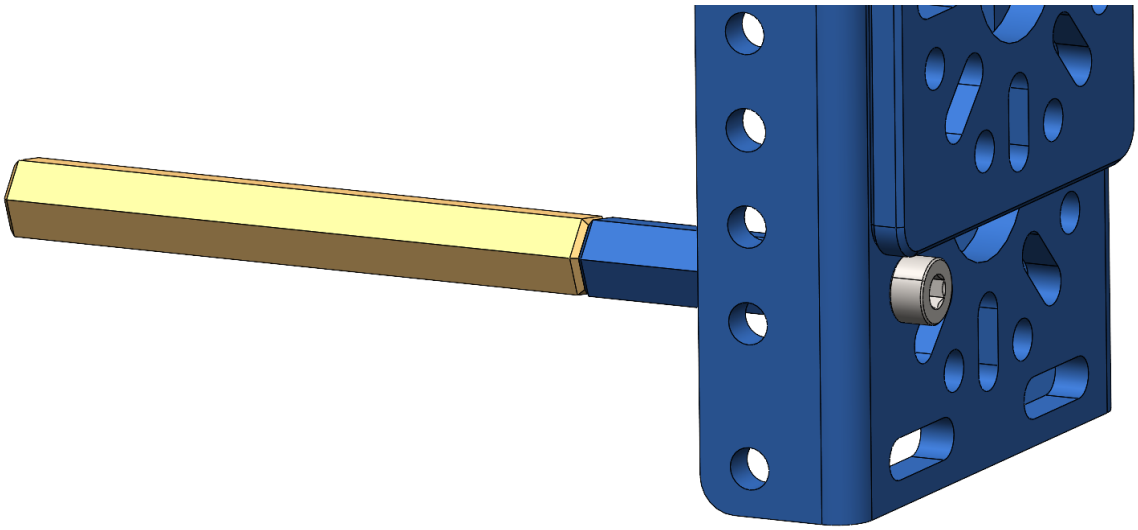
- 1 x Drive Base
- 1 x Left Frame
- 1 x Right Frame
- 1 x Shooter
- 1 x Indexer
- Hex Key Metric 7 Piece Set, Part # 70144-7
- Combination Wrench, Part # 70145
- 5.5 mm Nut Driver, Part # 70146

Step 1:

Parts:

- 1 x Shooter Assembly
- 2 x 25 mm Male to Female Standoffs
- 2 x 52 mm Standoffs
- 2 x M3 x 10 mm SHCS
- 1 x 2.5 mm Hex Key (Green)

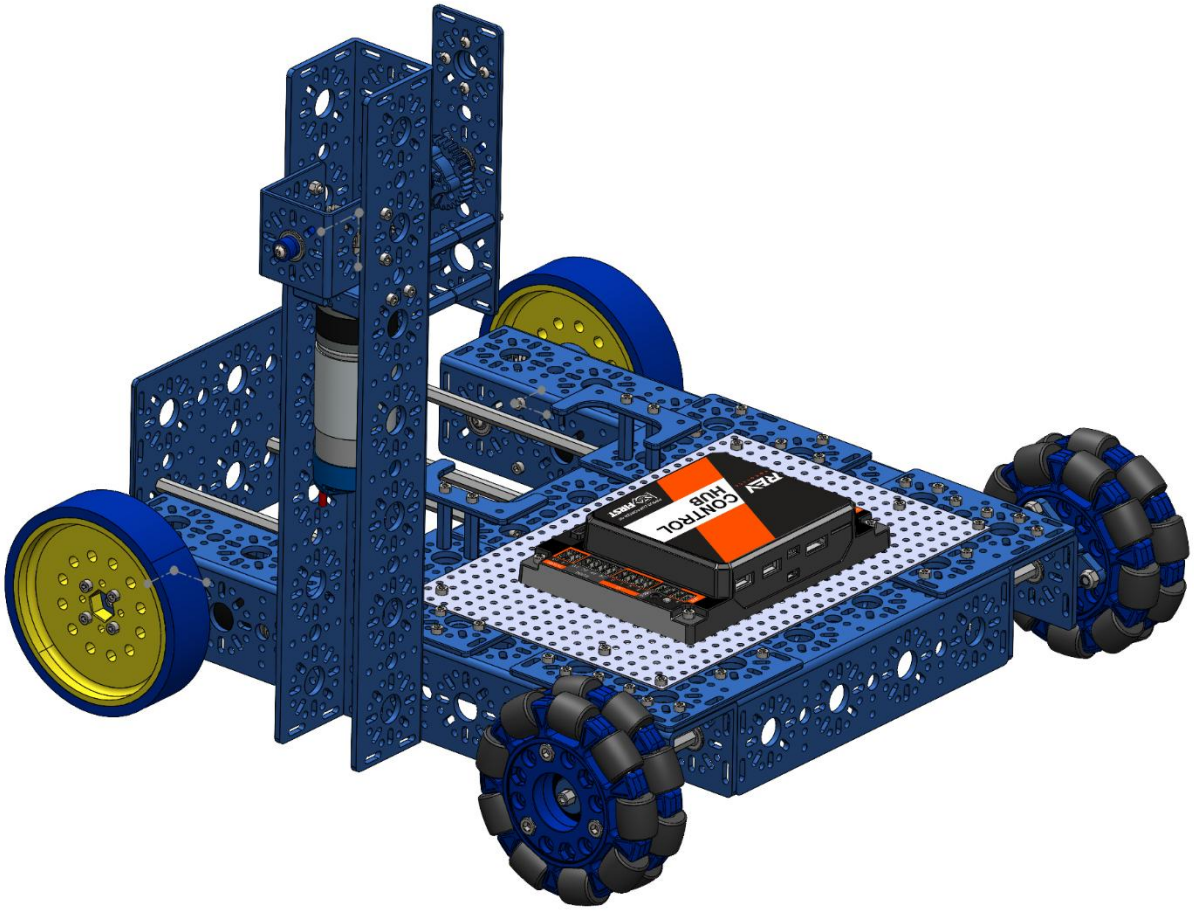


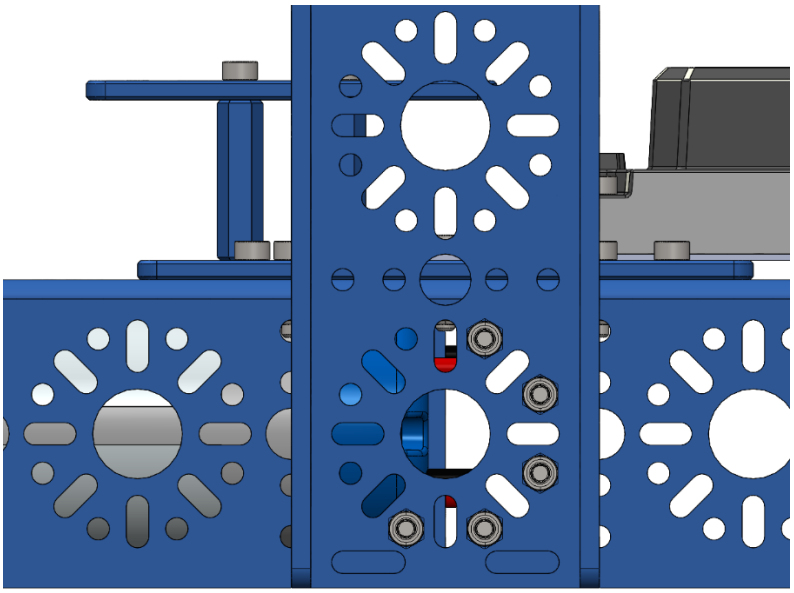


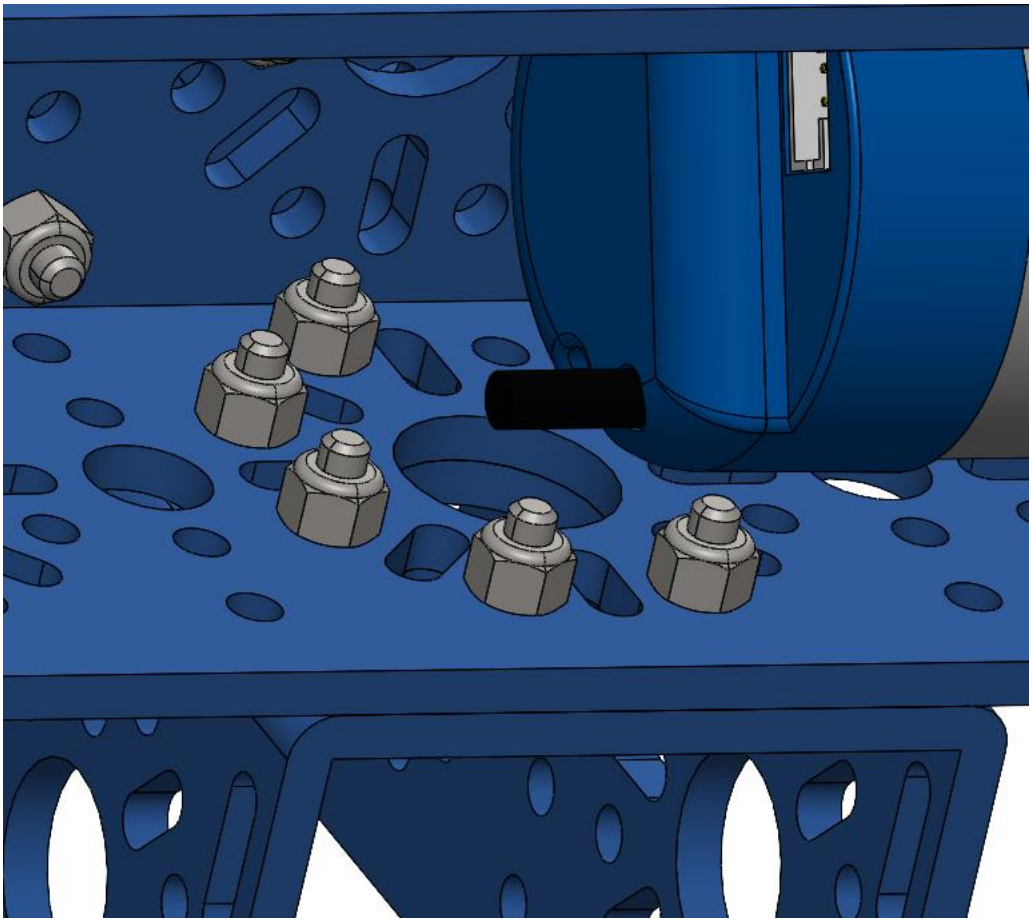
Step 2:

Parts:

- 1 x Drive Base
- 1 x Left Side Frame
- 5 x M3 x 12 mm SHCS
- 5 x M3 Nyloc Nuts
- 1 x 2.5 mm Hex Key (Green)
- 1 x 5.5 mm Wrench



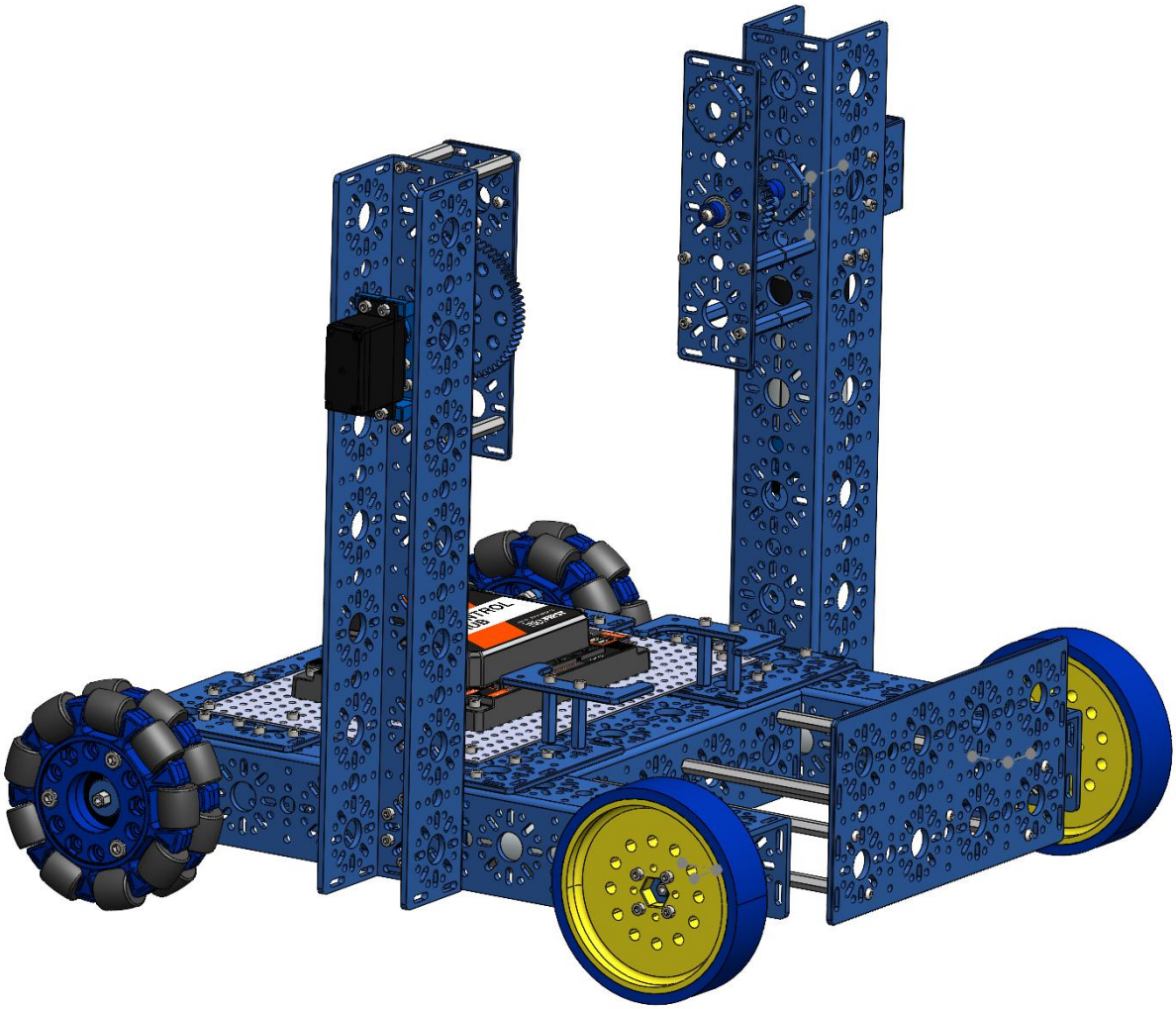




Step 3:

Parts:

- 1 x Drive Base
- 1 x Right Side Frame
- 5 x M3 x 12 mm SHCS
- 5 x Nyloc Nuts
- 1 x 2.5 mm Hex Key (Green)
- 1 x 5.5 mm Wrench

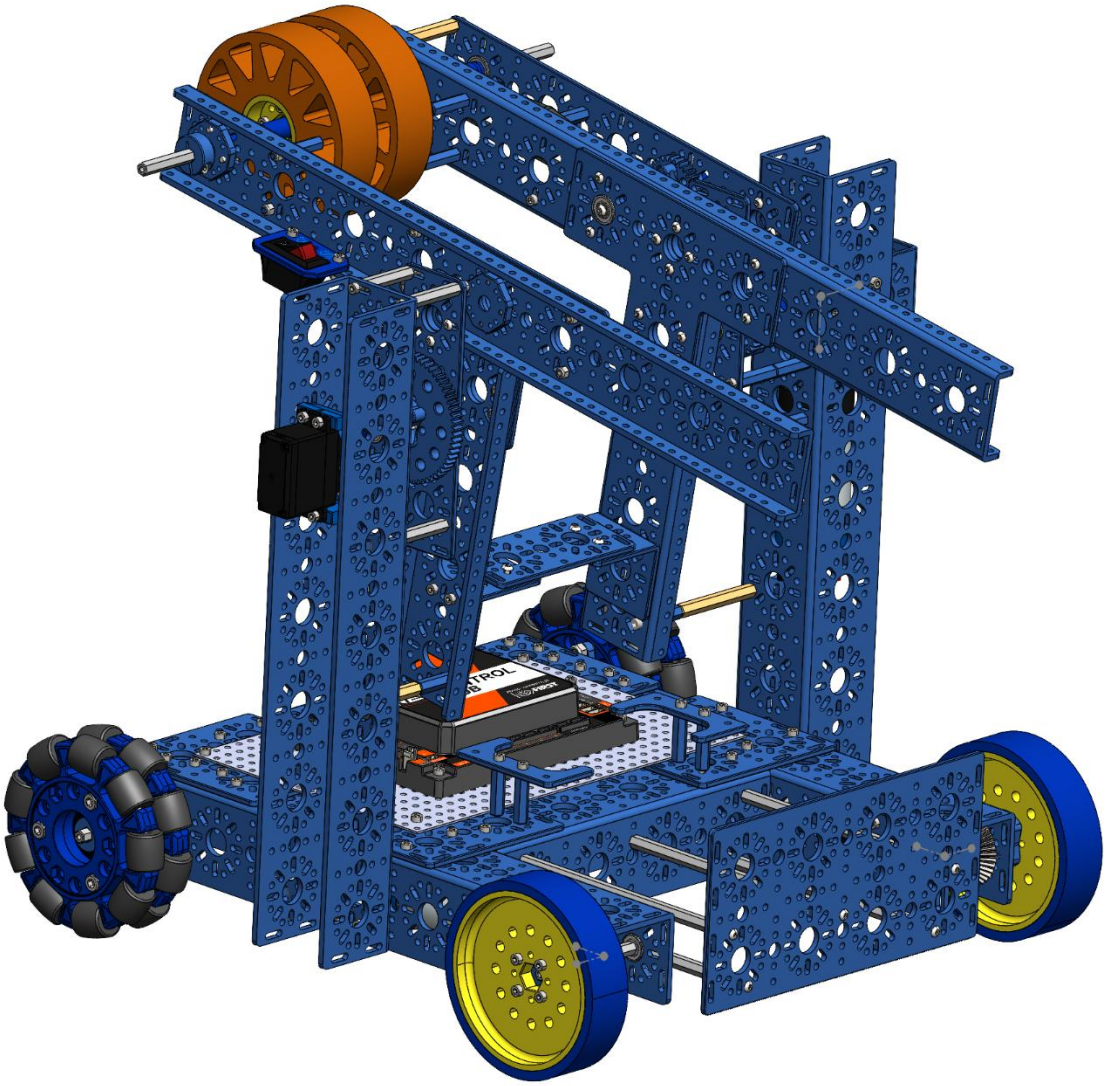


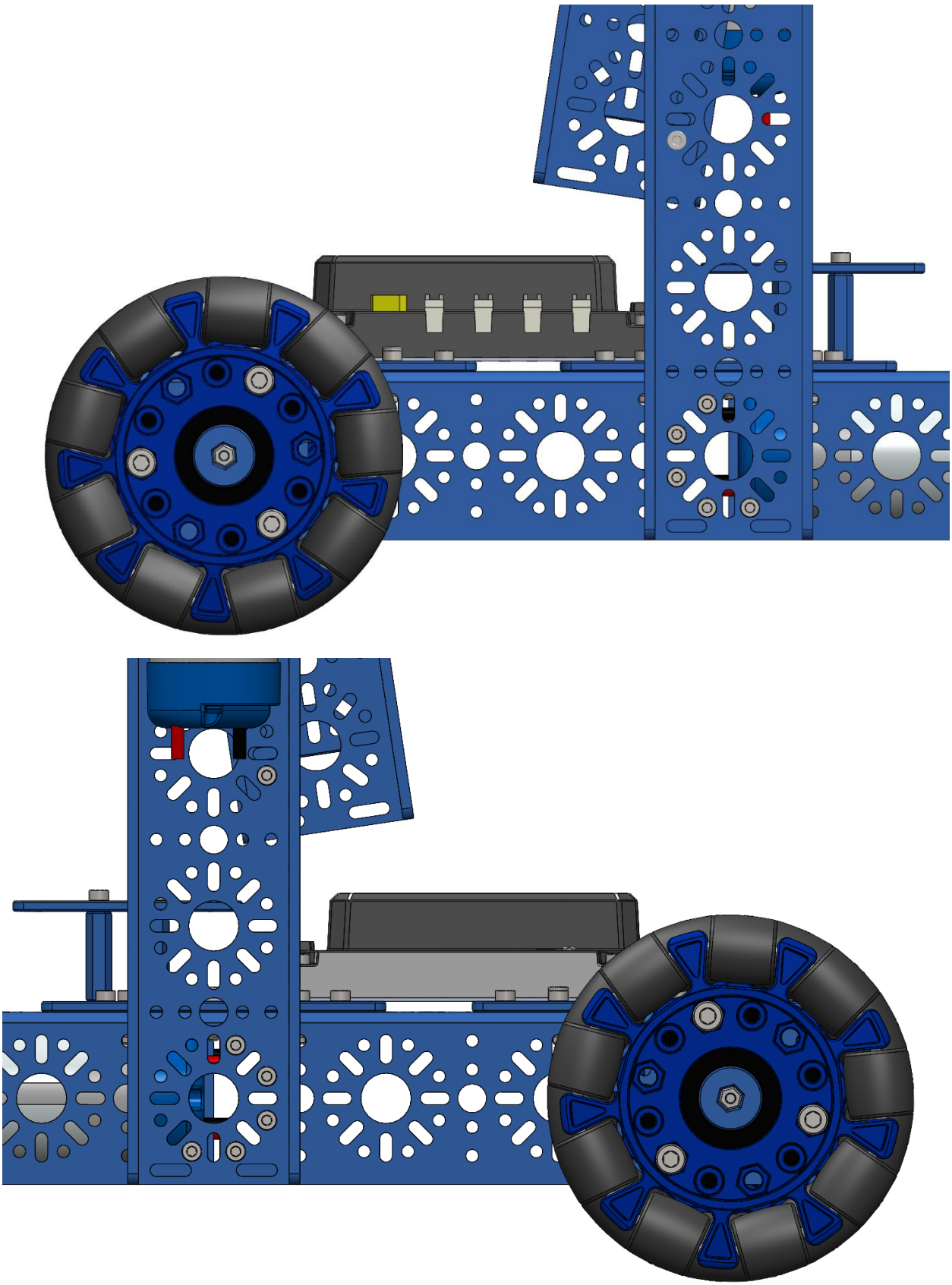
Screw the right side just as the left side.

Step 4:

Parts:

- 1 x Main Assembly
- 1 x Shooter Assembly
- 2 x M3 x 10 mm SHCS
- 1 x 2.5 mm Hex Key (Green)

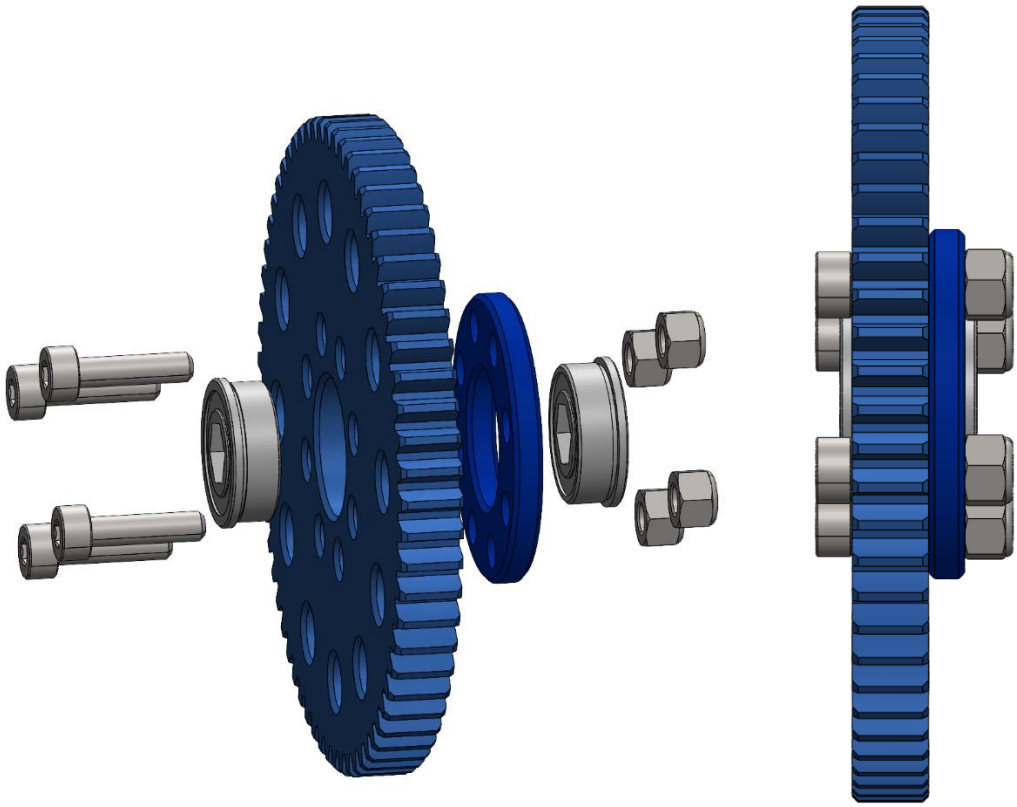




Step 5:

Parts:

- 1 x Pattern Spacer
- 1 x 64T Gear
- 2 x Flanged Bearing
- 4 x M3 x 12 mm SHCS
- 4 x M3 Nyloc Nuts
- 1 x 2.5 mm Hex Key (Green)
- 1 x 5.5 mm Nut Driver or Wrench

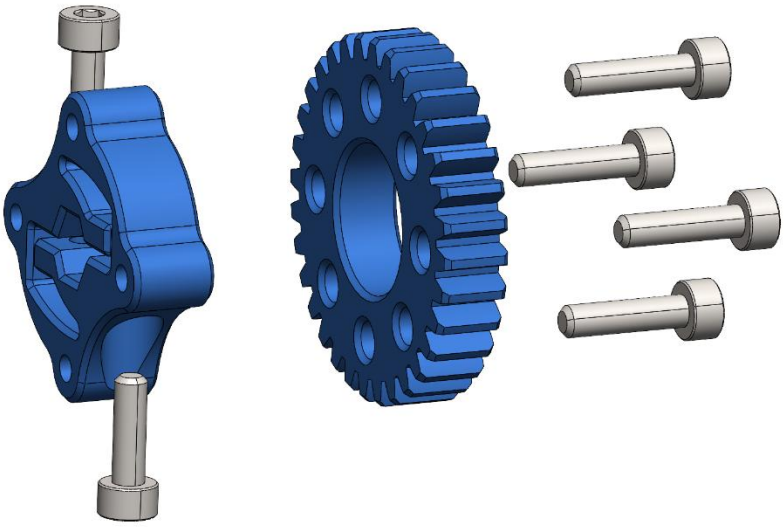


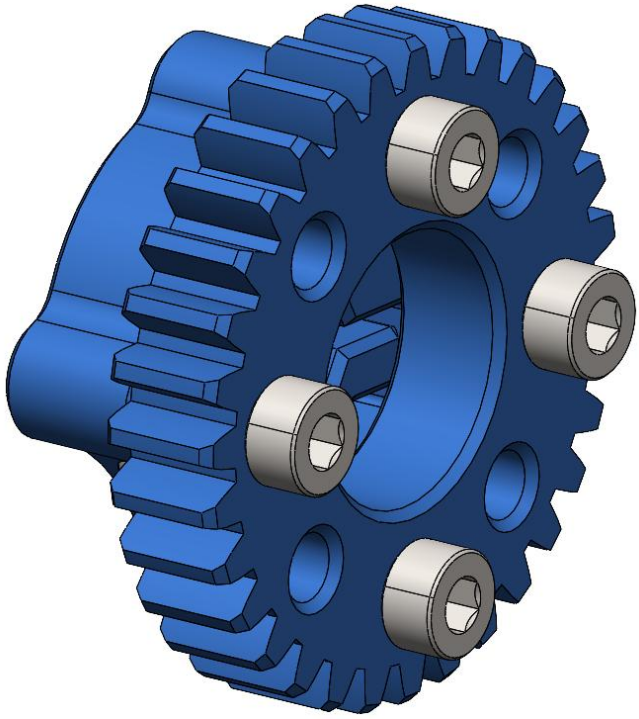
NOTE: BEARINGS WILL BE LOOSE.

Step 6:

Parts:

- 2 x M3 x 10 mm SHCS
- 4 x M3 x 12 mm SHCS
- 1 x Low Profile Clamping Shaft Hub
- 1 x 32T Gear
- 1 x 2.5 mm Hex Key (Green)

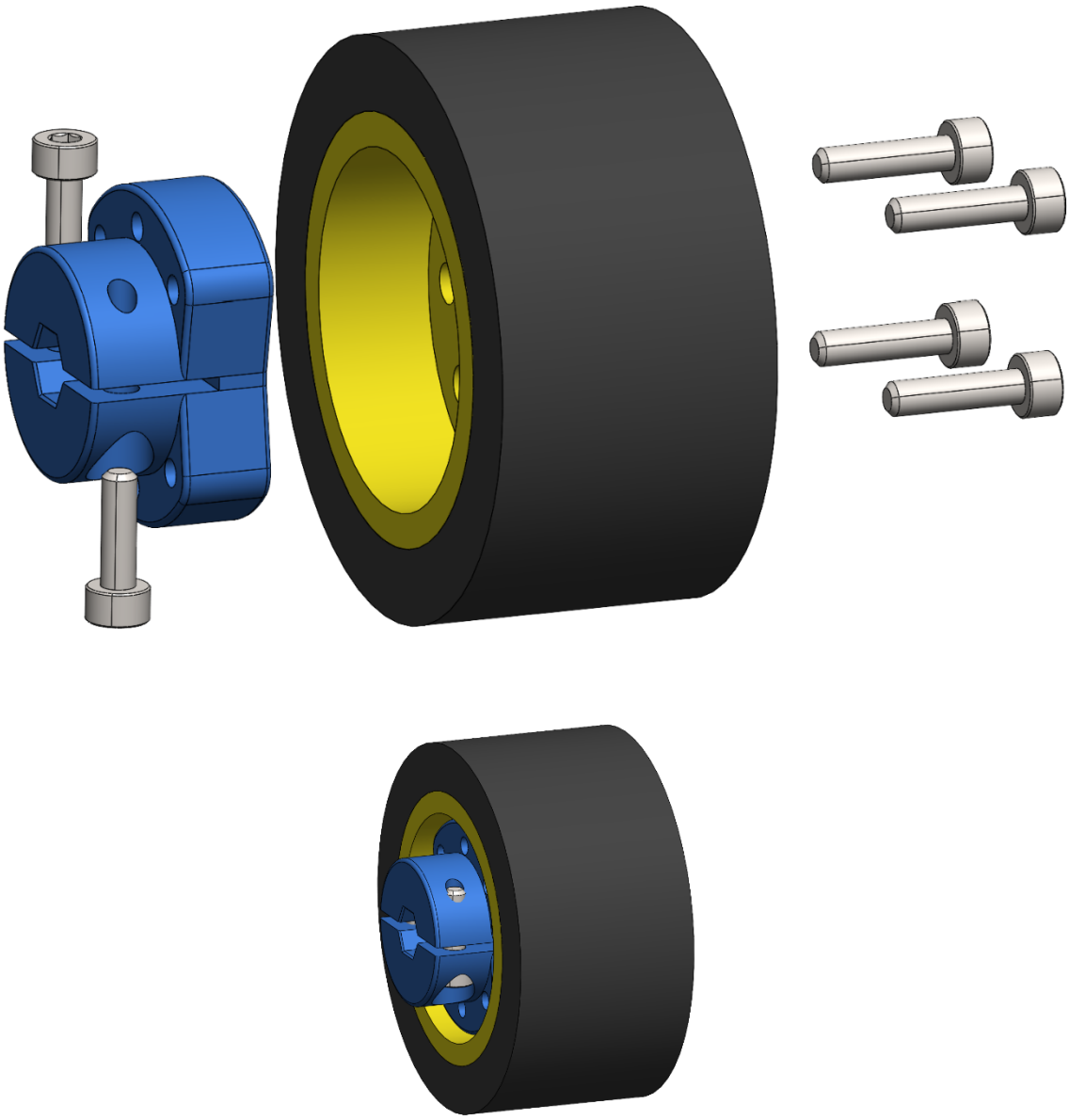




Step 7:

Parts:

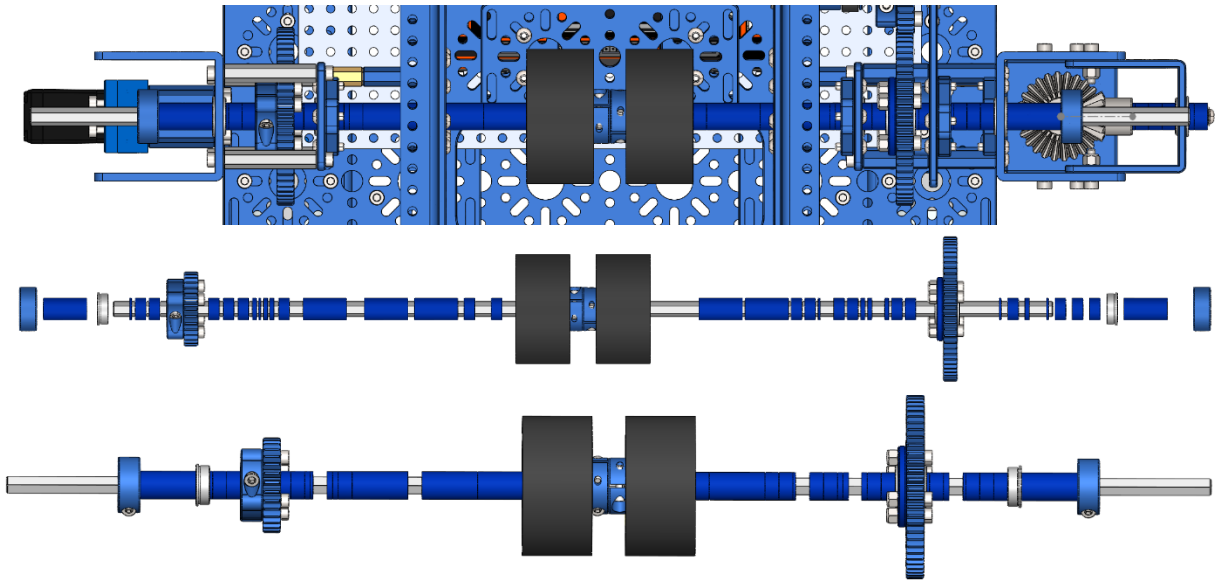
- 2 x 50 mm Wheel Black
- 8 x M3 x 12 mm SHCS
- 4 x M3 x 10 mm SHCS
- 2 x Clamping Shaft Hub
- 1 x 2.5 mm Hex Key (Green)



Step 8:

Parts:

- 1 x 432 mm Hex Shaft
- 2 x Collar Clamp
- 2 x M3 x 10 mm SHCS
- 5 x 1 mm Spacer
- 7 x 2 mm Spacer
- 18 x 5 mm Spacer
- 7 x 20 mm Spacer
- 1 x Assembly from Step 5
- 1 x Assembly from Step 6
- 2 x Assembly from Step 7
- 2 x Flanged Bearing



This step can be tricky. The main goal is that the gears line up with the left and right side gears and that the two wheels are in the center of the ball path.

Step 9:

Parts:

- 1 x Main Assembly
- 1 x Indexer Assembly
- 4 x M3 x 10 mm BHCS
- 4 x M3 Nyloc Nuts
- 1 x 2 mm Hex Key (Pink)
- 1 x 5.5 mm Nut Driver or Wrench