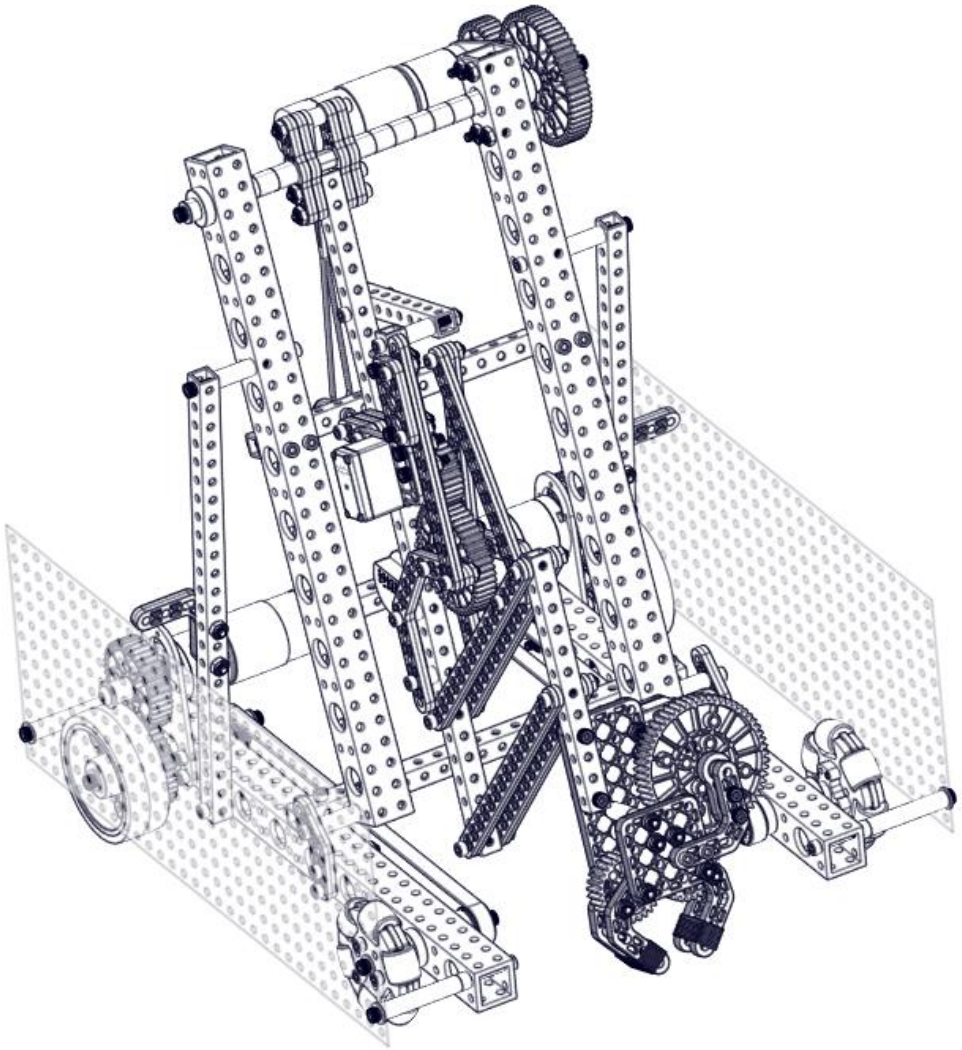
AndyMark®

ROBITS | INTO THE DEEP ROBOT

Assembly Guide



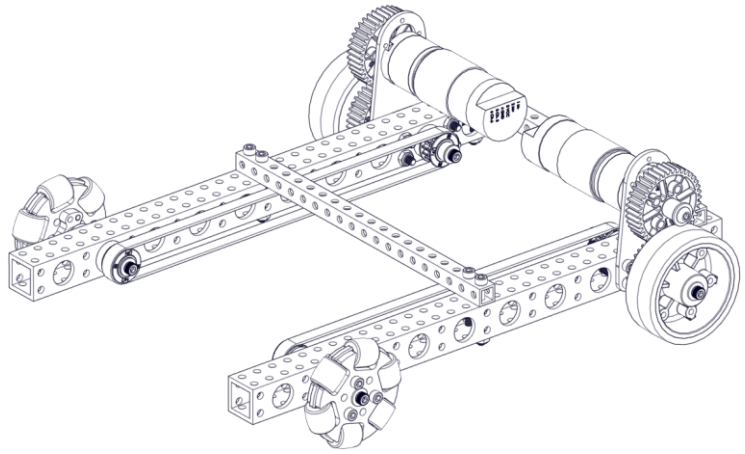
Revision #	Date	Author	Purpose
0	8/26/2024	E. Scime	Original Document

P. Yeung	8/26/2024
Reviewer Name	Date Reviewed

Assembly

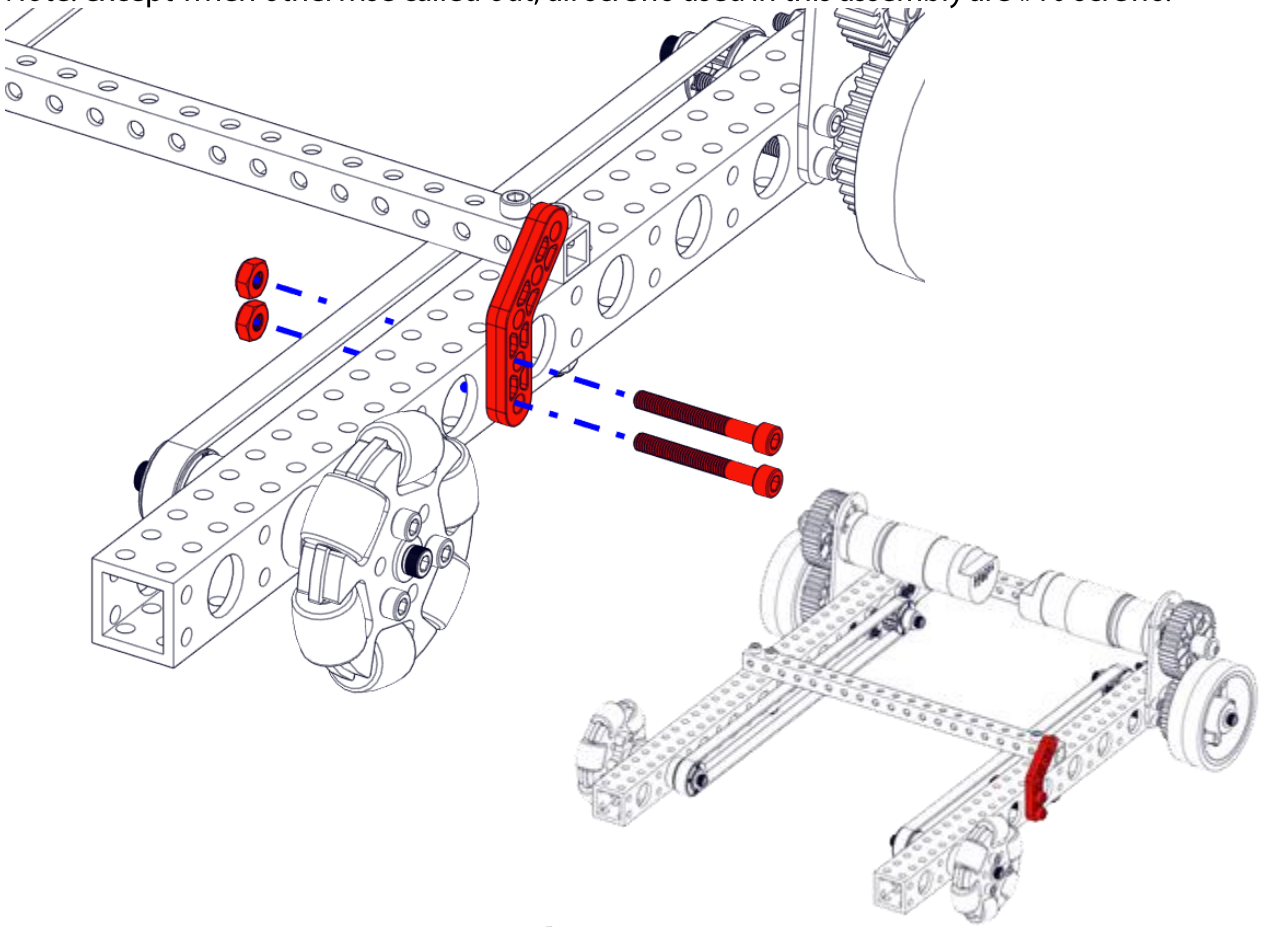
Step 1

Complete the ROBITS Starter Chassis by following the assembly guide.



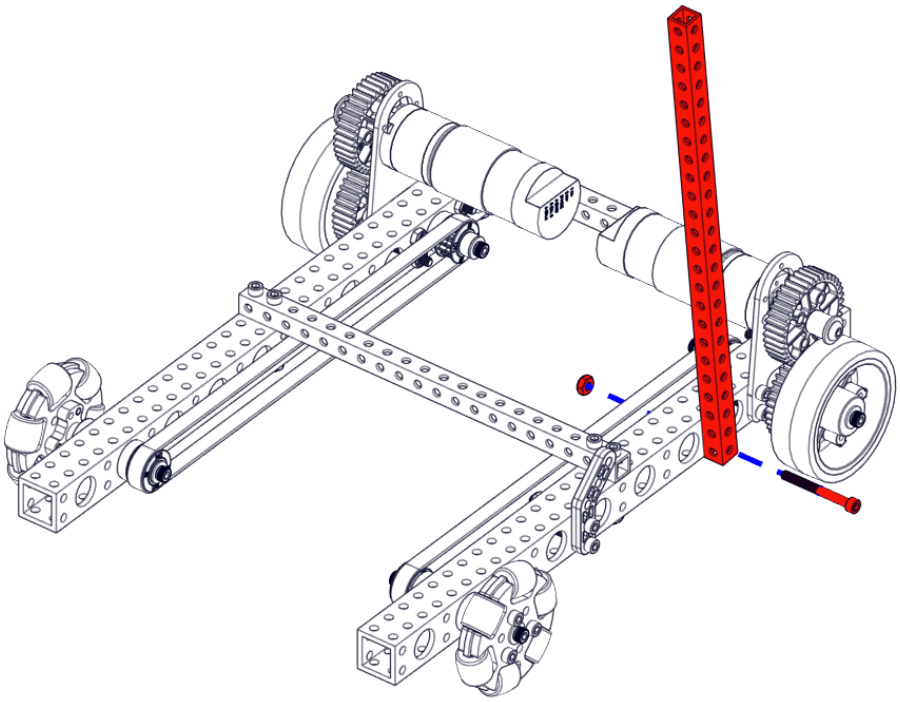
Step 2

Attach a 135 ROBITS Angle Gusset (am-5010_135) using [2] 1.5" screws and [2] nuts.
Note: except when otherwise called out, all screws used in this assembly are #10 screws.



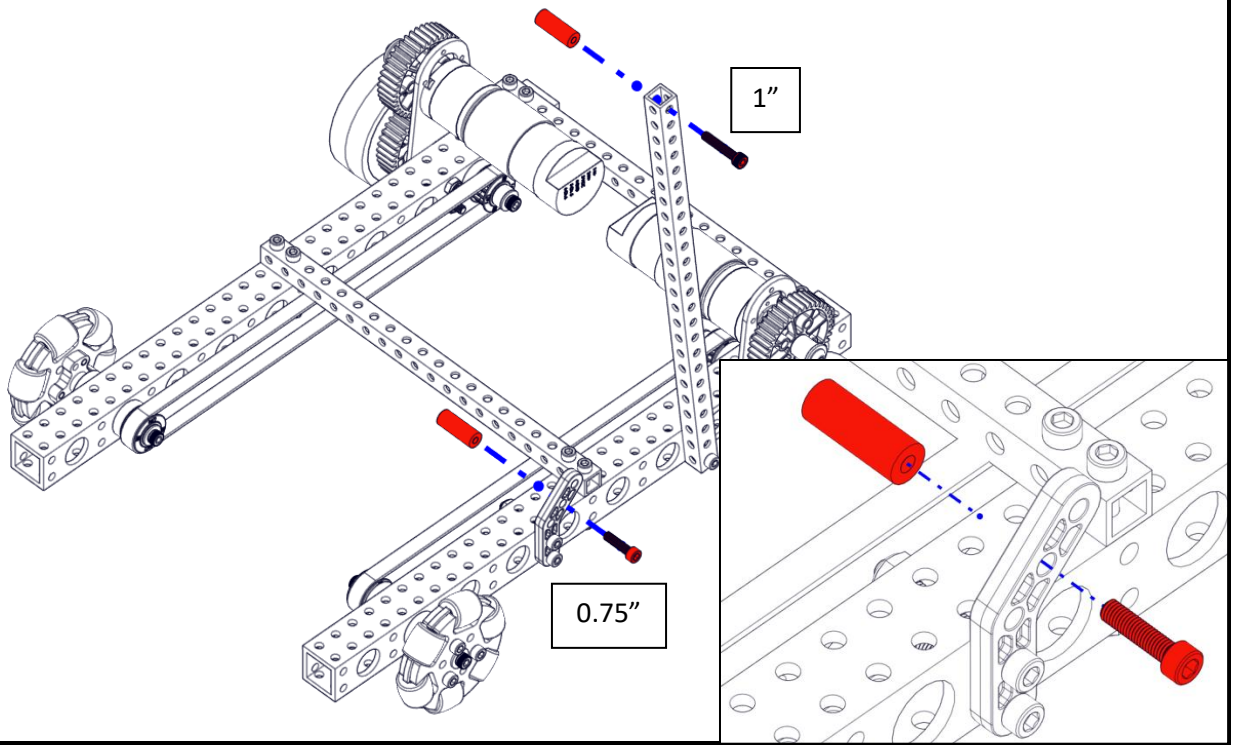
Step 3

Attach a 0.5″x0.5″x12″ ROBITS Tube (am-5001-1200) to the chassis with [1] 1.75″ screw and nut.



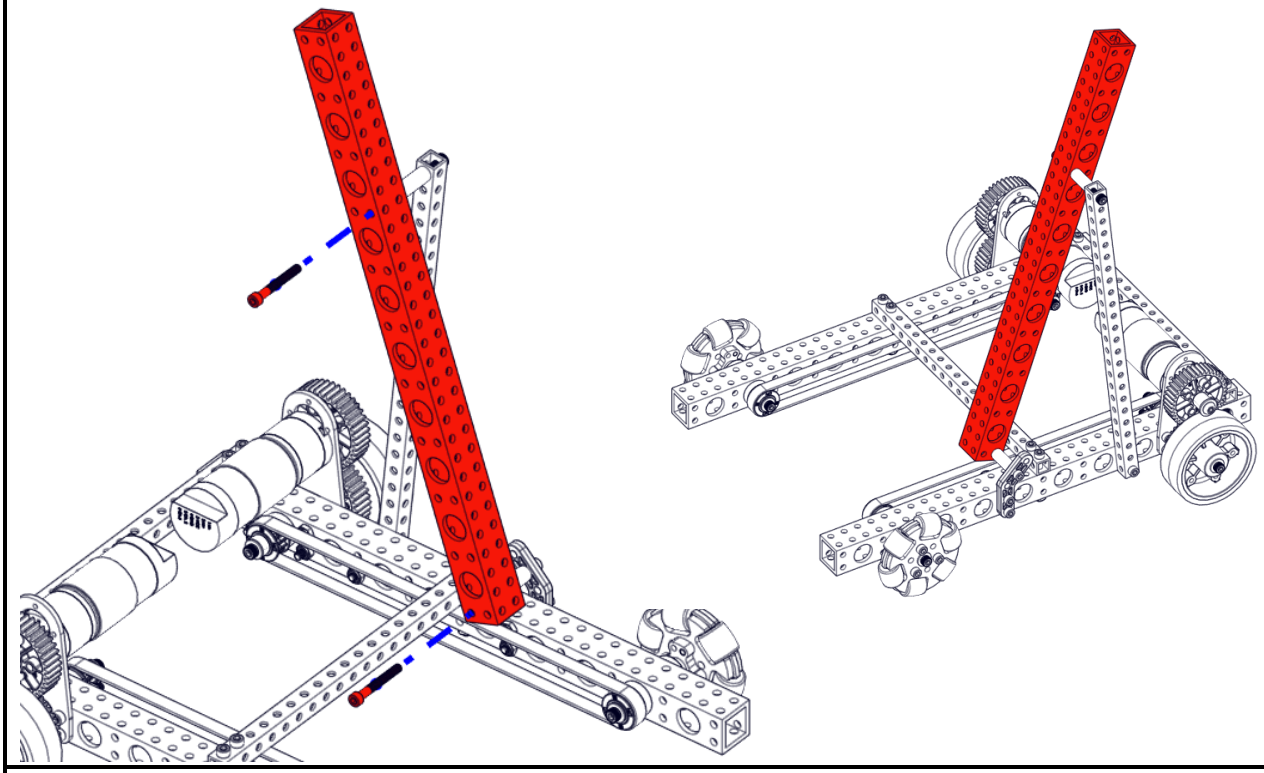
Step 4

Attach 1″ standoffs to the Angle Gusset and Tube using [1] 1″ screw and [1] 0.75″ screw.



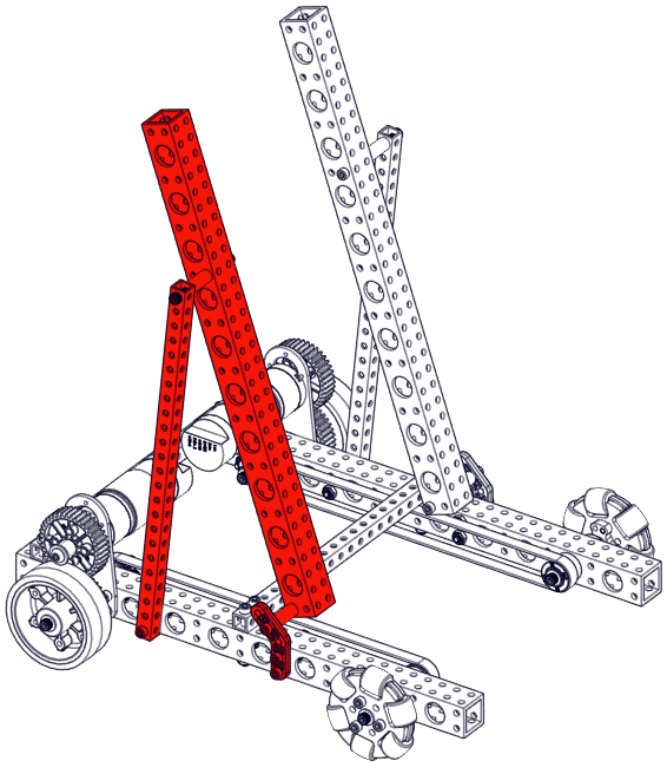
Step 5

Attach a 1"x1"x15.5" ROBITS Tube (am-5002-1550) to the standoffs using [2] 1.5" screws.



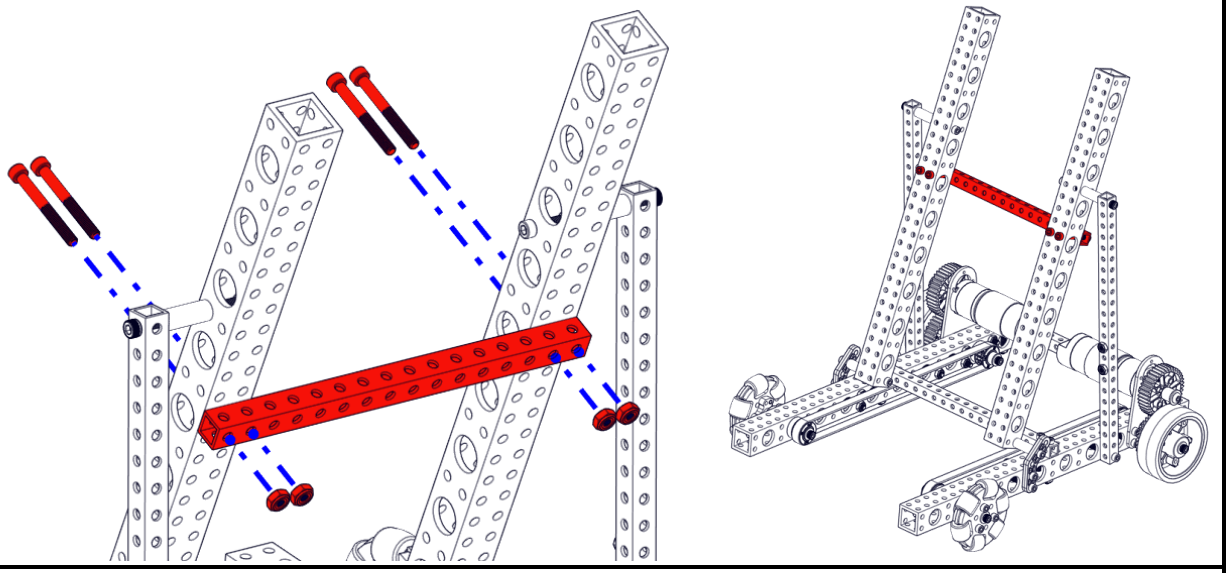
Step 6

Repeat Steps 2 through 5 on the other side of the chassis.



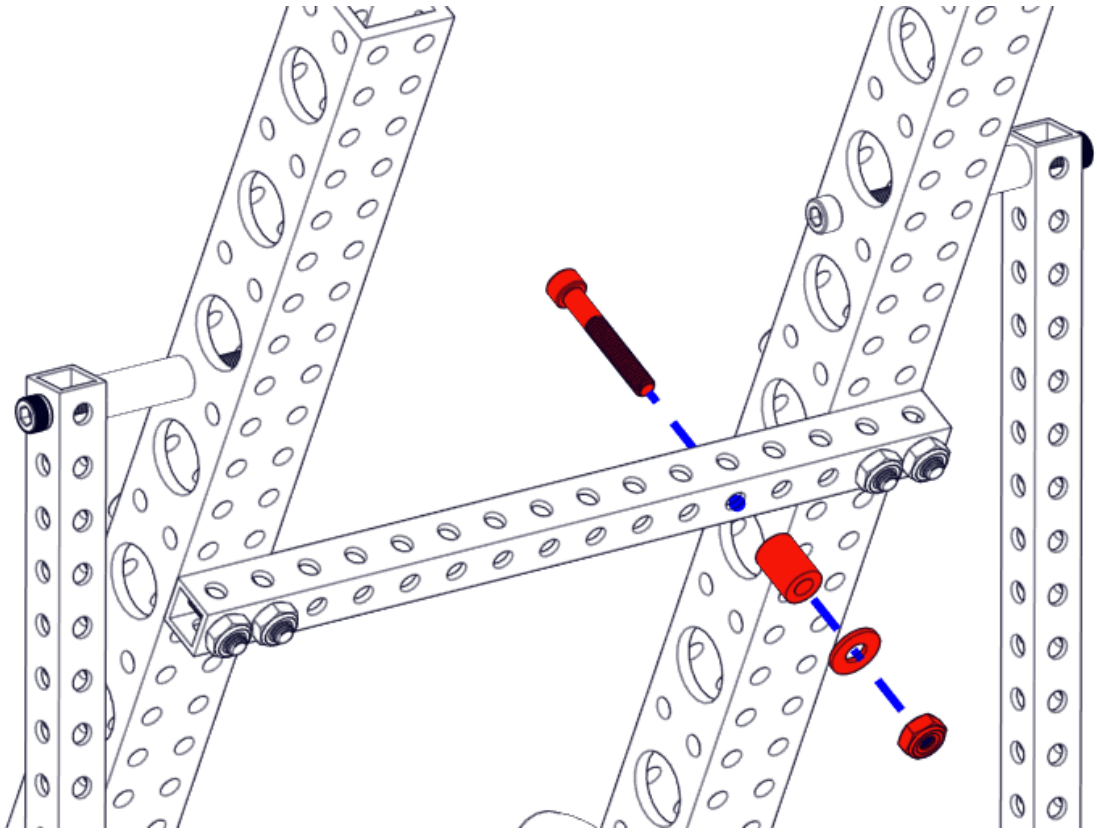
Step 7

Join the two 1″ Tubes together with a 0.5″x0.5″x8″ ROBITS Tube and [4] 1.75″ screws and nuts.



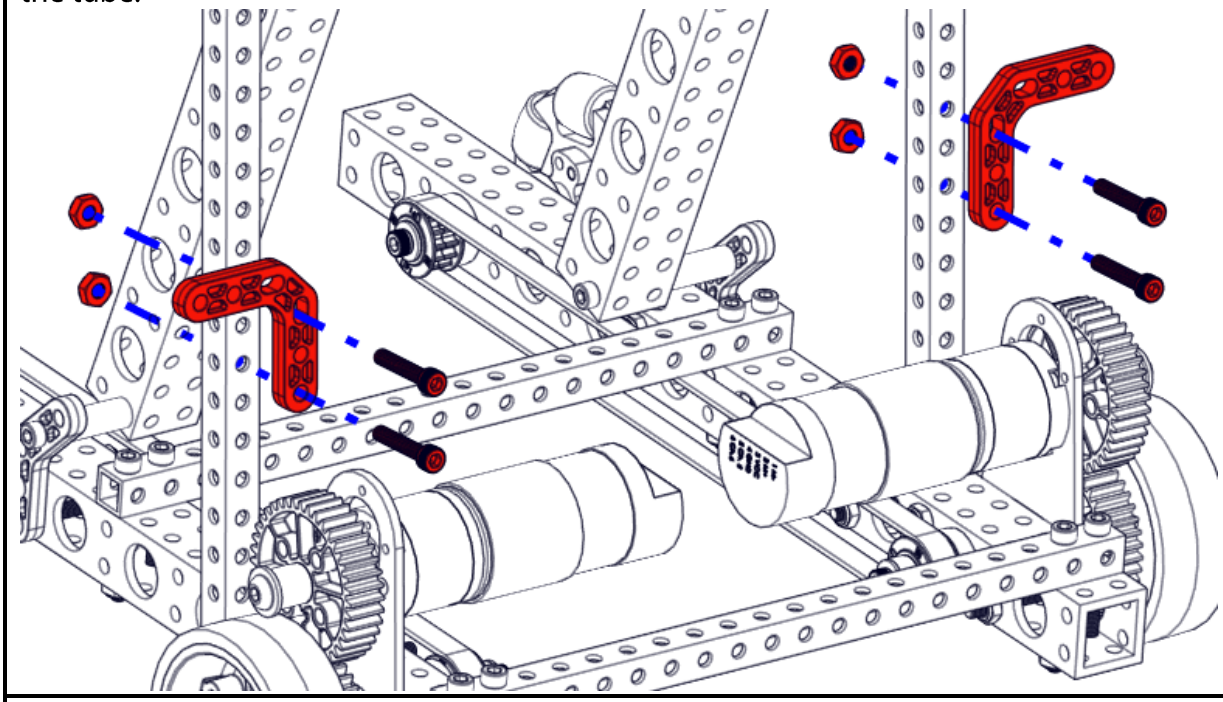
Step 8

Slide a 1.25″ screw through the 8″ Tube, and slip a 0.5″ screw spacer and washer overtop as shown. Secure with a nut. This assembly will be used to retain a rubber band later.



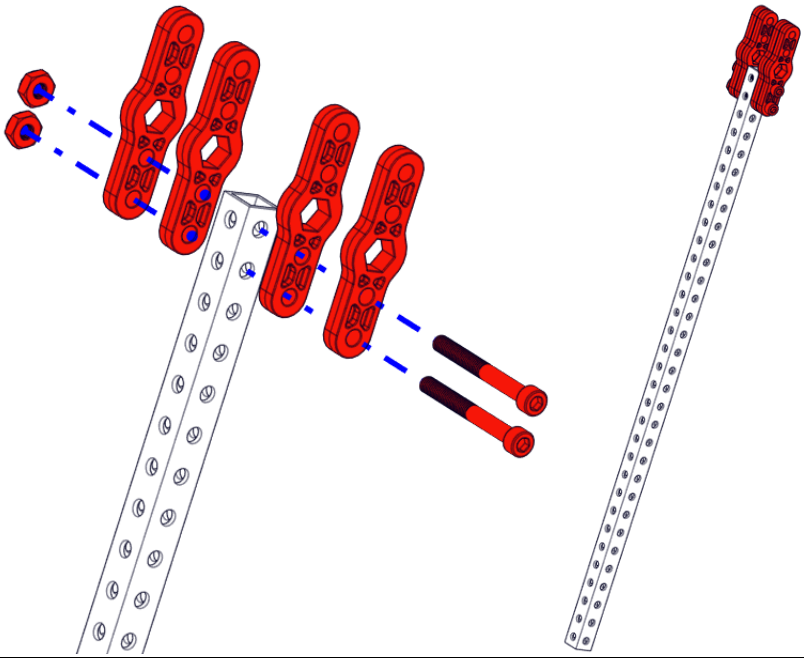
Step 9

Attach [2] 3x3 ROBITS Corner Gussets (am-5005_3x3) to the tubes placed in Step 3 as shown using [4] 1″ screws and nuts. The bottom of each gusset is on the 9th hole from the bottom of the tube.



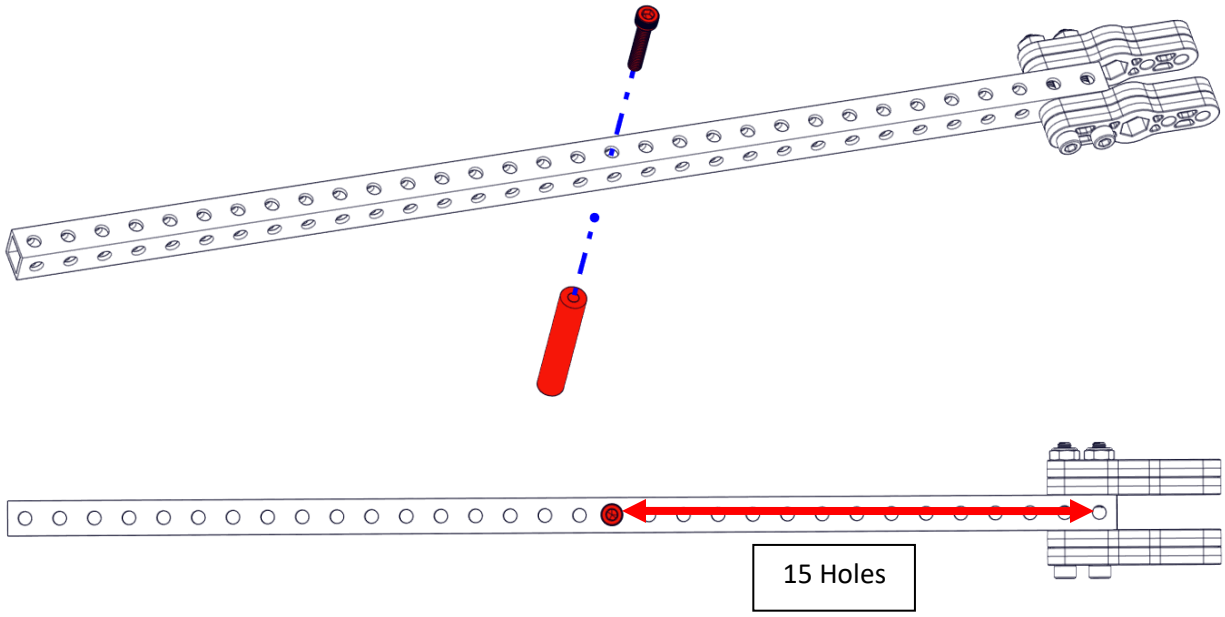
Step 10

Take a 0.5″x0.5″x16″ ROBITS Tube and attach [4] Double End Shaft Carriers (am-5016) using [2] 1.75″ screws and nuts as shown. NOTE: Briefly inserting a hex shaft into the Shaft Carriers is recommended to help align the hex holes during assembly.



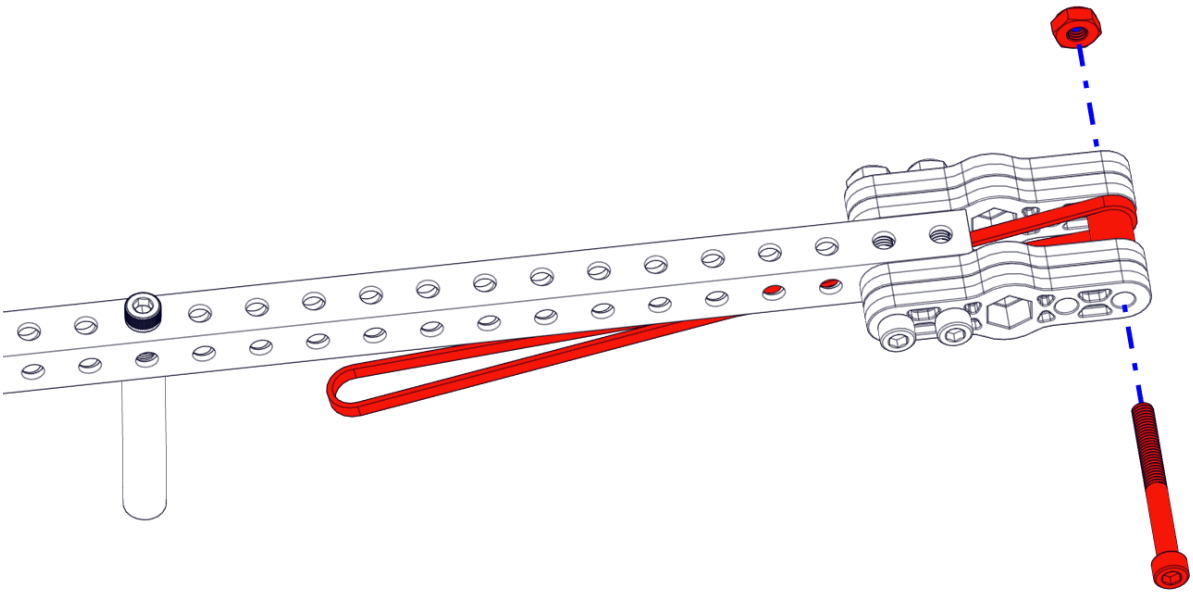
Step 11

Attach a 2" standoff (am-1702) to the assembly with a 1" screw through the 15th hole from the end of the tube where the Shaft Carriers were attached.



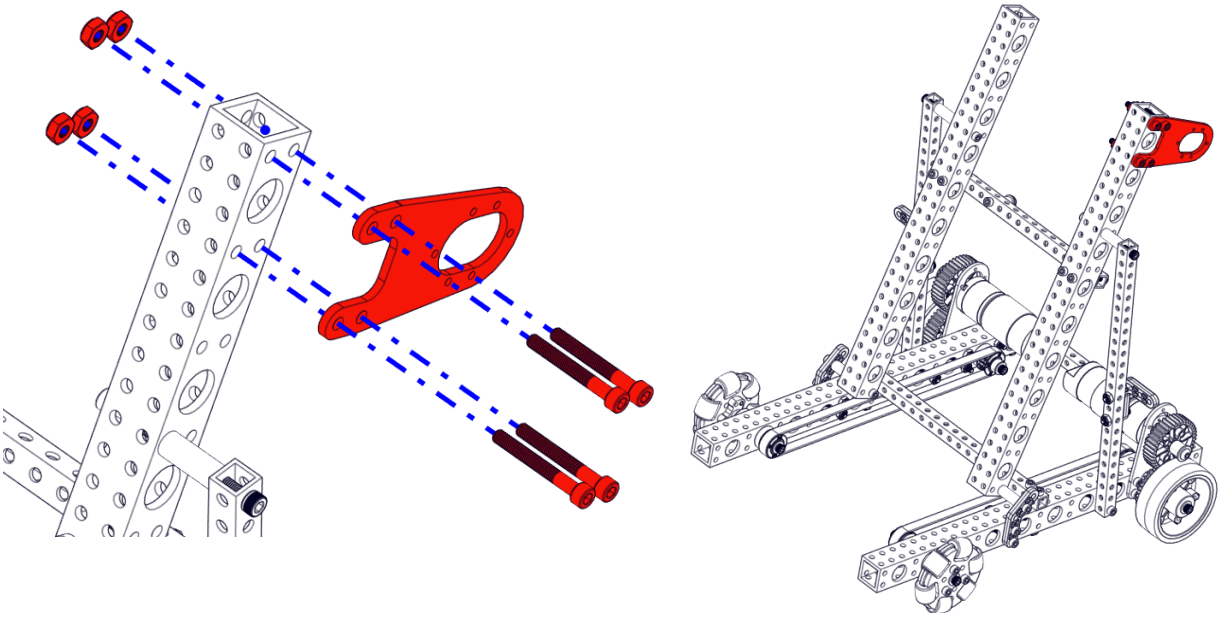
Step 12

Slip a Rubber Band (am-5024_black) around a 0.5" screw spacer and secure it in place between the Shaft Carriers with a 1.75" screw and nut. Set this assembly (the "Arm" assembly) aside for the moment. NOTE: You can add or remove rubber bands to adjust the motion of your arm to your preference.



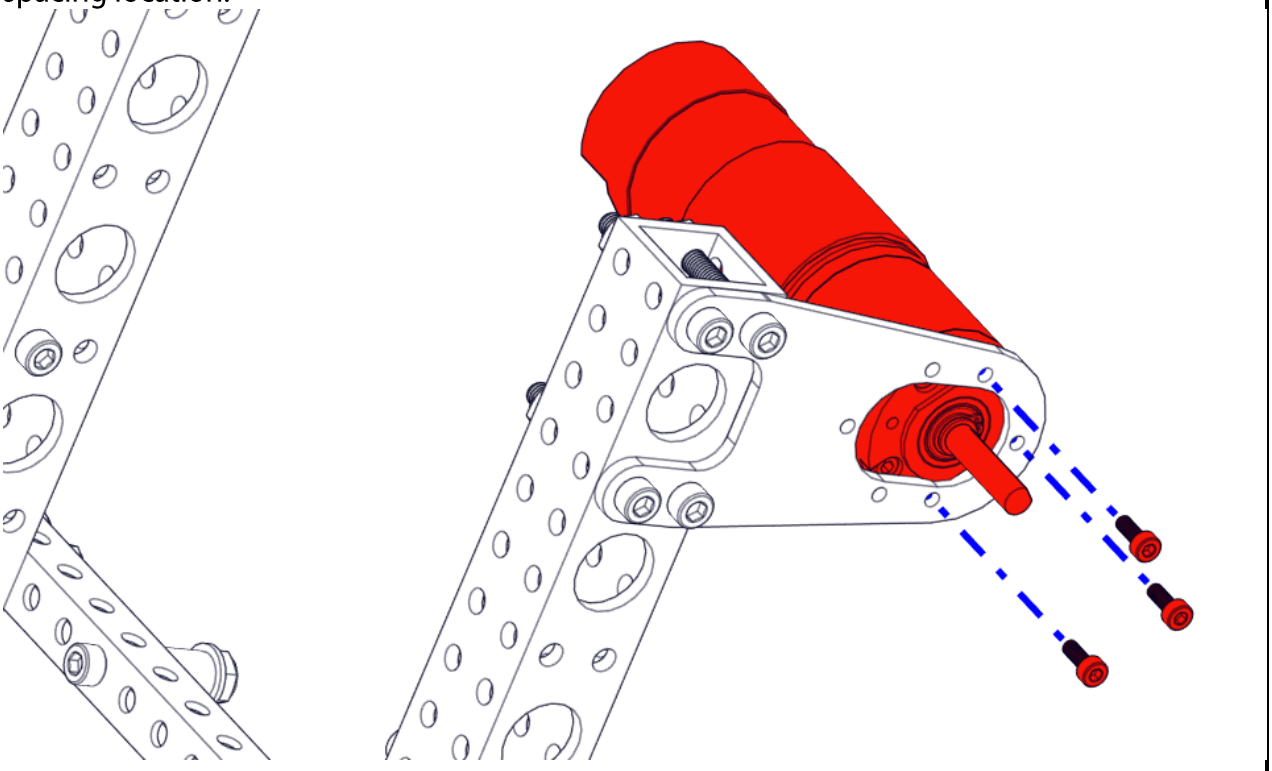
Step 13

Attach a ROBITS 80T/100T Motor Mount (am-5017) to the 1x1 tube as shown using [4] 1.5″ screws and nuts.



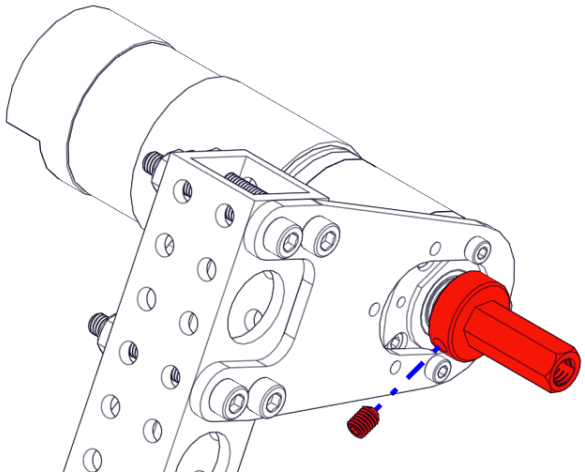
Step 14

Attach a NeveRest motor (51:1 ratio) to the mount using [3] M3 screws in the 100T gear spacing location.



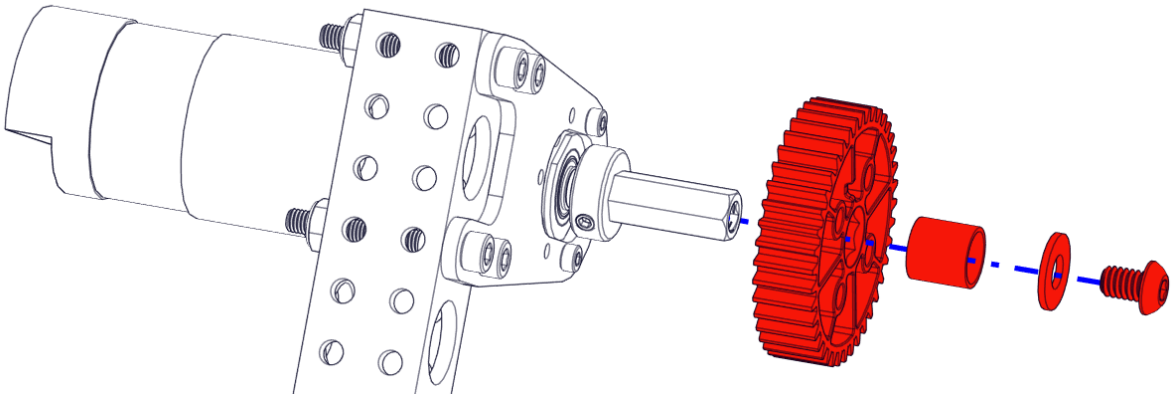
Step 15

Slip the 3/8" Hex Adapter onto the NeveRest motor and tighten the setscrew.



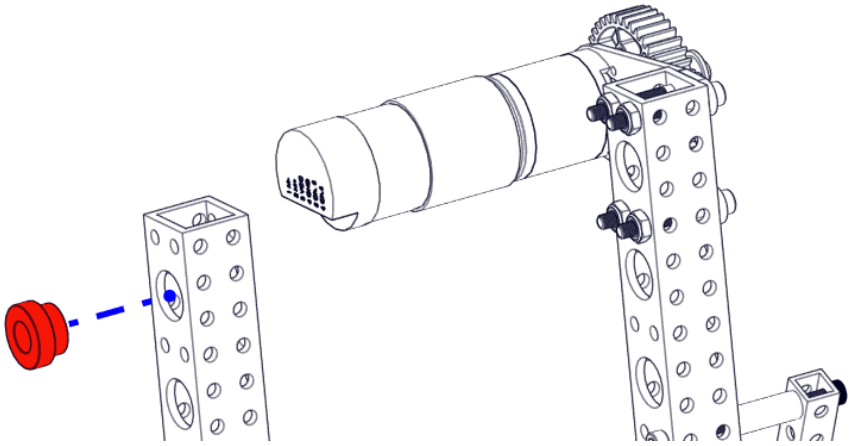
Step 16

Slide a 40T gear and 0.5" shaft spacer onto the Hex Adapter and secure in place with the included 1/4" Washer and Button Head Cap Screw.



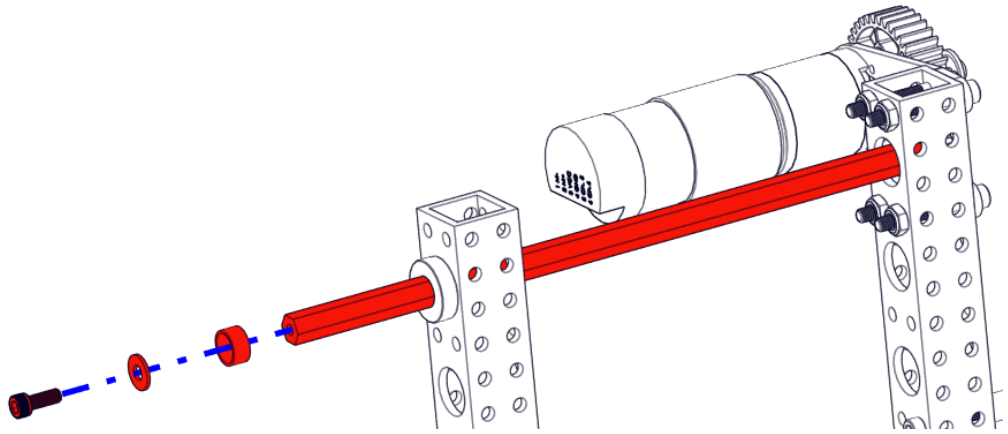
Step 17

On the opposing 1x1, insert a ROBITS Bushing (am-5021) in the topmost hole.



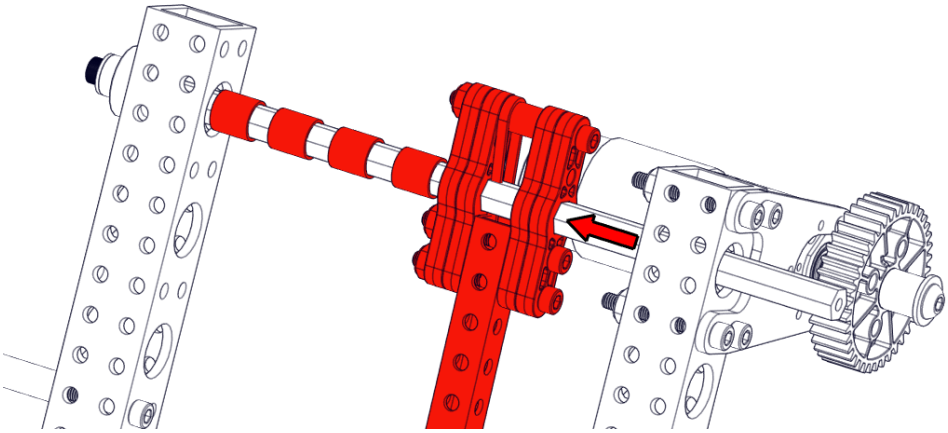
Step 18

Cap one of the ends of a 10″ hex shaft with a 0.5″ screw and washer. Slip [1] 0.25″ shaft spacer over it, and then slide the hex shaft through the bushing placed in Step 17.



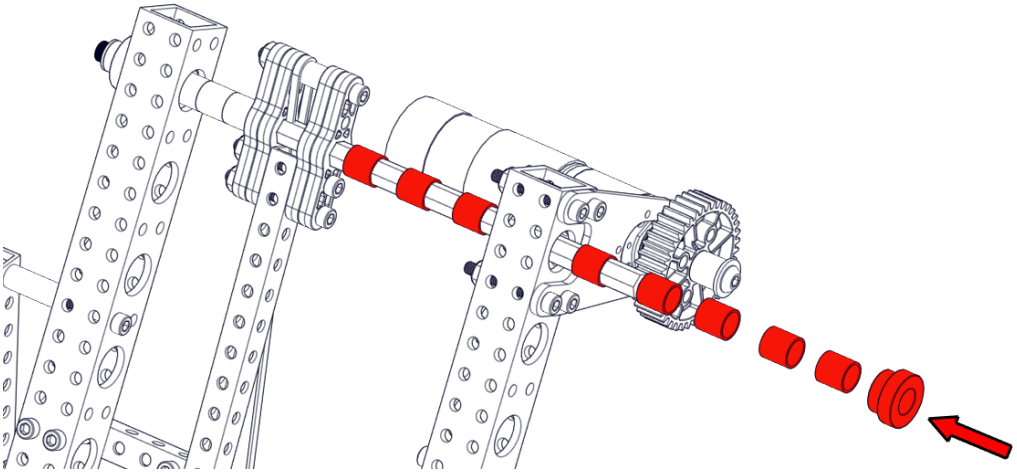
Step 19

Slide [4] 0.5″ shaft spacers onto the hex shaft and the Arm Assembly completed in Step 12.



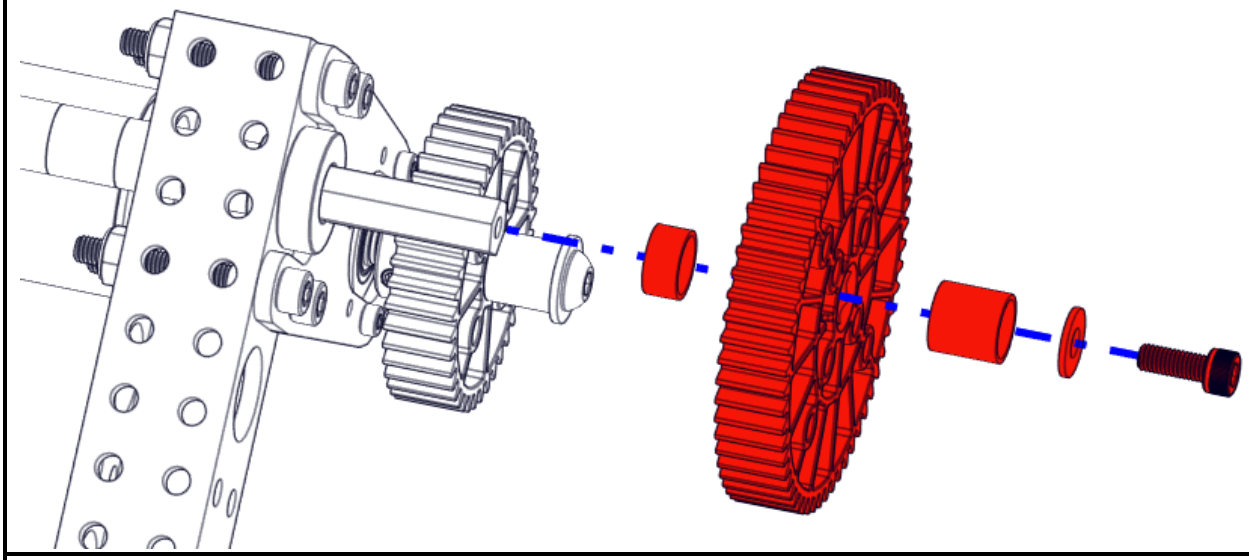
Step 20

Slide [8] more 0.5″ shaft spacers onto the hex shaft followed by another bushing.



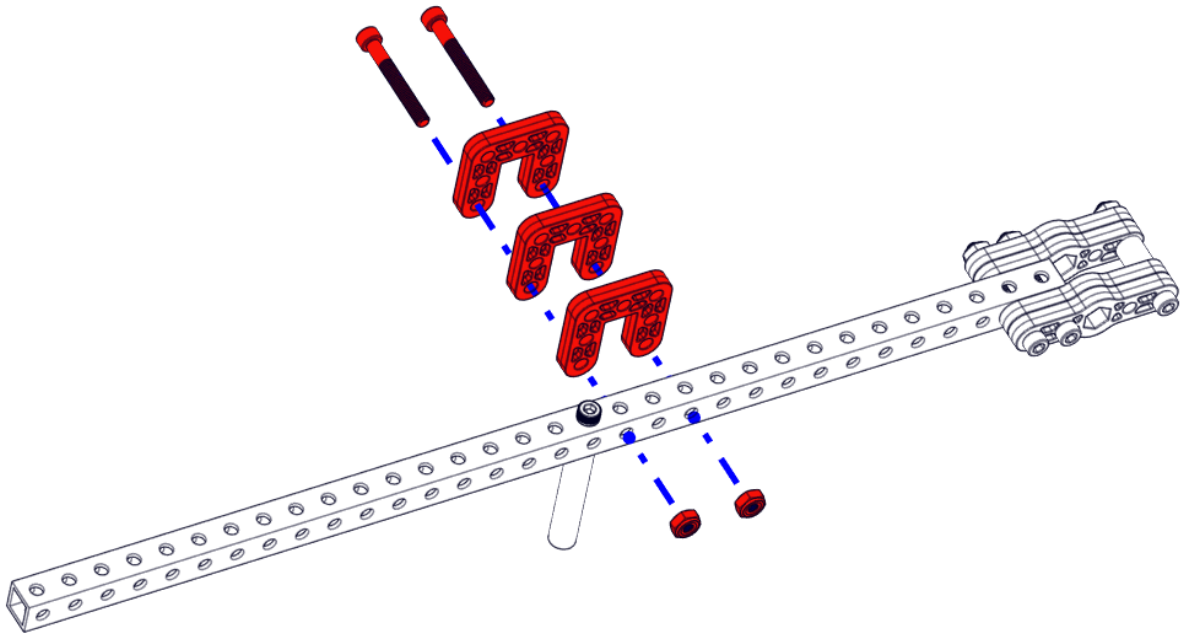
Step 21

Complete the hex shaft by sliding on [1] 0.25" shaft spacer, a 60T gear, a 0.5" shaft spacer, and securing them in place with a 0.5" screw and washer.



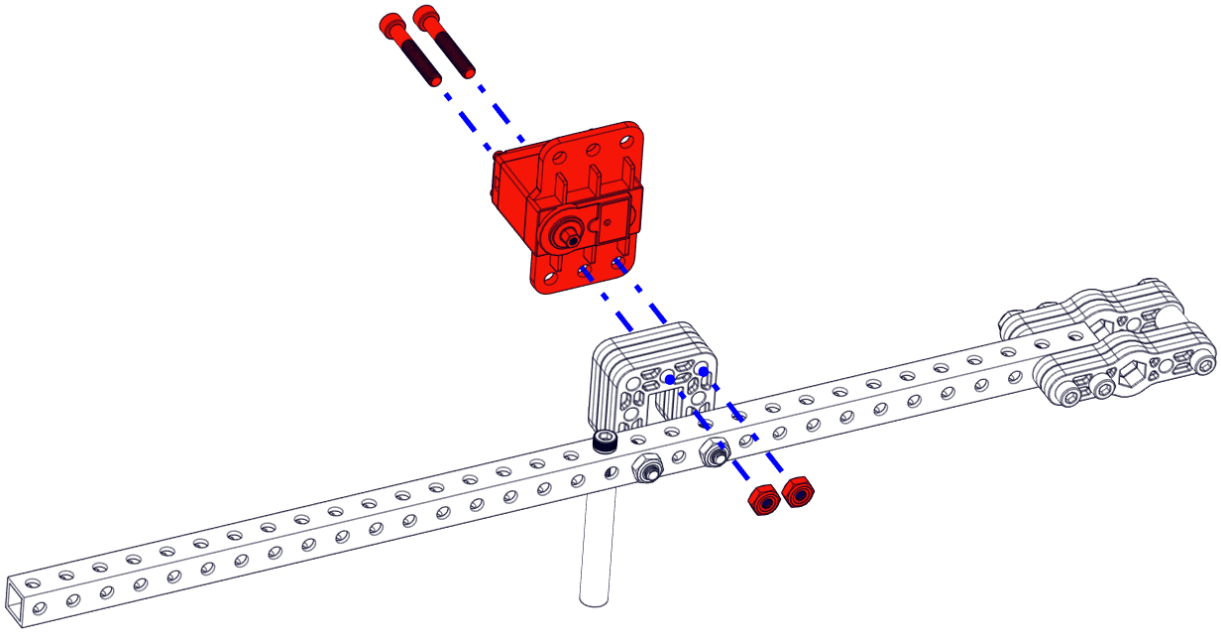
Step 22

On the arm assembly, attach [3] ROBITS 3x3 U-Gussets (am-5008_3x3) using [2] 1.5" screws and nuts between the mounting point to the rest of the robot and the standoff, and through the hole directly next to the standoff.



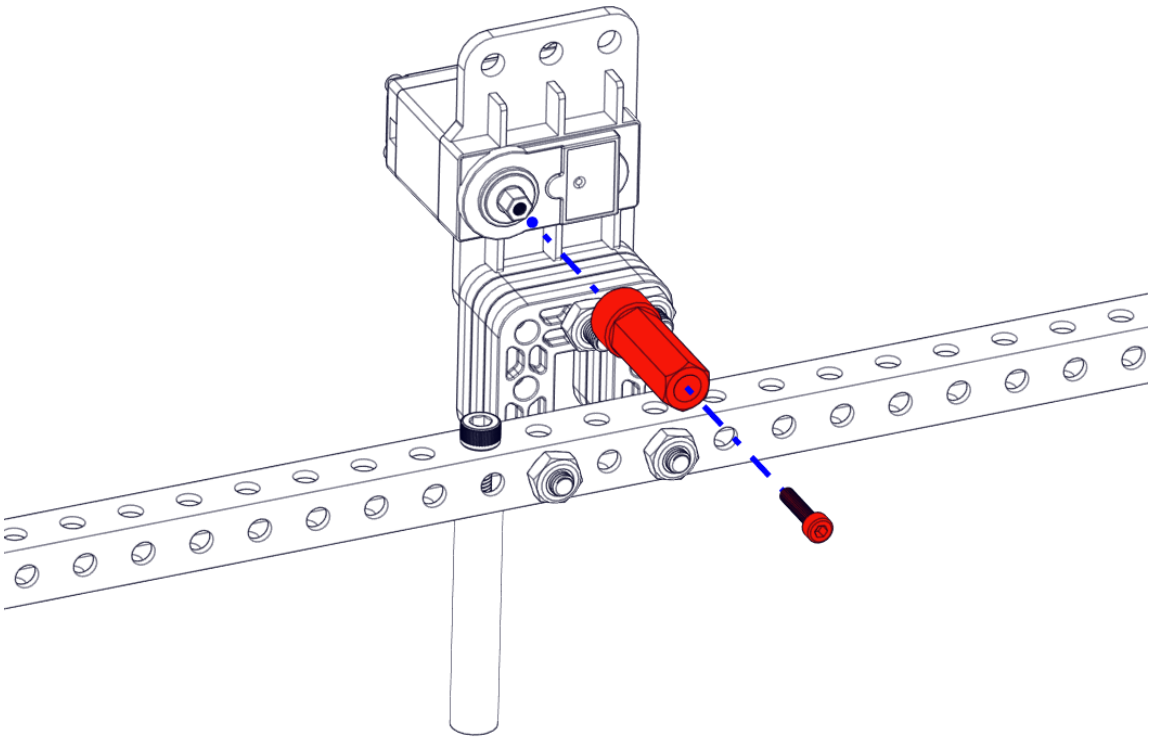
Step 23

Attach a high-torque programmable servo to the U-Gussets with [2] 1.25" screws and nuts.



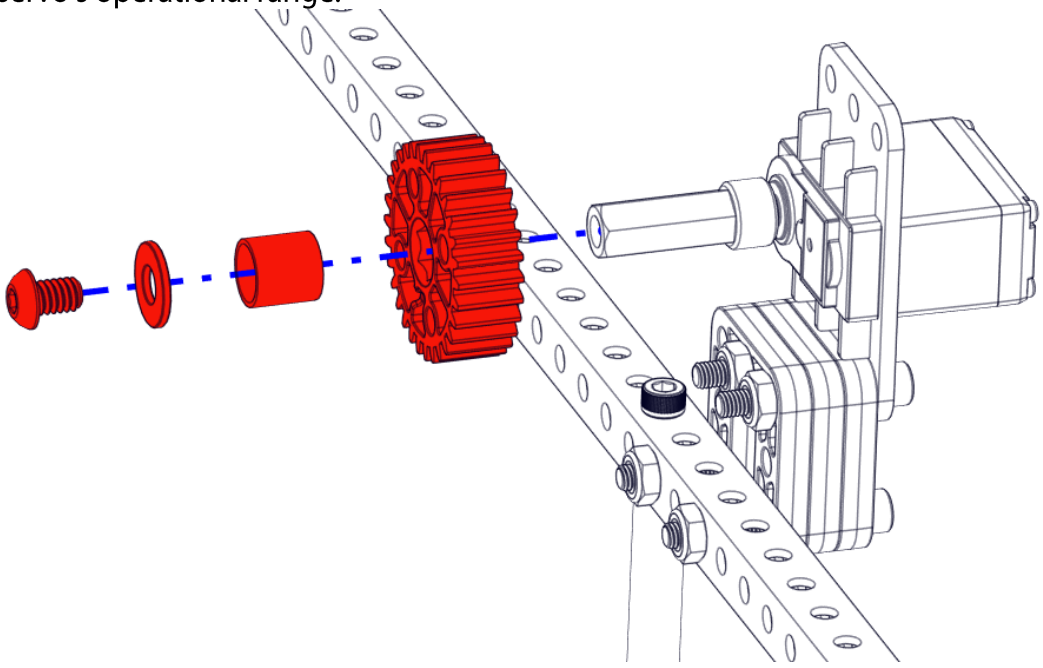
Step 24

Slip on the servo adapter and secure it in place with the included M3 screw.



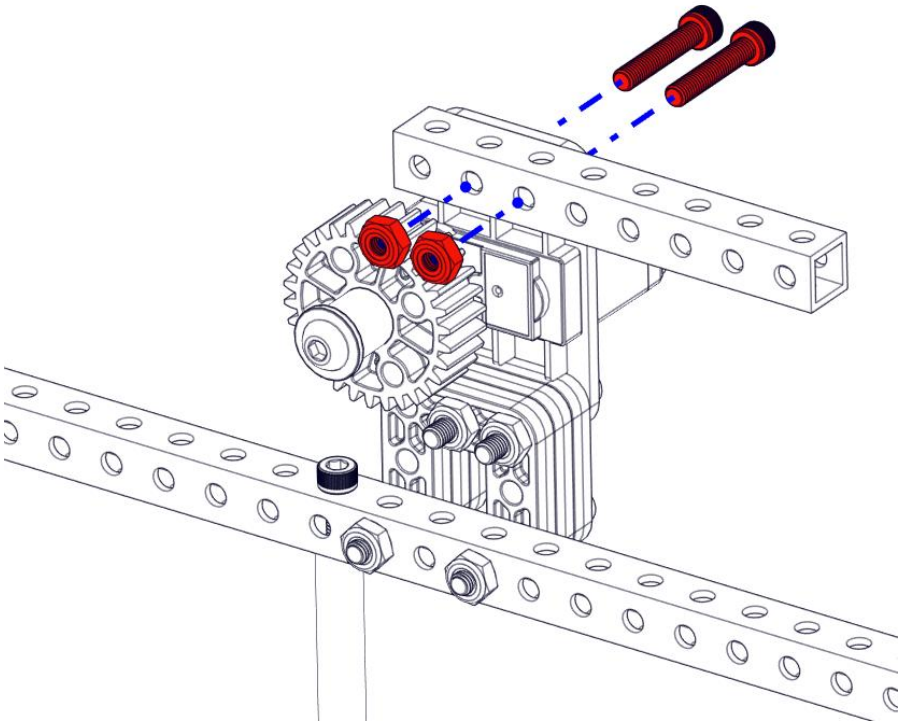
Step 25

Place a 30T gear and 0.5″ spacer on the shaft adapter and secure in place with the included 1/4" washer and button head cap screw. NOTE: This gear may need to be rotated later to align with the servo's operational range.



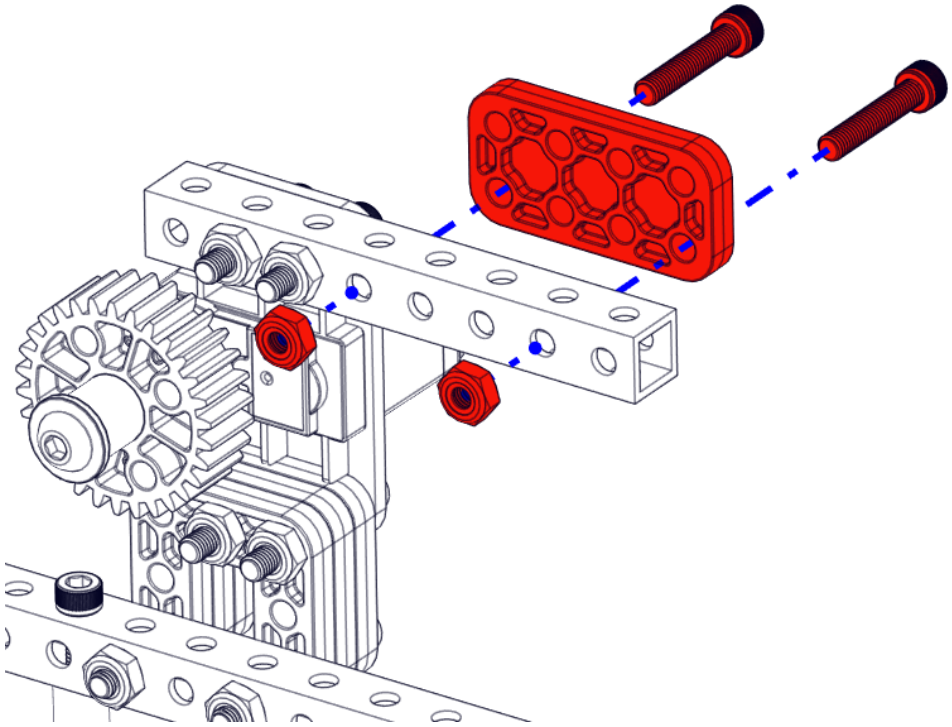
Step 26

Attach a 0.5″x0.5″x4″ ROBITS tube to the other side of the servo using [2] 1″ screws and nuts.



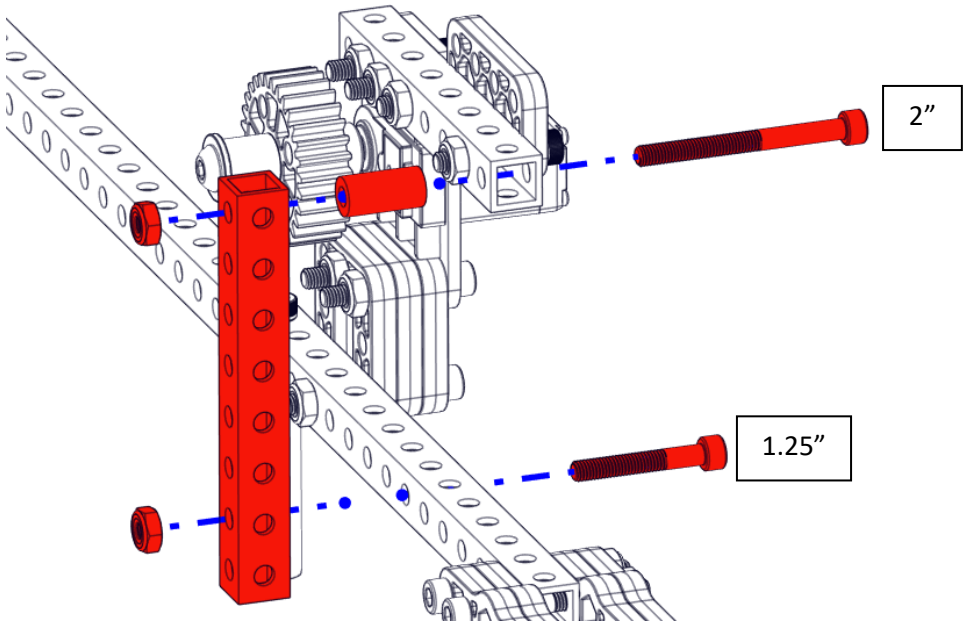
Step 27

Attach a 2x4 ROBITS plate (am-5006_2x4) to the 4" tube with [2] 1" screws and nuts.



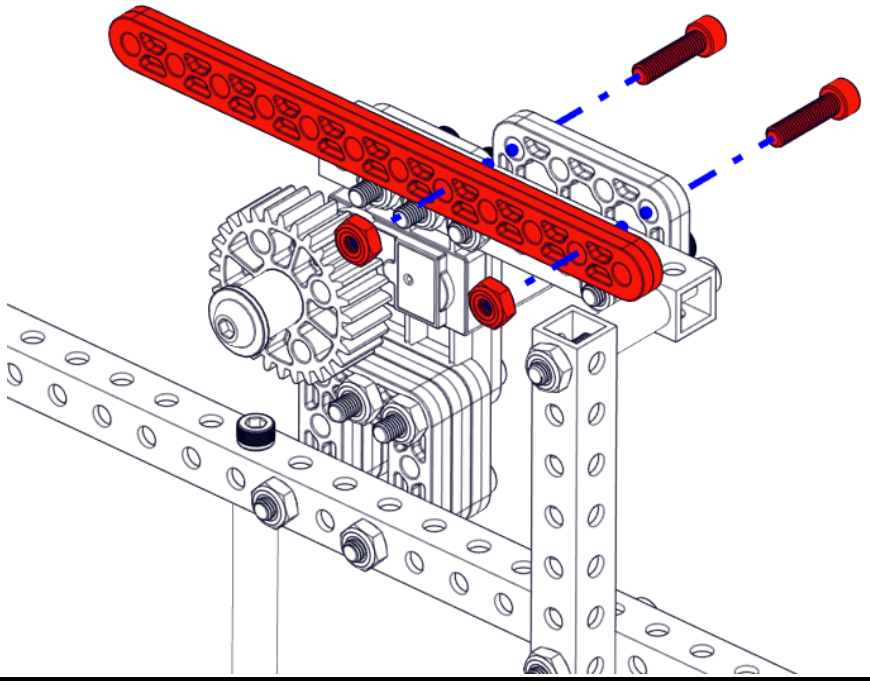
Step 28

Connect another 4" ROBITS tube at the end of the previous one and at the tube that functions as the base of the arm. Use a 0.75" long screw spacer between the two 4" tubes and a 2" long screw and nut to join them. At the base, use a 1.25" screw and nut on the fifth whole from the edge of the shaft carriers.



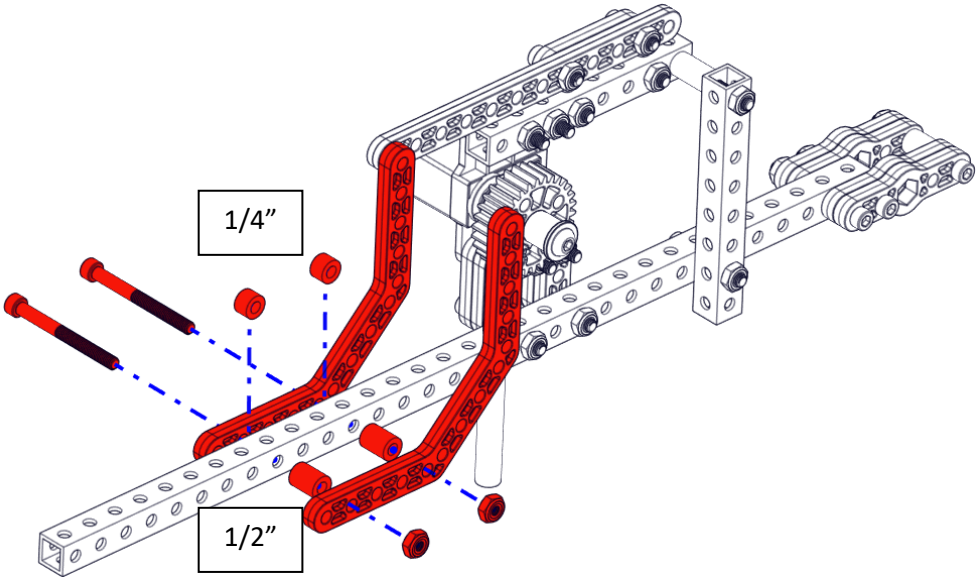
Step 29

Connect a ROBITS 12 hole Beam (am-5011_1x12) to the 2x4 plate using [2] 0.75″ screws and nuts.



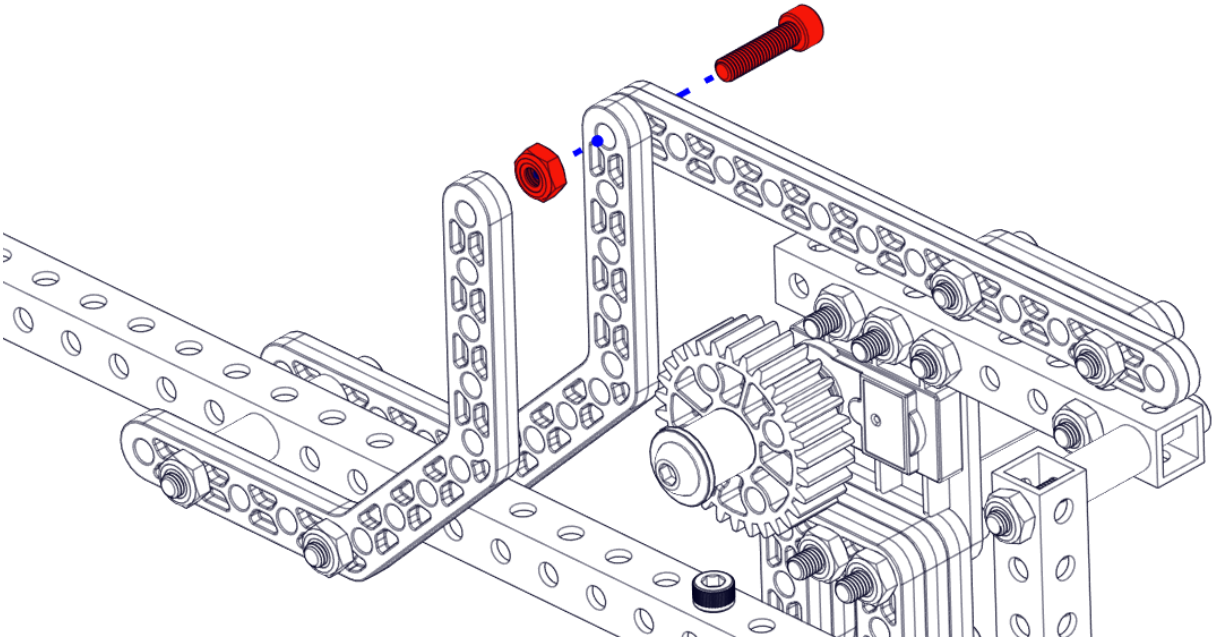
Step 30

Attach [2] 5x5 ROBITS Corner Gussets (am-5005_5x5) to the base of the arm. Install them so that one hole aligns with the beam installed in the last step. One Gusset must be separated from the tube by two 0.5″ screw spacers and the other is spaced 0.25″. Use [2] 2″ screws and nuts.



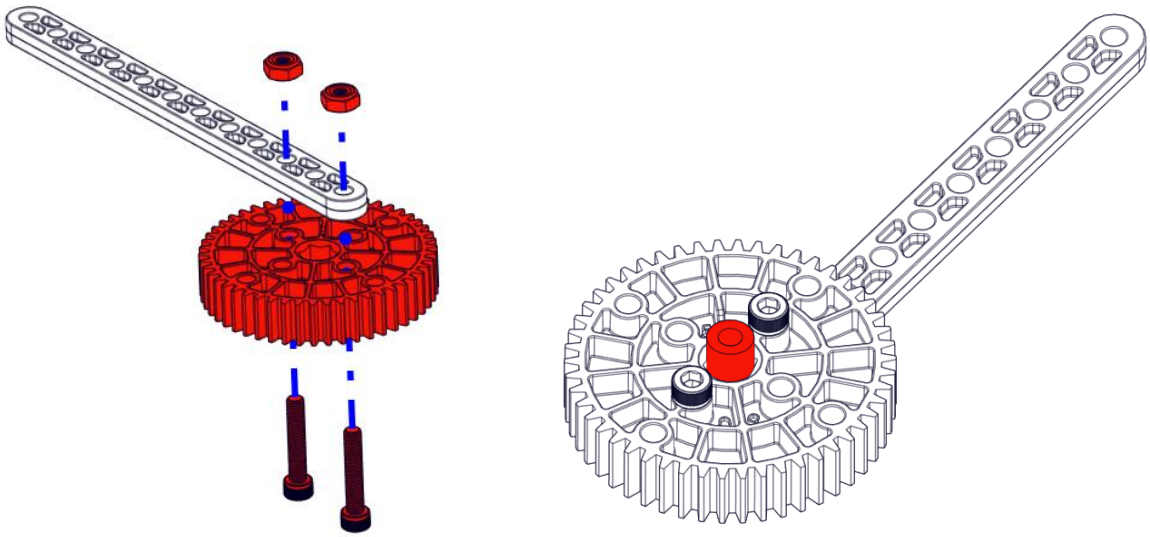
Step 31

Connect one gusset to the beam using a 0.75″ screw and nut.



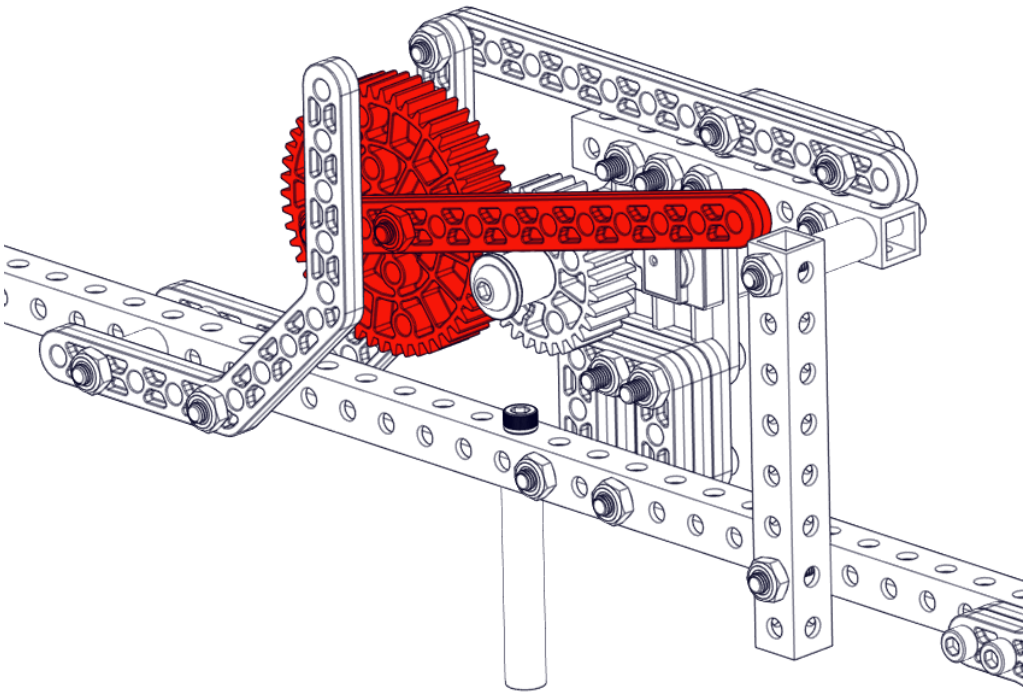
Step 32

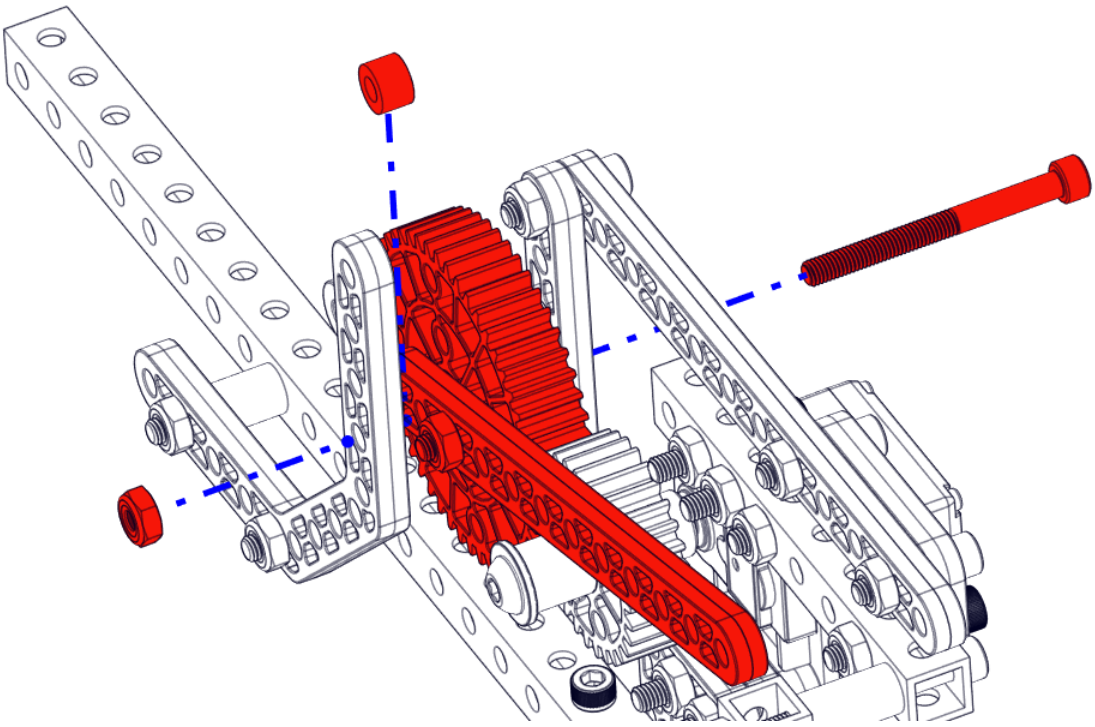
Take a 1x12 ROBITS Beam and attach a 50T to the end using [2] 1″ screws and nuts. Slip a 0.75″ screw spacer into the center hole of the gear.



Step 33

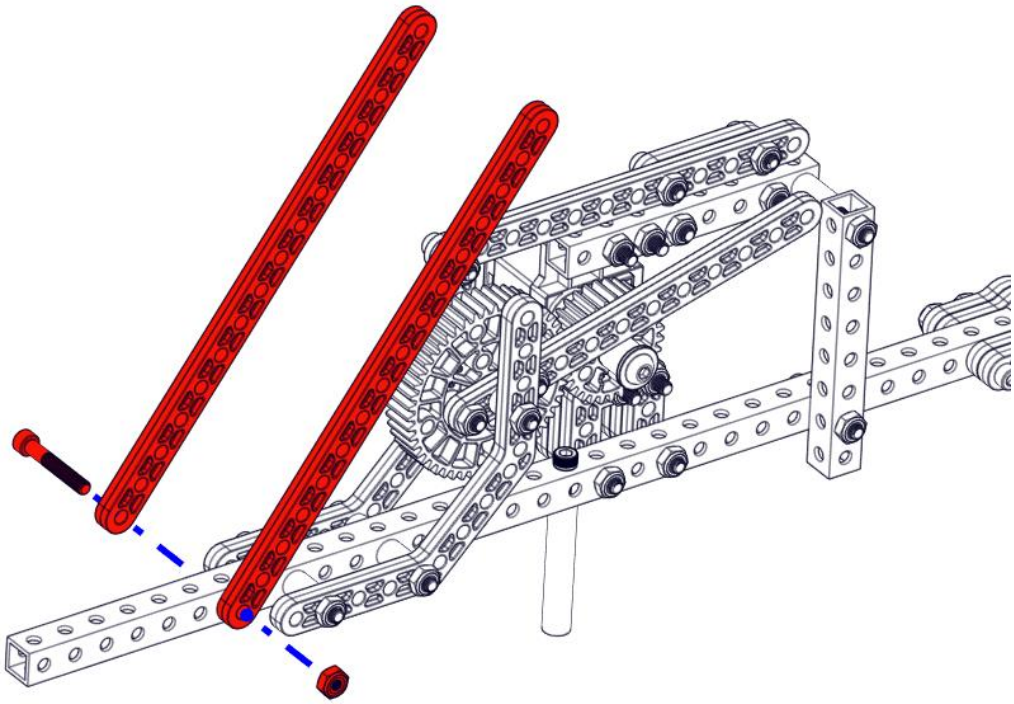
Slide that assembly into the arm and pin it place with a 2" screw and nut. Make sure to use a 0.25" screw spacer to keep the assembly properly engaged with the servo gear! The assembly should spin freely, do not tighten the screw so much it stops moving.





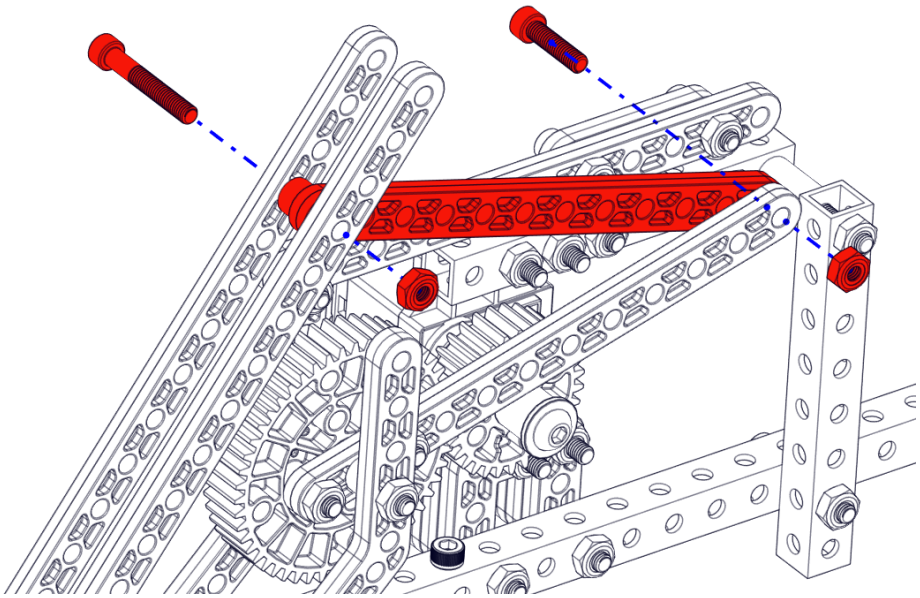
Step 34

Attach two 1x16 ROBITS Beams (am-5011_1x16) to the base with [1] 1.25″ screw and nut through the 7th hole from the end of the tube. NOTE: Do not overtighten this screw! The beams should still move freely after they have been attached. This applies to Steps 34-37.



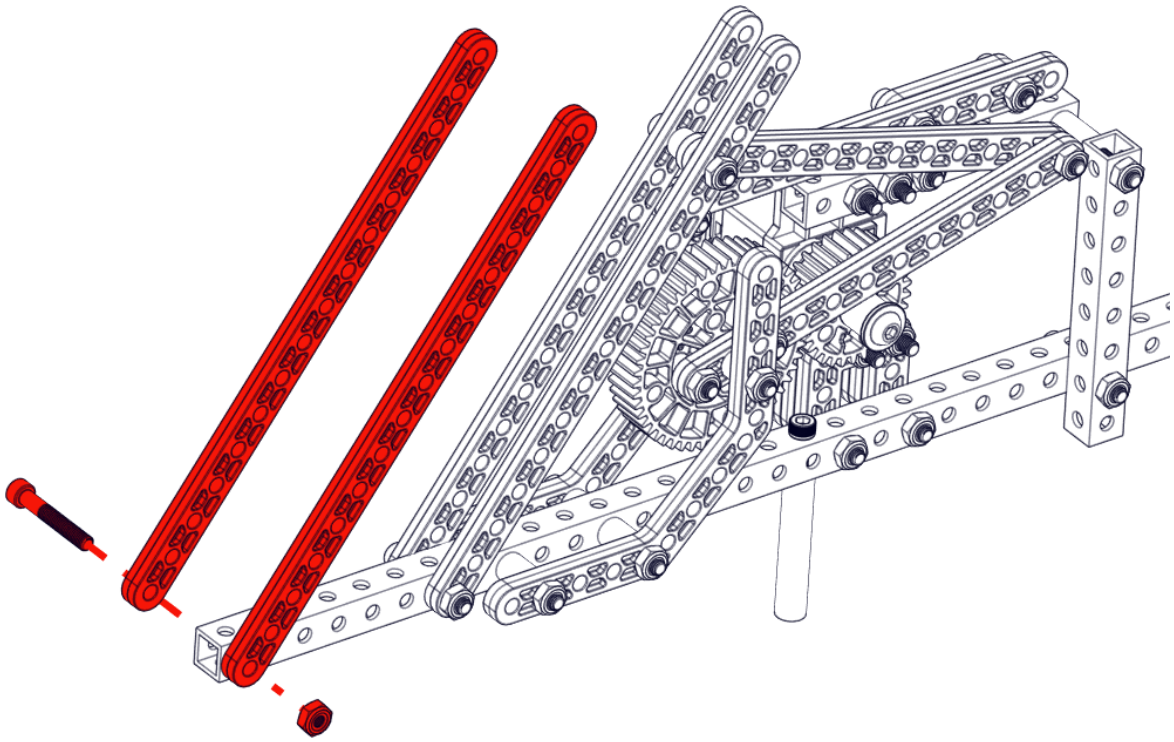
Step 35

Use another 1x12 Beam to connect the 1x16 Beams to the 1x12 Beam attached to the gearing. You will need to use a 0.25″ spacer and 1.25″ screw on one side to properly space the 1x16 beams apart. On the other side, use a 0.75″ screw and nut.



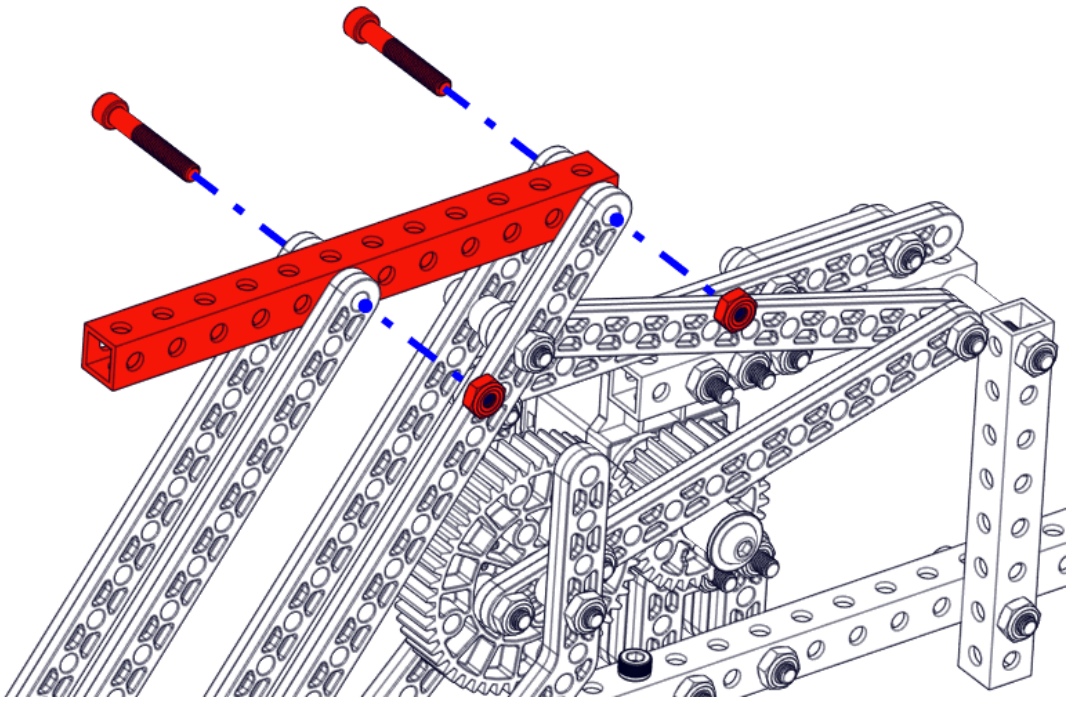
Step 36

Attach another set of 1x16 Beams at the end of the base tube with a 1.25″ screw and nut.



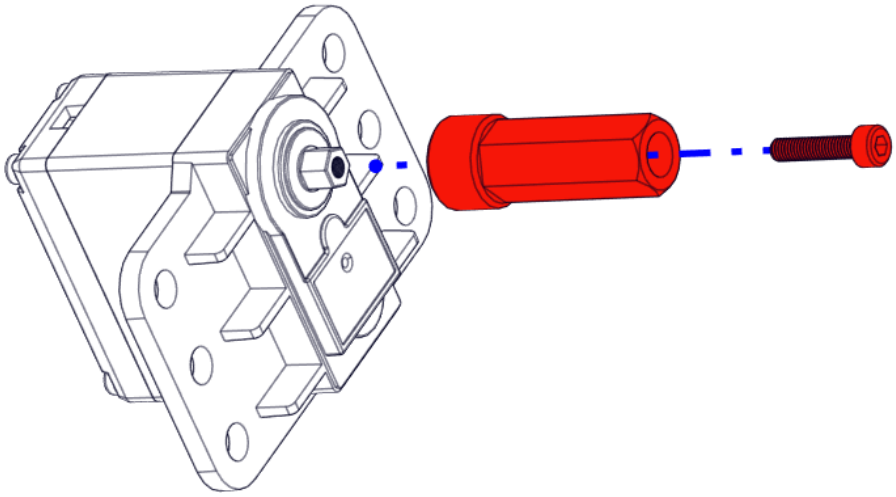
Step 37

Connect a 0.5″x0.5″x6″ ROBITS Tube to both sets of 1x16 beams using [2] 1.25″ screws and nuts spaced 5 holes apart, with one set of Beams at the end of the tube as shown.



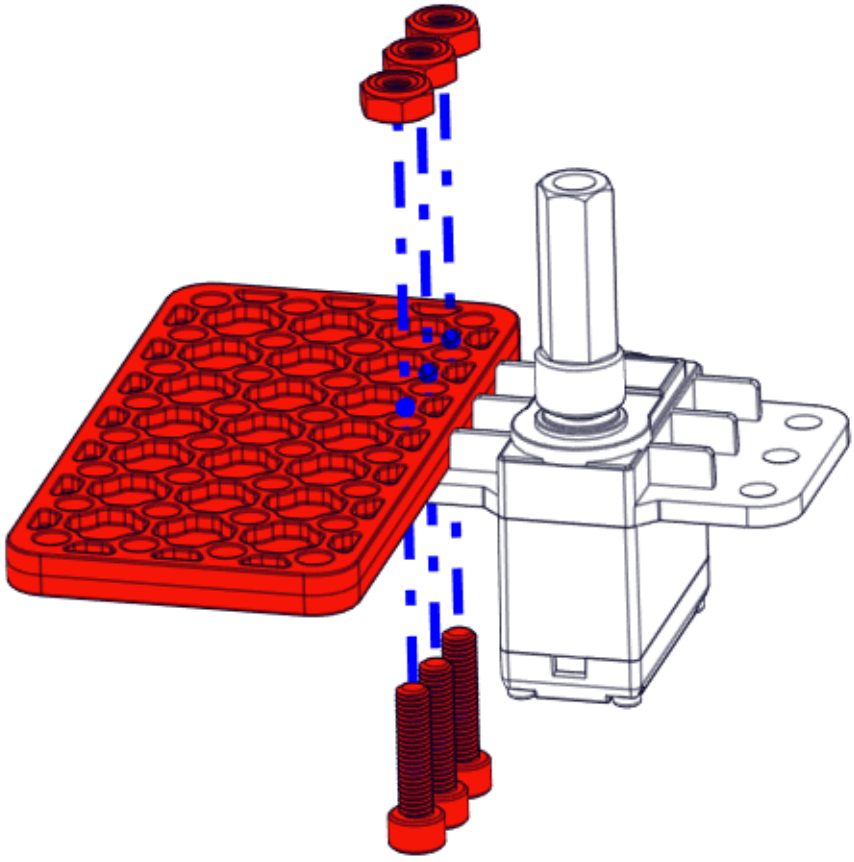
Step 38

Connect a 3/8" Hex Adapter to a high torque programmable servo and secure it with the included M3 Socket Head Cap Screw.



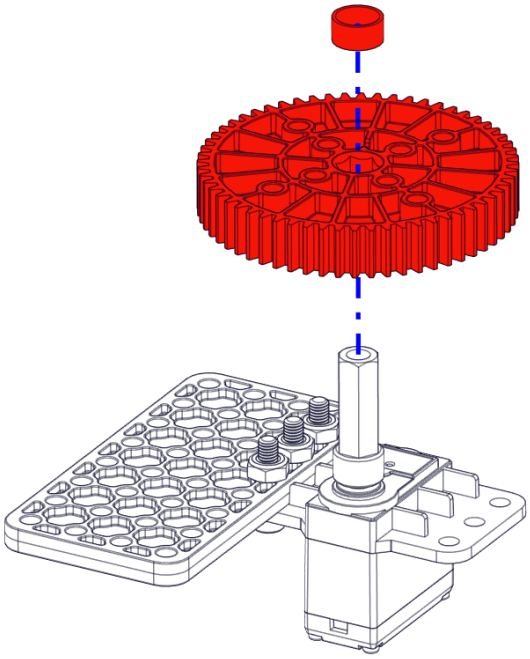
Step 39

Attach a 4x8 ROBITS Plate (am-5006_4x8) to the servo using three 3/4" screws and nuts.



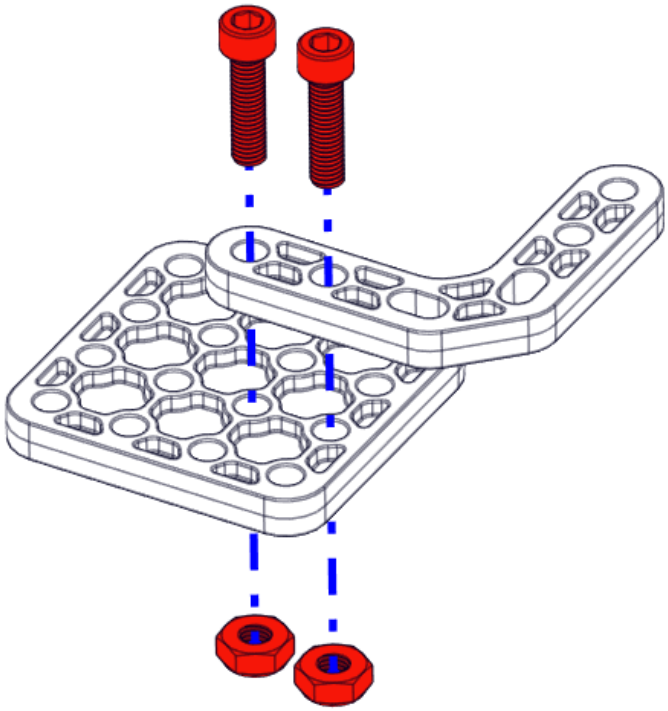
Step 40

Slip a 60T ROBITS gear and 1/2" shaft spacer over the shaft adapter.



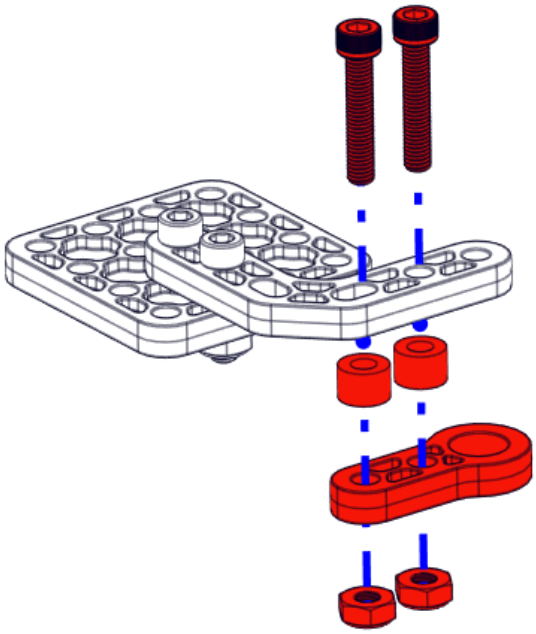
Step 41

Connect a 4x4 ROBITS Plate (am-5006_4x4) to a 3x3 ROBITS Gusset (am-5005_3x3) using [2] 3/4" screws and nuts as shown.



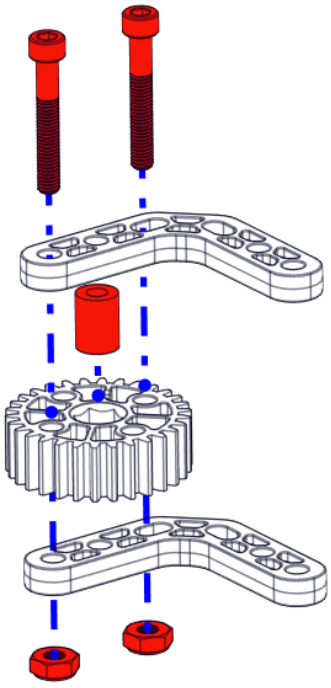
Step 42

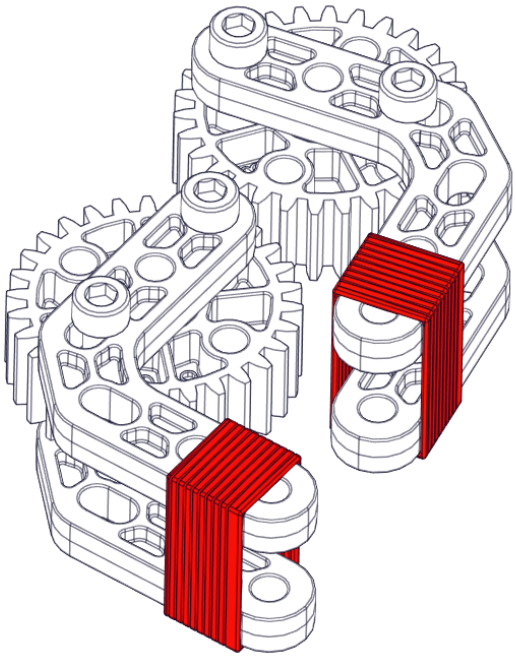
Connect a ROBITS Single End Bushing Carrier (am-5014) to the assembly in Step 41, spaced away from the Gusset by [2] 1/4" spacers and attached using [2] 1” screws and nuts.



Step 43

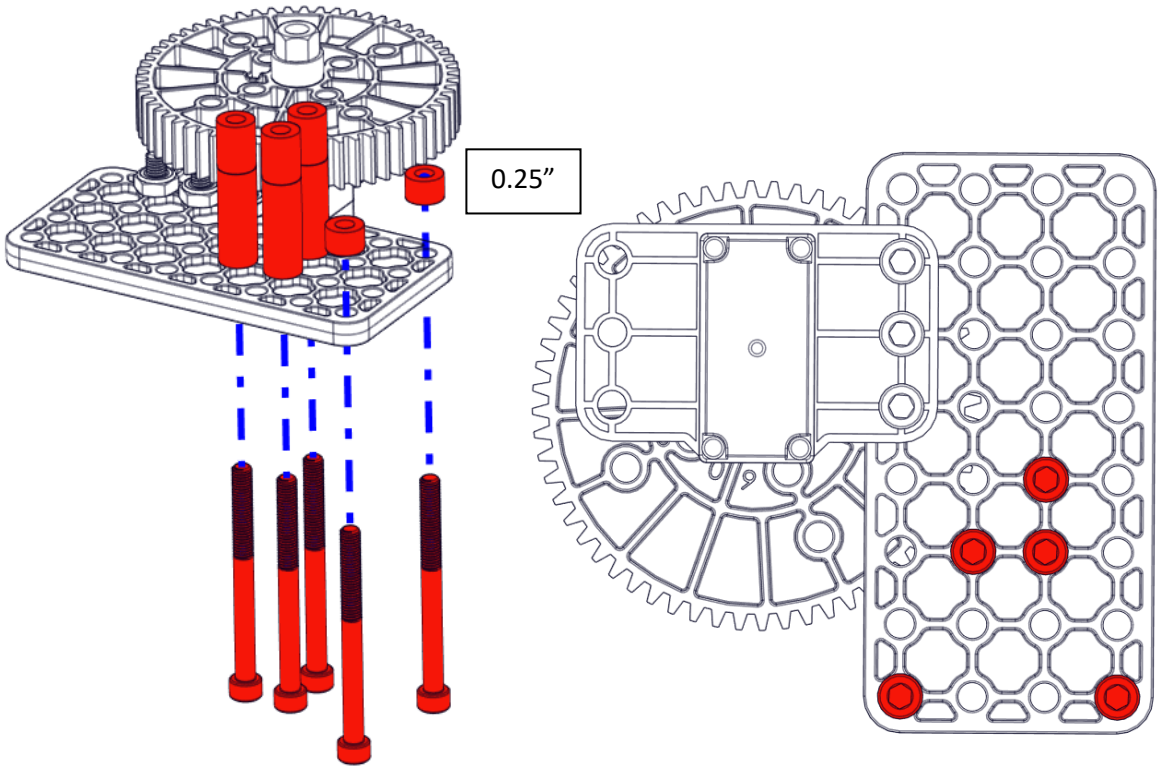
Construct a claw assembly using [2] 3x3 Gussets, a 30T ROBITS gear, a 1/2" screw spacer, and connected via [2] 1.25” screws and nuts. Wrap a rubber band around the assembly as shown. Construct two of these, each a mirror of each other as shown. A cable tie can be attached around the rubber bands and through the holes in the Gussets to retain them.





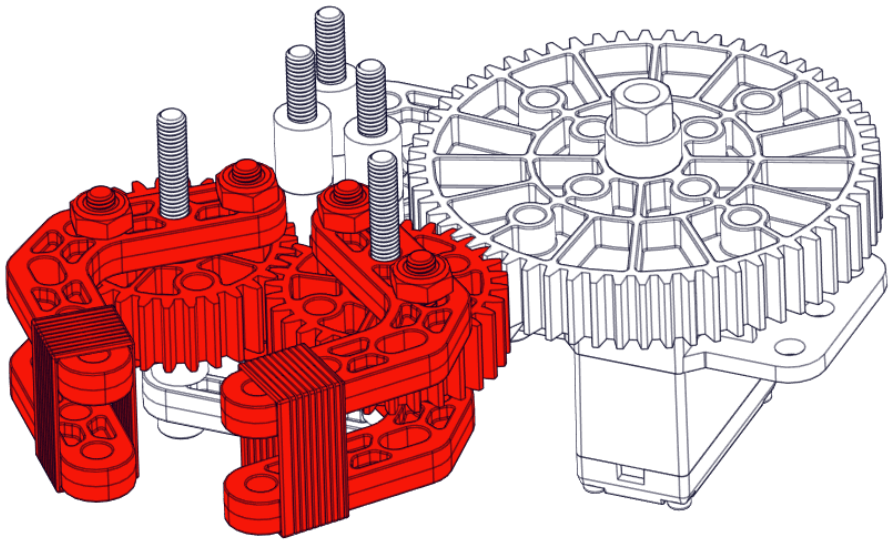
Step 44

Stack [3] 1″ screw spacers and [3] 1/2″ screw spacers on top of each other and slide through 2.25″ screws to hold them in place on the assembly from Step 40 as shown. Also slide [2] additional 2.25″ screws through the plate and place two 1/4" screw spacers over them.



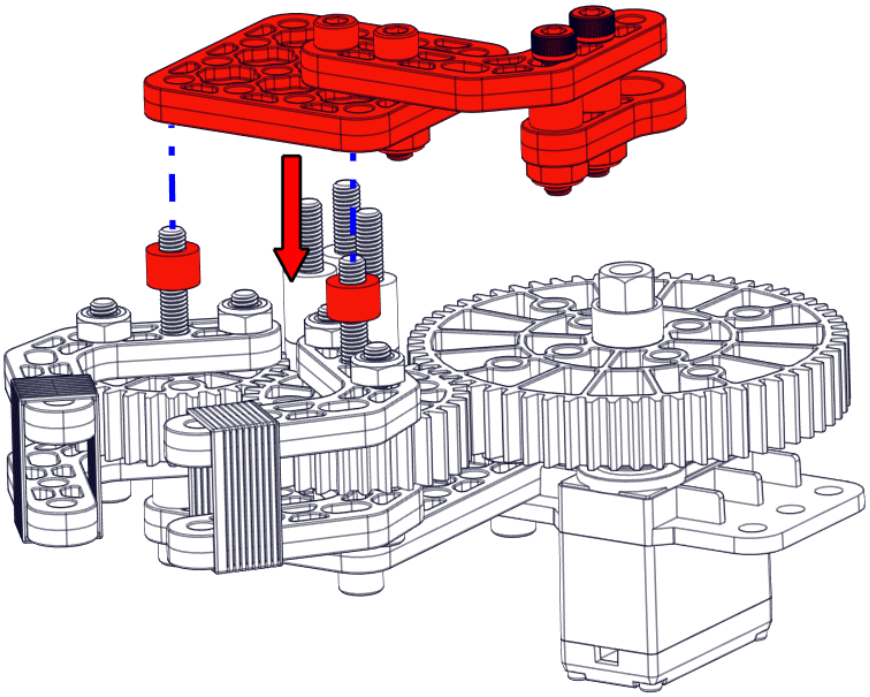
Step 45

Slide both claw assemblies onto the screws with the fewest numbers of spacers, as shown.
Note: Be sure to align the claws to that they come together at the claw tips.



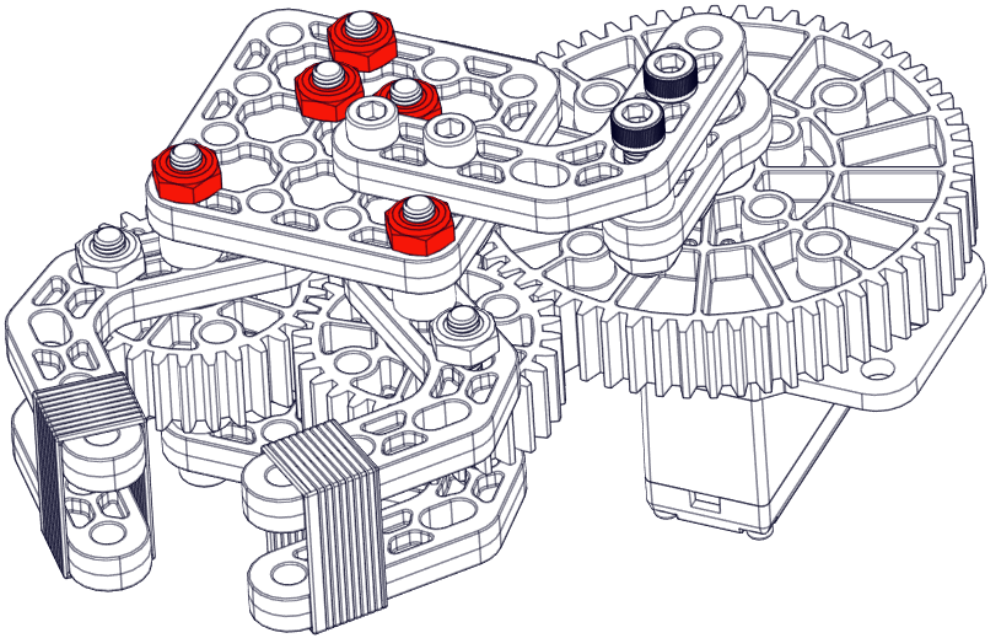
Step 46

Place the assembly from Step 42 on top of the claws, spaced off by [2] 1/4" screw spacers.



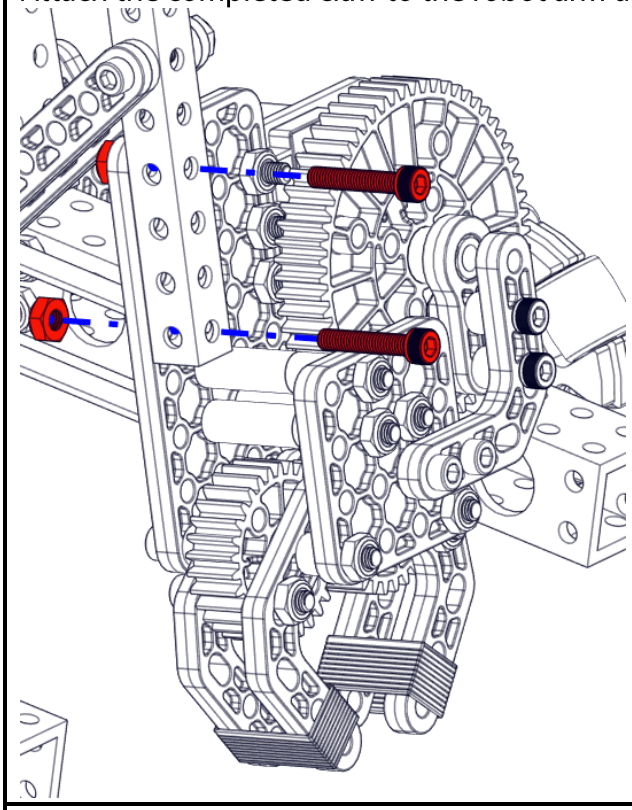
Step 47

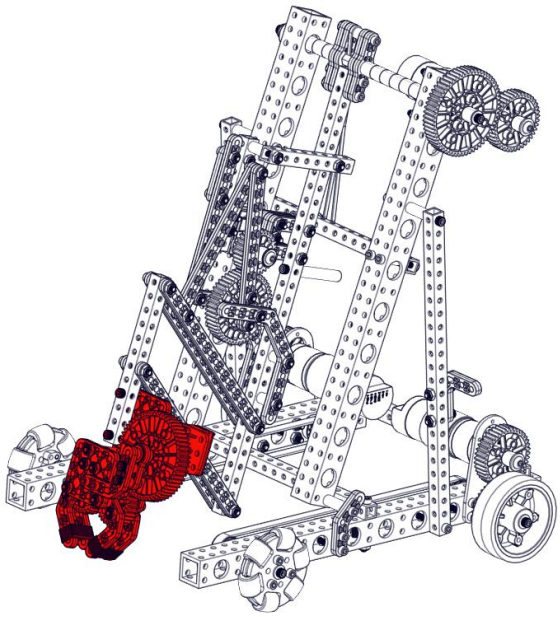
Secure all the components of the assembly using [4] nuts. Note: Do not overtighten claw finger screws. The fingers should still move freely after they have been attached.



Step 48

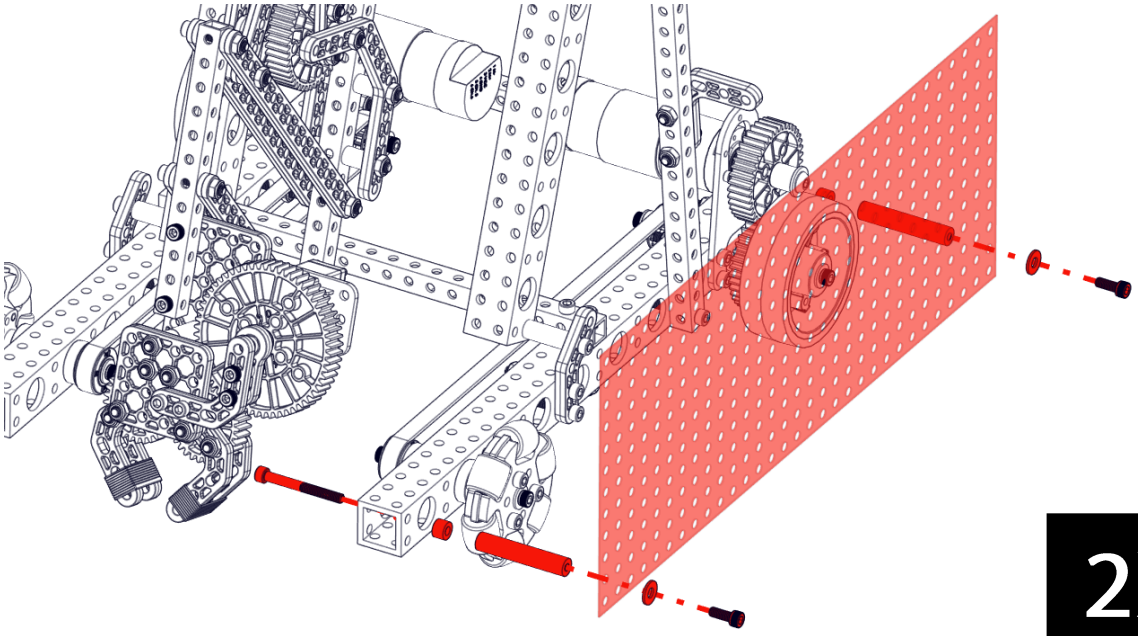
Attach the completed claw to the robot arm using [2] 1″ screws and nuts.





Step 49

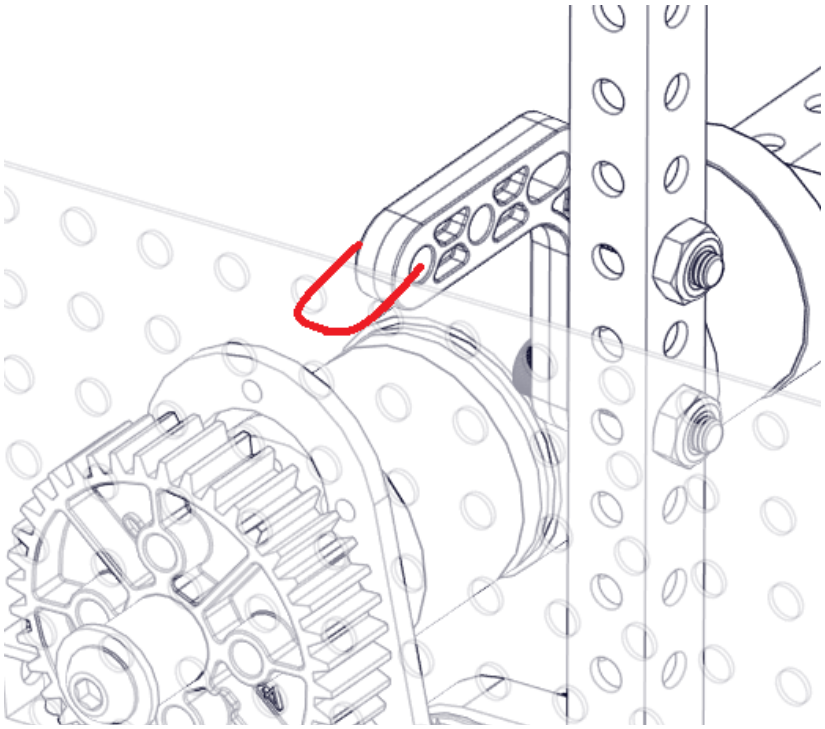
In the outermost top holes of the robot frame, insert 1.75″ screws and then slip [1] 1/4" screw spacer over them. Screw on 2″ standoffs to secure the screws in place. Place the 15.5″ Perforated Polycarbonate Sheet (am-4964) at the end of the standoffs, and secure in place with washers and 1/2" screws. Do this on both sides of the robot.



2X

Step 50

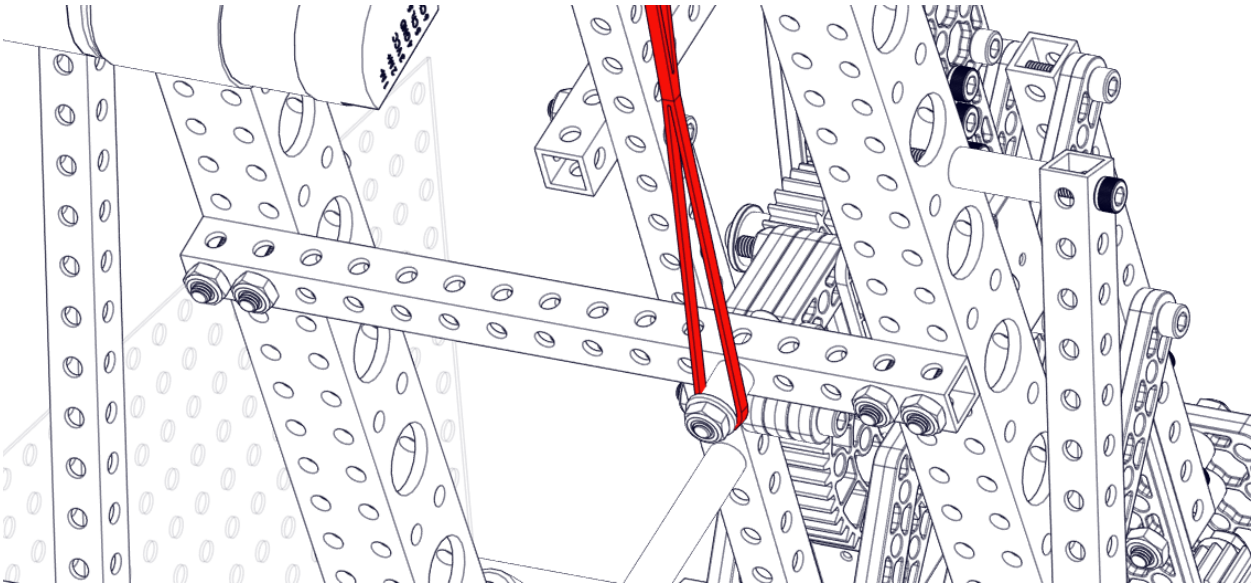
Insert cable ties through the side panels and the Gussets sticking out into them to ensure a tight connection to the robot.



2X

Step 51

Wrap the rubber band(s) from the arm around the counterbalance point as shown.



The ROBITS for INTO THE DEEP Robot is now complete.