uStepper - Robot Arm

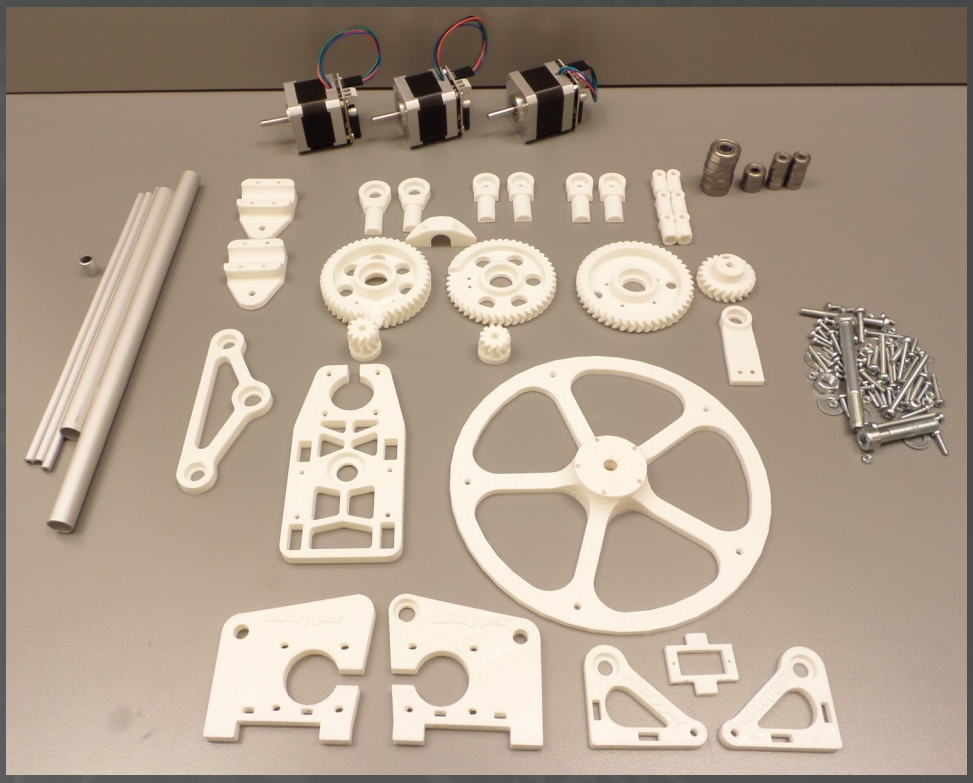
Assembly instructions

Microcontroller, stepper driver and encoder in an ultra-compact design!

By ON Development IVS

Bill Of Materials

A BOM is first presented followed by a step-by-step assembly guide.



Bearings:

- 5 pcs. 608Z
- 3 pcs. 625Z
- 10 pcs. 624Z

Bolts:

- 1 pc. M8 x 40mm
- 1 pc. M8 x 70mm
- 1 pc. M5 x 40mm
- 4 pcs. M4 x 20mm
- 1 pcs. M4 x 30mm
- 1 pc. M4 x 35mm
- 1 pc. M4 x 55mm
- 15 pcs. M3 x 8mm
- 2 pcs. M3 x 10mm
- 4 pcs. M3 x 12mm
- 7 pcs. M3 x 20mm
- 4 pcs. M3 x 30mm

Nuts:

- 20 pcs. M3
- 7 pcs. M4
- 1 pc. M5
- 2 pcs. M8

Washers:

- 5 pcs. M8, OD: 15.8mm
- 4 pcs. M5, OD: 9.8mm
- 2 pcs. M4, OD: 8.8mm

Spacers:

- 1 pc. 14mm between gears
- 1 pc. 7mm link at end bracket

Rods:

The length of the rods can be varied to fit your needs.

- 1 pc. 15mm x 300mm
- 1 pc. 15mm x 220mm
- 2 pcs. 6mm x 240mm
- 1 pc. 6mm x 252mm

Actuators:

- 3 pcs. uStepper premium

Assembly

Follow the steps below to assemble the uStepper Robot Arm.

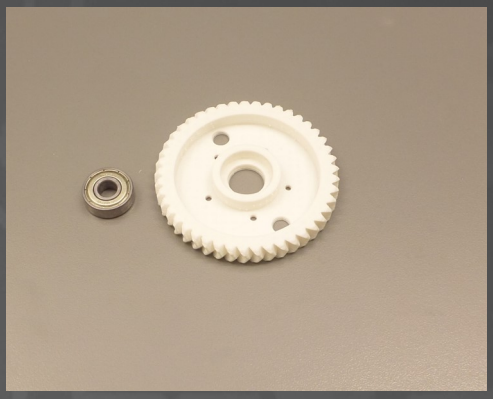


Fig.1: Fit the 608Z bearing in the base gear.

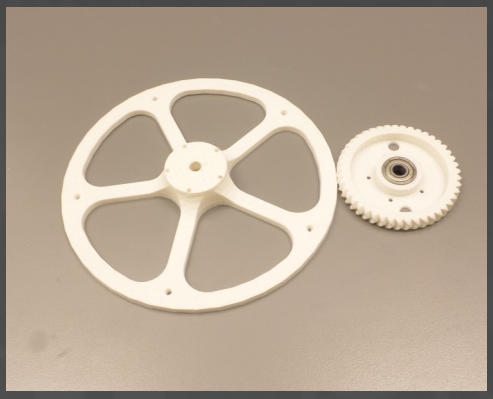


Fig.2: Prepare the base for assembly with the base gear.

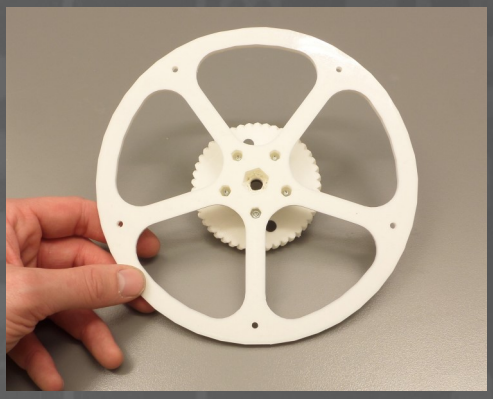


Fig.3: Place M3 nuts in the appropriate holes for mounting the base gear.

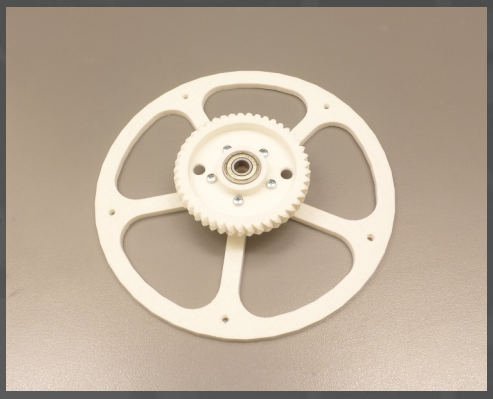


Fig.4: Mount the base gear using M3 Philips screws.

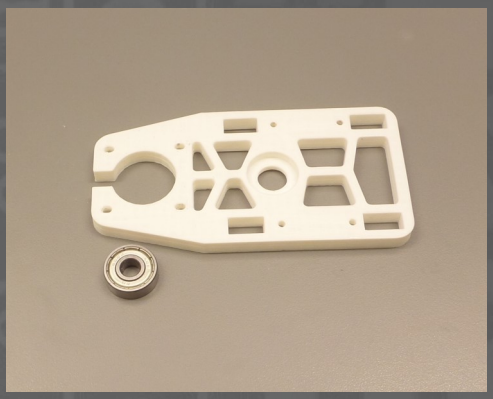


Fig.5: Prepare the bottom plate for assembly.

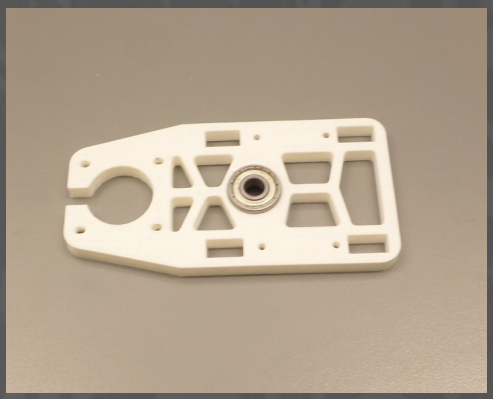


Fig.6: Fit the 608Z bearing in the bottom plate.

Assembly

Follow the steps below to assemble the uStepper Robot Arm.

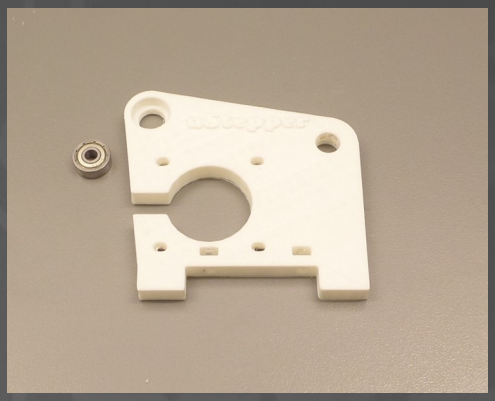


Fig.7: Now prepare one of the sides for mounting.

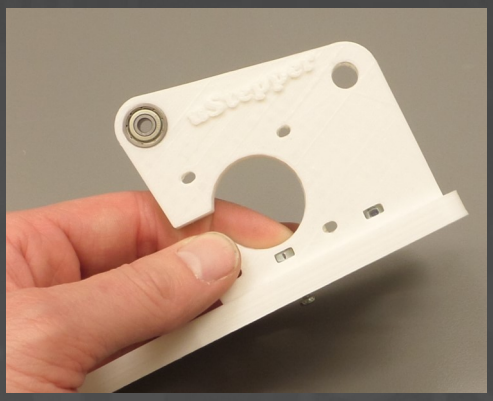


Fig.8: Fit the 624Z bearing, fit the side plate in the bottom plate and place M3 nuts in the side plate.

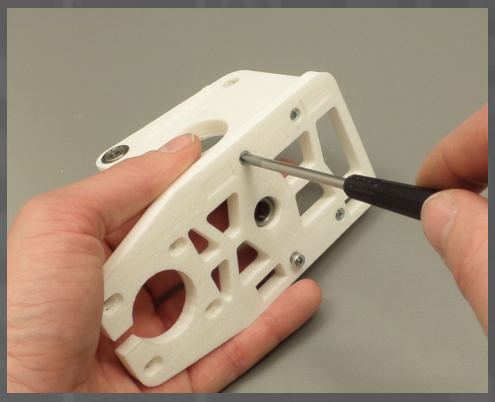


Fig.9: Assemble the two pieces with M3 Philips screws. Also fit the M3 Philips screws for the other side.

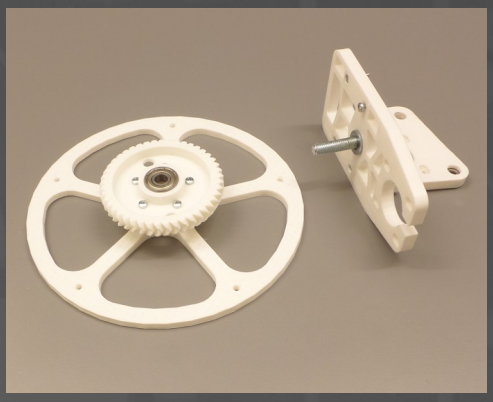


Fig.10: Prepare the assembly of base and bottom plate with the M8 bolt and a washer.

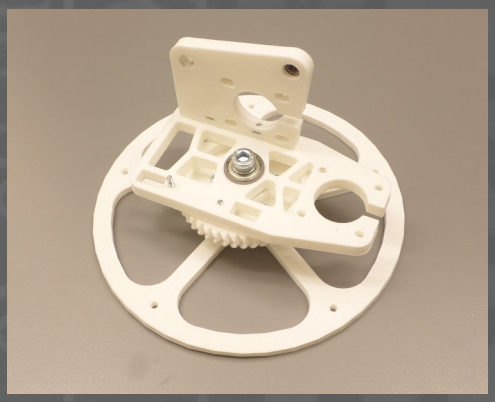


Fig.11: Assemble the two pieces by fitting an M8 nut in the base and tightening the M8 bolt.

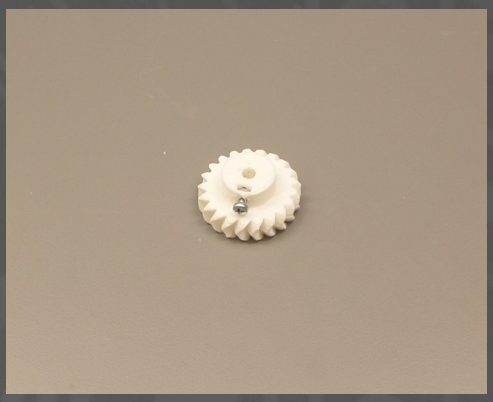


Fig.12: Prepare the motor gear for the base motor by fitting M3 nut and screw.

Assembly

Follow the steps below to assemble the uStepper Robot Arm.

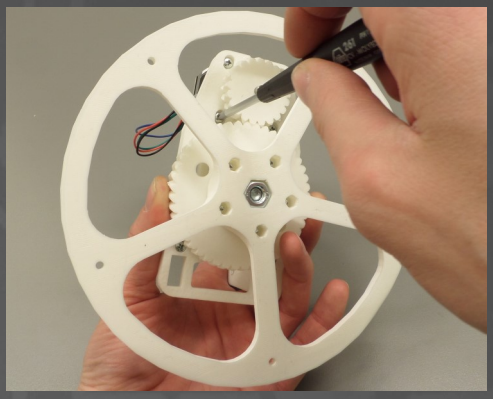


Fig.13: Fit the motor with gear, and tighten the M3 screws keeping the motor in place.

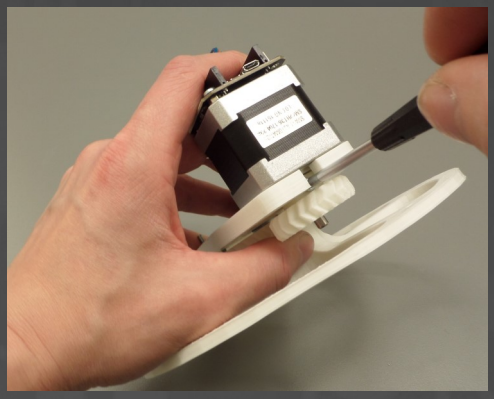


Fig.14: Now tighten the screw in the motor gear.

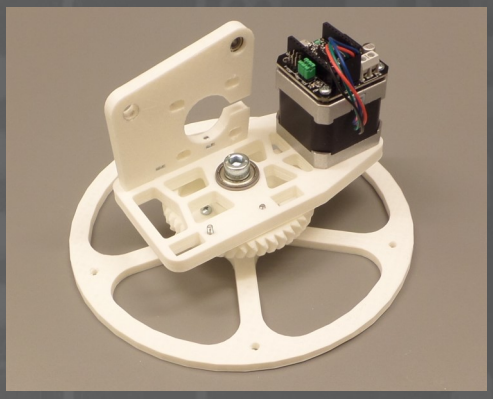


Fig.15: At this stage in the process your base should look like this.

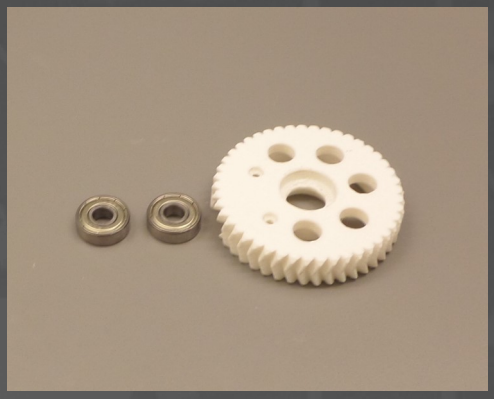


Fig.16: Now prepare the main gear for assembly.

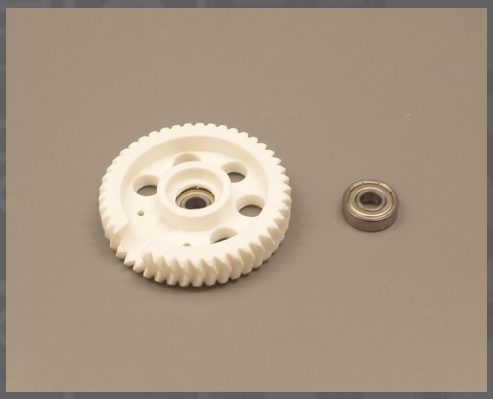


Fig.17: Fit the 608Z bearings in the gear.

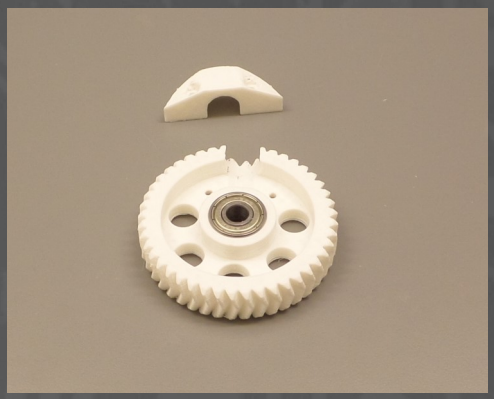


Fig.18: Both bearings are fitted, and the bracket for mounting the main arm is prepared.

Assembly

Follow the steps below to assemble the uStepper Robot Arm.

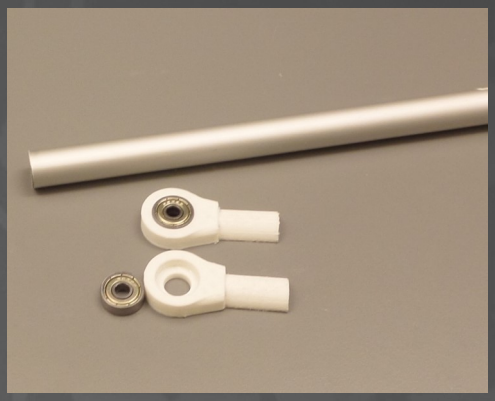


Fig.19: The joint for the main arm is fitted with 625Z bearings.

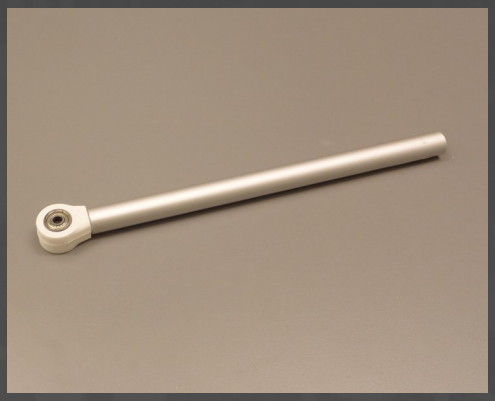


Fig.20: The joint is fitted in the tube.

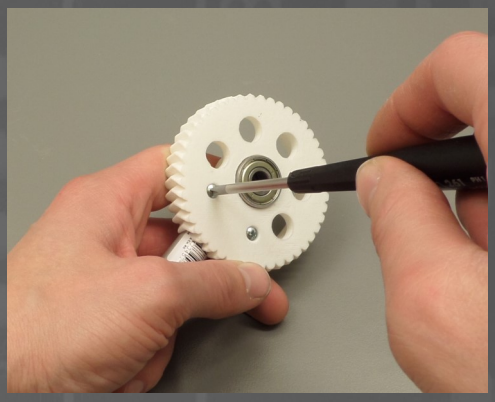


Fig.21: After sliding the tube into the main gear the bracket is mounted, ensuring that the tube stays in place.

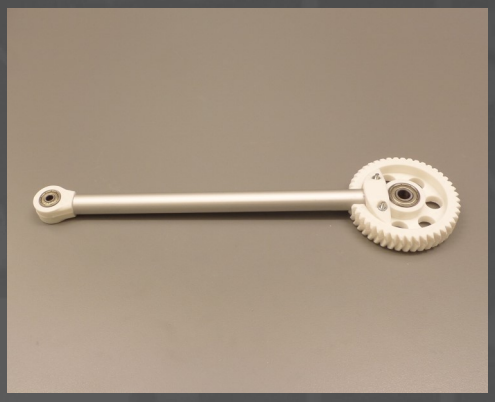


Fig.22: The main gear with tube and joint should look like this.

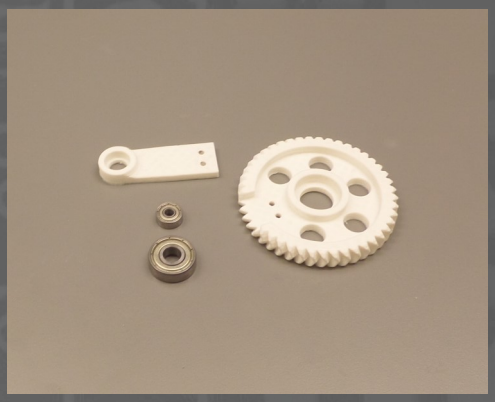


Fig.23: Prepare the secondary gear.

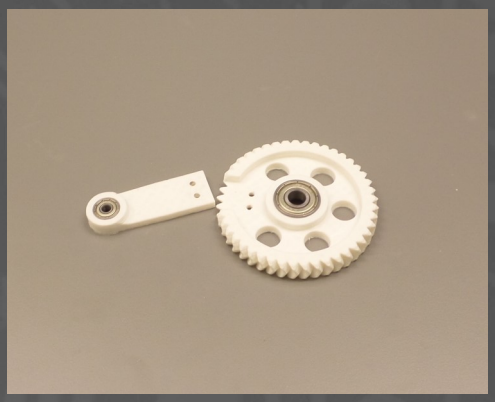


Fig.24: The 624Z bearing is fitted in the gear arm and the 608Z bearing is fitted in the secondary gear.

Assembly

Follow the steps below to assemble the uStepper Robot Arm.

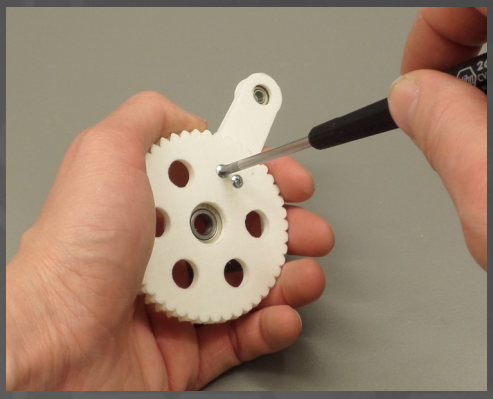


Fig.25: Assemble the gear arm with the secondary gear using M3 nuts and screws.

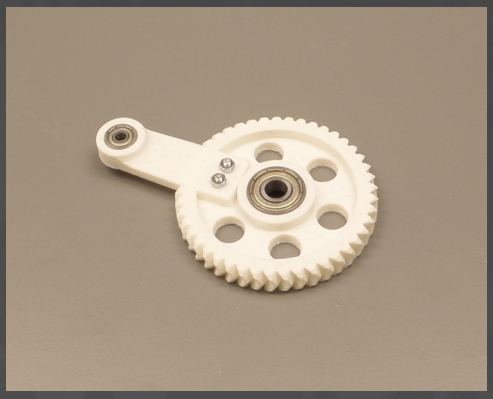


Fig.26: The assembled secondary gear should look like this.

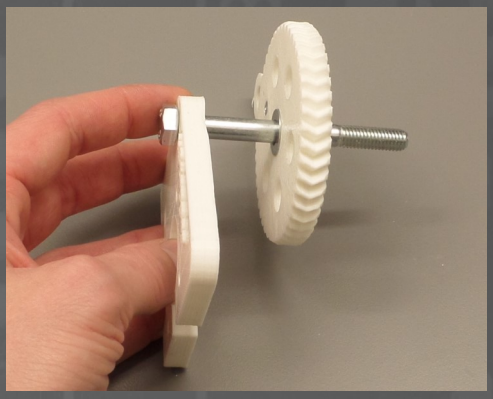


Fig.27: Fit the M8 main bolt in the unmounted side plate and slide the secondary gear onto this (with three washers between gear and plate).

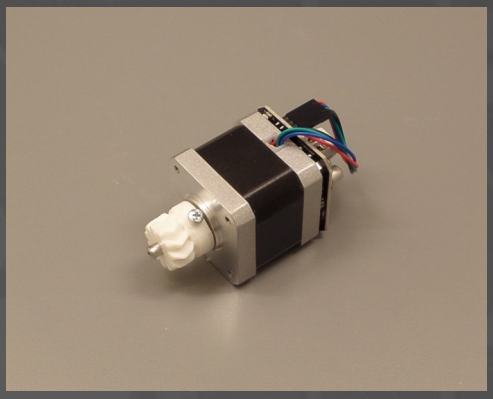


Fig.28: Prepare the secondary gear motor by sliding the gear onto the shaft. Remember to add M3 nut and screw to the gear.

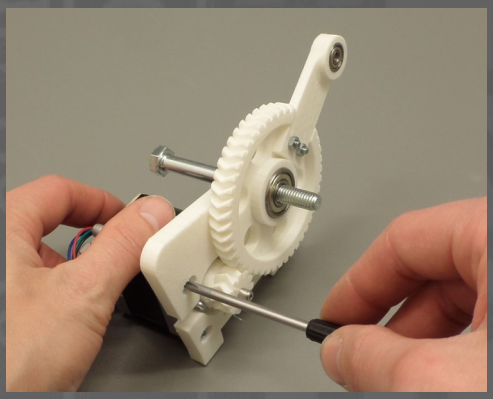


Fig.29: Mount the motor using M3 screws, ensuring a tight fit with the secondary gear.

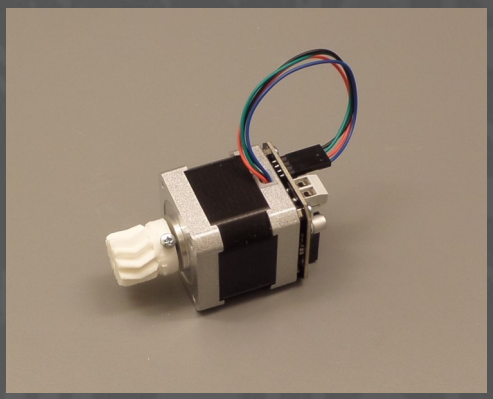


Fig.30: Prepare the main gear motor by sliding the gear onto the shaft. Remember to add M3 nut and screw to the gear.

Assembly

Follow the steps below to assemble the uStepper Robot Arm.

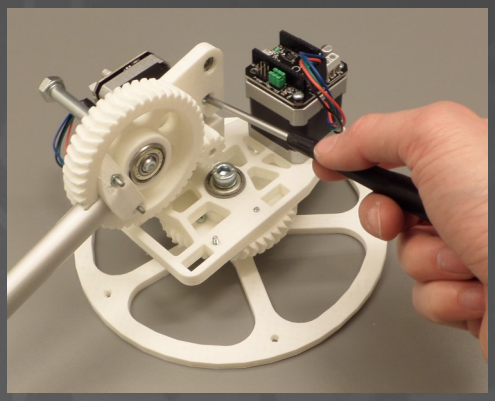


Fig.31: Now place the main bolt in the mounted side plate, slide the main gear on (with a washer between) and mount the motor.

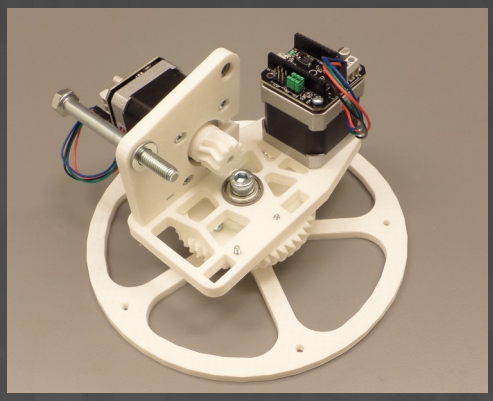


Fig.32: Remove the main gear and M8 bolt.

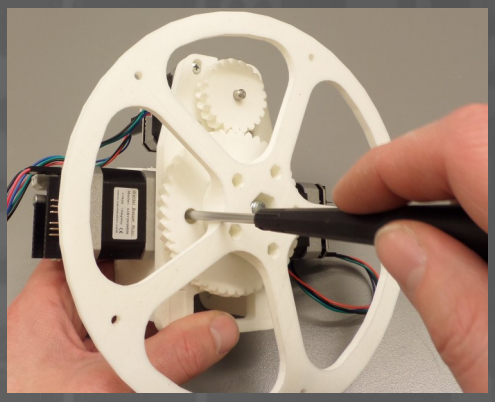


Fig.33: Now mount the secondary gear side plate with motor using the screws added on figure 9.

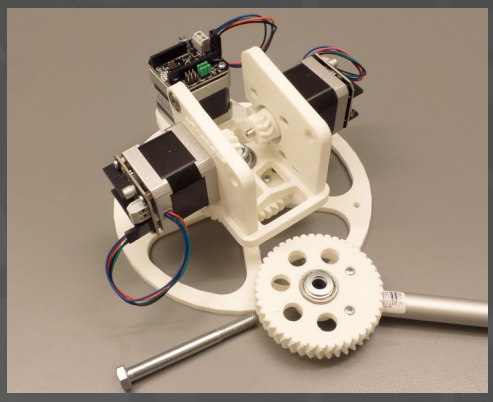


Fig.34: Both side plates with motors are now mounted. Prepare the main gear for assembly.

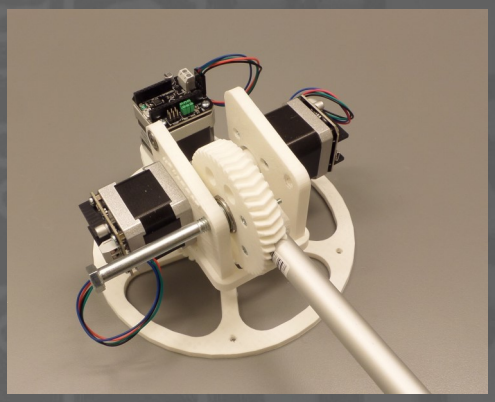


Fig.35: Slide in the M8 main bolt (with a washer between side plate and gear).

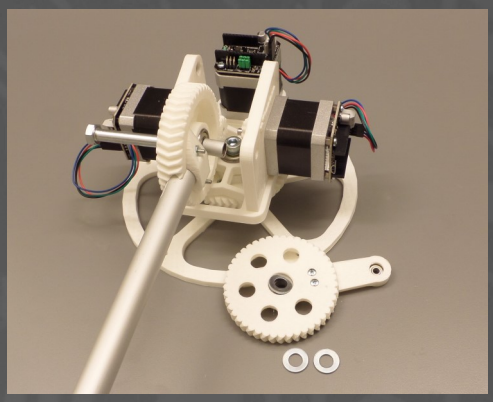


Fig.36: Add the space between the two gears and prepare the secondary gear.

Assembly

Follow the steps below to assemble the uStepper Robot Arm.

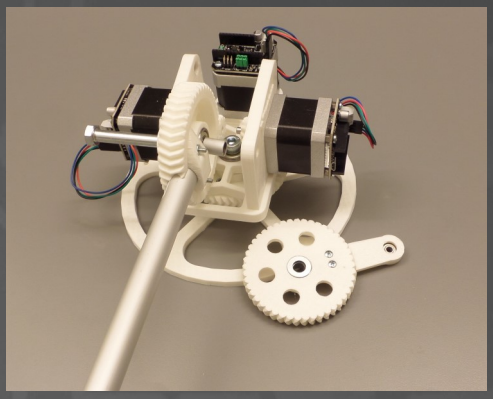


Fig.37: Add three washers to the secondary gear when mounting it.

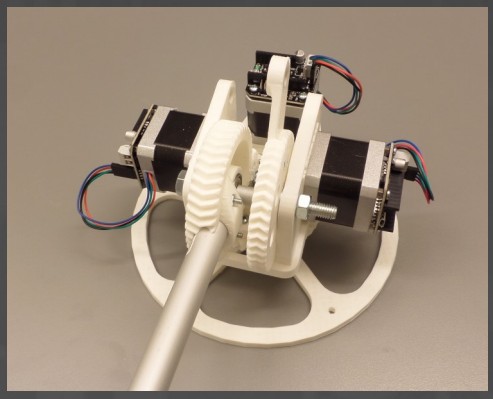


Fig.38: Slide the main bolt trough the secondary gear and fit the M8 nut.

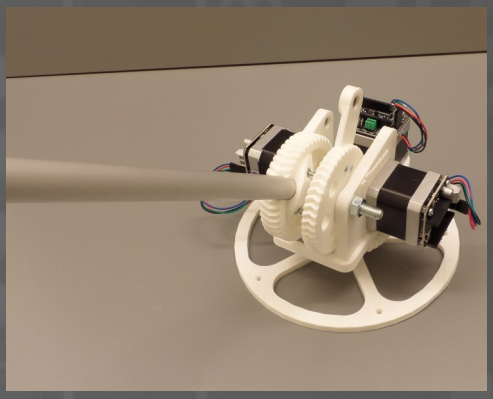


Fig.39: If mounted correctly, the motors and gears should run smooth without any slack.

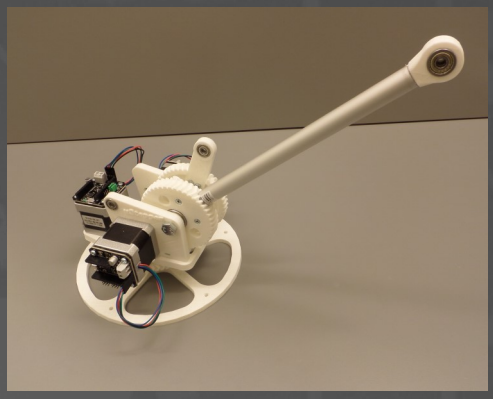


Fig.40: The Robot Arm should look like this by now.

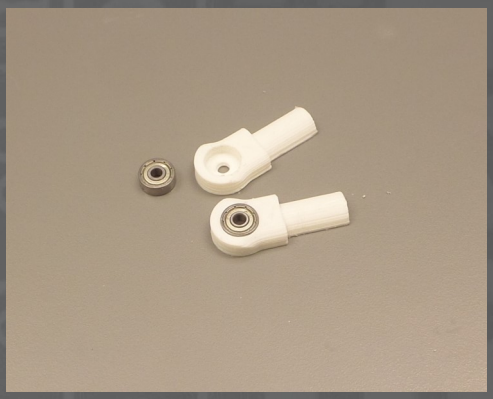


Fig.41: Prepare the joints for the secondary arm by fitting 624Z bearings.

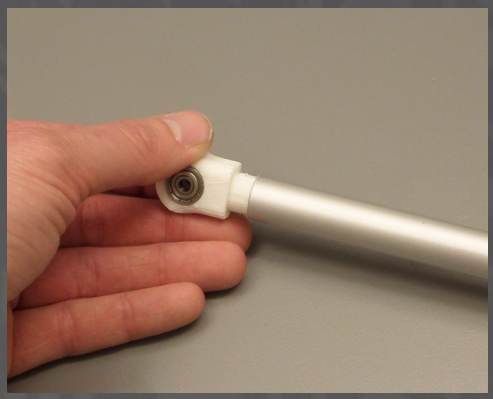


Fig.42: Slide the joints into the tube. They should sit tight.

Assembly

Follow the steps below to assemble the uStepper Robot Arm.

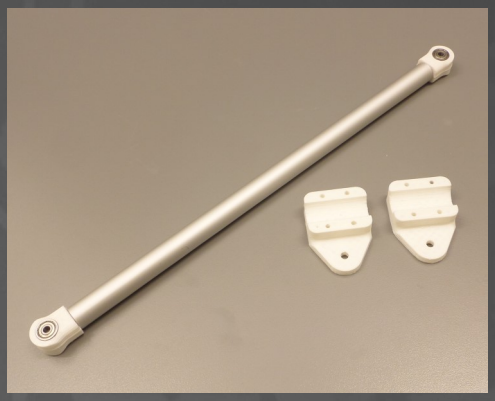


Fig.43: Prepare the bracket for the main joint.

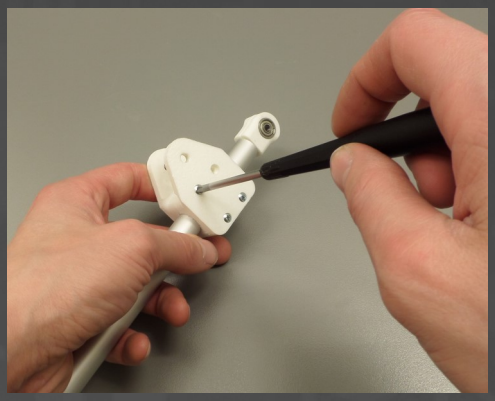


Fig.44: Mount the bracket on the secondary arm using M3 nuts and screws.

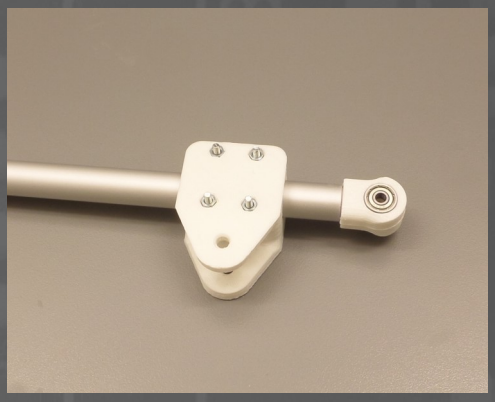


Fig.45: The bracket assembly should look like this.

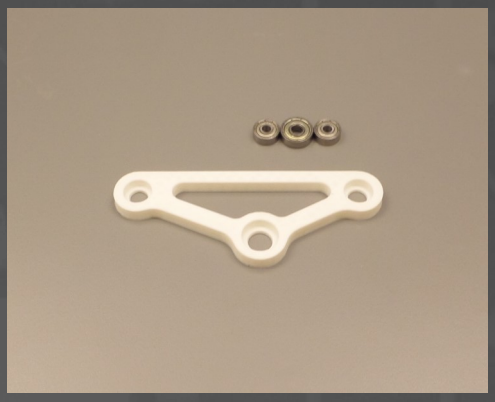


Fig.46: Prepare the triangle for mounting.

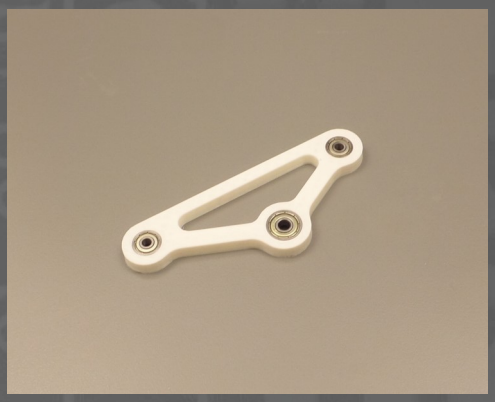


Fig.47: Fit the two 624Z and the 625Z bearing in the triangle.

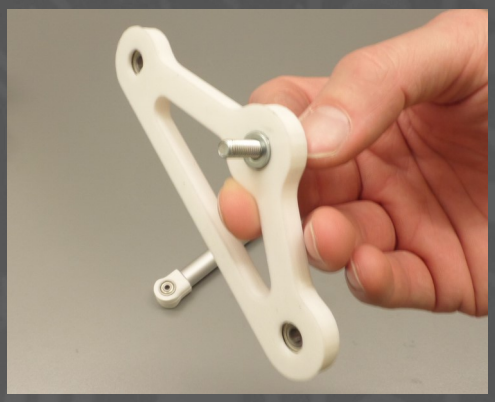


Fig.48: Slide the M5 screw in the 625Z bearing and add two washers.

Assembly

Follow the steps below to assemble the uStepper Robot Arm.

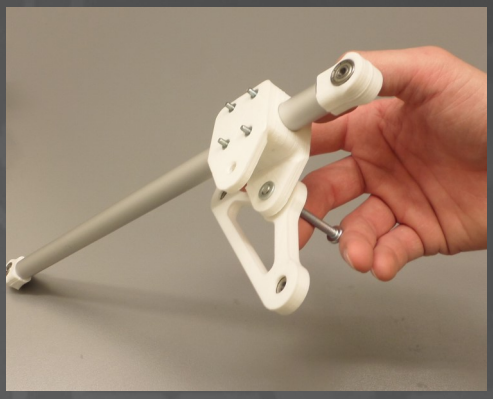


Fig.49: Fit the triangle to the bracket and add a washer.

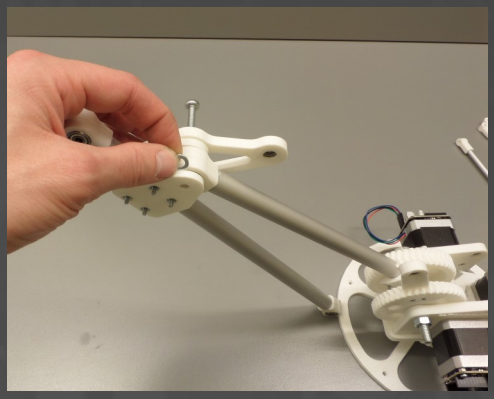


Fig.50: Assemble the joint. Remember to add a washer.

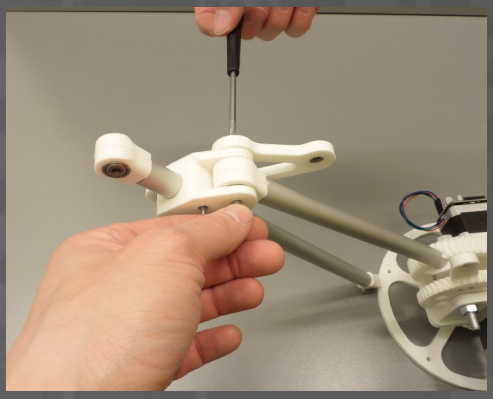


Fig.51: Finish the assembly of the joint by fitting an M5 nut and tighten.

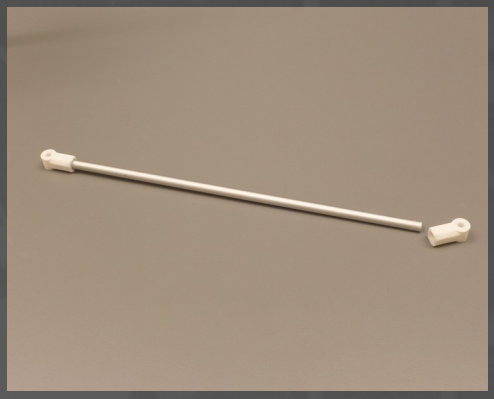


Fig.52: Assemble the 6mm rods, add glue if needed (but wait until you have assembled the whole arm and verified the functionality).

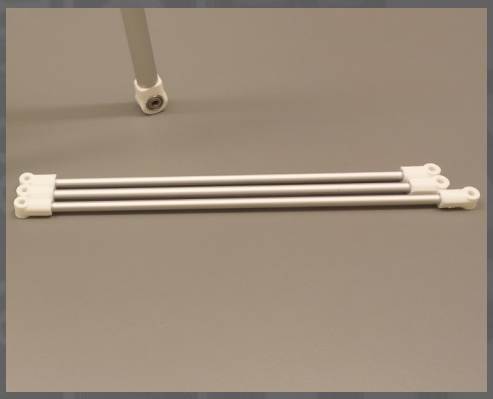


Fig.53: There are three 6mm rods.

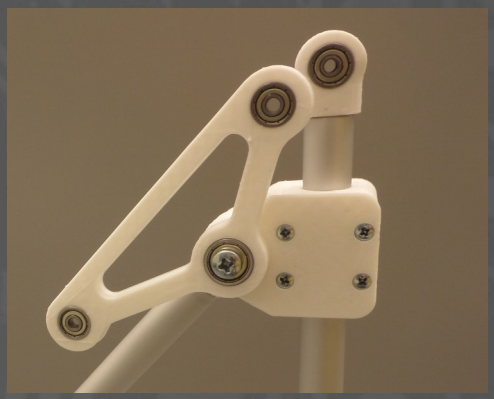


Fig.54: The links just assembled will be mounted to these bearings.

Assembly

Follow the steps below to assemble the uStepper Robot Arm.

Fig.55: The links are mounted with M4 screws and nuts.

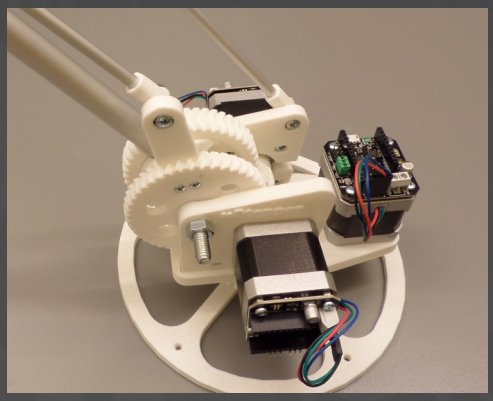


Fig.56: A links is attached to the secondary gear arm.

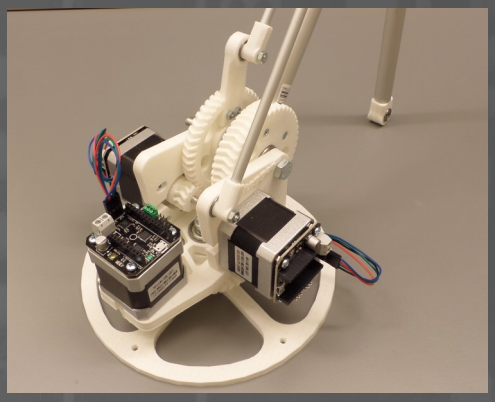


Fig.57: And one is attached to the side plate.

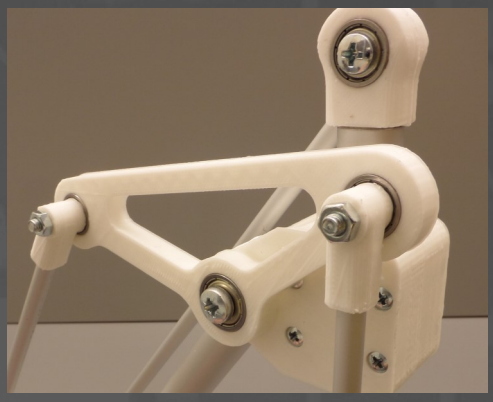


Fig.58: Close-up of the assembly.

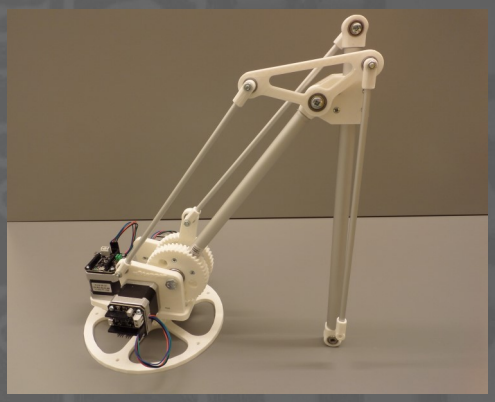


Fig.59: At this stage, you uStepper Robot Arm should look like this.

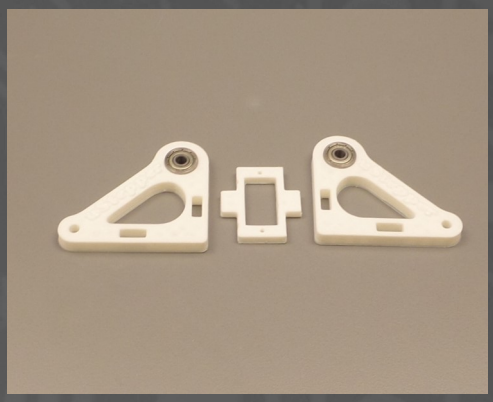


Fig.60: The bracket at the end is prepared and 624Z bearings are fitted.

Assembly

Follow the steps below to assemble the uStepper Robot Arm.

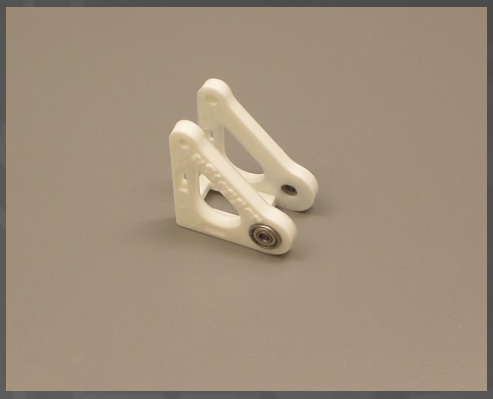


Fig.61: The bracket is ready for mounting. A standard micro servo can be mounted in the bracket.

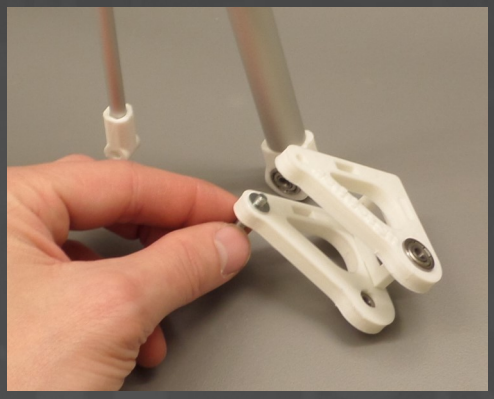


Fig.62: Use an M4 screw to mount the bracket. Remember washers.

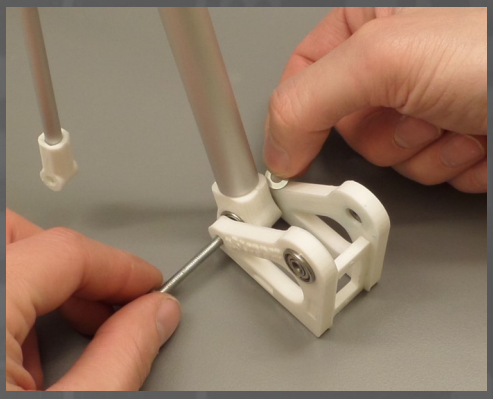


Fig.63: Push the screw into place while remembering to add washers.

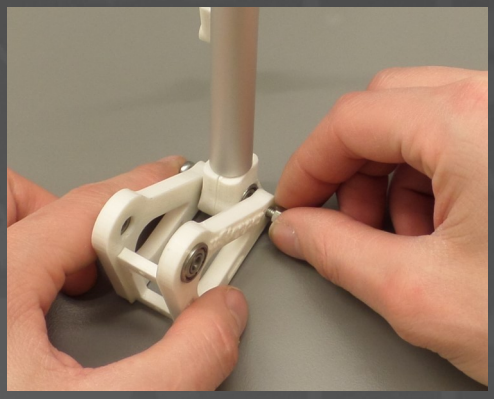


Fig.64: Fitting an M4 nut will finish the mount.

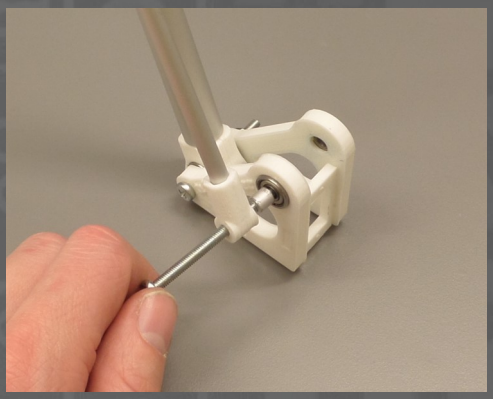


Fig.65: Attach the link to the bracket using an M4 screw and spacer.

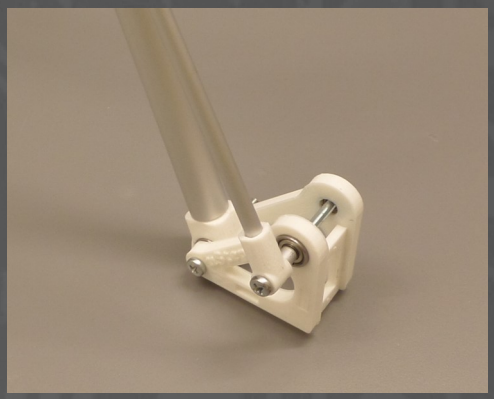
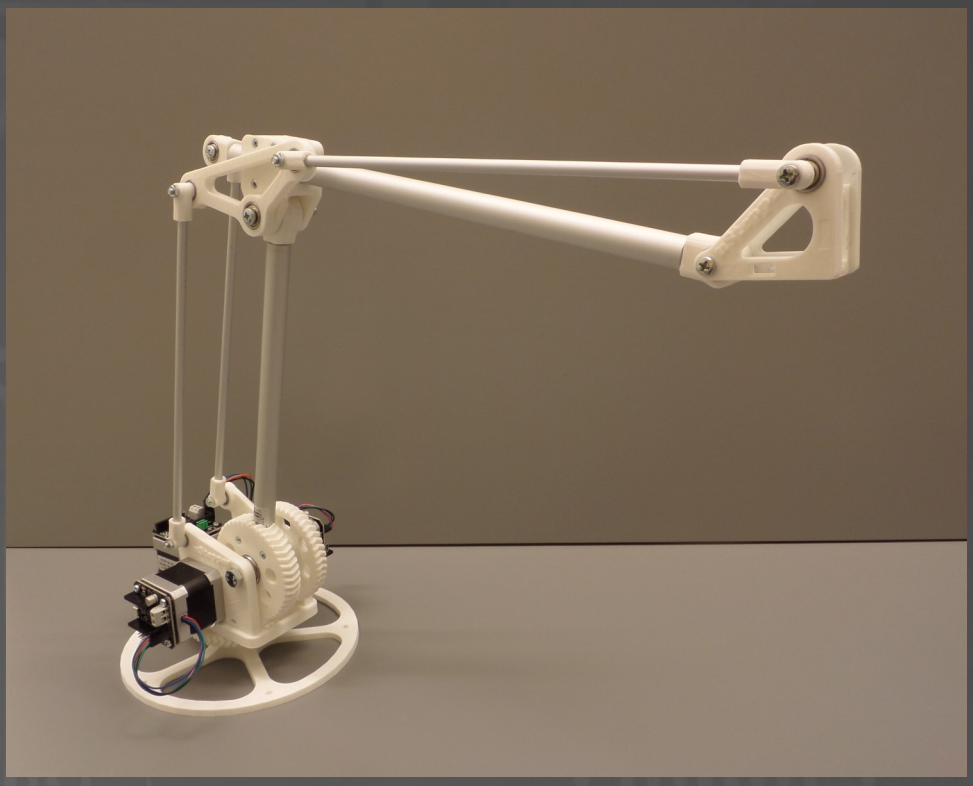


Fig.66: The assembly is now done.

Finished Robot Arm

You have now assembled the uStepper Robot Arm, and your result should be similar to what is shown on the following two pictures.



Disclaimer

ON Development IVS can not be held responsible for any damage inflicted upon mounting or interfacing with the uStepper board or the uStepper Robot Arm. This also includes damage to stepper motor (both electrical and mechanical), any other 3rd party hardware connected to uStepper or physical damage to its surroundings. Most stepper motor cases are made of aluminum, and care must be taken when preparing the mountings for uStepper.

By using the uStepper products you acknowledge that ON Development IVS can not be held responsible for any injuries and/or damage to any 3rd party hardware that may occur when using the uStepper products.

The design is still a Work in Progress. Files, instructions, and other stuff might change!

Detailed description, design files and examples can be found on www.uStepper.com

Contact

ON Development IVS
sales@ustepper.com

www.uStepper.com