

LEGOLAS

Stand

Instructions

Parts List

4 x



1"-Ø Rubber End Caps

10 x



M3 – 2mm Tapered Bolt*

14 x



M3 – 4mm Tapered Bolt*

2 x



M3 – 4mm Round-Head Bolt*

12 x



M3 – T-Slot Nut*

12 x



M3 – Corner Cube*

4 x



10 x 10 mm Profile – 75 mm
Anodized Aluminum T-slot
Extrusion*

7 x



10 x 10 mm Profile –300 mm
Anodized Aluminum T-slot
Extrusion*

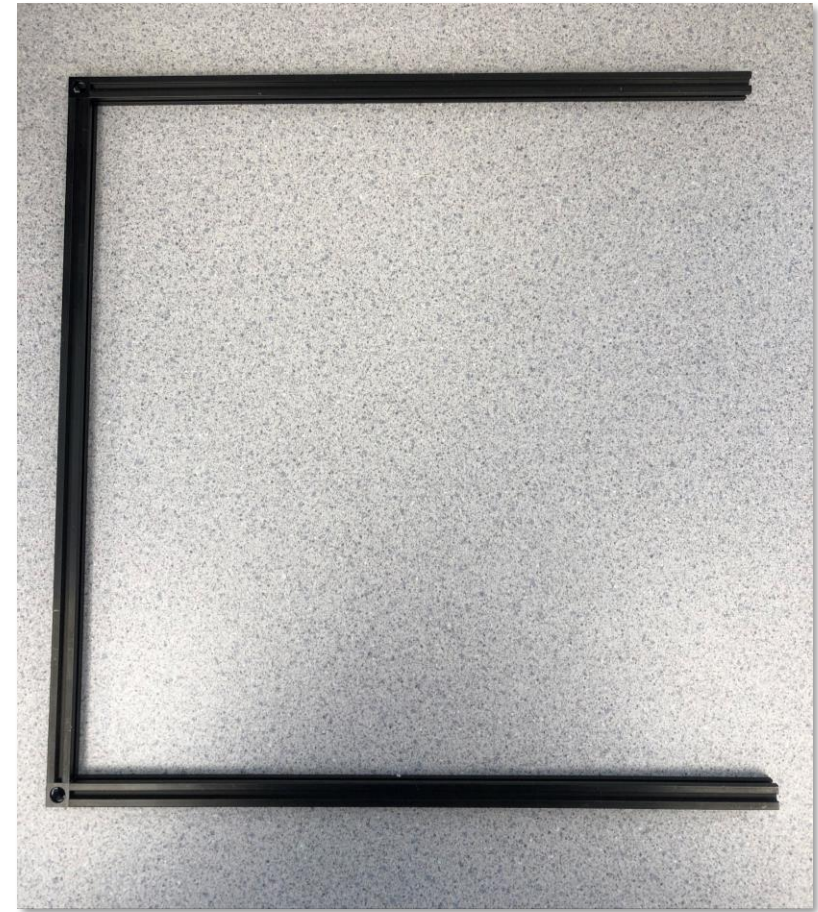
*MakerBeam Product

- You will also need a 2 mm Hex bit
- Rubber End Caps may be replaced by
MakerBeam 3D Printed End Caps

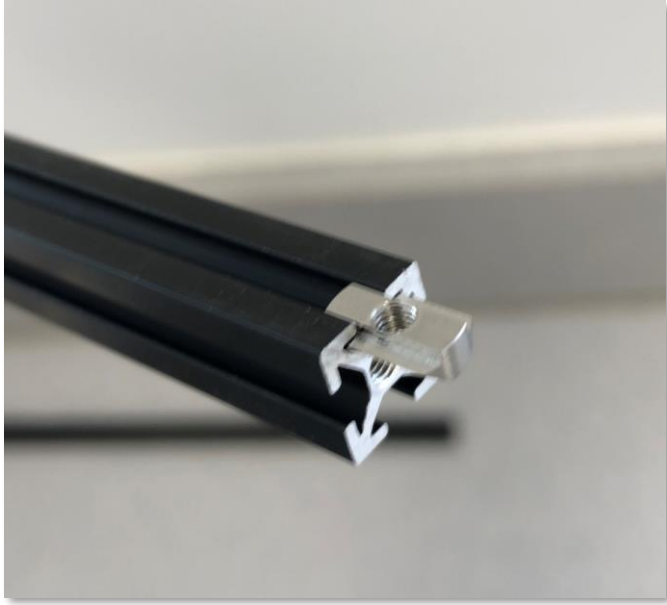
(<https://www.makerbeam.com/makerbeam-3d-printed-end-caps-for-makerbeam-4p.html>)



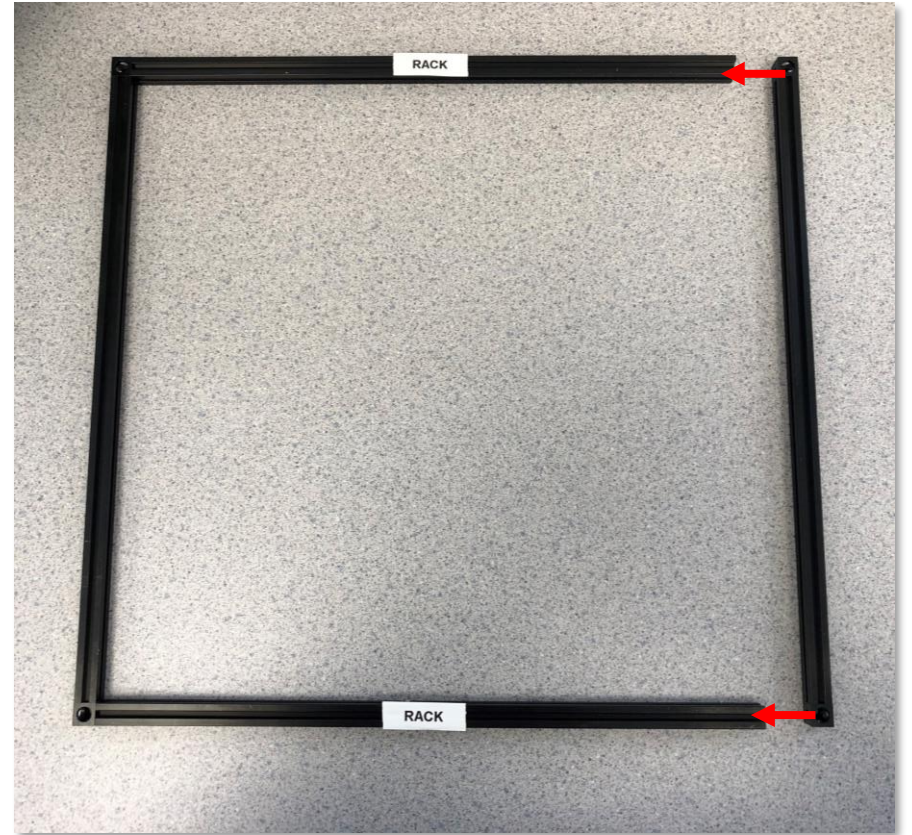
Use the 2mm Hex wrench to install Corner Cubes on the edges of 300 mm Aluminum extrusions with the M3 – 4mm Tapered Bolts



Connect 3 of these 300 mm sections together, ensuring that all cubes have a face with a small hole (the face for fastening the screws) facing downwards



On another extrusion, slide 2 T-slot nuts into one of the slots on the same face. Cap off both ends of this extrusion with corner cubes, again ensuring they have a small-hole face pointing in the same direction



Line this up with the previous “C” shape created by the other 3 extrusions and attach (with M3 - 4 mm Tapered Bolts) to create the square frame. It may be helpful to label the top and bottom extrusions to designate them for the gear racks. Ensure the small-hole faces are still pointing downwards

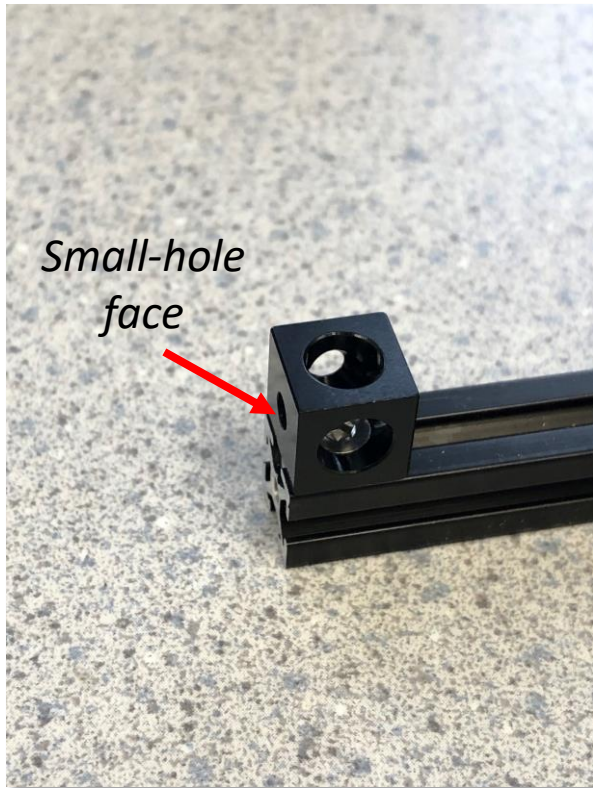


Find the side of the 75 mm extrusions with the threaded hole (*left*) and attach this side to the small holes of the Square Frame created in the last step (using M3-4mm Tapered Bolts), creating the 4 legs of the Stand. Then flip over the Stand (*right*) – now our 300 mm extrusion with the 2 T-slot nuts should be on your left. The next steps will involve the 2 short legs shown on the bottom of the rightmost image.



*Small-hole
face pointing
upwards*

On the two short legs mentioned in the last step, insert a T-slot nut into the slot facing the bottom of the square frame, and attach a corner cube (M3-4 mm Tapered Bolt) just tight enough so that it stays attached, but so that you can also slide it vertically along the slot. Make sure the corner cube has a small-hole face pointing *upwards*



(*Top Left*) – Slide 2 T-slot nuts into a new 300 mm extrusion along the same face. Attach a Corner cube at both ends of the slot (M3-2mm Tapered Bolt) so that it lies flush with the end.

(*Top Right*) - To ensure it lies flush with the end, it can be helpful to hold the pieces as shown here when fastening them together. Ensure that there is a small-hole face pointing away from the end of the extrusion



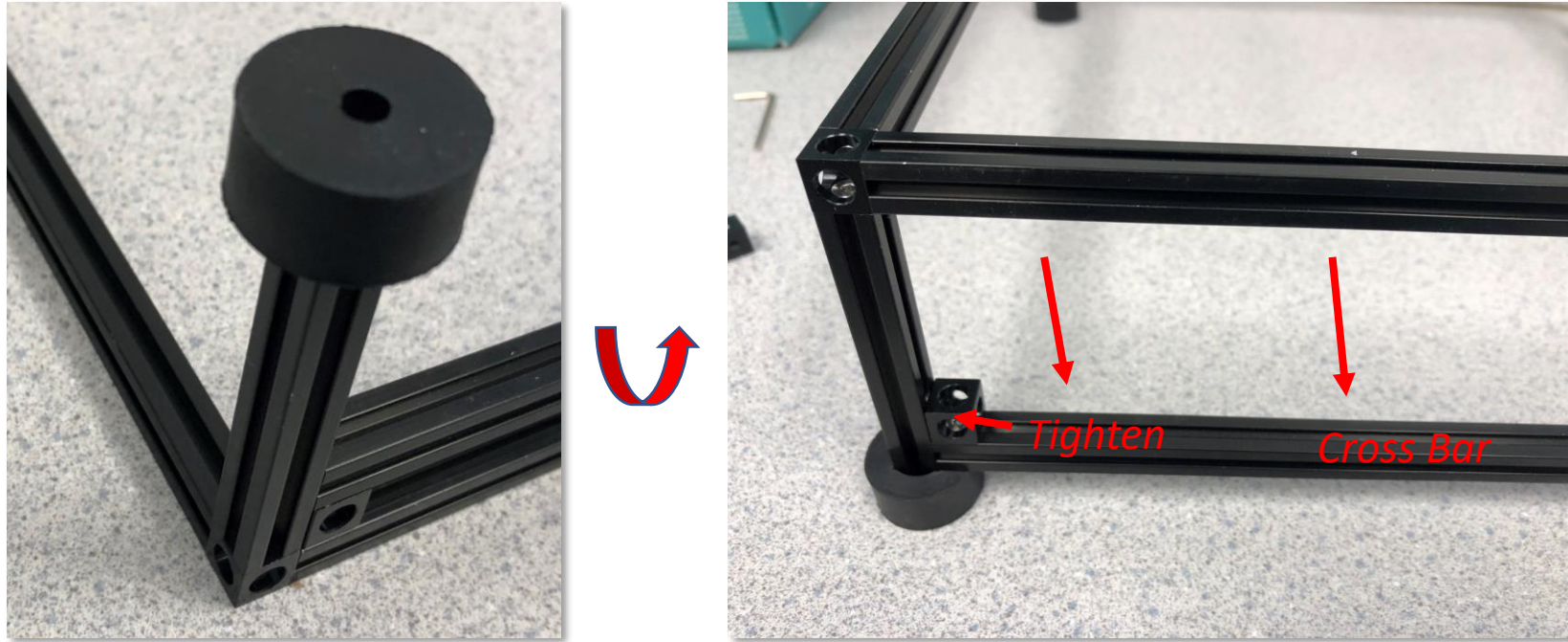
(*Bottom*) Flip this new assembly over, and insert two more T-slot nuts, ensuring that they don't slide out as you move to the next step.



(Top) Keeping the new assembly in the same orientation as it ended in the last step, place it on top of the bottom of the square rack, between the legs. Continue to make sure the T-slots on top do not slide out.



(Bottom) Using M3-2mm Tapered Bolts, secure the corner cube to the T-slot nuts that are on the Stand Legs. Do not tighten fully, only enough so that they are attached but the new assembly is able to slide up and down between the legs of the stand.



(left) Place the Rubber End Caps (Or MakerBeam 3D Printed End Caps) on the end of each of the 4 legs.

(right) Flip over the frame, and now slide down the cross-bar assembly down so that it contacts the top of Rubber End Cap. Use the Hex Wrench to fully tighten the connection so the cross-bar does not move.

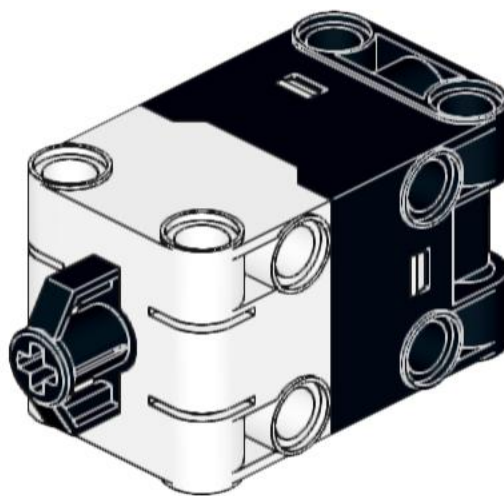
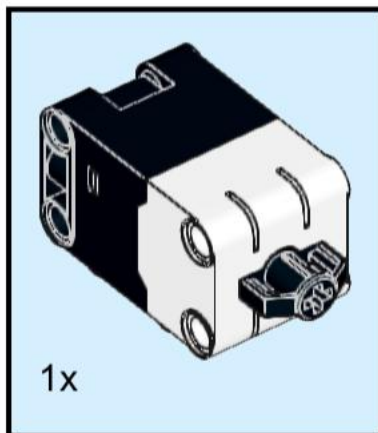


(left) Create two more Extrusions with Corner Cubes at the end (M3-4mm Tapered Bolts)

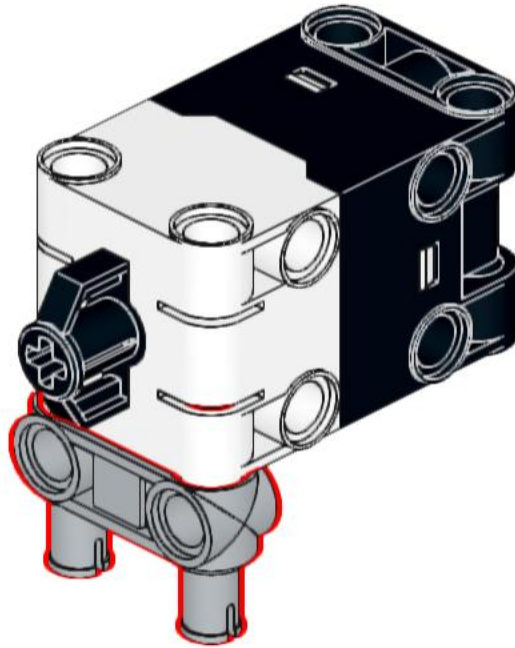
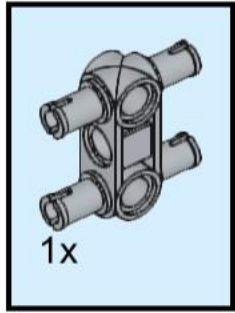
(middle) Flip over the frame again and attach each of these extrusions via their corner cube to the 2 T-slot nuts along the cross-bar assembly. Only tighten enough so they are attached but can slide left to right.

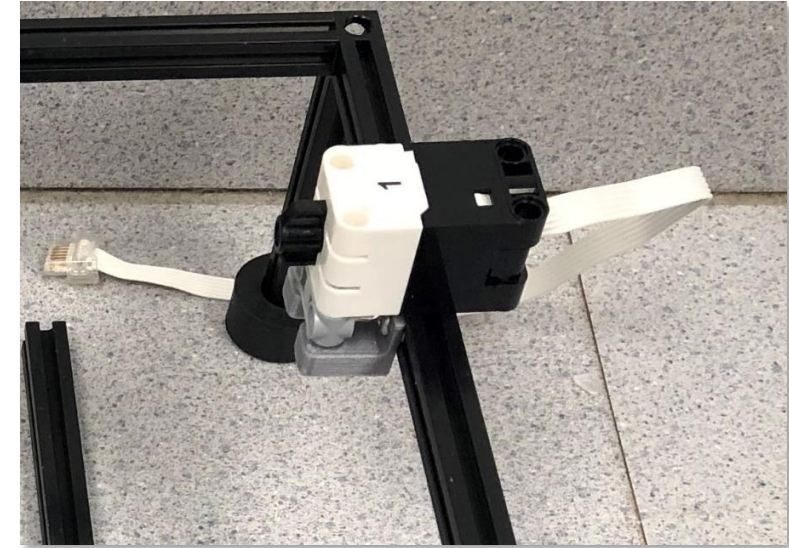
(right) Place the Acid/Base 3D Printed Reservoir between the two beams and slide them so they fit snugly against the sides of it. Now, remove the reservoir and tighten the beams where they are. These beams are here to keep the sample wells and reservoir steady during experiments; their position and width can be adjusted later.

1



2

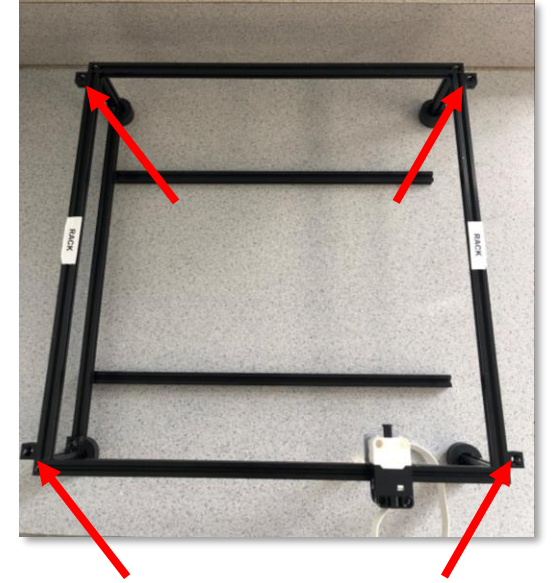




(left) Lightly loosen the two bolts securing the right-most extrusion of the square frame in this picture and rotate the entire extrusion clockwise, so that the T-slot nuts facing the ground are now facing the interior of the square.

(middle) Attach the Push Sensor Holder 3D printed pieces so that the LEGO holes are facing the floor. You can keep this connection loose enough so that you can move them around to the proper distance for the LEGO Push Sensor Assembly to fit.

(right) Attach the Push Sensor Assembly. Note that you should move this entire attachment (including the sensor) to a location along the extrusion in which the depressor will contact a mid-axle support from the gantry, but this can be done later.



In this step we will install the End Stops on the frame, which prevent the robot from running off the track. Their spacing will be adjusted later (in the Bridge Instructions)

(left) Use a 2mm hex key to loosen the 2mm Tapered Bolt at one end of each “rack” designated extrusion

(mid-left) Pull the extrusion back, and slide 2 T-slot nuts into each extrusion

(mid-right) re-attach the “rack” extrusions, slide one of each T-slot nut to each end of the extrusion and secure a Corner cube so that it is locked in place. Do not overtighten (we will adjust their position along the extrusion later).

(right) at the end, there should be 4 corner cubes attached to the frame (2 per rack extrusion).



Now we will glue the LEGO rack pieces onto the frame on each “rack” designated extrusion.

(left) Deposit a small (1”) strip of superglue along the rack, placing the adhesive on both sides of the middle channel.

(mid-left) Place a rack piece down carefully, so that its end coincides with the end of the rack extrusion. Ensure it is parallel with the rack piece, and centered along its axis. Allow 30 seconds before applying the next 1” strip of superglue.

(mid-right) Repeat this process until one side of the rack is complete, ensuring there is no gap between pieces.

(right) Repeat again for the rack on the other side of the frame