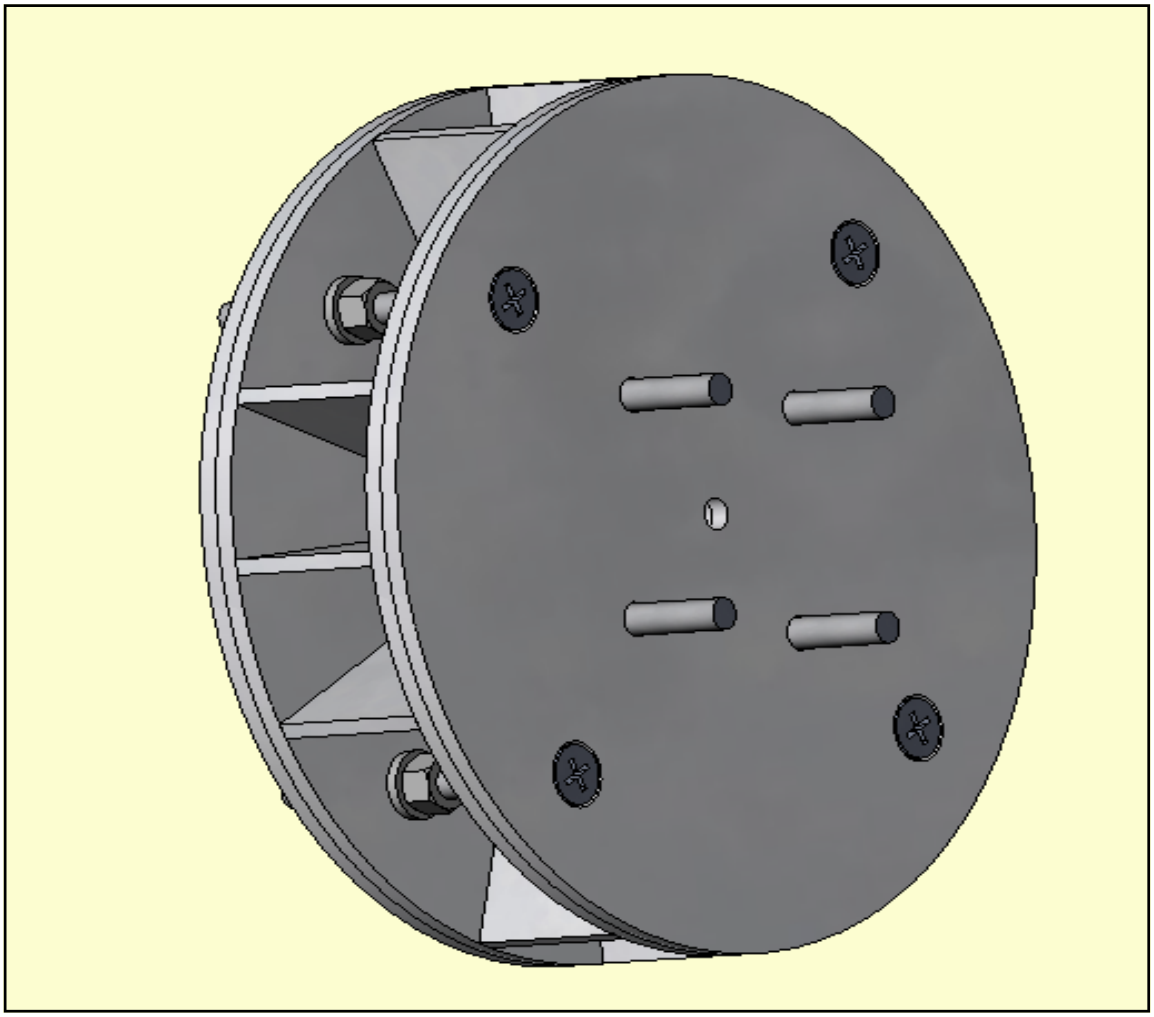
Shoulder Hubs



To complete the shoulder hubs, you will need the following hardware

16 x M6 x 55mm countersunk screws
50 x M6 flat washers
50 x M6 hex nuts

Although only 40 washers and nuts are actually required. It's likely nuts and washers may get lost inside the leg or elsewhere when you are assembling and disassembling the legs for transporting the droid. If you buy 100 of each, you will probably find the price is only a few dollars more as a quantity discount will kick in.

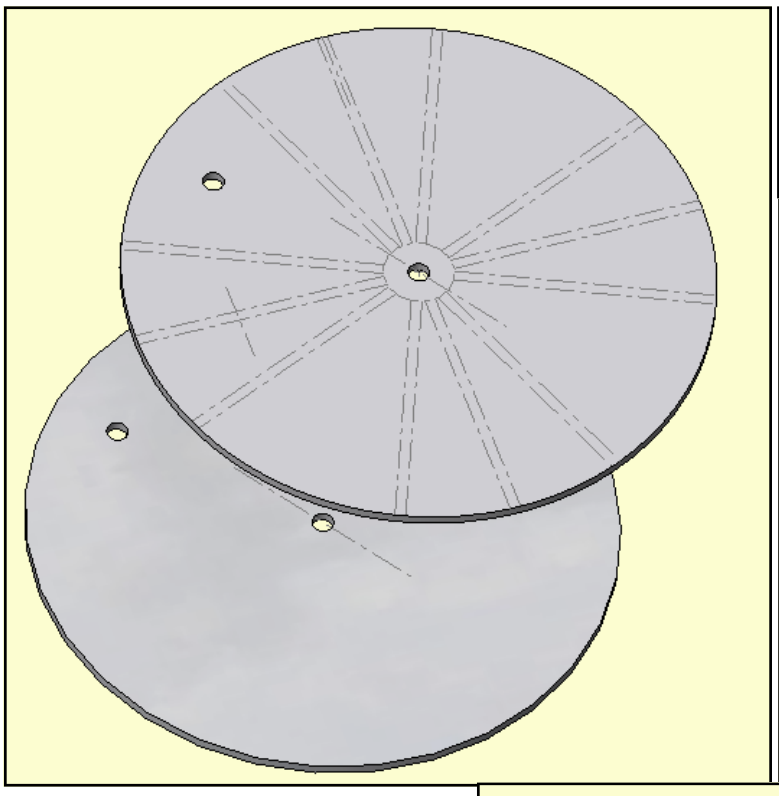
To make assembly and disassembly easy at events, I also bought an M6 nut socket and driver.

Begin by cutting out all the parts on the sheet FIXED 3 LEG SHOULDER COMPONENTS. Note that the 2 strips on the left side are 1mm thick. Make them wider and longer than the drawing so you can trim it off after gluing. This is easier than assuming everything will be perfect and finding out later on that it isn't.

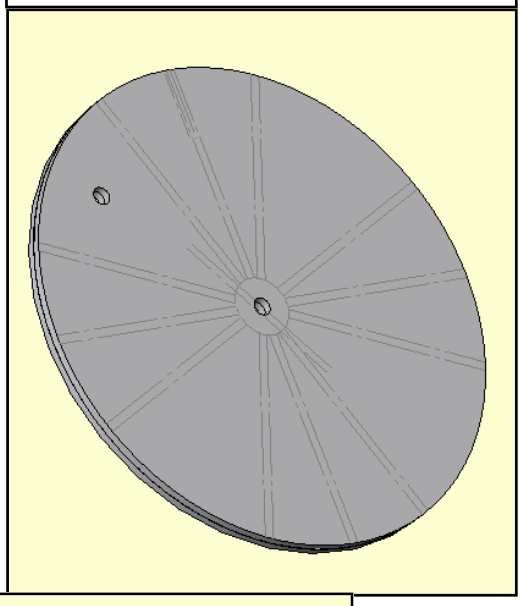
One set of circular plates is labeled L1—L4, the other is labeled R1—R4. These correspond to the set of plates to make the left and right shoulder hubs. It is crucial that they are not mixed up or your droid will look like it's had broken legs set by a drunken doctor.

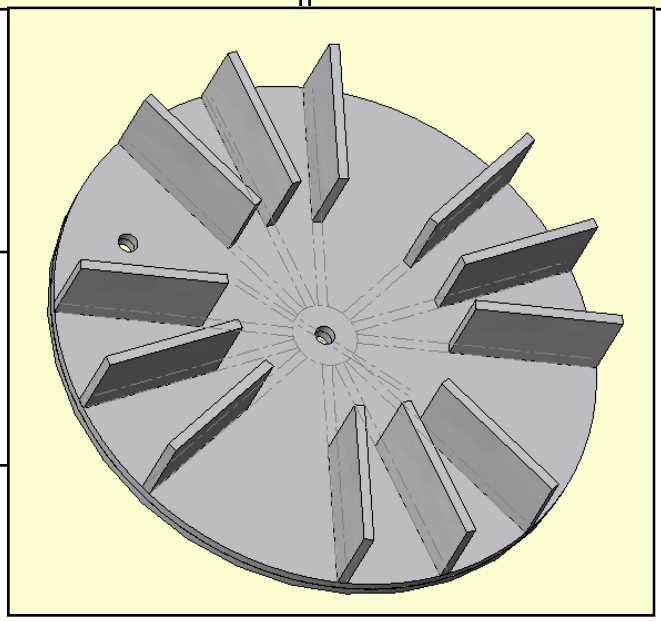
Note that in the sets, 3 of the plates only show 2 holes while the 4th plate has 8. The 2 holes in each of the plates marked 1– 3 are used to hold everything in alignment until the glue is set, then using a drill press, you can drill through the entire shoulder using plate 4 as a guide so all screws line up correctly. This will make more sense as you follow the construction drawings. All holes are 6mm.

The rectangular pieces that appear down the righthand side of the sheet should be cut carefully so the long edges are all equal in height. If they are not, your shoulder will lose a small amount of strength. It's not crucial, as the forces are actually transferred from the leg to the body frame via the screws, washers and nuts that go inside, but it all helps.

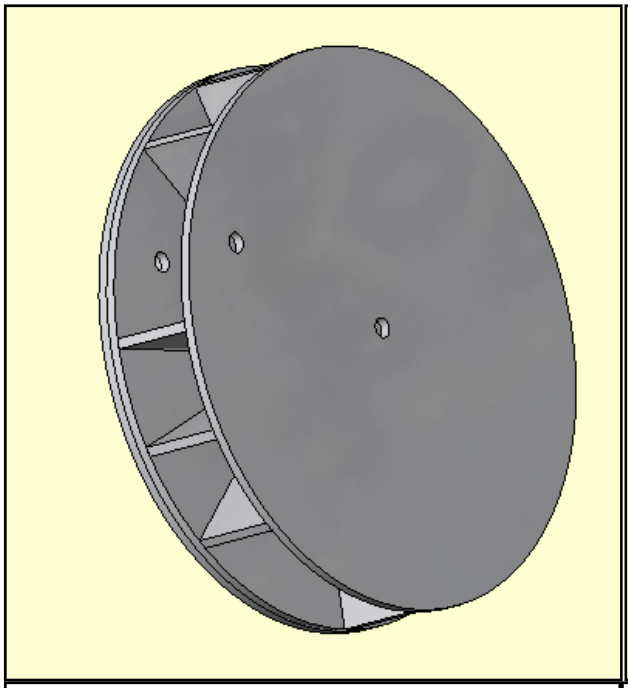


Begin with either the Left set or Right set. With plate 1 on the table, glue plate 2 on top of it. Place M6 screws through the 2 holes to keep them aligned. You'll end up with a single 6mm thick plate.

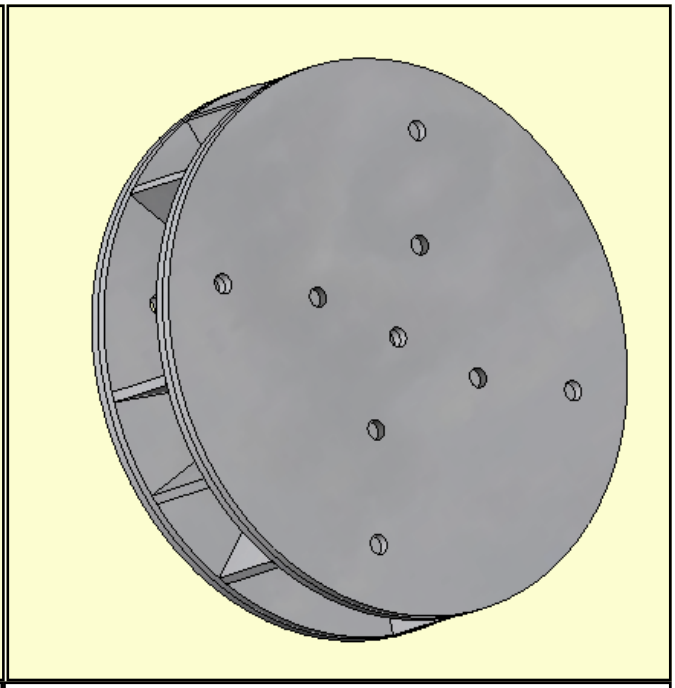




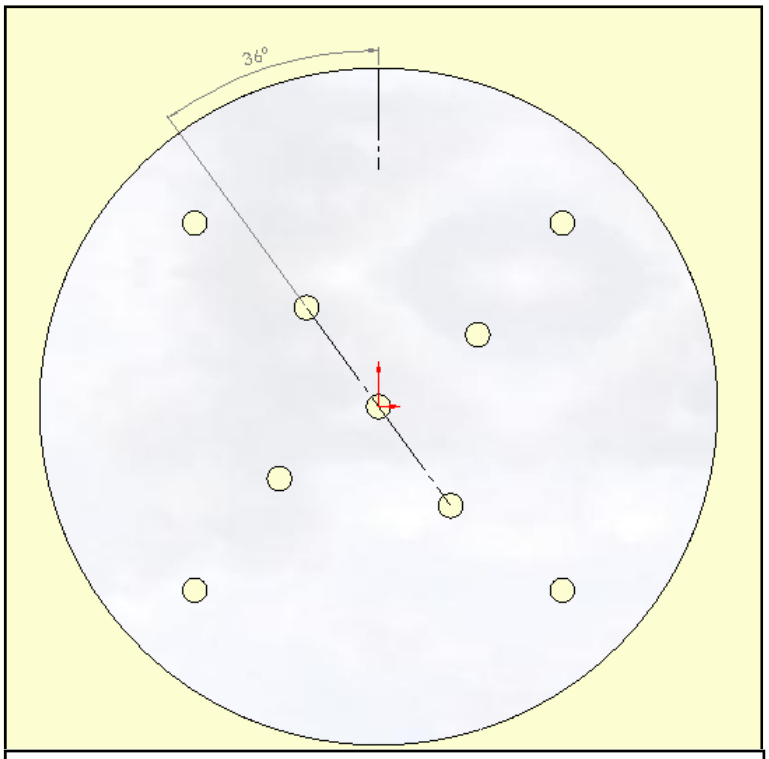
Now glue in 12 of the rectangular uprights in the alignment marks. Make sure the outer edge is flush with the circular plates. Don't let them protrude past the edge or the final 1mm wrap will not sit down around the plates correctly.



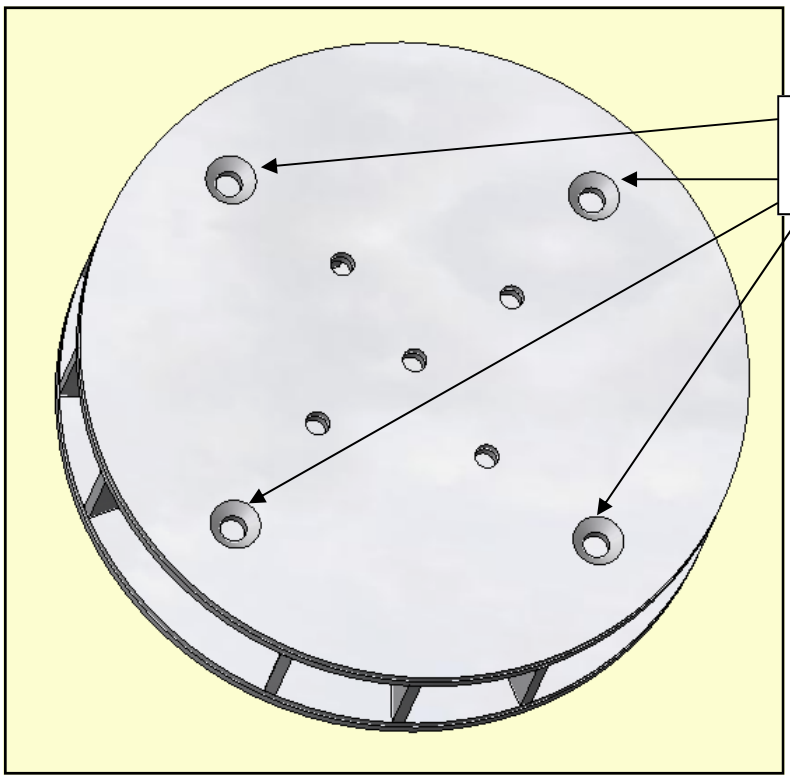
Glue on plate 3 again using the holes for alignment



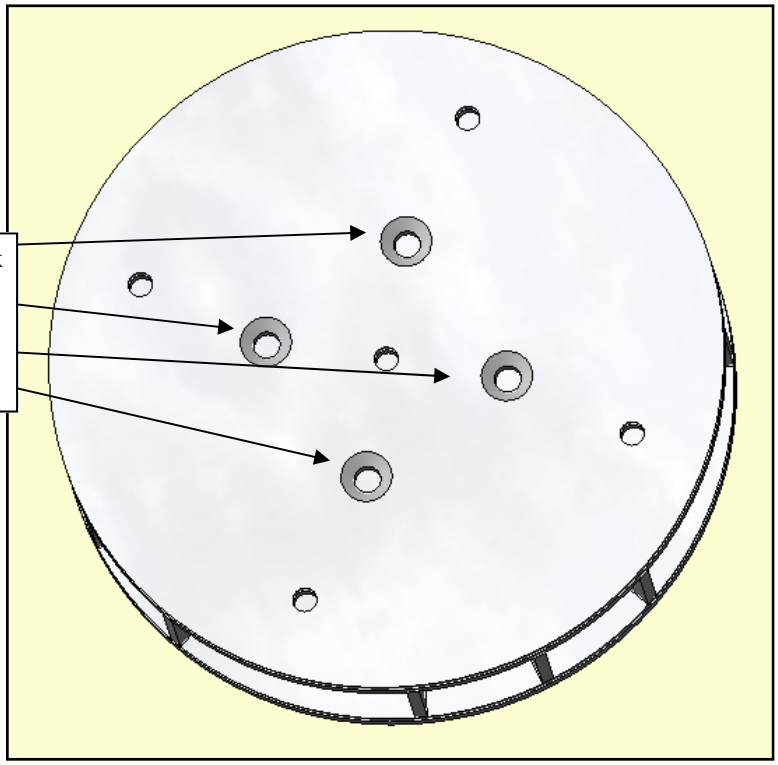
Follow that with Plate 4, then drill through all holes using a drill press to ensure they are at right angles to the plate.



The line shows the orientation of the leg in relation to the top of the shoulder hub. So this hub is for the left leg. The other hub will be the reverse.



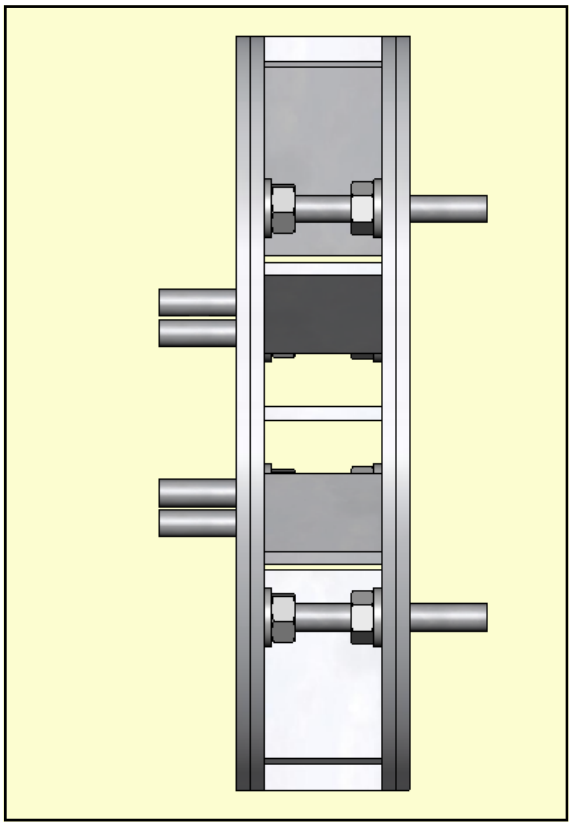
Countersink the outer holes on face 4 of the shoulder



Turn over the shoulder hub and countersink the inner holes on face 1.

Repeat these processes on the other hub.

Make sure the countersinking is deep enough that the head of the screw is flush with the hub surface. You don't want them sticking up or they will stress the hub, shoulder plates in the body frame and the legs.



Mount the screws into the hubs.

There should be a washer and nut against each inside face. This directs the force on the legs through to the shoulder plate in the body frame.

Use locktite on the nuts to ensure they don't shake loose in use.

Test fit the hubs into the body. You will have to trim up the cutouts in the skin and possibly drill the holes in the shoulder plates of the body frame to get them to fit.

After fitting, glue the 1mm strip around the open edge of the hubs and trim up. The join should go towards the bottom of the hub.

You will probably need to trim the skin cutout further for the final fit.

Now drill out the central hole to about 30mm. This will allow cables and connector to pass through the leg for assembly and disassembly.

I used a shiny metal vinyl strip to finish off my hubs.