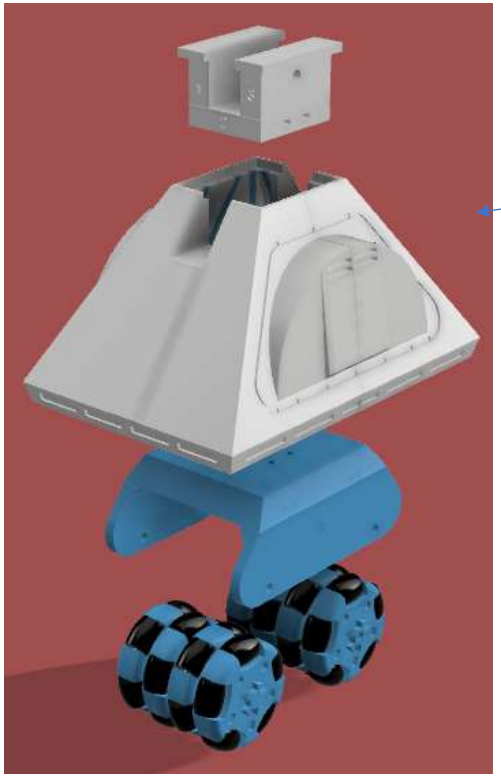
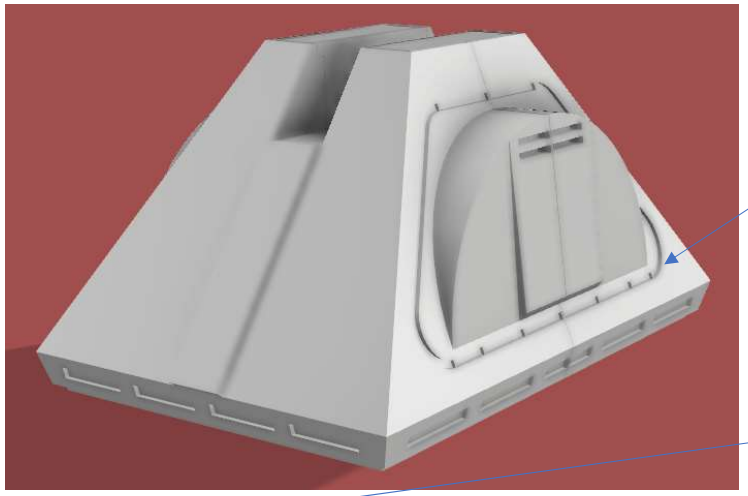
MrBaddeley
R2D2 version 2 Centre Foot
Version 0.1 (Draft)

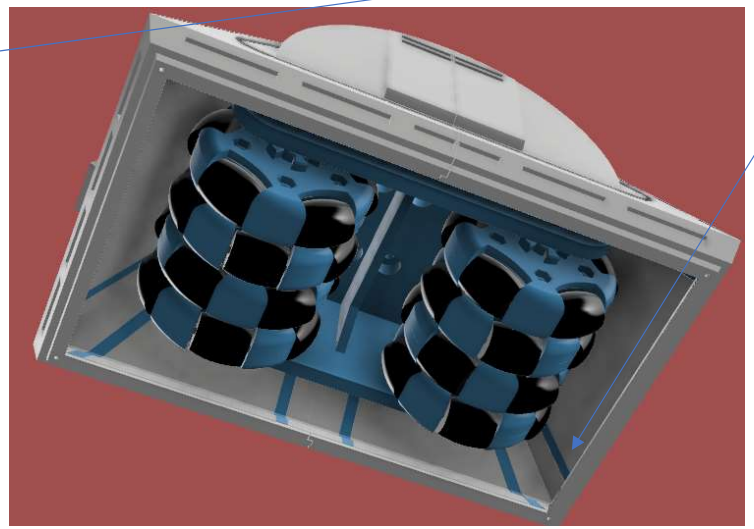
https://www.patreon.com/user?u=4294285
for other parts and instructions

Features...

CSR Spec







2 piece skin print, accurate and designed, designed with no supports and minimum sanding.

Strengthen ribs to provide extra skin resilience (cross layer strength & corners)

4 part assembled frame

Fully printed including skin, frame and Onmiwheels

8 Omniwheels configuration for robust centre leg.

Modular so Wheels & frame can be upgraded if needed.

Frame can be printed in Nylon if mega strength needed

2 top Frame options for locking Centre Foot.

MrBaddeley R23D printed Centre Skins instructions

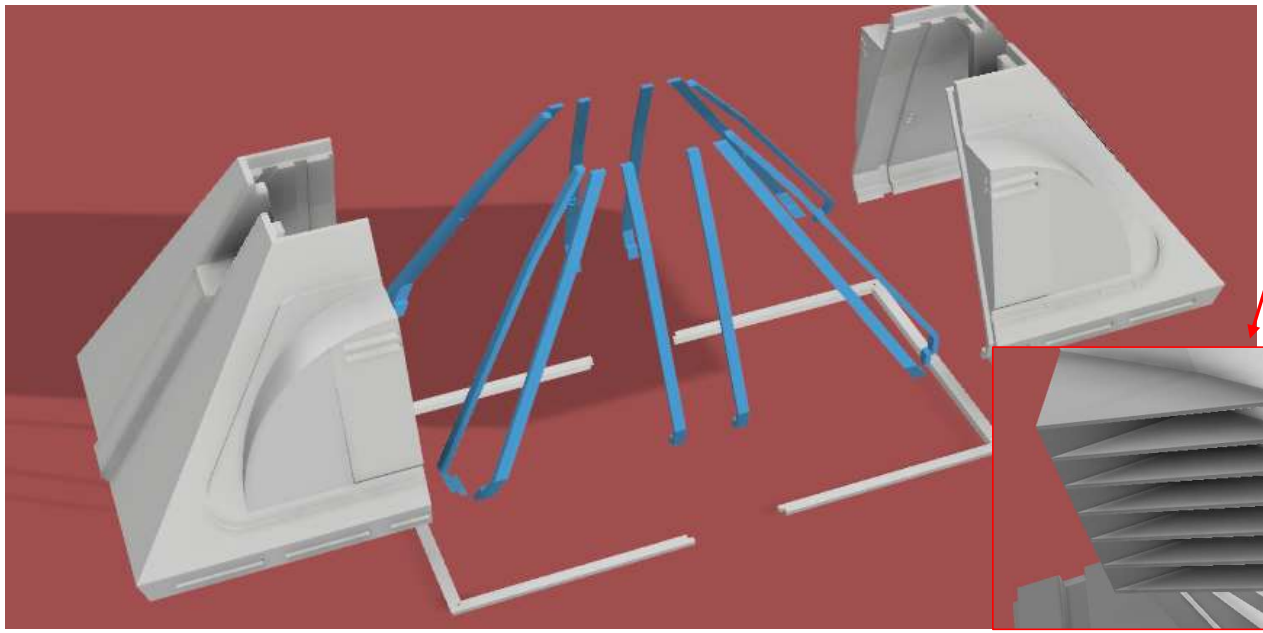
The Centre Foot Skins are easy to print. All have support built in, so don't need support structures. I recommend .3 layer, any higher res will take longer and the finish is about the same. Infill is minimum 10% (15% I used).
The Ribs should be printed with the flat side down.

The Skins are printed in 4 parts, with the base printed separately (and 1.75mm holes in each corner for alignment.

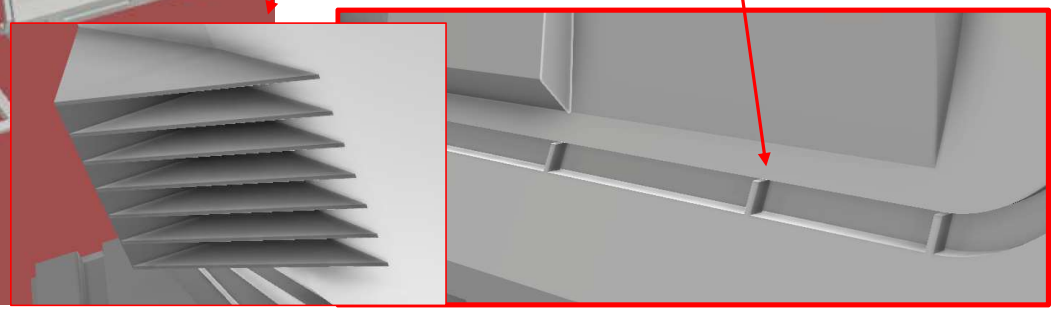
There are 12 ribs, these are numbered 1-9, A, B & C with corresponding markings on the skins.

The 2 halves have a lip for alignment and easy gluing.

Print the skins, ribs and base before assembly.



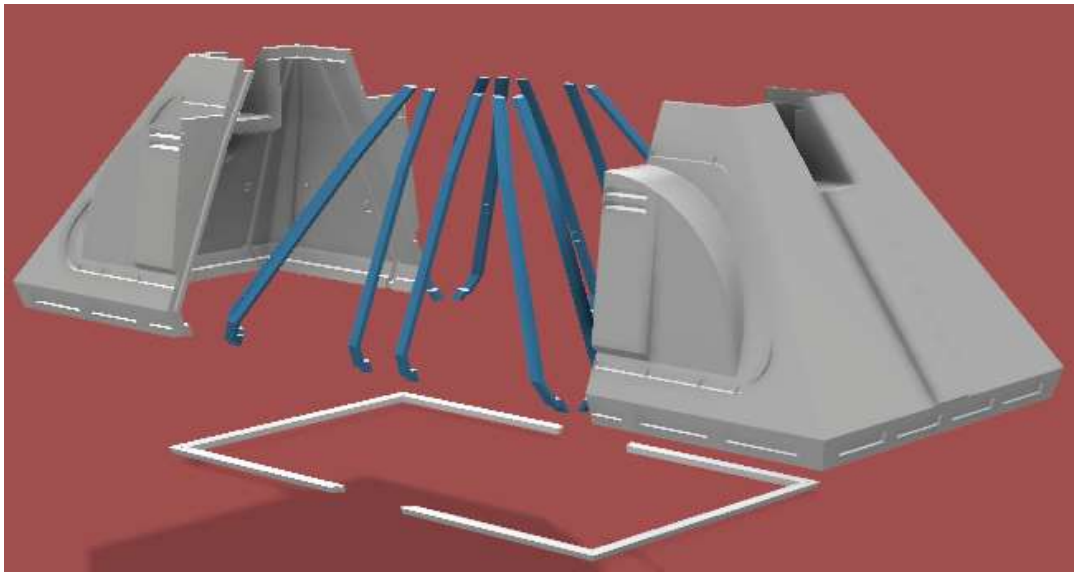
The supports need removing before assembly. The 45 degree ribs first, can be cut away with a craft knife or dremel (or pliers) . There are small support on the details, again remove with small pliers and file smooth if needed.

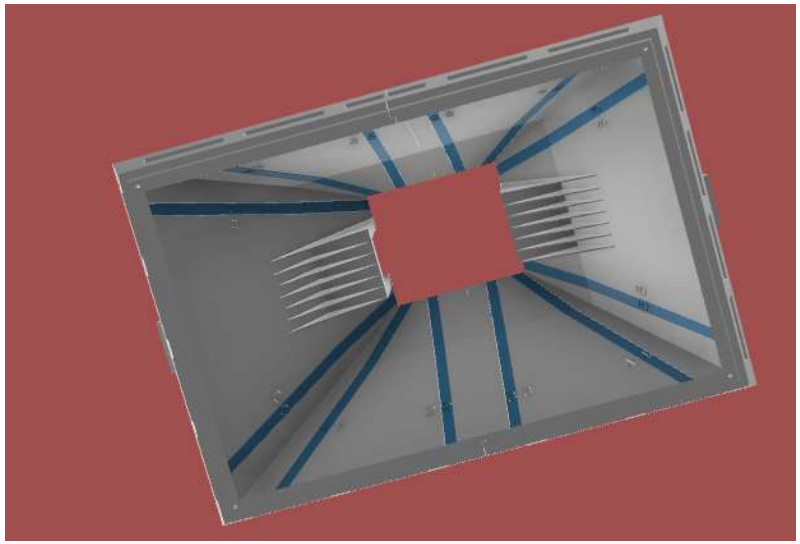


Once all supports have been removed and cleaned, the two halves can be glued together (I use ABS and Acetone welding but the preference for other filaments is up to you. PETG is a great choice as it's less likely to warp than ABS).

Once the two main skins have need glued, glue in all the ribs. Each rib has a number or letter and the main skin also has this near the rib slot. Simply Slot these in and glue.

These provide across layer strength to make for a very robust set of skins.

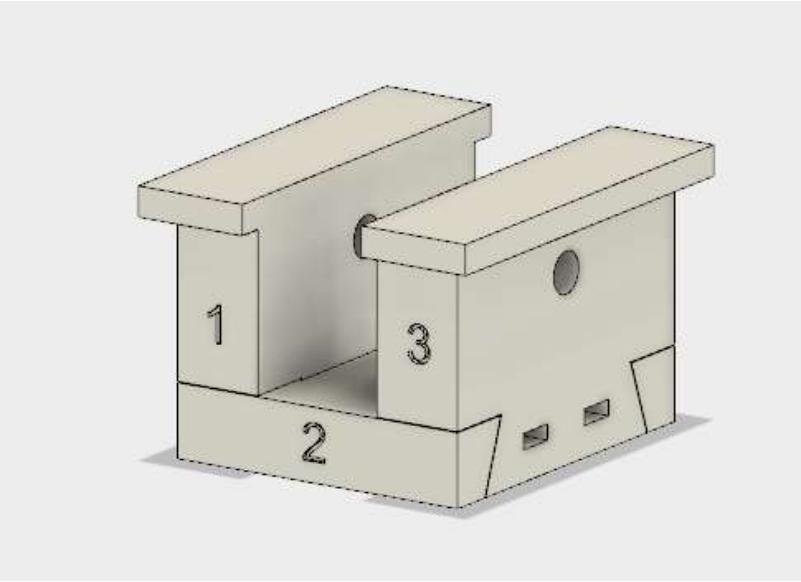


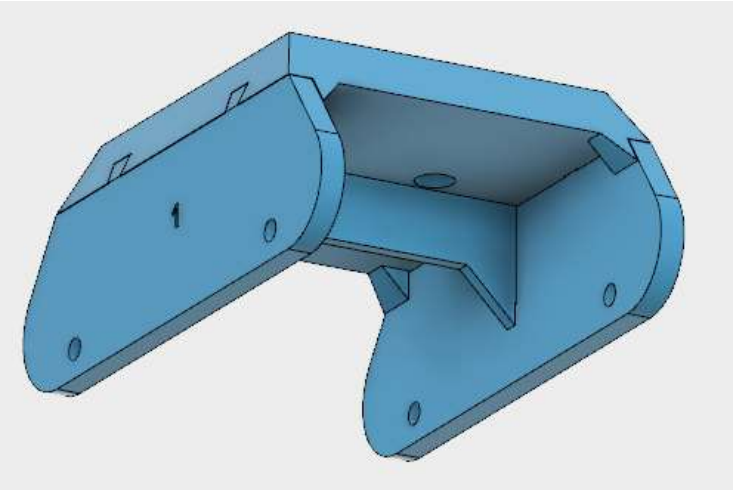


Should look something like this (without the support, I haven't remove it from the render ☺)

Final glue the base plate together and align with 1.75 filament pegs.

This should give you the base Centre Foot Skin!!





The top frame is a simple three part structure. Each part should be printed flat (Critical as this part needs to be super strong). ABS with .3 layer and 25%+ should be fine but if you're feeling adventurous and want a bomb proof foot, try Nylon. (I use Nylon Bridge by Taulman, prints nice and uses woodglue or gluestick for adhesion to the base, it's incredibly strong).

Print all three parts and assembly / Glue as shown.

Note the slots for M4 Square Nuts, you will need these to full assemble the foot. Once dropped in to the holes, you can either use a little ABS juice to secure or print the small nut plate with slots in to hold them. Check the nuts with a M4 bolt that they work and are aligned.

The Omniframe is the same, print 4 pieces (in ABS or nylon as above). They should fit together snugly, glue the structure together to create a very solid frame for the Centre Leg and Wheels.

Note the four holes on the omniframe bolt directly to the top frame using M4 Bolts with the frame inbetween.

There’s a special frame OmniFrameC3rdwheel, this fits on the inside of one of the centre wheels to give a better offset to give a smooth run.

For the Omniwheels you will need some hardware.

8 x 6mm Bearings. (Standard 606ZZ 6x17x6mm Sealed Miniature Deep Groove Radial Ball)

40 x 3mm pins, these are to be cut 32mm long. Stainless, 3mm bolts, anything you can get hold of. These are the centre pins for the Omniwheel.

40 x M4 20mm bolts (Crosshead or Allen Head top) with M4 standard nuts.

The wheels I printed in Nylon Bridge Taulman. ABS will wear fairly quickly as will PLA etc. I would really recommend Nylon, if not, ABS or PETG.

The Frame for the Omniwheel is fine with ABS

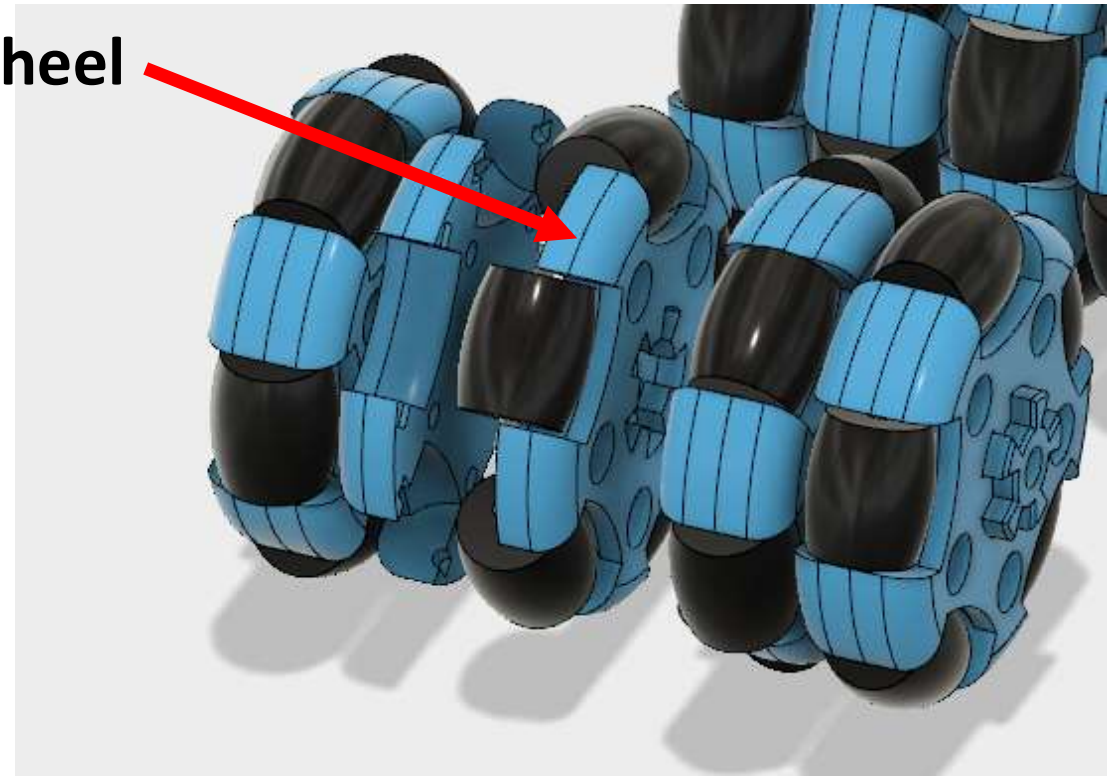
.3 Layer, 35% infill or greater is recommend.

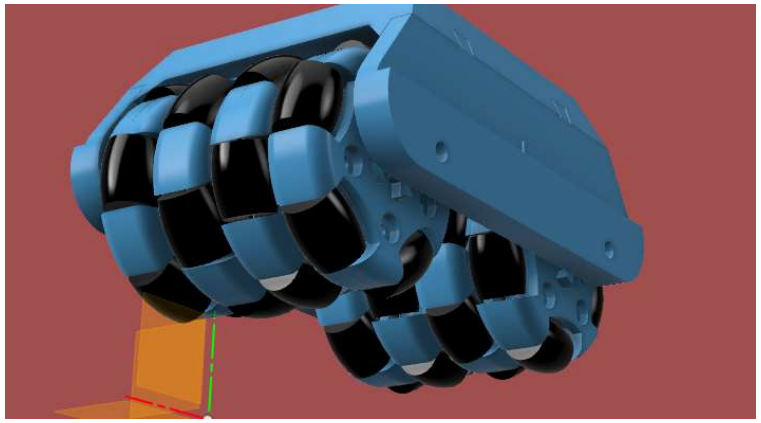
Assembly is simply put the wheels on the pins, the pins in the frame, the 6mm bearing in the centre and use the 5 bolts and nuts to hold together.

Repeat… When completed the wheels fit together at on offset, build 2 sets of four. There’s an end cap which slots in the end to create the full set….

OmniFrameC3rdwheel

When installed properly, all the wheels should be at different angles covering the full 360 revolution.

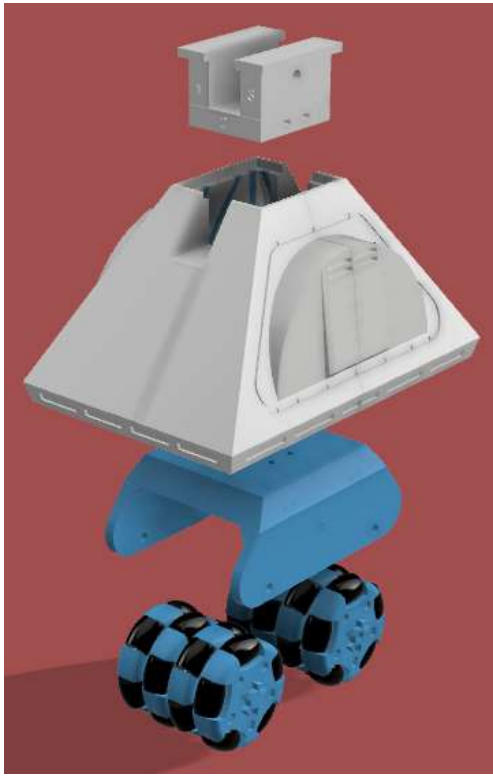




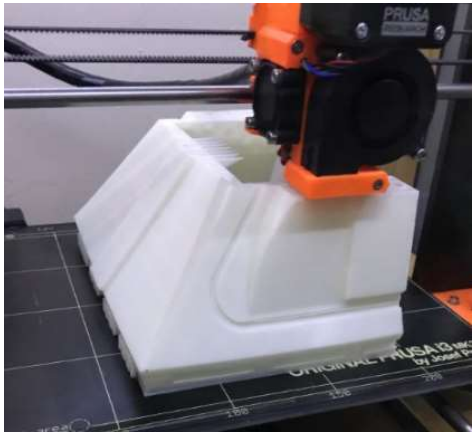
Final assembly is to fix the wheels into the Omniframe. I used 6mm threaded rod cut to length, fit the 6mm nuts inside the frame, then put a washer either side of the wheel set and screw the 6mm bar from the outside through the first nut, washer, wheels, washer and the other nut and frame. used a nylock nut on either end.

Then it's assembling the whole thing, the top frame fits into the skin, the omniframe into the bottom and M4 Bolts hold it together fixed from below.

Job Done!



Note, the Ankle will need to be attached to the top frame before final assembly.
Obviously you can assembly before the Ankle is ready or attached for test. It's simply a matter of removing the 4 M4 bolts and the assembly comes apart for maintenance, upgrade or replacements.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Supported and tested by Rob Dinniwell, Joseph Masci, Gregory Welch, Sam D. Fenimore, LarryJ, tevans, Rick Davis, Brendan Faulkner, Nicolas Carré, Ben Langley, Mathieu Saint-marc and Brian.