Mini CH-33P Guide by Matt Zwarts

This is the guide for printing and assembling a mini CH-33P I designed, 3D printed body, simple electronics and controlled via Bluetooth smartphone app or your own device.

Review the part and recommended settings for printing to keep weight and strength optimized before printing and post some pics of you build in the Facebook Group.

https://www.facebook.com/groups/MrBaddeley/about/

Shout me a coffee of some filament costs if you like to keep adding to my designs and builds that I enjoy sharing

https://paypal.me/Matteous78?locale.x=en_AU

Happy Building,

Matthew Zwarts

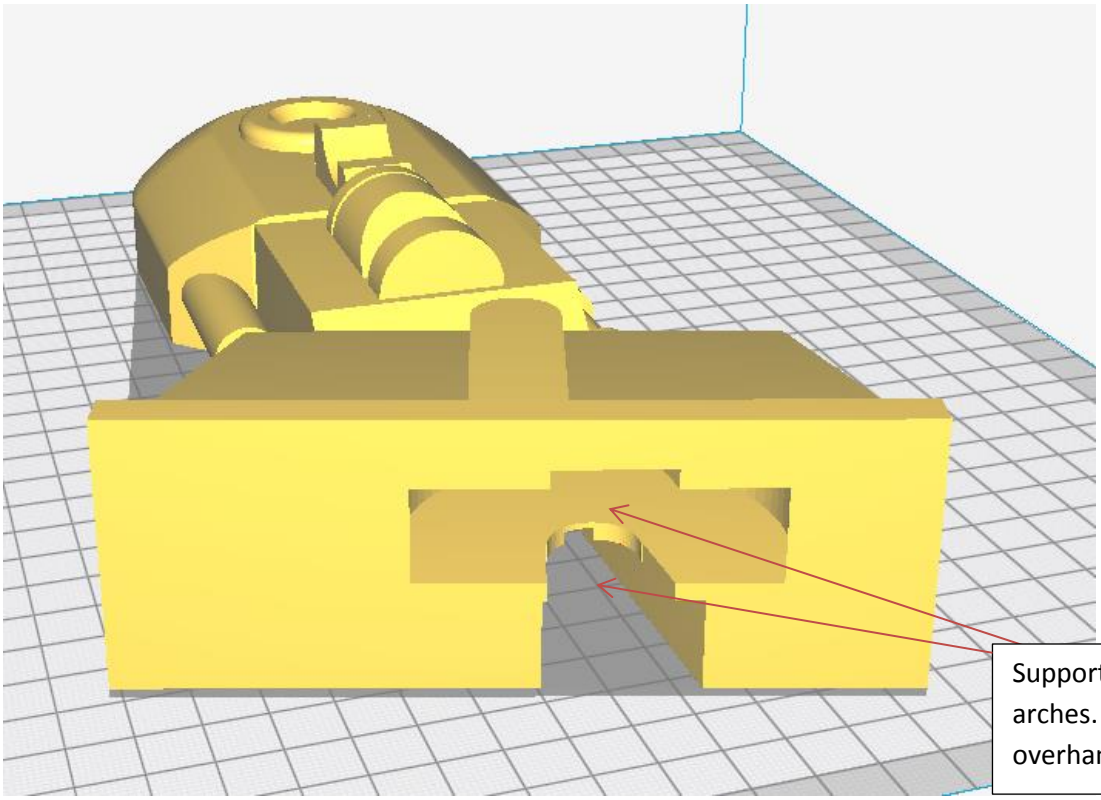
Contents

Printer Settings

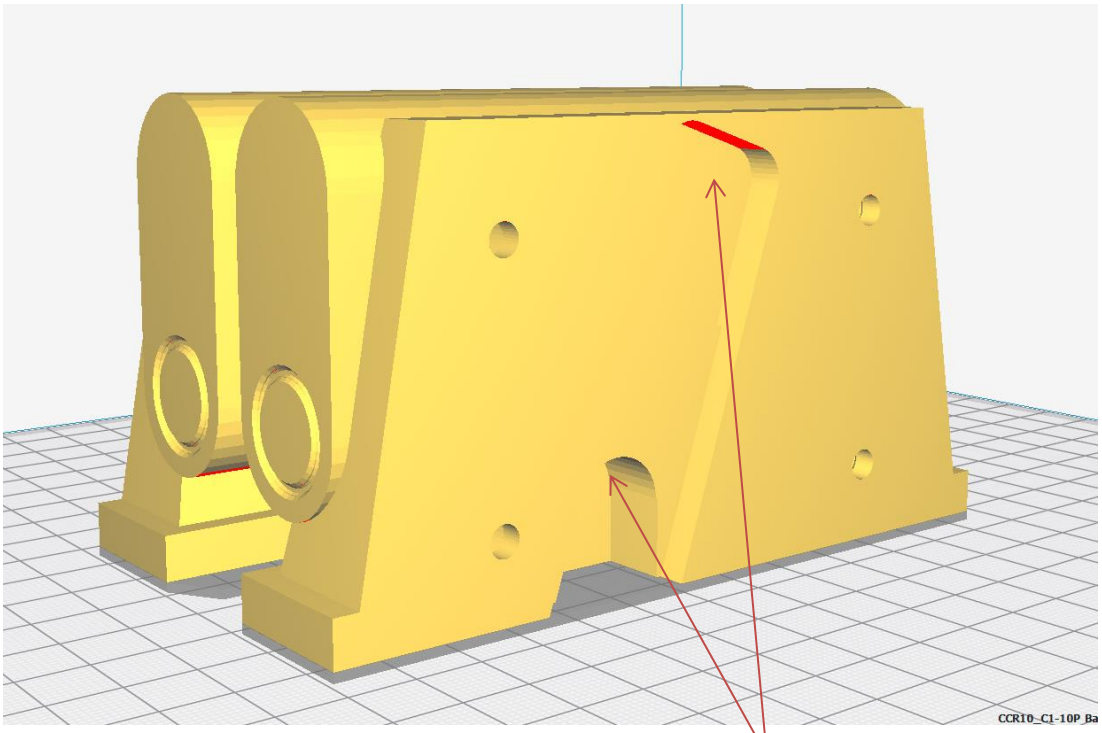
All the prints I did where with PLA + material, use your own print temperatures and machine based settings.

I estimated it used about 1.8kg of PLA + filament to print all the parts.

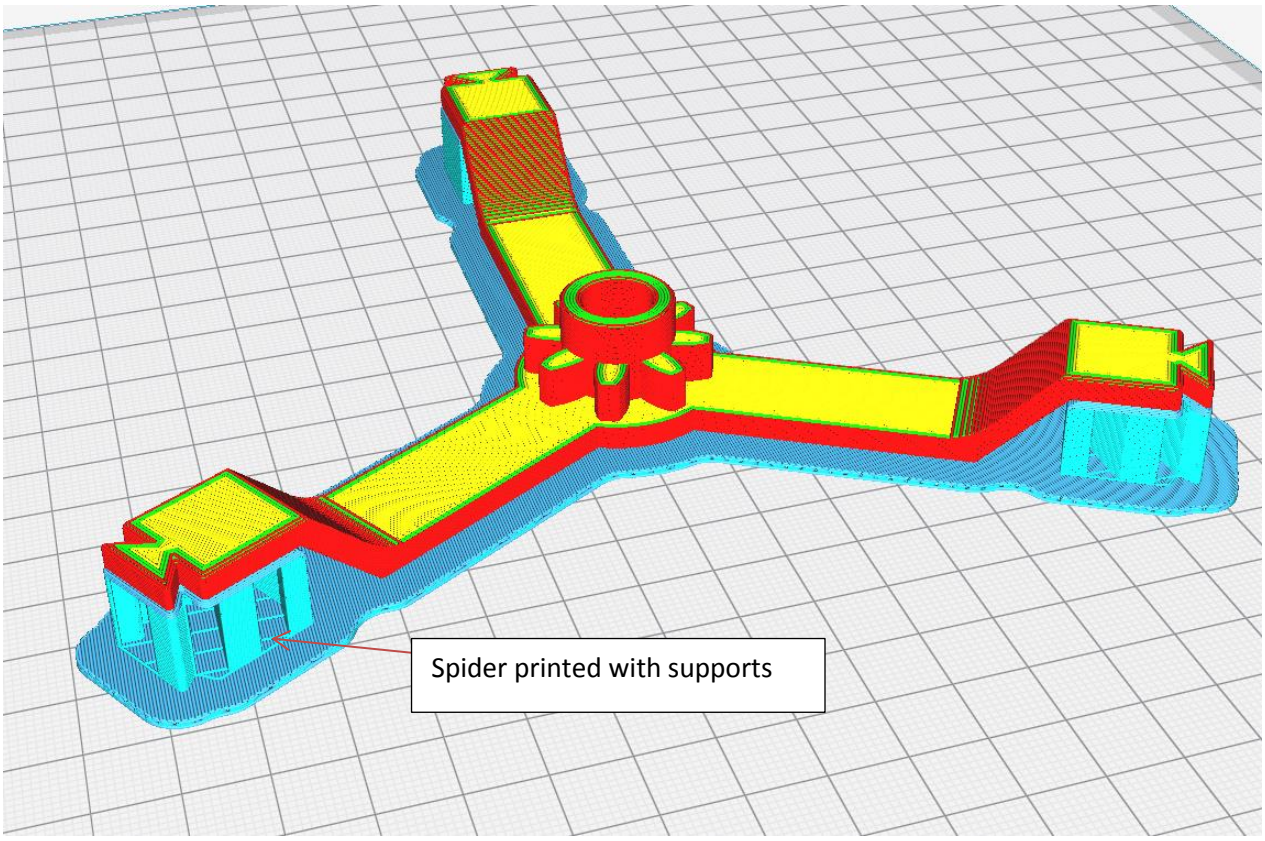
Part Name	Quantity	Supports	Overhang Value	Infill %	Notes
CH-33P Antenna Base.STL	1	No		10	
CH-33P Antenna Top.STL	1	No		10	
CH-33P Body MZ.STL	1	No		10	Print at 0.2 layer height for crisper detail
CH-33P Centre Leg.STL	1	Yes	65	30	
CH-33P Dome Centre Spider.STL	1	Yes	65	30	
CH-33P Dome MZ.STL	1	No		15	Print at 0.2 layer height for crisper detail
CH-33P Eye.STL	2	No		15	
CH-33P Front Caster Axle MZ.STL	1	No		50	
CH-33P Front Castor Fork.STL	1	No		50	
CH-33P Front Castor Tyre.STL	1	No		50	
CH-33P Large Eye.STL	1	No		15	Supports only needed in wheel arch
CH-33P Large LED Insert.STL	1	No		15	
CH-33P LED insert.STL	2	No		15	
CH-33P Left Battery Box.STL	1	No		15	
CH-33P Left Leg.STL	1	Yes	65	15	Supports mainly needed in wheel arch
CH-33P Right Battery Box.STL	1	No		15	
CH-33P Right Leg.STL	1	Yes	65	15	Supports mainly needed in wheel arch
CH-33P Small Antenna.STL	1	No		15	
CH-33P Small Eye 2.STL	1	No		15	
CH-33P Small Eye.STL	2	No		15	
Dome Axle.STL	1	No		30	
Dome Gear.STL	1	No		30	

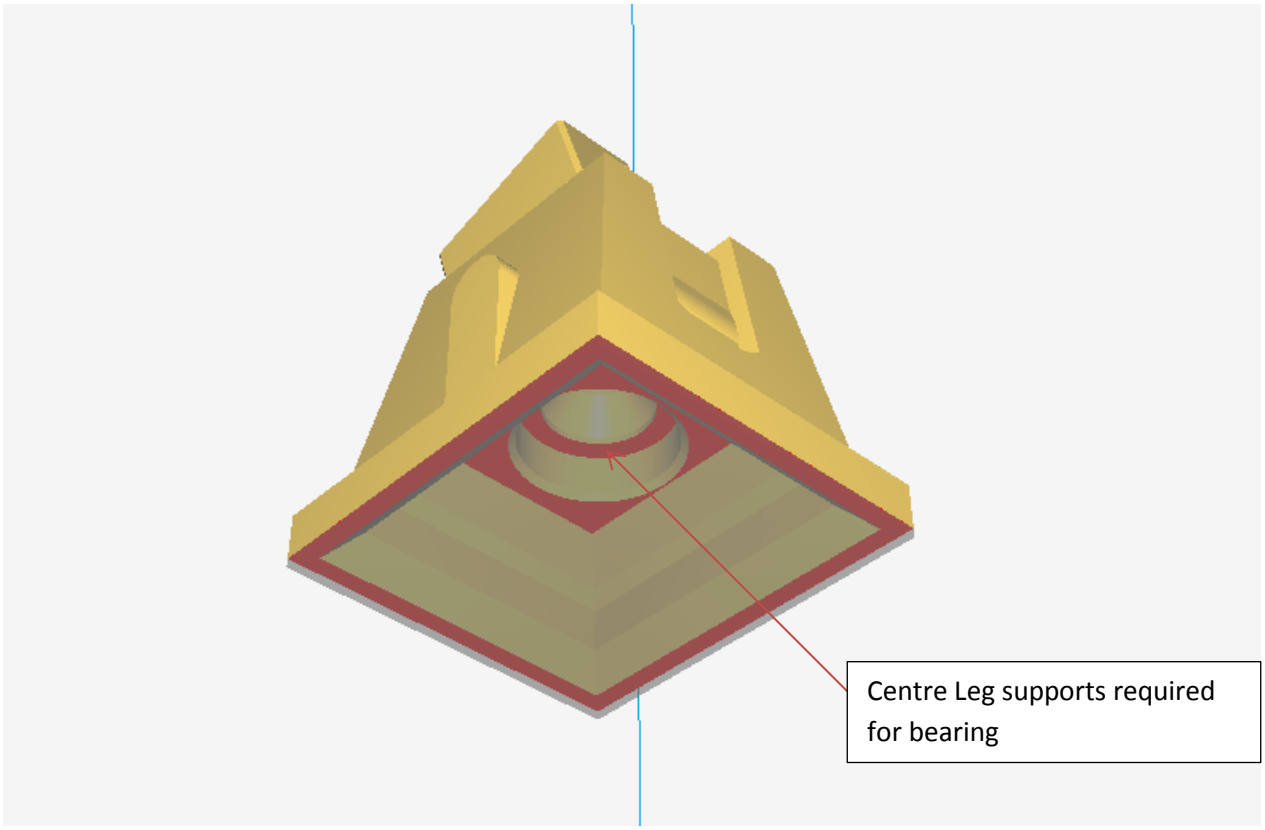


Supports required here in the wheel arches. Auto supports with 65° overhang should be fine

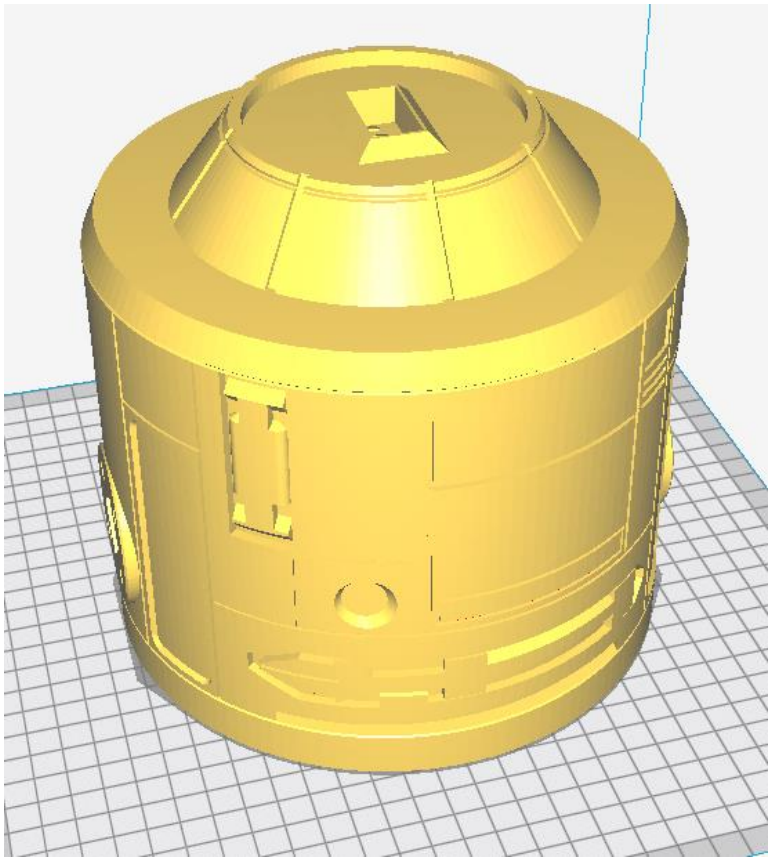


Battery Boxes printed vertical with supports needed in a few places, auto supports should be fine


Spider printed with supports


Centre Leg supports required for bearing

The dome and body are printed upside down with no supports, print at 0.2mm layer height for finer details.



Electronics

Electronics BOM

Part Name	Quantity	Source	Link	Comments
HC-05 Bluetooth Module	1	Banggoods	https://www.banggood.com/HC-05-Wireless-Bluetooth-Serial-Transceiver-Module-Slave-And-Master-p-908621.html?rmmds=search&cur_warehouse=CN	
Arduino Nano	1	Banggoods	https://www.banggood.com/NANO-IO-Shield-Expansion-Board-Nano-V3-Improved-Version-No-Cable-For-Arduino-p-1010994.html?rmmds=search&cur_warehouse=CN	Arduino Clone will be fine
Toggle switch (on-off)	1	Any	https://www.banggood.com/Red-3-Pin-ON-ON-SPDT-Mini-Toggle-Switch-AC-6A125V-3A250V-p-967014.html?rmmds=search&cur_warehouse=CN	Any toggle switch for on/ off
MX1508 Motor Driver Board	2	Banggoods	5pcs Dual Channel L298N DC Motor Driver Board PWM Speed Dual H Bridge Stepper Module Module Board from Electronic Components & Supplies on banggood.com https://banggood.app.link/WfcEpe8eJ81167075.html?rmmds=search&cur_warehouse=CN	can be labelled as a L298 but isn't
DC 3V-6V DC 1:120 Gear Motor	3	Banggoods	https://banggood.app.link/a6OjtswUU8	I buy 5 for almost the same price
7.4v 3 cell Lipo 800mAh	1	Banggoods	https://www.banggood.com/ZOP-Power-11_1V-800mAh-25C-3S-Lipo-Battery-JST-Plug-p-967263.html?rmmds=search&cur_warehouse=CN	Larger battery will be fine so long as it fits, just 7.4 volt
Wire	-	Any	-	Various wire for connecting everything
Resistor 1K Ohm	3	any	-	Any 3 resistors of equal value will work for the voltage divider

The total cost for electronics is around $35 AUD, wire is extra and assumed you have basic tools like a soldering iron and so on.

Click on the Links to go to where I purchased the parts from.

Hardware

Hardware BOM

Part Name	Quantity	Source	Comment
M6 x 25 Long SHCS	8	Hardware store	I got my bolts from used filament spools, Esun PLA+, recycled!
M6 nuts	8	Hardware store	
Bearings 22mm OD x 8mm ID x 7mm	3	Hardware store	
Various wood screws	8	Hardware store	the ones I used were 8G x 20mm long, this holds the footshells together
Small wood screws	-	Hardware store	Hold on the motor for the dome rotation, could be just hot glued
M4 grub screw 10mm long	1	Hardware store	Retain the dome gear onto the motor
M4 nut	1	Hardware store	Retain the dome gear onto the motor

Very minimal hardware is required, I recycled the bolts from the filament spools… the wood screws I used were 20mm long wood screws, about 4mm Outside diameter on the thread.

The bearings are pressed into the front tyre and 1 is used in the front pivot or axle joint.

Assembly

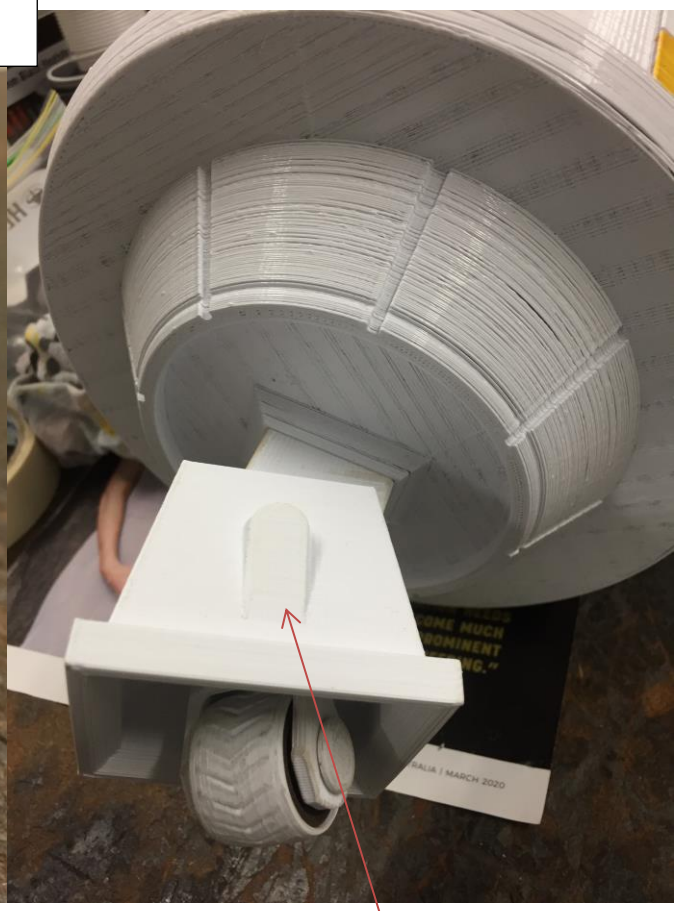
Ensure all dags from printing are removed and if it doesn't fit then sand it a little bit first!

Bearings installed into the caster wheel

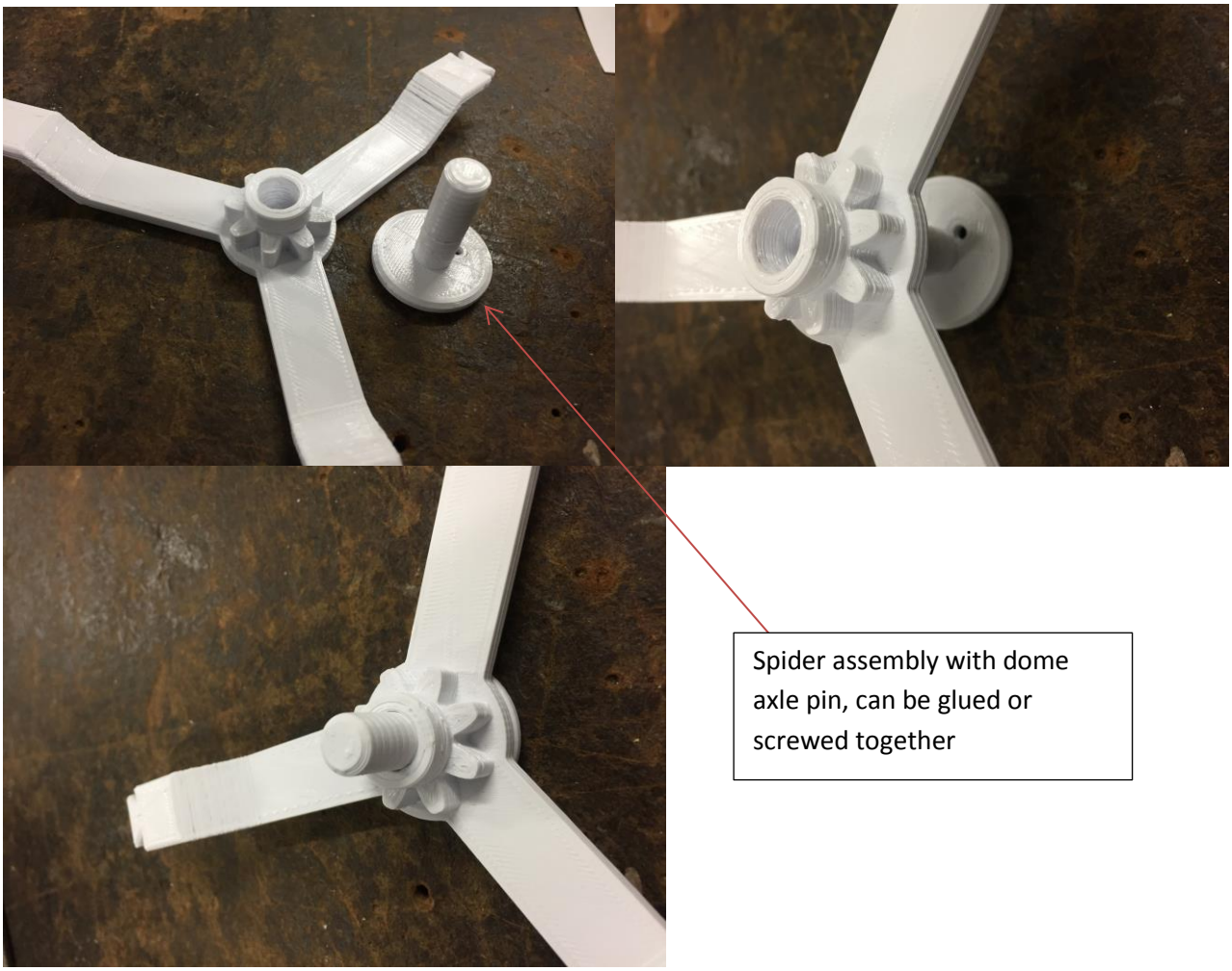
Bearing 22x8x7mm

3 off required

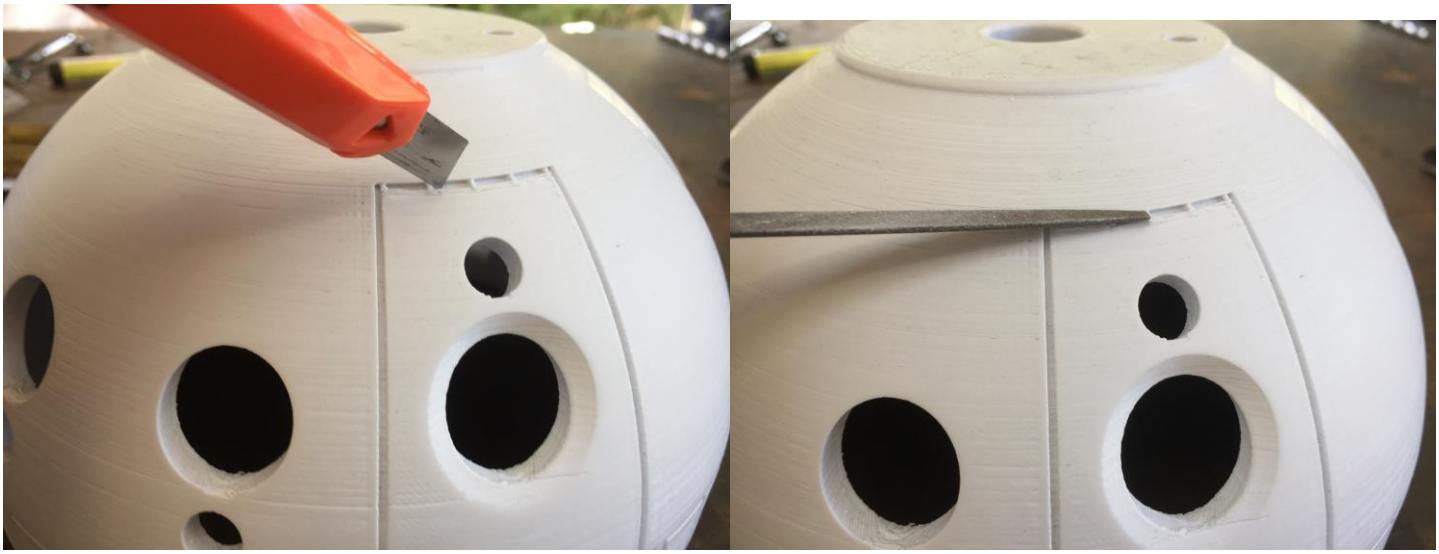
The bearing does not need this edge, just some I had spare

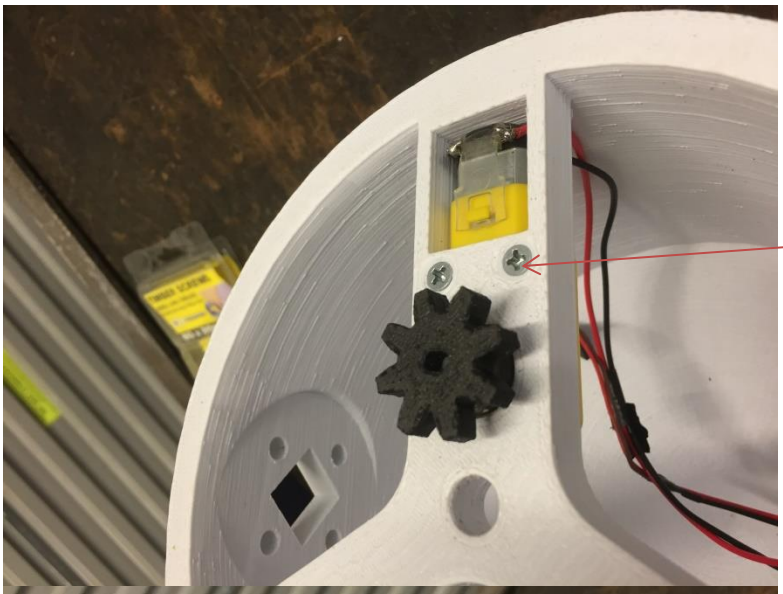


Bearing pushed into centre foot



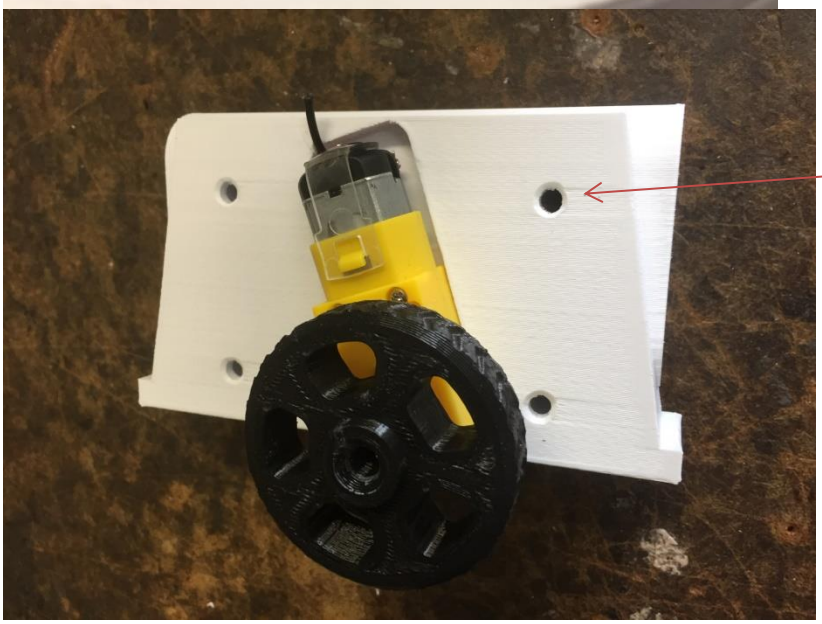
Carefully remove dome supports and file groove prior to painting



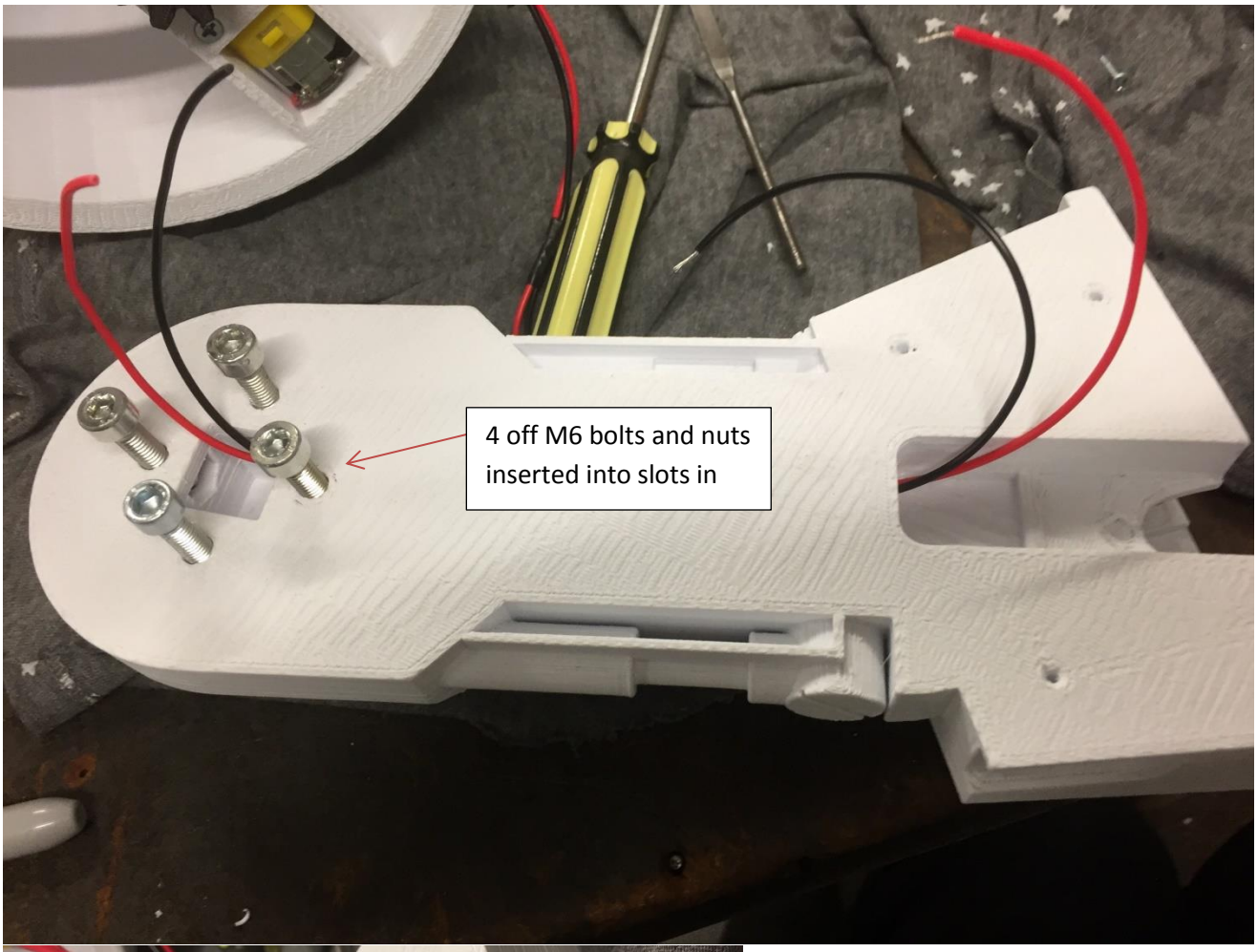


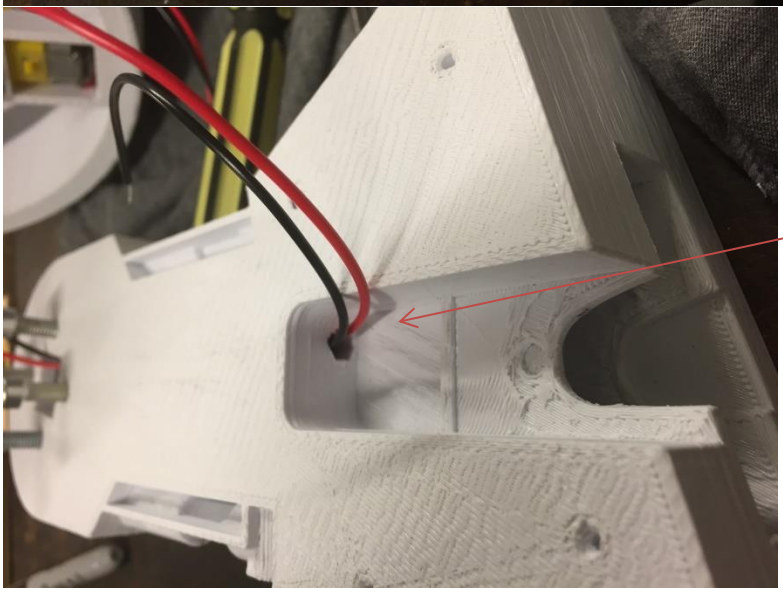
2 small screws retain motor, could be hot glued

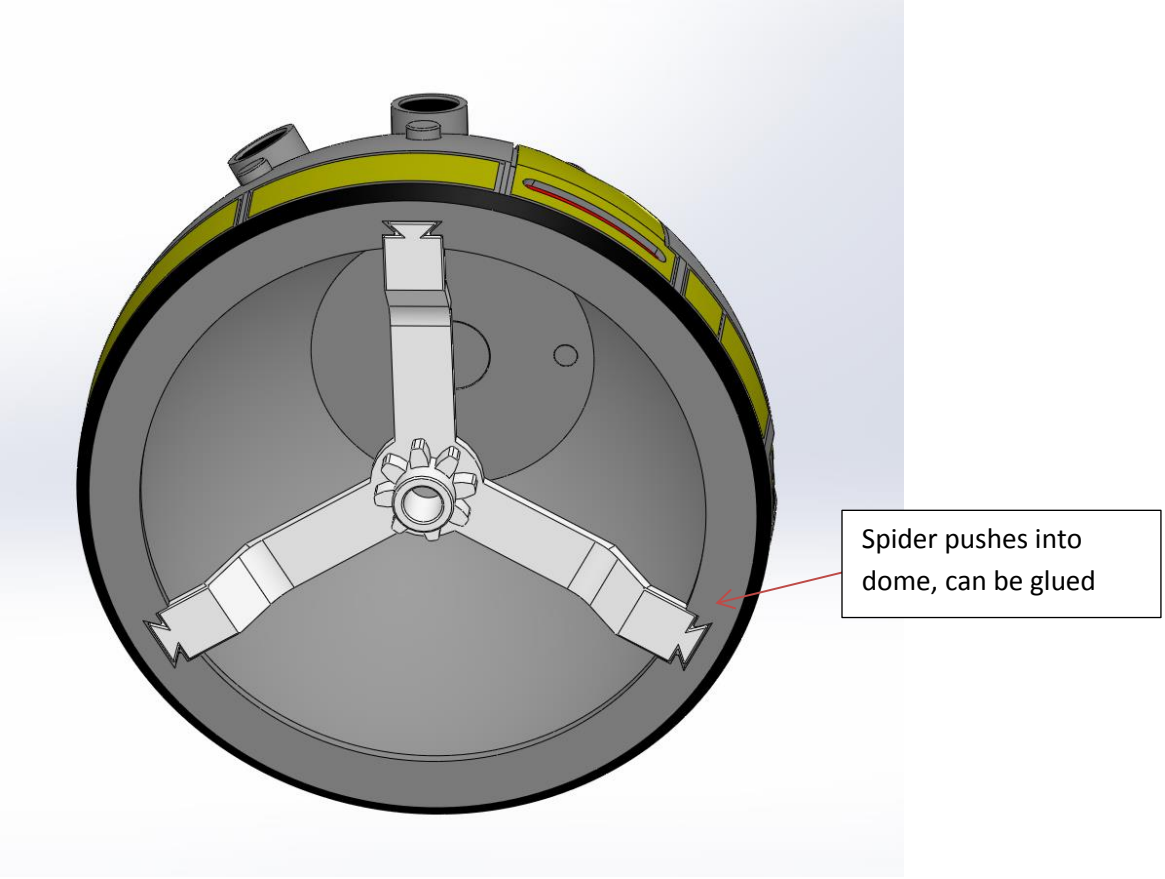
M4 nut and grub screw onto shaft

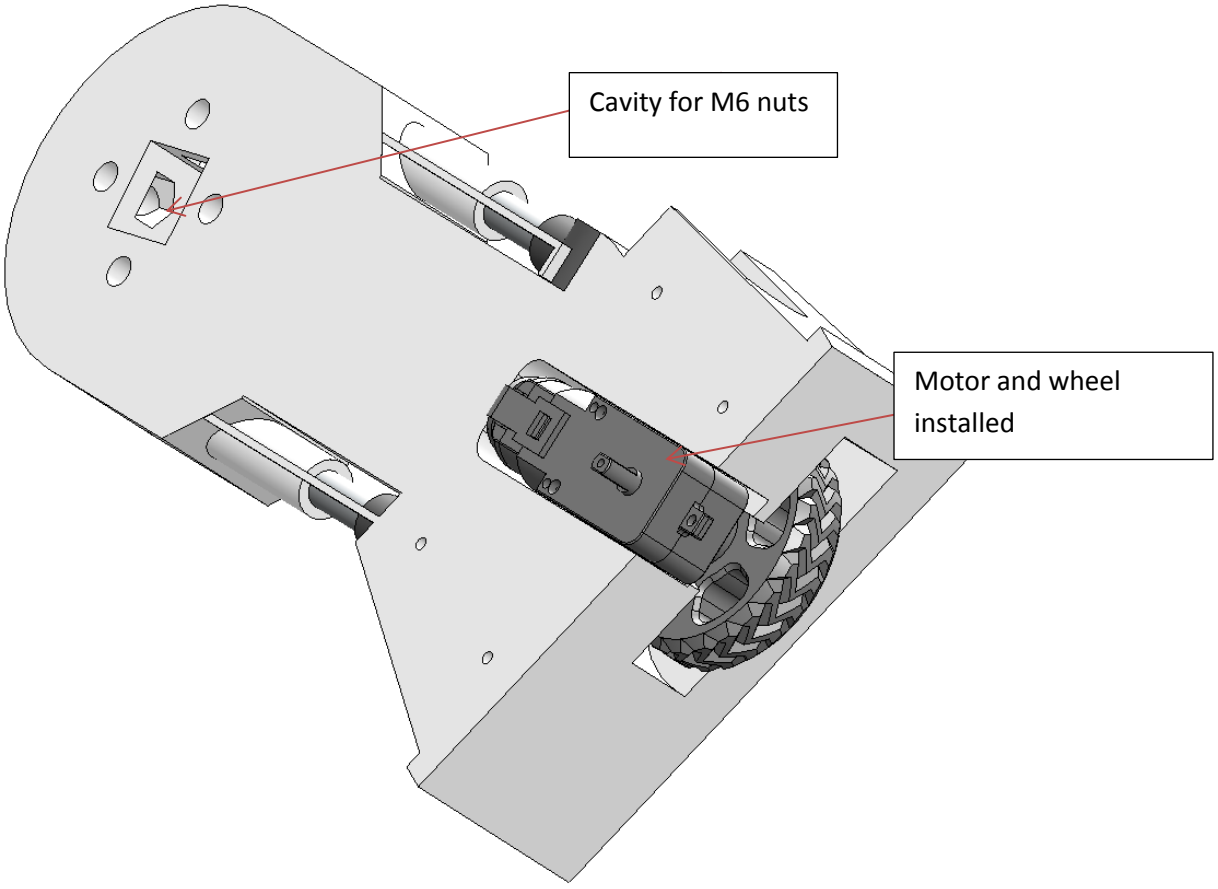


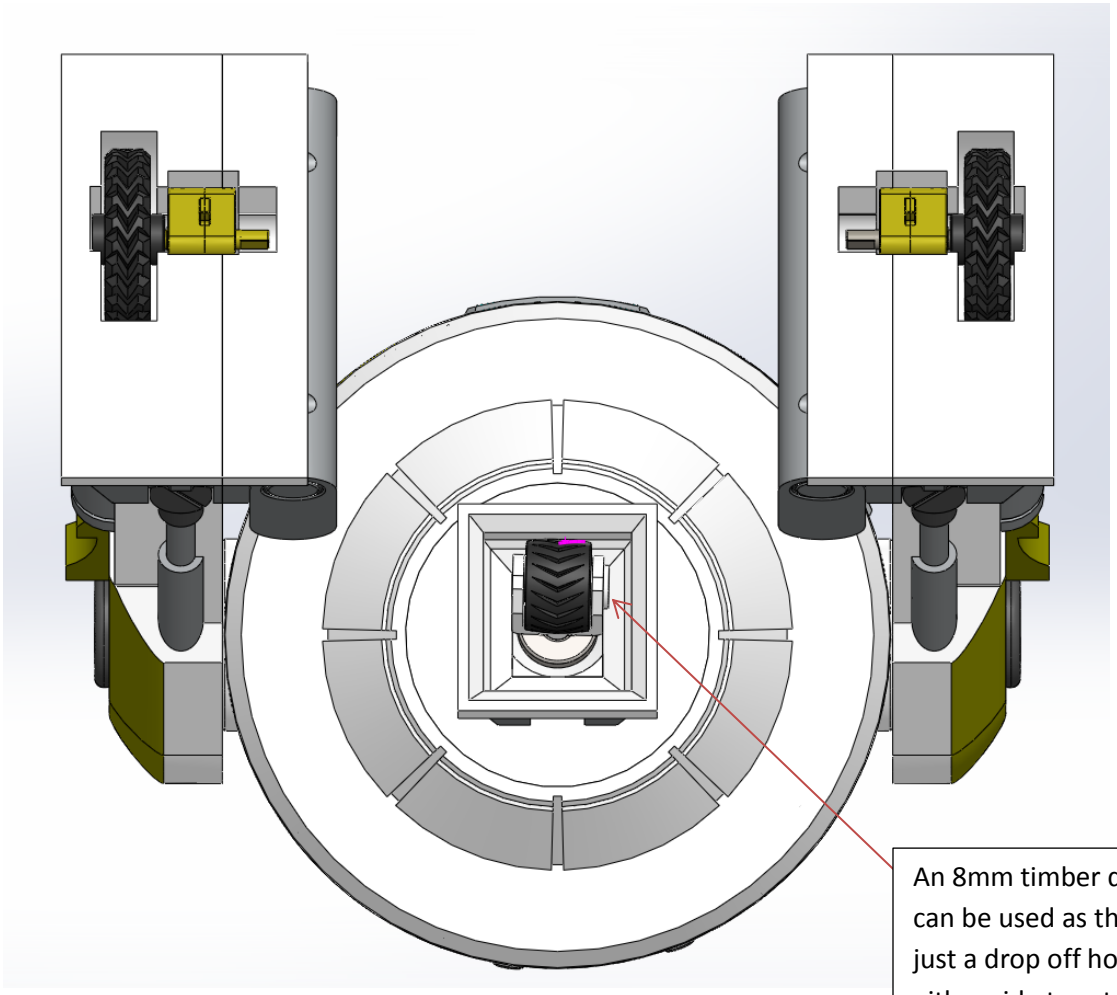
4 screws through from other side to screw into the side of each leg, no screw is required in the motor, a small step in the leg print holds the motor from sliding up.


4 off M6 bolts and nuts
inserted into slots in

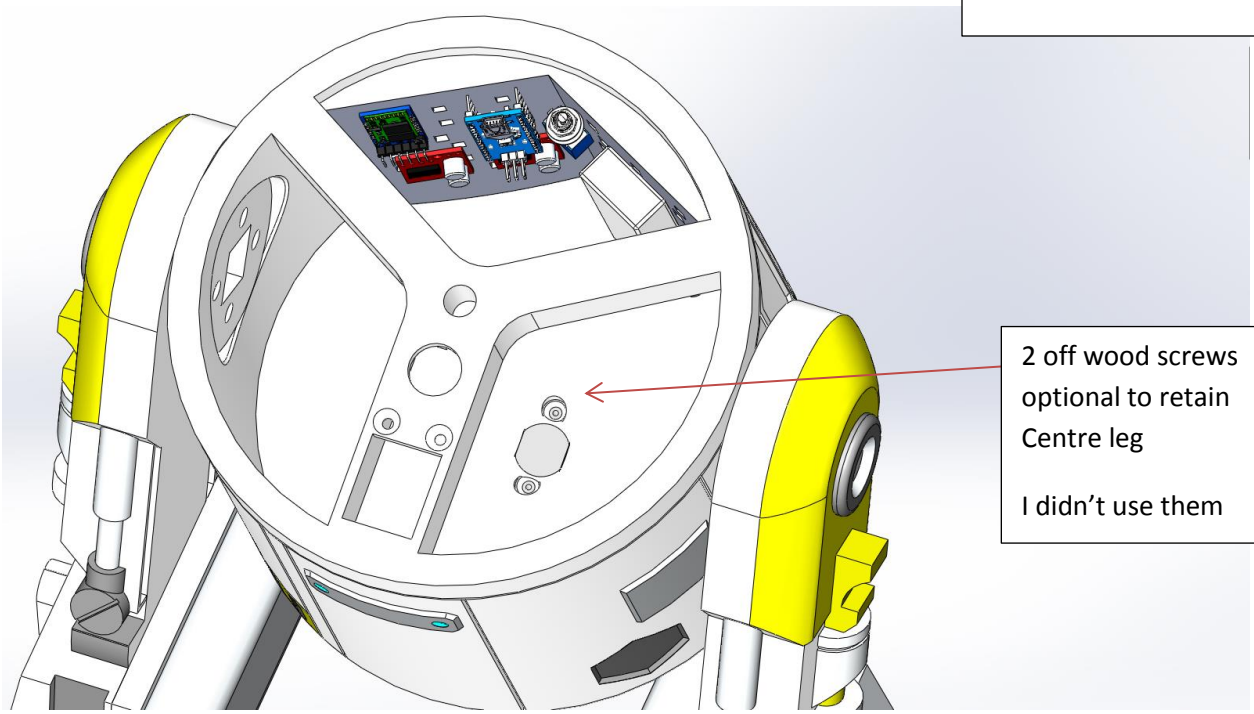

Wires run through a
hole in the legs


Spider pushes into dome, can be glued


Cavity for M6 nuts
Motor and wheel installed



An 8mm timber dowel can be used as the axle just a drop off hot glue either side to retain

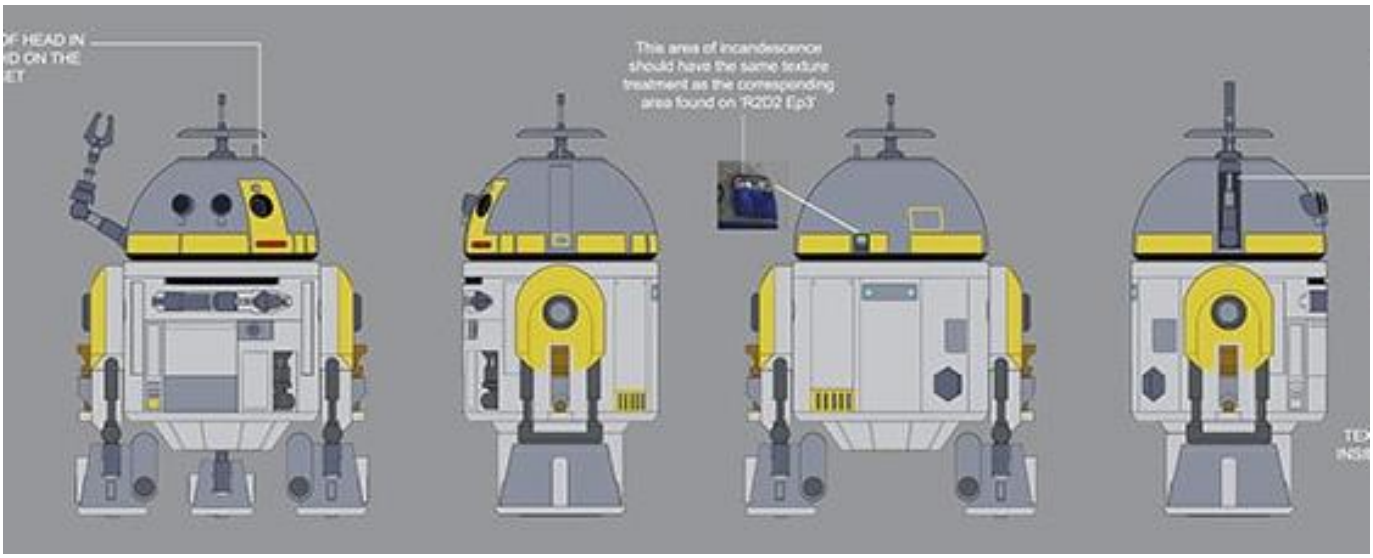


2 off wood screws optional to retain Centre leg

I didn't use them

Painting and Sounds

I Printed all my parts in White PLA + and then painted the details on with a brush. I sprayed the dome Light Grey and masked and sprayed the yellow on top of that. The body I left white and hand brushed details with hobby paints.



I used this for the paint reference, sorry I can't remember the original source.

The sounds is achieved by connecting your phone to a Bluetooth speaker, I used a cheap $10 one from Kmart:

Then playing the sounds from the phone app, the random button will play a random sound every 30 seconds.

https://www.kmart.com.au/product/bluetooth-pocket-speaker/2670810