Mini Chopper Guide by Matt Zwarts

This is the guide for printing and assembling a mini Chopper 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

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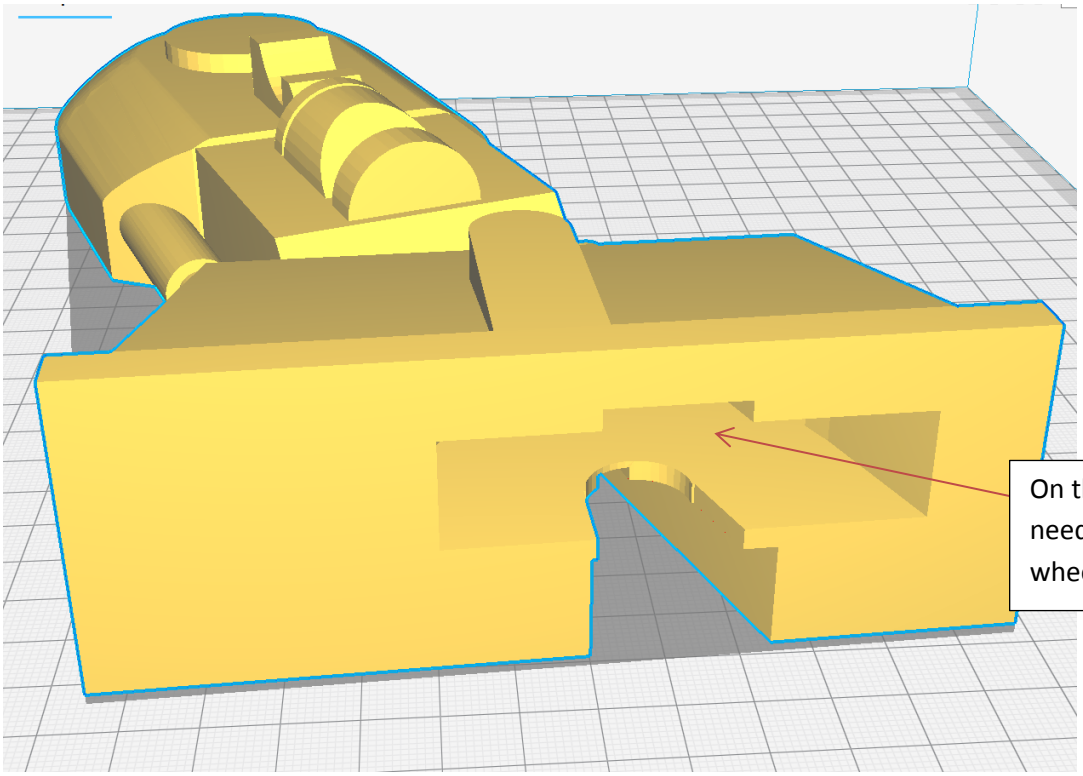
Printer Settings

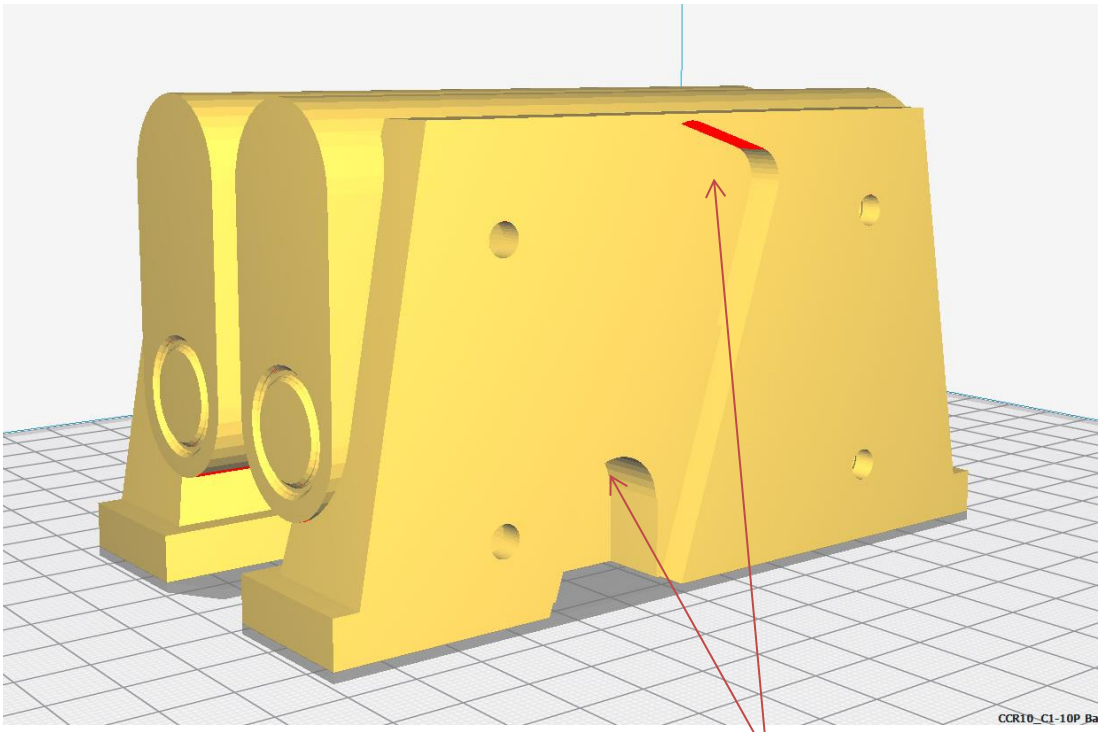
All the prints I did where with PLA + material, use your own print temperatures and machine based settings.

I estimated it used about 1.5kg of PLA + filament to print all the parts.

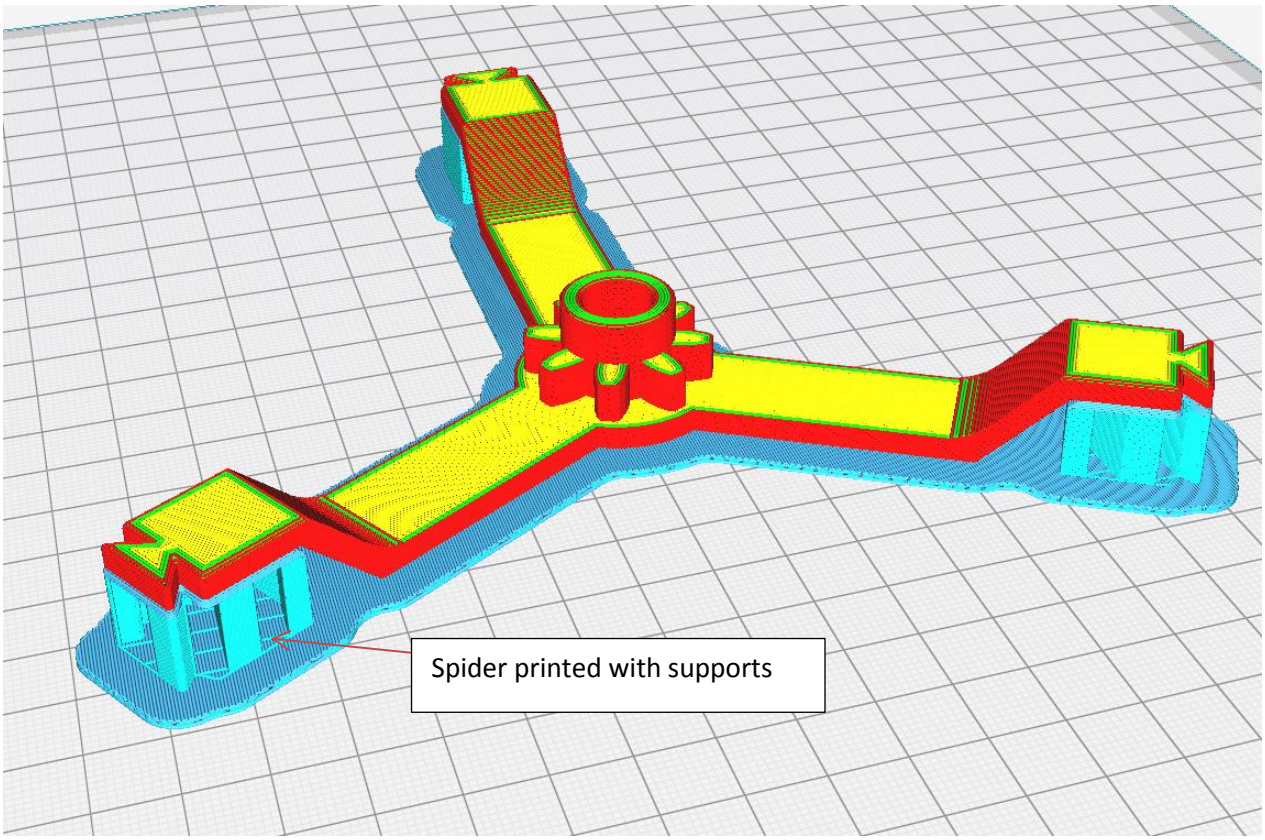
Part Name	Quantity	Supports	Overhang Value	Infill %	Notes
Antenna Base.STL	1	No		10	
Antenna Top.STL	1	No		10	
Black Eye.STL	1	No		10	
C1-10P Battery Box Left.STL	1	Yes	65	10	
C1-10P Battery Box Right.STL	1	Yes	65	10	
C1-10P Body MZ.STL	1	No		15	Print at 0.2 layer height for crisper detail
C1-10P Body-Electrical mount.STL	1	No		10	
C1-10P Dome MZ.STL	1	No		15	Print at 0.2 layer height for crisper detail
C1-10P Left Leg.STL	1	Yes	65	15	Supports only needed in wheel arch
C1-10P MZ Wheel Rev 2.STL	2	Yes	65	30	
C1-10P Right Leg.STL	1	Yes	65	15	Supports only needed in wheel arch
Dome Axle.STL	1	No		20	
Dome Centre Spider.STL	1	Yes	65	20	
Dome Gear.STL	1	No		30	
Eye.STL	2	No		10	
Front Axle.STL	1	No		30	
Front Fork.STL	1	No		30	
Front Tire.STL	1	No		30	
Front Wheel Hubs.STL	2	No		15	
Head Detail Block.STL	1	No		10	
Head Side Led Strip.STL	1	No		10	



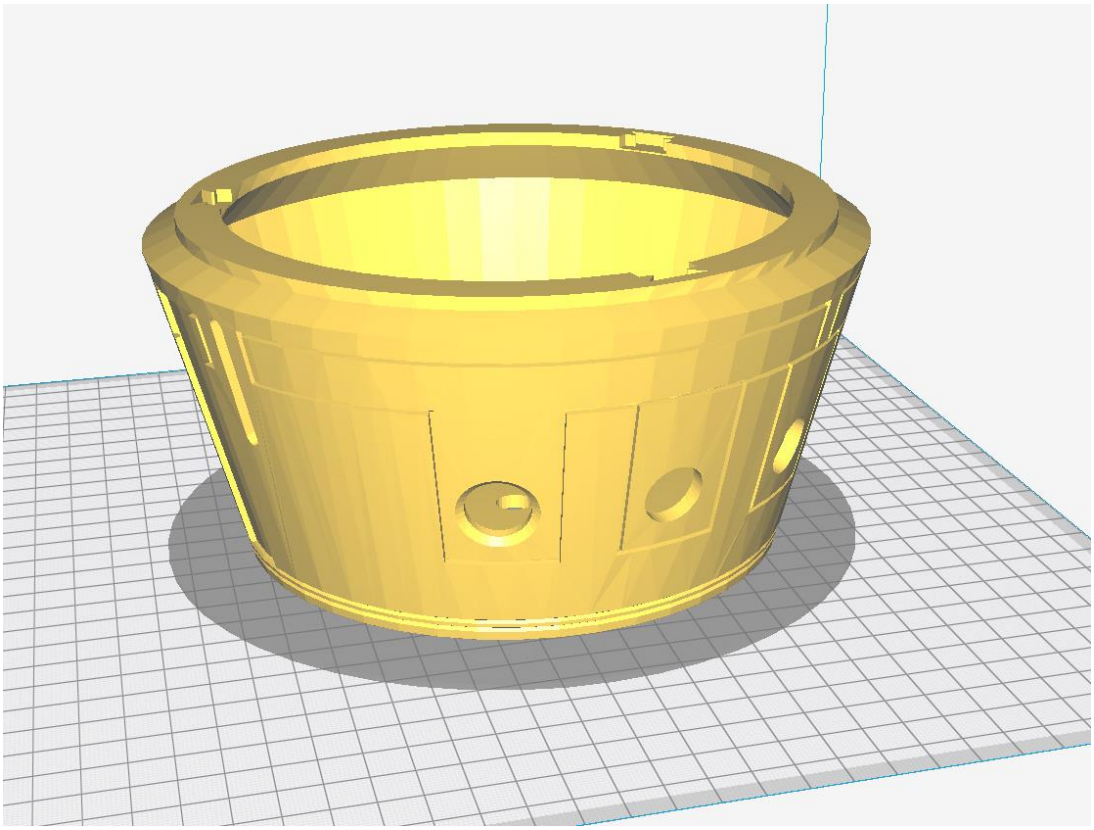
On the legs support is only needed on this large area for the wheel cavity

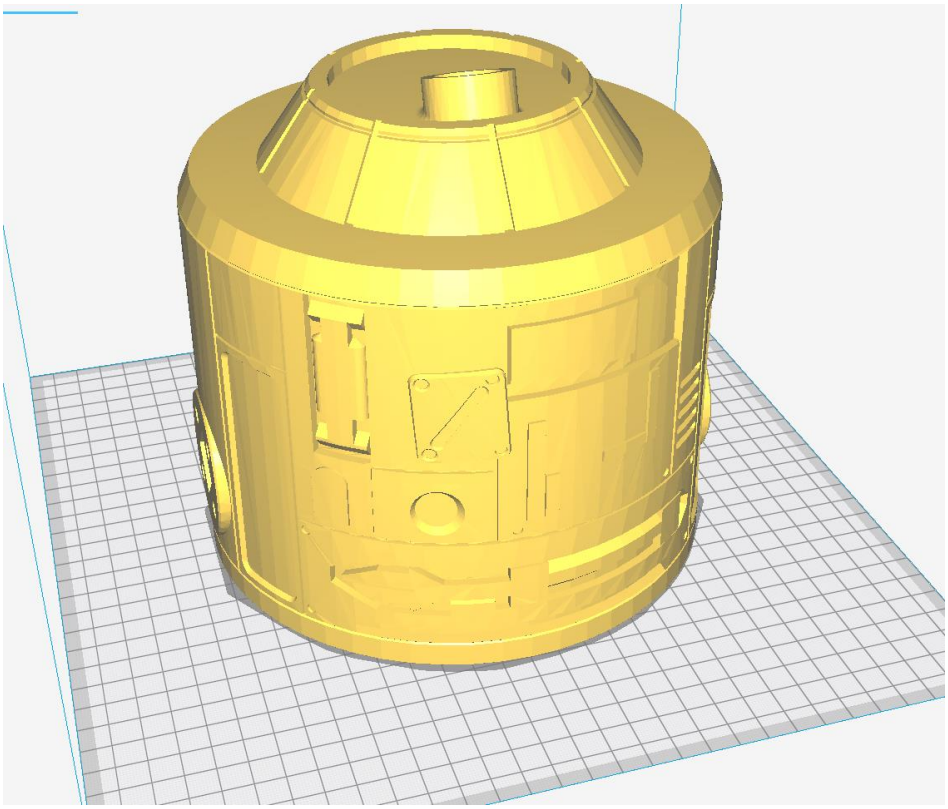


Battery Boxes printed vertical with supports needed in a few places, auto supports should be fine


Spider printed with supports

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 just buy 5 or more at a time 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	See wiring schematic for Voltage divider	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

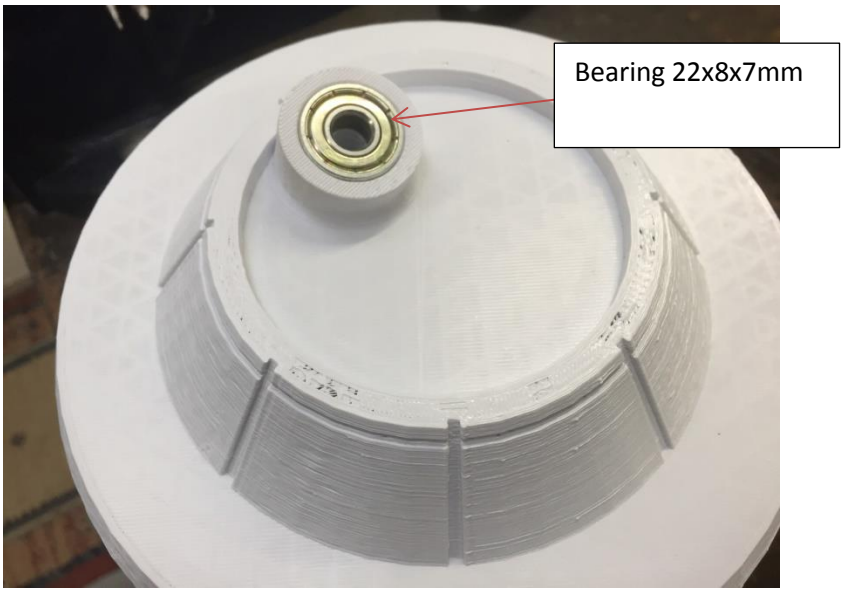
Part Name	Quantity	Source	Comment
M6 x 25 Long SHCS	8	Hardware store	I got my bolts from used filament spools, Esun PLA+, recycled!
M6 nuts	8	Hardware store	
M8 x 50mm SHCS or SCHS	1	Hardware store	
M8 Nylock Nut	1	Hardware store	
Bearings 22mm OD x 8mm ID x 7mm	4	Hardware store	
Various wood screws	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.

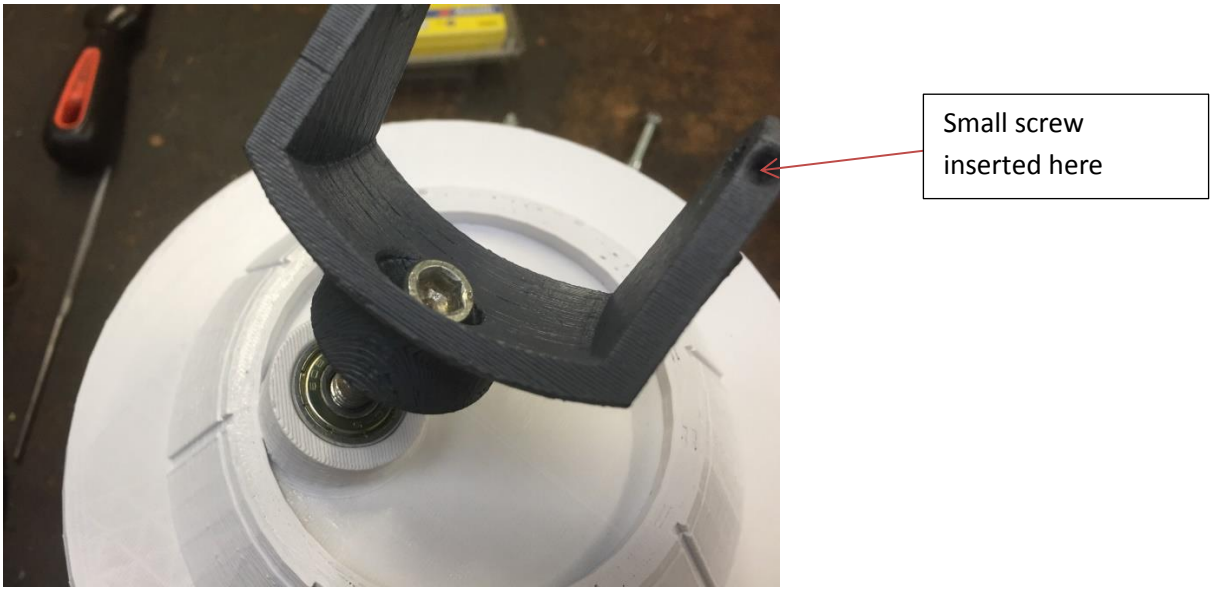
The bearings are pressed into the front tyre and 2 are used in the front pivot or axle joint, the M8 bolt is only needed to be done up just loose and the nylock is to ensure it doesn't vibrate loose.

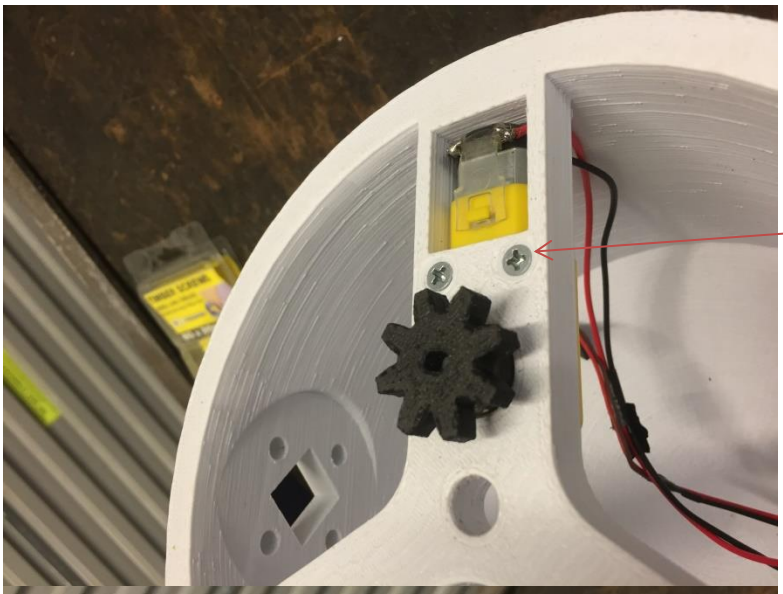
Assembly

Bearings installed into the body on the outside and inside



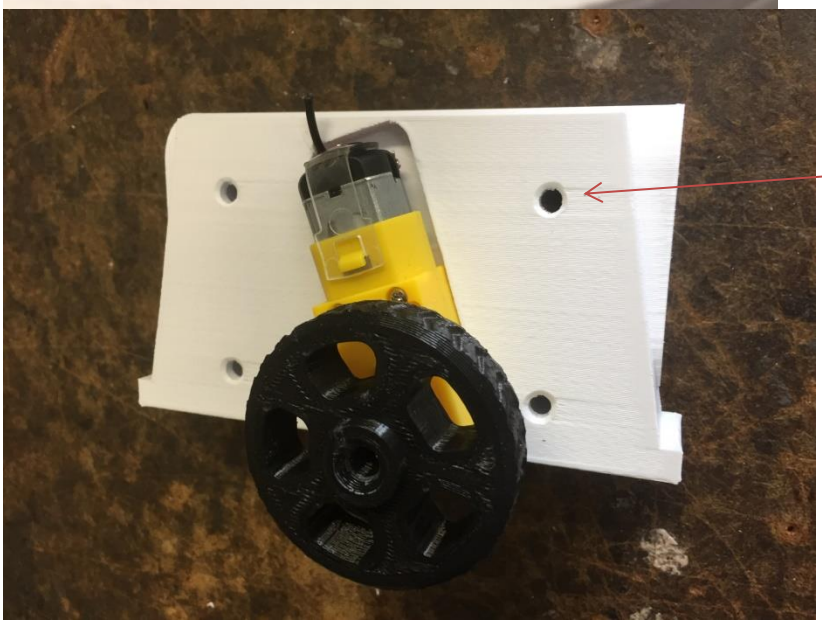
M8 SHCS installed through the front fork and bolted on, the other 2 bearings are pressed into the front tyre and then the wheel, 2 front wheel hubs and axle are installed. There is space for a small screw to retain the front axle.



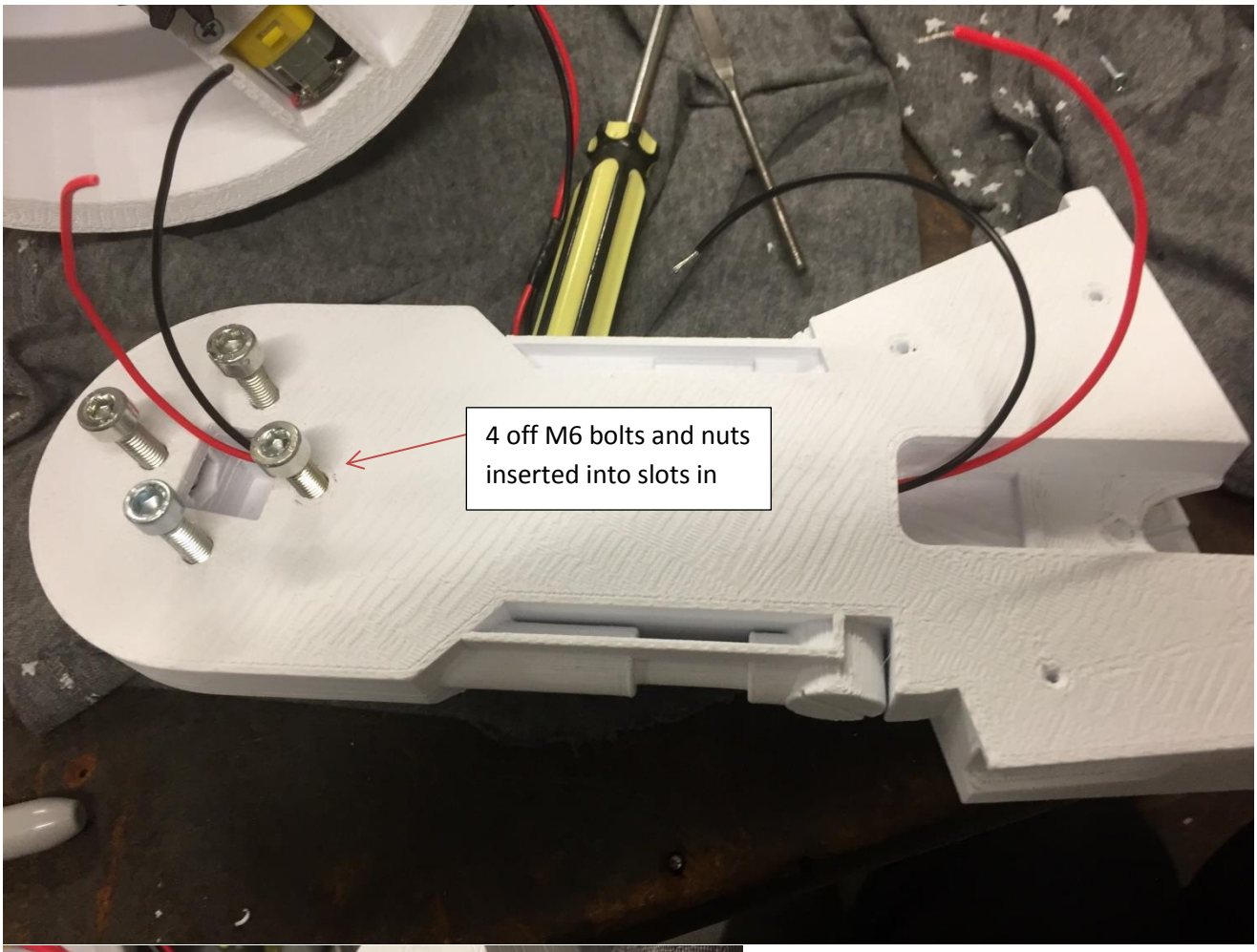


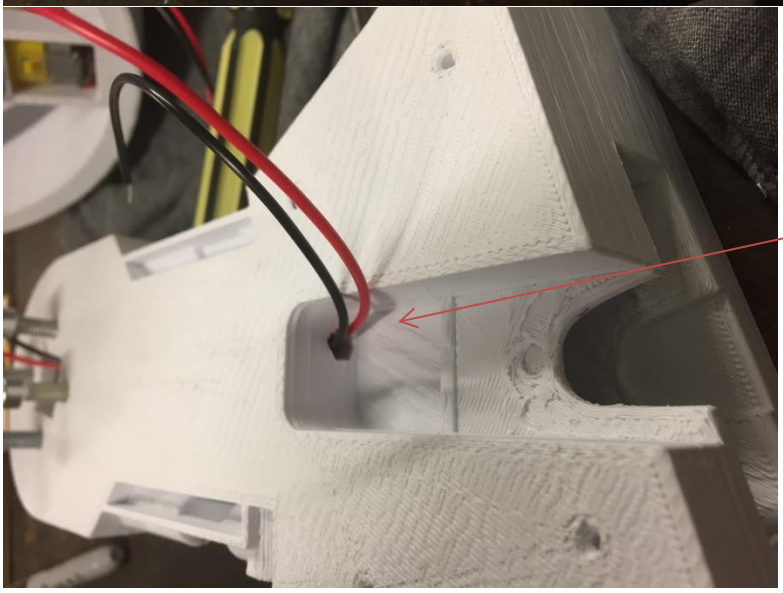
Small screws inserted here

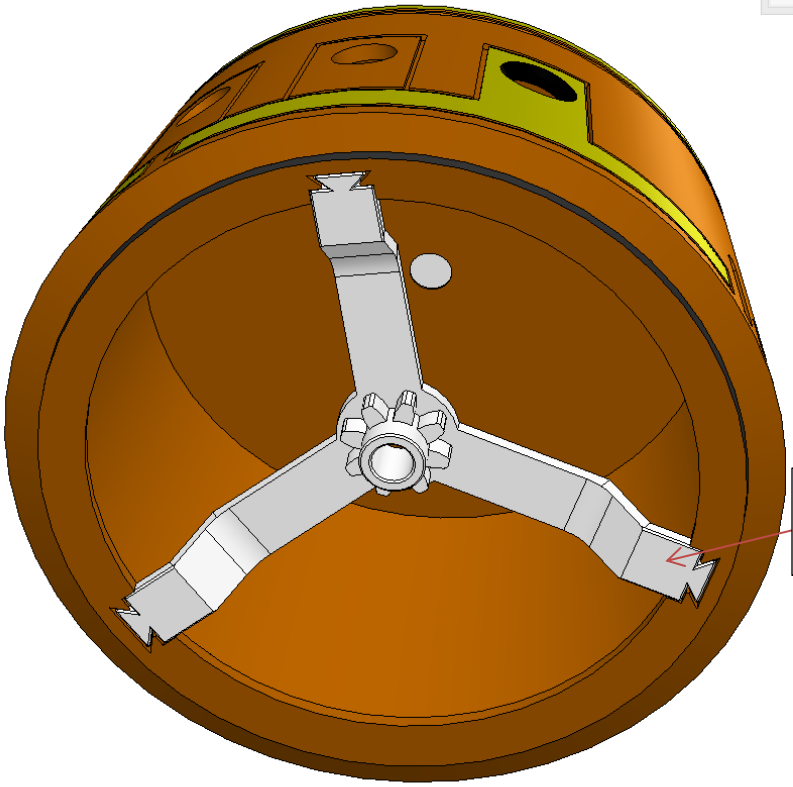
M4 nut and grub screw

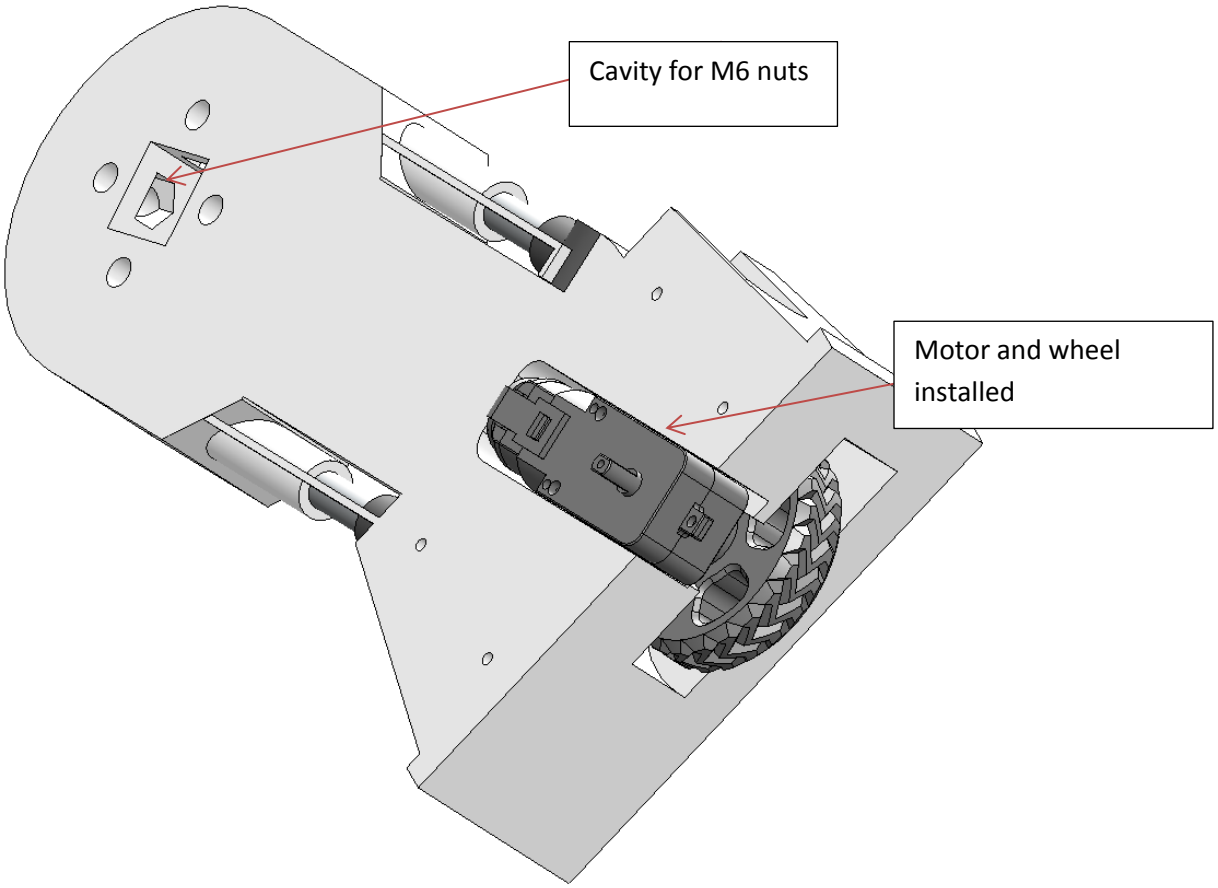


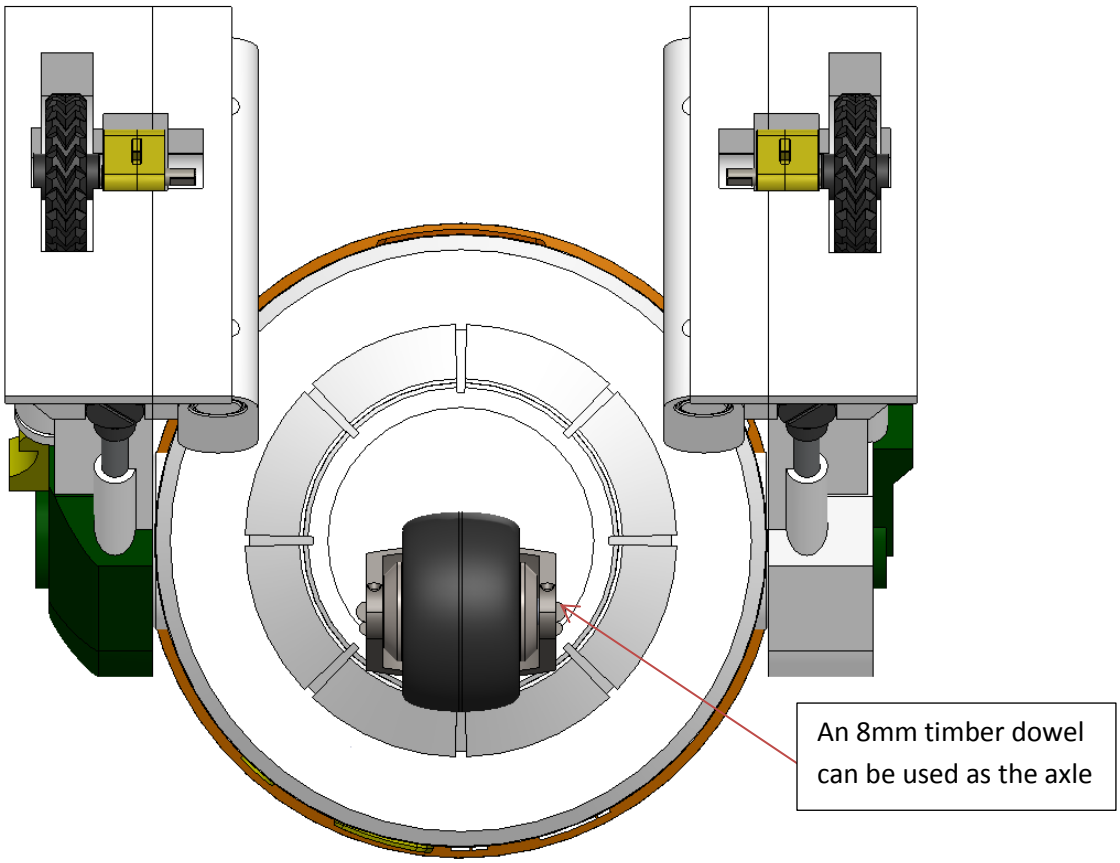
4 screws through from other side to screw into the side of each leg, no screw is required in the motor, a small step in the leg print holds the motor from sliding up.

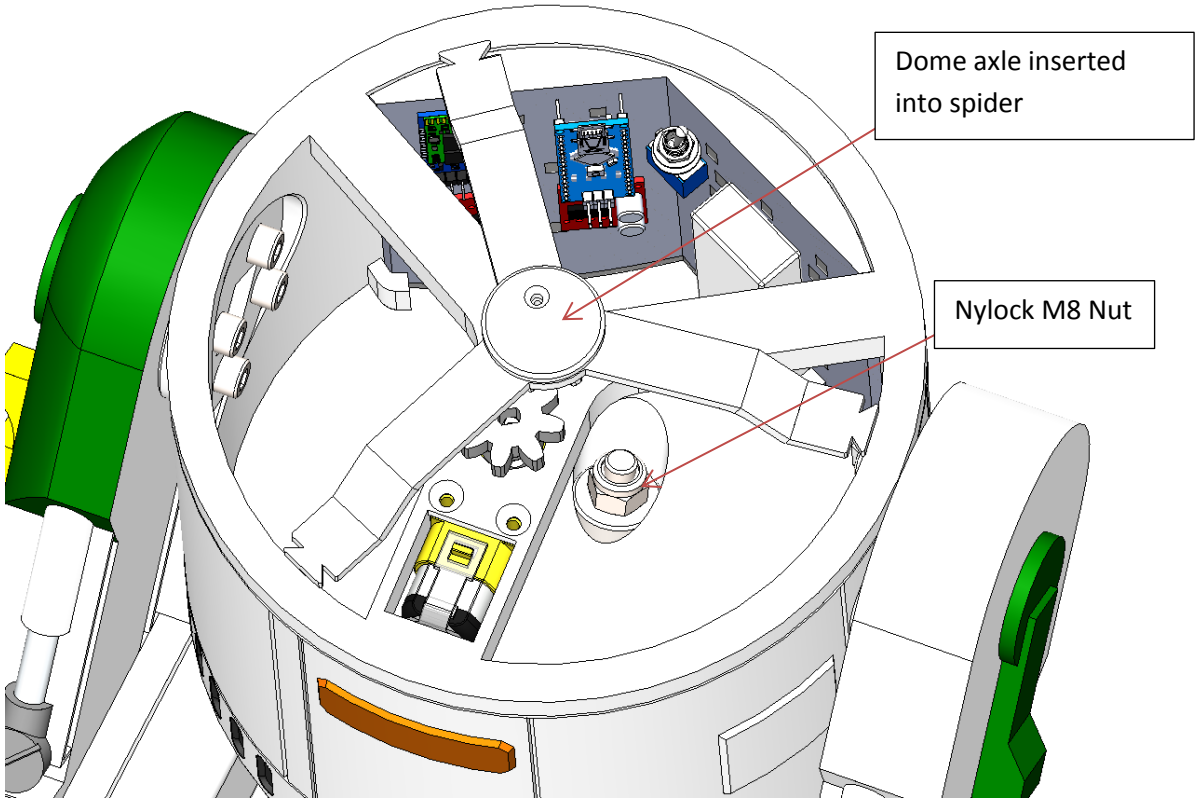

4 off M6 bolts and nuts
inserted into slots in


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


Dome axle inserted into spider
Nylock M8 Nut

Painting and Sounds

I Printed all my parts in White PLA + and then painted the details on with a brush. I sprayed the dome orange and masked and sprayed the yellow on top of that.

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