

Omni Robot Platform

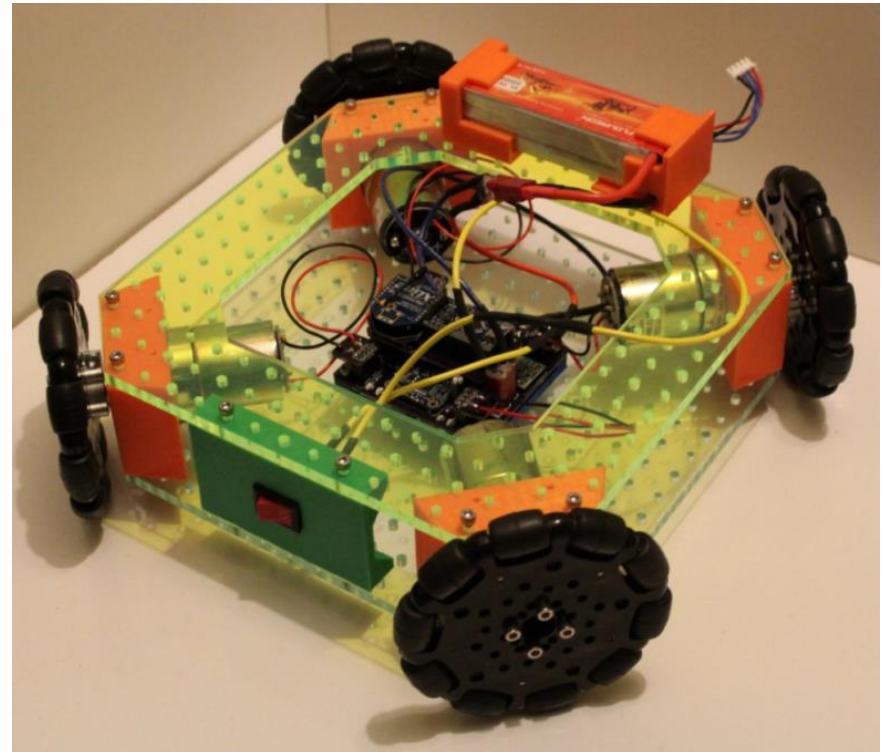
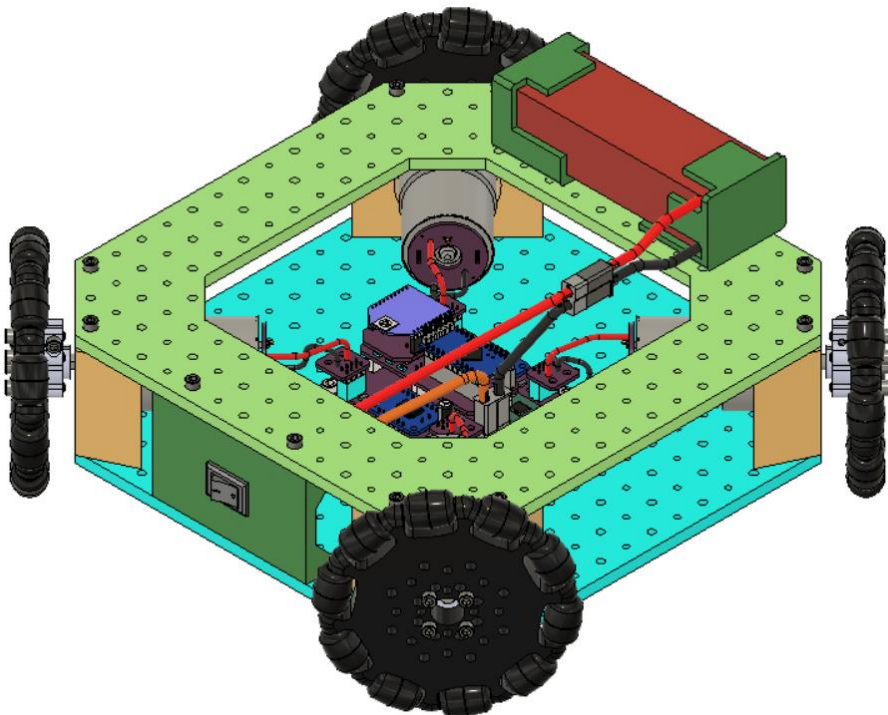
Richard Firth 1/25/18

I saw these cool omnidirectional robots, so I decided to make one of my own (The ones for sale were out of stock). I figured I may as well document it and release it for others to make.

This isn't a robot since it is controlled by a remote, but it should be easy enough to add sensors.

Everything is released like an open source thing. So people may do whatever they want with these.

Contact me at richardfirthucsb@gmail.com if you decide to make one of these. I'd be interested to know what people do with it.



Goal / Contents

- Provide high level instructions on how to construct the robot platform
- List the parts used in constructing the robot platform
- Go over the design/engineering of the thing, so that people can understand how it was designed & constructed

Resources:

Github: https://github.com/richardFirth/OmniRobotPlatformSKIRB_RevA

CAD Files: https://grabcad.com/library/omni-robot-platform-skirb_reva-1

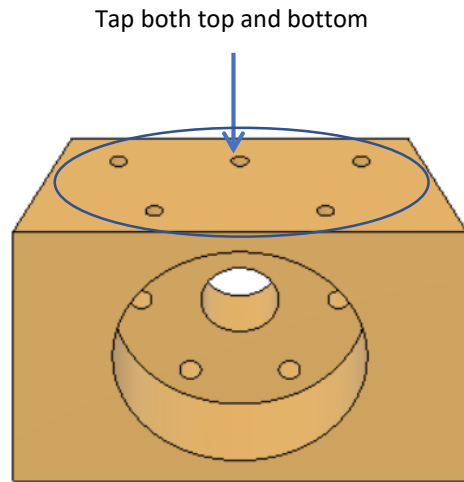
Prerequisites:

- Electronics/soldering
- Arduino Programming
- Knowledge of Xbees
- 3D printing
- ~\$450 + equipment

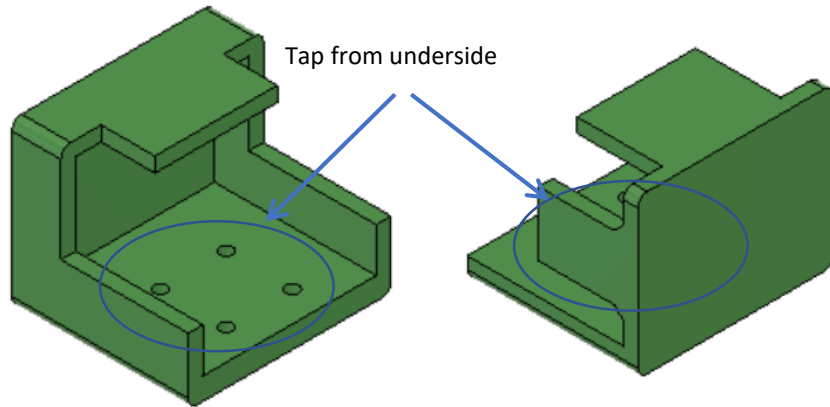
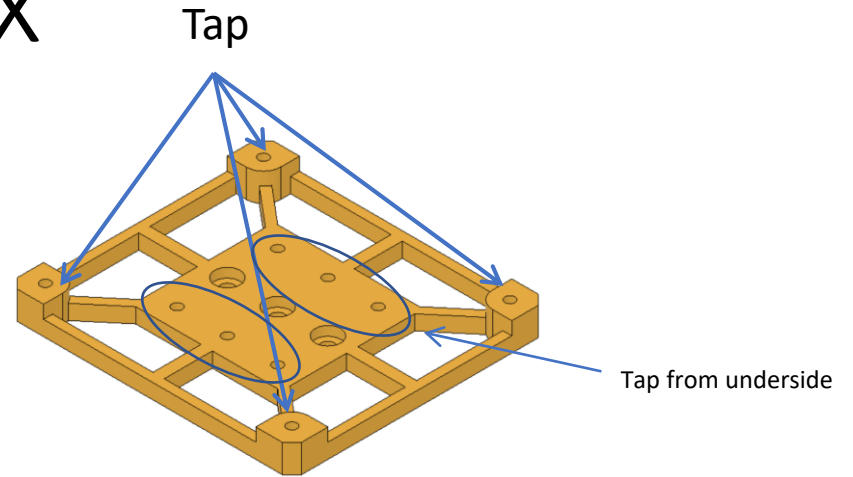
Price estimate: ~\$200

- Each wheel assy ~\$30 (\$120 for wheels)
- LiPO battery \$16
- Misc screws, wire ect \$20
- 3D printed parts, laser cut parts \$30

3D Printed Parts Index



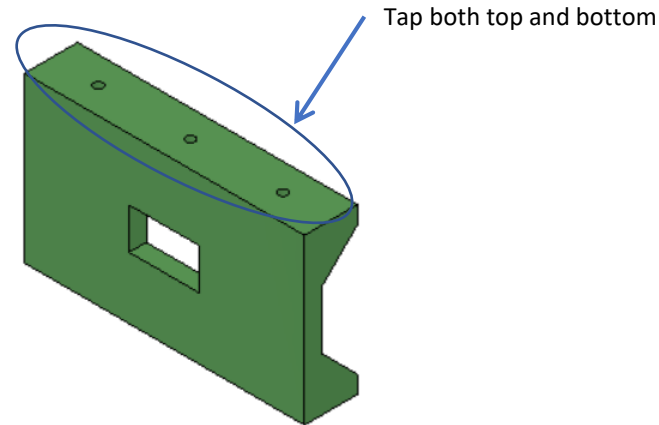
MotorHolderD (X4)



BatteryHolderA_2

BatteryHolderB_2

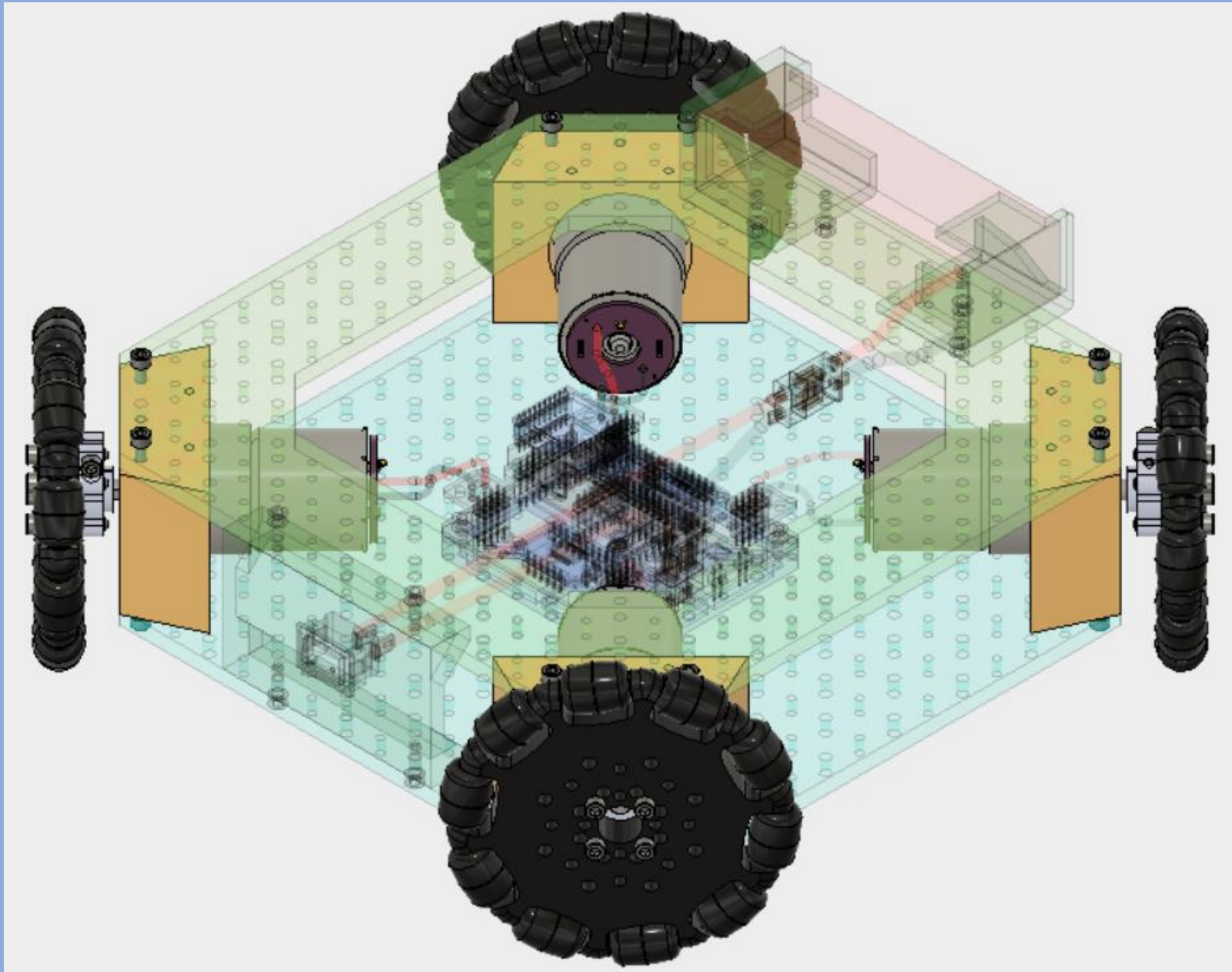
Standoff_Omni



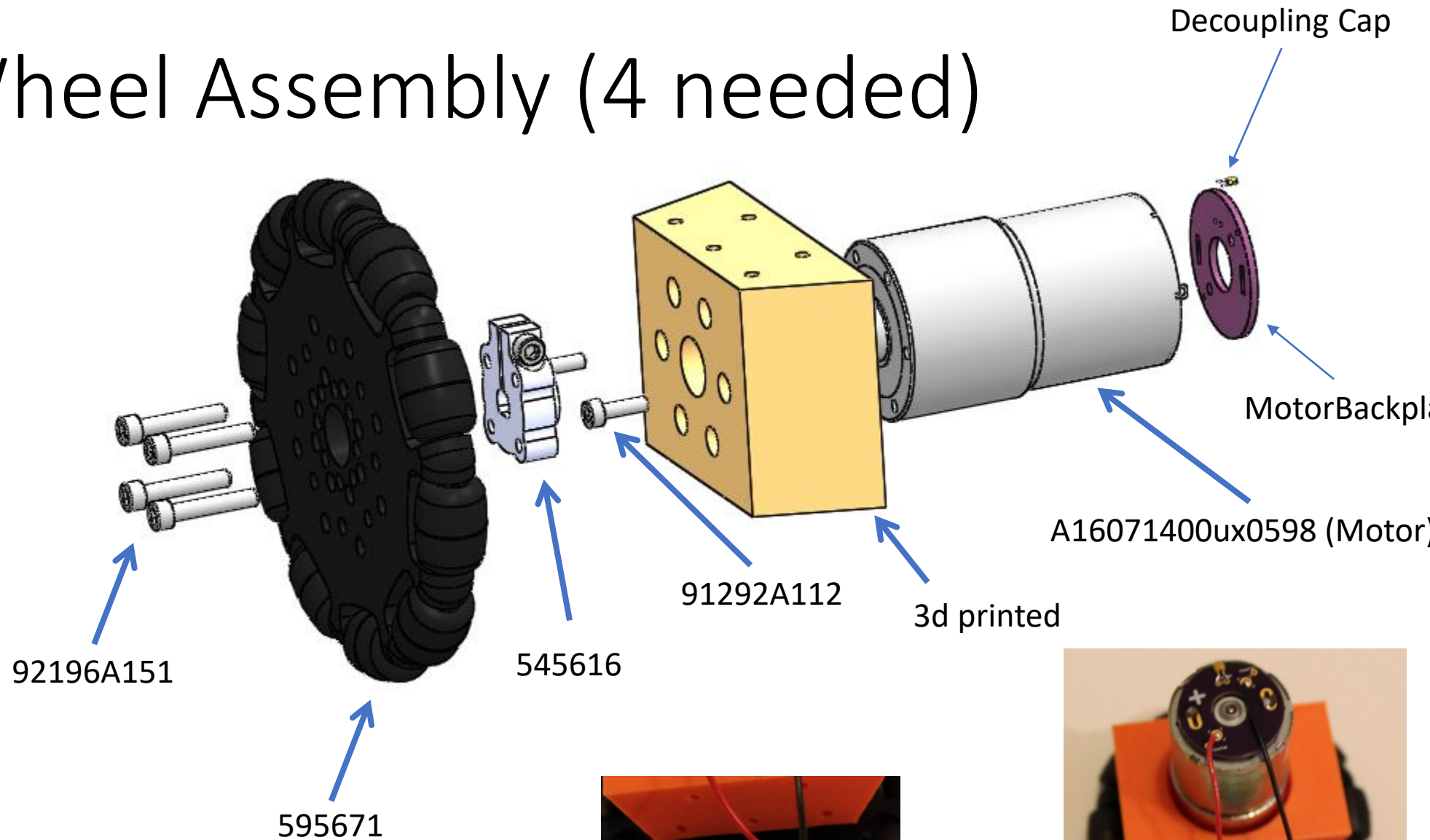
SwitchHolder

- Holes match the spacing for attaching stuff bought on servocity.com
- Thread holes using a 6-32 tap
 - <https://www.mcmaster.com/#2548a12/=1a34129>
 - <https://www.mcmaster.com/#27175a114/=1a340o6>

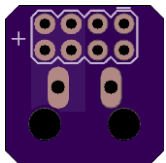
Wheels









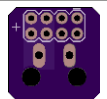


Wheel Assembly (4 needed)






Motor attached to main board via clips

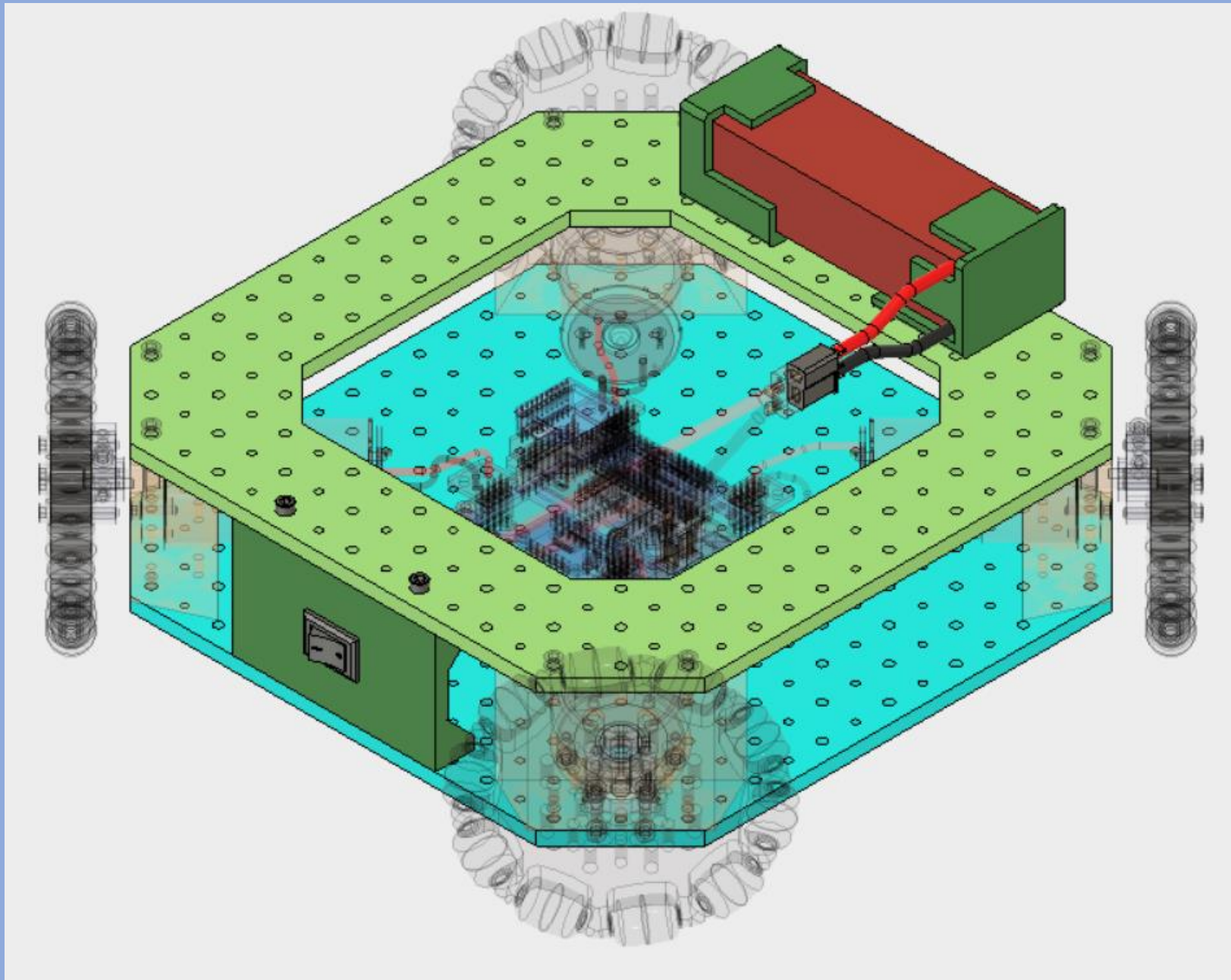


Bill of materials – Wheel Assemblies (Need 4)

Part #	Description	Pic	Source
ZGA37RG31 (Gearbox) a16071400ux0598 (Uxcell P/N)	12V 100 RPM DC Motor		https://www.amazon.com/gp/product/B01KTZXZ1G/
545616	Face Tapped Clamping Hubs, 0.770" Pattern (6mm)		https://www.servocity.com/770-clamping-hubs#348=98 SERVOCITY.
595671	4" Omni Wheel		https://www.servocity.com/4-omni-wheel SERVOCITY.
0.1 uF Ceramic Capacitor	0.1 uF Ceramic Capacitor		https://www.amazon.com/gp/product/B01N3L8IE1
MotorBackplate	MotorBackplate		https://oshpark.com/shared_projects/eEKy6Eoc 
MotorClip	MotorClip		https://oshpark.com/shared_projects/modA4HzY 
Wire	Wire		https://www.amazon.com/gp/product/B01180QKJ0/

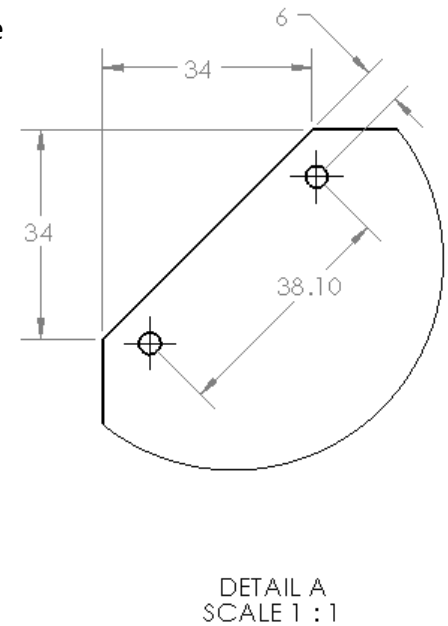
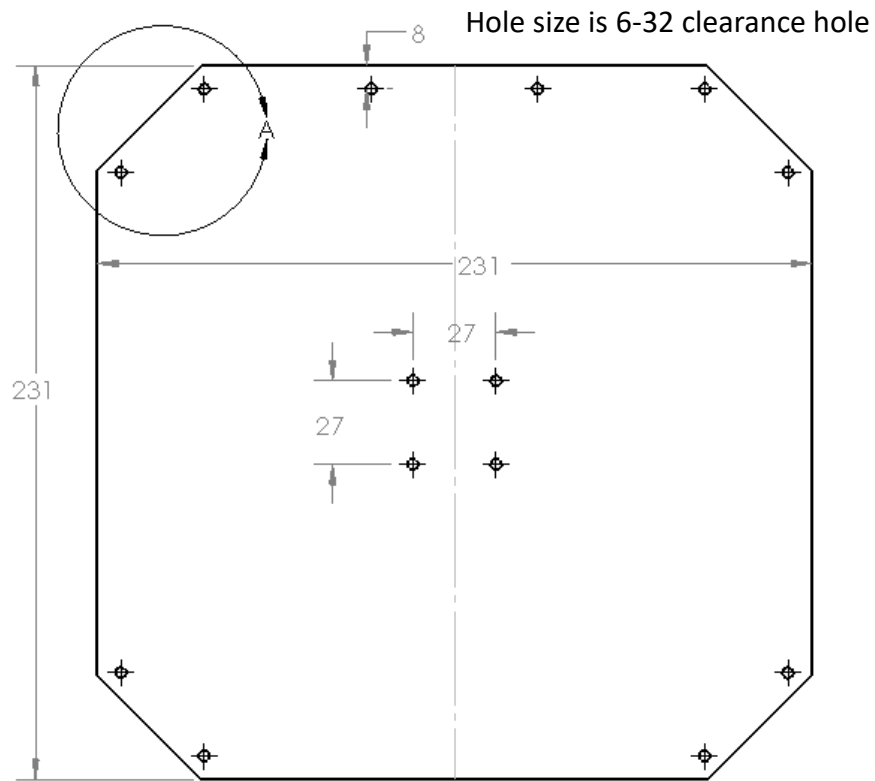
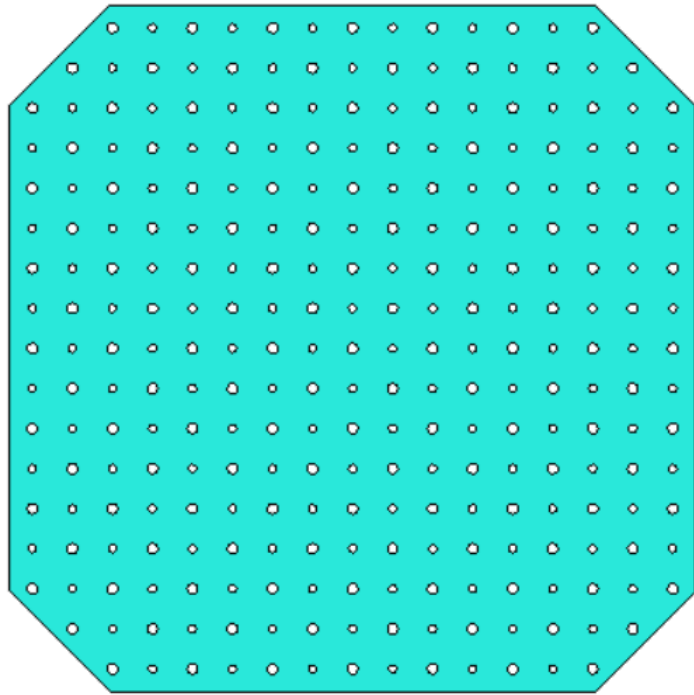
Part #	Part	Pic	Source
92196A151	18-8 Stainless Steel Socket Head Screw 6-32 Thread Size, 3/4" Long		https://www.mcmaster.com/#92196A151/ McMASTER-CARR.
92196A146	18-8 Stainless Steel Socket Head Screw, 6-32 Thread Size, 3/8" Long		https://www.mcmaster.com/#92196A146/
91292A112	8-8 Stainless Steel Socket Head Screw M3 x 0.5 mm Thread, 8 mm Long		https://www.mcmaster.com/#91292A112/ McMASTER-CARR.

Body

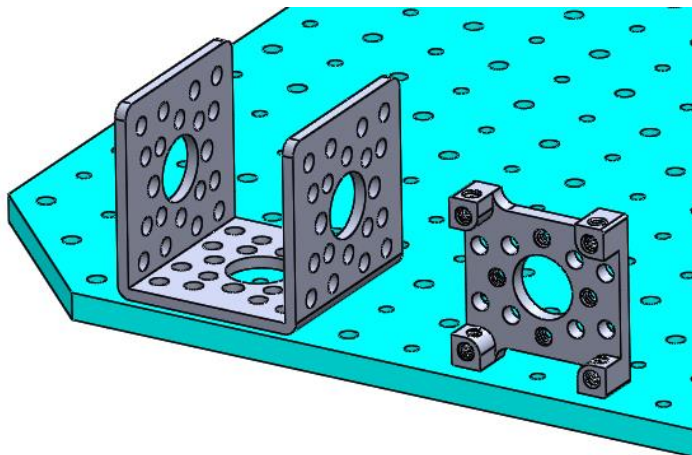


Laser Cut / Flat Parts

If you don't have access to a laser cutter. You can order from ponoko or use a Saw/Drill on plywood. Not all holes are used.



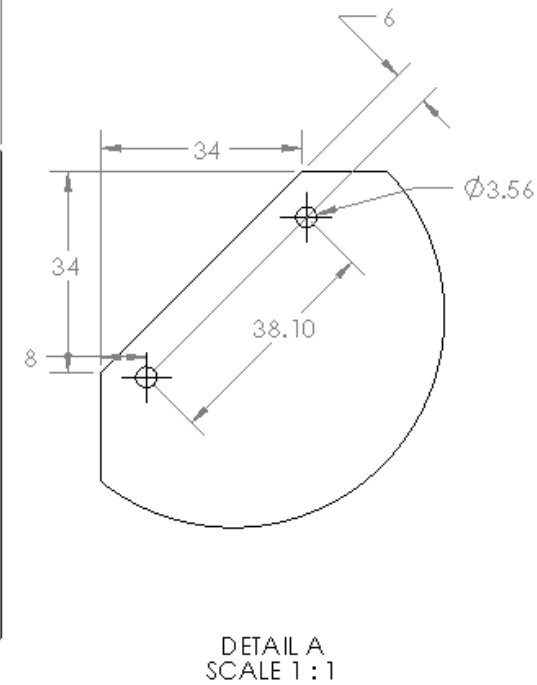
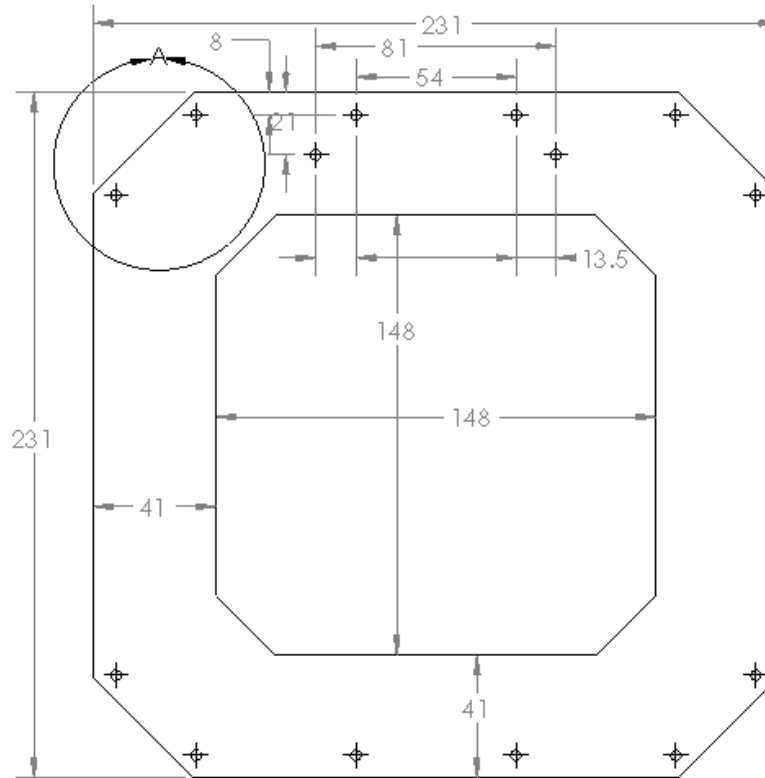
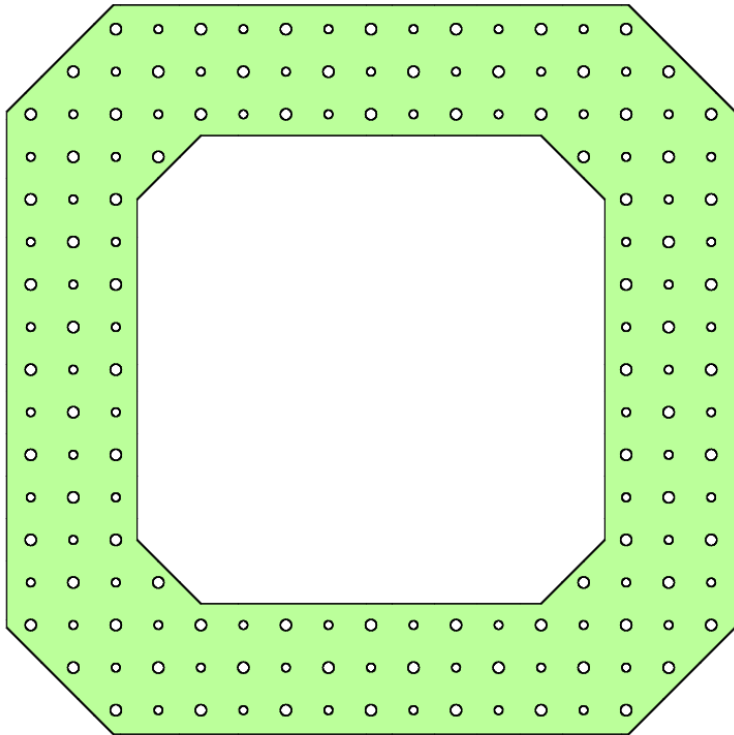
(if not using a laser cutter, these are the critical holes)



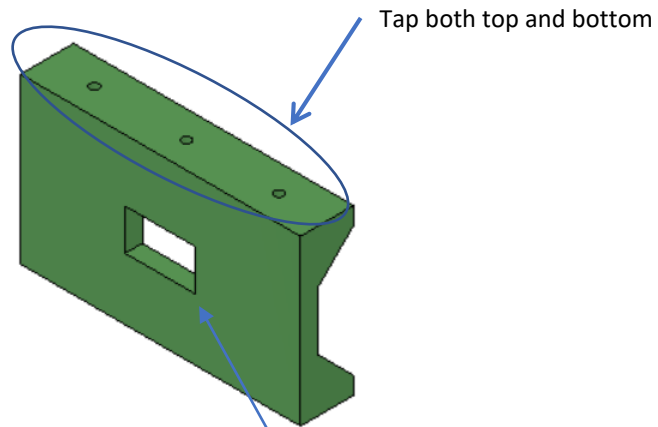
- Holes match the spacing for attaching stuff bought on servocity.com
- Narrower holes can be 6-32 threaded using tap.

Dimensions in MM

If you don't have access to a laser cutter. You can order from ponoko or use a Saw/Drill on plywood. Extra holes are to support future stuff you might add.



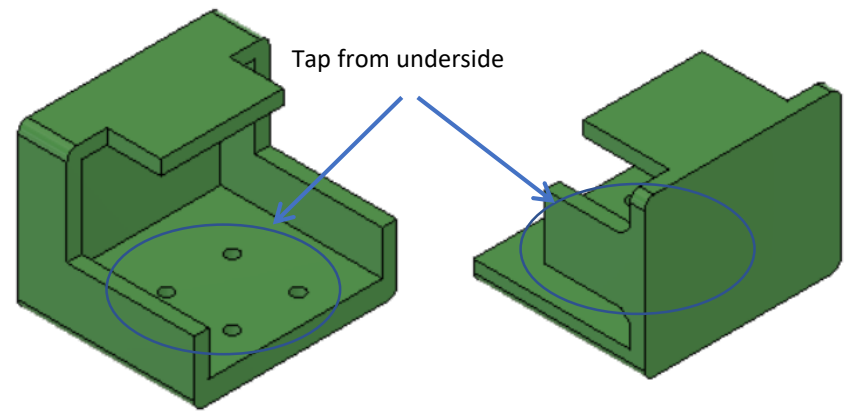
Standoff_Omni



SwitchHolder

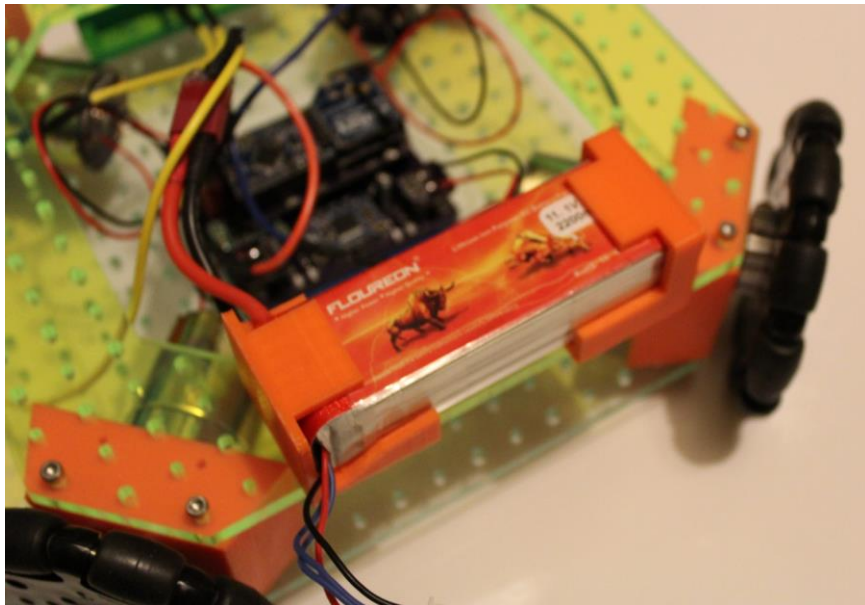


Snap in



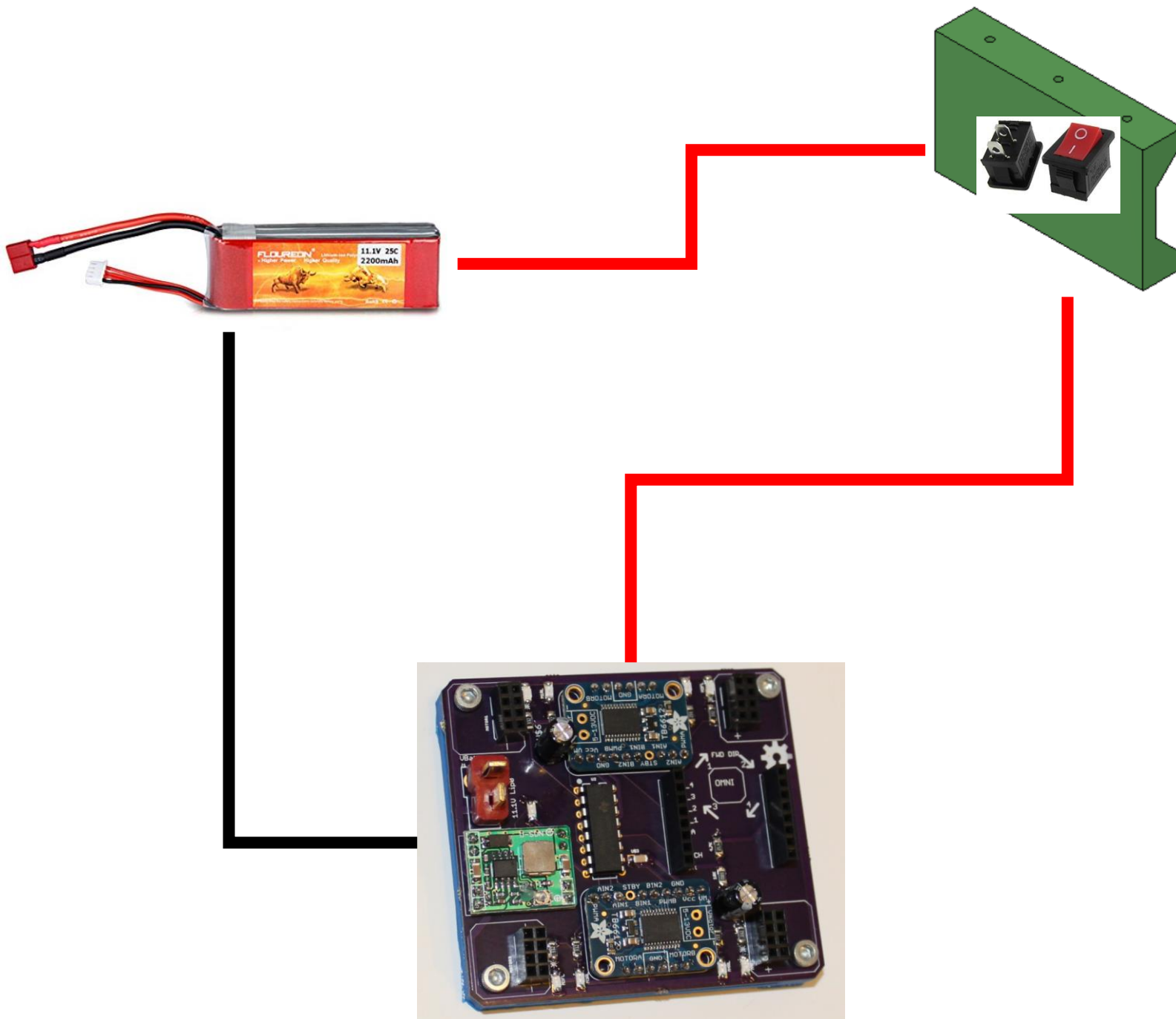
BatteryHolderA_2

<https://www.amazon.com/gp/product/B009751Y3Q/>



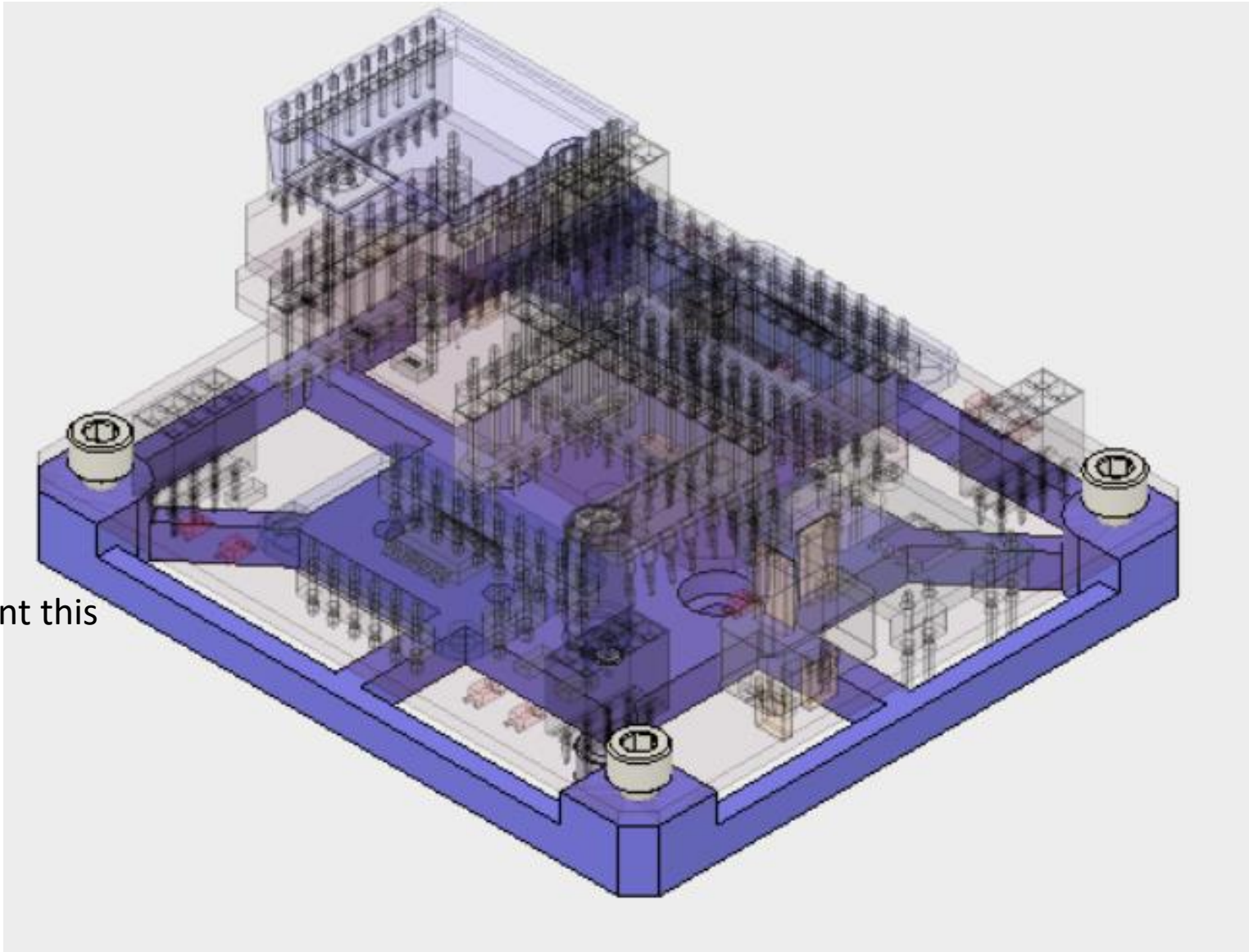
<https://www.amazon.com/gp/product/B00PQKQ0BM>

Wiring



Circuit board Holder

3d Print this



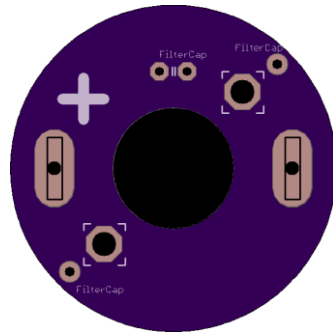
Printed Circuit Boards

MotorClip -> https://oshpark.com/shared_projects/modA4HzY (need 4)

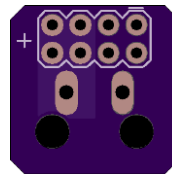
MotorBackplate -> https://oshpark.com/shared_projects/eEKy6Eoc (need 4, optional part)

Not to Scale!

MotorBackplate



MotorClip



Design Notes - Mechanical

- For the frame and wheels, the materials were chosen based on the fact I have access to a laser cutter and 3D printer and am familiar with them
- Wheels, hubs, screw sizes ect were chosen to match stuff off ServoCity, because I have a bunch of their stuff already, and the hole pattern lets me attach actobotics stuff to the robot
- The motor was the first guess, and worked so I didn't try others. Of the choices available 100 RPM seemed a good place to start. (<https://www.amazon.com/gp/product/B01KTZXZ1G/>) and they don't use a lot of current (around 0.5 amp when resisted according to an ad hoc test – I used a benchtop power supply and grabbed the wheel physically and resisted it while looking at the current)
- The battery was the second of a two pack bought for another project, but works well here.
- I didn't really think about cost as a thing since this is a one off for learning purposes

