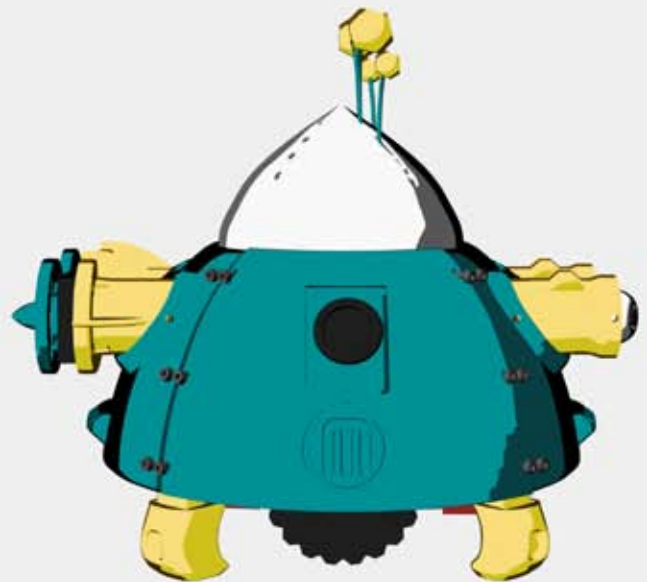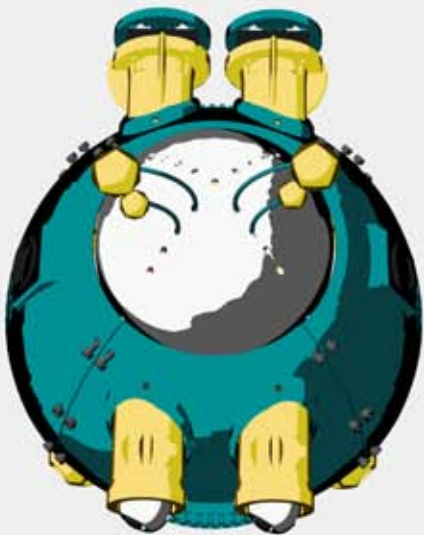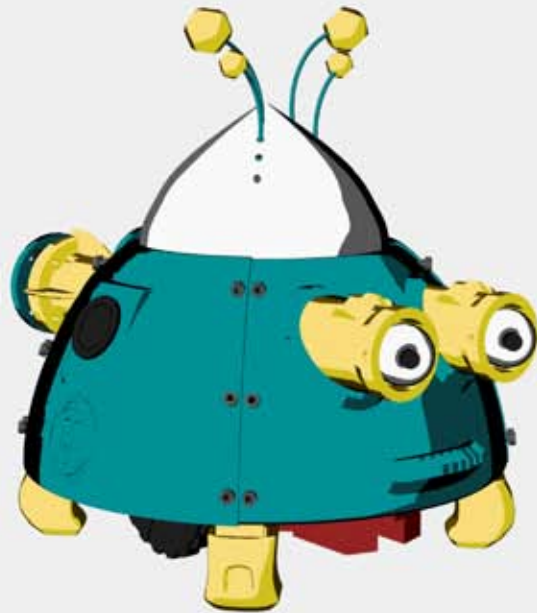# Bumper Bot 1.0

Assembly Instructions

Introduction

Hello, my name is Jason Bakutis, I am a Maker/ 3D Modeler for Makerbot, here in Brooklyn, NY. I designed and built Bumper Bot to be featured at our Robot Petting Zoo for the 2012 Maker Faire season. Some of you may have already seen Bumper Bot in action. If so, then you also saw how much the children (of all ages) enjoyed his company.

Bumper Bot is a friendly robot. He finds his way around, whistling as he goes. If something is in his way, he finds a way around. Sometimes, the world can get confusing, but taking the slow and steady path will always see you through.

I also designed Bumper Bot to be built by others, with intuitive, easy to follow steps. My hope is that the world's population of adorable, beeping, roving robots will grow, as well as evolve. I engineered Bumper Bot in a way that encourages modification, and it is really easy to give your Bot its own personality. As you look through the following instructions, you will see what I mean.

I look forward to seeing the many awesome ways you all will build the next generation of Bumper Bots.

Enjoy!

-Jason

Component Diagram

MakerBot

innerDome.stl x 1(optional)

dome.stl x 1

eyeball.stl x 2

pupil.stl x 2

jetCover.stl x 2

*40mm computer "muffin" fan x 2 (optional)

dodecahedron.stl x 4 (optional)

jetLeft.stl x 1
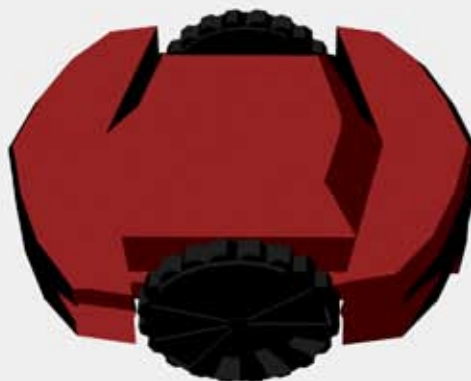
jetCone.stl x 2

jetRight.stl x 1

side.stl x 2

face.stl x 2

*Arcade Button x 2

* Scribbler "S2" by Parallax x 1

leg.stl x4

eyeSocketRight.stl x1

eyeSocketLeft.stl x1

RED electrical "ring" coupler 5 mm opening

* 8 x

*100 lb picture hanging cable 8 x 40mm

*hex screws/ nuts:
M3 x 16mm
M3 x 30mm
M3 x 40mm
M3 x 50mm

legBracket.st x4

* = non-printed (purchased) parts

1.

Bumper Bot
Tools List

1.) 3 mm hex wrench
2.) Small phillips screwdriver
3.) Crimping tool
4.) Wire clippers
5.) Hot glue gun (optional)
6.) Super glue (alternative to above)
7.) Drill
8.) Needle nose pliers

URLs for
Scribbler S2 and arcade buttons

To purchase your Scribbler S2:
http://www.parallax.com/go/s2

To purchase classic arcade buttons:
http://www.xgaming.com/store/
arcade-parts-and-accessories/product/
20-buttons-with-microswitches/

1.) Using 3 M3 x 16mm screws,
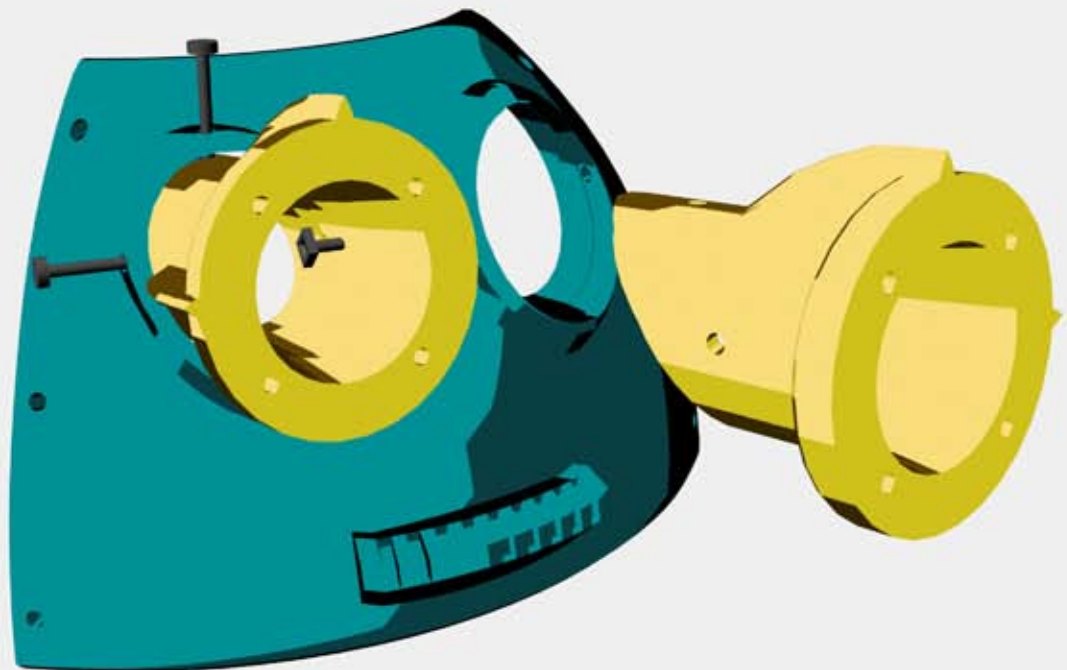attach eyeSocketLeft.stl to face.stl, as shown.

2.) Repeat process with
eyeSocketRight.stl

Tighten this outer screw first, to snug socket towards outside of face
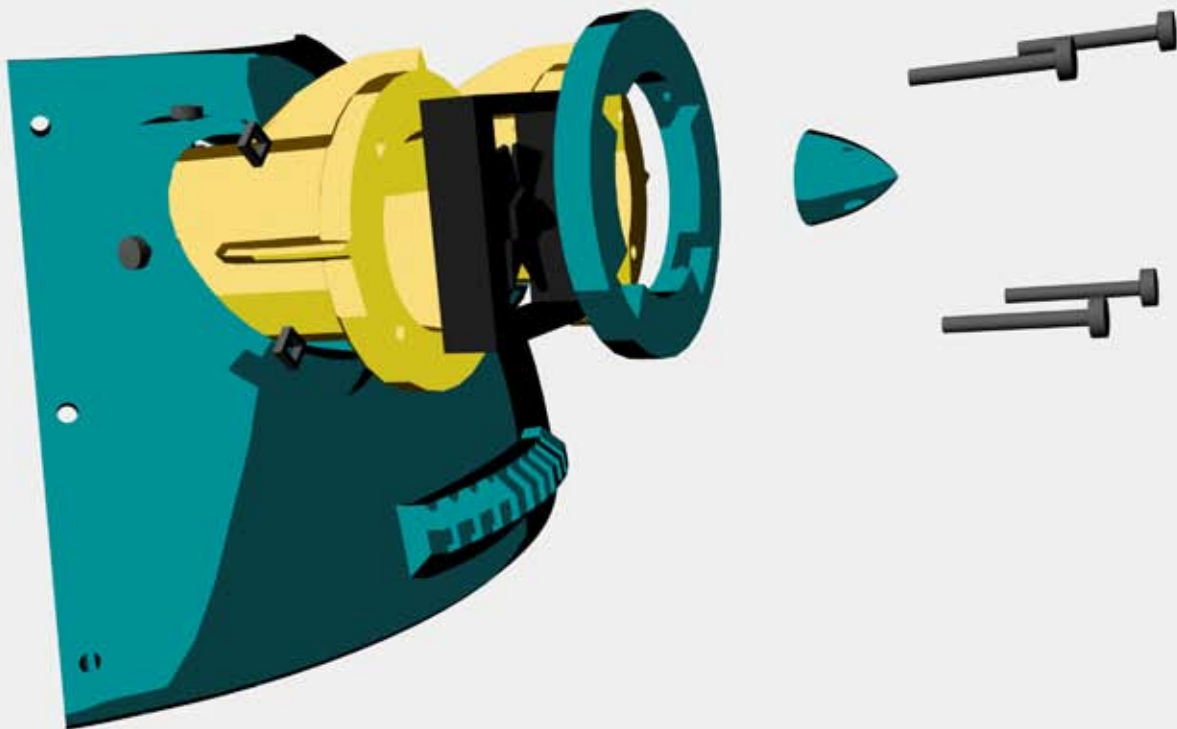
2.

3.
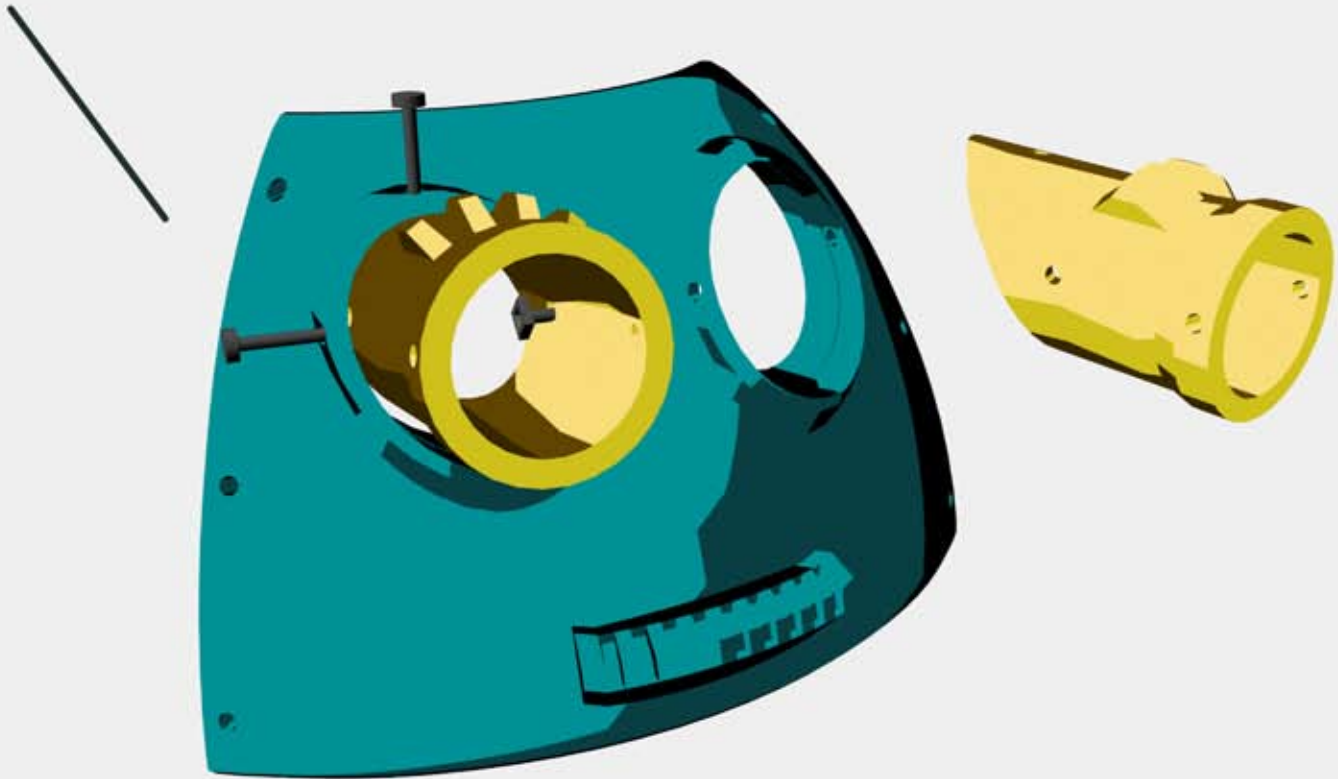
3.) Attach leftJet.stl to side.stl
using 3 x M3x16mm screws/nuts

4.) Attach rightJet.stl to side.stl
using 3 x M3x16mm screws/nuts

5.)7 Using 4 x M3x30, attach jetCover.stl and
40mm fans (optional) to jetLeft.stl and jetRight.stl.

6.) If using 40mm fans, glue jetCone.stl to centers of both fans.

5.

7.) Attach arcade button
through hole in side.stl (some sanding might be
 required to widen holeif slight shrinkage occurred).
 Attach plastic nut that was supplied with the button.

8.) Repeat with second side.stl.
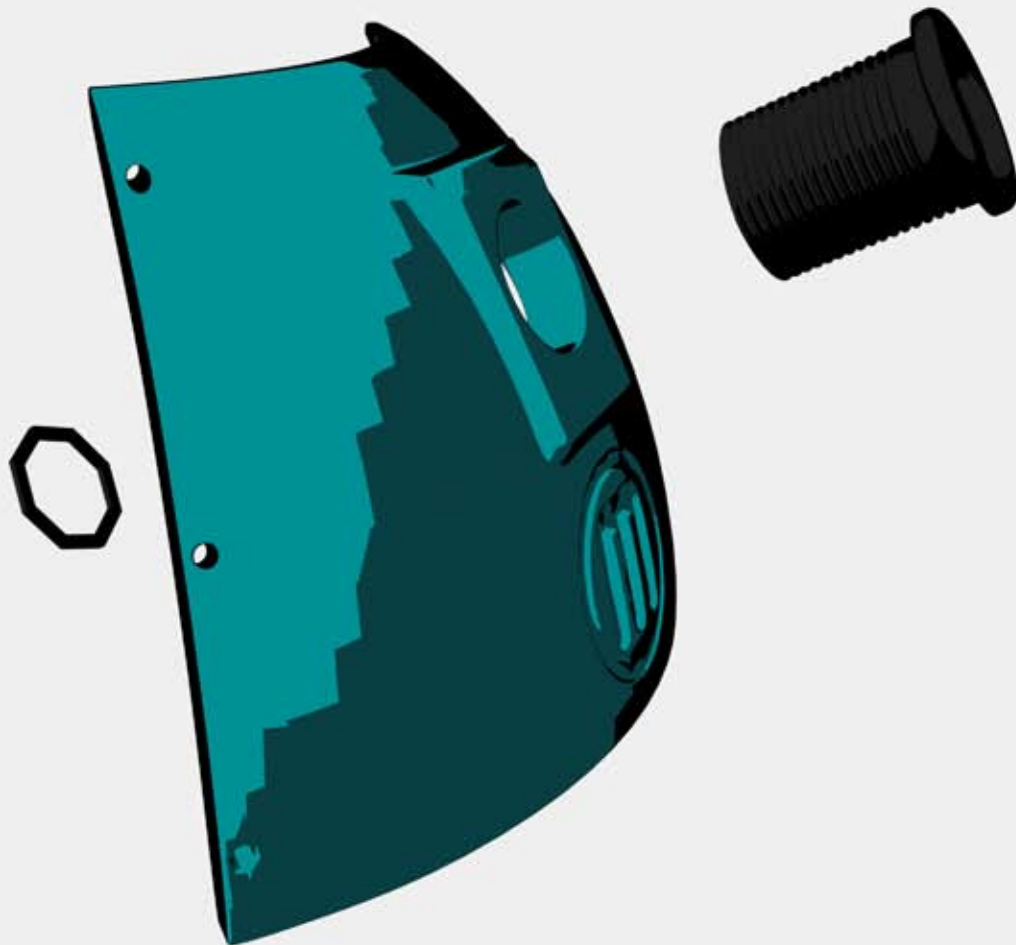
9.) Connect side.stl to face.stl using M3 x 40mm
(be sure to use 40mm, since later on, we will
see a reason for the extra length) and legBracket.stl. Be sure
to place the tapered end of legBracket.stl facing up (as shown).
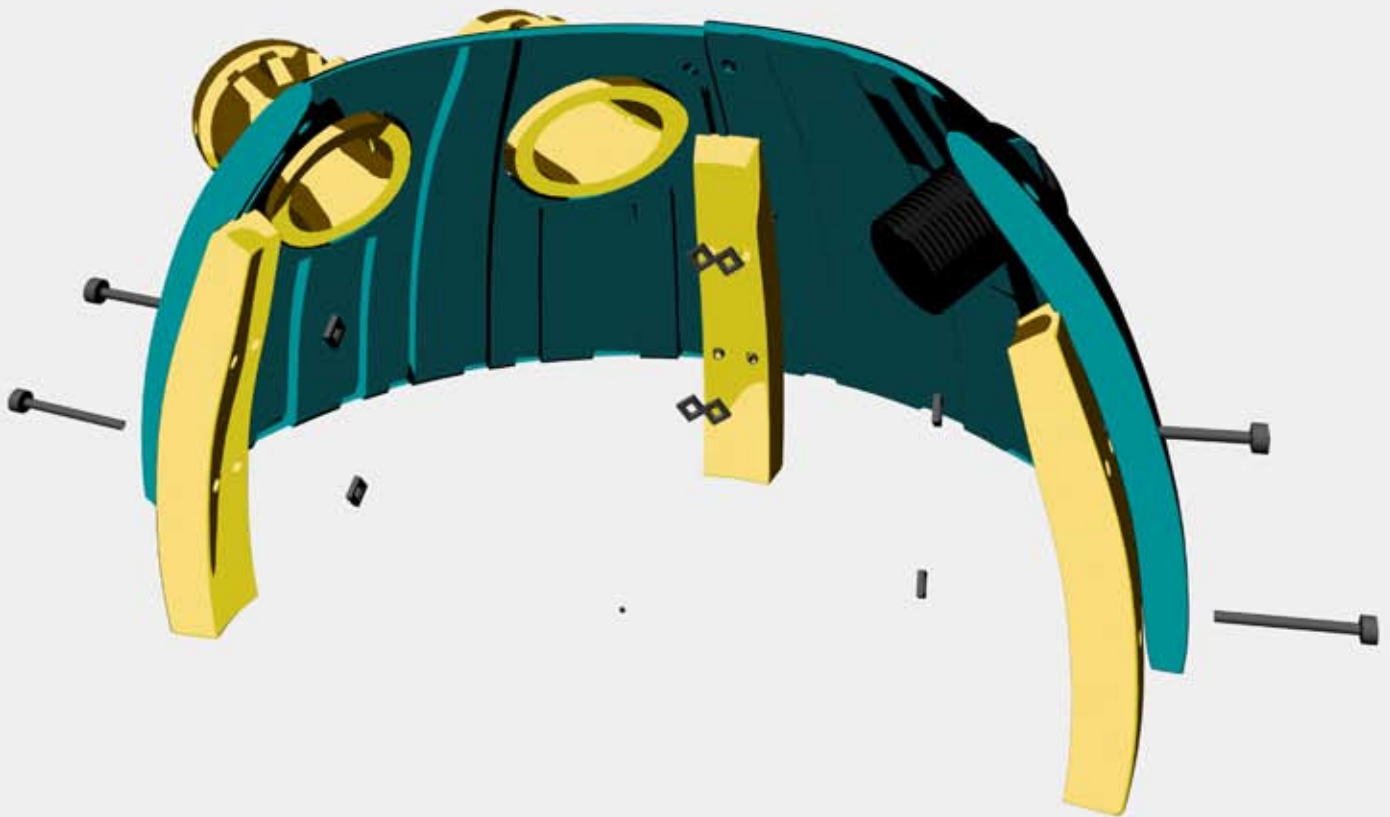
10.) Repeat process, until semi-spherical shaped goodness
is achieved (see next page).

11.) Attach innerDome.stl inside dome.stl using 4 x M3x40mm. The innerDome is an optional platform for attaching circuitry andbatteries for sound, lights, etc.
Make your BumperBot your own!

12.) These 4 screws go through the sides, faces, dome as well as the innerDome platform.
To skip installing the platform, merely attach 8 M3x40mm screws into dome.stl.
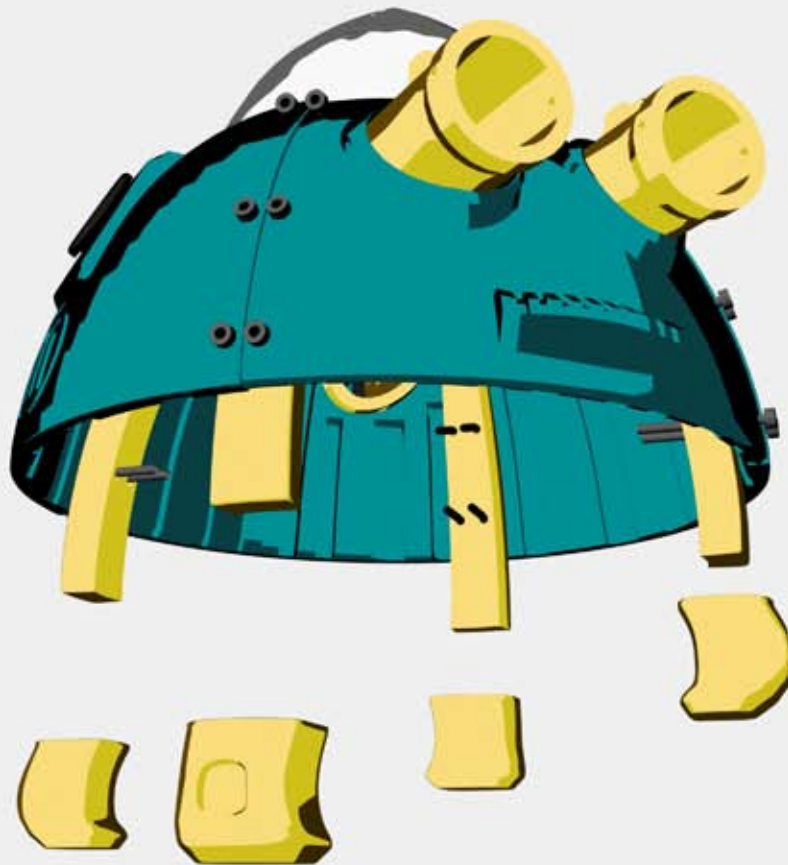
13.) By now, your BumperBot should look something like this:
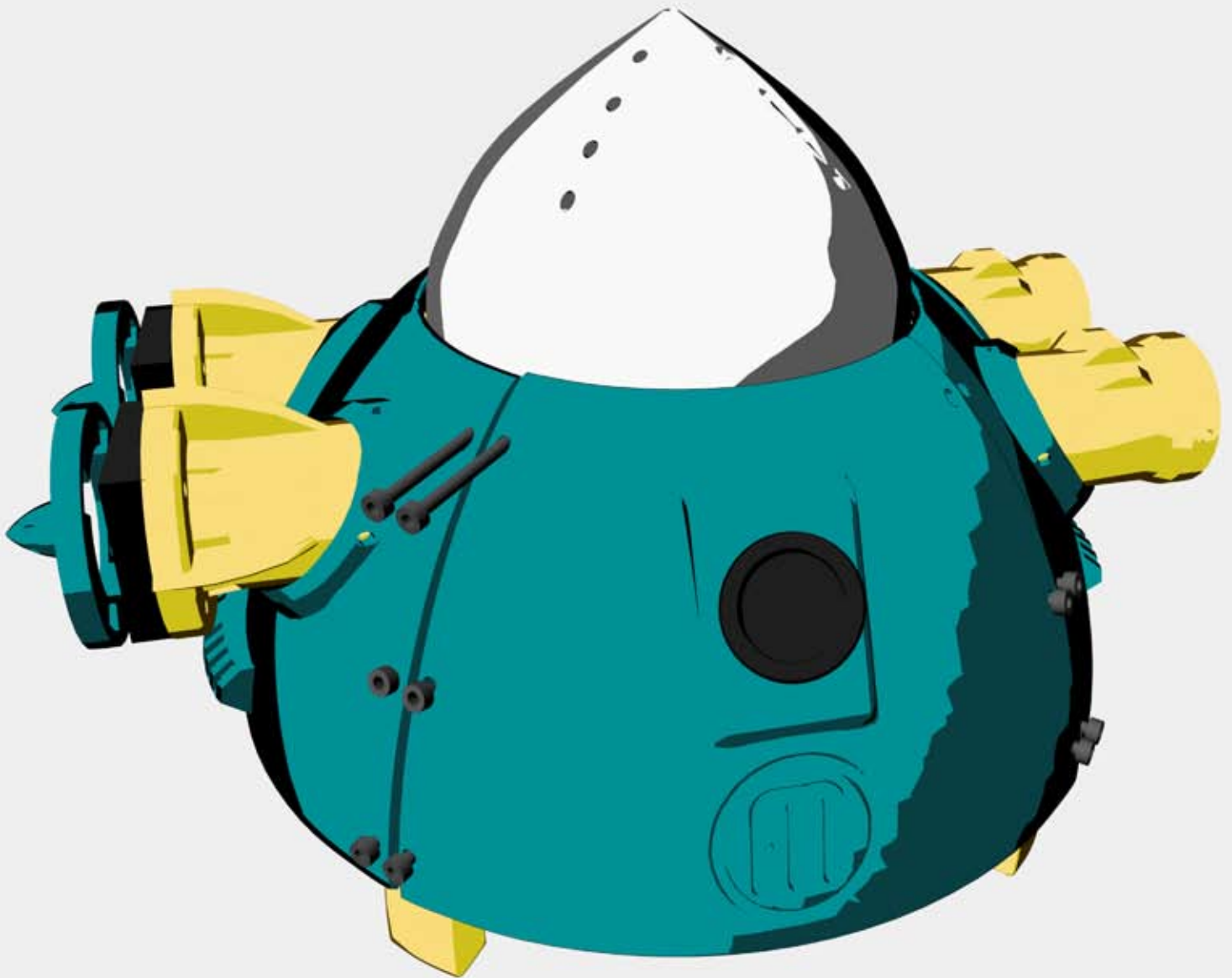
14.) Or this,if you decided to install the innerDome.stl platform (nice, I like your need to innovate...). The dome is rendered with transparency to show inner detail.
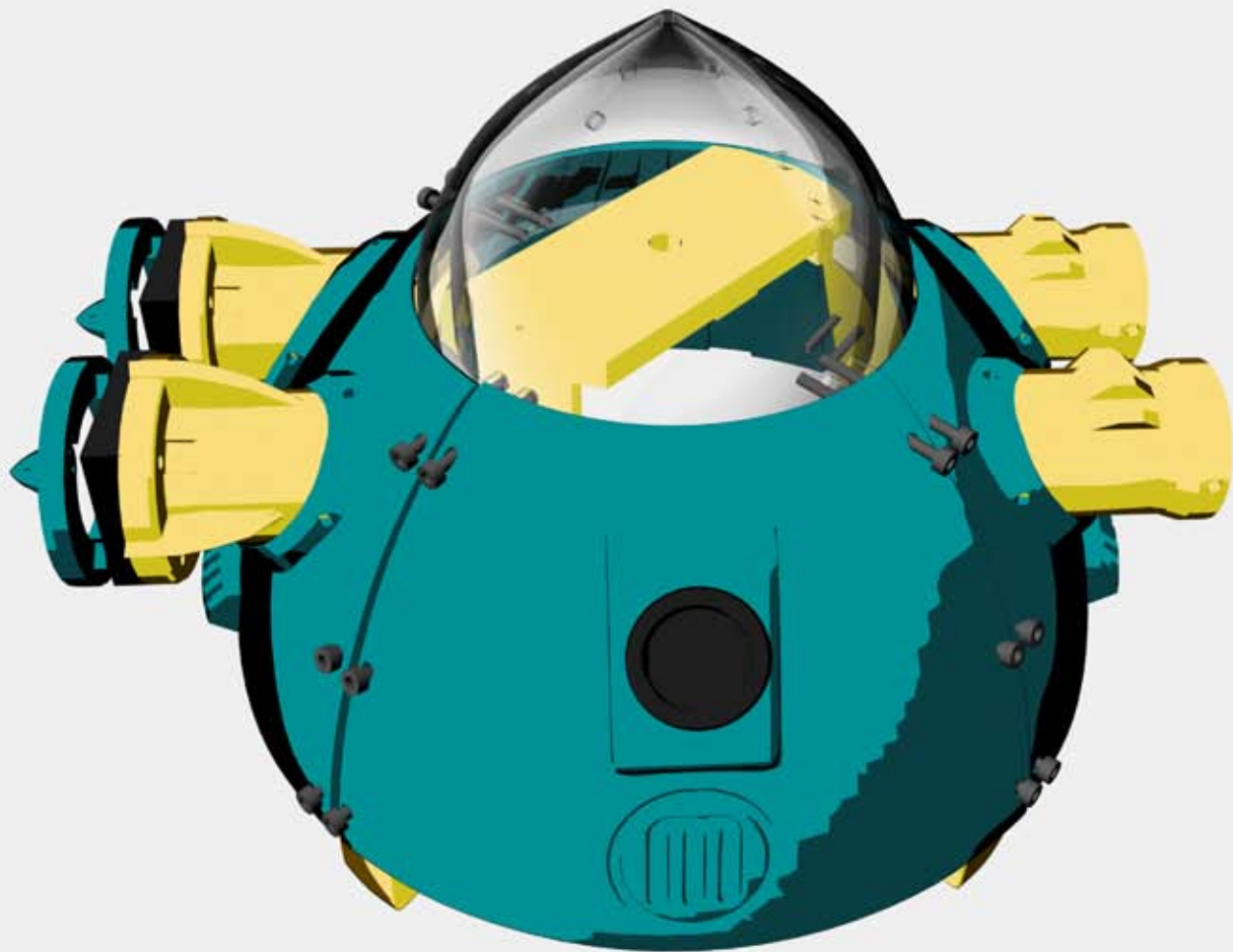
15.) Glue the 4 leg.stl to the 4 legBracket.stl. I used hot glue, and they held on terrifically, but use your glue of choice.

16.) Since you have the glue out, glue pupil.stl to eyeball.stl.
17.)Repeat.
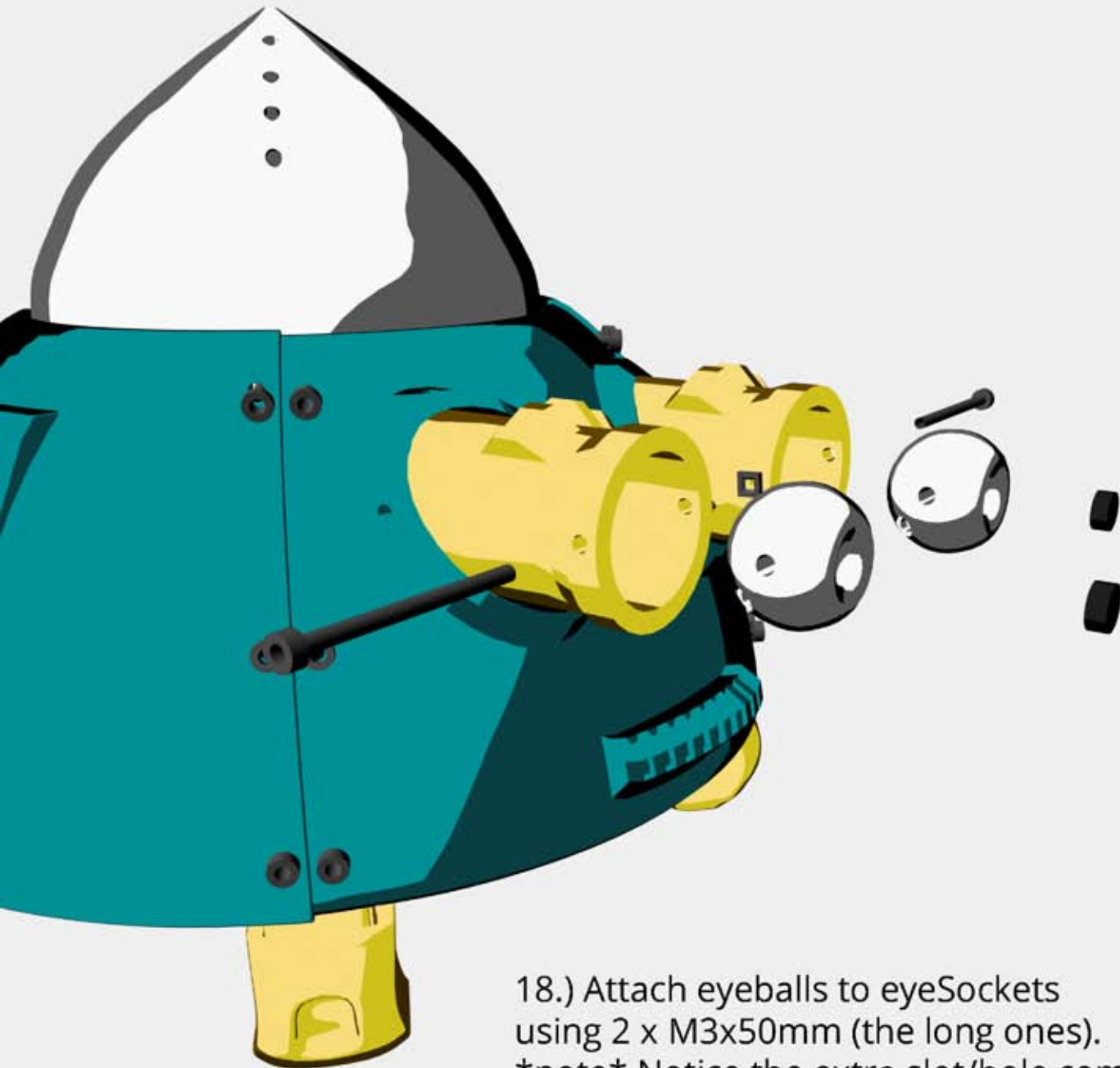
18.) Attach eyeballs to eyeSockets
using 2 x M3x50mm (the long ones).
note Notice the extra slot/hole combination
in the back of each eye. Looks like they
are more than ready to be fitted with a way to
make them move....(hint...challenge).

CHAPTER 2

Getting your Scribbler S2 ready for your BumperBot,
and getting your BumperBot ready for your Scribbler S2.

19.) Using a crimping tool, attach your electrical 'loop' couplers to both ends of your 35mm lengths of 100lb picure hanging cable.
I also put a drop of cyanoacrylate glue in each coupler beforehand, just to be safe. Make 4 of these.
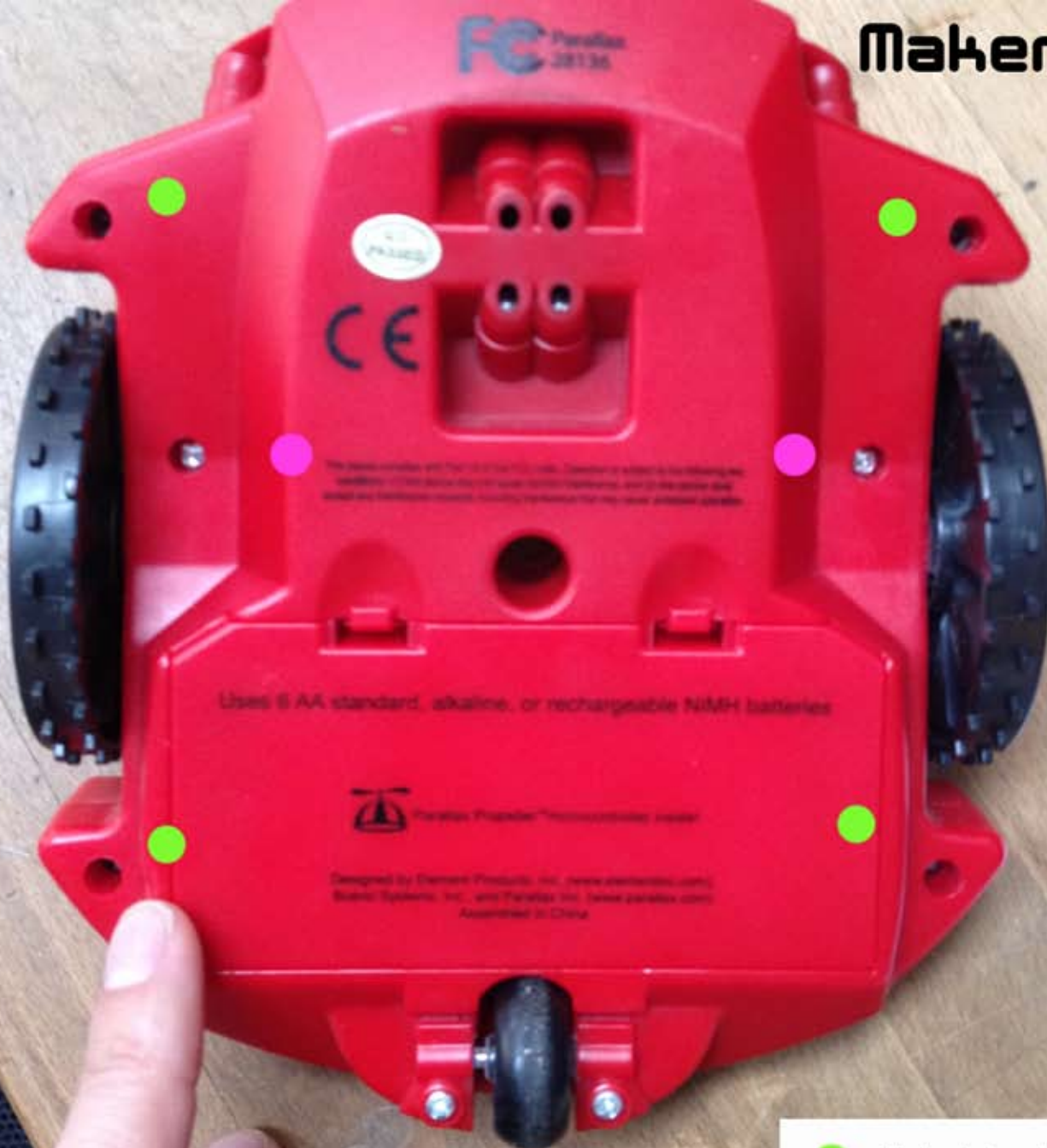
=Holes to be drilled

=Screws that might need to be temporarily removed

21.) Using a small phillips screwdriver remove the 4 corner screws. You might also need to temporarily remove the 2 closest to the wheels in order to "spread and rattle' the initial 4 corner screws loose, they sometimes stick. Just replace the 2 near the wheels when the corner screws are out, to keep the body together while we...
22.) Drill all the way through the 4 corner holes using a bit that is roughly the size of an M3 screw (or a bit larger).

22.)Attach 4 M3 x 30mm screws/nuts through the 4 holes that you just drilled, as pictured.
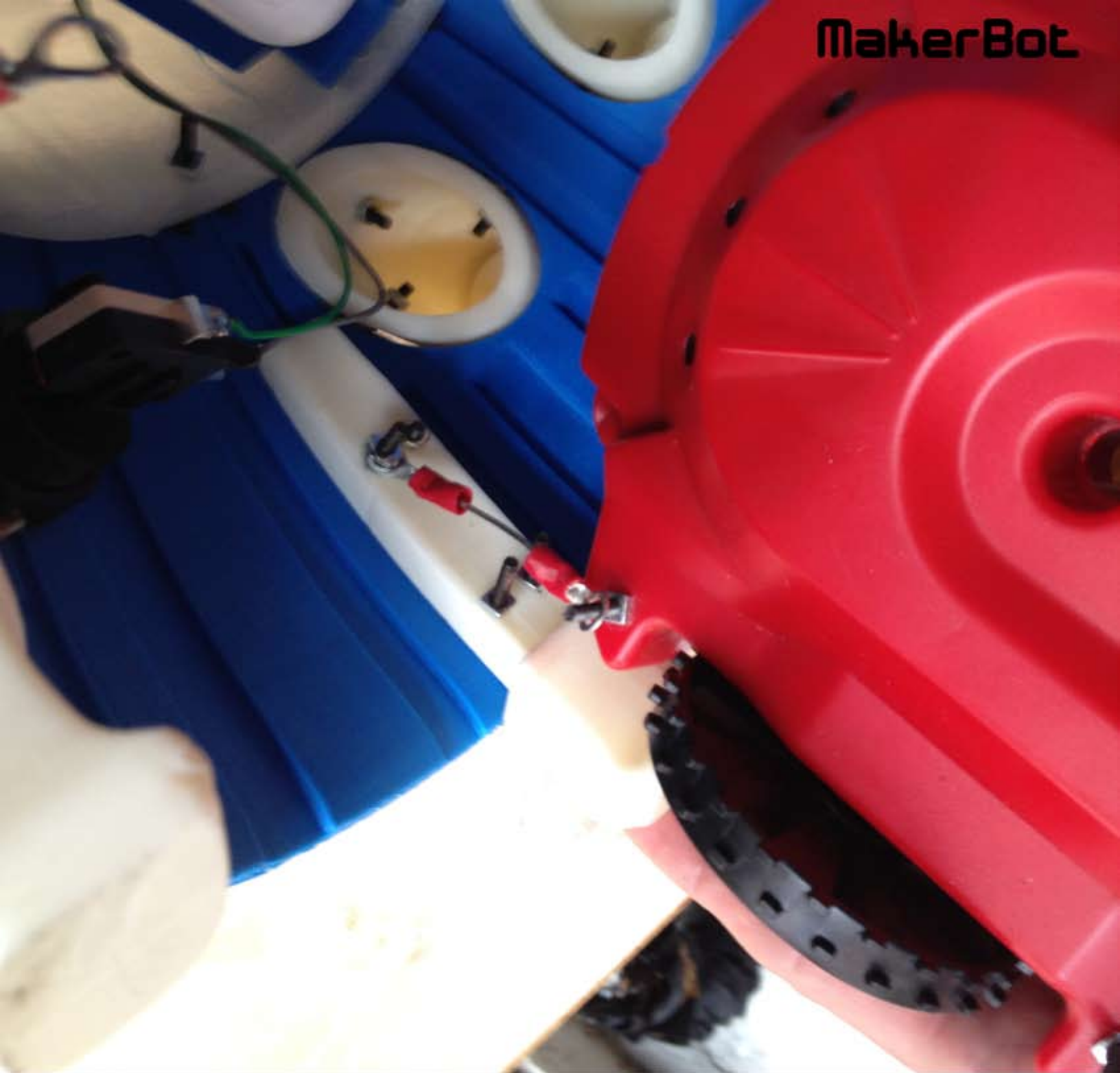
23.) You might want to program your Scribbler before mounting the "engine" into your BumperBot, but it is also possible to do it later, by removing 2 of the nuts from the top of the Scribbler.

24.) Make sure the IR sensors are facing towards the eye Sockets, and attach the 4 M3 x30mm on the top of the Scribbler to the 4 cable assemblies. This is really the only tricky part, but definitely possible. Be patient...

24.) ANTENNAE !!!
Cut as few or as many pieces of ABS filament
and hot glue them into the supplied holes
in the dome.stl. This is a great chance to
give your Bumper Bot personality.
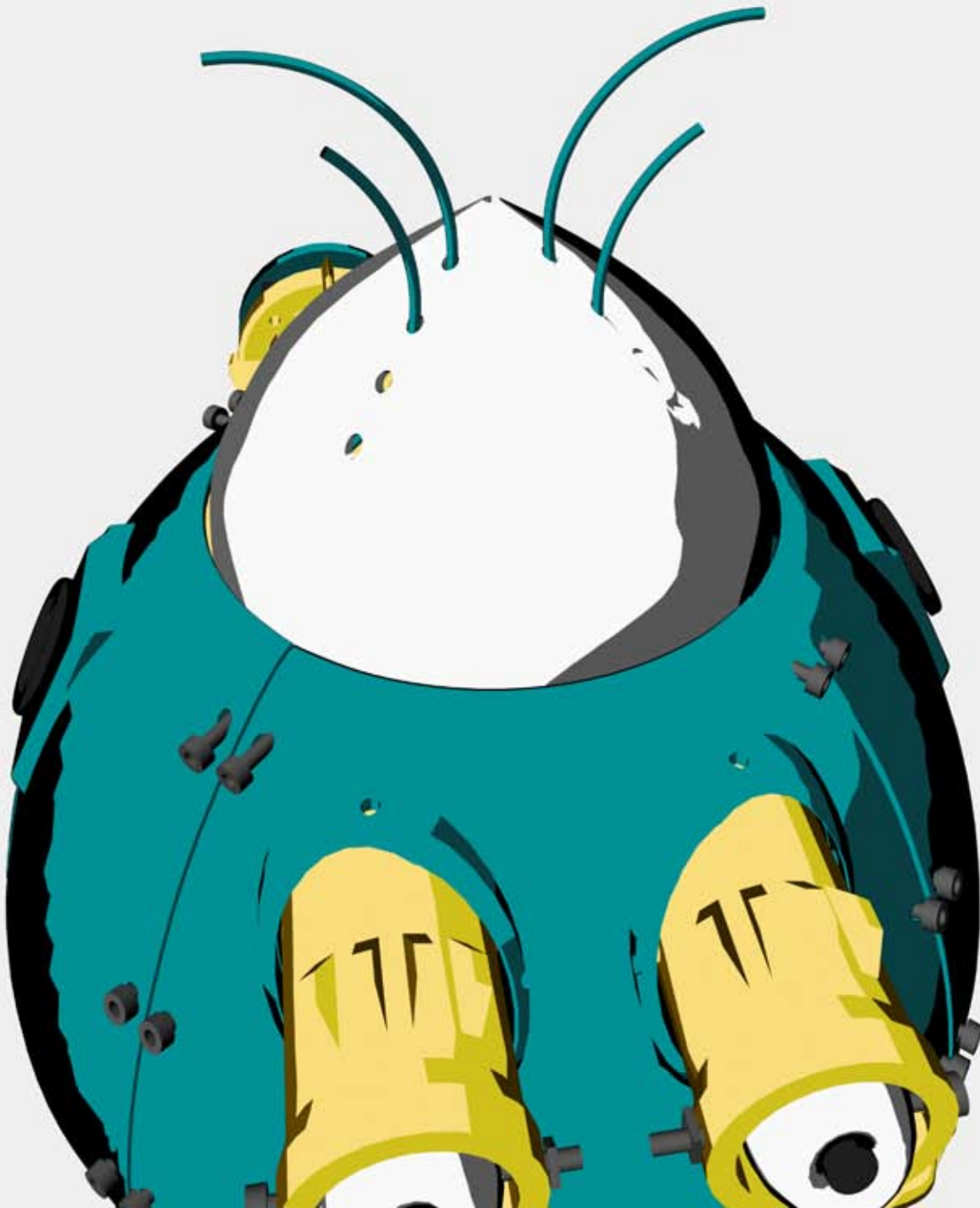
25.) ANTENNAE WITH DODECAHEDRONS!!!
After drilling a filament-sized hole in each dodecahedron,
use hot glue to put the crowning touch on your
 BumperBot, and have fun!