

MrBaddeley
SU-MO build instructions
(Draft)

<https://www.patreon.com/mrbaddeley>

for other parts and instructions

SU-MO Features

- Simple Build
- No cabling / soldering
- Single day print
- Works with any basic RC controller / Receiver (3 channels, tank mix)
- Cheap, basic electronics (FS90R continuous servos, battery and RC controller)



Printing guidelines

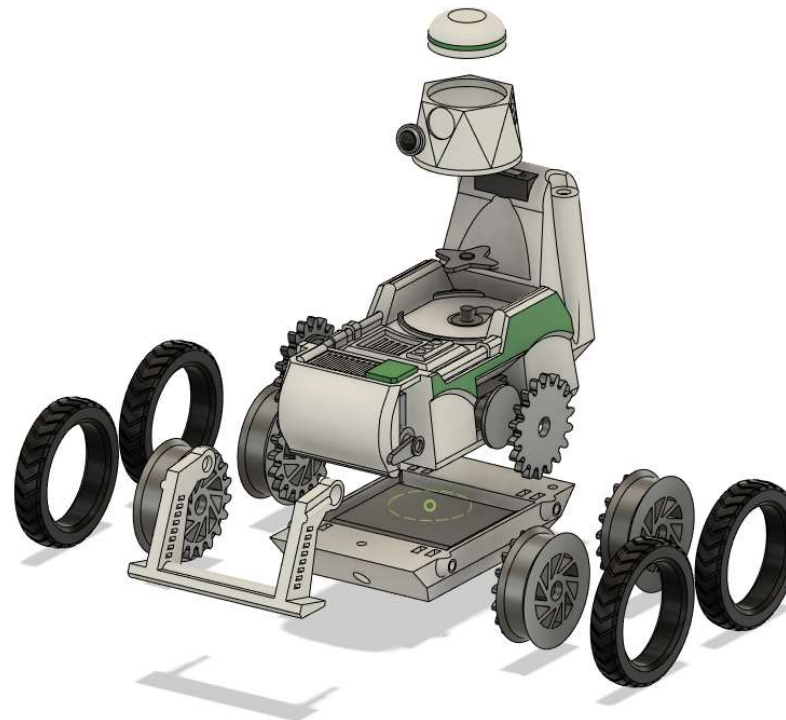
Support Needed:

No parts need support

All parts are oriented for printing!! No support needed.

Generally all parts should be printed with a .2 layer height as maximum. 3 outer walls (1.2mm Cura) and around 15% infill.

The tyres need to be printed in flex, check the web for settings / recommendations. Print slow and hot with no retraction. Loosening the tension on the extruder can also help a lot.



Hardware & electronics

Hardware:

M3 Square nuts x12

M3x30mm Bolts (x4) for the wheels

683-ZZ 3mm bearings (3x7x3) x 8 for the wheels

M3x20mm Bolts (lift)

FS90R Continuous Servo (x3)

MG92b Standard Servo (not continuous)

4.8v 1200mah Battery (and connector to RC receiver).

SS12F15G5 mini toggle switch

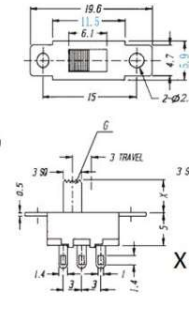
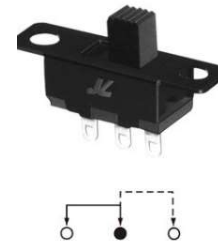
Connector is a JST SM connector, I made one, but you can buy the JST SM connectors from Amazon and cut the connector of an old servo for the other end

6 channel (only 3 needed) RC controller (any type, needs tank mix)

Note it's tight space in the SU-MO, so the controller shown has a small receiver and this fits all models, I've since done a number of optional tops which also fit larger receivers such as the Flysky i6-x 6 channel receiver



SS-12F15 (1P2T)
Rating:
0.5A 50V DC



Assembling the Lower Base



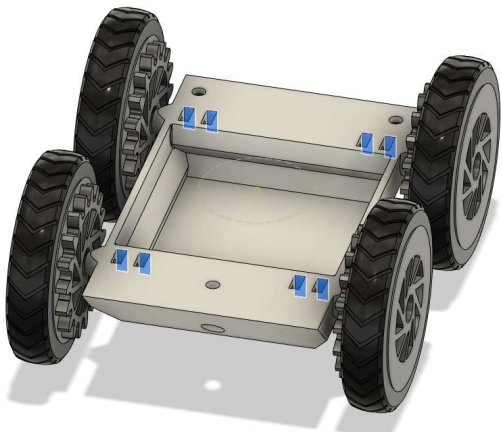
First, make up the four wheels. Push the tyre onto the wheel, and push two 683-ZZ 3mm bearings into the wheels either side.

Repeat this four times to create all four wheels.

Next take the battery box, drop M3 square nuts x 8 into the slots (shown in blue), push them firmly down into the frame. If needed a drop of hot glue will ensure they don't fall out.

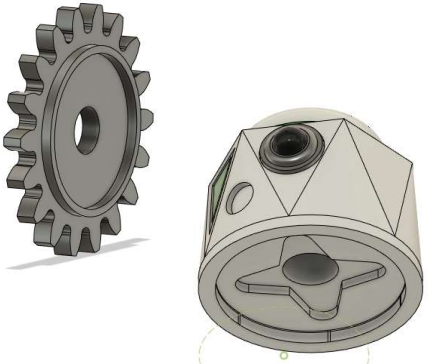
Next take four M3x30mm countersunk bolts and use these to bolt the wheels onto the frame. Tighten up, but leave enough play to spin freely.

This is the Lower Base, the battery fits into this base and it screws into the top frame. Easily removed for battery charging with 3 screws.



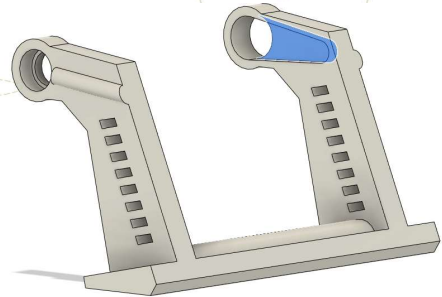
Hardware two 683-ZZ (x8), M3x30mm countersunk bolts (x4) M3 square nuts (x8)

Assembling the Upper Frame



Next, take the MainDrive gears (x2) and use two part epoxy to glue the circular servo horn (supplied with the FS90R servo), ensure it fits level and flush with the servo connector on the same side as the ridge.

Next take the third FS90R servo, get the four pronged horn and glue as above into the main dome, again with the servo connector facing downward.

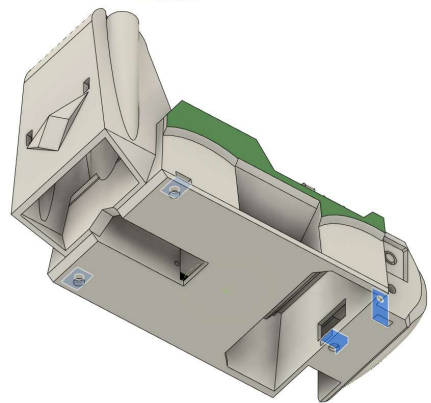


Finally, take the MG92b standard servo horn, and glue this into the “lift” print, again the servo connector facing out so it connects to the Servo when fitted.

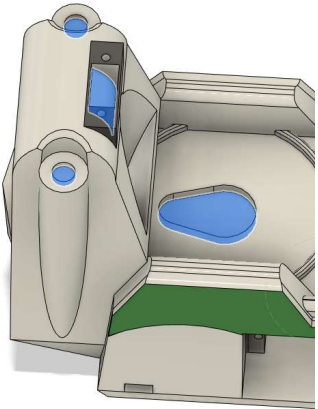
Next, let’s prepare the topframe, take 4x M3 square nuts and slot these into the frame. There’s three at the base which hold the battery box on. Again, use hot glue to hold these in place if needed.

The fourth M3 Square nut goes into the longer slot which is on the opposite side of the front lift servo.

Hardware M3 square nut (x4), FS90R (x3), MG92b (x3)



Assembling the Upper Frame



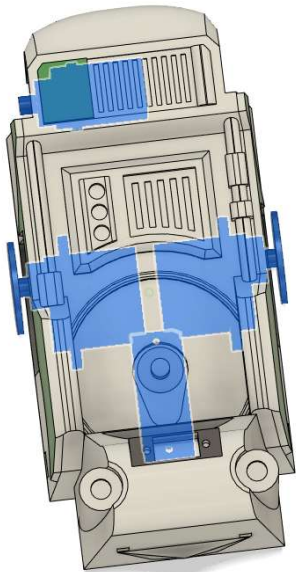
Continuing to prepare the topframe, using a file, drill or small knife, remove the thin plastic shown in blue, this is simply to remove the need for supports, file / clean it up, note none of these will be visible on the final model so don't worry too much about the finish.

Next, let's fit the 4 servos. (3x FS90R and 1x MG92b)

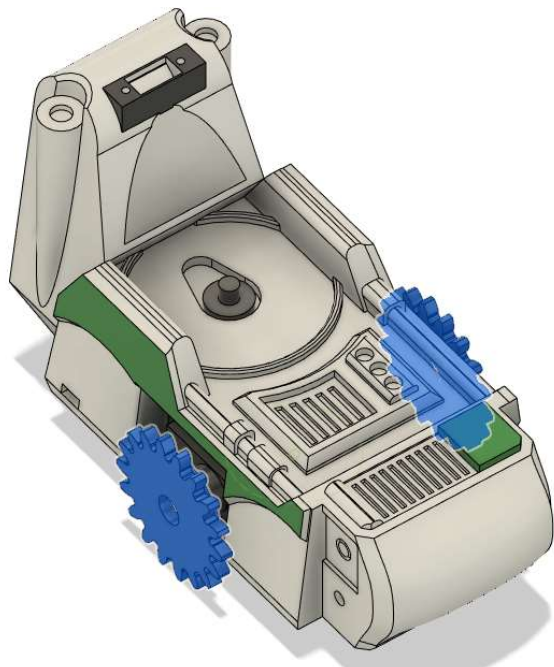
The MG92b is the main lift at the front, this should slot in, firstly push the cable / connector into the front hole and pass the cable through the hole leading to the centre of the frame, push the servo in and secure with the 2 screws supplied with the servo.

Next fit the two FS90R drive servos, these go either side of the frame, again push the cables through into the large hole in the base. Secure both servos with the two screws provided.

Again, fit the last servo, which is for the dome, this fits in the frame from the bottom at the rear, again route the connector and cable through to the same hole. Finally secure the servo with the two screws provided.



Assembling the Upper Frame



Next, fit and screw the two drive gears to the drive servos.

Then, take the receiver. You can either fit a small receiver into the large hole in the centre of the frame underneath, or if it's a larger one, it can fit in the alternative flysky frame.

The Flysky frame also has two 5mm holes for the receiver and a couple of slots for a cable tie to secure it in place. Note, routing the cables depends on which option you go for, but you need the main drive servos to go to channel 1 and 2, then use the appropriate channel for the dome and lift depending on your RC setup.

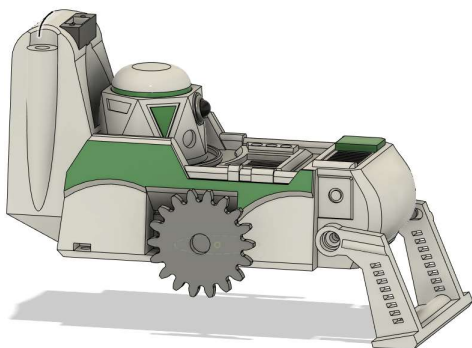
If you want to fit a power switch (SS12F15G5 mini toggle switch) you will need to cut the power connector cable on the +4.8v side and solder either side of the switch and secure with two small screws.

Finally, fit the lift arm (use 1 x 3mm bearing which slots on the opposite side to the servo), ideally use a servo tester or powered RC setup to ensure the lift is in the correct position for the up / down set up.

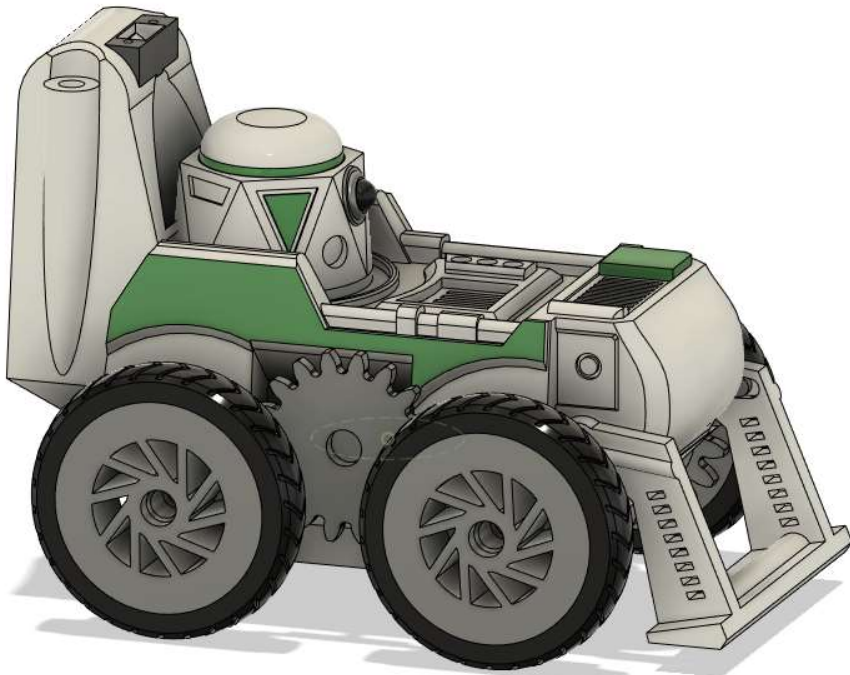
Secure the lift arm with the servo screw on the servo side and a M3x20 bolt which bolts into the captive nut.

Finally, assemble the Dome (glue the eye and leave the lid, it just slots in), push the dome onto the servo and you can secure with the servo screw or just leave it pushed on.

Hardware: RC Receiver, SS12F15G5 switch, 683-ZZ (x1), M3x20 bolt



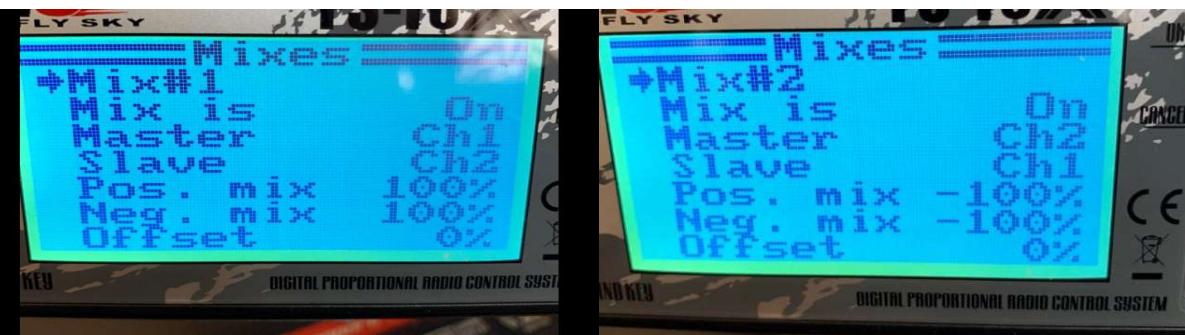
Finishing off

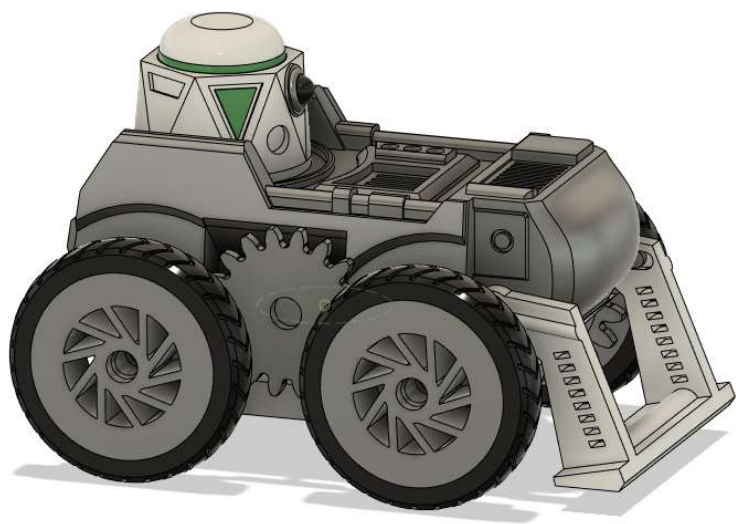


Take M3x10 (x3), fit the battery into the lowerframe, route / connect the power and screw the lower frame to the upper frame.

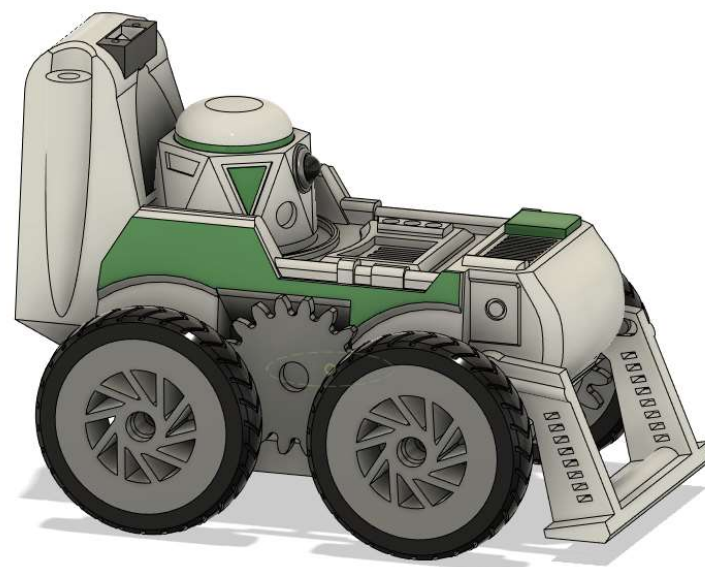
Note, from a RC perspective, you'll need the transmitter in tank mode, for the two channels (1,2). Typically this is done either with a setting shown in the instructions, or through mixing.

For mixing, it's normally Channel 1 (drive) as the master and Channel 2 (steer) as the slave, pos mix +100. neg mix +100 combined with a second mix, where Ch2 is the master and Ch1 the slave with -100 for both pos and neg (as shown in the pics, this is for the FlySky i6-x transmitter).





Basic (Small receiver)



FlySky i6-x 6 channel
(inc switch hole)



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Workshop, Deryck Beard, diyquad, Dj, DM Jim -- The Tabletop Engineer, Doko Theo, Dominic Marco, Don carothers, Don Newell, Dorian Gray, Doug Inman, Doug Wilson, Douglas Olson, Douglas Souza, Draco1986, Duke Duel, Dylan Panarra, Ech03, Ed Johnson, Ed Kraus, Eddie Nielsen, Eduardo Alves, EIPS, Elicia Kim, Ely Madrigal, Eric Beeks, Eric Boyer, Eric Hanson, Eric Ho, Eric Kana, Eric M Gore, Erick Main, Ermer Twano, esther rimington, Evan Muschinske, Everett Brooks, Fabian Hediger, Felix, Felix Tao, Fernando Sosa, Fidel Aaron, Filippo Dispenza, Florian LEVY, Fran, Francesco Pelosi, Franziska Sauer, Fraser Jarvis, Frederic Annet, Freya, Gage Mclvor, Gareth Becker, Gary King, Gary Smith, Geoffro / Hex3D, Georg Schibranj, George Ford, Glenn David, Glynn Turner, Greg, Greg Fowler, Greg MacAusland, Greg Oetker, Greg Tracy, Gregory Zinn, Guillaume Jasmin, Gyogy Banyar, Hai Pham, Hajuskin, Harold Harmon, Hennequez Frederic, Henry Ford, Hiromichi Yoshida, Horst Kröhn, Hugo Barois, Ian Jennings , Ian 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Monteith, Larry, Larryl, Lars Legend, Lars Lindberg, Laurent Devendeville, Lee, Lee Cassar, Lee Gray, Lee Murray, Lee Pearson, Leo Edinger, Leon de Graaff, Lesley Farquhar, Lisa Charlton, Lloyd Tillman, Loco Mags, Lord Hotwing, LordGarth6, Iorncampbell, Luc Canniv, Luis Rodriguez, Luke Iovenitti, Luke Killam, Lynn, M Kleis, Make it out of Wood, Malcon Akitan, Manuel Ferro Jr, Manuel Roman Camacho, Marc AVON, Marc Fischer, Marc Frank, Marco Randazzo, Marcus David Kraus, Marcu, Mardu's costumes & props, mario kempster, Mark Clayton, mark coombes, Mark Leigh, Mark Oram, Mark S Tadgeil, mark sampson, Markus Glomb, Marllon Douglas, Martin, Martin Beveridge, Martin Blanco, Martin Conway, Martin Corner, Martin Drake, Martin Laycock, Martin Rourke, Mat, Matt Campbell, Matt Evans, Matt Garboski, Matt Hobbs, Matt Keller, Matt Long, Matt Moram, Matt Pohl, Matthew Collins, Matthew Greenberg, Matthew Hopkins, Matthew Leech, Matthew Morley, Matthew Pawlik, Matthew Ramdass, Matthias, Matthias 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