

MrBaddeley

T3-DO build instructions (Draft)

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

for other parts and instructions

T3-DO Features

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



Printing guidelines

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

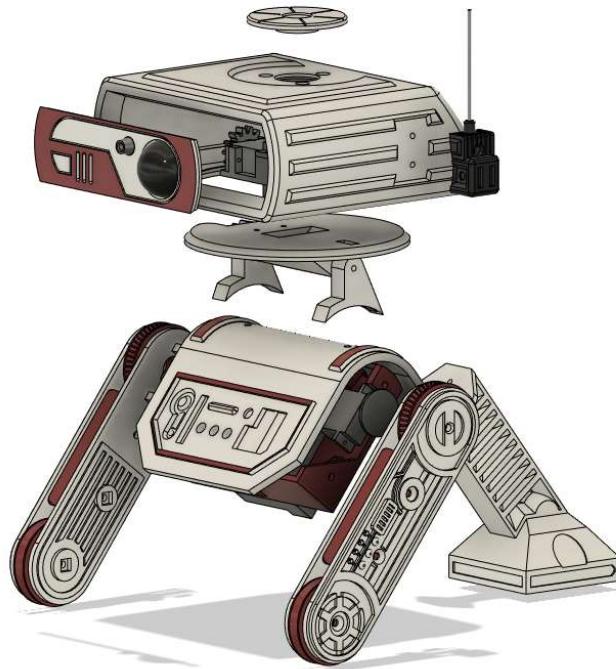
Generally all parts should be printed with a .2 layer height as maximum. 3 outer walls (1.2mm Cura) and around 15% infill.

The tracks 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.

Support Needed:

LIdlerWheel

RIdlerWheel



Hardware & electronics

Hardware:

FS90R Servo x2

M3x10 bolt (x10)

M3 Nut (x6)

M3x25 bolt (x2)

M3x20 bolt (x8)

M3 square nut (x6)

683-ZZ bearings (x4)

683-ZZ bearing (x2)

MR625-ZZ bearing (x1)

MG90 (or MG92b) x2

M3x5 bolt (x3)

M3x15 bolt (x3)

Cable ties (x2)

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

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)



Leg assembly..



First, let's make the two drives (repeat each instructions twice for the two sides.)

Take the Rdrive wheel 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 inner side to connect to the servo.

Next, take the RLegMainC and the FS90R servo, fit this to the RLegMainC as shown and use the two servo self tapping screws to secure.

Then take the Servo / Leg assembly and we'll fix that to the main body. Use a M3x10mm Countersunk bolt and M3 nut, use this to bolt through the top hole into the body and tighten.

Next take the assembled drive wheel and attach to the Servo using the screws provided.

The take the RLegMainA & B, and fit these to the assembly. You'll need a M3x25mm Countersunk bolt and M3 nut for the top hole, and M3x20mm countersunk bolt and an M3 square nut for the lower hole. Tighten both bolts together to make the assembly solid and secure.

Next take the RIdlerWheel and push 683-ZZ 3mm bearing (x2) into either side to complete the idler wheel assembly.

Use a M3x20mm bolt and M3 square nuts (x2) to attached the idler wheel onto the assembly. The two nuts are used to tight them together to secure without squashing the overall assembly. You can use locktite to secure the bolts but make sure the idler wheel spins freely. (Nyloc could work also)

Hardware: FS90R Servo x2, M3x10 bolt (x2), M3 Nut (x4), M3x25 bolt (x2), M3x20 bolt (x4), M3 square nut (x6), 683-ZZ bearings (x4).

Leg assembly..



Once you've completed both sides, the assembly should look like this. Next take the two flex tyres and slip them over the two drive legs to finalise the drive system. The tracks are printed in soft TPU (I used Ninjaflex).

Next, take the caster and the wheel. Clear the support in the wheel, a small circular file will clear out so the hole in the center is clean.

Fit two 683-ZZ bearings into the wheel, then take the wheel and fit it into the Caster and use a M3x10 countersunk bolt for the axle. Note the bolt should go through and self tap the other side, it does not need a nut.

Make sure the wheel runs free.

Then take the rear leg and MR625-ZZ bearing and push the bearing into the hole in the foot recess.

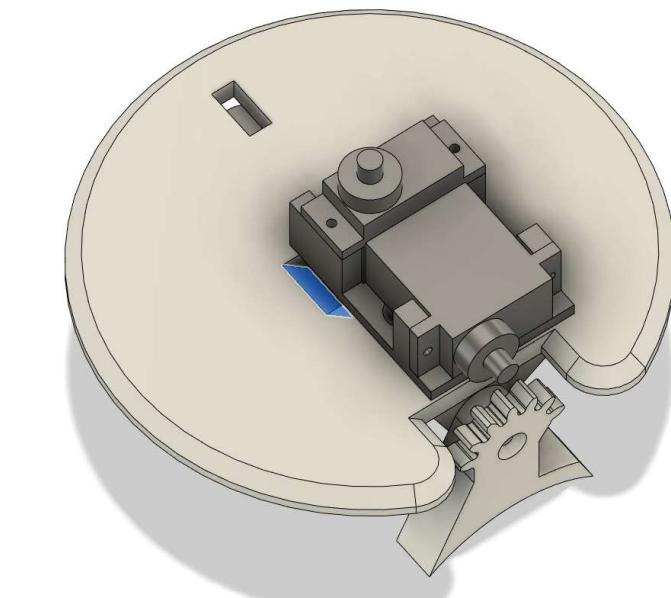
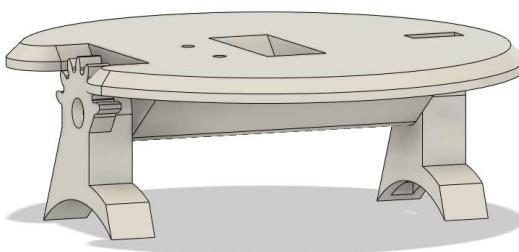
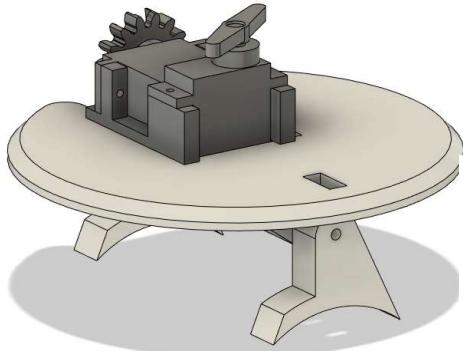
Push the assembled caster into the rear leg to complete the caster and rear leg assembly.

Finally you can attached the rear leg to complete the drive system. Use M3x10 bolts (x4) to attach it, the centre holes are self tapping and the outer ones use M3 nut (x2) to secure.

Hardware: **MR625-ZZ bearing , 683-ZZ bearing (x2), M3x10 bolt (x5), M3 nut (x2)**



Head assembly..



Take the head gear firstly and glue (using 2 part epoxy) in the MG92b servo horn (You can use either MG90 or MG92b, for the neck servo the MG90 will work but is slightly under powered, so the 92b will be better).

Take the headplate and NeckBracketA and NeckBracketB, using M3x20 countersunk bolts (x2), bolt on either side to create the head pivot assembly. Note the bolts will self tap, and should allow the plate to move fairly freely in a nodding action.

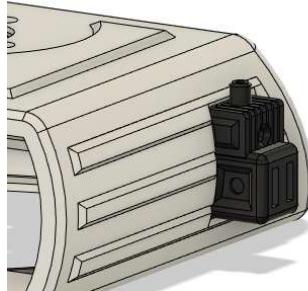
Next take the ServoHeadBracket, it fits as shown as is held in with M3x10 bolt (x2) which self tap into the HeadPlate.

Note when assembling this, the servo cable for the head turning servo comes out of the hole shown in blue. You have to route the wire before the assemble / attach the plate. Route the wire, use the two bolts to hold the plate in place, finally the using the servo screws provided attach the MG90 (or MG92b) x2 servos into the bracket.

Next, temporarily remove the NeckBracketA and route the servo cables through the hole in the plate, continue this through the hole in the NeckBracketA and refit the NeckBracketA in place, so the servo cables route through the neck.

Finally, centre the Nod Servo with a servo tester and fit the head gear.

Hardware: MG90 (or MG92b) x2, M3x20 bolt (x2), M3x10 (x2)



Take the main head and the head bracket.

First, glue the servo horn into the headbracket using two part epoxy glue as you've done previously.

Next, using M3x5 countersunk bolts (x3) bolt the headbracket into the main head (again these are self tappers).

Bolt the sidehead onto the main head, using M3x15 countersunk bolt.

Using two part epoxy (or superglue), glue the eye and holo into the headface.

Finally, glue the headface into the main head to complete the head assembly, again using 2 part epoxy or superglue.

The head assembly fits onto the headplate assembly using the servo horn, and secure this with the servo screw that comes with the MG90 (or MG92b).

This completes the head assembly. There's the "tophead" which drops into the hole above the servo screw.

Hardware: M3x5 bolt (x3) M3x15 bolt (x1)





Take the head assembly and bolt this onto the BodyShoulder with M3x15 bolt (x2), note these self tap into the head brackets.

You're now ready for the final assembly.

The RC receiver goes under the main body frame and is held in place with 2 cable ties, the aerials can be put through the holes in the body, so they sit in the body cavity.

The battery sits into the main body cavity (note I used a single 4.8v 1200mah Battery, runtime could be improved with a second one in parallel or an alternative battery).

Connect the two drive track servos onto ch1 and ch2, the two head servos onto ch3 and ch4 routing the wires through the holes in the body frame.

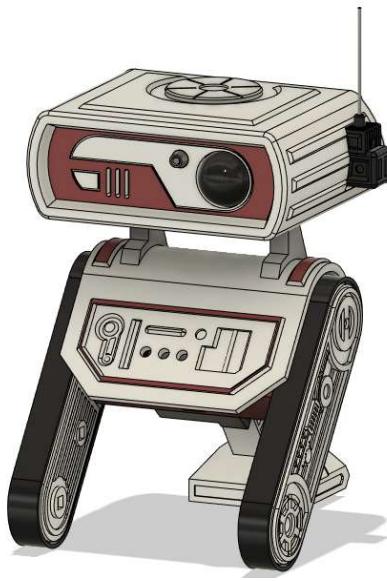
Finally, fit the shoulder / head assembly to the main body / drive using M3x20 bolt (x2) which fit in the two holes just above the center leg and self tap into the shoulder assembly.

A M3x10 countersunk bolt can also be fitted at the front to secure.

This completes T3-DO build!

Hardware: **M3x15 bolt (x2), Cable ties (x2), M3x20 bolt (x2), M3x10 bolt**

RC settings .



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).



