

GroundBot BP-3 & TD-1 BOM and Assembly Instructions

Bill of Materials:

BOM Level	Part Name	Part Number	Quantity
1	3D-Printed Base Frame	G1001	1
2	3D-Printed Top Plate	G1002	1
3	3D-Printed Back Frame Support	G1003	1
4	RC Station 12mm Hex RC Wheels and Tires	G1004	4
5	Velcro Strap	G1005	1
6	3D-Printed Bearing Support	G1006	2
7	3D-Printed Left Headlight Support	G1007	1
8	3D-Printed Right Headlight Support	G1008	1
9	3D-Printed Camera Mount	G1009	1
10	3D-Printed Control Panel Support	G1010	1
11	3D-Printed Control Panel Cover	G1011	1
12	3D-Printed Control Panel Legs	G1012	2
13	Receiver Antenna Support	G1013	1
14	M4*20mm Screws	G1014	4
15	M4*10mm Screws	G1015	2
16	M4 Nuts	G1016	6
17	M3*16mm Screws	G1017	4
18	M3 Nuts	G1018	4
19	M2*6mm Screws	G1019	4
20	10" Zipties	G1020	9
21	Motor Screws	G1021	3
22	Servo Motor	G2002	1

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23	SR315 Receiver	G2003	1
24	Ezrun 4274 G2 Motor	G2004	1
25	QUICRUN 8BL150 G2 ESC	G2005	1
26	3D-Printed Front Axle Support	G2006	1
27	3D-Printed Double Helical Gears (n=10)	G2007	1
28	3D-Printed Double Helical Gears (n=50)	G2008	1
29	Rear Axle	G2009	1
30	Black Screw	G2010	2
31	Machined Pyramid Nut	G2011	2
32	5/16 Flange Nut	G2014	2
33	8x16x5mm Bearings	G2018	2
34	T10 2-Way Radio Walkie Talkie	G3001	1
35	4s 10000mAh Spektrum Battery	G3002	1
36	Avatar HD Pro Camera	G3003	1
37	TrueRC X2 5.8GHZ Antenna	G3004	1
38	5V Fan	G3005	2
39	3S 5000mah Lipo Battery	G4001	1
40	Power Distribution Panel	G4002	1

Tools required:

- Rubber Mallet
- Wrench
- Sand paper, 800 grit
- Screwdriver
- Pliers
- Scissors
- Super glue
- 3/32 Allen key

GroundBot Assembly Instructions

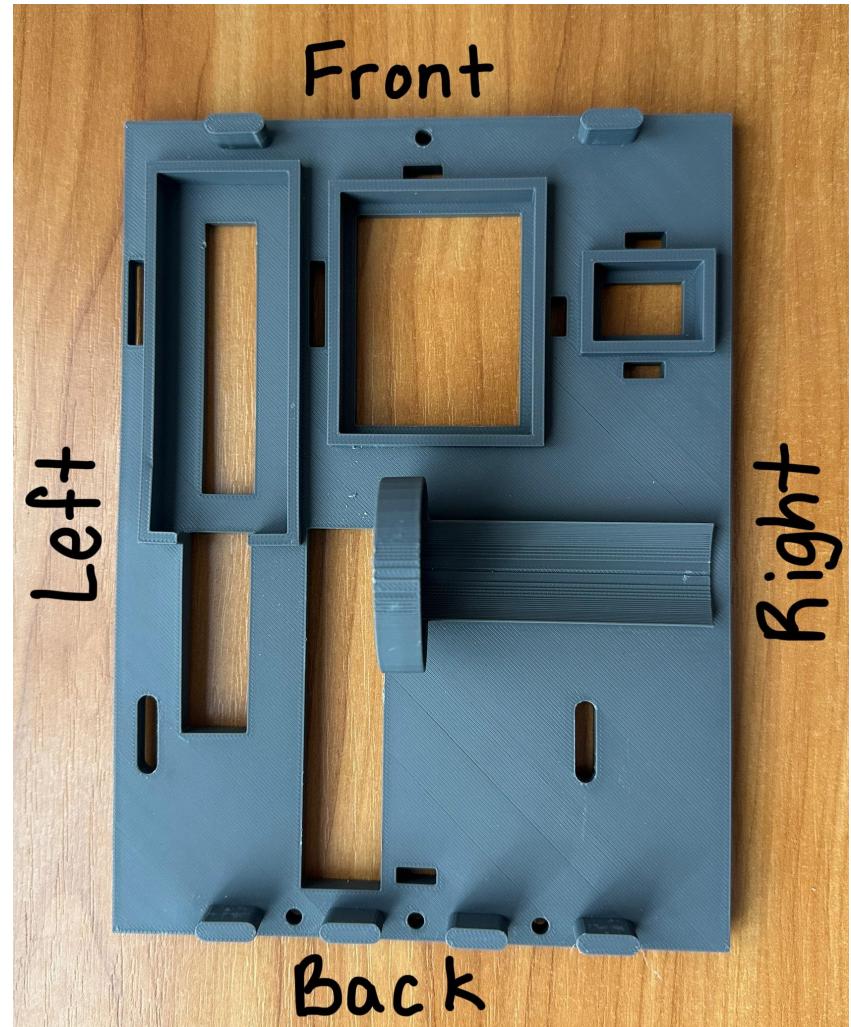
PODBot Phase II

1. Obtain all 3D-printed parts from the printers, as well as other materials from the bill of materials.
2. Clear the supports from the 3D-printed parts. Use pliers if necessary, but be careful not to break the parts.

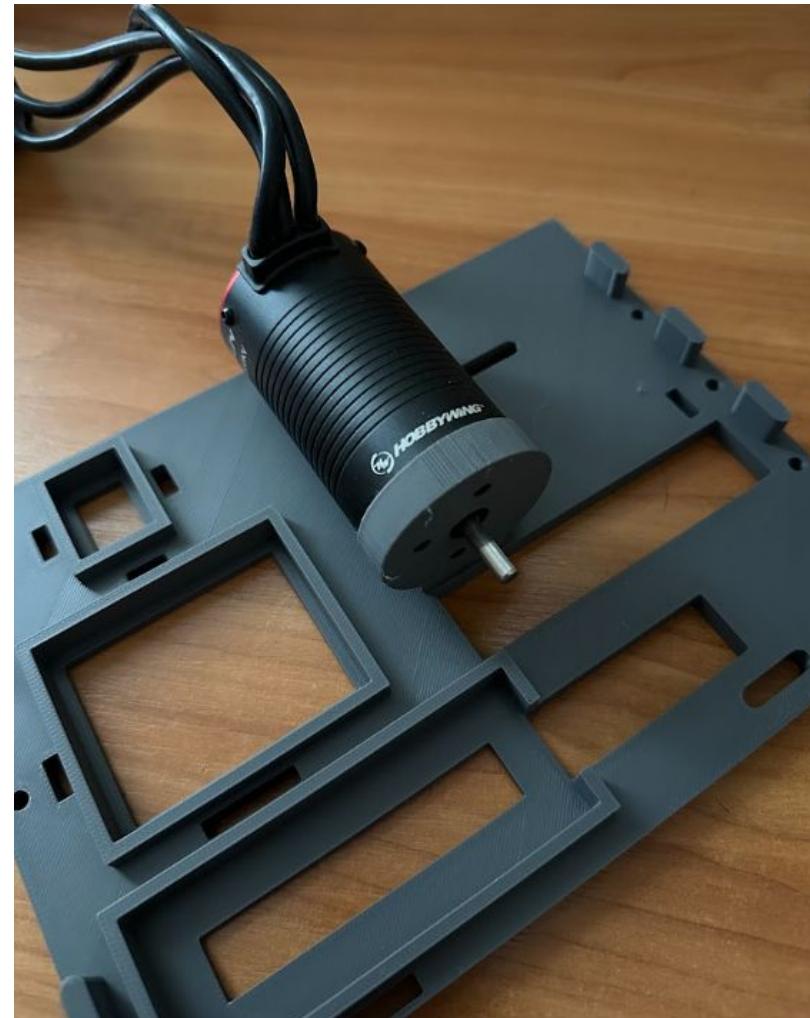
3. Take two wheels and two 3/16 flange nuts. Superglue a nut into the inner center of each wheel. Allow it to cure for at least 30 minutes.



4. Take the 3D-printed base plate (G1001)



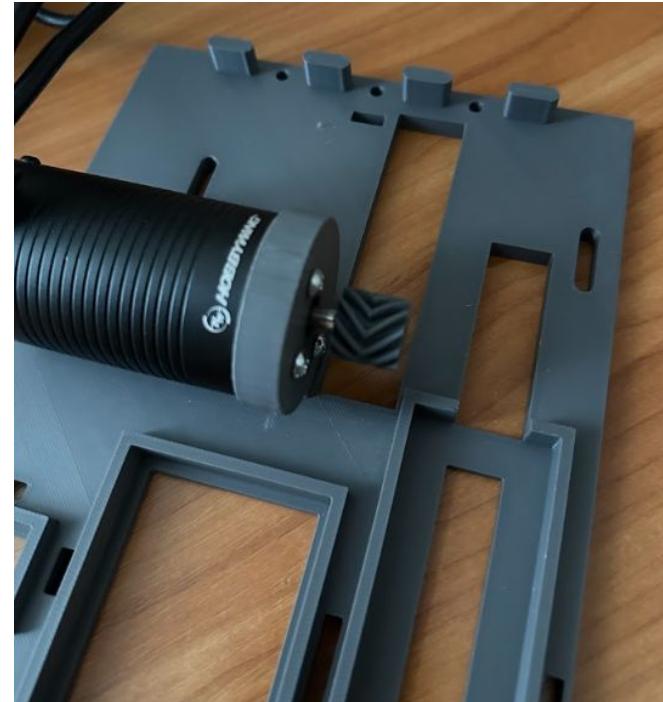
5. Slide the motor into the vertical circular slot on the base plate and push it all the way in. The shaft should protrude through the center hole. The wires at the end of the motor should be facing up.



6. Use 3 small silver screws and a screwdriver to secure the motor to the base plate.



7. Place the small gear (10 teeth) on the motor shaft so that the arrows face toward the front of the bot. The flat part of the gear and the motor shaft should be aligned. Push it in far enough so that it is centered with the cutout slot underneath it. This may require a rubber mallet.



8. Connect the motor to the ESC.

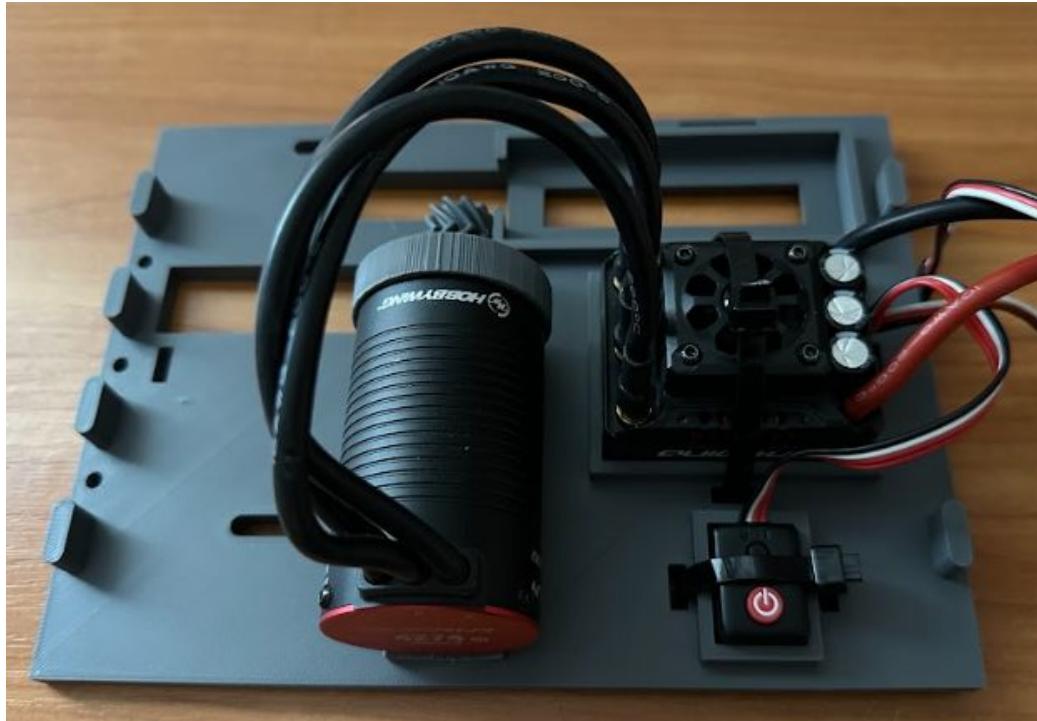
Follow the picture below to make sure that the wires are placed correctly. Wire A of the motor should be connected to slot C of the ESC. Wire B of the motor should be connected slot B of the ESC. Wire C of the motor should be connected to slot A of the ESC.



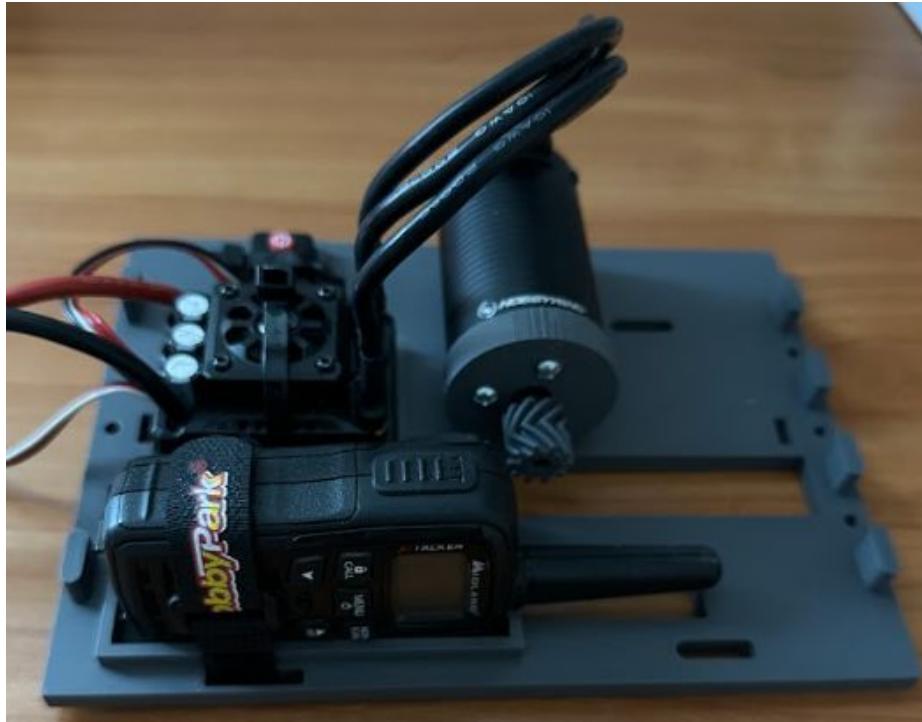
9. Place the ESC in the middle slot on the base plate.
Secure it with a zip tie in the middle.



10. Place the ESC button in the small slot on the right side of the base plate. Secure it with a zip tie.



11. Place the walkie-talkie on the left side of the base plate as shown below. Use a velcro strap to secure it in place.



12. This completes the base plate assembly. Set it aside for now.

13. Take the rear axle. Notice that the square part is not centered. Hold it so that the majority of the square part is to the left of the center, as shown below.



14. Take two black threaded metal pieces and screw them in at the ends of the rear axle.



15. Take the bigger gear (50 teeth) and slide it onto the rear axle through the left side, making sure that the arrows are facing toward you. Keep sliding it until it is fully secured on the square portion of the rear axle.



16. Take the two 3D-printed bearing supports (G1006) and two bearings. Place one bearing into each support. Use a rubber mallet if necessary. There will be extra space in the support, which can be ignored.



17. Slide the bearings onto each side of the rear axle.



18. The wheels from step 3 should be finished curing.

Screw on the wheels to each side of the rear axle.



19. Screw on pyramid shaped supports on the outside center of the wheels to secure them in place.



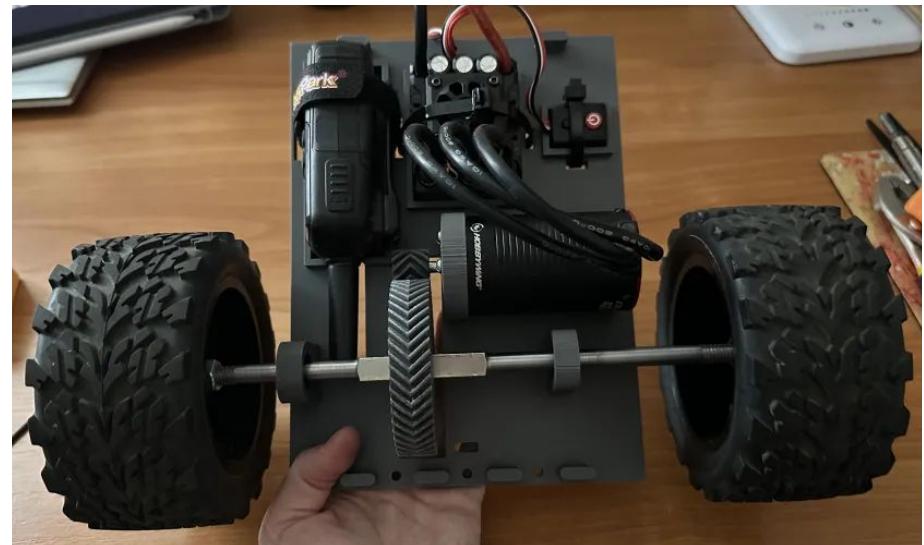
20. This completes the rear axle assembly.

21. Take the base plate assembly and the rear axle assembly.



22. Put some super glue on the sides of the capsule-shaped extrusions of the bearing supports. Be careful not to get any superglue on your skin.

23. Align the bearing supports with the capsule-shaped cutouts on the base plate and push them in. Make sure that the gears are aligned and the teeth are locked in place.

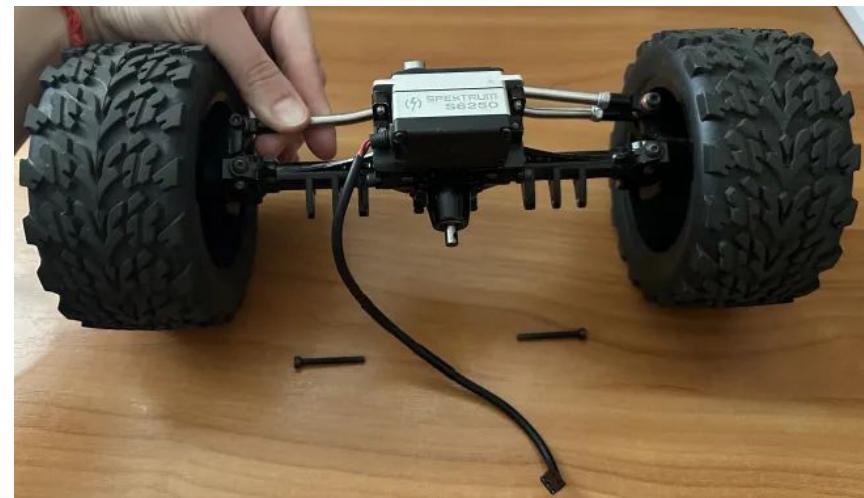


24. This completes the bottom frame assembly of GroundBot.
Set it aside for now.

25. Take the 3D-printed front
axle support (G2006).



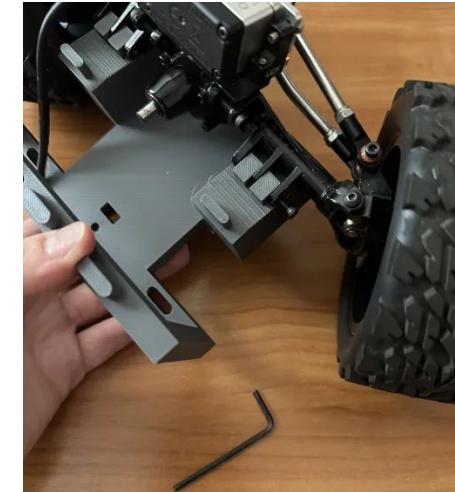
26. Take the front axle. This already has the servo motor and two wheels attached to it. Notice that the triangular extrusions to each side of the servo motor have long black screws in them. Twist them out.



27. Place the front axle on the front axle support such that the servo motor is facing up. Make sure that the triangular extrusions are placed between the 3D-printed extruded blocks and that the holes align.



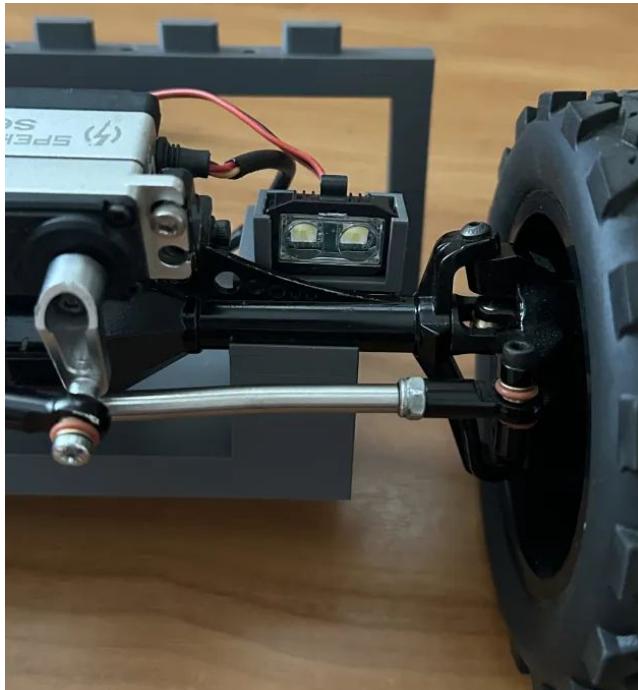
28. Take the screws from step 26 that were recently taken out to secure the front axle to the front axle support. Use a 3/32 Allen key if necessary. Note that it is enough if the screws are at least halfway in as shown to the right.



29. Take the 3D-printed left headlight support (G1007) and the 3D-printed right headlight support (G1008). Snap them in place on the capsule-shaped extrusions on the front axle support.

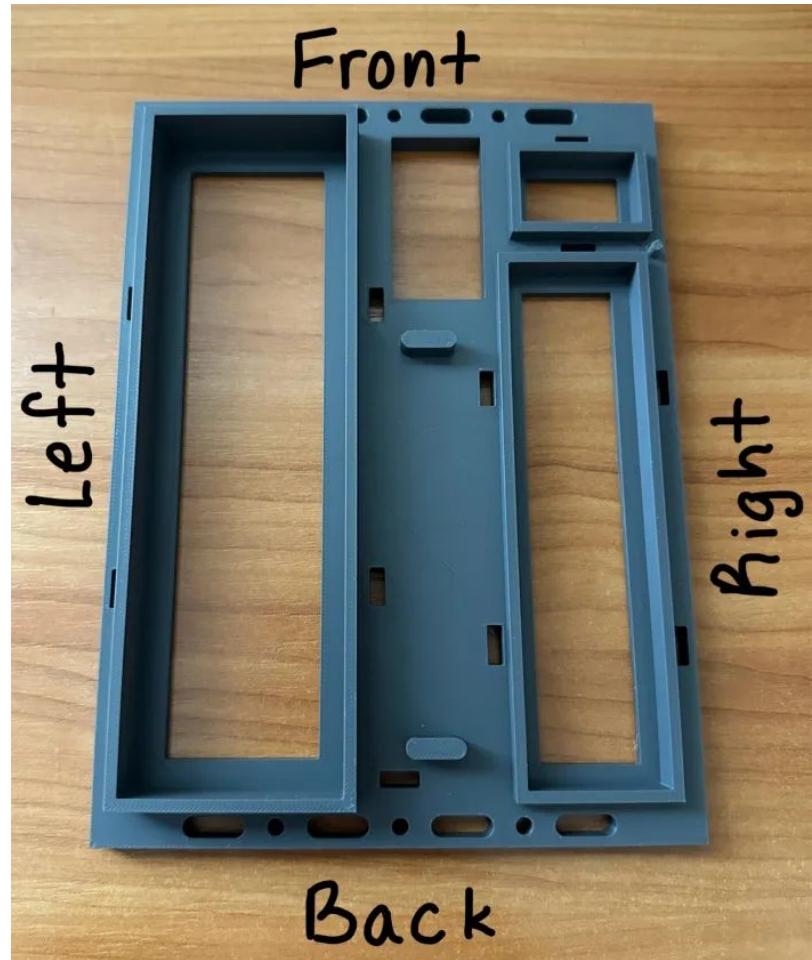


30. Place the headlights in the supports by simply pushing them into the slots on the headlight supports.



31.This completes the front axle assembly. Set it aside for now.

32. Take the 3D-printed top plate (G1002).



33. Take the receiver and place it in the small cutout in the front of the top plate. The antenna wire should be facing the edge. Secure it with a zip tie.



34. Take 2 zip ties and put the tail of one of them through the head of another until it is secured together, about an inch. See the picture below of what this should look like.

Repeat this with 2 more zip ties.



35. Place the 10,000 mAh LiPo battery into the big slot on the left side of the top plate. Make sure that the cable is at the back left corner facing up.



36. Use the zip ties from step 34 to secure the LiPo battery to the top plate. Pull on all of the tails until it is fully secured and cut off the excess.



37. Place the 5,000 mAh LiPo battery into the smaller slot on the right side of the plate. Make sure that the cable is on the front right corner facing up. Secure it with 2 zip ties.



38. Take the 3D-printed receiver antenna support (G1013) and pull the receiver antenna through it.



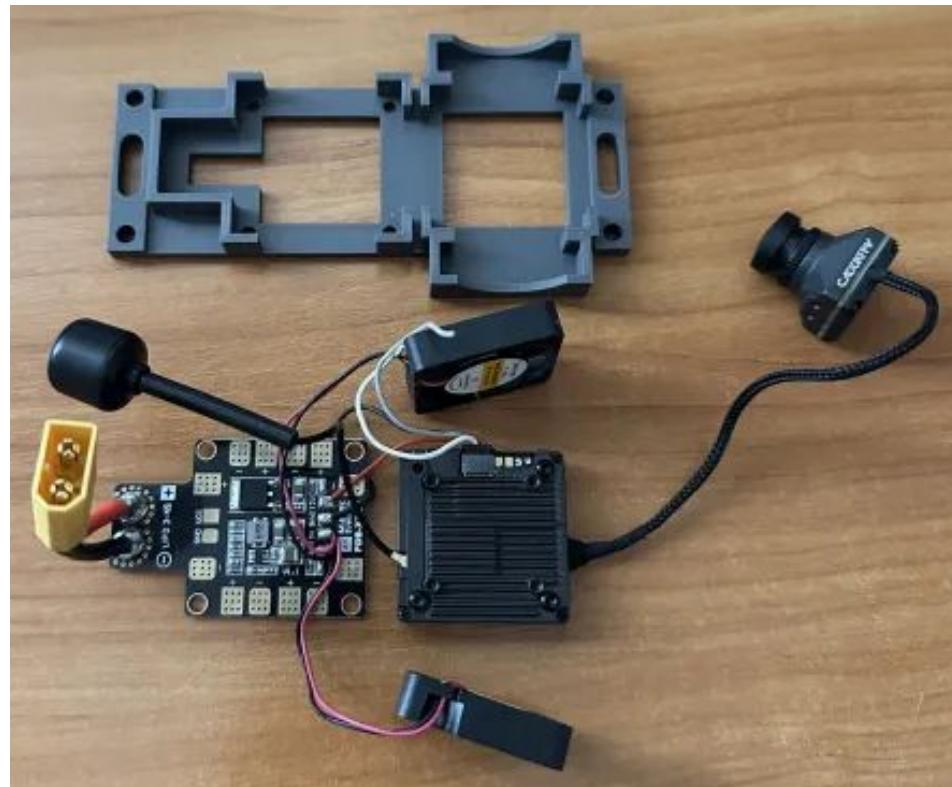
39. Place the receiver antenna support onto the circular extrusion next to the receiver on the top plate.

Make sure that the clear part of the receiver antenna is facing up.

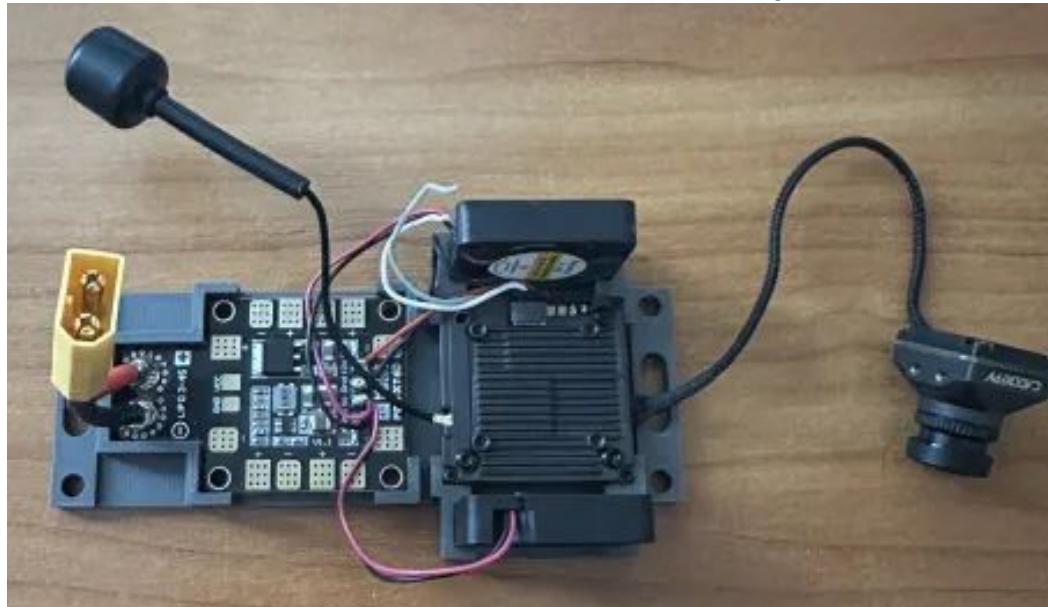


40. This completes the top plate assembly. Set it aside for now.

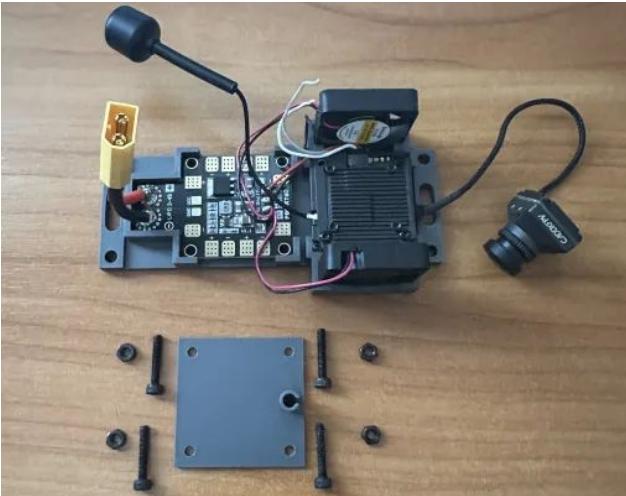
41. Take the 3D-printed control panel support (G1010) and the electronic assembly.



42. Place the printed circuit board (PCB), fans, and the camera module in their respective slots as shown below. Be careful with all of the wires so that they don't disconnect.



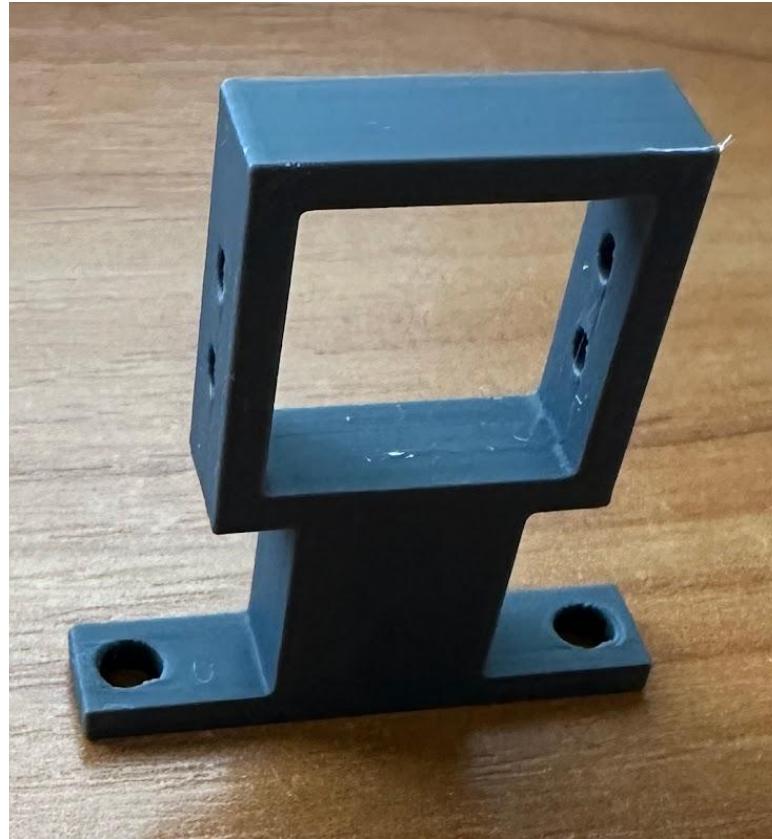
43. Take the 3D-printed control panel cover (G1011), four M3*16mm screws, and four M3 nuts. Screw the control panel cover over the PCB by putting the screws in each corner and securing the nut on the bottom. Use a M2.5 wrench to tighten the screws.



44. Place the camera antenna into the circular extrusion on top of the control panel cover.



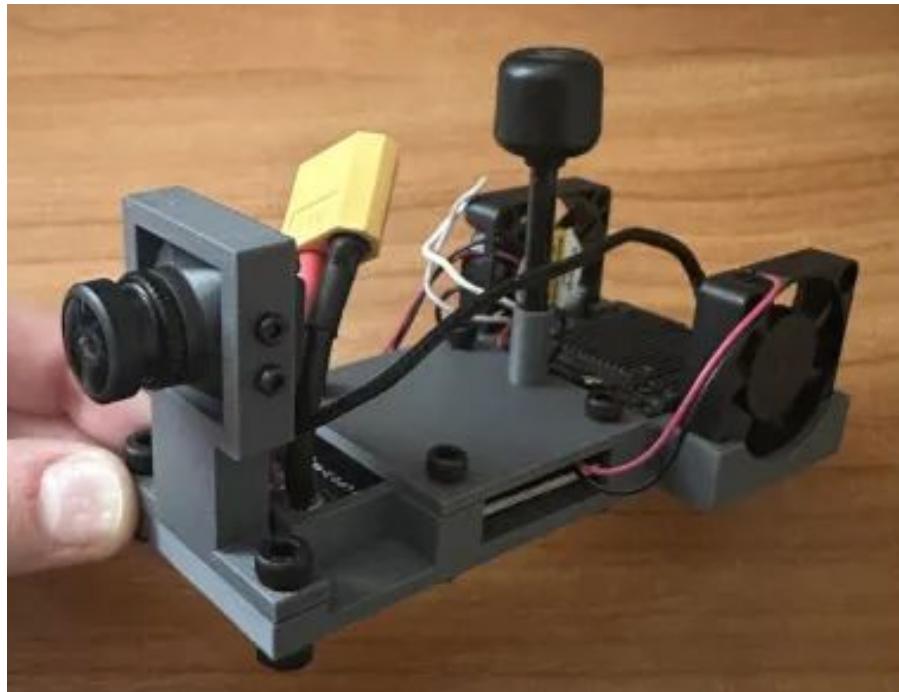
45. Take the 3D-printed camera mount (G1009).



46.Put the camera through the square cutout of the camera mount and align the holes. Secure it with two M2*6mm screws on each side. Use a M1.5 wrench to tighten the screws.



47. Take two M4*10mm screws and two M4 nuts. Secure the camera onto the control panel support next to the PCB.



48. Take two 3D-printed control panel legs (G1012). Place them under the control panel support by pushing the capsule-shaped extrusions into the cutouts.



49.This completes the payload assembly.

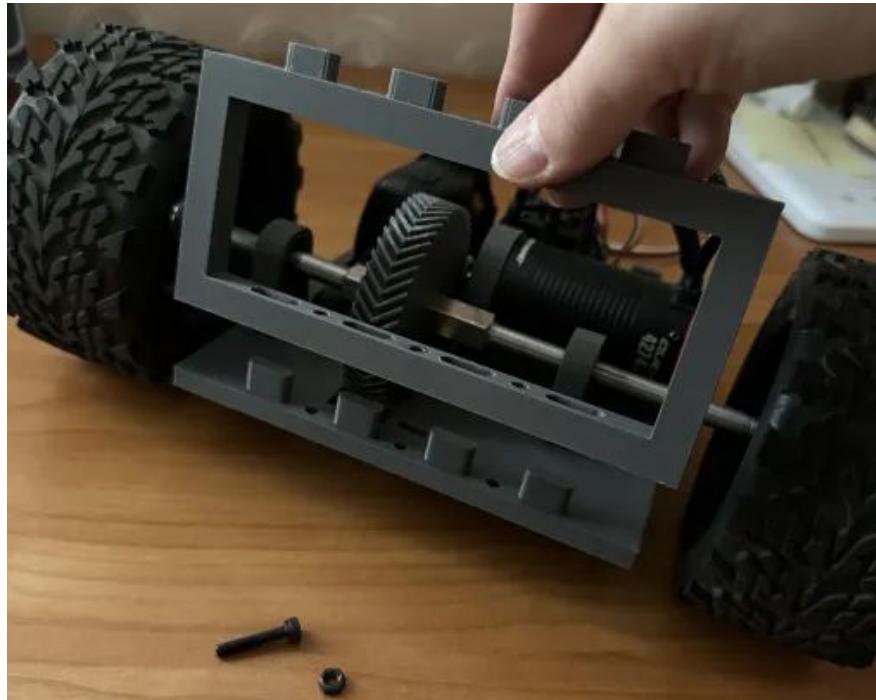
50.Take the top plate assembly and the payload assembly.

51. Push the control panel legs of the payload assembly onto the capsule-shaped extrusion in the middle of the top plate. Make sure that the camera is facing the front.

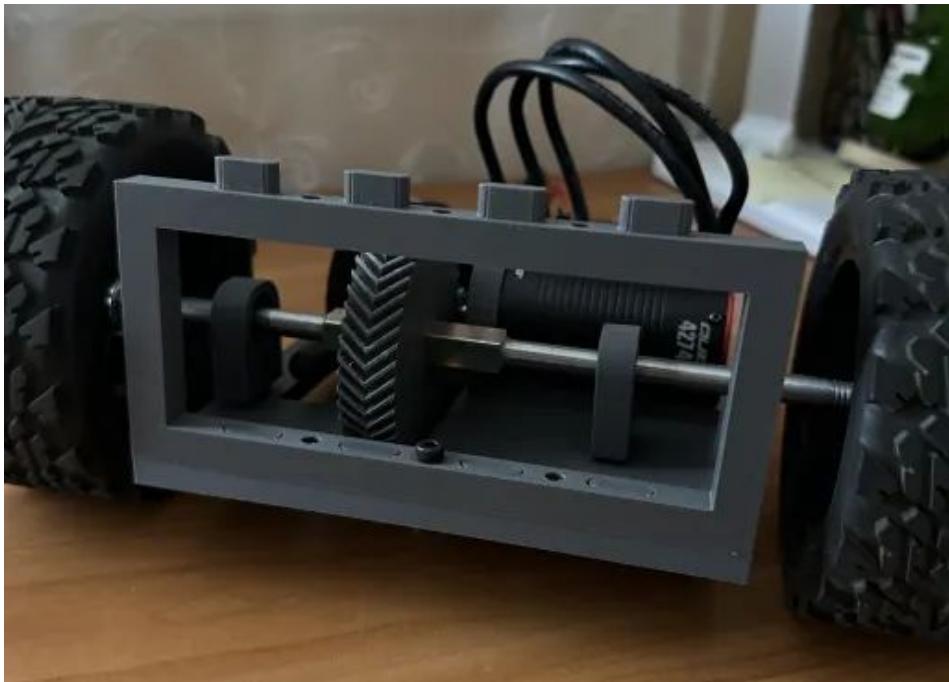


52. This completes the top frame assembly of GroundBot.
Set it aside for now.

53. Take the 3D-printed back frame support (G1003), the base frame assembly, M4*20mm screw, and M4 nut.



54.In the back of the base frame, push the back frame support onto the capsule-shaped extrusions. Secure it with a M4*20mm screw and M4 nut in the middle.



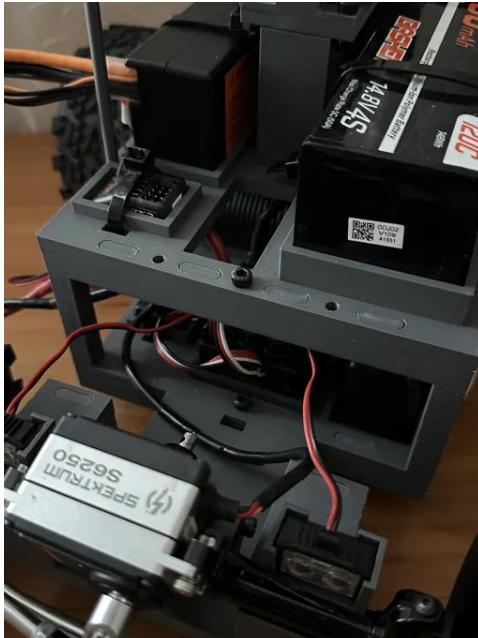
55. Take the front axle assembly and push it onto the capsule-shaped extrusions at the front of the base frame. Secure it with a M4*20mm screw and M4 nut in the middle.



56. Take the top plate assembly. Push it onto the capsule-shaped extrusions at the top of the front axle assembly and the back frame support.

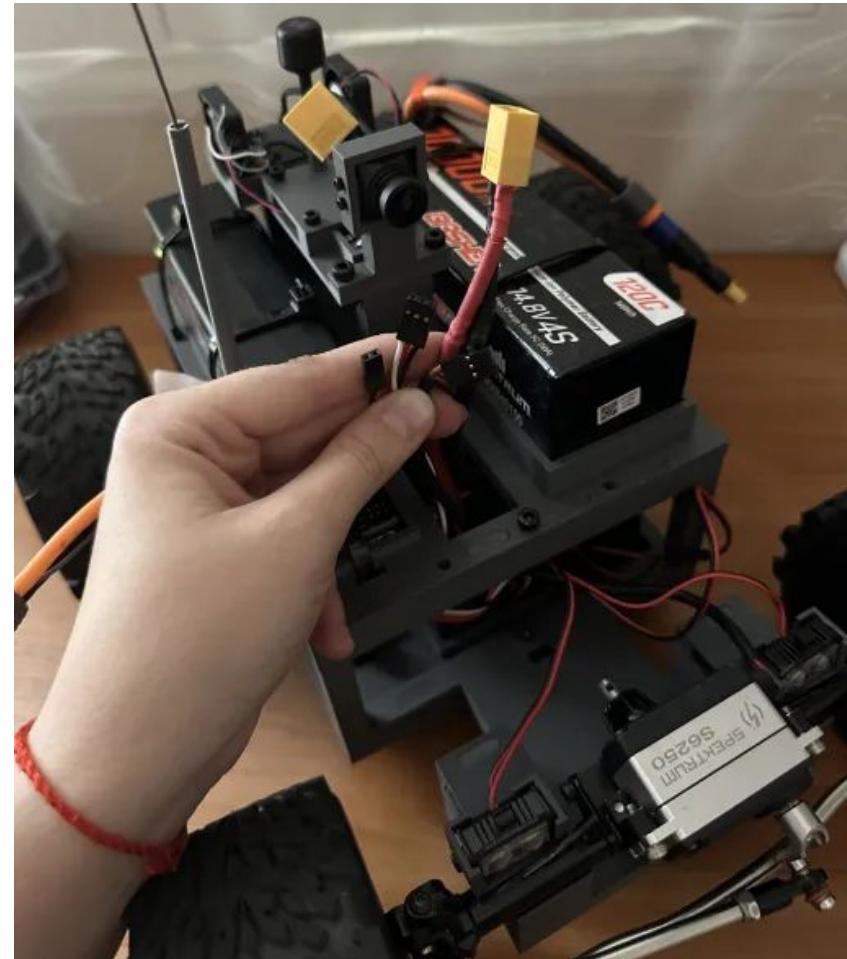


57. Take two M4*20mm screw and two M4 nut. Place one at the front of the top plate center and one in the back to secure the top plate to the front axle assembly and the back frame support.



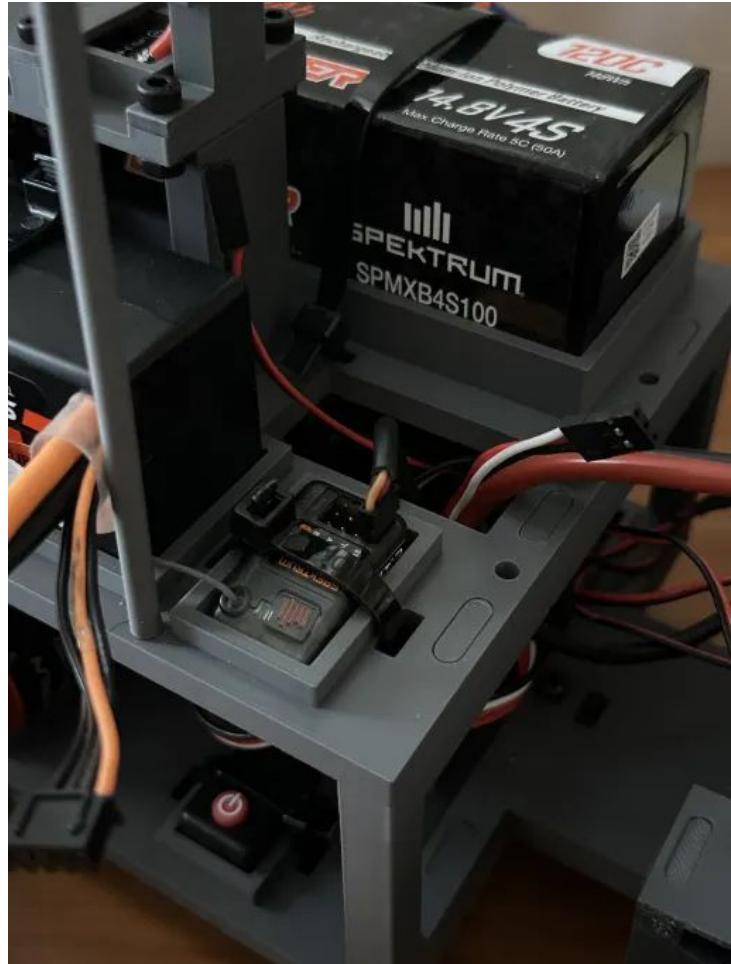
58.This completes the GroundBot frame.

59. Pull the cables of the servo motor, ESC (multi-wire connector and the cables with the XT60 yellow connector on them), and headlights from the center of the GroundBot frame through the cutout at the front of the top plate.



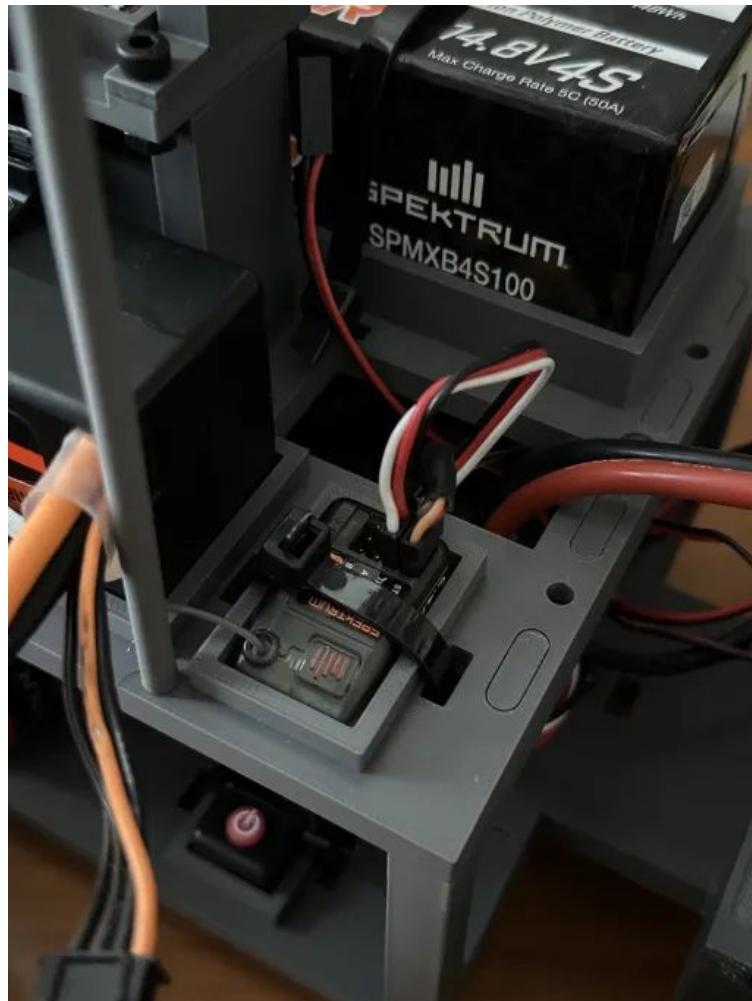
60. Take the servo motor wire (the one that has orange, red, and black wires) and place it in the first slot of the receiver labeled “STR”.

Make sure that the orange wire is closest to the label.

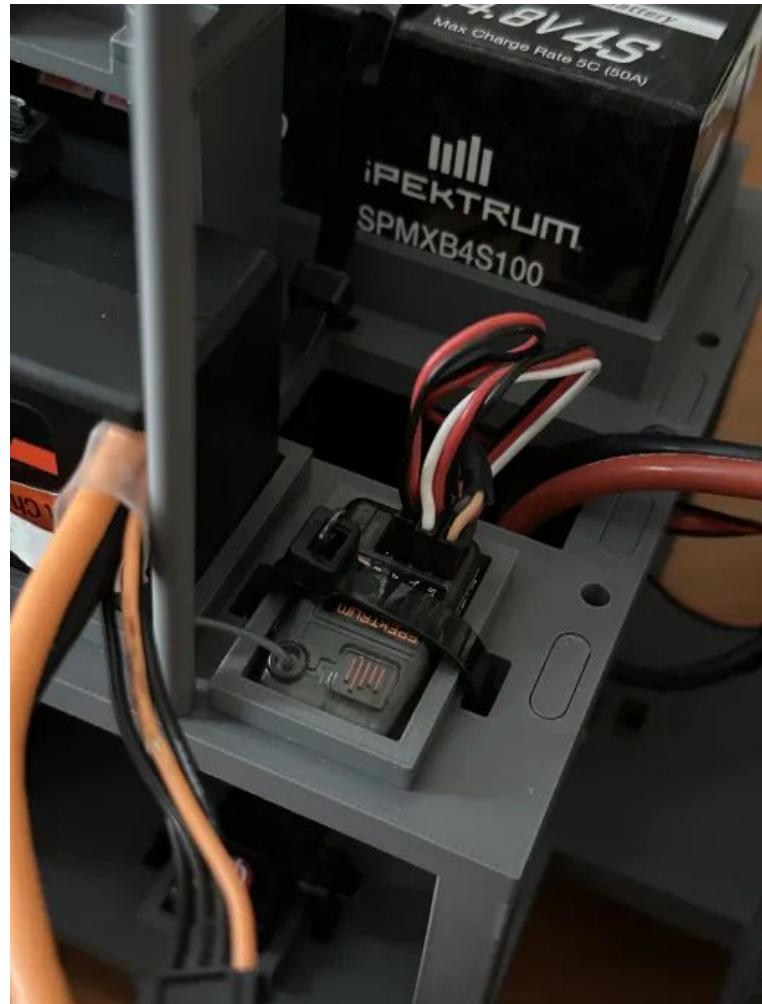


61. Take the ESC wire (the one that has white, red, and black wires) and place it in the second slot of the receiver labeled “THR”.

Make sure that the white wire is closest to the label.



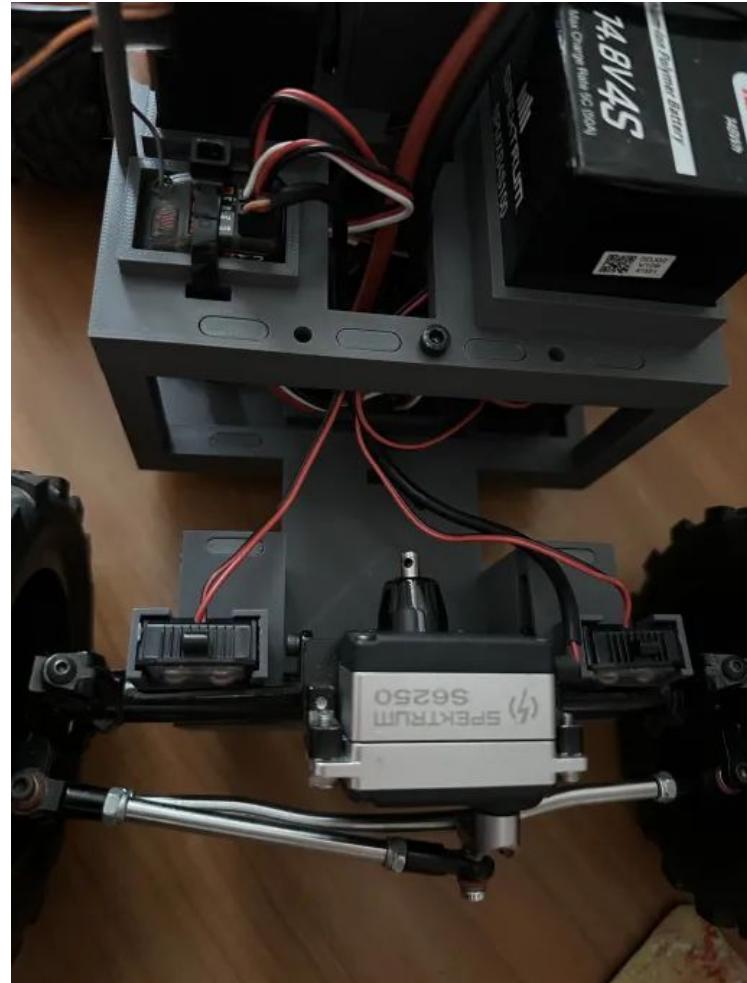
62. Take the headlights wire (the one with black and red wires) and place it in the third slot of the receiver labeled “AUX1. Make sure that the black wire is closest to the label.



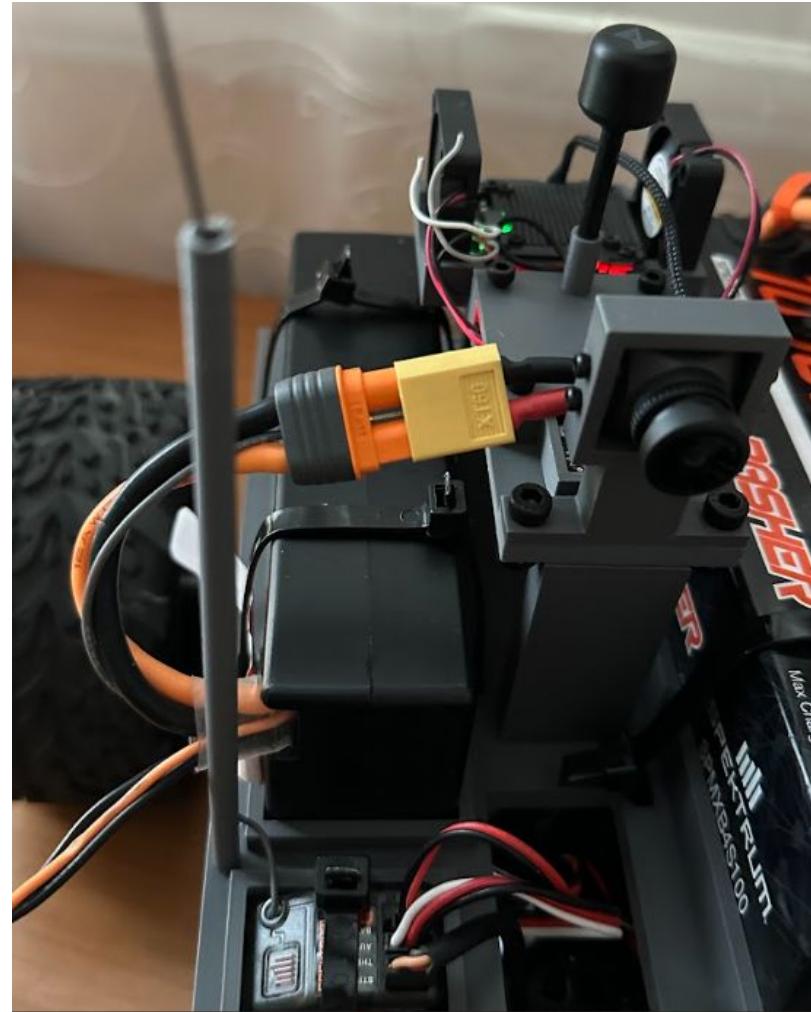
63. Connect the yellow XT60 connector of the ESC cable with the yellow part of the 10,000 mAh LiPo battery cable.



64.Tuck the extra length of all the wires into the center of the GroundBot frame so that nothing sticks out.



65. Connect the yellow XT60 connector of the PCB on the payload assembly with the orange part of the 5,000 mAh LiPo battery.



The GroundBot is fully assembled!