



University of British Columbia
Electrical and Computer Engineering
ELEC 291/292

Robot Assembly

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This document shows how to assemble the robot for project 2. The materials listed below are required. A picture of the materials follows the list.

Description	Quantity
Ball caster kit	1
Geared motor	2
Servo wheels	2
Robot chassis	1
4-40 screw/nut kit	1
4 x AA battery holder	1
9V battery clip	1
DPDT Switch	1



Steps

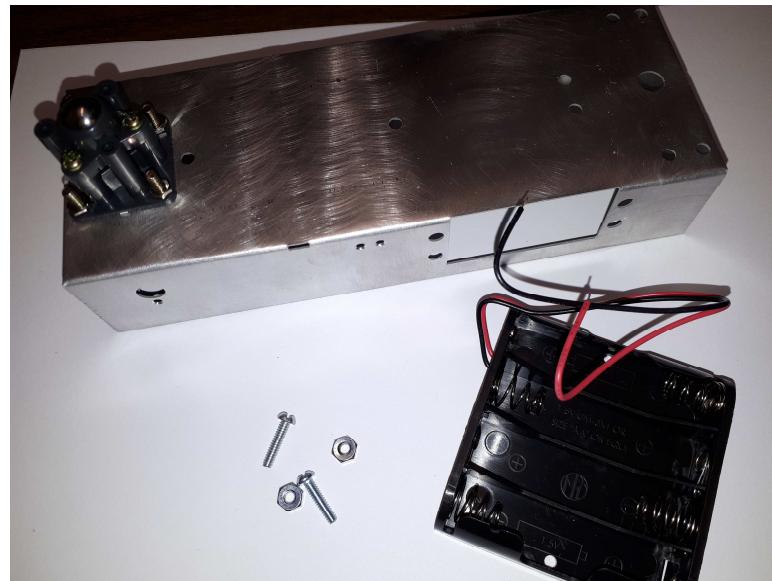
- 1) Follow the directions included with the caster wheel in order to assemble it. There are materials to assemble two caster wheels. We just need one. The caster wheel comes with machine screws to secure it to the robot chassis.



- 2) Attach the caster wheel to the robot chassis as shown in the picture bellow.



3) The next step is to attach the 4 x AA battery holder to the bottom of the robot. We will be using two 4-40 PLASTIC screws and nuts. In the picture below the screws are made of metal. Metal screws WILL SHORT CIRCUIT THE BATTERIES. Use the plastic screws included in the kit.



4) Attach the battery holder to the chassis using PLASTIC screws.



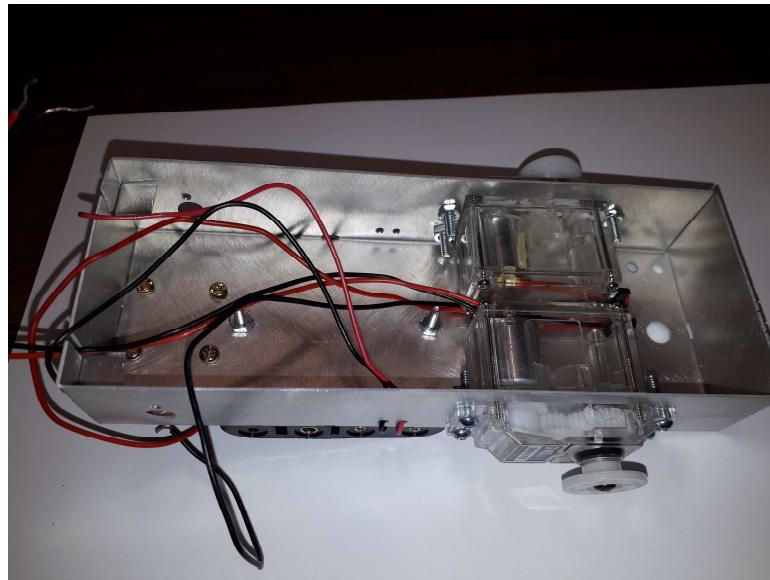
5) The picture bellow show the inside of the chassis when both the caster wheel and battery holder are installed. Did you use plastic screws and nuts to attach the battery holder? I didn't, that is why my batteries short-circuited!



6) The next step is to attach the geared motors to the chassis. We need four 4-40 screws and nuts per motor.



7) Install the geared motors as shown in the picture bellow.



8) Now we can install the wheels. We need to remove the plastic horns first.



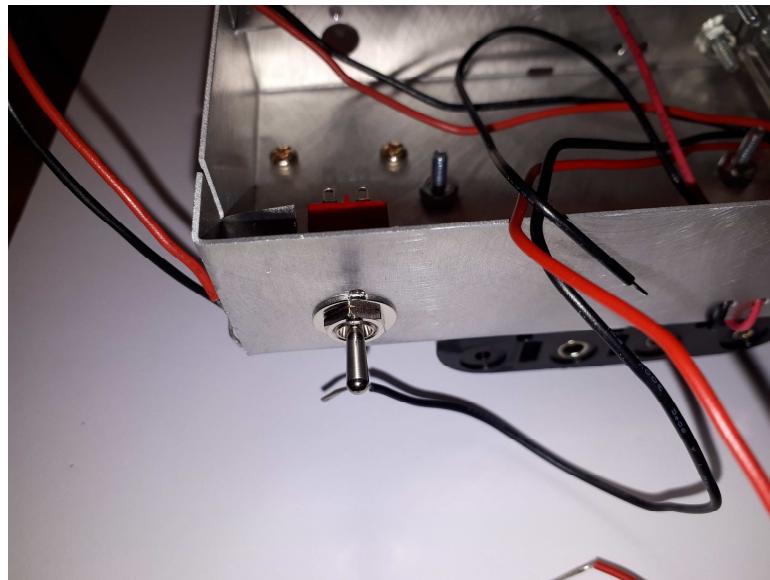
9) After removing the white circular motor horns that come with the servo motors, we install the wheels and secure them with the same black self threading screws that came with the motors.



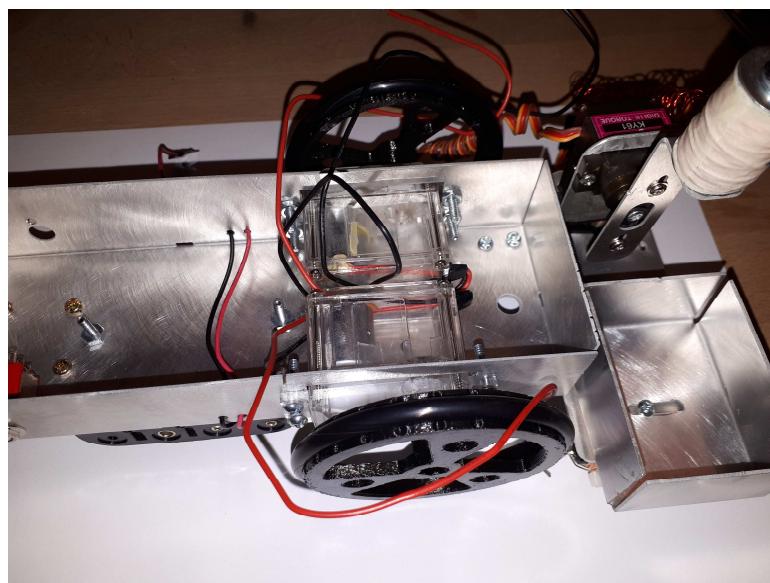
10) The double-pole/double-toggle DPDT switch allows us to turn the robot on/off.



11) Attach the DPDT switch as shown in the picture bellow. There is a notch in the switch that matches a small hole in the chassis.



12) Now is the time to install the coin picker assembly. Instructions to assemble the coin picker are provided in the course web page.



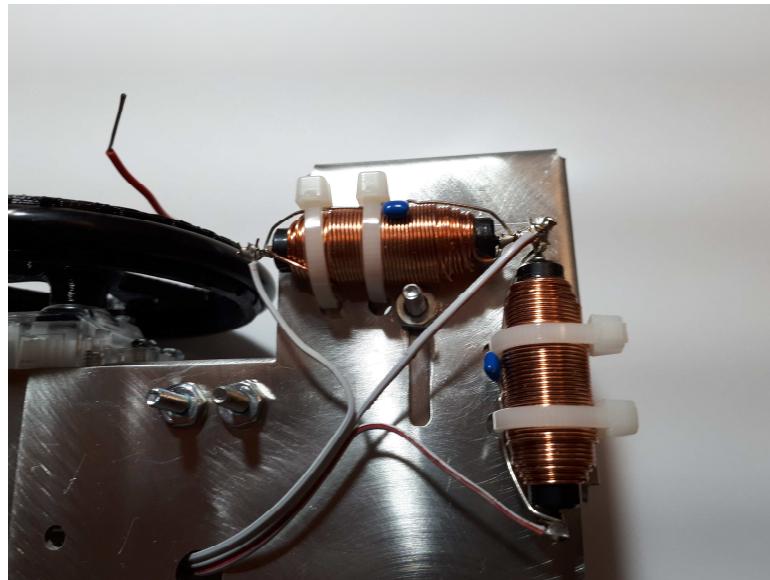
13) To get the wires from the 4 x AA battery holder inside the robot, use the two small holes on the side of the robot chassis.



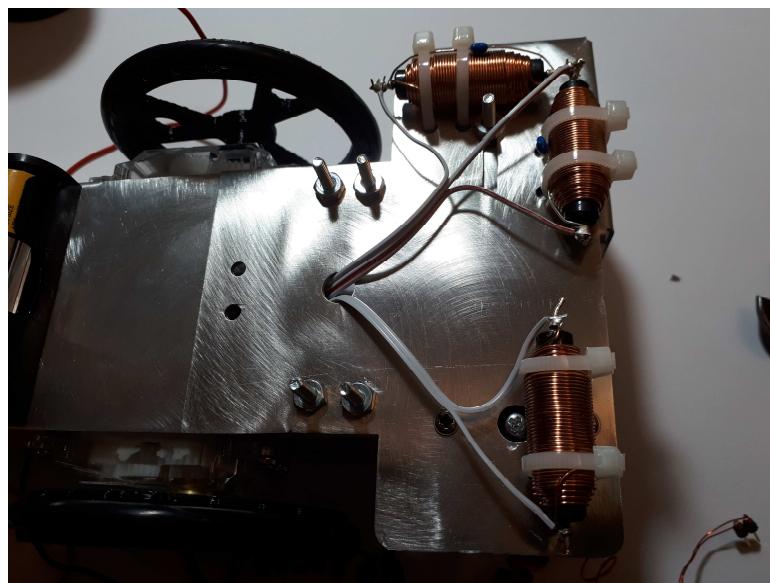
14) Rip three conductors from the ribbon cable provided in the project 2 kit. Using a pen or permanent marker, draw a line on one of the sides as show in the picture. This line will help us identify which conductor is connected to which inductor. As you can see, I used a red pen.



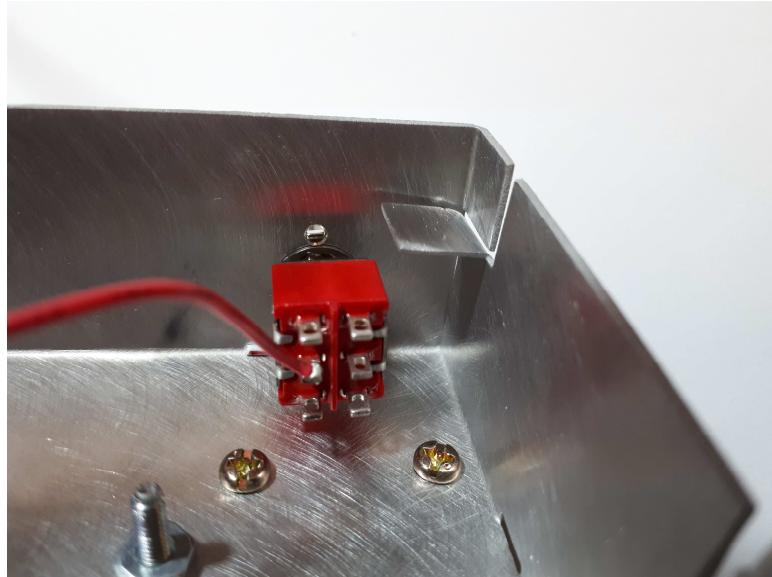
15) Strip the ends of the ribbon cable and solder them to the perimeter detector tank circuits.



16) Do the same with the metal detector inductor. To get the ribbon cables inside the robot, use the hole shown in the picture.



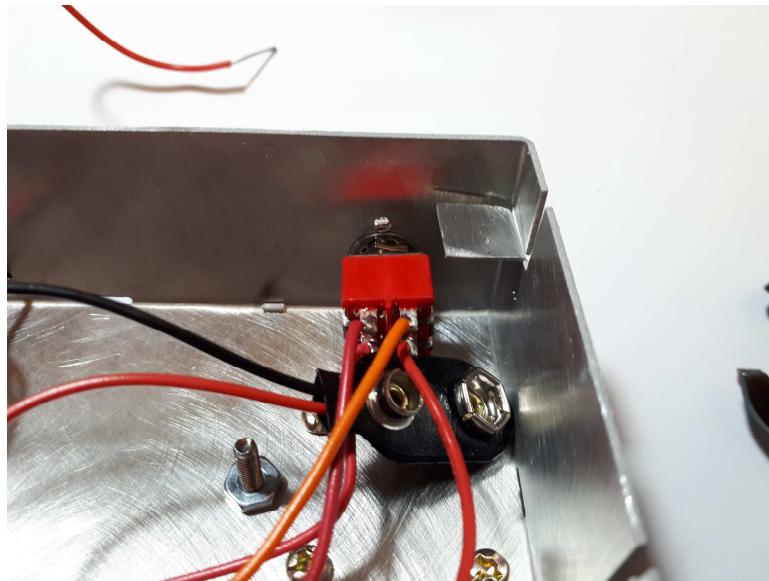
17) The DPDT switch is used to turn on/off the robot. In my case I used a 9V battery to power the microcontroller (after converting it to 5V using an LM7805 voltage regulator) and 4 x AA to power the motors, servos, and electromagnet. I used one of the poles for the 9V battery and the other pole for the 4 x AA batteries. Start by soldering the red wire of the 9V battery to one of the center poles of the switch.



18) Do the same with the red wire of the 9V battery clip.



19) Solder a couple of wires to the top terminals of the switch. In my case I used a red wire for the 4 x AA batteries and an orange wire for the 9V battery. Those two wires, together with the corresponding negative black wires, go to the breadboard to power the different circuits of the robot.



20) The picture bellow shows the robot with all the wires installed. Those wires should be connected to the breadboard(s) to power, control, or sense the different parts of the robot.

