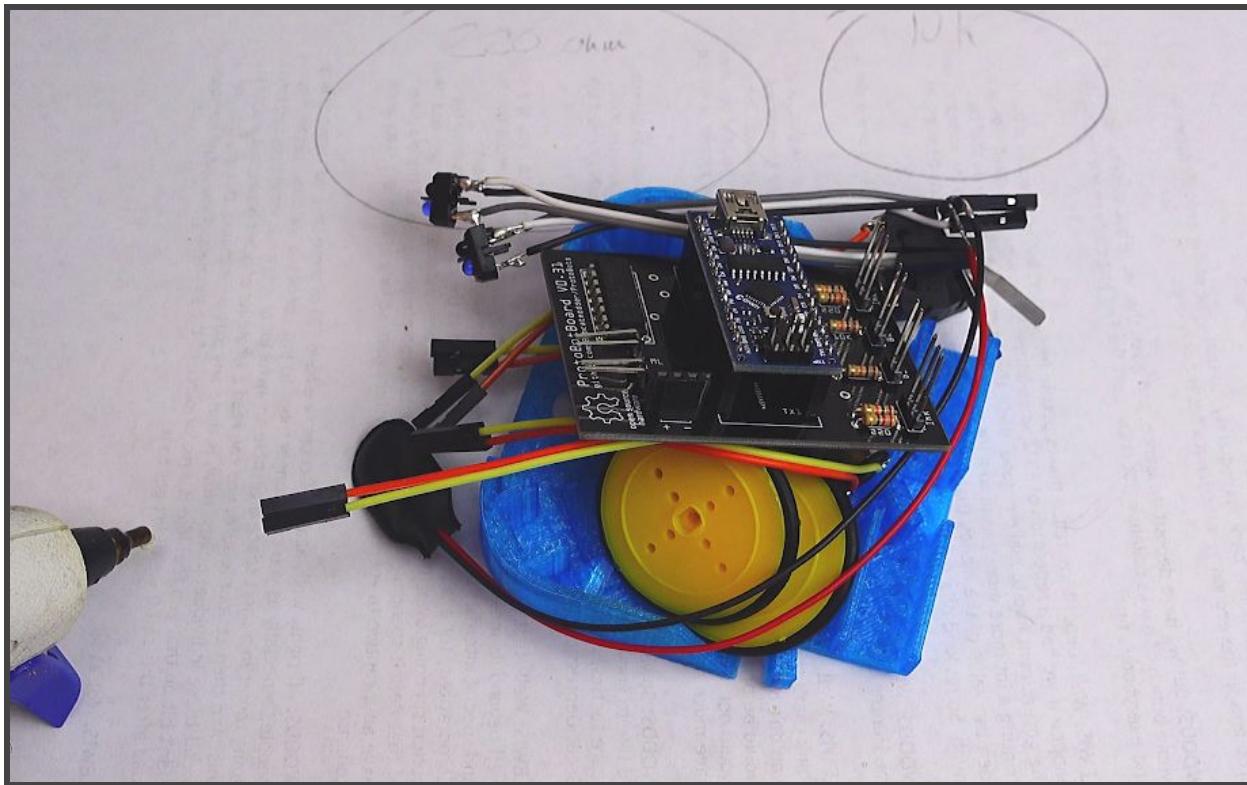


# ProtoBot Assembly Guide



## You will need:

- 3D printed base part
- 2 x 3D printed Antenna parts
- 4 x 3D printed ProtoBotBoard Supports
- 2 x Bump sensors
- 2 x Motors
- 2 x IR Sensors
- 1 x 9V Battery clip
- 1 x 9V Battery
- A length of Hook and Loop fastener (Such as VELCRO), about as long as the battery

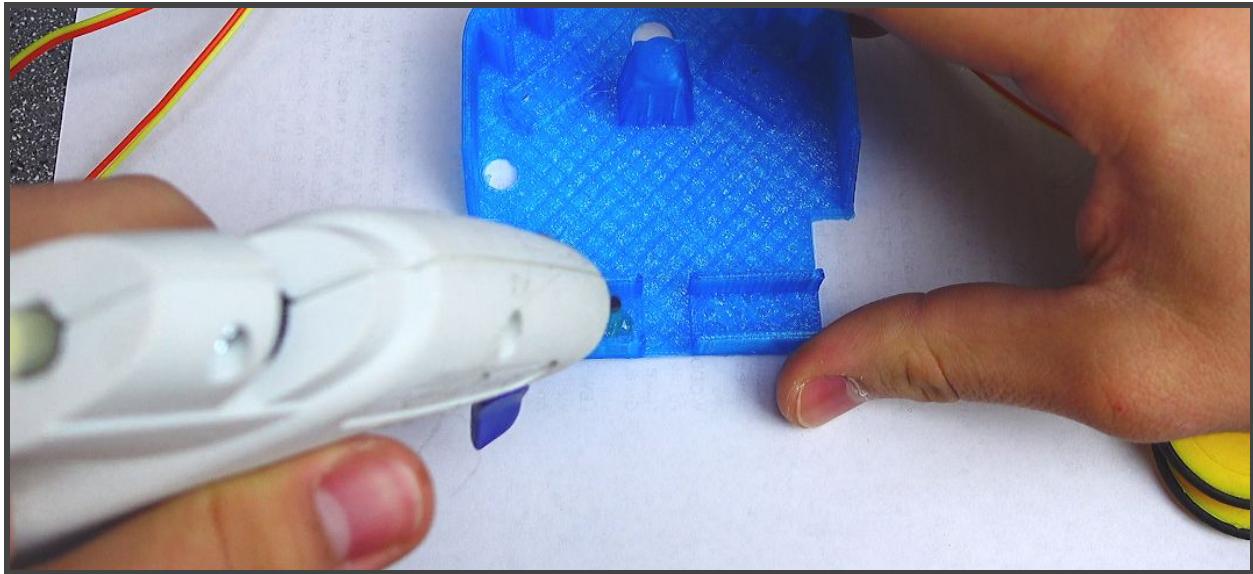
## Tools to prepare:

- A hot glue gun (High-Temp is better)

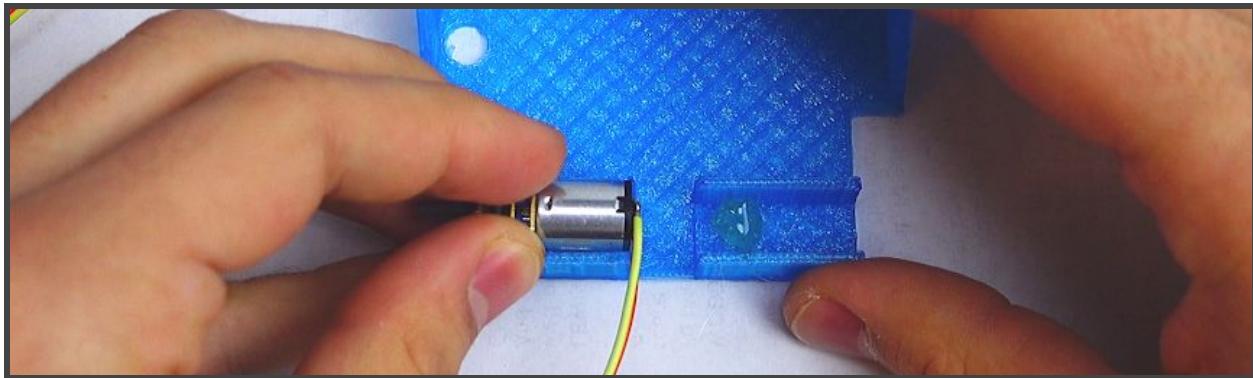
Note: A piece of scrap paper taped to whatever worksurface you have is a good way to protect the surface underneath.



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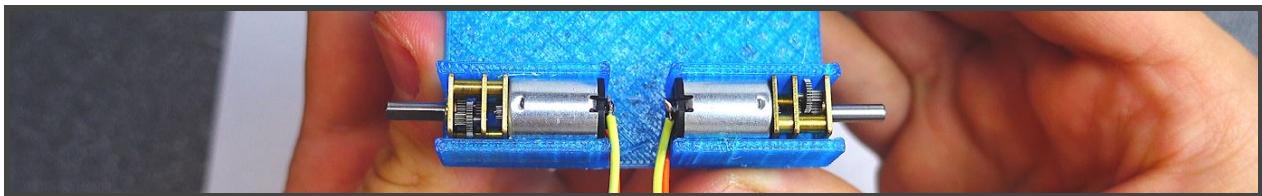


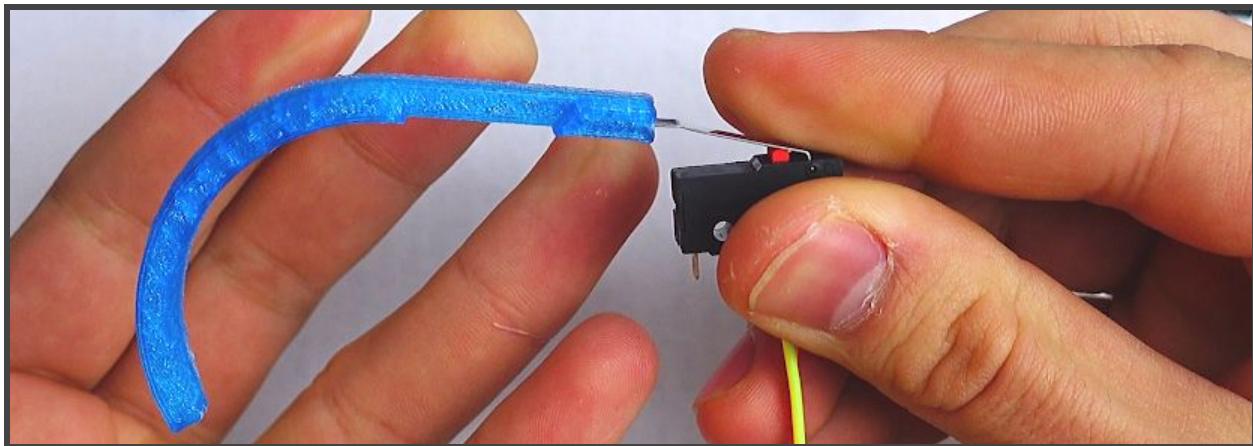
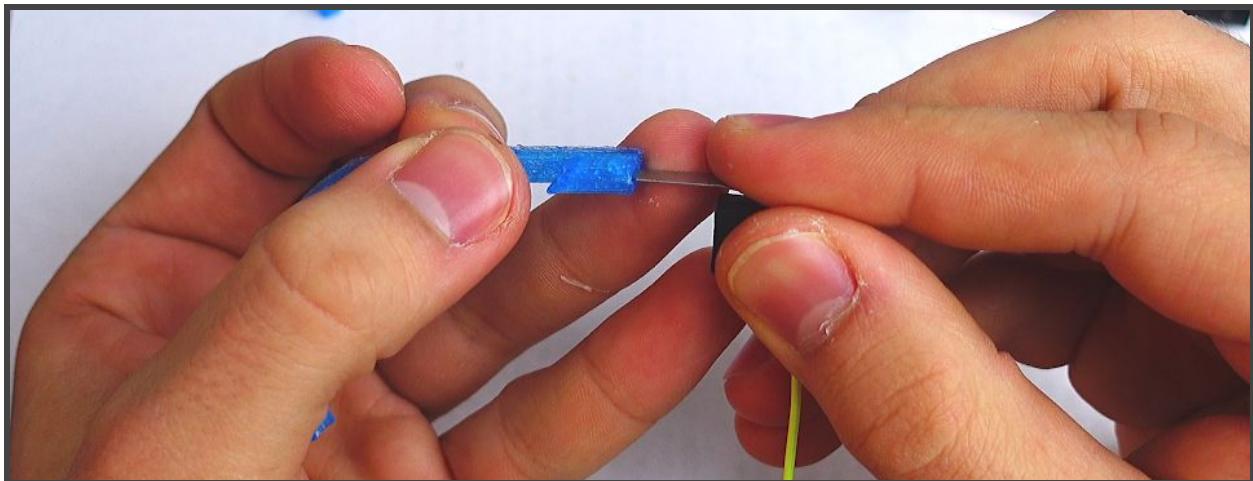
- Apply a large dab of hot glue to the inner end of each motor mount



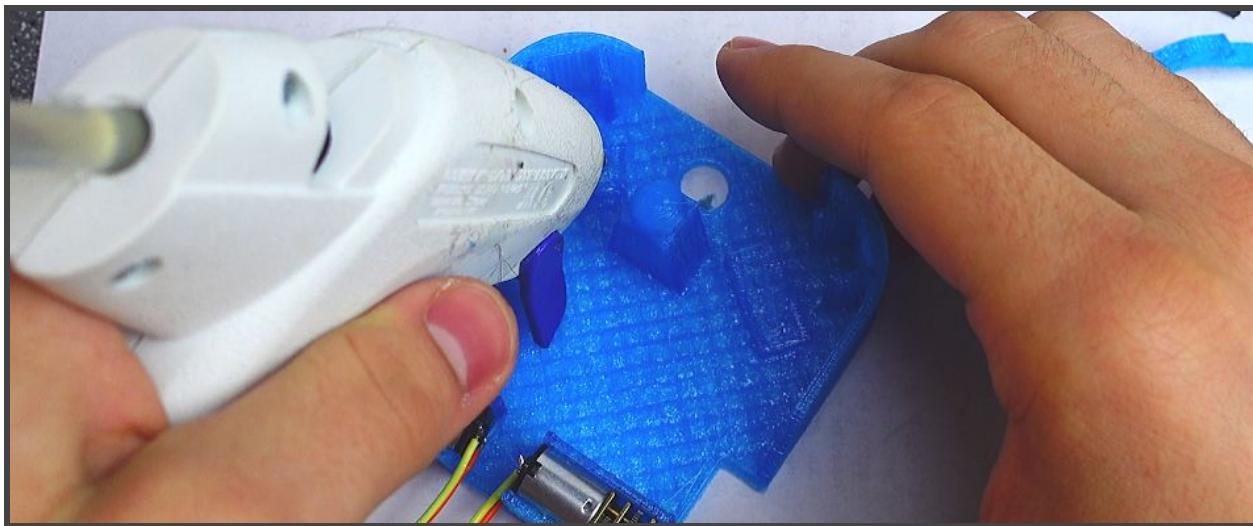
- Insert each motor into the mount, with the wires facing as shown

Note: Be careful not to get glue into the gearboxes!

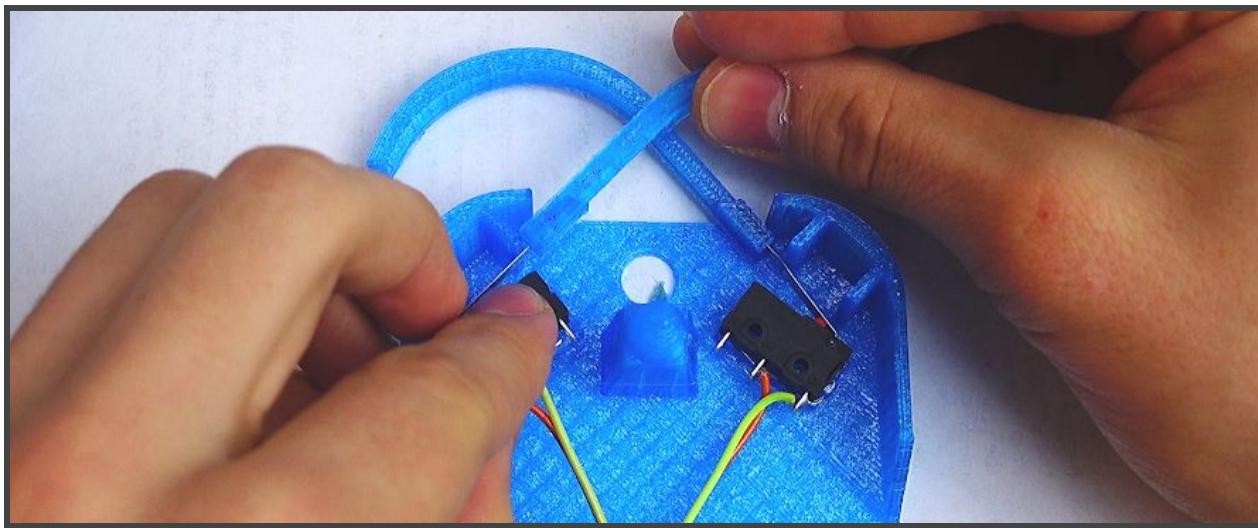
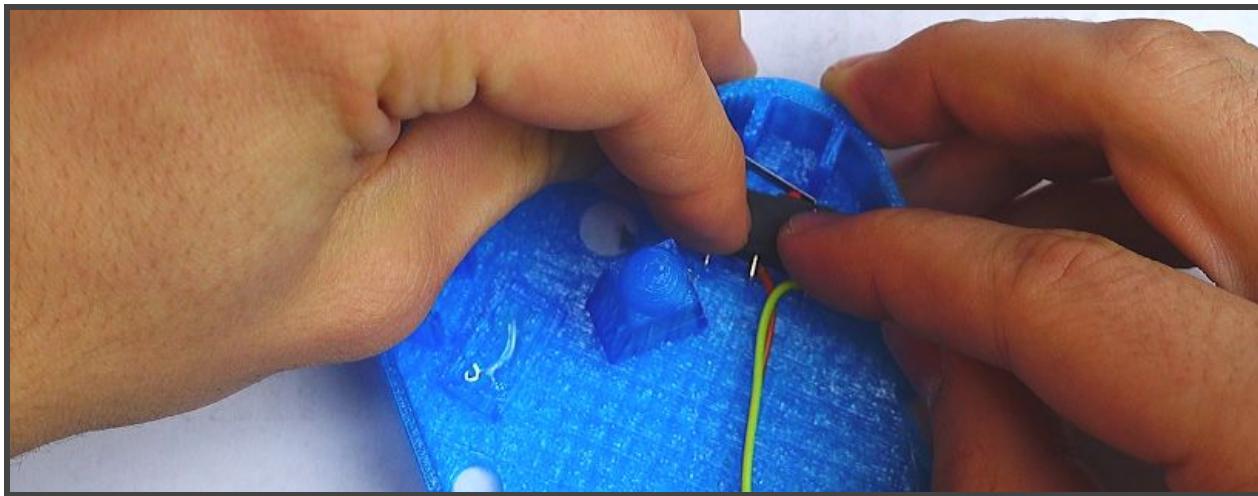




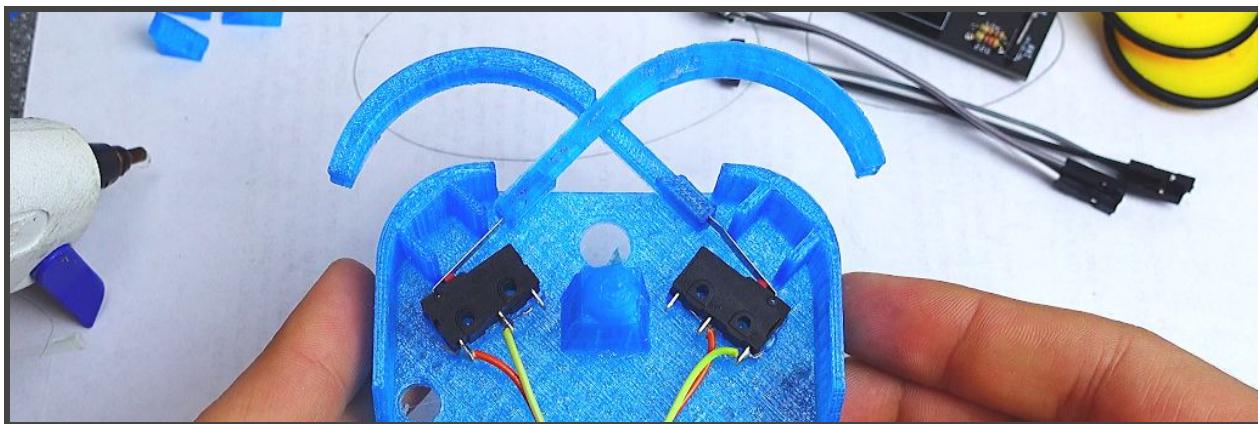
- Insert the bump sensors into the antenna pieces, as shown

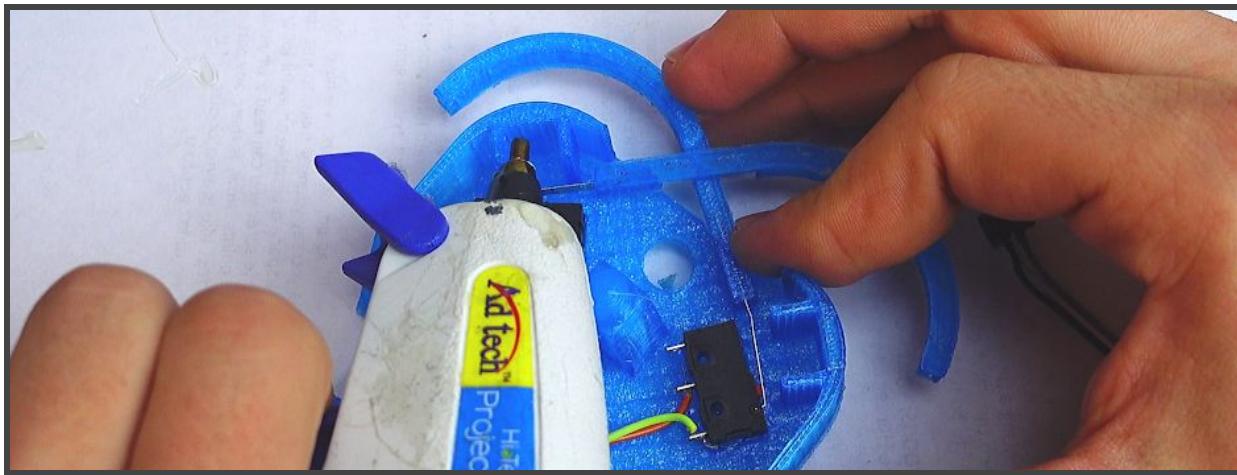


- Put a dab of hot glue on each of the bump sensor platforms

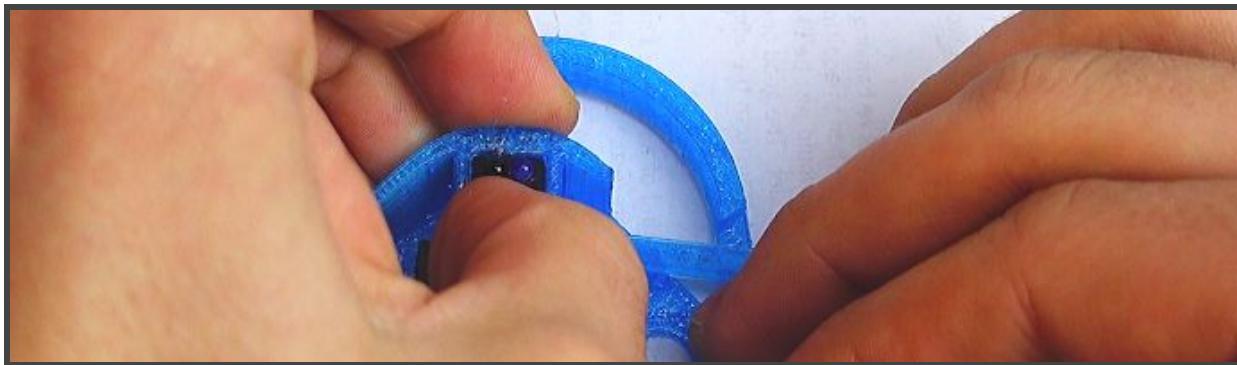


- Place each bump sensor on a platform, lining the sensors up with the edges of the platforms.





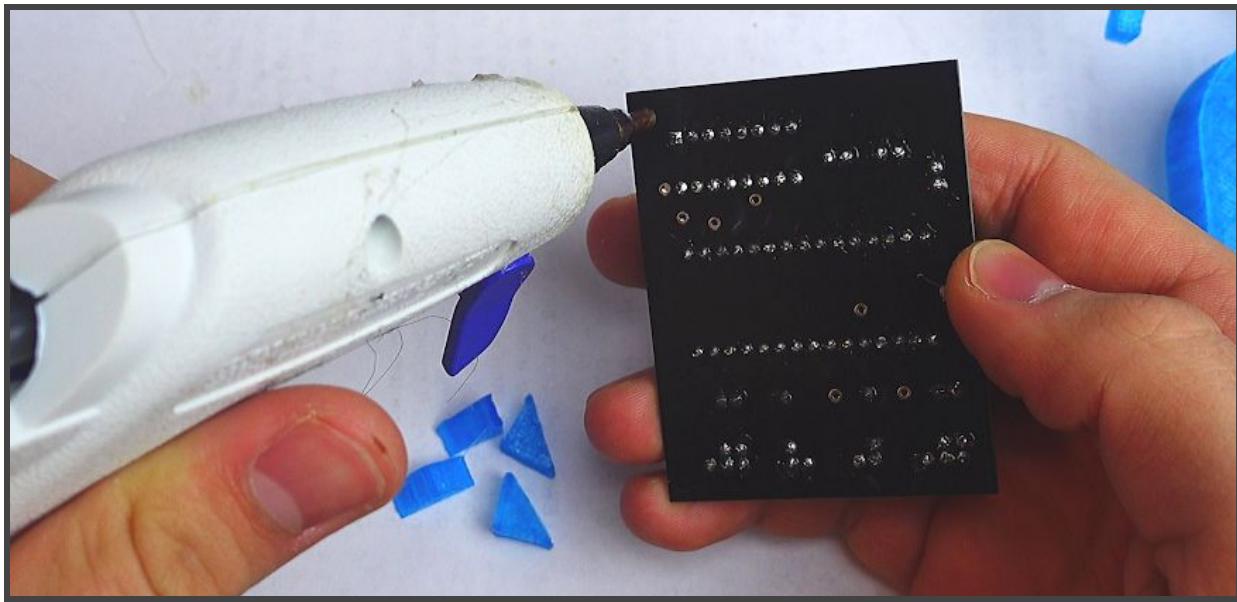
- Put a dab of glue at the top of one of the IR Sensor mounts



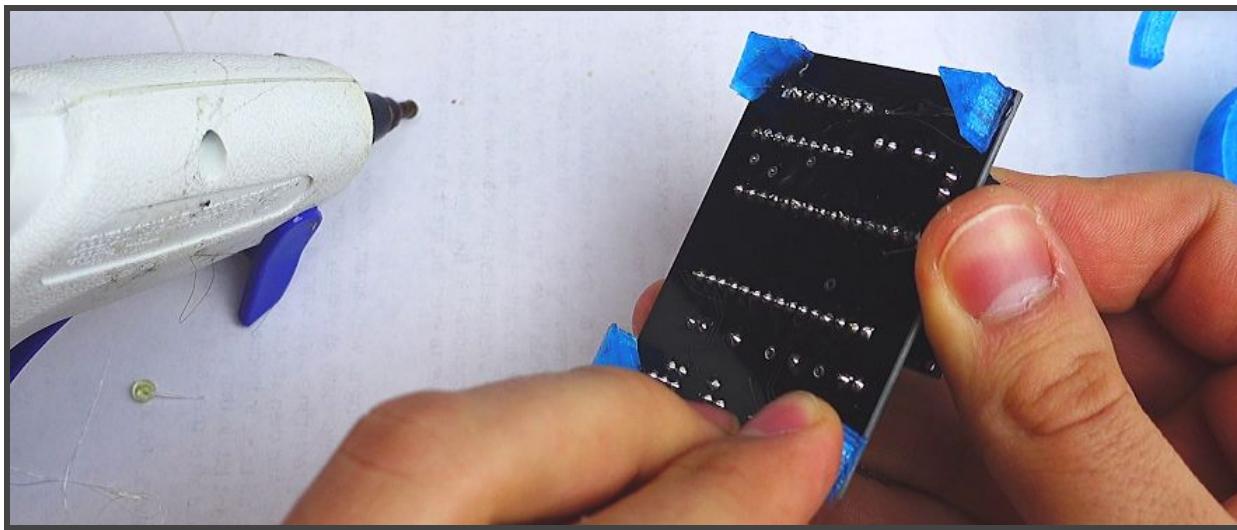
- Bend the wires out of the way, then insert an IR Sensor, so that the top is a little higher than the top of the base



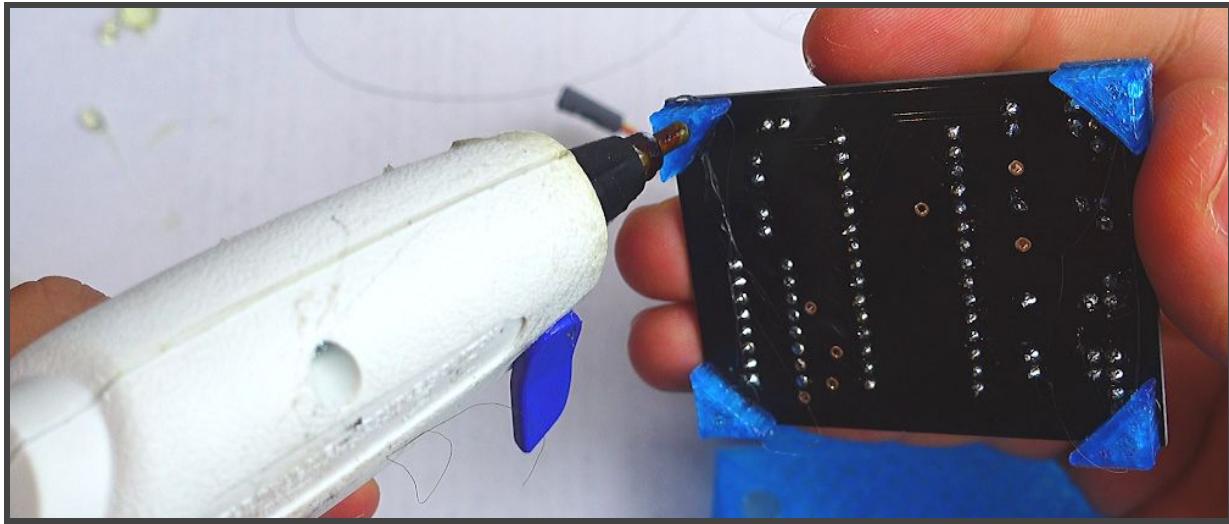
- Repeat for the other side and sensor



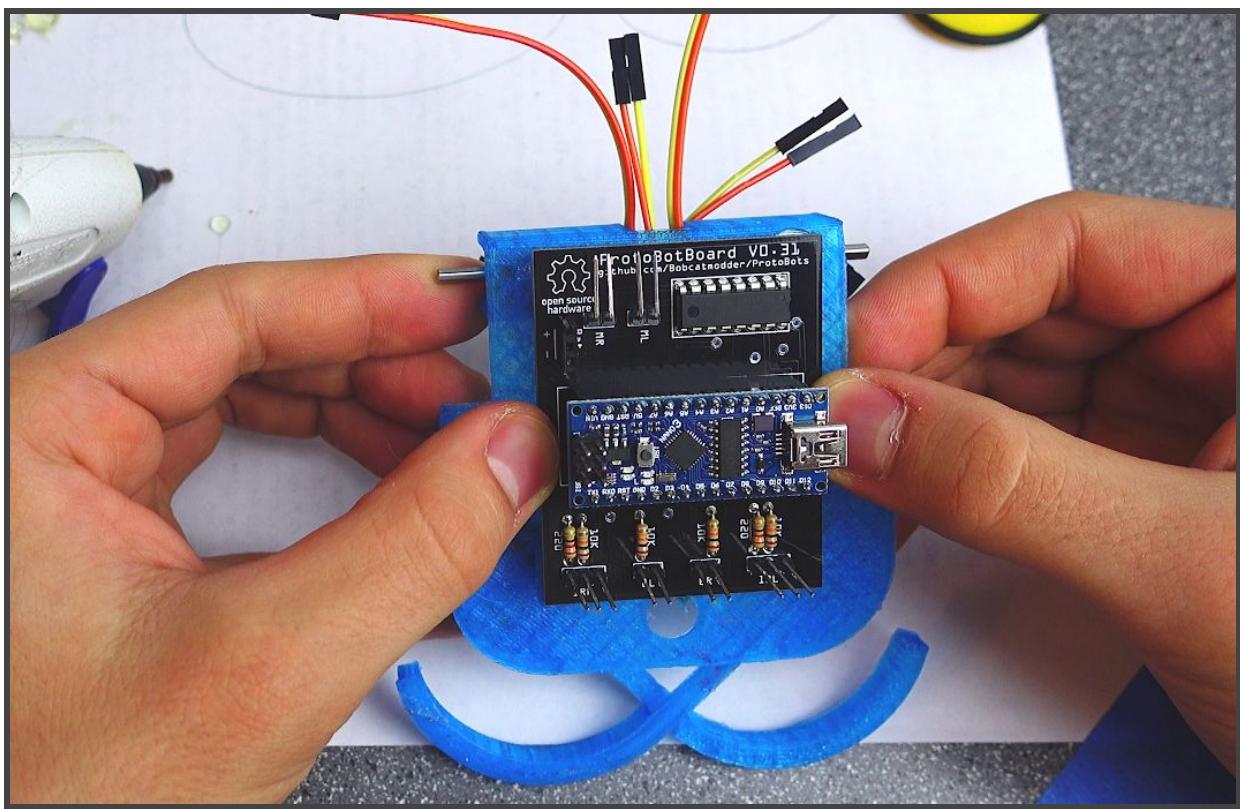
- Put a dab of hot glue on each corner on the underside of the ProtoBotBoard



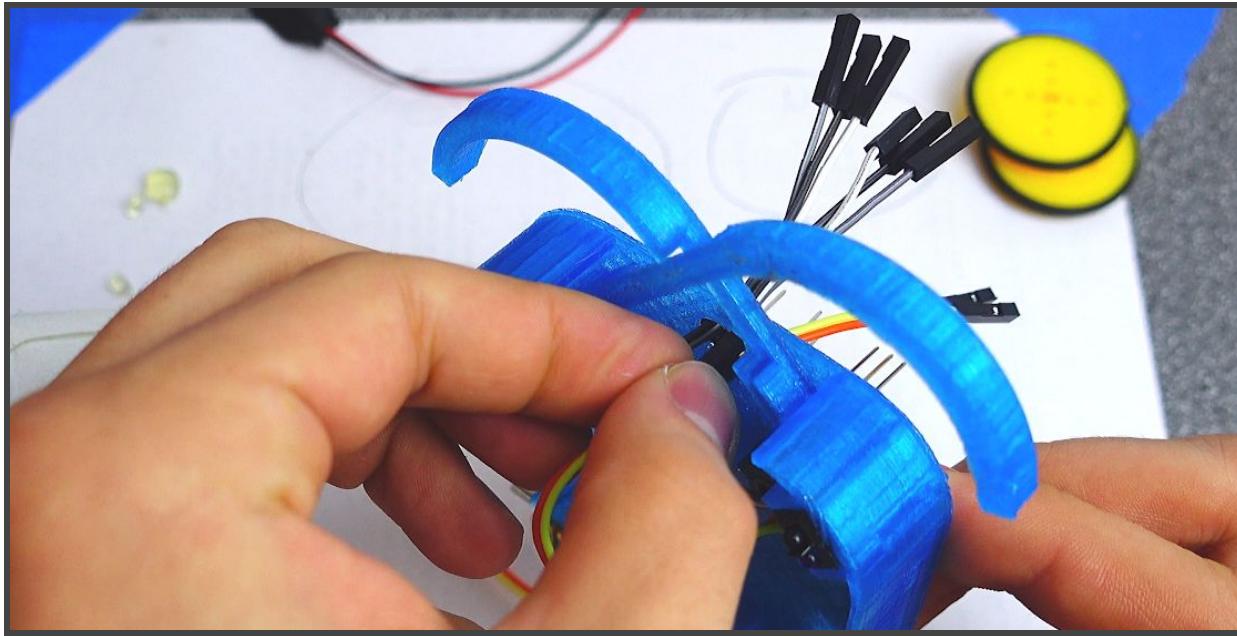
- Glue each of the board supports in place, at the four corners



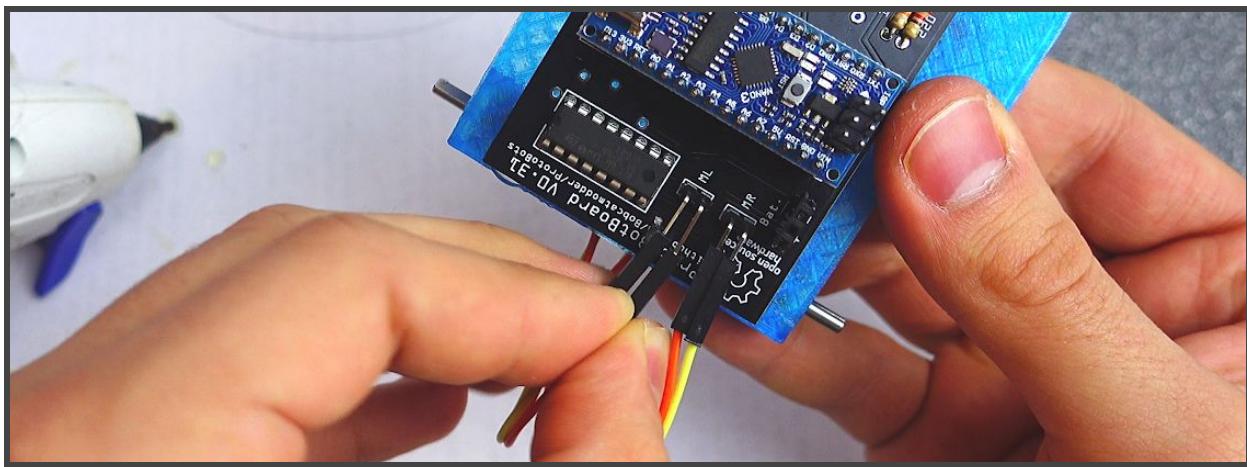
- Add a dab of glue to each ProtoBotBoard support



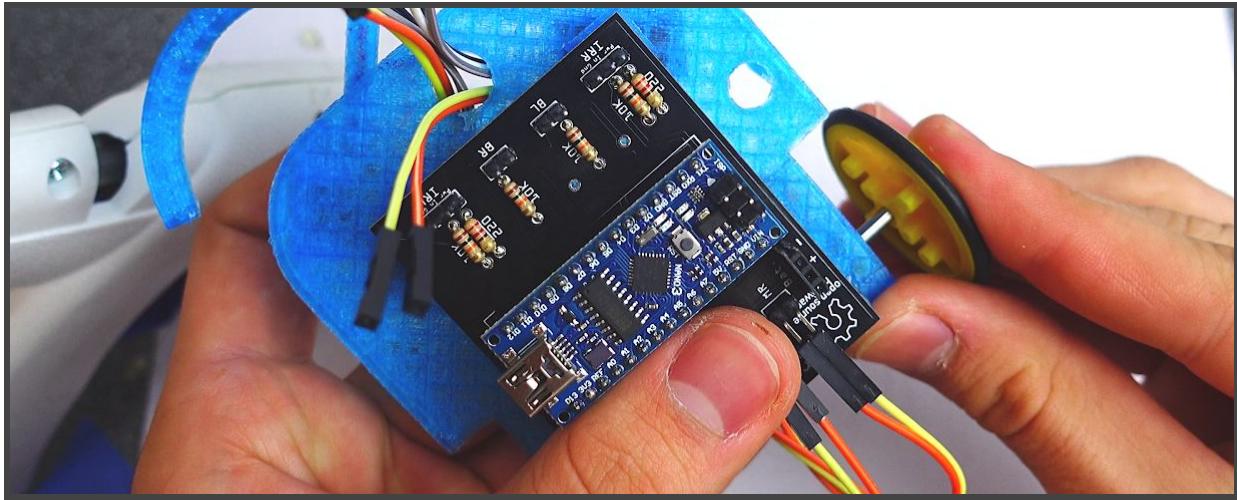
- Glue the ProtoBotBoard to the base, with the sensor pins facing forwards, as shown.



- Feed all the sensor wires through the hole in the front of the ProtoBot Base

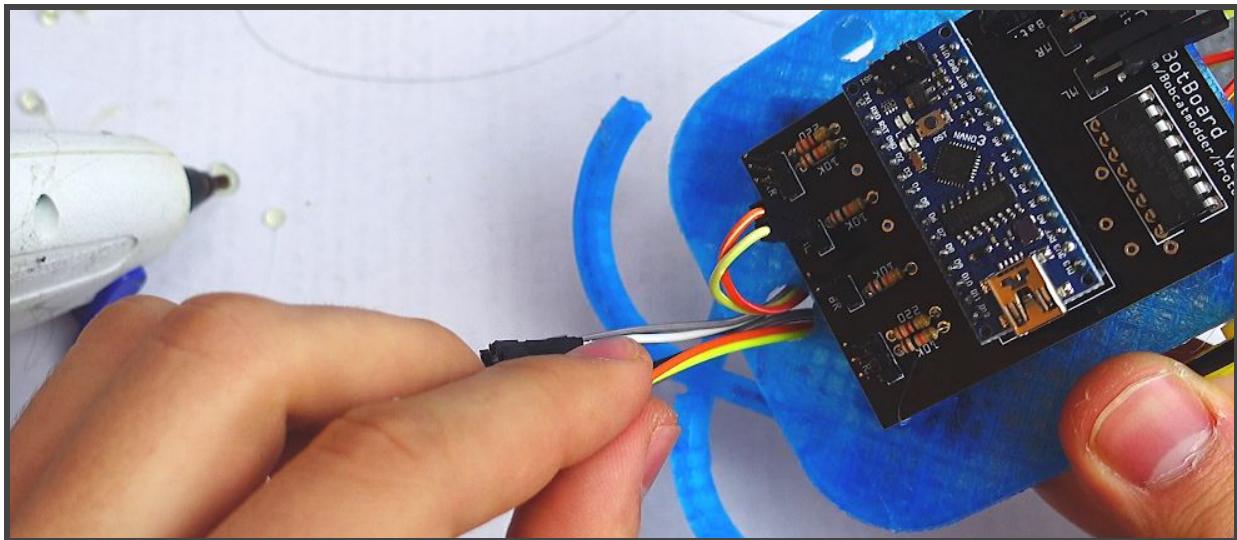


- Connect the wires from the motors to their respective ports, "ML" for the left motor, and "MR" for the right



- Attach the wheels to the motors

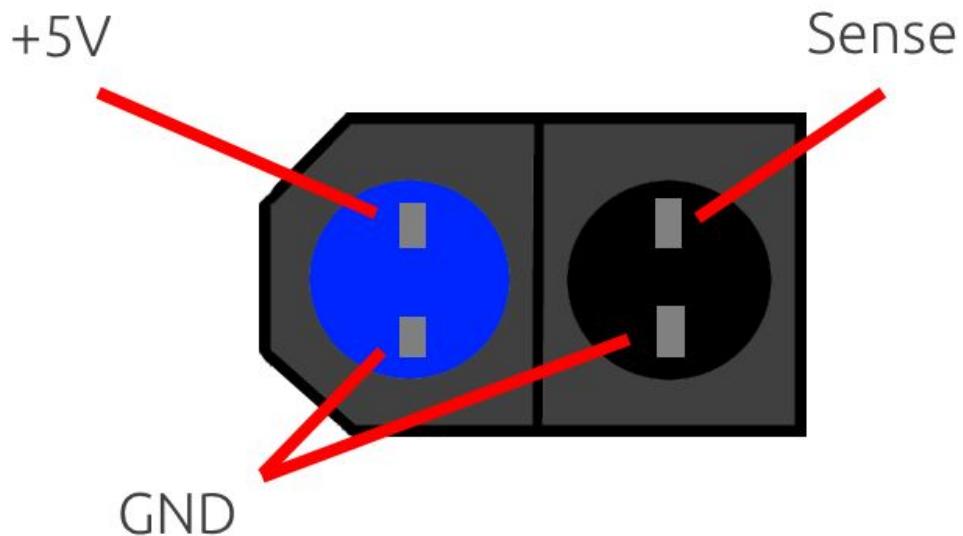
If the wheels are yellow, you might want to add a bit of hot glue to hold them in place. If they are pink, they will have a “D” shaped hole, and they do not need glue.



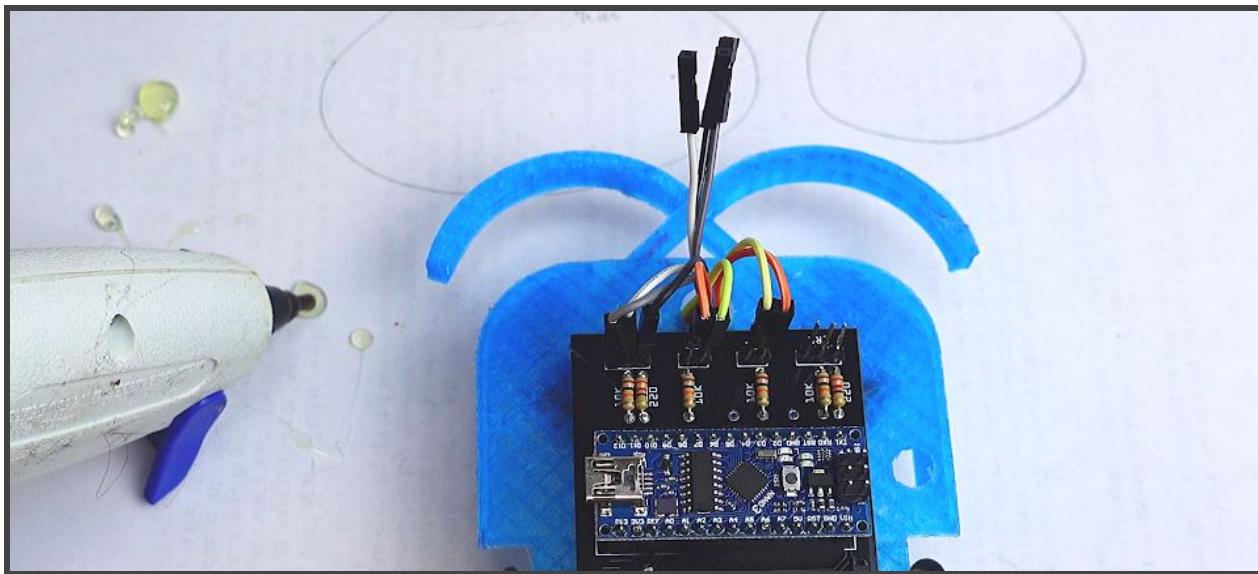
- Attach the bump sensors to their ports, “BL”, and “BR”.

Note: The sensor on the right side is actually the left sensor, because the antenna is on the left.

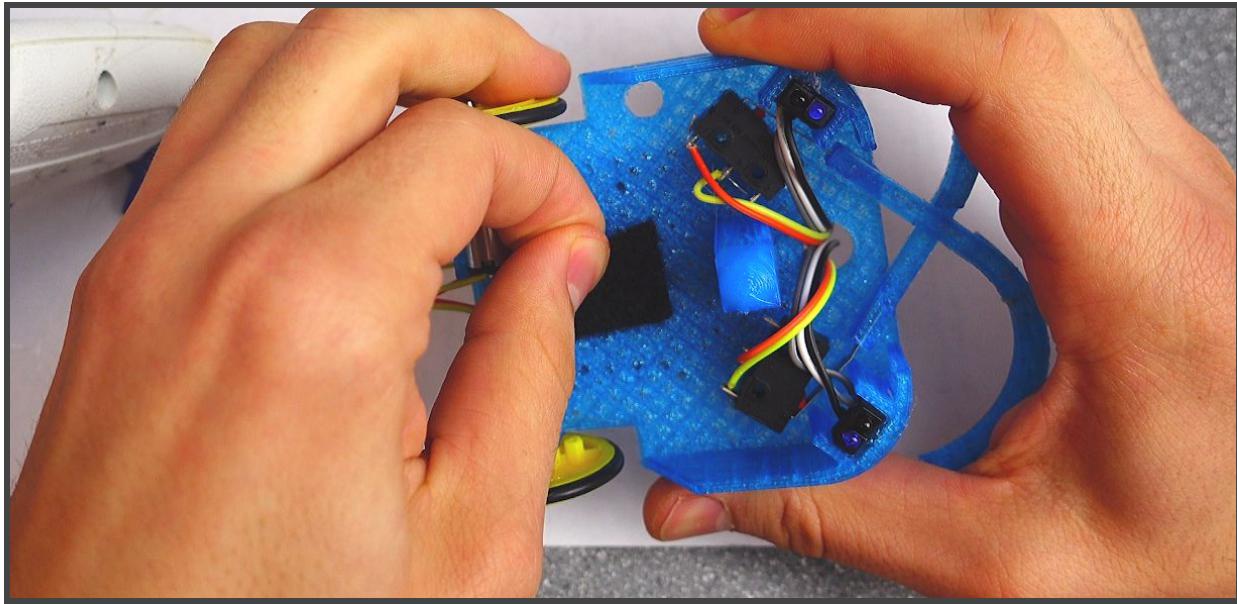
## TCRT5000L IR Sensor - Pinout from Underside



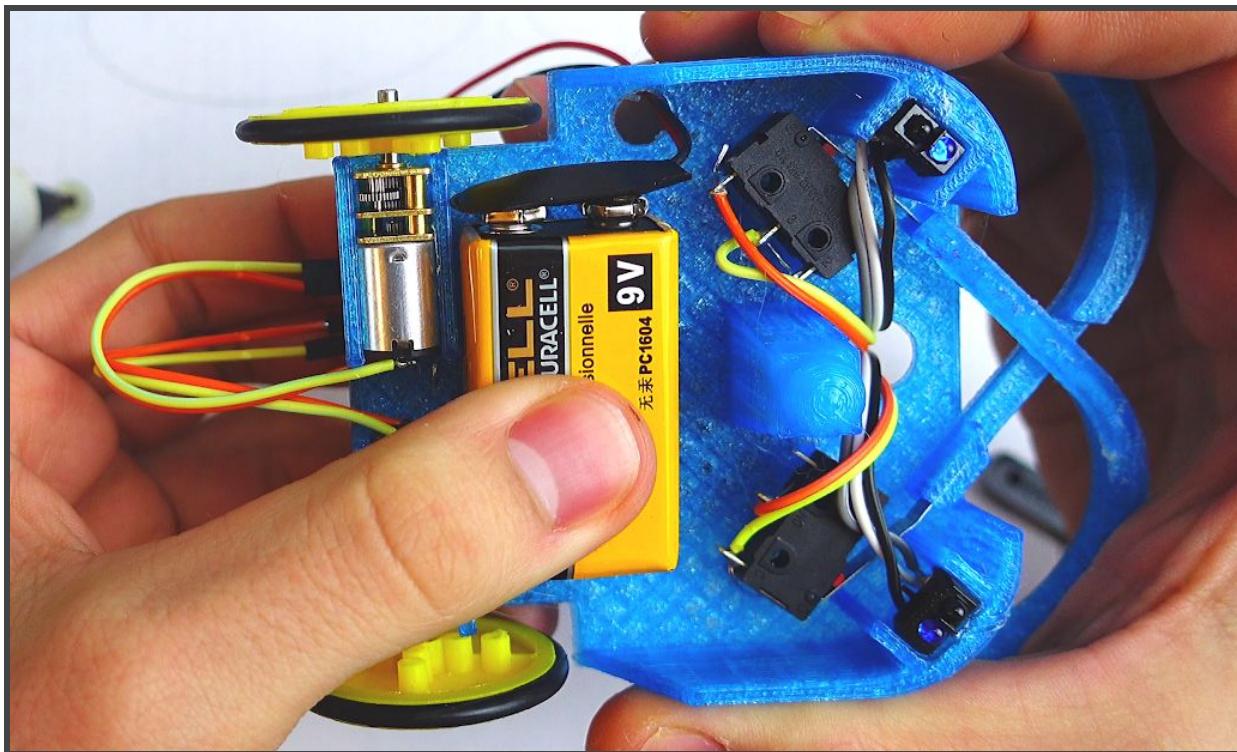
To use the sensor, connect both GNDs to Ground, then connect +5V to 5V through a 220ohm resistor. The sense pin connects to an analog Read pin on your microcontroller, with an additional 10K resistor between that and 5V. The higher the returned value, the less light is being receiving by the receiver.



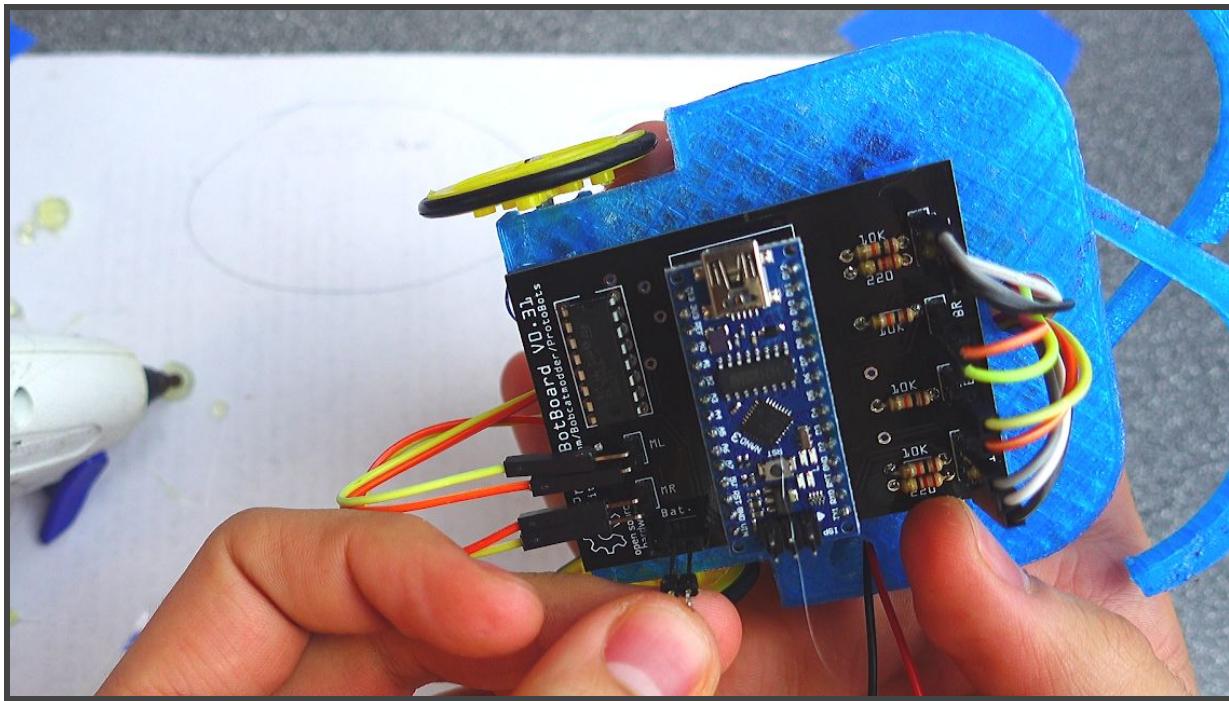
- Based on the diagram, figure out which wires should go where. "+5V" goes to "Pwr", "Sense" goes to "In" and "GND" goes to "GND". The left and right infrared sensors go into their respective ports, "IRL" and "IRR".



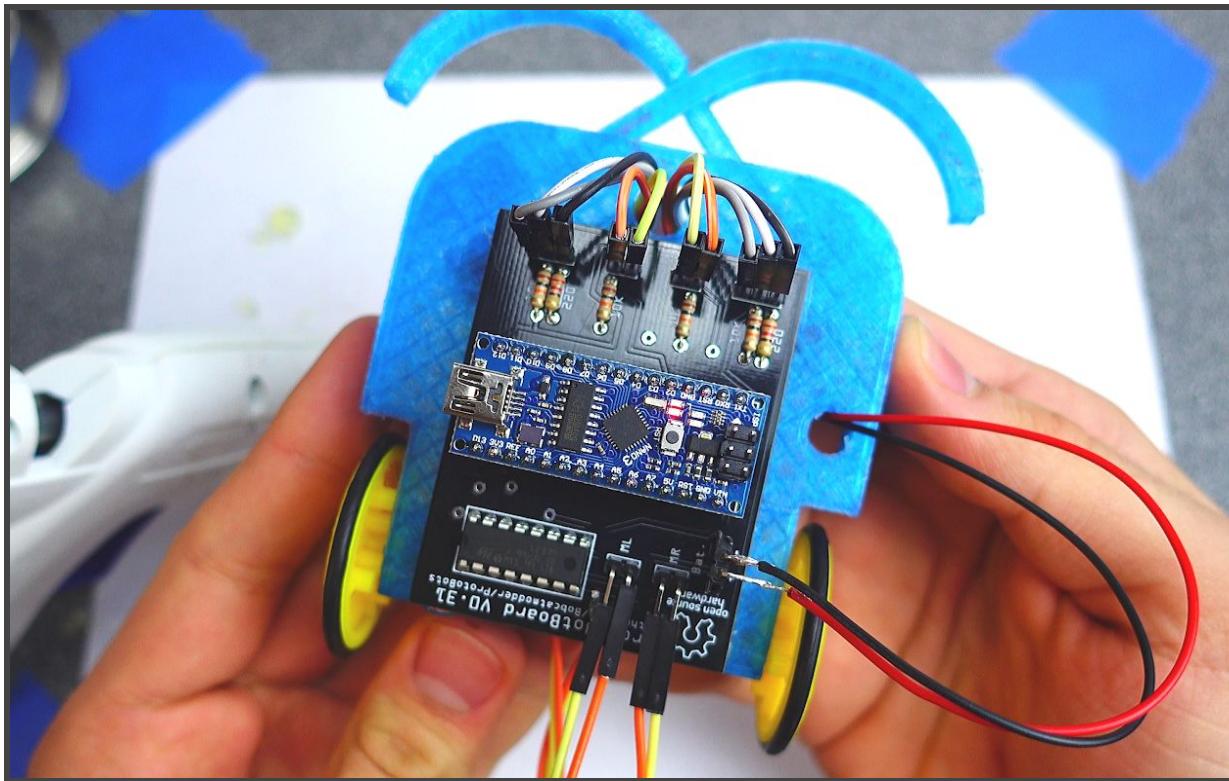
- Place one of the pieces of hook and loop fastener, and attach it to where the battery will be under the ProtoBot base



- Attach the other piece to the 9V Battery, then feed the wire through the hole in the side of the base



- Plug the battery into the ProtoBotBoard



If the Arduino lights up, and no magic smoke escapes, you've successfully built a ProtoBot!