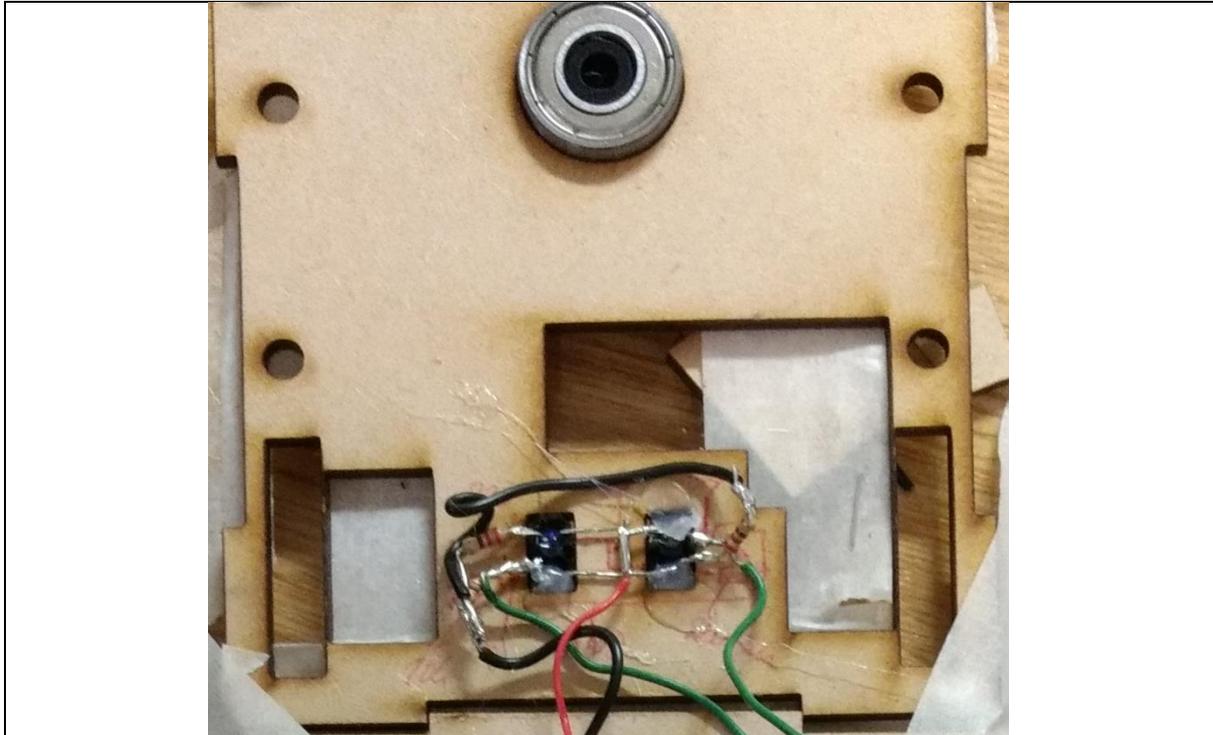


Suggested order for things to go on the board:

- 1) Resistors
- 2) Switches
- 3) Wires to go to the LED's (The square soldering pad goes to ground)
- 4) DIP-16 socket
- 5) MPU6050 – solder to the board
- 6) Headers (for Arduino, NRF-transciever, OLED)
- 7) Distance sensor

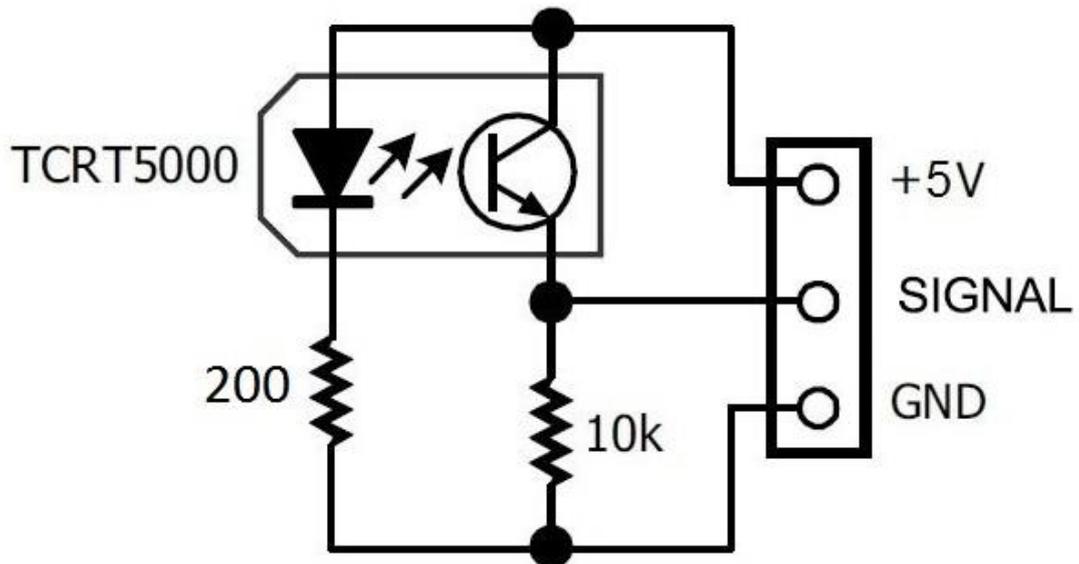
Chassis mounted sensors

At this point, you can start mounting the sensors in the front and bottom plate of the qBot shell. Note that the bottom plate design has changed since this picture was taken.

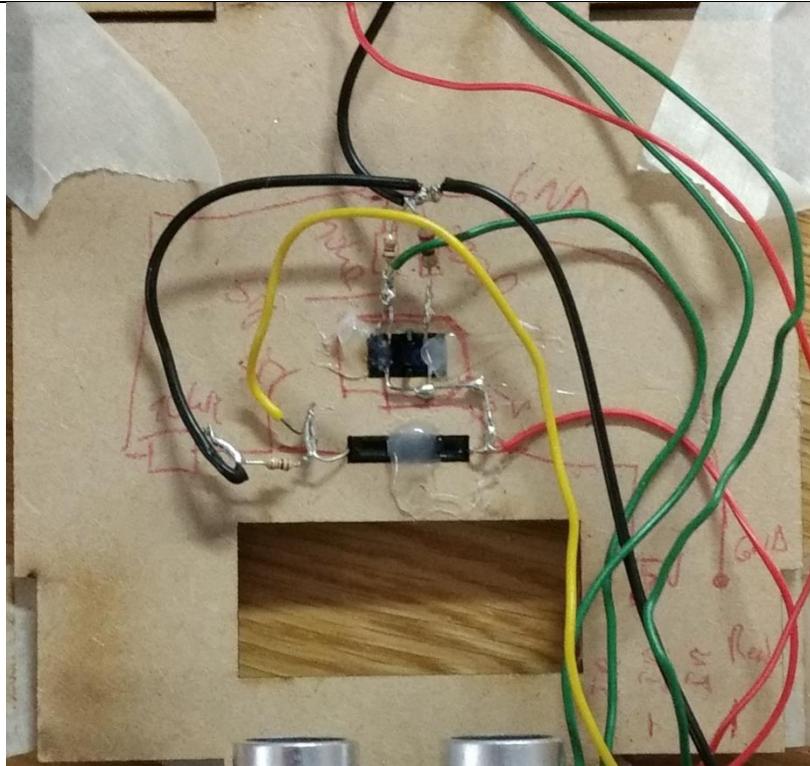


The bottom plate houses two reflective IR sensors – note that they are sensitive to direction. See the attached circuit schematic showing the polarity of the sensor. It is made up of one IR LED and one IR sensitive phototransistor, both components have a polarity.

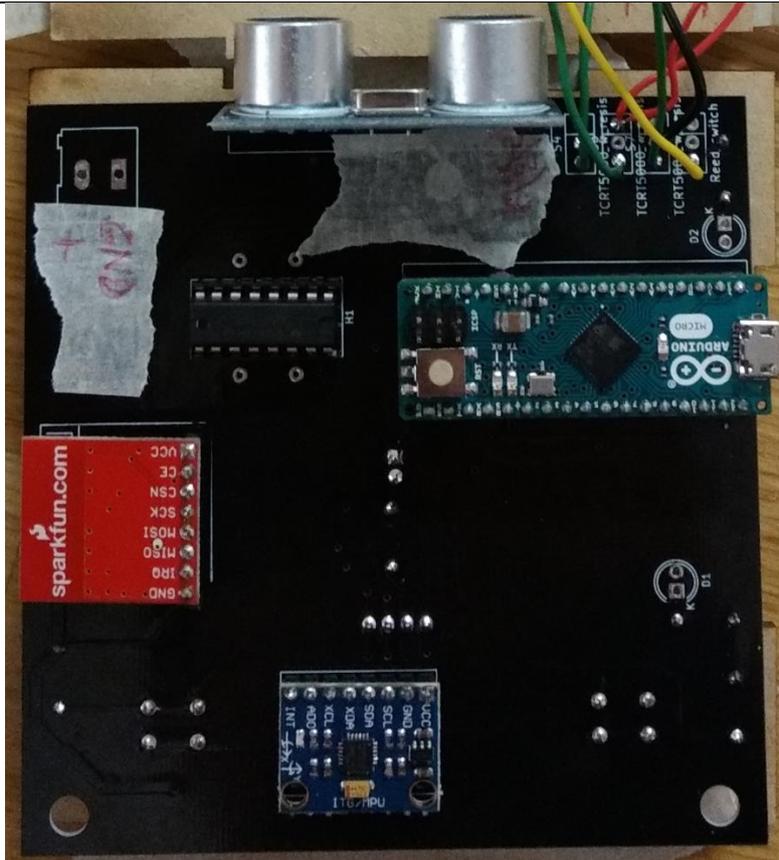
I suggest connecting the 5V between the two sensors as shown in the picture. Be advised that one of the sensors needs to be turned around for this to line up.



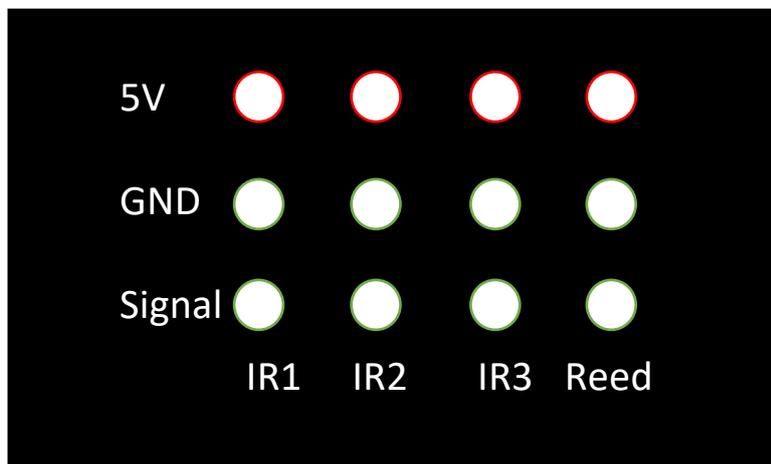
This is the view from underneath, so if you hold the sensor package with the leads pointing upwards, the wiring should be done like this. The small black LED looking thing is the phototransistor and the blue LED is the IR diode.



The front panel has one IR-reflection sensor along with a reed-switch. The reed switch is wired up with 5V on one side, and the returning signal going out on the other side before a resistor connects it to ground.



The front and bottom mounted sensors are connected to the PCB in the top right corner. Each connection point has 5V and GND available, however, these can be spliced together before they are connected to the PCB if you like.

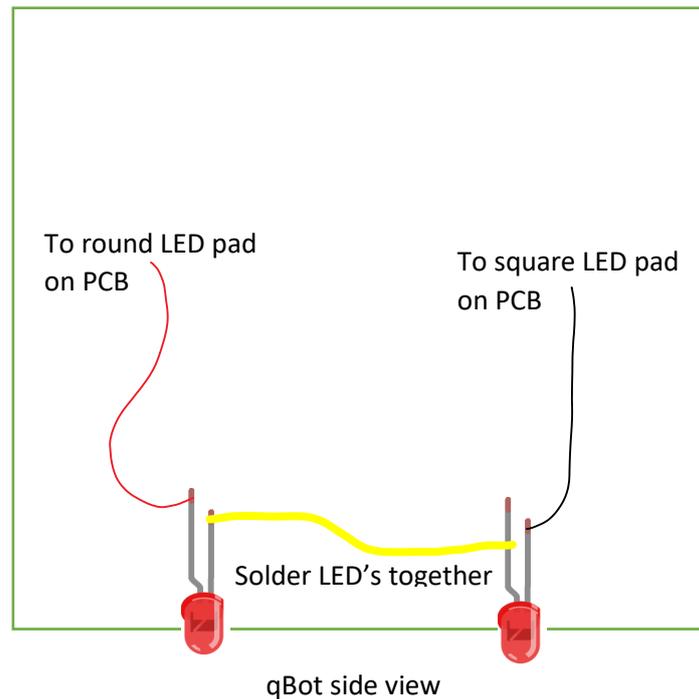


The top right of the PCB will look like this from the backside. This is a zoomed in illustration view of the pads.

Output components – LED's and motors

The LED's are connected together in series, two and two. This means that each LED connection from the PCB drives two LED's. Bend out one cathode and one anode on each LED, and solder them together while they sit in the holes on the bottom panel. Make sure you keep track of which lead is which of the ones remaining, as it is slightly harder to see once they are soldered together.

Remember that the longer of the two LED leads connects to signal, the shorter one connects to ground.



The motors can receive their wires now. Polarity of the motors is not important, as their rotational direction can be controlled by the code. It is a good idea to wrap some electrical tape around the tabs where the motor leads are connected, as these tabs are very fragile and will render the motor useless if they are broken. This tape acts as a strain relief. Solder the motor wires to the M1-M4 pins. Motor 1 is M1 and M2, where Motor 2 goes to M3 and M4 on the PCB. The chip which controls the motors is an H-bridge, this means we will be able to run these motors both forwards and backwards.

Chassis assembly

The 3D-printed fin slides into the roller bearing, which is in turn placed in the bottom plate. Mount the roller bearing so that it is flush with the underside of the bottom plate.

The wheels are pressed onto the motor shaft, the press fit is quite tight, but it fits. The o-rings slip into the groove on the wheels. Use a bit of tape underneath the openings for the motors to make sure the motors are flush with the qBot bottom. Then hot-glu the motors onto the bottom plate on the inside. When they are in place, remove the tape underneath and reinforce the motors by gluing from the outside as well. But make sure you don't have any big blobs sticking out, the qBot rides quite low.

At this point, some of the components will be attached to the chassis plates. Now it's a matter of fitting everything together.

First though, insert all the small supports into the top, front, back and side panels. The 9 by 12mm squares goes into the top plate, squeeze them in so they are flush with the surface of the top plate. The side supports will be the base on which the PCB will rest. Push them in from the outside of the panels, with the semi-circle facing inwards. Insert them so they are flush with the outside of the plate.

For this project, leave one side-plate unfastened. But the rest of the plates can be hot-glued lightly together.