Electronics Guide

# Infrared Sensor

This guy is mounted on the lifting side of the robot, and it’s ground and signal wires run under the bot to a small board that has the op amp mounted on it. The black wire is ground and the gray wire is signal. The op amp has a 1 Mega ohm resistor on it. Coming from it, there are 3 wires. The **purple wire** is the signal and goes into the pin slot labeled IR sensor on the pic. The **red wire** goes to the 3.3v bus. The **black wire** goes to the ground bus.

# QRD (Color Sensor)

This guy is mounted under the ball ramp, on the scissor lift side of the wall. It has four wires. The **blue wire** is signal wire, it goes into the pic. It should not need to be put into the op amp, but there is a slot open on the op amp The **green wire** is the power line for LED, it goes directly into the pic. The **black wire** is the ground for both the LED and the QRD, it goes into the ground bus. The **red wire** is power for the QRD, it goes into the 3.3v power bus.

# “Front” Bumper

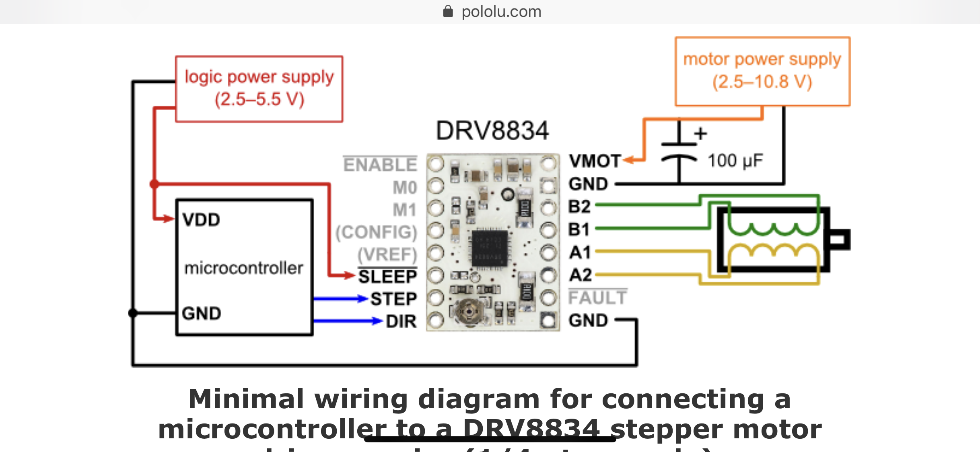
The front bumper is the bumper system for the side with all the electrical systems. Not very aptly named. **THE SIGNAL LINE IS CURRENTLY ZIP TIED TO THE BOTTOM OF THE ROBOT**. It has 3 wires. The **yellow wire** is the signal line and goes directly into the pic. The **black wire** is ground that is common with the “Back” bumper and goes into ground bus. The **red wire** is 3.3v power and is common with the “Back” bumper.

# “Back” Bumper

The back bumper is the bumper system for the lifting side of the bot. It has 3 wires. It has 3 wires. The **yellow wire** is the signal line and goes directly into the pic. The **black wire** is ground that is common with the “Front” bumper and goes into ground bus. The **red wire** is 3.3v power and is common with the “Front” bumper.

# Lifting Stepper (And Board)

This is the small white polulo board. It is using a little more than minimum connections as shown below.

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The **A and B wires** are the connection line from the stepper. The black wire on the connection bus goes farthest from the 5v power socket, and lines up with the black line on the side of the board. Vmot and gnd is the **5v power line with the capacitor.** M0, M1, and GND are grounded with a ground wire to the ground bus with a **black line** that has black connectors to it. Dallin suggests we use a VREF line, there is a wire in the tool box to do so (white). The **blue line** is STEP, which is the PWM output from the pic. The **yellow line** is direction and goes to the pic. There is a line to do the sleep pin in the box, haven’t decided color yet (green).

# Sorting Servo

The sorting servo is found in the bucket. It has 3 wires. The **brown wire** is ground and connects with the **black wire** on the power line that goes to the 5v wire split. I don’t know if a capacitor is needed for the servo. We didn’t use it before, but I don’t know if it would make it work better. I don’t know what color the power line is, but it is the **middle wire**. It connects to the **red wire** on the 5v power line. THIS IS NOT THE WIRE WITH THE CAPACITOR ATTACHED. The **remaining wire** is the signal line and it connects with the **purple wire** that connects to the pic.

# Driving Steppers (And Board)

The driving steppers are mounted on the bottom of the robot. Their connection lines come up to the electrical systems area. The **connection lines** plug into the driver board with the tabs out. The **power line** WITHOUT **the capacitor** from the 5v line goes into the power pins. I created a **bus** that connects to the driver board. Look for the **red and black wires** and they line up with the power sockets on the board. Below are the lines of the bus:

Red – 3.3v power, goes into the power bus

Black – ground, goes into the ground bus

Blue or Purple – PWM line, I forget if it is purple or Blue. It goes into the PWM output of the pic.

Yellow – Direction line, goes into the pic

Orange – Direction line, goes into the pic

Gray – Sleep line, goes into the pic

Mount with the bus away from the robot so we can keep the directions straight

# Debugging LED

This is a simple system, just a LED and a resistor in series. The **green line** goes into the pic (pin 11 I believe), and the **black line** goes into the ground bus.

Power hub:

Driver board

Bumper power

QRD power

Lifting driver board (white)

PIC pin 20

Op Amp

Ground hub:

Driver board

Bumper ground

QRD ground

Trigger LED ground

Lifting driver board

PIC pin 19

Op Amp

Debug LED

PIC

2 – Green

Yellow

Blue

Purple

Purple

Green

Blue

11 – Green

Yellow

Orange

Blue

Yellow

Green

Gray

Black

20 - Red