

Attach the positive (red) wire from the battery pack to one of the switch terminals. Also, attach the short positive (red) jumper wire to the other switch terminal. See figure 2.30.

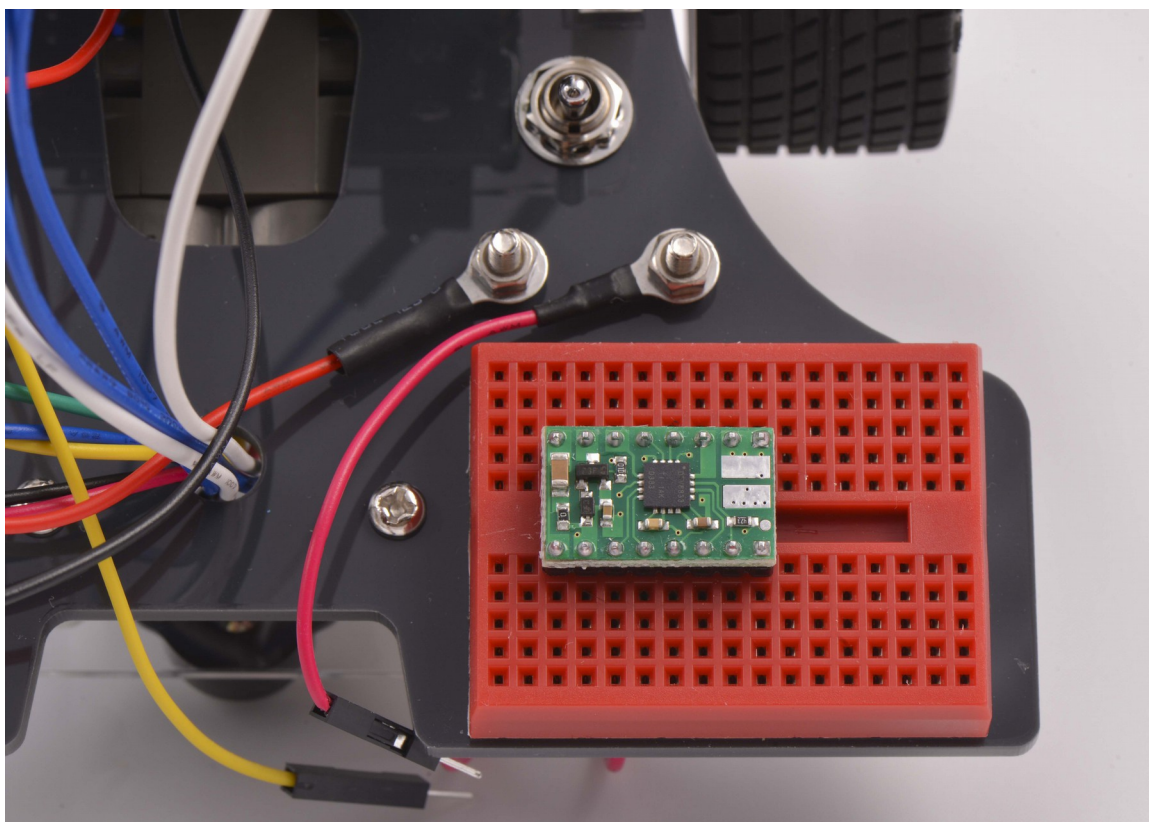


Figure 2.30

Now for the motor (H-bridge) controller, depicted in figure 2.31.

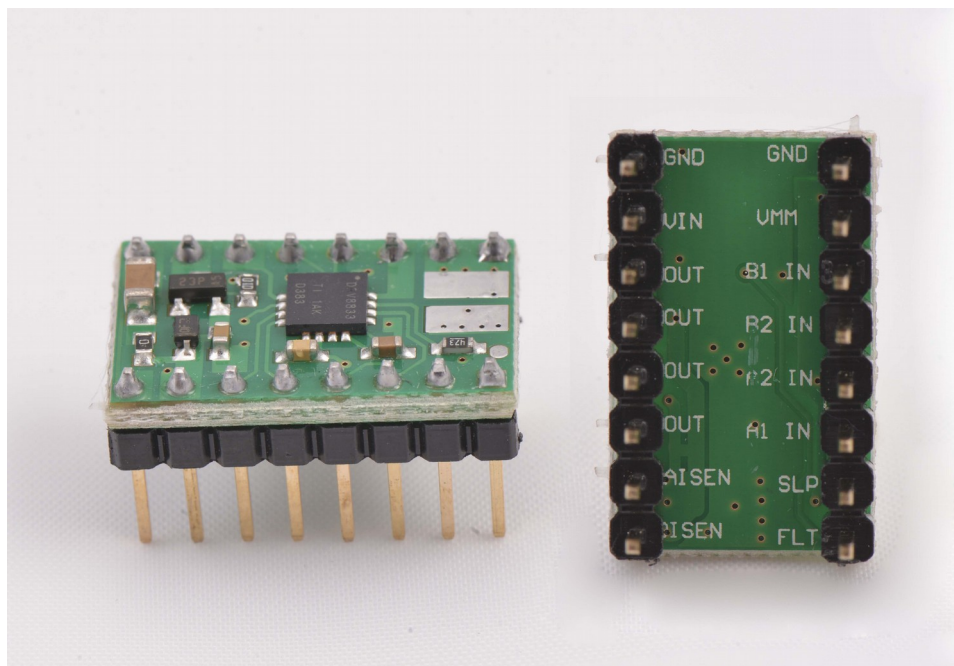


Figure 2.31

Note: The motor controller has multiple solder pads on the right side of the board. These solder pads will be used to orient the controller in the breadboard. When installing the controller in the breadboard, make sure the solder pads are on the right side of the body as shown in figure 2.30.

Connect the positive (red) wire from the power switch to the motor controller. Connect two (2) ground (black) wires from the motor controller to both the STEM Board microprocessor and the breadboard (to be used later). See the wiring diagram in figure 2.32.

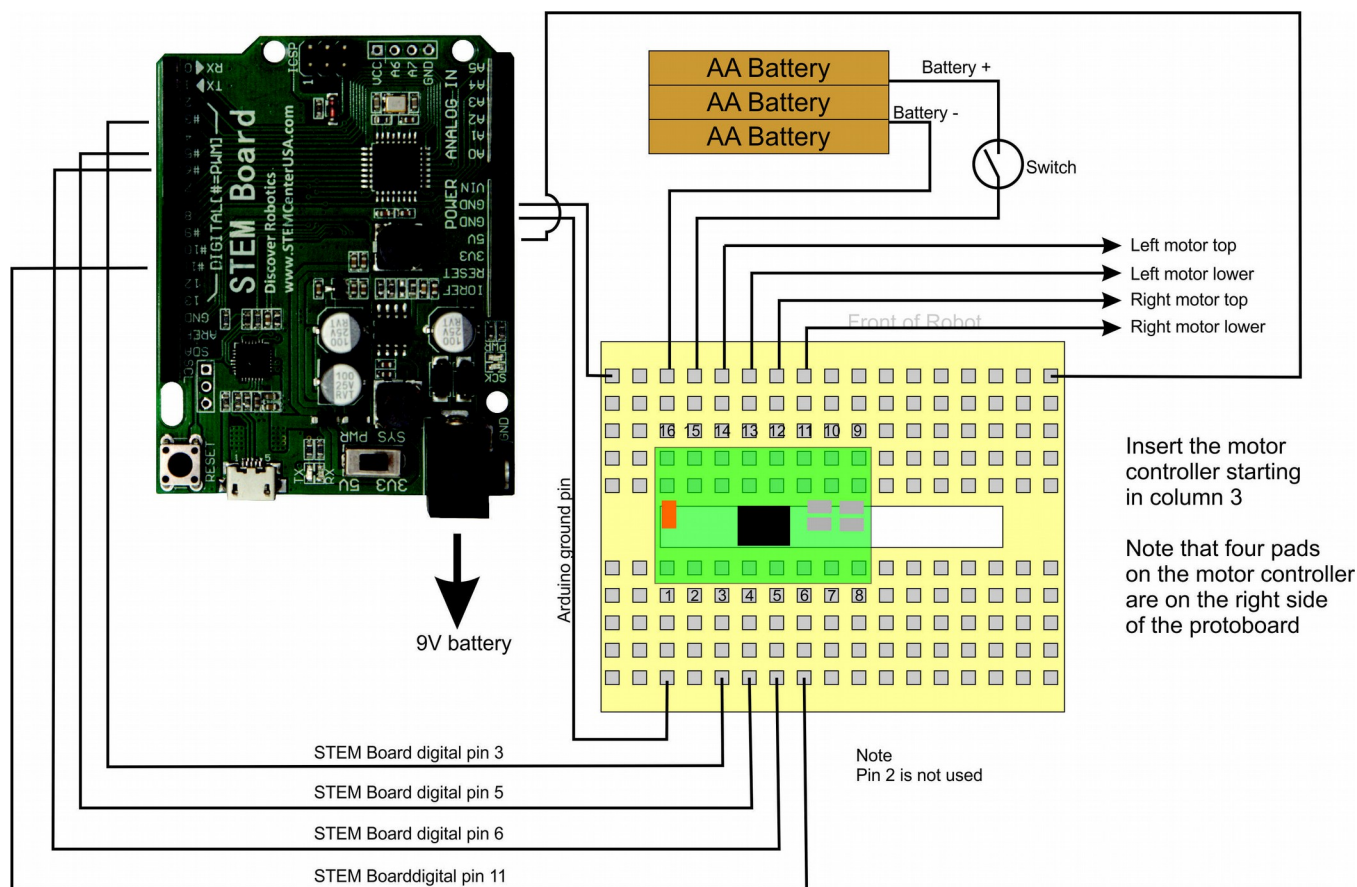


Figure 2.32

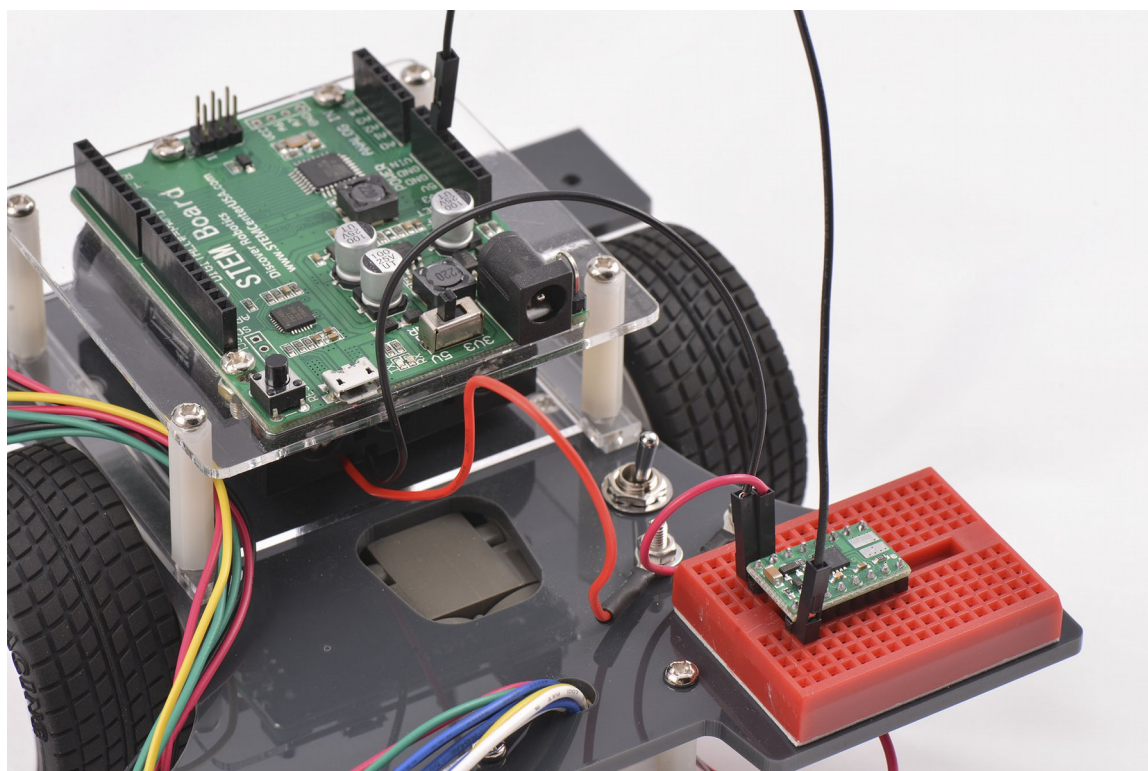


Figure 2.33

Wire the motors to the controller, as shown in figure 2.34. Refer to [Lesson 6: Programming Motion Control](#) to make sure that the leads are connected correctly.

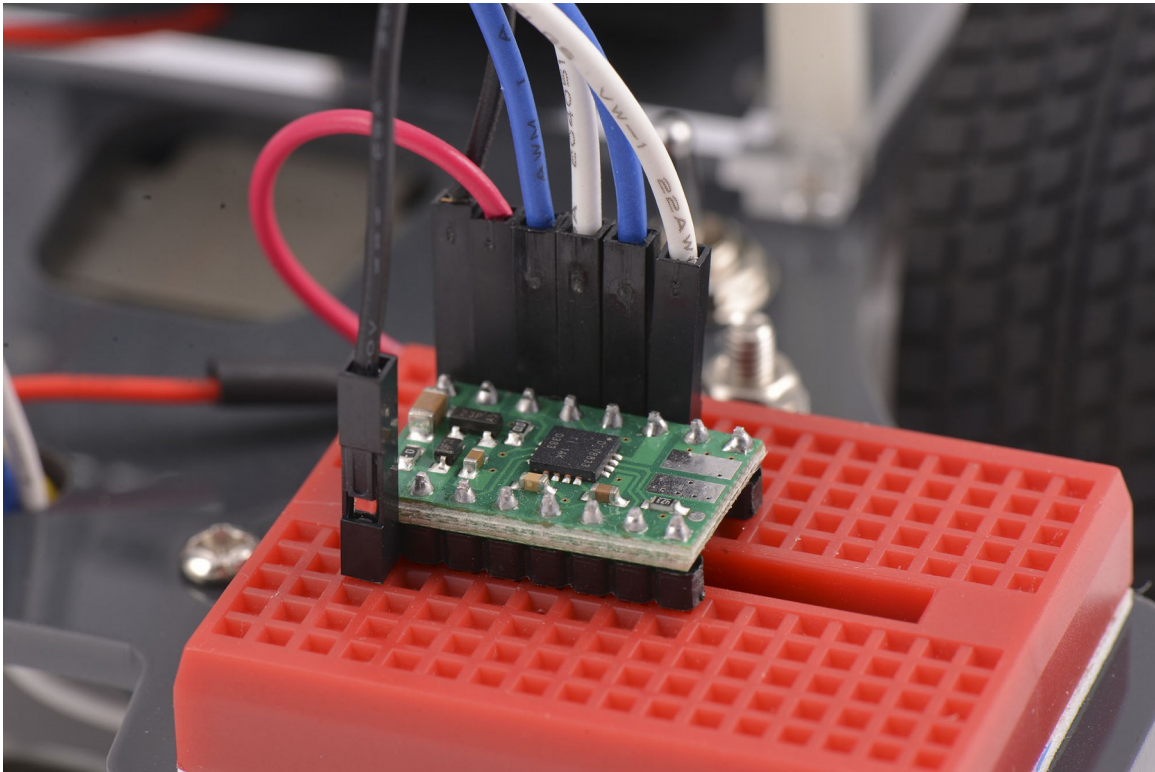


Figure 2.34

Connect the motor controller to the STEM Board microcontroller using four (4) male-male wires, as shown in figures 2.35 and 2.36.

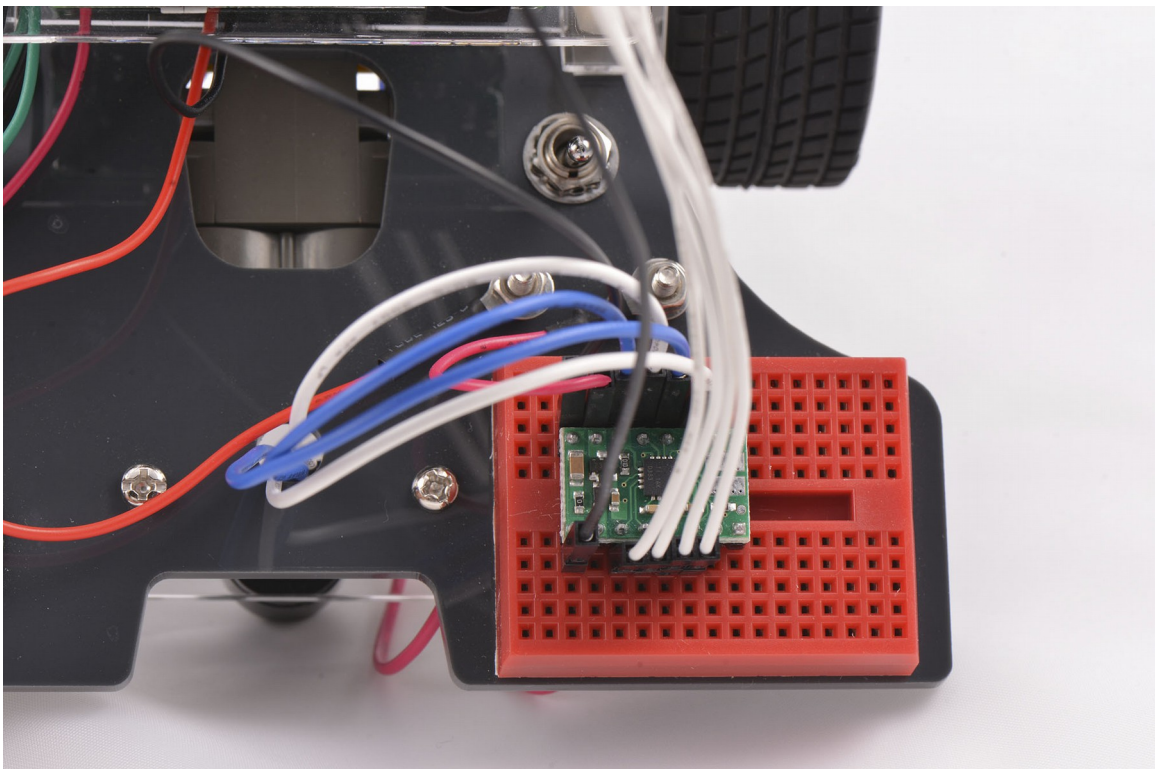


Figure 2.35

Verify your circuit using the wiring diagram in figure 2.32.

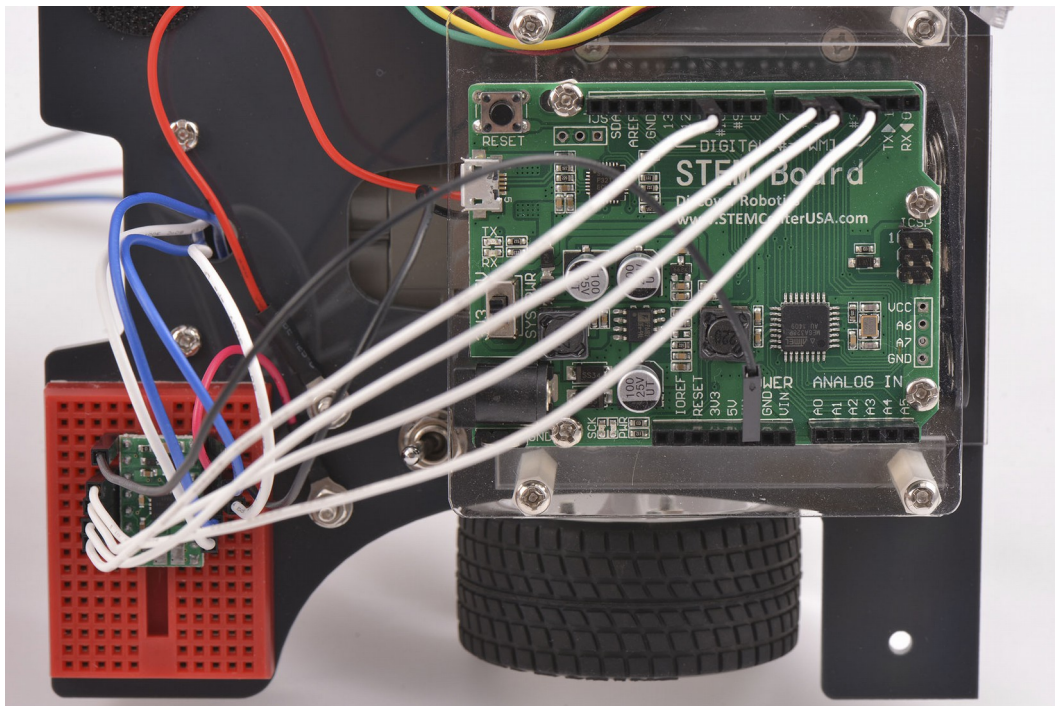


Figure 2.36

Connect the left and right LED lights to the breadboard. Place one (1) 220Ω resistor in series for each LED light, and connect them to the STEM Board microcontroller using male-male wires, as shown in figure 2.37.

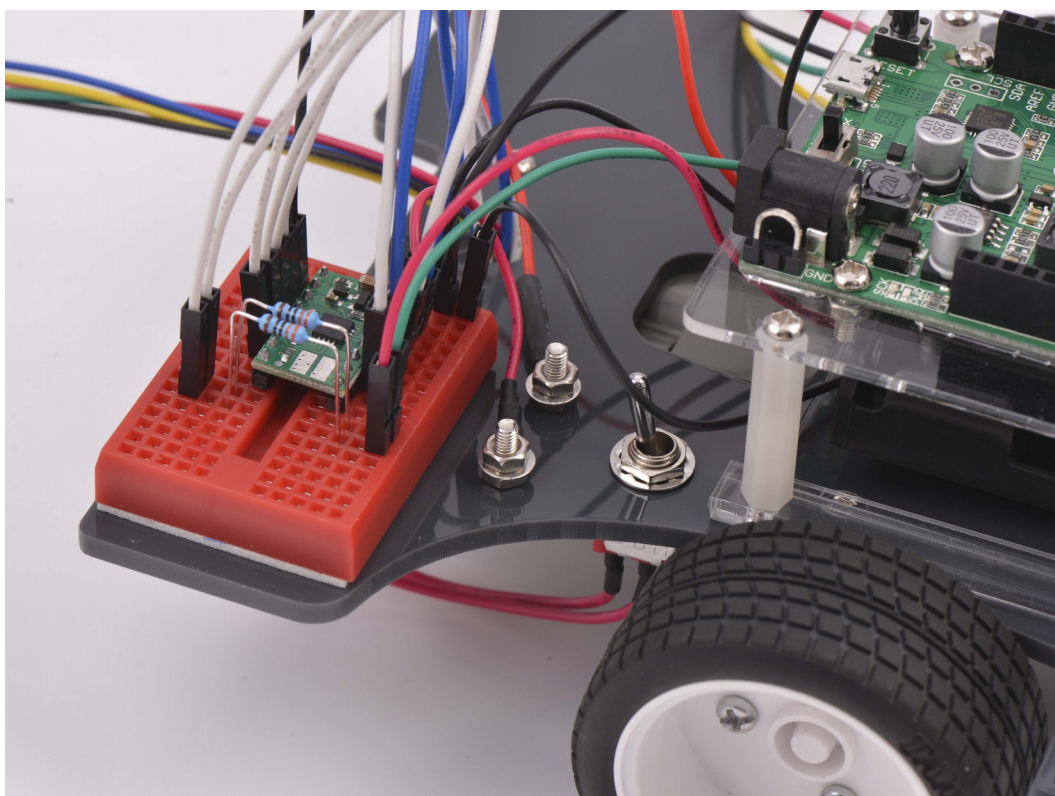


Figure 2.37

Verify your circuit using the wiring diagram in figure 2.39.

Connect the Trig (yellow) and Echo (green) wires from the ultrasonic sensor to the STEM Board microcontroller, as shown in figure 2.38.

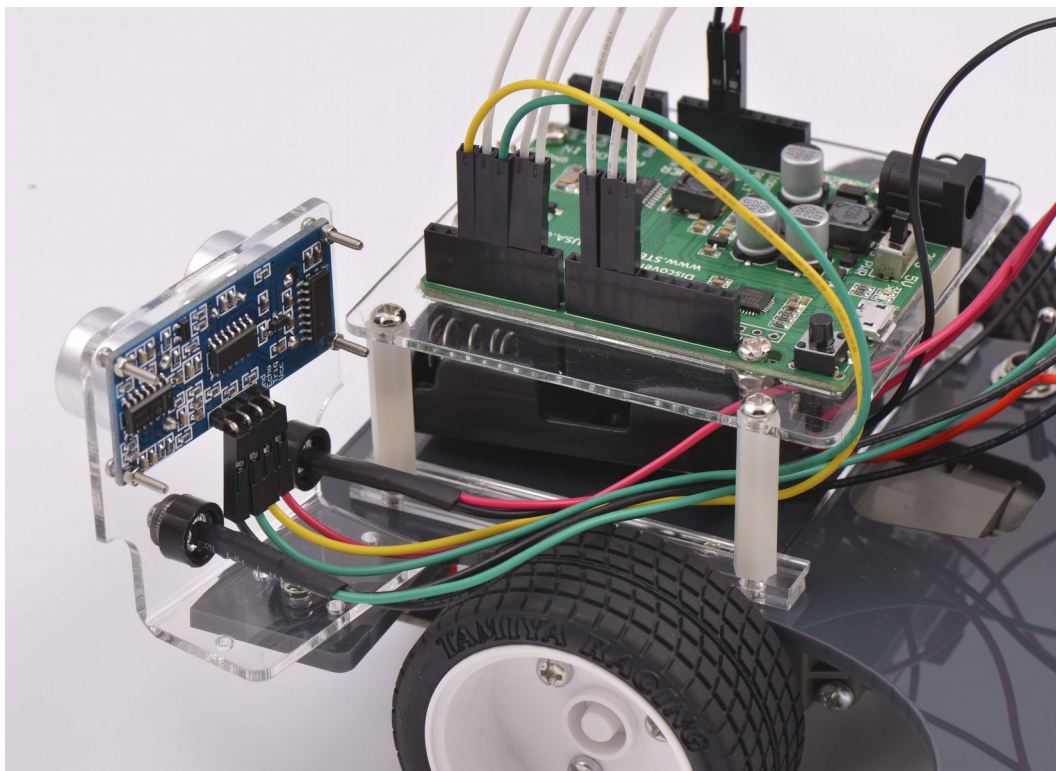


Figure 2.38

The wiring diagram in figure 2.39 should be used for circuit details.

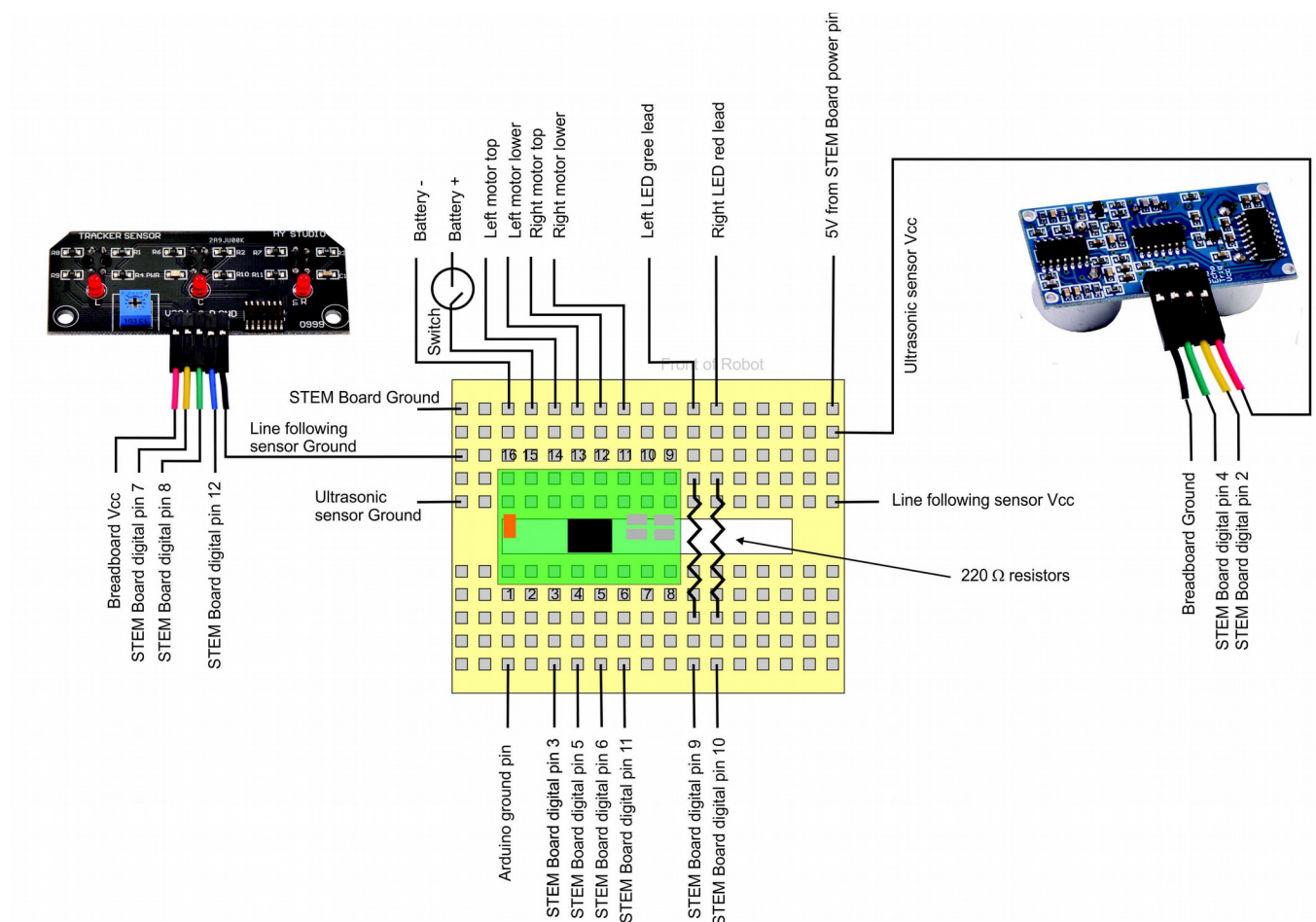


Figure 2.39

Connect the line sensor wires to the STEM Board microcontroller, as shown in figures 2.40 and 2.41.

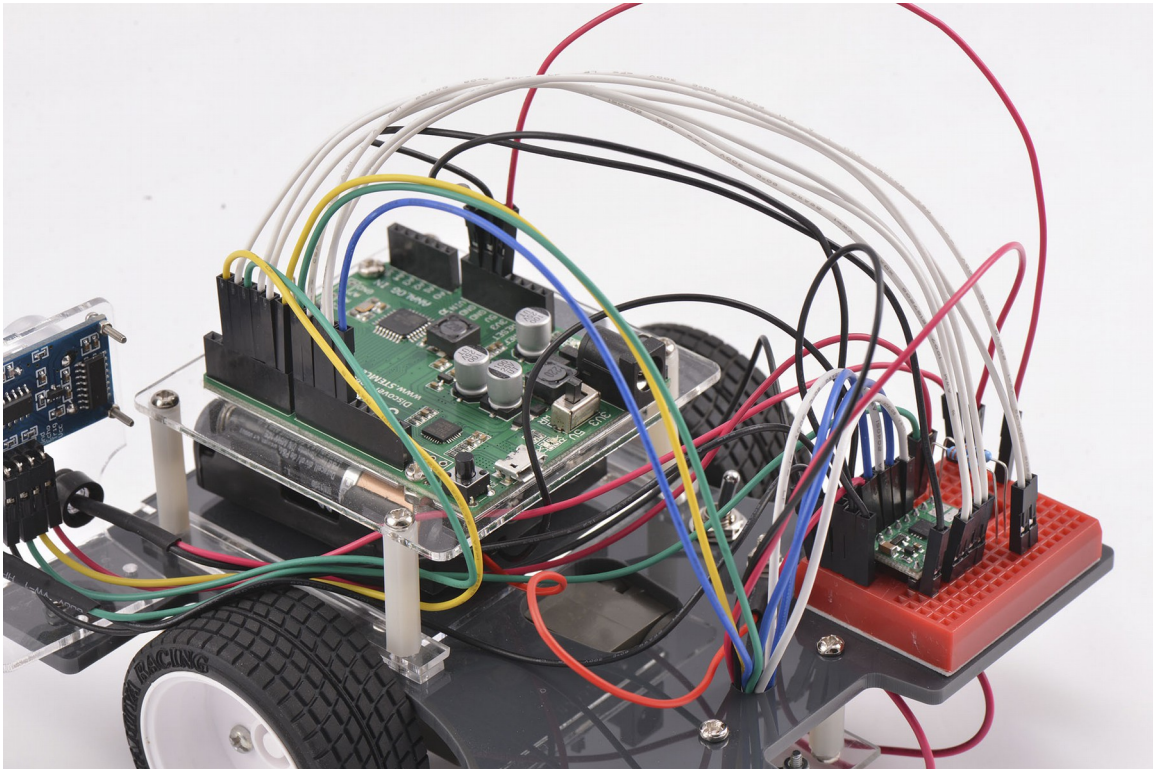


Figure 2.40

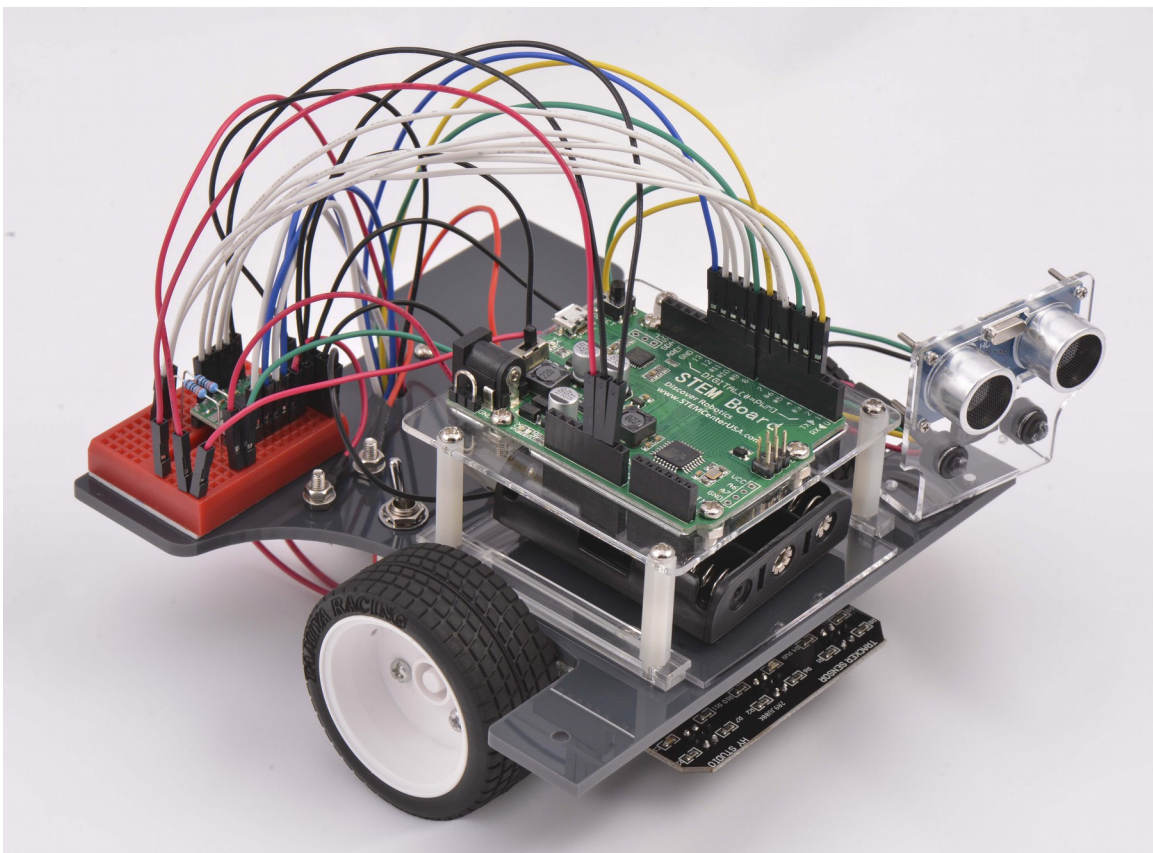


Figure 2.41

Verify your circuit using the wiring diagram in figure 2.39.

A close-up view of the completed breadboard is pictured in figure 2.42.

Note: The five ground (black) wires are connected on the left side of the breadboard. The three positive (red) wires are connected on the right side of the breadboard.

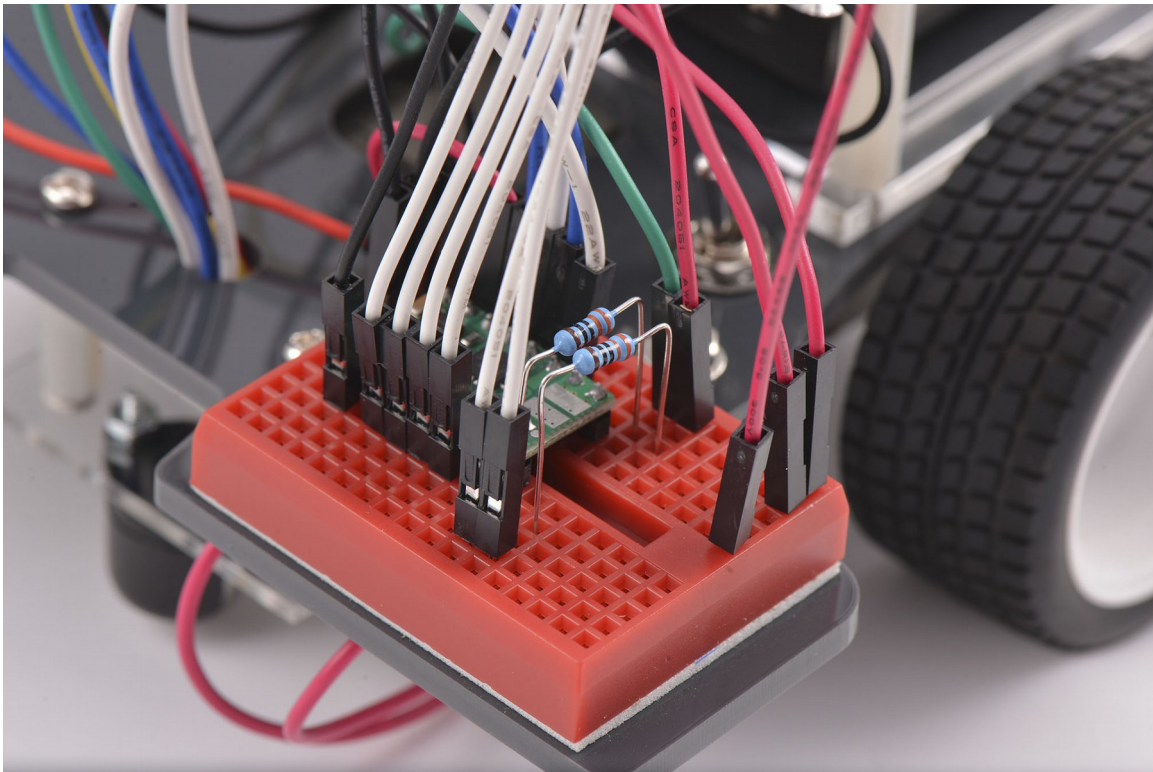


Figure 2.42

Insert three (3) AA batteries in the battery socket, as shown in figure 2.43.

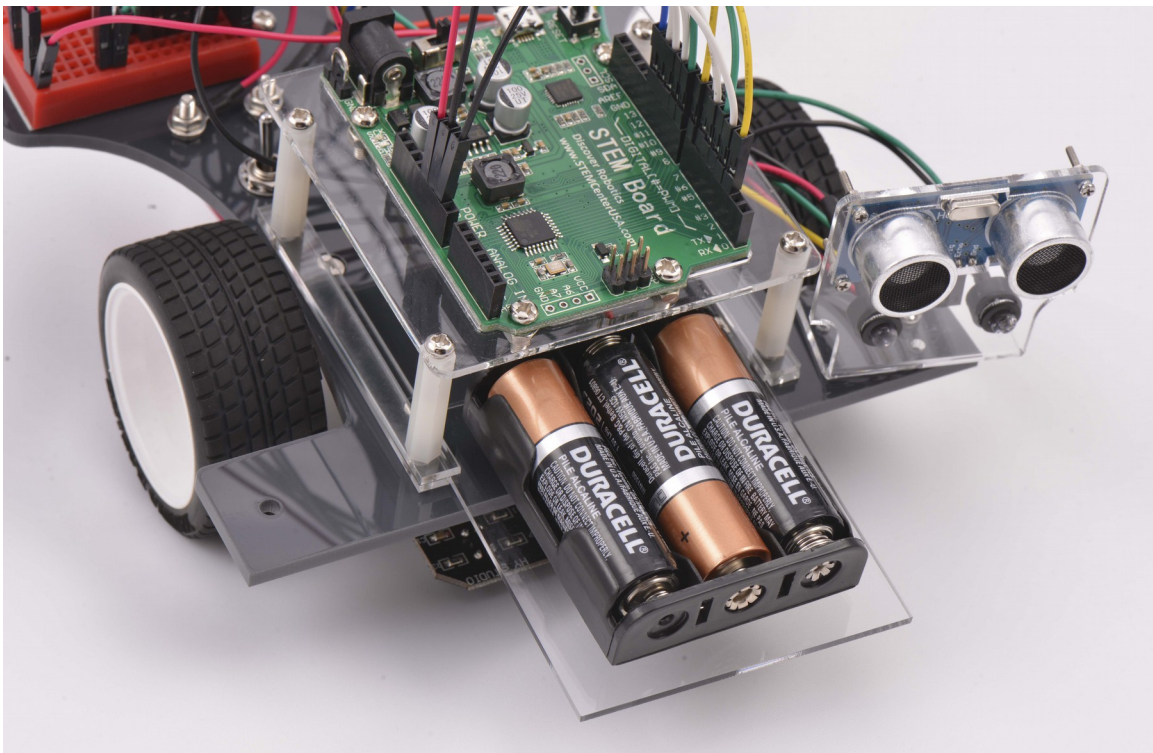


Figure 2.43

IMPORTANT: Make sure the power switch is turned **OFF**. Remember, the power switch is arranged as so the **OFF** position points to the rear of your Pi-Bot.

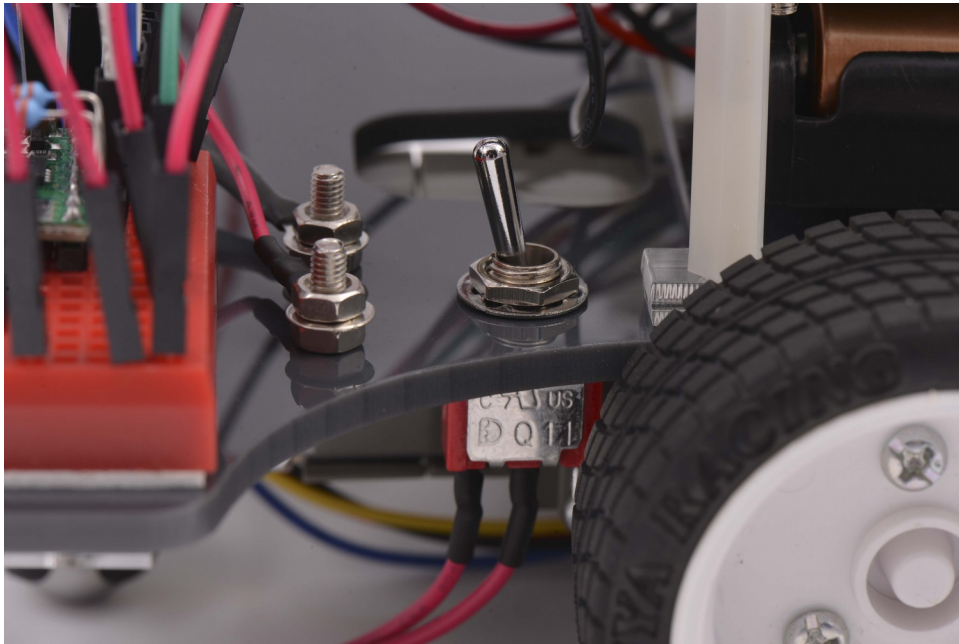


Figure 2.44

Our final step is to locate the 9V battery, as shown in figure 2.45. Attach the 9V battery to the body using the provided velcro.

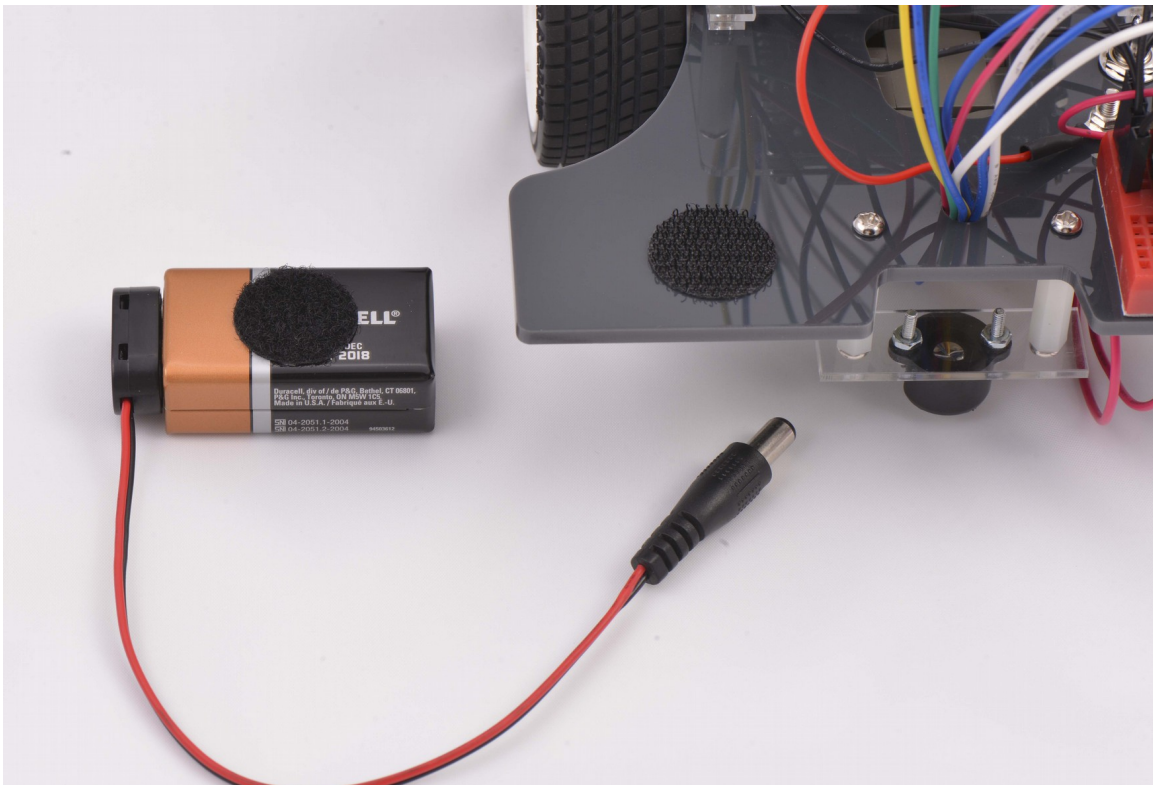


Figure 2.45

The completed Pi-Bot is shown in figure 2.46.

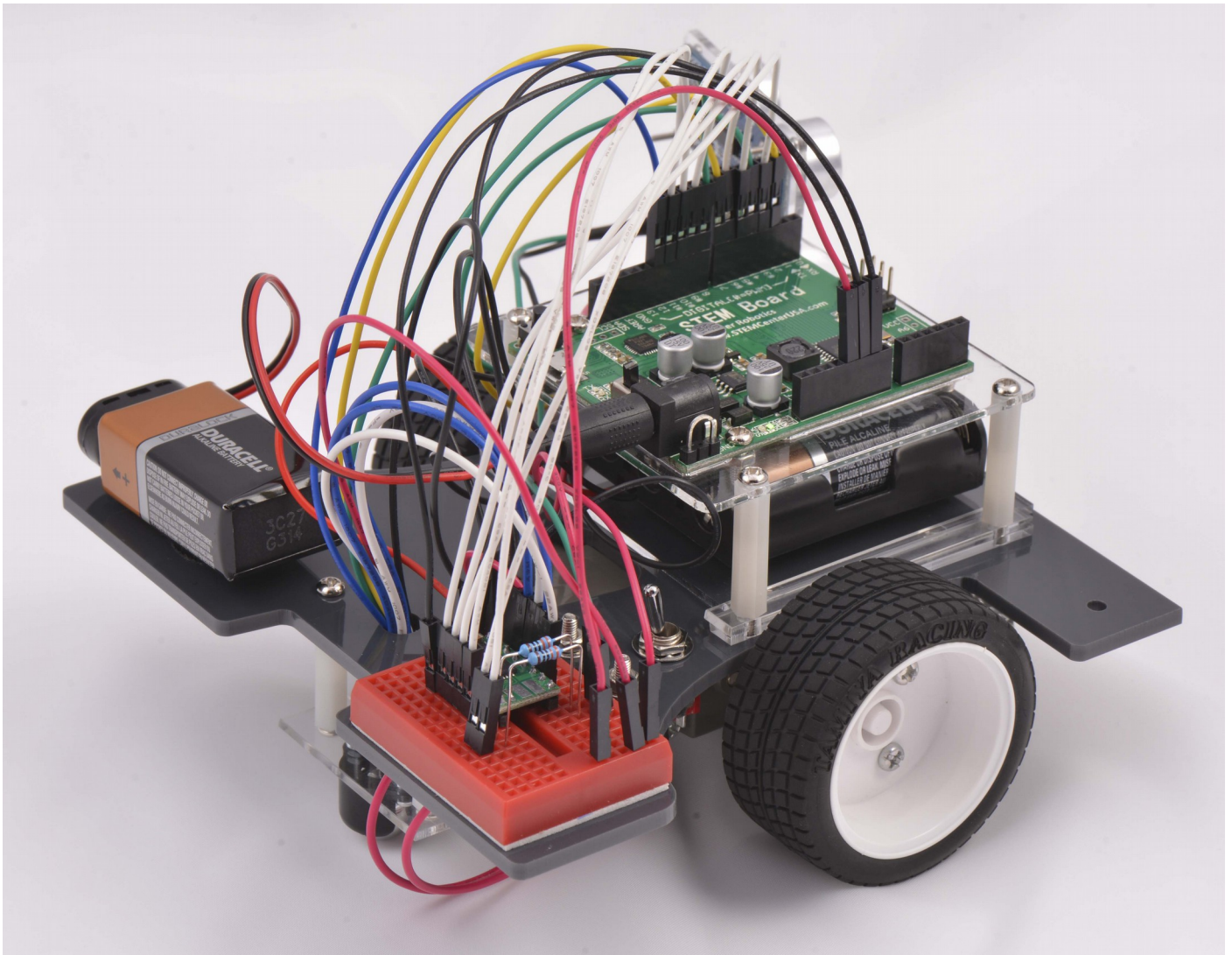


Figure 2.46

Plug the 9V battery into the 9V socket on the STEM Board microprocessor to test it out. Look for the green LED on the microprocessor and the red LEDs on the line sensor to turn on.

Do not turn on the power switch to the motor controller yet!

Congratulations! Your fully constructed and wired Pi-Bot is now ready for programming.