

Arduino LAB

Assignment 6

4 WD Robot

Figure 1 shows the 4WD (4-Wheels-Drive) robot platform featuring four gear motors with 65mm wheels. The chassis plates contain numerous cuts and holes for mounting sensors, microcontrollers and other hardware. The space between the plates is ideal for batteries or more components.



Figure 1 - 4WD Robot

In order to control the movement of the 4DC motor, a motor driver shield is used.

The motor shield lets you drive four DC motors with your Arduino board, controlling the speed and direction of each one independently. You can also measure the motor current absorption of each motor, among other features.

The shield can be powered by the Arduino board or using an external power supply based on the location of the jumper as indicated below in the figure. In our experiment, make sure that the wires are connected like the figure and the jumper is set to operate on the Arduino board supply (Jumper connected)

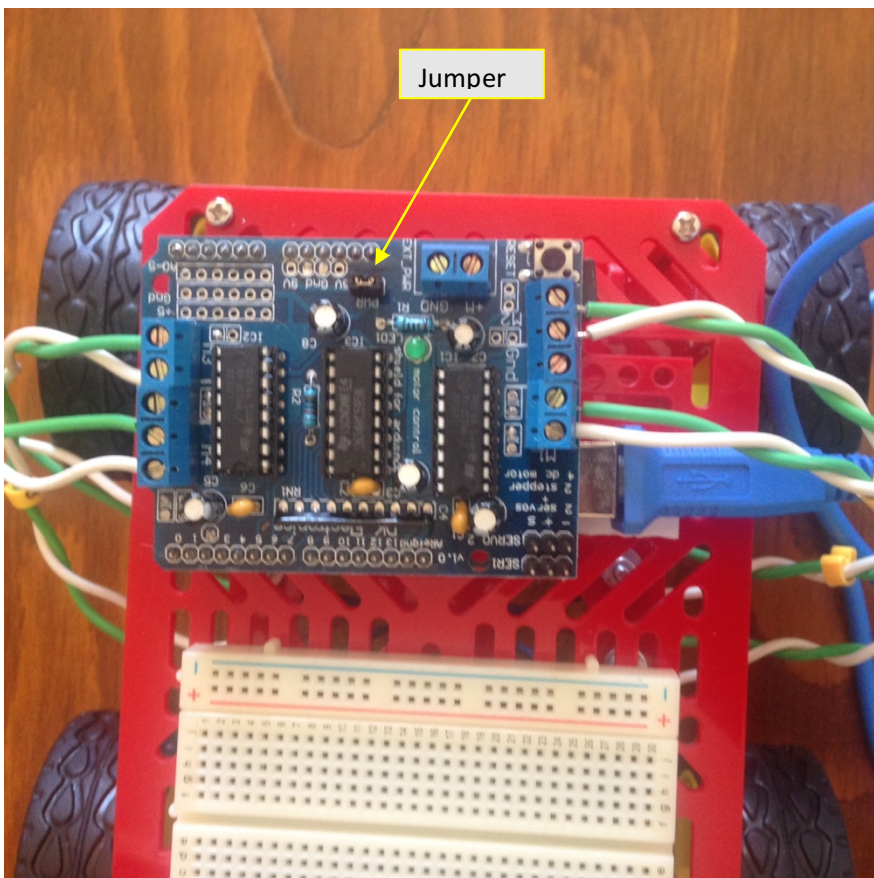


Figure 2 - Connections

Arduino Library:

In order to control the movements of the motors using the driver, you will need to use the following library:

“Adafruit Motor Shield Library”

link: https://piazza.com/class/profile/get_resource/ijs4u31zj1h7oq/io5n63123u52dt

The library is very simple; you can check the included examples like “Motor Test” to understand the necessary functions.

Requirements:-

- You are required to use 4WD Robot, Motor driver shield, Arduino Kit to control the movement of the Robot.
- The robot should move in an almost oval trajectory like the one indicated in the figure below (**Note: Robot does not rotate**).
- To make the robot turn, you can either make one wheel rotate faster than the other ones, or you can make them rotate on different directions with different speeds. It is up to you to choose the proper approach.
- To power up the arduino board and motor, use the **powerbank** that you were handed and try to fix it correctly on the car. In fact, all the components should be stable as much as possible at the back of the car (Use the straps you were handed if possible).
- The robot should operate by itself (autonomous), it is not remotely controlled.

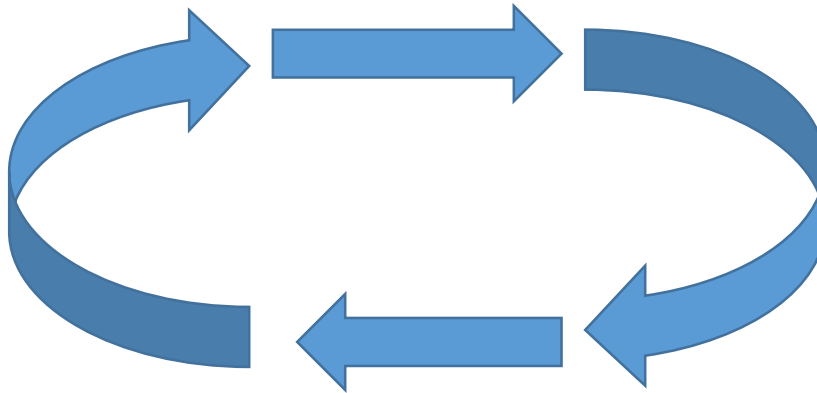


Figure 3 - Robot trajectory

Bonus:-

- As a bonus task, you are encouraged to operate the robot remotely using the RF transceivers used in the previous assignment.
- One transceiver (transmitter) is connected to the arduino with multiple pushup buttons to control the movement of the car,
- the other transceiver (reciever) is connected to the other arduino kit that is located at the back of the car to translate the movements to the shield and motors.

Deliverables

- Submit a small video demonstrating the experiment given that your video will clearly show the movement of the robot from a fixed location (Plan view of the robot movement).
- Send your videos to: omar.salaheldine@gmail.com with the subject: Embedded_LAB_6. Make sure to include your full names and IDs in the mail body.
- Deadline for sending the videos is: Friday 17th June @11:59 pm.

Good Luck