SUMO ROBOT LEAGUE

MRK-2 Check List

Plastic parts

- 1 x Scoop
- 1x Chassis
- 1x Battery compartment
- 1x Motor cover
- 1x Lid
- 4x Wheel with through-hole
- 2x Wheel for motors
- 2x Small wheel with through-hole
- 2x Rubber track
- 1x Finger guard

Hardware (4-40)

- 1x 3/32” hex key
- 1x 1/4” metal hex screw
- 2x 3/8” metal hex screw
- 4x 1/2” metal hex screw
- 2x steel nuts
- 2x plastic screw
- 6x plastic nuts

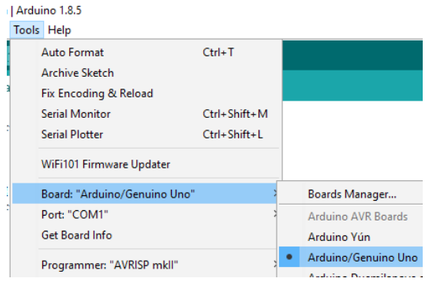
Electronics

- 1x AA battery holder
- 1x MRK-2 circuit board
- 1x ultrasonic sensor
- 2x DC motor

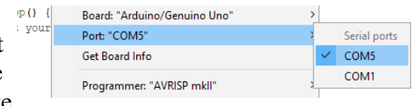
Step 1 - Test the board.

We first want to test the MRK-2 circuit board to make sure it functions properly before building a robot with it. To do this, attach a USB cable to both the board and your computer. Open the Arduino IDE on your computer (available for free download from **http://bit.ly/ArduinoIDE**) and verify that the Arduino Console has “Arduino Uno” selected.

If the bottom right border of the console says anything else, click on the Tools menu and select **Arduino Uno** as the board type.



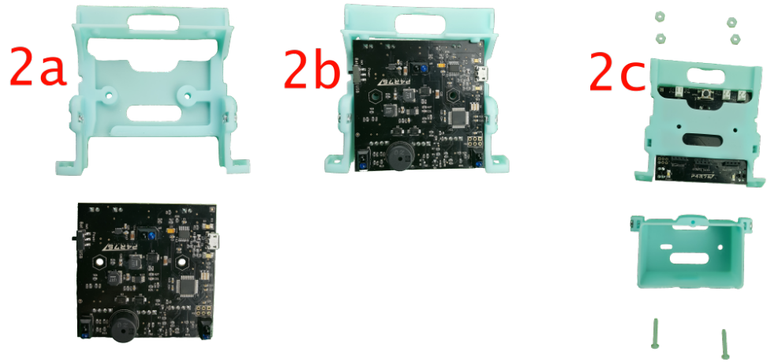
Then in the Tools menu select the port with the highest number. Note that the port number for your robot will change from computer to computer.



To test the board, click the “Upload” button provided in the toolbar (or select Upload from the Sketch menu). The default sketch should compile successfully and then upload to the board. If everything worked, the Arduino IDE will display “Done Uploading” at the top of the console. Now unplug the USB cable and proceed.

A video of Step 1 that includes troubleshooting Arduino connections is available at **http://bitly.com/MRK1_Step1**.

Step 2 - Bolt together chassis, circuit board, battery compartment, and fingerguard.



2a. Gather the chassis and circuit board.

2b. Insert the circuit board into the chassis as shown. Take extra care to not bend or damage the pins on the opposite side of the circuit board.

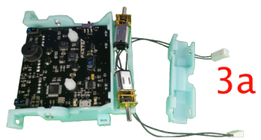
2c. Gather the battery box and plastic nuts and screws.

2d. Insert the plastic screws through the battery box, then through the chassis and circuit board respectively.

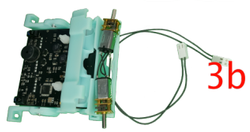
2e. Fasten each plastic screw with two plastic nuts.

2f. Gather and fasten the finger guard on to the screws as shown.

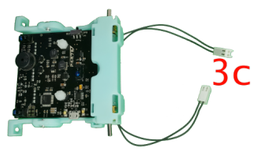
Step 3 – Install the motors and motor cover.


3a

Route the motor wires through the large hole in the chassis. Ensure the motors are flush against the small nub located on the ends on each side of the hole.


3b

Begin attaching the motor cover by lining up the indentations on the inside of the motor cover with the indentations on the chassis.


3c

Rotate the motor cover over the motors until the cover clicks in place. If there is excessive resistance, double check that the motors are flush against the nubs on the chassis.

Step 4 – Attach the scoop.


4a

Gather the scoop, hex key, 3/8” metal hex screws, and metal nuts.


4b

Fit the front edges of the chassis into the grooves in the scoop. Fit the nuts into their slots on the chassis. Fasten with the screws through the front of the scoop. Use the hex key to ensure the scoop is securely fastened to the chassis.

Step 5 – Attach the wheels.


5a

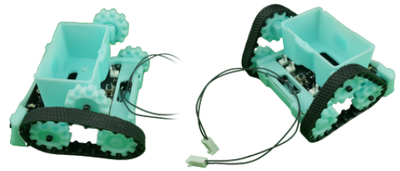
Gather the wheels, both through-hole and motor wheels, 1/2” hex screws, and hex key. Attach the motor wheels by inserting the half moon shaped motor shaft into the corresponding slot in the wheel.


5b

Fasten the through-hole wheels with the hex key. The wheel need to be able to spin freely. If they do not, loosen the screws until they do.

Step 6 – Attach the rubber tracks.

6. Stretch the rubber tracks over the wheels ensuring the teeth in the wheels match up with the grooves tracks.



Step 7 – Plug in the motors and battery pack.


7a

Ensure the leads from the motor on the right is plugged into Mtr_R while the motor on the left is plugged into MTR_L as shown.


7b

Plug the battery pack leads into the pins labeled as “Vbat.”

Step 8 – Secure the battery lid.

After putting batteries(not included) in the battery pack, secure the lid using the hex key and 1/4” hex screw. Ensure the leads from the battery pack are routed through the hole provided at the top of the battery box.

Step 9 – Install the ultrasonic sensors.


9a Locate the ultrasonic sensors.


9b Plug the ultrasonic sensors into the port labeled “Distance Sensor” as shown.

If you want to decrease track tension and make your robot move faster, try replacing the top wheels with the included smaller 3D printed wheels.
Have access to a 3D printer? Try other customizations to improve your sumo robot's performance or enable new functions.

Notes