

Megamark Controller Documentation

The Choitek Megamark is an advanced full-size multipurpose mobile manipulator robotics platform for students, artists, educators, and researchers alike. The Megamark Controller is the quickest and easiest way to start using your Megamark robot right away without the need for any additional programming.



User Interface

The Megamark Controller's user interface has been designed to be as simple, clean, and straightforward to use as possible. The visual interface includes both a USB controller that can control a connected Megamark robot and a graphical 3D simulator that works by itself.

[COM Port:]

Set the COM port of the connected Megamark robot here. (Normally, this would be COM3, COM4, COM5, etc. on Windows. This is something like `/dev/ttyACM0` on Linux, and something like `/dev/cu.usbmodem1411` for Mac. Note that on Windows, COM ports above COM9 do not work. If you need to know which COM port your robot is connected to, try the "Device Manager" on Windows or "System Information" on Mac OS.)

[Connect to Robot:]

Once the COM port has been correctly set and the robot connected to the computer via USB, you can click on the Connect to Robot button to establish a connection. (Note: Once connected, this button will change to Disconnect Robot.)

[Flip Wheels:] Flip Left Wheel
 Flip Right Wheel

Occasionally, the left or right wheel may be reversed on the hardware side. If this is the case, you can quickly and easily flip the direction of the left and/or right wheels by checking these boxes.



[Wheel Speed Slider]: The Choitek Megamark is capable of moving forward roughly 0.2 meters per second (0.66 ft/s). You can change the speed at which the Megamark moves and turns by adjusting this slider: full speed at the top of the slider and full stop at the very bottom of the slider.

Color A

Color B

[Colors]: Optionally, you can customize the colors of the Megamark graphical visualizer by clicking on these buttons and choosing your preferred colors. (Note: these buttons do not change the color of actual Megamark robots.)

Keyboard and Mouse Controls



Rotate & Zoom

[Rotate Camera]: Hold the Right Mouse Button and move the mouse to rotate the camera.

[Zoom Camera]: Use the Mouse Scroll Wheel to zoom the camera in and out.

Wheels

[Turn Left]: Press the Left Arrow to turn the robot left.

[Turn Right]: Press the Right Arrow to turn the robot right.

[Move Forward]: Press the Up Arrow to move the robot forwards.

[Move Backward]: Press the Down Arrow to move the robot backwards.

Left Arm

[Left Elbow Up]: Press w to rotate the left elbow up.

[Left Elbow Down]: Press s to rotate the left elbow down.

[Left Shoulder In]: Press d to rotate the left shoulder in.

[Left Shoulder Out]: Press a to rotate the left shoulder out.

Right Arm

[Right Elbow Up]: Press i to rotate the right elbow up.

[Right Elbow Down]: Press k to rotate the right elbow down.

[Right Shoulder In]: Press j to rotate the right shoulder in.

[Right Shoulder Out]: Press l to rotate the right shoulder out.

Left Gripper Motors

[Rotate All Left Grippers In]: Press **E** to rotate all left grippers in.

[Rotate All Left Grippers Out]: Press **Q** to rotate all left grippers out.

[Rotate Left Gripper 0 In]: Press **1** to rotate left gripper 0 in.

[Rotate Left Gripper 0 Out]: Press **Left Shift** to rotate left gripper 0 out.

[Rotate Left Gripper 1 In]: Press **2** to rotate left gripper 1 in.

[Rotate Left Gripper 1 Out]: Press **Z** to rotate left gripper 1 out.

[Rotate Left Gripper 2 In]: Press **3** to rotate left gripper 2 in.

[Rotate Left Gripper 2 Out]: Press **X** to rotate left gripper 2 out.

[Rotate Left Gripper 3 In]: Press **4** to rotate left gripper 3 in.

[Rotate Left Gripper 3 Out]: Press **C** to rotate left gripper 3 out.

[Rotate Left Gripper 4 In]: Press **5** to rotate left gripper 4 in.

[Rotate Left Gripper 4 Out]: Press **V** to rotate left gripper 4 out.

[Rotate Left Gripper 5 In]: Press **6** to rotate left gripper 5 in.

[Rotate Left Gripper 5 Out]: Press **B** to rotate left gripper 5 out.

Right Gripper Motors

[Rotate All Right Grippers In]: Press **U** to rotate all right grippers in.

[Rotate All Right Grippers Out]: Press **O** to rotate all right grippers out.

[Rotate Right Gripper 0 In]: Press **7** to rotate right gripper 0 in.

[Rotate Right Gripper 0 Out]: Press **N** to rotate right gripper 0 out.

[Rotate Right Gripper 1 In]: Press **8** to rotate right gripper 1 in.

[Rotate Right Gripper 1 Out]: Press **M** to rotate right gripper 1 out.

[Rotate Right Gripper 2 In]: Press **9** to rotate right gripper 2 in.

[Rotate Right Gripper 2 Out]: Press **J** to rotate right gripper 2 out.

[Rotate Right Gripper 3 In]: Press **0** to rotate right gripper 3 in.

[Rotate Right Gripper 3 Out]: Press **I** to rotate right gripper 3 out.

[Rotate Right Gripper 4 In]: Press **;** to rotate right gripper 4 in.

[Rotate Right Gripper 4 Out]: Press **/** to rotate right gripper 4 out.

[Rotate Right Gripper 5 In]: Press **=** to rotate right gripper 5 in.

[Rotate Right Gripper 5 Out]: Press **Right Shift** to rotate right gripper 5 out.

Other Controls

[Reset all motors]: Press **R** to reset all robot motor values.

Joystick Controls

The Megamark Controller software has been pre-configured to directly work with wired Logitech F310 and wireless Logitech F710 gamepad controllers.



Logitech F310 gamepad shown for reference.

Wheels

[Turn Left]: Press `DPAD Left` to turn the robot left.

[Turn Right]: Press `DPAD Right` to turn the robot right.

[Move Forward]: Press `DPAD Up` to move the robot forwards.

[Move Backward]: Press `DPAD Down` to move the robot backwards.

Left Arm

[Left Elbow Up]: Move `Left Joystick Up` to rotate the left elbow up.

[Left Elbow Down]: Move `Left Joystick Down` to rotate the left elbow down.

[Left Shoulder In]: Move `Left Joystick Right` to rotate the left shoulder in.

[Left Shoulder Out]: Move `Left Joystick Left` to rotate the left shoulder out.

Right Arm

[Right Elbow Up]: Move `Right Joystick Up` to rotate the right elbow up.

[Right Elbow Down]: Move `Right Joystick Down` to rotate the right elbow down.

[Right Shoulder In]: Move `Right Joystick Left` to rotate the right shoulder in.

[Right Shoulder Out]: Move `Right Joystick Right` to rotate the right shoulder out.

Left Gripper Motors

[Rotate All Left Grippers In]: Press `X` to rotate all left grippers in.

[Rotate All Left Grippers Out]: Press `Y` to rotate all left grippers out.

Right Gripper Motors

[Rotate All Right Grippers In]: Press `A` to rotate all right grippers in.

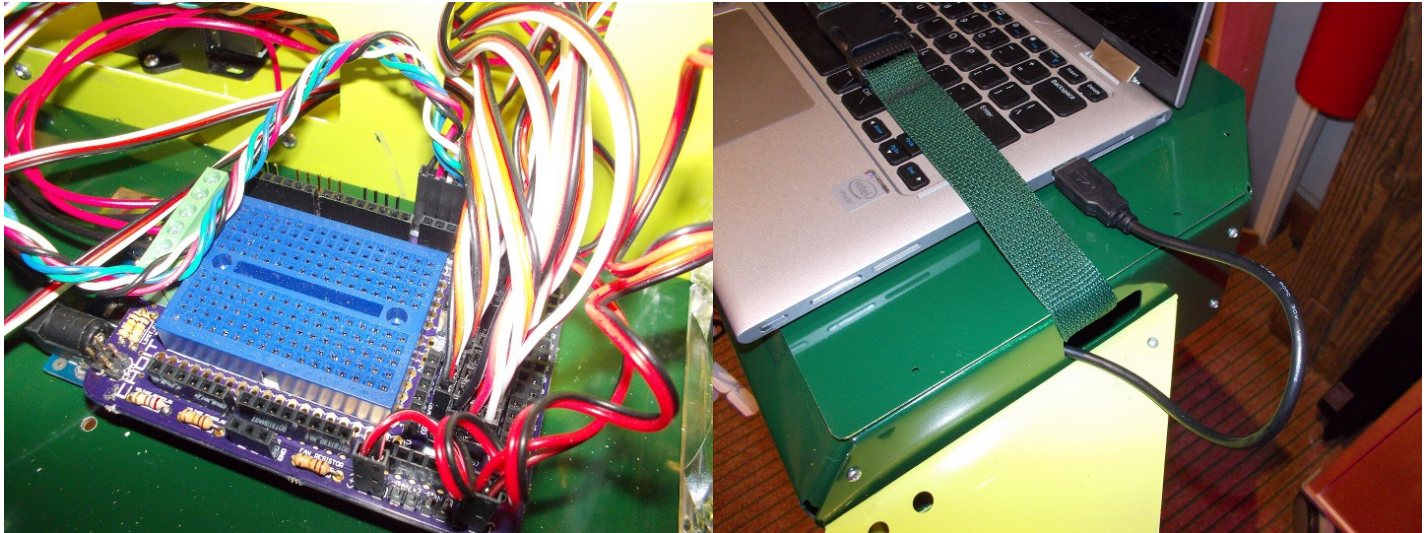
[Rotate All Right Grippers Out]: Press `B` to rotate all right grippers out.

Other Controls

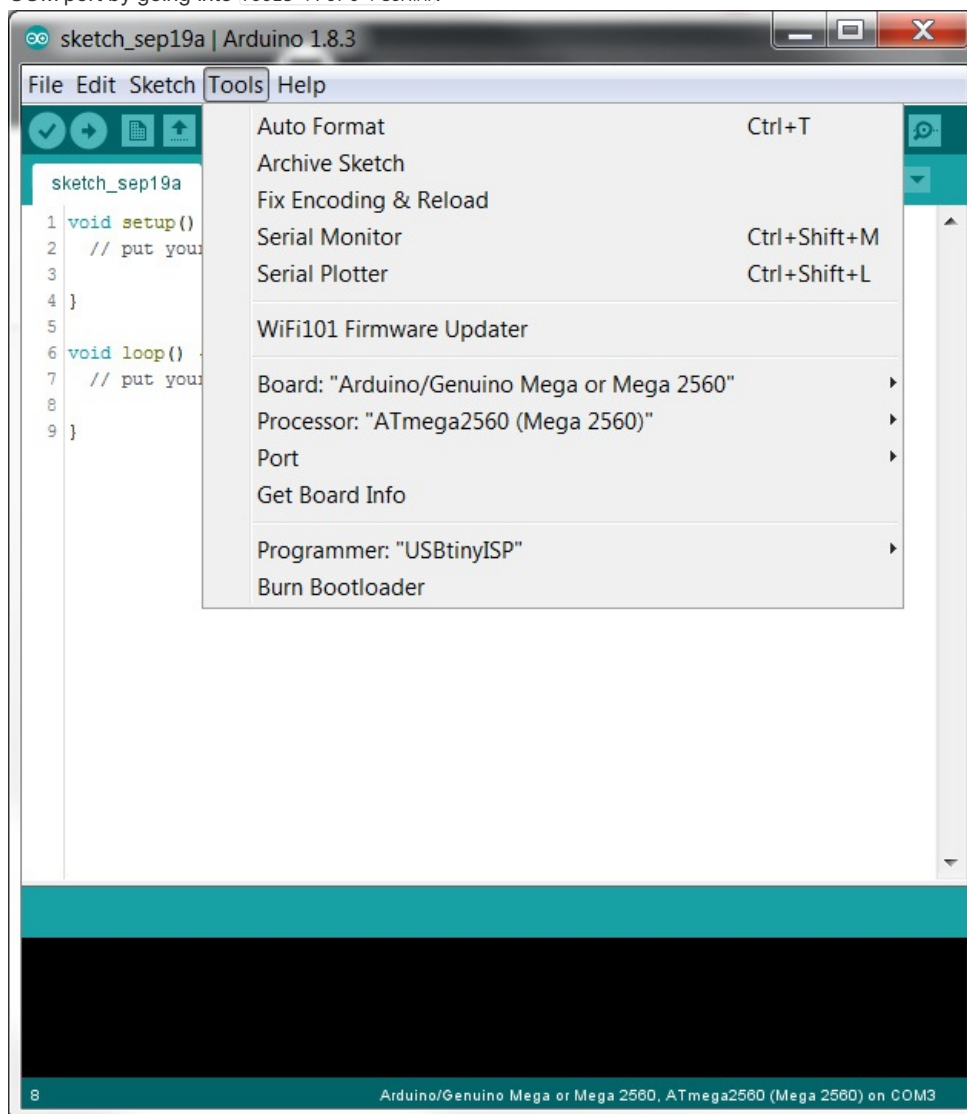
[Reset all motors]: Press `Start` to reset all robot motor values.

Arduino Firmware First Time Setup

Step 1: If you have not done so already, follow the steps in the *Megamark Arduino Setup Guide* and make sure you have the Arduino software and the Megamark Arduino Library installed and ready to go. Plug the robot's internal Arduino Mega 2560 onto your laptop via USB Serial.

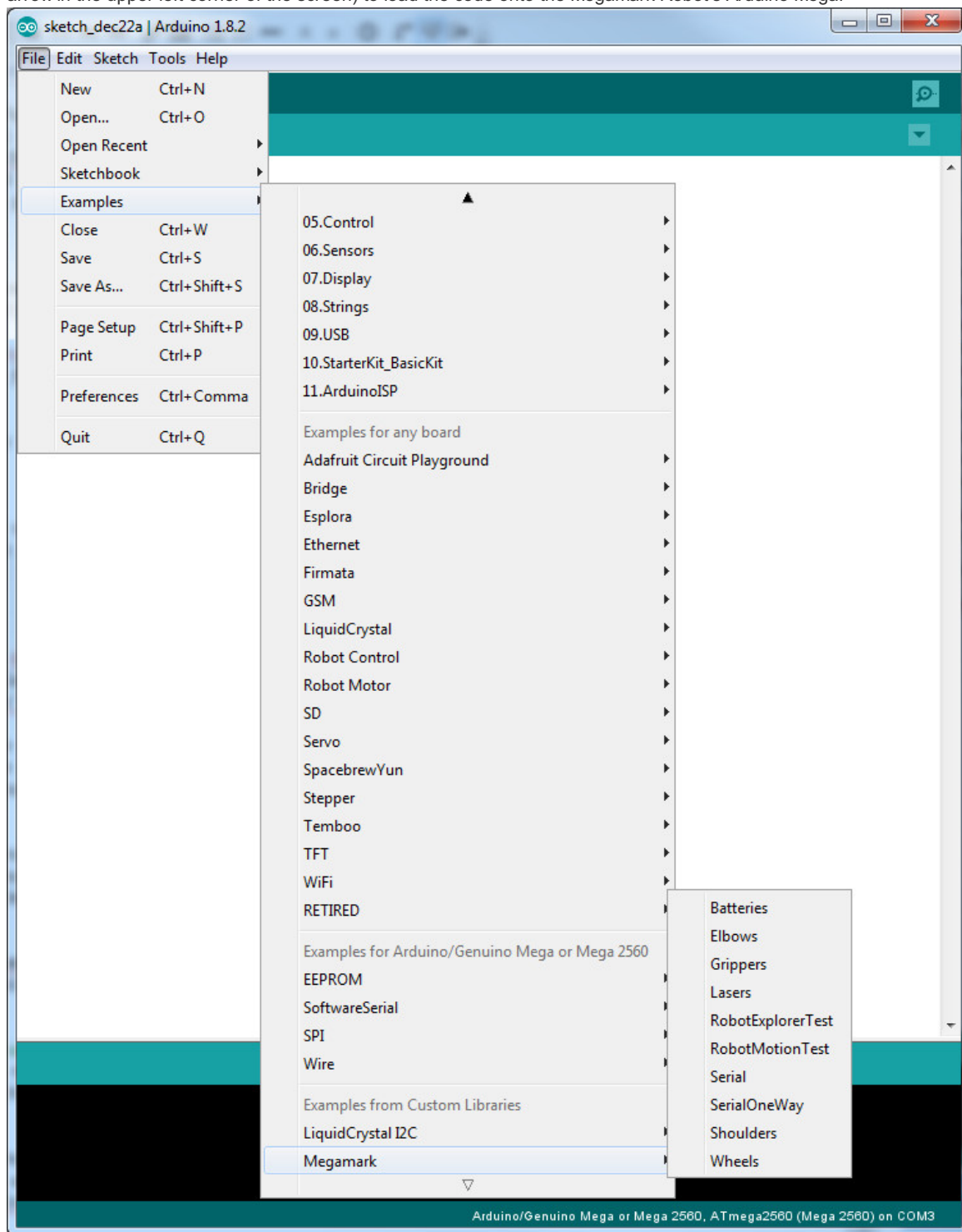


Step 2: Fire up the newly installed Arduino IDE. Set your board type by going into `Tools->Board->Arduino/Genuino Mega or Mega 2560`. Set your COM port by going into `Tools->Port->COM##`.



Note: Some versions of the Choitek Megamark run on an Arduino Mega 1280 for legacy compatibility reasons.

Step 3: Go over to File->Examples->Megamark->SerialOneWay. Once the example file has been loaded, press the Upload button (shaped liked an arrow in the upper left corner of the screen) to load the code onto the Megamark Robot's Arduino Mega.



*Once the SerialOneWay example has been loaded, the robot should now be controllable by the Megamark controller software.