ARDUINO FIRMATA MODULE GUIDE

Learn to control Arduino sensors and actuators with the Firmata module through praticals examples.

map

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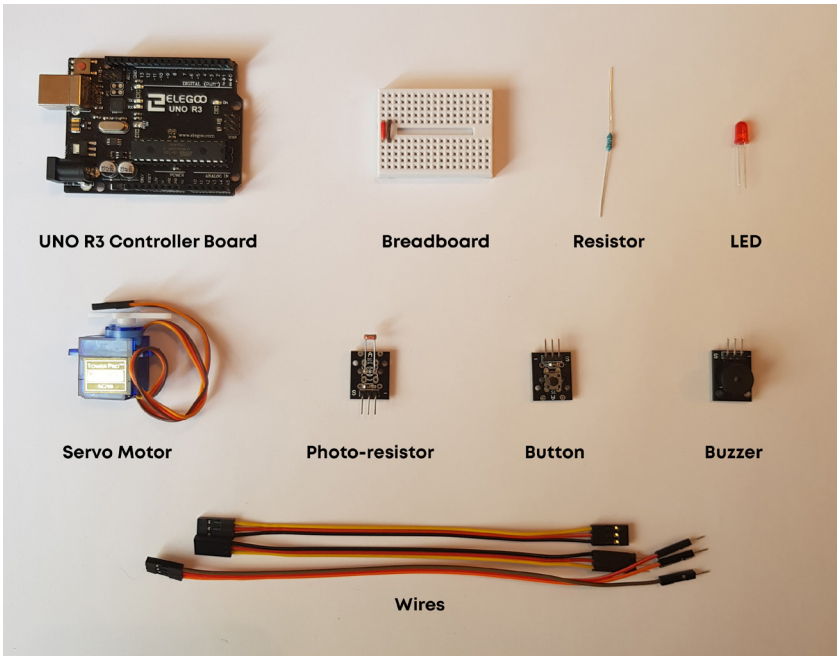
1. Set up

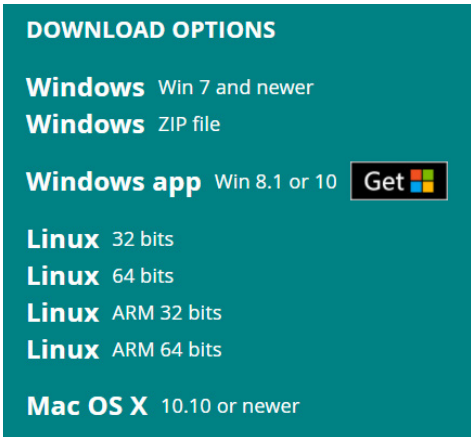
In this tutorial we will use some components that are parts of two Arduino kits from Elegoo but you can use any original or Arduino Uno clones. Compatible models for this tutorial are Arduino Uno, Arduino Mega and Teensy 3.2 or 4.0 (Mac only).

37 Sensor Kit V2.0 :
https://www.elegoo.com/collections/electronic-component-kits/products/elegoo-37-in-1-sensor-kit

Super Stater Kit UNO R3 Project :
https://www.elegoo.com/collections/arduino-learning-sets/products/elegoo-uno-project-super-starter-kit



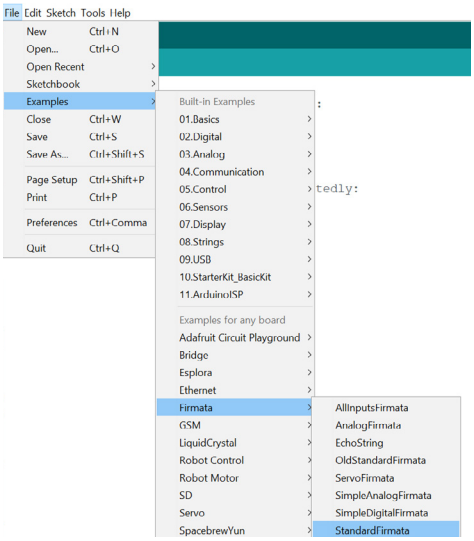
Components needed



- Before starting we need to install some prequisities.

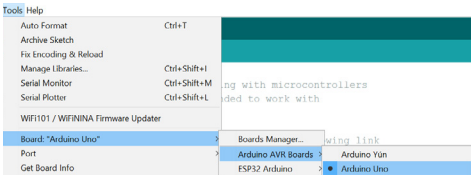
  Go to the download section of Arduino official website: https://www.arduino.cc/en/software.

  Select your platform and download the IDE.



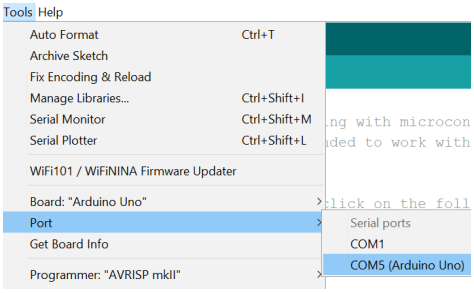
- Once installed, start Arduino software and load StandardFirmata file in Examples > Firmata. Note that if you are using an Arduino Mega or a Teensy (Mac only), choose StandardFirmataPlus.

  Firmata is an Arduino libraray which will allow MadMapper to control the Arduino.

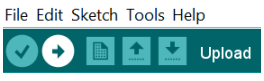


- Plug the Arduino Uno to your computer.

  Select the “Arduino Uno” board in Tools > Board.



- Select the correct Arduino port in Tools > Port.

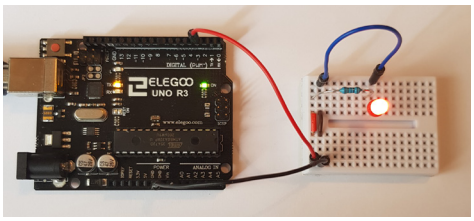


- Upload the library to your Arduino board by pressing the right arrow button in the top bar.

- Once uploaded, you will be notified by the message “Done uploading.” in the bottom pannel. There should not be any errors.

  To finish, close Arduino IDE and disconnect the board. Now you are ready to control your Arduino from MadMapper.

2. Light the first led

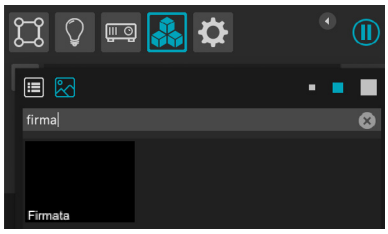


- Connect the LED to the 3rd pin of the Arduino.

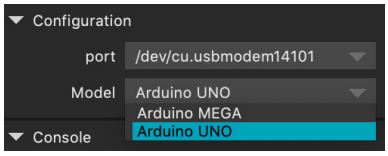
  The 3rd pin is a PWM (Pulse Width Modulation) compatible pin that we can send a signal to.
  PWM explanation: https://en.wikipedia.org/wiki/Pulse-width_modulation

  Add a resistor and connect the LED to the ground.

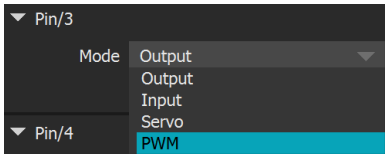
  For more informations on Arduino sketches, you can find great resources on the official website:
  https://www.arduino.cc/en/Tutorial/HomePage



- In MadMapper, search for the Firmata module and add it to your project.



- Select the port and model of your board in the configuration settings.

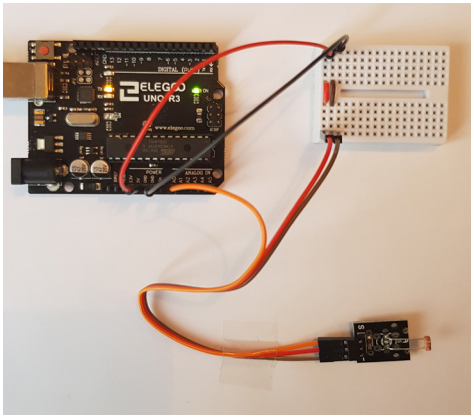


- In Digital/D3 which refers to the 3rd pin of the digital pins, select the PWM mode.

- Increase or decrease the “Value” slider, it should change the LED brightness intensity.

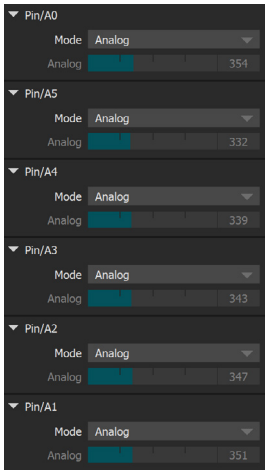
Tips Arduino UNO doesn’t properly support using PWM and Servo at the same time.

3. Photo-resistor sensor



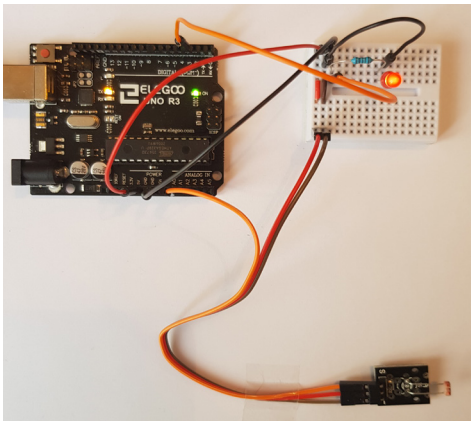
- Restart the schema from scratch.

  Connect the photo-resistor to an analog pin of the board, in this example, we used the A0 pin.

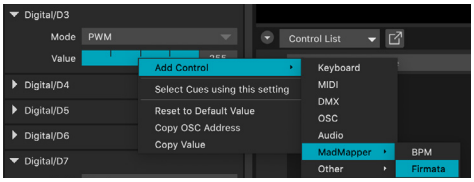


- Try to hide the sensor from any light source, you should see the corresponding analog pin varying in MadMapper.

  Note that all analog pins might react to the sensor. To prevent this, you should add resistors to the pins.



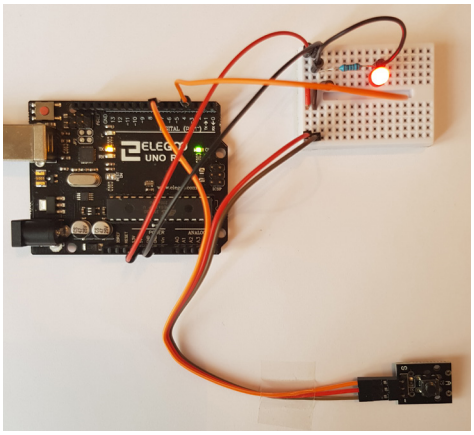
- We will visualize the light intensity with a LED. Connect the LED to a PWM pin, here we use the third digital pin.



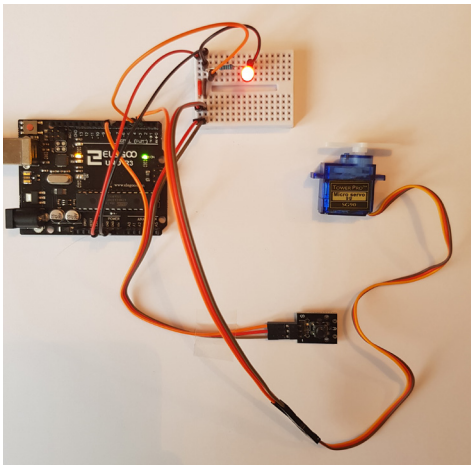
- Add control to this pin with Right click > Add control > MadMapper > Firmata.
  Select the correct channel where the sensor is connected, it should be A0.

  After this, the LED should switch off when covering the sensor.

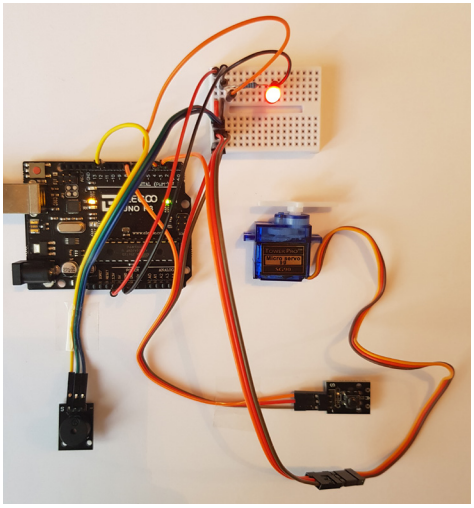
4. Controlling Servo Motors



- Replace the photo-resistor by a button sensor.
  Add it to a digital pin, here we use the pin 7.

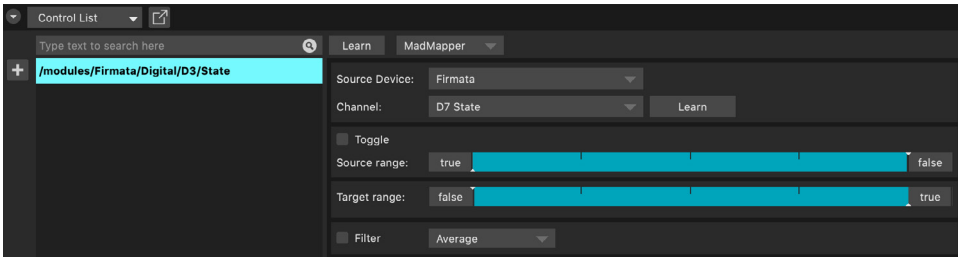


- Add the servo motor to pin 2.
  We will trigger it when pressing the button

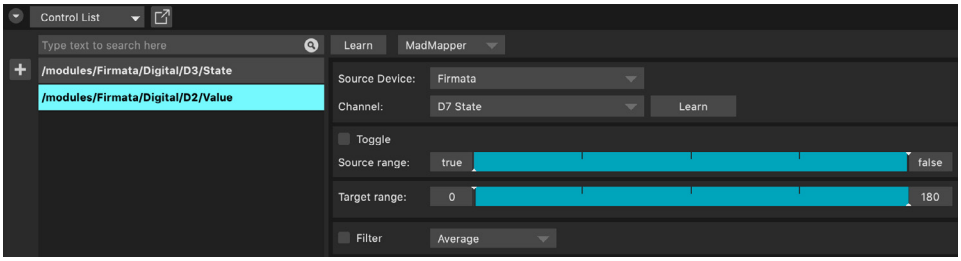


- In bonus we added a passive buzzer on pin 12 which will beep when pressing the button

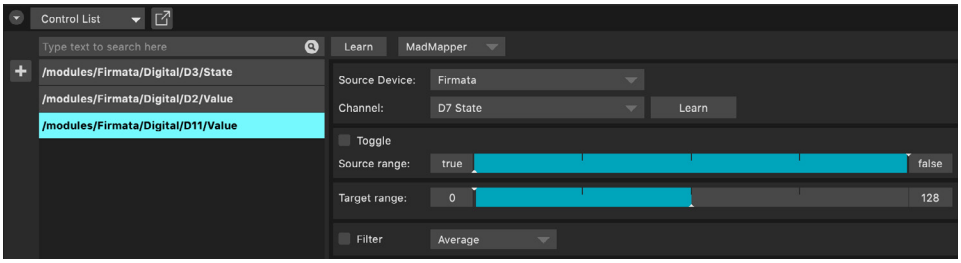
Add control to the LED, Servo Motor and Buzzer to trigger them while pressing the button. Choose the appropriate channel to refer to the button pin and remap the source range accordingly.



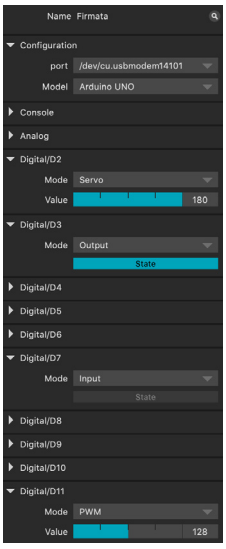
LED controls.



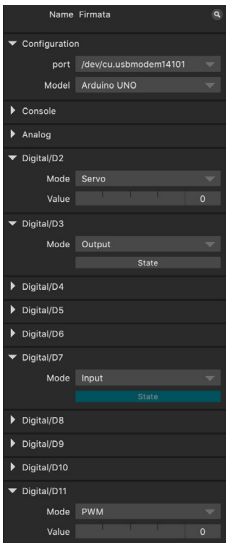
Servo Motor controls.



Passive Buzzer controls.



On



Off

- When everything is properly mapped, the button should light the led, turn the servo motor and ring the buzzer when pressed.

  In MadMapper, you should see the pins turning on and off while pressing the button.

Tips

You can add multiple servos motors to be controlled by the Arduino and MadMapper.