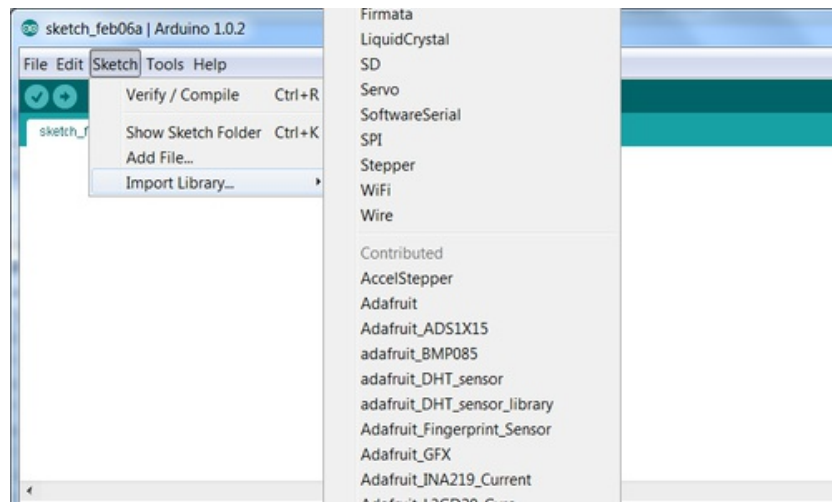




All About Arduino Libraries

Created by Bill Earl



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Arduino Libraries



Arduino libraries are a convenient way to share code such as device drivers or commonly used utility functions. This guide details how to install libraries on your computer. For an excellent introduction to Arduino libraries and what you can do with them, see the Libraries page from [Arduino Tips, Tricks and Techniques](http://adafru.it/aYG) (<http://adafru.it/aYG>).

There are two general types of Arduino Libraries:

Standard Libraries

The Arduino IDE comes with a set of standard libraries for commonly used functionality. These libraries support all the examples included with the IDE. Standard library functionality includes basic communication functions and support for some of the most common types of hardware like: Servo Motors and Character LCD displays.

Standard Libraries are pre-installed in the "Libraries" folder of the Arduino install. If you have multiple versions of the IDE installed, each version will have its own set of libraries. **For the most part, it is not a good idea to change the Standard Libraries or install your libraries in the same folder.**

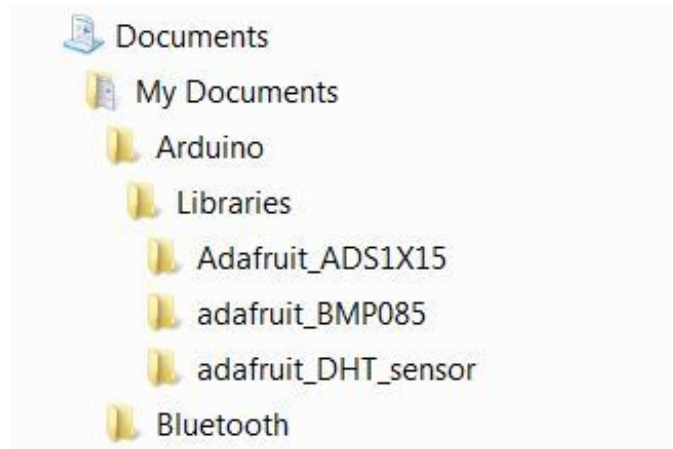
User Installed Libraries

There are many other libraries with useful functionality and device drivers for all sorts of hardware. These drivers are available from places like Arduino Playground, Github and Google Code. Adafruit provides over 100 libraries supporting almost all of our Arduino compatible products. Most of our libraries are hosted on [GitHub](http://adafru.it/aYH) (<http://adafru.it/aYH>). Direct links are provided from the product description and/or tutorial pages.

User installed libraries should be installed in your sketchbook libraries folder so they can be used with all versions of the IDE. This way, if a new version of

the IDE is released, you don't have to re-install all your favorite libraries!

Where to Install your Libraries



It is important to install your libraries in the correct location. Otherwise the compiler will not be able to locate them when you try to compile and upload your sketches.

Locate your Sketchbook Folder and the Libraries Folder Inside

Your sketchbook folder is the folder where the Arduino IDE stores your sketches. This folder is automatically created by the IDE when you install it.

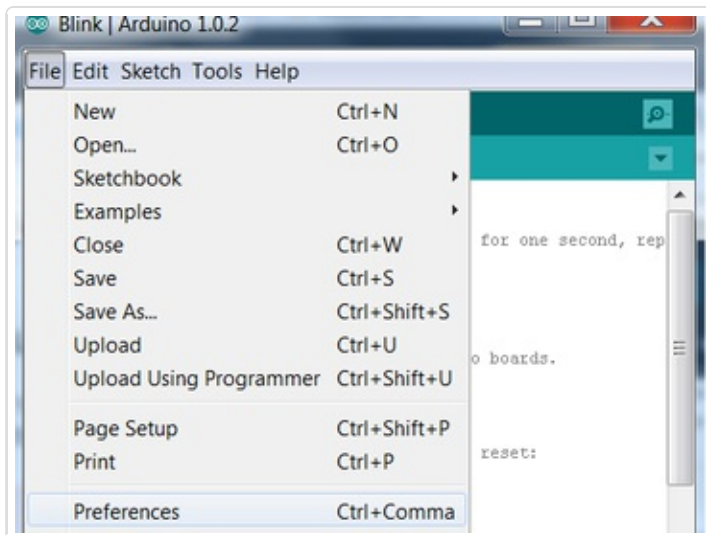
On Linux machines, the folder is named "Sketchbook" and it is typically located in /home/<username>

On Windows and Macintosh machines, the default name of the folder is "Arduino" and is located in your Documents folder.

This is a common source of confusion on Windows and Mac machines, your sketchbook folder is not named "sketchbook" it is named "Arduino"!

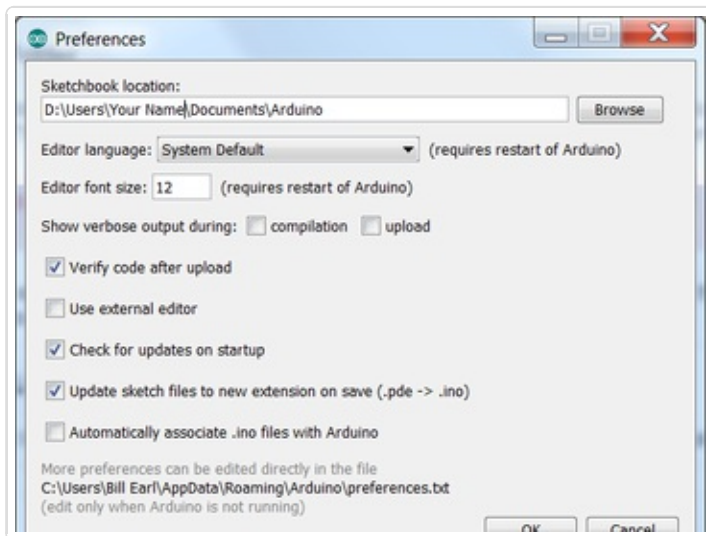
User installed libraries should go in a folder named "Libraries", located inside your sketchbook folder. This is where the IDE will look for user installed libraries.

On version 1.0.2 and later of the Arduino IDE, the "Libraries" folder is created automatically. On earlier versions of the IDE, you may need to create it when you install your first library.



Open the Preferences Dialog

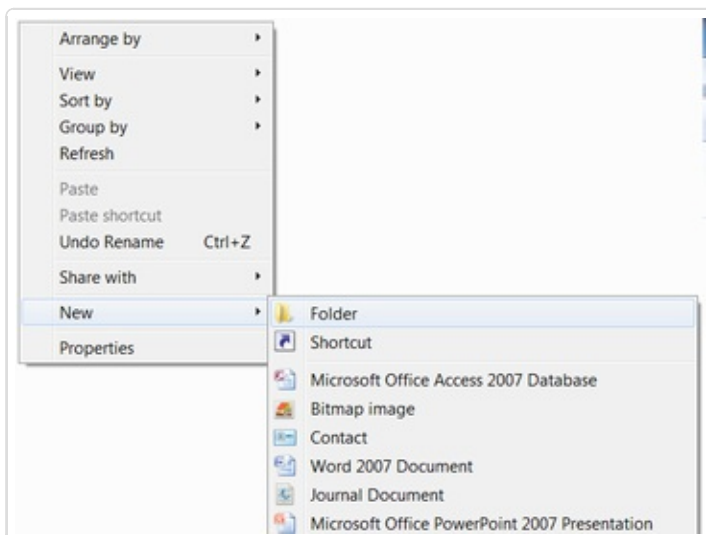
Click "File->Preferences" in the IDE.



Find the Sketchbook Location

Usually a folder named "Arduino" in your Documents folder.

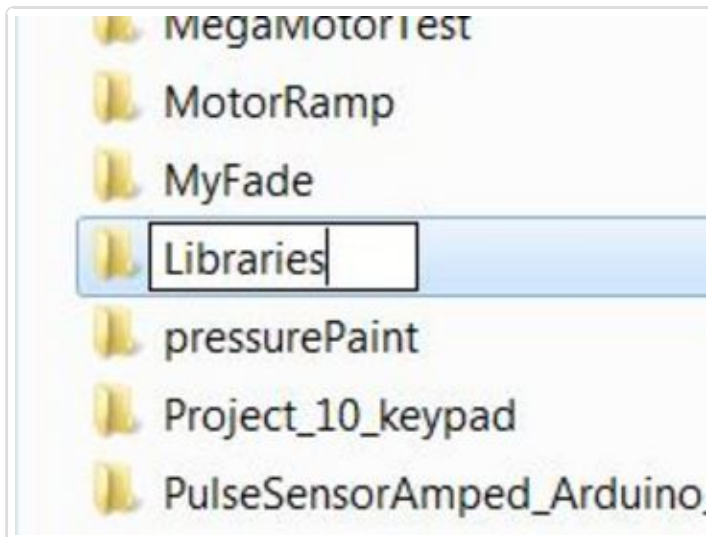
Once you know the location, navigate to this folder in Windows Explorer.



Create a Libraries Folder

If there is no Libraries folder there , create one.

Right click in Windows Explorer and select "New->Folder".



Rename to "Libraries"

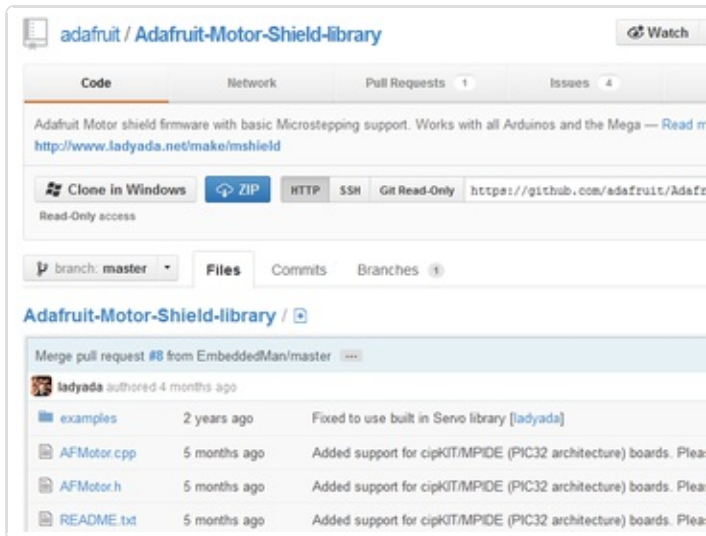
Right click on the "New Folder" and select "Rename". Then type in "Libraries".

Installing a Library on Windows

Follow these steps to install a library in Windows.

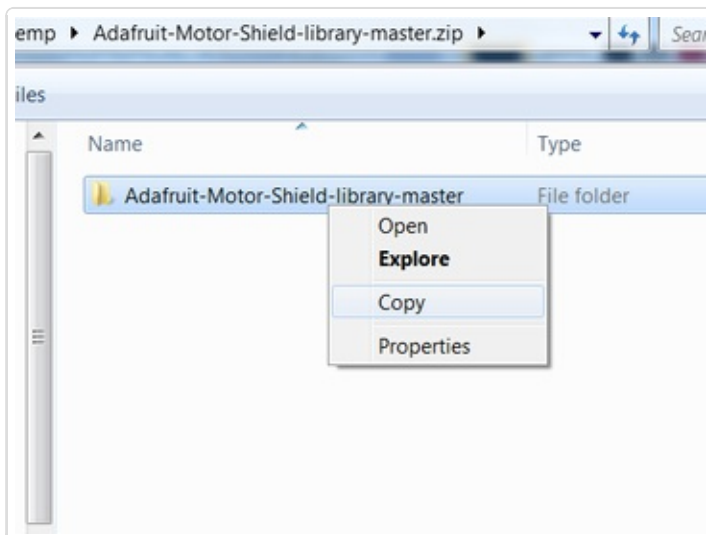
Close the Arduino IDE

First make sure that **all** instances of the Arduino IDE are closed. The IDE only scans for libraries at startup. **It will not see your new library as long as any instance of the IDE is open!**



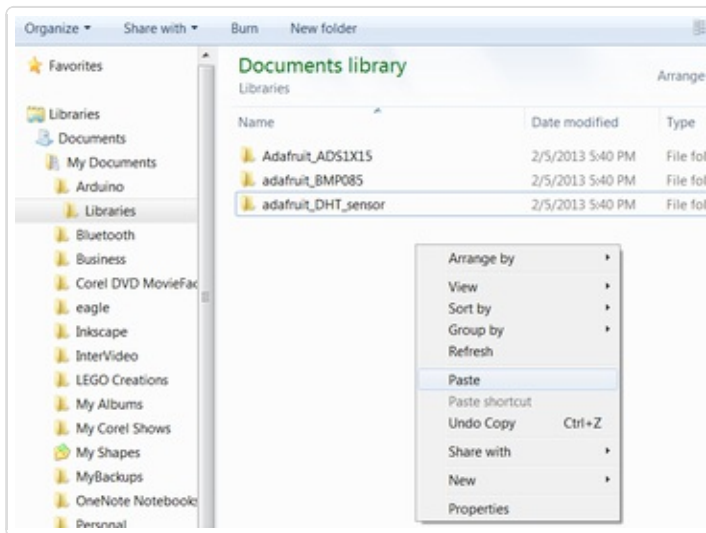
Download the Zip File

Click the "Zip" button on the Github repository page.



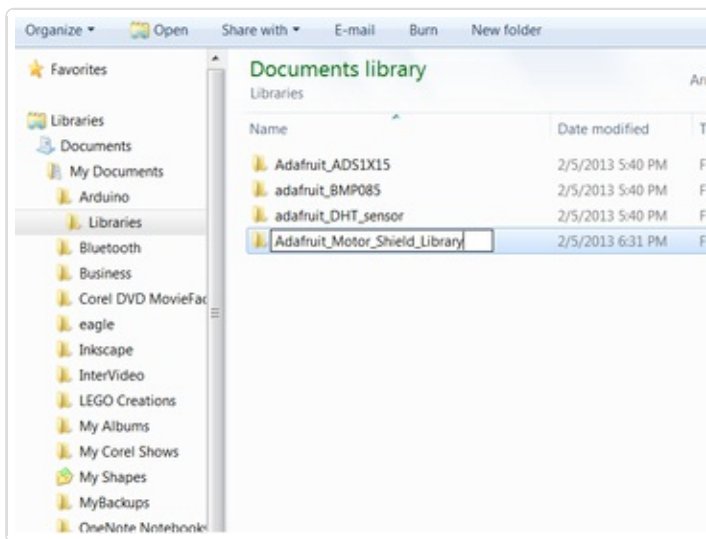
Open the Zip File

Open the Zip File and copy the library master folder.



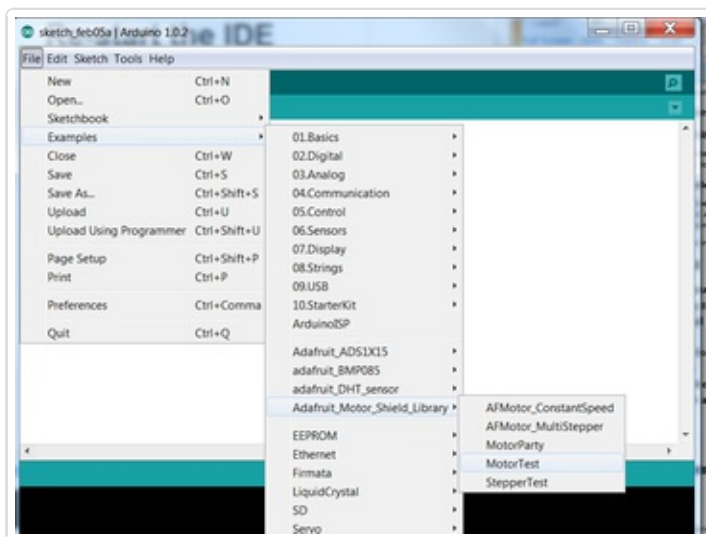
Paste into your Libraries Folder

Open your sketchbook Libraries folder and paste the mater folder you copied from the .Zip.



Give it a Legal Name

The IDE will not recognize folders with dashes in the name. So you must rename the Github Master Folder. Underscores are OK!



Re-start the IDE

Restart the Arduino IDE and verify that the library appears in the File->Examples menu.

Load one of the library examples to test.



Verify that it Compiles

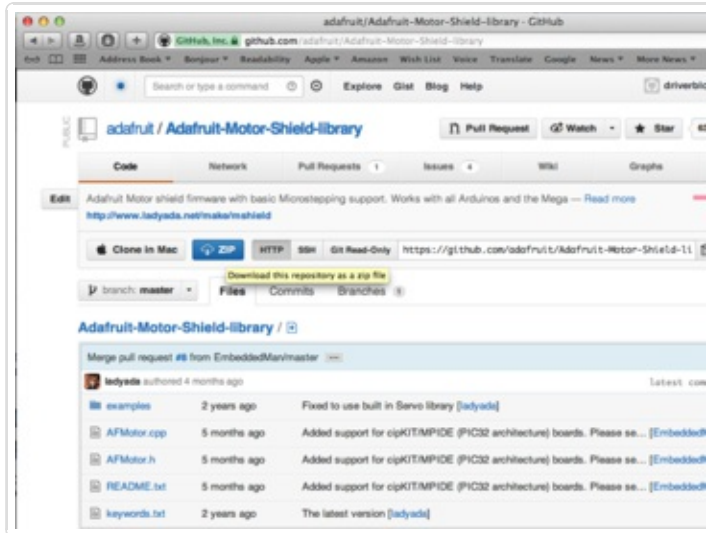
Click the check-mark icon in the upper left and verify that the example sketch compiles without errors.

Installing a Library on Mac OSX

Follow these steps to install a library in Mac OSX.

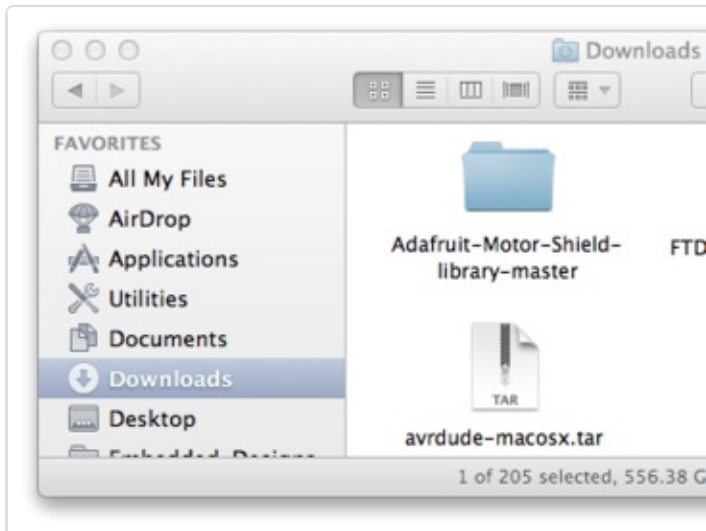
Close the Arduino IDE

First make sure that **all** instances of the Arduino IDE are closed. The IDE only scans for libraries at startup. **It will not see your new library as long as any instance of the IDE is open!**



Download the Zip File

Click the "Zip" button on the Github repository page.



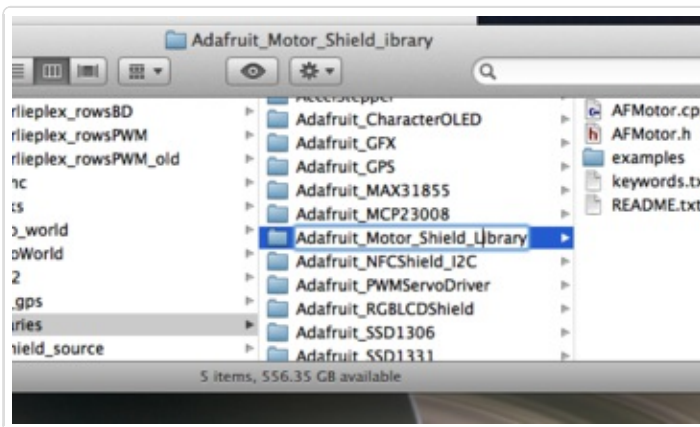
Find it in the Downloads Folder

OSX will automatically open the zip file there.



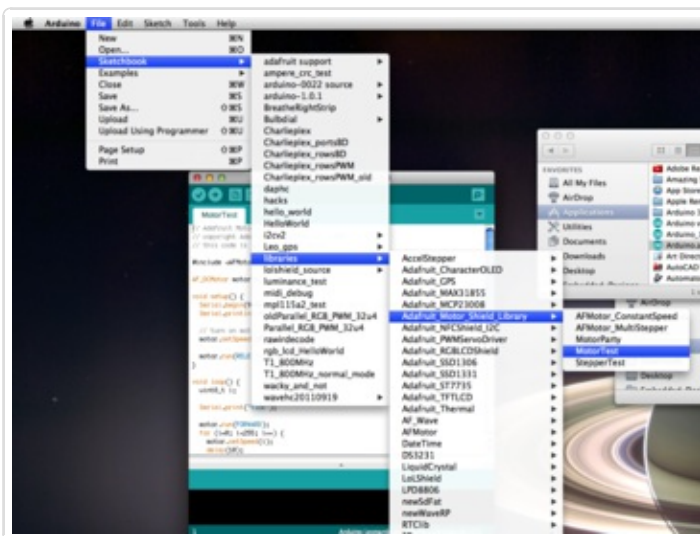
Drag it to your Libraries Folder

Open your sketchbook Libraries folder and drag the master folder from Downloads into it.



Give it a Legal Name

The IDE will not recognize folders with dashes in the name. So you must rename the Github Master Folder. Underscores are OK!



Re-start the IDE

Restart the Arduino IDE and verify that the library appears in the File->Examples menu.

Load one of the library examples to test.

```
void setup() {  
  Serial.begin(9600); // set up Serial library at 9600 bps  
  Serial.println("Motor test!");  
  
  // turn on motor  
  motor.setSpeed(200);  
  motor.run(RELEASE);  
}  
  
void loop() {  
  uint8_t i;  
  
  Serial.print("tick");  
  
  motor.run(FORWARD);  
  for (i=0; i<255; i++) {  
    motor.setSpeed(i);  
    delay(10);  
  }  
  
  for (i=255; i!=0; i--) {  
    motor.setSpeed(i);  
    delay(10);  
  }  
}
```

Done compiling.

Binary sketch size: 3,396 bytes (of a 32,256 byte maximum)

1 Arduino Uno on /dev/tty.usbmodemfa1311

Verify that it Compiles

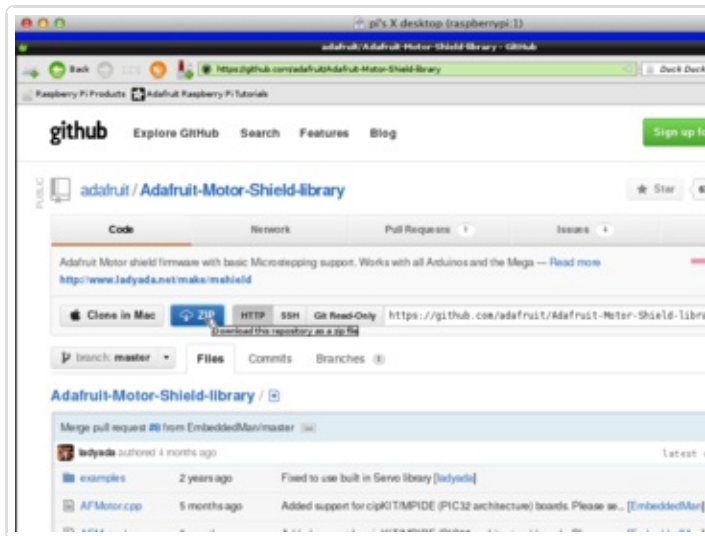
Click the check-mark icon in the upper left and verify that the example sketch compiles without errors.

Installing a Library on Linux

Follow these steps to install a library in Linux.

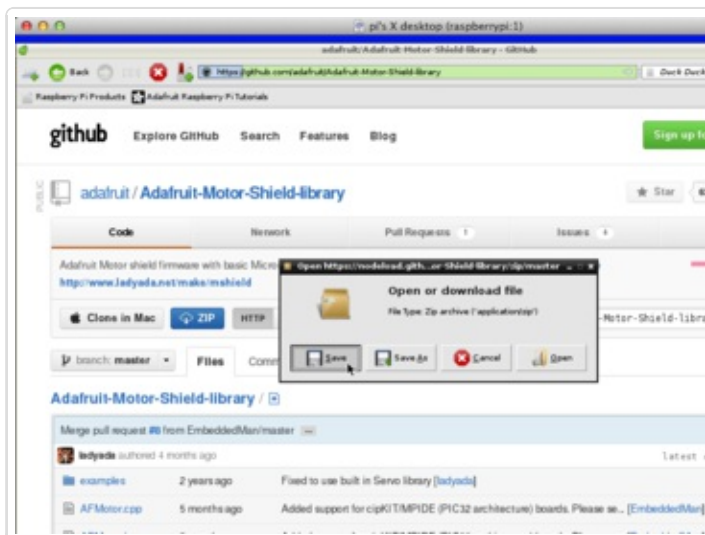
Close the Arduino IDE

First make sure that **all** instances of the Arduino IDE are closed. The IDE only scans for libraries at startup. **It will not see your new library as long as any instance of the IDE is open!**



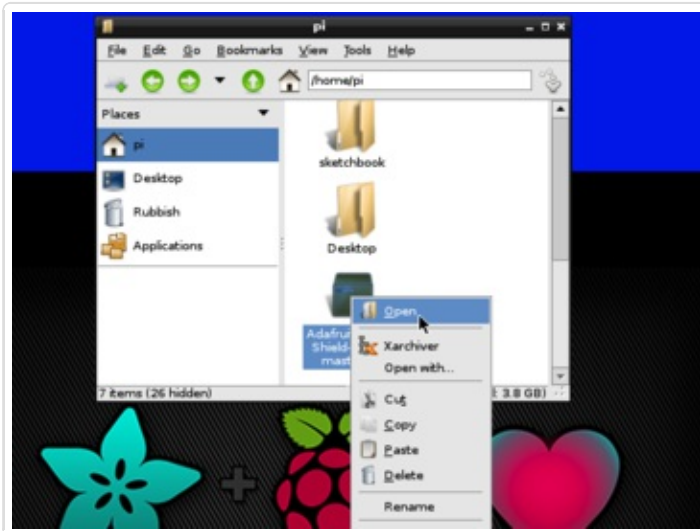
Download the Zip File

Click the "Zip" button on the Github repository page.



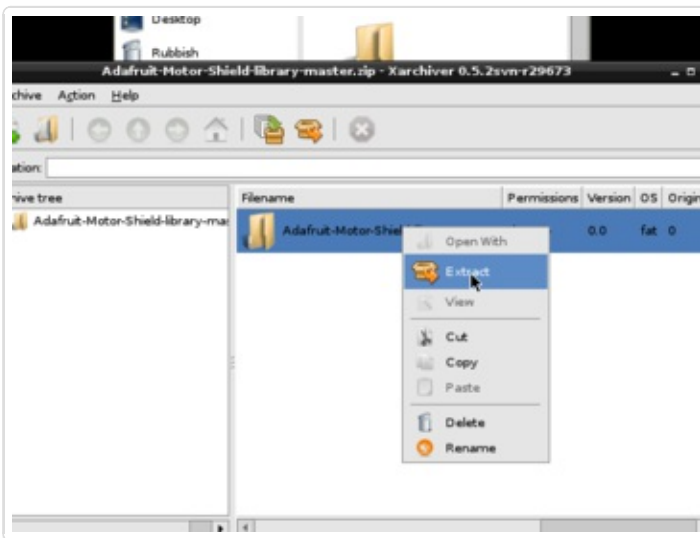
Save the Zip File

Save the zip file to a convenient location.



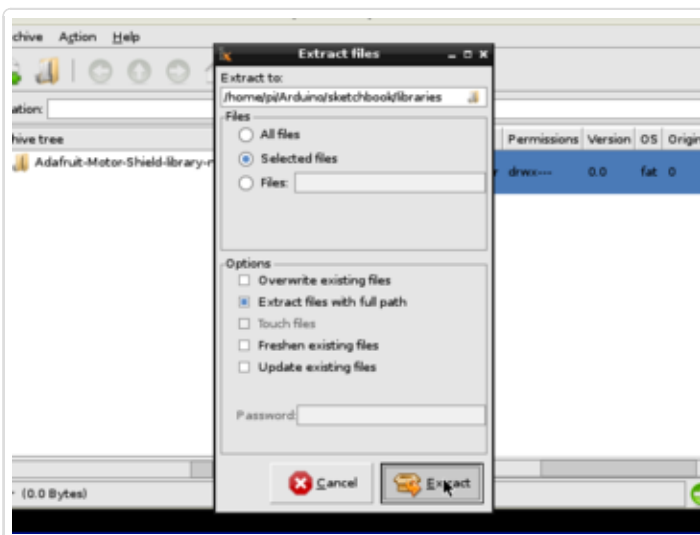
Open the Zip File

Open the Zip File and copy the library master folder.



Start the Extraction

Select "Extract" from the menu and navigate to your Sketchbook/Libraries folder



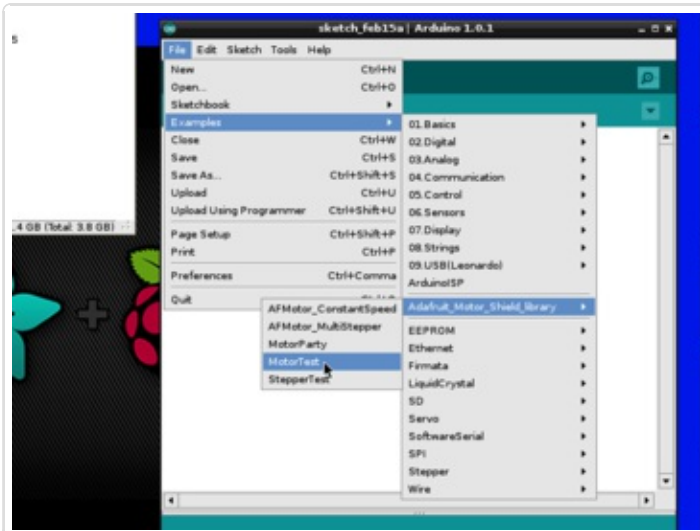
Extract into your Libraries Folder

After navigating to the sketchbook/libraries folder, complete the extraction.



Give it a Legal Name

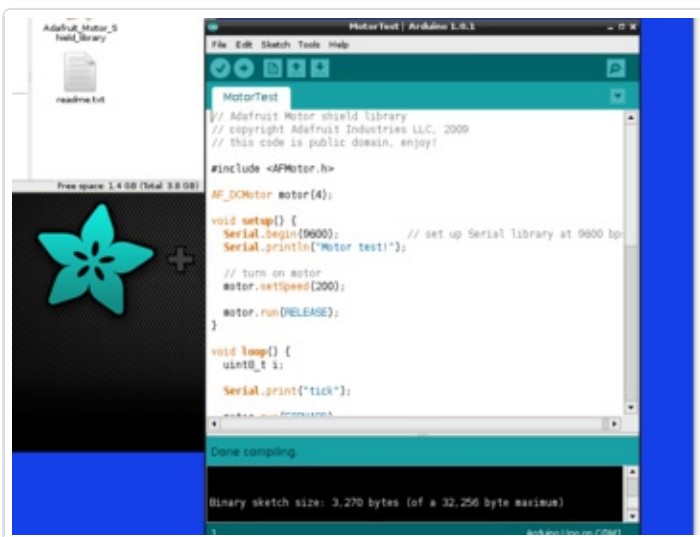
The IDE will not recognize folders with dashes in the name. So you must rename the Github Master Folder. Underscores are OK!



Re-start the IDE

Restart the Arduino IDE and verify that the library appears in the File->Examples menu.

Load one of the library examples to test.



Verify that it Compiles

Click the check-mark icon in the upper left and verify that the example sketch compiles without errors.

Common Library Problems

```
// want these to be as small/large as possible without hitting the hard s
// for max range. You'll have to tweak them as necessary to match the ser
// have!
#define SERVOMIN 150 // this is the 'minimum' pulse length count (out of
#define SERVOMAX 600 // this is the 'maximum' pulse length count (out of

// our servo # counter
<

'Adafruit_PWMServoDriver' does not name a type

servo:23: error: 'Adafruit_PWMServoDriver' does not name a type
servo.pde: In function 'void setup()':
servo:41: error: 'pwm' was not declared in this scope
servo.pde: In function 'void setServoPulse(uint8_t, double)':
servo:59: error: 'pwm' was not declared in this scope
servo.pde: In function 'void loop()':
servo:66: error: 'pwm' was not declared in this scope
servo:70: error: 'pwm' was not declared in this scope

23
```

'xxxx' does not name a type

This is the most common library related error message and it means that the compiler could not find the library. This can be due to:

- Library is not Installed (see previous pages in this guide)
- Wrong Folder Location
- Wrong Folder Name
- Wrong Library Name
- Library Dependencies
- Forgot to Shutdown the IDE

See below for solutions to these problems.

Wrong Folder Location

The IDE will only find standard libraries and libraries installed in the sketchbook Libraries folder. It will not be able to find libraries installed elsewhere.

The Library folder must be at the top level of the Libraries folder. If you put it in a sub-folder, the IDE will not find it.

Don't have a "Sketchbook" folder

It is there. But on a Windows or Mac/OSX machine it may not be named "Sketchbook". See the page titled "Where to Install your Libraries".

Incomplete Library

You must download and install the entire library. Do not omit or alter the names of any files inside the library folder.

Wrong Folder Name

The IDE will not load files with certain characters in the name. Unfortunately, it doesn't like the dashes in the zip files names generated by Github. When you unzip the file, rename the folder so that it does not contain any 'illegal' characters. Simply replacing each dash ('-') with an underscore ('_') usually works.

Wrong Library Name

The name specified in the `#include` of your sketch must match exactly (including capitalization!) the class name in the library. If it does not match exactly, the IDE will not be able to find it. The example sketches included with the library will have the correct spelling. Just cut and paste from there to avoid typos.

Multiple Versions

If you have multiple versions of a library, the IDE will try to load all of them. This will result in compiler errors. It is not enough to simply rename the library folder. It must be moved outside of the sketchbook Libraries folder so the IDE won't try to load it.

Library Dependencies

Some Libraries are dependent on other libraries. For example, most of the Adafruit Graphic Display libraries are dependent on the Adafruit GFX Library. You must have the GFX library installed to use the dependent libraries.

“Core” Libraries

Some libraries cannot be used directly. The GFX library is a good example of this. It provides core graphics functionality for many Adafruit displays, but cannot be used without the specific driver library for that display.

Forget to shutdown the IDE

The IDE only searches for libraries at startup. You must shut down ALL instances of the IDE and restart before it will recognize a newly installed library.