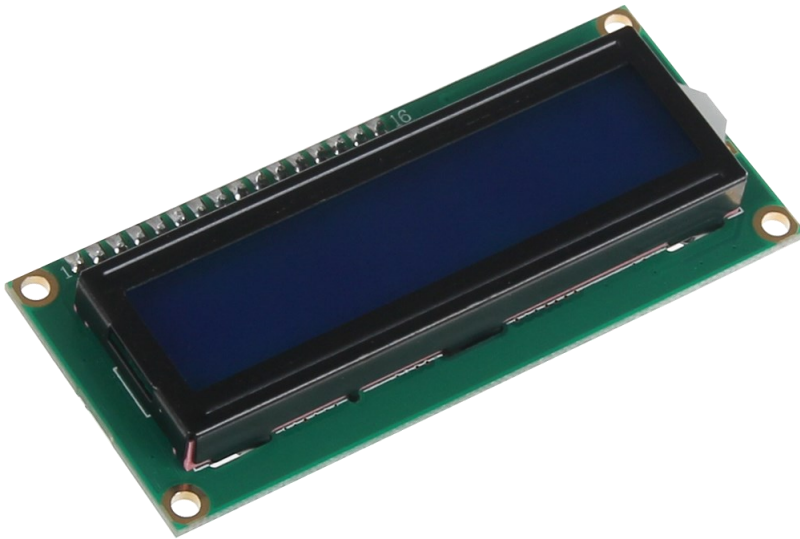


16X2 LCD MODULE

I2C serial



1. GENERAL INFORMATION

Dear customer,

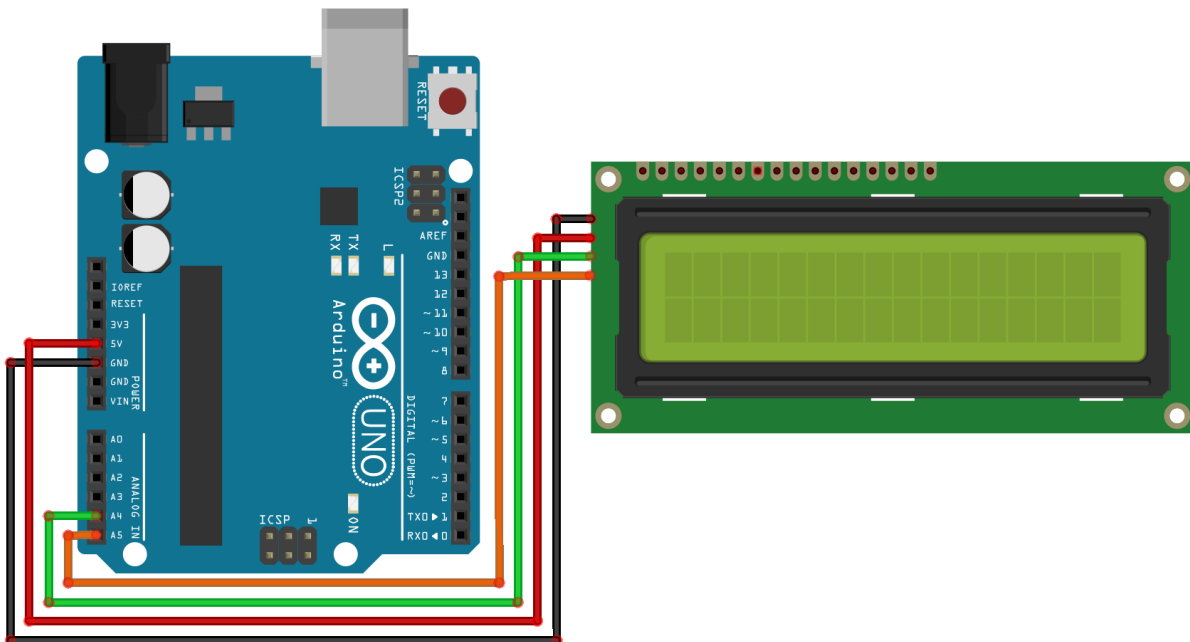
Thank you for purchasing our product. In the following, we will show you which things should be noted during the use.

Should you encounter any unexpected problems, do not hesitate to contact us

2. USE WITH AN ARDUINO

Connecting the display

Connect the display to the pins of your Arduino like shown in the picture or rather in the chart.



This picture was made in [Fritzing](#).

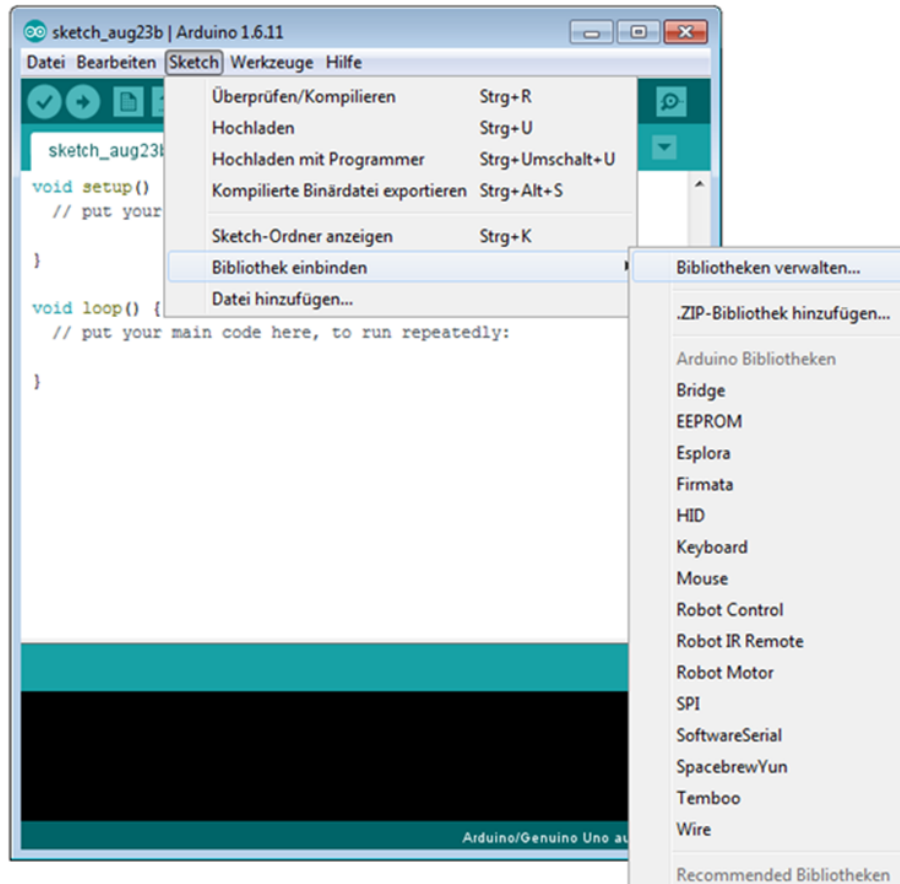
Arduino® Uno	16 x 2 LCD
GND	GND
5 V	VCC
SDA	SDA
SCL	SCL

Installation of the library

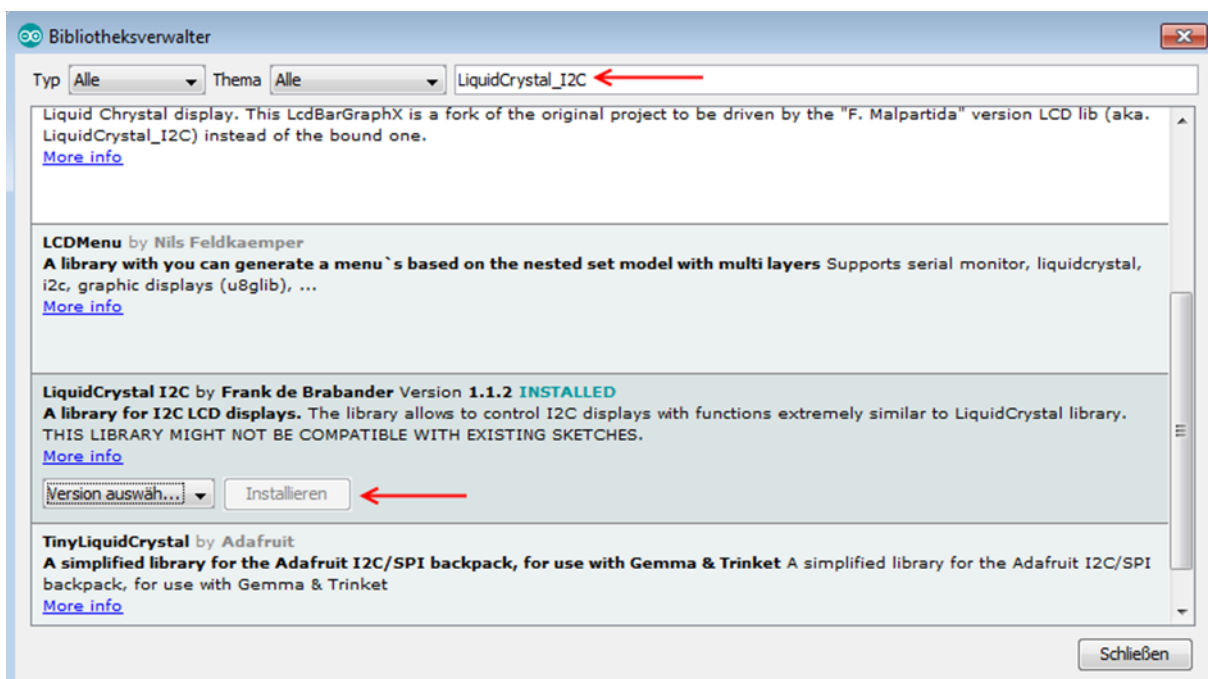
Before you can transfer the code example to your Arduino, you must install first the additional library **LiquidCrystal_I2C**.

This library allows you an easy and fast usage of the display.

Therefore, open the library manager on your Arduino software.



Search now in the library manager for the **LiquidCrystal_I2C** library and install it.



As soon as the library is installed, the installation of the display is finished. You can now transfer the code example which is described in the next step and test the display

Code example

In the following, you can use the code example to test the usage with your display. Copy this example completely on your Arduino.

Because of the different hardware addresses of the display, you must use in the code the right address.

Should your display do not the desired action within the first try, change the address in the prepared lines.

```
#include <Wire.h>
#include <LiquidCrystal_I2C.h>

//-----Hardware Adressierung-----
//Bei falscher Funktion bitte obere Zeile auskommentieren,
//und untere Zeile freigeben
LiquidCrystal_I2C lcd(0x27,16,2);
//LiquidCrystal_I2C lcd(0x3F,16,2);

void setup()
{
  lcd.init();
}

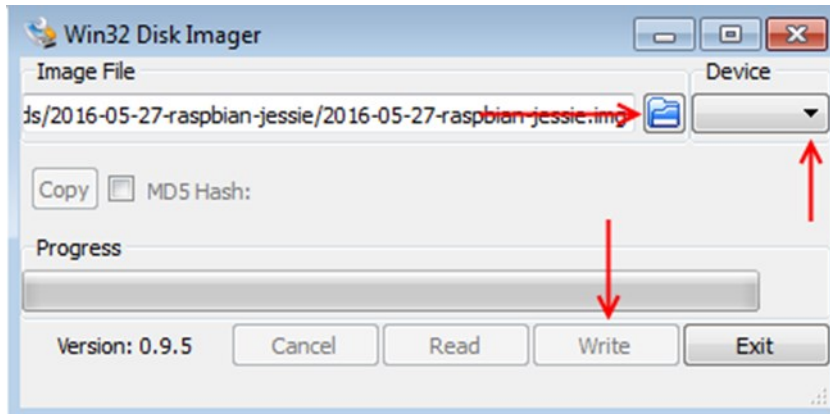
void loop()
{
  lcd.backlight();

  //Nachricht ausgeben
  lcd.setCursor(0,0);
  lcd.print("    joy-IT");
  lcd.setCursor(0,1);
  lcd.print(" I2C Serial LCD");
}
```

3. USAGE OF THE RASPBERRY PI

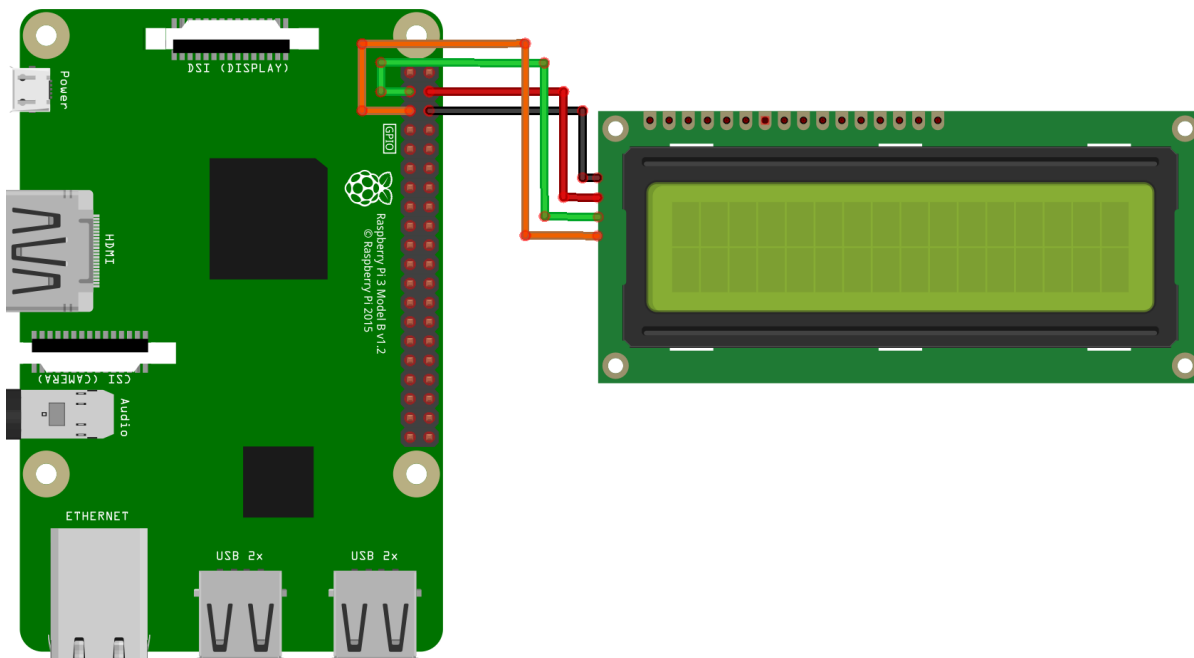
Installation of the software

Should you already have the latest Raspbian system on your Raspberry Pi, you can skip this step and you can continue with the next step. Install on your SD card the latest Raspbian with the help of the [Win32-Disk-Imager](#) which you can find with the following [link](#).



Connecting the display

Connect the display to the pins of your Raspberry Pi like shown in the picture or rather in the chart.



This picture was made in [Fritzing](#).

Raspberry Pi	16 x 2 LCD
Pin 6 (Ground)	GND
Pin 4 (5 V)	VCC
Pin 3 (BCM 2 / SDA)	SDA
Pin 5 (BCM 3 / SCL)	SCL

Installation of the libraries

As soon as the installation is finished and the system is restarted, open the terminal and perform the following commands:

```
sudo apt-get install python-pip python-dev build-essential
sudo pip install RPi.GPIO
sudo apt-get install python-imaging
sudo apt-get install python-smbus i2c-tools
```

If the I2C function is not activated on your Raspberry Pi, you must catch up on this in the settings.

Therefore, open the settings with the following command:

```
sudo raspi-config
```

In the window just opened choose the option ***Interfacing Options***.

```
Raspberry Pi Software Configuration Tool (raspi-config)
1 Change User Password      Change password for the current u
2 Network Options           Configure network settings
3 Boot Options              Configure options for start-up
4 Localisation Options      Set up language and regional sett
5 Interfacing Options       Configure connections to peripher
6 Overclock                 Configure overclocking for your P
7 Advanced Options         Configure advanced settings
8 Update                    Update this tool to the latest ve
9 About raspi-config        Information about this configurat

<Select>                    <Finish>
```

Choose and activate **I2C** here.

```
Raspberry Pi Software Configuration Tool (raspi-config)
A1 Overscan      You may need to configure overscan if black bars are present on display
A2 Hostname      Set the visible name for this Pi on a network
A3 Memory Split  Change the amount of memory made available to the GPU
A4 SSH           Enable/Disable remote command line access to your Pi using SSH
A5 SPI           Enable/Disable automatic loading of SPI kernel module (needed for e.g. PiFace)
A6 I2C           Enable/Disable automatic loading of I2C kernel module
A7 Serial        Enable/Disable shell and kernel messages on the serial connection
A8 Audio         Force audio out through HDMI or 3.5mm jack
A9 1-Wire        Enable/Disable one-wire interface
AA GPIO Server   Enable/Disable remote access to GPIO pins

<Select>                                <Back>
```

Afterwards, you must add the according entry into the module file. Therefore, open the module file:

```
sudo nano /etc/modules
```

Add the following two lines at the end of the file:

```
i2c-bcm2708
i2c-dev
```

Save the file with the key combination **CTRL + O** then. After that you can leave the editor with **CTRL+ X** . Restart your Raspberry Pi now with the following command:

```
sudo reboot
```

Now, you can download the LCD driver.

To allow you as fast and as easy beginning as possible, use the **Raspberry Pi LCD 4x20 I²C python driver** from **CaptainStouf**.

This was released by GNU General Public License v2.0 and can be opened [here](#).

As the first step, we create a new folder for the driver package and download it afterwards:

```
mkdir I2C-LCD && cd I2C-LCD
wget http://tutorials-raspberrypi.de/wp-content/uploads/scripts/hd44780_i2c.zip
unzip hd44780_i2c.zip
```

Now you must read the I2C address.

Please note that the display must be connected now.

```
sudo i2cdetect -y 1
```

The output will show the following:

```
    0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00:          -- -- -- -- -- -- -- -- -- -- -- -- -- --
10: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
20: -- -- -- -- -- -- -- 27 -- -- -- -- -- -- -- --
30: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
40: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
50: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
60: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
70: -- -- -- -- -- -- -- -- -- --
```

The just started test has recognized the I2C signal at the **address 27**. This is the standard address of the display. But it also can be found at another saving address. In such a case, you must change the saving address in the settings of the driver into your own address.

Therefore, open the driver file with the following command:

```
sudo nano lcddriver.py
```

In the line with **ADDRESS=0x27**, you must change **27** to your own saving address which is shown in the I2C test. Afterwards, you can leave the editor with the frequently used key combination.

Communication with the display

The installation of the display is now finished. As the last step, you can create a new file to test the display and put it into operation.

```
sudo nano LCD.py
```

Enter now the following code example.

The text within the command **lcd lcd_display_string** will be shown on the display.

The number behind the text issues the line in which the text will be shown in.

The text can be of course modified following your desires. The editor can be left with the fundamental key combination.

```
import lcddriver
from time import *

lcd = lcddriver.lcd()
lcd.lcd_clear()

lcd.lcd_display_string("    joy-IT", 1)
lcd.lcd_display_string(" I2C Serial LCD", 2)
```

Start the code example with the following command:

```
sudo python LCD.py
```


4. OTHER INFORMATION

Our Information and Take-back Obligations according to the Electrical and Electronic Equipment Act (ElektroG)



Symbol on Electrical and Electronic Products:

This crossed-out bin means that electrical and electronic products do **not** belong into the household waste. You must hand over your old appliance to a registration place. Before you can hand over the old appliance, you must remove used batteries and replacement batteries which are not enclosed by the device.

Return Options:

As the end user, you can hand over your old appliance (which has essentially the same functions as the new one bought with us) free of charge for disposal with the purchase of a new device. Small devices, which do not have outer dimensions bigger than 25 cm can be handed in for disposal independently of the purchase of a new product in normal household quantities.

1. Possibility of return at our company location during our opening hours

SIMAC Electronics GmbH, Pascalstr. 8, D-47506 Neukirchen-Vluyn

2. Possibility of return nearby

We will send you a parcel stamp with which you can send us your old appliance free of charge. For this possibility, please contact us via e-mail at service@joy-it.net or via telephone.

Information about Package:

Please package your old appliance safe for transport. Should you not have suitable packaging material or you do not want to use your own material, you can contact us and we will send you an appropriate package.

5. SUPPORT

If any questions remained open or problems may arise after your purchase, we are available by e-mail, telephone and ticket support system to answer these.

E-Mail: service@joy-it.net

Ticket-system: <http://support.joy-it.net>

Telephone: +49 (0)2845 98469 – 66 (10 - 17 o'clock)

For further information visit our website:

www.joy-it.net