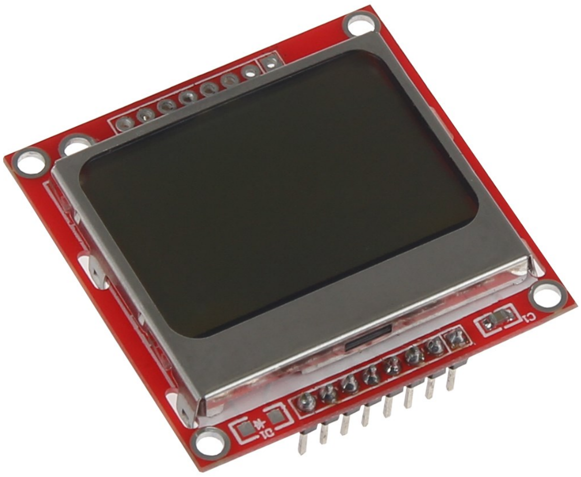
JOY-IT



84x48 LCD Display

Index

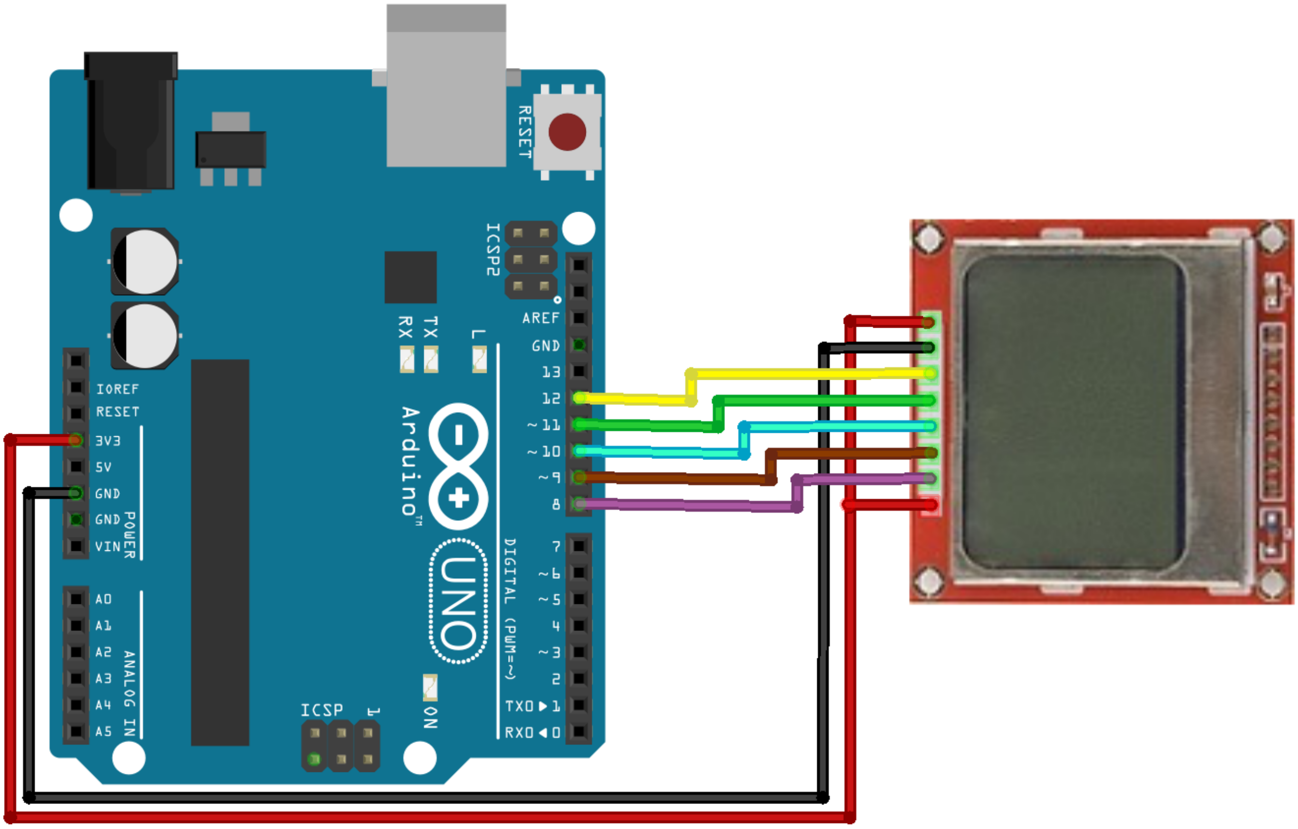
Dear customer,

thank you for purchasing our product.
Please find our instructions below:

1. Verwendung mit einem Arduino

1.1 Anschließen des Dispalys

Connect the LCD module to your Arduino as shown in the figure below.
Alternatively, you can also use the table on the following page.



2.2 Pin assignment

LCD Module 84x84	Arduino Uno
8-LED	3.3V
7-SCLK	8
6-DN <MOSI>	9
5-D/C	10
4-RST	11
3-SCE	12
2-GND	GND
1-VCC	3.3V

1.2 Code example

With the following code example, you can use the LCD module.
Please transfer the example completely to your Arduino.
In the void loop() function you can use LCDString to display the text you want.

```
//Pin Assignment
#define PIN_SCE 12
#define PIN_RESET 11
#define PIN_DC 10
#define PIN_SDIN 9
#define PIN_SCLK 8
#define LCD_COMMAND 0
#define LCD_DATA 1
//Setting the screen size (84x48 Pixel)
#define LCD_X 84
#define LCD_Y 48

//Hexadecimal values for pixel assignment
static const byte ASCII[][5] = {
{0x00, 0x00, 0x00, 0x00, 0x00} // 20  ,
{0x00, 0x00, 0x5f, 0x00, 0x00} // 21 ! ,
{0x00, 0x07, 0x00, 0x07, 0x00} // 22 " ,
{0x14, 0x7f, 0x14, 0x7f, 0x14} // 23 # ,
{0x24, 0x2a, 0x7f, 0x2a, 0x12} // 24 $ ,
{0x23, 0x13, 0x08, 0x64, 0x62} // 25 % ,
{0x36, 0x49, 0x55, 0x22, 0x50} // 26 & ,
{0x00, 0x05, 0x03, 0x00, 0x00} // 27 ' ,
{0x00, 0x1c, 0x22, 0x41, 0x00} // 28 ( ,
{0x00, 0x41, 0x22, 0x1c, 0x00} // 29 ) ,
{0x14, 0x08, 0x3e, 0x08, 0x14} // 2a * ,
{0x08, 0x08, 0x3e, 0x08, 0x08} // 2b + ,
{0x00, 0x50, 0x30, 0x00, 0x00} // 2c , ,
{0x08, 0x08, 0x08, 0x08, 0x08} // 2d - ,
{0x00, 0x60, 0x60, 0x00, 0x00} // 2e . ,
{0x20, 0x10, 0x08, 0x04, 0x02} // 2f / ,
{0x3e, 0x51, 0x49, 0x45, 0x3e} // 30 0 ,
{0x00, 0x42, 0x7f, 0x40, 0x00} // 31 1 ,
{0x42, 0x61, 0x51, 0x49, 0x46} // 32 2 ,
{0x21, 0x41, 0x45, 0x4b, 0x31} // 33 3 ,
{0x18, 0x14, 0x12, 0x7f, 0x10} // 34 4 ,
{0x27, 0x45, 0x45, 0x45, 0x39} // 35 5 ,
{0x3c, 0x4a, 0x49, 0x49, 0x30} // 36 6 ,
{0x01, 0x71, 0x09, 0x05, 0x03} // 37 7 ,
{0x36, 0x49, 0x49, 0x49, 0x36} // 38 8 ,
{0x06, 0x49, 0x49, 0x29, 0x1e} // 39 9 ,
{0x00, 0x36, 0x36, 0x00, 0x00} // 3a : ,
{0x00, 0x56, 0x36, 0x00, 0x00} // 3b ; ,
{0x08, 0x14, 0x22, 0x41, 0x00} // 3c < ,
{0x14, 0x14, 0x14, 0x14, 0x14} // 3d = ,
{0x00, 0x41, 0x22, 0x14, 0x08} // 3e > ,
{0x02, 0x01, 0x51, 0x09, 0x06} // 3f ? ,
{0x32, 0x49, 0x79, 0x41, 0x3e} // 40 @ ,
{0x7e, 0x11, 0x11, 0x11, 0x7e} // 41 A ,
{0x7f, 0x49, 0x49, 0x49, 0x36} // 42 B ,
{0x3e, 0x41, 0x41, 0x41, 0x22} // 43 C ,
{0x7f, 0x41, 0x41, 0x22, 0x1c} // 44 D ,
{0x7f, 0x49, 0x49, 0x49, 0x41} // 45 E ,
{0x7f, 0x09, 0x09, 0x09, 0x01} // 46 F ,
{0x3e, 0x41, 0x49, 0x49, 0x7a} // 47 G ,
{0x7f, 0x08, 0x08, 0x08, 0x7f} // 48 H ,
{0x00, 0x41, 0x7f, 0x41, 0x00} // 49 I ,
{0x20, 0x40, 0x41, 0x3f, 0x01} // 4a J ,
{0x7f, 0x08, 0x14, 0x22, 0x41} // 4b K ,
{0x7f, 0x40, 0x40, 0x40, 0x40} // 4c L ,
{0x7f, 0x02, 0x0c, 0x02, 0x7f} // 4d M ,
{0x7f, 0x04, 0x08, 0x10, 0x7f} // 4e N ,
{0x3e, 0x41, 0x41, 0x41, 0x3e} // 4f O ,
{0x7f, 0x09, 0x09, 0x09, 0x06} // 50 P ,
{0x3e, 0x41, 0x51, 0x21, 0x5e} // 51 Q ,
{0x7f, 0x09, 0x19, 0x29, 0x46} // 52 R ,
{0x46, 0x49, 0x49, 0x49, 0x31} // 53 S ,
{0x01, 0x01, 0x7f, 0x01, 0x01} // 54 T ,
{0x3f, 0x40, 0x40, 0x40, 0x3f} // 55 U ,
{0x1f, 0x20, 0x40, 0x20, 0x1f} // 56 V ,
{0x3f, 0x40, 0x38, 0x40, 0x3f} // 57 W ,
{0x63, 0x14, 0x08, 0x14, 0x63} // 58 X ,
{0x07, 0x08, 0x70, 0x08, 0x07} // 59 Y ,
{0x61, 0x51, 0x49, 0x45, 0x43} // 5a Z ,
{0x00, 0x7f, 0x41, 0x41, 0x00} // 5b [ ,
{0x02, 0x04, 0x08, 0x10, 0x20} // 5c BACKSLASH ,
{0x00, 0x41, 0x41, 0x7f, 0x00} // 5d ] ,
{0x04, 0x02, 0x01, 0x02, 0x04} // 5e ^ ,
{0x40, 0x40, 0x40, 0x40, 0x40} // 5f _ ,
{0x00, 0x01, 0x02, 0x04, 0x00} // 60 ` ,
{0x20, 0x54, 0x54, 0x54, 0x78} // 61 a ,
{0x7f, 0x48, 0x44, 0x44, 0x38} // 62 b ,
{0x38, 0x44, 0x44, 0x44, 0x20} // 63 c ,
{0x38, 0x44, 0x44, 0x48, 0x7f} // 64 d ,
{0x38, 0x54, 0x54, 0x54, 0x18} // 65 e ,
{0x08, 0x7e, 0x09, 0x01, 0x02} // 66 f ,
{0x0c, 0x52, 0x52, 0x52, 0x3e} // 67 g ,
{0x7f, 0x08, 0x04, 0x04, 0x78} // 68 h ,
{0x00, 0x44, 0x7d, 0x40, 0x00} // 69 i ,
{0x20, 0x40, 0x44, 0x3d, 0x00} // 6a j ,
{0x7f, 0x10, 0x28, 0x44, 0x00} // 6b k ,
{0x00, 0x41, 0x7f, 0x40, 0x00} // 6c l ,
{0x7c, 0x04, 0x18, 0x04, 0x78} // 6d m ,
{0x7c, 0x08, 0x04, 0x04, 0x78} // 6e n ,
{0x38, 0x44, 0x44, 0x44, 0x38} // 6f o ,
{0x7c, 0x14, 0x14, 0x14, 0x08} // 70 p ,
{0x08, 0x14, 0x14, 0x18, 0x7c} // 71 q ,
{0x7c, 0x08, 0x04, 0x04, 0x08} // 72 r ,
{0x48, 0x54, 0x54, 0x54, 0x20} // 73 s ,
{0x04, 0x3f, 0x44, 0x40, 0x20} // 74 t ,
{0x3c, 0x40, 0x40, 0x20, 0x7c} // 75 u ,
{0x1c, 0x20, 0x40, 0x20, 0x1c} // 76 v ,
{0x3c, 0x40, 0x30, 0x40, 0x3c} // 77 w ,
{0x44, 0x28, 0x10, 0x28, 0x44} // 78 x ,
{0x0c, 0x50, 0x50, 0x50, 0x3c} // 79 y ,
{0x44, 0x64, 0x54, 0x4c, 0x44} // 7a z ,
{0x00, 0x08, 0x36, 0x41, 0x00} // 7b { ,
{0x00, 0x00, 0x7f, 0x00, 0x00} // 7c | ,
{0x00, 0x41, 0x36, 0x08, 0x00} // 7d } ,
{0x10, 0x08, 0x08, 0x10, 0x08} // 7e ~ ,
{0x78, 0x46, 0x41, 0x46, 0x78} // 7f DEL
};
//Initialise the display
void setup() {
LCDInit();
}
void loop() {
LCDClear();
LCDString("joy-IT ");
LCDString("84x48");
LCDString(" LED-Modul");
delay(1000);
}
```

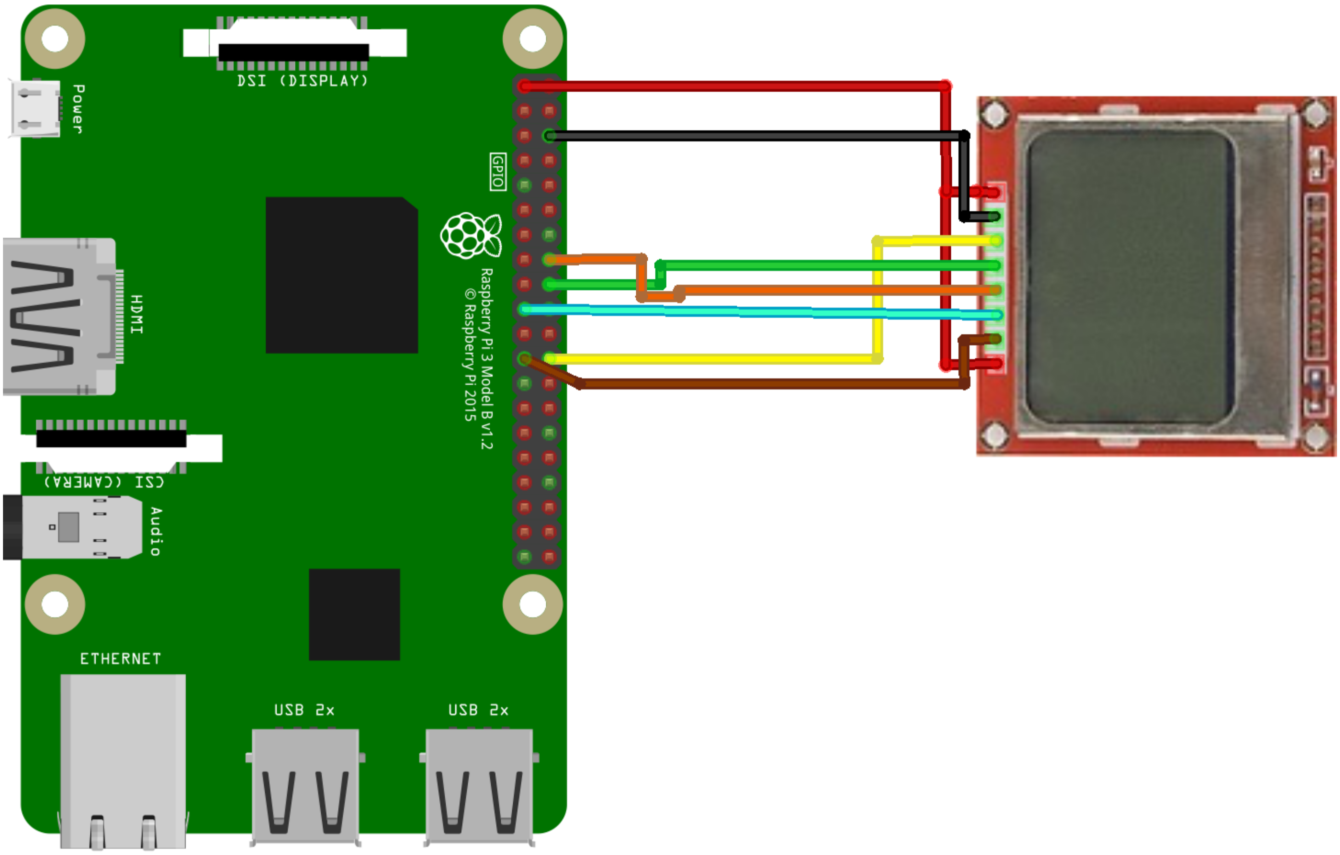
```
//move pointer to position
void positionXY(int x, int y) {
LCDWrite(0, 0x80 | x);
LCDWrite(0, 0x40 | y);
}
//pick single char and search for matching value
void LCDCharacter(char character) {
LCDWrite(LCD_DATA, 0x00);
for (int index = 0 ; index < 5 ; index++)
{
LCDWrite(LCD_DATA, ASCII[character - 0x20][index]);
}
LCDWrite(LCD_DATA, 0x00);
}

void LCDString(char *characters) {
while (*characters)
{
LCDCharacter(*characters++);
}
}
//reset display
void LCDClear() {
for (int index = 0 ; index < (LCD_X * LCD_Y / 8) ; index++)
{
LCDWrite(LCD_DATA, 0x00);
}
positionXY(0, 0);
}
//initialise display
void LCDInit() {
pinMode(PIN_SCE, OUTPUT);
pinMode(PIN_RESET, OUTPUT);
pinMode(PIN_DC, OUTPUT);
pinMode(PIN_SDIN, OUTPUT);
pinMode(PIN_SCLK, OUTPUT);
digitalWrite(PIN_RESET, LOW);
digitalWrite(PIN_RESET, HIGH);
LCDWrite(LCD_COMMAND, 0x21);
LCDWrite(LCD_COMMAND, 0xB0);
LCDWrite(LCD_COMMAND, 0x04);
LCDWrite(LCD_COMMAND, 0x14);
LCDWrite(LCD_COMMAND, 0x20);
LCDWrite(LCD_COMMAND, 0x0C);
}
void LCDWrite(byte data_or_command, byte data) {
digitalWrite(PIN_DC, data_or_command);
digitalWrite(PIN_SCE, LOW);
shiftOut(PIN_SDIN, PIN_SCLK, MSBFIRST, data);
digitalWrite(PIN_SCE, HIGH);
}
```

2. Usage with a Raspberry Pi

2.1 Connecting the display

Connect the LCD module to your Raspberry Pi as shown in the figure below.
Alternatively, you can also use the table on the following page.



2.2 Pin assignment

LCD Module 84x84	Raspberry Pi
8-LED	Pin 1 (3.3V)
7-SCLK	Pin 23 (BCM 11 / SCLK)
6-DN <MOSI>	Pin 19 (MCM 10 / MOSI)
5-D/C	Pin 16 (BCM 23)
4-RST	Pin 18 (BCM 24)
3-SCE	Pin 24 (BCM 8)
2-GND	Pin 6 (GND)
1-VCC	Pin 1 (3.3V)

2. 3 Installation of the operating system

If you are already using a current Raspbian system on your Raspberry, you can skip this step and proceed immediately to step 3.

Install the latest version of the Raspbian system , which you can download here, with the help of the „Win32 Disk Imager“-program.

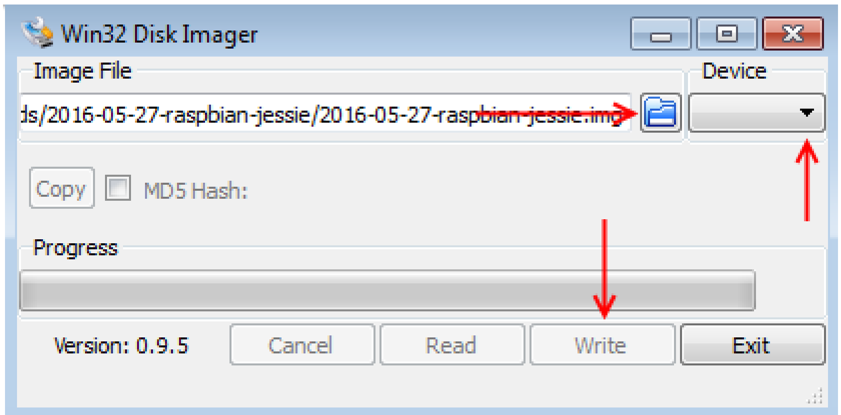


Image File: ds/2016-05-27-raspbian-jessie/2016-05-27-raspbian-jessie.img

2. 4 Installation of the libraries

In order to allow you to install the libraries as quickly and easily as possible, we use a library from **Adafruit** , which was published under the MIT license.

Open the terminal console and run the following commands:

```
sudo apt-get install git
git clone https://github.com/adafruit/Adafruit_Nokia_LCD.git
cd Adafruit_Nokia_LCD
sudo python setup.py install
```

2. 5 Using the code examples

The display installation is now complete. Open the Examples folder and try one of the examples. Of course you can also edit the examples according to your wishes and ideas.

```
sudo python animate.py
```

```
sudo python image.py
```

```
sudo python shapes.py
```

3. Support

We also support you after your purchase. If there are any questions left or if you encounter any problems please feel free to contact us by mail, phone or by our ticket-support-system on our website.

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