

# Grove - LCD RGB Backlight

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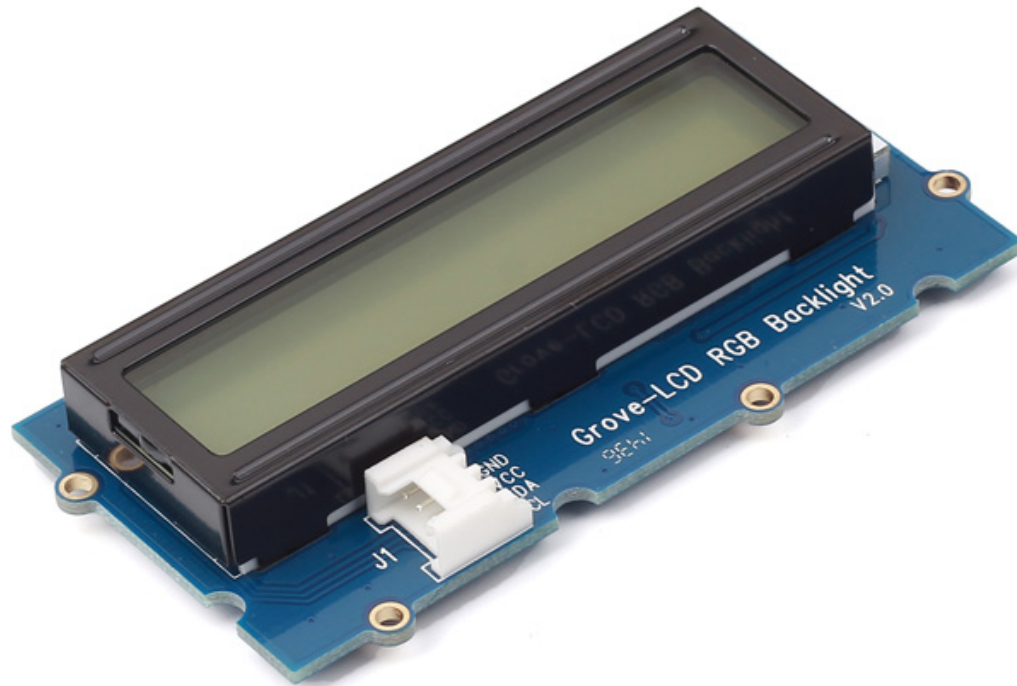
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Done with tedious mono color backlight? This Grove enables you to set the color to whatever you like via the simple and concise Grove interface. It takes I2C as communication method with your microcontroller. So number of pins required for data exchange and backlight control shrinks from ~10 to 2, relieving IOs for other challenging tasks. Besides, Grove - LCD RGB Backlight supports user-defined characters. Want to get a love heart or some other foreign characters? Just take advantage of this feature and design it! This product is a replacement of

Grove - Serial LCD. If you are looking for primitive 16x2 LCD modules, we have green yellow backlight version and blue backlight version on sale also.



**Note**

This document works for Grove-LCD RGB Backlight Version 1.0, 2.0 and 4.0.

## Version

Product Version	Changes	Released Date
Grove-LCD RGB Backlight V1.0	Initial	June 2012
Grove-LCD RGB Backlight V2.0	Optimize PCB layout	Nov 2013
Grove-LCD RGB Backlight V4.0	Optimize PCB layout	Sep 2016

## Features

- RGB Backlight
- I2C communication
- Built-in English fonts

- 16x2 LCD

**Tip**

More details about Grove modules please refer to [Grove System](#)

## Specification

Item	Value
Input Voltage	5V
Operating Current	<60mA
CGROM	10880 bit
CGRAM	64x8 bit
LCD I2C Address	0X3E
RGB I2C Address	0X62

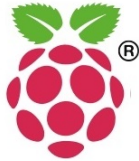
**Note**

There are 4 I2C addresses and we use 2 I2C addresses for LCD and RGB.

## Platforms Supported

Arduino

Raspberry Pi





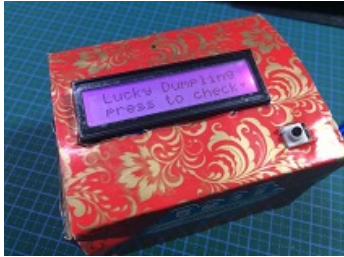
#### Caution




The platforms mentioned above as supported is/are an indication of the module's software or theoretical compatibility. We only provide software library or code examples for Arduino platform in most cases. It is not possible to provide software library / demo code for all possible MCU platforms. Hence, users have to write their own software library.

## Application Ideas

- Human Machine Interface
- Smart House
- Sensor Hub

Here are some projects for your reference.

Edison Wi-Fi Address	WiFi Enabled Greenhouse	Grove Lucky Dumping
		
<p>Make it Now!</p>	<p>Make it Now!</p>	<p>Make it Now!</p>

Toothbrushing Instructor	LinkIt ONE Pager	LinkIt ONE IoT Demo
		
<p>Make it Now!</p>	<p>Make it Now!</p>	<p>Make it Now!</p>

Getting Started




**Note**

If this is the first time you work with Arduino, we firmly recommend you to see [Getting Started with Arduino](#) before the start.

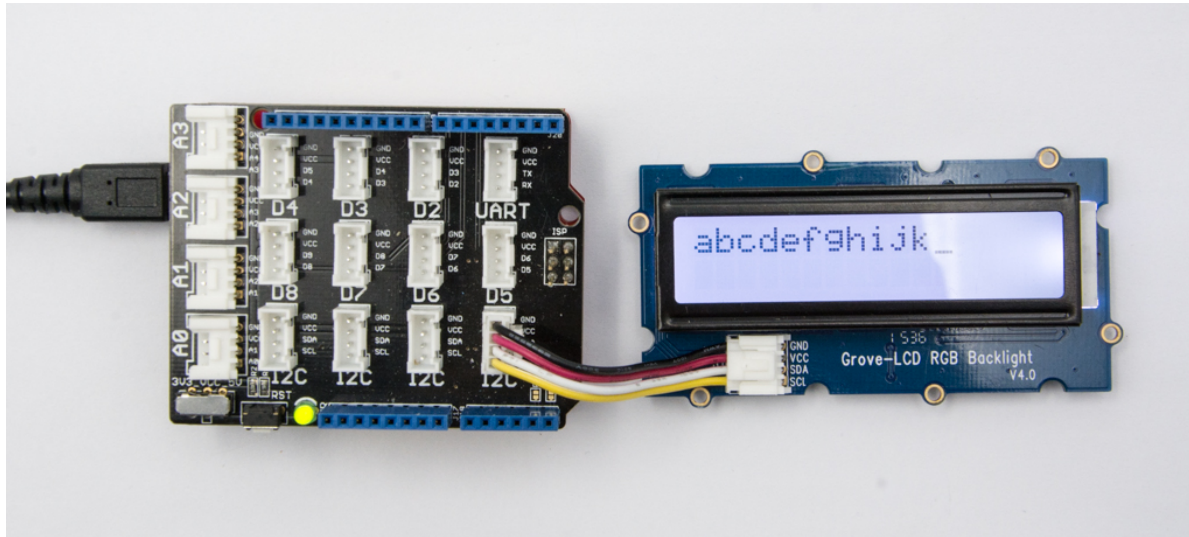
## Play With Arduino

### Hardware

- **Step 1.** Prepare the below stuffs:

Seeeduino V4.2	Base Shield	Grove-LCD RGB Backlight
		
<a href="#">Get One Now</a>	<a href="#">Get One Now</a>	<a href="#">Get One Now</a>

- **Step 2.** Connect Grove-LCD RGB Backlight to **I2C** port of Grove-Base Shield.
- **Step 3.** Plug Grove - Base Shield into Seeeduino.
- **Step 4.** Connect Seeeduino to PC via a USB cable.



**Note**

If we don't have Grove Base Shield, We also can directly connect Grove-LCD RGB Backlight to Seeduino as below.

Seeduino	Grove-LCD RGB Backlight
5V	Red
GND	Black
SDA	White
SCL	Yellow



## Software

- **Step 1.** Download the [Grove-LCD RGB Backlight Library](#) from Github.
- **Step 2.** Refer [How to install library](#) to install library for Arduino.
- **Step 3.** Here are 12 examples in the library as below.
  - Autoscroll
  - Blink
  - Cursor
  - CustomCharacter
  - Display
  - fade
  - HelloWorld
  - Scroll
  - SerialDisplay
  - setColor
  - setCursor
  - TextDirection
- **Step 4.** Please follow below picture to select example **HelloWorld** and upload the arduino. If you do not know how to upload the code, please check [how to upload code](#).

HelloWorld | Arduino 1.8.5

File Edit Sketch Tools Help

The screenshot shows the Arduino IDE interface with the 'File' menu open. The 'Examples' submenu is also open, displaying a list of example sketches. The 'HelloWorld' example is highlighted in blue. The background of the IDE shows a code editor with some text, including a license notice and a code snippet starting with `#include <Wire.h>`.

File Menu Item	Shortcut	Submenu Item	Submenu Item
New	Ctrl+N	Bridge	
Open...	Ctrl+O	ChainableLED-master	
Open Recent		CircularLED	
Sketchbook		DHT sensor library	
Examples		Ethernet	
Close	Ctrl+W	Ethernet2	
Save	Ctrl+S	Ethernet_Shield_W5200-master	
Save As...	Ctrl+Shift+S	Firmata	/or
Page Setup	Ctrl+Shift+P	Grove - LCD RGB Backlight	
Print	Ctrl+P	Grove_I2C_Motor_Driver_v1_3-master	er
Preferences	Ctrl+Comma	Grove_LCD_RGB_Backlight-master	Autoscroll
Quit	Ctrl+Q	Grove_LED_Bar	Blink
		Grove_Ultrasonic_Ranger-master	Cursor
		LiquidCrystal	CustomCharacter
		mcp_can	Display
		Mutichannel_Gas_Sensor-master	fade
		OLED_Display_96X96-master	HelloWorld
		OTAA-LoRaWAN-Seeed-master	Scroll
		respeaker_arduino_library-master	SerialDisplay
		SD	setColor
		Seeeduino_LoRaWAN_for_hybrid_gateways-master	setCursor
		SparkFun MiniMoto	TextDirection

Here is the code of HelloWorld.ino.

```
1  #include <Wire.h>
2  #include "rgb_lcd.h"
3
4  rgb_lcd lcd;
5
6  const int colorR = 255;
7  const int colorG = 0;
8  const int colorB = 0;
9
10 void setup()
11 {
12     // set up the LCD's number of columns and rows:
13     lcd.begin(16, 2);
14
15     lcd.setRGB(colorR, colorG, colorB);
16
17     // Print a message to the LCD.
18     lcd.print("hello, world!");
19
20     delay(1000);
21 }
22
23 void loop()
24 {
25     // set the cursor to column 0, line 1
26     // (note: line 1 is the second row, since counting begins with 0):
27     lcd.setCursor(0, 1);
28     // print the number of seconds since reset:
29     lcd.print(millis()/1000);
30
31     delay(100);
32 }
```

- **Step 4.** We will see the hello world on LCD.

## Play with Codecraft

### Hardware

**Step 1.** Using a Grove cable connect Grove - LCD RGB Backlight to Seeeduno's I2C port. If you are using Arduino, please take advantage of a Base Shield.

**Step 2.** Link Seeeduno/Arduino to your PC via an USB cable.

### Software

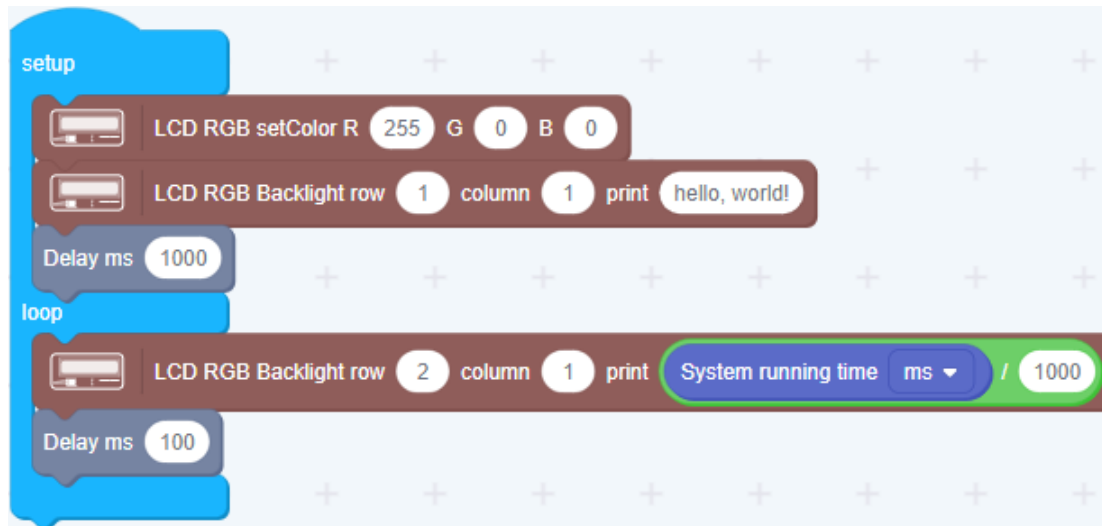
**Step 1.** Open [Codecraft](#), add Arduino support, and drag a main procedure to working area.



#### Note

If this is your first time using Codecraft, see also [Guide for Codecraft using Arduino](#).

**Step 2.** Drag blocks as picture below or open the cdc file which can be downloaded at the end of this page.



Upload the program to your Arduino/Seeeduino.






**Success**

When the code finishes uploaded, you will see "hello, world!" and system running time displayed in the LCD.

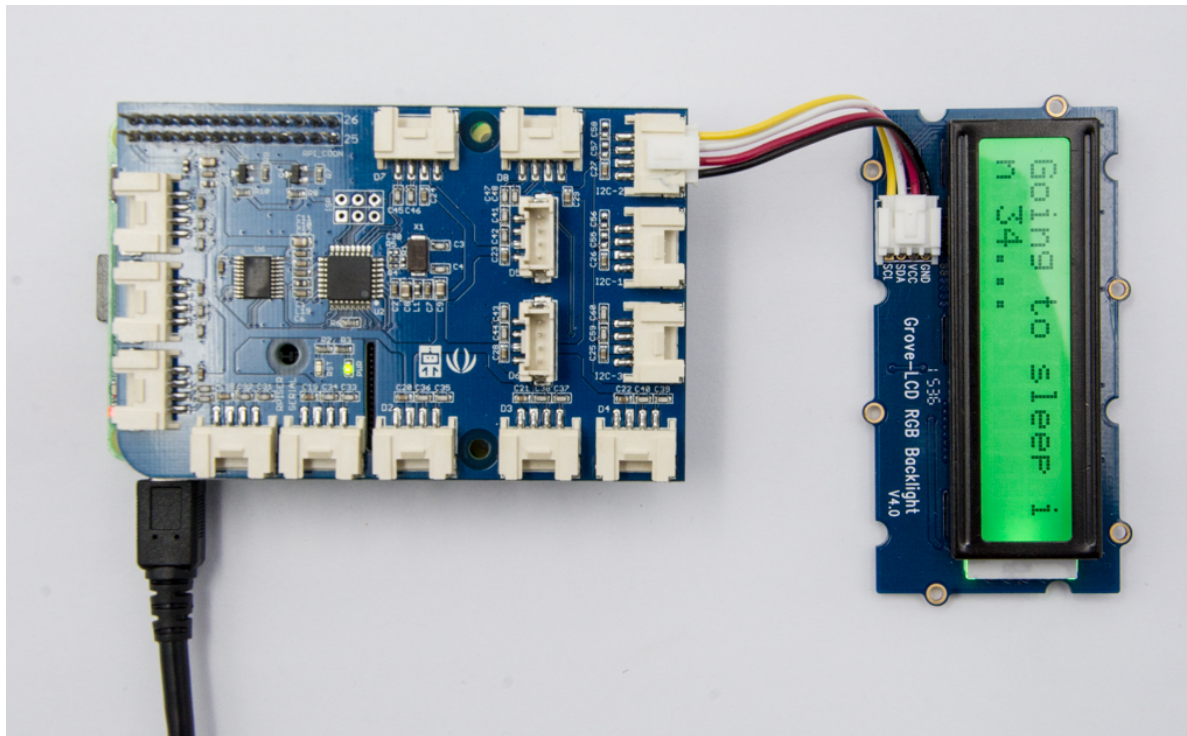
## Play With Raspberry Pi

### Hardware

- **Step 1.** Prepare the below stuffs:

Raspberry pi	GrovePi_Plus	Grove-LCD RGB Backlight
		
<a href="#">Get One Now</a>	<a href="#">Get One Now</a>	<a href="#">Get One Now</a>

- **Step 2.** Plug the GrovePi\_Plus into Raspberry.
- **Step 3.** Connect Grove-LCD RGB Backlight to **I2C** port of GrovePi\_Plus.
- **Step 4.** Connect the Raspberry to PC through USB cable.



## Software

- **Step 1.** Follow [Setting Software](#) to configure the development environment.
- **Step 2.** Git clone the Github repository.

```
1 cd ~  
2 git clone https://github.com/DexterInd/GrovePi.git
```

- **Step 3.** Excute below commands to use the Grove-LCD RGB Backlight to display.

```
1 cd ~/GrovePi/Software/Python/grove_rgb_lcd
2 python grove_rgb_lcd.py
```

Here is the grove\_rgb\_lcd.py code.

```
1 import time,sys
2
3 if sys.platform == 'uwp':
4     import winrt_smbus as smbus
5     bus = smbus.SMBus(1)
6 else:
7     import smbus
8     import RPi.GPIO as GPIO
9     rev = GPIO.RPI_REVISION
10    if rev == 2 or rev == 3:
11        bus = smbus.SMBus(1)
12    else:
13        bus = smbus.SMBus(0)
14
15 # this device has two I2C addresses
16 DISPLAY_RGB_ADDR = 0x62
17 DISPLAY_TEXT_ADDR = 0x3e
18
19 # set backlight to (R,G,B) (values from 0..255 for each)
20 def setRGB(r,g,b):
21     bus.write_byte_data(DISPLAY_RGB_ADDR,0,0)
22     bus.write_byte_data(DISPLAY_RGB_ADDR,1,0)
23     bus.write_byte_data(DISPLAY_RGB_ADDR,0x08,0xaa)
24     bus.write_byte_data(DISPLAY_RGB_ADDR,4,r)
25     bus.write_byte_data(DISPLAY_RGB_ADDR,3,g)
26     bus.write_byte_data(DISPLAY_RGB_ADDR,2,b)
27
```



```
28 # send command to display (no need for external use)
29 def textCommand(cmd):
30     bus.write_byte_data(DISPLAY_TEXT_ADDR, 0x80, cmd)
31
32 # set display text \n for second line(or auto wrap)
33 def setText(text):
34     textCommand(0x01) # clear display
35     time.sleep(.05)
36     textCommand(0x08 | 0x04) # display on, no cursor
37     textCommand(0x28) # 2 lines
38     time.sleep(.05)
39     count = 0
40     row = 0
41     for c in text:
42         if c == '\n' or count == 16:
43             count = 0
44             row += 1
45             if row == 2:
46                 break
47             textCommand(0xc0)
48             if c == '\n':
49                 continue
50             count += 1
51             bus.write_byte_data(DISPLAY_TEXT_ADDR, 0x40, ord(c))
52
53 #Update the display without erasing the display
54 def setText_norefresh(text):
55     textCommand(0x02) # return home
56     time.sleep(.05)
57     textCommand(0x08 | 0x04) # display on, no cursor
58     textCommand(0x28) # 2 lines
59     time.sleep(.05)
60     count = 0
61     row = 0
62     while len(text) < 32: #clears the rest of the screen
```

```

63     text += ' '
64     for c in text:
65         if c == '\n' or count == 16:
66             count = 0
67             row += 1
68             if row == 2:
69                 break
70             textCommand(0xc0)
71             if c == '\n':
72                 continue
73             count += 1
74             bus.write_byte_data(DISPLAY_TEXT_ADDR, 0x40, ord(c))
75
76 # example code
77 if __name__ == "__main__":
78     setText("Hello world\nThis is an LCD test")
79     setRGB(0,128,64)
80     time.sleep(2)
81     for c in range(0,255):
82         setText_norefresh("Going to sleep in {}...".format(str(c)))
83         setRGB(c,255-c,0)
84         time.sleep(0.1)
85     setRGB(0,255,0)
86     setText("Bye bye, this should wrap onto next line")

```

- **Step 4.** We will see the Grove-LCD RGB Backlight display as Going to sleep in 1...

## FAQ

- Q1: How to use multiple Grove-LCD RGB Backlight?
  - A1: Please refer to [Arduino Software I2C user guide](#).

- Q2: How to use button to switch Grove RGB LCD to display different pages?

- A2: Here is the code.

```
1  #include <Wire.h>
2  #include "rgb_lcd.h"
3
4  rgb_lcd lcd;
5  const int switchPin = 2;
6  static int hits = 0;
7  int switchState = 0;
8  int prevSwitchState = 0;
9
10 void setup() {
11     lcd.begin(16, 2);
12     pinMode(switchPin, INPUT);
13     Serial.begin(9600);
14     lcd.setCursor(0, 0);
15     lcd.print("Page 1");
16 }
17
18 void loop() {
19     switchState = digitalRead(switchPin);
20     Serial.print("switchState:"); Serial.println(switchState);
21     if (switchState != prevSwitchState) {
22         if (switchState == HIGH) {
23             hits = hits + 1;
24             delay(10);
25         }
26     }
27
28     Serial.print("hits:"); Serial.println(hits);
29     if(hits==1)
30     {
```

```
31   Serial.println("Page 1");
32   lcd.clear();
33   lcd.setCursor(0, 0);
34   lcd.print("Page 1");
35   }else
36   if(hits==2)
37   {
38     Serial.println("Page 2");
39     lcd.clear();
40     lcd.setCursor(0, 0);
41     lcd.print("Page 2");
42   }else
43
44   if(hits==3)
45   {
46     Serial.println("Page 3");
47     lcd.clear();
48     lcd.setCursor(0, 0);
49     lcd.print("Page 3");
50   }else
51
52   if ( hits>=4)
53   {
54     hits = 0;
55     Serial.println("couter is reset");
56     Serial.println("Page 1");
57     lcd.clear();
58     lcd.setCursor(0, 0);
59     lcd.print("Page 1");
60   }
61   delay(500);
62 }
```

## Resources

- **[Library]** [Software Library](#)
- **[Document]** [Github page for this document](#)
- **[Codecraft]** [CDC File](#)
- **[Datasheet]** [PCA9633](#)
- **[Datasheet]** [JHD1313](#)





## Tech Support

Please submit any technical issue into our [forum](#).