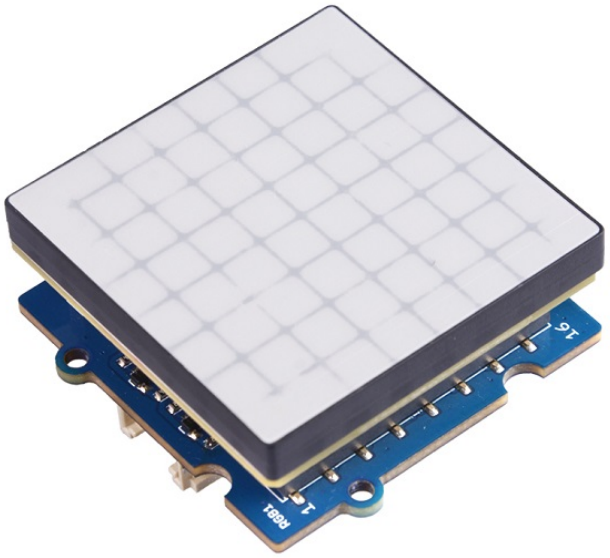
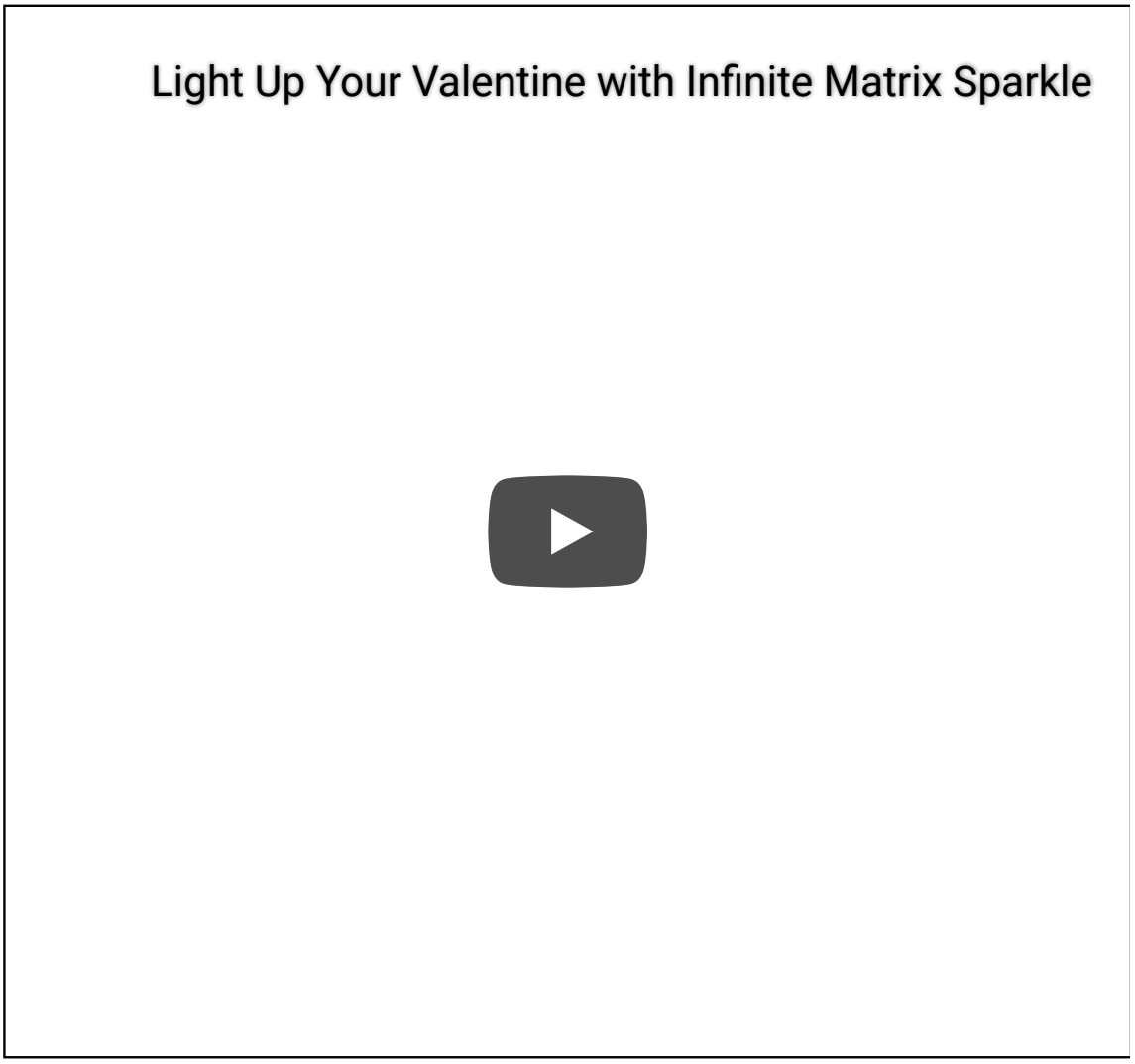
Grove - RGB LED Matrix w/Driver



8x8 RGB LED Matrix is awesome for simple image display, 64 pixel leds and 255 colors for each pixel means almost infinite possibilities. However, the complicated wiring of the matrix is daunting. Now we present the Grove - RGB LED Matrix w/Driver for you, leave all the complex and variable wireing and soldering

behind, just one single grove connector to control the RGB 8x8 LED matrix easily. Amazing? Try it yourself and you will love it.



Get One Now

[https://www.seeedstudio.com/grove-rgb-led-matrix-w-driver.html]

Version

Product Version	Changes	Released Date
Grove - RGB LED Stick (10 WS2813 Mini)	Initial	Dec 2018

Features

- 8x8 pixel, **RGB** 255 colors
- Build-in MCU
- ±1%(typ.) LED Current accuracy between channels
- Support for displaying custom images

Specification

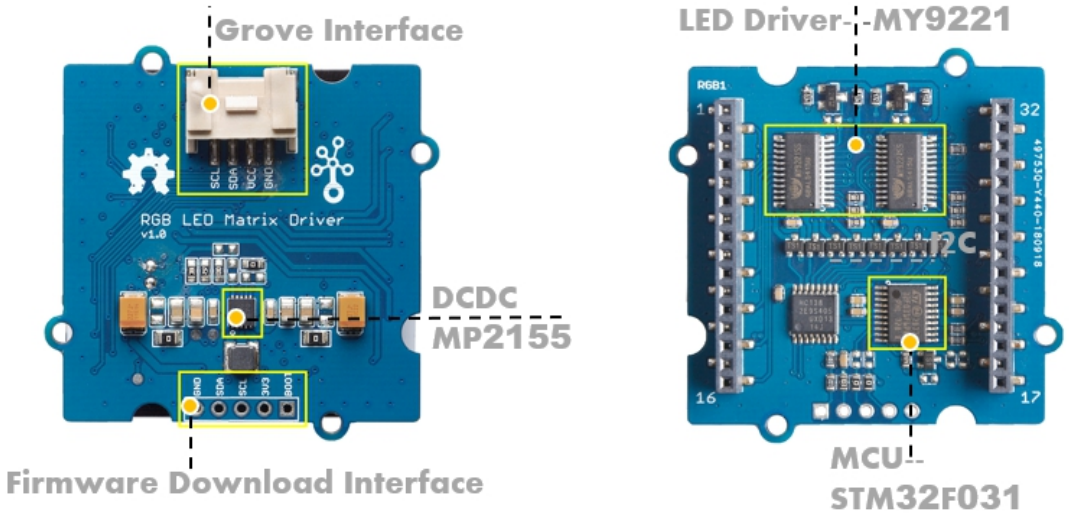
Item	Value
Operating Voltage	3.3V / 5V
Operating Temperature	-40℃ ~ +85℃
Interface	I2C
I2C Address	0x65
size	L: 40mm W: 40mm H: 21mm
Weight	17.3g
Package size	L: 120mm W: 100mm H: 33mm
Gross Weight	28g

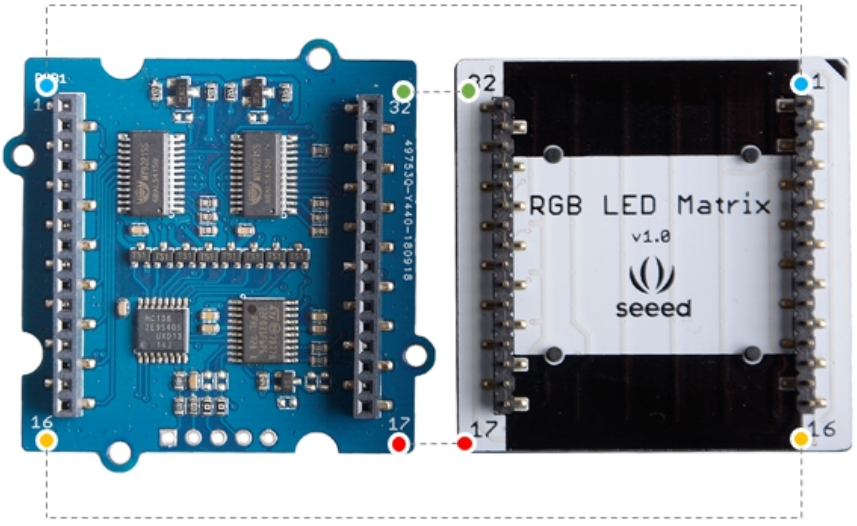
Typical Applications

- Simple image display
- Toys

Hardware Overview

Pin Out

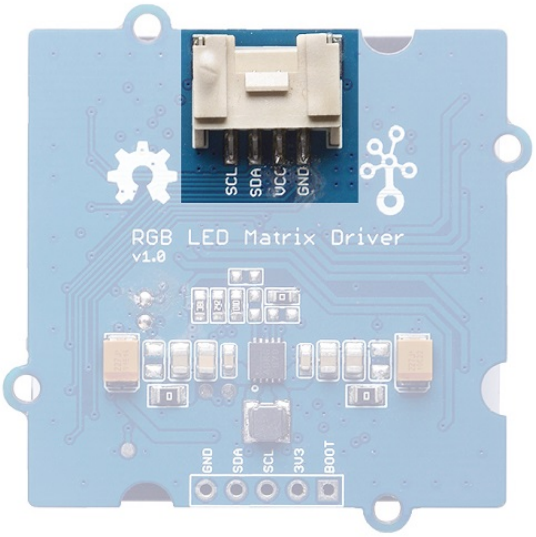




Grove Interface

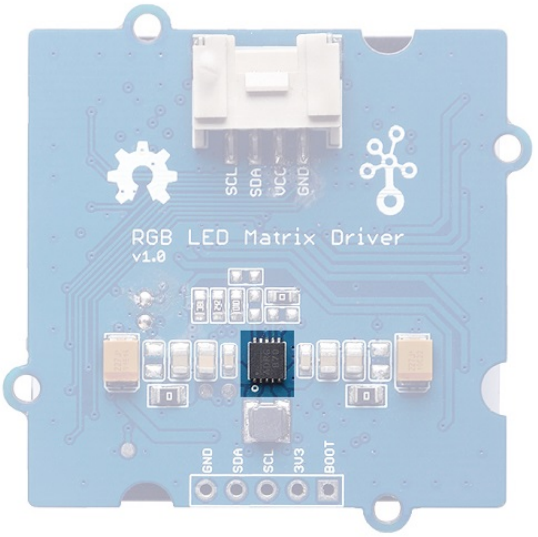
We use I2C interface to control the LED matrix:

> GND: connect this module to the system GND
> VCC: you can use 5V for this module
> SDA: I2C serial data
> SCL: I2C serial clock



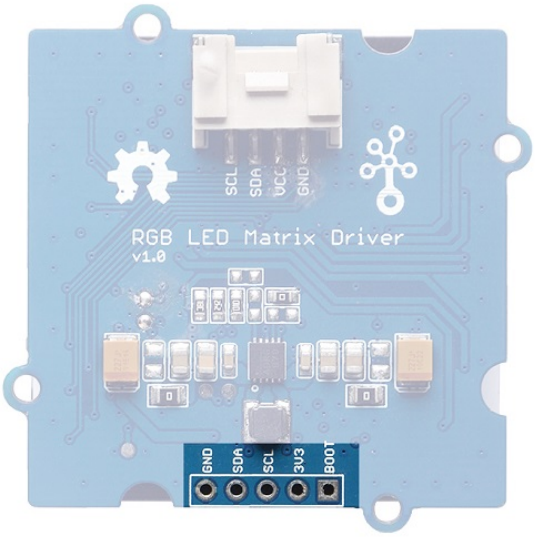
DC-DC Module

We use MP-2155 to provide a stable 3.3V for the the MCU and the LED driver chip.



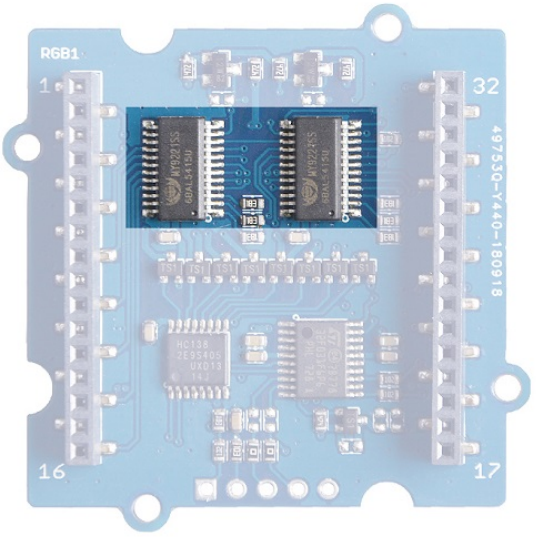
Firmware Download Interface

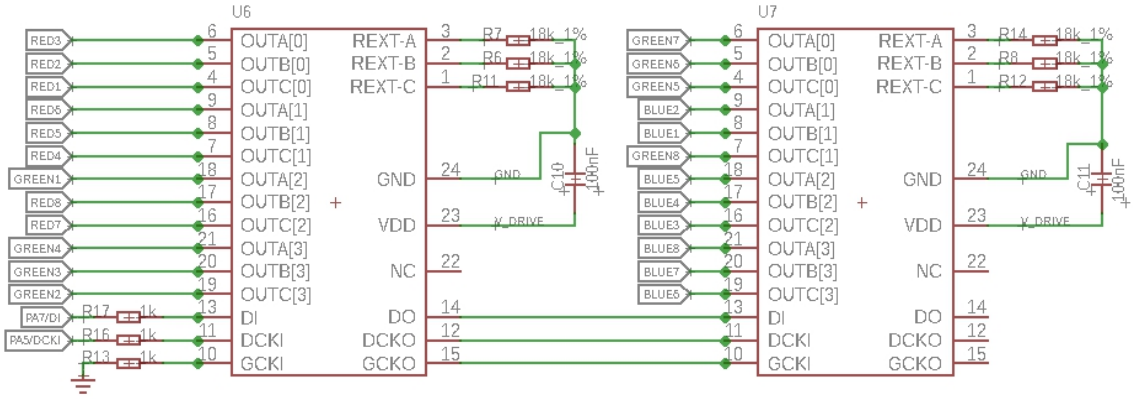
Connect to the SDA and SCL pin, works as the UART when download the firmware.



LED Driver

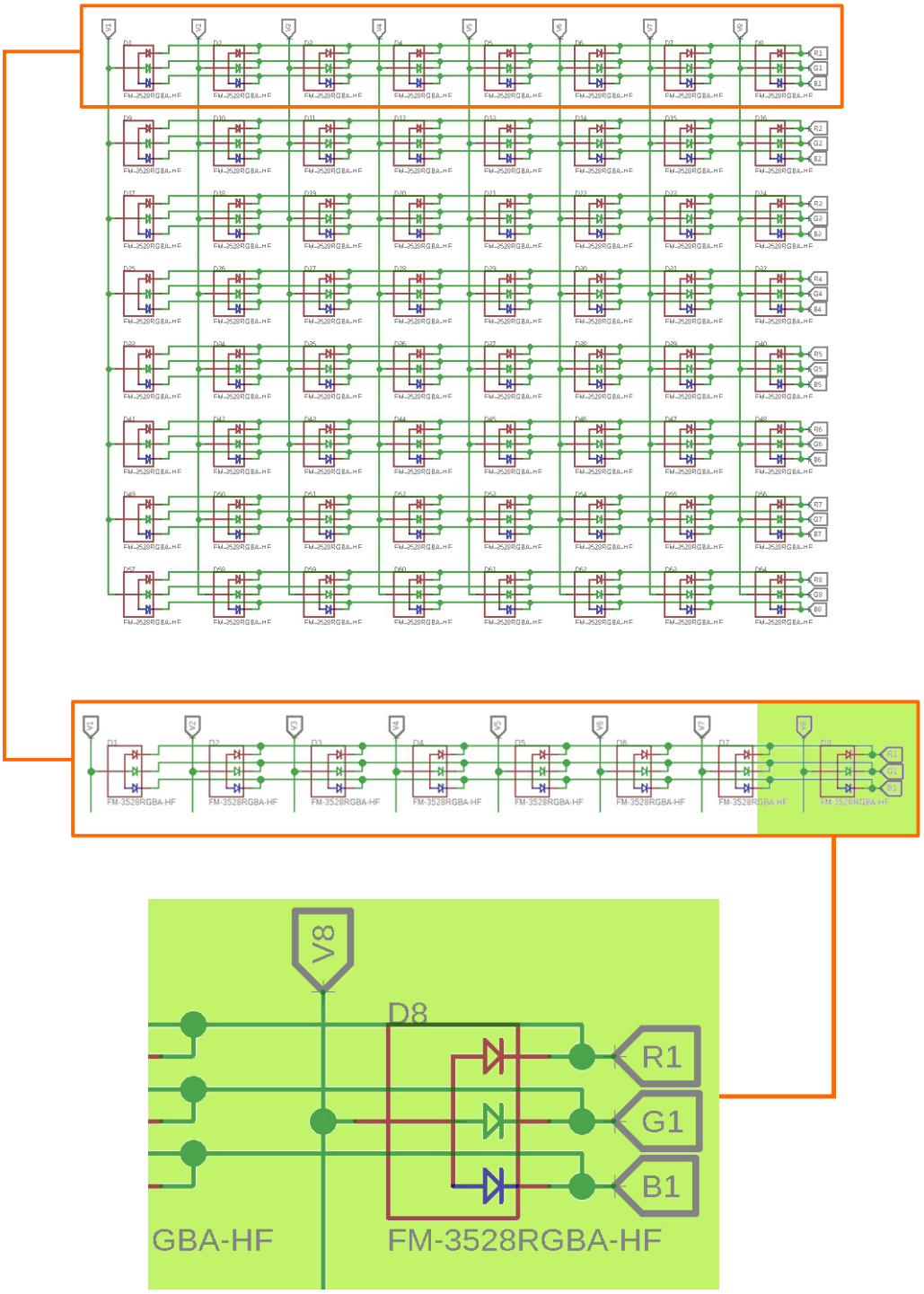
The MY9221 [https://files.seeedstudio.com/wiki/Grove-RGB_LED_Matrix_w-Driver/res/MY9221.pdf] is a 12-channels (R/G/B x 4) constant current APDM (Adaptive Pulse Density modulation) LED driver. Since this mudule is 8x8 matrics, so we need **RGB** X8 output channels, therefor, we use two MY9221.





8x8 LED Matrix

We use 64 KTR-3528RGB LEDs to form an 8x8 matrix LED



We use the V signal for column selection and the RGB signal for row selection.

We name the leds by **D**, D1 - D64. R1/G1/B1 - R8/G8/B8 is drive by two MY9221, **V1 - V8** is controled by the 74HC183PW chip. If all the

LEDs are off, the V1 -V9 should be pulled low by default, and all the RGB changle line will all be pulled high.

e.g.

D8 is in the first row, eighth column. If we want to make the **D8** Green-255, then we should pull V8 high, and pull R1/B1 high, pull G1 to ground. Then only the Green led will be light up, you will see the D8 turn pure green.

Platforms Supported

Arduino	Raspberry Pi		
			

Caution
The platforms mentioned above as supported is/are an indication of the module's hardware or theoritical 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.

Getting Started

Play With Arduino

Hardware

Materials required

Seeeduino V4.2	Base Shield
	
Get One Now [https://www.seeedstudio.com/Seeeduino-V4.2-p-2517.html]	Get One Now [https://www.seeedstudio.com/Base Shield-V2-p-1378.html]

Note

1 Please plug the USB cable gently, otherwise you may damage the port. Please use the USB cable with 4 wires inside, the 2 wires cable can't transfer data. If you are not sure about the wire you have, you can click here [https://www.seeedstudio.com/Micro-USB-Cable-48cm-p-1475.html] to buy

2 Each Grove module comes with a Grove cable when you buy. In case you lose the Grove cable, you can click here [https://www.seeedstudio.com/Grove-Universal-4-Pin-Buckled-20cm-Cable-%285-PCs-pack%29-p-936.html] to buy.

Important

1. If the you uses Arduino UNO as the motherboard, it is recommended that use the DC power supply. Otherwise, the maximum ripple of VCC may exceed 100mV. If you use Seeeduino V4.2 as the motherboard, you do not need to connect DC power.

2. Hot swap is not supported.

- **Step 1.** Connect the Grove - RGB LED Matrix w/Driver to port **I2C** of Grove-Base Shield.
- **Step 2.** Plug Grove - Base Shield into Seeeduino.
- **Step 3.** Connect Seeeduino to PC via a USB cable.

Note
If we don't have Grove Base Shield, We also can directly connect this module to Seeeduino as below.

Seeeduino	Grove Cable	Grove - RGB LED Matrix w/Driver
GND	Black	GND
5V or 3.3V	Red	VCC
SDA	White	SDA
SCL	Yellow	SCL

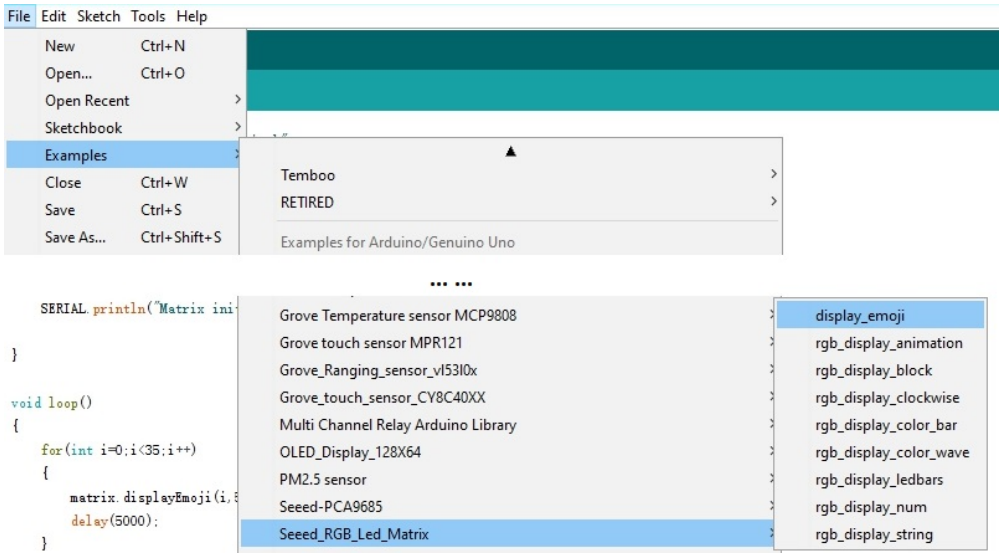
Software

Attention
If this is the first time you work with Arduino, we strongly recommend you to see Getting Started with Arduino

[https://wiki.seeedstudio.com/Getting_Started_with_Arduino/] before the start.

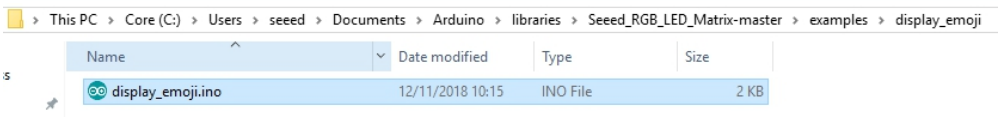
- **Step 1.** Download the Seeed_RGB_LED_Matrix [https://github.com/Seeed-Studio/Seeed_RGB_LED_Matrix] Library from Github.
- **Step 2.** Refer to How to install library [https://wiki.seeedstudio.com/How_to_install_Arduino_Library] to install library for Arduino.
- **Step 3.** Restart the Arduino IDE. Open the example, you can open it in the following three ways：

  a. Open it directly in the Arduino IDE via the path: **File → Examples → Seeed_RGB_Led_Matrix → display_emoji**.



  b. Open it in your computer by click the **display_emoji.ino** which you can find in the folder **XXXX\Arduino\libraries\Seeed_RGB_LED_Matrix-master\examples\display_emoji**, **XXXX** is the location you

installed the Arduino IDE.



c. Or, you can just click the icon in upper right corner of the code block to copy the following code into a new sketch in the Arduino IDE.

```
#include "grove_two_rgb_led_matrix.h"

#ifdef ARDUINO_SAMD_VARIANT_COMPLIANCE
#define SERIAL SerialUSB
#else
#define SERIAL Serial
#endif


#define DISPLAY_COLOR    0X11


void waitForMatrixReady()
{
    delay(1000);
}

GroveTwoRGBLedMatrixClass matrix;
void setup()
{
    Wire.begin();
    SERIAL.begin(115200);
    waitForMatrixReady();
    uint16_t VID = 0;
    VID = matrix.getDeviceVID();
    if(VID != 0x2886)
    {
        SERIAL.println("Can not detect led matrix!!!");
        while(1);
    }
```

```
    SERIAL.println("Matrix init success!!!");

}

void loop()
{
    for(int i=0;i<35;i++)
    {
        matrix.displayEmoji(i,5000,true);
        delay(5000);
    }
}
```

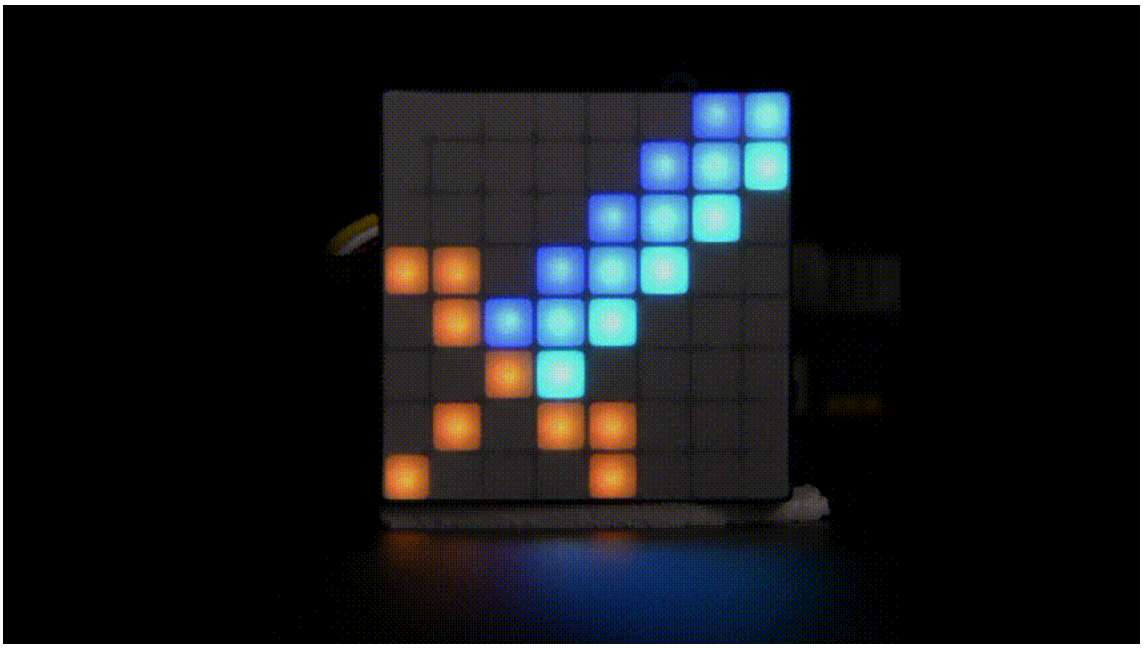

Attention

The library file may be updated. This code may not be applicable to the updated library file, so we recommend that you use the first two methods.

- **Step 4.** Upload the demo. If you do not know how to upload the code, please check How to upload code [https://wiki.seeedstudio.com/Upload_Code/].

Success

If every thing goes well, now you can see the LED matrix show:



DIY

Now let's talk about diy.

Note
In this version firmware if you want to diy your own image with UNO serial you need to modify the file of arduino. If you use mega or lotus, the change will not be needed.

> Locate the arduino setup folder **xxxxx\Arduino\hardware\arduino\avr\libraries\Wire\src**, open the **Wire.h** file

change

```
#define BUFFER_LENGTH 32
```

into

```
#define BUFFER_LENGTH 128
```

> Then locate the arduino setup folder **xxxxx\Arduino\hardware\arduino\avr\libraries\Wire\src\utility**, open the **twi.h** file.

change

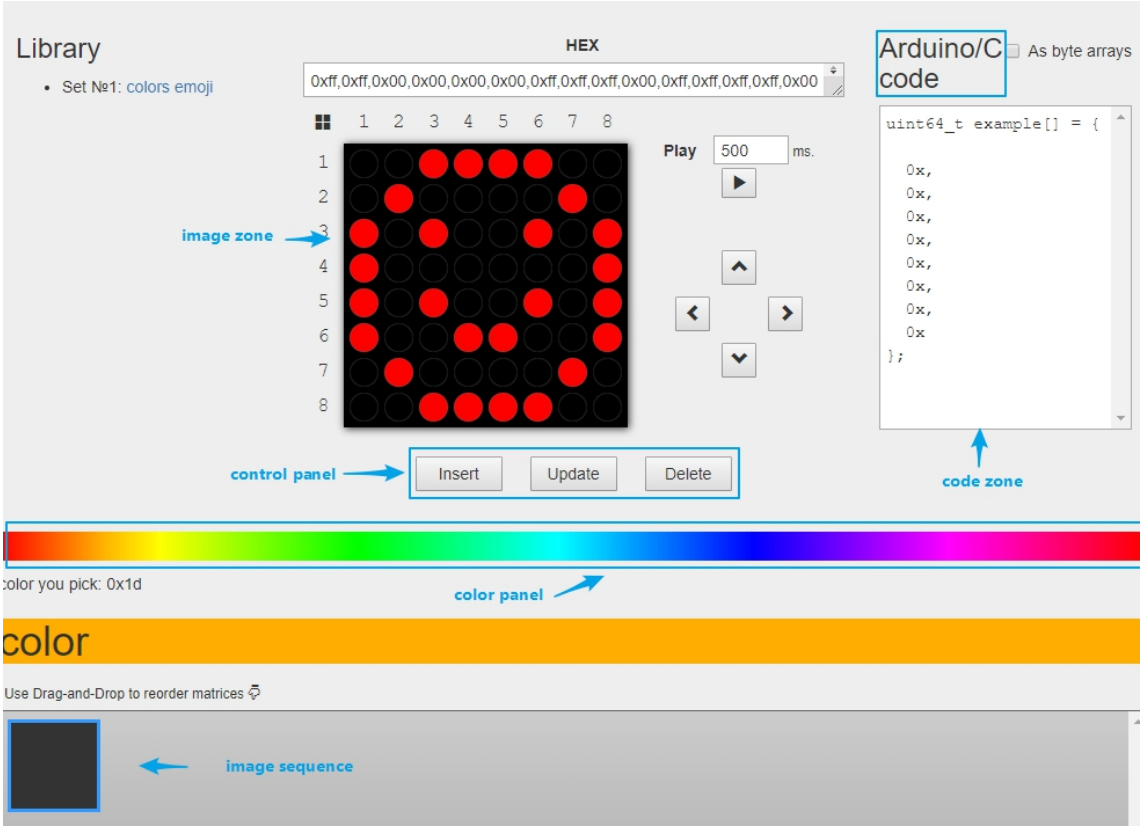
```
#define TWI_BUFFER_LENGTH 32
```

into

```
#define TWI_BUFFER_LENGTH 128
```

Let's begin DIY.

- **Step 1.** Download the image editor [https://files.seeedstudio.com/wiki/Grove-RGB_LED_Matrix_w-Driver/res/docs.zip], it's a zip file, unzip it.
- **Step 2.** Find the **index.html** in the folder **doc→doc**, double click to open it.



- **Step 3.** Creat your own images, when you finish one, click **Insert** in the control panel, the you can edit anothor one, when you finish all the image sequence you can copy the code in the code zone.
- **Step 4.** Replace the following code block line 9 **unit64_t example[]** with your own code.

```
#include "grove_two_rgb_led_matrix.h"

#ifdef ARDUINO_SAMD_VARIANT_COMPLIANCE
#define SERIAL SerialUSB
#else
#define SERIAL Serial
#endif

uint64_t example[] = {

  0xffff5e5e5e5effff,
```

```
  0xff5effffffff5eff,
  0x5eff5effff5eff5e,
  0x5effffffffffff5e,
  0x5eff5effff5eff5e,
  0x5effff5e5effff5e,
  0xff5effffffff5eff,
  0xffff5e5e5e5effff,

  0xffff29292929ffff,
  0xff29ffffffff29ff,
  0x29ff29fff29ff29,
  0x29ffffffffffff29,
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  0x29ffffffffffff29,
  0xff29ffffffff29ff,
  0xffff29292929ffff,

  0xffff00000000ffff,
  0xff00ffffffff00ff,
  0x00ff00fff00ff00,
  0x00ffffffffffff00,
  0x00fff0000fff00,
  0x00ff00fff00ff00,
  0xff00ffffffff00ff,
  0xffff00000000ffff
};

void waitForMatrixReady()
{
    delay(1000);
}

GroveTwoRGBLedMatrixClass matrix;
void setup()
{
    Wire.begin();
    SERIAL.begin(115200);
    waitForMatrixReady();
    uint16_t VID = 0;
    VID = matrix.getDeviceVID();
    if(VID != 0x2886)
```

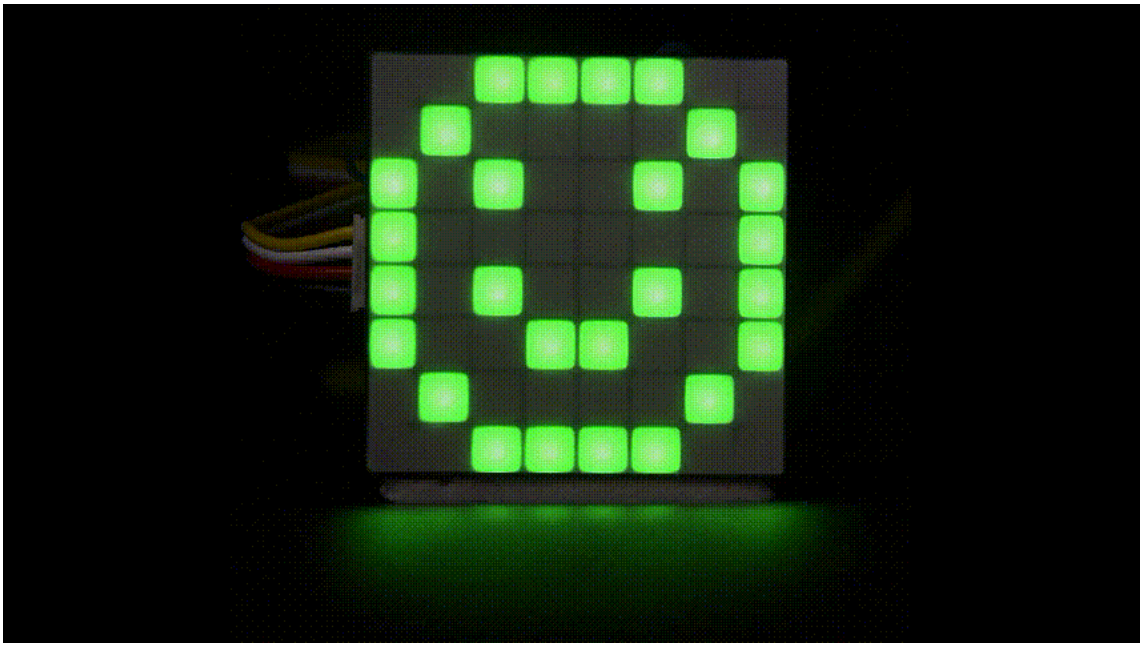
```
    {
        SERIAL.println("Can not detect led matrix!!!");
        while(1);
    }
    SERIAL.println("Matrix init success!!!");

}

void loop()
{
 for (int i=0;i<3;i++) {
        matrix.displayFrames(example+i*8, 200, false, 1)
        delay(500);
    }
}
```

Success

If every thing goes well, now you can see the LED matrix show:



Schematic Online Viewer

Resources

- **[Zip]** Grove - RGB LED Matrix Driver Eagle Files [https://files.seeedstudio.com/wiki/Grove-RGB_LED_Matrix_w-Driver/res/Grove%20-%20RGB%20LED%20Matrix%20w%20Driver.zip]
- **[Zip]** RGB LED Matrix 8x8 Eagle Files [https://files.seeedstudio.com/wiki/Grove-RGB_LED_Matrix_w-Driver/res/RGB%20LED%20Matrix%208x8.zip]

- **[Zip]** Seeed_RGB_LED_Matrix Library [https://github.com/Seeed-Studio/Seeed_RGB_LED_Matrix/archive/master.zip]
- **[PDF]** Datasheet MY9221 [https://files.seeedstudio.com/wiki/Grove-RGB_LED_Matrix_w-Driver/res/MY9221.pdf]
- **[PDF]** Datasheet MP2155 [https://files.seeedstudio.com/wiki/Grove-RGB_LED_Matrix_w-Driver/res/MP2155.pdf]

Tech Support

Please do not hesitate to submit the issue into our forum [https://forum.seeedstudio.com/]

[https://www.seeedstudio.com/act-4.html?utm_source=wiki&utm_medium=wikibanner&utm_campaign=newproducts]