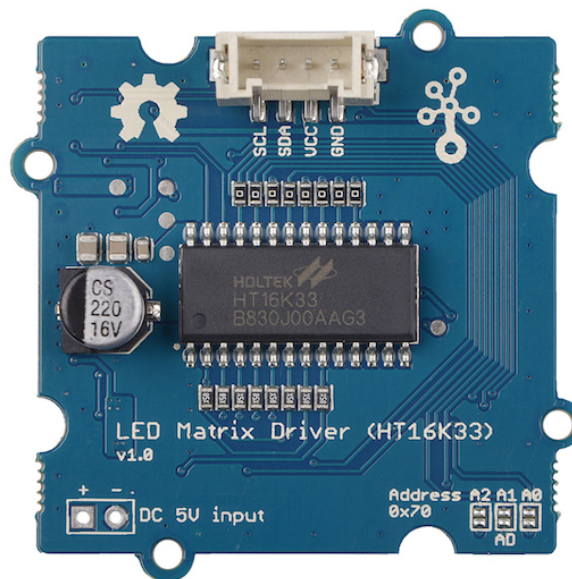


Grove - LED Matrix Driver (HT16K33)



LED Matrix is low cost and usually used to display simple numbers and images. The Grove - LED Matrix Driver is the I²C based product which allows you to control the LED matrix with our prepared and easy-to-use libraries, or you can create your own library to control it to satisfy your need. The 8*8 LED Matrix can be assembled and unassembled from the driver board easily, so it is convenient to change different color LED matrix display based on your need.

Get One Now 

[<https://www.seeedstudio.com/Grove-LED-Matrix-Driver-HT16K33.html>]

Version

Product Version	Changes	Released Date
Grove - LED Matrix Driver (HT16K33)	Initial	Sep 2018

Feature

- Integrated RC oscillator
- R/W address auto increment
- Max. 8 x 8 patterns
- I²C-bus interface

Specification

Item	Value
Supply Voltage	3.3V / 5V
LED Matrix Dot NO.	8 * 8
Operating temperature	-40 ~ 85°C
Storage temperature	-50 ~ 125°C
Interface	I2C
I2C address	0x70(default) 0x71~0x77(configurable)
size	L: 40mm W: 40mm H: 17mm
Weight	8.8g
Package size	L: 140mm W: 90mm H: 18mm
Gross Weight	15g

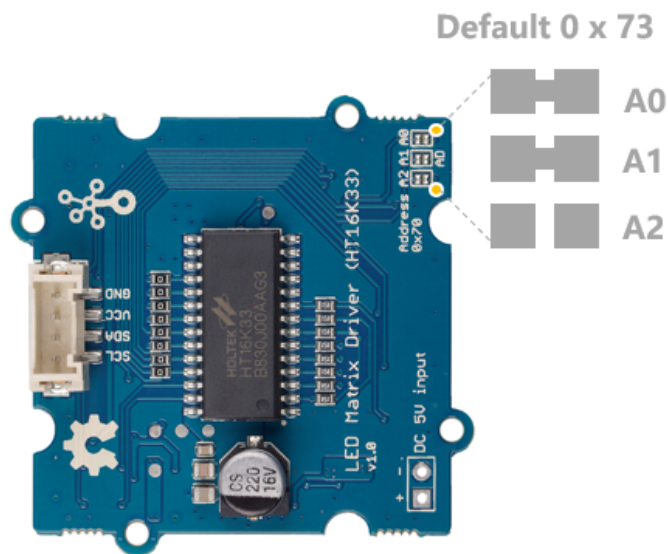


Note

There are 8 possible I2C address of this grove, from 0x70 to 0x77. The default I²C address is 0x77. You can change the I2C address by do some soldering as instructed in the below table.

I ² C address	Connection
0x70	Disconnect: A0 A1 A2
0x71	Disconnect: A1 A2, Connect: A0
0x72	Disconnect: A0 A2, Connect: A1
0x73	Disconnect: A2, Connect: A1 A0
0x74	Disconnect: A0 A1, Connect: A2
0x75	Disconnect: A1, Connect: A0 A2
0x76	Disconnect: A0, Connect: A1 A2
0x77	Connect: A0 A1 A2

For example, if I want to change the address to 0x73, I need to connect pad A1,A0 and disconnect pad A2. Then I will get address 0b01110011, that is 0x73.



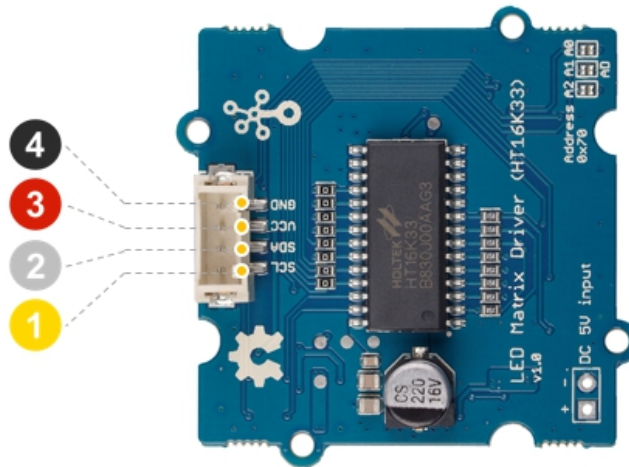
Typical applications

- Industrial control indicators
- Digital clocks, thermometers, counters, multimeters
- Combo sets
- VCR sets
- Instrumentation readouts
- Other consumer applications

- LED Displays

Hardware Overview

Pin Out



- 4 GND: connect this module to the system GND
- 3 VCC: you can use 5V or 3.3V for this module
- 2 SDA: I²C serial data
- 1 SCL: I²C serial clock




Platforms Supported

Arduino	Raspberry Pi
	

Getting Started

Play With Arduino

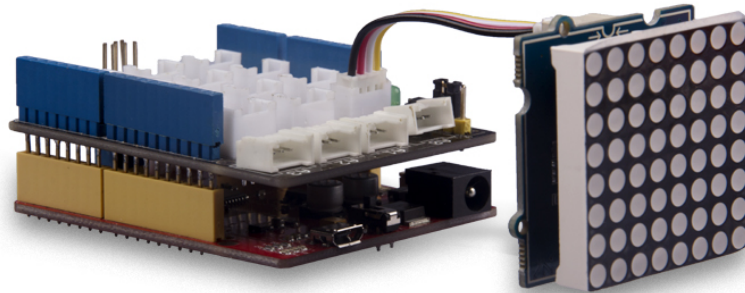
Materials required

Seeeduino V4.2	Base Shield	Grove-LED Matrix Driver
		
<p>Get ONE Now [https://www.seeedstudio.com/Seeeduino-V4.2-p-2517.html]</p>	<p>Get ONE Now [https://www.seeedstudio.com/Base-Shield-V2-p-1378.html]</p>	<p>Get ONE Now [https://www.seeedstudio.com/Grove-LED-Matrix-Driver-HT16K33.html]</p>

**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) [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) [https://www.seeedstudio.com/Grove-Universal-4-Pin-Buckled-20cm-Cable-%285-PCs-pack%29-p-936.html] to buy.

- **Step 1.** Connect red square matrix LED to the Grove-LED Matrix Driver.
- **Step 2.** Connect the Grove - LED Matrix Driver to port **I²C** of Grove-Base Shield.
- **Step 3.** Plug Grove - Base Shield into Seeeduino.
- **Step 4.** Connect Seeeduino to PC via a USB cable.



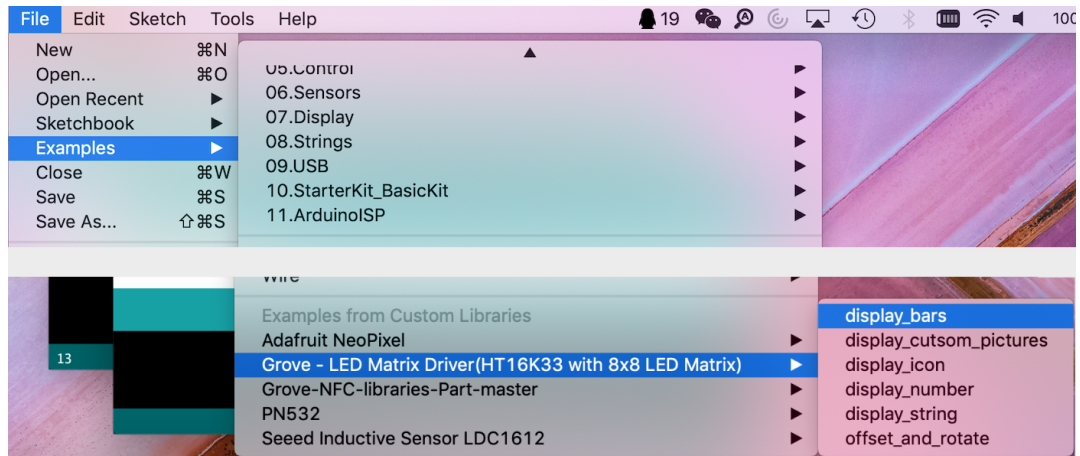
Software



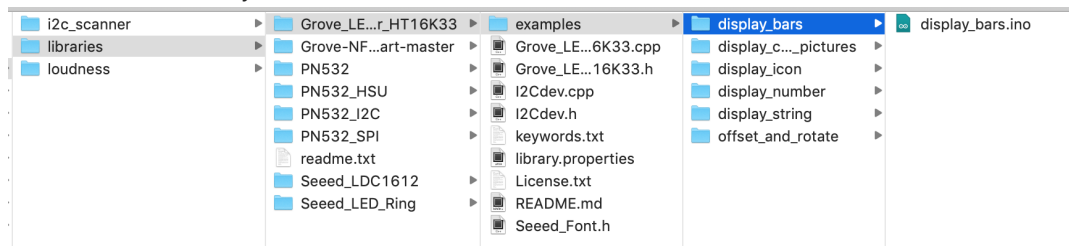
Attention


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

- **Step 1.** Download the [Grove_LED_Matrix_Driver_HT16K33](https://github.com/Seeed-Studio/Grove_LED_Matrix_Driver_HT16K33) [https://github.com/Seeed-Studio/Grove_LED_Matrix_Driver_HT16K33.git] Library from Github.
- **Step 2.** Refer to [How to install library](https://wiki.seeedstudio.com/How_to_install_Arduino_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** → **Grove - LED Matrix Driver(HT16K33 with 8*8 LED Matrix)** → **display_bars**.



- b. Open it in your computer by click the **basic_demo.ino** which you can find in the folder **XXXX\Arduino\libraries\Grove_LED_Matrix_Driver_HT16K33\examples\displayBars\display_bar** **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.

```

1  #include <Wire.h>
2  #include "Grove_LED_Matrix_Driver_HT16K33.h"
3
4
5  Matrix_8x8 matrix;
6
7  void setup()
8  {
9      Wire.begin();
10     matrix.init();
11     matrix.setBrightness(0);
12     matrix.setBlinkRate(BLINK_OFF);
13 }
14
15 void loop()
16 {
17     for (int i=0;i<33;i++)
18     {
19         // The input range of writeBar is [0-32]
20         matrix.writeBar(i);
21         matrix.display();
22         delay(150);
23     }
24 }
  
```



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.



Success

If everything goes well, you will be able to see various bars display on the LED matrix.

If you would like to run other examples, you may do similar processes and be able to see different displays.

DIY

Are you willing to let the LED matrix to display the emoji? Now, it is your turn to design your own. Prepare yourself with the above-listed Hardware and Software requirements.

- **Step 1.** Use the online [LED Matrix Editor](http://xantorohara.github.io/led-matrix-editor/#) [http://xantorohara.github.io/led-matrix-editor/#] to edit and create animations for 8*8 LED matrices.
- **Step 2.** Select the LEDs color on the top right corner. In my case, I choose 'red' as I am using the Red LED Matrix.
- **Step 3.** Create your own design by simply click on the blank dot.
- **Step 4.** Copy the hex file generated according to your design. There are two ways you can do this:
 - copy the hex value in the hex box at the bottom left corner.
 - copy the corresponding code in the Arduino/C code section.

The screenshot shows the LED Matrix Editor interface. On the left, there's a 'Library' section with three sets of options. The main area is an 8x8 grid of LEDs with a red pattern. A 'Play' button is set to 500 ms. A 'HEX' box at the bottom left contains the value '3c4299a581a5423c'. On the right, the 'Arduino/C code' section shows a C++ code snippet for displaying the hex value on the matrix.

```
const uint64_t Emoji[] = {
  0x3c4299a581a5423c,
  0x3c4281bd81a5423c,
  0x3c4299a581a5423c
};
const int IMAGES_LEN =
  sizeof(IMAGES)/8;
```

- **Step 5.** Create the new '.ino' file under the same folder with other LED Matrix examples and copy below code.

```
1 #include "Grove_LED_Matrix_Driver_HT16K33.h"
2 #include <Wire.h>
3
4 //put your own design hex group here.
5 const uint64_t Emoji[] =
6 {
7   0x3c4299a581a5423c
```



```

7   0x3c4299a381a3423c,
8   0x3c4281bd81a5423c,
9   0x3c42a59981a5423c,
10  };
11
12  Matrix_8x8 matrix;
13
14
15  void setup() {
16    Wire.begin();
17    matrix.init();
18    matrix.setBrightness(0);
19    matrix.setBlinkRate(BLINK_OFF);
20    *****
21    * Description
22    *   Setting the blink rate of matrix
23    * Parameter
24    *   blink_type: BLINK_OFF, BLINK_2HZ, BLINK_1HZ
25    * Return
26    *   Null.
27    *****/
28  }
29
30  void loop() {
31    for (int i = 0; i < 3; i++)
32    {
33      matrix.writeOnePicture(Emoji[i]);
34      *****
35      * Description
36      *   Write a picture in display buffer.
37      *   Call display() to show display buffer.
38      * Parameter
39      *   pic: A uint64_t type 8x8 matrix picture, you can make it at
40      *       https://xantorohara.github.io/Led-matrix-editor/#
41      * Return
42      *   Null.
43      *****/
44      matrix.display();
45      *****
46      * Description
47      *   Clear the display buffer.
48      *   This function will display nothing on 8x8 Matrix after call display().
49      * Parameter
50      *   Null.
51      * Return
52      *   Null.
53      *****/
54      delay(500);
55    }
56  }

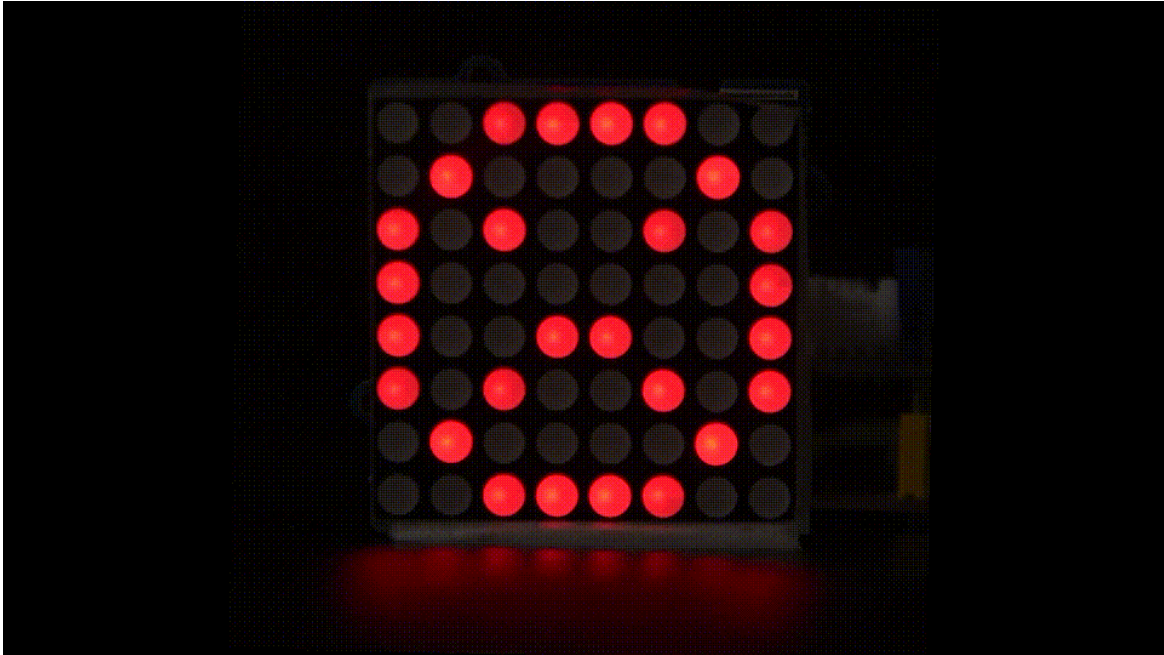
```

- **Step 6.** Upload your project to your seeeduino.

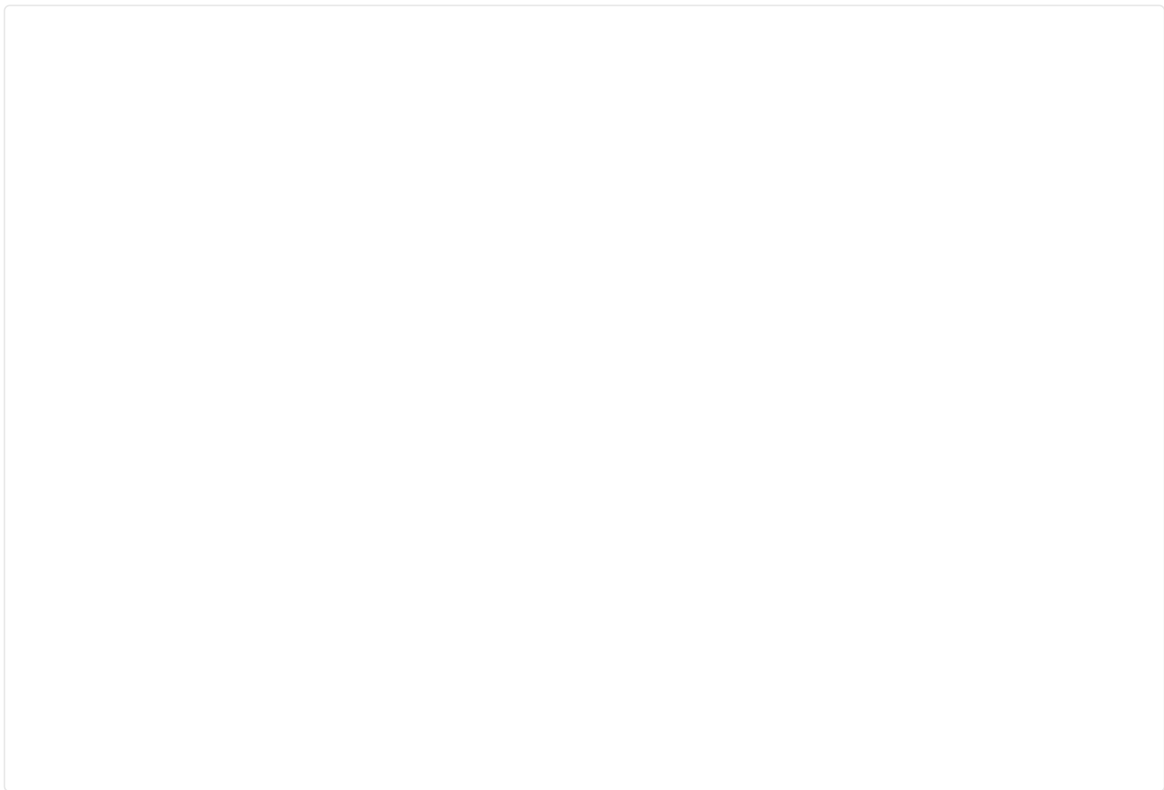


Success

If everything goes well, your LED Matrix will display as below.



Schematic Online Viewer



Resources

- **[Zip]** [Grove - LED Matrix Driver\(HT16K33\) Eagle Files](https://files.seeedstudio.com/wiki/Grove-LED_Matrix_Driver-HT16K33/res/202002241_PCBA;Grove-LED-Matrix-Driver(HT16K33).zip) [https://files.seeedstudio.com/wiki/Grove-LED_Matrix_Driver-HT16K33/res/202002241_PCBA;Grove-LED-Matrix-Driver(HT16K33).zip]

- **[Zip]** [Grove_LED_Matrix_Driver_HT16K33 Software Library](https://github.com/Seeed-Studio/Grove_LED_Matrix_Driver_HT16K33/archive/master.zip) [https://github.com/Seeed-Studio/Grove_LED_Matrix_Driver_HT16K33/archive/master.zip]
- **[PDF]** [Datasheet HT16K33](https://files.seeedstudio.com/wiki/Grove-LED_Matrix_Driver-HT16K33/res/310040349,SMD-IC-Driver;SOP-28-1.pdf) [https://files.seeedstudio.com/wiki/Grove-LED_Matrix_Driver-HT16K33/res/310040349,SMD-IC-Driver;SOP-28-1.pdf]

Tech Support

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



[https://www.seeedstudio.com/act-4.html?

utm_source=wiki&utm_medium=wikibanner&utm_campaign=newproducts]