MATRIX MODULE & EXPANSION BOARD

Commissioning and Usage of LED-Matrix01 and RB-MatrixCTRL board

JOY-iT

CONTENTS

1. GENERAL INFORMATION

Dear costumer,
thank you very much for choosing our product.
In the following, we will introduce you to what has to be observe while
starting up and using this product.
Should you encounter any unexpected problems during use, please do not
hesitate to contact us.

2. USING THE MATRIX ON THE GPIO BAR

A seperate power supply unit is required to use the LED Matrix.
This should be rated at 5V and round about 4A (per LED-Matrix).
Please ensure that the cable diameter is sufficient.
First connect the enclosed cable for the power supply to the LED Matrix and
power supply unit.
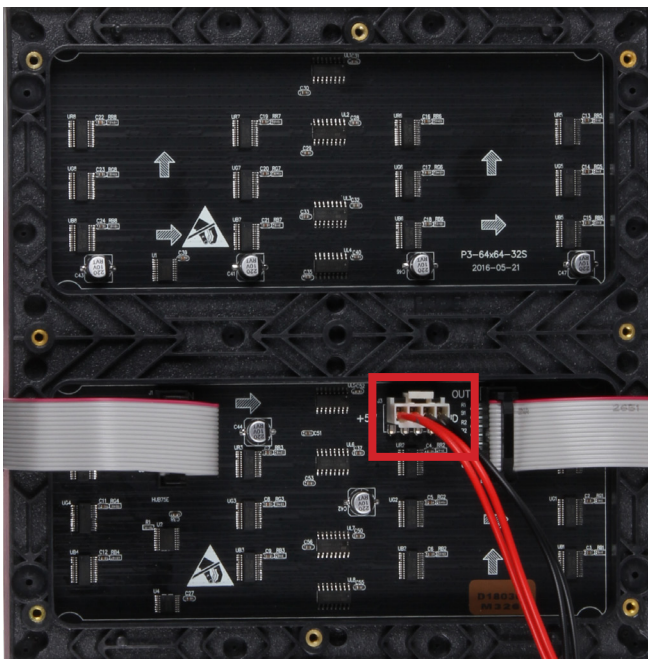
Up to three matrices can be operated parallel while using the 40-pin GPIO
strip of the Raspberry Pi. Additional matrices can be connected in series to
each matrix. Please make sure to adjust your power supply accordingly.

Therefore use the HUB75 connector contact marked with **IN** on the matrix.
Further matrices can be connected in series via the **OUT** contact.
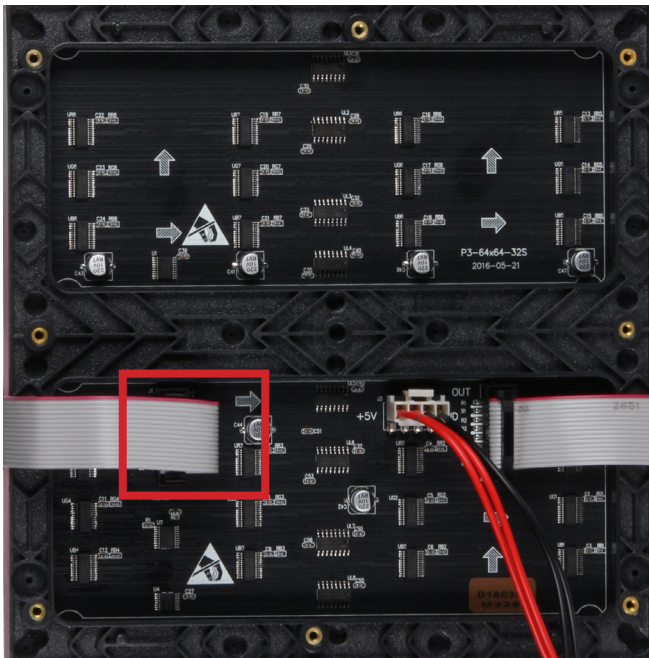
The following diagram shows a scheme for the GPIO bar of the Raspberry PI and which pins should be used for connecting the three matrices in parallel.

CONNECTION	PIN	PIN	CONNECTION
-	01	02	-
G1 (Matrix 3)	03	04	-
B1 (Matrix 3)	05	06	**GND / N (Matrix 1+2+3)**
LAT (Matrix 1+2+3)	07	08	R1 (Matrix 3)
-	09	10	**E (Matrix 1+2+3)**
CLK (Matrix 1+2+3)	11	12	**OE (Matrix 1+2+3)**
G1 (Matrix 1)	13	14	-
LA (Matrix 1+2+3)	15	16	**LB (Matrix 1+2+3)**
-	17	18	**LC (Matrix 1+2+3)**
B2 (Matrix 1)	19	20	-
G2 (Matrix 1)	21	22	**LD (Matrix 1+2+3)**
R1 (Matrix 1)	23	24	R2 (Matrix 1)
-	25	26	B1 (Matrix 1)
-	27	28	-
G1 (Matrix 2)	29	30	-
B1 (Matrix 2)	31	32	R1 (Matrix 2)
G2 (Matrix 2)	33	34	-
R2 (Matrix 2)	35	36	G2 (Matrix 3)
R2 (Matrix 3)	37	38	B2 (Matrix 2)
-	39	40	B2 (Matrix 3)
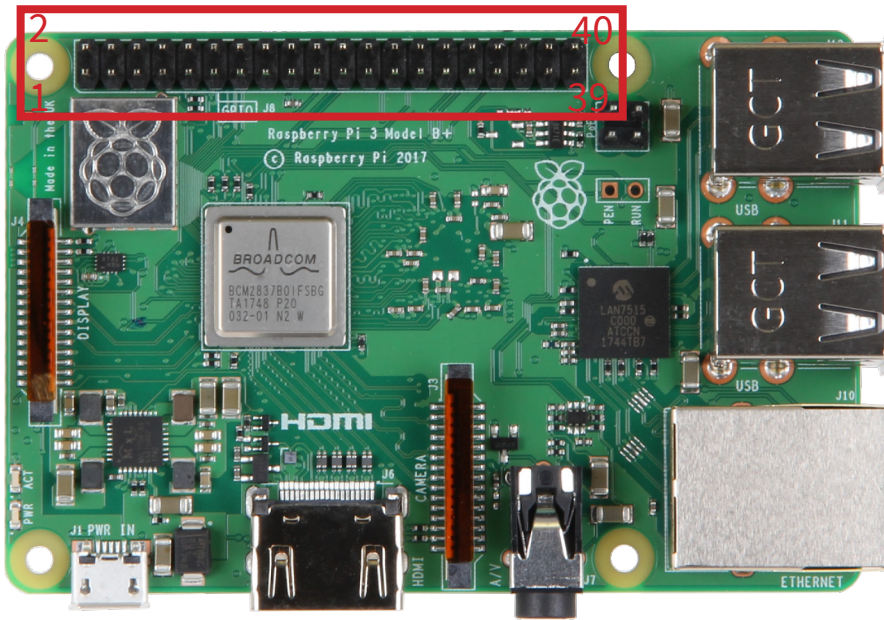
3. USAGE OF THE MATRIX CONTROLLER BOARD

Instead of placing the matrices directly on the GPIO bar of your Raspberry PI, you can also use our RB-MatrixCtrl controller board to operate up three matrices in parallel. You can also use our controller to operate additional matrices in series.

In addition to the simplified connection, the controller board can supply the Raspberry PI directly with power and provides sufficient cooling with the build-in fan.
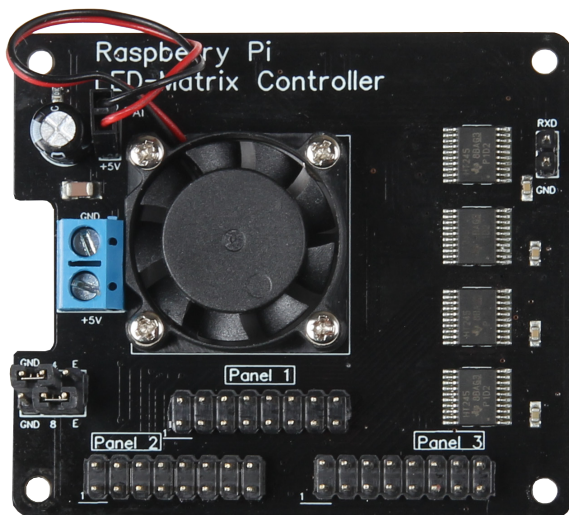
First plug the matrix controller board onto the GPIO bar of your Raspberry Pi. Connect the HUB75 connectors of your matrices with the corresponding connectors (panel 1, panel 2, panel 3) on the controller board.
If you want to power your Raspberry PI directly from the controller board, you can also connect a +5V power source directly to the controller board. Please note that the connection is not protected against reverse polarity and reverse current. The connection is not intended to supply the matrix with power.

Please also check the pin assignment of the E-pin (or LE) on your LED Matrix. This can be different on various matrices between the 4th and 8th pin. You can change the pinout with the left jumpers on the controller board. Set the connection according to the pinout on your matrix. If the 4th or 8th pin on your matrix is connected to GND (or N), you should also set the corresponding jumpers on the controller board.
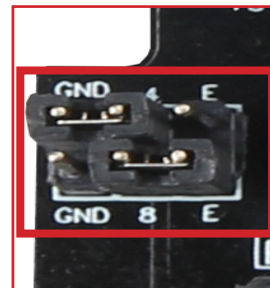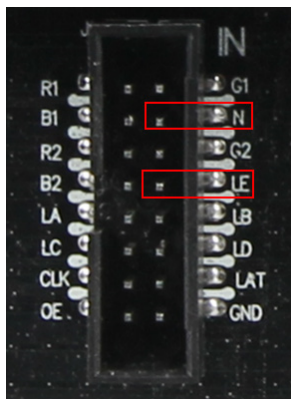
4. INSTALLATION OF THE MATRIX

To use the matrix on your Raspberry Pi, you must first install the related library. Open a terminal and enter the following commands:

```
sudo apt-get update
sudo apt-get install git
git clone https://github.com/hzeller/rpi-rgb-led-matrix
```

As next step the onboard sound must be deactivated. Since the matrix uses a clock circuit that is also used by the onboard sound, it is not possible to use it simultaneously. If you still need sound output, you should use an external USB sound adapter. To disable the onboard sound, first open the config file with the following command:

```
sudo nano /boot/config.txt
```

Search for the line "**dtparam=audio=on**" and change it to "**dtparam=audio=off**". Then save the file with the key combination **Ctrl+O** , confirm with Enter and leave the editor with the key combination **Ctrl+X**.

Since the changes will only take effect after a restart, you should restart your Raspberry PI now with the command:

```
sudo reboot
```

Now use the following commands to navigate to the downloaded library folder and prepare the demo program:

```
cd rpi-rgb-led-matrix
make -C examples-api-use
```

The demo program can now be started. Please note that the number of LEDs per row and column must be specified when starting the program. For a single matrix (64x64 LEDs) this equals 64 LEDs in the row and 64 LEDs in the column:

```
sudo examples-api-use/demo -D 0 --led-rows=64 --led-cols=64
```

For slower panels or faster Raspberry PIs, the speed can be adjusted with **--ledslowdown-gpio=<0...4>**
Only values between 0 and 4 are accepted. The command could look like this:

```
sudo examples-api-use/demo -D 0 --led-rows=64 --led-cols64 --led-slowdown-gpio=2
```

5. USAGE WITH PYTHON

To use the matrix with Python, first execute the following commands in a terminal:

FOR PYTHON 2:

```
sudo apt-get update
sudo apt-get install python2.7-dev python-pillow -y
make-build-python
sudo make install-python
```

FOR PYTHON 3:

```
sudo apt-get update
sudo apt-get install python3-dev python3-pillow -y
make build-python PYTHON=$(which python3)
sudo make install-python PYTHON=$(which python3)
```

Now navigate to the samples folder:

```
cd bindings/python/samples
```

In this folder you will find several examples that you can use to test the function of your matrix. An example can be started with the following command:

```
sudo ./runtext.py
```

The command to execute also accepts the additional parameters:
 --led-rows, **--led-chain** and **--led-parallel**:

--led-rows: number of rows in a panel. Values like 8, 16, 32 and 64 are typical here.

--led-chain: number of matrices connected in series. The default value for a single matrix is 1.

--led-parallel: matrices connected in parallel. Values between 1 and 3 are typical here. The default value for a single matrix is 1.

The additional parameters are simply added after the orginal command:

```
sudo ./runtext.py --led-chain=4
```

6. DISPLAYING PICTURES AND VIDEOS

The matrix can be used to display individual images, animated images (GIFs) and videos. To start, navigate to the utils subfolder:

```
cd /home/pi/rpi-rgb-led-matrix/utils
```

In this folder you can store all files that you want to display on the matrix.

DISPLAYING PICTURES AND GIFS:

Images and GIFs can be displayed using the led-image-viewer.
Run the following command for it:

```
sudo ./led-image-viewer beispiel.gif
```

DISPLAYING VIDEOS:

Videos can be displayed with the video-viewer. Run the following command for it:

```
sudo ./video-viewer beispiel.webm
```

ADDITIONAL PARAMETER:

Additional parameters can be added to the display command.
Various parameters are available. We have listed the most important ones for you here:

PARAMETER	FUNCTION
-C	centers the image
-w<**seconds**>	multiple images: waiting time in seconds until the next image is displayed
-t<**seconds**>	animations: stops the execution after x seconds
-l<**number**>	animations: number of complete cycles
-D<**delay in ms**>	animations: delay between single frames. default value: -1
-f	multiple images: permanent cycle through all pictures
-s	multiple images: random order
--led-rows=<**number**>	number of rows per matrix: usually 8, 16, 32 or 64
--led-cols=<**number**>	number of columns per matrix: usually 8, 16, 32 or 64
--led-chain=<**number**>	number of matrices connected in series
--led-parallel=<**number**>	number of matrices connected in parallel
--led-brightness=<**percent**>	brightness in percent
--led-show-refresh	shows the refresh rate

A complete list of all possibilities and parameters can also be found **here**.

7. USAGE IN OWN PROJECTS

The library can of course also be integrated into your own projects. The necessary include files can be found in the subfolder **include**. The library is located in the subfolder **lib**. Usually a C++ library is used, but there are also C and Python libraries available.

In addition, further external bindings were developed:

Nodejs binding from Maxime Journaux
Nodejs/Typescript binding from Alex Eden
Go binding from Máximo Cuadros
Rust binding from Vincent Pasquier

8. INFORMATION AND TAKE-BACK OBLIGATIONS

Our information and take-back obligations according to the Electrical and Electronic Equipment Act (ElektroG)

Symbol on electrical and electronic equipment:

This crossed-out dustbin means that electrical and electronic appliances do not belong in the household waste. You must return the old appliances to a collection point.
Before handing over waste batteries and accumulators that are not enclosed by waste equipment must be separated from it.

Return options:
As an end user, you can return your old device (which essentially fulfils the same function as the new device purchased from us) free of charge for disposal when you purchase a new device.
Small appliances with no external dimensions greater than 25 cm can be disposed of in normal household quantities independently of the purchase of a new appliance.

Possibility of return at our company location during opening hours:
Simac GmbH, Pascalstr. 8, D-47506 Neukirchen-Vluyn, Germany

Possibility of return in your area:
We will send you a parcel stamp with which you can return the device to us free of charge. Please contact us by e-mail at Service@joy-it.net or by telephone.

Information on packaging:
If you do not have suitable packaging material or do not wish to use your own, please contact us and we will send you suitable packaging..

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-system on our website.

E-mail: service@joy-it.net
Ticket-system: http://support.joy-it.net
Phone: +49 (0)2845 98469 – 66 (10 am - 5 pm)

For further information please visit our website:
www.joy-it.net

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