<u>MOD-RGB</u>

INSTALLATION AND FIRMWARE
SUITABLE FOR FIRMWARE REVISION 3

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It is possible that the pictures in this manual differ from the latest revision of the board.

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MOD-RGB is a completely open-source module suitable for controlling multicolor RGB LED strips. The strips can be either 3.3V, 5V or 12V powered. The board comes with custom open-source firmware to simplify the usage of the board. The custom firmware also makes it possible to communicate with the board via I2C. As an alternative to the I2C the board has also a DMX interface. More information for how the firmware source code was compiled might be found in the "project_information.txt" file inside the source code folders (the source code of the latest firmware is available at the product page of MOD-RGB). The latest firmware version is release 3. Different firmware revisions might have big differences and incompatibilities.

The LED strips should have three separate data lines for each color – RED, GREEN and BLUE. The LED we used also had a separate power supply line.

The OLIMEX strips named LED-STRIPE-XX and LED-ROPE-XX work without the need of MOD-RGB.

The LED strips used with the board might be of the same color or different colors. The board has short-circuit protection and can provide up to 5A to each strip channel. Olimex provides Arduino examples for interfacing with MOD-RGB.

Sample hardware connection between an UEXT board (OLIMEXINO-STM32), MOD-RGB, and a suitable LED strip (3-color 12V) can be found in the picture below:
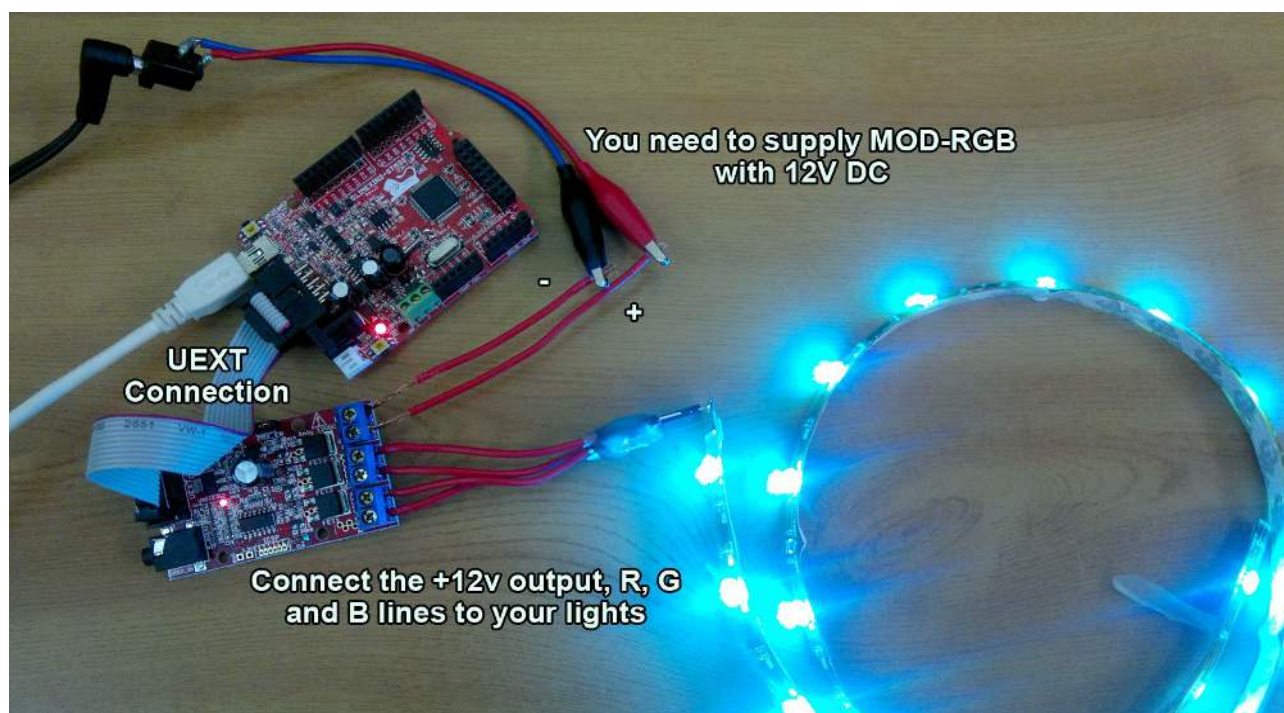
Note that the picture shows RGB that requires 12V DC provided to the PWR_CON connector. Pin 1 is 12V, pin 2 is GND. In this case UPWR_E jumper should be open by default.

DMX MODE

Requires RS-485 interface (MOD-RS485 and MOD-RS485-ISO are tested and working successfully).

To enter DMX512 mode:

Turn off/power down MOD-RGB then close DMX_EN and turn on/power up MOD-RGB. The other jumper UPWR_E shoud be closed if the device board we interface with needs to be powered via the UEXT. If we use MOD-RS485 we also close UPWR_E and then we power cycle the board.

In the beginning the board has no address. To acquire one we transmit data (different than 0) to a channel. For instance we transmit the value N to RED channel. Then GREEN would be N+1 and N+2 would be BLUE. If we want to change the addresses again we open and then close the DMX_EN jumper.

I2C MODE

To enter audio-in/I2C mode (default):

Power the board up with jumper DMX_EN being open. In this mode we can connect audio stream via the audio jack and the LEDs (or the LED strips) should start blinking according to the music.

Note the board works with frequencies in the (100-150)Hz range – if you listen to music with no proper bass the demo won't work properly!

This audio mode would remain active until you send a command via the I2C line (via the UEXT). The commands available are:

1. `0x01` – Enable LED PWM (start);
2. `0x02` – Disable LED PWM (stop);
3. `0x03` – Entering RGB colors in `0` to `255` (3 parameters);
4. `0x14` – Command to receive the input signal from the audio-in connector. The ADC is configured for 150Hz.
5. `0x15` – Command to disable the input signal from the audio-in. R, G and B are set to `0`.
6. `0x20` – Read the board ID number. By default `0x64`.
7. `0xF0` – Assign new address for the board. Before sending the command DMX_EN jumper must be closed. After that, make sure that the jumper is opened again, to avoid accidentally changing the address

Initially the default I2C address is `0x20`

The format of the standard I2C message follows the pattern:

S |AAAAAAA|W/R|ACK| |DDDDDDDD|ACK| |DDDDDDDD|ACK| |DDDDDDDD|ACK|...... |P

, where
S – Start condition (automatically sent)
AAAAAAA – Olimex Address – 0x20
W/R – read or write – 0
ACK – acknowledge
DDDDD – DATA to transmit
ACK – acknowledge
DDDDD – DATA to transmit
…... - the address of the device
P – command to perform and its parameters

After that we pass the command and its parameters if there are any.

For example:
1/ 0x20 0x01 - Enable LED PWM;
2/ 0x20 0x02 - Disable LED PWM;
3/ 0x20 0x03 255 0 0 – set the first LED in 255, the second and third in 0 – RED color;
4/ 0x20 0x14 – enable the input signal from the audio-in connector;
5/ 0x20 0x15 – disable the input signal from the audio-in connector;
6/ 0x20 0x20 – return the ID of the board;
7/ 0x20 0xF0 0x55 – change the default address from 0xF0 to 0x55

To enter the address before entering a command you need to close DMX_EN jumper, enter the command to change the address (0xF0) and then remove the jumper.