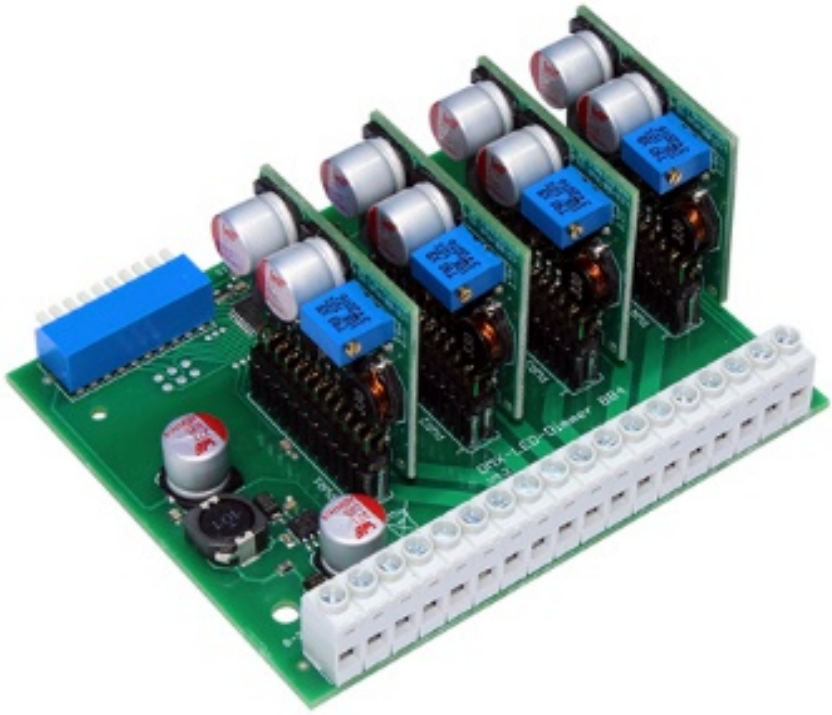
DMX-LED-Dimmer BB4 MK2

User Manual



For your own safety, please read this user manual and warnings carefully before installation.

Description

The **DMX-LED-Dimmer BB4** is designed to control LEDs, which operate with constant current and works with up to 24V of the LED voltage.

Adjustable output current
The DMX LED Dimmer BB4 has 4 outputs where the LEDs are operated with a current of 0 to 330mA-1500mA. The level of the output current can be adjusted via DMX.

Voltages up to 24V
The DMX-LED-Dimmer BB4 works with supply voltages up to 24V.

DMX-FAIL Function
An adjustable DMX FAIL Function offers the option to hold the current state (HOLD) or to take a preset value in case of a failed DMX signal.

DMX-Master-Dimmer
The DMX-LED-Dimmer BB4 has various Master Dimmers.

Up to 1024 brightness steps
Each output driver has a resolution of 1024 steps in which the output current is controlled. The special driver design allows a constant current which is not modulated by a PWM for the dimming process.

Two adjustable operation modes
Control with 2 DMX channels per output, the first DMX channel allows rough control and the second DMX channel allows fine control.

Settable dim curve
The dimming curves are freely configurable for each output.

RDM support
The DMX LED Dimmer BB4 allows configuration via RDM over DMX.

LED-State-Display
The integrated multifunctional display shows the current status of the device.

Suitable for top hat rail mounting
The top-hat rail housing 1050 is available as optional accessory for the DMX LED Dimmer BB4.

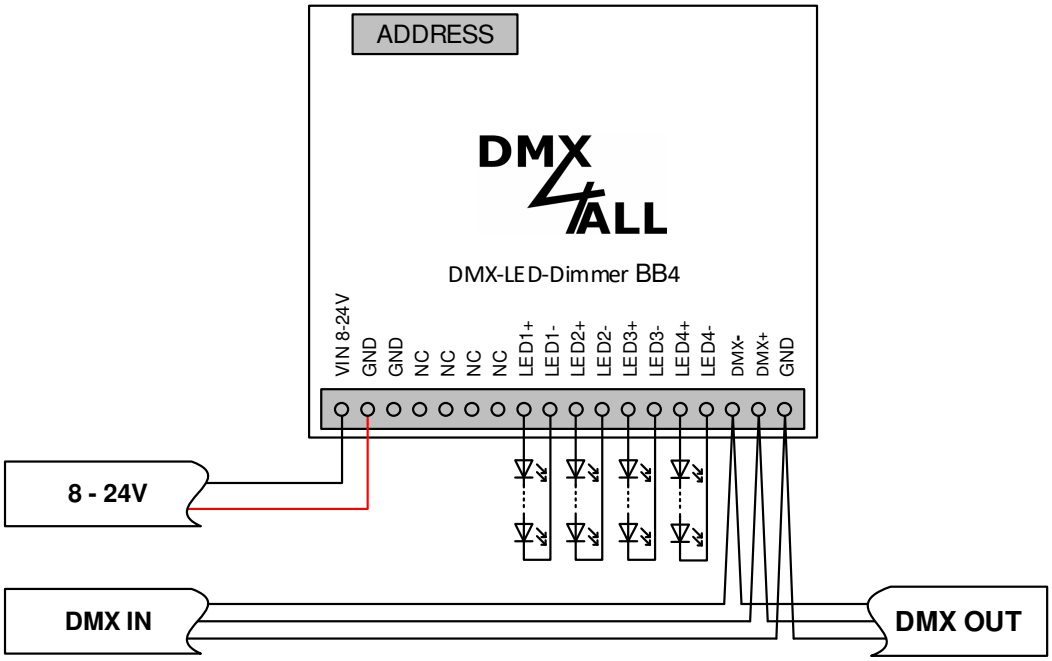
Data sheet

Power supply:	8-24V DC (maximum 26V) 50mA (without connected load)
Drop voltage:	max. 2V
Output current:	4x 0 – settable output current (330mA – 1500mA) Sustained short circuit / 1024 steps at each output
Protocol:	DMX512 RDM
DMX channels:	4 channels with 8Bit control and Lookup table 8 channels with 10Bit control
DMX-FAIL:	Hold / 0%-100%
Masterdimmer:	None / Global / System
PWM-Frequency:	No PWM at the output
StandAlone-Function:	9 internal StandAlone programs Switching on individual outputs
Operation temperature:	0°C up to +45°C Thermal overload protection per output
Connection:	Screw terminals
Dimensions (LxBxH):	99mm x 82mm x 47mm

Connections

Never connect the terminals with each other, e.g. GND of the power supply and the terminal LED- of the output or the different LED terminals !!!

Never connect the single negative outputs to the LEDs with each other !!! This damages the LEDs and the LED drivers.



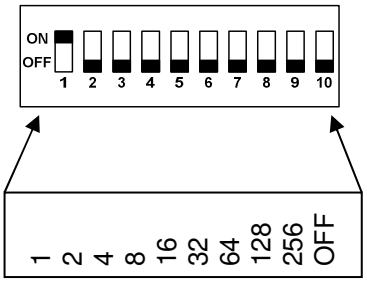
DMX Addressing

The DMX start address is adjustable via switches 1-9.

Switch 1 has the valency 2^0 (=1), switch 2 has the valency 2^1 (=2) and so on… finally switch 9 has the valency 2^8 (=256).

The sum of the values of the switches set to ON corresponds to the start address.

Switch 10 is stored for special functions and is to leave on OFF via DMX in the normal mode.



The DMX address can also be set via RDM. In this case the switches must all be set to OFF !

LED-Display

The integrated DMX-LED is a multifunctional display. In the normal operation the LED lights permanently. In this case the device is working.

Furthermore, the LED signals the events. In this case the LED lights up in short pitches. The Number of flashing signals is equal to the Number of the error status:

Erorr	Name	Description
1	NO DMX signal	There is no DMX signal detected.
2	Addressing error	Please check, if an valid DMX start address is adjusted.
4	Factory Reset	A Factory-Reset was executed

Behavior in case of DMX loss (from hardware V4.2)

The DMX-LED-Dimmer BB4 can hold the received DMX values at the last value or set them to a specific value in case of a DMX signal loss (DMX Fail).

The behavior at DMX failure is set exclusively via RDM.
For this, the parameter DMX_FAIL_MODE must be used.

HOLD ➔ Hold the last DMX values

Level 0 - 255 ➔ All DMX values are set the adjusted value

After a power failure, the hold values are not restored by the HOLD function. In this case, the values are set to 0.

Set output current

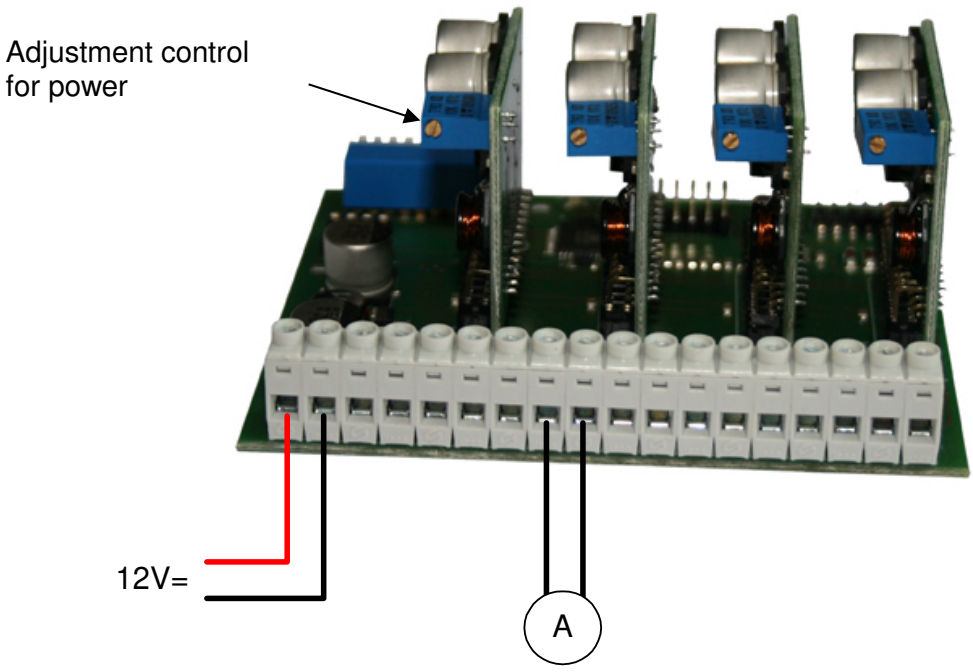
Each output has a regulator for settings adjusting the maximal output current.

The output current is in the range from 330mA up to 1500mA.

⚠ Before connecting a LED to an output please adjust the suitable operating current for the LED !!! Only in this case a safety use can be guaranteed.

For adjusting the output current, please proceed as follows:

- Set up the DIP-switch 1 up to 5 and 10 to ON
- Connect the power supply
- Now connect a current measurement device to the LED-outputs. The measure range should not be chosen higher than 2A.
- Please adjust now the LED-operating current with help of the regulator for settings.
- Repeat this measuring and adjusting for every channel.



To get an optimal result please adjust a power supply to 12V. If you use a higher power supply it is recommendable to use LED in series to the measure instrument.

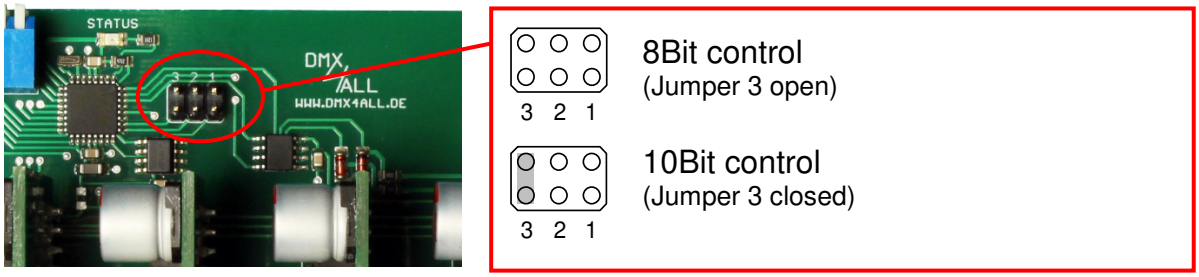
Switch on the outputs without DMX

For service operation the outputs can be switched on or off permanently. For this switch 5 and 10 must be set on ON.
Now, via switch 1-4 the outputs can be turned off and on.

Set operation modes

The **DMX-LED-Dimmer BB4** has 2 operation modes, which can be combined with the master dimmer settings.

The setting 8Bit / 10Bit control occurs via jumper 3:



<u>8Bit control:</u> Control output via <u>one</u> DMX channel each

The output resolution of 1024 steps is adapted to the 256 steps of the DMX value with a LookUp table (Curve Definition). This LookUp table (Curve Definition) is editable for each output. Within the delivery state the LookUp table is predefined linearly.

<u>10Bit control</u>: Control output via <u>two</u> DMX channel each

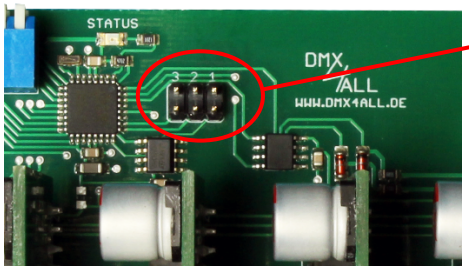
Each output has a 10Bit resolution. To address this directly, 2 DMX channels are used for each output. The 2. DMX channel is fine adjustment.

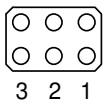
⚠ The RDM parameter PERSONALITY can also be used to set the operating mode with master dimmer. No jumper must be set for RDM operation.

DMX-Master-Dimmer

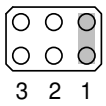
The **DMX-LED-Dimmer BB4** has several Masterdimmer.

These can be activated via jumper 1 and 2. A combination with the operation mode 8Bit / 10Bit (jumper 3) is possible.

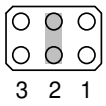




No Masterdimmer
(Jumper 1 + 2 open)



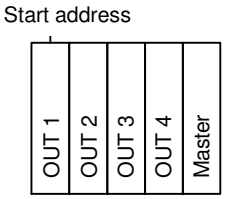
Masterdimmer for all channels
(Jumper 1 closed)



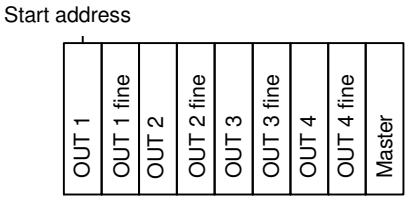
System-Masterdimmer for all channels
(Jumper 2 closed)

Masterdimmer for all channels

The DMX channel with the start address is set and used as master dimmer for all outputs. The assignment of the DMX addresses is as follows:



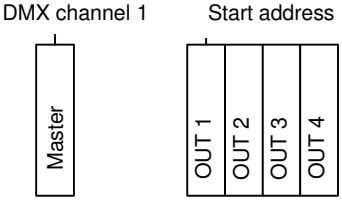
Jumper 3 open



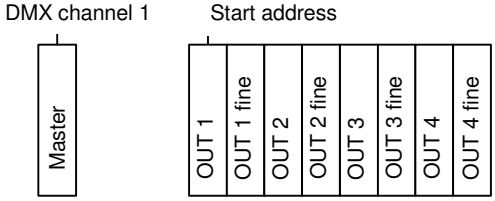
Jumper 3 closed

System-Masterdimmer for all channels

The value for the master dimmer corresponds to DMX channel 1 which is then used as master dimmer for all outputs. The DMX start address specifies the DMX channel on which the DMX values for the outputs start. The assignment of the DMX addresses is as follows:



Jumper 3 closed



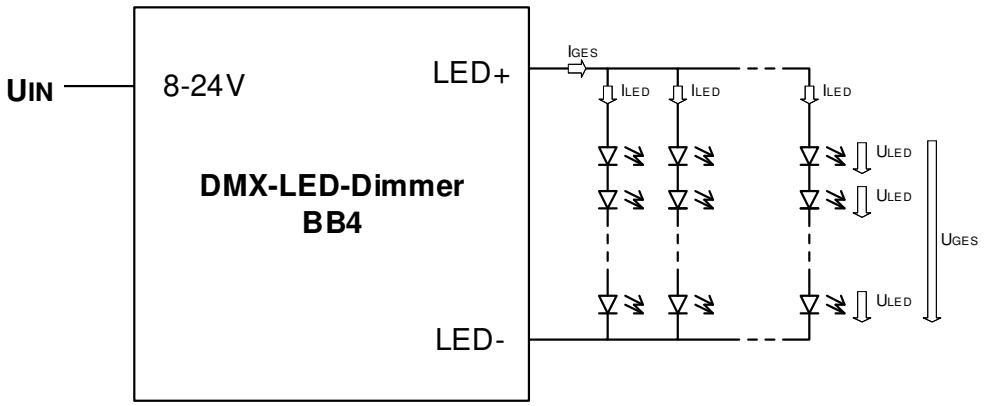
Jumper 3 closed

The RDM parameter PERSONALITY can also be used to set the operating mode with master dimmer. No jumper must be set for RDM operation.

Connect LEDs

The LEDs can be connected to the DMX LED Dimmer BB4 in different ways, in series, in parallel or in mixed connection.

Each LED output is run independently of the others. So, one output can be used with a series connection of LEDs and another with a parallel connection of LEDs.



The following rules must be followed:

- Use only the same LEDs at one output
- Each branch must have the same number of LEDs
- U_{GES} has to be 2V less as U_{IN}
- $I_{GES} = \Sigma I_{LED}$ must correspond to the set current of the DMX LED Dimmer because these are current-controlled outputs.

Example: 24 white 1W LEDs at one output

LED data: U_{LED} = 3,42V ; I_{LED} = 350mA
Power supply: 24V DC

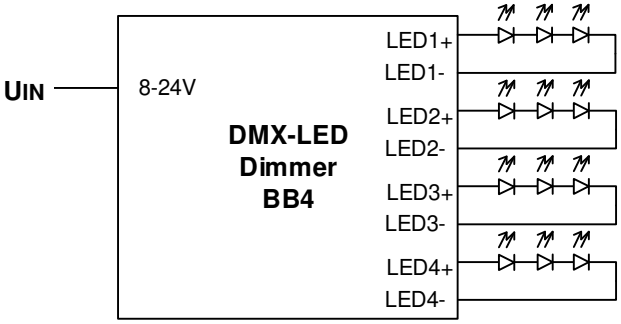
The connection is made in 4 branches with 6 LEDs each in series.

U_{GES} = 6 * 3,42V = 20,52V ✓
I_{GES} = 4 * 350mA = 1400mA ✓

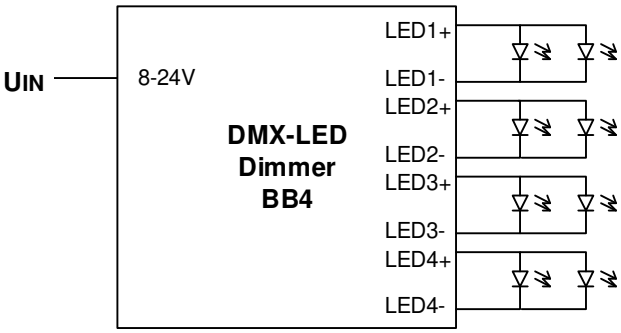
Examples for LED connection

⚠ Only the same LEDs, if possible from one lot, may be run in parallel !

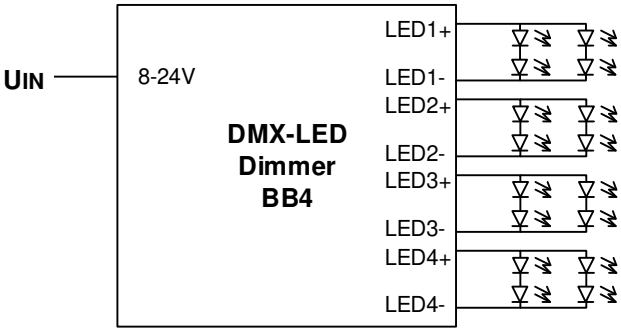
Example 1:
When the LEDs are connected in series, each LED receives the same operating current. The sum of the LED voltages at the output must be ca. 2V less than the operating voltage.



Example 2:
If the LEDs are connected parallel, the current is divided among the individual LEDs. The sum of the LED operating currents must correspond to the specified value of the LED dimmer!

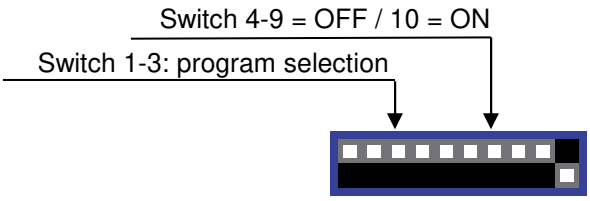


Example 3:
In case of mixed connection of LEDs, several LEDs are run in line and several of these branches are connected in parallel at the output.



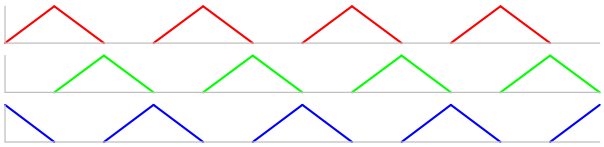
Call the internal colour changes

You can call the internal colour change by turning switch 10 on ON. Now you can adjust the colour change programs via the switches 1 up to 3.

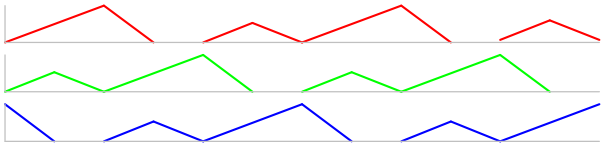


The following colour changes are possible:

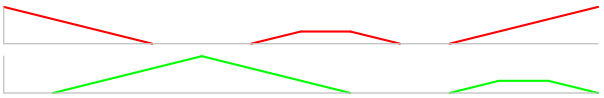
Color change 1:



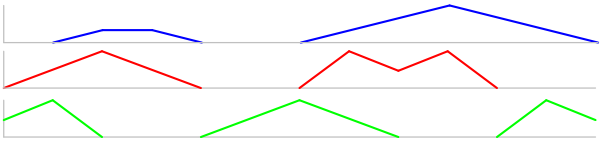
Color change 2:



Color change 3:

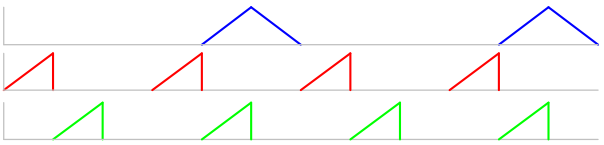


Colour change 4:

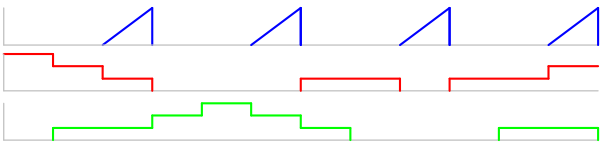


Color change 5:

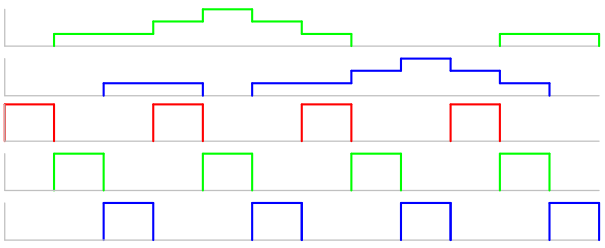
Color change 6:



Color change 7:



Color change 8:



LookUp-Table configuration

The **DMX-LED-Dimmer BB4** has a LookUp-Table per output.

The received DMX channel has values from 0 to 255. The DMX LED Dimmer BB4 output driver on the other hand offers 1024 steps (10 bits) which are assigned to the DMX values.

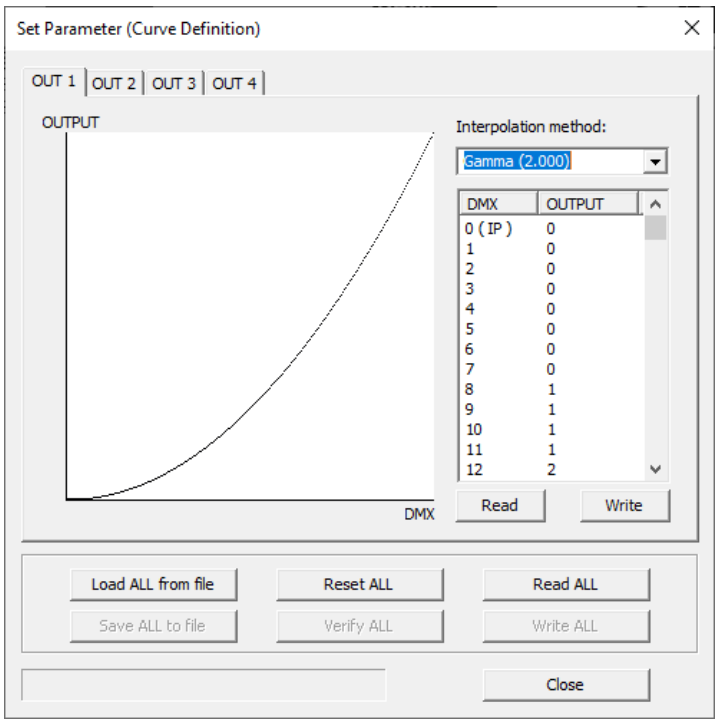
So, it is possible that in the lower brightness range small steps make small brightness changes. On the other hand, larger steps can be programmed in the upper brightness range.

If no LookUp-Table is configured (state of delivery) the output control occurs linearly.

Set LookUp-Table via RDM

To set the LookUp-Table the RDM-Parameter CURVE_DEFINITION is used.

The program RDM-Configurator provides the following surface to enter the dim curve for this parameter:



A detailed description of the functions can be found in the RDM-Configurator manual.

RDM (ab Hardware V2.4)

RDM is the short form for **R**emote **D**evice **M**anagement.

As soon as the device is within the system, device-dependent settings can occur remotely via RDM command due to the uniquely assigned UID. A direct access to the device is not necessary.

⚠ The setting made on the device, e.g. via jumpers or DIP switches, always has priority!

This device supports the following RDM commands:

Parameter ID	Discovery Command	SET Command	GET Command	ANSI/ PID
DISC_UNIQUE_BRANCH	✓			E1.20
DISC_MUTE	✓			E1.20
DISC_UN_MUTE	✓			E1.20
DEVICE_INFO			✓	E1.20
SUPPORTED_PARAMETERS			✓	E1.20
PARAMETER_DESCRIPTION			✓	E1.20
SOFTWARE_VERSION_LABEL			✓	E1.20
DMX_START_ADDRESS		✓	✓	E1.20
DEVICE_LABEL		✓	✓	E1.20
MANUFACTURER_LABEL			✓	E1.20
DEVICE_MODEL_DESCRIPTION			✓	E1.20
IDENTIFY_DEVICE		✓	✓	E1.20
FACTORY_DEFAULTS		✓	✓	E1.20
DMX_PERSONALITY		✓	✓	E1.20
DMX_PERSONALITY_DESCRIPTION			✓	E1.20
DMX_FAIL_MODE		✓	✓	E1.37

Parameter ID	Discovery Command	SET Command	GET Command	ANSI/ PID
SERIAL_NUMBER[1)]			✓	PID: 0xD400
IDENTIFY_MODE[1)]		✓	✓	PID: 0xD402
CURVE_DEFINITION[1)]		✓	✓	PID: 0xD430

1) Manufacturer depending RDM control commands (MSC - Manufacturer Specific Type)

Manufacturer depending RDM control commands:

SERIAL_NUMBER
PID: 0xD400

Outputs a text description (ASCII-Text) of the device serial number.

GET Send: PDL=0
Receive: PDL=21 (21 Byte ASCII-Text)

IDENTIFY_MODE
PID: 0xD402

Sets the mode used with IDENTIFY_DEVICE.

GET Send: PDL=0
Receive: PDL=1 (1 Byte IDENTIFY_MODE_ID)

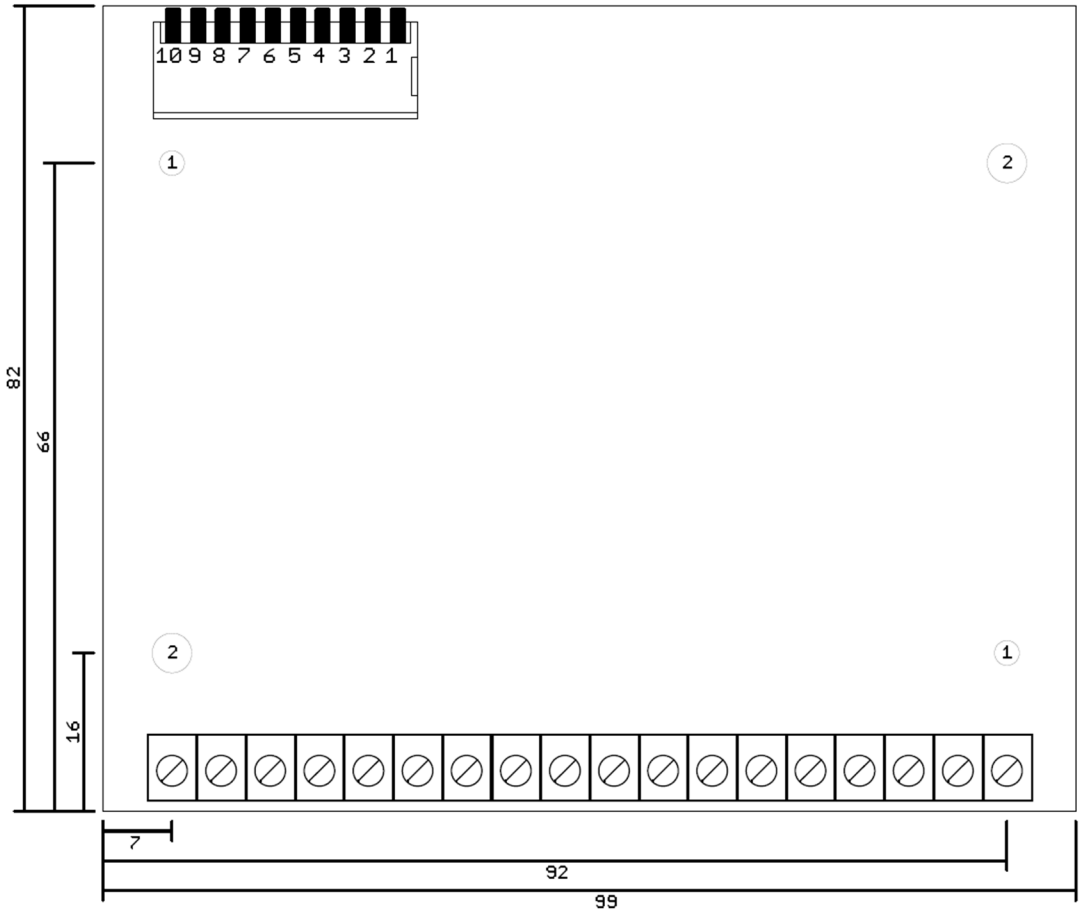
SET Send: PDL=1 (1 Byte IDENTIFY_MODE_ID)
Receive: PDL=0

IDENTIFY_MODE_ID	Function
0	FULL Identify All outputs switch simultanously ON/OFF and the status LED flashes
1	LOUD Identify All outputs switch in order ON/OFF and the status flashes
2	QUIET Identify The outputs do not switch, only the status LED flashes

CURVE_DEFINITION
PID: 0xD430

Sets the LookUp tables of the device.

Dimensions



All details in mm

Factory Reset

Bevor Sie den Factory Reset durchführen lesen Sie alle Schritte sorgfältig durch.

Um den **DMX-LED-Dimmer BB4** in den Auslieferzustand zurückzusetzten gehen Sie wie folgt vor:

- Gerät ausschalten (Spannungsversorgung und USB trennen !)
- Adressschalter 1 bis 10 auf ON stellen
- Gerät einschalten (Spannungsversorgung oder USB)
- Die LED blinkt nun innerhalb von ca. 3 Sekunden 20x

  ➔ Während die LED blinkt den Schalter 10 auf OFF stellen
- Der Factory Reset wird nun durchgeführt

  ➔ Die LED blinkt nun mit Ereigniscode 4
- Gerät ausschalten (Spannungsversorgung und USB trennen !)
- Das Gerät kann nun verwendet werden.

Ist ein erneuter Factory Reset notwendig kann dieser Vorgang wiederholt werden.

Equipment

Module enclosure 1050 for DIN-rail

CE-Conformity

This assembly (board) is controlled by a microprocessor and uses high frequency. In order to maintain the properties of the module with regard to CE conformity, installation into a closed metal housing in accordance with the EMC directive 2014/30/EU is necessary.

Disposal

Electronical and electronic products must not be disposed in domestic waste. Dispose the product at the end of its service life in accordance with applicable legal regulations. Information on this can be obtained from your local waste disposal company.

Warning

This device is no toy. Keep out of the reach of children. Parents are liable for consequential damages caused by nonobservance for their children.

Risk-Notes

You purchased a technical product. Conformable to the best available technology the following risks should not excluded:

Failure risk:
The device can drop out partially or completely at any time without warning. To reduce the probability of a failure a redundant system structure is necessary.

Initiation risk:
For the installation of the board, the board must be connected and adjusted to foreign components according to the device paperwork. This work can only be done by qualified personnel, which read the full device paperwork and understand it.

Operating risk:
The Change or the operation under special conditions of the installed systems/components could as well as hidden defects cause to breakdown within the running time.

Misusage risk:
Any nonstandard use could cause incalculable risks and is not allowed.

Warning: It is not allowed to use the device in an operation, where the safety of persons depend on this device.

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