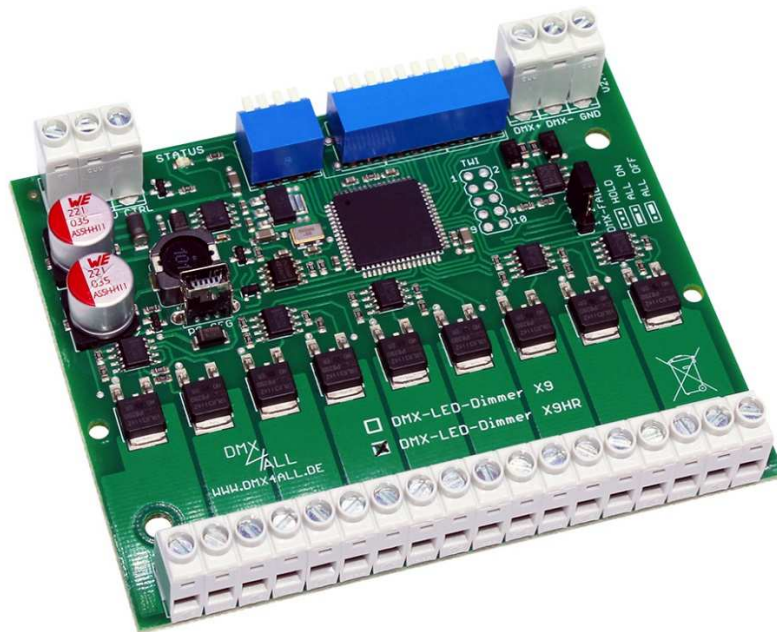


DMX-LED-DIMMER X9HR

User Manual





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

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Description

The **DMX-LED-Dimmer X9HR** is especially designed for controlling RGB LED-Stripes. The dimmer has 9 High-Resolution PWM-Outputs (3xRGB) independently controllable via DMX.

9 Outputs

The DMX-LED-Dimmer X9HR has 9 outputs to which LEDs can be connected. All outputs are designed in the same way so single color, RGB or RGBW LEDs can be connected.

High Power Outputs

The outputs can drive a current up to 10A.

So it is possible to connect a maximum load of 120W (12V) / 240W (24V).

0% to 100% dimmable

The connected LEDs are dimmed by PWM from 0% to 100%.

For voltages from 12V up to 24V

The DMX-LED-Dimmer X9HR operates with supply voltages from 12V up to 24V. The LED voltage can be different per output so that one X9HR DMX-LED-Dimmer can control different LED systems.

DMX-FAIL Function

An adjustable DMX FAIL function offers the option to get in case of lost DMX signal the current state (HOLD) or assuming a preset value.

DMX-Master Dimmer

Optionally, another DMX channel can be activated as Master Dimmer (all outputs) or one master dimmer per RGB group. The global master dimmer is fixed at DMX address 1 and can be used as system master dimmer.

Adjustable dimming curve

The dimming curves can be configured individually for each output.

RDM support

The DMX-LED-Dimmer X9HR allows configuration by RDM via DMX.

SubDevice-Mode

In SubDevice mode, each output is assigned its own DMX address and DMX FAIL behavior via RDM.

LED-State Display

The DMX state is indicated via the LED status.

Firmware-Update-Function

To use future functions, the DMX-LED-Dimmer X9HR offers a firmware update function.

Top hat rail housing available

The top-hat rail housing 1050 is available as accessory for the DMX-LED-Dimmer X9HR.

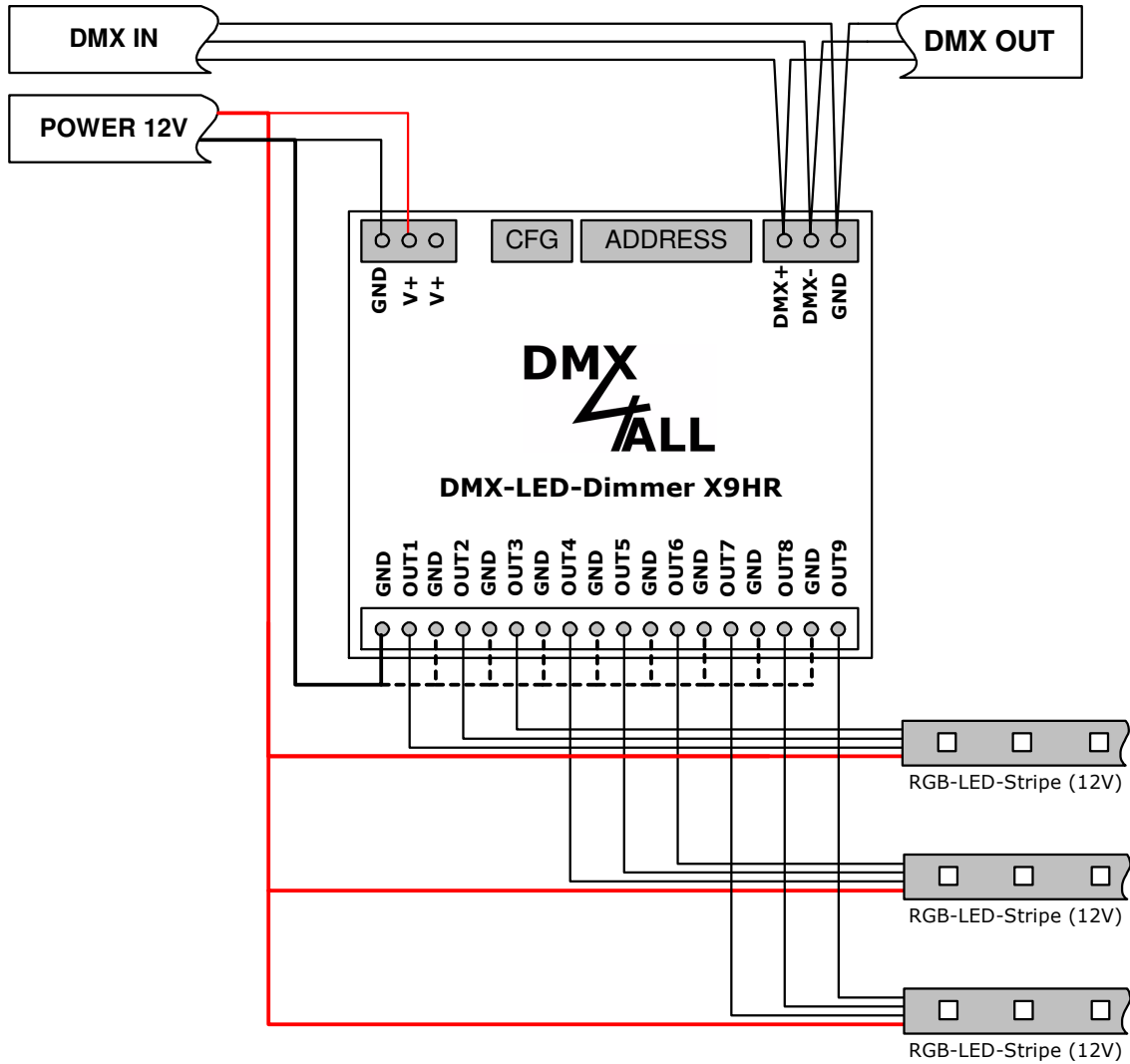
Data sheet

Power supply:	7-24V DC 80mA@12V / 100mA@24V (without connected LED load)
LED voltage:	7-24V DC (no AC voltage !)
Protocol:	DMX512 RDM
DMX channels:	9 channels with 8Bit-controlling and LookUp-Table 18 channels with 16Bit-controlling + optional Master-Dimmer-Channels
DMX-FAIL:	Hold / 0%-100%
Output:	9 PWM-signal with 16Bit-resolution Common supply voltage
Output current:	max. 10A each output In sum 90A with all GND connections (direct from power supply)
Output power:	9x 120W (12V) / 9x 240W (24V)
Masterdimmer:	None / Global / RGB / System
PWM-frequency:	488 Hz / 2kHz / 4kHz
CTRL output:	Control output for switching off the load power supply units (Energy-Save)
StandAlone function:	9 internal StandAlone programs
Connections:	Screw terminals
Dimensions:	99mm x 82 mm

Content

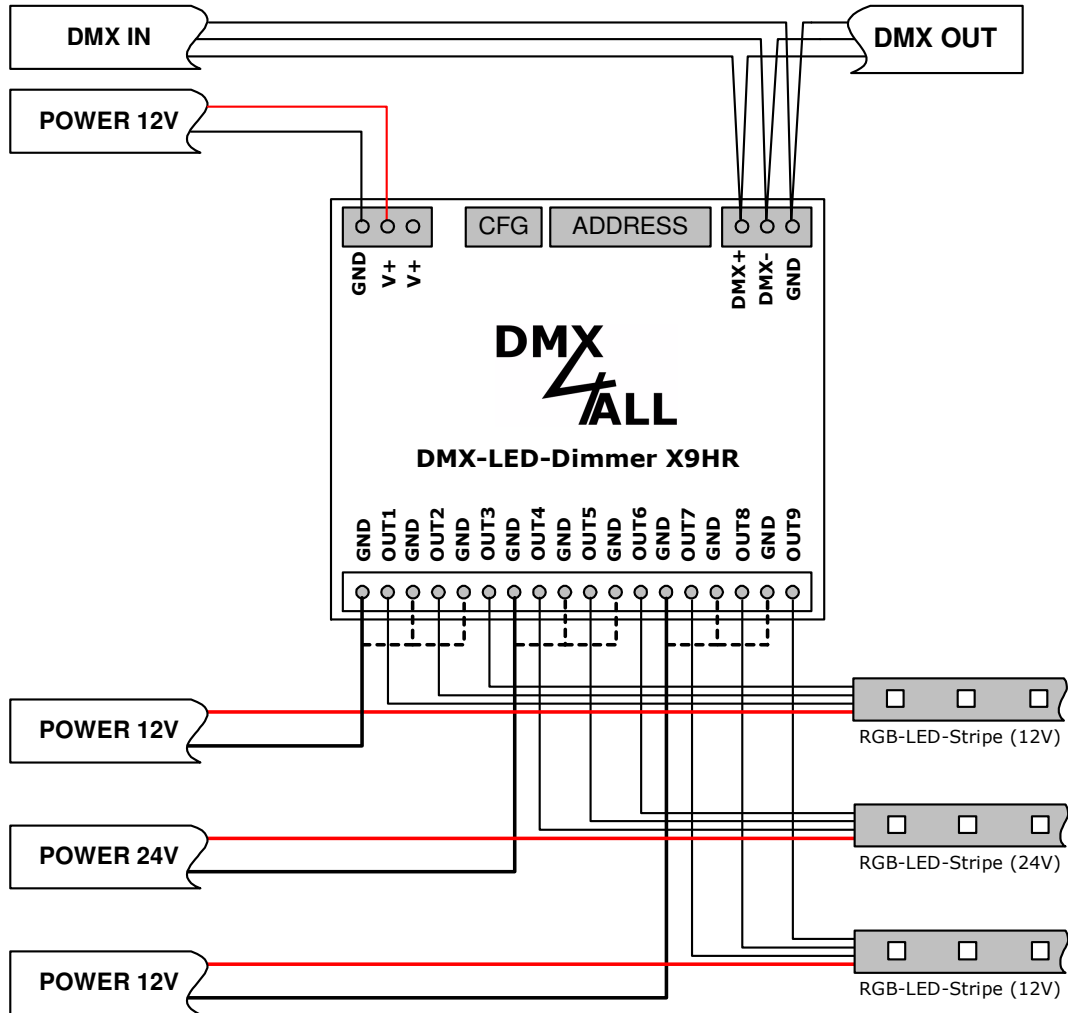
- 1x DMX-LED-Dimmer X9HR
- 1x Quick manual german and english

Connection with one power supply



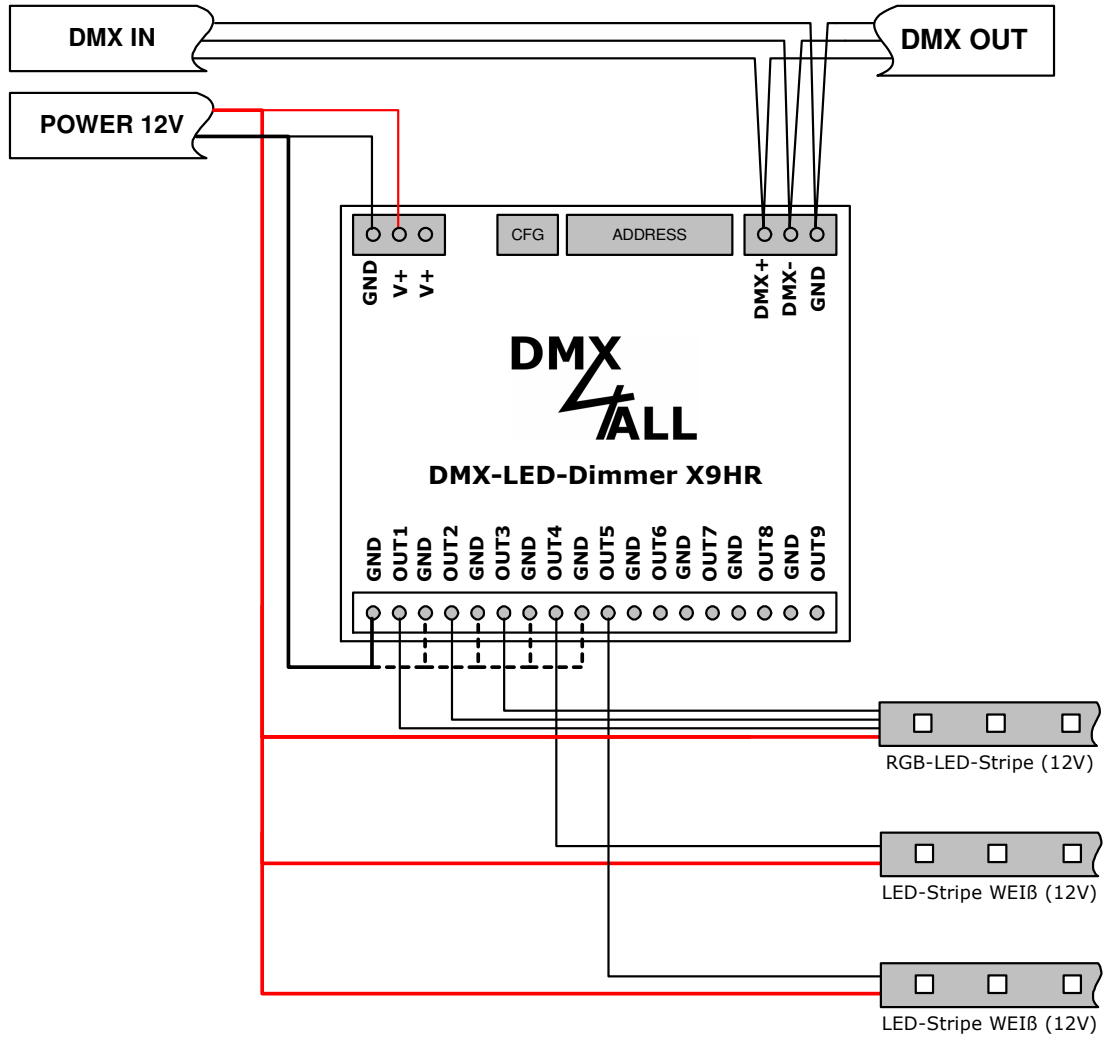
 Must be connected direct
 from the power supply !
 Use at least one GND
 connection per 10A.

Connection with several power supplies



 Must be connected direct
 from the power supply !
 Use at least one GND
 connection per 10A.

Connection with single color and multi-color stripes



Must be connected direct
 from the power supply !
 Use at least one GND
 connection per 10A.

CTRL-Output (Energy-Save)

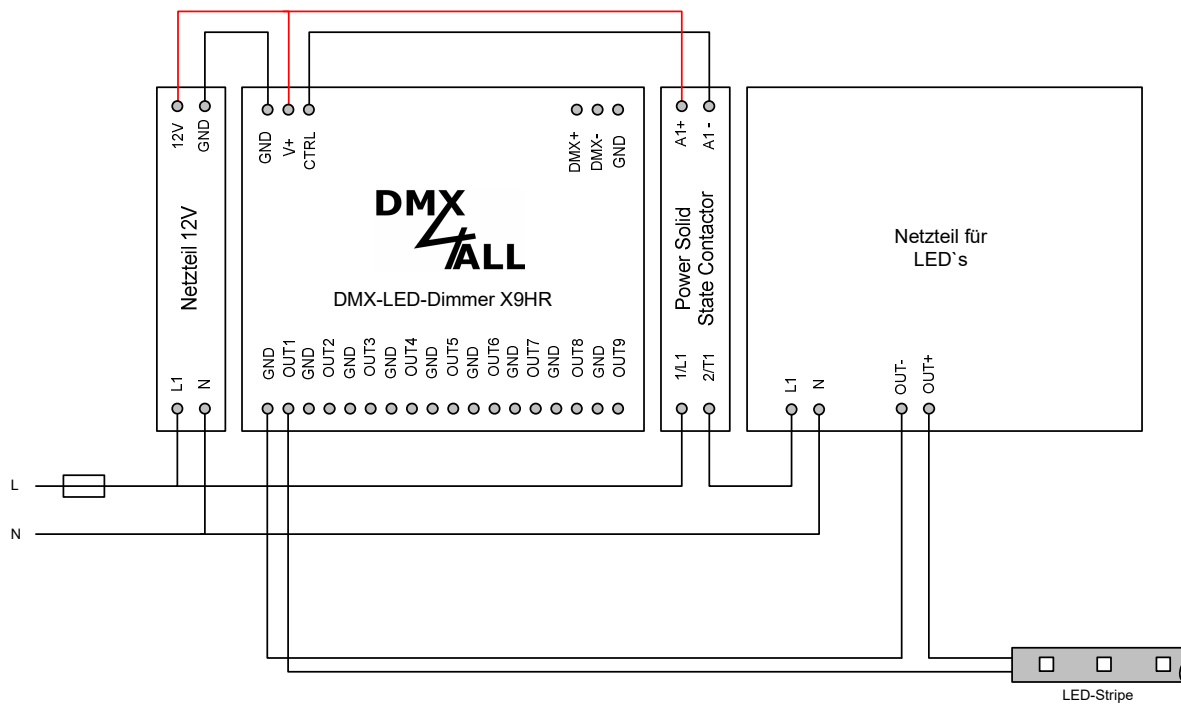
(from 06/2014 / Version 2.1)

The **DMX-LED-Dimmer X9HR** has an Energy-Save control output (CTRL) which is able to run off the Load Power Supply of the LEDs.

If none of the outputs is activated for a period of 5 minutes or all DMX values are set to 0 for 5 minutes, the control output is switched off.

So, the power loss for power supply units that are not needed for a longer period of time can be avoided.

Example installation:



Cable Lengths

The DMX-LED-Dimmer X9HR should be run with shortest possible cable lengths.

Because of the low operation voltage in LED installation the cable cross section is to choose as large as possible to keep the voltage drop as low as possible on the cable.

The cable cross section should be all the larger as the distance increases and the load increases.

The following cable lengths should not be exceeded:

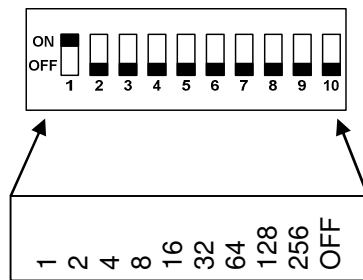
From power supply to DMX-LED-Dimmer X9HR → 1m

From DMX-LED-Dimmer X9HR to LEDs → 10m

DMX-Addressing

The starting address is adjustable with the switches 1 to up 9.

Switch 1 has the valency 2^0 (=1), switch 2 the valency 2^1 (=2) etc. until switch 9 has the valency 2^8 (=256). In total the switches showing ON correlate with the starting address.



The RDM parameter `DMX_STARTADDRESS` can also be used to set the DMX start address.

A DMX start address set via the DIP switches has priority over the start address set via RDM.

LED-Display

The integrated LED is a multifunctional-display.

During the normal DMX-Operation the LED flashes permanent. In this case the device is working.

Furthermore, the LED shows the event. In this case the LED lights in short pitches and then turns into the off mode for a longer period. The number of flashing impulses corresponds with the error status:

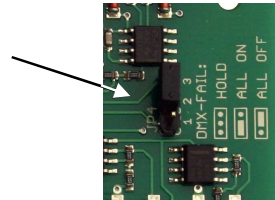
Error Status	Error	Description
1	No DMX	There is no DMX-Signal reaching the dimmer
2	Address error	Check if a valid DMX starting address is adjusted at the DIP-switch
4	Factory Reset	A Factory-Reset was executed

DMX FAIL Action


(from 06/2013 / Version 2)

The DMX-LED-Dimmer X9HR can hold the last value, switch on or switch off the LED outputs on DMX fail.

This DMX-Fail option is selectable with the Jumper.



HOLD:	Hold last value	
ALL ON:	Turn on all outputs	(100%)
ALL OFF:	Turn off all outputs	(0%)

 After voltage drop the held values are not restored by the HOLD function. In this case the values are set to 0 (OFF).

 Via the RDM parameter DMX_FAIL_MODE the level can be adjusted also.

Operation Modes

The **DMX-LED-Dimmer X9HR** has several operation modes / Personality (Configuration switch 3 and 4), which are set in combination with the Master-Dimmer (Configuration switch 1 and 2):

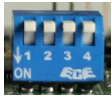
- Personality 1: 9Ch. Dimmer
- Personality 2: 9Ch. Dimmer + Master
- Personality 3: 9Ch. Dimmer + RGB-Master
- Personality 4: 9Ch. Dimmer + System-Master
- Personality 5: 9Ch. Dimmer 2kHz
- Personality 6: 9Ch. Dimmer 2kHz + Master
- Personality 7: 9Ch. Dimmer 2kHz + RGB-Master
- Personality 8: 9Ch. Dimmer 2kHz + System-Master
- Personality 9: 9Ch. Dimmer 16Bit
- Personality 10: 9Ch. Dimmer 16Bit + Master
- Personality 11: 9Ch. Dimmer 16Bit + RGB-Master
- Personality 12: 9Ch. Dimmer 16Bit + System-Master
- Personality 13: 9Ch. Dimmer 4kHz
- Personality 14: 9Ch. Dimmer 4kHz + Master
- Personality 15: 9Ch. Dimmer 4kHz + RGB-Master
- Personality 16: 9Ch. Dimmer 4kHz + System-Master
- Personality 17: 4x CCT-Control*
- Personality 18: 4x CCT-Control 2kHz*
- Personality 19: 4x CCT-Control 4kHz*



Über den RDM-Parameter `DMX_PERSONALITY` kann die Betriebsart über RDM eingestellt werden. Die mit * gekennzeichneten Personalities sind ausschließlich per RDM zu verwenden.

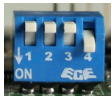
Ist eine Betriebsart über die Konfigurationsschalter eingestellt, so hat diese Vorrang zu der per RDM eingestellten Betriebsart.

9Ch. Dimmer 8Bit with dim curve



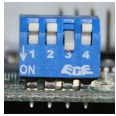
In this operating mode, each output is controlled with a DMX channel (8Bit). A freely programmable dimming curve (look-up table / curve definition) is available for each output, which maps the 8-bit DMX value to the 16-bit resolution of the output. The output characteristics are preprogrammed linear and can be freely programmed.

9Ch. Dimmer 16Bit



In this operating mode, each output is controlled with two DMX channels (16Bit). There is a 16-bit resolution for each output, which is mapped directly via the DMX values. 2 DMX channels are used per output. The 2nd DMX channel is the fine adjustment.

9Ch. Dimmer 8Bit 2kHz (linear)



In this operating mode, each output is controlled with a DMX channel (8Bit). The output is controlled with 2kHz and a linear dimming curve.

9Ch. Dimmer 8Bit 4kHz (linear)



In this operating mode, each output is controlled with a DMX channel (8Bit). The output is controlled with 4kHz and a linear dimming curve.

Master-Dimmer



No Master Dimmer



Master Dimmer



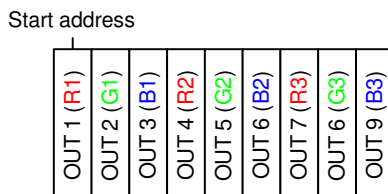
RGB-Master Dimmer



System-Master Dimmer

Personality 1: 9Ch. Dimmer

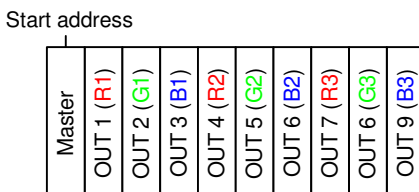
In this operation mode each output is controlled with one DMX channel (8Bit). For each output there's a free programmable dim curve (LookUp table / Curve definition) available, which displays the 8Bit-DMX value to the 16Bit solution of the output. The output diagrams are linear predefined and can be freely programmed.



A 488Hz PWM- output frequency is used in this operation mode.

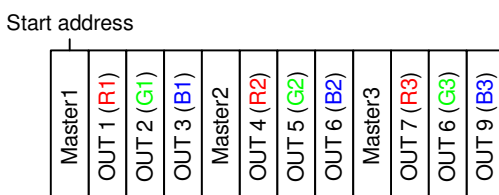
Personality 2: 9Ch. Dimmer + Master

Additionally, to Personality 1, the first DMX channel is used as master dimmer for all 9 outputs.



Personality 3: 9Ch. Dimmer + RGB-Master

In addition to Personality 1, one master dimmer is used for every 3 outputs (RGB group).



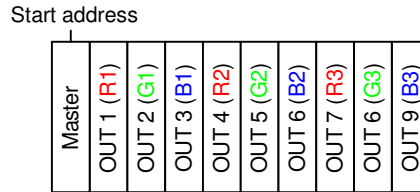
Personality 4: 9Ch. Dimmer + System-Master

Additionally, to Personality 1, DMX channel 1 is used as master dimmer for all 9 outputs.



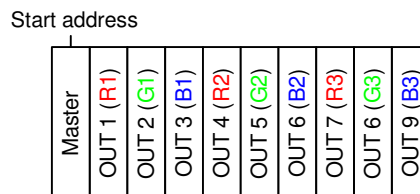
Personality 5: 9Ch. Dimmer 2kHz

In this operation mode a 2kHz PWM output frequency and a linear control for the outputs is used.



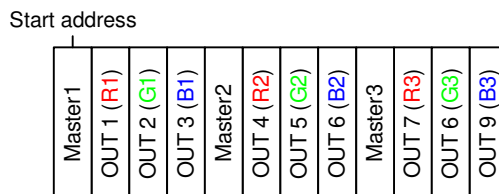
Personality 6: 9Ch. Dimmer 2kHz + Master

Additionally, to Personality 5, the first DMX channel is used as master dimmer for all 9 outputs.



Personality 7: 9Ch. Dimmer 2kHz + RGB-Master

In addition to Personality 5, one master dimmer is used for every 3 outputs (RGB group).



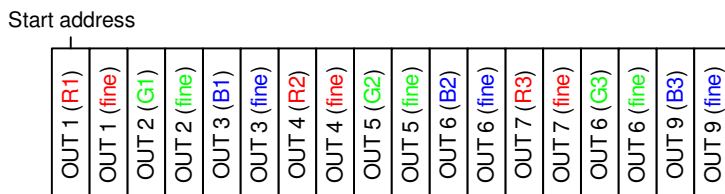
Personality 8: 9Ch. Dimmer 2kHz + System-Master

Additionally, to Personality 1, DMX channel 1 is used as master dimmer for all 9 outputs.



Personality 9: 9Ch. Dimmer 16Bit

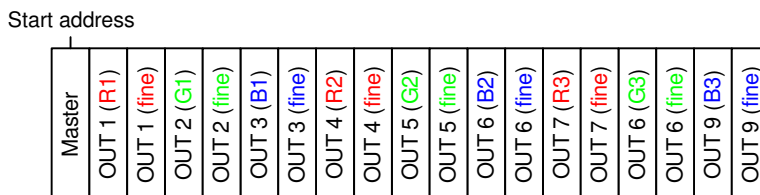
In this operation mode each output is controlled with two DMX channel (16Bit). For each output there's a 16Bit resolution available, directly displayed via the DMX values. Every output uses 2 DMX channels. The 2. DMX channel is the fine adjustment.



A 488Hz PWM- output frequency is used in this operation mode.

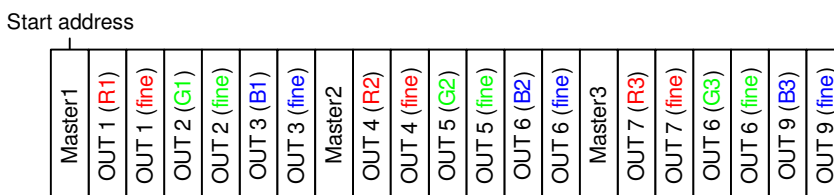
Personality 10: 9Ch. Dimmer 16Bit + Master

Additionally, to Personality 9, the first DMX channel is used as master dimmer (8Bit) for all 9 outputs.



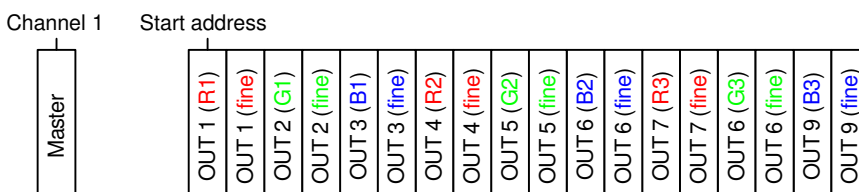
Personality 11: 9Ch. Dimmer 16Bit + RGB-Master

In addition to Personality 9, one master dimmer (8Bit) is used for every 3 outputs (RGB group).



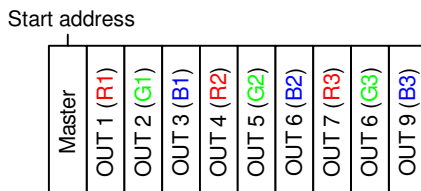
Personality 12: 9Ch. Dimmer 16Bit + System-Master

Additionally, to Personality 9, DMX channel 1 is used as master dimmer (8Bit) for all 9 outputs.



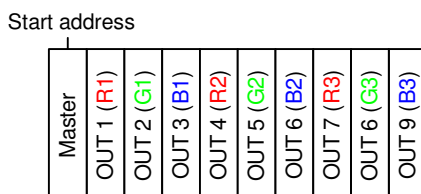
Personality 13: 9Ch. Dimmer 4kHz

In this operation mode a 4kHz PWM output frequency and linear control is used for the outputs.



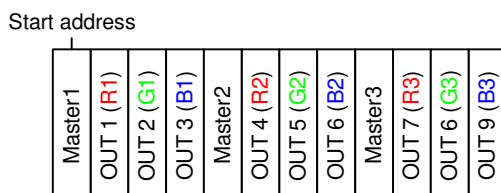
Personality 14: 9Ch. Dimmer 4kHz + Master

Additionally, to Personality 13, the first DMX channel is used as master dimmer for all 9 outputs.



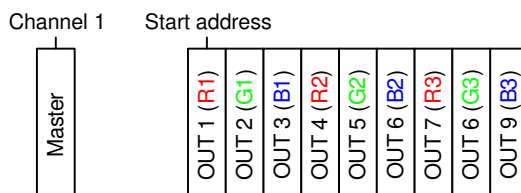
Personality 15: 9Ch. Dimmer 4kHz + RGB-Master

In addition to Personality13, one master dimmer is used for every 3 outputs (RGB group).



Personality 16: 9Ch. Dimmer 4kHz + System-Master

Additionally, to Personality 13, DMX channel 1 is used as master dimmer for all 9 outputs.



Personality 17: 4x CCT-Control

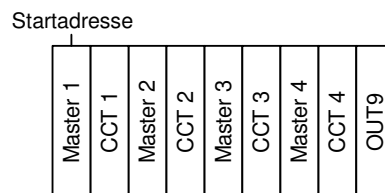
The CCT mode is especially created for cold-white and warm-white mixed light percentage.

Always, 2 outputs, one for cold-white and one for warm-white, are grouped. For these outputs the brightness is to set via the master channel and the mixing ratio via the CCT channel.

The outputs are grouped as follows:

	Cold white	Warm white
CCT Group 1	OUT1	OUT2
CCT Group 2	OUT3	OUT4
CCT Group 3	OUT5	OUT6
CCT Group 4	OUT7	OUT8

In sum the DMX-LED-Dimmer X9HR+ has 4 independent CCT groups taking the outputs 1 up to 8. Output 9 can be controlled via a single DMX channel.



Personality 18: 4x CCT-Control 2kHz

Different from Personality 17, a 2kHz PWM output frequency is used in this operation mode.

Personality 19: 4x CCT-Control 4kHz

In this operation mode, different from Personality 17, a 4kHz PWM output frequency is used.



The high frequency output of 2kHz or 4kHz is optimized for use in connection with video recording e.g. in TV studios.

Configuration of the dimming curve (Curve definition)

The **DMX-LED-Dimmer X9HR** has a freely programmable dimming curve (look-up table / curve definition) for each output.

The received DMX-Channel has values from 0 up to 255 (8 bit). The DMX-LED-Dimmer X9HR output driver provides 65536 steps (16 Bit) which are assigned to the DMX values.

So, it is possible to effect with small steps little brightness changings in the lower brightness range. However, in the upper brightness range it's possible to program bigger steps.

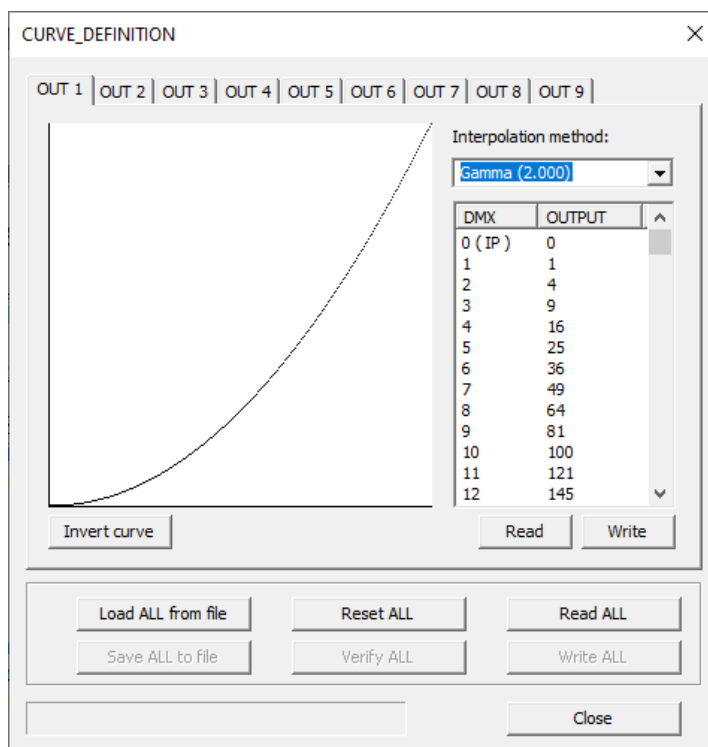


If no dimming curve is configured (delivery status) the output control is linear.

Set dimming curve via RDM

The RDM parameter CURVE_DEFINITION is used to set the dimming curve / lookup tables.

For this parameter, the Program RDM Configurator offers the following interface for editing the dimming curve:



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

Set LookUp-Table via USB

To transfer the Look-Up Table to the **DMX-LED-Dimmer X9HR** a PC-Connection cable and a USB-Connection at the PC is necessary.

Via the software DMX-Configurator the LookUp-Tables can be defined. The DMX-Configurator is available for free as download.

- Connect the DMX-LED-Dimmer X9HR with a standard USB-Mini-B connection cable to PC. As shown in the picture on the right site, plug the cable on the USB-Connection of the DMX-LED-Dimmer X9HR.



- Install the USB-Driver if it is not available.
- Start the DMX-Configurator Software (V2.3.9 or higher is needed)
- Generate a connection to DMX-LED-Dimmer X9HR
- Open Hardware-Settings (menu *Hardware*→*Hardware Settings*)

For each output (OUT1-OUT9) a table with DMX-Values in the range of 0-255 and the according output values (OUTPUT) is available. A graphic presentation illustrates the output line.

- Configure the output curve
- Check the output curve by selecting the LookUp *Test* and move the slider. The connected LED behaves according to the output line.
- Select **WRITE TO DEVICE** to transfer the table to the DMX-LED-Dimmer X9HR.

RDM

(from hardware V2.3)

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

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



If the DMX start address is set via RDM, all address switches at the DMX-LED-Dimmer X9HR must be set to OFF ! A DMX start address set by the address switches is always prior !

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
DISPLAY_LEVEL		✓	✓	E1.20
DMX_FAIL_MODE		✓	✓	E1.37

Parameter ID	Discovery Command	SET Command	GET Command	ANSI/PID
SERIAL_NUMBER ¹⁾			✓	PID: 0xD400
DISPLAY_AUTO_OFF ¹⁾		✓	✓	PID: 0xD401
IDENTIFY_MODE ¹⁾		✓	✓	PID: 0xD402
CURVE_DEFINITION ¹⁾		✓	✓	PID: 0xD430
SOFT_DIMMING ¹⁾		✓	✓	PID: 0xD431
SUBDEVICE_ENABLE ¹⁾		✓	✓	PID: 0xFF0F

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=33 (33 Byte ASCII-Text)

DISPLAY_AUTO_OFF

PID: 0xD401

Sets the time after which the display is switched off (DISPLAY_LEVEL = 0).

Valid values are:

- 0 - NO AUTO OFF
- 600 - 1 minute
- 1200 - 2 minutes
- 1800 - 3 minutes
- 2400 - 4 minutes
- 3000 - 5 minutes
- 3600 - 6 minutes
- 4200 - 7 minutes
- 4800 - 8 minutes
- 5400 - 9 minutes

GET Send: PDL=0
 Receive: PDL=2 (1 Word)

SET Send: PDL=2 (1 Word)
 Receive: PDL=0

IDENTIFY_MODE

PID: 0xD402

Sets the mode that is executed 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	Funktion
0	FULL Identify All outputs switch ON / OFF simultaneously and the status LED flashes
1	LOUD Identify The outputs switch ON / OFF one after the other and the status LED flashes
2	QUIET Identify The outputs do not switch, only the status LED flashes

CURVE_DEFINITION

PID: 0xD430

Sets the devices LookUp tables.

SOFT_DIMMING

PID: 0xD431

Sets the soft dimming behavior of the device.

GET Send: PDL=0
 Receive: PDL=1 (1 Byte SoftDimm parameter)

SET Send: PDL=1 (1 Byte SoftDimm parameter)
 Receive: PDL=0

Parameter	Function
0	Soft-Dimm OFF
1-255	Soft-Dimm up to the given value

SUBDEVICE_ENABLE

PID: 0xFF0F

Enable or disable the sub devices of the device.

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

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

SUBDEVICE_ENABLE_STATE	Funktion
0	SUB DEVICES DISABLED
1	SUB DEVICES ENABLED

SubDevice-Mode

In standard mode, the DMX-LED-Dimmer X9HR has a DMX start address from which the DMX channels are used one after the other.

In SubDevice mode, each output is assigned its own DMX address and DMX FAIL behavior.

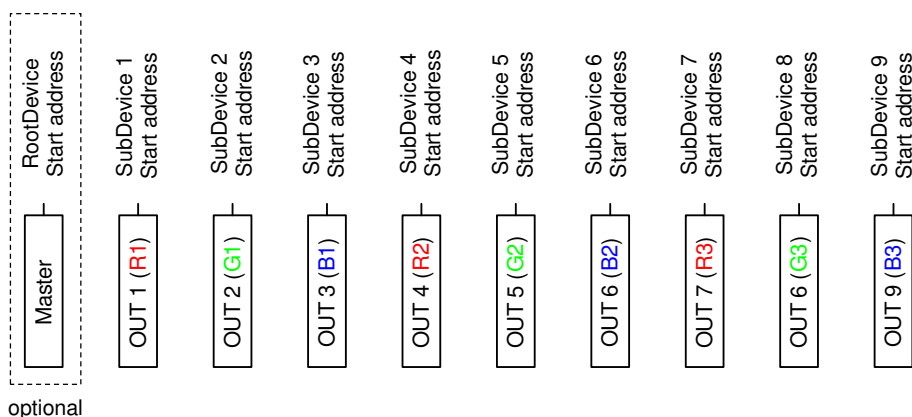
The active RGB master dimmer is an exception. If this is active, the DMX start address and the DMX FAIL behavior can be set for each RGB group with master dimmer.

To activate and deactivate the sub-device mode, the parameter SUBDEVICE_ENABLE must be activated via RDM.

Then the setting of the DMX address and the DMX FAIL behavior for each output / RGB group is made possible via RDM.

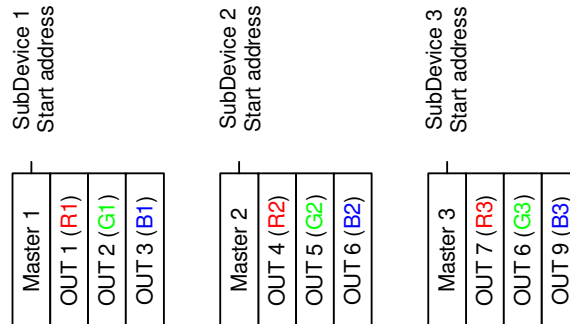
The assignment of the DMX addresses in SubDevice mode is as follows:

9Ch. Dimmer 8Bit

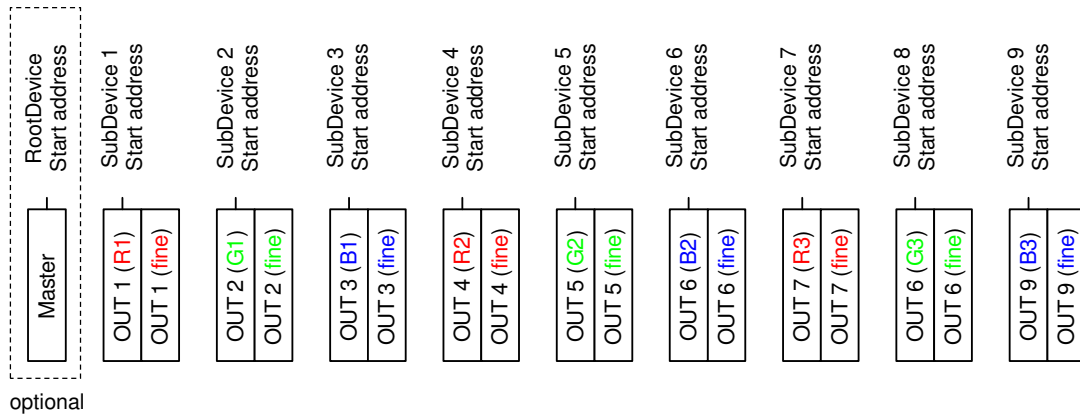


The assignment of the DMX addresses to the outputs is freely possible in SubDevice mode. Several outputs can also use the same DMX address.

9Ch. Dimmer 8Bit with RGB-Master-Dimmer



9Ch. Dimmer 16Bit



Execute Firmware Update

The **DMX-LED-Dimmer X9HR** has Update-Function, which allows transferring future firmware versions.

Please proceed as follows:

- Turn off the device (disconnect power supply and USB connection !)
- Set switch 7, 8 and 10 on ON
- Set switch 9 on OFF
- Generate USB connection to PC
- Install the USB driver if necessary (check in the device manager)
- Start the Update-Software **DMX4ALL USB-Updater**
- Select DMX-LED-Dimmer X9HR from list
- Click *Firmware-Update*
- Select Firmware file (.bin) and confirm
- Wait until update has finished



No program is allowed to access the USB-Connection. Close the DMX-Configurator and USB-Updater before USB-Cable is connected to the DMX-LED-Dimmer X9HR. Do not start the USB-Updater if the DMX-LED-Dimmer X9HR is in its update-mode.

If an error occurs during the update, you can start from beginning every time.

Factory Reset



Before running the Factory Reset, read all steps carefully.

To reset the **DMX-LED-Dimmer X9HR** to delivery state, proceed as follows:

- Turn off device (disconnect power supply and USB connection !)
- Set DIP switch 1 up to 10 to ON
- Turn on device (connect power supply)
- The LED lights up 20x during ca. 3 seconds
 - ➔ While the LED lights up set DIP switch 10 to OFF
- Now, the Factory Reset is executed
 - ➔ The LED lights up with error code 4
- Turn off device (disconnect power supply !)
- Now, the device can be used



If a Factory Reset is needed again, this procedure can be repeated at any time.

Equipment

DIN-Rail housing 1050



USB-Kabel A → Mini B 5pol.



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 be 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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