DMX-LED-DIMMER X9HR+

User Manual

Contents

Important Notes

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

A firmware update is recommended after receipt the product. This is the only way to ensure that the device has the latest version. You can find the latest firmware on the homepage.

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 DMX-LED-Dimmer X9HR 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 to adopt a predefined value if the DMX signal fails.

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
Within the SubDevice Mode, each output is assigned its own DMX address and DMX FAIL behavior via RDM.

Touch-Control
The DMX-LED-Dimmer X9HR+ is designed with 3 touch fields for operation and a 7-segment display.

RGB-Status display
Via a RGB status display the DMX reception is shown.

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

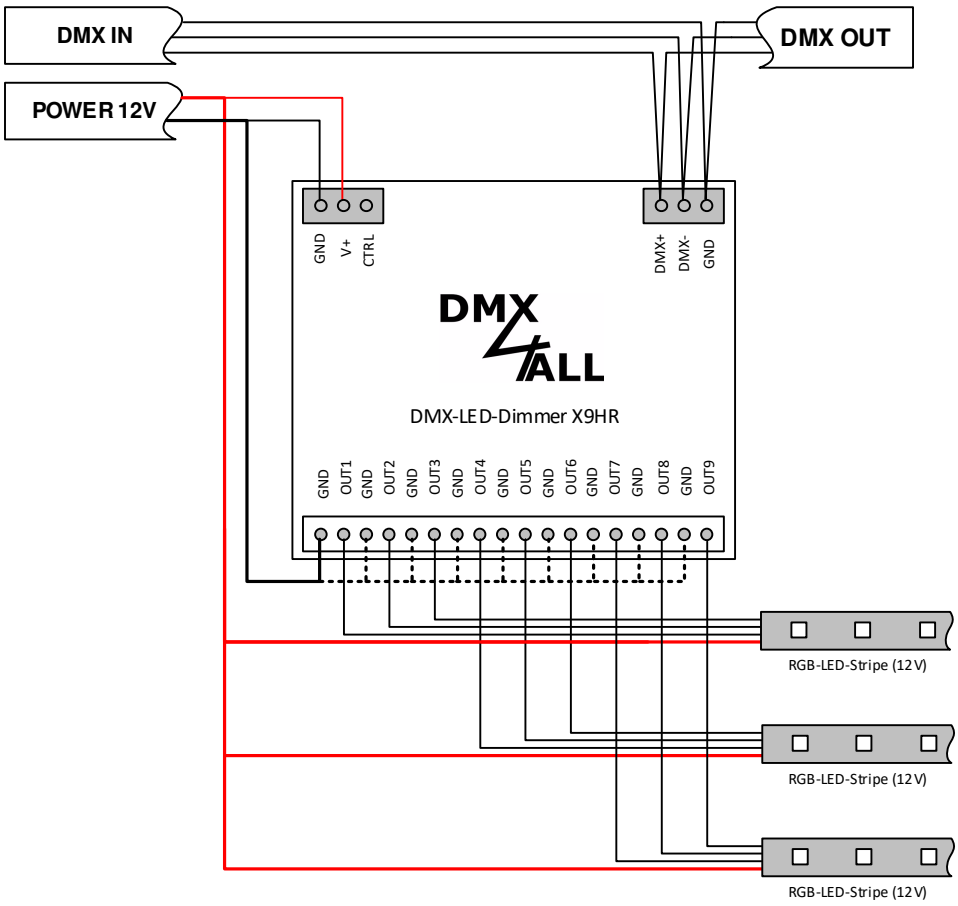
Data sheet

Power supply:	7-24V DC 100mA@12V / 150mA@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
Display:	7 segment display RGB LED
TOUCH-Control:	3 touch buttons
Connections:	Screw terminals
Dimensions:	105mm x 90mm x 60mm

Content

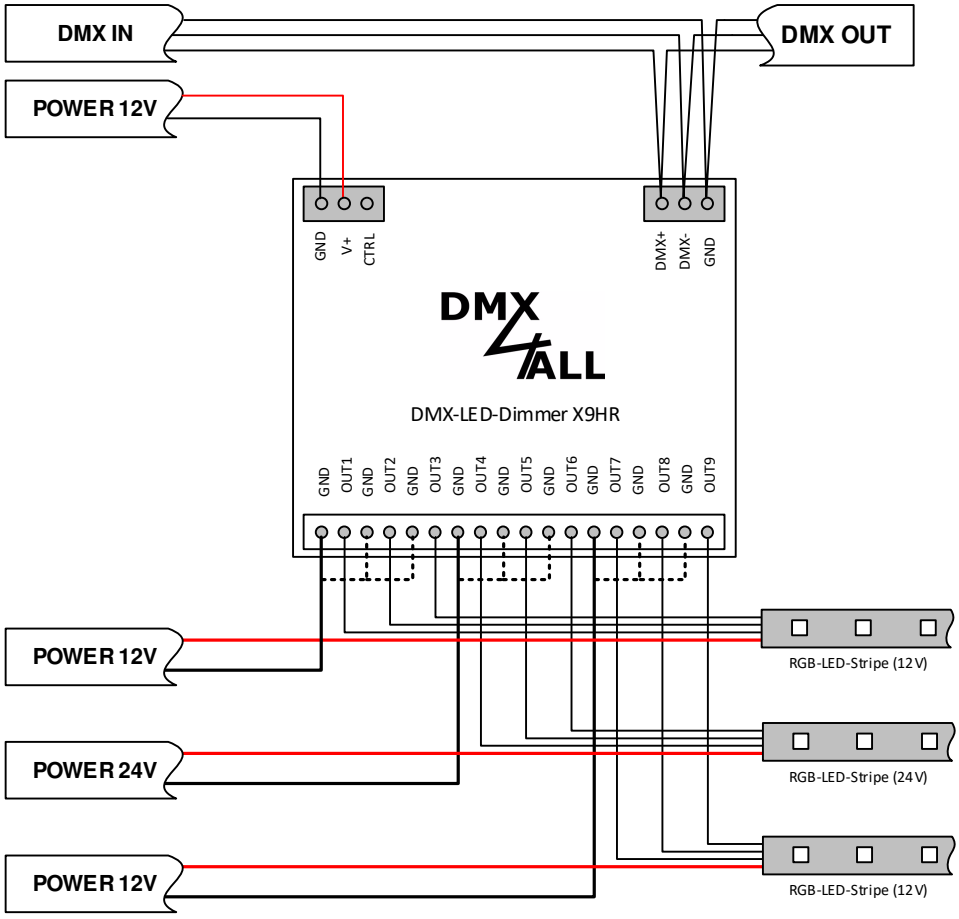
1x DMX-LED-Dimmer X9HR+
1x Quick guide german and english

Connection with one power supply



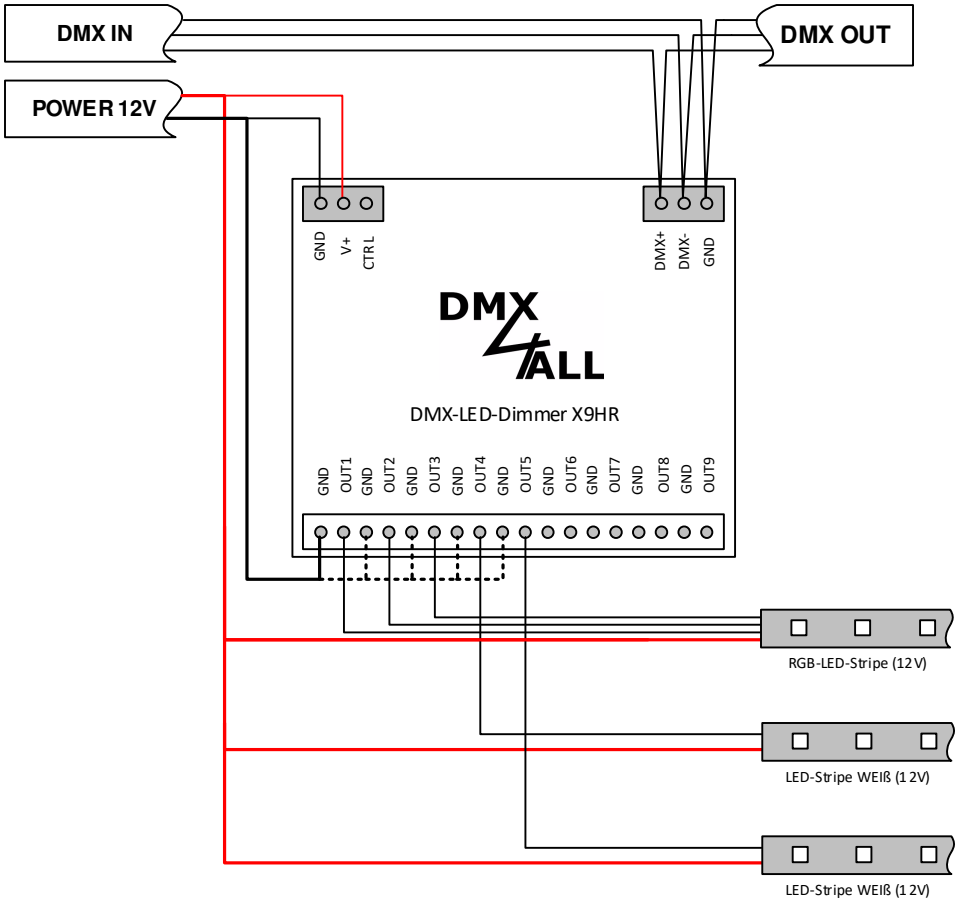
Must be connected direct from the power supply ! Use at least one GND connection per 10A.

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.

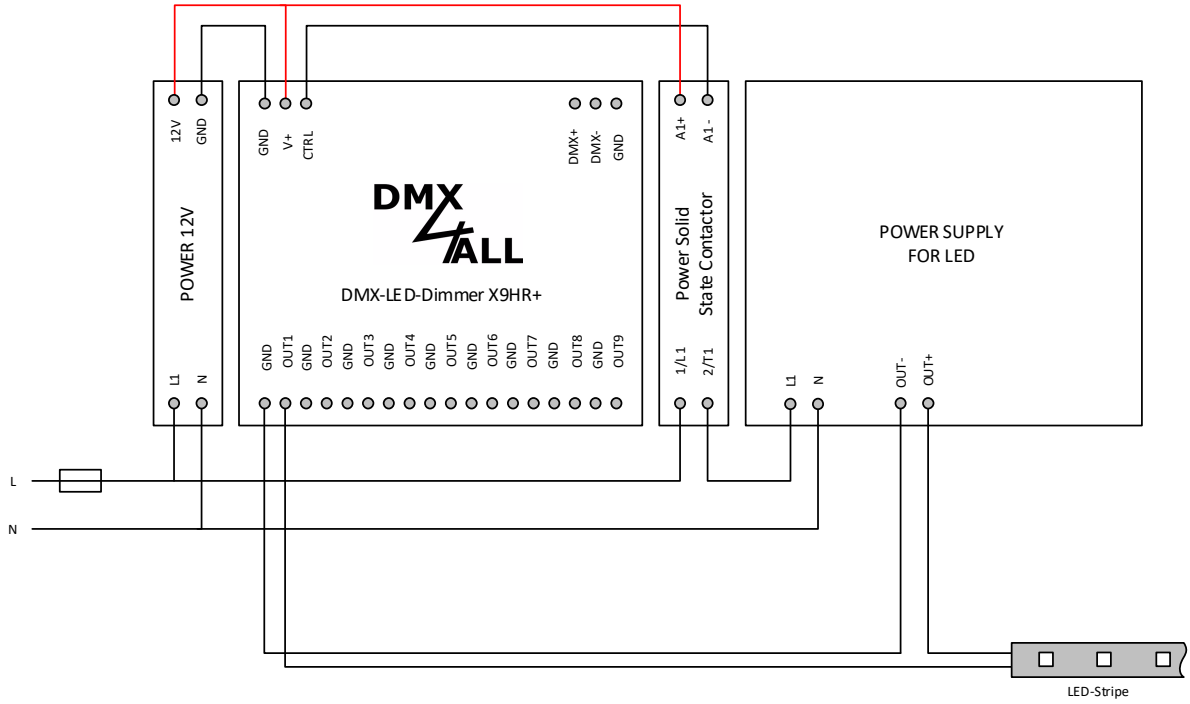
CTRL-Output (Energy-Save)

The **DMX-LED-Dimmer X9HR+** has a CTRL control output (Energy-Save), which can shut down the load power supplies for the LEDs.

If no output is controlled for 5 minutes or all DMX values are set for 5 minutes to 0, the control output will be shut down.

So, the power dissipation for power supplies that are not needed for a longer period can be avoided.

Example installation:



Cable Lengths

The DMX-LED-Dimmer X9HR should be run with short 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.

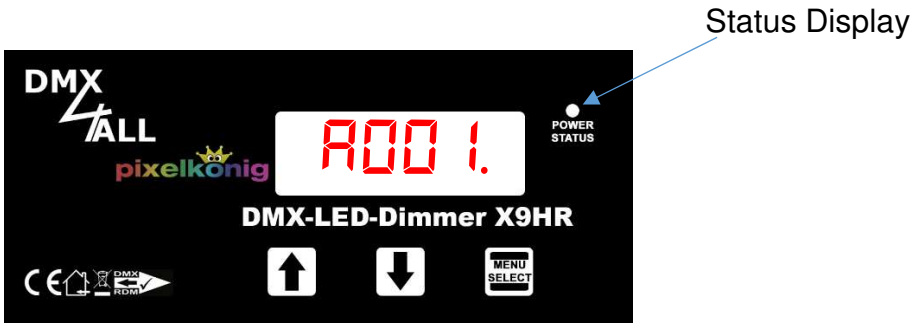
The cable cross section should be all the larger as the distance increases and the load increases.

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

Status Display

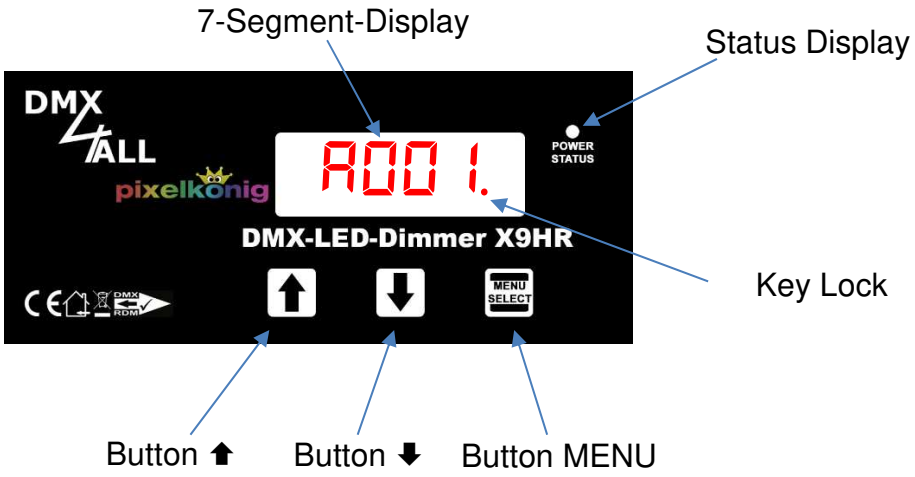
The integrated RGB status display is a multifunction display.



Off	Power supply not connected / Display is switched off
RED flashes	No DMX signal detected
GREEN	Device ready for use
GREEN flashes	Device shows RDM identify

Settings

Either the settings can be made via RDM or directly at the DMX-LED-Dimmer X9HR+ via the 3 buttons at the 7 segment display.



Key Lock

After turning on the DMX-LED-Dimmer X9HR+ or if no button is pressed for ca. 15 seconds the key lock starts automatically and the set DMX start address is shown.

The activated key lock is displayed via a lighting dot right below in the display.

To release the key lock, any key must be pressed for ca. 3 seconds.
During this time, the key lock indicator flashes until it finally goes out.

Menu Guide

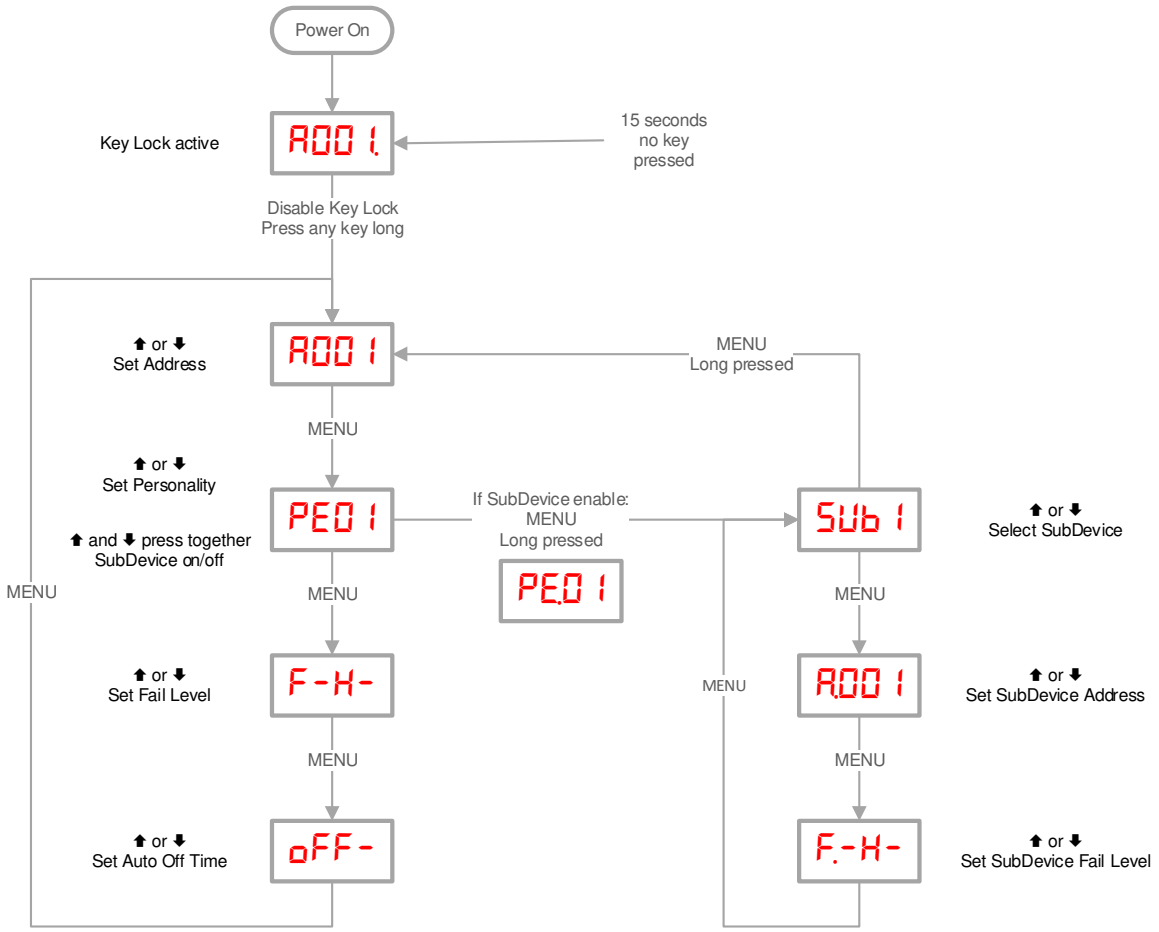
Various menu items are shown via the display, which can then be set using the buttons ⬆ or ⬇.

The menu item is displayed with a letter abbreviation followed by the set value.

The letter abbreviations are assigned as follows:

A	DMX-Startadresse
PE	Personality
F	Fail-Mode
oFF	AutoOff Time
Sub	Sub-Device

The menu navigation is shown as follows:



DMX-Address

Via the RDM parameter DMX_START_ADDRESS or directly at the device under menu A the start address can be set.

By pressing the buttons ⬆ or ⬇ the start address can be set in a arrange of 1 and 512.

If ⬆ or ⬇ is pressed held, the start address increases or decreases until the button is pressed.

Display Switch Off

To avoid disturbing lighting points during the operation, the DMX-LED-Dimmer X9HR+ display can be switched off.

The shutdown can occur manually or automatically.

Manually it takes place via the RDM parameter DISPLAY_LEVEL.

To activate the automatic shutdown the RDM parameter DISPLAY_AUTO_OFF Is to select or the menu oFF directly at the device.

The time, after which the shutdown should take place is to select between 1 and 9 minutes or off (-) by pressing the buttons ⬆ or ⬇.

⚠ The display shutdown is only in the normal operation (permanent applied DMX-Signal) possible after the set time runs out. If the DMX-Signal gets lost or a button is pressed at the device the display is switched on and the passed time is reset.

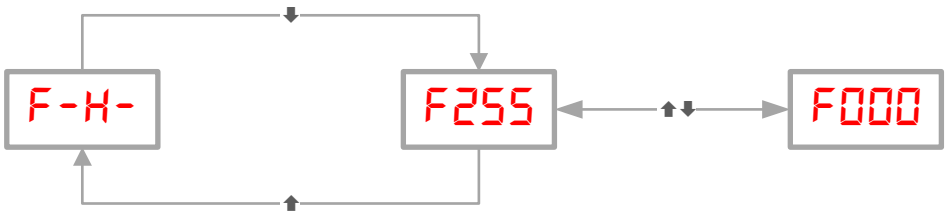
DMX-FAIL Action

The **DMX-LED-Dimmer X9HR+** has a DMX-FAIL function keeping the last switching state (HOLD) or set the predefined switching state to the set value.

In case of DMX fail the behavior can be set via the RDM parameter DMX_FAIL_MODE or directly at the device in the menu F .

Using the buttons ⬆ or ⬇ to set the value in range of 0 and 255. If ⬆ or ⬇ is pressed held, the value increases or decreases automatically until the button is pressed.

If the maximum value of 255 is reached, the hold function is activated by pressing ⬆ again. Pressing ⬇ again the hold function is deactivated again.



F000 up to F255 Set output to value (0-255)

F-H- Hold last value (HOLD)

⚠ In case of a power fail the hold switching states are not restored with the hold function. In this case the values are set to 0 (OFF).

Operation Modes

The **DMX-LED-Dimmer X9HR+** has several operation modes (Personality).

- 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

The number of the needed DMX channels and their assignment as well as the way of controlling the outputs depends on the Personality.

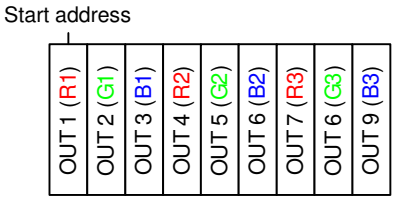
The Personality is to choose via the RDM parameter DMX_PERSONALITY or at the device in the menu PE.

By pressing the buttons ⬆ or ⬇ the Personality is set between 1 and 19.

The DMX address assignment is described on the following pages.

Personality 1: 9Ch. Dimmer

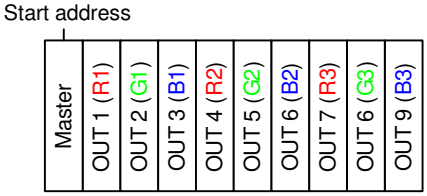
In this operation mode each output is controlled with one DMX channel (8Bit).
For each output there's a free programmable dim curve (LookUp table / Curve definition) available, which displays the 8Bit-DMX value to the 16Bit solution of the output. The output diagrams are linear predefined and can be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



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

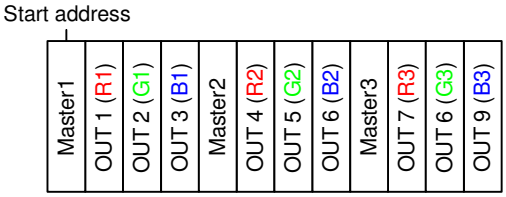
Personality 2: 9Ch. Dimmer + Master

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



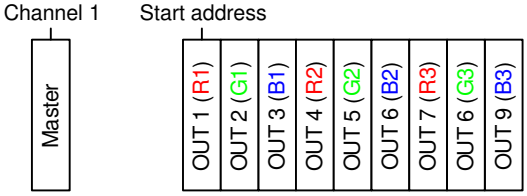
Personality 3: 9Ch. Dimmer + RGB-Master

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



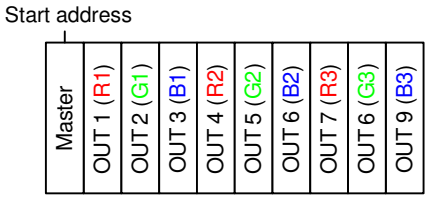
Personality 4: 9Ch. Dimmer + System-Master

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



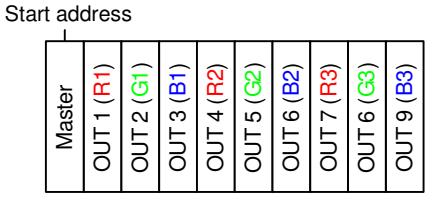
Personality 5: 9Ch. Dimmer 2kHz

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



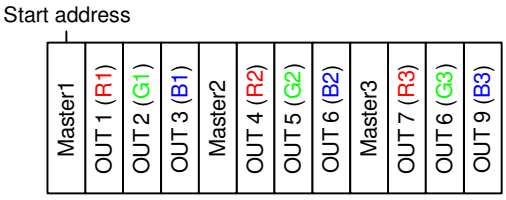
Personality 6: 9Ch. Dimmer 2kHz + Master

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



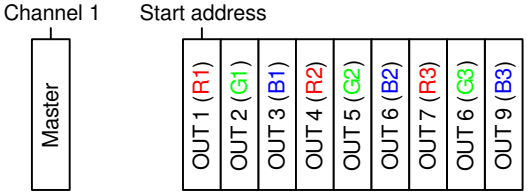
Personality 7: 9Ch. Dimmer 2kHz + RGB-Master

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



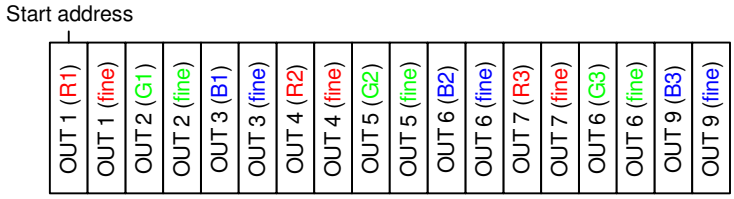
Personality 8: 9Ch. Dimmer 2kHz + System-Master

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



Personality 9: 9Ch. Dimmer 16Bit

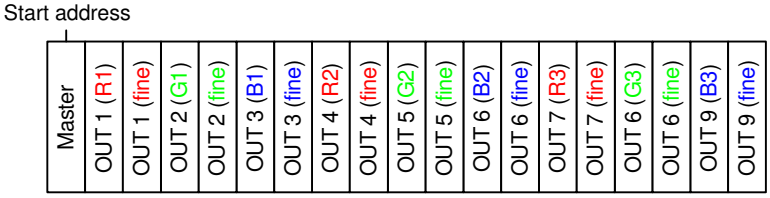
In this operation mode each output is controlled with two DMX channel (16Bit). For each output there's a 16Bit resolution available, directly displayed via the DMX values. Every output uses 2 DMCX channels. The 2. DMX channel is the fine adjustment.



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

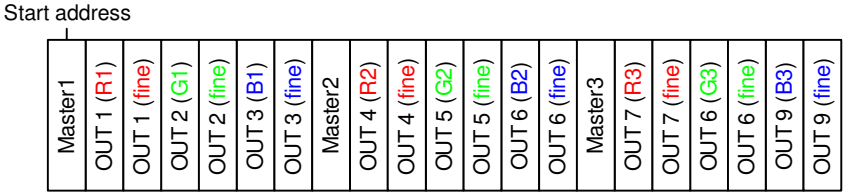
Personality 10: 9Ch. Dimmer 16Bit + Master

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



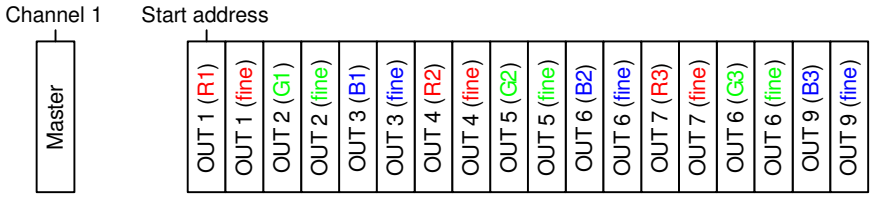
Personality 11: 9Ch. Dimmer 16Bit + RGB-Master

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



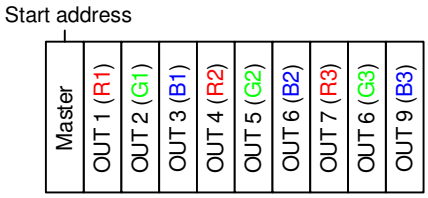
Personality 12: 9Ch. Dimmer 16Bit + System-Master

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



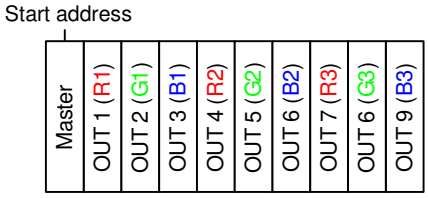
Personality 13: 9Ch. Dimmer 4kHz

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



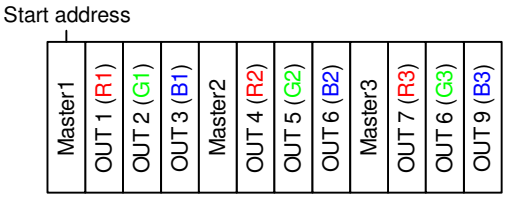
Personality 14: 9Ch. Dimmer 4kHz + Master

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



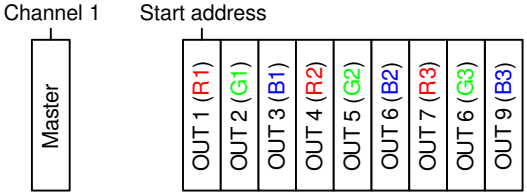
Personality 15: 9Ch. Dimmer 4kHz + RGB-Master

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

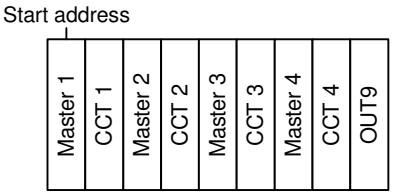
The CCT mode is especially created for cold-white and warm-white mixed light percentage.

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.

SubDevice-Mode

The DMX-LED-Dimmer X9HR+ has a start address within the standard mode, from which the channels are used in order.

Each output is assigned with an own DMX address and a DMX-FAIL-Behavior within the SubDevice mode.

The active RGB-Master-Dimmer is excepted. If it is active the start address as well as the DMX-FAIL-Behavior is set for each RGB group with master dimmer.

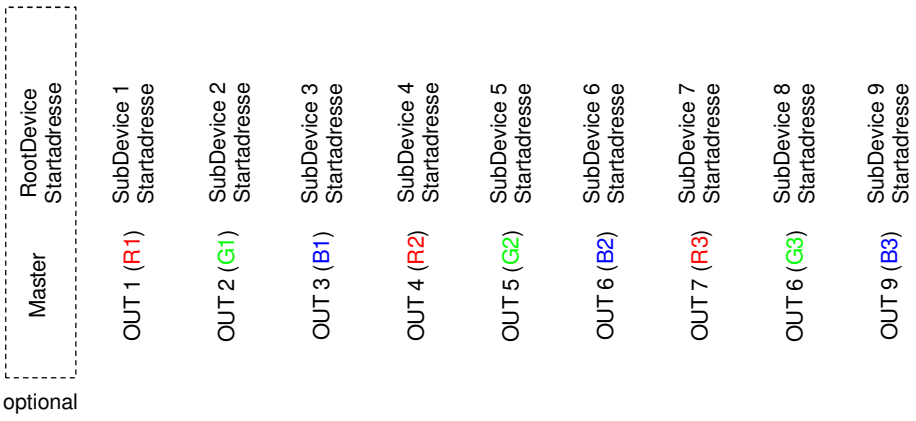
To activate and deactivate the SubDevice mode, the parameter SUBDEVICE_ENABLE must be used via RDM or the buttons ⬆ and ⬇ must be pressed simultaneously for approx. 3 seconds on the device in the menu PE.

The SubDevice-Mode is shown by the dot lighting up

Afterwards the setting of the DMX address and the DMX FAIL behavior for each output / RGB group is enabled.

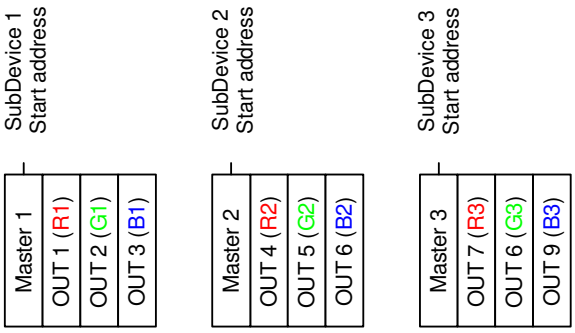
Within the SubDevice-Mode the assignment of the DMX address is as follows:

9Ch. Dimmer 8Bit

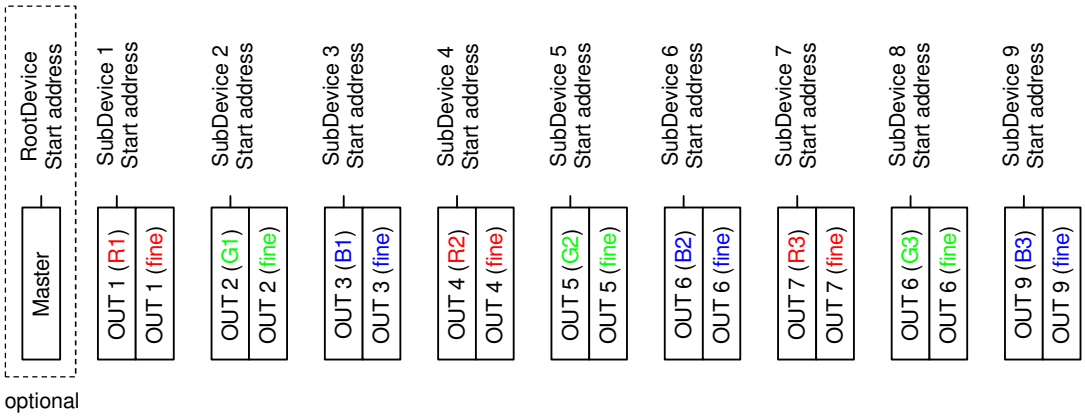


In the SubDevice Mode the assignment of the DMX addresses to the outputs is possible freely. Several outputs can also use the same DMX address.

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



9Ch. Dimmer 16Bit



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.

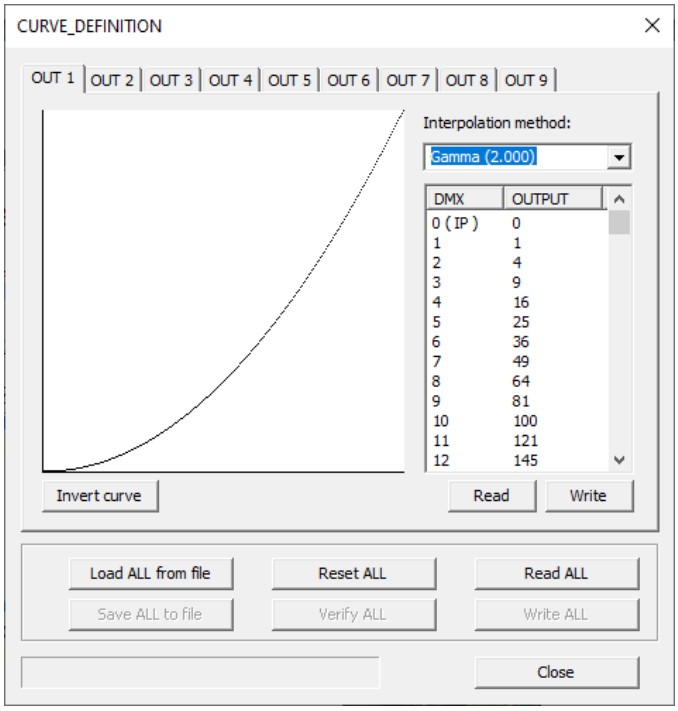
So, it is possible to effect with small steps little brightness changings in the lower brightness range. However, in the upper brightness range it's possible to program bigger steps.

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:



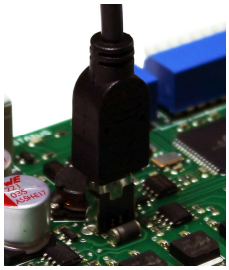
A detailed description of the functions can be found in the RDM Configurator manual.

Set dimming curve 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	Function
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	Function
0	SUB DEVICES DISABLED
1	SUB DEVICES ENABLED

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, 8and 10 on ON
- Set switch 9 on OFF
- Generate USB connection to PC
- Install the USB driver if necessary (check within 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
- Disconnect USB connection
- All switches on OFF
- Close housing

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:

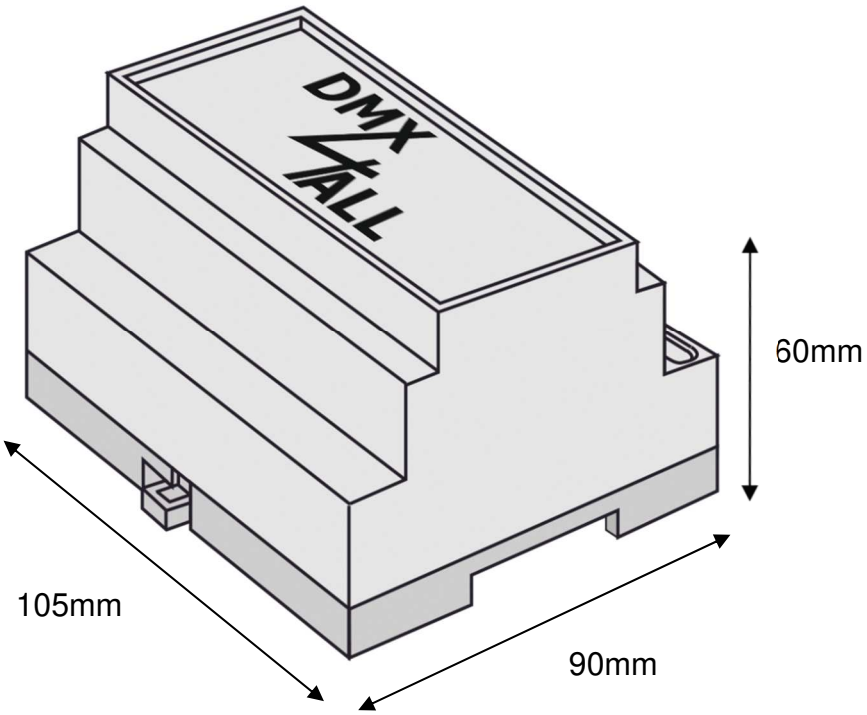
- Turn off device (disconnect power supply and USB connection !)
- Set DIP switch 1 up to 10 to ON
- Turn on device (connect power supply)
- The LED lights up 20x during ca. 3 seconds

  ➔ While the LED lights up set DIP switch 10 to OFF
- Now, the Factory Reset is executed

  ➔ The LED lights up with error with 4 short light impulses
- Turn off device (disconnect power supply !)
- Set all switches on OFF
- Close housing
- Now, the device can be used

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

Dimensions



(all details in mm)

Equipment

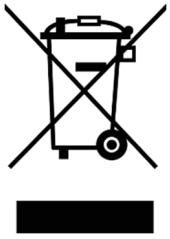
Power supply 12V

USB cabel A → Mini B 5pol.

CE-Conformity

This device 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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