SOUNDLIGHT
The DMX Company

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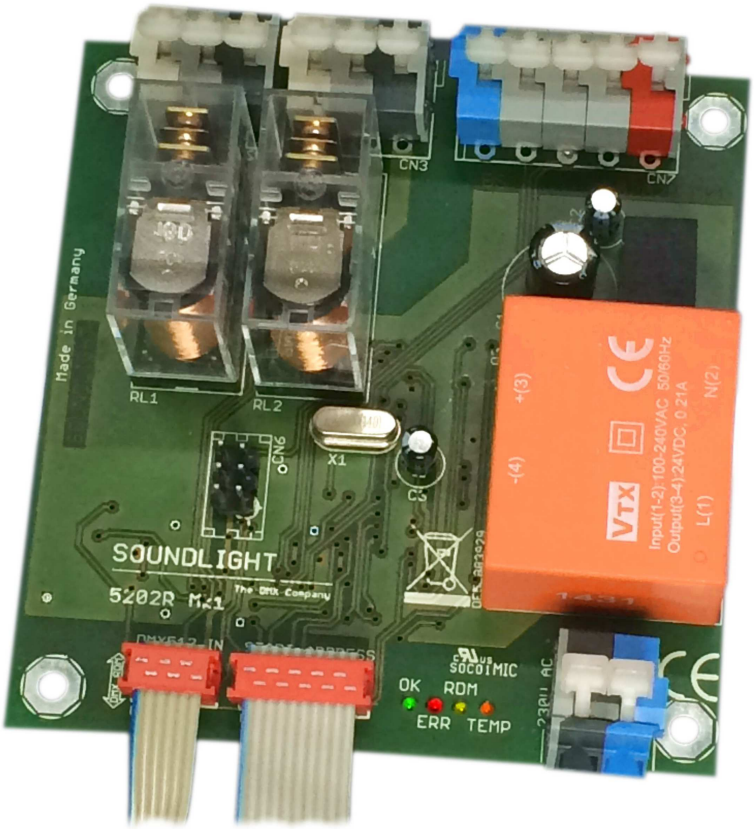
OPERATING MANUAL

DMX Safety Relay 5202R-EP
Version Mk1.2



DMX RDM

RoHS compliant

SOUNDLIGHT *The DMX Company* Bennigser Str.1 D-30974 Wennigsen Tel. 05045-91293-11

Thank you for choosing a SOUNDLIGHT device.

The SOUNDLIGHT DMX Saftey relay 5202R-EP is an intelligent DMX decoder to convert digital data complying with standards USITT DMX512/1990, ANSI E1-11 DMX512-A, DIN 56930-2 and ANSI E1-20 DMX RDM into switching control signals for various purposes. The 5202R-EP can be used with all standard lighting control systems. Its special advantages include:

- **universal protocol decoding**
  Recognizes all variants of the protocol as defined by USITT / ESTA / DIN

- **future-proof**
  The unit is software controlled an can easily be adapted to any change in protocol definition.

- **signal feed-thru**
  The DMX data input is fed to DMX THRU terminals. This allows easy integration in complex multi-device wirings.

- **simple supply**
  The power supply is from standard voltage 115...230VAC.

- **signal loss**
  In the case of a loss of the drive signal a pre-definable action will be taken.

- **cost-effective**
  The SOUNDLIGHT 5202R-EP is a cost-effective solution for many purposes.

General

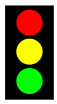
The DMX Relay 5202R-EP is ideally suited for all kinds of switching control. It has been designed for use with effects in entertainment lighting. The 5202R-EP must not be used for hazardous applications. Certain applications may require additional safety measures (see below). The 5202R-EP can be configured to several different modes of operation; full configuration requires use of a full-featured DMX RDM controller (DMX RDM is a bidirectional DMX protocol defined in standard ANSI E1-20). We recommend to use the ENTTEC RDM controller (www.enttec.com) or -preferably- the JESE USB RDM TRI GET/SET controller (www.jese.co.uk).

Nomenclature

These symbols are used within this manual:

DANGER ! May cause harm to user and/or equipment

INFO: How to setup your device



INFO: Status information

Unpacking

Please unpack carefully and check that all items are intact. When leaving our factory, the interface has been in good condition. In case of damage during transport please notify the carrier immediately. Please note that specific deadlines may apply to claim transport damages. We will only be able to replace goods damaged during transit if we receive a written and signed confirmation issued by the freight forwarder. Make sure you receive such a document and send to us a.s.a.p.

When unpacking, you should identify these items:

* the interface 5202R-EP
* a LCD display 3008P-SD (only contained in 5202R-KIT)
* a XLR connector board 5202R-AP (only contained in 5202R-KIT)
* this manual

Please note that a start address programming adaptor (3006P-SD or 3008P-SD) is NOT included (except 5202R-KIT). ***All settings can be performed using DMX RDM****. Alternatively, a programming adaptor, which can be used to set DMX start address, DMX personality and DMX HOLD mode,* ***must be ordered separately****. If you already have it, there is no need to buy again: the start address board can be used for many of our DMX interfaces, pcb and DIN rail mount alike.*

Cage Clamp Connectors

The decoder SWINGC4 consists of 6 terminal blocks. Terminals are based on screwless WAGO cage clamp technology, which prevents loose connections and guarantees safe electrical contact at all times. Use a standard **flat blade** screw driver and press the lever to open the terminal, insert wire and release. Do **not** use a philipps or pozidrive screwdriver to prevent damage ! Though both, solid and stranded wires may be used we recommend to use stranded wires in combination with isolated ferrules whenever possible.

Please refer to the connector location outlined on next page.

Applications

The DMX relay 5202R-EP is intended to control stage lighting effects. A additional DMX data slot can be used as common trigger to enable synchronized effects or secure the system against unwanted trigger.

IMPORTANT NOTICE
The control protocol DMX512 is not intended to control scenery or effects which could be hazardous to man or materials (see standard ANSI E-11 DMX512-A, available from www.ansi.org). This restriction must be similarly applied to previous standards USITT DMX512/1990, DMX56930-2 or standards based on E1-11, such as ANSI E1-20 DMX RDM.
DMX512 does not contain any mechanisms or procedures that allow instant system shutdown in

case of malfunction or failure. Thus it is in the sole responsibility of the user to install a second, independent safety circuit to shutdown the application an case of trouble.

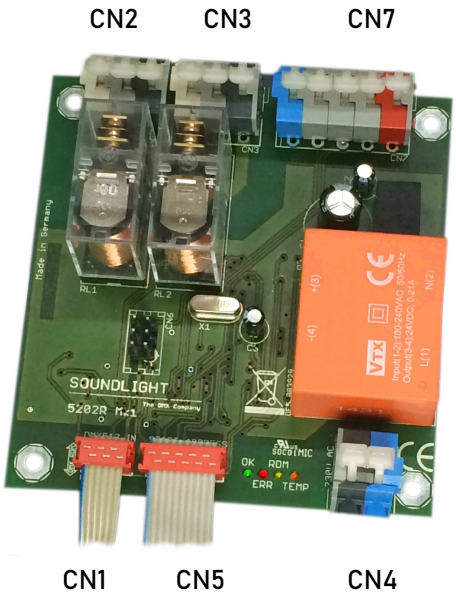
Safety Notice

Attention! This devices uses mains power 115...230VAC. Mains power can be dangerous to life. Applicable electrical safety rules must be obeyed when installing and operating the device. Make sure, that all wiring is only carried out in unpowered state.

The DMX relay 5202R-EP is intended for use in dry environments. It must be installed in a suitable electrical cabinet or housing. The operating conditions (see chapter „Technical Data“ must be met at all times.

Connectors

The DMX relay 5202R-EP consists of 6 inputs and outputs:



CN1 **DMX IN / OUT (Ribbon Cable 6-pin)**
to connect the DMX adapter pcb 5202R-AP

1	0V, GND
2	DMX -
3	DMX+
4	Lock-Switch
5	Lock-LED
6	Vcc +5.0VDC

CN2 **Relay Output 1**

white	C (Common)
d'grey	NC (Normally Closed)
l'grey	NO (Normally Open)

CN3 **Relay Output 2**

white	C (Common)
d'grey	NC (Normally Closed)
l'grey	NO (Normally Open)

CN4 **Power Supply (Cage Clamps)**

black	115-230V AC (L)
blue	115-230V AC (N)

CN5 **Start Adress Board (Ribbon Cable 10pin)**
to connect a start address board 3006P-SD or 3008P-SD

1	Vcc +5.0VDC
2	SEN Serial Enable
3	SCLK Serial Clock

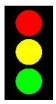
4	SDAT	Serial Data
5	LED Error	
6	LED OK	
7	SDAI	Serial Data Input
8	LED RDM	
9	GND, 0.0VDC	
10	nc	

CN7 **External Sensors (Cage Clamps)**

1	blue	GND 0.0VDC
2	grey	Sensor 1
3	grey	Sensor 2
4	grey	Sensor 3
5	red	Vcc +5.0VDC

Important Notice: *Please make sure, that all control voltages conected to terminals CN1, CN5 and CN7 must be compatible to digital TTL logic and never exceed 5VDC. Higher voltages are likely to damage the connected internal components.*

Signal Indicators



Four status LEDs will indiate the decoder status:

green:	OK	DMX Signal OK *A valid DMX signal is being received.*
rot:	ERROR	Blinks at loss of control signal or data errors.
gelb:	RDM	DMX RDM programming active; blinks at DMX RDM traffic
rot:	TEMP	Blinks at overtemperature of extenal sensors *slow blinking at violation of lower limit* *fast blinking at violation of upper limit*

Depending on address board used, some indicators are also available on the start address board.

Adressboard

The relay module 5202R-EP has been preset to start address #001 and thus occupies DMX data slots 1...3. To change the slot allocation, the interface must be programmed. This can be done using a standard DMX RDM controller (we suggest to use the JESE GET/SET controller) or a optional start address board 3006P-SD or 3008P-SD.

Notice: Start address boards are not contained with delivery of DIN rail decoders, since they are only used once for programming and can be used repeatedly. They must always be ordered separately.

NOTICE: This relay module uses Subdevice Addressing and thus differs from other relay modules. Other start address boards than the special version ***3006P-SD*** or ***3008P-SD*** cannot be used.The 5202R-EP can be basically operated in two different modes of operation:

1. ROOT MODE

In Root Mode, only one start address will be assigned for the complete relay module. The relay assignment is fixed, and the relay outputs are organized as follows:

Start address readout in Root Mode

Start address:	Output/Relay 1
Start address+1:	Output/Relay 2
Start address+2:	Safety slot

The Root Mode is active, when no Subdevices have been activated. SubDevice Mode can be deactivated using the start address board (Setup menu) or the RDM controller (set SUB-DEVICE_ENABLE to $00). A discovery must be run after changing the SubDevice mode. Refer to the RDM manual (available from our website) or or RDM website for more information about RDM PIDs and how to use them.

2a. SUBDEVICE MODE, SINGLE MODE

In Subdevice Mode (Single Mode) each output (each relay, including the safety slot) can have its own individual start address. Thus seven addresses must be set to configure the complete module. The SubDevice mode allows to assign multiple relays to the same address, or define the same slot as saftey slot for mutiple modules.

Start address readout in Subdevice Mode

The Subdevice mode is active, when Subdevices have been activated. SubDevice Mode can be activated using the start address board (Setup menu) or the RDM controller (set SUB-DEVICE_ENABLE to $FF). A discovery must be run after changing the SubDevice mode. Refer to the RDM manual (available from our website) or or RDM website for more information about RDM PIDs and how to use them.

2b. SUBDEVICE MODE, BLOCK MODE

In Subdevice mode (Block Mode) two start addresses can be set: one start address for the block of relays, and the second start address for the safety channel.

Start address readout in SubDevice Mode

The Subdevice mode is active, when Subdevices have been activated. SubDevice Mode can be activated using the start address board (Setup menu) or the RDM controller (set SUB-DEVICE_ENABLE to $FF). A discovery must be run after changing the SubDevice mode. Refer to the RDM manual (available from our website) or or RDM website for more information about RDM PIDs and how to use them.

DMX Personality

The DMX Personality defines the mode of operation and can be used to set the relay trigger levels. Relays get engaged as soon as the upper trip level is exceeded, and are set to OFF as soon as the control signal is lower than the the lower trip level.

DMX Personality	DMX Level	Action
Personality 1		
	<45%	Relay OFF
	>55%	Relay ON
Personality 2		
	<3%	Relay OFF
	>97%	Relay ON
Personality 3		
	<25%	Relay OFF
	>75%	Relay ON
Personality 4		
	0%	Relay OFF
	>0%	Relay ON

Relays

This decoder is fitted with contact relays designed for a switching current of **max 10A at 230V** (resistive load only!). When selecting and ordering the appropriate relay card, please note, that all data given by the relay manufacturers are for **RESISTIVE LOAD** only. Incandescent lamps may be considered resistive loads. Switching inductive loads, such as transformers or solenoids, requires lower loads - we strongly recommend not to exceed 50% of the resistive load data. Besides, contacts may burn due to inductive spikes and sparks. Make sure to add protective circuitry (RC combinations, VDR resistors) if switching inductive loads. Switching inductive loads on the mains power supply may also generate high frequence noise and degrade the power supply quality. If switching capacitive loads (electronic ballasts or psu) inrush current limiting devices may be required to prevent contact damage. If in doubt pls consult the relay maker data sheet (OMRON, Type G2R-1-ASI), available at:
http://components.omron.eu/en/products/catalogue/relays/pcb_power_relays/up_to_16a/g2r/default.html

Technical Data

Dimensions:	85 mm x 66 mm x 30 mm (L x B x H)
Type:	Printec circuit board
Power Supply:	115/230VAC (100-240VAC) max. 3VA
DMX IN:	USITT DMX512/1990, DIN56930-2, ANSI E1-11 DMX512-A, ANSI E1-20 DMX RDM, ANSI E1-37 1 Unit Load
DMX OUT:	fed thru

Contact Outputs:	2
Relay Out:	250V AC max. 10A (resistive load), combined N.O./N.C.
Sensor Inputs:	3
Sensor Type:	NTC 10kOhm, connected to Vcc
Input Impedance:	2,2kOhm
Operating Temperature:	0-50°C
Humidity:	non-condensing
Storage temperature:	-10-70°C
Order Code:	5202R-EP

DMX RDM

The 5202R-EP is compatible with ANSI E1-20 DMX RDM Version 1.0. Please note some special properties of devices complying with DMX RDM:

- DMX HOLD properties are not supported by RDM standard ANSI E1-20. A factory specific command (DMX HOLD, PID $80F1) has been added to compensate these restraints. Use parameters 00...02 to set the desired HOLD mode:

  00: no HOLD, all outputs OFF upon loss of signal
  01: no HOLD, all Outputs ON upon loss of signal
  02: DMX HOLD (last look remains active)

- When using mechanicals switch address boards (3000P), the setting of the the DMX personality reflects the setting of DIP switches 3 and 4 (and vice versa) .

NOTE: *When parameters Start Address, DMX Personality or DMX HOLD Mode have been modified using DMX RDM, the address switches become inactive (blocked). To re-enable start address switches, temporarily set any address from 900...999 (simply set the "9xx" digit). This will re-enable switches, yellow RDM LED goes to OFF.*

DMX RDM Properties

The 5202R-EP is fully compliant to DMX RDM Standard ANSI E1-20 V1.0. The device will be identified as DMX RELAY in CONTACTORS category and can be configured to four modes of operation (DMX PERSONALITY).

Selecting the appropriate DMX PERSONALITY will set the required mode of operation.

Special RDM functions allow to monitor the system. All functions are compliant with the RDM standard and can be operated from any standard RDM controller. We suggest to use the JESE GET/SET controller to setup the system. For more information about DMX RDM and its possibilities pls check ***www.rdm.soundlight.de***

Special RDM functions:

RESET_DEVICE:	calling with parameter =1 ($01) causes a warm reset calling with parameter = 255 ($FF) causes a cold reset
DEVICE_POWER_CYCLES:	reads the number of device startups

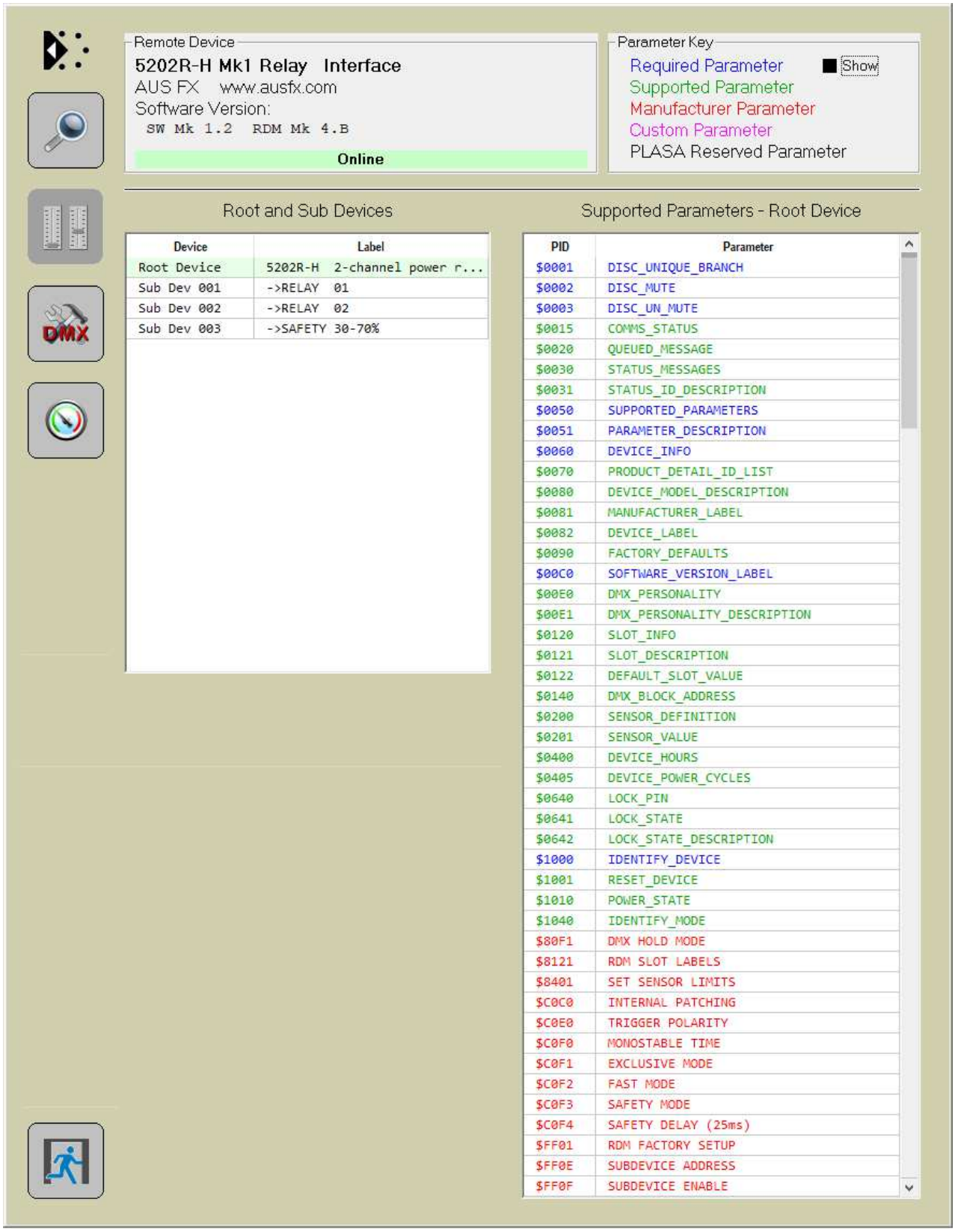


Table of RDM commands for 5202R-EP Mk1

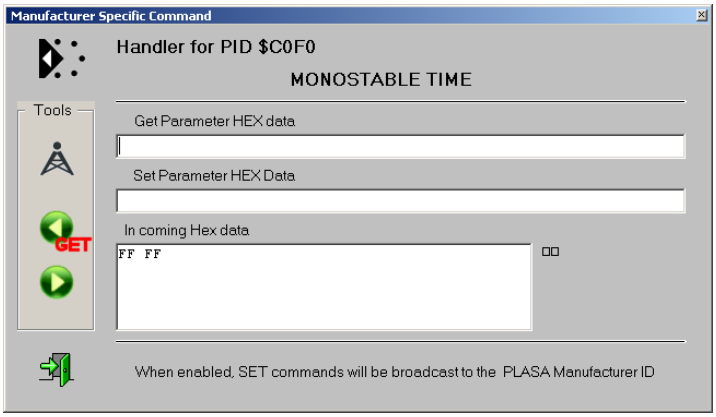
The following PID descriptions discuss specific options for the 5202R-EP. For standard RDM PIDs, pls refer to the RDM manual, available from www.manuals.soundlight.de. All notations refer to data presented in hexadecimal format and examples are demonstrated with the JESE GET/SET RDM controller software. Pls refer to your RDM controller manual for command syntax and data format.

PIDC0F0: MONOSTABLE TIME Setting the monostable pulse duration

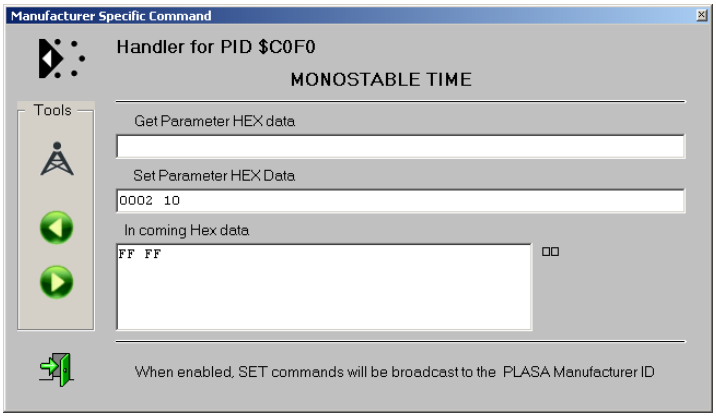
The relays used in the 5202R-EP work in bistable mode; that is: when (and as long as) triggered, they remein in active state.
the function cen be reverted to monostable mode (pulse contact mode), and the contact closure time can be set using the function C0F0.

Parameter: <Slot number> <Monotime>
where: Slot number = 0001: Slot no. 1
Slot number = 0002: Slot no. 2
Slot number = FFFF: all

Monotime: $01...$7F (25ms steps)
$FF: bistable Mode



Press GET to display the current setting.
Example: both outputs are set to bistable mode (default)

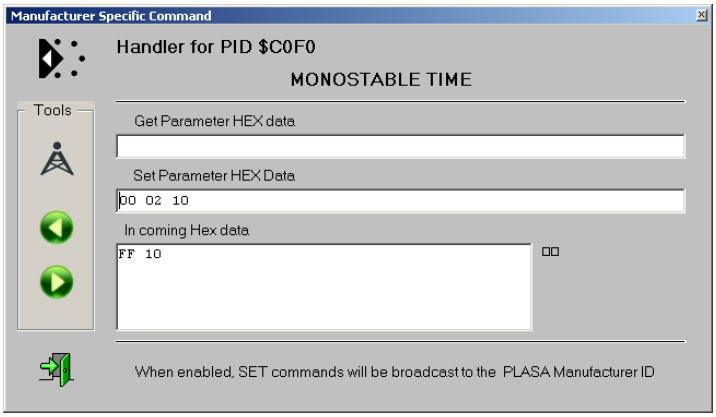


To set output 2 to monostable mode using a pulse dauration of 0.4 sec (400msec), enter:

0002 10 (hex)

10hex = 16dez, 16*25ms = 400ms

Press SET to write data.



Verify:

Press GET to read current data.

Relay 2 will now operate in monostable mode using a pulse duration of 0.4 sec.

PIDC0E0: DMX DATA POLARITY Trigger flank for monostable oparation

By default the monostable action will be triggered by the positive input flank (0% -> 100%). The flank can be inverted to trigger from the relasing flank (100% -> 0%). Syntax is similar to the previous command

Parameter: <Slot number> <Polarity>

where:	Slot number = $0001:		Slot no. 1
	Slot number = $0002:		Slot no. 2
	Slot number = $FFFF:		all
	Polarity:	$00	inverted
		$FF	normal

PIDC0C0: INTERNAL PATCHING Relay Data Source

By default the monostable action will trigger relay 1 from data slot 1, and relay 2 from data slot 2 (using the respective set start address). We recommend t make no changes.

The INTERNAL PATCHING function allows to override these allocations. This will be helpful when both relays shall be triggers from the same data slot, eventually with different flank allocation.

Parameter:	<Slot number> <Source>		
where:	Slot number = $0001:		Slot no. 1
	Slot number = $0002:		Slot no. 2
	Slot number = $FFFF:		all
	Source:	$01	Slot no. 1
		$02	Slot no. 2

PIDC0F1: EXCLUSIVE MODE Relays switching in Exclusive Mode

In EXCLUSIVE MODE, only one relay (out of two) can be activated at a time.
Allocation is as follows:

CH1	CH2	RELAY1	RELAY 2
OFF	OFF	OFF	OFF
ON	OFF	ON	OFF
OFF	ON	OFF	ON
ON	ON	OFF	OFF

Parameter:	<Slot number> <MODE> [Byte]		
where:	Slot number = $0001:		Slot no. 1
	Slot number = $0002:		Slot no. 2
	Slot number = $FFFF:		all
	MODE = $FF (255):		Exclusive ON
	MODE= $00 (0):		Exclusive OFF

PIDC0F2: FAST MODE — High Speed / Fast Response

In standard mode, multiple DMX data telegrams are being evaluated before the relay status is changed. Thus, a safe an reliable switching insensitive to data noise can be guaranteed.

In Fast Mode, each incoming DMX data telegram triggers the outputs immediately. This is called the FAST MODE, which is fast acting, but less tolerant to signal noise.

Parameter: <MODE> [Byte]

MODE = $FF (255):	Fast Mode ON
MODE= $00 (0):	Fast Mode OFF

PIDC0F3: SAFETY MODE — Configure the Trigger Slot

This function configures the safety functions.

Please note: The Safety Switch (toggle switch on the conector board) can be allocated using this function, but is ALWAYS allocated to relay #1 (hardware related). Thus the switch cannot be deactivated for relay 1.

All other assignments can be freela activated and de-activated at your option. The sensor inputs will disable outputs when the sensor signal is beyond the set minimum and maximum values. The DMX trigger slot will disable outputs, when lower 30% or higher 70% (the trigger levels are fixed for the 5202R-EP and cannot be changed). Set the repective bit in the configuration to enable feature.

Parameter: <Slot number> <SAFETY> [Byte]

SAFETY = $80 (128):	Safety slot activated
SAFETY = $40 (064):	Safety switch activated
SAFETY = $20 (032):	Sensor 3 activated using delay
SAFETY = $10 (016):	Sensor 3 activated, no delay
SAFETY = $08 (008):	Sensor 2 activated using delay
SAFETY = $04 (004):	Sensor 2 activated, no delay
SAFETY = $02 (002):	Sensor 1 activated using delay
SAFETY = $01 (001):	Sensor 1 activated, no delay

Example: to activate safety slot trigger plus sensor 1 without sensor delay, add these values:

Sicherheitsslot no.:	$80	128
Externer Sensor 1:	$01	001
combined:	$81	129

SET COMMAND: 00 01 81 in hex format, or:
000 001 129 in decimal format

PIDC0F4: SAFETY DELAY	Delay time for sensor evaluation

The sensor delay time can be activated to delay sensor related action. Thus it will be possible to trigger a relay and to disable the output again as soon as the sensor is trioggered. This allows to create applications like automatic filling stations (relay activated and de-activated as soon as sensor reports filling level) or flame detectors (process started but halted if sensor not in range after delay time).

Delay time is defined in increments of 25ms. Thus the total time can be adjusted from 0...6,3 seconds.

Parameter: <Slot number> <DELAY> [Byte]
where: Slot number = $0001: Slot no. 1
Slot number = $0002: Slot no. 2
Slot number = $FFFF: all

DELAY = $00 (000) ... $FF (255)
(timecount * 25ms)

Example: The saftey supersision for relay 2 shall be engaged after 2 seconds:
SET PID C0F4: 00 02 50

Calculation: 2 seconds is 80x 25ms, 80(dec) is 50 hex ($50). Most RDM controllers require values to be entered in hex format.

More RDM Info

For more information on DMX RDM pls check the web pages of the DMX RDM protocol group (www.rdmprotocol.org), or visit: www.rdm.soundlight.de

Disturbances

If a trouble-free operation cannot be guaranteed, disconnect the relay card interface and secure it against unwanted operation. This is especially necessary, when
- the unit has visible damages;
- the unit does not operate;
- internal parts are loose;
- connection cables show visible damages.

Limited Warranty

This DMX interface ist warranted against defects in metarials and workmanship for a period of 12 month, beginning with the date of purchase. The warranty is limited to repair or exchange of the

hardware product; no further liability is assumed. SOUNDLIGHT is not responsible for damages or for loss of data, sales or profit which arise from usage or breakdown of the hardware product. In Germany, SOUNDLIGHT will repair or replace established defects in hardware, provided that the defective part is sent in, freight paid, through the responsible dealer along with warranty card and/or sales receipt prior to expiration of warranty.

Warranty is void:

- when modifying or trying to repair the unit without authorisation;
- modification of the circuitry;
- damages by interference of other persons;
- operation which is not in arccordance with the manual;
- connection to wrong voltage or current;
- misuse.

CE Conformity

CE

This DMX relay card is microprocessor controlled and uses high frequency (8 MHz quartz). The interface has been tested in our EMC lab to comply with EN55015. To ensure the best performance regarding radiated and conducted emissions we suggest to install the interface in a closed, conductive (e.g. metal) housing, which must be connected to GND.

Please make sure that shielded data cable is used and the shield is connected properly to the GND pin. Shield must never make contact to other signal lines.

FCC Statement

This product has been tested and complies with the specifications for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installd and used according to the instructions, may cause harmful interference to radio communications.
However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which is found by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment or devices
- Connect the equipment to an outlet other than the receiver's
- Consult a dealer or an experienced radio/TV technician for assistance

FCC Caution: Any change or modification to the product not expressly approved by SLH could void the user’s authority to operate the device.

End of Lifetime

When the useful lifetime of this product has been reached, it must be disposed of properly. Electronic devices must not be placed in domestic waste. Consult your local authorities to find the nearest collection point of used electric and electronic devices. SOUNDLIGHT is a WEEE registered company (Reg No. DE58883929).

Service

There are no parts within the DMX relais card 5202R-EP which require the user's attention. Should your unit require servicing, please send it to the factory, freight paid.

Product Info

Stay informed: product information is available from our website, pls check the relevant product page at: www.soundlight.de/produkte/5202r-ep

For general DMX RDM info, pls check: www.rdm.soundlight.de
Load manuals from our support site: www.manuals.soundlight.de

Accessories

Setting the DMX start address, the DMX personality, or the DMX HOLD mode and other parameters requires a suitable DMX RDM controller or a start address board. We recommend these devices:

DMX START ADDRESS BOARD 3006P-SD

Address board to set start address, personality and DMX HOLD mode.

Address boards are not contained with delivery and must be ordered separately.

For more info refer to: www.soundlight.de/produkte/3006p-sd

DMX RDM CONTROLLER GET/SET USBRDM-TRI

The USBRDM-TRI Interface connects via USB and comes with RDM controller software „GET/SET“. This software allows to administer all RDM supported functions of the Relay module.

The USBRDM-TRI Mk2 can be inserted into a existing DMX line (e.g. from light control desk to fixtures) to add DMX RDM functionality for legacy setups.

For more info refer to: www.soundlight.de/produkte/usbrdm-tri2