OPERATING MANUAL

DMX RDMIZER 4704A-EP Mk1

RoHS
compliant

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Thank you for choosing a SOUNDLIGHT product.
The SOUNDLIGHT DMX RDMIZER is an intelligent DMX interface designed to update legacy equipment to RDM functionality. The interface can be used with all standard light control systems. Its special advantages include:

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

- **simple supply**
  The power supply may be derived from unregulated 15...24V DC, stabilization on board

- **high noise immunity**
  Special srl (slew rate limited) input circuitry provides for high noise immunity on data lines.

- **cost-effective**
  The SOUNDLIGHT 4704A-EP RDM is a cost-effective solution for many purposes.

Applications

Use the RDMIZER 4704A-EP to upgrade your legacy equipment easily to RDM! This decoder
- provides four TTL control outputs
- four independent sensor inputs configurable to voltage or temperature
- a DMX feedthru with decoded start address

To provide full RDM functionality, connect the 4704A-EP in series with your legacy device. Then simply set the adress switch of your legacy device to 001 - all further address settings will be performed by the 4704A-EP.
Thus the 4704A- acts as a "replacement" for your legacy device. This is enhanced with up to four individual control channels (placed before your lagacy device's data slots) to perform user-defined actions (trigger button, power switch etc.). Sensor data can be read back via RDM. The naming of your product can be changed to meet your specific needs, also individual DMX data slots can be renamed to reflect the purpose of the control channel. All you need to operate and configure your RDMIZER is a standard RDM controller.

Connectors

The DMX RDMIZER 4704A-EP consists of the following interconnections:

CN2	DMX INPUT (XLR 5-pin)	
	1	GND
	2	DMX -
	3	DMX +
	4	connected to CN2 Pin 4
	5	connected to CN2 Pin 5

CN3	DMX OUTPUT (XLR 5-pin)	
	1	GND
	2	DMX -
	3	DMX +
	4	connected to CN1 Pin 4
	5	connected to CN1 Pin 5

CN1	Power Supply	
	red	+15-24V DC
	blue	GND

CN4	Control Output	
	1	Output #1
	2	Output #2
	3	Output #3
	4	Output #4
	5	GND
	6	+5V DC

CN5	Sensor Input	
	1	Input #1
	2	Input #2
	3	Input #3
	4	Input #4
	5	GND
	6	+5V DC

CN6	DMX Feedthru	
	1	DMX -
	2	DMX +
	3	Input #5
	4	Input #6
	5	GND
	6	+15...24V DC connected to power supply CN1 !! be careful !!

CN7	DMX Start Address
	Connection to Start Address Board 3003P
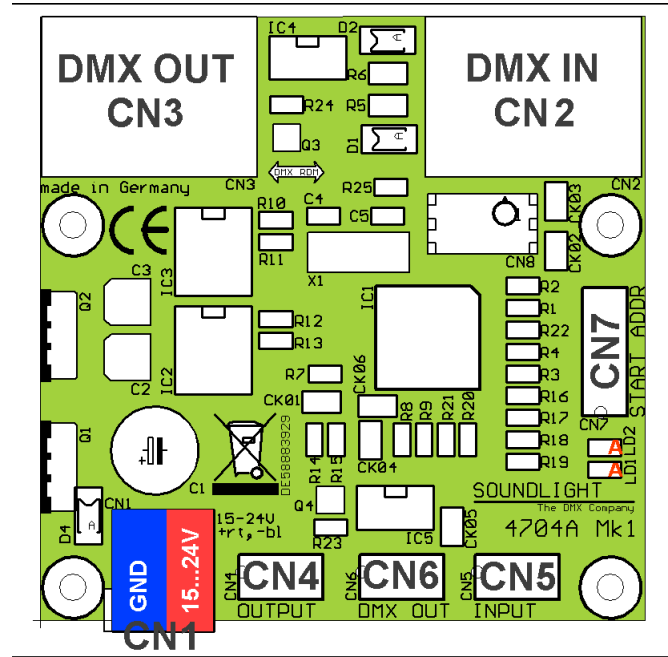
Signal Indicators

The status of the Demultiplex Board is signalled with two LED indicators.

green:	Operation, Signal OK
red:	ERROR or NO DATA (blinking)
	No error indication while normal operation
	Error blinking at data errors or at loss of communication.
blue:	RDM start address or configuration set

Start Address Setting

A start address board 3003P is used to set the desired start address of the 4704A-EP DMX RDMIZER. Please refer to the manual 3003P for more information. This is the short form:

- press left to select the desired setting:

Addr:	Start Address setting
S1..S4:	Function setting (on/off)
dis:	Display setting (on/off)

- press right to confirm and toggle selection or advance numbers
- press left to step to next digit or exit

Any pause of more than 5 seconds will cause the address board to cancel operation or save data entered.

The soft functions S1...S4 replace the DIP switches used on mechanical address boards 3000P. The functions are identical:

DIP-Switch	Function
1	**DMX HOLD** OFF (default) non-hold, see DIP-Switch #2 ON: DMX HOLD, last setting active at signal loss
2	**OUTPUT LEVEL AT SIGNAL LOSS** OFF (default) 0% (off) ON 100% (full)
3	**not used**
4	**DMX PERSONALITY** OFF: Personality #1 (8 channel mode) OFF: Personality #2 (16 channel mode)

RDM Properties

The RDMIZER 4704A-EP conforms to ANSI E1-20 DMX RDM standard 1.0. The unit will be recognized as a INTERFACE unit and can be configured (settings valid at delivery, can be reconfigured):

- as a 8-channel device   (DMX PERSONALITY #1)
- as a 16-channel device (DMX PERSONALITY #2)

Select the appropriate DMX PERSONALITY to configure the DMX decoder.

Special functions available with the 4704A RDMIZER interface include:

RESET DEVICE
Used to reset the unit. A "cold" reset or a "warm" reset are available. The "cold" reset will increase the DEVICE POWER CYCLES counter.

        Function: SET
                        Parameters: 01 ($01) generates a warm reset
                                        255 ($FF) generates a cold reset

DEVICE POWER CYCLES
reads the number of device power-ups. Cannot be reset.

        Function: GET
                        Parameters: none
                        Return data: 1 word (0-65535, $0000-$FFFF)

DMX HOLD MODE
sets the behaviour at loss of data signal and reflects the state of DIP switches 1 and 2 (or settings S1, S2, repectively - see above).

        Function: GET / SET
                        Parameters: 1 Byte (0-2)   0=non-hold, all outputs OFF
                                                                       1=non-hold, all outputs ON
                                                                     2=DMX HOLD (last valid value retained)

RDM SLOT LABELS

sets the labels of the DMX data slots. By default, all data slots are labeled as "OUTPUT1" thru "OUT-PUT16" and can be renamed to your specific needs. Labels may be up to 16 characters long.

    Function: GET / SET
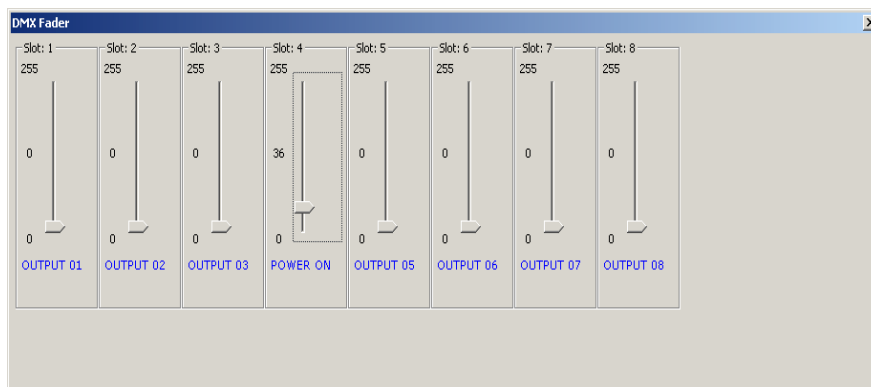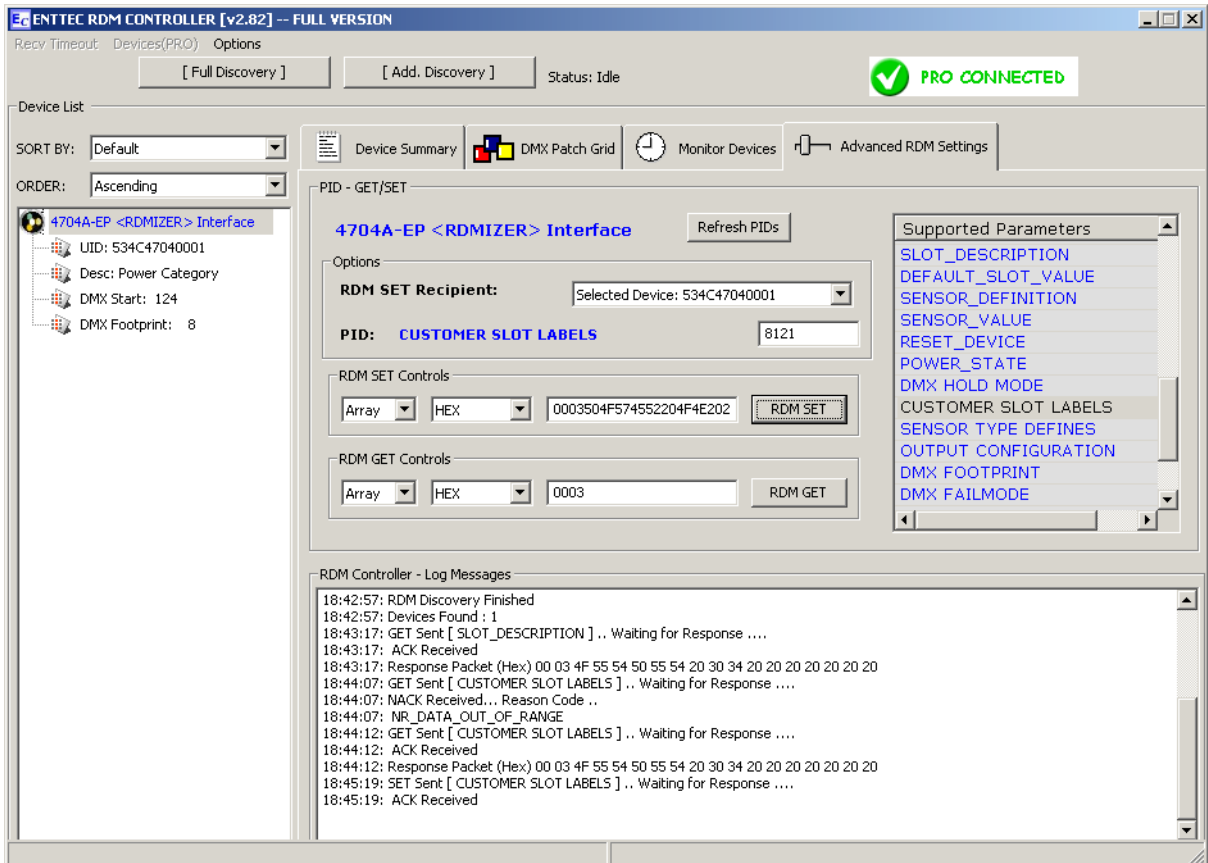   Parameters: GET: 1 word (slot number, beginning with $0000)
                                   SET: 1 word (slot number), followed with 16 ASCII bytes

Example: to rename data slot 04 to "POWER ON" these data must be transferred:
                00 03 50 4F 57 45 52 20 4F 4E 20 20 20 20 20 20 20 20
        [Slot 4   P   O   W   E   R   _   O   N   _   _   _   _   _   _   _   _   ]

The extended command "CUSTOMER SLOT LABELS" allows writing a label, while the standard command "SLOT LABELS" only allows to read a lebel. Please obey some rules:
- Data must be written with or without spaces between data depending on software (check with your RDM controller software).
- Label length must always be 16 characters, unused chars must be replaced with spaces ($20).
- All characters must be replaced with their approriate ASCII code (refer to a ASCII table)
- No formatting characters (comma, semicolon, TAB etc.) must be used. This may result in system instability, since some RDM controllers do not allow use of these characters.

The above applies to all functions dealing with text blocks.
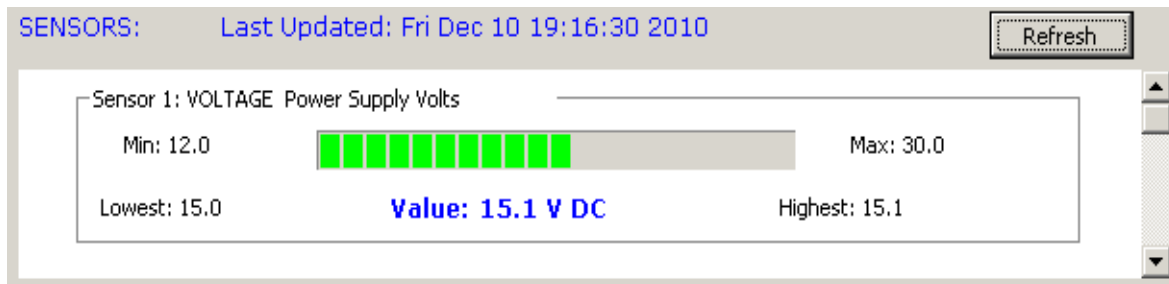
SENSOR TYPE DEFINES

This function allows to set the definition of a sensor input. Several parameters (including text) may be configured, and care must be taken to not enter invalid data. Make a GET call before you attempt to SET sensor parameters and analyze the data returned to familiarize yourself with the function. Sensors are numbered from 00 to 04 with sensor 00 being the system sensor (supply voltage), which cannot be changed. Attempts to write to sensor 00 will be rejected.

Function: GET / SET
Parameters: GET: 1 Byte (sensor number, $00 ... $04)
              SET: 46 Bytes

Example: try ro read sensor 00. This will display these data:
00 01 02 01 00 78 01 2C 00 96 00 F5 02 20 50 6F 77 65 72 20 53 75 70 70 6C 79 20 56 6F 6C 74 73 20 20 20 20 20 20 20 20 20 20 41 42 43

Analyzing these data will result in:

00	Sensor number	;$00= system sensor
01	Type	;01=voltage sensor
02	Unit	;02=volts
01	Prefix	;01=prefix "dezi"
00 78	Range Minimum Value	;$0078 = 120dV = 12,0V
01 2C	Range Maximum Value	;$012C = 300dV = 30,0V
00 96	Normal Minimum Value	;$0096 = 150dV = 15,0V
00 F5	Normal Maximum Value	;$00F5 = 245dV = 24,5V
02	Recorded Value Support	;$00= no, $02=yes
20	Space	
50 6F 77....	32 characters Text	;"Power Supply Volts"

The sensor display shows the data retrieved from the SENSOR TYPE DEFINES function.
Use these variables to set the sensor functionality:
Sensor number: 01...04

Type:	00=temperature, 01=voltage, 02=current, 05=power, 09=volume, 1C=contacts, 7F=other
Unit:	00=none, 01=centigrade, 02=DCV, 07=DCA, 0A=power (W)
Prefix:	00=none, 01=dezi, 02=centi, 03=milli, 04=micro 11=deka, 12=hekto, 13=kilo, 14=mega (all values hexadecimal)

For a full description of all parameters available, check the ANSI E1-20 document available at:
http://webstore.ansi.org/RecordDetail.aspx?sku=ANSI+E1.20-2006

NOTE: the sensor label may contain up to 32 characters of text description. Please note, that the first character used with the 4704A-EP is defined as space ($20), thus 31 are available for user-defined sensor labels. The last character must also always be a space and will be dropped at readout. This is required for compatibility issues.

IDENTIFY MODE

Selects "loud" (signalling on outputs) or "quiet" mode (siganlling on indicator LEDs)
FUNCTION: GET / SET
            Parameters: GET: nothing, returns 1 Byte (Identify Mode)

SET: 1 Byte (Identify Mode)
                                $00= quiet mode, $FF=loud mode

DMX FAIL MODE

Selects the behaviour at loss of data. This function is similar to DMX HOLD MODE (see above) but
has a different parameter set to match future standard E1-37.

        FUNCTION: GET / SET
                Parameters: GET: nothing, returns 7 bytes
                                SET: 7 bytes

DMX HOLD	DMX FAIL MODE
0: goto OFF	$00 $00 $00 $00 $FF $FF $00
1: goto ON	$00 $00 $00 $00 $FF $FF $FF
2: keep last	$00 $00 $FF $FF $FF $FF $FF

PIN SETTING

Allows to define a PIN code to lock various functions. This parameter is used to get and set the PIN
code for devices that support locking. The lock state is set using the LOCK_STATE message.

        FUNCTION: SET
                Parameters: 2 words (4 bytes): <current PIN> <new PIN>
                        A PIN can be any value between 0000(dec) and 9999(dec), that is, $0000
                        and $270F. The default PIN is 0000. Please keep the PIN in a safe place,
                        since there is no way to retrieve a lost PIN.
                        Example: Set the PIN to1234(dec)
                        Enter: 000004D2 since 1234(dec) = 04D2(hex)

LOCK STATE

This parameter is used to determine the lock state for devices that support locking. A lock, when
applied, can have a variable level of what is protected against in the device. The locking mechanism is
designed to deter tampering and is not intended to provide absolute security.
With the 4704A-EP, there are two different lock states available.

        FUNCTION: GET / SET
                Parameters: GET: none,
                                returns 2 Bytes: <current lock state><# of lock states>
                        SET: 3 bytes: <PIN> <desired lock state>
                LOCK STATES: 0= no lock state active
                                1= lock configuration
                                2= lock setup
                                3= lock both

                                Configuration lock includes:
                                - SET DMX PERSONALITY
                                - SET DMX FAIL MODE
                                - SET DMX HOLD

                                Setup loock includes:
                                - SET RDM SLOT LABELS
                                - SET SENSOR DEFINITION
                                - SET OUTPUT CONFIGURATION
                                - SET DMX FOOTPRINT

                        Example: using the PIN defined above, set the lock state to "lock
                        setup". Enter data: 04 D2 02

LOCK STATE DESCRIPTION
Returns a description for the requested lock state.
> FUNCTION: GET
>> Parameters: GET: 1 byte (no. of lock state requested)
>>> returns: 1-33 bytes <# lock state> <text: 0..32 bytes>

OUTPUT CONFIGURATION
Defines the configuration of the four control outputs on the 4704A-EP.
> FUNCTION: GET / SET
>> Parameters: GET: none
>>> returns: 6 bytes <control outputs available: word>
>>>> <out1:byte> <out2:byte> <out3:byte>
>>>> <out4:byte>
>> SET: 6 bytes   <control outputs available: word>
>>> <out1:byte> <out2:byte> <out3:byte>
>>> <out4:byte>

> OUTPUT CONFIGURATION:
> $FF= output deactivated
> $00= normal port (TTL level: off/on)
> $01= PWM output
> $02= PWM inverted

Please refer to HARDWARE DESCRIPTION for more information how to use and connect outputs.
Please refer to DMX SETUP for more information regarding output assignment.

DMX FOOTPRINT
Sets the number of DMX data slots allocated with the selected DMX footprint.
> FUNCTION: GET / SET
>> Parameters: GET: 1 byte <# of footprint>
>>> returns: 3 bytes <#footprint:byte> <# slots:word>
>> SET: 3 bytes: <#footprint:byte> <# slots:word>
>>> (number of footprint begins with 0)

> Example: allocate 11 data slots to footprint 2:
> SET: $01 *(footprint 2)* $00 $0B *(11 decimal)*

Please note that the number of data slots must comprise the number of outputs activated plus the number of date slots to be transferred yo your legacy device. See DMX SETUP for mor information. The maximum number of DMX data slots to be defined is 16 (including control outputs).

DMX Setup

The RDMIZER 4704A-EP receives the number of data slots defined for the selected DMX personality and uses these data to feed the control outputs and the DMX feedtru to your legacy device. The first data slots are assigned to the outputs, the next to the legacy device. All data transferred to the DMX input of your legacy device are re-arranged to a "virtual" start address of 001, which makes ist easy to setup your legacy device: simply set the DMX start address to "1" and you're done. The final start address will then be monitored and administered byt the RDMIZER interface.

The total number of data slots defined with the DMX FOOTPRINT function (see above) must be calculated as follows:

number of data slots = number of control outputs + nuber of slots needed by legacy device.

So if you need two control outputs and your legacy device (e.g. a smoke machine) needs 3 data slots (heating, on, volume) set the footprint to 5 (=2 + 3).

The control outputs are assigned in order, that is, control output#1 comes first, control output#4 cames last. Assuming a RDM start address of 101 and control outputs 1 and 3 activated and the application example used above (smoke machine) the overall DMX slot allocation would then be:

|		
[099]	n/a	
[100]	n/a	
[101]	control output#1, start adress of the combined RDM device	
[102]	control output#3	
[103]	heating	sent as slot#1 to your legacy device
[104]	on	sent as slot#2 to your legacy device
[105]	volume	sent as slot#3 to your legacy device
[106]	n/a	

Hardware Description

The schematics of the 4704A-EP RDMIZER is printed in the annex. Please refer to the schematics for connector pinouts and tecnical information.
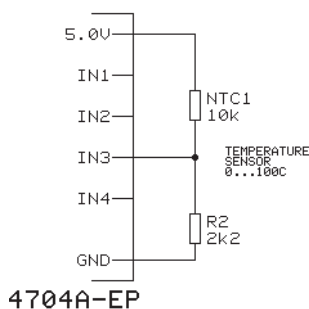
INPUT CONNECTION

Four inputs (IN1...IN4) are available as sensor inputs to generate feedback, wich can be read via RDM commands. All inputs are sensitive CMOS inputs and accept levels 0...+5V DC (max.). Exceeding the maximum voltage may damage the unit. Please take care to add protective circuitry if higher signals are to be monitored. All inputs are clamped with 100kohms to GND and will read zero when not connected.

Input as voltage sensor: use a series resistor of 450kOhms to create a voltage input
                              (input range: 0 to 25V DC max.). Either topology can be used:
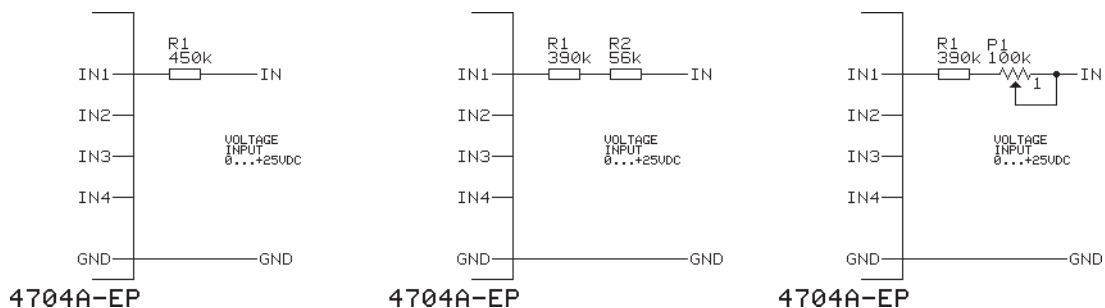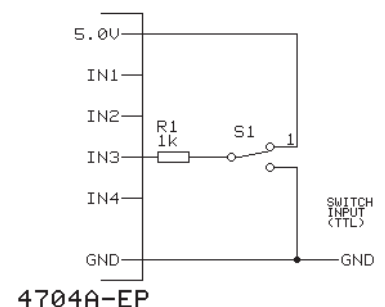

Input as temperature sensor: use a 10k NTC resistor to create a temperature sensistive input.
                              The sensor must be fed from the internal supply voltage.


Input as Switch input: Use a TTL compatible drive signal to feed the input. Potential-free switches may use the internal supply voltage to create a TTL-compatible drive signal.

OUTPUT CONNECTION

All control outputs are TTL compatible and can drive LS-TTL, CMOS, and HCT compatible logic. Relays, solenoids, lamps and other actors may require additional circuitry. Interfacing to standard npn and pnp output drivers is straightforward. Here are some illustrations giving typical values. When using MOSFET drivers, logic compatible types (e.g. International Rectifier IRLL types) should be specified.

Outputs must be prevented against overvoltage and short circuits.
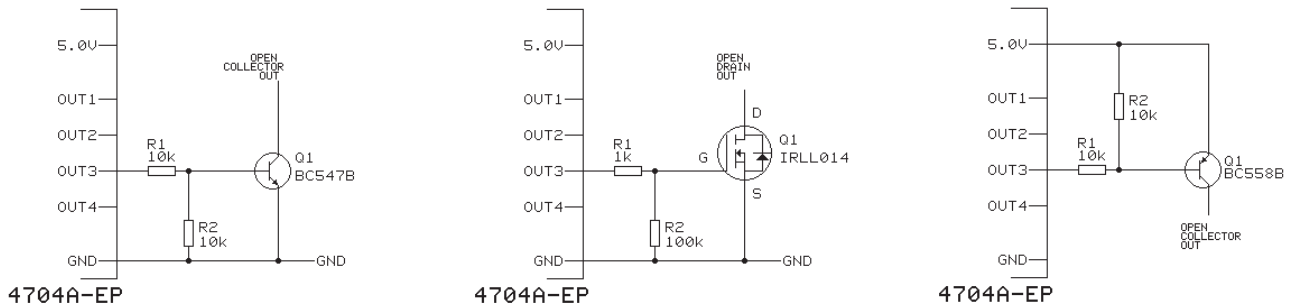
DMX OUT CONNECTION

The DMX output must be connected to the DMX Input of your legacy device. No interface circuitry is needed.

Signal Name	Output Connector CN6	DMX INPUT Legacy Device
GND	Pin 5	XLR Pin 1
DMX -	Pin 1	XLR Pin 2
DMX +	Pin 2	XLR Pin 3

Technical Data

Dimensions:	70 mm x 70 mm x 45 mm
Supply:	15...24V DC, approx. 35mA without load
DMX IN:	1 unit load
DMX OUT:	fed thru
DMX Slave Out:	10 unit load
RDM Compatibility:	ANSI E1-20:2006 V1.0
Control Outputs:	4, TTL compatible, configurable as port or as PWM output
Sensor Inputs:	4, input sensitivity 0...+5VDC (absolute maximum input voltage 5.2V DC)
Order code:	4704A-EP RDMIZER

CE Conformity

This DMX decoder is microprocessor controlled and uses high frequency (8 MHz quartz). The interface has been tested in our EMC lab to comply with EN5022B and IEC65/144. To ensure the best performance regarding radiated and conducted emissions we suggest to install the interface card 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 installed 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.

Disturbances

If a trouble-free operation cannot be guaranteed, disconnect the decoder interface and secure it against unwanted operation. This is especially necessary, when

- the unit shows visible damages;
- the unit does not operate;
- internal parts are loose;
- interconnection cables show visible damages.

Limited Warranty

This instrument ist warranted against defects in materials and workmanship for a period of 24month, 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.

End-of-Liftetime Procedures

Electronic devices are not domestic waste and must be disposed of properly. If the end of lifetime of this device has been reached, it must be recycled by your local WEEE recycling system or collection point.
SOUNDLIGHT is a WEEE registered company (registration code DE-58883929)

Service

There are no parts within the DMX Decoder Board 4704A-EP RDMIZER which require the user's attention. Should your unit require servicing, please send it to the factory, freight paid.

Internet-Hotline

Please use our internet domain http://www.rdm.soundlight.de for new versions, updates etc. If you have any comments which may be worth considering, please send a message to info@soundlight.de. We will check your message and reply accordingly.