OPERATING MANUAL
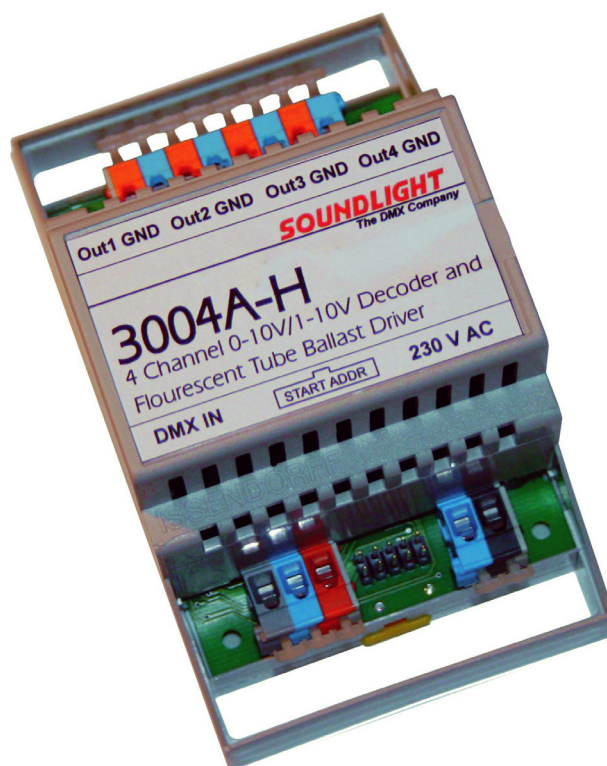
Electronic ballast decoder 3004A-H Mk1

combined 1-10V / DSI / DALI / PWM Version

SOUNDLIGHT *The DMX Company*   Bennigser Strasse 1   D-30974 Wennigsen   Tel. +49-(0)5045-912 93-11

Thank you for choosing a SOUNDLIGHT device.

The SOUNDLIGHT DMX 1-10V/DSI/DALI Converter 3004A-H is an intelligent DMX converter decoding digital data complying with standard USITT DMX512 and DIN 56930-2 to drive electronic ballasts for flourescent tubes. The card 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 / DIN

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

- **high linearity**
  As the unit accepts and outputs data in digital format, excellent linearity chracteristics result.

- **simple supply**
  The power supply is achieved by its own PSU, power supply is 230V AC.

- **signal loss**
  In the case of a loss of the drive signal the last setting will remain intact.

- **application tolerant**
  The SOUNDLIGHT 3004A-H drives all kins of ballasts:
  DSI: Digital Serial Interface
  DALI: Digital Adressable Lighting Interface
  1-10V: industry standard analog voltage driven ballasts
  PWM: High speed 100% Pulse Width Modulated devices

- **cost-effective**
  The SOUNDLIGHT 3004A-H is a cost-effective solution for many purposes.

APPLICATIONS

The converter 3004A-H is designed to drive flourescent light tubes with variable intensity. Up to two SOUNDLIGHT LUXMATE PCA electronic ballasts (8 separate circuits) may be connected per output. The unit is well suited for all applications on stage, for TV background lighting, or for architectural lighting purposes. The dimming range is 100% to 1%, and OFF at DMX input zero. (The OFF state will apply to digitally driven ballasts only).

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.

When unpacking, you should identify these items:

* the interface 3004A-H
* this manual

IMPORTANT NOTE: The optional programming adaptor 3000P or 3003P must be ordered separately.

The decoder 3004A-H comprises of these connectors::
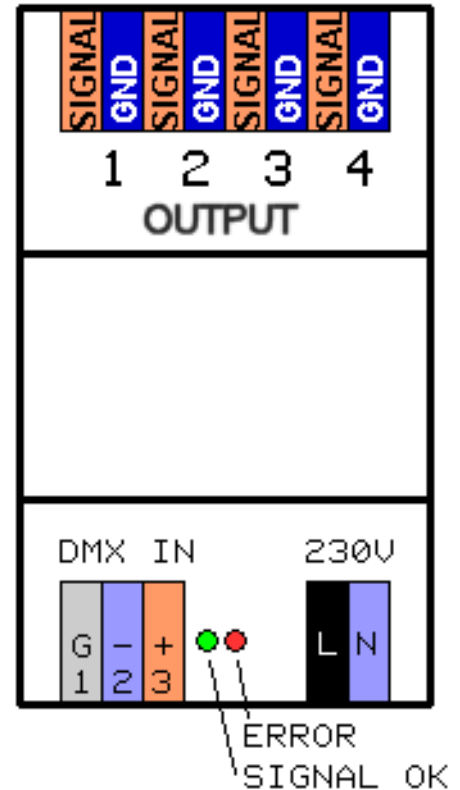
CN6 **POWER SUPPLY 230V AC 50 Hz**
  1   black: **L**   230V AC
  2   blue: **N**   0V AC

CN2 **DMX Data Input**

  1 (grey)   GND, Screen
  2 (blue)   DMX Drive Signal -
 3 (orange)   DMX Drive Signal +

CN3-6 **Drive Output to electronic ballasts**

  1   CH 1: Drive Signal 1
  2   CH 1: Drive Signal GND
  3   CH 2: Drive Signal 2
  4   CH 2: Drive Signal GND
  5   CH 3: Drive Signal 3
  6   CH 3: Drive Signal GND
  7   CH 4: Drive Signal 3
  8   CH 4: Drive Signal GND

Refer to the drawing for the location of the connectors. To open clamp, press lever. Insert wire, release lever.

DO NOT CONFUSE TERMINALS; CONNECTING TO WRONG VOLTAGES OR POTENTIALS MAY BE HAZARDOUS AND/OR DAMAGE EQUIPMENT.
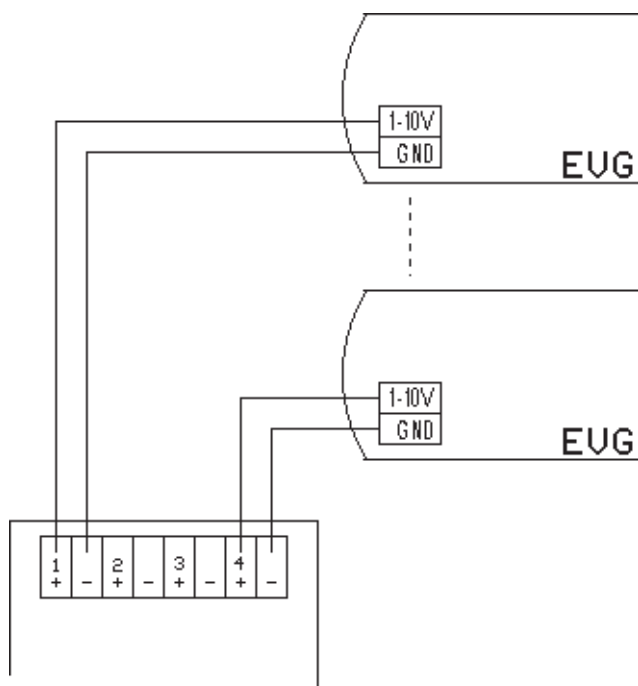
You may connect DSI (Digital Serial Interface) compatible, or DALI (Digital Addressable Lighting Interface) compatible, or analog 1-10V compatible electronic ballasts (EVG) to the 3004A-H. Optimum performance will be obtained when using DSI compatible ballasts. The interface has to be programmed for Analog, DSI or DALI mode, see below. You are not allowed to mix analog, DSI and DALI devices on one decoder.

Ballasts must be connected to the output terminals of the 3004A-H. Multiple ballasts may be connected in parallel if required - see technical data.

Digital SOUNDLIGHT PCA electronic ballasts are insensitive to polarization. If using other ballasts, please check before wiring. The signal output of the 3004A-H is positive (+).

SIGNAL INDICATORS

Status signalling is with LED indicators:

green: DMX data reception OK
red: ERROR
                normally off
                blinks at transmission errors or at loss of signal

DMX Start Address

Hundreds - Tens - Ones
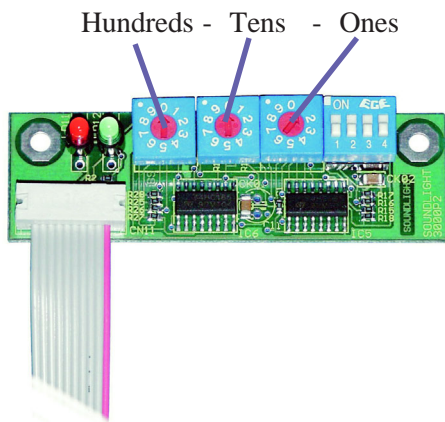
It is a commonly used scheme for building automation devices to avoid configuration switches. All settings are stored permanently in non-volatile memory. When installing the decoder for the first time, however, the output protocol and the DMX start address (number of the first DMX data slot, value 001 ... 509) must be programmed.

The start address switch board 3000P or 3003P is required to set start address and mode of operation. This is a standard device, which can be used for all SOUNDLIGHT decoders.

Programming adaptor

To set a DMX start address, connect the address board as decribed above.
MAKE SURE THE CONNECTOR IS PLUGGED THE RIGHT ORIENTATION AS INDICATED ON THE LABEL. CONNECTING THE ADDRESS BOARD THE WRONG WAY MAY DAMAGE BOTH, THE DECODER AND THE ADDRESS BOARD.
Then power up the decoder and apply a valid DMX signal.

Then simply set the desired start address. The hundreds switch is located next to the LEDs. Valid address settings are from 001 to 509. Wait some seconds until the unit recognizes and programs the address setting. The programming cycle will be indicated by the the red and green LED flashing alternatively four times.

If the decoder is already fully wired you may test the system for proper operation right now. If everything works to your satisfaction, power down the system and remove the address board.
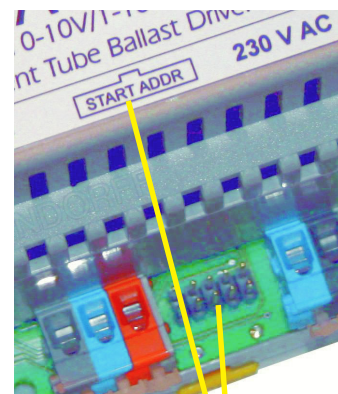
Connector for start address board and polarization notice

DIP switches

The output protocol of the decoder and the behaviour at loss of data may be selected by the user. The address board consists of four DIP switches to select the required features. All settings are stored in internal nonvolatile memory (same as the DMX start address).

DIP-SWITCH 1:   **DMX HOLD**
                        Defines the behaviour at loss of DMX data.
                        OFF= see DIP switch #2
                        ON = DMX HOLD at data loss

DIP-SWITCH 2:   **OUTPUT LEVEL AT NON-HOLD**
OFF= all outputs are driven to 0% (e.g. stage lighting)
ON = all outputs are driven to 100% (e.g. architectural lighting)

DIP-SWITCH 3/4:   **OPERATING MODE**
OFF/OFF=   Analog output 0..10V / 1-10V
ON /OFF=   DSI
OFF/ON =   DALI
ON /ON =   PWM

MODES OF OPERATION

MODE 1: ANALOG OUT 0-10V / 1-10V

DIP-SWITCH 3 = OFF
DIP-SWITCH 4 = OFF

The decoder 3004A-H supports both, 0-10V output and 1-10V output. The difference of both protocols is the direction of the drive current: while 0-10V devices require a control current to be _supplied_ by the decoder, 1-10V devices require control current to be _drawn_ by the decoder.
The decoder satifies both needs and adjusts its output automatically.
The control characteristics are fully linear ranging from DMX=000 (full off, or minimum intensity, depending on ballast characteristics) to DMX=255 (maximumj intensity). Please note, that most analog driven electronic ballasts cannot be drive to the OFF state using the control input. This is a ballast property.
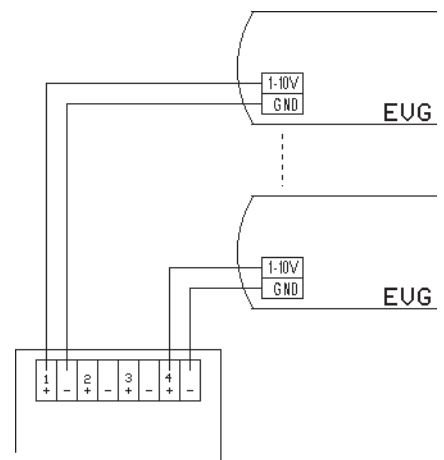
Minimum ballast intensity is 1% (typically). Again, this is a ballast property: minimum levels of 3%, even 5% (or higher) are commonly available (The decoder will nevertheless go down to 0V). Please check the data of your ballasts. SOUNDLIGHT recommends use of OSRAM ballasts for optimum performance.

MODE 2: DSI

DIP-SWITCH 3 = ON
DIP-SWITCH 4 = OFF

DSI (Digital Serial Interface) is a digital protocol for smooth intensity control. Optimized drive characteristics, following a quasi-logarithmic law to match the eye's intensity sensing and excellent common mode characteristics are among the DSI benefits.
You may use all PCA ECO and PCA EXCEL ballasts made by Tridonic and BBC.
Each output may be loaded with up to two ballasts, giving a total of 8 ballasts to be driven by the 3004A-H. DMX control is identified by these control values:

DMX = 000   ballast OFF (Standby)
DMX = 001   ON , 1% Intensity
DMX = 128   10% Intensity
DMX = 255   100% Intensity
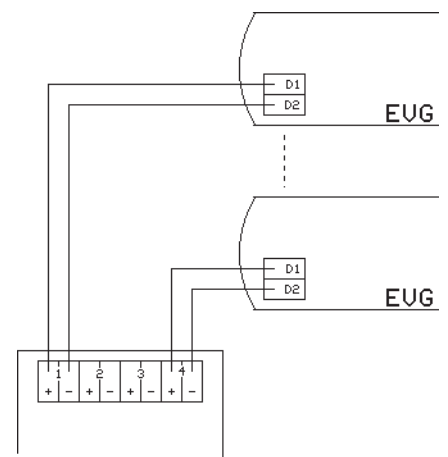
MODUS 3: DALI   DIP-SWITCH 3 = OFF
                                                         DIP-SWITCH 4 = ON

Nearly all ballast manufacturers (e.g. Philips, Helvar, Osram, Tridonic etc) will supply DALI compatible ballasts. All DALI ballasts may be connected to the 3004A-H, independent of type and manufacturer. Wiring is same as with DSI.

IMPORTANT NOTICE:
The decoder 3004A-H supplies drive voltage to connected DALI ballasts. Thus **NO ADDITIONAL** DALI power supply must be used, DALI **BUS** is not supported (only individual devices).

The decoder control range is defined to support a 1% to 100% intensity span. Please note, that several DALI ballasts will only support lower dim levels starting at 3%, 5% or even 10%. If so, the DMX inignition point will remain intact, but intensity will only increase as soon as the ballast starting value has been reached. For a 3% starting value, this is about half-scale.

DALI ballasts usually react much faster than DSI ballasts, but lack resolution (only 170 intensity steps available as compared to 255 for DSI). That is why they may appear somewhat "rougher" when fading.

DMX = 000	ballast OFF (Standby)
DMX = 001	ballst ON , 1% intensity
DMX = 128	10% intensity
DMX = 255	100% Helligkeit
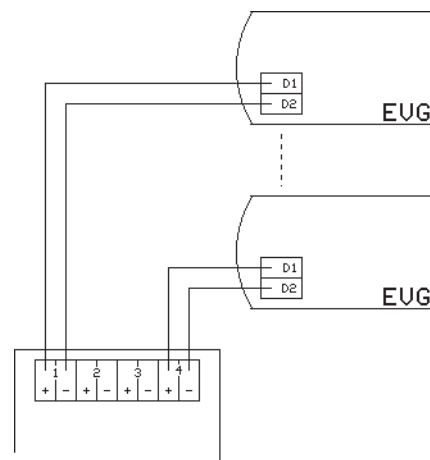
EVG-Sortiment zum Betrieb der T8/Ø26mm Leuchtstofflampen

Produktbezeichnung	Zum Betrieb der T8-Leuchtstofflampe
Einlampige Versionen	
QT DALI-FQ 1x24/230-240 DIM	1xL18
QT DALI-L 1x36/230-240 DIM	1xL36, 1xL38
QT DALI-FQ 1x54/230-240 DIM	1xL58
Zweilampige Versionen	
QT DALI-FQ 2x24/230-240 DIM	2xL18
QT DALI-L 2x36/230-240 DIM	2xL36, 2xL38
QT DALI-FQ 2x54/230-240 DIM	2xL58

EVG-Sortiment zum Betrieb der FQ-T5/ø16mm Leuchtstofflampen

Produktbezeichnung	Zum Betrieb der FQ-Leuchtstofflampe
Einlampige Versionen	
QT DALI-FQ 1x24/230-240 DIM	1xFQ 24
QT DALI-FQ 1x39/230-240 DIM	1xFQ 39
QT DALI-FQ 1x54/230-240 DIM	1xFQ 54
QT DALI-FQ 1x80/230-240 DIM	1xFQ 80
Zweilampige Versionen	
QT DALI-FQ 2x24/230-240 DIM	2xFQ 24
QT DALI-FQ 2x39/230-240 DIM	2xFQ 39
QT DALI-FQ 2x54/230-240 DIM	2xFQ 54

MODE 4: PWM   DIP-SWITCH 3 = ON
                                                         DIP-SWITCH 4 = ON

A PWM output allows intensity control for electrically non-linear devices, such as LEDs. PWM (pulse width modulation) achieves intensity control by setting the output to either full ON or full OFF using a variable on/off ratio. The 3004A-H features four 4 PWM outputs delivering a 10V PWM control signal. This may be used to drive power output stages equippend with bipolar transistors or MOSFETs. Output frequency is approx. 240 Hz. The control characteristic is absolutely linear and has a 8 bit resolution (256 steps).

DMX = 000	OFF, output = 0V
DMX = 128	50% intensity, duty cycle 50% (ratio 1:1)
DMX = 255	100% intensity, output = 10V

Drive Characteristics

Using microprocessor-controlled electronic ballasts results in a unprecedented precise logarithmic control curve matching the eye's intensity sensitivity very closely. Thus the whole dimming range (1%...100%) seems completely linear to the eye.

DSI cuts the DMX control range (256 steps) into two halves to generate two decades of intensity (from 1% to 10% and from 10% to 100%). Thus a DMX input value of 001 represents a output intensity of 1%, a DMX input value of 128 represents a output intensity of 10% and a DMX input value of 255 represents a output intensity of 100%.

DALI cuts the DMX control range (256 steps) into three thirds to generate three decades of intensity control (from 0.1% to 1%, from 1% to 10% and from 10% to 100%). Thus a DMX input value of 087 would represent a output intensity of 1%, and all values from 001 to 086 would do the same because there a no electronic ballasts available worldwide which can dim lower than 1%. This, however, would make 1/3 of the fader control range useless.
To obtain the same behaviour as with DSI devices the 3004B-H stretches the remaining 2/3 (170 steps) of the DMX control range to full scale. Thus smooth fades in DALI mode may appear somewhat "rougher".

Electronic Ballasts

The electronic ballasts are connected to connector CN4. Each output has two terminals, orange (output drive signal, +) and blue (ground, -). SOUNDLIGHT PCA electronic ballasts are insensitive to polarization of the drive signal, thus terminal connections may be interchanged. When using other brands, make sure to obey correct polarization of the drive signal.

Each output may drive up to 2 ballasts maximum.

Installation of electronic ballasts must only be carried out by trained and qualified technicians. Electronic ballasts must be connected to mains voltage; interchanging power supply and control lines will damage both, ballast and decoder. Check your wiring thoroughly before powering up your system.

TECHNICAL DATA

Dimensions: 65 mm x 105 mm x 65 mm
Power supply: 230V AC approx. 3W
DMX IN: 1 Unit Load
Output analog :   0..10V current sink or current source, max 2mA
Outputs DSI: Impulse signal 1200 bps 15V
Output DALI: Impulse signal 1200 bps 15V
Output PWM: 0/10V approx. 240 Hz, max. 2mA
Order Code: 3004A-H

DISTURBANCES

If a trouble-free operation cannot be guaranteed, disconnect the 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 instrument 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

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, please make sure that shielded data cable is used and the shield is connected properly to the GND terminal. Shield must never make contact to any 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.

SERVICE

There are no parts within the DMX decoder which require the user's attention. Should your unit require servicing, please send it to the factory, freight paid.

END OF LIFETIME

When the useful lifetime of this product has been reched, 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.

INTERNET-HOTLINE

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