Analogue converter

4 channel

Ordercode: 10016

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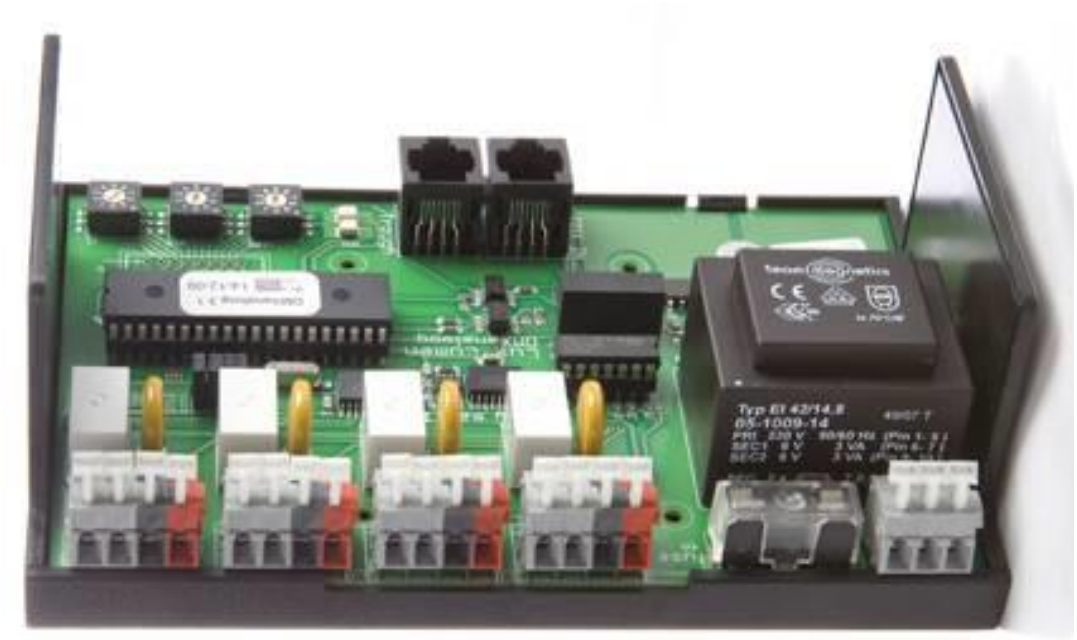
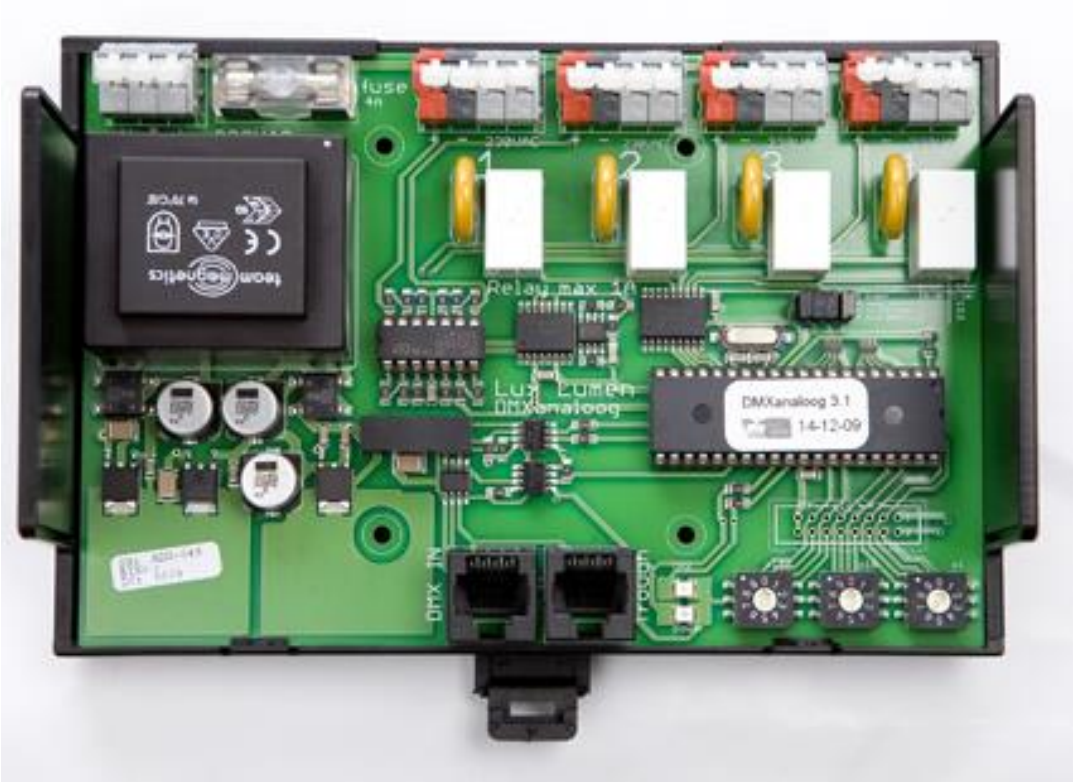
3

Picture

3.1 General



3.2 Top



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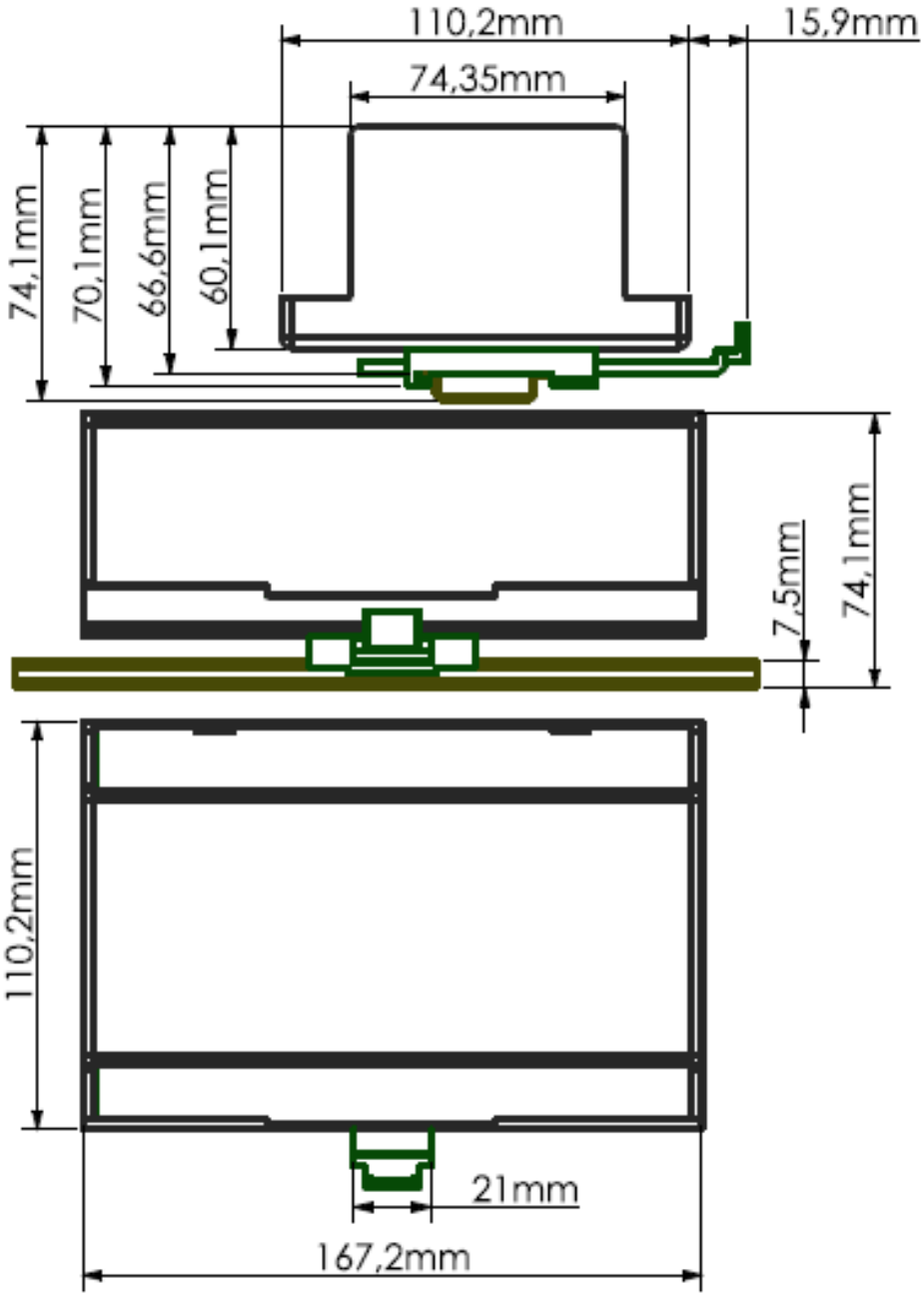
4 Dimensions



Please note, dimensions given are din-rail included.

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5 Safety information

Before installing, powering up, or servicing this DMX analogue converter card it his highly recommended that you read this manual and ensure yourself that you completely understand its content. Observe the safety precautions in this manual. Install and operate the analogue converter only as described in this manual and in conformity with local regulations. If you have any questions how to operate this product safely please contact your point of sale.

5.1 Symbols

Following symbols are used to identify important safety information on the product and in this manual.

DANGER! Safety hazard. Risk of severe injury or death.

Warning! Hazardous voltage. Risk of lethal or severe electric shock.

Warning! LED light emission. Risk of eye injury.

Warning! Burn hazard. Hot surface. Do not touch

Warning! Refer to user manual.

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5.2 Protection from electric shock

This DMX analogue converter card is connected with live power so take all precautions to prevent injuries or electrical shocks. Shut down the power of the complete installation before carrying out any installation or maintenance work.

Please note that all metal parts used in the enclosure where this card is used are firmly grounded.

If any cable, seal or housing is damaged, cracked or reformed, disconnect the power of the installation immediately.

The DMX analogue converter card is only to be used in a proper housing conform to local regulations.

For any additional servicing, not described in this manual, please contact your point of sale.

5.3 Protections from fire and burns

Do not operate this DMX analogue converter card if ambient temperatures, inside its enclosure, is above 45 °C (113 °F). Please ensure yourself that sufficient ventilation around the card is possible.

Do not modify the card in a way not described in this manual.

Never bypass the fuse or change the fuse with another type or value as is rated in this manual.

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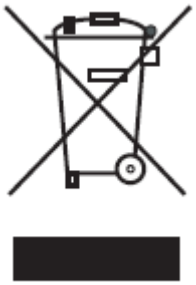
5.4 Protection from injury

Ensure yourself that all components, covers are securely fastened. Verify that the card is firmly clicked on a standard din-rail.

5.5 Disposing of this product



This DMX analogue converter card is manufactured in compliance with directive of the European community: waste electrical and electronically equipment. Please help to preserve our environment and ensure that this product will be recycled properly at the end of its life.

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6 Physical installation

Thank you for selecting this DMX analogue converter card as best solution in your setup.

Warning! Read the safety precautions in this manual before integrating this card into your installation.

Installation must be carried out by qualified professionals only.

Assure yourself that there is sufficient and unrestricted air flow around the analogue converter card.

6.1 Unpacking

The following items are included in your package:

- DMX to analogue converter card
- Carton box package
- Short form manual

6.2 Location and orientation

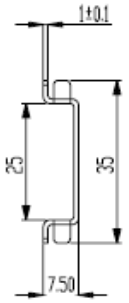
This DMX analogue converter card cannot be used without additional protective housing. The housing protects the user against electrical shocks and it is protecting the card against climatologically influences.

Please assure yourself that the cabinet which houses the DMX analogue converter card is according to local regulations and laws of the country of installation.

It is advised to install the card in horizontal position on the din-rail.

6.3 Mounting

The DMX analogue converter can be mounted on a standard 35 mm top hat din-rail. A typical section of this din-rail can be found here:



Note: Use end blocking clamps if necessary in your application.

The analogue converter card is designed for architectural purposes in fixed installation. To remove the analogue converter card from the din-rail, gently move the mounting clip like indicated here:

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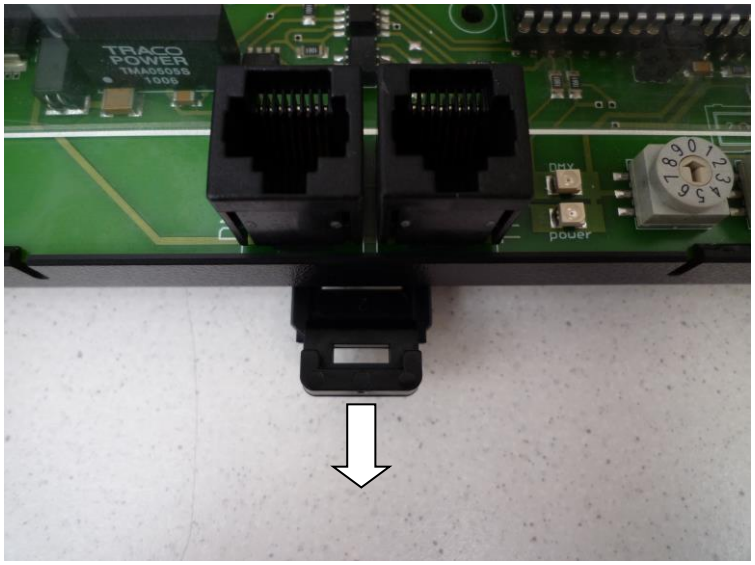
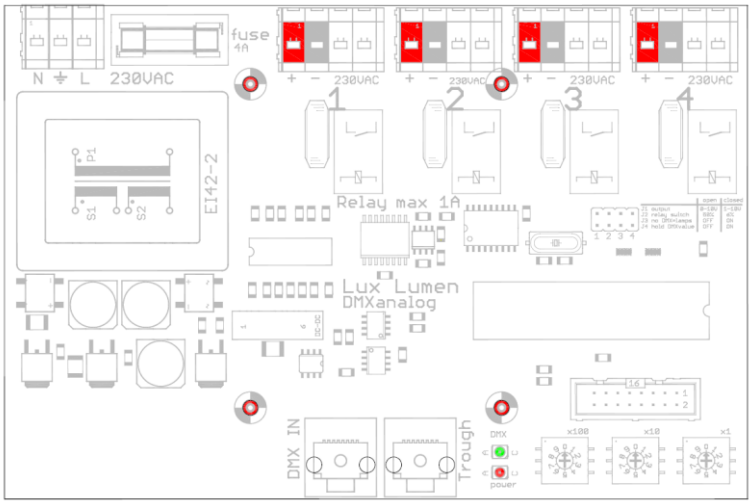


If the product is used in a situation where heavy mechanical shocks can be expected, we advise to remove the plastic din-rail enclosure and bolt the analogue converter PCB directly on a metal base. Use bolts and nuts M3 to attach the PCB. Use proper spacers to avoid electrical contact between solder pads and the metal parts of the housing.

Assure yourself that no metal parts of screws or bolts make contact with the electrical circuits on the printed circuit board.

The four mounting holes can be found below in the red color:



In case of problems or doubts, please contact your point of sale.

7 External connections

7.1 AC power input

Safety precautions

Please take all necessary precautions to prevent electrical shocks since this card uses live power feed.

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Specifications of the power input

The card operates fully functional:

- in the voltage range 220-240 Volt AC
- in the frequency range 50-60 Hz.
- Maximum power consumption is 4 A for the complete card depending on the loads of the outputs.

In case of doubts, please contact your point of sale.

Physical connections

The cable section of power feeding cable must be in the range like given in the table below:

Connection technology	Cage Clamp®
Conductor size : solid	0.08-2.5mm²
Conductor size: fine-stranded	0.08-2.5mm²
Conductor size: fine-stranded	0.25-1.5mm² (with insulated ferule)
Conductor size: fine-stranded	0.25-1.5mm² (with un-insulated ferule)
AWG	28-12
Strip length	5-6 mm/0.20-0.24 in
Conductor entry angle	0° to PCB

Note: Cage clamp® is a trade mark of Wago contact technology.

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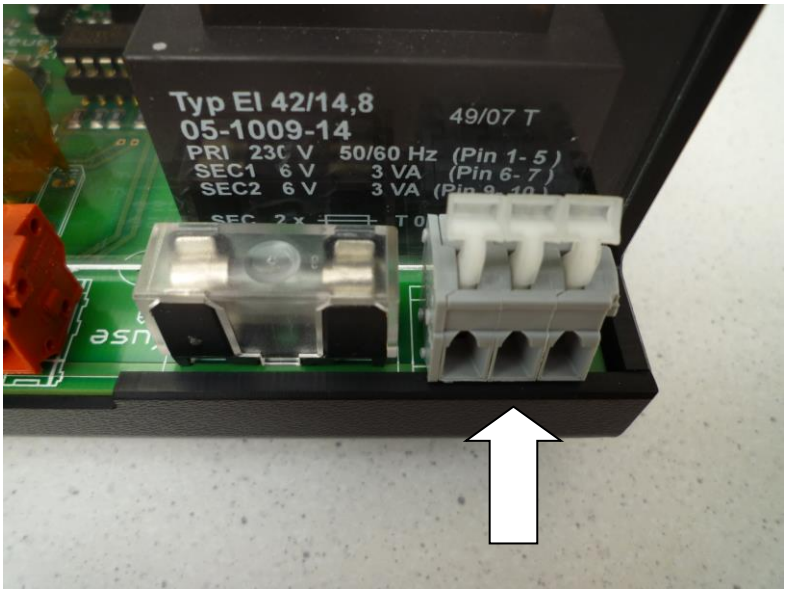
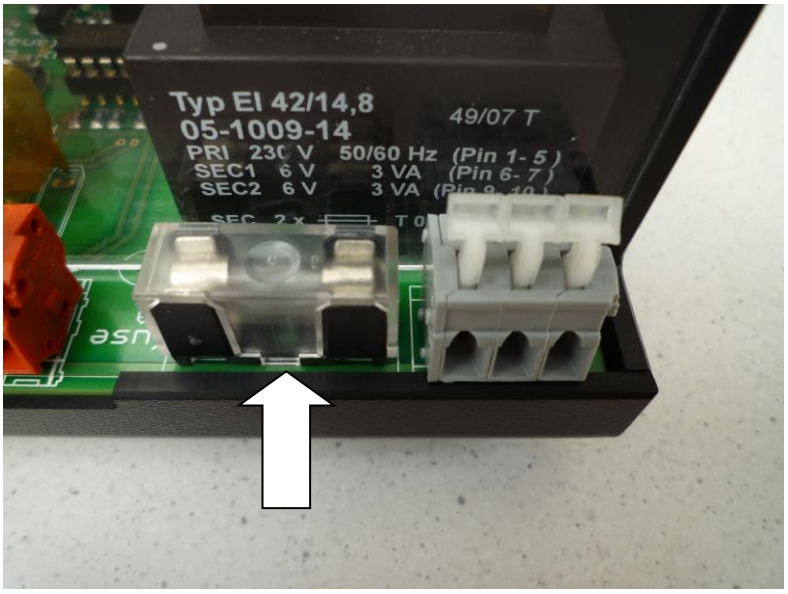
Location of power input-clamps

The power input can be found below:



Fuse located on board

A fuse to protect the card from overload or short circuit can be found beside the input clamp.



Only replace the fuse with 4 A rated, F type.

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7.2 AC power outputs

Safety precautions

Please take all necessary precautions to prevent electrical shocks since this card uses live power feed.

Specifications of the power outputs

- Switched 230 volt outputs
- Maximum 1 A current

In case of doubts, please contact your point of sale.

Physical connections

The cable section of power feeding cable must be in the range like given in the table below:

Connection technology	Cage Clamp®
Conductor size: solid	0.08-2.5 mm²
Conductor size: fine-stranded	0.08-2.5 mm²
Conductor size: fine-stranded	0.25-1.5 mm² (with insulated ferule)
Conductor size: fine-stranded	0.25-1.5 mm² (with un-insulated ferule)
AWG	28-12
Strip length	5-6 mm/0.20-0.24 in
Conductor entry angle	0° to PCB

Note: Cage clamp® is a trade mark of Wago contact technology.

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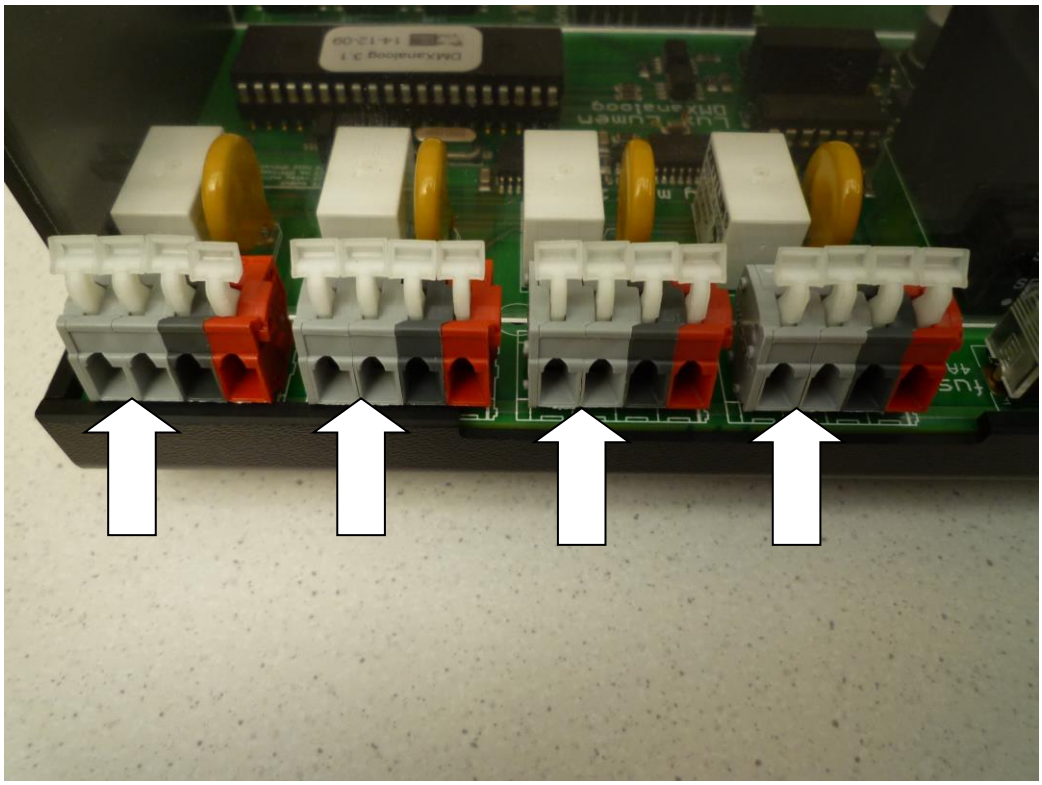
Location of the AC power outputs

Four sets of clamps are used to connect the AC power outputs of the card.

These sets can be found in the picture below:



Note: These clamps are connected with the mains feed!

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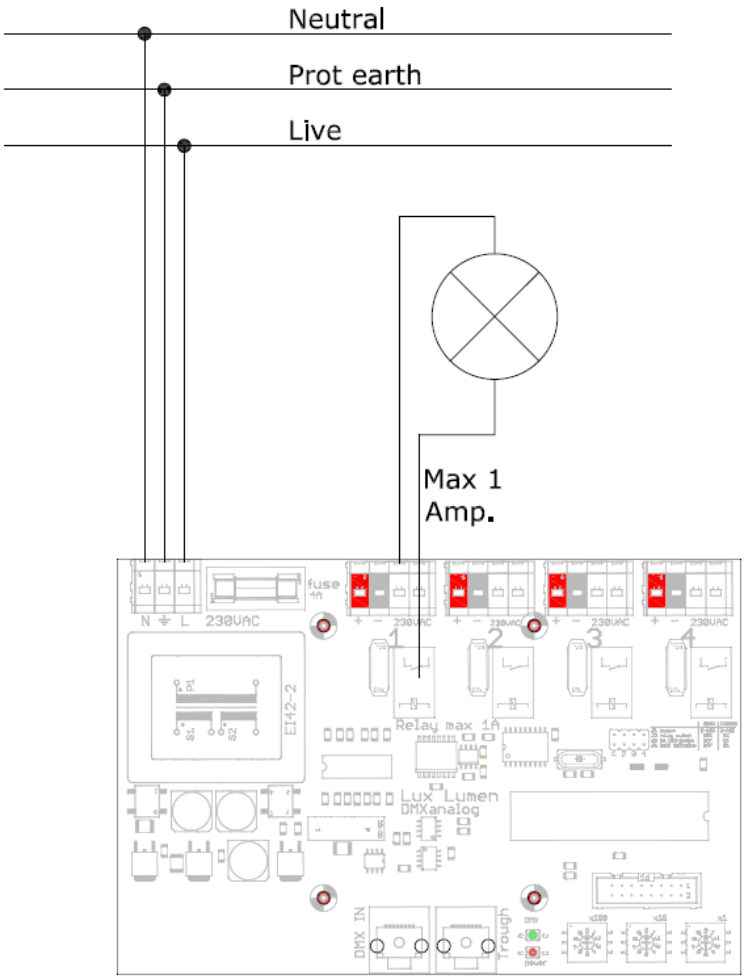
Wiring diagrams of the AC power outputs

Without external relays:

The maximum current for each output is 1 A. If this is sufficient for it's load, the load can be connected directly to the AC output clamps.

This can be found in the wiring scheme below:



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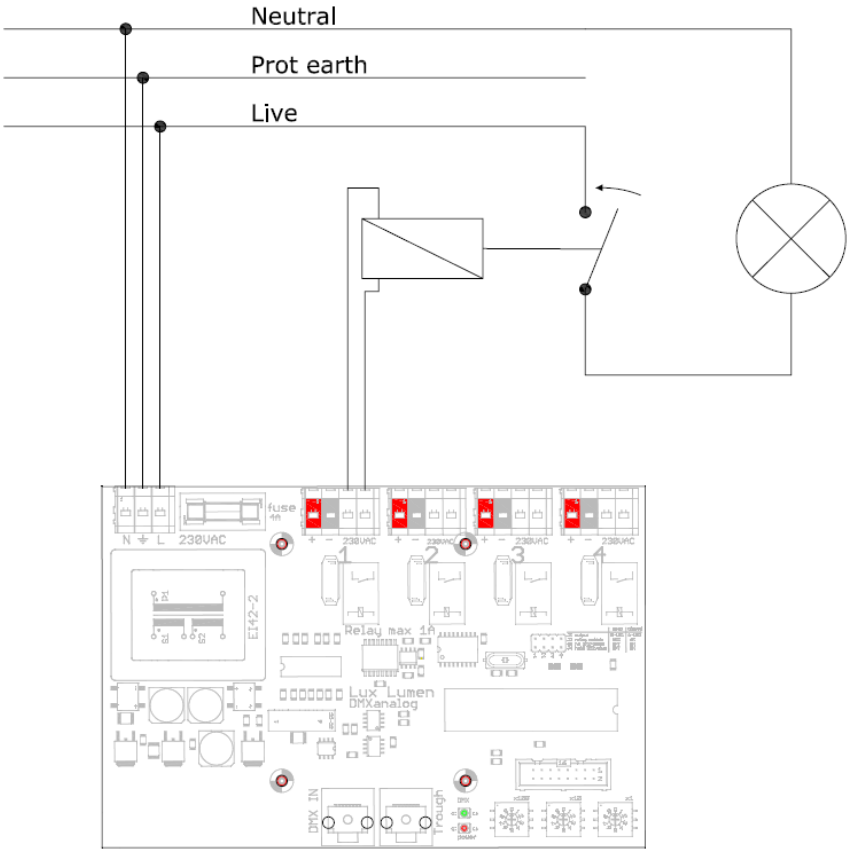
With external relays:

The maximum current for each output is 1 A. In situations where higher currents are needed, the use of an external power relays is recommended.

The maximum load is not determined by the 1 A of the DMX analogue card, but by the current switching capacity of the relays.

This can be found in the wiring scheme below:



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7.3 DC power outputs

Safety precautions

Never connect the live power to the DC output terminals of the DMX analogue converter card!

In case of doubts, please contact your point of sale.

Purpose of the DC outputs

The DC control outputs are converting a DMX value of 0-256 digital steps into an analogue DC voltage located between 0-10 volt or 1-10 volt, depending on the cards configuration. This control signal can be used to drive analogue dimmers or other analogue inputs.

Physical connections

The cable section of power feeding cable must be in the range like given in the table below:

Connection technology	Cage Clamp®
Conductor size : solid	0.08-2.5 mm²
Conductor size: fine-stranded	0.08-2.5 mm²
Conductor size: fine-stranded	0.25-1.5 mm² (with insulated ferule)
Conductor size: fine-stranded	0.25-1.5 mm² (with un-insulated ferule)
AWG	28-12
Strip length	5-6 mm/0.20-0.24 in.
Conductor entry angle	0° to PCB

Note: Cage clamp® is a trade mark of Wago contact technology.

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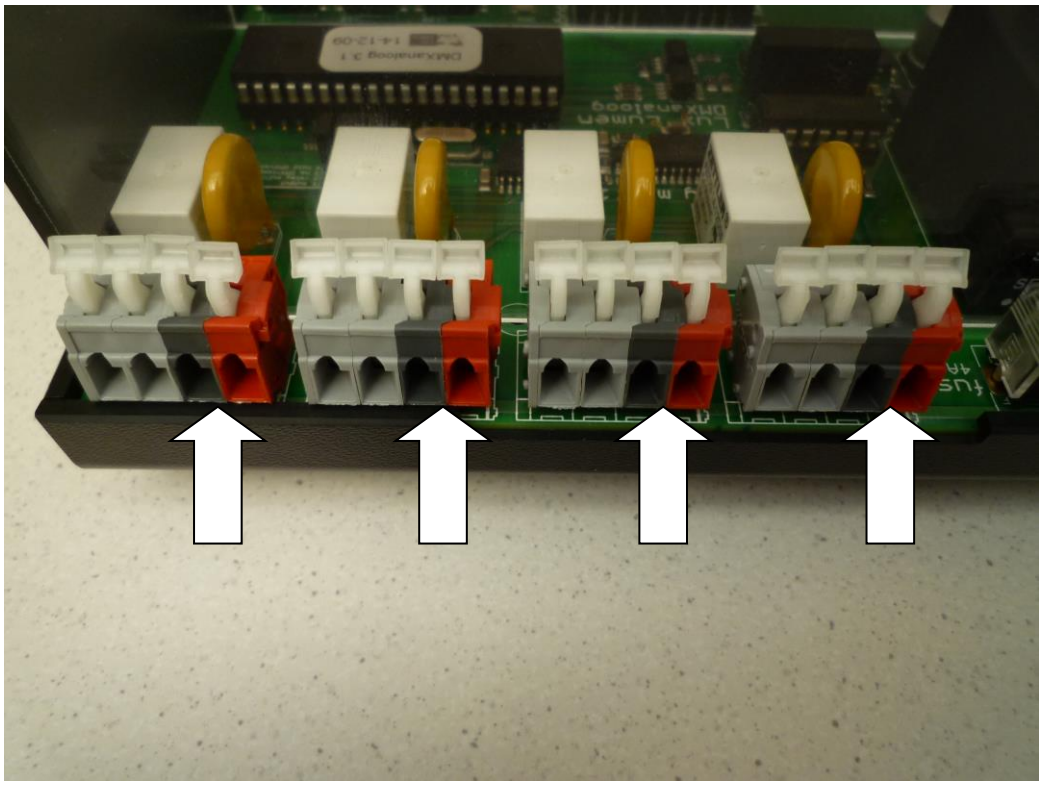
Location of the DC outputs

Four sets of clamps are used to connect the DC control outputs of the card.

These sets can be found here:



Polarity outputs

Please observe the polarity at the DC control terminals. Improper connection might damage the card and peripherals permanently.

In case of inversed polarity warranty is void.

If one device on the control line has inversed polarity, the light output at this channel will be minimum (not necessary off).

Configuration of the DC control outputs

By means of a jumper on the PCB, all DC control outputs can be set either at 1-10 volt or 0-10 volt operating range.

More info: Section 8.2

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Maximum drive current of the DC control outputs

The complete card can operate both in current sourcing mode (mostly 0-10 volt systems) or current sinking mode (mostly 1-10 volt systems).

The maximum output current is 20 mA for current sinking or current sourcing mode.

When using ballast that 'consume' 1 mA each, at their input control port, you can connect up to 20 gears on one output without overloading the output.

Hooking up an excessive amount of electronic control gear may have as result that dimming is not sufficient or even damage the outputs of the analogue converter card.

7.4 Remote addressing board input

Safety precautions

Never connect other devices as the remote addressing board to this input.

In case of doubts, please contact your point of sale.

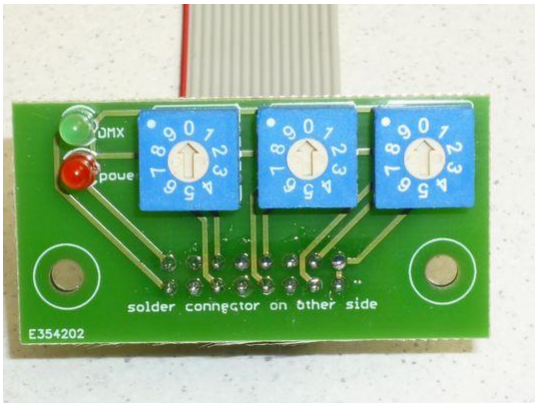
Specifications

If an external addressing board is used the rotary switches on the analogue converter board must be set at:

- *0 (x100) 0(x10) 0 (x1)*

This input is used when the addressing wheels cannot be situated at the PCB board itself. Mostly this occurs when the card is used in metal housings like a standard 19" rack unit.

You can find a picture of this remote addressing board below:



Suitable connector and cable

In cases in which the remote addressing board will be used, a special connector needs to be soldered on the PCB. For more information contact your point of sale.

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When using the remote address PCB, the card cannot be used in the standard plastic housing.

The maximum length of the 16 pole flat-cable shall not exceed 50 cm in length.

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7.5 DMX in and output

Precautions

Never connect other devices as a DMX transmitter or receiver to this input and output.

In case of doubts, please contact your point of sale.

Specifications

The use of Cat.5 or Cat.6 cable with according connectors is conformal the DMX 2004 by USITT in fixed installations. For more detailed information: www.usitt.org

The benefits are:

- Low cost of connectors
- Low cost of cabling
- Worldwide availability
- Fast application on site
- Very well known by electrical contractors
- Reliable connections

When the card operates in DMX-mode and the DMX-signal should be corrupt or not present, after 1 minute all outputs will go to 0% and remain in that status till the DMX-signal is restored properly.

Suitable cable for transmission of the DMX-signal

Name of cable	Shielded or not shielded	Remarks regarding shielding	Max run length	Termination above run length (see 7.1)
CAT 5E UTP	Not	No ground connection at output terminals	250 m	100 m
CAT 5E FTP or STP	Yes	Connection of shielding to PE clamp of output terminals	250 m	100 m
CAT 6 UTP	Not	No ground connection at output terminals	250 m	100 m
CAT 6 FTP or STP	Yes	Connection of shielding to PE clamp of output terminals	250 m	100 m

Pin layout of UTP to XLR connectors

XLR pin 1 wired to UTP contacts 7 and 8. UTP wire color usually brown and brown/white for schielding.

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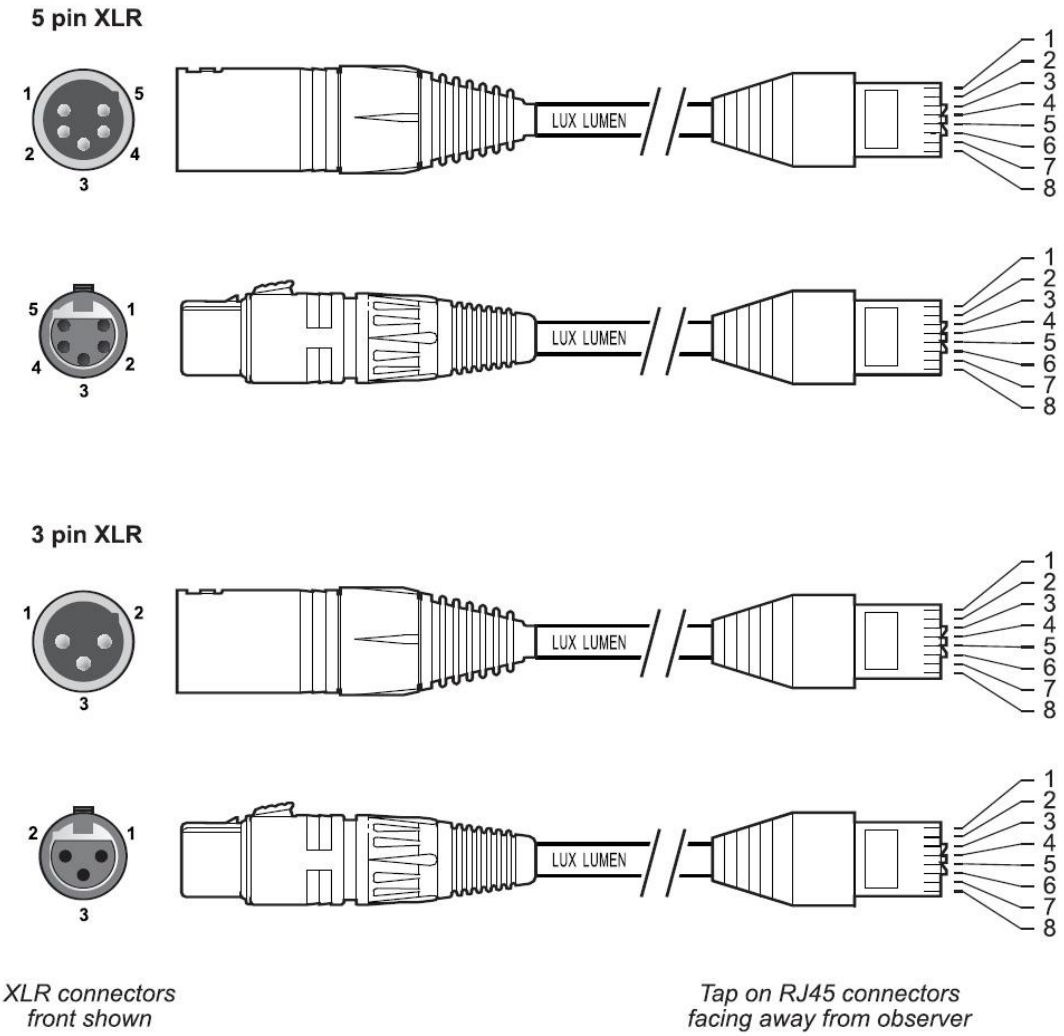
XLR pin 2 wired to UTP contact 2. UTP wire color usually orange for data negative connection.

XLR pin 3 wired to UTP contact 1. UTP wire color usually orange/white for data positive connection.



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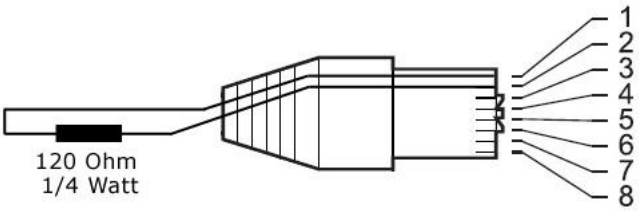
Termination of the DMX signal

To avoid disturbance of the DMX-signal it is recommended to terminate the DMX-line at the last open 'through' connector at each physical DMX-line. This is done with an 'end plug'. This end plug consists of a 0.25 watt resistor of 120 ohm between pins 1 and 2 of the connector.

Typical schematic of the end plug can be found below:



Tap on RJ45 connectors facing away from observer

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8 EMC and safety requirements

The DMX analogue converter card is fully compliant to the LVD and EMC directive of the European council, if used in a properly designed setup.

EMC requirements of the power supply:

The DMX analogue converter card is only intended to be used in lighting applications, and as such, the complete assembly of led unit and power supply needs to be fully compliant with the harmonized standards.

Immunity according to:

- EN 61547:2009 (General EMC immunity requirements lighting eq.)
- EN 61000-4-1:2006 (General immunity testing techniques)
- EN 61000-4-2:2008 (ESD immunity test)
- EN 61000-4-3:2006 + A1:2007 (Radiated immunity test)
- EN 61000-4-4:2004 (Fast transients and burst immunity)
- EN 61000-4-5:2005 (Surge immunity test)
- EN 61000-4-6:2008 (Conducted immunity test)
- EN 61000-4-8:1993 (Magnetic field immunity test)
- EN 61000-4-11:2004 (Voltage variations immunity test)
- EN 61000-6-1:2005 (Generic standards for immunity)

Emission according to:

- EN 61000-3-2:2005+A1:2008+A2:2009 (Harmonics emission test<16A)
- EN 61000-3-3:2008 (Flicker+ voltage changes limits< 16A)
- EN 55015:2006+A2:2009 (Conducted + radiated emission lighting equipment)

To achieve this compliance, a proper power supply must be supplied. In case of doubts, contact your point of sale.

LVD requirements of the power supply:

The DMX analogue converter card is only intended to be used in lighting applications, and as such, the complete assembly of led unit and power supply needs to be fully compliant with following harmonized standards:

- EN 60598: general requirements of lighting equipment.

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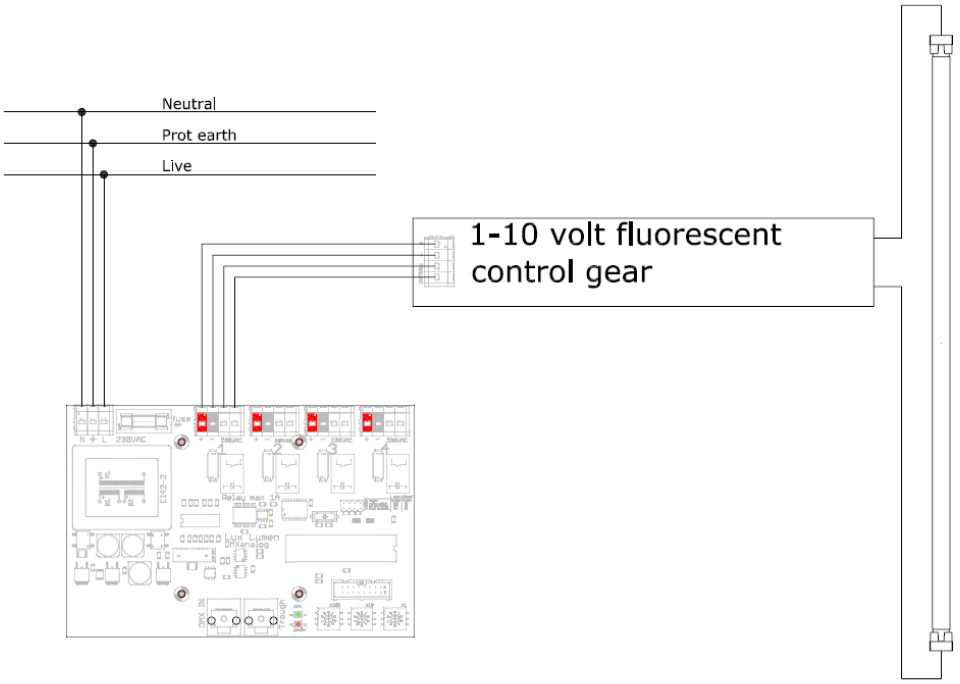
Installation setup

9.1 General description

The DMX analogue converter card is typically intended to drive control gear with 1-10 volt current sinking input. It features 4 independent controllable outputs, each with a Switched 220 volt Ac output and a analogue DC control output.

9.2 Typical layout

The wiring scheme below shows a typical layout when used with fluorescent fixtures.



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10

Card configuration

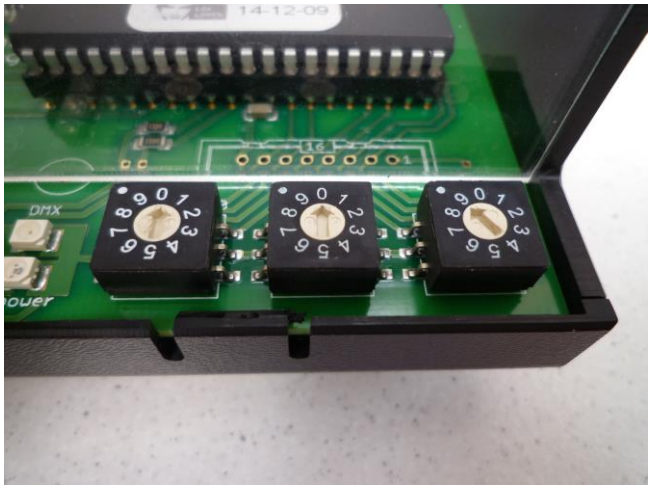
10.1 DMX start address setting

The card uses 4 DMX-channels in one consecutive block.

For example, if the start address is set to 009, the card uses addresses 09-10-11-12.

DMX address	Analogue card output
009 (address by the rotary wheels)	output nr 1
010	output nr 2
011	output nr 3
012	output nr 4

The picture below shows the rotary address setting wheels.



Note: If the card is oriented that the text on the PCB is readable, the positions of the wheels will affect following address-setting:

→ Left wheel is hundreds (x100)
→ Middle wheel is tens (x 10)
→ Right wheel is units (x 1)

On the picture above the start address is set to 009.

When using the DMX controlled mode of the card, the highest DMX start address that can be set is 509. If a start address higher as 509 is used, the corresponding channels with a virtual address number higher as 512 will not react on any changes in the DMX values.

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10.2 DMX operating modes

Safety precautions

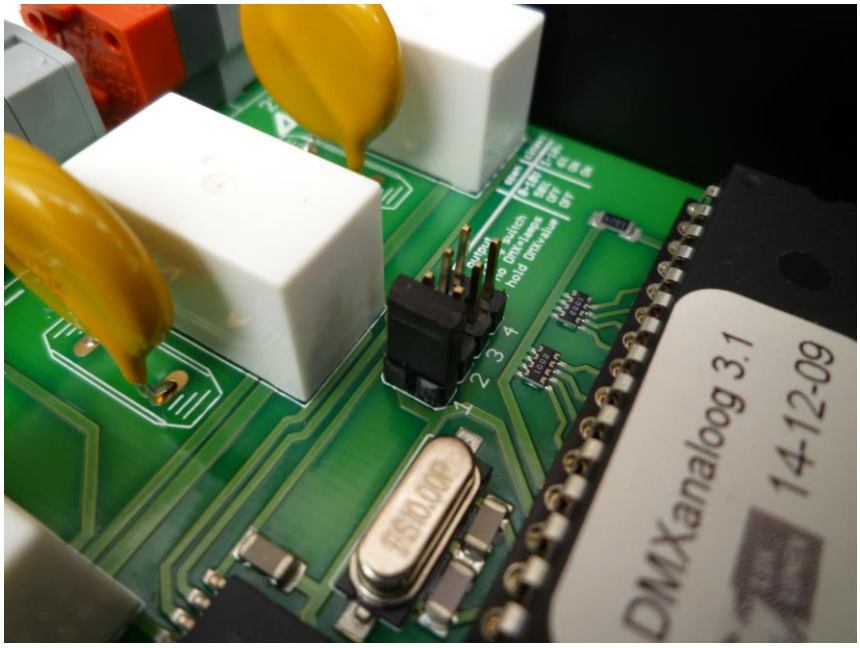
Since the board contains live power, assure yourself that the live power is disconnected from your complete installation before changing the card's operating mode.

Different operating modes

The card has 4 different setting which can be changed according to the needs of the setup:

	Jumper 'open'	Jumper 'closed'
J1	Output voltage 0=>10 Volt	Output voltage 1=> 10 volt
J2	*Relay Hysteresis:* Relay switches on at 60% Relay switches off at 40%	*Relay Hysteresis:* Relay switches on at 6% Relay switches off at 4%
J3	15 seconds after loss of DMX-signal all channels switch to 0% or open contact.	15 seconds after loss of DMX-signal all channels switch to 100% or closed contact.
J4	By loss of DMX-signal settings of J 3 are followed.	DMX hold

The location of the 4 jumpers is shown below. Remove the enclosures plastic cover to operate the jumpers.



In the picture above, jumper 1 is closed and jumper 2-3-4 are in open position.

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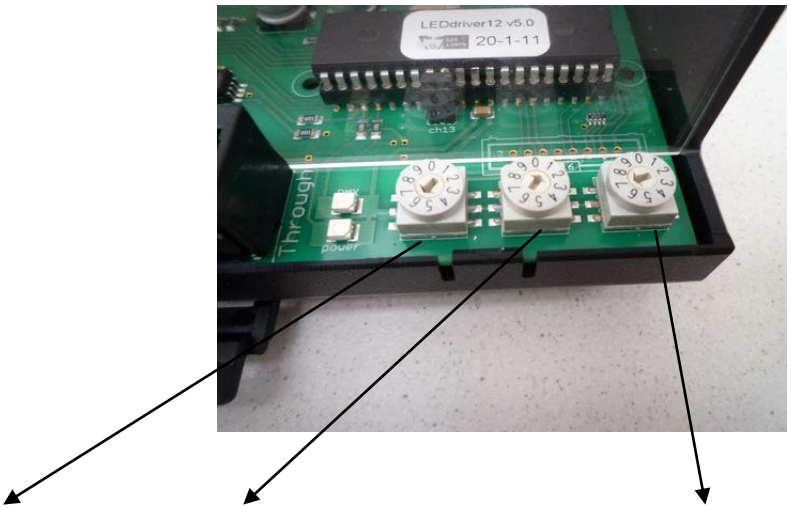
10.3 Stand-alone operation of the card

Features

When the card is operated without an external DMX-signal following functions can be activated by setting the address Wheel to appropriate number.

- 7 Different basic colors at 100% output
- A selection of 9 different dynamic programs each with 9 different speeds.
- Only to be operated by connecting RGB fluorescent modules or RGBW fluorescent modules. The colors need to be connected accordingly:
    - Red to channel 1
    - Green to channel 2
    - Blue to channel 3
    - White to channel 4

Functions in the range of 6 X Y → statically scenes



6	0 = 100% intensity	0 = all channels off
6	1 = 10% intensity	1 = all red
6	2 = 20% intensity	2 =all yellow (red+green)
6	3 = 30% intensity	3 =all green
6	4 = 40% intensity	4 = all cyan (green+ blue)
6	5 = 50% intensity	5 = all blue
6	6 = 60% intensity	6 =all magenta (red+blue)
6	7 = 70% intensity	7 =all white (red+green+blue+ white)
6	8 = 80% intensity	8 = all white full (only channel 4)
6	9 = 90% intensity	9 = not used

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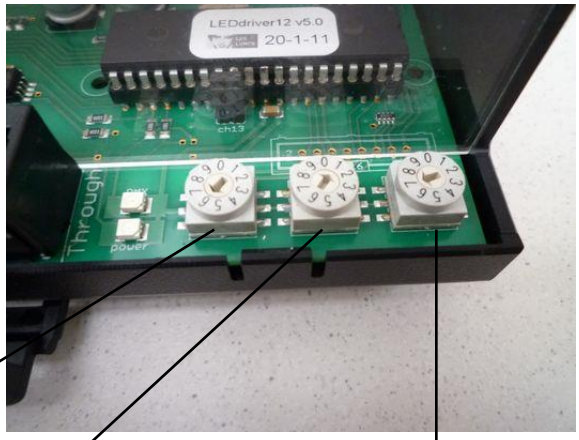
Functions in the range of 7 X Y → dynamical programs



7	0 = not defined	0 =RGB fading, no step between
7	1 = 10% speed = slowest	1 =RGB fading, 1 step between
7	2 = 20% speed	2 =RGB slow fade, no step between
7	3 = 30% speed	3 =RGB+W, no step between
7	4 = 40% speed	4 =Red green fade, 1 step between
7	5 = 50% speed	5 =Red blue fade, 1 step between
7	6 = 60% speed	6 =Blue green fade, 1 step between
7	7 = 70% speed	7 =RGBW fading, no step between
7	8 = 80% speed	8 =RWGWBW fading, no step
7	9 = 90% speed = fastest	9 =RGBWBG, no step between

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Service and maintenance

11.1 Safety precautions

Read carefully the safety information in this manual. Lock out the power on the entire system and allow all electronic devices to discharge, and cool down, before executing any service or maintenance.

11.2 Cleaning

DMX analogue converter card itself

Extensive dirt and particle build-up degrades performance and may cause overheating. This can result in damaged board and power supply's. Damage by inadequate cleaning or maintenance is not covered by the product warranty.

Never use solvents to clean the outer housing of the card.

Never use water or wet cloth.

Enclosure in which the card is integrated

Best is to use compressed air to remove dust or soft cloth to remove the dust in the cabinet. When using compressed air, care must be taken not to damage the fans in the enclosure. Never use solvents to clean the outer housing of the enclosure.

11.3 Monitoring

Two led's are located at left side of the address setting wheel.

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The led's indicate the status of the card like shown below:

Color led	Red	Green
Name led	Power	DMX
Position led	Towards observer	Away from observer
Status led= ON	Power is present at the power input	Valid DMX-signal is present.
Status led= Off	No power is present or microprocessor is not working properly	No Valid DMX-signal is present.
Status led= blinking	Card operates in stand-alone mode.	DMX-signal is dropped. (it was present before)

11.4 Software updates

Availability of software updates

At the moment of publishing this manual, November 2011, the latest available firmware version = v3.2

Date	Soft version	Changes
November 2011	3.2	None

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Troubleshooting

Color of led	Status of led	Problem	Action
RED	On	Power is applied to the card.	Check the status of the green led.
	Off	No power is applied to the card	Check the fuse and the incoming power supply
	Blinking continuous	The card is operating in stand-alone mode	If the card is supposed to be used with a valid DMX-signal, change the DMX-address to a valid number
GREEN	On	A valid DMX-signal is detected	Check the outputs of the DMX analogue card
	Off	No valid DMX-signal is detected nor does the card run in stand-alone mode	Check the outputs of the DMX analogue card
	Blinking	There was for certain time a valid DMX-signal but for unknown reason the DMX-signal dropped	Check the output of your DMX-driver and check you DMX-cabling

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13 Specifications

13.1 Electrical

Inputs

- 220-240 volt AC
- Maximum 1000 watt power consumption depending on configuration of your complete setup
- Power input on Cage clamp®
- DMX input and feed through on UTP connectors
- DMX start address settable with rotating wheels
- Status led's for DMX and power input
- Input for remote addressing wheel present

Outputs

- 4 independent controllable outputs
- Each output capable of driving 1 A load on its AC output
- Each output capable of driving 20 mA on the DC control terminals in current sourcing or current sinking mode
- Stand-alone mode possible without DMX-signal
- Outputs on Cage clamp® for easy connection

13.2 Environmental

- IP rating: IP 20
- Humidity: 30% to 95%
- Ta (max) : +40 °C (104 °F)
- Ta (min): -15 °C (+5 °F)
- Tc (max): +55 °C (131 °F)

13.3 Extra features

Stand-alone mode possible with different programs and speed settings.

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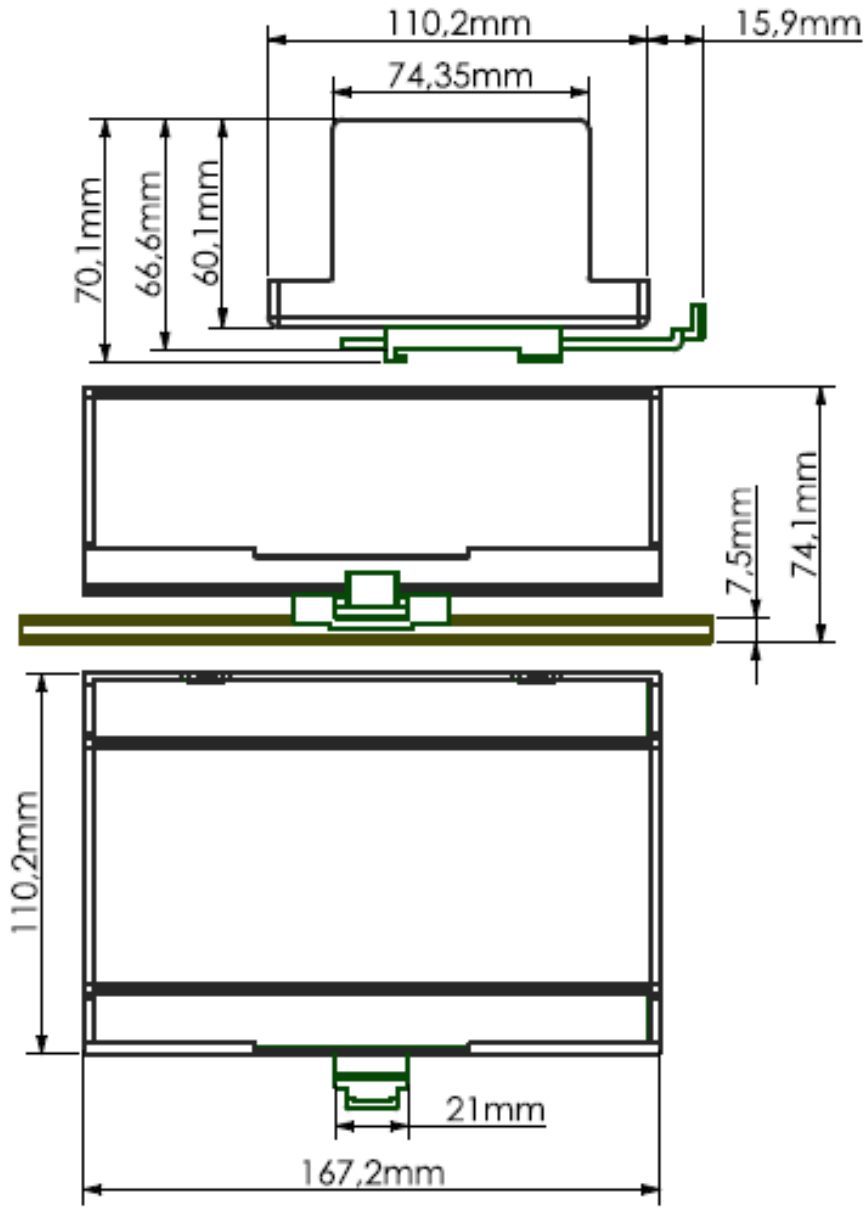
13.4 Mechanical

Physical dimensions of the card below:

Dimensions analogue card	167x 110 x 70	mm
Dimensions packaging	230 x 230 x 130	mm
Weight analogue card	390	gr
Weight packaging	500	gr



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Warranty

14.1 Application of warranty

Warranty period

Warranty service is valid for one year from the date of purchase by the consumer, as evidenced by invoice date given out by your point of sale.

Warranty service

Service under warranty can only be done by Lux Lumen.

Coördinaties:

Lux Lumen
Kernenergiestraat 53 A
2610 Wilrijk
Belgium

Any cost of secure transportation of the product to and from Lux Lumen service department, will be borne by the customer.

Limitations

Lux Lumen will not warrant the following:

- Periodic check-ups, maintenance and repair or replacement of parts due to normal wear and tear.
- Consumables
- Any software
- Defects caused by modifications carried out without Lux Lumen's approval.
- Damage resulting from the fact that a product is not conforming to country specific standards or specifications in another country that the country of purchase.

Costs incurred by Lux Lumen's service center in making any adoptions or modifications of a product necessary for country specific technical or safety standards or specifications, or any other cost to adjust the product as a result of any specifications which have changed since the delivery of the product.

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Warranty service is excluded if damage or defects have been caused by:

Improper use, extensive use, handling or operation of the product as referred to in the user manual or operator manual and/or relevant user documents, including without limitation, incorrect storage, dropping, excessive shocks, corrosions, dirt, water, or sand damage, if the product is not rated to be used in severe conditions, indicated by its IP and IK degree, mentioned in the product specifications in this manual.

Repairs, modifications or cleaning carried out by a non Lux Lumen service centre.

Use of spare parts, software or consumables, which are not compatible with the product.

Connecting the product to equipment not intended to be used with this product.

Defects caused by improper condition of the power supply network.

Inadequate packaging of the product when returning it under the RMA procedure.

Accidents or disasters or any cause beyond the control of Lux Lumen, including but not limited to lightning, water, fire, public disturbances, improper ventilation, and acts of god.

Others

It is the responsibility of the customer to backup and save any software files and programs before repair and to restore the same after such repair.

This warranty does not affect the consumer's statutory rights under applicable national legislation in force, nor the consumer's rights against the retailer arising from the sales/purchase contract. In the absence of applicable national legislation, this warranty will be the consumer's sole and exclusive remedy, and Lux Lumen cannot be liable for any incidental or consequential damages for breach of any express or implied warranty of this product.

For full details of the warranty offered on this product, please contact Lux Lumen's service center.

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14.2 RMA procedure

To send material back to Lux Lumen, you need a RMA (Return Material Authorization) document that you will receive from Lux Lumen.

Without the RMA document, we cannot accept the material.

The procedure to obtain a RMA:

Step 1:

Customer contacts Lux Lumen about warranty, defects if material has to be returned.

Step 2:

Lux Lumen sends the customer a filled out RMA document (using a unique RMA number)

Step 3:

Customer sends material (include a copy of the RMA document with the material)

Step 4:

Lux Lumen evaluates the problem, and informs the client if repair is done under warranty, or makes an offer to the client for repair.

Step 5:

The procedure related to lux lumen quality procedures, according ISO 9001 is started up.

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Used list of abbreviations

- DMX: digital multiplexed data signal to according to USITT
- PCB: printed circuit board
- PWM: Pulse width modulation
- CAT 5: category 5 cable
- CAT 6: category 6 cable
- U_f: Forward voltage of the LED junction
- AC: Alternating current
- DC: Direct current
- °F: Temperature in degrees Fahrenheit
- °C: Temperature in degrees Celsius
- din-rail: rail used in electrical installation according to 'Deutsche Industry Norm' specifications
- LED: Light Emitting Diode

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