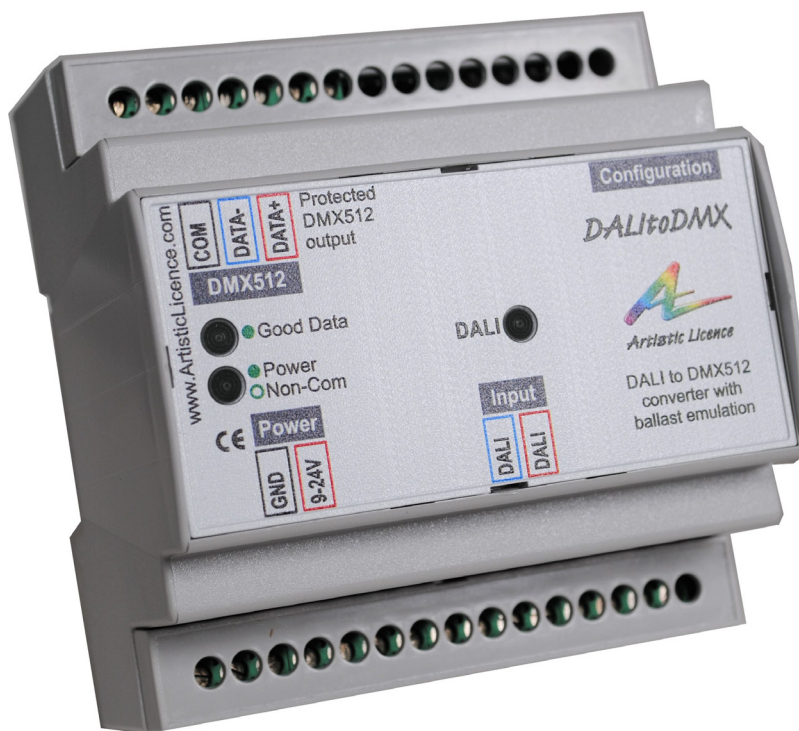




Artistic Licence



DALIttoDMX

User Guide



Please read these instructions before using the product.

This product has been designed & manufactured for professional use only. It should only be installed by a suitably qualified technician and in accordance with electrical regulations in the country of use.

Unless directed in the instructions there are no user serviceable parts inside the outer case of this product.

Always disconnect from the power supply when not in use.

Any specific IP rating, where appropriate, is given in the instructions. Unless otherwise stated this product is designed for indoor use only. If used outdoors it **MUST** be installed in an appropriate IP rated cabinet. Do not allow this product to be exposed to rain or moisture. Do not allow liquid to penetrate the product.

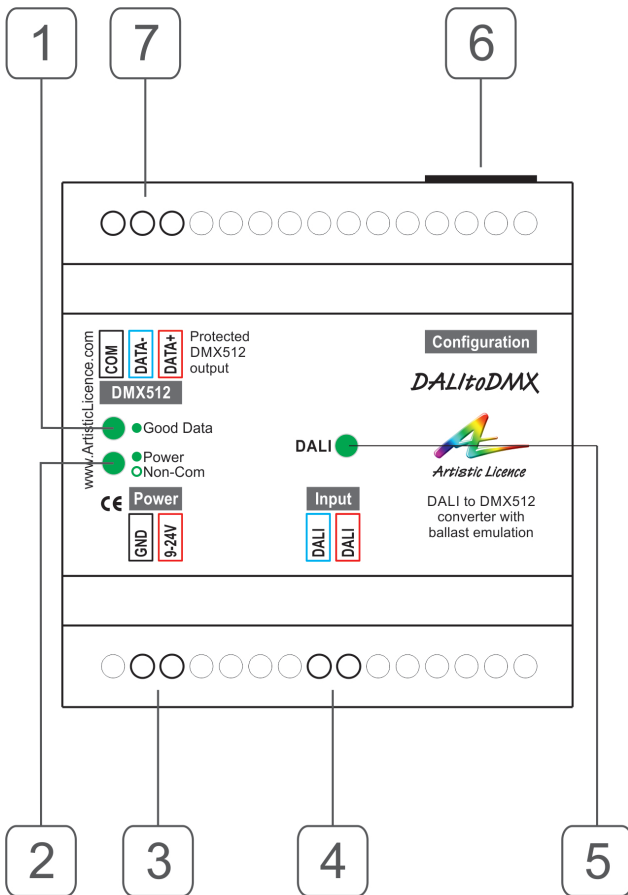
Please recycle all packaging.

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Download the user guide by scanning the following QR code:



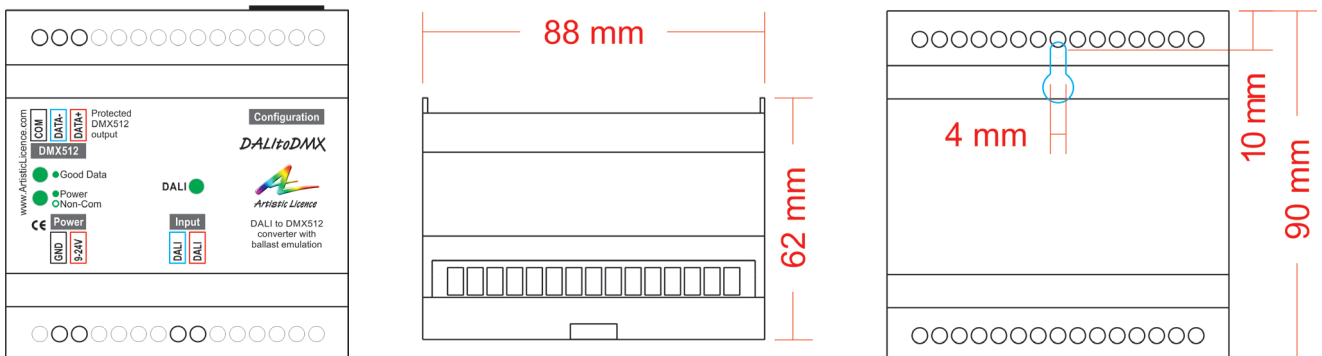
Connections



Ref.	Type	Description
1	LED	Solid: Receiving DALI commands for active short addresses
2	LED	Solid: Product power & DALI BUS power present Flashing: Virtual DALI devices not commissioned Off: Product power or bus power or both not connected
3	Connection	Power input 9-24 VDC
4	Connection	DALI Input
5	LED	Solid: DALI bus power present Flashing: DALI data present
6	DIP Switch	See table below

Dip Switch	Function
1	Not Used
2	Not Used
3 & 4	Sets number of virtual DALI devices (see Table 1 on page 4)
5	OFF (default): No dimming curve correction ON: Exponential curve correction
6	OFF (default): Device Mode ON: Trigger Mode

Mounting Diagram



Overview

DALIttoDMX converts DALI (DT0 - intensity) into DMX512. It is designed for environments that require integration between the two protocols. DT8 (colour) is not supported.

In its normal mode of operation (Device Mode), the product enables an existing DALI controller to control DMX fixtures.

DALIttoDMX features a second mode of operation (Trigger Mode), which can be useful in some scenarios (see page 6).

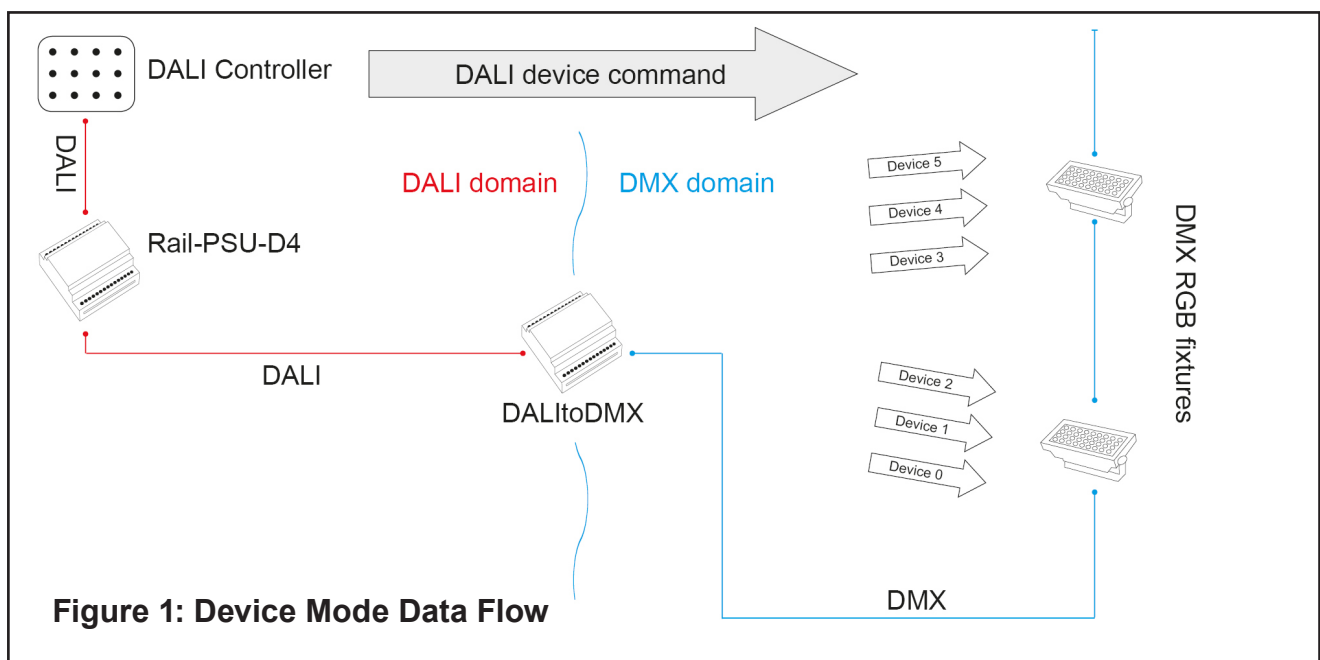
If you are new to DALI, please read the DALI primer in Appendix 1. You can also download our [DALI guide](#).

Device Mode (normal operation)

In Device Mode (ensure DIP switch 6 is set to OFF), DALIttoDMX simulates virtual DALI devices, each of which controls a single DMX channel. This is shown conceptually in Figure 1 below.

A virtual DALI device acts in the same manner as a normal DALI device and responds to DALI commands (see Appendix 2 for detail).

All the standard DALI addressing modes (Broadcast, Group, Device and Scene) are supported.



Selecting the number of devices

DALIttoDMX offers the user the option to simulate 1, 4, 16 or 64 DALI devices. The choice is made via setting DIP switches 3 and 4 as shown in Table 1. The DMX channels that are not being used are set to zero.

We recommend that DALIttoDMX is installed on its own DALI circuit. However, if the product is connected to a circuit on which physical DALI devices are already present, care must be taken to ensure that the total number of devices (physical plus virtual) does not exceed 64.

DIP Switch 3	DIP Switch 4	Total no. of Virtual Devices
Off	Off	1
Off	On	4
On	Off	16
On	On	64

Table 1

Device Mode (continued)

Mapping to DMX512

Each of the virtual DALI devices controls a consecutive DMX channel, as shown in Table 2 below.

Virtual DALI Device number	DMX Channel
0	1
1	2
2	3
3	4
4	5
⋮	⋮
63	64

Table 2

Commissioning the virtual devices

The virtual DALI devices can be commissioned with a short address (this requires a commissioning tool such as Commissioner dali).

If no commissioning of the virtual DALI devices is undertaken, only broadcast DALI will work. This can be useful during the installation phase prior to commissioning to check for system response.

To access the other DALI addressing modes (Group, Device and Scene), commissioning **MUST** be undertaken.

Fade time configuration

This option applies when 'Direct Arc Power' commands and 'Go To Scene' commands are used.

Fade times allow the virtual device to perform a simulated fade when they receive a command to adopt a new level.

DALIttoDMX offers three fade times of 0 (instant), 1 or 4 seconds. Other input values of fade times are treated as 0 (instant).

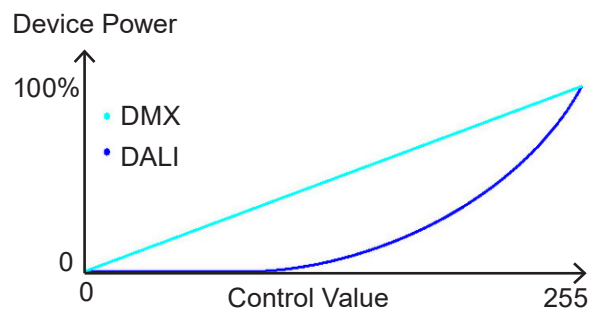
Fade times are selected on a 'per virtual device' basis using a tool such as Commissioner dali.

A one-second fade executes using a fade ramp of approximately 30 steps, while a four-second fade uses a fade ramp of approximately 120 steps.

Dimming Curve

The majority of DMX devices operate using a linear dimming curve with the level selected by a decimal value between 0 and 255.

DALI works with a non-linear (exponential) curve. As the graph shows, each method produces a different output:



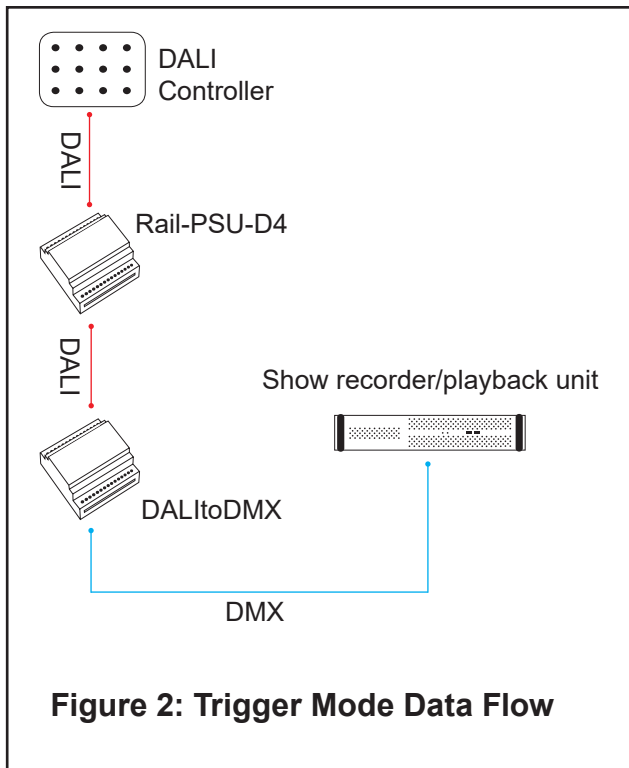
DALIttoDMX offers the user the ability to adjust the response curve of the DMX output in order to mimic that of DALI devices.

The choice is set using DIP switch 5. OFF means no curve correction, while ON will apply the exponential curve correction.

The correction affects all addressing modes (Broadcast, Group, Device and Scene). The correction is, however, an approximation, and due to the 8-bit encoding, some loss of resolution will occur.

Trigger Mode

Trigger Mode (set when DIP Switch 6 is ON) allows a DALI controller to trigger a DMX device, such as a show recorder / playback product (see Figure 2 below).



Selecting the number of devices

The number of virtual DALI devices can be set to 1, 4, 16 or 64 using DIP switches 3 and 4 (see Table 1).

Dimming Curve

The Dimming Curve Translation (DIP Switch 5) is operative for Devices and Groups.

Virtual DALI device set-up

Trigger Mode uses virtual DALI devices but, in contrast to Device Mode, they are not proxies for actual fixtures.

As such, the DALI addressing modes (Device, Group, Scene) lose their literal meaning. Instead, they should be viewed simply as data streams that enable various triggering options.

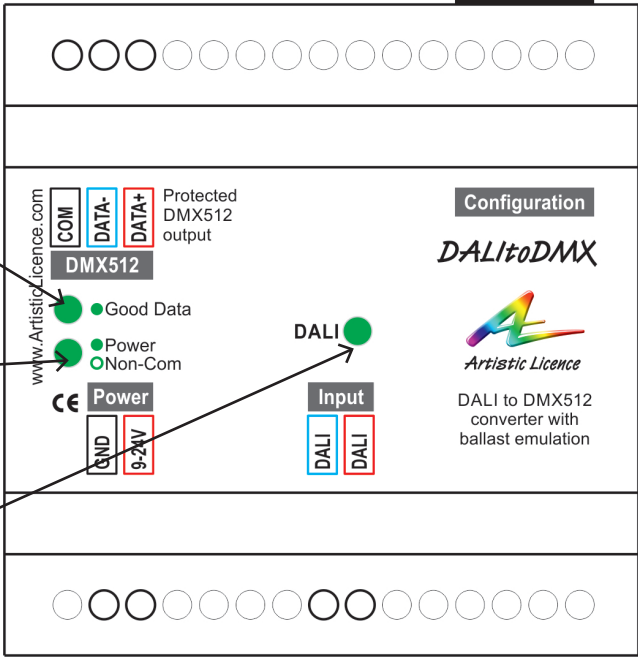
The virtual devices are pre-commissioned to define this triggering structure. The tables in Appendix 3 detail the pre-programmed relationship between the virtual devices and the DMX output slots.

LED Indicators

Good Data:
Illuminates green when product receives DALI commands for active short addresses.

Power/Commission alert:
Illuminates green during normal operation (product & bus power connected)
Flashes to off if the virtual DALI devices are not commissioned.

DALI:
Illuminates when DALI Bus Power is present.
Flashes to off when DALI data is present.



Failure Mode

In the event that the DALI Bus power supply goes off, if it is not reinstated after 1 second then all the relevant DMX outputs will snap to full intensity.

Troubleshooting

No Power light	<ul style="list-style-type: none"> • Check that the DC power wires are connected to the correct terminals and correct polarity. • Check product power is on AND bus power for DALI connected. • Switch off product and leave for 10 minutes (this allows the thermal fuse to reset). Switch on. If power light illuminates, it is likely that an external fault or wiring error is causing the problem.
DALI controller is not discovering DALItoDMX	<ul style="list-style-type: none"> • Product not powered on. • No DALI bus PSU present.
DMX fixtures can only be controlled by DALI broadcast commands	<ul style="list-style-type: none"> • The DALItoDMX virtual DALI devices have not been commissioned. Use a DALI tool such as Commissioner dali to achieve this.
The DALI light on DALItoDMX is not illuminated	<ul style="list-style-type: none"> • Product not powered on. • No DALI bus PSU present.
The Good Data light on DALItoDMX is not illuminated	<ul style="list-style-type: none"> • The DALItoDMX virtual DALI devices have not been commissioned. Try broadcasting to check.
Scene and Group commands not working	<ul style="list-style-type: none"> • Scenes and Groups have not yet been programmed.
DMX fixtures behaving erratically	<ul style="list-style-type: none"> • DMX cable not terminated at last fixture. • DMX cable is not suitable (must be data cable). • More than 32 DMX fixtures on the cable.
When I cycle power to my DALI device, it powers up at an unexpected intensity	<ul style="list-style-type: none"> • All DALI devices have a setting called 'Power On Level' which defines their intensity after power cycle. The device will stay at that intensity until DALItoDMX next refreshes it. Dali-Scope can be used to both read and programme the Power On Level.
When I cycle power to my DALI bus power supply, the devices go to unexpected intensities	<ul style="list-style-type: none"> • All DALI devices have a setting called 'System Failure Level' which defines their intensity after a fault such as loss of DALI bus power supply (see 'Failure Mode' on page 7). The DALI device will stay at that intensity until DALItoDMX next refreshes it. Dali-Scope can be used to read the device's System Failure Level.

Appendix 1 - DALI Primer

The DALI data packet comprises three parts:

- Address - device(s) being controlled.
- Command - type of message being sent.
- Data - the value associated with the command.

On any given circuit, DALI device intensity or colour can be controlled in four ways:

1. Scene - replay scenes stored in the DALI devices.
2. Broadcast - all devices receive the same command.
3. Group - each DALI device can be assigned to any of 16 groups.
4. Device – each of the 64 possible devices is controlled individually.

DMX runs at a much higher speed than DALI and so it easily out-runs DALI. If this is not managed, a time lag appears and incoming data will start to be ignored, resulting in a step or 'bump' on the dimming curve.

Best results are therefore achieved by sending the lowest number of commands. Efficiency decreases as one moves down the above list, so individual channel control is the most bandwidth-hungry.

Controlling individual channels can cause problems if a large number of s are present due to the high number of commands that need to be sent. If this method is to be used, careful consideration should be given to the bandwidth management.

Commissioning DALI devices

Unlike DMX fixtures, DALI devices do not have a default start address. This is because they need unique addresses (called a short-address) so that only one device replies to the controller at once.

When new DALI devices are used they must be commissioned. This requires a DALI commissioning tool such as an Artistic Licence **Commissioner dali**.

DALI bus power

DALI requires that a current limited voltage be applied to every circuit, called the DALI bus power. Without this, the DALI devices will enter fault mode and not respond.

Artistic Licence offers **daliPSU quad** a four-bus PSU device designed to work alongside **DMXtoDALI quad**, **DALIttoDMX**, **daliGate quad** and other DALI controllers.

Glossary

- DALI device (also ballast) – one of the 64 DALI luminaires.
- DALI short address – a number in the range 0 – 63 which uniquely identifies a DALI device on a given circuit.
- DALI circuit – a two wire interface of maximum distance 300m that contains up to 64 DALI devices.
- DALI Bus power – a current limited DC supply which must be provided in order for DALI to operate.
- DALI Device Type – Defines the capabilities of a DALI device.
- DALI DT0 – Device Type 0 was originally defined as fluorescent but is now used to mean intensity control.
- DALI DT8 – Device Type 8 is used for colour control. There are four possible operating modes of DT8.
- DALI RGBWAF – An operating mode of DT8 where Red, Green, Blue, White, Amber, Free (user defined) and intensity are controlled.
- DALI Colour Temperature – An operating mode of DT8 where colour temperature and intensity are controlled.
- RDM – Remote Device Management. The interface used for bidirectional communication over DMX512.
- Footprint – the number of channels or slots used by a DMX512 interface.
- Root-device – The main entity of an RDM enabled product. There is only one per RDM product.
- Sub-device – Subsidiary entities of an RDM device.

Appendix 2 - Supported DALI commands

'B', 'D' and 'G' refer to Broadcast, Device and Group respectively.

DALI Command	Type	Details	Supported in Device Mode?	Supported in Trigger Mode?	Good Data LED?
999	Direct Arc Value	Send direct level values	Y (B/D/G)	Y (B/D/G)	√
0	Off	Send the off command	Y (B/D/G)	Y (B/D/G)	√
1	Up	Increase value by 1 until Max Level	Y (B/D/G)	N	√
2	Down	Decrease value by 1 until Min Level	Y (B/D/G)	N	√
3	Step Up	Increase value by 1 until Max Level	Y (B/D/G)	N	√
4	Step Down	Decrease value by 1 until Min Level	Y (B/D/G)	N	√
5	Recall Max Level	Output Max Value	Y (B/D/G)	N	√
6	Recall Min Level	Output Min Value	Y (B/D/G)	N	√
7	Step Down and Off	Decrease value by 1/ Turn off	Y (B/D/G)	N	√
8	On and Step Up	Turn on / Increase by 1	Y (B/D/G)	N	√
16 - 31	Go to Scene x	Go to Scene Command	Y (B/D/G)	Y (see Appendix 3)	√
144	Query: Status	Query: Status	Part supported: Replies: 4 hex only when unit power is ON	Part supported: Replies: 4 hex only when unit power is ON	x
145	Query: Device	Query: Device	Y	Y	x
147	Query: Lamp Power On	Query: Lamp Power On	Part supported: Replies: FF hex only when unit power is ON	Part supported: Replies: FF hex only when unit power is ON	x
151	Query: Version Number	Replies: Current Version	Y	Y	x
153	Query: Device Type	Replies: Device Type	N	N	x
160	Query: Actual Level	Replies: Current Value	Y	Y	x
161	Query: Max Level	Replies: Max Value	Y	N	x
162	Query: Min Level	Replies: Min Value	Y	N	x

Appendix 2 - Supported DALI commands (continued)

DALI Command	Type	Details	Supported in Device Mode?	Supported in Trigger Mode?	Good Data LED?
163	Query: Power On Level	Replies: Power On Level	Y	N	x
164	Query: System Failure Level	Replies: System Failure Level	Y Replies: FE hex	Y Replies: FE hex	x
165	Query: Fade Time	Replies: Fade Time	Y	Y Replies "No Fade"	x
165	Query: Fade Rate	Not implemented	Y Replies "Not applicable"	Y Replies "Not applicable"	x
176 - 191	Query: Scene Levels	Replies: Scene Levels	Y	N	x
192	Query: Groups 0 to 7	Replies: Group Assignment	Y	N	x
193	Query: Groups 8 to 15	Replies: Group Assignment	Y	N	x

Appendix 3 - Trigger Mode Mapping Tables

Tables (i-iv) detail the pre-programmed relationship between the virtual devices and the DMX output slots in Trigger Mode. For all tables, the permitted DMX values for Devices and Groups lie in the range 0-255.

DALI I/P Command	DMX O/P Slot	
Device	1	1
Group	1	2
	2	3
	3	4
	4	5
	5	6
	6	7
	7	8
	8	9
	9	10
	10	11
	11	12
	12	13
	13	14
	14	15
	15	16
Scene	All	18

Table i: Mapping for 1 virtual device

DALI I/P Command	DMX O/P Slot	
Device	1	1
	2	2
	3	3
	4	4
Group	1	5
	2	6
	3	7
	4	8
	5	9
	6	10
	7	11
	8	12
	9	13
	10	14
	11	15
	12	16
	13	17
	14	18
	15	19
	16	20
Scene	All	21

Table ii: Mapping for 4 virtual devices

DALI I/P Command	DMX O/P Slot		
Device	1	1	
	2	2	
	3	3	
	4	4	
	5	5	
	⋮	⋮	
	16	16	
	Group	1	17
		2	18
		3	19
		4	20
		5	21
		6	22
		7	23
		8	24
		9	25
10		26	
11		27	
12		28	
13		29	
14		30	
15		31	
16		32	
Scene	All	33	

Table iii: Mapping for 16 virtual devices

DALI I/P Command	DMX O/P Slot		
Device	1	1	
	2	2	
	3	3	
	4	4	
	5	5	
	6	6	
	7	7	
	⋮	⋮	
	63	63	
	64	64	
	Group	1	65
		2	66
		3	67
		4	68
		5	69
		6	70
7		71	
8		72	
9		73	
10		74	
11		75	
12		76	
13		77	
14		78	
15		79	
16		80	
Scene	All	81	

Table iv: Mapping for 64 virtual devices

Appendix 4 - Trigger Mode Scene Selection Table

DALI Scene	DMX Value	DALI Scene	DMX Value	DALI Scene	DMX Value	DALI Scene	DMX Value
1	1	5	5	9	9	13	13
2	2	6	6	10	10	14	14
3	3	7	7	11	11	15	15
4	4	8	8	12	12	16	16

Table v: DMX values corresponding to individual scene selection

DALIttoDMX Specification

Mechanical <ul style="list-style-type: none">• Housing: DIN rail case• Material: Polycarbonate plastic - UL94-V0 rated• Overall dimensions: 90 mm (H) x 88 mm (W) x 62 mm (D)• Weight: 0.2 kg• Mounting: 35 mm DIN rail or surface mount• Country of manufacture: UK	DMX512 Output <ul style="list-style-type: none">• Output mode: PSU referenced• Output ESD protection: 12 kV• Electrocutation protection: Output protected against continuous connection to 425 VAC (self-healing)
Environmental <ul style="list-style-type: none">• Operating temperature: 0°C to 40°C• Storage temperature: -10°C to +50°C• Operating relative humidity (max): 80% non-condensing• IP rating: IP20 indoor use only• Certification: CE, WEEE, RoHS• Warranty: 2-year (return to base)	Control <ul style="list-style-type: none">• Input Protocols: DALI (DT0)• Output Protocols: DMX512, DMX512 (1990), DMX512-A
Power & Electrical <ul style="list-style-type: none">• Input voltage: 9-24 VDC• Input connector: (1) 2-pin screw terminal• Input power (max): 10 W• DC fuse: internal resettable fuse for control electronics	Configuration <ul style="list-style-type: none">• DIP Switches - Device/Trigger mode, virtual DALI device number (1/4/16/64), dimming curve
DALI Input <ul style="list-style-type: none">• Input mode: optically isolated	Data Connections <ul style="list-style-type: none">• 3-pin Screw Terminal DMX Output (1 no.)• 2-pin Screw Terminal DALI Input (1 no.)
	LED Indication <ul style="list-style-type: none">• Power / Non-commission / Good data / DALI & Bus power
	Ordering Info <ul style="list-style-type: none">• Product code: DALIttoDMX
	Accessories (not included) <ul style="list-style-type: none">• PSU-24-2-FER• daliPSU quad• Commissioner dali

CE Compliance



DALIttoDMX is CE compliant when installed in a shielded and earthed metal case

Warranty

All products are covered from date of purchase by a two-year return to base warranty.

By return to base, we mean that the customer is responsible for all costs of transport to and from Artistic Licence.

Returns will not be accepted without prior authorisation. In order to discuss a request to return goods, please email:

Sales@ArtisticLicence.com

Compliance

All Products manufactured or sold by Artistic Licence Engineering Ltd are fully compliant with the appropriate CE and RoHS regulations. Product specific information is available on request.

Waste Electrical & Electronic Equipment (WEEE)

Artistic Licence is a member of a WEEE compliance scheme and will happily recycle any of our products that you, at your expense, return to us.



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Due to our policy of continuing product improvement specifications are subject to change without notice

