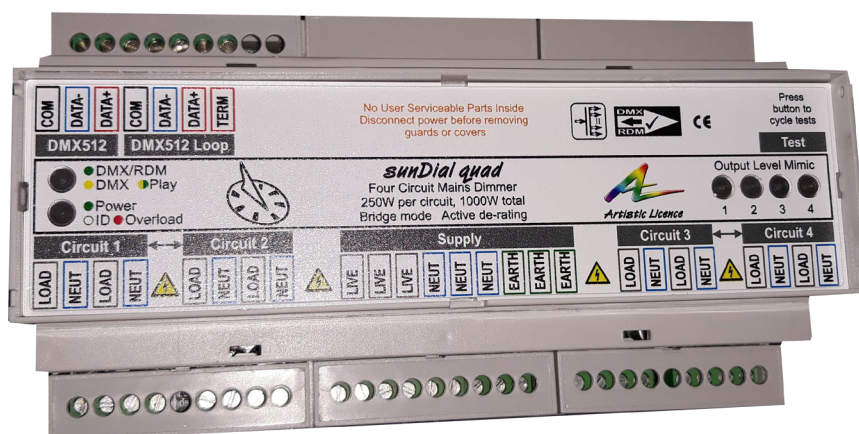




Artistic Licence



# *sunDial quad* *dmx & xgc 1k*

## 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 electrician and in accordance with electrical regulations in the country of use.

## **INSTALLATION NOTES**

The product is intended to be used as part of an assembly.

The product must be installed in an earthed metal enclosure with venting suitable for convection cooling.

The installer is advised to use an additional earth busbar or DIN Rail Earth Terminal to connect all the load and supply earths.

All stranded conductors must be finished with crimped ferrules.

**The product must be protected by a 6A input Type B RCBO.**

**Do not connect an insulation tester to any terminal of the product. Doing so may cause damage.**

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.

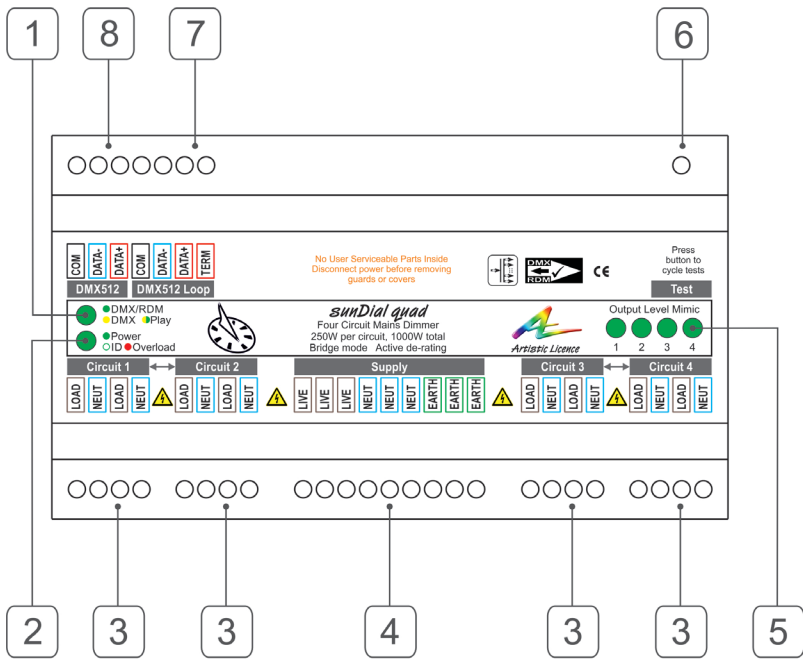
Please recycle all packaging.

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Download the user guide by scanning the following QR code:



# Connections



Ref.	Type	Description
1	LED indicator	DMX/RDM/Playback
2	LED indicator	Power/RDM Identify/Overload
3	Connection	Mains dimmed output circuits
4	Connection	230 VAC supply input
5	LED indicator	Output mimic
6	Switch	Test button
7	Connection	DMX Loop-through** & Term
8	Connection	DMX Input

## DMX512 Wiring

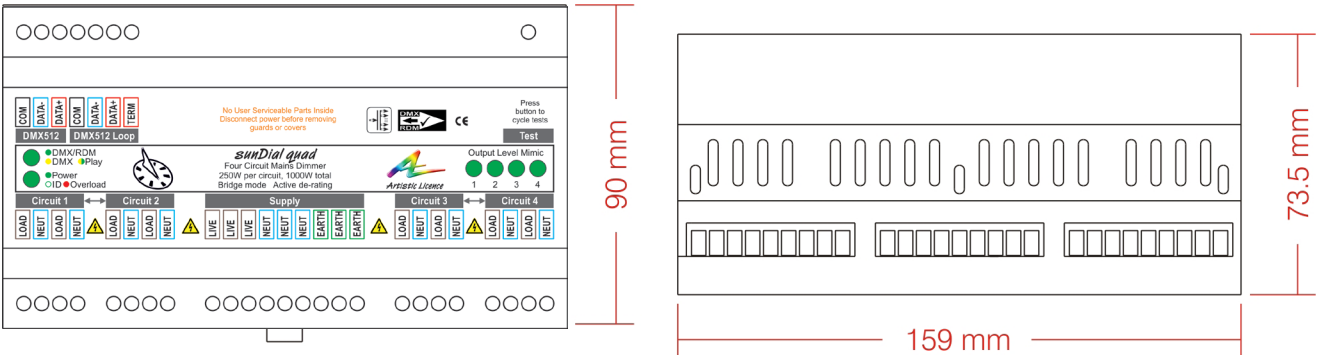
XLR Pin (Convention)	Function	Colour
1	Ground	Black
2	Data -	Blue
3	Data +	Red

\*\* A passive loop-through connection allows onward connection to other DMX512 devices. If this feature is not required then the signal must be terminated. The product contains an internal termination resistor. This is enabled by fitting a wire link between **Term** and **DAT+**.

## Internal Earth and Isolation

Circuit	Description	
DMX512 Input (including Loop Through)	Type:	Non-isolated
	Pin 1:	Connects to Internal Logic Ground
Dimming Outputs	230 VAC	
Internal Logic Ground	Floating	

## Mounting Diagram



## Overview

sunDial is a four channel mains voltage dimmer with DMX512/RDM control. It is designed to control dimmable LED, CFL and incandescent loads up to a total of 1kW at 230 VAC. Each output is controlled by the DMX512 input with an individual start address for each output.

The xgc version of the product has full DMX/RDM functionality with the addition of Xicato GalaXi wireless control. DMX512 and wireless control are merged on an HTP basis to control the outputs.

As is normal for Xicato GalaXi compatible products, the outputs will power on at full intensity. Please refer to the [Xicato web site](#) for details of the compatible control systems.

## Summary of Key Features

- Trailing edge mains dimmer
- DMX/RDM controlled (xgc model additionally supports Xicato GalaXi)
- Compatible with dimmable LED replacement bulbs, CFL & incandescent sources
- 4 outputs, 250W per circuit
- Bridge mode provides 500W per pair of outputs
- 8-bit or 14-bit control
- Choice of 4 dimming curves per channel
- LED indication for DMX/RDM/playback, power, identify, output level mimics, over-temp, over-current and output short circuit conditions
- RDM sensors for temperature and power
- Automatic heat and current management
- CAT III rated for installation directly into distribution boards
- Preset, data loss and test modes
- DIN Rail or surface mount

## Power/Wiring

sunDial quad is powered from a mains supply. The operating voltage is 230 VAC +/- 10%.

Mains connections are provided with multiple terminals for ease of installation. Note that the terminal maximum rating is 10A. 'Looping through' of the mains input is allowed so long as the total current does not exceed 10A.

## DMX Connection

### Input

The DMX512 input is attached via a 3-pin screw terminal (see connections diagram).

### Loop Through

A passive loop-through connection allows onward connection to other DMX512 devices. If this feature is not required then the signal must be terminated. The product contains an internal termination resistor. This is enabled by fitting a wire link between the screw terminals that will terminate the DMX line (Term & DAT+).

## Installation

- Operating Voltage: 230 VAC +/-10%
- Max conductor gauge: 2.5mm<sup>2</sup> (12 AWG)
- Maximum conductor temperature at product terminals: 90°C
- Screw terminal torque: 0.5 Nm
- The product is intended to be used as part of an assembly and must be installed by a qualified electrician.
- The product must be protected by a 6A input Type B RCBO.
- DO NOT connect an insulation tester to any terminal of the product.
- The installer is advised to use an additional earth busbar or DIN Rail Earth Terminal to connect all the load and supply earths.
- The product must be installed in an earthed metal enclosure with venting suitable for convection cooling.
- All stranded conductors must be finished with crimped ferrules.
- Each output is protected by a 7A slow blow fuse (not user-accessible).
- Complies with BS EN 62368-1:2014+A11:2017

## Outputs

1. The product is designed to drive a maximum of 250W per channel of dimmable CFL, incandescent or LED load.
2. A minimum load of 12W is recommended to avoid any LED flicker at switch on.
3. Automatic bridging mode can be used to drive higher individual loads. The output pairs 1 & 2 and 3 & 4 can drive a total of 500W in any combination. For example, if channel 3 is driving 100W then channel 4 can drive 400W.

## Control

Outputs can be controlled using a single DMX channel via a dimmer curve. This is called 8-bit mode.

Alternatively, two DMX channels can be linked to provide high resolution 14-bit mode. In this mode, the first DMX channel is the high-byte (coarse), and the second DMX channel is the low-byte (fine).

Mode	DMX Channels	Range	Step
8-bit (Personality 1-4)	1	0-255	1
14-bit (Personality 5)	2	0-40,000	4

## Active overload detection

1. Total product power consumption is microprocessor monitored once per half cycle. An overload of 6A will cause the product to shutdown until the next half cycle.
2. This means that in an output short circuit condition, total current is limited to 6A which protects the electronics.
3. In the event that the overload is due to high inrush current, the product will current limit the output for several half cycles - allowing the surge to abate prior to full power feed through. Visually, this looks like a conventional soft-start.

## Over-temperature fault

Operating temperature is monitored by two temperature sensors. If either sensor reports  $> 50^{\circ}\text{C}$ , the outputs are gradually dimmed to reduce power and temperature. If either sensor reports  $> 70^{\circ}\text{C}$ , all outputs shut down until both sensors report  $< 50^{\circ}\text{C}$ .

## Output priority

The priority of output is as follows (highest at the top):

1. Fault shutdown
2. Test button
3. Preset playback
4. Data loss event
5. DMX512

## Sensors

1. Temperature of the combined channels 1 & 2 heatsink.
2. Temperature of the combined channels 3 & 4 heatsink.
3. Product power consumption in 50W increments.
4. Mains frequency.

## Test button

Press the button under the terminal guard to force all outputs to full.

## Soft start mode

The product has a soft start feature such that it will slowly fade all outputs over a 2.5 sec period if powered on with the control input at full.

## Configuration

sunDial quad dmx uses either one or two channels to control each output, so the product has a footprint of 4-8. The various configuration options (including start address programming) are accessed via RDM, which requires a suitable programming interface.

## DMX-Workshop

DMX-Workshop, our free windows-based application, provides a convenient means of accessing the sunDial quad dmx configuration menus. (sunDial quad dmx must first be connected to an Art-Net network using a suitable gateway, e.g. artLynx).

The main configuration options are described below:

### Start Address

#### *Root start address*

Setting the root start address will re-address the sub-devices. There are four sub-devices which represent the outputs.

The resultant addressing depends on the resolution chosen. When 8-bit resolution is used (personality 1-4), only one DMX channel is needed per output. When 14-bit resolution is used (personality 5), two DMX channels are used.

#### **Example:**

Outputs 1 & 3 are set to personality 5 and outputs 2 & 4 are set to personality 1. Setting the root start address to 10 will result in:

Output (sub-device)	Footprint	Start address
1	2	10
2	1	12
3	2	13
4	1	15

#### *Sub-device start address*

Setting the sub-device start address affects only that output.

## RDM Identify

1. Root device
  - Dynamic Identify causes all outputs to flash at approx 1Hz. Power LED flashes green at 1Hz.
  - Static Identify causes all outputs to switch on full. Power LED flashes green at 1Hz.
2. Sub-device
  - Dynamic Identify causes sub-device output to flash at approx 1Hz. Power LED flashes green at 1Hz.
  - Dynamic Identify causes sub-device output to switch on full. Power LED flashes green at 1Hz.

## Dimming personalities

RDM personalities are used to select the output curve and the dimming resolution. Personalities 1-4 use 8-bit DMX via a dimming curve. Personality 5 allows 14-bit direct control without a curve. Custom curves can be uploaded, however the defaults are:

1. CFL/Incandescent: a linear curve suited to incandescent and CFL
2. LED: inverted hockey stick curve brings LED lamps on at 5% & then linear fade
3. Squirrel: a non-linear curve suited to 'squirrel cage' LED lamps
4. Relay: switches at 50% input value
5. High resolution 14-bit mode

## Custom Curves

Custom dimming curves can be generated from a spreadsheet or interactively via DMX-Workshop using the lightSense product:

<https://artisticlicence.com/product/lightsense/>

The dimming curves allow the 8-bit DMX control to smoothly dim the outputs using a 14-bit table.

DMX-Workshop is used to upload up to 4 curves. (N.B. Curves are a proprietary feature and cannot be uploaded by non-Artistic Licence RDM controllers).



## Preset mode

It is possible to pre-programme sunDial such that it can be installed without a DMX controller. The product has 6 preset memories which can be used to record various output level configurations.

DMX-Workshop allows these settings to be captured and played back (to access the relevant menus, right-click on the sunDial RDM device). Please note that the data captured is always the DMX512 input, independent of the currently selected output.

Preset playback is non-volatile. This means that if a preset is played back, sunDial can be then disconnected from DMX and power cycled and will still playback the preset.

## Data loss mode

DMX-Workshop (or a suitable RDM tool) also allows programming of data loss mode. This mode is intended to be used when sunDial quad dmx is being controlled by DMX (i.e. when it is not running in preset mode).

The data loss programming determines what sunDial quad dmx should do if DMX is lost for more than 2.5 seconds. It can be selected to play one of the 6 presets or hold the last state. If DMX returns, the control is immediately returned. sunDial quad dmx will also power up in this mode until DMX is detected.

To access the data loss mode menu, right-click the sunDial quad dmx RDM device, then go to Advanced - Artistic Licence products - Data loss mode.

## Test pattern

sunDial quad dmx offers two test patterns, which can be useful during show commissioning or rehearsals.

Test 1 = Outputs on & Test 2 = Outputs off

## Firmware uploads

The product firmware can be updated via DMX-Workshop. See the Resources section on the product page for the latest firmware:

<https://artisticlicence.com/product/sundial-quad/>

Output loads must be disconnected prior to firmware update. After a firmware update, the product must be power cycled.

## LED Indicators

	Off	Green
<b>Outputs</b>	No activity	Level mimic

	Off	Green	Yellow	Alternating green/yellow
<b>Data</b>	No DMX	DMX & RDM received	DMX received	Preset playback or test pattern active

	Off	Green	Red	Green flashing
<b>Power</b>	Product not powered	Normal operation	<ul style="list-style-type: none"> <li>Over-temp / over-current / output short circuit detected</li> <li>Frequency outside 45Hz - 65Hz range</li> <li>Supply brownout detected - safety interlock active</li> </ul>	Identify command received



# sunDial quad dmx 1k Specification

<b>Mechanical</b> <ul style="list-style-type: none"><li>• Housing: DIN Rail Case</li><li>• Material: Polycarbonate plastic, UL94-V0 rated</li><li>• Overall dimensions: 90 mm (H) x 159 mm / 9M (W) x 73.5 mm (D)</li><li>• Weight: 0.3 kg</li><li>• Mounting: 35 mm DIN Rail or Surface Mount</li><li>• Maximum conductor gauge: 2.5 mm<sup>2</sup> (12 AWG)</li><li>• Screw terminal torque: 0.5 Nm</li><li>• Maximum conductor temperature at product terminals: 90°C</li><li>• Country of manufacture: UK</li></ul>	<b>Outputs</b> <ul style="list-style-type: none"><li>• Type: 4 x mains dimming circuits</li><li>• Connectors: 4-pin screw terminals (4 no.)</li><li>• Min. recommended load: 12 W</li><li>• Max. load: 250 W per channel or 500 W per paired Channels 1+2 or 3+4</li><li>• Protection: Electronic &amp; 7A slow blow fuse</li></ul>
<b>Environmental</b> <ul style="list-style-type: none"><li>• Operating temperature: 0°C to 40°C</li><li>• Storage temperature: -10°C to +50°C</li><li>• Operating relative humidity (max): 80% non-condensing</li><li>• IP rating: IP20 indoor use only</li><li>• Certification: BS EN 62368-1:2014 +A11:2017, CE, WEEE, RoHS</li><li>• Warranty: 2-year (return to base)</li></ul>	<b>Control</b> <ul style="list-style-type: none"><li>• Input Protocols: DMX512, DMX512(1990), DMX512-A</li><li>• RDM V1.0 (E1.20 - 2010 ESTA Standard)</li><li>• Xicato Galaxi wireless control (xgc model only)</li></ul>
<b>Power &amp; Electrical</b> <ul style="list-style-type: none"><li>• Input voltage: 230 VAC +/-10%</li><li>• Input connector: Screw terminals</li><li>• Max. terminal rating: 10 A</li><li>• Duty cycle: 100% @ 25°C</li><li>• Input protection: User must supply (6A required)</li></ul>	<b>Sensors</b> <ul style="list-style-type: none"><li>• Heatsink temp. of channels 1+2</li><li>• Heatsink temp. of channels 3+4</li><li>• Product power consumption in 50W increments</li><li>• Mains frequency</li></ul>
<b>DMX512 input</b> <ul style="list-style-type: none"><li>• Input mode: Non-isolated</li><li>• Input ESD protection: 12 kV</li><li>• Input voltage protection: +/- 80 V</li><li>• 3-pin Screw Terminal DMX Input (1 no.)</li><li>• 4-pin Screw Terminal DMX Loop / Term (1 no.)</li></ul>	<b>LED Indication</b> <ul style="list-style-type: none"><li>• Power / DMX / RDM / Playback / RDM Identify / Over-Temp / Over-Current / Output short circuit / Level mimic</li></ul>
	<b>Configuration</b> <ul style="list-style-type: none"><li>• DMX Workshop compatible</li><li>• Configurable settings include:<ul style="list-style-type: none"><li>- Start address</li><li>- Dimming personality</li><li>- Preset &amp; data loss modes, test pattern</li></ul></li></ul>
	<b>Product codes</b> <ul style="list-style-type: none"><li>• Standard: sunDial quad dmx 1k</li><li>• Xicato GalaXi: sunDial quad xgc 1k</li></ul>

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## Compliance

All Products manufactured or sold by Artistic Licence Engineering Ltd are fully compliant with the appropriate UKCA, 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.



Compliance



sunDial quad is UKCA & CE compliant when installed in a shielded and earthed metal case.

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## 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](mailto:Sales@ArtisticLicence.com)

### Safety Warning

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



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

