

DMX512 Instructions

Installation

BEFORE YOU START

Read these instructions carefully. For the latest instructions for all our products please see www.rclighting.com/downloads

- For DMX Set Up & Addressing instructions, please refer to DOC-008 "DMX Set Up & Addressing".
- RCL spotlights need to be converted for DMX use. This cannot be done on site and must be specified when ordering.
- RCL spotlights converted for DMX still require a third party DMX source for control. RCL's handheld remote controller is used for addressing the spotlights only.
- DMX converted lights can be controlled using RCL's lighting control system, iDirect. For more information, please see DOC-081.
- DMX systems should always be installed by a contractor who understands the requirements of the DMX standard. Before RCL spotlights are installed, it is important to test the cable and source, as indicated in this document.

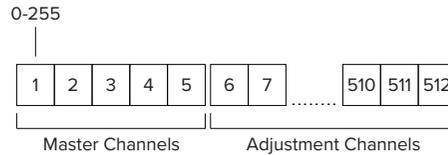
If you have any difficulty installing this product please contact:

Remote Controlled Lighting Ltd (UK)
42 Riverside Road, London SW17 0BA
+44 (0) 20 8404 2400
tech@rclighting.com

Remote Controlled Lighting Ltd (Asia)
Unit 13, 8/F, Lai Sun Yuen Long Centre
21-35 Wang Yip Street East,
Yuen Long, Hong Kong
+852 2310 9733

Introduction to DMX512

As an alternative to using RCL's handheld remote controller, it is also possible to control RCL's spotlights using the DMX512 protocol. DMX was originally developed for use in the theatre but is now widely used in entertainment, hospitality and retail.



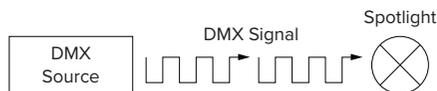
The DMX signal is made up of 512 'Channels'. Each channel can have a value between 0-255. For standard DMX setup, RCL requires the first five channels as Master Channels. The remaining channels (6-512) can be used for data.

NOTES

- If channels 1 – 5 are unavailable due to the presence of other devices, please contact RCL.

SA	SA+1	SA+2	SA+3
Pan (Coarse)	Pan (Fine)	Tilt	Dimmer

Each RCL spotlight requires four consecutive Adjustment Channels to control it – 2 for Pan, 1 for Tilt and 1 for Dimmer Level. The first channel that a light reads is called the Start Address (SA).

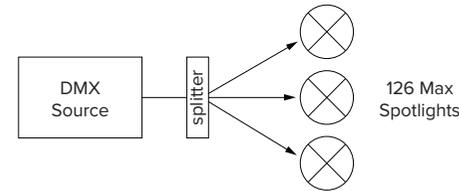


The DMX signal is sent out as a continuous stream of data from the DMX source via a cable or track. The spotlight uses the Start Address to identify which data it needs to read.

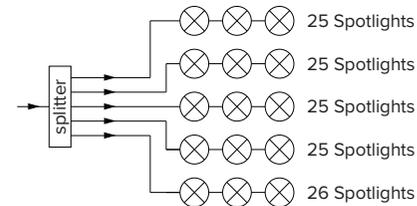
NOTES

- If DMX is to be used for dimming only, just one Adjustment Channel per spotlight is required.
- Some older RCL spotlights use five Adjustment Channels per fixture.

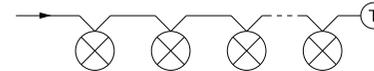
In principle, RCL spotlights should work with any DMX system, however not all DMX sources output the full 512 channels. The source must output at least 256 channels. To check system compatibility, please contact RCL.



The maximum number of spotlights that can be individually controlled by a single DMX source (sometimes called a Universe) is 126. However, due to loading issues RCL recommends that no more than 30 lights be connected to one DMX feed. To control more than 30 lights, it is possible to fit isolating amplifiers known as Splitters (readily available from third party manufacturers).



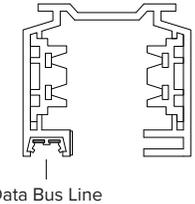
A typical Splitter with five outputs can control all 126 spotlights by connecting 25 to four chains and 26 to the fifth.



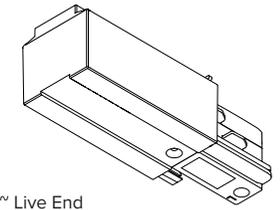
The DMX system must be connected in a 'Daisy Chain' configuration and the chain must be terminated with a 1W 120Ω DMX terminator. All cable used must be approved DMX cable.

DMX via 3-Circuit Track (230V)

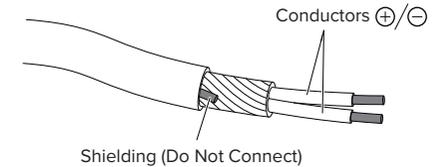
- For track mounted spotlights, the DMX signal should be fed via Eutrac's track with Data Bus. If another track type is specified, please contact RCL.



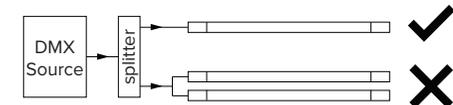
- The DMX signal is fed to the track via Live Ends or Couplers with Bus Contact. These must be wired in accordance with international standard IEC 60446.



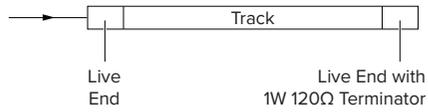
- All DMX cabling should be 24AWG twisted pair with braided outer-shield drain wire e.g. Belden 8102.



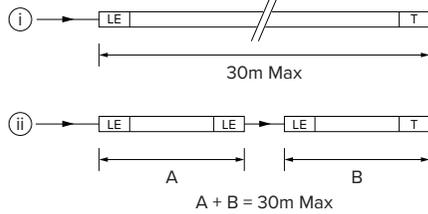
- Only one lighting track run should be connected per splitter output (i.e. if a splitter has 4 outputs then 4 lighting track runs can be used, 1 per output).



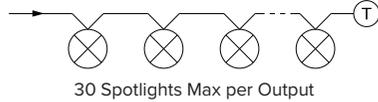
- 5 Each splitter output must be terminated with a 1W 120 Ω DMX terminator. This is normally a Live End fitted with a 1W 120Ω resistor (see wiring instructions for more information).



- 6 The maximum length per lighting track run is 30 metres. This can be a single track run (i) or a number of tracks (ii) connected in series.



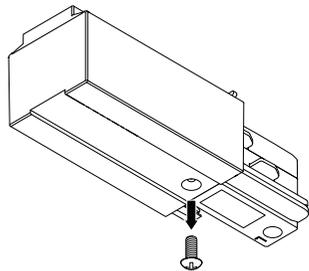
- 7 The maximum number of spotlights per splitter output should not exceed 30 (see 'Introduction to DMX512' for more details).



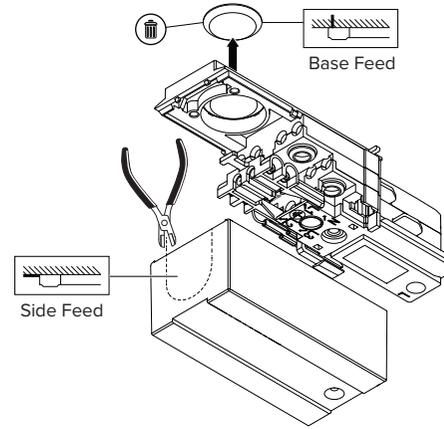
IMPORTANT

- The following wiring instructions are designed as an overview only. Full instructions for installing Eutrac track systems can be found at www.eutrac.de.

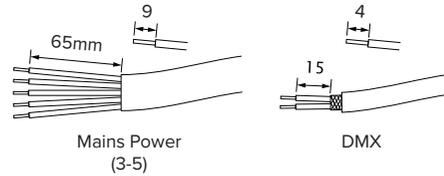
- 8 To wire up the Live End, first remove the outer casing.



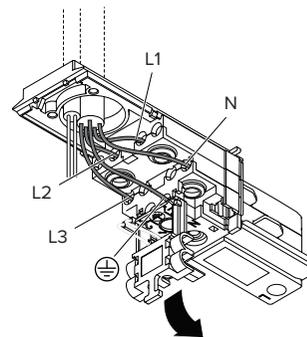
- 9 Remove the relevant access cover to feed the power and DMX cable.



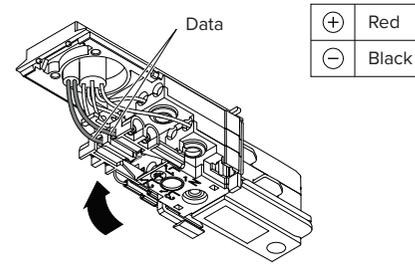
- 10 Strip the sheathing on the mains power and DMX cables using the measurements indicated below.



- 11 When wiring up the mains supply, check that the earth (green/yellow) and neutral (blue) wires are connected correctly. Circuits 1, 2 and 3 can be wired as required.

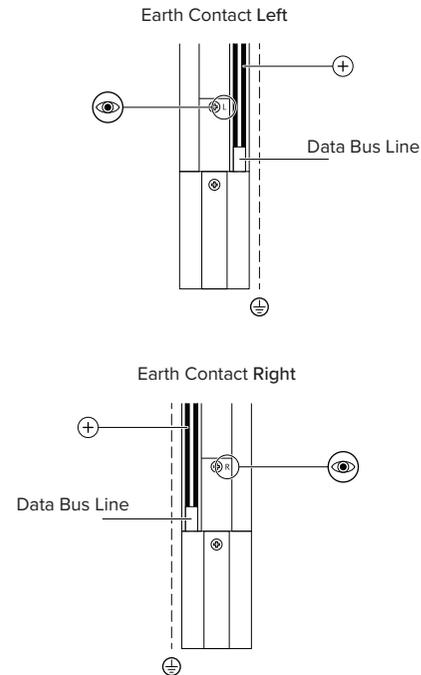


- 12 Return the data flap, ensuring that it clicks back into place. Wire up the DMX cable.

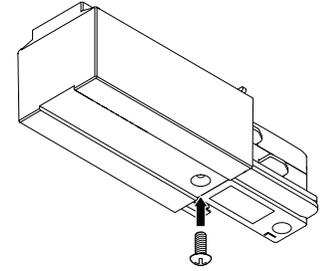


IMPORTANT

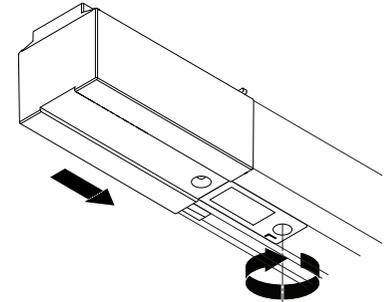
- Depending on the track configuration, the Data Bus Line may be located on either side of the track. Live Ends and Couplers are available for both arrangements.
- RCL requires that regardless of track arrangement, or product markings the outer DMX conductor is always (+).



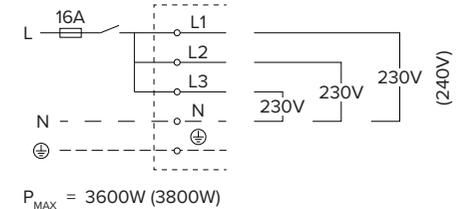
- 13 Replace the outer casing of the Live End and fix in place with the screw provided.



- 14 Slide the Live End into the track and secure in place by tightening the locking screw.



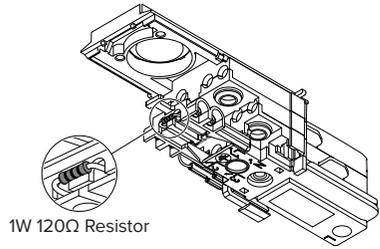
- 15 For 230V (240V) AC, the maximum load that can be distributed over the three circuits is 3600W (3800W). A 16A fuse should be installed.



- 16 To make a Terminator for track systems, a Live End fitted with a 1W 120Ω resistor can be used. The type of Live End required (data left or data right) will depend on the orientation of the track.

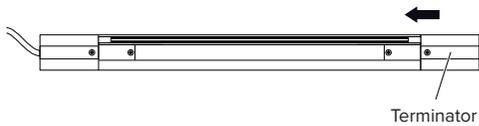


17 Remove the outer casing of the Live End Terminator and connect the resistor between the data points.



1W 120Ω Resistor

18 Replace the outer casing and secure the Live End Terminator into the opposite end of the track.



Terminator

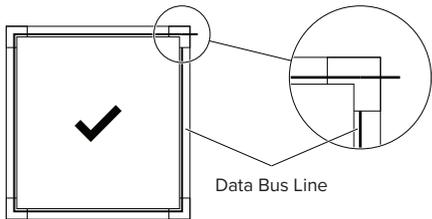
NOTES

- A Terminator is only needed at the end of a track run. Where two or more track lengths are connected in series, only the final length requires a Terminator.



IMPORTANT

- When mounting track with Data Bus, ensure that no loops within the data line are created. Where L- or T-Couplers are required, the data line in the respective coupler may be disconnected to avoid loops.

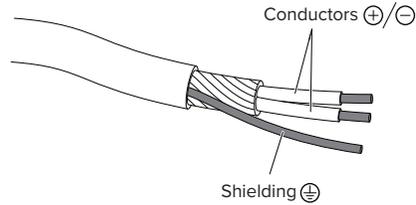


Data Bus Line

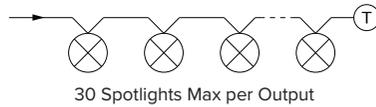
B Monopoint & Recessed Models

For Monopoint, Recessed and Hook Clamp versions, a 3-way connector is used to supply the DMX signal to the spotlight.

1 All DMX cabling should be 24AWG twisted pair with braided outer-shield drain wire e.g. Belden 8102. For CAT5/CAT6 cable wiring, see section D.

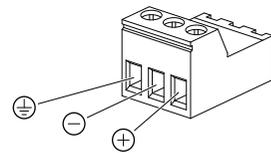


2 The maximum number of spotlights *per splitter output* should not exceed 30 (see 'Introduction to DMX512' for more details).

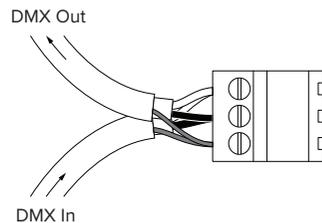


30 Spotlights Max per Output

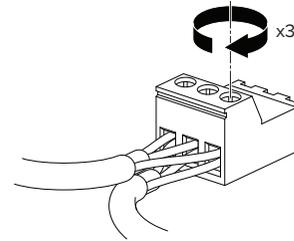
3 The DMX cable is connected to the luminaire via a 3-way connector, supplied by RCL.



4 Connect the DMX In and Out cables, ensuring that the cable shielding is grounded.



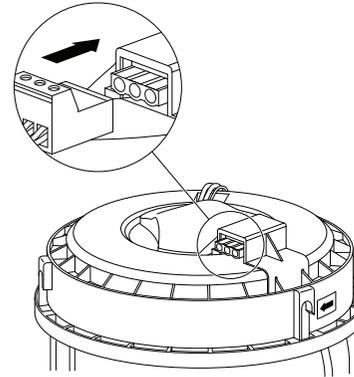
5 Tighten the connector screws to secure the cables in place ensuring a good connection between the lines.



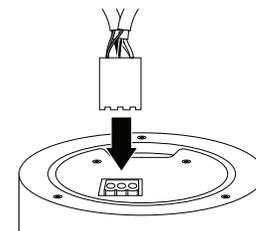
NOTES

- The spotlights should be connected in a 'Daisy Chain' configuration so that if a spotlight is removed, the remaining spotlights will still receive the DMX signal.

6 To connect DR7 or DRX5 to the DMX source, insert the 3-way connector into the DMX socket located on the top of the luminaire.

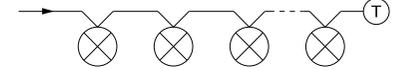


To connect DR2, DR8 and DRX1 monopoint versions to the DMX source, insert the 3-way connector into the DMX socket located on the top of the monopoint.

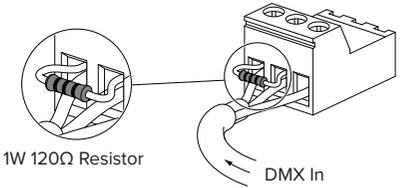


7 Spotlights should be connected to the DMX source during installation. Refer to product installation instructions for more information.

8 Each DMX line needs to be terminated using a 1W 120Ω resistor that is connected to the last 3-way connector in the spotlight chain.



9 To terminate the spotlight chain, connect the resistor between the (+) and (-) terminals along with the final DMX In cable.



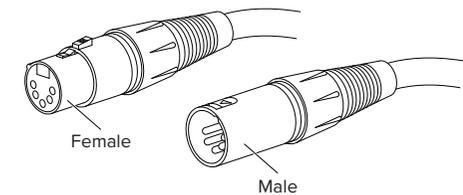
IMPORTANT

- Each cable run should not exceed a maximum length of 300m from the DMX source.

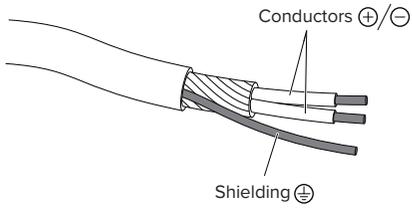
C XLR Connectors

If the DMX signal is to be carried via an XLR cable, it is important that the cable is wired correctly.

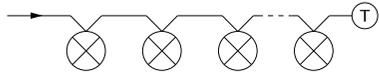
1 RCL recommends using 5-Pins connector when connecting RCL lights for DMX. Lights should always be wired in series.



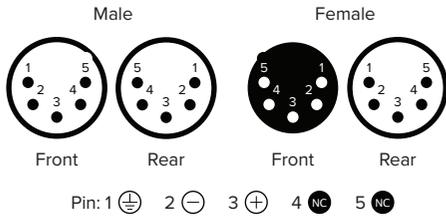
2 All DMX cabling should be 24AWG twisted pair with braided outer-shield drain wire e.g. Belden 8102. For CAT5/CAT6 cable wiring, see section D.



3 The maximum number of spotlights per splitter output should not exceed 30 (see 'Introduction to DMX512' for more details).



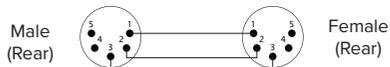
4 The Male and Female 5-Pin XLR connectors should be wired as indicated in the Wiring Diagram below.



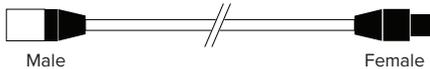
Front: The end that mates with the other connector
Rear: The end with the solder points

! IMPORTANT

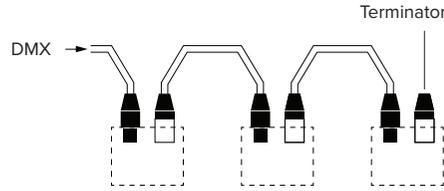
- Ensure that connections are consistent between male and female connectors.



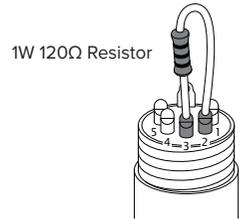
5 Cables between spotlights should be fitted with a Male and Female connector.



6 Lights should be connected in series and each splitter output should be terminated with a 1W 120Ω DMX Terminator.



7 To make the terminator, connect the resistor between pins 2 and 3 on the Male connector.



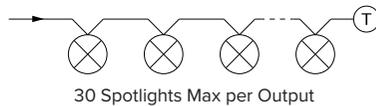
8 It might be necessary to assemble a 5-Pin to 3-Pin XLR adaptor. To do this connect the pins as indicated in the table below.

5-Pin XLR	3-Pin XLR	Signal
Pin 1	Pin 1	Signal ground
Pin 2	Pin 2	DMX Data -
Pin 3	Pin 3	DMX Data +
Pin 4	Not Connected	Auxiliary Data -
Pin 5	Not Connected	Auxiliary Data +

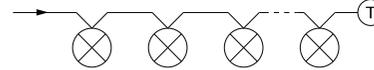
D Alternative DMX Connections

Some RCL spotlights such as Hook Clamp mounted fixtures can be supplied with alternative connectors to suit individual projects. In these situations the following guide lines should be observed.

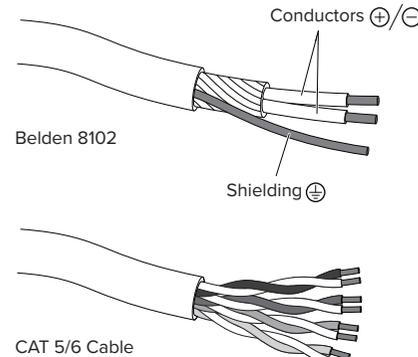
1 The maximum number of spotlights *per splitter output* should not exceed 30 (see 'Introduction to DMX512' for more details).



2 The spotlights should be connected in a 'Daisy Chain' configuration so that if a spotlight is removed, the remaining spotlights will still receive the DMX signal.



3 All DMX cabling should be 24AWG twisted pair with braided outer-shield drain wire e.g. Belden 8102. As an alternative, Category 5 (CAT 5) or Category 6 (CAT 6) cable can also be used.



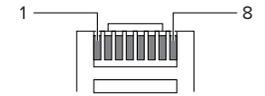
! NOTES

- CAT 6 cable is similar to CAT 5 cable, however it contains a longitudinal separator.
- CAT 5/6 cable is not normally shielded. If the cable does have shielding, do not connect it.

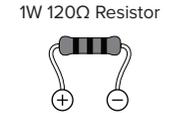
4 If CAT 5 or CAT 6 cable is to be used, it is normally connected using an RJ45 connector, wired as indicated in the table below.

Pair	Wire	Colour	Function	XLR Pin
2	1	White/Orange	Data 1+	DMX Pin 3
	2	Orange	Data 1-	DMX Pin 2
3	3	White/Green	Not Assigned	
	4	Green		
	5	Blue		
1	6	White/Blue	Ground	DMX Pin 1
	7	White/Brown		
4	8	Brown	Ground	DMX Pin 1

5 Looking at the top (flat) face of the RJ45 connector, the pins are numbered 1 – 8 from left to right.



6 Each DMX Splitter output needs to be terminated using a 1W 120Ω resistor, connected between the (+) and (-) terminals of the final connector in the spotlight chain.



! NOTES

- If you require installation information not covered in these instructions or have any questions relating to DMX, please contact RCL.

E DMX Testing

1 Before RCL spotlights are installed, it is important to test the cable and source. Initially, test for resistance and isolation. Finally, send a DMX signal down the cable and check that it can be received and read by a DMX test set at each position where a light is to be installed.

RCL can recommend the following third party DMX test sets:

- Artistic Licence - Micro-Scope (www.artisticlicence.com)
- Elation Professional – Dr DMX Multitool (www.elationlighting.com)

For more information on DMX testing, please see third party manufacturer instructions.

! NOTES

- During testing, it will be necessary to link the DMX In and DMX Out connectors at each position where no light is installed.