RJ45 Sockets   **Push-Fit Terminals**

MDR-DIN

DINrail Mount

DMX / RDM Splitter

User Manual

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1   Introduction

1.1   Overview

The MDR-DIN splitter is based on the successful range of MDR splitters. It is housed in a 5-module wide DIN plastic enclosure designed to mount onto a standard TS-35 DIN rail as used extensively in the electrical industry to mount circuit breakers and industrial control equipment. The MDR-DIN splitter provides four individual outputs from one DMX/RDM input. Each output is completely electrically isolated from the input and all other outputs, ensuring that voltage differences and noise will not compromise your installation.

The MDR-DIN handles the management of RDM (Remote Device Management) signals across its four outputs. RDM is an extension to the existing DMX standard and allows controllers to configure and monitor DMX based products. Unique to the MDR-DIN is the ability to individually disable RDM on any of its outputs using the front-panel switches. While many devices now offer RDM compatibility, there are still products available that do not perform correctly with RDM, causing the DMX network to flicker or jam when RDM signals are present. The MDR-DIN provides the ability to isolate these devices to one output by disabling the RDM, ensuring RDM can be used successfully on the remaining ports.

With LSC's companion product HOUSTON X, the state of the RDM enabled switches can be monitored remotely and a list of connected RDM devices can be reported including which output each device is connected to HOUSTON X also allows MDR-DIN software to be updated via RDM, so once it's installed there's no need to access the product again.

1.2   Models

Two models are available. Both models use push-fit terminals for power connections.
- MDRD/T – Push-fit terminals for DMX INPUT and 4 DMX outputs
- MDRD/J – RJ45 sockets for 2 DMX IN/THRU and 4 DMX outputs for installations where Cat-5 style cable is used for DMX512 reticulation

1.3   Features

- Four DMX/RDM outputs
- Each output is electrically isolated from the input and all other outputs
- RDM capability of each output port can be disabled for situations where legacy equipment is not compatible with RDM signals
- Splitter is discoverable by RDM
- Outputs can be labelled via RDM
- LSC's HOUSTON X monitoring and configuration system can display your network topography
- Each output circuit can be labelled via RDM for greater clarity in more complex networks
- LEDs for power, DMX and RDM activity
- Easy software update via RDM
- Conforms to the latest DMX/RDM standards
- CE (European) and RCM (Australian) approved
- Full two-year factory warranty
- Designed and manufactured in Australia by LSC – an Australian-owned company with over 40 years' experience in developing world-first DMX512 products

2   Installation

2.1   Mounting and Connecting

1. Mount the unit on a standard TS-35 DINrail (IEC/EN 60715). The unit is 5 modules wide.
2. Connect a suitable power source to the 9-24V DC push-fit terminals observing the correct polarity. A minimum of 5W of power is required.
3. Connect the DMX512 cables

| MDRD/J RJ45 Connectors	MDRD/T Push-Fit Terminals
 Power I/P — DMX IN/THRU — DMX IN/THRU 4 X DMX OUTPUTS	 Power I/P — DMX INPUT 4 X DMX OUTPUTS
Plug the DMX source cable into either DMX IN/THRU connector	Connect the DMX source cable into the DMX INPUT terminals
If this MDR-DIN splitter is the last device at the end of the DMX512 input cable, connect a 120-ohm resistor to the other DMX IN/THRU connector. See section 2.5 for the pin-outs. If the MDR splitter is not the last device on the line, the other DMX IN/THRU connector can be used to connect the DMX to other equipment	If this MDR-DIN splitter is the last device at the end of the DMX512 input cable, connect a 120-ohm resistor across the DMX INPUT terminals. If the MDR splitter is not the last device on the line, the same DMX INPUT terminals can be used to connect the DMX to other equipment in parallel.
Connect the DMX512 output cable(s) to the DMX512 output connector(s).	Connect the DMX512 output cable(s) to the DMX512 output terminals.

2.2   Connecting Multiple Splitters

When multiple splitters are required, it is best practise to use the THRU connector or a parallel of the input (rather than an output of a splitter) to feed the input of the next splitter. This is because the output of the splitter adds a tiny time delay to the signal. This delay is of no consequence for DMX alone but when RDM is included in the DMX signal, the very tight timing of the RDM specification can be exceeded if multiple splitters are connected in series.

When multiple splitters are connected using the THRU connector or a parallel of the input, there is no added delay and therefore no detrimental effect on the RDM signal.
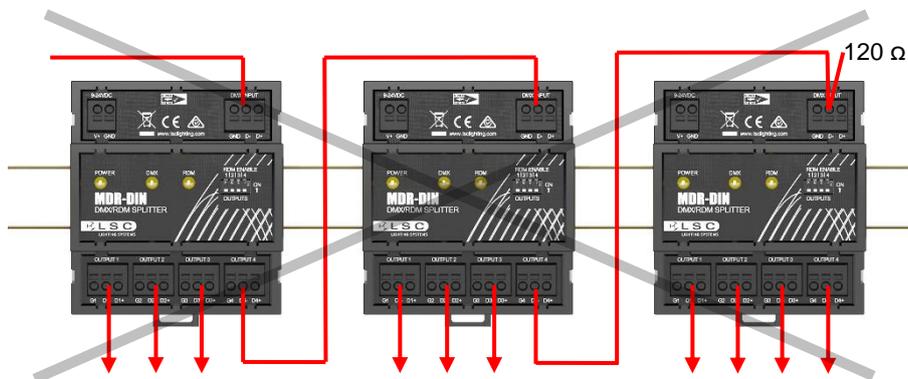
See the connection examples below.

120 Ω
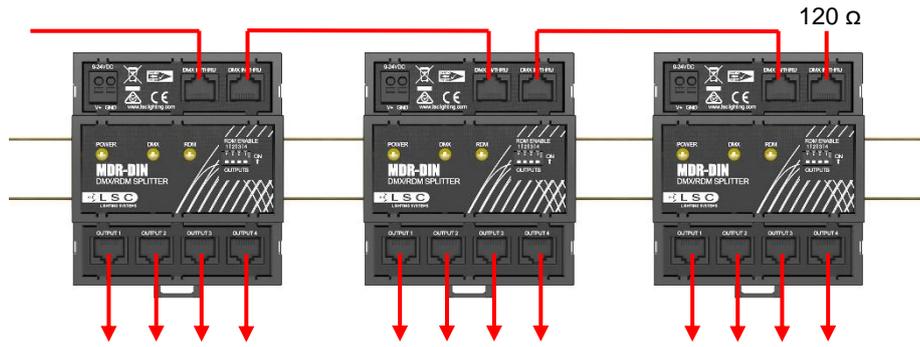
Recommended method of cascading multiple MDRD/J splitters

120 Ω
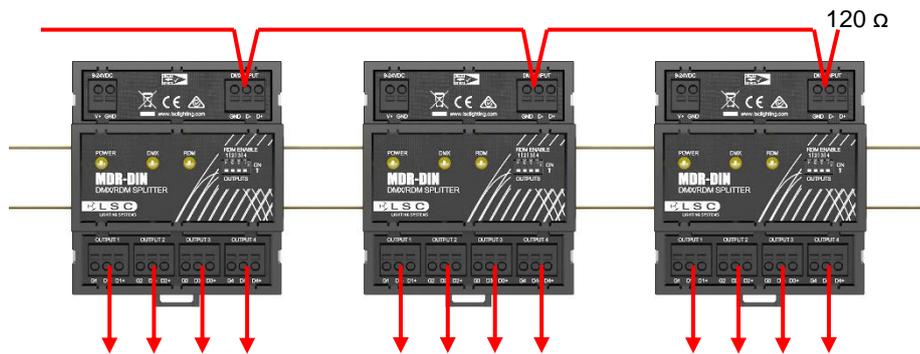
Recommended method of cascading multiple MDRD/T splitters

120 Ω

Connecting output to input is NOT recommended

2.3 DMX Cables

Only use specific DMX data cable. The data cable must conform to the EIA485 cable requirements by providing the following specifications:

- Low capacitance
- One or more twisted pairs
- Foil and braid shielded
- Impedance of 85-150 ohms, nominally 120 ohms
- 22AWG gauge for continuous lengths over 300 metres

Cat 5 UTP (Unshielded Twisted Pair) and STP (Shielded Twisted Pair) cable is acceptable. If you want to make your own cables, LSC recommends using Beldon 9842 (or equivalent). Never use audio cable.

The end of the DMX line must be terminated (120 Ω) to prevent the signal reflecting back up the line and causing possible errors.

2.4 Push-Fit Terminals

The following cables are suitable for use with the push-fit terminals:
- 2.5mm² stranded wire
- 4.0mm² solid wire

Stripping length is 8mm. Insert a small screwdriver into the slot adjacent to the cable hole. This releases the spring inside the connector. Insert the cable into the round hole then remove the screwdriver.

Solid wires or wires fitted with ferrules can often be pushed directly into the connector without the use of the screwdriver. When connecting multiple cables to a single terminal the wires must be twisted together to ensure a good connection to both legs. Non-insulated bootlace ferrules can also be used for stranded cables. Ferrules are not recommended for solid cables. Insulated bootlace ferrules can also be used allowing stranded cables to be easily inserted without the need of a tool to actuate the spring release.

The maximum ferrule outer diameter is 4mm.

2.5 DMX Pin Outs

RJ45	
Pin Number	Function
1	+ Data
2	- Data
3	Not Used
4	Not Used
5	Not Used
6	Not Used
7	Ground
8	Ground

5 pin XLR	
Pin Number	Function
1	Ground
2	- Data
3	+ Data
4	Not Used
5	Not Used

3 Pin XLR	
Pin Number	Function
1	Ground
2	- Data
3	+ Data

3   Operation

• The Power LED is lit when power is present and flashes when an RDM Identify request is received

• The DMX LED flashes when DMX data is present

• The RDM data LED flashes when RDM data is present

RDM Enable switches
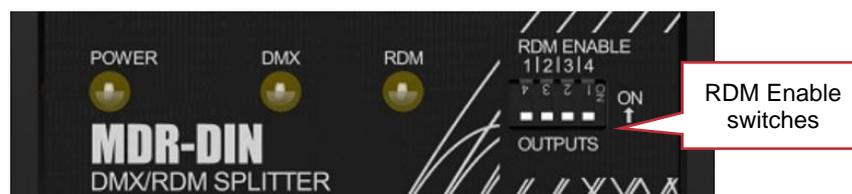
3.1 RDM Enable

Some older DMX controlled equipment is not compatible with RDM data and could flash or flicker when RDM data is present. To overcome this problem, each individual output port can have the RDM data turned off via the front panel "RDM ENABLE" switches. You can remotely check the status of the RDM ENABLE switches by using LSC's HOUSTON X software. See below.

3.2 RDM Operation

DMX allows a controller to communicate with a device. RDM (Remote Device Management) allows a device to communicate with a controller. RDM data is interleaved with the DMX data over the same cable.

The MDR-DIN can be discovered and identified by a RDM request and can also report the status of its four RDM ENABLE switches (see below). It responds to the following RDM commands:

- Get Comms Status
- Set Comms Status
- Get Supported Parameters
- Get Device Info
- Get Device Model Description
- Get Manufacturer Label
- Get Device Label
- Set Device Label
- Get Factory Defaults
- Set Factory Defaults
- Get Software Version Label
- Get Boot Software Version
- Get Boot Software Version Label
- Get Identify
- Set Identify
- Set Reset Device

In addition, the MDR-DIN supports the following manufacturer specific commands for use with LSC's HOUSTON X software:
- Get Parameter Description. Provides parameter description information to the controller
- Get MdrD Basics. Gets basic information (Label, Software Version etc)
- Get MdrD Status. Gets information such as the status of each RDM Enable switch, Input volts, etc

3.3 HOUSTON X

HOUSTON X is LSC's monitoring and remote configuration tool that works with APS, GEN VI, MDR-DIN, LED-CV4, UNITOUR, UNITY and Mantra Mini.
The software runs on Windows and Mac computers. It gives you the absolute authority to interrogate, monitor and instantly change parameters of connected products. HOUSTON X is the central overseer of your venue's equipment. Quickly locate and isolate faults, monitor temperatures, phase loadings, change a channel from dimmer to power-switching mode (TruPower), save or recall show configurations, all from one central location or remotely via the internet.
HOUSTON X is available for download from the LSC web site.

3.4 DMX – RDM Explained

DMX512A is the industry standard for the transmission of digital control signals between lighting equipment. It utilises just a single pair of wires on which is transmitted the level information for the control of up to 512 DMX slots. As the DMX512 signal contains the level information for all slots, each piece of equipment needs to be able to read the level(s) of the slots(s) that apply only to that piece of equipment. To enable this, each piece of DMX512 receiving equipment is fitted with an address switch or screen. This address is set to the slot number to which the equipment is to respond.
RDM stands for Remote Device Management. It is an "extension" to DMX. It has been designed to work with existing DMX systems. It does this by interleaving its messages with the regular DMX signal over the same wires. Because RDM messages go in both directions, any in-line DMX processing needs to be RDM capable. Older DMX splitters will not work with RDM because they only pass data in one direction.

4   Compliance Statements

The MDR-DIN from LSC Control Systems Pty Ltd meets all required CE and RCM standards.

European Committee for Electrotechnical Standardization (CENELEC).

CE

Australian RCM (Regulatory Compliance Mark).

5   Specifications

	MDRD/J	MDRD/T
Number of Buffered Outputs	4	
Input and Thru Connectors	RJ45	Push-fit terminals
Output Connectors		
Individual RDM Disable per Port	✔	
DMX Protocol	ANSI DMX512-A Standard E1.11:2008 (R2013)	
RDM Protocol	ANSI RDM Standard E1.20:2010	
Power, DMX and RDM Indicator LED	✔	
Software Upgrade via RDM	✔	
All Inputs and Outputs Isolated	✔	
Galvanic Isolation Barrier	1500V	
Short Circuit Protected	✔	
DMX512-A Compatible	✔	
Power Supply Requirements (not included)	9-24V DC (5W)	
Conformity	CE, RCM	
Individual RDM Disable Switches (per port)	✔	
Chassis Style	TS-35 DINrail mount (IEC/EN 60715)	
Construction Style	High-strength, flame-retardant ABS plastic material	
Physical Dimensions	88mm (w) x 59mm (d) x 104mm (h) 5 DIN units wide	
Actual Weight	0.16kg	
Shipping Dimensions	92mm (w) x 64mm (d) x 108mm (h)	

<u>Note</u>: All outputs are individually isolated from each other as well as the input. Isolation is for both data and common connections and provides a galvanic barrier to 1500V. Outputs are EMI-filtered and current-limited to protect against short circuits.

END