DMX512-A and RDM-Compatible Data Splitters User Manual

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PRODUCT OF AUSTRALIA

INTRODUCTION

DMX512-A based data splitters are not new to LSC. From the company's involvement in developing the original DMX512 specification in 1986, to releasing a number of world-first DMX512-based products in the ensuing years, LSC has been at the forefront of DMX512 communication for the entertainment industry.

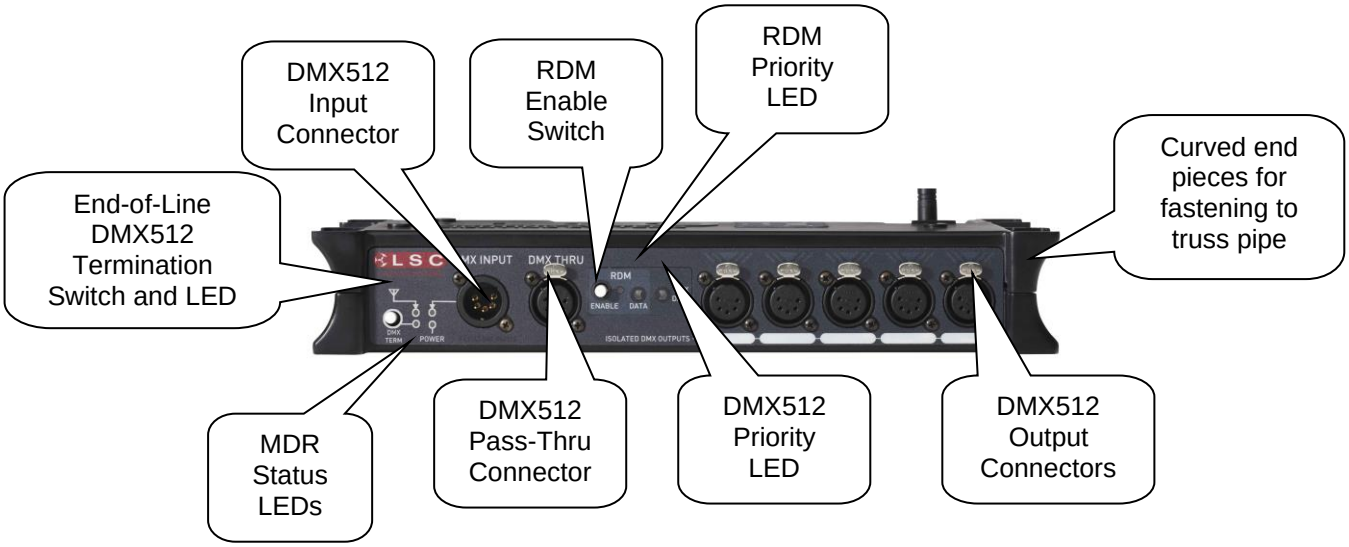
The MDR range is future-proofed allowing the add-on of RDM (Remote Device Management) when you need it – another world-first innovation.

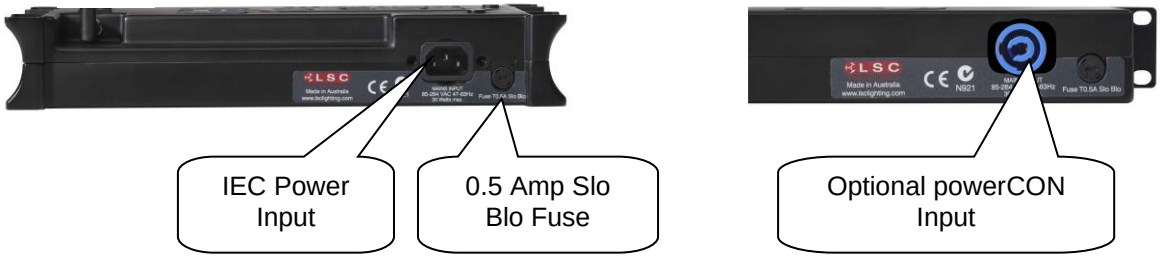
The range encompasses a 5-way and 10-way 19" rackmount configuration and a 5-way portable version that can be truss-mounted or used free-standing. All models allow the option of adding a RDM module that can be factory-fitted or field upgradeable. Additionally, an installation version comprising all RJ45 style connectors is available. Refer to the full range on page 7 for model numbers.

This User Manual provides a brief overview of the products and their key features, how to connect and operate the splitters and an explanation of DMX512-A and RDM.

GETTING CONNECTED

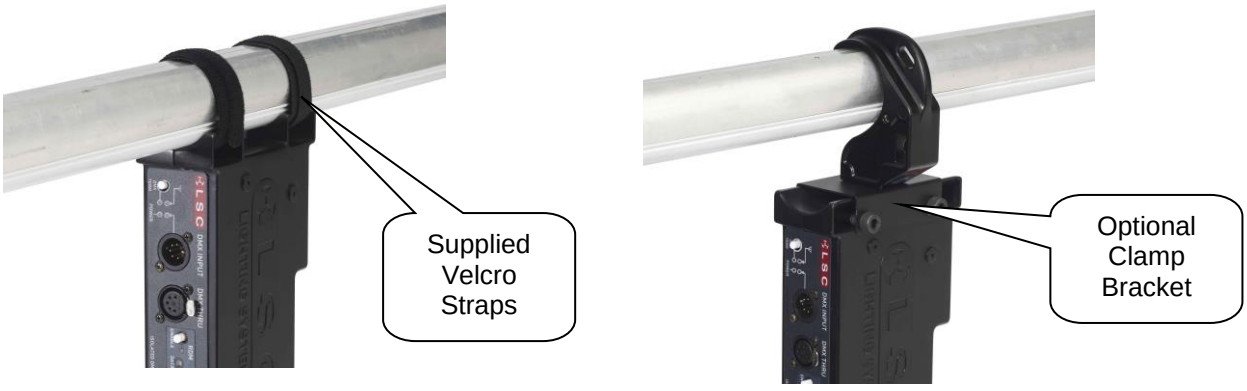
For the purpose of this section only the MDRT portable 5-way model is shown with all options fitted.





TRUSS-MOUNTING

The MDRT splitters can be mounted to a truss, handrails and pipes using two methods. The first method is with two Velcro straps, supplied with the splitter that can be looped through the end cavities of the plastic housing and wrapped around the truss or pipe.
The second method is a factory-supplied option, consisting of a metal bracket and fixing bolts, that allows the splitter to have a coupler or hook clamp attached.
For either method it is recommended to feed a suitably rated safety wire/chain through the end cavities of the splitter and fasten around the pipe/truss/handrail.



DMX512 OPERATION

The MDR DMX512 data splitters have been designed for quick and easy operation. A brief operational instruction is detailed below.

1. Connect the MDR DMX512-A data splitter to a suitable power source and apply power. The Power light will illuminate.
2. Connect the DMX512-A source cable into the DMX INPUT connector of the MDR splitter. The DMX Data light next to the connector will illuminate if data is present.
3. If the MDR splitter is to be the last device at the end of the DMX512 input cable, then press the DMX Term button. The DMX Terminate indicator light will now illuminate.
4. If the MDR splitter is not the last device on the line, the DMX THRU output connector can be used to connect an output cable and allow the incoming data stream to continue to other equipment downstream.
5. Connect the required DMX512 output cable/s to the DMX512 output connectors of the MDR splitter.
6. DMX512-A data present at the DMX512 input connector is now internally routed to all five (10) DMX512 output connectors and therefore to all devices connected downstream from the MDR splitter.

Note: 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.

RDM OPERATION

The RDM module, when fitted, allows RDM-based devices to communicate with each other in bi-directional mode interleaved with the DMX512-A signal. All inputs and outputs use the standard DMX512-A connectors and cables.

1. Connect Power, Input, Thru and Outputs as per the DMX512 section above.
2. To make the MDR splitter work in RDM mode, press the RDM Enable switch. The RDM Enable indicator light will now illuminate.
3. When data passes through the MDR splitter from the controller to a responder, then the DMX Data **>** indicator will illuminate. When RDM data passes back through the splitter from the responder to the controller, then the RDM Data **<** indicator will illuminate. As RDM is bi-directional, it is possible that both indicators may illuminate at the same time.
4. If RDM data overflows, the RDM Enable indicator will begin flashing and the RDM function will be disabled automatically.

Note: When an RDM device overflows the RDM data stream, then you must isolate the offending device from the network and reset the RDM module in the MDR splitter by pressing the RDM Enable switch off, then back on.

WIRELESS DMX512 OPERATION

Please note: This option is no longer supported or supplied by LSC. This information is only supplied for earlier MDR splitters that were fitted with this option.

For full wireless DMX512-A operation, please refer the manufacturer's websites:

Wireless Solutions (W-DMX)	www.wirelessdmx.com
City Theatrical (SHoW DMX)	www.citytheatrical.com

The wireless DMX512 modules supplied by LSC for the MDR range of splitters are modified receiver boards from the manufacturers listed above.

LSC do not supply wireless DMX512 transmitters. Please contact the above manufacturers for the appropriate transmitter to work with the MDR splitter.

The wireless DMX512 module can work as a sole DMX512-A input source for the splitter or as a backup source to the cable input, thus providing full redundancy for the DMX512-A cable input. If both wireless DMX512 and cable DMX512 are receiving data, the cable DMX512 input has priority. However, if there is a failure on the cable DMX512 input, the MDR splitter has an auto-switching feature that seamlessly switches the input priority to the Wireless input. When the failure on the cable DMX512 input has been rectified, the MDR splitter will automatically switch back to the cable DMX512 input.

1. Connect Power, input (if required), thru (if required) and outputs as per the DMX512 section above.
2. For Wireless Solutions W-DMX models, press and release the Function button to synchronise the receiver to the transmitter device. This process may take up to 10 seconds to synchronise. Once synchronised the Status indicator will illuminate.
3. To unlink the receiver from the transmitter, press and hold the Function button until the Status indicator goes off. The receiver is now not linked to the transmitter.
4. For City Theatrical SHoW DMX models, there are two buttons, a display and a Status indicator. The display shows four menu choices, various settings and unit information. The display will timeout after 10 seconds if no button activity is detected. The left and right buttons are used to move through the menus and to adjust and select settings. The Status indicator blinks red to indicate operation and No Transmitter Detected and blinks green to indicate operation and Transmitter Detected.
5. To set the receiver to respond to the SHoW DMX transmitter, you must select one of 64 different SHoW IDs that corresponds to what the transmitter is set to. Press the Menu button to activate the display. The display will show the current ID: IDxx. Press the Select button to scroll to the required ID number. The Status indicator will blink green to indicate the receiver has synchronised to the transmitter.
6. The SHoW DMX also allows you to change the Power setting. You will not need to change the setting as this will be set by LSC prior to the unit leaving the factory.

DMX512 EXPLAINED

DMX512-A 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 (addresses or channels).

The information for each slot is sent sequentially. The level of slot 1 is transmitted, then the level of slot 2, then slot 3, etc., up to a maximum of 512 slots. This stream of data containing the levels for all 512 DMX slots is repeated a minimum (generally) of 44 times per second. This provides sufficient updates of channel information for smooth fade transitions.

As the DMX512-A 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.

DMX512 CABLES

When good quality data cables are used, DMX512 cable runs may be up to 1,000m in length. When several DMX streams are required (to feed different locations), DMX512 splitters must be used. These provide multiple isolated DMX512 output streams of the same input stream.

Note: Do not use unscreened microphone or low-speed data cables for DMX. This can cause problems in the DMX network. Make sure the cable conforms 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 ohm, nominally 120 ohm
- 22AWG gauge for continuous lengths over 300m

DMX512 CONNECTOR PIN ASSIGNMENTS

Connector Pin Number	XLR 5-Pin Input Connector	XLR 5-Pin Thru Connector	XLR 5-Pin Output Connectors	XLR 3-Pin Output Connectors
Pin 1	Common	Common	Ground	Ground
Pin 2	DMX –ve in	DMX –ve thru	DMX –ve out	DMX –ve out
Pin 3	DMX +ve in	DMX +ve thru	DMX +ve out	DMX +ve out
Pin 4	Looped through	Looped through	Not Connected	Not used
Pin 5	Looped through	Looped through	Not Connected	Not used

RJ45 DMX CONNECTOR PIN ASSIGNMENTS

Connector Pin Number	RJ45 8-Pin Connector
Pin 1	DMX +ve
Pin 2	DMX –ve
Pin 3	Not Connected
Pin 4	Not Connected
Pin 5	Not Connected
Pin 6	Not Connected
Pin 7	Common
Pin 8	Common

RDM EXPLAINED

RDM is an acronym for Remote Device Management, which is a relatively new protocol that overlays on the existing DMX512-A cable network, using the same 3 pins of the XLR connector. The protocol has been released under the standard ANSI-E1.20-2006. Equipment connected to the DMX512-A network wishing to use the advantages of RDM, must be RDM-compatible.

Unlike DMX512-A, RDM is bidirectional – meaning messages sent out can be responded to and reported back to the originator. This can allow RDM controllers to interrogate, control and report on any RDM-enabled devices on the network by:

- changing DMX start addresses
- reporting faults
- changing fixture mode settings
- requesting a list of fade curves available from a dimmer rack
- reporting on lamp hours usage per fixture
- reporting on the temperature of dimmers and other connected devices

RDM will allow a lighting console to discover all the devices connected to its outputs and even how many DMX slots each item requires. This information could then be used to auto-patch the entire rig. The user settings of all the devices could be saved as part of the show file, so that when the show is reloaded into the console, the system could ensure that all devices are still connected and working, then check that the Pan invert settings and custom dimmer curves on certain devices have not changed. In the case of a faulty moving light, a new light could be connected and the user settings (e.g. DMX address, mode, tilt invert) automatically uploaded to the new unit.

RDM is backwards compatible with existing DMX512 equipment, allowing non-RDM devices to be connected to the same cable as RDM devices. The non-RDM units, if fully conforming to the DMX512-A standard, will simply ignore all the RDM data. The only exception to the rule is DMX512-A data splitters. Non-RDM units will simply block (stop) all RDM data from any devices connected downstream of the DMX512-A splitter. Therefore, any lighting system using RDM *must use* RDM-enabled DMX512-A data splitters.

Once the uptake of RDM by other manufacturers reaches levels where the majority of equipment is RDM-compatible, the advantages of RDM will become obvious and many users will wonder how we survived without it.

MDR DMX512-A/RDM SPLITTER SPECIFICATIONS

Technical Specifications	MDRR	MDRX	MDRT	MDRJ
DMX512-A Compatible	Yes	Yes	Yes	Yes
5-Pin XLR In and Thru Connectors	Yes	Yes	Yes	No
Output XLR Configuration	5-way	10-way	5-way	N/A
3-Pin XLR Available	Optional	Optional	Optional	N/A
RJ45 Connector Configuration	N/A	N/A	N/A	10-way
Integrated Termination Switch	Yes	Yes	Yes	Yes
RDM-Enabled	Optional	Optional	Optional	Optional
Galvanic Isolation Barrier (Volts)	1500	1500	1500	1500
Short-Circuit Protected	Yes	Yes	Yes	Yes
EMI-Filtered Outputs	Yes	Yes	Yes	Yes
Universal Input Power Supply (V AC)	85-264	85-264	85-264	85-264
Auto Frequency Input Selection (Hz)	47-63	47-63	47-63	47-63
Power Supply On LED	Yes	Yes	Yes	Yes
19” Rackmount Chassis	Yes	Yes	No	Yes
Conforms to CE Regulations	Yes	Yes	Yes	Yes

Dimensions:	**MDRR(X/J)**	480mm (w) x 44mm (h) x 110mm (d) 18.9" (w) x 1.73" (h) x 4.33" (d)
	MDRT	320mm (w) x 50mm (h) x 125mm (d) 12.6" (w) x 1.97" (h) x 4.92" (d)
Weight:	**MDRR(X)**	packed (volumetric) 2kgs (4.5lbs)
	MDRT	packed (volumetric) 2kgs (4.5lbs)
Construction:	**MDRR(X/J)**	All variants made from corrosion-resistant steel finished in black powder coat with rear screened polycarbonate labels.
	MDRT	Moulded housing made from tough ABS plastic rated to UL94-V0 with rear screened polycarbonate labels.

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