EtherN.8 RDM & EtherN.2 RDM
Ethernet DMX output devices

User guide

EtherN.2 **RDM**

EtherN.8 RDM

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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.

EtherN.8 **RDM**

EtherN.2 **RDM**

Overview
EtherN.8 **RDM** is a 1U Rack Mounted Art-Net to DMX/RDM converter capable of outputting upto 8 universes of DMX/RDM data.

EtherN.8 **RDM** houses four internal modules; each module comprising two DMX ports which are independently discoverable and configurable - each with four indicators. There are two Network connections to allow multiple units to be connected together.

EtherN.2 **RDM** is a wall-mounted panel Ethernet to DMX512 converter. It converts Art-Net Ethernet data into two universes of DMX/RDM data.

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Power Supply

The EtherN.2 **RDM** supports both Power over Ethernet and local DC power supply (not supplied) via the supplied Jaguar DC connector. The EtherN.2 **RDM** can receive DC power from 9 to 48V, and consumes 2 Watts. When connected to a Power over Ethernet feed, the EtherN.2 **RDM** only requires the RJ45 network connection.
The EtherN.8 **RDM** is fitted with an internal power supply which requires an 85 – 264V AC input with an earth connection. The mains fuse should only be replaced with a 3.15A Slow Blow.

Earthing

The following table details the internal Earth interconnection and isolation on the EtherN.8 **RDM**

Circuit	Description	
Chassis	Bonded to Earth-Ground	
DMX512 Ports	Type:	Grounded
	Pin 1:	Connects to internal Logic Ground.
	Shell:	The connector shell is connected to chassis
Ethernet	Type:	Transformer Isolated
	Screen:	Connects to Earth-Ground via 75 ohm resistance & 100pF capacitance, as specified in the IEEE standard
Internal Logic Ground	Connects to Earth-Ground via 10ohm resistance	

Please note that we use the term Earth-Ground to avoid international confusion. In Europe Earth-Ground is called Earth, in the USA Earth-Ground is called Ground.

Art-Net Interface

Art-Net is a TCP/IP based Ethernet protocol developed by Artistic Licence. It uses standard Ethernet distribution hardware to transport many DMX universes across the network, reducing cabling.
EtherN.8 **RDM** has two network connections, one on the front panel and one on the rear. Both can be used to connect the EtherN.8 **RDM** into a network. If looping to another EtherN.8 **RDM** it is recommended that this is only done to a maximum of three times.
EtherN.2 **RDM** has s single network connection, on the rear, which also provides power to the unit.
Connect to 10/100BaseT Ethernet Hub/Switch using Cat5 cable or better.

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Wiring Detail

The following guide should be used if custom Cat5 cables are being used.

As EtherN.8 **RDM** has an internal Ethernet Switch, the following guidelines must be used when connecting to a network:

Connecting EtherN.8 RDM to:	Cable to be used:
Ethernet Switch	Cross-Over Cable
Computer or Node	Patch/Straight Cable

When connecting an EtherN.2 **RDM** to a network, the following guidelines must be used:

Connecting EtherN.2 RDM to:	Cable to be used:
Computer or Node	Cross-Over Cable
Ethernet Switch	Patch/Straight Cable

Patch/Straight Cable

White/Orange		White/Orange
Orange		Orange
White/Green		White/Green
Blue		Blue
White/Blue		White/Blue
Green		Green
White/Brown		White/Brown
Brown		Brown

Cross-Over Cable

White/Green		White/Orange
Green		Orange
White/Orange		White/Green
Blue		Blue
White/Blue		White/Blue
Orange		Green
White/Brown		White/Brown
Brown		Brown

RJ45 Connector

PIN 5   PIN 1
PIN 4   PIN 2
PIN 3

XLR5 Female

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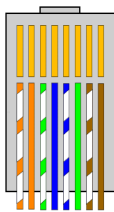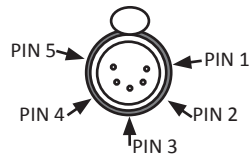
DMX Connections

The DMX512 is connected to the 5 pin XLR on the front panel.
Cable connection is as follows:

XLR Pin	RJ45 Pin	Convention	Function	RJ45 Colour
1	7	Black	Ground	White / Brown
1	8	Black	Ground	Brown
2	2	Blue	Data -	Orange
3	1	Red	Data +	White / Orange
4	6	n/c	Aux Data -	Green
5	3	n/c	Aux Data +	White / Green

The DMX512-A standard specifies that Cat5 cable can be used to carry DMX data. The table above shows which cores should be used. It is recommended that a good quality Cat5E cable is used.
For the outputs, RDM data uses the same connections as the DMX data.

RDM

RDM (Remote Device Management) is a PLASA Standards protocol from the Technical Standard Program that allows Bi-Directional communication over standard DMX cable. This enables a controller to have access to a DMX / RDM fixtures configuration and to alter this configuration remotely. The most obvious use is to be able to remotely set the start address of the fixture. However there are many other benefits to RDM such as sensor feedback, firmware uploads and automatic patching.
EtherN.8 **RDM** and EtherN.2 **RDM** fully support the RDM protocol (E1.20 - 2006) via Art-Net transport, but can also be used within networks where there is no RDM present.

Power Requirements
EtherN.2 RDM

15VDC to 48VDC @ 200mW (RJ45, Power over Ethernet)
9VDC to 48VDC @ 200mW (Jaguar)
Connection Options
• Powered Hub: Connect to IEEE802.3 PoE compliant 10BaseT Hub/Switch. This will provide device power via the Ethernet connector
• Independent Power: Connect DC power as specified above to the 2 pin Jaguar Connector located near the RJ45.

EtherN.8 RDM
85VAC - 264VAC, 25W

Power is supplied via IEC C13 connector. The unit must be grounded.
The mains fuse should only be replaced with a 3.15A Slow Blow Fuse.

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Indicators

EtherN.2 **RDM** features one 'module', whilst EtherN.8 **RDM** comprises four 'modules'. Each module has a set of indicator LEDs. The front panel Ethernet Connector on EtherN.8 **RDM** also has status indicators.

Module Indicators

STAT	On when the unit is powered. Flashing if a hardware fault is found.
NET	On when the network data is active.
DMX A/B	On when DMX data is being transmitted.
BOOT UP	During boot up, the LEDs will sequentially step.
BOOT LOADER	When in bootloader mode, the 'NET' LED will flash continuously.
ALL FLASHING (3 times)	The Sub-Net switch has been changed but the value has been set remotely.

Ethernet Indicators

PWR	Power LED.
LINK	On if there is a valid link between this connection and another Ethernet device.
ACT	Flashes when data is being either received or transmitted.
SPD	On if this connection is running at 100BaseT, Off if running at 10BaseT.

Universe & Sub-Net Selection

In Art-Net each universe being transmitted is set to a particular Sub-Net and Universe number to allow it to be distinguishable from other universes on the same network. This allows up to 256 independent universes to be on the same network. Using standard Ethernet distribution the maximum number of universes is 40. With correct network design this number can be increased.

Port	Universe	Port	Universe
1	0	9	8
2	1	10	9
3	2	11	A
4	3	12	B
5	4	13	C
6	5	14	D
7	6	15	E
8	7	16	F

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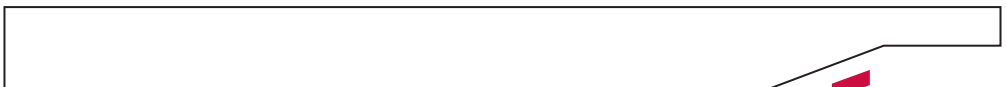
Universe

By default, each port of the EtherN.8 **RDM** has a sequential universe number, starting from 0. To change the universe, use either the internal web-server or configure it from your ZerOS console. The table overleaf shows the default settings.

Sub-Net

The Sub-Net for all the modules can be set by using the front panel Sub-Net switch. Alternatively, any of the below configuration methods can be used to set a module's Sub-Net .

NB: If all the indicators flash when a switch setting has been changed, the product will have been remotely configured, i.e. by DMX-Workshop or the internal web-server.

Configuration

There are three ways of remotely configuring a EtherN.8 **RDM** and an EtherN.2 **RDM**;
• Web-Server
• ZerOS console
• DMX-Workshop
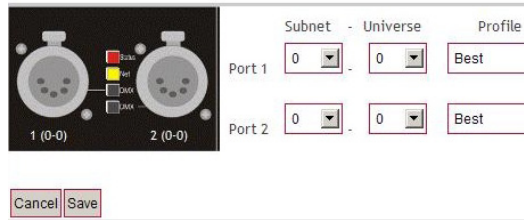
Web-Server

To configure the EtherN.8 **RDM** or EtherN.2 **RDM** via the internal web-server, either type the IP address of one of the modules or, if your web-browser supports NetBios, then use the name; en8rdm or en2rdm in your address bar (eg: http://en8rdm/).

The internal web page will show the current status of each module, such as it's DMX status and IP address.

There are two options for each module;
• DMX Settings
  Sets universe & sub-net values
  DMX Output Profile
• IP Settings
  Set a custom IP address, Sub-Net and
Gateway IP

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ZerOS Configuration

It is also possible to configure the EtherN.8 **RDM** and EtherN.2 **RDM** from within your ZerOS console (running ZerOS version 8.0 or above). In the Network/Devices tab, each module appears as a seperate device that you can configure using the on-screen controls.
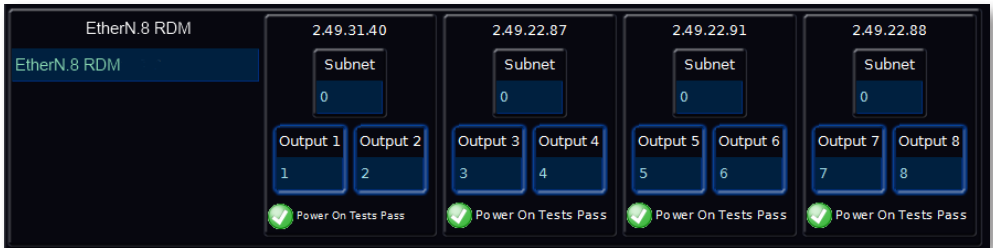

DMX-Workshop

DMX-Workshop is free Art-Net configuration software available from Artistic Licence. Within the 'Network' view you will see four nodes for a single EtherN.8 **RDM**, and one node for an EtherN.2 **RDM.** To configure a module, right click over the entry and the configuration menu appears.

The variables that can be configured are;

- Universe and Sub-Net Values
- Label
- IP Address
- DMX Output Merge mode (LTP / HTP)
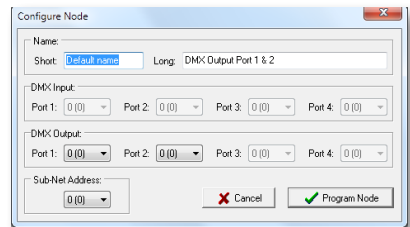
Transmit Style

Delta – DMX Output packets are synced with incoming Art-Net packets.

Continuous – DMX output packets are continuously transmitted independently of the Art-Net inputs.

Output Profiles

When configuring the EtherN.2 **RDM** and EtherN.8 **RDM** via the web interface, three output profiles are offered to suit different DMX equipment connected.

Profile Name	RDM	Transmit Style	Max Refresh Rate
Best	ON	Delta	43.57 FPS
Compatibility	OFF	Delta	43.06 FPS
Fix	OFF	Continuous	39.95 FPS

In addition to these profiles, a Custom mode is offered to allow custom configuration as required.

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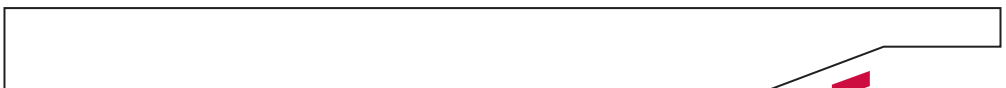
Jumper Settings

In normal operation EtherN.8 **RDM** and EtherN.2 **RDM** do not require any configuration. However there are several advanced settings that can be required to overcome various issues in more complex installations.

To fit a jumper to EtherN.8 **RDM**, follow the instructions below:

1) Disconnect the Power from the unit
2) Ensure you have adequate Anti-Static protection
3) Remove the top row of screws from the front panel
4) Remove the bottom row of screws from the rear panel
5) Carefully pull the two halves apart, about 10cm

The table below describes the function of each jumper. By default none of the jumpers are connected.

Jumper	Option
JP0 - JP3	Not Assigned
JP4	Connect to switch to the alternate 10.x.x.x network.
JP5	Connect to disable RDM.
JP6	Connect to invert the low byte of the IP address.
JP7	Connect to restore default settings on EtherN.2 **RDM**. Not assigned on EtherN.8 **RDM**.

ROM Boot Jumper

EtherN.8 **RDM** and EtherN.2 **RDM** have a built in fail safe mode that will put the unit into a basic running state allowing new firmware to be uploaded. This is only to be used if the currently installed firmware becomes corrupted.

To get an EtherN.8 **RDM** or EtherN.2 **RDM** to boot in Boot Loader mode, simply power the unit up with the ROM boot jumper linked. The 'Net' Indicator will flash when in Boot Loader mode. If the jumper is removed and the unit is powered up it will return to the current installed firmware.

Firmware Upload

As new revisions of the firmware are released (due to upgrades) it is possible to upgrade your EtherN.8 **RDM** and EtherN.2 **RDM** to the latest version. Please refer to the firmware upgrade instructions (published with the firmware) for more details.

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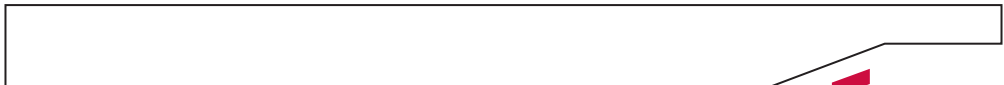
Error Messages

On power up, the EtherN.8 **RDM** and EtherN.2 **RDM** run a number of self checks to ensure that it is functioning correctly. If an internal fault occurs the LED's are used to display an error code.

LED State	Description
Stat & All Alternatively Flashing	SRAM Fault*
Net & All Alternatively Flashing	E2Prom Fault*
Port A & All Alternatively Flashing	System ROM Fault*
Net Flashing	Module is in Boot Loader Mode
All three times	Sub-Net switch is locked out
Port LED Flashing	Output is merging data

* = Contact Cooper Controls for advice

Mounting

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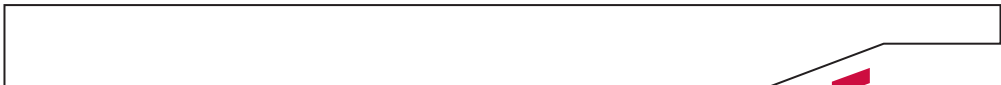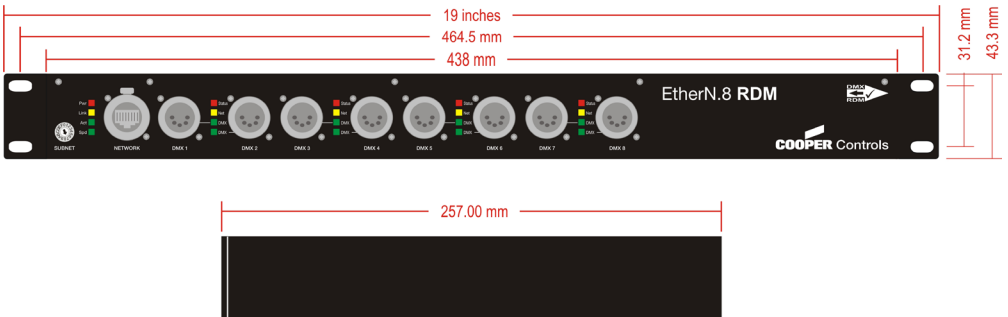
Troubleshooting

Q) My fixtures are flashing randomly when connected to a EtherN.8 **RDM** or EtherN.2 **RDM**?
A) The common cause of this is that they are responding to RDM data being transmitted by the EtherN.8 **RDM** or EtherN.2 **RDM**. If they are DMX512 compliant they should ignore this data. To overcome this refer to the 'Jumper Settings' section and link the jumper to disable RDM. Alternatively this can be done via the web-server.

Q) My fixture seems to lose DMX when set to high start addresses?
A) Some older equipment can not handle full rate DMX refresh rates. This results in it working on lower start addresses but seems 'steppy' on higher start addresses. To overcome this use the web-server advanced DMX page and slow the refresh rate down. Refer to the 'web-server' section

Q) EtherN.8 **RDM** or EtherN.2 **RDM** boots up but the 'Net' LED is always flashing?
A) This means that the unit has gone into boot loader mode. Uploading the latest firmware will allow the unit to function normally

Q) I changed my IP address and have lost all communication with the EtherN.8 **RDM** or EtherN.2 **RDM**?
A) When you change the IP address of a device out of the range the PC is on you must then change the PC IP address to match. If you still can not discover the device you will need to reset all custom settings to put it back into the default IP range (2.x.x.x). To do this refer to the 'Jumper Settings' section

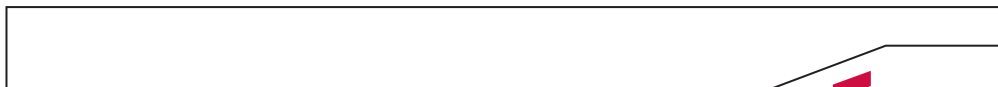Q) All the Module Indicators flash three times when I change the Sub-Net switch?
A) If the Sub-Net values have been set remotely the front panel switch is ignored. The LED's flash to show that the switch is being ignored.

Q) I have connected three or more EtherN.8 **RDM**'s in series and the data seems to be delayed from the first to the last?
A) If several EtherN.8 **RDM**'s are connected in series then the data from the control source has to be re-transmitted to each one. The more in series the longer the delay. To overcome the delay use an Ethernet Switch and connect all EtherN.8 **RDM**'s and control sources to it.

Q) An output port LED is flashing continuously and the DMX LED is flashing?
A) When the port LED is flashing it means that the output has two universes it is merging.

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