

# Things You Should Know

...about DMX, Art-Net, Streaming ACN, and RDM!

## DID YOU KNOW?!

**XLR** stands for “Cannon **X** Connector, with **L**atch and **R**ubber Guard”

**Art-Net** and **Streaming ACN**...  
*is just DMX over Ethernet!*

DMX logic **still** applies, Universes are **still** 512 bytes each.

Each “byte” of the **512 available control slots in a universe** can have a value from **0** to **255** or (256 potential values)

## A Very Brief Background of DMX

**USITT** developed the DMX512 protocol back in 1986, made significant edits in 1990.

**ESTA** worked DMX512 into an ANSI standard in 2004.

**Art-Net 1** was created by Artistic License Holdings, Ltd in 1998 (40 Univ), **Art-Net 2** in 2004 (256 Univ), and **Art-Net 3** in 2011 (32,768 Univ).

**ACN** (ANSI E1.17-2010) or *Architecture for Control Networks*, is a protocol for unidirectional lighting communication. This standard is managed by **ESTA**. The DMX version, **Streaming ACN** (ANSI 1.31), allows DMX to be sent over UDP/IP networks by wrapping a DMX frame in an ACN header. Streaming ACN supports **63999** potential universes!

When addressing Art-Net devices with an IP address, always use a **2.X.Y.Z** or a **10.X.Y.Z** IP address. This is how Art-Net is most happy! For example, **2.0.0.1** is a great place to start with your lighting console!

Art-Net uses **2.X.Y.Z** as its primary IP address scheme, and **10.X.Y.Z** addresses as a secondary.

In Art-Net, there are 32,768 possible places to send a DMX frame, called a Port-Address - a 15-digit number made up of the **Net** + **Sub-Net** + **Universe**.

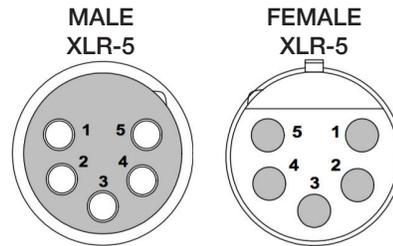
There are 128 total **Nets**:  
**128 Nets** \* **256 Sub-Nets** = **32,768** potential places

**Net**: 256 consecutive **Universes** (or 16 **Sub-Nets**)  
**Sub-Net**: 16 consecutive **Universes** (8,192 channels)  
**Universe**: 512 consecutive channels

**RDM**, or *Remote Device Management*, sits on top of DMX data, and allows for 2-way communication of devices and controllers. RDM allows controllers to send **GET** and **SET** messages to devices it sees, like:

Get|Set **DEVICE\_LABEL** (gets/sets the device's name)  
Get|Set **DMX\_START\_ADDRESS** (gets/sets DMX address)  
Get|Set **DMX\_PERSONALITY** (gets/sets personality)  
Get **LAMP\_HOURS** (asks for lamp hours)

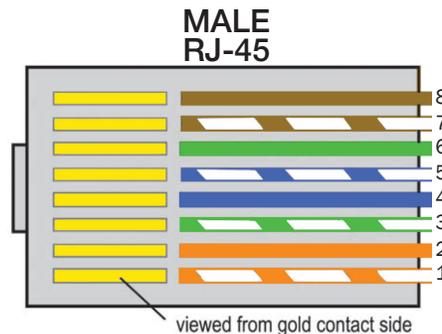
**NOTE:** All devices have unique RDM IDs



XLR5 Pinout for DMX512-A

PIN	WIRE	SIGNAL
1	Shield Drain	Ground, 0V
2	Inner Conductor (Black)	Data 1 -
3	Inner Conductor (White)	Data 1 +
4	Inner Conductor (Green)	Data 2 - (Spare)
5	Inner Conductor (Red)	Data 2 + (Spare)

*Colors of internal conductors may vary by manufacturer*

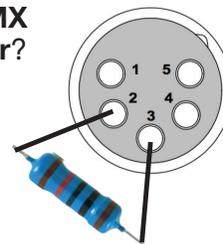


RJ45 Pinout for DMX512-A

PIN	WIRE	SIGNAL
8	Brown	0V Data 2 Common*
7	Brown/White	0V Data 1 Common*
4	Blue	Not Used, PoE, <i>typ.</i>
5	Blue/White	Not Used, PoE, <i>typ.</i>
6	Green	DMX 2 Data -
3	Green/White	DMX 2 Data +
2	Orange	DMX 1 Data -
1	Orange/White	DMX 1 Data +

Pin numbering and color in accordance with ANSI/TIA/EIA-568 scheme T568B - Double check with your manufacturer.  
\*Pins 7 & 8 are often connected together; especially when adapting to the 5 pin XLR

## Need a DMX Terminator?



Solder a 0.5W or larger **120Ω resistor** across **pins 2 & 3** in a Male XLR5!

## 64 DMX Universe Quick Reference

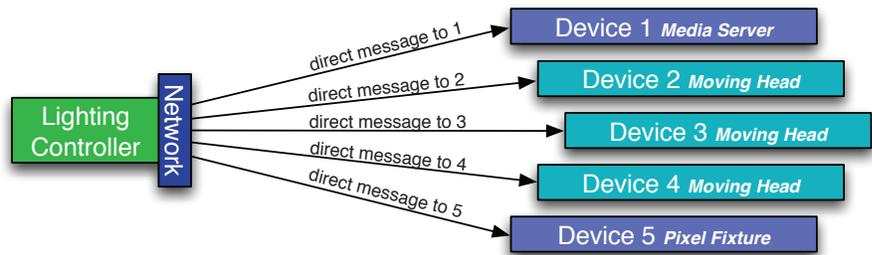
UNIVERSE	START #	END #
1	1	512
2	513	1024
3	1025	1536
4	1537	2048
5	2049	2560
6	2561	3072
7	3073	3584
8	3585	4096
9	4097	4608
10	4609	5120
11	5121	5632
12	5633	6144
13	6145	6656
14	6657	7168
15	7169	7680
16	7681	8192
17	8193	8704
19	9217	9278
21	10241	10752
23	11265	11776
25	12289	12800
27	13313	13824
29	14337	14848
31	15361	15872
33	16385	16896
35	17409	17920
37	18433	18944
39	19457	19968
41	20481	20992
43	21505	22016
45	22529	23040
47	23553	24064
49	24577	25088
51	25601	26112
53	26625	27136
55	27649	28160
57	28673	29184
59	29697	30208
61	30721	31232
63	31745	32256

# Unicast, Broadcast, and Multicast

## The 3 Ways of Sending DMX Over Ethernet

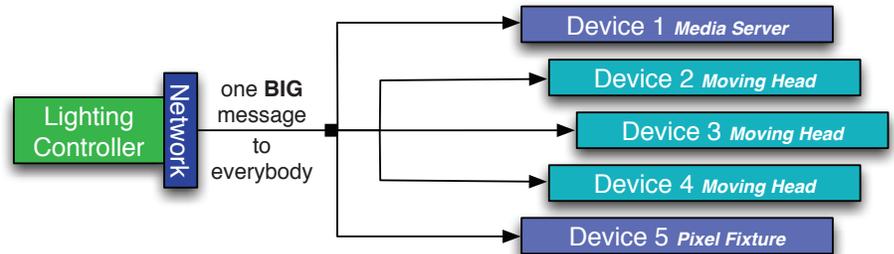
### UNICAST

Unicast messages are sent over the network from the controller to exactly one device, individually. Multiple devices require multiple messages.



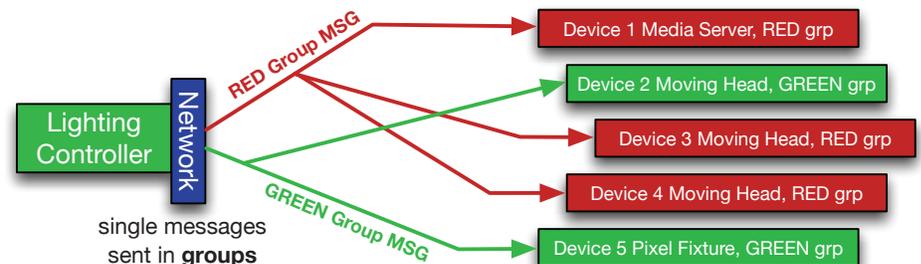
### BROADCAST

Broadcast messages are sent over the network from the controller to all devices on the network. Every device processes the message, even if it's not for that device.



### MULTICAST

Multicast messages are like Broadcast messages in a way, except a single message is sent over the network from the controller to logical groups of devices on the network. Devices can be addressed to listen to these group messages.



## DMX DO:

### DO's & DON'Ts

to save *your* load-in day!

Always have **DMX terminators** on hand, and use them.  
Any time you have multiple DMX lines, **use a repeater**.  
Always **optically isolate outdoor fixtures** from console.  
Always use approved **digital signal cable** for DMX!  
Always use 5 Pin XLRs for DMX portable cable

## DON'T:

Don't use a **DMX "two-fer" or Y-cable**. It can distort the signal.  
Don't use **mic cable** for DMX. Wrong impedance & conductor.  
Don't **solder DMX cables** together.  
Don't go **over 1500'** when using DMX and proper cabling (suggested)  
Don't talk DMX to **dangerous devices** like pyro, cryo, rigging.  
Devices using 3 pin XLRs may work but are NOT COMPLIANT  
Don't add more than 32 fixtures on a single DMX run out repeater!

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