

# DMX/RDM SYSTEM OVERVIEW



## TECHNICAL INFO

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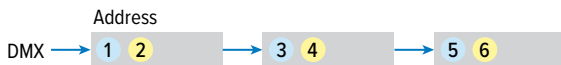
### DMX UNIVERSE AND FIXTURE RUNS

A DMX Universe is 512 channels of output from the DMX controller. Each channel has an ID of 1-512. Each ID can communicate a value of 0%-100% as an 8-bit number (a range of 0-255 which correlates to 0%-100%). DMX controlled lighting fixtures and other DMX devices have their ID (or Start address) set so they know which channel of data to monitor for adjusting its intensity or color. Simple white fixtures might use just one address for intensity while a RGBW device requires four addresses so each color can be given a specific intensity. If a project has the need to control more than 512 channels, two or more universes will be required.

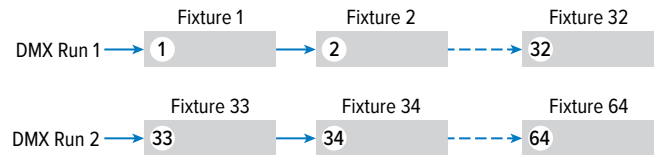
#### RGBW FIXTURE RUN EXAMBLE



#### TUNABLE WHITE FIXTURE RUN EXAMBLE



DMX is a great protocol to control light fixtures, but there are some limitations. As the DMX signal moves through the fixtures, it loses signal strength on each DMX driver. At some point, it will become too weak to be reliable. For this reason, there is a limit of 32 fixture controllers per DMX cable run. If you have too many fixture controllers for a single daisy-chain, but haven't filled up your universe yet, you can install a DMX Splitter or DMX repeater. This is the only way to split your DMX feed into more lines, and each output of the splitter can send data to 32 devices, allowing you to expand your capabilities.



Note: Some fixtures may have multiple DMX controllers for separate up and down lighting control, long runs, or higher power.

### DMX/RDM (REMOTE DEVICE MANAGEMENT)

ANSI E1.20 Remote Device Management offers an improvement to the DMX protocol by adding bidirectional communication between the lighting fixture controllers and connected RDM compatible devices.

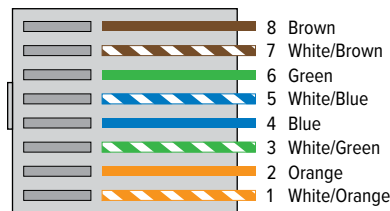
This provides many advantages and is especially useful for address settings and other functions like RGBW channel testing, identity driver testing, and firmware upgrades.



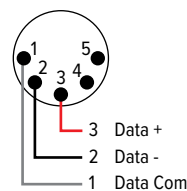
### DMX WIRING

- The DMX standard specifies 120 Ω or 100 Ω 1- or 2- twisted pair shielded cable suitable for use with EIA-485 (120 Ω) and EIA-422 (100 Ω) electronics, or Cat5e (or better) cable.
- Daisy chain DMX devices, total length does not exceed 300m/1000 ft.
- DMX line terminated with resistor 120 Ω.

#### RJ45 WIRING



#### 5-PIN XLR WIRING



#### CONNECTION SCHEDULE for DMX512 Equipment Using IEC 60603-7 8-Position Modular Connectors

PIN (WIRE) #	WIRE COLOR	DMX512 FUNCTION
1	White/Orange	Data 1+
2	Orange	Data 1-
3	White/Green	Data 2+ <i>optional</i>
6	Green	Data 2- <i>optional</i>
4	Blue	Not assigned
5	White/Blue	Not assigned
7	White/Brown	Data Link Common for Data 1 (0 v)
8	Brown	Data Link Common for Data 2 (0 v)
	Drain	

#### Notes:

- Pin numbering and color in accordance with ANSI/TIA/EIA-568 scheme T568B.
- Pin 8 should be wired as a signal common even if pins 3 and 6 are NOT wired so both conductors 7 and 8 are at equal potential.

### 7.3 IEC 60603-7 8-POSITION MODULAR CONNECTORS

The use of IEC 60603-7 8-position modular connectors (commonly referred to as RJ45 type connectors - plugs/jacks) and associated punchdown terminal blocks shall be limited to connections that are part of a fixed installation and not normally accessible except to qualified, authorized users, nor intended for regular connection and disconnection. External (user accessible) IEC 60603-7 8-position modular connectors are permitted only on patch and data distribution products and only when permanently installed in controlled access areas. **Note:** Examples of not normally accessible or controlled access areas include a locked electrical room or control booth, provided those who need access have a key (or lock combination) available.

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## TECHNICAL INFO

### TROUBLESHOOTING

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#### DMX WIRE TERMINATION

All DMX wire runs, require the end of the wire at the last fixture to be terminated, normally with a 120  $\Omega$  resistor across the DMX+ and DMX- wires. A maximum of 32 devices can be on a daisy chain without repeating/boosting hardware. A non-terminated DMX bus can exhibit jittering control, non-control, flickering or delayed response to control.

#### MAXIMUM FIXTURES PER DMX UNIVERSE

A maximum of 32 DMX fixtures per DMX daisy-chain or if using DMX splitters, a Maximum of 512 channels of uniquely addressed fixtures. For every 32 DMX fixtures, make sure to use a DMX Splitter (RDM) to maintain integrity of DMX data.

#### REVERSING DMX+ AND DMX- WIRES

The wires might get reversed during installation at any segment of the wiring run. A reversed wire connection may seem to work but not all colors and control will be definite, sporadic control or inverted control may occur. Take a logical approach to check that each wiring connection point has the correct polarity.

#### IS THE CABLING OK?

DMX may continue to work partially even under extreme conditions like having one half of the data pair broken. If you have a fixture which is misbehaving, connect it directly to the DMX source with a short jumper cable. If it now works, there is an issue with your cabling to investigate.

#### IS THE DEVICE OK?

Damage to device DMX receivers can occur in many ways; lightning storms are a common problem. If the device doesn't respond to DMX when connected directly to a known good DMX source via a known good cable, the device itself may need service to repair a damaged DMX input