



Introduction To DMX512

OVERVIEW

DMX512 is a digital communication protocol used to connect theatrical and architectural controllers to compatible end devices including dimmers, LED fixtures, relays, automated lighting fixtures and special effects equipment.

WHEN TO USE DMX512

DMX512 should be used when a lighting control system requires:

- Centralized control
- Smooth fades
- Real time performance in response to real time dynamic control.
- Interoperability of dimmers, RGB LED lighting, tunable white LED lighting, automated lighting fixtures, relay cabinets and special effects equipment.

DMX512 provides an “open” (non-proprietary) means of communication that allows for lighting devices from a variety of manufacturers to be connected together in a single system.

WHAT IS DMX512

DMX512 is a streaming application. Each data link (a “universe”) constantly sends 512 bytes of control data at rates up to 44 times/second. This results in the smoothest intensity and color fades possible. A large scale DMX512 system, as might be used with media servers, can incorporate up to up to 64,000 universes distributed over specialized Ethernet protocol converters (“nodes” or “gateways”).

In a DMX512 system, timing for fades and device actions are calculated in the controller, not the end device. DMX512 systems ensure the proper synchronization of end devices in response to control.

DMX512 STANDARDS

To ensure that one manufacturer’s device can properly interface with another manufacturer’s device, both devices must be compliant with ANSI standard E1.11 – 2008, USITTDMX512-A.

A growing number of DMX512 devices are now compliant with a related ANSI standard, E1.20 Remote Device Management over USITT DMX512 Networks. This standard is commonly known as “RDM” and it allows, among other things, for end devices to be discovered by an RDM capable controller and then given a unique DMX512 address. Other uses for RDM include selecting an operating mode (aka “personality”) in an end device and requesting status (power consumption, temperature, etc) from an end device. RDM is not considered a real-time protocol.

Related ANSI standards include E1.3 – 0 to 10v Analog control, E1.17 Architecture for Control Networks (“ACN”), E1.27.1 Standard for Portable Control Cables for Use with E1.11-DMX512-A and E1.27.2 Standard For Permanently Installed Control Cables For DMX512-A. All of these documents are available free of charge at www.plasa.org/standards.

WIRING FOR DMX512

In order to function properly, a DMX512 system uses a multi-drop 'bus' wiring topology ('daisy chain') that must adhere to the ANSI standards E1.27.1 or E1.27.2. For clarity, DMX512 wiring cannot be wired as a "T-Tap", a "Star" or a "Y". The last device in the daisy chain must be terminated with DMX Terminator (typically a 120 ohm resistor between the data pair) to maintain the integrity of the signal. As a rule of thumb, DMX links should not exceed 1000 feet in length and must not have more than 32 devices per link. When DMX512 systems require "Star" wiring, devices commonly known as "Repeaters" or "Opto-splitters" must be used.

CONNECTORS FOR DMX512

For temporary installations, it is proper to use XLR5 connectors. The use of XLR3 or RJ45 connectors on portable equipment does not meet the standards. The cable shall be suitable for use with EIA-485 systems.

For permanent installations the cables must be compliant with E1.27.1 or cables specified as EIA/TIA568 Category 5 or higher (i.e. Cat5 Ethernet cable). Permanent installations must use XLR5 on all connection except in patch bays where RJ45 are permissible. Internal connections in areas not readily accessible by users must be either soldered wires, wire in setscrews or other compression-type termination or insulation displacement. Wire nuts must not be used.

ADDITIONAL CONSIDERATIONS

Specialized devices are available for DMX512 systems to interface and integrate with 0 to 10v controlled devices, 0 to 10v inputs, contact closure inputs, contact closure outputs, dimmable constant-voltage LED fixtures, and dimmable constant-current LED fixtures.

Contract documents for all DMX512 control systems should include a complete system single line drawing to be confirmed in the installing contractor's submittal.

APPLICATIONS SUPPORT

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