How to transmit DMX512 over RJ45

ESTA Control Protocols Working Group found that Category 5 or higher UTP cable, or the slightly more expensive STP cable, was as suitable for the transmission of DMX–512 data as the recommended EIA–485 data cables.

Incorporating cables for DMX data into the Ethernet cable plant of installations can provide for the use of existing DMX protocols while allowing for the future use of Ethernet protocols.

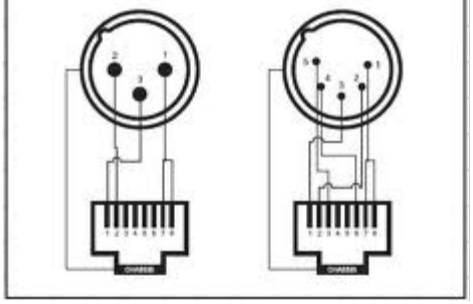
Keep in mind, this refers to DMX512A data being transported over Category 5 or 6 wiring with RJ45 termination. Though the wire is physically the same as Ethernet, the electrical properties are very different and can damage Ethernet equipment such as network switches and Ethernet adapters in computers

The datasheet below details the wiring scheme for cables linking 5-Pin XLR DMX connectors to standard RJ45 Ethernet connectors:

Wiring Color Code

Wire Color	Function	Equivalent XLR Pin Number
white / orange	Pair 1 true (Data 1 +)	3
orange	Pair 1 complement (Data 1 -)	2
white / green	Pair 2 true (Data 2 +)	5
green	Pair 2 complement (Data 2 -)	4
blue	Unassigned	
white / blue	Unassigned	
white / brown	Data link common (common reference) for Pair 1 (0 V)	1
brown	Data link common (common reference) for Pair 2 (0 V)	1

Connector	Pin								
RJ45	1	2	3	4	5	6	7	8	Chassis
5-Pin XLR	3	2	5	N/C	N/C	4	1	1	Chassis
3-Pin XLR	3	2	N/C	N/C	N/C	N/C	1	1	Chassis



ESTA RJ45

DMX 5 Pin #	Signal	Wire Color
1	DMX_DATA+	Orange / White
2	DMX_DATA–	Orange
3	GND	Brown / White
3	GND	Brown

Color Kinetics Only

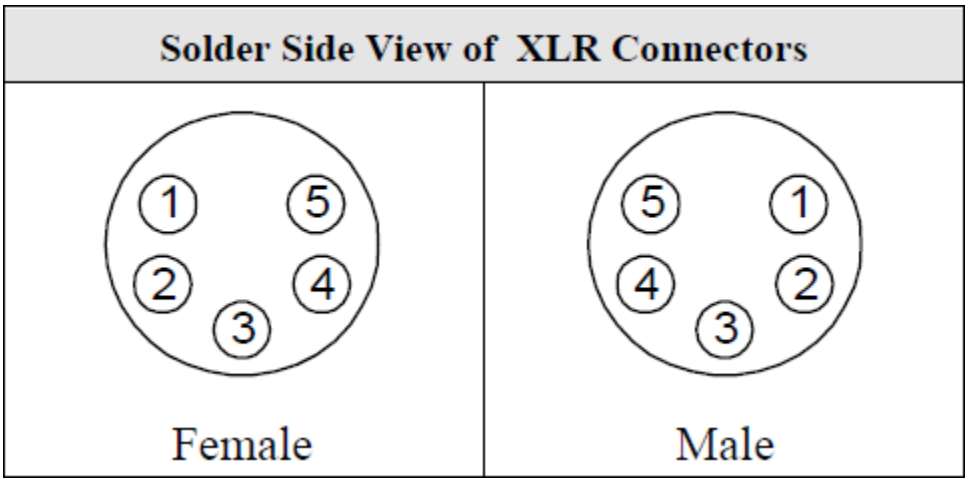
RJ45 Pin #		
1	DMX_DATA–	Orange
2	DMX_DATA+	Orange / White
3	GND	Green / White
6	GND	Green

RJ45 Pin	Wire Color	Pair#	Wire Purpose	XLR Pin
1	White / Orange	2	DMX Data 1 + (Primary Data Link)	3
2	Orange	2	DMX Data 1 - (Primary Data Link)	2
3	White / Green	3	DMX Data 2 + (Optional Data Link)	5
6	Green	3	DMX Data 2 - (Optional Data Link)	4
4	Blue	1	Not Assigned	n/c
5	White / Blue	1	Not Assigned	n/c
7	White / Brown	4	Signal Common for Data 1 0V	1
8	Brown	4	Signal Common for Data 2 0V	1
-	Shield	-	Shield (Only if STP cable is used)	1

Notes:

- This specification conforms to the ANSI E1.11 - 2004 standard Entertainment Technology USITT DMX512-A Asynchronous Serial Digital Data Transmission Standard for Controlling Lighting Equipment and Accessories.
- The EIA/TIA 568 standard defines two alternatives for the RJ45 connector wire colours referred to as T–568A and T–568B. Use of T–568A (shaded green in the table above) is recommended for all new installations.
- Connect the cable shield only to pin 1 of each connector. Do NOT connect the cable shield to the metal bodies of the XLR connectors because doing so can create an electric shock hazard if there's a difference in earth potential between the dimmer packs and the control desk.
- Always check for compatibility of all the equipment that you intend connecting together with DMX cables because the non-standard use of pins 4 and 5 can cause malfunction and/or damage to incompatible equipment.
- The Cat. 5 cables carrying DMX data from the console to the patch panel and from the patch panel to the dimmers must be patched directly together by a patch cable at the patch panel.

Connector Pins Layouts:



Suggested Wiring Practices

- Do not run data signals next to or in the same conduit as high power sources. If necessary to be near these sources cross over them at 90 degrees or keep as much parallel distance between them as possible.
- Use IDCs for all Category 5 cable applications.
- Run in grounded metal conduit when there may be concern from nearby high power devices and/or situations where the structure of the cable may be compromised.
- Plenum cable in plenum applications and also where physical damage may be a concern and conduit is not practical.
- Be aware that the Color Kinetics uses a different (non-ESTA standard) color code.

Important Note: Please check your equipment manufacturer's pinout specifications as individual equipment may not use the ESTA standard.

WARNING

Accidental connection of DMX circuits to non DMX equipment, such as Ethernet hubs at patch panels, may result in damage to equipment. Ensure patch panels and all connectors on DMX circuits are clearly labelled “DMX Only” and that access to the patch panels and connected DMX equipment is restricted to qualified and trained personnel only.