
Converging Systems Inc.



e-Node™ DMX (Version MKIII)

e-Node Interfacing with DMX Guide

Version 1.04

Note: For versions of the e-Node/dmx prior to the MKIII version, please consult the “e-Node Quick Start Guide (MKII)” or the “e-Node Interfacing with DMX (MKII).” The MKIII version can be identified by the SN label or the presence of the RJ-45 Port 2 on the e-Node/dmx.

Revision History

Date	Version	Description	Author
10/01/2012	1.00	Initial Version	AD
1/25/2013	1.01	Corrected use of comma vs period.	AD
2/11/2013	1.02	Added connection diagram	CS
7/22/2015	1.03	MK III updates	AD
8/04/2015	1.04	MK III updates	AD

ILC-100, ILC-400, e-Node, and e-Node/dmx are trademarks of Converging Systems Inc. All other respective trademarks remain a respectable licensed product of its original creator.

1	Overview	4
2	DMX Addressing	4
2.1	Color Presets	6
2.2	DMX Color Commands	6
3	Configuring e-Node	10

1 Overview

The e-Node™/dmx has built in capabilities to interpret incoming **CS-Bus Messaging** (either lighting or motor commands) that **are currently supported** by most of the leading automation and lighting control system vendors (Crestron, Control 4, Elan, Key Digital, Leviton/Bitwise, Lutron, RTI, Savant, Vantage, etc.) and to convert those commands into industry-compatible DMX data streams that can directly drive industry standard DMX fixtures without additional hardware. The e-Node/dmx’s internal color computer generates a color-processed DMX data stream that is transmitted from the device’s Port 2 (RJ-45/DMX output port) to up to 32 DMX fixtures (the limit of the DMX systems without splitters) using DMX cabling and applicable RJ-45, XLR or other installer provided connectors. The e-Node/dmx’s sophisticated internal color computer enables popular automation and lighting control panels that either have no DMX fixture support or only limited support to connect to DMX fixtures without any additional hardware or expensive customized programming! Control of these DMX fixtures is achieved once CS-Bus Messages are received by the e-Node/dmx’s Ethernet “LAN” interface. Single-color DMX fixtures, as well as three-color DMX fixtures, and additional channel options (amber, white, motion, etc.) can be controlled using existing CS-Bus Messaging for color lighting, including controlling the color in the Hue/Saturation/Value (HSV) color space. Color management within the HSV color space insures that hue accurate dimming from any color to black is possible without the standard type of color shifts that are experienced with attempting to dim using RGB sliders. And as a bonus, nearly all of the standard **CS-Bus Messaging** operations, such as Fades, Dissolves, Sequence rates, multi-color color presets, and Color Effect Sequence, etc. are **now** all accessible with third-party DMX fixtures. Gone are the days that DMX fixtures need to be controlled by multi-thousand dollar DMX lighting boards—the e-Node/dmx is the right interface for most applications.

In addition, as a separate but not concurrent mode of operation, the e-Node/dmx can be reconfigured at startup *to operate as if it were a standard e-Node device* to communicate with standard CS-Bus devices such as the ILC-100 and ILC-400 intelligent lighting controllers as well as the IMC-x00 family of motor controllers. (This extra feature is provided to enable dealers and installer to sample the rich feature set available with Converging Systems’ line of LED controllers such as tunable white and Circadian Tuning as well as numerous additional programmed color effects. In addition, the e-Node/dmx reconfigured this way will also enable dealers and installers to experience .001% dimming which is not possible with industry-standard DMX fixtures.)

Regardless of the mode of operation—outbound processing targeted to DMX fixtures, or direct CS-Bus Messaging processing targeted to Converging Systems’ non-DMX LED control technology (using the Port 0 and Port 1 CS-Bus connections on the e-Node), all of the available third-party drivers currently compatible with Converging Systems’ hardware as well as the special Lutron connectivity features can all be utilized. (For Lutron connectivity, see the Converging Systems’ Interfacing Guide “e-Node Interfacing with Lutron”).

2 DMX Addressing

The DMX data packet is mapped to **CS-Bus Messaging** format by assigning a unique **Zone/Group/Node (“ZGN”)** number to one to ten successive DMX channels. The default settings are mapped as shown in the following table; however, these can be changed to suite different requirements.

Table 1

DMX Fixture	Default UID	Default DMX Channel Allocation	Default CS- Zone. Group. Node
1	101	10-19	2.1.1
2	102	20-29	2.2.1
3	103	30-39	2.3.1
4	104	40-49	2.4.1
5	105	50-59	2.5.1
6	106	60-69	2.6.1
7	107	70-79	2.7.1
8	108	80-89	2.8.1
9	109	90-99	3.1.1

DMX Fixture	Default UID	Default DMX Channel Allocation	Default CS- Zone. Group. Node
10	110	100-109	3.2.1
11	111	110-119	3.3.1
12	112	120-129	3.4.1
13	113	130-139	3.5.1
14	114	140-149	3.6.1
15	115	150-159	3.7.1
16	116	160-169	3.8.1
17	117	170-179	4.1.1
18	118	180-189	4.2.1
19	119	190-199	4.3.1
20	120	200-209	4.4.1
21	121	210-219	4.5.1
22	122	220-229	4.6.1
23	124	230-239	4.7.1
24	124	240-249	4.8.1
25	125	250-259	5.1.1
26	126	260-269	5.2.1
27	127	270-279	5.3.1
28	128	280-289	5.4.1
29	129	290-299	5.5.1
30	130	300-309	5.6.1
31	131	310-319	5.7.1
32	132	320-329	5.8.1

As an example sending a CS-Bus Message **#3.4.1.LED=OFF;<cr>** will turn off a fixture that is set to DMX channels 120. DMX fixtures do not have to be set to take sequential addresses. It is possible to have just five fixtures set as follows:

Table 2

Fixture	DMX Channel Allocation	CS- Zone. Group. Node
1	10-12	2.1.1
2	20-25	2.1.2
3	30-33	2.1.3
4	70-72	3.1.1
5	100-102	3.1.2

The **CS-Bus Message** addressing format (See “CS Messaging Manual” for more details) uses the three parts of an address (**ZGN**) to identify a device based on its Zone (Floor), a Group (Room), and an Node (fixture). This allows devices or fixtures to be uniquely identified. There is also the capability to use an “ALL” address of 0. For example a **CS-Bus Message** of

#2.4.0.LED=RECALL,2;<cr>

will set all fixtures in Zone 2, Group 4 to the color of preset 2. Similarly an address of

#3.0.0

will control all devices with a Zone of 3. This capability has been included in to the e-Node/dmx such that an address of

#2.0.1

will control the first eight DMX Fixtures defined in Table 1.

2.1 Color Presets

Every fixture has its own set of Presets associated with it. These 24 Presets define a color that can be recalled and set using **CS-Bus** commands. Each individual color has a range from 0 (off) to 240 (fully on) and these can be stored inside the e-Node/dmx. The initial factory default for these colors is as follows:

Table 3

Preset	R.G.B Values	Color
1	240.0.0	Red
2	240.150.0	Yellow
3	0.240.0	Green
4	0.240.160	Cyan
5	0.0.240	Blue
6	240.0.140	Magenta
7	127.80.0	Orange
8	127.127.127	Half white
9	240.240.240	White

2.2 DMX Color Commands

Most of the commands that apply to the Converging Systems' ILC-100 and ILC-400 LED controller have been replicated in the e-Node/dmx with some exceptions. Each fixture can have separated operations. For example a fade down on Fixture 1 can be processed at the same time as a hue up on Fixture 2. Please consult your third-party software vendor's integration notes or driver/profile notes for more information here. Converging Systems also maintains customized software platform integration notes for all of its software partners. Since drivers/profiles are always being updated, it is wise to only rely on Converging Systems' Integration Notes as a first step in developing your own integration programming

Integration Notes can be accessed from the following Converging Systems webpage:

http://convergingsystems.com/inres_atoz.htm

Note: Effective with the release of MIII versions of the e-Node/dmx, integrated dissolve features are now available and are highlighted in blue below (that is a command to perform some function which has a built-in suffix-type command that specifies a dissolve rate). Existing drivers may or may not support these new integrated dissolve features. However, separate dissolve commands requiring a separate command stream (i.e. LED.DISSOLVE.1=1;<cr>) to change a respective dissolve rate are supported traditionally by most software platforms.

Table 4

Device	Item	Data/Command	Comment	e-Node DMX MII	e-Node DMX
.LED		=ON =ON:XX	LED ON Turns on LED to color when OFF was issued Optional ramping parameter—time (XX) can be set from 0 sec (instantaneous) to 64800 sec (18 hrs.)	✓ ✓	✓ NA
.LED		=OFF =OFF:XX	LED OFF Turns LEDs OFF Optional ramping parameter—time (XX) can be set from 0 sec (instantaneous) to 64800 sec (18 hrs.)	✓ ✓	✓ NA
.LED		=EFFECT,#	EXECUTES AN EFFECTS PROCESSOR Executes a previously stored Effect # 1 Note: Sequences from Presets 1 through sequential Presets until the End Point Preset with programmed RGB values of 240.240.240 or programmed RGBW values of 240.240.240.240 is encountered at which point the cycle jumps back to Preset 1 (without displaying the End Point Preset) and repeats in perpetuity until a “Stop” or subsequent command is encountered..	✓	NA
.LED		=STORE,#	STORE PRESET LEVEL Stores a lighting preset at # (1-24) Note: any combination of Hue/Saturation/Brightness describing a “color” can be saved in this manner.	✓	✓
.LED		=RECALL,# =RECALL,#:XX	RECALL PRESET LEVEL Recalls a previously stored Preset # (1-24) Optional ramping parameter—time (XX) can be set from 0 sec (instantaneous) to 64800 sec (18 hrs.)	✓ ✓	✓ NA
.LED	.DISSOLVE.1	=XX	SET DISSOLVE RATE#1 Specifies the rate (in seconds) that it takes to transition from one state to another using a direct value command such SET,L; SAT, S; HUE,H; RED,R, GREEN,G, BLUE,B; RGB, HSV, COLOR;VALUE. This is the default ramp time if not specified in the command.	✓	NA
.LED	.DISSOLVE.2	=XX	SET DISSOLVE RATE#2 Specifies the rate (in seconds) that it takes to transition between ON and OFF and between PRESETS (RECALL,X). This is the default ramp time if not specified in the command.	✓	NA
.LED	.DISSOLVE.3	=XX	SET DISSOLVE RATE#3 Specifies the rate (in seconds) that it takes to transition from one state another within the following effects: -Effect(1)	✓	NA
.LED	.SEQRATE	=XX	SET SEQUENCE RATE Used with effects to switch from one preset to another. Specifies the time (after any dissolve) that the preset color is maintained before transitioning to the next in sequence.	✓	NA
.LED		=HUE_UP	HUE UP Scrolls through colors red->green->blue Note: Ramping continues until interrupted by receiving a “STOP” command	✓	✓
.LED		=HUE_DOWN	HUE DOWN Scrolls through colors red->blue->green Note: Ramping continues until interrupted by receiving a “STOP” command	✓	✓
.LED		=HUE,H =HUE,H:XX	SET HUE VALUE Sets hue target. and dissolves to a hue of value H (0-240) Red = 0. Green = 80. Blue = 160 Optional ramping parameter—time (XX) can be set	✓ ✓	✓ NA

Device	Item	Data/Command	Comment	e-Node DMX MII	e-Node DMX
			from 0 sec (instantaneous) to 64800 sec (18 hrs.)		
.LED		=SAT_UP	SATURATION UP Fades up saturation Note: Ramping continues until interrupted by (i) receiving a “STOP” command or (ii) until an upper or lower limit is reached	✓	✓
.LED		=SAT_DOWN	SATURATION DOWN Fades down saturation Note: Ramping continues until interrupted by (i) receiving a “STOP” command or (ii) until an upper or lower limit is reached	✓	✓
.LED		=SAT,S	SET SATURATION LEVEL Sets saturation target. and dissolves to a saturation of value S (0-240)	✓	✓
		=SAT,S:XX	Optional ramping parameter—time (XX) can be set from 0 sec (instantaneous) to 64800 sec (18 hrs.)	✓	NA
.LED		=FADE_UP	FADE UP Fades up brightness (lightness) Note: Ramping continues until interrupted by (i) receiving a “STOP” command ¹ or (ii) until an upper or lower limit is reached	✓	✓
.LED		=FADE_DOWN	FADE DOWN Fades down brightness (lightness) Note: Ramping continues until interrupted by (i) receiving a “STOP” command ¹ or (ii) until an upper or lower limit is reached	✓	✓
.LED		=SET,L	SET BRIGHTNESS LEVEL Fades to a brightness (lightness) L (0-240)	✓	✓
		=SET,L:XX	Optional ramping parameter—time (XX) can be set from 0 sec (instantaneous) to 64800 sec (18 hrs.)	✓	NA
.LED		=STOP	ADJUSTMENT STOP Stops the selected auto ramping (fade. saturation. or hue as applicable)	✓	✓
.LED	.COLOR	=H.S.V	“HSL” COLOR SETTING (unsupported command within e-Node/DMX - see .LED=HSV,H.S.V) Specifies the color in HSL (range is 0 to 240) and dissolves to that color.		
.LED		=HSV,H.S.V	“HSV” COLOR SETTING Specifies the color in HSV (range is 0 to 240) and dissolves to that color	✓ ¹	NA
		=COLOR,H.S.V:XX	Optional ramping parameter—time (XX) can be set from 0 sec (instantaneous) to 64800 sec (18 hrs.)	✓ ¹	NA
.LED	.PRESETH.X	=H.S.V	SET PRESET (HSV Color Space) (unsupported command within e-Node/DMX) Specifies the color in HLS mode (range is 0-240) for preset #. (i.e. .PRESETH.X=? returns specifics of color in HLW mode for preset “X” while .PRESETH with no modifier returns the color in HLS of whatever the current color setting is). Note: Setting Presets do not affect the current LED state.		
.LED		=RED,R	SET RED LEVEL Sets red channel target and fades to the value R (0-240). Note: G/B/W values are not changed.	✓	✓
		=RED,R:XX	Optional ramping parameter—time (XX) can be set from 0 sec (instantaneous) to 64800 sec (18 hrs.)	✓	NA
.LED		=GREEN,G	SET GREEN LEVEL Sets green channel target and fades to the value G (0-240). Note: R/B/W values are not changed.	✓	✓
		=GREEN,G:XX	Optional ramping parameter—time (XX) can be set from 0 sec (instantaneous) to 64800 sec (18 hrs.)	✓	NA
.LED		=BLUE,B	SET BLUE LEVEL Sets blue channel target and fades to the value B (0-	✓	✓

Device	Item	Data/Command	Comment	e-Node DMX MII	e- Node DMX
		=BLUE,B:XX	240). Note: R/G/W values are not changed. Optional ramping parameter—time (XX) can be set from 0 sec (instantaneous) to 64800 sec (18 hrs.)	✓	NA
.LED		=WHITE,W	SET WHITE LEVEL Sets white channel target and fades to the value W (0-240). Note: R/G/B values are not changed	✓	✓
		=WHITE,W:XX	Optional ramping parameter—time (XX) can be set from 0 sec (instantaneous) to 64800 sec (18 hrs.)	✓	NA
.LED	.VALUE	=R.G.B	“RGB” COLOR SETTING (unsupported command with e-Node/DMX - see .LED=RGB,R.G.B or .LED=RGBW,R,G,B,W) Specifies the color in RGB (range is 0 to 240) and dissolves to that color.		
.LED		=RGB,R.G.B	“RGB” COLOR SETTING Specifies the color in RGB (range is 0 to 240) and dissolves to that color.	✓	✓
		=RGB,R.G.B:XX	Optional ramping parameter—time (XX) can be set from 0 sec (instantaneous) to 64800 sec (18 hrs.)	✓	NA
.LED		=RGBW,R.G.B.W	“RGBW” COLOR SETTING (Current command) Specifies the color in RGBW (range is 0 to 240) and dissolves to that color.	✓	✓
		=RGBW,R.G.B.W:XX	Optional ramping parameter—time (XX) can be set from 0 sec (instantaneous) to 64800 sec (18 hrs.)	✓	NA
.LED	.PRESET.X	=R.G.B	SET PRESET (RGB Color Space) Specifies the color in RGB or preset # (range is 0 to 240). (i.e. .PRESET.X=? returns specifics of color for preset “X”)	✓	
.LED		=CCT,XXXX	SETS LED COLOR TO CCT (unsupported command with e-Node/DMX) Specifies the color temperature (CCT) of RGB or RGW+W luminaries in degrees Kelvin (range is 1700-7000).		
		=CCT,XXXX:XX	Optional ramping parameter—time (XX) can be set from 0 sec (instantaneous) to 64800 sec (18 hrs.)		
.LED		=CCT_UP	SETS LED COLOR TO CCT (unsupported command with e-Node/DMX) Fades up CCT (color temperature)		
.LED		=CCT_DOWN	SETS LED COLOR TO CCT (unsupported command with e-Node/DMX) Fades down CCT (color temperature)		
.LED		=SUN,S	RECALL A CLB -Chronobiological Lighting Level (i.e. Circadian Tuning) (unsupported command with e-Node/DMX) Executes a factory stored lighting continuum for representing sunlight from natural nighttime to noon-day sun S (00-240 0=nighttime-no illumination 240=full noon-day sun		
		=SUN,S:XX	Optional ramping parameter—time (XX) can be set from 0 sec (instantaneous) to 64800 sec (18 hrs.)		
.LED		=SUN_UP	PWM CLB UP (unsupported command with e-Node/DMX) Scrolls through CLB levels upwards (to noon-day sun) Note: ramping continues until interrupted by receiving a “STOP” command		
.LED		=SUN_DOWN	PWM CLB DOWN (unsupported command with e-Node/DMX) Scrolls through CLB levels downwards (to black) Note: ramping continues until interrupted by receiving a “STOP” command		
.LED		=RGB,R.G.B	“RGB” COLOR SETTING) Specifies the color in RGB (range is 0 to 240) and dissolves to that color.	✓	✓

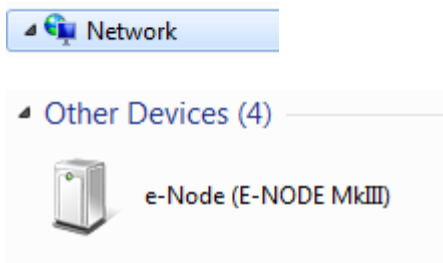
Device	Item	Data/Command	Comment	e-Node DMX MII	e-Node DMX
		=RGB,R.G.B:N	Optional ramping parameter—time (XX) can be set from 0 sec (instantaneous) to 64800 sec (18 hrs.)	✓	NA
.LED		=RGBW,R.G.B.W	“RGB” COLOR SETTING (Current command) Specifies the color in RGB (range is 0 to 240) and dissolves to that color.	✓	✓
		=RGBW,R.G.B.W:XX	Optional ramping parameter—time (XX) can be set from 0 sec (instantaneous) to 64800 sec (18 hrs.)	✓	NA

¹ Feature available with V.X.Xx or later with e-Node/DMX firmware

3 Configuring e-Node

The e-Node/dmx can be configured in either of two ways.

The first way is using its built-in web server. If your computer network supports UPnP, you can quickly access your e-Node/dmx by opening Windows Explorer and double clicking on “Network.” All accessible e-Nodes or e-Node/dmx will appear as shown below:



Note: If your computer does not support UPnP you will have to discover the IP address of the e-Node by launching the e-Node Pilot application which is available from the Converging Systems Dealer Portal. For more information on e-Node Pilot, consult the e-Node Pilot application document. All of the following software steps, can be duplicated using the e-Node Pilot application

Next, double click on the targeted e-Node and the following webpage will appear.

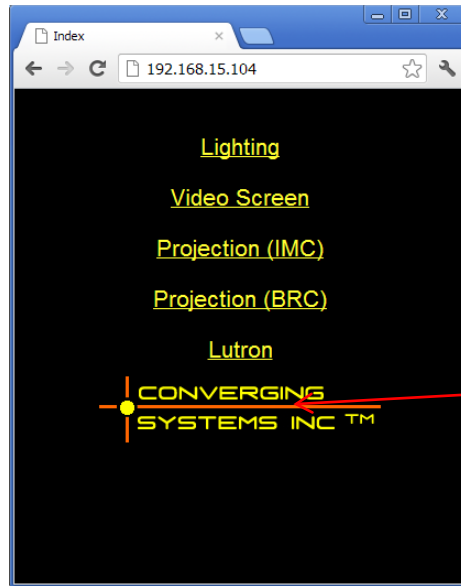
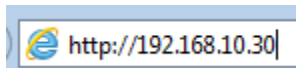


Figure 1

Alternatively, you can right click on the e-Node discovered above and select **Properties** to determine your e-Node’s IP address. You can enter that IP address into the address bar of your browser as follows:



After you hit **Enter**, you will see the above e-Node home page appear as well (see Figure 1). This webpage should auto-adjust in size depending upon your browsing device (i.e. iPad^R, iTouch^R, Android^R phone, etc.).

Next, from the e-Node home page, and click on the Converging Systems’ logo (see Red arrow above) in Figure 1.

Enter the default factory password **ADMIN** (upper case) and select **Logon**. If you have changed this password type in that customized password instead. You should see the following screen appear.

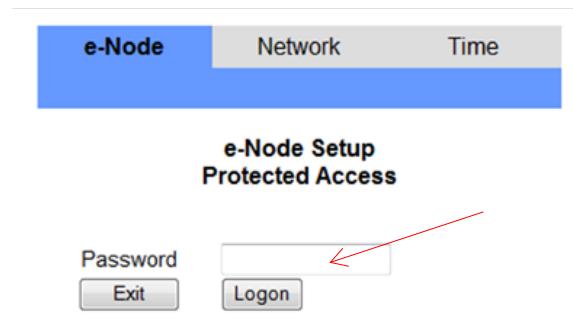


Figure 2

This page will display the current information about the e-Node including its hardware and firmware versions.

The screenshot shows the 'e-Node' configuration page with the 'Info' tab selected. The 'e-Node Information' section contains the following fields and buttons:

- Name: E-NODE
- Type: e-Node 2000 S
- Serial No: 00000000
- HW Version: 02.00 (with a RESET button)
- FW Version: 02.04 (with an UPDATE button)
- Buttons: Exit, Logoff

Figure 3

Set up e-Node to operate in DMX Mode.

Click on the “Ports” tab to view the port configuration. Make sure the type of Port C is set to “DMX”. Port C is marked as Port 2 on the e-Node. This is the RJ45 that operates as a DMX Port.

After selecting the “DMX” type click on “Apply.” The “baud” and “Priority” boxes are irrelevant, these are set automatically. Once the port is set you should either power cycle the e-Node or force a reset by selecting the **RESET** button in Figure 3 (see “e-Node Quick Start Guide” for more information).

The screenshot shows the 'Ports' configuration page. The 'Port Configuration' section is as follows:

- Port A (0) Type: NONE
- Port B (1) Type: NONE
- Port C (2) Type: DMX (indicated by a red arrow)
- Baud: [empty field]
- Buttons: Exit, Logoff, Apply

Figure 4

Set up e-Node to operate in CS-Bus Mode.

Click on the “Ports” tab to view the port configuration. Make sure the type of Port C is set to “NONE”. Next Set Port A (0) and Port B (1) to “CSBUS.” Port 0 and Port 1 are marked on the e-Node. Either port can be used for CS-Bus communication to CS-Bus compatible devices.

Note: Make sure you utilize straight wiring (1-1, 2-2, 3-3, 4-4, 5-5, 6-6) on all CS-Bus wiring and that you preserve pairs for pins (1 and 2), and pins (3 and 4), and pins (5 and 6). Do not use standard 568A or 568B wiring as this does **not** preserve pairs as required for CS-Bus wiring. For more information consult the ILC-100 or the IMC-100 Installation manuals).

After selecting the “CSBUS” type click on “Apply.” The “Baud” boxes is irrelevant. Once the port is set you should either power cycle the e-Node or force a reset by selecting

The screenshot shows the 'Ports' configuration page. The 'Port Configuration' section is as follows:

- Port A (0) Type: CSBUS (indicated by a red arrow)
- Port B (1) Type: CSBUS (indicated by a red arrow)
- Port C (2) Type: NONE
- Baud: [empty field]
- Buttons: Exit, Logoff, Apply

Figure 5

the **RESET** button in Figure 3 (see “e-Node Quick Start Guide” for more information).

4 Output Connections

Port 2 (RJ-45 port) on the e-Node provides a RS-DMX compatible connection. Use the below wiring table to create a compatible DMX cable for your particular needs.

Warning: DMX cabling is an art and proper shielding, pair utilization, and no spurs or Y’s should be ever utilized. 99.99999% of all DMX issues are cable related--**Repeat, cable related**. If you have any doubt as to wire DMX fixtures and the type of wiring that should be utilized, please consult popular resources on the web.

Pin	Signal
1	Data +
2	Data -
3	No not connect
4	No not connect
5	No not connect
6	No not connect
7	Ground
8	

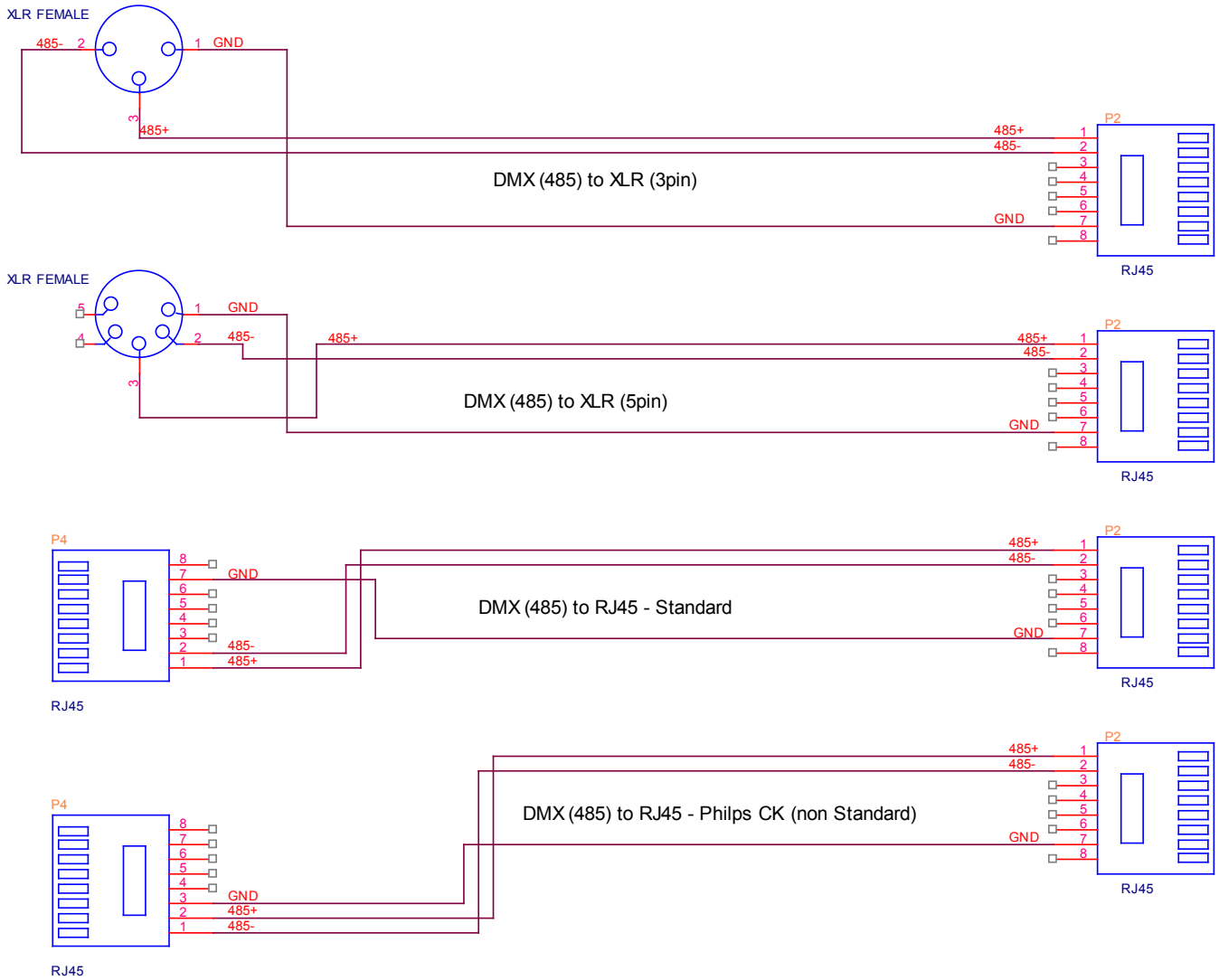


Figure 6 DMX RJ45 Wiring