CONVERGING SYSTEMS

Converging Systems – ILC-460 Smart Luminaire DMX Decoder

Data Sheet

DMX RDM

Calibrated CCT

GAMMA Correction

Hue (and CCT) Accurate Dimming

16-BIT CONTROL .001% low-end dimming support

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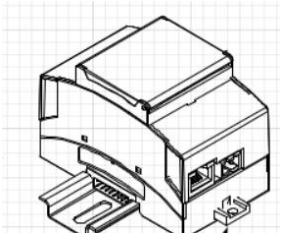
ILC-460™

Data Sheet and Installation Instructions



ILC-460 (Din Rail not included)

1 DESCRIPTION

Description

The ILC-460™ is a DIN-rail mounted DMX512-A-RDM decoder that is designed to be support one or more CLASS 2 ***supported*** luminaries without any additional power connections to the remote-powered fixture*. Commissioning of the ILC-460 including the setting of the DMX starting address and the alternative selection of any one of 20+ customized personalities is performed using popularly available RDM tools. Within each ILC-460 is a sophisticated 32-bit processor that integrates color technology that has been developed over the last 35+years by Converging Systems' engineers (and has been the technology foundation found in nearly all of the color copier and color printers in the market today). Supported light luminaires have been painstakingly engineered to provide repeatable results from fixture to fixture with micro-binned LEDS by their manufacturer and with user-selectable HSV/CCT profiles that have been designed by Converging Systems customized for those LEDs embedded within those fixtures. The resulting remote-powered Class 2 system of a single ILC-460 combined with one or more light engines can be integrated as any other DMX512-A-RDM device (but without any Class 1 power going to any light engine).

*Note: Depending upon the supported luminaire, between 1-10 downstream fixtures can be supported with a single ILC-460 controller being driven from a single 24v or 48v power supply.

Key Features

• 21+ DMX Personalities including HSV, CCT, RGBW, and multiple gamma dimming curves • 8 bit and 16-bit precision (selectable with RDM) • On-board DMX512-A-RDM, with DMX slots and DMX personalities set by RDM or custom USB cable (WIP) • Support of CCT from 1700 to 7000K (with specific DMX Personalities • Dimming to .001% with specific DMX Personalities	• With supported fixture-tunable range from 1700K-700)K, 95% CRI • •

2 ELECTRICAL AND CONTROL SPECIFICATIONS

2.1 Electrical Specifications

Functionality/Class	DMX Decoder
Power Supply Classification	Class 2 (low-voltage) with input voltage to PSU from 120vac~240vac (typical)
Voltage/Current Requirement	-24Vdc PSU @96 watts for 1-2 Par 16 fixtures requiring 700ma per channel -48Vdc PSU @96 watts for 3-4 PAR 16 fixtures requiring 700ma per channel
Nominal Current (no load)	--ma
Flammability rating according to UL94	V0

.

2.2 Functional Specifications

Control Option	**DMX512-A-RDM (for Pure Mode capability see ILC-450 controller)**		
Control Parameters**	HSB/HSV ✔	CCT + INT ✔	RGBW ✔
Adjustment Precision**	HSB/HSV -- 8/16 bit	CCT – 8/16 bit	RGBW – 8/16 bit
Dimming Ranges**	@8bit .5% to 100%		@16bit - .001% to 100%
DIN Mounting			
	Photometric Information (for detail see partner documentation for output data)		
CRI	>90% and typically >96%		
Lumen Output	***		

* RDM is a protocol extension to DMX-512-A that permits bi-directional communication between a compatible RDM discovery tool and one or more DMX-512-A-RDM compatible DMX decoder(s) using standard DMX cabling topology and a mandatory DMX EOL terminator

** DMX Personalities provide for selected functionality

*** Consult supported fixture manufacturer for more information

2.3 Recommended Power Supplies (PSU) --constant voltage only

Manufacturer	**Model**	**Input Voltage/Current**	**CSI PN**	**Qty of Fixtures**	
				1-2	3-4
Meanwell	MDR-100-24	120-240vac/1.3a	21-1048-240	✔	Not supported (insufficient power)
Meanwell	MCR-100-48	120-240vac/1.3a	21-1048-480	Not recommended (excessive voltage drop)	✔

Notes:

- DO NOT hot swap the connected luminaries
- Only use constant voltage power supplies. **If alternative power supplies are desired to be used, please contact Converging Systems in advance.** Failure to utilize non-approved power supplies may VOID your warranty
- Observe proper color coding of the output wires. Failure to observe proper wiring will VOID the warranty
- Connect only to DMX decoders that comply with DMX-512 specifications
- Only connect to approved downstream fixtures supported by Converging Systems. Converging Systems shall not be responsible for damage sustained to any connected luminaire (fixture) if these instructions are not followed.

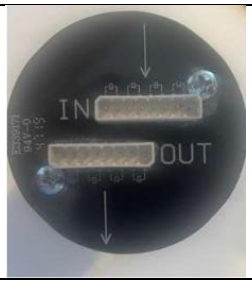
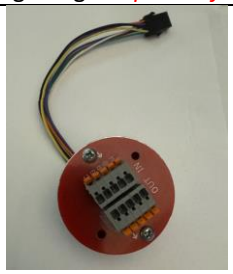
3 MECHANICAL SPECIFICATIONS

Dimension	Width 3.52" (89.7mm)	Length 2.12" (53.6mm)	Depth 2.4" (60.96mm)*
Weight	3.3 ounces (126.56 grams)		
Compatible DIN RAIL mounting systems	Compliance with DIN 43880 (compatible with standard 15mm x 6.2 mm hole pattern) (Verify if your DIN Rail is compatible)		
DIN Latching	Positive dual base latching system		
Color	Base-Black (similar to RAL 9005) Top-Light Gray (similar to RAL 7035)		
	Mounting Information		
ILC-460 mounting	Mounting orientation – horizontal or vertical Note: No air gap space is required for ILC-460		
Associated DIN Rail Power Supply Units	Vertical mounting recommended (for heat dissipation).Please allow -5mm air space for device mounted to the left and right of PSU, -40 mm air space above and 20mm air space below required.		

- Depth without DIN Rail-with low-profile DIN Rail 2.47" (62.74mm)

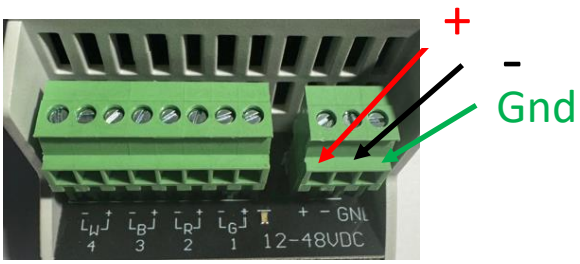
4 POWER / CONTROL CABLE ASSEMBLIES

Depending upon the type of model of light fixture that will be connected to the Converging Systems' ILC-460, different wiring schemes and terminations (EOL) instructions must be followed Please refer to the figures below to determine your specific fixture type. If you have Fixture Type A, refer to the instruction s in 4.1.x. If you have Fixture Type B, refer to the instructions in Section 4.2.x.

Clarte Fixture Type A Dual 8 pin white Phoenix connector *attached directly* to back of fixture	**Clarte Fixture Type B** Dual 5-pin Wego-type connectors attached to remote wire landing dongle *separate from* fixture
	

4.1 Fixture Type A Wiring

4.1.a Power Connection Cable (from 24v or 48vDC power supply to ILC-460)



Cable Type	From Compatible Power Supply Unit (PSU) to ILC-460
CL2-CL-3 18 awg* typical for standard runs*	-Connect + and – leads from the PSU to the + and – terminals on the detachable 3-pin power connector above. -Run a separate ground from the same 3-pin power connector to an electrical/earth ground

* Note: See voltage drop table for longer and shorter runs (even though this is a 24v table it can be used for 24v or 48v for this application. Consider this a 96watt load at 24v for the purposes of the Voltage Drop Table

4.1.b Load Cable Type (from ILC-460 to first supported fixture and then to any downstream connected fixtures)

Cable Type	Type	Gauge	Max Run from ILC-460 to last fixture
Thermostat cable	Solid	20 awg*	230 feet

*Note: the maximum gauge of wire than can be inserted into the 8-pin power connectors is 20 awg. If you need to use 18 awg wire for a bulk of your runs then you will need to create some connections from the 20 awg wired to the fixture and your longer 18 awg runs.

4.1.c Load Cable Wiring (from ILC-460 to first supported fixture)

A total of eight wires must be connected from the 8-pin terminal (green) plug on the ILC-460 to the 8-pin terminal (white) plug on the first fixture marked "IN." It does not matter what color scheme you use but you must be consistent between all plugs such that there are no crossovers or missing wires with a 1-1,2-2,3-3, 4-4, 5-5, 6-6, 7-7. 8-8 straight wiring configuration. Be careful when wiring the green plug for the ILC-460. ***Make sure before you insert each wire into the movable jaw/"elevator" mechanism that you unscrew each lock all the way before inserting the wire. Then make sure after the wire is inserted that you tighten each locking screw such that the inserted wire is being properly grabbed/tightened into the green connector.***

Note: We have found that one color coding scheme that is very easy to remember is that shown below. These colors do not relate to the LED diode colors but they do follow a general logic of **l**ightest/**l**eft to darkest/right (with the easy to remember RGB sequence in the middle) which may be easy to remember in the field.

Pin 1	White
Pin 2	Yellow
Pin 3	Orange
Pin 4	Red
Pin 5	Green
Pin 6	Blue
Pin 7	Brown
Pin 8	Black

4.1.d Load Cable Wiring (from first supported fixture to next downstream fixture)

Note: Skip this step if there is only one fixture in the system—proceed to Section 4.1.e.

Where there is an additional downstream fixture besides the first fixture already wired in Section 4.1.c above, an 8-wire connection harness must be created to connect the head-in fixture's OUT port to the next sequential downstream unit's IN port. In this case, the wiring scheme will be the same (i.e., 1-1, 2-2, 3-3, 4-4, 5-5, 6-6, 7-7., 8-8) but in this case both ends will be terminated with the same 8-pin white plug as shown below. Again, it does not matter what color scheme you use but you must be consistent between all plugs such that there are no crossovers or missing wires and the 1-1 wiring pattern is observed.

4.1.e Output/load Terminator (Load-EOL) *Mandatory Step on last fixture on Chain*

Regardless of the number permitted fixtures on the wiring chain describe above, an End of Line terminator **MUST** be installed into the last OUT port of the last fixture (or the first fixture if there are no additional downstream fixtures). This EOL plug will have come with your fixture order and is already pre-wired.

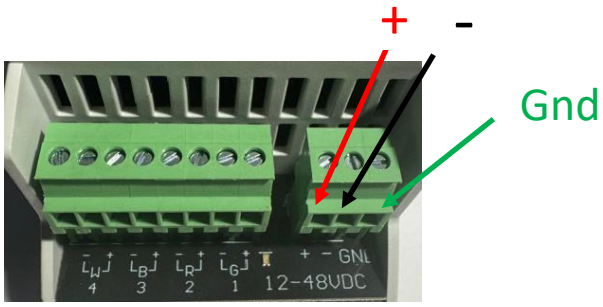
Note: this is EOL Plug is not inserted, no light output on any fixture connected to the ILC-460 will be possible.

4.1.f DMX Bus Terminator (DMX-Term) *Mandatory Step on last ILC-460 on Chain*

The DMX protocol (but particularly RDM) requires a DMX terminator be plugged into the Output port on the last DMX decoder (i.e., ILC-460 or similar) installed on the bus. DMX may or may not work reliability but RDM will not work at all without the DMX Terminator. In case you do not have one, you can wire one yourself with a standard RJ-45 modular plug and install a 120Ω resistor (1/2 Watt) between pin 1 and pin 2 on the RJ-45 (see image below).

4.2 Fixture Type B Wiring

4.2.a Power Cable Type (from 24v or 48vDC power supply to ILC-460)



Cable Type	From Compatible Power Supply Unit (PSU) to ILC-460
CL2-CL-3 18 awg typical for standard runs*	-Connect + and – leads from the PSU to the + and – terminals above. -Run a separate ground wire to an electrical/earth ground

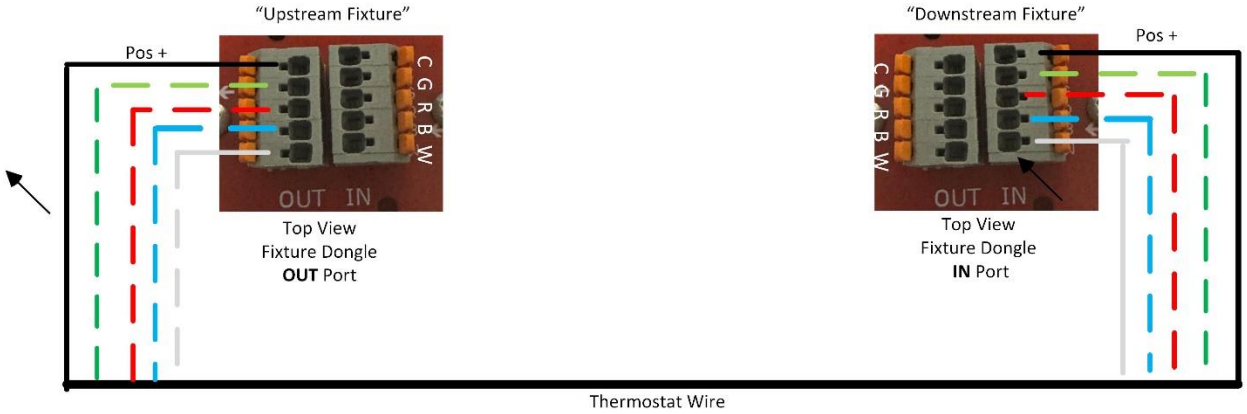
Note: See voltage drop table for longer and shorter runs

4.2.b Load Cable Type (from ILC-460 to Supported fixture)

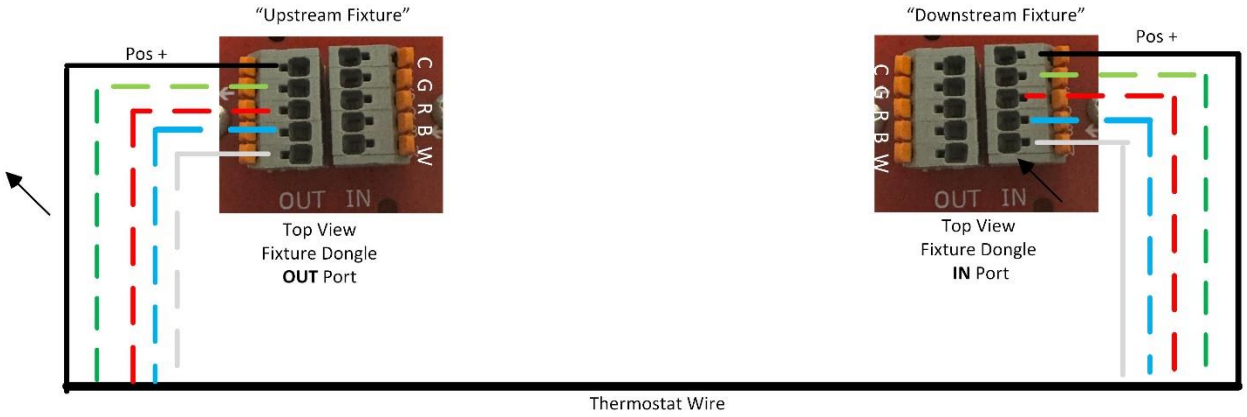
Cable Type	Type	Gauge	Max Run from ILC-460 to last fixture
Thermostat cable	Solid	20 awg	230 feet

4.2.c Load Cable Wiring (from ILC-460 to first Supported fixture).

A total of five wires must be connected from the 5 of the 8 terminals on the ILC-460. It is recommended that you use the standard provided colors of RED(-), GREEN(-), BLUE(-), WHITE(-) and BLACK (+)does not matter what color schema you use but you must be consistent between all plugs such that there are no crossovers or not secured wires from connector to connector.



4.2.d Load Cable Wiring (from first supported fixture to next downstream fixture)



4.2.f DMX Bus Terminator (DMX-Term) *Mandatory Step on last ILC-460 on Chain*

Insert jumper as shown below as shown in step 4.2.f

5 RDM and the ILC-460

5.1 Background

The ILC-460 controller contains numerous details that can be read by RDM (Remote Data Management) devices like the Swisson XMT-xxx and the DMFcat[R] from City Theatrical to (i) identify the ILC-460 controller and (ii) discover (and change in some cases) key operating parameters. Most of the discoverable parameters are read-only while some other parameters can be both reviewed and edited by the user using these RDM tools.

Parameters that that can be edited include the following

- The "**Patched**" or "S**tarting DMX" or "Base DMX Address"** used to communicate with the ILC-460 controller by a DMX encoder. Note: the factory default from Converging Systems is DMX Channel 1
- The default "**DMX Profile**" or corresponding mapping of available DMX channels that will be available upon power-up of the ILC-460- controller. Note: the factory default from Converging Systems is Profile 17)

Note on DMX Profiles. Integrated within the ILC-460 are a number of calibrated color and CCT profiles. Since not all DMX systems/lightboards have the capability of selecting non-standard DMX profiles, the most popular/universally supported DMX profile (#17) has been set by the factory as the default. For lighting and automation systems that can support alternative DMX profiles, any one of the over 20 DMX Profiles can be set as the new default (if you have an RDM tool available.

Some of the advantages of these additional DMX Profiles are the ability to

- Select precise Color temperature can be selected without having to manually mix or know what combinations of individual emitters can create specific CCT
- Select specific pre-calibrated **H**SV (Hue/Saturation/Value or brightness) levels or CCT (Correlated Color Temperature) levels and dim those level without Hue shifts or CCT temperature shifts
- Dim below typical lower limits of 1% or 2% dimming levels without flicker.
- Achieve alternative Gamma correction curves while dimming

5.2 Reading and Setting Parameters with an RDM Tool

Please refer to the instructions that come with your RDM tool (or contact your RDM tool manufacturer for more information- Converging Systems cannot train you on the use of your particular RDM tool).

Min Requirements
-a compatible RDM tool (see list in Section 5.1. above)
-a DMX terminator (this is absolutely mandatory for RDM Discovery and to edit parameters)

Steps
-Set your RDM tool to "RDM" mode
-Discover the ILC-460
-Patch the **DMX Address** (base or starting) Address as required by your setup (address range from 1 to 512)
-Select the applicable **DMX Personality** as required or supported by your DMX encoder/lightboard/system.

5.3 Supported DMX Personalities

DMX Personalities #1 - #5

Profile		1	2	3	4	5
Label		Color Tuning 4ch/8bit	Dynamic Dim 1ch/16bit	Color Tuning 2 ch/16bit	Square Dim 4ch/8bit	Color Tuning 4ch/16bit
Channels		4	1	2	4	4
Bits		8	16	16	8	16
Assignments/Offset						
1	0	Intensity	Intensity	Intensity	Intensity	Intensity
2	1	CCT	Fine Intensity	Fine intensity	CCT	Fine Intensity
3	2	Saturation	Undefined	CCT	Saturation	CCT
4	3	Hue	Undefined	Fine CCT	Hue	Fine CCT
5	4	Undefined	Undefined	Undefined	Undefined	Saturation
6	5	Undefined	Undefined	Undefined	Undefined	Fine Saturation
7	6	Undefined	Undefined	Undefined	Undefined	Hue
8	7	Undefined	Undefined	Undefined	Undefined	Fine Hue

DMX Personalities #6 - #10

Profile		6	7	8	9	10
Label		Linear Dim 4ch/16bit	Linear Dim 2ch/16bit	Log Dim 2ch/16bit	Log Dim 4ch/16bit	Square Dim 4ch/16 bit
Channels		4	2	2	4	4
Bits		16	16	16	16	16
Assignments/Offset						
1	0	Intensity	Intensity	Intensity	Intensity	Intensity
2	1	Fine Intensity	Fine Intensity	Fine intensity	Fine Intensity	Fine Intensity
3	2	CCT	CCT	CCT	CCT	CCT
4	3	Fine CCT	Fine CCT	Fine CCT	Fine CCT	Fine CCT
5	4	Saturation	Undefined	Undefined	Saturation	Saturation
6	5	Fine Saturation	Undefined	Undefined	Fine Saturation	Fine Saturation
7	6	Hue	Undefined	Undefined	Hue	Hue
8	7	Fine Hue	Undefined	Undefined	Fine Hue	Fine Hue

DMX Personalities #11 - #15

Profile		11	12	13	14	15
Label		Square Dim 2ch/16bit	Dynamic Dim 1ch/16 bit	Square Dim Enhanced 4ch/16bit	Square Dim Enhanced 4ch/8bit	Gamma Dim 4ch/16bit
Channels		2	1	4	4	4
Bits		16	8	16	8	16
Assignments/Offset						
1	0	Intensity	Intensity	Intensity	Intensity	Intensity
2	1	Fine Intensity	Undefined	Fine intensity	Fine Intensity	Fine Intensity
3	2	CCT	Undefined	CCT	CCT	CCT
4	3	Fine CCT	Undefined	Saturation	Fine CCT	Saturation
5	4	Undefined	Undefined	Hue	Saturation	Hue
6	5	Undefined	Undefined	Undefined	Hue	Fine Hue
7	6	Undefined	Undefined	Undefined	Undefined	Undefined
8	7	Undefined	Undefined	Undefined	Undefined	Undefined

DMX Personalities #16 - #20

Profile		16	17	18	19	20
Label		RGBW 4ch/8bit linear	RGBW 4ch/8bit Gamma	RGBW 4ch/8bit Squared	RGBW 4ch/16bit Gamma	RGBW 4ch/16bit Squared
Channels		4	4	4	4	4
Bits		8	8	8	16	16
Assignments/Offset						
1	0	RED	RED	RED	RED	RED
2	1	GREEN	GREEN	GREEN	Fine RED	Fine RED
3	2	BLUE	BLUE	BLUE	GREEN	GREEN
4	3	WHITE	WHITE	WHITE	Fine GREEN	Fine GREEN
5	4	Undefined	Undefined	Undefined	BLUE	BLUE
6	5	Undefined	Undefined	Undefined	Fine BLUE	Fine BLUE
7	6	Undefined	Undefined	Undefined	WHITE	WHITE
8	7	Undefined	Undefined	Undefined	Fine WHITE	Fine WHITE

DMX Profiles #21+

Profile		21	22	23	24	25
Label		**RGBW 4ch/16bit Squared**				
Channels		**4**				
Bits		**16**				
Assignments/Offset						
1	0	**RED**				
2	1	**Fine RED**				
3	2	**GREEN**				
4	3	**Fine GREEN**				
5	4	**BLUE**				
6	5	**Fine BLUE**				
7	6	**WHITE**				
8	7	**Fine WHITE**				

Notes:

- The DMX starting channel can be set by RDM (there is no provision to set DMX channels without RDM)*
- Any DMX masters (encoders) should be powered OFF while using a RDM discovery tool (only one master can be connected to the DMX bus at one time)
- While performing RDM operations, **you must insert the DMX terminator** into the unused port of the last DMX decoder, regardless of the type of DMX decoder (i.e., ILC-460 or some other DMX fixture/decoder)
- Perform RDM operations on no more than 32 ILC-460 or DMX decoders on the same DMX bus.

*Converging Systems is working on an app that will allow changing of editable RDM parameters using a special cable.