

Tech Notes

Revision 11/25/2024

Converging Systems' ILC-640d DALI II - DT8 Encoder

Addressing and Scene Macros

Overview:

The ILC-640d[™] DALI II *Encoder* is use to support up to 64 qualified DALI II DT-8 Tunable White (TW) Fixtures. Connected fixtures should be assigned to one of 16 DALI groups and those groups can be controlled individually from third-party automation systems including Lutron, Crestron, Elan/NICE, Control4, RTI, URC, Savant, etc. platforms using existing certified software drivers (available either natively within those platforms or from downloads from the Converging Systems' website—all free of charge) utilizing the Converging Systems e-Node 4x000 gateway as the communication gateway for the ILC-640d device(s).

Efficiency of Transmitting/Processing DALI command strings

It is well known that inherent to the DALI II protocol is the DALI II bus communication standard which is quite slow as compared with other communications standards. This restriction creates engineering challenges for DALI II developers to develop products that appear to operate as seamlessly and instantaneously as other protocols. The baud rate (speed of the data communication transmission line) of the DALI II protocol limits how guickly data can be transmitted from the DALI II Encoder (front end) and subsequently transmitted and then processed by the each and every DALI II Decoder (back end or DALI II fixtures) on the DALI bus. Converging Systems is well experienced in building Encoder and Decoder technology for other (faster protocols) including (i) our own CS-BUS/Pure Mode Protocol product line, as well as (ii) our DMX product line conforming to the DMX-512A Protocol standard. These faster baud rate systems can instantaneously encode (for DMX) as well as decode (for CS-BUS/Pure Mode devices including the Converging Systems ILC- 100[™]/200[™] /300[™] /4xx[™] line of decoders) digital data such that the responsive of both system is immediate! The Converging Systems Pure Mode standard as well as the DMX-512A standard presents no hint or manifestation of less than immediate response of linear strips, and fixtures when triggered to change color temperature/brightness (or even HSV values with full color devices). Alternatively, the operation of DALI II fixtures traditionally appears less than immediate. The industry has coined the term "popcorning" for this idiosyncrasy which characteristically manifests itself with supported fixtures by lights sporadically turning on in sequence rather than all on at the same time (hence "popcorning").

Converging System solution. Converging Systems has worked with its partners primarily DMF Lighting to optimize the DALI II system on both the Encoder side (Converging Systems' manufactured



products) as well as on the Decoder side (the DALI II fixture) with value-added engineering designed to minimize if not eliminate the "popcorning" manifestations typically seen with other third-party products. To that end, by following a recommended a simple Standard Operating Procedure Programming procedure, optimal results can be achieved. See the next section for this information.

Standard Operating Procedure for Controlling DALI II fixtures.

<u>Background</u>. The Converging Systems' support of DALI II fixtures allows any or all of 64 those fixtures to be organized quickly into one or more DALI Groups (up to 16). All fixtures that a member of a specific Group can be controlled seamlessly without delay (i.e., fast and without "popcorning") with any supported command sent to that DALI Group. Specifically, all DALI fixtures that are a member of a single DALI group will respond in unison (and without "popcorning"). Additional DALI fixtures that are assigned to other DALI Groups will again all respond in unison without each DALI Group, although the time for the command to reach the 2nd and subsequent DALI Groups is dependent upon the time that the 3rd party automation system takes to send the second (and subsequent) command(s) to the other DALI Groups as well as other factors. This eventuality is beyond the scope of the DALI II encoder (in this case the e-Node and the ILC-640d) and the Converging Systems' partnered DALI II (decoder) fixture. **Note**: Other non-Converging Systems partnered DALI II fixtures may or may not perform as a system as fast as Converging Systems partnered DALI II fixtures primarily because of hardware and/or firmware weaknesses within those fixtures.

<u>Group Assignments.</u> Up to 64 DALI II fixtures that can be supported with a single ILC-640d Decoder. Those fixtures must be assigned to at least one DALI Group (or up to 16 Groups if desired) in order to be controlled from a third-party control platform. using the ILC-640d DALI encoder and the e-Node 4x00 gateway. With proper planning, all DALI fixtures that need to be controlled instanteously (without popcorning) which may be able to seen within the field of view of the user, should be assigned to a single DALI Group. If secondary DALI groups are desired, those typically should be arranged that any delay in turning on the 2nd and subsequent DALI Groups would be in different areas where any delayed turn on would not be even noticed.



Examples. Typical assignment of DALI II fixtures might include the following:

Case 1: Assignment of targeted fixtures into a single bank of artwork lights (i.e., 3 spot lights for the artwork shown with green dots on the below figure).

Art	work			Group 1					
				F F 11 12	F 13				
	\bigcirc	\bigcirc	\bigcirc	ILC-DALI (1)	1 2 3 4 5 6 7 8 9 10 11 12 13				
) ()	\bigcirc	\bigcirc	\bigcirc	1 GROUP 1					
Room	1-Floor 1								

Case 2:Assignment of targeted fixtures within a larger section with a single room--for illuminating two sections of the room (yellow dot references) without impacting the middle two lights (orange dot reference) or the above spots (green dot references)

Artwork	(Group	2						
		Fix 1	Fix 2	Fix 3	Fix 4	Fix 7	Fix 8	Fix 9	Fix 10
		ILC-DALI (1) 1 2 3 4 5 6 7 8 9 10) :	
		D 2 GF	ROUP 2						ו
Room 1-Floor 1									

Case 3: Assignment of targeted fixtures within even a larger section within a single room (for illuminating all overhead lights-see red dots, without impacting the artwork light/green





> **Case 4**: Assignment of all fixtures within a single room.

Artwork	Group 4									
	F F F F F F F F F F F F F F F F F F F									
	ILC-DALI (1) 1 2 3 4 5 6 7 8 9 10 11 12 13									
	4 GROUP 4 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2									
Room 1-Floor 1										

> **Case 5**: an entire floor (with up to 64 fixtures being triggered as a result)







> Case 6: an entire building (that had 64 fixtures)



Standard Operating Procedure for Supporting Macros /Scenes from 3rd Party Automation Systems

It is common within automation and lighting platforms that scenes can be programmed to reduce the user interaction to control banks of lights. With just a simple button press, one or more lights can be adjusted to a pre-determined level as well as other more sophisticated actions just as music levels, thermostat levels, etc. can all be controlled in the same fashion.

Background on how these systems send such information to 3rd party devices. There is no standard among the top automation and lighting platforms for the speed at which commands that are part of a scene are sent out to supported devices. Depending upon the transmission speed of the respective communication bus (i.e., serial transmission over RS-232c, IP communication over 10/100/1000 Ethernet, DMX signals over standard DMX-512A buses, or DALI II signals over the DALI II bus), the receiving device (typically called the Decoder must be able to both receive and process those incoming commands reliably(. To that end, the ILC-640d currently has a buffer size sufficient to receive a total of 20 incoming instructions at a time. For many automation platforms, that would be quite sufficient to control 20 DALI groups as a part of a single Macro. Since those DALI Groups can handle up to 64 fixtures each, in most cases only one or two DALI Group commands would need to be transmitted for the execution of a scene provided that the advance planning of what fixtures should be adopted into *logical DALI Groups to minimize the sending of multiple DALI Group commands*. See the example below. Although both Cases (1 and 2) below will work with no problems, there will be no delay (or popcorning) with <u>Case 2</u> as there may be some popcorning seen in <u>Case 1</u> after the initial triggering of Group 1 when Group 2 is subsequently invoked and then finally when Group 3 is finally invoked serially. Another way of looking at this situation is that parallel processing (<u>Case 2</u>) is faster than serial processing (Case 1).



Case 1	Case 2				
Inefficient Way to Turn On	Efficient Way to Turn On				
-lights 1 through 10 in Room 1 (red dots), and	-lights 1 through 10 in Room 1 (red dots), and				
-lights 11-13 (green dots), and	-lights 11-13 (green dots), and				
-all the lights in Room 2 (green dots and yellow	-all the lights in Room 2 (green dots and yellow				
dots in Room 2)	dots in Room 2)				
Send over three strings /Groups Commands to	Send over just one string/Group Commands to				
-Group1: members—red dots in Room 1, then to	-Group 4: members—all members of Groups 1 +				
-Group 2: members – green dots in Room 1, then to	Group 2 + Group 3 (describer to the left) ots in				
-Group 3: members—green dots in Room 2	Room 1, then to				
	-Group 2: members – green dots in Room 1, then to				