DALI-2 D4i

A Brief History and Introduction

INVENTRONICS

The History of DALI:

The Digital Addressable Lighting Interface (DALI) was first released in the early 1990's and has remained a leading lighting controls protocol. It is currently governed by the DALI Alliance (formerly the Digital Illumination Interface Alliance or DiiA). DALI allows for networked control of individual luminaires, groups of luminaires or all luminaires via DALI commands provided through a connected DALI bus. This provides extreme versatility by allowing the creation and reconfiguration of lighting groups through software instead of having to modify the control wiring. It can be used to control luminaires, create scenes and store luminaire data. In this white paper, we outline the differences between DALI-2 and D4i to ensure customers are aware of the benefits and exactly what the certification entails.

What is DALI-2?

In late 2017, the DALI Alliance expanded on the DALI platform and created DALI-2 for increased interoperability, more stringent test protocols and extended commands compared to the first generation of DALI. To ensure standards and detailed testing procedures are followed, DALI-2 requires test results to be independently verified by the DALI Alliance before certification is granted, whereas DALI was self-certified by manufacturers. This certification methodology allows for increased interoperability between DALI-2 LED drivers and DALI-2 controllers.

The two main applications for DALI-2 are traditional and intra-luminaire. A traditional DALI-2 network features a bus distributed to multiple luminaires throughout a building (See Figure 1). In a DALI-2 Intra-Luminaire network, the DALI-2 bus does not leave the luminaire but instead connects to a wireless radio or sensor within the luminaire (See Figure 2). DALI-2 Intra-Luminaire networks are ideal for street, area and roadway lighting applications.

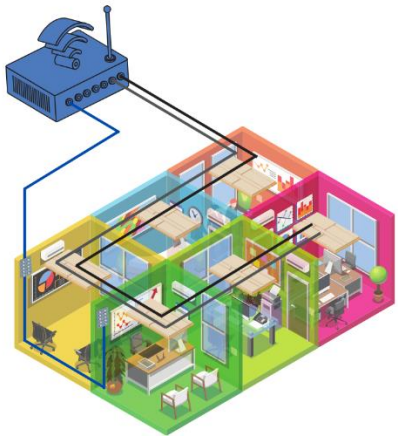

Figure 1: Traditional Applications: DALI-2 bus distributed to multiple luminaires throughout a building

Figure 2: Intra-Luminaire Applications: DALI-2 bus does not leave the luminaire

What is D4i?

While DALI-2 standardizes the interface for intra-luminaire communication; D4i standardizes the feature set of the LED driver for intra-luminaire networks. Therefore, the D4i certification program is an extension to DALI-2 making it easier to implement connectivity to create smart cities since the D4i certified LED driver can provide power to the DALI bus and control devices, such as light sensors, push buttons and occupancy sensors. To clarify, DALI-2 can exist without D4i but D4i cannot exist without DALI-2. See Table 1 for a list of

required features for D4i certified LED drivers.

Feature	DALI Standard
Health and Diagnostic Data	DALI Part 253
Input Voltage	
Output Voltage	
Temperature	
Failure Conditions	
Power Monitoring	DALI Part 252
Memory Bank for Luminaire Information	DALI Part 251
Integrated DALI Bus Supply	DALI Part 250

Table 1: Requirements for D4i

D4i standardizes what information can be monitored and stored, and where that information is stored. See Table 2 for a list of health and diagnostic data that can be monitored by D4i and DALI-2 certified drivers. For a more in-depth look into the health and diagnostic data, please see our DALI-2 D4i Technical Primer App Note.

Data	D4i	DALI-2 (minimum)
Temperature (Internal and External)	✓	
Thermal Derating	✓	
Thermal Derating Counter	✓	
Set Max Output Current	✓	✓ (as maximum dim %)
Dim Driver	✓	✓
Energy Reporting	✓	
Memory Bank Extensions	✓	
Health and Performance Data	✓	
Read Driver PN	✓ (via GTIN)	✓ (via GTIN)
Read Rated Power	✓	
Store Fixture Information	✓	
Failure Mode Flags	✓	✓ (Basic)
Store Extended Fixture Information	✓	

Table 2: Health and diagnostics data that can be monitored by the LED driver

Benefits of D4i:

D4i offers a wide range of additional benefits by standardizing and centralizing vital data such as:

- Preventative maintenance
- Asset tracking
- Power monitoring

One of the biggest advantages to D4i is that it answers all the 5 “W’s” that can help save money on maintenance and keep customers lights operating consistently:

- Which Luminaire is malfunctioning?
- What is the Luminaire and Driver part number?
- When does it need to be replaced and has it already failed?
- Where is the light located?
- Why did the Luminaire fail and are there others showing signs of failure that can be replaced now?

Summary:

While there are many advantages to DALI-2, Inventronics sees the value add of offering products with the additional D4i certification. With the standardization of the LED driver feature set and communications protocol, D4i certified LED drivers allow luminaire manufacturers the possibility of plug and play controls compatibility with a wide range of application specific controls solutions. D4i provides the control system with the ability to ensure the entire smart lighting system runs effortlessly and it can be easily integrated. Customers can optimize their lighting system by reading data in real-time to increase energy savings, reduce maintenance costs and ensure consistent lighting controls. To learn more about

Inventronics D4i drivers, be sure to visit https://www.inventronics-co.com/dali-2-d4i-led-drivers/

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Bobbie Grider is the marketing communications manager for Inventronics and is responsible for developing the company's marketing, advertising and public relations strategies for their broad portfolio of LED drivers and lighting accessories. Based in Oklahoma City, OK Grider manages the branding and messaging for Inventronics, a leading manufacturer of LED drivers for the solid-state lighting market. She has a bachelor's degree in journalism and business marketing. She has five years' experience in the power and lighting industry.