synapse

DALI-2® AND D4i™
OVERVIEW

Background on DALI®

Digital Addressable Lighting Interface (DALI) is a protocol for digital lighting control. DALI was originally developed to allow digital control, configuration and querying of fluorescent ballasts. It enabled lights to be addressed and controlled individually or in groups and also enabled two-way communication for status and other information.

The DALI protocol runs over a 2-wire communication bus where communication signals, including power and other control data, are carried by the same set of wires.

It was originally developed by Phillips in 1984 and has been managed independently by the Digital Illumination Interface Alliance (DiiA) since 2017. The DiiA is an open, global consortium of lighting companies that aims to grow the market for lighting-control solutions based on Digital Addressable Lighting Interface (DALI) technology.

Note- For more details about DALI and the DiiA visit- https://www.digitalilluminationinterface.org/

What is DALI-2?

DALI-2 refers to the latest version of the DALI protocol. One of the most significant changes in DALI-2 was the addition of control devices (including application controllers and input devices), which were not included at all in the original version of DALI.

The Synapse DIM10-087-06 embedded lighting controls are classified as application controllers. The Synapse controllers are designed to work with DALI-2 LED Drivers and other DALI-2 products that communicate with each other inside a luminaire in a standard way using the DALI-2 protocol. The Synapse application controllers are not compatible with older DALI LED drivers and components.

What is D4i?

The traditional use of DALI was to connect a series of separate luminaires on a DALI wiring bus. This is known as inter-luminaire DALI.

D4i stands for DALI for IoT. The DiiA has extended the DALI-2 certification program for DALI-2 products that enable intra-luminaire DALI. For LED drivers and control devices, D4i is an extension of DALI-2. D4i products are DALI-2 products that have a specific set of features.

Intra-luminaire DALI refers to a small DALI network inside an individual luminaire. D4i specifications ensure that power is available for control devices such as sensors or wireless communication devices that are attached to or integrated into the luminaire. Meanwhile, D4i drivers inside the luminaire are able to store and report a wide range of data in a standardized way.

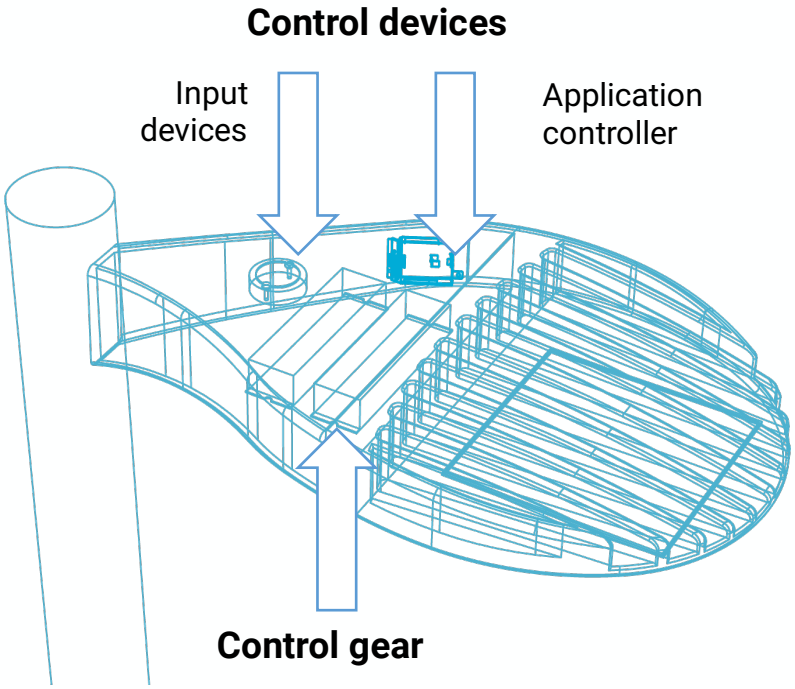
Key D4i components

Control gear (LED Drivers)

- Directly connected to the light source, providing it with power

Control devices (two basic types:)

- Application controllers
- Input devices



Two types of control devices:

1. Application controllers
   - The “brains” of the system.
   - Use information from any source, make decisions and can send commands to the control gear.

2. Input devices
   - Fairly simple devices that provide information to the system.
   - Examples include push-buttons, sliders, occupancy sensors, and light sensors.

Certification levels

There are two categories of certification, Product certification and Luminaire Certification, with sub-levels within each category.

Product-level Certifications

- DALI-2 – product communicates over the DALI-2 bus
- D4i- product communicates over the DALI-2 bus and has additional read and write compatibility to work with other intra-luminaire DALI-2 devices

Note: Certified products have successfully completed the DALI-2 certification process, including verification by DiiA. Such products qualify to use the DALI-2 trademarks. Only certified products can carry the DALI-2 trademarks (wordmark or DALI-2 logo), and only DiiA members can certify their DALI-2 products.

Luminaire-level Certifications

- DALI-2 luminaires- contain certified DALI-2 components
- D4i luminaires- contain certified D4i components
- Zhaga-D4i luminaires- contain certified D4i components and a Zhaga interface

Note: For details on Luminaire level certifications visit- https://www.digitalilluminationinterface.org/dali/luminaires.html

What can you do with a Synapse “application controller" and a DALI-2 LED Driver today?

Power monitoring/reporting

Today our DIM10-087-06 controllers can communicate with DALI-2 LED Drivers and pull real time power data directly from the LED Driver. Power data for individual lights can be stored and viewed over multiple weeks using either the SS450 or CBS gateways (Figure 2).

The optional SimplySnap Cloud applications enable longer timeframes over several months or years and includes the ability to compare power usage between multiple lighting groups/zones (Figure 3).

Figure 2

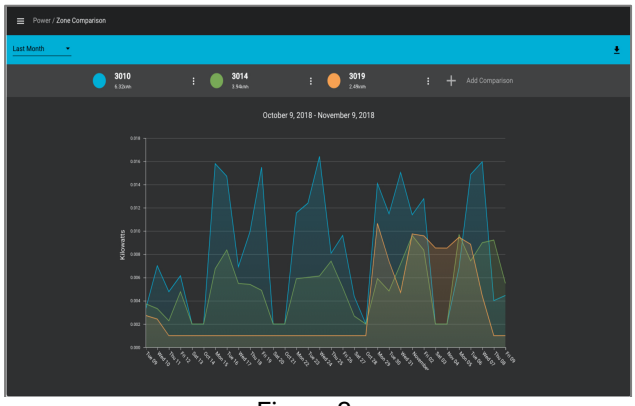
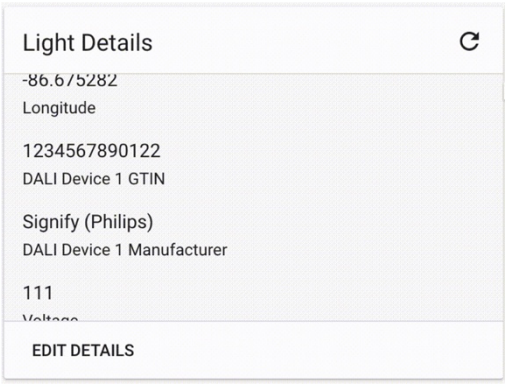


Figure 3

View LED Driver Manufacturer information

DIM10-087-06 controllers can also view and retrieve GTIN and manufacturer information from DALI control gear (LED drivers). This is included on the Light Details page for a light and can be retrieved on demand from the controller in the UI.



What future capabilities might be possible with a Synapse controller and a DALI-2 LED Driver tomorrow?

Future data that LED Driver and Luminaire manufacturers can program and store into a DALI-2 Control Gear/LED Driver that will provide detailed asset information about the fixture, the components installed, and other operational information.

More luminaire information in the future will enable easier and more complete documentation, faster maintenance, and more efficient repairs.

- Supply power and voltage ratings
- Light output, including CCT/CRI ratings
- Light distribution type
- Luminaire color
- Text luminaire identification/descriptions

Diagnostics & Maintenance will improve dramatically with historical data and counters to capture critical information about the usage and operational details.

- Failure conditions
  - Various control gear failure conditions
  - Various lamp failure conditions
- Counters for each failure type
- Control gear information:
  - Operating time, start counter, supply voltage and frequency, power factor, temperature and output current.
- Light source information:
  - Operating voltage, current, temperature, light source start counter, light source on time

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