DALI-2
New Standards and Mandatory Certification

Dr. Scott Wade
Technical & Certification Manager,
Digital Illumination Interface Alliance
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  - Product certification & registration

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DiiA and DALI

Digital Illumination Interface Alliance

- An open, global consortium of lighting companies that promotes the adoption of lighting-control systems using DALI technology
- 76 members (August 2017)
- Provides the DALI trademarks to members
- Creates and maintains the official DALI test sequences for members
- Provides a DALI-2 Certification process and DALI version-1 registration

Certification or Registration?

- Certification: DALI-2
  - More details later...
- Registration: DALI version-1
IEC 62386

What’s new?
- Input devices (multi-masters)

What’s next?
- 332 Feedback and 333 Manual configuration (control device features)
- 2xx parts: Power measurement, thermal information, central emergency, load shedding, ...
- Amendments for parts 101, 102 and 103
- Other drafts in progress:
  - 104 DALI – Wireless and alternative wired systems (wireless, power-line, internet protocol...)
  - 105 Firmware update
## IEC 62386

### 101 – General requirements – System (V1 & V2)

### 104 – General requirements – Wireless and alternative wired system (in progress)

### 105 – General requirements – Firmware update (in progress)

### 102 – Control gear (V1 & V2)

<table>
<thead>
<tr>
<th>LED (V2 in progress)</th>
<th>Switching (in progress)</th>
<th>Colour Control</th>
<th>in progress (control gear functions):</th>
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<th>Input devices:</th>
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<tbody>
<tr>
<td>207</td>
<td>208</td>
<td>209</td>
<td>225 Colour Tc</td>
<td>226 Colour xy</td>
<td>307 Relative input devices (in progress)</td>
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<td>222 Thermal lamp information</td>
<td>223 Light compensation over time</td>
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<td>219 Power measurement</td>
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<td>304 Light sensor</td>
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<td>Self-contained Emergency</td>
<td>Conversion to DC</td>
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<td></td>
<td>305 Colour sensor (future part)</td>
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<tr>
<td>Fluorescent (V1 &amp; V2)</td>
<td>Dimmer (V2 in progress)</td>
<td>0/1-10 V</td>
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<td>301 Push Buttons</td>
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### 103 – Control devices (V2)

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• Control gear
• Input devices (control devices)
• Application controller (control devices)

Note:
• Systems can contain more than one application controller.
• A bus power supply is required, either separate or integrated with an existing device.
Two types of control device:

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

- **Input devices**
  - Fairly simple devices that provide information to the system.
  - Examples include push-buttons, sliders, occupancy sensors, and light sensors.
Control devices – Application controllers

- Can use information from any source, including:
  - Control gear
  - Input devices
  - Other application controllers
  - External devices/buses/systems

- Can make decisions, and can send commands to control gear
  - No other device can send commands to control gear

- Single-master or multi-master allowed
  - **Single-master**: simpler – a receiver is not necessary, but can optionally be used to allow polling of input devices, or checking status of control gear
  - **Multi-master**: supports event driven operation of input devices
Control devices – Application controller examples

1. Ceiling-mounted occupancy sensor, broadcasting levels to the control gear
   - This could be a single-master application controller
   - Only one is allowed in a DALI system

2. DIN-rail mounted controller driving two DALI buses
   - This could be a multi-master application controller
   - Other multi-masters can be used on each bus
Control devices – Input devices

- Provide information to application controllers
- Multi-master
- Can be polled, but normally used in event driven mode

- Four input devices already published in IEC 62386
  - 301 Push buttons
  - 302 Absolute input devices
  - 303 Occupancy sensor
  - 304 Light sensor
Control devices – Input device examples

Push-button with LED feedback

- 101, 103 Control devices
- 301 push-button (x8 instances)
- 332 feedback (x8 features at instance level)

Events include:
- Press/release
- Short press, long press, double press
- Button stuck

Feedback allows control of:
- brightness/colour/volume/pitch
- One per instance (button) and/or per device
Control devices – Input device examples

Combined occupancy and light sensor

- 101, 103 Control device
- 303 occupancy sensor (x1 instance)
- 304 light sensor (x1 instance)

Events include:
- Occupied/vacant, movement
- Illuminance level (after a change)
- A report timer allows periodic reporting of the input value

Polling can also be used
Benefits of DALI 2

Control devices – part 103

- ONLY certified control devices can use the DALI-2 trademark
- Application controllers and Input devices defined
- Single-masters and multi-masters allowed
- Event priorities defined
- Separate addressing & grouping from control gear
Benefits of **DALI**

**Control gear and bus power supplies - improvements**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Benefit</th>
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<td>Clearer specification, including bus timing and bus power supplies</td>
<td>Improved interoperability</td>
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<tr>
<td>Requirement for polarity insensitivity</td>
<td>Easier installation</td>
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<tr>
<td>Bus powered units</td>
<td>Less wiring</td>
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<tr>
<td>Multiple logical units</td>
<td>More cost-effective products</td>
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<tr>
<td>Extended fade time, 100 ms to 16 minutes</td>
<td>Increased comfort and flexibility</td>
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<tr>
<td>Manufacturer specific operating modes</td>
<td>Improved interoperability and flexibility</td>
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<tr>
<td>Query light source type</td>
<td>Easier maintenance</td>
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DALI-2 Certification

 PRODUCTS

- Control gear
  - Parts 101, 102 and/or 207
- Control devices
  - Parts 101 & 103 (Single-master application controllers)

HOW TO CERTIFY

- **Test** using the latest version of the official test sequences
- **Submit** product information and test results through member’s account
- **Independent verification** of results by DiiA
- **Success!** - certification is granted
DALI-2 Certification

- **How to check:**
  - The 🌟 trademark is only allowed once a product has successfully completed certification.
  - Check the product label.
  - Check the web-site. Every DALI-2 certified product is shown in a public area of the web-site: [www.digitalIlluminationinterface.org/products](http://www.digitalIlluminationinterface.org/products)

- **Next products for certification**
  - Multi-master application controllers
  - Bus power supplies
  - Colour control (xy and $T_c$)
  - Input devices
  - Self-contained emergency

- **Plugfest**
  - Members bring their products for testing with control gear or control devices from other members
  - Live testing with a variety of products
  - Results in improved interoperability
  - Next: October, Dornbirn
Summary

- The main aims of the Digital Illumination Interface Alliance were explained.
- New parts of IEC 62386 were shown, as well as the upcoming parts.
- Example input devices (push-button and sensor) were explained.
- Interoperability of DALI products is achieved through a certification programme for DALI-2.