

Digital Addressable Lighting Interface

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The **Digital Addressable Lighting Interface (DALI)** is a digital protocol for the controlling of lighting in buildings, such as electrical ballasts and dimmers.

DALI was established as a successor for the still market dominating 1-10v and an open standard rival to Digital Signal Interface (DSI), on which it is based. DALI is standardized in accordance with International Electrotechnical Commission IEC 60929, standard for fluorescent lamp ballasts.

Each piece of operating equipment with a DALI interface can be communicated with over DALI individually. Using a bi-directional data exchange, a DALI controller can query and set the status of each light. As a standalone system, DALI can be operated with a maximum of 64 devices. Alternatively, DALI can be used as a subsystem via DALI gateways.

Advantages

- DALI is an open standard not exclusively owned by a single company.
- It requires only a pair of wire to form the bus to communication to all devices on a single DALI network.
- Unlike for example high-speed RS485 it doesn't insist the cabling is a "daisy-chain", "stars" and "T's" are perfectly acceptable giving the installers flexibility
- The DALI System is not defined as SELV (Safety Extra Low Voltage) and therefore can be run next to the mains carrying cables or a part of a multi-core cable that includes mains power.
- The DALI signal has a high SNR (signal to noise ratio) which enables the signal to be exposed to a large amount of noise before the signal is destroyed.
- The Baud (or transmission speed) of DALI is low (1200hz) this reduces the need for Stub matching of the transmission lines and to reduce the complexity of the system
- The maximum number of devices on a DALI loop is 64, which is a manageable network size, smaller numbers may not be enough, while higher numbers become harder to commission and track
- DALI has Group and Scene Commands to reduce the amount of information which is sent over a DALI loop. The use of these commands reduce network latency and allow for all devices to react within the same time. An example is "Group 1 goto 100%" or "Recall Scene 1"
- Because it uses Differential Manchester encoding it doesn't matter which way around the signal cable is wired, this makes installation more foolproof.

Disadvantages

- When addressed a DALI device is assigned a short address (a number from 0-63) which becomes its unique address on the bus. When Installers or commissioners don't arrange the addresses in the devices in a logical order (for example following the flow of the building) replacement of faulty devices becomes confusing and time consuming
- Being restricted to 64 addresses (six bits), DALI cannot be used in large installations without using another technology to workaroud the limitation.
- Its slow communication speed (1200 bits per second) can mean a visible delay in large installations with a lot happening.
- In Early models of some DALI Ballasts the DALI requirement for permanent memory was misintepreted to mean EEPROM exclusively. This meant that every update to the fade rate or fade time for example was written to EEPROM. Moreover, no protection for the EEPROM lookup table was implemented, which exacerbated the problems caused by overwritten EEPROMS. The number of times an EEPROM can be rewritten is limited (200K - 10M times). In current generations of these DALI devices RAM is used in preference to EEPROM during normal operation, which has dramatically reduced the number of EEPROM writes and thus avoided problems with overwritten eeproms.
- There are few affordable portable test tools available for DALI, Portable tools are available from a number of companies and they range from \$200EU upwards.
- The data has to run on mains-rated cable, with 600v isolation and at least a 1mm cross-section rather than using a thinner data cable.
- The volt-drop should be less than 2 volts from the start to the ends of the line thereby forcing disciplined planning by the installers.