Dimming *protocols* for decorative lighting: TRIAC, 0-10V, DALI-2, DMX512 and wireless

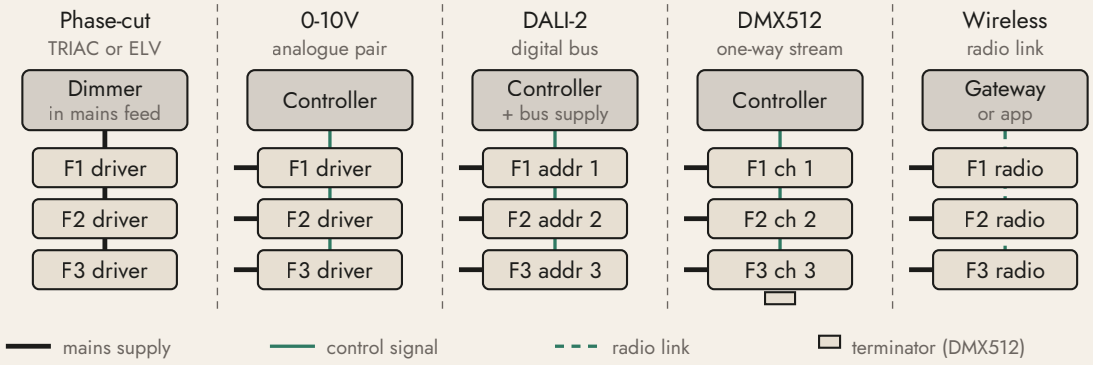
Phase-cut, 0-10V, DALI-2, DMX512 and wireless compared for decorative fittings: what each is and where it snags, with wording to paste in. The driver and controller pairing is what must be tried.

Compliance guidance. Not engineering advice. Facts are from the sources listed, read on 5 November 2026; several are US reports, so UK figures may differ. A lighting designer or electrical engineer should confirm each driver and controller pairing, and a mock-up should be tried on the real control chain before production.

AT A GLANCE

Method	What it is and how it is wired	Limits as published	Main snag
Phase-cut (TRIAC, ELV)	A dimmer in the mains feed cuts part of each AC wave. No control cable.	Limited by the dimmer's rated load, which does not carry over from incandescent watts to LED drivers.	Driver and dimmer must suit each other: flicker, hum, ghosting or early cut-off.
0-10V	Two low-voltage wires carry 0 to 10 V DC from a controller to the driver; mains is separate. Commands only, no reply.	No addressing. Two standardised forms (sinking and sourcing). The older standard does not specify off, so mains is usually switched.	Response and lowest level vary from driver to driver; "dim to off" claims can be vague.
DALI-2	Two-way digital bus (IEC 62386). Each driver has an address and can be grouped and put in scenes.	Per bus: 64 control gear, 64 control devices, 16 groups, 16 scenes per gear, 250 mA, 300 m between the farthest devices.	Needs a bus power supply and commissioning. Only products in the DALI Alliance database are DALI-2 certified.
DMX512	One controller sends up to 512 channel values per link over a terminated RS-485 cable (ANSI E1.11-2024).	512 data slots per link, 32 unit loads, 120 ohm termination. Cable specification is outside the standard.	No required error checking; no assurance every packet arrives. Not meant as a building-wide network.
Wireless (e.g. Bluetooth mesh)	A radio link replaces the control cable. A receiver in or on each fitting sets the driver.	Set by the standard chosen and the product.	Name the standard and its certification, say where the receiver sits and what powers it.

Sources: standards bodies, the DALI Alliance and US government research, read on 5 November 2026. The method is for the lighting designer to choose; the driver and controller pairing should be tried before production.



How each control method reaches three fittings. Original drawing by Make Bespoke Studio, schematic only: not a wiring diagram.

SPECIFICATION WORDING

DIMMING METHOD AND DRIVER

Dimming method: [DALI-2 (IEC 62386, control gear to Part 102, LED Part 207) / 0-10V current-sinking / trailing-edge phase-cut / DMX512-A (ANSI E1.11)]. The workshop is to state on the shop drawing, for each fitting: driver make and model [ ]; dimming types its datasheet accepts [ ]; number of independently controlled channels [ ]; lowest light level reached [ ] % and whether it dims to off. For DALI-2, the driver is to be listed in the DALI Alliance product database and the listing reference given.

COMPATIBILITY AND MOCK-UP

The lighting control supplier [ ] is to confirm in writing that the specified driver and the [dimmer / controller / gateway] are compatible, the maximum number of fittings per [dimmer / bus / link] [ ] and the lowest level achievable. One fitting is to be tried on the real control chain over its whole dimming range, and signed off by [lighting designer] before production. Any change of driver or control method after approval of the shop drawings is a variation.

COMMISSIONING AND HANDOVER

[Controls supplier] is to set up and commission addresses, groups, scenes or channels, and to hand over a schedule of addresses or channels per fitting, the wiring diagram and the driver datasheets. The workshop is to label each fitting with its address or channel where it is not set on site.

TERMS USED

Driver (LED)

The electronic control gear that supplies the LED light source with the controlled current or voltage it needs. It decides which dimming methods the fitting accepts.

Phase-cut (TRIAC, ELV)

A mains dimmer that removes part of each AC wave: the front for a forward or leading-edge (TRIAC) dimmer, the end for a reverse or trailing-edge (ELV) dimmer.

0-10V dimming

A low-voltage control signal from 0 to 10 V DC to a driver. It sends commands only and does not report back.

DALI-2

The DALI Alliance's certification programme for the latest version of the DALI protocol in IEC 62386, a two-way digital bus on which each device has an address.

DMX512

A digital protocol, ANSI E1.11 (DMX512-A), that sends up to 512 data slots per link from one controller to one or more receivers.

STANDARDS AND SOURCES

- DALI Alliance: Quick Start Guide v1.1 (April 2023) and Specifying with DALI, DiiA(SE)001a: read. Designer's guide: sections 3, 4, 6, 7.
- IEC 62386-101:2022, DALI system components: IEC listing read; standard text not read.
- ANSI E1.11-2024, USITT DMX512-A (ESTA): scope, topology, slots, loading, termination.
- Dimming LEDs with Phase-Cut Dimmers, PNNL-22945 (US DOE, 2013): US report. 0-10V Control for LED Streetlights, PNNL-32949 (US DOE, 2023).
- NEMA SSL 7A-2015 (R2021), Phase-Cut Dimming for Solid State Lighting: foreword, scope and contents only.
- Bluetooth mesh networking primer (Bluetooth SIG): read to section 8. Zigbee: Connectivity Standards Alliance overview.
- Approved Document L, Volume 2 (England), 2021 edition: 6.62 to 6.65; 2026 edition, 5.68 to 5.72.

Full guide: https://makebespoke.com/trade/technical/dimming-protocols-decorative-lighting. Make Bespoke Studio coordinates manufacture through its partner workshops. Figures are guidance only and your specification governs; some may be superseded, so contact the studio to verify.