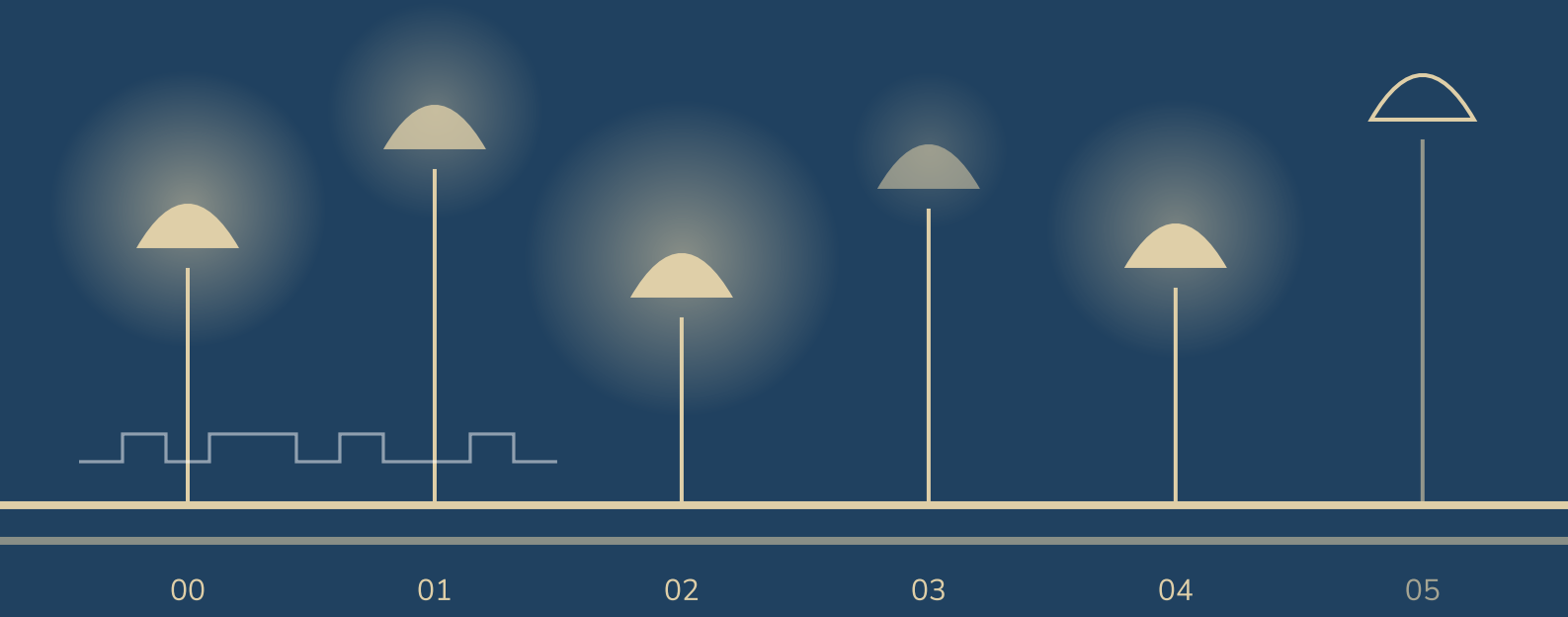
New Forest
TECHNOLOGY SERVICES
Premium Integrated Solutions

A FREE GUIDE
LIGHTING CONTROL SERIES · NO. 1

DIGITAL ADDRESSABLE LIGHTING INTERFACE

DALI, explained.

A plain-English guide to the lighting standard that lets every light in a building have a name, a voice and a memory.



www.newforesttech.services

Edition 1 · November 2026

BEFORE WE START

Lights that know their own name

Ever stood in a room with nine switches on the wall and no idea which one does the lamp you actually want? Sound familiar? DALI is the grown-up answer to that problem.

Inside most good-quality LED lights there's a small box called a **driver**. It turns mains electricity into exactly what the LEDs need. Give that driver a DALI connection and something clever happens: it can be told what to do over two thin wires, it remembers its settings, and it can answer back when asked how it's feeling.

That's why you'll find DALI in offices, hospitals, schools, hotels, museums and, more and more, in really nice homes. It's an open international standard, so lights from different makers work together on the same two wires.

We wrote this guide because we spend a lot of our time explaining DALI to clients, architects, electricians and the occasional curious neighbour. It starts simple and gets steadily more detailed. The boxes marked **GOING DEEPER** are for the technically curious. Skip them and you'll still understand everything that matters.

No sales pitch, promise. Well, maybe a small one on the back page.

— The team at New Forest Technology Services, Lymington

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01

SECTION ONE

What is DALI?

One standard, two wires, and every light in the building on first-name terms.

DALI stands for Digital Addressable Lighting Interface. It's an international standard, IEC 62386, that describes how lights, sensors, switches and controllers talk to each other over a simple two-wire connection.

Each word in the name earns its place. Take them one at a time and you've understood most of DALI already.



Digital

Instructions travel as short messages of ones and zeros, not as a varying voltage. "Kitchen to 40 per cent" means exactly that, every time, whoever made the light.



Addressable

Every light gets its own address, like a house number. You can talk to one light, a group of them, or all of them at once, without rewiring a thing.



Interface (two-way)

It isn't just a remote control. A controller can ask a light questions and get answers back: "Are you on?", "What level are you at?", "Has your LED failed?"

A conversation, not a light switch

An ordinary switch is a blunt instrument: it connects or disconnects the power. Dimmers are only slightly more subtle. DALI turns the whole lighting installation into a polite conversation. The controller speaks, every light listens, and only the light whose name was called (or whose group was called) does anything.

Because the power to each light stays on and only the *message* changes, you can rearrange which switch controls which lights, create moods, or link the lights to sensors, all from software. The cables in the walls never change.

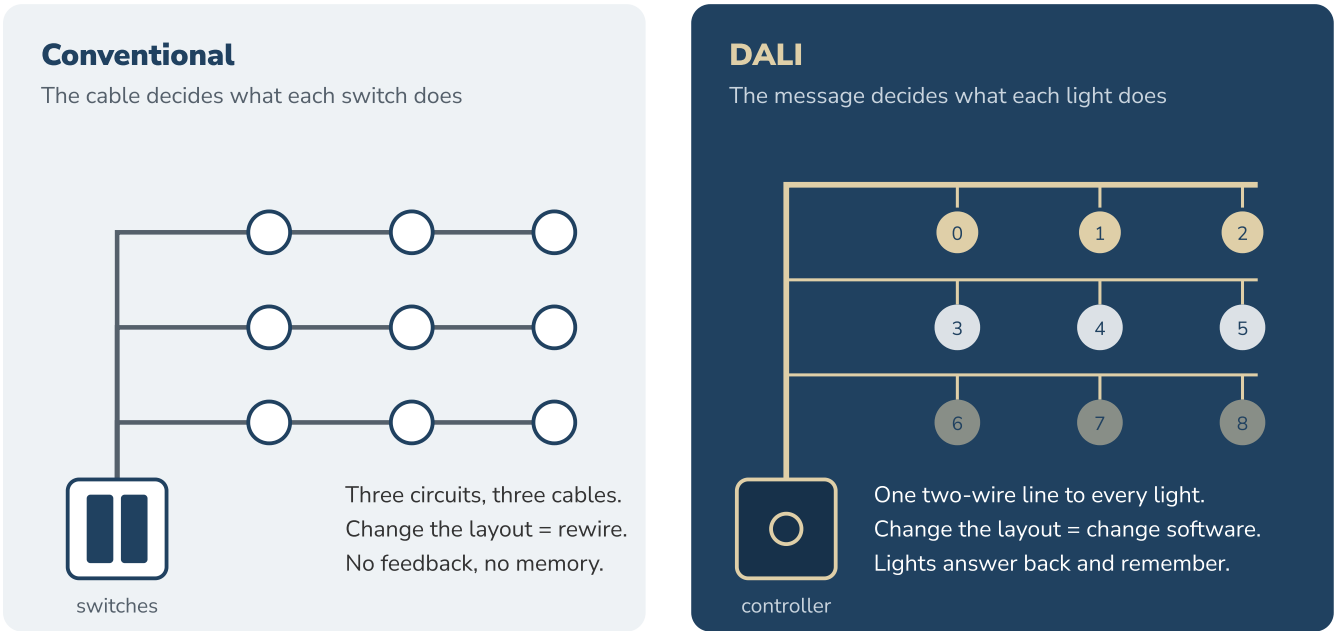
The short version

- Every light on a DALI line has its own address (up to 64).
- Lights can belong to groups, and remember scenes.
- Settings are stored *inside* each light, so the system keeps working even if a controller is swapped.
- Lights report faults, so you find the dead one before the client does.
- It's an open standard: lots of manufacturers, one language.

BEFORE AND AFTER

Why not just use switches?

With conventional wiring, the cable *is* the control. If the switch by the door controls the four downlights, it's because a switched live runs from that switch to those four lights. Want the switch to do something different? Out come the floorboards.



Same nine lights, two philosophies. On the right, each light keeps a permanent mains supply and the gold DALI pair carries the instructions. Numbers are the lights' DALI addresses.

What about ordinary dimmers?

Phase dimmers chop up the mains waveform and hope the LED lamp copes. Some do; many flicker, buzz or refuse to dim below 20 per cent. An older approach for commercial lighting, **1–10 volt**, uses a separate low-voltage pair where the voltage sets the brightness. It works, but it's one level for everything on that pair, with no addresses and no feedback.

What DALI adds

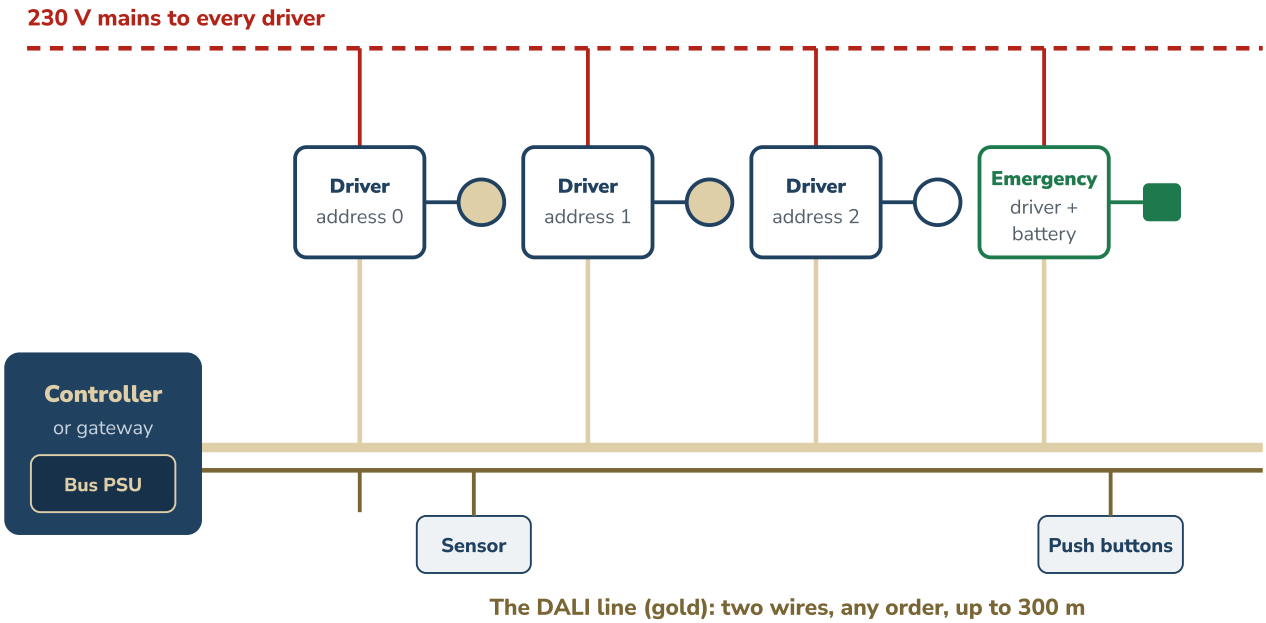
- **Individual control** of up to 64 lights per line, without extra cables.
- **Smooth, flicker-free dimming** down to very low levels (with good drivers).
- **Memory**: groups, scenes, minimum and maximum levels live in each light.
- **Feedback**: lamp failures, energy use and running hours, reported automatically.
- **Choice**: mix certified products from different manufacturers.

02

SECTION TWO

The parts of a DALI system

A cast of five: the lights, the brains, the inputs, the power supply and the wires that join them.



A typical DALI line. Every driver has a permanent mains feed (red) and a connection to the DALI pair (gold). Sensors and push-button interfaces sit on the same pair. A small, current-limited power supply keeps the line alive.

1 Control gear (the drivers)

The box inside or beside each light fitting. It powers the LEDs and obeys DALI commands. DALI calls these **control gear**. There are versions for LED, tunable white and colour, emergency lights, relays and even old-style 1–10 volt equipment.

2 The controller

The brains. It might be a dedicated DALI controller, or a **gateway** that connects DALI to a bigger home or building system such as KNX, Loxone or Control4. It decides what happens and sends the messages.

3 Control devices (the inputs)

Presence sensors, daylight sensors and push-button interfaces. Since DALI-2 these are standardised too, so a sensor from one maker works with a controller from another.

4 The bus power supply

DALI drivers don't power the line themselves. A dedicated **bus power supply** holds it at around 16 volts and limits the current to a safe maximum. It's often built into the controller or gateway, and you need exactly enough of them: usually one per line.

5 The DALI line

Two wires, often labelled DA+ and DA−, looped to every device. Most drivers don't mind which way round they go. One line handles up to 64 drivers plus 64 sensors or buttons. Bigger buildings simply use more lines.

> GOING DEEPER
>
> The rule book is **IEC 62386**, split into parts: 101 covers the wiring and signals, 102 the drivers, 103 the sensors and controllers, the 200-series each type of driver (207 for LED, 209 for colour, 202 for emergency) and the 300-series each type of sensor.

THE DALI LINE

Two wires, five numbers to remember

64
drivers per line (plus 64 sensors and buttons)

16 V
typical line voltage when idle

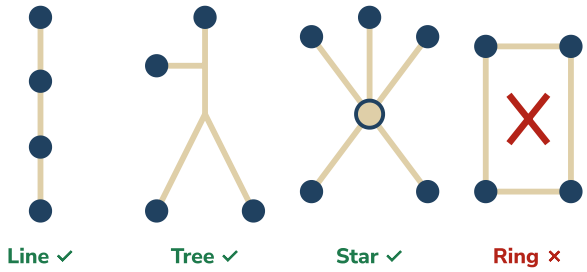
250 mA
maximum current for the whole line

300 m
maximum cable length on one line

2 V
maximum voltage drop along the cable

Wire it almost any way you like

DALI is refreshingly relaxed about layout. You can run the pair in a line from fitting to fitting, branch it like a tree, or star it out from a central point. No end-of-line resistors, no special data cable. The one thing you shouldn't do is join it back on itself in a ring.



Which cable?

Because DALI messages are slow and robust, ordinary mains cable is fine. Guidance from manufacturers runs roughly: up to 100 m on 0.5 mm², up to 150 m on 0.75 mm², and up to 300 m on 1.5 mm². In UK homes and offices the DALI pair usually travels as the two spare cores of a **5-core 1.5 mm² cable** alongside the light's own live, neutral and earth.



Brown · live
Blue · neutral
Green/yellow · earth
Black · DALI
Grey · DALI
(a common convention: label it!)

The usual UK arrangement. Power and control share one cable. Always sleeve and label the DALI cores and note the colours on the drawings.

Safety: DALI is not "low voltage" wiring

The DALI line runs at about 16 volts, so it's tempting to treat it like a data cable. Don't. The standard only requires **basic insulation** between DALI and the mains inside a driver, so it is **not SELV** (safety extra-low voltage). It must be installed as a mains circuit, in mains-rated cable and terminals, kept apart from data, alarm and other SELV wiring, and isolated before anyone works on it. Installation is a job for a competent electrician.

GOING DEEPER · THE POWER BUDGET

Each driver may draw up to **2 mA** from the line; DALI-2 sensors declare their own figure (often 3–15 mA). Add them up and keep the total comfortably below what the bus power supply guarantees: 64 drivers × 2 mA = 128 mA, well inside a 250 mA supply. Adding a second supply "for luck" can push the line over its 250 mA limit, so don't.

SECTION THREE

03 Addresses, groups and scenes

Who's who, who goes together, and how they like to be set when guests arrive.

64 addresses

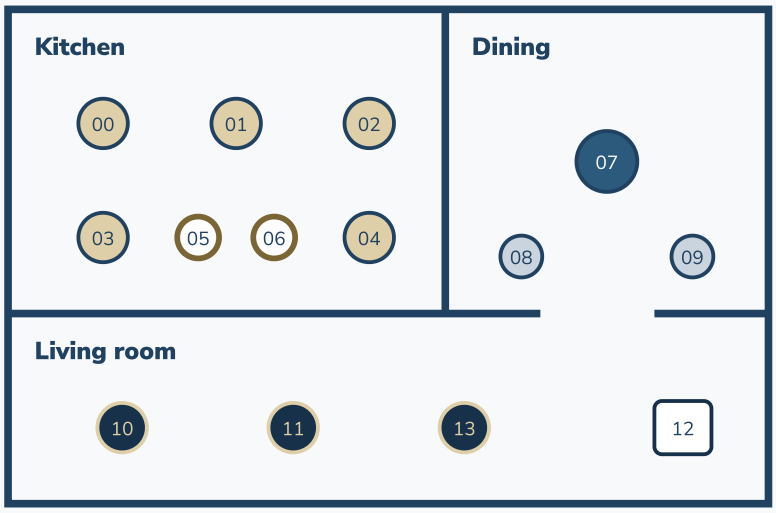
Every driver on a line gets a unique **short address** from 0 to 63. It's how a controller speaks to one light and only that light.

16 groups

Lights can join any of 16 **groups**. One message to "group 2" and every member reacts together, perfectly in step. A light can be in several groups at once.

16 scenes

Each light remembers its own level for 16 **scenes**. Call "scene 3" and every light goes to its stored level for scene 3. One message, whole room set.



Groups in this example

- **Group 0** kitchen downlights
- **Group 1** island pendants
- **Group 2** dining (pendant + walls)
- **Group 3** living room
- **Group 15** everything downstairs

Numbers are DALI short addresses. Address 12 is a floor lamp on a DALI relay, so it can join scenes too.

Every light here is also in group 15, so "all off" is one message.

Scenes: the room remembers how you like it

Scene	Kitchen downlights	Island pendants	Dining	Living room
0 · Bright (cleaning, guests arriving)	100 %	100 %	100 %	100 %
1 · Cooking	90 %	60 %	30 %	off
2 · Dinner	15 %	40 %	50 %	20 %
3 · Film night	off	5 %	off	3 %
4 · Midnight snack	off	10 %	*not in scene*	*not in scene*

"Not in scene" means the light simply ignores that scene and stays as it is, so a late-night kitchen visit doesn't switch off the film in the next room.

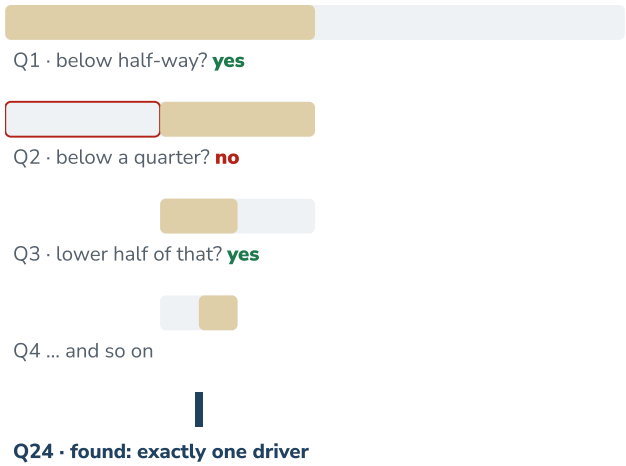
COMMISSIONING

How the lights get their names

Drivers come out of the box with no address at all. So how does a controller find 40 identical drivers hidden in a ceiling and give each a different number? It plays a very fast game of "higher or lower".

1. **"Everybody, wake up."** The controller tells every unaddressed driver to get ready for addressing.
2. **"Pick a secret number."** Each driver chooses a random number between 0 and 16,777,215. The odds of two drivers picking the same one are tiny.
3. **"Is anyone's number at or below 8,388,608?"** Any driver that is says yes. The controller keeps halving the range: higher or lower, higher or lower…
4. **After about 24 questions** it has pinned down the lowest secret number exactly.
5. **"Whoever has that number, you are now address 0. Please step aside."** That driver drops out of the game.
6. Repeat until nobody answers. Around two seconds per driver, so a full line of 64 takes a couple of minutes.

Halving the range each time



Then: which light is which?

Addresses are handed out in random order, so the installer then **identifies** each one. The controller flashes address 0, someone spots which fitting is blinking and names it "Kitchen downlight 1", and so on. DALI-2 drivers even have a dedicated "identify yourself" command. Good installers label every driver and keep a record.

Adding lights later

There's a version of the game that only invites drivers *without* an address. New lights get found and numbered; existing ones keep theirs. (Running the "everyone" version on a working system wipes every name, which is a very good way to ruin a Friday afternoon.)

GOING DEEPER · THE REAL COMMANDS

The game uses special commands: `INITIALISE` (sent twice, opens a 15-minute window), `RANDOMISE`, then `SEARCHADDR` and `COMPARE` for each guess, `PROGRAM SHORT ADDRESS`, `WITHDRAW` and finally `TERMINATE`. The random number is 24 bits long, so with 64 drivers the chance of a duplicate is roughly 1 in 8,000.

04

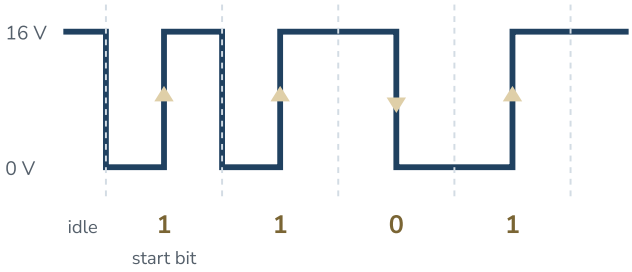
SECTION FOUR

How DALI talks

Short sentences, spoken slowly and clearly. Which, frankly, is how all instructions should be given.

The signal

When nobody's talking, the line sits at about 16 volts. To send a message, the controller briefly pulls the voltage down and lets it back up in a precise rhythm, 1,200 times a second. Every bit has a change in the middle: **low then high means 1**, **high then low means 0**. This style, called *Manchester encoding*, is very hard to misread, even on long cables next to mains.



A DALI message, taken apart

An instruction to a light is just **two bytes**: who it's for, and what to do. Here's "living-room group, go to 30 per cent":

	Start	Address byte: "group 3, here's a level"								Data byte: level 210 (= 30 %)							
		1	0	0	0	0	1	1	0	1	1	0	1	0	0	1	0
	always 1	who: one light, a group, or everyone								what: a brightness level or a command number							

Questions and answers

Some messages are questions: "What level are you at?", "Is your lamp working?". The light replies with a single byte a few milliseconds later. No reply means "no" (or "nobody home"); a garbled reply means several lights answered at once.

Say it twice

Instructions that change a light's settings (rather than just its brightness) must be sent **twice within a tenth of a second**. A stray glitch can't accidentally reprogram your lighting.

Polite, not fast

1,200 bits a second is gentle by modern standards. Each message plus the pause after it takes about 30 milliseconds, so a line handles roughly **30 instructions a second**. That's plenty, as long as the controller is clever about it.

One message per light: the "popcorn" effect



64 lights × 28 ms ≈ 1.8 seconds of stragglers

One group or scene message: all together



GOING DEEPER · THE ADDRESS BYTE

A single light at address *A* is written `0AAAAAAS`, a group *G* is `100GGGGS`, and "everyone" is `1111111S`. The last bit, *S*, says whether the second byte is a brightness level (0) or a command (1). So `0xFE 0xFE` means "everyone to full" and `0xFF 0x00` means "everyone off".

05

SECTION FIVE

Dimming, done properly

Why "half brightness" is level 229, not 127, and why that's a good thing.

Your eyes are not a light meter

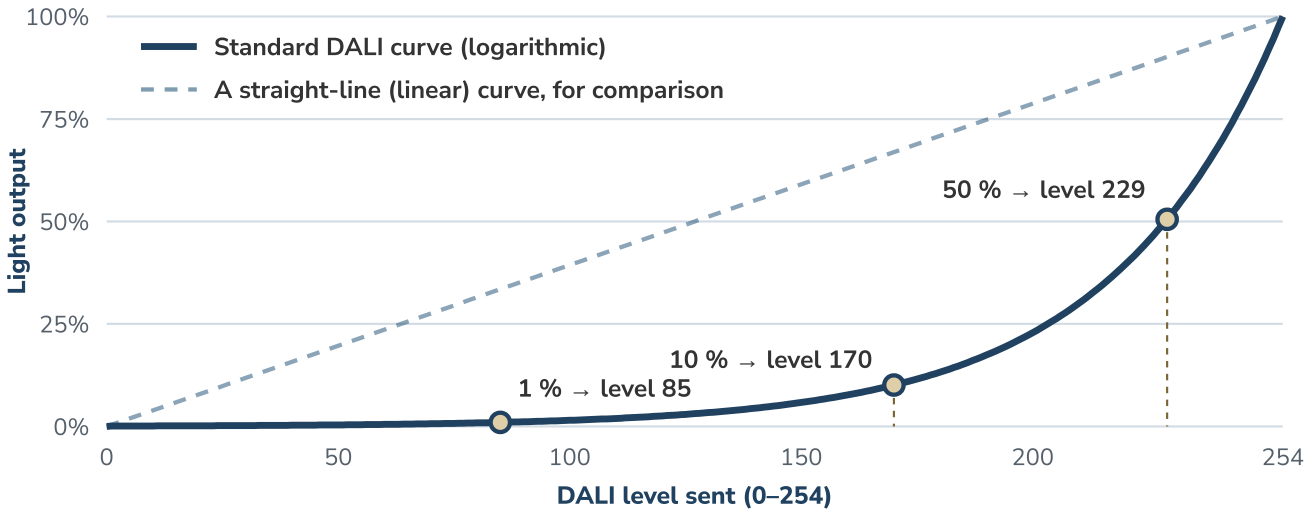
Human vision is wonderfully non-linear. Going from 1 to 2 per cent light output looks like a big jump; from 90 to 91 per cent you'd never notice. Equal steps of light would cram all the useful control into the bottom few steps.

DALI solves this with a **logarithmic dimming curve**. Levels run from 1 (0.1 per cent) to 254 (100 per cent), and every step is about **2.8 per cent brighter than the one before**. To your eyes, the steps feel even, all the way from a faint glow to full blast.

Handy landmarks

Light output	DALI level
0.1 % (faintest)	1
1 %	85
10 %	170
50 %	229
100 %	254

Each tenfold change in light is about 85 levels.



The DALI dimming curve. Most of the range is spent where your eyes are most sensitive: in the dim end. Some LED drivers also offer a straight-line (linear) curve for special cases.

Fades that feel expensive

Each light stores a **fade time**. When it's told to change level or go to a scene, it glides there over that time, however far it has to travel. Settings run from instant to 90 seconds, and DALI-2 adds an extended fade of up to 16 minutes, lovely for a sunrise wake-up or a slow "goodnight".

Our tip: 0.7 to 1 second makes everyday switching feel smooth and premium, not laggy.

GOING DEEPER · THE FORMULAS

Light output for level *n* (1–254):

$$X = 10^{((n - 1) / (253/3) - 1)} \%$$

Fade time for setting *X* (1–15):

$$T = 0.5 \times \sqrt{(2^X)} \text{ seconds}$$

Watch out: some controllers map "50 %" on a slider to level 127, which on this curve is only about 3 per cent light. If "half" looks gloomy, that's usually why.

TUNABLE WHITE AND COLOUR

Not just how bright, but what colour

White light comes in many shades, from the amber glow of a candle to the cool blue-white of a bright overcast sky. With the right DALI drivers you can choose the shade, as well as the brightness, from the same two wires.



2200 K	2700 K	3000 K	4000 K	5000 K	6500 K
candle-like	cosy home	warm white	neutral, kitchens	bright, focused	daylight

Tunable white

Lights that can move between warm and cool white are called **tunable white**. DALI handles them with a special driver type, known as **DT8**, which accepts a colour temperature directly. The controller says "3000 K, please" and the driver works out the mix of warm and cool LEDs, keeping the brightness steady while it does.

There's another way to do it: two ordinary drivers, one warm and one cool, each on its own address. It works with any controller, but uses twice the addresses and makes the controller do the maths. Where the controller supports DT8, it's usually the neater choice.

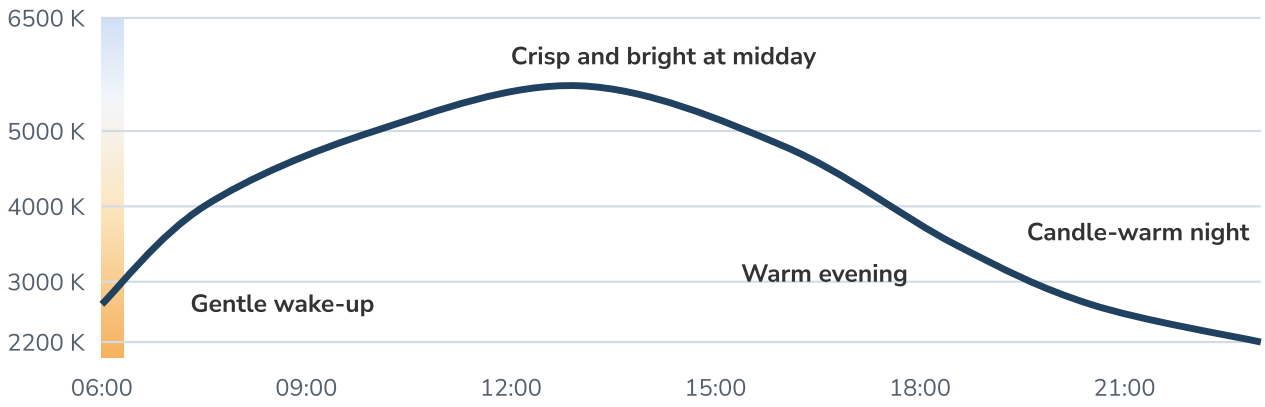
Full colour

The same DT8 family covers colour lighting: red, green and blue (plus white, amber and more) channels, or precise colour coordinates for architectural work. Great for feature lighting, gardens, pools and the occasional disco.

> GOING DEEPER · MIREKS
>
> DALI doesn't actually send Kelvin. It sends **mireks**: one million divided by the Kelvin value. 2700 K is 370 mirek and 4000 K is 250. Steps in mireks look more even to the eye than steps in Kelvin. Higher mirek means warmer light.

Lighting that follows the sun

Combine tunable white with a clock and you get **human-centric** (or circadian) lighting: cooler, brighter light through the working day, warming up as evening comes and dropping to a candle-warm glow late at night. It's widely used in care homes, schools and offices, and it's lovely at home too.



A typical day of tunable-white lighting, set up as a schedule in the controller. The DALI drivers simply follow the colour temperature they're sent.

06

SECTION SIX

Sensors, switches and emergency lighting

The inputs that make lighting automatic, and the lights that must never fail.

DALI-2 brought the inputs in from the cold

The first version of DALI only standardised the lights. Sensors and switches existed, but each manufacturer did its own thing, so a sensor from one brand would only talk to that brand's controller. **DALI-2** changed that with standard **control devices**, each made of one or more *instances*:

- **Push buttons**: short, double and long presses, reported as events.
- **Presence sensors**: "occupied", "vacant", "still occupied".
- **Light sensors**: how bright it is in the room.
- **Absolute inputs**: sliders, dials and switches.

One ceiling multisensor might hold a presence instance and a light instance, reporting both over the same two wires.

Presence detection

Lights come on when someone walks in and off a set time after they leave. Perfect for corridors, toilets and utility rooms.

Absence detection

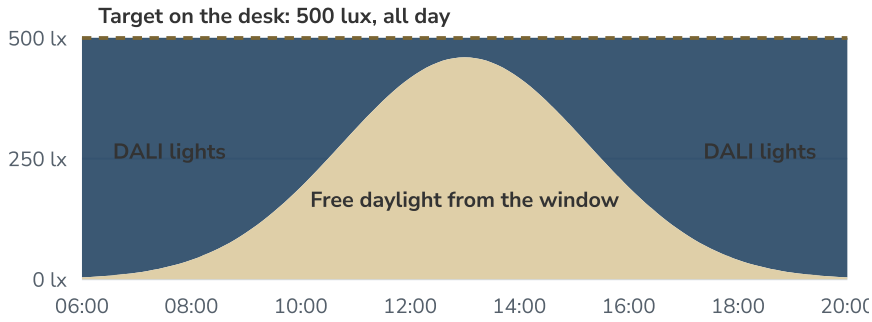
You switch on; the sensor only switches off. Saves energy without lights popping on every time the cat strolls through.

Corridor hold

Instead of dark-or-bright, corridors drop to a gentle 10–20 per cent when empty. Safer, calmer, still efficient.

Daylight harvesting

When the sun streams in, why pay to light the room? A light sensor measures the brightness and the controller trims the DALI lights to make up only the difference. The desk stays at a steady level all day; the lights do as little as possible.



Constant light, minimum energy. Gold is free daylight; navy is what the DALI lights add.

GOING DEEPER · EVENTS AND INSTANCES

Control devices have their own 64 addresses, separate from the lights, and use longer 24-bit messages that lights simply ignore. Instead of waiting to be asked, they send **event messages** when something happens. Each instance has a type (1 push button, 3 presence, 4 light), a priority and a filter so you only hear the events you care about. Check your controller supports the instance types you plan to use.

EMERGENCY LIGHTING

Lights that test themselves

Emergency lights only matter on the worst day of the year, so they have to be checked regularly. In commercial buildings and many rental properties, that's a legal duty. DALI can take most of the drudgery out of it.

The testing routine (UK)

The UK code of practice, **BS 5266-1** (the 2025 edition replaced 2016), expects emergency lighting to be tested routinely:

- **Every month**, a short **function test**: simulate a mains failure and check every emergency light comes on from its battery.
- **Every year**, a **full rated-duration test**, usually three hours, to prove each battery lasts as long as it should.
- Results recorded in a **logbook**, with faults fixed promptly.

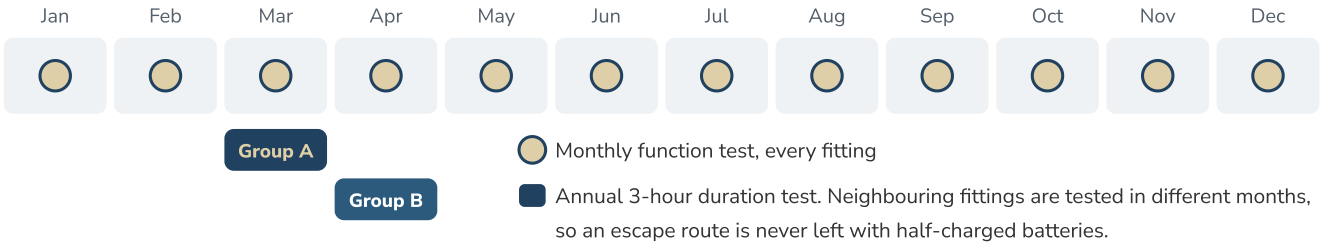
Done by hand, that means someone walking the building with a test key and a clipboard, every month, forever.

How DALI helps

DALI emergency drivers (known as **DT1**) can run their own function and duration tests on a schedule, then report the results: battery charge, test passed, lamp failed, battery failed. A DALI controller collects it all, so the logbook can largely fill itself and faults are flagged the day they happen.

Automatic test systems are covered by **BS EN 62034**. Testing remains the responsible person's duty; the system just makes it far easier to do, and to prove.

A year of automatic testing, with duration tests staggered



Why stagger the long tests?

After a three-hour test a battery can take up to a day to recharge. If every light on an escape route were tested at once and the power then failed for real, the route would be poorly lit. DALI lets you set a different test start time for each fitting or group.

A word of caution

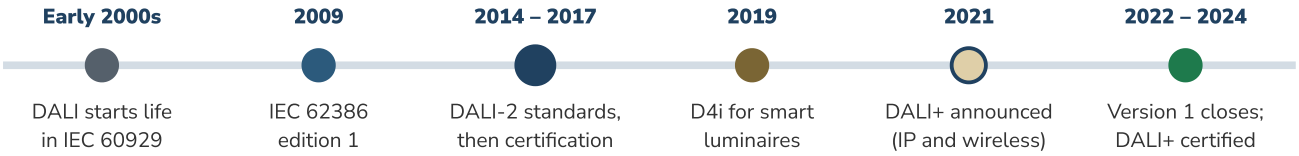
Emergency lighting is life-safety equipment. Some smart-home controllers can read DALI emergency status but aren't designed to be the system of record. Make sure testing, logging and fault response meet BS 5266-1 and your fire risk assessment, whatever controller you use.

07

SECTION SEVEN

The DALI family

DALI-1, DALI-2, D4i and DALI+: what each one is, and why the logo on the box matters.



DALI version 1

Where it all started

Defined only the lights (control gear). Products were self-declared rather than independently tested, so compatibility between brands was usually good but never guaranteed. Huge numbers are still installed and still work happily with modern controllers.

DALI-2

Today's standard

Adds standard sensors, push buttons and controllers, tighter timing, more commands (identify, extended fades) and, crucially, **mandatory certification**: products are tested against the standard before they can carry the DALI-2 logo. If you're buying new, look for it.

D4i

DALI for smart luminaires

Builds on DALI-2 for intelligent light fittings. A D4i driver stores data about the luminaire, reports its **energy use**, running hours, temperature and faults, and can power a small sensor or wireless node plugged into a standard socket on the fitting.

DALI+

DALI without the wires

The same DALI-2 commands carried over IP networks. The first certified carrier is **Thread**, a low-power wireless mesh. Ideal for retrofits where pulling new cable isn't practical, with bridges linking wireless and wired DALI.

Do old and new mix?

Mostly, yes. Version-1 lights work with DALI-2 controllers (they just don't gain the new features). What doesn't mix well is version-1-era *sensors*, which were proprietary. Uncertified "DALI-compatible" products are the usual source of odd behaviour on mixed systems.

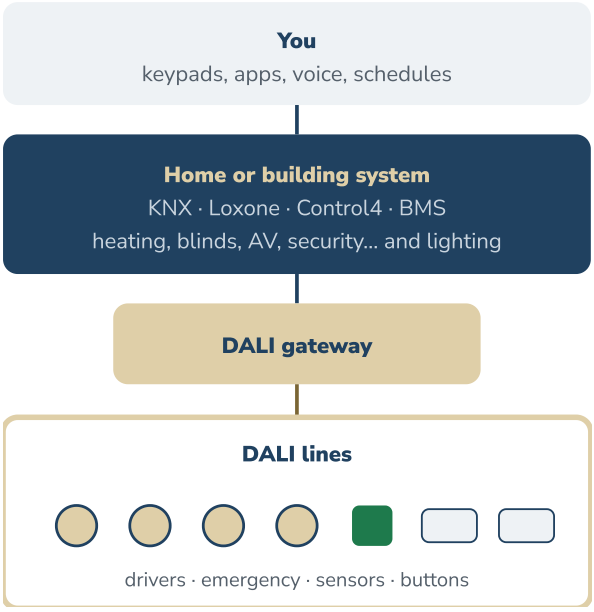
GOING DEEPER · CHECK BEFORE YOU BUY

The DALI Alliance keeps a free online **product database** of certified DALI-2, D4i and DALI+ products at dali-alliance.org. If a product claims DALI-2 but isn't listed, ask why.

THE BIGGER PICTURE

How DALI fits with everything else

DALI is a **lighting** standard, and it's very good at it. It isn't trying to run your heating, blinds, audio or security. In a smart home or building it usually sits underneath a broader system, joined by a gateway.



DALI in smart-home systems

- **KNX** uses KNX-DALI gateways: one box per one or two DALI lines, each mapping DALI groups and scenes onto KNX.
- **Loxone** has its own DALI Extension (up to 64 drivers, with DALI-2 sensor support on current hardware) plus wireless options.
- **Control4** has no DALI port of its own; it reaches DALI through a KNX-DALI gateway or a third-party DALI gateway with a Control4 driver.
- **Home Assistant** and other open platforms connect via DALI gateways with a network interface.

Gateways vary a lot in what they expose: tunable white, emergency reporting and DALI-2 sensors are the usual gaps. Check before you promise.

DALI compared with other ways of controlling lights

	Switches & phase dimmers	1–10 V	DALI-2	DMX	Proprietary wireless
Control each light	**No**	**No**	**Yes, 64 per line**	**Yes, 512 channels**	**Yes**
Feedback & faults	**No**	**No**	**Yes**	**Limited**	**Varies**
Mix manufacturers	**Hit and miss**	**Yes**	**Yes, certified**	**Yes**	**Usually not**
Speed	Instant	Instant	~30 messages/s	Very fast	Varies
Extra wiring	Switch drops	Separate low-voltage pair	2 cores in mains cable	Data cable, terminated	None
Best for	Simple rooms	Basic commercial dimming	Architectural lighting, homes, offices	Stage, effects, colour shows	Retrofits

SECTION EIGHT

08 Planning a DALI system

A short checklist that avoids the long, expensive conversations later.

The checklist

1. **Count the lights and sensors** on each floor or zone. Plan around 50 drivers per line, not the full 64, so there's room to add more later.
2. **Decide the groups and scenes** before anyone commissions anything: which lights belong together, and the moods for each room.
3. **Choose certified DALI-2 drivers** with a genuinely low minimum level and good flicker performance. Decide early on tunable white (DT8) or not.
4. **Check the controller or gateway** supports what you need: tunable white, sensors, emergency reporting, number of lines.
5. **Size the power supply**: count each driver at 2 mA plus each sensor's figure, and leave headroom.
6. **Plan the cable**: mains-rated, usually 1.5 mm², no rings, and every DALI core labelled.
7. **Agree the behaviour** after a power cut and if the controller fails (see right).
8. **Insist on records**: an address list, group and scene plan, and the commissioning file.

The 3 a.m. surprise

Out of the box, most DALI drivers are set to come on at **full brightness** when the power returns. In an office that's sensible. At home, after a brief power cut in the middle of the night, it means every light in the house blazing on while everyone's asleep.

Two settings, stored in every driver, decide this:

Setting	What it controls	Our usual choice at home
Power-on level	What the light does when mains power returns	Off, or back to the last level (DALI-2)
System failure level	What it does if the DALI line itself goes quiet (controller unplugged, supply fault)	Stay exactly as it is

In offices, corridors and anywhere safety needs light, "full on" can be the right answer. The point is to choose, not to inherit a default.

GOING DEEPER · A WORKED EXAMPLE

A four-bedroom house: 46 downlights, 6 pendants and 4 DALI-2 sensors at 6 mA each on the ground floor. Drivers: 52 × 2 mA = 104 mA. Sensors: 4 × 6 mA = 24 mA. Total 128 mA, comfortably within a 240 mA gateway supply. 52 drivers is above our 50 comfort line, so we'd split the ground floor over two lines and leave both with room to grow.

HONEST ANSWERS

Myths and frequently asked questions

"DALI is only for big commercial buildings."

It started there, but it's now common in quality homes, especially where there are lots of downlights, tunable white or a smart-home system. The extra cost is mostly in the drivers and a gateway, not the wiring.

"The DALI wires are low voltage, so they're safe to treat like data cable."

No. DALI is not SELV and must be installed and isolated as a mains circuit. See page 6.

"If the controller dies, the lights stop working."

Each driver keeps its settings and goes to its system failure level, which you choose. Groups and scenes are stored in the lights themselves, so a replacement controller can pick up where the old one left off.

"Any 'DALI' driver will work with any DALI controller."

Certified DALI-2 products are tested to work together. Uncertified "DALI-compatible" ones usually do, but not always, and they're where most strange faults come from.

"DALI is slow, so the lights will lag."

A well-designed system uses group and scene commands, so a whole room changes with a single message in a fraction of a second. Lag and the popcorn effect are signs of a controller sending one message per light.

Can I still have normal light switches?

Yes. Push-button interfaces let ordinary-looking retractive switches or designer keypads control DALI groups and scenes, and you choose what each button does in software.

Does DALI save energy?

On its own, a little, through dimming. Combined with presence and daylight sensors, typically a lot, because lights only run when and as much as they're needed. D4i drivers can even report their own energy use.

Can I add DALI to an existing house?

If the light fittings already have a spare pair of cores (or new cable can be pulled), yes. Otherwise, DALI+ and other wireless options are worth a look. Each light needs a DALI driver either way.

How many lights can I have?

64 drivers per DALI line, and as many lines as you like. A large office simply has lots of lines connected to one control system.

Does DALI work with smart speakers and apps?

Not directly; DALI doesn't speak Wi-Fi. A gateway or home-automation system sits in between and connects your lighting to apps, voice assistants and everything else.

Will DALI still be around in 20 years?

It's an international standard with decades of installed base and an active industry alliance still developing it (DALI+, D4i). It's about as safe a bet as lighting technology gets.

KEEP THIS PAGE HANDY

DALI at a glance

Per DALI line

Drivers (control gear)	**64** · addresses 0–63
Sensors & buttons (DALI-2)	**64** · their own addresses
Groups / scenes	**16** / **16**
Line voltage	Typically **16 V** DC when idle
Power supply limit	**250 mA** total; 2 mA per driver
Cable length / voltage drop	**300 m** / **2 V** max
Topology	Line, tree or star; **no rings**
Safety class	**Not SELV**: install as mains
Speed	1,200 bit/s ≈ 30 messages a second

Common driver types

DT1	Self-contained emergency lighting
DT5	Converter to 0/1–10 V output
DT6	LED (the most common)
DT7	Switching (relays)
DT8	Colour: tunable white, RGB and more
D4i	Luminaire data, energy and diagnostics

Levels and fades

Light output	Level	Fade setting	Time
0.1 %	1	1	0.7 s
1 %	85	2	1 s
5 %	144	4	2 s
10 %	170	6	4 s
25 %	203	8	8 s
50 %	229	10	16 s
75 %	243	12	32 s
100 %	254	15	90.5 s

Colour temperature

Kelvin	Mirek	Feels like
2200 K	455	Candlelight
2700 K	370	Traditional bulb, cosy
3000 K	333	Warm white
4000 K	250	Neutral white
6500 K	154	Daylight

Before you sign off a DALI job

Every light found and labelled · groups and scenes tested · power-on and failure levels chosen · line voltage checked at the far end · records handed over.

WORDS YOU'LL HEAR

Glossary

Address	The unique number (0–63) a driver uses on its DALI line. Also called a short address.
Broadcast	A message sent to every light on a line at once.
Bus / line	The two-wire DALI connection and everything on it. One power supply, up to 64 drivers and 64 control devices.
Bus power supply	The small, current-limited supply that keeps the DALI line at about 16 volts. Often built into a controller or gateway.
Commissioning	Addressing, naming, grouping and setting up every light and sensor so the system behaves as designed.
Control device	A DALI-2 input or controller: sensors, push-button interfaces, application controllers.
Control gear	DALI's name for drivers: the devices that power and control a light source.
D4i	A DALI Alliance certification for intelligent luminaires: built-in power for sensors, luminaire data, energy and diagnostic reporting.
DALI-2	The current generation of DALI, with standardised sensors and controllers and independent product certification.
DALI+	DALI-2 messages carried over IP networks, currently certified over the Thread wireless mesh.
DALI Alliance	The industry body that manages DALI-2, D4i and DALI+ certification and the product database.
Driver	The electronics that turn mains power into what an LED needs. A DALI driver also understands DALI messages.
DT8	The DALI driver type for colour control, including tunable white.
Event	A message a DALI-2 sensor or button sends on its own when something happens.
Fade time	How long a light takes to glide to a new level or scene.
Gateway	A device that connects DALI to another system such as KNX, Loxone, Control4 or a network.
Group	One of 16 sets of lights that can be controlled together with a single message.
IEC 62386	The international standard that defines DALI.
Instance	One input inside a DALI-2 control device, for example one button or one presence detector.
Logarithmic curve	DALI's dimming curve: equal steps look equally different to the human eye.
Mirek	One million divided by the colour temperature in Kelvin. How DALI expresses tunable white.
Popcorn effect	Lights changing one after another instead of together, caused by sending one message per light.
Power-on level	The level a light goes to when its mains power returns.
Scene	One of 16 stored levels in every light, recalled together with one message.
SELV	Safety extra-low voltage. DALI is *not* SELV and must be treated as mains wiring.
System failure level	The level a light goes to if the DALI line loses power or goes quiet.
Tunable white	Lighting whose colour temperature can be adjusted, from warm to cool white.

ABOUT US

We speak fluent geek, but translate to human.

New Forest Technology Services is a smart-home, AV, security and lighting-control company based in Lymington, working across the New Forest, Hampshire and the south coast.

We design, install and look after lighting control on DALI, KNX, Loxone and Control4, and we're often the people called in when someone else's system has been left half-finished. Nothing is impossible. We can make it happen.

If this guide has left you wondering whether DALI is right for your home, your office or that tricky renovation, give us a shout. No obligation, just friendly advice (and maybe a shared sigh about technology).

New Forest Technology Services is a registered Loxone partner, an authorised Control4 dealer and a certified KNX Partner.

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