Lutron LED Drivers

Take control of the LED opportunity

EcoSystem H-Series LED driver

The LED driver is key to the performance of your fixture and the success of your lighting project. Take control of the global LED opportunity with Lutron's full line of LED drivers.

Featuring **Lutron EcoSystem™ technology**
(see page 8)

LUTRON®

save energy with Lutron™ ®

Contents

Lutron LED Driver Families Overview

EcoSystem™ H-Series LED Driver

- Features a smooth fade-to-on and fade-to-black for incandescent-like dimming
- Provides smooth, continuous, and stable 1% dimming for any space in any application
- Ideal for downlights, troffers, and linear lighting
- Available in compact (K) and linear (M) case models

EcoSystem H-Series LED Driver, linear (M) case

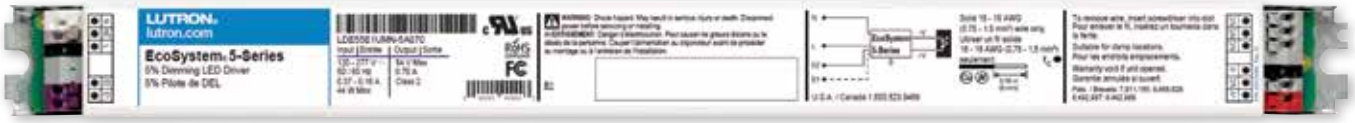
Hi-lume™ A-Series LED Driver

- Smooth 1% dimming for architectural applications
- Ideal for downlights, cove, and track lighting
- Use in conjunction with EcoSystem for individual fixture control
- Easy LED retrofit on existing systems with 2-wire INC/MLV/ELV or 3-wire fluorescent dimming ballasts
- Available in compact (K), linear (M), UL Listed (KL), and independent CE (P), case models

Hi-lume A-Series LED Driver, compact (K) case

EcoSystem 5-Series LED Driver

- Energy-saving, smooth 5% dimming, without compromising dimming quality
- Ideal for downlights, troffers, and linear lighting
- Available in compact (K), linear (M), independent CE (R), and independent Japanese (T) case models



EcoSystem 5-Series LED Driver, linear (M) case

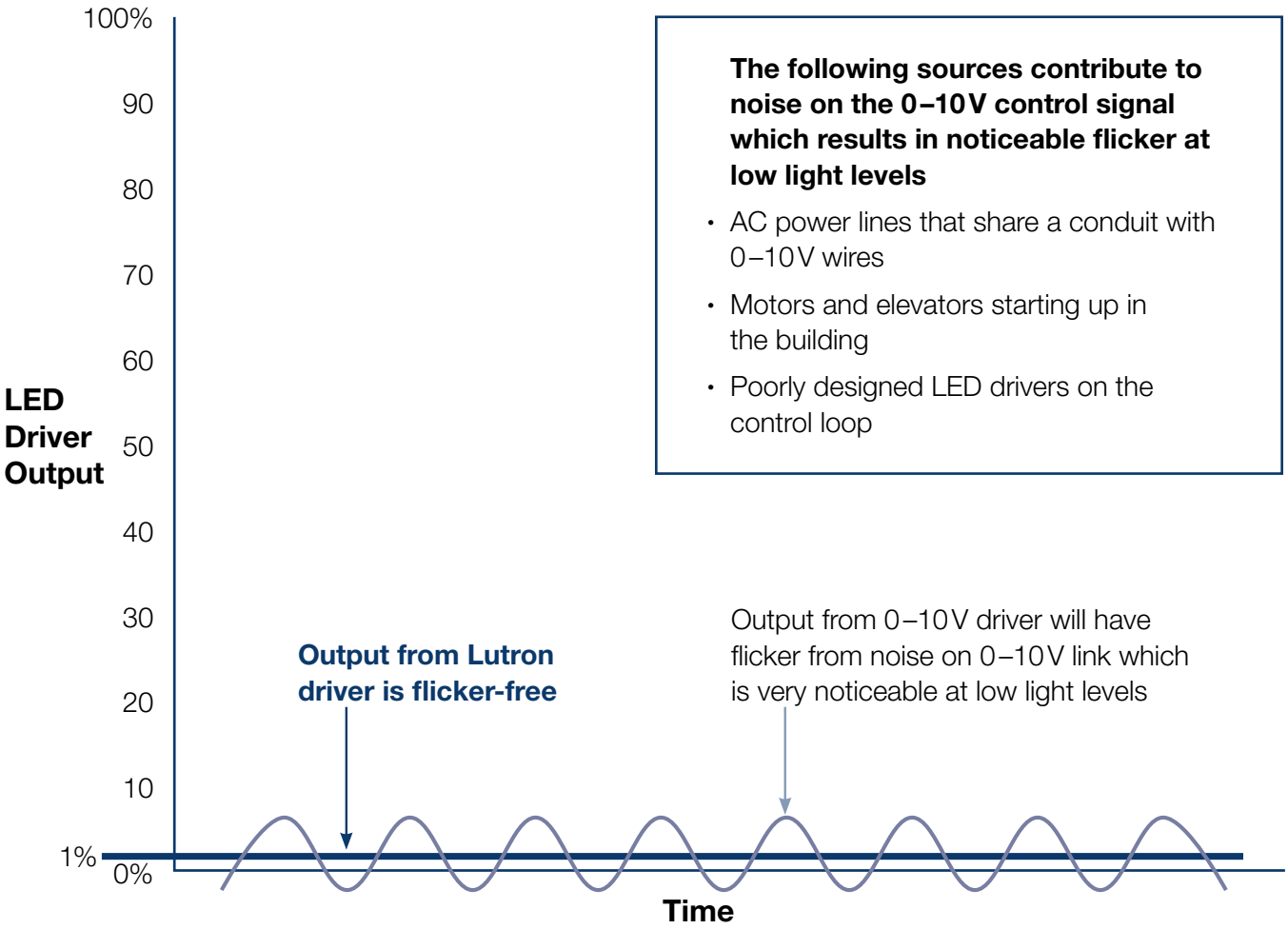
Why Lutron Drivers?

Outstanding performance and reliability

Look to the full line of Lutron drivers to deliver outstanding performance and reliability. Lutron drivers also offer system design flexibility to meet the needs of every application, with exceptional service and support wherever, whenever you need it.

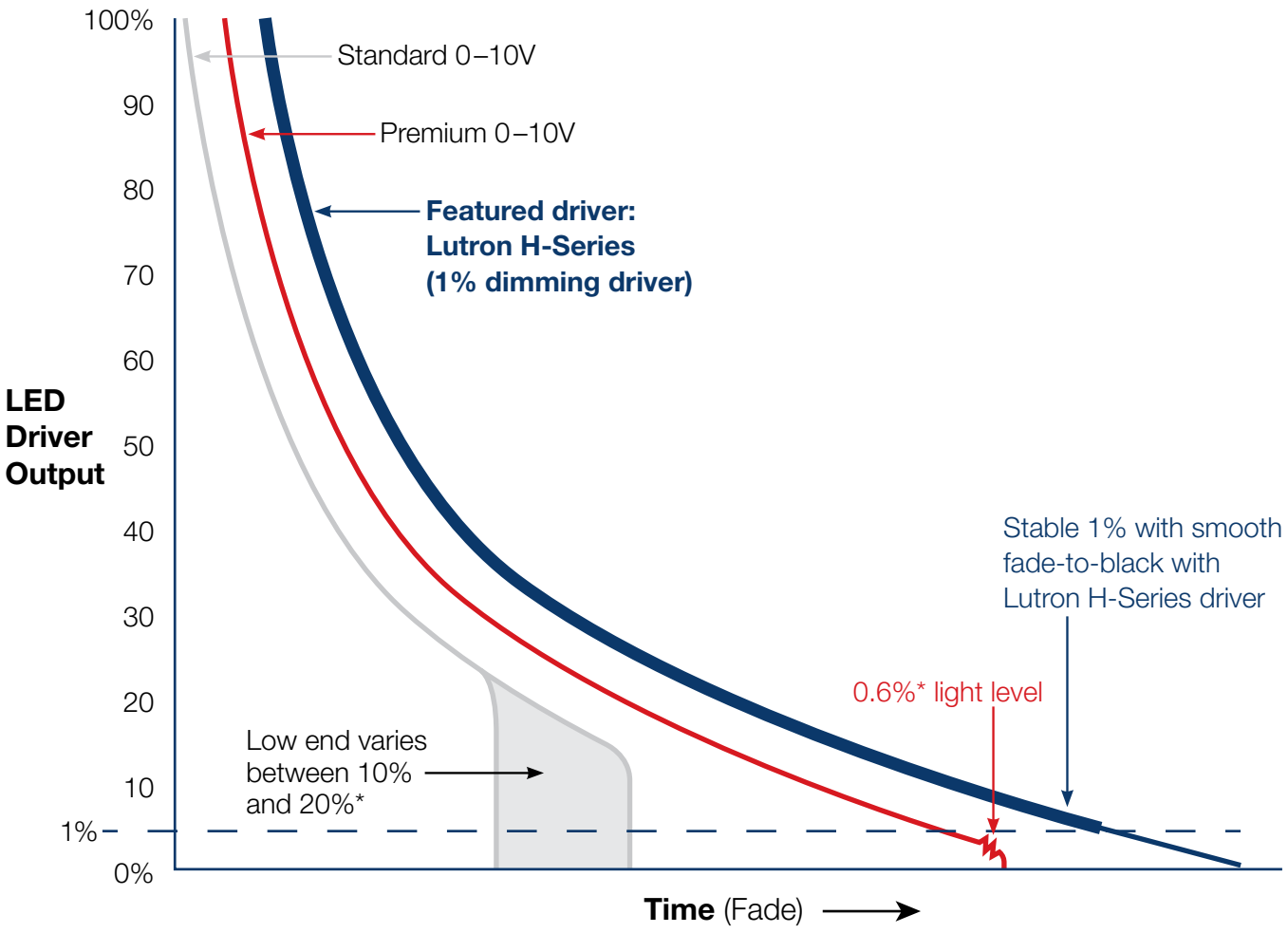
Flicker-free, high-performance dimming

High performance low end dimming is only valuable if the output is flicker-free. Analog communication methods can not maintain a light level as well as digital methods. 0–10V control is susceptible to noise, which causes perceptible flicker at very low light levels.



Stable LED dimming—no drop-out or dead travel

Lutron LED drivers deliver stable dimming and an incandescent-like, smooth, fade-to-black performance unlike any other LED drivers in the market.



* The lowest light level attained depends on the load tested.

Why Lutron LED Drivers?

Design flexibility

Individual fixture control or zone control helps you design LEDs into systems alongside fluorescent and other lighting sources.

Individual fixture control with EcoSystem™

- Easier to wire than 0–10V; two control wires with no polarity or topology restrictions
- Rezone without rewiring
- Granular control and fault reporting
- System monitoring and data reporting

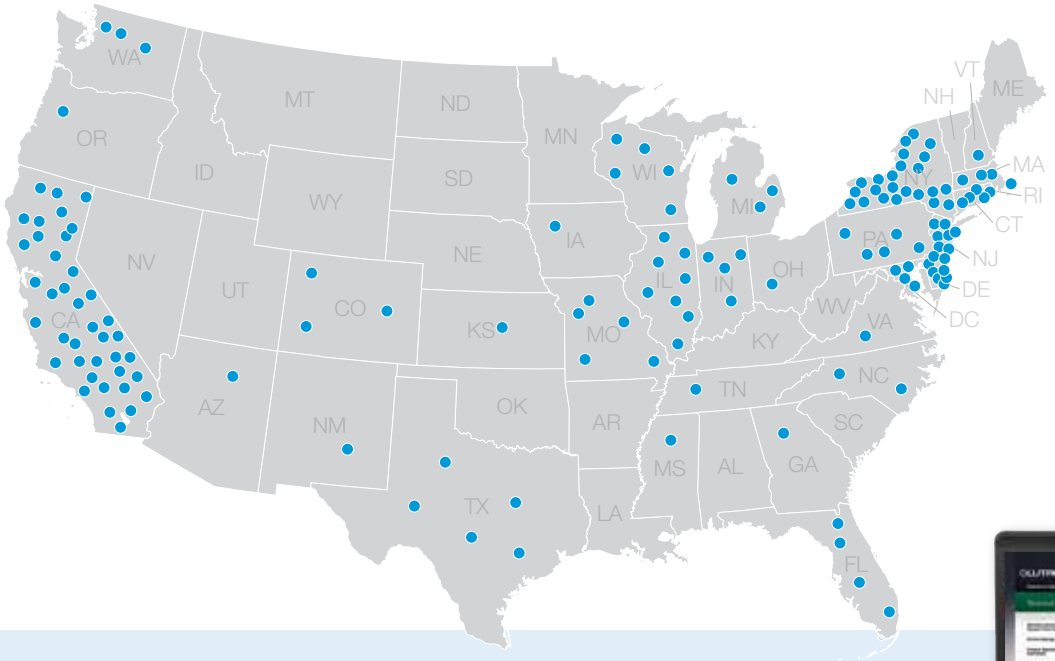
Zone-based control with 2-wire or 3-wire phase dimming

- Easy retrofit; no extra wires needed to replace existing incandescent/low voltage or 3-wire fluorescent dimming ballasts
- Dims to 1% with a variety of Lutron dimmers
- Lutron LED drivers provide longer life and smoother dimming performance than any screw-in LED bulb

Collaboration with all fixture manufacturers

Lutron works with **over 300 fixture manufacturers globally** to deliver exceptional dimming performance. The map below indicates our **top 60+ manufacturer accounts** across the U.S.

Choose from **over 1000+ fixtures** with Lutron LED drivers from those accounts; the fixtures are listed on our High Performance LED fixture list.



To find a fixture, visit the LED Control Center of Excellence:

www.lutron.com/findafixture

leds@lutron.com

1.877.DIM.LED8

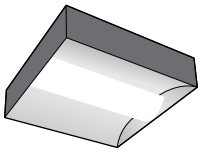
Features and Benefits

Lutron's best-in-class product features

Feature	Benefit
Meets NEMA 410 inrush standard	Prevent breaker tripping caused by large inrush currents drawn by LED drivers that don't meet the standard
H-Series and 5-Series models dissipate less than 0.3 W standby power at 120 V and 277 V	These models exceed Energy Star requirements
Remote mountable up to 100 feet[1], depending on wire size, with a Class 2 output	Flexibility to install within the fixture or remotely in a panel
Sophisticated software algorithms maintain a 0.97 power factor at 120 V and 0.90 power factor at 277 V[2]	Reduce overall power system loss and demand charges on your power system
Tested to survive 4,000 V surge	Protect the fixture in regions that are prone to lightning strikes
Patented thermal fold-back protection	Protect drivers and fixtures from overheating by reducing power output
Models of the 15–75 W linear driver available that meet the power line quality requirements of the Design Lights Consortium (DLC) standard	DLC compliance ensures a high quality LED fixture and allows the end user to apply for local utility rebates
UL Type TL Rating on 15–75 W linear driver for linear and troffer fixtures	Type TL Rating makes it easier for fixture manufacturers to offer the customer more choices in LED drivers by simplifying the process of getting standards approval
A-Series models support the Lutron QwikFig™ manufacturing system	Fixture manufacturers can now stock fewer models of Lutron LED driver needs so that they can meet demanding customer lead times
Meets UL 1598C requirements for field replacement	In the event that an LED driver does not meet your expectations, this standard allows you to replace the driver without sending the fixtures back to the manufacturer

[1] See specification sheet for model-specific remote mount distances.
[2] Some lower wattage models have a 0.88 power factor at 277 V. Please refer to the specification submittal for details.

Lutron Global LED Driver Product Offering

	Hi-lume™ A-Series		
Dimming Range	(100%–1%)		
Cost	$$$		
Rating Type	cUL: 120V~ only	cUL: 120–277V~	CE/ENEC: 220–240V~
Control Type	2-wire forward phase	3-wire/EcoSystem	EcoSystem
Prefix	LTE	L3D	LDEA
Fixture Type Compatibility			
 **Downlight**	**5–40W**  ENERGY STAR | CCR | PWM | CV | QF	**5–53W**  ENERGY STAR | CCR | PWM | CV | QF	**5–25W**  CCR | PWM
 **Troffer, Linear Pendant, Linear Recessed**	**5–40W**  ENERGY STAR | CCR | PWM | CV | QF	**5–40W**  ENERGY STAR | CCR | PWM | CV | QF	
 **Cove, Under Cabinet**	**5–40W**  UL Listed CCR | PWM | CV	**5–40W**  UL Listed CCR | PWM | CV	**5–25W**  CV

EcoSystem™ H-Series	EcoSystem 5-Series	
(100%–1%, fade-to-black)	(100%–5%)	
$$	$	
cUL: 120–277V~	cUL: 120–277V~	CE/ENEC: 220–240V~
EcoSystem	EcoSystem	EcoSystem
LDE1	LDE5	LDE5
8–40W  ENERGY STAR | **EE** | **CCR/PWM***	**8–40W**  ENERGY STAR | **EE** | **CCR**	**8–35W**  **EE** | **CCR**
15–75W  **DLC** | **EE** | **CCR/PWM***	**15–75W**  **DLC** | **EE** | **CCR**	**25–50W**  **EE** | **CCR**

*PWM below 5%

ENERGY STAR Energy Star Compliant models available

DLC DLC Compliant models available

QF QwikFig

EE Energy efficient with <0.3W typical standby

CCR Constant Current Reduction dimming

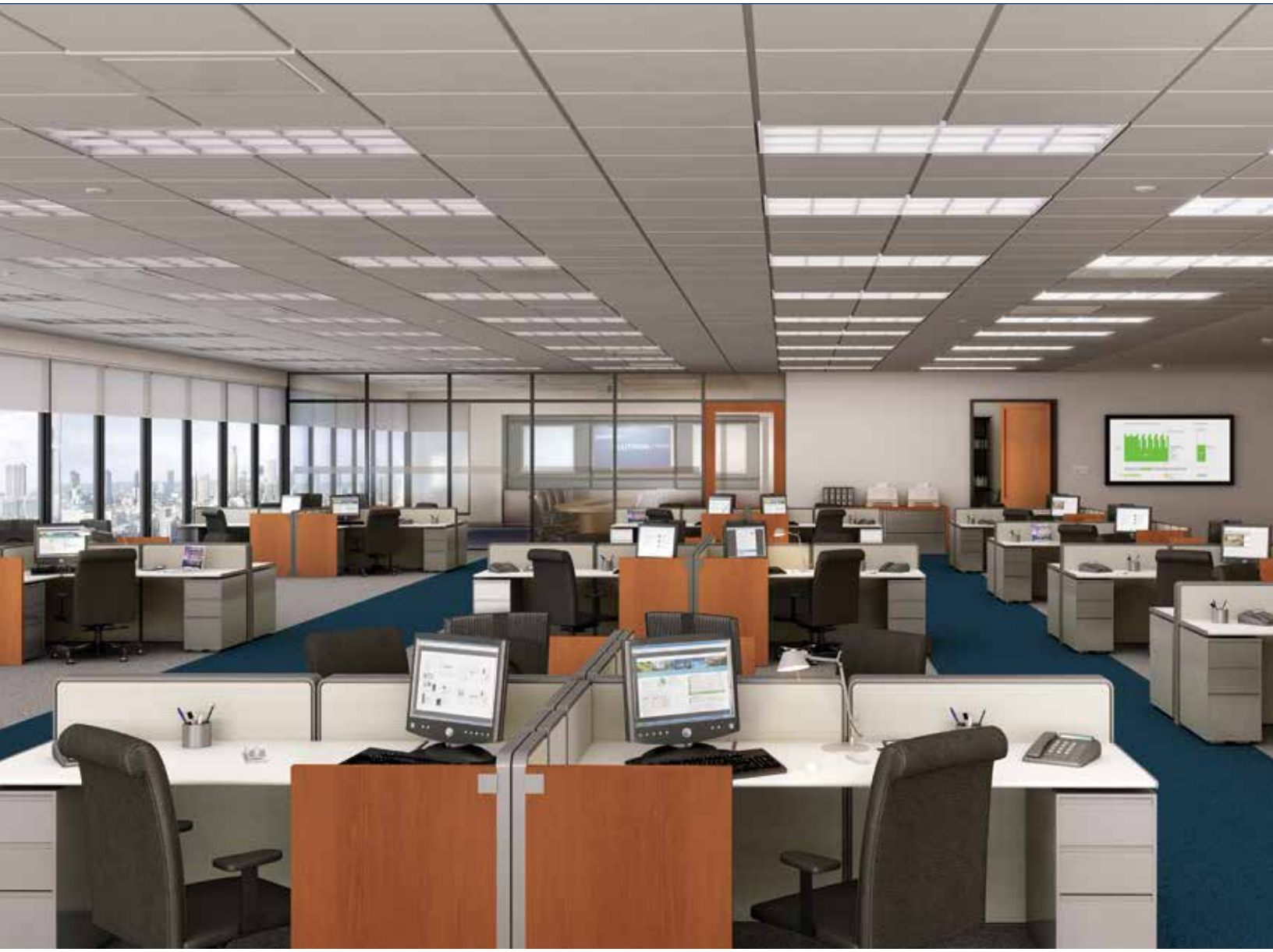
CV Constant Voltage dimming (PWM only)

PWM Pulse-Width Modulating dimming

What is Qwikfig™? QwikFig is a program for manufacturers that allows them to stock and easily configure Lutron A-Series LED drivers on demand. They are able to stock fewer models of Lutron LED drivers to meet all their driver needs, and quickly configure these drivers to meet demanding customer lead times.

- Lower fixture lead time
- Customize driver to deliver any power density or lumen density required by the specifier

A Look at EcoSystem™



What is EcoSystem?

EcoSystem is a digital control method for LEDs and ballasts that allows you to address individual fixtures and provides status feedback from the fixtures. EcoSystem makes it easy to digitally assign any or all of the following controls to one or many fixtures, without any complicated wiring:

- occupancy/vacancy sensors
- daylight sensors
- keypads
- wireless remotes

This opens up an entire suite of energy-saving, system-monitoring, and system-control schemes where the design, setup, zoning, and rezoning are all done within the software, making the electrical and control design simple.

What makes up EcoSystem?

Lutron's digitally addressable EcoSystem starts with one simple but essential building block—the EcoSystem LED driver or fluorescent ballast.

EcoSystem transforms a single fixture into the centerpiece of an efficient lighting system for:

- a single room
- multiple rooms
- an entire floor
- an entire building or a campus of buildings

You can use a variety of sensors or wallstations to control any combination of fixtures within the system.

LED driver is controlled from keypads, occupancy/vacancy sensors, daylight sensors, and remote controls to automatically adjust the light level in the fixture.

Occupancy/vacancy sensors automatically turn off assigned fixtures in unoccupied spaces

Daylight sensors sense daylight and dim or turn off electric lights when sufficient daylight is available

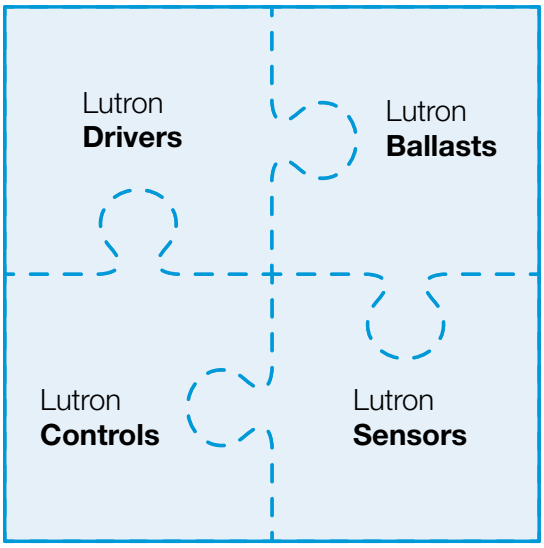
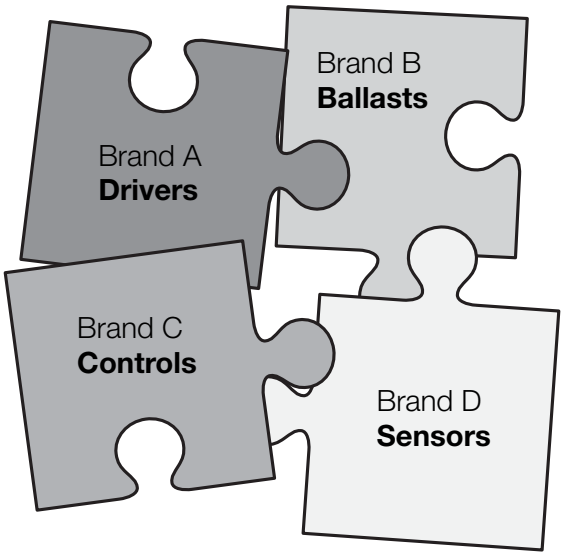
Keypads allow occupants to save and recall different lighting scenes in multi-purpose rooms

Wireless remotes provide personal control anywhere in a space—the Pico® wireless control can be wall-mounted, handheld, or placed on a tabletop pedestal

Why Use EcoSystem™ In Your Next Design?

1 Guarantees 100% compatibility between Lutron controls, drivers, ballasts, and sensors

- EcoSystem eliminates the need to test fixtures with controls and prevents costly design errors
- Up to 100 zones per digital link
- Multiple links can be controlled as one sequence

Lutron EcoSystem Engineered and tested to work together	**Other Systems** Will it work? Who will program, fix, and service it?
	
EcoSystem is a complete, rigorous protocol that guarantees 100% system performance	Minimum standards and multiple manufacturers may lead to compatibility and performance problems

2 Ensure reliable digital communication for high-performance dimming

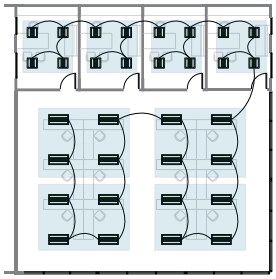
Analog communication wiring that is run in parallel with power wiring is susceptible to electrical interference and coupled noise, especially from motors, relays, and noisy power supplies. EcoSystem digital communication provides immunity to these problems even when the control wiring is run as Class 1 in the same conduit with power wires.

3 Meet energy codes using fewer components, for a more cost-effective strategy

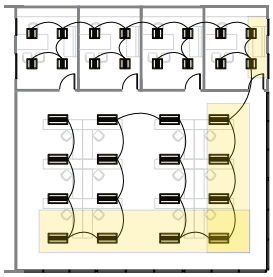
EcoSystem digital control allows you to combine energy strategies in a space, while using fewer components than other solutions. For example, this 14-zone, mixed office application utilizes three overlapping, energy-saving strategies and requires just one EcoSystem link. A typical 0–10V application for this same space might require as many as 14-zone controllers and 14 pairs of associated wiring.

Control strategies

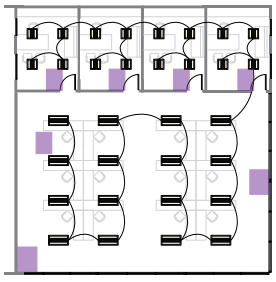
Occupancy/vacancy Sensing Zones

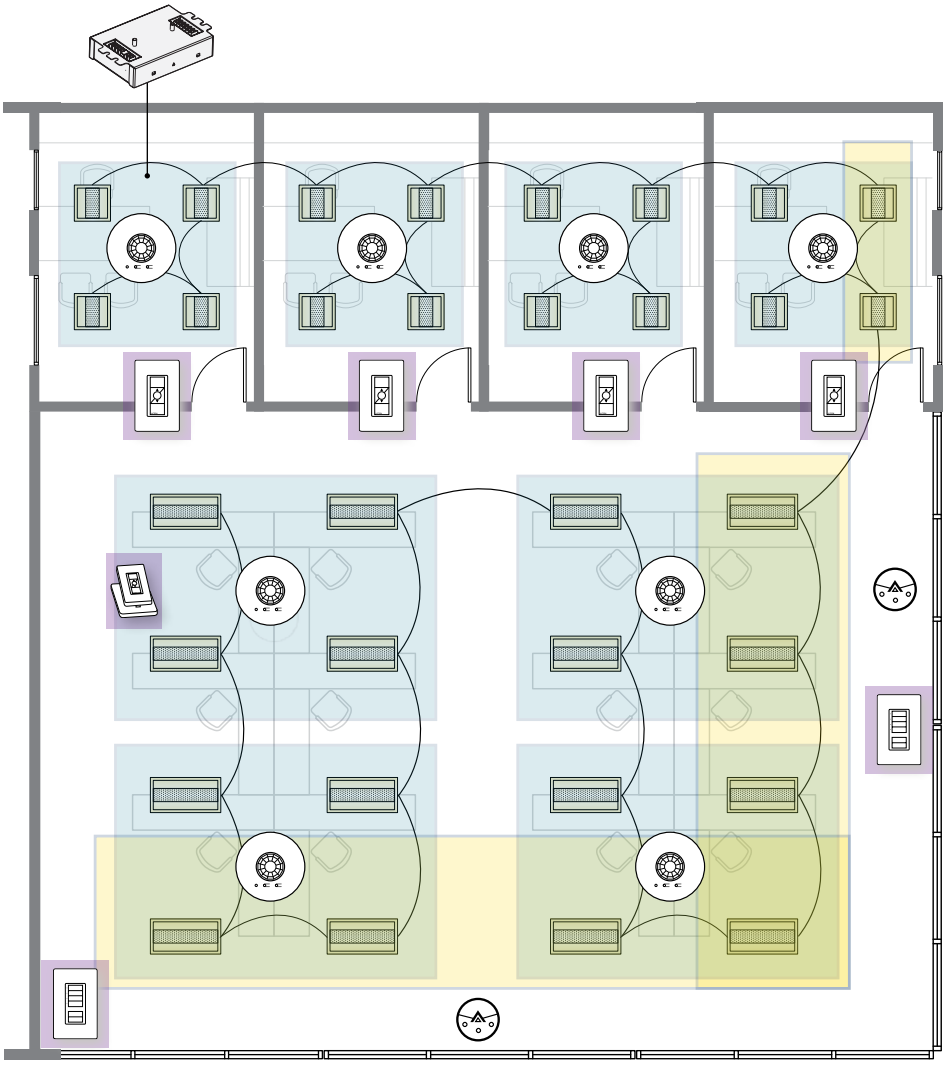


Daylighting Zones



Personal Control





EcoSystem® makes complex sequences of operation simple

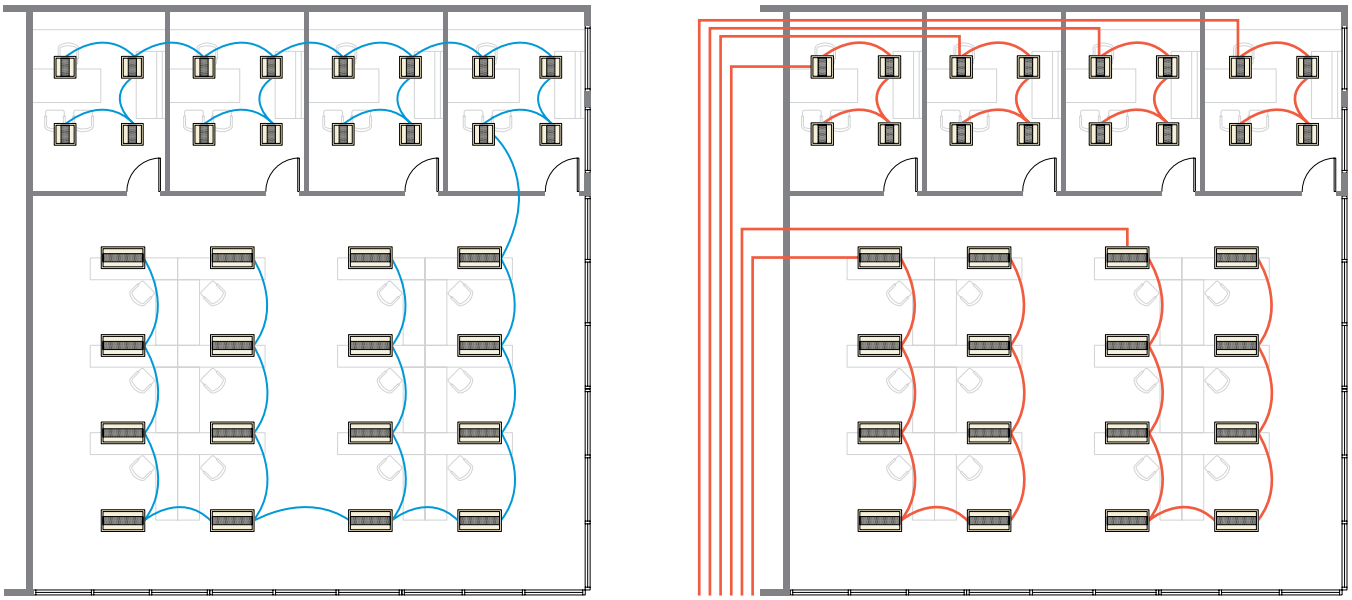
Products

- Occupancy/vacancy sensor
- Daylight sensor
- Keypad
- Pico® wireless control Wall-mounted, on a pedestal, or handheld

Wired or wireless options available

Why Use EcoSystem™ In Your Next Design?

4 Wiring for EcoSystem is easier to design, install and reconfigure.



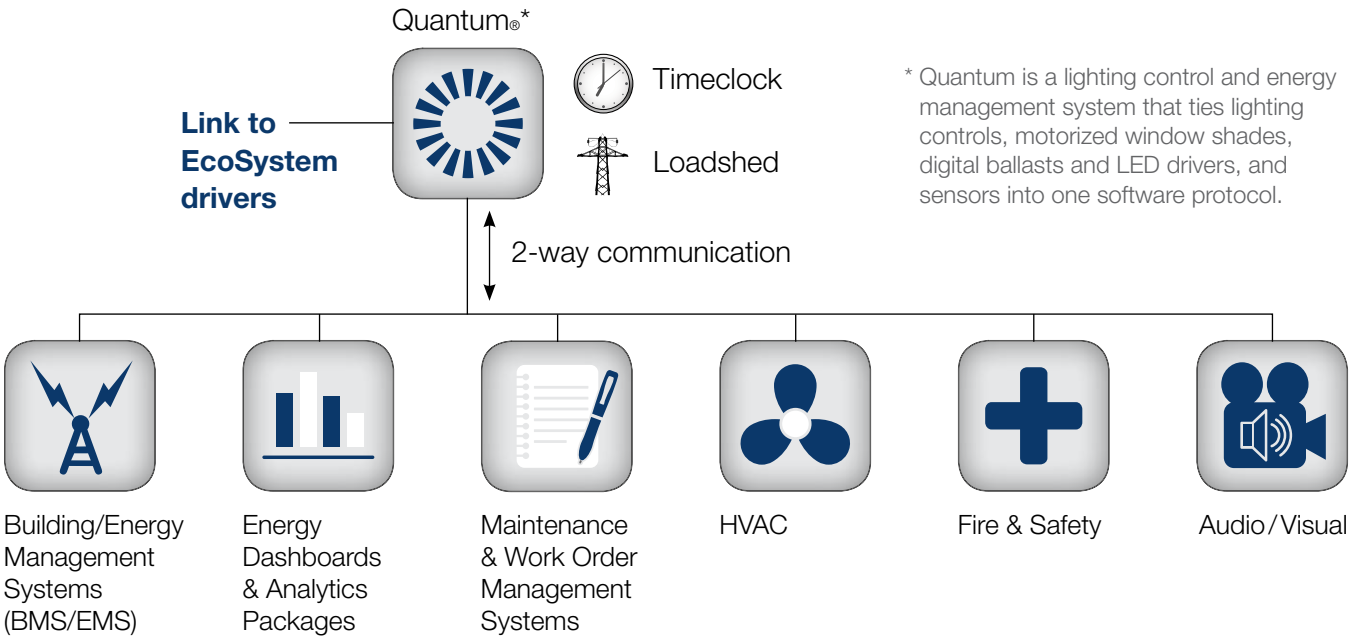
EcoSystem: one link

0–10V: many links

The choice is clear when it comes to LED control, choosing digital EcoSystem just makes sense.

EcoSystem	0–10V	
No home runs for power or control wiring	Home run required for power and control wiring, and the dimmer has a relay to power off the fixture	**EcoSystem is easier to wire**
Polarity independent and topology-free control wiring	Polarity needs to be maintained for control wiring across all fixtures in the zone	
Run control and power wiring in same conduit	Cannot always use existing power wiring conduit for 0–10V control	
Control terminals are miswire protected to 277V	Control wire miswire to power is likely to damage the drivers for every fixture in the loop	
Less material and troubleshooting = less cost	More material and troubleshooting = more cost	
Rezone without rewiring	Open ceiling, run new low-voltage wiring, and add more zones and control loops	**EcoSystem is easier to rezone**
Less time = lower cost	More time = higher cost	
Minimal work space disruption	Significant workspace disruption	

5 Link to digital data network



* Quantum is a lighting control and energy management system that ties lighting controls, motorized window shades, digital ballasts and LED drivers, and sensors into one software protocol.

At-a-glance comparison

	Benefits	EcoSystem	0–10V
1	Engineered and tested to guarantee 100% compatibility between Lutron controls, drivers, and sensors, which removes the need to test fixtures with controls and prevent costly design errors	✓	✗
2	Helps meet and exceed stringent energy code requirements, including automatic shut-off, daylighting, and dimming for multi-level control	✓	✗
3	Communicate with a digital data network for light energy usage monitoring, failure reporting (driver, ballast, lamp), and integration with BMS	✓	✗
4	Easily rezone and reconfigure without rewiring during design, commissioning, or throughout the building life cycle	✓	✗
5	Stable light output for high-performance dimming with a control signal that is immune to common electrical interference and coupled line noise	✓	✗

EcoSystem™ LED Driver Applications

EcoSystem has been installed in thousands of customer sites globally — and the installed base continues to expand. Here are a few of the major market segments currently taking advantage of EcoSystem digital solutions.

Class A open office

Fixtures commonly used: downlights and troffers

In an open commercial office, digital light control can contribute to increased energy savings and enhanced employee productivity.

- Constantly monitor energy usage and maintenance reporting through Quantum® Total Light Management™ systems
- Use daylight sensors to automatically adjust lights and shades throughout the day in response to the changing position of the sun
- Easily reconfigure spaces to allow for churn without rewiring

Class A and B private office

Fixtures commonly used: downlights and troffers

A tailored lighting control solution increases productivity in a private office setting.

- Enhance comfort with smooth dimming, preset scene control, and personal light/shade control
- Fade-on/fade-to-black for an incandescent-like experience

Class A and B conference rooms

Fixtures commonly used: downlights, linears, and coves

A conference room, which often functions as a multi-purpose space, needs to easily accommodate meetings, videos, or presentations.

- Flexible zoning while providing best-in-class dimming from 100% to 1%
- Integrate automated shades and A/V systems to further increase the space's flexibility
- Fade-on/fade-to-black minimizes disruption when lights turn on and off

Auditoriums

Fixtures commonly used: downlights, coves, and pendants

Smooth dimming is essential to setting the stage for an engaging audience experience.

- Maintain large dimming zones with multiple zones, multiple levels, and multiple load-type control
- Fade-on/fade-to-black minimizes disruption when lights turn on and off

Classrooms

Fixtures commonly used: pendants and troffers

The right lighting helps students focus.

- Put control in the teacher's hands with preset scene control/ multi-zone daylighting/shade integration
- Wire multiple classrooms on a single link to lower control cost
- Constantly monitor energy usage and maintenance remotely through the Quantum system (off site if needed)

Restaurants, hospitality, and public spaces

Fixtures commonly used: downlights, sconces, coves, and pendants

Smooth dimming and varying light levels allow a restaurant to skillfully combine food, service, décor, and atmosphere into an unforgettable dining experience.

- Easily monitor energy usage
- Re-zone without rewiring to accommodate the space's ever-changing needs
- Fade-on/fade-to-black minimizes disruption when lights turn on and off

Note: Use constant current reduction (CCR) dimming instead of pulse-width modulation (PWM) in spaces requiring video or camera operations to eliminate flicker in camera images.

The Lutron Difference

Unrivaled Innovation

- Committed to meeting evolving market needs for over 50 years

World Class Quality

- Superior products that stand the test of time
- High-performance product and system design
- Rigorous, 100% end-of-line testing and control
- Continuous evaluation and improvement

Outstanding Service and Support

Lutron provides a level of support unequaled anywhere in the industry, including access to over 100 field service technicians worldwide. You can count on:

- **Global reach —** With offices on four continents, we combine global reach with knowledge from sales, field application engineering, and local service teams.
- **Design support —** Our **LED Control Center of Excellence** ensures compatibility in your design between Lutron controls, dimmable LED bulbs, and high-performance LED fixtures.
  www.lutron.com/LED 1.877.DIM.LED8
- **Service programs —** We offer end-to-end service programs including design, construction management, startup, and post-occupancy support for lifetime performance.
- **24/7 Live Technical Support —** 1.800.523.9466

Notes

www.lutron.com

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