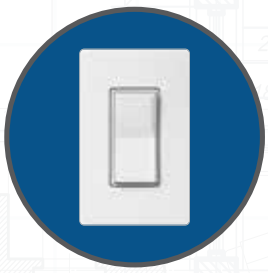
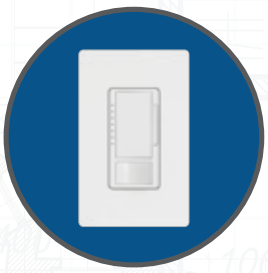
Commercial Applications Guide

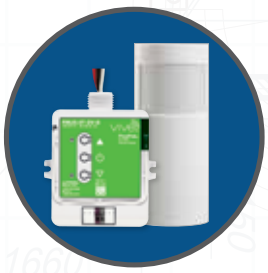
When energy codes do not apply



Dimmers



Sensors



Wireless lighting control

LUTRON

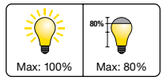
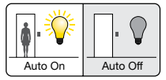
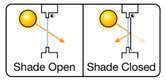
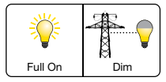
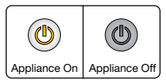
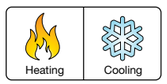
Table of Contents

Introduction

Applications

This document is for information purposes only. It is not meant to replace your state's or local jurisdiction's official energy code. Please refer to your local building energy code or authority having jurisdiction for your precise requirements. Only the authority having jurisdiction can guarantee code compliance.

Energy-saving lighting control strategies

Strategy	Potential savings
 **High-end trim/tuning** sets the maximum light level based on customer requirements in each space.*	10–30% Lighting
 **Occupancy/vacancy sensing** turns lights on when occupants are in a space and off when they vacate the space.*	20–60% Lighting
 **Daylight harvesting** dims electric lights when daylight is available to light the space.*	25–60% Lighting
 **Personal dimming control** gives occupants the ability to set the light level.*	10–20% Lighting
 **Controllable window shading** moves shades to reduce glare and solar heat gain.*	10–20% Cooling
 **Scheduling** provides scheduled changes in light levels based on the time of day.*	10–20% Lighting
 **Demand response** automatically reduces lighting loads during peak electricity usage times.*	30–50% During peak period
 **Plug load control** automatically turns off loads after occupants leave a space.*	15–50% of Controlled loads
 **HVAC integration** controls heating, ventilation, and air conditioning systems through a contact closure.*	5–15% HVAC

*Go to lutron.com/references for more information.

Choosing the appropriate lighting control solution for a space can be overwhelming. This commercial lighting control solutions guide provides examples of how Lutron products can be used in areas where code requirements do not apply. This guide focuses on dimmers, sensors, and Vive solutions, but our other control systems offer similar features.

Lutron Product Capabilities: Commercial Applications

Strategies for code/standards compliance	Local Solutions: Wallbox	Local Solutions: Vive	Local Solutions: Vive with wireless hub*	Panel Solutions: Energi Savr Node	Panel Solutions: Quantum
Occupancy sensing	◉	◉	◉	◉	◉
Multi-level lighting control	◉	◉	◉	◉	◉
Daylight harvesting		◉	◉	◉	◉
Receptacle control		◉	◉	◉	◉
Timeclock			◉	◉ **	◉
Demand response			◉ †	◉ †	◉
Energy monitoring			◉		◉
BACnet integration			◉		◉

To learn more about these products and their specifications, go to **lutron.com/catalogs.**

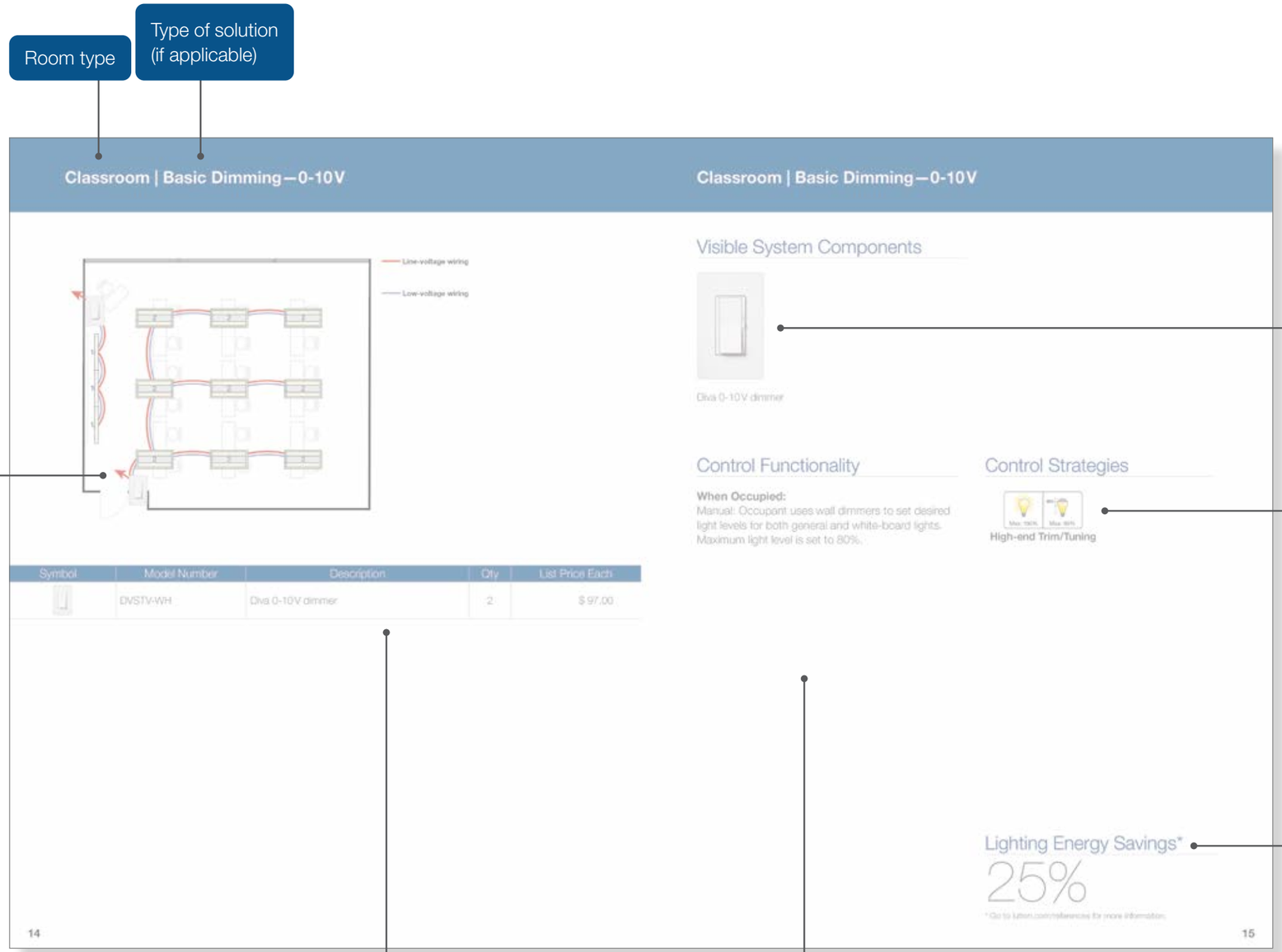
* For the latest information on products compatible with the Vive wireless hub go to lutron.com/vive.
** Requires QS timeclock.
† Automated Demand Response capability requires signal from a third-party device.

How to Use this Guide

This application guide is designed to help specifiers and contractors understand Lutron controls in a simple manner. Each of the pages will lay out different spaces, the corresponding lighting control products for those spaces, and the way the system is set up in the space.

For Specifiers
Use this application guide for design suggestions, to understand the way the system operates and to specify the relevant products for each space.

For Contractors
Use this application guide to understand how the system is installed, the way the system must operate, and to order the correct products for each application.



Local Solutions Layout

This is a high-level overview of the local solutions layout. For individual room requirements refer to the detailed room type solutions in this guide.

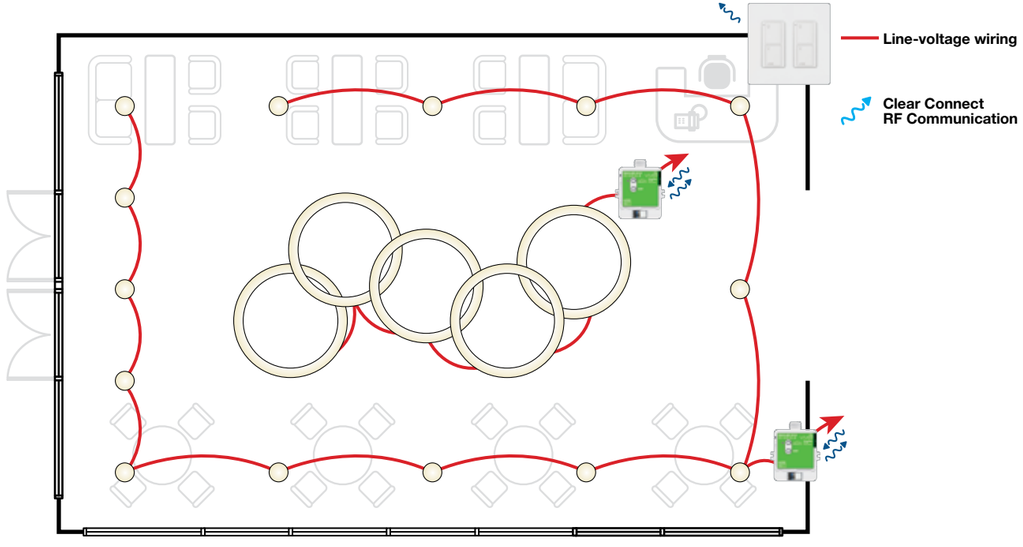
A single PowPak module can control a single or multiple fixtures. The products shown here are representative of local solutions. Multiple product options are available to meet the needs of the space.

- In-wall occupancy sensor
- 0-10V in-wall dimmer
- PowPak module
- Radio Powr Savr wireless occupancy sensor
- Pico wireless remote control

Adding a Vive wireless hub to a Vive lighting control solution, provides these additional benefits:

- Central control, management, and monitoring of Vive devices via web browser
- Supports astronomic and time-of-day events
- Two contact closure inputs for third-party integration, such as Automatic Demand Response
- Wi-Fi access for easy commissioning
- Control up to 10,000 sq. ft. with a single hub
- Optional BACnet integration

* Go to lutron.com/vive for complete compatibility and design details.



Symbol	Model Number	Description	Qty	List Price Each
	RMJS-16R-DV-B	PowPak switching module	2	$ 131.00
	PJ2-2B-GWH-L01	Pico wireless 2-button control	2	$ 25.00
	PICO-WBX-ADAPT	Pico wallbox adapter	2	$ 8.60

Want to add a Vive wireless hub for more features? Go to lutron.com/vive for complete compatibility and design details.

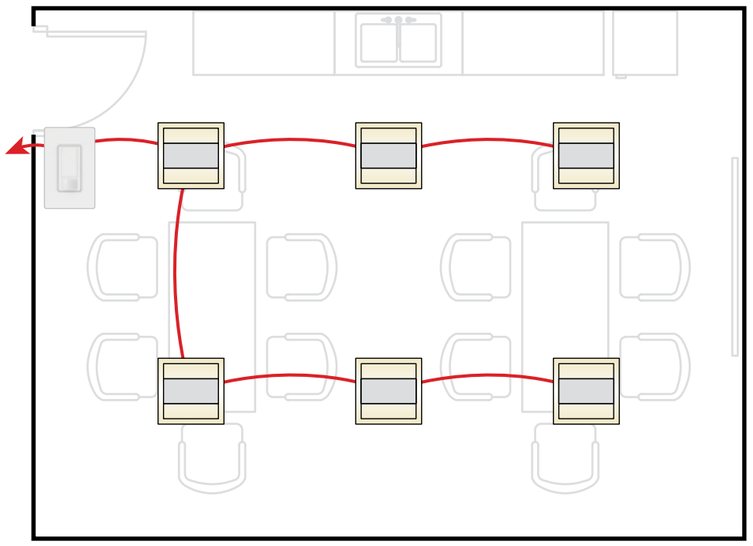
Visible System Components

Pico wireless control

Control Functionality

When Occupied:
Manual: Occupant uses wall switch to turn all lights on or off.

Add a Vive wireless hub to enable simple setup, system monitoring, timeclock functionality, and advanced integration.



Symbol	Model Number	Description	Qty	List Price Each
	MS-VPS6M2-DV-WH	Maestro sensor switch	1	$ 53.00

Break Room

Visible System Components

Maestro sensor switch

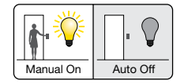
Control Functionality

Occupant Enters:
Lights do not automatically turn on when an occupant enters the space; lights must be turned on manually.

When Occupied:
Manual: Occupant uses wall switch to turn all lights off.

Occupant Exits:
All lights automatically turn off 15 minutes after all occupants exit.

Control Strategies

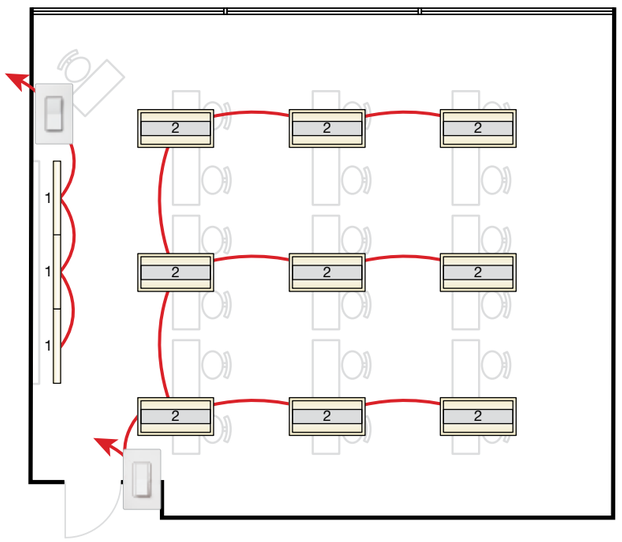


Occupancy/Vacancy

Lighting Energy Savings*

30%

* Go to lutron.com/references for more information.



Symbol	Model Number	Description	Qty	List Price Each
	STCL-153P-WH	Sunnata touch dimmer	2	$ 53.00

*If phase control load is not known or electronic low-voltage (ELV) track lighting, we recommend using the Maestro PRO dimmer with LED+ technology (MA-PRO-WH) instead of the Sunnata touch dimmer.

Classroom | Basic Dimming—Phase Control

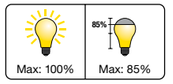
Visible System Components

Sunnata touch dimmer

Control Functionality

When Occupied:
Manual: Occupant uses wall dimmers to set desired light levels for both general and white-board lights. Maximum light level is set to 80%.

Control Strategies

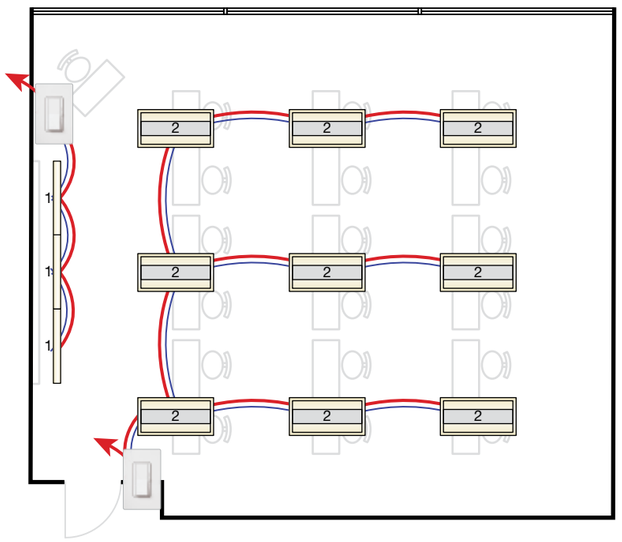


High-end Trim/Tuning

Lighting Energy Savings*

25%

* Go to lutron.com/references for more information.



Line-voltage wiring

Low-voltage wiring

Symbol	Model Number	Description	Qty	List Price Each
	DVSTV-WH	Diva 0-10V dimmer	2	$ 97.00

Classroom | Basic Dimming—0-10V

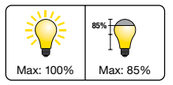
Visible System Components

Diva 0-10V dimmer

Control Functionality

When Occupied:
Manual: Occupant uses wall dimmers to set desired light levels for both general and white-board lights. Maximum light level is set to 80%.

Control Strategies

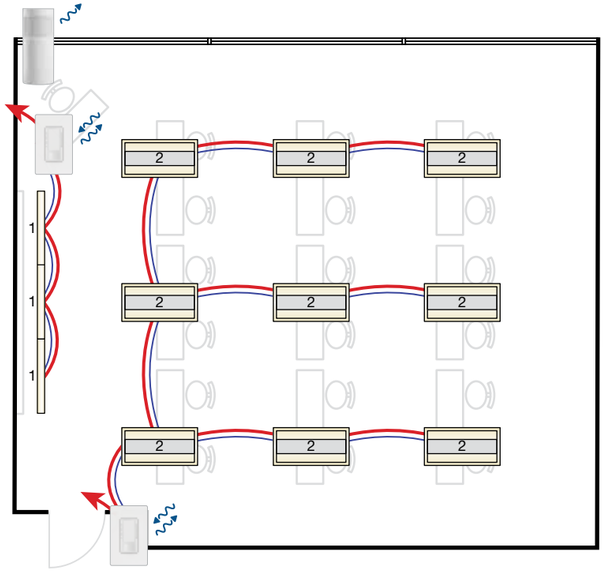


High-end Trim/Tuning

Lighting Energy Savings*

25%

* Go to lutron.com/references for more information.



Line-voltage wiring

Low-voltage wiring

Clear Connect RF Communication

Symbol	Model Number	Description	Qty	List Price Each
	MRF2S-8SD010-WH	Maestro Wireless 0-10V dimmer sensor	2	$ 180.00
	LRF2-OKLB-P-WH	Radio Powr Savr wireless corner-mount occupancy sensor	1	$ 89.00

Want to add a Vive wireless hub for more features? Go to lutron.com/vive for complete compatibility and design details.

Classroom | Dimming and Occupancy Sensing

Visible System Components

Maestro Wireless 0-10V dimmer sensor

Radio Powr Savr wireless corner-mount occupancy sensor

Control Functionality

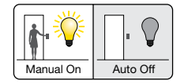
Occupant Enters:
Lights automatically turn on when an occupant enters the space. Maximum light level is set to 80%.

When Occupied:
Manual: Occupant uses dimmer sensors to set desired light levels for both general and white-board lighting.

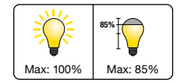
Occupant Exits:
All lights automatically turn off 15 minutes after all occupants exit.

Add a Vive wireless hub to enable simple setup and rezoning, system monitoring, timeclock functionality, and advanced integration.

Control Strategies



Occupancy/Vacancy

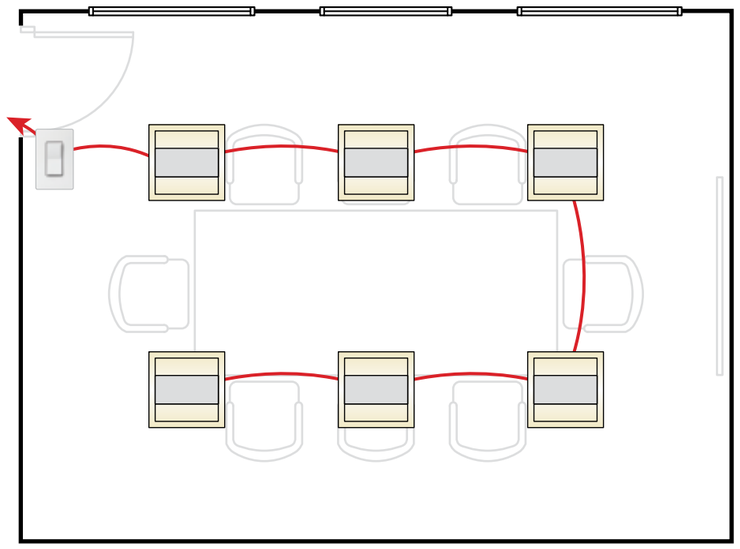


High-end Trim/Tuning

Lighting Energy Savings*

55%

* Go to lutron.com/references for more information.



Symbol	Model Number	Description	Qty	List Price Each
	STCL-153P-WH	Sunnata touch dimmer	1	$ 53.00

*If phase control load is not known or electronic low-voltage (ELV) track lighting, we recommend using the Maestro PRO dimmer with LED+ technology (MA-PRO-WH) instead of the Sunnata touch dimmer.

Conference Room | Basic Dimming—Phase Control

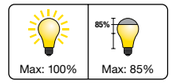
Visible System Components

Sunnata touch dimmer

Control Functionality

When Occupied:
Manual: Occupant uses wall dimmer to set desired light levels for all lights. Maximum light level is set to 80%.

Control Strategies

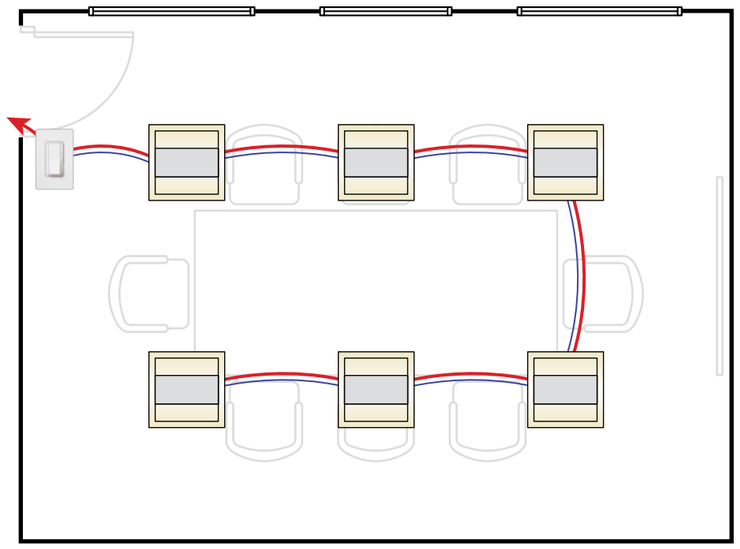


High-end Trim/Tuning

Lighting Energy Savings*

25%

* Go to lutron.com/references for more information.



Line-voltage wiring

Low-voltage wiring

Symbol	Model Number	Description	Qty	List Price Each
	DVSTV-WH	Diva 0-10V dimmer	1	$ 97.00

Conference Room | Basic Dimming—0-10V

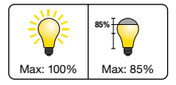
Visible System Components

Diva 0-10V dimmer

Control Functionality

When Occupied:
Manual: Occupant uses wall dimmer to set desired light levels for all lights. Maximum light level is set to 80%.

Control Strategies

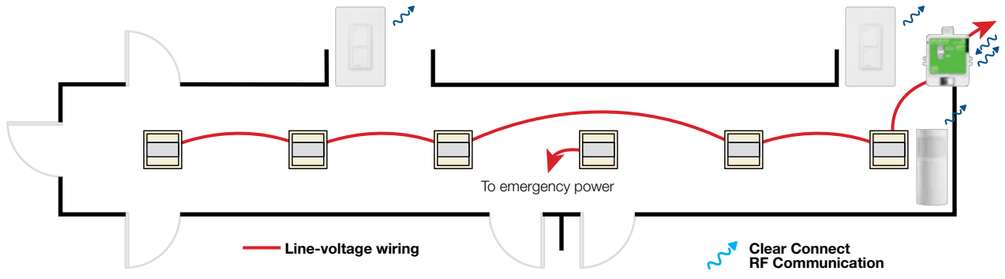


High-end Trim/Tuning

Lighting Energy Savings*

25%

* Go to lutron.com/references for more information.



Symbol	Model Number	Description	Qty	List Price Each
	RMJS-16R-DV-B	PowPak switching module	1	$ 131.00
	LRF2-OHLB-P-WH	Radio Powr Savr wireless hallway occupancy sensor	1	$ 89.00
	PJ2-2B-GWH-L01	Pico wireless 2-button control	2	$ 25.00
	PICO-WBX-ADAPT	Pico wallbox adapter	2	$ 8.00

Notes: Local control may be not accessible to unauthorized personnel.

Want to add a Vive wireless hub for more features? Go to lutron.com/vive for complete compatibility and design details.

Egress Corridor

Visible System Components

Pico wireless control

Radio Powr Savr wireless hallway occupancy sensor

Control Functionality

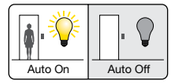
Occupant Enters:
All lights automatically turn on to maximum light level.

When Occupied:
Manual: Occupant uses wall switch to turn all non-emergency lights off.

Occupant Exits:
All non-emergency lights automatically turn off 15 minutes after all occupants exit.

Add a Vive wireless hub to enable simple setup and rezoning, system monitoring, timeclock functionality, and advanced integration.

Control Strategies



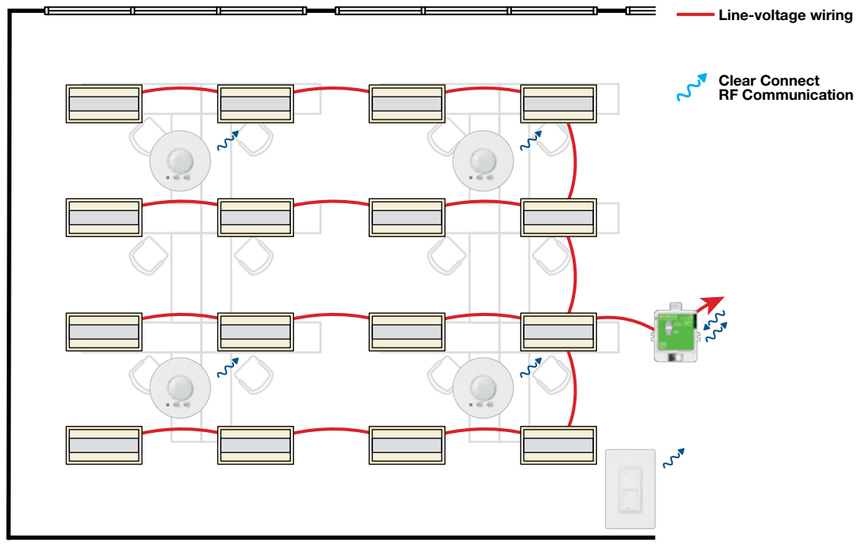
Occupancy/Vacancy

Lighting Energy Savings*

40%

Note: Local control may be not accessible to unauthorized personnel.

* Go to lutron.com/references for more information.



Symbol	Model Number	Description	Qty	List Price Each
	RMJS-16R-DV-B	PowPak switching module	1	$ 131.00
	LRF2-OCR2B-P-WH	Radio Powr Savr wireless ceiling-mount occupancy sensor	4	$ 89.00
	PJ2-2B-GWH-L01	Pico wireless 2-button control	1	$ 25.00
	PICO-WBX-ADAPT	Pico wallbox adapter	1	$ 8.60

Want to add a Vive wireless hub for more features? Go to lutron.com/vive for complete compatibility and design details.

Open Office

Visible System Components

Pico wireless control

Radio Powr Savr wireless ceiling-mount occupancy sensor

Control Functionality

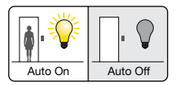
Occupant Enters:
All lights automatically turn on to maximum light level.

When Occupied:
Manual: Occupant uses wall switch to turn all lights off.

Occupant Exits:
All lights automatically turn off 15 minutes after all occupants exit.

Add a Vive wireless hub to enable simple setup and rezoning, system monitoring, timeclock functionality, and advanced integration.

Control Strategies

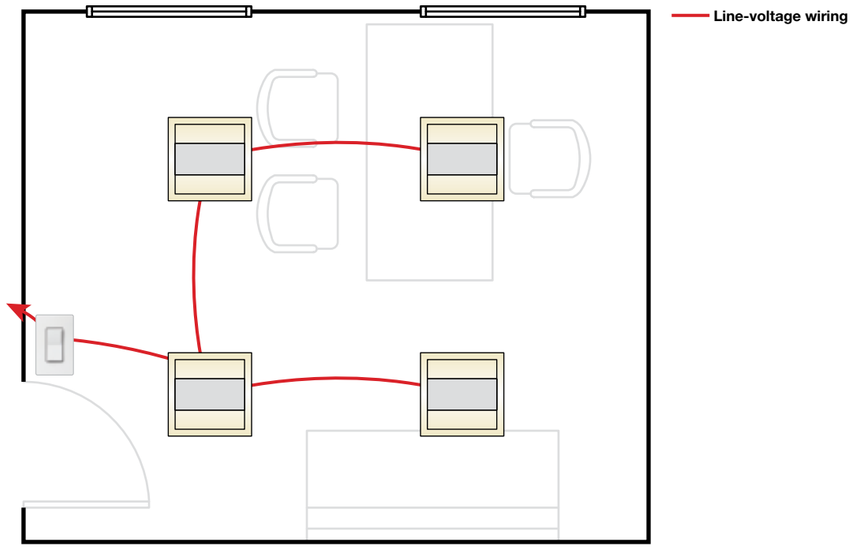


Occupancy/Vacancy

Lighting Energy Savings*

35%

* Go to lutron.com/references for more information.



Symbol	Model Number	Description	Qty	List Price Each
	STCL-153P-WH	Sunnata touch dimmer	1	$ 53.00

*If phase control load is not known or electronic low-voltage (ELV) track lighting, we recommend using the Maestro PRO dimmer with LED+ technology (MA-PRO-WH) instead of the Sunnata touch dimmer.

Private Office | Basic Dimming—Phase Control

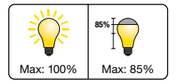
Visible System Components

Sunnata touch dimmer

Control Functionality

When Occupied:
Manual: Occupant uses wall dimmer to manually set desired light levels for all lights. Maximum light level is set to 80%.

Control Strategies

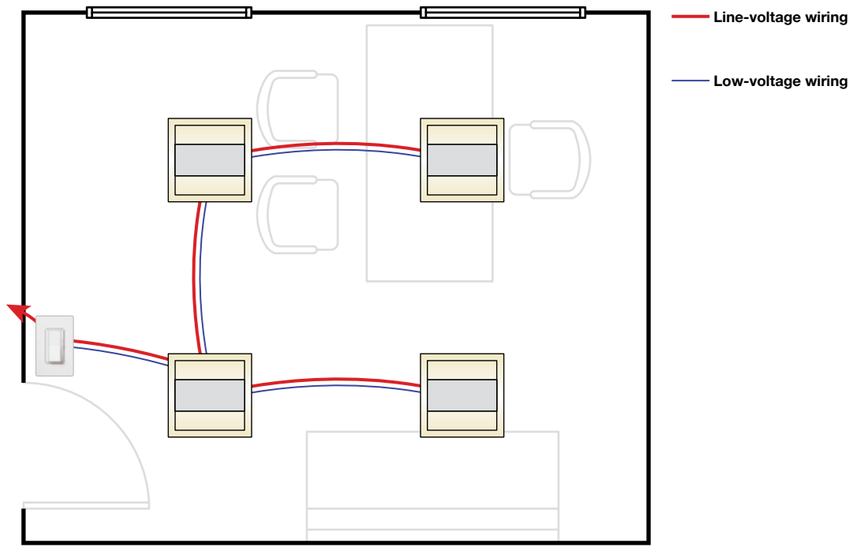


High-end Trim/Tuning

Lighting Energy Savings*

30%

* Go to lutron.com/references for more information.



Symbol	Model Number	Description	Qty	List Price Each
	DVSTV-WH	Diva 0-10V dimmer	1	$ 97.00

Private Office | Basic Dimming—0-10V

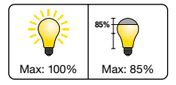
Visible System Components

Diva 0-10V dimmer

Control Functionality

When Occupied:
Manual: Occupant uses wall dimmer to manually set desired light levels for all lights. Maximum light level is set to 80%.

Control Strategies

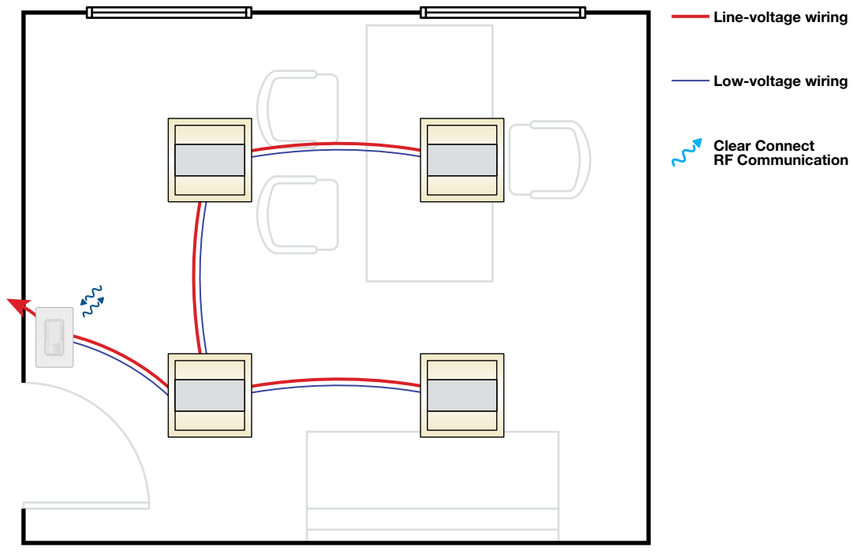


High-end Trim/Tuning

Lighting Energy Savings*

30%

* Go to lutron.com/references for more information.



Symbol	Model Number	Description	Qty	List Price Each
	MRF2S-8SDV010-WH	Maestro Wireless 0-10V dimmer sensor	1	$ 180.00

Want to add a Vive wireless hub for more features? Go to lutron.com/vive for complete compatibility and design details.

Private Office | Dimming and Occupancy Sensing

Visible System Components

Maestro Wireless 0-10V
dimmer sensor

Control Functionality

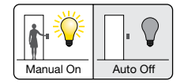
Occupant Enters:
Lights do not automatically turn on when an occupant enters the space. Maximum light level is set to 80%.

When Occupied:
Manual: Occupant uses dimmer sensors to set desired light levels for all lighting.

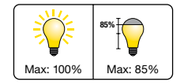
Occupant Exits:
All lights automatically turn off 15 minutes after all occupants exit.

Add a Vive wireless hub to enable simple setup and rezoning, system monitoring, timeclock functionality, and advanced integration.

Control Strategies



Occupancy/Vacancy

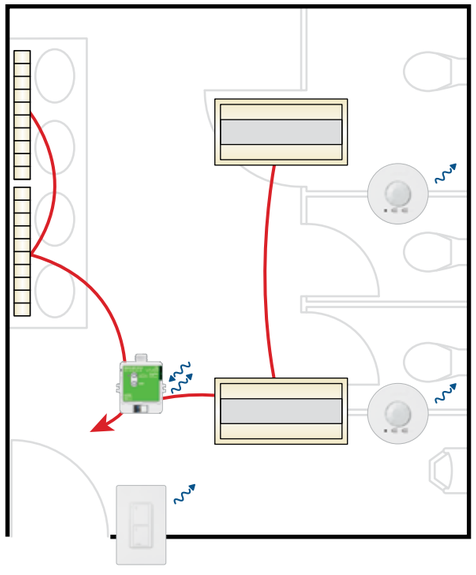


High-end Trim/Tuning

Lighting Energy Savings*

50%

* Go to lutron.com/references for more information.



Symbol	Model Number	Description	Qty	List Price Each
	RMJS-16R-DV-B	PowPak switching module	1	$ 131.00
	LRF2-OCR2B-P-WH	Radio Powr Savr wireless ceiling-mount occupancy sensor	2	$ 89.00
	PJ2-2B-GWH-L01	Pico wireless 2-button control	1	$ 25.00
	PICO-WBX-ADAPT	Pico wallbox adapter	1	$ 8.00

Want to add a Vive wireless hub for more features? Go to lutron.com/vive for complete compatibility and design details.

Multi-Stall Restroom

Visible System Components

Pico wireless control

Radio Powr Savr wireless ceiling-mount occupancy sensor

Control Functionality

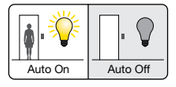
Occupant Enters:
All lights automatically turn on to maximum light level.

When Occupied:
Manual: Occupant uses wall switch to turn all lights off.

Occupant Exits:
All lights automatically turn off 15 minutes after all occupants exit.

Add a Vive wireless hub to enable simple setup and rezoning, system monitoring, timeclock functionality, and advanced integration.

Control Strategies

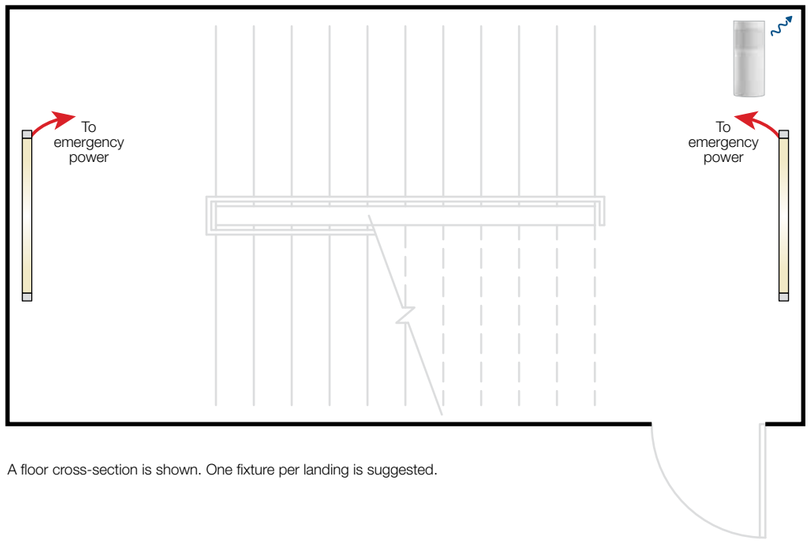


Occupancy/Vacancy

Lighting Energy Savings*

50%

* Go to lutron.com/references for more information.



A floor cross-section is shown. One fixture per landing is suggested.

Line-voltage wiring

Clear Connect RF Communication

1 integrated into each light fixture

Symbol	Model Number	Description	Qty	List Price Each
	Integral to fixture[1]	Integral fixture control	2 (per floor)	$ 60.00[2]
	LRF2-OKLB-P-WH	Radio Powr Savr wireless corner-mount occupancy sensor	1 (per floor)	$ 89.00

1. Fixture control comes pre-installed in fixture. Look for the Clear Connect Wireless symbol for fixtures containing this module. Go to lutron.com/findafixture for a complete list of compatible fixtures and drivers.
2. Fixture adder for the control module may vary.

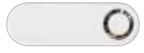
Code Notes: Verify that the egress fixtures go to full output upon loss of control signal. For projects that require UL 924 compliance, provide an automatic load control relay (ALCR) per load controller connected to emergency fixtures. This solution requires digitally enabled ballasts and drivers by others. Go to lutron.com/vive for the latest compatibility details.

Want to add a Vive wireless hub for more features? Go to lutron.com/vive for complete compatibility and design details.

Egress Stairwell

Visible System Components

Radio Powr Savr wireless corner-mount occupancy sensor



Integral fixture control

Control Functionality

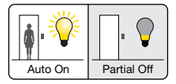
Occupant Enters:
All lights automatically turn on to maximum light level. Maximum light level is set to 80%.

Occupant Exits:
All lights dim to minimum light level 15 minutes after all occupants exit. Minimum light level is set to 10%.

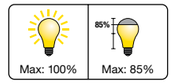
Emergency Mode:
Lighting connected to emergency power turns on to full output.

Add a Vive wireless hub to enable simple setup, system monitoring, timeclock functionality, and advanced integration.

Control Strategies



Occupancy/Vacancy

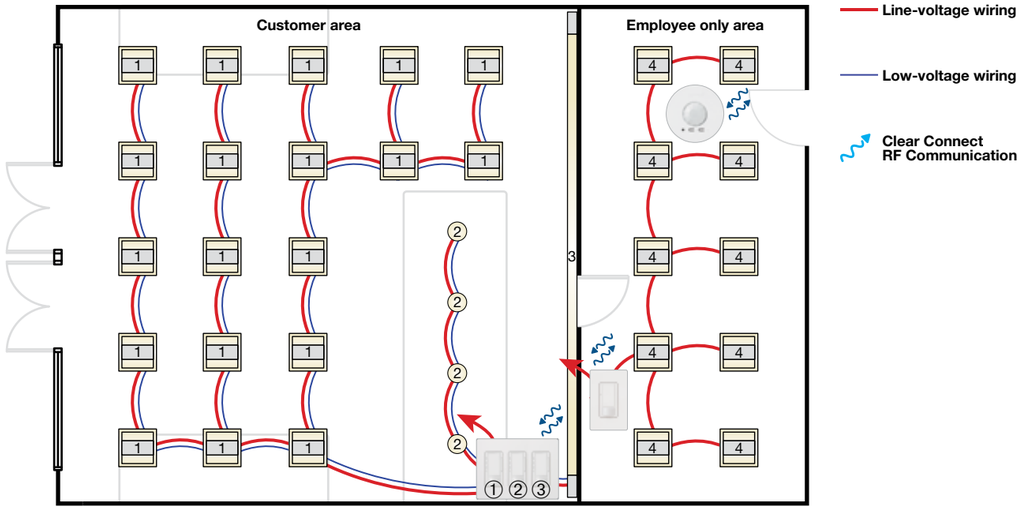


High-end Trim/Tuning

Lighting Energy Savings*

80%

* Go to lutron.com/references for more information.



Line-voltage wiring

Low-voltage wiring

Clear Connect RF Communication

Symbol	Model Number	Description	Qty	List Price Each
	MRF2S-8SD010-WH	Maestro Wireless 0-10V dimmer sensor	3	$ 180.00
	MRF2S-8SS-WH	Maestro Wireless sensor switch	1	$ 160.00
	LRF2-OCR2B-P-WH	Radio Powr Savr wireless ceiling-mount occupancy sensor	1	$ 89.00
	HJS-1-FM	Vive wireless hub	Shared	Consult your local rep for hub pricing and service options

Retail Space

Visible System Components

Maestro Wireless 0-10V dimmer sensor

Maestro Wireless sensor switch

Radio Powr Savr wireless ceiling-mount occupancy sensor

Control Functionality

Customer Area

When Occupied:
Manual: Employees use wall dimmers to set desired light levels for general lighting. Maximum light level is set to 80%.

Timeclock:
Timeclock turns general lighting on during normally occupied hours. Timeclock turns general lighting off during normally unoccupied hours.

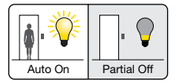
Employee Only Area

Occupant Enters:
All lights automatically turn on to maximum light level.

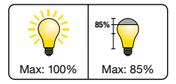
When Occupied:
Manual: Employees use a wall switch to turn off the lighting.

Occupant Exits:
All lights automatically turn off 15 minutes after all occupants exit.

Control Strategies



Occupancy/Vacancy



High-end Trim/Tuning

Scheduling

lutron.com
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Customer Assistance
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Email: support@lutron.com
Phone: 1.844.LUTRON1 (588.7661) — includes 24/7 technical support

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