

Commercial Application Guide

Code Compliance | Lighting Controls

Title 24-2016

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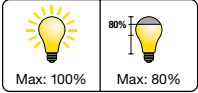
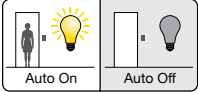


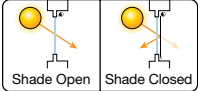

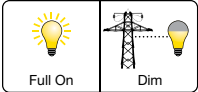
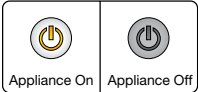

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This document summarizes the lighting and receptacle control requirements for commercial buildings. It is for information purposes only. It is not meant to replace your state’s or local jurisdiction’s official energy code. Please refer to your local 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

Codes can sometimes be complicated and difficult to navigate. This commercial application guide provides examples of how Lutron products can be used to meet or exceed code requirements. This guide focuses on Vive and Vive compatible solutions, but our other control systems offer similar features.

Lutron Product Capabilities: Commercial Applications

	Local Solutions			Panel Solutions	
	Wallbox	Vive	Vive with wireless hub*	Energi Savr Node	Quantum
Strategies for code/standards compliance	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

Summary of Requirements for Lighting and Receptacle Controls

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The requirements listed below are summarized for simplicity and may have other exceptions that were omitted.

	Minimum control type	Description	Code provision
Local Control	Switching	Lighting shall be capable of turning ON and OFF. There shall be at least one manual device for control of the lighting within a space. See code for spaces that allow remote location of control.	130.1 (a)
	Multi-level or dimming ¹	Lighting shall be capable of multiple control steps in enclosed spaces 100 sq. ft. or larger. Light level requirements are defined in Table 130.1-A. There shall be at least one manual device for control of the lighting within a space. See code for spaces that allow remote location of control. Outdoor sign lighting ON during both day and night must be dimmed during nighttime hours.	130.1 (b) 130.3 (a) 2
Automatic Control ³	Timeclock ²	Interior: Scheduled control, based on time-of-day, turns lighting ON or OFF based on typical occupancy. Occupancy sensors also comply as an alternate to using a timeclock. Exterior & Parking Garages: Scheduled control, based on time-of-day and sunrise/sunset (requires astronomical timeclock), turns lighting ON or OFF based on typical occupancy and day-light.	130.1 (c) 1 130.2 (c) 1, 2 & 5 130.3 (a) 2 130.3 (c) 1 & 2
	Occupancy sensor	Automatic control turns lighting ON upon occupancy or OFF after a vacancy of 20 minutes or less. When manual ON is used, provide a vacancy sensor which does not allow for automatic ON.	130.1 (c)
	Full ON	When initiated by a timeclock or occupancy sensor, lighting is automatically turned ON to maximum lighting power.	130.1 (c) 1
	Partial ON	When initiated by a timeclock or occupancy sensor, lighting is automatically turned ON to 50% or less of maximum lighting power.	130.1 (c) 5
	Full OFF	When initiated by a timeclock or occupancy sensor, lighting is automatically turned OFF.	130.1 (c) 5 130.2 (a)
	Partial OFF	When initiated by a timeclock or occupancy sensor, lighting is automatically reduced by at least 50% of maximum lighting power for interior spaces, 20% for parking garages, and 40% for building exteriors. Automatic full OFF also complies for interior spaces..	130.1 (c) 6 & 7 130.2 (c) 3, 4, & 5
Other	Daylight responsive control ¹	Interior & Parking Garages: A sensor which adjusts lighting in response to available daylight is required for sidelight and skylight zones (see the “Daylight zone requirements” diagrams). For interior spaces, there must be at least two light levels between ON and OFF. Exterior: A photosensor can be used as an alternate to the dawn/dusk operation of an astronomical timeclock.	130.1 (d) 130.2 (c) 1 130.3 (a) 2 140.1 (d)
	Receptacle control	At least 50% of the receptacles shall automatically turn OFF based on typical occupancy or after a vacancy of 20 minutes or less. Each uncontrolled receptacle must have at least one controlled receptacle within 6 feet. Open offices with receptacles in modular furniture must include one controlled receptacle per workstation. Plug-in devices do not comply.	130.5 (d)
	Demand Response	Automatic lighting reduction by a minimum of 15% of total installed lighting power in response to a Demand Response signal is required for new buildings larger than 10,000 sq. ft. or luminaire alterations that increase the lighting power in the enclosed space.	130.1 (e)

For areas being used as a path of egress or fixtures being used for emergency, verify compliance with your local authority having jurisdiction. Acceptance (functional) testing is required for all new construction applications to ensure that control hardware and software are calibrated, programmed and functioning properly (Code provision C408.3).

1 When multi-level lighting control and/or daylight responsive control is required, Lutron recommends using continuous dimming to allow for smooth light level adjustment and maximize energy savings.
2 Lutron recommends using occupancy sensors to achieve automatic on/off requirements in place of a timeclock to maximize energy savings and optimize user experience.
3 Manual ON is always permitted for interior applications. Provide manual ON control when no automatic ON is indicated.

Daylight Zone Requirements

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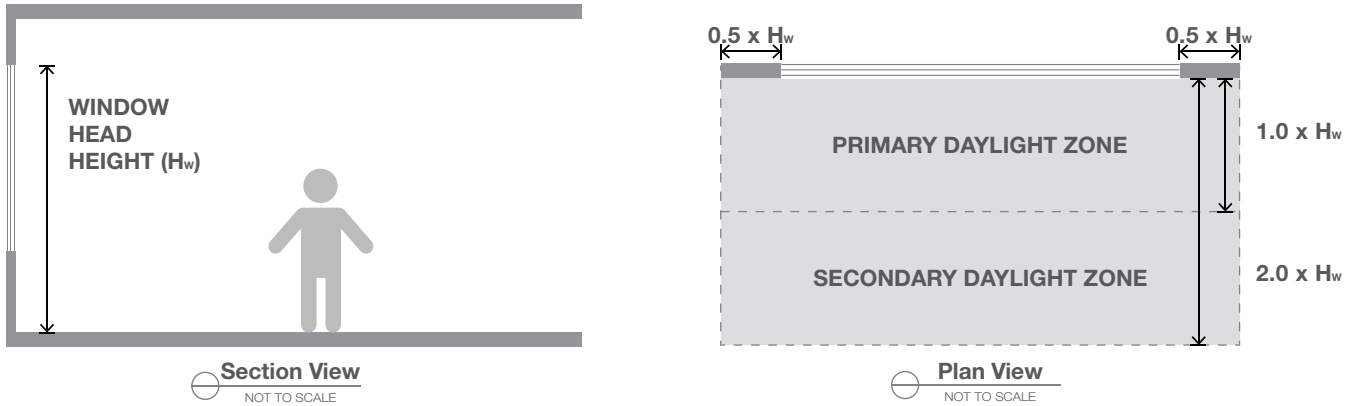
Daylight Zone Requirements:

Sidelighted daylight zones must be controlled separately from toplighted zones. North, South, East, and West zones must also be controlled separately.

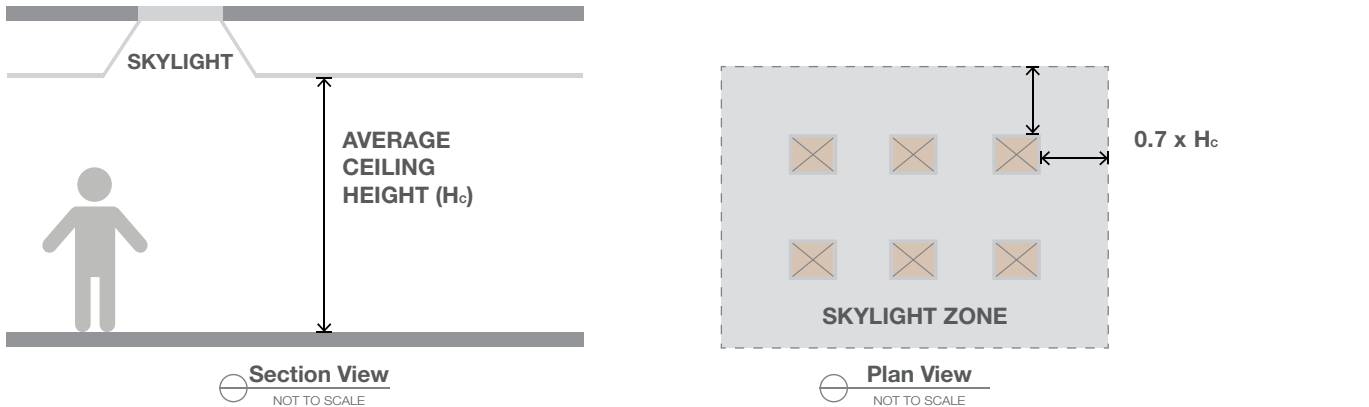
Daylight Exceptions:

Daylight control is not required when the total lighting power of a daylight zone is 120 W. or less (600 for parking garages), or when the total glazing/opening area is 24 sq. ft. or less (36 sq. ft. for parking garages). Other exceptions exist, based on space type, window area, neighboring obstructions, and glass transmittance.

Sidelighting (Window)



Toplighting (Skylight)



Suggested Code Compliant Solutions

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The compliant solutions listed below are suggested based on total installed cost, simplicity of design, and basic functional needs for the space. These solutions do not represent the only compliant options to meet lighting and receptacle control requirements. Applications in this guide will illustrate these solutions and/or alternate solutions for advanced functionality.

		Atrium	Break Room	Classroom, Lecture Hall, Training Room	Conference, Multi-purpose Room	Egress Corridor ⁴	Lobby
Local Control	Switching	⚙️	⚙️	⚙️	⚙️	⚙️	⚙️
	Multi-level or dimming	🔵	🔵	🔵	🔵	🔵	🔵
Automatic Control ²	Timeclock	⚙️					
	Occupancy sensor		⚙️	⚙️	⚙️	⚙️	⚙️
	Full ON					⚙️	⚙️
	Partial ON	⚙️		⚙️			
	Full OFF	⚙️	⚙️	⚙️	⚙️		⚙️
	Partial OFF					⚙️	
Other	Daylight responsive control	🔵	🔵	🔵	🔵	🔵	🔵
	Receptacle control	🔵	🔵		🔵		
	Demand response	🔵	🔵	🔵	🔵	🔵	🔵

1 Retrofit requirements indicated are for lighting alterations which replace existing luminaires with new luminaires without redesign of interior spaces. The solutions shown for interior spaces and parking garages are compliant when the lighting power is reduced by at least 50% in offices, retail spaces, and hotels, and by at least 35% in all other space types. Exterior retrofit requirements indicated are for alterations which increase the Lighting Power Density (LPD), or replace at least 50% of the total luminaires.

2 Manual ON is always permitted for interior applications. Provide manual ON control when no automatic ON is indicated.

3 Astronomical timeclock shall ensure the lights are off during daylight hours. Occupancy sensor shall provide Full ON and Partial OFF control. Occupancy sensing not required for lighting mounted higher than 24 feet.

4 For areas not designated as a path of egress, the occupancy sensor must turn lights to full OFF.

Suggested Code Compliant Solutions

Title 24-2016

Diagram key:

🔵 = New construction

⚙️ = Lighting retrofit¹

⚙️ = New construction and retrofit¹

Open Office (>250 sq. ft.)	Private Office (<250 sq. ft.)	Restroom	Egress Stairwell ⁴	Storage Room	Facade/ Landscape	Parking Garage (Not Roof)	Other Exterior ³
⚙️	⚙️	⚙️	⚙️	⚙️		⚙️	
🔵	🔵	🔵	🔵	🔵		🔵	
					⚙️		⚙️
⚙️	⚙️	⚙️	⚙️	⚙️		⚙️	⚙️
⚙️		⚙️	⚙️	⚙️	⚙️	⚙️	⚙️
⚙️	⚙️	⚙️		⚙️	⚙️		⚙️
			⚙️			⚙️	⚙️
🔵		🔵	🔵	🔵	🔵	🔵	🔵
🔵	🔵						
🔵	🔵	🔵	🔵	🔵	🔵	🔵	🔵

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

For Specifiers

Use this application guide for design suggestions, 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.

Understand how the products are laid out in the space

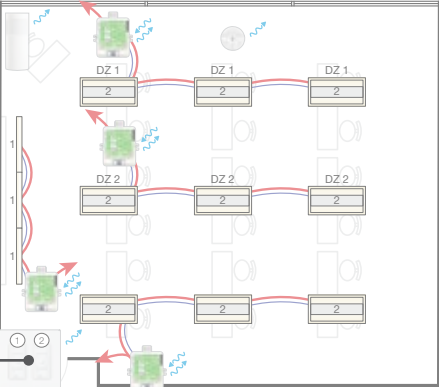
Learn more about the products used in the space

Room type

Type of solution

Classroom | New Construction

Title 24-2016









Line-voltage wiring

Low-voltage wiring

Clear Connect RF Communication

DZ 1 & DZ 2 = Daylight Zones

Symbol	Model Number	Description	Qty	List Price Each
	RMJS-8T-DV-B	PowPak dimming module with 0-10V	4	\$ 150.00
	LRF2-DCRB-WH	Radio Powr Savr wireless daylight sensor	1	\$ 120.00
	LRF2-VKLB-P-WH	Radio Powr Savr wireless corner-mount vacancy sensor	1	\$ 85.00
	PJ2-3BRL-GWH-L01	Pico wireless 3-button with raise/lower control	2	\$ 21.00
	PICO-WBX-ADAPT	Pico wallbox adapter	2	\$ 8.00
	HJS-1-FM	Vive wireless Hub	Shared	Consult your local rep for Hub pricing and service options.



Code Notes: For non-daylit classrooms, all general lighting can be connected to a single 0-10V dimming module. Go to lutron.com/Vive for complete compatibility and design details. This solution requires 0-10V enabled ballasts and drivers by others.

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Classroom | New Construction

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Visible System Components



Pico wireless control

Radio Powr Savr wireless corner-mount vacancy sensor and daylight sensor

Control Functionality

Occupant Enters:
All lights automatically turn on to 50% light level. Occupant turns on lights to maximum level manually. Maximum light level is set to 80%.


When Occupied:
Automatic: Overhead lights dim/brighten based on daylight availability. There are two perimeter daylight zones.


Manual: Occupant uses wall dimmers to set desired light levels for both general and white-board lights.


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


System Events:
Demand Response: All lights automatically dim 20% during demand events.


Control Strategies

**Occupancy/Vacancy**

**Daylight Harvesting**

**Personal Dimming**

**High-end Trim/Tuning**

**Demand Response**

Lighting Energy Savings*

60%

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

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Type of solution

Learn about the products visible in the space and the different options available for these.

Learn what strategies are implemented in the space






Learn what energy savings you achieve over manual shut-off

Understand how the space functions with the installed system

This guide offers up to three solutions per space type.

- The **Retrofit Solutions** are simple and inexpensive solutions, generally suited for a basic retrofit.
- The **New Construction Solutions** are value driven, generally best suited for new construction.
- The **Recommended Solutions** have advanced functionality for greater comfort and energy savings.

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.

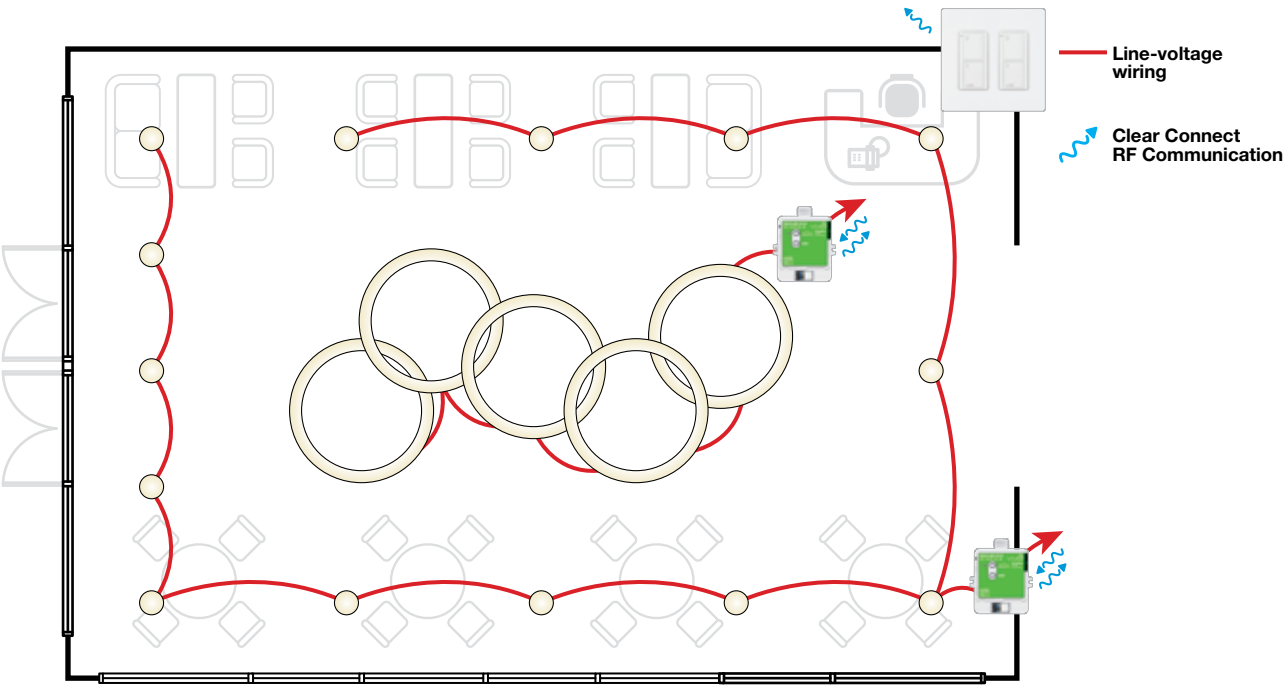
-  Vive wireless hub*
-  PowPak module
-  Occupancy sensor
-  Pico wireless remote control
-  Daylight sensor




Vive wireless hub Features:

- Central control, management, and monitoring of Vive devices via web browser
- Supports astronomic and time-of-day events
- Two contact closure inputs for 3rd party integration such as Automatic Demand Response
- WiFi 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	\$ 129.00
	PJ2-2B-GWH-L01	Pico wireless 2-button control	2	\$ 21.00
	PICO-WBX-ADAPT	Pico wallbox adapter	2	\$ 8.00
	HJS-1-FM	Vive wireless Hub	Shared	Consult your local rep for Hub pricing and service options.

Code Notes: Requirements specified for atriums 20-40 ft. in height. This solution is code for lighting retrofits when the lighting power is reduced by at least 50% in offices, retail spaces, and hotels, and by at least 35% in all other space types. 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 off.

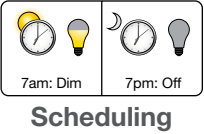
Timeclock:
Timeclock turns perimeter lights on during normally occupied hours.

Timeclock turns lights off during normally unoccupied hours.

Code Notes: Requirements specified for atriums 20-40 ft. in height. This solution is code for lighting retrofits when the lighting power is reduced by at least 50% in offices, retail spaces, and hotels, and by at least 35% in all other space types.



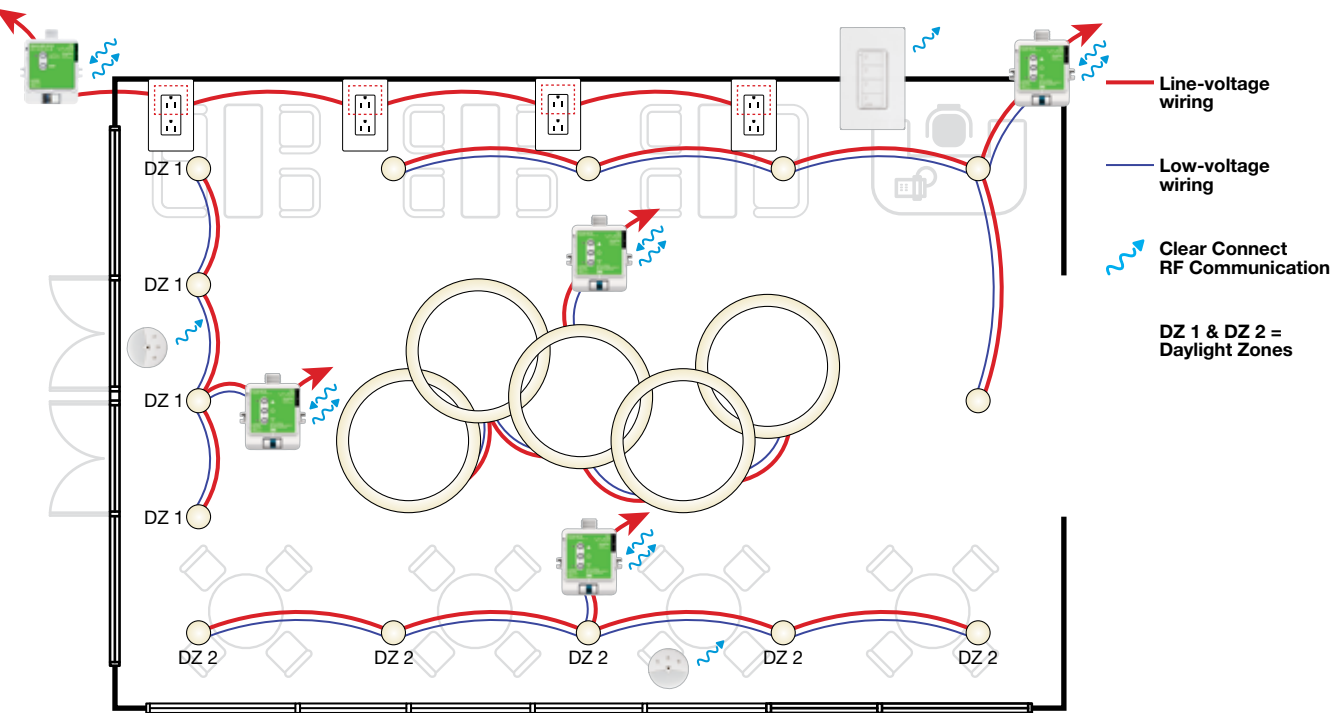
Control Strategies





Lighting Energy Savings*

10%

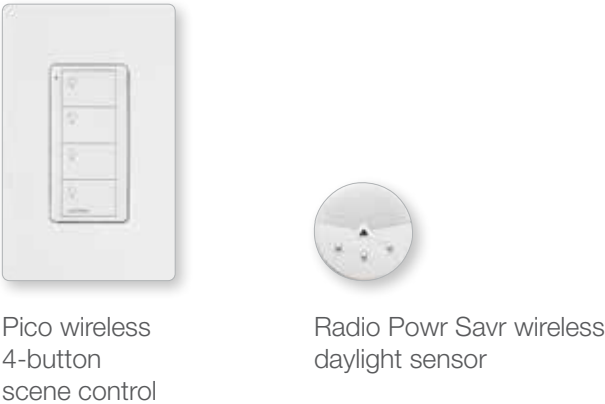
* Go to lutron.com/references for more information.



Symbol	Model Number	Description	Qty	List Price Each
	RMJS-8T-DV-B	PowPak dimming module with 0-10V	4	\$ 150.00
	RMJS-20R-DV-B	20A PowPak relay module	1	\$ 139.00
	LRF2-DCRB-WH	Radio Powr Savr wireless daylight sensor	2	\$ 120.00
	PJ2-4B-GWH-L31	Pico wireless 4-button scene control	1	\$ 39.00
	PICO-WBX-ADAPT	Pico wallbox adapter	1	\$ 8.00
	HJS-1-FM	Vive wireless Hub	Shared	Consult your local rep for Hub pricing and service options.

Code Notes: Requirements specified for 20-40 ft. atriums. Go to lutron.com/vive for complete compatibility and design details. This solution requires 0-10V enabled ballasts and drivers by others.

Visible System Components



Control Functionality

When Occupied:
Automatic: Overhead lights dim/brighten based on daylight availability. There are two perimeter daylight zones.

Manual: Occupant selects scenes to set desired light levels for all lights.

Timeclock:
Timeclock turns all controlled receptacles on and lights on to 50% light level during normally occupied hours. Maximum light level is set to 80%.

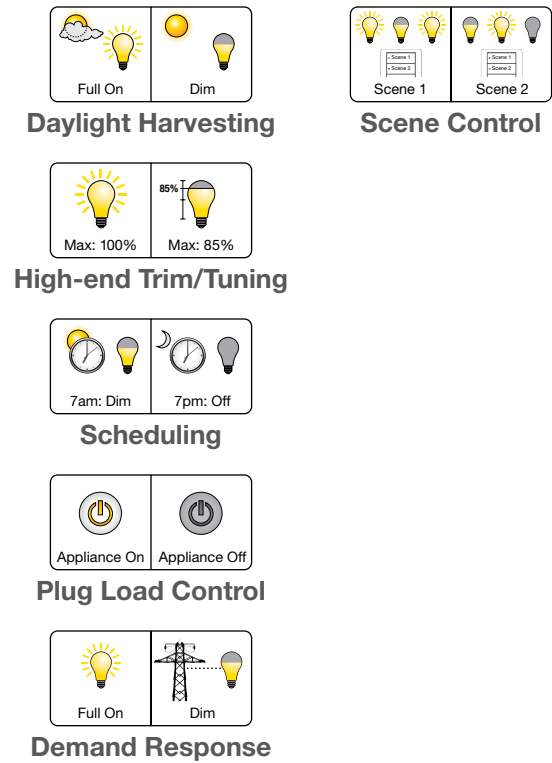
Timeclock turns lights and controlled receptacles off during normally unoccupied hours.

System Events:
Demand Response: All lights and controlled receptacles automatically dim 20% during demand events.

Code Notes: Requirements specified for 20-40 ft. atriums.



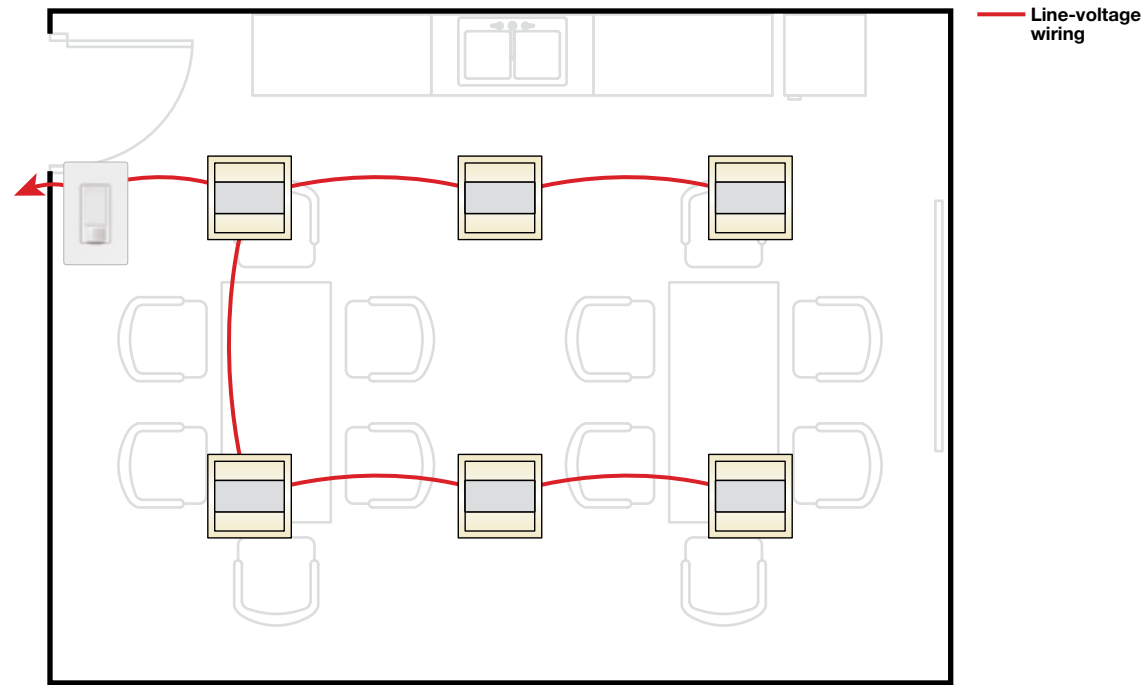
Control Strategies




Lighting Energy Savings*

60%

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



Symbol	Model Number	Description	Qty	List Price Each
	MS-VPS6M2-DV-WH	Maestro vacancy sensing switch*	1	\$ 53.00

Code Notes: This solution is code compliant for lighting retrofits when the lighting power is reduced by at least 50% in offices, retail spaces, and hotels, and by at least 35% in all other space types.
*Maestro MS-VPS6M2-DV-WH is not compatible with Vive wireless hub.

Visible System Components



Maestro vacancy sensing 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.

Code Notes: This solution is code compliant for lighting retrofits when the lighting power is reduced by at least 50% in offices, retail spaces, and hotels, and by at least 35% in all other space types.



Control Strategies



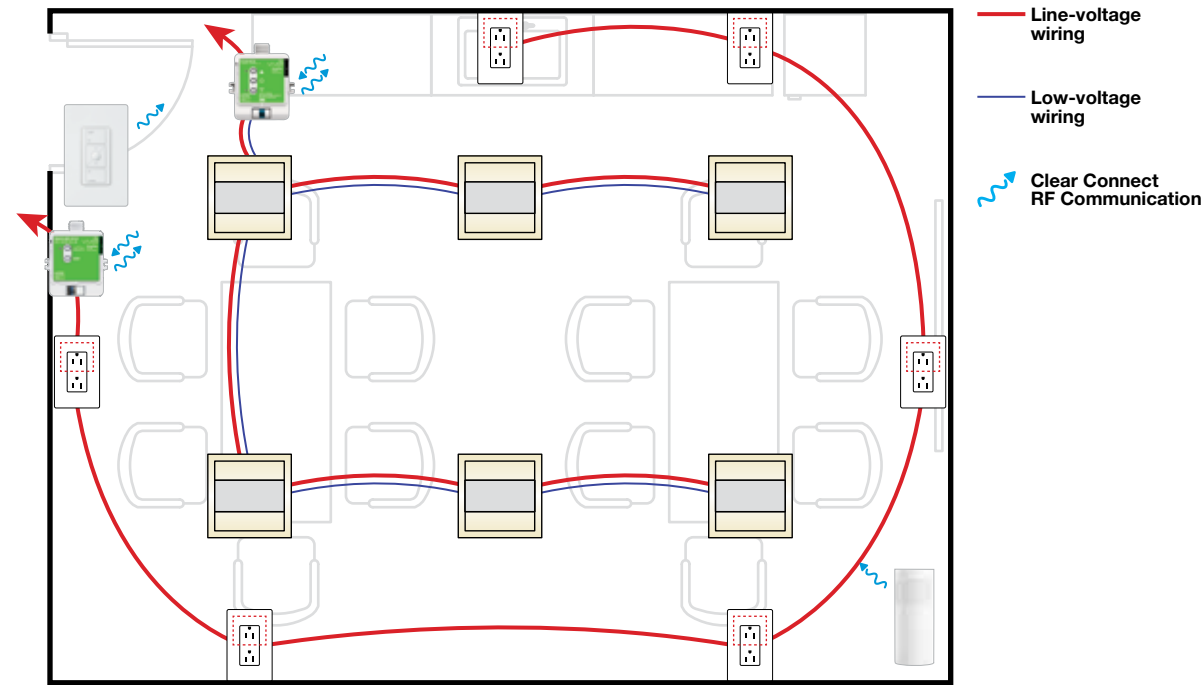
Manual On Auto Off






Occupancy/Vacancy

Lighting Energy Savings*

30%

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



Symbol	Model Number	Description	Qty	List Price Each
	RMJS-8T-DV-B	PowPak dimming module with 0-10V	1	\$ 150.00
	RMJS-20R-DV-B	20A PowPak relay module	1	\$ 139.00
	LRF2-VKLB-P-WH	Radio Powr Savr wireless corner-mount vacancy sensor	1	\$ 85.00
	PJ2-3BRL-GWH-L01	Pico wireless 3-button with raise/lower control	1	\$ 21.00
	PICO-WBX-ADAPT	Pico wallbox adapter	1	\$ 8.00
	HJS-1-FM	Vive wireless Hub	Shared	Consult your local rep for Hub pricing and service options.

Code Notes: For break rooms with daylight, include a 0-10V dimming module per zone and a daylight sensor. Go to lutron.com/vive for complete compatibility and design details. This solution requires 0-10V enabled ballasts and drivers by others.

Visible System Components



Pico wireless control



Radio Powr Savr wireless corner-mount vacancy sensor

Control Functionality

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

Controlled receptacles automatically regain power when occupant enters.

When Occupied:
Manual: Occupant uses wall dimmer to set desired light levels for all lights.

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

50% of all receptacles automatically turn off 15 minutes after all occupants exit.

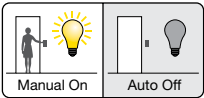
System Events:
Demand Response: All lights automatically dim 20% during demand events.

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

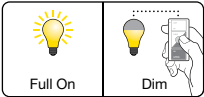
Code Notes: For break rooms with daylight, include a 0-10V dimming module per zone and a daylight sensor.



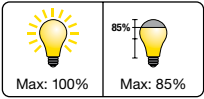
Control Strategies



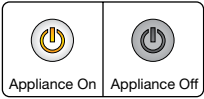
Occupancy/Vacancy



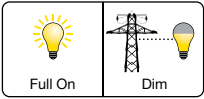
Personal Dimming



High-end Trim/Tuning



Plug Load Control

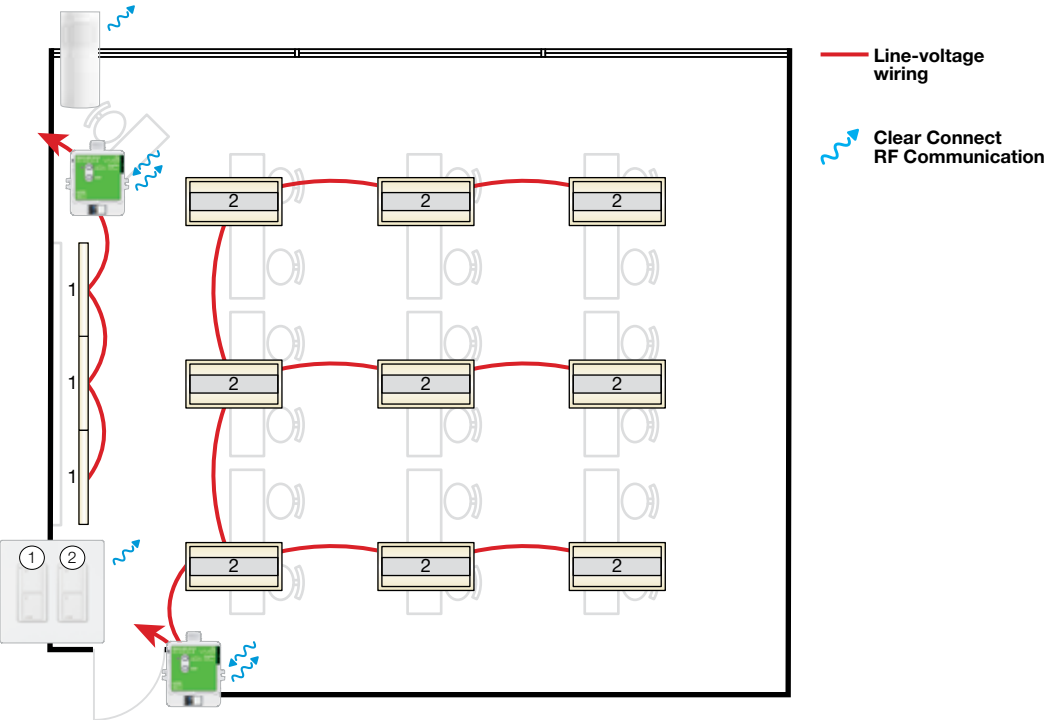





Demand Response

Lighting Energy Savings*

45%

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



Symbol	Model Number	Description	Qty	List Price Each
	RMJS-16R-DV-B	PowPak switching module	2	\$ 129.00
	LRF2-VKLB-P-WH	Radio Powr Savr wireless corner-mount vacancy sensor	1	\$ 85.00
	PJ2-2B-GWH-L01	Pico wireless 2-button control	2	\$ 21.00
	PICO-WBX-ADAPT	Pico wallbox adapter	2	\$ 8.00

Code Notes: This solution is code compliant for lighting retrofits when the lighting power is reduced by at least 50% in offices, retail spaces, and hotels, and by at least 35% in all other space types.

Visible System Components



Pico wireless control



Radio Powr Savr wireless corner-mount vacancy sensor

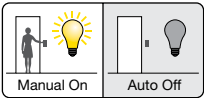
Control Functionality

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 switches to turn on and off general and white-board lighting.

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

Control Strategies



Occupancy/Vacancy

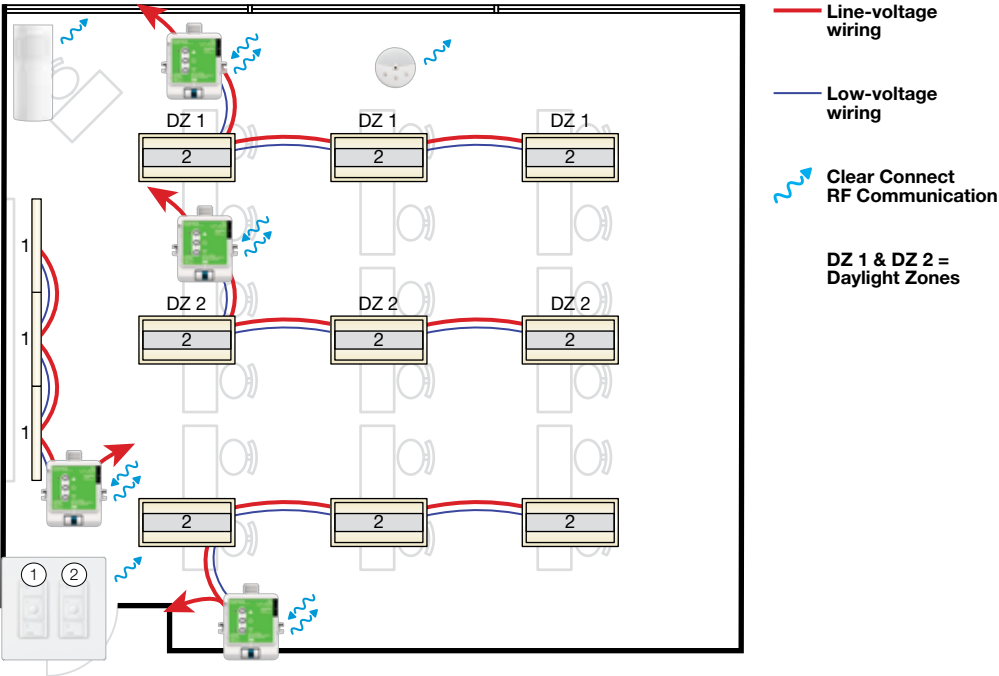







Lighting Energy Savings*

45%

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

Code Notes: This solution is code compliant for lighting retrofits when the lighting power is reduced by at least 50% in offices, retail spaces, and hotels, and by at least 35% in all other space types.



Symbol	Model Number	Description	Qty	List Price Each
	RMJS-8T-DV-B	PowPak dimming module with 0-10V	4	\$ 150.00
	LRF2-DCRB-WH	Radio Powr Savr wireless daylight sensor	1	\$ 120.00
	LRF2-VKLB-P-WH	Radio Powr Savr wireless corner-mount vacancy sensor	1	\$ 85.00
	PJ2-3BRL-GWH-L01	Pico wireless 3-button with raise/lower control	2	\$ 21.00
	PICO-WBX-ADAPT	Pico wallbox adapter	2	\$ 8.00
	HJS-1-FM	Vive wireless Hub	Shared	Consult your local rep for Hub pricing and service options.

Code Notes: For non-daylit classrooms, all general lighting can be connected to a single 0-10V dimming module. Go to lutron.com/vive for complete compatibility and design details. This solution requires 0-10V enabled ballasts and drivers by others.

Visible System Components



Pico wireless control



Radio Powr Savr wireless corner-mount vacancy sensor and daylight sensor

Control Functionality

Occupant Enters:
All lights automatically turn on to 50% light level. Occupant turns on lights to maximum level manually. Maximum light level is set to 80%.

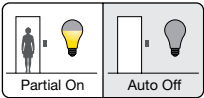
When Occupied:
Automatic: Overhead lights dim/brighten based on daylight availability. There are two perimeter daylight zones.

Manual: Occupant uses wall dimmers to set desired light levels for both general and white-board lights.

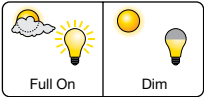
Occupant Exits:
All lights automatically turn off 15 minutes after all occupants exit.

System Events:
Demand Response: All lights automatically dim 20% during demand events.

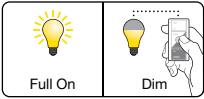
Control Strategies



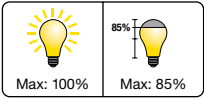
Occupancy/Vacancy



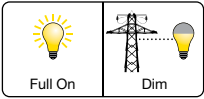
Daylight Harvesting



Personal Dimming



High-end Trim/Tuning

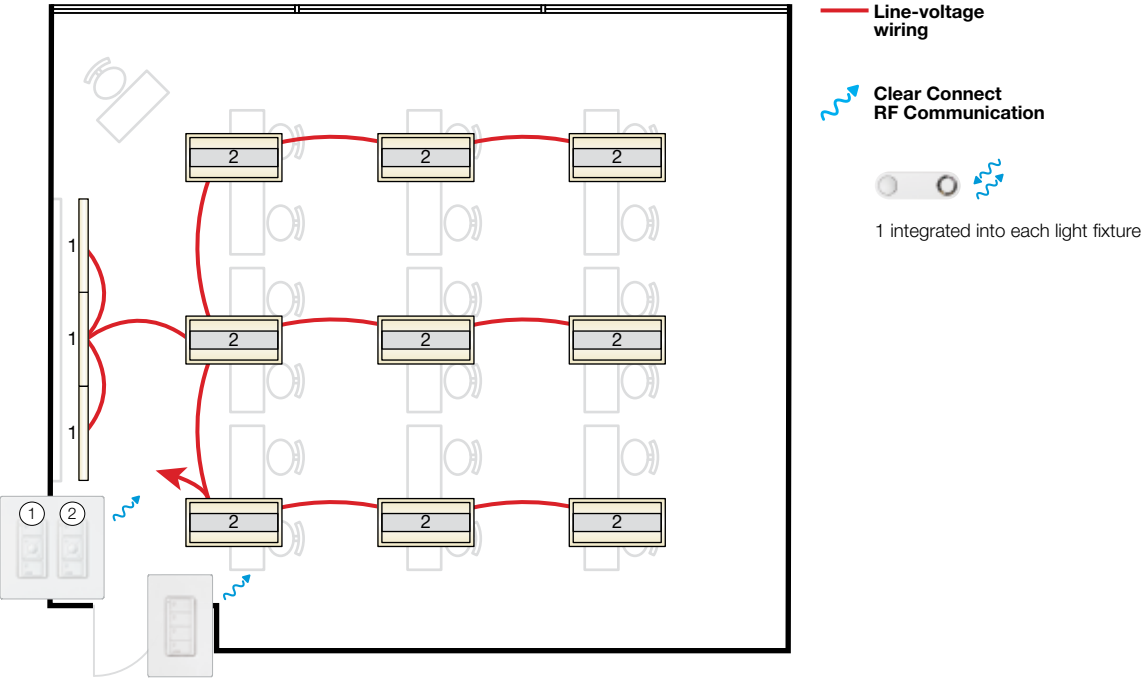






Demand Response

Lighting Energy Savings*

60%

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



Symbol	Model Number	Description	Qty	List Price Each
	Integral to fixture ¹	Integral fixture control with sensor	12	\$ 70.00 ²
	PJ2-4B-GWH-L31	Pico wireless 4-button scene control	1	\$ 39.00
	PJ2-3BRL-GWH-L01	Pico wireless 3-button with raise/lower control	2	\$ 21.00
	PICO-WBX-ADAPT	Pico wallbox adapter	3	\$ 8.00
	HJS-1-FM	Vive wireless Hub	Shared	Consult your local rep for Hub pricing and service options.

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.



This solution requires digitally enabled ballasts and drivers by others.

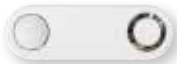
Visible System Components



Pico wireless control



Pico wireless 4-button scene control



Integral fixture control with sensor

Control Functionality

Occupant Enters:
All lights automatically turn on to 50% light level. Occupant turns on lights to maximum level manually. Maximum light level is set to 80%.

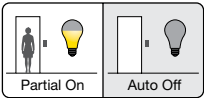
When Occupied:
Automatic: Overhead lights dim/brighten based on daylight availability. There are two perimeter daylight zones.

Manual: Occupant selects scenes or uses dimmers to set desired light levels for all lights. Entry scene controller has 3 user preferred presets and 1 all off button.

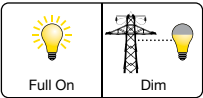
Occupant Exits:
All lights automatically turn off 15 minutes after all occupants exit.

System Events:
Demand Response: All lights automatically dim 20% during demand events.

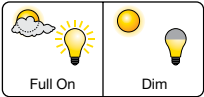
Control Strategies



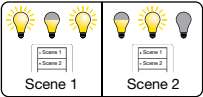
Occupancy/Vacancy



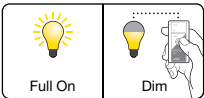
Demand Response



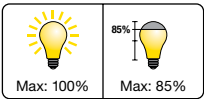
Daylight Harvesting



Scene Control



Personal Dimming

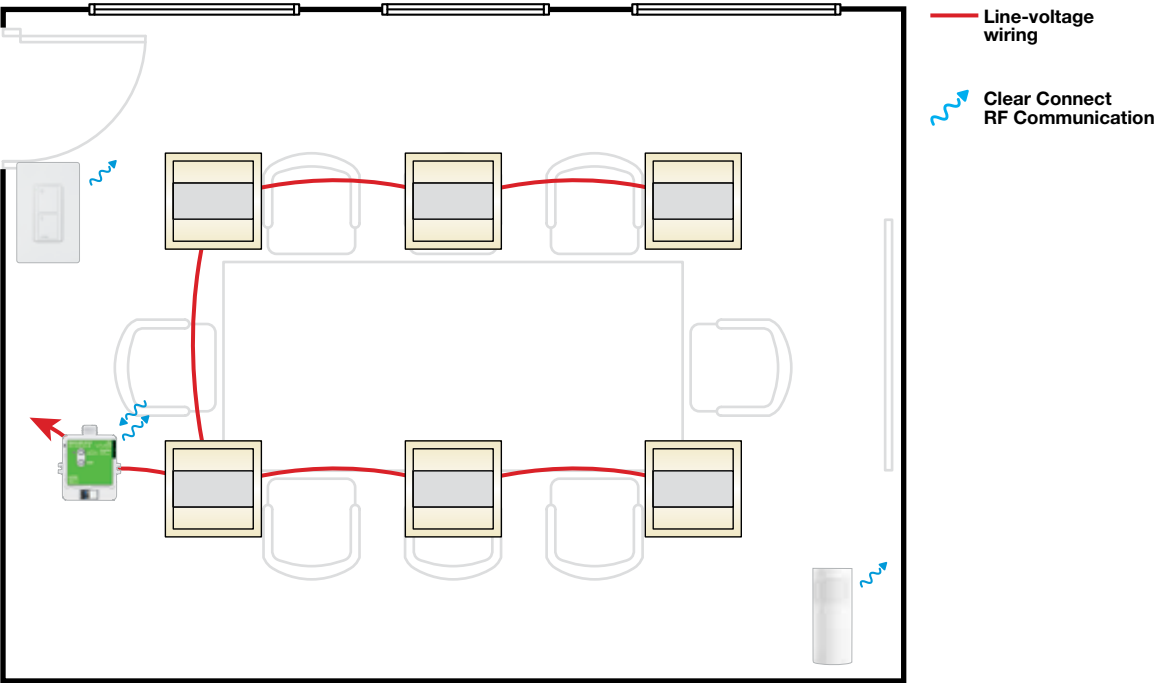





High-end Trim/Tuning

Lighting Energy Savings*

60%

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



Symbol	Model Number	Description	Qty	List Price Each
	RMJS-16R-DV-B	PowPak switching module	1	\$ 129.00
	LRF2-VKLB-P-WH	Radio Powr Savr wireless corner-mount vacancy sensor	1	\$ 85.00
	PJ2-2B-GWH-L01	Pico wireless 2-button control	1	\$ 21.00
	PICO-WBX-ADAPT	Pico wallbox adapter	1	\$ 8.00

Code Notes: This solution is code compliant for lighting retrofits when the lighting power is reduced by at least 50% in offices, retail spaces, and hotels, and by at least 35% in all other space types. 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



Radio Powr Savr wireless corner-mount vacancy sensor

Control Functionality

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

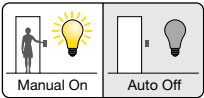
When Occupied: Manual: Occupant uses wall switch to turn all lights off.

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

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



Control Strategies



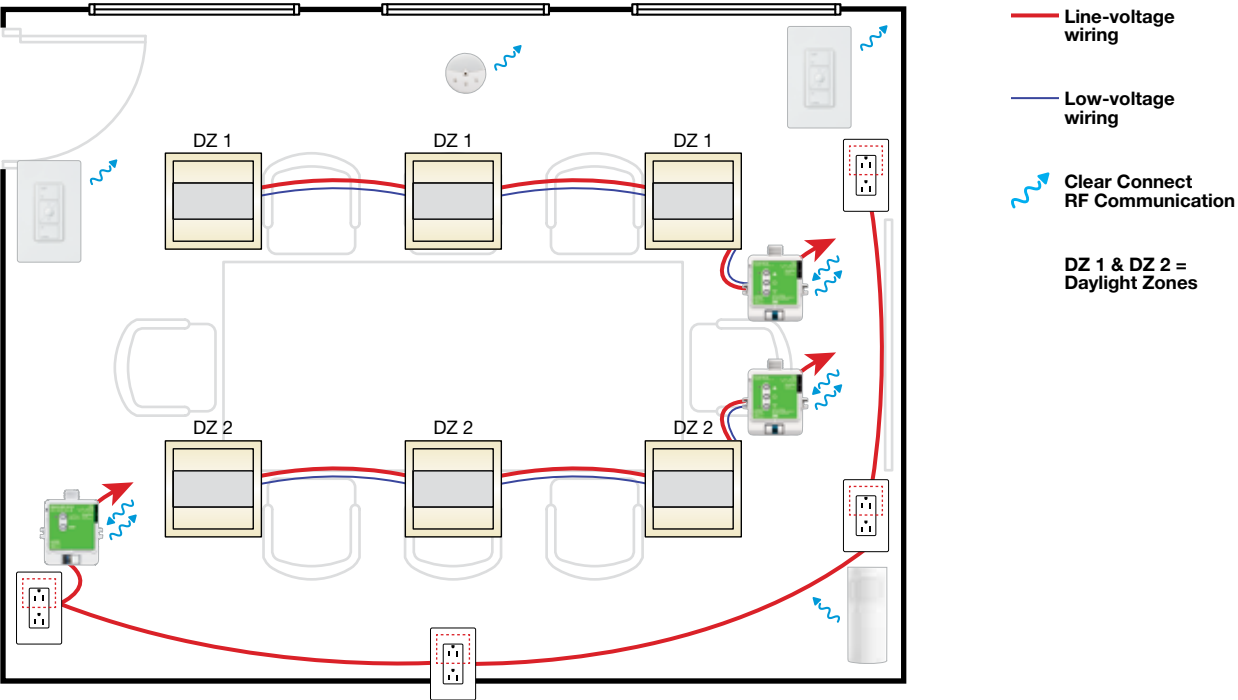
Occupancy/Vacancy







Lighting Energy Savings*

40%

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

Code Notes: This solution is code compliant for lighting retrofits when the lighting power is reduced by at least 50% in offices, retail spaces, and hotels, and by at least 35% in all other space types.



Symbol	Model Number	Description	Qty	List Price Each
	RMJS-8T-DV-B	PowPak dimming module with 0-10V	2	\$ 150.00
	RMJS-20R-DV-B	20A PowPak relay module	1	\$ 139.00
	LRF2-DCRB-WH	Radio Powr Savr wireless daylight sensor	1	\$ 120.00
	LRF2-VKLB-P-WH	Radio Powr Savr wireless corner-mount vacancy sensor	1	\$ 85.00
	PJ2-3BRL-GWH-L01	Pico wireless 3-button with raise/lower control	2	\$ 21.00
	PICO-WBX-ADAPT	Pico wallbox adapter	2	\$ 8.00
	HJS-1-FM	Vive wireless Hub	Shared	Consult your local rep for Hub pricing and service options.

Code Notes: For non-daylit conference rooms, all general lighting can be connected to a single 0-10V dimming module. Want to add a Vive wireless hub for more features? Go to lutron.com/vive for complete compatibility and design details. This solution requires 0-10V enabled ballasts and drivers by others.

Visible System Components



Control Functionality

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

Controlled receptacles automatically regain power when occupant enters.

When Occupied:
Automatic: Overhead lights dim/brighten based on daylight availability. There are two perimeter daylight zones.

Manual: Occupant uses wall dimmer to set desired light levels for all lights.

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

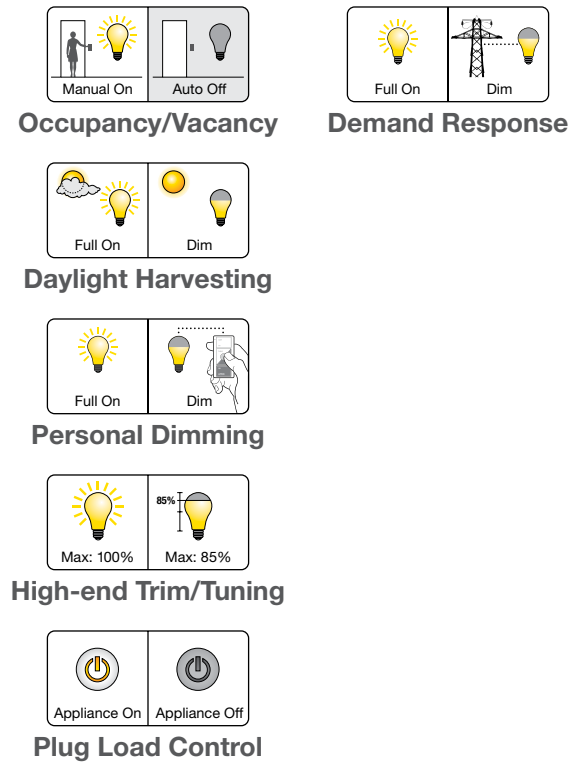
50% of all receptacles automatically turn off 15 minutes after all occupants exit.

System Events:
Demand Response: All lights automatically dim 20% during demand events.

Code Notes: For non-daylit conference rooms, all general lighting can be connected to a single 0-10V dimming module.



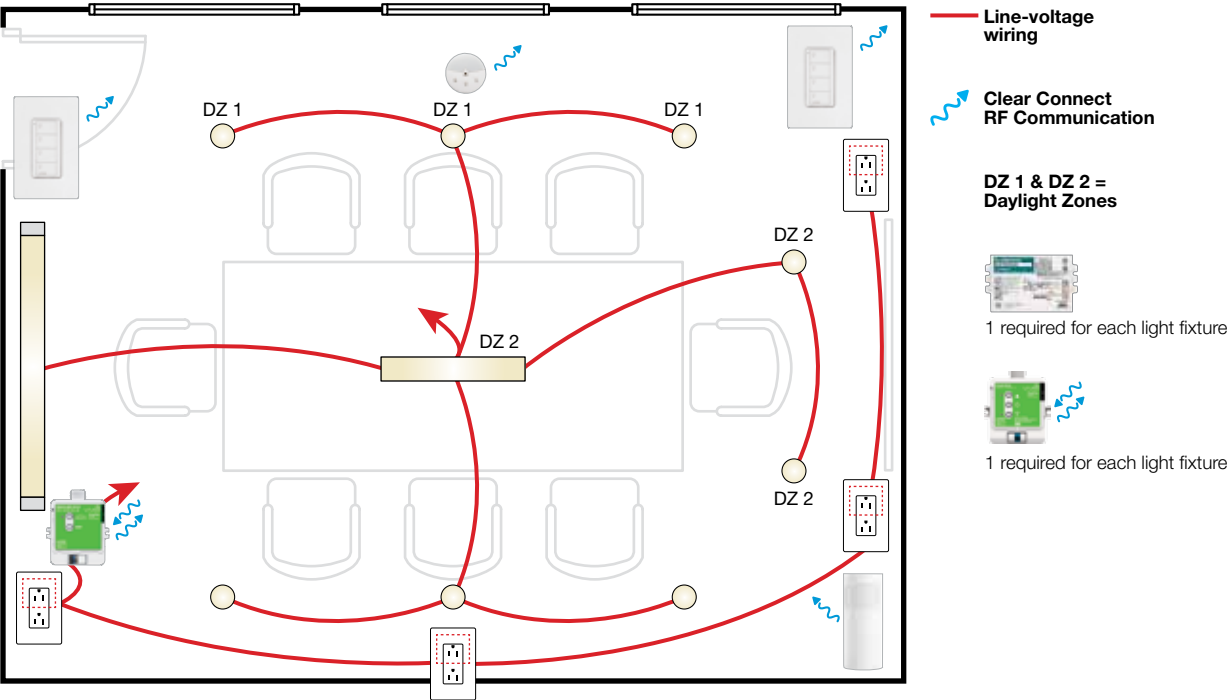
Control Strategies



Lighting Energy Savings*

60%

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



Symbol	Model Number	Description	Qty	List Price Each
	Multiple	EcoSystem-enabled Hi-Lume soft-on, fade-to-black series ballasts/drivers	10	\$ 67.00 - \$ 81.00
	FCJS-ECO	Wireless fixture control with EcoSystem	10	\$ 75.00
	RMJS-20R-DV-B	20A PowPak relay module	1	\$ 139.00
	LRF2-DCRB-WH	Radio Powr Savr wireless daylight sensor	1	\$ 120.00
	LRF2-VKLB-P-WH	Radio Powr Savr wireless corner-mount vacancy sensor	1	\$ 85.00
	PJ2-4B-GWH-L31	Pico wireless 4-button scene control	2	\$ 39.00
	PICO-WBX-ADAPT	Pico wallbox adapter	2	\$ 8.00
	HJS-1-FM	Vive wireless Hub	Shared	Consult your local rep for Hub pricing and service options.

Go to lutron.com/BallastTool or lutron.com/findafixture to identify the correct ballast or LED fixture for your project.

Visible System Components



Control Functionality

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

Controlled receptacles automatically regain power when occupant enters.

When Occupied:
Automatic: Overhead lights dim/brighten based on daylight availability. There is one perimeter daylight zone.

Manual: Occupant select scenes to set desired light levels for all lights. Entry scene controller has 3 user preferred presets and 1 all off button.

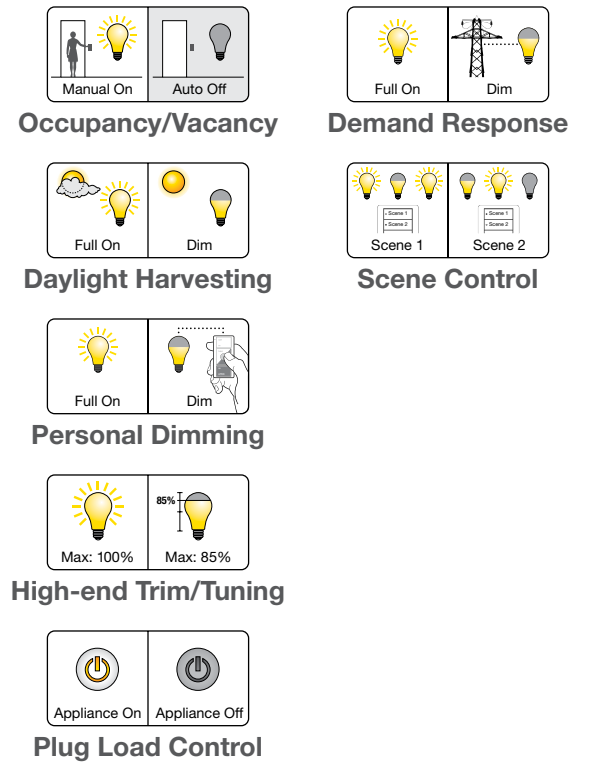
Occupant Exits:
All lights automatically turn off 15 minutes after all occupants exit.

50% of all receptacles automatically turn off 15 minutes after all occupants exit.

System Events:
Demand Response: All lights automatically dim 20% during demand events.



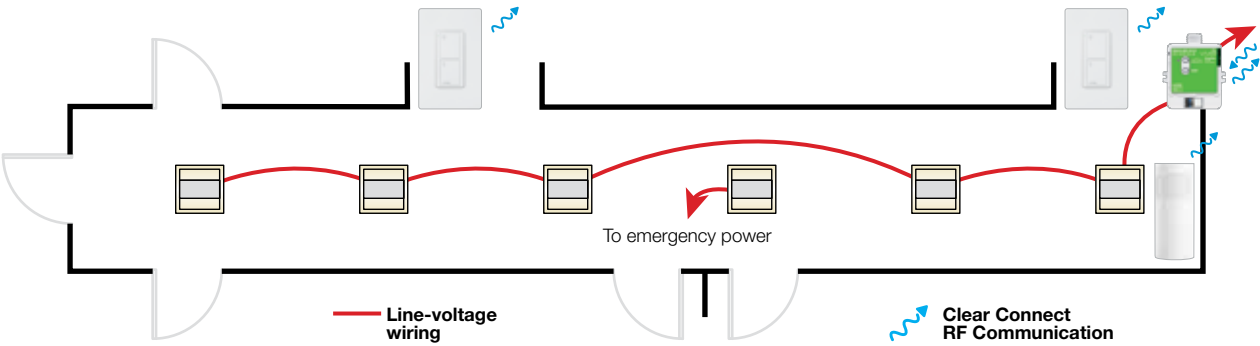
Control Strategies






Lighting Energy Savings*

60%

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



Symbol	Model Number	Description	Qty	List Price Each
	RMJS-16R-DV-B	PowPak switching module	1	\$ 129.00
	LRF2-OHLB-P-WH	Radio Powr Savr wireless hallway occupancy sensor	1	\$ 85.00
	PJ2-2B-GWH-L01	Pico wireless 2-button control	2	\$ 21.00
	PICO-WBX-ADAPT	Pico wallbox adapter	2	\$ 8.00

Code Notes: This solution is code compliant for lighting retrofits when the lighting power is reduced by at least 50% in offices, retail spaces, and hotels, and by at least 35% in all other space types.
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



Radio Powr Savr wireless hallway occupancy sensor



Control Functionality

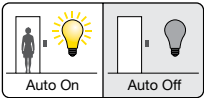
Occupant Enters:
All lights automatically turn on to maximum light level.

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 re-zoning, system monitoring, timeclock functionality, and advanced integration.

Control Strategies



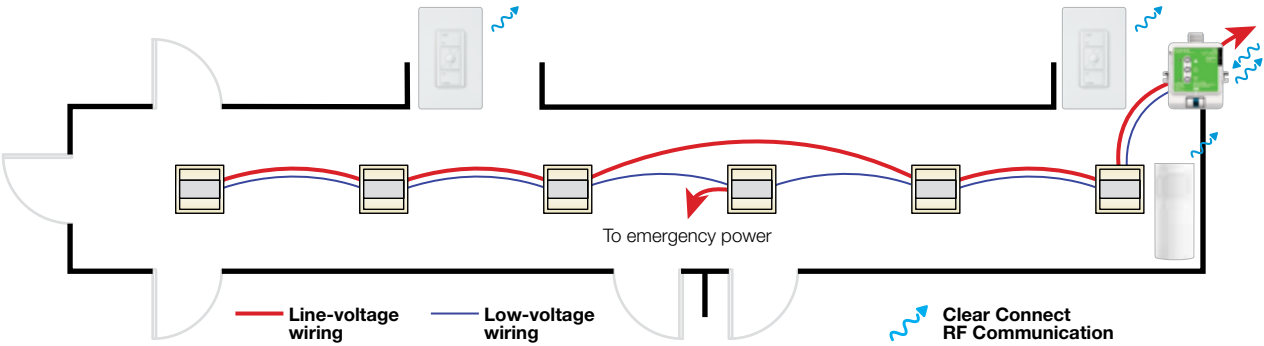
Occupancy/Vacancy

Lighting Energy Savings*

40%

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

Code Notes: This solution is code compliant for lighting retrofits when the lighting power is reduced by at least 50% in offices, retail spaces, and hotels, and by at least 35% in all other space types.



Symbol	Model Number	Description	Qty	List Price Each
	RMJS-8T-DV-B	PowPak dimming module with 0-10V	1	\$ 150.00
	LRF2-OHLB-P-WH	Radio Powr Savr wireless hallway occupancy sensor	1	\$ 85.00
	PJ2-3BRL-GWH-L01	Pico wireless 3-button with raise/lower control	2	\$ 21.00
	PICO-WBX-ADAPT	Pico wallbox adapter	2	\$ 8.00
	HJS-1-FM	Vive wireless Hub	Shared	Consult your local rep for Hub pricing and service options.

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. Add a daylight sensor for corridors with daylight zones. Want to add a Vive wireless hub for more features? Go to lutron.com/vive for complete compatibility and design details. This solution requires 0-10V enabled ballasts and drivers by others.

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. Maximum light level is set to 80%.

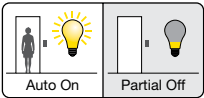
When Occupied:
Manual: Occupant uses wall dimmer to set desired light levels for all lights. Manual control cannot fully shut off the lights. Minimum light level is set to 10%.

Occupant Exits:
All lights automatically go to minimum light level 15 minutes after all occupants exit.

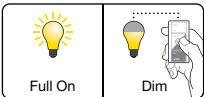
Emergency Mode:
Lighting connected to emergency power turns on to full output.

System Events:
Demand Response: All lights automatically dim 20% during demand response event. Demand response cannot shut off the lights.

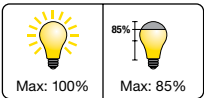
Control Strategies



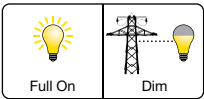
Occupancy/Vacancy



Personal Dimming



High-end Trim/Tuning



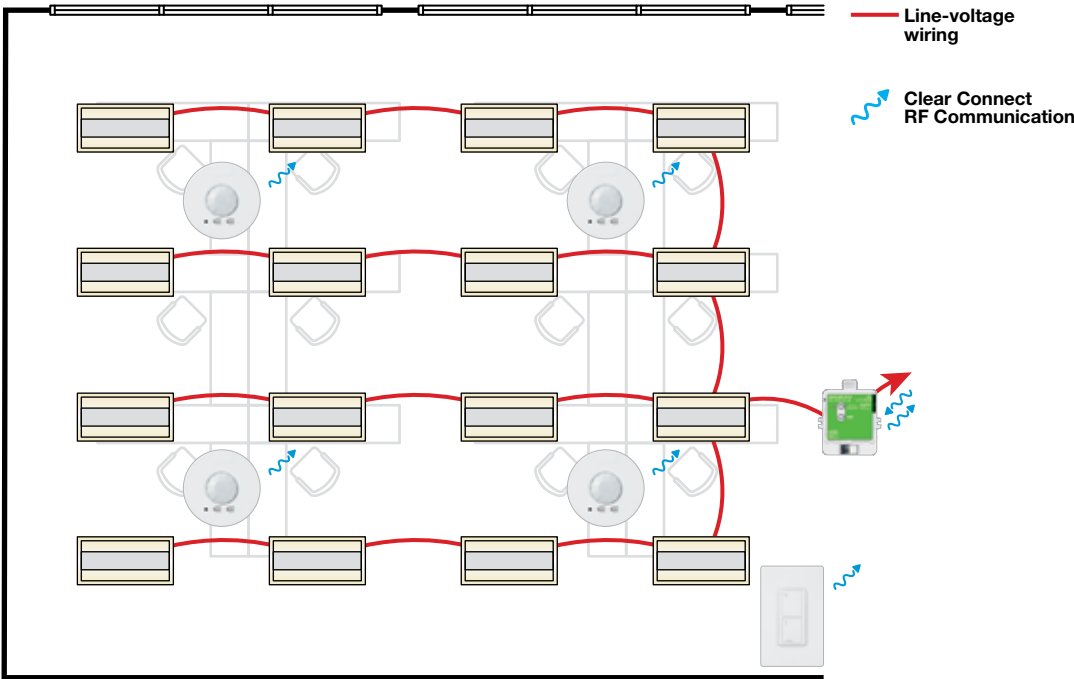
Demand Response




Lighting Energy Savings*

60%

Code Notes: For non-egress corridors, set the minimum light level to full off.

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



Symbol	Model Number	Description	Qty	List Price Each
	RMJS-16R-DV-B	PowPak switching module	1	\$ 129.00
	LRF2-OCR2B-P-WH	Radio Powr Savr wireless ceiling-mount occupancy sensor	4	\$ 85.00
	PJ2-2B-GWH-L01	Pico wireless 2-button control	1	\$ 21.00
	PICO-WBX-ADAPT	Pico wallbox adapter	1	\$ 8.00

Code Notes: This solution is code compliant for lighting retrofits when the lighting power is reduced by at least 50% in offices, retail spaces, and hotels, and by at least 35% in all other space types.
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



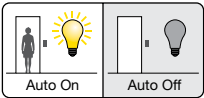
Radio Powr Savr wireless ceiling-mount occupancy sensor

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 re-zoning, system monitoring, timeclock functionality, and advanced integration.

Control Strategies



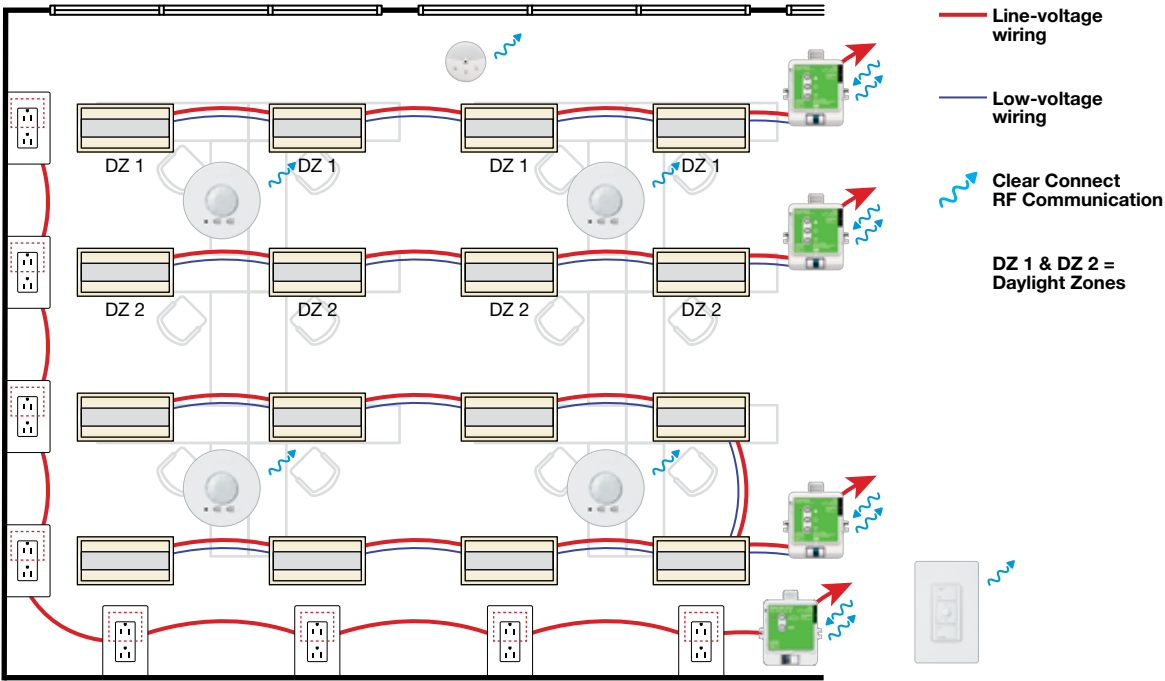
Occupancy/Vacancy







Lighting Energy Savings*

35%

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

Code Notes: This solution is code compliant for lighting retrofits when the lighting power is reduced by at least 50% in offices, retail spaces, and hotels, and by at least 35% in all other space types.



Symbol	Model Number	Description	Qty	List Price Each
	RMJS-8T-DV-B	PowPak dimming module with 0-10V	3	\$ 150.00
	RMJS-20R-DV-B	20A PowPak relay module	1	\$ 139.00
	LRF2-DCRB-WH	Radio Powr Savr wireless daylight sensor	1	\$ 120.00
	LRF2-OCR2B-P-WH	Radio Powr Savr wireless ceiling-mount occupancy sensor	4	\$ 85.00
	PJ2-3BRL-GWH-L01	Pico wireless 3-button with raise/lower control	1	\$ 21.00
	PICO-WBX-ADAPT	Pico wallbox adapter	1	\$ 8.00
	HJS-1-FM	Vive wireless Hub	Shared	Consult your local rep for Hub pricing and service options.

Code Notes: For non-daylit open offices, all general lighting can be connected to a single 0-10V dimming module. Go to lutron.com/vive for complete compatibility and design details. This solution requires 0-10V enabled ballasts and drivers by others.

Visible System Components



Control Functionality

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

Controlled receptacles automatically regain power when occupant enters.

When Occupied:
Automatic: Overhead lights dim/brighten based on daylight availability. There are two perimeter daylight zones.

Manual: Occupant uses wall dimmers to set desired light levels for all lights.

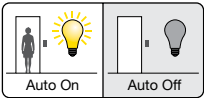
Occupant Exits:
All lights automatically turn off 15 minutes after all occupants exit.

50% of all receptacles automatically turn off 15 minutes after all occupants exit.

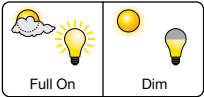
System Events:
Demand Response: All lights automatically dim 20% during demand response event.

Code Notes: For non-daylit open offices, all general lighting can be connected to a single 0-10V dimming module.

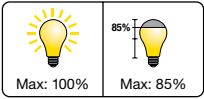
Control Strategies



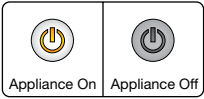
Occupancy/Vacancy



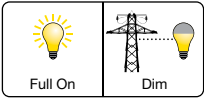
Daylight Harvesting



High-end Trim/Tuning



Plug Load Control

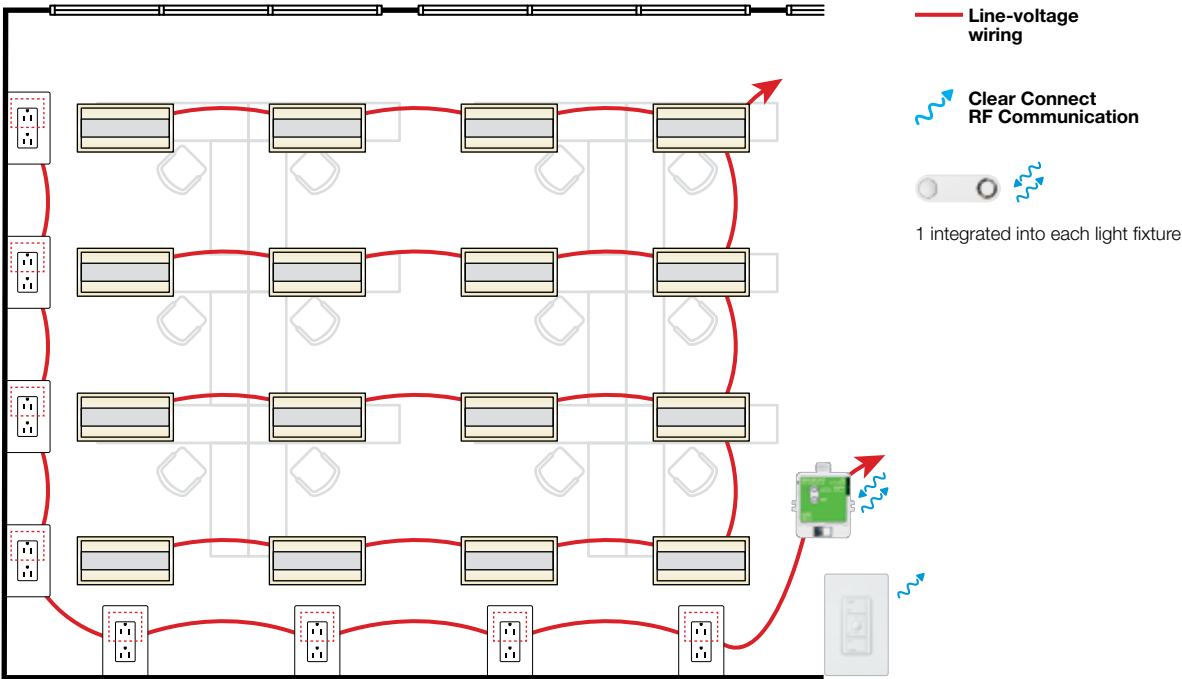


Demand Response

Lighting Energy Savings*

55%

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



Symbol	Model Number	Description	Qty	List Price Each
	Integral to fixture ¹	Integral fixture control with sensor	16	\$ 70.00 ²
	RMJS-20R-DV-B	20A PowPak relay module	1	\$ 139.00
	PJ2-3BRL-GWH-L01	Pico wireless 3-button with raise/lower control	1	\$ 21.00
	PICO-WBX-ADAPT	Pico wallbox adapter	1	\$ 8.00
	HJS-1-FM	Vive wireless Hub	Shared	Consult your local rep for Hub pricing and service options.

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.



This solution requires digitally enabled ballasts and drivers by others.

Visible System Components



Control Functionality

Occupant Enters:
Each individual light automatically turns on to 50% light level as occupant approaches fixture proximity.

Controlled receptacles automatically regain power when occupant enters.

When Occupied:
Automatic: Each individual overhead light dims/brightens based on local daylight availability.

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

Occupant Exits:
Each individual light automatically turns off 15 minutes after all occupants exit fixture proximity.

50% of all receptacles automatically turn off 15 minutes after all occupants exit.

System Events:
Demand Response: All lights automatically dim 20% during demand events.



Control Strategies

Occupancy/Vacancy

Daylight Harvesting

High-end Trim/Tuning

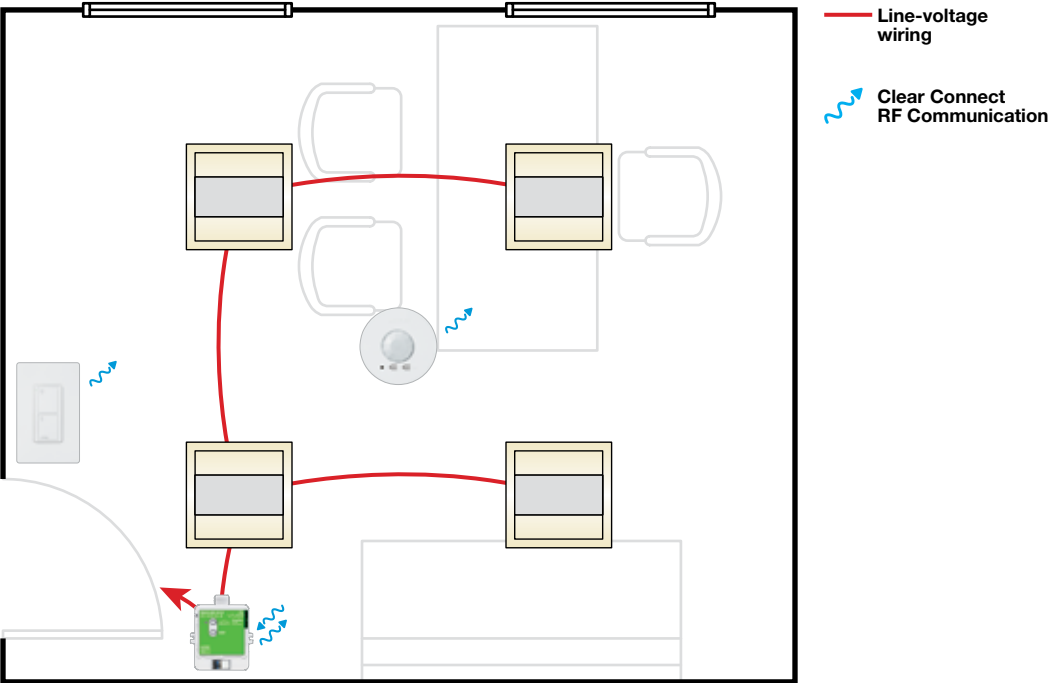
Plug Load Control


Demand Response

Lighting Energy Savings*

60%

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



Symbol	Model Number	Description	Qty	List Price Each
	RMJS-16R-DV-B	PowPak dimming module	1	\$ 129.00
	LRF2-VCR2B-P-WH	Radio Powr Savr wireless ceiling-mount vacancy sensor	1	\$ 85.00
	PJ2-2B-GWH-L01	Pico wireless 2-button control	1	\$ 21.00
	PICO-WBX-ADAPT	Pico wallbox adapter	1	\$ 8.00

Code Notes: This solution is code compliant for lighting retrofits when the lighting power is reduced by at least 50% in offices, retail spaces, and hotels, and by at least 35% in all other space types.
Want to add a Vive wireless hub for more features? Go to lutron.com/vive for complete compatibility and design details.

Visible System Components



Control Functionality

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

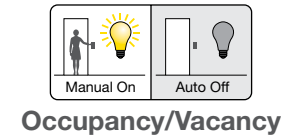
When Occupied:
Manual: Occupant uses wall switch to turn all lights off.

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

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



Control Strategies

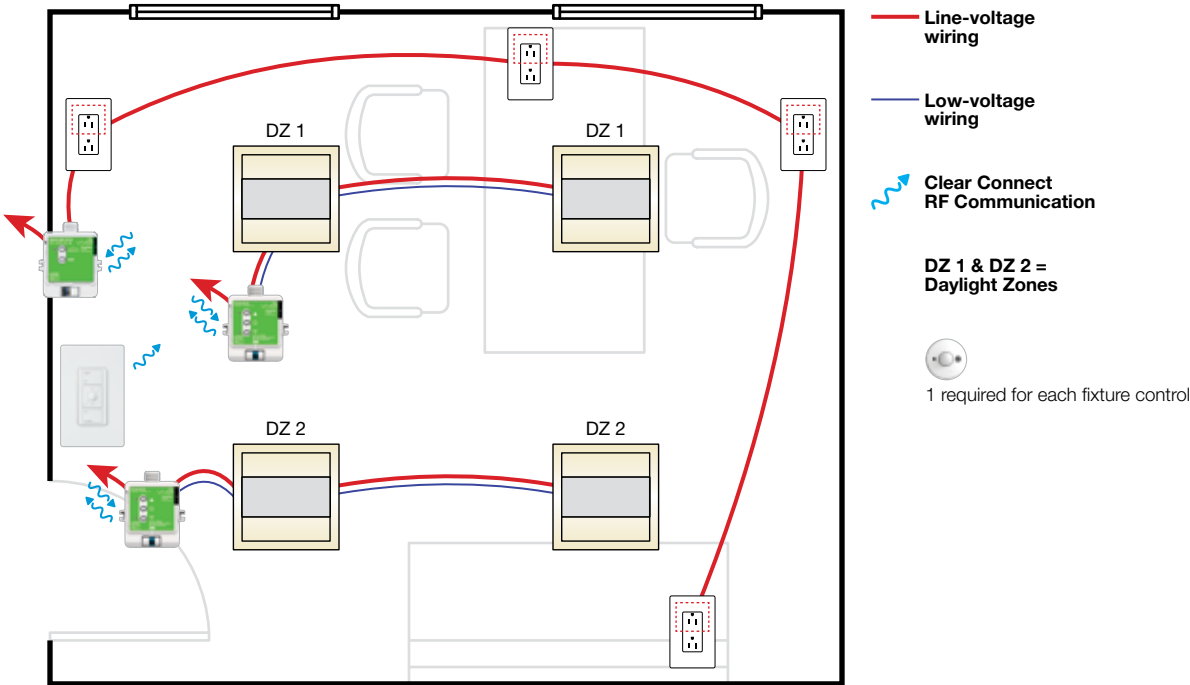







Lighting Energy Savings*

30%

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

Code Notes: This solution is code compliant for lighting retrofits when the lighting power is reduced by at least 50% in offices, retail spaces, and hotels, and by at least 35% in all other space types.



Symbol	Model Number	Description	Qty	List Price Each
	FCJS-010	Wireless Fixture Control with 0-10V	2	\$ 75.00
	RMJS-20R-DV-B	20A PowPak relay module	1	\$ 139.00
	FC-SENSOR	PowPak Fixture Sensor	2	\$ 35.00
	PJ2-3BRL-GWH-L01	Pico wireless 3-button with raise/lower control	1	\$ 21.00
	PICO-WBX-ADAPT	Pico wallbox adapter	1	\$ 8.00
	HJS-1-FM	Vive wireless Hub	Shared	Consult your local rep for Hub pricing and service options.

FCJS models are capable of controlling up to 3 ballasts or drivers. Review the "Vive PowPak Fixture Controls" submittal document for more design details. Want to add a Vive wireless hub for more features? Go to lutron.com/vive for complete compatibility and design details. This solution requires 0-10V enabled ballasts and drivers by others.

Visible System Components



Control Functionality

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

Controlled receptacles automatically regain power when occupant enters.

When Occupied:
Automatic: Overhead lights dim/brighten based on daylight availability. There are two perimeter daylight zones.

Manual: Occupant uses wall dimmer to set desired light levels for all lights.

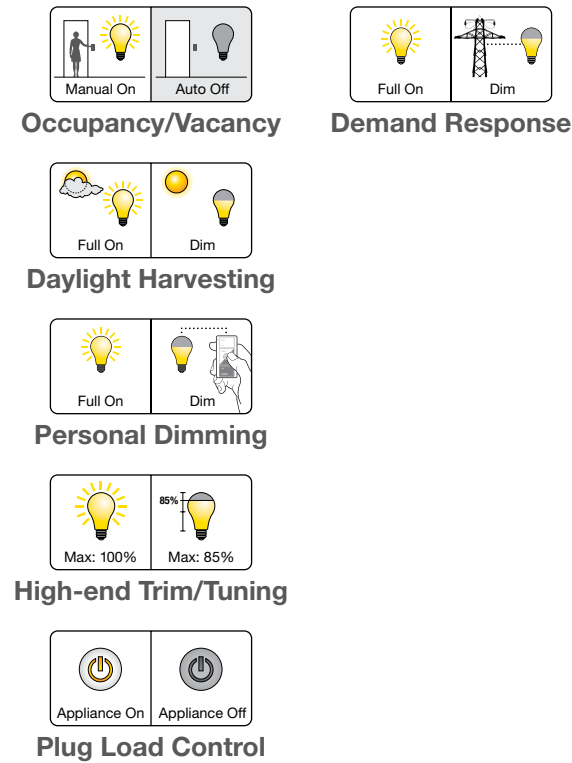
Occupant Exits:
All lights automatically turn off 15 minutes after all occupants exit.

50% of all receptacles automatically turn off 15 minutes after all occupants exit.

System Events:
Demand Response: All lights automatically dim 20% during demand events.



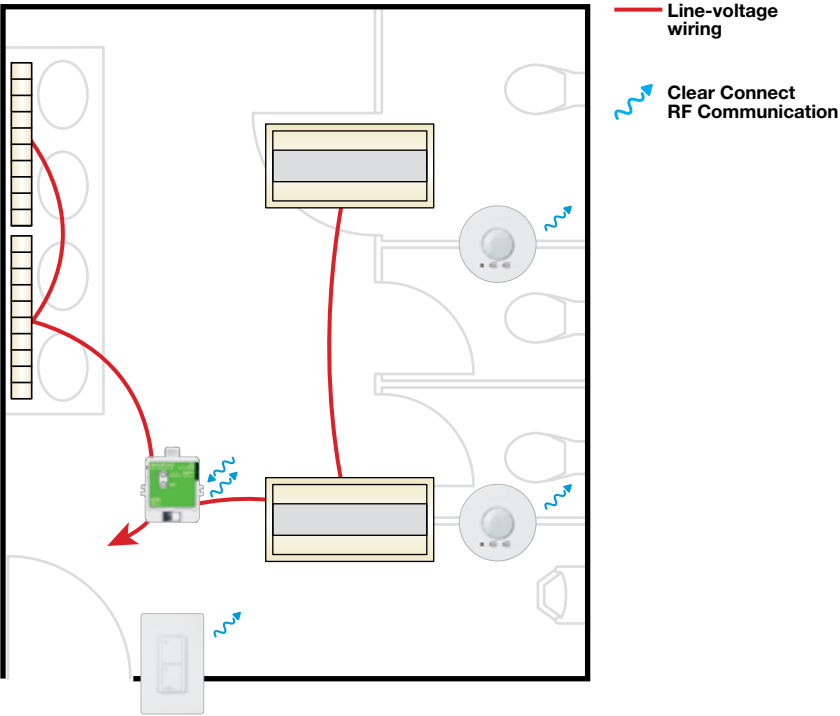
Control Strategies






Lighting Energy Savings*

60%

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



Symbol	Model Number	Description	Qty	List Price Each
	RMJS-16R-DV-B	PowPak switching module	1	\$ 129.00
	LRF2-OCR2B-P-WH	Radio Powr Savr wireless ceiling-mount occupancy sensor	2	\$ 85.00
	PJ2-2B-GWH-L01	Pico wireless 2-button control	1	\$ 21.00
	PICO-WBX-ADAPT	Pico wallbox adapter	1	\$ 8.00

Code Notes: This solution is code compliant for lighting retrofits when the lighting power is reduced by at least 50% in offices, retail spaces, and hotels, and by at least 35% in all other space types. 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



Radio Powr Savr wireless ceiling-mount occupancy sensor

Control Functionality

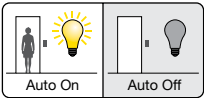
Occupant Enters:
All lights automatically turn on to maximum light level.

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 re-zoning, system monitoring, timeclock functionality, and advanced integration.

Control Strategies



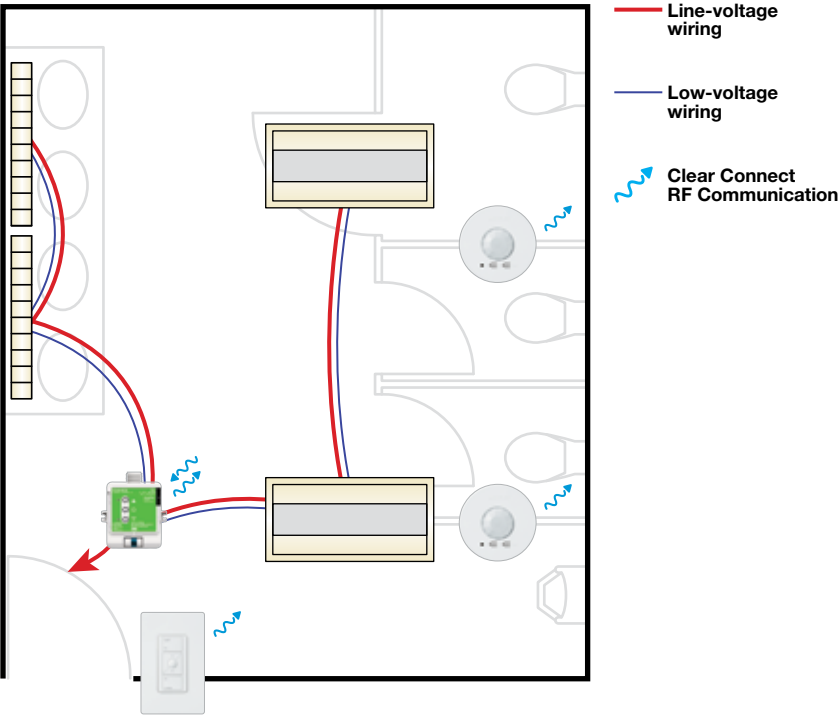
Occupancy/Vacancy

Lighting Energy Savings*

50%

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

Code Notes: This solution is code compliant for lighting retrofits when the lighting power is reduced by at least 50% in offices, retail spaces, and hotels, and by at least 35% in all other space types.



Symbol	Model Number	Description	Qty	List Price Each
	RMJS-8T-DV-B	PowPak dimming module with 0-10V	1	\$ 150.00
	LRF2-OCR2B-P-WH	Radio Powr Savr wireless ceiling-mount occupancy sensor	2	\$ 85.00
	PJ2-3BRL-GWH-L01	Pico wireless 3-button with raise/lower control	1	\$ 21.00
	PICO-WBX-ADAPT	Pico wallbox adapter	1	\$ 8.00
	HJS-1-FM	Vive wireless Hub	Shared	Consult your local rep for Hub pricing and service options.

Code Notes: Add a daylight sensor for restrooms with daylight zones. Go to lutron.com/vive for complete compatibility and design details. This solution requires 0-10V enabled ballasts and drivers by others.

Visible System Components



Control Functionality

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

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

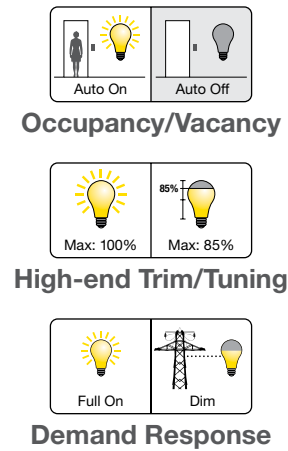
Occupant Exits:
All lights automatically turn off 15 minutes after all occupants exit.

System Events:
Demand Response: All lights automatically dim 20% during demand events.

Code Notes: Add a daylight sensor for restrooms with daylight zones.



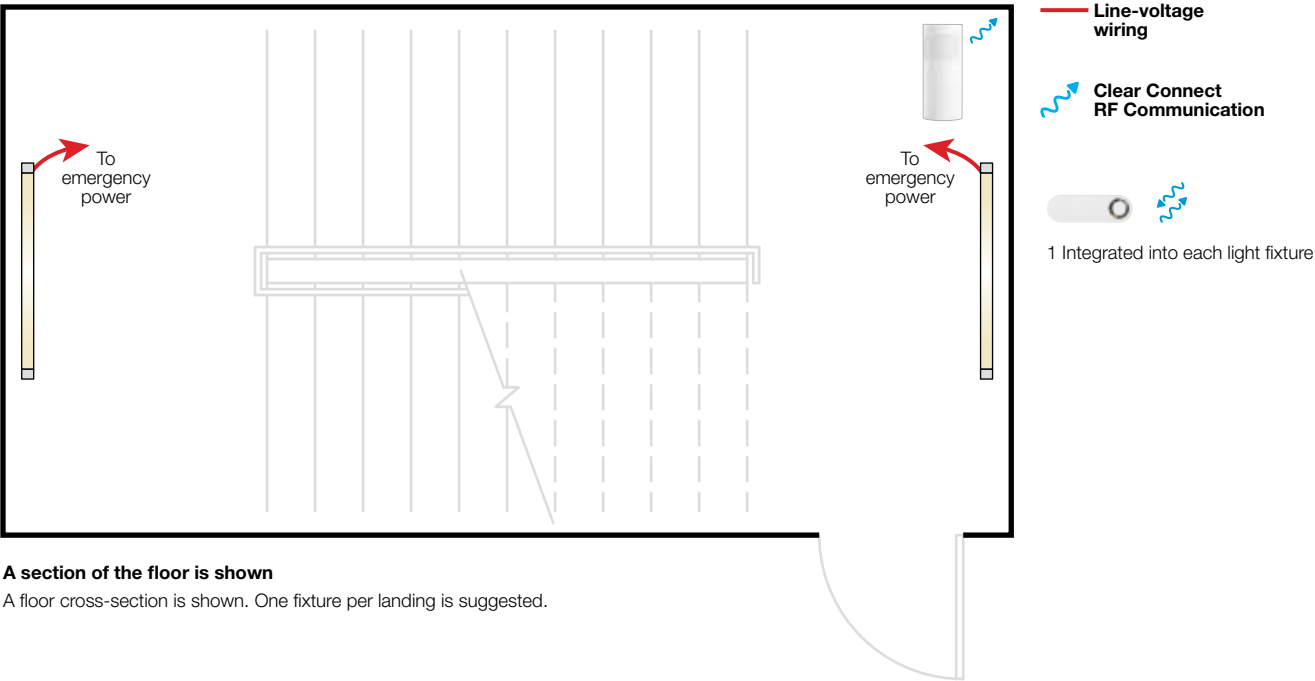
Control Strategies






Lighting Energy Savings*

60%

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



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

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)	\$ 85.00
	HJS-1-FM	Vive wireless Hub	Shared	Consult your local rep for Hub pricing and service options.

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. Add a daylight sensor for stairwells with daylight zones. This solution requires digitally enabled ballasts and drivers by others. Go to lutron.com/vive for the latest compatibility details.

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%.

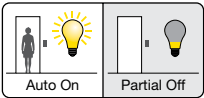
Emergency Mode:
Lighting connected to emergency power turns on to full output.

System Events:
Demand Response: All lights automatically dim 20% during demand response event. Demand response cannot shut off the lights.

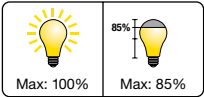
Code Notes: For non-egress stairwells, set the minimum light level to full off.



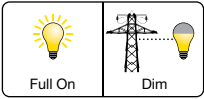
Control Strategies



Occupancy/Vacancy



High-end Trim/Tuning



Demand Response

Lighting Energy Savings*

80%

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

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