Energy Code
Applications Guide

Design to meet code control provisions with Cooper Lighting Solutions' Digital Lighting Control Solution - WaveLinx

ANSI / ASHRAE / IES Standard 90.1 (2022 edition)

COOPER Lighting Solutions

a signify business

cooperlighting.com

The WaveLinx connected lighting system are utilized by designers, electrical contractors, engineers, and building owners/operators to meet the latest energy codes, enhance energy efficiency, and elevate the occupant experience.

WaveLinx
Digital Lighting Control Solutions

Table of Contents

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. The recommendations presented in this guide are based on the originally published code prior to addenda. Please refer to your local building energy code or Authority Having Jurisdiction (AHJ) for your precise requirements. Only the AHJ can guarantee code compliance.

WaveLinx overview

WaveLinx is a Cooper Lighting Solutions smart lighting system and more. It's an intelligent digital lighting system designed to help organizations drive down energy costs while creating healthier indoor and outdoor spaces.

WaveLinx offers an unparalleled choice of wired and wireless lighting control products, from simple switches to advanced automation, to fixtures with integrated sensors. It's one of the simplest systems to design, install, and commission.

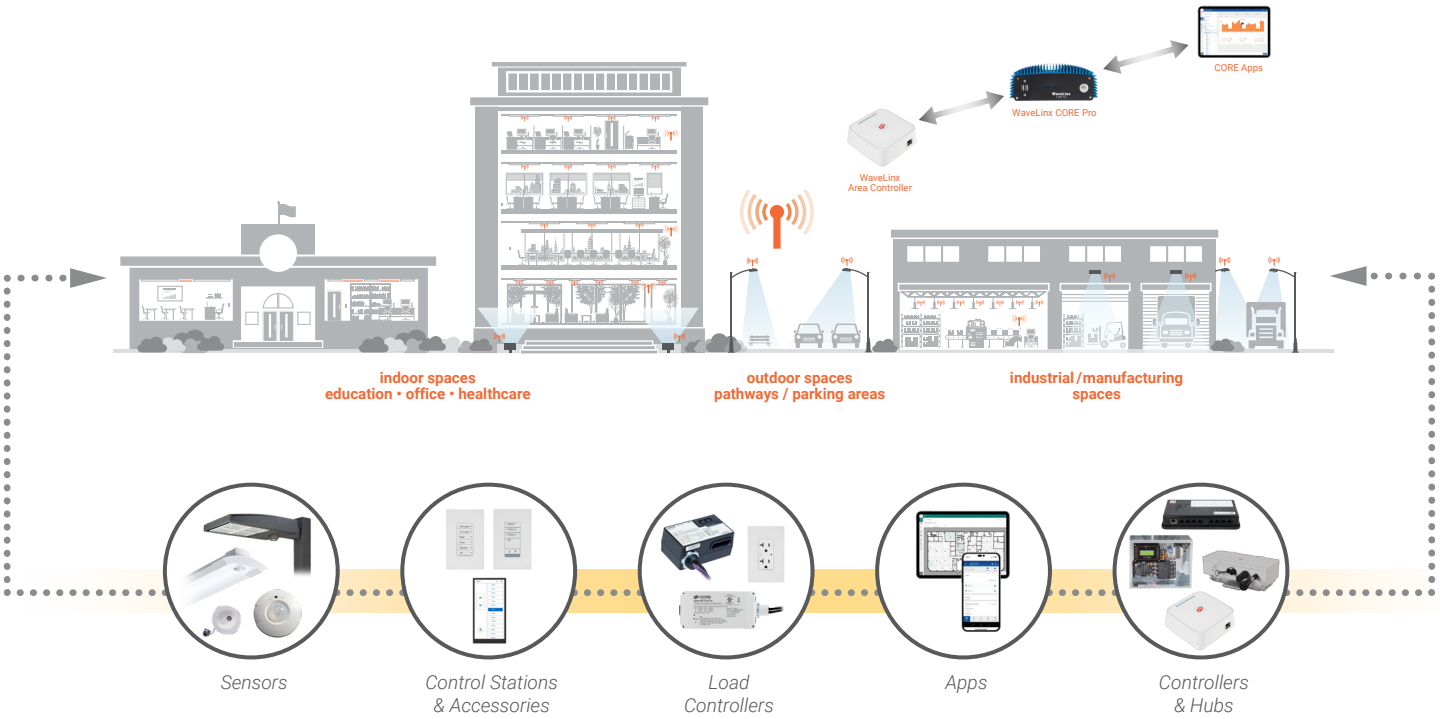
With WaveLinx, you experience the next level of aesthetics and personalized ambiance and comfort, along with our largest offering of WaveLinx-enabled fixtures embedded with sensing and connectivity.

A smarter way to save energy is here.

How does WaveLinx work?

WaveLinx is a system of wired and wireless devices that controls lighting in multiple spaces.

- For a **single space**, use either wired CAT devices or wireless LITE devices.
- For **connected spaces**, use wired CAT and/or wireless PRO devices, and connect them with the WaveLinx Area Controller to link spaces together.
- For **central management, visual floorplans, dashboards and data exchange**, use a WaveLinx CORE on-prem, that offers standard and proprietary interfaces such as BACnet®/IP, OpenADR, APIs, and visualization applications.



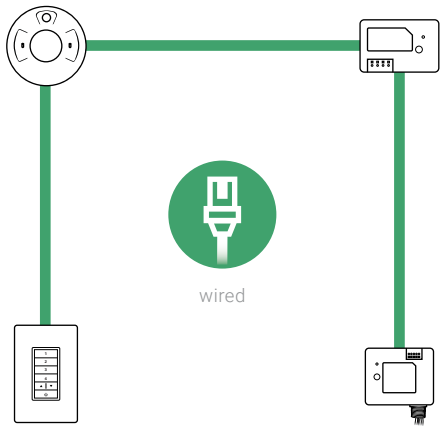
Save up to 60% or more in lighting energy with a WaveLinx system.

STRATEGY	DESCRIPTION	ESTIMATED SAVINGS
 Manual Dimmer	**Manual/personal dimming control –** one of five alternative methods that meets multi-level control requirements.	**10-20%**
 Occupancy Sensor	**Occupancy/vacancy sensing –** provides manual on/automatic off or automatic on/automatic off and partial off capabilities.	**20-60%**
 Daylighting Control	**Daylight dimming –** provides multiple daylight dimming zones that automatically adjust the lighting based on daylight available in the space, or fixture-integrated sensors, for completely granular daylighting control.	**20-45%**
 Receptacle Control	**Plug load control –** automatically turns on receptacles upon occupancy regardless of light status. Ensures receptacles are turned off when the space is vacant.	**15-50% controlled loads**
 Task Tuning	**High-end/task tuning –** lowers the maximum light level for automatic energy savings.	**10-30%**
 Demand Response	**Demand response –** automatically reduces light level based on signal from 3rd-party system.	**10-40%**
 Remote Signal Control	**BACnet –** coordinates control through BMS. **Remote signal control –** communicates to 3rd-party systems via API.	**20%**
 Outdoor Control	**Outdoor control –** automatically adjust area, site, and flood lighting via scheduling or astronomic clock.	**25%**
 HVAC System	**HVAC integration –** controls heating, ventilation, and air conditioning systems through contact closure or BACnet protocol.	**10-15%**

3 Different technologies for adaptability in any environment

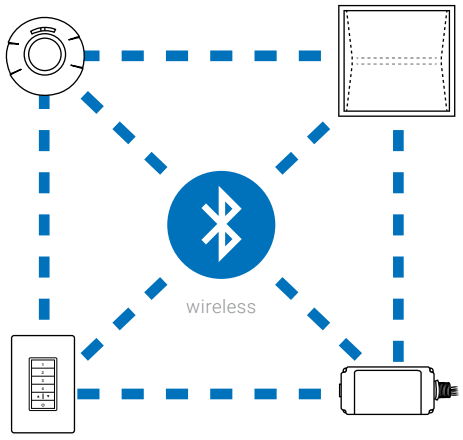
WaveLinx CAT

WaveLinx CAT devices communicate through CAT5 cables and are used in single- and networked-space applications.



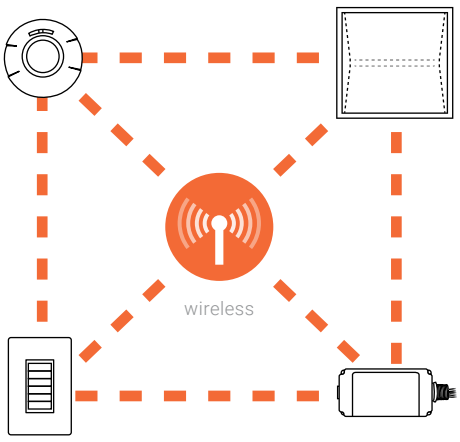
WaveLinx LITE

WaveLinx LITE devices communicate wirelessly and are used in single-space applications.



WaveLinx PRO

WaveLinx PRO devices communicate wirelessly and are used in networked-space applications.

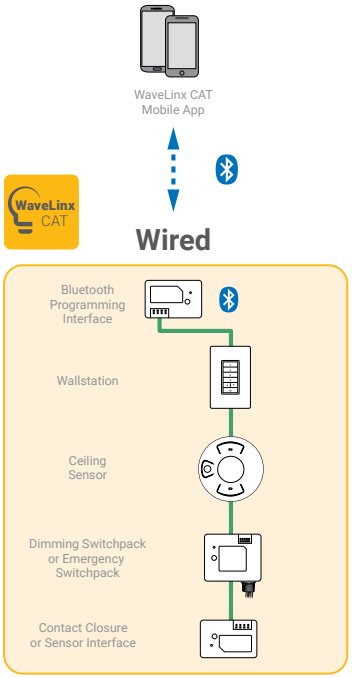


From standalone to enterprise solutions

Standalone spaces

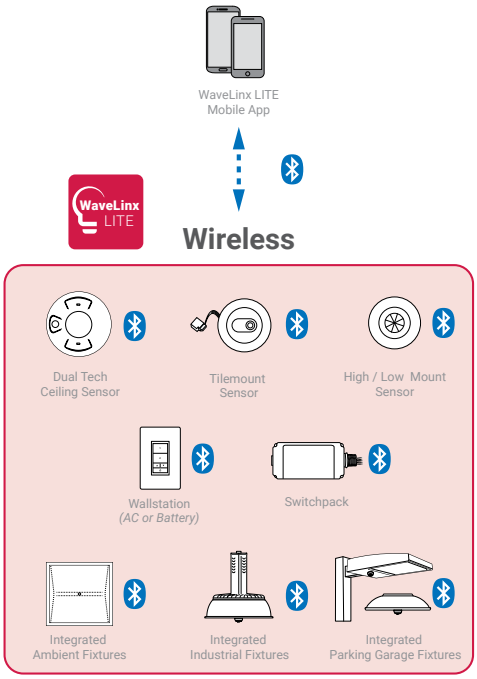
Single Room/Single Space

Start by implementing controls for a single room. Return at any time to easily upgrade to a connected system.



Functionality

1. User registration
2. Configuration
3. Firmware updates
4. Notifications
5. Backup/restore



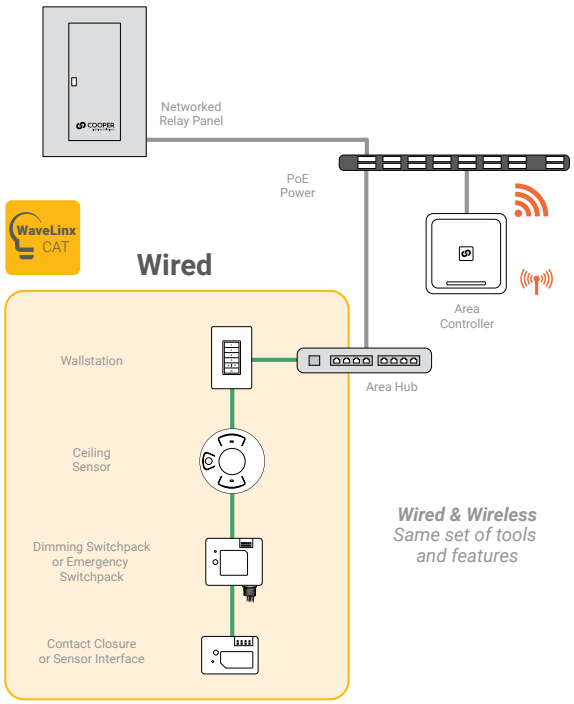
Functionality

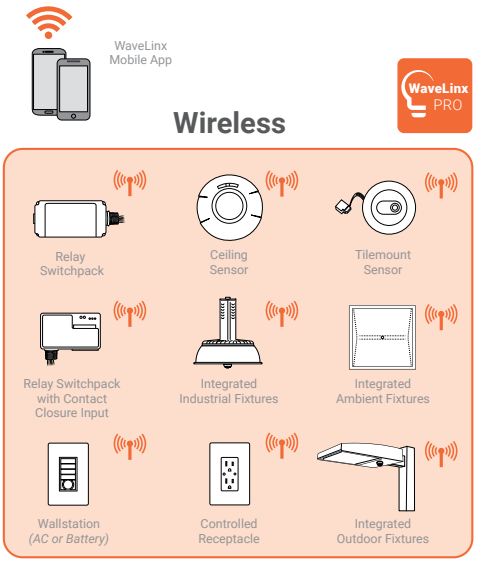
1. User registration
2. Project data
3. Notifications
4. Firmware updates
5. Project configuration
6. Backup/restore

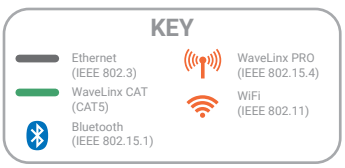
Connected spaces

Multiple Rooms/Entire Floor

Add controls to more rooms or an entire floor without having to reprogram or replace existing equipment.



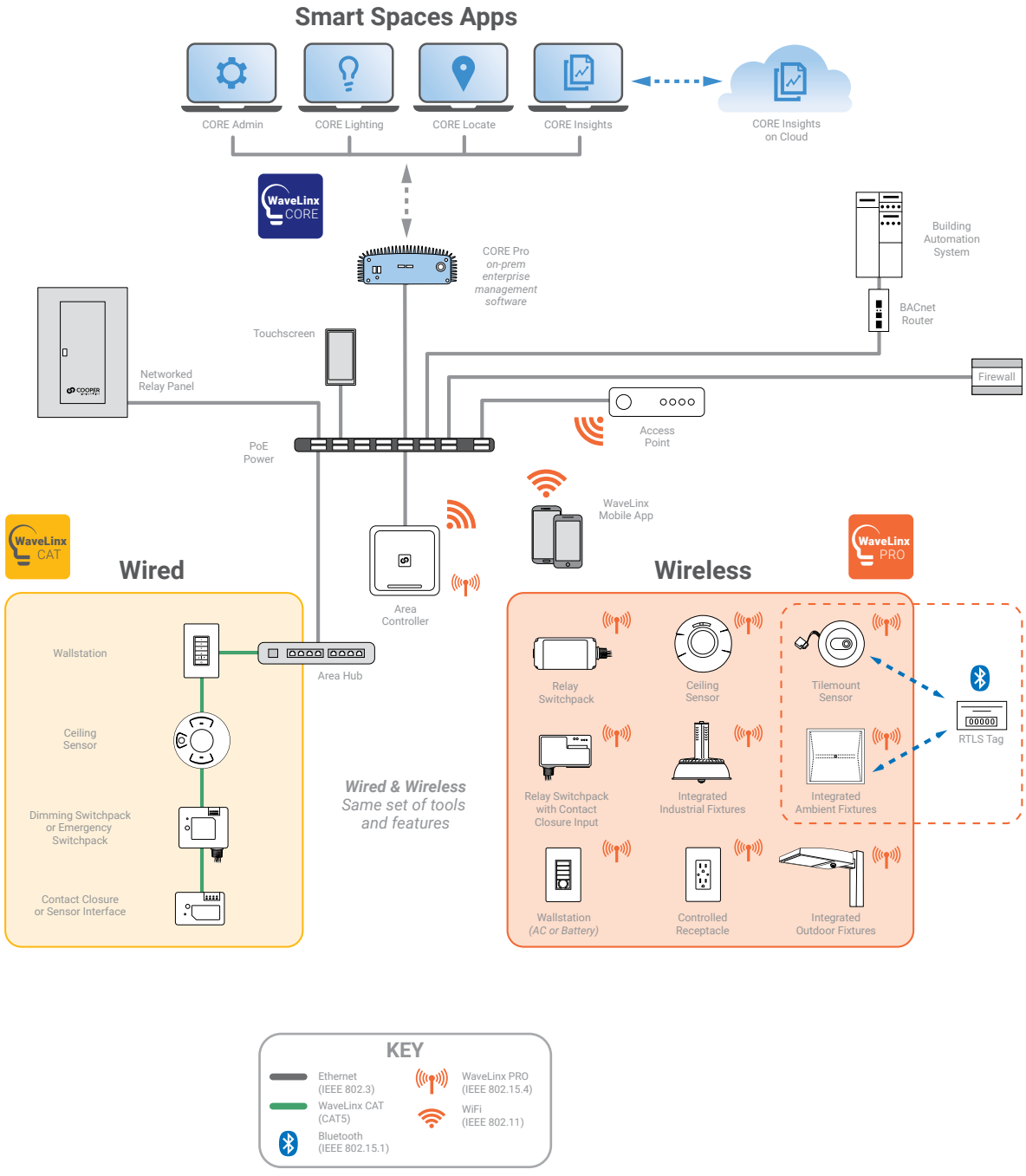




Enterprise solutions

Multiple Floors/Entire Building

Using WaveLinx Area Controller and CORE, controls can be scaled to multiple floors or an entire building on just one system, with independent control for each floor or network.



Typical control strategies for code compliance

	WaveLinx CAT	WaveLinx LITE	WaveLinx PRO	WaveLinx PRO & CORE
	WaveLinx CAT Wired solution for standalone or single spaces	**WaveLinx LITE** Wired solution for standalone or single spaces	**WaveLinx PRO** Wired & Wireless solution for connected spaces	**WaveLinx PRO & CORE** Wired & Wireless enterprise solution
Occupancy/Vacancy Sensing	●	●	●	●
Dimming Control	●	●	●	●
Daylight Control	●	●	●	●
Plug-Load Control	●	●	●	●
High-End Trim or Task Tuning	●	●	●	●
3rd Party Integration via Contact Closure Input	●	●	●	●
Emergency Lighting Control	●	●	●	●
Time-based Scheduling			●	●
Lighting dimming and Relay Panel			●	●
Demand Response Control	●	●	●	●
Energy Monitoring				●
Floorplan Visualization				●
BACnet Integration				●
3rd Party Integration via API				●
Alarms and Events				●
Asset tracking and Geofencing				●
Data insights				●

Energy codes can sometimes be complicated and difficult to navigate. This commercial application guide provides examples of how WaveLinx products can be used to meet or exceed code requirements. This guide focuses on CAT, LITE, and PRO. Keep in mind that to enable some advanced functionality, like BACnet integration, the CORE may be required. Please refer to the actual energy code document for details.

What triggers the energy code and what are the mandatory control requirements?

- New construction
- Alterations or retrofit
  - Where an alteration of an interior space includes addition or relocation of full height partitions
  - Where lighting within the interior spaces is altered.
  - Where lighting controls within spaces are altered

Typical control strategies for code compliance

	Requirement	Provisions	Summary
Manual Control	Local Control	9.4.1.1 (a) 9.4.1.1 (b)	There shall be one or more manual lighting control device that provides ON and OFF control of all lighting in the space[1]. None of the lighting restricted to manual ON shall be automatically turned ON. Note: Remote location of the control device is permitted for safety or security concerns.
	Multi-level lighting control	9.4.1.1 (d)	The general lighting in the space shall be manually controlled with continuous dimming to 10% or less of full lighting power in addition to full ON and full OFF.
Automatic Control	Partial On[2]	9.4.1.1 (c)	No more than 50% of the lighting power for general lighting shall be allowed to be automatically turned on, and none of the remaining lighting shall be automatically turned on.
	Partial Off	9.4.1.1 (g) 9.4.1.2 (b) 9.4.1.4 (d) 9.4.1.4 (e)	General lighting in the space shall be automatically reduced by at least 50% within 20 mins (10 mins for parking garages; 15 mins for exterior)of all occupants leaving the space. Full Off also complies.
	Full Off[3]	9.4.1.1 (h)	All lighting in the space, including emergency circuits shall be automatically shut off within 20 minutes of all occupants leaving the space.
	Scheduled shutoff[4]	9.4.1.1 (i) 9.4.1.2 (a) 9.4.1.4 (a) 9.4.1.4 (c)	**Interior:** All lighting in the space, including lighting connected to emergency circuits, shall be automatically shut off during periods when the space is scheduled to be unoccupied. Occupancy sensors may be used to comply. **Exterior & parking garages:** Lighting shall be automatically shut off between midnight or business closing, whichever is later, and 6 a.m. or business opening, whichever comes first.
	Scheduled shutoff during non-business hours[5]	9.4.1.1 (j)	Lighting shall be scheduled to provide automatic OFF control so that lights are turned off at the end of business hours.
Other	Automatic Daylight responsive control	9.4.1.1 (e) 9.4.1.1 (f) 9.4.1.2 (c) 9.4.1.2 (d) 9.4.1.4 (b)	**Interior:** If the general lighting within the primary sidelighted and toplighted area is ≥ 75W or the general lighting within the primary and secondary sidelighted area is ≥ 150W, the general lighting in these areas shall be controlled by continous daylight dimming to 20% or less and off. **Exterior & parking garages:** Exterior lighting shall automatically turn off when there is sufficient daylight or within 30 mins of sunrise. The perimeter 20 ft. of parking garages with access to daylight and daylight transition zones must automatically reduce lighting power in response to daylight.
	Automatic Receptacle Control	8.4.2 (a)	At least 50% of all 125V, 15 and 20 amp receptacle shall be automatically controlled.
		8.4.2 (b)	At least 25% of branch circuit feeders installed for modular furniture shall be automatically controlled.

Notes

Per provision 9.9, lighting control devices and control systems must be tested to verify operation.

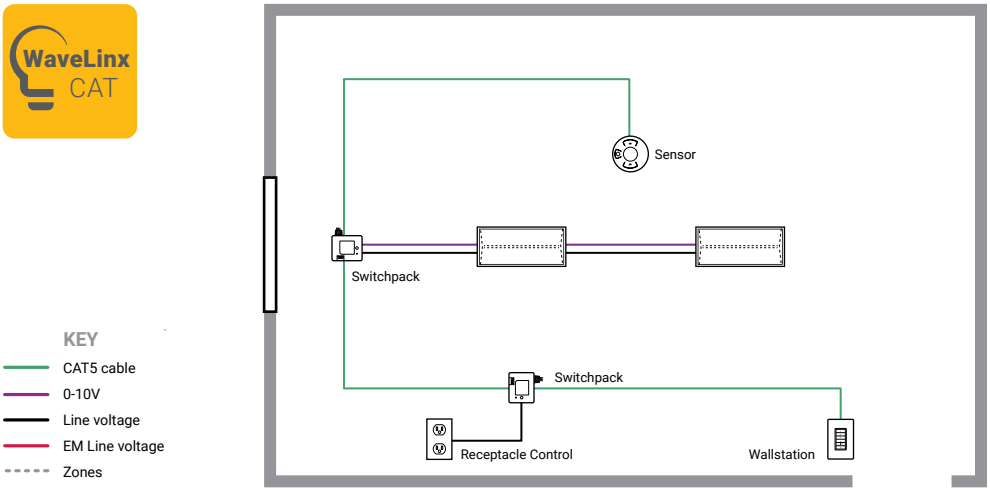
1. *Each control device shall control an area ≤ 2,500 ft² if the space is ≤ 10,000 ft². Control area shall be capped at 10,000 ft² for spaces > 10,000 ft².*
2. *Offices greater than 300 ft², shall have the following requirements:*
   a. *Controls zones for general lighting shall be limited to 600 ft².*
   b. *Control zones for general lighting shall be permitted to automatically turn on, up to full power upon occupancy.*
   c. *General lighting in other unoccupied control zones shall be permitted to automatically turn on to no more than 20% of full power.*
3. *Control devices shall control an area ≤ 5,000 ft².Exceptions include:*
   a. *Lighting required for 24/7 continous operation*
   b. *Lighting in spaces where patient care is rendered*
   c. *General and task lighting in spaces where automatic shutoff would endager the safety or security of the room or building occupants.*
   d. *Lighting load not exceeding 0.02 W/ft² x gross lighted floor area of the building.*
4. *Any manual override controls shall not turn the lighting on for more that 2 hours per activation during scheduled off periods and shall not control more that 5,000 ft².*
5. *Any manual override controls shall not turn the lighting on for more that 2 hours per activation during scheduled off periods.*

Control requirements by application type

	Requirement	Offices			Conference/ Meeting/ Multipurpose Rooms	Classroom/ Lecture Hall/ Training Room	Lobby	Corridor
		≤ 150ft²	> 150 & ≤ 300ft²	> 300ft²				
Manual and/or Automatic Control	Local Control	●	●	●	●	●	●	●
	Manual ON	choose 1	choose 1	choose 1	choose 1	choose 1		
	Partial On							
	Multi-level lighting control	●	●	●	●	●		
Automatic Control	Partial Off			●			●	●
	Full Off	●	●	●	●	●	choose 1	choose 1
	Scheduled shutoff							
	Scheduled shutoff during non-business hours							
Other	Daylight responsive control			●	●	●	●	●
	Automatic Receptacle Control	●	●	●	●	●		

	Requirement	Restroom	Stairwell	Gymnasium/ Fitness Center	Warehouse/ Storage Area	Sales Area / Retail Sales	Parking Garage	Exterior Lighting
Manual and/or Automatic Control	Local Control			●	●	●		
	Manual ON			choose 1	choose 1	choose 1		
	Partial On							
	Multi-level lighting control			●				
Automatic Control	Partial Off		●		●		●	
	Full Off	●	choose 1	choose 1	choose 1	choose 1		
	Scheduled shutoff						●	●
	Scheduled shutoff during non-business hours					●		
Other	Daylight responsive control		●	●	●	●	●	●
	Automatic Receptacle Control							

Private Office (≤ 300 ft²) - Wired



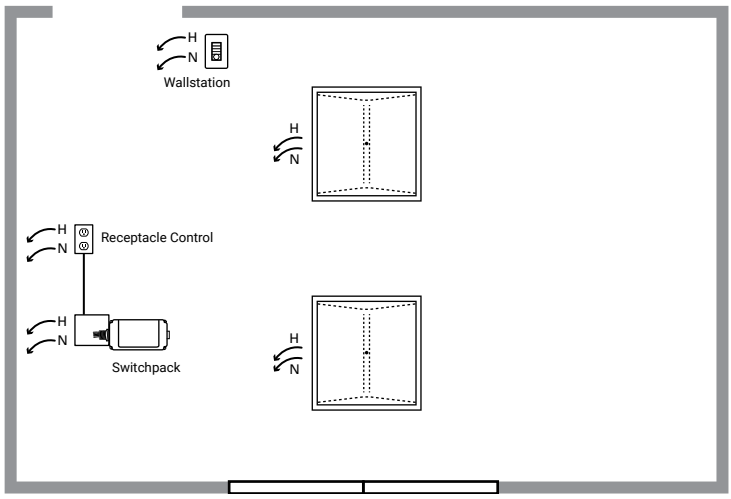
Control Strategies	
	Occupancy/ Vacancy
	Dimming Control
	High-end/ Task Tuning
	Plug load control

Control Functionality	
Occupant Enters	Lights and controlled receptacle automatically turn on to a level of 50% when an occupant enters the space. High-end trim set to 90%.
When Occupied	Manual: Occupant uses wall dimmer to set desired light levels for all lights.
Occupant Exits	All lights and receptacle automatically turn off 20 minutes after all occupants exit.

Bill of Material

Quantity	Catalog #	Description	Code Provision
2	RSP-C-010-Z1	RSP-C Relay Switchpack – Zone 1	Multi-level lighting control 9.4.1.1 (d) Automatic receptacle control 8.4.2
1	WST-C-3D	WST-C Wallstation 3 button dimming	Local control 9.4.1.1 (a) 9.4.1.1 (b) Multi-level lighting control 9.4.1.1 (d)
1	OCS-C-P06	OCS-C Occupancy & Daylight ceiling sensor (600 ft²)	Partial On 9.4.1.1 (c) Full Off 9.4.1.1 (h) Automatic daylight responsive control 9.4.1.1 (e) 9.4.1.1 (f)
2	24EN-LD2-34-UNV-L835-CD1-U	Encounter 2x4 fixture with 0-10V dimming	

Private Office (≤ 300 ft²) - Wireless



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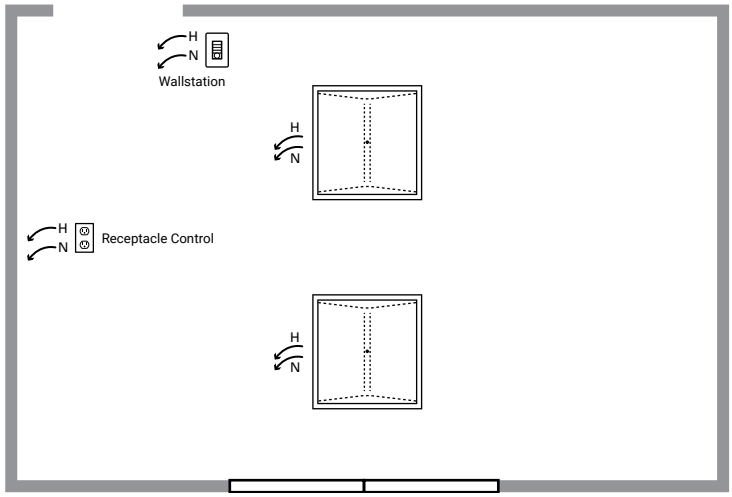
1	RSP-C-010-Z1	RSP-C Relay Switchpack – Zone 1	Multi-level lighting control 9.4.1.1 (d) Automatic receptacle control 8.4.2
1	WST-C-3D	WST-C Wallstation 3 button dimming	Local control 9.4.1.1 (a) 9.4.1.1 (b) Multi-level lighting control 9.4.1.1 (d)
2	22EN-LD2-34-UNVL835-CD1-WLS-U	Encounter 2x2 fixture with WLS integrated sensor	Partial On 9.4.1.1 (c) Full Off 9.4.1.1 (h) Automatic daylight responsive control 9.4.1.1 (e) 9.4.1.1 (f)

Private Office (≤ 300 ft²) - Wireless



Control Strategies	
	Occupancy/ Vacancy
	Dimming Control
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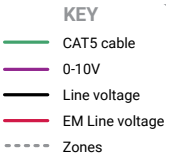
	Plug load control

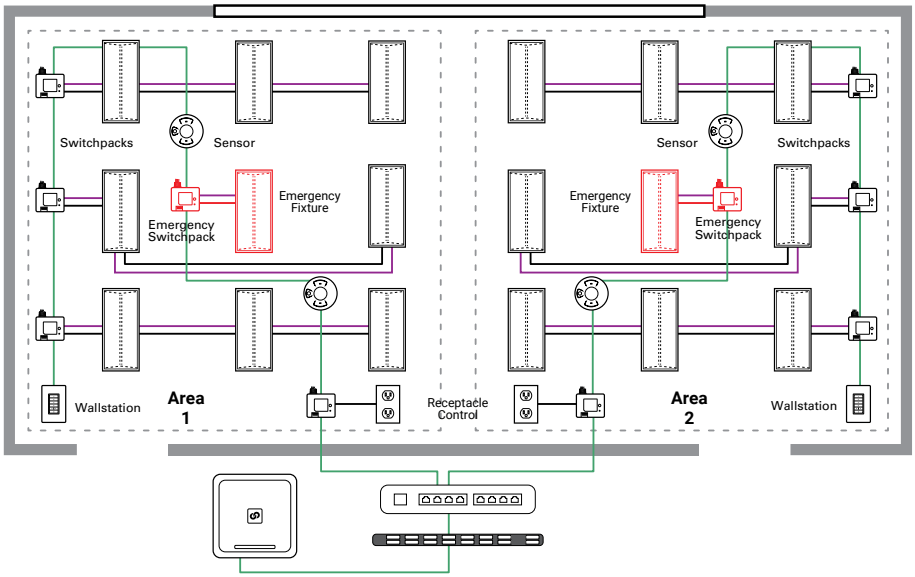
Control Functionality	
Occupant Enters	Lights and controlled receptacle automatically turn on to a level of 50% when an occupant enters the space. High-end trim set to 90%.
When Occupied	Manual: Occupant uses wall dimmer to set desired light levels for all lights.
Occupant Exits	All lights and receptacle automatically turn off 20 minutes after all occupants exit.

Bill of Material

Quantity	Catalog #	Description	Code Provision
1	WAC2-POE	WaveLinx Area Controller	
1	W4S-RL-W	WaveLinx PRO Wallstation	Local control 9.4.1.1 (a) 9.4.1.1 (b) Multi-level lighting control 9.4.1.1 (d)
1	WR-20	WaveLinx PRO Receptacle	Automatic Receptacle Control 8.4.2
2	22EN-LD2-34-UNVL835-CD1-WPS-U	Encounter 2x2 fixture with WPS integrated sensor	Partial On 9.4.1.1 (c) Full Off 9.4.1.1 (h) Automatic daylight responsive control 9.4.1.1 (e) 9.4.1.1 (f)

Open Office* (> 300 ft²) - Wired





Control Strategies

- Occupancy/ Vacancy
- Dimming Control
- Daylight Control
- High-end/ Task Tuning
- Plug load control

Control Functionality

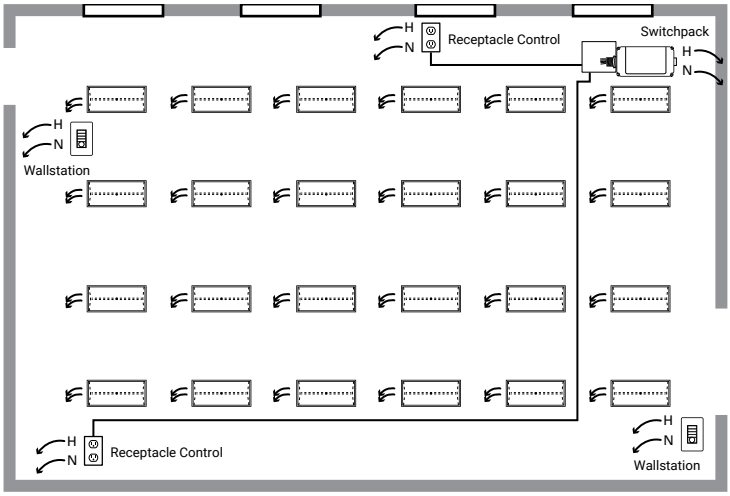
Occupant Enters	When the occupant enters Area 1, all fixtures in that area automatically turn on to 50% . Fixtures in Area 2, the unoccupied area, turn on to 20%. All controlled receptacles regain power.
When Occupied	Automatic: fixtures close to the window dims/brightens based on local daylight availability. Manual: Occupant uses the Wallstation to set desired light levels for the area. Unoccupied areas: Dim to 20%
Occupant Exits	Each area automatically turns off after 20 minutes. Controlled receptacles also turn off.

Bill of Material

Quantity	Catalog #	Description	Code Provision
8	RSP-C-010-Z1	RSP-C Relay Switchpack – Zone 1	Multi-level lighting control 9.4.1.1 (d) Automatic receptacle control 8.4.2
2	ESP-C-010-Z1	ESP-C-010-Z1	Multi-level lighting control 9.4.1.1 (d)
2	WST-C-3D	WST-C Wallstation 3 button dimming	Local control 9.4.1.1 (a) 9.4.1.1 (b) Multi-level lighting control 9.4.1.1 (d)
4	OSC-C-P06	OCS-C Occupancy & Daylight ceiling sensor (600 ft²)	Partial On 9.4.1.1 (c) Partial Off 9.4.1.1 (g) Full Off 9.4.1.1 (h) Automatic daylight responsive control 9.4.1.1 (e) 9.4.1.1 (f)
18	24EN-LD2-34-UNVL835-CD1-U	Encounter 2x4 fixture with 0-10V dimming	

** Control zones are limited to 600ft²*

Open Office* (> 300 ft²) - Wireless



Control Strategies	
	Occupancy/ Vacancy
	Dimming Control
	Daylight Control
	High-end/ Task Tuning
	Plug load control

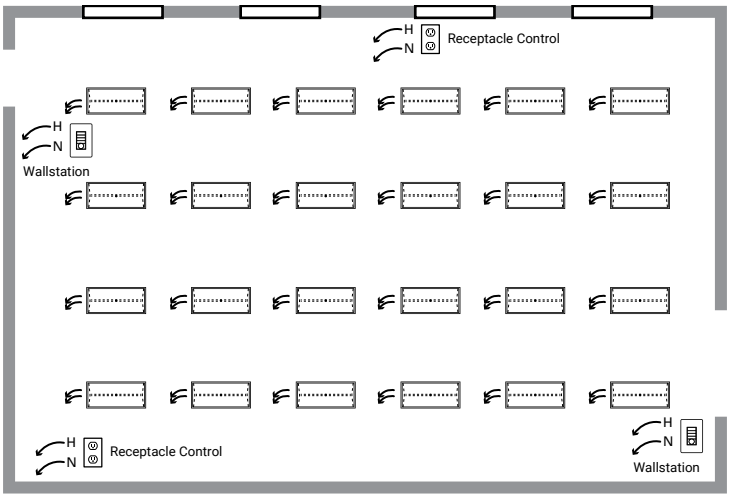
Control Functionality	
Occupant Enters	Each individual light automatically turns on to 50% light level as occupant approaches fixture proximity. High-end trim is set to 80%. Controlled receptacles automatically regain power when occupant enters.
When Occupied	Automatic: Each individual overhead light dims/brightens based on local daylight availability. Manual: Occupant uses wall station to set desired light levels for all lights. Unoccupied zones: Dim to 20%
Occupant Exits	Each individual light automatically turns off 20 minutes after all occupants exit fixture proximity. 50% of all receptacles automatically turn off 20 minutes after all occupants exit.

Bill of Material

Quantity	Catalog #	Description	Code Provision
1	RSP-L-010-347	RSP-L Relay switchpack	Automatic receptacle control 8.4.2
2	WWL3-RL-W	WaveLinx LITE Wallstation	Local control 9.4.1.1 (a) 9.4.1.1 (b) Multi-level lighting control 9.4.1.1 (d)
24	24EN-LD2-34-UNVL835-CD1-WLS-U	Encounter 2x4 fixture with WLS integrated sensor	Partial On 9.4.1.1 (c) Partial Off 9.4.1.1 (g) Full Off 9.4.1.1 (h) Automatic daylight responsive control 9.4.1.1 (e) 9.4.1.1 (f)

** Control zones are limited to 600ft²*

Open Office* (> 300 ft²) - Wireless



Control Strategies	
	Occupancy/ Vacancy
	Dimming Control
	Daylight Control
	High-end/ Task Tuning
	Plug load control

Control Functionality

Occupant Enters	Each individual light automatically turns on to 50% light level as occupant approaches fixture proximity. High-end trim is set to 80%. 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 station to set desired light levels for all lights. Unoccupied zones: Dim to 20%
Occupant Exits	Each individual light automatically turns off 20 minutes after all occupants exit fixture proximity. 50% of all receptacles automatically turn off 20 minutes after all occupants exit.

Bill of Material

Quantity	Catalog #	Description	Code Provision
1	WAC2-POE	WaveLinx Area Controller	
2	W4S-RL-W	WaveLinx PRO Wallstation	Local control 9.4.1.1 (a) 9.4.1.1 (b) Multi-level lighting control 9.4.1.1 (d)
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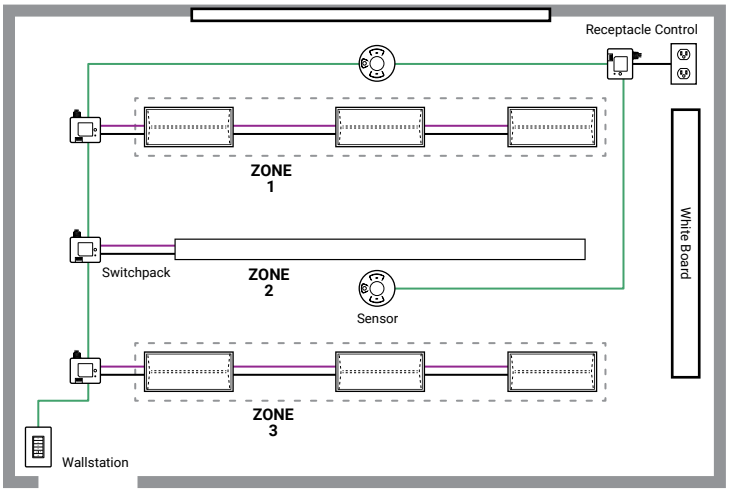
** Control zones are limited to 600ft²*

Conference Room - Wired



KEY
- CAT5 cable
- 0-10V
- Line voltage
- EM Line voltage
- Zones

Control Strategies

- Occupancy/ Vacancy
- Dimming Control
- Daylight Control
- High-end/ Task Tuning
- Plug load control

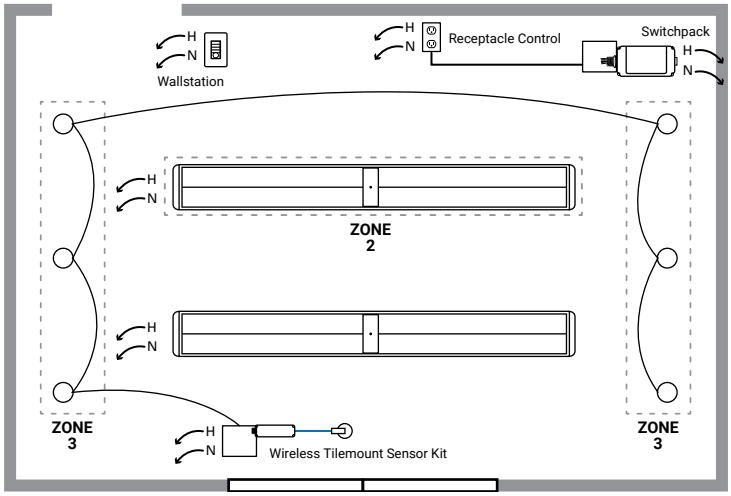
Control Functionality

Occupant Enters	Lights do not automatically turn on when an occupant enters the space; lights must be turned on manually. High-end trim is set to 80%. Controlled receptacles automatically regain power when occupant enters.
When Occupied	Automatic: Overhead lights dim/brighten based on daylight availability. Zone 1 is a primary daylight zone. Manual: Occupant uses wall dimmer to set desired light levels for all lights.
Occupant Exits	All lights and receptacle automatically turn off 15 minutes after all occupants exit. 50% of all receptacles automatically turn off 15 minutes after all occupants exit.

Bill of Material

Quantity	Catalog #	Description	Code Provision
1	RSP-C-010-Z1	RSP-C Relay Switchpack – Zone 1	Multi-level lighting control 9.4.1.1 (d)
1	RSP-C-010-Z1	RSP-C Relay Switchpack – Zone 2	Multi-level lighting control 9.4.1.1 (d)
1	RSP-C-010-Z1	RSP-C Relay Switchpack – Zone 3	Multi-level lighting control 9.4.1.1 (d)
1	RSP-C-010-Z1	RSP-C Relay Switchpack – Zone R	Automatic receptacle control 8.4.2
1	WST-C-3D	WST-C Wallstation 3 button dimming	Local control 9.4.1.1 (a) 9.4.1.1 (b) Multi-level lighting control 9.4.1.1 (d)
2	OSC-C-P06	OCS-C Occupancy & Daylight ceiling sensor (600 ft^2)	Partial On 9.4.1.1 (c) Partial Off 9.4.1.1 (g) Full Off 9.4.1.1 (h) Automatic daylight responsive control 9.4.1.1 (e) 9.4.1.1 (f)
6	24EN-LD2-34-UNVL835-CD1-U	Encounter 2x4 fixture with 0-10V dimming	
1	8WSL-LD2-80-SRC-UNV-L840-CD1-U	WSL 8ft linear	

Conference Room - Wireless



Control Strategies

- Occupancy/ Vacancy
- Dimming Control
- Daylight Control
- High-end/ Task Tuning
- Plug load control

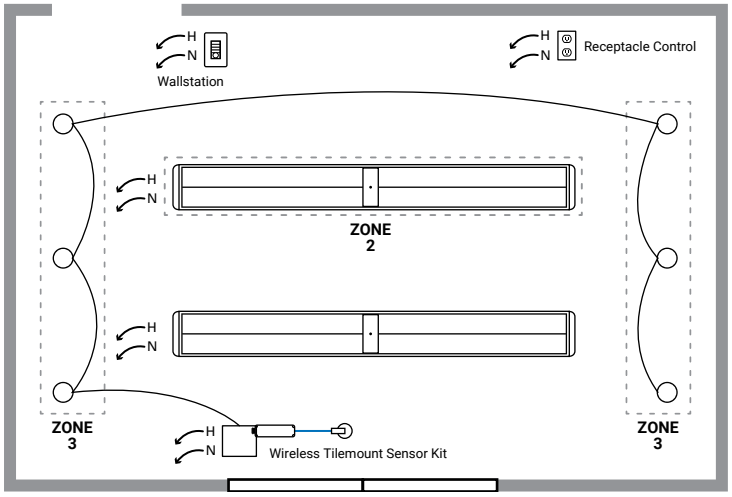
Control Functionality

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. Zone 1 is a primary daylight zone. Zone 2 is the secondary daylight zone. Manual: Occupant uses wall dimmer to set desired light levels for all lights.
Occupant Exits	All lights and receptacle automatically turn off 15 minutes after all occupants exit. 50% of all receptacles automatically turn off 15 minutes after all occupants exit.

Bill of Material

Quantity	Catalog #	Description	Code Provision
1	RSP-L-010-347	RSP-L Relay switchpack	Automatic receptacle control 8.4.2
1	WWL3-RL-W	WaveLinx LITE Wallstation	Local control 9.4.1.1 (a) 9.4.1.1 (b) Multi-level lighting control 9.4.1.1 (d)
1	WTK	WaveLinx LITE tile mount sensor kit	Partial On 9.4.1.1 (c) Partial Off 9.4.1.1 (g) Full Off 9.4.1.1 (h) Zone 2 is the secondary daylight zone.
2	DSI-WS-40L835-1DUNV-STD-WLS-DC-WAC48-T1-8	Divide Suspended with WaveLinx Sensor	Partial On 9.4.1.1 (c) Partial Off 9.4.1.1 (g) Full Off 9.4.1.1 (h) Automatic daylight responsive control 9.4.1.1 (e) 9.4.1.1 (f)
6	PR6FS12D010 (Housing) PR6M12MD8FSMW (LED Module)	PR6M12MD8FSMW (LED Module)	

Conference Room - Wireless



Control Strategies

- Occupancy/ Vacancy
- Dimming Control
- Daylight Control
- High-end/ Task Tuning
- Plug load control

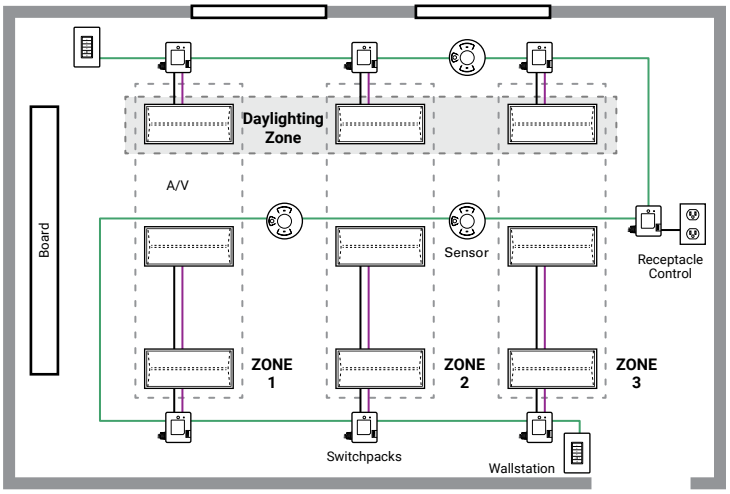
Control Functionality

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. Zone 1 is a primary daylight zone. Zone 2 is the secondary daylight zone. Manual: Occupant uses wall dimmer to set desired light levels for all lights.
Occupant Exits	All lights and receptacle automatically turn off 15 minutes after all occupants exit. 50% of all receptacles automatically turn off 15 minutes after all occupants exit.

Bill of Material

Quantity	Catalog #	Description	Code Provision
1	WAC2-POE	WaveLinx Area Controller	
1	W4S-RL-W	WaveLinx PRO Wallstation	Local control 9.4.1.1 (a) 9.4.1.1 (b) Multi-level lighting control 9.4.1.1 (d)
1	WTA	WaveLinx LITE tile mount sensor kit	Partial On 9.4.1.1 (c) Partial Off 9.4.1.1 (g) Full Off 9.4.1.1 (h) Automatic daylight responsive control 9.4.1.1 (e) 9.4.1.1 (f)
1	WR-20	WaveLinx PRO Receptacle	Automatic receptacle control 8.4.2
2	DSI-WS-40L835-1DUNV-STD-WPS-DC-WAC48-T1-8	Divide Suspended with WaveLinx sensor	Partial On 9.4.1.1 (c) Partial Off 9.4.1.1 (g) Full Off 9.4.1.1 (h) Automatic daylight responsive control 9.4.1.1 (e) 9.4.1.1 (f)
6	PR6FS12D010 (Housing) PR6M12MD8FSMW (LED Module)	PR6M12MD8FSMW (LED Module)	

Classroom - Wired



KEY
- CAT5 cable
- 0-10V
- Line voltage
- EM Line voltage
- Zones

Control Strategies

	Occupancy/ Vacancy
	Dimming Control
	Daylight Control
	High-end/ Task Tuning
	Plug load control

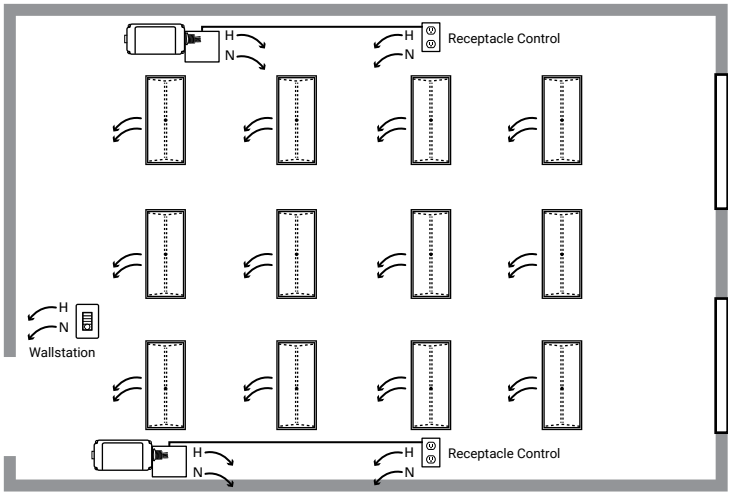
Control Functionality

Occupant Enters	Lights automatically turn on to 50%when an occupant enters the space. 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. 3 fixtures close to the window is in a primary daylight zone. 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.

Bill of Material

Quantity	Catalog #	Description	Code Provision
7	RSP-C-010-Z1	RSP-C Relay Switchpack – Zone 1	Multi-level lighting control 9.4.1.1 (d) Automatic receptacle control 8.4.2
2	WST-C-3D	WST-C Wallstation 3 button dimming	Local control 9.4.1.1 (a) 9.4.1.1 (b) Multi-level lighting control 9.4.1.1 (d)
3	OCS-C-P06	OCS-C Occupancy & Daylight ceiling sensor (600 ft^2)	Partial On 9.4.1.1 (c) Partial Off 9.4.1.1 (g) Full Off 9.4.1.1 (h) Automatic daylight responsive control 9.4.1.1 (e) 9.4.1.1 (f)
9	24EN-LD2-34-UNV-L835-CD1-U	Encounter 2x4 fixture with 0-10V dimming	

Classroom - Wireless



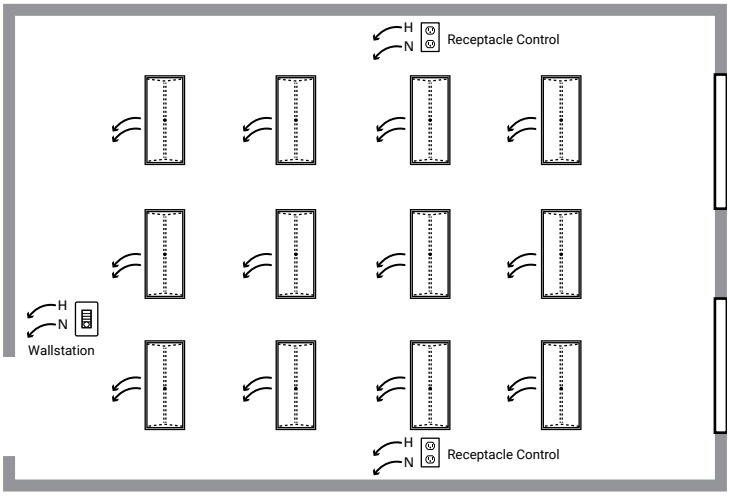
Control Strategies	
	Occupancy/ Vacancy
	Dimming Control
	Daylight Control
	High-end/ Task Tuning
	Plug load control

Control Functionality	
Occupant Enters	Each individual light automatically turns on to 50% light level as occupant approaches fixture proximity. Maximum light level is set to 80%. 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 station to set desired light levels for all lights. Unoccupied zones: Dim to 20%
Occupant Exits	Each individual light automatically turns off 20 minutes after all occupants exit fixture proximity. 50% of all receptacles automatically turn off 20 minutes after all occupants exit.

Bill of Material

Quantity	Catalog #	Description	Code Provision
1	RSP-L-010-347	RSP-L Relay switchpack	Automatic receptacle control 8.4.2
2	WWL3-RL-W	WaveLinx LITE Wallstation	Local control 9.4.1.1 (a) 9.4.1.1 (b) Multi-level lighting control 9.4.1.1 (d)
12	24EN-LD2-34-UNVL835-CD1-WLS-U	Encounter 2x4 fixture with WLS integrated sensor	Partial On 9.4.1.1 (c) Partial Off 9.4.1.1 (g) Full Off 9.4.1.1 (h) Automatic daylight responsive control 9.4.1.1 (e) 9.4.1.1 (f)

Classroom - Wireless



Control Strategies	
	Occupancy/ Vacancy
	Dimming Control
	Daylight Control
	High-end/ Task Tuning
	Plug load control

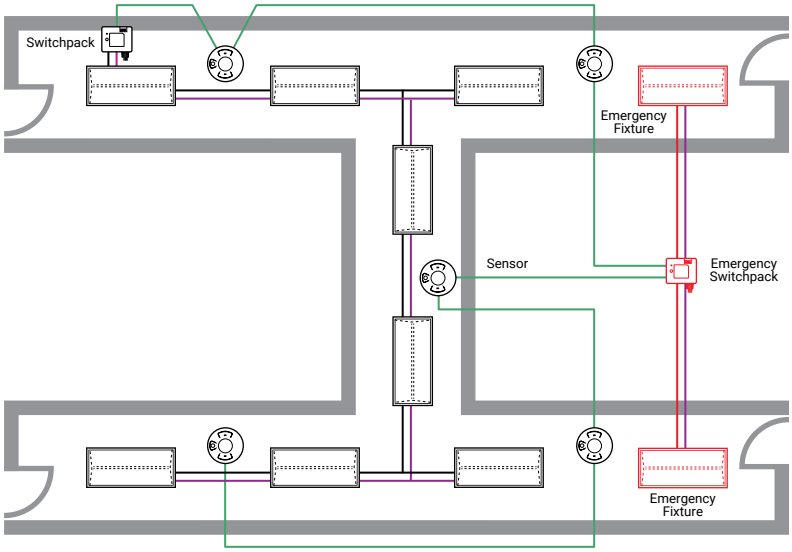
Control Functionality

Occupant Enters	Lights automatically turn on to 50%when an occupant enters the space. 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. Closed loop daylight responsive control is implemented in the full area due to large windows. Manual: Occupant uses wall dimmer to set desired light levels for all lights.
Occupant Exits	All lights automatically turn off 20 minutes after all occupants exit. 50% of all receptacles automatically turn off 20 minutes after all occupants exit.

Bill of Material

Quantity	Catalog #	Description	Code Provision
1	WAC2-POE	WaveLinx Area Controller	
1	W4S-RL-W	WaveLinx PRO Wallstation	Local control 9.4.1.1 (a) 9.4.1.1 (b) Multi-level lighting control 9.4.1.1 (d)
2	WR-20	WaveLinx PRO Receptacle	Automatic receptacle control 8.4.2
12	24EN-LD2-34-UNVL835-CD1-WPS-U	Encounter 2x4 fixture with WPS integrated sensor	Partial On 9.4.1.1 (c) Partial Off 9.4.1.1 (g) Full Off 9.4.1.1 (h) Automatic daylight responsive control 9.4.1.1 (e) 9.4.1.1 (f)

Corridor - Wired



KEY
- CAT5 cable
- 0-10V
- Line voltage
- EM Line voltage
- Zones

Control Strategies

Occupancy/ Vacancy

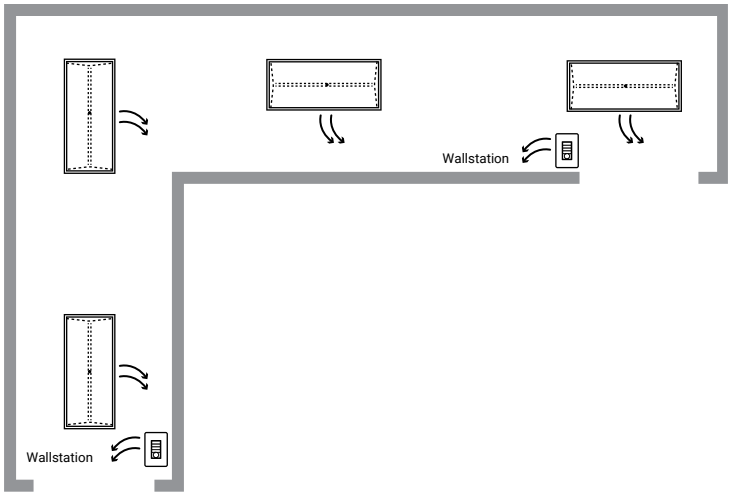
Control Functionality

Occupant Enters	Lights automatically turn on to 50% when an occupant enters the space.
Occupant Exits	All lights dim to minimum light level 20 minutes after all occupants exit. Minimum light level is set to 10%.
Emergency Mode	Lighting connected to emergency power turns on to full output, during an emergency situation.

Bill of Material

Quantity	Catalog #	Description	Code Provision
1	RSP-C-010-Z1	RSP-C Relay Switchpack – Zone 1	Multi-level lighting control 9.4.1.1 (d)
1	ESP-C-010-Z1	ESP-C Emergency Relay Switchpack - Zone 1	
5	OCS-C-P06	OCS-C Occupancy & Daylight ceiling sensor (600 ft^2)	Partial On 9.4.1.1 (c) Partial Off 9.4.1.1 (g) Full Off 9.4.1.1 (h)
10	24EN-LD2-34-UNV-L835-CD1-U	Encounter 2x4 fixture with 0-10V dimming	

Corridor - Wireless



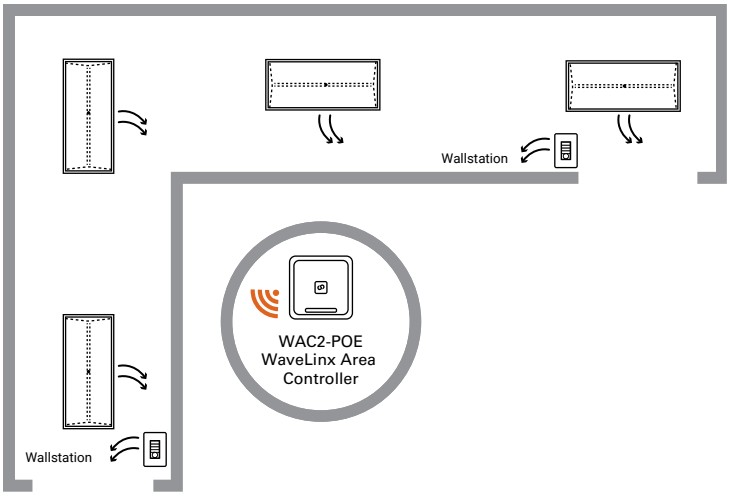
Control Strategies
Occupancy/ Vacancy

Control Functionality	
Occupant Enters	Lights automatically turn on to 50%when an occupant enters the space.
Occupant Exits	All lights dim to minimum light level 20 minutes after all occupants exit. Minimum light level is set to 10%.

Bill of Material

Quantity	Catalog #	Description	Code Provision
1	WWL3-RL-W	WaveLinx LITE Wallstation	Local control 9.4.1.1 (a) 9.4.1.1 (b) Multi-level lighting control 9.4.1.1 (d)
4	24EN-LD2-34-UNVL835-CD1-WLS-U	Encounter 2x4 fixture with WLS integrated sensor	Partial On 9.4.1.1 (c) Partial Off 9.4.1.1 (g) Full Off 9.4.1.1 (h)

Corridor - Wireless



Control Strategies

Occupancy/
Vacancy

Control Functionality

Occupant Enters	Lights automatically turn on to 50% when an occupant enters the space.
Occupant Exits	All lights dim to minimum light level 20 minutes after all occupants exit. Minimum light level is set to 10%.

Bill of Material

Quantity	Catalog #	Description	Code Provision
1	WAC2-POE	WaveLinx Area Controller	
2	W4S-RL-W	WaveLinx PRO Wallstation	Local control 9.4.1.1 (a) 9.4.1.1 (b) Multi-level lighting control 9.4.1.1 (d)
4	24EN-LD2-34-UNVL835-CD1-WPS-U	Encounter 2x4 fixture with WPS integrated sensor	Partial On 9.4.1.1 (c) Partial Off 9.4.1.1 (g) Full Off 9.4.1.1 (h)

WaveLinx

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A WaveLinx system creates incredible value, from the cost savings of occupancy detection to the flexibility and power of scheduled lighting control.

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At Cooper Lighting Solutions, we build forward-thinking lighting solutions that make people's lives safer, while making buildings, homes and cities smarter and more sustainable. We deliver an industry-leading portfolio of residential, sports, infrastructure, industrial, and commercial LED lighting; plus lighting controls and smart lighting systems.

We question, we seek and we solve. Because building a better world means asking tough questions and pushing harder for answers. Together with our customers, we create solutions that build a better world. At Cooper Lighting Solutions, we push past the ordinary to build brighter.

Cooper Lighting Solutions is a business unit of Signify, the world leader in lighting. Together we have a shared purpose to unlock the extraordinary potential of light for brighter lives and a better world.

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