AcuityControls

nLight®

ASHRAE 90.1–2010

nLight® Applications Guide

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/ ACUITY CONTROLS

It's not just smarter. It's easier.

Acuity Controls is advanced lighting controls technology, service and support from a single expert source. We offer one of the industry's most extensive product portfolios for indoor and outdoor applications; single rooms to campuses to municipalities. Our product solutions include occupancy and photosensors, centralized and distributed systems, panels, fixture-integrated, wired and wireless controls that simply work.

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/ ABOUT

About ASHRAE 90.1

ASHRAE 90.1 is an energy code designed to reduce energy consumption. The ASHRAE 90.1 2010 energy code has specific requirements for lighting controls. The use of advanced lighting controls to synchronize light levels with daylight, occupancy, and multi-level control capability are required in order to be compliant.

About this Guide

Acuity Controls offers the nLight® Applications Guide to facilitate quicker and easier lighting controls solutions to aid in complying with the requirements of ASHRAE 90.1. Use this guide as a quick reference of typical nLight layouts that can help get your project on the path towards compliance. The Acuity Controls Design Services Team is also available to support engineers and contractors with detailed design, submittal, and installation. For additional information, please contact your Acuity Brands® Sales Representative.

About nLight

The nLight networked digital lighting control system is easy-to-use, easy-to-install and saves energy. Using only standard CAT5e cable, nLight networks together occupancy sensors, wall stations, and digital LED luminaires to create a digital lighting system with unmatched flexibility! nLight easily scales from one room to an entire campus. Create a lighting control solution that's perfect for your space and need.

Code Requirements for Common Building Spaces

The chart below is an overview of the Code Requirements for Common Building Spaces. Please use this information as a guide. For specific ASHRAE code requirements please refer to the ASHRAE 90.1–2010 code.

	Control Requirement*	Code Provision	Code Summary*	Space Type							
				Private Office	Open Office	Conference, Meeting, Multipurpose Room	Classroom, Lecture Hall, Training Room	Lobby	Corridor	Restroom	Stairwell
On-Off Control	Manual-On or Partial-On	9.4.1	Automatically controlled spaces must be either manual-on by a local switch or auto-on to not more than 50%.	✓	✓	✓	✓				
	Full Automatic-On	9.4.1	Automatically controlled spaces are allowed to turn on to full.					✓	✓	✓	✓
	Programmable Timeclock	9.4.1.1a	Interior lighting shall be controlled with a time-of-day schedule control that turns lighting off at specific programmed times. Note: Occupancy sensors or another building control/alarm system that indicate vacancy also comply.		✓ (or)			✓ (or)	✓ (or)		✓ (or)
	Automatic Full-Off via Occupancy Sensor	9.4.1.2b	Lights must be turned off within 30 minutes of vacancy by use of an occupancy sensor or timer switch.	✓	✓	✓	✓	✓	✓	✓	✓
	Automatic Partial-Off via Occupancy Sensor	9.4.1.6g	Lighting should automatically reduce power by at least 50% within 30 minutes of vacancy.								✓
	Space (i.e. Local Switch) Control	9.4.1.2	Each space enclosed by ceiling-height partitions shall have at least one readily accessible control device to independently control the general lighting within the space.	✓	✓	✓	✓	✓	✓	✓	✓
Light Level Control	Multi-Level / Dimming Control	9.4.1.2a	Controlled lighting shall have at least one control step between 30% and 70%, in additional to full on and full off.	✓	✓	✓	✓				
	Multi-Level Daylight Control	9.4.1.4, 9.4.1.5	The general lighting in primary sidelit areas (250ft² or larger) or daylight areas under skylights (900ft² or larger) shall be separately controlled by at least one multilevel photocontrol, which can be continuous dimming.	✓	✓	✓	✓	✓	✓	✓	✓
Additional Controls	Automatic Receptacle (i.e. Plug Load) Control	8.4.2	50% of all receptacles, including those installed in modular partitions, shall be automatically turned off by a control device.	✓	✓		✓**				

*Note: This summary is for general information purposes only and is provided without any warranty as to accuracy, completeness, or otherwise. The user should read the applicable code sections for more complete and detailed descriptions of code requirements and exceptions and should consult with a professional engineering or other competent advisor before making any decision or taking any action based on this summary.

**Requirement is for computer classrooms only.

Quick summary of applicable code sections

Room description

Room layout with devices & locations

Room layout diagram with control, fixture, and wiring type detail

Required list of devices in order to implement room layout design above

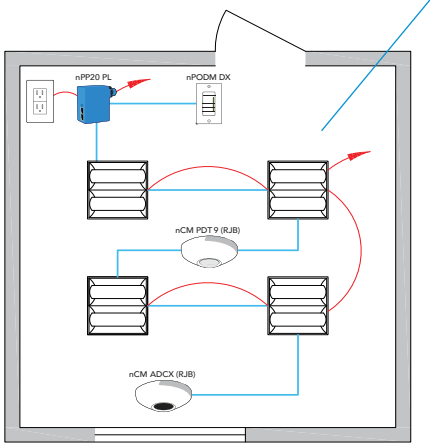
Operational details describe the functionality provided by the equipment specified in the solution

Additional options that add control capacity beyond code requirements

8 PRIVATE OFFICE: Windows, nLight Enabled Fixtures

Supports the Following Requirements:

- Local Switch (Section 9.4.1.2)
- Multi-Level / Dimming Control (Section 9.4.1.2a)
- Automatic Full-Off via Occupancy Sensor (Section 9.4.1.2b)
- Multi-Level Daylight Control (Section 9.4.1.4/5)
- Plug-Load Control (Section 8.4.2)



CAT-5e Cable
Line Voltage Wires
Line Power Feed
0-10V Wires

Bill of Materials

Symbol	Qty	Product #	Description
	4	See Appendix A	nLight Enabled Fixture
	1	nPP20 PL	Plug Load Relay Pack
	1	nPODM DX	On/Off & Raise/Lower WallPod
	1	nCM PDT 9 (RJB)	Dual Technology Occupancy Sensor
Options			
	1	nCM ADCX (RJB)	Automatic Dimming Photocell — If area from sidelighting is >250 ft.²

/ OPERATION DETAILS:

Lights:
- All lights are dimmable
- All fixtures controlled together or independently
- Maximum level can be limited to 80%
- Optional automatic lumen compensation

Occupancy Control:
- Lights must be turned on manually (or optionally can be configured to come on automatically to 50%)
- Plug load turns on automatically
- Lights & plug load turn off when room becomes vacant

Daylight Control:
- Smooth continuous dimming
- Custom grouping of fixtures into separate daylight zones (max. number zones = number of fixtures)
- Not required in spaces without side lit areas > 250 ft.²

Manual Control:
- On/off & raise/lower control of lights

/ ADDITIONAL OPTIONS:
- Surface or recessed mount sensors also available
- Room can be connected to nLight backbone to enable network control including time based controls and integration with building management systems (see pg. 26)
- For emergency lighting control, order fixtures with **-n80EMG** or **-n100EMG** option

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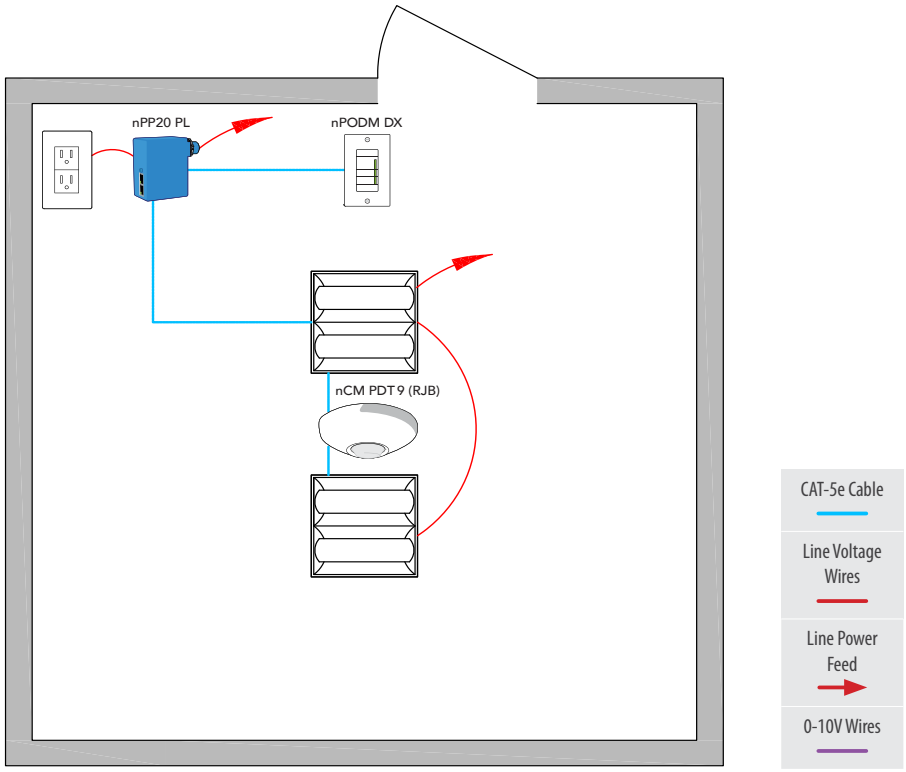
PRIVATE OFFICE: No Windows, nLight Enabled Fixtures

Supports the Following Requirements:

- Local Switch (Section 9.4.1.2)
- Multi-Level / Dimming Control (Section 9.4.1.2a)
- Automatic Full-Off via Occupancy Sensor (Section 9.4.1.2b)
- Plug-Load Control (Section 8.4.2)



Bill of Materials

Symbol	Qty	Product #	Description
	2	See Appendix A	nLight Enabled Fixture
	1	nPP20 PL	Plug Load Relay Pack
	1	nPODM DX	On/Off & Raise/Lower WallPod
	1	nCM PDT 9 (RJB)	Dual Technology Occupancy Sensor (Small Motion)

/ OPERATION DETAILS:

Lights:
- All lights are dimmable
- All fixtures controlled together or independently
- Maximum level can be limited to 80%
- Optional automatic lumen compensation

Occupancy Control:
- Lights must be turned on manually (or optionally can be configured to come on automatically to 50%)
- Plug-load turns on automatically
- Lights and plug-load turn off when room becomes vacant

Manual Control:
- On/off & raise/lower control of lights

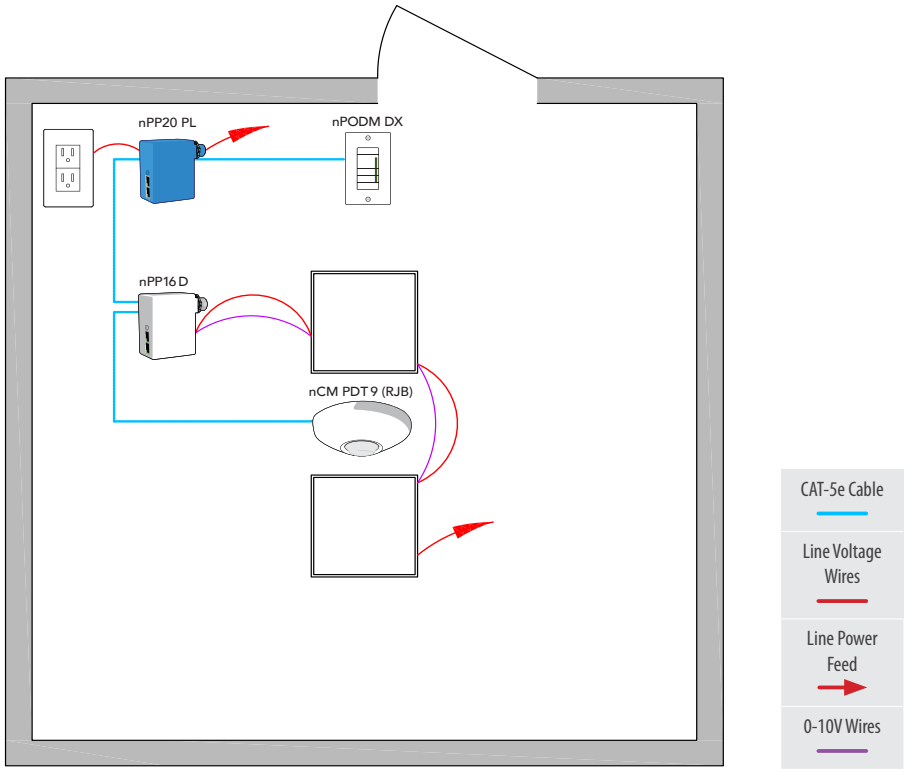
/ ADDITIONAL OPTIONS:

- Recessed mount sensors also available
- Room can be connected to nLight backbone to enable network control including time based controls and integration with building management systems (see pg. 26)
- For emergency lighting control, order fixtures with **-n80EMG** or **-n100EMG** option

Note: For a wall mount switch and occupancy sensor, substitute the nPODM DX with a nWSX PDT LV DX and remove the nCM PDT 9 (RJB)

Supports the Following Requirements:

- Local Switch (Section 9.4.1.2)
- Multi-Level / Dimming Control (Section 9.4.1.2a)
- Automatic Full-Off via Occupancy Sensor (Section 9.4.1.2b)
- Plug-Load Control (Section 8.4.2)



Bill of Materials

Symbol	Qty	Product #	Description
	1	nPP16 D	Relay Pack with 0-10V Dimming Output
	1	nPP20 PL	Plug Load Relay Pack
	1	nPODM DX	On/Off & Raise/Lower WallPod
	1	nCM PDT 9 (RJB)	Dual Technology Occupancy Sensor (Small Motion)

/ OPERATION DETAILS:

Lights:
- All lights are dimmable
- All fixtures controlled together
- Maximum level can be limited to 80%

Occupancy Control:
- Lights must be turned on manually (or optionally can be configured to come on automatically to 50%)
- Plug-load turns on automatically
- Lights and plug-load turn off when room becomes vacant

Manual Control:
- On/off & raise/lower control of lights

/ ADDITIONAL OPTIONS:

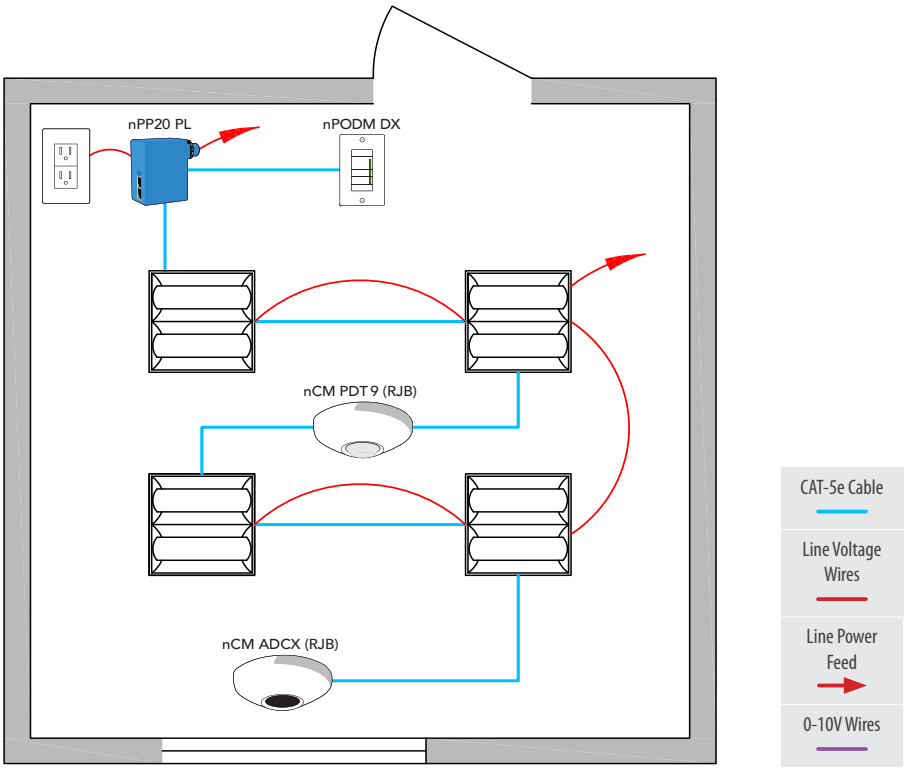
- Recessed mount sensors also available
- Substitute relay pack model **nPP16 D SA** for default manual-on configuration or **nPP16 D PA** for default auto-on to 50% configuration
- Room can be connected to nLight backbone to enable network control including time based controls and integration with building management systems (see pg. 26)
- For emergency lighting control add model **nPP16 D ER**

Note: For a wall mount switch and occupancy sensor, substitute the nPODM DX with a nWSX PDT LV DX and remove the nCM PDT 9 (RJB)

PRIVATE OFFICE: Windows, nLight Enabled Fixtures

Supports the Following Requirements:

- Local Switch (Section 9.4.1.2)
- Multi-Level / Dimming Control (Section 9.4.1.2a)
- Automatic Full-Off via Occupancy Sensor (Section 9.4.1.2b)
- Multi-Level Daylight Control (Section 9.4.1.4/5)
- Plug-Load Control (Section 8.4.2)



Bill of Materials

Symbol	Qty	Product #	Description
	4	See Appendix A	nLight Enabled Fixture
	1	nPP20 PL	Plug Load Relay Pack
	1	nPODM DX	On/Off & Raise/Lower WallPod
	1	nCM PDT 9 (RJB)	Dual Technology Occupancy Sensor

Options

	1	nCM ADCX (RJB)	Automatic Dimming Photocell — If area from sidelighting is >250 ft.^{2}

/ OPERATION DETAILS:

Lights:
- All lights are dimmable
- All fixtures controlled together or independently
- Maximum level can be limited to 80%
- Optional automatic lumen compensation

Occupancy Control:
- Lights must be turned on manually (or optionally can be configured to come on automatically to 50%)
- Plug load turns on automatically
- Lights & plug load turn off when room becomes vacant

Daylight Control:
- Smooth continuous dimming
- Custom grouping of fixtures into separate daylight zones (max. number zones = number of fixtures)
- Not required in spaces without side lit areas > 250 ft.^{2}

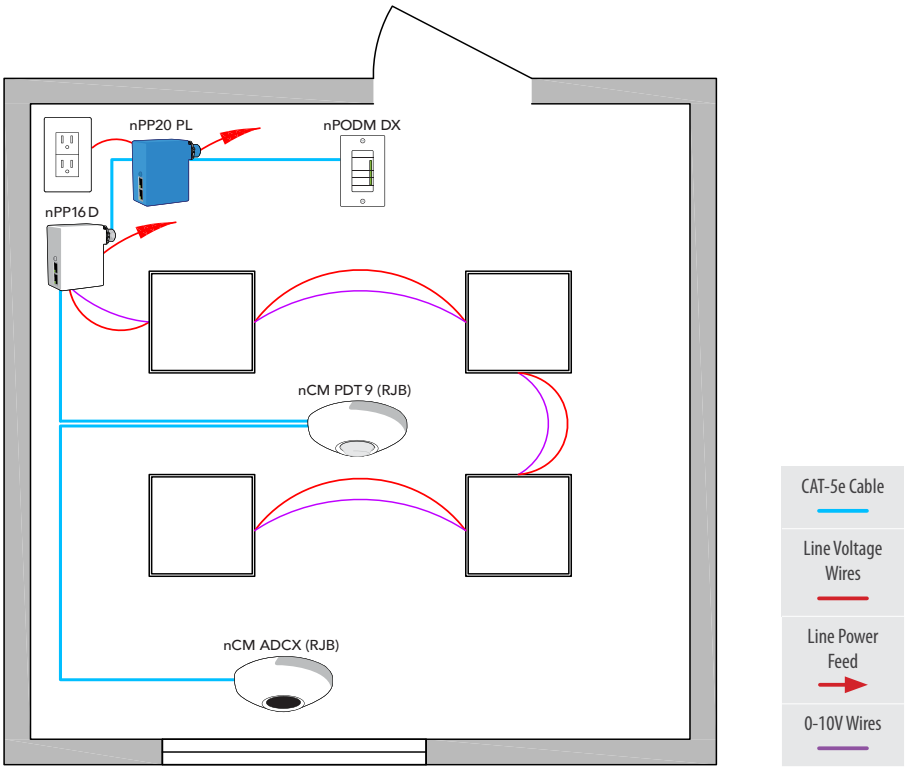
Manual Control:
- On/off & raise/lower control of lights

/ ADDITIONAL OPTIONS:

- Surface or recessed mount sensors also available
- Room can be connected to nLight backbone to enable network control including time based controls and integration with building management systems (see pg. 26)
- For emergency lighting control, order fixtures with **-n80EMG** or **-n100EMG** option

Supports the Following Requirements:

- Local Switch (Section 9.4.1.2)
- Multi-Level / Dimming Control (Section 9.4.1.2a)
- Automatic Full-Off via Occupancy Sensor (Section 9.4.1.2b)
- Multi-Level Daylight Control (Section 9.4.1.4/5)
- Plug-Load Control (Section 8.4.2)



*If daylighting is required, additional relay pack(s) may also be required.

Bill of Materials

Symbol	Qty	Product #	Description
	1	nPP16 D	Relay Module with 0-10V Dimming Output
	1	nPP20 PL	Plug Load Relay Pack
	1	nPODM DX	On/Off & Raise/Lower WallPod
	1	nCM PDT 9 (RJB)	Dual Technology Occupancy Sensor

Options

	1	nCM ADCX (RJB)	Automatic Dimming Photocell — If area from sidelighting is >250 ft.^{2}

/ OPERATION DETAILS:

Lights:
- All lights are dimmable
- All fixtures are controlled together
- Maximum level can be limited to 80%

Occupancy Control:
- Lights must be turned on manually (or optionally can be configured to come on automatically to 50%)
- Plug load turns on automatically
- Lights & plug load turn off when room becomes vacant

Daylight Control:
- Smooth continuous dimming
- Not required in spaces without side lit areas > 250 ft.^{2}

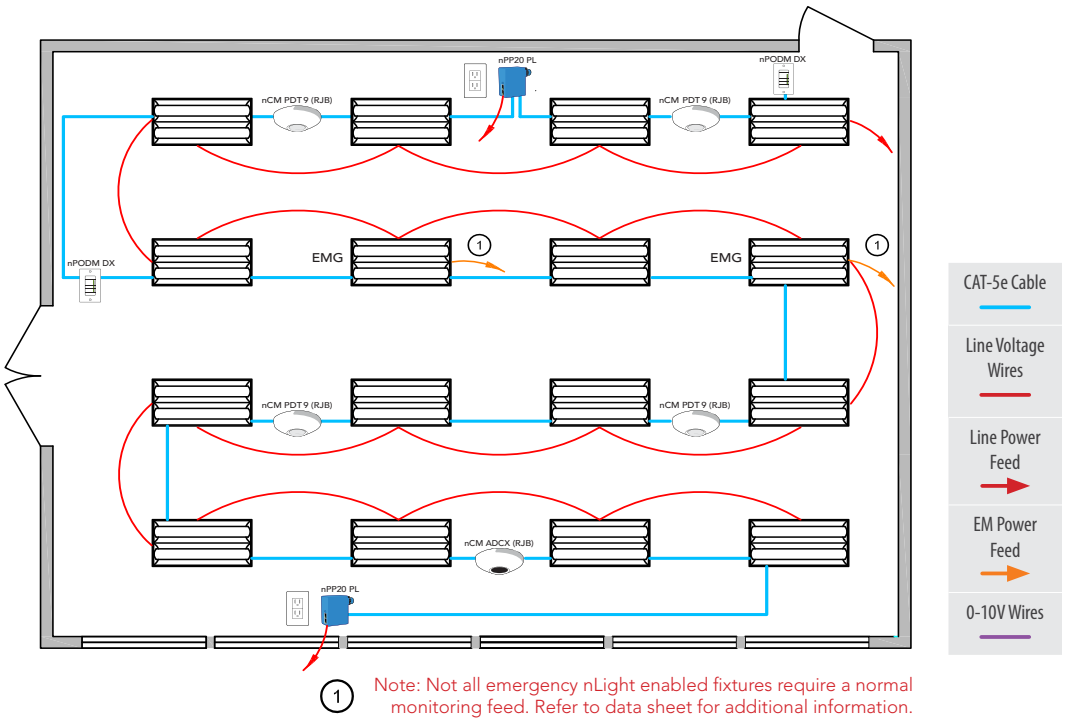
Manual Control:
- On/off & raise/lower control of lights

/ ADDITIONAL OPTIONS:

- Surface or recessed mount sensors also available
- Substitute model **nPP16 D SA** for default manual on functionality or **nPP16 D PA** for default auto-on to 50% functionality
- Room can be connected to nLight backbone to enable network control including time based controls and integration with building management systems (see pg. 26)
- For emergency lighting control add model **nPP16 D ER**

Supports the Following Requirements:

- Local Switch (Section 9.4.1.2)
- Multi-Level / Dimming Control (Section 9.4.1.2a)
- Automatic Full-Off via Occupancy Sensor (Section 9.4.1.2b)
- Multi-Level Daylight Control (Section 9.4.1.4/5)
- Plug-Load Control (Section 8.4.2)



(1) Note: Not all emergency nLight enabled fixtures require a normal monitoring feed. Refer to data sheet for additional information.

Bill of Materials

Symbol	Qty	Product #	Description
	14	See Appendix A	nLight Enabled Fixture
	2	See Appendix A	nLight Enabled Fixture with the EMG Option
	2	nPP20 PL	Plug Load Relay Pack
	2	nPODM DX	On/Off & Raise/Lower WallPod
	4	nCM PDT 9 (RJB)	Dual Technology Occupancy Sensor
	1	nCM ADCX (RJB)	Automatic Dimming Control Photocell

/ OPERATION DETAILS:

Lights:
- All lights are dimmable
- All fixtures controlled together or independently
- Maximum level can be limited to 80%
- Optional automatic lumen compensation

Occupancy Control:
- Lights must be turned on manually (or optionally can be configured to come on automatically to 50%)
- Plug load turns on automatically
- Lights & plug load turn off when room becomes vacant

Daylight Control:
- Smooth continuous dimming
- Not required in spaces without side lit areas > 250 ft.^{2}

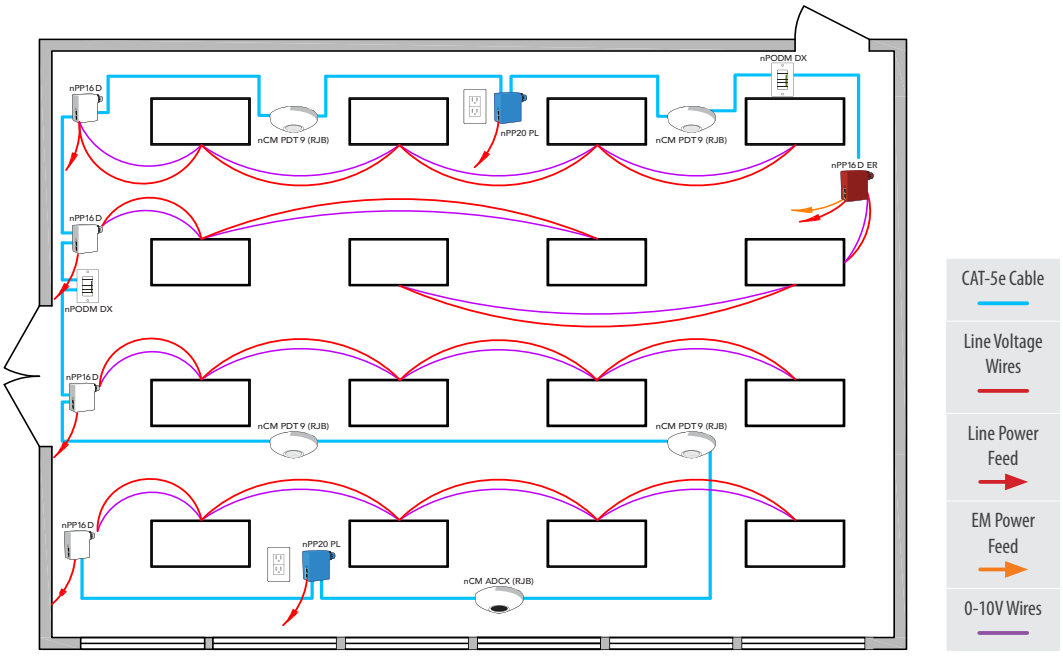
Manual Control:
- On/off & raise/lower control of lights
- Optional individual row control (add **nPODM 4P DX**)

/ ADDITIONAL OPTIONS:

- Surface or recessed mount sensors also available
- Add model **nPODM 4S DX** for four scene with manual dimming control
- Add Graphic WallPod (model **nPOD GFX**) for individual row and up to 16 scene control
- Room can be connected to nLight backbone to enable network control including time based controls and integration with building management systems (see pg. 26)

Supports the Following Requirements:

- Local Switch (Section 9.4.1.2)
- Multi-Level / Dimming Control (Section 9.4.1.2a)
- Automatic Full-Off via Occupancy Sensor (Section 9.4.1.2b)
- Multi-Level Daylight Control (Section 9.4.1.4/5)
- Plug-Load Control (Section 8.4.2)



Bill of Materials

Symbol	Qty	Product #	Description
	4	nPP16 D	Relay Module with 0-10V Dimming Output
	1	nPP16 D ER	Emergency Relay Module with 0-10V Dimming Output
	2	nPP20 PL	Plug Load Relay Pack
	2	nPODM DX	On/Off & Raise/Lower WallPod
	4	nCM PDT 9 (RJB)	Dual Technology Occupancy Sensor
	1	nCM ADCX (RJB)	Automatic Dimming Control Photocell

/ OPERATION DETAILS:

Lights:
- All lights are dimmable
- Each row controlled independently
- Maximum level can be limited to 80%

Occupancy Control:
- Lights must be turned on manually (or optionally can be configured to come on automatically to 50%)
- Plug load turns on automatically
- Lights & plug load turn off when room becomes vacant

Daylight Control:
- Smooth continuous dimming
- Daylight zones defined by rows
- Not required in spaces without side lit areas > 250 ft.^{2}

Manual Control:
- On/off & raise/lower control of lights
- Optional individual row control (add **nPODM 4P DX**)

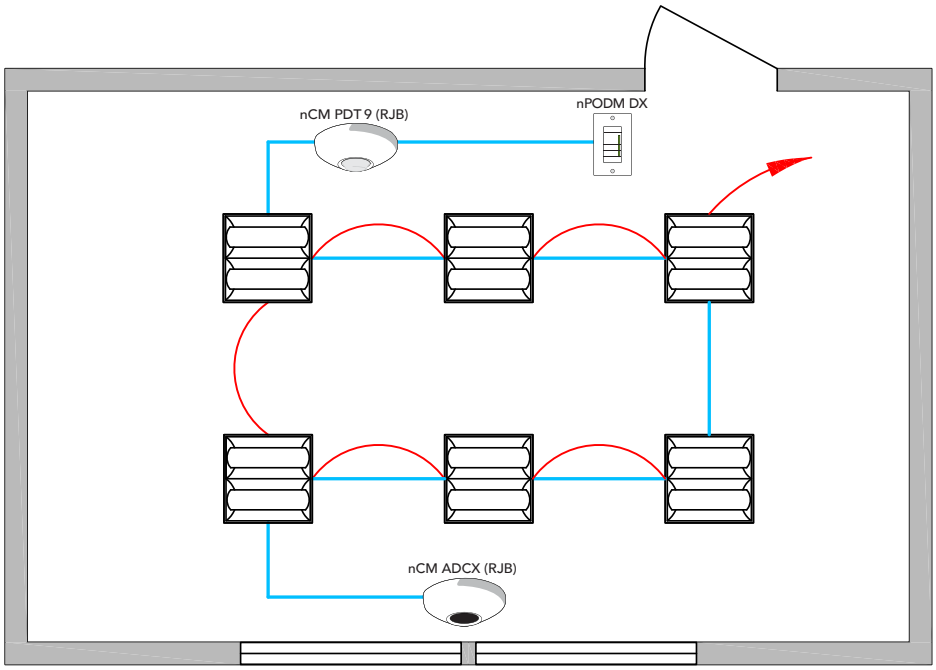
/ ADDITIONAL OPTIONS:

- Surface or recessed mount sensors also available
- Add additional relay pack (model **nPP16 D**) if a white board lighting zone also required
- Add Graphic WallPod (model **nPOD GFX**) for individual row and up to 16 scene control
- Room can be connected to nLight backbone to enable network control including time based controls and integration with building management systems (see pg. 26)

CONFERENCE ROOM with nLight Enabled Fixtures

Supports the Following Requirements:

- Local Switch (Section 9.4.1.2)
- Multi-Level / Dimming Control (Section 9.4.1.2a)
- Automatic Full-Off via Occupancy Sensor (Section 9.4.1.2b)
- Multi-Level Daylight Control (Section 9.4.1.4/5)



Bill of Materials

Symbol	Qty	Product #	Description
	6	See Appendix A	nLight Enabled Fixture
	1	nPODM DX	On/Off & Raise/Lower WallPod
	1	nCM PDT 9 (RJB)	Dual Technology Occupancy Sensor

Options

	1	nCM ADCX (RJB)	Automatic Dimming Control Photocell

/ OPERATION DETAILS:

Lights:
- All lights are dimmable
- All fixtures controlled together or independently
- Maximum level can be limited to 80%
- Optional automatic lumen compensation

Occupancy Control:
- Lights must be turned on manually (or optionally can be configured to come on automatically to 50%)
- Lights automatically turn off when room becomes vacant

Daylight Control:
- Smooth continuous dimming
- Custom grouping of fixtures into separate daylight zones (max. number of zones = number of fixtures)
- Not required in spaces without side lit areas > 250 ft.^{2}

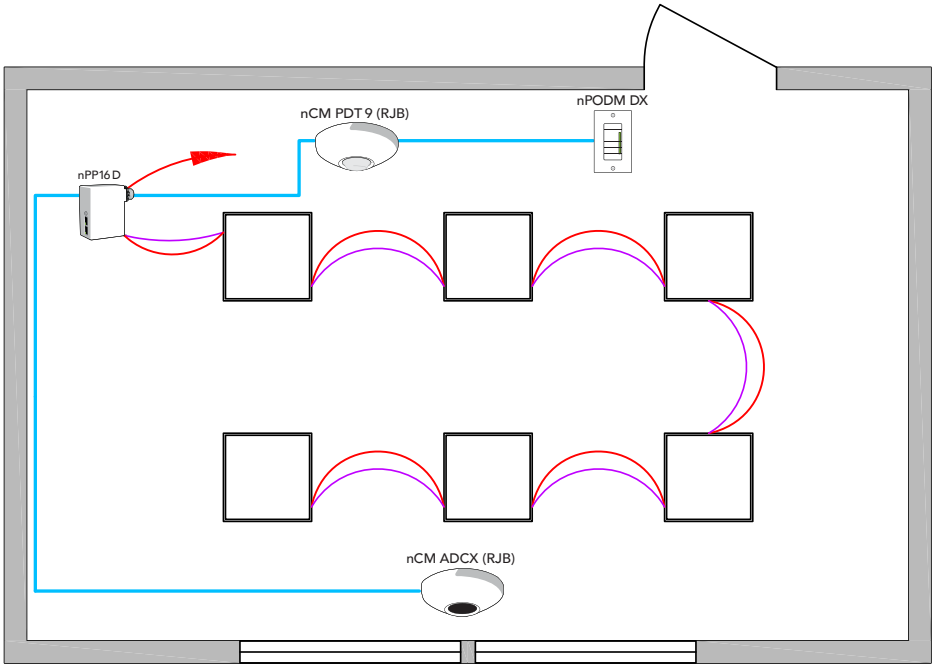
Manual Control:
- On/off & raise/lower control of lights

/ ADDITIONAL OPTIONS:

- Surface or recessed mount sensors also available
- Add **nPODM 4S** for four scene or **nPOD GFX** for touch screen control
- Room can be connected to nLight backbone to enable network control including time based controls and integration with building management systems (see pg. 26)
- For emergency lighting control, order fixtures with **-n80EMG** or **-n100EMG** option

Supports the Following Requirements:

- Local Switch (Section 9.4.1.2)
- Multi-Level / Dimming Control (Section 9.4.1.2a)
- Automatic Full-Off via Occupancy Sensor (Section 9.4.1.2b)
- Multi-Level Daylight Control (Section 9.4.1.4/5)



*If daylighting is required, additional relay pack(s) may also be required.

CAT-5e Cable | Line Voltage Wires | Line Power Feed | 0-10V Wires

Bill of Materials

Symbol	Qty	Product #	Description
	1	nPP16 D	Relay Module with 0-10V Dimming Output
	1	nPODM DX	On/Off & Raise/Lower WallPod
	1	nCM PDT 9 (RJB)	Dual Technology Occupancy Sensor

Options

	1	nCM ADCX (RJB)	Automatic Dimming Control Photocell

/ OPERATION DETAILS:

Lights:
- All lights are dimmable
- All fixtures controlled together
- Maximum level can be limited to 80%

Occupancy Control:
- Lights must be turned on manually (or optionally can be configured to come on automatically to 50%)
- Lights automatically turn off when room becomes vacant

Daylight Control:
- Smooth continuous dimming
- Daylight zones defined by rows
- Not required in spaces without side lit areas > 250 ft.^{2}

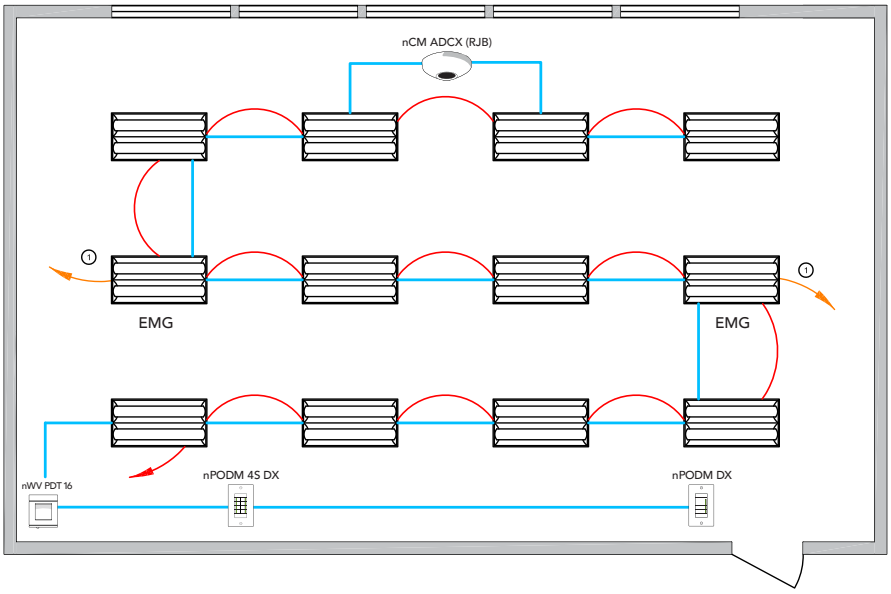
Manual Control:
- On/off & raise/lower control of lights

/ ADDITIONAL OPTIONS:

- Surface or recessed mount sensors also available
- Model **nPP16 D PA** for default auto-on to 50%
- Room can be connected to nLight backbone to enable network control including time based controls and integration with building management systems (see pg. 26)
- For emergency lighting control add model **nPP16 D ER**

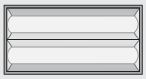
Supports the Following Requirements:

- Local Switch (Section 9.4.1.2)
- Multi-Level / Dimming Control (Section 9.4.1.2a)
- Automatic Full-Off via Occupancy Sensor (Section 9.4.1.2b)
- Multi-Level Daylight Control (Section 9.4.1.4/5)



① Note: Not all emergency nLight enabled fixtures require a normal monitoring feed. Refer to data sheet for additional information.

Bill of Materials

Symbol	Qty	Product #	Description
	10	See Appendix A	nLight Enabled Fixture
	2	See Appendix A	nLight Enabled Fixture with the EMG Option
	1	nPODM DX	On/Off & Raise/Lower WallPod
	1	nWV PDT 16	Dual Technology Wide View Occupancy Sensor

Options

	1	nPODM 4S DX	Teacher Station — 4 Scene Control Master On/Off & Raise/Lower
	1	nCM ADCX (RJB)	Automatic Dimming Control Photocell

/ OPERATION DETAILS:

Lights:
- All lights are dimmable
- Each row/fixture controlled independently
- Maximum level can be limited to 80%
- Optional automatic lumen compensation

Occupancy Control:
- Lights must be turned on manually (or optionally can be configured to come on automatically to 50%)
- Lights automatically turn off when room becomes vacant

Daylight Control:
- Smooth continuous dimming
- Custom grouping of fixtures into separate daylight zones (max. number zones = number of fixtures)
- Not required in spaces without side lit areas > 250 ft.^{2}

Manual Control:
- On/off & raise/lower control of lights
- Optional 4 scene control

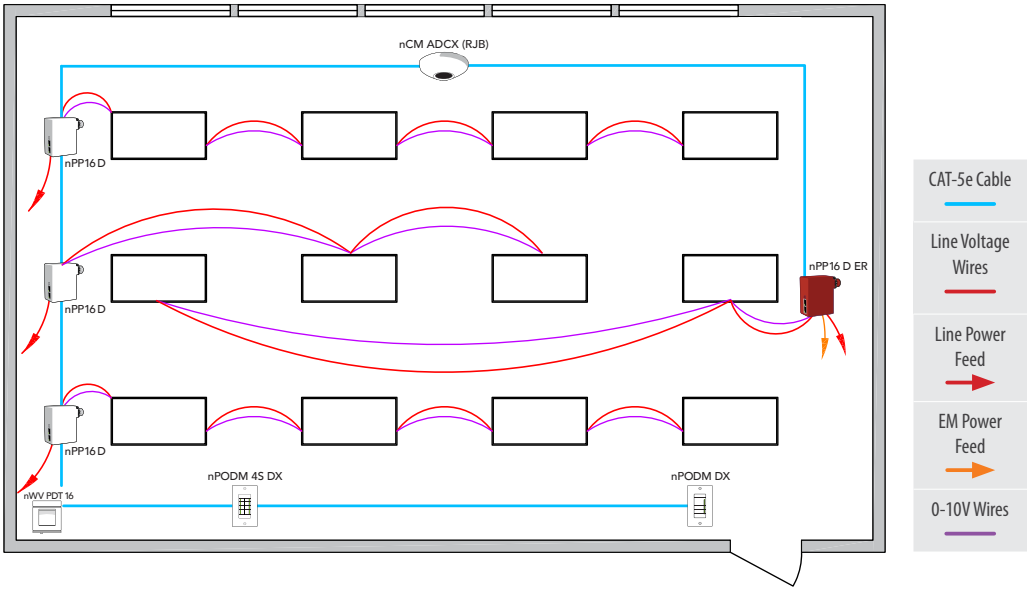
/ ADDITIONAL OPTIONS:

- Surface or recessed mount sensors also available
- Add Graphic WallPod (model **nPOD GFX**) for individual row and up to 16 scene control
- Room can be connected to nLight backbone to enable network control including time based controls and integration with building management systems (see pg. 26)
- Add plug load control for computer classrooms as required per code provision 8.4.2

**Apply this design to classrooms, lecture halls or training rooms.*

Supports the Following Requirements:

- Local Switch (Section 9.4.1.2)
- Multi-Level / Dimming Control (Section 9.4.1.2a)
- Automatic Full-Off via Occupancy Sensor (Section 9.4.1.2b)
- Multi-Level Daylight Control (Section 9.4.1.4/5)



Bill of Materials

Symbol	Qty	Product #	Description
	3	nPP16 D	Relay Module with 0-10V Dimming Output
	1	nPP16 D ER	Emergency Relay Module with 0-10V Dimming Output
	1	nPODM DX	On/Off & Raise/Lower WallPod
	1	nWV PDT 16	Dual Technology Wide View Occupancy Sensor

Options

	1	nPODM 4S DX	Teacher Station — 4 Scene Control Master On/Off & Raise/Lower
	1	nCM ADCX (RJB)	Automatic Dimming Control Photocell

/ OPERATION DETAILS:

Lights:
- All lights are dimmable
- Each row controlled independently
- Maximum level can be limited to 80%

Occupancy Control:
- Lights must be turned on manually (or optionally can be configured to come on automatically to 50%)
- Lights automatically turn off when room becomes vacant

Daylight Control:
- Smooth continuous dimming
- Provides up to three daylight zones, each controlled independently
- Not required in spaces without side lit areas > 250 ft.^{2}

Manual Control:
- On/off & raise/lower control of lights
- Optional 4 scene control

/ ADDITIONAL OPTIONS:

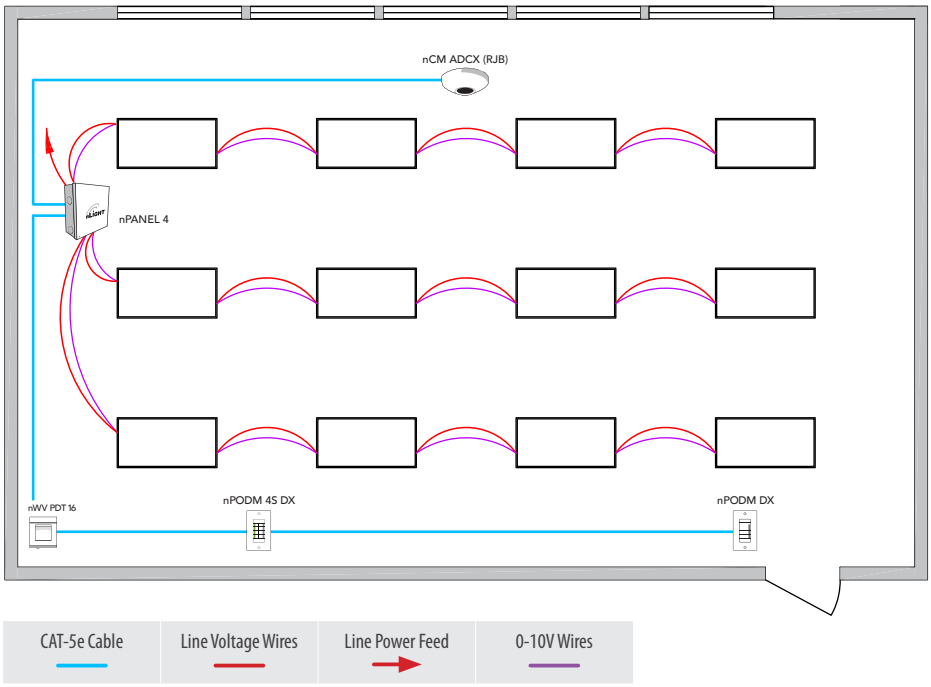
- Surface or recessed mount sensors also available
- Add additional relay pack (model **nPP16 D**) if a white board lighting zone also required
- Add Graphic WallPod (model **nPOD GFX**) for individual row and up to 16 scene control
- Room can be connected to nLight backbone to enable network control including time based controls and integration with building management systems (see pg. 26)
- Add plug load control for computer classrooms as required per code provision 8.4.2

**Apply this design to classrooms, lecture halls or training rooms.*

CLASSROOM* with 0-10V Dimming Fixtures (Panel Alternative)

Supports the Following Requirements:

- Local Switch (Section 9.4.1.2)
- Multi-Level / Dimming Control (Section 9.4.1.2a)
- Automatic Full-Off via Occupancy Sensor (Section 9.4.1.2b)
- Multi-Level Daylight Control (Section 9.4.1.4/5)



Bill of Materials

Symbol	Qty	Product #	Description
	1	nPANEL 4	Four Relay Module with 0-10V Dimming Output and EM Options
	1	nPODM DX	On/Off & Raise/Lower WallPod
	1	nCM ADCX (RJB)	Automatic Dimming Control Photocell
	1	nWV PDT 16	Dual Technology Wide View Occupancy Sensor

Options

	1	nPODM 4S DX	Teacher Station — 4 Scene Control Master On/Off & Raise/Lower

/ OPERATION DETAILS:

Lights:
- All lights are dimmable
- Each row controlled independently
- Maximum level can be limited to 80%

Occupancy Control:
- Lights must be turned on manually (or optionally can be configured to come on automatically to 50%)
- Lights automatically turn off when room becomes vacant

Daylight Control:
- Smooth continuous dimming
- Provides up to three daylight zones, each controlled independently
- Not required in spaces without side lit areas > 250 ft.^{2}

Manual Control:
- On/off & raise/lower control of lights
- Optional 4 scene control

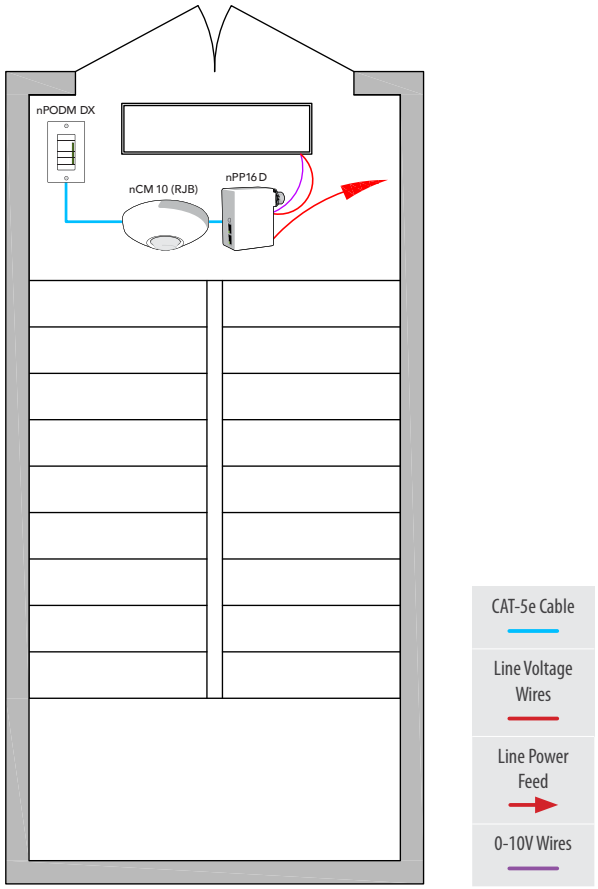
/ ADDITIONAL OPTIONS:

- Surface or recessed mount sensors also available
- 4th relay available in panel for connection to additional lighting zone (e.g., white board)
- Add Graphic WallPod (model **nPOD GFX**) for individual row and up to 16 scene control
- Room can be connected to nLight backbone to enable network control including time based controls and integration with building management systems (see pg. 26)
- For emergency lighting control add barrier to **nPANEL**
- Add plug load control for computer classrooms, as required per code provision 8.4.2

**Apply this design to classrooms, lecture halls or training rooms.*

Supports the Following Requirements:

- Local Switch (Section 9.4.1.2)
- Multi-Level / Dimming Control (Section 9.4.1.2a)
- Automatic Partial or Full-Off via Occupancy Sensor (Section 9.4.1.6g/2b)
- Automatic Off via Programmable Timeclock (see pg. 26) (Section 9.4.1.1a)



Bill of Materials

Symbol	Qty	Product #	Description
	1	nPP16 D	Relay Module with 0-10V Dimming Output
	1	nPODM DX	On/Off & Raise/Lower WallPod
	1	nCM 10 (RJB)	PIR Extended Range Occupancy Sensor

/ OPERATION DETAILS:

Lights:
- All lights are dimmable
- Maximum level can be limited to 80%

Occupancy Control:
- Lights automatically drop to 50% (or lower) when space becomes vacant

Auto-Off Control:
- Lights automatically turn off when the space becomes vacant or can be shut-off via timeclock (see pg. 26 for programmable timeclock)

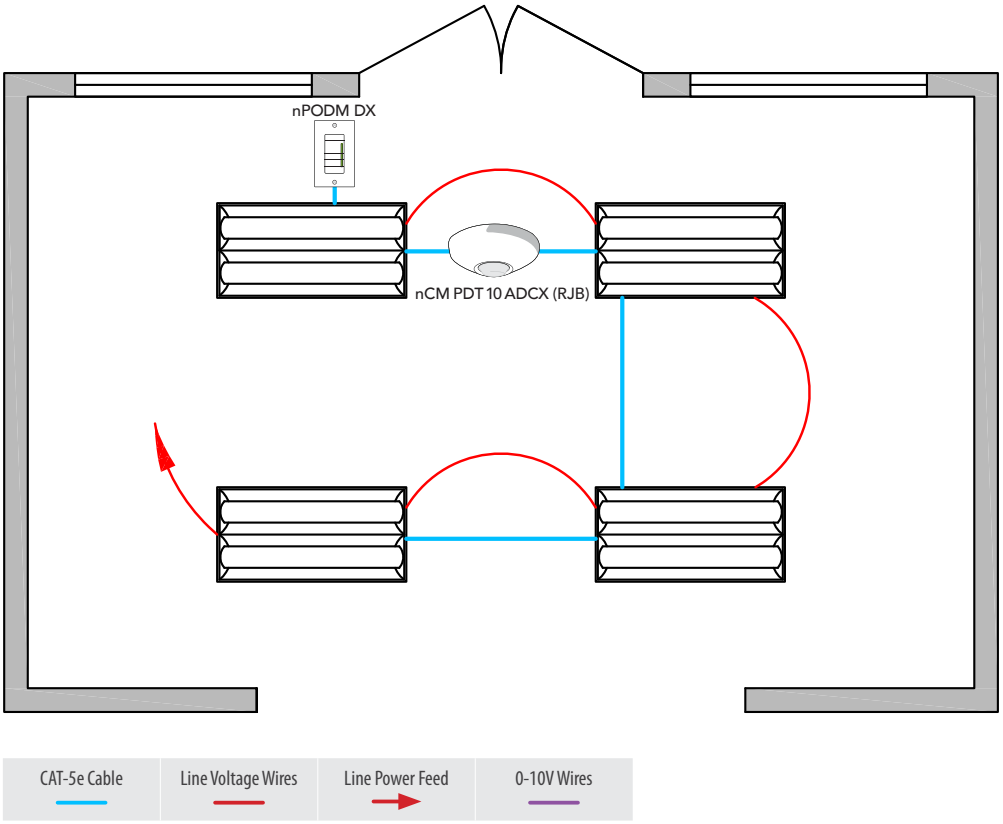
Manual Control:
- On/off & raise/lower control of lights

/ ADDITIONAL OPTIONS:

- Surface or recessed mount sensors also available
- Room can be connected to nLight backbone to enable network control including time based controls and integration with building management systems (see pg. 26)
- For emergency lighting control add model **nPP16 D ER**
- For sidelit areas >250ft² or skylit areas >900ft², add **nCM ADCX (RJB)** for daylight control

Supports the Following Requirements:

- Local Switch (Section 9.4.1.2)
- Automatic Full-Off via Occupancy Sensor (Section 9.4.1.2b)
- Multi-Level Daylight Control (Section 9.4.1.4/5)



Bill of Materials

Symbol	Qty	Product #	Description
	4	See Appendix A	nLight Enabled Fixture
	1	nPODM DX	On/Off & Raise/Lower WallPod
	1	nCM PDT 10 ADCX	Dual Technology Extended Range Occupancy Sensor With Automatic Dimming Photocell

/ OPERATION DETAILS:

Lights:
- All lights are dimmable
- All fixtures controlled together or independently
- Maximum level can be limited to 80%
- Optional automatic lumen compensation

Occupancy Control:
- Lights automatically go to full bright when occupied
- Lights automatically turn off when space becomes vacant

Daylight Control:
- Smooth continuous dimming
- Custom grouping of fixtures into separate daylight zones (max. number of zones = number of fixtures)
- Not required for spaces without side lit areas > 250 ft.^{2}

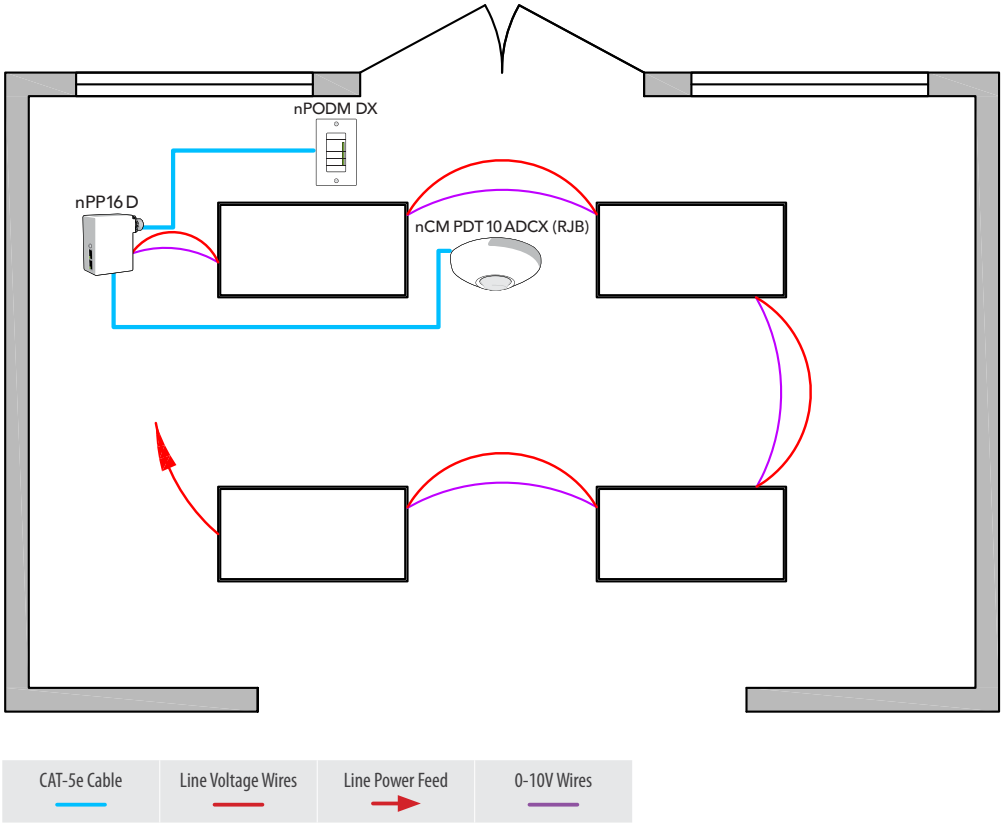
Manual Control:
- On/off & raise/lower control of lights

/ ADDITIONAL OPTIONS:

- Surface or recessed mount sensors also available
- Space/zone can be connected to nLight backbone to enable network control including time based controls and integration with building management systems (see pg. 26)
- For emergency lighting control, order fixture with **-n80EMG** or **-n100EMG** option

Supports the Following Requirements:

- Local Switch (Section 9.4.1.2)
- Automatic Full-Off via Occupancy Sensor (Section 9.4.1.2b)
- Multi-Level Daylight Control (Section 9.4.1.4/5)



Bill of Materials

Symbol	Qty	Product #	Description
	1	nPP16 D	Relay Module with 0-10V Dimming Output
	1	nPODM DX	On/Off & Raise/Lower WallPod
	1	nCM PDT 10 ADCX (RJB)	Dual Technology Extended Range Occupancy Sensor With Automatic Dimming Photocell

/ OPERATION DETAILS:

Lights:
- All lights are dimmable
- All fixtures controlled together
- Maximum level can be limited to 80%

Occupancy Control:
- Lights automatically go to full bright when occupied
- Lights automatically turn off when space becomes vacant

Daylight Control:
- Smooth continuous dimming
- Not required for spaces without side lit areas > 250 ft.^{2}

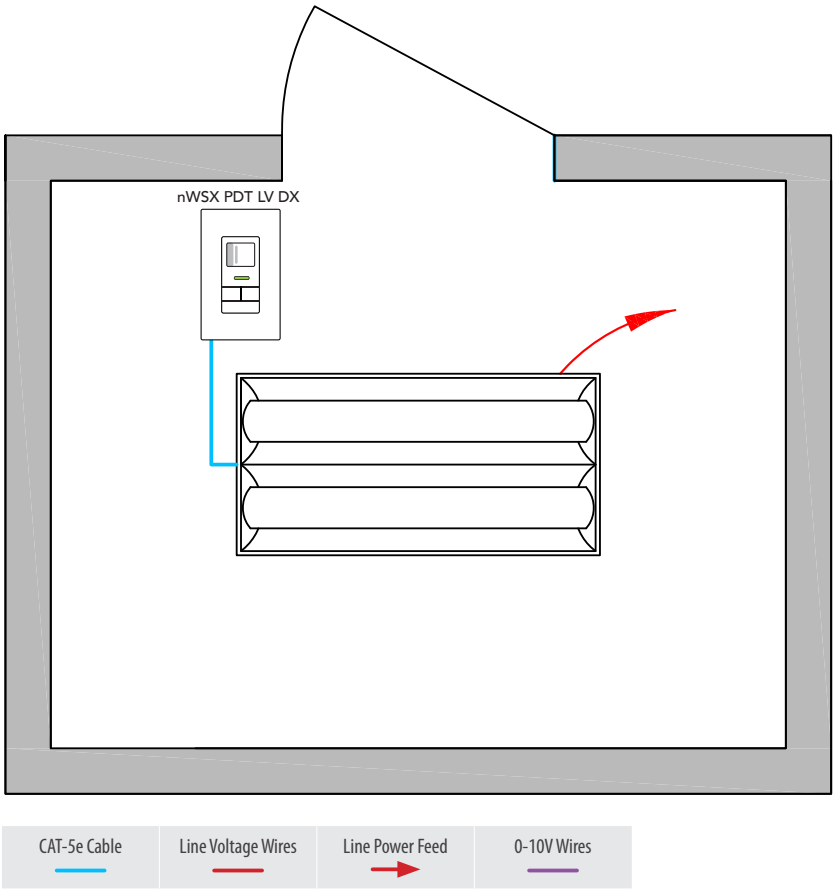
Manual Control:
- On/off & raise/lower control of lights

/ ADDITIONAL OPTIONS:

- Surface or recessed mount sensors also available
- Model **nPP16 D PA** for default auto-on to 50%
- Space/zone can be connected to nLight backbone to enable network control including time based controls and integration with building management systems (see pg. 26)
- For emergency lighting control add model **nPP16 D ER**

Supports the Following Requirements:

- Local Switch (Section 9.4.1.2)
- Automatic Full-Off via Occupancy Sensor (Section 9.4.1.2b)



Bill of Materials

Symbol	Qty	Product #	Description
	1	See Appendix A	nLight Enabled Fixture
	1	nWSX PDT LV DX	On/Off & Raise/Lower Dual Tech Occupancy Switch

/ OPERATION DETAILS:

Lights:
- All lights are dimmable
- Maximum level can be limited to 80%
- Optional automatic lumen compensation

Occupancy Control:
- Lights automatically go to full bright when occupied
- Lights automatically turn off when space becomes vacant

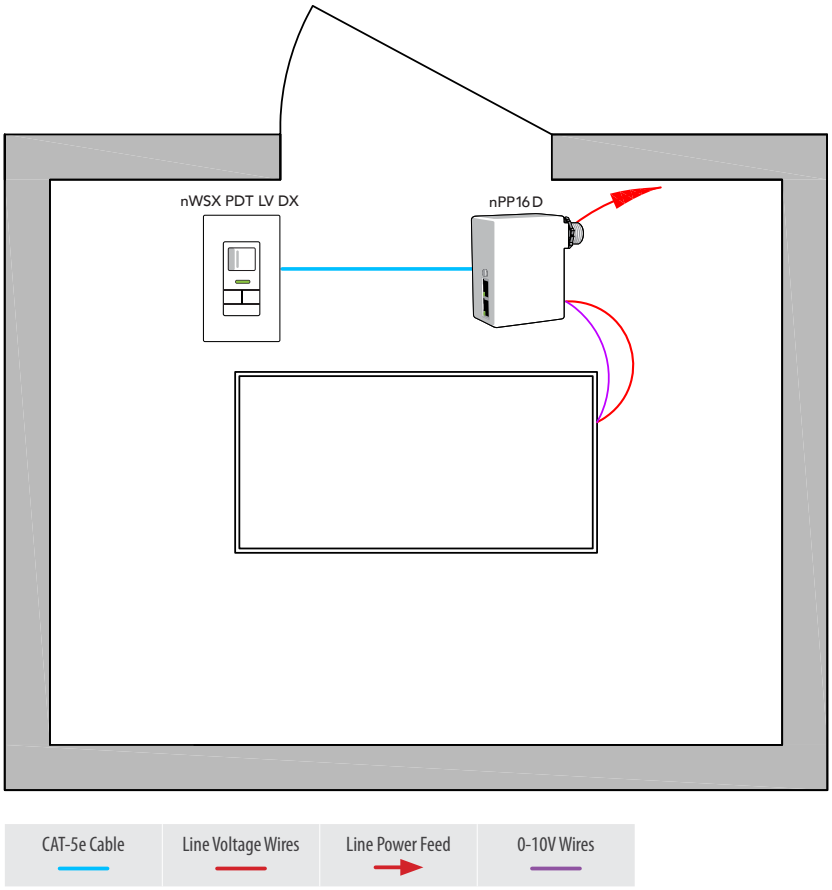
Manual Control:
- On/off & raise/lower control of light

/ ADDITIONAL OPTIONS:

- Surface or recessed mount sensors also available
- Room can be connected to nLight backbone to enable network control including time based controls and integration with building management systems (see pg. 26)
- For emergency lighting control add **-n80EMG** or **-n100EMG** to fixture option

Supports the Following Requirements:

- Local Switch (Section 9.4.1.2)
- Automatic Full-Off via Occupancy Sensor (Section 9.4.1.2b)



Bill of Materials

Symbol	Qty	Product #	Description
	1	nPP16 D	Relay Module with 0-10V Dimming Output
	1	nWSX PDT LV DX	On/Off & Raise/Lower Dual Tech Occupancy Switch

/ OPERATION DETAILS:

Lights:
- All lights are dimmable
- Maximum level can be limited to 80%

Occupancy Control:
- Lights automatically go to full bright when occupied
- Lights automatically turn off when space becomes vacant

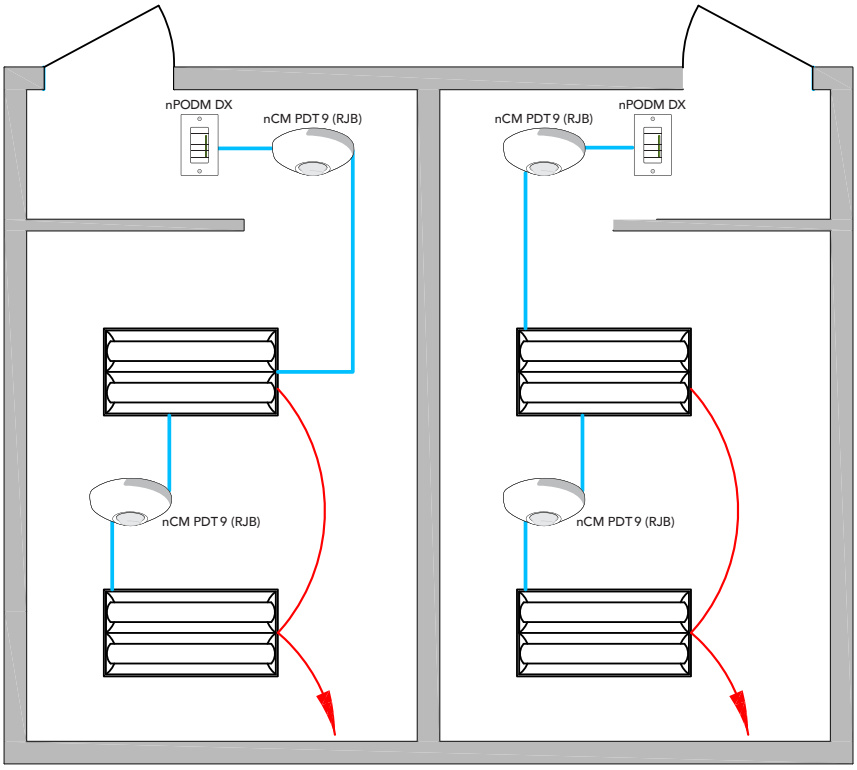
Manual Control:
- On/off & raise/lower control of light

/ ADDITIONAL OPTIONS:

- Surface or recessed mount sensors also available
- Room can be connected to nLight backbone to enable network control including time based controls and integration with building management systems (see pg. 26)
- For emergency lighting control add model **nPP16 D ER**

Supports the Following Requirements:

- Local Switch (Section 9.4.1.2)
- Automatic Full-Off via Occupancy Sensor (Section 9.4.1.2b)



Bill of Materials (Each Restroom)

Symbol	Qty	Product #	Description
	2	See Appendix A	nLight Enabled Fixture
	1	nPODM DX	On/Off & Raise/Lower WallPod
	2	nCM PDT 9 (RJB)	Dual Technology Occupancy Sensor

/ OPERATION DETAILS:

Lights:
- All lights are dimmable
- All fixtures are controlled together or independently
- Maximum level can be limited to 80%
- Optional automatic lumen compensation

Occupancy Control:
- Lights automatically go to full bright when occupied
- Lights automatically turn off when room becomes vacant

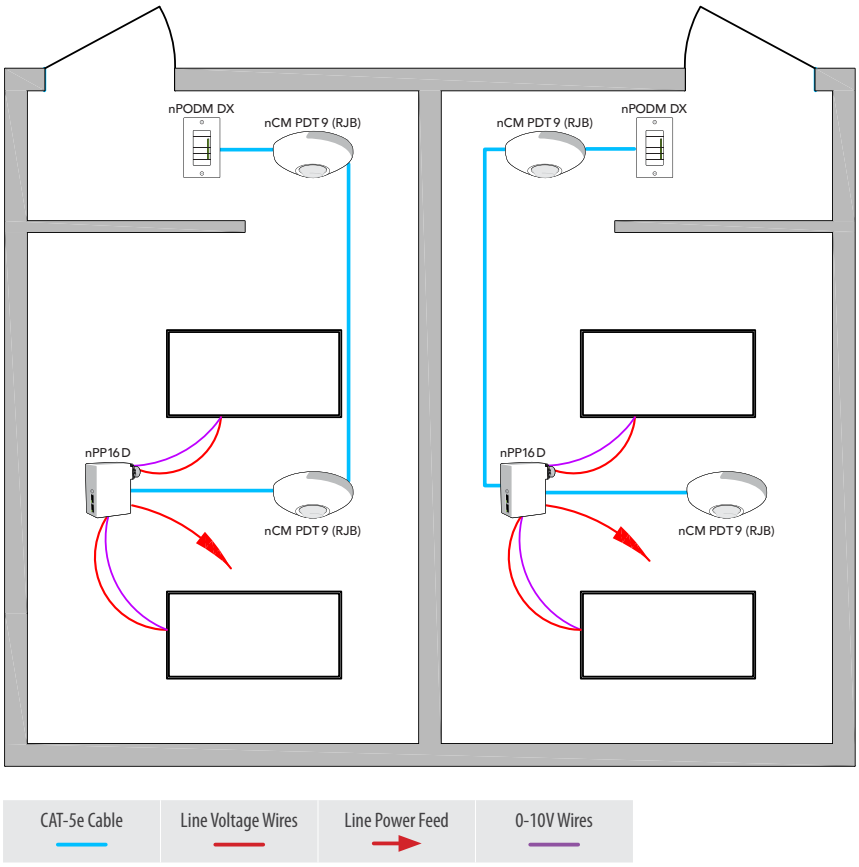
Manual Control:
- On/off & raise/lower control of lights

/ ADDITIONAL OPTIONS:

- Surface or recessed mount sensors also available
- Room can be connected to nLight backbone to enable network control including time based controls and integration with building management systems (see pg. 26)
- For emergency lighting control add **-n80EMG** or **-n100EMG** to fixture option

Supports the Following Requirements:

- Local Switch (Section 9.4.1.2)
- Automatic Full-Off via Occupancy Sensor (Section 9.4.1.2b)



Bill of Materials (Each Restroom)

Symbol	Qty	Product #	Description
	1	nPP16 D	Relay Module with 0-10V Dimming Output
	1	nPODM DX	On/Off & Raise/Lower WallPod
	2	nCM PDT 9 (RJB)	Dual Technology Occupancy Sensor

/ OPERATION DETAILS:

Lights:
- All lights are dimmable
- All fixtures are controlled together (per room)
- Maximum level can be limited to 80%

Occupancy Control:
- Lights automatically go to full bright when occupied
- Lights automatically turn off when room becomes vacant

Manual Control:
- On/off & raise/lower control of lights

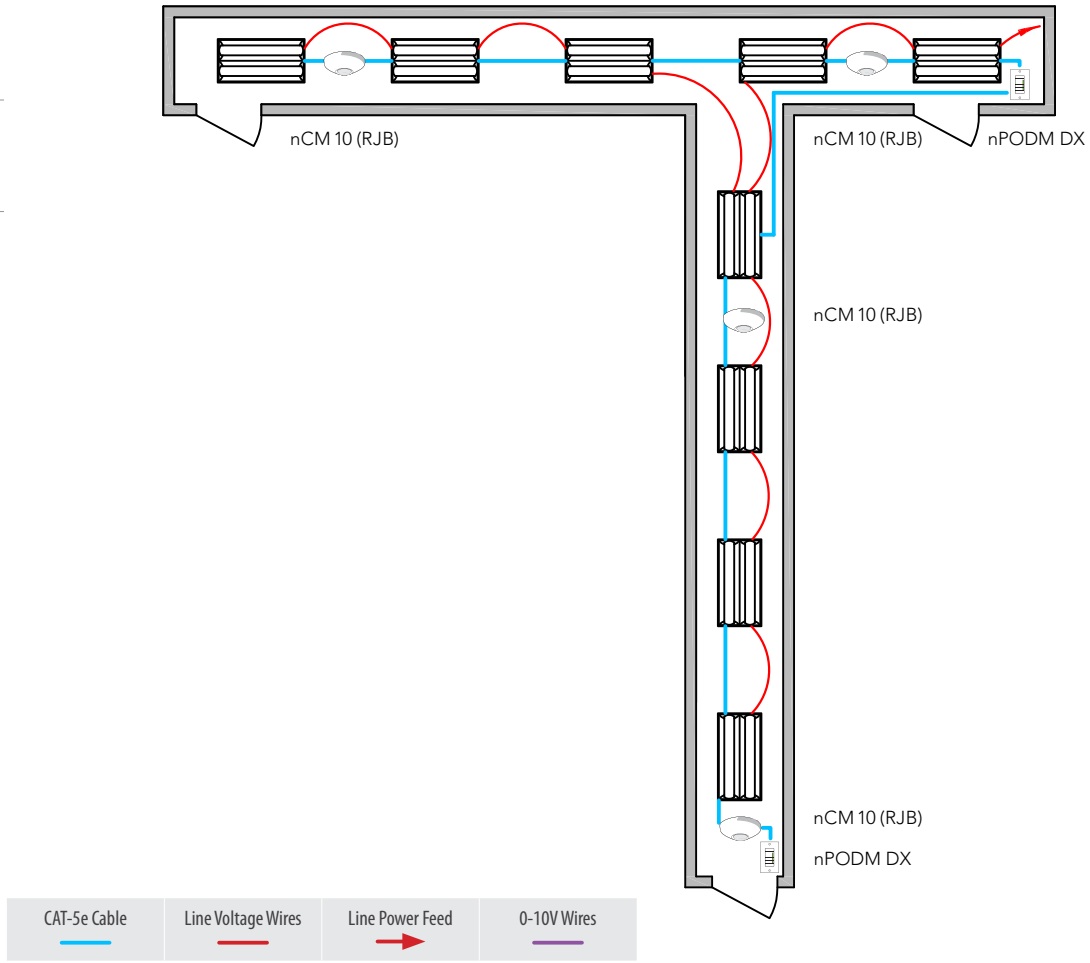
/ ADDITIONAL OPTIONS:

- Surface or recessed mount sensors also available
- Substitute model **nPP16 D PA** for default auto-on to 50% functionality
- Room can be connected to nLight backbone to enable network control including time based controls and integration with building management systems (see pg. 26)
- For emergency lighting control add model **nPP16 D ER**

CORRIDOR with nLight Enabled Fixtures

Supports the Following Requirements:

- Local Switch (Section 9.4.1.2)
- Automatic Full-Off via Occupancy Sensor (Section 9.4.1.2b)



Bill of Materials

Symbol	Qty	Product #	Description
	9	See Appendix A	nLight Enabled Fixture
	4	nCM 10 (RJB)	PIR Extended Range Occupancy Sensor
	2	nPODM DX	On/Off & Raise/Lower WallPod

/ OPERATION DETAILS:

Lights:
- All lights are dimmable
- All fixtures controlled together or independently
- Maximum level can be limited to 80%
- Optional automatic lumen compensation

Occupancy Control:
- Lights automatically go to full bright when occupied
- Lights automatically turn off when space becomes vacant

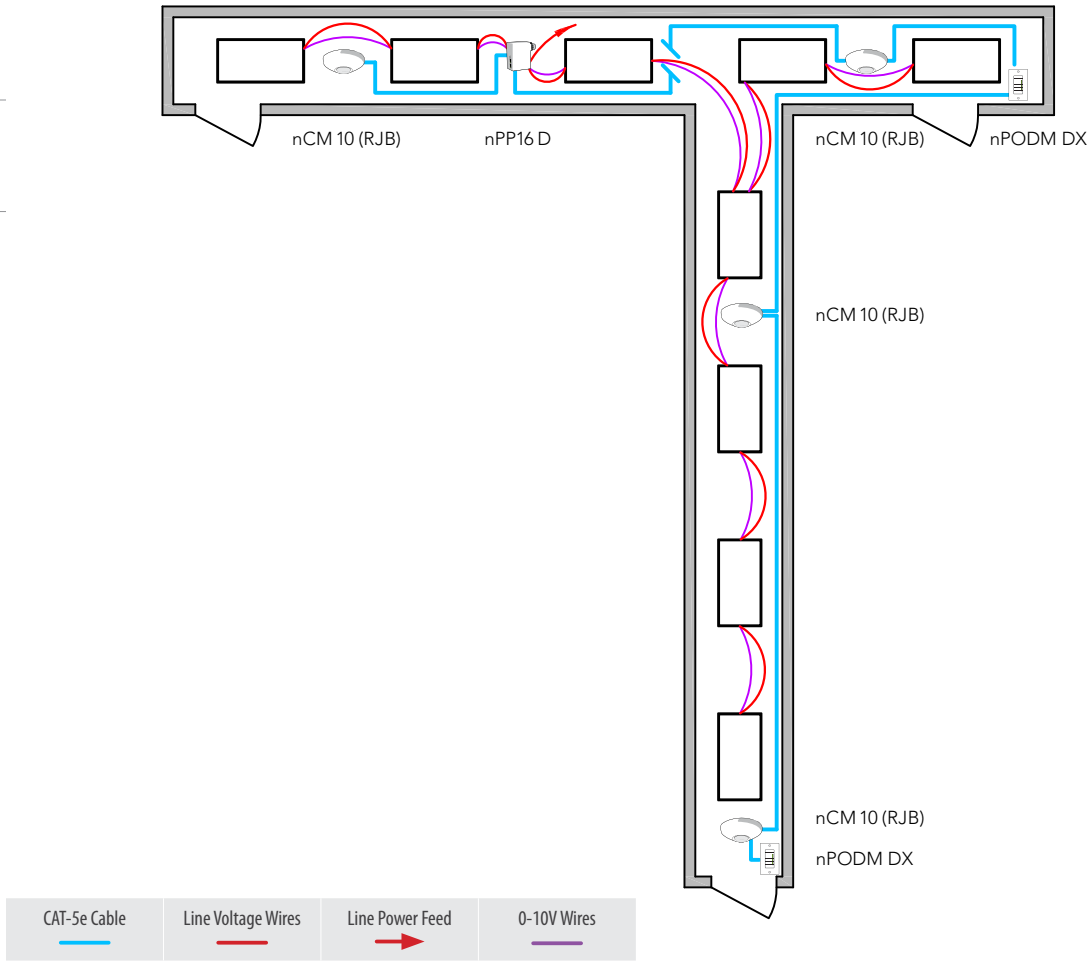
Manual Control:
- On/off & raise/lower control of lights

/ ADDITIONAL OPTIONS:

- Surface or recessed mount sensors also available
- Space/zone can be connected to nLight backbone to enable network control including time based controls and integration with building management systems (see pg. 26)
- For emergency lighting control use **-n80EMG** or **-n100EMG** to fixture option
- For sidelit areas >250ft² or skylit areas >900ft², add **nCM ADCX (RJB)** for daylight control

Supports the Following Requirements:

- Local Switch (Section 9.4.1.2)
- Automatic Full-Off via Occupancy Sensor (Section 9.4.1.2b)



Bill of Materials

Symbol	Qty	Product #	Description
	1	nPP16 D	Relay Module with 0-10V Dimming Output
	4	nCM 10 (RJB)	PIR Extended Range Occupancy Sensor
	2	nPODM DX	On/Off & Raise/Lower WallPod

/ OPERATION DETAILS:

Lights:
- All lights are dimmable
- All fixtures controlled together
- Maximum level can be limited to 80%

Occupancy Control:
- Lights automatically go to full bright when occupied
- Lights automatically turn off when space becomes vacant

Manual Control:
- On/off & raise /lower control of lights

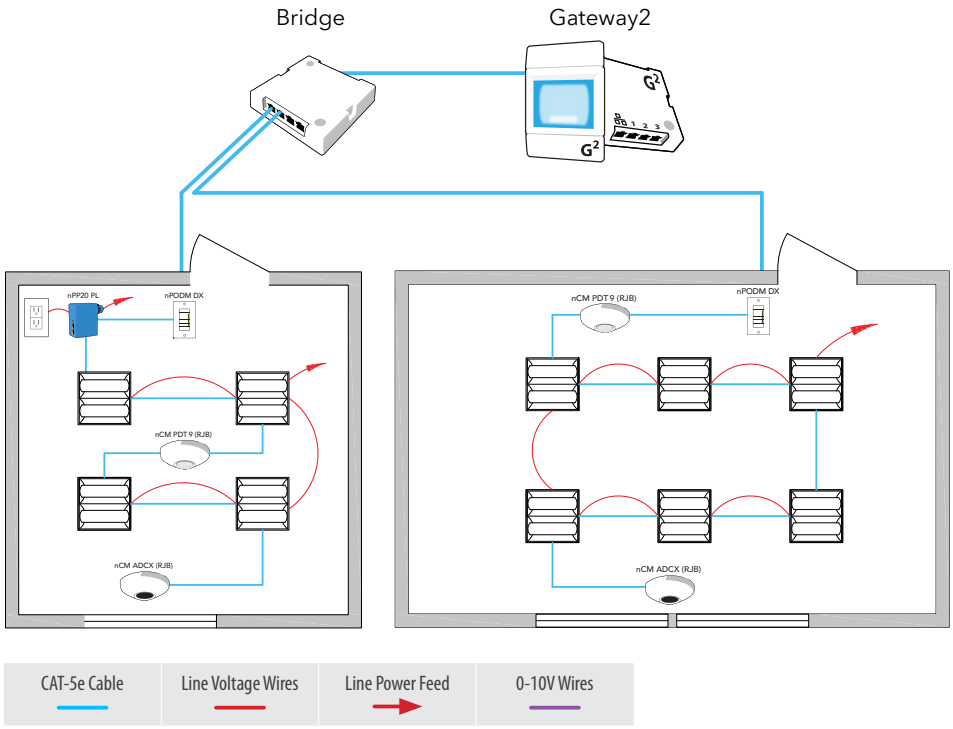
/ ADDITIONAL OPTIONS:

- Surface or recessed mount sensors also available
- Space/zone can be connected to nLight backbone to enable network control including time based controls and integration with building management systems (see pg.26)
- For emergency lighting control add model **nPP16 D ER**
- For sidelit areas >250ft² or skylit areas >900ft², add **nCM ADCX (RJB)** for daylight control

Programmable Timeclock Control:

Although not pictured within each of the individual room design guides, each nLight Control Zone can be connected via an nLight backbone to create a networked nLight lighting control system capable of meeting the requirements of the ASHRAE 90.1 programmable timeclock provision (Section 9.4.1.1a). A networked system also enables astronomical time clock control.

For additional information regarding building management integration or demand response features, please contact your Acuity Brands Sales Representative.



Bill of Materials

Symbol	Qty	Product #	Description
	1	nBRG 8 KIT	8-Port Backbone Bridge
	1	nGWY2 KIT	Network Gateway Controller

nLight BLE Radio Module

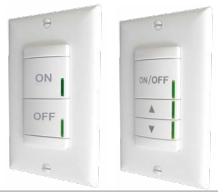
The nLight® nIO BT Bluetooth Low Energy (BLE) module from Acuity Controls enables wireless communication to an nLight zone of devices from a smartphone. The nLight smartphone app, nConfig, easily modifies the settings and operation of the devices in an nLight zone aiding in meeting energy code requirements.

The nLight BLE Module connects to an nLight zone of devices using CAT-5e cables and is powered directly off of the CAT-5e cables. Upon powering up the nIO BT communicates with the Acuity Controls smartphone app via **Bluetooth Low Energy.** The on-board blue LED indicates paired state, and pin code recognition ensures system security.

Product Family	Fixture Series	Notes
Lithonia Lighting	AC Series	LED Recessed
Lithonia Lighting	AL Series	LED High Performance Architectural Recessed
Lithonia Lighting	ALLS	LED Surface Mount
Lithonia Lighting	AVLED	Avante® LED Recessed - Direct/Indirect
Lithonia Lighting	BZL Series	LED Recessed Indirect
Lithonia Lighting	FSL Series	LED Recessed
Lithonia Lighting	RT Series	LED Recessed Volumetric
Lithonia Lighting	T Series	LED Recessed Troffer
Lithonia Lighting	VT Series	LED Recessed Volumetric
Lithonia Lighting	GT Series	General Recessed Troffer
Lithonia Lighting	SBS Series	LED Shadow Box Square
Lithonia Lighting	WL Series	LED Wall Bracket Surface Mount
Lithonia Lighting	RTLX	LED Surface Volumetric
Lithonia Lighting	ST LED	LED Surface Volumetric
Lithonia Lighting	IBL / IBH	LED Highbay
Lithonia Lighting	PTN	LED Highbay - Proteon
Lithonia Lighting	LDN	Downlight
Lithonia Lighting	ACLX	AC Series Surface Mount
Lithonia Lighting	RTLR	LED Relight Volumetric Recessed Mount
Lithonia Lighting	RTLEDRT	Relight Volumetric for Lensed Troffers
Lithonia Lighting	SBS LX	LED Relight Shadow Box Square
Lithonia Lighting	T LX	LED Relight Surface Mount
Lithonia Lighting	VTL RT LED	LED Relight Lensed Troffers
Lithonia Lighting	VTLR LED	LED Relight Parabolic Lensed
Lithonia Lighting	VTLX	LED Relight Volumetric Surface Mount
Gotham	EVO	LED Downlight
Gotham	Incito	LED Downlight

Product Family	Fixture Series	Notes
Mark Architectural Lighting	Slot 4 LED	Pendant, Wall, Surface, Recessed
Mark Architectural Lighting	Slot 6 LED	Recessed
Mark Architectural Lighting	Fin LED	Recessed
Mark Architectural Lighting	Whisper LED	Recessed
Mark Architectural Lighting	Nol LED	Recessed
Mark Architectural Lighting	SPR LED	Perimeter
Peerless	Vellum LED	Suspended, Recessed
Peerless	Mino LED	Recessed
Peerless	Round 2/4 LED	Suspended, Wall
Peerless	Square LED	Suspended, Wall
Peerless	Origami LED	Suspended, Wall
Peerless	Bruno LED	Suspended, Wall
Peerless	Staple	Suspended, Wall
Peerless	Lightline, Indirect	Suspended
Peerless	Lightedge	Suspended
Peerless	Icetray	Suspended
Peerless	Cerra	Suspended
Peerless	Prima	Suspended
Peerless	Naro	Suspended
Peerless	Tulip	Suspended
Peerless	Envision	Suspended
Peerless	Aero	Suspended
Peerless	Enzo	Suspended

Note: New nLight enabled fixtures added regularly. Please reference fixture spec sheets for nLight enabled options.

	Control Requirement	Code Provision	Code Summary*	Recommendations for Compliance	nLight Solution Details	
Shut-Off Control	Space (i.e. Local Switch) Control	9.4.1.2	Each space enclosed by ceiling-height partitions shall have at least one readily accessible control device to independently control the general lighting within the space.	Include manual control device(s) in all room control system designs.	nLight WallPod devices provide a user with local control of lighting within an nLight controlled space (i.e. nLight zone). WallPods are available in multiple styles – each with varying features and user experience.	
					Push-Button WallPod	**Graphic WallPod**
						
					Traditional tactile buttons and LED user feedback.	Full color touch screen provides a sophisticated look and feel.
	Programmable Timeclock	9.4.1.1a	Interior lighting shall be controlled with a time-of-day schedule control that turns lighting off at specific programmed times. Note: Occupancy sensors or another building control/alarm system that indicate vacancy also comply.	Utilizing controls capable of being networked across an entire building enables simple compliance via a single central programmable time clock.	Individual nLight Control Zones (ie rooms) can be easily networked together across an entire building simply by connecting them into a "backbone" made up of one or more nLight Bridge devices and an nLight Gateway. The Gateway provides programmable time clock functionality for an nLight network as well as interfaces to the SensorView Suite of web-based software applications (via an Ethernet LAN / WAN connection).	
					Network Gateway	
					Additional benefits of installing an nLight backbone include remote status monitoring, iOS smartphone app control, and BMS interface capability.	
	Automatic Full-Off via Occupancy Sensor	9.4.1.2b	Lights must be turned off within 30 minutes of vacancy by use of an occupancy sensor or timer switch.	Always include occupancy sensors in all control system designs regardless of lighting type.	nLight occupancy sensors utilize 100% digital passive infrared (PIR) detection, come in several mounting styles, and offer multiple coverage pattern options. Additionally, nLight sensors are available with patented Microphonics™ dual technology detection for rooms with obstructions. Configuring for full off vs partial off control is done with system programming.	
	Automatic Partial-Off via Occupancy Sensor	9.4.1.6g	Lighting should automatically reduce power by at least 50% within 30 minutes of vacancy.	Always include occupancy sensors in all control system designs. Reducing the level of dimmable fixtures to 50% is easiest method of compliance, however turning off 50% of lighting via circuit switching is also an option.	**360° Occupancy Sensor**	**120° WideView Corner Sensor**
					Surface or recessed mounts to ceiling tiles or sheetrock/plaster.	Directly mounts in corner or to ceiling via repositionable ceiling bracket.

**Note: This summary is for general information purposes only and is provided without any warranty as to accuracy, completeness, or otherwise. The user should read the applicable code sections for more complete and detailed descriptions of code requirements and exceptions and should consult with a professional engineering or other competent advisor before making any decision or taking any action based on this summary.*

<table>
<tr><th></th><th>Control Requirement</th><th>Code Provision</th><th>Code Summary*</th><th>Recommendation for Compliance</th><th>nLight Solution Details</th></tr>
<tr><td rowspan="4">Light Level Control</td><td rowspan="3">Multi-Level / Dimming Controls</td><td rowspan="3">9.4.1.2a</td><td rowspan="3">Controlled lighting shall have at least one control step between 30% and 70%, in additional to full on and full off. Not required for spaces with one luminaire rated <100 W or for spaces with lighting power allowance of <0.6 W/ft2.</td><td rowspan="3">Continuously dimmable LED (or fluorescent) fixtures and manual dimming controls are the easiest method of compliance.</td><td>nLight provides multiple options for controlling continuous dimming luminaires. This allows spaces with several lighting types and technologies to be controlled together and with a common user experience.</td></tr>
<tr><td>nLight enabled Acuity Brands Fixtures

Acuity offers a wide variety of LED fixtures with factory installed integrated nLight controls that provide smooth continuous dimming, and optional automatic lumen maintenance or manual task tuning.</td><td>Dimming Relay Packs / Panels

nLight dimming relay packs / panels enable control of any 0-10VDC dimmable LED (or fluorescent) luminaire. Manual task tuning control can also be used.</td></tr>
<tr><td>Multi-Level Daylight Controls</td><td>9.4.1.4, 9.4.1.5</td><td>The general lighting in primary sidelit areas (250ft² or larger) or daylight areas under skylights (900ft² or larger) shall be separately controlled by at least one multilevel photocontrol, which can be continuous dimming.</td><td>Automatic daylight harvesting photocells that continuously adjust the level of dimming fixtures according to daylight levels provide the most effective and least distracting control.</td><td>nLight offers standalone daylight harvesting sensors as well as occupancy sensors with integrated daylight harvesting. Sensors are available in four different housings and provide continuous dimming control of any/all networked nLight enabled fixtures or dimming relay packs, each capable of being its own daylight zone.
Ceiling Mount Dimming Photocell

Recessed Mount Dimming Photocell
 </td></tr>
<tr><td>Additional Controls</td><td>Automatic Receptacle (i.e. Plug Load) Control</td><td>8.4.2</td><td>50% of all receptacles, including those installed in modular partitions, shall be automatically turned off by a control device.</td><td>Since the same automatic shut-off requirements apply to receptacles and lighting, utilizing the same occupancy sensors for both is the simplest method of compliance.</td><td>The nLight Plug-Load relay pack is capable of switching an entire 20A receptacle load. Simply add into an nLight Control Zone (room) with an occupancy sensor and the unit will automatically switch off when the room is vacant. Local manual switch control of receptacles is not required and therefore is disabled by default.
Plug Load / Receptacle Relay Pack
 </td></tr>
</table>

Note: This summary is for general information purposes only and is provided without any warranty as to accuracy, completeness, or otherwise. The user should read the applicable code sections for more complete and detailed descriptions of code requirements and exceptions and should consult with a professional engineering or other competent advisor before making any decision or taking any action based on this summary.

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Additional Resources:

Acuity Controls Typical Layout Drawings

http://www.acuitybrands.com/typicals

ASHRAE

https://www.ashrae.org/

Use the Following Sections of the ASHRAE 90.1 2010 Code as Reference:

Section 8.4.2 — Automatic Receptacle Control
Section 9.4.1 — Lighting Control
Section 9.4.1.1 — Automatic Lighting Shutoff
Section 9.4.1.2 — Space Control
Section 9.4.1.3 — Parking Garage Lighting Control
Sections 9.4.1.4/5 — Automatic Daylighting Controls
Section 9.4.1.6 — Additional Control
Section 9.4.1.7 — Exterior Lighting Control
Section 9.4.4 — Functional Testing

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