The NX Distributed Intelligence™ lighting control system is a simple and cost-effective tool that meets state and local energy codes and other requirements, while also providing the flexibility to help users feel comfortable. Using a small number of components, NX covers a wide variety of applications across commercial, institutional and industrial buildings. Using the same short list of products, the system scales from one office or one floor, to one building or across an entire campus. The NX mobile application can be used to make adjustments to the standard settings, and to customize the settings and lighting to get the most from the system.

This Design & Application Guide provides Engineers, Designers and Architects with detailed product information on the NX system and exemplifies how to design and specify a system. Facility Manager, Operating Engineers and Installing Contractors can also use this document to find additional information on the use of the NX system.
NX Distributed Intelligence™ lighting control platform utilizes a Distributed Network Architecture (DNA) that connects intelligent devices including luminaires, controllers, panels, occupancy sensors, photocells, wall switches and dimmers. NX’s fully distributed design means programming is stored at the device, and each control can function independently all the way down to the room, fixture and device level. This approach eliminates operational dependencies on software, gateways and servers.

- NX is designed for commercial and industrial applications with panel, room-based and in-fixture controllers, sensors and wall switches, integration interfaces, and native BACnet® support for Building Automation Systems
- NX supports indoor and outdoor applications, wired, wireless and hybrid networked lighting control deployments
- NX is designed to self-configure, automatically meeting energy code requirements as devices are connected. Further configuration may be done using either the NX smartphone application (local) or a browser-based interface (networked)

Complete Suite of Products

NX Distributed Intelligence™ offers a broad portfolio of controllers, network devices, panels, sensors, and interfaces under one platform to address new construction and retrofit applications.

**Lighting Controllers**

- In-Fixture Sensor Modules
  - Luminaire-integrated design
  - Intelligent auto-configuration
  - Bluetooth® enabled sensors available in five versions to address occupancy and daylight dimming

- Radio Modules
  - Provide HubBNET™ wireless mesh network communication
  - Robust and reliable IEEE 802.15.4 2.4GHz radio
  - Remote, in-fixture and on-fixture mounting options

- Room Controllers
  - Intelligent auto-configuration
  - Automatic code compliance
  - CAT5 plug and play connectivity
  - UL924 emergency solutions
  - Plug load controller available in split and full control, 15A and 20A options

- Plug Load Control
  - Enables code compliance
  - Easily integrates with Room Controllers
  - Available in split and full control, 15A and 20A options

- Wall Stations
  - Attractive, architecturally-pleasing decorator style design
  - Plug and play integration with NX system
  - Multiple switch options available including SpectraSync™ CCT control

- SimpleTouch™ Graphic Wall Station
  - Full-color touchscreen control of groups presets and schedules
  - Flexible, user friendly interface
  - Customizable home screen and navigation

- OMNI Ceiling Sensor
  - Patented IntelliDAPT™ self-adaptive technology
  - Passive Infrared, Ultrasonic and Dual Technology versions
  - With occupancy or vacancy mode up to 2000 sq ft coverage area

- Daylight Sensors
  - Open-loop daylighting controls
  - Supports up to 6 lighting zones per room
  - Simple device setup using the NX mobile App

- Area Controllers
  - Central component for enterprise solutions
  - Real-time programming and monitoring
  - Native BACnet® support

- Network Bridges
  - Connect Room Controllers to HubBNET network
  - Provide communication link for Area Controllers
  - CAT5 plug and play connectivity

- Interfaces
  - Provides inputs to and outputs from the system
  - Options for contact closure, serial/AV, or 0-10V dimming
  - Simplified connections to HubBNET or SmartPORT™

- NX Relay Panels
  - Provides programmable switching and dimming of lighting circuits
  - Can be used exclusively or as part of a network solution
  - Available in 8, 16, 24, 32 and 48 relay versions

These are the key components. See appendix or please visit www.hubbellcontrolsolutions.com for a full list of NX products.
## Code Compliance at Every Level of Scalability

From a single standalone fixture solution to a complete networked building approach, NX can maximize energy savings and meet or exceed today’s energy code requirements.

<table>
<thead>
<tr>
<th>High End Trim</th>
<th>Continuous Daylighting</th>
<th>Demand Response</th>
<th>BMS Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>An artificial maximum light output set below actual maximum light output for each space</td>
<td>Automatically turns lights down to a reduced level or off based on the amount of daylight present in a space</td>
<td>A defined temporary reduction of lighting load or load shedding in response to a request from an energy authority such as a utility or regional transmission operator</td>
<td>The data exchange for control and monitoring from a facility’s Building Management System or Energy Management System using a common protocol such as BACnet®</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Local Control</th>
<th>Multi Level Control</th>
<th>Scheduling</th>
<th>Occupancy Sensor Full OFF</th>
<th>Occupancy Sensor Partial ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual lighting controls that control all the lights in that space and requires human intervention</td>
<td>Providing additional light levels in a space beyond Full ON and Full OFF</td>
<td>Controls light levels based on facility schedule</td>
<td>Full OFF: Automatically turns the lights off within a set period of time after all occupants leave the space</td>
<td>Full ON: Automatically turns lights on to a reduced level between full ON and full OFF when occupants enter the space</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Full OFF</th>
<th>Partial ON</th>
<th>Partial OFF</th>
<th>Continuous Daylighting</th>
<th>Plug Load Control</th>
<th>Demand Response</th>
<th>BMS Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatically turns the lights off within a set period of time after all occupants leave the space</td>
<td>Automatically turns lights on to a reduced level between full ON and full OFF when occupants enter the space</td>
<td>Automatically turns lights down to a reduced level after all occupants leave the space</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Loads and Codes

The NX Distributed Intelligence system has solutions for every project type, all that’s needed is a list of loads and which energy codes are required. NX Room Controllers, in-fixture controllers, sensors and wall switch stations are selected based more on the project scope and design intent rather than on cryptic rules. Combined with an array of accessories and a native BACnet building automation interface, the system will work with other systems. It has toolsets to allow large systems to network together to control multiple buildings with one system.

### Standards & Code

#### Indoor

<table>
<thead>
<tr>
<th>Energy Codes</th>
<th>C405.2.2.3</th>
<th>9.4.1.1 (a)</th>
<th>130.1 (a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High End Trim</td>
<td>Local Control</td>
<td>Multi Level Control</td>
<td>Scheduling</td>
</tr>
</tbody>
</table>

#### Outdoor

<table>
<thead>
<tr>
<th>Energy Codes</th>
<th>C405.2.5(2)</th>
<th>9.4.1.4 (b)</th>
<th>C405.2.2.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Astronomical Timelock</td>
<td>Setback</td>
<td>Daylight OFF</td>
<td>Demand Response</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Energy Codes</th>
<th>C405.2.5(3)</th>
<th>9.4.1.4 (d)</th>
<th>C405.2.2.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outdoor</td>
<td>BMS Integration</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Energy Codes</th>
<th>C405.2.5(1)</th>
<th>9.4.1.4 (a)</th>
<th>C405.2.2.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outdoor</td>
<td>BMS Integration</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- C405.2.2.3: 2015 International Energy Conservation Construction Code
- C405.2.5(2): 2016 ASHRAE 90.1
- C405.2.5(3): Title 24 Part 6
- BACnet®
Choosing The Right System Architecture

All systems, including lighting controls, have a structure of hierarchy and topology, known as a system architecture. In commercial and industrial lighting control applications, a system architecture must be evaluated against several criteria, including security, performance, and flexibility. Most lighting control systems have a fixed structure, requiring certain devices to be a part of any system, no matter how small. Many systems also have a centralized hierarchy, where a master device commands the entire system. These rules can be difficult to understand and apply, and a new design is needed for each new project.

Most lighting control systems have a fixed structure, requiring certain devices to be a part of any system, no matter how small. System connections will be shown through the topology. Many systems also have a fixed hierarchy, such centralized, where a master device commands the entire system. These rules make most systems difficult to understand and must be redesigned project to project. The system has a wide variety of applications, while remaining flexible and easy to design with.

Distributed Network Architecture (DNA)

The NX system utilizes the Distributed Network Architecture, or DNA. Each part in the NX system always knows what its role is. This structure allows NX to scale from a single intelligent fixture to an entire building or campus using only parts needed for the task without, central processors or gateways. NX systems are flexible, easy to design with and can be used in a wide variety of applications, including education, office, industrial and outdoor venues.

Wired, Wireless and Hybrid

The NX system uses a secure wired, wireless or hybrid topology. Deployment within the topology requires using room or fixture-based controls, sensors and wall switch stations. Where the ceiling is accessible, low-voltage Cat5 cable connects the system together. When areas controlled by NX are not as accessible, wireless accessories can be added anywhere along the way. NX allows any combination of these networks. The system can be configured and managed wirelessly using the mobile App designed for both Android™ and iOS platforms.

In-Fixture or Circuit Level Control

NX systems have a strong heritage in circuit-level control using devices that switch and dim large areas at once. Unlike traditional lighting relay panels, Room Controller devices can be placed within the area they control and are wired for group control. Ceiling/wall sensors and wall switch stations provide inputs, and NX automatically configures to meet basic code requirements. In-fixture controls are the ultimate in distributed control, where each luminaire can switch and dim itself. Fixtures can include occupant and light detection, meeting most codes out of the box, without installing other devices. NX even has relay panels built on the same DNA as the other choices, allowing for multiple design paths.

NX: Best in Class Intelligent Lighting Controls System

While meeting and exceeding energy codes, NX is easy to design with, install and configure. The Distributed Network Architecture (DNA) of NX is reliable and scales for any size project. NX allows for project completion on time and budget, without wondering if the system can meet standards. Hubbell Control Solutions provides world-class service and support every step of the way, including a 5-year warranty.
Energy by Use for All Building Types

18% Other
17% Lighting
16% Ventilation
16% Refrigeration
15% Cooling
14% Computers
4% Office Equipment
3% Cooking
2% Water Heating
1% Space Heating
1% Other

1 US Energy Information Administration
https://www.eia.gov/consumption/commercial/

Energy Savings

Lighting comprises 17% of the total energy consumption in a building. While commercial lighting energy use continues to decline as a result of increased LED lighting efficacy and more stringent energy codes, there are still opportunities for energy savings. For example, additional savings can be seen through controlling plug loads and the deployment of dimmable LED luminaires controlled with occupancy or daylight sensors.

Additional HVAC Savings

Native BACnet® Integration with Building Management Systems (BMS) allows an exchange of occupancy and daylight information to help manage energy strategies and promote additional energy efficiency improvements through other building systems, such as HVAC. Integrating lighting control equipment through BACnet has the added benefit of reducing the initial equipment cost, reducing wall and ceiling clutter by eliminating the need for duplicate sensors and leveraging Hubbell Controls Solutions advanced sensor technology. Enabling BMS control of dimmable LED luminaires may represent an additional point of control which reduces the overall thermal load within a conditioned space.

Lighting Control Intent

Circuit Level vs. Fixture Level Control

Designing the right lighting control system for your application requires a few decisions to put you on the path to success. This process begins at the room level. Most of the sequence of operation can be accomplished with programming, however some flexibility is required. The number of control groups needed for the room has to be considered. A simple space with only general lighting requirements can benefit from the simplicity of a Room Controller providing circuit level control. Repeatability of spaces with identical, simple control intent is a good use for room based needs such as in hospital’s patient rooms, or school’s classrooms. Rooms with multiple lighting zones, like a classroom with windows, a white board, and the need for dimming, may be served better with an in-fixture control that uses programming instead of control wiring to group the lighting into zones. A need for re-zoning in the future, like in the case of a tenant occupied commercial office space, could also use the in-fixture control programming. With NX in-fixture solutions, all of the switching, dimming and grouping of lighting is provided by controls internal to the luminaires.

Stand-Alone Or Networked

With NX, networking becomes an option to be considered in light of additional requirements. The lighting controls operate independently regardless of a network being installed or not and regardless of the complexity of the code or control intent of an individual space. Reasons for installing a network might include the need to alter building-wide schedules on a regular basis or to integrate the lighting controls into the Building Automation System. Making the step up to a facility wide network simply requires the addition of a Network Bridge module to each room or space that is to be on the network.

Exterior Lighting Control

Connecting NX enabled outdoor luminaires wirelessly to the building controls only requires the addition of a single radio to the wired building network. Since NX uses common messaging for wired and wireless control, the interior and exterior lighting will operate seamlessly from the same browser based user interface.

[Diagram: Energy by Use for All Building Types]

[Diagram: NX DISTRIBUTED INTELLIGENCE™]
NX Lighting Control System Best Practices

Hubbell’s NX Distributed Network Architecture (DNA) uses two networks for communication and control. Each is designed to support NX’s DNA: SmartPORT™ for the local area network and HubbNET™ for the wide area network. Hubbell recommends the following parameters for best practice design:

HubbNET
Communication backbone for area control. All HubbNET devices must be daisy chained from any single HubbNET Segment port from an Area Controller
• 328 ft per daisy chained segment – Ethernet, CAT5e or better
• Up to 64 devices per HubbNET port (See last bullet)
• HubbNET is a powered network, do not connect HubbNET CAT5 cables to standard Ethernet devices. Consult factory if additional network segments are required
• Number of ports can be expanded using POE switch (see diagram)
• Total number of Hubbnet devices cannot exceed 500 per Area Controller

SmartPORT
Communication backbone for zone level control. Bridges connect HubbNET and SmartPORT layers.
• All SmartPORT devices are CAT5 daisy chain connected
• Up To 1000 ft total cable length per SmartPORT Zone Segment
• Up to 32 NX Devices per SmartPORT Zone Segment

SmartPORT Power Budgeting
Each SmartPORT connection has a PBU (Power Budget Unit). SmartPORT devices either supply power (+ PBUs) to the network or draw power from it (-PBUs). For every device this is pre-calculated from factory. See tables on pages 36-39 for PBU allocation by device. Below is a reference example for PBU calculation when designing a system.

Power Supplied | Power Consumed
--- | ---
Example 1 | +1 PBU | -1 PBU
Example 2 | +2 PBU | -1 PBU -1 PBU

Wireless Radio
Best practice indoor radio range for NXRHM-H is 100 ft. Actual range is dependent upon building construction and radio location. Best practice outdoor range is 1000 ft. Maximum outdoor range is 1000 ft based on clear line of sight.

NX Network Bridge
Wireless In-Fixture Control - Open Office
HubbNET™ Wireless

SmartPORT LINK REMAINING PBUS: +25
SmartPORT LINK REMAINING PBUS: +11
+30 PBU
+30 PBU
-1 PBU -1 PBU
-3 PBU
-3 PBU -1 PBU

Network Topology

Diagram Key
- Commercial Office
- Auxiliary Spaces
- Entrance/Parking
SpectraSync™ Color Tuning Technology enables dynamic control over the lighting of indoor spaces. Control indoor spaces based on the needs of the application, specific activities throughout the day and preferences of the occupants with three distinct SpectraSync™ Color Tuning Technologies. For additional details please click the SpectraSync™ logo above.

- **Dim to Warm**
  Dim to Warm mimics the familiar warming effect that occurs with traditional incandescent sources as they are dimmed. (Available with 2200K-3000K)

- **Tunable White**
  Tunable White offers the ability to tailor correlated color temperature (CCT) to the occupants personal preference, enhancing task visibility, material and colors and the aesthetics of the space. (Available with 2700K-5000K or 2700K-6500K)

- **Scheduled White**
  Scheduled White creates an environment that mimics the rhythm of natural light or follows an alternative user-defined schedule throughout the day, enhancing an occupant's mood and well-being. (Available with 2700K-5000K or 2700K-6500K)

When paired with SpectraSync™ enabled luminaires, NX delivers a comprehensive color control solution, simplifying setup and code compliance through self-configuration and a Bluetooth® interface with mobile application.
EDUCATION
**CONTROL INTENT**

**CLASSROOM (800 SQ FT)**  
Wired - Room Control

**SOLUTION STRATEGY**
- Use NX Room Controller for classroom

**BEST PRACTICE LAYOUT**
- Place the occupancy sensor around the middle row or section of the room
- The daylight sensor must be placed near the windows in the middle of the wall
- Place two switch stations near the door which will allow control of each zone independently by the occupants upon entering the space.

**OPERATIONAL DESCRIPTION**
- 0-10V dimming Loads
- 2 dimmable zones
- 2 daylight zones
- Auto ON to 80% upon occupancy
- Continuous daylight dimming
- Manual control - Full ON, All OFF, Scene raise/lower
- UL924 compliance via battery back-up in the luminaire
- Programming via mobile NX Device Setup App

**BILL OF MATERIALS**

<table>
<thead>
<tr>
<th>QTY.</th>
<th>Catalog #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>NXRC-2RD-UNV</td>
<td>Room Controller with 2 dimming outputs</td>
</tr>
<tr>
<td>1</td>
<td>NXOS-OMDT2</td>
<td>Occupancy sensor</td>
</tr>
<tr>
<td>1</td>
<td>NXDS</td>
<td>Daylight sensor</td>
</tr>
<tr>
<td>4</td>
<td>NXSW-ORLO*</td>
<td>ORLO Specialty Switch</td>
</tr>
<tr>
<td>12</td>
<td>LCAT24-35MLG-EDU1</td>
<td>2x4 LCAT LED Troffers</td>
</tr>
</tbody>
</table>

*This switch is acting as the partition switch*

**MULTIPURPOSE ROOM (1200 SQ FT)**  
Wired - Room Control

**SOLUTION STRATEGY**
- Use NX Room Controller for multipurpose room

**BEST PRACTICE LAYOUT**
- Place 1 occupancy sensor in the corner of each partition space
- Place the scene button stations by the doors
- Each partitioned space must be set up identically

**OPERATIONAL DESCRIPTION**
- 0-10V dimming Loads
- 4 dimmable zones
- Auto ON to 80% upon occupancy
- Manual control - Full ON, All OFF, Scene raise/lower
- UL924 compliance via battery back-up
- Room can divide into two rooms with 2 dimmable zones each or combine into a single room with 4 dimmable zones
- Room combine to be done with manual switch operation
- All programming via mobile NX Device Setup App (including partitioning)

**BILL OF MATERIALS**

<table>
<thead>
<tr>
<th>QTY.</th>
<th>Catalog #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>NXRC-2RD-UNV</td>
<td>Room Controller with 2 dimming outputs</td>
</tr>
<tr>
<td>2</td>
<td>NXOS-LODT</td>
<td>Occupancy sensor</td>
</tr>
<tr>
<td>2</td>
<td>NXSW-SS</td>
<td>6 button scene station</td>
</tr>
<tr>
<td>12</td>
<td>LCAT24-35MLG-EDU1</td>
<td>2x4 LCAT LED Troffers</td>
</tr>
<tr>
<td>2</td>
<td>NXHB2</td>
<td>NX Bridge</td>
</tr>
<tr>
<td>1</td>
<td>NXSW-1</td>
<td>1 button switch station</td>
</tr>
</tbody>
</table>

*The partition scheme shown above is “Manual controlled partitioning.” For automatic, refer to WSPS - Partitioning sensor in Appendix*

Note: Drawings not shown to scale and do not reflect actual quantity of fixtures in shown space.
**SOLUTION STRATEGY**
- Manual ON/OFF control
- Use NX wireless enabled fixtures throughout the space including the outdoor areas to reduce installation complexity

**BEST PRACTICE LAYOUT**
- Connect both wall switch stations to the room controller
- Install 2 button wall switch stations near the door to control all lights
- Tie the room controller to the rest of the space using the radio module
- For outdoor space, use NX enabled outdoor fixtures integrated with NXOFMs

**OPERATIONAL DESCRIPTION**
- 2 daylight zones, sensors are integral to fixtures
- 3 Schedule Presets (weekday, weekend, holidays)
- Manual control via 2 button wall stations
- Schedule outdoor lighting
- Auto ON to 50% upon occupancy (indoor only)
- Daylight dimming
- Programmable by Area Controller
- UL924 compliance via battery back-up

**BILL OF MATERIALS**

<table>
<thead>
<tr>
<th>QTY</th>
<th>Catalog #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td>PEL2-5MIN-FPW-EDU-NXSW</td>
<td>Peloton High Bay Fixture with NX wireless</td>
</tr>
<tr>
<td>1</td>
<td>NXRC2-1RD-UNV</td>
<td>Single zone room controller</td>
</tr>
<tr>
<td>8</td>
<td>AL-D 36L-40 3K4X4 UNV PCR-TT</td>
<td>Alpha Outdoor Fixtures with Photocontrol - Twist Lock® Cell</td>
</tr>
<tr>
<td>8</td>
<td>NXOFM-1R1D-UNV</td>
<td>On-fixture module</td>
</tr>
<tr>
<td>1</td>
<td>SCLNX</td>
<td>PIR outdoor sensor in the fixture</td>
</tr>
<tr>
<td>2</td>
<td>NXSW-2</td>
<td>2 button switch station</td>
</tr>
<tr>
<td>1</td>
<td>NXRM-H</td>
<td>Radio module</td>
</tr>
<tr>
<td>2</td>
<td>NXSW-SS</td>
<td>6 presets scene station</td>
</tr>
</tbody>
</table>

---

**SOLUTION STRATEGY**
- Use NX wired, SpectraSync enabled LCAT LED Troffers for color tuning and code compliance

**BEST PRACTICE LAYOUT**
- Use a dedicated wall station for color tuning control
- Deploy a simple ON/OFF switch to turn all lights ON/OFF for non-working hours
- Place the CCT wall station near the white board and the ON/OFF switch near the door

**OPERATIONAL DESCRIPTION**
- 0-10V dimming loads
- 1 daylight zone (teacher station)
- 4 dimmable zones (3 general lighting and 1 teacher station)
- Daylight dimming
- Master manual ON/OFF control at door
- Tunable white, preset scene control at door
- Tunable white scene, Art Learning, Teacher Presentation, Art Fun and Nap
- Auto ON to 50% upon occupancy
- Programming via NX Device Setup App
- UL924 compliance via battery back-up

**BILL OF MATERIALS**

<table>
<thead>
<tr>
<th>QTY</th>
<th>Catalog #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>LCAT24-2.75TMLG-EDU-NXES</td>
<td>LCAT LED troffer, NX and SpectraSync enabled</td>
</tr>
<tr>
<td>1</td>
<td>NXSW-DD-GH</td>
<td>Specialty ON/OFF switch</td>
</tr>
<tr>
<td>1</td>
<td>NXSW-CCT-WH</td>
<td>Color tuning wall station</td>
</tr>
</tbody>
</table>
PRIVATE OFFICE (120 SQ FT)

**SOLUTION STRATEGY**
- Auto ON to 50% upon occupancy
- Programming via NX Device Setup App

**OPERATIONAL DESCRIPTION**
- Auto ON to 50% upon occupancy
- Manual control - ON/Raise/Lower/OFF
- UL924 compliance via battery backup
- Programming via NX Device Setup App

**BILL OF MATERIALS**

<table>
<thead>
<tr>
<th>QTY.</th>
<th>Catalog #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>LCAT24-35MLG-EDU-NXES</td>
<td>LCAT LED Troffers (with NXES Control option)</td>
</tr>
<tr>
<td>1</td>
<td>NXSW-ORLO</td>
<td>ORLO Specialty Switch</td>
</tr>
</tbody>
</table>

Note: Drawings not drawn to scale and do not reflect actual quantity of fixtures in shown space

**CONTROL INTENT**

**CONFERNECE ROOM (1,100 SQ FT)**

**SOLUTION STRATEGY**
- Use Prescolite downlights and Litecontrol fixtures (for architectural effect) in the conference room (along with LCAT family troffers)
- All fixtures come NX Enabled (wired option) - for ease of future reconfiguration and centralized control
- Where possible, utilize the dim to OFF drivers to reduce total installed cost per fixture

**BEST PRACTICE LAYOUT**
- Place the NXAVM module close to the audio/visual control equipment (50 ft or less)
- Place the scene button station near the entry door
- Recommend using scene switch stations whenever deploying dim to OFF fixtures

**OPERATIONAL DESCRIPTION**
- Auto ON to 50% upon occupancy
- Scene selection in conference room
- Audio/visual integration
- UL924 compliance via battery backup
- Add 1 daylight zone

**BILL OF MATERIALS**

<table>
<thead>
<tr>
<th>QTY.</th>
<th>Catalog #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>LT4S1D1M1NXE-4L-FL1-120-65K8WNT</td>
<td>Prescolite Downlights (with NXES control option)</td>
</tr>
<tr>
<td>1</td>
<td>3L-R-D-4-5-SOF-C-35K-D600-D00-1C-UNV-W1-NXES**</td>
<td>Litecontrol Recessed Linear (wired option) with NXES control option</td>
</tr>
<tr>
<td>11</td>
<td>LCAT24-35MLG-EDU-NXES**</td>
<td>Columbia Recessed Troffers (with NXES control option)</td>
</tr>
<tr>
<td>1</td>
<td>NXSW-SS</td>
<td>Scene switch</td>
</tr>
<tr>
<td>1</td>
<td>NXHBH2</td>
<td>NX bridge</td>
</tr>
<tr>
<td>1</td>
<td>NXAVM</td>
<td>Audio/visual interface</td>
</tr>
</tbody>
</table>

**NOTE:** Uses a dim to off driver
**CONTROL INTENT**

**SOLUTION STRATEGY**
- Use NX in-fixture wired for the indoor spaces (each fixture becomes individually addressable for ease of reconfiguration in future)
- Tie all zones and areas together with an Area Controller that will act as one common user interface
- The bridge and NXRM-H radio module, joins the parking lot and outdoor areas to the indoor areas
- Hubbell Outdoor Ratio fixtures integrated with NX wireless, for parking lot
- All indoor fixtures have standard 0-10V drivers. Outdoor fixtures are dim to OFF

**BEST PRACTICE LAYOUT**
- Place the bridge and radio module within 100 ft or less, of at least one wireless device
- Do not exceed 32 fixtures per bridge
- A bridge is required for every 32 fixtures wrap within a zone
- Add additional bridge for extending the zone beyond 32 fixtures

**OPERATIONAL DESCRIPTION**
- Auto ON to 50% upon occupancy
- Continuous daylight dimming (Common Office Area)
- Manual control - ON/RAISE/LOW/OFF
- Weekday, holiday and weekend schedule for all indoor
- Holiday schedule for outdoor parking
- UL924 compliance via battery backup
- Programming via area controller

**WIRELESS CONNECTION**
- Place the bridge and radio module within 100 ft or less, of at least one wireless device
- Do not exceed 32 fixtures per bridge
- A bridge is required for every 32 fixtures wrap within a zone
- Add additional bridge for extending the zone beyond 32 fixtures

**BILL OF MATERIALS**

<table>
<thead>
<tr>
<th>QTY</th>
<th>Catalog #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>63</td>
<td>LCAT24-15M - EDU - NIES</td>
<td>LCAT LED Troffers (with NIES Control option)</td>
</tr>
<tr>
<td>12</td>
<td>RAR2-320L-110-3K4-3K7-3-UNV-A4-DB-NXWE</td>
<td>Ratio area/site luminaire</td>
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<tr>
<td>12</td>
<td>NOXFMR-1R4-UNV</td>
<td>7-pin On-Fixture wireless control module for use with outdoor fixtures</td>
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<tr>
<td>1</td>
<td>NXAC</td>
<td>NX Area Controller</td>
</tr>
<tr>
<td>8</td>
<td>NSW- ORLO</td>
<td>ORLO Specialty Switch</td>
</tr>
<tr>
<td>4</td>
<td>NOHBN2</td>
<td>NX Bridge</td>
</tr>
<tr>
<td>1</td>
<td>NOXRM-H</td>
<td>Radio module</td>
</tr>
<tr>
<td>1</td>
<td>NXXP*</td>
<td>SmartPORT™ module</td>
</tr>
<tr>
<td>1</td>
<td>NOXDI*</td>
<td>Network Interface module</td>
</tr>
</tbody>
</table>

*Also requires a power supply and an enclosure where these need to be mounted, please refer to the NHXDI spec sheet for details

**NOTES:**
1. Each bridge can connect only up to 32 fixtures
2. The bridges are self powered from the HubbNET
3. The radio attached to the bridge needs to be powered separately as a UVPP is used here
PARKING LOTS AND DECKS
CONTROL INTENT

SOLUTION STRATEGY
- Use NX wireless enabled fixtures with photocell for top deck of parking garage
- Use NX wireless fixtures with integrated sensors for parking stalls and driving aisles
- NX wireless enabled fixtures for entry and exit, and stairwell areas
- Programming via Area Controller

BEST PRACTICE LAYOUT
- For the interior floor parking aisles, group every two luminaires together to ensure better sensor coverage when an occupant walks by
- Tie all areas together over NX wireless network
- Install bridge with the radio module within 100 ft of at least one fixture
- Ensure that every wireless fixture less than 100 ft from the next wireless fixture

OPERATIONAL DESCRIPTION
- Multi-zone daylight harvesting for exterior walls
- Full ON to 100% upon occupancy
- Dim to 50% upon vacancy
- Dusk to dawn photo ON/OFF/dim for top deck

BILL OF MATERIALS

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<th>Catalog #</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>12</td>
<td>VPS/30NB-70/5K/T4/UNIV/7PR-TL/BT</td>
<td>Small Viper fixtures, black finish, with 7-pin receptacle (no control, ordered separately)</td>
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<tr>
<td>12</td>
<td>NXOFM-1RD-UNV</td>
<td>On-fixture module, daylight harvesting, scheduled dimming</td>
</tr>
<tr>
<td>33</td>
<td>ARS-24LSK-070-SM-U8L-NXSW</td>
<td>Arceos garage light fixtures with NX wireless control option with smart sensor</td>
</tr>
<tr>
<td>1</td>
<td>NXHBN2</td>
<td>NX Bridge</td>
</tr>
<tr>
<td>1</td>
<td>NXRM-H</td>
<td>NX Radio Module</td>
</tr>
<tr>
<td>3</td>
<td>ESL4-35HL-FAW-EDU-NXOS</td>
<td>Escalate stairwell fixture with NX OMNI, PIR occupancy sensor, dimming daylight harvesting</td>
</tr>
<tr>
<td>1</td>
<td>NXAC-120</td>
<td>Area Controller</td>
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</table>

Note: Drawings not drawn to scale and do not reflect actual quantity of fixtures in shown space.
Storage Aisles - High Activity
- 50% dim after no vacancy, 100% upon occupancy

Storage Aisles - Low Activity
- 100% upon occupancy, OFF when vacant after 20-minute timeout
- Scheduled OFF on holidays and non-operational days

Daylit Workstations
- 100% upon occupancy, OFF when vacant after 20-minute timeout
- Daylight based control

SOLUTION STRATEGY
- Deploy Hubbell’s Peloton high bay fixtures with high mount integrated sensors
- Include the wireless option for individual fixture control and ease of installation
- With no wiring involved, it’s the most hassle-free way of achieving out of the box code compliance in a challenging space

BEST PRACTICE LAYOUT
- Place majority of luminaires with emergency backup fixtures in the high activity storage aisle area and workstation areas
- Take advantage of any natural light available

OPERATIONAL DESCRIPTION
- UL924 via battery backup on select emergency fixtures
- Fixtures to be pre-configured with industrial commissioning profile
- Any additional programming via mobile App
- Zone based control limited to 2 aisle sensors per group for enhanced coverage upon occupancy

BILL OF MATERIALS

<table>
<thead>
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<td>96</td>
<td>PEL4-40MM-N-EDU-NXSPWH</td>
<td>Peloton High Bay Fixture with NX Wireless</td>
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<tr>
<td>12</td>
<td>PEL4-40MM-N-ELL14-EDU-NXSPWH</td>
<td>Peloton High Bay Fixture with NX wireless and emergency backup, 10W</td>
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</tbody>
</table>

WAREHOUSE (25,000 SQ FT)

Wireless - In-fixture Control
APPENDIX
**APPENDIX**

**NX System Components and Accessories**

**For additional resources view our NX In-Fixture Selection Guide**

### Catalog No. | Descriptor | Colors
--- | --- | ---
**Area Controllers**
NXAC-125 | NX Area Controller, NEMA, 1, HubNet®, BACnet, 120 volt | Gray

**Network Bridges**
NXP8B2 | NX network bridge module | Blue

**Room Controllers**
NXRC-10-03A | NX Room Controller, 1 relay, universal voltage (120-347VAC) | Blue
NXRC-20-03A | NX Room Controller, 2 relays, universal voltage (120-347VAC) | Blue
NXRC-2-100 | NX Room Controller, 1 relay, 0-10V, 300 mA, power monitoring, universal voltage (120-347VAC) | Blue
NXRC-2-150 | NX Room Controller, 2 relays, 0-10V, power monitoring, universal voltage (120-347VAC) | Blue

**Lighting Control Panels**
NXP8B2-0413L-S | NX lighting control panel, 120/277VAC input, 8 relay capacity, 8-30A /1P latching relays, surface mount | Gray
NXP8B2-1013L-S | NX lighting control panel, 120/277VAC input, 16 relay capacity, 16-30A /1P latching relays, 8 relay spaces, surface mount | Gray
NXP8B2-2013L-S | NX lighting control panel, 120/277VAC input, 24 relay capacity, 24-30A /1P latching relays, 8 relay spaces, surface mount | Gray
NXP8B2-3213L-S | NX lighting control panel, 120/277VAC input, 32 relay capacity, 32-30A /1P latching relays, 8 relay spaces, surface mount | Gray
NXP8B2-4813L-S | NX lighting control panel, 120/277VAC input, 48 relay capacity, 48-30A /1P latching relays, 8 relay spaces, surface mount | Gray
NXP8B2-6413L-S | NX lighting control panel, 120/277VAC input, 64 relay capacity, 64-30A /1P latching relays, 8 relay spaces, surface mount | Gray
NXP8B2-1016L-S | NX lighting control panel, 120/277VAC input, 16 relay capacity, 16-10A /1P latching relays, surface mount | Gray
NXP8B2-2016L-S | NX lighting control panel, 120/277VAC input, 24 relay capacity, 24-10A /1P latching relays, surface mount | Gray
NXP8B2-3216L-S | NX lighting control panel, 120/277VAC input, 32 relay capacity, 32-10A /1P latching relays, surface mount | Gray
NXP8B2-4816L-S | NX lighting control panel, 120/277VAC input, 48 relay capacity, 48-10A /1P latching relays, surface mount | Gray
NXP8B2-6416L-S | NX lighting control panel, 120/277VAC input, 64 relay capacity, 64-10A /1P latching relays, surface mount | Gray
NXP8B2-1018L-S | NX lighting control panel, 120/277VAC input, 16 relay capacity, 16-10A /1P latching relays, 8 relay spaces, surface mount | Gray
NXP8B2-2018L-S | NX lighting control panel, 120/277VAC input, 24 relay capacity, 24-10A /1P latching relays, 8 relay spaces, surface mount | Gray
NXP8B2-3218L-S | NX lighting control panel, 120/277VAC input, 32 relay capacity, 32-10A /1P latching relays, 8 relay spaces, surface mount | Gray
NXP8B2-4818L-S | NX lighting control panel, 120/277VAC input, 48 relay capacity, 48-10A /1P latching relays, 8 relay spaces, surface mount | Gray
NXP8B2-6418L-S | NX lighting control panel, 120/277VAC input, 64 relay capacity, 64-10A /1P latching relays, 8 relay spaces, surface mount | Gray

**Vacancy Sensors**
NAPS-04127 | Ceiling mount, PIR and Ultrasonic, 2000 sq ft | White
NAPS-04125 | Ceiling mount, PIR and Ultrasonic, 300 sq ft, Form C relay | White
NAPS-04123 | Ceiling mount, PIR and Ultrasonic, 180 sq ft, Form C relay | White
NAPS-04121 | Ceiling mount, PIR and Ultrasonic, 100 sq ft, Form C relay | White
NAPS-04120 | Ceiling mount, BACnet, 3000 sq ft | White
NAPS-04128 | Ceiling mount, Ultrasonic, 2000 sq ft | White
NAPS-04129 | Ceiling mount, Ultrasonic, 1500 sq ft | White
NAPS-04130 | Ceiling mount, Ultrasonic, 1800 sq ft | White
NAPS-04131 | Ceiling mount, Ultrasonic, 1800 sq ft, Form C relay | White
NAPS-04132 | Ceiling mount, Ultrasonic, 1200 sq ft | White
NAPS-04133 | Ceiling mount, Ultrasonic, 600 sq ft | White
NAPS-04134 | Ceiling mount, Ultrasonic, 2000 sq ft, Form C relay | White
### NX System Components and Accessories (continued)

#### Daylight Sensors
- **NXDG**: NX legacy daylight sensor
- **NXDG-D**: NX legacy daylight sensor, outdoor

#### Switches
- **NXSW-BT**: NX digital single switch, 1 button, momentary, pilot
- **NXSW-2BT**: NX digital single switch, 2 buttons, momentary, pilot
- **NXSW-3BT**: NX digital single switch, 3 buttons, momentary, pilot
- **NXSW-4BT**: NX digital single switch, 4 buttons, momentary, pilot
- **NXSW-5BT**: NX digital single switch, 5 buttons, momentary, pilot
- **NXSW-AC**: NX digital single switch, 2 buttons, raise/lower
- **NXSW-O**: NX digital single switch, pilot ON
- **NXSW-L**: NX digital single switch, pilot Lower
- **NXSW-TL**: NX digital single switch, pilot ON/Lower
- **NXSW-LT**: NX digital single switch, pilot ON/Lower
- **NXSW-AC**: NX digital single switch, pilot raise/lower
- **NXSW-C**: NX digital single switch, 2 buttons, momentary, pilot
- **NXSW-D**: NX digital single switch, 3 buttons, momentary, pilot
- **NXSW-P**: NX digital single switch, 4 buttons, momentary, pilot
- **NXSW-TP**: NX digital single switch, 5 buttons, momentary, pilot

#### NXWPS Wall position sensor module, with reflector
- **NXWPS-100**: NXWPS wall position sensor module, with reflector, 100" offset to NX

#### NX In-Fixture Cables
- **CAT5-100F-OR-PLENUM**: CAT5 cable for NX SmartPORT devices, plenum rated, 100ft, Orange
- **CAT5-50F-OR-PLENUM**: CAT5 cable for NX SmartPORT devices, plenum rated, 50ft, Orange
- **CAT5-25F-OR-PLENUM**: CAT5 cable for NX SmartPORT devices, plenum rated, 25ft, Orange
- **CAT5-10F-OR-PLENUM**: CAT5 cable for NX SmartPORT devices, plenum rated, 10ft, Orange
- **CAT5-3F-OR-PLENUM**: CAT5 cable for NX SmartPORT devices, plenum rated, 3ft, Orange

#### NX In-Fixture Options Selection Guide

<table>
<thead>
<tr>
<th>Catalog No.</th>
<th>Descriptor</th>
<th>Classification</th>
<th>Networkable</th>
<th>Occupancy</th>
<th>Daylight Harvesting</th>
<th>0-10V Dimming</th>
<th>ON/OFF Control</th>
<th>Bluetooth App Programming</th>
</tr>
</thead>
<tbody>
<tr>
<td>NXS</td>
<td>Indoor</td>
<td>Standalone</td>
<td>No</td>
<td>Yes</td>
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**Part numbers are hyperlinked to Specifications Sheets or Product Family page online**

### NX In-Fixture Options Selection Guide

<table>
<thead>
<tr>
<th>NX Option</th>
<th>Application</th>
<th>Category</th>
<th>Networkable</th>
<th>Scheduling</th>
<th>Occupancy</th>
<th>Daylight Harvesting</th>
<th>0-10V Dimming</th>
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**Part numbers are hyperlinked to Specifications Sheets or Product Family page online**

**Catalog No.**
- NXS
- NXSOS
- NXSPO
- NXSPOF
- NXSPOFH
- NXSPOFHL
- NXSPOFLL
- NXSPOFLLH
- NXSPOFLLHL

**Descriptor**
- NX digital switch
- NX digital single switch
- NX digital single switch, pilot ON
- NX digital single switch, pilot Lower
- NX digital single switch, pilot ON/Lower
- NX digital single switch, pilot ON/Lower
- NX digital single switch, pilot raise/lower
- NX digital single switch, 2 buttons, raise/lower
- NX digital single switch, 3 buttons, raise/lower

**Classification**
- Indoor
- Indoor/Outdoor
- Outdoor

**Networkable**
- Yes
- No

**Occupancy**
- Yes
- No

**Daylight Harvesting**
- Yes
- No

**0-10V Dimming**
- Yes
- No

**ON/OFF control**
- Yes
- No

**Bluetooth App Programming**
- Requires a NXBTC

**Harvesting**
- Wired
- Wireless

**Dimming**
- 0-10V

**Control**
- Bluetooth

**App**
- Programming

**See page 41 for more information on NX In-Fixture Options Selection Guide.**
Our Experience
Hubbell Control Solutions offers customers a wide variety of services, a wealth of field experience and the highest quality products. We are committed to the same level of quality when providing services including layouts, training and system start-ups to our customers.

Solutions
From the first contact through the final system adjustment, Hubbell Control Solutions Technical Sales and Service personnel adhere to the highest level of professionalism and responsiveness. Because we value our customers so highly, we ensure that they receive full corporate support throughout every phase of a sale. Our service organization offers the convenience of a variety of services: on-site troubleshooting, maintenance contracts for periodic system checks, on-site start up and check out to maximize system performance.

Service & Support capabilities:
- Sensor Layout and Tuning
- Onsite Startup
- Telephone Startup
- Onsite Performance-Verification Walkthrough
- Customer-Site Solution Training
- Onsite Support
- Remote Diagnostics
- Onsite Programming

Phone and Online Support
While it is our goal to provide you with intelligent, simple and scalable control solutions, customer experience level and project complexity may necessitate additional support during the design development, construction and post-occupancy stages of a project.

The Hubbell Control Solutions support team is available for consultation to evaluate multiple control scenarios to identify the ideal lighting control device or system to meet energy code requirement and customer criteria. Additionally, our team of friendly and experienced professionals is enabled to assist on-site personnel, such as installation contractors, 3rd party integrators, certified field technicians and facilities personnel, to quickly resolve issues and provide additional support.

Technical Service Center:
(800) 888-8006

Design Service
Our team of lighting control system design professionals are available to provide sensor layouts, networked system design services and 3rd party integration support for new and retrofit projects. Our goal is to provide you with on-time and accurate delivery of design deliverables optimized for your specific application, compliant with local building codes and project specifications.

On-site Support
Hubbell Control Solutions offers on-site support service to ensure your project goes smoothly. While Hubbell Control Solutions products are designed with simplicity in mind, some projects may benefit from a Certified Field Technician (CFT) to perform an on-site pre-installation walk-through, after-hours and remote startup assistance, occupant training, sensor tuning, preset programming and other pre/post-occupancy services.