

TOTAL CONTROL



DESIGNING

IN AN

ERA OF CHANGE

Managing energy performance is an increasing challenge in the face of new market forces

Evolving Energy Codes

Codes are evolving from prescriptive to performance-based, requiring a greater understanding of available control solutions. Multi-level requirements will result in a sea-change from switching to dimming solutions. Requirements for reporting, documentation and demand response signal the need for intelligent solutions networked for single seat control and monitoring.

Transformative Lighting Technology

Mainstream adoption of solid state lighting has added a new level of complexity to system design. Dimming LEDs requires careful coordination of lamps, drivers and controls to ensure proper performance.

High Performance Buildings

New holistic design and operating tools are helping building owners achieve their goals of reducing operating and maintenance costs over the lifecycle of the building, while enhancing everyday work lifestyles. Increasingly projects will benefit from strategies including Building Information Modeling (BIM) as well as integrated building systems that address the key attributes of performance: sustainability, cost-effectiveness, safety and security, productivity and functionality.



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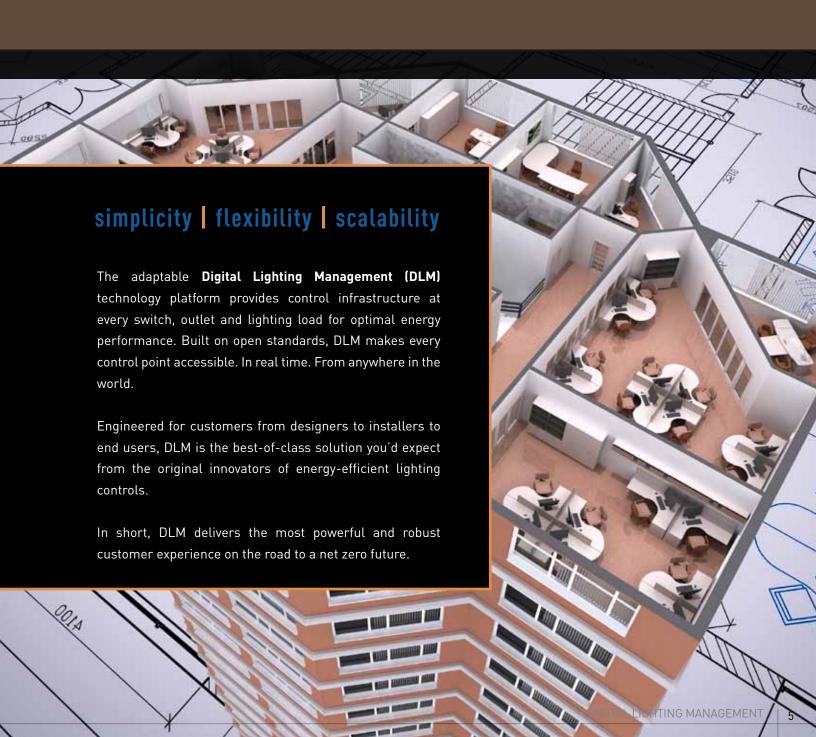
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LIGHTING LOAD TOTAL CONTROL

DIGITAL LIGHTING MANAGEMENT



THE ULTIMATE SOLUTION, TODAY AND TOMORROW

SIMPLICITY...

Less is more. DLM makes it simple to optimize energy performance and meet the latest code requirements.

- fewer essential components for easy specification in any type of space
- plug-together devices and free topology for effortless wiring
- out-of-the-box code compliance with patented Plug n' Go™ automatic configuration
- intuitive user interfaces and convenient remote management options

iPrep Academy

Fast-track retrofit project implemented LED lighting upgrade + DLM controls in classrooms, offices, restrooms and lounges. Installed and operational two weeks after specification.

"I've installed a lot of different lighting controls over the years, and DLM was the easiest. The wiring is extremely simple and Plug n' Go automatic configuration is a real time saver."

Guillermo Lugo, Head Electrician iPrep Academy Miami-Dade Unified School District



FLEXIBILITY...

It's hard to anticipate everything you might need for each control solution. DLM lets you tune each space to meet occupant needs, and expand or transform your lighting control systems in the future.

- building block architecture for design and installation freedom
- Push n' LearnTM personalization for simple to complex control sequences of operation without premium pricing
- easy integration with other systems including A/V, motorized shades and HVAC

SCALABILITY...

Supporting the drive toward a net zero future, DLM scales up to accommodate whole buildings or campuses designed for the highest levels of energy performance.

- single point of connection per room for centralized maintenance and reduced cost of ownership
- intelligent monitoring capabilities to verify performance
- integration with building automation systems (BAS) using open standards
- capable of smart grid integration with the peace of mind provided by enterprise-grade IT security

Adobe Systems, Inc.

Building-wide sustainability measures, including integrating DLM occupancy + daylighting controls with HVAC and building management systems, put Adobe's San Jose headquarters in the top percentile of energy efficiency in the U.S.

"An array of submeters and other points are continuously monitored through the sensors to HVAC to reduce heating or cooling empty conference rooms alone



BOTTOM UP CONTROL SOLUTIONS

Room Solutions

Whether you want code compliance or LEED certification, simply plug together your choice of components for autonomous, distributed control in each room.

In offices, conference rooms, classrooms, or hospital rooms, let room controllers, occupancy sensors, daylighting sensors, and wall switches work together automatically to coordinate control of lighting and plug loads.

Add convenience with sophisticated personalized sequences of operation, or by integrating AV and motorized shade control, or partition controls.



Area Solutions

For larger spaces, from open offices, to lobbies, to gymnasiums, or warehouses, start with your choice of room controllers or lighting control panels.

For panel controlled spaces, plug in sensors and switches to reap the benefits of both time-based and more nuanced control strategies.



Whole Building Solutions

Connect already functional room and area solutions via a network to monitor energy use and adjust control sequences from a central location.

Harness open source BACnet and Niagara connectivity to integrate any sized network with a building automation system (BAS) delivering data and control from a common interface. Employ strategies from occupancy-based HVAC setbacks to granular override operations for monitoring, scheduling and control.



CONTROL STRATEGIES FOR SUPERIOR ENERGY PERFORMANCE MANAGEMENT

CONTROL STRATEGY	ROOM	AREA	WHOLE BLDG
ON/OFF On/off Switching Relays controlled by occupancy sensors, daylighting sensors, scheduling and/or personal controls turn lighting on when it is needed and off at other times to save energy	•	•	•
Dimming/Multi-level Control Manages energy by adjusting the lighting level, or recalling lighting scenes, in response to occupancy, daylight contribution, scheduling and/or personal controls	•	•	•
High End Trim Reduces the maximum light level for energy savings when the lighting is on	•	•	•
Plug Load Control Turns off task lighting and devices plugged in to selected outlets after hours or when an area is vacant	•	•	•
Occupancy-based Control Turns lighting off when an area is vacant using passive infrared (PIR), ultrasonic or dual technology sensors.	•	•	•
Daylighting Control Manages the electric light level as the daylight contribution changes	•	•	•
Personal Control Saves energy through manual-on and auto-on to 50% control strategies that keep lights off, or at reduced levels, until needed	•	•	•
Shade Control Adjusts motorized shades to reduce glare and minimize thermal gain	•	•	•

CONTROL ST	RATEGY	ROOM	AREA	WHOLE BLDG
	AV Integration Allows third party systems to command DLM, and enables coordination of A/V, touch screens, shading and lighting controls	•	•	•
	Scheduling Saves energy by establishing time-based normal hours and after hours behaviors and sequences of operation	•	•	•
720	Contact Closure Integration Communicates occupancy status to HVAC and enables third party inputs for efficient operation	•	•	•
422 T	Power Monitoring Provides fast, affordable access to lighting and plug load energy use with per occupant granularity	•	•	•
⊕ BACnet	BACnet Integration Provides thousands of lighting control data points for monitoring and scheduling	•	•	•
	Remote Device Configuration Makes it easier to fine tune settings including sensitivity and time delay to maximize energy savings			•
赛]	Demand Response Dims lighting or turns off selected electrical loads in response to utility requests to minimize peak loads			•
	Web Browser-based Control Manage from anywhere, on- or off-site, using standard web browser-based user interface			•
Powered by 12 Po	Advanced Integration and Customization Ultimate native control of data points and additional DLM parameters built on the Niagara framework.			•

DESIGNING A ROOM OR AREA SOLUTION

Choose DLM building blocks, starting with a foundation of distributed room controllers or centralized lighting control panels. Plug the devices together via free-topology Cat 5 networks, and enjoy the simplicity of Plug n' Go automatic configuration. Push n' Learn gives you the flexibility to create sophisticated sequences of operation without expensive customization. If project objectives reach beyond code compliance to higher levels of energy performance, DLM offers easy scalability (see pages 22-23).

STEP 1

Select Load Control Devices

- Identify load types and control preferences:
 - Lighting and plug loads
 - Switched and dimmed loads
 - Emergency loads
 - Distributed and centralized circuiting
 - Current monitoring capability
 - Scheduling capability





Select room controllers, plug load controllers and panels.

STEP 2

Select Occupancy Sensor

- Identify space type and occupancy characteristics:
 - Size and purpose of space
 - Partitions or obstructions
 - Mounting height and location
 - Line of sight to movement
 - Small or large movements
 - Integral control buttons



Select PIR, ultrasonic or dual technology and wall switch, wall mount or ceiling form factor.

STEP 3

Select Personal Controls

- Identify occupant control requirements:
 - Load control
 - Dimming control
 - Scene control
 - Wall mounted or handheld control
 - Manual partition control



Select switches and remotes, and specify button functions and sequences of operation. Customize switch color and button engraving in the field.

STEP 4

Select Daylighting Sensor

- Identify space type and daylight characteristics:
 - Side lighting or top lighting
 - Size of daylit area
 - One or more zones



Select single-zone dual-loop or closed-loop sensor, or multi-zone open loop sensor. Confirm that load control selections (step 1) support preferred on/off, bi-level, tri-level or continuous dimming operation.

STEP 5

Select Interfaces

- Identify network connectivity and third party interface requirements:
 - BACnet connectivity for room or for networking
 - Contact closure inputs or output
 - RS-232 communications
 - Analog photocell interface
 - Automatic partition control



Select network bridge module to add BACnet connectivity and additional interfaces if needed.



Select Accessories & Configuration Tools

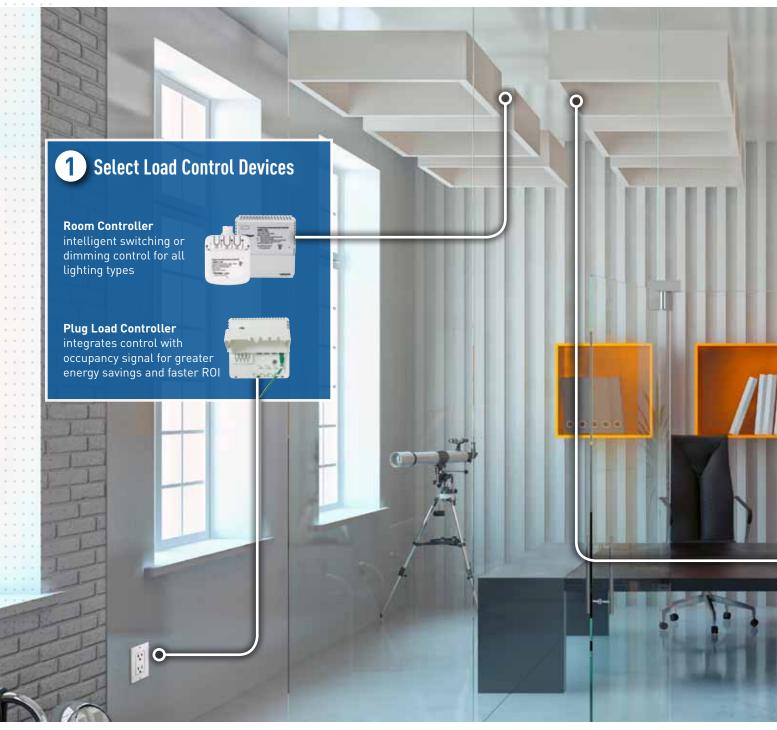
- Consider installation and configuration requirements:
 - Cable lengths
 - Splitters and couplers
 - IR port locations
 - Wireless handheld configuration tool



Use pre-configured cables for reliability and enjoy ladder free configuration.

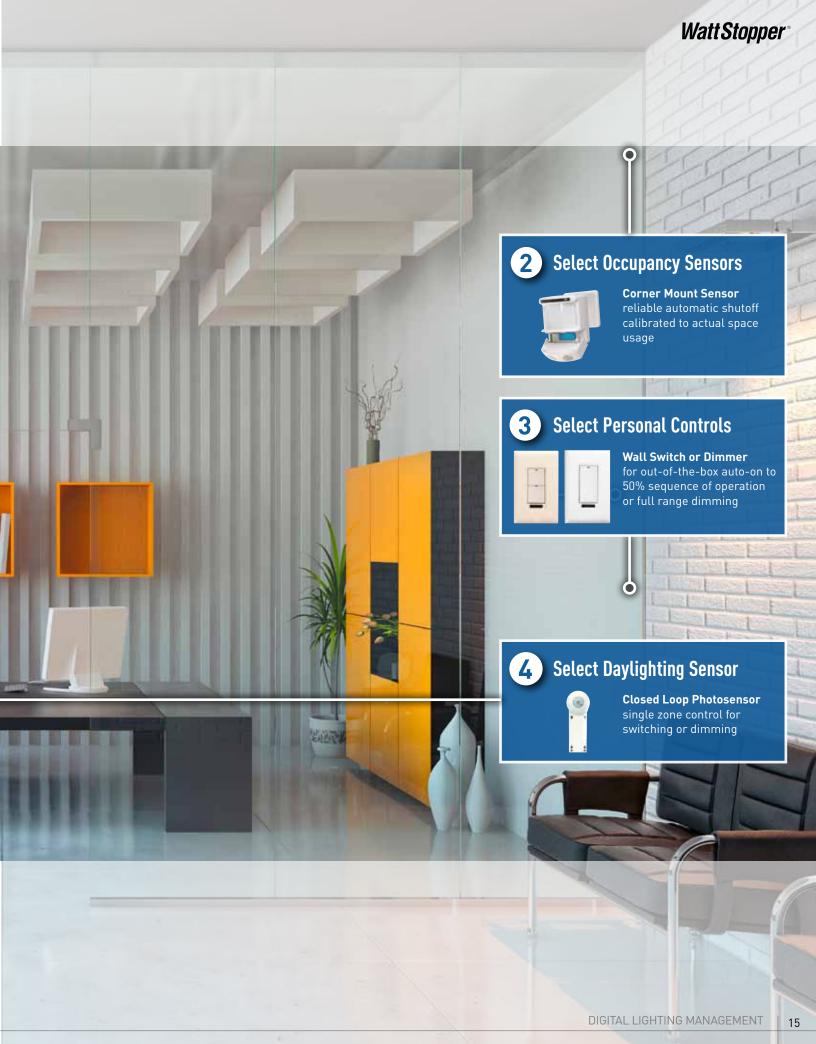
ROOM SOLUTIONS

for code compliance



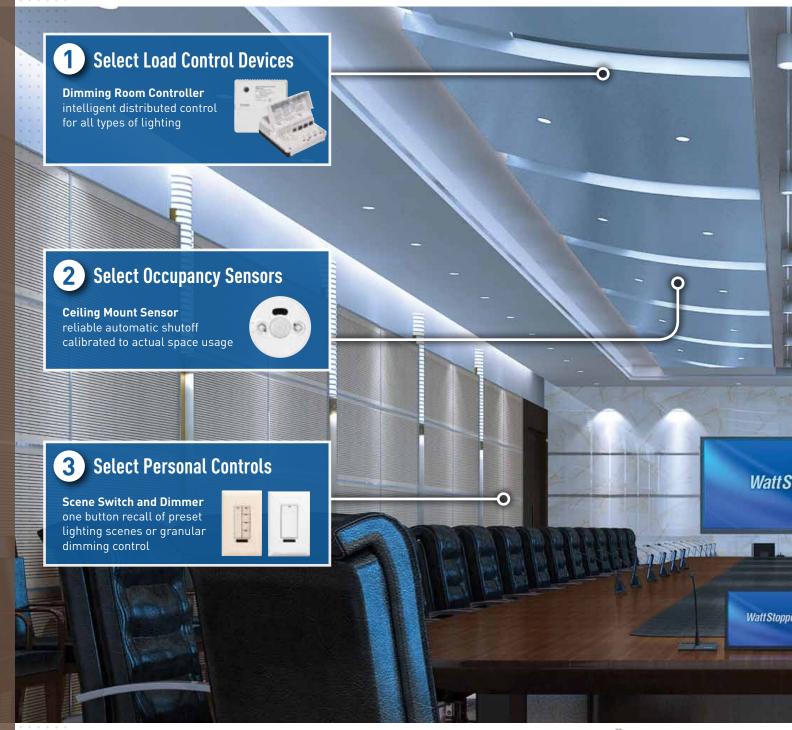
Get out-of-the-box code compliance. Plug n' Go automatic sequence of operation + default occupancy sensor parameters + automatic daylighting sensor calibration and configuration means simplicity, savings and accelerated payback.





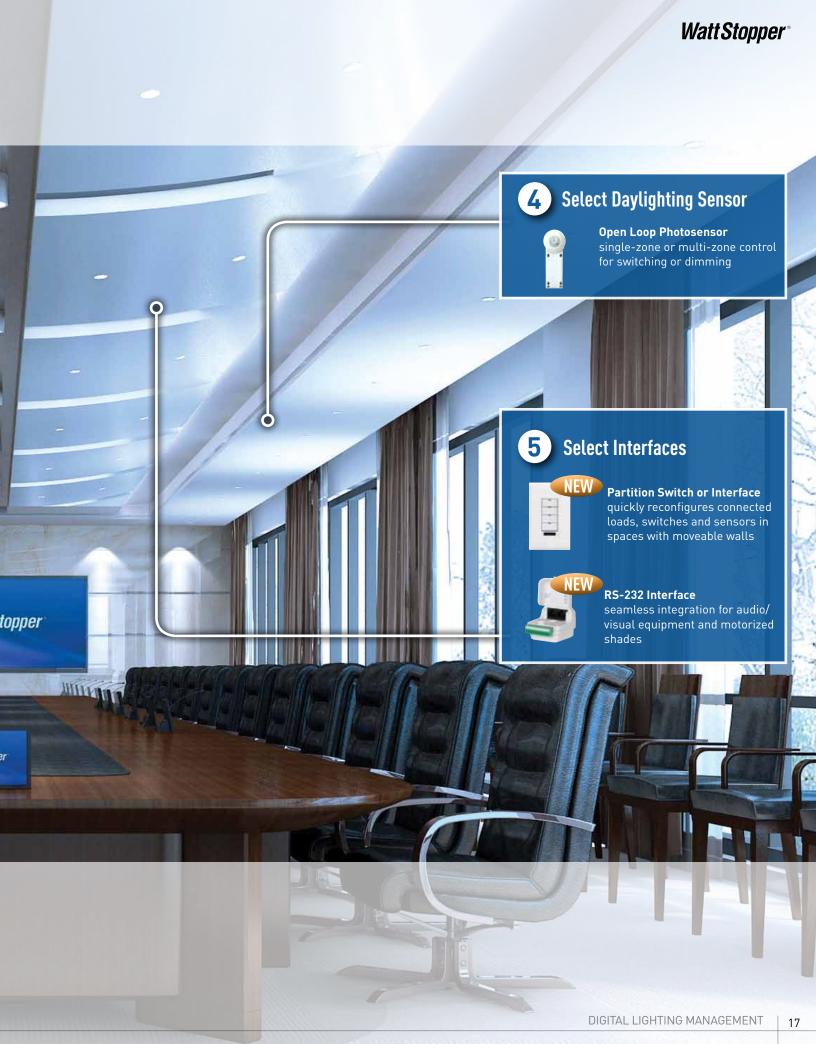
ROOM SOLUTIONS

for high-profile spaces



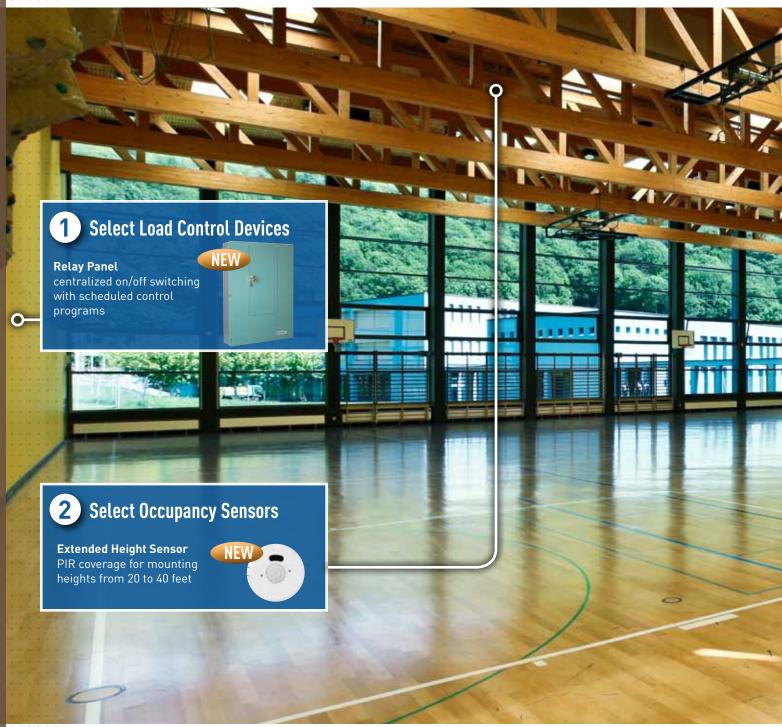
Deliver convenience + productivity + optimal energy performance. Push n' Learn sophisticated sequences of operation and easy A/V integration mean flexibility without expensive customization.





AREA SOLUTIONS

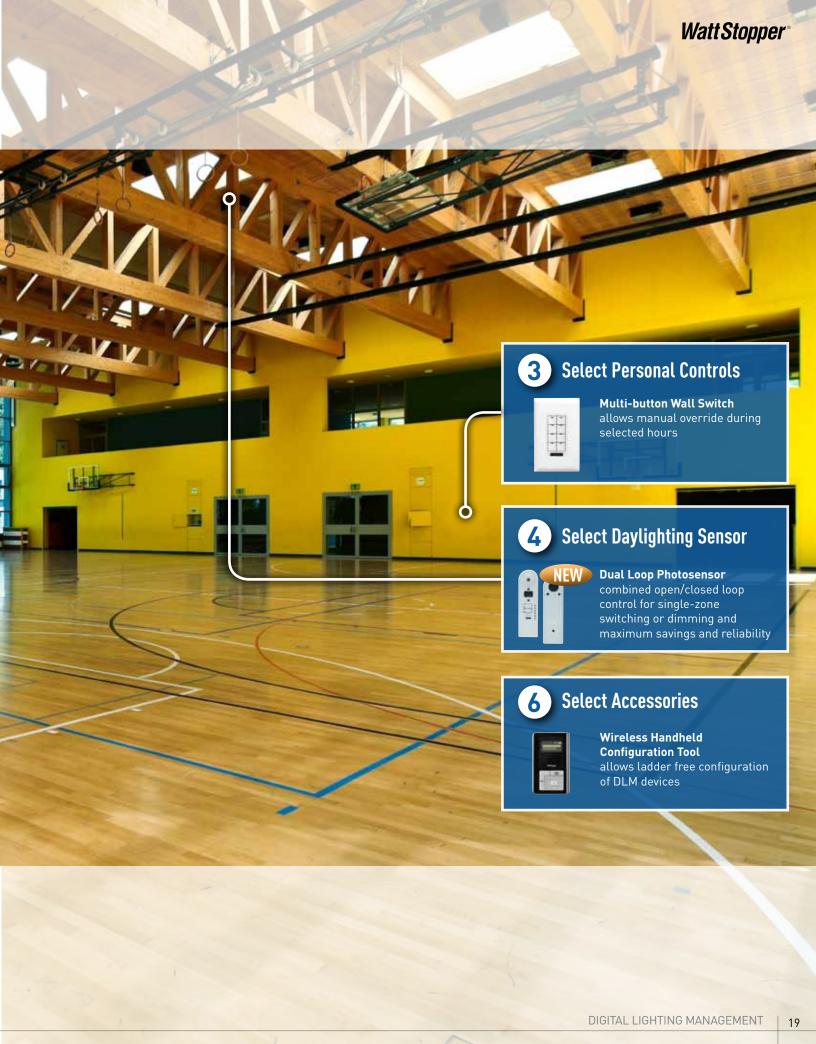
for centralized load control



Enable the right strategies at the right times in public spaces.

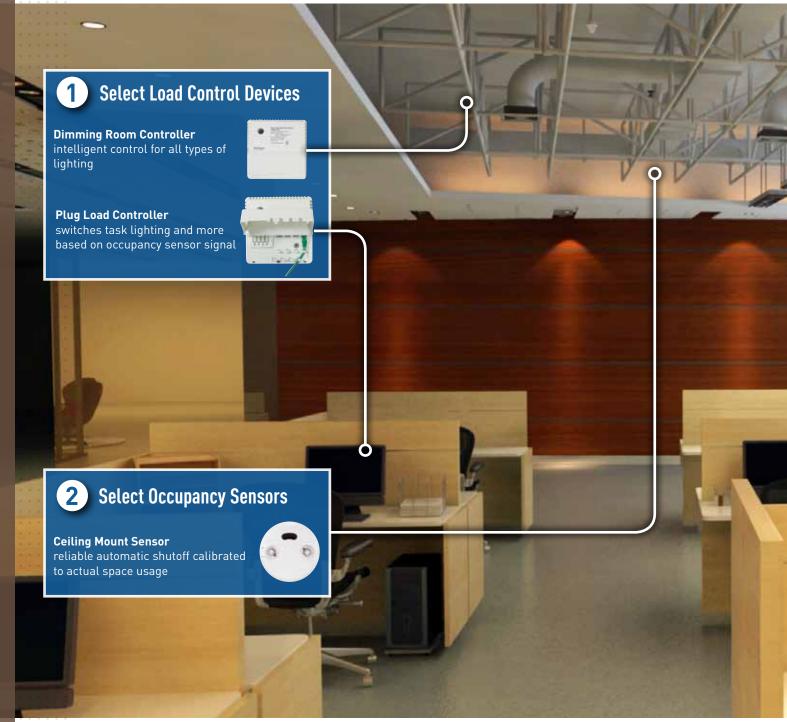
Lock out sensors + switches for event security, and lock in savings during normal hours.





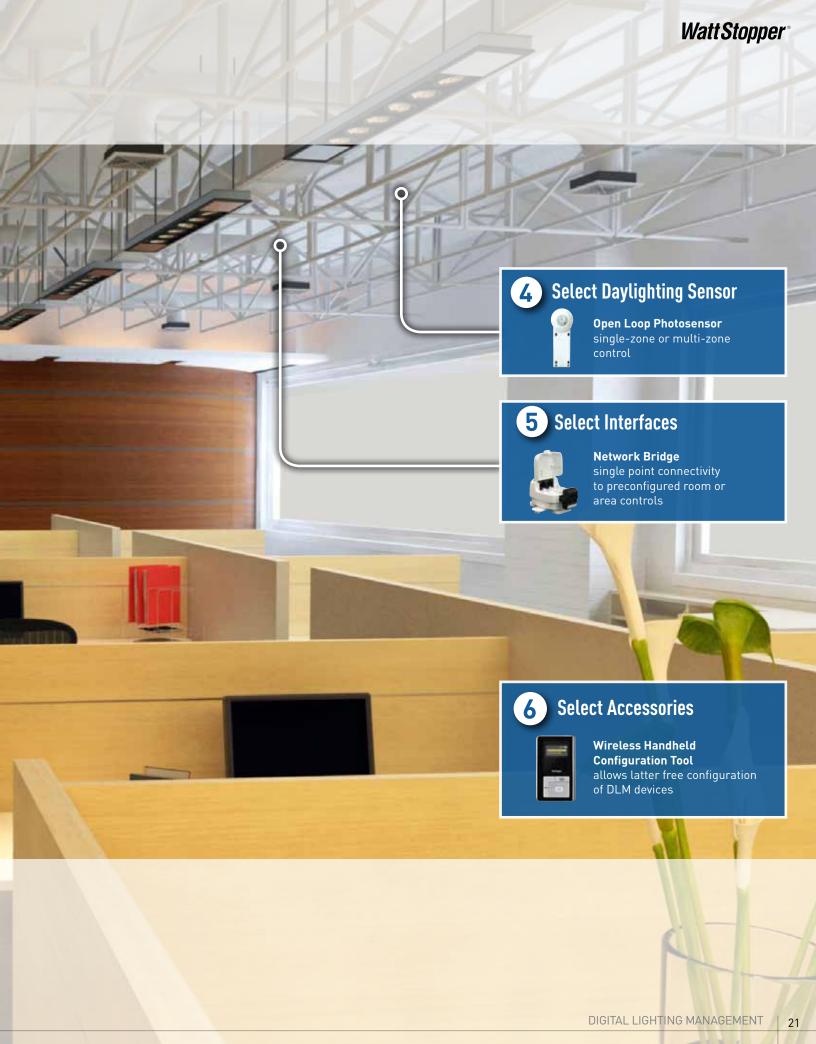
AREA SOLUTIONS

for distributed load control



Manage energy by adding a network connection to schedule distinct sequences of operation. Auto-on + default sensor settings ensure convenience and productivity during the day. Manual-on + lower sensitivity + shorter time delays increase savings after hours.





DESIGNING A NETWORK AND WHOLE BUILDING SOLUTION

Sometimes a project needs to scale from a room or area solution (see pages 12-13) to a building wide application. By layering a network on top of pre-configured room and area solutions, professionals can monitor and tune lighting controls. By integrating DLM with other building systems, the project can achieve the highest levels of performance.

STEP 7

Specify
Network
Control and
Monitoring
Options

- Identify desired room or area functionality that requires a network
 - Ability to monitor energy use of lighting and plug loads
 - Ability to schedule different sequences of operations
 - Access data and parameters from a central or remote location for maintenance and override
 - Integration to supervisory systems via data networks
 - Participation in demand response programs









STEP 8

Specify
Network Scope
and Integration
Options

- Identify whole-building requirements to define system architecture
 - Web browser access to WattStopper turnkey system
 - Simple integration of selected data points via BACnet IP
 - Direct BACnet access to all room and area data
 - Direct Niagara AX access to all room and area data



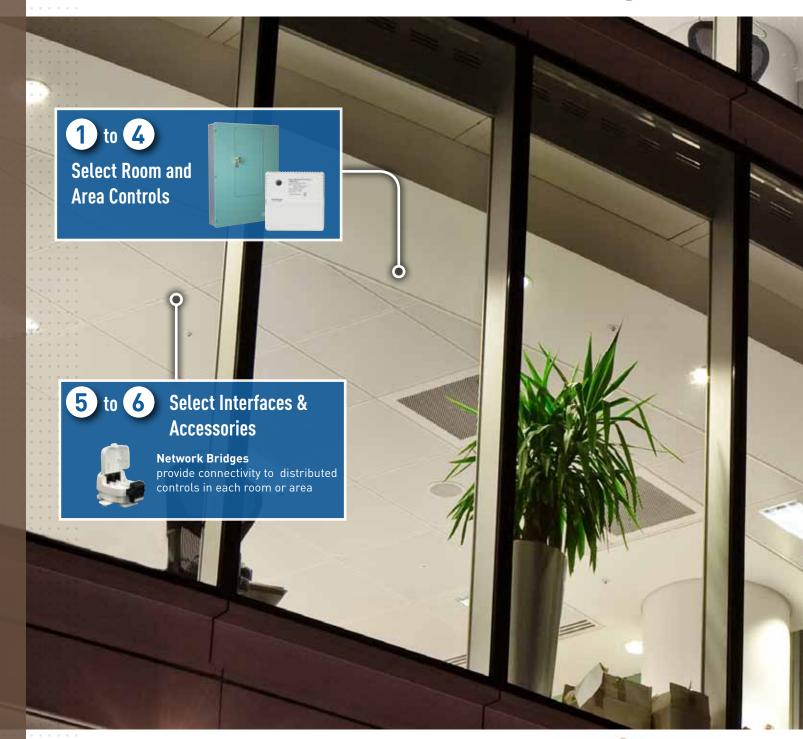


Specify Scope of Responsibility

- Identify who is responsible for implementing room and area solutions, and network solutions
 - Installation and termination of network wiring (electrician or integrator)
 - Configuring room and area control sequences of operation
 - Establishing overrides and scheduling (WattStopper or others)
 - Establishing specialty use cases by global programming for laboratory or secure environments
 - Creating customized or personalized graphics

WHOLE BUILDING SOLUTIONS

for centralized management



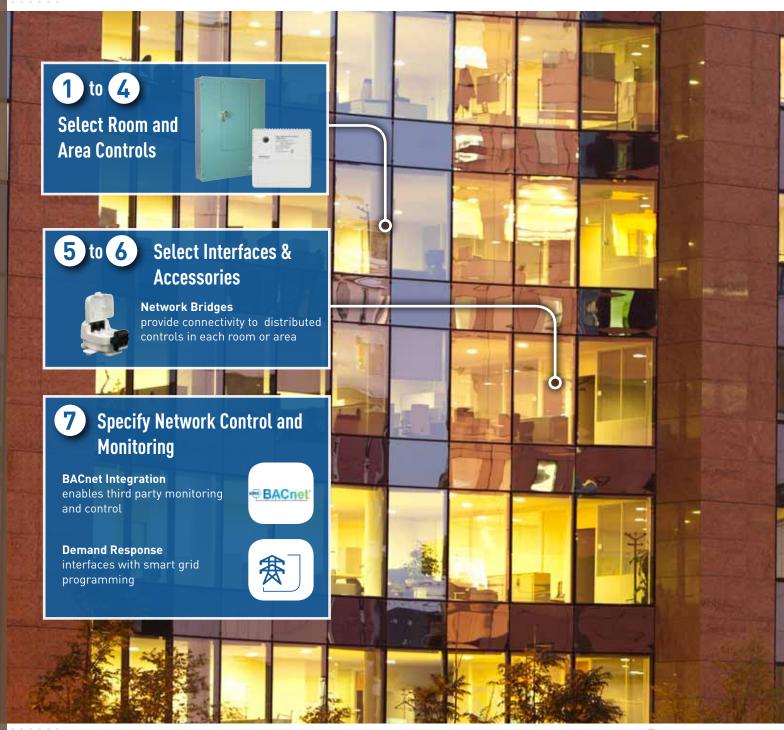
Total monitoring + total command means total control of every switch, sensor, room controller and plug load controller. So every load is commandable, and every setpoint is adjustable.





WHOLE BUILDING SOLUTIONS

for BAS integration



Open protocols integrate intelligent building systems, including lighting + plug loads + HVAC. Approach net zero with secure connections to smart grid networks.





DIGITAL LIGHTING MANAGEMENT

Room and Area Controls

					FEATURES								
	MODEL #		DESCRIPTION	VOLTAGE	LOAD RATINGS		DIM	NOR	0-10V DIM	CM	RJ45		
	ROOM CONTR	OLLERS											
		LMRC-101	1-relay On/Off Room Controller	120/277VAC	Ballast: 20A Incan: 20A Motor: 1Hp	•		1			3		
• •	(VI)	LMRC-102	2-relay On/Off Room Controller	120/277VAC	Ballast: 20A Incan: 20A Motor: 1Hp			2			3		
		LMRC-211		120/277VAC	Ballast: 20A								
	- 7	LMRC-211-347*	1-relay 0n/0ff 0-10V Dimming Room Controller	347VAC*	Incan: 20A Motor: 1Hp			1	1	•	4		
		LMRC-212		120/277VAC	Ballast: 20A								
	- 7	LMRC-212-347*	2-relay On/Off 0-10V Dimming Room Controller	347VAC*	Incan: 20A Motor: 1Hp			2	2	•	4		
	*	LMRC-213	120/277VAC Ballast: 20A					_	•				
	- 7	LMRC-213-347*	3-relay 0n/0ff 0-10V Dimming Room Controller	347VAC*	Incan: 20A Motor: 1Hp			3	3	•	4		
	s	LMRC-221	1-relay On/Off Forward Phase Dimming Room Controller	120/277VAC	Incandescent, MLV, LED: 20A 2-wire or 3-wire ballast: 16A Incandescent, MLV, LED: 20A 2-wire or 3-wire ballast: 16A		•	1		•	4		
		LMRC-222	2-relay On/Off Forward Phase Dimming Room Controller	120/277VAC			•	2		•	4		
	PLUG LOAD CONTROLLERS												
• •	(000)	LMPL-101	Plug Load Room Controller	120VAC	Ballast: 20A Incan: 20A Motor: 1Hp			1			3		
		LMPL-201	Plug Load Room Controller with Current Monitoring	120VAC	Ballast: 20A Incan: 20A Motor: 1Hp	•		1		•	4		

^{* 15}A Ballast only

FEA	FEATURE LEGEND						
	ON/OFF - ON/OFF SWITCHING						
	DIM - DIMMING						
	NOR - NUMBER OF RELAYS						
	0-10V DIM - 0-10V DIMMING OUTPUT						
	CM - CURRENT MONITORING						
	RJ45 - NUMBER OF RJ45 PORTS						

	MODEI		DESCRIPTION	FUNCTION
1	LIGHTING CONTROL	PANELS		
	NEW	LMCP8 LMCP24 LMCP48	LMCP Series Relay Panel Interiors and Enclosures	Switches lighting and plug loads in areas not suitable for room controllers Can be scheduled by segment manager, LMCT-100 or BAS

МО	DEL#	DESCRIPTION	VOLTAGE					COVER	RAGE			TUR
OCCUPANCY	SENSORS										RJ45	
-		1-button PIR Wall Switch Occupancy Sensors	24VDC; 8mA					otion) iotion)			2	
Ė	LMPW-102	2-button PIR Wall Switch Occupancy Sensors	24VDC; 8mA	Up t	o 40 i o 25 i	ft. (ma ft. (mi	ijor m nor m	otion) otion)			2	
		1-button Dual Technology Wall Switch Occupancy Sensors	24VDC; 20mA					otion) iotion)			2	
		2-button Dual Technology Wall Switch Occupancy Sensors	24VDC; 20mA					otion) iotion)			2	
	LMPX-100	Corner Mount PIR Occupancy Sensor	24VDC; 7mA	LMP LMP	X-10 X-10	10-1: 10-3:	long r 2-side	ange l ed aisl	lens, leway	o to 1,000 ft ² up to 90 ft. lens, up to 60 ft. s, up to 60 ft.	1	
NEW -	LMPC-100	Ceiling Mount PIR Occupancy Sensor	24VDC; 7mA	LMP	C-10	0-1:	high d	lensity	y lens	s, up to 1,200 ft² , up to 500 ft² ens, up to 3,800 ft²	2	
0 0	LMUC-100	Ceiling Mount Ultrasonic Occupancy Sensor	24VDC; 20mA	LMU	IC-10	10-2 ։ ւ	ıp to 1	1,000 f	ft²		2	
6 0	LMDX-100	Corner Mount Dual Technology Occupancy Sensor	24VDC; 20mA		X-10 ktop)		to 2,0	00 ft ²	(walk	ing) up to 1,000 ft²	1	
0_0	LMDC-100	Ceiling Mount Dual Technology Occupancy Sensor	24VDC; 20mA	LMD	C-10	10 : up	to 1,0	00 ft²			2	
					F	EATUF	RES		FE	ATURE LEGE	ND	
N	MODEL #	DESCRIPTION	VOLTAGE	LS	LD	SC	RJ45	CP		LS - LOAD SWITCHI		
PERSONAL C	ONTROLS									LD - LOAD DIMMING		
	LMSW-100 Seri	es 1-, 2-, 3-, 4- and 8-button Digital Wall Switches	24 VDC; 5mA	•	•	•	2			SC - SCENE CONTR RJ45 - NUMBER OF LCD - LCD- DISPLA	RJ45 F	٥٥
	LMDM-101	1-button Dimming Wall Switch	24 VDC; 5mA	•	•	•	2			CP - CONFIGURATION)F
	LMSW-105	5-button Scene Switch	24 VDC; 5mA	•		•	2					
NEW	LMPS-104	4-button Partition Switch	24 VDC; 5mA	DC; 5mA 2 16								
•	LMRH-102	2-button IR Remote Control	3 AAA batteries	•								
	LMRH-101	1-button Dimming IR Remote Control	3 AAA batteries	•	•							
	LMRH-105	5-button Scene IR Remote Control	3 AAA batteries	•	•	•						

DIGITAL LIGHTING MANAGEMENT

Room and Area Controls

	MODEL #				FEATURES							
			DESCRIPTION	VOLTAGE	ON/OFF	DIM	ZON	RJ45	PNG	AC		
4	DAYLIGHTING	SENSORS										
	2	LMLS-400	Single-zone On/Off and Dimming Closed Loop Photosensor	24 VDC; 7mA	•	•	1	1	•	•		
• •	9	LMLS-500	Multi-zone On/Off and Dimming Open Loop Photosensor	24 VDC; 7mA	•	•	3	1				
N	EW	LMLS-600	Single-zone Dual Loop Switching and Dimming Photosensor	24 VDC; 7mA	•	•	1	1	•	•		

FE	ATURE LEGEND		
	ON/OFF - ON/OFF SWITCHING		RJ45 - NUMBER OF RJ45 PORTS
	DIM - DIMMING		PNG - PLUG N' GO
	NOZ - NUMBER OF ZONES		AC - AUTOMATIC CALIBRATION

	MODEL #	DESCRIPTION	FUNCTION
INTE	ERFACES AND ACCESSOF	RIES	
	LMRL-100	Isolated Relay Interface	Single-pole, double throw relay communicates occupancy status
	LMI0-101	Input/Output Interface	Single-pole, double throw relay communicates occupancy status of selected sensor(s)
			Accepts inputs from up to three 3rd party devices
EW	LMI0-102	Partition Interface	Accepts inputs from 3rd party contact closures on 4 moveabl walls
	LMI0-301	Photocell Input Module	Reads input from analog photocells
	LMDI-100	Serial Data Interface	Communicates with 3rd party control system via RS-232 signals
	LMIR-100	Digital IR Ceiling Mount Receiver	Infrared transceiver accepts commands from DLM IR remote controls and transmits them over DLM local network
CON	FIGURATION TOOLS		
	LMCT-100	Wireless Configuration Tool	Enables convenient system and device modifications via pushbutton. Stores up to nine sensor profiles.
	LMCI/LMCS	Computer Interface Tools and Software	Enables PC connection to DLM local network in order to modify or document device and system settings.

Whole Building Solutions

	MODEI	L #	DESCRIPTION	FUNCTION
8	NETWORK COMPON	ENTS		
		LMBC-300	Network Bridge	Provides segment network connectivity to one DLM local network
		LMSM-201	Segment Manager, one MS/TP segment network	Provides browser based remote control and management for
		LMSM-603	Segment Manager, three MS/TP segment networks	DLM devices connected to a segment network
		NB-SWITCH NB-SWITCH-8 NB-SWITCH-16	Global Network Switches	Provides high speed connectivity for Digital Lighting Management (DLM) networked systems
	A law of	NB-ROUTER	Segment Network to IP Router	Provides a connection point between a single Digital Lighting Management (DLM) segment network and an Ethernet LAN

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