

# DIGITAL LIGHTING MANAGEMENT

Plug n' Go™ automatic configuration for quick installation and maximum energy savings

Optional networking for scheduled control and remote system management

Full suite of digital room controllers, occupancy sensors, switches, panels and more



Push n' Learn™ for simple personalization and wireless tool for ladder-free configuration

Plugs together using Cat 5e cables with RJ45 connectors eliminating wiring errors

Integrates plug load and lighting control

## Description

Digital Lighting Management (DLM) is an intelligent, distributed control system that automatically maximizes lighting energy efficiency. DLM includes room controllers, occupancy sensors, switches, daylighting sensors, plug load controls, lighting control panels, interfaces and accessories that provide convenient, energy-saving control of dimmed and switched loads. DLM can be used for stand-alone control of individual building spaces, or for centralized control of a floor, a building, or an entire campus.

## Operation

Digital Lighting Management components operate on a free-topology DLM local network. Each DLM local network is managed by one or more room controllers that, upon startup, automatically configure system components for the most energy-efficient sequence of operation using Plug n' Go technology. Devices may be personalized using Push n' Learn pushbutton programming. DLM sensors and switches feature two-way infrared (IR) communication that enables personal control from handheld remotes. An optional handheld IR wireless configuration tool may be used to view and modify system parameters, and store occupancy sensor settings. Additionally, multiple local networks may be connected to a BACnet-compatible segment network for centralized monitoring and management (see Segment Network section).

## Plug n' Go and Push n' Learn

Plug n' Go establishes default functionality based on the installed components. If a local network includes only a room controller and an occupancy sensor, it will default to auto-on/ auto-off operation. If it includes a single relay room controller, an occupancy sensor and a switch, it will default to manual-on/ auto-off operation. A dual relay room controller, an occupancy sensor and a switch will default to bi-level auto-on/auto-off operation; relay 1 turns on automatically while relay 2 defaults to manual-on (both automatically shut off). Push n' Learn mode allows any load to be selected and assigned to any sensor(s), switch(es) and switch button(s). It also allows load parameters such as operating mode (manual- or auto-on), blink warning and daylighting setpoints to be modified.

## Energy Savings Beyond Code

Digital Lighting Management has been engineered to meet and exceed energy codes, facilitate sustainable development and provide an unprecedented return on investment for both new construction and retrofit projects. Features, such as bi-level control, daylight harvesting, plug load control and dimming are provided by a range of room controllers, sensors and switches that control multiple lighting sources in a wide variety of applications. DLM simplifies designing for ASHRAE 90.1, IECC, EPCAct, California Title 24 and LEED.

## Features

- Sensors and switches include infrared (IR) transceiver for bi-directional communication
- On/off and dimming control options
- Handheld remotes for personal control
- Digital sensors feature easy-to-read LCD displays
- Includes self-calibrating open loop daylighting sensor
- Components plug together in any configuration on free-topology Category 5e DLM local networks
- Boot loading capable for firmware upgrades
- All DLM products are RoHS compliant

PROJECT		LOCATION/TYPE	
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## Wattstopper DLM Local Network Parameters

- Communication and power delivered via Cat 5e cables with RJ45 connectors
- 24VDC power provided by room controller(s)
- Room controllers provide cumulative current output; maximum network capacity 800mA
- Free topology permits both star and daisy-chain connection patterns
- Up to 1,000' of cable per DLM local network; 150' allowance per DLM communicating device
- Supports Plug n' Go (patented) and Push n' Learn technologies

When only LMRC-100 Series, LMPB-100 and/or LMPL-101 Load Controllers are used:

- 150mA per controller (maximum 4)
- Up to 24 communicating devices
- Up to 8 loads

When LMRC-110, -210, -220 Series and/or LMPL-201 Load Controllers are used:

- Up to 150mA per LMRC-110 Series or 250mA per 200 Series controller (output is limited if network is fully powered)
- Up to 48 communicating devices
- Up to 64 loads
- Up to 4 LMRC-100 Series, LMPB-100 and/or LMPL-101 Load Controllers

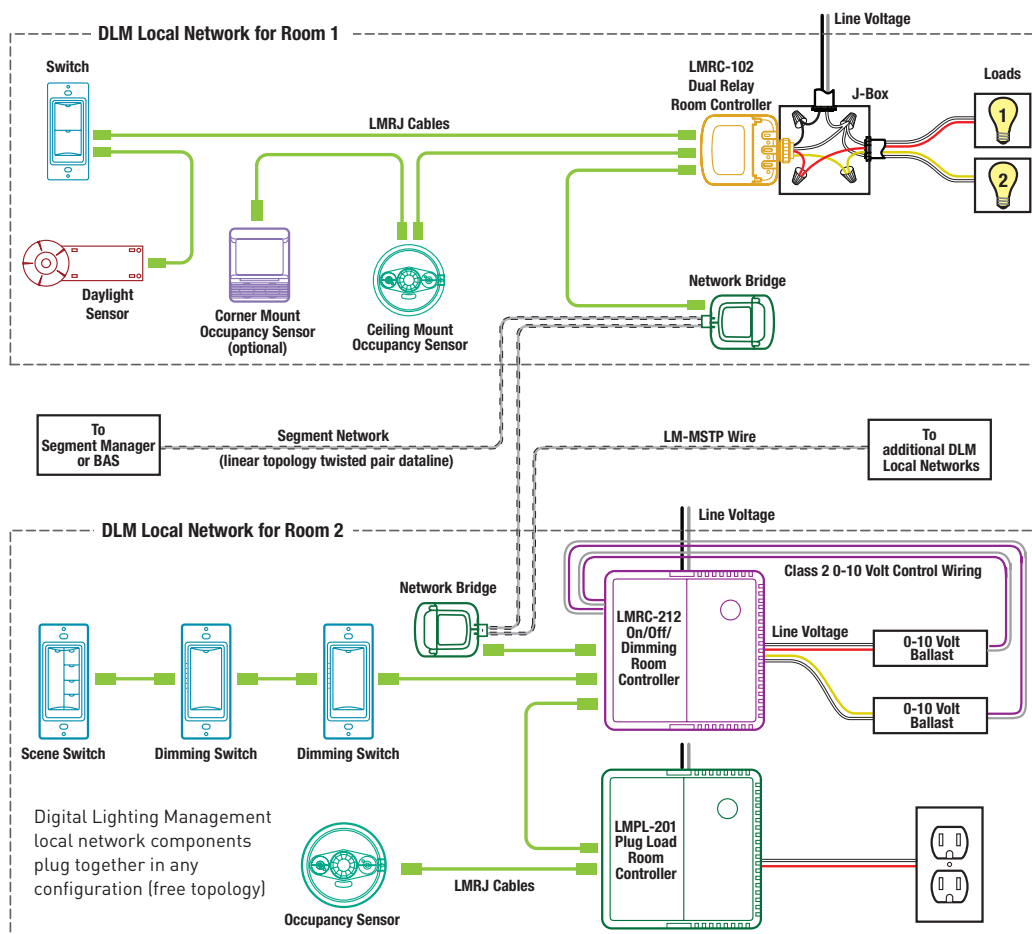
## DLM Segment Network (MS/TP) Parameters

- RS485 network, BACnet MS/TP twisted pair, baud rate 9600, 19200, 38400, 76800 or 115200 selectable
- Wattstopper LM-MSTP wire, rated for BACnet MS/TP (RS485)

- Linear topology (daisy chain wiring); 4,000' max per segment
- Up to 40 DLM local networks, or up to 300 DLM devices, connected via LMBC-300 Network Bridge. LMCP panels added via equivalency chart (see TB# 189).

## Connecting

Two DLM local networks connected to optional DLM segment network



Each segment network can connect up to 40 local networks, or up to 300 DLM devices, for centralized monitoring and control

## Segment Network Control Options

### Description

Digital Lighting Management is designed to scale from individual rooms to whole buildings and campuses. For building-wide monitoring and management, multiple DLM local networks may be connected to an industry standard open protocol network for control by a segment manager or building automation system (BAS). Networking also allows lighting control panels to be incorporated into a DLM system.

### Operation

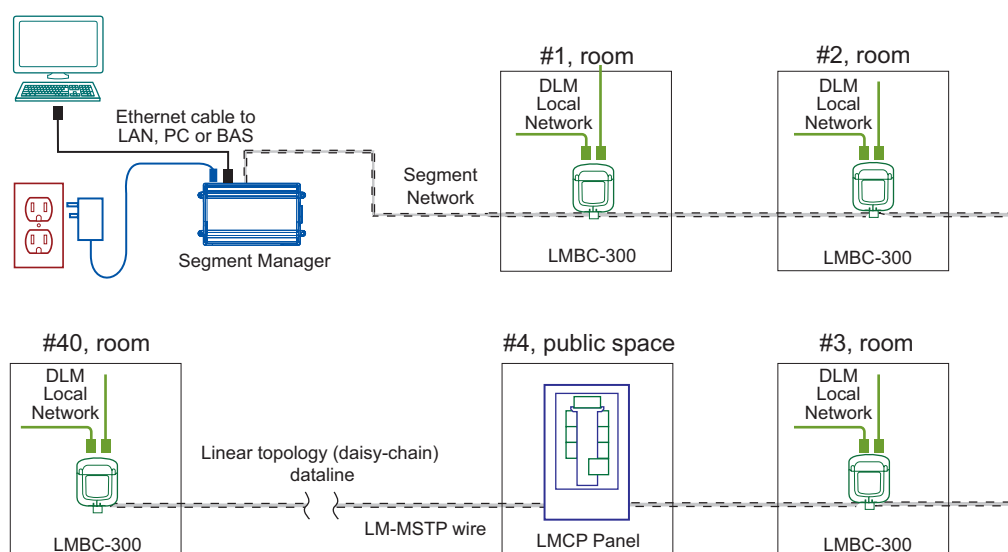
Because DLM uses a robust bottom-up design architecture, based on individual rooms, segment network operation is simple; it builds on the Plug n' Go and Push n' Learn functionality of each local network. Building operators can create normal and after hours lighting control schedules and conveniently monitor and fine tune DLM operation for even greater energy savings. They can also monitor power consumption in real time (requires enhanced room controllers).

### Features

- Enables centralized control of individual DLM local networks
- Connects to LMCP lighting control panels
- Allows scheduling of DLM devices
- Enables remote system management that includes real-time current monitoring
- Web browser user interface can be accessed via direct TCP/IP connection, local LAN or via the Internet
- Easy integration with BAS through use of standard BACnet objects to represent DLM local network device settings and states

### Network Wiring

DLM segment network with optional segment manager



The segment manager may be located at any point along the segment network so long as the linear topology (daisy chain wiring) is maintained. However, the recommended best practice is to install the LSM at the beginning of the network segment as shown above.

### BACnet Compatibility

System integrators can quickly and easily incorporate new or existing DLM systems into BACnet MS/TP and BACnet/IP networks. DLM Network Bridge devices are standard MS/TP master devices, and the MS/TP MAC address is automatically configured through arbitration with other devices on the network.

### Applications

Network capability is an ideal solution when remote access to DLM local networks is desired. It can help energy managers take advantage of demand response opportunities and help cut operating costs. It is also recommended for control of lighting in areas best suited to schedule-based control, such as lobbies, corridors and exteriors. If enhanced Room Controllers or Plug Load Controllers are used, energy data can also be made available to a BAS.

## DLM Components

Load Controllers	
LMRC-101 On/Off Room Controller with 1 relay LMRC-102 On/Off Room Controller with 2 relays LMRC-111 On/Off/0-10 Volt Dimming Room Controller with 1 relay and 1 0-10 volt dimming output LMRC-112 On/Off/0-10 Volt Dimming Room Controller with 2 relays and 2 0-10 volt dimming outputs LMRC-211 On/Off/0-10 Volt Dimming Room Controller with 1 relay and 1 0-10 volt dimming output LMRC-212 On/Off/0-10 Volt Dimming Room Controller with 2 relays and 2 0-10 volt dimming outputs LMRC-213 On/Off/0-10 Volt Dimming Room Controller with 3 relays and 3 0-10 volt dimming outputs LMRC-221 Forward Phase Dimming Room Controller, 1 line voltage dimming output LMRC-222 Forward Phase Dimming Room Controller, 2 line voltage dimming outputs LMFC-011 On/Off/0-10 Volt Dimming Fixture Controller with 1 relay and 1 0-10 volt dimming output LMPL-101 Plug Load Room Controller LMPL-201 Plug Load Room Controller LMPB-100 Power Booster	
Lighting Control Panels	
LMCP Series Panels and Zone Controller	
Occupancy Sensors	Personal Controls
LMPW-101 PIR Wall Switch Occupancy Sensor with 1 relay LMPW-102 PIR Wall Switch Occupancy Sensor with 2 relays LMPX-100 PIR Corner Mount Occupancy Sensor LMPC-100 PIR Ceiling Mount Occupancy Sensor LMUC-100 Ultrasonic Ceiling Mount Occupancy Sensor LMDW-101 Dual Technology Wall Switch Occupancy Sensor with 1 relay LMDW-102 Dual Technology Wall Switch Occupancy Sensor with 2 relays LMDX-100 Dual Technology Corner Mount Occupancy Sensor LMDC-100 Dual Technology Ceiling Mount Occupancy Sensor	LMSW-101 1-Button Wall Switch LMSW-102 2-Button Wall Switch LMSW-103 3-Button Wall Switch LMSW-104 4-Button Wall Switch LMSW-108 8-Button Wall Switch LMDM-101 1-Button Dimming Wall Switch LMSW-105 5-Button Scene Switch LMPS-104 Partition Switch DLM Switch Button Kits and Switch Button Engraving LMRH-102 2-Button IR Remote Control LMRH-101 Dimming IR Remote Control LMRH-105 Scene IR Remote Control
Daylighting Sensors	Configuration Tools
LMLS-400 Single Zone On/Off and Dimming Closed Loop Photosensor LMLS-500 Multi-zone On/Off and Dimming Open Loop Photosensor LMLS-600 Dual Loop Switching and Dimming Photosensor	LMCT-100 Wireless Configuration Tool DLM Computer Interface Tools and Software
Network Components	Interfaces
LMBC-300 Network Bridge LMSM Series Segment Manager and Network Supervisor LMSM-ENC1 Enclosure for LMSM Segment Manager NB-ROUTER DLM Segment Network to IP Router NB-SWITCH DLM Global Network 5-Port Switch NB-SWITCH 8 DLM Global Network 8-Port Switch NB-SWITCH 16 DLM Global Network 16-Port Switch LMNC DLM Network Component Enclosure LMAX-100 Niagara AX Driver Module Wireless Network Bridge Series (BACnet, LonWorks, Ethernet)	LMIR-100 IR Ceiling Mount Receiver LMRL-100 Isolated Relay Interface LMIO-101 Input/Output Interface LMIO-102 Partition Interface LMIO-201 Analog Sensor Input Module LMIO-301 Photocell Input Module LMDI-100 RS-232 Serial Data Interface WRC Series Wireless Receptacle Controls for DLM
Cables and Accessories	
LMRJ Series Pre-Terminated Cables (available in 6", 3', 10', 15', 25', 35', 50', 75' and 100' lengths, in plenum and non-plenum rated versions) LM-MSTP Segment Network Wire (available by the foot or in 1000', 2000' or 4000' reel) Local and Segment Network Accessories	