

# Digital Lighting Management

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

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

Optional networking for scheduled control and remote system management

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



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

Integrates plug load and lighting control

PROJECT

LOCATION/TYPE

## Product Overview

### 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 virtually all lighting sources in a wide variety of applications. DLM simplifies designing for ASHRAE 90.1, IECC, EAct, 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 daylighting sensors
- Components plug together in any configuration on free-topology Category 5e DLM local networks
- Boot loading capabilities for firmware upgrades
- All DLM products are RoHS compliant

# Network Characteristics

## 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 communicating device
- Supports Plug n' Go and Push n' Learn patent pending technologies

### When only LMRC-100 Series and/or LMPL-101 Room Controllers are used:

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

### When LMRC-2xx and/or LMPL-201 Room Controllers are used:

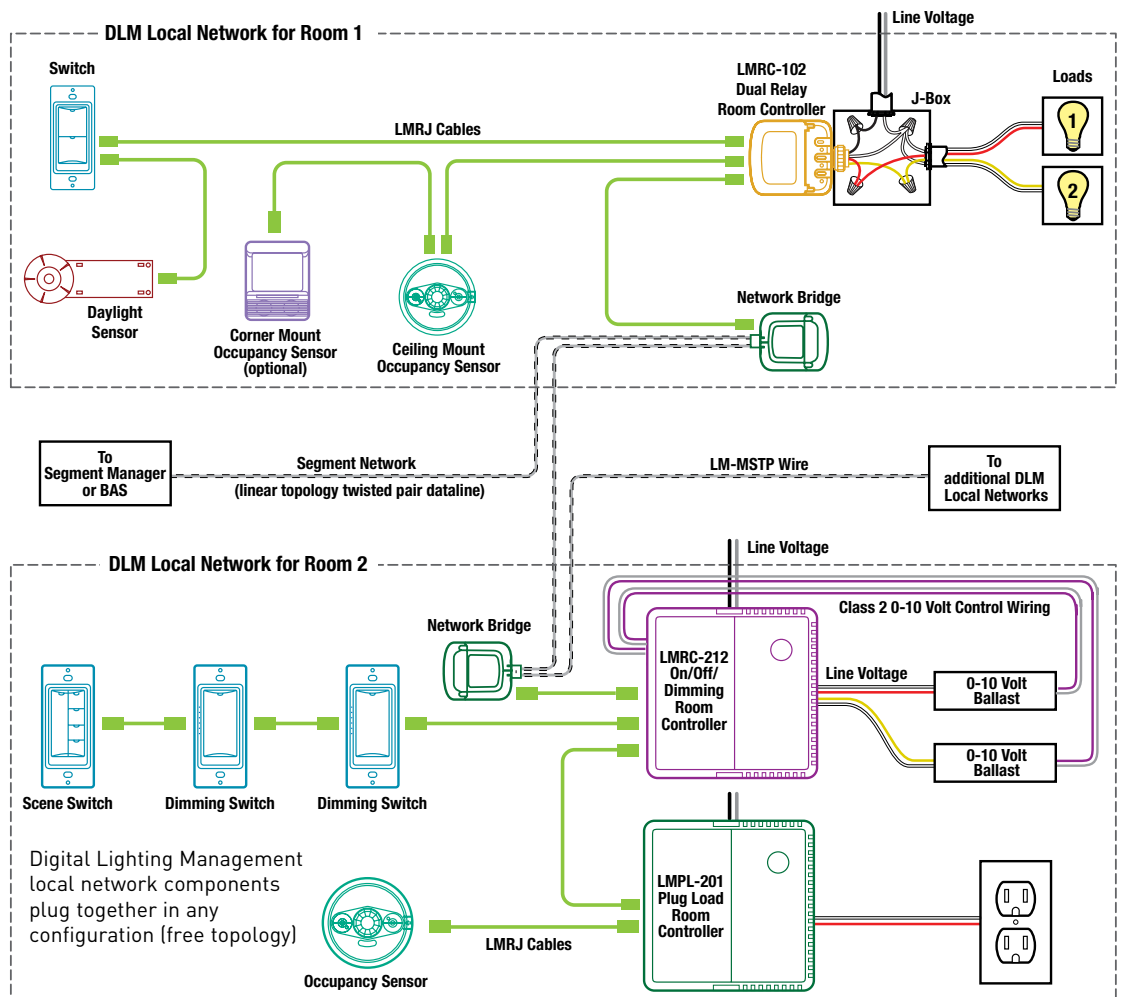
- Up to 250mA per room controller (output is limited if network is fully powered)
- Up to 48 communicating devices
- Up to 64 loads
- Up to 4 LMRC-100 Series and/or LMPL-101 Room Controllers

## DLM Segment Network (MS/TP) Parameters

- RS485 network, BACnet MS/TP twisted pair, baud rate 9600, 19200, 38400 or 76800 selectable
- WattStopper LM-MSTP wire, rated for BACnet MS/TP (RS485)
- Linear topology (daisy chain wiring); 4,000' maximum per segment
- Up to 40 DLM local networks, 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 for centralized monitoring and control

## Segment Network Control Options

### Description

Digital Lighting Management is designed to scale from individual rooms to whole buildings. 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 architecture is designed from the bottom up, segment network operation is simple, and 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.

### BACnet Compatibility

System integrators can quickly and easily incorporate new or existing DLM systems into BACnet MS/TP 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

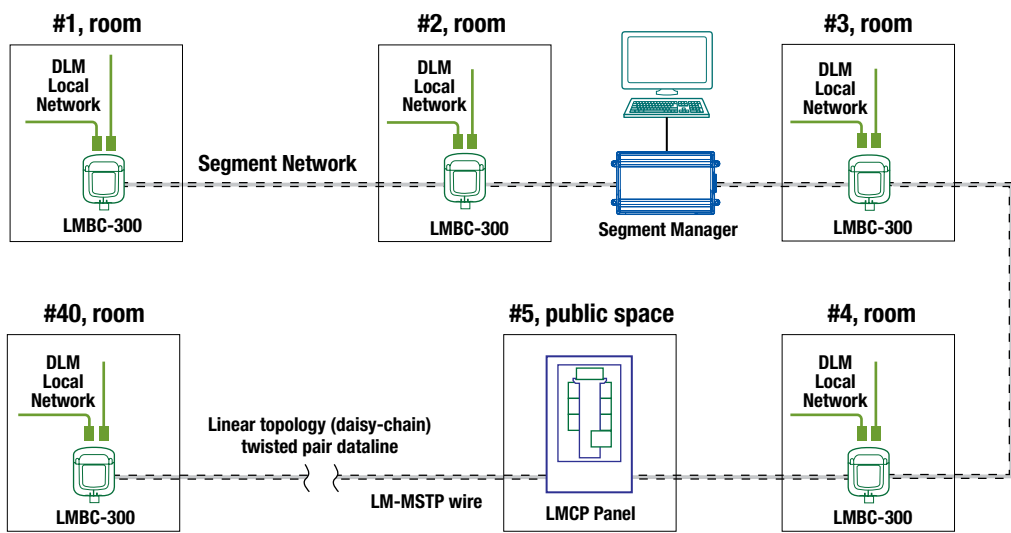
Network capability is an ideal solution when remote access to DLM local networks is desired. It can help energy managers take advantage of demand response opportunities and help cut operating costs. It is also recommended for control of lighting in areas best suited to schedule-based control, such as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

## 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. Best practice is to locate it in the middle of the segment network such that an equal number of bridges are on either side.

# DLM Components

Room Controllers	
LMRC-101 Digital On/Off Room Controller with 1 relay LMRC-102 Digital On/Off Room Controller with 2 relays LMRC-211 Digital On/Off/0-10 Volt Dimming Room Controller with 1 relay and 1 0-10 volt dimming output LMRC-212 Digital On/Off/0-10 Volt Dimming Room Controller with 2 relays and 2 0-10 volt dimming outputs LMRC-213 Digital On/Off/0-10 Volt Dimming Room Controller with 3 relays and 3 0-10 volt dimming outputs LMRC-221 Digital Forward Phase Dimming Room Controller, 1 line voltage dimming output LMRC-222 Digital Forward Phase Dimming Room Controller, 2 line voltage dimming outputs LMPL-101 Digital Plug Load Room Controller LMPL-201 Digital Plug Load Room Controller	
Occupancy Sensors	Personal Controls
LMPW-100 Digital PIR Wall Switch Occupancy Sensor LMPX-100 Digital PIR Corner Mount Occupancy Sensor LMPC-100 Digital PIR Ceiling Mount Occupancy Sensor LMUC-100 Digital Ultrasonic Ceiling Mount Occupancy Sensor LMDW-100 Digital Dual Technology Wall Switch Occupancy Sensor LMDX-100 Digital Dual Technology Corner Mount Occupancy Sensor LMDC-100 Digital Dual Technology Ceiling Mount Occupancy Sensor	LMSW-101 Digital 1-Button Wall Switch LMSW-102 Digital 2-Button Wall Switch LMSW-103 Digital 3-Button Wall Switch LMSW-104 Digital 4-Button Wall Switch LMSW-108 Digital 8-Button Wall Switch LMDM-101 Digital 1-Button Dimming Wall Switch LMSW-105 Digital 5-Button Scene Switch LMPS-104 Digital Partition Switch DLM Switch Button Kits and Switch Button Engraving LMRH-102 Digital 2-Button IR Remote Control LMRH-101 Digital Dimming IR Remote Control LMRH-105 Digital Scene IR Remote Control
Daylighting Sensors	Configuration Tools
LMLS-400 Digital Single Zone On/Off and Dimming Closed Loop Photosensor LMLS-500 Digital Multi-zone On/Off and Dimming Open Loop Photosensor LMLS-600 Digital Dual Loop Switching and Dimming Photosensor	LMCT-100 Digital Wireless Configuration Tool DLM Computer Interface Tools and Software
Network Components	Lighting Control Panels
LMBC-300 Network Bridge LMSM Series 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 LMAX-100 Niagara AX Router	LMCP Series Panels
Interfaces and Accessories	
LMRJ Series Pre-Terminated Cables (available in 6', 3', 10', 15', 25', 50', and 100' lengths, in plenum and non-plenum rated versions) and Segment Network Wire LMIR-100 Digital IR Ceiling Mount Receiver LMRL-100 Isolated Relay Interface LMIO-101 Digital Input/Output Interface LMIO-102 Digital Partition Interface LMIO-301 Photocell Input Module LMDI-100 Serial Data Interface LMSM-ENC1 Enclosure for LMSM Segment Manager	

