GreenMAX® DRC Room Control System

LEVITON

System Objectives

- Fully distributed room control system

- Room Agnostic – Each room operates independently of other rooms and is not dependent on network processors or centralized controllers for operation

- Not dependent on internet connectivity for operation or configuration

- Uses wired LumaCAN high-performance networking for communication between devices

- Uses wireless Ethernet for configuration and backbone connectivity

- Fully configurable from a smart device app

- Can be used to comply with IECC, ASHRAE 90.1 and 2019 Title 24, Part 6 0-10V dimming, occupancy/vacancy sensing, partial-ON, partial-OFF, daylighting and demand response requirements

LEVITON®

System Features

- Programmable via any WiFi-enabled Android or iOS smart device using the GreenMAX® DRC App

- Multi-location switching

- Fully programmable digital keypads/buttons with integral scene support

- Occupancy/vacancy detection
  - Multi-zone occupancy
  - Partial-ON and partial-OFF functionality with configurable timeouts and levels for each
  - Operating Modes: Manual-ON, ON to Fixed Level, ON to Last Level

- Multi-zone daylight harvesting
  - Closed loop
  - Auto or manual target level detection
  - Operating Mode: Cap at target or override multiple operation

- User groups separate from daylighting or occupancy groups for simplified control

- Control from GreenMAX DRC App, Sapphire touchscreen, GreenMAX DRC App, or LumaGraphics

- Security – Fully encrypted and secure communication, multiple levels of user privilege and controlled user access

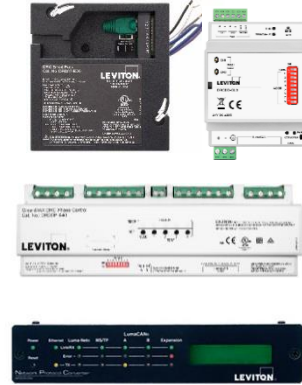LEVITON®

GreenMAX DRC System Components

User Interface

- Keypads
- Touchscreens
- Smartphone App

Sensors

- Light Level Detection
- Occupancy Detection
- Network Sensors
- Analog Sensors
- Analog Interface

Load Controls

- Phase Control
- 0-10V
- DMX
- DALI
- GreenMAX Relay (no AI)

Room Controllers

- Line Voltage
  - Includes RC, 0-10V, & Relay
  - J-Box Mount
- Low Voltage
  - Surface or Cabinet Mount
  - Control Only

LEVITON ®

GreenMAX DRC System Components

- Room Controller—Line Voltage
  - Includes 0-10V and relay
  - 1 required per room
  - Requires 225mA power
  - Can be connected to 100 "things."
    All of the below = 1 thing
    - Smart pack
    - 1 channel of a phase control dimmer
    - Keypad (1,2,4,8 btn)
    - 1 Input of an AI
    - DALI input or output
    - DMX channel
    - Relay in a GreenMAX relay cabinet
  - Installation methods - install into knockout or act as cover for 4" square box

- Primary Use
  - Coordinating the business logic within the room
  - Wi-Fi/Ethernet <->LumaCAN interface
  - Configuration interface for the system
  - Interfaces
    - LumaCAN In/Out
      - Termination provided via plug
    - Wi-Fi
    - ZigBee (future)

GreenMAX DRC System Components

- Room Controller—Low Voltage
  - 1 required per room
  - Requires 225mA power
  - Can be connected to 100 "things." All of the below = 1 thing
    - Smart pack
    - 1 channel of a phase control dimmer
    - Keypad (1,2,4,8 btn)
    - 1 Input of an AI
    - DALI input or output
    - DMX channel
    - Relay in a GreenMAX relay cabinet
  - Installation methods - surface or DIN rail
  - (1) Analog input, terminals: +24V, common, input
    - Can also be used to insert power to network, pair with PST24-I10

- Primary Use
  - Coordinating the business logic within the room
  - Wi-Fi/Ethernet <->LumaCAN interface
  - Configuration interface for the system
  - Interfaces
    - LumaCAN In/Out
      - Termination provided via plug
    - Wi-Fi
    - ZigBee (future)

LEVITON®

GreenMAX DRC System Components

- Digital Switch (Keypads)
  - 0-Many required per room
  - 25mA Current draw each, powered from LumaCAN network
  - Buttons out of the box turn the LED ON/OFF but have no system interaction
  - All buttons are programmable
  - Engraving provided with every unit through Quotes, ASAP will include it when the engraving field is completed
  - Available in White, other colors via color change kit

- Primary Use
  - Communicates to Room Controller (Sapphire too!), no functionality without Room Controller on-line
    - Each button is assigned an "Input" number
  - Interfaces
    - LumaCAN
    - Termination provided via dip switch
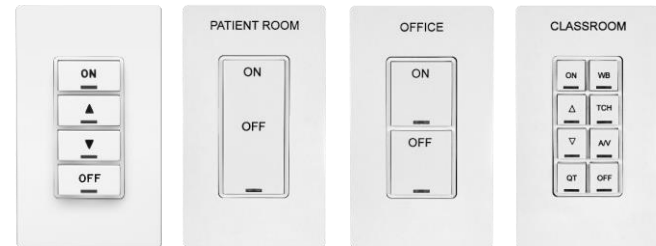
GreenMAX DRC System Components

- Sensors
  - 0-Many required per room
  - 450sqft occupancy
  - 0-50fc photocell
  - Major motion detection only
  - 35mA current draw, powered from LumaCAN network
  - Available in White, flush mount
  - 2" Mounting hole
  - Class 2 in conduit? Drill 2" hole in side of junction box and install junction box in ceiling directly above ceiling

- Primary Use
  - Occupancy detection
  - Communicates to Room Controller (Sapphire too!), no functionality without Room Controller on-line
    - Each of the two sensors is assigned an input number, when using with Sapphire, input is assigned via dip switch and the two are consecutive
  - Interfaces
    - LumaCAN
    - Termination provided via dip switch

LEVITON

GreenMAX DRC System Components

- Analog Interface
  - (2) Analog Inputs
  - Powered from LumaCAN network
  - Current Draw: 35mA + connected devices
  - Things you can connect
    - 0-10V photocell
    - Potentiometer
    - Low voltage switch
    - Low voltage occupancy sensor
    - Not dry contact or current loop
  - Install
    - Surface mount
    - Lid of 4-11/16" square box
    - One or More in DIN rail cabinet
      - 7 on one rail of DINRK—001, or (6)+(1) PST24-I10

- Primary Use
  - Interface to non-LumaCAN devices
  - Demand response interface
  - Fire alarm/security system interface
  - Communicates to network and/or Room Controller (including Sapphire) depending on configuration
  - Interfaces
    - (2) Analog In
    - +24VDC/Common Out
    - Termination provided via jumper

LEVITON®
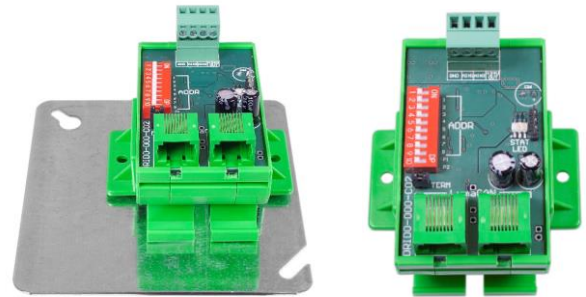
GreenMAX DRC System Components

- Smart Pack
  - (1) 20A relay + 0-10V controls
  - Self-powered, no current draw from network
  - **No power supply to network**
  - Install
    - Nipple mount
    - Lid of 4" square box
    - Sandwich when all must be in conduit
  - Assigned a single LumaCAN channel

- Primary Use
  - Control of switching load
  - Control of 0-10V loads
  - Contact closure to other device
  - Interfaces
    - LumaCAN
    - Termination via jumper

GreenMAX DRC System Components

- Phase Control Dimmer
  - (4) 2.5A 120-277V 50/60Hz Phase Control Dimmers
  - Each Channel can be forward or reverse phased
  - AMPlify Features – combine multiple channels for increased capacity
  - 200mA Network power required (transition)
  - Install
    - Requires Enclosure, DINRK-001 or larger
  - Assigned 1-4 LumaCAN Channels
  - Contact Closure Input (NOT AI!!)
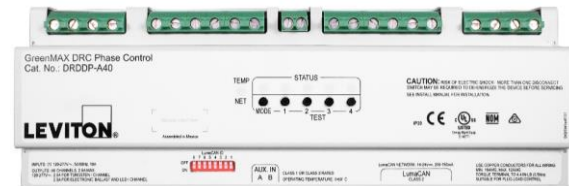 - Fully configurable dimmer curve

- Primary Use
  - Control of phase control (Hot/Neutral) loads
  - Interfaces
    - LumaCAN
    - Termination via plug

Mode	No. of Channels	Channel 1 Capacity	Channel 2 Capacity	Channel 3 Capacity	Channel 4 Capacity	LED Indicators			
						1	2	3	4
1*	1	10A	Jumper to 1	Jumper to 2	Jumper to 3	ON	ON	ON	ON
2A	2	2.5A	7.5A	Jumper to 2	Jumper to 3	OFF	ON	ON	ON
3	3	2.5A	2.5A	5A	Jumper to 3	OFF	OFF	ON	ON
4	4	2.5A	2.5A	2.5A	2.5A	OFF	OFF	OFF	OFF

The following mode is only configurable via GreenMAX DRC App

Mode	No. of Channels	Channel 1 Capacity	Channel 2 Capacity	Channel 3 Capacity	Channel 4 Capacity	LED Indicators			
2B	2	5A	Jumper to 1	5A	Jumper to 3				

* Default Mode from the factory is single (1) channel mode with jumpers installed between all four channels. In this mode, the dimmer operates like a single channel dimmer with max capacity of 10A. For other configuration, jumpers must be removed as per the chart above.

GreenMAX DRC System Components

- DALI Gateway
  - (2) Channel DALI Gateway
  - Powered from LumaCAN network or adjacent power supply
    - 60mA for interface
    - 250mA for each DALI channel
    - Supports dedicated supply for DALI network
  - Patching device
    - DALI load = LumaCAN Channel
    - DALI actuator = LumaCAN Input
  - Fixed fade time for all DALI devices

- Primary Use
  - Interface to DALI fixtures
  - Interfaces
    - LumaCAN
    - Termination via jumper
    - (2) DALI channels

GreenMAX DRC System Components

- LumaCAN Gateway
  - BACnet Interface
  - One required per LumaCAN sub-net
  - Limited to 500 points per interface
  - Object list
    - AO for each load control
    - AI for each actuator
    - Schedule with MSV for behaviors
  - DMX output interface
    - Patch 512 consecutive LumaCAN channels to DMX output
  - DMX input interface
    - Patch DMX Input to 512 consecutive LumaCAN channels
  - Luma-Net interface

- Primary use
  - Interface to other network
  - (2) Protocols / interface
  - Powered from LumaCAN network or dedicated supply
  - Installs into ½ RU
  - PST24-R41

GreenMAX DRC System Components

- Sapphire Touchscreen
  - Touch-based user interface
  - 325mA power draw + connected devices
  - Analog inputs can be any
    - Occupancy sensor
    - Switch
    - Potentiometer
    - Photocell
    - Patched to LumaCAN input
  - Screen configured from Sapphire Studio
  - May work with (or in some cases without) GreenMAX DRC Room Controller; app cannot be used to configure at this time

- Primary Use
  - Touchscreen interface
  - LumaCAN interface
  - Ethernet interface for switcher/scaler, BC4, HiFi

LEVITON®

Programmable Keypad Functions

- Programmable Keypad Room Controller buttons—assignable with one of the following behaviors
  - Room commands—impacts everything controlled by the Room Controller
    - ON—Configurable level & fade time, observes daylighting target
    - OFF
    - Toggle ON/OFF
    - Raise/Lower—Configurable % change/press, also support press/hold/release
  - Group commands
    - ON
    - OFF
    - Toggle ON/OFF
    - Raise/Lower

- Scene—collection of groups at a level and recalled via a fade time. Also can include fixture attributes

- Last Select Scene Raise/Lower—increases/decreases the selected scene and only things in that scene

Applications

LEVITON

Application Rules

- **One** Room Controller per room
  - 100 network devices (network nodes) per Room Controller
    - Photocell and sensor are 2 nodes
    - 8-button is 1 node
- **One** (and only one) Room Controller in every room
- Observe power and data requirements for LumaCAN networks
- Link rooms together via WiFi network
- GreenMAX DRC is a new system and not an extension of GreenMAX Relay Panels although GreenMAX relays can be used with the system. GreenMAX components that do not work with GreenMAX DRC are as follows:
  - HDU
  - Scheduler
  - Analog input
  - Digital switches

LEVITON®

WiFi and BACnet

- What is WiFi used for?
  - Configuration
  - App control
  - One controller controlling things in another room
- What is BACnet used for?
  - Control from a BMS system
  - LumaGraphics
- Some system may need both
- LumaCAN connectivity between rooms only required for BACnet

LEVITON®

GreenMAX DRC
Smart Packs, Keypads, & Sensor

GreenMAX DRC
Room Controller

GreenMAX DRC App
Configuration and control

GreenMAX
DRC
Occupancy and
Photocell
Sensor

GreenMAX DRC Keypads

GreenMAX DRC Smart Packs

GreenMAX DRC
Add Phase Control Dimmer

GreenMAX DRC Phase Control Dimmer

GreenMAX DRC Room Controller

GreenMAX DRC App
Configuration and control

GreenMAX DRC Occupancy and Photocell Sensor

GreenMAX DRC Keypads

GreenMAX DRC Smart Packs

LEVITON

GreenMAX DRC System
BACnet Interface

GreenMAX DRC Phase Control Dimmer

GreenMAX DRC Room Controller

GreenMAX DRC App
Configuration and control

GreenMAX DRC Occupancy and Photocell Sensor

GreenMAX DRC Keypads

GreenMAX DRC Smart Packs

LumaCAN Gateway

LEVITON®

GreenMAX DRC System

DALI Interface

GreenMAX DRC
DALI Interface

Power Supply

GreenMAX
DRC Room
Controller

GreenMAX
DRC
Occupancy and
Photocell
Sensor

GreenMAX DRC App
Configuration and control

GreenMAX DRC Keypads

LED Lighting

GreenMAX DRC System

DMX Interface

Power Supply

GreenMAX
DRC Room
Controller

GreenMAX DRC App
Configuration and control

GreenMAX
DRC
DMX Interface

GreenMAX
DRC
Occupancy and
Photocell
Sensor

GreenMAX DRC Keypads

LED Lighting

LEVITON®
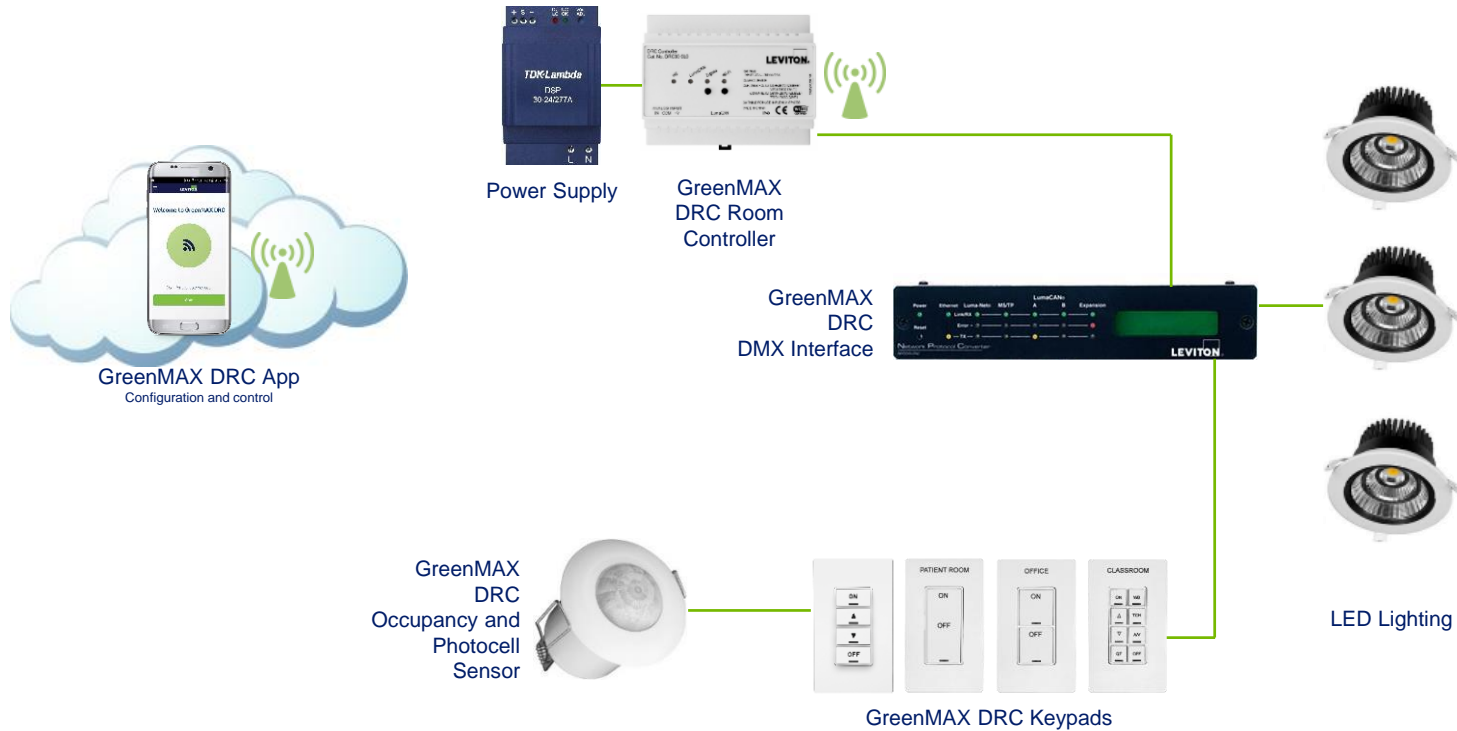
GreenMAX DRC
Building Rooms into Systems
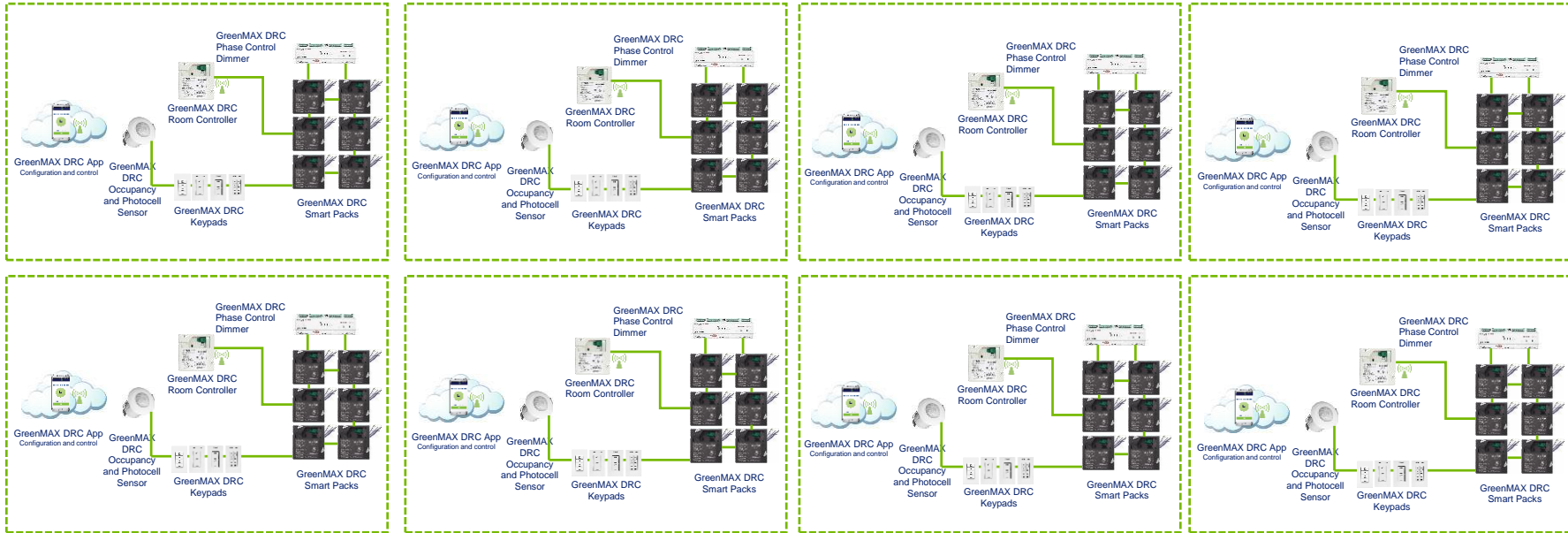
Networking GreenMax DRC

Multiple Rooms on BACnet

- Configuration over WiFi

- Each Room Controller is its own AP

- BACnet interface connected to LumaCAN network

- LumaCAN network connection between rooms

- One BACnet interface connection required per LumaCAN network

- LumaCAN rules with GreenMAX DRC are the same as LumaCAN rules with GreenMAX

  - 250 nodes per network

  - 1600 feet per segment

  - 6 port and 2 port repeaters for longer networks and home run topology

To BACnet/IP network
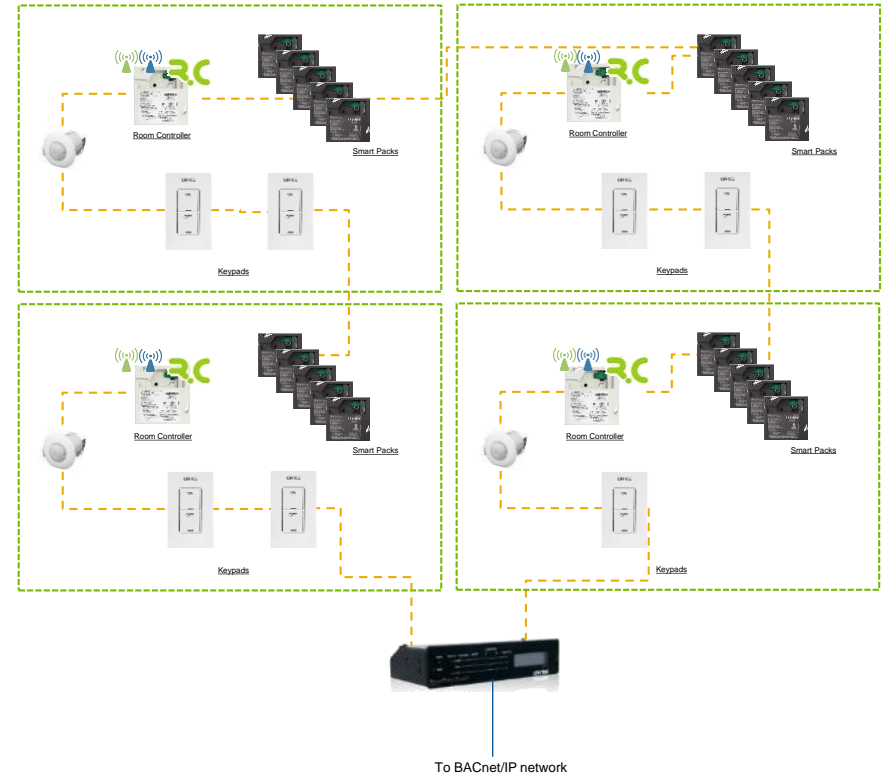
Networking GreenMax DRC

Wi-Fi & BACnet Network
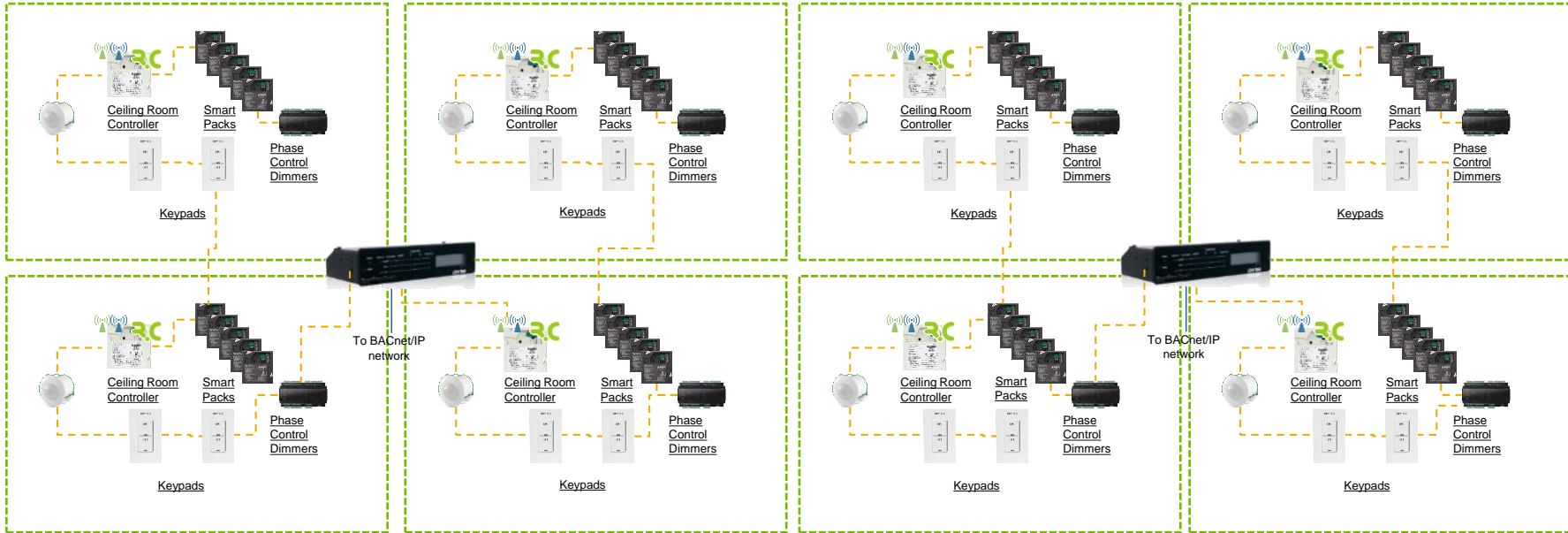
Commissioning Flow

- Create the project (internet connection required)
  - Assign other users to the project if more then one person commissioning

- All commission is done one room at a time from within the room

- Create the room through the building hierarchy

- Connect to the Room Controller over WiFi—System broadcasts as "GreenMax DRC xxxxxx" —sticker with serial number is on the device

- Use "identify" to confirm you have the DRC you want

- Update firmware if required

- Connect to building access point if needed

- Add devices to this Room Controller, use identify and name devices—remove devices that belong to other rooms

- Set up groups, scenes, daylighting/occupancy zones, and keypad programming

- Move to next room

- Sync to cloud

LEVITON®

Connectivity to Leviton Cloud Servers

- System does not require cloud connectivity for operation; however, we use Leviton cloud services as a central point of authority for security

- Connectivity is required to create a new project and add/modify/remove users

- Periodic internet connectivity is required to
    - Update project access list
    - Sync new rooms with the cloud during commissioning
    - Move access permissions between users

- During Commissioning
    - Rooms can be created without internet connectivity

- GreenMAX DRC App—communicates to you when changes need to be synchronized

LEVITON®

Energy Code Compliance

LEVITON

2018 IECC vs. ASHRAE 90.1 2019 vs. 2019 Title 24

Control Type	2018 IECC	ASHRAE 90.1 2019	2019 Title 24	Summary of Requirements
Manual Space Control	✔	✔	✔	• Every area enclosed by walls or floor-to-ceiling partitions must have a manual control • Controls must be located within the area served by the controls, or must be a remote switch clearly identifying the lights it controls with a status indicator
Automatic Shutoff	✔	✔	✔	• Automatic time switches are required in most areas that are not controlled by an occupancy sensor. The switch must also have a manual override • Different applications have specific guidelines for partial-OFF, bi-level and auto-OFF sensors
Multi-Level Area Lighting Controls	✔	✔	✔	• Manual-ON/OFF override control is required in each area enclosed by ceiling-height partitions • Each area required to have manual control is also required to be able to reduce the lighting by 50%
Automatic Daylight Control	✔	✔	✔	• Control required in daylight control zones that provide these areas with separate control that is independent of the general lighting in the space, which can be stepped or continuous dimming • Calibration cannot be located on the photocontrol
Receptacle Control	✔	✔	✔	• Required in specific applications to keep certain receptacles powered OFF based on occupancy
Demand Response			✔	• Required in buildings > 10,000sqft to reduce the energy usage from a signal supplied from the power company. Interface to utility may be provided by Leviton or by others, interface to GreenMAX DRC is via analog interface.

LEVITON

Ordering Information

LEVITON®

Ordering Information

Cat. No.	Product Description
DRC07-ED0	GreenMAX DRC Line Voltage Room Controller, 120-277VAC, 50/60 Hz
DRC00-0L0	GreenMAX DRC Low Voltage Room Controller, DIN Rail form factor
DRC00-030	GreenMAX DRC Line Voltage Room Controller, 347VAC, 60 Hz
OSR05-ICW	GreenMAX DRC Occupancy Sensor and Photocell
DRDDP-A40	GreenMAX DRC Phase Control Dimmer
DRID0-C02	GreenMAX DRC 2-Port AI
DRD07-ED0	GreenMAX DRC Smart Pack, 120-277VAC
DRD07-E30	GreenMAX DRC Smart Pack, 347VAC

LEVITON®

Ordering Information—Switches

Cat. No.	Product Description
DRKDN-1Cx	GreenMAX DRC Digital Switch, 1-Button, LumaCAN 3 (inc. single-gang wallplate)
DRKDN-2Cx	GreenMAX DRC Digital Switch, 2-Button, LumaCAN 3 (inc. single-gang wallplate)
DRKDN-4Cx	GreenMAX DRC Digital Switch, 4-Button, LumaCAN 3 (inc. single-gang wallplate)
DRKDN-8CW	GreenMAX DRC Digital Switch, 1-Button, LumaCAN 3 (inc. single-gang wallplate)
CKDNK-10y	GreenMAX DRC 1-Button Color Change Kit (inc. single-gang wallplate)
CKDNK-20y	GreenMAX DRC 2-Button Color Change Kit (inc. single-gang wallplate)
CKDNK-40y	GreenMAX DRC 4-Button Color Change Kit (inc. single-gang wallplate)
CKDNK-80y	GreenMAX DRC 8-Button Color Change Kit (inc. single-gang wallplate)
CKDNK-1Ey	GreenMAX DRC 1-Button Color Change Kit w/engraving (inc. single-gang wallplate)
CKDNK-2Ey	GreenMAX DRC 2-Button Color Change Kit w/engraving (inc. single-gang wallplate)
CKDNK-4Ey	GreenMAX DRC 4-Button Color Change Kit w/engraving (inc. single-gang wallplate)
CKDNK-8Ey	GreenMAX DRC 8-Button Color Change Kit w/engraving (inc. single-gang wallplate)

LEVITON®

Thank You

LEVITON®