

## Using EcoSystem<sup>1</sup> Ballasts and Drivers in HomeWorks QS Systems

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### Overview

Lighting fixtures that utilize Lutron EcoSystem digitally addressable fluorescent dimming ballasts and LED drivers can be controlled in a HomeWorks QS system by using either DIN Rail Power Modules with EcoSystem (LQSE-2ECO-D) or GRAFIK Eye QS with EcoSystem (QSGRx-yE). Power Modules with EcoSystem are capable of controlling up to 128 EcoSystem drivers/ballasts (64 maximum per EcoSystem link). GRAFIK Eye QS with EcoSystem units are capable of controlling up to 64 EcoSystem drivers/ballasts. Zones can be grouped together into zones either in the HomeWorks QS software (for DIN rail power modules) or locally at the main unit (for GRAFIK Eye QS units). The DIN rail power modules support up to 64 zones per EcoSystem link and the GRAFIK Eye QS units support up to 16 zones. EcoSystem drivers/ballasts communicate over a 2-wire, non-polarized, topology-free, digital communication bus.

The purpose of this document is to explain how to design, program, activate, and troubleshoot a HomeWorks QS system that utilizes EcoSystem drivers/ballasts. This document has two main sections: one focused on the Power Module with EcoSystem solution and the other focused on the GRAFIK Eye QS with EcoSystem solution. Refer to the appropriate section based on the control hardware being used in the application.

**Note:** Only HomeWorks QS software version 6.0.0 or later supports the use of Power Modules with EcoSystem and GRAFIK Eye QS with EcoSystem.

**Note:** For optimal performance, Lutron recommends using HomeWorks QS software version 9.0.0 or later to program EcoSystem devices. For more information, refer to **Section 1.4**.

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<sup>1</sup> EcoSystem drivers are no longer available to order as of September 1, 2021.

## 1.0 Power Module with EcoSystem

The Power Module with EcoSystem is a QS wired device that resides on the QS link and counts as 1 device of the available 99 devices on the link. Each module has 2 EcoSystem links and each EcoSystem link can have a maximum of 64 EcoSystem drivers/ballasts that can be grouped together in up to 64 zones (128 maximum per module).

Below is a list of important technical documents pertaining to the Power Module with EcoSystem. Please review the information contained within these documents as they will be referred to throughout this document.

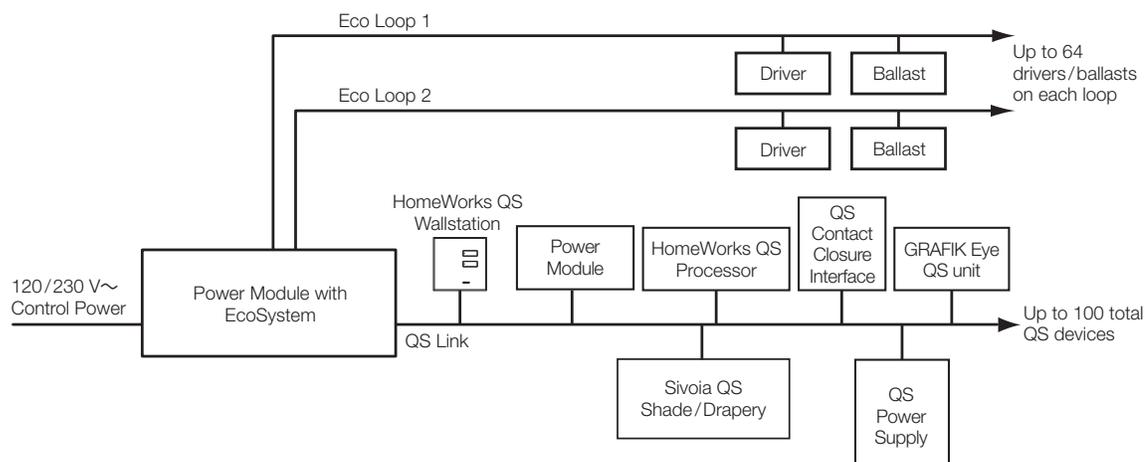
[Power Module with EcoSystem specification submittal \(P/N 369611\)](#)

[Power Module with EcoSystem install guide](#)

[DIN Panels and Accessories specification submittal \(P/N 369788\)](#)

### 1.1 Installation and Wiring

Refer to the documents above for information regarding the installation and wiring of modules. See below for a system example wiring diagram.



#### 1.1.1 Wiring Tips

In addition to what is already called out in the Power Module with EcoSystem specification submittal and install guide, see below for more EcoSystem wiring tips.

- Do NOT connect line voltage to the 2-wire EcoSystem link
- Do NOT connect the 2-wire EcoSystem link to earth ground. Connecting the EcoSystem link to earth ground will result in fixtures flickering or being stuck at low-end.
- EcoSystem wiring can be run in the same conduit as line voltage because it is treated as Class 1 wiring. Please follow all Class 1 safety rules for EcoSystem wiring.
- Any wiring topology (e.g., daisy-chain, star, home run, t-tap) can be used with EcoSystem wiring; however, for ease of troubleshooting, Lutron recommends using daisy-chain wiring.
- If using daisy-chain wiring for the EcoSystem link, Lutron recommends running a “loop back” wire from the last driver/ballast on the link to the Power Module. Do not physically connect the wire to the Power Module. This “loop back” wire would only be connected to the Power Module in the event of a wiring issue in the middle of the EcoSystem link.

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## 1.1 Installation and Wiring (continued)

### 1.1.2 Additional Notes

- Each Power Module is 9 DIN modules wide and can be mounted in a 3<sup>rd</sup> party DIN rail panel or in a Lutron DIN rail Power Module Enclosure.
- Each Power Module counts as 1 device on the QS Link (PDU count = 0)
- Each Power Module has 2 EcoSystem links and each EcoSystem link can control a maximum of 64 EcoSystem drivers/ballasts.

**Note:** Lutron recommends not exceeding 63 drivers/ballasts on any given link. This is to take advantage of the single driver/ballast auto-replacement feature. This feature automatically readdresses a new driver/ballast with the address of the previous driver/ballast that failed or was replaced on the same link. This will work on any EcoSystem link with 63 or less drivers/ballasts on the link. If more than 1 driver/ballast needs to be replaced, the new drivers/ballasts will need to be activated in the software. For more details on driver/ballast activation, see **Section 1.3**.

- EcoSystem drivers/ballasts can be grouped together into lighting zones in the HomeWorks QS software. For more information, see **Section 1.2**. A zone is a group of independently addressed drivers/ballasts which will operate and be controlled as a single unit. Similar to traditional incandescent switch leg with multiple bulbs or fixtures on it.
- Upon completion of the EcoSystem driver/ballast wiring, it is recommended to verify the wiring by using the “Test” button on the Power Module. Refer to the Power Module with EcoSystem install guide for more information.
- Use Area Scene programming. When multiple zones of EcoSystem controlled lighting is part of the same scene, it is best to use HomeWorks QS software version 9.0 or newer to assign EcoSystem zones to the scene. This is accomplished by using the Area Scene feature for the areas which contain the EcoSystem loads. In the **Assignable Items** drop-down menu, these show up as **Lighting – Areas** instead of the more commonly used **Lighting – Zones**. Refer to **Section 1.4** for more information.

## 1.2 Adding and Configuring the Power Module in the Design Tab

### 1.2.1 Creating EcoSystem Loads

1. Click **Design > Loads** and verify that at least the columns listed below are visible. If not, click **Customize Columns** and manually add them in.
  - a. Zone #
  - b. Zone Name
  - c. Load #
  - d. Fixture (required if using a Fixture Schedule)
  - e. Load Type (required if not using a Fixture Schedule)
  - f. Fixture Wattage
  - g. Fixture Qty
  - h. Emergency

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## 1.2 Adding and Configuring the Power Module in the Design Tab (continued)

### 1.2.1 Creating EcoSystem Loads (continued)

2. Add the appropriate number of EcoSystem drivers/ballasts in a selected area by following the steps below.

a. Enter appropriate information in the **Zone #** and **Zone Name** fields (e.g., “1” and “Downlights” respectively). To group multiple drivers/ballasts together in the same zone, modify the zone number of the selected driver/ballast to match the drivers/ballasts already in the desired zone.

b. In the **Load #** field, enter the load number of each EcoSystem driver/ballast using the following format:

Power Module *Panel #*–*Power Module # in Panel*–*EcoSystem Link #*–*EcoSystem Address #*

**Example:** The driver/ballast is connected to Panel 1, Power Module 1 in that panel, EcoSystem link 1 on the Power Module, and the desired address for the driver/ballast is 1. The **Load #** would be “Power Module 1-1-1-1”. Using this naming convention will help in the assignment, addressing, and troubleshooting process.

**Note:** For the address number, start with 1 and increase by 1 for each additional driver/ballast wired on the same EcoSystem link. In order for the single ballast auto-replacement feature to work, do not exceed 63 drivers/ballasts on the same link.

**Note:** On the ceiling plans, indicate the **Load #** of each EcoSystem fixture in the project to aid in the driver/ballast addressing and activation process. Failure to do this will make driver/ballast addressing and troubleshooting very difficult.

c. If a **Fixture Schedule** was created in the project, assign the appropriate EcoSystem fixture to the load in the **Fixture** field. Otherwise, set the **Load Type** column to an EcoSystem load type.

d. Enter the appropriate fixture wattage in the **Fixture Wattage** field and set the **Fixture Qty** field to “1” since each EcoSystem driver/ballast needs its own unique address.

e. In the **Emergency** field, enter the emergency level for the fixture. The emergency level will trigger when the driver/ballast is still receiving line voltage power but the EcoSystem link is disconnected or does not have power. EcoSystem drivers/ballasts will go to their emergency level when one of the EcoSystem link wires is removed or the Power Module is powered down which will remove power from the EcoSystem links.

3. Repeat step 2 for each additional EcoSystem driver/ballast. See below for an example of an area that contains 11 EcoSystem drivers/ballasts and 3 lighting zones (Downlights, Sconces, Pendant).

Loads								
3rd Party HVAC								
2a		2b		2c		2d		2e
Zone #	Zone Name	Load #	Fixture	Load Type	Fixture Wattage	Fixture Qty	Emergency	
1	Downlights	DPM 1-1-1-1	Downlights - EcoSystem Ballast	Fluorescent EcoSystem	25	1	100%	
1	Downlights	DPM 1-1-1-2	Downlights - EcoSystem Ballast	Fluorescent EcoSystem	25	1	100%	
1	Downlights	DPM 1-1-1-3	Downlights - EcoSystem Ballast	Fluorescent EcoSystem	25	1	100%	
1	Downlights	DPM 1-1-1-4	Downlights - EcoSystem Ballast	Fluorescent EcoSystem	25	1	100%	
1	Downlights	DPM 1-1-1-5	Downlights - EcoSystem Ballast	Fluorescent EcoSystem	25	1	100%	
1	Downlights	DPM 1-1-1-6	Downlights - EcoSystem Ballast	Fluorescent EcoSystem	25	1	100%	
2	Sconces	DPM 1-1-1-7	Sconces - EcoSystem LED Driver	LED EcoSystem	15	1	100%	
2	Sconces	DPM 1-1-1-8	Sconces - EcoSystem LED Driver	LED EcoSystem	15	1	100%	
2	Sconces	DPM 1-1-1-9	Sconces - EcoSystem LED Driver	LED EcoSystem	15	1	100%	
2	Sconces	DPM 1-1-1-10	Sconces - EcoSystem LED Driver	LED EcoSystem	15	1	100%	
3	Pendant	DPM 1-1-1-11	Pendant - EcoSystem Ballast	Fluorescent EcoSystem	40	1	100%	

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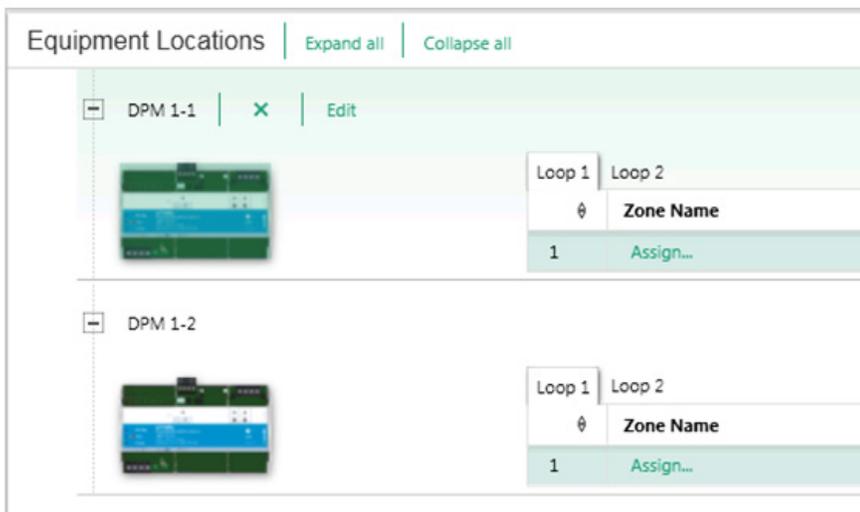
## 1.2 Adding and Configuring the Power Module in the Design Tab (continued)

### 1.2.2 Adding Power Modules and Assigning Loads to EcoSystem Links

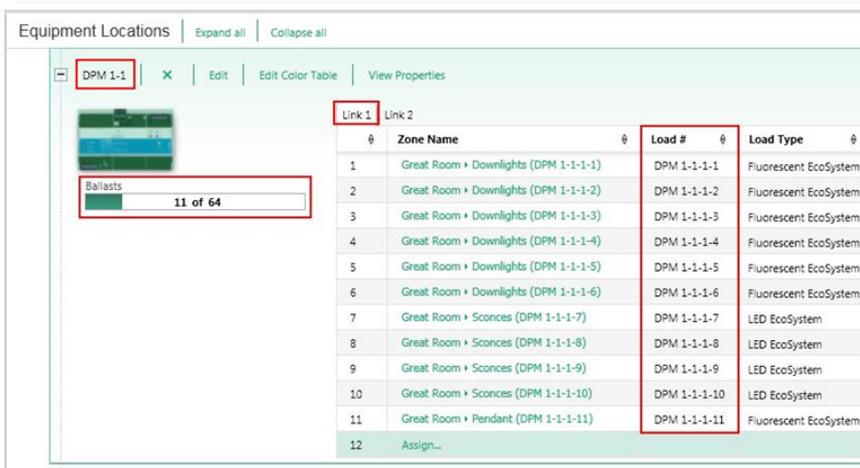
1. Navigate to **design > equipment** and add a “DIN Rail Power Module Eco” to the Toolbox. If the modules will be mounted in Lutron DIN rail panels, add the panels to the Toolbox, too.
2. Add the appropriate number of Power Modules into the project and name them using the following format:

Power Module *Panel #–Power Module #*

**Example:** 2 Power Modules mounted in Lutron DIN rail panels that house 2 Power Modules each (e.g., HQ-DP2). The first module would be named “Power Module 1-1” and the second module “Power Module 1-2”.



3. Click on the **Assign** link in the **Zone Name** field for the Power Module that will have drivers/ballasts assigned to it. Assign each driver/ballast to the appropriate EcoSystem link and address (1–64). See below for an example of drivers/ballasts assigned to EcoSystem link 1. Notice how the **Load #** of each driver/ballast clearly defines the Panel #, Power Module #, EcoSystem link #, and address.



4. After assigning all EcoSystem drivers/ballasts to the appropriate EcoSystem links, assign all Power Module to the QS link of the processors on the **design > Link Assignment** screen. Remember that each Power Module counts as 1 of the available 99 devices on the QS link. Also, each zone of EcoSystem drivers/ballasts (not each driver/ballast individually) counts as 1 of the available 512 zones on the QS link.

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## 1.3 Activating the Power Modules and EcoSystem Drivers/Ballasts

### 1.3.1 Activate Power Modules

1. Navigate to **activate > devices** and select the processor QS links that the Power Modules are assigned to.

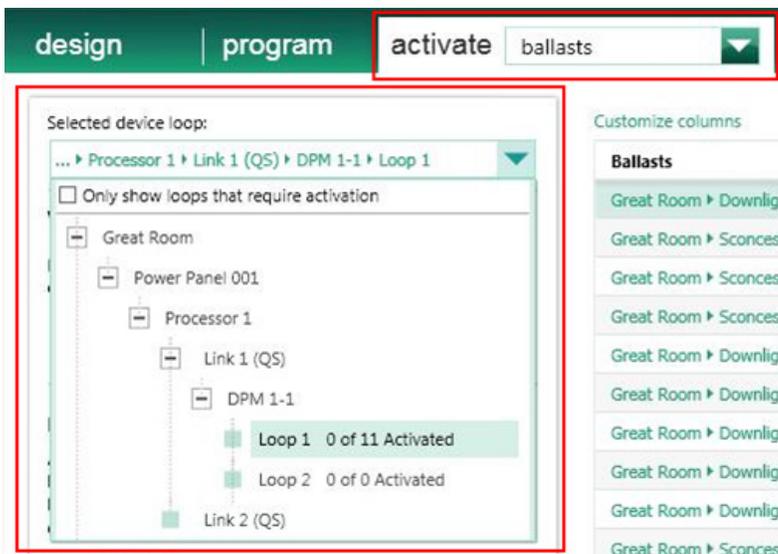


2. Activate the Power Modules on the QS links by either pressing and holding a button on each Power Module, manually entering each Power Module serial number, or scanning each Power Module serial number. The Power Modules must be activated before activating and addressing any EcoSystem drivers/ballasts.

Activated Devices	Type	Serial #	Status
Great Room > DPM 1-1	DIN Rail Power Module Eco	006E233A	Good

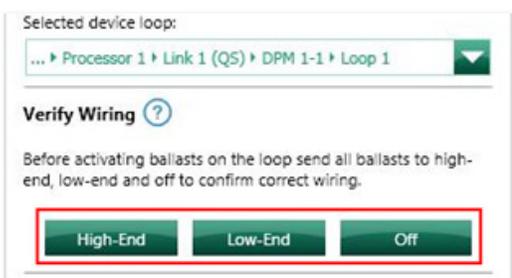
### 1.3.2 Activate EcoSystem Drivers/Ballasts

1. Navigate to **activate > drivers** or **activate > ballasts** and select the EcoSystem link of the drivers/ballasts to be activated from the **Selected device loop** drop-down menu.



2. After selecting the EcoSystem link to be activated, verify the wiring of all drivers/ballasts on the link by clicking **High End**, **Low-end**, and **Off**. If any drivers/ballasts fail to respond as expected, correct the issue before proceeding.

**Note:** The EcoSystem link wiring can be tested at the Power Module by pressing the “Test” button on the unit. See **Section 1.1** for more information.

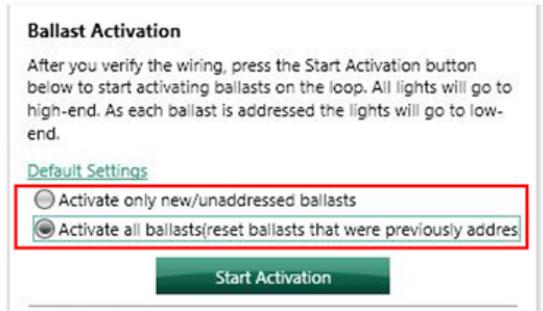


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### 1.3 Activating the Power Modules and EcoSystem Drivers/Ballasts (continued)

#### 1.3.1 Activate Power Modules (continued)

3. Activate all new drivers/ballasts on the link. If an entire link of new drivers/ballasts are being activated for the first time, select **Activate all drivers/ballasts**. If some of the drivers/ballasts on the link have already been addressed, select **Activate only new/unaddressed drivers/ballasts** so that the drivers/ballasts that are already addressed do not get unaddressed. Click **Start Activation**.



4. Verify that the number of drivers/ballasts detected on the link matches the number of drivers/ballasts assigned to that link in the database.



5. Click **Customize columns** and click the box **Show only unactivated drivers/ballasts**. Notice how the last number in each parentheses matches **Address On Link**. This will help in the addressing and troubleshooting process.

Ballasts	Address On Link	Status	Action
Great Room > Downlights (DPM 1-1-1-1)	1	-	Activate
Great Room > Downlights (DPM 1-1-1-2)	2	-	Activate
Great Room > Downlights (DPM 1-1-1-3)	3	-	Activate
Great Room > Downlights (DPM 1-1-1-4)	4	-	Activate
Great Room > Downlights (DPM 1-1-1-5)	5	-	Activate
Great Room > Downlights (DPM 1-1-1-6)	6	-	Activate
Great Room > Sconces (DPM 1-1-1-7)	7	-	Activate
Great Room > Sconces (DPM 1-1-1-8)	8	-	Activate
Great Room > Sconces (DPM 1-1-1-9)	9	-	Activate
Great Room > Sconces (DPM 1-1-1-10)	10	-	Activate
Great Room > Pendant (DPM 1-1-1-11)	11	-	Activate

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### 1.3 Activating the Power Modules and EcoSystem Drivers/Ballasts (continued)

#### 1.3.1 Activate Power Modules (continued)

6. A random fixture on the link will begin to flash in order to identify itself. If there are multiple areas on the same EcoSystem link (which is likely), it is easiest to address drivers/ballasts on an area by area basis rather than walking throughout the residence trying to find the fixture that is flashing. To aid in this process, click **Flash Next Driver/Ballast** until a fixture in the area to be activated starts to flash.



**Example:** Drivers/ballasts are being activated in the Great Room. Click **Flash Next Driver/Ballast** until a fixture in the Great Room begins to flash. Using the ceiling plan with the load numbers of each EcoSystem fixture, identify the fixture that is flashing and click **Activate** in the **Action** column for that fixture.

Customize columns  Show only unactivated ballasts

Ballasts	Address On Link	Status	Action
Great Room ▶ Downlights (DPM 1-1-1-1)	1	-	Activate
Great Room ▶ Downlights (DPM 1-1-1-2)	2	-	Activate
Great Room ▶ Downlights (DPM 1-1-1-3)	3	-	Activate
Great Room ▶ Downlights (DPM 1-1-1-4)	4	-	Activate
Great Room ▶ Downlights (DPM 1-1-1-5)	5	-	Activate
Great Room ▶ Downlights (DPM 1-1-1-6)	6	-	Activate
Great Room ▶ Sconces (DPM 1-1-1-7)	7	-	Activate
Great Room ▶ Sconces (DPM 1-1-1-8)	8	-	Activate
Great Room ▶ Sconces (DPM 1-1-1-9)	9	-	Activate
Great Room ▶ Sconces (DPM 1-1-1-10)	10	-	Activate
Great Room ▶ Pendant (DPM 1-1-1-11)	11	-	Activate

**Note:** If a flashing fixture is skipped before being activated, click **Flash Previous Driver/Ballast** to go back to that fixture.

7. After successfully activating a driver/ballast, the **Status** column will show **Good** ✓ and the **Action** column will show **Deactivate**.

Customize columns  Show only unactivated ballasts

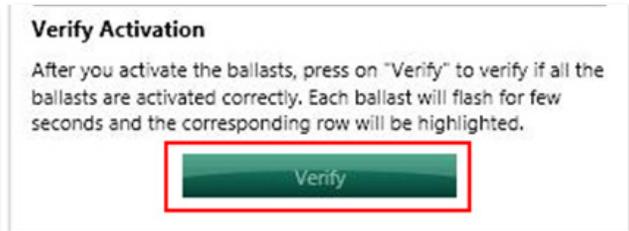
Ballasts	Address On Link	Status	Action
Great Room ▶ Downlights (DPM 1-1-1-1)	1	-	Activate
Great Room ▶ Downlights (DPM 1-1-1-2)	2	Good ✓	Deactivate
Great Room ▶ Downlights (DPM 1-1-1-3)	3	-	Activate
Great Room ▶ Downlights (DPM 1-1-1-4)	4	-	Activate
Great Room ▶ Downlights (DPM 1-1-1-5)	5	-	Activate
Great Room ▶ Downlights (DPM 1-1-1-6)	6	-	Activate
Great Room ▶ Sconces (DPM 1-1-1-7)	7	-	Activate
Great Room ▶ Sconces (DPM 1-1-1-8)	8	-	Activate
Great Room ▶ Sconces (DPM 1-1-1-9)	9	-	Activate
Great Room ▶ Sconces (DPM 1-1-1-10)	10	-	Activate
Great Room ▶ Pendant (DPM 1-1-1-11)	11	-	Activate

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## 1.3 Activating the Power Modules and EcoSystem Drivers/Ballasts (continued)

### 1.3.1 Activate Power Modules (continued)

8. Repeat step 6 until all drivers/ballasts on the link have been successfully addressed and activated.
9. When all drivers/ballasts on a link have been addressed and activated, click **Exit Activation** to go back to the main activation screen.
10. Verify that all drivers/ballasts were activated in the correct areas using the correct addresses. To do this, click **Verify**.



11. Click **Start** to begin the verification process. Once the verification process begins, the drivers/ballasts will flash one at a time in the order that they are listed on the screen. The driver/ballast that is flashing will be highlighted in the grid. The grid can be reordered by clicking the column headers. The verification process can be paused and resumed at any time.

Selected device loop:  
 ... ▶ Processor 1 ▶ Link 1 (QS) ▶ DPM 1-1 ▶ Loop 1

**Verifying Activation**

The ballast corresponding to the selected row will flash for few seconds. Thereafter, the next row will be highlighted and the corresponding ballast will start flashing.

You can sort the rows by column headers.

You can change the row from where the verification starts by clicking on the row.

You can pause and resume verification.

Exit Start

Customize columns  Show only unactivated ballasts

Ballasts	Address On Link
Great Room ▶ Downlights (DPM 1-1-1-1)	1
Great Room ▶ Downlights (DPM 1-1-1-2)	2
Great Room ▶ Downlights (DPM 1-1-1-3)	3
Great Room ▶ Downlights (DPM 1-1-1-4)	4
Great Room ▶ Downlights (DPM 1-1-1-5)	5
Great Room ▶ Downlights (DPM 1-1-1-6)	6
Great Room ▶ Sconces (DPM 1-1-1-7)	7
Great Room ▶ Sconces (DPM 1-1-1-8)	8
Great Room ▶ Sconces (DPM 1-1-1-9)	9
Great Room ▶ Sconces (DPM 1-1-1-10)	10
Great Room ▶ Pendant (DPM 1-1-1-11)	11

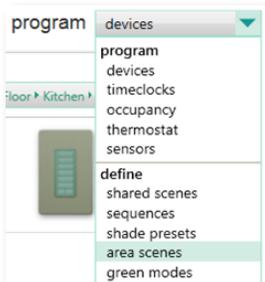
12. Once all drivers/ballasts have been verified, click **Exit**.
13. Repeat steps 1–12 for all other EcoSystem links in the project.

## 1.4 Programming EcoSystem Zones in the HomeWorks QS Software

- EcoSystem zones can be programmed to any system trigger (e.g., keypad button, contact closure, timeclock event) or 3<sup>rd</sup> party control similar to any other lighting zone.

**Note:** The HomeWorks QS software allows for a maximum fade time of 4 hours (14,400 seconds); however, EcoSystem drivers/ballasts support a maximum fade time of 1 hour (3600 seconds). Any fade time for EcoSystem loads greater than 1 hour will fade over the course of 1 hour.

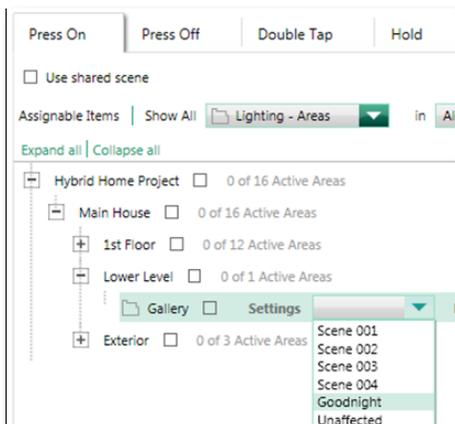
- For optimal performance, use HomeWorks QS software version 9.0 and newer with **area scenes**. **area scenes** are similar to **shared scenes** but **area scenes** only applies to a single area of the area tree vs. **shared scenes** can span multiple areas. Create **area scenes** by navigating to **program > area scenes** in the **program** tab drop down menu.



Each area has a default set of **area scenes** already created which adjusts all lighting zones in the area to common preset levels (i.e., 100%, 75%, 50%, 25%, and 0%). These default presets can be renamed and re-programmed or new preset scenes can be created in addition to the default presets. In the case of EcoSystem devices, presets would typically be created and programmed to control only the EcoSystem devices within the space. Zones that are not to be affected by a particular scene can be set to unaffected. When naming the preset, Lutron recommends naming it after the scene that it will be assigned to (e.g., Goodnight, Welcome). Each area within the database can have 16 **area scenes** plus an off scene.



Once the **area scenes** have been defined, they can be assigned to the trigger by selecting **Lighting – Areas** under the **Assignable Items** drop down menu.



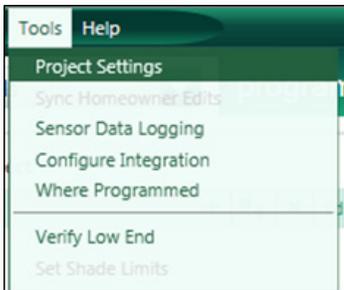
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## 1.4 Programming EcoSystem Zones in the HomeWorks QS Software (continued)

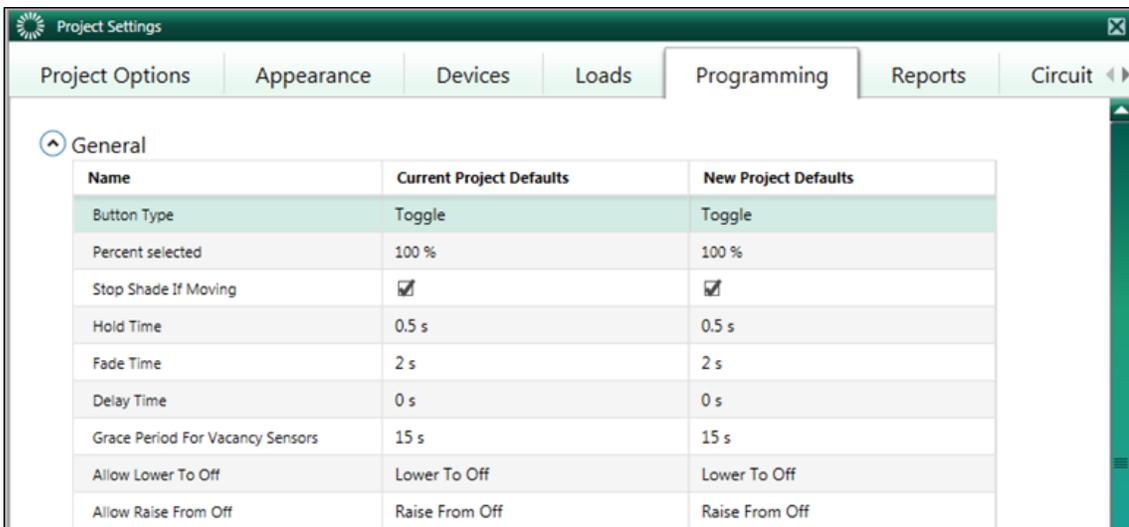
### 1.4.1 Area Scene Programming Recommendations

- Do not utilize different delays for zones within the same area. If a staggered or delayed on affect is desired, use standard lighting zone programming to reduce transfer time. No warnings or pop-up messages will appear in the software because it assumes that different delay times are intentional.
- Raising the light level from off or lowering it to off may introduce a “popcorn” effect between zones even if **area scenes** have been applied to the last button pressed. For applications with a lot of EcoSystem lighting, Lutron recommends disabling the ability to raise from off and lower to off.
- To disable the ability to raise from off and lower to off:

1. In the **Tools** drop down menu, select **Project Settings**.



2. Click the **Programming** tab and change **Allow Lower to Off** setting to **Lower to Low-end**. Lutron recommends only doing this for **Current Project Defaults** so that only the current database is affected by this change.
3. Change **Allow Raise From Off** setting to **Do Not Raise From Off**. Lutron recommends only doing this for **Current Project Defaults** so that only the current database is affected by this change.



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## 1.5 Replacing EcoSystem Modules

1. Navigate to **Activate > Devices** and select the processor QS link that the Power Modules are assigned to.



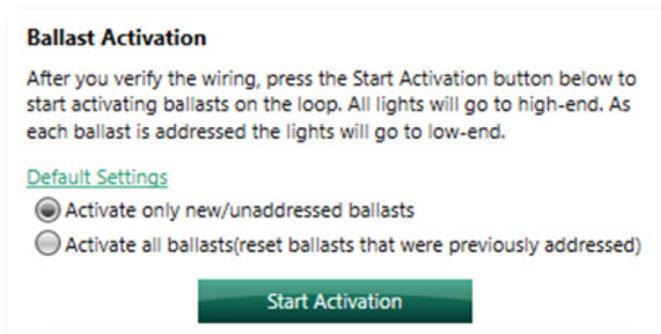
2. Find the Power Module that needs to be replaced and deactivate it.

Devices	Type	Serial #	Activated	Connected
Basement > Electrical closet	DIN Rail Power Module Eco	013C2E82	Good	✓ Connected

3. Replace the Power Module and activate the new Power Module. See **Section 1.3** for instructions.
4. Transfer the database with the new Power Module to the processors. At this point, the system will be up and running with the new Power Module.

**Note:** For HomeWorks QS software versions older than 13.0, the drivers/ballasts will appear as unactivated until **Activate only new/unaddressed drivers/ballasts** is selected.

**Note:** For HomeWorks QS software version 13.0 or newer, drivers/ballasts will show as activated once the new Power Module is activated.



5. Click **Start Activation** and all the previously addressed drivers/ballasts will appear as activated.

Ballasts	Status
Basement > basement 1-1 (9)	Good ✓
Basement > basement 1-2 (10)	Good ✓
Basement > basement 1-3 (11)	Good ✓
Basement > basement 1-4 (12)	Good ✓

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## 2.0 GRAFIK Eye QS with EcoSystem

GRAFIK Eye QS with EcoSystem units are available in a 6, 8, or 16 zone models. Zones 1, 2, and 3 on any GRAFIK Eye QS with EcoSystem unit are integral line voltage dimming zones but can be configured to control EcoSystem lighting zones as well. GRAFIK Eye QS with EcoSystem units can be used as either QS wired devices or as RF devices in the system.

Each GRAFIK Eye QS with EcoSystem unit can have a maximum of 64 EcoSystem drivers/ballasts connected to it using the 2-wire EcoSystem digital communication bus. EcoSystem drivers/ballasts can be grouped together into local zones at the GRAFIK Eye QS with EcoSystem.

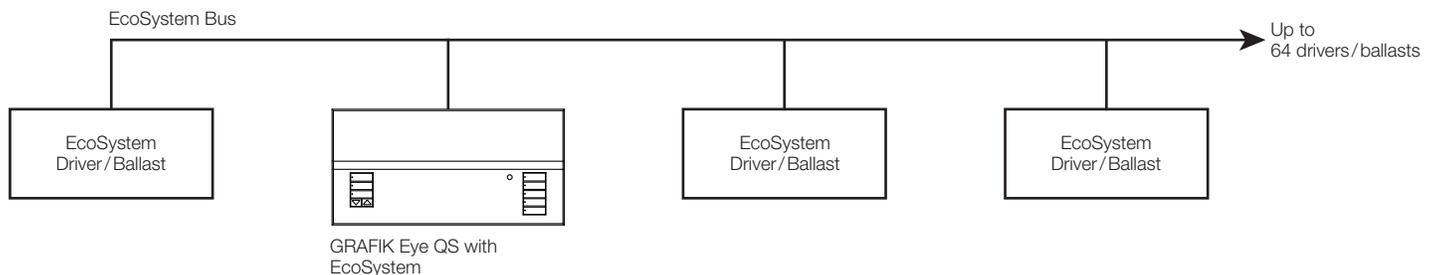
Below is a list of important technical documents pertaining to the GRAFIK Eye QS with EcoSystem unit. Please review the information contained within these documents as they will be referred to throughout this document:

[GRAFIK Eye QS with EcoSystem Specification Submittal](#)

[GRAFIK Eye QS with EcoSystem Installation and Operation Guide](#)

### 2.1 Installation and Wiring

Refer to the documents above for information regarding the wiring, local addressing, and zone configuration of EcoSystem drivers/ballasts connected to GRAFIK Eye QS with EcoSystem units. See below for a wiring example.



#### 2.1.1 Wiring Tips

In addition to what is already called out in the EcoSystem documents, see below for more EcoSystem wiring tips.

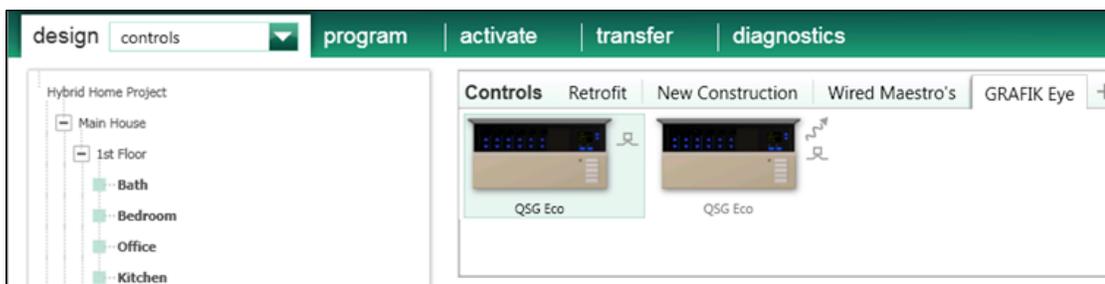
- Do NOT connect line voltage to the 2-wire EcoSystem link
- Do NOT connect the 2-wire EcoSystem link to earth ground. Connecting the EcoSystem link to earth ground will result in fixtures flickering or being stuck at low-end.
- EcoSystem wiring can be run in the same conduit as line voltage because it is treated as Class 1 wiring. Please follow all Class 1 safety rules for EcoSystem wiring.
- Any wiring topology (e.g., daisy-chain, star, home run, t-tap) can be used with EcoSystem wiring; however, for ease of troubleshooting, Lutron recommends using daisy-chain wiring.
- If using daisy-chain wiring for the EcoSystem link, Lutron recommends running a “loop back” wire from the last driver/ballast on the link to the Power Module. Do not physically connect the wire to the Power Module. This “loop back” wire would only be connected to the Power Module in the event of a wiring issue in the middle of the EcoSystem link.

#### 2.1.2 Additional Notes

- Each GRAFIK Eye QS with EcoSystem unit counts as 1 device on the QS or RF Link (PDU count = 0).
- Each GRAFIK Eye QS with EcoSystem unit has 1 EcoSystem link that can control a maximum of 64 EcoSystem drivers/ballasts.
- EcoSystem drivers/ballasts are grouped together into lighting zones at the GRAFIK Eye QS with EcoSystem unit. For more information, refer to the **EcoSystem Setup** section of the **GRAFIK Eye QS with EcoSystem Installation and Operation Guide**.

## 2.2 Adding and Configuring the GRAFIK Eye QS with EcoSystem in the Design Tab

1. Navigate to **design > controls** and add a GRAFIK Eye QS with EcoSystem unit to the toolbox.



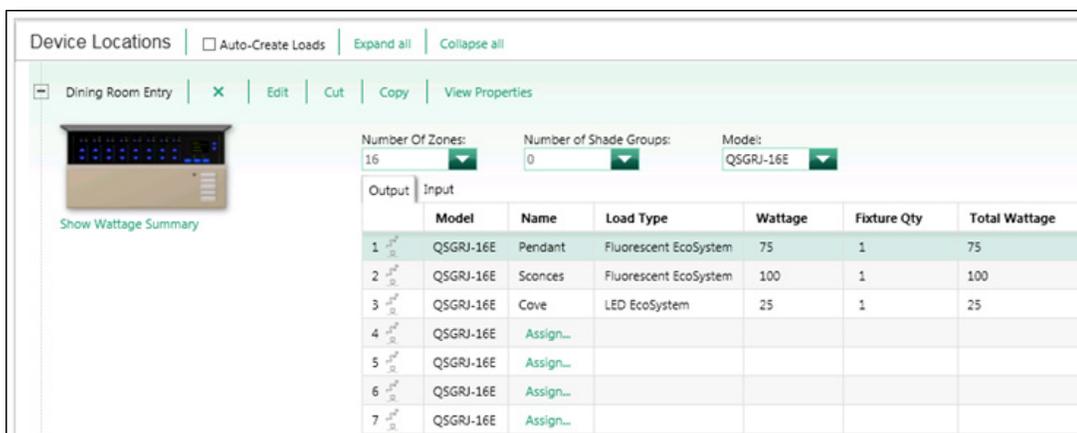
2. Navigate to design > loads and add the appropriate number of EcoSystem LED and/or fluorescent loads in each area. Each GRAFIK Eye QS with EcoSystem unit can have a maximum of 64 EcoSystem drivers/ballasts connected to it and can control a maximum of up to 16 zones. However, the **Fixture Qty** field is unable to be changed to anything other than 1 for an EcoSystem load. For EcoSystem zones that contain multiple drivers/ballasts, leave the fixture quantity set to “1” and enter the total fixture wattage in the **Fixture Wattage** field.

**Example:** 4 EcoSystem sconce fixtures that are 25 W each and in the same zone. Enter “100” in the **Fixture Wattage** field and leave the **Fixture Qty** set to “1”.

Zone #	Zone Name	Load #	Load Type	Fixture Wattage	Fixture Qty	Total Watts
1	Pendant	109A	Fluorescent EcoSystem	75	1	75
2	Sconces	109B	Fluorescent EcoSystem	100	1	100
3	Cove	109C	LED EcoSystem	25	1	25

**Note:** In the software it may appear that only 6, 8, or 16 ballasts are connected to the GRAFIK Eye QS with EcoSystem unit. If there are multiple drivers/ballasts grouped into zones, each GRAFIK Eye QS with EcoSystem unit can not have more than 64 drivers/ballasts.

3. Add the appropriate number of GRAFIK Eye QS with EcoSystem units to each area on the **design > controls** screen and assign each EcoSystem zone to the corresponding unit. The first 3 zones can be used as line voltage dimming zones or they can be used to control EcoSystem drivers/ballasts.



## 2.3 Program and Activation Tabs

- EcoSystem drivers/ballasts can be programmed to any system triggers (e.g., keypad button, contact closure, timeclock event) or 3<sup>rd</sup> party control like other load types.

**Note:** The programming suggestions for the Power Module with EcoSystem in **Section 1.4** do not pertain to the GRAFIK Eye QS with EcoSystem unit. The changes for EcoSystem programming in the HomeWorks QS software do not apply to EcoSystem zones controlled by GRAFIK Eye QS with EcoSystem units.

- Device activation of GRAFIK Eye QS with EcoSystem units can occur either before or after the EcoSystem drivers/ballasts have been addressed and grouped into zones locally at the GRAFIK Eye QS with EcoSystem unit.

**Note:** All driver/ballast addressing and zoning is done locally at the GRAFIK Eye QS with EcoSystem unit, not in the HomeWorks QS software. Refer to the **GRAFIK Eye QS with EcoSystem Installation and Operation Guide** for more information on the wiring, local addressing, and zone configuration of the EcoSystem drivers/ballasts connected to each GRAFIK Eye QS with EcoSystem unit.

## Appendix A – Dimming Range of EcoSystem LED Drivers

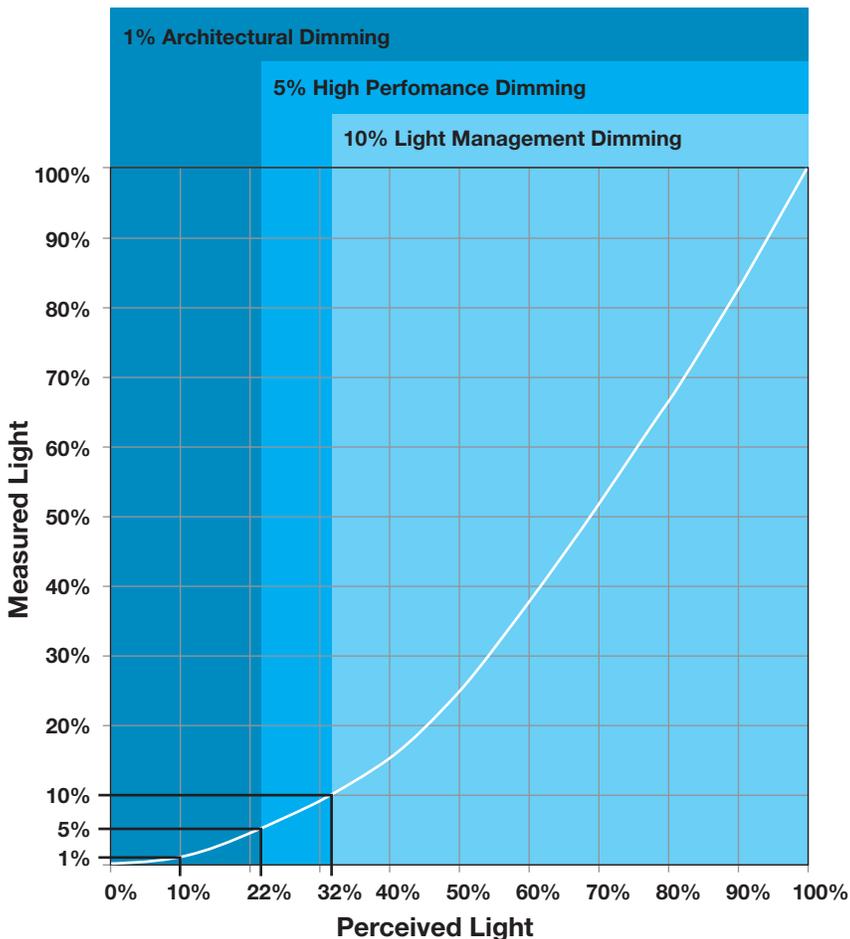
EcoSystem LED drivers support both a 1% and a more cost effective 5% low-end. Understanding low-end is critical to apply LED lighting to areas of a residence. The 1% and 5% low-end values indicate that a fixture with one of those two options will output 1% or 5% of its light intensity. Light intensity is defined as the luminance on a 1 ft<sup>2</sup> (0.3 m<sup>2</sup>) surface of which there is a uniformly distributed flux of one lumen. These percentages are measured using a light meter.

The most important aspect of understanding the dimming range is the difference between the low-end measured by a light meter vs. the perceived low-end as observed by the human eye. The human eye is much more dynamic than a light meter in that it can adjust to varying conditions within the environment. If the lights are dimmed to a low level, the human eye will compensate by dilating the pupil to allow more light into the eye. The opposite is true at the brighter end of the range.

While a dimming range of 20–100% sounds like a large and satisfactory range, an understanding of measured vs. perceived light will typically indicate that a 20% low-end will be inadequate in most lighting applications.

Measured Low-End	Perceived Low-End
1%	10%
5%	22%
10%	32%
20%	45%

Home theaters, bedrooms, and dining rooms ideally require the ability to achieve a low-end of 1% or less; however, areas like foyers, hallways, and stairwells may be fine utilizing 5% low-end. For most residential applications, low-end levels above 5% will likely produce an undesirable result because the eye will perceive the space to be brighter than what it actually is. The chart below is a visual representation of the relationship between measured and perceived light levels across the entire dimming range.



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