

Programming Residential Systems with Lutron LED Drivers

Overview

Lutron LED drivers deliver smooth, flicker-free, continuous, high-performance dimming with outstanding quality and superior reliability, removing the issue of LED compatibility. Available for fixtures from over 300 manufacturers globally, Lutron LED drivers offer the flexibility of zone-control with 2-wire or 3-wire dimmers or individually addressable fixtures with HomeWorks digital control. This application note explains programming best practices when using these LED drivers with Lutron residential systems.

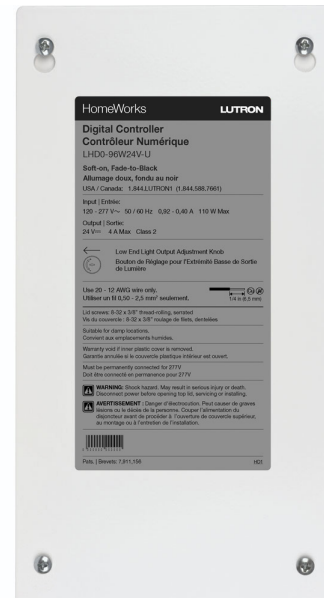
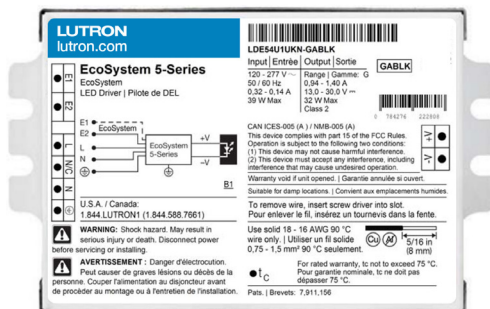


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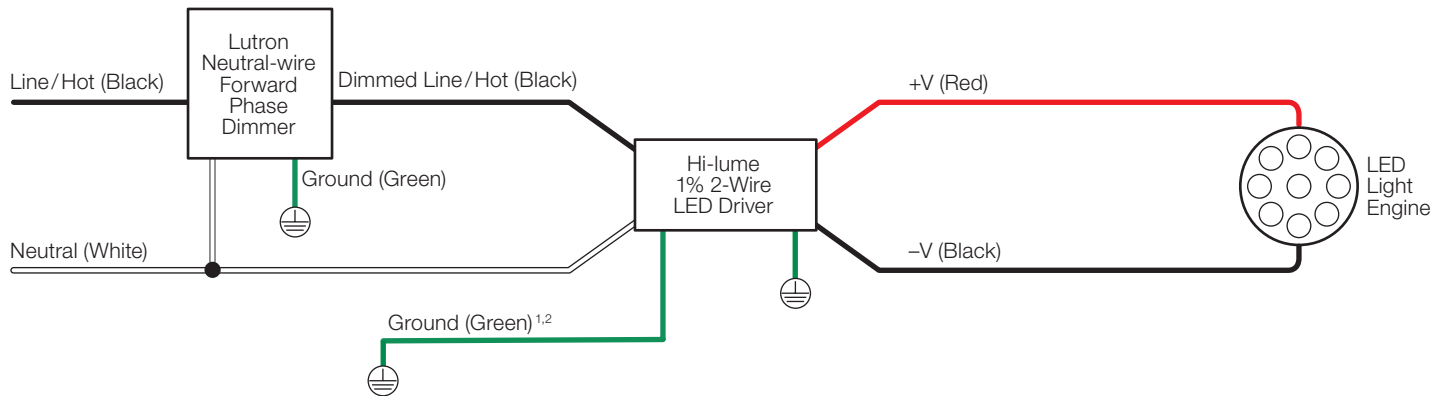
Wiring Diagram Overview

Different drivers will require different wiring configurations. It is essential to have the correct wires in place to support the selected drivers that are being used, both for power and control. Below are basic diagrams that illustrate the difference between 2-Wire controls, 3-Wire controls, and EcoSystem controls. The diagrams below are only meant to illustrate the differences between control types. Refer to the driver installation guides for comprehensive wiring diagrams.

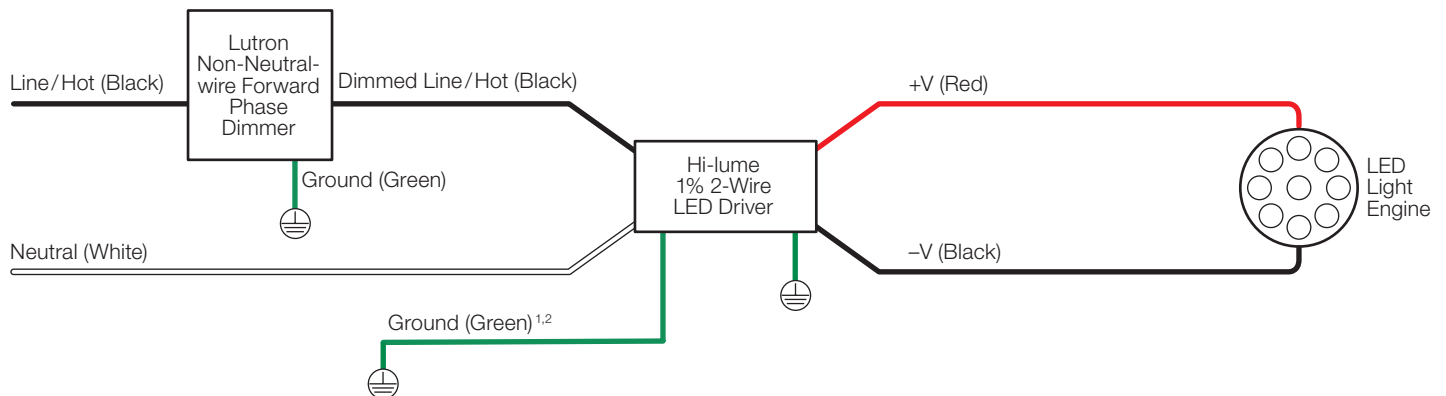
2-Wire Controls

The 2-wire control is an analog control method that is used to operate Lutron LED drivers. The dimmers set the intensity of the drivers and provide power to the drivers by providing a single line-voltage, phase-control signal from the dimmer to the driver on a dimmed hot wire. All drivers connected to a single dimmed hot wire must be on the same circuit and will be controlled together. The number of drivers that can be connected to a single circuit is limited by the dimmer being used.

Neutral Wire Application



Non-Neutral Wire Application



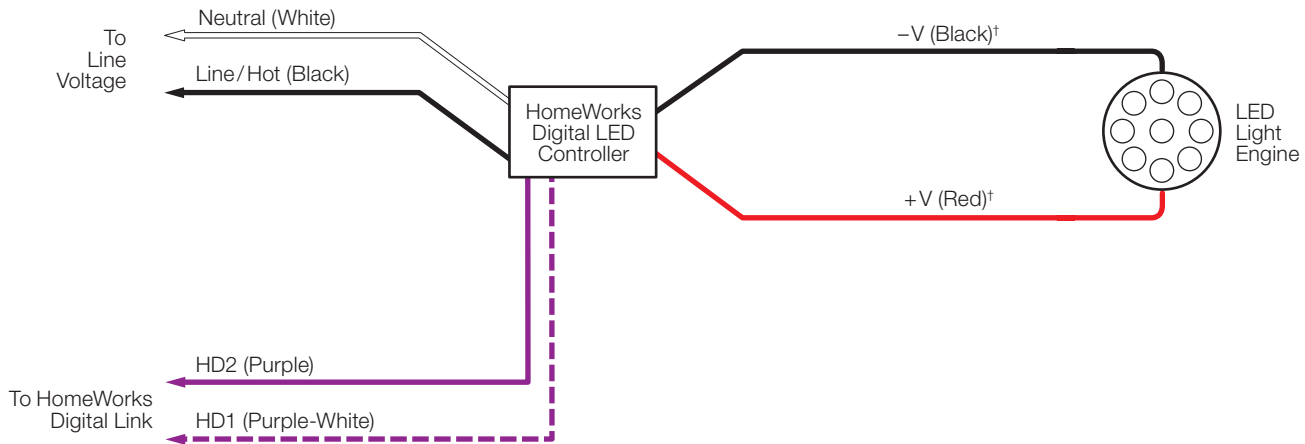
¹ Ground wire connection available on K case models only.

² Fixture and driver case must be grounded in accordance with local and national electrical codes.

Wiring Diagram Overview *(continued)*

HomeWorks Digital Controls (HomeWorks only)

The HomeWorks digital technology standard allows individual addressability of each fixture to easily reconfigure lighting zones and accommodate changes in a space without rewiring. This feature provides a soft, incandescent-like transition between 0.1% and off.



Hi-lume 1% 2-Wire Driver *(continued)*

Compatible Controls

The Hi-lume 1% 2-Wire LTE LED driver is compatible with the following HomeWorks and RadioRA 2 controls:

HomeWorks

Product	Part Number	Drivers per Control	Load-Type Setting
HomeWorks wallbox power module *	LQRJ-WPM-6P	2–10 (per output); 26 total per module	Hi-lume 1% 2-Wire LTE LED
GRAFIK Eye QS control unit *	QSGRJ-	2–10 (per output); 26 total per unit	Hi-lume 1% 2-Wire LTE LED
Phase adaptive DIN power module	LQSE-4A-120-D	1–6 (per output); 2 A maximum driver input current	Hi-lume 1% 2-Wire LTE LED
HomeWorks DIN power module *	LQSE-4A1-D	1–6 (per output); 1 A maximum driver input current	Hi-lume 1% 2-Wire LTE LED
HomeWorks LED+ DIN power module	LQSE-4A5-120-D	Zone 1: 1–20; 4 A maximum driver input current Zones 2–4: 1–13; 3 A maximum driver input current	Hi-lume 1% 2-Wire LTE LED
HomeWorks C•L dimmer	HQRD-6CL	1–6; 250 W max	Hi-lume 1% 2-Wire LTE LED
HomeWorks adaptive dimmer *	HQRD-6NA-	1–10; 400 W max	Hi-lume 1% 2-Wire LTE LED
HomeWorks 600 W dimmer *	HQRD-6ND-	1–8; 350 W max	Hi-lume 1% 2-Wire LTE LED
HomeWorks 1000 W dimmer *	HQRD-10ND-	1–13	Hi-lume 1% 2-Wire LTE LED
HomeWorks LED+ dimmer	HQRD-PRO-	1–20; 400 W max	Hi-lume 1% 2-Wire LTE LED
HomeWorks C•L hybrid keypad	HQRD-HNX	1–10; 200 W max	Hi-lume 1% 2-Wire LTE LED
HomeWorks GRAFIK T C•L dimmer	HQRT-G25LW	1–10; 400 W max	Hi-lume 1% 2-Wire LTE LED
HomeWorks phase selectable dimmer	HQRT-G5NEW	1–10; 400 W max	Hi-lume 1% 2-Wire LTE LED
GRAFIK T RF C•L hybrid keypad	HQRT-GHXB	1–10; 400 W max	Hi-lume 1% 2-Wire LTE LED

Note: All wattages are in terms of input wattage to the LED driver.

* See note on page 6 for control compatibility.

RadioRA 2

Product	Part Number	Drivers per Control	Low-End Setting/Load-Type Setting
RadioRA2 wallbox power module	LQRJ-WPM-6P	2–10 (per output); 26 total per module	Hi-lume 1% 2-Wire LTE LED
GRAFIK Eye QS control unit *	QSGRJ-	2–10 (per output); 26 total per unit	Hi-lume 1% 2-Wire LTE LED
RadioRA 2 C•L dimmer	RRD-6CL	1–6	Hi-lume 1% 2-Wire LTE LED
RadioRA 2 LED+ dimmer	RRD-PRO-	1–20; 400 W max	Hi-lume 1% 2-Wire LTE LED
RadioRA 2 adaptive dimmer *	RRD-6NA-	1–10; 400 W max	Hi-lume 1% 2-Wire LTE LED
RadioRA 2 600 W dimmer	RRD-6ND-	1–8; 350 W max	Hi-lume 1% 2-Wire LTE LED
RadioRA 2 1000 W dimmer *	RRD-10ND-	1–13	Hi-lume 1% 2-Wire LTE LED
RadioRA 2 C•L hybrid keypad	RRD-HNX	1–10; 200 W max	Hi-lume 1% 2-Wire LTE LED

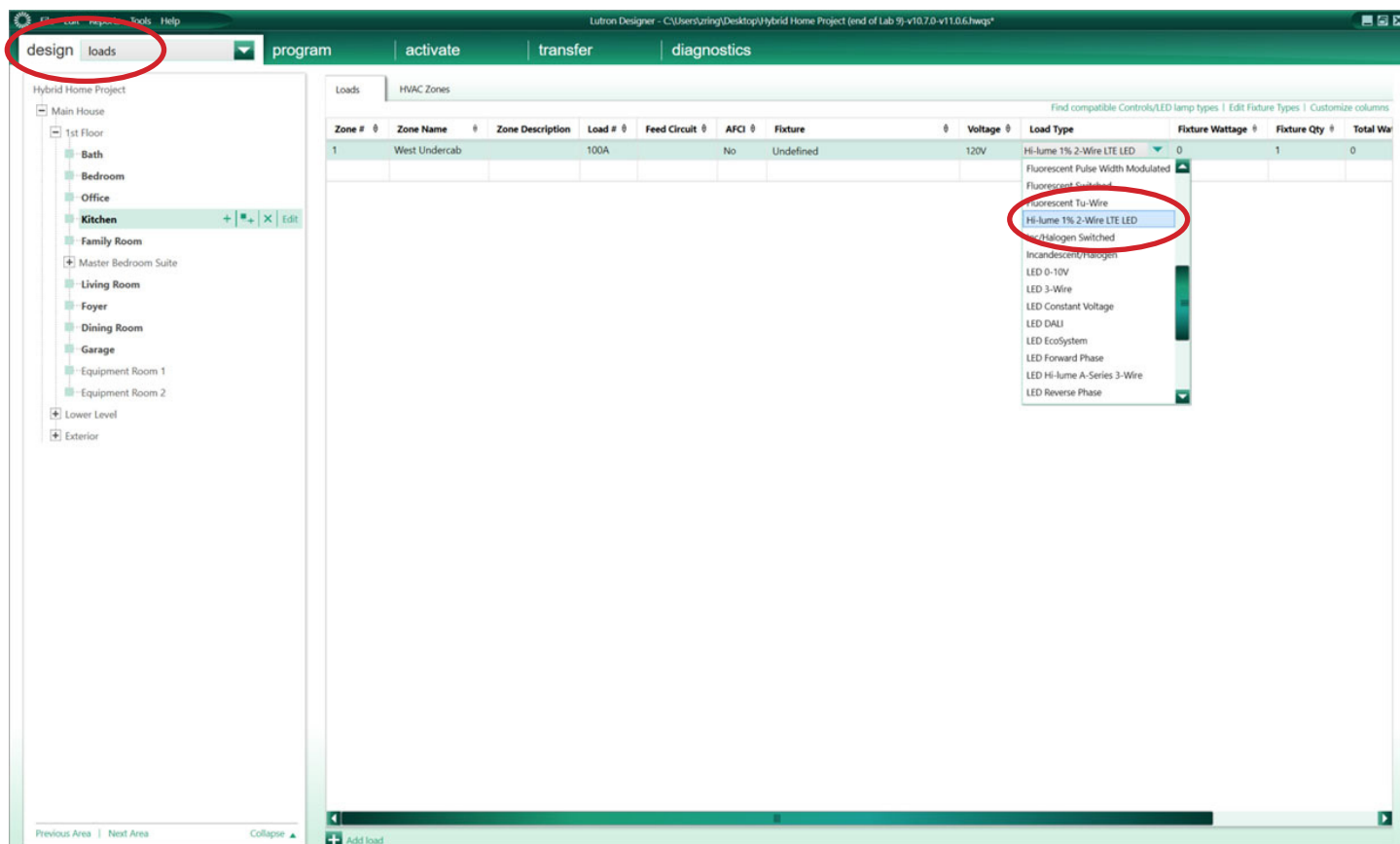
Note: All wattages are in terms of input wattage to the LED driver.

* See note on page 6 for control compatibility.

Hi-lume 1% 2-Wire Driver (continued)

HomeWorks: Load Schedule

Using the Lutron Designer programming software, add the load to the load schedule by going to the **design>loads** tab and selecting the appropriate load type for the driver. For the Hi-lume 1% 2-Wire LED Driver select **Hi-lume 1% 2-Wire LTE LED**.



The software automatically populates the **High-End** and the **Low-End** fields with the appropriate values for the selected driver. 78 (High) and 32 (Low) will provide the full dimming range (1-100%).

Loads											
HVAC Zones											
Find compatible Controls/LED lamp types Edit Fixture Types Customize columns											
Circuit	AFCI	Fixture	Voltage	Load Type	Fixture Wattage	Fixture Qty	Total Watts	Interface	Interface Qty	High End	Low End
No	Undefined	120V	Hi-lume 1% 2-Wire LTE LED	27	1	31				78	32

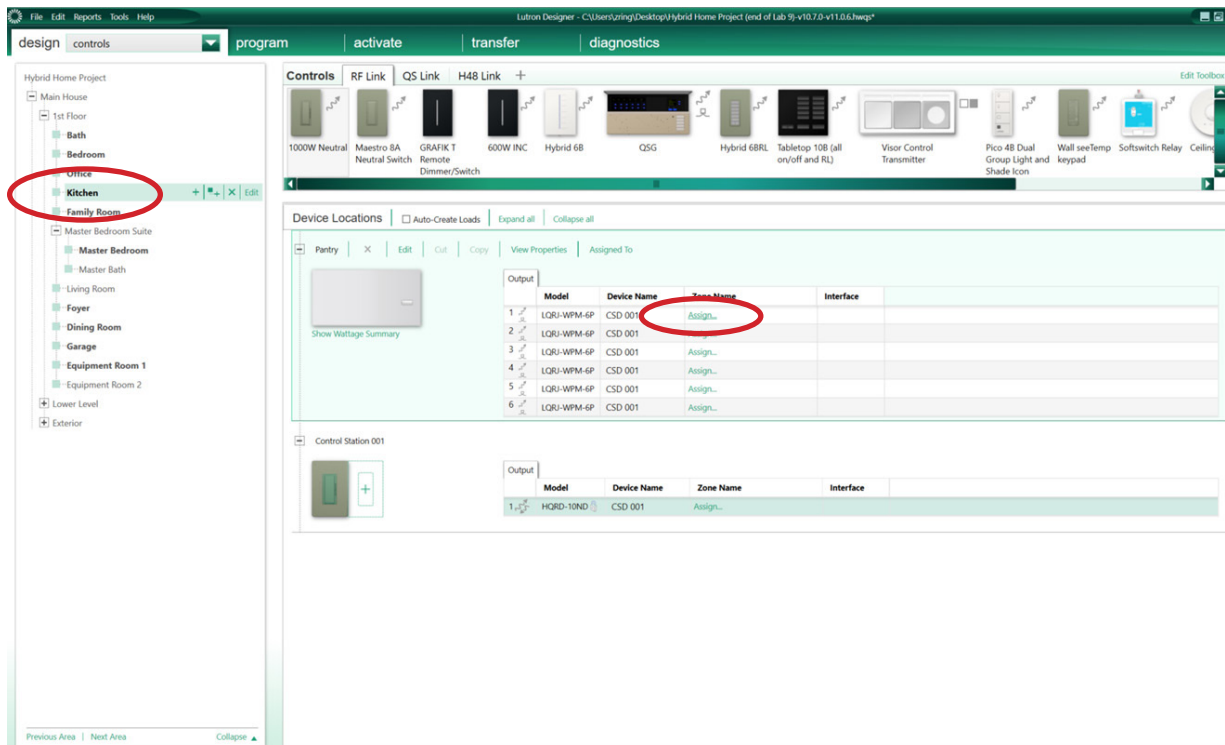
Note: If the **High-End** and **Low-End** trim columns do not show, **Customize columns** will need to be selected. Next select the High/Low-End by selecting the checkbox. However, these trim values should not be changed.

Find compatible Controls/LED lamp types Edit Fixture Types Customize columns					
Total Watts	Interface	Interface Qty	High End	Low End	
			78	32	

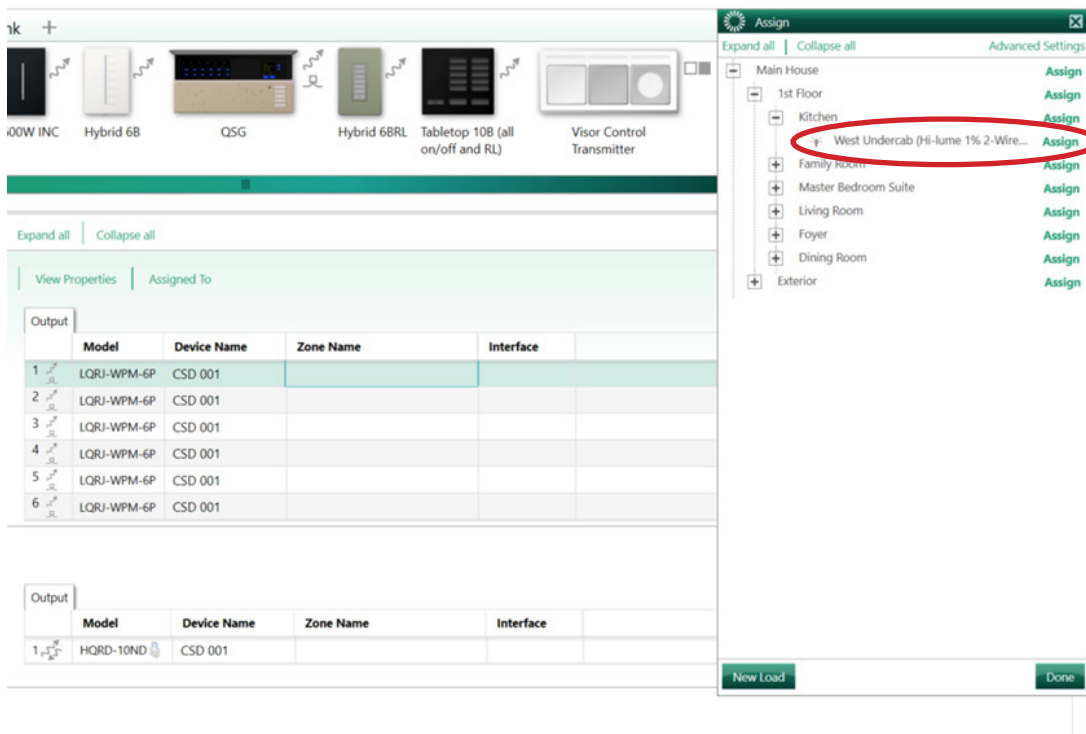
Hi-lume 1% 2-Wire Driver (continued)

HomeWorks: Assign the load to a control

When assigning the load to a wallbox dimmer, GRAFIK Eye QS, or WPM, the assignment will be done in the **design>controls** tab. Use the area tree to navigate to the desired control/output and select **Assign**.



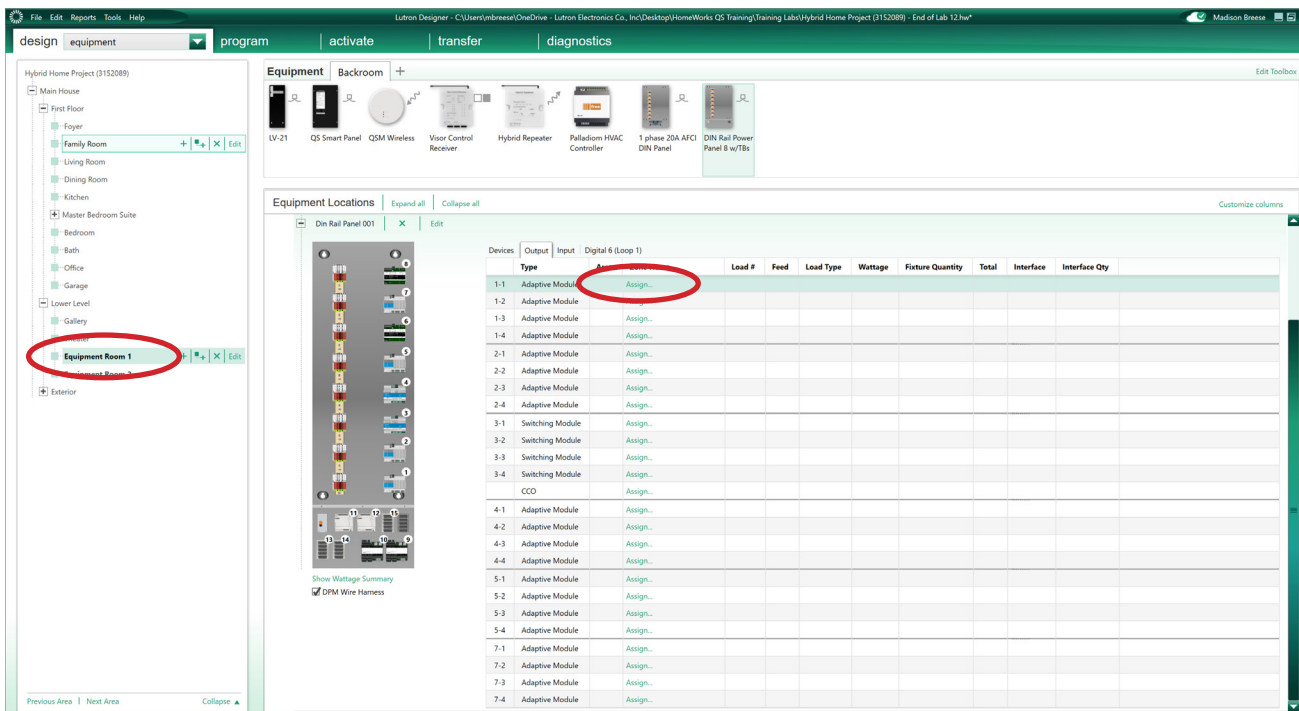
A window will appear on the right side of the screen. Find the load in question and select **Assign**.



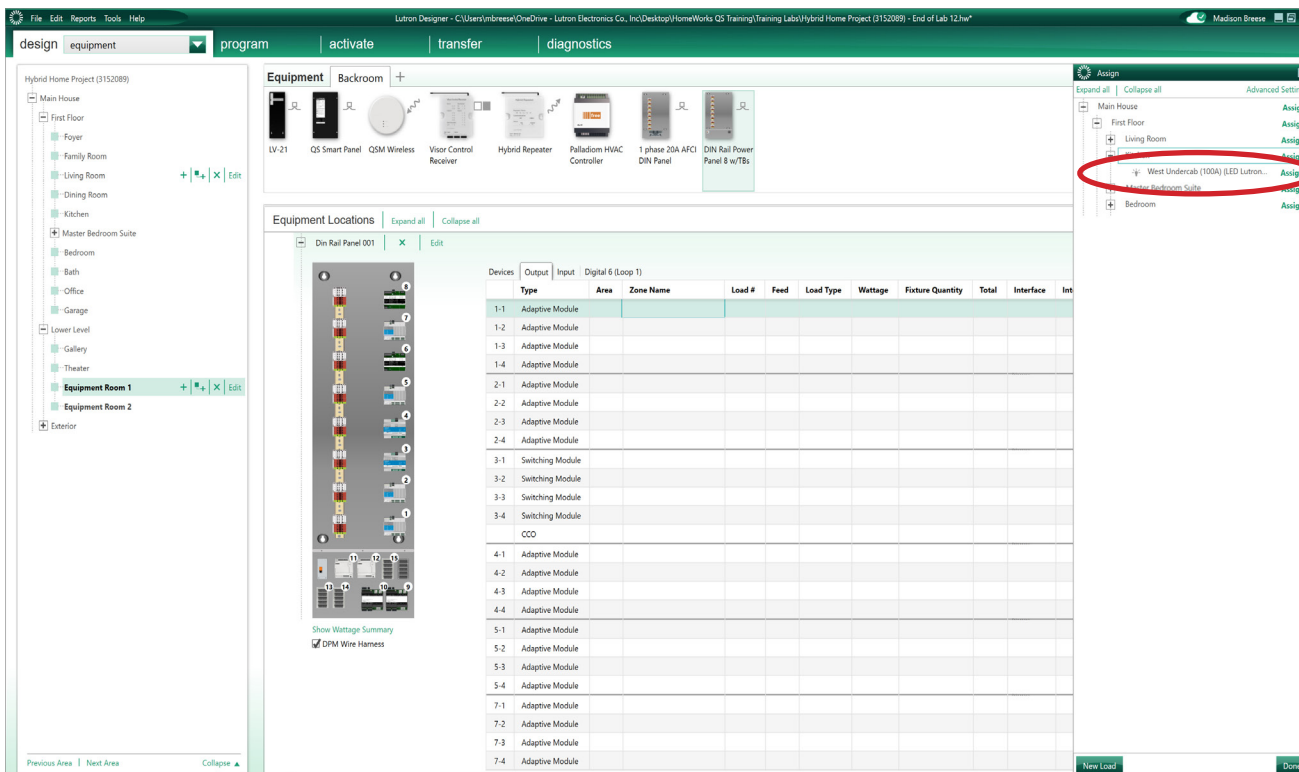
Hi-lume 1% 2-Wire Driver *(continued)*

HomeWorks: Assign the load to a control *(continued)*

When assigning the load to a DIN Rail Power Module (DPM), this will be done in the **design>equipment** tab. Use the area tree to navigate to the desired module/output and select **Assign**.



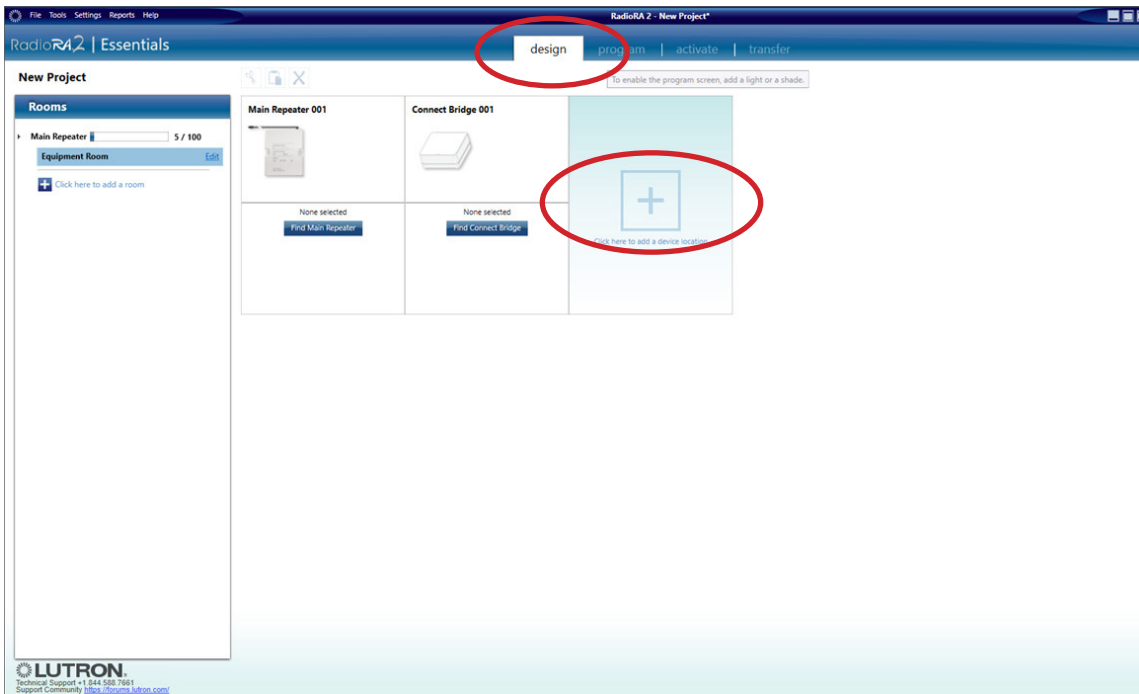
A window will appear on the righthand side of the screen. Find the load in question and select **Assign**.



Hi-lume 1% 2-Wire Driver (continued)

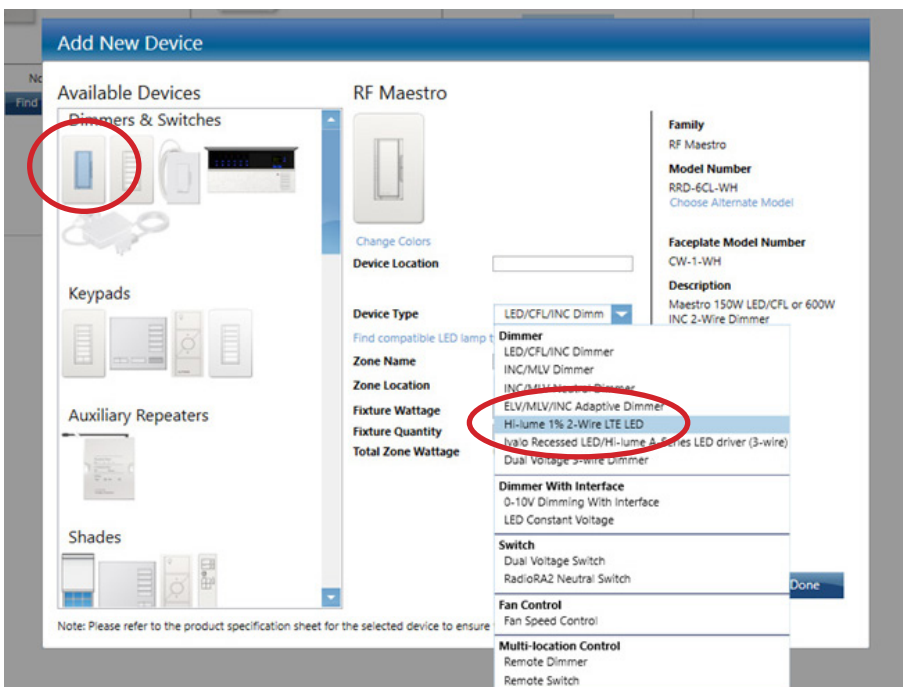
RadioRA 2: Add the control to the database

Using RadioRA 2 programming software, navigate to the **design** tab of the programming software and select the **+** icon to add a new device location.



The **Add New Device** window will appear. Select the first dimmer available under **Dimmers & Switches** and select **Hi-lume 1% 2-wire LTE LED** under **Device Type**. This will automatically set the high and low-end trims to the appropriate levels. High = 78%; Low = 32%.

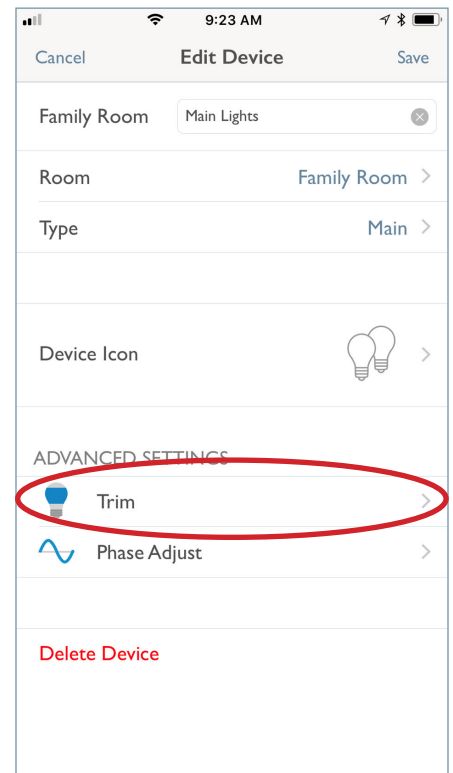
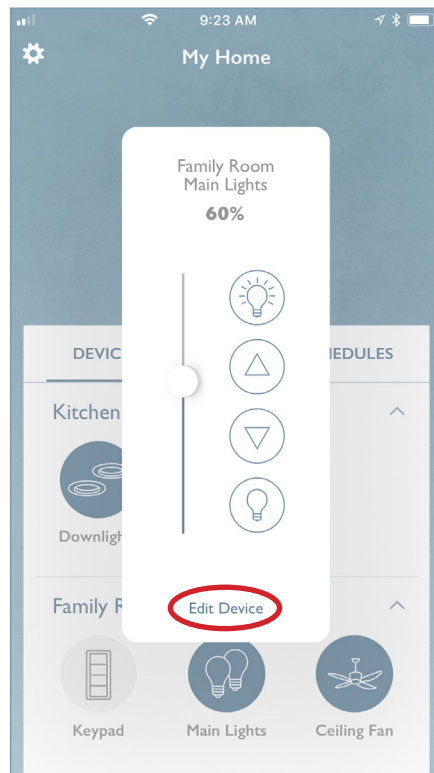
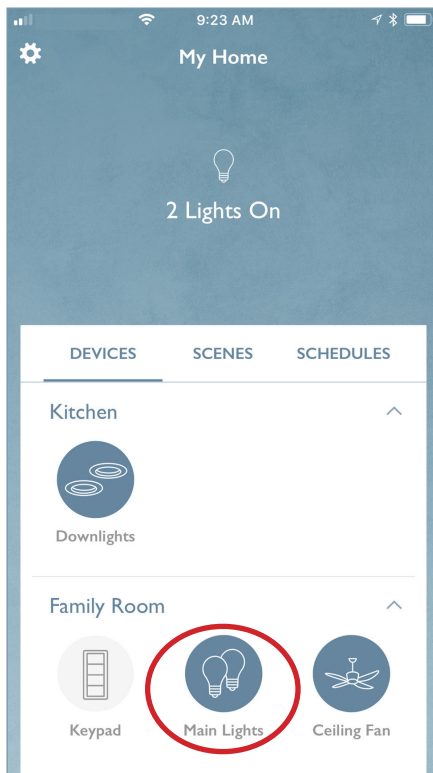
Note: Older versions of software may require the trim values to be adjusted manually. After the dimmer is added, right click on the device and select “Advanced Settings” to adjust the trim values.



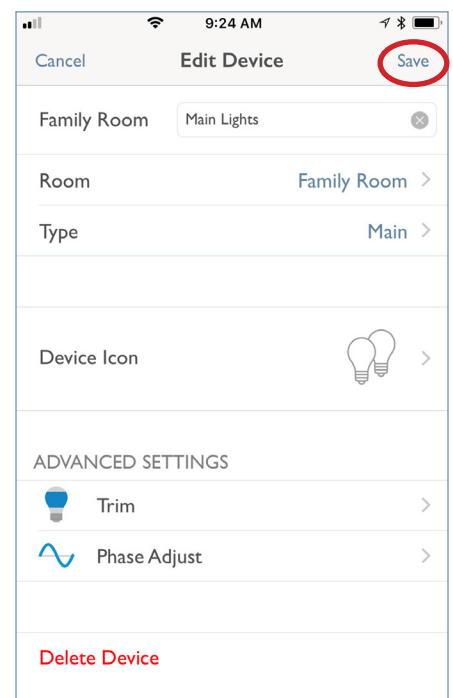
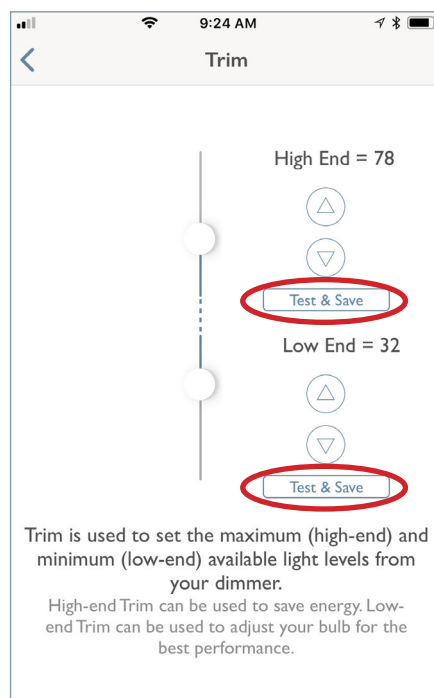
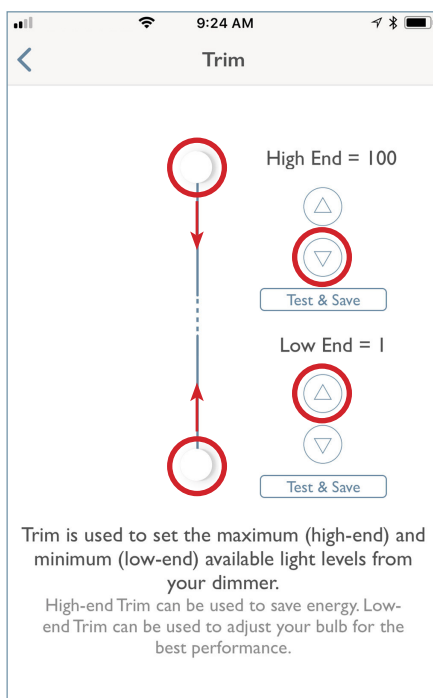
Hi-lume 1% 2-Wire Driver (continued)

RA2 Select: Adjusting Trim Settings

To edit a device using the RA2 Select App, select the device from the home screen of the App by pressing on the icon or name of the device. First select **Edit Device** then select **Trim** from the **Advanced Settings** menu.



Set the high-end to 78 and press **Test & Save**. Set the low-end to 32 and press **Test & Save**. Select the back arrow (<) and select **Save** in the **Edit Device** window.



Hi-lume 1% 3-Wire Driver

The Hi-lume 1% 3-Wire driver is a high-performance LED driver that provides smooth, continuous, flicker-free, 1% dimming for virtually any LED fixture, whether it requires constant-current or constant-voltage.

Compatible Controls

The Hi-lume 1% 3-Wire LED driver is compatible with the following controls:

HomeWorks

Product	Part Number	Drivers per Control				Load Type
		40 W Driver		40 W Driver		
		120 V~	277 V~	120 V~	277 V~	
3-Wire Interface (120 V~)	PHPM-3F-120	1-41	–	1-31	–	LED Hi-lume A-Series 3-Wire
3-Wire Interface (Dual Voltage)	PHPM-3F-DV	1-41	1-88	1-31	1-72	LED Hi-lume A-Series 3-Wire
HomeWorks 3-Wire fluorescent dimmer	HQRD-F6AN-DV	1-15	1-33	1-11	1-27	LED Hi-lume A-Series 3-Wire

Any of the following controls can be made compatible with the Hi-lume 1% 3-Wire LED driver by adding a PHPM-3F interface:

- LQSE-4A-120-D
- LQSE-4A5-120-D
- Wallbox power module: LQRJ-WPM-6P
- GRAFIK Eye QS control unit: QSGRJ-X
- HomeWorks forward-phase neutral wire dimmers (e.g., - HQRD-PRO, HQRD-10ND, HQRD-6ND, HQRD-6NA)

RadioRA 2

Product	Part Number	Drivers per Control				Load Type
		40 W Driver		40 W Driver		
		120 V~	277 V~	120 V~	277 V~	
3-Wire Interface (120 V~)	PHPM-3F-120	1-41	–	1-31	–	LED Hi-lume A-Series 3-Wire
3-Wire Interface (Dual Voltage)	PHPM-3F-DV	1-41	1-88	1-31	1-72	LED Hi-lume A-Series 3-Wire
RadioRA 2 3-Wire fluorescent dimmer	RRD-F6AN-DV	1-15	1-33	1-11	1-27	LED Hi-lume A-Series 3-Wire

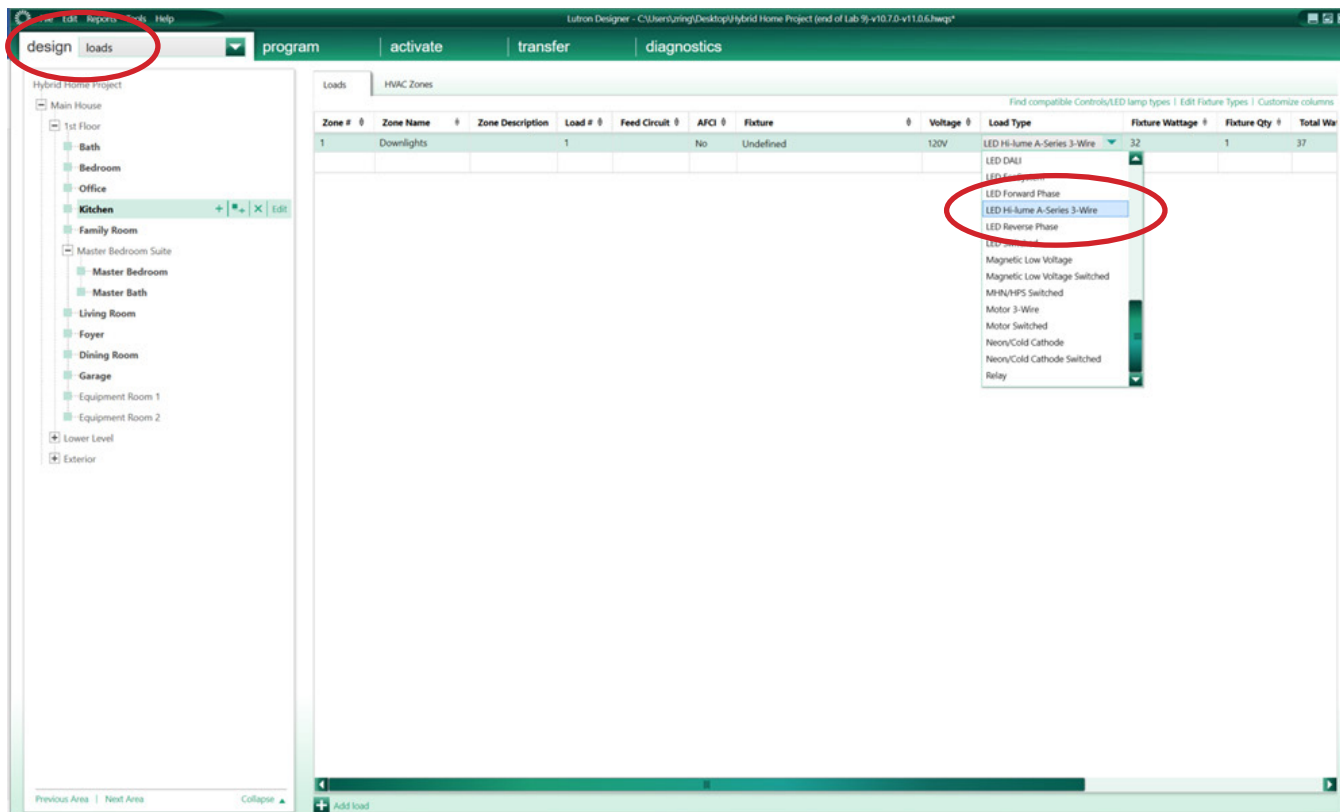
Any of the following controls can be made compatible with the addition of a PHPM-3F interface:

- Wallbox power module: LQRJ-WPM-6P
- GRAFIK Eye QS control unit: QSGRJ-X
- RadioRA 2 forward-phase neutral wire dimmers (e.g., - RRD-PRO, RRD-10ND, RRD-6ND)

Hi-lume 1% 3-Wire driver (continued)

HomeWorks: Load Schedule

Using the Lutron Designer programming software, add a load to the load schedule by going to the **design>loads** tab and selecting the appropriate load type for the driver. For the Hi-lume 1% 3-Wire LED Driver select **LED Hi-lume A-Series 3-Wire**.



The software automatically populates the **High-End** and the **Low-End** fields with the appropriate values for the selected driver. 78 (high-end) and 32 (low-end) will provide you with full dimming range (1-100%).

Load #	Zone Name	Zone Description	Load #	Feed Circuit	AFCI	Fixture	Voltage	Load Type	Fixture Wattage	Fixture Qty	Total Watts	Interface	Interface Qty	High End	Low End
1	Downlights		1		No	Undefined	120V	LED Hi-lume A-Series 3-Wire	32	1	32			78	32

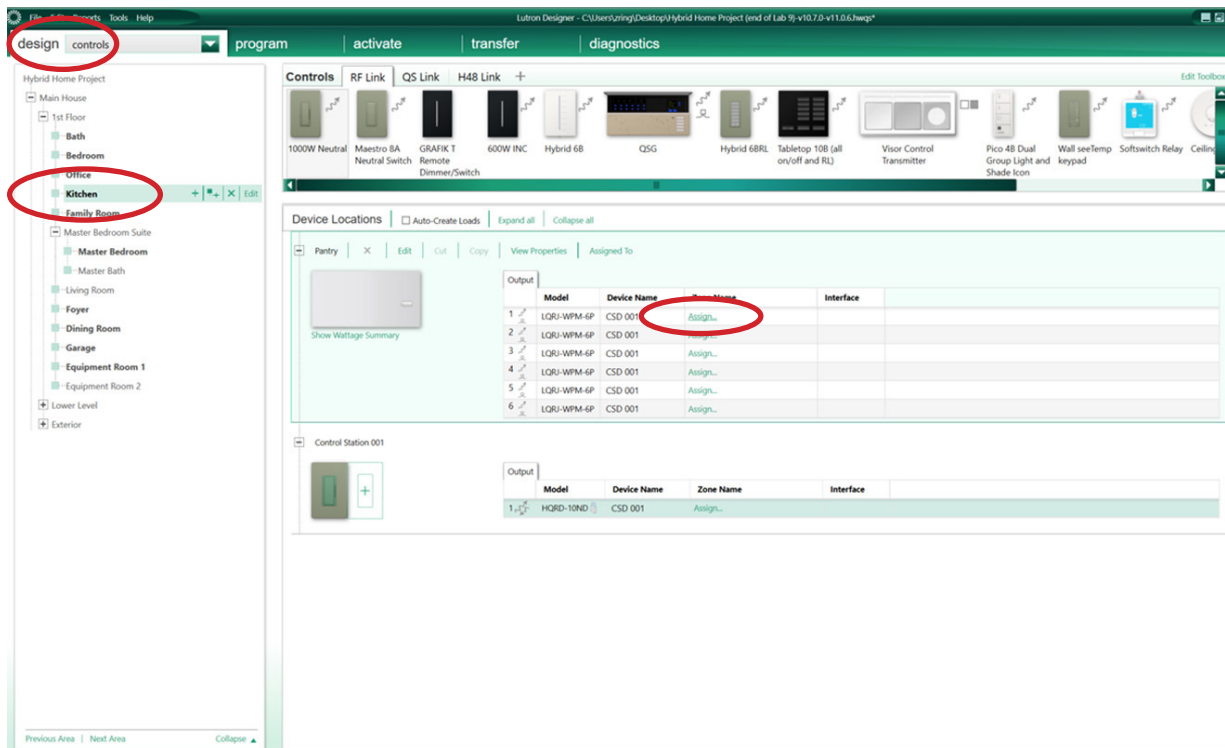
Note: If the **High-End** and **Low-End** trim columns do not show, you will need to click **Customize columns** and then select the High/Low-End by selecting the checkbox.

Find compatible Controls/LED lamp types Edit Fixture Types Customize columns				
Total Watts	Interface	Interface Qty	High End	Low End
			78	32

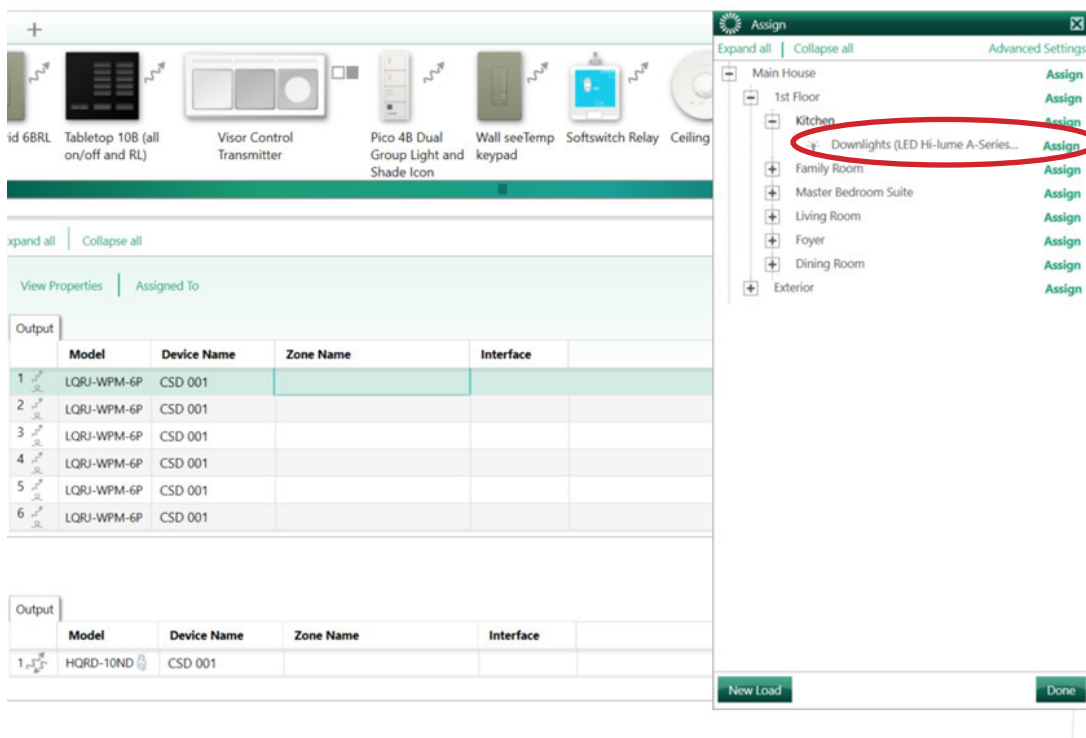
Hi-lume 1% 3-Wire Driver (continued)

HomeWorks: Assign the load to a control

If the load is being assigned to a wallbox dimmer, GRAFIK Eye QS control, or WPM, the assignment will be done in the **design>controls** tab. Use the area tree to navigate to the desired control and select **Assign**.



A window will appear on the righthand side of the screen. Find the load in question and select **Assign**.



Hi-lume 1% 3-Wire Driver (continued)

HomeWorks: Assign the load to a control (continued)

If the load is being assigned to a control that does not directly support 3-wire dimming, be sure to select the correct interface in the **Interface** dropdown menu.

Device Locations | ☐ Auto-Create Loads | Expand all | Collapse all | Customize columns

Pantry | X | Edit | Cut | Copy | View Properties | Assigned To

Show Wattage Summary

Output	Model	Device Name	Zone Name	Interface
1	LQRJ-WPM-6P	CSD 001	Downlights	None
2	LQRJ-WPM-6P	CSD 001	Assign...	None
3	LQRJ-WPM-6P	CSD 001	Assign...	PHPM-3F-120-WH
4	LQRJ-WPM-6P	CSD 001	Assign...	PHPM-3F-120-WH
5	LQRJ-WPM-6P	CSD 001	Assign...	
6	LQRJ-WPM-6P	CSD 001	Assign...	

Find compatible LED lamp types

If the load is being assigned to a DIN Rail Power Module (DPM), this will be done in the **design>equipment** tab. Use the area tree to navigate to the desired module/output and select **Assign**.

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design | equipment | program | activate | transfer | diagnostics

Hybrid Home Project (3152089)

- Main House
 - First Floor
 - Foyer
 - Family Room
 - Living Room
 - Dining Room
 - Kitchen
 - Master Bedroom Suite
 - Bedroom
 - Bath
 - Office
 - Garage
 - Lower Level
 - Gallery
 - Threat
 - Equipment Room 1
 - Exterior

Equipment Backroom

LV-21 QS Smart Panel QSM Wireless Visor Control Receiver Hybrid Repeater Palladium HVAC Controller 1 phase 20A AFCI DIN Panel DIN Rail Power Panel 8 w/7Bs

Equipment Locations | Expand all | Collapse all | Customize columns

Din Rail Panel 001 | X | Edit

Show Wattage Summary

☒ DPM Wire Harness

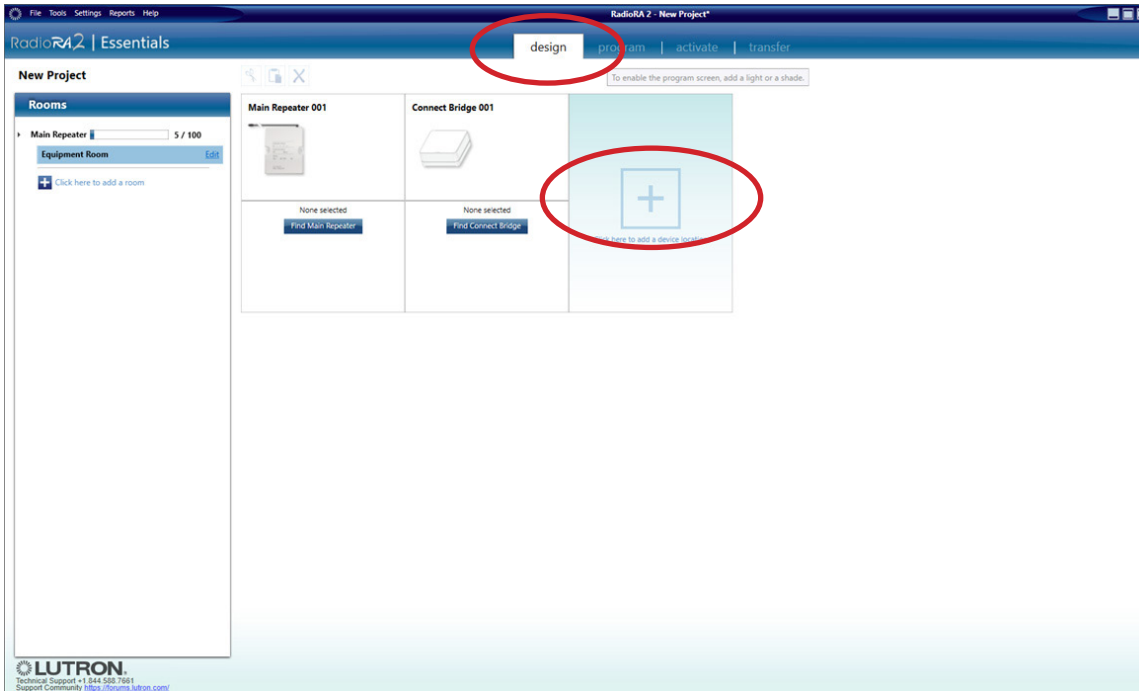
Devices	Output	Input	Digital 6 (Loop 1)	Type	Area	Zone Name	Load #	Feed	Load Type	Wattage	Fixture Quantity	Total	Interface	Interface Qty
1-1	Adaptive Module	Assign...												
1-2	Adaptive Module	Assign...												
1-3	Adaptive Module	Assign...												
1-4	Adaptive Module	Assign...												
2-1	Adaptive Module	Assign...												
2-2	Adaptive Module	Assign...												
2-3	Adaptive Module	Assign...												
2-4	Adaptive Module	Assign...												
3-1	Switching Module	Assign...												
3-2	Switching Module	Assign...												
3-3	Switching Module	Assign...												
3-4	Switching Module	Assign...												
	CCO	Assign...												
4-1	Adaptive Module	Assign...												
4-2	Adaptive Module	Assign...												
4-3	Adaptive Module	Assign...												
4-4	Adaptive Module	Assign...												
5-1	Adaptive Module	Assign...												
5-2	Adaptive Module	Assign...												
5-3	Adaptive Module	Assign...												
5-4	Adaptive Module	Assign...												
7-1	Adaptive Module	Assign...												
7-2	Adaptive Module	Assign...												
7-3	Adaptive Module	Assign...												
7-4	Adaptive Module	Assign...												

Previous Area | Next Area | Collapse

Hi-lume 1% 3-Wire Driver (continued)

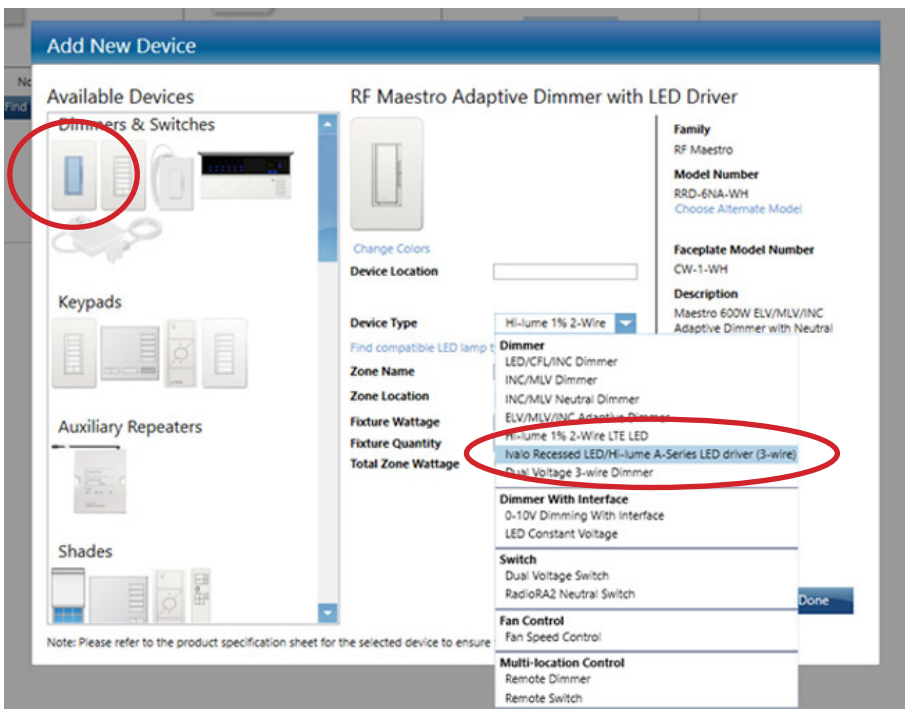
RadioRA 2: Add the control to the database

Using RadioRA 2 programming software, navigate to the **design** tab and select the **+** icon to add a new device location.



The **Add New Device** window will appear. Select the first dimmer available under **Dimmers & Switches** and select the **Ivalo Recessed LED/Hi-lume A-Series LED Driver (3-wire)** under **Device Type**. This will automatically set the high and low-end trims to the appropriate levels. High = 78%; Low = 32%.

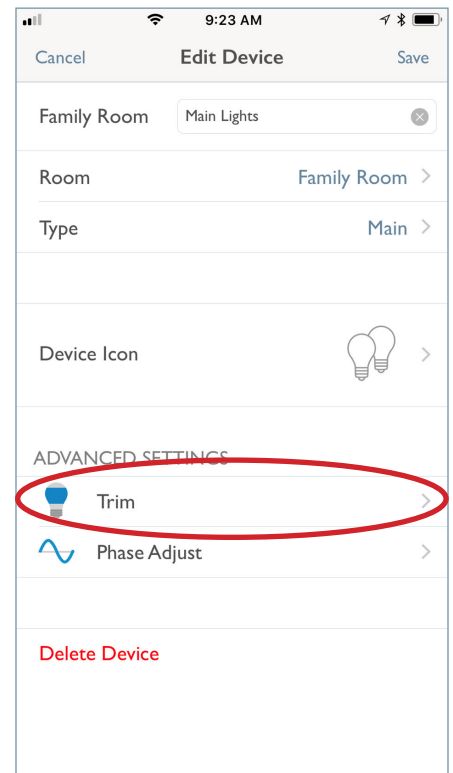
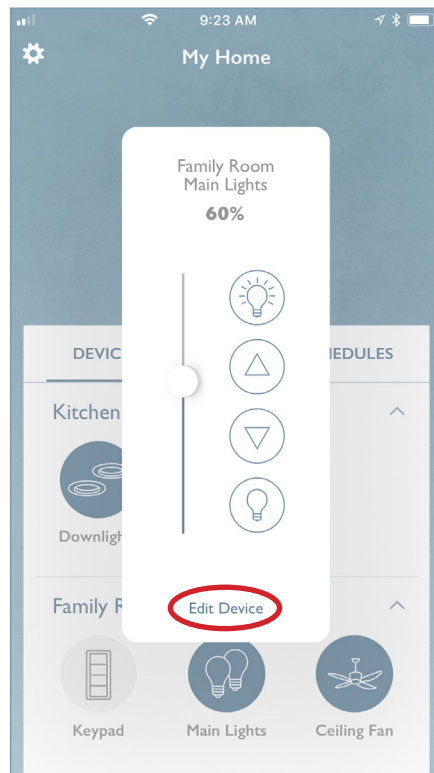
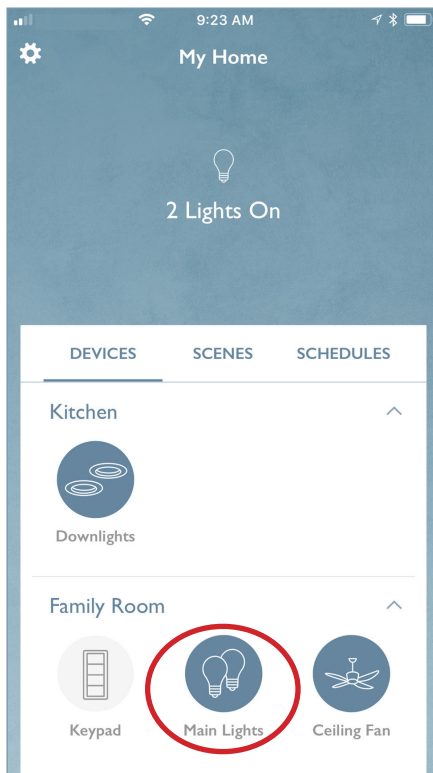
Note: Older versions of software may require the trim values to be adjusted manually. After the dimmer is added, right click on the device and select “Advanced Settings” to adjust the trim values.



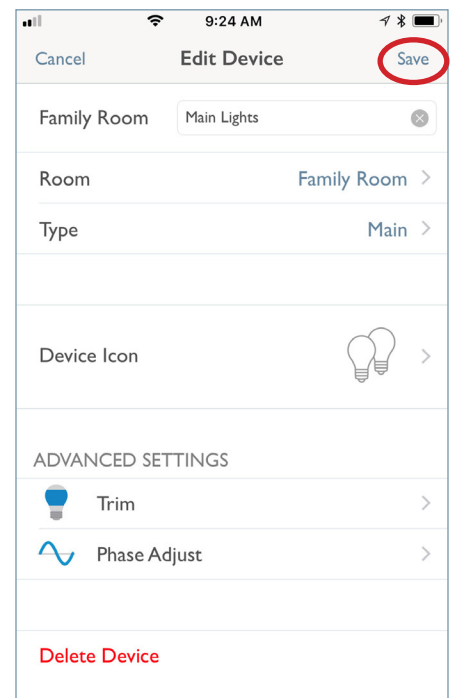
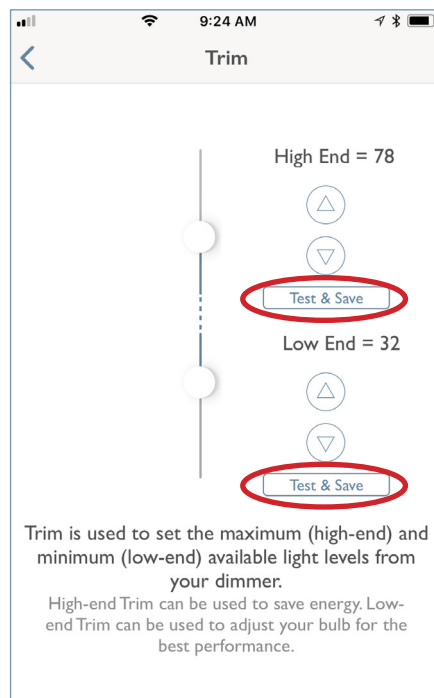
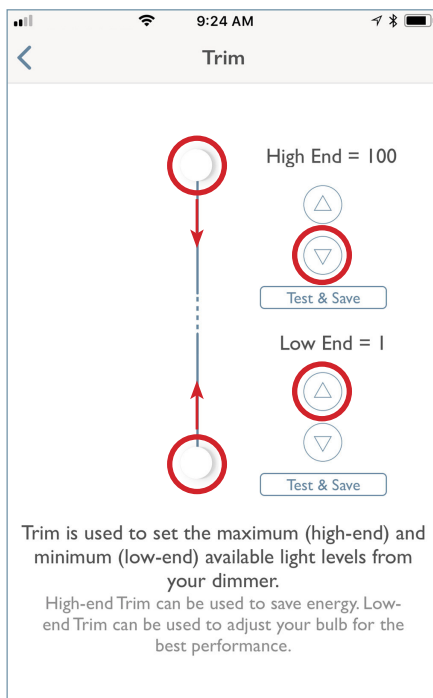
Hi-lume 1% 3-Wire (continued)

RA2 Select: Adjusting Trim Settings

To edit a device using the RA2 Select App, select the device from the home screen of the App by pressing on the icon or name of the device. First select **Edit Device** then select **Trim** from the **Advanced Settings** menu.



Set the high-end to 78 and press **Test & Save**. Set the low-end to 32 and press **Test & Save**. Select the back arrow (<) and select **Save** in the **Edit Device** window.



Hi-lume 1%, 5-Series, and Embedded EcoSystem Solutions¹

Please refer to the following Application Note for an explanation of how to design, program, activate, and troubleshoot a HomeWorks QS system that utilizes EcoSystem ballasts/drivers. The document is split into two sections, with one section focused on the DIN-rail Power Module with EcoSystem solution, and the other section focused on the GRAFIK Eye QS with EcoSystem solution. Please refer to the appropriate section based on the control hardware being used on the specific project.

www.lutron.com/PasswordProtectedDocumentLibrary/Using%20EcoSystem%20in%20HWQS.pdf

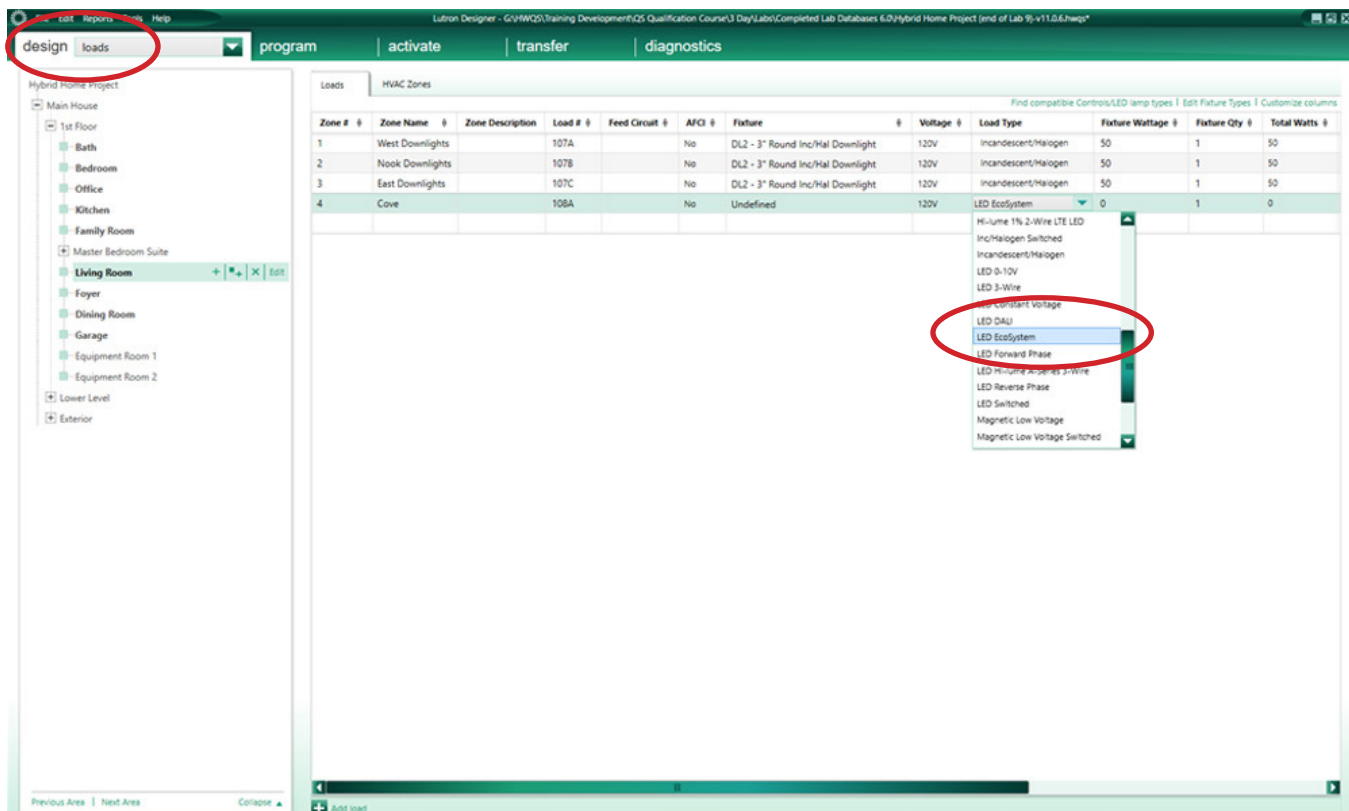
Compatible Controls

The Hi-lume 1% EcoSystem driver can be assigned to the following controls:

Product	Model Number		Recommended Software Version	Drivers per Control
	120 V~	277 V~		
HomeWorks QS with EcoSystem	LQSE-2ECO-D QSGRJ-_E QSGRJ-_E	—	10 or higher	64 per EcoSystem link

HomeWorks QS: Load Schedule (LQSE-2ECO-D)

To add a load to the load schedule go to the **design>loads** tab and select the appropriate load type for the driver. For the Hi-lume 1%, 5-series, and Embedded EcoSystem drivers, select **LED EcoSystem**.

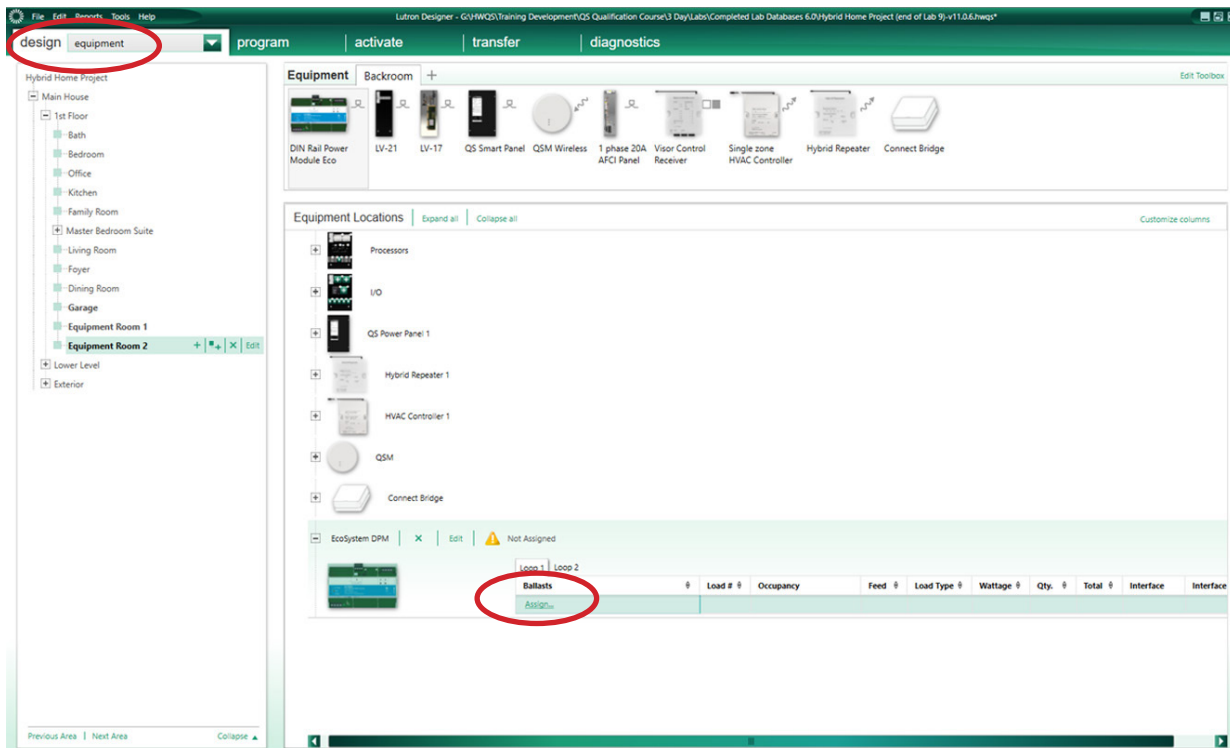


¹ EcoSystem drivers are no longer available to order as of September 1, 2021.

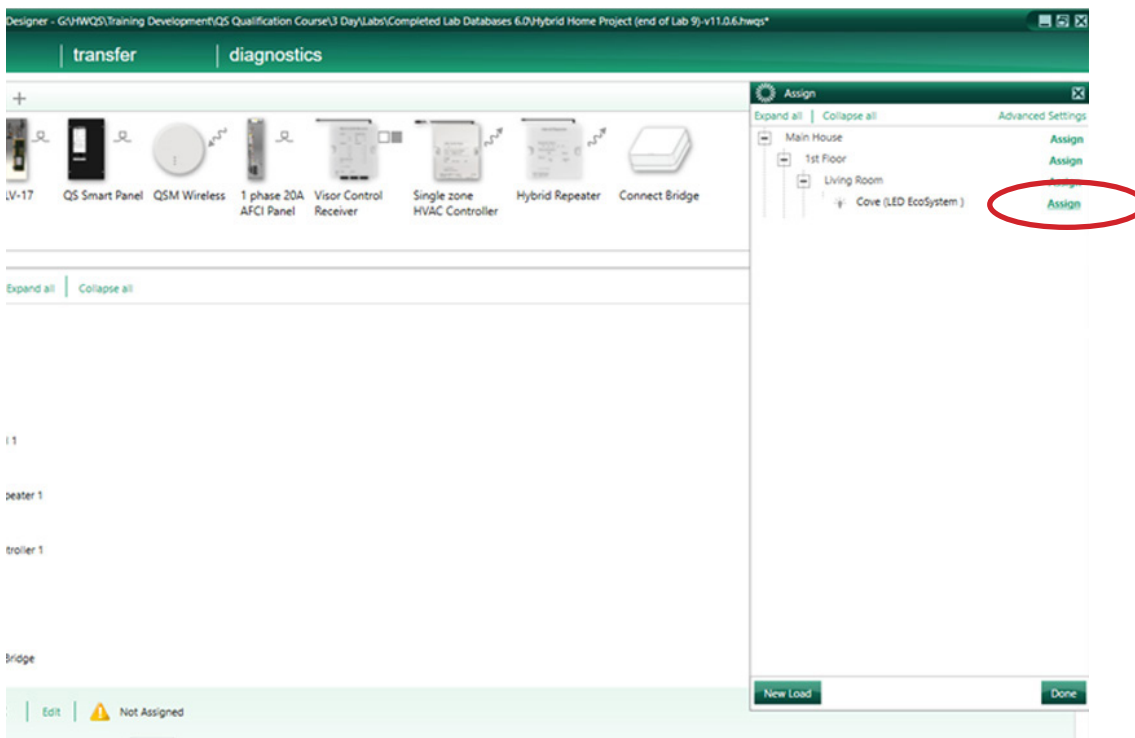
Hi-lume 1%, 5-Series, and Embedded EcoSystem Solutions *(continued)*

HomeWorks QS: Assign the load to a control (LQSE-2ECO-D)

If the load is being assigned to a LQSE-2ECO-D the assignment will be done in the **design>equipment** tab. Select the desired loop and select **Assign** under the **Ballasts** column.



A window will appear on the righthand side of your screen. Find the load in question and select **Assign**.



Hi-lume 1%, 5-Series, and Embedded EcoSystem Solutions *(continued)*

HomeWorks QS: Load Schedule (QSGRJ-_E)

To add a load to the load schedule navigate to the **design>loads** tab and select the appropriate load type for the driver. For the Hi-lume 1%, 5-series, and Embedded EcoSystem drivers, select **LED EcoSystem**.

Each GRAFIK Eye QS with EcoSystem unit can have a maximum of 64 EcoSystem ballasts/drivers connected to it and can control a maximum of up to 16 zones, however, **Fixture Qty** is unable to be changed to anything other than 1 for an EcoSystem load type in the software. For EcoSystem zones that contain multiple ballasts/drivers the fixture quantity will need to be left at 1 and the TOTAL fixture wattage will have to be entered in the **Fixture Wattage** field.

For example, if there are 4 EcoSystem Sconce fixtures that are 25 W each and are all in the same zone, 100 W would be entered in the **Fixture Wattage** field and the **Fixture Qty** would be left at 1.

Note: EcoSystem ballasts and drivers must be programmed and assigned to GRAFIK Eye QS zones using the local buttons and display on the GRAFIK Eye. EcoSystem ballast/driver to zone mapping cannot be performed through the HomeWorks QS software.

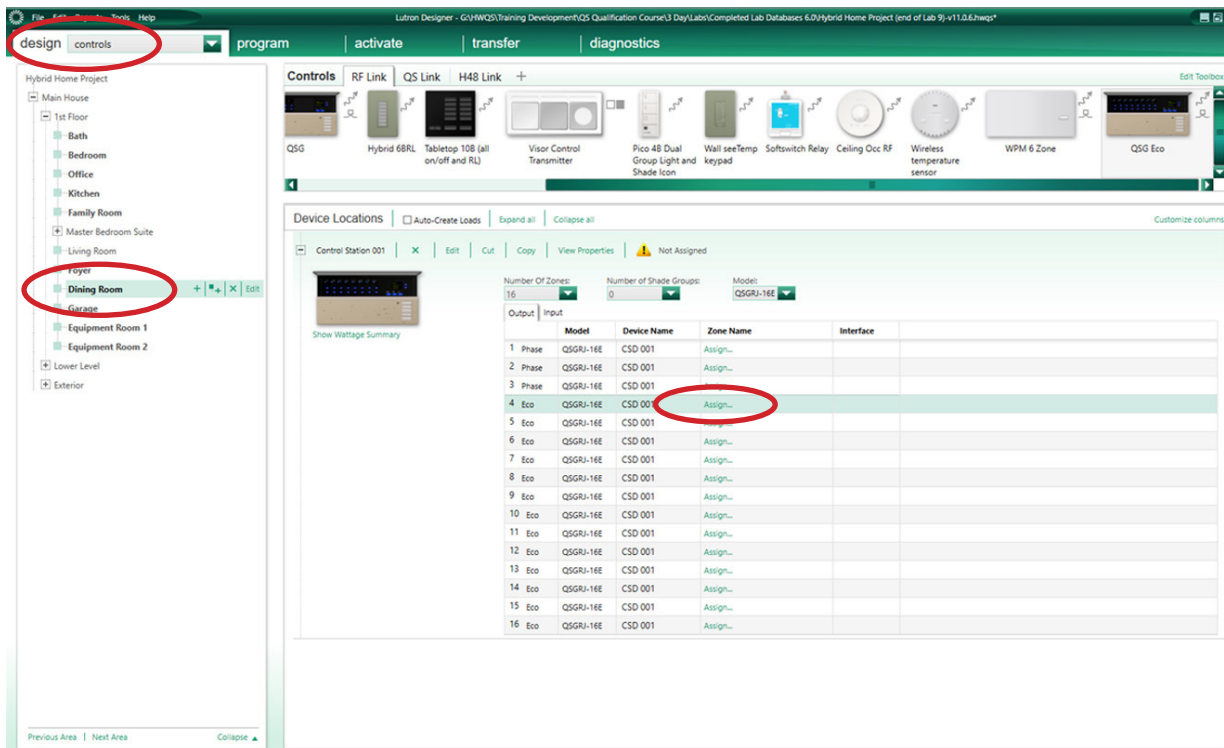
The screenshot shows the Lutron Designer software interface with the 'design loads' tab selected. The 'Loads' table is displayed, showing the configuration for various zones. Zone 4, 'Cove', is highlighted with a red circle, indicating the configuration for the LED EcoSystem load.

Zone #	Zone Name	Zone Description	Load #	Feed Circuit	AFCI	Fixture	Voltage	Load Type	Fixture Wattage	Fixture Qty	Total Watts
1	West Downlights		107A		No	DL2 - 3" Round Inc/Hal Downlight	120V	Incandescent/Halogen	50	1	50
2	Nook Downlights		107B		No	DL2 - 3" Round Inc/Hal Downlight	120V	Incandescent/Halogen	50	1	50
3	East Downlights		107C		No	DL2 - 3" Round Inc/Hal Downlight	120V	Incandescent/Halogen	50	1	50
4	Cove		108A		No	Undefined	120V	LED EcoSystem	100	1	100

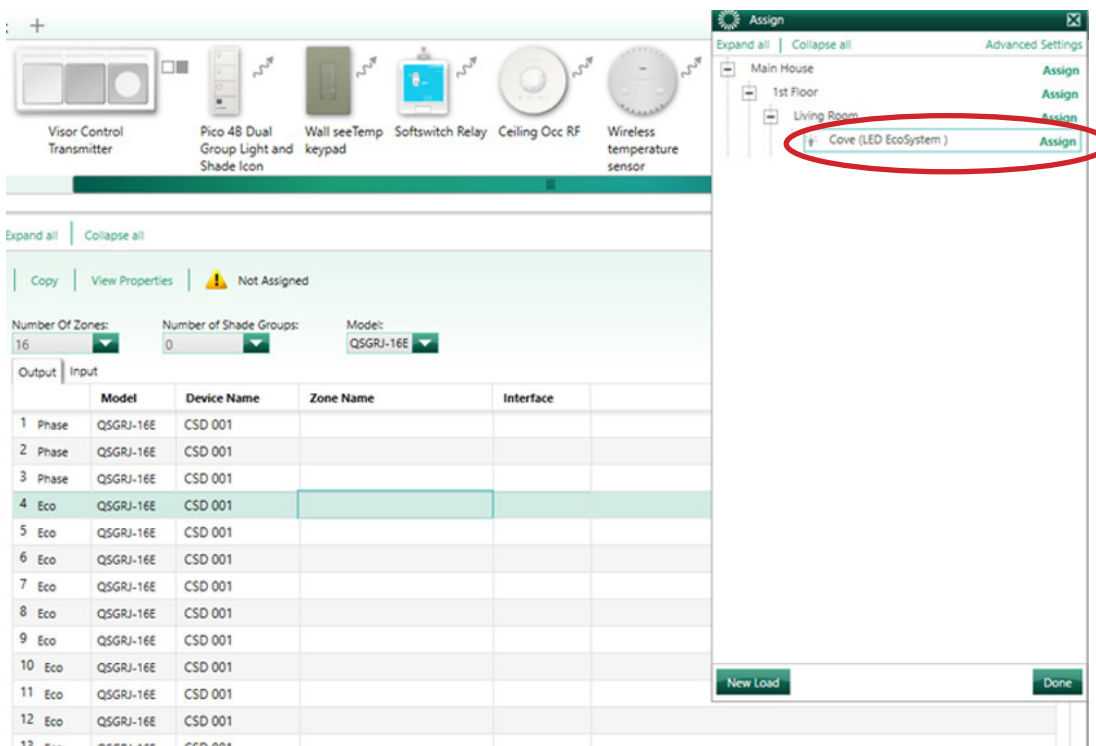
Hi-lume 1%, 5-Series, and Embedded EcoSystem Solutions *(continued)*

HomeWorks QS: Assign the load to a control (QSGRJ-_E)

If the load is being assigned to a QSGRJ-_E, navigate to the **design>controls** tab. Select one of the Eco outputs and select **Assign** under the **Zone Name** column.



A window will appear on the right side of the screen. Find the load in question and select **Assign**.



Hi-lume Premier 0.1% 3-Wire Driver and EcoSystem Driver¹

The Hi-lume Premier 0.1% Constant-Voltage Driver (L3D0) is a high-performance LED driver capable of controlling up to 96 W of 24 V~ constant-voltage loads. This driver provides smooth and continuous dimming down to 0.1% low-end. It is ideal for use with strip lighting in applications such as coves, under or over cabinet lighting and pathway lighting. The driver is UL® listed with an integrated wiring compartment and can be mounted up to 150 ft (45 m) away from the load.

Compatible Controls for 3-Wire Driver

The Hi-lume Premier 0.1% Constant-Voltage driver is compatible with both EcoSystem and 3-wire control types. When using a 3-wire control, the Hi-lume Premier 0.1% Constant-Voltage driver is compatible with the following controls:

HomeWorks QS

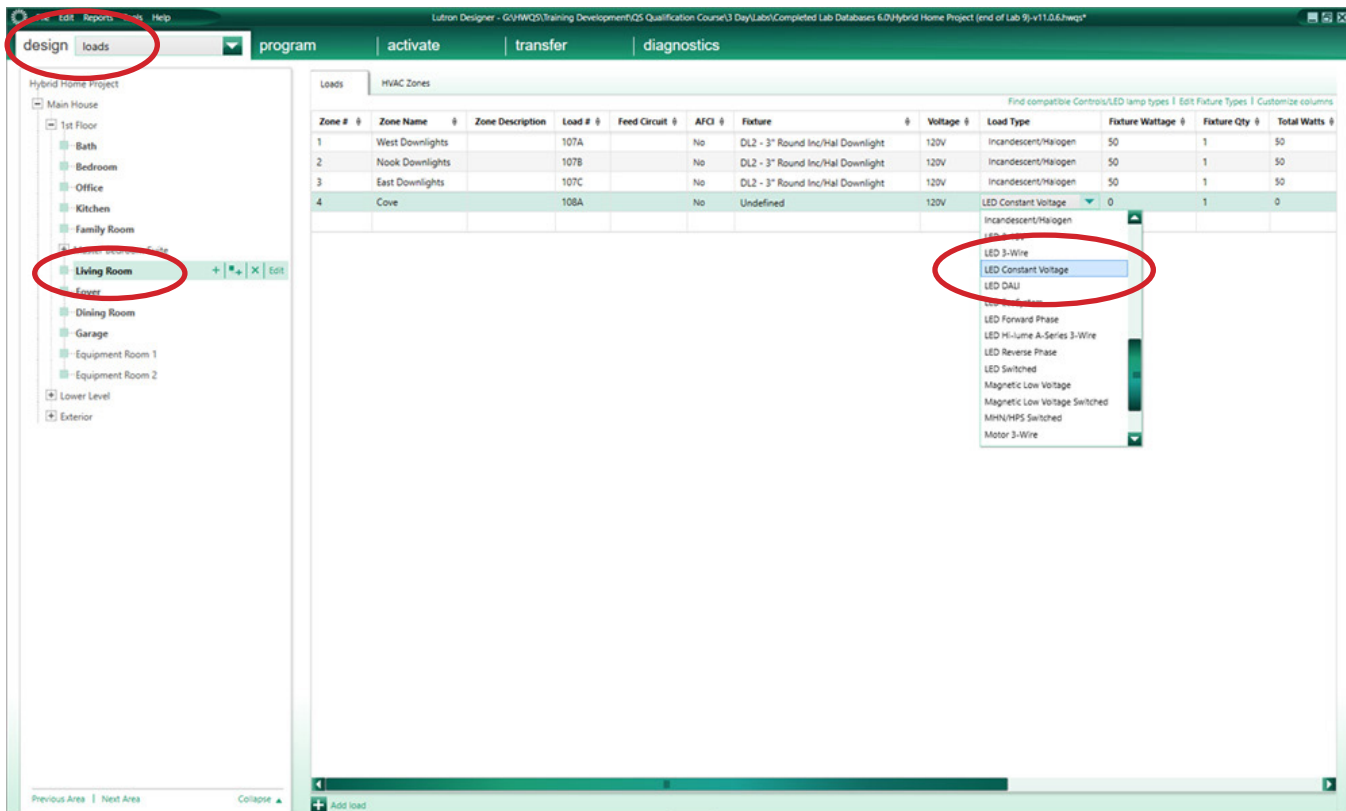
Product	Model Number		Recommended System Version	Drivers per Control	
	120 V~	277 V~		120 V~	277 V~
HomeWorks QS with EcoSystem	HQRD-F6AN-DV	HQRD-F6AN-DV	10 or higher	1-6	1-14

RadioRA2

Product	Model Number		Recommended System Version	Drivers per Control	
	120 V~	277 V~		120 V~	277 V~
RadioRA 2	RRD-F6AN-DV	RRD-F6AN-DV	10 or higher	1-6	1-14

HomeWorks QS: Load Schedule for 3-Wire Driver

To add a load to the load schedule navigate to the **design>loads** tab and select the appropriate load type for the driver. For the Hi-lume Premier 0.1% Constant-Voltage driver, select **LED Constant Voltage**.

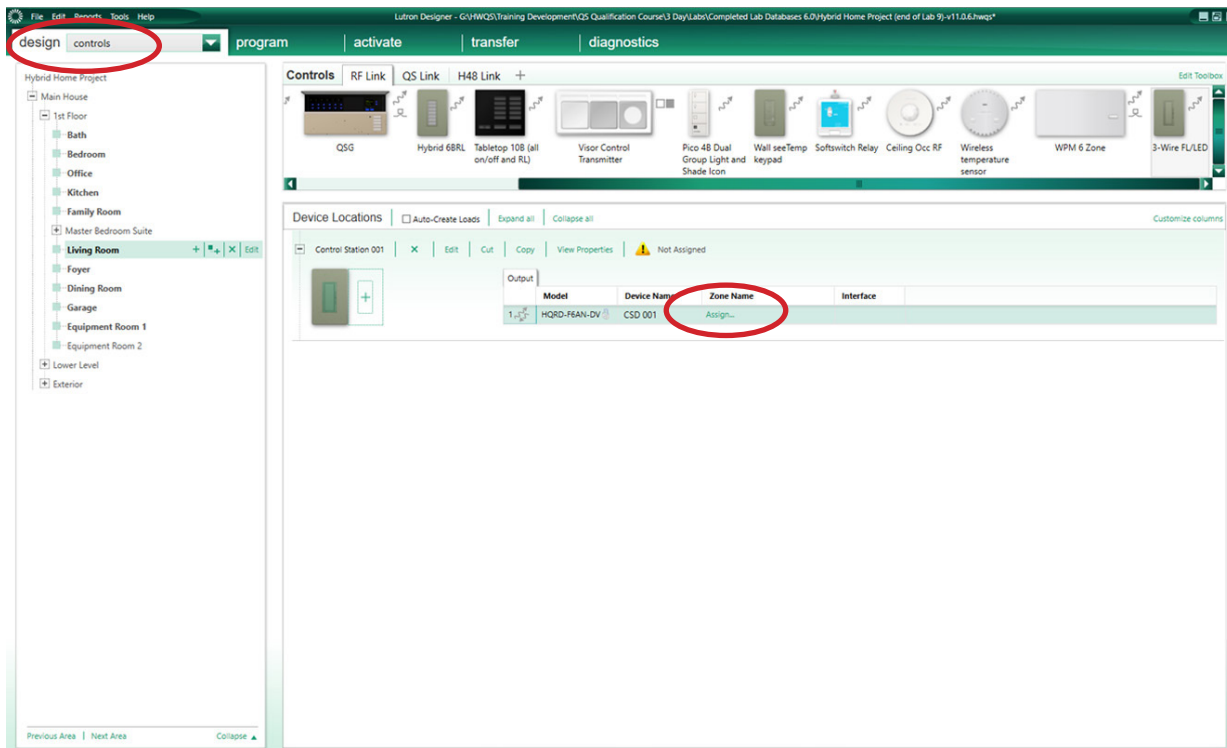


¹ EcoSystem drivers are no longer available to order as of September 1, 2021.

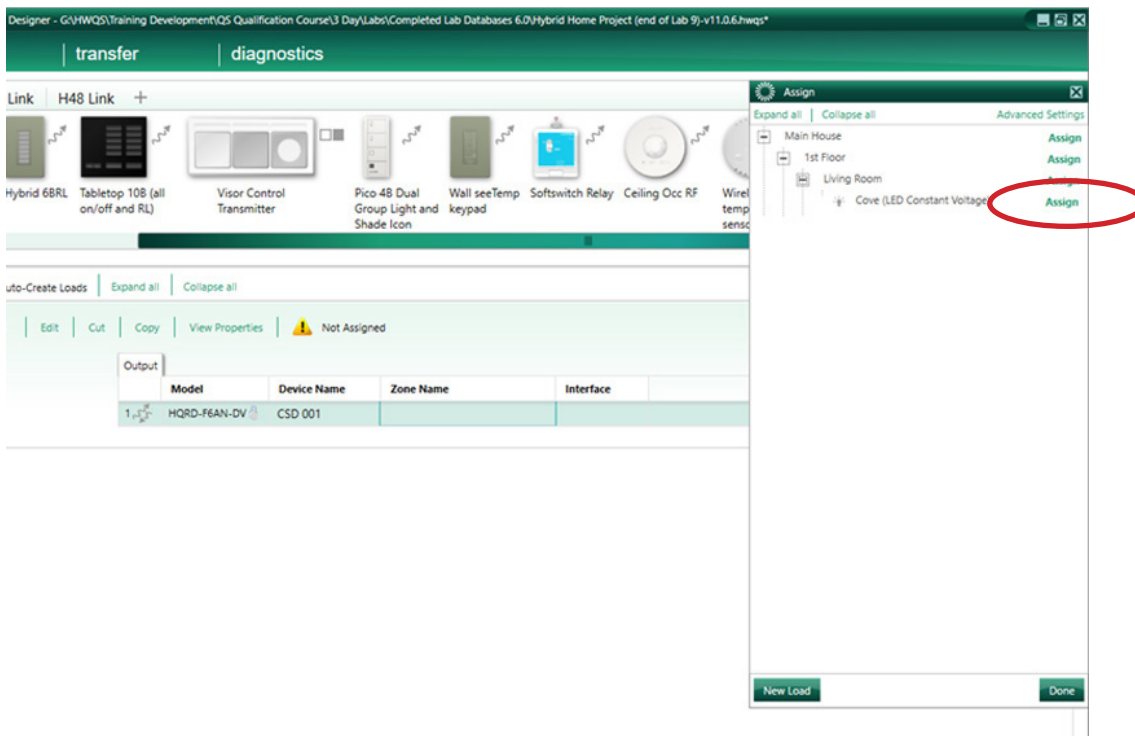
Hi-lume Premier 0.1% 3-Wire Driver and EcoSystem Driver *(continued)*

HomeWorks QS: Assign the load to a control for 3-Wire Driver

If the load is being assigned to a HQRD-F6AN-DV navigate to the **design>controls** tab. Select the **Assign** under the **Zone Name** column.



A window will appear on the righthand side of your screen. Find the load in question and select **Assign**.



Hi-lume Premier 0.1% 3-Wire Driver and EcoSystem Driver *(continued)*

HomeWorks QS: Assign the load to a control for 3-Wire Driver *(continued)*

After the load has been assigned to the control, the model number of the driver will appear in the **Interface** column.

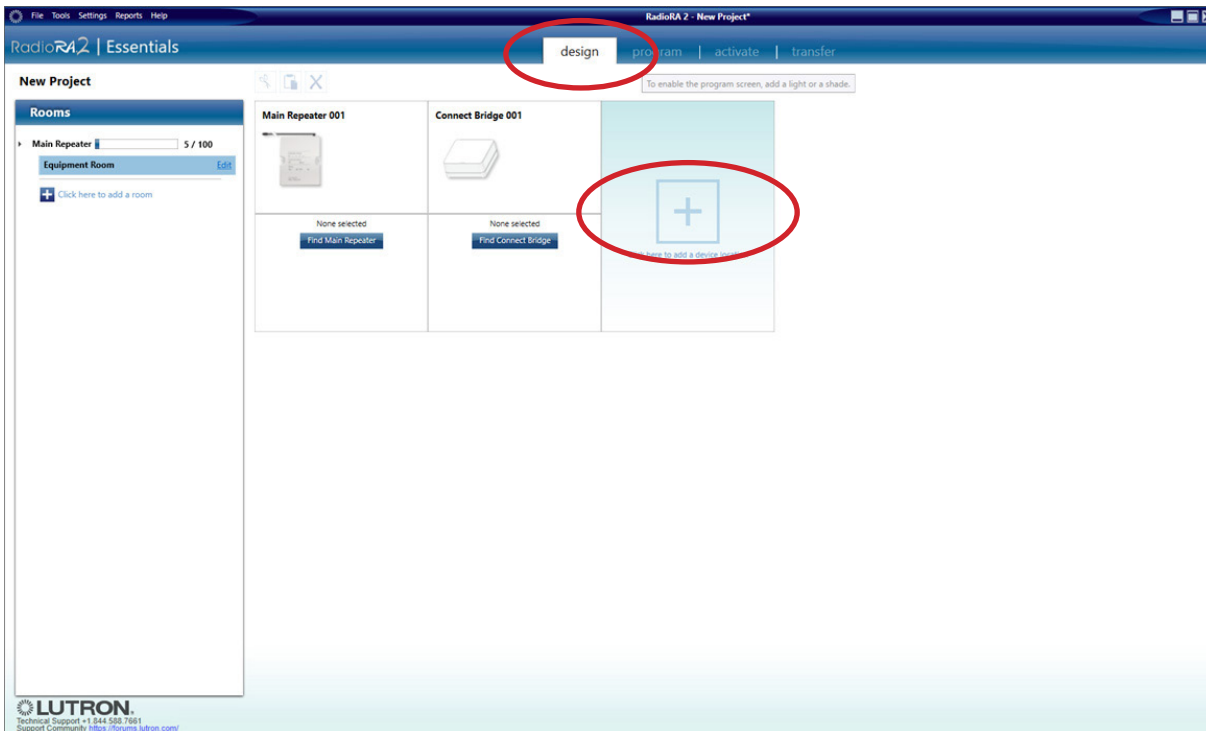
The screenshot shows the Lutron Designer software interface. On the left is a project tree for 'Hybrid Home Project' with a list of rooms including Bath, Bedroom, Office, Kitchen, Family Room, Master Bedroom Suite, Living Room, Foyer, Dining Room, Garage, Equipment Room 1, and Equipment Room 2. The main area is divided into 'Equipment' and 'Equipment Locations' sections. The 'Equipment' section shows various components like DIN Rail Power Module Eco, LV-21, LV-17, QS Smart Panel, QSM Wireless, 1 phase 20A AFCI Panel, Visor Control Receiver, Single zone HVAC Controller, Hybrid Repeater, Connect Bridge, and LV-14. The 'Equipment Locations' section shows a list of equipment including Processors, I/O, QS Power Panel 1, Hybrid Repeater 1, HVAC Controller 1, QSM, and Connect Bridge. Below this is a table for 'EcoSystem DPM' with columns for Loop, Load #, Occupancy, Feed, Load Type, Wattage, Qty, Total, and Interface. The 'Interface' column is circled in red, showing the model number L3DD-96WQ24V-U.

Loop	Load #	Occupancy	Feed	Load Type	Wattage	Qty	Total	Interface
Loop 1	1	100A		LED Constant Voltage	40	1	40	L3DD-96WQ24V-U

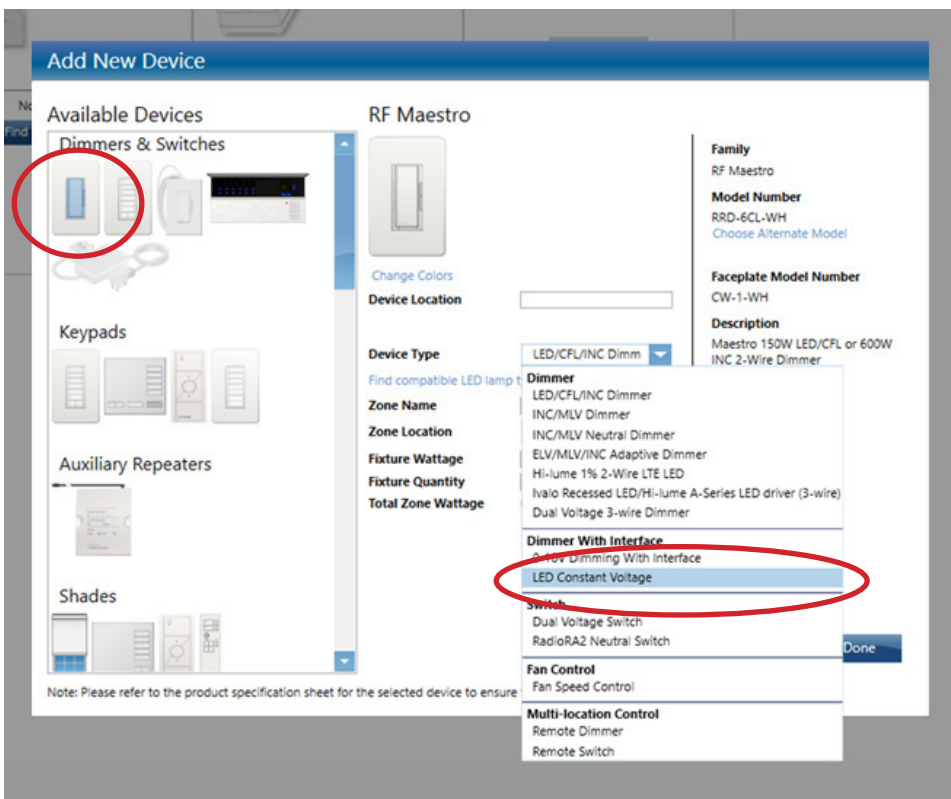
Hi-lume Premier 0.1% 3-Wire Driver and EcoSystem Driver *(continued)*

RadioRA 2: Add the control to the database for 3-Wire Driver

On the **design** tab of the programming software select the **+** icon to add a new device location.



The **Add a New Device** window will appear. Select the first dimmer available under **Dimmers & Switches** and select **LED Constant Voltage** under **Device Type**.



Hi-lume Premier 0.1% 3-Wire Driver and EcoSystem Driver *(continued)*

The Hi-lume Premier 0.1% Constant Voltage Driver (L3D0) is a high-performance LED driver capable of controlling up to 96 W of 24 V constant voltage loads. This driver provides smooth, continuous, and flicker-free dimming down to 0.1% low-end. It is ideal for use with strip lighting in applications such as coves, under or over cabinet lighting and pathway lighting. The driver is UL® Listed with an integrated wiring compartment and can be mounted up to 150 ft (45 m) away from the load, depending on the wire gauge.

Compatible Controls for EcoSystem Driver

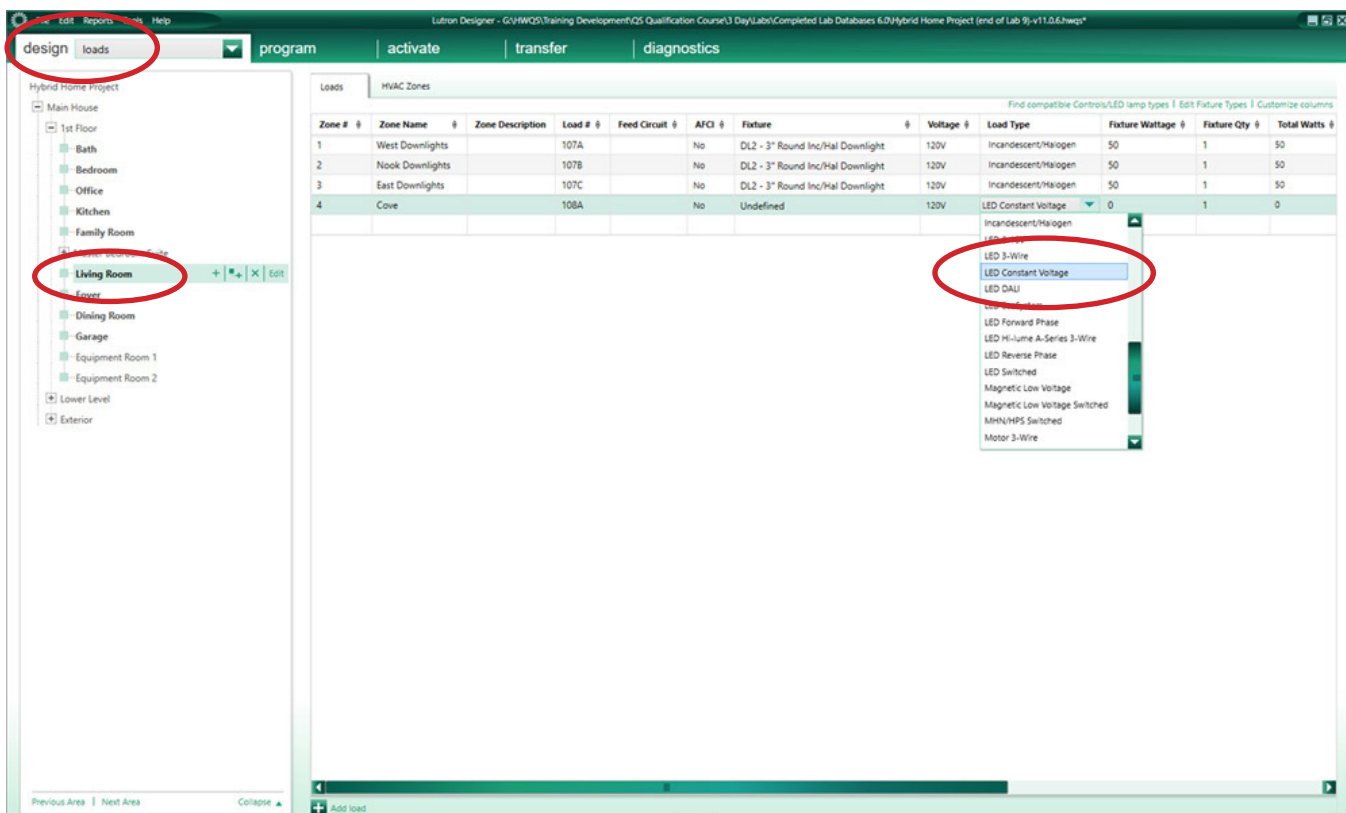
The Hi-lume Premier 0.1% LED driver can be assigned to the following controls:

HomeWorks QS with EcoSystem

Product	Model Number		Recommended System Version	Drivers per Control
	120 V~	277 V~		
HomeWorks QS with EcoSystem	LQSE-2ECO-D QSGRJ-_E QSGR-_E	–	10 or higher	64 per EcoSystem link

HomeWorks QS: Load Schedule (LQSE-2ECO-D)

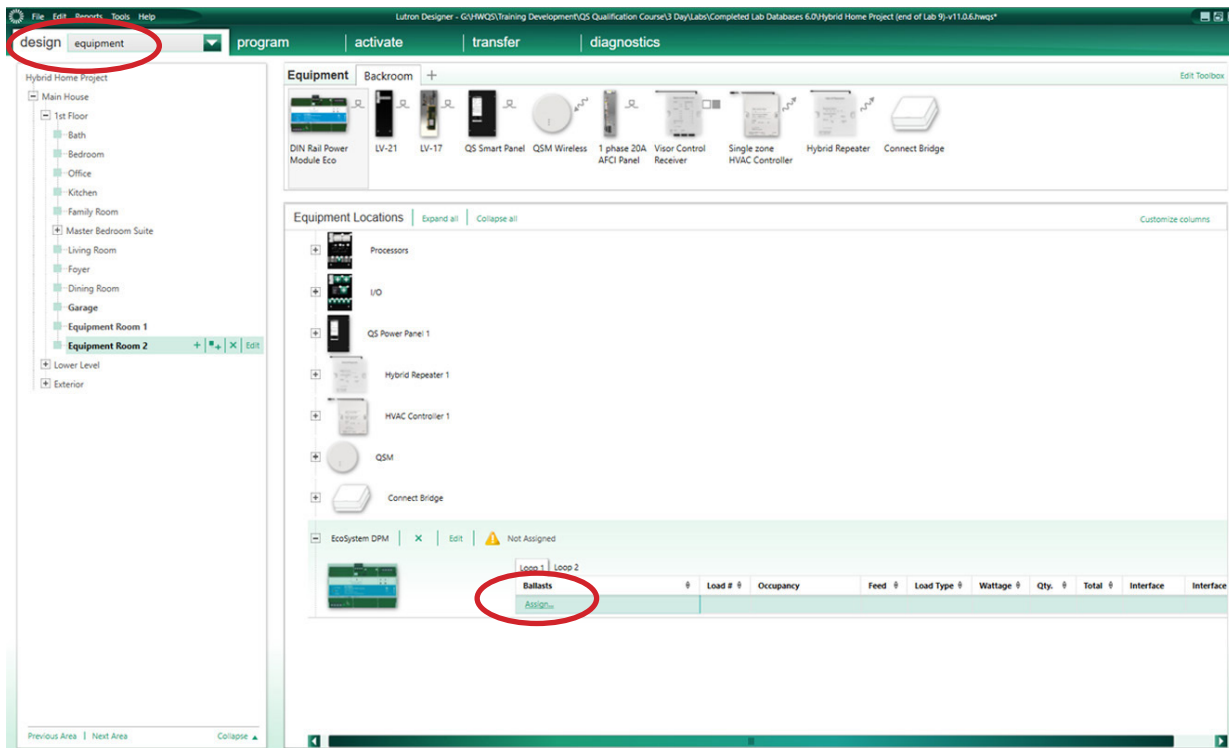
To add a load to the load schedule go to the **design>loads** tab and select the appropriate load type for the driver. For the Hi-lume Premier 0.1% driver select **LED Constant Voltage**.



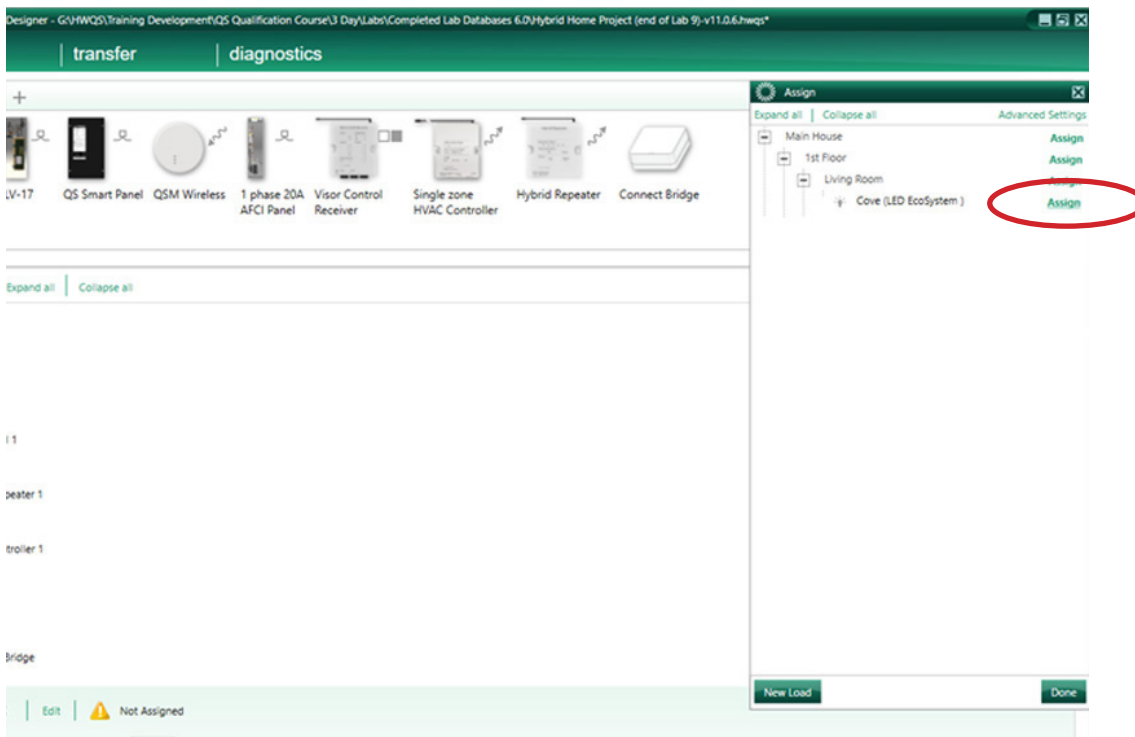
Hi-lume Premier 0.1% 3-Wire Driver and EcoSystem Driver *(continued)*

HomeWorks QS: Assign the load to a control (LQSE-2ECO-D)

To assign the load to a LQSE-2ECO-D, navigate to the **design>equipment** tab. Select the desired loop and select **Assign** under the **Ballasts** column.



A window will appear on the right hand side of the screen. Find the load in question and select **Assign**.



Hi-lume Premier 0.1% 3-Wire Driver and EcoSystem Driver *(continued)*

HomeWorks QS: Assign the load to a control (LQSE-2ECO-D) *(continued)*

After the load has been assigned to the EcoSystem loop, the model number of the driver will appear in the **Interface** column.

The screenshot displays the Lutron Designer software interface. On the left, a tree view shows the project structure, including 'Main House' and 'Equipment Room 2'. The 'Equipment' tab is active, showing a list of components: DIN Rail Power Module Eco, LV-21, LV-17, QS Smart Panel, QSM Wireless, 1 phase 20A AFCI Panel, Visor Control Receiver, Single zone HVAC Controller, Hybrid Repeater, Connect Bridge, and LV-14. Below this, the 'Equipment Locations' section shows a list of components: Processors, I/O, QS Power Panel 1, Hybrid Repeater 1, HVAC Controller 1, QSM, and Connect Bridge. At the bottom, the 'EcoSystem DPM' section is visible, showing a table with columns: Loop, Load #, Occupancy, Feed, Load Type, Wattage, Qty, Total, and Interface. The 'Interface' column is circled in red, showing the model number 'L3DD-96WQ24V-U'.

Loop	Load #	Occupancy	Feed	Load Type	Wattage	Qty	Total	Interface
Loop 1	1							
Loop 2	1							
Ballasts								
...	1	100A		LED Constant Voltage	40	1	40	L3DD-96WQ24V-U
Assign...								

Hi-lume Premier 0.1% 3-Wire Driver and EcoSystem Driver *(continued)*

HomeWorks QS: Load Schedule (QSGRJ-_E)

To add a load to the load schedule go to the **design>loads** tab and select the appropriate load type for the driver. For the Hi-lume Premier 0.1% driver select **LED Constant Voltage**.

Each GRAFIK Eye QS with EcoSystem unit can have a maximum of 64 EcoSystem ballasts/drivers connected to it and can control a maximum of up to 16 zones. However, **Fixture Qty** is unable to be changed to anything other than 1 for an EcoSystem load type in the software. For EcoSystem zones that contain multiple ballasts/drivers the fixture quantity will need to be left at 1 and the TOTAL fixture wattage should be entered in the **Fixture Wattage** field.

For example, if there are 4 EcoSystem Sconce fixtures that are 25 W each and are all in the same zone, 100 W would be entered in the **Fixture Wattage** field and the **Fixture Qty** would be left at 1.

Note: EcoSystem ballasts and drivers must be programmed and assigned to GRAFIK Eye QS zones using the local buttons and display on the GRAFIK Eye. EcoSystem ballast/driver to zone mapping cannot be performed through the HomeWorks QS software.

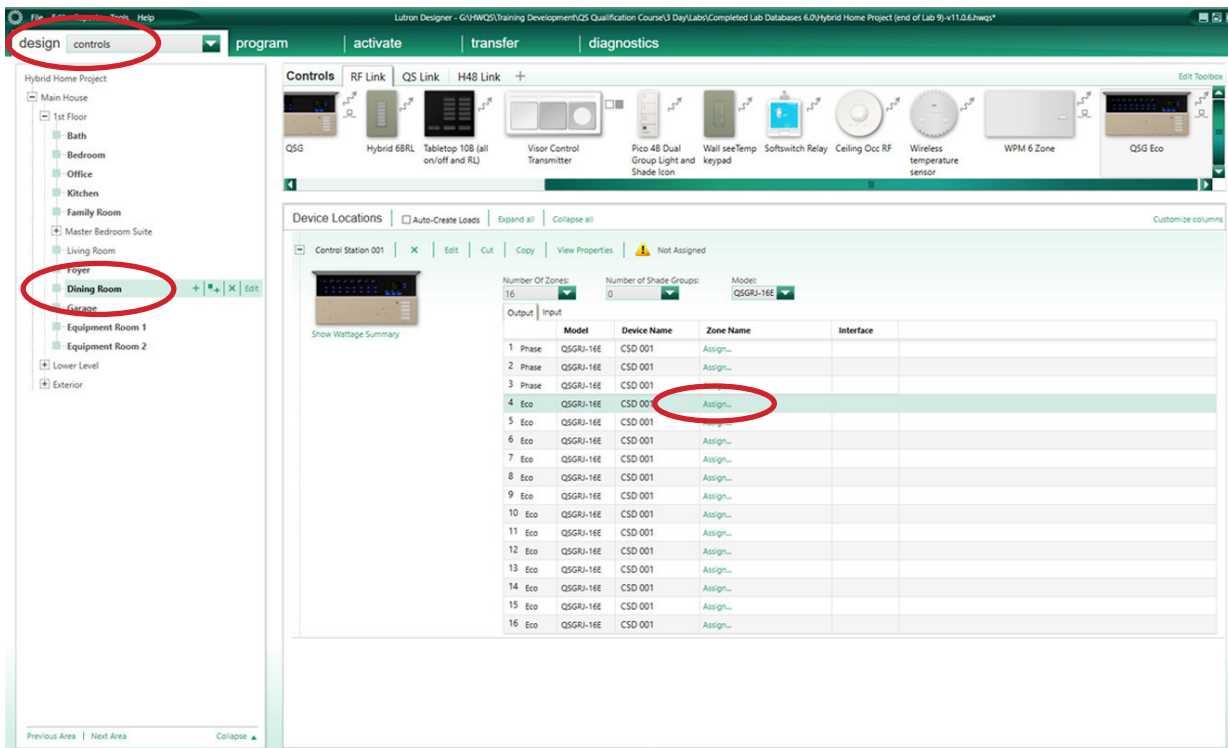
The screenshot shows the Lutron Designer software interface. The 'design > loads' tab is active. On the left, a tree view shows the project structure with 'Living Room' selected. The main area displays a table of loads. The table has columns: Zone #, Zone Name, Zone Description, Load #, Feed Circuit, AFC, Fixture, Voltage, Load Type, Fixture Wattage, Fixture Qty, and Total Watts. Zone 4, 'Cove', is highlighted with a red circle. The 'Fixture Wattage' for Zone 4 is 100, and the 'Fixture Qty' is 1, resulting in a 'Total Watts' of 100.

Zone #	Zone Name	Zone Description	Load #	Feed Circuit	AFC	Fixture	Voltage	Load Type	Fixture Wattage	Fixture Qty	Total Watts
1	West Downlights		1		No	DL2 - 3" Round Inc/Hal Downlight	120 V	Incandescent/Halogen	50	1	50
2	Nook Downlights		2		No	DL2 - 3" Round Inc/Hal Downlight	120 V	Incandescent/Halogen	50	1	50
3	East Downlights		3		No	DL2 - 3" Round Inc/Hal Downlight	120 V	Incandescent/Halogen		1	50
4	Cove		4		No	Undefined	120 V	LED Constant Voltage	100	1	100

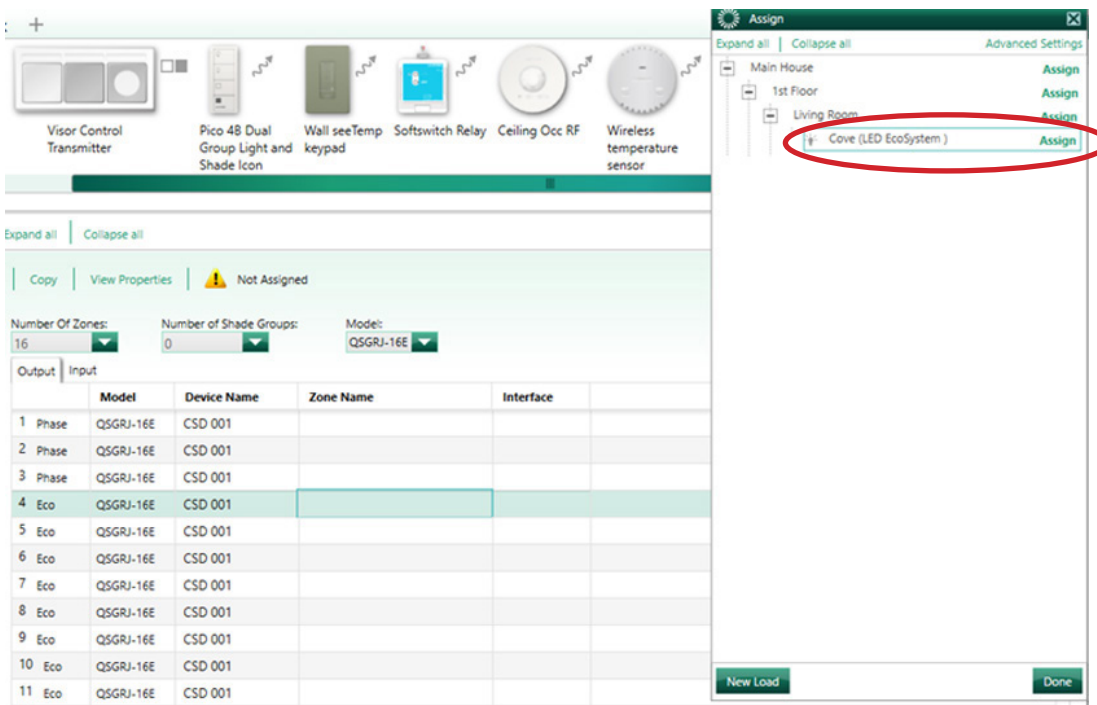
Hi-lume Premier 0.1% 3-Wire Driver and EcoSystem Driver *(continued)*

HomeWorks QS: Assign the load to a control (QSGRJ-_E)

If the load is being assigned to a QSGRJ-_E the assignment will be done in the **design>controls** tab. Select one of the Eco outputs and select **Assign** under the **Zone Name** column.



A window will appear on the right hand side of the screen. Find the load in question and select **Assign**.



Hi-lume Premier 0.1% 3-Wire Driver and EcoSystem Driver *(continued)*

HomeWorks QS: Assign the load to a control (QSGRJ-_E) *(continued)*

After the load has been assigned to the EcoSystem loop, the model number of the driver will appear in the **Interface** column.

The screenshot shows the Lutron Designer software interface. The 'Device Locations' window is open, displaying a table of device assignments for 'Control Station 001'. The table has columns for 'Model', 'Device Name', 'Zone Name', and 'Interface'. The 'Interface' column for the 'Cove' zone is highlighted with a red circle, showing the model number 'L300-96W24V-U'.

Output	Input	Model	Device Name	Zone Name	Interface
1 Phase	QSGRJ-16E	CSD 001	Assign...		
2 Phase	QSGRJ-16E	CSD 001	Assign...		
3 Phase	QSGRJ-16E	CSD 001	Assign...		
4 Eco	QSGRJ-16E	CSD 001	Cove	L300-96W24V-U	
5 Eco	QSGRJ-16E	CSD 001	Assign...		
6 Eco	QSGRJ-16E	CSD 001	Assign...		
7 Eco	QSGRJ-16E	CSD 001	Assign...		
8 Eco	QSGRJ-16E	CSD 001	Assign...		
9 Eco	QSGRJ-16E	CSD 001	Assign...		
10 Eco	QSGRJ-16E	CSD 001	Assign...		
11 Eco	QSGRJ-16E	CSD 001	Assign...		
12 Eco	QSGRJ-16E	CSD 001	Assign...		
13 Eco	QSGRJ-16E	CSD 001	Assign...		
14 Eco	QSGRJ-16E	CSD 001	Assign...		
15 Eco	QSGRJ-16E	CSD 001	Assign...		
16 Eco	QSGRJ-16E	CSD 001	Assign...		

HomeWorks Digital Controller and HomeWorks Digital 0.1% LED Controller

HomeWorks Digital 0.1% LED controllers provide a high-performance solution for any space, in any application. They provide smooth, continuous dimming down to 0.1% of full output current, and fade smoothly between 0% and 0.1% with Soft-on, Fade-to-Black.

Compatible Controls for HomeWorks Digital Controller

Product	Model Number		Recommended Software Version	Drivers per Control
	120 V~	277 V~		
HomeWorks QSX with Digital	LQSE-2HDC-D	LQSE-2HDC-D	21.4 or higher	64 per digital link

HomeWorks QSX: Load Schedule for HomeWorks Digital Controller

To add a load to the load schedule, navigate to the **design>loads** tab and select the appropriate load type for the driver. For the HomeWorks Digital Controller, select HomeWorks Digital.

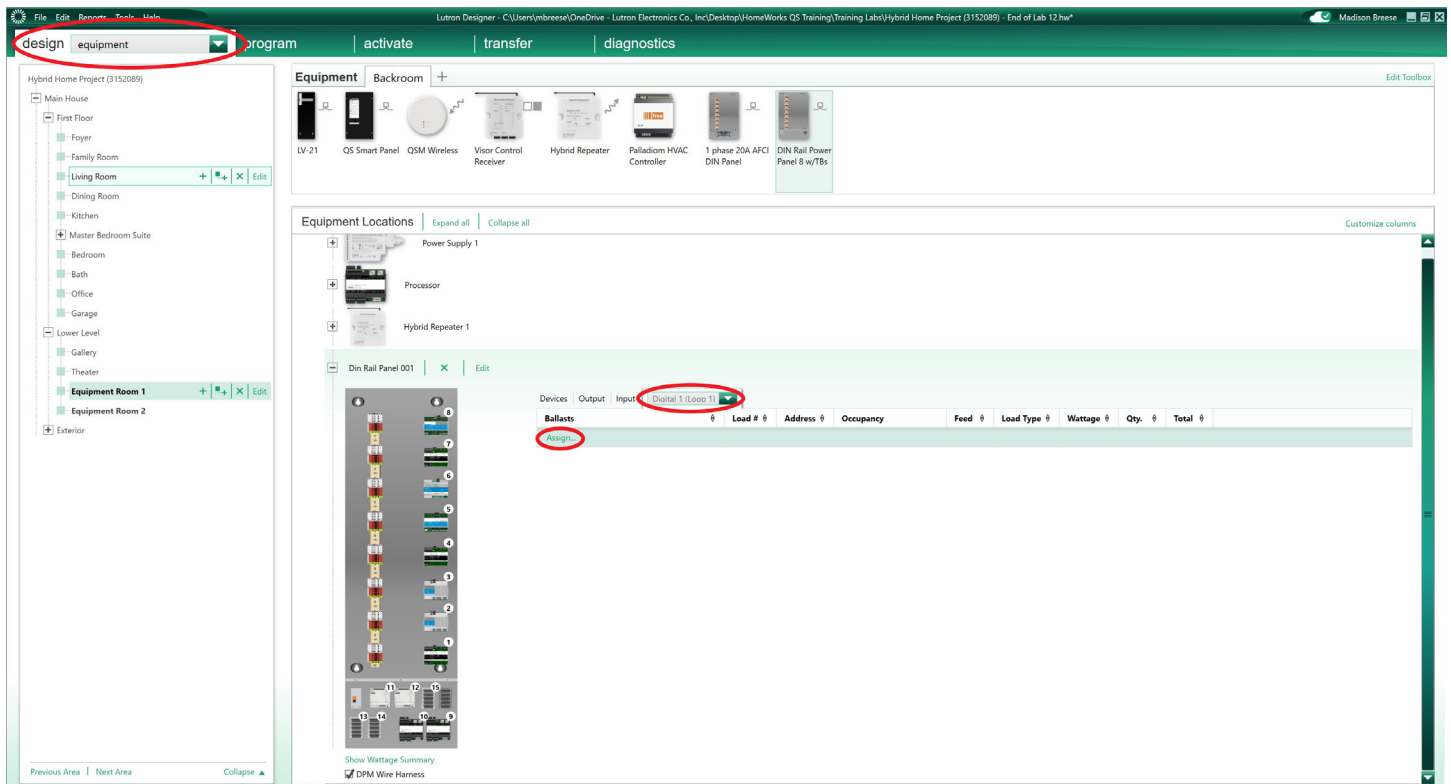
The screenshot shows the Lutron Designer software interface. The top navigation bar includes tabs for 'design', 'loads', 'program', 'activate', 'transfer', and 'diagnostics'. The 'design' tab is active, and the 'loads' sub-tab is selected. On the left, a tree view shows the project structure, with 'Living Room' highlighted. The main workspace displays a table of loads. The table has columns: Zone #, Zone Name, Zone Description, Fixture Type, Fixture Qty, Load #, Product Type, Load Type, Total Watts, Voltage, Emergency, Interface, Interface Qty, and Manual Override. A dropdown menu is open for the 'Load Type' column of the first row, showing various options, with 'HomeWorks Digital' highlighted and circled in red.

Zone #	Zone Name	Zone Description	Fixture Type	Fixture Qty	Load #	Product Type	Load Type	Total Watts	Voltage	Emergency	Interface	Interface Qty	Manual Override
1	West Downlights	DL2 - 3" Round Inc/Hal Downlight	1	107A	-	Incandescent/Halogen	Incandescent/Halogen	50	120 V	No (100%)	None	50	
2	Nook Downlights	DL2 - 3" Round Inc/Hal Downlight	1	107B	-	Incandescent/Halogen	Incandescent/Halogen	50	120 V	No (100%)	None	50	
3	East Downlights	DL2 - 3" Round Inc/Hal Downlight	1	107C	-	Incandescent/Halogen	Incandescent/Halogen	50	120 V	No (100%)	None	50	
4	Floor Lamp	Lamp - Night Light - 39 lm	1	107D	-	Incandescent/Halogen	Incandescent/Halogen	20	120 V	No (100%)	None	100	
5	Cove	Undefined	1	107	-	Incandescent/Halogen	Incandescent/Halogen	20	120 V	No (100%)	None	100	

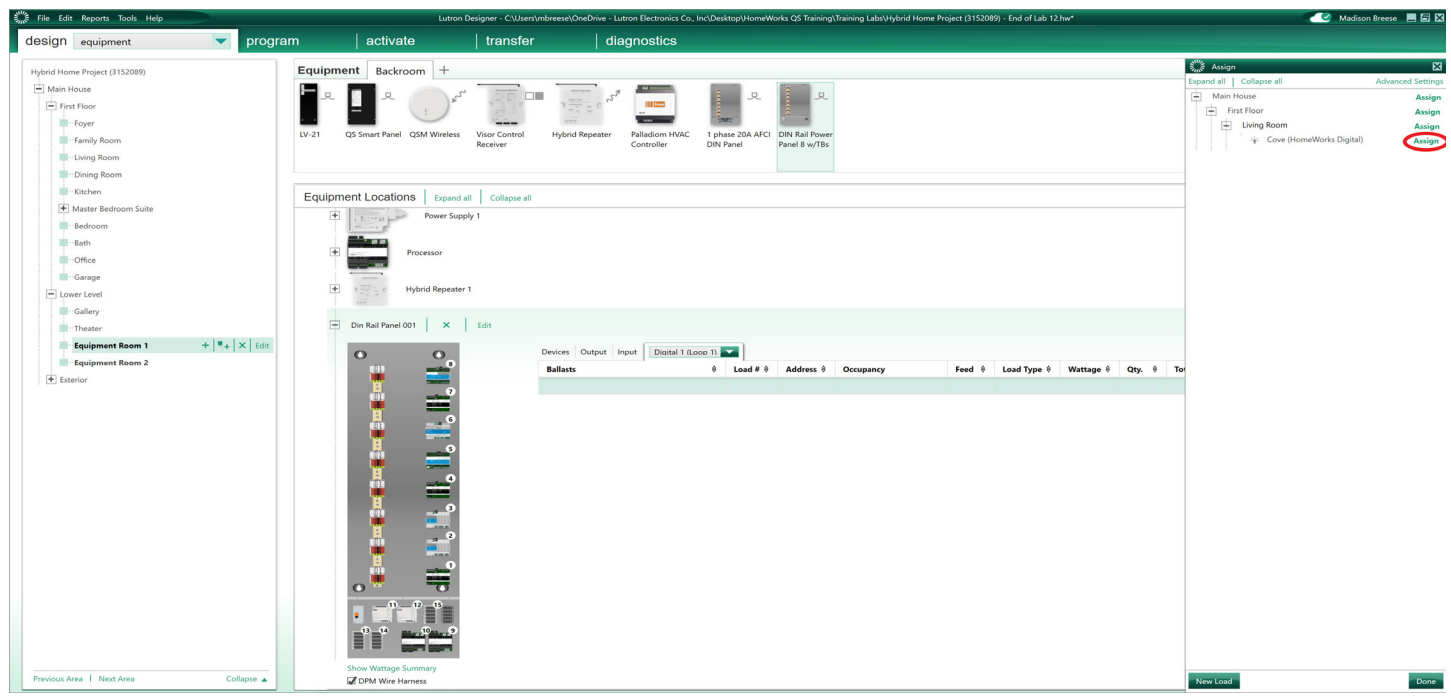
HomeWorks Digital Controller and HomeWorks Digital 0.1% LED Controller (continued)

HomeWorks QSX: Assign the load to a control (LQSE-2HDC-D)

To assign the load to a LQSE-2HDC-D, navigate to the **design>equipment** tab. Select the desired loop and select **Assign** under the **Ballasts** column.



A window will appear on the right hand side of the screen. Find the load in question and select **Assign**.



HomeWorks Digital Controller and HomeWorks Digital 0.1% LED Controller (continued)

HomeWorks QSX: Assign the load to a control (LQSE-2HDC-D) (continued)

The screenshot displays the Lutron Designer software interface for configuring a HomeWorks QSX system. The interface is divided into several sections:

- Project Tree (Left):** Shows the project structure for 'Hybrid Home Project (3152088)'. The 'Main House' is expanded, showing various rooms including the 'Equipment Room 2' which is currently selected.
- Top Menu Bar:** Includes options like 'design', 'equipment', 'program', 'activate', 'transfer', and 'diagnostics'.
- Equipment Panels (Top):** Displays a row of equipment icons including Hybrid Repeater, Floor Control Receiver, Digital IO, DMX, QSM, and various DIN Rail Power Modules.
- Equipment Locations (Main Workspace):** This section is active and shows a table of equipment assignments. The table has columns for Loop, Load #, Address, Occupancy, Feed, Load Type, Wattage, Qty, Total, Interface, and Interface Qty. The table shows one entry for 'Ballasts' assigned to 'Loop 1' and 'Loop 2'.

Loop	Load #	Address	Occupancy	Feed	Load Type	Wattage	Qty	Total	Interface	Interface Qty
Loop 1	0	0	0	0	0	0	0	0	0	0
Loop 2	0	0	0	0	0	0	0	0	0	0
Ballasts	107	Unaddressed			HomeWorks Digital	0	1	0	None	0

Additional Information and Resources

EcoSystem Programming

For more information on configuring and using EcoSystem loads, refer to **Using EcoSystem Ballasts/Drivers in HomeWorks QS** available in the Application Notes section at www.lutron.com (requires a myLutron login).

Specification Submittals:

[Hi-lume 1% 2-wire/EcoSystem \(LTEA\)](#)

[Hi-lume 1% 3-Wire/EcoSystem \(L3DA\)](#)

[Hi-lume Premier 0.1% EcoSystem/3-wire Constant Voltage \(L3D0\)](#)

0.1% Premier HomeWorks Digital Controller

HomeWorks Digital Power Module

Installation Guides:

[Hi-lume 1% 2-wire](#)

[Hi-lume 1% EcoSystem](#)

[Hi-lume 1% 3-Wire/EcoSystem](#)

[Hi-lume 0.1% 3-wire/EcoSystem](#)

LCI Online - www.lutron.com/LCOnline

[OVW 103 - Understanding Load Types](#)

[OVW 301 - Introduction to LEDs and LED Drivers](#)

[OVW 206 - Hi lume A Series LED Driver](#)

Dimming LEDs

[Controlling LEDs White Paper](#)

[Residential Systems Control of LED Lighting](#)

[Challenges of Dimming LED Loads on ELV and MLV Transformers](#)

[0-10 V_{DC} Control Topology](#)

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