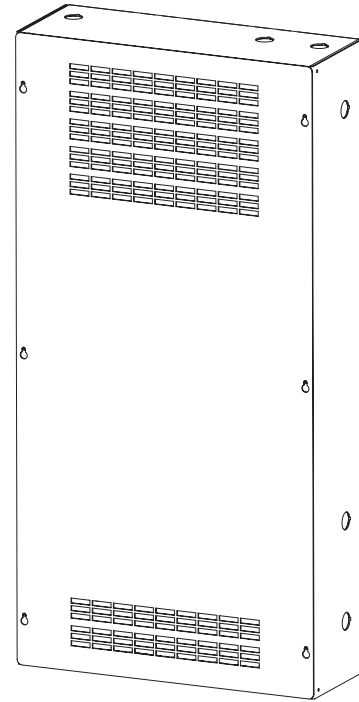


## Quantum Light Management Hub (QP2)

The Quantum Light Management Hub (QP2) connects Lutron QS devices, Lutron power panels, Lutron EcoSystem drivers and DMX512 devices to your Quantum lighting control system.

### Features

- Designed to control, manage, and monitor any Lutron Energi Savr Node units, Lutron power panels, GRAFIK Eye QS units, Sivoia QS shade/drapery systems, EcoSystem drivers and DMX512 devices.
- Supports both astronomic and time-of-day events to automatically control the lights and shades in the system.
- Simple reconfiguration of a space without rewiring for EcoSystem devices.
- Individually control, monitor, and adjust any light or shade in a space.
- QS links and EcoSystem loops are topology-free.
- For EcoSystem devices, the light management hub accepts one normally closed (NC) emergency input.
- EcoSystem bus may be wired NEC® Class 1 or IEC PELV/NEC® Class 2.



### QP2 Hub Capabilities

- Each Quantum Light Management Hub (QP2) supports up to 8 EcoSystem loops, (4 Quantum bus supplies).
- Each loop can have a combination of 64 EcoSystem devices with a maximum of 16 daylight sensors, 32 occupancy sensors, and 64 infrared (IR) devices, attached across the devices.
- Supports up to 2 Quantum processors with 2 links each that can be individually configured to communicate with:
  - Quantum bus supply (limited to one link per QP2 hub)
  - Lutron power panels
  - Lutron QS devices
  - DMX-512 devices for lighting zones (use QSE-CI-DMX for DMX integration zones)

### Allowed combinations of links for any single processor:

	DMX-In	DMX-Out	QS	Panel	DBI
DMX-In			✓		✓
DMX-Out			✓		✓
QS	✓	✓	✓	✓	✓
Panel			✓	✓	✓
DBI	✓	✓	✓	✓	

<b>Job Name:</b>	<b>Model Numbers:</b>
<b>Job Number:</b>	

## Specifications

### Regulatory Approvals

- cULus® Listed (Reference: UL® File E42071)
- California Energy Commission Listed
- NOM certified models available

### Power

- Input voltage: 120 V~, normal/emergency feed  
50/60 Hz 15 A
- Output: EcoSystem - 18 V== 250 mA per loop  
Processor - 24 V== 1 A per link

### Physical Design

- Enclosure: NEMA Type 1, IP-20 protection  
16 U.S. gauge steel
- Weight: 45 lb (20.4 kg) (with packaging)

### Mounting

- Surface-mount only

### Environment

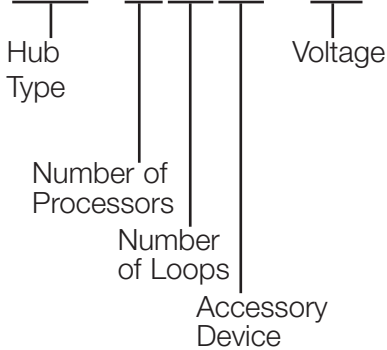
- For indoor use only
- 32 to 104 °F (0 to 40 °C)
- Relative humidity less than 90% non-condensing

<b>Job Name:</b>	<b>Model Numbers:</b>
<b>Job Number:</b>	

## How to Build a Model Number

Example

**QP2 - 2P8CSE - 120**



### Hub Type

QP2 = Quantum Light Management Hub

### Number of Processors

0P = 0 Quantum processors  
 1P = 1 Quantum processor  
 2P = 2 Quantum processors

### Number of Loops

0C = 0 EcoSystem loops  
 2C = 2 EcoSystem loops  
 4C = 4 EcoSystem loops  
 6C = 6 EcoSystem loops  
 8C = 8 EcoSystem loops

### Accessory Device

SE = 5-port Unmanaged Ethernet Switch

### Voltage

120 = 120 V~

## Available Model Numbers

Contact Lutron for options not listed below.

- QP2-0P0CSE-120 (for rough-in use)
- QP2-1P0CSE-120
- QP2-1P2CSE-120
- QP2-1P4CSE-120
- QP2-1P6CSE-120
- QP2-1P8CSE-120
- QP2-2P0CSE-120
- QP2-2P2CSE-120
- QP2-2P4CSE-120
- QP2-2P6CSE-120
- QP2-2P8CSE-120

## Additional Model Numbers

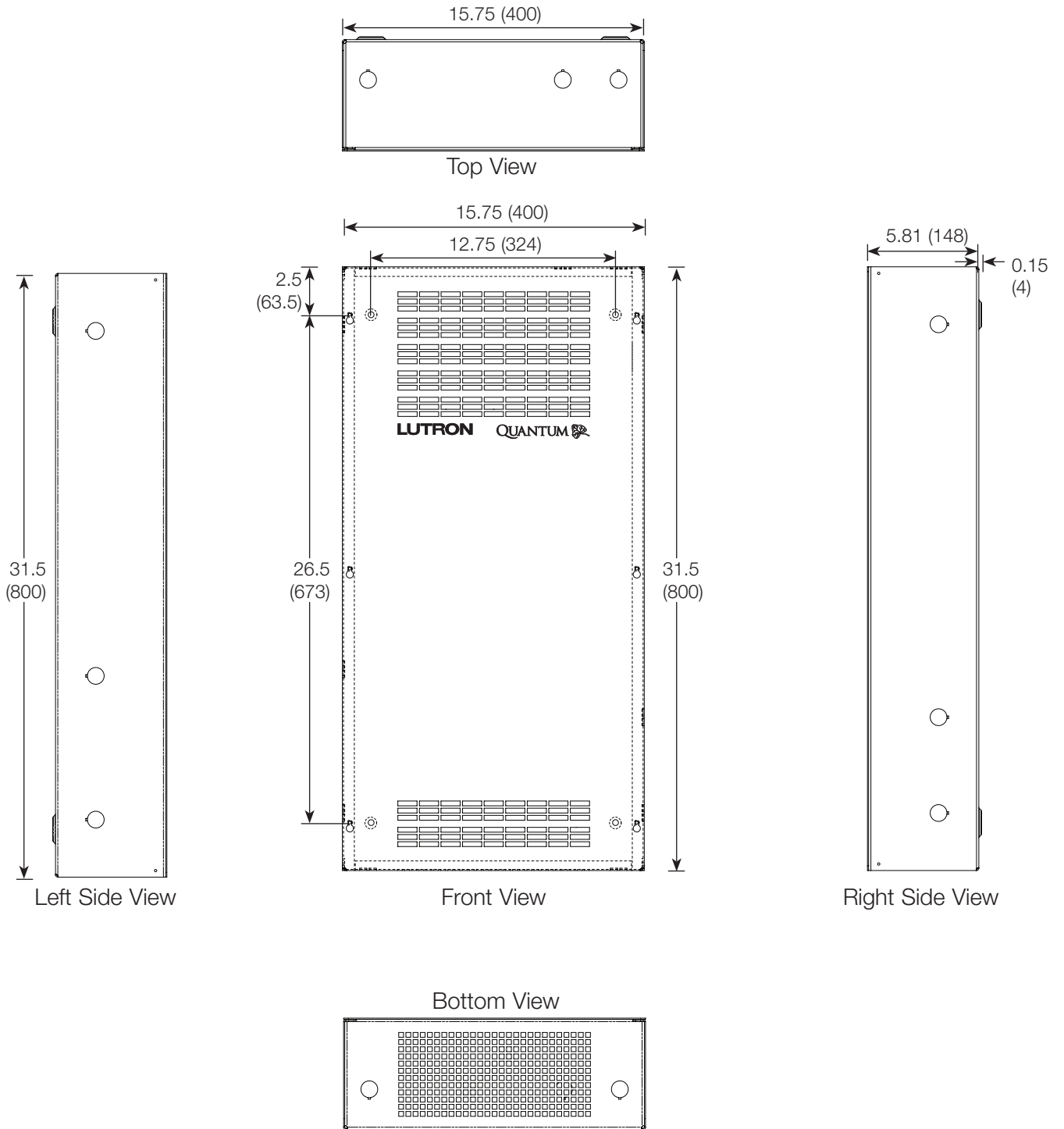
**QS-1P** - This is the Lutron model number for an additional processor that can be added to the hub. A panel can have a maximum of two processors but the panel can be ordered with 0, 1 or 2. This model allows a processor to be added in the field.

**Q-2C** - This is the Lutron model number for an additional EcoSystem bus supply. Each bus supply connects two EcoSystem loops to the processor. A panel can have a maximum of eight loops but can be ordered with 0, 2, 4, 6 or 8 loops. This model allows additional bus supplies to be added in the field.

<b>Job Name:</b>	<b>Model Numbers:</b>
<b>Job Number:</b>	

### Dimensions

Shown as in (mm)



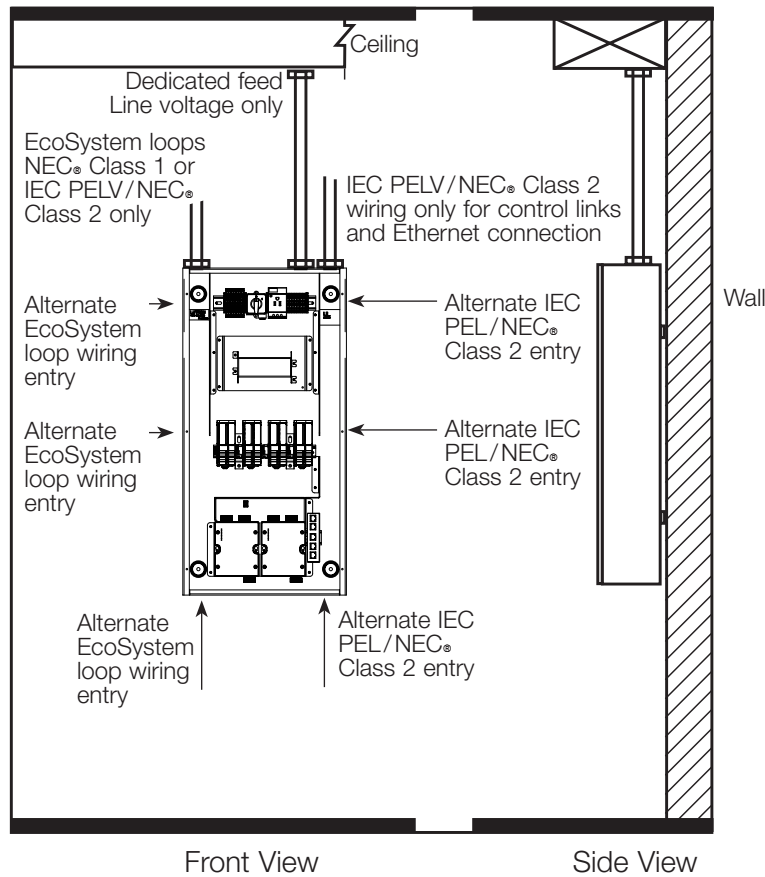
<b>Job Name:</b>	<b>Model Numbers:</b>
<b>Job Number:</b>	

### Mounting and Conduit Entry

- Surface-mount indoors.
- Hub generates heat. Mount only where temperature will be 32 to 104 °F (0 to 40 °C).
- This equipment is air-cooled. Do not block vents or warranty will be void. A minimum of 12 in (305 mm) of unobstructed space is required in front of and below the hub for ventilation.
- Water damages equipment. Mount in a location where the hub and processors will not get wet.
- Mount within 7° of true vertical.
- EcoSystem loop wiring can be Class 1 or IEC PELV/NEC® Class 2; always keep Class 1 and Class 2 wiring separate, and follow all applicable local and national electric codes.
- Reinforce wall structure for weight and local codes.

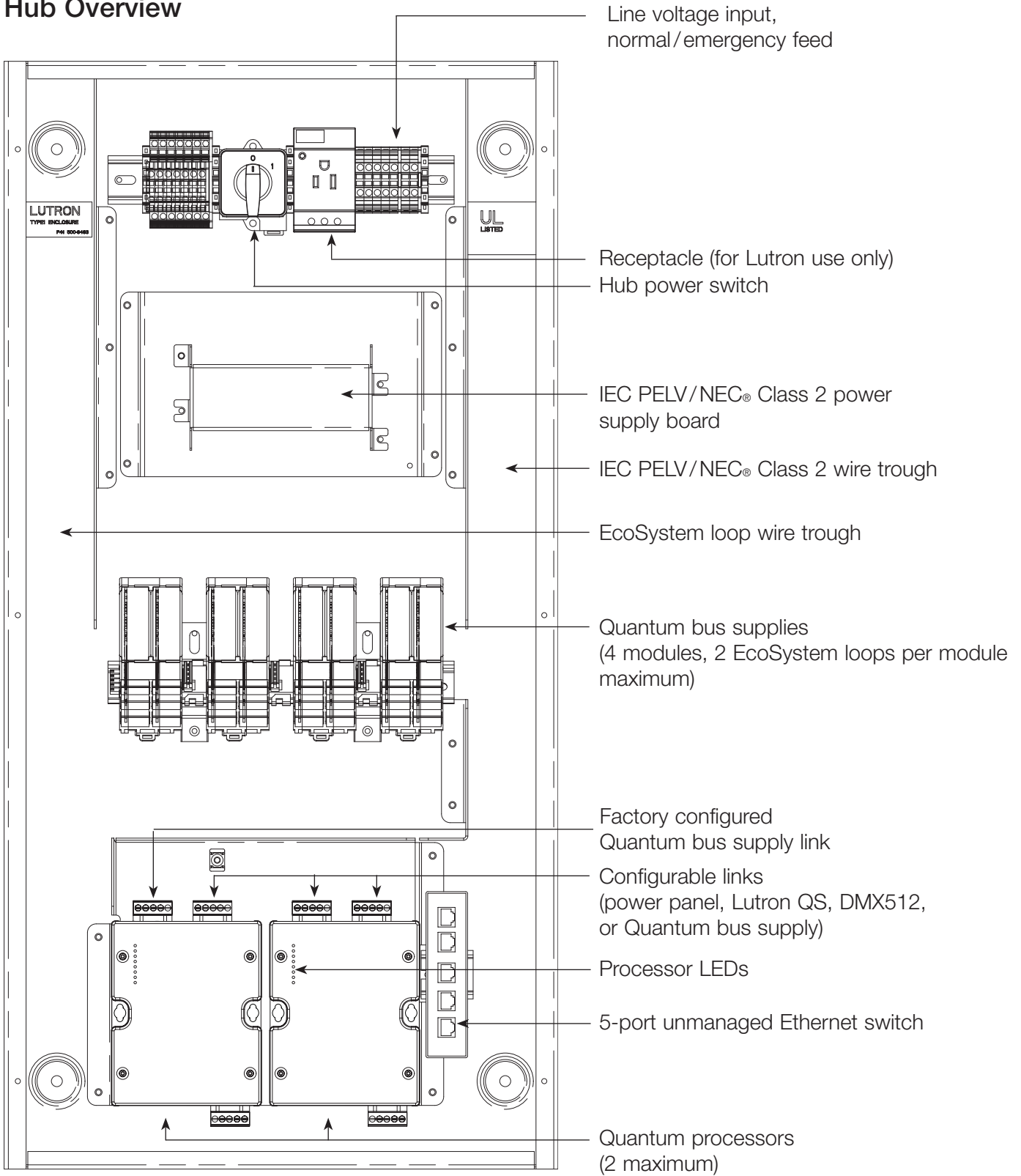
Hub	Maximum BTUs/Hour	Weight (without packaging)
All models	220	45 lb (20.4 kg)

- Mount hubs so line (mains) voltage wiring is at least 6 ft (1.8 m) from sound or electric equipment and wiring.



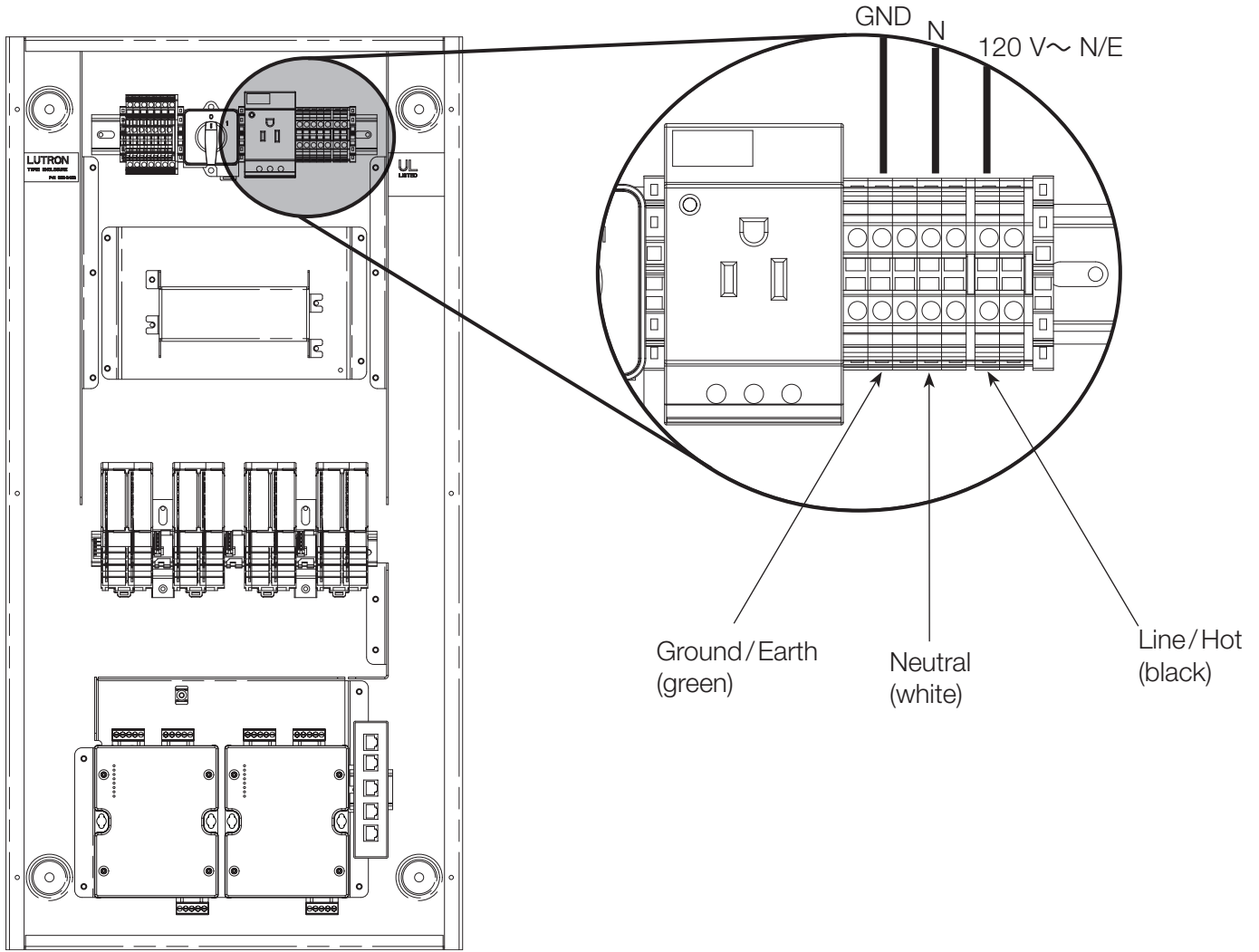
<b>Job Name:</b>	<b>Model Numbers:</b>
<b>Job Number:</b>	

### Hub Overview



<b>Job Name:</b>	<b>Model Numbers:</b>
<b>Job Number:</b>	

## Line Voltage Wiring

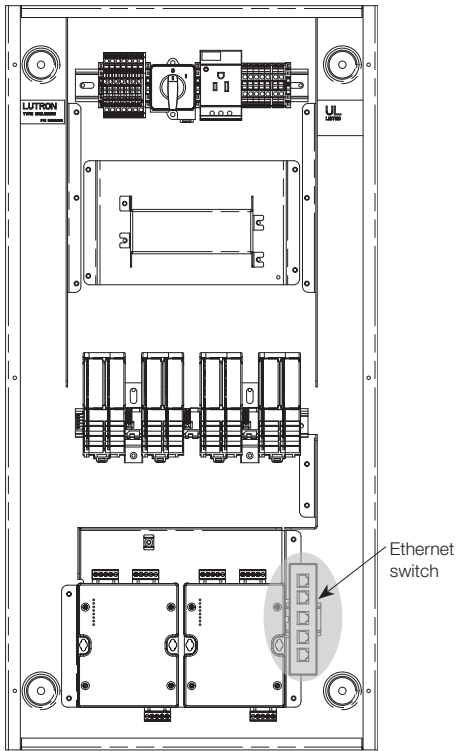


### Notes

- Line voltage must enter hub from top right of hub
- Run a dedicated 120 V~ normal/emergency feed
- Lutron recommends that no more than four Light Management Hubs are powered by a single derated 20 A circuit
- Run wiring so line (mains) Class 1 voltage is separate from IEC PELV/NEC® Class 2 wiring

Job Name:	Model Numbers:
Job Number:	

## Quantum Inter-Processor Wiring



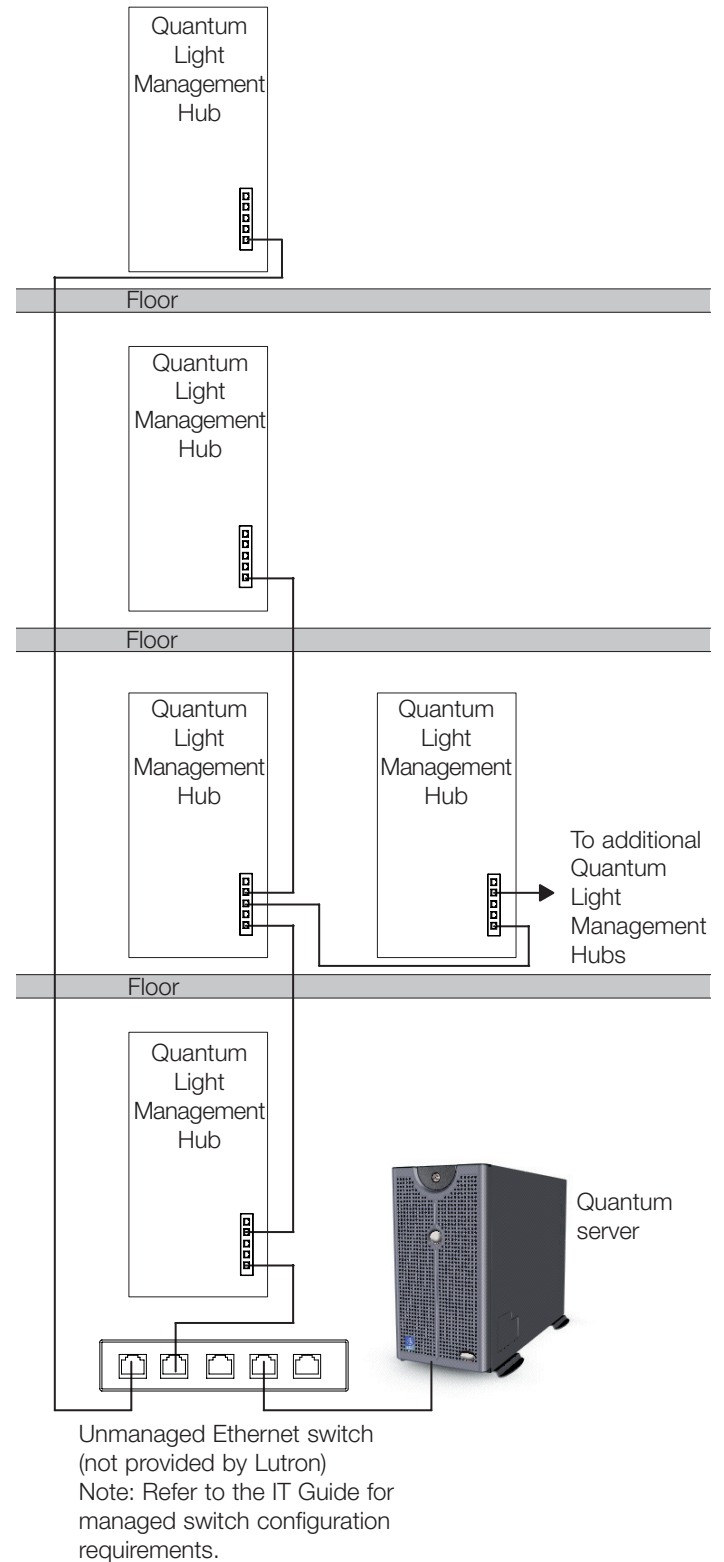
### Notes

The inter-processor wiring is considered IEC PELV/NEC® Class 2; do not run in the same conduit as line (mains) voltage wiring.

- Processors cannot be daisy-chained. Each must be connected to an Ethernet switch.
  - Inter-processor wiring uses a standard Ethernet connection. All wiring must comply with IEEE 802.3 standards and must support Any-Source Multicast communication
- Wiring distance for any single “wire segment”<sup>\*</sup> is 330 ft (100 m) max; use unmanaged Ethernet switches for longer distances.
- Processors cannot be more than 6 “wire segments” from the server.
- A dedicated network or VLAN is recommended for the lighting control system.
- For more information about connecting a Quantum system to a corporate or building wide network, please refer to the Quantum IT Guide (P/N 040423) at [www.lutron.com/ITGuide](http://www.lutron.com/ITGuide)

<sup>\*</sup> A wire segment is a length of cable connecting two devices communicating over Ethernet.

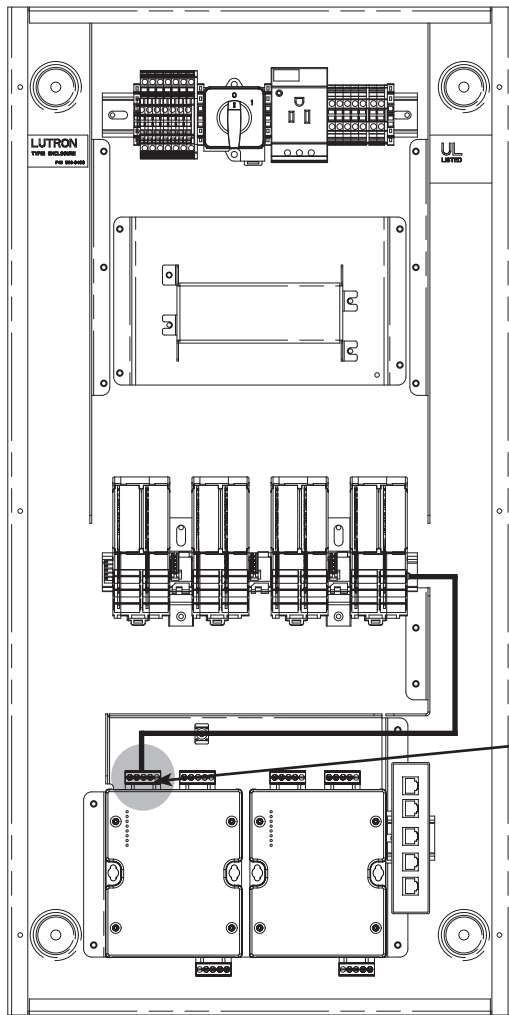
## Example of Inter-Processor Wiring: Riser Diagram



<b>Job Name:</b>	<b>Model Numbers:</b>
<b>Job Number:</b>	



## Dedicated Quantum Bus Supply Link



QP2-2P8CSE-120 shown

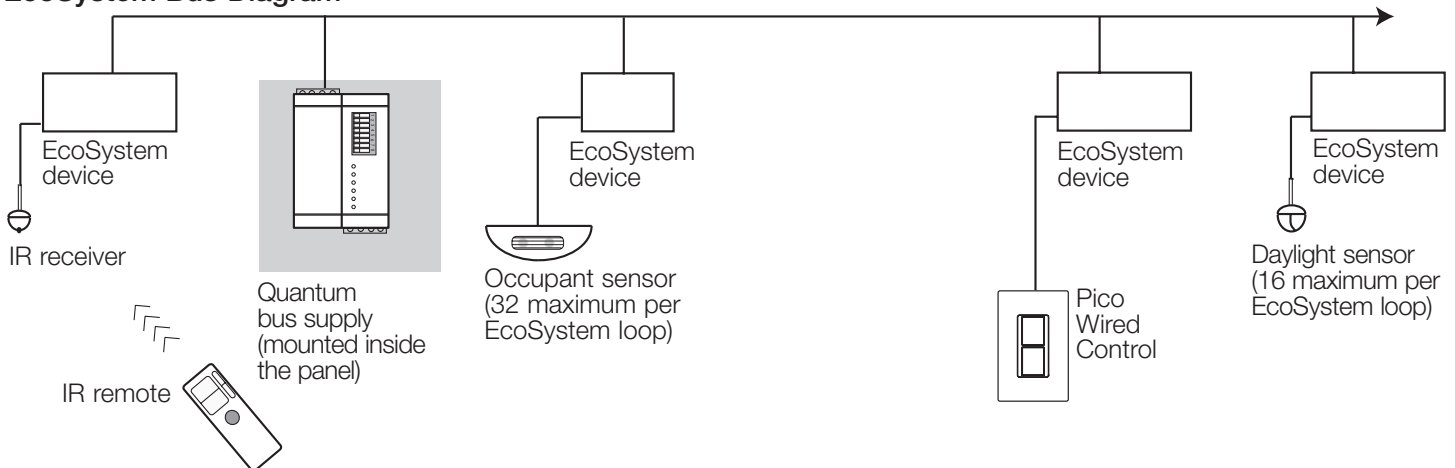
### Notes

- EcoSystem loops may be wired in accordance with NEC® Class 1 or IEC PELV/NEC® Class 2 practices
- Sensors and Quantum bus supply contact closures must be wired IEC PELV/NEC® Class 2

Dedicated Quantum bus supply link; prewired by Lutron to Quantum Bus Supply located in hub

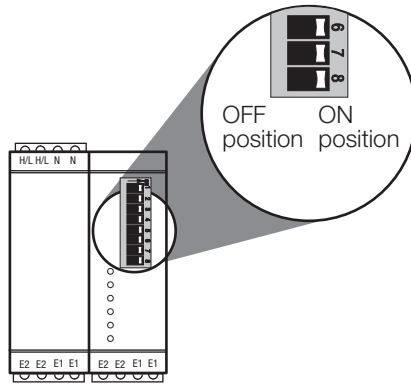
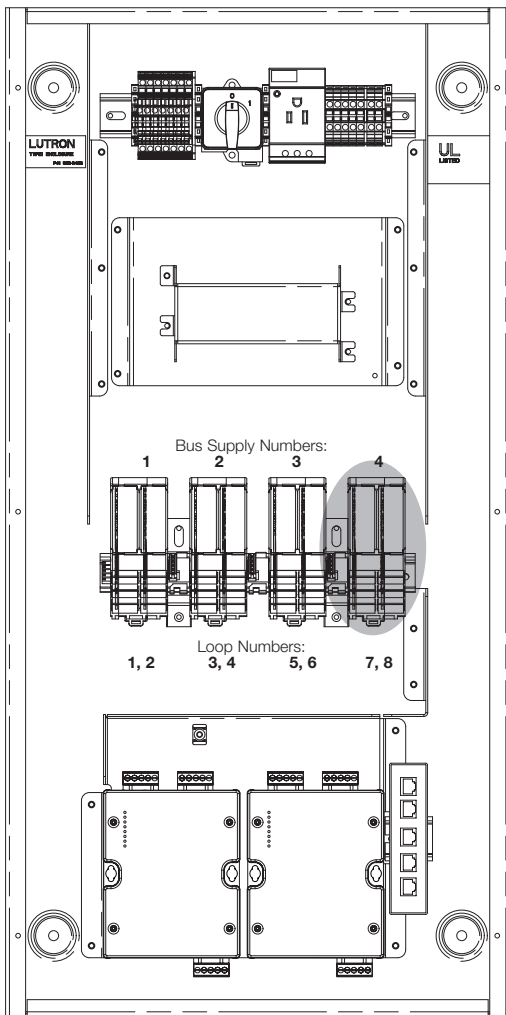
**Note:** If Quantum bus supply link is not required, this can be used as a configurable link. PDU power is not available from the Quantum hub on this link. An external power supply is required to power devices on this link.

### EcoSystem Bus Diagram



Job Name:	Model Numbers:
Job Number:	

# Quantum Bus Supply OPT Switches and LEDs

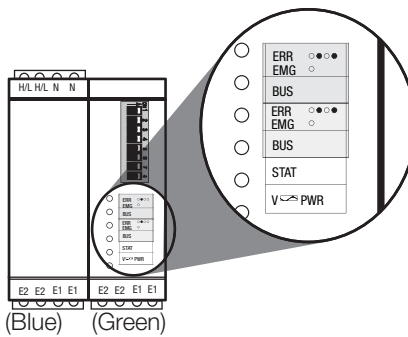


## OPT Switches

OPT switches are used to configure the Bus Supply. The tables below describe the options. To place an OPT switch in the OFF position, slide the switch to the left; away from the switch's number. Default is ON (next to the switch's number).

## OPT Switch Functions

1	Addressing				
2	Set address for bus supply's loops (2 loops per bus supply)	Bus Supply 1 Addresses 1, 2	Bus Supply 2 Addresses 3, 4	Bus Supply 3 Addresses 5, 6	Bus Supply 4 Addresses 7, 8
4	Green Loop (right side)				
5	Manual override levels	Lights stay at current level	Lights go to "high" level	Lights go to "low" level	Lights go to Off
6	Blue Loop (left side)				
7	Manual Override levels	Lights stay at current level	Lights go to "high" level	Lights go to "low" level	Lights go to Off
8	Manual Override				
		Manual override levels will be used		Lights will go to the level specified by the system	



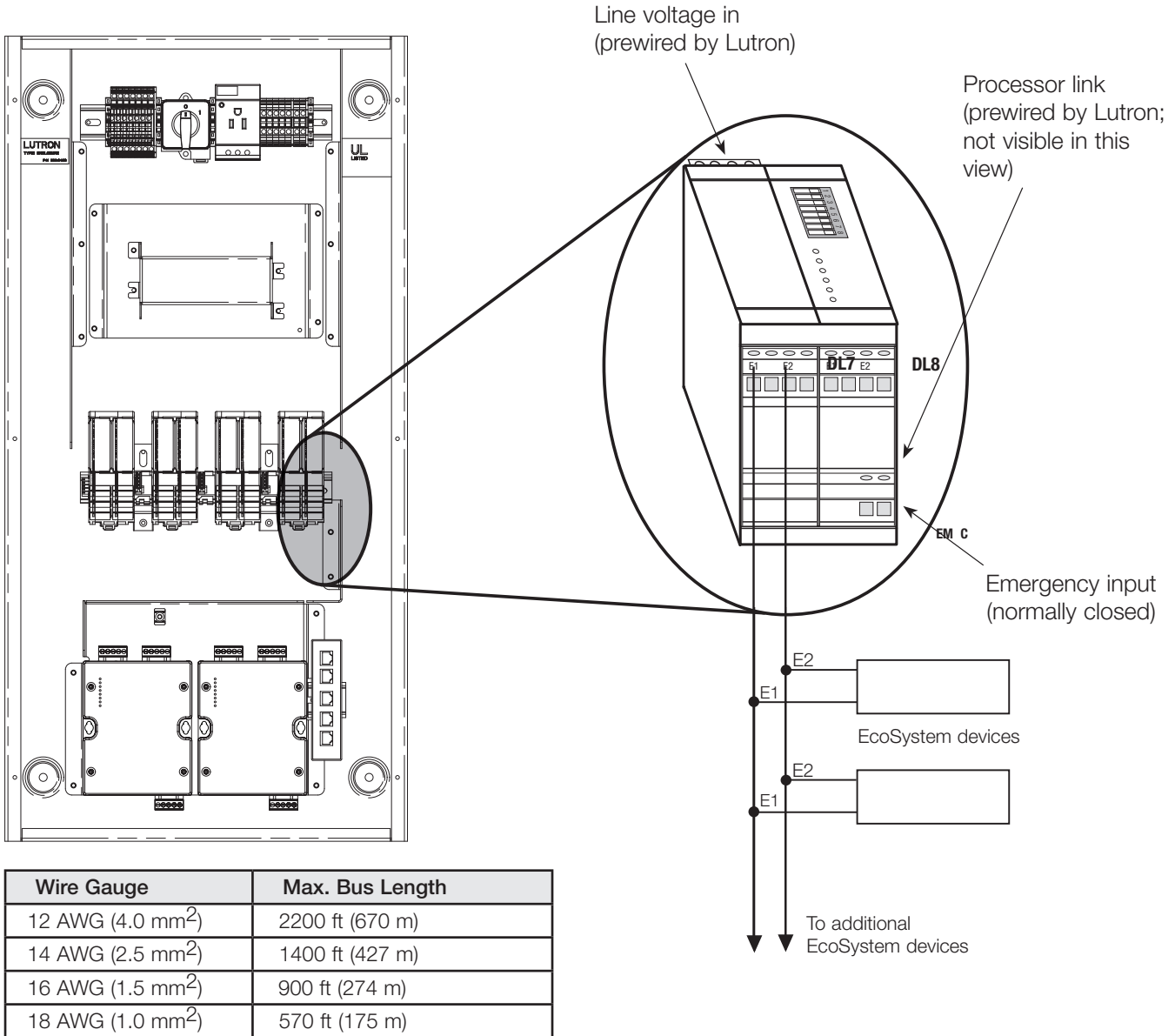
## Status LEDs

LEDs on the Quantum Bus Supply indicate network status. The specific LEDs, color and flashing method is detailed below.

LED	Normal Operation	Problem Indicator	Probable Cause
V~ PWR	On	Off	No Mains power
STAT	Steady flash	Off	No Mains power or unit fault
		On	Unit fault
BUS	Intermittent flash or Off	On	Unit fault
		Off	
ERR/EMG	Off	On	Emergency contact closure is active
		Steady flash	Miswire detected on corresponding bus

<b>Job Name:</b>	<b>Model Numbers:</b>
<b>Job Number:</b>	

# Quantum Bus Supply Wiring

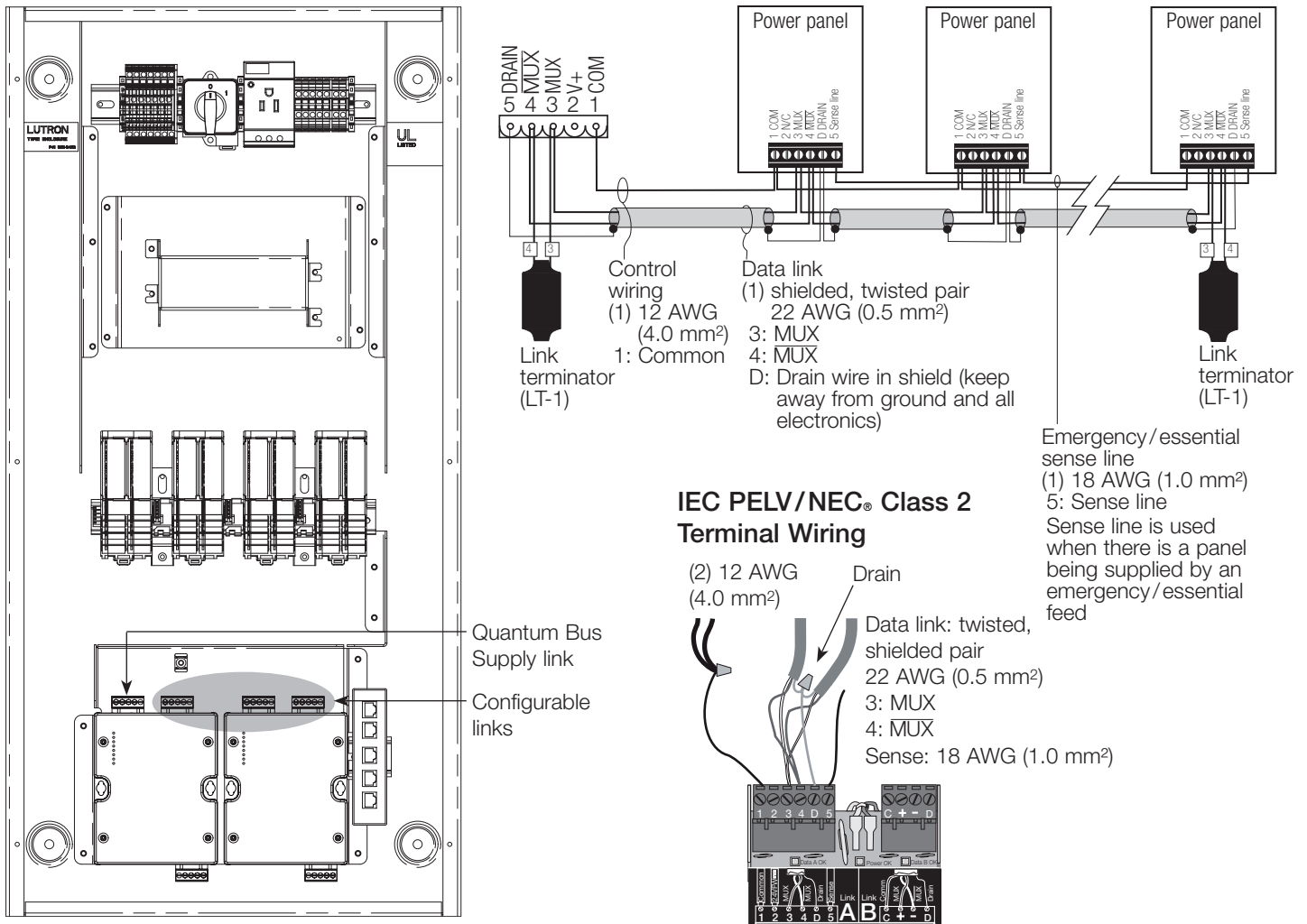


### Notes

- E1 and E2 wires are not polarity sensitive.
- Line/Hot, neutral, and ground wires are also connected to each lighting fixture; some may have an emergency feed.
- Wire-free topology.
- If 15 V<sub>DC</sub> +/- 1 V<sub>DC</sub> is not present between E1 and E2, check the Quantum bus supply wiring. A short between E1 and E2 will cause the bus supply to stop providing voltage on the bus and will cause the ERR indicator to flash. Removing the short between E1 and E2 will allow the bus supply to operate properly.
- To wire the Quantum bus supply for IEC PELV/NEC® Class 2, the Quantum bus supply wires must be separated from the mains wiring. Otherwise, the IEC PELV wiring must be classified as NEC® Class 1.
- Use of Lutron EcoSystem bus cable is recommended. See Lutron spec sheet for the available options: [http://www.lutron.com/TechnicalDocumentLibrary/ecosystem\\_cable.pdf](http://www.lutron.com/TechnicalDocumentLibrary/ecosystem_cable.pdf)

<b>Job Name:</b>	<b>Model Numbers:</b>
<b>Job Number:</b>	

### Configurable Link Wiring: Power Panel Link



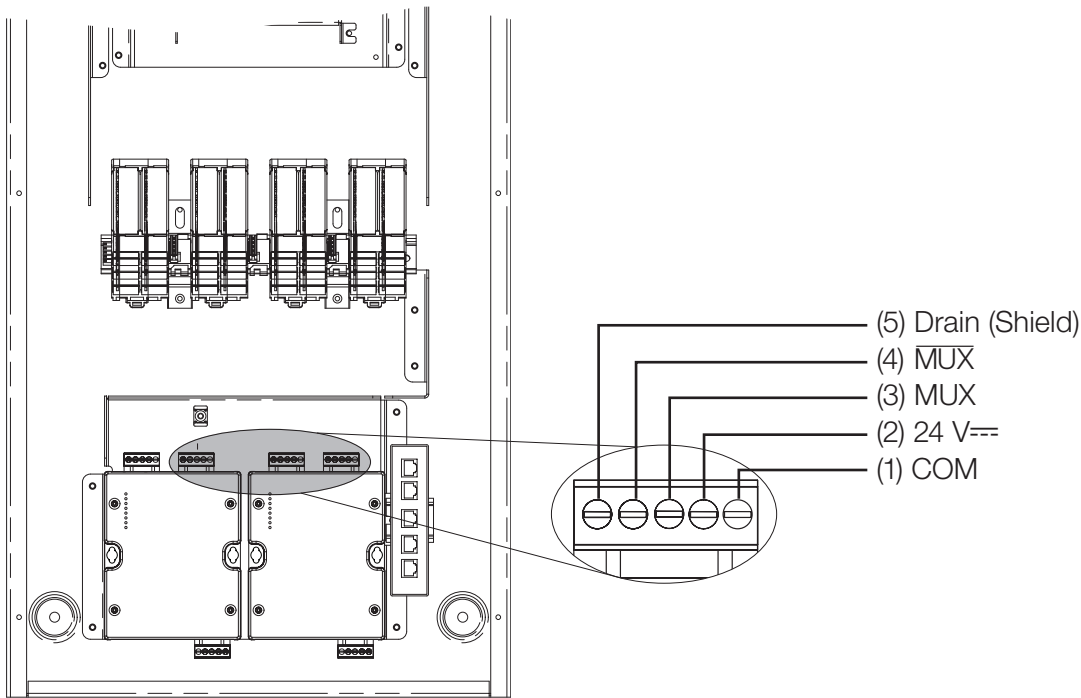
**Notes**

- Power panel link must be daisy-chained (no T-taps).
- Maximum of 32 circuit selectors per link (note that some GP series panels can contain more than one circuit selector per panel).
- It is not necessary to have the Quantum connection at the end of the link. The panel can be in the middle of the link also.
- The sense wire (terminal 5) is used whenever there is a panel being supplied by an emergency/essential feed; see power panel instructions for details. The sense wire will not be terminated at the Quantum hub.
- Each low-voltage IEC PELV/NEC® Class 2 terminal can accept only two 22-18 AWG (0.5-1.0 mm²) wires. Two 12 AWG (4.0 mm²) conductors will not fit. Connect as shown using appropriate wire connectors.
- Total length of the power panel link may be no more than 2000 ft (610 m). Lutron model: MX-RPTR can be used to extend the link beyond 2000 ft (610 m). Contact Lutron for more information.
- GRX-CBL-46L IEC PELV/NEC® Class 2 wiring cable is available from Lutron and contains two 12 AWG (4.0 mm²) conductors for control power, one twisted, shielded pair of 22 AWG (0.5 mm²) for data link, and one 18 AWG (1.0 mm²) conductor for emergency (essential) sense line. See Lutron cable specifications for all plenum and non-plenum options available.

[http://www.lutron.com/TechnicalDocumentLibrary/cables\\_nonplenum.pdf](http://www.lutron.com/TechnicalDocumentLibrary/cables_nonplenum.pdf)  
[http://www.lutron.com/TechnicalDocumentLibrary/cables\\_plenum.pdf](http://www.lutron.com/TechnicalDocumentLibrary/cables_plenum.pdf)

<b>Job Name:</b>	<b>Model Numbers:</b>
<b>Job Number:</b>	

## Configurable Link Wiring: QS Link



### QS Link Wiring:

- 22 AWG to 12 AWG (0.5 mm<sup>2</sup> to 4.0 mm<sup>2</sup>)

Available Power Draw Units (PDUs) per link	Maximum Link Length	Wire Gauge	Available from Lutron in one cable
33	500 ft (152 m)	Power (terminals 1 and 2) 1 pair 18 AWG (1.0 mm <sup>2</sup> ) Data (terminals 3 and 4) 1 pair 22 AWG (0.5 mm <sup>2</sup> ) twisted and shielded	GRX-CBL-346S GRX-PCBL-346S
33	2000 ft (610 m)	Power (terminals 1 and 2) 1 pair 12 AWG (4.0 mm <sup>2</sup> ) Data (terminals 3 and 4) 1 pair 22 AWG (0.5 mm <sup>2</sup> ) twisted and shielded	GRX-CBL-46L GRX-PCBL-46L

### Notes

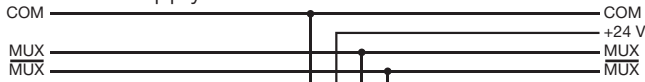
- System communication uses IEC PELV/NEC® Class 2 low-voltage wiring.
- Follow all local and national electrical codes when installing IEC PELV/NEC® Class 2 wiring with line voltage/mains wiring.
- Each terminal accepts up to two 18 AWG (1.0 mm<sup>2</sup>) wires or one 12 AWG to 22 AWG (4.0 mm<sup>2</sup> to 0.5 mm<sup>2</sup>) wire.
- Total length of QS link must not exceed 2000 ft (610 m). Contact Lutron Customer Support for applications needing to extend QS link wiring.
- A Quantum QS link can have up to 512 switch legs (outputs) and 99 QS devices.
- The Quantum Light Management Hub provides 33 power draw units (PDUs) on the QS Link. Refer to the QS Link Power Draw Units Specification Submittal (Lutron P/N 369405) at [www.lutron.com](http://www.lutron.com)
- QS Link Wiring can be T-tapped or daisy-chained.
- Wire sizes:
  - Two 12 AWG (4.0 mm<sup>2</sup>) conductors for control power.
  - One twisted, shielded pair of 22 AWG (0.5 mm<sup>2</sup>) for data link.
  - Cable is available from Lutron: GRX-CBL-46L.

<b>Job Name:</b>	<b>Model Numbers:</b>
<b>Job Number:</b>	

### Configurable Link Wiring: QS Link (continued)

Only terminals 1, 3, and 4 connected between devices that supply PDUs

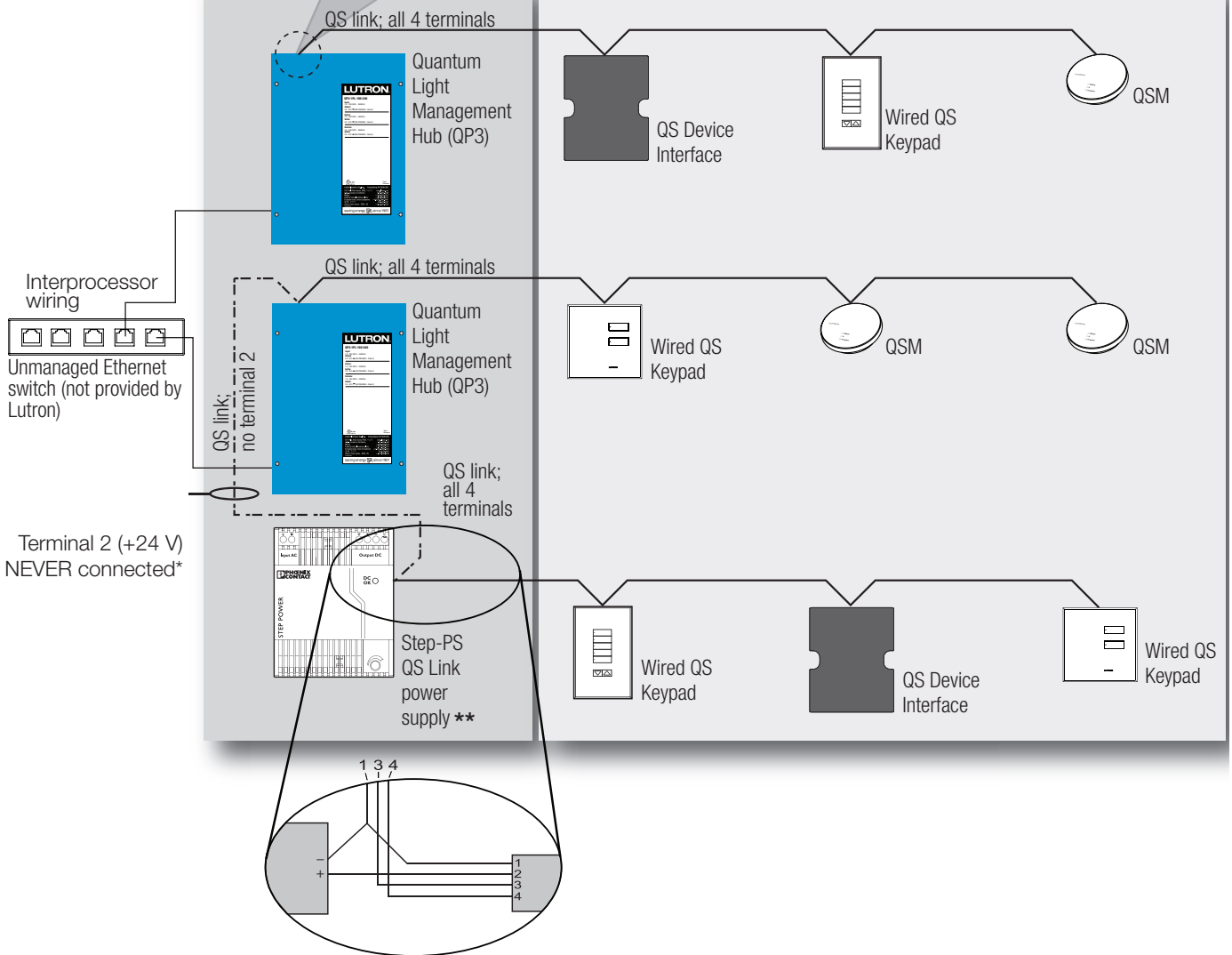
All 4 terminals connected to QS link devices that consume PDUs



Terminal 2 NEVER connected between devices that supply PDUs

Devices that supply PDUs

Devices that consume PDUs



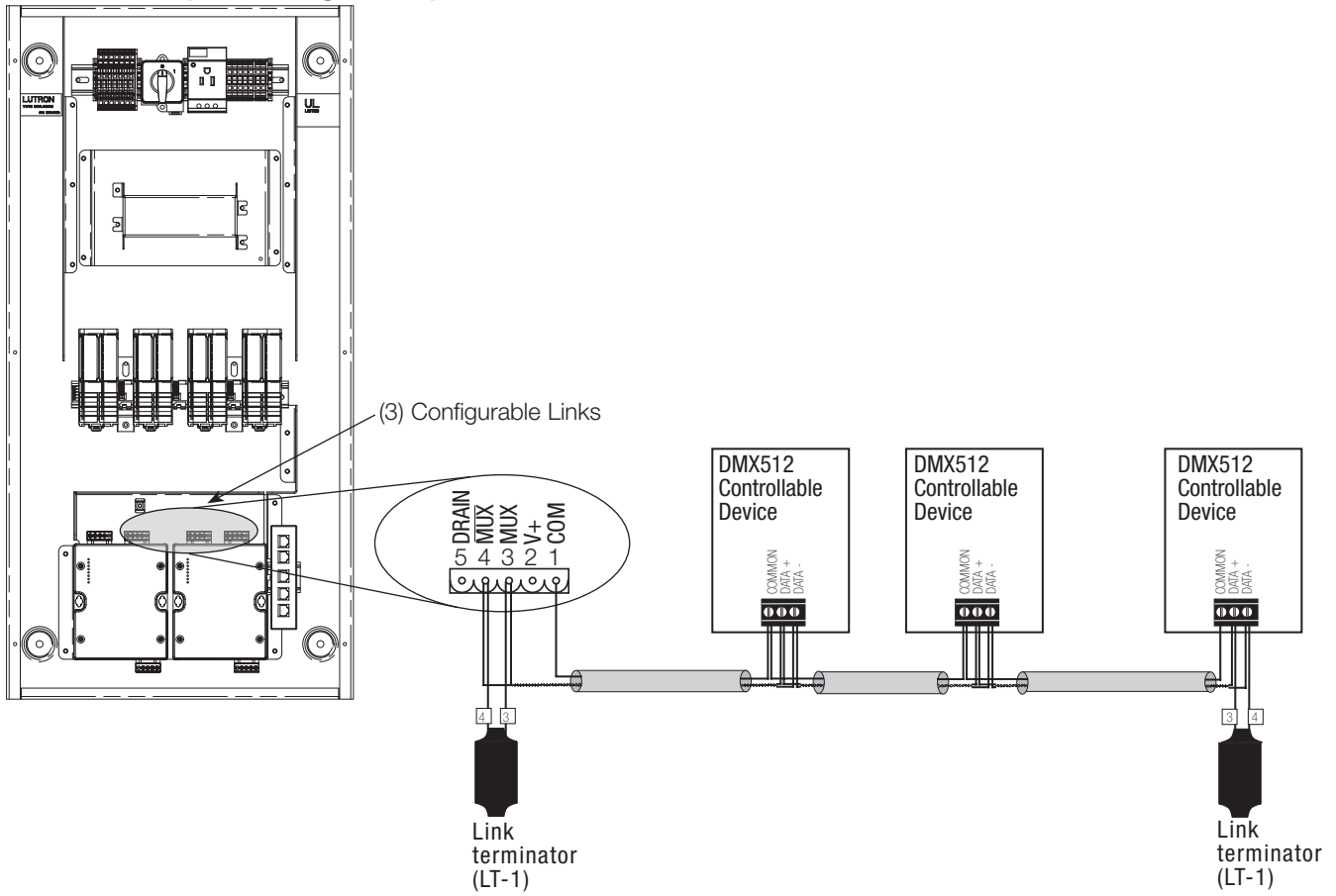
#### QS Link Wiring Rules

- \* Terminal 2 (+24 V) should NEVER be connected between devices that supply PDUs.
- \*\* For QS Link power supply wiring connection details, refer to the installation instructions for the specific power supply model being used.

<b>Job Name:</b>	<b>Model Numbers:</b>
<b>Job Number:</b>	

# Configurable Link Wiring: DMX512

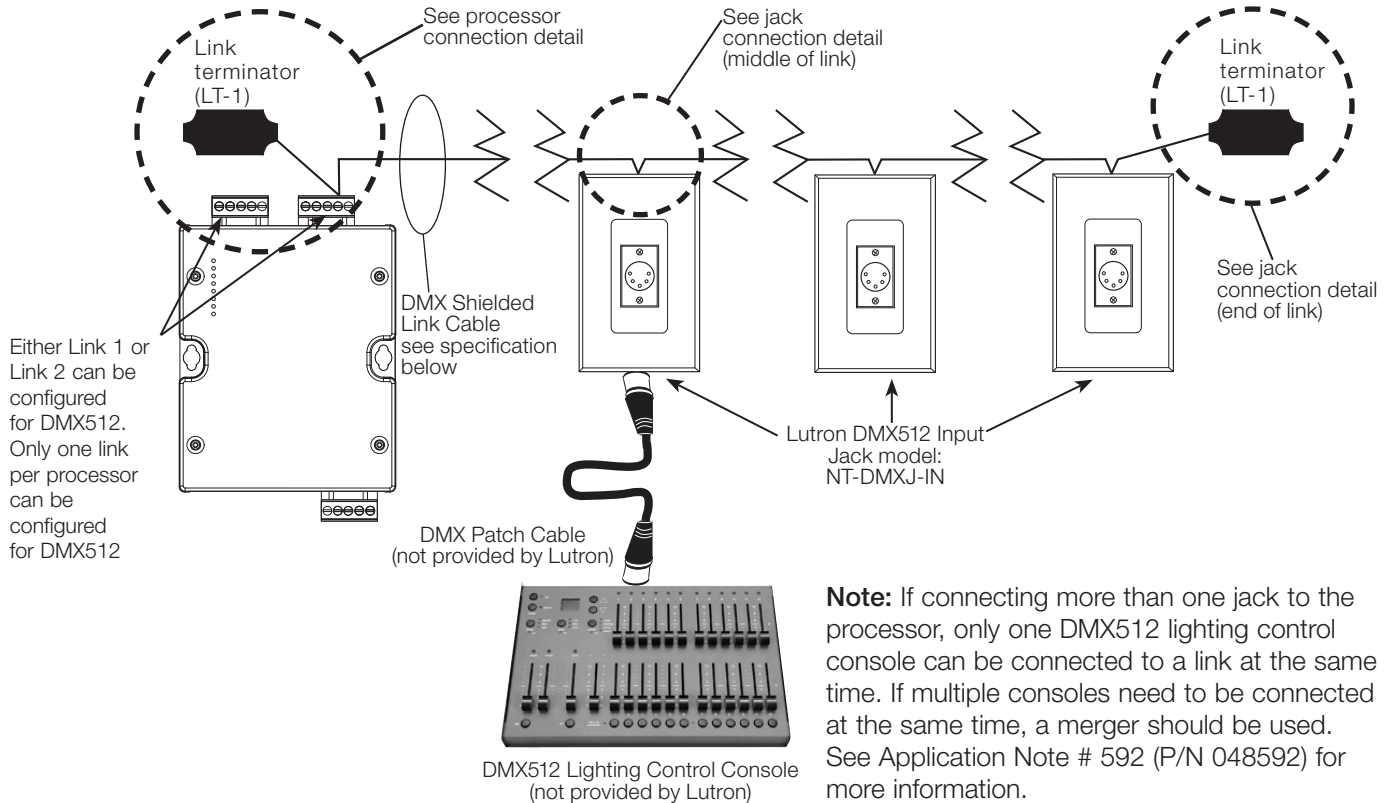
## DMX512 Output Wiring Example



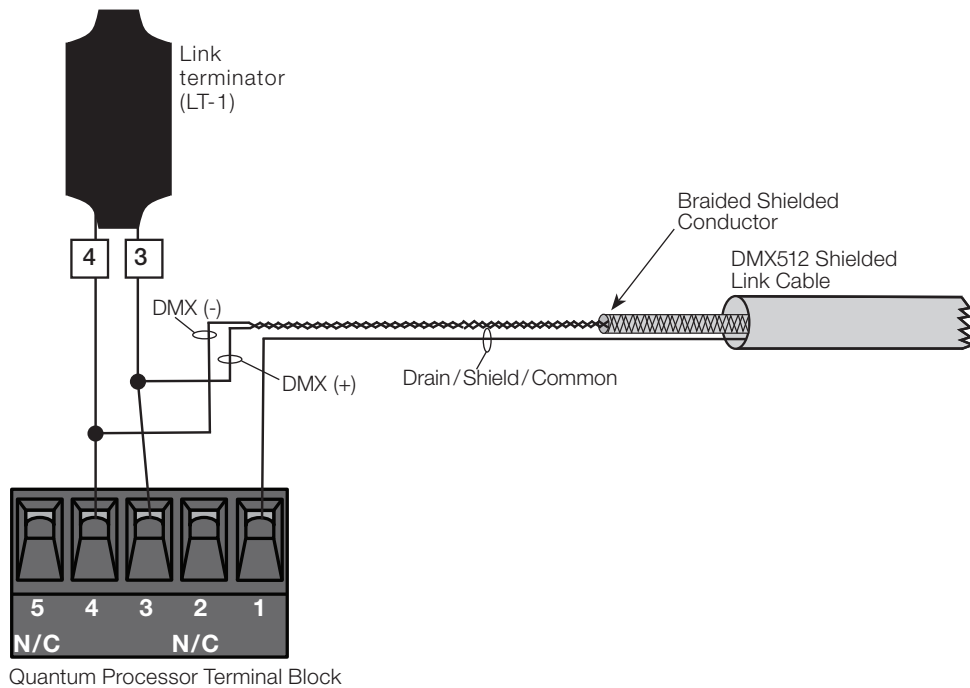
Job Name:	Model Numbers:
Job Number:	

### Configurable Link Wiring: DMX512 (continued)

#### DMX512 Input Typical 1-Line Diagram



#### DMX512 Quantum Processor Connection Details

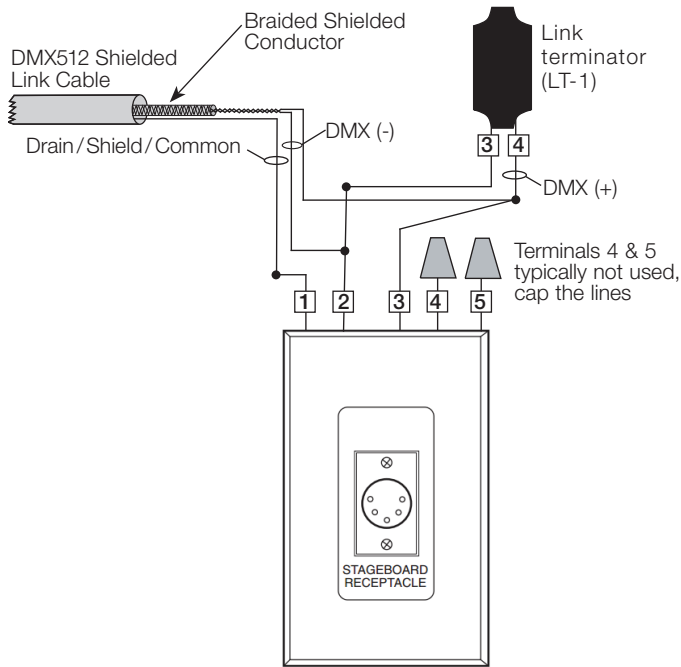


Job Name:	Model Numbers:
Job Number:	

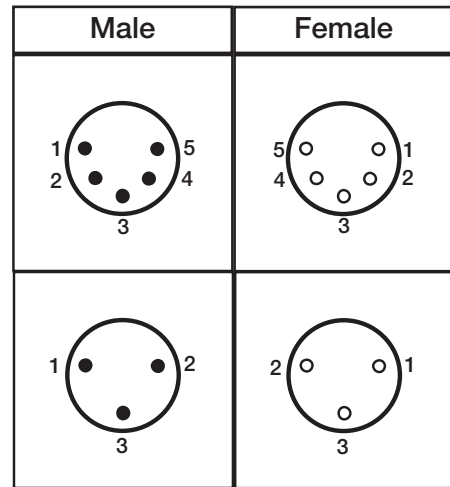


### Configurable Link Wiring: DMX512 (continued)

#### Jack Connection Detail (End of Link)



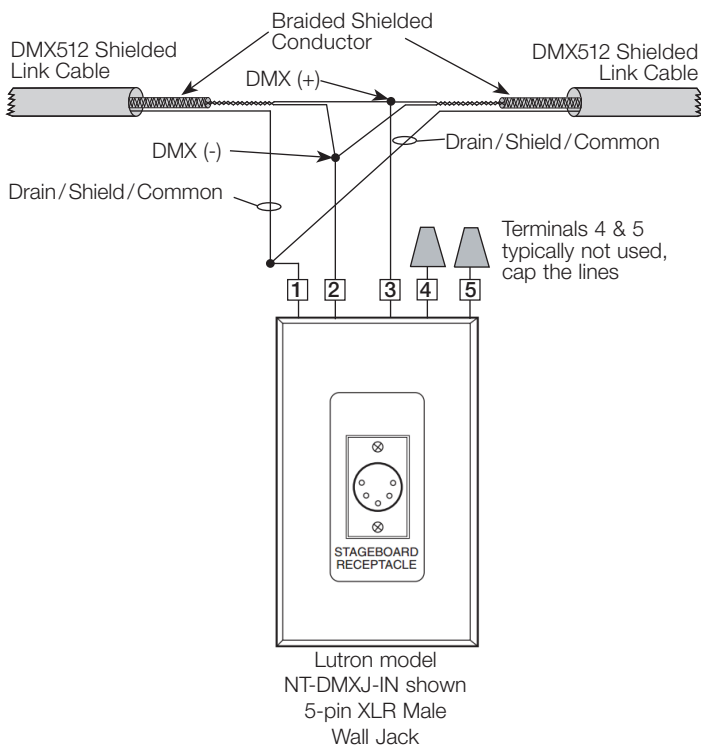
#### Alternate XLR Jack Pinouts



#### DMX XLR Jack Pinout Standard

1	Drain/Shield/Common
2	DMX (-) Primary Link
3	DMX (+) Primary Link
4	DMX (-) Secondary Link
5	DMX (+) Secondary Link

#### Jack Connection Detail (Middle of Link)



<b>Job Name:</b>	<b>Model Numbers:</b>
<b>Job Number:</b>	

## Configurable Link Wiring: DMX512 (continued)

### DMX Cable Wiring Table

The table below provides information pertaining to Lutron-provided (optional) DMX cable and how it should be terminated. For third-party cable, consult with the manufacturer for their connection recommendations and always use shielded cable that complies with the ANSI E1.11-2008, USITT DMX512-A standard.

Manufacturer	Model	Signal Name	Wire Color	Lutron model NT-DMXJ-IN connection	Lutron Quantum Processor Connection
Lutron	GRX-CBL-DMX-250 or GRX-CBL-DMX-500	Drain/Shield/Common	Use braided wire that surrounds the twisted pairs	Pin 1 - Drain/Shield/Common (white with black stripe)	Pin 1 - Common
		DMX (-) Primary Link	White or pink	Pin 2 - DMX (-) Primary Link (red)	Pin 4 - MUX
		DMX (+) Primary Link	Black	Pin 3 - DMX (+) Primary Link (yellow)	Pin 3 - MUX
		DMX (-) Secondary Link	Green	Pin 4 - DMX (-) Secondary Link (blue)	No connection (cap the wire)
		DMX (+) Secondary Link	Red	Pin 5 - DMX (+) Secondary Link (black)	No connection (cap the wire)

### Notes

- Installation and all devices must comply with the ANSI E1.11-2008, USITT DMX512-A standard.
  - Below are a few important points from the standard:
    - All DMX512 devices in a DMX512 universe must be wired in a daisy-chain configuration.
    - Total length of the link wiring for one DMX512 universe must not exceed 1000 ft (305 m). DMX repeaters or splitters can be used to extend the link. All repeaters must comply with the standard. The repeater manufacturer’s guidelines must be followed.
    - All cable used must comply with the standard. Lutron models GRX-CBL-DMX-250 and GRX-CLB-DMX-500 comply with the standard and are recommended.
    - DMX512 link terminators must be installed at both ends of the DMX512 link. Lutron model LT-1 link terminators are included with the panel and are recommended. Note that some DMX512 devices have built-in link terminators.
    - A maximum of (31) DMX512 devices can be directly connected to the DMX512 controller. If (32) or more devices are required, DMX512 repeaters or splitters must be used to extend the number of devices. A repeater or splitter is needed so that no more than (32) devices are directly connected on the same wire segment. Note that link terminators are required at the beginning and end of every wire segment.
  - The Quantum processor can be programmed to either control DMX512 devices (DMX512 output) or to receive DMX512 signals from a DMX512 controller (DMX512 input) such as a theatrical stage board.
  - All wiring must be low-voltage IEC PELV/NEC® Class 2 wiring. Each terminal of the Lutron processor can accept only stranded wire, and either (1 or 2) 22–18 AWG (0.5 mm<sup>2</sup> – 1.0 mm<sup>2</sup>) conductors or (1) 16–12 AWG (1.5 mm<sup>2</sup> – 4.0 mm<sup>2</sup>).
  - The Quantum processor can be at the end or in the middle of the DMX512 link. The link terminators must always be installed at the ends of the link.
  - Only one link of the processor can be configured as a DMX512 link. The other link of the processor must be configured as a QS link.
  - DMX512 devices must be addressed prior to commissioning of the system. A schedule of the DMX devices and their addresses must be supplied to the Lutron project manager prior to commissioning. Lutron is not responsible for the addressing of the DMX512 devices.
  - Refer to the Lutron DMX512 Application Note #592 (P/N 048592) at [www.lutron.com](http://www.lutron.com) for information on the different DMX512 applications that Lutron can provide.
- The Lutron logo, Lutron, EcoSystem, Energi Savr Node, GRAFIK Eye, Hi-Lume, Leaf Design, Pico, Sivoia, and Quantum are trademarks or registered trademarks of Lutron Electronics Co., Inc. in the US and/or other countries.  
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<b>Job Name:</b>	<b>Model Numbers:</b>
<b>Job Number:</b>	