Lutron Residential and Commercial Systems Rules

This document is meant to be a collection point for the rules that apply to different Lutron systems. This document is not meant to be an individual product specification for each piece of hardware, but rather provides definition to the interaction between these devices within the system. The rules outlined by this document are limits for system designs.

The systems whose rules are outlined in this document are:

- Quantum (3.0 and higher)
- QS Standalone
- myRoom
- Vive
- GRAFIK Eye 4000
- XPS
- LCP128
- HomeWorks QS (version 11.0 and higher)
- RadioRA 2
- Caséta Wireless

For more information on the rules or other applications, please contact Lutron or see the appropriate product specification submittal.
Quantum (3.0 and higher)

General System Rules
- For Quantum systems requiring more than 25 subsystems on a single server, contact Lutron for quoting options.
- For Quantum subsystems requiring more than 8 processors per subsystem, contact Lutron for quoting options.
- For Quantum subsystems requiring more than 50 areas, contact Lutron for quoting options.
- Devices in one subsystem cannot control devices in another subsystem.
- For A/V Integration, each processor supports 8 concurrent Telnet logins.
- Each processor has 2 links. Links have a possible configuration of QS, Power Panel, EcoSystem DBI (EcoSystem only available in QP2 hubs), or DMX input.
  - 512 switch legs per link. Switch legs are the smallest controllable outputs and include:
    - Dimmed or switched circuits
    - Digitally addressable devices (ballasts, drivers, and interfaces)
    - A single DMX channel
    - Contact closure outputs
    - Sivoia QS Shade Drives
- QS Link Rules
  - 99 QS devices per QS link
  - 100 zones of control (99 switch legs per zone)
  - 100 occupancy sensors
  - 100 daylight or radio window sensors
  - 100 wall controls (e.g.: Pico, QS Keypad, IR)
  - QS link is topology free (can be daisy-chained, T-tapped, starred, etc.)
  - Maximum link run of 2000 ft (610 m), using 12 AWG (4.0 mm²) wires for power pair.
  - QS link can be extended an additional 2000 ft (610 m) using the QSPS-10PNL. See spec sheet 085335 for details.
  - For PDU information, refer to spec sheet 369405.
- Power Panel Link Rules
  - 32 circuit selectors per power panel link.
  - Power panel link must be daisy chained.
  - Maximum link run of 2000 ft (610 m), using 12 AWG (4.0 mm²) wires for power pair (Link Terminators required).
  - Panel link can be extended up to 3 times using the MX-RPTR for a total distance of 8000 ft (2438 m).

Quantum-supported Applications
- Q-control+ App can have 20 concurrent users when connected to server.
- Q-control+ App can have 2 concurrent users when connected directly to processor.
- GreenGlance supports up to 10 client connections.
- Personna PC supports up to 10,000 users.
  - Supports up to 20 concurrent users.
  - Supports up to 10,000 user accounts.

EcoSystem Loop Rules
- 64 digital addresses per loop. Addresses include:
  - EcoSystem ballasts/drivers
  - EcoSystem interfaces (e.g.: BMJ, XPJ, BMF, TVI-LMF)
  - EcoSystem enabled fixtures
- Maximum number of devices wired to EcoSystem Loop.
  - 64 wall controls (GRAFIK Eye QS does not support using wall controls connected to EcoSystem devices).
  - 32 occupancy sensors
  - 16 daylight sensors
- Maximum of 16 daylight sensors can control devices on a single loop regardless of where they come into the system (wireless on QS link, wired on QS link, or wired on EcoSystem loop).

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Quantum (3.0 and higher) (continued)

DALI® Loop Rules
- 64 digital addresses per loop.
- Supports up to 16 DALI® groups of control.
- Cannot control individual addresses.

Interface Rules
- DMX interface supports 32 output DMX channels. Up to 16 DMX interfaces per QS link.
  - 1 Quantum zone = 1 channel for intensity (value of 1–100) OR 3 channels for RGB control (value of 1–100) OR 1 channel for integration (value of 1–255).
  - GRAFIK Eye QS zone mapping for 1 channel intensity only.
- Up to 10 QSE-CI-NWK-E per QS link.
- QSE-CI-NWK-E can control up to 10 areas.
- Maximum 3 incoming/outgoing Telnet connections on a QSE-CI-NWK-E.
- LUT-ELI can be shared between panel link and emergency QS devices, refer to Application Note #106 for more information.
- LUT-ELI can be wired up to 32 devices total (QS devices, circuit selectors, and EcoSystem bus supplies).
- LUT-ELI signal line (for QS devices and EcoSystem bus supplies) can be run up to 2000 ft (610 m) with 18 AWG (1.0 mm²) wire.

Controls/Sensors Rules
- Multiple QS sliders on a single control count as one QS device unless mounted with a keypad, then the keypad also counts as one QS device.
- QS sliders can only control zones in its area.
- Zone Chaining - QS sliders can only control zones in the same area. When partitioning, the slider can affect zones in other combined areas.
- Up to 16 Quantum QS Slider Control units in an area.
- QS Sensor Module (QSM) can support wired and wireless devices. Below is a breakdown of the devices:
  - 4 wired sensors/controls
  - 10 wireless occupancy/vacancy sensors
  - 10 Pico wireless controls
  - 10 wireless daylight or radio window sensors
- When using wired or wireless sensors/remotes (occupancy, daylight, radio window, Pico wireless control) in a Quantum system, sensors should be associated to a QSM. A sensor associated to a GRAFIK Eye control unit will only be able to control that GRAFIK Eye control unit. This may limit the sequence of operations available for that sensor.

Server Requirements
- A server is required if:
  - Reporting or Green Glance is required
  - Historical activity data is required
  - iPad (Q Control+) with multiple subsystems
  - Remote Access
  - Personna PC
  - Energy Metering
  - Alerts and Alarms
  - Quantum Vue

Limitations per Area
- Up to 15 scenes + OFF
- Up to 31 shade presets
- Up to 100 zones (99 switch legs per zone)

iPad is a trademark of Apple Inc., registered in the U.S. and other countries.
QS Standalone

General Link Rules
• 512 switch legs per system. Switch legs are the smallest controllable outputs and include:
  – Dimmed or switched circuits
  – Digitally addressable devices (ballasts and interfaces)
  – A single DMX channel
  – Contact closure outputs
  – Sivoia QS shade drives
• 100 QS devices
• 100 occupancy sensors
• 100 daylight sensors
• 100 wall controls (e.g.: Pico, QS Keypad, IR)
• 100 zones of control
• QS link is topology free (can be daisy-chained, T-tapped, starred, etc.).
• Maximum link run of 2000 ft (610 m), using 12 AWG (4.0 mm²) wires for power pair.
• QS link can be extended up to an additional 2000 ft (610 m) using the QSPS-10PNL. See spec sheet 085335 for details.

EcoSystem Loop Rules
• 64 digital addresses per loop. Addresses include:
  – EcoSystem ballasts/drivers
  – EcoSystem interfaces (e.g.: BMJ, XPJ, BMF, TVI-LMF)
  – EcoSystem enabled fixtures
• Maximum number of devices wired to EcoSystem Loop:
  – 64 wall controls (GRAFIK Eye QS does not support using wall controls connected to EcoSystem devices).
  – 32 occupancy sensors
  – 16 daylight sensors
• Maximum of 16 daylight sensors can talk to a single loop regardless of where they come into the system (wireless to QS link, wired to QS link, or wired to EcoSystem loop).

DALI® Loop Rules
• 64 digital addresses per loop.
• Supports up to 16 DALI® groups of control.

Interface Rules
• DMX interface supports 32 DMX channels per DMX interface.
  – 1 GRAFIK Eye zone = 1 channel for intensity OR 3 channels for RGB control.
• Up to 10 QSE-CI-NWK-E.
  – QSE-CI-NWK-E can talk to up to 10 areas.
  – Maximum of 2 concurrent Telnet logins on a QSE-CI-NWK-E.
• LUT-ELI can wire up to 32 devices total.
• LUT-ELI signal line (for QSGs, ESNs, and DBIs) can be run up to 2000 ft (610 m) with 18 AWG (1.0 mm²) wire.

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QS Standalone (continued)

Load Control Rules

• GRAFIK Eye unit limitations:
  – 4 occupancy sensors per zone in zone mode.
  – 16 occupancy sensors per unit in scene mode.
  – 1 daylight sensor can either control zone(s) of light or groups of EcoSystem ballasts.
    · 1 sensor per zone or group (no sensor averaging).
    · Each zone or group can be calibrated independently.
    · Limit of 16 daylight groups per GRAFIK Eye EcoSystem unit.
  – 30 total wireless devices associated directly to QSG (includes occupancy sensors, daylight sensors, Pico, Sivoia QS wireless shade drives, and other QSG units).
  – 25 timeclock events per daily schedule.

• Energi Savr Node Softswitch / 0–10 V limitations:
  – Associations per unit:
    · 16 occupancy sensors
    · 8 daylight sensors

• Energi Savr Node EcoSystem / DALI limitations:
  – Associations per unit:
    · 128 remote occupancy sensors and 4 local wired sensors
    · Maximum 16 occupancy sensors assigned to a single area
    · 128 remote daylight sensors and 4 local wired daylight sensors
    · Maximum 2 daylight sensors assigned to a single area, averaged together
    · 4 daylight rows

• Energi Savr Node phase adaptive limitations:
  – Associations per unit:
    · 16 remote occupancy sensors and 4 local wired occupancy sensors
    · 8 daylight sensors
    · Maximum 2 daylight sensors to a single area, averaged together.
  – Cannot control switched loads.

• QSM can support wired and wireless devices. Below is a breakdown of the devices:
  – 4 wired sensors / controls
  – 10 wireless occupancy / vacancy sensors
  – 10 Pico wireless controls
  – 10 wireless daylight or radio window sensors

• Each standalone Sivoia QS wireless shade and Sivoia QS wireless Triathlon shade can support up to 10 Pico wireless controls

Limitations per Area

• Up to 16 scenes + OFF
myRoom Prime

QS Link Rules

- 1 QS link maximum per myRoom Prime system.
- 50 QS devices per QS link.
- 50 zones per system.
- 50 switch legs per link. Switch legs are the smallest controllable outputs and include dimmed or switched circuits.
- 15 occupancy sensors total (wired and wireless), 50 wireless Pico controls. Wired and wireless occupancy sensors cannot be combined in the same system.
- QS link is topology-free (can be daisy-chained, T-tapped, starred, etc.).
- Maximum link run of 2000 ft (610 m), using 12 AWG (4.0 mm²) wires for power pair.

Controls/Sensors Rules

- QSM can support wired and wireless devices. Below is a breakdown of the devices:
  - 4 wired sensors/controls
  - 10 wireless occupancy/vacancy sensors
  - 10 Pico wireless controls
- 4 door contact sensors maximum; one door contact per CCI (door contact is provided by others).
myRoom Plus

General System Rules
• 1 system can have up to 2 processors.
• 1 system can have up to 200 zones and switch legs.
  – One processor can control 100 zones (50 per link).
  – One processor can control up to 200 switch legs (100 per link).
• Switch legs are the smallest controllable outputs and include:
  – Dimmed or switched circuits
  – Digitally addressable devices (ballasts, drivers, and interfaces)
  – A single DMX channel
  – Contact closure outputs
  – Sivoia QS Shade Drives
• Supports 16 concurrent Telnet logins (connected directly to processor).
• Processors are offered in 1 or 2 link models. Links have a possible configuration of QS link, wireless link, or thermostat link.

Controls/Sensors Rules
• QSM can support wired and wireless devices. Below is a breakdown of the devices:
  – 4 wired sensors/controls
  – 10 wireless occupancy/vacancy sensors
  – 10 Pico wireless controls

3rd-Party Control
• Other than “Processor 1”, each processor has a maximum of 5 outbound telnet connections.
• “Processor 1” can have up to 3 outbound telnet connections if remote access is enabled. If remote access is disabled, the processor can have up to 5 outbound telnet connections.

QS Link Rules
• Maximum 4 QS links per system
• 50 QS devices per QS link
• 50 occupancy sensors
• 50 wall controls (e.g.: Pico, QS Keypad, IR) per QS link
• QS link is topology-free (can be daisy-chained, T-tapped, starred, etc.)
• Maximum link run of 2000 ft (610 m), using 12 AWG (4.0 mm²) wires for power pair.
• QS link can be extended up to an additional 2000 ft (610 m) using the QSPS-10PNL. See Lutron specification sheet 085335 for details.
Vive (with hub)

**General System Rules (maximums)**
- 64 hubs networked together via wired ethernet port.
- 700 Lutron load controllers per hub.
- 71 ft (21.6 m) between wireless devices and hub.
- 30 ft (9 m) through construction between:
  - Sensors and load controllers
  - Remote controls and load controllers
- 60 ft (18 m) through open air between:
  - Sensors and load controllers
  - Remote controls and load controllers

**Controls/Sensors Limits**
- Any load controlling device can be controlled by:
  - 10 occupancy/vacancy sensors
  - 10 Pico wireless controls (hub does NOT count as a Pico wireless control)
- Any load controlling device, except for PowPak 20 A Switch Module & Integrated Wireless Receptacle, can also be controlled by:
  - 1 daylight sensor (either Radio Powr Savr sensor or fixture control sensor, but cannot be both)

**Vive Vue**
- Supports 1 login with up to 3 concurrent users
- Limit 50 timeclock events

Vive (without hub)

**Control/Sensor Limits**
- Any load controlling device can be controlled by:
  - 10 occupancy / vacancy sensors
  - 10 Pico wireless controls (hub does NOT count as a Pico wireless control)
- Any load controlling device, except for PowPak 20 A Switch Module & Integrated Wireless Receptacle, can also be controlled by:
  - 1 daylight sensor (either Radio Powr Savr sensor or fixture control sensor, but cannot be both)
- All wireless devices have the following ranges:
  - 30 ft (9 m) through construction between:
    - Sensors and load controllers
    - Remote controls and load controllers
  - 60 ft (18 m) through open air between:
    - Sensors and load controllers
    - Remote controls and load controllers
- PowPak EcoSystem (Energi TriPak only, not supported by Vive hub)*
  - Maximum 32 digital addresses
  - Works with all EcoSystem ballasts, drivers, and interfaces (except C5-XPJ-16A).
  - 9 zones maximum
  - 2 daylight rows maximum
  - Maximum number of each wireless device:
    - 9 Pico remote controls
    - 6 Radio Powr Savr sensors
    - 1 daylight sensor

* For EcoSystem in a Vive system, use FCJS-ECO Fixture Controller Modules.
GRAFIK Eye 4000

**General System Rules (maximums)**
- 8 main unit addresses (GRAFIK Eye 4000 and Slider)
- 16 control stations
- 32 circuit selectors
- 64 zones
- 512 circuits
- LUT-ELI must be daisy chained to link and can wire up to 32 circuit selectors.
- Maximum 8 combined AC motor group controller and SG-SVC control units on the link.
- See “Lutron Integration Protocol” for integration command set.

XPS

**General System Rules (maximums)**
- 512 circuits
- 32 control stations (includes keypads, AV interfaces, and IO interfaces)
- 16 panels
- 2 CCIs per panel
- 1 expansion module per system. With expansion panel, new system maximums:
  - 96 control stations (includes keypads, AV interfaces, and ID interfaces)
- 500 timeclock events
  - 7 daily schedules with up to 25 events
  - 40 holiday schedules
- LUT-ELI must be daisy chained to link and can wire up to 32 LCD controllers.
- See “Lutron Integration Protocol” for integration command set.

LCP128

**General System Rules (maximums)**
- 128 circuits
- 32 controls (includes keypads, AV interfaces, and IO interfaces)
- 8 panels
- 32 scenes and OFF per system
- 2 CCIs per panel
- 500 timeclock events
  - 7 daily schedules with up to 25 events
  - 40 holiday schedules
- LUT-ELI must be daisy chained to link and can wire up to 32 LCD controllers.
- See “Lutron Integration Protocol” for integration command set.
HomeWorks QS (11.0 and higher)

General System Rules

- 1 system can have up to 16 processors.
- 1 system can have up to 10,000 switch legs.
- Supports 16 concurrent Telnet logins (connected directly to processor).
- Each processor has 2 links. Links have a possible configuration of QS link, wireless link, Power Panel link, or H48 link.

- QS Link Rules
  - 32 QS links maximum
  - 99 QS devices per QS link
  - 512 switch legs per link. Switch legs are the smallest controllable outputs and include:
    - Dimmed or switched circuits
    - EcoSystem or DALI digitally addressable devices (ballasts, drivers, and interfaces)
    - A single DMX channel
    - Contact closure outputs
    - Sivoia QS Shade Drives
  - 100 occupancy sensors
  - 100 wall controls (e.g.: Pico, QS Keypad, IR) per QS link.
  - QS link is topology free (can be daisy-chained, T-tapped, starred, etc.).
  - Maximum link run of 2000 ft (610 m), using 12 AWG (4.0 mm²) wires for power pair.
  - QS link can be extended up to an additional 2000 ft (610 m) using the QSPS-10PNL. See spec sheet 085335 for details.

- Power Panel Link Rules
  - 32 Power Panel links maximum.
  - 16 module interfaces per Power Panel link.
  - 256 switch legs per Power Panel link.
  - Power panel link must be daisy-chained.
  - Maximum link run of 2000 ft (610 m), using 12 AWG (4.0 mm²) wires for power pair.
  - Panel link can be extended up to 3 times using the MUX-RPTR for a total distance of 8000 ft (2438 m).

- Wireless Link Rules
  - 15 wireless links maximum.*
  - 4 repeaters per wireless link.
  - 95 devices per wireless link.
  - 100 switch legs per wireless link.
  - 5 wireless temperature sensors per wireless link.
  - 2500 ft² (250 m²) coverage per repeater.
  - 30 ft (9 m) from any non-repeater to repeater.
  - 60 ft (18 m) between repeaters.
  - 1000 ft (305 m) wire run between repeaters for applications requiring greater distances (pool house, boat house, guest house, etc.).

- H48/Q96 Link Rules
  - 32 H48/Q96 links maximum.
  - 4 H48/Q96 interfaces per H48/Q96 link.
  - 1000 ft (305 m) maximum wire run between processor and H48/Q96 unit(s), daisy chain only.
  - 500 ft (152 m) maximum wire run off of each H48 bus output, but cannot exceed 1000 ft (305 m) total wire distance.
  - 48 HomeWorks wired Maestro devices per H48 interface.
  - 96 Sivoia QED shades per HWI-Q96 Interface.
  - 256 Sivoia QED shades per H48/Q96 Link.
  - HWI-Q96 and Sivoia QED shades requires a license purchase (HQ-HWI-Q96-SW) to allow activation and transfer.
  - Link translator (HQ-HWI-LX) required when the wire run between processors and interfaces on an H48/Q96 link type exceeds 50 ft (15 m) (link terminator also required).

* The maximum number of wireless links is not the same in every country.

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HomeWorks QS (11.0 and higher)  
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Interface Rules
- DMX interface supports 32 output DMX channels. Up to 16 DMX interfaces per QS link.
- HVAC Controller
  - Temperature sensing can utilize either a single wired sensor or up to 4 wireless sensors per HVAC Controller (wireless temperature sensors are averaged together).
  - Up to 5 wireless temperature sensor per RF link.
  - A wireless temperature sensors assigned to an RF link and attached to an HVAC Controller on another RF link will count towards the 5 wireless temperature sensors per RF link limit on both RF links.
- VCRX
  - The visor control can listen to up to 10 transmitters.

Controls/Sensors Rules
- QSM can support wired and wireless devices. Below is a breakdown of the devices:
  - 4 wired sensors/controls
  - 10 wireless occupancy/vacancy sensors
  - 10 wireless Pico controls
  - 10 wireless daylight or radio window sensors

3rd-Party Control
- Other than “Processor 1”, each processor has a maximum of 5 outbound telnet connections (combination of 3rd-party HVAC or other).
- “Processor 1” can have up to 3 outbound telnet connections if remote access is enabled. If remote access is disabled, the processor can have up to 5 outbound connections.
- Remote access can be optionally switched off if using Lutron Connect Bridge or not using remote access.

Mobile Applications
- Requires one Lutron Connect Bridge (CONNECT-BDG-#) per residence.
- Lutron Connect mobile application is a free download from the app store.
- App supports iOS and Android mobile device platforms.
- Free remote access
  - Up to (15) mobile devices can simultaneously connect over the Internet to the HomeWorks QS system.

MDU System Rules
- 1 processor
- 1 QS link, 1 RF link
- 50 total lighting and shades zones
- 50 total devices
- QS wired link
  - 50 devices per link
  - 50 zones per link
  - 2000 ft (600 m) maximum wire length
- Wireless link
  - 50 devices per link (includes repeaters)
  - 50 zones per link
  - 4 repeaters maximum
  - RF distance - 60 ft (18 m) from repeater to repeater, 30 ft (9 m) from device to repeater
- Network link
  - Standard ethernet wiring (328 ft [100 m] maximum) used to connect processors to network
  - 10/100 Mbit Ethernet
RadioRA 2

General System Rules
• 2 main repeaters maximum.*
• 8 auxiliary repeaters maximum (4 auxiliary repeaters per main repeater).
• 1 wireless link per main repeater. Link limits:
  – 100 devices (including repeaters)
  – 100 zones (includes shades, HVAC zones, dimmers/switches, and VCRX outputs)
  – 5 wireless temp sensors
  – 2500 ft² (762 m²) coverage per repeater
  – 30 ft (9 m) from any non-repeater to repeater
  – 60 ft (18 m) between repeaters
  – 1000 ft (305 m) wire run between repeaters for applications requiring greater distances (pool house, boat house, guest house, etc.).

Interface Rules
• HVAC Controller
  – Temperature sensing can utilize either a single wired sensor or up to 4 wireless sensors per HVAC Controller (wireless sensors are averaged together).
  – Up to 5 wireless sensors per Main Repeater link.
  – A wireless sensor assigned to an RF link and attached to an HVAC Controller on another Main Repeater link will count towards the 5 wireless sensors per RF link limit on both Main Repeater links.

• VCRX
  – The visor control can listen to up to 10 transmitters.

Mobile Applications
• Requires one Lutron Connect Bridge (CONNECT-BDG-#) per residence.
• Lutron Connect mobile application is a free download from the app store.
• App supports iOS and Android mobile device platforms.
• Free remote access
  – Up to 7 mobile devices can simultaneously connect over the Internet to the RadioRA 2 system.

Shade Rules
• Each shade Electronic Drive Unit (EDU) counts as 1 zone on the wireless link.
• Sivoia QS Wireless and Sivoia QS Triatholon shades are compatible with RadioRA 2 systems.

* Two Main Repeater systems require the Inclusive version of programming software for commissioning.
Caséta Wireless

General System Rules

• With Smart Bridge:
  – 1 Smart Bridge per system.
  – Supports up to 50 devices (includes load controllers, Pico wireless controls, wireless shades, and Smart Bridge).
  – Allows 1 login with 10 concurrent users.
  – Supports up to 50 scenes.
  – Supports up to 50 timeclock events.
  – All Serena shade types are supported.
  – All Sivoia QS wireless shades, Sivoia QS wireless Triathlon shades, and Serena shades are supported with the Smart Bridge PRO with the exception of horizontal sheer blinds and Venetian blinds.
  – 1 lamp dimmer can be used as a range extender.

• Without Smart Bridge:
  – Up to 10 total Pico wireless controls, occupancy sensors, and daylight sensors (1 daylight sensor maximum) can be associated with one load controller.