Patient Room Pillow Speaker Integration with Lutron Control Systems

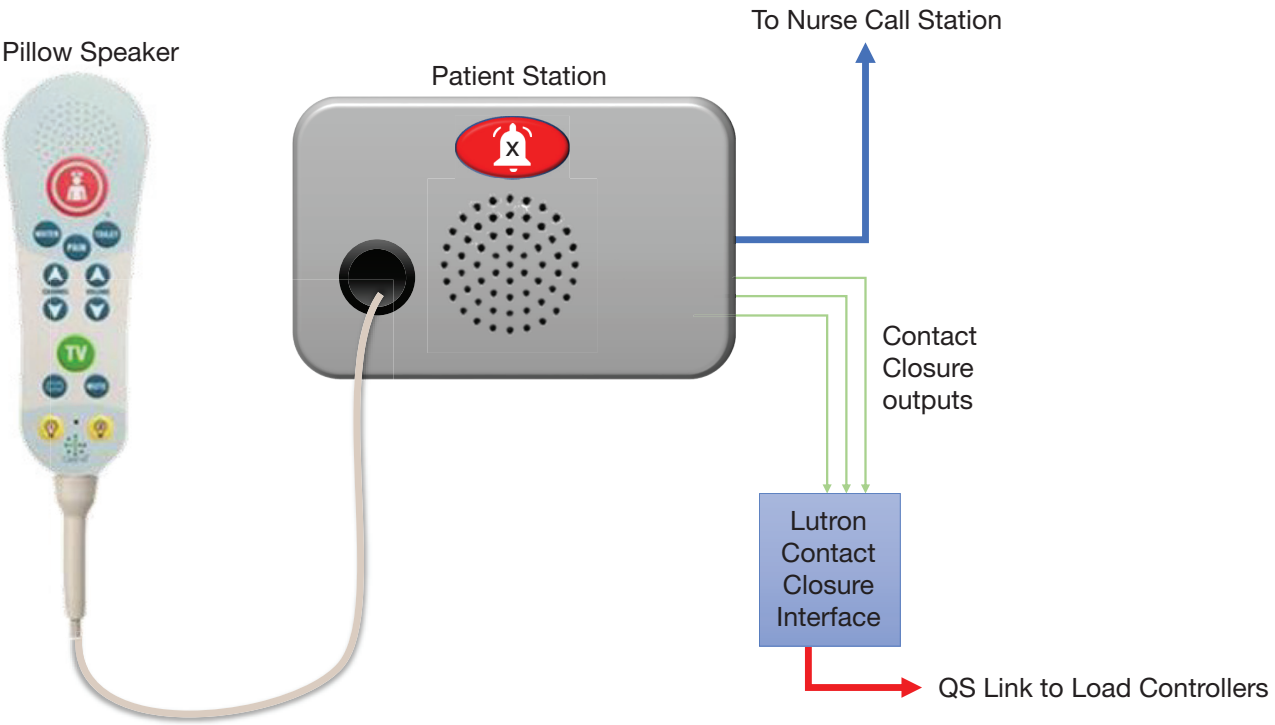
Lutron systems help enhance the patient experience by providing patients control over their environment. In many cases, patients in hospitals or long-term care facilities interact with their environment via the pillow speaker. This app note describes the methods to integrate a pillow speaker into a Lutron lighting and shading control system.

System Components

There are multiple required components involved in a patient room control system:

- Pillow Speaker – provides the user interface for the patient
- Patient Station – connection point for the pillow speaker; provides signals to other devices (TV, lights, nurse call station, etc.); this is made by a different manufacturer than the pillow speaker and is part of the overall nurse call system
- Lighting System Interface – connects the patient station to the lighting control system

The diagram below shows a typical setup:



While this basic diagram is true for most scenarios, there can be wide variation in the specifics. For example: different types of pillow speakers with differing button combinations may be used; different types of patient stations may be used which provide different types of integration; different lighting control interfaces may be necessary for the proper integration. This app note will provide details on some of the most common applications for contact-closure based pillow speaker integration using Curbell Medical™ products as an example.

System Components *(continued)*

In most cases, the patient station provides a contact closure, corresponding to various light or shade control buttons, to the lighting system interface. These buttons are usually momentary, meaning they close when the button on the pillow speaker is pressed, and open when it is released. A patient station will have one contact closure output for each light or shade control button. Check documentation from the patient station manufacturer for specifics, including mapping of buttons on the pillow speaker to specific contact closures.

In some cases, pillow speaker and patient station systems may provide a more sophisticated digital method of control, such as using Ethernet or BACnet commands. In these cases, coordination between the pillow speaker manufacturer, patient station manufacturer, and Lutron is required. These solutions are outside the scope of this app note.

Sequences of Operation

Depending on the client's needs, there are a variety of configurations of pillow speakers a client may choose. The choice of pillow speaker will determine the sequence of operation (SOO) that the system can support. The choice of Lutron system will also determine what SOOs are supported; see the System Support section of this document for details.

The following are some common types of pillow speakers, along with typical supported SOOs, using a variety of Curbell Medical™ designs. The number of buttons and configurations of pillow speakers from other manufacturers will vary:

One Button: Lights Only

This scenario provides a single contact-closure output from the pillow speaker to the lighting control system. While usually used for one zone of control, as shown in the image, it may allow for control of multiple zones if scenes are used. Typical supported SOOs include:

- Toggle lights (switch between 100% and off, for one or more zones)
- Toggle scenes (switch between a scene and off, for multi-zone spaces)
- Cycle dim (press and hold the button to toggle between dimming up to full and down to off)
- Scene sequence (step between high/medium/low light levels or scenes)

Sequences of Operation *(continued)*

Two Buttons: Lights Only or Lights and Shades

This scenario provides two contact-closure outputs from the pillow speaker to the lighting control system. This is typically used for two zones of lighting control, as shown in the image; however, based on the desired functionality, additional SOOs could be supported using Button 1/Button 2:

- Toggle zone 1/toggle zone 2, shown on left
- Lights raise/lower (allowing patient to raise the lights from off, or lower them to off)
- Toggle scene
- Toggle lights/toggle shades (for rooms that have shades, using an open/stop/close/stop "garage door style" function)

Note: Icons on image are illustrative only, if using other functions (e.g., shades) different icons may be used.

Four Buttons: Lights and Shades

In this scenario, there are two buttons for lights, and two buttons for shades. This provides four contact closures from the pillow speaker to the lighting control system. This is commonly used for two zones of light control, plus raise and lower of shades, as shown. However, other SOOs could be supported:

- Toggle zone 1/toggle zone 2/shade raise/shade lower, shown on left
- Lights raise/lights lower/shade raise/shade lower
- Select scene/turn off/shade raise/shade lower
- Toggle zone 1/toggle zone 2/toggle shade 1/toggle shade 2
- Lights raise/lights lower/toggle shade 1/toggle shade 2
- Select scene/turn off/toggle shade 1/toggle shade 2

Note: Icons on image are illustrative only, if using other functions (e.g., shades) different icons may be used.

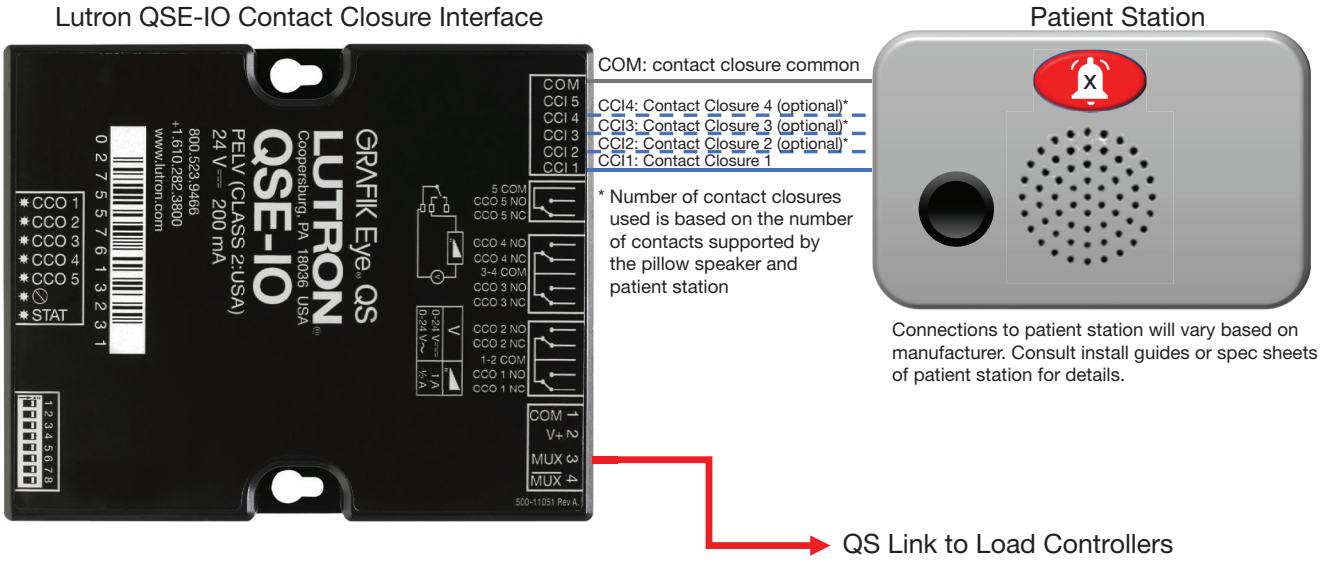
Wiring Details

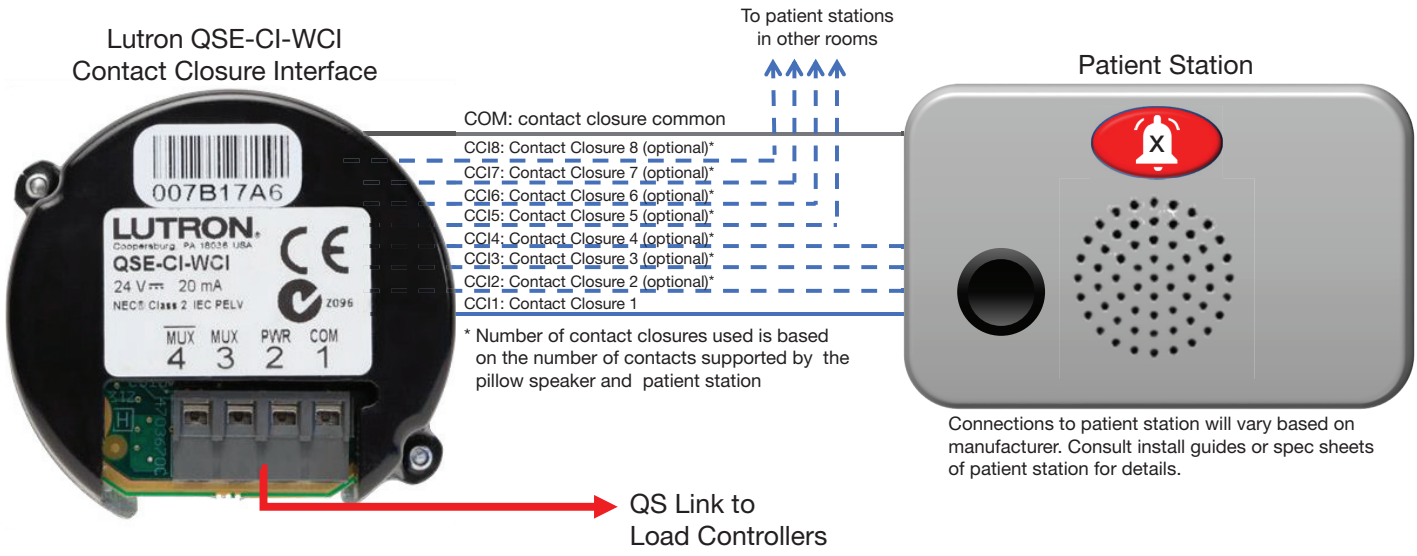
There are multiple ways that the contact closure output from a patient station can be integrated into a Lutron system. In many patient room applications, the Quantum or Athena lighting control systems will be utilized, which allows very flexible programming to support a variety of different sequence of operation for lights and shades. If other systems are being considered, ensure the necessary devices and sequence of operation are supported, as described in the System Support section of this document. Contact your local Lutron representative for more details of individual system functionality.

Wiring to the Patient Station in the diagrams below is for reference only. The Patient Station manufacturer's datasheet and install guides should be consulted for appropriate wiring details. For example, some Patient Stations have multiple lighting common connections that need to be tied together to yield a single COM connection going to the Lutron system components.

Option 1: QSE-IO or QSE-CI-WCI

In this scenario, the output of the patient station can tie into a QSE-IO or QSE-CI-WCI, which can integrate with other Lutron devices and systems over the QS link (see diagram below). The QSE-IO can accept up to 5 contact-closure inputs, allowing it to be used for many of the scenarios in this app note. The QSE-CI-WCI can accept up to 8 contact closure inputs, allowing it to be used for many of the scenarios in this app note. For applications where only one or two contact closures are necessary, one QSE-IO or QSE-CI-WCI could be shared across multiple patient stations.



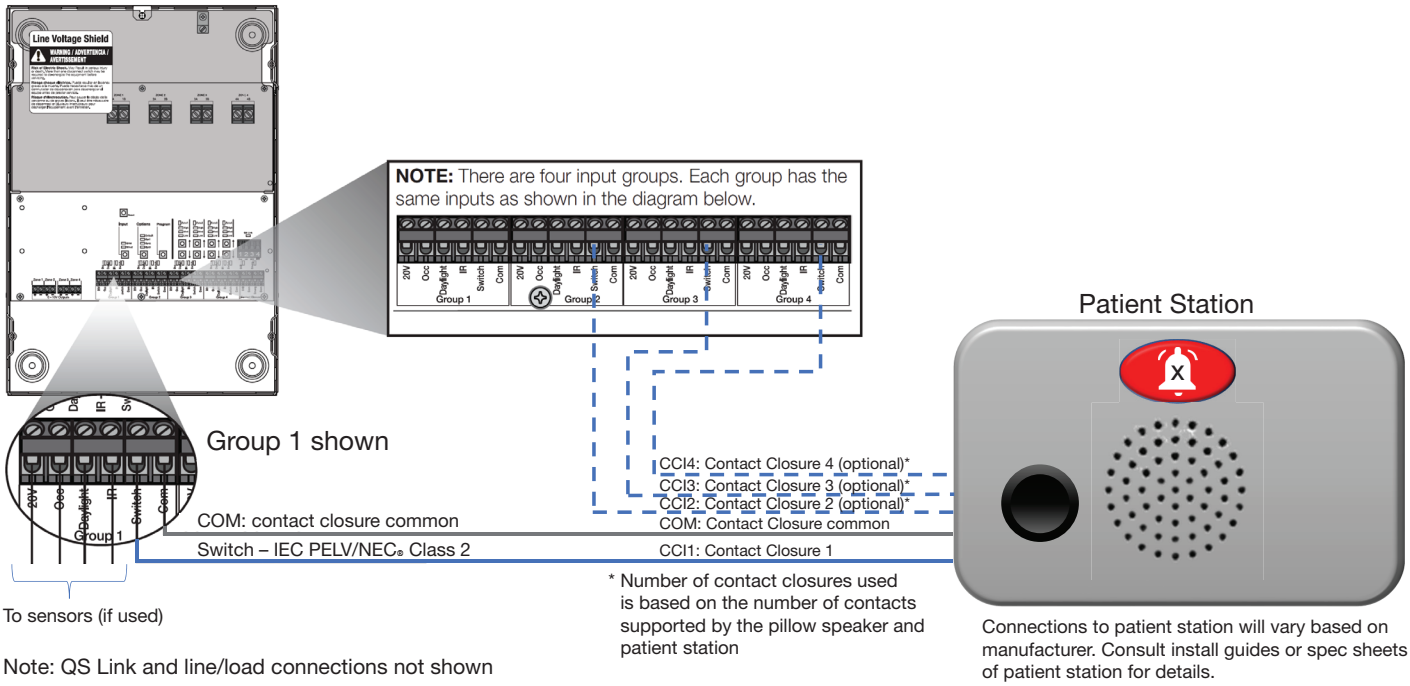


Wiring Details *(continued)*

Option 2: CCI on Energi Savr Node (ESN) Modules

If 0-10 V⎓ or Softswitch ESN modules are being used for control of the lighting zones, they have integral contact closure inputs that can be used to activate the desired functionality (see diagram below). Each 0-10 V⎓ and Softswitch ESN has five contact closure inputs, allowing it to be used for many of the scenarios in this app note. For applications where only one or two contact closures are necessary, one ESN can be shared across multiple patient stations.

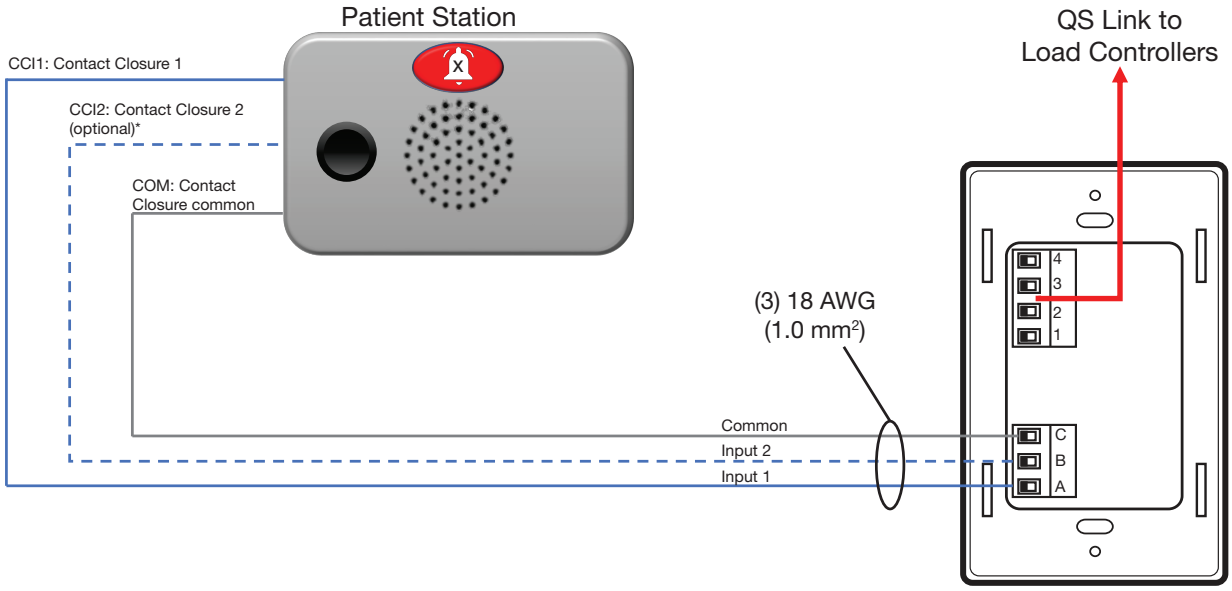
ESN Setup



Note: QS Link and line/load connections not shown

Option 3: CCI on seeTouch keypads

If seeTouch keypads are being used for manual control, their onboard CCIs can be used to achieve the one- and two-button functionalities described in this app note. Each seeTouch keypad has two contact closure inputs (see diagram below). For applications where only one contact closure is necessary, one seeTouch keypad can be shared across multiple patient stations.



System Support

Depending on the exact sequence of operation desired, and the integration method used, different Lutron systems may be required. Confirm your desired sequence of operation and integration method in the table below. As system capabilities are subject to change, always verify desired functionality with Lutron before finalizing any design.

	Zone Toggle	Scene Sequence	Cycle Dim	Scene Activate	Lights Raise/ Lower	Shade Raise/ Lower	Toggle Shade
QSE-IO	Q, A, S	Q, A		Q, A, S	Q, A, S	Q, A, S	
ESN/CCI	Q, A, S	Q, A		Q, A, S	Q, A	Q, A	
seeTouch Keypad CCI[1]	Q, A, S	Q, A		Q, A, S	Q, A, S	Q, A, S	
QSE-CI-WCI	Q, A, S	Q, A	Q, A	Q, A, S	Q, A, S	Q, A, S	Q, A, S

[1] Mimics button press from front of keypad in a Standalone QS system

Q = Supported by Quantum Systems
A = Supported by Athena Systems
S = Supported by Standalone QS Systems (may require programming using ESN app)

Conclusion

Integrating lighting control into the pillow speaker is an important element to allow a patient control over their environment. While the integrations detailed in this app note involve contact closures, there are a variety of different number of closures, and therefore different sequences of operation, that can be supported. By matching the desired sequence of operation to the proper pillow speaker configuration, you can achieve the necessary contact closure functionality when tied to a variety of different Lutron devices and systems.

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