

Lutron Homeworks QS Modules for Crestron r02

User Guide

1.0 Overview

The Lutron Homeworks QS Modules for Crestron is a collection of modules built in Crestron's SIMPL and SIMPL+ languages to allow complete control and integration of a Lutron Homeworks QS system with any Crestron 2-Series or 3-series system. Control is accomplished via TCP/IP. Software and firmware used for testing:

Crestron 2-series firmware 4.007.0004
Crestron 3-series firmware 1.005.0015
SIMPL Windows 4.02.08 Build 20100723:1510
Device Database 48.05.005.00
Crestron Database 37.05.005.00

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A. Core Module

The core module establishes a connection with the Homeworks QS integration point processor and manages all data flowing between the Lutron processor and Crestron program. It is capable of communicating with the Lutron processor via TCP/IP. Inputs and outputs are provided to interface with other modules. Each Crestron program must have 1 and only 1 core module per Homeworks QS system. Installations with multiple separate Lutron Homeworks QS systems will require multiple Core Modules. All other modules can be added as needed.

Beginning with r02 of the module, when the module connects to the Homeworks QS system it will set monitoring values on the integration point to default settings that are preferred for proper module operation. These values should not be changed. For this reason, the Integration Point Monitoring Module has been removed from the module set beginning with r02. For details on how the monitoring parameters are setup, please see the notes in the change log at the end of this document.

Signal Name	Direction	Type	Description
Username	Parameter	String	Username used to login to the Homeworks QS processor over TCP/IP. Field must have a value for SIMPL to compile. Default=default
Password	Parameter	String	Password used to login to the Homeworks QS processor over TCP/IP. Field must have a value for SIMPL to compile. Default=default
Port Number	Parameter	Analog	This field is for System Builder use only. When programming in Simpl, the port number must be defined on the TCP/IP client definition. Default=23d
FROM_MODULES\$	Input	String	Command data from other Lutron Homeworks QS Crestron modules.
{{TCP/IP_Client_>>_Connect-F}}	Input	Digital	Connects to the Connect-F output of a TCP/IP client object in the SIMPL program. See demo program for proper implementation.
{{TCP/IP_Client_>>_status}}	Input	Analog	Connects to the status output of a TCP/IP client object in the SIMPL program. See demo program for proper implementation.
{{TCP/IP_Client_>>_RX\$}}	Input	String	Connects to the RX\$ output of a TCP/IP client object in the SIMPL program. See demo program for proper implementation.

TO_FEEDBACK_PROCESSING_MODULE\$	Output	String	Connect this to the input of the Lutron Homeworks QS feedback processing module described later in section B.
BAD_LOGIN	Output	Digital	This signal will go high if the Lutron system replies that the username and password parameters do not match the information in the system.
Connect-F	Output	Digital	This output reflects the status of the TCP/IP client Connect-F output. It is provided for access to the signal status in System Builder.
Status	Output	Analog	This output reflects the status of the TCP/IP client status output. It is provided for access to the signal status in System Builder.
{{Connect_>>_TCP/IP_Client}}	Output	Digital	Connects to the Connect input of a TCP/IP client object in the SIMPL program. See demo program for proper implementation.
{{TX\$_>>_TCP/IP_Client}}	Output	String	Connects to the TX\$ input of a TCP/IP client object in the SIMPL program. See demo program for proper implementation.

B. Feedback Sorting Module

The feedback sorting module manages data flowing from the Lutron processor to the Crestron program and breaks out messages by integration ID into groups of 200. By doing so the module reduces the amount of data that each individual module must parse making the overall program more efficient. Except in the rare case that feedback is not required, the Crestron program should contain 1 feedback sorting module per core module implemented in the system.

Signal Name	Direction	Type	Description
SHOW_TRACE_MSGS	Input	Digital	If high, debug messages will be shown in SIMPL Debugger for troubleshooting. In normal use this can be set to 0 or commented out "//".
FROM_CORE_MODULE\$	Input	String	Response data from the Lutron Homeworks QS core module.
INTEGRATION_GROUP[*]\$	Output	String	Connect this to the input of the Lutron Homeworks QS group feedback processing module for the specified group. Note that the group feedback processing module must have the offset parameter set to match the group output being used. The module supports up to 2000 integration ID's broken up into 10 groups of 200. Unused outputs may be commented out "//".

C. Group Feedback Processing Module

The group feedback processing module manages data flowing from the Lutron feedback sorting module to the Crestron program and breaks out messages by integration ID. By doing so the module reduces the amount of data that each individual module must parse making the overall program more efficient.

Signal Name	Direction	Type	Description
OFFSET	Parameter	Analog	Used to set the module to the proper group for sorting. There are 10 groups which support 200 integration ID's per group. The offset value must match the group number being connected from the feedback sorting module.
SHOW_TRACE_MSGS	Input	Digital	If high, debug messages will be shown in SIMPL Debugger for troubleshooting. In normal use this can be set to 0 or commented out "//".
INTEGRATION_ID[*]\$	Output	String	Connect this to the input of the Lutron Homeworks QS module for the device at the indicated Integration ID. The actual integration ID will correspond with the range indicated in the offset parameter. For example, if the module is set with OFFSET=5 for group 5, output 1 will contain responses for integration ID 801. Unused outputs may be commented out "//".

D. Dimming Load Control Module

The Homeworks QS dimming load control module allows direct control of a dimming load in the Homeworks QS system. The dimming zone is the object that must be controlled rather than the dimmer device.

Signal Name	Direction	Type	Description
INTEGRATION_ID	Parameter	String	Integration ID of the dimming load as indicated in the Lutron software. Example: 5
PRESET_FADE_TIME	Parameter	String	Time to fade between the current level and the new preset level. Format is HH:MM:SS, MM:SS, SS or SS.ss. Default=00:01 (1 second)

PRESET_DELAY_TIME	Parameter	String	Time to wait before beginning to fade to new preset level. Format is HH:MM:SS, MM:SS, SS or SS.ss. Default=00:00 (0 seconds - no delay)
UP_DOWN_FADE_TIME	Parameter	String	Time for Up/Down commands to ramp a complete half cycle (on->off,off->on). This is used to ramp Level_Bar while up/down are active since the dimmer does not provide status until it stops. Format is in seconds. Default=5s
UP	Input	Digital	On rising edge begins to ramp up the dimmer, falling edge stops the ramp.
DOWN	Input	Digital	On rising edge begins to ramp down the dimmer, falling edge stops the ramp.
POLL_LEVEL	Input	Digital	On rising edge polls the dimmer for its current output level. This poll should only need to take place once as subsequent changes will be automatically reported to the Crestron system.
PRESET_LEVEL_AN	Input	Analog	On change fades the dimmer to the level of Level_AN based on the FadeTime and DelayTime.
RX\$ _FROM_FB_PROCESSOR	Input	String	String from Lutron Homeworks QS group feedback processing module for the integration ID of the dimmer.
LEVEL_BAR	Output	Analog	The current level of the dimmer as reported by the Homeworks QS system with support for levels down to 0.01%. While raising or lowering the level will ramp (based on Up_Down_Fade_Time setting) towards the users commanded level to provide simulated feedback.
LEVEL_TEXT\$	Output	String	The current level of the dimmer as reported by the Homeworks QS system in string format. The string will update based only on information from the Lutron system and therefore the value will not change continuously

			during a ramping operation.
TX\$ _TO _CORE _MODULE	Output	String	Commands to Lutron Homeworks QS Core Module

E. Switched Load Control Module

The Homeworks QS switched load control module allows direct control of a switched load in the Homeworks QS system. The switched zone is the object that must be controlled rather than the switch device.

Signal Name	Direction	Type	Description
INTEGRATION_ID	Parameter	String	Integration ID of the dimming load as indicated in the Lutron software. Example: 5
DELAY_TIME	Parameter	String	Time to wait before beginning to set new state. Format is HH:MM:SS, MM:SS, SS or SS.ss. Default=00:00 (0 seconds - no delay)
ON	Input	Digital	Sets the load to the on state based on delay time.
OFF	Input	Digital	Sets the load to the off state based on delay time.
POLL_STATUS	Input	Digital	On rising edge polls the switched load for its current output level. This poll should only need to take place once as subsequent changes will be automatically reported to the Crestron system.
RX\$ _FROM _FB _PROCESSOR	Input	String	String from Lutron Homeworks QS group feedback processing module for the integration ID of the switched load.
ON_FB	Output	Digital	Real feedback indicating that the current state of the switched load is on as reported by the Homeworks QS system.
OFF_FB	Output	Digital	Real feedback indicating that the current state of the switched load is off as reported by the Homeworks QS system.
TX\$ _TO _CORE _MODULE	Output	String	Commands to Lutron Homeworks QS Core Module

F. Radio Powr Savr Module

The Homeworks QS Radio Powr Savr module allows for monitoring of the status of a Radio Powr Savr occupancy sensor in the Homeworks QS system. Note that the unit has 1 way communication only and cannot be polled by the control system. Status will be updated upon a change of state from occupied to unoccupied or vice versa.

Signal Name	Direction	Type	Description
INTEGRATION_ID	Parameter	String	Integration ID of the occupancy sensor as indicated in the Lutron software. Example: 5
RX\$_FROM_FB_PROCESSOR	Input	String	String from Lutron Homeworks QS group feedback processing module for the integration ID of the occupancy sensor.
OCCUPIED_FB	Output	Digital	Real feedback indicating that the current state of the occupancy sensor is occupied as reported by the Homeworks QS system.
UNOCCUPIED_FB	Output	Digital	1 feedback indicating that the current state of the occupancy sensor is unoccupied as reported by the Homeworks QS system.
TX\$_TO_CORE_MODULE	Output	String	Commands to Lutron Homeworks QS Core Module

G. Button Models Module

The Homeworks QS button model module allows for a button on a Crestron touch panel or keypad to send the proper command functions to a keypad module such that the Crestron button will function in the same way as the corresponding Lutron button. This module is an optional component that is provided for the convenience of the programmer and it may be used at the programmer's discretion.

Signal Name	Direction	Type	Description
BUTTON_TYPE	Parameter	Digital	Selects the button type model to be applied. The setting should match the type of button that is defined in the Lutron software. Available options include: SINGLE ACTION SINGLE ACTION W/ DOUBLE TAP SINGLE ACTION W/ HOLD SINGLE ACTION W/ DOUBLE TAP AND HOLD TOGGLE

			TOGGLE W/ DOUBLE TAP TOGGLE W/ HOLD TOGGLE W/ DOUBLE TAP AND HOLD DUAL ACTION DUAL ACTION W/ DOUBLE TAP MASTER RAISE/LOWER SINGLE SCENE RAISE/LOWER SINGLE ACTION W/CYCLE DIM SINGLE ACTION W/DOUBLE TAP AND CYCLE DIM TOGGLE W/CYCLE DIM TOGGLE W/DOUBLE TAP AND CYCLE DIM
BUTTON_IN	Input	Digital	Input from the button press of a touch panel or keypad.
PRESS_GO	Output	Digital	Trigger to send a button press command to a Lutron keypad module. See demo program for proper implementation.
RELEASE_GO	Output	Digital	Trigger to send a button release command to a Lutron keypad module. See demo program for proper implementation.
HOLD_GO	Output	Digital	Trigger to send a button hold command to a Lutron keypad module. See demo program for proper implementation.
DOUBLE_TAP_GO	Output	Digital	Trigger to send a button double tap command to a Lutron keypad module. See demo program for proper implementation.

H. seeTouch Keypad Emulation Module

The seeTouch Keypad Emulation module allows the Crestron system to mimic all functions that can normally be performed on a seeTouch keypad. It supports all of the 11 possible button functions and 2 CCI functions for press, release, hold and double tap.

Signal Name	Direction	Type	Description
INTEGRATION_ID	Parameter	String	Integration ID of the keypad as indicated in the Lutron software. Example: 5
BUTTON[*]_PRESS	Input	Digital	Sends a press command for the indicated keypad button. This function can be triggered directly from a Crestron button or via an output of the button models module.
BUTTON[*]_RELEASE	Input	Digital	Sends a release command for the indicated keypad button. This function can be triggered directly from a Crestron button or via an output of the button models module.
BUTTON[*]_HOLD	Input	Digital	Sends a hold command for the indicated keypad button. This function can be triggered directly from a Crestron button or via an output of the button models module.
BUTTON[*]_DOUBLE_TAP	Input	Digital	Sends a double tap command for the indicated keypad button. This function can be triggered directly from a Crestron button or via an output of the button models module.
POLL_LED[*]	Input	Digital	Requests the current status of the indicated LED on the device. This poll should only need to take place once as subsequent changes will be automatically reported to the Crestron system.
RX\$_FROM_FB_PROCESSOR	Input	String	String from Lutron Homeworks QS group feedback processing module for the integration ID of the keypad.
LED[*]_FB	Output	Digital	Logical equivalent of the physical LED on the seeTouch keypad.
TX\$_TO_CORE_MODULE	Output	String	Commands to Lutron Homeworks QS Core Module

I. seeTouch Keypad Monitor Module

The seeTouch Keypad Monitor module allows the Crestron system to use a seeTouch keypad as a control interface for the Crestron system. It supports all of the 11 possible buttons and 2 CCI inputs for press, release, hold and double tap functions as detailed below and 7 LED's.

Signal Name	Direction	Type	Description
INTEGRATION_ID	Parameter	String	Integration ID of the keypad as indicated in the Lutron software. Example: 5
SET_LED*_ON	Input	Digital	When pulsed will set the indicated LED to the on(lit) state.
SET_LED*_OFF	Input	Digital	When pulsed will set the indicated LED to the off(unlit) state.
RX\$_FROM_FB_PROCESSOR	Input	String	String from Lutron Homeworks QS group feedback processing module for the integration ID of the keypad.
BUTTON[*]_PRESS	Output	Digital	Pulses when a button press is received from the Homeworks QS system.
BUTTON[*]_RELEASE	Output	Digital	Pulses when a button release is received from the Homeworks QS system.
BUTTON[*]_HOLD	Output	Digital	Pulses when a button hold is received from the Homeworks QS system.
BUTTON[*]_DOUBLE_TAP	Output	Digital	Pulses when a button double tap is received from the Homeworks QS system.
TX\$_TO_CORE_MODULE	Output	String	Commands to Lutron Homeworks QS Core Module

J. Tabletop seeTouch Keypad Emulation Module

The Tabletop seeTouch Keypad Emulation module allows the Crestron system to mimic all functions that can normally be performed on a Tabletop seeTouch keypad. It supports all of the 23 possible buttons for press, release, hold and double tap functionality and 15 LED's for status feedback.

Signal Name	Direction	Type	Description
INTEGRATION_ID	Parameter	String	Integration ID of the keypad as indicated in the Lutron software. Example: 5
BUTTON[*]_PRESS	Input	Digital	Sends a press command for the indicated keypad button. This function can be triggered directly from a Crestron button or via an output of the button models module.
BUTTON[*]_RELEASE	Input	Digital	Sends a release command for the indicated keypad button. This function can be triggered directly from a Crestron button or via an output of the button models module.
BUTTON[*]_HOLD	Input	Digital	Sends a hold command for the indicated keypad button. This function can be triggered directly from a Crestron button or via an output of the button models module.
BUTTON[*]_DOUBLE_TAP	Input	Digital	Sends a double tap command for the indicated keypad button. This function can be triggered directly from a Crestron button or via an output of the button models module.
POLL_LED[*]	Input	Digital	Requests the current status of the indicated LED on the device. This poll should only need to take place once as subsequent changes will be automatically reported to the Crestron system.
RX\$_FROM_FB_PROCESSOR	Input	String	String from Lutron Homeworks QS group feedback processing module for the integration ID of the keypad.
LED[*]_FB	Output	Digital	Logical equivalent of the physical LED on the Tabletop seeTouch keypad.
TX\$_TO_CORE_MODULE	Output	String	Commands to Lutron Homeworks QS Core Module

K. Tabletop seeTouch Keypad Monitor Module

The Tabletop seeTouch Keypad Monitor module allows the Crestron system to use a seeTouch keypad as a control interface for the Crestron system. It supports all of the 23 possible buttons for press functions as detailed below and 15 LED's.

Signal Name	Direction	Type	Description
INTEGRATION_ID	Parameter	String	Integration ID of the keypad as indicated in the Lutron software. Example: 5
SET_LED[*]_ON	Input	Digital	When pulsed will set the indicated LED to the on(lit) state.
SET_LED[*]_OFF	Input	Digital	When pulsed will set the indicated LED to the off(unlit) state.
RX\$_FROM_FB_PROCESSOR	Input	String	String from Lutron Homeworks QS group feedback processing module for the integration ID of the keypad.
BUTTON[*]_PRESS	Output	Digital	Pulses when a button press is received from the Homeworks QS system.
BUTTON[*]_RELEASE	Output	Digital	Pulses when a button release is received from the Homeworks QS system.
BUTTON[*]_HOLD	Output	Digital	Pulses when a button hold is received from the Homeworks QS system.
BUTTON[*]_DOUBLE_TAP	Output	Digital	Pulses when a button double tap is received from the Homeworks QS system.
TX\$_TO_CORE_MODULE	Output	String	Commands to Lutron Homeworks QS Core Module

L. Visor Control Receiver Emulation Module

The Visor Control Receiver Emulation module allows the Crestron system to mimic all functions that can normally be performed on the Visor Control Receiver. It supports all of the 6 possible buttons with button hold functionality as well as 3 inputs.

Signal Name	Direction	Type	Description
INTEGRATION_ID	Parameter	String	Integration ID of the receiver as indicated in the Lutron software. Example: 5
SCENE[*]_PRESS	Input	Digital	Sends a press command for the indicated keypad button. This function can be triggered directly from a Crestron button or via an output of the button models module.
SCENE [*]_RELEASE	Input	Digital	Sends a release command for the indicated keypad button. This function can be triggered directly from a Crestron button or via an output of the button models module.
SCENE [*]_HOLD	Input	Digital	Sends a hold command for the indicated keypad button. This function can be triggered directly from a Crestron button or via an output of the button models module.
SCENE[*]_DOUBLE_TAP	Input	Digital	Sends a double tap command for the indicated keypad button. This function can be triggered directly from a Crestron button or via an output of the button models module.
SECURITY_INPUT_OPEN SECURITY_INPUT_CLOSE INPUT1_OPEN INPUT1_CLOSE INPUT2_OPEN INPUT2_CLOSE	Input	Digital	Sends a command to "open" or "close" the indicated input. Typically these inputs would be driven by external devices. If the inputs are connected to external devices, controlling their state from the program could produce undesired results.
POLL_ [*]_LED	Input	Digital	Requests the current status of the indicated LED on the device. This poll should only need to take place once as subsequent changes will be automatically reported to the Crestron system.
RX\$_FROM_FB_PROCESSOR	Input	String	String from Lutron Homeworks QS group feedback processing module for the integration ID of

			the receiver.
LED[*]_FB	Output	Digital	Logical equivalent of the physical LED on the Visor Control Receiver.
SECURITY_INPUT_OPEN_FB SECURITY_INPUT_CLOSED_FB INPUT1_OPEN_FB INPUT1_CLOSED_FB INPUT2_OPEN_FB INPUT2_CLOSED_FB	Output	Digital	Real feedback indicating the status of the input. This status cannot be polled and will only be reported on a change of state (i.e. an input goes from open to closed or closed to open).
TX\$ _TO _CORE _MODULE	Output	String	Commands to Lutron Homeworks QS Core Module

M. Visor Control Receiver Monitor Module

The Visor Control Receiver Monitor module allows the Crestron system to use a Visor Control Receiver as a control interface for the Crestron system. It supports all of the 6 possible buttons for press, release, hold and double tap functions as detailed below.

Signal Name	Direction	Type	Description
INTEGRATION_ID	Parameter	String	Integration ID of the receiver as indicated in the Lutron software. Example: 5
SET_LED*_ON	Input	Digital	When pulsed will set the indicated LED to the on(lit) state.
SET_LED*_OFF	Input	Digital	When pulsed will set the indicated LED to the off(unlit) state.
RX\$ _FROM _FB _PROCESSOR	Input	String	String from Lutron Homeworks QS group feedback processing module for the integration ID of the receiver.
BUTTON[*]_PRESS	Output	Digital	Pulses when a button press is received from the Homeworks QS system.
BUTTON[*]_RELEASE	Output	Digital	Pulses when a button release is received from the Homeworks QS system.
BUTTON[*]_HOLD	Output	Digital	Pulses when a button hold is received from the Homeworks QS system.
BUTTON[*]_DOUBLE_TAP	Output	Digital	Pulses when a button double tap is received from the Homeworks QS system.
TX\$ _TO _CORE _MODULE	Output	String	Commands to Lutron Homeworks QS Core Module

N. Visor Control Receiver Output Control Module

The Visor Control Receiver Output Control module allows direct control of a single output on a Visor Control Receiver in the Homeworks QS system. Each output on the Visor Control Receiver gets an integration ID assigned to it in the Lutron software for control.

Signal Name	Direction	Type	Description
INTEGRATION_ID	Parameter	String	Integration ID of the receiver as indicated in the Lutron software. Example: 5
OPEN	Input	Digital	On rising edge opens the output.
CLOSE	Input	Digital	On rising edge closes the output.
POLL_STATUS	Input	Digital	On rising edge polls the output for its current status. This poll should only need to take place once as subsequent changes will be automatically reported to the Crestron system if zone status is enabled.
RX\$FROM_FB_PROCESSOR	Input	String	String from Lutron Homeworks QS group feedback processing module for the integration ID of the receiver.
OPEN_FB	Output	Digital	Indicates that the current status of the output is open.
CLOSE_FB	Output	Digital	Indicates that the current status of the output is closed.
TX\$TO_CORE_MODULE	Output	String	Commands to Lutron Homeworks QS Core Module

O. Sivoia QS Shade Module

The Sivoia shade module allows direct control of a shade in the Homeworks QS system.

Signal Name	Direction	Type	Description
INTEGRATION_ID	Parameter	String	Integration ID of the shade as indicated in the Lutron software. Example: 5
PRESET_DELAY_TIME	Parameter	String	Time to wait before beginning to transition to new preset level. Format is HH:MM:SS, MM:SS, SS or SS.ss. Default=00:00 (0 seconds)

			- no delay)
UP_DOWN_TRAVEL_TIME	Parameter	String	Time for Up/Down commands to ramp a complete half cycle (open->closed, closed->open). This is used to ramp Level_Bar while up/down are active since the shade does not provide status until it stops. Format is in seconds. Default=5s
UP	Input	Digital	On rising edge begins to raise the shade, falling edge stops the shade.
DOWN	Input	Digital	On rising edge begins to lower the shade, falling edge stops the shade.
POLL_LEVEL	Input	Digital	On rising edge polls the shade for its current level. This poll should only need to take place once as subsequent changes will be automatically reported to the Crestron system.
PRESET_LEVEL_AN	Input	Analog	On change sets the shade to the level of Level_AN based on the Delay Time.
RX\$_FROM_FB_PROCESSOR	Input	String	String from Lutron Homeworks QS group feedback processing module for the integration ID of the shade.
LEVEL_BAR	Output	Analog	The current level of the shade as reported by the Homeworks QS system with support for levels down to 0.01%. While raising or lowering the level will ramp (based on Up_Down_Travel_Time setting) towards the users commanded level to provide simulated feedback.
LEVEL_TEXT\$	Output	String	The current level of the shade as reported by the Homeworks QS system in string format. The string will update based only on information from the Lutron system and therefore the value will not change continuously during a ramping operation.
TX\$_TO_CORE_MODULE	Output	String	Commands to Lutron Homeworks QS Core Module

P. Sivoia QS Venetian Blind Module

The Sivoia QS Venetian blind module allows direct control of a blind in the Homeworks QS system.

Signal Name	Direction	Type	Description
INTEGRATION_ID	Parameter	String	Integration ID of the blind as indicated in the Lutron software. Example: 5
LIFT_PRESET_DELAY_TIME	Parameter	String	Time to wait before beginning to transition to new lift preset level. Format is HH:MM:SS, MM:SS, SS or SS.ss. Default=00:00 (0 seconds - no delay)
LIFT_UP_DOWN_FADE_TIME	Parameter	String	Time for lift Up/Down commands to ramp a complete half cycle (open->closed, closed->open). This is used to ramp LIFT_LEVEL_BAR while up/down are active since the blind does not provide status until it stops. Format is in seconds. Default=5s
TILT_PRESET_DELAY_TIME	Parameter	String	Time to wait before beginning to transition to new tilt preset level. Format is HH:MM:SS, MM:SS, SS or SS.ss. Default=00:00 (0 seconds - no delay)
TILT_UP_DOWN_FADE_TIME	Parameter	String	Time for tilt Up/Down commands to ramp a complete half cycle (open->closed, closed->open). This is used to ramp TILT_LEVEL_BAR while up/down are active since the blind does not provide status until it stops. Format is in seconds. Default=5s
LIFT_UP	Input	Digital	On rising edge begins to raise the blind, falling edge stops the blind.
LIFT_DOWN	Input	Digital	On rising edge begins to lower the blind, falling edge stops the blind.
LIFT_POLL_LEVEL	Input	Digital	On rising edge polls the blind for its current lift level. This poll should only need to take place once as subsequent changes will be automatically reported to

			the Crestron system.
LIFT_PRESET_LEVEL_AN	Input	Analog	On change sets the blind to the specified tilt level based on TILT_PRESET_DELAY_TIME.
TILT_UP	Input	Digital	On rising edge begins to tilt the blind up, falling edge stops the blind.
TILT_DOWN	Input	Digital	On rising edge begins to tilt the blind down, falling edge stops the blind.
TILT_POLL_LEVEL	Input	Digital	On rising edge polls the blind for its current tilt level. This poll should only need to take place once as subsequent changes will be automatically reported to the Crestron system.
TILT_PRESET_LEVEL_AN	Input	Analog	On change sets the blind to the specified tilt level based on TILT_PRESET_DELAY_TIME.
RX\$FROM_FB_PROCESSOR	Input	String	String from Lutron Homeworks QS group feedback processing module for the integration ID of the blind.
LIFT_LEVEL_BAR	Output	Analog	The current lift level of the blind as reported by the Homeworks QS system with support for levels down to 0.01%. While raising or lowering the level will ramp (based on LIFT_UP_DOWN_FADE_TIME setting) towards the users commanded level to provide simulated feedback.
LIFT_LEVEL_TEXT\$	Output	String	The current lift level of the blind as reported by the Homeworks QS system in string format. The string will update based only on information from the Lutron system and therefore the value will not change continuously during a ramping operation.
TILT_LEVEL_BAR	Output	Analog	The current tilt level of the blind as reported by the Homeworks QS system with support for levels down to 0.01%. While raising or lowering the level will ramp (based on TILT_UP_DOWN_FADE_TIME setting) towards the

			users commanded level to provide simulated feedback.
TILT_LEVEL_TEXT\$	Output	String	The current tilt level of the blind as reported by the Homeworks QS system in string format. The string will update based only on information from the Lutron system and therefore the value will not change continuously during a ramping operation.
TX\$ _TO_CORE_MODULE	Output	String	Commands to Lutron Homeworks QS Core Module

Q. Grafik Eye QS Module

The Grafik Eye QS module allows the Crestron system to mimic all functions that can normally be performed on a Grafik Eye QS keypad. It supports all of the 20 possible buttons for press, release, hold and double tap functionality and 14 LED's for status feedback.

Signal Name	Direction	Type	Description
INTEGRATION_ID	Parameter	String	Integration ID of the keypad as indicated in the Lutron software. Example: 5
BUTTON[*]_PRESS	Input	Digital	Sends a press command for the indicated keypad button. This function can be triggered directly from a Crestron button or via an output of the button models module.
BUTTON[*]_RELEASE	Input	Digital	Sends a release command for the indicated keypad button. This function can be triggered directly from a Crestron button or via an output of the button models module.
BUTTON[*]_HOLD	Input	Digital	Sends a hold command for the indicated keypad button. This function can be triggered directly from a Crestron button or via an output of the button models module.
BUTTON[*]_DOUBLE_TAP	Input	Digital	Sends a double tap command for the indicated keypad button. This function can be triggered directly from a Crestron button or via an output of the button models module.
POLL_LED[*]	Input	Digital	Requests the current status of the indicated LED on the device. This poll should only need to

			take place once as subsequent changes will be automatically reported to the Crestron system.
RX\$_FROM_FB_PROCESSOR	Input	String	String from Lutron Homeworks QS group feedback processing module for the integration ID of the keypad.
LED[*]_FB	Output	Digital	Logical equivalent of the physical LED on the Grafik Eye QS keypad.
TX\$_TO_CORE_MODULE	Output	String	Commands to Lutron Homeworks QS Core Module

R. Phantom Keypad Module

The phantom keypad module allows the Crestron system to mimic all functions of a Homeworks QS phantom keypad. It supports 100 buttons for press, release, hold and double tap functionality and 100 LED's for status feedback.

Signal Name	Direction	Type	Description
INTEGRATION_ID	Parameter	String	Integration ID of the keypad as indicated in the Lutron software. Example: 5
BUTTON[*]_PRESS	Input	Digital	Sends a press command for the indicated keypad button. This function can be triggered directly from a Crestron button or via an output of the button models module.
BUTTON[*]_RELEASE	Input	Digital	Sends a release command for the indicated keypad button. This function can be triggered directly from a Crestron button or via an output of the button models module.
BUTTON[*]_HOLD	Input	Digital	Sends a hold command for the indicated keypad button. This function can be triggered directly from a Crestron button or via an output of the button models module.
BUTTON[*]_DOUBLE_TAP	Input	Digital	Sends a double tap command for the indicated keypad button. This function can be triggered directly from a Crestron button or via an output of the button models module.
POLL_LED[*]	Input	Digital	Requests the current status of the indicated LED on the device. This poll should only need to take place once as subsequent changes will be

			automatically reported to the Crestron system.
RX\$_FROM_FB_PROCESSOR	Input	String	String from Lutron Homeworks QS group feedback processing module for the integration ID of the keypad.
LED[*]_FB	Output	Digital	Logical equivalent of the LED on the phantom keypad.
TX\$_TO_CORE_MODULE	Output	String	Commands to Lutron Homeworks QS Core Module

S. Pico Wireless Control Emulation Module

The Pico Wireless Control Emulation module allows the Crestron system to mimic all functions that can normally be performed on a Pico wireless remote. It supports all of the 5 possible buttons for press and release functionality.

Signal Name	Direction	Type	Description
INTEGRATION_ID	Parameter	String	Integration ID of the remote as indicated in the Lutron software. Example: 5
BUTTON[*]	Input	Digital	Sends a press command on the rising edge of the digital input for the indicated remote button. Sends a release command on the falling edge of the digital input for the indicated remote button.
TX\$_TO_CORE_MODULE	Output	String	Commands to Lutron Homeworks QS Core Module

T. Pico Wireless Control Monitor Module

The Pico Wireless Control Monitor module allows the Crestron system to use a Pico wireless remote as a control interface for the Crestron system. It supports all of the 5 possible buttons for press and release functions as detailed below.

Signal Name	Direction	Type	Description
INTEGRATION_ID	Parameter	String	Integration ID of the remote as indicated in the Lutron software. Example: 5
RX\$_FROM_FB_PROCESSOR	Input	String	String from Lutron Homeworks QS group feedback processing module for the integration ID of the remote.
BUTTON[*]_PRESS	Output	Digital	Pulses when a button press is received from the Homeworks QS system.
BUTTON[*]_RELEASE	Output	Digital	Pulses when a button release is received from the Homeworks QS system.

U. HVAC Controller Module

The HVAC controller module allows the Crestron system to perform all available control functions of a Homeworks QS HVAC controller for current temperature, heat set point, cool set point, HVAC mode, fan, ECO mode, scheduling override and temperature sensor connection functionality along with corresponding status feedback.

Signal Name	Direction	Type	Description
INTEGRATION_ID	Parameter	String	Integration ID of the HVAC controller as indicated in the Lutron software. Example: 5
GET_CURRENT_TEMPERATURE	Input	Digital	Polls the HVAC controller for its current temperature status.
HEAT_SET_POINT_UP HEAT_SET_POINT_DOWN	Input	Digital	Sends a command to raise or lower the heat set point by 1 degree on the rising edge of the button press.
COOL_SET_POINT_UP COOL_SET_POINT_DOWN	Input	Digital	Sends a command to raise or lower the cooling set point by 1 degree on the rising edge of the button press.
GET_SET_POINTS	Input	Digital	Polls the HVAC controller for its current heat and cool set point status.
SET_MODE_OFF SET_MODE_HEAT SET_MODE_COOL SET_MODE_AUTO SET_MODE_EM_HEAT	Input	Digital	Sends a command to set the mode of the HVAC system to the indicated setting.
GET_MODE	Input	Digital	Polls the HVAC controller for its current operating mode status.
SET_FAN_AUTO SET_FAN_ON	Input	Digital	Sends a command to set the fan of the HVAC system to the indicated setting.
GET_FAN	Input	Digital	Polls the HVAC controller for its current fan mode status.
SET_ECO_MODE_OFF SET_ECO_MODE_ON	Input	Digital	Sends a command to turn eco mode on or off on the rising edge of the button press.
GET_ECO_MODE	Input	Digital	Polls the HVAC controller for its current eco mode status.
SET_ECO_OFFSET_[*]	Input	Digital	Sends a command to set the eco offset to the indicated value on the rising edge of the button press.
GET_ECO_OFFSET	Input	Digital	Polls the HVAC controller for its current eco offset status.
SET_SCHED_OVERRIDE_DISABLED	Input	Digital	Sends a command to set the schedule override to the

SET_SCHED_OVERRIDE_ENABLED SET_SCHED_OVERRIDE_PERMANENT_HOLD			indicated setting on the rising edge of the button press.
GET_SCHED_OVERRIDE	Input	Digital	Polls the HVAC controller for its current schedule override status.
GET_TEMP_SENSOR_CONNECTION	Input	Digital	Polls the HVAC controller for its current temperature sensor connection status.
RX\$_FROM_FB_PROCESSOR	Input	String	String from Lutron Homeworks QS group feedback processing module for the integration ID of the keypad.
CURRENT_TEMPERATURE_AN	Output	Analog	Value indicating the current temperature as reported by the HVAC controller in degrees with a range of 40-100.
HEAT_SET_POINT_AN	Output	Analog	Value indicating the current heat set point as reported by the HVAC controller in degrees with a range of 40-103.
COOL_SET_POINT_AN	Output	Analog	Value indicating the current cooling set point as reported by the HVAC controller in degrees with a range of 50-113.
MODE_OFF_FB MODE_HEAT_FB MODE_COOL_FB MODE_AUTO_FB MODE_EM_HEAT_FB	Output	Digital	Status feedback indicating the current operating mode of the HVAC controller.
FAN_AUTO_FB FAN_ON_FB	Output	Digital	Status feedback indicating the current fan mode of the HVAC controller.
ECO_MODE_OFF_FB ECO_MODE_ON_FB	Output	Digital	Status feedback indicating the current status of eco mode on the HVAC controller.
ECO_OFF[*]_FB	Output	Digital	Status feedback indicating the current setting of the eco offset on the HVAC controller.
SCHED_OVERRIDE_DISABLE_FB SCHED_OVERRIDE_ENABLED_FB SCHED_OVERRIDE_PERMANENT_HOLD_FB	Output	Digital	Status feedback indicating the current setting of the schedule override on the HVAC controller.
CONNECTION_NORMAL_FB CONNECTION_NO_SENSOR_FB CONNECTION_WIRED_SENSOR_FB	Output	Digital	Status feedback indicating the current status of the temperature sensor connection type on the HVAC controller.
TX\$_TO_CORE_MODULE	Output	String	Commands to Lutron Homeworks QS Core Module

V. HVAC Scheduling Module

The HVAC scheduling module allows the Crestron system to retrieve information about the current configuration of scheduling in the Homeworks QS HVAC controller for display on a touch panel. Note that this module only displays the scheduling information as it has been configured by the Lutron software. This module does not allow a user to change the schedule or event configuration from the control system.

Signal Name	Direction	Type	Description
INTEGRATION_ID	Parameter	String	Integration ID of the HVAC controller as indicated in the Lutron software. Example: 5
GET_SCHEDULE_[*]	Input	Digital	Sets the value of the schedule to be retrieved when the GET_SCHEDULE_EVENT_INFO input is triggered.
GET_EVENT_[*]	Input	Digital	Sets the value of the event to be retrieved when the GET_SCHEDULE_EVENT_INFO input is triggered.
GET_SCHEDULE_EVENT_INFO	Input	Digital	Sends a command to retrieve the information for the currently selected schedule and event.
GET_SCHEDULE[*]_DAY_ASSIGNMENT	Input	Digital	Sends a command to retrieve the information for the day assignments of the indicated schedule.
RX\$FROM_FB_PROCESSOR	Input	String	String from Lutron Homeworks QS group feedback processing module for the integration ID of the keypad.
GET_SCHEDULE_[*]_FB	Output	Digital	Feedback indicating the currently selected schedule to be retrieved with a press of the GET_SCHEDULE_EVENT_INFO input.
GET_EVENT_[*]_FB	Output	Digital	Feedback indicating the currently selected event to be retrieved with a press of the GET_SCHEDULE_EVENT_INFO input.
SCHEDULE_EVENT_SCHEDULE\$	Output	String	The name of the schedule last retrieved by the GET_SCHEDULE_EVENT_INFO input.
SCHEDULE_EVENT_EVENT\$	Output	String	The name of the event last retrieved by the GET_SCHEDULE_EVENT_INFO input.
SCHEDULE_EVENT_TIME\$	Output	String	The time of the schedule event last retrieved by the GET_SCHEDULE_EVENT_INFO

			input.
SCHEDULE_EVENT_SPC\$	Output	String	The cool set point of the schedule event last retrieved by the GET_SCHEDULE_EVENT_INFO input.
SCHEDULE_EVENT_SPH\$	Output	String	The heat set point of the schedule event last retrieved by the GET_SCHEDULE_EVENT_INFO input.
SCHEDULE[*]_SUNDAY_FB SCHEDULE[*]_MONDAY_FB SCHEDULE[*]_TUESDAY_FB SCHEDULE[*]_WEDNESDAY_FB SCHEDULE[*]_THURSDAY_FB SCHEDULE[*]_FRIDAY_FB SCHEDULE[*]_SATURDAY_FB	Output	Digital	Status feedback indicating the current active schedule days for the indicated schedule.
TX\$_TO_CORE_MODULE	Output	String	Commands to Lutron Homeworks QS Core Module

W. Fanspeed Control Module

The fanspeed control module allows the Crestron system to perform all available control functions of a Homeworks QS fanspeed controller for speed selection functionality along with corresponding status feedback. The fan zone is the object that must be controlled rather than the fanspeed control device.

Signal Name	Direction	Type	Description
INTEGRATION_ID	Parameter	String	Integration ID of the fanspeed controller as indicated in the Lutron software. Example: 5
FAN_OFF FAN_LOW FAN_MEDIUM FAN_MEDIUM_HIGH FAN_HIGH	Input	Digital	Sends a command to set the speed of the fanspeed controller to the indicated setting.
POLL_STATUS	Input	Digital	Polls the fanspeed controller for its current operating mode status.
RX\$_FROM_FB_PROCESSOR	Input	String	String from Lutron Homeworks QS group feedback processing module for the integration ID of the fanspeed controller.
FAN_OFF_FB FAN_LOW_FB FAN_MEDIUM_FB FAN_MEDIUM_HIGH_FB FAN_HIGH_FB	Output	Digital	Status feedback indicating the current operating mode of the fanspeed controller.
TX\$_TO_CORE_MODULE	Output	String	Commands to Lutron Homeworks QS Core Module

X. International Keypad Emulation Module

The International Keypad Emulation module allows the Crestron system to mimic all functions that can normally be performed on a seeTouch International keypad. It supports all of the 12 possible button functions and 2 CCI functions for press, release, hold and double tap.

Signal Name	Direction	Type	Description
INTEGRATION_ID	Parameter	String	Integration ID of the keypad as indicated in the Lutron software. Example: 5
BUTTON[*]_PRESS	Input	Digital	Sends a press command for the indicated keypad button. This function can be triggered directly from a Crestron button or via an output of the button models module.
BUTTON[*]_RELEASE	Input	Digital	Sends a release command for the indicated keypad button. This function can be triggered directly from a Crestron button or via an output of the button models module.
BUTTON[*]_HOLD	Input	Digital	Sends a hold command for the indicated keypad button. This function can be triggered directly from a Crestron button or via an output of the button models module.
BUTTON[*]_DOUBLE_TAP	Input	Digital	Sends a double tap command for the indicated keypad button. This function can be triggered directly from a Crestron button or via an output of the button models module.
POLL_LED[*]	Input	Digital	Requests the current status of the indicated LED on the device. This poll should only need to take place once as subsequent changes will be automatically reported to the Crestron system.
RX\$_FROM_FB_PROCESSOR	Input	String	String from Lutron Homeworks QS group feedback processing module for the integration ID of the keypad.
LED[*]_FB	Output	Digital	Logical equivalent of the physical LED on the keypad.
TX\$_TO_CORE_MODULE	Output	String	Commands to Lutron Homeworks QS Core Module

Y. International Keypad Monitor Module

The International Keypad Monitor module allows the Crestron system to use a seeTouch international keypad as a control interface for the Crestron system. It supports all of the 12 possible buttons and 2 CCI inputs for press, release, hold and double tap functions as detailed below and 10 LED's.

Signal Name	Direction	Type	Description
INTEGRATION_ID	Parameter	String	Integration ID of the keypad as indicated in the Lutron software. Example: 5
SET_LED*_ON	Input	Digital	When pulsed will set the indicated LED to the on(lit) state.
SET_LED*_OFF	Input	Digital	When pulsed will set the indicated LED to the off(unlit) state.
RX\$_FROM_FB_PROCESSOR	Input	String	String from Lutron Homeworks QS group feedback processing module for the integration ID of the keypad.
BUTTON[*]_PRESS	Output	Digital	Pulses when a button press is received from the Homeworks QS system.
BUTTON[*]_RELEASE	Output	Digital	Pulses when a button release is received from the Homeworks QS system.
BUTTON[*]_HOLD	Output	Digital	Pulses when a button hold is received from the Homeworks QS system.
BUTTON[*]_DOUBLE_TAP	Output	Digital	Pulses when a button double tap is received from the Homeworks QS system.
TX\$_TO_CORE_MODULE	Output	String	Commands to Lutron Homeworks QS Core Module

Z. Architrave Keypad

An Architrave keypad can be controlled using the existing modules for the seeTouch Keypad. Functions are mapped as follows:

- Buttons 1 through 7 and LED's 1 through 7 correspond directly between the devices.
- The top raise and lower functions on the seeTouch do not have any corresponding function on an Architrave keypad.
- The bottom raise and lower functions on the seeTouch correspond with the raise and lower functions on an Architrave keypad.
- The CCI1 and CCI2 functions correspond directly between the devices.

3.0 Lutron Processor Configuration

A. Configuring Telnet

The method for interfacing with a Homeworks QS system is via telnet over its Ethernet port. In order for this to work the Homeworks QS system must be configured with either a fixed IP address or the network must have a DHCP/DNS server that keeps track of the processor's IP address and make it available via DNS lookup. If your DHCP server supports reservations this would be the easiest method. Enter the Homeworks QS processor's Ethernet MAC address into the reservation settings on the DHCP server and give the Lutron a fixed IP address.

RS-232 may also be used with an RS-232 to Ethernet adapter.

Telnet access requires a username and password. The default settings for use with integration are username=default and password= default. Additional logins may be configured under "Program->Configure Integration" within the Lutron software, however additional users should not be necessary for the purpose of integration.

Note that although the Core Module now configures the monitoring settings for the integration connection automatically, additional telnet connections can be created and configured separately. For example, if you would like to be able to connect to the Homeworks QS processor and send and receive commands with a prompt in place, setup an additional telnet connection (other than the one being used for AV control) and configure that connection as desired.

4.0 Change Log

r01 - Initial Release

- Tested with Lutron Homeworks QS software version 2.1.0 and OS firmware version 2.1.0.

r02

- The Integration Point Monitoring module was removed from the module set due to changes in the Core module listed in the next item.
- The Core module was changed to add functionality which sets the monitoring parameters of the connection to specified values. The monitoring parameters are set when a connection is initiated or reconnected. Specifically, the monitoring parameters are set as follows: Prompts and Diagnostics are disabled. Replies, Buttons, LEDS, Zones, Occupancy, Scenes, Sequence, HVAC and Modes are enabled. This change was made in an effort to provide the data necessary for all modules to function properly as well as to minimize the possibility of issues arising with feedback parsing.
- The Feedback Processing module was replaced with the Feedback Sorting Module and the Group Feedback Processing module in order to accommodate larger numbers of integration ID's in a system.
- The Fanspeed Control module was added.
- The International Keypad Emulation and Monitoring modules were added.

- The Phantom Keypad Emulation module was changed to place the Press/LED, Release, Hold, Double Tap and Poll LED functions into expandable groups on the module inputs and outputs.
- The Button Models module was updated to add the following button types: Single Action with Cycle Dim, Single Action with Double Tap and Cycle Dim, Toggle with Cycle Dim, and Toggle with Double Tap and Cycle Dim. These new button types were added to the end of the parameter list to maintain consistency with r01 of the module for the previously defined button types.
- Tested with Lutron Homeworks QS software version 5.0.1 and OS firmware version 5.0.1.