Integration Note

Manufacturer:	Lutron RadioRA
Model Number(s):	**RadioRA**
Comments:	
Document Revision Date:	2/12/2013

OVERVIEW AND SUPPORTED FEATURES

IMPORTANT: As explained in this Integration Note, you are limited to a combined total of 15 Scene and Room Buttons in the g! Viewer Interface. This limitation only applies to Scene and Room Buttons: there is no limitation on the number of individual switches that can be controlled from the Viewer interface.

Installing a RadioRA lighting system can be broken down into the following steps:

1. Work with the client to determine what lights will be controlled, where switches will be installed, and where keypads will be installed. See **Suggested Design Procedure** below.
2. Install and test each of the switches and keypads to confirm proper wiring. See **Installation Overview** for the list of steps required.
3. Program and test the lighting system for proper keypad and scene function. This process is discussed in **RadioRA Programming Overview** below.
4. Integrate the lighting system into the **g!** system and test proper operation. This step is outlined in **g! Configuration Details**.

RADIORA LIGHTING SYSTEMS SUPPORT THE FOLLOWING FEATURES:

Wireless Communications: No dedicated low voltage wiring to control switches or keypads.

Switch Control: Control of individual loads from virtual and simulated keypads on the Viewer Interface.

LED Control: LEDs in the Viewer interface behave consistently with the LEDs on the physical Master Controls (keypads).

Schedule Control: Up to three schedules can be set using the Viewer software. The schedules are tied to the house mode.

Master Control Button without Lighting Commands: Master Control buttons can be setup with no lights assigned to them, and thereby provide a means for the user to send commands directly to the **g!** system which can be event-mapped as desired.

RADIORA LIGHTING SYSTEMS DO NOT SUPPORT THE FOLLOWING FEATURES:

Any feature not specifically noted as “supported” is not supported.

Contact Closure Inputs: The inputs on the Chronos are not supported at this time.

Sivoia Motorized Treatment Control: The Sivoia control is not supported at this time.

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WORKING WITH g! AND RADIORA

This section provides some definitions and background on RadioRA and **g!**.

DEFINITIONS:

Zone: Load or switch / dimmer.

Zone Number: Identifier for a Zone. Zone Numbers are needed if you plan to control that load individually from the **g!** system.

Master Control: This can be a keypad, the RS-232 Interface, or the Chronos.

Master Control Number: This is the identifier for each Master Control (keypad, RS-232 Interface, etc) in the system. The Master Control Number is not required currently, but we suggest you set unique numbers for all Master Controls to enable future support of additional RadioRA features.

Room Button: When pressed, turns on all the lights in the room to their preset levels. When pressed again, turns them all off. The LED for the room button is on if all the lights in that room are on at any dim level. Pressing the Room Button on a Master Control will turn on the LEDs for all other Master Controls programmed with that same Room Button.

Scene Button: When pressed, turns on specified lights to preset levels and turns off other specified lights. When pressed again, turns off the lights that were on, and leaves the lights that it turned off alone. The LED for the scene is only on when that Scene button is pressed on that Master Control. Pressing a Scene Button on a Master Control does NOT turn on LEDs on other Master Controls that have the same scene.

Phantom Buttons: Virtual buttons that exist in the RS-232 Interface or the Chronos. These are critical to the **g!** integration. Phantom buttons can be setup as either Scene Buttons or Room Buttons.

Whole-Home Buttons: On a Chronos system, Phantom buttons can span both systems.

GENERAL NOTES:

- RadioRA is available in two frequencies. The second letter on the model number is the frequency code: RB-600LM is “B”. All devices in a RadioRA system must have the same letter.
- A RadioRA system requires an RS-232 Interface or a Chronos System Bridge and Timeclock to interface to the **g!** system.
- Each RadioRA system can have up to 32 zones (loads). If you need more loads, then use the Chronos System Bridge and Time Clock, which supports an additional 32 zones.
- Each RadioRA system can have up to 12 Master Control (keypads). If you add the Chronos System Bridge and Time Clock, then you get up to 24, but note the item below.
- The RS-232 Interface counts as one Master Control, and the Chronos counts as two Master Controls in each system. Remember to deduct them in the total calculation
- Each RadioRA system can have up to 4 repeaters. Each repeater covers about 2,500 square feet of living space.

NOTES WHEN USING RADIORA WITH GRAFIK EYE:

- When integrating the GRAFIK Eye into a RadioRA system, we suggest adding only one GRAFIK Eye, since all GRAFIK Eyes will respond to commands issued to any GRAFIK Eye.
- Set the scenes on the GRAFIK Eye before configuring or programming the RadioRA RS-232 interface or Chronos.

THE 15 SCENE LIMIT

The RadioRA protocol does not allow the **g!** system to know how individual Master Control buttons are configured. Instead, the protocol provides the **g!** system with complete knowledge of up to 15 Phantom Buttons built in to the RS-232 or Chronos Interface.

To properly display the state of keypad LEDs and properly simulate button presses on Master Controls, the procedure described in this Integration Note requires that any Scene or Room Button in the RadioRA system (that will appear in the Viewer interface) be first programmed as a Phantom Button in the RS-232 or Chronos Interface.

This way, the **g!** system knows about all the Room and Scene Buttons, and can properly display and execute the commands.

IMPORTANT: Because there are 15 Phantom Buttons in the RS-232 or Chronos Interface, you are limited to a combined total of 15 Scene and Room Buttons in the g! Viewer.

There is no limitation (other than RadioRA limitations) on the number of individual zones (loads) that can be controlled from the Viewer interface.

MASTER CONTROLS LED BEHAVIOR

Scene Buttons and Room Buttons cause different LED behavior on the Master Controls (keypads).

For example, consider a system where you install two Master Controls (keypads), one by the front door and one by the back door. You program both of their buttons the same so that the keypads are consistent to a user in the home. If you press a **Scene Button** on the back door keypad, the LED next to that button will turn on, but the corresponding LED by the front door will not turn on, and the corresponding button on the Viewer interface will similarly not turn on.

Room Buttons do not have this behavior. In the example above, consider that the keypads by the front door and back door were both setup with **Room Buttons** instead. In this case, when the user presses a button on the keypad, the LED next to the button turns on. In addition, the corresponding LED on the other keypad also turns on, as does any corresponding button in the Viewer interface.

SUGGESTED DESIGN PROCEDURE

The following steps illustrate one approach to work with a client to arrive at a lighting system design that can be implemented successfully with RadioRA.

STEP 1: ORGANIZE THE LOADS INTO GROUPS

The first step is to put all the switches into groups: one group for each primary space or function. Typical groups include:

- Outside Lights: these are loads around the perimeter of the house that normally are controlled by switches scattered about at various locations.
- Pathway Lights: these are loads that provide the basic lighting to move around the house. Loads include the front door, the entry hallway, stairwells, the garage entryway, etc.
- Family Room Lights: these are loads in a room that combine to create a mood or atmosphere. Often there are numerous switches ganged at one location or ganged at several locations.

STEP 2: DECIDE HOW KEYPADS CONTROL EACH GROUP

Once you have the switches in groups, decide what the home owner will want to do with each group. The result of this step is a list of keypads, and the desired behavior for each button. Each keypad button can be thought of as a scene (a Lutron Scene Button) or a remote switch (a Lutron Room Button).

IMPORTANT: Limit the total number of Scene and Room Buttons to 15.

- Scene Buttons: each scene turns a group of lights on to specified levels. Scenes are most commonly used in spaces like family rooms and kitchens.
- Room Buttons: these are controls that allow the home owner to turn on lights from anywhere in the house, and are most commonly used for outside lights (turn on the front door light) and whole house light control (all lights off).

This process is probably the most important step, and should be done with the client's input. Here are some examples to help illustrate:

- Outside Lights: Place a keypad by the front door and the back door. Both will behave the same, and include buttons for:
    - All On: Turn on all the outside lights.
    - Evening: Turn on the normal lights that illuminate the driveway and front door.
    - Party: Turn on the yard spot lights and accent lights that highlight the landscaping.
    - All Off: Turn off all of the outside lights.
- Kitchen: Place a keypad in the kitchen with buttons for:
    - All On: Turn on all of the lights in the kitchen.
    - Evening: Turn on just the lights for a normal evening.
    - Cook: Turn on the lights needed to cook and prepare dinner.
    - Dine: Turn on the lights over the dining table, and dim the lights in the kitchen to provide the appropriate dining atmosphere.
    - Late Night: Turn on the under-counter lights just enough to be able to walk around in the middle of the night.
    - All Off: Turn off all of the lights in the kitchen.
- Basement Light: Add a single button on one of the keypads in the house to remotely control the basement light. The keypad button is illuminated when the light is on.

- Master Keypad: Place a keypad in the master suite with buttons for:
    - Outside All On: Turn on all of the outside lights.
    - Outside Evening: Turn on normal evening lights.
    - Outside Party: Turn on the yard spot lights and accent lights.
    - Outside All Off: Turn off all of the outside lights.
    - Inside All On: Turn on all of the inside lights.
    - Inside Evening: Turn on the normal evening lights: Kitchen Evening and Pathway lights.
    - Inside Late Night: Turn on pathway lights just enough to get around during the night.
    - Inside All Off: Turn off the inside lights.

STEP 3: PREPARE YOUR BILL OF MATERIALS

The results of the first two steps are lists of switches and keypads along with a list of the desired behavior/ commands for each lighting group.

You should end up with a total of 15 or fewer Scene Buttons and Room Buttons. Each of these buttons will be assigned to one of the available Phantom Buttons in the RS-232 Interface or Chronos.

In addition to your list of required switches, refer to the **Connection Diagram** and **Bill of Materials** below to determine an overall list of required parts for the installation.

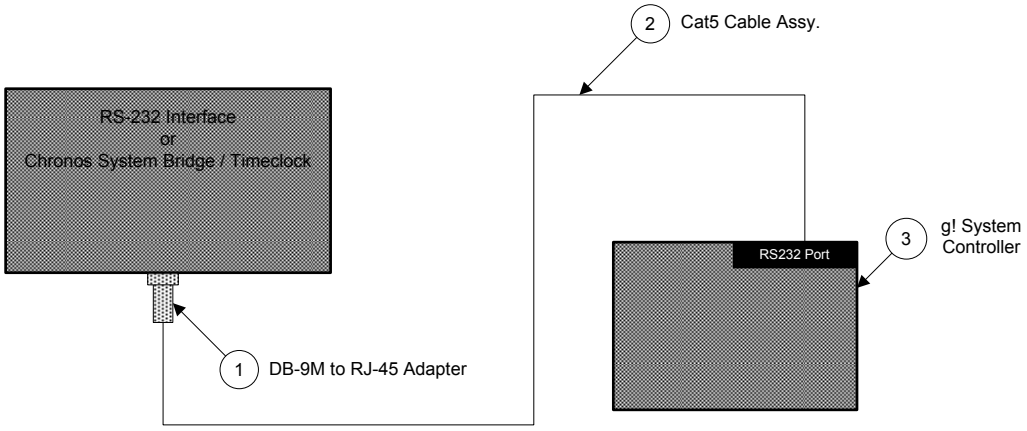
INSTALLATION OVERVIEW

Refer to the diagrams that follow:

1. Rough-in the high-voltage electrical wiring for the lights as though you were using standard light switches.
2. Run a Cat5 cable from the location of the RS-232 Interface or Chronos to the **g!** system.
3. Install the RadioRA switches and Master Controls, and the RS-232 Interface or Chronos.
4. Power up the switches and keypads.

CONNECTION DIAGRAM

Refer to the **Bill of Materials** and **Wiring Diagram** that follow. Refer to the **RS-232 Connection Options** Integration Note for alternative connections methods.



BILL OF MATERIALS

#	Device	Manufacturer	Part Number	Protocol	Connector Type	Notes
1	DB-9M to RJ-45 Adapter	ELAN	HA-CB-307	RS-232	DB-9 Male X RJ-45 Female	
2	Cat5 Cable Assy.	Installer	N/A	RS-232	RJ-45 Male X RJ-45 Male	You must connect and terminate all 8 conductors
3	g! System Controller	ELAN	Various (e.g. HC12)	RS-232	RJ-45 Female	

RadioRA Programming Overview

The following sections provide very abbreviated versions of the steps used to program the RadioRA system, according to standard RadioRA instructions. Refer to the documentation from Lutron for more details.

Step 1: Basic Programming of the RS-232 or Chronos

In all installations you should setup the RS-232 Interface or Chronos first. Refer to the RS-232 Interface / Chronos Setup Guide.

1. Set the Master Controller Number: we suggest setting it to 1.
2. Activate the RS-232 Interface. Set Hardware Handshake to off.

Step 2: Activate and setup Repeaters, Switches, Dimmers and Master Controls:

The following instructions are covered in the standard RadioRA Setup Guide.

1. Activate repeaters, and set one repeater to be the main repeater.
2. Activate controls (switches, dimmers and Master Controls).
3. Assign each column of each Master Control to be either Room or Scene Buttons.

The following step is covered in the RS-232 / Chronos Setup Guide.

4. Assign each Master Control a Master Control Number.

Step 3: Setup Scene and Room Buttons:

If you have keypads installed in the wall, or wish to have keypads in the Viewer interface to control Scene or Room Buttons, then program the scenes that you plan to use into the Phantom Buttons stored in the RS-232 Interface / Chronos. These instructions are covered in the RS-232 Interface / Chronos Setup Guide.

1. Assign Phantom Buttons as Room or Scene Buttons.
2. Assign dimmers, switches or GRAFIK Eye control units to each of the Phantom Buttons.
3. Program each Phantom Button with the desired lighting levels for the zones in each.

Step 4: Copy the Phantom Button Settings to the Other Master Controls

If you have other Master Controls (keypads) in the system, then you need to program each of the buttons on that Master Control.

Follow the instructions to copy settings from a Phantom Button on the RS-232 Interface or Chronos to the appropriate Master Control button. These are covered in the RS-232 Interface or Chronos Setup Guide.

Step 5: Setup Individual Zones (Loads):

If you would like to control individual lights from the **g!** Viewer interface, then you need to setup the Zones with Zone Numbers. This procedure is explained in the RS-232 Interface or Chronos Setup Guide.

g! CONFIGURATION DETAILS

The following table provides settings used in the **g!** Configurator when connecting to a Lutron system. Please refer to the *Configurator Reference Guide* for more details.

In the table below:

- o "<Select from list>" Select the appropriate item from the list (or drop-down) in the Configurator.
- o "<User Defined>", etc. Type in the desired name for the item.
- o "<Auto Detect>", etc. The system will auto detect this variable.

Devices	Variable Name	Setting	Comments
Communication Devices	**Name**	<User Defined> (Default: **Lighting**)	
	Type	**Serial Port**	
	Communication Type	**Standard Connection**	
	Location	<User Defined> (Not Required)	
	COM Port	<Select from list>	COM1, 2, 3 or 4
Lighting Interface	**Name**	<User Defined> (Default: **Lutron RadioRA**)	
	Device Type	**Lutron RadioRA**	
	Location	<Select from list> (Not Required)	
	COM Device	<Select from list> (Default: **Lighting**)	
Lighting Devices	**Name**	<Auto Detect>	The system will automatically add the Phantom Buttons:
	Lighting Interface	<Auto Detect>	Buttons 1-15 can be Room or Scene Buttons
	Device Type	<Auto Detect>	Button 16 is All On
	Location	<Select from list> (Not Required)	Button 17 is All Off
	Button Number	<Auto Detect>	
Lighting Devices	**Name**	<Auto Detect> (Default: **Zone 1, 2, 3, ...**)	The system will automatically detect zones when they change state
	Lighting Interface	<Auto Detect>	Turn on or off each Zone to have them automatically
	Device Type	<Auto Detect>	added to the system
	Location	<Select from list> (Not Required)	
	Button Number	<Auto Detect>	
Keypads	**Name**	<User Defined>	Manually add Master Controls (keypads)
	Lighting Interface	**Lutron RadioRA**	
	Keypad Type	<Select>	
	Location	<Select from list> (Not Required)	
<For Each Keypad Button>	Select the button on the keypad image in the properties window.		
	Edit Text	<User Defined>	Set the name you wish to appear in the Viewer interface
	Location	<Select from list> (Not Required)	
	Button Type	<Select>	Set Scene Buttons to **Scene**, Room Buttons to **Toggle**
	Commands	<Click **Add Command**>	Select the corresponding Phantom Button (Button 1-15)

COMMON MISTAKES

1. Failing to plug the Cat5 cable assembly into the correct serial port. Make sure the RJ-45 connector is plugged into the correct serial port as specified in the Configurator.
2. Configuring 2 subsystems with the same serial port.