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# RadioRA®



Wireless Home Lighting Control

## **RadioRA® RS232 Protocol and Programming Guide**

A Protocol and Programming Guide for the Lutron® RadioRA® RS232 Interface and Chronos™ System Bridge and Timeclock

RA-RS232, RB-RS232, RA-SBT-CHR, RB-SBT-CHR

# Notes on this Manual

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This manual outlines how to use some of the features of the RS232 Interface and *Chronos* System Bridge and Timeclock to integrate a *RadioRA* System to other equipment via RS232. For information on installing the RS232 Interface, see the Setup and Installation Guide Addendum for *RadioRA* RS232 Interface (P/N 044-005). For information on installing the *Chronos* System Bridge and Timeclock, see the Setup and Installation Guide for a *RadioRA Chronos* System Bridge and Timeclock (P/N 044-037).

## Important Application Notes

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1. The RS232 Interface is a type of Master Control. The System can have a maximum of 12 Master Controls. Therefore, for every 1 Master Control NOT used, 1 RS232 Interface may be used in its place.
2. Systems that include a *Chronos* System Bridge and Timeclock can have 12 Master Controls in addition to the System Bridge and Timeclock. When bridging two systems, each system can have a maximum of 12 Master Controls
3. ALL ON is Phantom Button 16 and ALL OFF is Phantom Button 17.

## Consumer Information

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This symbol is intended to alert the user to the presence of important installation and operating instructions.

### **Danger**

This *RadioRA* System must not be used to control equipment, other than lighting, which is not visible from every master or local control location. It also must not be used to control equipment which could create hazardous situations such as entrapment if operated accidentally. Examples of equipment which must not be controlled by this *RadioRA* System include (but are not limited to) motorized gates, garage doors, industrial doors, microwave ovens, and heating pads, etc. It is the installer's responsibility to ensure that the equipment, other than lighting, being controlled is visible from every master or local control location and that only suitable equipment is connected to this *RadioRA* System.

### **FCC Information**

**NOTE:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

**Caution:** Changes or modifications not expressly approved by Lutron Electronics Co. could void the user's authority to operate this equipment.

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# Product Overview

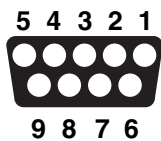
## Mechanics

The *RadioRA* RS232 Interface is a wall-mounted device which can be mounted on a standard junction box or directly on a wall. It uses a supplied 9VAC transformer. The *RadioRA Chronos* System Bridge and Timeclock is a wall-mounted device which mounts directly on a wall. It uses a supplied 18VAC transformer.

### Connectivity Features:

- One female DB9 RS232 Connection
- Baud Rate of 9600 (8N1 settings)
- Connects to the serial port on a computer using a standard DB-9 serial cable (all pins straight through)
- Hardware handshaking is recommended, but not necessary

## RS232 Pin Functions



Female DB9 Pinout for RS232 Interface

Pin Number	Pin Name	Pin Description	Required for Hardware Handshaking	Required for Simple Communications (Hardware Handshaking Disabled)
1	DCD	Data Carrier Detect (input)		
2	TX	Transmit Data (output)	X	X
3	RX	Receive Data (input)	X	X
4	DSR	Data Set Ready (input)	X	
5	GND	Ground	X	X
6	DTR	Data Terminal Ready (output)	X	
7	CTS	Clear To Send (input)	X	
8	RTS	Request To Send (output)	X	
9	RI	Ring Indicate (input)		

# Product Overview

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## Definitions of Common Terms

**Bridged System** - A system is considered “bridged” when a *Chronos* System Bridge and Timeclock is used to integrate two *RadioRA* Systems in a single residence.

**Chronos™** - The *RadioRA* System Bridge and Timeclock. This device provides the ability to bridge two *RadioRA* Systems. It also provides an integral astronomic timeclock, RS-232 integration, and contact closure inputs.

**Delay Time** - The time a Switch will wait before it goes to the desired state.

**Fade Time** - The time it takes a dimming device to reach its goal level.

**Master Control** - A *RadioRA* Master Control is a system control point that provides control of lights throughout a home. Master Controls can be wall mounted, tabletop, or cordless. Other system Master Controls are the Switch Closure Interface, the Infrared Interface, or another RS232 Interface.

**Master Control Number** - Master Control Numbers are used to identify *RadioRA* Master Controls via the RS232 Interface or *Chronos* System Bridge and Timeclock.

**Phantom Buttons** - Phantom Buttons are “virtual” buttons in the RS232 Interface or *Chronos* System Bridge and Timeclock. Though there are no physical buttons that represent these Phantom Buttons, they work very similarly to buttons on *RadioRA* Master Controls. Each Phantom Button can be assigned either as a ROOM or SCENE.

**Phantom LEDs** - Phantom LEDs are “virtual” LEDs in the RS232 Interface or *Chronos* System Bridge and Timeclock. Though there are no physical LEDs that represent these Phantom LEDs, they work very similarly to LEDs on *RadioRA* Master Controls. Phantom LEDs 1–15 are associated with Phantom Buttons 1–15, respectively.

**RadioRA Serial Device** - The *RadioRA* RS232 Interface or the *RadioRA Chronos* System Bridge and Timeclock.

**ROOM Button** - A ROOM button is a programmable button whose LED is ON when any lighting zone assigned to that button is ON at any level. When issuing an “ON” command, a ROOM button may only turn zones ON, not OFF.

**SCENE Button** - A SCENE button is a programmable button whose LED is ON when the SCENE associated with that button has been activated. The LED will go out when the light zone changes level or receives a command to change level, even if the new level is the same as its preset level. The LED will also go out if the SCENE is turned OFF. When issuing an “ON” command, a SCENE button may turn zones ON or OFF.

**Whole-home Buttons** - When using a *Chronos* System Bridge and Timeclock, Phantom Buttons have the added capability of being able to span two *RadioRA* Systems. Whole-home Buttons are created by linking the Phantom Buttons to buttons on Master Controls.

**Zone** - A zone is any individual *RadioRA* Dimmer, Switch, *GRAFIK Eye* Interface, or *Sivoia®* Control. A *RadioRA* System has a maximum of 32 zones.

**Zone Number** - Zone Numbers can be used to identify any individual zone (one Dimmer, Switch, *GRAFIK Eye* Interface, or *Sivoia* Control) in your *RadioRA* System via the RS232 Interface or *Chronos* System Bridge and Timeclock.

# Product Overview

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## System Capabilities

When the *RadioRA* System is connected to an external device through the RS232 Interface, the external device can perform the following functions:

- Control 15 Phantom Buttons which may be individually selected as ROOM or SCENE button types.
- Turn the 15 Phantom Buttons ON, OFF, or TOGGLE.
- Raise or Lower the 15 Phantom buttons.
- Control one “ALL ON” and one “ALL OFF” Scene.
- Directly control any individual Dimmer, Switch, *GRAFIK Eye* Interface, or *Sivoia* Control.
- Specify a fade time when controlling Phantom Buttons 1 through 15, an individual Dimmer, or a Switch.
- Control Security Solid and/or Security Flash Mode.
- Monitor the RS232 Interface for changes of any *RadioRA* devices including Master Control Button Presses, Zone Level Changes (when initiated locally), System Status Changes (e.g. entered Programming Mode, Security Flash Mode, etc.), and Phantom LED Changes.
- Query the RS232 Interface to determine the status of any *RadioRA* zone, status of any Phantom Button, or the current *RadioRA* System mode.
- Monitor the RS232 Interface for the button presses on other Master Controls in the *RadioRA* System.

## Bridged System Capabilities

When two *RadioRA* System are bridged using the *Chronos* System Bridge and Timeclock, and the *Chronos* System Bridge and Timeclock is connected to an external device through its RS232 port, the external device can perform the following functions:

- Control 15 Phantom Buttons which may be individually selected as ROOM or SCENE button types, and can contain Zones from both systems.
- Turn the 15 Phantom Buttons ON, OFF, or TOGGLE.
- Raise or Lower the 15 Phantom buttons on one system at a time.
- Control one “ALL ON” and one “ALL OFF” Scene.
- Directly control any individual Dimmer, Switch, *GRAFIK Eye* Interface, or *Sivoia* Control in either system.
- Specify a fade time when controlling Phantom Buttons 1 through 15, an individual Dimmer, or a Switch in either system.
- Control Security Solid and/or Security Flash Mode.
- Monitor the System Bridge and Timeclock for changes of any *RadioRA* devices including Master Control Button Presses, Zone Level Changes (when initiated locally), System Status Changes (e.g. entered Programming Mode, Security Flash Mode, etc.), and Phantom LED Changes.
- Query the *Chronos* System Bridge and Timeclock to determine the status of any *RadioRA* zone, status of any Phantom Button, or the current *RadioRA* System mode.
- Monitor the *Chronos* System Bridge and Timeclock for the button presses on other Master Controls in either *RadioRA* System.

# Programming Overview

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## General Usage

### System Specifics

The RS232 Interface will only “talk” to one *RadioRA* System.

The RS232 Interface counts as one Master Control, and thus reduces the total number of Master Controls available in a *RadioRA* System by one.

The *Chronos* System Bridge and Timeclock will “talk” to up to two *RadioRA* Systems.

The *Chronos* System Bridge and Timeclock counts as two Master Controls in each system.

### Programming Overview

The RS232 Interface is programmed similarly to a *RadioRA* Master Control, except that it uses 7-segment displays and scroll buttons instead of LEDs and Master Control Buttons. The *Chronos* System Bridge and Timeclock is programmed through menus on its built-in LCD and a membrane keypad.

- Each Dimmer, Switch, *GRAFIK Eye*® Control Unit, and *Sivoia*® Control is assigned a Zone Number; when one of these devices changes state, an RS232 message will be issued.
- Each Master Control is assigned a Master Control Number; when a Master Control Button is pressed, an RS232 message that includes the Master Control Number and Button Number will be issued.
- If a Master Control Button that does not have lighting loads assigned to it is pressed, it will give a button press indication; the associated LEDs can be controlled via RS232. Requires *RadioRA* Master Controls that Lutron shipped after May 8, 2000, or Cordless Tabletop Master Controls that shipped after August 1, 2001. Contact Lutron for more information.

The installer must manually program the Phantom Buttons, Zone Numbers, and Master Control Number assignments through the *RadioRA* System.

### Security Mode

An external system can send an RS232 message that causes the *RadioRA* System to enter or exit Security Mode. However, the external system can only cause the *RadioRA* System to exit Security Mode if it was initiated from the external system.

## Product Notes

All the RS232 messages are predefined, but some messages can be disabled.

If hardware handshaking is not used, care must be taken to ensure that all messages are processed. Once the Serial Device (RS232 Interface or *Chronos* System Bridge and Timeclock) receives a command, it will ignore all other RS232 inputs until it is finished buffering that command. At that time it will issue an “!” prompt (ASCII 33).



# Programming Overview

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The *RadioRA* Serial Devices (RS232 Interface and *Chronos* System Bridge and Timeclock) provide the ability to cause actions in the *RadioRA* System, react to events in the *RadioRA* System, and determine the status of the *RadioRA* System.

## Causing Action in a *RadioRA* System

### Description

A Serial Device allows an external RS232 device to control the zones in a *RadioRA* System and to turn LEDs on Master Controls in the *RadioRA* System ON and OFF. There are several ways to turn lights ON and OFF in the *RadioRA* System via a Serial Device: Phantom Button Presses, Direct Zone Control, Raise/Lower, and Security Mode.

### Phantom Button Press

A Phantom Button Press is a command that can change multiple lights in a *RadioRA* System. The BP (Button Press) command is used to trigger a Phantom Button Press. There are 17 Phantom Buttons numbered 1 through 17. Phantom Buttons 1 through 15 are selectable between ROOM type and SCENE type. Phantom Button 16 is ALL ON, and 17 is ALL OFF. By default, all the zones in the system will respond to Phantom Buttons 16 and 17. But this can be reprogrammed to control only the desired zones. Phantom Button 16 always turns all zones assigned to it to full ON (Scene 1 for a *GRAFIK Eye* Control Unit) and Phantom Button 17 always turns all zones assigned to it OFF.

For Phantom Buttons 1 through 15, a fade time from 0 to 240 seconds can be specified such that the lights fade to their destination level over the specified time. When specifying a fade time, Switches can also be instructed to wait to go to their destination level until the fade time has expired. By default, Switches will react immediately to a Phantom Button Press. This ability to specify fade times only applies to Dimmers and Switches shipped after February 1, 2001 and RS232 Interfaces that shipped after August 1, 2001.

### Direct Zone Control

Direct Zone Control provides the ability to control a single zone of light without using a Phantom Button. There are three different types of zones: Dimmers, Switches, *GRAFIK Eye* Control Units, and *Sivoia* Controls. An SDL command (Set Dimmer Level) applies to Dimmers, an SSL command (Set Switch Level) applies to Switches, and an SGS command (Set *GRAFIK Eye* Scene) applies to *GRAFIK Eye* Interfaces and *Sivoia* Controls. If a command for an incorrect zone type is used, the device may not respond as expected. **Note:** To control more than one zone, Lutron recommends using a Phantom Button because using Direct Zone Control Commands will result in slower and staggered system responses.

When controlling the level of a Dimmer, a fade time between 0 and 240 seconds can be applied causing the Dimmer to achieve its goal level at the end of the fade duration. Similarly, when controlling a Switch, a delay time between 0 and 240 seconds can be applied causing the Switch to delay action until the specified amount of time has passed. The fade and delay times only apply to Dimmers and Switches that shipped after February 1, 2001 and RS232 Interfaces that shipped after August 1, 2001.

### Raise/Lower

The Raise and Lower commands brighten or dim all Dimmers and *GRAFIK Eye* Interfaces assigned to a Phantom Button. For example, if the foyer and kitchen Dimmers are assigned to Phantom Button 1, then Raising Phantom Button 1 would brighten the foyer and kitchen Dimmers. The ability to Raise/Lower lighting loads only applies to RS232 Interfaces that shipped after August 1, 2001.

### Security Mode

Security Mode allows a *RadioRA* System to lock assigned lights ON to full (Solid Mode), or flash assigned zones ON and OFF (Flash Mode). The SSM (Security Solid Mode) and SFM (Security Flash Mode) commands are used to enter and exit Security Mode. To program Security Mode through the Serial Device, a Phantom Button must be specified. Whatever zones are assigned to that Phantom Button will be affected by the Security Mode command. The Phantom Button specified must either be a SCENE Button, Phantom Button 16, or Phantom Button 17.

# Programming Overview

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## Causing Action in a *RadioRA* System (Cont.)

A *RadioRA* Serial Device will time out of Security Mode five minutes after receiving the last SSM or SFM command. To avoid timing out, the SSM or SFM command should be resent to the Serial Device periodically (within five minutes). If the system is in both Security Solid and Security Flash Mode, sending either an SSM or SFM command will keep the Serial Device from timing out of both Security Solid and Security Flash Mode.

A Serial Device can be in Security Solid Mode and Security Flash Mode at the same time; however, each mode must be assigned to a different Phantom Button. For example, you may be in Security Flash Mode on Phantom Button 5 and Security Solid Mode on Phantom Button 17 at the same time, but you may not be in Security Flash Mode and Security Solid Mode on Phantom Button 16 at the same time. If you turn ON a Security Mode that is already ON and set it to a different button, the system will enter Security Mode on the second button, and then, after about 30 seconds, the system will exit the mode on the first button. For example, if the Serial Device is in Security Flash Mode on Phantom Button 4 then an RS232 command sends the system into Security Flash Mode on Phantom Button 12, the system will immediately enter Security Flash Mode on Phantom Button 12 and timeout of Security Flash Mode on Phantom Button 4 after about 30 seconds.

### The LED Control (LC) Command

Status feedback of external equipment connected to a *RadioRA* System via a Serial Device may be obtained and displayed using the *RadioRA* Master Control LEDs and the LC command. There are several important points to keep in mind when using the LC command:

- Only Master Control Buttons without any *RadioRA* devices assigned will respond to an LC command.
- If power is lost and then restored, Master Control LEDs will return to their pre-power loss state (ON or OFF). When the Cordless Tabletop Master Control wakes up, it will assume that all LEDs without *RadioRA* programming are OFF. For more information on controlling LEDs, refer to *Controlling Non-RadioRA Equipment Using RadioRA Master Controls*, on page 13.
- Does not apply to Master Controls shipped prior to May 8, 2000, or to any Cordless Tabletop Master Controls shipped prior to August 1, 2001.

## Reacting to Events in a *RadioRA* System

### Description

The *RadioRA* Serial Devices (RS232 Interface and *Chronos* System Bridge and Timeclock) allow external RS232 devices to react to events in the *RadioRA* System. There are four types of events that trigger RS232 Feedback Commands: Master Control Button Presses, Cordless Tabletop Master Controls waking up or going to sleep, Local Changes to zones, and System Mode Changes. **Note:** When using a Serial Device to react to events in a *RadioRA* System, it is important to remember that it is possible for a single action in a *RadioRA* System to result in the same feedback being sent multiple times.

### Master Control Button Presses

When a Master Control Button is pressed, the Serial Device will issue an MBP command (Master Control Button Press), as well as a ZMP command (a Zone Map containing the status of every zone in the system) and an LMP command (an LED Map containing the status of the Phantom LEDs). If the Master Control is not assigned a Master Control Number, an MBP command will not be issued, but a ZMP and an LMP command will still be issued.

When a Raise or Lower button is pressed on a Master Control, an RBP (Raise Button Press) or LBP (Lower Button Press) command will be issued. When the Raise or Lower buttons are released on a Master Control, an RBR (Raise Button Release) or LBR (Lower Button Release) command will be issued, as well as a ZMP command and an LMP command. If a Master Control is not assigned a Master Control Number, then Raise/Lower feedback will not be issued, but a ZMP and an LMP command will still be issued. The ability to give Raise/Lower feedback only applies to RS232 Interfaces that shipped after August 1, 2001.

### Cordless Master Controls Waking Up or Going to Sleep

When a Cordless Master Control wakes up, a CWU (Cordless Waking Up) command will be issued. When a Cordless Master Control goes to sleep, a CGS (Cordless Going to Sleep) command will be issued. This information is useful when controlling external devices to make sure LED states are up to date. For more information, see *Controlling Non-RadioRA Equipment Using RadioRA Master Controls*, on page 13. The ability to give Cordless Master Control awake status only applies to RS232 Interfaces that shipped after August 1, 2001.

### Local Changes to Zones

Local changes to zones occur when:

- A Dimmer or Switch is turned ON or OFF (from a Dimmer, Switch, Accessory Dimmer or Switch).
- The light level is adjusted at a Dimmer or Accessory Dimmer.
- A *GRAFIK Eye Control Unit* is sent to a different Scene (from the *GRAFIK Eye Control Unit* or from remote).

When a zone is changed locally, the Serial Device will issue an LZC command (Local Zone Change) as well as a ZMP command (Zone Map) and an LMP command (LED Map). If the zone is not assigned a Zone Number, an LZC command will not be issued, but a ZMP command and an LMP command will still be issued.

### System Mode Changes

System mode changes occur when:

- The *RadioRA* System enters or exits Security Solid or Security Flash Mode.
- The *RadioRA* System enters or exits any Programming Mode.
- The *RadioRA* System enters or exits Flash Mode.

When the system changes modes, the Serial Devices issues an RSM command (*RadioRA* System Mode) indicating the system mode change.

# Programming Overview

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## Reacting to Events in a *RadioRA* System (Cont.)

### Guidelines for using the *RadioRA* Serial Devices to react to *RadioRA* System events

To have your external system react when a zone is changed locally, listen for the LZC (Local Zone Change) command. Keep in mind that this only applies to local changes from the Dimmer, Switch, *GRAFIK Eye* Control Unit, or *Sivoia* Control. An LZC command will not be issued if a Master Control Button Press initiated a change to a zone.

To have your external system react when a zone turns ON or OFF, regardless of how it was turned ON or OFF, listen for the ZMP command (Zone Map). When this command is received, the zone map should be compared to the previous zone map that was received. Differences indicate changes: a change from “1” to “0” indicates that the zone was turned OFF, while a change from “0” to “1” indicates that the zone was turned ON.

To indicate or react when all lights in a ROOM are OFF, any lights in a ROOM are ON, or a SCENE is active or inactive, listen for the LMP command (LED Map). The LMP command can be used similarly to the ZMP command described above. **Note:** If the external system is not using the LZC, ZMP, or LMP feedback commands, they can be turned OFF (refer to the command set for details on pages 35-36). Turning OFF unused commands will help reduce unnecessary RS232 communications.

### Querying the Status of a *RadioRA* System

The Serial Devices allow external RS232 equipment to determine:

- If a zone is ON or OFF.
- If a Phantom LED is ON or OFF.
- The current mode of the *RadioRA* System.

The ZMPI (Zone Map Inquiry) and ZSI (Zone Status Inquiry) commands are used to ask the Serial Device for the status of zones. The ZMPI will provide an entire zone map (a ZMP command), while a ZSI will provide the status of a single zone.

The LMPI (LED Map Inquiry) and LSI (LED Status Inquiry) commands are used to ask the Serial Device for the status of the Phantom LEDs. The LMPI command will provide an entire LED Map (an LMP command), while an LSI will provide the status of a single Phantom LED.

The RSMI command (*RadioRA* System Mode Inquiry) is used to determine which mode the *RadioRA* System is in. The Serial Device will respond with four RSM commands (*RadioRA* System Mode): one for Security Solid, one for Security Flash, one for Flash, and one for Programming Mode. **Note:** Serial Devices will not process any RS232 commands while the *RadioRA* System is in programming mode.

If an external RS232 system is not setup to continuously monitor the RS232 port, asking the *RadioRA* System for status is a useful way to monitor *RadioRA* System actions or get an updated status. However, using the Serial Device in this manner will cause you to miss MBP commands (Master Control Button Press) and LZC commands (Local Zone Change).

## Controlling Non-*RadioRA* Equipment Using *RadioRA* Master Controls

When a programmed button on a *RadioRA* Master Control is pressed, it will transmit an RF command and flash the associated LED. If a button is not programmed (i.e. there are not any Dimmers, Switches, *GRAFIK Eye* Control Units, or *Sivoia* Controls assigned to a button), there will not be an RF transmission or a flashing LED.

To control an external device from a Master Control Button that does not have *RadioRA* devices assigned to it, an LED control command (LC) must be sent to the Master Control first. This will initialize the Master Control to transmit an RF command to the *RadioRA* Serial Device to control external devices. This information is retained by the Master Control in the event of a power loss and is therefore only necessary once.

After a Master Control has received an LC command, buttons pressed which do not have *RadioRA* devices assigned will flash their LEDs and transmit an RF command. When the LEDs stop flashing, they will return to their previous state.

To update the Master Control's LED status prior to when the LED stops flashing, the external system must issue an LED Control command (LC) within approximately two seconds of receiving the Master Control Button Press command (MBP). After this time, the LED will stop flashing. **Note:** The LED Control command (LC) only applies to buttons without *RadioRA* devices assigned.

When controlling the LEDs on a Cordless Tabletop Master Control, special care must be taken. While the Cordless Tabletop Master Control is awake, it will respond to LED Control commands as already described above. However, when the Cordless Tabletop Master Control is asleep, it will not respond to LED Control commands. When the Cordless Tabletop Master Control wakes up, it will assume that all LEDs without *RadioRA* programming are OFF. So, when the external equipment is notified that the Cordless Tabletop Master Control has awoken, it should only send LED Control commands to turn ON any LEDs which should be ON. To know if the Cordless Tabletop Master Control is awake or asleep, listen for the CWU (Cordless Waking Up) and CGS (Cordless Going to Sleep) commands.

The functionality described in this section (the ability to control an LED on an Master Control and respond to Master Control Button Presses that do not have *RadioRA* programming) requires *RadioRA* Master Controls that Lutron shipped after May 8, 2000 and Cordless Tabletop Master Controls that Lutron shipped after August 1, 2001. The ability to monitor when a Cordless Tabletop Master Control is awake or asleep only applies to RS232 Interfaces that Lutron shipped after August 1, 2001. Contact Lutron at 1-800-523-9466 for more information.

# Programming Guidelines

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The previous sections of this document describe how to use external equipment to control and respond to a *RadioRA* System. It is also important to ensure that the *RadioRA* Serial Device is connected to the *RadioRA* System correctly and that the programming of the *RadioRA* System matches the RS232 programming. This section is intended to help coordinate the Serial Device programming and the RS232 programming.

## When to Use Phantom Buttons

Phantom Buttons are intended to give the Serial Device control over multiple *RadioRA* Dimmers with one command. To control more than one device at one time, Phantom Buttons are recommended. A worksheet has been provided to help keep track of the Phantom Button assignments.

## When to Use Zone Numbers

Zone Numbers are used to uniquely identify Dimmers, Switches, *GRAFIK Eye* Control Units, and *Sivoia* Controls in a *RadioRA* System. To directly control a zone, respond to a zone change, or to monitor the status of a zone, that zone must be assigned a Zone Number. **Note:** If you are controlling more than one zone, Phantom Buttons are recommended. Using Direct Zone Control commands will cause slower and staggered system response, which may not be acceptable to end users. A worksheet has been provided to help keep track of zone assignments.

## When to Use Master Control Numbers

Master Control Numbers are used to uniquely identify Master Controls. To respond to a Button Press on a Master Control, control the status of a Master Control LED, or monitor when a Cordless Tabletop Master Control is awake or asleep, the Master Control must be assigned a Master Control Number. A worksheet has been provided to help keep track of Master Control Numbers.

# Programming Preparations

## RS232 Programming Worksheet

RadioRA Serial Devices can be programmed so that a light or a group of lights can be controlled by one or more Phantom Buttons. Prior to programming your system, complete the RS232 Programming Worksheet (page 16). If the Chronos System Bridge and Timeclock is bridging two systems, complete the RS232 Programming Worksheet for System 2 also.

### Step 1 Record all Dimmer, Switch, and GRAFIK Eye Control Unit locations and control types along the top of the worksheet

(Accessory Dimmers and Accessory Switches do not need to be recorded.)

M.C.Type: \_\_\_\_\_ 1 2 3 4 5  
 M.C. Location: \_\_\_\_\_  
 System: \_\_\_\_\_

Phantom Button	Description	Zones	Master BR Dimmer	Front Hall Dimmer	Rear hall Switch				
		1							
2									
3									
4									

### Step 2 Select a Serial Device

Start with any Serial Device and write down its location.

M.C.Type: RS232 Interface 1 2 3 4 5  
 M.C. Location: A/V Room  
 System: 1

Phantom Button	Description	Zones	Master BR Dimmer	Front Hall Dimmer	Rear hall Switch	Den GRAFIK Eye	Front Porch Switch
		1					
2							
3							
4							

### Step 3 Record Phantom Button names

Write a description for each Phantom Button under the Description column of the worksheet.

M.C.Type: RS232 Interface 1 2 3 4 5  
 M.C. Location: A/V Room  
 System: 1

Phantom Button	Description	Zones	Master BR Dimmer	Front Hall Dimmer	Rear Hall Switch	Den GRAFIK Eye	Front Porch Switch
		1	<u>M. Bedroom / Room</u>				
2	<u>Hall / Room</u>						
3	<u>Movie / S</u>						
4							

### Step 4 Select Dimmers, Switches, or GRAFIK Eye Control Units

Select which Dimmers, Switches, or GRAFIK Eye Control Units will be controlled by each Phantom Button by going across the worksheet and placing a check in the corresponding box(es).

M.C.Type: RS232 Interface 1 2 3 4 5  
 M.C. Location: A/V Room  
 System: 1

Phantom Button	Description	Zones	Master BR Dimmer	Front Hall Dimmer	Rear Hall Switch	Den GRAFIK Eye	Front Porch Switch
		1	<u>M. Bedroom / Room</u>	<input checked="" type="checkbox"/>			
2	<u>Hall / Room</u>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
3	<u>Movie / Scene</u>				<input checked="" type="checkbox"/>		
4	<u>Goodnight / Scene</u>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

- Repeat Steps 1 through 4, for all RS232 Interfaces in your system.
- If bridging systems with a Chronos System Bridge and Timeclock, repeat Steps 1 through 4, for System 2.

# Section 2 - Programming

## RS232 PROGRAMMING WORKSHEET

M.C. Type: \_\_\_\_\_

M.C. Location: \_\_\_\_\_

System: 1 \_\_\_\_\_

Phantom Button	Description																																
1																																	
2																																	
3																																	
4																																	
5																																	
6																																	
7																																	
8																																	
9																																	
10																																	
11																																	
12																																	
13																																	
14																																	
15																																	
16	ALL ON																																
17	ALL OFF																																

Zones



# RS232 PROGRAMMING WORKSHEET

M.C. Type: \_\_\_\_\_

M.C. Location: \_\_\_\_\_

System:  2

Phantom Button	Description	Zones																																				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32					
1																																						
2																																						
3																																						
4																																						
5																																						
6																																						
7																																						
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14																																						
15																																						
16																																						
17																																						

# Programming Preparations

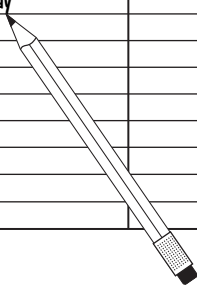
## Assigning Master Control Numbers

Master Control Numbers are only necessary if: the Serial Device will be used to control the LEDs on a Master Control, RS232 feedback is desired when a Master Control button or the Raise/Lower buttons are pressed, or RS232 feedback is desired when a Cordless Master Control wakes up or goes to sleep. For a description of a Master Control Number, see Definitions of Common Terms on page 6.

### Step 1 Complete the Master Control Number Worksheet

Complete the Master Control Number Worksheet for easy reference while assigning the Master Control Numbers.

Master Control Number	Location	Type
1	Master Bedroom	15 button Tabletop
2	Foyer	10 button Cordless
3	Security closet	Switch Closure Interface
4	Main hallway	
5		
6		
7		
8		
9		
10		
11		
12		



### MASTER CONTROL NUMBER WORKSHEET

System 1

Master Control Number	Location	Type
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

System 2 (Chronos System Bridge and Timeclock only)

Master Control Number	Location	Type
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

# Notes on Protocol

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1. All commands are in ASCII characters.
2. Each command is made up of fields, separated by commas (commas are required), and terminated with a carriage return <CR> = ASCII 13. Commands are not case sensitive, but a Serial Device will always send commands in upper case.
3. Line Feeds (ASCII 10) are ignored.
4. Spaces are ignored; however, for maximum efficiency, it is recommended not to format commands with spaces.
5. There is a limit of 22 characters per command (including spaces).
6. Most parameters are required. Optional parameters are indicated by parentheses ( ).
7. When using a *Chronos* System Bridge and Timeclock to bridge systems, an optional system parameter is indicated by brackets { }.
7. To simplify parsing data from the *RadioRA* Serial Devices, the devices will follow the following guidelines:
  - All commands sent from a Serial Device are 3 characters (plus parameters).
  - Commands sent from the a Serial Device will not have spaces in them, EXCEPT if ON is a parameter. ON will be followed by a space. This is so it will have the same length as the OFF parameter.
  - For a given parameter, the length will be the same, regardless of the value. This means that if a parameter can range from 1 to 15, 1 will be transmitted as 01.
  - The RS232 Interface will not process commands while the *RadioRA* System is in programming mode.
  - Commands sent from the a Serial Device will be followed by a <CR> = ASCII 13.

# Protocol Guide

## Command Outline

Class	Command	Nomenclature	Associated Commands	Page
Device Control	BP	Button Press		21
	SDL	Set Dimmer Level		22
	SSL	Set Switch Level		23
	SGS	Set GRAFIK Eye® Scene		24
	RAISE	Raise Phantom Button	STOPRL	25
	LOWER	Lower Phantom Button	STOPRL	25
	STOPRL	STOP Raise/Lower	RAISE, LOWER	26
	LC	LED Control		26
	SSM	Security Solid Mode		27
	SFM	Security Flash Mode		27
Feedback Commands	LZC	Local Zone Change	LZCMON, LZCMOFF	28
	MBP	Master Control Button Press	MBPMON, MBPMOFF	29
	LMP	LED Map	LMPMON, LMPMOFF, LMPI	30
	ZMP	Zone Map	ZMPMON, ZMPMOFF, ZMPI	30
	RBP	Raise Button Press	MBPMON, MBPMOFF	31
	RBR	Raise Button Release	MBPMON, MBPMOFF	31
	LBP	Lower Button Press	MBPMON, MBPMOFF	32
	LBR	Lower Button Release	MBPMON, MBPMOFF	32
	CWU	Cordless Waking Up	MBPMON, MBPMOFF	33
	CGS	Cordless Going to Sleep	MBPMON, MBPMOFF	33
	RSM	<i>RadioRA</i> System Mode	RSMON, RSMOFF, RSMI	34
	Status Inquiry	ZSI	Zone Status	LZC
LSI		LED Status	LSR	37
ZMPI		Zone Map Inquiry	ZMP	38
LMPI		LED Map Inquiry	LMP	38
FBKI		Feedback Status Inquiry	FBK	39
RSMI		<i>RadioRA</i> System Mode Inquiry	RSM	39
Miscellaneous Commands	VERI	Version Inquiry	REV	40
	PON	Prompt ON		40
	POFF	Prompt OFF		40

# Device Control Commands

These commands are used to control *RadioRA* System devices from external equipment.

## Button Press (BP)

Trigger a Phantom Button Press on the *RadioRA* Serial Device.

### Syntax:

#### Command, Parameters

BP,<Button Number>,<State>(<Fade Time>(<DS>)){(<System>)}

Parameter	Description	Format
Button Number	ROOM/SCENE Buttons ALL ON ALL OFF	1 through 15 16 17
State	Whether to turn the Phantom Button ON, OFF, or TOGGLE from its present state	ON / OFF / TOG
Fade Time (optional)	Time, in seconds, Dimmers should take to get to their programmed level	0 through 240
DS (optional)	Delay Switch action until fade time has expired	DS
System (optional - Bridged system only)	System that should activate first	S1 or S2

### Examples

Turn ALL ON

**BP,16,ON**

TOGGLE Phantom Button 2 over 10 seconds

**BP,2,TOG,10**

Turn Phantom Button 5 OFF over 120 seconds and delay Switches 120 seconds

**BP,5,OFF,120,DS**

### Bridged Examples

Turn ALL ON, System 1 first

**BP,16,ON**

Turn ALL ON, System 2 first

**BP,16,ON,S2**

Toggle Phantom Button 4 over 45 seconds

**BP,4,TOG,45,S1**

System 1 first

Turn Phantom Button 7 OFF over 30 seconds

**BP,7,OFF,30,DS,S2**

and delay Switches 30 seconds, System 2 first

### Notes

- The Phantom ROOM/SCENE buttons must be preprogrammed in the *RadioRA* System.
- This command cannot be used to trigger a button press on a different device.
- TOGGLE means if the Phantom LED is ON, an OFF will be issued; if the Phantom LED is OFF, an ON will be issued.
- The state parameter is ignored for Phantom Buttons 16 and 17 (ALL ON and ALL OFF).
- Fade Time only applies to Phantom Buttons 1 through 15.
- Fade Time will not affect *GRAFIK Eye* Interfaces.
- A Fade Time must be specified to use the DS option.
- The optional Fade Time and DS parameters only apply to RS232 Interfaces that Lutron shipped after August 1, 2001, and Dimmers and Switches shipped after February 1, 2001.
- The System parameter only applies when using a *Chronos* System Bridge and Timeclock as a System Bridge.
- If the System parameter is omitted in a bridged system, System 1 is assumed.

# Device Control Commands

## Set Dimmer Level (SDL)

Set an individual Dimmer's light level.

### Syntax:

#### Command, Parameters

SDL,<Zone Number>,<Dimmer Level>(<Fade Time>){(<System>)}

Parameter	Description	Format
Zone Number	Dimmer Number	1 through 32
Dimmer Level	% Brightness (0 is OFF, 100 is full ON)	0 through 100
Fade Time (optional)	Time, in seconds, the Dimmer should take to get to its Dimmer Level.	0 through 240
System (Bridged only)	System containing the Dimmer	S1 or S2

### Examples

Set Dimmer 3 to 50%

**SDL,3,50**

Turn Dimmer 19 OFF

**SDL,19,0**

Set Dimmer 5 to 75% over 240 seconds

**SDL,5,75,240**

### Bridged Examples

Turn Dimmer 19 in System 2 OFF

**SDL,19,0,S2**

Set Dimmer 4 in System 1 to 50% over 240 seconds

**SDL,4,50,240,S1**

### Notes

- If more than one zone of light is being controlled, it is strongly recommended to use a Phantom Button Press (BP) for much smoother and faster system response.
- The Dimmer Level is the percentage of the Dimmer's full illumination.
- If the Zone Number is a Switch, *GRAFIK Eye* Control Unit, or a *Sivoia* Control, the unit may respond to this command with unexpected results.
- The optional Fade Time parameter only applies to RS232 Interfaces that Lutron shipped after August 1, 2001 and Dimmers that Lutron shipped after February 1, 2001.
- The System parameter only applies when using a *Chronos* System Bridge and Timeclock as a System Bridge.
- If the System parameter is omitted in a bridged system, System 1 is assumed.

# Device Control Commands

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## Set Switch Level (SSL)

Turn an individual Switch ON or OFF.

### Syntax:

#### Command, Parameters

SSL,<Zone Number>,<State>(<Delay Time>){(<System>)}

Parameter	Description	Format
Zone Number	Switch Number	1 through 32
State	Turn the Switch ON or OFF	ON / OFF
Delay Time (optional)	Time, in seconds, the Switch should wait to take action.	0 through 240
System (Bridged only)	System containing the Switch	S1 or S2

### Examples

Turn Switch 1 ON

**SSL,1,ON**

Turn Switch 8 ON after 30 seconds have passed

**SSL,8,ON,30**

### Bridged Examples

Turn Switch 6 in System 2 OFF

**SSL,6,OFF,S2**

Turn Switch 8 in System 1 ON after 30 seconds have passed

**SSL,8,ON,30,S1**

### Notes

- If more than one zone of light is being controlled, it is strongly recommended to use a Phantom Button Press (BP) for much smoother and faster system response.
- If the Zone Number is a Dimmer, *GRAFIK Eye* Control Unit, or a *Sivoia* Control, the unit may respond to this command with unexpected results.
- The optional Delay Time parameter only applies to RS232 Interfaces that Lutron shipped after August 1, 2001 and Switches that Lutron shipped after February 1, 2001.
- The System parameter only applies when using a *Chronos* System Bridge and Timeclock as a System Bridge.
- If the System parameter is omitted in a bridged system, System 1 is assumed.

# Device Control Commands

## Set *GRAFIK Eye* Scene (SGS)

Send a *GRAFIK Eye* Control Unit to a Scene.

### Syntax:

#### Command, Parameters

SGS,<Zone Number>,<Scene>{,<System>}

Parameter	Description	Format
Zone Number	<i>GRAFIK Eye</i> Interface Zone Number	1 through 32
Scene	<i>GRAFIK Eye</i> Control Unit Scenes Number (0 is OFF)	0 through 16
System (Bridged only)	System containing the <i>GRAFIK Eye</i> Control Unit	S1 or S2

### Example

Turn all *GRAFIK Eye* Control Units on *GRAFIK Eye* Interface 5 to Scene 2

**SGS,5,2**

### Bridged Example

Turn all *GRAFIK Eye* Control Units on *GRAFIK Eye* Interface 5 in System 1 to Scene 4

**SGS,5,4,S1**

### Notes

- A *GRAFIK RA™* Control Unit can be used in place of a *GRAFIK Eye* Control unit with a *GRAFIK Eye* Interface.
- If more than one zone of light is being controlled, it is strongly recommended to use a Phantom Button Press (BP) for much smoother and faster system response.
- All *GRAFIK Eye* Control Units on the *GRAFIK Eye* link will respond.
- If the Zone Number is a Dimmer or a Switch, the unit may respond to this command with unexpected results.
- The SGS command can also be used with *RadioRA Sivoia* Window Treatment Controls. For the Scene parameter, use 0 for Closed, 1 for Preset 1, 2 for Preset 2, 3 for Preset 3, and 16 for Open.
- The System parameter only applies when using a *Chronos* System Bridge and Timeclock as a System Bridge.
- If the System parameter is omitted in a bridged system, System 1 is assumed.



# Device Control Commands

## Raise (RAISE)

Begin Raising a Phantom Button.

### Syntax:

#### Command, Parameters

RAISE,<Button Number>{,<System>}

Parameter	Description	Format
Button Number	Phantom Button Number	1 through 15
System (Bridged only)	System	S1 or S2

### Examples

Raise Phantom Button 2

**RAISE,2**

Stop Raising

**STOPRL**

### Notes

- Only Phantom Buttons 1 through 15 can be Raised.
- Only one Phantom Button can be Raised or Lowered at any one time.
- To stop Raising a Phantom Button, see the STOPRL command on page 26.
- The Raise command only applies to RS232 Interfaces that Lutron shipped after August 1, 2001.
- The System parameter only applies when using a *Chronos* System Bridge and Timeclock as a System Bridge.
- In a bridged system, only one system may be Raised at a time.
- If the System parameter is omitted in a bridged system, System 1 is assumed.

## Lower (LOWER)

Begin Lowering a Phantom Button.

### Syntax:

#### Command, Parameters

LOWER,<Button Number>{,<System>}

Parameter	Description	Format
Button Number	Phantom Button Number	1 through 15
System (Bridged only)	System	S1 or S2

### Examples

Lower Phantom Button 12

**LOWER,12**

Stop Lowering

**STOPRL**

### Notes

- Only Phantom Buttons 1 through 15 can be Lowered.
- Only one Phantom Button can be Raised or Lowered at any one time.
- To stop Lowering a Phantom Button, see the STOPRL command below.
- The Lower command only applies to RS232 Interfaces that Lutron shipped after August 1, 2001.
- The System parameter only applies when using a *Chronos* System Bridge and Timeclock as a System Bridge.
- In a bridged system, only one system may be Lowered at a time.
- If the System parameter is omitted in a bridged system, System 1 is assumed.

# Device Control Commands

## Stop Raise Lower (STOPRL)

Stop Raising and Lowering.

### Syntax:

#### Command

STOPRL

### Example

Stop Raising and Lowering

**STOPRL**

### Notes

- This command will stop any Raise or Lower events in progress that were initiated from the RS232 Interface.
- The STOPRL command only applies to RS232 Interfaces that Lutron shipped after August 1, 2001.
- When using a *Chronos* System Bridge and Timeclock as a System Bridge, the STOPRL command will Stop any Raise or Lower events in progress, regardless of System.

## LED Control (LC)

Turn an LED on a Master Control ON or OFF.

### Syntax:

#### Command, Parameters

LC,<Master Control Number>,<Button Number>,<State>{,<System>}

Parameter	Description	Format
Master Control Number	Master Control Number	1 through 12
Button Number	ROOM/SCENE Buttons	1 through 15
State	ON to turn LED ON, OFF to turn LED OFF	ON / OFF
System (Bridged only)	System containing the Master Control	S1 or S2

### Example

Turn LED 1 on Master Control 6 ON

**LC,6,1,ON**

### Bridged Example

Turn LED 1 on Master Control 6 OFF in System 2

**LC,6,1,OFF,S2**

### Notes

- Once a Master Control receives this command, buttons without Dimmers, Switches, *GRAFIK Eye* Control Units, or *Sivoia* Controls assigned to them, may be used to control external equipment (See Controlling Non-*RadioRA* Equipment Using *RadioRA* Master Controls on page 13).
- Only applies to LEDs whose associated buttons do not have *RadioRA* devices assigned.
- Does not apply to Master Controls shipped prior to May 8, 2000, or to Cordless Tabletop Master Controls that shipped prior to August 1, 2001.
- The System parameter only applies when using a *Chronos* System Bridge and Timeclock as a System Bridge.
- If the System parameter is omitted in a bridged system, System 1 is assumed.

# Device Control Commands

## Security Solid Mode (SSM)

Turn Security Solid Mode ON or OFF.

### Syntax:

#### Command, Parameters

SSM,<Button Number>,<State>

Parameter	Description	Format
Button Number	Phantom SCENE Button Number ALL ON ALL OFF	1 through 15 16 17
State	Turn Security Solid Mode ON or OFF	ON / OFF

### Examples

Enter Security Solid Mode on Phantom Button 3

**SSM,3,ON**

Exit Security Solid Mode on Phantom Button 1

**SSM,1,OFF**

### Notes

- Must be applied to a SCENE, ALL ON or ALL OFF (i.e. does not apply to ROOMS).
- Button Number is ignored for the OFF state.
- This command needs to be sent to the *RadioRA* Serial Device periodically or the Interface will exit Security Mode after 5 minutes.
- This command can only be used to exit Security Solid Mode if the system entered Security Solid Mode through the *RadioRA* Serial Device.

## Security Flash Mode (SFM)

Turn Security Flash Mode ON or OFF.

### Syntax:

#### Command, Parameters

SFM,<Button Number>,<State>

Parameter	Description	Format
Button Number	Phantom SCENE Button Number ALL ON ALL OFF	1 through 15 16 17
State	Turn Security Flash Mode ON or OFF	ON / OFF

### Examples

Enter Security Flash Mode on Phantom Button 6

**SFM,6,ON**

Exit Security Flash Mode on Phantom Button 2

**SFM,2,OFF**

### Notes

- Must be applied to a SCENE, ALL ON or ALL OFF (i.e. does not apply to ROOMS).
- Button Number is ignored for the OFF state.
- This command needs to be sent to the *RadioRA* Serial Device periodically or the Interface will exit Security Mode after 5 minutes.
- This command can only be used to exit Security Flash Mode if the system entered Security Flash Mode through the *RadioRA* Serial Device.

# Feedback Commands

These commands are used to supply external equipment with information on *RadioRA* System events.

## Local Zone Change (LZC)

A Dimmer, Switch, *GRAFIK Eye* Control Unit, or *Sivoia* Control was changed locally (not from a Master Control).

### Syntax:

#### Command, Parameters

LZC,<Zone Number>,<State>{,<System>}

Parameter	Description	Format
Zone Number	Zone Number	1 through 32
State	Level went from OFF to ON Level went from ON to OFF Level went from ON level to another ON level	ON OFF CHG
System (Bridged only)	System containing the Zone	S1 or S2

### Example

Dimmer 1 changed from 100% to 50%

**LZC,01,CHG**

Dimmer 4 changed from OFF to 25%

**LZC,04,ON**

### Bridged Example

Dimmer 3 changed from OFF to 25% in System 2

**LZC,03,ON,S2**

### Notes

- There is a blank space following the ON parameter.
- This feedback can be turned ON or OFF, see LZCMON and LZCMOFF on page 35.
- The System parameter only applies when using a *Chronos* System Bridge and Timeclock as a System Bridge.

# Feedback Commands

## Master Control Button Press (MBP)

A button was pressed on a Master Control.

### Syntax:

#### Command, Parameters

MBP,<Master Control Number>,<Button Number>,<State>{,<System>}

Parameter	Description	Format
Master Control Number	Master Control Number	1 through 12
Button Number	ROOM / SCENE ALL ON ALL OFF	1 through 15 16 17
State	ROOM / SCENE is turning ON or OFF	ON / OFF
System (Bridged only)	System containing the Master Control	S1 or S2

### Examples

ALL ON pressed on Master Control 3

**MBP,03,16,ON**

Button 15 pressed on Master Control 2 (LED was ON)

**MBP,02,15,OFF**

### Bridged Example

Button 11 pressed on Master Control 3 (LED was ON) in System 2

**MBP,03,11,OFF,S2**

### Notes

- There is a blank space following the ON parameter.
- Only applies to buttons with *RadioRA* System programming or if the Master Control is controlling external devices (see Controlling Non-*RadioRA* Equipment Using *RadioRA* Master Controls on page 13).
- This feedback can be turned ON or OFF, see MBPMON and MBPMOFF on page 36.
- The System parameter only applies when using a *Chronos* System Bridge and Timeclock as a System Bridge.
- When timeclock events are activated with the *Chronos* System Bridge and Timeclock, it will transmit MBP with Master Control number 14.
- When testing Phantom Buttons with the *Chronos* System Bridge and Timeclock, it will transmit MBP with Master Control number 13.

# Feedback Commands

## LED Map (LMP)

Gives the state of all the Phantom LEDs.

### Syntax:

**Command, Parameter**  
LMP,<LED States>

Parameter	Description	Format
LED States	1 if LED is ON, 0 if LED is OFF	15 bit string of 1 or 0

### Example

Phantom LEDs 1 and 5 are ON, all others are OFF      **LMP,100010000000000**

### Notes

- Phantom Buttons without programming will return a 0 value.
- An LMP command is issued on power up and following any changes in the *RadioRA* System.
- The Phantom LEDs use the LED logic for ROOM and SCENE buttons.
- LED States are numbered from 1 to 15 starting with 1 on the left.
- This feedback can be turned ON or OFF, see LMPMON, and LMPMOFF on page 36.

## Zone Map (ZMP)

Gives the state of all the zones.

### Syntax:

**Command, Parameter**  
ZMP,<Zone States>{,<System>}

Parameter	Description	Format
Zone States	1 if zone is ON, 0 if zone is OFF, and X if unassigned	32 bit string of 1, 0, or X
System (Bridged only)	System containing Zones	S1 or S2

### Example

Zones 2 and 9 are ON, all others are OFF, and Zones 31 and 32 are unassigned.      **ZMP,01000001000000000000000000000000XX**

### Bridged Example

Zones 2 and 9 in System 1 are ON      **ZMP,01000001000000000000000000000000,S1**  
Zones 3 and 10 in System 2 are ON      **ZMP,00100000100000000000000000000000,S2**

### Notes

- Zone Numbers without any assignment will return an X.
- Zone States are numbered from 1 to 32 with 1 starting on the left.
- This feedback can be turned ON or OFF, see ZMPMON and ZMPMOFF on page 36.
- In a bridged system, Zone Maps for both systems will be returned in response to a ZMPI command.

## Feedback Commands

### Raise Button Press (RBP)

The Raise button is being pressed on a Master Control.

#### Syntax:

##### Command, Parameters

RBP,<Master Control Number>,<Button Number>{,<System>}

Parameter	Description	Format
Master Control Number	Master Control Number	1 through 12
Button Number	ROOM / SCENE	1 through 15
System (Bridged only)	System containing Master Control	S1 or S2

#### Example

Button 2 is being Raised on Master Control 5 **RBP,05,02**

#### Bridged Example

Button 2 is being Raised on Master Control 5 in System 2 **RBP,05,02,S2**

#### Notes

- Only applies to buttons with *RadioRA* System programming or if the Master Control is controlling external devices (see Controlling Non-*RadioRA* Equipment Using *RadioRA* Master Controls on page 13).
- This feedback can be turned ON or OFF, see MBPMON and MBPMOFF on page 35.
- Raise/Lower feedback only applies to RS232 Interfaces that Lutron shipped after August 1, 2001.
- The System parameter only applies when using a *Chronos* System Bridge and Timeclock as a System Bridge.

### Raise Button Release (RBR)

The Raise button was released on a Master Control.

#### Syntax:

##### Command, Parameters

RBR,<Master Control Number>,<Button Number>{,<System>}

Parameter	Description	Format
Master Control Number	Master Control Number	1 through 12
Button Number	ROOM / SCENE	1 through 15
System (Bridged only)	System containing Master Control	S1 or S2

#### Example

Button 2 is no longer being Raised on Master Control 5 **RBR,05,02**

#### Bridged Example

Button 2 is no longer being Raised on Master Control 5 in System 2 **RBR,05,02,S2**

#### Notes

- Only applies to buttons with *RadioRA* System programming or if the Master Control is controlling external devices (see Controlling Non-*RadioRA* Equipment Using *RadioRA* Master Controls on page 13).
- This feedback can be turned ON or OFF, see MBPMON and MBPMOFF on page 35.
- Raise/Lower feedback only applies to RS232 Interfaces that Lutron shipped after August 1, 2001.
- The System parameter only applies when using a *Chronos* System Bridge and Timeclock as a System Bridge.

# Feedback Commands

## Lower Button Press (LBP)

The Lower button is being pressed on a Master Control.

### Syntax:

#### Command, Parameters

LBP,<Master Control Number>,<Button Number>{,<System>}

Parameter	Description	Format
Master Control Number	Master Control Number	1 through 12
Button Number	ROOM / SCENE	1 through 15
System (Bridged only)	System containing the Master Control	S1 or S2

### Example

Button 8 is being Lowered on Master Control 11 **LBP,11,08**

### Bridged Example

Button 8 is being Lowered on Master Control 11 in System 2 **LBP,11,08,S2**

### Notes

- Only applies to buttons with *RadioRA* System programming or if the Master Control is controlling external devices (see Controlling Non-*RadioRA* Equipment Using *RadioRA* Master Controls on page 13).
- This feedback can be turned ON or OFF, see MBPMON and MBPMOFF on page 35.
- Raise/Lower feedback only applies to RS232 Interfaces that Lutron shipped after August 1, 2001.
- The System parameter only applies when using a *Chronos* System Bridge and Timeclock as a System Bridge.

## Lower Button Release (LBR)

The Lower button was released on a Master Control.

### Syntax:

#### Command, Parameters

LBR,<Master Control Number>,<Button Number>{,<System>}

Parameter	Description	Format
Master Control Number	Master Control Number	1 through 12
Button Number	ROOM / SCENE	1 through 15
System (Bridged only)	System containing the Master Control	S1 or S2

### Example

Button 8 is no longer being Lowered on Master Control 11 **LBR,11,08**

### Bridged Example

Button 8 is no longer being Lowered on Master Control 11 in System 2 **LBR,11,08,S2**

### Notes

- Only applies to buttons with *RadioRA* System programming or if the Master Control is controlling external devices (see Controlling Non-*RadioRA* Equipment Using *RadioRA* Master Controls on page 13).
- This feedback can be turned ON or OFF, see MBPMON and MBPMOFF on page 35.
- Raise/Lower feedback only applies to RS232 Interfaces that Lutron shipped after August 1, 2001.
- The System parameter only applies when using a *Chronos* System Bridge and Timeclock as a System Bridge.



## Feedback Commands

### Cordless Waking Up (CWU)

A Cordless Master Control is waking up.

#### Syntax:

##### Command, Parameters

CWU,<Master Control Number>{,<System>}

Parameter	Description	Format
Master Control Number	Master Control Number	1 through 12
System (Bridged only)	System containing the Master Control	S1 or S2

#### Example

Cordless Master Control 6 is waking up **CWU,06**

#### Bridged Example

Cordless Master Control 3 is System 1  
is waking up **CWU,03,S1**

#### Notes

- When a Cordless Master Control wakes up, all of its LEDs without *RadioRA* programming will be OFF.
- Cordless Master Control waking up or going to sleep feedback is only accurate when the system is not in a programming mode.
- This feedback can be turned ON or OFF, see MBPMON and MBPMOFF on page 35.
- This feedback only applies to RS232 Interfaces that Lutron shipped after August 1, 2001.
- The System parameter only applies when using a *Chronos* System Bridge and Timeclock as a System Bridge.

### Cordless Going to Sleep (CGS)

A Cordless Master Control is going to sleep.

#### Syntax:

##### Command, Parameters

CGS,<Master Control Number>{,<System>}

Parameter	Description	Format
Master Control Number	Master Control Number	1 through 12
System (Bridged only)	System containing the Master Control	S1 or S2

#### Example

Cordless Master Control 3 is going to sleep **CGS,03**

#### Bridged Example

Cordless Master Control 3 is System 1  
is going to sleep **CGS,03,S1**

#### Notes

- Cordless Master Control waking up or going to sleep feedback is only accurate when the system is not in a programming mode.
- This feedback can be turned ON or OFF, see MBPMON and MBPMOFF on page 35.
- This feedback only applies to RS232 Interfaces that Lutron shipped after August 1, 2001.
- The System parameter only applies when using a *Chronos* System Bridge and Timeclock as a System Bridge.

# Feedback Commands

## RadioRA System Mode (RSM)

RadioRA System has entered/exited a System Mode.

### Syntax:

#### Command, Parameters

RSM,<System Mode>,<Event>{,<System>}

Parameter	Description	Format
System Mode	Programming Mode Security Solid Mode Security Flash Mode Flash Mode	PGM SSM SFM FSH
Event	Enter or Exit	ENT / EXT
System (Bridged only)	System	S1 or S2

### Examples

System exited Security Solid Mode

**RSM,SSM,EXT**

System entered Programming Mode

**RSM,PGM,ENT**

### Bridged Examples

System 1 exited Security Solid Mode

**RSM,SSM,EXT,S1**

System 2 exited Security Solid Mode

**RSM,SSM,EXT,S2**

System 1 entered Programming Mode

**RSM,PGM,ENT,S1**

System 2 entered Programming Mode

**RSM,PGM,ENT,S2**

### Notes

- The Serial Device will not process commands while the *RadioRA* System is in programming mode.
- This feedback can be turned ON or OFF, see RSMON and RSMOFF on page 36.
- The System parameter only applies when using a *Chronos* System Bridge and Timeclock as a System Bridge.
- When entering or exiting a programming mode from a *Chronos* System Bridge and Timeclock in a bridged system, an RSM command will be sent for each system.

# Monitoring Control

---

These commands are used to turn monitoring events ON and OFF.

## Local Zone Change Monitoring ON (LZCMON)

### Syntax:

#### Command

LZCMON

### Example

Turn ON Local Zone Change Monitoring                    **LZCMON**

## Local Zone Change Monitoring OFF (LZCMOFF)

### Syntax:

#### Command

LZCMOFF

### Example

Turn OFF Local Zone Change Monitoring                    **LZCMOFF**

## Master Control Button Press Monitoring ON (MBPMON)

Turn ON monitoring for Master Control button presses (MBP commands), Master Control Raise or Lower button presses (RBP, RBR, LBP, and LBR commands), and Cordless Master Controls waking up or going to sleep (CWU and CGS commands).

### Syntax:

#### Command

MBPMON

### Example

Turn ON Master Control  
Button Press Monitoring    **MBPMON**

## Master Control Button Press Monitoring OFF (MBPMOFF)

Turn OFF monitoring for Master Control button presses, Master Control Raise or Lower button presses, and Cordless Master Controls waking up or going to sleep.

### Syntax:

#### Command

MBPMOFF

### Example

Turn OFF Master Control  
Button Press Monitoring    **MBPMOFF**

# Monitoring Control

---

## LED Map Monitoring ON (LMPMON)

**Syntax:**

**Command**  
LMPMON

**Example**

Turn ON LED Map Monitoring LMPMON

## LED Map Monitoring OFF (LMPMOFF)

**Syntax:**

**Command**  
LMPMOFF

**Example**

Turn OFF LED Map Monitoring LMPMOFF

## Zone Map Monitoring ON (ZMPMON)

**Syntax:**

**Command**  
ZMPMON

**Example**

Turn ON Zone Map Monitoring ZMPMON

## Zone Map Monitoring OFF (ZMPMOFF)

**Syntax:**

**Command**  
ZMPMOFF

**Example**

Turn OFF Zone Map Monitoring ZMPMOFF

## RadioRA System Mode Monitoring ON (RSMMON)

**Syntax:**

**Command**  
RSMMON

**Example**

Turn ON *RadioRA* System Mode Monitoring RSMMON

## RadioRA System Mode Monitoring OFF (RSMMOFF)

**Syntax:**

**Command**  
RSMMOFF

**Example**

Turn OFF *RadioRA* System Mode Monitoring RSMMOFF

# Status Inquiry

These commands are used to allow external systems to ask the status of the *RadioRA* System.

## Zone Status Inquiry (ZSI)

Request the state of a specific zone.

### Syntax:

#### Command, Parameters

ZSI,<Zone Number>{,<System>}

Parameter	Description	Format
Zone Number	Zone Number	1 through 32
System (Bridged only)	System containing the Zone	S1 or S2

Response

LZC,<Zone Number>,<ON/OFF>{,<System>}

### Example

What is the status of Zone 4?

**ZSI,4**

Response: Zone 4 is ON

LZC,04,ON

### Bridged Example

What is the status of Zone 4 in System 1?

**ZSI,4,S1**

Response: Zone 4 in System 1 is ON

LZC,04,ON ,S1

### Note

- There is a blank space following the ON parameter.
- The System parameter only applies when using a *Chronos* System Bridge and Timeclock as a System Bridge.
- If the System parameter is omitted in a bridged system, System 1 is assumed.

## LED Status Inquiry (LSI)

Request the state of a specific Phantom LED.

### Syntax:

#### Command, Parameters

LSI,<LED Number>

Parameter	Description	Format
LED Number	Phantom LED	1 through 15

Response

LSR,<LED Number>,<ON/OFF>

### Example

What is the status of Phantom Button 3's LED?

**LSI,3**

Response: Phantom LED 3 is ON

LSR,03,ON

### Notes

- There is a blank space following the ON parameter.
- Only applies to Phantom LEDs on this *RadioRA* Serial Device.

# Status Inquiry

---

## Zone Map Inquiry (ZMPI)

Request an updated Zone Map.

### Syntax:

#### Command

ZMPI

#### Response

ZMP(same as ZMP Monitoring Command)

### Example

Send an updated Zone Map (non-bridged)

Response: (non-bridged)

**ZMPI**

ZMP,11001011001011001011001011001011001000

### Bridged Example

Send an updated Zone Map (bridged)

Response:

**ZMPI**

ZMP,11001011001011001011001011001011001000,S1

ZMP,00101001101000010101100100101110,S2

### Notes

- The System parameter only applies when using a *Chronos* System Bridge and Timeclock as a System Bridge.
- In a bridged system, Zone Maps for both Systems will be returned.

## LED Map Inquiry (LMPI)

Request an updated LED Map.

### Syntax:

#### Command

LMPI

#### Response

LMP(same as LMP Monitoring Command)

### Example

Send an updated LED Map

Response:

**LMPI**

LMP,011001000000000

# Status Inquiry

---

## Feedback Status Inquiry (FBKI)

Send the status of all the monitoring.

### Syntax:

#### Command

FBKI

#### Response

Status of Prompt Feedback - FBK,P,<STATE>  
Status of Zone Map Feedback - FBK,ZMP,<STATE>  
Status of LED Map Feedback - FBK,LMP,<STATE>  
Status of Local Zone Change Feedback - FBK,LZC,<STATE>  
Status of Master Control Button Press Feedback - FBK,MBP,<STATE>  
Status of *RadioRA* System Mode Feedback - FBK,RSM,<STATE>

### Example

Send an update of the feedback status

Response: All feedbacks are ON except the  
*RadioRA* System Mode

#### FBKI

FBK,P,ON  
FBK,ZMP,ON  
FBK,LMP,ON  
FBK,LZC,ON  
FBK,MBP,ON  
FBK,RSM,OFF

### Note

- There is a blank space following the ON parameter.

## RadioRA System Mode Inquiry (RSMI)

Request the status of the *RadioRA* System.

### Syntax:

#### Command

RSMI

#### Response

Status of the Programming Mode - RSM,PGM,<STATE>{,<SYSTEM>}  
Status of Flash Mode - RSM,FSH,<STATE>{,<SYSTEM>}  
Status of Security Solid Mode - RSM,SSM,<STATE>{,<SYSTEM>}  
Status of Security Flash Mode - RSM,SFM,<STATE>{,<SYSTEM>}

### Example

What is the current status of the *RadioRA* System

Response: The *RadioRA* System has exited all  
modes except Security Solid Mode

#### RSMI

RSM,PGM,EXT  
RSM,FSH,EXT  
RSM,SSM,ENT  
RSM,SFM,EXT

### Bridged Example

What is the current status of the *RadioRA* System

Response: The *RadioRA* System has exited all  
modes except Security Solid Mode

#### RSMI

RSM,PGM,EXT,S1  
RSM,PGM,EXT,S2  
RSM,FSH,EXT,S1  
RSM,FSH,EXT,S2  
RSM,SSM,ENT,S1  
RSM,SSM,ENT,S2  
RSM,SFM,EXT,S1  
RSM,SFM,EXT,S2

# Miscellaneous Commands

---

## Version Inquiry (VERI)

Request the *RadioRA* Serial Device firmware revision level.

### Syntax:

#### Command

VERI

#### Response

REV,M<Master Revision>,S<Slave Revision>

### Example

What is the REV of the *RadioRA* Serial Device?

**VERI**

Response:

REV,M3.14,S1.01

## Prompt ON (PON)

Turn the RS232 prompt ON.

### Syntax:

#### Command

PON

### Example

Turn the RS232 prompt ON

**PON**

### Note

- When the RS232 prompt is turned ON, the *RadioRA* Serial Device sends a prompt when it is ready to receive a new command.

## Prompt OFF (POFF)

Turn the RS232 prompt OFF.

### Syntax:

#### Command

POFF

### Example

Turn the RS232 prompt OFF

**POFF**

### Note

- When the RS232 prompt is turned ON, the *RadioRA* Serial Device sends a prompt when it is ready to receive a new command.





# Command Summary

Command	Nomenclature	1st Parameter	2nd Parameter	3rd Parameter	4th Parameter	5th Parameter
BP	Button Press	Button Number	State	(Fade Time)	(DS)	{{(System)}}
CGS	Cordless Going to Sleep	Master Control Number	{(System)}			
CWU	Cordless Waking Up	Master Control Number	{(System)}			
FBKI	Feedback Status Inquiry					
LBP	Lower Button Press	Master Control Number	Button Number	{(System)}		
LBR	Lower Button Release	Master Control Number	Button Number	{(System)}		
LC	LED Control	Master Control Number	Button Number	State		{{(System)}}
LMP	LED Map	LED States				
LMPI	LED Map Inquiry					
LMPMOFF	LED Map Monitoring OFF					
LMPMON	LED Map Monitoring ON					
LOWER	Lower	Button Number	{{(System)}}			
LSI	LED Status Inquiry	LED Number				
LZC	Local Zone Change	Zone Number	State	{(System)}		
LZCMOFF	Local Zone Change Monitoring OFF					
LZCMON	Local Zone Change Monitoring ON					
MBP	Master Control Button Press	Master Control Number	Button Number	State		{(System)}
MBPMOFF	Master Control Button Press Monitoring OFF					
MBPMON	Master Control Button Press Monitoring ON					
POFF	Prompt OFF					
PON	Prompt ON					
RAISE	Raise	Button Number	{(System)}			
RBP	Raise Button Press	Master Control Number	Button Number	{(System)}		
RBR	Raise Button Release	Master Control Number	Button Number	{(System)}		
RSM	RadioRA System Mode	System Mode	Event	{(System)}		
RSMI	RadioRA System Mode Inquiry					
RSMMOFF	RadioRA System Mode Monitoring OFF					
RSMMON	RadioRA System Mode Monitoring ON					

# Command Summary

Command	Nomenclature	1st Parameter	2nd Parameter	3rd Parameter	4th Parameter	5th Parameter
SDL	Set Dimmer Level	Zone Number	Dimmer Level	(Fade Time)	{{System}}	
SFM	Security Flash Mode	Button Number	State			
SGS	Set <i>GRAFIK</i> Eye Scene	Zone Number	Scene	{{System}}		
SSL	Set Switch Level	Zone Number	State	(Delay Time)	{{System}}	
SSM	Security Solid Mode	Button Number	State			
STOPRL	Stop Raise/Lower					
VERI	Version Inquiry					
ZMP	Zone Map	Zone States	{System}			
ZMPI	Zone Map Inquiry					
ZMPMOFF	Zone Map Monitoring OFF					
ZMPMON	Zone Map Monitoring ON					
ZSI	Zone Status Inquiry	Zone Number	{{System}}			

## Notes:

- Refer to command details section for important notes on commands and their parameters.
- Commands shown within parentheses, example (Fade Time), are optional. Commands shown within brackets, example {System}, are used with bridged systems only.

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