# Lumencor Remote Control Accessory (RCA) Instruction Manual

**Emissions Certifications**

This equipment has been tested and found to comply with the limits of EMC directive 2004/108/EC. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

**Safety Certifications**

2006/95/EC

CE Declaration of Conformity

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## 1. Introduction

The Lumencor Remote Control Accessory (RCA) is designed for laboratory use with either a Lumencor SOLA or SPECTRA family product by bioanalytical researchers. The RCA is used for manual control of the light engine without the need for a computer.

The RCA may be used to turn on or off the light source(s) or adjust the intensity level, all electronically. When used with a SOLA it may also be configured to be shuttered externally by a TTL pulse or by the action of a manually operated footswitch.

The RCA menu system may be switched by the user from SOLA to SPECTRA and back to provide the appropriate control features dictated by the light engine to which it is connected. Complete setup and operation instructions are included in section 3. below.

## 2. Precautions and Warnings {Précautions et mises en garde}

A few simple practices will ensure trouble-free operation for the life of the light engine.

Les quelques règles simples suivantes permettront d'assurer un fonctionnement fiable pendant toute la durée de service de la source lumineuse.

**Safety Instructions:**
Please read and follow all safety instructions provided **BEFORE** using your new RCA. Failure to comply with the safety instructions may result in fire, electrical shock, or personal injury and may damage or impair protection provided by equipment. Please save all safety instructions.

**Instructions de sécurité:**
Veiller à lire et à respecter toutes les instructions de sécurité fournies **AVANT** d'utiliser le nouveau RCA afin d'écarter les risques d'incendie, de décharge électrique, de blessure corporelle et de possibles dommages ou défaillance de la protection offerte par l'appareil. Conserver toutes les instructions de sécurité.

**Safety Definitions {Définitions relatives à la sécurité}:**

**Warning:** Statements identify conditions or practices that could result in personal injury.

**Avertissement:** déclarations qui identifient des situations ou des pratiques susceptibles d'entraîner des blessures corporelles.

**Caution:** Statements identify conditions or practices that could result in damage to your equipment.

**Attention:** déclarations qui identifient des situations ou des pratiques susceptibles d'endommager le matériel.

**Safety Items {Mesures de sécurité}:**

**Warning: DO NOT use an unapproved power supply.** The Lumencor-supplied external power supply is recommended for use with the RCA. Alternate 5VDC power supplies may be used provided that the current is limited to 500mA max. Also, it is imperative that it has output over-current protection, as the power input of the RCA is not fused. The equipment is required to be supplied by a DC power source that has been assessed to meet the

requirements of a limited current circuit per clause 9.3 of IEC 61010-1. Connect the AC power cord to a receptacle with a protective safety (earth) ground terminal.

**Avertissement : NE PAS utiliser une alimentation électrique non homologuée.** Il est conseillé d'utiliser l'alimentation électrique externe fournie par Lumencor avec la RCA. Il est possible d'utiliser une autre alimentation électrique continue 5VDC à condition que l'intensité soit limitée à 500m A maximum. En outre, il est impératif qu'elle présente une protection de sortie contre les surintensités, car l'entrée d'alimentation du RCA ne comporte pas de fusible. Le matériel doit être alimenté par une source d'alimentation continue qui a été déclarée conforme aux critères d'un circuit d'énergie limitée en vertu de la clause 9.3 de CEI 61010-1. Brancher le cordon électrique sur une prise de courant protégée par une borne de terre.

**Caution: DO NOT open the unit.** There are no serviceable parts inside and opening the light engine enclosure will void the manufacturer's warranty.

**Attention: NE PAS ouvrir l'appareil.** Il ne contient aucune pièce réparable et l'ouverture de son boîtier a pour effet d'annuler la garantie.

**DISCLAIMER: Lumencor shall not be liable for injury to the user or damage to the product resulting from the RCA being used in a way for which it was not intended and in complete disregard for all posted safety precautions and warnings.**

**AVIS DE NON-RESPONSABILITÉ: Lumencor décline toute responsabilité pour les blessures corporelles ou les dommages au produit résultant d'une utilisation du RCA autre que celle prévue et du mépris total de toutes les mesures de sécurité et mises en garde affichées.**

# 3. Installation and Operating Instructions

## 3.1 RCA & Sola setup (with PC)

In this configuration, both the PC and the RCA can communicate with the light engine via the RS-232 serial cable to send commands for on/off control of each light output and for adjustment of the output power level.

Power for the RCA comes via the USB-to-USBmini cable connected between the PC and the RCA. This cable also provides communications between the PC and the RCA and/or the SOLA. The yellow toggle switch on the RCA is used to turn on/off power to the RCA.

In addition to the on/off control of the source via the RCA keypad, the SOLA light engine may also be turned on/off manually with an external switch (e.g. foot switch, optional purchase) or by an external trigger signal from a camera (or DAQ board) connected to the RCA. A DIN-to-BNC(dual) adapter is included with the RCA for this purpose. The switch (yellow wire) or camera (black wire) is connected to one of the two BNC connectors and then must be configured in the RCA SOLA menu.

**Setup Instructions**

1. Connect the USB-to-USBmini cable between the PC and the RCA. Leave the power switch in the off (down) position.
2. Connect the RS-232 cable between the RCA and the SOLA.
3. For external switching, connect the DIN-to-BNC(dual) adapter to the rear of the RCA. The red wire connects to a foot switch (optional purchase, not pictured) and the black wire connects to a camera (not pictured).

**Operation**

Turn the SOLA power switch on, then turn the RCA power switch on. As the RCA powers up it should detect that it is connected to a SOLA and automatically invoke the SOLA menu system, display a splash screen for about one second and then display the first control screen. To transition to the next control screen press the MODE button.

The RCA control functions are described below.

**Control Screen**

**Output** - Pressing the ON/OFF button once will turn the light engine output on. Pressing it again will turn the light engine output off.

**Intensity** - Press the UP/DN arrow keys to increase or decrease the output intensity.

**Configuration Screen**

Use the LT/RT arrow keys to navigate to the item that you want to change.

**Timer** - The timer is used to automatically turn the SOLA off if left unattended by the user. Use the UP/DN arrow keys to change the setting.

**Option** - The two available options are PC Cmd and Shutter. Use the UP/DN arrow keys to change the setting.

In PC Cmd mode, any commands from the PC generated by the Lumencor GUI or a 3rd party lab software program will pass through the RCA and control the light engine without the need to re-cable from the PC to the light engine.

In Shutter mode, the RCA will translate Uniblitz shutter ON/OFF commands from the computer into the appropriate ON/OFF serial commands to turn on/off the light engine.

**Camera** - The user must specify whether the TRIGGER output signal from the camera is HIGH or LOW true and set it appropriately by toggling the ENTER button. The input can be enabled or disabled with the UP/DN buttons. If this input is not being used it is best to set it to the OFF state. The camera input is the BNC with the black wire connecting it to the DIN connection to the RCA.

**Switch** - The user must configure the SWITCH input. If this input is not being used it is best to set it to the OFF state. The switch input is the BNC with the yellow wire connecting it to the DIN connection to the RCA.

If the switch is a "normally open momentary" switch, then select LOW using the ENTER button and MOMENT using the UP/DN buttons.

If the switch is a "normally closed momentary" switch, then select HI using the ENTER button and MOMENT using the UP/DN buttons.

If the switch is a "toggle" switch, then select either HI or LOW using the ENTER button and MOMENT using the UP/DN buttons.

If the user wants their momentary switch to behave as a toggle switch, then select TOGGLE using the UP/DN buttons. The Switch input can be enabled or disabled with the UP/DN buttons.

## 3.2 RCA & SPECTRA (3-7 or X) setup (with PC)

In this configuration, both the PC and the RCA can communicate with the light engine via the RS-232 serial cable to send commands for on/off control of each light output and for adjustment of the output power level.

Power for the RCA comes via the USB-to-USBmini cable connected between the PC and the RCA. This cable also provides communications between the PC and the RCA and/or the SOLA. The yellow toggle switch on the RCA is used to turn on/off power to the RCA.

### Setup Instructions

1. Connect the USB-to-USBmini cable between the PC and the RCA. Leave the power switch in the off (down) position.
2. Connect the RS-232 cable between the RCA and the SPECTRA.

### Operation

Turn the SPECTRA power switch on, then turn the RCA power switch on. As the RCA powers up it should detect that it is connected to a SPECTRA and automatically invoke the SPECTRA menu system, display a splash screen for about one second and then display the control screen. To transition to the edit or demo screen just press the MODE button. The RCA control features in each screen are described below.

### Control Screen

Use the LT/RT arrow keys to navigate to the source that you want to change.

**Output** - Pressing the ON/OFF button once will turn the selected source on or off.

**Intensity** - Press the UP/DN arrow keys to increase or decrease the output intensity of the selected source.

**Edit Screen**

This screen is used for editing each of the 6 source labels that appear in the Control screen. Use the ENTER key to advance to the next label to edit and to save the one that you have just edited. Use the UP/DN keys to change a character. Use the LT/RT keys to select the character that you want to change.

**Demo Screen**

This screen is used for starting Demo mode. Once started, by pushing the ENTER key, the RCA will enable each source for 2 seconds, then advance to the next one until all 6 have been enabled. Then it will repeat this sequence indefinitely.

## 3.3 RCA (no PC)

The RCA may be used standalone with either a SOLA or SPECTRA and no PC. In this mode, power for the RCA will be supplied by an AC/DC adapter that Lumencor ships with every RCA.

## 3.4 Menu Selection

Each RCA is shipped from Lumencor set up for automatic detection of the light engine it is connected to. For this detection to happen, the RCA must first be connected to a light engine and the light engine must be powered on. Now when the RCA is turned on it can determine what it is connected to.

If you prefer to have the RCA not auto-detect and always default to the same menu, then follow these instructions.

1. Turn off the RCA.
2. Disconnect the RS-232 cable from the RCA.
3. Power on the RCA and the display should read “No Light Engine Connected! Select Menu Mode”.
4. The current menu mode is displayed in the lower right corner of the display. Use the UP/DN keys to change the mode. If you choose Sola and then hit the ENTER key, the RCA will always power up in the Sola menu and no longer try to detect which light engine it is connected to.

The menu mode can be changed back at any time by re-doing these instructions.

## 3.5 Determining Firmware Version

The firmware version programmed into the RCA electronics is displayed on the splash screen whenever the RCA is first powered on. It will appear in the lower right corner of the splash screen. The splash screen only remains on the display for a few seconds.

# 4. Routine Maintenance and Trouble Shooting

Keep the display clean for optimum viewing. No other maintenance is required.

## 5. Customer Support

**T**: 503.799.4094
**E**: les.decker@lumencor.com
**W**: http://www.lumencor.com/support/software_control
**M**: Lumencor, Inc., 14964 NW Greenbrier Parkway, Beaverton, OR 97006 U.S

## 6. Product Specifications

The RCA must be operated and stored within the environmental conditions specified.

| Specification | Detail |
|---|---|
| **Temperature** | |
| Operating | 32 to 95° F (0 to 35° C) |
| Non-operating | -4 to 158° F (-20 to 70° C) |
| **Humidity** | |
| Operating and non-operating | 0 to 80% relative humidity, non-condensing |
| **Altitude** | |
| Operating | 0 to 10,000 feet (3,048 meters) |
| Non-operating | 0 to 20,000 feet (6,096 meters) |
| **Dimensions (LxWxH)** | 5.9 x 3.8 x 1.9 in / 15.0 x 9.7 x 4.8 cm |
| **Weight** | 0.6 lb / 0.2 kg |
| **Input Power Requirements** | 5 VDC / 500mA |
| Connectivity | RS-232, USB |
| Warranty | 36 months parts and labor |

# 7. Connectors

## 7.1 RS-232 Connector

This port conforms to standard RS-232 Interface Protocol.

| Pins | Definition | DC Characteristics |
|---|---|---|
| 1, 2, 3, 4, 6, 7, 8 | DCD, RXD, TXD, DTR, D3R, RTS, CTS | VCC = 5.0V, $V_{ilow}$ (max) = 0.8V, $V_{ihigh}$ (min) = 2.4V, $I_{ilow}$ = 0.5mA, $I_{ihigh}$ = 1.0µA |
| 5 | Gnd | |
| 9 | N/C | |

DB9 Connector Pin Definitions

## 7.2 USB Connector

Refer to the illustration below to identify pin numbers on the connector.

| Pins | Definition | DC Characteristics |
|---|---|---|
| 1 | Input Power | 5 VDC |
| 2 | USBD- | |
| 3 | USBD+ | |
| 4 | Ground | Ground |

## 7.3 DIN Connector

Refer to the illustration below to identify pin numbers on the connector.


| Pins | Definition | DC Characteristics |
|---|---|---|
| 1,2 | Ground | Ground |
| 3 | IN1 | weak pullup (10k) to 3.4VDC |
| 4 | IN2 | weak pullup (10k) to 3.4VDC |

## 8. Declaration of Conformance

Manufacturer: Lumencor, Inc.
14964 NW Greenbrier Parkway, Beaverton, OR 97006 USA

We declare under our sole responsibility that the RCA conforms to the following directives and norms:

EMC directive 2004/108/EC
2006/95/EC
CE Declaration of Conformity

## 9. Warranty

The RCA is backed by a 36 month warranty to end users.