



Lumencor AURA and CORE Light Engine[®] 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
CB Scheme
CE Declaration of Conformity
TUV NRTL Listing
TUV Canadian Listing
TUV European License



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1. Introduction

The Lumencor AURA and CORE light engines are designed for laboratory use by bioanalytical researchers and/or developers of life science instrumentation. The AURA provides 3, 4 or 5 spectrally discrete, bright, controllable light outputs directly to a sample; or in the case of fluorescence microscopy, to the objective. The CORE provides 4 outputs. Each of the colors is produced by an independent module that has been optimized to produce a precise set of wavelengths.

This manual covers all AURA and CORE models: AURA X-YYY-ZZ or CORE X-YYY-ZZ. X denotes the number of colors, YYY denotes a unique customer code and ZZ denotes F/L (fixed or live) configuration and revision.

The light sources within the light engines are controlled by software; either via a serial interface (RS-232 or USB) to a computer running a Lumencor supplied GUI or via a TTL interface to a computer running a third party microscopy software application. The user can enable or disable each source independently and change the intensity of each source independently. The only manual control is a power switch on the rear panel (AURA and CORE) to turn on/off the 24VDC power into the unit. A green power indicator on the rear cover is lit ("ON") when the power supply is connected to the light engine and the power switch is in the on position.

2. Precautions and Warnings

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

Safety Instructions:

Please read and follow all safety instructions provided **BEFORE** using your new AURA or CORE. 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.

Safety Definitions:

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

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

Safety Items:

Warning: DO NOT use an unapproved power supply. The Lumencor supplied external power supply is recommended for use with the AURA or CORE light engine. Alternate 24VDC/5A power supplies may be used but it is imperative that it has output over-current protection, as the power input of the AURA or CORE is not fused. Connect the AC power cord to a receptacle with a protective safety (earth) ground terminal.



Warning: DO NOT stare into the output of the light engine. The brightness of this light source is higher than most commercial lighting fixtures and is intended to couple directly into a microscope or other bioanalytical instrument.



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

Caution: DO NOT connect a video cable to the TTL input enable port. Although the connector might look compatible, this input is not intended to be driven by a video signal.

Caution: DO NOT set liquids on the light engine. Spilled liquids may damage your light engine.

Caution: DO NOT drop the light engine. It contains glass optical components that could be damaged or misaligned by the shock produced by a drop onto a hard surface.

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

3. Installation and Operating Instructions

3.1 Standard Components

AURA

The AURA ships with the following list of standard components.

- a. AURA light engine, configured with three, four or five channels (colors). The particular excitation filter configuration within the unit will be noted on a label affixed to the bottom of the unit.
- b. A 24V/5A power supply (Lumencor part no. 27-10001).
- c. A 6ft AC power cord for the power supply (for North American customers, Lumencor part no. 29-10002, for UK customers, Lumencor part no. 29-10004 and for European customers, Lumencor part no. 29-10005).
- d. A TTL cable (Lumencor part no. 29-10001).

AURA ships with one output adaptor included with the unit. The user may choose from one of the following.

Output Adaptor	Lumencor Part No.
Liquid Light Guide	82-10006
Nikon TI	82-10003
Olympus IX71/81	82-10002
Zeiss x00M	82-10001
Fly-In	82-10007
1mm Quartz Fiber	82-10014

CORE

The CORE light engine does not ship with a list of standard components. All cabling and power is the responsibility of the integrator and/or manufacturer of the scanning equipment that the CORE is designed into.

3.2 Installation Considerations

AURA

When setting the AURA up for use, be sure to place the unit on a hard surface and avoid blocking or restricting airflow at the air inlets or exhaust ports on the enclosure. Restricting the airflow will cause the unit to operate at elevated temperatures and will result in decreased product life and/or premature failure.

Position the unit in such an orientation that allows unrestricted access to the DC power connector. In an emergency, you may need to disconnect power to the unit quickly.

The AURA can either be controlled by a Lumencor supplied GUI via a RS-232 port or by 3rd party laboratory software via the TTL port. The GUI provides a quick and easy way to control your new light engine. You will have the ability to turn each source within the unit on/off, adjust the power of each source independently from off to full power, switch between the GREEN and YELLOW excitation filters and also cycle through all sources automatically at a frequency chosen by the user. Refer to the photo below of the rear panel for location of the various connectors.



Rear Panel of AURA light engine

CORE

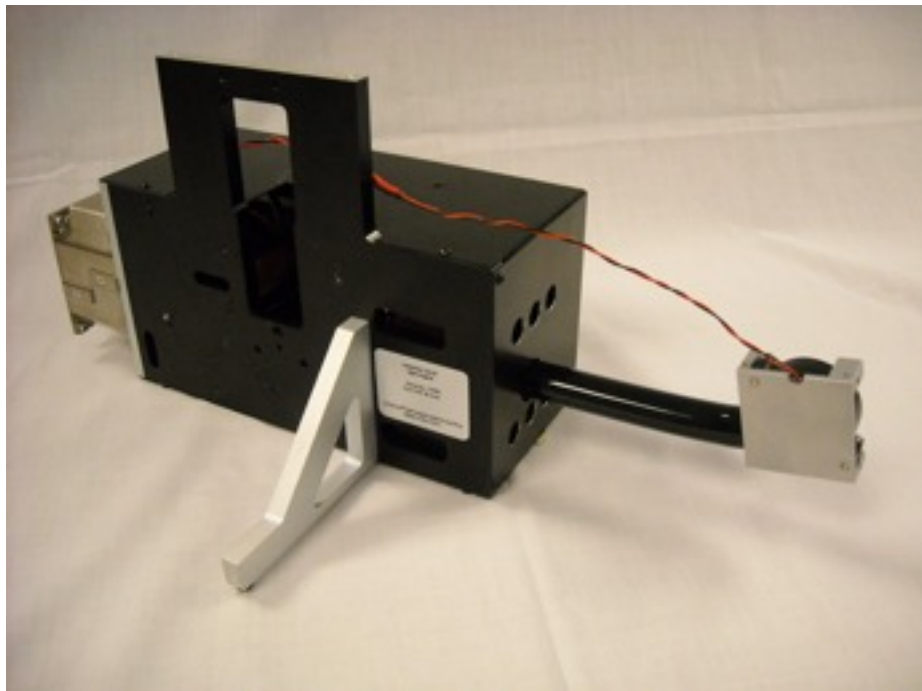
The CORE light engine installation is treated differently in that the CORE is a subassembly or subordinate component in a customer's scanner or other bioanalytical equipment. By design, the light engine will always be mounted inside the equipment in a particular manner that will have addressed the airflow, power and control requirements of the light engine. The power and control requirements for CORE are the same as for AURA. The unique aspect of a CORE installation is that the cooling fans are not part of the light engine enclosure but are mounted externally.

As with the AURA stand-alone product, the CORE light should be mounted in such a way as to not block or impede air flow from the vent holes in the baseplate beneath the copper heatsinks for each source.

There are two air entry points into the CORE light engine which will require certain levels of airflow in order to prevent overheating of the light sources inside.

One entry point is for cooling air flow for the single light pipe illumination source inside the product. The amount of airflow required is a minimum of 0.5 CFM at 0.8" H₂O pressure. The blower fan connection to the light engine is the responsibility of the integrator and will likely be in the form of a tube-type connection with an inside diameter of 0.5 inches. The recommended blower fan is the same one that is used in the standard AURA product, part number 28-10002.

The required airflow at the other input port is a minimum of 10 CFM at 0.18" H₂O pressure. The fan may be connected via ducting to the light engine or it could be mounted directly on the outside face of the enclosure. The fan connection to the light engine is the responsibility of the integrator however Lumencor engineering will certainly provide consultation as needed by the customer in order to ensure a robust and safe design.





3.3 GUI Installation for AURA and CORE

Installation instructions follow for GUI control of the AURA and CORE. Connectivity between the computer and your light engine can be accomplished in one of two ways; either using a RS-232 straight-thru cable or using the optional USB-to-RS232 adapter cable. Both methods are covered below.

Both products use the same GUI so all references to AURA below will apply to both AURA and CORE.

GUI Installation and Operating Instructions (using RS-232 straight-thru cable)

Download the zip file for the AURA GUI from http://www.lumencor.com/software_control.html.

Unzip the file and run setup.exe to install the AURA GUI.

Connect the RS-232 cable between the PC and the AURA.

Connect the power supply to the AURA.

Toggle the power switch on the rear panel to the ON "1" position. The green LED next to the switch should light.

Run the GUI by going to the Program Menu and selecting LLE Controller.

In the GUI, select "COMPUTER" mode.

In the COM pulldown menu, select the COM port assigned to serial communications. Generally this is COM1. [If you are unsure which one that is then go to Control Panel, then System, then the Hardware tab. Select Device Manager to see the hardware profile. Expand "PORTS (COM & LPT)" to see which COM port is assigned to the "Communications Port" and select that port in the GUI.] The PC should now have control of each color channel in the AURA. You will have the ability to turn each color ON or OFF and adjust the intensity of each individually. THIS STEP IS REQUIRED TO RE-ESTABLISH THE COMMUNICATION LINK WHENEVER THE AURA LIGHT ENGINE IS POWER CYCLED OR WHENEVER THE GUI IS STARTED.

GUI Installation and Operating Instructions (using USB-to-RS232 cable)

Download the zip file for the AURA GUI from http://www.lumencor.com/software_control.html#.

Unzip the file and run setup.exe to install the AURA GUI.

Connect the USB-to-RS-232 cable between the PC and the AURA.

Connect the power supply to the AURA.

Toggle the power switch on the rear panel to the ON "1" position. The green LED on the top cover should light.

Run the GUI by going to the Program Menu and selecting LLE Controller.

In the GUI, select "COMPUTER" mode.



In the COM pulldown menu, select the COM port assigned to USB-to-Serial communications. [If you are unsure which one is correct then go to Control Panel, then System, then the Hardware tab. Select Device Manager to see the hardware profile. Expand “PORTS (COM & LPT)” to see which COM port is assigned to the “USB-to-Serial Comm Port” and select that port in the GUI.] The PC should now have control of each color channel in the AURA. You will have the ability to turn each color ON or OFF and adjust the intensity of each individually. THIS STEP IS REQUIRED TO RE-ESTABLISH THE COMMUNICATION LINK WHENEVER THE AURA LIGHT ENGINE IS POWER CYCLED OR WHENEVER THE GUI IS STARTED.

3.4 TTL Interface

The purpose of the TTL Interface is to provide the end-user with a more predictable means (in terms of timing) of enabling/disabling each individual light source in the LE. This is accomplished via the parallel port on a PC. Connect the Lumencor supplied TTL cable between the PC and the TTL port on the rear of the AURA. The integration and set up of the 3rd party laboratory software is very application specific and beyond the scope of this document. For programming information, visit the Lumencor website at http://www.lumencor.com/software_control.html and download the AURA TTL Interface Specification. Contact support if you need more assistance.

3.5 Monitor Connector (Dosimeter, AURA only)

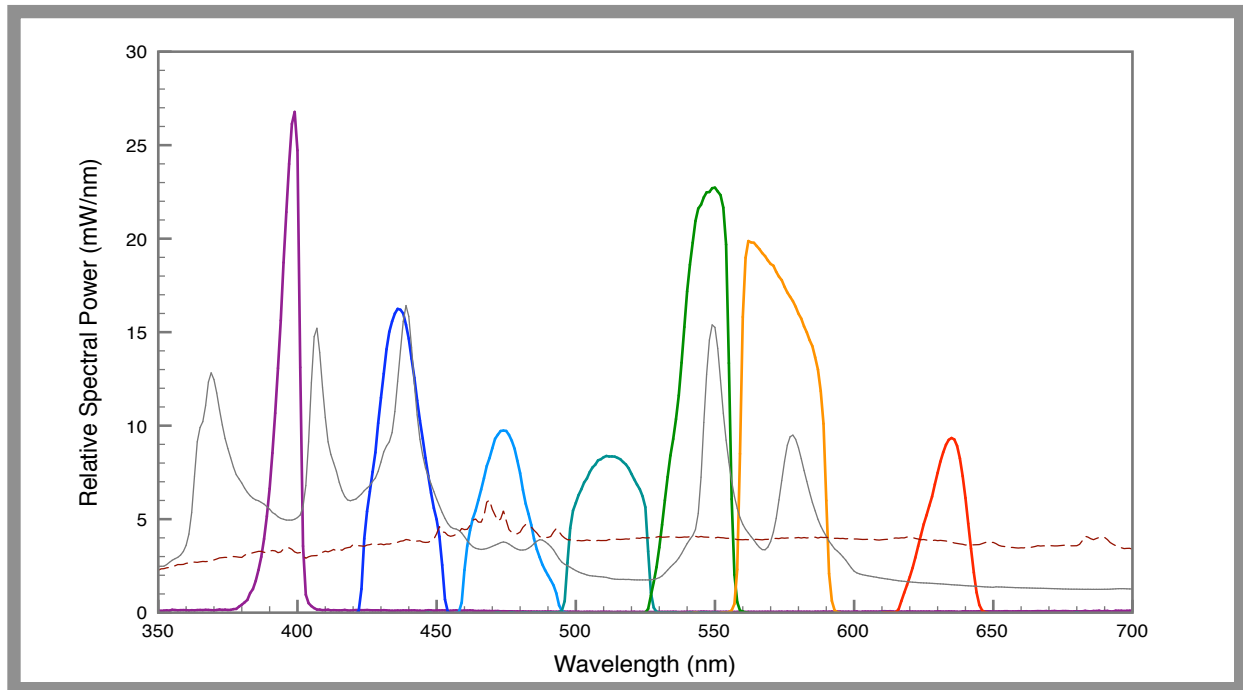
This connector provides a means for monitoring the output of the internal Dosimeter that is measuring the relative power output of the selected light source in the unit. The connector accepts a standard BNC connector. Lumencor does not supply a cable.

3.6 Photointerrupter Connector (CORE only)

This connector provides a means for monitoring the position of the green/yellow filter in the light pipe channel. When the yellow filter is in place in the light path then pin 1 is driven low and when the green filter is in place in the light path then pin 3 is driven low.

4. Spectral Output

The spectra of the most commonly requested light engine outputs (colored bands) are shown below along with a 75W Xenon trace (grey) and a 120W metal halide lamp output (brown). Other outputs are available upon request.



5. Routine Maintenance and Trouble Shooting

Remove any built-up dust or accumulation on the air intake ports. A vacuum may be used to remove debris so that a steady supply of air is available for cooling. It is recommended that these dust-filters be cleaned by a gentle suction device at least every 6 months and more often in dusty or smoke-filled environments.

There are no user-replaceable components or sub-assemblies in AURA or CORE.

6. Customer Support

T: 503.505.6985

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.A.



7. Product Specifications

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

Specification	Detail
Temperature	
Operating	32 to 104° F (0 to 40° 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)	9.25 x 7.25 x 4.0 in / 23.5 x 18.4 x 10.2 cm
Weight	8 lb / 3.6 kg
Lamp Life	> 10,000 hr
Input Power Requirements	24 VDC / 5A
Warm-up Period	Less than 1 minute
Protection	IP Rating of X0
Sound Level	Sound Level at 1 meter < 65db(A)
Connectivity	RS-232, USB, TTL
Warranty	18 months parts and labor

8. Connectors

8.1 TTL Input Connector

This connector is used to enable/disable each source and select between the GRN/YEL excitation filter.

Pins	Definition	DC Characteristics
1, 2, 3, 11, 12, 13	Red, Green, Cyan, Teal, Blue, UV respectively - low true enables	VCC = 5.0V, V _{ilow} (max) = 1.5V, V _{ihigh} (min) = 3.3V, I _{ilow} = 0.5mA, I _{ihigh} = 1.0μA
15 - Green/Yellow	Excitation Filter Select, V _{in} = H => Green, V _{in} = L => Yellow	VCC = 5.0V, V _{ilow} (max) = 1.5V, V _{ihigh} (min) = 3.3V, I _{ilow} = 0.5mA, I _{ihigh} = 1.0μA
6, 7, 8, 10	Gnd	
4, 9, 14	N/C	

DB15HD connector Pin Definitions

8.2 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

8.3 Dosimeter Connector (Monitor)

This connector is a standard BNC connector located on the rear panel. It is used to read the internal dosimeter by connecting to a scope or frequency counter. It outputs a square wave, 0-5V, frequency is proportional to the power of the light being measured.



8.4 Photointerrupter Connector (CORE only)

This external connector provides access to an internal photointerrupter board used to monitor the position of the yellow and green excitation filters in the light pipe channel.

Pins	Definition	DC Characteristics
1, 3	Yellow in place, pin 1 = 0, Green in place, pin 3 = 0	VCC = 5.0V, V _{ilow} (max) = 0.8V, V _{ihigh} (min) = 2.4V, I _{ilow} = 0.5mA, I _{ihigh} = 1.0μA
2, 4	Gnd	
5	VCC	

9. Declaration of Conformance

Manufacturer: Lumencor, Inc.

14964 NW Greenbrier Parkway, Beaverton, OR 97006 USA

We declare under our sole responsibility that the AURA and CORE Light Engines conform to the following directives and norms:

EMC directive 2004/108/EC

2006/95/EC

CB Scheme

CE Declaration of Conformity

TUV NRTL Listing

TUV Canadian Listing

TUV European License

10. Warranty

The AURA and CORE light engines are backed by an 18 month warranty.