

SPECTRA TUNE 7!



Luminaire for specific applications



DS 45007-00

DISCLAIMER

This document is intended for all audiences. The material herein is provided "AS-IS" and LEDMOTIVE makes no warranty of any kind regarding this material.

LEDMOTIVE shall not be liable for errors and omissions contained herein.

All product specifications and data included in this document are subject to change without notice to improve operation, reliability, design or otherwise.

COPYRIGHT & TRADEMARK

© 2019, Ledmotive Technologies S.L, all rights reserved.

Any unauthorized work, review, copy, translation and distribution of this material is strictly prohibited.

LEDMOTIVE, LIGHT CREATOR and LEDMOTIVE LOGO are trademarks of Ledmotive Technologies S.L. The trademarks may be used either alone or in combination with a further product designation.

Nothing in this publication is intended to make representation regarding whether any trademark is registered or to suggest that any sign other than those mentioned should be a trademark of Ledmotive Technologies S.L. or any third party.

Index

DESCRIPTION	3
SPECTRA TUNE 7! – Features	3
LED-ENGINE: CONFIGURATION	4
SPECTRAL MODULATION	5
SPECTRAL SWITCHING TIME	6
THERMAL PROTECTION	6
ELECTRICAL SPECIFICATIONS	6
OPTIONAL IP65 GLASS PROTECTOR	6
LIGHTING LEVELS – INSTALLATION PROPER DIMENSIONING	7
CONTROL SOFTWARE	8
OPTIONAL RESTful API	9
PRODUCT PARTS	9
INSTALLATION LAYOUT	9
FEATURES - SUMMARY	11
MAINTENANCE AND SERVICE	12
WARNING AND SAFETY	12
ENVIRONMENTAL AND DISPOSAL COMPLIANCE	12
WARRANTY	13

DESCRIPTION

The SPECTRA TUNE 7! device is a unique LED downlight luminaire for *general lighting for specific applications (Retail, Office, Wellness)* developed by LEDMOTIVE. The system can deliver any light spectrum from the modulation of each of its different wavelength channels. No warm-up time is required, and light can be dimmed from 10% to 100% for each channel with a resolution depth of 12 bits (4096 steps).

The SPECTRA TUNE 7! is equipped with 7 different types of colored LEDs.

LEDMOTIVE patented technology warrants spectral precision and accuracy as well as stability over time, through a CMOS-based onboard sensor.

The system can playback programmed spectra sequences over time, dynamically modifying the spectral components and atmosphere present in the indoor enclosed space environment.

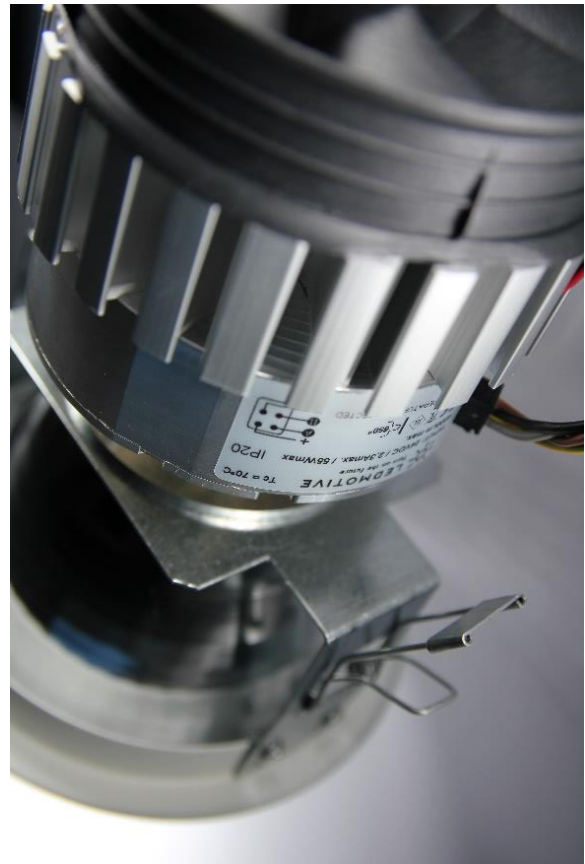


Figure 1. SPECTRA TUNE 7!

SPECTRA TUNE 7! – Features

- High power multi-spectral LED light engine
 - Independent wavelength channel dimming
 - Precise, accurate and stable light emission
 - No warm-up time required
 - Overheat temperature protection
 - The default wired communication is based on a EIA-485 using the LEDMOTIVE LIGHT HUB® device
 - Free basic μ WAVE software© with the SPECTRA TUNE 7! with basic operation controls.
 - API RESTful available for full programming flexibility.
 - Multiple SPECTRA TUNE 7! devices operation (up to 128 or more** per LIGHT HUB)
 - Optional: IP65 front glass
- ** depending on the amount of traffic information exchanged

LED-ENGINE: CONFIGURATION

Below is a summary of the standard configuration. Values may change slightly depending on the current availability of the different wavelength (color) or flux bins.

Channel	Color	Peak Emission (nm)	radiometric value (W)	Photometric Value(lm)	FWHM (nm)
CH 1	Royal Blue	450	1.26	45.7	23
CH 2	Blue	480	1.08	123.4	27
CH 3	Cyan	505	1.18	409.1	34
CH 4	Green	525	0.64	363.7	37
CH 5	Lime	550	2.2	971.4	117
CH 6	PC Amber	595	2.53	907.6	81
CH 7	Red	640	0.95	151.5	20

Figure 2. Generic features of the standard SPECTRA TUNE 7! downlight

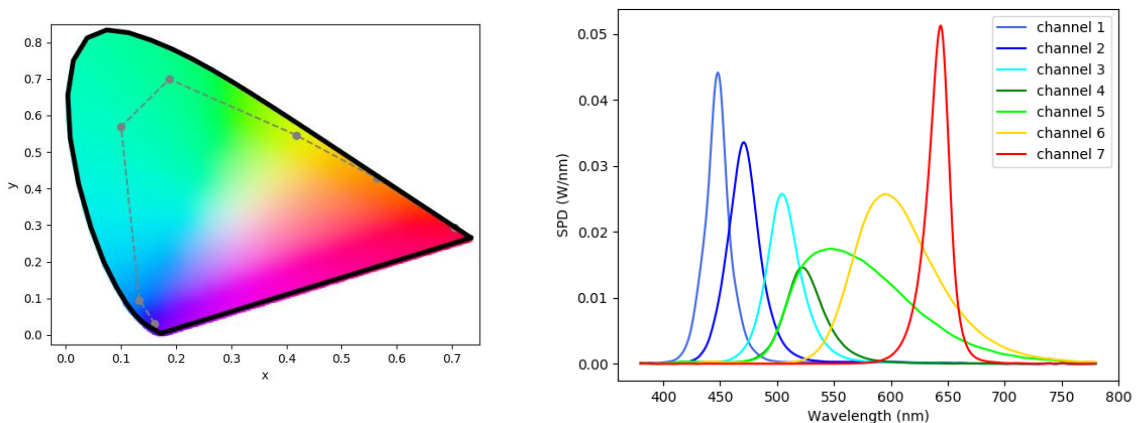


Figure 3. (left) CIE 1931 xy coordinates of the 7 channels that define the color gamut and (right) Spectral Power Distributions (SPDs) of the LED channels

All active channels are mixed within the LED engine, which provides the SPECTRA TUNE 7! with a smooth (highly uniform in color) light.

SPECTRAL MODULATION

Example of two different spectral modulations that best reproduce a blackbody radiation curve at two different temperatures (2700 K and 6500 K):

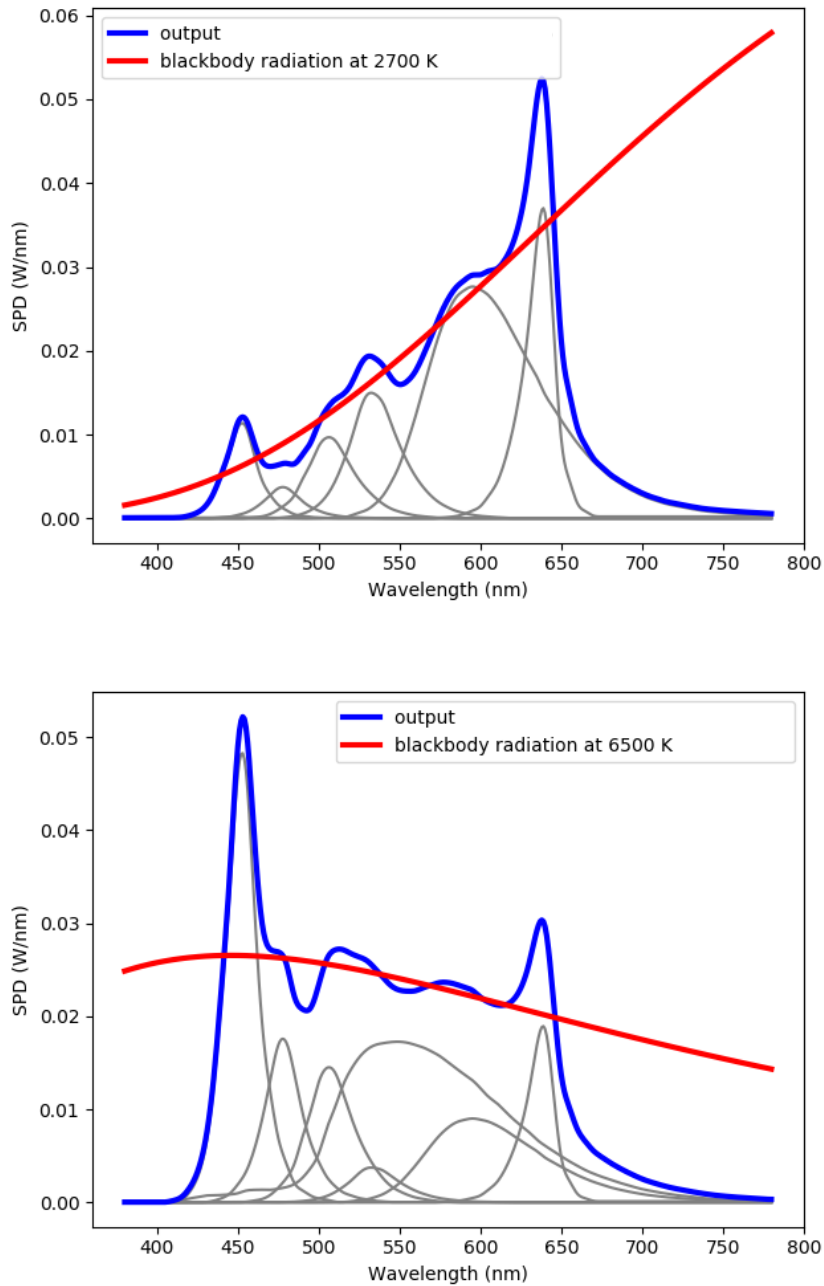


Figure 4. Example of two different spectral fittings (2700 K and 6500 K blackbody radiators)

SPECTRAL SWITCHING TIME

The SPECTRA TUNE 7! works in synchronous mode by default with the LIGHT HUB. In this mode, the luminaire acknowledges every command received from the LIGHT HUB before a new instruction can be received so that “collisions” between messages can be detected and duly corrected.

The commands programmed in the μ WAVE software are in synchronous mode. Typical response times in this mode is 250 milliseconds approximately and that is the minimum spectral switching time.

Whenever a specific application requires for fast switching times, the SPECTRA TUNE 7! can be set to work in asynchronous mode¹. In this case, the SPECTRA TUNE 7! does not send an acknowledge receipt to the LIGHT HUB, making it possible a spectral streaming in real time. The typical average time between consecutive spectra in asynchronous mode is around 10 milliseconds (100 different spectrum’s every second on average).

THERMAL PROTECTION

The SPECTRA TUNE 7! incorporates a temperature protection control that is enabled by default. In the unlikely event of PCB overheating (fan or dissipation failure, harsh environments, etc.), the LED module will automatically reduce its luminous flux and consequently the consumed electrical power to keep the temperature within a safety range. In this way, the optimal working conditions that warrant the lifespan of the LED engine and its components are always preserved.

ELECTRICAL SPECIFICATIONS

Nominal Input Voltage	100-270 V AC 50/60 Hz
Max. Input Power	80 W (limited by firmware)
Max. Input Current	3.3 A* (limited by firmware)
Power and data connector	MOLEX 43025-0409
Data communication (A,B) control	LEDMOTIVE proprietary protocol**

* fuse protection at 4.0 A

** based on a communication bus EIA-485 (also known as RS-485)

For details of the wiring please check the data sheet of VEGA 07 ref. **DS_450005**

OPTIONAL IP65 GLASS PROTECTOR

LEDMOTIVE can provide, optionally, a transparent glass protector and a rubber O-ring that warrants a frontal with IP65.

¹ API RESTful is then necessary

LIGHTING LEVELS – INSTALLATION PROPER DIMENSIONING

As in every lighting installation, light intensity levels on the specific room where the SPECTRA TUNE 7! is going to be installed will depend on several parameters such as dimensions, wall painted colors, furniture, presence of natural light, materials, etc.



Figure 5. Lighting simulation of a residential bedroom

The following table may be used as a quick guide to calculate the number of SPECTRA TUNE 7! luminaires that would be needed for a specific application, depending on the room dimensions and the desired maximum illuminance levels required for the research undergone²:

	300 lx	500 lx	1000 lx
8 m ²	4	4	8
12 m ²	4	6	12
16 m ²	6	8	16

Table1. Quick calculation of number of luminaires required as a function of illuminance and room dimensions

² This table should be considered as a rough approximation, not contractual data. Calculations have been done for a rectangular room with a simple furniture equipment, 2.5 m ceiling height, with no natural or additional light sources and with a regular maintenance and cleaning policy.

CONTROL SOFTWARE

With a single or a group of SPECTRA TUNE 7! a μ WAVE software is provided for windows (PC or Laptop) version in order to control the lighting system.

The μ WAVE provides with basic functionalities as can be shown in Figure 6.

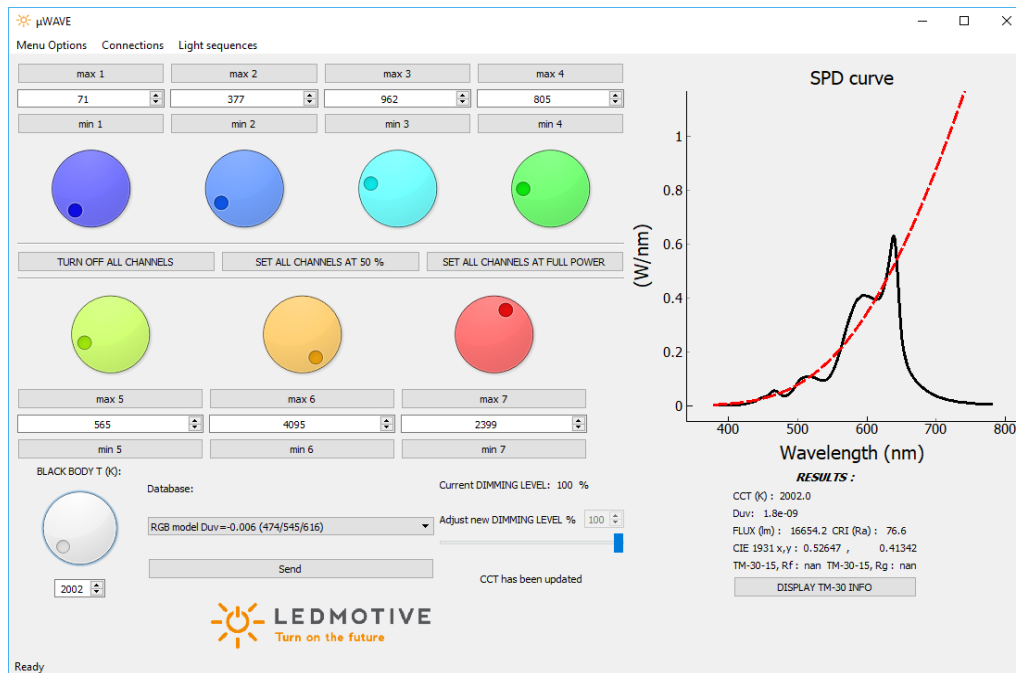


Figure 6. Screenshot of the μ WAVE software

Computer requirements:

- Windows 8 or later version and 64-bit OS

Features:

- Change the amplitude of each channel to design a specific spectrum
- Save and import light spectra
- Dim the light output
- Correlated Color Temperature (CCT) selection
- Playback spectrum from a spectral database
- Create, save and reproduce light sequences (dynamic streaming of light spectra) by adding different spectrum to a sequence pool

For research applications that may need advanced programming functionalities or faster spectral switching time please check the optional RESTful API.

OPTIONAL RESTful API

To provide a user with full flexibility in the operation of the SPECTRA TUNE 7!, a RESTful API is available for the LIGHT HUB. The LIGHT HUB can be accessed using the HTTP protocol under any programming language (C, C++, C#, Python, MATLAB, Java, JavaScript, etc.).

Some additional information can be found in the LIGHT HUB Datasheet Ref. **DS_450002**

Please contact the sales team at sales@ledmotive.com to request a quotation on this optional item.

PRODUCT PARTS

The SPECTRA TUNE 7! includes the following hardware and software items:

- **Spectrally tunable** LED luminaire incl power supply
- μ WAVE Software©

OPTIONAL:

- IP65 glass protector
- RESTful API

Other material needed to install and control the luminaire(s):

- LIGHT HUB
- Communication bus wiring
- Ethernet cable

INSTALLATION LAYOUT

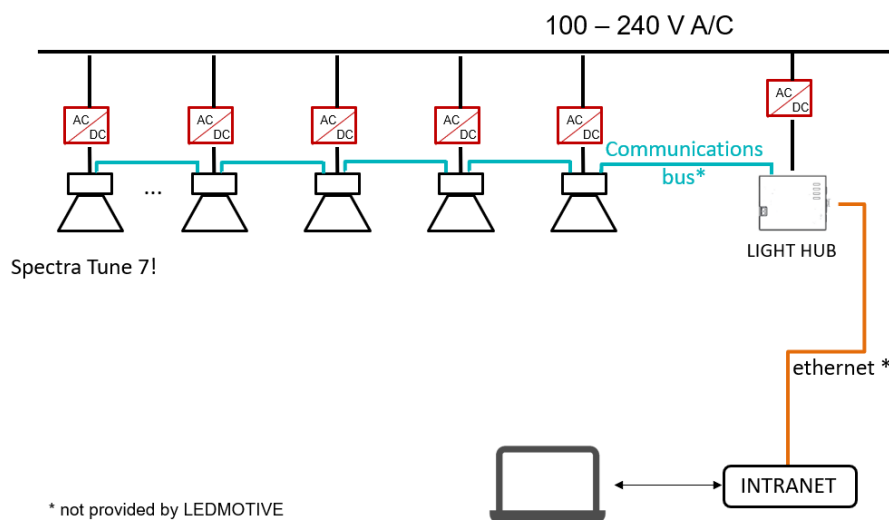


Figure 7. example of an electrical and bus communication layout

Figure7 shows an example of an electrical connection and the bus communication layout in a daisy chain configuration.

If you need further information about electrical connections or how to build the communication bus an Application Note (**AN470010**) is available upon request. Please contact the sales team at sales@ledmotive.com for additional information.

FEATURES - SUMMARY

Source type	Multiple high-power LED
Output	7 different spectral bands
Max Radiometric Power	12 W (for all channels at full power) ³
Max Luminous Flux	3400 lumens
Spectral range	420-730 nm
Beam angle	45°
Operating temperature range	0 °C to +35 °C
Synchronous operation mode speed	250 milliseconds
Feedback control loop	Enabled by default
Nominal Input voltage	24 V DC (Constant voltage)
Max Input current	3.3 A (limited by firmware)
Max Input Power	80 W (limited by firmware)
Communications protocol	bus EIA-485
Control software	FREE μWAVE Software©
IP	20
Insolation Class	Class II
OPTIONAL	
Frontal IP65	Transparent Glass
Advanced control	RESTful API
Asynchronous operation mode speed	10 milliseconds (API required)

³ Radiometric power may slightly change depending on the currently available LED binning

MAINTENANCE AND SERVICE

- Do not open, disassemble or manipulate the SPECTRA TUNE 7!
- If a fingerprint mark or dirt is observed at the diffuser, you may clean it. Before cleaning, disconnect from the main supply and allow the system to cool down. Wipe the surface of the diffuser gently with a tissue containing ethanol.
- No user serviceable parts inside. Replacement of the entire SPECTRA TUNE 7! is required when malfunction may occur.

WARNING AND SAFETY

- Before installing, servicing, or performing routine maintenance upon this product, follow the general precautions.
- ALWAYS adhere to safety instructions and warnings
- All necessary measures must be taken to avoid electric shock when handling electrical and/or electronic equipment. In case of doubt disconnect the main power supply when handling lighting equipment.
- All statements regarding safety of operation, warranty and technical data only apply when the unit is operated correctly according to its specifications. The safety of any system incorporating the equipment is the responsibility of the assembler of the system.
- The SPECTRA TUNE 7! is intended for use in dry interiors only. Without the IP65 optional part, it is not water resistant and must be protected from adverse weather conditions (hot and humid).
- Keep away from flammable materials. To avoid damage, do not expose it to spray, liquids, dust or chemical products.
- Do not stare directly into the LED Light source at short distance or long-exposures
- Ensure that heat sink fins and/or fans are not obstructed.
- During normal operation, the fixture can achieve high temperature, be careful when handling it to avoid skin burning.
- Do not operate the SPECTRA TUNE 7! with missing or damaged components.

ENVIRONMENTAL AND DISPOSAL COMPLIANCE

- LEDMOTIVE is committed to provide environmentally friendly products to the solid-state lighting market. SPECTRA TUNE 7! is compliant to the European Union directives on the restriction of hazardous substances in electronic equipment, namely the RoHS Directive 2011/65/EU and REACH Regulation (EC) 1907/2006.
- LEDMOTIVE will not intentionally add the following restricted materials to its products: lead mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE).

- In accordance with EU Directive WEEE (Waste Electrical and Electronic Equipment), SPECTRA TUNE 7! and or LED modules must not be disposed of with another household waste.
- At the end of their life, it must be taken to the appropriate local facility available for the disposal or recycling of the electronic parts.

WARRANTY

- This product has passed the proper EU regulations and directives.
- LEDMOTIVE offers a 5-year limited warranty