OSRAM LTC-X3T300000-1Cx

Datasheet

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LED ENGIN LuxiTune

LTC-X3T300000-1Cx

LuxiTune™ is the only tunable white light engine offering a halogen-style Warm Dimming and CCT Tuning in the same product.

Applications

- Museum
- Retail
- Hospitality
- Residential
- Office

Features

- Small form factor LED light engine consisting of a multi-channel emitter + driver + TIR lens
- Beam angle options: 24°/34°/45°
- Precisely tracks a short distance below the Black Body Locus
- Two modes of operation:
  - Warm dimming mode: Warms from 3000K to below 1800K as it dims halogen-style
  - CCT tuning mode: Tunes from 1800K to 6500K with independent brightness control
- Stable flux and CCT over operating temperature
- Accurate color rendition with CRI 92 @3000K
- Single 2 SDCM CCT bin at 3000K
- 72 lm/W light engine efficiency (emitter + driver + lens) at steady state (hot) use conditions
- Supports 0-10V, DALI and Casambi BLE enabled controls
- Driver design meets UL low voltage guidelines
- Lead (Pb) free and RoHS compliant

Description

LuxiTune™ is the only tunable white light engine offering a halogen-style Warm Dimming and CCT Tuning in the same product.

With high color rendering index (CRI) and unit-to-unit variations ≤3 SDCM over operating conditions, it delivers high quality, energy-efficient directional lighting for architectural, high end residential, hospitality, museum and retail applications. Based on LED Engin's proven LuxiGen™ emitter technology, LuxiTune is available in three beam angles and supports several control protocols, providing flexibility and freedom in lighting design.

Ordering Information

Type	Description	Ordering Code
Use the following to order a basic unit without daughter cards.		
LTC-X3T300000-1C1	LZC LuxiTune 1100lm Gen 2.4 - includes emitter & integrated 0-10V driver on connectorized board, programmed for Casambi BLE	Q65113A2995
LTC-X3T300000-1C5	LZC LuxiTune 1100lm Gen 2.4 - includes emitter & integrated 0-10V driver on connectorized board, programmed for DALI	Q65113A2996
All part numbers ending in -1C1 support control with Bluetooth (BLE).		
All part numbers ending in -1C5 support control with DALI & 0-10V.		
Use the following to order a daughter card separately, one for each LTC part number. Wires not provided.		
LTC8-BLE3	BLE mesh daughter card (Casambi profile 6500K-1800K). Works with LTC part number ending in –1C1	Q65113A3431
LTC4-DALI	DALI daughter card. Works with LTC part number ending in –1C5	Q65113A3180
Use the following to order TIRs in holder separately with each LTC-X3T300000-1C1 or LTC-X3T300000-1C5		
LLNF-4T08-H	Narrow Flood (24⁾ Lens and Holder	Q65113A3185
LLFL-6T08-H	Flood (34⁾ Lens and Holder	Q65113A3186
LLWF-6T08-H	Wide Flood (45⁾ Lens and Holder	Q65113A3187

LED Engin provides guidance for the wiring of the daughter cards without the pin-headers, but customers are required to solder the wires connecting the cards.

Firmware Versions

Firmware revisions that are supported with released product are as follows.

Revision	Released	Supported functionalities
V1.60	January 2017	All functionalities in v1.31 Same as Gen 3.0
V1.61	September 2017	Extended range tuning curve Extended range profile for Casambi BLE Same as Gen 3.1
V1.62	January 2019	All functionalities in v1.61 DALI 102/209 registration as control gear

LuxiTune Chromaticity Bin @T_C = 65°C; 100% intensity; 2 SDCM Single Bin

Bin coordinates are listed below in the table

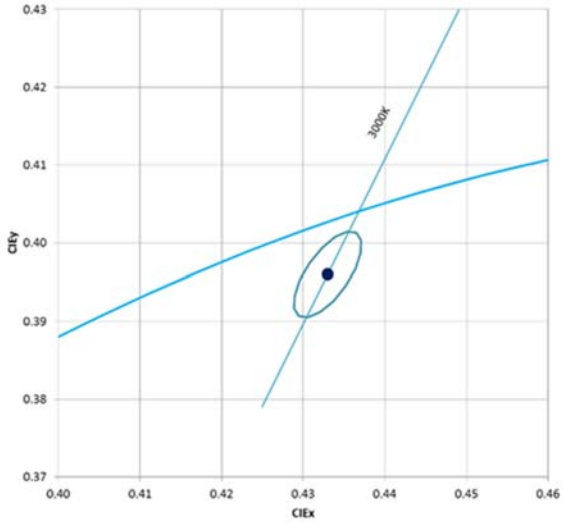


Figure 1: Single chromaticity bin plotted on excerpt from the CIE 1931 (2°) x-y chromaticity diagram

Chromaticity Bin @ T_C = 65°C; 3000K, 100% intensity, 2 SDCM

Table 1

Center point Cx	Center point Cy	Major axis a	Minor axis b	Rotation, ϕ
0.4329	0.3957	0.0063	0.0026	56.3
0.4319[1]	0.3979[1]			

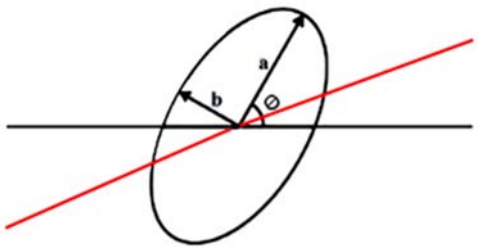
Notes for Table 1:

1. Emitter only

Chromaticity Bin @ T_C = 15°C–85°C; 3000K, 100% intensity, 3 SDCM

Table 2

Center point Cx	Center point Cy	Major axis a	Minor axis b	Rotation, ϕ
0.4329	0.3957	0.0095	0.0040	56.5



Operating Conditions @ T_b = 15℃–85℃

Table 3

Parameter	Symbol	Min	Typical	Max	Unit
Input Voltage – Light Engine[1]	V_{in}	21.0	24.0	27.0	V
Input Current (@24VDC)	I_{in}		615	800	mA
On-mode Power @3000K, 100% intensity, T_b=65℃	P_{on}		14.5	19(2)	W
Standby Power (@0-10V)	P_{min}			0.45	W
Thermal Resistance, Electrical	$R_{j\text{-}b,\ el}$[3]		1.3		℃/W
Thermal Resistance, Real	$R_{j\text{-}b,\ real}$[3]		1.6		℃/W
Storage Temperature Range	T_{stg}	-40		+110	℃
Operating Temperature Range[4, 5, 6]	NTC1	+15	25	+85	℃

Notes for Table 3:

2. Light Engine is defined as emitter + integrated driver + lens.
3. The max power 19W is measured at 2000K, 85C, 100% intensity.
4. $R_{j\text{-}b}$ is the thermal resistance between the LED junction and the bottom of the hybrid board
5. T_c is referred to as T_b (emitter board) and T_0 (driver board) in this product datasheet. The maximum of the 'Operating Temperature Range' is also referred to as 'rated maximum temperature T_c'. The temperature measurement point on the MCPCB, NTC1 is located next to the LED emitter. See figure 13. NTC1 should not exceed 85℃.
6. LuxiTune is operational at temperatures below 15℃, however there is risk of condensation and unit needs to be protected against moisture.
7. If NTC1>85℃, the device goes into thermal protection mode. The luminous flux is reduced in steps of 10% until it turns "off" at NTC1 = 105℃. Once the temperature drops to NTC1 <65℃, the brightness will be fully restored.

Operating Characteristics @ T_b = 15℃–85℃

Table 4

Parameters[1]	Symbol	Min	Typical	Max	Unit
Luminous Flux[2] – Light Engine[3] @3000K	Φ_V	950	1050	1175	lm
Useful Luminous Flux – Emitter only @3000K	Φ_{use}		1100		lm
Rated Beam Angle – Emitter only			104		degrees
Efficiency – Light Engine @3000K			70		lm/W
Efficiency – Emitter only @3000K			76		lm/W
Color Rendering Index (CRI) @3000K	R_a		92		
Warm Dim Parameters	Symbol	Min	Typical	Max	Unit
Correlated Color Temperature	CCT		3000		K
Correlated Color Temperature @<0.5% intensity	CCT		1800		K
CCT Tuning Parameters	Symbol	Min	Typical	Max	Unit
Luminous Flux[2] – Light Engine @6500K	Φ_V	880	1050		lm
Luminous Flux[2] – Light Engine @1800K	Φ_V	800	1000		lm
Photobiological Safety Risk Group Classification according to IEC/TR 62778					
Light Engine			RG1		
E_{thr} – Emitter only			489lx		

Notes for Table 4:

1. All parameters measured at 100% intensity and T_b=65℃ unless stated otherwise
2. Luminous flux performance guaranteed within published operating conditions. LED Engin maintains a tolerance of ± 10% on flux measurements.
3. Light Engine: Emitter + driver board + secondary lens.

Beam Characteristics @ T_b = 15℃–85℃

Table 5

Lens Description	Part number	Beam angle[1] FWHM (degrees)	Field angle[2] (degrees)	CBCP[3] 3000K; full intensity (cd)
Narrow Flood	LLNF-4T08-H	24°	53°	2700
Flood	LLFL-6T08-H	34°	83°	1500
Wide Flood	LLWF-6T08-H	45°	89°	1250

Notes for Table 5:

1. Beam angle is defined as the full width at 50% of the max intensity (FWHM).
2. Field angle is defined as the full width at 10% of the max intensity.
3. CBCP (Center Beam Candlepower) is on-axis luminous intensity measured in candela.

Typical Relative Intensity over Angle – TIR Optics

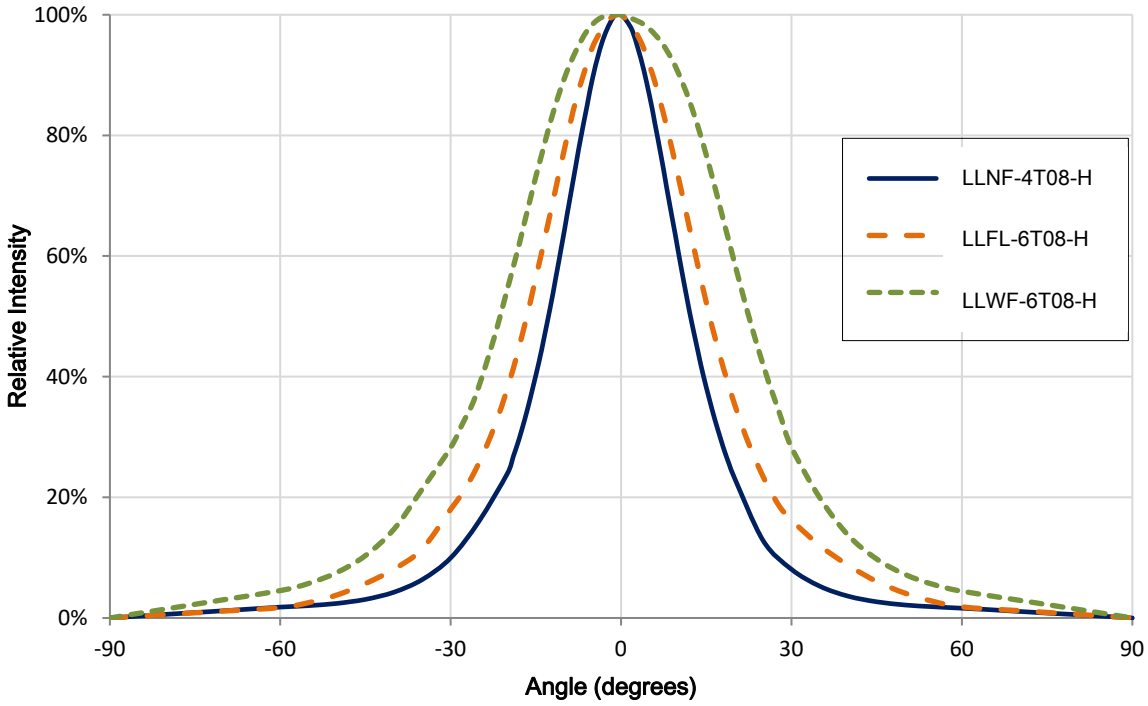


Figure 2: Typical relative intensity over angle

Average Lumen Maintenance Projections

Based on long-term reliability testing, LED Engin projects that LuxiTune will deliver, on average, 70% Lumen Maintenance for >35,000 hours of operation at specified operating conditions.

Typical Relative Spectral Power Distribution

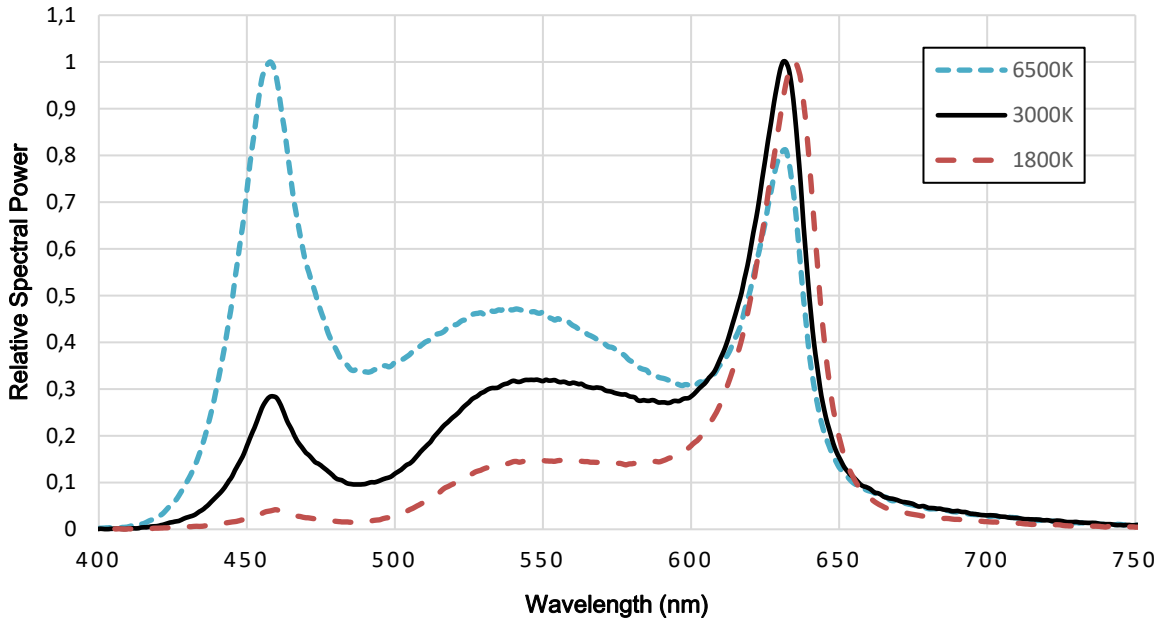


Figure 3: Typical relative spectral power vs. wavelength

CCT Range in Warm Dimming Mode

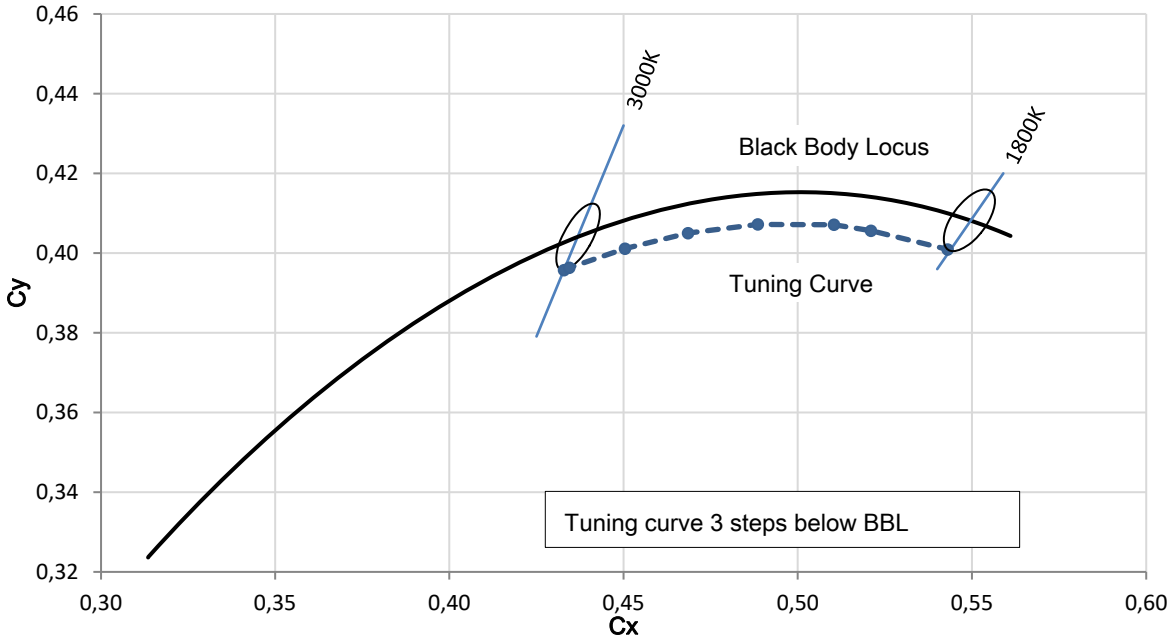


Figure 4: Typical CCT range in warm dim mode

Relative Intensity vs. CCT in Warm Dimming Mode

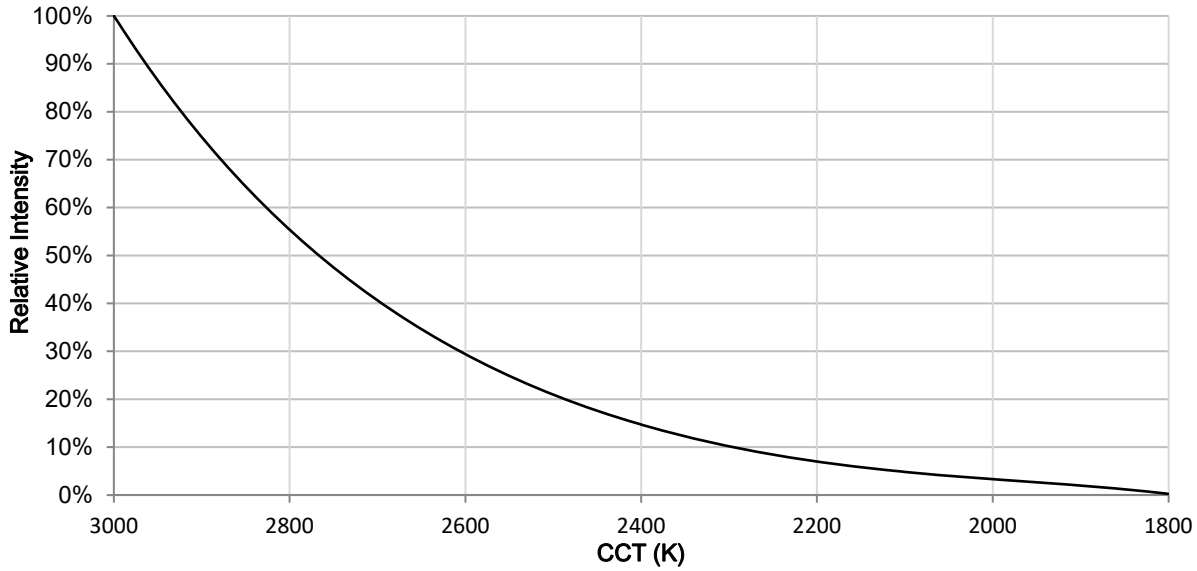


Figure 5: Intensity vs. CCT dimming profile in warm dim mode

CCT vs. Control Voltage in Warm Dimming Mode

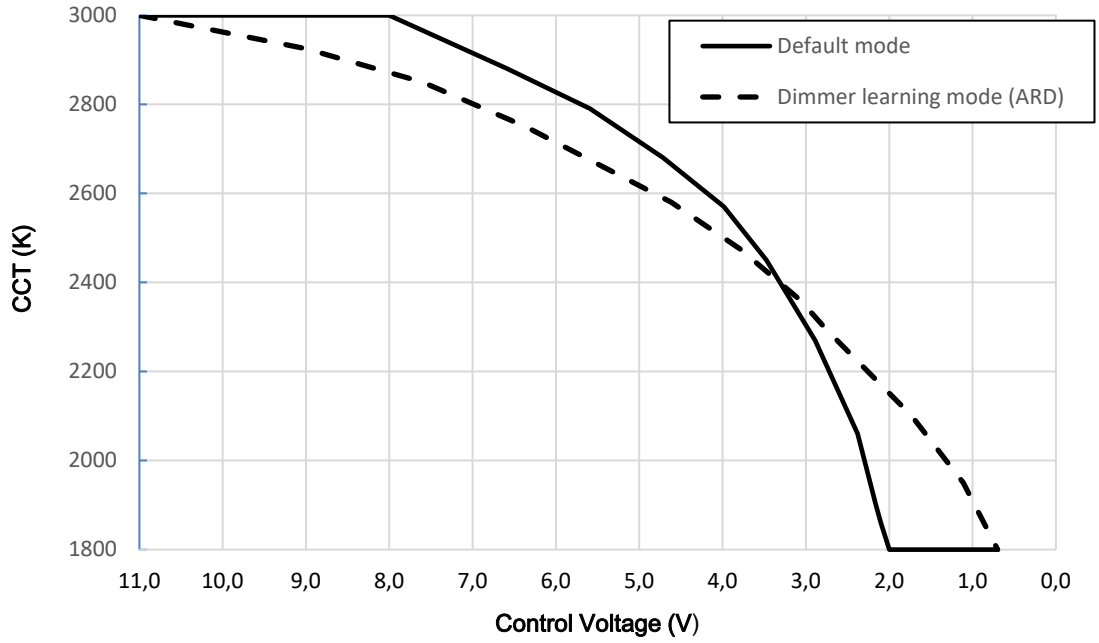


Figure 6: CCT vs. control voltage in warm dim mode

Relative Intensity vs. Control Voltage in Warm Dimming Mode

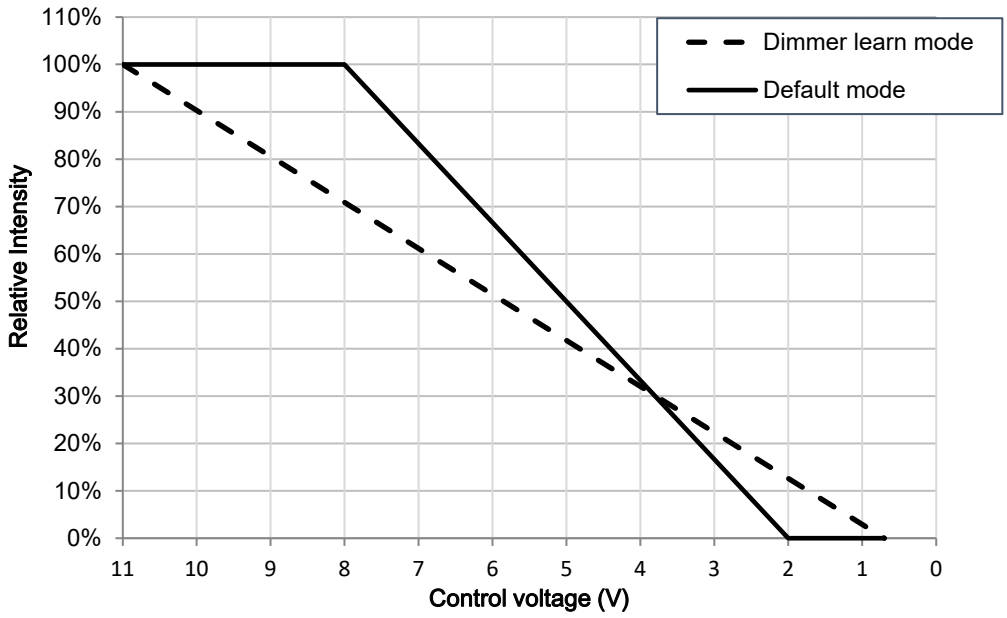


Figure 7: Intensity vs. control voltage in warm dim mode

Note for Figure 7:

1. LuxiTune driver has a linear response, i.e. it will produce linear output with linear dimmer and logarithmic output with logarithmic dimmer.

CCT Range in CCT Tuning Mode

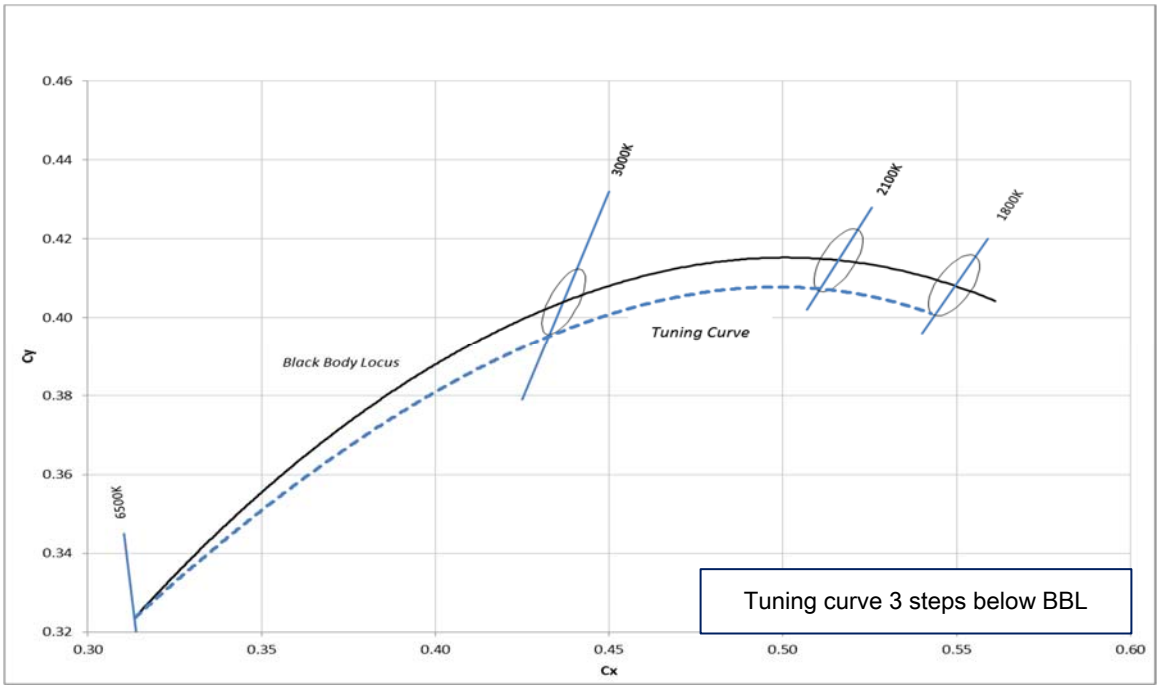


Figure 8: Typical CCT range in CCT tuning mode

Relative Intensity vs. CCT in CCT Tuning Mode

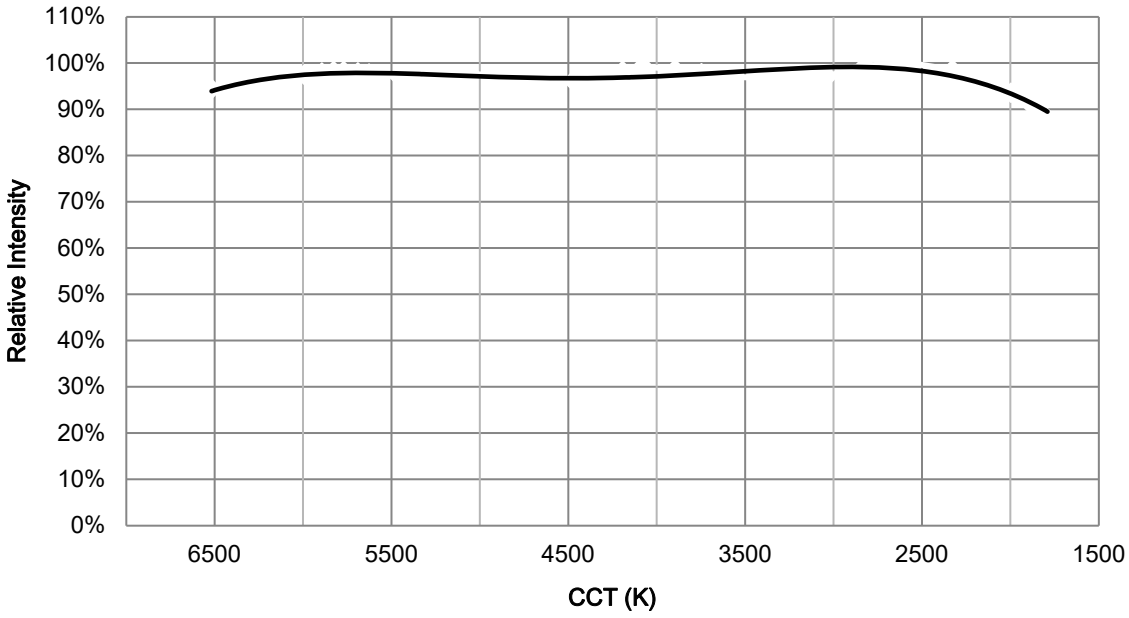


Figure 9: Relative Intensity vs. CCT in CCT tuning mode PC Lime Chromaticity Group

CCT vs. Control Voltage in CCT Tuning Mode

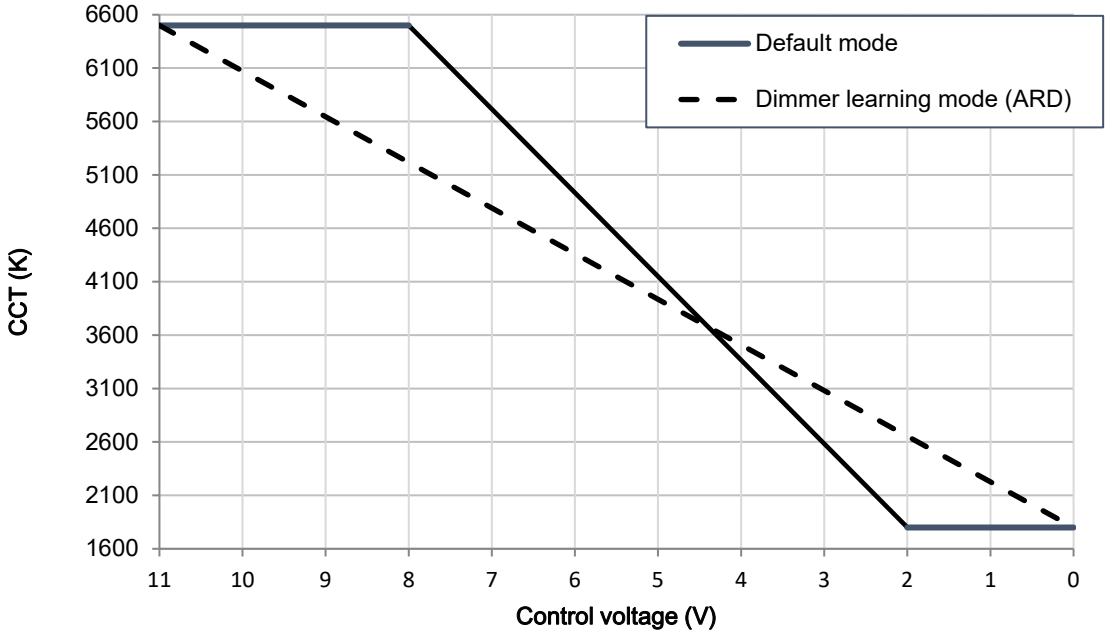


Figure 10: CCT vs. control voltage in CCT tuning mode

Relative Intensity vs. Control Voltage in CCT Tuning Mode

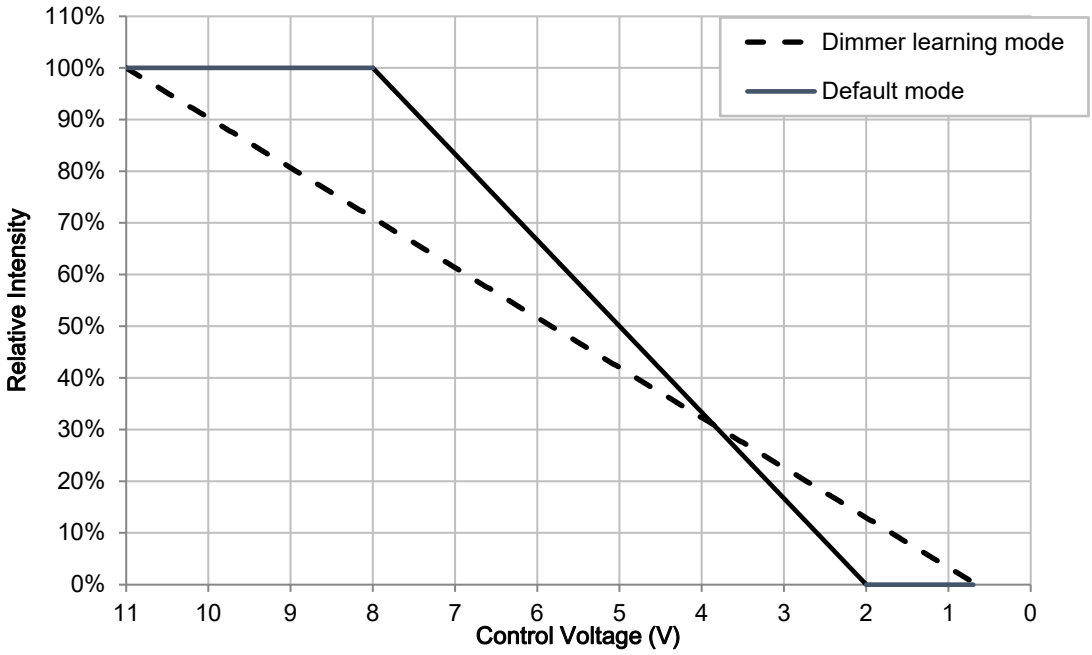


Figure 11: Relative intensity vs. control voltage in CCT tune mode

Note for Figure 11:

1. LuxiTune driver has a linear response, i.e. it will produce linear output with linear dimmer and logarithmic output with logarithmic dimmer.

CRI vs. CCT in CCT Tuning Mode

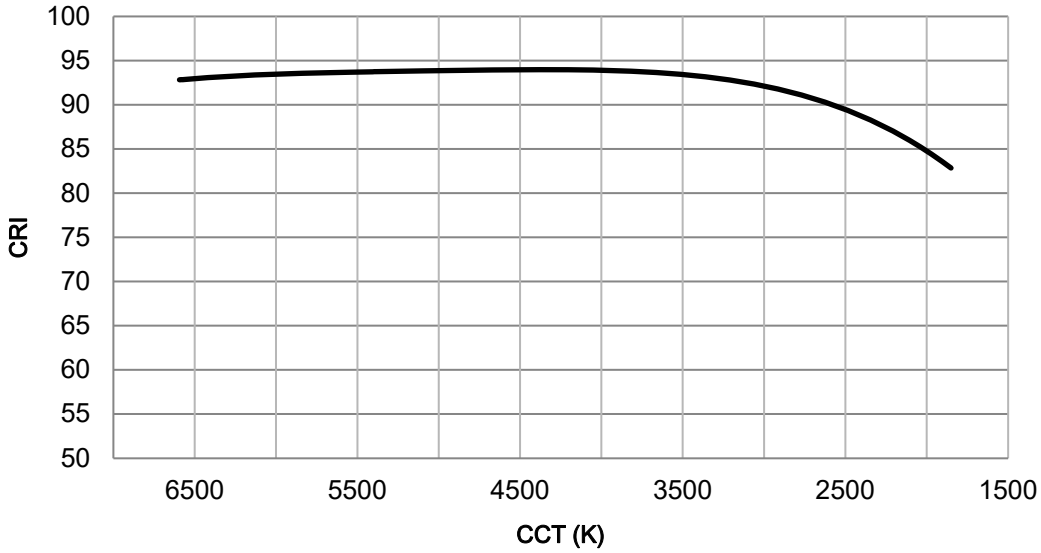


Figure 12: CRI vs. CCT in CCT tune mode

LuxiTune Light Engine – Without Secondary Lens

Mechanical Dimensions (mm)

LED Engin recommends that customers purchase the LuxiTune light engine with the supported secondary optics as the optics is optimized for color mixing and efficiency. However, some luminaire manufacturers have their unique secondary optics that they would like to use with LuxiTune. The following mechanical dimensions are provided as a guidance.

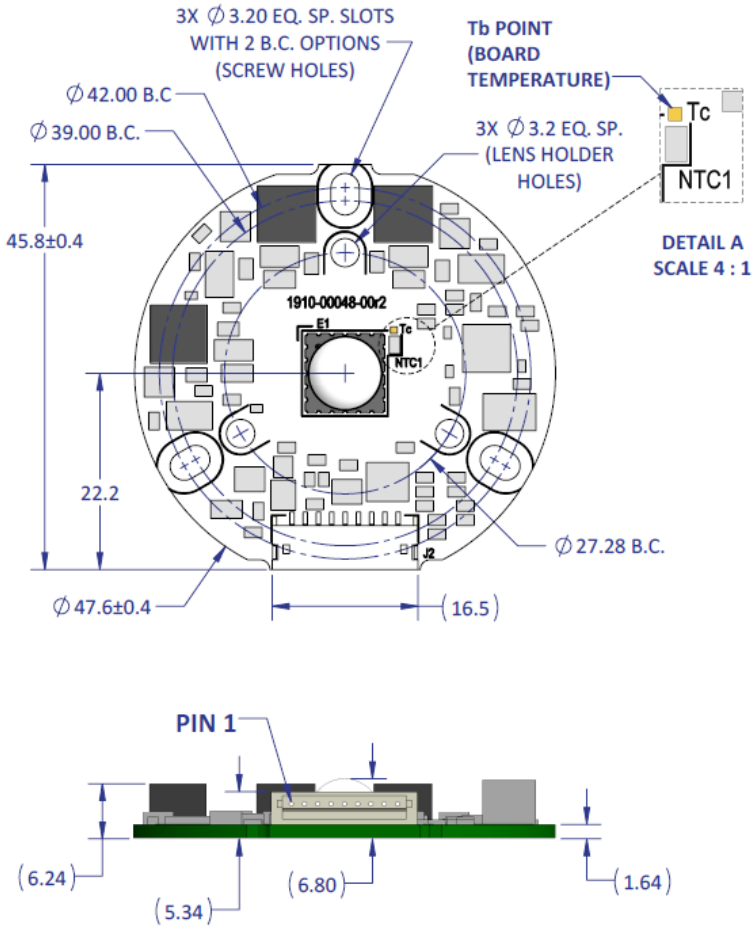


Figure 13: Mechanical dimensions of LuxiTune light engine – without secondary lens

Notes for Figure 13:

1. Unless otherwise noted, the tolerance = +/- 0.2mm.
2. Suggested location of optional heat spreader for 0-10V driver in dotted lines. Heat spreader should keep clearance with solder pads. Refer to thermal section.

LuxiTune Light Engine – With Secondary Lens

Mechanical Dimensions (mm)

The standard LuxiTune light engine is sold with supported secondary optics optimized for color mixing and efficiency. The following mechanical dimensions are provided as a guidance for luminaire design. The 3-legged lens holder sits in the 3 holes shown in Figure 13.

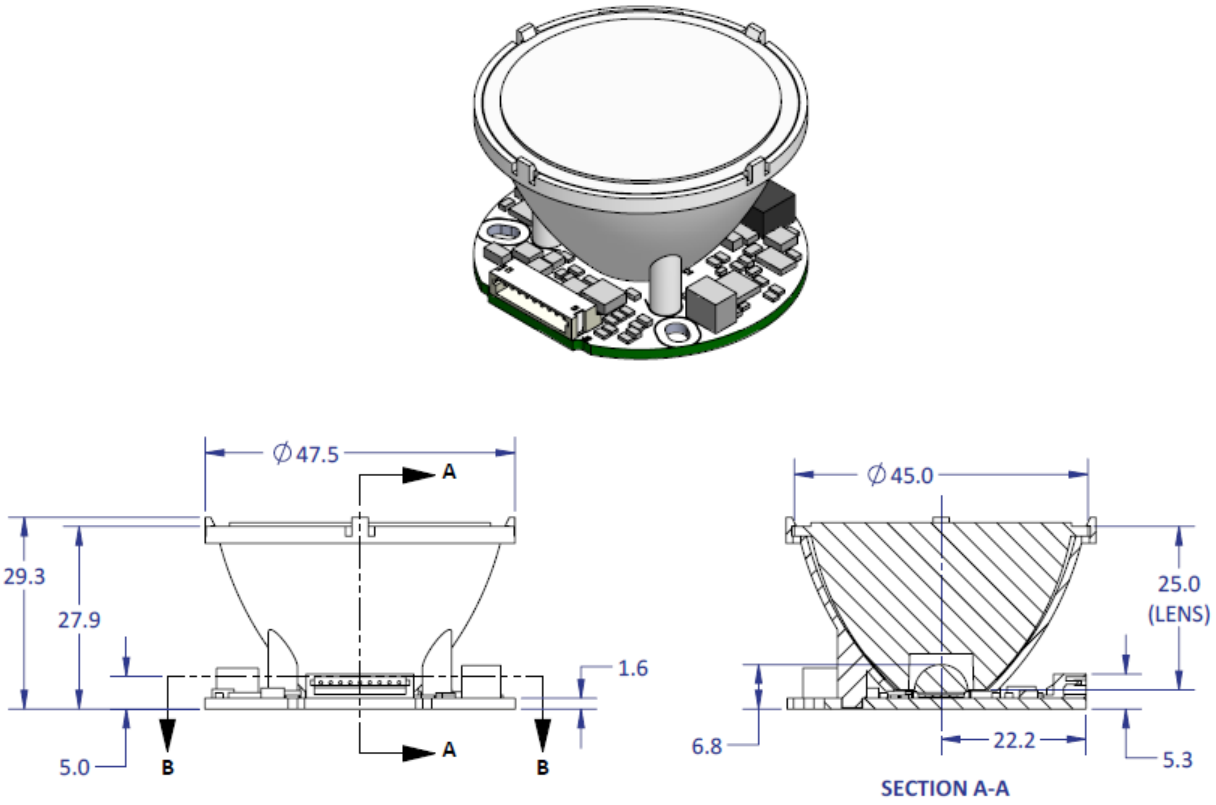


Figure 14: Mechanical dimensions of LuxiTune light engine – with secondary lens

Notes for Figure 14:

1. Unless otherwise noted, the tolerance = +/- 0.2mm.
2. Suggested location of optional heat spreader for 0-10V driver in dotted lines. Heat spreader should keep clearance with solder pads. Refer to thermal section.

Lens Assembly Instructions

Lens holder legs may be inserted into MCPCB mounting holes. An epoxy or polyurethane-based adhesive should be used to adhere the lens holder to the MCPCB.
While there are many suitable adhesives, LED Engin recommends Dow Corning 3145 RTV.
Cyanoacrylate adhesives (superglue) must not be used, because they are known to cause lens contamination effects due to “blooming” of the adhesive.

Lens Cleaning

For the removal of dust, use a lint-free soft cloth.
For the removal of stains, use a neutral detergent, i.e. dishwashing soap.
Do not use any solvents, abrasive liquids or abrasive fabrics because they may damage the optical grade lens surfaces.

Thermal and Mechanical Design Considerations

Heat Sink Thermal Resistance

Thermal design is critical for optimal performance of the LuxiTune engine; therefore it is important to choose an efficient heat sink. Design attributes such as heat sink size and shape, active or passive cooling options, material, surface finish etc. need to be selected such that the thermal resistance of the heat sink is optimized for the specific environment the fixture will be operating in.

The board thermal reference point referred to as NTC1 is marked in Figure 13 and is used to control the performance of the light engine. In the case of insufficient cooling, the light engine will be protected by the driver. The driver continuously monitors the temperature at NTC1 and will reduce the power in steps of 10% when the temperature rises above 85℃. At 105℃ the light engine will be turned off.

The temperature at NTC1 is correlated to the junction temperature of the dies in the emitter and is also an indicator for thermal design. LED Engin recommends that the following thermal resistance values are met in the luminaire design.

Table 6

$T_{ambient}$[1] (℃)	T_b @NTC1 (℃)	P_d[2] (W)	Tj (℃)	Required minimum heat sink $R_{th\_(heatsink + TIM)}$ [3] (℃/W)
25	85	14.6	112	4.1
45				2.7
55				2.0

Table 7

$T_{ambient}$[1] (℃)	T_b @NTC1 (℃)	P_d[2] (W)	Tj (℃)	Required minimum heat sink $R_{th\_(heatsink + TIM)}$ [3] (℃/W)
25	65	14.6	92	2.7
45				1.4
55				0.7

Notes for Tables 6 & 7:

1. $T_{ambient}$ is defined as the air temperature surrounding the heat sink. Eg. if the heat sink is mounted inside an enclosed fixture, $T_{ambient}$ is the temperature of the air inside the fixture.
2. P_d is the thermal power dissipation.
3. R_{th} values are calculated based on typical data sheet operating conditions.

Thermal Design Guidance

A good thermal design requires an efficient heat transfer from the LuxiTune hybrid board to the heat sink. In order to minimize air gaps between the board and the heat sink, it is common practice to use thermal interface materials (TIM) such as thermal pastes, thermal pads, phase change materials and thermal epoxies. Each material has its pros and cons depending on the design. Thermal interface materials are most efficient when the mating surfaces of the board and the heat sink are flat and smooth. Rough and uneven surfaces may cause gaps with higher thermal resistances, increasing the overall thermal resistance of this interface. It is critical that the thermal resistance of the interface is low, allowing for an efficient heat transfer to the heat sink and keeping LuxiTune hybrid board temperatures low.

LED Engin recommends the use of the following thermal interface materials:

- Bergquist's Gap Pad 5000S35, 0.020in thick
  - Part Number: Gap Pad® 5000S35 0.020in/0.508mm
  - Thickness: 0.020in/0.508mm
  - Thermal conductivity: 5 W/m-K
  - Continuous use max temperature: 200℃
- 3M's Acrylic Interface Pad 5590H
  - Part number: 5590H @ 0.5mm
  - Thickness: 0.020in/0.508mm
  - Thermal conductivity: 3 W/m-K
  - Continuous use max temperature: 100℃
  - Using M3 Screw (or #4 screw), with polycarbonate or glass-filled nylon washer (#4) the recommended torque range is: 20 to 25 oz-in (1.25 to 1.56 lbf-in or 0.14 to 0.18 N-m)

Mechanical Mounting Considerations

The mounting of LuxiTune hybrid board assembly is a critical process step. Excessive mechanical stress in the board can cause the board to warp, which can lead to emitter substrate cracking and subsequent cracking of the LED dies. To relax some of the stress, it is advisable to use polycarbonate or glass-filled nylon washers between the screw head and the board and to follow the torque range listed above.

LED Engin recommends the use of the following thermal interface materials:

- Inspect hybrid board and heat sink for flatness and smoothness.
- Select appropriate torque for mounting screws. Screw torque depends on the mounting method (thermal interface materials, screws, and washer). Follow the torque range listed above.
- Always use three M3 or #4-40 screws with #4 plastic washers.
- When fastening the three screws, it is recommended to tighten the screws in multiple small steps.
- Always use plastic washers in combinations with the three screws. This helps maintain, roughly, constant pressure on the board as the assembly heats up.
- In designs with non-tapped holes using self-tapping screws, it is common practice to follow a method of three turns tapping a hole clockwise, followed by half a turn anti-clockwise, until the appropriate torque is reached.
- Using M3 Screw (or #4 screw), with polycarbonate or glass-filled nylon washer (#4) the recommended torque range is: 20 to 25 oz-in (1.25 to 1.56 lbf-in or 0.14 to 0.18 N-m).

Thermal Feedback and Protection

The LuxiTune light engine has a closed loop thermal feedback mechanism which controls color stability such that color coordinates are constant over the entire operating temperature range of 15℃ - 85℃ (NTC1 = +15 … +85℃).

When the board temperature exceeds 85℃ (NTC1 > 85℃), the LuxiTune emitter goes into thermal protection mode. The light intensity is reduced in steps of 10% until the emitter turns “off” when it reaches 105℃ (NTC1 = 105℃). When the temperature drops again and reaches 65℃ (NTC1 <65℃), the light intensity is fully restored.

Electrical Interfaces

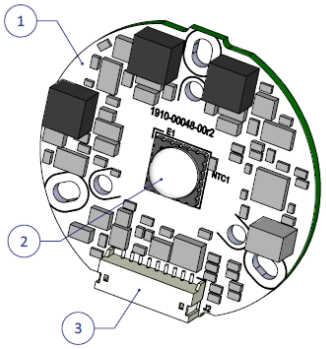
24VDC Power Supply Requirements

This LuxiTune product requires an AC-to DC power supply that meets the following requirements. The input to the LuxiTune driver from the AC-DC power supply is constant voltage, but the output from the integrated driver to the LuxiTune light source is constant current.

Class 2 / SELV power supply, max current 1.5A
Minimum Output Voltage: 21V
Maximum Output Voltage: 27V
Minimum Output Power: 24W

Connectors

A 9-pin connector, J2, is used for supply power, 0-10V dimming signals and automatic range dimmer option



ITEM NO.	PartNo	Description	QTY.
1	3300-00079-00, Rev02	LTC Luxitune Hybrid Board (Gen2.4)	1
2	LZC-03T30R	Emitter: LZC, 12 die, Luxitune, w/ Frosted Lens (6500K)	1
3	JST PN: S9B-ZR-SM4A-TF(LF)(SN)	(@ J2): 9 Positions Header, Shrouded Connector 0.059" (1.50mm) Surface Mount, Right Angle Tin	1

Figure 15: Connector J2 on LuxiTune unit

24VDC Power Supply Wiring

Connect 24VDC power supply Vout+ to LuxiTune connector J2, pins 2, 3 (Vin+). Both pins must be connected to Vout+ of the 24VDC power supply to spread the current load.
Connect 24VDC power supply Vout- to LuxiTune connector J2, pins 1, 6 (GND). Both pins must be connected to Vout- of the 24VDC power supply to spread the current load.
LuxiTune must not be connected in reverse polarity, because reverse operation can cause permanent damage to the drive circuitry. The terminal wires should have cross section 0.5-1.5 mm^2 corresponding to 16-24 AWG.
See table 8 below for pin description.

Table 8

Pin	Name	Description
1	GND	Common ground
2	Vin+	+24V, supply power
3	Vin+	+24V, supply power
4	Dim	Dimming 0-10V input
5	CCT	CCT tuning 0-10V input
6	GND	Common ground
7	GPIO1	Programmable general purpose I/Os for LED Engin use
8	GPIO2	Programmable general purpose I/Os for LED Engin use
9	RSET/GPIO3	RSET in default mode/Programmable general purpose I/Os for LED Engin use

Recommended Power Supplies

Table 9

Input Voltage	Manufacturer	Part Number	Maximum Output Power
90-305VAC	Efore	RSLP035-24	36W
90-264VAC	Mean Well	DR-30-24	30W
90-264VAC	Mean Well	MDR-40-24	40W
90-264VAC	Mean Well	PLC-45-24	45W
90-264VAC	Mean Well	DR-45-24	45W
100-240VAC	MagTech	GFP451DA-2419EW	45W
220-240VAC	Osram	ELEMENT 30/220-240/24 G2 [1]	30W

Note for Table 9:

1. Only for applications in Europe.

Dimming and Tuning Control Functions

LuxiTune works with the following control inputs:

- 0-10V
- BLE
- DALI

Insulation of Control Circuits

Table 10

Control Protocol	Insulation between control circuit and Class 2/SELV circuit on the LuxiTune driver board and daughter cards	Details	Requirements for controller between mains supply of the controller and the control circuit
0-10V	None	Same ground for Class 2/SELV circuit and 0-10V interface	Double or reinforced insulation
DALI	Supplementary insulation	Designed for mains voltage up to 300 Vrms	At least basic insulation
DMX-RDM DMX 512-A	Supplementary insulation	Designed for mains voltage up to 300 Vrms	Double or reinforced insulation

0-10V Control Functions

LuxiTune implementation of the 0-10V interface in non-isolated. The following are supported:

- All 0-10V dimmers with either current sink (IEC60929) or current source configuration.
- All 1-10V dimmers with either current sink (IEC60929) or current source configuration.
- All 0-100K Ohm variable resistors.

Default Control Range:

The default input control range is 2V for <0.5% and 8V for 100% and <0.7V for 0% (See figures 6 and 8). This setup guarantees a full 0.5-100% control range even with dimmers that do not have a well-defined voltage range below the 2V and above the 8V limits.

Compatible Dimmers & Controls

LuxiTune has been tested internally with these products and found to be compatible.

Common 0(1)-10V Dimmers

Table 11

Supplier	Model	Log/Linear	Voltage Range
Lutron	Diva, DVTV (logarithmic)	Log	0-10V
Lutron	Nova-T, NTFTV	Log	0-10V
Lutron	Diva, NFTV	Log	0-10V
Lutron	Grafik Eye -GRX-TVI with GRX3503	Log	0-10V
Lutron	Energi Savr Node - QSN-4T16-S	Log	0-10V
Lutron	TVM2 Module	Log	0-10V
Leviton	IP710-DLX	Linear	0-10V
Lightolier	V2000FAMU	Linear	0-10V
Lightolier	ZP600FAM120	Linear	0-10V
Lightolier	MP1500FAM120	Linear	0-10V
Jung	240-10	Linear	1-10V
Gira	0308 00	Linear	1-10V
Merten	5729	Linear	1-10V
Busch-Jaeger	2112U-101	Linear	1-10V
Hunt	PS-(LED)-010	Linear	0-10V
Pass & Seymour	CD4FB-W	Linear	0-10V
Watt Stopper	DCLV1	Linear	0-10V

Notes for Table 11:

1. This table only lists a small subset of available dimmer. LuxiTune works with any 0-10V dimmer.
2. Depending on the type of dimmer selected, make sure that its installation meets local electrical wiring standards. Observe electrical isolation requirements with dimmers that connect to 220VAC/110VAC mains

BLE Mesh & Casambi App Control Functions

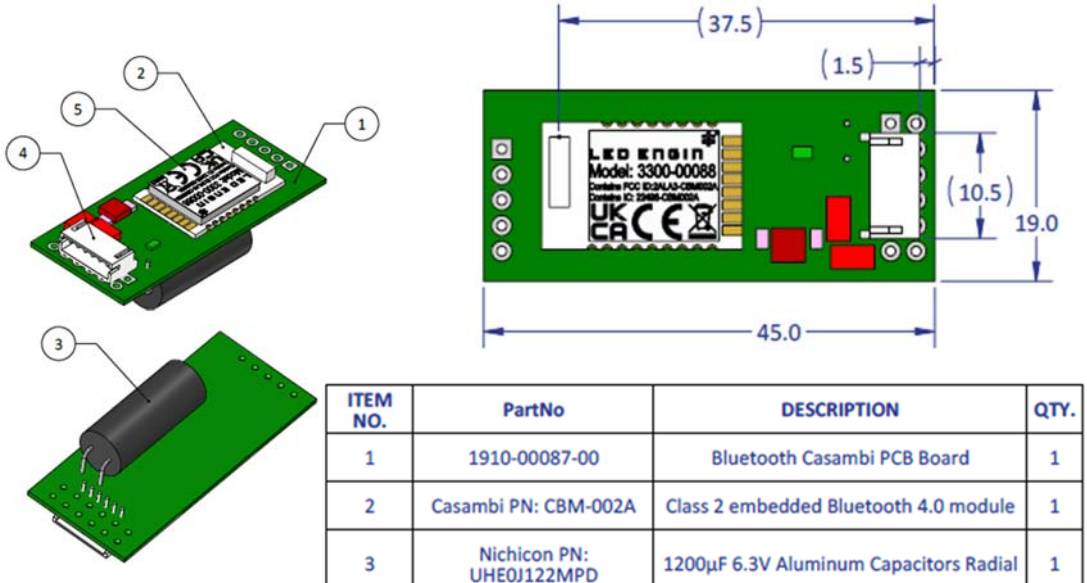
LuxiTune Gen 2.4 light engine can be controlled wirelessly using a Bluetooth (BLE) daughter card, in conjunction with the Casambi App for iOS and Android devices. The user will need to connect the BLE card with the light engine. The BLE card is FCC, CE and UKCA conform as indicated on the label on the card.

The Casambi Bluetooth App can be downloaded from the Apple store or Google Play store for iOS and Android devices. In case of Android devices, we recommend using the higher end devices, since the BLE hardware in some low-end Android devices are not as effective at signal detection over a large physical area, where the light fixtures might be located.

https://casambi.com/downloads.html

LuxiTune uses two different color profiles that the Casambi interface recognizes (not to be confused with 2 handles for CCT and intensity). The CCT range from 1800K to 3000K, which is for warm dimming applications, is one of the profiles. The second profile is for a CCT range 1800K to 6500K used for tunable white or CCT tuning applications. The LuxiTune BLE card is set up for the 1800K to 6500K color profile as a default, since Casambi supports one color profile at a time.

BLE Daughter Card

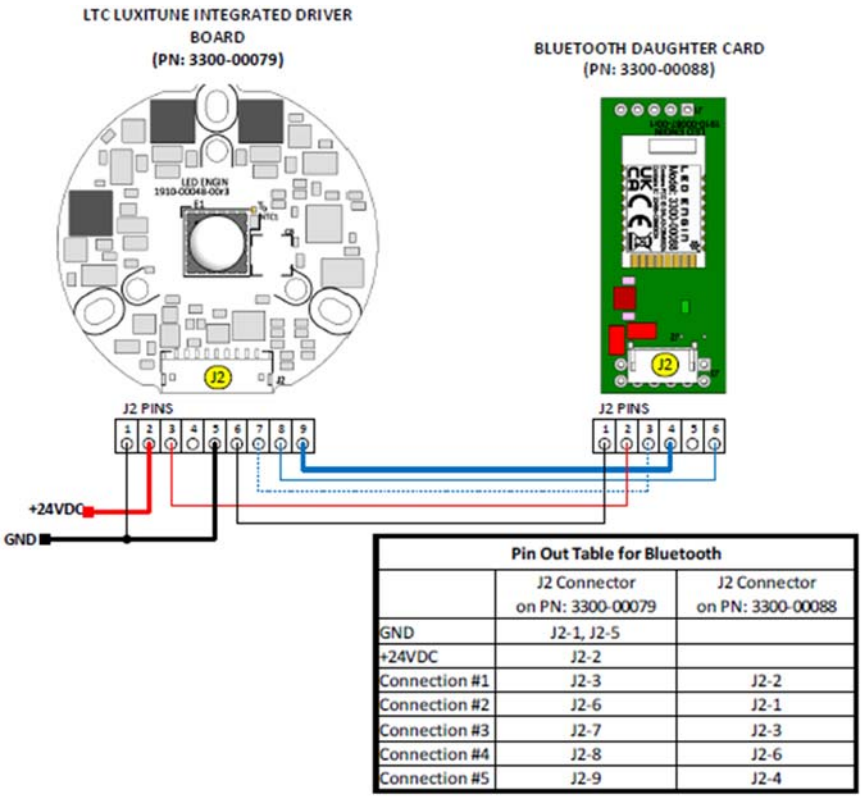


ITEM NO.	PartNo	DESCRIPTION	QTY.
1	1910-00087-00	Bluetooth Casambi PCB Board	1
2	Casambi PN: CBM-002A	Class 2 embedded Bluetooth 4.0 module	1
3	Nichicon PN: UHE0J122MPD	1200µF 6.3V Aluminum Capacitors Radial	1
4	(@ J3), JST PN: S6B-ZR(LF)(SN)	(@ J3): 6 Positions Header, Shrouded Connector 0.059" (1.50mm) Through Hole, Right Angle Tin	1
5	2000-00002-00	Label LT Gen 2.x BLE Daughter Card	1

Figure 16: BLE daughter card

BLE Wiring Diagram

The information below should be used to connect one LuxiTune unit with one BLE card. Wires are not provided. This configuration assumes that the unit will be only controlled with BLE, not 0-10V. Other configurations may be possible, subject to the application and the fixture.



Pin Out Table for Bluetooth		
	J2 Connector on PN: 3300-00079	J2 Connector on PN: 3300-00088
GND	J2-1, J2-5	
+24VDC	J2-2	
Connection #1	J2-3	J2-2
Connection #2	J2-6	J2-1
Connection #3	J2-7	J2-3
Connection #4	J2-8	J2-6
Connection #5	J2-9	J2-4

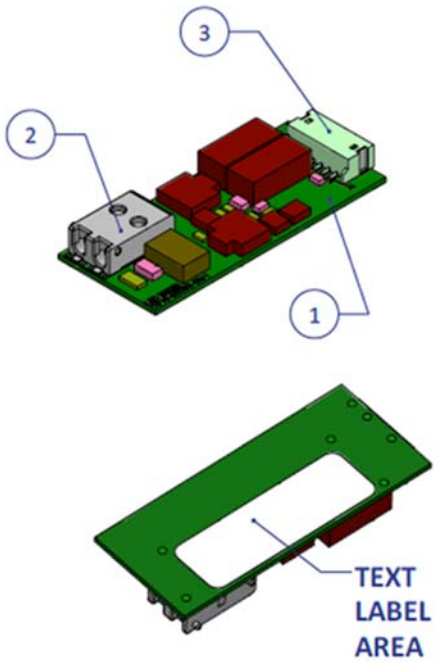
Figure 17: Wiring of LuxiTune through J2

DALI Control Functions

The LuxiTune unit can be operated in two different modes:
- Halogen-style warm dimming mode, DALI device type 6 (DT6) compatible (Control gear 102). Fsda
- CCT tuning mode, DALI device type 8 (DT8) compatible (Control gear: 209 Color control).

To add DALI functionality to the unit, it must be connected to a DALI daughter card, shown in Figure 17. First remove the power from the board and then connect the DALI daughter card as indicated in Figure 18.

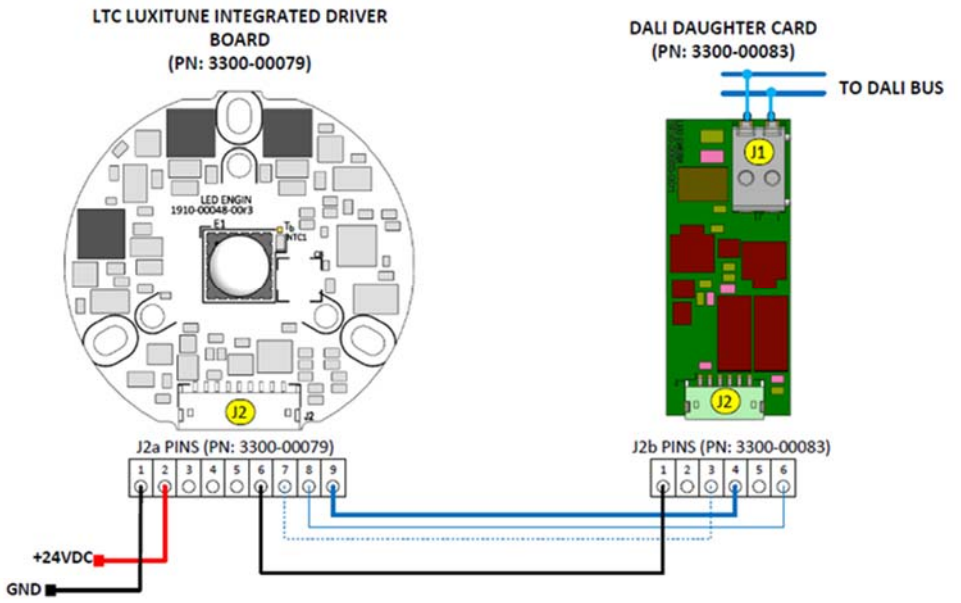
By default the unit will start up in warm dimming mode with base address 0, but when it receives a DT8 command (dim warm/cool) it will switch to the CCT tuning mode. It cannot switch automatically back. Only a special DALI command (SetTcPHY_coolest=0) will set it back to the warm dimming mode. This should not be done dynamically as there are only a limited amount of resets possible (10,000).



ITEM NO.	PartNo	DESCRIPTION	QTY.
1	1910-00083-00	Pinless DALI PCB Board	1
2	(@J1), TE PN: 2834006-2	RELEASE POKE-IN CONNECTOR 2 POLE	1
3	(@J2), JST Sales PN: S6B-ZR-SM4A-TF(LF)(SN)	CONN HEADER SMD R/A 6POS 1.5MM PITCH	1

Figure 18: DALI daughter card

DALI Wiring Diagram



Pin Out Table for DALI Daughter Card		
	J2 (J2a) Connector on PN: 3300-00079	J2 (J2b) Connector on PN: 3300-00083
GND	J2a-1	
+24VDC	J2a-2	
Connection #1	J2a-6	J2b-1
Connection #2	J2a-7	J2b-3
Connection #3	J2a-8	J2b-6
Connection #4	J2a-9	J2b-4

Figure 19: Wiring diagram for DALI control

Common DALI Controllers

Table 12

Supplier	Model (for CCT tune, DT8 compatible)
Lunatone	DALI Cross Switch
Hadler	DALI uP
Tridonic	DALI TouchPanel 02
LumiTech	HMI DALI Touchpanel DT8
Zumtobel	LiteCom
Osram	DALI PRO CONT-4 RTC
	Model (for dim to warm, standard DT6 compatible)
Leviton	Dali Controller On/Off, pn.CD250-C

Note for Table 12:

1. Not all DALI controllers are available in the US, most are sold in Europe only.

Packaging & Traceability

- Traceability is enabled by a QR code for tracking matching parts. The unique code consists of the following characters, which can be either letters or numbers.

T006-xxxxxxxx or T012-xxxxxxxx	13 character QR code is an unique identifier for each unit
T006	First 4 characters indicate 1800K-6500K tunable range LuxiTune with Bluetooth Control
T012	First 4 characters indicate 1800K-6500K tunable range LuxiTune with DALI Control
Xxxxxxxx	Last 8 characters indicate unique product serial number (serial # 12 in 00000012)

- The QR code on the board is printed in text and barcode format on labels.
  - Type: QR code 13 char, 16x16 dots, 4x4mm
  - Primary label dimensions: 0.25”x0.25”
  - Label type: high temperature resistant (polyimide based)
  - Location and position of primary label: on the board

- Packaging for the LuxiTune hybrid boards units is as follows:
  - Plastic Tray & Lid 360x315x14.5mm holds 25 hybrid boards
  - 1 Tray is packed in one Pizza Box 382*321*22mm. 1 x BPL Label per Pizza Box
  - Outer Box / Shipping Carton 412*346*275mm can fit up to 10 pizza boxes depending on number of set ordered. 1 x BPL Label per Outer Box

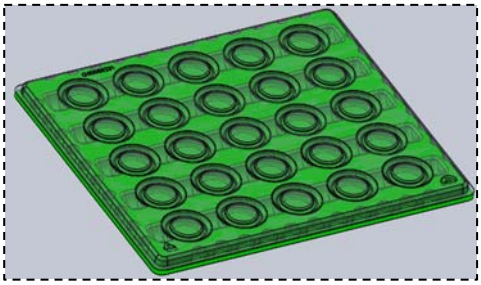


Figure 20: Tray & Lid for LuxiTune hybrid boards

- Packaging for LuxiTune daughter cards units is as follows:
  - Plastic Tray & Lid 360x140x16.7mm holds 15 daughter cards
  - 1 set of Tray is packed in 1 Pizza Box 384*154*24mm. 1 x BPL Label per Pizza Box
  - For Bluetooth daughter cards, a simplified Declaration of Conformity with 2011/65/EU and amendments and 2014/53/EU is added to the Pizza Box
  - Outer Box / Shipping Carton 414*180*160mm can fit up to 5 Pizza Boxes depending on number of sets ordered. 1 x BPL Label per Outer Box

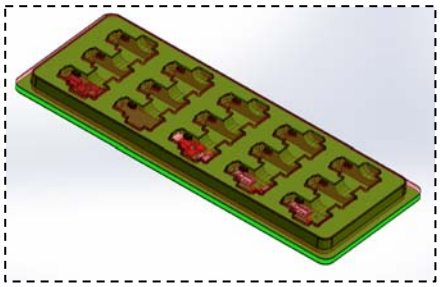


Figure 21: Tray & Lid for LuxiTune daughter cards

- Any LTC compatible TIR optics ordered is also shipped separately from the matched pairs and be used interchangeably

Notes

UL

LuxiTune driver assembly meets UL guidelines for low voltage electronic circuit designs. Existing luminaire products using LuxiTune have passed UL testing and are UL and cUL listed.

CE

The LuxiTune product(s) are in conformity with the relevant Union harmonization legislation for CE. For additional information and actual declaration, please contact OSRAM Opto Semiconductors GmbH, at Leibnizstrasse 4, 93055 Regensburg, Germany.

2014/30/EU and amendments	Directive of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to electromagnetic compatibility; Official Journal of the EU L96, 29/03/2014, p. 79-106
2011/65/EU and amendments	Directive of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment; Official Journal of the EU L174, 1/07/2011, p. 88-110
2009/125/EC and amendments	Directive of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of Ecodesign requirements for energy-related products
(EU) 2019/2020 and amendments	COMMISSION REGULATION (EU) 2019/2020 of 1 October 2019 laying down Ecodesign requirements for light sources and separate control gears pursuant to Directive 2009/125/EC of the European Parliament and of the Council and repealing Commission Regulations (EC) No 244/2009, (EC) No 245/2009 and EU) No 1194/2012

Ecodesign regulation information

The reference control settings

Full load: light output 100%

CCT: 3000K

These values can be set by using either of the control protocols described in this datasheet.

How to remove lighting control parts

All daughter cards listed in this datasheet are considered lighting control parts for DALI and Bluetooth Casambi protocols. By removing the wire from the card connector in turn-off state, LuxiTune disconnects from the control parts.

List of compatible dimmers

The list of dimmers compatible with either of the control protocols described in this datasheet, is located under each respective controls chapter of this datasheet.

Disposal

Separate control gear and light sources must be disposed of at certified disposal companies in accordance with Directive 2012/19/EU (WEEE) in the EU and with Waste Electrical and Electronic Equipment (WEEE) Regulations 2013 in the UK. For this purpose, collection points for recycling centers and take-back systems (CRSO) are available from retailers or private disposal companies, which accept separate control gear and light sources free of charge. In this way, raw materials are conserved, and materials are recycled.

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LED Engin, an OSRAM brand based in California's Silicon Valley, develops, manufactures, and sells advanced LED emitters, optics and light engines to create uncompromised lighting experiences for a wide range of entertainment, architectural, general lighting and specialty applications. LuxiGen™ multi-die emitter and secondary lens combinations reliably deliver industry-leading flux density, upwards of 5000 quality lumens to a target, in a wide spectrum of colors including whites, tunable whites, multi-color and UV LEDs in a unique patented compact ceramic package. Our LuxiTune™ series of tunable white lighting modules leverage our LuxiGen emitters and lenses to deliver quality, control, freedom and high density tunable white light solutions for a broad range of new recessed and downlighting applications. The small size, yet remarkably powerful beam output and superior in-source color mixing, allows for a previously unobtainable freedom of design wherever high-flux density, directional light is required. LED Engin is committed to providing products that conserve natural resources and reduce greenhouse emissions; and reserves the right to make changes to improve performance without notice.

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