LuxiTune™ Generation 2.0 Tunable White 1100lm Light
For Halogen-style dimming and CCT Tuning

LTC-P3T1xxxxH-1A3

Key Features

- 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:
  - Halogen dimming mode: Warms from 3000K to below 1600K as it dims halogen-style
  - CCT tuning mode: Tunes from 2100K to 4300K with independent brightness control
- Accurate color rendition with CRI 90
- Single 3 SDCM CCT bin
- 63 lm/W light engine efficiency (emitter + driver + lens) at steady state (hot) use conditions
- Works with standard 0-10V dimmer and DMX controls
- Driver design meets UL low voltage guidelines
- Lead (Pb) free and RoHS compliant

Typical Applications

- Down lighting
- Accent lighting
- Hospitality lighting
- Architectural lighting
- Track lighting

Description

LuxiTune™ is the only single-emitter solution capable of simulating a halogen style CCT curve as it dims below the black body with standard dimmers. LuxiTune delivers warm, consistent, and energy-efficient Lux-on-Target™ directional lighting for restaurants, entertainment, hotels and other hospitality lighting applications.

With a high color rendering index (CRI) throughout the dimming range, LuxiTune ensures accurate color rendition at all intensity levels. Furthermore, emitter-to-emitter variations of less than 3 SDCM at maximum intensity guarantee consistent light quality. LuxiTune, which is based on LED Engin's proven LuxiGen™ emitter technology, is available in three beam options: 24°/ 34°/45°, providing flexibility and freedom in lighting design.

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LuxiTune Part Number Options

Part number	Description
LTC-P3T12447H-1A3	LZC LuxiTune 1100lm emitter and driver board GEN2.0 with Narrow Flood (24^{o}) Lens and Holder
LTC-P3T13447H-1A3	LZC LuxiTune 1100lm emitter and driver board GEN2.0 with Flood (34^{o}) Lens and Holder
LTC-P3T14547H-1A3	LZC LuxiTune 1100lm emitter and driver board GEN2.0 with Wide Flood (45^{o}) Lens and Holder

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LuxiTune Chromaticity Bin @ T_C = 15 – 85°C; 100% intensity
3 SDCM Single Bin

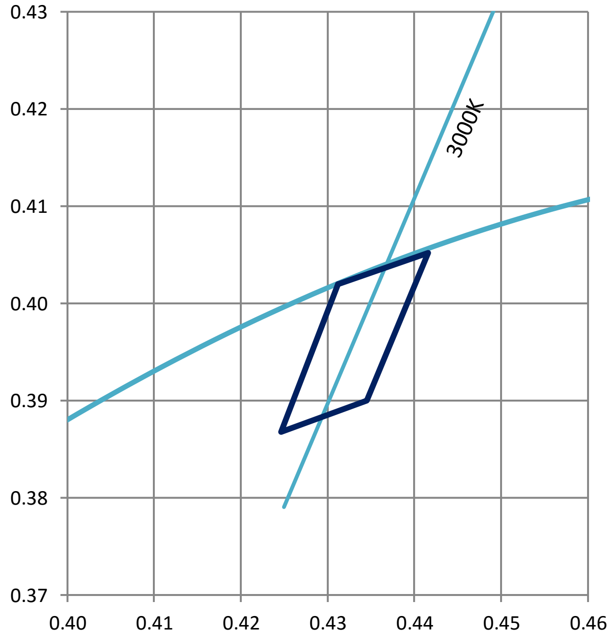

Figure 1: Single chromaticity bin plotted on excerpt from the CIE 1931 (2°) x-y chromaticity diagram. Bin coordinates are listed below in the table.

LuxiTune Bin Coordinates @ T_C = 15 – 85°C; 100% intensity
3 SDCM Single Bin

CIEx	CIEy
0.4312	0.4020
0.4246	0.3868
0.4345	0.3900
0.4416	0.4052

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Operating Conditions @ T_C = 15 – 85°C

Parameter	Symbol	Min	Typical	Max	Unit
Input Voltage	V_{in}	21.0	24.0	27.0	V
Input Current (@24VDC)	I_{in}		720	1150	mA
Input Power	P_{in}		17.3	24	W
Standby Power	P_{min}			0.5	W
Thermal Resistance (T_C point to MCPCB base)	$R\Theta_{MCPCB}$		0.6		°C/W
Storage Temperature Range - Light Engine[1]	T_{stg}	-40		+110	°C
Operating Temperature Range[2,3]	T_C[4]	+15	25	+85	°C

Notes:
1. Light Engine is defined as emitter + driver board + lens.
2. LuxiTune is operational at T_C below 15°C, however there is risk of condensation. If part is operated below 15°C, it needs to be protected against moisture.
3. If T_C>85°C, the device goes into thermal protection mode. The luminous flux is reduced in steps of 10% until it turns "off" at T_C = 105°C. Once the temperature drops to T_C <65°C, the brightness will be fully restored.
4. The temperature measurement point is labeled Tc and is located on the MCPCB next to the LED emitter.

Optical Characteristics @ T_C = 15 – 85°C

Parameters	Symbol	Min	Typical	Max	Unit
Luminous Flux[2] – Light Engine[1] @3000K, 100% intensity	Φ_V	1045	1100	1155	lm
Luminous Flux[2] – Emitter only @3000K, 100% intensity	Φ_V		1250		lm
Efficiency – Light Engine[1] @3000K, 100% intensity, T_C=65°C, 24VDC			63		lm/W
Color Rendering Index (CRI) @3000K, 100% intensity, T_C=65°C	R_a		90		
Halogen Dim Parameters	**Symbol**	**Min**	**Typical**	**Max**	**Unit**
Correlated Color Temperature @100% intensity	CCT		3000		K
Correlated Color Temperature @<1% intensity	CCT		1600		K
CCT Tuning Parameters	**Symbol**	**Min**	**Typical**	**Max**	**Unit**
Luminous Flux[2] – Light Engine[1] @4300K, 100% intensity	Φ_V	830	1000		lm
Luminous Flux[2] – Light Engine[1] @2100K, 100% intensity	Φ_V	830	940		lm

Notes:
1. Light Engine: Emitter + driver board + 34° secondary lens.
2. Luminous flux performance guaranteed within published operating conditions. LED Engin maintains a tolerance of ± 10% on flux measurements.

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Beam Characteristics @ T_C = 15 – 85°C

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:
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

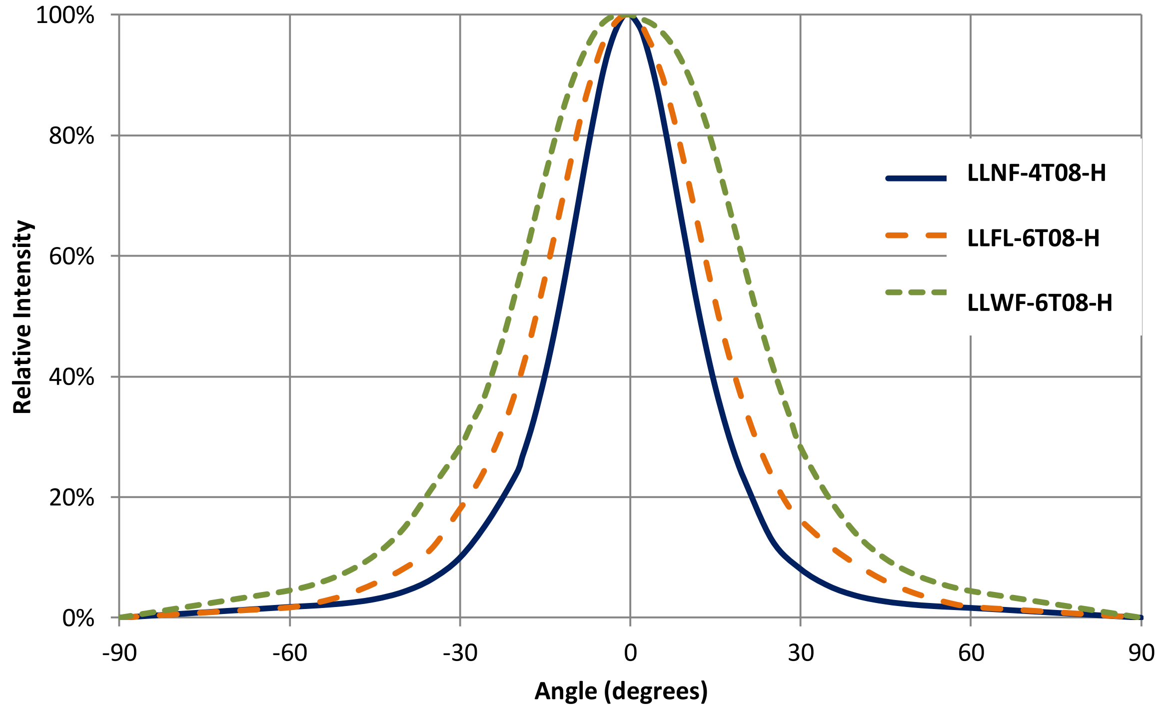

Figure 2: Typical relative intensity over angle

Average Lumen Maintenance Projections

Based on long-term reliability testing, LED Engin projects that LuxiTune will deliver, on average, 70% Lumen Maintenance at >70,000 hours of operation at nominal operating conditions (T_c = 65°C, 24VDC, 100% intensity, 3000K).

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Typical Relative Spectral Power Distribution

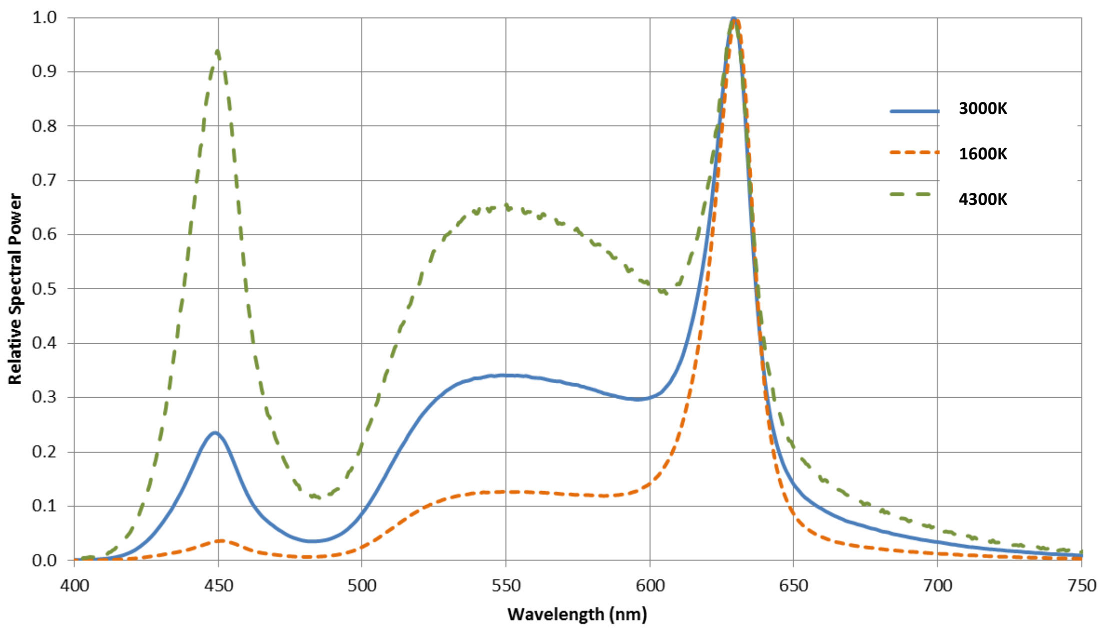

Figure 3: Typical relative spectral power vs. wavelength

CCT Range in Halogen Dimming Mode

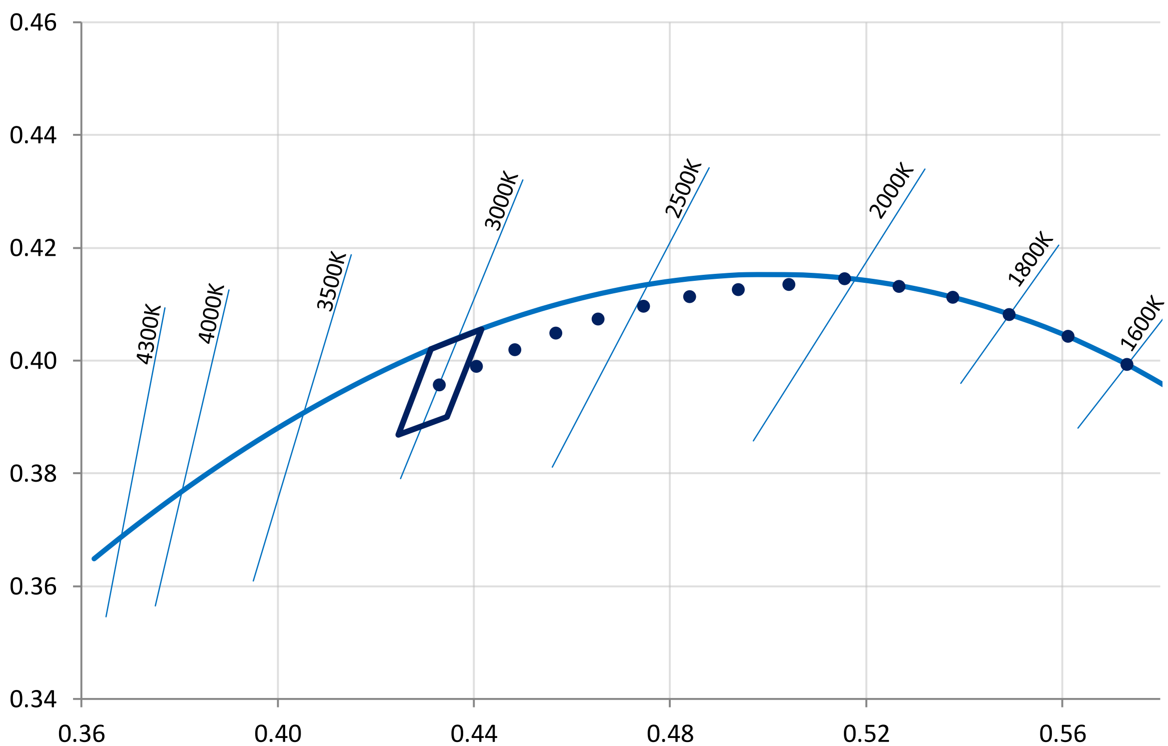

Figure 4: Typical CCT range in halogen dim mode

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CCT Range in CCT Tuning Mode

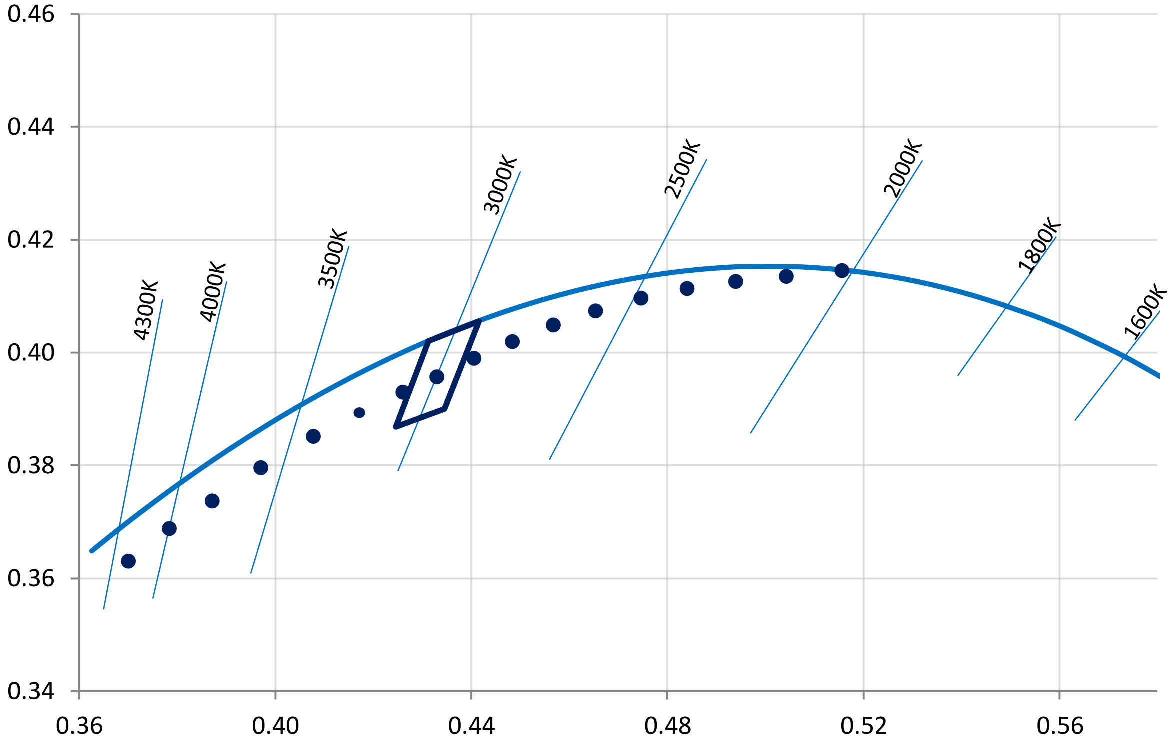

Figure 5: Typical CCT range in CCT tuning mode

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CCT vs. Intensity in Halogen Dimming Mode:

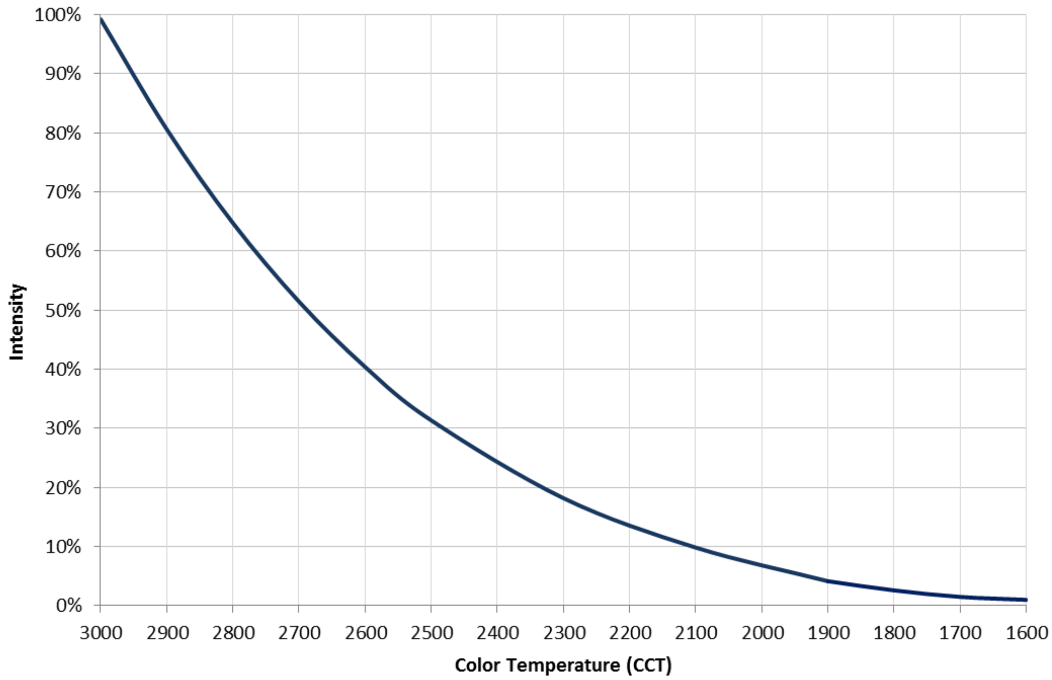

Figure 6: Intensity vs. CCT dimming profile

Relative Intensity vs. Control Voltage in Halogen Dimming Mode

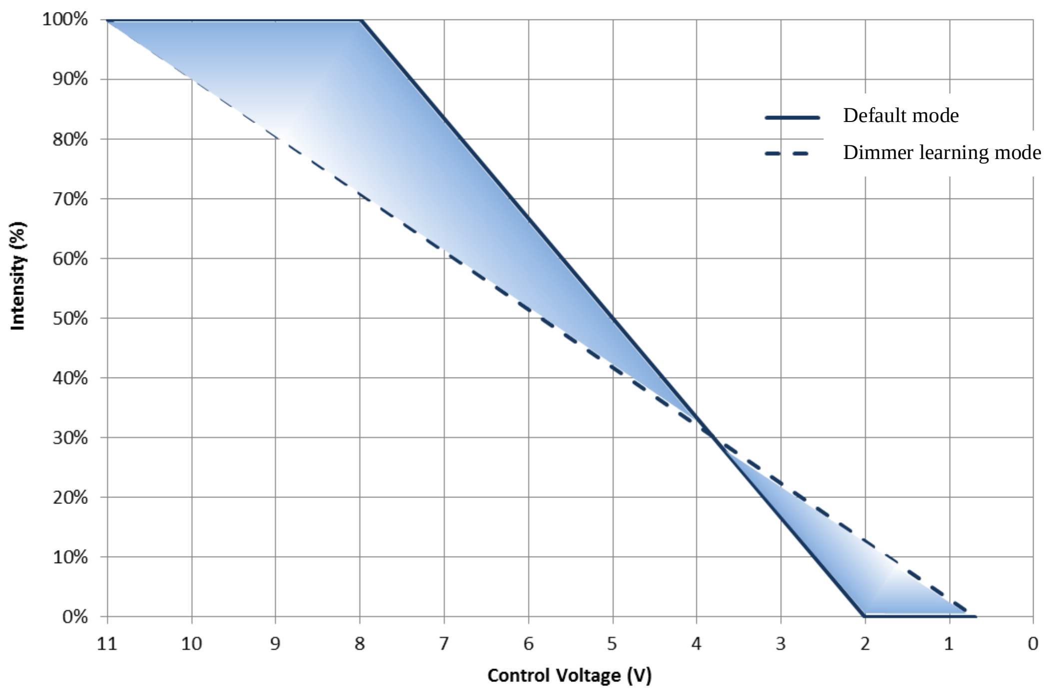

Figure 7: Intensity vs. control voltage

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

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CCT vs. Control Voltage in CCT Tuning Mode

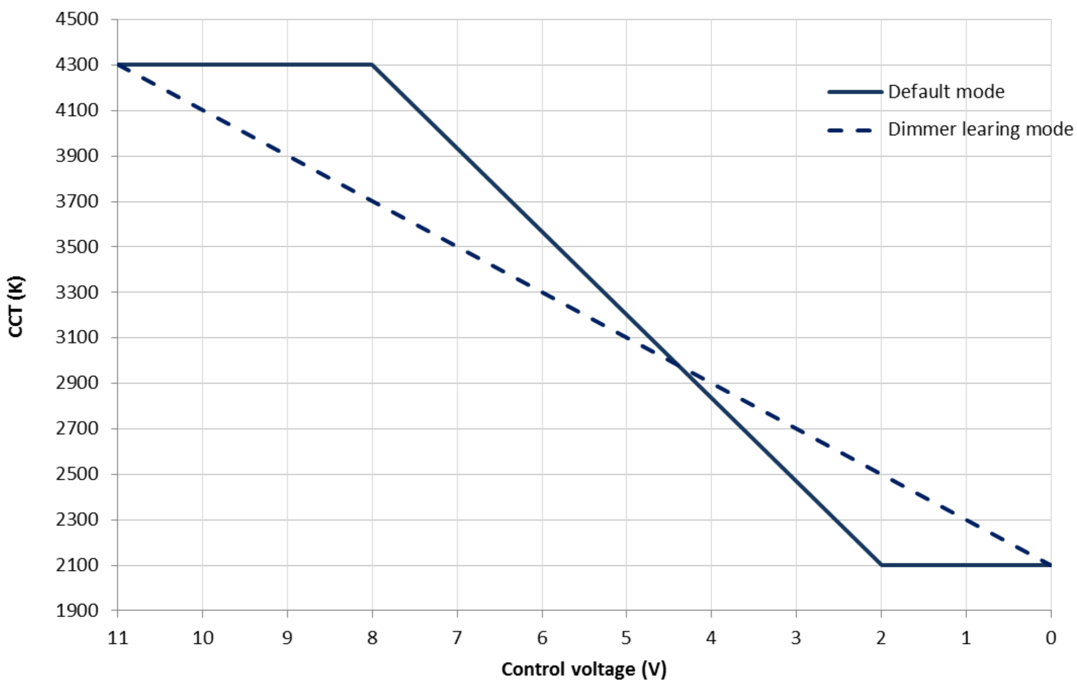

Figure 8: CCT vs. control voltage

Relative Intensity vs. Control Voltage in CCT Tuning Mode

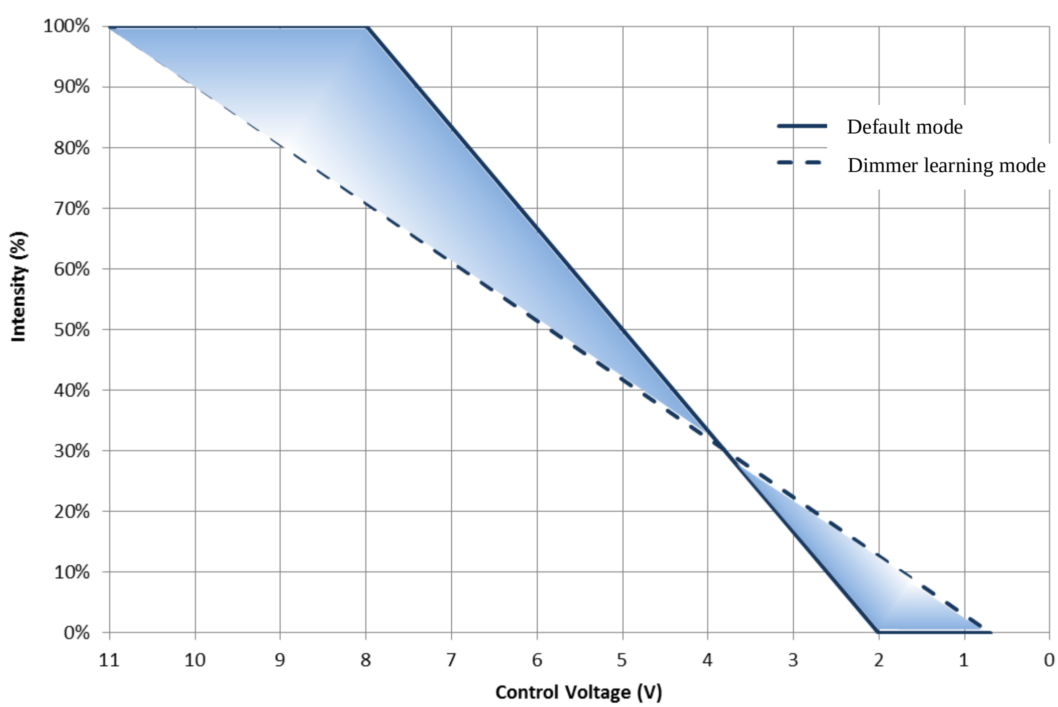

Figure 9: Intensity vs. control voltage

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

Relative Intensity vs. CCT in CCT Tuning Mode

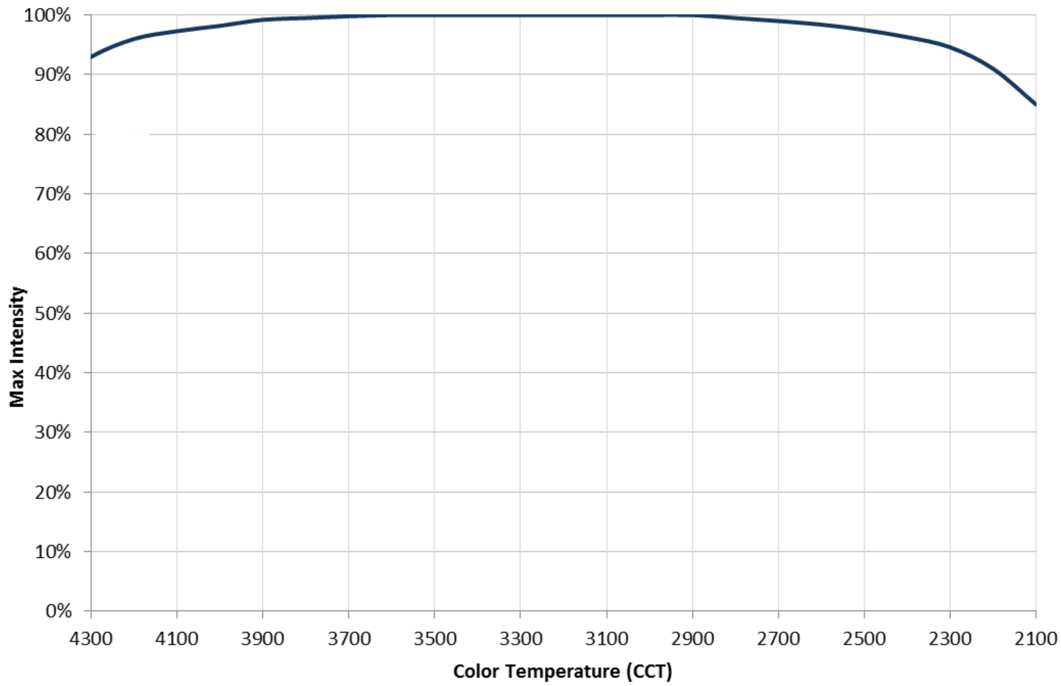

Figure 10: Relative Intensity vs. CCT

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Electrical Interfaces

Connector

J1 connector is for the automatic range dimmer option, see page 14 for detailed instructions.
J2 9-pin connector header uses JST part number S9B-ZR.
J2 pin out configuration, see table below.
J2 mating connector part numbers:

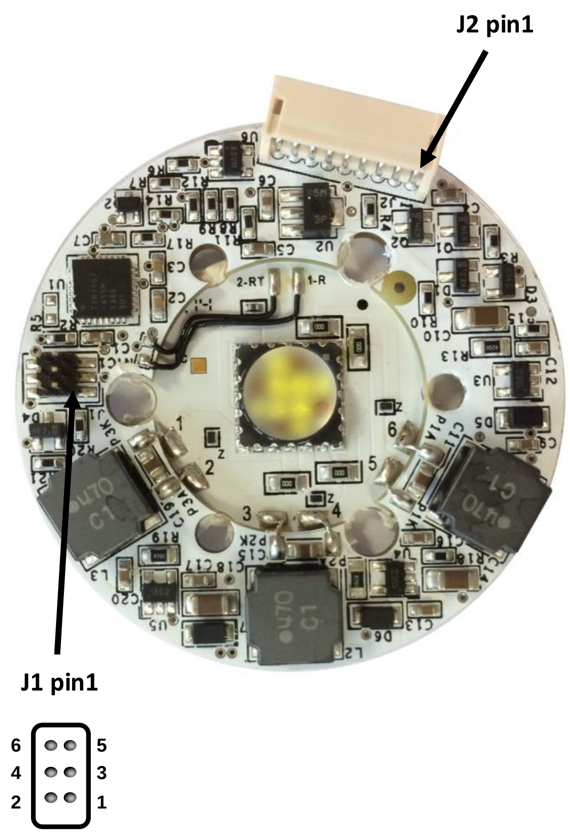
1. JST, ZHR-9(P): 9pin female with poke-in feature for 26AWG wire; 1A rating with #26.
2. JST, 09ZR-8M-P(P): 9pin female with IDC feature for up to 28AWG wire; 0.7A rating with #28

24VDC Power supply requirements

Minimum Output Voltage: 21V
Maximum Output Voltage: 27V
Minimum Output Power: 24W

24VDC Power supply wiring

Connect 24VDC power supply Vout+ to LuxiTune connector J2, pin 2 (Vin+) and pin 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, pin 1 (GND) and pin 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. See Appendix 2 for wire diagrams.



J2 Connector		
Pin	**Name**	**Function**
1	GND	Power supply Vout- DMX ground
2	V_{in+}	Power supply Vout+
3	V_{in+}	Power supply Vout+
4	0-10V Brightness	Halogen dim mode: Brightness CCT tune mode: Brightness
5	0-10V CCT	Halogen dim mode: Not connected CCT tune mode: CCT change
6	GND	Power supply Vout- DMX ground (non-isolated)
7	DMX B-	DMX signal B- (non-isolated)
8		NC
9	DMX A+	DMX signal A+ (non-isolated)

Please be aware that our implementation of DMX is “grounded”. There is NO isolation between the DMX data lines or the DMX ground nor is there electrical isolation on the DMX lines.

Figure 11: LuxiTune connector configuration

LuxiTune Light Engine – Without Secondary Lens

Mechanical Dimensions (mm)

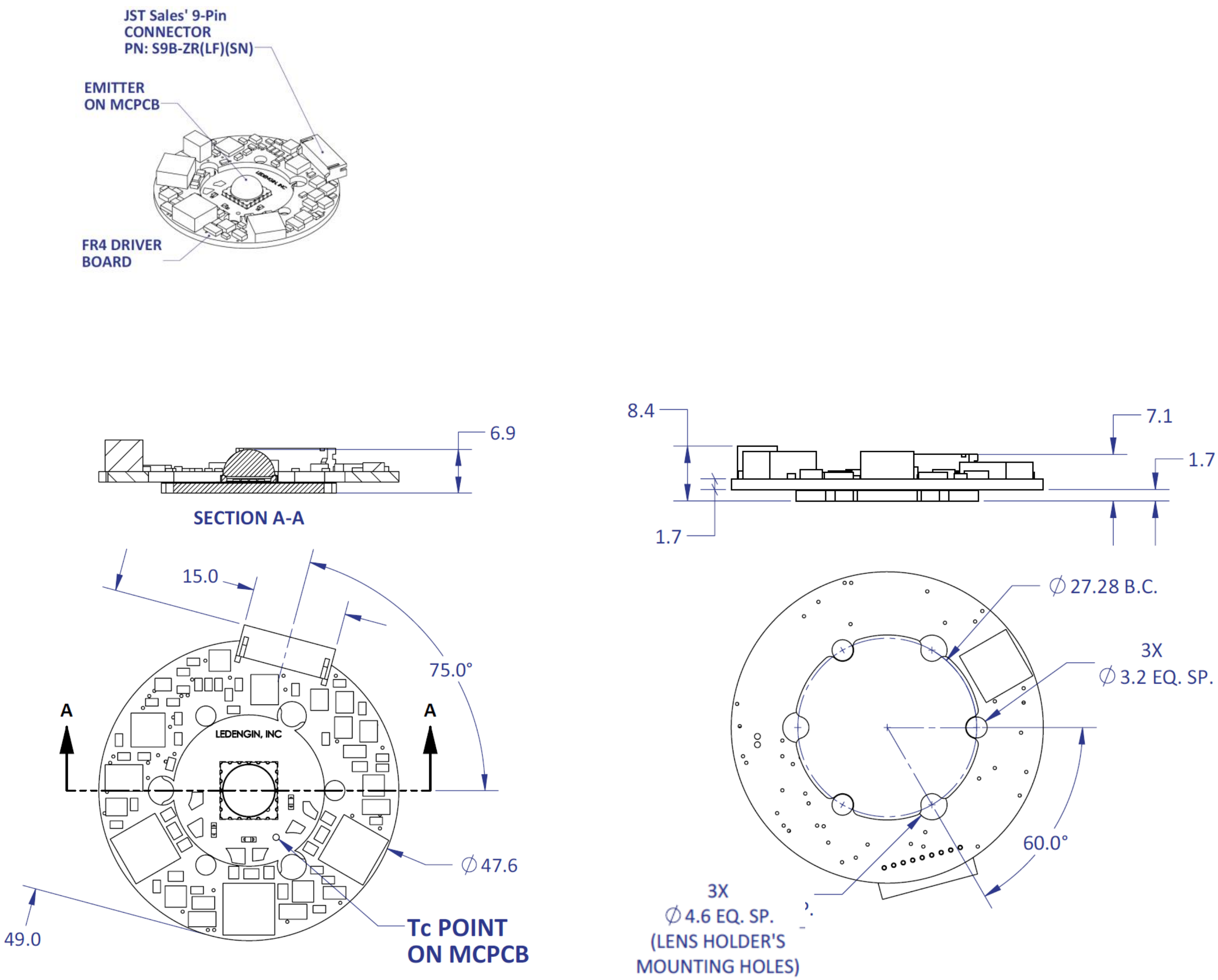


Figure 12: Mechanical dimensions of LuxiTune light engine – without secondary lens

Notes

1. Unless otherwise noted, the tolerance = +/- 0.2mm.

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LuxiTune Light Engine – With Secondary Lens

Mechanical Dimensions (mm)

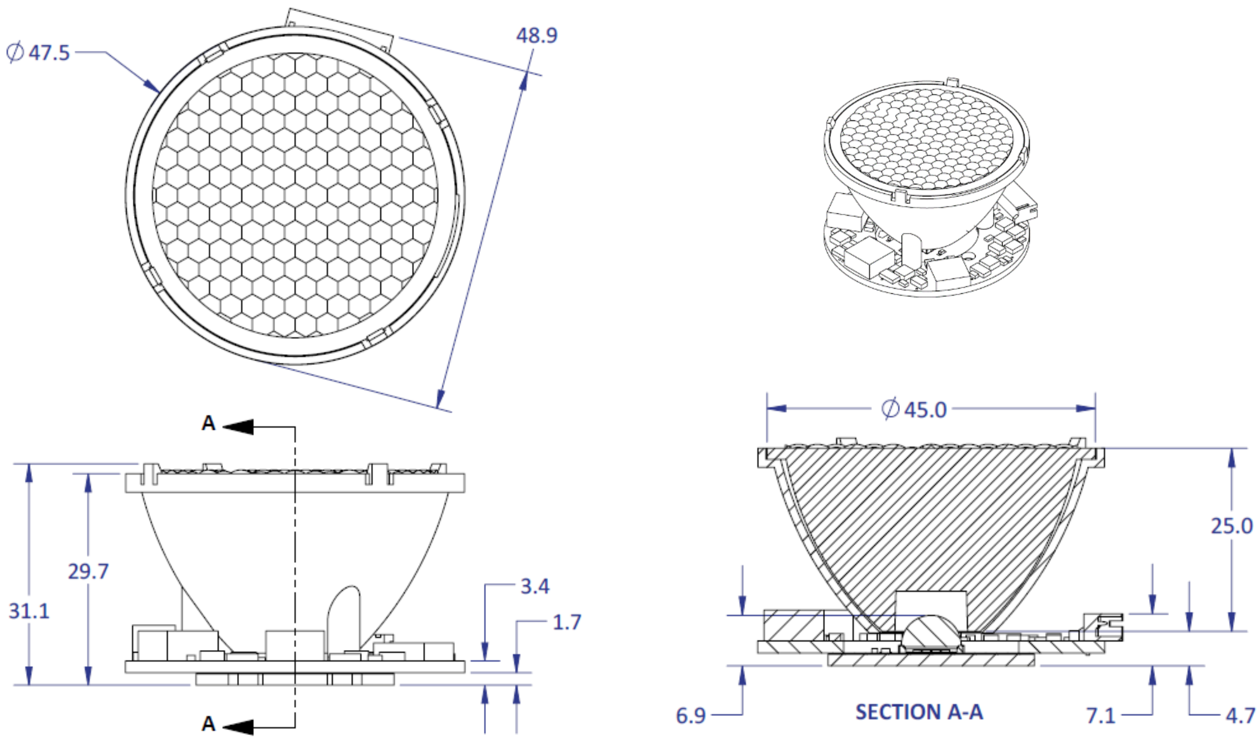

Figure 13: Mechanical dimensions of LuxiTune light engine – with secondary lens

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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 epoxy.

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.

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Dimmer and Tuning Control Functions

LuxiTune works with the following control inputs:

1. All 0-10V and 1-10V dimmers with either current sink (IEC60929) or current source configuration.
2. All 1-10V and 1-10V dimmers with either current sink (IEC60929) or current source configuration.
3. All 0-100k Ohm variable resistor.

Notes

1. LuxiTune implementation of the 0-10V interface is non-isolated.
2. For a list of common 0-10V controller products, please see Appendix 1.
3. For wiring diagrams, please see Appendix 2.

LuxiTune default input control range:

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

LuxiTune self-learning input control range:

LuxiTune Automatic Range Dimming mode, ARD, allows the LuxiTune module to learn the actual voltage range of a dimmer. In this mode, LuxiTune learns the minimum dimmer voltage between 0.7V and 2V and sets it to the lowest light intensity level (~0.5% of max lumens) that the unit can be dimmed to. Similarly, it learns the maximum dimmer voltage between 8V and 11V and sets it to the maximum intensity of light (max lumens). Down to 0.7V, the light engine does not switch off, but stays at the lowest intensity level. Below 0.7V, the light will turn off.

Notes

1. Please make sure the input voltage is not larger than 11V. If slightly larger than 11 volt the unit will interpret the input signal incorrectly which can result in a strange and delayed dimming response.

The following sequence puts the LuxiTune unit into ARD mode:

1. Connect pins 4 to 6 of connector J1.
2. Power cycle the unit. Warm white light will flash 3 times, indicating that the dimming range is about to be reset to the default of 2-8V. The unit is then ready to operate in the ARD mode and learn a new dimming range.
3. Teach the LuxiTune module a new dimmer's voltage range by going through at least one full dimming cycle by moving the dimmer slider to its maximum (upper) and minimum (lower) positions. If connected to a second 0-10V control for CCT tuning, also exercise that control while in this teaching mode.
4. To complete the learning and retain the learned range, remove the connection between pins 4 and 6 of connector J1 and power cycle the unit. After a few seconds, greenish white light will flash 3 times indicating that the unit is no longer in learning mode.
5. The LuxiTune unit will apply the range that is stored in its memory until it is reset. This will happen when the ARD mode is reactivated as described above.

Notes

1. When the power is turned "off" and "on" (power cycling) and no mode change has taken place, the emitter will not blink but will immediately begin functioning and adjust to the set dimming level.
2. When a new/different dimmer is connected, the LuxiTune unit needs to be placed again into ARD mode, so that it's ready to learn the voltage range of the new dimmer. (Start again from step 1)
3. The ARD sequence works in both Halogen Dimming and CCT Tuning mode.

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DMX Dimmer and Tuning Control Functions

LuxiTune works with the following DMX control inputs:

1. DMX 512-A standardized digital lighting control protocol
   DMX control units that do not follow USITT DMX512-A specifications, can cause unexpected behavior. LuxiTune DMX input pin7 (DMX B-), pin 9 (DMX A+), pin 1 (GND) and pin 6 (GND) on J2 connector are non-isolated. DMX ground is shared with the ground from the power supply.

DMX control options:

1. Halogen dim mode: In this mode, LuxiTune warms as it dims. It uses only one DMX-channel.
2. CCT tuning mode: In this mode, LuxiTune CCT tunes on the black body curve. It uses two DMX-channels, one for Brightness control and one for CCT tuning.

For a list of common DMX controller products, please see Appendix 1 and for wiring diagrams see Appendix 2.

Smoothing options:

The smoothing option can provide a smoother response if there are large steps in the control signal. This could be the case with DMX systems that only offer 100 steps instead of the standard 256 steps. In some cases it could also provide a smoother response for 0-10V control inputs. This option can be set with DMX address 06.

Commissioning via DMX controls:

For customized settings of LuxiTune engine, a setup mode allows DMX controls to be used to put LuxiTune into specific modes.

The following sequence puts LuxiTune in setup mode:

1. Connect the 0-10V CCT (pin5 of J2) to the GND (pin 1 or 6 of J2).
2. Disconnect Pin 4 (0-10V Brightness) from dimmer. Pin 4 must not be connected to anything ("open pin").
3. After 1 second the LuxiTune DMX input is ready to receive DMX data. (pin 7 (DMX-) and 9 (DMX+) of J2 connector)

In setup mode, DMX addresses have the following functions:

Address	Function
01	Base address low; Sets the DMX base address of a LuxiTune module. LuxiTune can only use DMX address <1> to <64>.
02	NA; Reserved for future use. Use <0> as default
03	Code; Use <199>; Enables LuxiTune module to accept setup data
04	Code; Use <91>; Enables LuxiTune module to accept setup data
05	Mode; Select a mode of operation. (see control options table for current modes of operation)
06	Settings; Select value associated with a specific mode of operation. (see control options table for current values)

Example:

Program the following settings into LuxiTune module:

a) DMX base address to <15>
b) CCT tuning mode, 4300K to 2100K with smoothing.

Enter the following data:

DMX 001	<15>	Address for the module (15 for brightness control and 16 for CCT tuning)
DMX 002	<0>	Not used
DMX 003	<199>	Code
DMX 004	<91>	Code
DMX 005	<16>	CCT tuning mode, 4300K to 2100K
DMX 006	<1>	Smoothing ON

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DMX Control Options

DMX 001	DMX 002	DMX 003	DMX 004	DMX 005	DMX 006	Function	
(low base address)	(NA)	(Code)	(Code)	(Mode)	(Setting 1)		(DMX channel function in operation)
001-64	000	199	091	008		**Halogen dimming mode (4300-2100K)**	
					000-001	Smoothing of input signals from dimmer (0=off, 1=>on)	
							Ch1 = Brightness with CCT change (0-255)
001-064	000	199	091	009		**Halogen dimming mode (3000-1600K)**	
					000-001	Smoothing of input signals from dimmer (0=off, 1=>on)	
							Ch1 = Brightness with CCT change (0-255)
001-064	000	199	091	**016**	**(default)**	**CCT tuning mode (4300-2100K)**	
					000-**001**	Smoothing of input signals from dimmer (0=off, 1=>on)	
							Ch1 = Brightness (0-255)
							Ch2 = CCT setting (0-255)
001-064	000	199	091	017		**CCT tuning mode (3000-1600K)**	
					000-001	Smoothing of input signals from dimmer (0=off, 1=>on)	
							Ch1 = Brightness (0-255)
							Ch2 = CCT setting (0-255)

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Thermal and Mechanical design considerations

Heat Sink Thermal Resistance

Thermal design is key for optimal performance of 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, materials, surface finishes, etc. need to be balanced such that the heat sinks thermal resistance is optimized for specific environment the fixture will be operating in. Higher LED junction temperatures due to poor thermal management may impact the expected life time of the unit. LuxiTune MCPCB thermal reference point, Tc, may be used to calculate a thermal resistance of the luminaire design. LED Engin recommends to not exceed the following maximum thermal resistances:

$T_{ambient}$ [1]	T_C [2]	ΔT (= T_C - $T_{ambient}$)	Max R_{th} @ ΔT [3]
25°C	65°C	40°C	2.3°C/W
45°C	65°C	20°C	1.1°C/W
25°C	85°C	60°C	3.2°C/W
45°C	85°C	40°C	2.2°C/W

Notes:
1. $T_{ambient}$ is defined as the air temperature surrounding the heat sink. For example, if the heat sink is mounted inside an enclosed fixture, then $T_{ambient}$ is the temperature of the air inside the fixture.
2. LuxiTune MCPCB T_C point is located on the MCPCB. See Figure 2 for more information on the location of the T_C point.
3. Max R_{th} @ ΔT values are calculated based on typical data sheet operating conditions.

Thermal interface material, heat sink - MCPCB

A good thermal design requires an efficient heat transfer from the LuxiTune MCPCB to the heat sink. In order to minimize air gaps in between the MCPCB and the heat sink, it is common practice to use thermal interface materials 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 MCPCB 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 MCPCB temperatures low.
When optimizing the thermal performance, attention must also be paid to the amount of stress that is applied on the MCPCB. Too much stress can cause the ceramic emitter to crack. To relax some of the stress, it is advisable to use polycarbonate or glass-filled nylon washers between the screw head and the MCPCB and to follow the torque range listed below.

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

1. 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°C
    - Using M3 Screw (or #4 screw), with polycarbonate or glass-filled nylon washer (#4) the recommended torque range is: 50 to 60 in-oz (3.13 to 3.75 in-lbs or 0.35 to 0.42 N-m)

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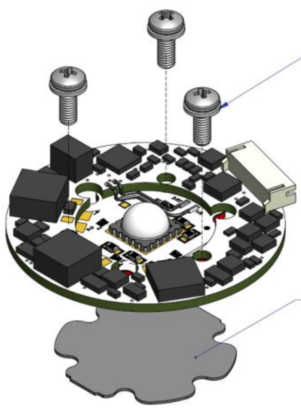
2. 3M's Acrylic Interface Pad 5590H
    - Part number: 5590H @ 0.5mm
    - Thickness: 0.020in/0.508mm
    - Thermal conductivity: 3 W/m-K
    - Continuous use max temperature: 100°C
    - Using M3 Screw (or #4 screw), with polycarbonate or glass-filled nylon washer (#4) the recommended torque range is: 50 to 60 in-oz (3.13 to 3.75 in-lbs or 0.35 to 0.42 N-m)

Mechanical Mounting Considerations

The mounting of LuxiTune MCPCB assembly is a critical process step. Excessive mechanical stress build up in the MCPCB can cause the MCPCB to warp which can lead to emitter substrate cracking and subsequent cracking of the LED dies



LED Engin recommends the following steps to avoid mechanical stress build up in the MCPCB:

1. Inspect MCPCB and heat sink for flatness and smoothness.
2. Select appropriate torque for mounting screws. Screw torque depends on the MCPCB mounting method (thermal interface materials, screws, and washer).
3. Always use three M3 or #4-40 screws with #4 washers.
4. When fastening the three screws, it is recommended to tighten the screws in multiple small steps. This method avoids building stress by tilting the MCPCB when one screw is tightened in a single step.
5. Always use plastic washers in combinations with the three screws. This avoids high point contact stress on the screw head to MCPCB interface, in case the screw is not seated perpendicular.
6. 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.

Thermal feedback and protection

The LuxiTune light engine has a closed loop thermal feedback mechanism which controls luminous flux such that it is constant over the entire operating temperature range of 15°C - 85°C (T_C = +15 … +85°C).
When the MCPCB temperature exceeds 85°C (T_c > 85°C), 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°C (T_c = 105°C). When the temperature drops again and reaches 65°C (T_C <65°C), the light intensity is fully restored.

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Notes

UL
LuxiTune driver assembly meets UL guidelines for low voltage electronic circuit designs.

RoHS Compliance
LuxiTune products do not contain any restricted hazardous substances (RoHS) with levels above the threshold limits permitted in accordance with EU Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment. Declarations for this product can be obtained from your local LED Engin representative.

Company Information
LED Engin, 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.

LED Engin reserves the right to make changes to improve performance without notice.

Please contact sales@ledengin.com or +1 408 922-7200 for more information.

Appendix 1 Compatible Dimmers & Controls

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

Common 0-10V dimmer models

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:

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.

Common DMX control products

Supplier	Model
Nicolaudie	STICK (tested)
Enttec	DMX USB PRO (tested), OPEN DMX (tested)
EldoLED	DimWheel Colour
Lutron	LUT-DMX, QSE-CI-DMX, GRX-CI-PRG (tested)
E-cue	Glass Touch Series
Philips	Color Kinetics ColorDial, Lightolier Lytemode DMX
ETC	Mosaic
Leviton	Remembrance
Cooper	SCD96-NA, DMX Output Interface (tested)
Rako	RADMX (tested)

Notes

The DMX control unit has to adhere closely to the USITT DMX512-A specification. Incorrect timing of the controller can cause unexpected response.

Please be aware that LuxiTune implementation of DMX is "grounded". There is NO isolation between the DMX data lines or the DMX ground, nor is there electrical isolation on the DMX lines.

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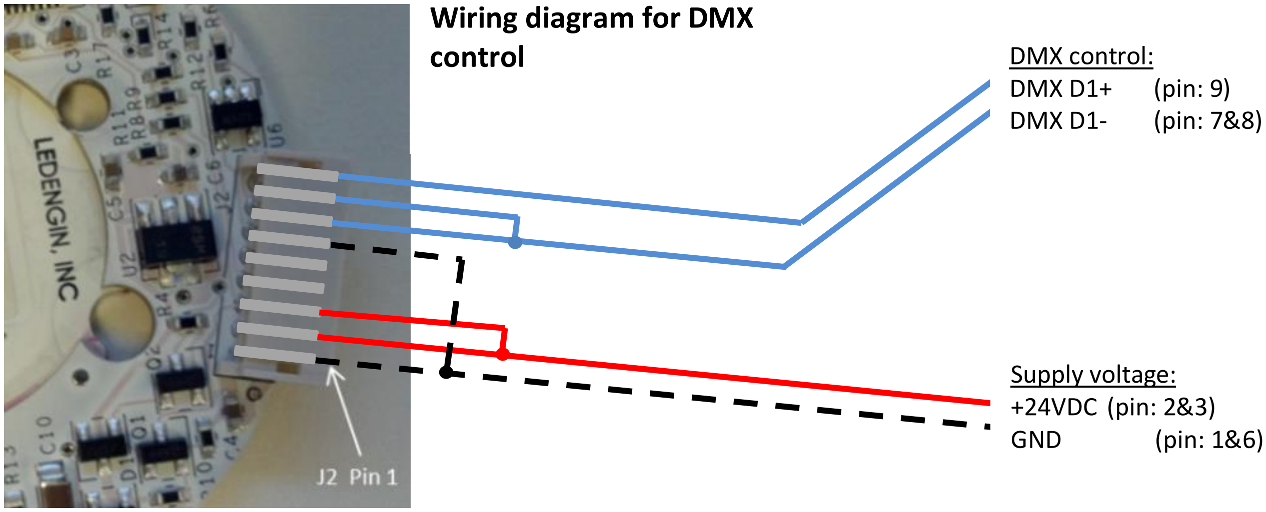
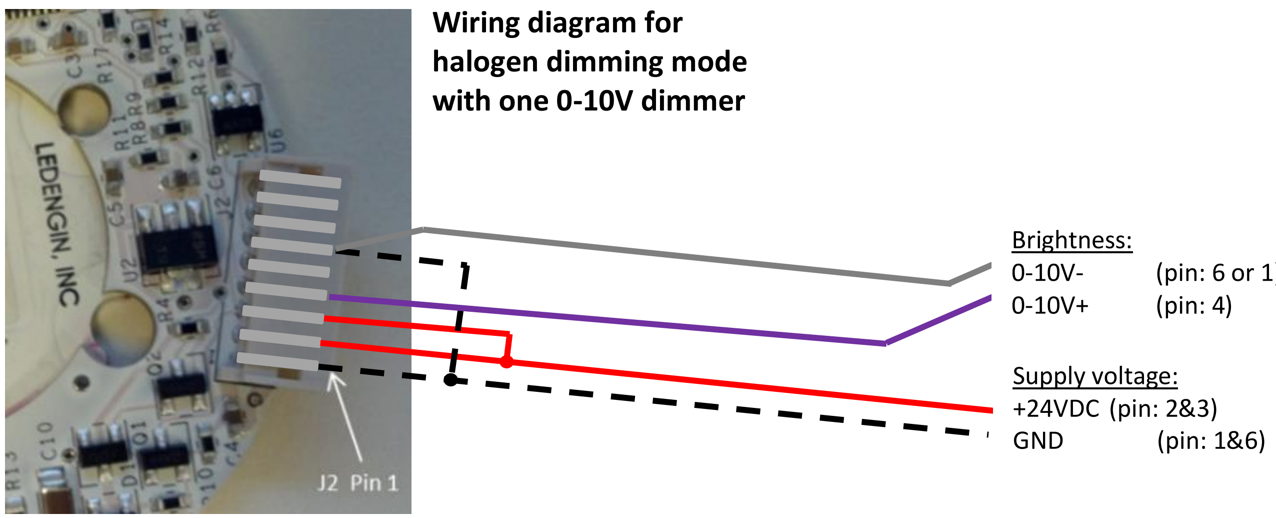
Appendix 2 Wiring Diagrams

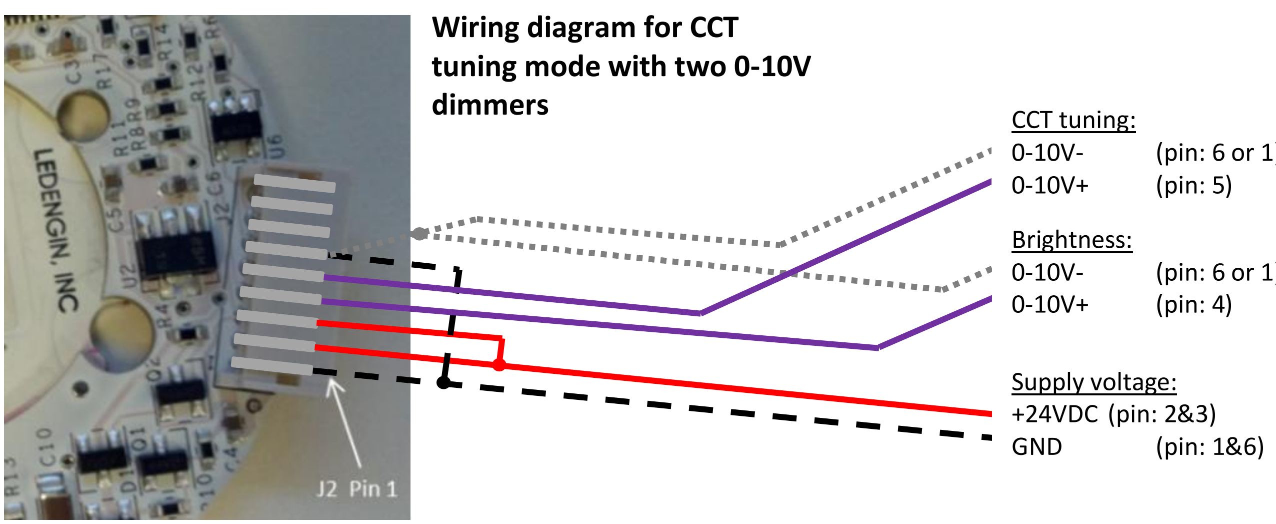
Wiring diagram for DMX control



Wiring diagram for halogen dimming mode with one 0-10V dimmer



Wiring diagram for CCT tuning mode with two 0-10V dimmers



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