



BIOS SkyBlue™ Gen 2

Technology Overview • Ordering Guide



+



Circadian lighting made simple

A circadian lighting partnership

Axis has partnered with BIOS to assist lighting professionals in designing circadian-effective lighting. A broad range of Axis and BalancedCare™ luminaires seamlessly integrate SkyBlue technology with the aim to create environments that improve alertness and promote better sleep, health and well-being.

BIOS technology has now evolved into its second generation, offering improved color consistency, higher efficiency, and more control options. In true partnership fashion, Axis has taken care to fully adapt the BIOS Gen 2 system to each of its luminaire types - optimizing LED configurations with distinct optical properties to ensure the quality and performance Axis customers have come to expect.



What is BIOS SkyBlue?

Life is all about contrast, perhaps none as important as light and dark, day and night. As humans, we have evolved with blue sky and daylight as natural cues to keep our body clocks aligned with the 24-hour day. This healthy contrast between daylight and darkness allows our circadian rhythms to function as designed.

BIOS SkyBlue communicates with the body on a biological level by providing a specific wavelength of light that stimulates our circadian system. It works in conjunction with traditional white light LEDs, so it maintains the appearance of white light in familiar color temperatures. SkyBlue lighting systems can deliver the benefits of natural light without compromising light quality.

Why BIOS SkyBlue?

- ✓ **Better sleep by night, improved alertness by day**
- ✓ **“Invisible” 490 nm blue boost to circadian system while generally maintaining the appearance of white light**
- ✓ **No color tuning or CCT adjustments required for Static and Dynamic engines**
- ✓ **Wide choice of Axis and BalancedCare™ luminaires with SkyBlue option**
- ✓ **Compatible with standard 0-10V dimming**



Encourage healthy sleep patterns



Promote sleep quality



Support productivity



Support physical, mental and emotional well-being



Promote short- and long-term health



Disclaimer

While Axis makes the BIOS SkyBlue technology available, the ultimate decision of where, when and how to use it is at the discretion of the designer.

BIOS SkyBlue™

About the technology

Solutions to simplify circadian lighting in everyday applications

BIOS SkyBlue light engines align with our natural biological rhythms – circadian rhythms, which repeat every 24 hours. SkyBlue emulates the natural blue sky signal that we as humans have experienced in our evolution over millennia, working quietly behind the scenes to deliver circadian-supportive light.

How does it work?

BIOS SkyBlue lighting solutions deliver the health-enhancing blue wavelength of the light spectrum. Recently discovered photoreceptors in the human eye – photosensitive retinal ganglion cells or ipRGCs – contain the protein melanopsin, which is highly sensitive to that blue wavelength. When melanopsin is stimulated by light, the ipRGCs send a signal to the body's master clock, telling it to re-set its cycle for the next 24 hours. That signal triggers a variety of biological processes, including essential hormone production (e.g. early morning cortisol for alertness and nighttime melatonin to promote sleep).

Key Features

Peaks at 490 nm to target melanopsin, the light-sensitive protein contained in our non-visual photoreceptors

- ✓ Delivered light does not appear blue
- ✓ Maintains appearance of white light
- ✓ Choice of correlated color temperatures (CCTs): 3000K, 3500K and 4000K

Peaks also at 660 nm in the far-red spectrum

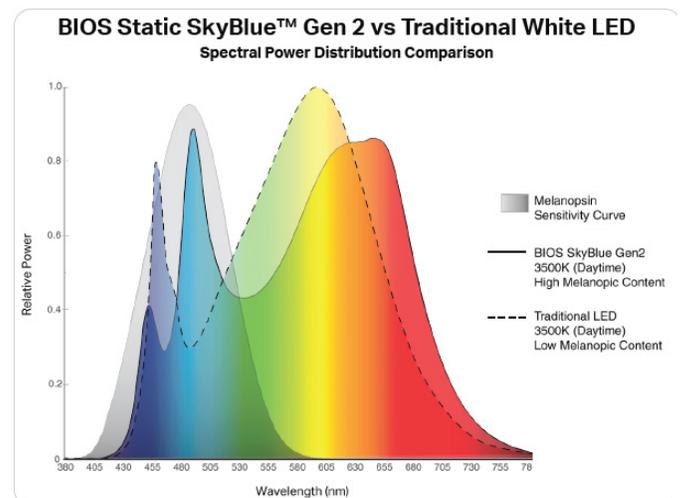
- ✓ Facilitates detection of illnesses through skin, such as cyanosis and sepsis
- ✓ Meets the cyanosis observation index (COI)* recommended threshold of < 3.3 at 4000K

More efficient at reaching circadian metric targets than traditional LED systems

- ✓ Circadian stimulus (CS)
- ✓ Equivalent melanopic lux (EML)
- ✓ Melanopic Equivalent Daylight Illuminance (MEDI)

* Interior Lighting Standard AS/NZS 1680 2.5:1997 Section 7.2, superseded by 2018, introduces COI as a measure of the ability of a light source to aid the detection of cyanosis in a patient: "where cyanosis observation is necessary the lighting should have a color temperature of between 3300K and 5300K and a COI of 3.3 or less". Cyanosis can present itself as a 'bluing' of the skin, indicating low skin oxygen saturation which may suggest cardiac or respiratory problems. Color rendering and light quality are important. COI compares color fidelity of oxygenated blood and cyanosed blood relative to a 4000K reference.

- ✓ Office
- ✓ Classroom
- ✓ Healthcare (acute & continuum of care)
- ✓ Hospitality
- ✓ Behavioral Health Facilities
- ✓ Wellness/Fitness Centers
- ✓ Transportation Control Centers
- ✓ Military Operations & Training Centers



Typical 3500K spectrum compared to BIOS SkyBlue 3500K, which peaks at 490 nm to target the sensitivity of melanopsin. It also peaks near 660 nm far red to help detect illnesses through skin.

About the technology

A second generation of BIOS technology has expanded the Axis Lighting offerings. Select products integrate one of four BIOS LED systems:

Static SkyBlue

Same operation and behavior as the original, but with improved color consistency and higher efficiency

- ✓ Provides a consistent SkyBlue boost throughout the duration of the operation.
- ✓ Available in select Axis and BalancedCare luminaires.
- ✓ Compatible with any LED driver, including 0-10V.

Dynamic SkyBlue

Improved color consistency and efficiency but with different dimming behavior and CCT range than the original

- ✓ 100% to 81% dimming: The Bio-Dimming™ module gradually reduces SkyBlue content while light level remains relatively constant.
- ✓ 80% dimming and below: CCT reduces to 2700K, SkyBlue content is removed and light levels can be gradually reduced.
- ✓ Compatible with single-channel, constant-current drivers, including 0-10V.

DynamicCare™ for BalancedCare™

Applies to compatible BalancedCare luminaires only; available in 3000, 3500, 4000K with Bio-Dimming module

- ✓ 100% to 51% dimming: The Bio-Dimming module gradually reduces SkyBlue content while light level remains relatively constant.
- ✓ 50% dimming and below: CCT is reduced by 500K, SkyBlue content is removed and light levels can be gradually reduced.
- ✓ Compatible with single-channel, constant-current drivers, including 0-10V.

BIOS Tunable White (BTW)

Uses tunable white drivers (no Bio-Dimming module)

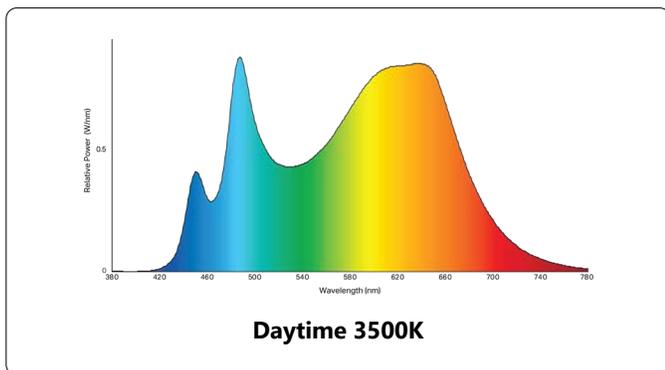
- ✓ Available in 4000K-2700K and 3500K-2700K; e.g., BTW4027 - the stimulus is provided by combined SkyBlue + white light at 4000K; SkyBlue is present at each CCT until 2700K is reached, at which point the SkyBlue stimulus is removed.
- ✓ Both color and intensity can be controlled, as with any tunable white system.
- ✓ Compatible with most Axis products that use tunable white.
- ✓ Not available in BalancedCare products.

BIOS SkyBlue™

Four systems: **Static SkyBlue™**, Dynamic SkyBlue™, DynamicCare™ for BalancedCare, and BIOS Tunable White (BTW)

BIOS Static SkyBlue™ Engine

Spectral Power Distribution (SPD)



How it works

Compatible with Axis and BalancedCare products

The static spectrum does not change spectral qualities for the duration of its operation. It delivers a steady but invisible blue-light boost to white light throughout the day, maximizing circadian impact.

M/P Ratios* and Nominal Performance

	BIOS Static SkyBlue Solutions		
CCT	3000K	3500K	4000K
CRI	81	84	84
R9	75	75	75
COI	6	4	2.6
SkyBlue Melanopic (M/P) Ratio *	0.70	0.80	0.90

* M/P (melanopic to photopic) ratio indicates the ability of a light source to stimulate melanopsin, the protein contained in our non-visual photoreceptors that activates our circadian systems; it is used to help calculate EML (equivalent melanopic lux), one of the metrics used for circadian lighting in the WELL Building Standard.

Applications

Suitable for day-active applications, such as schools and offices.

Static SkyBlue Light Engine

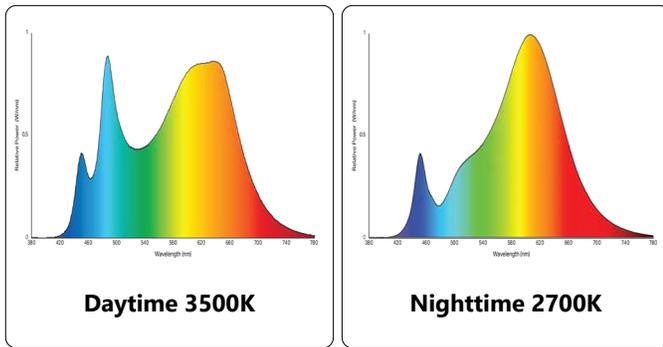
- ✓ Supports daytime circadian stimulus
- ✓ No color tuning or correlated color temperature (CCT) adjustment required
- ✓ Color of light remains constant throughout the day:
 - 490 nm 'blue boost' does not reduce during the day
 - Apparent CCT of 3000K, 3500K or 4000K remains constant
- ✓ High melanopic to photopic (m/p) ratio
 - While m/p ratio will remain constant if light level is dimmed, EML, MEDI, and CS values will be affected due to reduced vertical illuminance
- ✓ CRI >80; R9 >75 at each CCT
- ✓ Simple controls
 - Works with all LED drivers
 - Compatible with standard 0-10V dimming

BIOS SkyBlue™

Four systems: Static SkyBlue™, **Dynamic SkyBlue™**, DynamicCare™ for BalancedCare, and BIOS Tunable White (BTW)

BIOS Dynamic SkyBlue™ Engine

Spectral Power Distribution (SPD)
CCT always reduces to 2700K



How it works

Compatible only with Axis products

BIOS dynamic light engines use easy-to-program Bio-Dimming™ to provide high SkyBlue content during the day and remove SkyBlue content at night. The integral Bio-Dimming module allows the luminaire to deliver a steady but invisible boost of SkyBlue melanopic content to white light for daytime applications. The Bio-Dimming module then reduces the SkyBlue light over a specified amount of time, as programmed through lighting controls, while maintaining a constant light level. Once SkyBlue reaches its reduced level, CCT is reduced to 2700K, then light levels can be changed. The reduction to 2700K provides a visual and psychological cue that low stimulus has been reached.

BIOS Bio-Dimming Settings with Dynamic SkyBlue Light Engine

DIMMER SETTING*	BIOS SKYBLUE™	LIGHT OUTPUT	
100%* (Full On)	100%	100%	Bio-Dimming™
99%-81%	100%-0%	100%	
80%	NO BIOS	100%	Intensity Dimming
79%-0%	NO BIOS	LINEAR DIMMING	

Note: Bio-Dimming learns individual brightness preferences and maximizes BIOS SkyBlue accordingly. Dimmer setting percentages as shown are relative to this learned maximum brightness set point. For more information, please see "What to Expect from the BIOS Bio-Dimmer Machine Learning System" or go to www.bioslighting.com.

M/P Ratios* and Nominal Performance

	BIOS Dynamic SkyBlue Solutions		
	3000K	3500K	4000K
CCT	3000K	3500K	4000K
CRI	83	83	83
R9	75	75	75
COI	6	4	2.6
SkyBlue Melanopic (M/P) Ratio ***	0.74	0.83	0.92

*** M/P (melanopic to photopic) ratio indicates the ability of a light source to stimulate melanopsin, the protein contained in our non-visual photoreceptors that activates our circadian systems; it is used to help calculate EML (equivalent melanopic lux), one of the metrics used for circadian lighting in the WELL Building Standard.

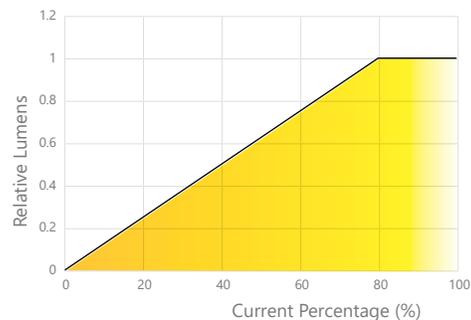
Applications

Suitable for 24-hour working environments such as hospitals, adult care facilities, laboratories, transportation control centers and applications involving shift work.

Dynamic SkyBlue Light Engine

- ✓ Supports daytime circadian stimulus, reduces nighttime stimulus, based on user-defined schedule
- ✓ No color tuning or CCT adjustment required
- ✓ Uses the integral BIOS Bio-Dimming module to regulate SkyBlue stimulus
- ✓ SkyBlue content can be removed as day progresses, through approximately the first 20% of Bio-Dimming, reducing melanopic impact while keeping light levels for visual tasks constant
- ✓ CCT reduces to 2700K once SkyBlue is removed
- ✓ High melanopic to photopic (m/p) ratio
- ✓ CRI >80; R9 >75 at each CCT
- ✓ Simple controls: Uses any single-channel constant current LED driver with 0-10V dimming interface

Lumen output remains relatively constant until 81% Bio-Dimming is reached

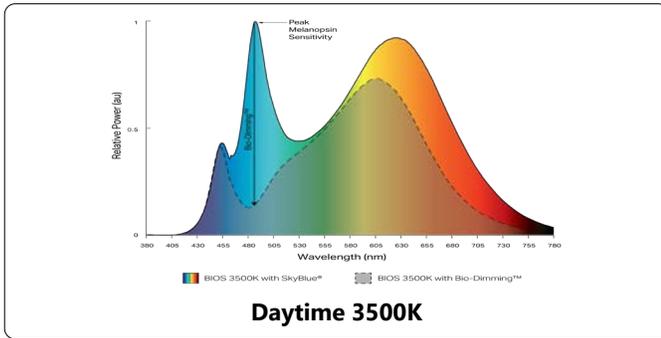


BIOS SkyBlue™

Four systems: Static SkyBlue™, Dynamic SkyBlue™, **DynamicCare™ for BalancedCare**, and BIOS Tunable White (BTW)

DynamicCare™ for BalancedCare™

Spectral Power Distribution (SPD)
CCT reduces by 500K



How it works

Compatible only with BalancedCare products

BIOS DynamicCare SkyBlue light engines use easy-to-program Bio-Dimming™ to provide high SkyBlue content during the day and remove SkyBlue content at night. The integral Bio-Dimming module allows the luminaire to deliver a steady but invisible boost of SkyBlue melanopic content to white light for daytime applications. The Bio-Dimming module then reduces the SkyBlue light over approximately the first 50% of dimming, as programmed through lighting controls, while maintaining a constant light level. Once SkyBlue reaches its reduced level, CCT is reduced by approximately 500K, at which point light levels can be changed.

Applications

Suitable for 24-hour working environments such as hospitals, adult care facilities, laboratories, transportation control centers and applications involving shift work.

DynamicCare™ Light Engine

- ✓ Optimizes performance for BalancedCare lightguide technology
- ✓ Supports daytime circadian stimulus, reduces nighttime stimulus, based on user-defined schedule
- ✓ No color tuning or CCT adjustment required
- ✓ Uses the integral BIOS Bio-Dimming module to regulate SkyBlue stimulus
- ✓ SkyBlue content can be removed through approximately the first 50% of Bio-Dimming, as day progresses, reducing melanopic impact while keeping light levels for visual tasks constant
- ✓ CCT reduced by 500K once SkyBlue is removed
- ✓ High melanopic to photopic (m/p) ratio
- ✓ CRI >80; R9 >75 at each CCT
- ✓ Simple controls: Uses any single-channel constant current LED driver with 0-10V dimming interface

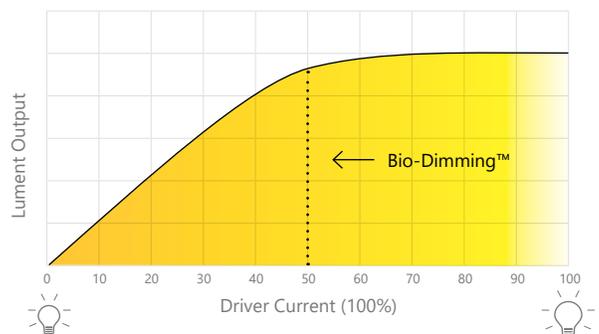
BIOS Bio-Dimming Settings with DynamicCare™ Light Engine

DIMMER SETTING	BIOS SKYBLUE®	LIGHT OUTPUT	
100% (Full On)	100%	100%	Bio-Dimming™
99%-51%	100%-0%	100%-90%	
50%	NO BIOS	~90%	Intensity Dimming
49%-0%	NO BIOS	LINEAR DIMMING	

BIOS SkyBlue® maintained for maximum circadian impact. Light output remains relatively constant.

BIOS SkyBlue® removed to provide minimal circadian impact. Light output dims down linearly.

Lumen output remains relatively constant until 51% Bio-Dimming is reached

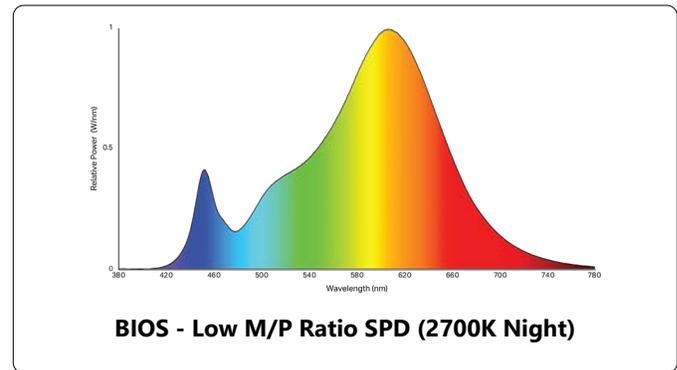
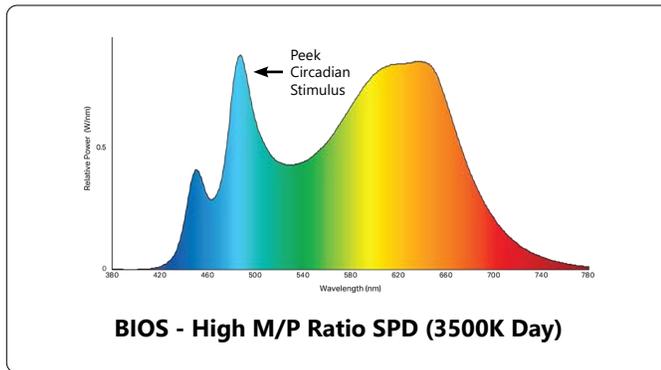


BIOS SkyBlue™

Four systems: Static SkyBlue™, Dynamic SkyBlue™, DynamicCare™ for BalancedCare, and **BIOS Tunable White (BTW)**

BIOS Tunable White (BTW)

Spectral Power Distribution (SPD)



How it works

Compatible only with Axis products

Features:

- ✓ Tunable control with the benefit of SkyBlue stimulus at the maximum starting CCT to elimination of the stimulus at 2700K
- ✓ Separate control of CCT and light output
- ✓ Bio-Dimming module replaced by TW drivers

The BIOS tunable white system allows the user to select the duration of stimulus vs non-stimulus exposure, which does not occur automatically since this system does not use a Bio-Dimming module.

The Bio-Dimming module is replaced by tunable white drivers, such as DALI. The user will have separate control of CCT and light output, as with any tunable system.

It is available in 4000K-2700K and 3500K-2700K. For example, BTW4027 provides combined SkyBlue + white light at 4000K and SkyBlue is present at each CCT as it travel dims to 2700K, at which point the SkyBlue is removed.

This option gives the user flexibility with regard to stimulus exposure time, CCT selection and intensity.

BIOS SkyBlue™

Performance comparisons

SkyBlue compared to traditional white LEDs

To the naked eye, the white light produced by an Axis luminaire with SkyBlue option may appear identical to the white light from traditional LEDs, but the actual spectrum is different.

Greater melanopic content

Axis luminaires with SkyBlue deliver greater melanopic content. The resulting higher melanopic ratios contribute to higher Equivalent Melanopic Lux (EML), Melanopic Equivalent Daylight Illuminance (MEDI), and Circadian Stimulus (CS) values, three important circadian lighting metrics.



Better visual comfort

As shown in the table below, when compared to traditional LEDs, SkyBlue technology can achieve greater circadian impact at equivalent illuminance levels; a reduction in illuminance levels, therefore, could result in better visual comfort.



Luminaires	Light Source 3500K	Circadian Metrics			All Desks Average	
		CS	EML	MEDI	Horizontal Illum E _h	Vertical Illum E _v
Indirect/Direct Pendant 50% up/50% down (400lm up/400lm down)	Traditional LED	0.31	242	220	472	368
	BIOS LED	0.35	309	280		

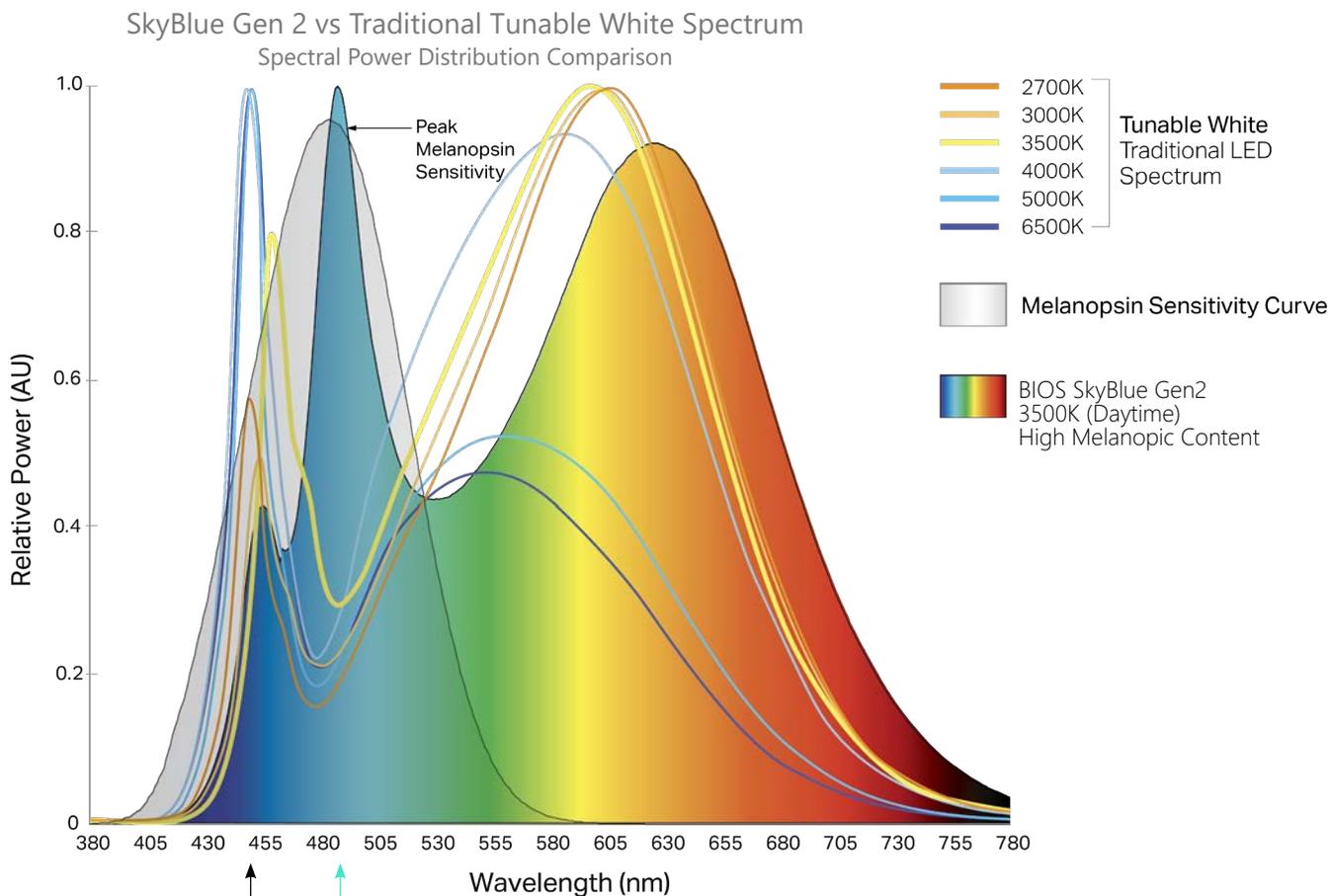
The illuminance values in the chart above represent the average light level across the room; individual calculation points are higher or lower depending on where they were taken. Light levels and circadian metric values account for electric lighting only and do not consider daylight contribution.

BIOS SkyBlue™

Performance comparisons

SkyBlue Compared to Tunable White

Spectral Power Composition and M/P Ratios



Traditional LEDs

BIOS delivers higher melanopic content than traditional LEDs, regardless of correlated color temperature (CCT), as shown in graph above.

Spectral power distribution more accurately indicates whether a light source addresses the melanopsin sensitivity curve than CCT.

IALD / LIRC WELL v2™ Guidelines

The following information and tables have been adapted from the IALD/LIRC WELL Guidelines 2019 Document for BIOS Illuminated Partners. The information below represents the minimum required information as outlined in the IALD/LIRC Guidelines document. Please refer to the '[2019_IALD-LIRC_WELL-Guidelines.pdf](#)' for detailed information.

WELL™ | Light | Feature L03 - Circadian Lighting Design

CIRCADIAN LIGHTING DESIGN (1pt / 3pt Max)	BIOS Dynamic SkyBlue Engine			BIOS Static SkyBlue Engine		
	3000K	3500K	4000K	3000K	3500K	4000K
	83	83	83	83	83	83
Melanopic Ratio (R)*	0.74	0.83	0.92	0.70	0.80	0.90

Requirements for this feature:

Electric lighting is used to achieve light levels shown in the table below as measured on the vertical plane at eye level of the occupant. The light levels are achieved at least between the hours of 9 A.M. and 1 P.M. and may be lowered after 8 P.M. For tabulated spectral power distribution (SPD) data please go to www.bioslighting.com

*Melanopic Ratio (R) is used to determine EML values. EML stands for Equivalent Melanopic Lux, and is defined by the photopic lux multiplied by a melanopic ratio, EML = LxR. For more information see "Measuring and Using Light in the Melanopsin Age" by Lucas, RJ et al.

WELL™ | Light | Feature L04 - Glare

GLARE CONTROL CRITERIA (3pt Max)	COMPLIANT	VALUE
a. Indirect (100% emission above horizontal)		
b. Unified Glare Rating (UGR)		
c. Shielding Angle		
d. Max. Luminance / Max. Intensity (45°C-90°C)		
e. Not Applicable		

Requirements for this feature:

For each luminaire type, manufacturers must provide a statement of compliance for one of the four methods or exclusion from the standard, plus supporting values as defined in the compliance category.

WELL™ | Light | Feature L07 - Part 1: Color Rendering

ELECTRIC LIGHT QUALITY PART 1 - ENSURE COLOR RENDERING QUALITY (1pt Max)		COMPLIANT	VALUE
CRI	CRI > 90	--	
CRI, R9	CRI >80 with R9>50	☑	CRI = 83 R9 >75
IES TM-30-18	IES Rf ≥ 78, IES Rg ≥ 100, -1% ≤ IES Rcs, h1 ≤ 15%	--	
Not Applicable	Decorative, emergency, other	--	

WELL™ | Light | Feature L07 - Part 2: Flicker

ELECTRIC LIGHT QUALITY PART 2- MANAGE FLICKER (1pt Max)	COMPLIANT	VALUE
Meets IEEE 1789-2015 Standard Recommended Practice		



Energizing the office environment

Axis Elle™ Surface 45° shown above could be used with BIOS Static SkyBlue spectrum (CCT at 3000K, 3500K or 4000K). The lighting quality would appear constant during work hours as blue boost - and daytime stimulus - remain steady.

BIOS SkyBlue™

Compatible Axis luminaires

		Static SkyBlue Engine	Dynamic SkyBlue Engine	DynamicCare™ for BalancedCare™	BIOS Tunable White
		B(CCT) DPB(STC)	B(CCT) DPB(DYN)	B(CCT)-DPB(DCA)	BTW(CCT) -TW(#)
CCT range		3000K	3000K w/ Bio-Dimming™	3000K w/ Bio-Dimming™	
		3500K	3500K w/ Bio-Dimming™	3500K w/ Bio-Dimming™	BTW3527
		4000K	4000K w/ Bio-Dimming™	4000K w/ Bio-Dimming™	BTW4027
Available CRI		80+	80+	80+	80+
R9		>75 at all CCTs	>75 at all CCTs	>75 at all CCTs	>75 at all CCTs
	Air Pendant , Surface , Wall	✓	✓		✓
	Aura, Dia, Day, Plano, Wave Troffers	✓	✓		✓
	Beam 2 Direct Recessed , Pendant , Wall , Surface , Vertical	✓	✓		✓
	Beam 2 Direct/Indirect, Indirect Pendant , Wall	✓	✓		✓
	Beam 2 Square Direct Pendant , Wall , Surface	✓	✓		✓
	Beam 2 Square Indirect Pendant , Wall	✓	✓		✓
	Beam 3 Direct Recessed , Pendant , Wall , Surface , Perimeter , Vertical	✓	✓		✓
	Beam 3 Direct/Indirect, Indirect Pendant , Wall	✓	✓		✓
	Beam 4 Direct Recessed , Pendant , Wall , Surface , Perimeter	✓	✓		✓
	Beam 4 Direct/Indirect, Indirect Pendant , Wall , Vertical	✓	✓		✓
	Beam 6 Direct Recessed , Pendant , Wall , Surface , Perimeter , vertical	✓	✓		✓
	Beam 6 Direct/Indirect Pendant	✓	✓		✓
	Cove Perfekt® Ceiling Hi-Output , Lo-Output	✓	✓		✓
	Cove Perfekt® Wall Hi-Output , Lo-Output	✓	✓		✓

Compatible Axis Luminaires

	Static SkyBlue Engine	Dynamic SkyBlue Engine	DynamicCare™ for BalancedCare™	BIOS Tunable White
	B(CCT) DPB(STC)	B(CCT) DPB(DYN)	B(CCT)-DPB(DCA)	BTW(CCT) -TW(#)
CCT range	3000K	3000K w/ Bio-Dimming™	3000K w/ Bio-Dimming™	
	3500K	3500K w/ Bio-Dimming™	3500K w/ Bio-Dimming™	BTW3527
	4000K	4000K w/ Bio-Dimming™	4000K w/ Bio-Dimming™	BTW4027
Available CRI	80+	80+	80+	80+
R9	>75 at all CCTs	>75 at all CCTs	>75 at all CCTs	>75 at all CCTs
 Mini Box Pendant , Wall , Wall Vertical , Surface	✓	✓		✓
 Prime Pendant , Wall , Surface	✓	✓		✓
 Sculpt™ Direct Recessed , Pendant , Wall , Surface , Perimeter	✓	✓		✓
 Sculpt™ Direct/Indirect, Indirect Pendant , Wall	✓	✓		✓
 Sculpt™ SoftZone® Pendant Direct/Indirect , Direct , Indirect	✓	✓		✓
 SideStep® Pendant	✓	✓		✓
 Sketch® Recessed	✓	✓		✓
 SkyeFall Recessed 2x2	✓	✓		✓
 SkyePool Recessed 2x2	✓	✓		✓
 SkyePlane Recessed 1x1 , 1x2 , 1x4 , 2x2 , 2x4	✓	✓		✓
 SkyeScape Recessed 2x2	✓	✓		✓
 SkyeView Recessed 2x2	✓	✓		✓
 SkyeView Recessed 1x4	✓	✓		✓

Compatible Axis luminaires

	Static SkyBlue Engine	Dynamic SkyBlue Engine	DynamicCare™ for BalancedCare™	BIOS Tunable White
	B(CCT) DPB(STC)	B(CCT) DPB(DYN)	B(CCT)-DPB(DCA)	BTW(CCT) -TW(#)
CCT range	3000K	3000K w/ Bio-Dimming™	3000K w/ Bio-Dimming™	
	3500K	3500K w/ Bio-Dimming™	3500K w/ Bio-Dimming™	BTW3527
	4000K	4000K w/ Bio-Dimming™	4000K w/ Bio-Dimming™	BTW4027
Available CRI	80+	80+	80+	80+
R9	>75 at all CCTs	>75 at all CCTs	>75 at all CCTs	>75 at all CCTs
 Flexible Ambient 1x1 , 1x4 , 2x2 , 2x4	✓		✓	
 Multi-Function Overbed (Ambient Mode) 2x2 , 2x4	✓		✓	
 Sconces (12", 24", 36" sizes) Box , Open Book , Closed Book	✓		✓	
 BalancedCare Elle™ Ceiling Line , Corner , 45°	✓		✓	

BIOS SkyBlue™

How to order

Spec sheet sample order, Dynamic SkyBlue™ Light Engine

Description: Beam 4 Wall Direct LED at 1000lm/ft, with 80 CRI, BIOS 3500K with Bio Dimming™, Ultra blend lens, 4ft length, white finish, 120 volts, dimming 0-10V (SkyBlue enabled 100% to 81%, static white from 80% to 1%) with BIOS Dynamic Spectrum engine, 1 circuit

TB4WDLED		1000		80		B35		UB	
PRODUCT ID		NOM. LUM/FT DOWN		CRI		COLOR TEMP.		SHIELDING	
TB4WDLED	BEAM4 - Wall Direct LED	400	400 lm/ft - Minimum	80	80 CRI*	27	2700 K	B30	3000 K - BIOS*
		1000	1000 lm/ft - Maximum	90	90 CRI**	30	3000 K	B35	3500 K - BIOS*
						35	3500 K	B40	4000 K - BIOS*
						40	4000 K	TW2750	2700-5000 K - Tunable White
								TW2765	2700-6500 K - Tunable White
								DW3020	3000-2000 K - Dim to Warm
								TC1680	1650-8000 K - Color Tuning
Outputs between listed min and max are available. Consult factory for outputs outside of the listed range. Consult factory for max output with BIOS				* Not available with color tuning. ** 90 CRI is not available with Bios.		Consult Axitone technical sheet for more information on color technology. *Consult BIOS guide for more information on BIOS technology			Choose only one of the options above; SurroundLite not available with direct. * Default lens for Color Tuning, Tunable white and BIOS. Consult factory for other lens.

4		W		120		DPB(DYN)		1			
LENGTH (FT)		MR (OPTIONAL)		FINISH		DRIVER		CIRCUITS			
2	2'	DMLED(#)	downlight module LED	AP	aluminum paint	120	120 V	DP	dimming (0-10V) 1%	1	1 circuit
3	3'			W	white	277	277 V	LT(#)	Lutron*	2	2 circuits
4	4'			BLK	black	347	347 V	BI	bi-level dimming	+E(#)	emergency circuit*
5	5'			C	custom	UNV	universal	O(#)	other**	+NL(#)	night light circuit*
8	8'					DC	low voltage	DPB(#)	dimming (0-10V) 1% with Bios*	+GTD(#)	generator transfer device*
12	12'							TW(#)	tunable white drivers*	+M	MR
S(L)	System Run							CT(#)	color tuning drivers*		
								POE(#)	POE drivers*		
Add 6" per lamp. Specify quantity. Separate circuits included. Requires 120V or 277. Available in luminaires with Axitone and BIOS but downlight modules will not be tunable white, color tuning, or BIOS LEDs				* Only available with POE drivers.		* See page 2 to specify system ** Please consult factory, see page 2			*Specify quantity		

ORDER # _____
TB4WDLED-1000-80-B35-UB-4-W-120-DPB(DYN)-1

NOTES _____
Regarding IES files: Standard product IES files can be used for BIOS products at this time, as the photometric curve will not change. For power density calculations, consult your Axis Lighting representative.

- ELECTRICAL**
 - Lutron driver***
 - LDE1 - Hi-lume 1% EcoSystem with Soft-on, Fade-to-Black
 - LTEA - Hi-lume 1% 2-wire (120V forward phase only)
*Consult factory
 - Other drivers****
 - DALI - Digital Addressable Lighting Interface
 - DMX - Digital Multiplex
 - LV - line voltage - Advance Mark 10
 - Xitanium SR - For wireless sensor
 - BIOS DPB drivers***
 - STC - BIOS control 0-10V with static spectrum and BIOS SkyBlue enabled from 100% to 1%.
 - DYN - BIOS control 0-10V with dynamic spectrum and BIOS SkyBlue® with Bio-Dimming™, which changes spectral qualities by removing the SkyBlue component when dimming from 100% to 81%, while light output remains relatively constant; bio-dimming reduces CCT to 2700K. Dimming from 80% to 1% will then reduce light output.
 - Tunable White TW drivers***
 - DALIDT6 - DALI Type 6 (Two DALI Addresses)
 - DALIDT8 - DALI Type 8 (One DALI Address)
 - LTTW - Lutron T-Series Tunable White
 - Power over Ethernet MOLEX POE drivers***
 - IGOR
 - O - Other (Consult factory)

BIOS SkyBlue™

How to order

Spec sheet sample order, BIOS Tunable White (BTW) Light Engine

Description: Beam 3 Wall Direct/Indirect LED at 400lm/ft Up, 400lm/ft Down, with 80 CRI, BIOS Tunable White (BTW) 4027K, Spotless lens Up, Ultra blend lens Down, 4ft length, white finish, 120 volts, DALI Type 8 TW Driver (SkyBlue enabled at 4000K, SkyBlue removed at 2700K)

TB3WDILED		NOM. LUM/FT UP		NOM. LUM/FT DOWN		CRI	COLOR TEMP. (choose one)	SHIELDING INDIRECT
TB3WDILED	BEAM3 - Wall	400	400 lm/ft - min.	400	400 lm/ft - min.	80	27 2700 K	SO spotless lens
	Direct/Indirect LED	1100	1100 lm/ft - max.	1000	1000 lm/ft - max.	90	30 3000 K	SLA surroundlite asy.
		1500	1500 lm/ft - for TC1680 with SL*	700	700 lm/ft - for TC1680 with UB lens*		35 3500 K	0.25G 0.25" Glo lens
							40 4000 K	
							B30 3000 K - BIOS*	
							B35 3500 K - BIOS*	
							B40 4000 K - BIOS*	
							TW2750 2700-5000 K - Tunable White	
							TW2765 2700-6500 K - Tunable White	
							BTW3527 3500-2700 K - Tunable BIOS	
							BTW4027 4000-2700 K - Tunable BIOS	
							DW3020 3000-2000 K - Dim to Warm	
							TC1680 1650-8000 K - Color Tuning	
		Outputs between listed min and max are available. Consult factory for outputs outside of the listed range. Consult factory for max output with BIOS		Outputs between listed min and max are available. Consult factory for outputs outside of the listed range. Consult factory for max output with BIOS		* Not available with color tuning		Choose only one of the options above
		*For shieldings other than SL there is a fixed lumen output. Please consult factory for more information.		*For shieldings other than UB there is a fixed lumen output. Please consult factory for more information.		** Not available with Bios.		

LENGTH (FT)	MR (OPTIONAL)	FINISH	VOLTAGE	DRIVER	CIRCUITS
2 2'	DMLED(#)	AP aluminum paint	120 120 V	DP dimming (0-10V) 1%	1 1 circuit
3 3'		W white	277 277 V	LT(#) Lutron *	2 2 circuits
4 4'		BLK black	347 347 V	BI bi-level dimming	+E(#) emergency circuit*
5 5'		C custom	UNV universal	O(#) other **	+NL(#) night light circuit*
8 8'			DC low voltage*	DPB(#) dimming (0-10V) 1% with Bios*	+GTD(#) generator transfer device*
12 12'				TW(#) tunable white drivers*	+M MR
S(L) System Run				CT(#) color tuning drivers*	
				POE(#) POE drivers*	
	Add 6" per lamp. Specify quantity Separate circuits included Requires 120V or 277V Available in luminaires with Axitune and BIOS but downlight modules will not be tunable white, color tuning, or BIOS LEDs		* Only available with POE drivers.	** See page 2 to specify system ** Please consult factory, see page 2	*Specify quantity

ORDER #
TB3WDILED-400-400-80-BTW4027-SO-UB-4-W-120-TW(DALIDT8)

NOTES
Regarding IES files: Standard product IES files can be used for BIOS products at this time, as the photometric curve will not change. For power density calculations, consult your Axis Lighting representative.

- ELECTRICAL**
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- Other drivers****
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- Power over Ethernet MOLEX POE drivers* IGOR
- UL2108 certified for 0 - Other (Consult factory)