bios Dynamic Engine

Bio-Dimming™ Lighting Control Protocol

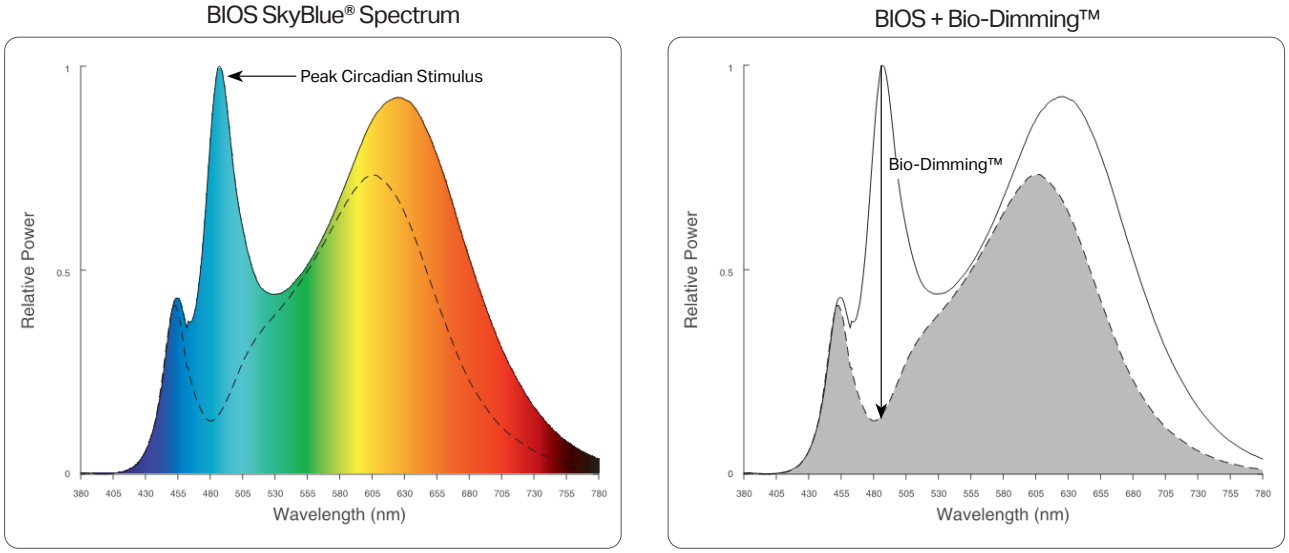
SW SHIFT WORK ENVIRONMENTS

BIOS Circadian Lighting Control Protocol for Shift Work is designed for spaces that are occupied continuously over a 24-hour period, such as hospitals, security facilities, behavioral health, etc. Whether you have 2 or 3 shifts, BIOS Dynamic Engine provides SkyBlue® signals over an extended daytime period to help each shift achieve circadian stimulus for a portion of their relative 'daytime' and activity periods.

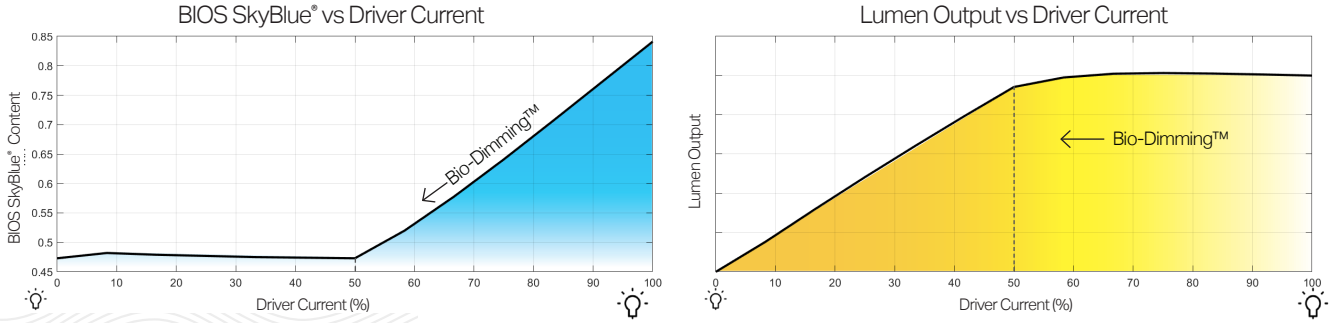
BIOS Dynamic Engine + Bio-Dimming™

BIOS SkyBlue® Dynamic Light Engine provides a brilliant white light that is optimized for vision and circadian needs. BIOS is pleased to offer SkyBlue® Dynamic Light Engines in 3000K, 3500K, and 4000K with Bio-Dimmng™. BIOS SkyBlue® Dynamic Light Engine is dimmable and features a simple approach to circadian lighting controls. When paired with the BIOS Bio-Dimming™ module, it operates using any single channel constant current (CC) LED driver and can be used with any standard dimming interface/protocol (0-10V, ELV, DMX, Wireless) and could work with existing two-channel control systems as well.

Spectral Power Distribution



Bio-Dimming™ - SkyBlue® Content and Lumen Output



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Dimmer Settings with Bio-Dimming™

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

BIOS SkyBlue® maintained for maximum circadian impact.

Light output remains relatively constant.

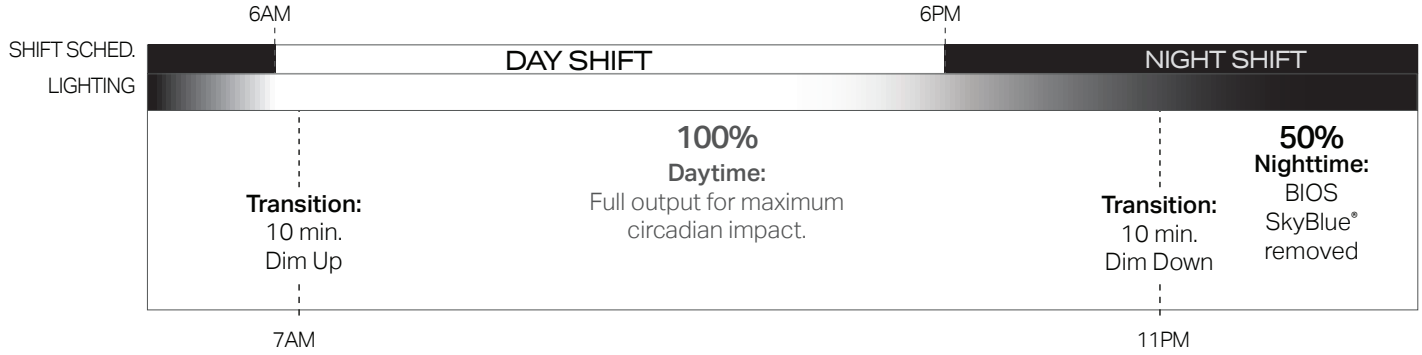
BIOS SkyBlue® removed to provide minimal circadian impact.

Light output dims down linearly.

*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

SW BIOS Shift Work Protocol - (2) 12hr Shifts

For businesses whose operations require two (2) shifts, the lighting system should be at full output in the morning, about an hour after the Day Shift begins, and continue to provide SkyBlue® signals well into the evening as shown in the diagram below. In the late evening, the lighting controls should dim to 50%, removing the SkyBlue® signals. This extended period of high circadian stimulus ensures that people from both shifts receive proper daytime signals while allowing the Night Shift a period of low circadian stimulus as well.



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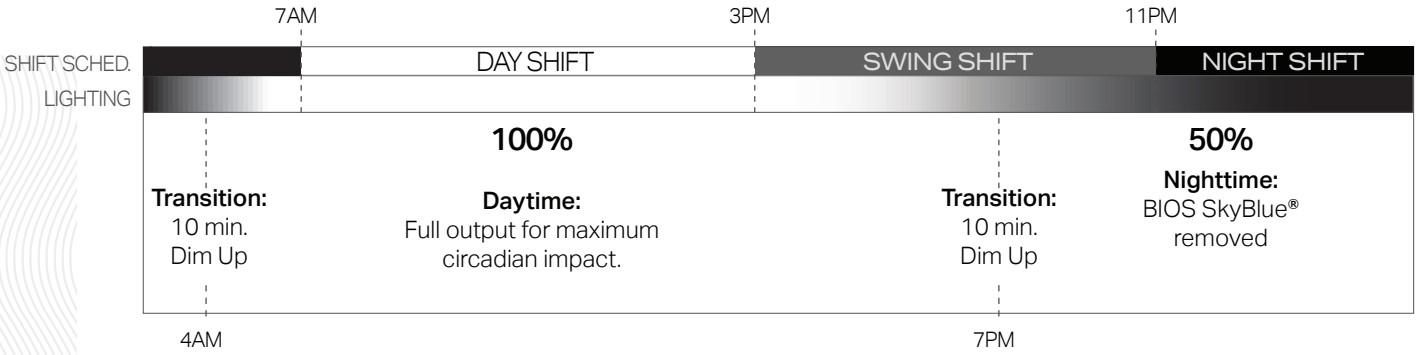
Bio-Dimming™ Lighting Control Protocol

SW SHIFT WORK ENVIRONMENTS

SW BIOS Shift Work Protocol - (3) 8hr Shifts

For businesses whose operations require two (3) shifts, the lighting system should be at full output beginning in the early morning, at the end of the Night Shift and before the Day Shift arrives. High circadian stimulus should be maintained until the evening, several hours into the Swing Shift, and then the lighting controls should dim to 50%, removing the SkyBlue® signals. This extended period of high circadian stimulus ensures that people from all shifts receive proper daytime signals while allowing the Night and Swing Shifts a period of low circadian stimulus as well.

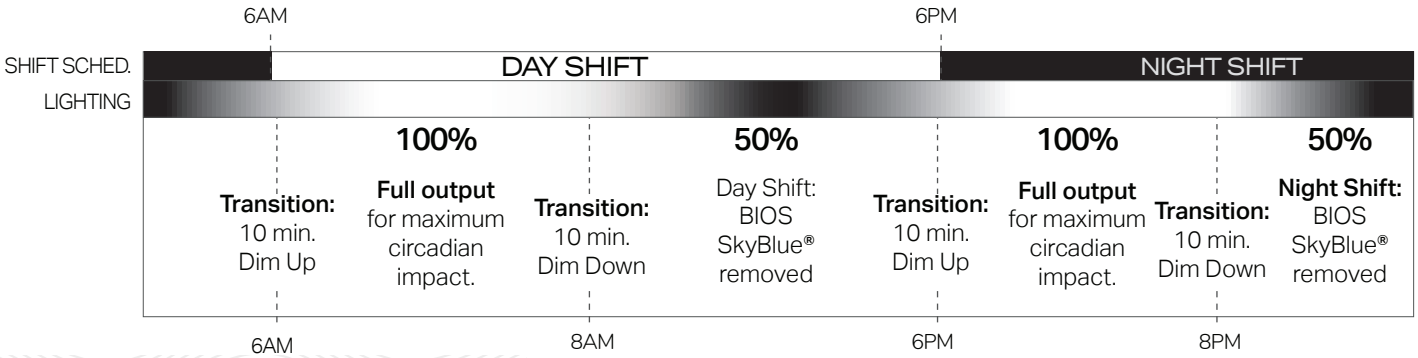


ES ENERGY SAVER APPROACH

Energy Saver protocol is a good option for spaces where energy allowances are constrained. The following protocol are energy saving lighting control strategies for shift work applications that offer for circadian stimulus while also reducing energy use over the course of the day. BIOS Circadian Energy Saver Protocol for shift work focuses on providing SkyBlue® signals for the first 2 hours of each shift.

SW ES BIOS Shift Work Protocol - (2) 12hr Shifts

For businesses whose operations require two (2) shifts, BIOS SkyBlue® should be used for the first two (2) hours at the beginning of each shift as shown in the diagram below. After two (2) hours, the lighting controls should dim to 50%, removing the SkyBlue® signals and maintaining light output.



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Bio-Dimming™ Lighting Control Protocol

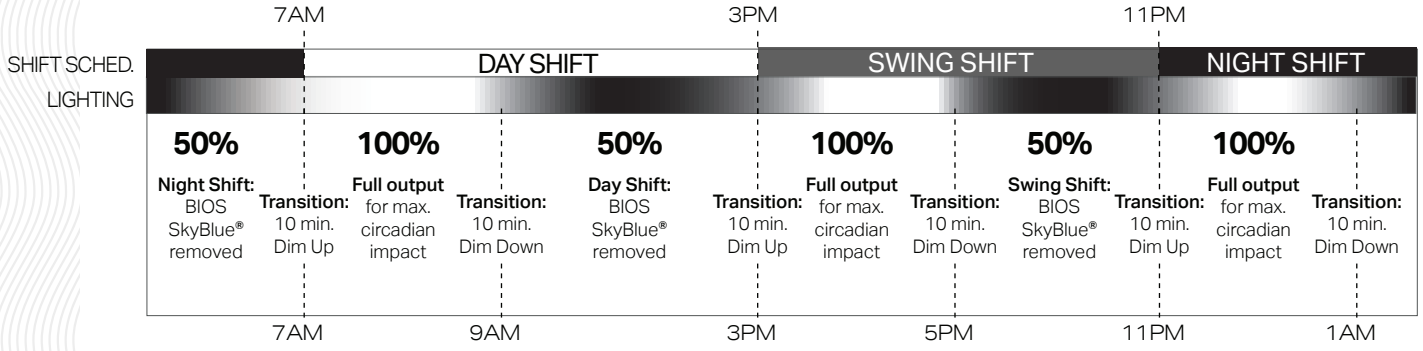
SW SHIFT WORK ENVIRONMENTS

ES ENERGY SAVER APPROACH

Energy Saver protocol is a good option for spaces where energy allowances are constrained. The following protocol are energy saving lighting control strategies for shift work applications that offer for circadian stimulus while also reducing energy use over the course of the day. BIOS Circadian Energy Saver Protocol for shift work focuses on providing SkyBlue® signals for the first 2 hours of each shift.

SW ES BIOS Shift Work Protocol - (3) 8hr Shifts

For businesses whose operations require three (3) shifts, BIOS SkyBlue® should be used for the first two (2) hours at the beginning of each shift as shown in the diagram below. After two (2) hours, the lighting controls should dim to 50%, removing the SkyBlue® signals and maintaining light output.



Frequently Asked Questions

Does protocol change with the seasons?

No. The main culprit of negative health consequences are due largely to social jet lag. Social jet lag occurs when our activity patterns no longer align with the solar day. Social jet lag is common in modern society and is especially prevalent during winter months when daylight hours are very short, and we still need to be active during hours of darkness. BIOS does not recommend lighting protocols/scenes that mimic the seasons.

Should I use an astronomical timeclock?

Yes, you can use an astronomical clock for solar synchronization. However, you should be careful to ensure that short days during the winter won't encroach normal working hours. When this happens, we recommend a set hour schedule rather than astronomical clocks and solar synchronization.