



SkyBlue™ LED Circadian Solutions



The Christ Hospital NICU / BIOS +Lumenwerx

LIGHTING FOR HEALTHCARE

- Increase Staff Productivity
- Improve Medical Diagnostics
- Improve Patient Outcomes
- Reduce Energy Costs





SkyBlue™ LED Circadian Solutions LIGHTING FOR HEALTHCARE

LIGHT AND CIRCADIAN DISRUPTION

With the 24-hour nature of healthcare environments, both staff and patients spend an inordinate amount of time indoors without access to important light signals their bodies need, leading to circadian disruption and a variety of health issues.

BIOS SKYBLUE™

BIOS SkyBlue is the only LED circadian lighting solution that captures the lighting spectrum of the natural blue sky (490nm) to promote better sleep, better energy, and better wellness.

Traditional lighting lacks this important 490nm, in fact, a study by the Cleveland Clinic¹ reported higher amounts of "blue-sky" (490nm) wavelength of light corresponds to better sleep, improved mood, and increased pain tolerance.

¹Office of Research and Innovation, Nursing Institute, Cleveland Clinic, Cleveland, Ohio. Bernhofer EI, Higgins PA, Daly BJ, Burant CJ, Hornick TR. "Hospital lighting and its association with sleep, mood and pain in medical inpatients." Journal of Advanced Nursing. 2014 May; 70(5):1164-73

BIOS ILLUMINATED LIGHT FIXTURES

BIOS SkyBlue LED circadian lighting solutions are designed by wellness lighting experts. The BIOS Illuminated Partner Program pairs BIOS SkyBlue LEDs with leading lighting manufacturers to bring you high quality light fixtures with industry-leading wellness lighting technology.

BIOS LED SOLUTIONS

BIOS offers four (4) different LED circadian lighting solutions — **Biological Static, Biological Dynamic, Biological Tunable, and Biological Dim-to-Warm**. Each of our BIOS LEDs Solutions can be integrated into BIOS Illuminated Partner Light Fixtures, see participating BIOS Partners by scanning the QR code below.

A MORE ACCURATE DIAGNOSIS

- BIOS SkyBlue solutions deliver far-red light (660 nm) that has the unique ability to penetrate the skin's "optic window" to enhance visual diagnosis, specifically vein delineation for cyanosis, which is a precursor to a host of medical ailments.
- BIOS SkyBlue meets the Cyanosis Observation Index (COI) requirements for visual assessment, providing a COI₁₀ of 3.3 at 3500K and a COI₁₀ of 1.5 at 4000K and a R9 of 90+.

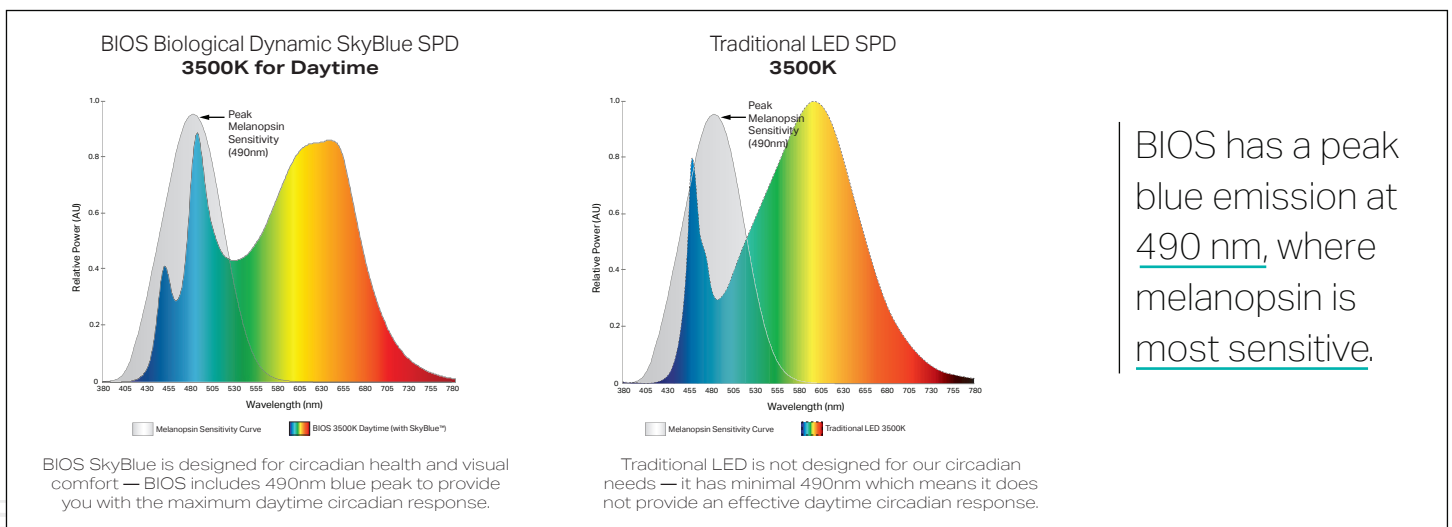
WELL BUILDING STANDARD™

BIOS SkyBlue lighting provides industry-leading LED technology that gives designers the tools they need, to create healthier spaces toward satisfying Circadian Lighting Design Feature L03 under the WELL Building Standard™ v2.

ABOUT BIOS

As former NASA engineers and researchers, our founders created lighting solutions to help astronauts regulate their circadian rhythms while on the International Space Station.

Today we continue to use these discoveries to innovate, creating biological lighting solutions that redefine what is possible and improve the health and wellness of people here on Earth.





SkyBlue™ LED Circadian Solutions LIGHTING CONTROLS FOR HEALTHCARE

LIGHTING CONTROLS

BIOS believes wellness lighting controls should be simple and easy to use. BIOS recommended lighting controls are all single-channel, for **Biological Dynamic, Tunable, and Dim-to-Warm**, this means intensity and CCT are controlled together. **Biological Static** does not have a CCT change and can be controlled with a simple on/off switch or wall dimmer.

All BIOS Solutions are all compatible with standard dimming controls.

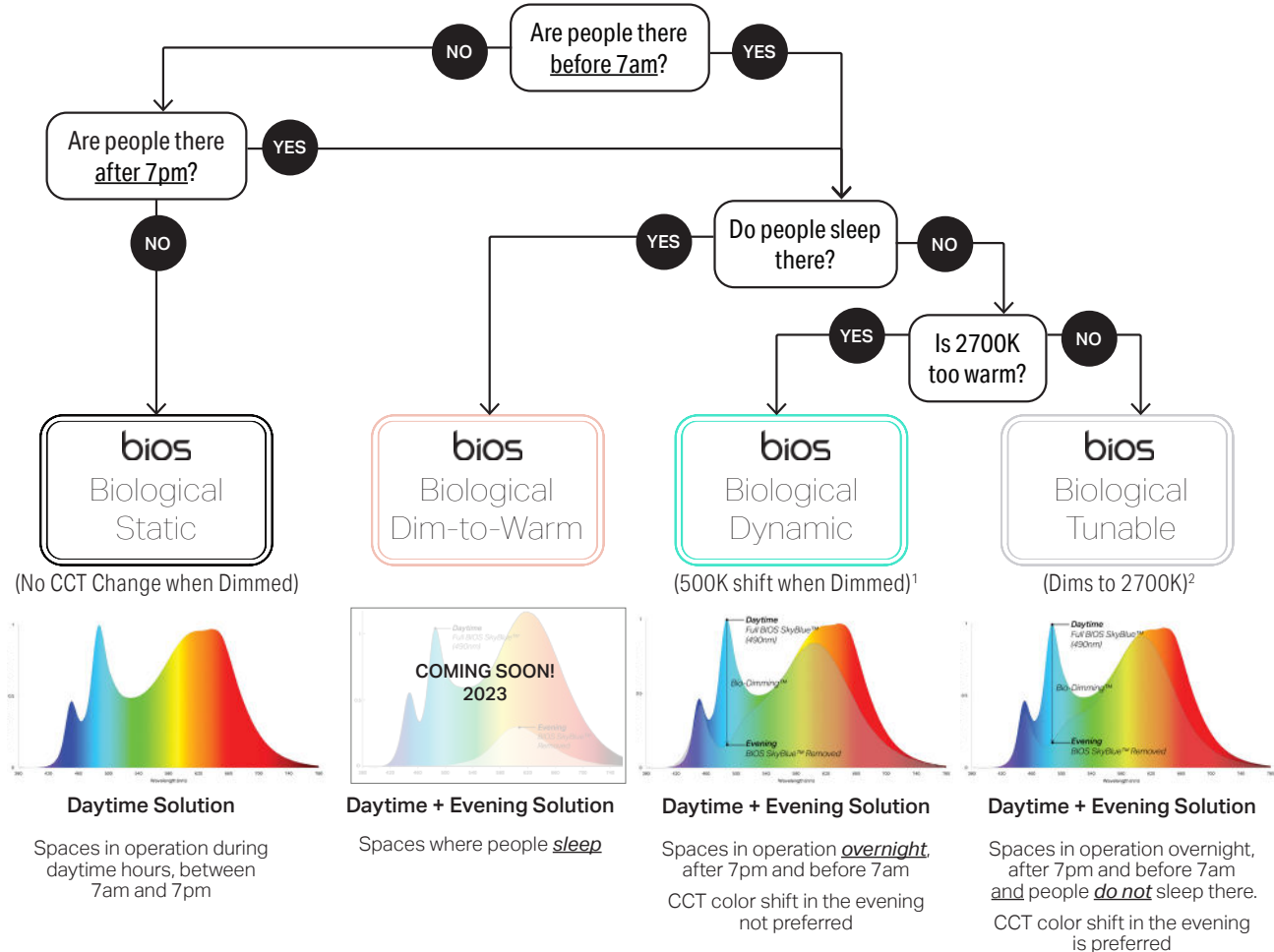
Please refer the following diagram as you begin to decide where to use BIOS. The subsequent pages provide additional lighting control detail for healthcare applications, specifically when, where, and for how long to use BIOS LED Solutions.

WHEN TO USE BIOS SKYBLUE

Biological Static is ideal for medical offices and clinics whose operating hours are between 7 am and 7 pm. For spaces that require daylight harvesting, BIOS recommends **Biological Tunable** with two-channel control.

Biological Dynamic is recommended for nurses stations and corridors. **Biological Dim-to-Warm** is recommended for patient rooms and family waiting areas.

For medical departments or facilities that are occupied later in the evening (after 7 pm) and include shiftwork, please contact BIOS directly for additional information at consultation@bioslighting.com.



¹ 3000K dims to 2700K

² BIOS Biological Tunable is compatible with two-channel applications. For two-channel application notes please visit our website under [Partner Resources > Technical Specifications](#).





SkyBlue™ LED Circadian Solutions LIGHTING CONTROLS FOR HEALTHCARE

BIOLOGICAL STATIC

BIOS Biological Static makes wellness lighting simple and easy with just the flip of a switch! Biological Static is a daytime only solution, intended to provide important daytime light signals for circadian health. Ideal applications for BIOS Biological Static include spaces in operation during daytime hours — between 7am and 7pm. BIOS Biological Static LEDs can be used with a simple on/off switch or wall dimmer and is compatible with *standard dimming controls (0-10V, wireless, ELV, DMX)*.

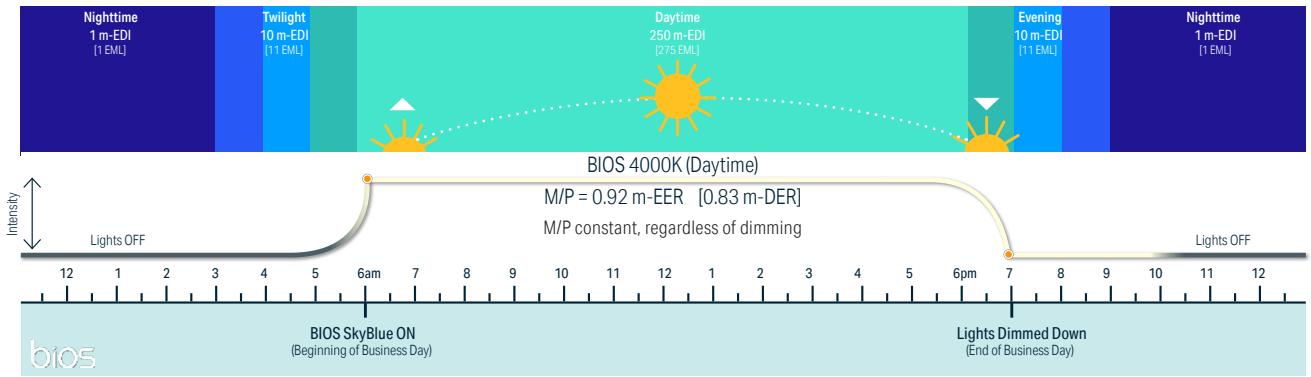
Biological Static - Healthcare Application Areas

- Operating Rooms
- Administrative Offices
- Medical Offices
- Primary Care Clinics
- Community Health Centers
- Infusion Bays / Clinics
- Dentist Offices
- Dialysis Clinics



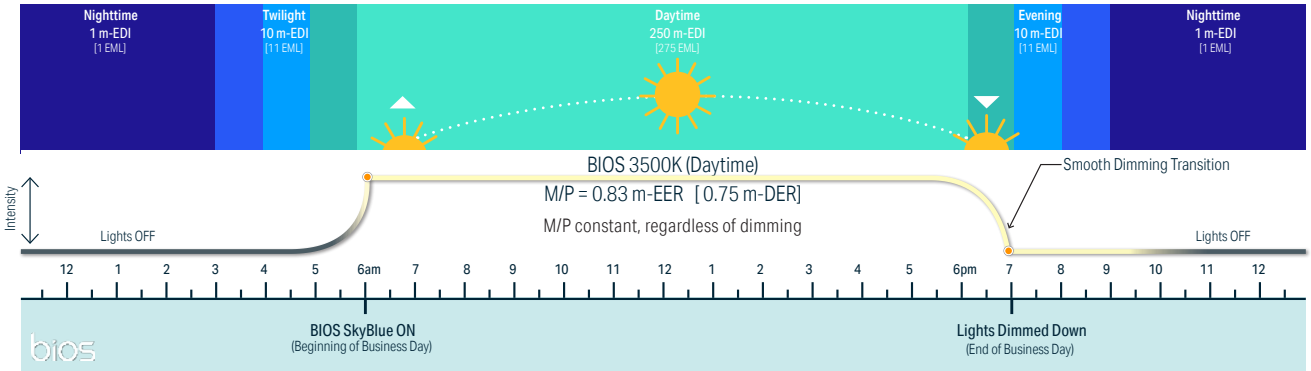
4000K

(No CCT change when dimmed)



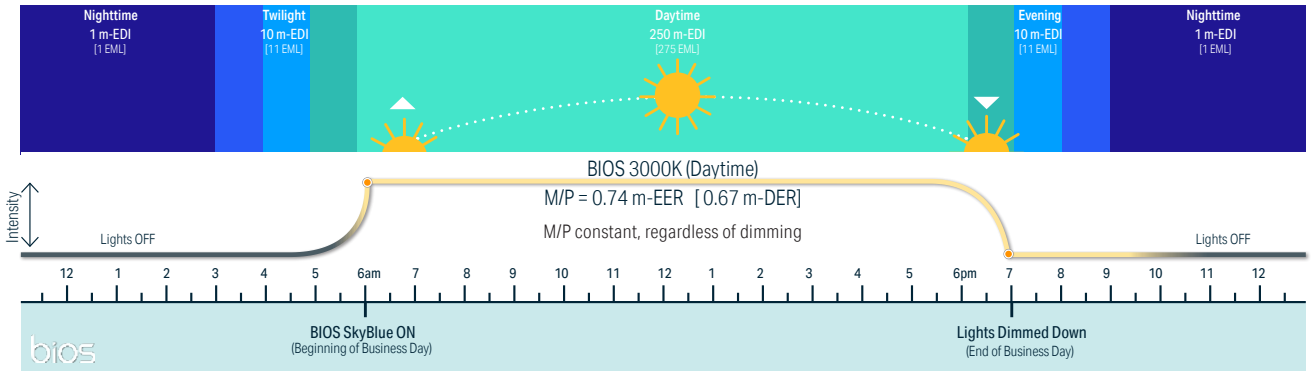
3500K

(No CCT change when dimmed)



3000K

(No CCT change when dimmed)





SkyBlue™ LED Circadian Solutions LIGHTING CONTROLS FOR HEALTHCARE

BIOLOGICAL DYNAMIC

BIOS Biological Dynamic LEDs provide daytime-to-evening wellness lighting solutions. Simply select your daytime CCT, choose from 4000K, 3500K, or 3000K. Biological Dynamic LEDs dim to evening CCTs of 3500K, 3000K, and 2700K respectively. CCT and Intensity are controlled together using a single channel with the BIOS Bio-Dimming™ Control Module, making the transition from biological day to biological night seamless and effective. *All BIOS Solutions are all compatible with standard dimming controls (0-10V, wireless, ELV, DMX).* Biological Dynamic is recommended for use primarily at Nurses Stations.

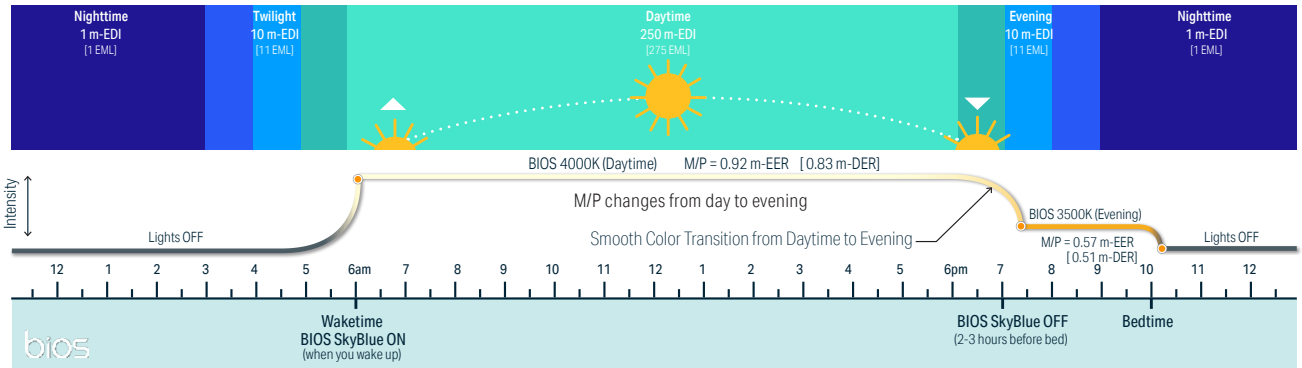
Biological Dynamic - Healthcare Application Areas

- Nurse Work Stations
- Patient Corridors
- Back of House Corridors

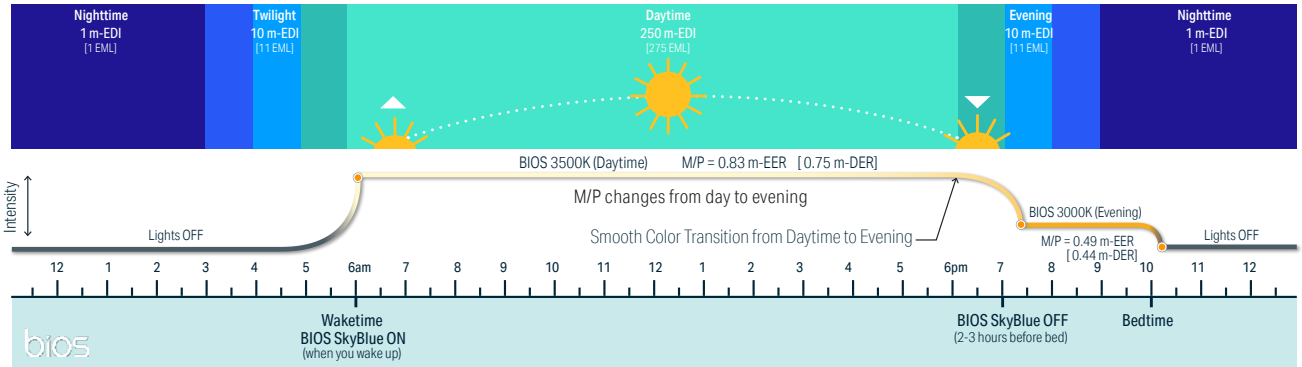
³ BIOS Biological Dynamic is compatible with two-channel applications. For BIOS-specific two-channel application notes please visit our website under [Partner Resources > Technical Specifications](#).



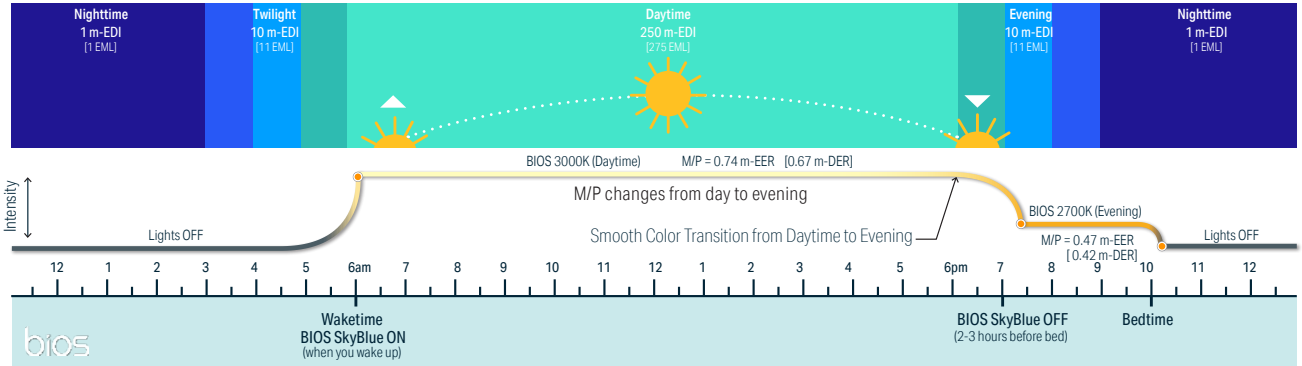
4000K
(Dims to 3500K)



3500K
(Dims to 3000K)



3000K
(Dims to 2700K)





SkyBlue™ LED Circadian Solutions LIGHTING CONTROLS FOR HEALTHCARE

BIOLOGICAL TUNABLE (BIO-DIMMING)

BIOS Biological Tunable LEDs provide daytime-to-evening wellness lighting solutions. Simply select your daytime CCT — choose from 4000K, 3500K, or 3000K. Regardless of daytime CCT, all **Biological Tunable** LEDs dim to an evening CCT of 2700K. CCT and intensity are controlled together using a single channel with the BIOS Bio-Dimming™ Control Module, making the transition from biological day to biological night seamless and effective. *All BIOS Solutions are all compatible with standard dimming controls (0-10V, wireless, ELV, DMX).*

Biological Tunable - Healthcare Application Areas

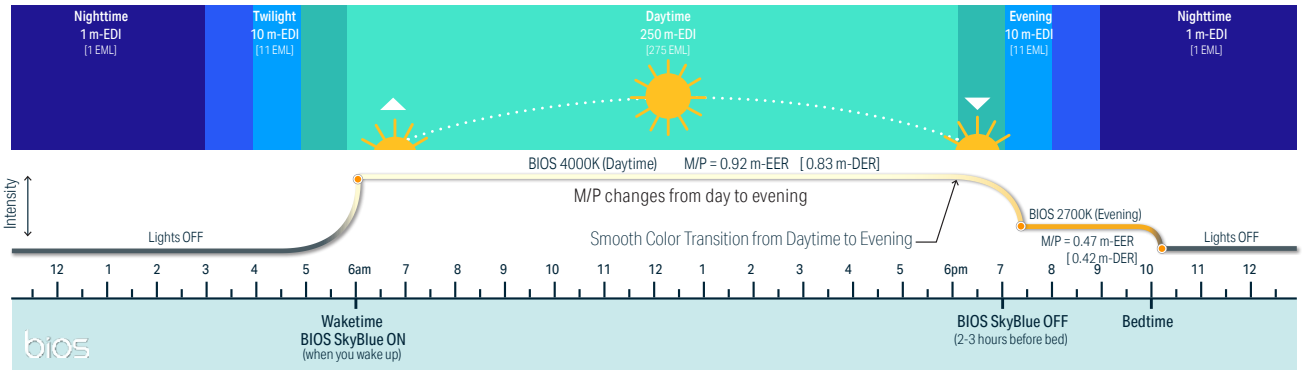
- Med. Surg. Patient Rooms
- ICU Patient Rooms
- NICU Patient Rooms
- ED Patient Rooms
- Prep/Hold/Recovery Patient Bays
- Family Waiting Areas

² BIOS Biological Tunable is compatible with two-channel applications. For two-channel application notes please visit our website under [Partner Resources > Technical Specifications](#).



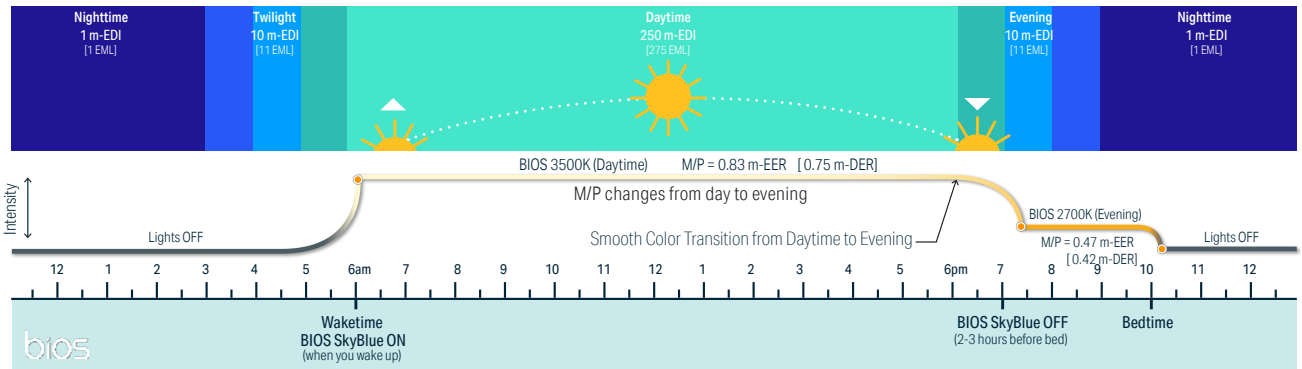
4000K

(Dims to 2700K)²



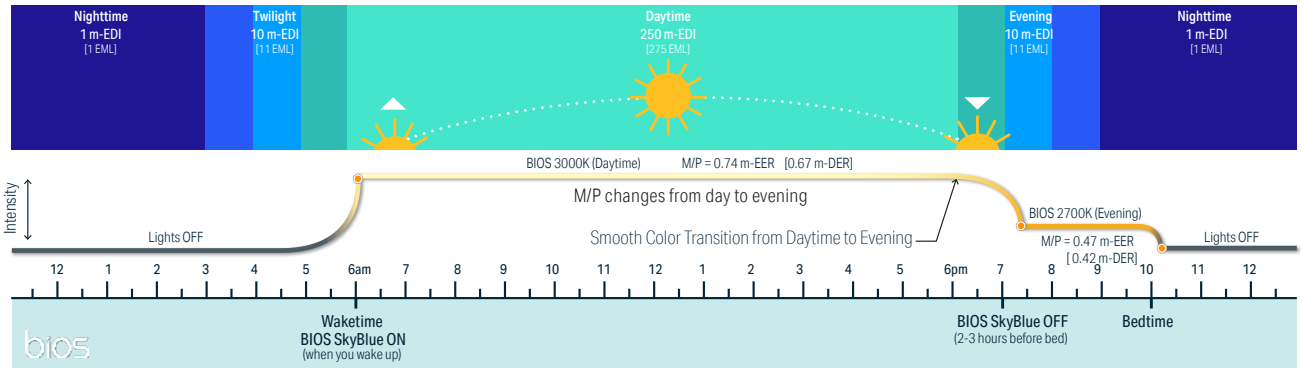
3500K

(Dims to 2700K)²



3000K

(Dims to 2700K)²





SkyBlue™ LED Circadian Solutions LIGHTING CONTROLS FOR HEALTHCARE

BIOLOGICAL TWO-CHANNEL SETUP

BIOS Biological Dynamic, Biological Tunable, and Biological Dim-to-Warm are daytime-to-evening wellness lighting solutions.

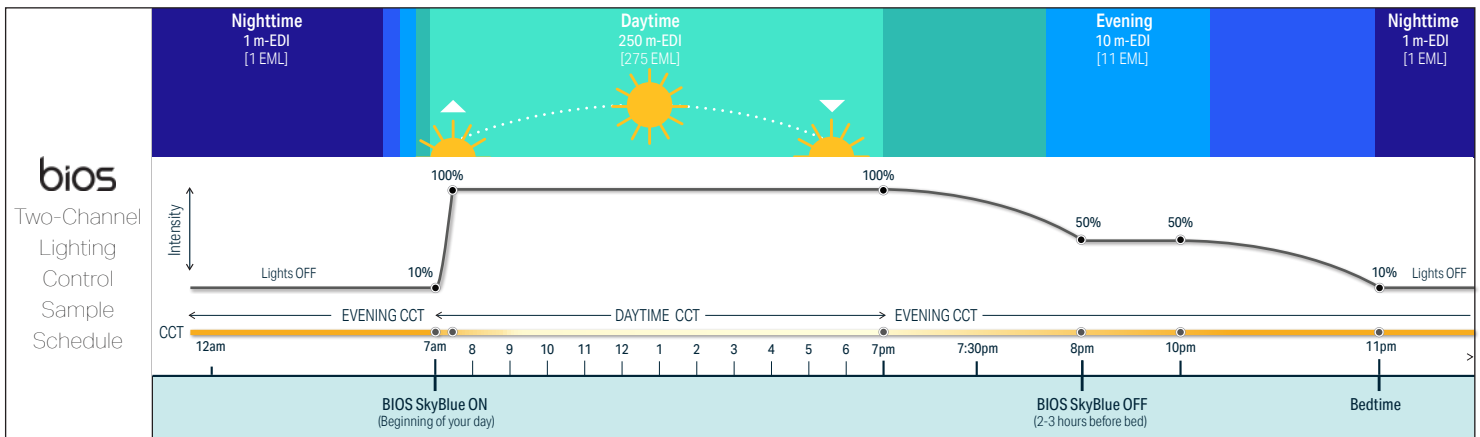
Each of these solutions can be used for two-channel applications, where CCT and intensity are controlled separately using a standard two-channel driver to create the transition from biological day to biological night.

Two-channel setup is recommended for spaces that include daylight harvesting controls.

Two-Channel Tunable - Healthcare Application Areas

- Med. Surg. Patient Rooms
- ICU Patient Rooms
- NICU Patient Rooms
- ED Patient Rooms
- Prep/Hold/Recovery Patient Bays
- Family Waiting Areas

³ For BIOS-specific two-channel application notes please visit our website under [Partner Resources > Technical Specifications](#).



DAYTIME-TO-EVENING SOLUTIONS

BIOS has engineered wellness light sources that can easily and effectively transition from daytime to evening all in one light source!

BIOS LEDs create high-quality white light and include SkyBlue (490nm) which can help boost mood and improve alertness during the day. In the same light source, BIOS also has LEDs for evening to remove the daytime light signals and prepare your body and mind for sleep.

For a list of BIOS Illuminated light fixtures and to see BIOS Illuminated Partners, please scan the QR code at the bottom of this page.

SHIFTWORK CONSULTATION

BIOS provides unique expertise in circadian lighting application for shiftwork. Based on our experience with shiftwork and circadian lighting, we have found that the lighting strategies for shiftwork are not a one-size-fits-all.

Wellness lighting for shiftwork requires a more detailed approach, tailored to align with each shiftwork groups needs. That is why BIOS offers a consultation program specifically for shiftwork.

For questions about wellness and circadian lighting for shiftwork or for medical departments or facilities that are occupied later in the evening (after 7 pm), please contact BIOS directly at consultation@bioslighting.com.

