

## Background

With the rapid advancement of smart lighting systems, the demand for dynamic brightness control of LED light sources has evolved from basic on-off regulation to high-precision, real-time adjustment. Traditional LED dimming solutions often suffer from noticeable response delays, which fail to meet the requirements of modern control systems that demand millisecond-level signal following. In stage performances, Live sports breasting, and unresponsive brightness adjustments can disrupt the artistic expression of light effects. Against this backdrop, fast dimming technology for LED drivers has emerged as a core competitive feature, addressing the critical gap between control system agility and LED output stability, and becoming a key enabler for high-performance lighting and display systems.

## What is Fast Dimming

Fast Dimming is the capability of an LED driver to change the light output intensity of the luminaires almost instantaneously and with precise control in response to a command from the stadium's central control system.

It is defined by two critical metrics:

- **Ultra-low latency:** The delay from a "scene change" command to the lights beginning to respond is minimized.
- **High transition speed:** The ability to ramp up or down from one lighting level to another (e.g., from 20% to 100%) smoothly and rapidly, without flicker or strobing visible on high-speed cameras.

## Benefits of Fast Dimming Seamless

### Integration with broadcast & show control:

- **Live broadcast scenes:** Enables instant switching between pre-set lighting scenes for different broadcast moments – e.g., instantly dimming crowd/ambient lighting while boosting field/court illumination when the main broadcast camera is live, creating dramatic focus.
- **Synchronized show effects:** Allows lighting to be perfectly timed with pyrotechnics, player introductions, halftime shows, and audio cues for a cohesive spectator experience.

### Elimination of broadcast flicker & artifacts:

- Modern broadcast cameras use variable shutter speeds (up to 10,000 fps for super-slow-mo). Fast, stable dimming ensures **flicker-free footage** at all times, preventing dark bands or strobing in High-Speed Slow-Motion Replay.

### Enhanced operational flexibility & energy savings:

- **Dynamic event transitions:** Allows rapid adaptation for multi-purpose venues. Quickly transition from "Pre-game Warm-up" (moderate light) to "Game Time" (full light) to "Halftime Show" (dynamic colors and effects) to "Cleaning/Maintenance" (low light).
- **Demand-responsive dimming:** Instantly respond to natural light changes (in retractable roof or open stadiums) or reduce levels during extended breaks, saving significant energy without compromising readiness.

### Improved player & official safety:

- **Consistent, rapid-response lighting:** ensures there are no lingering periods of inadequate or unstable illumination during critical transitions, maintaining optimal visual conditions.

## *Disclaimer*

*This note is for reference only. It is the responsibility of the customer to thoroughly analyze all aspects of the customers' proposed application for the products. The customer is solely responsible for making the final selection of the product(s) to be used and to ensure that all performance and safety requirements of the application are satisfied. Inventronics makes no representation or warranty as to the completeness or accuracy of the information contained herein. The products and specifications set forth in this document are subject to change without notice and Inventronics disclaims any and all liability for such changes.*