Control4 Whitepaper

A detailed explanation of PixLite® and Control4 and how they work together

Full Content

1 Introduction

Pixel lighting has become an essential part of design across entertainment, architecture, themed spaces, and residential projects. The technology transforms lighting from static washes into dynamic visuals, capable of gradients, animations, mapped video and immersive effects. One of the challenges with this technology has been integration: how to connect a high-capacity pixel controller into an automation system without relying on middleware, dedicated media servers, or a PC running continuously in the background.

Advatek's PixLite® Mk3 platform provides a reliable foundation for pixel control at scale. These controllers support standard DMX over Ethernet protocols (eDMX), including sACN and Art-Net, so lighting effects can be generated from consoles, media servers, or software tools. With the SHOWTime™ feature set, content can be recorded, stored on a microSD card, and played back without the original source present, enabling installations to run consistently and reliably.

The Control4 driver developed by Chowmain Software integrates this capability directly into Control4 projects. Within Composer, a PixLite® Mk3 can be linked to the Control4 system, exposing controls for solid colors, global brightness, and SHOWTime™ scene or playlist playback. Device feedback and monitoring are also available, ensuring stable performance.

For Control4 dealers, this means pixel lighting can be managed much like any other lighting load. Color and brightness controls appear in the standard interface, with advanced options a step away. For PixLite® users, it provides a straightforward way to integrate into Control4 automation environments across residential, hospitality, and commercial projects.

2 What is Pixel Control?

Pixel control refers to the ability to address and manage each LED individually within a strip, string, or fixture. In a constant-voltage strip, all LEDs respond as a single unit; adjusting the red channel makes the entire strip more red. In a pixel-controlled strip, each LED has its own red, green, blue, and often white values. This allows effects to be generated so that, for example, one part of the strip can shimmer in amber, whilst another fades into blue, all from the same control stream.

This distinction opens new creative possibilities. Designers can produce smooth gradients, chases, and video-mapped effects that respond to architecture, staging, or interaction. The technology is highly scalable, equally suited for a single accent feature in a home theater or a façade spanning tens of thousands of LEDs.

Pixel control also enables precision. Effects can be aligned exactly to architectural lines or stage designs, offering an accuracy not possible with traditional static lighting. These

combined benefits have made pixel lighting a cornerstone of visual design in theme parks, festivals, broadcast studios, retail spaces, and high-end residences.

3 The PixLite® Mk3 Platform

PixLite® Mk3 is Advatek's flagship controller family, enabling professional-grade pixel installations. Each model in the Mk3 range shares the same processor and firmware, ensuring a consistent workflow and compatibility across the product line.

A key strength of PixLite® controllers is their broad compatibility with LED protocols. They are designed to work with a wide variety of pixel ICs, giving integrators freedom to choose LED types without being locked into a single standard.

Another defining capability is scale. A 16-port PixLite® Mk3 can process up to 96 universes of pixel data simultaneously, equivalent to over 49,000 DMX channels. This allows thousands of LEDs to be driven from a single controller, reducing the device count on your network while maintaining significant coverage.

Within the PixLite® Mk3 product line, each series offers unique strengths:

- The E-Series delivers the raw PixLite Mk3 engine in a cost-effective, streamlined design, ideal for compact projects or installations with limited space.
- The A-Series uses that same powerful engine, while adding advanced features such as live current monitoring, smart electronic fuses, and dual gigabit networking for more complex and sophisticated installations.
- The T-Series and R-Series focus on long-range distribution, pairing transmitters and receivers to extend pixel control across large venues or campuses.

These controllers are regularly deployed in environments where reliability is essential, from live entertainment to permanent architecture, consistently deliver stable, precise results.

4 Lighting Data Sources

For a pixel installation to display effects, the controller must receive data that defines what each LED should do. This is typically structured in universes of 512 DMX channels, following the DMX512 standard.

While DMX can run over physical cabling, large-scale projects quickly exceed those limits. Instead, Ethernet-based DMX protocols (sACN and Art-Net) are used. Both are capable of transmitting thousands of universes over standard network infrastructure.

PixLite® Mk3 controllers accept both protocols, making them compatible with nearly any content source. Examples include:

- Lighting consoles such as grandMA, ETC, Hog, or Chamsys.
- Media servers such as Resolume, Disguise, or Pixera, often used for pixel-mapping video.
- Specialist software such as LightJams LED Mapper, Madrix, MadMapper or Touch Designer, for creative installations.

The live workflow is straightforward, where the content source generates effects, transmitting over eDMX. PixLite® receives this, and then outputs pixel control data to the LEDs in real time. This allows for frame-accurate output across thousands of pixels.

5 SHOWTime™

Live playback offers flexibility, but it requires the content source to remain connected and active. For permanent or semi-permanent projects, leaving a PC or server in place is not always practical or reliable.

The SHOWTime™ feature-set, built into every PixLite® Mk3 controller, enables standalone playback. The process begins with recording: an integrator sends live data (sACN or Art-Net) into the controller and records it to the microSD card as a scene file. Each scene contains the pixel data required to reproduce the effect exactly as it was during recording.

Multiple scenes can be grouped into playlists, which can also include static colors. This makes it possible to combine dynamic effects with simple looks in a single sequence.

By default, playback can be started in a variety of ways: via sACN, DMX, or UDP triggers, or by using the PixLite®'s HTTP or WebSocket API. SHOWTime™ therefore provides both flexibility and reliability, enabling installations to operate independently of the original content source.

One main advantage of SHOWTime™ is repeatability. Once content has been recorded, it can be recalled consistently without external equipment, ensuring installations run reliably over long periods.

6 Control4 Integration

6.1 From Triggers to Native Control

Controlling SHOWTime™ content can be achieved from external systems using PixLite®'s built-in triggers. With the Control4 driver developed by Chowmain Software, PixLite® Mk3 controllers can be even more easily integrated directly into Control4 projects. This approach allows pixel lighting to be monitored and triggered directly through the same interfaces and programming workflows that dealers already use for other subsystems.

6.2 Connection and Setup

The driver communicates with PixLite® over its HTTP(S) and WebSocket API. Configuration is undertaken in Composer Pro, where the driver is added to the project, the PixLite®'s IP address is entered, and if the device has been password protected, its admin password is entered. Once these steps are complete, Control4 exchanges commands and feedback with the PixLite® automatically.

6.3 Core Features

The Control4 driver provides access to both simple and advanced control features:

- **Direct color and intensity:** select a solid RGBW color across all connected pixels and adjust overall brightness with a global slider.

- **SHOWTime™ discovery:** automatically lists all available scenes and playlists recorded on the controller's microSD card.
- **Playback:** start, pause, skip forward, or move back through playlists, just as with standard playback controls.
- **Mode selection:** switch between live eDMX streaming and SHOWTime™ playback.
- **Freeze and Blank:** hold the current frame or instantly turn all outputs off.

6.4 Monitoring and Feedback

The driver returns useful feedback to Control4, including:

- Device information such as name and firmware version.
- Playback status: idle, playing, or paused.
- Error reporting, including last error logged and a "card not found" alert if the microSD is missing.
- Device temperature.

This information can be viewed in Composer or integrated into programming logic for conditional actions and notifications.

6.5 Advanced Monitoring (A-Series Only)

When used with A-Series controllers, the driver also provides:

- Electronic fuse monitoring in real time.
- Current measurement for the pixel output loads.

This information can be used to create predictive maintenance strategies, triggering alerts before a fault becomes visible to the end user.

6.6 Example Use Cases

- In a residence, static accent colors can be adjusted daily while playlists run for special occasions.
- In hospitality, playlists can be triggered to align with scheduled events or themes.
- Technicians and service providers can receive alerts if a fuse trips or if current levels exceed expected thresholds.

7 Benefits of Using Control4 with PixLite®

The combination of PixLite® Mk3 and the Control4 driver simplifies pixel lighting integration. Dealers can control thousands of LEDs with the same workflows used for conventional lighting, reducing complexity for both programming and end-user interaction.

The system is highly scalable, allowing installations from small accent projects to stadium-sized displays to be managed through a single driver and controller. Reliability is enhanced by the proven performance of Advatek hardware and the stability of Control4 automation.

For projects requiring ongoing monitoring, the A-Series adds predictive maintenance capabilities, helping to ensure system uptime and reduce service calls.

8 Example Workflow

Consider a project where each room in a high-end residential project features a PixLite® controller. Dynamic lighting effects are designed in a media server. The server streams sACN data to a PixLite® Mk3 in each room, which outputs the effects to LED strips during programming. These effects are recorded into SHOWTime™ scenes and grouped into a playlist. The content is stored on the controller's microSD card.

In Composer Pro, the installer adds the driver, enters each PixLite® IP address and binds controls to the user interface. From Control4 touchscreens, remotes, or mobile apps, the end user can select a static color, recall a playlist, adjust intensity, or pause playback for each controller. If the installation is using PixLite® A-Series controllers, the system can also alert operators if a fuse trips or current draw exceeds thresholds.

This workflow highlights how pixel lighting content moves from creative generation, through recording and storage, into seamless automation within Control4.

9 Annex: Full Feature Reference

For technical completeness, the driver supports the following functions as provided by Chowmain Software:

- Free manufacturer sponsored driver
- 2-way IP Control
- Native Control4 Color Lighting Functionality
- Lighting Extras
    - Status
        - Mode
        - Operation
        - Playback State
        - Temperature
        - Current Draw
        - eFuse Status
    - Mode
        - Live
        - Freeze
        - Blank
    - Playback
        - Play
        - Pause
        - Play/Pause
        - Restart
        - Previous
        - Next
        - Previous Scene
        - Next Scene

    - Scenes
        - Scene List
    - Playlists
        - Playlist List
- Programming Commands
    - Execute Playlist
    - Execute Scene
    - Playback Controls
    - Set Intensity
    - Set Mode
- Actions
    - Identify
    - Test Mode
- Driver Events
    - Connected
    - Disconnected
    - eFuse Good
    - eFuse Bad
    - Error
    - No Error
    - SD Card Not Found
- Keypad Bindings
    - Intensity On
    - Intensity Off
    - Intensity Toggle
    - Play
    - Pause
    - Play/Pause
    - Restart
    - Previous
    - Next
    - Previous Scene
    - Next Scene
    - Mode Live
    - Mode Freeze
    - Mode Blank

10 Resources

A resource package is provided alongside this document, containing:

- The Control4 driver.
- Technical notes from Chowmain Software.
- An example SHOWTime™ scene file for testing.
- This White Paper, providing context and guidance.

11 Conclusion

Pixel lighting offers unmatched creative possibilities, but integration has often required additional hardware or custom programming. With PixLite® Mk3 controllers, content can be created using standard tools, recorded with SHOWTime™, and recalled reliably without the need for an on-site PC or server. With the Control4 driver, this functionality extends directly into the Control4 ecosystem.

Dealers gain a familiar interface for managing color and brightness, while SHOWTime™ integration enables advanced effects and automation. Monitoring ensures that system health is visible, and the A-Series provides endpoints that can be leveraged for predictive maintenance.

Together, PixLite® Mk3 and Control4 deliver a scalable, dependable, and integrated solution for pixel lighting across residential, hospitality, and commercial environments.