CHIPKIN

Case Study

Lutron Grafik 6000 Lighting to EcoStruxure Integration

Overview

A national restaurant chain operating more than 2,000 locations across the United States required a standardized and cost-effective solution to integrate its existing Lutron Grafik 6000 lighting systems into a BACnet IP building automation environment based on Schneider Electric EcoStruxure.

The customer required that the solution preserve all existing lighting functionality, including zone-level dimming, scene control, and local manual operation, while replacing an existing Siemens PLC-based lighting control layer. The integration needed to support site-to-site variations in lighting layouts and be scalable for enterprise-wide deployment without requiring lighting system replacement.

Chipkin Automation Systems was engaged to deliver a BACnet IP integration strategy that met these requirements while minimizing capital costs, operational risk, and long-term support complexity.

Existing Lighting Architecture and Integration Challenges

Most restaurant locations shared a similar lighting architecture consisting of:

- Lutron Grafik 6000 lighting controller
- Lutron LCP128 (Softswitches 128) panel for dimming and relay outputs
- Lutron OMX-CI-RS232 communication interface
- On-site Siemens SIMATIC S7-200 PLC with a TP700 HMI handling scheduling and scene control

Communication between the PLC and the Lutron lighting system relied on Lutron's proprietary RS-232 protocol and Siemens PPI. The Grafik 6000 platform does not support BACnet IP or BACnet MS/TP, preventing direct integration with a building automation system.

The Grafik 6000 architecture introduced several integration challenges that needed to be addressed to ensure a reliable and scalable solution.

Key constraints included:

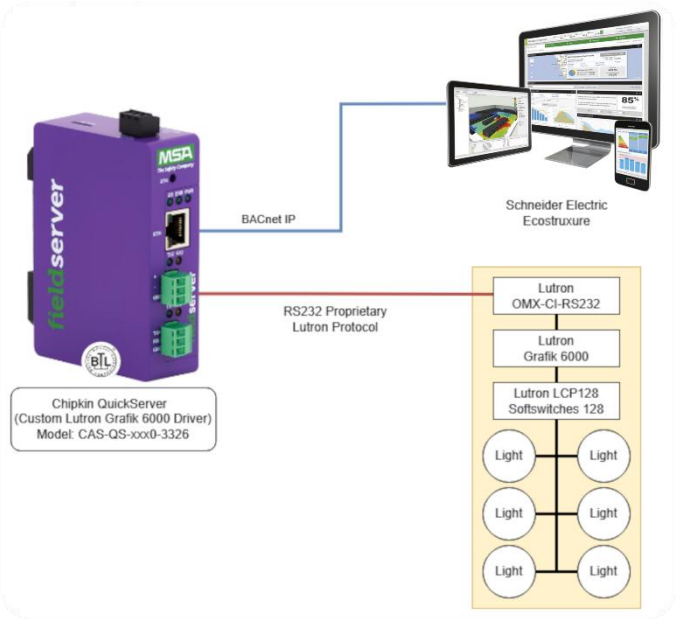
- No native BACnet support in the Lutron Grafik 6000 platform, requiring protocol translation
- A proprietary, timing-sensitive RS-232 protocol, where precise command sequencing was critical to correct scene and relay operation
- Inconsistent field wiring and configuration variations resulting from years of site-specific retrofits and upgrades

In addition, the replacement solution needed to operate as a true drop-in alternative to the existing PLC-based control layer. It was required to preserve all existing lighting behavior and local manual controls while remaining repeatable and scalable across thousands of locations.

Chipkin's approach to the solution

Chipkin implemented a FieldServer QuickServer with a custom **Lutron Grafik 6000 driver** to integrate the legacy lighting platform into a modern BACnet IP building automation environment. The QuickServer was deployed as the protocol translation layer, enabling centralized BACnet-based control while preserving all existing lighting behavior and local manual operation.

The solution replaced the existing Siemens SIMATIC S7-200 PLC and TP700 HMI–based lighting control layer and was designed to function as a true drop-in alternative. Communication with the Lutron system was achieved using Lutron's proprietary RS-232 protocol, allowing the QuickServer to issue native lighting commands without requiring any changes to the installed lighting infrastructure.



As illustrated in the system architecture diagram, system operation included:

- A BACnet IP building automation system providing centralized scheduling, monitoring, and lighting scene control
- The Chipkin QuickServer acting as a BACnet IP to RS-232 protocol gateway, translating BACnet commands into native Lutron messages
- The Lutron OMX-CI-RS232 interface facilitating communication with the lighting controller
- The Grafik 6000 controller and LCP128 Softswitches executing zone-level dimming, relay control, and scene activation

This architecture enabled a standardized integration approach that could be deployed consistently across thousands of sites. For locations with non-standard lighting layouts or expanded dimmer and scene counts, configuration variants were implemented without modifying the underlying driver, supporting scalability while minimizing engineering and long-term support effort.

Results and Business Impact

The Chipkin QuickServer solution functioned as a true drop-in replacement for the existing Siemens SIMATIC S7-200 PLC–based lighting control system. All lighting scenes, zone-level dimming, and relay operations performed as expected, with no observed differences in response time or reliability. Local manual controls on the Grafik 6000 panels remained fully operational, preserving on-site redundancy.

By enabling native BACnet IP communication, the QuickServer allowed the existing Lutron Grafik 6000 lighting system to be centrally monitored and controlled through the Schneider Electric EcoStruxure building automation system. This eliminated reliance on a standalone PLC and HMI while introducing enterprise-level visibility, scheduling, and control for the first time.

From a business perspective, the solution avoided the need for full lighting system replacement across more than 2,000 locations, delivering significant capital cost savings. The standardized integration approach supported rapid deployment, reduced engineering effort per site, and minimized long-term maintenance and support complexity. The customer successfully validated the solution at pilot locations and approved it for broader rollout across its national footprint.

This project demonstrates how legacy, non-BACnet lighting systems can be modernized through protocol expertise rather than infrastructure replacement. By replacing a PLC-based control layer with a QuickServer and integrating directly into a modern BAS, Chipkin Automation Systems delivered a scalable, low-risk modernization strategy that preserved existing investments while enabling long-term operational flexibility.