



Case Study

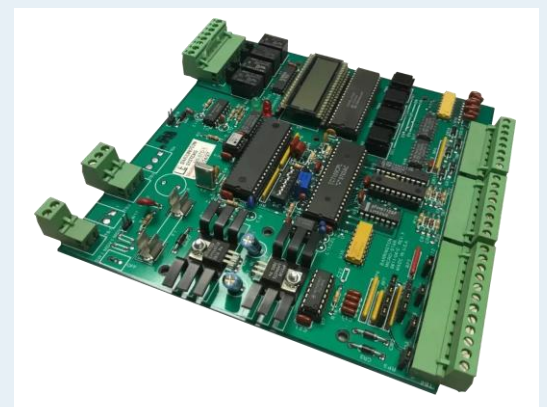
Integrating Barrington Microstar with BACnet MS/TP ALC

Overview

This project focused on integrating two Barrington Microstar trunks into a BACnet MS/TP Automated Logic Controller (ALC) to facilitate monitoring and control within the Building Automation System (BAS). Initially, the Microstars were connected in a daisy-chain configuration with a Barrington Lanstar controller serving as the trunk head. The integration involved removing the Lanstar Controller and replacing it with a QuickServer gateway, enabling communication between the **Microstar MS-STD-1 trunks** and the BAS. The BAS interfaced is an **ALC OptiFlex BACnet Integrator G5CE**.

Replacing Microstar's extensive field wiring is costly. Chipkin's QuickServer solution removes the obsolete Lanstar Controller while preserving the existing Microstar infrastructure and enabling connectivity to modern systems.

The QuickServer further offers unparalleled flexibility, allowing fine-tuned optimization of critical timing parameters such as **timeout**, **recovery_interval**, **retry_interval**, and **probation_delay**. This Flexibility along with powerful diagnostic



tools ensures high success rate and peak performance, reliable communication, and efficient integration within existing systems.

During the integration, challenges arose due to intermittent communication dropouts, which caused data reporting inconsistencies. Chipkin was able to overcome these challenges by adjusting system parameters leading to a successful integration. The completed project resulted in a more cohesive BAS, providing the institution with improved operational efficiency and enhanced control over their building systems.

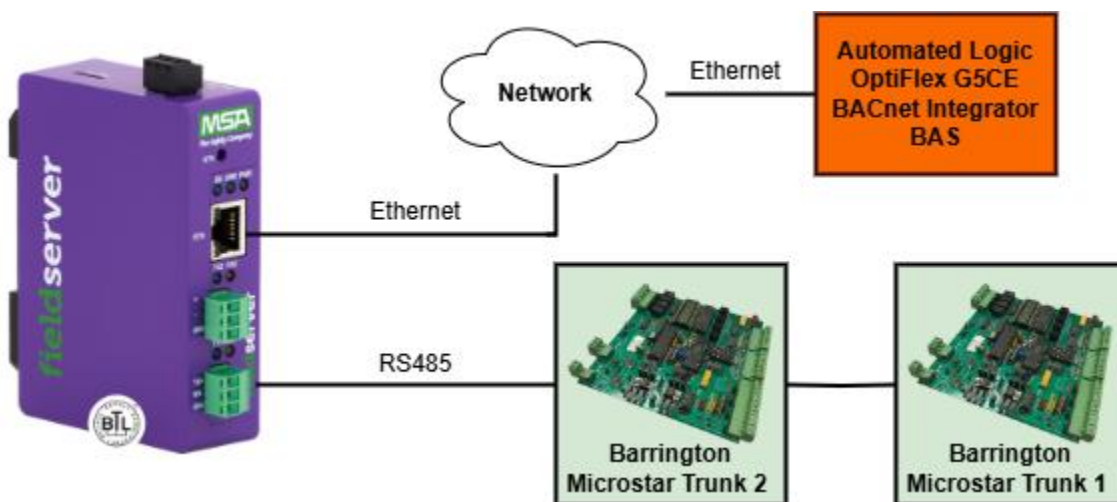
Challenges

- The Barrington system operated on a proprietary communication protocol that was incompatible with the ALC's BACnet MS/TP infrastructure.
- The integration required real-time data exchange and reliable connectivity across the building automation network.
- The existing system configuration needed a minimal-disruption approach to maintain ongoing operations during implementation.

Chipkin's approach to the solution

Chipkin deployed the QuickServer Gateway (CAS-QS-2010-3025), a protocol conversion device that translates Barrington Microstar data into BACnet MS/TP to replace the Barrington Lanstar controllers.

The primary objective of this project was to link the two Barrington Microstar trunks in a daisy chain within the institution to the BACnet MS/TP server. The integration aimed to create a connected and more responsive BAS environment, allowing for improved operational efficiency. The figure below shows the system's Network diagram.



Key implementation steps included:

Hardware Setup

- Removing the Lanstar controller and replacing it with **QuickServer Gateway CAS-QS-2010-3025** between the Barrington Microstar and ALC.
- Configured EIA-485 serial connections for reliable data transmission.
- Utilized **FieldServer Standard Configuration (FS-8790-33)** for configuration and support services.

Protocol Conversion & Data Mapping

- Programmed the QuickServer Gateway to convert proprietary Microstar data points into BACnet MS/TP objects.
- Utilized **CAS BACnet Explorer (CASBAC001)** to validate BACnet points and ensure accurate data mapping.
- Set baud rates to match Microstar's supported 4800 baud for optimal communication.

During the integration, several technical issues were encountered:

1. **Intermittent Communication Dropouts** - The system experienced periodic loss of communication on the Microstar network, leading to brief disconnections.
2. **Invalid Data Reporting** - When communication was lost, the system defaulted to reporting a zero value, which was misleading and could impact operational decisions.

System Testing & Validation

The Quickserver's powerful diagnostic capabilities allowed Chipkin to quickly overcome these challenges:

- **Snapshot Analysis:** Provided real-time snapshots of communication data, allowing for rapid identification of anomalies.
- **Wireshark Captures:** Enabled deep packet inspection of network traffic, facilitating troubleshooting and performance optimization.
- **Serial Logs:** Offered detailed insight into communication sequences, aiding in the resolution of timing and connectivity issues.

Using the above diagnostic capabilities, Chipkin applied a series of targeted adjustments by optimizing Communication Parameters to the system's reconfiguration to improve response to communication failures:

- **Retries:** Increased to 3 to allow multiple attempts at re-establishing communication.
- **Retry Interval:** Adjusted to 10 seconds to minimize downtime.
- **Probation Delay:** Set to 60 seconds to ensure stable reconnections and prevent false node status changes.

By fine-tuning these settings, the system was able to recognize and recover from communication dropouts more efficiently, reducing the frequency of invalid zero-value reports.

Extensive testing was conducted to confirm that the adjustments resolved the dropout issues and improved overall system reliability.

Results and Real-World Implications

By replacing the obsolete Barrington Lanstar Controllers, Chipkin's QuickServer Gateway provided an effective, reliable, and affordable solution for integrating the Barrington Microstar system with the ALC without having to replace cost prohibiting wiring. By leveraging robust protocol conversion technology and data mapping, our client achieved enhanced building automation performance with improved control and monitoring capabilities while preserving existing infrastructure.

- **Complete Integration:** The QuickServer Gateway successfully bridged communication between Barrington Microstar and ALC.
- **Enhanced Automation:** Enabled full BACnet MS/TP functionality, allowing the ALC to control and monitor Microstar devices efficiently.
- **Minimal Downtime:** The implementation was executed with minimal impact on existing building operations.