

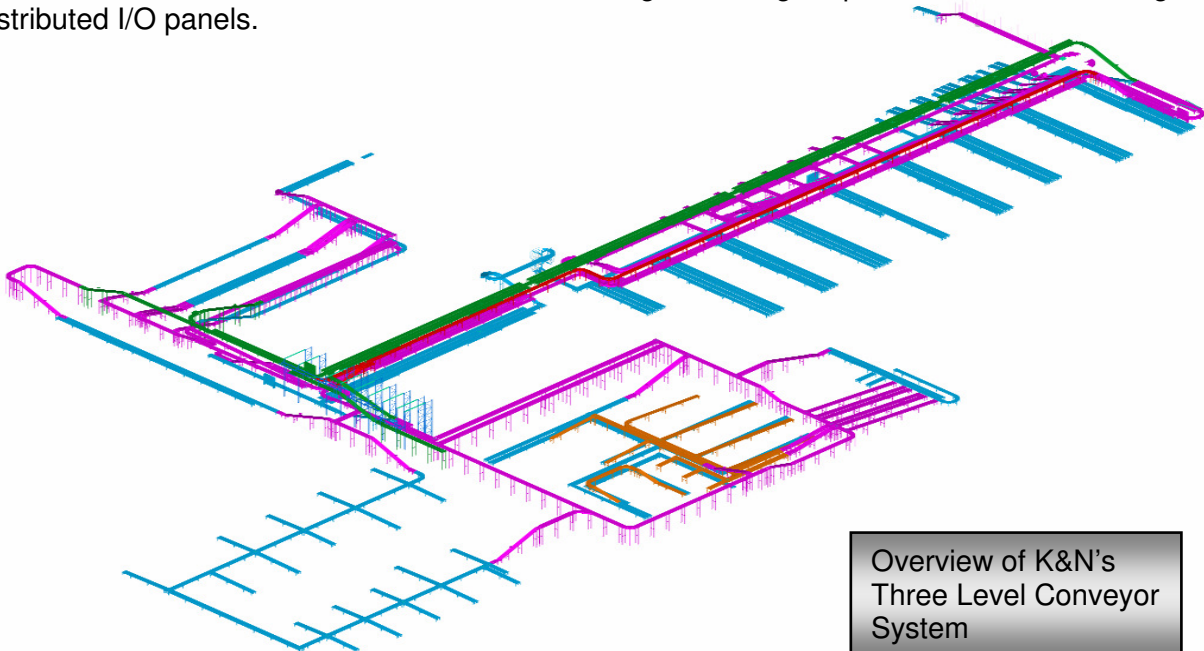
## Overview

K&N Engineering, of Riverside, California, is the inventor and leading innovator of reusable cotton gauze filter technology for automotive applications. The 280,000<sup>2</sup>ft K&N facility has a multi-level closed loop conveyor system consisting of about 1600 I/O and 100 barcode scanners, programmed by Enterprise Automation. In addition to the normal conveyor controls, the Conveyor Control System (CCS) interacts with K&N's Business Management System (BMS), a SQL server based platform. The CCS reads and writes data from/to the BMS, such as route data, arrival data, and conveyor status.

## Solution

Enterprise Automation had three major technical challenges to consider. Firstly, the CCS needed to process approximately 1.7 million SQL transactions per day. This is primarily because the BMS is responsible for the majority of tote routing, and since the system is also closed loop, the BMS has the ability to reroute totes at any time. Further, the system was designed without the need for an HMI, so the SQL transactions include additional information regarding alarms, warnings, and status; such as e-stops, jams, and queue levels. The second challenge was to update 100 bar code scanners at least 10 times per second. And finally, 1600 points of distributed I/O required updating at least 30 times per second.

To solve the challenge of SQL throughput, Enterprise Automation in conjunction with Think and Do developers developed a custom Extended Function Block (EFB) to handle the SQL transactions. By incorporating the EFB directly into Think and Do, the goal of a single software solution was maintained. To achieve the required update rates of the bar code readers, Sick bar code scanners were combined with an array of Digi PortServers connected via Ethernet to Think and Do. And finally, to meet the challenge of polling the I/O fast enough, Enterprise Automation configured Automation Direct Terminator I/O communicating over high speed Ethernet, residing in 25 distributed I/O panels.



## Technology

Think and Do's ability to handle large amounts of I/O and various communications in a deterministic manner, made it a very effective I/O server. The use of Subcharts for transfer control, serial port decoding, transfer SQL communications, and alarming, allowed for global changes and rapid deployment of the control system. Automation Direct's Ethernet based Terminator I/O was an excellent cost effective choice for achieving fast I/O updates and flexibility during design and installation.