

Case Study

IO-LINK DELIVERS INCREASED DATA, SIMPLER SYSTEMS, AND LOWER COST

When Ready Systems of Burlington, Ontario, Canada was looking for a replacement for their DeviceNet network architecture, they turned to long-time partner Balluff to investigate possible Ethernet control architectures. While they also provide complex material handling and robotics systems, Ready Systems is most well-known for pallet-based assembly line conveyor systems for the automotive seating industry.

“It looks like just a basic conveyor where the seats go down the line,” says Ron Heyden, co-owner of Ready Systems, “It sounds fairly simple, but it’s very complex in programming, data tracking and data acquisition.”

To be competitive, Ready Systems must be able to easily handle a wide range of seat configurations. And due to seating being a critical element of a vehicle safety system, they must track large amounts of data through the production process and store the data for the life of the vehicle. To ensure they were up for the task, Ready Systems selected IO-Link for the backbone of their controls architecture with devices from multiple vendors, RFID work-in-process traceability, and smart sensors.

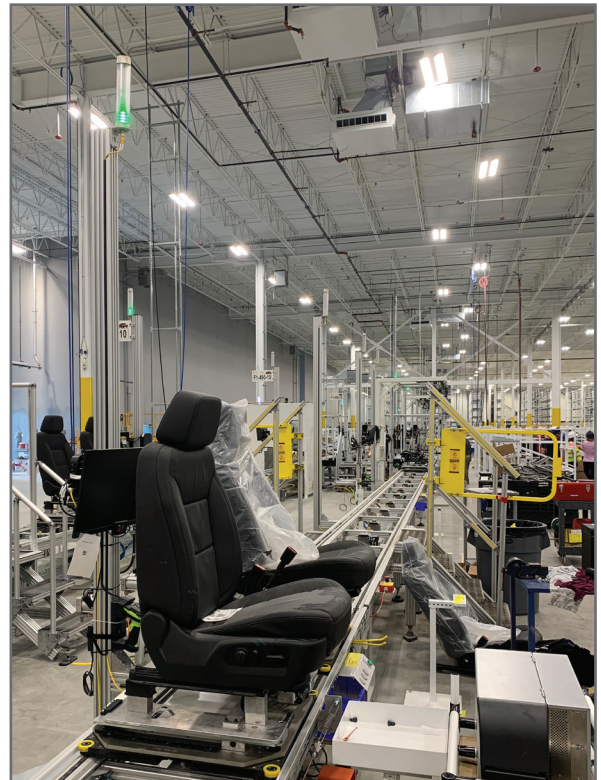
ETHERNET NETWORKS SIMPLIFIED

With a simple point-to-point connection, an IO-Link network interface block can connect up to eight IO-Link compatible devices, and through connected modules up to 256 discrete connections can be made to one Ethernet IP address. Without IO-Link, Ethernet required a large number of Ethernet drops with each module needing its own cable. This meant more Ethernet cards in the machine PLC, more Ethernet switches, more on-machine Ethernet cabling — all with more possible failure points.

“When Balluff IO-Link was implemented, it reduced the number of devices on the network by 75%,” said Heyden. “It really simplifies the network architecture, especially if you’re doing a ring network. We can do a whole line with one Ethernet card and one ring out there, that’s way easier to troubleshoot.”

But the biggest motivator to switch to IO-Link was the flexibility of the devices available with IO-Link — from RFID readers tracking pallet IDs, to smart five segment beacons with multiple light and audible programming options keeping supervisors and operators up to date on machine status to serial converters capturing badge swipes for operator login and maintenance security levels on the HMI. Ready Systems is easily able to adapt most applications to their controls architecture including solenoid valves, VFDs-drives, discrete I/O, smart sensors, analog I/O, smart lights, smart beacons, and pushbuttons.

“Just anything and everything that can connect to it makes your system simpler,” Heyden said.



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CRITICAL TRACEABILITY WITH RFID

With the critical nature of data and traceability in seat assembly, industrial RFID systems are a crucial part of each conveyor line.

“RFID is installed in the critical stations, anywhere there’s an oven, critical assembly, part matching, air bag traceability, and where there’s a safety critical torque being done. Wherever there is a decision being made,” said Heyden.

A unique barcode is produced for each seat broadcast from the automotive assembly plant; in the first station the operator scans the barcode for seat build specifications. As the seat is assembled, up to 50 parameters are captured through the process and pushed up to the MES system to be stored forever with each seat’s unique serial number. Anything deemed critical is recorded, including the seat’s barcode, airbag, motors, operator IDs, torque values, flagging for rework and even less-critical things like part and color matching for the specific build.

SMART SENSORS SIMPLIFY DESIGN AND ELIMINATE ANALOG

IO-Link makes it easier to integrate sensors into the design as well. Position measurement sensors, like low profile Balluff linear position sensors, are integrated into pallet elevators, transfers, and lifts to provide specific closed-loop position of the movement. IO-Link sensing devices eliminate the need for analog in the equipment. The sensors digitally provide the position in engineering units eliminating the cost of a PLC analog card, shielded cable management and bits/resolution/distance conversion calculations in the PLC. Where continuous position data isn’t required, traditional proximity sensors provide pallet position and feedback on up/down position for changing the pallet direction.

WHY READY SYSTEMS STANDARDIZED ON BALLUFF IO-LINK CONTROLS ARCHITECTURE

According to Heyden, the reasons Ready Systems committed to this IO-Link controls architecture over Ethernet I/O are plentiful.

“I feel the diagnostics that are with each device are a huge advantage.”

Devices that speak IO-Link report three types of data: process, parameters, and events. Typically, this is much more than their sensor data, as it can include setpoints, warnings and alarms, or even condition monitoring data like tilt, vibration, or temperature. These technical values can then be used to create value in predictive maintenance, Industrial IoT (IIoT), and smart factory applications. “The diagnostics are really there to help get the line running, and during the life of the machine to make troubleshooting easier and replacement easier.”

In addition, Heyden lauded that IO-Link reduced wiring by about 25%, especially important to machine builders. It has shortened the timeframe of Ready Systems’ installs as everything is simply unplugged before shipping and plugged back in during install. Assemblers and millwrights can easily be brought into the electrical side on an install to help reconnect the equipment and quickly finish commissioning.

“This allows us to take on more projects because we’re getting done faster, but it is also making us more efficient and cost competitive.”

As to why Ready Systems prefers to work with Balluff as their IO-Link supplier, Heyden praises the strong local customer service and valuable technical support that Balluff provides to Ready Systems. But most importantly, Balluff supports Ready Systems with a strong ability to support them in Canada, the United States and Mexico, wherever their equipment is being installed and commissioned.

Ready Systems also uses IO-Link as a competitive advantage when talking with manufacturing customers about new lines and designs. “Simplifying the whole network so there isn’t a ton of Ethernet out there makes it easier for a maintenance guy — easier to troubleshoot with easier device replacement.” And add-on-instructions, available with Balluff network interfaces and devices, standardize data formats for the end-user when bringing together a line from multiple builders and suppliers.



With an impressive and diverse collection of IO-Link innovations engineered into every design, Ready Systems is well positioned to provide powerful material handling and robotics systems. These systems have robust controls architecture that are smart factory ready, but also simple to support and maintain over the life of the equipment.

ABOUT READY SYSTEMS

Ready Systems was founded in 2007 and has grown to be an industry leader in: pallet-based assembly lines, seat assembly lines, material handling equipment, robotic automation and integration, rack handling conveyor systems, automated shipping systems, and tote exchange systems. With more than 60 years of experience in the industrial material handling environment, the company's system integration robotic team can handle nearly all programming needs. Learn more at www.readysystems.com.

ABOUT BALLUFF WORLDWIDE

Balluff stands for innovative technology, quality, and cross-industry experience in industrial automation. As a leading sensor and automation specialist, Balluff offers a comprehensive portfolio of innovative sensor, identification, and network solutions as well as software for integrated system solutions designed to improve the competitive position of its customers. Founded in Neuhausen auf den Fildern in 1921, Balluff now employs 3,600 workers in distribution, production, and development sites around the globe. This guarantees excellent worldwide product availability for our customers, as well as high-quality consulting and service directly on site. Learn more at www.balluff.com.

ABOUT IO-LINK

IO-Link is the first standardized IO technology worldwide (IEC 61131-9) for the communication with sensors and actuators. The powerful point-to-point communication is based on the long established 3-wire sensor and actuator connection without additional requirements regarding the cable material. So, IO-Link is no fieldbus. The three pillars of IO-Link are: simplified installation, automated parameter setting and expanded diagnostics. Learn more at www.io-link.com.