

White Paper

# Rockwell Automation RFID Pilot Program

*Rockwell Automation implements RFID  
pilot program at Champaign Distribution  
Center to improve its distribution process  
and increase quality control*





*The 181,000-square-foot Rockwell Automation Champaign Distribution Center stocks more than 20,000 product SKUs, ranging from small terminal blocks and controllers to larger variable frequency drives.*

While it isn't a new technology, radio frequency identification (RFID) has recently become a hot topic among manufacturers, particularly consumer segment product companies. The technology was catapulted to the forefront by Wal-Mart's mandate requiring its top 100 suppliers to use RFID tags on cases and pallets of consumer goods shipped to its distribution centers and stores by January 2005.

Today, many manufacturers are scrambling to implement RFID in order to comply with the demands that Wal-Mart has set, along with other retailers who have since followed. The value of RFID goes beyond simply meeting retailer demands, as the technology is delivering significant benefits throughout the value chain for companies across a wide sector of industries. One example is automation supplier Rockwell Automation, which turned to RFID to more efficiently track product distribution and capture shipping data to meet international customs requirements.

With 20,000 employees serving customers in more than 80 countries, Rockwell Automation is a leading provider of industrial automation power, control and information solutions. The company's broad line of industrial automation products includes power transmission components, programmable controllers, motors, drives and factory management software. In 1996, to improve distribution efficiency and respond to strong international sales growth, Rockwell Automation built a centralized distribution center 140 miles south of Chicago in Champaign, Ill., to stock finished products from its own plants, as well as those produced at strategic industry partner manufacturing facilities. The 181,000-square-foot Champaign Distribution Center stocks more than 20,000 product SKUs, ranging from small terminal blocks and controllers to larger variable frequency drives.

Through a highly automated “paperless” control system, the facility ships an average of 13,000 orders a day to distributor locations throughout North America and around the world. The warehouse employs a variety of technologies including a radio frequency (RF) picking system, conveyors, carousels and pick-to-light systems. Bar code scanning and RF processes driven by the facility’s warehouse management system track the products through the production and distribution process. On average, daily tracking activities include: scanning of serial numbers (5,000-6,000 per day); order quality control (25 percent of orders per day or approximately 3,360 order lines, 67,000 pieces); and cycle counting (300 parts per day or 84,000 pieces per day).

In response to a growing international customer base and an expanding product portfolio, the company relocated portions of production to regions outside of North America. Though more efficient from a manufacturing standpoint, this strategy added a layer of logistical complexity. Despite the highly automated control system in place at the Champaign facility, Rockwell Automation quickly realized it lacked the capability to meet increasingly complex international shipping demands, including critical “country of origin” tracking requirements.

“With more of our manufacturing operations being distributed around the world, we needed to be able to accurately identify the place of origin of each product,” said Greg Hubbert, director of logistics, Rockwell Automation. “It became clear that our current system couldn’t support what we needed, and simply ignoring the country of origin issue would become increasingly more costly.”

For example, if a customer ordered 10 pieces of a particular product, and five were made in the United States and the other five were made in China, the shipment would be assessed a different import tax based on where the products were manufactured. Therefore it was critical that Rockwell Automation be able to properly identify and track the country of origin to ensure that accurate taxes were being assessed within the destination country.

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**— Greg Hubbert, Rockwell Automation logistics director**

### **Balancing Growth with Compliance**

### Evaluating an RFID solution

While solving the country of origin compliance issue was the catalyst to implement an RFID program, as Rockwell Automation took a closer look at the technology, it found that RFID could support several other important functions, such as serial number capture, which could help boost process efficiency and quality. Specifically, the company could eliminate the need to scan serial numbers, increase the quality control audit from 25 percent to 100 percent of orders and eliminate piece counting in the cycle count process.

“We realized that RFID was going to continue to grow, and by implementing it now, we would receive several ancillary benefits,” said Hubbert. “So there was a good business case to use the technology and save on labor costs while increasing shipping efficiency and quality control.”

Additionally, Rockwell Automation identified the potential to track requirements needed to meet RoHS (Restriction of Hazardous Substances) and WEEE (Waste from Electrical and Electronic Equipment) compliance, and wanted the capability to track a product through its lifecycle.

### Pilot Program Deployment

In order to minimize the impact on existing operations, in fall 2003 Rockwell Automation went forward with an RFID unit-based pilot program to track products originating from its Twinsburg, Ohio, manufacturing plant through the Champaign Distribution Center.

The data from the pilot program would help determine the viability of the technology, as well as the cost to implement it across the distribution center. Ultimately, Rockwell Automation wanted to create a scalable, end-to-end solution to solve its international shipping and compliance issues while automating inventory and improving quality control.

“The pilot program was a proof of concept and learning opportunity,” said Hubbert. “We wanted to show that the technology could completely replace the bar code scanning system currently being used and be easily integrated into our existing distribution process with minimal disruption. By starting small and focusing on a limited number of SKUs, we were able to get management buy-in on the pilot program and gather the documentation necessary for expansion of the program. We were fortunate to have access to the resources and expertise of our Global Manufacturing Solutions group which was instrumental in the development and deployment of the pilot program.”

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As outlined, the pilot program would focus on the data capture of an EPC tag that is linked with an individual product's unique serial number. This information is passed back to the warehouse management system to fulfill serial number capture requirements for specific products.

The ability to provide RFID-tagged finished goods would ultimately allow the Champaign facility to reduce costs. Specifically, the technology would improve cycle count efficiency by eliminating piece part counting. RFID would also allow Rockwell Automation to automate the transfer of serial numbers for products that currently required an extra bar code scan. Moreover, with RFID fully integrated into the receiving process, the technology would help improve visibility, accuracy and productivity within the company's supply chain.

### **The Path from Production to Distribution**

The 257,000-square-foot Twinsburg plant serves as one of the core manufacturing hubs for the company. The plant produces more than 1,700 different products, including programmable controllers, input/output (I/O) cards, communication interfaces and motion controllers, with production volume ranging from 100 to 500,000 per year for each product. Rockwell Automation identified three serialized products to be used in the plant's pilot program.

*At the manufacturing plant, the packaged products within the pilot program are affixed with a barcode label and an RFID tag.*



*When an order is filled, the products picked are placed in a conveyor tub, passed under an RFID antenna where the RFID tag ID is read, uploaded into a database and linked with the product ID and serial number.*

The RFID program at the Twinsburg plant operates like most RFID processes. Finished products exit the production line and are packaged into a shipping box. Operators then attach a bar code label (which contains a serial number) as well as an Alien Technologies RFID tag. The box is passed under an RFID antenna where the RFID tag ID is read and uploaded into a database where it is linked with the product ID and serial number.

Upon arrival at the Champaign Distribution Center, the RFID tag is read at the dock door, and the product is transferred to a designated area of the warehouse. When the product is picked to fill an order, the bar code is scanned with a handheld reader, and the product is placed onto a conveyor system. At the quality control station, an antenna portal reads the tag and captures the product data, allowing the company to link the serial number and product to a particular order.

The software system purges any tags that are read twice so that the database accurately represents the number of products passing through the system. At the last stage, the product is boxed and shipped to the customer. On an average day, between 50 and 100 RFID-tagged pieces pass through the scanners and are shipped to distributors.

The RFID solution was integrated successfully within the existing distribution process, and after one year into the pilot program, the first stage is complete. Company managers reported high levels of cooperation across the company and were able to clearly document the value of the RFID program — both near- and long-term.

“The RFID pilot program helped us achieve our ultimate goal — a scalable, end-to-end solution and proof-of-concept with limited operational impact,” said Hubbert. “The program showed that an RFID solution could replace the bar code scanning of serial numbers at the distribution center, automate the production activities in Champaign, and allow the company to more effectively cycle count inventory and track quality control of outbound shipments.”

The next phase of the pilot project will include further business process integration of the RFID technology, the incorporation of more products/SKUs, the involvement of more production plants and the ability to capture and track product field warranty data. As the pilot program matures, Rockwell Automation hopes to gain the metrics necessary to justify expanding the project and the knowledge necessary to implement RFID for maximum return on investment.

The RFID pilot program taught Rockwell Automation several valuable lessons. First and foremost, starting small with a pilot program versus embarking on a full-fledged operation can be a cost-effective way to identify the real impact of deploying RFID technology. With the pilot program, the company was able to successfully provide accurate, real-time information about when products were made and when they were shipped to the distributor.

An ancillary benefit of the pilot was the practical, hands-on RFID implementation knowledge the company gained from going through the pilot program process. Rockwell Automation RFID engineers enhanced their application experience and identified best practices for EPC implementation in a warehouse and manufacturing environment. Ultimately, the pilot program led to the formulation of a proprietary, four-step methodology that takes manufacturers from piloting to full-scale implementation of an RFID solution for maximum return on investment.

While the time and effort required to develop and implement the pilot program was considerable, those involved in the project feel that it was worth it. “Overall, we were able to confirm the viability of RFID technology and use the data captured by the technology to improve our distribution process,” said Hubbert. “It wasn’t easy, but along the way we learned valuable lessons about the technology and its application that can be used both internally and externally to help our customers’ successfully implement an RFID solution.”

### **Achieving a Scalable Solution**

### **Valuable Experience**

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