

33% of the time. And with better inventory visibility and accuracy comes improved forecasting and replenishment operations. Many retailers also have charge-back arrangements with suppliers for dealing with markdowns that result from overstock. Better visibility allows retailers to run leaner and smarter, improving margins and profit for both retailers and suppliers. Operational efficiencies accrue across the value chain by reducing the capital that must be tied up to complete each consumer sale, and by reducing the number of shopping trips that end in disappointment.

Many of the projects to date have involved applying and encoding RFID tags in stores or distribution centers. While the business results are meaningful, such downstream tagging does not scale in a cost-effective manner. Full deployment depends on reliable, scalable, and efficient source tagging.

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Source Tagging Solutions

The general (non-RFID) source tagging problem is not new. It is common for UPC barcodes, style, size and color, retail price, content, country of origin, and care instruction labels to be applied at the source. Some manufacturers rely on service bureaus to deliver pre-printed labels (sorted by order into SKU specific bundles), and others have in-factory printing capabilities.

Manufacturers can augment this traditional approach by combining printing with RFID encoding, or they can consider a new paradigm in which the management of the RFID tag is a completely separate process.

Augmenting the Traditional Approach

Figure 1 shows a traditional printed swing ticket with an embedded RFID inlay as one way to apply an RFID tag to an apparel item.



Figure 1: RFID circuit embedded in a variable data printed care label

With this approach, the tag travels through the printing process with the added requirement of writing EPC data into the embedded RFID circuit. Some off-the-shelf thermal printer manufacturers offer printer-encoders that combine these operations. For manufacturers who wish to rely on their existing business processes, which can include service bureaus for producing and managing printed tickets, this approach bears consideration. But there are also a few things to keep in mind:

- ▶ Use of RFID encoding capability available in commercial printer-encoders may slow operations.
- ▶ The installed base of printers may not support RFID encoding, and those that do may require extra spacing on the roll of blanks to ensure that they do not inadvertently write data to adjacent RFID tags on the roll. (Newer models of printer-encoders have solved the problem of on-pitch encoding.)
- ▶ Surface variations in the label due to the embedded RFID circuit may reduce the quality of printing, and care must be taken to avoid damage to the circuit from excessive pressure.
- ▶ Existing installed and distributed software systems may not support serialization requirements for managing EPC numbers.

Working with service bureaus that deliver high quality RFID tags using specialized printing and encoding capabilities helps mitigate these potential issues.

The Alternative—Dedicated RFID Tags

Figure 2 illustrates the types of RFID-only tags that suppliers apply and encode separately from other variable-data printed tags and tickets. Direct apply approaches are possible because of the unique characteristics of RFID: reading and writing data to and from RFID tags does

With this approach, the supplier writes unique EPC data to each RFID tag in a set of items. For example, in some packing facilities, operators must barcode-scan items one at a time into a shipping carton as they fill the order. With bulk encoding, the operator could gather bundles or stacks of items together, encode them in less than a second, and obtain an accurate count of the items. Or, operators could simply load the items into a shipping carton, which they then pass through a bulk-encoding station for counting and encoding on its way to being loaded onto a pallet for shipment. For example, test results with denim garments demonstrate that an Impinj Speedway® reader can encode 14 pairs of jeans with RFID tags based on the Impinj Monza® 4 tag chip in about 1 second. Note that because sets of tags are encoded in a batch with this approach (with a unique EPC or serial number written to each item), it follows that the items packed within the case must be of the same SKU.

Impinj and Partners Enable RFID Success

Impinj provides tag chips, tag design support, and reader-encoder products to its network of source tagging solution providers who enable manufacturers to reliably encode RFID tags in-factory or as part of the printing process. Impinj works closely with printer vendors and service bureaus to provide the best products and support possible. As the world's leading UHF RFID technology provider, Impinj enables a variety of options for apparel suppliers to add high quality RFID tagging to their product offering with minimal cost and disruption to the manufacturing process. For more information visit www.impinj.com.



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