

## RFID Changes the Role of Label Printers



Fully automated systems, such as the Print-and-Apply Module from FKI Logistex, use existing bar code information to query a facility's warehouse management system for data needed to create the hybrid RFID label.

Labels with an encoded inlay, along with a bar code label and human readable text offer assurance to the shipper. "It's cheap insurance and good business practice," says Ream. "All of the information is intrinsically linked to the tag and to the case it is on."

While inventory management depends more on the software than the printer, selecting a printer capable of handling future RFID formats can go a long way in achieving a return on investment in a reasonable time period. How the printer's software collects and manages the data from resource planning and other material handling systems becomes crucial. Also, how the label stock is handled by the printer can determine the success or failure of RFID tags embedded in labels.

For the foreseeable future, successful data collection in manufacturing and distribution will rely upon three labels or, more commonly, one label with three forms of communication. RFID tags by themselves are nowhere near 100 percent reliable. If a tag falls apart from impact, or gets zapped by electrostatic discharge (ESD), some form of communication backup is required. That backup is the bar code, and the human-readable data on the label. Getting all of that information onto a single label is a good start in the race toward RFID compliance.

### The printer's role

While there is a plethora of label printers on the market, selecting the right printer can be a challenge. When there were just printers and labels, it was easier. With RFID, there is the printer, encoder, reader,

By Clyde E. Witt

There are hundreds of models of thermal printers. Selecting the right one can be the first step in a successful RFID inventory management strategy.

Eighteen months ago, as companies worked to meet the mandates of retailers for radio frequency identification (RFID) tagging, the easy route first appeared to be: apply an RFID tag to a case, then encode the tag as the case moved down the line. In many instances this route proved to be a dead end. Dead-on-arrival RFID tags made (and still make) this approach a logistics nightmare.

As the technology to encode an

RFID chip with the same information being printed in the bar code label evolved, the bar code label printer, equipped with new technology, came to the rescue. It's now the de facto standard for creating RFID tags—and for doing a lot more.

"End users are finding that encoding a tag at the point of bar code label origin is an easier, more accurate way to issue EPC [electronic product code] codes," says Matt Ream, senior manager of RFID systems, Zebra Technologies (Vernon Hills, Ill.).

# Transport Packaging

antennas connected to the reader, the label's inlay, and placement of the inlay on the label. All of these elements, and others, have to mesh. While interoperability is still a long way off, manufacturers of all the pieces of the puzzle see the need to work with each other.

Printer manufacturers work with label stock manufacturers and software designers to build machines that will limit the variables the buyer has to be concerned with. Inlays have become thinner and that has helped with the problem of printing over the tag. Printing over the inlay still leaves a slight bump in the label, but this does not usually interfere with scanning the bar code.

Thermal printing technology requires the pressure of the roller on the print head with label stock sandwiched between. This squeezing action formerly caused inlays to break and come unstuck from the label stock. That problem, too, has been overcome by most printer and label stock manufacturers.

A more common challenge is the placement or location of the inlay within the label. From a design viewpoint, compliance labels are complex with various information vying for space on the label.

"Positioning of the inlay in the label is critical," says Ream. "The encoder's field of view is intentionally quite narrow so that it is [programming] only a single tag."

If an inlay is not in the perfect spot for programming, the machine will stop, "find" the tag by moving the label, then program it. To be sure the bar codes and inlays are in harmony on a label, manufacturers offer ways, via software, to create custom label configurations.

Programming inlays does slow the label printing process. But keep in mind, it's not just labels that are being printed. A lot of activity is taking place within the machine.

The process can be made more efficient by making sure all purchased inlays on the roll coming to the printer are good. Things can, and do, happen to labels in transit that can make them so they can't be programmed. Electrostatic discharge is one challenge; physical damage from handling is another.

The printer can work around these challenges. When an order for a label (or labels) is transmitted to a printer, the printer has to "wake" the inlay, or check to see if it can carry information. If the tag is "alive" it is programmed. Next, the data is verified. If verification is received, the bar code data is printed onto the label. Should the label fail at any point in this sequence of activities, the printer should print an error message on the label.

## Choosing a printer

Everything about RFID seems to be a moving target. Although that target is beginning to slow as standards and universal protocols come into play, keeping current remains a challenge. Upgradability is the key right now, says Steve Hull, RFID product manager at Sato (Charlotte, NC) "Everyone is talking about and waiting for the Gen 2 label and interoperability." But, adds Hull, there still are not a lot of Gen 2 tags avail-

able or readers that are Gen 2 ready. From a printer standpoint, buyers must make sure an upgrade path is in place. What the upgrade will cost, or whether the printer becomes obsolete when Gen 2 becomes a reality, are strategic business issues.

Because the mandates of the large retailers impact a limited number of SKUs, there has been a reluctance at some companies to make large investments. The solutions put in place look, in many cases, like pilot programs, and are not enterprise-wide enough to show an ROI.

Mike Sanzone, RFID products specialist, MPI Label Systems (Sebring, Ohio), says there is a better way. "We've taken all the components a company finds on the desktop and put them onto a mobile cart." The product includes various devices to validate, write and affix labels in a single process. It can be incorporated into a scalable, modular conveyor loop system. This mobility puts a different spin on the slap-and-ship approach to labeling. Users can "float around" with the equipment, he says, rather than make an investment in fixed-position units.

Wireless connectivity is another feature that makes label printing more mobile. As Zebra's Ream points out, it gives companies the flexibility to move equipment, as well as save money by not running Ethernet cable. "Going wireless," he says, "is good for anyone in the start-up mode if they're not sure of the configuration of production lines."

Another important part of printer selection is the software. Software controls the information that goes onto a label and creates the physical look, feel and RFID content. Designers of label printer software have, for the most part, realized RFID is here to stay and are making appropriate products.

"The role of the label is to accurately carry the inventory management information," says Ardi Batmanghleidj, president, Innovatum, a software producer in Atlanta. "RFID tags do that in a somewhat passive manner and reduce the amount of human interaction, thus saving time."

On the assumption that a company might have more than one brand of printers in its facilities, it's wise to look for software that can handle the widest range of printers. This is good advice if a company will be expanding or upgrading its printers, says Batmanghleidj. "A company has to purchase equipment that will first satisfy its business objectives," he says. "And that should be a piece of robust hardware that can encode the inlay, and print the bar code and human-readable information."

While it seems like RFID is evolving at an ever-increasing pace, manufacturers suggest a company adopt an evolutionary, not a revolutionary approach. Getting data collection systems in place now, optimizing all that bar code label printing has to offer, allows users to add the RFID piece of the puzzle in as standards and protocols come to pass. As more companies move toward compliance, they are taking this slower approach and learning from what others have done.

MHM

## Beaver Street Fisheries Gets On Board With RFID

Beaver Street Fisheries (Jacksonville, Fla.) imports from more than 50 countries and provides frozen fish, meats and prepared foods to Wal-Mart, as well as other retailers, restaurants and institutions. The first step toward RFID implementation was solving the challenges of finding the best types of RFID tags and labels for its products, and learning how to encode and apply them reliably to cases and pallets. The company had no previous experience with RFID. Its eight-person IT department was involved in two other major, high-priority projects. To get started it contacted Zebra



*Incoming product with RFID and bar code labels is scanned using hand-held devices at Beaver Street Fisheries.*

Technologies, which recommended The Danby Group (Norcross, Ga.), which had experience with both RFID and compliance labeling systems.

Beaver Street set up an RFID test lab in its warehouses and conducted three pilot projects. The Danby Group integrated the smart label printing/encoding operations with Beaver Street's enterprise applications using a software integration product developed by Franwell Inc. (Plant City, Fla.), and tested various label placement options and types of EPC technology.

To label the subset of its cases and pallets that require EPC tags for Wal-Mart, Beaver Street developed a cart-mounted smart labeling solution. A Zebra R110Xi printer on the cart encodes RFID inlays embedded within the label material and prints a 4-by-6-inch label in a single pass. The printer validates that tags are readable before they are encoded. If the tag is unreadable, "VOID" is automatically printed on the label, and a new label is encoded and produced. Tagged cases are passed through a portal reader, to ensure the RFID tags are still readable after they have been applied to cases.

The density and moisture content of each package of frozen fish is not identical, which makes reading performance inconsistent and occasionally results in unreadable cases. The Danby Group and Beaver Street developed an order confirmation application that processes data from the portal reader and compares it with the customer's order, which is held in a SQL server database application.

"The R110 printers can encode both Class 0+ and Class 1 tags," says Howard Stockdale, CIO. The R1110Xi also is field-upgradeable to encode Gen 2 tags.

Beaver Street Fisheries met its compliance requirements more than a year ahead of schedule, and is ready to expand its tagging as necessary. The company is also positioned to seamlessly upgrade to Class 1 Generation 2 technology with no new investment in printing equipment.

"Beaver Street has gone from managing shipping with a clipboard, to employing cutting-edge RFID technology," says Rich Bruce of The Danby Group. "Its management had a vision. They wanted to be the first in their industry to be RFID-enabled. Now they are capitalizing on this vision to improve their business."