

The logo graphic consists of a dark blue square containing a white circular pattern of interconnected lines, resembling a stylized globe or network. To the right of this square, the word "Intermec" is written vertically in a bold, dark blue, sans-serif font.

**Intermec**

**White  
Paper**

**R F I D   T E C H N O L O G Y   I N   R E T A I L**

*Intermec*

Imagine a technology that could slice the time it takes a retailer to measure inventory, one that could provide accurate information about a single item as it moves from manufacturing through a store and then on to post-sales support. Imagine one that could finally fully automate checkout, freeing store personnel to provide increased levels of customer support. Welcome to RFID, a new technology that promises these benefits and more.

RFID — radio frequency identification — already is demonstrating measurable results that have the potential to transform how business is conducted for both retailers and their suppliers. Benefits include reduced labor costs, simplified business processes, improved inventory control, increased sales and reduced shrinkage.

### **WHAT IS RFID?**

An RFID system typically includes the following components:

- A tag or label that is embedded with a single chip computer and an antenna. The antenna can be printed on the tag with carbon-based inks. The tag is an extension of the bar code labels you see in stores today, but with more intelligence.
- A radio (much like a wireless LAN radio) that communicates with the tag. “Passive” tags, the type of tags commonly used in retail supply chain systems, pick up enough energy from the radio to operate and to communicate back to the radio. “Active” tags have an embedded battery and offer the advantage of longer-range communications.

Various types of tags and labels are available for use in different environmental conditions. Radios, often referred to as “interrogators,” can be either fixed-position or portable, just like bar code scanners.

An RFID system’s “read range” — the distance a tag must be from the interrogator in order to read the information stored on its computer chip — varies from a few centimeters to tens of meters, depending on frequency used, whether a tag is active or passive, and how directional the antenna is on the interrogator.

### **ADVANTAGES OF RFID**

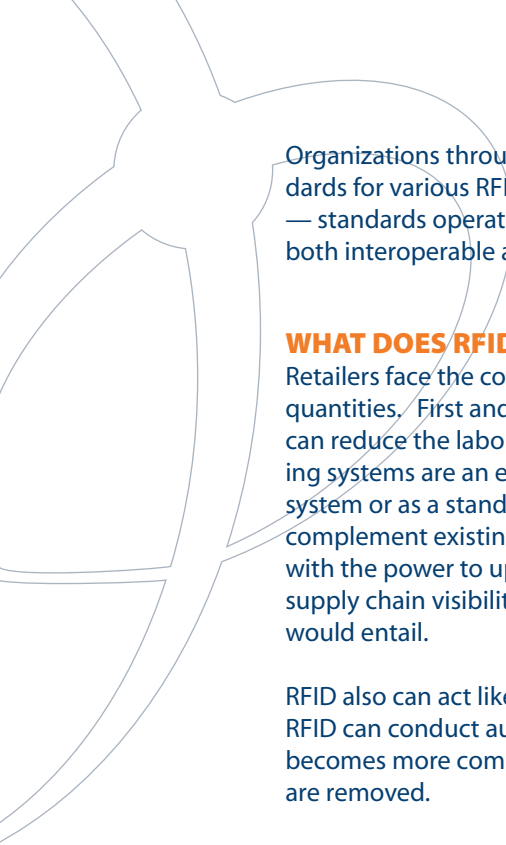
Unlike bar code-based tracking systems, an RFID system can read the information on a tag without requiring line of sight and without the need for a particular orientation. That means RFID systems can be largely automated, reducing the need for manual scanning.

In addition, RFID tags hold much more data than UPC labels. The tag can be programmed to hold information such as an item’s serial number, color, size, manufacture date and current price, as well as a list of all distribution points the item touched before arriving at a store. Some RFID systems allow companies to write information to the tag and store it there; the RFID tag then essentially acts as a portable, dynamic database. Other systems allow the information contained on the tag to be edited, added to or locked, capabilities that are particularly valuable when dealing with high-end inventory tracking and other applications when complete, up to date information (such as current pricing) is of particular benefit.

### **ADOPTION OF RFID**

RFID adoption is paced by two interlocking phenomenon: cost and ubiquity. At today’s price point for tags, most applications make sense only if the tags can be used over an extended period of time or recycled and reapplied. This is why most current RFID implementations involve some form of asset tracking or security application in closed-end systems. Since there are as yet no cross-company standards for metadata formats and no reliable guaranteed infrastructure in widespread use, the development of closed-end systems is further reinforced.





Organizations throughout the industry are working to develop national and international RFID standards for various RFID applications, even as market adoption advances. This combination of effort — standards operation and market adoption — can be expected to result in RFID systems that are both interoperable and affordable.

### **WHAT DOES RFID OFFER RETAILERS?**

Retailers face the constant demand to have the right goods available at the right places in the right quantities. First and foremost, incorporating RFID technology into existing supply chain operations can reduce the labor required to monitor goods movement and inventory flow. Bar code-based tracking systems are an effective tool for basic inventory tracking. Used in conjunction with a bar code system or as a stand-alone inventory tracking application, RFID allows manufacturers and retailers to complement existing systems while gathering more information throughout a supply chain. Systems with the power to update the information that moves with an individual product provide complete supply chain visibility without the prohibitive labor costs and error rates a similar manual system would entail.

RFID also can act like a security guard at a gateway. As goods are moved from dock to truck to store, RFID can conduct automatic inventories and compare the goods with the manifest. Goods flow becomes more complete, stock outs are reduced, overages are curtailed and accounting discrepancies are removed.

### **MANAGING AN ENTIRE RETAIL SUPPLY CHAIN**

RFID tracking systems are finding their way into cross-dock and warehousing applications first. But as they stretch further throughout a retail supply chain, they will require close cooperation between suppliers and retailers. As RFID systems are adopted, manufacturers will tag goods during production so everyone along the way, from supplier to manufacturer to logistics teams and end customers, benefits from the increased information that RFID systems provide. For this to happen, however, the cost of the system must drop to the point that its cost can be justified by the savings a company will reap from improved inventory management. Once that is the case, large global retailers will begin to demand that suppliers provide RFID-tagged packaging at the overpack/case level. That likely will happen first at the inventory control and pallet tracking level, followed next by high-ticket item goods such as electronics, then by other product groups as total system costs come down.

Examples of adoption into other areas of the supply chain provide a preview of RFID's potential to impact retail systems. CHEP, the global leader in pallet and container pooling services, and Georgia-Pacific, one of the world's leading manufacturers and distributors of tissue, pulp, paper, packaging, building products and related chemicals, are using Intermec's Intellitag® RFID technology on recyclable plastic containers (RPCs).

RPCs are used to package and transport produce. A grower packs and ships fruits and vegetables in RPCs for travel through distribution to a store's produce department. There, store associates simply lift the container onto the shelf for an instant display. That means no more manual unloading of cartons or disposal of used or soiled packaging. When the produce container is empty, it is returned for cleaning and reuse. The RFID tag is used not only to keep track of the location of the RPC, but also to document its cleaning history, from the date and temperature of the washing to the chemicals used.

Each RPC's RFID tag incorporates a unique identification that can be read from 3 to 5 meters (9.8 – 16.4 feet) away as the RPC moves along high speed conveyors, passes through doorways, rests in fields, is loaded on a truck or is stacked on a pallet, even in groups of 100 or more.

By adding tag interrogators, a grower can track loads of produce to a specific retailer to help speed payment, or a retailer can make sure the first produce into the system is the first to go on the shelves.

## ITEM LEVEL TRACKING

The ultimate goal in retail is to create RFID systems that provide the benefits of the technology at a cost that supports item-level tracking. Such item-level tracking would provide each unit of inventory with a unique ID.

When this occurs, the inventory accuracy and improved goods tracking will rise exponentially. Physical inventories and product re-ordering will be done in a fraction of time it now takes and retailers will be able to take inventory much more frequently. Truly automated checkout will become viable as RF interrogators list the contents of a shopping cart without moving any of the items. And truly accurate and timely reconciliation of shipments will cut down on shrinkage.

New manufacturing technologies already promise automated, high-speed RFID tag production that will reduce tag costs, a major step in making these benefits possible. Although tags are only one part of a complete RFID system, industry experts now predict tag prices that may reach five cents per tag or less in the next few years. As item-level RFID systems move from inventory tracking to item manufacturing, perhaps spurred by large retailer demands for tagged merchandise, companies will begin to experience more of the efficiencies of a well-integrated RFID technology system.

## WHAT'S NEXT?

An effective and efficient distribution system is the key to retailer success. Major retailers and consumer goods companies already are conducting RFID pilot projects. Now is the time to learn more. Companies remain reluctant to publicly discuss ROI, but as roll out of inventory and pallet tracking applications continue, the efficiencies will become clear and implementation of an RFID system will become a competitive advantage.

Opportunities to learn more about standards-based RFID systems include:

- Intermec Intellitag product family – [www.intermec.com](http://www.intermec.com)
- AIAG (Automotive Industry Action Group) – [www.aiag.org](http://www.aiag.org)
- AIM (The Association for Automation Identification and Data Capture Technologies) - [www.aimglobal.org](http://www.aimglobal.org)
- ANSI (American National Standards Institute) - [www.ansi.org](http://www.ansi.org)
- EAN International - [www.ean-int.org](http://www.ean-int.org)
- IEC (International Electrotechnical Commission) - [www.iec.ch](http://www.iec.ch)
- ISIT - [www.isit.com](http://www.isit.com)
- ISO (International Organization for Standardization) - [www.iso.ch](http://www.iso.ch)
- UCC (Uniform Code Council) - [www.uc-council.org](http://www.uc-council.org)



For more information about Intermec or its Intellitag product family, please contact 1.800.923.4824 or 1.425.348.2600, or simply visit [www.intermec.com](http://www.intermec.com).

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