

Executive Summary

The ability to access information anytime, anywhere, is vital in today's fast-paced world. More than ever, people need mobile information solutions to improve productivity and operate more efficiently. Smart companies and organizations turn to Symbol Technologies for automatic identification data collection solutions at every point along the supply chain of modern commerce.

This technical brief discusses the extent to which RFID has been implemented in the retail supply chain, identifies factors which have proved to be obstacles to general acceptance, and discusses issues that need to be addressed before this technology is widely adopted.



Image courtesy of the Auto-ID Center: <http://www.autoidcenter.org>

Pallet with EPC tag

Introduction – Symbol and RFID

Symbol Technologies, Inc. has been participating in the development and advancement of the state of the art in RFID (Radio Frequency Identification) technology for more than a decade. The company has conducted numerous pilot applications in a variety of different settings in retailing, manufacturing and other sectors.

RFID technology is used to mark, identify and track individual objects as they move from the manufacturing floor through the supply chain and into the hands of the buyer or consumer. As the objects move through the supply chain, wireless RFID readers can communicate with an RFID tag on the object, collect information about the object (such as a unique number), and match that number in a database to access a complete record about the object.

Symbol views RFID as a subset of the suite of automatic data capture technologies, and includes RFID in the core competencies the company deploys as a leading supplier of enterprise mobility solutions. Symbol envisions that RFID will become a complementary technology to bar code technology as the number of commercial implementations increase. With its background and experience in auto ID and enterprise mobility, Symbol looks forward to adding RFID to the range of products and solutions it offers to its customers.

RFID and the Retail Supply Chain

RFID is a relatively mature technology that has been in use for well over a decade. Look around and you can see RFID at work in the world around you—ranging from E-ZPassSM road tolling systems to access control badges at your place of work, to automobile immobilizer chips built into your car key, and the SpeedpassTM key fob you use to buy your gas. Clearly, RFID works—which prompts the question: “Why, despite years of interest, hasn’t it worked in the retail industry?”

Interest in RFID technology is driven by the desire of companies to achieve greater visibility to their supply chains, with the goal of increasing operational efficiency. An efficient supply chain operation helps to ensure that goods can be bought at the place and time consumers are ready to purchase. Potential gains from the visibility RFID generates include lower inventory levels, reduced labor costs and increased sales—the bottom line: increased profitability.

However, there are a number of reasons why RFID has not been widely implemented in the retail supply chain, including:

► *Standards*

There is no definitive globally-accepted standard for the data format, communications technology, data interchange and other interoperability factors that would enable seamless integration between manufacturers, distributors and retailers.

► *Functionality*

There are many different kinds of RFID technologies and tags, each of which has

significantly different functional characteristics. Some tags have batteries, some don’t. Some tags have short-read ranges, some have long-read ranges. Popular tags operate on at least six different frequencies, often with many competing protocols at each frequency. In short, for many buyers, there are just too many choices, and it is difficult for them to determine the best technology and tag for their application.

► *High Cost of RFID tags*

A side effect of the lack of a definitive standard is that no single RFID technology benefits from economies of scale which could result in reduced tag pricing, which in turn leads to even greater volumes. Often, buyers cannot cost-justify implementation at current tag prices. Without confidence that future tag prices would decline as usage increases, buyers are hesitating to undertake large-scale implementations.

► *Performance*

Retail supply chain applications of RFID are demanding, requiring, for example, reliable reads in varied and extreme environments like fast paced outdoor loading docks. There is some question regarding the reliability of low-cost tags, and this hinders acceptance for retail supply chain applications.

► *Systems and Software*

Without end-to-end integration of RFID into the information technology (IT) systems of the supply chain, the hoped-for efficiency benefits cannot be achieved. In the past, the emphasis was almost exclusively on tags and readers, with almost no emphasis on the software and systems needed to manage and integrate the RFID data once captured.

These issues have combined to slow the growth of RFID solutions and acceptance of RFID as a useful tool by retailers. But hope is on the horizon, in the form of standards adoption across the industry.

EPC—The Emerging Standard

EPC (Electronic Product Code) is the emerging standard for RFID applications in the retail supply chain. It represents an industry consensus on the best technological approach to successful implementation of RFID. The overall EPC concept is designed to work in a range of retail supply chain applications—from “backroom” applications such as pallet and carton tracking to “selling floor” applications such as item level tagging.

At its most basic level, EPC is a coding scheme for RFID data that will identify an individual item’s manufacturer, product category and unique serial number. But the EPC concept encompasses much more than data structures—it’s a complete network of integrated technologies, software and systems combined to take full advantage of RFID technology.

EPC emerged from the Auto-ID Center, a partnership between almost 100 companies and five of the world’s leading research universities including the Massachusetts Institute of Technology (MIT). Retailers include many globally recognizable names—Wal*Mart®, Target Corporation, Home Depot®, Procter & Gamble, Unilever, Tesco plc—just to name a few.

EPC Impact So Far

In the past, RFID standardization efforts had been driven primarily by technology vendors. But the Auto-ID Center changed the focus of research from esoteric

technological debates to a study of technology requirements specific to the retail supply chain.

In fact, this is probably the single biggest reason why EPC matters—because it is a standard driven by retail supply chain users for retail supply chain users.

For example, users made it clear that tags needed to be both low cost and high performance (specifically, robust read distance and reliability) to be useful in the retail supply chain. Vendors responded with innovative technologies that significantly increased performance, while also pointing the way to much lower cost.

Early in the development of EPC, end users identified the challenge of management and integration of RFID data into their IT systems. As a result, EPC was developed not just as a tag technology, but rather as a system, which includes software elements to make EPC data more manageable. The system includes components developed by the Auto-ID Center: ONS (Object Name Service) for tag identification and Savant, the “nervous system”¹ of the EPC network, for intelligent data filtering and management.

Similarly, new tag and reader protocol standards were developed, not only to increase performance, but also to provide a clear focus for the industry’s product and market development. By focusing on a clear set of interoperable standards, the goal is not only to provide more choice to the end user community, but also to allow economies of scale to go to work, reducing both tag and reader costs over time.

Finally, and most importantly, end users recognized that in order for EPC to be successful, it needed to be developed and

managed on an ongoing basis by an entity with strong credentials in developing and implementing real-world retail automatic identification standards. For this reason, responsibility for the ongoing management of EPC has been transferred to Auto-ID U.S., LLC a wholly owned subsidiary of the UCC (Uniform Code Council) and EAN International. UCC and EAN are well known for their long track record of managing UPC (Universal Product Code)—the seminal and predominant retail bar coding standard in use today.

The Impact of EPC on Retailers

EPC is a foundation on which real-world solutions can be built. Already, several major retailers and CPG (consumer packaged goods) companies have publicly announced their intent to pilot the technology. Some have even announced target timeframes for initial implementations. You can expect to see the scope of these efforts grow as companies seek the exact business and process models that will maximize their ROI (Return on Investment) for EPC implementation.

In the near term, the emphasis is on “back room” applications—tagging pallets, cartons, and reusable containers to track the movement of goods throughout the distribution system. Longer term, users are just beginning to assess the impact of tagging individual items on the retail sales floor. While there may be exceptions, most users want to drive EPC to success in the back room before moving to item level tagging on the retail sales floor.

In general, EPC appears well positioned to become a foundation for RFID technology in the retail supply chain over the next several years, with great potential to deliver bottom-line business benefit on a mass scale.

The Future

As EPC stands ready to make its impact on the world of RFID, it is clear that it has potential to address the long-standing problems of visibility in the retail supply chain. As with any new technology, however, there will be some bumps along the road—some we can anticipate today and some that we cannot. Planning for these bumps with a world-class technology partner is a key to success.

Symbol, a world leader in enterprise mobility solutions with core strength in rugged mobile computing, wireless networking and advanced data capture is a trusted partner to our customers for integrated mobility solutions. As an EPC open standards founder and endorser, Symbol is working with leading RFID technology providers to create RFID-capable product platforms that will enable its customers to benefit from integrated technology solutions employing an optimum mix of RFID, and 1D and 2D bar code technologies.

Summary

Automatic data capture is a key technology component of realizing the vision of enterprise mobility solutions. RFID is a complementary data capture technology that is part of the suite of core competencies that Symbol deploys to realize our vision. As the commercial impact of RFID grows, Symbol is well positioned to help our customers add this capability to the range of products and solutions they implement in their supply chain.

About the author

Alan Melling is Senior Director of EPC Solutions at Symbol Technologies, a leading provider of automatic data capture and management solutions. He may be reached at melling@symbol.com.

Symbol Enterprise Mobility Services

Symbol's global services organization offers a full range of professional and customer support services—from project planning and network design through integration and installation to ongoing service and support.

Professional services address the following phases of a systems implementation:

- ▶ **Planning:** consulting services, network design services, site survey, and project management.
- ▶ **Development:** system integration, custom training, custom hardware development, and application development.
- ▶ **Implementation:** physical installation of hardware and software, as well as configuration and test of the system both before and after installation.

Contact Symbol to ensure a customized, innovative mobility solution that not only addresses your specific business issues but also exceeds your expectations.

About Symbol Technologies

Symbol Technologies, Inc. (NYSE:SBL) delivers enterprise mobility solutions that enable anywhere, anytime data and voice communication designed to increase productivity, reduce costs and realize competitive advantage. Symbol systems and services integrate rugged mobile computing, advanced data capture and wireless networking for the world's leading retailers, transportation and logistics companies and manufacturers as well as government agencies and providers of healthcare, hospitality and security. More information is available at www.symbol.com/rfid

References:

1. The Auto-ID Center—http://www.autoidcenter.org/aboutthetech_indepthlook6.asp

Additional Resources:

1. Uniform Code Council (UCC)—<http://www.uc-council.org/>
2. EAN International—<http://www.ean-int.org/>

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Corporate Headquarters
Symbol Technologies, Inc.
One Symbol Plaza
Holtsville, NY 11742-1300
TEL: +1.800.722.6234/+1.631.738.2400
FAX: +1.631.738.5990

For Asia Pacific Area
Symbol Technologies Asia, Inc.
(Singapore Branch)
Asia Pacific Division
230 Victoria Street #05-07/09
Bugis Junction Office Tower
Singapore 188024
TEL: +65.6796.9600
FAX: +65.6337.6488

For Europe, Middle East and Africa
Symbol Technologies
EMEA Division
Symbol Place, Winnersh Triangle
Berkshire, England RG41 5TP
TEL: +44.118.9457000
FAX: +44.118.9457500

For North America, Latin America and Canada
Symbol Technologies
The Americas
One Symbol Plaza
Holtsville, NY 11742-1300
TEL: +1.800.722.6234/+1.631.738.2400
FAX: +1.631.738.5990

Symbol Website
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