



RADIO FREQUENCY IDENTIFICATION

A STATUS REPORT

(JULY 7, 2009)

Introduction

The goal of this document is twofold:

1. To describe the tagging structure review process currently underway at GS1, including a description of the optimal tagging requirements requested by the international book trade.
2. To provide background on two uses of RFID technology currently underway within the U.S. book trade.

Summary

The potential for [Radio Frequency Identification](#) (RFID) to reduce warehouse and distribution labor costs, improve forecasting and planning, reduce theft and out-of stock conditions and improve customer experience is hard to ignore. Because of this, it appears likely that RFID will have a significant role to play in the future of the book supply chain. To demonstrate this, one current and one potential application of RFID technology in the U.S. book trade are discussed at the end of this document.

Although high costs and other barriers to entry have impeded pervasive adoption to date, representatives of the international book trade have long been active in planning for the widespread use of item-level RFID in order to guarantee a smooth and standard implementation across the supply chain once these barriers have lessened. In particular, industry professionals have been working hard to ensure that incompatibility issues, such as those experienced with ISBN and UPC, are avoided when this technology is introduced.

In addition, the [International ISBN Agency](#) and [GS1](#) have concluded that the existing format standard for encoding data in RFID tags (RF tags) is generally appropriate for books. This format (designated as SGTIN-96 -- 96 bit Serialized Global Trade Item Number) ensures that, as with other products, both the book (ISBN) and an individual copy of the book (serial number) are identifiable. A GS1 Working Group is now considering how to indicate when an RF tag has been applied by an organization other than the publisher (such as a retailer, distributor or manufacturer).

Book Industry Requirements for RFID

The following optimal requirements for RFID tags in the book trade were collected by the International ISBN Agency following consultation with a number of book industry organizations and other interested parties and communicated to GS1:

1. The product identifier should be the ISBN (Bookland GTIN13)
2. Should have serialization of up to 100 million items
3. Should have unique identification of up to 100,000 appliers of tags
4. Should use EAS-bit to allow theft detection on a stand-alone basis by a detection gate
5. Should use chip UID unique identifier (UID) to ensure that there is always only one single valid combination of EPC and UID. (In the case where someone was able to break the permalock protection and alter the EPC, this causes an invalid combination of EPC-UID that can be detected at the POS.)

ISBN Integration in EPC

GS1 and the International ISBN Agency

GS1 and the International ISBN Agency have enjoyed an excellent working relationship for nearly 30 years. A contract between GS1 and the International ISBN Agency enabling representation of an ISBN in an EAN-13 bar code was signed in 1980 and renewed several times since. More recently, GS1 and the International ISBN Agency have strengthened their working relationship by cross participating in their respective governing bodies and identifying possible joint projects. The opportunity to implement EPCglobal technologies was identified as a priority item.

Electronic Product Code

Much like the ISBN is an identification scheme for universally identifying books and related products via barcodes and other means, the Electronic Product Code (EPC) is an identification scheme for universally identifying physical objects via RFID tags and other means. EPC is managed by EPCglobal Inc™, a joint venture between GS1 and GS1 US.

SGTIN-96: An EPC Coding Format

The integration of ISBN into EPC has been discussed by the international book trade since June 2008 through an ad hoc working group, a meeting at the Frankfurt Book Fair, and direct communications between GS1 and International ISBN Agency representatives.

As a result of these meetings and other communications, the International ISBN Agency and GS1 have concluded that the existing format standard for encoding data in RFID tags is generally appropriate for books. This format (designated as SGTIN-96 -- 96 bit Serialized Global Trade Item Number) ensures that, as with other products, both the book (ISBN) and an individual copy of the book (serial number) can be identified. This format also guarantees that

the book industry tagging remains compatible with other industries selling products in retail trade.

Assigning EPC Codes – Source and Other Participants

Inopportunately, although the SGTIN-96 format in its present configuration would meet the needs of the book industry if all RF tagging were done at the source (i.e., the publisher), it cannot be expected that all books will be source tagged at all times. There is no doubt that application of RFID tags by other participants in the supply chain will be necessary. Not only will there be a period of phasing in RFID, there will undoubtedly be companies incapable of tagging over the long haul.

In order to allow these other participants (i.e., wholesalers, bookstores, etc.) to assign unique serial numbers to book RFID tags, it is necessary to uniquely identify them in the coding. This requirement has been presented as a change request by the International ISBN Agency to the GS1 Architecture Group which will investigate some alternative ways of doing this and come back with a proposed solution within 3 – 6 months. Since the book industry is not alone in having this requirement, the Architecture Group will be looking at generic solutions that will become part of the EPC standard and enable users in other industries to take advantage of the capability.

For a more technical explanation of the SGTIN-96, see the document entitled “[EPC SGTIN-96: A technical description from Brian Green, International ISBN Agency](#)” (dated June 24, 2009).

Current & Potential Applications of RFID in the U.S. Book Trade

John Wiley & Sons – Current Application

- The Wiley RFID pilot program is underway for higher education titles; the main objective of the program is to combat piracy and illegal re-importation of titles. Other uses for RFID will be investigated, such as returns of complimentary copies, other returns controls, inventory management, etc.
- Wiley is implementing the pilot with book manufacturers: Donnelley, Courier and Quebecor. Wiley is also in discussions with Phoenix Color Corp.
- Hardcover books receive tags under end sheets; the tag is applied to Cover 3 of paperbacks. Paperback tags resemble barcode stickers to make the presence of the tag less prominent.
- Half million books are being tagged for the pilot; full-scale implementation is ramping up for January 2010.
- By January 2010, existing item-level tagging will to be combined with new case-level tagging. Products will be trackable through distributors and retailers to end customers and back through the returns process.
- Wiley is creating identifiable tags: TID. These are readable, but not writable. They will always be identifiable as tags that originated with Wiley and cannot be counterfeited.

BookPeople – Potential Application

- This pilot is planned for BookPeople, a bookstore in Austin, Texas. It is a joint project of BookPeople, RFID Sherpas and Excellis Consulting Corp.
- The model for the pilot in a retail environment is the successful implementation in Dutch book retailer BGN.
- The pilot and the associated study of process efficiency improvements and overall effect of tagging is expected to last at least 12 months.
- Books will either arrive tagged (when arrangements have been made for tagging), or they will be tagged at the store location.
- Benefits to retailers and customers expected to be demonstrated by the pilot:
 - Greater precision in management of inventory and store floor
 - Availability of SmartKiosks that will read tags and provide more in-depth information about books and other products to the customer
 - Faster stock receiving (of pre-tagged books)
 - Faster checkout (stack of books can be scanned with one swipe)

For More Information

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