

# Playing tag



**Radio Frequency Identification (RFID)** tags have been heralded as the next big thing in supply chains for at least two decades and the hype that surrounds them seems to rise as fast as their price continues to fall. But what can they really do, who's really using them, and how long will it be before the technology arrives at a warehouse near you?

1. Tags inserted into key fobs can be used with vehicle mounted readers to unlock doors automatically as the driver approaches or to prevent the engine starting if the proper key is not present.

**Let's get one thing straight** about radio frequency identification technology – it isn't new. In fact, the technology goes back to World War II. So why all the hype recently about how it's going to transform all our supply chains? The answer is simply that the costs have now fallen to a point where, in a number of applications at least, it has become a realistic commercial option rather than just a glint in the IT director's eye.

It's the price of the RF tags themselves that has made the real difference. In the late 1980s a single passive tag could cost as much as £8, but tag prices now have fallen to well under £1, depending on who you ask, the volumes you're buying and the spec you require. Although this is still far in excess of the cost of a bar code, it's low enough to make many applications more viable than ever before.

Those applications reach far and wide, from putting tags into returnable unit load containers like roll cages or beer kegs to tagging and tracking vehicles around a distribution centre. But while it's always made sense to attach tags to relatively high value, returnable items, what's really grabbed everyone's attention recently is that it's now increasingly viable to tag individual low-value products too, allowing the power of RFID to be extended from one end of the supply chain to the other on anything from a pair of trousers to a tin of beans.

And that power is certainly considerable: unlike bar codes, which are generally only used to identify generic types of goods (beans versus milk, for example), RFID tags

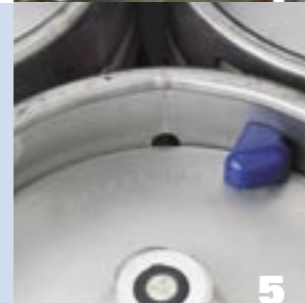
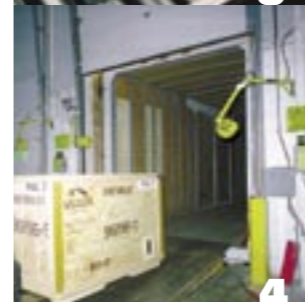
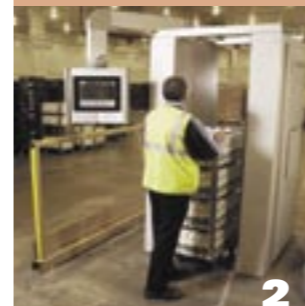
can identify every single item separately – every individual can of beans or carton of milk.

By positioning readers strategically in retail stores, the technology can be used to keep an eye on what's on the shelf in every product line, allowing them to ensure they never run out of a particularly popular line. And because RF tags can identify individual items, they can be used to carry item specific information, too – say, the size and colour of each garment on a particular rack of clothes. The potential for tracking and tracing both unit loads and individual products in the warehouse and throughout the supply chain, meanwhile, is obvious.

One of the major advantages of RFID is that unlike bar codes, which require optical reading and thus a clear line of sight between code and reader, RF tags can be read without line of sight, so tags can be embedded either into the products themselves or into their packaging. This is particularly useful in harsh environments that bar codes could not withstand.

Whether tags are embedded or incorporated in a label, they can also be read by simply bringing them near a relatively low-cost reader, where the use of bar codes requires either the human input needed to find a bar code on an item and then point a scanner at it or the use of highly expensive omni-directional fixed scanners.

The reading equipment for RFID tags has other advantages over bar code equivalents, too – not least that it requires less maintenance. Dust and dirt, for instance, can



2. Gate-type RFID readers like this Intelligent unit in use at logistics services provider Gist can read all the individual product tags in a load as it passes through, while...  
3. ...this fixed position RFID reader is perfect for lineside applications.  
4. Among the many warehouse applications for RFID, tag readers can be built into loading bay doors to ensure the goods being loaded are exactly the right ones.  
5. Trenstar tag embedded in protective housing on a beer keg. Breweries are big users of RFID as bar codes don't tend to withstand the constant rough handling and washing involved.

dramatically affect bar code readers' capabilities, but have little or no effect on RFID readers.

RFID tags can also be read much quicker than bar codes. Where bar codes need to be individually scanned, simply bringing an RF reader within a certain distance of multiple RF tags should be enough to effectively read them all in one go.

## Tag technology

Essentially just a silicon computer chip with an antenna attached to it, RF tags come in two basic forms – glass capsules and flat label-type – and two basic flavours – active and passive. Active tags are battery powered and have typical read ranges up to 100m. Their cost is considerably greater than passive tags, however, which don't require a battery as they are powered by the signal emitted by the reader. Read range on passive tags is up to 2m in Europe, though higher in the US (over 12m) due to the higher-powered readers their regulations permit.

Passive tags are generally smaller than active tags and because of the price differential, it's passive tags that are mostly used in the supply chain (although active tags have certain applications where longer read ranges are required – tracking vehicles around a distribution centre or containers around a port, for instance).

Tags also come in read-only or read-write versions and in a range of different frequencies. Ultra-high frequency (UHF) tags are generally accepted to offer the best performance, particularly in terms of read ranges. UHF also has better 'anti-collision' properties, so UHF tags can be successfully read at higher densities than lower frequency alternatives.

**The standards, too, are finally coming together to some degree, most notably with UHF Generation 2 – the latest standard for ultra high frequency tags which was finalised in September 2005 and has been widely adopted by the industry since, most recently by the International Standards Organisation.**

Tag readers (or read-writers) also come in various formats, including gate-type units designed to have entire pallet loads wheeled through them, fixed units that can sit next to a conveyor and scan all passing goods, and even handheld units that an operator can roam freely with. Reader costs vary, but as a general guide are around the same as equivalent bar code scanners.

## Critical mass

Up to two or three years ago, implementations of RFID technology in the supply chain were fairly limited. But as the price has fallen, it has been picked up by all sorts of operations, not just for unit load tracking but also for individual item-level tagging.

Retailers are among the most keen to trial or adopt RFID – firms like Tesco, Walmart and Marks & Spencer are among the well-known supermarket groups to have begun using it already. Manufacturers, too, have dipped their toes in the water – Gillette has already employed RFID within the packaging on some of its razor blades, for instance, and brewers like Carlsberg Tetley have long used RF tags on returnable beer kegs. Even car giant Ford has got in on the act – it uses RFID at the heart of a sophisticated system to track prototype vehicles around some of its development and testing sites in the UK, Belgium and Germany.

As surely as night follows day, a drive by manufacturers and retailers like this today will turn into a prerequisite for all those that work with them tomorrow.

Given this level of support and demand, the technology's arrival in the mainstream cannot be far away. Prices continue to fall, further encouraging take-up. And developments in the technology itself are also making it more attractive – not least the use of conductive inks to produce printable circuitry which might make tag production even cheaper in the future.

How soon your own organisation has to start using and dealing with RFID, therefore, really depends on just two things: how quickly the price curve continues to evolve and how soon you – or your customers – decide that it's no longer possible to resist the benefits the technology can bring.