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RFID AS A MODERN BRAND PROTECTION TECHNOLOGY

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Abstract: *In this paper we will present the newest achievements using RFID (Radio Frequency Identification) technology in relation to brand protection in today's industry. At the beginning, our presentation of the paper will go to the explanation of RFID technology as a modern industrial concept and later moved on the details about brand protection in manufacturing. Today, machine builders around the world put great emphasis and at the same time devote attention on the quality of their products such as machine uptime, productivity so flexibility is important selling detail. RFID solutions can make big contributions and provide valuable scale compared to reverse-engineered copies from low-quality competitors which produce cheap spare parts or simply parts.*
Keywords: *RFID, brand protection, machine builders, part builders*

INTRODUCTION

To start, RFID stands for Radio Frequency Identification. RFID is a suite of technologies that includes "tags" which get applied to items that need to be tracked, "readers" or "interrogators" that scan the tags nearby for their data, and a series of integration technologies that link the readers back to central databases and systems that track the data being scanned [1].

An RFID tag is based on a chip or integrated circuit (IC) usually composed of silicon. A tag insert or inlay is the IC attached to an antenna, which is usually printed or etched on a substrate material. The tag itself is the inlay plus its encapsulated protective packaging. The packaging can be flexible or stiff, as the application warrants.

An RFID system typically consists of a radio-enabled device that communicates with or "interrogates" a tag or label, which is embedded with a single chip processor and an antenna. The "interrogator" or RFID reader may be a fixed antenna or it may be portable, like a bar code scanner. The tag itself is an extension of the bar code labels you see everywhere today, but with more intelligence. The advantage of these more intelligent systems is that, unlike barcode tracking systems, an RFID system can read the information on a tag without requiring line of sight or a particular orientation. This means that RFID systems can be largely automated, reducing the need for manual scanning.

In the back end of the system, a host computer stores all collected data within a database. Since RFID tags can also carry data, tags can serve as data transfer agents, synchronizing disparate information systems. Tags may carry a product's history or genealogy, and may interact and communicate with manufacturing production systems for increased automation and process error proofing. The tags can either be Read Only (RO) or Read/Write (R/W) capable. There are two types of RFID tag: active and passive [1].

Active: Battery powered, Read-write and read only versions available, Longer read ranges (10 to 130 feet), Higher tag costs ($10 to $1000 per tag), 2D location systems possible. Example: toll booths or railroad car tracking. Active Tags will broadcast all the time or sit waiting for a request from a reader to blast its signal, Figure 1.

Passive: Powered by reader, Read-write and read only versions available, Shorter read ranges, Lower tag costs (Less than $1 per tag), Item ID. Example: item management. A properly calibrated reader being place within range of the tag and collecting the data within the signal activates passive tags, Figure 1.

Figure 1. RFID working units in practice using

RFID AND BRAND PROTECTION

Worldwide brand theft is costing companies more than $400 billion annually in revenues and is growing at an alarming rate of up to 15% a year. The World Health Organization (WHO) estimates that 10% of the global drug market is made up of fake products in fake packages. Not only does counterfeiting lead to revenue loss and brand defamation, it undermines security, placing consumers directly in harm's way.

RFID tags or chips allow brand owners, packagers and retailers to "talk" to their products from the beginning to the end of the supply chain. Tags can contain a range of information about a product, including manufacturing and packaging facility locations, packaging line runs, date codes, product ingredients, packaging supplier data and logos. Tags can be sandwiched between layers of plastic or paperboard used for packaging and paper or film used for labels. RFID readers are then placed all along the supply chain, following a product and its package ensuring its authenticity and safety [2].

However, one of RFID's major stumbling blocks has been high cost. Typically, RFID chips can run up to $1.00 of more per tag. But as chips get thinner and smaller, it is estimated that RFID costs will dip down to the 10 to 20 cents per chip range. RFID experts say that cost will lessen as RFID manufacturers develop cheaper tags while increasing production volumes.

Parts availability is a key factor to guaranteeing profitability for every machine suppliers and machine users. In this case, it is easy to offer customers a complete catalog of original parts via fast and reliable distribution way using tags. The idea is not to do it more frequently and frequently but to do it faster, more reliably, and to automatically generate data that can be used to generate a report to the customer, and can be stored

in a database that will be used to follow the machine and spare parts performances.

Because these kinds of machines are frequently reverse engineered and copied using rapid prototyping technology or other modern production way, every part has to be checked to determine if it is an original and suitable for the aimed machines or not. This is done by reading an RFID tag (active or pasive) embedded or incorporated in the mentioned parts or spare parts, thus guaranteeing that only original, high quality parts are used. Not only does this minimize end customer complaints due to varying product quality, but it also has the added advantage of routing 100% of the spare parts business though the machine builder. On this way spare parts business provides continuing sales, ensures the quality of the parts, and protects the high professional image of both the machine builder and parts manufacturer [2].

Protect quality and brand protection ensure that non-approved or pirated spare parts cannot be used and purchased. Maintenance cycles can be strongly determined and replacement parts business can be controlled on easy way by customers.

Each tagged part will carry key information about its ownership and maintenance needs i.e. history. This will help speed up machine repairs – reducing delays– and will improve the overall safety of the machines.

In this paper we will consider production used in automotive industry and healthcare equipment. For example, carmakers are taking similar steps to improve the safety of their products. Key safety components such as brakes, air backs and seats or the rest parts of the car, can be tagged so that the car manufacturer can trace faulty goods back to the supplier and then demand repairs or replacements. In future it will be possible to link RFID tags containing a unique identification number, such as the Electronic Product Code (EPC), to very important information, e.g. date of manufacture, materials used for that and origin of components.

Mention RFID and packagers may automatically think in terms of chips/tags, unwieldy readers and high cost. But a chipless RFID technology has been developed and licensed by a company called Inkode. The Inkode system involves embedding tiny metal

fibers–called Taggents [TM]–into plastic and paper or any other materials that radio frequency waves can penetrate. These microscopic particles are energized by low power and respond when "excited" by radio frequency waves [3].

Other example, even sophisticated healthcare equipment as medical devices or implants can be tagged with RFID to ensure it is functioning properly and to track maintenance and inspection information. When medical devices have to be followed-up, it is often difficult for clinical engineers to identify which devices of the huge numbers in circulation are faulty. That's because companies frequently produce goods that look nearly identical but have minor changes in features. In addition, it's very difficult to track the make and model number of medical devices that have already been used in surgery, such as artificial hips, knee joints and dental implants. One company is developing ways to RFID-tag the implants' packaging so that product information, such as expiration dates, can be tracked accurately and patients can know that their implants are safe so customer safety will increase considerably.

In this paper, as a result of our evaluation we will show that applying RFID technology, also, saves more than 50% of data entry time process. Other benefits of this technology are that gray market activity will be decreased on minimum scale so profit of companies will go up [3].

The brand label shows the value of your product. The unique number stored on the label's RFID chip identifies the product beyond doubt as yours or a counterfeit. It proves the product's authenticity not only to you but also to your customer. A combination of holograms with the RFID label and a separate authenticity card is even more convincing and enables the customer to check the product online at home.

Iveco, a commercial truck and bus manufacturer owned by the Fiat Group, plans to expand the RFID system it uses to process the receipt, picking and shipping of replacement parts, as well as guarantee their authenticity. The application, which has been in operation at Iveco's distribution centre in Turin, Italy, for approximately one year, will be installed at a DC in Madrid during the few next weeks.

Machine builders everywhere put great emphasis on the quality of their products; machine up - time, productivity, and flexibility are important selling points. RFID solutions can make essential contributions and provide valuable USPs compared to reverse-engineered copies from low quality competitors.

RFID also automates inventory counts, providing a complete, accurate snapshot of asset status in a mere fraction of the time it would take to conduct a physical manual inventory. To track assets with RFID, tags are attached to all assets - from servers, racks, and laptops to office chairs, carts, and kegs. To take inventory, an employee can simply roam the facility with a handheld RFID reader or a mobile RFID reader on a cart - there's no need to properly identify the asset, locate a bar code, and scan each asset one by one. Without the intensive labor, companies can afford to replace the annual audit with weekly or even more frequent inventory counts. And RFID's automation eliminates the costly errors associated with manual inventory, including missed or mis-categorized assets. The result is an up-to-date accurate picture of asset status as frequently as needed to best manage the business (www.motorola.com).

Airbus is introducing Radio Frequency Identification (RFID) technology to its supply of aircraft spare parts. This follows the successful introduction of the technology to its aircraft tools supply chain four years ago. RFID technology allows the storage and modification of data on a microchip and the exchange of data with PC or EDP systems. Together with its industrial partner, eConnective AG, and co-developer of the technology, Fraunhofer Institute, Magdeburg, Germany, Airbus has launched a test phase with the help of a European Airbus operator. This will allow the RFID transponder chip to be used for the first time on civil aircraft spares.

Airbus pioneered the use of the RFID technology in aircraft tool management in 1999. As a result, all Airbus tools with manufacturer serial numbers are now equipped with the microchip for radio frequency identification, offering electronic support for loan and repair management of tools. The microchips are installed on the tools as well as the tool boxes and contain data about the history of the

tool as well as shipping, routing and customs information. It is anticipated that the availability of this ground-breaking technology on aircraft spares parts will significantly help to simplify inventory and repair management of the equipped repairable and rotable spare parts [4].

One of the major benefits of this new technology for the airlines is a simplified component repair management, where the repair and flight history of the component will be available electronically. The microchip assures the availability and accuracy of vital information and documentation and also allows a comprehensive tracking system.

The airlines will further benefit by time saved on trouble shooting, parts inspection, repairs administration and on the whole logistics cycle. This increase in efficiency will contribute to the airlines' bottom line through reduced spares investment needs, higher spares availability rates and simplified administration.

A leading aircraft manufacturer with the most modern and comprehensive product line on the market, Airbus is a global company with design and manufacturing facilities in France, Germany, the UK and Spain as well as subsidiaries in the U.S., China and Japan. Headquartered in Toulouse, France, Airbus is an EADS joint Company with BAE SYSTEMS.

A new car immobilizer system uses three RFID readers to make it tougher for thieves to drive off with your automobile. RFID security systems installed in new vehicles by car manufacturers have succeeded in reducing car thefts, according to statistics gathered by immobilizer manufacturers, These RFID security systems work by fitting a car's ignition key with a passive RFID transponder containing a unique ID code, Figure 2.

Figure 2. RFID for automobile

Whenever the key is inserted into the ignition switch, it activates an RFID reader connected to a control module in the engine's central computer (which controls such things as the car's ignition and fuel systems) and is wired to an antenna built into the vehicle's steering column. The RFID reader generates a random number, which is transmitted to the key. The key's transponder combines the random number with its own unique serial number, encrypts the new number and transmits it back to the car's RFID reader. If the numbers don't match, the car won't start [2].

CONCLUSION

Machine builders around the world put great emphasis and at the same time devote attention on the quality of their products such as machine uptime, productivity so flexibility is important selling detail. RFID solutions can make big contributions and provide valuable scale compared to reverse-engineered copies from low-quality competitors which produce cheap spare parts or simply parts.

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