Product Authentication System

WHITE PAPER

RFID 4u®
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INTRODUCTION

In many industries product tracking reaches beyond “in” or “out”. It is important to know the pedigree of the product—the life it had before it reached the shelf or the consumer’s hands. Counterfeited products can have destructive effects, not only on customer satisfaction but also sometimes even on consumer health or life. Clearly, this leads to a damaged business image and decreased revenue.

RFID technology has been used to authenticate products such as pharmaceuticals for over a decade and with the invention of smaller and smaller tags, RFID has penetrated also the electronics and consumer goods manufacturing.

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1. SOLUTION OVERVIEW

RFID4U’s Authentication System provides full product pedigree information and inventory tracking that can be utilized for a myriad of products, such as for example:

- Wearable technology (fitness bracelets, heart rate watches, etc.)
- Electronics (TVs, phones, speakers, earphones, etc.)
- Luxury items (purses, shoes, designer clothing, sunglasses and other accessories)
- Medication and high-end cosmetics
- Jewelry and watches

But what does the system enable?

- Unique identification of product for authentication
- Information about product (expiration date, manufacturing date, etc.)
- Supply chain information from manufacturing to store
- Lot recalls
- Warranty tracking and service
- Inventory management

Software

Our Authentication Solution is based on TAGMATIKS, our cutting-edge enterprise, cloud-ready sensory adaptive network software platform, that enables rapid deployment and integration of scalable, real-time visibility solutions.

The system provides unique ID generation and writing tools including encryption, as well as tracking and authentication tools, that are available for smartphones and tablets for making time-critical decisions on the spot. We support all Android, iOS and WM mobile devices.

Hardware

RFID tags (NFC and UHF RFID) in very small sizes are embedded in labels, or caps for pharma applications or in the product itself (wearables, electronics, luxury goods). RFID tags are encoded with a unique ID based on the manufacturer’s requirements, which is encrypted and cannot be rewritten. This ID is then matched with a product database, where variations or duplicates would trigger an alarm. Other information can be written to the tag, such as lot number, expiry date, etc. that provides data for safety purposes and recalls.
2. RFID PROGRAMMING STATION

The RFID tags embedded in the product are encoded during the manufacturing process. This is accomplished using a fixed RFID reader station installed on the manufacturing line and the RFID Programming Station software application that enables automatic tag programming.

After the administrator login, the application allows for reader configuration and station configuration. The non-administrator user has access only to the programming station screen and a dashboard but is not allowed to change the configuration. The user and administrator permissions can be customized based on customer requirements.

Reader Configuration

The Configure Reader screen provides standard reader configuration parameters. Notice that you can have up to 4 antennas per reader and each antenna can program a separate product, which increases the throughput.

On this screen it is also possible to generate the Lock Password. The Lock Password is used for locking the tags after programming so that they cannot be rewritten.

Station Configuration

This screen provides options for the configuration of the programming station. The parameters include:
• The Station ID
• Part number (this is used when the part number is specified manually, otherwise this information is loaded automatically by scanning the barcode of the product)
• Database File Path – this file maintains the list of part numbers and serial numbers
• Station password
• Mode – there are three options – Read & Program, Read & Verify and Read Only and the selection will depend on which action this station is performing. If we are programming the tags, the Read & Program will be selected. If only verification of correct data written, then Read & Verify. Read Only shows what is programmed into the tag.
• For the Read & Program Mode, number of Write Retries can be selected. This specifies, how many times will reader try to program the tag before it “fails” the tag.
• Product Name
• Database & File Locations – Depending on the database used, the specific file has to be selected. The flat file (CSV file), XML file or MySQL, as well as the path to the file location.

Tag Programming
The Programming Station screen is used for the Tag Programming. Upon scanning a barcode of the product, the serial number and the part number automatically appear in the appropriate fields. The application automatically generates the data for the User Memory field (based on the specified format) that will be programmed into the tag’s user memory. In this case, the user memory data consists of the serial number, part number and the date and time, when the tag
has been programmed. After pressing the Read & Program button, the tag is being programmed.

After the tag is successfully written to, the application shows a green bar with a success message. All antennas read and program tags in a round robin fashion so while one tag is being written to, the others are queued up.

If one tag fails to be programmed even after the number of specified retries, the application shows an alert.
Dashboard

The dashboard provides a complete overview of the programming station activity and includes total of tags attempted, number of tags successfully programmed, number of failures and the success rate. The tags can be also filtered by dates, part numbers, serial number and modes. The dashboard data can be exported to an XLS, HTML, PDF, CSV and other types of files.
Languages

For foreign manufactures, we have the capability to translate the applications to various languages. Below is an example of the Programming Station in Chinese.

![Programming Station in Chinese](image-url)
3. BENEFITS

- Unique identification of product for authentication ensures that the product has been manufactured by the brand manufacturer and therefore the recipe or technology is safe, sound and guaranteed. This prevents customer dissatisfaction and increases safety.
- Information about product, such as expiration date, manufacturing date, lot number and other data, helps to sort product for inventory management (FIFO), recalls, picking, etc.
- Supply chain information from manufacturing to store to ensure that product is authentic and has not been tampered with throughout the supply chain.
- Enabled lot identification creates recalls that save cost as only selected products or lots are recalled.
- Warranty tracking and service enable servicing only authentic products that are in warranty, which saves time and cost (counterfeited products break more often and products out of warranty are usually not eligible for free service or exchange).
- More efficient inventory management based on automated receiving, sorting, picking and shipping.
- This solution can be also supplemented by mobile authentication applications that work on smartphones or handhelds with built in NFC reader or wirelessly with UHF reader station, for authentication on the go, in stores, during shipping and receiving or even authentication by the customer.