

Product Guide: NXP UCODE®9 Washable Tetile UHF RFID Label

https://www.rfidlabel.com

Contents

1. Product overview 2
2. Technical Specifications 2
3. Key Features 3
4. Benefits 4
5. Applications 5
6. Encoding 6
7. Installation 8
8. FAQ 9

Product Overview

A Textile RFID Label is a specialized radio frequency identification (RFID) tag designed for the textile and apparel industry. Made from soft yet durable materials, these labels are engineered to endure various environmental conditions, including several washing, wearing, and storage. By integrating RFID technology, they enable fast, accurate tracking and identification of items, significantly enhancing operational efficiency in areas such as supply chain management, inventory control, and retail operations.

Technical Specifications



AZL-U9-NL-7040

Chip Type: NXP UCODE® 9

Frequency Band: UHF 860-960 MHz

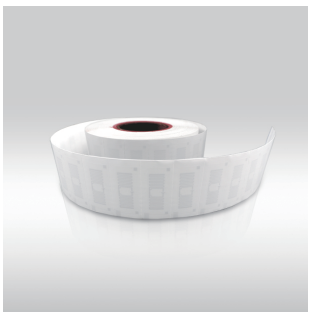
International Standard: ISO/IEC 18000-6C,EPC Global Gen 2v2.1

Memory Size: 96 Bits EPC memory

Environmental Spec:

Operating Limits: -40°C~70°C, 20%~90% RH

Storage Limits: 18°C~28°C, 40%~60% RH



AZL-U9-NL-6631

Chip Type: NXP UCODE® 9

Frequency Band: UHF 860-960 MHz

International Standard: ISO/IEC 18000-6C, EPC Global Gen2v2.1

Memory Size: 96 Bits EPC memory

Environmental Spec:

Operating Limits: 10°C~40°C, 20%~80% RH

Storage Limits: -20°C ~ 50°C, 20%~80% RH

Key Features

Flexible Design	Textile RFID labels are designed to be ultra-thin and can easily be embedded in fabrics such as clothing, mattresses, towels, and more, without compromising the textile's comfort or appearance. These labels are lightweight and soft, ensuring they have minimal or no impact on the garment's feel or adding any extra weight, making them perfect for long-term wear. At the same time, the labels are marked with dotted lines for precise sewing.
Battery-free Design	Most Textile RFID labels are passive, meaning they require no batteries and are powered by the signal from the RFID reader, eliminating the need for battery replacements. These labels are designed for durability, offering a long lifespan and making them ideal for large-scale, long-term applications.
Non-contact Identification	Textile RFID labels can be scanned and read from a distance without physical contact, enhancing the efficiency of inventory management, merchandise inspection, and anti-theft monitoring. This capability streamlines operations and reduces the need for manual handling.
Washable Use	Unlike traditional labels, this Textile RFID labels are specially designed to be used after few times of washing without damage, ensuring that they continue to function throughout their life cycle. The read performance of these labels remains stable even after several washes, making them suitable for use in industries such as retail and textile supply chain.

Benefits

Improve Management Efficiency	Washable textile RFID labels significantly improve item management efficiency, especially in environments that require frequent cleaning, such as retail, supply chain and manufacturing. Unlike traditional barcode systems or manual tracking methods, which depend on manual entry and identification, RFID labels enable automatic data capture. This automation reduces the need for manual intervention, enhancing both the speed and accuracy of inventory and asset management processes.
Improve the Accuracy of Item Tracking and Inventory Management	RFID technology significantly enhances the automation and accuracy of item tracking, especially for large quantities of products such as apparel, bedding, towels, and garments. By embedding RFID labels into these items, businesses can streamline item identification and inventory management, minimizing human error and reducing the risk of loss. This automation not only boosts efficiency but also improves overall inventory accuracy.
Enhance Customer Experience	Washable textile RFID labels not only improve management efficiency but also enhance the consumer experience. In the apparel retail sector, RFID labels enable customers to quickly check inventory availability, improving their shopping experience with greater convenience.
Enhance Anti-theft Function	RFID labels can also play a role in preventing theft in industries such as apparel retail and logistics. By embedding RFID labels, merchants are able to accurately monitor the movement of items and identify stolen or unauthorized items in real-time. RFID systems are often used in conjunction with alarms, which are triggered when labels are not scanned correctly, effectively reducing the rate of theft.
Reduce Labor Costs and Errors	Automated RFID technology helps organizations reduce reliance on manual operations, minimizing human error. In traditional inventory, cleaning, and logistics management, employees manually check item status, quantity, or location, often leading to mistakes. RFID automates these processes, improving efficiency, reducing labor costs, and ensuring high accuracy by automatically recording and updating information without human intervention.

Applications

Textile Products Manufacturing	In the manufacturing industry, especially for textiles, effective material management and product tracking are crucial. Washable textile RFID labels help manufacturers monitor raw materials, semi-finished goods, and finished products at every stage. Each label provides a unique identifier, enabling real-time tracking and record-keeping. These labels also support quality control by capturing inspection data throughout the production process, ensuring products meet standards and remain fully traceable.
Textile Products Supply Chain Management	Effective tracking and management of materials in the supply chain are key to improving logistics efficiency. Washable textile RFID labels enhance automation and reduce errors by providing real-time inventory updates. These labels enable accurate tracking of item quantity, location, and status, minimizing discrepancies and losses. During transportation, RFID labels ensure goods reach their destinations efficiently. Additionally, they offer full supply chain visibility, providing real-time data from production to delivery, which enhances transparency and supports better decision-making.
Textile Products Retail	Washable textile RFID labels offer significant benefits in retail, especially for apparel and home textiles. They improve inventory management by providing real-time tracking, preventing stock-outs and overstocking. RFID labels enhance the customer experience with smart fitting rooms that offer size, style, and inventory information, as well as support for self-checkout systems. They also boost security by triggering alarms at access points, reduce theft, and allow customers to scan labels for detailed product information, including brand and care instructions, driving satisfaction and sales.

Encoding

1. Prepare encoding tools

① A UHF RFID Reader

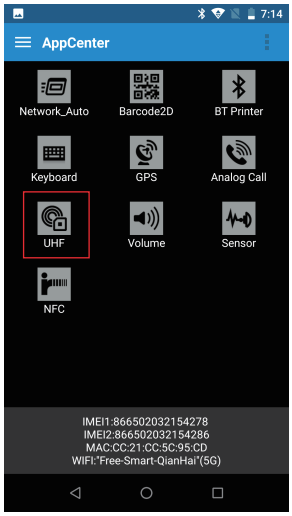
② An app that can encode and read UHF chips

Here we will take our UHF handheld RFID reader, AZ-C72 for demonstration.



2. Encoding the UHF labels

Select the UHF option in the APP Center on the handheld device.



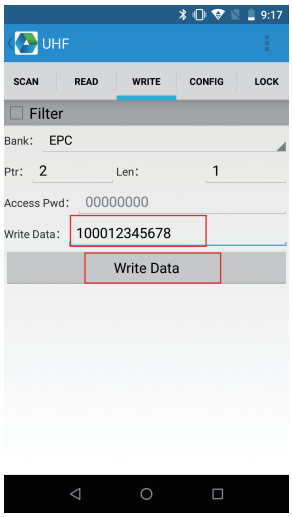
3. Set "EPC" in the "Readwrite tag" button

① Click the "Readwrite tag" button in the upper left toolbar to enter the encoding page.

② Input the data in the "Length" field, and enter the words (in hexadecimal format) you want to encode in the "character" field

(1 word = 2 bytes = 16 bits = 4 hex characters)

③ Place the label near the reader and click the "Write" button. When the screen displays "success," the encoding is successfully completed.



Verification	After programming is complete, scan the NFC badge with the same NFC device to ensure that the written data can be read properly. If you programmed a URL or social media link, the phone should automatical ly jump to the corresponding page or display the relevant content after scanning the badge. If it involves anti-counterfeiting or authentication functions, make sure the verification process works correctly so that consumers can safely verify the product.
Update and Manage Data Regularly	The data on the NFC chip can be rewritten, allowing you to update the badge content regularly according to marketing activities or needs. Programming tools usually provide editing and rewriting functions. For anti-counterfeiting or encrypted information, ensure that the keys and verification systems are updated regularly to maintain the security of the brand and consumer trust.

Installation

Choose the Installation Location	Choose a location where the RFID label can easily scan, such as the side of a textile or the surface of a textile. Ensure that the installation location is within the effective RFID communication range.
Sewing labels to textile	Ensure that the dotted line on the label is horizontally aligned with the textile and that the label is exposed as completely as possible without being blocked and sewed the label firmly onto the textile along the dotted line.
Test label	Use an RFID reader to scan the label to ensure it is readable. Data writing is also needed to test whether the function is normal.

FAQ

1. What types of textiles can washable textile RFID labels be applied to?

Clothing: including work clothes, uniforms, sportswear, etc.
Home textiles: such as mattresses, bed sheets, towels, quilt covers, curtains, etc.

2. Does Washable textile RFID label affect the comfort of textiles?

Washable textile RFID label designs are often very thin and flexible and embedded discreetly to ensure that the label does not interfere with the comfort of clothing or other textiles. Particularly in clothing and bedding, labels are typically placed in areas that do not interfere with comfort, such as collars, linings, or edges of sheets.

3. Does washable textile RFID label affect the appearance of the item?

High-quality washable textile RFID labels are compact in design, flexible in embedding, and usually do not detract from the appearance of the item. They are usually placed internally or in an inconspicuous area to ensure a clean and tidy appearance.

4. Can washable textile RFID label be used in all types of detergents?

Washable textile RFID labels are usually able to withstand many types of detergents, but strong acidic or alkaline chemicals should be avoided when using them. For environments where strong detergents are frequently used, it is recommended to choose RFID labels that are chemically resistant, which will increase the durability and stability of the labels.

5. How to ensure that washable textile RFID labels are not lost or detached?

In order to ensure that washable textile RFID labels are not easily detached, the design usually takes into account the way the labels are embedded. Common methods include sewing, heat sealing and pasting, which are suitable for different types of textiles. In addition, the external encapsulation of the tag is also designed to be abrasion-resistant and waterproof to ensure that it will not be easily damaged or detached during washing.

RFID label

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