



# Demystifying RFID Labels

Understanding RFID Labels and Printers – and How to Sell Them

# MEET THE TEAM



**Ryan Zins**

Product Manager for RFID labels



**Chris Brown**

RFID Program Director/  
Subject Matter Expert







# AGENDA

- Why demand for RFID labels is increasing
- Types of RFID labels and how they work
- Which industries are using RFID labels
- How your customers can meet RFID labeling mandates
- How to encode RFID labels using an RFID printer
- How to sell RFID labels and printers
- What the future of RFID holds



# RFID BASICS

## Radio Frequency **ID**entification

- System using radio waves to identify and track items and events
- Generic term that applies to any & all solutions using radio waves to identify and track things





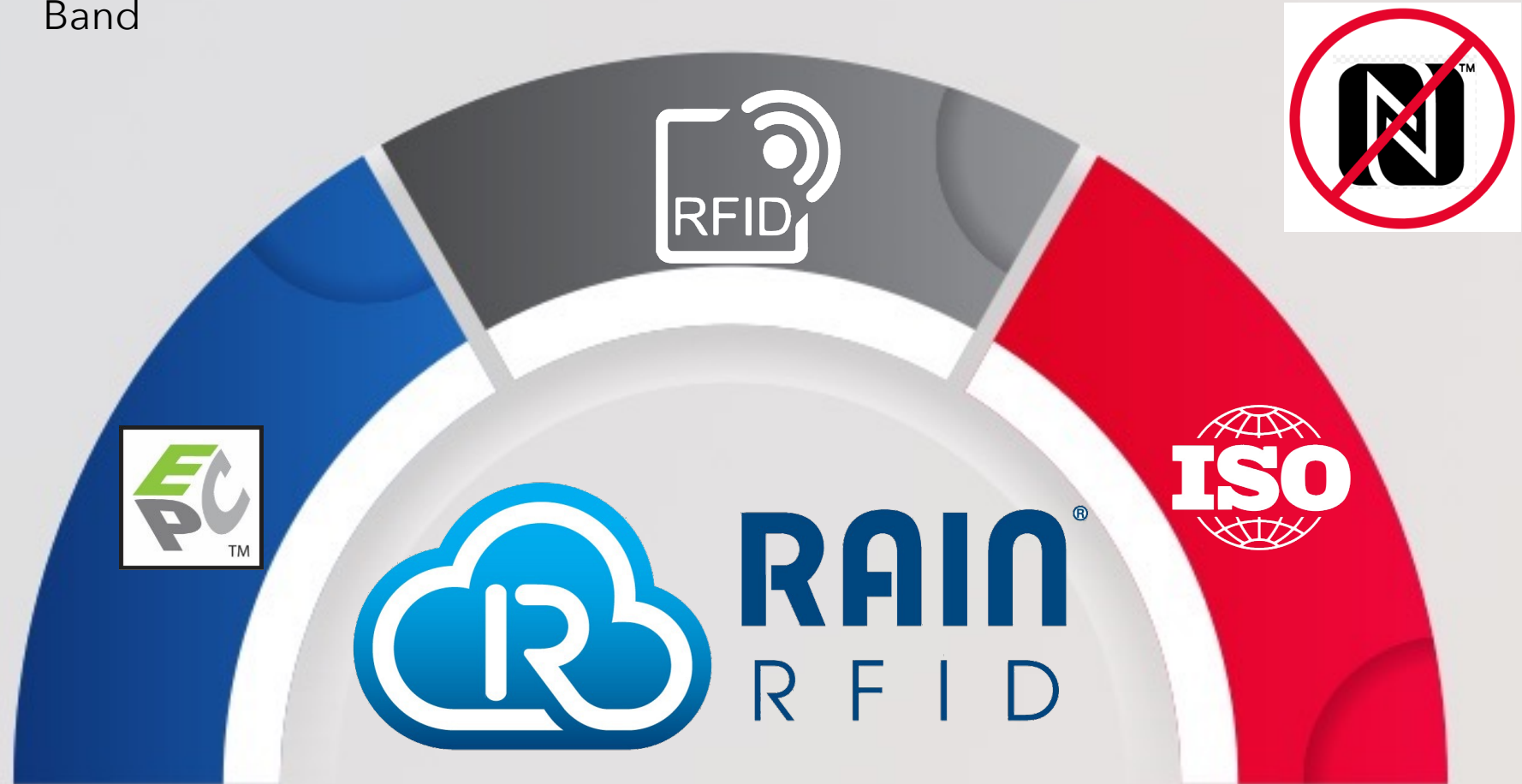
# OUR TYPE OF RFID: "RAIN"

UHF Frequency  
Band

Passive Tags

Too many names,  
99% the same...

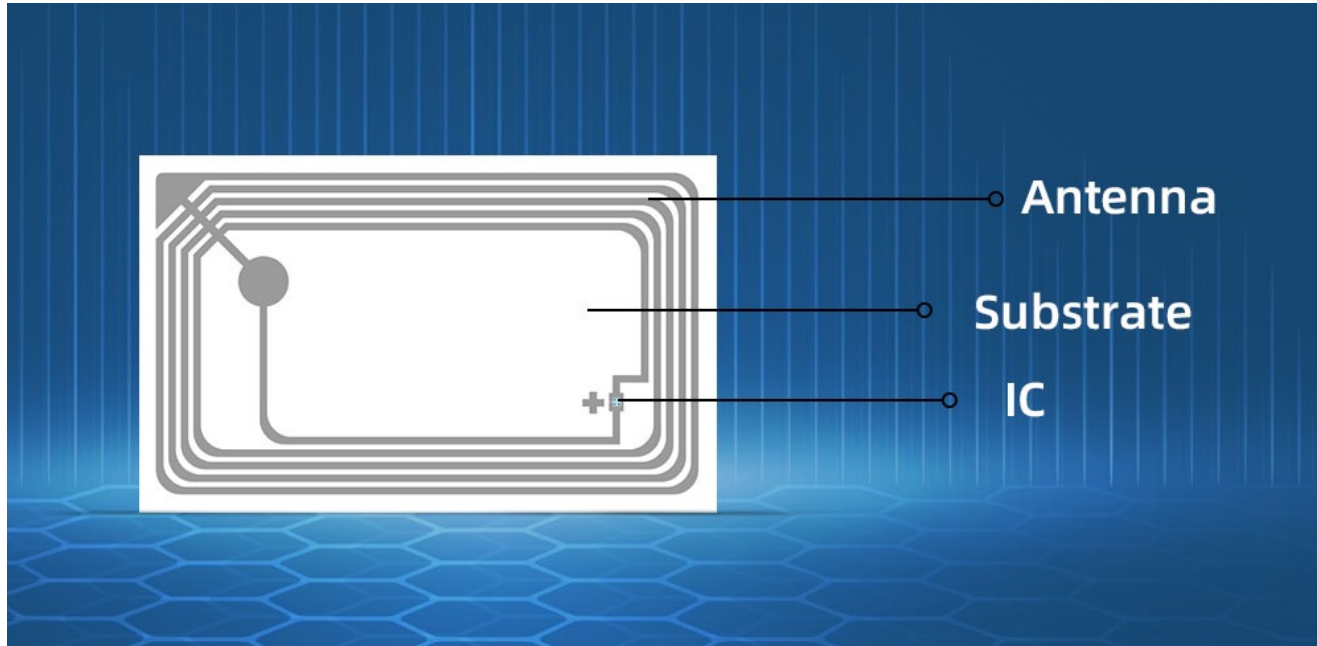
- GS1 (Class 1) Gen2
- (GS1) EPC
- ISO/IEC 18000-63
- ISO 18000-6C
- UHF Passive
- "RFID"



Clarify with your customers



# WHAT IS AN RFID TAG?



## Finished construction of:

- **Chip** = microprocessor or IC; “brains of the operation”
- **Antenna**
- **Inlay** = chip + antenna on substrate
- **“Housing”** – label stock (or casing if required)

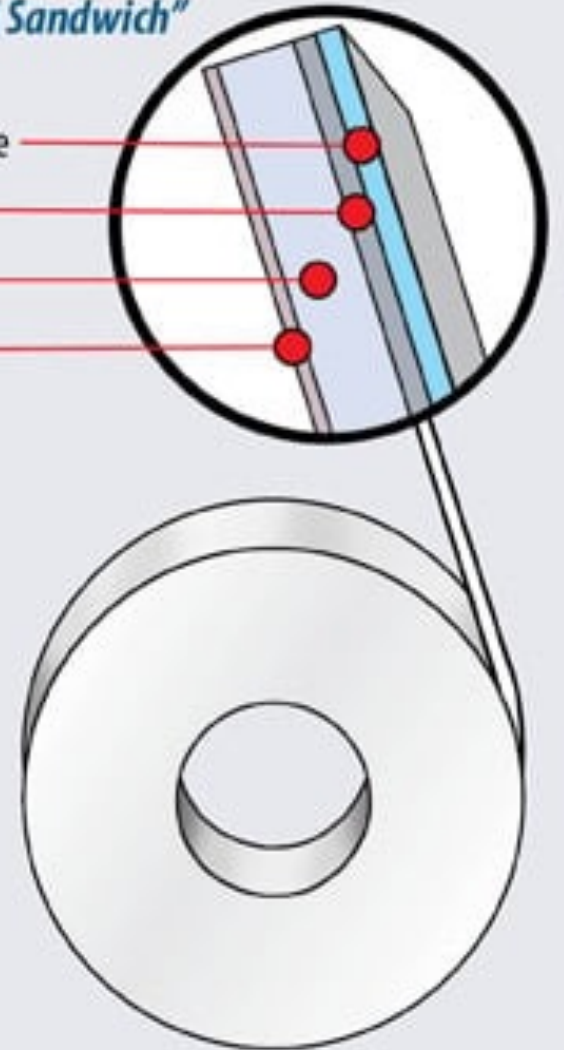
## *A Typical “Label Sandwich”*

Topcoat or Laminate

Facestock

Adhesive

Liner





# The Retailer Mandate Blast-Off

- **Walmart**
  - Now important for American Auto ID VARs
  - Many new product categories
  - Item-level; Not logistics units
- **Dick's Sporting Goods**
  - Jan 2024
  - Important for American Auto ID VARs
- **Nordstrom, Dillard's, Belk, Macy's**
- **Target, Home Depot next?**
- **Logistics labels next?**



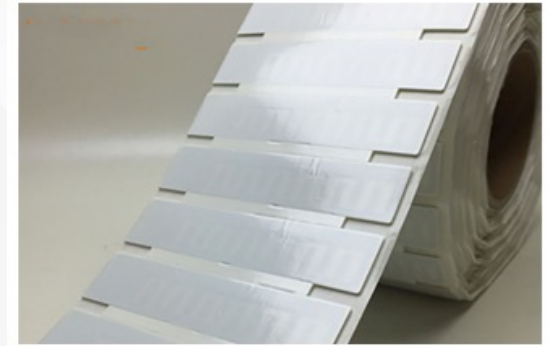


# RFID TAG TYPES

- Standard Smart / RFID label
- On-Metal tag
- Horticulture / Cannabis plant tags
- Auto-Windshield tags
- "RTI" (Returnable Transport Item) tags
- Hard tags
- And more...



Smart Labels



On-metals



Plant Stakes



RTI Tags Courtesy Tadbik



Hard Tag Courtesy Xerafy

# INDUSTRIES AND APPLICATIONS USING RFID

## ■ RETAIL

- “Retailer mandates”
- Inventory Management
  - Major retailers
  - Smaller chains
- “RTLS” (real-time locationing system)





# INDUSTRIES AND APPLICATIONS USING RFID

## ■ LOGISTICS

- Transportation & Logistics (“T&L”)
- Warehousing operations
- Courier services
  - UPS “go-live”
  - FedEx researching
- Postal services
- Fast, efficient, non-line-of-sight identification, tracking and routing of logistics units
  - Read multiple items “simultaneously”
  - Pallets, cases, cartons, “RTI’s” (Returnable Transport Items)



# INDUSTRIES AND APPLICATIONS USING RFID

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## AUTOMOTIVE

- **Parts tracking**
  - OEMs, Tier 1 and Tier 2 suppliers
- **“AVI” (Automatic Vehicle Identification)**
  - OEMs
  - Logistics providers
  - Service & Inspection centers
  - Road tolling
  - Parking
- **Tires**
  - Embedded or “patch”
  - Retailer mandates
  - “Seasonal storage” – calling all Canadians!





# INDUSTRIES AND APPLICATIONS USING RFID



## AVIATION / AEROSPACE

- Aviation – baggage tracking
- Aviation / Aerospace – part tracking

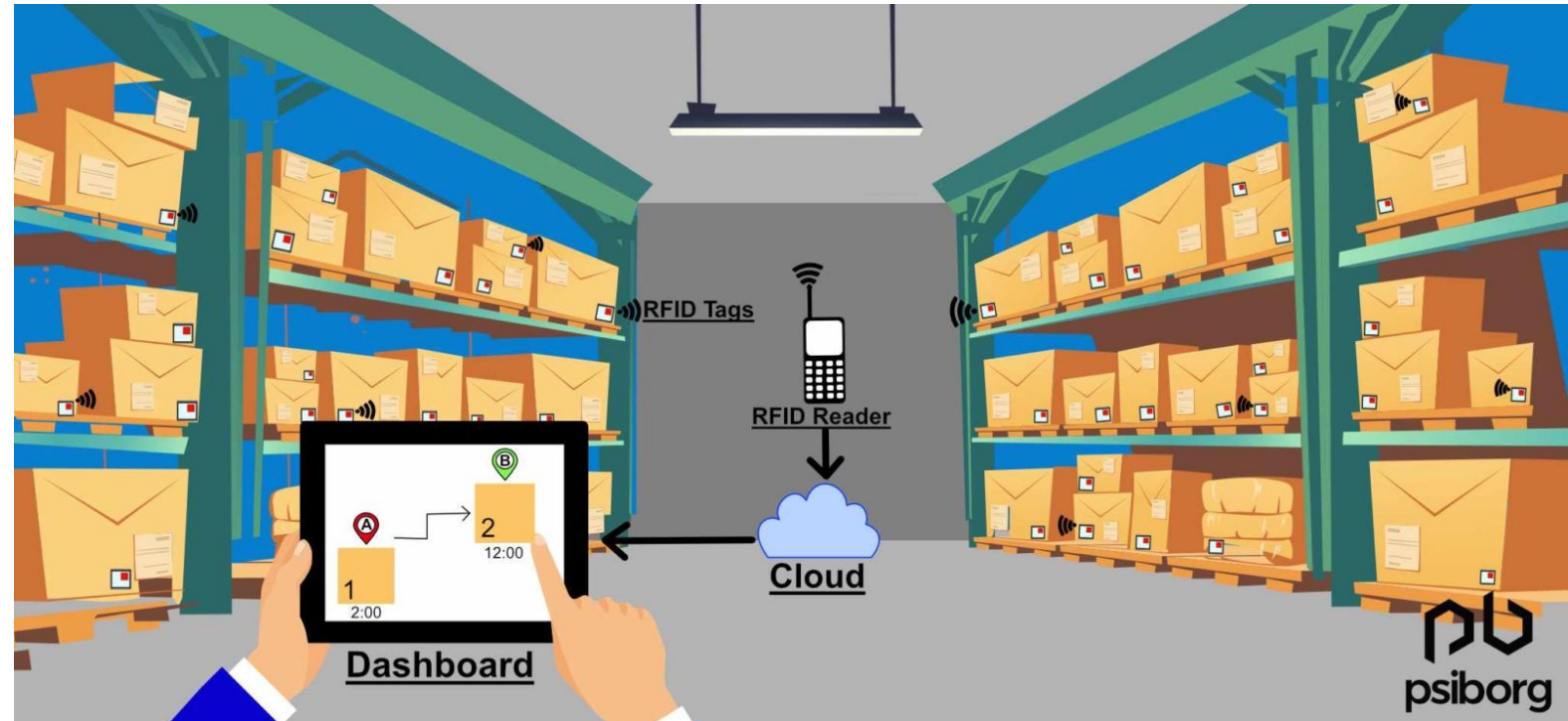
**SPEC2000**

**TSC** PRINTRONIX  
AUTO ID

# INDUSTRIES AND APPLICATIONS USING RFID

## INVENTORY MANAGEMENT

- All industries
- Item count
- “Always on”
- Increased accuracy
- Reduced labor and costs
- Item “locationing”





# INDUSTRIES AND APPLICATIONS USING RFID

## ASSET TRACKING

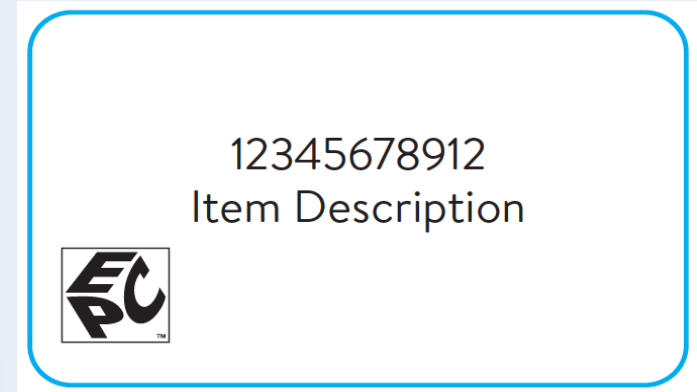
- All industries
- Tools
- IT assets
- Evidence tracking
- Art and valuables



**METAL CRAFT**  
ID MADE BETTER

# Retailer mandates – How do I comply?

- “Sticker” added to the product
  - Easiest
  - Fastest
  - Cheapest
  - Currently, the most common solution
- Incorporate RFID inlay into existing product packaging
  - No “ugly white sticker”
  - Potential issues with auto application

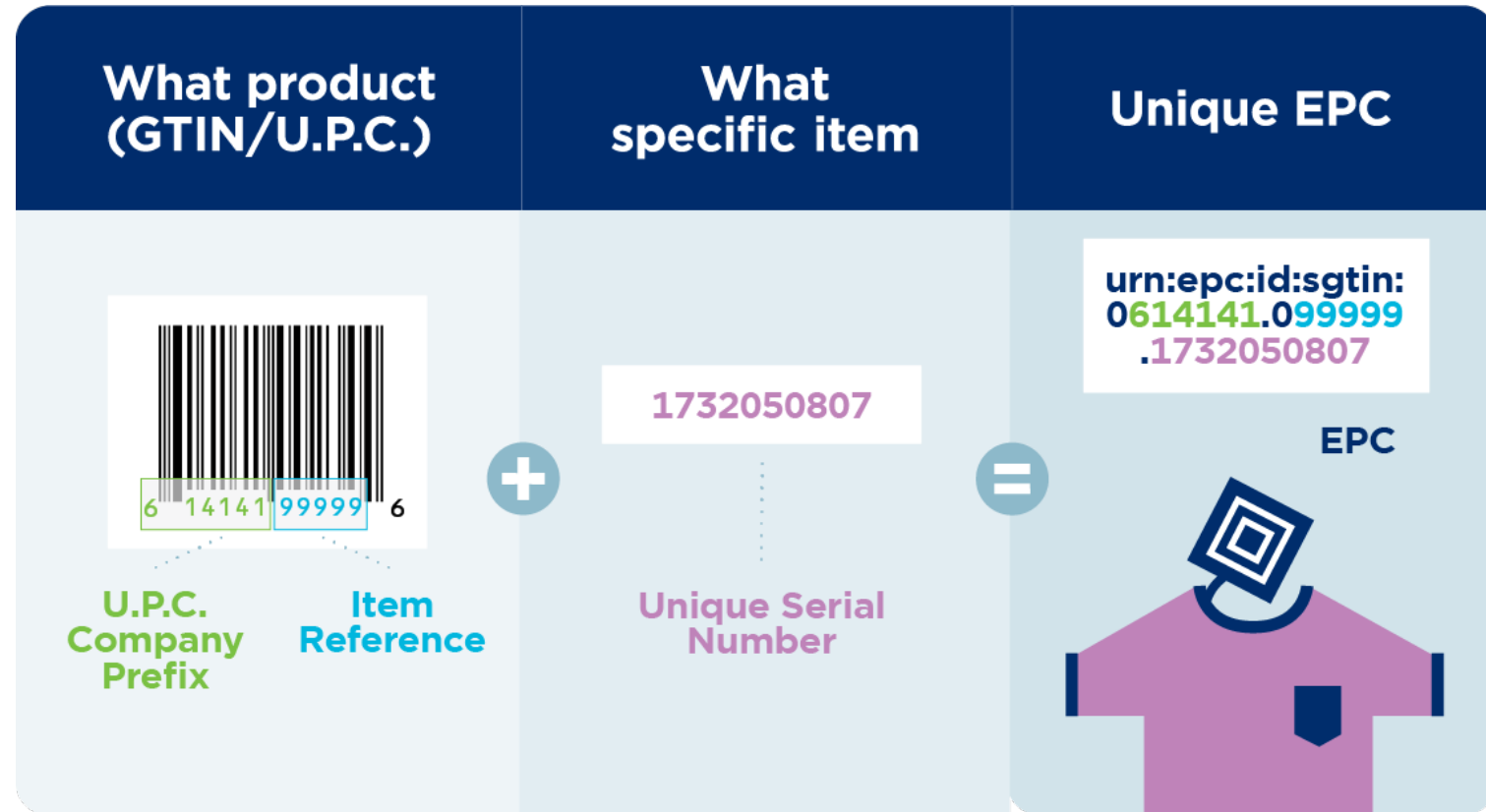




# Retailer Mandates

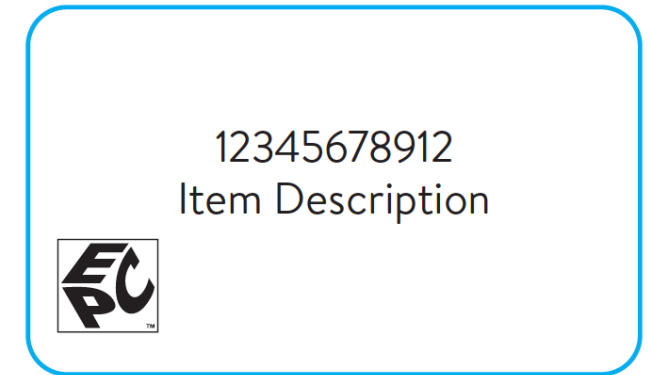
## UPC / EAN to SGTIN-96

- Concept is to convert that ubiquitous retail barcode to an RFID encoding
- UPC ≈ “GTIN”
- UPC Data Elements:
  - Company Prefix (GS1 Global!)
  - Item Reference number
  - **Check digit**
- SGTIN-96 Data Elements:
  - **Header**
  - **Filter value**
  - Company Prefix (GS1 Global!)
  - Item Reference number
  - **Serial number**
  - **(Permalock)**



# Printing and Encoding an SGTIN-96

- Get Mandate-Approved Inlay and “Sticker” (Label)
- Printed Elements (assuming UPC already there)
  - EPC logo
  - Item description
  - UPC number
- “Deconstruct” the UPC Number
  - <https://www.gs1us.org/tools/gs1-company-database-gepir>
  - Company Prefix (use “global” variant)
  - Item Reference number
  - Note: Check digit





# Printing and Encoding an SGTIN-96

We will use BarTender® to Make Our Label





123456789012  
Item Description

Lot: ABC123





### RFID Tags Properties

**RFID Encoder 1**

- RFID
- Security
- Error Handling
- Data Sources
  - Filter Value
  - ;
  - Company Prefix
  - ;
  - Item Reference
  - ;
  - Serial Number

**Data Source** | **Data Type** | **Transforms**

Name: <none>

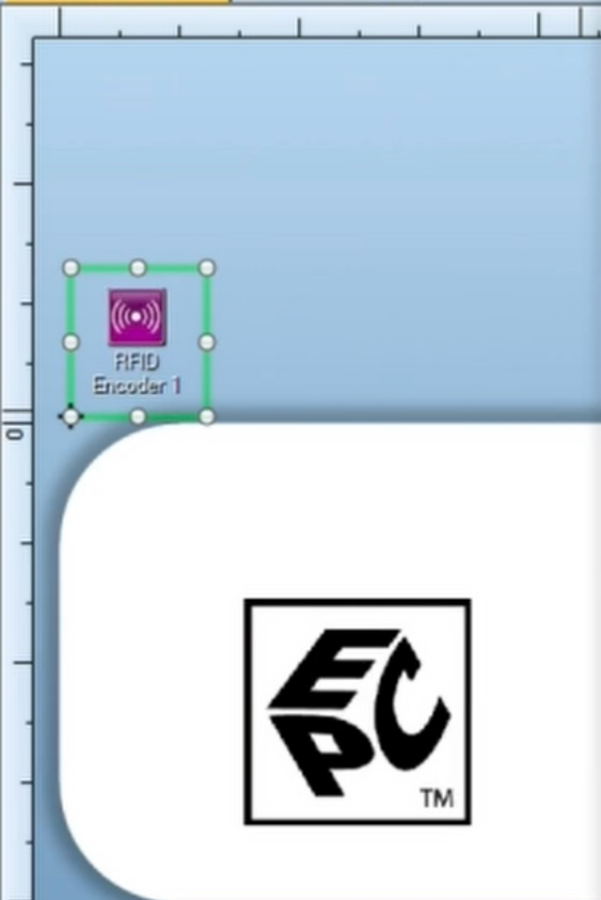
Description: Item Reference

Type: Embedded Data

Embedded Data: 013502

Close Help





### RFID Tags Properties

**RFID Encoder 1**

- RFID
- Security
- Error Handling
- Data Sources
  - Filter Value**
  - ;
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**Data Source** | **Data Type** | **Transforms**

Name: <none>

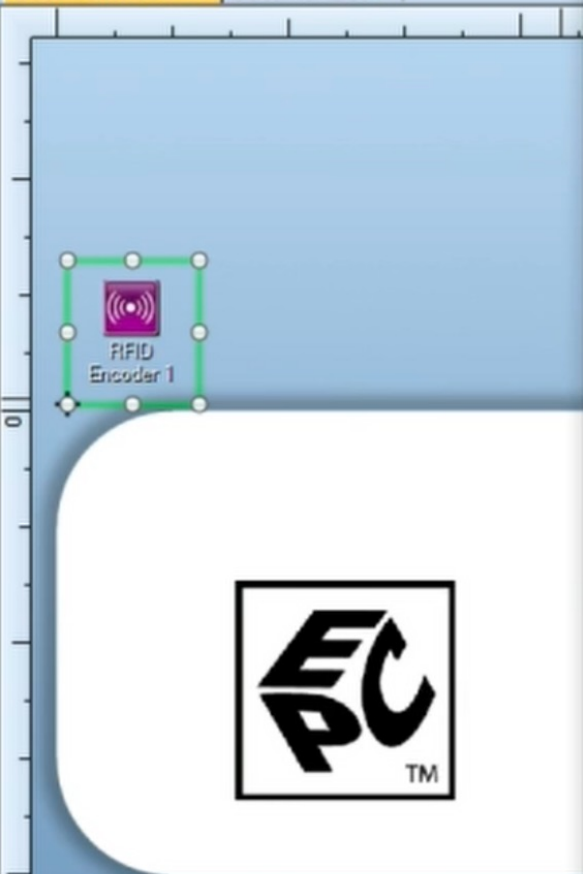
Description: Filter Value

Type: Embedded Data

Embedded Data: 1

Close Help





### RFID Tags Properties

RFID Encoder 1

- RFID
- Security
- Error Handling
- Data Sources
  - Filter Value
  - ;
  - Company Prefix**
  - ;
  - Item Reference
  - ;
  - Serial Number

Data Source Data Type Transforms

Name: <none>

Description: Company Prefix

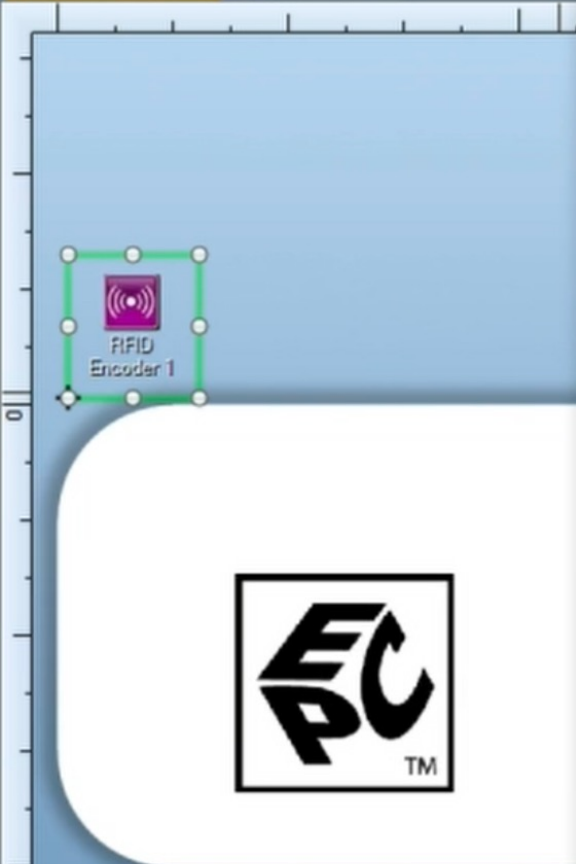
Type: Embedded Data

Embedded Data: 0795122

Close Help



Document1.btw\* x Document2.btw\*



### RFID Tags Properties

RFID Encoder 1

- RFID
- Security
- Error Handling
- Data Sources
  - Filter Value
  - ;
  - Company Prefix
  - ;
  - Item Reference**
  - ;
  - Serial Number

Data Source: Data Type: Transforms

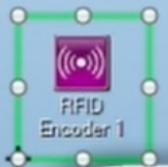
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Description: Item Reference

Type: Embedded Data

Embedded Data: 013502

Close Help



### RFID Tags Properties

**RFID Encoder 1**

- RFID
- Security
- Error Handling
- Data Sources
  - Filter Value
  - ;
  - Company Prefix
  - ;
  - Item Reference
  - ;
  - Serial Number**

**Data Source** | **Data Type** | **Transforms**

Name: <none>

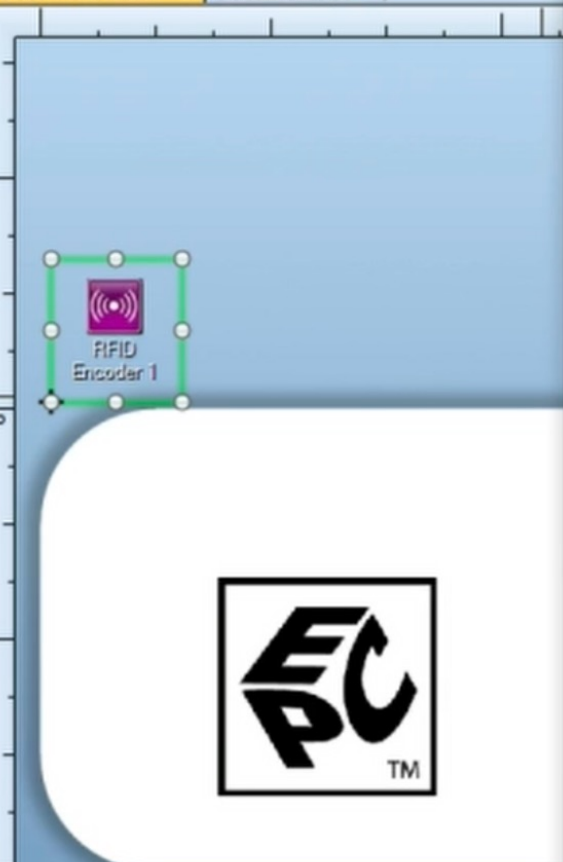
Description: Serial Number

Type: Embedded Data

Embedded Data: 8

Close Help





### RFID Tags Properties

**RFID Encoder 1**

- RFID
- Security**
- Error Handling
- Data Sources
  - Filter Value
  - ;
  - Company Prefix
  - ;
  - Item Reference
  - ;
  - Serial Number

Use driver's settings

Specify security settings for this document

Access Control

EPC/UII Block: Lock Permanently

User Block: Open Range...

TID Block: Lock Permanently

Access Password: Open

Kill Password: Open

Access Password

New Password: Constant: [ ]

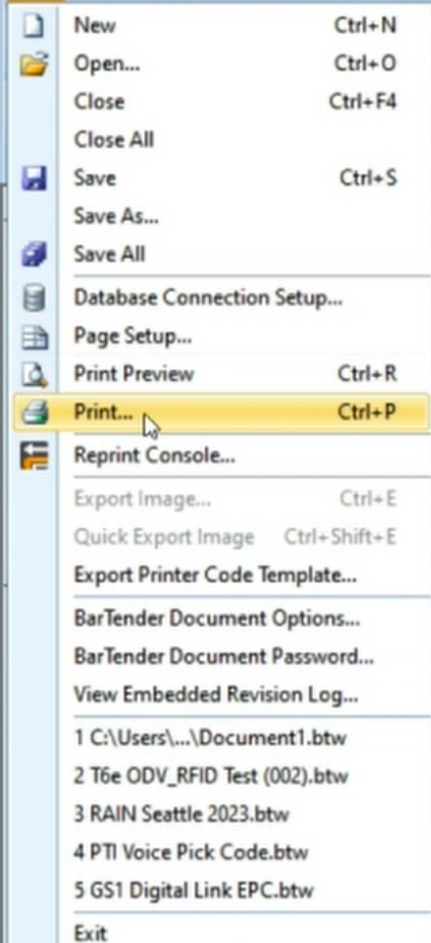
Old Password: [ ]

Kill Password

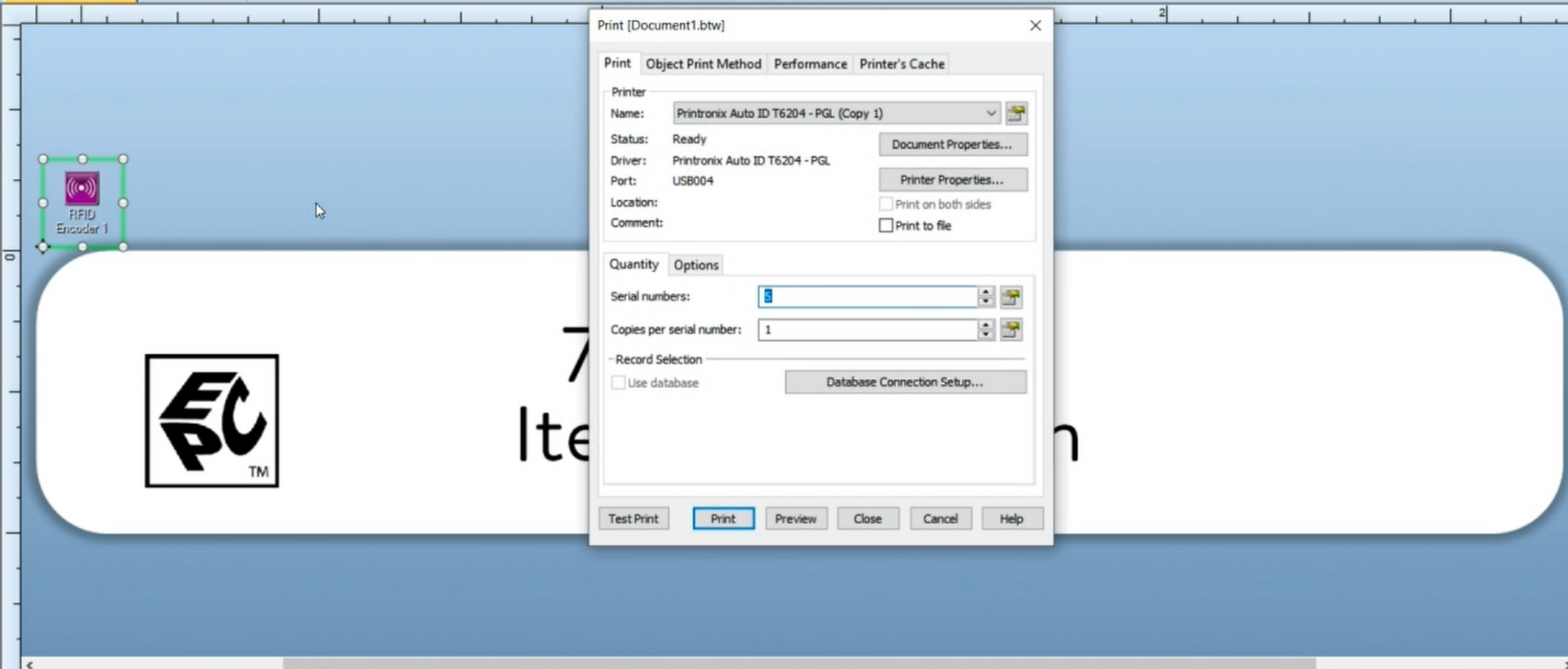
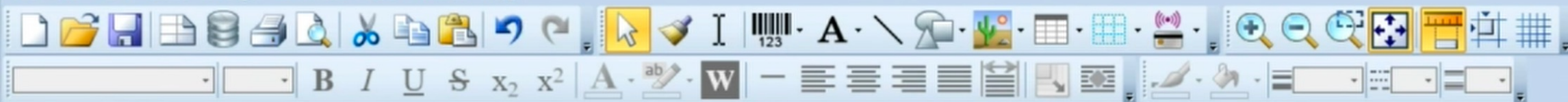
Modify Kill Password

New Kill Password: Constant: ED94B499

Close Help



795122135029  
Item Description







# Inventory management is failing

- The product is often out of stock
- Even when it's in stock, nobody can find it
- Shelves/Racks are poorly organized
- In retail, is a store associate very helpful? Or even exist!
- Omnichannel is often difficult to achieve due to poor inventory controls

# RFID is modern “silver bullet” for managing inventory

- Up to 30% improvements in inventory accuracy allow for much, much tighter inventory controls
- RTLS features available on RFID systems help employees find inventory
- RFID can also help with retail floor organization, which can help boost sales
- RFID streamlines the omnichannel experience that many customers expect
- RFID can help small to mid-sized businesses provide a much more robust omnichannel experience



# HOW TO SELL RFID PRINTERS

## NOT ALL RFID PRINTERS ARE CREATED EQUAL

- Make sure your RFID printer partner is “in the ballgame”
  - Encoding reliability
  - Error handling
  - Advanced commands and functionalities





# HOW TO SELL RFID PRINTERS

## SELECTING THE RIGHT MODEL

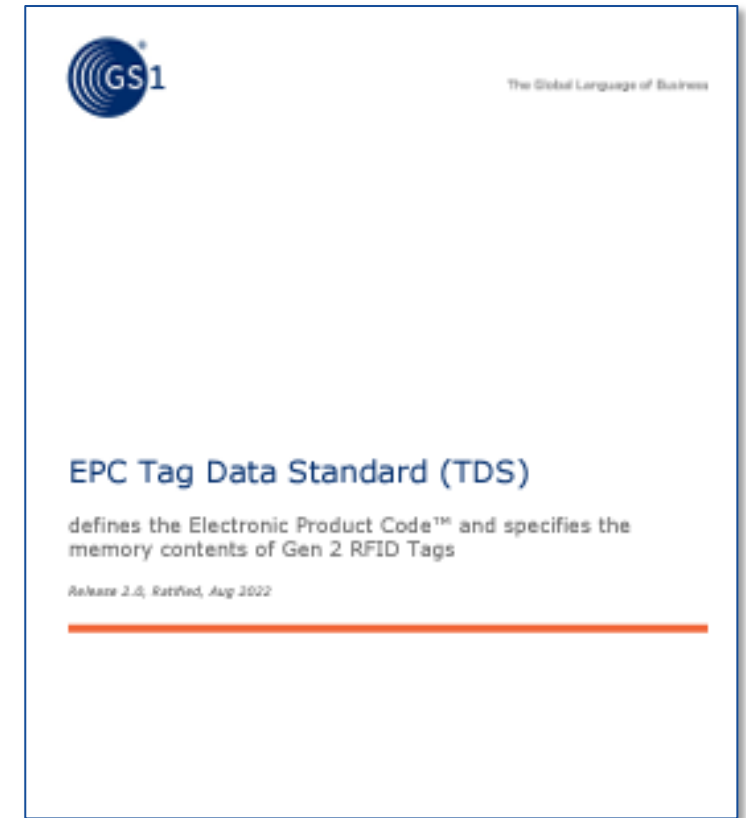
- TSC Printronix's broad portfolio to cover most any application and requirements
- All TSC Printronix RFID printers have the same "RFID brains"
- The two questions:
  1. What type(s) of RFID tags will your customer work with?
  2. All traditional non-RFID printer specs



# WHAT DOES THE FUTURE HOLD?

## GS1 TAG DATA STANDARD 2.0

- What's this TDS 2.0 all about?
  - Previous “Encoding Schemes” often not sufficient
  - Now “+AIDC data” can be encoded and read easily
    - (Expiration) Date
    - Batch / Lot Number
- Food – “FSMA” supply chain traceability kicking off now
- Healthcare / Pharma – item-level traceability through the “value chain” from manufacturer to healthcare provider



# Tag Data Standard 2.0

- Printing and encoding a TDS 2.0 label
  - SGTIN+ with Batch/Lot number
  - Let's do it...





# “Sunrise 2027”

- Use of 2D barcodes at point-of-sale
- UPC / EAN barcode “+”
  - Serial number
  - Additional item attribute data like Expiry Date, Batch/Lot Number, Item Count, etc.
- Synergy with RFID
  - Shared / additional data between the two
  - RFID throughout the supply chain
  - RFID and 2D for singular item information
  - 2D at check-out



# Questions?

**Printers: [cbrown@tscus.com](mailto:cbrown@tscus.com)**

**Labels: [rzins@teamdls.com](mailto:rzins@teamdls.com)**



**Chris Brown**

RFID Program Director/  
Subject Matter Expert



**Ryan Zins**

Product Manager for RFID labels



**James Cirigliano**

VP Marketing, DLS  
VP Marketing Communications, TSC



**Thank You**

**TSC Auto ID** [tscprinters.com](https://tscprinters.com) | **Printronix Auto ID** [printronixautoid.com](https://printronixautoid.com)