Warehouse Management using RFID

“THE SOURCE FOR ACCURATE INFORMATION FOR ANY BUSINESS’S IDENTIFICATION NEEDS”
What is RFID?

**RFID (Radio Frequency Identification)** is a technology that allows automatic identification of objects, animals or people.

**RFID is not just a better bar code**

**Capabilities**
- More data, greater accuracy, automated delivery
- Line of sight not required
- Reads 1000’s of items simultaneously

**Benefits**
- Improved accuracy, visibility, operational efficiency and security
- Opportunities to quantify processes and map improvements
- Opportunities for exception based management
RFID Components

**Tag**: It is a transponder that is made up of an integrated antenna and an electronic circuit. The information can be written and rewritten on a tag. The ID written on the tag is known as the EPC (Electronic Product Code).

**Reader**: An **RFID reader** is a device that is used to interrogate an RFID tag. The reader has an antenna that emits radio waves; the tag responds by sending back its data.

**Host Computer**: It reads/writes data from/to the tags through the reader. It stores and evaluates obtained data and links the transceiver to applications.
How RFID works?

Radio command signal issued from reader
Modified signal containing data returned

Host Computer
Reader
Antenna
164B28F34
Trend
Over 90% of warehouses and distribution centers are still only partially automated or completely manual-based.

RFID solutions for improving back-end processes are available today and are proving their value every day in a variety of business environments.
Access Control To Secure / High value Warehousing facilities using Biometric System....
# Warehouse Management

## Application Opportunities

1. Receiving and Shipping
2. Cross-docking
3. Putaway and Cycle Counting
4. Forward pick Replenishment
5. Order Picking, Consolidation and Staging
6. Physical Security

## Solution components

1. Read/write RFID tags
2. CK30/IP4 and 24xx handheld computers
3. 700 color for supervisory use
4. CV60, 2455 and 2475 VMUs
5. Intermec or CISCO WLAN backbone
6. Planning, integration, implementation and education services
<table>
<thead>
<tr>
<th>Diagram</th>
<th>Assets Tracked</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conveyor Scanning</td>
<td>• Manufactured Items&lt;br&gt;• Each product inside of case&lt;br&gt; • Cases&lt;br&gt; • Containers</td>
<td>• Verification of each product w/o opening case&lt;br&gt; • Lot tracking of cases&lt;br&gt; • Read/Write of data to case&lt;br&gt; • Each product for reg., warranty of distrib.</td>
</tr>
<tr>
<td>Entry Way Scanning</td>
<td>• Pallets&lt;br&gt; • Containers&lt;br&gt; • Shipment Units</td>
<td>• Automated delivery &amp; shipment notification&lt;br&gt; • Prevent mis-shipments&lt;br&gt; • Automated bill of lading&lt;br&gt; • Improved cross dock / dock utilization</td>
</tr>
<tr>
<td>Stretch Wrap Scanning</td>
<td>• Cases of product on pallet&lt;br&gt; • Every product on pallet</td>
<td>• Each product or case level verification prior to shipping</td>
</tr>
<tr>
<td>Overhead Scanning</td>
<td>• Oversized Items&lt;br&gt; • Pallets&lt;br&gt; • Containers</td>
<td>• Automated delivery notification&lt;br&gt; • Inventory management&lt;br&gt; • Staging operations&lt;br&gt; • Improved Conveyance usage</td>
</tr>
<tr>
<td>Hand Held Mobile</td>
<td>• Inventory management&lt;br&gt; • Material handling&lt;br&gt; • Destination&lt;br&gt; • Inspection&lt;br&gt; • Aggregate/De-Aggregate</td>
<td>• Allows for exception processing&lt;br&gt; • Rapid searching or inventorying&lt;br&gt; • Rapid pallet or shipping unit build</td>
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Barcode/ RFID scanners with vehicle mount computers
Wireless / Batch
Inventory Management
*Where is it? What is it? What is inside the box?*

Material Handling
By Destination
*Where is it going? Where has it been? Should it be here?*

Material Handling
Aggregate / De-aggregate
*What have I assembled or disassembled? How many do I have? Do I have enough?*

Material Handling
Inspecting / Maintaining
*Has this been repaired? Is this under warranteen? Has this been inspected? Is this complete? What is the asset’s status or state?*
Manufacturing / Warehouse Applications
Distribution / Logistics Applications

A. Conveyor Scanning
B. Entry Way Scanning
C. Stretch Wrap Scanning
D. Overhead Scanning
E. Hand Held Mobile
F. Forklift Reader
G. RFID Printer and Label
Fork Lift Readers

RFID Reader/Interrogator and 802.11b / n

Cavity Slot Antenna
Returnable/reusable plastic containers
RFID Example

RFID Tags on pallets and at locations

RFID Reader on Forklift
RFID Tags at Locations & Pallets

- Go To A2
- Verify

Incorrect
- Go To A2

Putaway
- Go to A4

Pick
- Go to S3

Go To A2
RFID Tags at Locations & Pallets

- Pick Go to S3
- Return to Receiving
Warehouse & Distribution Applications

- Receiving
- Cross-Docking
- Putaway
- Inventory Management
- Picking
- Order Consolidation
- Forward Pick Replenishment
- Document Management
- Shipping
1. In the Yard

Automated yard management systems use RFID tags on trucks and trailers to track their movement in real time and can use the information for efficient, automated routing and workforce management.
2. On the Pallet

• Permanently identifying pallets and other returnable logistics containers with RFID tags facilitates automated tracking systems that reduce manual handling and dwell times.

• Application software can take advantage of the accurate, automatic identification to improve asset visibility and issue management alerts when items are missing or returns are overdue.

• The net result is improved asset utilization that lets you run your business with less safety stock – and more capital.

• A study by the MIT Auto-ID Center and Accenture found companies could reduce their fixed assets one percent to five percent by taking advantage of RFID.
3. At the Receiving Dock

• While gate readers can identify an incoming shipment, other RFID systems can track individual pallets, cartons and cases, as they are unloaded.

• RFID readers at the dock door can expedite the identification of pallets in an entire shipment and log them into warehouse management or inventory control systems in seconds.

• Handheld or stationary RFID readers can save valuable time in cross docking by instantly locating needed items and accurately recording their transfer to outbound shipments.

• The benefits of RFID-assisted receiving at distribution centers can be replicated at individual store locations. A study by Accenture found retailers could reduce in-store receiving expenses by 65 percent with RFID.
4. In the Warehouse

- RFID readers also can be mounted on forklifts or at key storage area entry/exit points to monitor inventory movements.

- This practice can produce near 100 percent inventory accuracy and eliminate the need for cycle counts and reduce out-of-stock emergencies.

- Improved product availability translates directly into increased sales, as much as seven percent according to a report by AMR Research.

- Accenture and Forrester Research also studied RFID’s impact on inventory accuracy and visibility and predicted retail revenue gains of between one percent and three percent.
Bill of Landing
Material Tracking
5. At the Shipping Area

• RFID can error-proof shipping operations by ensuring all the items needed to fulfill an order are present and packed before the order is dispatched. Bar coding is effective for shipment verification, but is still prone to errors because the application relies on operators to manually scan each item.

• The item data is written to the pallet tag to create a master record. Intellitag readers record the information as pallets pass various locations and the data is transferred to a SAP enterprise resource planning system to record inventory levels and status.

• Systems like these produce timely information that improves visibility and provides the flexibility to utilize the pallet tags for other tracking, shipping and receiving operations.
6. In Transit

- Using RFID, logistics providers can create shipment manifests by reading pallet tags during the loading process.

- Tagged pallets facilitate accurate and efficient cargo transfers, especially in break-bulk operations.

- This can drive excess inventory out of the supply chain by making it easier to get the right product to the right store at the right time.
7. Within the Infrastructure

• Receiving, Cross-Docking, Put-Away, Inventory Mgmt, Order Mgmt and Shipping. The examples presented here have all described RFID use with warehouse management, inventory control and other enterprise software applications.

• Flexible, standards-based RFID equipment can integrate with current information system infrastructures to enhance and extend the benefits of successful applications.

• Getting started with RFID doesn’t have to mean starting over with supply chain applications.
# RFID For Warehouse

<table>
<thead>
<tr>
<th>Common Applications</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receiving</td>
<td>Optimize inventory - Support JIT - Improve order-to-cash cycle</td>
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<tr>
<td>Cross-Docking</td>
<td>Improve load balancing - Reduce expediting - Increase fill rate</td>
</tr>
<tr>
<td>Put-Away</td>
<td>Optimize space allocation - Maximize stock rotation - Shorten leadtimes</td>
</tr>
<tr>
<td>Inventory Mgmt</td>
<td>Improve capital usage - Reduce shrinkage - Optimize stock rotation</td>
</tr>
<tr>
<td>Order Mgmt</td>
<td>Reduce fulfilment time - improve order accuracy - Reduce returns</td>
</tr>
<tr>
<td>Shipping</td>
<td>Increase accuracy - Improve speed</td>
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Why US for RFID SOLUTION?

• Only AIDC company focused for 100% working solution delivery with worlds best Reader / RFID Labels / Software.

• We knows your business and how RFID can help you be more successful

• Alliance with Major RFID companies / Software Companies like TAGEOS / STAR INTERNATIONAL / WIPRO / HCL etc.

• OUR RFID solutions provide more information to make existing automated data capture systems even more productive

• Expertise in other AIDC technologies like Bar-coding, Biometrics, Wireless etc.
Verticals

- Automobile Industries
- Field Service
- Government Sectors
- Logistics
- Manufacturing
- Pharma & HealthCare
- Retail
- Route Sales Management
Why RFID in Warehouse/Distribution?

Most logical first step for most manufacturers:

- Better Visibility into Location of Inventory throughout the distribution chain.
- Reduced Warehouse Labour Costs
- Reduced Inventory Write offs (shrinkage, EOL, shelf life)
- Reduction in errors - Improved Accuracy
- Increased Throughput
- Lower Inventory Levels
- Improved Customer Satisfaction
- Customer Mandates
The Layers of Logistic Units
(Radio Frequency Identification - RFID)

Layer 5

Movement Vehicle
(truck, airplane, ship, train)

Container
(e.g., 40 foot Sea Container)

Layer 4 (433 MHz)
ISO 17363
(Freight containers)

Layer 3 (860-960 MHz)
(Other 18000 with TPA
ISO 17364
(Returnable transport items)

Layer 2 (860-960 MHz)
ISO 17365
(Transport units)

Layer 1 (860-960 MHz)
ISO 17366
(Product packages)

Layer 0 (860-960 MHz)
(13.56 MHz with TPA
ISO 17367
(Product tagging)

“TPA” - Trading Partner Agreement

Source: Akira Shibata, DENSO-Wave Corporation
RFID In Shipping Warehouse

1. Untagged pallets at receiving

2. Sun's RFID System enables tagging of pallets.

3. RFID tagged pallet stored in the warehouse. WMS updated.

4. WMS creates a pick list in response to a shipping order, pick list includes ID on pallet RFID tags. Warehouse personnel start aggregating the pallets for the container.

5. RFID reader on forklift reads the RFID tag on pallet. WMS validates correct pallet is picked up.

6. RFID reader at the dock door reads RFID tag data on pallet and container. WMS ensures correct pallet goes into the container. Container content info. updated in the Equipment Mgmt System.
RFID In Container Shipping Process

1. RFID tag on container read by RFID reader at exit from the container depot.

2. RFID reader at warehouse dock door records container arrival.

3. RFID tagged pallets aggregated and loaded into container. WMS ensures correct pallet gets loaded onto the container using tag info from container and pallet.

4. RFID reader at warehouse dock door records container departure.

5. RFID tag on container read by RFID reader at container yard entrance at seaport.

Equipment Management System (EMS). Updated on container's movements, location and contents.
• Tags (chips)
• Readers
• Network (LAN or WLAN)
• Reader and network Software
• Integration software to database
• Database
• Integration software to applications
• Data communication software/services

Source: EPC Global
Supply Chain Partner 1

Analyze, Model, Redesign, Execute

Extended Supply Chain Flows

RFID Data

Transactions (EDI, XML,...)

Supply Chain Partner n
RFID Standards

Many to choose from!
RFID Standards

ISO 180006C - *Freight containers* — *RF automatic identification*

ISO 180006C - *Supply chain applications of RFID* - *Freight containers*

ISO 180006C - *Supply chain applications of RFID* - *Returnable transport items*

ISO 180006C - *Supply chain applications of RFID* - *Transport units*

ISO 180006C - *Supply chain applications of RFID* - *Product packaging*

ISO 180006C - *Supply chain applications of RFID* - *Product tagging*
Standards

RFID for Item Management Air Interface (ISO 18000)

- ISO/IEC 18000-1 - Generic parameters - Air interface
- ISO/IEC 18000-2 - Parameters for air interface below 135 kHz
- ISO/IEC 18000-3 - Parameters for air interface at 13.56 MHz
- ISO/IEC 18000-4 - Parameters for air interface at 2.45 GHz
- ISO/IEC 18000-6 - Parameters for air interface at 860-960 MHz
The RFID Supply Chain Vision

Implement knowledge-enabled logistics through fully automated visibility and management of assets in support of the warfighter.

Using good information to reduce bad inventory.
Passive RFID Mandates

- Cases & pallets shipped to any receiving points has to be in accordance with supplier implementation plan

- Tags will be EPC-compliant and will be a contractual obligation on suppliers
Complimentary Long Range and Short Range Passive RFID

Container Tag
associated to a…

Pallet Tag
associated to a…

Carton Tag
associated to …

8 UID Packaging Tags
each with 1 associated
UID item
Contact US

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