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Standards Committee

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Introduction to 12N Codes

While the QR code was developed in 1994 by the Japanese company Denso Wave. Its purpose was to track vehicles during manufacturing; it was designed to allow high-speed component scanning. It was created with a high data capacity—up to 4000 characters, but the architecture allowed for a single field of data.

The Reverse Logistics Association developed new protocols that optimize the amount of information that can be included in a QR code label—with multiple fields. They created a Dictionary of Standard Field name titles and a standardized field delimiter. Their data dictionary of field names was approved by ANSI as a global standard and their tags were endorsed by the Open Connectivity Foundation for on-boarding of IoT devices. Many top companies are mounting pilot projects to implement this new standard. The ANSI approved protocol (MH10.8.2.12N) is ISO 15434 complaint.

As an ANSI Standard, 12N codes are license free. The management of the codes and copyright of the field names is managed by the RLA. A number of companies, listed under Technical Resources have develop tools and applications that utilize the 12N protocols.

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Label Confusion!

- Too many types…
  - Why NOT combine them into ONE?

➢ Too many labels….

This one has the capacity!

Option	Max. Data Capacity	Cost
Bar Code	1000 characters	Ink
RFID	Limited by Chip choice	Chip (>10¢)
QR Code	**4000 characters**	Ink

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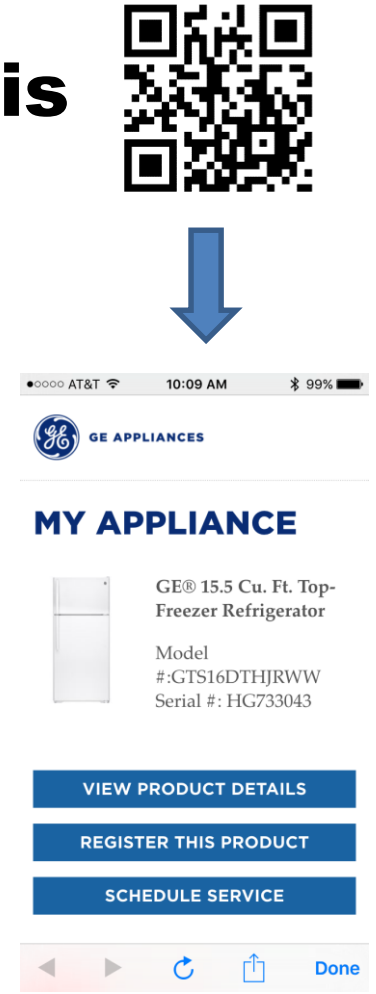
One Label to Do It ALL

THIS

Becomes This



Which reads like this on your smart phone

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Origins

- RLA Standards Committee started about 5 years ago.
  - The Reverse Logistics Standards Committee is organized to explore and promote cross industry standards that facilitate reverse logistics process optimization.
- In pursuit of this, we created a standard protocol for product labeling referred to as **Smart QR Labels.**
  - Our protocol was endorsed by ANSI and labeled MH10.8.2.12N or simply **12N Codes.**

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What Problem Were We Solving?

Today, logistics labels are placed on forward logistics packaging.

Very efficient

Saves industries $$$

Reverse Logistics currently does not have such tools

Such tools would enable the level of automation that is in forward logistics

Such tools would make reverse logistics more efficient

Such tools would enable better end-of-life Product Management

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Vision

- We envision…
  - A label directly attached to a product
    - Packaging is no longer available
  - That label can use a variety of technologies
    - RFID, NFC, QR Codes, Bar Codes, Something new
    - It can be printed onto the existing product label.
  - But it must be scan-able/readable by the consumer
    - e.g. QR codes readable with a smart phone

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Types of Products

- ❑ Electronics
- ❑Home appliances
  - Big and small
- ❑Components, sub assemblies
- ❑Cameras
- ❑Toys, sports equip.
- ❑ Oil cans
- ❑ Mattresses, furniture
- ❑Medicine bottles
- ❑ Food products
- ❑Tools

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We created…

- A labeling protocol (12N) that…
  - Would allow for multiple fields of information
  - Maximum flexibility for manufacturers to control
- We established…
  - A Standardized field delimiter
  - A Data Dictionary for field names
    - This would allow for space optimization
    - This would facilitate translation into multiple languages
    - A dictionary is extensible

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We realized…

- With ONE label… we could do it all!
- Consolidation of labels and include even more information.
  - QR codes have a capacity (today) of 4,000 characters.
  - RFID and other near field technologies are emerging.
- 12N codes could support the entire product life cycle

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Consumer Information

- Consumers have access to free apps to read…
- One click product registration
- One click support
- One click RMA
- Recycling info
- Product recall info
- Product accessories
- Extended Warranties
  - etc

IMPROVES USE EXPERIENCE
Raises Consumer Promotional Scores

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Benefit to Consumer

- Consumers who read the label can participate in expediting reverse logistics process.
  - The label can contain product warranty information
  - The label can contain product support information
  - The label can contain product recycling information
  - The label can contain product disposal information.

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Channel Information

- Single Scan at POS
- List of required return items *(BOM)*
- Verification of registration date
- Counterfeit detection
- Product recall info

IMPROVES USE EXPERIENCE
Raises Consumer Promotional Scores

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Logistics Information

- Easily Accessible
  - Storage Temp Range
  - Schedule B
  - HTS
  - NMFC
  - Max. Stack Height
  - Clamp Truckable?
  - Weight of Carton
  - Weight Pallet
  - Weight Container
  - Weight: Contents
  - GHS Classification *(Global Harmonized System)*

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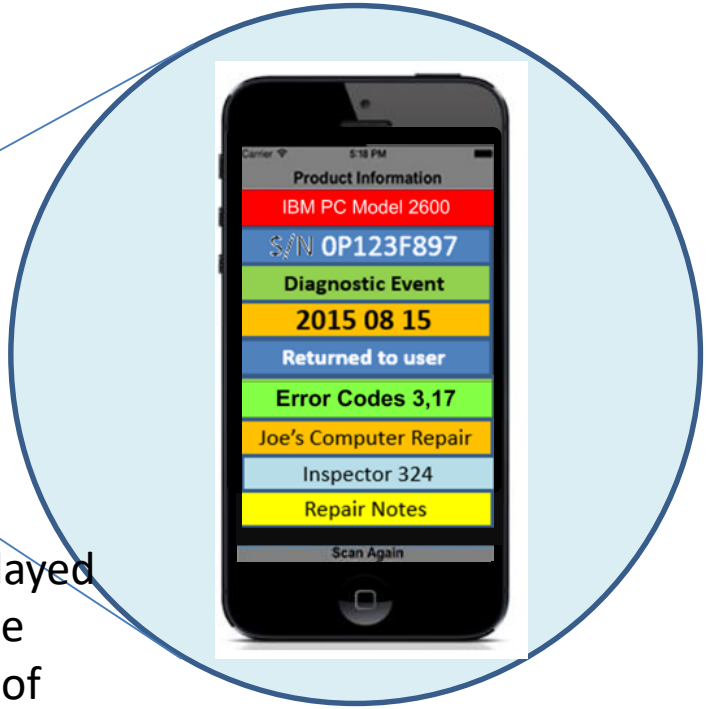
Repair Information

<D51>[150815][3 0x0E/3FF,17 0x00/3FF][01][324]

DATE: August 15, 2015
FAILED: Audio. The sound could not be played
FAILED: Monitor. The operator has chosen to fail the device based on the appearance of the test
DepotID: Joe's Computer Repair
OperatorID: 324



Digital Toe Tags!

* Supported by Eurosoft

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Benefit to Re-Use and Refurbishers

- Secondary Market, Re-Purpose, Take-back
  - Reduce –Reuse – Recycle
- Label can contain more info re: specs
- Additional Label can be applied with specialized fields when products are returned.
  - Limit mislabeling returned products

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Benefits to Field Service

12N QR

Each Button:

- May be text, URL, phone #, SMS (chat)

Support for Updateable Information:

- Combining 12N printed label with 12N formatted NFC/RFID allows both static and updateable information

Possible Applications:

- Step by Step Troubleshooting Guide
- Support Website or Help Desk #
- Instant Chat – for Sales or Service
- Warranty Management
- Owners Manual & FAQ Docs
- Buy Now Promotions
- Emergency Hotline
- Maintenance Log / Reminders
- Service Contracts

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Benefit to Manufacturers

- Manufacturers who print the code on product
  - Incur customer good-will for making info. easily obtainable.
  - Have another avenue of communication to the consumer re:
    - Product support
    - Extended warranties
    - Product Take-back programs
    - Collection of data for analytics
  - Have technology to advance Product Return AUTOMATION (chicken and egg- start someplace)

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Regulatory Information

- ✓ MSDS
- ✓ Prop 65
- ✓ EPEAT Level
- ✓ Certifications
  - FCC
  - CE
  - WEEE
  - RoHS

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Types of Product Info

- Geo-tagging
  - Integration with mapping to identify appropriate disposal locations
    - Electronics
    - Medications
- Recycling
  - Oil, paint, batteries
- Recycling value
  - Bid on scrap e.g. old dryers have scrap value
  - New industry can bid on
  - Exists now for cell phones
    - 70 Ounces of gold in 1 M old phones

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- Consumer Electronics
  - Does it have batteries?
  - Does it have data storage?
  - EPEAT
  - Energy Star
  - RoHS, WEEE for Europe
    - Self-regulation in US to obviate need for reg. in US

Types of Product Info

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Benefits to Recycling Industry

End of the Magical Mystery Tour

Better accurate data re:

Product ID

Recyclable content

Hazardous materials

Have technology to advance Product Return AUTOMATION (chicken and egg- start someplace)

Minimize land-fill

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Corporate Benefits

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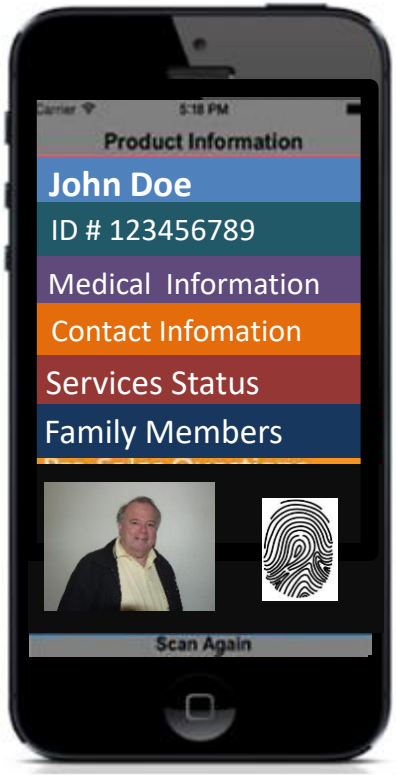
12N QR Label – USECASE Disaster Facing



- ❑ No power?
- ❑ No Connectivity?
- ❑ Full Data Access with battery operated device
- ❑ Scan-able with auto-fill at work stations
- ❑ Encrypted and public data
  - Read-able by smart phones or industrial scanners.

Special Applications

- Counterfeit Prevention
- Disaster Relief ID Badges
- Product Recalls
- Geo-tag
- IoT On-boarding
- Field Service Sonic Screwdriver
  - Up on a pole… on a ladder? Easy access to additional information including videos or schematics

- Manufacturers/Supply chain partners can add labels…
  - Each field selectively encrypted
  - Multi-lingual, multi-currency
- Accessible when there is no connectivity
  - Large buildings etc.…
  - During disasters
  - By design *(security)*
- Data dictionary open standard and easily extensible

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12N Field Names

- There are currently over 250 defined fields.
- With field names defined as four alpha-numeric characters, the re is no practical limit to field names

Sample

Number	Filed Name	Type
BOO0	Company Name	Alpha
BOO1	Product Name	Alpha
BOO2	Model Number	Alpha
BOO3	Product Data Sheet	Url
BOO4	Date of Manufacture	date
BOO5	Product Serial Number	alpha-numeric
MOO6	Product Configuration	alpha
UOO7	Product Support	URL
UOO8	Product Documentation	URL
UOO9	Phone Product Support	Phone #
WOOA	Warranty terrms	ULR or text
WOOB	Length of Warranty	URL or numeric
WOOC	Warranty Registration	ULR
WOOD	Extended Warranty	URL

	Categories
B	Basic
C	Certifications
G	Govt or manadated
I	Industry Specific
K	Blockchain
M	Manufacturer defined
P	Pressales support/Marketing
R	Recycling
S	Shipping/Customs
T	Internet of Things
U	User oriented information
W	Warranty
Z	Administration codes

- The fields are separated into categories for easier searches.
- It is easy to request that fields and categories be added.

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Caveats

- Manufacturers choose what they want to add
  - All fields are optional for population by the manufacturer for each product. With the addition of the letter ‘P’ after a code, the manufacturer can designate each field as readable only by the Professional version of the Reader; e.g. RL04 would be readable by any scanner as a date of manufacture, RLP04 would only be readable by special scanners. Codes designated with the letter ‘M’ are only read by proprietary scanners authorized by the Manufacturer; e.g. RLM1A would only be readable by scanner software provided by the manufacturer. RLM fields are encrypted.

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More Caveats

- Two levels of readers
  - Consumers find product and recycling info,
  - Logistics Professionals have access to more info.
    - Hazardous materials, etc.
  - Manufacturers may even create proprietary codes that are readable only by authorized readers.

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12N Example

ANSI MH10.8.2-2016
(Continuous Maintenance of ANSI MH10.8.2-2016)

12N Field Identifiers

[)>RS06GS12NB000Campbell SoupUSM065goo.gl/TxvQ2aUSI061goo.gl/DBtDzXUSI04D11/1/17RSEOT

15434 Header

12N Data Identifier

Data Record B000 Company

Data Record M065 – Mfg website

Data Record I061 ingredients

Data Record I04D Exp. Date

77 characters

Message Trailer

12N

The Data construct is defined and controlled by the RLA, comprised of 2 segments: the field identifier (FI) code, immediately followed by the data as defined for that element according to the data dictionary of the RLA. It is essentially a catalog of fields with standardized content. The Field Identifiers are posted at http://rla.org/12ncodes The use and structure of these codes are defined at: http://rla.org/12nformat Examples can be found at that site.

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Why QR Codes?

- Current State of the art has three viable options for product labeling– each having set standards

Option	Max. Data Capacity	Cost
Bar Code	1000 characters	Ink
RFID	Limited by Chip choice	Chip (>10¢)
QR Code	4000 characters	Ink

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Technology Agnosticism

We are not married to QR Codes

It's merely the best starting point

Our field dictionary is agnostic to technology

Labeling technology continues to evolve and new technologies are developed.

We will support all viable technologies

Today, QR codes have the optimal capacity for a inexpensive label that can be decoded by any Smart Phone.

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Tools and Applications

- Tools to create and manage 12N labels have been produced by InforMission, LLC (www.informission.com) and are licensed by the RLA.
  - Contact tools@rla.org for more information
- Application support using 12N protocols is currently offered by:
  - Eurosoft: for computer diagnostics www.eurosoft-uk.com
  - Andlor Software: for warehouse management. www.andlor.com