

Mandates and Standards For RFID and Barcode Technology



Dr. Peter Green
BellHawk Systems Corporation
45 River Street
Millbury, MA 01527
pgreen@BellHawk.com
www.BellHawk.com



Providing Innovative Systems Solutions for
Industrial, Commercial and Government Clients since 1989

Requirements to perform Material Tracking and Control

- Bioterrorism Act
- Barcode Labeling Requirements
- Traceability Requirements
- RFID Tagging

New Standards

- Need to Comply

Cannot Comply Using Pencil and Paper Methods

- Need for Technology Adoption



- Passed to Protect Food Supply
- 500 Micrograms of Ricin can kill an adult
 - No known cure
 - Byproduct of castor bean production
 - A small vial tipped into food mix can kill 10,000 people
- FDA Mandate
 - All food processors and packers must register
 - Must have 4 Hour one-step forward on-step back traceability
 - 5 day administrative detention for plant and management
 - 3 year recall on all products if unable to trace
- FDA does surprise inspections
 - Right to shut-down plant



Cannot Meet Requirements with Pencil and Paper Records in Filing Cabinet

Barcode Labeling Mandates

Objective: To make the receiving of materials much more efficient.

Issuers: All tier 1 manufacturers and distributors, now spreading to tier 2

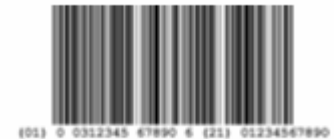
Old Way: Copy of Purchase Order to sent to receiving

Check off items received

Enter into ERP System

Receive and check invoice against shipment

Pay invoice



New Way: Tracking barcode is attached to each pallet or shipping carton

Advanced shipment notice sent to customer detailing contents

Advanced shipment notice approved

Material handler scans tracking barcode upon receipt

Invoice automatically paid



Great Cost Savings in Supply Chain – But Big Penalties for Mistakes

Objective: Improve safety

Issuers: FDA, DOD, Aerospace, Automotive, Homeland Security

Requirements:

- Track raw materials from receipt through manufacturing/mix/assembly
- Track intermediate materials through post-processing and packing
- Track finished goods through warehouse to customer

Information to Track

- Location and disposition of materials
- QC test and inspection results
- Process parameters
- People who processed materials

Must be able to track

- Back to potential common source of problems
- Forward to where used



Objective: Eliminating scanning in receiving and tracking materials

Issued by: DOD, WalMart – many others to follow

Require:

- Tracking RFID tags on pallets and shipping containers
- Tracking RFID tags on end-use containers
 - ➔ Serial coded – DOD
 - ➔ EPC coded – WalMart, Target, etc.

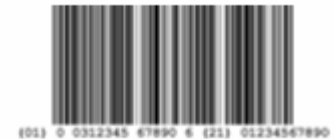
EPC = Electronic Product Code

➔ RFID Equivalent of UPC or GTIN code



What is Driving Mandates

1. Globalization
2. Security and Counterfeit Protection
3. Availability of Cost Effective Technology
4. Cost Reduction in Supply Chain
5. Internet and Global Communications
6. Availability of Global Standards
 - ➔ UPC/EAN – barcode labeling
 - ➔ ISO – RFID and EPC
 - ➔ FCC and ECC – compatible operating frequencies

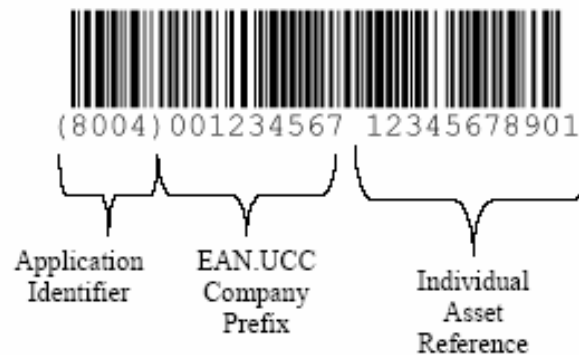


Mandates will become more numerous, from many more sources, and will drive data collection in manufacturing and distribution.

Cannot comply using paper and pencil – need high degree of technology adoption

Global Individual Asset Identifier

GIAI Data Structure



New UCC/EAN Standard – Uses Code 128 Barcodes

Also being used as basis for RFID Standard
and EDI and XML Data Interchange Standards





BellHawk Systems Corporation

GIAI AI Codes

AI	Full Title	Format	Data Title
00	SSCC (Serial Shipping Container Code)	n2+n18	SSCC
01	Global Trade Item Number™	n2+n14	GTIN™
02	GTIN of Trade Items Contained in a logistic unit	n2+n14	CONTENT
10	Batch or lot number	n2+an..20	BATCH/LOT
11*	Production date (YYMMDD)	n2+n6	PROD DATE
12*	Due date (YYMMDD)	n2+n6	DUE DATE
13*	Packaging date (YYMMDD)	n2+n6	PACK DATE
15*	Best before date (YYMMDD)	n2+n6	BEST BEFORE or SELL BY
17*	Expiration date (YYMMDD)	n2+n6	USE BY OR EXPIRY
20	Product variant	n2+n2	VARIANT
21	Serial number	n2+an..20	SERIAL
22	Secondary data for specific health industry products	n2+an..29	QTY/DATE/BAT CH
23**	Lot number (transitional use)	n3+n..19	BATCH/LOT
240	Additional product identification assigned by the manufacturer	n3+an..30	ADDITIONAL ID
241	Customer part number	n3+an..30	CUST. PART NO.
250***	Secondary serial number	n3+an..30	SECONDARY SERIAL
251***	Reference to source entity	n3+an..30	REF. TO SOURCE
252	Global Identifier Serialised for Trade (GIST)	n3+n27	GIST
30	Variable count	n2+n..8	VAR. COUNT

AI	Full Title	Format	Data Title
310n-369n	(Trade and logistic measurements)	n4+n6	
337n	Kilograms per square metre	n4+n6	KG PER.m ²
37	Count of trade items contained in a logistic unit	n2+n..8	COUNT
390(n)	Amount payable - single monetary area	n4+n..15	AMOUNT
391(n)	Amount payable - with ISO currency code	n4+n3+n..15	AMOUNT
392(n)	Amount payable for a Variable Measure Trade Item - single monetary unit	n4+n..15	PRICE
393(n)	Amount payable for a Variable Measure Trade Item - with ISO currency code	n4+n3+n..15	PRICE
400	Customer's purchase order number	n3+an..30	ORDER NUMBER
401	Consignment number	n3+an..30	CONSIGNMENT
402	Shipment Identification Number	n3+n17	SHIPMENT NO.
403	Routing code	n3+an..30	ROUTE
410	Ship to - deliver to EAN.UCC Global Location Number	n3+n13	SHIP TO LOC
411	Bill to - invoice to EAN.UCC Global Location Number	n3+n13	BILL TO
412	Purchased from EAN.UCC Global Location Number	n3+n13	PURCHASE FROM
413	Ship for - deliver for - forward to EAN.UCC Global Location Number	n3+n13	SHIP FOR LOC
414	Identification of a physical location EAN.UCC Global Location Number	n3+n13	LOC No
415	EAN.UCC Global Location Number of the Invoicing Party	n3+n13	PAY TO

Codes can be Concatenated



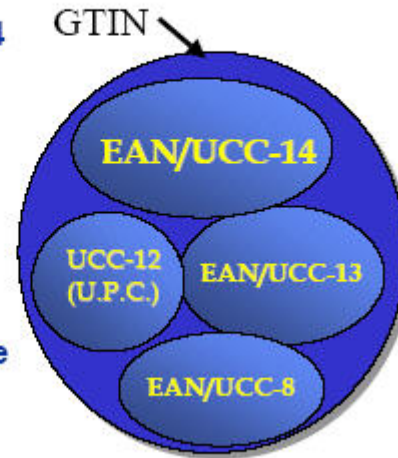
(01) 90614141000415 (3202) 000712

GTIN + Weight



Global Trade Item Numbers

- ❖ Globally unique 14 digit number to identify Trade Items (product or service)
- ❖ EAN/UCC-14, EAN/UCC-13, UCC-12, and EAN/UCC-8 are the data structures within GTIN



UPC-A symbol
UCC-12 structure



EAN-13 symbol
EAN/UCC-13 structure

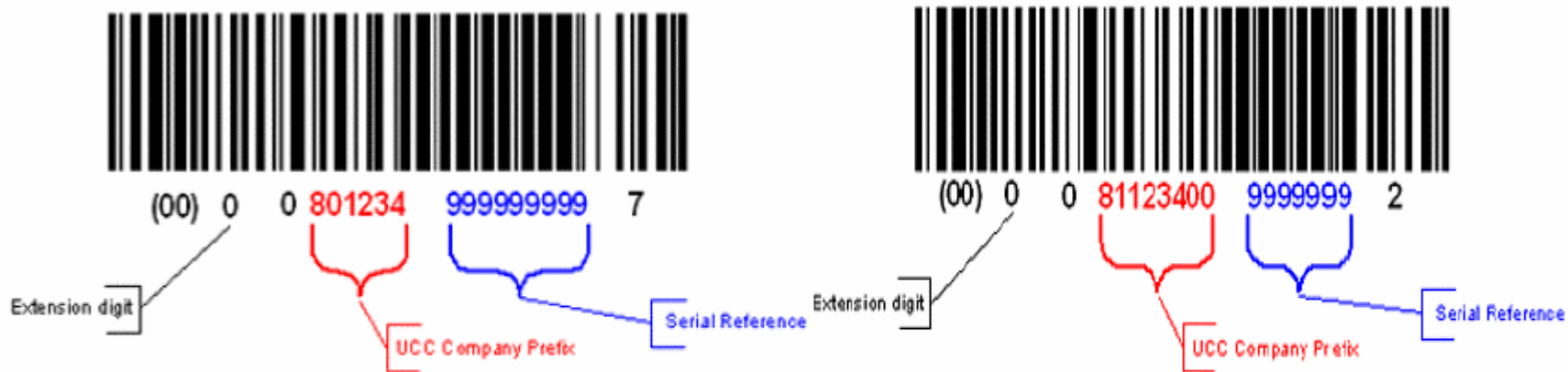


GTINS UCC/EAN License Plate



Individually Serialized Items + Containers with Multiple Same Items

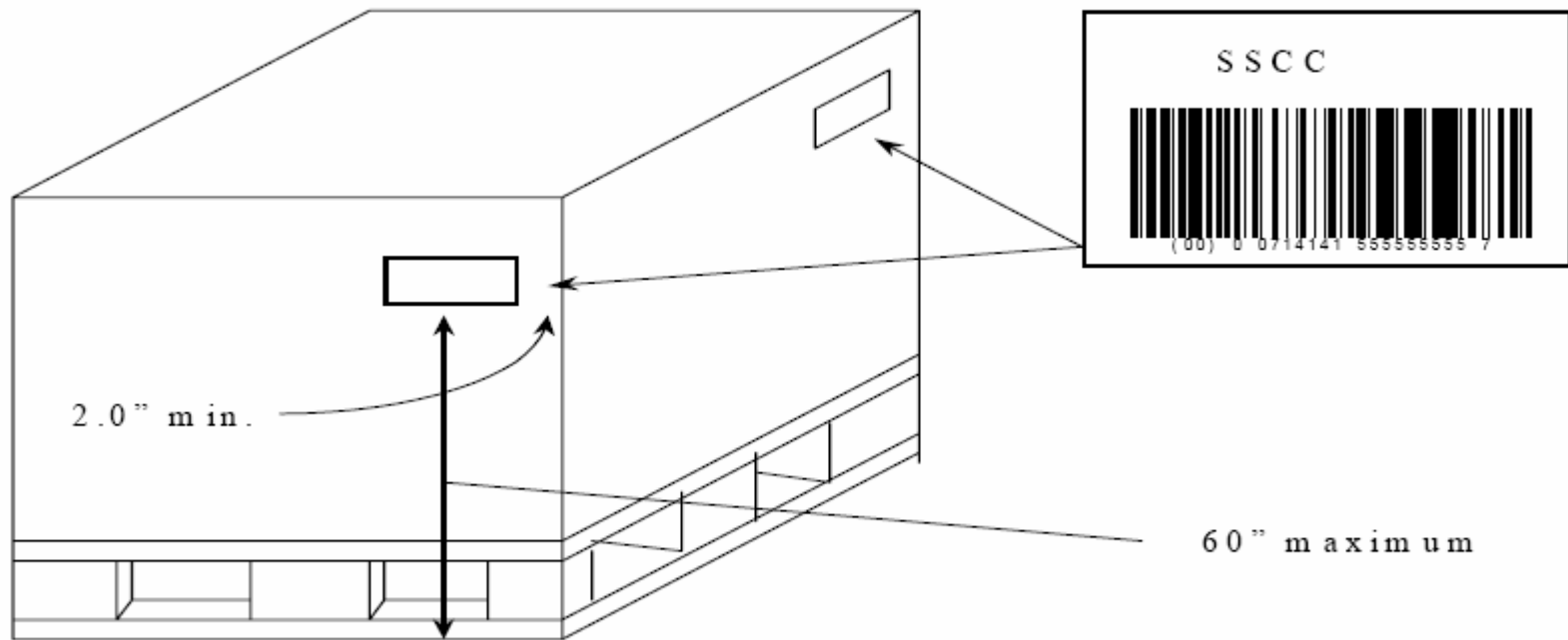
Serialized Shipping Container Code



Example of an SSCC with a 6-digit UCC Company Prefix

Example of an SSCC with an 8-digit UCC Company Prefix





Pallet may also have RFID Tag that contains SSCC Data

May be printed as part of a combined label or applied separately

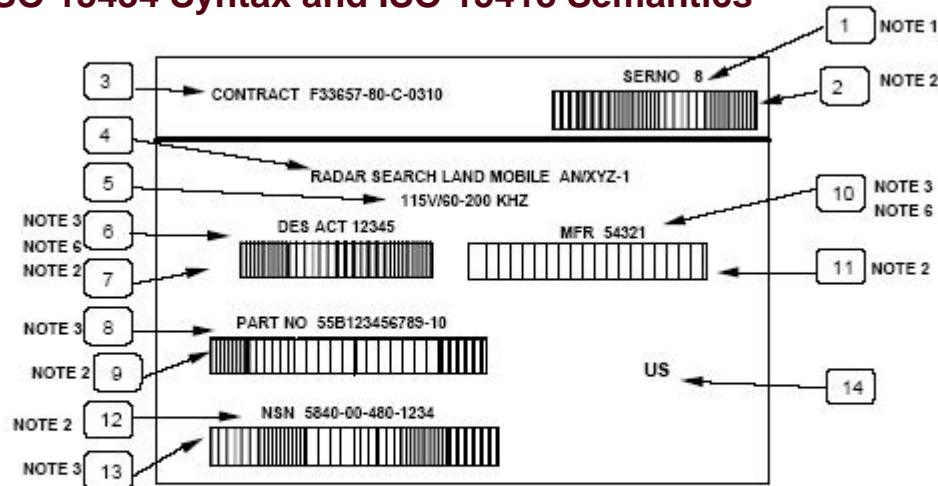


Required Barcode Marking on All DOD Part Shipments Issued October 2003

MIL-STD-130L



ISO 15434 Syntax and ISO 15418 Semantics





- | | |
|--|---|
| 1. Serial Number | 9. Bar coded PIN when NSN not available (see figure 7) |
| 2. Bar coded serial number (see figure 7) | 10. Manufacturer activity identifier (see 3.3) |
| 3. Acquisition Instrument identification no. | 11. Bar coded manufacturer activity identifier (see 3.3 and figure 7) |
| 4. Nomenclature (item name and type designation) | 12. NSN |
| 5. Special characteristics | 13. Bar coded NSN (see figure 7) |
| 6. Design activity identification (DAI) (see 3.3 and figure 7) | 14. Government ownership designation |
| 7. Bar coded DAI (see figure 7) | |
| 8. Part or Identifying Number (PIN) | |

MIL SPEC 130-M adds
2D Barcode
to all labels



Basis of standard for RFID Tags which are mandated beginning in 2005

Sysco Container Labeling Mandate

Ship From: Valued SYSCO Supplier Address 1 Address 2 City, State, Zip	Ship To: SYSCO N.E. RDC Address 1 Address 2 City, State, Zip
Ship To Postal Code: (420) 44444 	Carrier: CARR: Carrier Name PRO #: 123456789 BOL #: 987654321
P.O. # 123 - 456789 - 987654	
Container # 000008285 Cases: 56 SKU: 4557083 Lot Number: 2003010112345	
(00) 0 0046863 000008285 7 	



ASNs sent via EFS Network



← SSCC Bar Code

With Passive Tags

- LF Band – below 135 KHz - typically contact to about 18 inches
 - Single item at a time
- VHF Band – 13.56 MHz - 2 to 4 feet
 - Multiple items in gate
 - ISO 15963 compliant – USA and Europe
 - Established transponder technology from TI and Philips
- UHF Band – 860 to 930 MHz – 3 to 10 feet
 - Multiple Items in Gate
 - Wal-Mart, DOD
 - Emerging standards – ISO 8000-6
 - Different frequency band allocation in USA and Europe

