Global Trade Item Numbers™ (GTIN™) Implementation Guide

Executive Summary

The GTIN (Global Trade Item Number) is the foundation for the EAN.UCC System for uniquely identifying trade items (products and services) sold, delivered, warehoused, and billed throughout the retail and commercial distribution channels. It provides an accurate, efficient and economical means of controlling the flow of products and information through the use of an all-numeric identification system.

The Global Trade Item Number (GTIN) is the EAN.UCC System identifier for trade items, which encompasses both products and services. GTINs provide the capability to deliver unique identification worldwide. The most commonly recognized and used GTINs are the U.P.C. and EAN-13 symbols.

GTINs are utilized on products and cases and are a key component of e-commerce transactions and communications. Users can be confident that a GTIN, when used correctly, will uniquely identify their products as they pass through the global supply chain to the ultimate end user. This global identification system ensures that the corresponding electronic communications will contain information unique to their company and products.

Key Benefits

- Facilitates the global flow of trade items (products and services) and associated information.
- Uniquely identifies trade items at all levels of packaging.
- Delivers trade item data in a consistent format and structure.
- Simplifies supply chain management.
- Employs the globally accepted and utilized EAN.UCC System whose language is understood by the global marketplace.
- The GTIN can be combined with other relevant data in UCC/EAN-128 symbols.

Why Standards?

Open, global standards:
- Allow system-to-system interaction

- Speed processes by enabling end-to-end automation

- Lower costs, while reducing errors

- Reduce the risk of system incompatibility

- Protect technology investments by removing the limitations of closed, proprietary systems and solutions

- Enable the optimization of supply chain management practices

- Eliminate supply chain roadblocks and bottlenecks

In today's competitive global marketplace, speed and efficiency is critical to success and survival. Producing a good product is no longer enough to keep a company competitive. Managing the physical flow of product with the electronic flow of business data is a major challenge in today's intensely competitive environment. The same time, attention, and detail that goes into designing and producing a quality product must also be evident in the transmission of that product's business data through the supply chain. A system built with standardized processes and a common business language is needed to monitor and manage the movement of product and information through every component along the supply chain.

Definition

A GTIN (Global Trade Item Number) is used for the unique identification of trade items worldwide within the EAN.UCC System. A GTIN has a 14-digit data structure though its data carrier (bar code) may contain only 12-digits (the U.P.C.), 13-digits (EAN-13) or 8-digits (EAN-8). The GTIN is defined as a 14-digit number to accommodate all the different structures.

The term *trade item* refers to any product or service upon which there is a need to retrieve pre-defined information; this product or service may be priced, ordered, or invoiced at any point in the supply chain. This includes individual items as well as all of their different packaging configurations.

There are four data structures for the GTIN; each provides unique numbers when right justified in a 14-digit database field:

- UCC-12 (Twelve Digits)

  - Six digits representing the UCC Company Prefix
  - Five digits representing the Item Reference number
  - One digit representing the Check Digit

  Or

  - Seven digits representing the UCC Company Prefix
  - Four digits representing the Item Reference number
  - One digit representing the Check Digit

Or

- Eight digits representing the UCC Company Prefix
- Three digits representing the Item Reference number
- One digit representing the Check Digit

Or

- Nine digits representing the UCC Company Prefix
- Two digits representing the Item Reference number
- One digit representing the Check Digit

- EAN/UCC-13 (Thirteen Digits)

  - Twelve digits containing the EAN.UCC Company Prefix and Item Reference number
  - One digit representing the Check Digit

- EAN/UCC-14 (Fourteen Digits)

  - One digit representing the Indicator digit to indicate packaging level
  - Twelve digits containing the EAN.UCC Company Prefix and Item Reference number
  - One digit representing the Check Digit

- EAN/UCC-8 (Eight Digits)

  - Seven digits containing a EAN.UCC Company Prefix and Item Reference number
  - One digit representing the Check Digit

UCC Company Prefix – the number assigned to a company by the UCC. The inclusion of the UCC Company Prefix ensures uniqueness throughout the world. The UCC Company Prefix is assigned to companies in varying lengths. Note: A UCC Company Prefix is converted to a EAN.UCC Company Prefix by adding a leading zero, e.g., UCC Company Prefix 614141 becomes 0614141.

EAN.UCC Company Prefix – the number assigned to a company by either an EAN Member Organization or by the UCC. The inclusion of the EAN.UCC Company Prefix ensures uniqueness throughout the world. The EAN.UCC Company Prefix is assigned to companies in varying lengths.

Item Reference – the number assigned by the holder of the EAN.UCC Company Prefix to uniquely identify a trade item within the company. The Item Reference varies in length as a function of the Company Prefix length.

Check Digit – a calculated one-digit number used to ensure data integrity. To understand how this digit is calculated; visit the UCC at http://www.uc-council.org/checkdig.htm.

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**

GTIN →

EAN/UCC-14

UCC-12 (U.P.C.)   EAN/UCC-13
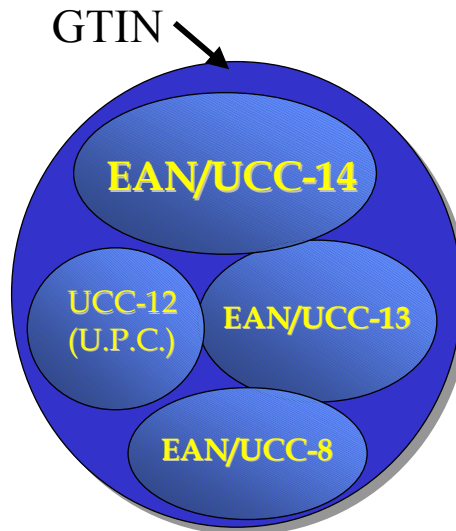
EAN/UCC-8

GTIN Data Structures

UCC-12, EAN/UCC-13, EAN/UCC-8, and EAN/UCC-14 in a GTIN compliant database

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
UCC-12	0	0	X	X	X	X	X	X	X	X	X	X	X	C
EAN/UCC-13	0	X	X	X	X	X	X	X	X	X	X	X	X	C
EAN/UCC-8	0	0	0	0	0	0	X	X	X	X	X	X	X	C
EAN/UCC-14	X	X	X	X	X	X	X	X	X	X	X	X	X	C

The GTIN may be encoded in EAN/UPC, ITF-14, and UCC/EAN-128 symbologies. The appropriate data structure and symbology combination is determined by many factors, such as the type of product, or the printing material used for the product packaging.

The following table provides examples of unique product identification at various levels and using various bar codes.

Item	Level	Bar Code	Item ID	GTIN
Single	Consumer	U.P.C.	614141666654	00614141666654
3 Pack	Consumer	U.P.C.	614141000773	00614141000773
6 Pack	Consumer	U.P.C.	614141000883	00614141000883
12 Pack	Consumer	U.P.C.	614141000999	00614141000999
24 Units	Case	UCC/EAN-128	10614141000101	10614141000101
48 Units	Case	UCC/EAN-128	30614141000303	30614141000303
96 Units	Case	ITF-14	50614141000512	50614141000512

The following illustrates the use of a GTIN in UPC-A and EAN-13 bar codes:

6 14141 00044 9

9 401234 567894 >

UPC-A symbol
UCC-12 structure
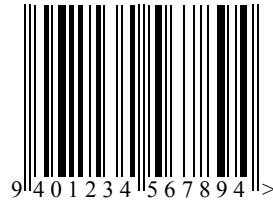
EAN-13 symbol
EAN/UCC-13 structure

The following illustrates a GTIN in a UCC/EAN-128 bar code:

(01) 9061414100415 (3202) 000712

Note:
- When UCC/EAN-128 symbology is used to encode a GTIN, the AI of (01) prefixes the data
- Ability to string together (concatenate) multiple fields (Here, the GTIN plus net weight in pounds)

The following illustrates a GTIN in an ITF-14 bar code:
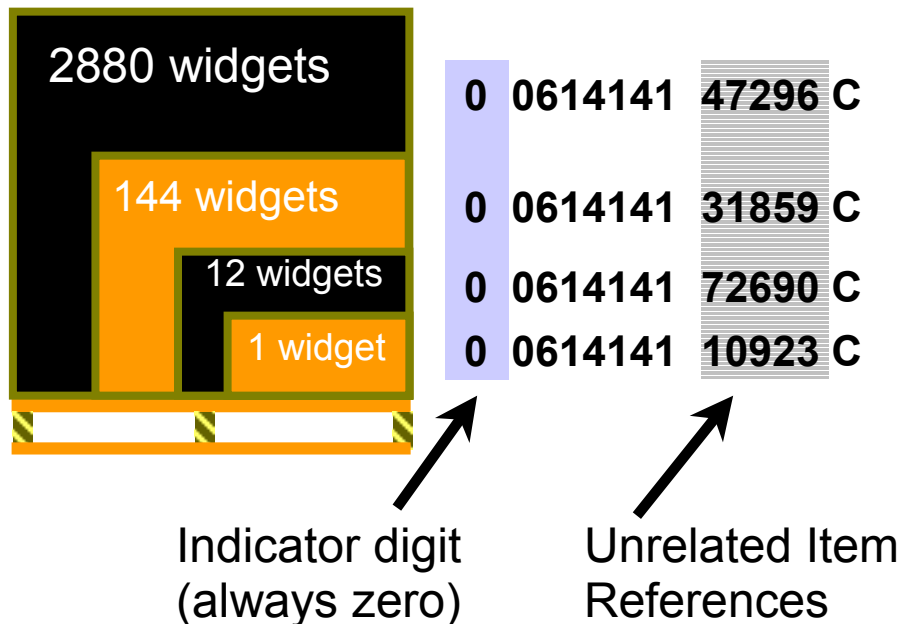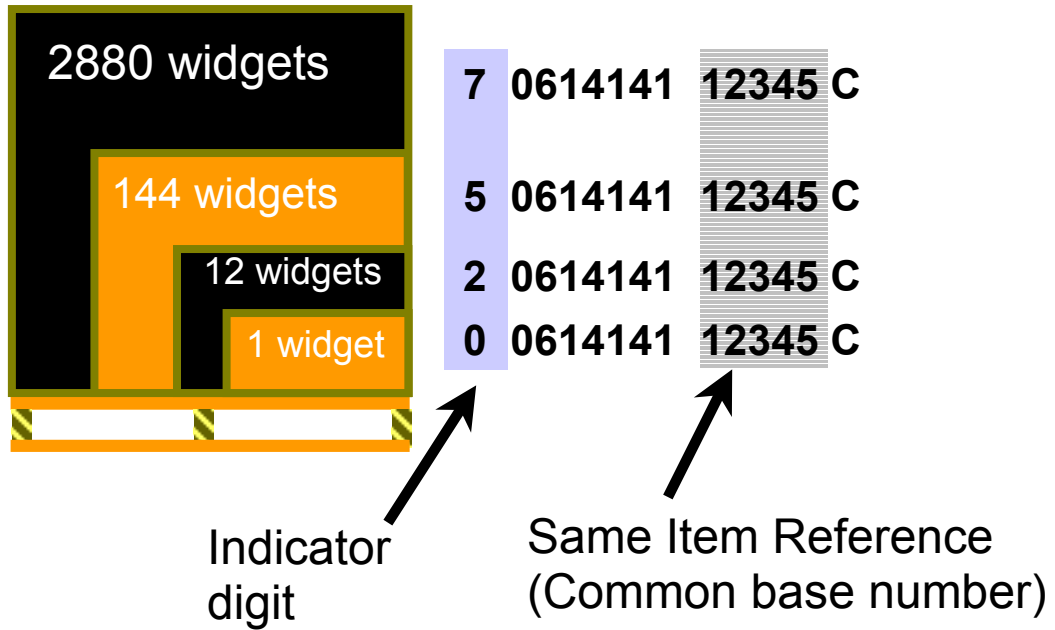
1 0 6 1 4 1 4 1 0 0 0 4 1 5

Note:
- ITF-14 = The EAN.UCC system's only use of Interleaved 2 of 5. It is only used to encode the GTIN
- Any of the GTIN data structures may be used, as long as they are expressed as a 14-digits

The following illustrates the assignment of GTINs at various item and package levels; note that uniqueness can be achieved through the use of different Indicator digits or different Item References at the higher levels of packaging.

Item Reference for higher levels of packaging
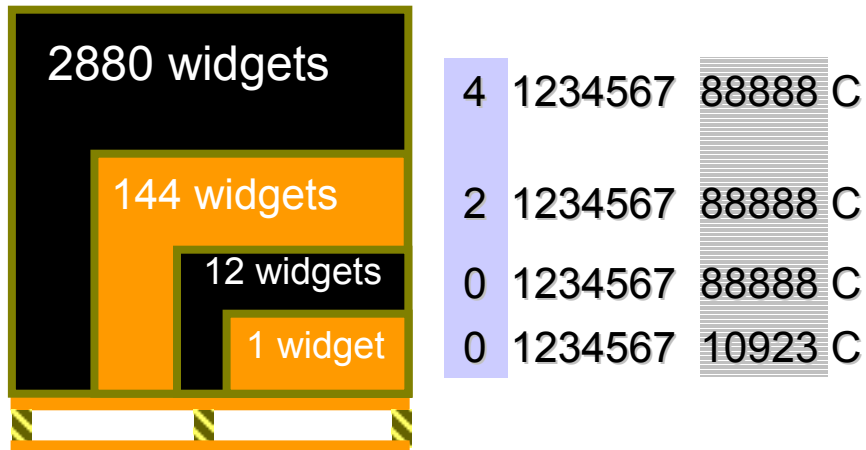
2880 widgets   0 0614141 47296 C

144 widgets   0 0614141 31859 C

12 widgets   0 0614141 72690 C

1 widget   0 0614141 10923 C

Indicator digit (always zero)   Unrelated Item References

Indicator digit for higher levels of packaging

7	**0614141**	**12345**	**C**
5	**0614141**	**12345**	**C**
2	**0614141**	**12345**	**C**
0	**0614141**	**12345**	**C**

2880 widgets

144 widgets

12 widgets

1 widget

Indicator digit

Same Item Reference (Common base number)

Combination of Indicator digit and Item Reference for higher levels of packaging

4	1234567	88888	C
2	1234567	88888	C
0	1234567	88888	C
0	1234567	10923	C

2880 widgets

144 widgets

12 widgets

1 widget

Why the GTIN is useful?

- *Uniqueness:* The GTIN identifies an item uniquely. The rules for assigning GTINs ensure that every variation of an item (product or service) is allocated a single reference number that is globally unique.

- *Non-significance*: The GTIN numbering structure does not contain any meaningful information in itself. GTINs are simple pointers to database information that can be directly used in any company and in any country.

- *Multi-sectoral*: GTINs are unique across all business sectors. This means that a healthcare product, a PC sound card or an internet-ordered service are all identified in a compatible manner.

- *International*: GTINs are unique worldwide. A GTIN assigned anywhere in the world and can be used anywhere in the world.

- *Security*: Security of GTINs is provided through a combination of database look-up and the fixed length, numeric format that includes a standard Check Digit.

- *Data Integrity*: The Check Digit ensures the integrity of data passing into the system.

- *Source Numbering*: The GTIN is assigned by the brand owner of the product. Once assigned, all trading partners and internal users can use the GTIN. The same GTIN can be used to identify a series of identical items.

- *Automatic Data Capture*: One of the key benefits of the GTIN is that it can be encoded in many automatic data capture technologies (such as a bar code or radio frequency identification tags). Scanning allows the information flow to be linked to the physical flow of trade items through the supply chain.

Examples of GTIN Use

According to a recently released KPMG study, 'the adoption of an industry standardized numbering system provides benefits and savings across the supply chain. The initial ones were related to increased process efficiencies, reduction of errors, etc. More significant, but more difficult to capture, were the benefits from supply chain visibility and collaboration, that can drive significant inventory reductions across the whole supply chain.'[1]

In the book industry, the move to computerize book information led to the realization that a descriptive/alpha system was too cumbersome. In the grocery

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[1] *Industry Standard Numbering Systems in the Globalization of Supply Chains and Markets*, KPMG Consulting LLC, September 28, 2000.

industry, the idea had been around, but the evolution of commercially viable scanning equipment signified an opportune moment. It is significant to note that both industries adopted an all-numeric schema.

Only in the grocery industry have significant attempts been made to quantify the benefits. Net benefits (after implementation costs) were initially estimated at approximately 1% of sales, but more recently revised to 2.8% of sales, or US$8 billion. These benefits were primarily due to increased process efficiencies and productivity gains. The same studies also estimate that an additional US$15 billion of benefits could potentially be realized through improved collaboration[2].

In the case of the book industry, the benefits and savings of using a standard product identification numbering system were considered so obvious that a cost/benefit analysis was not even done to quantify anticipated results.

In conclusion, the agreement to adopt a standardized product identification numbering system provides the foundation to reap extensive benefits throughout the supply chain, not only for all the individual members but also in growing the whole industry.

All EAN.UCC Keys

EAN.UCC keys identify:

- **Trade items:** Products and services upon which there is a need to retrieve pre-defined information at any point in the supply chain (Global Trade Item Number/**GTIN**).

- **Logistic units:** Physical units established for transport and storage of goods of any kind that need to be tracked and traced individually in a supply chain (Serialized Shipping Container Code/**SSCC**).

- **Assets:** Fixed or returnable assets (Global Individual Asset Identifier/**GIAI**, Global Returnable Asset Identifier/**GRAI**).

- **Locations:** Physical, functional or legal entities requiring a permanent identification, such as a company, department, or warehouse (Global Location Number/**GLN**).

- **Service Relations:** Public or private service provider to track any entity's service requirements and needs over a continuing relationship (Global Service Relation Number/**GSRN**).

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[2] *17 Billion Reasons to Say Thanks: The 25th Anniversary of the U.P.C. and Its Impact on the Grocery Industry*, PriceWaterhouseCoopers, December 14, 1999.

Frequently Asked Questions

1. Why are the UCC and EAN promoting the use of GTINs?

The use of GTINs ensures that items are identified uniquely around the world, which enables more efficient global trading.

2. Do GTINs replace the U.P.C.?

No, GTIN is a new term only. The U.P.C. does not go away; companies that place a UCC-12 (U.P.C.) on products now should continue to do so.

3. Is a unique GTIN required for every level of packaging?

Yes. There should be a unique number identifying the single unit, an inner or multi-pack, and a case.

4. What impact will GTINs have on our systems?

All companies utilizing GTINs are encouraged to ensure their databases and application software can accommodate 14 digits.

5. What is 2005 Sunrise?

This is an initiative underway in USA and Canada with two objectives. First, retailers must upgrade Point of Sale (POS) systems to scan and store EAN-13 symbols in addition to U.P.C. symbols. This needs to be completed by 1/1/2005. Second, all supply chain participants are encouraged to expand the GTIN field in their databases to 14-digits to enable all forms of the GTIN. See http://www.uc-council.org/2005sunrise for complete information.

6. Does my company need a new UCC Company Prefix?

No. Continue to use the one you have.

7. What data structures are considered GTINs?

UCC-12, EAN/UCC-13, EAN/UCC-8, and EAN/UCC-14.

8. Does a different GTIN have to be assigned for promotional or seasonal packages?

While the decision is up to the manufacturer, the UCC recommends unique identification for tracking, reorder and e-commerce purposes. For further information refer to the UCC-12 (U.P.C.) Guidelines document available

individually or included within *The Art of Producing Bar Codes* of the UCC's *Solutions Center*™.

9. When is a "9" used as the Indicator digit in a GTIN?

It is used to indicate a variable measure product.

Standard Reference

The UCC's *Solutions Center*™ - your one-stop source for EAN.UCC System tools to help you **improve supply chain management and conduct business more productively**. You will find the essential education and implementation resources you need to:

- Integrate and utilize the standards of the EAN.UCC System in your business

- Guide you through the bar coding process

- Improve the efficiency of your electronic commerce activities

- Uniquely identify your company's products, assets, locations, and logistics units throughout the global supply chain

Specifically, *The Art of Producing Bar Codes* will guide you through the implementation process, giving you specific solutions and guidelines to properly mark products and logistics units for use within the EAN.UCC System. This easy-to-follow system will guide you through the essentials of the bar coding process to help you:

- Assess where you will use the bar code

- Determine the specific information to include in the bar code

- Prepare bar code specifications for those responsible for printing your bar codes

A preview can be seen at http://www.uc-council.org/solutionscenter.

Further Help

- E-mail: mailto:info@uc-council.org
- Phone: 937.435.3870
- Web site: http://www.uc-council.org/

UCC Glossary

Term	UCC Glossary Definition
Advance Ship Notice (ASN)	Notification of product due prior to receipt (see Ship Notice Manifest (856).
AI	Abbreviation for Application Identifier.
Application Identifier (AI)	A two-, three-, or four-digit prefix used within UCC/EAN-128 Symbols to define the meaning of information that follows.
Asset Type	A number assigned by the owner of an asset to uniquely identify a type of asset.
Attribute	A piece of information reflecting a characteristic related to an identification number (i.e., GTIN, GRAI).
Bar code	A precise arrangement of parallel lines (bars) and spaces that vary in width to represent data.
Brand owner	The party that is responsible for allocating EAN.UCC numbering and bar coding on a given trade item. The administrator of an EAN.UCC Company Prefix.
Check Digit	A digit calculated from the other digits of an Element String, used to check that the data has been correctly composed (see EAN.UCC Check Digit Calculation).
Company Number	A number allocated by the UCC or an EAN International Numbering Organization that follows the EAN.UCC Prefix within the EAN.UCC Company Prefix. When combined with the EAN.UCC Prefix, the Company Number uniquely identifies a company.
Data carrier	A means to represent data in a machine-readable form, used to enable automatic reading of the Element Strings.
Data Standard	The entirety of all EAN.UCC System data standardized in meaning and structure.
Data structure	The UCC and EAN numbering structures defined in the various lengths required for the different identification purposes which all share a hierarchical composition. Their composition blends the needs of international control with the needs of the users.
EAN	See EAN International.
EAN International	EAN International, based in Brussels, Belgium, is an organization of EAN Numbering Organizations that jointly manages the EAN.UCC System with the UCC.
EAN Member Organization	A member of EAN International that is responsible for administering the EAN.UCC System in its country (or assigned area) and for managing the correct use of the EAN.UCC System by its member companies.
EAN.UCC Company Prefix	Part of the international EAN.UCC Data Structures consisting of an EAN.UCC Prefix and a Company Number, both of which are allocated by either the UCC or an EAN International Numbering Organization.
EAN.UCC Prefix	An index number with two or more digits, co-administered by the UCC and EAN International, denoting the format and meaning of a particular Element String.
EAN.UCC System	The specifications, standards, and guidelines co-administered by the UCC and EAN International.
EDI	Electronic Data Interchange.

Electronic Commerce	The conduct of business communications and management through electronic methods, such as electronic data interchange and automated data collection systems.
Electronic Data Interchange (EDI)	The computer-to-computer transmission of business information using a public standard format.
Electronic Message	A composition of Element Strings from scanned data and transaction information assembled for data validation and unambiguous processing in a user application.
Extension digit	A digit, allocated by the user, used to increase the capacity of the Serial Reference within the SSCC. *When used within the term "Extension digit," the word "digit" is never capitalized.*
GIAI	Shorthand term for the EAN.UCC Global Individual Asset Identifier.
GLN	Shorthand term for the EAN.UCC Global Location Number using the EAN/UCC-13 Data Structure to identify physical, functional, or legal entities.
Global Positioning Unit (GPU)	A navigational tool that assists travelers whether traveling by car, boat, plane or foot. These devices provide information pertaining to state and country boundaries, lakes, rivers, interstate highways even exit information for the federal interstate highway system. The GPU can locate services such as food, lodging and gas stations.
GRAI	Shorthand term for the EAN.UCC Global Returnable Asset Identifier.
GSRN	Shorthand term for the EAN.UCC Global Service Relation Number.
GTIN	Shorthand term for the EAN.UCC Global Trade Item Number. A GTIN may use the EAN/UCC-8, UCC-12, EAN/UCC-13, or EAN/UCC-14 Data Structure.
GTIN Format	The format in which GTINs must be represented in a 14-digit reference field (key) in computer files to ensure uniqueness of the identification numbers.
Identification Number (ID)	A numerical name for something in the supply chain to provide unique identification for it. ID numbers are used to retrieve information previously exchanged between trading partners and stored in their computer database files.
Individual Asset	An entity which is part of the inventory of given company *(see Returnable Asset).*
Individual Asset Reference	A number within a GIAI assigned by the holder of an EAN.UCC Company Prefix to an Individual Asset.
Item Number	See Item Reference.
Item Reference	The part of the data structures allocated by the user to identify a trade item for a given EAN.UCC Company Prefix.
Location Number	See GLN.
Location Reference	A number within a GLN assigned by various parties to identify a different entity.
Logistic Unit	Any "container" that permits the physical grouping and identification of goods for shipping. It could be a carton, a plastic wrap, a pallet, or a trailer, depending upon the industry or goods.
Logistic Unit Identifier	Identification of an item of any composition established for transport and/or storage that needs to be managed through the supply chain.
Manufacturer's Number	See EAN.UCC Company Prefix.
Manufacturer's ID	See EAN.UCC Company Prefix.
Point-of-Sale	The point where a customer purchases a product(s) within a retail store. This purchase is typically facilitated by a "check-out" lane or counter where bar code scanning equipment is located.

POS (Point-of-Sale)	Point-of-Sale. Refers to the retail type checkout where EAN/UPC Bar Code Symbols are normally scanned.
Returnable Asset	A reusable entity owned by a company, used for transport and storage of goods.
Serial Reference	The part of the data structure allocated by the user in conjunction with the Extension digit that establishes a unique SSCC for a given EAN.UCC Company Prefix.
Serial Shipping Container Code	See SSCC.
Service Reference	A number assigned by the service provider to identify the recipient of services in the context of a service relationship.
SSCC	The unique identification of a Logistic Unit using an 18-digit data structure. Formerly known as the Serial Shipping Container Code.
SSCC Serial Number	See Serial Reference.
Symbol	The combination of symbol characters and features required by a particular symbology, including Quiet Zone, start and stop characters, data characters, and other auxiliary patterns, which together form a complete scannable entity; an instance of a symbology and a data structure.
Symbol character	A group of bars and spaces in a symbol which is decoded as a single unit. It may represent an individual digit, letter, punctuation mark, control indicator, or even multiple data characters.
Trade item	Any item (product or service) upon which there is a need to retrieve pre-defined information and that may be priced or ordered or invoiced at any point in any supply chain.
Trading partner	A party to transactions in the supply chain, such as a supplier (seller) or a customer (buyer).
UCC Company Prefix	Part of the UCC-12 Data Structure consisting of a UCC Prefix and a Company Number allocated by the UCC.
UCC/EAN-128 Bar Code Symbol	A subset of the Code 128 Bar Code Symbol that is utilized exclusively for UCC.EAN defined data structures. UCC/EAN-128 Symbols can be printed as stand-alone linear symbols or as a composite symbol with an accompanying 2D Composite Component printed directly above the UCC/EAN-128 linear component.
Uniform Code Council, Inc. (UCC)	The Uniform Code Council, Inc. based in the United States, is a membership organization that jointly manages the EAN.UCC System with EAN International. The UCC also administers the EAN.UCC System in the United States and Canada.
Universal Product Code (U.P.C.)	See UCC-12 Identification Number.
U.P.C. Symbol	A bar code symbol that encodes the twelve-digit UCC-12 (U.P.C.)
Variable Measure Trade Item	An item always produced in the same pre-defined version (type, design, packaging, etc.) that may be sold at any point in the supply chain, which either may vary in weight/size by its nature or which may be traded without a pre-defined weight/size/length.