

# Global Trade Item Numbers (GTIN) Application Guideline

## ***Executive Summary***

The GTIN (Global Trade Item Number) is the foundation for the EAN.UCC® System for uniquely identifying trade items products and/or 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 goods 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.
- Works with GTIN data can be combined with other relevant data in UCC/EAN-128 symbols.
- Simplifies supply chain management.
- Employs the globally accepted and utilized EAN.UCC System whose language is understood by the global marketplace.

## **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 fourteen -digit data structure though its data carrier (bar code) may contain only twelve digits (the U.P.C.), thirteen digits (EAN-13) or eight 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 field:

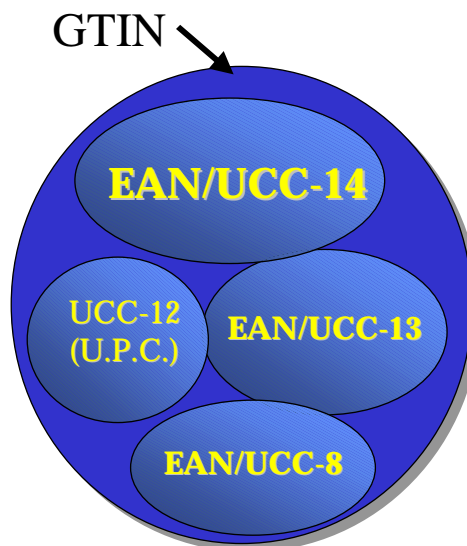
- UCC-12 (Twelve Digits)
  - Six digits representing the Company Prefix assigned by the UCC
  - Five digits representing the Item Reference Number
  - One digit representing the Check Digit

Or

- Eight digits representing the Company Prefix assigned by the UCC
- Three digits representing the item Reference Number
- One digit representing the Check digit
- EAN/UCC-13 (Thirteen Digits)
  - Twelve digits containing the Company Prefix and Item Reference Number
  - One digit representing the Check Digit
- EAN/UCC-14 (Fourteen Digits)
  - First Digit available to indicate packaging level
  - Twelve digits containing the 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

## 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 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	X	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



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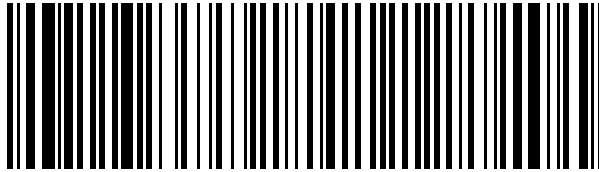
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The GTIN may be encoded in EAN/UPC, ITF-14, and UCC/EAN-128 symbologies. The appropriate data structure and symbology combination is a determined by many factors, such as the type of product, or the printing material used for the product packaging.

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 a UCC/128 bar code:



(01) 90614141000415 (3202) 000712

- ❖ 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)

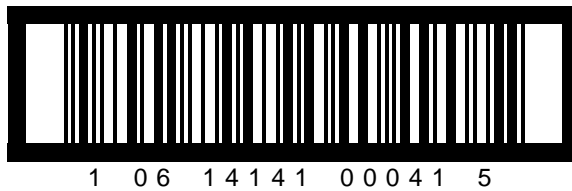


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The following illustrates the use of a GTIN in an ITF-14 bar code:

## **Example of ITF-14**

**Data Carriers - Bar Codes**



**ITF-14 = EAN.UCC's only use of Interleaved 2 of 5.  
It is only used to encode the GTIN**

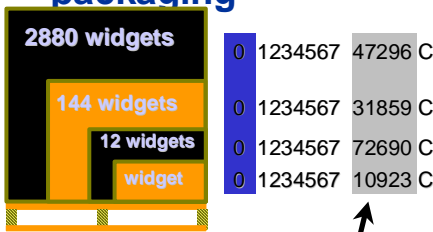
**Any of the GTIN data structures may be used, as  
long as they are expressed as a 14 digits**



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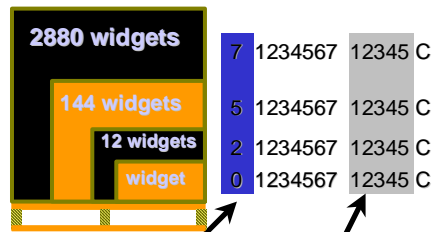
The following illustrates the assignment of GTINs at various item and package levels; note that uniqueness can be achieved through the use of different indicators or different item reference numbers at the higher levels of packaging.

### Item reference for higher levels of packaging



Unrelated Item References

### Indicator for higher levels of packaging

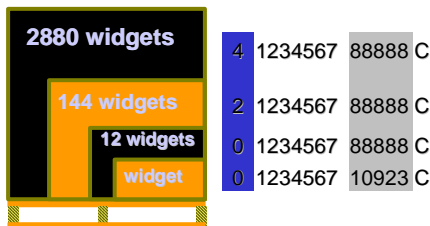


Indicator Same Item Reference (Common base number)



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### Combination of Indicator and Item reference for higher levels of packaging



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## 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 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.’<sup>1</sup>

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<sup>1</sup> *Industry Standard Numbering Systems in the Globalization of Supply Chains and Markets*, KPMG Consulting LLC, September 28, 2000.

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 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<sup>2</sup>.

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.

## Relationship to the other EAN.UCC Keys

EAN.UCC keys identify:

- **Trade items:** Goods and services upon which there is a need to retrieve fixed 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 which need to be tracked and traced individually in a supply chain (Serialized Shipping Container Codes/**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.

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

## Frequently Asked Questions

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

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

***Q. Do GTINs replace the U.P.C.?***

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

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

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

***Q. What impact will GTINs have on our systems?***

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

***Q. What is 2005 Sunrise?***

A. 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 use all forms of the GTIN. Se [www.ucc-council.org/2005sunrise](http://www.ucc-council.org/2005sunrise) for complete information.

***Q. Does my company need a new Company Prefix?***

A. No. Continue to use the one you have.

***Q. What data structures are considered GTINs?***

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

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

A. 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 from the UCC.

***Q. When is a “9” used as the indicator digit in a GTIN?***

A. It is used to indicate a variable measure weight product.

## ***Standard References***

- UCC Solutions Center (on-line)
- General EAN.UCC Specification

## ***Further Help***

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

## UCC Glossary

Term	UCC Glossary Definition
<b>Advance Ship Notice (ASN)</b>	Notification of product due prior to receipt (see Ship Notice Manifest (856)).
<b>AI</b>	Abbreviation for Application Identifier.
<b>Application Identifier (AI)</b>	A two-, three-, or four-digit prefix used within UCC/EAN-128 Symbols to define the meaning of information that follows.
<b>Asset Type</b>	A number assigned by the owner of an asset to uniquely identify a type of asset.
<b>Attribute</b>	A piece of information reflecting a characteristic related to an identification number (i.e., GTIN, GRAI).
<b>Bar code</b>	A precise arrangement of parallel lines (bars) and spaces that vary in width to represent data.
<b>Brand owner</b>	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.
<b>Check Digit</b>	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).
<b>Company Number</b>	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.
<b>Data carrier</b>	A means to represent data in a machine readable form, used to enable automatic reading of the Element Strings.
<b>Data Standard</b>	The entirety of all EAN.UCC System data standardized in meaning and structure.
<b>Data structure</b>	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.
<b>EAN</b>	See EAN International.
<b>EAN International</b>	EAN International, based in Brussels, Belgium, is an organization of EAN Numbering Organizations that jointly manages the EAN.UCC System with the UCC.
<b>EAN Member Organization</b>	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.
<b>EAN.UCC Company Prefix</b>	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.
<b>EAN.UCC Prefix</b>	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.
<b>EAN.UCC System</b>	The specifications, standards, and guidelines co-administered by the UCC and EAN International.
<b>EDI</b>	Electronic Data Interchange.

<b>Electronic Commerce</b>	The conduct of business communications and management through electronic methods, such as electronic data interchange and automated data collection systems.
<b>Electronic Data Interchange (EDI)</b>	The computer to computer transmission of business information using a public standard format.
<b>Electronic Message</b>	A composition of Element Strings from scanned data and transaction information assembled for data validation and unambiguous processing in a user application.
<b>Extension digit</b>	A digit, allocated by the user, used to increase the capacity of the Serial Reference within the SSCC. <i>When used within the term "Extension digit," the word "digit" is never capitalized.</i>
<b>GIAI</b>	Shorthand term for the EAN.UCC Global Individual Asset Identifier.
<b>GLN</b>	Shorthand term for the EAN.UCC Global Location Number using the EAN/UCC-13 Data Structure to identify physical, functional, or legal entities.
<b>Global Positioning Unit (GPU)</b>	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.
<b>GRAI</b>	Shorthand term for the EAN.UCC Global Returnable Asset Identifier.
<b>GSRN</b>	Shorthand term for the EAN.UCC Global Service Relation Number.
<b>GTIN</b>	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.
<b>GTIN Format</b>	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.
<b>Identification Number (ID)</b>	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.
<b>Individual Asset</b>	An entity which is part of the inventory of given company ( <i>see Returnable Asset</i> ).
<b>Individual Asset Reference</b>	A number within a GIAI assigned by the holder of an EAN.UCC Company Prefix to an Individual Asset.
<b>Item Number</b>	See Item Reference.
<b>Item Reference</b>	The part of the data structures allocated by the user to identify a trade item for a given EAN.UCC Company Prefix.
<b>Location Number</b>	See GLN.
<b>Location Reference</b>	A number within a GLN assigned by various parties to identify a different entity.
<b>Logistic Unit</b>	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.
<b>Logistic Unit Identifier</b>	Identification of an item of any composition established for transport and/or storage that needs to be managed through the supply chain.
<b>Manufacturer's Number</b>	See EAN.UCC Company Prefix.
<b>Manufacturer's ID</b>	See EAN.UCC Company Prefix.
<b>Point-of-Sale</b>	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.

<b>POS (Point-of-Sale)</b>	Point-of-Sale. Refers to the retail type checkout where EAN/UPC Bar Code Symbols are normally scanned.
<b>Returnable Asset</b>	A reusable entity owned by a company, used for transport and storage of goods.
<b>Serial Reference</b>	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.
<b>Serial Shipping Container Code</b>	See SSCC.
<b>Service Reference</b>	A number assigned by the service provider to identify the recipient of services in the context of a service relationship.
<b>SSCC</b>	The unique identification of a Logistic Unit using an 18-digit data structure. Formerly known as the Serial Shipping Container Code.
<b>SSCC Serial Number</b>	See Serial Reference.
<b>Symbol</b>	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.
<b>Symbol character</b>	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.
<b>Trade item</b>	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.
<b>Trading partner</b>	A party to transactions in the supply chain, such as a supplier (seller) or a customer (buyer).
<b>UCC Company Prefix</b>	Part of the UCC-12 Data Structure consisting of a UCC Prefix and a Company Number allocated by the UCC.
<b>UCC/EAN-128 Bar Code Symbol</b>	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.
<b>Uniform Code Council, Inc. (UCC)</b>	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.
<b>Universal Product Code (U.P.C.)</b>	See UCC-12 Identification Number.
<b>U.P.C. Symbol</b>	A bar code symbol that encodes the twelve-digit UCC-12 (U.P.C.)
<b>Variable Measure Trade Item</b>	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.