



1.1 About This Manual

This manual aims to provide all necessary information to anyone interested in the GS1 System, or involved in its implementation, but in particular:

- Companies requiring to know how to number and apply bar codes to items for the purpose of controlling the movement of goods and services world-wide
- Retailers requiring information about the various GS1 Identification Keys (numbers) and bar coding options they may encounter or may use to meet their own needs
- Members of the various professions who take part in the bar coding process by providing supplies or services, for example, printers, graphic designers, film master suppliers, and manufacturers of scanning or marking equipment.

For further information in relation to the technical aspects of all the GS1 Symbologies and their production, please refer to the GS1 Australia User Manual – Bar Code Symbol Technical Details

1.1.1 Disclaimer

Every possible effort has been made to ensure that the information and specifications in this manual are correct, however GS1 Australia expressly disclaim liability for any errors. In addition, no warranty or representation is made that this manual will not require modification due to developments in technology or changes or additions to the GS1 System.

1.1.2 Contact Us

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1.2 Background to the GS1 System

The GS1 System originated in the United States and was established in 1973 by the Uniform Code Council (UCC). The UCC adopted a twelve-digit identification number, and the first identification numbers and bar codes in open trade were being scanned in 1974. Following the success of this UCC System, the European Article Numbering Association, was established in 1977 to develop a compatible system for use outside North America. EAN International, its member organisations (MOs) around the world, and the UCC had been working together in partnership, but never under a common name; in 2004 EAN International, the MOs, and the UCC merged to form a new organisation, GS1.

The GS1 System was designed as a superset of the UCC System and principally uses thirteen-digit numbers. As a consequence of using certain bar codes and data structures, the GS1 System has expanded. Today full global compatibility is achieved through the use of the Global Trade Item Number (GTIN).

Although North America set a sunrise date of January, 2005, for the global use of the GTIN-13 and GTIN-8, a GTIN-12 represented by a UPC-A or UPC-E Bar Codes may still be required for items sold at retail Point-of-Sale (POS) in the United States and Canada. This is because many North American users cannot yet accommodate a GTIN-13 or GTIN-8 in their twelve-digit database files. If advised by North American distributors that your bar codes are unable to be scanned, please contact GS1 Australia regarding the allocation of a U.P.C. Company Prefix.

The GS1 System provides for the use of unambiguous numbers called **GS1 Identification Keys** to identify goods, services, assets locations and documents worldwide. These numbers can be represented in GS1 Bar Codes to enable their electronic reading wherever required in business processes. The system is designed to overcome the limitations of using company, organisation, or sector specific coding systems, and to make trading much more efficient and responsive to customers.

These Identification Keys are also used in Electronic Data Interchange (EDI) to improve the speed and accuracy of communications. This document only provides information about the numbering system, the bar codes, and the scanning system. For information about EDI, please refer to the GS1 Australia web site at www.gs1au.org or contact GS1 Australia.

In addition to providing unique GS1 Identification Keys, the GS1 System provides a solution for capturing attribute information, such as best before dates, serial numbers, and batch numbers, which can appear in bar code form.

Currently bar codes are used as the data carriers in the GS1 System, but with the newly emerged Radio Frequency Identification (RFID) Standard incorporated within the EPC network, the RFID data carrier will become more common in the future.

The GS1 System is designed for use in any industry or trade sector, at all levels of manufacturing and distribution. In Australia major system adopters include the grocery, health, steel, hardware, electrical appliance, furniture, meat, and telecommunications industries. The GS1 System is even used for fire brigades and electricity generators.

Any changes to the system are introduced so as not to negatively affect current users.

GS1 Australia provides separate guidelines for implementation of the GS1 System for specific industries, such as those listed above. These guidelines are available from our website at www.gs1au.org, or on request from GS1 Australia.



1.3 GS1 Company Prefix

GS1 Australia assigns a GS1 Company Prefix to each of its members, which is then used to create GS1 Identification Keys. Currently GS1 Australia allocates seven- to nine-digit GS1 Company Prefixes to its membership, however GS1 Company Prefixes of other lengths may be allocated in the future to further conserve numbers. Please note that other GS1 Member Organisations may allocate GS1 Company Prefixes of different lengths.

The GS1 Company Prefix allows for the allocation of a range of numbers. To obtain an additional GS1 Company Prefix or increase your range of available numbers, members should contact GS1 Australia. Additional fees may apply.

Individual Bar Code Number Subscriber Members do not have a GS1 Company Prefix but are allocated an entire GTIN-13

The GS1 Company Prefix cannot be sold, leased or given, in whole or part, for use by any other company other than the company it was allocated to.

When a company changes legal status as a result of an acquisition, merger, partial purchase, split or "spin-off", the following guidelines apply.

1.3.1 Acquisitions and Mergers

In the case of an acquisition or merger GS1 Australia must be notified in writing by both the "buying" and the "selling" companies. There are then two available options regarding the use of the GS1 Company Prefix and associated GS1 ID Keys:

- The "buying" company can adopt the "selling" company's GS1 Company Prefix, keeping the GS1 ID Keys already allocated. If the "buying" company is already a member of GS1 Australia an additional fee will apply. However, if the "buying" company is not yet a member of GS1 Australia, they must first become a member.
- The "buying" company can phase in GS1 ID Keys carrying their own GS1 Company Prefix, for example when packaging is redesigned or reprinted.

"Buying" companies need to be aware that if they decide to reallocate GS1 ID Keys using their own GS1 Company Prefix instead of acquiring the "selling" company's GS1 Company Prefix, this may result in additional work and data file maintenance for customers.



1.3.2 Partial Purchase

When a company buys a division, brand name, or a range of items, there are then two available options regarding the use of the GS1 Company Prefix and associated GS1 ID Keys:

- The “selling” company may submit in writing to GS1 Australia that they have sold their brand/division/range of items, and they no longer require the GS1 Company Prefix used to identify these items, therefore authorising the transfer of their GS1 Company Prefix to the “buying” company
 - The “selling” company may provide written authorisation to GS1 Australia stating that the “buying” company will exhaust all existing stock carrying the “selling” company’s GS1 Company Prefix. At their earliest convenience the “buying” company must allocate new GTINs using their own GS1 Company Prefix to the items, for example when packaging is redesigned or reprinted. Trading partners must be notified of the changes to the GS1 ID Keys in advance
- “Buying” companies need to be aware that if they are not members of GS1 Australia, and decide to allocate new GS1 ID Keys instead of acquiring the “selling” company’s GS1 Company Prefix, they will first be required to become GS1 Australia members to acquire their own GS1 Company Prefix. This option of allocating new GS1 ID Keys to products may result in additional work and data file maintenance for customers.

1.3.3 Split or Spin-Off

When a company splits into two or more separate companies it is necessary for each GS1 Company Prefix assigned to the original company to be transferred to one, and only one, of the new companies. Any company left without a GS1 Company Prefix will need to apply to GS1 Australia to obtain one. A decision as to which of the new companies will take over which GS1 Company Prefixes should be made to minimise the number of changes to GS1 ID Keys that will be required. The decision should be part of the legal arrangements that set up the new companies.

It is not necessary for existing stock of items to be renumbered. However, when any of the split or spin-off companies are using GS1 ID Keys that are created using a GS1 Company Prefix that it no longer holds, then it should re-number those GS1 ID Keys using its own GS1 Company Prefix, for example when new labelling or packaging is produced. Customers should be notified well in advance of the changes.

Split or spin-off companies that retain a GS1 Company Prefix must keep a record of the GS1 ID Keys created from their prefix that have been allocated to items they no longer own. They must not re-use these GS1 ID Keys until an appropriate amount of time after the company that split away owning those items last supplied goods identified by those GS1 ID Keys (e.g. four years for items carrying GTINs). Therefore, the company that did not retain the GS1 Company Prefix has to keep the company that did maintain the prefix informed of the dates on which the goods were last supplied with the previous number, or to guarantee a date by which the number change will be made.



1.4 Basics of the GS1 System

There are three main elements of the GS1 System; **the Identification, the data carrier** (most commonly a bar code), and **eMessaging**.

1.4.1 Identification

The GS1 System provides **Identification Keys** for different applications. The application will determine how the number is to be used. The data structure of the GS1 Identification Keys guarantees worldwide uniqueness within the relevant area of application. There are nine GS1 Identification Keys that support the identification of items, services, logistic units, returnable containers, etc. Each of the GS1 Identification Keys provides a link between the items (a physical product, place, thing or service) and information pertaining to them.

A GS1 Company Prefix will be assigned to a user company to allow that user company to create any of the GS1 Identification Keys, namely GTIN (Global Trade Item Number), GLN (Global Location Number), SSCC (Serial Shipping Container Code), GRAI (Global Returnable Asset Identifier), GIAI (Global Individual Asset Identifier), GSRN (Global Service Relation Number), and GDTI (Global Document Type Identifier), Global Shipment Identification Number (GSIN) and Global Identification Number for Consignment (GINC).

All GS1 Identification Keys must be allocated uniquely. It is recommended that the numbers do not contain any intelligence or parsable strings. The embedding of internal codes is discouraged because it is often found that the rules for changing them differ from the rules for changing an identification number.

To ensure accuracy and prevent duplication it is good practice to assign the role of allocating GS1 ID Keys to a specific member of your organisation, and to keep records of all numbers allocated.

Trade Item Identification - GTIN

A trade item is any item (product or service) upon which there is a need to retrieve pre-defined information that may be priced, ordered, or invoiced for trade between participants at any point in the supply chain. Global Trade Item Numbers (GTINs) are the GS1 Identification Key used for the unique identification of trade items worldwide.

The GTIN-13, GTIN-8, GTIN-12 and GTIN-14 are all used to provide unique identification of trade items.

Note: The GS1 System identification numbers were previously called EAN/UCC-13, EAN/UCC-8, UCC-12 and EAN/UCC-14 Identification Numbers.

The identification and bar coding of trade items enables the automation of POS (through Price Look Up (PLU) files), goods receiving, inventory management, automatic re-ordering, sales analysis, and a wide range of other business applications.

Within the Australian retail industry trade item numbers have historically been referred to APNs and TUNs. Whilst this terminology may still occasionally be encountered, the correct term for both is Global Trade Item Number, or GTIN.

For detailed information on the allocation of GTINs refer to Chapter 2 Numbering Trade Items on page 14.



Logistic Unit Identification - SSCC

Logistic units are units which store or transport any combination of trade items and which need to be identified and managed through the supply chain. The Serial Shipping Container Code (SSCC) is the GS1 Identification Key used for the unique identification of logistic units.

Each individual logistic unit is allocated a unique serial number, the SSCC, which must be different for every logistic unit. Even if the logistic units contain identical trade items, they still require different SSCCs.

Scanning the SSCC marked on each logistic unit allows the physical movement of the unit to be individually tracked and traced by providing a link between physical movement of items and the associated information flow. It also opens up the opportunity to implement a wide range of applications such as cross docking, shipment routing, and automated receiving.

For detailed information on the identification of logistic units and the allocation and use of the SSCC refer to Chapter 3 Logistic Units on page 58.

Location Identification - GLN

A Global Location Number (GLN) is the GS1 Identification Key used to uniquely identify a physical or legal entity.

GLNs use the same structure as the GTIN-13 for trade items, but must be treated as a separate series of numbers.

The use of GLNs is a pre-requisite for efficient Electronic Data Interchange (EDI).

For detailed information on the allocation and use of GLNs refer to Chapter 4 Numbering Locations and Assets on page 72.

Asset Identification - GIAI and GRAI

The GS1 System provides a system for the identification of assets. The object of asset identification is to identify a physical entity as an inventory item. Asset identifiers should not be used for any other identification purpose.

There are two types of GS1 Identification Keys used for numbering Assets:

- GS1 Global Returnable Asset Identifier (GRAI) – used to identify a reusable entity (e.g. a reusable beer keg) that is normally used for transport and storage of goods.
- GS1 Global Individual Asset Identifier (GIAI) – used to identify uniquely an entity that is part of the inventory of a given company (e.g. a personal computer).

For detailed information on the identification of assets refer to Chapter 4 Numbering Locations and Assets on page 72.

Identification of Service Relationships - GSRN

The Global Service Relation Number (GSRN) is used to identify the recipient of services in the context of a service relationship.

Two examples of using a GSRN to identify service relationships are in:

- A hospital admission, where it could be used to record a patient's room charges, medical tests, and patient charges
- A membership in a frequent flyer programme, where it could be used to record awards, claims, and preferences



The GSRN is the key to access information stored on computer systems or reference information transferred via Electronic Data Interchange (EDI).

Identification for Document Control - GDTI

The term “document” is applied broadly to cover any official or private papers that infer a right (e.g. proof of ownership) or obligation (e.g., notification or call for military service) upon the bearer. Examples include land registration papers, tax demands and proof of shipment/receipt forms.

The GDTI is assigned by the document issuer.

The same GDTI is used for all document classes that are issued with an identical purpose.

A different GDTI shall be used whenever characteristics of the document are different.

Identification of a Shipment - GSIN

The GSIN is a unique number assigned by a consignor (seller) of goods. It identifies a logical grouping of logistic units for the purpose of transport shipment from that consignor (seller) to the consignee (buyer).

The GSIN may be used by all parties in the transport chain as a communication reference, for example, in Electronic Data Interchange (EDI) messages where it can be used as a shipment reference and/or consignor's loading list.

The GSIN fulfils the requirements of the UCR (Unique Consignment Reference) of the world Customs Organisation (WCO).

Identification of a Consignment - GINC

The GINC identifies a logical grouping of goods (one or more physical entities) that has been consigned to a freight forwarder and is intended to be transported as a whole. The GINC must be allocated by a freight forwarder (or a carrier acting as a freight forwarder) or a consignor, but only if prior agreement of the freight forwarder is given.

The GINC may be used as a communication reference by all parties in the transport chain, such as in Electronic Data Interchange (EDI) messages where it can be used as a consignment reference and/or a freight forwarders or carriers loading list.

Attribute Identification - Application Identifiers (AIs)

Through the use of Application Identifiers (AIs) the GS1 System enables data over and above item identification, such as batch numbers or use by dates, to be encoded in GS1-128, GS1 DataBar and GS1 DataMatrix Bar Codes and unambiguously and securely interpreted when scanned. The use of Application Identifiers ensures that the information encoded by one company can also be scanned and interpreted by any other company in the supply chain.

For information on Application Identifiers refer to Chapter 5 GS1 Application Identifiers (AIs) on page 79.



1.4.1.1 Selecting the Correct GS1 ID Key

Use the tables below as a guide for selecting the correct GS1 ID Key based on the intended application.

GS1 ID Key	Acronym	Application	Chapter and Page Number
Global Trade Item Number	GTIN	As the name implies, the GTIN helps automate the trading process – basically buying and selling. GTINs are therefore assigned to any item (product or service) that may be priced, or ordered, or invoiced at any point in any supply chain. The GTIN is then used to retrieve pre-defined information about the item.	Chapter 2 Page 14
Serial Shipping Container Code	SSCC	The SSCC is the GS1 Identification Key for an item of any composition established for transport and/or storage which needs to be managed through the supply chain. The SSCC is assigned for the life time of the transport item and is a mandatory element on the GS1 Logistic Label.	Chapter 3 Page 58
Global Location Number	GLN	The GLN is the GS1 ID Key for Locations. The GLN can be used to identify physical locations and legal entities where is a need to retrieve pre-defined information to improve the efficiency of communication with the supply-chain. Global Location Numbers are a prerequisite for Electronic Data Interchange (EDI).	Chapter 4 Page 72
Global Individual Asset Identifier	GIAI	The GIAI is the GS1 Identification Key used in a diverse range of business applications ranging from tracking to recording the life-cycle history of aircraft parts. The GIAI is assigned by the owner of the asset.	Chapter 4 Page 77
Global Returnable Asset Identifier	GRAI	The GRAI is the GS1 Identification Key for types of reusable package or transport equipment that are considered an asset. It is used to enable tracking as well as recording of all relevant data associated with the individual asset or asset type. The GRAI is assigned for the life time of the asset.	Chapter 4 Page 75
Global Service Relation Number	GSRN	The GSRN is the GS1 Identification Key used to identify the recipient of services in the context of a service relationship. It is used to enable access to a database entry for recording recurring services. The GSRN is normally assigned by the service provider.	Chapter 5 Page 135
Global Document Type Identifier	GDTI	The GDTI is the Identification Key for a document type combined with an optional serial number and used to access database information that is required for document control purposes. The GDTI is assigned for the life time of the document type .	Chapter 5 Page 102
Global Shipment Identification Number	GSIN	The GSIN identifies a logical grouping of physical units in a transport shipment. It is assigned by a seller (sender) of the goods and may be used as a communication reference by all parties in the transport chain e.g. in EDI messages.	Chapter 5 Page 116
Global Identification Number for Consignment	GINC	The GINC identifies a logical grouping of physical units that has been consigned to a freight forwarder. It is assigned by the freight forwarder or carrier of the transport units and may be used as a communication reference by all parties in the transport chain e.g. in EDI messages.	Chapter 5 Page 115

TABLE 1 Selecting the Correct GS1 ID Key



1.4.2 Data Carriers

All of the identification numbers used in the GS1 System can be represented in data carriers and of these, bar codes are the most commonly used. Bar codes are a means of representing data in machine readable form, and allow automatic data capture at each point where an item leaves or enters premises.

With improvements in the technology and new application requirements, new data carriers such as GS1 DataBar, GS1 DataMatrix, and RFID have been introduced.

Bar codes are usually included in the production process, at the producer site. They may be pre-printed with other information present on the packaging, a label can be affixed to the item at the production line, or they can be printed directly on to the packaging online.

For information on GS1 DataBar refer to chapter 6, section 6.2.9 GS1 DataBar Symbol Specifications on page 166 and for detailed information on the following Data Carriers refer to chapter 6, section 6.2 Bar Code Specifications on page 147.

The EAN/UPC Symbology (which includes the EAN-13, EAN-8, UPC-A and UPC-E Bar Codes) is a bar code symbology family that can be read omnidirectionally. It must be used for all items that are scanned at retail POS and may be used on other trade items intended to be scanned in a General Distribution Scanning environment.



Figure 1 EAN-13 Bar Code



Figure 2 EAN-8 Bar Code



Figure 3 UPC-A Bar Code



Figure 4 UPC- E Bar Code



The ITF-14 Bar Code (Interleaved 2-of-5) is restricted for use on trade items not passing through the retail POS. Because of the robust nature of this bar code it is best suited for direct printing on to corrugate fibreboard.

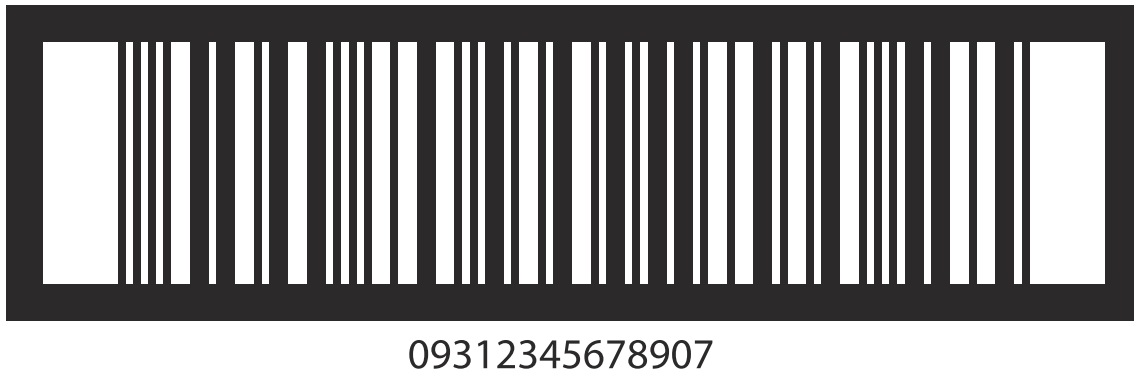


Figure 5 ITF-14 Bar Code

GS1-128 Bar Code is an extremely flexible symbology that, with the use of Application Identifiers, can encode not only the GTIN, but additional attribute data. The GS1-128 Bar Code is also used to encode the Serial Shipping Container Code (SSCC) on a logistics label. It is not intended to be read on items passing through POS.

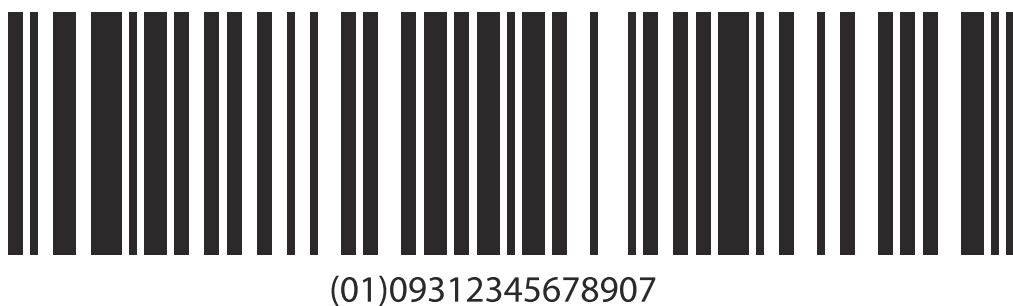


Figure 6 GS1-128 Bar Code



There are seven different types of GS1 DataBar Bar Codes four of which are omnidirectional and can therefore be scanned at Point-of-Sale; one of these, GS1 DataBar Stacked Omnidirectional, is illustrated below. GS1 DataBar has been approved for bilateral use between trading partners from 2010. In 2014 GS1 DataBar becomes an open symbology and all scanning environments must be able to read these symbols.



Figure 7 GS1 DataBar Stacked Omnidirectional Bar Code



1.4.3 eMessaging

The identification numbers used with the GS1 System are also used in Electronic Data Interchange (EDI) messages; this allows unique trade item information associated with a transaction to be identified and exchanged between trading partners.

Today, the majority of data in commercial paper documents is generated from existing computer applications. These paper documents are printed and copied before the information they contain is finally communicated by mail or fax. In turn, the business partner re-keys all this information into another computer application for further processing. This process is extremely slow, costly and unreliable. The need for a faster, cheaper and more accurate solution for exchanging business data is a priority for many companies and organisations.

In the traditional sense EDI can be conceptualised as paperless trading. A common and useful definition for EDI is the “transfer of structured data, by agreed message standards, from one computer application to another by electronic means and with a minimum of human intervention”.

The electronic exchange of data (or eMessaging) provides trading partners with an efficient business tool for the automatic transmission of business data. Companies do not need to worry about different and/or incompatible computer systems.

Through the use of GS1 Australia’s traditional eMessaging guidelines, GS1 EANCOM (subset of International UN/EDIFACT standard) and GS1’s Business Message Standards (XML syntax), data may be communicated quickly, efficiently and accurately, irrespective of a users internal hardware or software.

GS1 does not see XML replacing traditional EDI syntaxes such as UN/EDIFACT. At their lowest levels, XML and UN/EDIFACT are simply eMessaging syntaxes, both having different strengths and weaknesses.

For more information contact GS1 Australia.



1.5 GS1 Prefixes

The GS1 Prefix is a number with two or more digits, administered by the GS1 Global Office, which is allocated to GS1 Member Organisations or for Restricted Circulation Numbers.

As new prefixes are constantly being added, an up to date list can be viewed at the GS1 Global Office website – www.gs1.org

U.P.C. Prefixes

A U.P.C. Prefix is a special representation of the GS1 Prefixes '00 – 09' with the leading zero removed. They are used when representing the GTIN-12, Coupon-12, RCN-12, and VMN-12 in a UPC-A Bar Code.

GS1 US has allocated U.P.C. Prefixes for a range of purposes.

U.P.C. Prefix	Application
0, 6, 7	A five-digit U.P.C. Company Prefix for the creation of GS1 Identification Keys.
2	Random weight Point-of-Sale trade items for restricted circulation.
3	National Drug Code (NDC) and National Health Related Item Code (NHRIC). Note that the bar code is not affected by the various internal structures possible with the NDC or NHRIC. Applicable only in the US.
4	For use without code format restriction and with Check Digit protection for internal company applications. Applicable only in the US.
5	For use on coupons.
1, 8	Variable Length U.P.C. Company Prefixes for the creation of GS1 Identification Keys.
9	Reserved for uses unidentified at this time.

Retailers in Australia can expect to encounter items carrying a GTIN-12 with U.P.C. Prefixes 0, 1, 6, 7 and 8. In the near future they can also expect to encounter items with the U.P.C. Prefix of 9.

TABLE 2 U.P.C. Prefixes