GS1®

in Europe

Identification of products that require activation at the Point-of-sale

Technical specifications for GS1 DataBar

Version 1.0, November 2014

www.gs1.eu

The global language of business

Contents

1. Target Audience

This document is destined for issuers, solution providers and distributors of product that require activation at the point of sale: gift cards, gift boxes and pre-paid cards. Issuers and and solution providers benefit from this document to correctly encode the GTIN and the activation code of the products in question, distributors to scan and process the activation code and the GTIN at Point-of-sale (POS).

2. Scope of the document

The scope of this document is to describe how to implement the global GS1 standards for items that require activation at the point-of-sale identification and symbol marking in order to automate and speed up the product handling procedures for all involved parties in a product management process.

3. Business Application

Products that require activation at the point-of-sale: gift boxes, gift cards and prepaid cards are products/cards containing a credit, that can be money (card) or a service (box). The owner of the gift card (i.e. receiver) or pre-paid card can use it to pay at POS and the owner of the gift box can use it to obtain a service. For gift cards it may be possible to reload the card. Meal vouchers do not belong to this product range. Examples are Bongo's, iTunes gift cards, vivaboxes, etc.

Gift boxes, gift cards and prepaid cards can be sold at POS as "normal" products and therefore need a GTIN in a bar code that enables scanning and Price-Lookup at POS. In addition these products need a unique activation code that enables the consumer to use the card or box when activated at POS. This activiation is done by the POS system of the distributor, by connecting to a service based on the activation code. Without activation the code is intended to prevent misuse.

Like the GTIN the activation code is also presented in a barcode, sometimes together with the GTIN, sometimes in a separate barcode. Today the structure of this activation code as well as the barcode differ from issuer to issuer. Sometimes a GS1 barcode is used (i.e. GS1-128) and sometimes a proprietary barcode. Below, you can find two examples of current practices.
Examples:

There are two ways of activation at POS depending on the barcodes used: One Step Activation and Two Step Activation:

- 'Two Step Activation': By first scanning the GTIN, the product is recognized as a product that needs to be activated. In a second step, the activation code is scanned. In many cases, the activation code is not represented in a GS1 barcode.
- 'One Step Activation': The GTIN and the activation code are represented in one barcode. The types of barcodes used differ from issuer to issuer and they may or may not comply to the GS1 standards.

Since the activation process is not standardized and therefore inefficient, it may happen in practice that the activation is already done when the gift cards or boxes are still in the store. Since these are theft sensitive products, it is essential that the activiation is done after purchase at POS only. Using GS1 standards for both identifying the product and the representation of the activation code, will result in more efficient and faster processing at POS and will avoid proprietary practices and prevent theft.

Depending on the products, a second activation code may be required when using the product. This is normally a secret PIN code contained inside the box and can only be accessed by the owner of the product.

GS1 DataBar is the solution for identification and activation of the gift card or gift box when scanned at POS. Applicable variants are GS1 DataBar Expanded or a GS1 DataBar Expanded Stacked with:

- AI (01) to represent the GTIN.
- AI (21) to represent the activation code (serial number). The serial number is alphanumeric and can contain up to 20 digits.

(01) 0 5410000 12345 9 (21) 1234CB

There are some clear benefits of moving to a Global identification scheme for products that require activation at the Point-of-sale:

- The structure of the GTIN and its assignment rules are administered by GS1, a not-for-profit standards organization that is supported by implementation guidance, business examples, and maintenance.
- GTINs are unique worldwide. A GTIN can be used throughout the world with no need for trading partner(s) to assign proprietary numbers to ensure uniqueness.
- The application uses the same GS1 Standards that are used in many other business applications. If you are already using GS1 Standards to identify products or locations, it is easy to extend your use to identify products that require activation at point-of-sale as well.
- Activation of the product scanning one single barcode at the point-of-sale system

4. Content of the GS1 DataBar Symbol

Global Trade Item Number (GTIN): AI (01)

The GS1 Identification Key used to identify the gift cards, gift box and pre-paid cards. The key is comprised of a GS1 Company Prefix followed by an item reference and a Check Digit. Its verification, which must be carried out in the application software, ensures that the number is correctly composed.

	Application Identifier	Global Trade Item Number (GTIN)													Check Digit
		GS1-8 Prefix or GS1 Company Prefix → ← Item reference														
(GTIN-8)	0 1	0	0	0	0	0	0	N_1	N_2	N_3	N_4	N_5	N_6	N_7	N_8
(GTIN-12)	0 1	0	0	N_1	N_2	N_3	N_4	N_5	N_6	N_7	N_8	N_9	N_{10}	N_{11}	N_{12}
(GTIN-13)	0 1	0	N_1	N_2	N_3	N_4	N_5	N_6	N_7	N_8	N_9	N_{10}	N_{11}	N_{12}	N_{13}
(GTIN-14)	0 1	N_1	N_2	N_3	N_4	N_5	N_6	N_7	N_8	N_9	N_{10}	N_{11}	N_{12}	N_{13}	N_{14}

Format of the Element String

GS1 Company Prefix: A globally unique number assigned to a GS1 member company

Item Reference: The number assigned by a member company to the Trade Item

---

Check Digit: A modulo-10 number calculated across the preceding digits to ensure data integrity

The data transmitted from the bar code reader means that the Element String denoting the GTIN of a Trade Item has been captured.

When indicating this Element String in the Non-HRI text section of a bar code label, the following data title should be used: GTIN

Activation Code (Serial Number): AI (21)

The Application Identifier (21) indicates that the GS1 Application Identifier data field contains the activation code (serial number). A serial number is assigned to an entity for its lifetime. When combined with a GTIN, a serial number uniquely identifies an individual item.

Format of the Element String	
Application Identifier	Serial Number
2 1	X_1 ———— variable length ————→ X_{20}

The data transmitted from the bar code reader means that the Element String denoting a serial number has been captured. As this Element String is an attribute of a trade item, it must be processed together with the GTIN of the trade item to which it relates.

When indicating this Element String in the Non-HRI text section of a bar code label, the following data title should be used: SERIAL

Concatenation rules

All GS1 bar code symbologies that use GS1 Application Identifiers allow several Element Strings to be encoded in one bar code, a process called concatenation

Pre-Defined Length Element Strings:

Concatenated Element Strings constructed from Application Identifiers with a pre-defined length do not require a Separator Character. Each Element String is immediately followed by either the next Application Identifier or the Symbol Check Character and Stop Character.

For example, concatenation of the serial number with the associated Global Trade Item Number (GTIN) does not require the use of a Separator Character.

Variable length Data Strings :

Concatenating Element Strings of variable length involves the use of a Separator Character. The Separator Character used is the Function 1 Symbol Character (FNC1). It is placed immediately after the last symbol character of a variable length data string and is followed by the Application Identifier of the next Element String. If the Element String is the last to be encoded, it is followed by the Symbol Check and Stop Characters and no FNC1 Separator Character is required.

When concatenating a mixture of pre-defined and other Element Strings, the pre-defined Element Strings should appear before the variable length Element Strings.

For gift card application, the length types of the element strings are as follows :

- AI (01)   ➔fixed length data string

- AI (21)   ➔ variable length data string

Here below, the optimized concatenation for gift cards:

AI(01)	Data	AI(21)	Data

Note: Parentheses shall surround AIs in Human Readable Interpretation, but are not encoded in the GS1 symbol.

5. GS1 Databar Symbol Specifications

GS1 DataBar Expanded & Expanded Stacked

The GS1 DataBar family consists of 7 different varieties of the GS1 DataBar. Only two of them are applicable encoding GTIN plus activation codef: the GS1 DataBar Expanded and the GS1 DataBar Expanded Stacked.

GS1 DataBar Expanded

(01) 0 5400141 27368 7 (21) 12345AB

- Max 74 Numeric/41 Alphanumeric characters
- All GS1 keys and Application Identifiers

(e.g. GTIN or AI 21)

● Omnidirectional

GS1 DataBar Expanded Stacked

(01) 0 5400141 27368 7 (21) 12345AB

● Max 74 Numeric/41 Alphanumeric characters
● All GS1 keys and Application Identifiers (e.g. GTIN or AI 21)
● Can be stacked from 2 up to 11 rows.
● Omnidirectional

Data transmitted by the scanner

The GS1 DataBar family symbols are designed and intended to be used with symbology identifiers specified in the ISO standard. GS1 DataBar family symbols are normally transmitted using symbology identifier prefix "]e0". For example, a GS1 DataBar Symbol encoding AI (01) Element String 10012345678902 produces the transmitted data string "]e00110012345678902."

GS1 Databar Expanded Symbols encode the application identifiers. All Element Strings of variable length and those of fixed length not stated in the predefined table shown in Gen Specs section 5.10.1 must be delimited when followed by another Element String in a single Bar Code. The delimiter is a Function 1 Symbol Character (FNC1). This is transmitted as a <GS> (ASCII 29).

Note: When only AI (01) and AI (21) are encoded in this sequence no FNC1 is needed after AI (21) because the data string ends here.

Printing considerations

For the print quality, you must take into consideration the following parameters :

a) the minimum X-dimension to comply with (between 0.264 mm and 0.660 mm)
b) the space available for the printing of the barcode (size of the coupon and the space available for the barcode on the coupon)
c) The printing method

6. Implementation notes

The following points are very important when considering the implementation of GS1 Databar for gift cards:

1. Check the **space** dedicated to the barcode on the item. This will enable you to select either GS1 DataBar expanded or GS1 DataBar Expanded stacked.
   - If less space, choose for a GS1 DataBar expanded stacked.
   - If enough space, choose for a GS1 DataBar expanded

2. Choose the **X-dimension**. This should be between 0.264 mm and 0.660 mm.

3. Check the way the GS1 Symbol is printed: printing method and printing quality. Your local GS1 Member Organisation offers bar code verification for original test samples .

4. Make a **test** and send it to your GS1 MO to ensure the correctness of the implementation

7. GS1 Glossary of Terms and Definitions

| Term	Definition
Concatenation	The representation of several Element Strings in one bar code.
EAN-13 Bar Code	A bar code of the EAN/UPC Symbology that encodes GTIN-13, Coupon-13, RCN-13, and VMN-13.
Function 1 Symbol Character (FNC1)	A symbology character used in some GS1 data carriers for specific purposes.
Global Trade Item Number (GTIN)	The GS1 Identification Key used to identify trade items. The key comprises a GS1 Company Prefix, an Item Reference and Check Digit.
GS1-128 Symbology	A subset of Code 128 that is utilised exclusively for GS1 System data structures.
GS1 Application Identifier	The field of two or more digits at the beginning of an Element String that uniquely defines its format and meaning.
GS1 Application Identifier data field	The data used in a business application defined by one application identifier.
GS1 DataBar	A family of bar codes, including GS1 DataBar Omnidirectional; GS1 DataBar Stacked Omnidirectional; GS1 DataBar Expanded; GS1 DataBar Expanded Stacked GS1 DataBar Truncated, GS1 DataBar Limited, and GS1 DataBar Stacked symbols.
GS1 DataBar Expanded Bar Code	A bar code that encodes any GS1 Identification Key plus Attribute data, such as weight and "best before" date, in a linear symbol that can be scanned omnidirectionally by suitably programmed Point-of-Sale

	scanners
GS1 DataBar Expanded Stacked Bar Code	A bar code that is a variation of the GS1 DataBar Expanded Bar Code that is stacked in multiple rows and is used when the normal symbol would be too wide for the application.
GS1 Prefix	A number with two or more digits, administered by GS1 that is allocated to GS1 Member Organisations or for Restricted Circulation Numbers.
Serial number (activation code)	A code, numeric or alphanumeric, assigned to an individual instance of an entity for its lifetime. Example: Microscope model AC-2 with serial number 1234568 and microscope model AC-2 with serial number 1234569. A unique individual item may be identified with the combined Global Trade Item Number (GTIN) and serial number.

Annex1.- GS1 DataBar Technical Specifications

Symbol characteristics

Different (n,k) symbol characters are used for both GS1 DataBar Expanded versions, where each symbol character is n modules in width and is composed of k bars and k spaces. Each segment should have the same length.
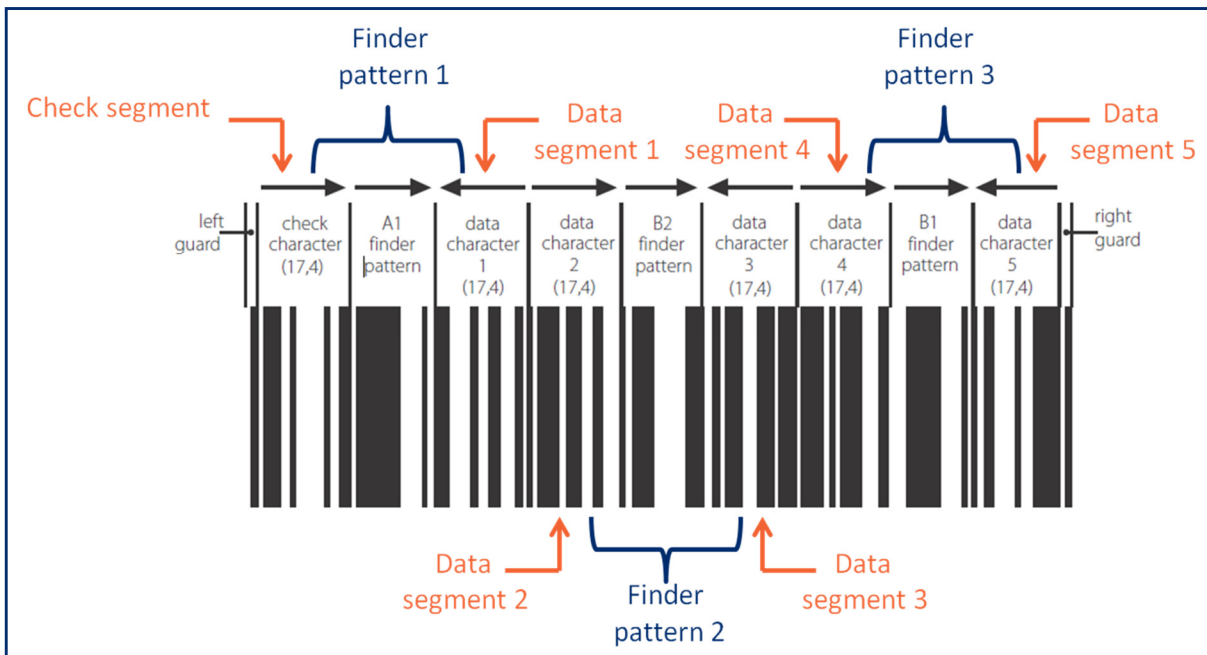
GS1 DataBar Expanded Symbols contains a Symbol Check Character, 3 to 21 data characters and 2 to 11 finder patterns, depending on the symbol length. The symbols are constructed as a sequence of triplets, each consisting of a finder pattern between two symbol characters. If there is an odd number of symbol characters a finder pattern follows the last symbol character. GS1 DataBar Expanded is capable of being scanned in separate segments, each segment consisting of a data character or Symbol Check Character and the adjacent finder pattern. The Symbol Check Character encodes a modulo 211 check value for data security.

The left and right Guard Bar Patterns consist of a narrow bar and narrow space. GS1 DataBar Expanded versions do not require a **Quiet Zone**. The **X-dimension** (= width of the narrowest bar) should be between 0.264 mm and 0.410 mm.

The **GS1 DataBar Expanded** Bar Code has a variable width (from 4 to 22 symbol characters, or a minimum of 102X wide and a maximum of 534X wide) and is 34X high. The symbol starts with a 1X space and ends with either a 1X bar or space.

The **GS1 DataBar Expanded Stacked** Bar Code is a multi-row stacked version of GS1 DataBar Expanded. It can be printed in widths of 2 to 20 segments and can have from 2 to 11 rows. Its structure includes a 3X high separator pattern between rows, each row is 34x high. It is designed to be read by an omnidirectional scanner such as a retail slot scanner. GS1 DataBar Expanded Stacked is used when the symbol area or print mechanism is not wide enough to accommodate the full single-row GS1 DataBar Expanded Symbol. It is designed for variable weight products, perishable products, traceable retail products, and coupons.

GS1 DataBar Size Specification

Symbol(s) Specified	X-Dimension mm (inches)			Minimum Symbol Height for Given X mm (inches)			Quiet Zone		Minimum Quality Specification
	Minimum	Target	Maximum	For Minimum X-dimension	For Target X-dimension	For Maximum X-dimension	Left	Right	
GS1 DataBar Expanded	0.264	0.330	0.660	8.99	11.23	22.44	NA	NA	1.5/06/670
GS1 DataBar Expanded Stacked	0.264	0.330	0.660	18.75	23.44	46.86	NA	NA	1.5/06/670

GS1 in Europe

E: camille.dreyfuss@gs1eu.org

T: +33 1 40 95 21 79

F: +33 1 40 95 54 49

www.gs1.eu