INTERNATIONAL STANDARD

ISO/IEC 24724

Second edition
2011-04-01

Information technology — Automatic identification and data capture techniques — GS1 DataBar bar code symbology specification

Technologies de l'information — Techniques automatiques d'identification et de capture des données — Spécifications de la symbologie des codes à barres GS1 DataBar

© ISO/IEC 2011

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

iTeh STANDARD PREVIEW

(standards.iteh.ai)

ISO/IEC 24724:2011
https://standards.iteh.ai/catalog/standards/sist/d9f4551c-3ff3-41b4-8765-
86182164b3c7/iso-iec-24724-2011

Contents

Page

iii

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 24724 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 31, *Automatic identification and data capture techniques*.

This second edition cancels and replaces the first edition (ISO/IEC 24724:2006), which has been technically revised.

Introduction

GS1 DataBar was formerly known as "Reduced Space Symbology (RSS)" and is renamed to align with the name of the GS1 organization.

The GS1 DataBar family contains three types of linear symbologies to be used with the GS1 system. The first type has four variations (GS1 DataBar Omnidirectional, GS1 DataBar Truncated, GS1 DataBar Stacked and GS1 DataBar Stacked Omnidirectional). The stacked variations are two-row symbols. The second type comprises only one variation, namely GS1 DataBar Limited. The third type has two variations: a single row variation (GS1 DataBar Expanded) and a multi-row stacked variation (GS1 DataBar Expanded Stacked). The use of GS1 DataBar is intended to comply with the GS1 application guidelines as defined in the GS1 General Specifications.

GS1 DataBar Omnidirectional and GS1 DataBar Stacked Omnidirectional encode a 14-digit GS1 item identification (often referred to as a Global Trade Item Number, or GTIN) in a linear symbol that can be scanned omnidirectionally by suitably programmed point-of-sale scanners. GS1 DataBar Truncated and GS1 DataBar Stacked encode a 14-digit GS1 item identification in a linear symbol and are not suitable for omnidirectional scanning. GS1 DataBar Limited encodes a 14-digit GS1 item identification with a leading digit of zero or one in a linear symbol for use on small items that will not be scanned at the point-of-sale. GS1 DataBar Expanded encodes GS1 item identification plus supplementary application identifier element strings such as weight and "best before" date in a linear symbol that can be scanned omnidirectionally by suitably programmed point-of-sale scanners.

Any member of the GS1 DataBar family can be printed as a stand-alone linear symbol or as part of a GS1 Composite symbol with an accompanying two-dimensional component printed above the GS1 DataBar linear component.

GS1 DataBar symbols are intended for encoding identification numbers and data supplementary to the identification. The administration of the numbering system by GS1 ensures that identification codes assigned to particular items are unique worldwide and that they and the associated supplementary data are defined in a consistent way. The major benefit for the users of the GS1 system is the availability of uniquely defined identification codes and supplementary data formats for use in their trading transactions.

Information technology — Automatic identification and data capture techniques — GS1 DataBar bar code symbology specification

1 Scope

This International Standard defines the requirements for the GS1 DataBar symbology family. It specifies the characteristics of the GS1 DataBar symbology family, data character encodation, symbol formats, dimensions, print quality requirements, error detection, and decoding algorithms.

For GS1 Composite symbols, ISO/IEC 24723 defines the two-dimensional component.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 646, *Information technology — ISO 7-bit coded character set for information interchange*

ISO 4217, *Codes for the representation of currencies and funds*

ISO/IEC 15416, *Information technology — Automatic identification and data capture techniques — Bar code print quality test specification — Linear symbols*

ISO/IEC 15417, *Information technology — Automatic identification and data capture techniques — Code 128 bar code symbology specification*

ISO/IEC 15420, *Information technology — Automatic identification and data capture techniques — EAN/UPC bar code symbology specification*

ISO/IEC 19762-1, *Information technology — Automatic identification and data capture (AIDC) techniques — Harmonized vocabulary — Part 1: General terms relating to AIDC*

ISO/IEC 19762-2, *Information technology — Automatic identification and data capture (AIDC) techniques — Harmonized vocabulary — Part 2: Optically readable media (ORM)*

ISO/IEC 24723, *Information technology — Automatic identification and data capture techniques — GS1 Composite bar code symbology specification*

3 Terms, definitions, abbreviated terms and mathematical operators

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 19762-1, ISO/IEC 19762-2 and the following apply.

NOTE   For terms which are defined below and in ISO/IEC 19762, the definitions given below apply.

3.1.1
2D component
two-dimensional portion of a GS1 Composite symbol, which encodes supplemental information about an item, such as its lot number or expiration date

3.1.2
AI element string
character string containing an application identifier followed by its associated data field

3.1.3
encodation methods
compaction schemes used by GS1 DataBar Expanded and 2D components to encode commonly used AI element strings in binary strings that are shorter than would be required using general data compaction for the symbology

3.1.4
indicator digit
leading digit of a GTIN-14 item identification number used to differentiate multiple levels of packaging or to indicate a variable measure item

3.1.5
linear component
linear portion of a GS1 Composite symbol, which encodes the primary identification of an item

3.1.6
linkage flag
indicator encoded in a GS1 DataBar or GS1-128 linear component to signal if a 2D component accompanies the linear component

3.1.7
segment
minimum decodable portion of a bar code symbol, consisting, in GS1 DataBar, of a symbol character and its adjacent finder pattern

3.1.8
GS1-128
subset, specified in GS1 General Specifications, of Code 128 as defined in ISO/IEC 15417

3.1.9
voting
decoding technique whereby decoded segment values are saved along with a count of the number of times they have been decoded

NOTE   Voting is used for decoding GS1 DataBar by segments such as when used with omnidirectional scanning.

3.2   Abbreviated terms

AI   Application Identifier (see ISO/IEC 15418)

2D   two-dimensional

3.3   Mathematical operators and notational conventions

For the purposes of this document, the following mathematical operators apply.

div   integer division operator which discards the remainder

mod   integer remainder after integer division

The following ISO notational conventions are used.

0,2   A comma between numbers represents a decimal value (e.g. 0,2 equals 2/10) except when used in subscripts or as an (n,k) designation.

12 345   A space between digits indicates factors of a thousand.

4   Symbol description

4.1   Types of GS1 DataBar symbol

The GS1 DataBar symbology consists of the following three types:

First type of GS1 DataBar symbol that has the following four variations:

> GS1 DataBar Omnidirectional

> GS1 DataBar Truncated

> GS1 DataBar Stacked

> GS1 DataBar Stacked Omnidirectional

Second type of GS1 DataBar symbol that has the following one variation:

> GS1 DataBar Limited

Third type of GS1 DataBar symbol that has the following two variations:

> GS1 DataBar Expanded

> GS1 DataBar Expanded Stacked

The first type of GS1 DataBar symbol contains four symbol characters in every symbol and has identical character encoding rules and structure for all symbols of this type.

The second type of GS1 DataBar symbol is structurally different than the first type, containing two symbol characters and uses different character encoding rules.

The third type has yet another distinct symbology structure and set of character encoding rules, and can contain a variable number of symbol characters.

GS1 DataBar Omnidirectional, GS1 DataBar Stacked Omnidirectional, GS1 DataBar Expanded and GS1 DataBar Expanded Stacked are designed to be read in segments by omnidirectional scanners.

NOTE   Annex J contains a summary of characteristics of the three types of GS1 DataBar symbology types.

4.2   Symbology characteristics

The characteristics of the GS1 DataBar symbology are:

a)   Encodable character set:

   1)   GS1 DataBar Omnidirectional, GS1 DataBar Truncated, GS1 DataBar Stacked, GS1 DataBar Stacked Omnidirectional and GS1 DataBar Limited: 0 through 9;

   2)   GS1 DataBar Expanded and GS1 DataBar Expanded Stacked: a subset of ISO/IEC 646, consisting of the upper and lowercase letters, digits, and 20 selected punctuation characters in addition to the special function character, FNC1.

b)   Symbol character structure: different (n,k) symbol characters are used for each type of the symbology, where each symbol character is n modules in width and is composed of k bars and k spaces.

c)   Code type: continuous, linear bar code symbology.

d)   Maximum numeric data capacity (including implied application identifiers where appropriate, but not including any encoded FNC1 characters):

   1)   GS1 DataBar Omnidirectional, GS1 DataBar Truncated, GS1 DataBar Stacked, GS1 DataBar Stacked Omnidirectional and GS1 DataBar Limited: application identifier "01" plus a 14-digit numeric item identification;

   2)   GS1 DataBar Expanded and GS1 DataBar Expanded Stacked: 74 numeric or 41 alphabetic characters (see note).

      NOTE   The GS1 DataBar Expanded data capacity depends on the encoding method. The maximum is 74 digits for (01) + other AIs, the maximum is 70 digits for any AIs, and the maximum is 77 digits for (01) + (392x) + any AIs.

e)   Error detection:

   1)   GS1 DataBar Omnidirectional, GS1 DataBar Truncated, GS1 DataBar Stacked, GS1 DataBar Stacked Omnidirectional: mod 79 checksum;

   2)   GS1 DataBar Limited: mod 89 checksum;

   3)   GS1 DataBar Expanded and GS1 DataBar Expanded Stacked: mod 211 checksum.

f)   Character self-checking: yes.

g)   Bidirectionally decodable: yes.

4.3   Summary of additional features

The following is a summary of additional GS1 DataBar symbology features:

a)   Data compaction: Each member of the family has data compaction methods optimized for the data strings that they will encode. GS1 DataBar Expanded is optimized for specific combinations of application identifiers that are commonly used.

b) Component linkage: All GS1 DataBar symbols include a linkage flag. If the linkage flag is clear, i.e. equal to 0, then the GS1 DataBar symbol stands alone. If the linkage flag is set, i.e. equal to 1, then a 2D component is associated with the GS1 DataBar family linear component and its separator pattern.

c) GS1-128 emulation: Readers set to the GS1-128 emulation mode transmit the data encoded within the GS1 DataBar family symbol as if the data were encoded in one or more GS1-128 symbols.

4.4   Symbol structure

Each GS1 DataBar symbol contains outside guard patterns, symbol characters, and finder patterns. Every symbol includes a method for error detection.

The guard patterns for the first and third types of GS1 DataBar symbols consist of two one-module wide elements forming either a bar/space or a space/bar pair at each end of the symbol. GS1 DataBar Stacked and GS1 DataBar Expanded Stacked symbols have guard patterns at the ends of each row of the symbol. GS1 DataBar Limited symbols has a different guard pattern requirement that is designed to prevent misreads. See Annex I.1 regarding printing considerations for exterior guard pattern elements.

Every symbol has two or more symbol characters, each with an (n,k) structure. The symbol character values are combined mathematically to form the explicitly encoded data.

The finder pattern is a set of elements selected to be identifiable by the decoder so that the symbol can be recognized and the relative position of the elements can be determined. Each symbol contains one or more finder patterns. The finder patterns also function as the check character and/or segment identifiers.

All GS1 DataBar symbols include a linkage flag. If the flag is set, the GS1 DataBar linear component and its contiguous separator pattern shall be aligned with a 2D component in accordance with ISO/IEC 24723. Normally the GS1 DataBar linear component, its contiguous separator pattern, and the 2D component are printed at the same time, comprising a single GS1 Composite symbol. It is possible however, to preprint a GS1 DataBar linear component with the linkage flag set in anticipation of a subsequent process in which the 2D component is added. Under such circumstances the separator pattern shall be printed with the GS1 DataBar linear component in accordance with ISO/IEC 24723.

Bars and spaces may not be inverted for any form of GS1 DataBar symbol. That is, bars must be dark and spaces must be light. Scanners should not attempt to decode bar and space patterns as if they are inverted because inverted GS1 DataBar symbols can be misread.

5   Symbol requirements for GS1 DataBar Omnidirectional, GS1 DataBar Truncated, GS1 DataBar Stacked and GS1 DataBar Stacked Omnidirectional

5.1   Basic characteristics of GS1 DataBar Omnidirectional

GS1 DataBar Omnidirectional is a linear symbology capable of encoding 20 000 000 000 000 (2×10^{13}) values. These values are expressed as 14 digits. The first digit is a linkage flag. The following 13 digits are data characters. The 13 data characters plus an implied check digit form a GS1 14-digit item identification number including a leading indicator digit. Values 10 000 000 000 000 and above indicate that the linkage flag is set and therefore a 2D component is present, e.g. value 10 001 234 567 890 encodes item 00012345678905 with the linkage flag equal to 1.

GS1 DataBar Omnidirectional can be scanned and decoded in four segments and then reconstructed. This facilitates omnidirectional scanning. Figure 1 illustrates a stand-alone GS1 DataBar Omnidirectional symbol encoding the value 20012345678909 and having the linkage flag equal to 0.

Figure 1 — GS1 DataBar Omnidirectional symbol representing (01)20012345678909

NOTE   The leading (01) is the implied application identifier and is not encoded in the symbol. The last digit, 9, is not directly encoded in the symbol, but is a calculated mod 10 check digit. See Annex A for the check digit calculation. Annex F Encoding examples contains a complete example of encoding a GS1 DataBar Omnidirectional symbol.

5.2   Symbol structure of GS1 DataBar Omnidirectional

A GS1 DataBar Omnidirectional symbol, as shown in Figure 2, consists of eight regions (from left to right) comprising 96 modules:

a)   a one module space and one module bar left guard pattern

b)   four spaces and four bars with 16 modules comprising symbol character 1, (n,k) = (16,4)

c)   three spaces and two bars with 15 modules comprising the left finder pattern

d)   four bars and four spaces with 15 modules comprising symbol character 2, (n,k) = (15,4) (right to left)

e)   four bars and four spaces with 15 modules comprising symbol character 4, (n,k) = (15,4)

f)   three bars and two spaces with 15 modules comprising the right finder pattern (right to left)

g)   four spaces and four bars with 16 modules comprising symbol character 3, (n,k) = (16,4) (right to left)

h)   a one module space and one module bar right guard pattern

NOTE   The symbol character elements are ordered toward the adjacent finder.
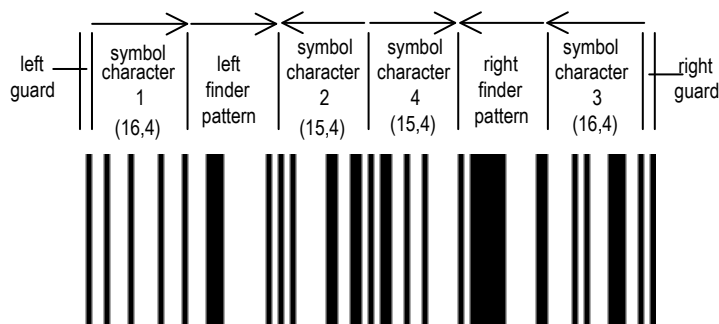
Figure 2 — GS1 DataBar Omnidirectional symbol representing (01)04412345678909

The total symbol contains 46 elements (bars and spaces) comprising 96 modules. Table E.1 in Annex E lists all 46 elements of a GS1 DataBar Omnidirectional symbol. A GS1 DataBar Omnidirectional symbol intended for omnidirectional scanning shall have a height greater than or equal to 33X (33 modules).

No quiet zones are required. The first and last elements may appear wider than one module without affecting the symbol if the adjacent background area is the same "color" (light on the left or dark on the right).

5.2.1 Symbol character structure

Each of the four symbol characters has an (n,k) structure. The value of n is 16 for the first and third (outside) symbol characters and 15 for the second and fourth (inside) symbol characters. The value of k is 4.

In Figure 2 the arrows show the ordering of element numbers within each character. The elements of the first and fourth symbol characters are ordered from left to right and the elements of the second and third characters are ordered from right to left, so that the symbol character elements are always ordered toward the adjacent finder.

Each symbol character contains two subsets of odd- and even-numbered elements. The terms odd and even refer to the ordinal number of the elements in each subset. For example the odd-numbered subset consists of the first, third, fifth and seventh elements in each symbol character starting with the element farthest from the adjacent finder pattern. In symbol characters one and two, the odd elements are spaces and the even elements are bars. In symbol characters three and four, the odd elements are bars and the even elements are spaces.

5.2.2 Symbol character value

For each symbol character value, an algorithm assigns a pattern of element widths to the odd and even subsets. The algorithm is given the number of elements, the number of modules, maximum element width, and whether the subset can have all elements wider than one module. Annex B gives a C-language implementation of the GS1 DataBar Omnidirectional, GS1 DataBar Truncated, GS1 DataBar Stacked and GS1 DataBar Stacked Omnidirectional symbol character element generation algorithm.

5.2.2.1 Outside symbol character values

For the outside symbol characters 1 and 3, the valid even element combinations shall have at least one single-module-wide element. The valid odd element subsets need not have a single-module-wide element. The even element restriction insures that the symbol characters have unique edge-to-similar-edge (bar plus space and space plus bar) module sums.

Table 1 shows the characteristics of the (16,4) subsets, listing the odd and even subset pairs in five groups. Both subsets have an even number of modules. The widest element widths are specified so that the number of modules in a pair of adjacent elements is never greater than nine. The total number of combinations of a (16,4) character is 2 841. The (16,4) symbol character value V_D is calculated by:

$$V_D = (V_{ODD} \times T_{EVEN}) + V_{EVEN} + G_{SUM}$$

where T_{EVEN} is the even subset total value, V_{ODD} is the odd subset value, V_{EVEN} is the even subset value, and G_{SUM} is the sum of the products of values for each previous group in Table 1. To encode a specific symbol character of V_D:

$$V_{ODD} = (V_D - G_{SUM}) \text{ div } T_{EVEN}$$

$$V_{EVEN} = (V_D - G_{SUM}) \text{ mod } T_{EVEN}$$

For example a (16,4) symbol character with the value of 2 315 is to be encoded. From Table 1, the value of the symbol character is in the range of Group 4, so $G_{SUM} = 2\ 015$ and $T_{EVEN} = 70$. Using the above equations:

$$V_{ODD} = (2\ 315 - 2\ 015) \text{ div } 70 = 300 \text{ div } 70 = 4$$

$$V_{EVEN} = (2\ 315 - 2\ 015) \text{ mod } 70 = 300 \text{ mod } 70 = 20$$

The symbol character value 2 315 is in Group 4 (see Table 1). The symbol character is comprised of an odd subset with 6 modules and a sequential value of $V_{ODD} = 4$ out of 10 (range 0 to 9) and an even subset with 10 modules and a sequential value of $V_{EVEN} = 20$ out of 70 (range 0 to 69). Using the routines in Annex B, the odd element widths are {1 2 2 1} and the even element widths are {1 5 1 3} giving the symbol character element widths of {1 1 2 5 2 1 1 3} as ordered towards the finder pattern (see Figure 2).

<p style="text-align:center">Table 1 — Outside symbol character (16,4) characteristics</p>

Value range	Group	Sum of previous groups, G_{SUM}	Odd/even subset modules	Odd/even widest elements	Odd subset total values, T_{ODD}	Even subset total values, T_{EVEN}
0 to 160	1	0	12/4	8/1	161	1
161 to 960	2	161	10/6	6/3	80	10
961 to 2 014	3	961	8/8	4/5	31	34
2 015 to 2 714	4	2 015	6/10	3/6	10	70
2 715 to 2 840	5	2 715	4/12	1/8	1	126

5.2.2.2 Inside symbol character values

For the inside symbol characters 2 and 4, the valid odd element combinations shall have at least one single module wide element. The valid even element subsets need not have a single-module-wide element. The odd element restriction insures that the symbol characters have unique edge-to-similar-edge (bar plus space and space plus bar) module sums.

Table 2 shows the characteristics of the (15,4) subsets, listing the odd and even subset pairs in four groups. The odd subset has an odd number of modules and the even subset has an even number of modules. The widest element widths are specified so that the number of modules in a pair of adjacent elements is never greater than nine. The total number of combinations for a (15,4) character is 1 597. The range of allowed values of the odd subset is restricted so that the innermost element (odd element number 1) will not exceed 4 modules.

<p style="text-align:center">Table 2 — Inside symbol character (15,4) characteristics</p>

Value range	Group	Sum of previous groups, G_{SUM}	Odd/even subset modules	Odd/even widest elements	Odd subset total values, T_{ODD}	Even subset total values, T_{EVEN}
0 to 335	1	0	5/10	2/7	4	84
336 to 1 035	2	336	7/8	4/5	20	35
1 036 to 1 515	3	1 036	9/6	6/3	48	10
1 516 to 1 596	4	1 516	11/4	8/1	81	1

The (15,4) symbol character value V_D is calculated by:

$$V_D = (V_{EVEN} \times T_{ODD}) + V_{ODD} + G_{SUM}$$

where T_{ODD} is the odd subset total value, V_{EVEN} is the even subset value, V_{ODD} is the odd subset value, and G_{SUM} is the sum of the products of values for each previous group. To encode a specific symbol character of value V_D:

$$V_{EVEN} = (V_D - G_{SUM}) \text{ div } T_{ODD}$$

$$V_{ODD} = (V_D - G_{SUM}) \text{ mod } T_{ODD}$$

Note that the significance of the even and odd subsets is reversed in these calculations compared to the (16,4) outside symbol characters.

5.2.3 Symbol value

The value of the symbol is formed by combining the values of the left symbol character pairs and the right symbol character pairs. The value of each symbol character pair is formed by combining the values of the outside and inside symbol characters. The symbol character pairs and their range of values are listed in Table 3.

Table 3 — Symbol character pair values

Outside symbol character		Inside symbol character		Symbol character pair	
(n,k)	values ($V_{OUTSIDE}$)	(n,k)	values (V_{INSIDE})	number of values	value range
(16,4)	2 841	(15,4)	1 597	4 537 077	0 to 4 537 076

The symbol character pair value V_{PAIR} is calculated by:

$$V_{PAIR} = (1\ 597 \times C_{OUTSIDE}) + C_{INSIDE}$$

where $C_{OUTSIDE}$ and C_{INSIDE} are the symbol character values.

To encode the pair value V_{PAIR} into the outside and inside symbol characters $C_{OUTSIDE}$ and C_{INSIDE}:

$$C_{OUTSIDE} = V_{PAIR} \text{ div } V_{INSIDE}$$

$$C_{INSIDE} = V_{PAIR} \text{ mod } V_{INSIDE}$$

For example, if the symbol character pair value V_{PAIR} is 1 971 265, then $C_{OUTSIDE}$ and C_{INSIDE} are:

$$C_{OUTSIDE} = 1\ 971\ 265 \text{ div } 1\ 597 = 1\ 234$$

$$C_{INSIDE} = 1\ 971\ 265 \text{ mod } 1\ 597 = 567$$

The symbol value is calculated by combining the values of the left and right symbol character pair values. The calculation is:

$$V_{SYMBOL} = (4\ 537\ 077 \times V_{LPAIR}) + V_{RPAIR}$$

where V_{SYMBOL} is the symbol value and V_{LPAIR} and V_{RPAIR} are the left and right symbol character pair values.

To encode the symbol value V_{SYMBOL} into the left and right symbol character pairs V_{LPAIR} and V_{RPAIR}:

$$V_{LPAIR} = V_{SYMBOL} \text{ div } 4\ 537\ 077$$

$$V_{RPAIR} = V_{SYMBOL} \text{ mod } 4\ 537\ 077$$

For example, if the symbol V_{SYMBOL} is 1 234 567 890, Then the value of the left pair V_{LPAIR} and the value of the right pair V_{RPAIR} are:

$$V_{LPAIR} = 1\ 234\ 567\ 890 \text{ div } 4\ 537\ 077 = 272$$

$$V_{RPAIR} = 1\ 234\ 567\ 890 \text{ mod } 4\ 537\ 077 = 482\ 946$$

Combining the values of the symbol characters generates 20 585 067 703 929 values, however, only the first 20 000 000 000 000 values (0 to 19 999 999 999 999) are used. The high-order digit is the 2D component linkage flag: 0 for a stand-alone GS1 DataBar Omnidirectional, GS1 DataBar Truncated, GS1 DataBar Stacked, GS1 or GS1 DataBar Stacked Omnidirectional and 1 if a 2D component adjoins the GS1 DataBar Omnidirectional, GS1 DataBar Truncated, GS1 DataBar Stacked or GS1 DataBar Stacked Omnidirectional primary symbol. This flag is stripped from the remaining 13 digits to form the item identification. An implied mod-10 check digit is calculated and added to the end to form the GTIN-14 identification number. A leading application identifier prefix 01 is added to the transmitted data, immediately after the mandatory transmitted symbology identifier,]e0 or]C1.