The Global Language of Business

GS1 Human Readable Interpretation (HRI) Implementation Guideline

Guideline to how to apply Human Readable Interpretation (HRI) on GS1 barcodes

Release 1.2, Ratified, Apr 2018

Document Summary

Document Item	Current Value
Document Name	GS1 Human Readable Interpretation (HRI) Implementation Guideline
Document Date	Apr 2018
Document Version	1.2
Document Issue	
Document Status	Ratified
Document Description	Guideline to how to apply Human Readable Interpretation (HRI) on GS1 barcodes

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Log of Changes

Release	Date of Change	Changed By	Summary of Change
1.0	Sept 2011	Mark Frey, Adele Paris & Greg Rowe	Updated per final comment resolutions. Guide was approved
1.1	Sep 2015	Alex Johnson	Re-Branding
1.2	Apr 2018	Yoshihiko Iwasaki	WR18-036 updates to bring-up to date and fully in line with the GS1 General Specifications

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Table of Contents

1 Introduction

The objective of this guide is to explain in simple terms how to manage the Human Readable Interpretation (HRI) associated with GS1 barcodes. Human Readable Interpretation refers to the characters printed below, beside or above a barcode. HRI serves as a fall-back option in situations where there is a need to manually interpret or process barcoded data.

The HRI rules enable industry to create consistent packaging designs that can be distributed to multiple countries and used in the same way.

1.1 Purpose and scope

The purpose of this document is to provide an easy to follow guideline for the application of Human Readable Interpretation as it relates to its use with barcodes. Each HRI Rule is explained in simple terms along with examples or figures.

1.2 Who can use this document?

The intended audience of the document is:

- Manufacturers
- Retail and healthcare industry users such as retail checkout staff, nurses, warehouse staff
- Printing and design companies such as package designers and barcode software design companies.

2 GS1 barcodes

This section provides an overview of all GS1 barcodes to which the HRI rules in this document apply. All barcode examples follow the dimensional specifications as specified in the symbol specification tables (*GS1 General Specifications*, section 5).

2.1 EAN/UPC

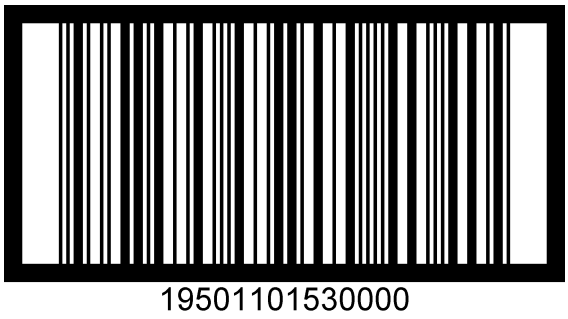
UPC-A

EAN-13

UPC-E

EAN-8

2.2 ITF-14



2.3 GS1-128

2.4 GS1 DataBar

Omnidirectional

(01) 0 9501101 53000 3

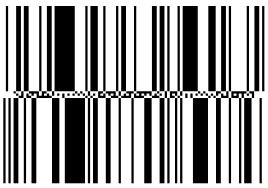
Expanded

(01) 0 9501101 53000 3 (17) 140704

Stacked Omnidirectional

(01) 0 9501101 53000 3

Expanded Stacked



(01) 0 9501101 53000 3
(3103) 000480

Truncated

(01) 0 9501101 53000 3

Limited

(01) 0 9501101 53000 3

Stacked

(01) 0 9501101 53000 3

2.5 GS1 DataMatrix

(01) 0 9501101 53000 3
(17) 150119
(10) AB-123

2.6 GS1 QR Code

(01) 0 9501101 53000 3
(8200) http://example.com

2.7 GS1 Composite Symbology

Example of GS1 DataBar Limited Composite symbol with CC-A:

(01)13112345678906(17)010615(10)A123456

3 Human Readable Interpretation rules

Note: The rules in this section are based on the *GS1 General Specifications [GENSPECS]*, in particular sections 4 and 5. Rules and phrases that are direct quotes from the *GS1 General Specifications* rules are shown in italics.

3.1 Where to print the HRI?

3.1.1 EAN/UPC symbology

For EAN/UPC symbologies the following rule applies: *The human readable digits SHALL be printed underneath the main symbol and above the add-on symbol. [GENSPECS – section 5.2.5]*.

Some correct examples of EAN/UPC symbols, the HRI is placed at the bottom:

EAN-13

EAN-8

UPC-A

UPC-E

Some examples of EAN/UPC symbols with an add-on symbol. The HRI of the add-on symbol is placed above it:

EAN-13
(with two-digit add-on symbol)

EAN-13
(with five-digit add-on symbol)

3.1.2 Other symbologies

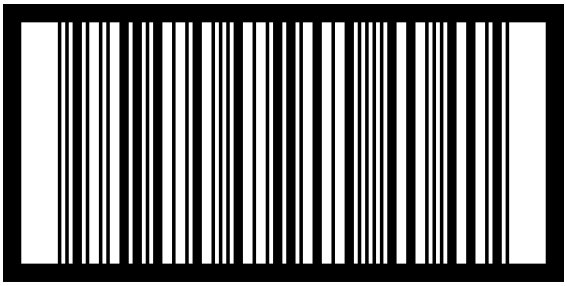
For symbologies other than EAN/UPC, including symbologies that support multiple element strings, the following rules apply.

Whether a GS1 AIDC data carrier encodes a GS1 identification key, GS1 key attributes, or a combination of both, the HRI SHOULD be placed below the barcode and grouped together wherever physically possible while maintaining the HRI legibility and minimum barcode height (as specified in the appropriate symbol specification table). [GENSPECS , section 4.15, rule 1].

When HRI is grouped together (for example, all HRI data is grouped below the barcode or all HRI data is grouped above the barcode), HRI shall always follow the encoding sequencing of the GS1 AIDC data carrier. [GENSPECS , section 4.15, rule 1 clause c]

Note: Encoding sequencing is the order in which the data encoded in the data carrier. For example, if the order of the AIs encoded in the data carrier is 01, 17, 10, the HRI will appear in the following order (01), (17), (10).

Example of an ITF-14 symbol, HRI is placed at the bottom:



GS1-128 with multiple element strings, the HRI is grouped together and placed below the symbol:

A similar example, but now with a GS1 DataBar Expanded symbol:

The next two examples show the HRI grouped together under the symbol, but across multiple lines of text:

GS1 DataMatrix

(01) 0 9501101 53000 3
(17) 150119
(10) AB-123

GS1 QR Code

(01) 0 9501101 53000 3
(8200) http://example.com

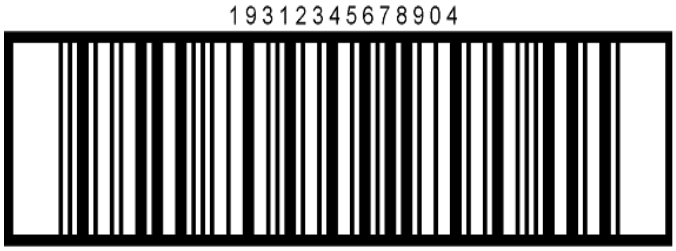
3.2 What to do if the HRI does not fit under the barcode?

3.2.1 Place the HRI above or to the side

For all symbologies, except for EAN/UPC barcodes, the HRI MAY be printed above, to the left, or to the right of the symbol.

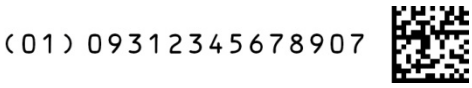
In such cases, the *HRI SHALL always be printed adjacent to (obviously associated with) the GS1 AIDC data carrier while protecting Quiet Zones. [GENSPECS , section 4.15, rule 1 clause a].*

An example, the HRI is placed above the ITF-14 symbol:



A GS1 DataBar Expanded Stacked symbol with HRI placed to the right:

A GS1 DataMatrix symbol with HRI placed to the left:



3.2.2 Use a combination of top, bottom, and side to place the HRI

For symbologies that can contain multiple element strings, the HRI for GS1 identification keys and attributes MAY be separated (for example by placing the HRI for the GS1 identification key below the barcode and the HRI of the attributes HRI above the barcode). In that case, *the preference for GS1 key HRI placement is always below the barcode [GENSPECS , section 4.15, rule 1 clause b].*

In this example the HRI of the GTIN (AI (01) is placed under the GS1 DataBar Expanded symbol, while the expiry date (AI (17) and the batch/lot number are placed above it:

The same example but now with a GS1-128 barcode:

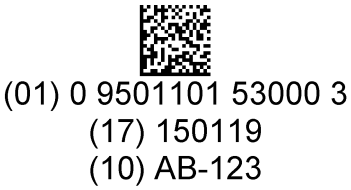
3.3 What to do if the Human Readable Interpretation line is too long?

A single data element shall not be broken into two lines of HRI, for example the data for a serial number would appear on one line of HRI. [GENSPECS , section 4.15, rule 2].

An example of correct HRI, all AIs and their corresponding values are placed on the same line:

The rule also implies that the AI should not be separated from its corresponding data. In cases where space constraints do not permit all HRI to fit on one line, the AI and its corresponding data should be moved to the next line.

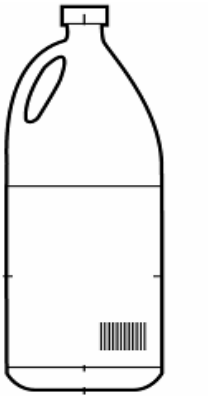
A correct example, HRI is split across multiple lines but the AIs and corresponding data are kept together:



The example below demonstrates how a single data element AI (17) is incorrectly broken into two lines of HRI.

3.4 What to do if the barcode is printed in ladder orientation?

Barcodes can be printed in picket fence or ladder orientation:

Picket Fence Orientation	Ladder Orientation
	

If the barcode is printed in ladder orientation on the product, the HRI SHOULD remain clearly associated with the barcode and may appear below, to the left, or to the right of the symbol respecting Quiet Zones. [GENSPECS , section 4.15, rule 10].

Note: The terms left, right and under are used relative to the symbol orientation, as illustrated in the figure below:

[GENSPECS figure 4.15-3]

Example of correct HRI placement with a GS1-128 symbol printed in ladder orientation:

3.5 What is the best font to use for printing the HRI?

A clearly legible font SHALL be used (e.g., OCR-B as defined in ISO 1073-2) and the character set as defined in [GENSPECS section 7.11]. Reasonable alternative type fonts and character sizes are acceptable provided the interpretation is clearly legible. [GENSPECS , section 4.15, rule 4]

Below is an example of OCR-B font:

(01) 04512345678906

3.6 How to represent the GS1 Application Identifiers in HRI?

GS1-128, GS1 DataBar Expanded, GS1 DataBar Expanded Stacked, GS1 DataMatrix and GS1 QR Code apply GS1 Application Identifiers (AIs) to encode the data in a barcode. The AI values must be represented as HRI between parentheses.

Parentheses SHALL surround AIs in HRI but are not encoded in the GS1 AIDC data carrier. [GENSPECS , section 4.15, rule 3]

The example below shows the correct representation of the AIs. The parentheses (brackets) around the AIs are only present as HRI and not encoded in the symbol.

Note: The AIs as shown in HRI do not always fully match what is encoded in the symbol. For example, in some of the GS1 DataBar symbols AI (01) is implied by the symbol type and the '01' value is not encoded as such.

3.7 How to represent special characters in HRI?

HRI SHALL be limited to element strings and will not include GS1 AIDC data carrier overhead such as separator characters. [GENSPECS , section 4.15, rule 6]

All GS1 AIDC data carriers require the use of specific technical encoding characters. These special characters allow scanning software to identify that the symbol conforms to GS1 encoding standards and so enables the correct decoding of data elements.

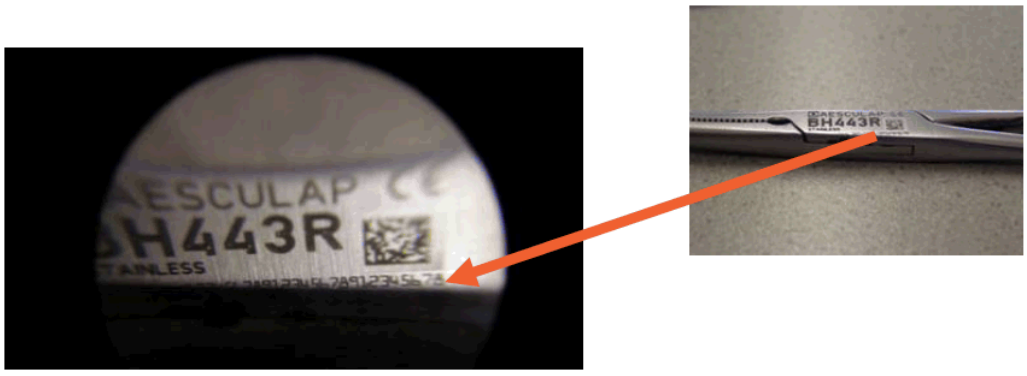
Examples of such characters are Start and Stop Characters, FNC1 and data separators. These characters are not represented in the HRI since they are intended only for use by automated scanning software

3.8 Do I always need to print the HRI?

HRI SHALL appear except in rare circumstances for specific applications where there are extreme space constraints (e.g., direct part marking). If the GS1 AIDC data carrier cannot be read or scanned and the HRI does not appear on the label, package, or item, non-HRI text SHOULD be used as backup information. [GENSPECS , section 4.15, rule 8]

Note: For Healthcare applications specific rules have been defined to address some of these aspects. *[see GENSPECS , sections 4.15 and 4.15.1]*

Example of a GS1 DataMatrix directly marked on an item, space limitations inhibit full representation of the HRI:



4 Glossary

Please refer to the *www.gs1.org/glossary* for the latest version of the glossary.

Term	Definition
attribute	An element string that provides additional information about an entity identified with a GS1 identification key, such as batch number associated with a Global Trade Item Number (GTIN).
element string	The combination of a GS1 Application Identifier and GS1 Application Identifier data field.
GS1 AIDC data carrier	A means to represent data in a machine readable form; used to enable automatic reading of the element strings as specified for use by GS1.
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 identification key	A unique identifier for a class of objects (e.g., a trade item) or an instance of an object (e.g., a logistic unit).
human readable interpretation(HRI)	Characters, such as letters and numbers, which can be read by persons and are encoded in GS1 AIDC data carriers confined to a GS1 standard structure and format. The human readable interpretation is a one-to-one illustration of the encoded data. However start, stop, shift and function characters, as well as the symbol check character, are not shown in the human readable interpretation.
non-HRI text	Characters such as letters and numbers that can be read by persons and may or may not be encoded in GS1 AIDC data carriers and are not confined to a structure and format based on GS1 standards (e.g., a date code expressed in a national format that could be used to encode a date field in a GS1 AIDC data carrier, brand owner name, consumer declarations).
Quiet Zone	A clear space which precedes the start character of a barcode and follows the stop character. Formerly referred to as “clear area” or “light margin”.