INTERNATIONAL STANDARD

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Information technology — Automatic identification and data capture techniques — Data Carrier Identifiers (including Symbology Identifiers)

Technologies de l'information — Techniques d'identification automatique et de capture de données — Identificateurs de porteuses de données (comprenant les identificateurs de symboles)

Reference number
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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 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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. 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 International Standard may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

International Standard ISO/IEC 15424 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 31, *Automatic identification and data capture techniques*, in collaboration with CEN Technical Committee TC 225, *Bar coding*, and AIM International, Inc. It was based in part on the corresponding European Standard EN 796, *Bar Coding — Symbology Identifiers*, which is fully compatible with this International Standard.

Annexes A and B form a normative part of this International Standard. Annex C is for information only.

Introduction

The need exists to identify the data carrier a reader detects in autodiscrimination environments. The Symbology Identifier concept provides a standardized way for a device receiving data from a reader to differentiate between the data carriers. This specification deals mostly with bar code symbologies, therefore the terms Symbology Identifier, symbology, and bar code are used throughout the document but they are intended to apply to other data carriers as well.

This identification is achieved by the addition of an optional feature to readers enabling the reader to prefix a standard string of characters to data messages. This preamble contains information about the decoded symbol (or other data carrier) and any processing the reader has done. The information is not encoded or otherwise explicitly or implicitly represented in the symbol, except that the presence of some optional features may be detected by the reading equipment, whereas others require the reader to be expressly configured to implement them.

This International Standard should be read in conjunction with the relevant symbology specifications.

Information technology — Automatic identification and data capture techniques — Data Carrier Identifiers (including Symbology Identifiers)

1 Scope

This International Standard applies to automatic identification device communication conventions and standardizes the reporting of data carriers from bar code readers and other automatic identification equipment. It specifies a preamble message generated by the reader and interpretable by the receiving system, which indicates the bar code symbology or other origin of transmitted data, together with details of certain specified optional processing features associated with the data message.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO/IEC 646:1991, *Information technology — ISO 7-bit Character Set for information interchange.*

EN 1556, *Bar coding — Terminology.*

3 Terms and definitions

For the purposes of this International Standard, the terms and definitions given in EN 1556 and the following apply.

3.1
code character
second character in the symbology identifier string, which usually indicates to the host the bar code symbology of the symbol which has been read

3.2
flag character
first character in the symbology identifier string, which indicates to the host that it and the characters following are the symbology identifier characters

3.3
modifier characters
remaining characters following the code character in the symbology identifier string

3.4
FNC1
special function character used for specific purposes in certain symbologies

3.5
FNC2
special function character used for specific purposes in certain symbologies

4 Requirements

This International Standard identifies symbologies for which a symbology specification has been published by ISO/IEC JTC 1, AIM International, or another recognized international standards body. In addition there is a fixed number of symbologies which do not have a full standard but do have a reference document available from AIM International, Inc. These symbologies are included in this International Standard because of their historical usage.

4.1 Structure

The symbology identifier shall be an ASCII character string prefixed by the reading equipment to the data contained in a bar code symbol.

The structure of the symbology identifier string shall be as follows:

]cm...

where] (ASCII value 93 in accordance with ISO 646) represents the symbology identifier flag character;

c represents the code character as defined in Table 1;

m... represents the modifier character(s) as defined for the symbology in question.

NOTE The sign] is the character assigned to ASCII value 93 in the United States ASCII character set in accordance with ISO 646.

If a reader is enabled to transmit symbology identifiers, it shall always transmit a symbology identifier at the beginning of each message. The application must know whether or not the reader has symbology identifiers enabled. Therefore, the symbol data may start with a] and still be interpreted unambiguously.

When these ASCII characters are transmitted in a 16-bit (double byte) system, an 8-bit byte of all zeros shall be transmitted before each of the above ASCII characters (bytes).

4.2 Code characters

Code characters shall be drawn from the set of upper- and lower-case alphabetic letters A through Z (ASCII values 65 through 90) and a through z (ASCII values 97 through 122). The currently assigned code characters are listed in Table 1. These code characters are case sensitive, i.e. a capital "A" is a different code character from a lower case "a".

The code character Y is not assigned to a specific symbology but will be used for system expansion. The first modifier character following Y will be a digit from 1 to 9 defining the number of remaining modifier characters in the symbology identifier prefix string.

All code characters not given here are reserved for future use. Maintenance of the list of code characters (and of options given in 4.3) shall be in accordance with annex A of this International Standard.

Certain symbologies emulate the data content of other symbologies, using their assigned symbology identifier. See annex B.

Table 1 — Code characters

Code char.	Symbology	Code char.	Symbology
A	Code 39	a	reserved
B	Telepen	b	reserved
C	Code 128	c	Channel Code
D	Code one	d	Data matrix
E	EAN/UPC	e	reserved
F	Codabar	f	reserved
G	Code 93	g	reserved
H	Code 11	h	reserved
I	Interleaved 2 of 5	i	reserved
J	reserved	j	reserved
K	Code 16K	k	reserved
L	PDF417 and MicroPDF417	l	reserved
M	MSI	m	reserved
N	Anker	n	reserved
O	Codablock	o	reserved
P	Plessey Code	p	reserved
Q	QR Code	q	reserved
R	Straight 2 of 5 (with two bar start/stop codes)	r	reserved
S	Straight 2 of 5 (with three bar start/stop codes)	s	reserved
T	Code 49	t	reserved
U	MaxiCode	u	reserved
V	reserved	v	reserved
W	reserved	w	reserved
X	Other bar code	x	reserved
Y	System expansion	y	reserved
Z	Non-bar code	z	Aztec code

4.3 Modifier characters

Some symbologies covered by this International Standard contain optional features which need to be indicated to the receiving equipment to enable them to be correctly processed. This optional processing is indicated by the modifier character(s).

Each symbology has a different set of optional features. These are listed in the following subclauses.

To determine the modifier character(s) for an application, refer to the subclause corresponding to the symbology concerned. Listed in this subclause may be one or more processing options, each of which has an assigned option value. The precise interpretation of the option should be obtained by reference to the relevant symbology specification. The modifier characters define the options available for the code character. The number of modifier characters and their meaning is defined for each of the code characters. The first modifier character shall be from the set {0 to 9, A to Z, a to z}; in some instances the character may represent a hexadecimal value (0 to F) corresponding to the sum of active processing options.

Where no options are indicated in the subclauses, the modifier character to be transmitted is 0. Values which are not included in the modifier values of a subclause are reserved for future use.

Check character options listed in the subclauses below indicate the basis of calculation of the check character, where a check character algorithm has been defined in the symbology specification or reference document.

4.3.1 Code 39

Code character: **A**

Modifier character value	*Option*
0	No check character validation nor full ASCII processing; all data transmitted as decoded
1	Modulo 43 check character validated and transmitted
3	Modulo 43 check character validated but not transmitted
4	Full ASCII character conversion performed; no check character validation
5	Full ASCII character conversion performed; modulo 43 check character validated and transmitted
7	Full ASCII character conversion performed; modulo 43 check character validated but not transmitted

4.3.2 Telepen

Code character: **B**

Modifier character value	*Option*
0	Full ASCII mode
1	Double density numeric only mode
2	Double density numeric followed by full ASCII
4	Full ASCII followed by double density numeric

4.3.3 Code 128

Code character: **C**

Modifier character value	*Option*
0	Standard data packet. No FNC1 in first or second symbol character position after start character
1	EAN/UCC-128 data packet - FNC1 in first symbol character position after start character
2	FNC1 in second symbol character position after start character
4	Concatenation according to International Society for Blood Transfusion specifications has been performed; concatenated data follows

4.3.4 Channel Code

Code character: **c**

Modifier character value	*Option*
3	Channel 3 decoded
4	Channel 4 decoded
5	Channel 5 decoded
6	Channel 6 decoded
7	Channel 7 decoded
8	Channel 8 decoded
9	Composite format

4.3.5 Code One

Code character: **D**

Modifier character value	*Option*
0	No special characters in first or second symbol character position
1	FNC1 implied in first symbol character position
2	FNC1 in second symbol character position
4	Pad character in first symbol character position. The first data character in the symbol will define the escape character. When this character is a \ it indicates that the symbol contains ECI escape sequences.

4.3.6 Data Matrix

Code character: **d**

Modifier character value	*Option*
0	ECC 000 to ECC 140
1	ECC 200
2	ECC 200, FNC1 in first or fifth position
3	ECC 200, FNC1 in second or sixth position
4	ECC 200, ECI protocol implemented
5	ECC 200, FNC1 in first or fifth position, ECI protocol implemented
6	ECC 200, FNC1 in second or sixth position, ECI protocol implemented

4.3.7 EAN/UPC

Code character: **E**

EAN/UPC symbols with supplements should be considered as two separate symbols. The first symbol is the main data packet, and the second symbol is the 2 or 5 digit supplement. These two symbols should be transmitted separately, each with its own symbology identifier. Provision is, however, made for the option of transmission of both symbols as a single data packet.

Modifier character value	*Option*
0	Standard data packet in full EAN format, i.e. 13 digits for EAN-13, UPC-A and UPC-E (does not include add-on data)
1	Two digit add-on data only
2	Five digit add-on data only
3	Combined data packet comprising 13 digits from EAN-13, UPC-A or UPC-E symbol and 2 or 5 digits from add-on symbol
4	EAN-8 data packet

4.3.8 Codabar

Code character: **F**

Modifier character value	*Option*
0	Standard Codabar symbol. No special processing.
1	ABC Codabar (American Blood Commission) concatenate/message append performed
2	Reader has validated the check character
4	Reader has stripped the check character before transmission

4.3.9 Code 93

Code character: **G**

Modifier character value	*Option*
0	No options specified at this time. Always transmit 0

4.3.10 Code 11

Code character: **H**

Modifier character value	*Option*
0	Single modulo 11 check character validated and transmitted
1	Two modulo 11 check characters validated and transmitted
3	Check character(s) validated but not transmitted

4.3.11 Interleaved 2 of 5

Code character: **I**

Modifier character value	*Option*
0	No check character validation
1	Modulo 10 symbol check character validated and transmitted
3	Modulo 10 symbol check character validated but not transmitted

4.3.12 Code 16K

Code character: K

Modifier character value	*Option*
0	No special characters in first or second symbol character position after start character
1	FNC1 implied or explicit in first symbol character position after start character
2	FNC1 in second symbol character position after start character
4	Pad character in first symbol character position after start character

4.3.13 PDF417 and MicroPDF417

Code character: **L**

Modifier character value	*Option*
0	Reader set to conform with protocol defined in 1994 PDF417 symbology specifications
1	Reader set to follow protocol of ENV 12925 for Extended Channel Interpretation (All data characters 92 doubled)
2	Reader set to follow protocol of ENV 12925 for Basic Channel Interpretation (Data characters 92 are not doubled)
3	Code 128 emulation: implied FNC1 in first position
4	Code 128 emulation: implied FNC1 after initial letter or pair of digits
5	Code 128 emulation: no implied FNC1

NOTE Modifier values 3, 4 and 5 are applicable only to MicroPDF417 symbols.

4.3.14 MSI

Code character: **M**

Modifier character value	*Option*
0	Modulo 10 symbol check character validated and transmitted
1	Modulo 10 symbol check character validated but not transmitted

4.3.15 Anker Code

Code character: **N**

Modifier character value	*Option*
0	No options specified at this time. Always transmit 0

4.3.16 Codablock

Code character: **O**

Modifier character value	*Option*
0	Codablock 256: FNC1 not used
1	Codablock 256: FNC1 in first data character position; subsequent occurrences converted to ASCII 29 (GS)
4	Codablock F: FNC1 not used
5	Codablock F: FNC1 in first data character position; subsequent occurrences converted to ASCII 29 (GS)
6	Codablock A

4.3.17 Plessey Code

Code character: **P**

Modifier character value	*Option*
0	No options specified at this time. Always transmit 0

4.3.18 QR Code

Code character: **Q**

Modifier character value	*Option*
0	Model 1 symbol
1	Model 2 symbol, ECI protocol not implemented
2	Model 2 symbol, ECI protocol implemented
3	Model 2 symbol, ECI protocol not implemented, FNC1 implied in first position
4	Model 2 symbol, ECI protocol implemented, FNC1 implied in first position
5	Model 2 symbol, ECI protocol not implemented, FNC1 implied in second position
6	Model 2 symbol, ECI protocol implemented, FNC1 implied in second position

4.3.19 Straight 2 of 5 (with two bar start/stop codes)

Code character: **R**

Modifier character value	*Option*
0	No check character validation
1	Modulo 7 check character validated and transmitted
3	Modulo 7 check character validated but not transmitted

4.3.20 Straight 2 of 5 (with three bar start/stop codes)

Code character: **S**

Modifier character value	*Option*
0	No options specified at this time. Always transmit 0

4.3.21 Code 49

Code character: **T**

Modifier character value	*Option*
0	No special characters in the first or second data character positions
1	FNC1 in the first data character position
2	FNC1 in the second data character position
4	FNC2 in the first data character position

4.3.22 MaxiCode

Code character: **U**

Modifier character value	*Option*
0	Symbol in Mode 4 or 5
1	Symbol in Mode 2 or 3
2	Symbol in Mode 4 or 5, ECI protocol implemented
3	Symbol in Mode 2 or 3, ECI protocol implemented in secondary message

4.3.23 Other bar code

Code character: **X**

For symbologies or symbology options not covered by this document, code character X with the following options may be assigned by the decoder manufacturer to identify those symbologies and options implemented in the reader.

Modifier character value	*Option*
0 to F	May be assigned by the decoder manufacturer

4.3.24 Non-bar code

Code character: **Z**

Where it is necessary to identify the source of data originating from a device other than a bar code reader, the code character Z together with the following options may be assigned by the device manufacturer.

Modifier character value	*Option*
0	Keyboard
1	Magnetic Stripe
2	Radio Frequency (RF) tag
3 to F	May be assigned by device manufacturer

4.3.25 Aztec Code

Code character: **z**

Modifier character value	*Option*
0	No options
1	FNC1 preceding 1st message character
2	FNC1 following an initial letter or pair of digits
3	ECI protocol implemented
4	FNC1 preceding 1st message character, ECI protocol implemented
5	FNC1 following an initial letter or pair of digits, ECI protocol implemented
6	Structured Append header included
7	Structured Append header included, FNC1 preceding 1st message character
8	Structured Append header included, FNC1 following an initial letter or pair of digits
9	Structured Append header included, ECI protocol implemented
A	Structured Append header included, FNC1 preceding 1st message character, ECI protocol implemented
B	Structured Append header included, FNC1 following an initial letter or pair of digits, ECI protocol implemented
C	Aztec Rune decoded

Annex A
(normative)

Maintenance

Maintenance of the list of symbology identifiers defined in this International Technical Specification shall be the responsibility of:

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to whom applications for the assignment of new symbology identifiers shall be made. AIM International, Inc. shall assess the technical justification for the proposed new assignment and take into account the opinions of its international affiliates in order to ensure the maximum harmonisation of related standards.

AIM International Inc. shall assign a new symbology identifier during the development of a new symbology specification. The specification shall contain a section specifying the symbology identifier and its modifier values. If and when the specification is published by AIM International, Inc., it will update the data carrier/symbology identifier maintenance document to reflect the symbology identifier section in the published specification. The maintenance document shall be identified with the month and year of publication.

NOTE AIM Europe (The Old Vicarage, Haley Hill, Halifax, HX3 6DR, U.K., a regional affiliate of AIM International, Inc.) has been assigned the maintenance responsibility for EN 796 by CEN and is responsible for ensuring that the updated list is forwarded to the Secretariat of CEN/TC225 to be distributed to CEN members at appropriate intervals.