

INTERNATIONAL STANDARD

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8632-2

Second edition
1992-10-01

**Information technology — Computer graphics —
Metafile for the storage and transfer of picture
description information —
Part 2:
Character encoding**

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*Technologies de l'information — Infographie — Métafichier de stockage
et de transfert des informations de description d'images —*

Partie 2: Codage des caractères



Reference number
ISO/IEC 8632-2:1992(E)

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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.

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.

International Standard ISO/IEC 8632-2 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

This second edition cancels and replaces the first edition (ISO 8632-2:1987), which has been technically revised.

ISO/IEC 8632 consists of the following parts, under the general title *Information technology – Computer graphics – Metafile for the storage and transfer of picture description information* :

Part 1: Functional specification

Part 2: Character encoding

Part 3: Binary encoding

Part 4: Clear text encoding

Annex A forms an integral part of this part of ISO/IEC 8632.

Introduction

0.1 Purpose of the character encoding

The Character Encoding of the Computer Graphics Metafile (CGM) provides a representation of the Metafile syntax intended for situations in which it is important to minimize the size of the metafile or transmit the metafile through character-oriented communications services. The encoding uses compact representation of data that is optimized for storage or transfer between computer systems.

If minimizing the processing overhead is more important than data compaction, an encoding such as the Binary Encoding contained in ISO/IEC 8632-3 may be more appropriate. If human readability is the most important criterion, an encoding such as the Clear Text Encoding in ISO/IEC 8632-4 may be more appropriate.

0.2 Objectives

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This encoding was designed with the following objectives:

- a) regular syntax: All elements of the metafile should be encoded in a uniform way so that parsing the metafile is simple;
- b) compactness: The encoding should provide a highly compact metafile, suitable for systems with restricted storage capacity or transfer bandwidth;
- c) extensibility: the encoding should allow for future extensions;
- d) transportability: the encoding should be suitable for use with transport mechanisms designed for character-oriented data based on a standard national character set derived from ISO/IEC 646.

0.3 Metafile characteristics

Each CGM command follows a simple regular syntax. Thus, new commands can be added in a future revision of ISO/IEC 8632 such that existing CGM interpreters can recognize (and ignore) the new commands. Also, new operands can be added to existing commands in the future revision of the standard such that existing CGM interpreters can recognize (and ignore) the additional operands.

Each CGM operand follows a simple regular syntax. Operands are variable in length. This permits small values to be represented by the smallest number of bytes.

Metafile characteristics**Introduction**

A certain range of operand values of standard commands have been reserved for private use; the remaining range is either standardized or reserved for future standardization.

0.4 Relationship to other International Standards

The Character Encoding has been developed in collaboration with the ISO subcommittee responsible for character sets and coding, ECMA, and CEPT. The encoding conforms to the rules for code extension specified in ISO 2022 in the category of complete coding system.

The representation of character data in this part of ISO/IEC 8632 follows the rules of ISO/IEC 646 and ISO 2022.

For certain elements, the CGM defines value ranges as being reserved for registration. The values and their meanings will be defined using the established procedures (see ISO/IEC 8632-1, sub-clause 4.12.)

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Information technology – Computer graphics – Metafile for the storage and transfer of picture description information –

Part 2 : Character encoding

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1 Scope

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This part of ISO/IEC 8632 specifies a character encoding of the Computer Graphics Metafile. For each of the elements specified in ISO/IEC 8632-1 an encoding is specified.

This encoding of the Computer Graphics Metafile provides a highly compact representation of the metafile, suitable for applications that require the metafile to be of minimum size and suitable for transmission with character-oriented transmission services.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 8632. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO/IEC 8632 are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO/IEC 646:1991, *Information technology – ISO 7-bit coded character set for information interchange.*

ISO 2022:1986, *Information processing – ISO 7-bit and 8-bit coded character sets – Code extension techniques.*

ISO 2375:1985, *Data processing – Procedure for registration of escape sequences.*

ISO 6429:1988, *Information processing – Control functions for 7-bit and 8-bit coded character sets.*

ECMA 96, *Graphics Data Syntax for a multiple Workstation Interface.*

CEPT, *Revision of T/CD 6.1 Videotex Presentation Layer Data Syntax.*

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3 Notational conventions

3.1 7-Bit and 8-Bit code tables

The bits of the bit combinations of the 7-bit code are identified by b7, b6, b5, b4, b3, b2, and b1, where b7 is the highest-order, or most-significant, bit and b1 is the lowest-order, or least-significant, bit.

The bit combinations may be interpreted to represent integers in the range 0 to 127 in binary notation by attributing the following weights to the individual bits:

Bit:	b7	b6	b5	b4	b3	b2	b1
Weight:	64	32	16	8	4	2	1

In this part of ISO/IEC 8632, the bit combinations are identified by notation of the form x/y , where x is a number in the range 0 to 7 and y is a number in the range 0 to 15. The correspondence between the notations of the form x/y and the bit combinations consisting of the bits b7 to b1 is as follows:

- x is the number represented by b7, b6, and b5 where these bits are given the weights 4, 2, and 1 respectively;
- y is the number represented by b4, b3, b2, and b1 where these bits are given the weights 8, 4, 2, and 1 respectively.

The notations of the form x/y are the same as those used to identify code table positions, where x is the column number and y is the row number.

A 7-bit code table consists of 128 positions arranged in eight columns and sixteen rows. The columns are numbered 0 to 7 and the rows are numbered 0 to 15. Figure 1 shows a 7-bit code table.

An example illustrates the 7-bit code: $1/11$ refers to the bit combination in column 1, row 11 of the code table, binary 0011011.

The bits of the bit combinations of the 8-bit code are identified by b8, b7, b6, b5, b4, b3, b2, and b1, where b8 is the highest-order, or most-significant, bit and b1 is the lowest-order, or least-significant, bit.

The bit combinations may be interpreted to represent integers in the range 0 to 255 in binary notation by attributing the following weights to the individual bits:

Bit:	b8	b7	b6	b5	b4	b3	b2	b1
Weight:	128	64	32	16	8	4	2	1

Using these weights, the bit combinations of the 8-bit code are interpreted to represent numbers in the range 0 to 255.

In this part of ISO/IEC 8632, the bit combinations are identified by notation of the form xx/yy , where xx and yy are numbers in the range 00 to 15. The correspondence between the notations of the form xx/yy and the bit combinations consisting of the bits b8 to b1 is as follows:

- xx is the number represented by b8, b7, b6, and b5 where these bits are given the weights 8, 4, 2, and 1 respectively;
- yy is the number represented by b4, b3, b2, and b1 where these bits are given the weights 8, 4, 2, and 1 respectively.

The notations of the form xx/yy are the same as those used to identify code table positions, where xx is the column number and yy is the row number. An 8-bit code table consists of 256 positions arranged in sixteen columns and sixteen rows. The columns and rows are numbered 00 to 15. Figure 2 shows an 8-bit code

table.

An example illustrates the 8-bit code: 04/01 represents the 8-bit byte 01000001, whereas 4/1 represents the 7-bit byte 1000001.

3.2 Code extension techniques vocabulary

In describing the characters that may occur within string parameters, certain terms imported from other standards (e.g., ISO 2022) are useful. In the context of the CGM, these terms, and the concepts to which they refer, apply only within the string parameters of the TEXT, APPEND TEXT, and RESTRICTED TEXT metafile elements.

3.2.1 C0 sets

A C0 set is a set of 30 control characters represented in a 7-bit code by 0/0 to 1/15, except 0/14 and 0/15 which shall be unused, and in an 8-bit code by 00/00 to 01/15, except 00/14 and 00/15 which shall be unused. C0 sets occupy columns 0 and 1 of a 7-bit code table or columns 00 and 01 of an 8-bit code table. The meanings of C0 controls within string parameters are described in 6.9.3.

3.2.2 C1 sets

A C1 set is a set of up to 32 control characters represented by bit combinations 08/00 to 09/15 in an 8-bit code. C1 sets occupy columns 08 and 09 of the 8-bit code table. In a 7-bit code the C1 control functions are represented by 2-byte escape sequences. This CGM encoding reserves the bit combinations 9/8 and 9/12 (ESC 5/8 and ESC 5/12 in a 7-bit environment, ESC = 1/11); these shall not be part of the content of string parameters. Other C1 control characters from other standards, such as ISO 6429, may be used within string parameters by agreement between the interchanging parties.

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3.2.3 G-sets

The G-sets (G0, G1, G2, G3) are coded character sets of 94 or 96 characters. CHARACTER SET INDEX designates which character set is to be the G0 set. ALTERNATE CHARACTER SET INDEX designates a character set to be used as both the G1 and G2 sets. The G-sets may be "invoked into" (caused to occupy) columns 2 through 7 of a 7-bit code table, or columns 02 through 07 and 10 through 15 of an 8-bit code table. This encoding of the CGM uses the G0 and G1/G2 sets within string parameters. The G3 set may be used within the string parameters of conforming metafiles; this requires selection of the extended 7-bit or extended 8-bit mode in the CHARACTER CODING ANNOUNCER. The CGM does not provide an element to explicitly designate the G3 sets; this may be done within a text string in accordance with ISO 2022, or by other means agreed upon by the interchanging parties.

Bits					0	1	2	3	4	5	6	7
b ₇	b ₆	b ₅	b ₄	b ₃	0	0	0	0	1	1	1	1
b ₂	b ₁	COLUMN	0	1	0	1	0	1	0	1	0	1
b ₀	ROW	0	1	2	3	4	5	6	7	0	1	2
0	0	0	0	0								
0	0	0	1	1								
0	0	1	0	2								
0	0	1	1	3								
0	1	0	0	4								
0	1	0	1	5								
0	1	1	0	6								
0	1	1	1	7								
1	0	0	0	8								
1	0	0	1	9								
1	0	1	0	10								
1	0	1	1	11								
1	1	0	0	12								
1	1	0	1	13								
1	1	1	0	14								
1	1	1	1	15								

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THE
CO
SET

A G-SET OF
94 OR 96
BIT COMBINATIONS

Figure 1 — The 7-bit code table