

*Dup (identical with & reproduced from  
ISO 8632-2:1987)*

~~LOAN COPY  
INFORMATION CENTRE  
STANDARDS AUSTRALIA~~

AS 3603.2—1988  
ISO 8632-2:1987

WITHDRAWN:  
19980701



**Standards  
Association of  
Australia**



# Australian Standard® 3603.2—1988

**COMPUTER GRAPHICS—  
METAFILE FOR THE STORAGE AND  
TRANSFER OF PICTURE DESCRIPTION  
INFORMATION**

## **Part 2—CHARACTER ENCODING**

(ISO Title: Information processing systems—Computer graphics—Metafile  
for the storage and transfer of picture description information—  
Part 2: Character encoding)



This Australian Standard was prepared by Committee IS/1, Information Processing Systems. It was approved on behalf of the Council of the Standards Association of Australia on 12 September 1988 and published on 12 December 1988.

---

The following interests are represented on Committee IS/1:

Australian Association of Permanent Building Societies  
Australian Bankers' Association  
Australian Bureau of Statistics  
Australian Computer Equipment Manufacturers Association  
Australian Computing Services Association  
Australian Computer Users Association  
Australian Information Industry Association  
Canberra College of Advanced Education  
CSIRO, Division of Information Technology  
Department of Defence  
Department of Industry, Technology and Commerce  
Latrobe University  
Life Insurance Federation of Australia  
Public Service Board, N.S.W.  
Telecom Australia  
University of Technology, Sydney

---

*Review of Australian Standards. To keep abreast of progress in industry, Australian Standards are subject to periodic review and are kept up-to-date by the issue of amendments or new editions as necessary. It is important therefore that Standards users ensure that they are in possession of the latest edition, and any amendments thereto.*

*Full details of all SAA publications will be found in the Catalogue of SAA Publications; this information is supplemented each month by SAA's journal 'The Australian Standard', which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.*

*Suggestions for improvements to Australian Standards, addressed to the head office of the Association, are welcomed. Notification of any inaccuracy or ambiguity found in an Australian Standard should be made without delay in order that the matter may be investigated and appropriate action taken.*

AUSTRALIAN STANDARD

**COMPUTER GRAPHICS—  
METAFILE FOR THE STORAGE AND  
TRANSFER OF PICTURE DESCRIPTION  
INFORMATION**

**Part 2  
CHARACTER ENCODING**

(ISO Title: Information processing systems—Computer graphics—Metafile  
for the storage and transfer of picture description information—  
Part 2: Character encoding)

**AS 3603.2—1988**

First published as AS 3603.2—1988.

**PUBLISHED BY THE STANDARDS ASSOCIATION OF AUSTRALIA  
STANDARDS HOUSE, 80 ARTHUR ST, NORTH SYDNEY, N.S.W.**

ISBN 0 7262 5282 4

## PREFACE

This Standard was prepared by the Association's Committee on Information Processing Systems in response to rapid developments and growth of interest in computer related graphics. It is identical with, and has been reproduced from, International Standard ISO 8632-2:1987, drawn up by ISO-TC 97, Information Processing Systems.

The computer graphics metafile provides a file format suitable for the storage and retrieval of picture information. The file format consists of a set of elements that can be used to describe pictures in a way that is compatible between systems of different architectures and devices of different capabilities and design.

For the purpose of this Australian Standard, the text of the ISO Standard should be modified as follows:

- (a) *Terminology*—The words 'Australian Standard' should replace the words 'International Standard' wherever they apply.
- (b) *Cross-reference*—The references to International Standards should be replaced by reference to Australian Standards as follows:

<i>Reference to International Standards</i>	<i>Relevant Australian Standard</i>
ISO	AS
646 Information processing—ISO 7-bit coded character set for information interchange	1776 Information processing—7-bit coded character set for information interchange
2022 Information processing—ISO 7-bit and 8-bit coded character sets—Code extension techniques	1953 Information processing—ISO 7-bit and 8-bit coded character sets—Code extension techniques
6429 Information processing—7-bit and 8-bit coded character sets—Additional control functions for character-imaging devices	2761 Information processing—7-bit and 8-bit coded character sets—Additional control functions for character-imaging devices

© Copyright — STANDARDS ASSOCIATION OF AUSTRALIA

Users of Standards are reminded that copyright subsists in all SAA publications and software. Except where the Copyright Act allows and except where provided for below no SAA publications or software may be reproduced, stored in a retrieval system in any form or transmitted by any means without prior permission in writing from the Standards Association of Australia. Permission may be conditional on an appropriate royalty payment. Requests for permission and information on commercial software royalties should be directed to the Head Office of the Association.

SAA will permit up to 10 percent of the technical content pages of a Standard to be copied for use exclusively in-house by purchasers of the Standard without payment of a royalty or advice to SAA.

SAA will also permit the inclusion of its copyright material in computer software programs for no royalty payment provided such programs are used exclusively in-house by the creators of the programs.

Care should be taken to ensure that material used is from the current edition of the Standard and that it is updated whenever the Standard is amended or revised. The number and date of the Standard should therefore be clearly identified.

The use of material in print form or in computer software programs to be used commercially, with or without payment, or in commercial contracts is subject to the payment of a royalty. This policy may be varied by SAA at any time.

## CONTENTS

	<i>Page</i>
0 Introduction . . . . .	6
0.1 Purpose of the character encoding . . . . .	6
0.2 Objectives . . . . .	6
0.3 Metafile characteristics . . . . .	6
0.4 Relationship to other International Standards . . . . .	6
0.5 Status of annex . . . . .	6
1 Scope and field of application . . . . .	7
2 References . . . . .	8
3 Notational conventions . . . . .	9
3.1 7-Bit and 8-Bit code tables . . . . .	9
3.2 Code extension techniques vocabulary . . . . .	10
3.2.1 C0 sets . . . . .	10
3.2.2 C1 sets . . . . .	10
3.2.3 G-sets . . . . .	10
4 Entering and leaving the metafile environment . . . . .	13
4.1 Implicitly entering the metafile environment . . . . .	13
4.2 Designating and invoking the CGM coding environment from ISO 2022 . . . . .	13
5 Method of encoding opcodes . . . . .	14
5.1 Encoding technique of the basic opcode set . . . . .	14
5.2 Extension mechanism . . . . .	14
5.3 Opcode assignments . . . . .	15
6 Method of encoding parameters . . . . .	18
6.1 Basic format . . . . .	18
6.2 Bitstream format . . . . .	19
6.3 Coding integers . . . . .	19
6.4 Coding real numbers . . . . .	20
6.5 Coding VDCs and points . . . . .	21
6.6 Coding point list parameters . . . . .	22
6.6.1 Displacement mode . . . . .	22
6.6.2 Incremental mode . . . . .	22
6.6.3 Incremental mode encoding . . . . .	26
6.7 Colour specifiers . . . . .	27
6.8 Colour lists . . . . .	27
6.8.1 Normal format (coding type=0) . . . . .	28
6.8.2 Bitstream format (coding type=1) . . . . .	28
6.8.3 Runlength format (coding type=2) . . . . .	28
6.8.4 Runlength bitstream format (coding type=3) . . . . .	29
6.8.5 Examples . . . . .	29
6.9 String parameters . . . . .	30
6.9.1 Overall string parameter format . . . . .	30
6.9.2 Bit combinations permitted within string parameters of text elements . . . . .	30
6.9.3 C0 control within string parameters . . . . .	31
6.9.4 Using G-sets in string parameters . . . . .	31
6.10 Enumerated parameters . . . . .	32
6.11 Index parameters . . . . .	32
6.12 Data record parameters . . . . .	32

	<i>Page</i>
7 Character substitution . . . . .	33
8 Representation of each element . . . . .	35
8.1 Delimiter elements . . . . .	36
8.1.1 BEGIN METAFILE . . . . .	36
8.1.2 END METAFILE . . . . .	36
8.1.3 BEGIN PICTURE . . . . .	36
8.1.4 BEGIN PICTURE BODY . . . . .	36
8.1.5 END PICTURE . . . . .	36
8.2 Metafile descriptor elements . . . . .	37
8.2.1 METAFILE VERSION . . . . .	37
8.2.2 METAFILE DESCRIPTION . . . . .	37
8.2.3 VDC TYPE . . . . .	37
8.2.4 INTEGER PRECISION . . . . .	37
8.2.5 REAL PRECISION . . . . .	37
8.2.6 INDEX PRECISION . . . . .	38
8.2.7 COLOUR PRECISION . . . . .	38
8.2.8 COLOUR INDEX PRECISION . . . . .	38
8.2.9 MAXIMUM COLOUR INDEX . . . . .	38
8.2.10 COLOUR VALUE EXTENT . . . . .	39
8.2.11 METAFILE ELEMENT LIST . . . . .	39
8.2.12 METAFILE DEFAULTS REPLACEMENT . . . . .	39
8.2.13 FONT LIST . . . . .	39
8.2.14 CHARACTER SET LIST . . . . .	40
8.2.15 CHARACTER CODING ANNOUNCER . . . . .	41
8.3 Picture descriptor elements . . . . .	42
8.3.1 SCALING MODE . . . . .	42
8.3.2 COLOUR SELECTION MODE . . . . .	42
8.3.3 LINE WIDTH SPECIFICATION MODE . . . . .	42
8.3.4 MARKER SIZE SPECIFICATION MODE . . . . .	42
8.3.5 EDGE WIDTH SPECIFICATION MODE . . . . .	42
8.3.6 VDC EXTENT . . . . .	42
8.3.7 BACKGROUND COLOUR . . . . .	43
8.4 Control elements . . . . .	44
8.4.1 VDC INTEGER PRECISION . . . . .	44
8.4.2 VDC REAL PRECISION . . . . .	44
8.4.3 AUXILIARY COLOUR . . . . .	45
8.4.4 TRANSPARENCY . . . . .	45
8.4.5 CLIP RECTANGLE . . . . .	45
8.4.6 CLIP INDICATOR . . . . .	45
8.5 Graphical primitive elements . . . . .	46
8.5.1 POLYLINE . . . . .	46
8.5.2 DISJOINT POLYLINE . . . . .	46
8.5.3 POLYMARKER . . . . .	46
8.5.4 TEXT . . . . .	46
8.5.5 RESTRICTED TEXT . . . . .	46
8.5.6 APPEND TEXT . . . . .	47
8.5.7 POLYGON . . . . .	47
8.5.8 POLYGON SET . . . . .	47
8.5.9 CELL ARRAY . . . . .	47
8.5.10 GENERALIZED DRAWING PRIMITIVE . . . . .	49
8.5.11 RECTANGLE . . . . .	49
8.5.12 CIRCLE . . . . .	49
8.5.13 CIRCULAR ARC 3 POINT . . . . .	49
8.5.14 CIRCULAR ARC 3 POINT CLOSE . . . . .	49
8.5.15 CIRCULAR ARC CENTRE . . . . .	49

*Page*

8.5.16	CIRCULAR ARC CENTRE CLOSE	50
8.5.17	ELLIPSE	50
8.5.18	ELLIPTICAL ARC	50
8.5.19	ELLIPTICAL ARC CLOSE	50
8.6	Attribute elements	51
8.6.1	LINE BUNDLE INDEX	51
8.6.2	LINE TYPE	51
8.6.3	LINE WIDTH	51
8.6.4	LINE COLOUR	51
8.6.5	MARKER BUNDLE INDEX	51
8.6.6	MARKER TYPE	52
8.6.7	MARKER SIZE	52
8.6.8	MARKER COLOUR	52
8.6.9	TEXT BUNDLE INDEX	52
8.6.10	TEXT FONT INDEX	52
8.6.11	TEXT PRECISION	52
8.6.12	CHARACTER EXPANSION FACTOR	53
8.6.13	CHARACTER SPACING	53
8.6.14	TEXT COLOUR	53
8.6.15	CHARACTER HEIGHT	53
8.6.16	CHARACTER ORIENTATION	53
8.6.17	TEXT PATH	53
8.6.18	TEXT ALIGNMENT	54
8.6.19	CHARACTER SET INDEX	54
8.6.20	ALTERNATE CHARACTER SET INDEX	54
8.6.21	FILL BUNDLE INDEX	54
8.6.22	INTERIOR STYLE	54
8.6.23	FILL COLOUR	55
8.6.24	HATCH INDEX	55
8.6.25	PATTERN INDEX	55
8.6.26	EDGE BUNDLE INDEX	55
8.6.27	EDGE TYPE	55
8.6.28	EDGE WIDTH	56
8.6.29	EDGE COLOUR	56
8.6.30	EDGE VISIBILITY	56
8.6.31	FILL REFERENCE POINT	56
8.6.32	PATTERN TABLE	56
8.6.33	PATTERN SIZE	57
8.6.34	COLOUR TABLE	57
8.6.35	ASPECT SOURCE FLAGS	57
8.7	Escape elements	59
8.7.1	ESCAPE	59
8.7.2	DOMAIN RING	59
8.8	External elements	60
8.8.1	MESSAGE	60
8.8.2	APPLICATION DATA	60
9	Defaults	61
10	Conformance	62
A	Formal grammar	63

# Computer graphics—Metafile for the storage and transfer of picture description information

## Part 2—Character encoding

### 0 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 8632/3 may be more appropriate. If human readability is the most important criterion, an encoding such as the Clear Text Encoding in ISO 8632/4 may be more appropriate.

#### 0.2 Objectives

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 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 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.

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 ISO 8632/2 follows the rules of ISO 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 8632/1, sub-clause 4.11.)

#### 0.5 Status of annex

The annex does not form an integral part of this part of ISO 8632/2 but is included for information only.