

Dup (Identical with reproduced from ISO 8632.3-1987)

LOAN COPY
INFORMATION CENTRE
STANDARDS AUSTRALIA

AS 3603.3—1988
ISO 8632-3—1987

WITHDRAWN:
19980701



**Standards
Association of
Australia**



Australian Standard® 3603.3—1988

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

Part 3—BINARY ENCODING

(ISO Title: Information processing systems—Computer graphics—Metafile
for the storage and transfer of picture description information—
Part 3: Binary 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which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.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 3
BINARY ENCODING**

(ISO Title: Information processing systems—Computer graphics—Metafile
for the storage and transfer of picture description information—
Part 3: Binary encoding)

AS 3603.3—1988

First published as AS 3603.3—1988.

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

ISBN 0 7262 5283 2

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—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

© 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 otherwise, 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 granted 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	5
0.1 Purpose of the Binary Encoding	5
0.2 Objectives	5
0.3 Relationship to other International Standards	6
0.4 Status of annexes	5
1 Scope and field of application	7
2 References	8
3 Notational conventions	9
4 Overall structure	10
4.1 General form of metafile	10
4.2 General form of pictures	10
4.3 General structure of the binary metafile	10
4.4 Structure of the command header	11
5 Primitive data forms	14
5.1 Signed integer	14
5.1.1 Signed integer at 8-bit precision	14
5.1.2 Signed integer at 16-bit precision	14
5.1.3 Signed integer at 24-bit precision	14
5.1.4 Signed integer at 32-bit precision	15
5.2 Unsigned integer	15
5.2.1 Unsigned integers at 8-bit precision	15
5.2.2 Unsigned integers at 16-bit precision	15
5.2.3 Unsigned integers at 24-bit precision	15
5.2.4 Unsigned integers at 32-bit precision	16
5.3 Character	16
5.4 Fixed point real	16
5.4.1 Fixed point real at 32-bit precision	16
5.4.2 Fixed point real at 40-bit precision	16
5.4.3 Value of fixed point reals	17
5.5 Floating point	17
5.5.1 Floating point real at 32-bit precision	17
5.5.2 Floating point real at 64-bit precision	18
6 Representation of abstract parameter types	19
7 Representation of each element	23
7.1 Method of presentation	23
7.2 Definite elements	24
7.3 Metafile descriptor elements	25
7.4 Picture descriptor elements	28
7.5 Control elements	30
7.6 Graphical primitive elements	32
7.7 Attribute elements	36
7.8 Escape element	42
7.9 External elements	43
8 Defaults	44
9 Conformance	45

	<i>Page</i>
A Formal grammar	46
B Examples	47
B.1 Example 1 : BEGIN METAFILE 'Example 1'	48
B.2 Example 2 : BEGIN PICTURE 'Test'	48
B.3 Example 3 : POLYLINE from 0,2 to 1,3 to 2,1 to 0,2	49
B.4 Example 4 : TEXT 'Hydrogen' at 0,1	49
B.5 Example 5 : Partitioned POLYLINE with 50 points	50
B.6 Example 6 : METAFILE DEFAULT REPLACEMENT linewidth 0.5	51
B.7 Example 7 : Application Data # 655 with 10K octets (chars) of data	51
C List of binary encoding metafile element codes	52

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

Part 3—Binary encoding

0 Introduction

0.1 Purpose of the Binary Encoding

The Binary Encoding of the Computer Graphics Metafile (CGM) provides a representation of the Metafile syntax that can be optimized for speed of generation and interpretation, while still providing a standard means of interchange among computer systems. The encoding uses binary data formats that are much more similar to the data representations used within computer systems than the data formats of the other encodings.

Some of the data formats may exactly match those of some computer systems. In such cases processing is reduced very much relative to the other standardized encodings. On most computer systems processing requirements for the Binary Encoding will be substantially lower than for the other encodings.

In cases where a computer system's architecture does not match the standard formats used in the Binary Encoding, and where absolute minimization of processing requirements is critical, and where interchange among dissimilar systems does not matter, it may be more appropriate to use a private encoding, conforming to the rules specified in clause 7 of ISO 8632/1.

0.2 Objectives

This encoding has the following features:

- a) Partitioning of parameter lists: metafile elements are coded in the Binary Encoding by one or more partitions (see clause 4); the first (or only) partition of an element contains the opcode (Element Class plus Element ID).
- b) Alignment of elements: every element begins on a word boundary. Alignment of partitions that require an odd number of octets is effected by padding with an octet with all bits zero. A no-operation element is available in this encoding; it is ignored. It may be used to align data on machine-dependent word boundaries for speed of processing.
- c) Uniformity of format: all elements have an associated parameter length value. The length is specified as an octet count. As a result, it is possible to scan the metafile, without interpreting it, at high speed.
- d) Alignment of coordinate data: at default precisions and by virtue of alignment of elements, coordinate data always start on word boundaries. This minimizes processing by ensuring, on a wide class of computing systems, that single coordinates do not have to be assembled from pieces of multiple computer words.
- e) Efficiency of encoding integer data: other data such as indexes, colour and characters are encoded as one or more octets. The precision of every parameter is determined by the appropriate precision as given in the METAFILE DESCRIPTOR.
- f) Order of bit data: in each word, or unit within a word, the bit with the highest number is the most significant bit. Likewise, when data words are accessed sequentially, the least significant word follows the most significant.