INTERNATIONAL STANDARD

**ISO/IEC 7942-4**

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# Information technology — Computer graphics and image processing — Graphical Kernel System (GKS) —

## Part 4: Picture part archive

*Technologies de l'information — Infographie et traitement d'image — Système graphique Kernel (GKS) —*

*Partie 4: Archive de partie d'image*



Reference number
ISO/IEC 7942-4:1998(E)

# Contents

# 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 7942-4 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 24, *Computer graphics and image processing*.

ISO/IEC 7942 consists of the following parts, under the general title *Information technology – Computer graphics and image processing – Graphical Kernel System (GKS):*

*Part 1: Functional description*

*Part 2: NDC metafile*

*Part 3: Audit trail*

*Part 4: Picture part archive*

Annexes A and B form an integral part of this part of ISO/IEC 7942.

# Introduction

The GKS-94 picture part archive provides a file format and encodings suitable for the storage and retrieval of GKS-94 picture parts. The file format consists of a set of elements that can be used to describe the contents of picture parts. This part of ISO/IEC 7942 extends the provisions of ISO/IEC 8632:1992/Amd.2: 1995.

# Information technology – Computer graphics and image processing –

# Graphical Kernel System (GKS) – Part 4: Picture part archive

## 1 Scope

This part of ISO/IEC 7942 provides a file format and encodings for the storage and retrieval of GKS-94 picture parts. It is based on Part 2 of ISO/IEC 7942, the NDC metafile, which is itself an extension of the Computer Graphics Metafile, Version 4 defined by ISO/IEC 8632:1992/Amd.2:1995 (all parts).

## 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 7942. 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 7942 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO/IEC 7942-1:1994, *Information technology - Computer graphics and image processing - Graphical Kernel System (GKS) - Part 1: Functional description*

ISO/IEC 7942-2:1997, *Information technology - Computer graphics and image processing - Graphical Kernel System (GKS) - Part 2: NDC metafile*

ISO/IEC 8632:1992/Amd.2:1995, *Information technology - Computer graphics - Metafile for the storage and transfer of picture description information* (all parts). *AMENDMENT 2: Application Structuring extensions.*

## 3 Definitions

For the purposes of this part of ISO/IEC 7942, the definitions given in ISO/IEC 7942-1 and ISO/IEC 8632-1/Amd.2 apply.

# 4 Concepts

## 4.1 The structure of a GKS-94 picture part archive

The structure of a GKS-94 picture part archive follows the GKS-94 NDC metafile described in Part 2 of this International Standard. This in turn follows the structure of the Computer Graphics Metafile (CGM) standard (ISO/IEC 8632-1:1992). The structure of a picture part archive is shown in figure 1. PPA is used as an abbreviation for PICTURE PART ARCHIVE and MF for metafile

| | | | |
|---|---|---|---|
| BEGIN PPA MF | MD | <picture part>... | END MF |

**Figure 1: General form of a picture part archive**

A Computer Graphics Metafile is a collection of elements from the standardized set. The BEGIN PICTURE PART ARCHIVE METAFILE element is followed by the METAFILE DESCRIPTOR (MD). After this the picture parts follow, each logically independent of each other. Finally the Metafile is ended with an END PICTURE PART ARCHIVE element.

Apart from the BEGIN PICTURE PART ARCHIVE METAFILE, END METAFILE and Metafile Descriptor elements, the metafile is partitioned into picture parts. All picture parts are mutually independent. A picture part consists of a BEGIN PICTURE element, a PICTURE DESCRIPTOR (PD) element, a BEGIN PICTURE BODY element, an arbitrary number of control, graphical and attribute elements and finally an END PICTURE element (see figure 2). PIC is used as an abbreviation for PICTURE and BEGIN BODY for BEGIN PICTURE BODY.

| | | | | |
|---|---|---|---|---|
| BEGIN PIC | PD | BEGIN BODY | <element>... | END PIC |

**Figure 2: General form of picture parts**

## 4.2 Metafile elements

Picture part archives use the same metafile elements as the GKS-94 NDC metafile except that the delimiter element BEGIN PICTURE PART ARCHIVE METAFILE is used in place of BEGIN NDC METAFILE. The new CGM element is marked by a dagger (†) in the tables in this section.

## 4.3 Delimiter elements

The picture part archive metafile includes the following new delimiter element:

BEGIN PICTURE PART ARCHIVE METAFILE†

## 4.4 Functional capability

### 4.4.1 Introduction

Following the provisions of ISO/IEC 8632-1:1992/Amd.2:1995, the contents of the Computer Graphics Metafile are defined by the METAFILE ELEMENT LIST element. The picture part archive set is designated PPA-SET.

### 4.4.2 PPA-SET

The PPA-SET includes the elements which can appear in the picture part archive. The elements which are not marked by daggers belong to the NDC-SET defined in Part 2 of this International Standard. The elements included in the picture part archive are:

<BEGIN PICTURE PART ARCHIVE METAFILE>†
<END METAFILE>
<BEGIN PICTURE>
<BEGIN PICTURE BODY>
<END PICTURE>
<METAFILE VERSION>
<VDC TYPE>
<METAFILE ELEMENT LIST>
<MAXIMUM COLOUR INDEX>
<FONT LIST>
<CHARACTER SET LIST>
<CHARACTER CODING ANNOUNCER>
<MAXIMUM VDC EXTENT>
<VDC EXTENT>
<CLIP INDICATOR>
<CLIP RECTANGLE>
<BEGIN APPLICATION STRUCTURE>
<APPLICATION STRUCTURE ATTRIBUTES>
<BEGIN APPLICATION STRUCTURE BODY>
<END APPLICATION STRUCTURE>
<POLYLINE>
<NON-UNIFORM RATIONAL B-SPLINE>
<CONIC SECTION>
<POLYMARKER>
<POLYGON>
<ELLIPTIC DISC>
<TEXT>
<COLOUR SELECTION MODE>
<COLOUR VALUE EXTENT>
<COLOUR PRECISION>
<COLOUR MODEL>
<CELL ARRAY>
<PICK IDENTIFIER>
<NAMESET>
<SCISSOR IDENTIFIER>
<SHIELD INDICATOR>
<GLOBAL TRANSFORMATION>
<LOCAL TRANSFORMATION>
<PATTERN SIZE>
<GDP>
<FILL REFERENCE POINT>
<CHARACTER HEIGHT>
<CHARACTER ORIENTATION>
<TEXT PATH>
<TEXT ALIGNMENT>
<ASPECT SOURCE FLAGS>
<LINE BUNDLE INDEX>
<LINE TYPE>
<LINE WIDTH>
<LINE COLOUR>
<MARKER BUNDLE INDEX>
<MARKER TYPE>
<MARKER SIZE>
<MARKER COLOUR>
<FILL BUNDLE INDEX>
<INTERIOR STYLE>
<HATCH INDEX>
<FILL COLOUR>
<EDGE VISIBILITY>
<EDGE TYPE>
<EDGE WIDTH>
<EDGE COLOUR>
<TEXT BUNDLE INDEX>
<CHARACTER EXPANSION FACTOR>
<CHARACTER SPACING>
<TEXT FONT INDEX>
<TEXT PRECISION>
<TEXT COLOUR>
<PATTERN SIZE>



## 4.5 Representation of picture parts in the picture part archive

As described in 6.4.4 of Part 1 of this International Standard, GKS-94 picture part consists of a strict sequence of output primitives. Primitives in a picture part have attributes bound to them in the same way as primitives in the NDC picture. A picture part can be archived by invoking the function ARCHIVE PICTURE PART. Each archive consists of a set of picture parts, with names local to the archive. The name to be given to a picture part in the archive is specified as a parameter to the function ARCHIVE PICTURE PART. A picture part can be retrieved from the archive by invoking the function RETRIEVE PICTURE PART FROM ARCHIVE. On retrieval a picture part name is supplied.

Picture parts are represented in the picture part archive in the same way as NDC pictures in the GKS-94 NDC metafile. Each picture part is delimited by BEGIN PICTURE and END PICTURE metafile elements. The

archival name of the picture part is stored in the picture identifier parameter of the BEGIN PICTURE element.

# 5 Abstract specification of new element

## 5.1 Data type definitions and abbreviations

Data type definitions are the same as those used in CGM Version 4.

## 5.2 Delimiter element

**BEGIN PICTURE PART ARCHIVE METAFILE** S

identifier

This is the first element of a picture part archive. It demarcates the beginning of the Metafile Descriptor. BEGIN PICTURE PART ARCHIVE METAFILE shall occur exactly once in a metafile. The identifier parameter is available for use by metafile generators and interpreters in a manner that is not further standardized.

# 6 Encodings of the GKS-94 Picture Part Archive

## 6.1 Introduction

Three encodings are defined for the picture part archive: character, binary and clear text. The picture part archive uses the same metafile elements as the GKS-94 NDC picture metafile with one exception. The element BEGIN PICTURE PART ARCHIVE METAFILE replaces the BEGIN NDC METAFILE element. The representations of this new element are given below. These follow the notational conventions and methods of encoding opcodes described in Part 2 of this International Standard; these conventions and methods are not repeated here.

## 6.2 Character encoding

The opcode assignment for BEGIN PICTURE PART ARCHIVE METAFILE is given in the table below.

| Opcode | 7-Bit coding | | 8-Bit coding | |
|---|---|---|---|---|
| BEGIN PICTURE PART ARCHIVE METAFILE opcode | 3/0 | 3/8 | 03/0 | 03/8 |

**Table 1 - Opcodes for metafile elements**

The representation of the element is given below.

**BEGIN PICTURE PART ARCHIVE METAFILE**

<BEGIN-PICTURE-PART-ARCHIVE-METAFILE-opcode: 3/0 3/8>
<string-fixed: substitution-codes>
<string-fixed: metafile-identifier>

The first parameter, substitution-code, is identical to that of the corresponding parameter of the BEGIN METAFILE element in ISO/IEC 8632-2:1992/Amd.2:1995.

## 6.3 Binary encoding

The representation of the BEGIN PICTURE PART ARCHIVE METAFILE is given below.

| Element Class 0 | Element Id | Parameter Type | Parameter List Length | Parameter Range |
|---|---|---|---|---|
| BEGIN PPA METAFILE | 25 | SF | BS | SR |

Code Description
1 BEGIN PPA METAFILE has 1 parameter:
P1: (string fixed) metafile name

## 6.4 Clear text encoding

The representation of the BEGIN PICTURE PART ARCHIVE METAFILE is given below. The derived name of the BEGIN PICTURE PART ARCHIVE METAFILE element is BEGPPAMF.

BEGIN PPA METAFILE ::= BEGPPAMF
<OPTSEP>
<SF:NAME>
<TERM>