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Electronic still-picture imaging — Removable memory —

Part 2:
TIFF/EP image data format

Imagerie de prises de vue électroniques — Mémoire mobile —

Partie 2: Format de données image TIFF/EP

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO 12234 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 12234-2 was prepared by Technical Committee ISO/TC 42, *Photography*.

ISO 12234 consists of the following parts, under the general title *Electronic still-picture imaging — Removable memory*:

⎯ *Part 1: Basic removable-memory module*

⎯ *Part 2: TIFF/EP image data format*

⎯ *Part 3: Design rule for camera file system (DCF)*

Annex A of this part of ISO 12234 is for information only.

Introduction

The term TIFF/EP refers to Tag Image File Format/Electronic Photography, defined in this part of ISO 12234. The term "TIFF 6.0" refers to the TIFF Revision 6.0 specification. TIFF/EP is defined to be as compatible as possible with existing desktop software packages, to enable them to operate with images from electronic still-picture cameras. TIFF Revision 6.0 is used as the basis for achieving this interoperability with the large installed base of imaging software. Wherever possible, TIFF/EP uses tags already defined in TIFF 6.0 and provides guidelines for the use of these tags as well as the allowed field values. New tags are defined to encode image data features that are not included in TIFF 6.0. These new tags conform to the practices specified in TIFF 6.0. This document also describes how related images, such as both "parent" high resolution and "thumbnail" low resolution images of the same subject, or temporal sequence "bursts" of the same scene, can be stored in a single TIFF/EP file.

With the permission of Adobe Systems Incorporated, sections of this TIFF/EP specification have been copied verbatim from the TIFF 6.0 specification dated June 3, 1992 specification © 1986-1988, 1992 Adobe Systems Incorporated. All Rights Reserved.

In this part of ISO 12234, references to tags and tag values defined in TIFF 6.0 are shown in bold typeface. Tags and tag values that are not defined in TIFF 6.0 are identified in italic type face. These new tags have been chosen to be as compatible as possible with the Exif tags defined in "Digital Still Camera Image File Format Standard (Exchangeable image file format for Digital Still Cameras: Exif)", Version 2.1, June 1998 by the Japan Electronic Industry Development Association (JEIDA). The new TIFF/EP tag-fields containing enumerated values follow the TIFF 6.0 convention, where the lower half of the values (0 to 127 for byte values, 0 to 32,767 for short values, and 0 to 2,147,483,647 for long values) are reserved by TIFF/EP and the upper half of the values (128 to 255 for byte values, 32,768 to 65,535 for short values, and 2,147,483,648 to 4,294,967,296 for long values) are private values that may be registered by I3A.

I3A may be contacted at the Photographic and Imaging Manufacturers Association, 550 Mamaroneck Avenue, Suite 307, Harrison, NY 10528-1612 USA, or by e-mail at pima@pima.net.

TIFF/EP complies with the TIFF 6.0 specification and uses the same header specified in TIFF 6.0. The reason for this is to maintain the highest degree of compatibility with existing TIFF readers and to make the adoption of TIFF/EP, including the new TIFF/EP tags, as easy as possible. In the future, if TIFF is revised, a revised version of TIFF/EP may be developed using the revised TIFF specification. TIFF/EP editors of a given TIFF/EP version number shall not update TIFF/EP files having a higher version number without warning the user that, in doing so, unknown tags will be deleted. This is explained in the section describing the *TIFF/EPStandardID* tag.

TIFF/EP tag definitions do not allow default values. All values shall be explicitly stated in order to improve interoperability with future versions of TIFF/EP. Images may be stored in uncompressed form or using JPEG baseline (DCT based) compression. In the latter case, an uncompressed baseline-TIFF-readable reduced resolution "thumbnail" image should also be stored in the 0th IFD to allow the images to be identified using a baseline TIFF 6.0 reader.

TIFF/EP uses the TIFF/JPEG specification given in "DRAFT TIFF Technical Note No. 2". This method differs from the JPEG method described in the TIFF 6.0 specification. In the method used within TIFF/EP, each image segment (tile or strip) contains a complete JPEG data stream that is valid according to the ISO JPEG standard (ISO/IEC 10918-1). TIFF/EP requires that readers only support the DCT based lossy JPEG process.

TIFF/EP currently does not define how to embed audio information within a TIFF/EP image file. Audio can be stored in a separate file on the same removable media, if desired, or stored within a TIFF/EP file using a private TIFF tag obtained from Adobe Corp. This does not preclude a future release of TIFF/EP from implementing embedded audio as part of the TIFF/EP file.

TIFF/EP image files should be stored in a READ-ONLY fashion using the appropriate file system mechanism. This will prevent accidental loss of important TIFF/EP tag-value information if the image is edited by a non-TIFF/EP compliant application. TIFF editors generally remove unknown tags when saving or updating an image file to

maintain the integrity of the TIFF file, since the unknown tags might not apply to the edited image. By creating TIFF/EP image files READ-ONLY, accidental loss of important information is prevented. TIFF/EP editors, on the other hand, shall warn the user, whenever editing a newer version TIFF/EP file with an older version TIFF/EP editor, that proceeding may result in the loss of information. The mandatory *TIFF/EPStandardID* tag-field specifies the TIFF/EP version used in creating a TIFF/EP image file.

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⎯ Eastman Kodak Company

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