INTERNATIONAL STANDARD

ISO/IEC 23000-2

Second edition
2008-01-15

Information technology — Multimedia application format (MPEG-A) —

Part 2: MPEG music player application format

Technologies de l'information — Format pour application multimédia (MPEG-A) —

Partie 2: Format pour application musicienne MPEG

Reference number
ISO/IEC 23000-2:2008(E)

© ISO/IEC 2008

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

COPYRIGHT PROTECTED DOCUMENT

© ISO/IEC 2008

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

 © ISO/IEC 2008 – All rights reserved

Contents

Page

Foreword ... v

Introduction ... vi

1 Scope ... 1

2 Normative references ... 1

3 Overview of MPEG Standards ... 2
3.1 MPEG-1 Layer III ... 2
3.2 MPEG-4 "MPEG-1/2 Audio in MPEG-4" ... 2
3.3 ISO Base Media File Format ... 3
3.4 MPEG-4 File Format ... 3
3.5 MPEG-21 File Format ... 4
3.6 MPEG-7 Multi-Media Description Scheme ... 4

4 Song File Format ... 4
4.1 Introduction ... 4
4.2 Audio track ... 5
4.3 Meta-data ... 5
4.4 File Conversion ... 6
4.5 Playback ... 6
4.6 File Structure ... 7

5 Album and Playlist Format for the Music Player ... 8
5.1 Introduction ... 8
5.2 Single Track Album ... 9
5.3 Multiple Track Album ... 10
5.4 Playlist ... 11

6 Scope of the Protected Music Player Application Format ... 13

7 Overview of Basic Standards for Protection ... 14
7.1 Protection and MPEG-4 File Formats ... 14
7.2 AES-128 encryption ... 14
7.3 MPEG-4 IPMP-X ... 14
7.4 MPEG-21 IPMP Base Profile ... 15
7.5 MPEG-21 REL MAM Profile ... 16

8 Protection of mp4 files ... 16
8.1 Introduction ... 16
8.2 Signalling ... 16
8.3 JPEG and MPEG-7 meta-data ... 20
8.4 MPEG-21 DID album ... 20

9 Protection of mp21 files using MPEG-21 IPMP and MPEG-21 REL ... 21
9.1 Introduction ... 21
9.2 Protection of single track mp21 files ... 21
9.3 Protection of mp21 album files with multiple tracks ... 22

10 Content encryption using AES-128 ... 23
10.1 Introduction ... 23
10.2 MPEG-4 IPMP-X signalling of AES-128 encryption ... 24
10.3 Encrypting the audio samples ... 26
10.4 Encryption of JPEG and MPEG-7 meta-data ... 26

11 Usage of File Format Brands ... 27

12 Conformance ... 27

© ISO/IEC 2008 – All rights reserved

12.1 Introduction **27**
12.2 File structures **27**
12.3 Music Player device conformance points **28**

13 Reference Software **28**
13.1 Player architecture **28**
13.2 Player functionalities **29**
13.3 MP3onMP4 Access Unit translator **30**
13.4 File format **30**
13.5 External dependencies **30**

Annex A (informative) **Example of ID3 information mapped to MPEG-7** **31**

Annex B (informative) **Example of DID in MAF** **33**

Annex C (informative) **Examples of MPEG-21 Protection Metadata** **35**

Annex D (informative) **Alternative protection signalling in mp4 files** **40**
D.1 Introduction **40**
D.2 Interoperability with ISMACryp **40**
D.3 Linkage to external Key Management Systems **42**

Annex E (informative) **Music Player Device Behaviour** **43**
E.1 Introduction **43**
E.2 Unprotected music player **43**
E.3 Protected music player using the default protection **44**
E.4 Protected music player using flexible protection **44**

Bibliography **46**

 © ISO/IEC 2008 – All rights reserved

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. 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.

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

ISO/IEC 23000-2 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

This second edition cancels and replaces the first edition (ISO/IEC 23000-2:2006), which has been technically revised.

ISO/IEC 23000 consists of the following parts, under the general title *Information technology — Multimedia application format (MPEG-A)*:

— *Part 1: Purpose for multimedia application formats*

— *Part 2: MPEG music player application format*

— *Part 3: MPEG photo player application format*

— *Part 4: Musical slide show application format (MAF)*

— *Part 5: Media streaming player*

— *Part 7: Open release (MAF)*

— *Part 8: Portable video player MAF*

— *Part 9: Multimedia application format for digital multimedia broadcasting*

© ISO/IEC 2008 – All rights reserved

Introduction

MPEG has developed a number of standards, all of which strive to serve the needs of consumers and industry. Among those are MPEG-4, a next-generation suite of standards for media compression, and MPEG-7, a suite of standards for meta-data representation. MPEG-4 specifies what MPEG expects to be another very successful specification, the MPEG-4 File Format, while MPEG-7 specifies not only signal-derived meta-data, but also archival meta-data such as Artist, Album and Song Title.

As such, MPEG-4 and MPEG-7 represent an ideal environment to support the current “MP3 music library” user experience, and, moreover, to extend that experience in new directions.

Firstly, this part of ISO/IEC 23000 shows how to carry MP3 information (music and meta-data) within the MPEG-4 and MPEG-7 framework. Moving MP3 into the MPEG-4 world supports, as a baseline, everything that users know and expect, but offers the capability to deliver a much richer music experience with components of MPEG-4, MPEG-7 and MPEG-21 at our disposal.

Secondly, this part of ISO/IEC 23000 builds on the music player and extends it to the Protected Music Player for both mp4 and mp21 file types including (1) mp4 file as protected content format with fixed encryption, without key management components and (2) protected mp21 file with flexible tool selection and key management components.

This part of ISO/IEC 23000 contains conformance and reference software.

© ISO/IEC 2008 – All rights reserved

Information technology — Multimedia application format (MPEG-A) —

Part 2:
MPEG music player application format

1 Scope

This part of ISO/IEC 23000 presents a basic architecture for constructing an annotated music library. It defines a simple file format for songs and a file format for albums and playlists. A conformant player application has to support all these specified file formats.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 11172-3:1993, *Information technology — Coding of moving pictures and associated audio for digital storage media at up to about 1,5 Mbit/s — Part 3: Audio*

ISO/IEC 13818-3:1998, *Information technology — Generic coding of moving pictures and associated audio information — Part 3: Audio*

ISO/IEC 14496-2:2004, *Information technology — Coding of audio-visual objects — Part 2: Visual*

ISO/IEC 14496-3:2005, *Information technology — Coding of audio-visual objects — Part 3: Audio*

ISO/IEC 14496-12:2005, *Information technology — Coding of audio-visual objects — Part 12: ISO base media file format*

ISO/IEC 14496-13:2004, *Information technology — Coding of audio-visual objects — Part 13: Intellectual Property Management and Protection (IPMP) extensions*

ISO/IEC 14496-14:2003, *Information technology — Coding of audio-visual objects — Part 14: MP4 file format*

ISO/IEC 15938-5:2003, *Information technology — Multimedia content description interface — Part 5: Multimedia description schemes*

ISO/IEC TR 15938-8:2002, *Information technology — Multimedia content description interface — Part 8: Extraction and use of MPEG-7 descriptions*

ISO/IEC 21000-2:2005, *Information technology — Multimedia framework (MPEG-21) — Part 2: Digital Item Declaration*

ISO/IEC 21000-4:2006, *Information technology — Multimedia framework (MPEG-21) — Part 4: Intellectual Property Management and Protection Components*

ISO/IEC 21000-5:2004, *Information technology — Multimedia framework (MPEG-21) — Part 5: Rights Expression Language*

ISO/IEC 21000-9:2005, *Information technology — Multimedia framework (MPEG-21) — Part 9: File Format*

© ISO/IEC 2008 – All rights reserved