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AMENDMENT 2
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Information technology — Multimedia application format (MPEG-A) —

Part 4: Musical slide show application format

AMENDMENT 2: Conformance and reference software for protected musical slide show application format

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

Partie 4: Format pour application de présentation musicale de diapositives

AMENDEMENT 2: Logiciel de conformité et de référence pour format pour application de présentation musicale de diapositives protégé

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Foreword

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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.

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Amendment 2 to ISO/IEC 23000-4:2009 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

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

Part 4:
Musical slide show application format

AMENDMENT 2: Conformance and reference software for protected musical slide show application format

After Clause 12 add the following two new clauses:

13 Conformance Points

13.1 File format

13.1.1 General

Conformant files shall be readable by Protected Musical Slide Show application format reference software player. The general structure of the file shall conform to the normative file structure defined in 5.3.

13.1.2 Conformant files

Some conformant files had been made using the authoring tool to demonstrate some possibilities of content protection using this International Standard. Table AMD2.1 shows the list of conformant files with their conformance points to the specification.

Table AMD2.1 — Conformance files

#	File name	Conformance points							
		MPEG-1 layer 3	JPEG	3GPP-TT	MPEG-4 LASeR	MPEG-7 SMP	MPEG-21 DIDL	MPEG-21 IPMP	MPEG-21 REL
1	np00.mp4	✓	✓	✓	✓	✓	✓	×	×
2	pm05.mp4	✓§	✓	✓	✓	✓	✓	✓	✓
3	pja02.mp4	✓	✓§	✓	✓	✓	✓	✓	✓
4	pj03.mp4	✓	✓‡	✓	✓	✓	✓	✓	✓
5	pmj01.mp4	✓§	✓§	✓	✓	✓	✓	✓	✓
6	pjs01.mp4	✓§	✓‡	✓	✓	✓	✓	✓	✓
7	pmp01.mp4	✓*	✓	✓	✓	✓	✓	✓	✓
8	pjp01.mp4	✓	✓*	✓	✓	✓	✓	✓	✓
9	pmjp01.mp4	✓§	✓*	✓	✓	✓	✓	✓	✓
10	pjs02.mp4	✓*	✓‡	✓	✓	✓	✓	✓	✓
11	pt01.mp4	✓	✓	✓§	✓	✓	✓	✓	✓
12	pa03.mp4	✓	✓	✓	✓¤	✓	✓	✓	✓
13	ap01.mp4	✓§	✓§	✓§	✓¤	✓	✓	✓	✓

Key

✓ implemented
× not implemented
§ protected
‡ some jpegs protected
* partition protected (experimental for JPEG: XOR tool only)
¤ protected (IPMP schema only)

NOTE 1 Protection tool varies (XOR, AES-128-ECB, AES-128-CBC, AES-128-CFB).

NOTE 2 Protection key: “mpeg” (without quotes).

13.2 Animation

The LASeR scene description shall conform to LASeR specification as defined in 6.3.

13.3 Timed text

The timed text sample structure shall conform to 3GPP TS 26.245 timed text specification.

13.4 Metadata

Metadata for audio and slide show shall conform to MPEG-7 MDS specification as defined in 6.5.
Metadata for content governance and protection shall conform to MPEG-21 DID, MPEG-7 IPMP Component Base Profile, and MPEG-21 REL MAM Profile specification as defined in clause 8.

14 Reference Software

14.1 Authoring tool

The authoring tool is presented to introduce how the protected musical slide show can be constructed. Execution file is provided.

14.1.1 Features

- MP3 player
- JPEG display
- MP3-JPEG synchronization
- MP3-Timed text synchronization
- Timed text font, highlight color and background color settings
- Content protection: MP3, JPEG, Timed-text, LASeR (in schema only)
- Choose of protection tools: XOR, AES-128-ECB, AES-128-CBC, and AES-128-CFB
- Partial protection for MP3
- Region protection for JPEG (experimental using XOR tool)

14.1.2 Requirements

- Libraries
    - FMOD

14.1.3 Installation

Unzip the package file in any desired directory

14.1.4 Using the tool

Creating musical slide show file (main user interface is shown in Figure AMD2.2):
- Select MP3 by clicking “Add MP3” button
- Select JPEG images by clicking “Add JPEG” button for one image. Repeat to add more
- Select timed text lyrics by clicking “Add Text” button. The timed text lyrics file is a text file pre-formatted using the following rules (as shown in Figure AMD2.1):

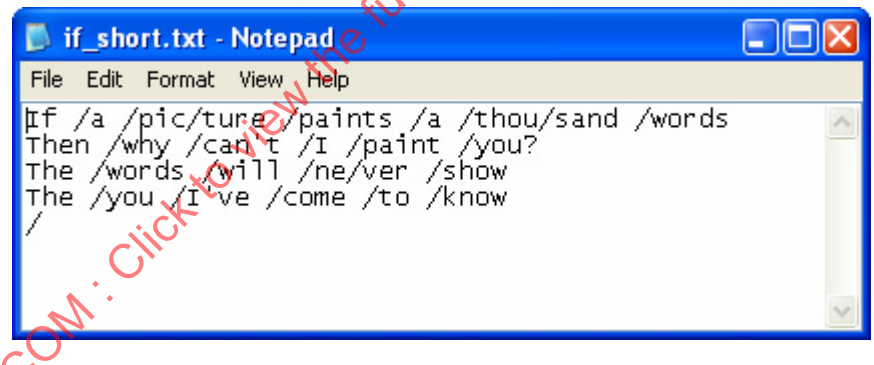

Figure AMD2.1 — Formatting the timed text

  - Separate synchronized text using slash “/” character
  - End the file with “/”
- To synchronize images:
  - Select the image to be synchronized
  - Play the MP3 using “Play” button, or drag the slider to the desired timestamp
  - Select the animation effect
  - Click “Synchronize” button below the slider, and click “OK” to confirm
- To synchronize text:
  - Play the MP3 using “Play” button
  - Click “Synchronize” button below the timed text viewer according to the synchronization rules
- To add protection to audio:
  - Double click the audio file directory name in resource list to invoke the protection windows (Figure AMD2.3)
  - Click “Protect” to protect the whole audio file

  - For protecting certain segment, firstly click “|>” button to play the audio. At desired timestamp, click “[s]” button to start the protection. To end the protection timestamp, click “[e]” button. Click “[r]” button to reset
  - Click “OK” to confirm
- To add protection to image:
  - Double click the image file directory name in resource list to invoke the protection windows (Figure AMD2.4)
  - Click “Protect” to protect the whole image region
  - For protecting certain segment in rectangle, click within the image to point the top-left corner of the rectangle, and click once more to point the bottom-right corner of the rectangle
  - Click “OK” to confirm
- To set the protection tool and license scheme:
  - Click “IPMP Tool” button to invoke IPMP Tool window (Figure AMD2.5)
  - Select provided Tool ID
  - Input protection key (any character)
  - Define the license validation range
  - Input the desired exercise number, or check “Unlimited” to define unlimited number of exercising content
  - Click “OK” to confirm
- To protect the LASeR animation, check the “Protect” button below the slider
- To protect the timed text, check the “Protect” button above the timed text viewer
- Finally, click “Save” to save the musical slide show file

The video tutorial on how to use the authoring tool is available in YouTube:
http://www.youtube.com/watch?v=hJfOaEGQxsE

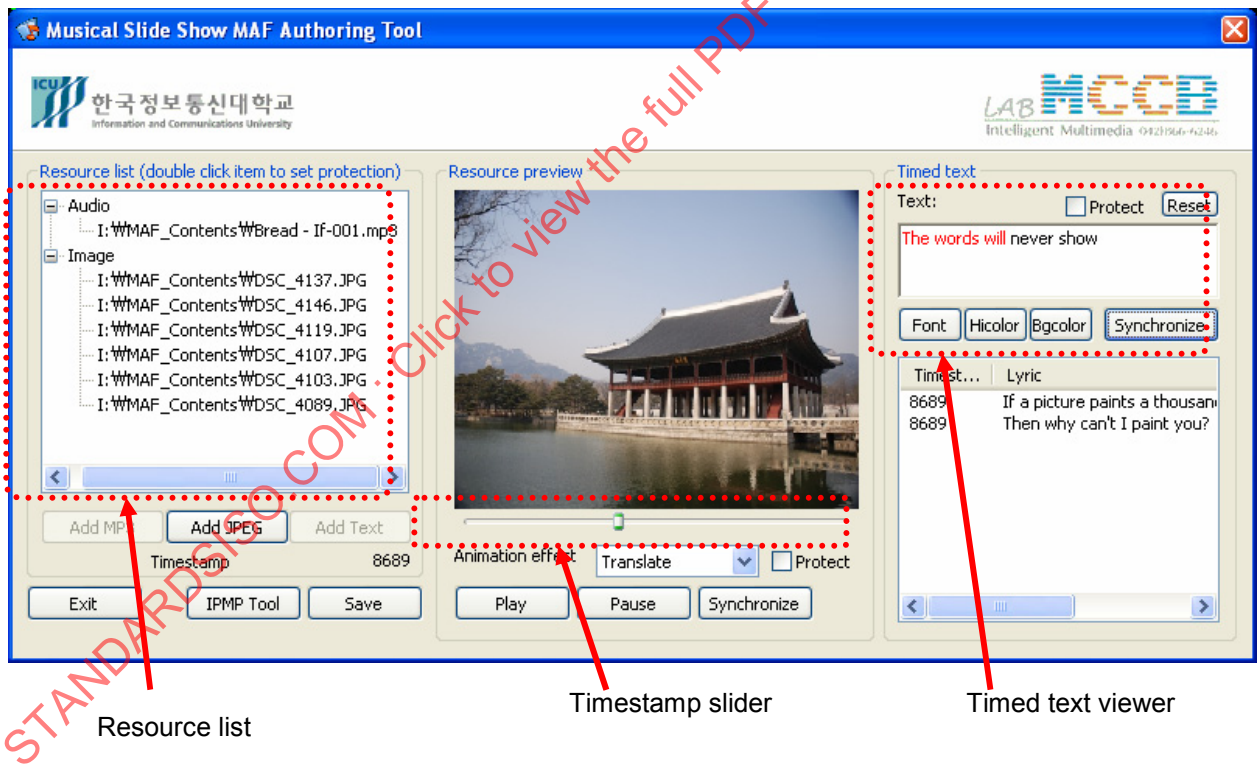

Figure AMD2.2 — Authoring tool user interface

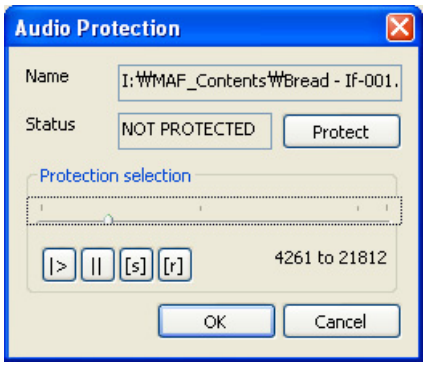

Figure AMD2.3 — MP3 protection user interface

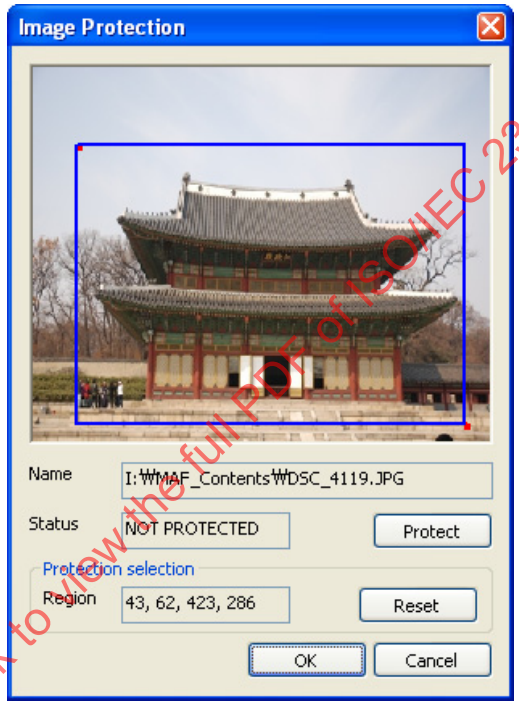

Figure AMD2.4 — Image protection user interface

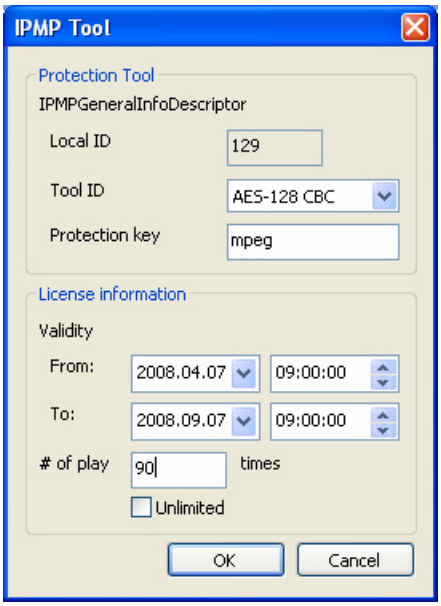

Figure AMD2.5 — IPMP Tool and REL settings user interface

14.2 Player

The musical slide show player reference software is built to provide example of implementation of how to extract contents from the specified file format and execute the contents. The implementation of protected musical slide show does not have to follow the algorithm of this reference software. Source code is provided.

14.2.1 Features

- MP3-JPEG-Timed text synchronized play
- ISO-base file format file structure view
- MPEG-7 SMP structure view
- MPEG-21 IPMP/REL structure view
- SVG Player (from MPEG output doc. N8821) for LASeR rendering

14.2.2 Modules

Figure AMD2.6 shows the software architecture of the player. Four external modules are used for the player. The modules representing the external libraries: FMOD library for MP3 decoding and handling, SVGLib to parse and render LASeR animation, MSXML to parse metadata, and Protection Tool library. The first three libraries are linked through import library files, while the latter is accessed through the source code. The internal modules of the player consist of ISO base file format parser, 3GPP-Timed text parser, metadata parser, audio control and the user interface.

The relation of each module in the software is shown in Figure AMD2.6 with different color. FMOD library is accessed through the ISO-base FF parser, and send the pertaining values about the audio data to the audio control so users can control the media playing through the user interface. The SVGLib is accessed through the ISO-base FF parser with values regarding the image size and offsets and display the images in the user interface. The 3GPP-TT parser loads information of timed-text samples from the musical slide show file through the ISO-base FF parser and render it in the user interface. The metadata parser parses the metadata inside the file through ISO-base FF parser using MSXML and reads any protection scheme with Protection Tool to unprotect the content and display it in the user interface.

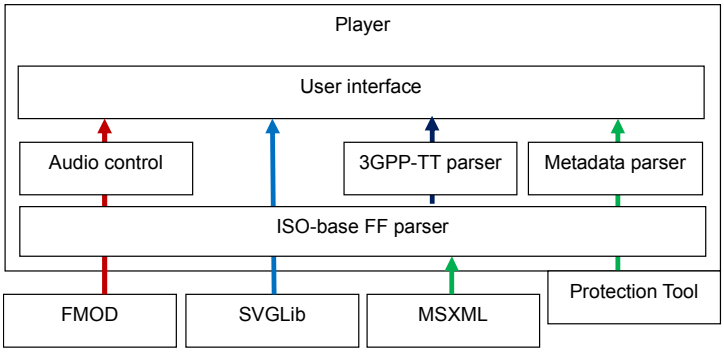

Figure AMD2.6 — Musical slide show AF software architecture

The list of modules with their function is shown in Table AMD2.2

Table AMD2.2 — List of modules

No.	Module	Function	Type
1	FMOD	Decodes and provides API to handle MP3 audio data	External
2	SVGLib	Parses and renders LASeR animation	External
3	MSXML	Provides libraries to parse XML metadata	External
4	Protection tool	Provides API to unprotect the protected content. Consists of the following tools: XOR, AES-128-ECB, AES-128-CBC, and AES-128-CFB	External
5	ISO-base FF parser	Parses ISO-base file format and returns variables of boxes of the file	Internal
6	Metadata parser	Parses MPEG-7, MPEG-21 IPMP and MPEG-21 REL metadata	Internal
7	3GPP-TT parser	Parses timed text from the 'mdat' box	Internal
8	Audio control	Controls the MP3 audio given by FMOD	Internal
9	User interface	Render the contents in the user's screen and provides interface for user to control the execution of media	Internal

In case of using basic mode (which is available by simply modifying the provided source code), the CxImage library is used to load and render the JPEG images. The library is also part of the reference software. It reads the file size and offset information through the ISO-base FF parser, and display it in the user interface.

14.2.3 Requirements

- Microsoft Visual C++ 6.0
- Libraries
  - FMOD for MP3 playing
  - SVG player from w8821 for LASeR rendering
  - MSXML for metadata parsing
  - Rijndael protection tool
  - XOR protection tool
  - CxImage for image rendering

14.2.4 Installation

- Unzip the source code files in any desired directory
- Unzip the additional library files in Visual Studio's C++'s include and library directory
- Open "Musical Slideshow MAF Player Lite.dsw" file
- Modify the project settings to determine the location of libraries if necessary