

---

---

**Information technology — Coding of audio-  
visual objects —**

**Part 4:  
Conformance testing**

*Technologies de l'information — Codage des objets audiovisuels —  
Partie 4: Essai de conformité*  
**(standards.iteh.ai)**

ISO/IEC 14496-4:2000

<https://standards.iteh.ai/catalog/standards/sist/c9264eac-b51a-46d1-bc9c-27d019817c70/iso-iec-14496-4-2000>

**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.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

ISO/IEC 14496-4:2000

<https://standards.iteh.ai/catalog/standards/sist/c9264eac-b51a-46d1-bc9c-27d019817c70/iso-iec-14496-4-2000>

© ISO/IEC 2000

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.ch](mailto:copyright@iso.ch)  
Web [www.iso.ch](http://www.iso.ch)

Printed in Switzerland

## Contents

	Page	
1	General .....	1
1.1	Scope .....	1
1.2	Normative references .....	1
2	Technical elements .....	3
2.1	Definitions .....	3
2.2	Abbreviations and symbols .....	3
3	Systems .....	3
3.1	Conformance Points .....	3
3.1.1	FlexMux Conformance Point .....	4
3.1.2	Sync Layer Conformance Point .....	4
3.1.3	OD Conformance Point .....	5
3.1.4	BIFS Conformance Point .....	5
3.1.5	OCI Conformance Point .....	5
3.1.6	IPMP Conformance Point .....	5
3.1.7	Scene Graph Conformance Point .....	5
3.2	Bitstream Conformance .....	5
3.2.1	FlexMux Conformance .....	5
3.2.2	Synchronization Layer Conformance .....	6
3.2.3	OD Conformance .....	6
3.2.4	BIFS Conformance .....	6
3.2.5	OCI Conformance .....	6
3.2.6	IPMP Conformance .....	7
3.2.7	Miscellaneous Conformance .....	7
3.3	Terminal Conformance .....	7
3.3.1	FlexMux conformance .....	8
3.3.2	Synchronization Layer Conformance .....	8
3.3.3	OD Conformance .....	13
3.3.4	BIFS Conformance .....	16
3.3.5	OCI Conformance .....	16
3.3.6	IPMP Conformance .....	17
3.3.7	Scene Graph Conformance .....	17
3.3.8	Miscellaneous Conformance .....	18
3.4	Test material and test suites .....	18
3.4.1	Parsing Hint File Format .....	19
3.4.2	Scene Dump File Format .....	21
3.4.3	Test Suites .....	24
4	Visual .....	29
4.1	Introduction .....	29
4.2	Definition of visual bitstream compliance .....	30
4.2.1	Requirements and restrictions related to profile-and-level .....	30
4.2.2	Additional restrictions on bitstream applied by the encoder .....	31
4.2.3	Encoder requirements and recommendations .....	31
4.3	Procedure for testing bitstream compliance .....	31
4.4	Definition of visual decoder compliance .....	32
4.4.1	Requirement on arithmetic accuracy in video objects (without IDCT) .....	33
4.4.2	Requirement on arithmetic accuracy in video objects (with IDCT) .....	34
4.4.3	Requirement on arithmetic accuracy in scalable still texture object (without IDWT) .....	34
4.4.4	Requirement on arithmetic accuracy in scalable still texture (with IDWT) .....	34
4.4.5	Requirement on output of the decoding process and timing .....	34
4.4.6	Recommendations .....	35
4.5	Procedure to test decoder compliance .....	35
4.5.1	Static tests .....	35
4.5.2	Dynamic tests .....	35
4.5.3	Specification of the test bitstreams .....	36
4.5.4	Implementation of the static test .....	50
4.5.5	Implementation of the dynamic test .....	51
4.5.6	Decoder conformance .....	51
4.5.7	Normative Test Suites for Simple, Simple Scalable, Core, Main and N-Bit profile .....	51
4.5.8	Bitstream Donated by MPEG-4 Platform Verification Bitstream Development Project .....	54

5	Audio .....	64
5.1	Introduction .....	64
5.2	Audio Conformance Points .....	64
5.3	Audio Profiles .....	65
5.4	Audio Interchange formats (Informative part) .....	66
5.4.1	Parsing an Audio_Data_Interchange_Format (ADIF) header .....	66
5.4.2	Parsing Audio_Data_Transport_Stream (ADTS) header .....	66
5.5	Audio Object Types .....	66
5.5.1	General Object Type Descriptions .....	67
5.5.2	Null .....	73
5.5.3	Common Characteristics of the AAC-derived object types .....	73
5.5.4	Common characteristics of the AAC objects supporting ISO/IEC 13818-7 profiles (AAC LC, AAC Main, AAC SSR and AAC LTP ) .....	77
5.5.5	AAC LC .....	79
5.5.6	AAC Main .....	86
5.5.7	AAC SSR .....	88
5.5.8	AAC LTP .....	91
5.5.9	AAC scalable .....	92
5.5.10	AAC-based Scalable Configurations .....	93
5.5.11	TwinVQ .....	95
5.5.12	CELP .....	99
5.5.13	HVXC .....	103
5.5.14	TTSI .....	113
5.5.15	General MIDI .....	116
5.5.16	Wavetable Synthesis .....	117
5.5.17	Algorithmic Synthesis and AudioFX .....	118
5.5.18	Main Synthetic .....	124
5.6	Audio Composition .....	125
5.6.1	Introduction .....	125
5.6.2	Common Audio Composition Characteristic .....	128
5.6.3	AudioSource and Sound2D .....	129
5.6.4	AudioSource and Sound .....	131
5.6.5	AudioSwitch .....	132
5.6.6	AudioMix and Sampling Rate Conversion .....	132
5.6.7	AudioFX .....	133
6	DMIF .....	134
6.1	Introduction .....	134
6.2	The PICS .....	134
6.2.1	Global statement of conformance .....	135
6.2.2	DMIF Signalling .....	135
6.2.3	Q.2931 Extensions for DMIF .....	141
6.3	The Conformance ATS .....	142
6.3.1	General .....	142
6.3.2	ATS for DS .....	143
7	SNHC .....	171
7.1	Introduction .....	171
7.1.1	Purpose & Scope .....	171
7.1.2	Intended Use of Decoders .....	172
7.1.3	What Is To Be Tested .....	172
7.2	Conformance Points .....	172
7.2.1	Covered Functionality .....	172
7.2.2	Description/References on Conformance Definitions .....	173
7.3	Testing Conditions .....	176
7.3.1	Description of Test Data .....	176

ITeH STANDARD PREVIEW  
 (standards.iteh.ai)

ISO/IEC 14496-4:2000

<https://standards.iteh.ai/catalog/standards/sist/c9264eac-b51a-46d1-bc9c-27d019817c70/iso-iec-14496-4-2000>

<b>Annex A (informative) Sample Bank Format (SASBF) compliance testing and materials</b> .....	<b>186</b>
<b>A.1 Introduction</b> .....	<b>186</b>
<b>A.2 Organization</b> .....	<b>186</b>
<b>A.3 Test Sequence Structure</b> .....	<b>188</b>
<b>A.4 Abbreviations</b> .....	<b>188</b>
<b>A.5 Measurement and Analysis</b> .....	<b>189</b>
<b>A.5.1 General</b> .....	<b>189</b>
<b>A.5.2 Decay/Release Segment</b> .....	<b>189</b>
<b>A.5.3 Filter</b> .....	<b>189</b>
<b>A.6 Test Banks</b> .....	<b>190</b>
<b>A.6.1 LimitsLFO.dls</b> .....	<b>190</b>
<b>A.6.2 LimitsVolEG.dls</b> .....	<b>190</b>
<b>A.6.3 Shut Down Time Test</b> .....	<b>190</b>
<b>A.6.4 LimitsModEG.dls</b> .....	<b>191</b>
<b>A.6.5 PitchEG.dls</b> .....	<b>191</b>
<b>A.6.6 PitchModLFO.dls</b> .....	<b>192</b>
<b>A.6.7 PitchVibLFO.dls</b> .....	<b>193</b>
<b>A.6.8 PitchGen.dls</b> .....	<b>193</b>
<b>A.6.9 GainModLFO.dls</b> .....	<b>195</b>
<b>A.6.10 GainEG.dls</b> .....	<b>196</b>
<b>A.6.11 GainGen.dls</b> .....	<b>196</b>
<b>A.6.12 FilterGen.dls</b> .....	<b>198</b>
<b>A.6.13 FilterModLFO.dls</b> .....	<b>203</b>
<b>A.6.14 FilterEG.dls</b> .....	<b>205</b>
<b>A.7 Mod EG Delay to Fc Test</b> .....	<b>206</b>
<b>A.8 Mod EG Hold to Fc Test</b> .....	<b>206</b>
<b>A.9 Mod EG Sustain to Fc Test</b> .....	<b>206</b>
<b>A.10 Discrepancies</b> .....	<b>209</b>
<b>A.11 Outstanding Issues</b> .....	<b>210</b>
<b>A.12 References</b> .....	<b>210</b>
<b>Annex B (informative) Complexity measurement criteria and tool for level definitions of algorithmic synthesis and AudioFX Object Type</b> .....	<b>211</b>
<b>B.1 Introduction</b> .....	<b>211</b>
<b>B.2 Parameters for complexity analyses</b> .....	<b>211</b>
<b>B.3 The complexity vector</b> .....	<b>214</b>
<b>B.4 The profiling tool for Structured Audio</b> .....	<b>227</b>
<b>Annex C (informative) Test bitstreams for the CELP object type</b> .....	<b>231</b>
<b>Annex D (informative) Patent statements</b> .....	<b>235</b>
<b>Bibliography</b> .....	<b>237</b>

STANDARD PREVIEW  
(standards.iteh.ai)

ISO/IEC 14496-4:2000

http://standards.iteh.ai/catalog/standards/sist/c9204eac-051a-40d1-b05c-27d019817c70/iso-iec-14496-4-2000

## 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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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.

Attention is drawn to the possibility that some of the elements of this part of ISO/IEC 14496 may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

International Standard ISO/IEC 14496-4 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

ISO/IEC 14496 consists of the following parts, under the general title *Information technology — Coding of audio-visual objects*:

— *Part 1: Systems*

— *Part 2: Visual*

— *Part 3: Audio*

— *Part 4: Conformance testing*

— *Part 5: Reference software*

— *Part 6: Delivery Multimedia Integration Framework (DMIF)*

Annexes A to D of this part of ISO/IEC 14496 are for information only.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[ISO/IEC 14496-4:2000](https://standards.iteh.ai/catalog/standards/sist/c9264eac-b51a-46d1-bc9c-27d019817c70/iso-iec-14496-4-2000)

<https://standards.iteh.ai/catalog/standards/sist/c9264eac-b51a-46d1-bc9c-27d019817c70/iso-iec-14496-4-2000>

## Introduction

Parts 1, 2 and 3 of ISO/IEC 14496 specify a multiplex structure and coded representations of audio-visual information. Parts 1, 2 and 3 of ISO/IEC 14496 allow for large flexibility, achieving suitability of ISO/IEC 14496 for many different applications. The flexibility is obtained by including parameters in the bitstream that define the characteristics of coded bitstreams. Examples are the audio sampling frequency, picture size, picture shape, picture rate, bitrate parameters, synchronisation timestamps, the association of bitstreams and synthetic objects within objects, the association of objects within scenes, the protection of bitstreams, objects and scenes. Part 6 of ISO/IEC 14496 specifies a framework for uniform delivery of MPEG-4 content according to the requested associated QoS, irrespective of their location and the transport technology.

This part of ISO/IEC 14496 specifies how tests can be designed to verify whether bitstreams and decoders meet the requirements as specified in parts 1, 2, 3 and 6 of ISO/IEC 14496 and allow interoperability with remote terminals in interactive, broadcast and local (with stored contents) sessions. These tests can be used for various purposes such as:

- manufacturers of encoders, and their customers, can use the tests to verify whether the encoder produces bitstreams compliant with parts 1, 2 and 3 of ISO/IEC 14496.
- manufacturers of decoders and their customers can use the tests to verify whether the decoder meets the requirements specified in parts 1, 2 and 3 of ISO/IEC 14496 for the claimed decoder capabilities.
- manufacturers and customers of terminals supporting interactive, broadcast and local sessions over a multitude of transport protocols and networks, can use the tests to verify whether the claimed functionalities are compliant with ISO/IEC 14496-6.
- manufacturers of test equipments, and their customers can use the tests to verify compliance with parts 1, 2 and 3 of ISO/IEC 14496.

### ISO/IEC 14496-4:2000

The text of ISO/IEC 14496-4 and the electronic attachments to this International Standard are provided on four CD-ROMs. All test sequences and bitstreams mentioned in the text of the standard are on these CD-ROMs.

- CD 1 contains all ISO/IEC 14496-1 and ISO/IEC 14496-2 sequences as well as those ISO/IEC 14496-3 which are not included on CD 2, CD 3 and CD 4.
- CD 2 contains ISO/IEC 14496-3 audio AAC lc, AAC ltp, AAC main and Twin-VQ sequences.
- CD 3 contains ISO/IEC 14496-3 audio AAC scalable and original sine-sweep sequences.
- CD 4 contains ISO/IEC 14496-3 audio AAC SSR sequences and International Standard ISO/IEC 14496-4.

Each CD-ROM contains a text file cdX.sum with a list of file names followed on the next line by a checksum, output of the Unix utility “sum”. This allows the integrity of zip files to be checked.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

ISO/IEC 14496-4:2000

<https://standards.iteh.ai/catalog/standards/sist/c9264eac-b51a-46d1-bc9c-27d019817c70/iso-iec-14496-4-2000>



# Information technology — Coding of audio-visual objects — Part 4: Conformance testing

## 1 General

### 1.1 Scope

This part of ISO/IEC 14496 specifies how tests can be designed to verify whether bitstreams and decoders meet requirements specified in parts 1, 2 and 3 of ISO/IEC 14496 and for part 6 of ISO/IEC 14496 it specifies how tests can be designed for bitstream delivery over various delivery technologies in an interoperable transparent manner to parts 1, 2 and 3. In this part of ISO/IEC 14496, encoders are not addressed specifically. An encoder may be said to be an ISO/IEC 14496 encoder if it generates bitstreams compliant with the syntactic and semantic bitstream requirements specified in parts 1, 2 and 3 of ISO/IEC 14496.

Characteristics of coded bitstreams and decoders are defined for parts 1, 2 and 3 of ISO/IEC 14496. The characteristics of a bitstream define the subset of the standard that is exploited in the bitstream. Examples are the applied values or range of the picture size and bitrate parameters. Decoder characteristics define the properties and capabilities of the applied decoding process. An example of a property is the applied arithmetic accuracy. The capabilities of a decoder specify which coded bitstreams the decoder can decode and reconstruct, by defining the subset of the standard that may be exploited in decodable bitstreams. A bitstream can be decoded by a decoder if the characteristics of the coded bitstream are within the subset of the standard specified by the decoder capabilities.

Procedures are described for testing conformance of bitstreams and decoders to the requirements defined in parts 1, 2 and 3 of ISO/IEC 14496. Given the set of characteristics claimed, the requirements that must be met are fully determined by parts 1, 2 and 3 of ISO/IEC 14496. This part of ISO/IEC 14496 summarises the requirements, cross references them to characteristics, and defines how conformance with them can be tested. Guidelines are given on constructing tests to verify bitstream and decoder conformance. This document gives guidelines on how to construct bitstream test suites to check or verify decoder conformance. In addition, some test bitstreams implemented according to those guidelines are provided as an electronic annex to this document. The procedures and signaling messages for session and channel establishment are defined in part 6 of ISO/IEC 14496.

Conformance with the signaling messages and procedures in this part of ISO/IEC 14496 are defined in accordance to the specifications in part 6 of ISO/IEC 14496. This specification allows the manufacturer to identify the conformance of the signaling message in a static review and provides abstract test cases to test the conformance to the procedures in a dynamic review of an implementation as defined in ISO/IEC 9646 Conformance Testing standard.

### 1.2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 14496. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO/IEC 14496 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 639:1988, *Code for the representation of names of languages*.

## ISO/IEC 14496-4:2000(E)

- ISO 8859-1:1987, *Information processing - 8-bit single-byte coded graphic character sets - Part 1: Latin alphabet No. 1.*
- IEC 461:1986, *Time and control code for video tape recorders.*
- IEC 908:1987, *Compact disc digital audio system.*
- ITU-T Rec. T.81 (1992)|ISO/IEC 10918-1:1994, *Information technology - Digital compression and coding of continuous-tone still images: Requirements and guidelines.*
- ISO/IEC 9646-1, *Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts.*
- ISO/IEC 9646-2, *Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract Test Suite specification.*
- ISO/IEC 9646-7, *Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 7: Implementation Conformance Statements.*
- ISO/IEC 11172-1:1993, *Information technology - Coding of moving pictures and associated audio for digital storage media at up to about 1,5 Mbit/s - Part 1: Systems.*
- ISO/IEC 11172-2:1993, *Information technology - Coding of moving pictures and associated audio for digital storage media at up to about 1,5 Mbit/s - Part 2: Video.*
- 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 11172-4:1993, *Information technology - Coding of moving pictures and associated audio for digital storage media at up to about 1,5 Mbit/s - Part 4: Compliance testing.*
- ITU-T Rec. H.222.0(1995)|ISO/IEC 13818-1:1996, *Information technology - Generic coding of moving pictures and associated audio information: Systems.*
- ITU-T Rec. H.262(1995)|ISO/IEC 13818-2:1996, *Information technology - Generic coding of moving pictures and associated audio information: Video.*
- ISO/IEC 13818-3:1998, *Information technology - Generic coding of moving pictures and associated audio information - Part 3: Audio.*
- ISO/IEC 13818-7:1997, *Information technology - Generic coding of moving pictures and associated audio information - Part 7: Advanced Audio Coding (AAC).*
- ISO/IEC 14496-1:1999, *Information technology - Coding of audio-visual objects - Part 1: Systems.*
- ISO/IEC 14496-2:1999, *Information technology - Coding of audio-visual objects - Part 2: Visual.*
- ISO/IEC 14496-3:1999, *Information technology - Coding of audio-visual objects - Part 3: Audio.*
- ISO/IEC 14496-6:1999, *Information technology - Coding of audio-visual objects - Part 6: Delivery Multimedia Integration Framework (DMIF).*
- Recommendations and reports of the CCIR, 1990 XVIIth Plenary Assembly, Dusseldorf, 1990 Volume XI - Part 1 Broadcasting Service (Television) Recommendation ITU-R BT.601-3, *Encoding parameters of digital television for studios.*
- CCIR Volume X and XI Part 3 Recommendation ITU-R BR.648, *Recording of audio signals.*
- CCIR Volume X and XI Part 3 Report ITU-R 955-2, *Satellite sound broadcasting to vehicular, portable and fixed receivers in the range 500 - 3000Mhz.*

IEEE Standard Specifications for the Implementations of 8 x 8 Inverse Discrete Cosine Transform, IEEE Std 1180-1990, December 6, 1990.

ITU-T Rec. H.261 (Formerly CCITT Rec. H.261), *Video codec for audiovisual services at p x 64 kbit/s*, Geneva, 1990.

## 2 Technical elements

### 2.1 Definitions

Relevant definitions for this part of ISO/IEC 14496 can be found in ISO/IEC 14496-1, ISO/IEC 14496-2, ISO/IEC 14496-3 and ISO/IEC 14496-6 for Systems, Visual, Audio and DMIF definitions respectively.

### 2.2 Abbreviations and symbols

Relevant abbreviations and symbols for this part of ISO/IEC 14496 can be found in ISO/IEC 14496-1, ISO/IEC 14496-2, ISO/IEC 14496-3 and ISO/IEC 14496-6 for Systems, Visual, Audio and DMIF definitions respectively.

## 3 Systems

### 3.1 Conformance Points

Figure 3-1 illustrates a typical MPEG-4 terminal, as per the specifications of the Systems Decoder Model as identified in ISO/IEC 14496-1. With reference to this model, the following conformance point types have been identified.

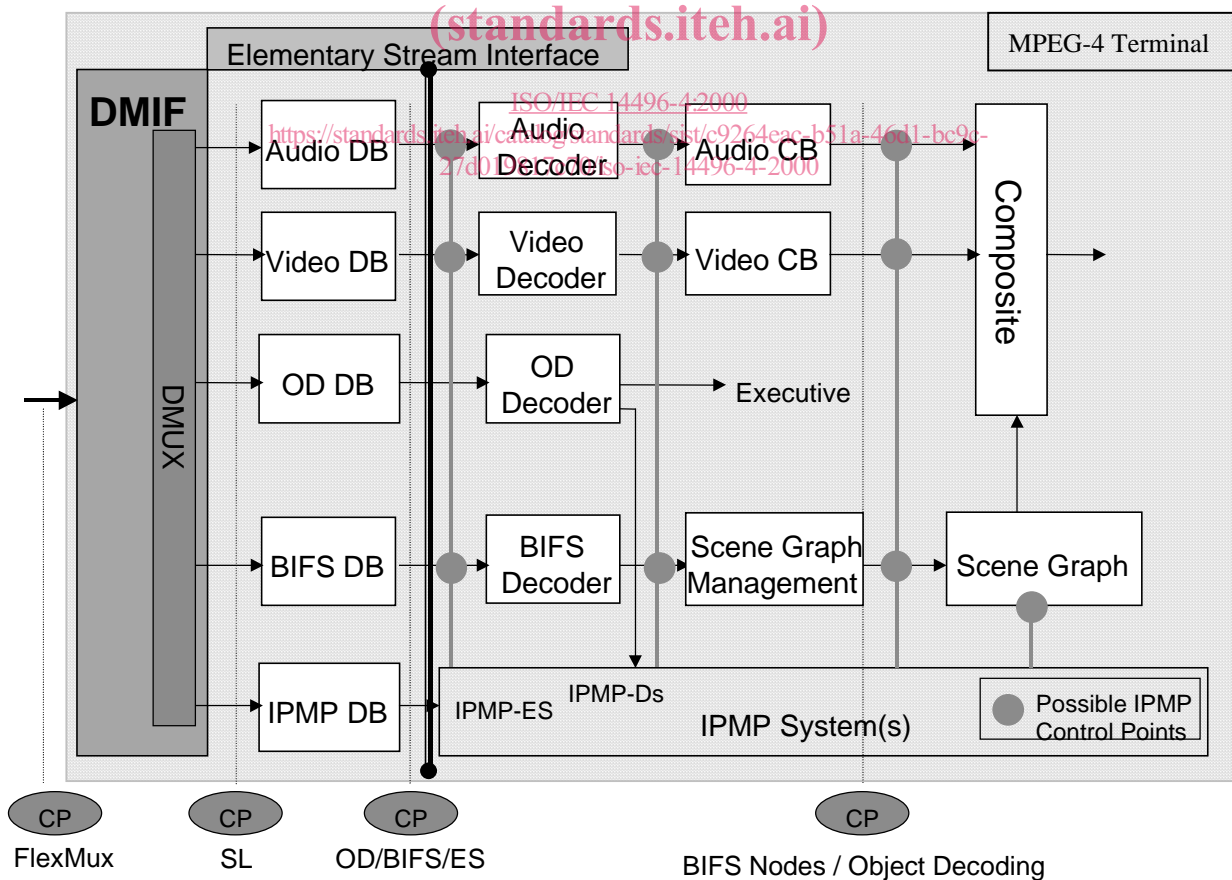


Figure 3-1 — Typical MPEG-4 terminal

## ISO/IEC 14496-4:2000(E)

On Figure 3-1, DB are Decoding Buffers, CB are Composition Buffers. Audio CB contain PCM data. Video CB contain pixel data. Decoding buffers contain reconstructed Access Units (AU) or pieces of AU.

Bitstream conformance points are:

- FlexMux
- Synchronisation Layer
- OD Decoding
- BIFS Decoding
- OCI Decoding
- IPMP
- Systems Decoder Model conformance

At a bitstream conformance point, bitstreams will be acquired for use in testing.

Terminal conformance points are:

- FlexMux
- Synchronisation Layer
- OD Decoding Buffer
- BIFS Decoding Buffer
- OCI Decoding Buffer
- IPMP
- Scene Graph
- Systems Decoder Model conformance

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[ISO/IEC 14496-4:2000](https://standards.iteh.ai/catalog/standards/sist/c9264eac-b51a-46d1-bc9c-27d019817c70/iso-iec-14496-4-2000)

<https://standards.iteh.ai/catalog/standards/sist/c9264eac-b51a-46d1-bc9c-27d019817c70/iso-iec-14496-4-2000>

### 3.1.1 FlexMux Conformance Point

A FlexMux conformance point is a conformance point where FlexMux streams as defined in subclause 11.2 of ISO/IEC 14496-1 can be acquired or inserted. According to a scene delivery, there may be several FlexMux conformance points. Each FlexMux conformance points correspond to one FlexMux channel allocated under DMIF responsibility. A FlexMux conformance point can be envisaged according to a bitstream point of view and according to a Terminal point of view. FlexMux bitstream conformance points are dedicated to the syntactic aspect of the FlexMux streams that can be acquired, while FlexMux Terminal conformance points are more dedicated to the semantics and the coherence of the FlexMux-ed streams, which can be acquired or inserted, with their associated signalling. The MPEG-4 signalling can be found in the Object descriptors.

### 3.1.2 Sync Layer Conformance Point

A Synchronisation Layer (SL) conformance point has to be considered from two possible points of view : the SL bitstream point of view and the SL Terminal point of view. SL bitstream conformance points are dedicated to the syntactic aspect of the SL bitstreams which can be acquired or inserted, assuming that the SL configuration of each SL stream is known upon acquisition of the Object Descriptor. SL terminal conformance points are more dedicated to the semantics and the coherence of the SL bitstreams with the associated signalling acquired from the Object descriptors, with the information found in the related SLConfigDescriptor, and with the information found in the associated SL\_PDU packet headers.

### 3.1.3 OD Conformance Point

This is a point situated between the DMIF interface and the OD parser/decoder. Access Units from OD Elementary Streams are present at this point in the terminal.

### 3.1.4 BIFS Conformance Point

This is a point situated between the DMIF interface and the BIFS parser/decoder. Access Units from BIFS Elementary Streams are present at this point in the terminal. BIFS Elementary Streams contains BIFS Command Frames or BIFS Anim Frames.

### 3.1.5 OCI Conformance Point

This is a point situated between the DMIF interface and the OCI parser/decoder. Access Units from OCI Elementary Streams are present at this point in the terminal.

### 3.1.6 IPMP Conformance Point

IPMP information shall be conveyed in an MPEG-4 bitstream using the IPMP framework described in ISO/IEC 14496-1, subclauses 8.3.2 and 8.6. This includes the IPMP Elementary stream (IPMP-ES) and the IPMP Descriptors (IPMP-Ds). IP Identification information shall be conveyed using IPI Data sets as specified in ISO/IEC 14496-1, subclause 8.6.8. IPMP bitstream conformance points are dedicated to syntactic conformance. IPMP terminal conformance points are dedicated to semantic conformance.

### 3.1.7 Scene Graph Conformance Point

This is a point situated between the Scene Graph Management and the Compositor. The data present at this point represents the current state of the Scene Graph, i.e. the integration over time of all BIFS Commands and BIFS Anims received by the terminal as well as all interactions from the viewer.

It is the last point in the BIFS information flow where conformance can be specified. The format of the data at this point is implementation-dependent. However, there shall be a way to extract this implementation-dependent information and present it for conformance testing in the Scene Dump format specified in the Test Material subclause below.

## 3.2 Bitstream Conformance

Each bitstream shall meet the syntactic and semantic requirements specified in ISO/IEC 14496-1. This subclause describes a set of tests to be performed on bitstreams. In the description of the tests it is assumed that the tested bitstream contains no errors due to transmission or other causes. For each test the condition or conditions that must be satisfied are given, as well as the prerequisites or conditions in which the test can be applied. Note that the application of these tests requires parsing of the bitstream to the appropriate levels. Parsing and interpretation of ODs is also required. In some cases of IPMP-protected data, de-scrambling may be required before the tests can be performed on non IPMP-related features.

### 3.2.1 FlexMux Conformance

#### 3.2.1.1 Conformance Requirements

FlexMux-ed bitstreams shall comply with the specifications in subclause 11.2 of ISO/IEC 14496-1

#### 3.2.1.2 Measurement procedure

Syntax of the bitstream shall meet the requirements of subclause 11.2 of ISO/IEC 14496-1.

#### 3.2.1.3 Tolerance

There is no tolerance for bitstream syntax checking. The diagnosis is pass or fail.

## ISO/IEC 14496-4:2000(E)

### 3.2.2 Synchronization Layer Conformance

#### 3.2.2.1 Conformance Requirements

SL-packetized bitstreams shall comply with the specifications in subclause 10.2 of ISO/IEC 14496-1.

#### 3.2.2.2 Measurement procedure

Syntax of the SL Packets shall meet the requirements of subclause 10.2 of ISO/IEC 14496-1.

#### 3.2.2.3 Tolerance

There is no tolerance for bitstream syntax checking. The diagnosis is pass or fail.

### 3.2.3 OD Conformance

#### 3.2.3.1 Conformance Requirements

OD streams shall comply with the specifications in clause 8 of ISO/IEC 14496-1.

#### 3.2.3.2 Measurement procedure

Syntax of the OD stream shall meet the requirements of clause 8 of ISO/IEC 14496-1.

#### 3.2.3.3 Tolerance

There is no tolerance for bitstream syntax checking. The diagnosis is pass or fail.

**iTeh STANDARD PREVIEW**  
(standards.iteh.ai)

### 3.2.4 BIFS Conformance

#### 3.2.4.1 Conformance Requirements

BIFS streams shall comply with the specifications in subclause 9.3 of ISO/IEC 14496-1.

[ISO/IEC 14496-4:2000](http://standards.iteh.ai/catalog/standards/sist/c9264eac-b51a-46d1-bc9c-27d019817c70/iso-iec-14496-4-2000)

<http://standards.iteh.ai/catalog/standards/sist/c9264eac-b51a-46d1-bc9c-27d019817c70/iso-iec-14496-4-2000>

#### 3.2.4.2 Measurement procedure

Syntax of the BIFS stream shall meet the requirements of subclause 9.3 of ISO/IEC 14496-1.

#### 3.2.4.3 Tolerance

There is no tolerance for bitstream syntax checking. The diagnosis is pass or fail.

### 3.2.5 OCI Conformance

#### 3.2.5.1 Conformance Requirements

OCI descriptors included in ObjectDescriptors or ES\_Descriptors shall comply with ISO/IEC 14496-1 subclause 8.6. A conformant OCI bitstream shall only contain OCI events and OCI descriptors that are compliant to ISO/IEC 14496-1 subclauses 8.4 and 8.6. A conformant OCI bit stream shall be embedded in SL bitstreams, the configuration of which complies to ISO/IEC 14496-1 subclause 8.4.2

#### 3.2.5.2 Measurement procedure

Syntax of the OCI stream and of the OCI descriptors shall meet the requirements of subclauses 8.4 and 8.6 of ISO/IEC 14496-1.

### 3.2.5.3 Tolerance

There is no tolerance. The diagnosis is pass or fail.

### 3.2.6 IPMP Conformance

#### 3.2.6.1 Conformance Requirements

The IPMP information in a conformant bit stream shall consist only of IPMP-ESs and IPMP-Ds that are compliant to ISO/IEC 14496-1 subclauses 8.3.2 and 8.6 as well as IPI Data Sets that are compliant to ISO/IEC 14496-1 subclause 8.6.8.

#### 3.2.6.2 Measurement procedure

The IPMP information in a conformant bit stream shall consist only of IPMP-ESs and IPMP-Ds that are parse-able to the extent of the specification of ISO/IEC 14496-1 subclauses 8.3.2 and 8.6.13 as well as IPI Data Sets that are parse-able.

#### 3.2.6.3 Tolerance

There is no tolerance for bitstream syntax checking. The diagnosis is pass or fail.

### 3.2.7 Miscellaneous Conformance

#### 3.2.7.1 Conformance Requirements

##### 3.2.7.1.1 Private data handling

The normal operation of compliant MPEG decoders shall not be affected by the presence of private data in MPEG4 system streams, i.e. decoders shall operate in the same way, if any private data are inserted or are not inserted in the already predefined fields.

Decoders shall be at a minimum capable of parsing and ignoring all private fields.

Decoders shall be at a minimum capable of parsing and ignoring all private elementary streams.

##### 3.2.7.1.2 Buffer management

The SDM testing, in terms of buffer underflow and overflow in the SDM is done one elementary stream at a time.

From a System Decoder Model point of view, FlexMux bitstream compliance, SL and Elementary stream compliance are required.

#### 3.2.7.2 Measurement procedure

All the implied bitstream syntaxes shall meet their associated requirements defined in ISO/IEC 14496-1, clause 7.

#### 3.2.7.3 Tolerance

There is no tolerance. The diagnosis is pass or fail.

### 3.3 Terminal Conformance

This subclause describes procedures to verify conformance of terminals. Each compliant decoder shall be able to decode all compliant ISO/IEC 14496-1 streams within the subset of the standard defined by the specified capabilities of the decoder.

All tests are performed using error free bitstreams. To test for correct interpretation of syntax and semantics, test sequences covering a wide range of parameters shall be supplied to the decoder under test and its output