

Information technology — Coding of audio-visual objects —

Part 15: Advanced Video Coding (AVC) file format

ICS 35.040

National foreword

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Summary of pages

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Part 15: **Advanced Video Coding (AVC) file format**

*Technologies de l'information — Codage des objets audiovisuels —
Partie 15: Format de fichier de codage vidéo avancé (AVC)*



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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.

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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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ISO/IEC 14496-15 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)*
- *Part 7: Optimized reference software for coding of audio-visual objects [Technical Report]*
- *Part 8: Carriage of ISO/IEC 14496 contents over IP networks*
- *Part 9: Reference hardware description [Technical Report]*
- *Part 10: Advanced Video Coding*
- *Part 11: Scene description and application engine*
- *Part 12: ISO base media file format*
- *Part 13: Intellectual Property Management and Protection (IPMP) extensions*
- *Part 14: MP4 file format*
- *Part 15: Advanced Video Coding (AVC) file format*
- *Part 16: Animation Framework eXtension (AFX)*
- *Part 17: Streaming text format*
- *Part 18: Font compression and streaming*
- *Part 19: Synthesized texture stream*

Introduction

The Advanced Video Coding (AVC) standard, jointly developed by the ITU-T and ISO/IEC SC29/WG11 (MPEG), offers not only increased coding efficiency and enhanced robustness, but also many features for the systems that use it. To enable the best visibility of, and access to, those features, and to enhance the opportunities for the interchange and interoperability of media, this part of ISO/IEC 14496 defines a storage format for video streams compressed using AVC.

This part of ISO/IEC 14496 defines a storage format based on, and compatible with, the ISO Base Media File Format (ISO/IEC 14496-12 and ISO/IEC 15444-12), which is used by the MP4 file format (ISO/IEC 14496-14) and the Motion JPEG 2000 file format (ISO/IEC 15444-3) among others. This part of ISO/IEC 14496 enables AVC video streams to:

- be used in conjunction with other media streams, such as audio;
- be used in an MPEG-4 systems environment, if desired;
- be formatted for delivery by a streaming server, using hint tracks;
- inherit all the use cases and features of the ISO Base Media File Format on which MP4 and MJ2 are based.

This part of ISO/IEC 14496 may be used as a standalone specification; it specifies how AVC content shall be stored in an ISO Base Media File Format compliant format. However, it is normally used in the context of a specification, such as the MP4 file format, derived from the ISO Base Media File Format, that permits the use of AVC video.

The ISO Base Media File Format is becoming increasingly common as a general-purpose media container format for the exchange of digital media, and its use in this context should accelerate both adoption and interoperability.

Extensions to the ISO Base Media File Format are defined here to support the new systems aspects of the AVC codec.

Information technology — Coding of audio-visual objects —

Part 15:

Advanced Video Coding (AVC) file format

1 Scope

This part of ISO/IEC 14496 specifies the storage format for AVC (ISO/IEC 14496-10 | ITU-T Rec. H.264) video streams.

The storage of AVC content uses the existing capabilities of the ISO Base Media File Format but also defines extensions to support the following features of the AVC codec:

- **Switching pictures:** To enable switching between different coded streams and substitution of pictures within the same stream.
- **Sub-sequences and layers:** Provides a structuring of the dependencies of a group of pictures to provide for a flexible stream structure (e.g. in terms of temporal scalability and layering).
- **Parameter sets:** The sequence and picture parameter set mechanism decouples the transmission of infrequently changing information from the transmission of coded macroblock data. Each slice containing the coded macroblock data references the picture parameter set containing its decoding parameters. In turn, the picture parameter set references a sequence parameter set that contains sequence level decoding parameter information.

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 14496-1:2001, *Information technology — Coding of audio-visual objects — Part 1: Systems*

ISO/IEC 14496-10, *Information technology — Coding of audio-visual objects — Part 10: Advanced video coding* | ITU-T Rec. H.264, *Advanced video coding for generic audiovisual services*

ISO/IEC 14496-12, *Information technology — Coding of audio-visual objects — Part 12: ISO base media file format* (technically identical to ISO/IEC 15444-12)

3 Terms, definitions, symbols and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 14496-1, ISO/IEC 14496-10 | ITU-T Rec. H.264 and the following apply.

3.1.1

parameter set

a sequence parameter set or a picture parameter set, as defined in ISO/IEC 14496-10

NOTE This term is used to refer to both types of parameter sets.

3.1.2

parameter set elementary stream

elementary stream containing samples made up of only sequence and picture parameter set NAL units synchronized with the video elementary stream

3.1.3

video elementary stream

elementary stream containing access units made up of NAL units for coded picture data

3.2 Symbols and abbreviated terms

AVC	Advanced Video Coding [ISO/IEC 14496-10]
HRD	Hypothetical Reference Decoder
IDR	Instantaneous Decoding Refresh
NAL	Network Abstraction Layer
PPS	Picture Parameter Set
SEI	Supplementary Enhancement Information
SPS	Sequence Parameter Set

4 Extensions to the ISO Base Media File Format

4.1 Introduction

This clause documents technical additions to the ISO Base Media File Format, which can be used when storing AVC streams. However, these additions could also be used by other media, if they are defined to use them. They are therefore documented here separately.

4.2 File identification

The brand 'avc1' shall be used to indicate that extensions conformant with this section are used in a file. The use of 'avc1' as a major-brand may be permitted by specifications; in that case, that specification defines the file extension and required behaviour.

4.3 Independent and Disposable Samples Box

Box Types:	'sdtb'
Container:	Sample Table Box ('stbl')
Mandatory:	No
Quantity:	Exactly one

This optional table answers three questions about sample dependency:

- 1) Does this sample depend on others (is it an I-picture)?
- 2) Do no other samples depend on this one?
- 3) Does this sample contain multiple (redundant) encodings of the data at this time-instant (possibly with different dependencies)?