INTERNATIONAL STANDARD

ISO/IEC
13818-4

Second edition
2004-12-15

Information technology — Generic coding of moving pictures and associated audio information —

Part 4:
Conformance testing

Technologies de l'information — Codage générique des images animées et des informations sonores associées —

Partie 4: Essais de conformité

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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.

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.

ISO/IEC 13818-4 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, of which it constitutes a minor revision. It also incorporates the Amendments ISO 13818-4/Amd.1:1999, ISO 13818-4/Amd.2:2000 and ISO 13818-4/Amd.3:2000 and the Technical Corrigenda ISO 13818-4/Cor.2:1998, ISO 13818-4/Amd.1:1999/Cor.1:2003 and ISO 13818-4/Amd.3:2000/Cor.1:2003.

ISO/IEC 13818 consists of the following parts, under the general title *Information technology — Generic coding of moving pictures and associated audio information*:

— *Part 1: Systems*

— *Part 2: Video*

— *Part 3: Audio*

— *Part 4: Conformance testing*

— *Part 5: Software simulation* [Technical Report]

— *Part 6: Extensions for DSM-CC*

— *Part 7: Advanced Audio Coding (AAC)*

— *Part 9: Extension for real time interface for systems decoders*

— *Part 10: Conformance extensions for Digital Storage Media Command and Control (DSM-CC)*

— *Part 11: IPMP on MPEG-2 systems*

Introduction

Parts 1, 2, 3 and 7 of ISO/IEC 13818 specify a multiplex structure and coded representations of audio-visual information. Parts 1, 2, 3 and 7 of ISO/IEC 13818 allow for large flexibility, achieving suitability of ISO/IEC 13818 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 rate and bitrate parameters.

This part of ISO/IEC 13818 specifies how tests can be designed to verify whether bitstreams and decoders meet the requirements as specified in parts 1, 2, 3 and 7 of ISO/IEC 13818. 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 valid bitstreams.

- Manufacturers of decoders and their customers can use the tests to verify whether the decoder meets the requirements specified in parts 1, 2, 3 and 7 of ISO/IEC 13818 for the claimed decoder capabilities.

The International Organization for Standardization and the International Electrotechnical Commission (IEC) draw attention to the fact that it is claimed that compliance with this part of ISO/IEC 13818 may involve the use of patents.

ISO and IEC take no position concerning the evidence, validity and scope of these patent rights.

The holders of these patent rights have assured the ISO and IEC that they are willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statements of the holders of these patents right are registered with ISO and IEC. Information may be obtained from the companies listed in Annex E.

Attention is drawn to the possibility that some of the elements of this part of ISO/IEC 13818 may be the subject of patent rights other than those identified in Annex E. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

Information technology — Generic coding of moving pictures and associated audio information —

Part 4:
Conformance testing

1 Scope

This part of ISO/IEC 13818 specifies how tests can be designed to verify whether bitstreams and decoders meet requirements specified in parts 1, 2, 3 and 7 of ISO/IEC 13818. In this part of ISO/IEC 13818, encoders are not addressed specifically. An encoder may be said to be an ISO/IEC 13818 encoder if it generates bitstreams compliant with the syntactic and semantic bitstream requirements specified in parts 1, 2, 3 and 7 of ISO/IEC 13818.

Characteristics of coded bitstreams and decoders are defined for parts 1, 2, 3 and 7 of ISO/IEC 13818. 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, 3 and 7 of ISO/IEC 13818. Given the set of characteristics claimed, the requirements that must be met are fully determined by parts 1, 2, 3 and 7 of ISO/IEC 13818. This part of ISO/IEC 13818 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.

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 639 (all parts), *Codes for the representation of names of languages*

ISO 8859-1, *Information processing — 8-bit single-byte coded graphic character sets — Part 1: Latin alphabet No. 1*

ISO/IEC 11172-1, *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, *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*

ISO/IEC 13818-1:2000, *Information technology — Generic coding of moving pictures and associated audio information: Systems*

ISO/IEC 13818-2:2000, *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 13818-7:2004, *Information technology — Generic coding of moving pictures and associated audio information — Part 7: Advanced Audio Coding (AAC)*

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

3   Terms and definitions

For the purposes of this document, the following definitions apply.

3.1   **16x8 prediction [video]**: A prediction mode similar to field-based prediction but where the predicted block size is 16x8 luminance samples.

3.2   **AC coefficient [video]**: Any DCT coefficient for which the frequency in one or both dimensions is non-zero.

3.3   **access unit [systems]**: A coded representation of a presentation unit. In the case of audio, an access unit is the coded representation of an audio frame.
In the case of video, an access unit includes all the coded data for a picture, and any stuffing that follows it, up to but not including the start of the next access unit. If a picture is not preceded by a group_start_code or a sequence_header_code, the access unit begins with the picture start code. If a picture is preceded by a group_start_code and/or a sequence_header_code, the access unit begins with the first byte of the first of these start codes. If it is the last picture preceding a sequence_end_code in the bitstream all bytes between the last byte of the coded picture and the sequence_end_code (including the sequence_end_code) belong to the access unit.

3.4   **adaptive bit allocation [audio]**: The assignment of bits to subbands in a time and frequency varying fashion according to a psychoacoustic model.

3.5   **adaptive multichannel prediction [audio]**: A method of multichannel data reduction exploiting statistical inter-channel dependencies.

3.6   **adaptive noise allocation [audio]**: The assignment of coding noise to frequency bands in a time and frequency varying fashion according to a psychoacoustic model.

3.7   **adaptive segmentation [audio]**: A subdivision of the digital representation of an audio signal in variable segments of time.

3.8   **alias [audio]**: Mirrored signal component resulting from sub-Nyquist sampling.

3.9   **analysis filterbank [audio]**: Filterbank in the encoder that transforms a broadband PCM audio signal into a set of subsampled subband samples.

3.10   **ancillary data [audio]**: part of the bitstream that might be used for transmission of ancillary data.

3.11   **audio access unit [audio]**: For Layers I and II, an audio access unit is defined as the smallest part of the encoded bitstream which can be decoded by itself, where decoded means "fully reconstructed sound". For Layer III, an audio access unit is part of the bitstream that is decodable with the use of previously acquired main information.

3.12   **audio buffer [audio]**: A buffer in the system target decoder for storage of compressed audio data.

3.13   **audio sequence [audio]**: A non-interrupted series of audio frames (base frames plus optional extension frames) in which the following parameters are not changed:
- ID
- Layer
- Sampling Frequency

For Layer I and II, a decoder is not required to support a continuously variable bitrate (change in the bitrate index) of the base stream. Such a relaxation of requirements does not apply to the extension stream.

3.14   **B-field picture [video]**: A field structure B-Picture.

3.15   **B-frame picture [video]**: A frame structure B-Picture.

3.16   **B-picture**; **bidirectionally predictive-coded picture [video]**: A picture that is coded using motion compensated prediction from past and/or future reference fields or frames.

3.17   **backward compatibility**: A newer coding standard is backward compatible with an older coding standard if decoders designed to operate with the older coding standard are able to continue to operate by decoding all or part of a bitstream produced according to the newer coding standard.

3.18   **backward motion vector [video]**: A motion vector that is used for motion compensation from a reference frame or reference field at a later time in display order.

3.19   **backward prediction [video]**: Prediction from the future reference frame (field).

3.20   **Bark [audio]**: Unit of critical band rate. The Bark scale is a non-linear mapping of the frequency scale over the audio range closely corresponding with the frequency selectivity of the human ear across the band.

3.21   **base layer [video]**: First, independently decodable layer of a scalable hierarchy.

3.22   **big picture [video]**: A coded picture that would cause VBV buffer underflow as defined in C.7 of ISO/IEC 13818-2:2000. Big pictures can only occur in sequences where low_delay is equal to 1. "Skipped picture" is a term that is sometimes used to describe the same concept.

3.23   **bitrate [audio]**: The rate at which the compressed bitstream is delivered to the input of a decoder.

3.24   **bitstream; stream**: An ordered series of bits that forms the coded representation of the data.

3.25   **bitstream verifier [video]**: A process by which it is possible to test and verify that all the requirements specified in ISO/IEC 13818-2 are met by the bitstream.

3.26   **block [video]**: An 8-row by 8-column matrix of samples, or 64 DCT coefficients (source, quantised or dequantised).

3.27   **block companding [audio]**: Normalising of the digital representation of an audio signal within a certain time period.

3.28   **bottom field [video]**: One of two fields that comprise a frame. Each line of a bottom field is spatially located immediately below the corresponding line of the top field.

3.29   **bound [audio]**: The lowest subband in which intensity stereo coding is used.

3.30   **byte aligned**: A bit in a coded bitstream is byte-aligned if its position is a multiple of 8-bits from the first bit in the stream.

3.31   **byte**: Sequence of 8-bits.

3.32   **centre channel [audio]**: An audio presentation channel used to stabilise the central component of the frontal stereo image.

3.33   **channel [audio]**: A sequence of data representing an audio signal being transported.

3.34   **chroma simulcast [video]**: A type of scalability (which is a subset of SNR scalability) where the enhancement layer (s) contain only coded refinement data for the DC coefficients, and all the data for the AC coefficients, of the chrominance components.

3.35   **chrominance format [video]**: Defines the number of chrominance blocks in a macroblock.

3.36   **chrominance component [video]**: A matrix, block or single sample representing one of the two colour difference signals related to the primary colours in the manner defined in the bitstream. The symbols used for the chrominance signals are Cr and Cb.

3.37   **coded audio bitstream [audio]**: A coded representation of an audio signal as specified in part 3 of ISO/IEC 13818.

3.38   **coded B-frame [video]**: A B-frame picture or a pair of B-field pictures.

3.39   **coded frame [video]**: A coded frame is a coded I-frame, a coded P-frame or a coded B-frame.

3.40   **coded I-frame [video]**: An I-frame picture or a pair of field pictures, where the first field picture is an I-picture and the second field picture is an I-picture or a P-picture.

3.41   **coded order [video]**: The order in which the pictures are transmitted and decoded. This order is not necessarily the same as the display order.

3.42   **coded P-frame [video]**: A P-frame picture or a pair of P-field pictures.

3.43   **coded picture [video]**: A coded picture is made of a picture header, the optional extensions immediately following it, and the following picture data. A coded picture may be a coded frame or a coded field.

3.44   **coded representation**: A data element as represented in its encoded form.

3.45   **coded video bitstream [video]**: A coded representation of a series of one or more pictures as defined in ISO/IEC 13818-2.

3.46   **coding parameters [video]**: The set of user-definable parameters that characterise a coded bitstream. Bitstreams are characterised by coding parameters. Decoders are characterised by the bitstreams that they are capable of decoding.

3.47   **component [video]**: A matrix, block or single sample from one of the three matrices (luminance and two chrominance) that make up a picture.

3.48   **compression**: Reduction in the number of bits used to represent an item of data.

3.49   **constant bitrate**: Operation where the bitrate is constant from start to finish of the coded bitstream.

3.50   **constrained parameters [video]**: The values of the set of coding parameters defined in 2.4.3.2 of ISO/IEC 11172-2:1993.

3.51   **constrained system parameter stream; CSPS [systems]**: A Program Stream for which the constraints defined in subclause 2.7.9 of ISO/IEC 13818-1:2000 apply.

3.52   **CRC**: The Cyclic Redundancy Check to verify the correctness of data.

3.53   **critical band [audio]**: Psychoacoustic measure in the spectral domain which corresponds to the frequency selectivity of the human ear. This selectivity is expressed in Bark.

3.54   **critical band rate [audio]**: Psychoacoustic function of frequency. At a given audible frequency, it is proportional to the number of critical bands below that frequency. The units of the critical band rate scale are Barks.

3.55   **data element**: An item of data as represented before encoding and after decoding.

3.56   **data partitioning [video]**: A method for dividing a bitstream into two separate bitstreams for error resilience purposes. The two bitstreams have to be recombined before decoding.

3.57   **DC coefficient [video]**: The DCT coefficient for which the frequency is zero in both dimensions.

3.58   **DCT coefficient [video]**: The amplitude of a specific cosine basis function.

3.59   **de-emphasis [audio]**: Filtering applied to an audio signal after storage or transmission to undo a linear distortion due to emphasis.

3.60   **decoded stream**: The decoded reconstruction of a compressed bitstream.

3.61   **decoder input buffer [video]**: The first-in first-out (FIFO) buffer specified in the video buffering verifier.

3.62   **decoder**: An embodiment of a decoding process.

3.63   decoder sub-loop [video]: Stages within encoder which produce numerically identical results to the decode process described in ISO/IEC 13818-2:2000, clause 7. Encoders capable of producing more than just I-pictures embed a decoder sub-loop to create temporal predictions and to model the behaviour of downstream decoders.

3.64   decoding (process): The process defined in ISO/IEC 13818 parts 1, 2, 3 and 7 that reads an input coded bitstream and outputs decoded pictures or audio samples.

3.65   decoding time-stamp; DTS [systems]: A field that may be present in a PES packet header that indicates the time that an access unit is decoded in the system target decoder.

3.66   dequantisation: The process of rescaling the quantised DCT coefficients after their representation in the bitstream has been decoded and before they are presented to the inverse DCT.

3.67   digital storage media; DSM: A digital storage or transmission device or system.

3.68   discrete cosine transform; DCT: Either the forward discrete cosine transform or the inverse discrete cosine transform. The DCT is an invertible, discrete orthogonal transformation.

3.69   display aspect ratio [video]: The ratio height/width (in SI units) of the intended display.

3.70   display order [video]: The order in which the decoded pictures are displayed. Normally this is the same order in which they were presented at the input of the encoder.

3.71   display process [video]: The (non-normative) process by which reconstructed frames are displayed.

3.72   downmix [audio]: A matrixing of n channels to obtain less than n channels.

3.73   drift [video]: Accumulation of mismatch between the reconstructed output produced by the hypothetical decoder sub-loop embedded within an encoder (see definition of "decoder sub-loop") and the reconstructed outputs produced by a (downstream) decoder.

3.74   DSM-CC: digital storage media command and control.

3.75   dual channel mode [audio]: A mode, where two audio channels with independent programme contents (e.g. bilingual) are encoded within one bitstream. The coding process is the same as for the stereo mode.

3.76   dual-prime prediction [video]: A prediction mode in which two forward field-based predictions are averaged. The predicted block size is 16x16 luminance samples. Dual-prime prediction is only used in interlaced P-pictures.

3.77   dynamic crosstalk [audio]: A method of multichannel data reduction in which stereo-irrelevant signal components are copied to another channel.

3.78   dynamic transmission channel switching [audio]: A method of multichannel data reduction by allocating the most orthogonal signal components to the transmission channels.

3.79   editing: The process by which one or more coded bitstreams are manipulated to produce a new coded bitstream. Conforming edited bitstreams must meet the requirements defined in parts 1, 2, and 3 of ISO/IEC 13818.

3.80   Elementary Stream Clock Reference; ESCR [systems]: A time stamp in the PES Stream from which decoders of PES streams may derive timing.

3.81   elementary stream; ES [systems]: A generic term for one of the coded video, coded audio or other coded bitstreams in PES packets. One elementary stream is carried in a sequence of PES packets with one and only one stream_id.

3.82   emphasis [audio]: Filtering applied to an audio signal before storage or transmission to improve the signal-to-noise ratio at high frequencies.

3.83   encoder: An embodiment of an encoding process.

3.84   encoding (process): A process, not specified in ISO/IEC 13818, that reads a stream of input pictures or audio samples and produces a valid coded bitstream as defined in parts 1, 2, and 3 of ISO/IEC 13818.

3.85   **enhancement layer [video]**: A relative reference to a layer (above the base layer) in a scalable hierarchy. For all forms of scalability, its decoding process can be described by reference to the lower layer decoding process and the appropriate additional decoding process for the enhancement layer itself.

3.86   **entitlement control message; ECM [systems]**: Entitlement Control Messages are private conditional access information which specify control words and possibly other, typically stream-specific, scrambling and/or control parameters.

3.87   **entitlement management message; EMM [systems]**: Entitlement Management Messages are private conditional access information which specify the authorisation levels or the services of specific decoders. They may be addressed to single decoders or groups of decoders.

3.88   **entropy coding**: Variable length lossless coding of the digital representation of a signal to reduce redundancy.

3.89   **event [systems]**: An event is defined as a collection of elementary streams with a common time base, an associated start time, and an associated end time.

3.90   **evil bitstreams**: Bitstreams orthogonal to reality.

3.91   **extension bitstream [audio]**: Information contained in an optional additional bit stream related to the audio base bit stream at the system level, to support bit rates beyond those defined in ISO/IEC 11172-3. The optional extension bit stream contains the remainder of the multichannel and multilingual data.

3.92   **fast reverse playback [video]**: The process of displaying the picture sequence in the reverse of display order faster than real-time.

3.93   **fast forward playback [video]**: The process of displaying a sequence, or parts of a sequence, of pictures in display-order faster than real-time.

3.94   **FFT**: Fast Fourier Transformation. A fast algorithm for performing a discrete Fourier transform (an orthogonal transform).

3.95   **field [video]**: For an interlaced video signal, a "field" is the assembly of alternate lines of a frame. Therefore an interlaced frame is composed of two fields, a top field and a bottom field.

3.96   **field period [video]**: The reciprocal of twice the frame rate.

3.97   **field picture; field structure picture [video]**: A field structure picture is a coded picture with picture_structure is equal to "Top field" or "Bottom field".

3.98   **field-based prediction [video]**: A prediction mode using only one field of the reference frame. The predicted block size is 16x16 luminance samples. Field-based prediction is not used in progressive frames.

3.99   **filterbank [audio]**: A set of band-pass filters covering the entire audio frequency range.

3.100   **fixed segmentation [audio]**: A subdivision of the digital representation of an audio signal into fixed segments of time.

3.101   **flag**: A variable which can take one of only the two values defined in this specification.

3.102   **FLC**: Fixed Length Code.

3.103   **forbidden**: The term "forbidden", when used in the clauses defining the coded bitstream, indicates that the value shall never be used. This is usually to avoid emulation of start codes.

3.104   **forced updating [video]**: The process by which macroblocks are intra-coded from time-to-time to ensure that mismatch errors between the inverse DCT processes in encoders and decoders cannot build up excessively.

3.105   **forward compatibility**: A newer coding standard is forward compatible with an older coding standard if decoders designed to operate with the newer coding standard are able to decode bitstreams of the older coding standard.

3.106   **forward motion vector [video]**: A motion vector that is used for motion compensation from a reference frame or reference field at an earlier time in display order.

3.107   **forward prediction [video]**: Prediction from the past reference frame (field).

3.108   **frame [audio]**: A part of the audio bit stream that corresponds to audio PCM samples from an Audio Access Unit.

3.109   frame [video]: A frame contains lines of spatial information of a video signal. For progressive video, these lines contain samples starting from one time instant and continuing through successive lines to the bottom of the frame. For interlaced video a frame consists of two fields, a top field and a bottom field. One of these fields may be temporally located one field period later than the other.

3.110   frame period [video]: The reciprocal of the frame rate.

3.111   frame picture; frame structure picture [video]: A frame structure picture is a coded picture with picture_structure is equal to "Frame".

3.112   frame rate [video]: The rate at which frames are be output from the decoding process.

3.113   frame reordering [video]: The process of reordering the reconstructed frames when the coded order is different from the display order. Frame reordering occurs when B-frames are present in a bitstream. There is no frame reordering when decoding low delay bitstreams.

3.114   frame-based prediction [video]: A prediction mode using both fields of the reference frame.

3.115   free format [audio]: Any bitrate other than the defined bitrates that is less than the maximum valid bitrate for each layer.

3.116   future reference frame (field) [video]: A future reference frame(field) is a reference frame(field) that occurs at a later time than the current picture in display order.

3.117   granules [Layer II] [audio]: The set of 3 consecutive subband samples from all 32 subbands that are considered together before quantisation. They correspond to 96 PCM samples.

3.118   granules [Layer III] [audio]: 576 frequency lines that carry their own side information.

3.119   group of pictures [video]: A notion defined only in ISO/IEC 11172-2 (MPEG-1 Video). In ISO/IEC 13818-2, a similar functionality can be achieved by the mean of inserting group of pictures headers.

3.120   Hann window [audio]: A time function applied sample-by-sample to a block of audio samples before Fourier transformation.

3.121   header: A block of data in the coded bitstream containing the coded representation of a number of data elements pertaining to the coded data that follow the header in the bitstream.

3.122   Huffman coding: A specific method for entropy coding.

3.123   hybrid filterbank [audio]: A serial combination of subband filterbank and MDCT.

3.124   hybrid scalability [video]: Hybrid scalability is the combination of two (or more) types of scalability.

3.125   I-field picture [video]: A field structure I-Picture.

3.126   I-frame picture [video]: A frame structure I-Picture.

3.127   I-picture; intra-coded picture [video]: A picture coded using information only from itself.

3.128   IDCT: Inverse Discrete Cosine Transform.

3.129   IMDCT [audio]: Inverse Modified Discrete Cosine Transform.

3.130   intensity stereo [audio]: A method of exploiting stereo irrelevance or redundancy in stereophonic audio programmes based on retaining at high frequencies only the energy envelope of the right and left channels.

3.131   interlace [video]: The property of conventional television frames where alternating lines of the frame represent different instances in time. In an interlaced frame, one of the field is meant to be displayed first. This field is called the first field. The first field can be the top field or the bottom field of the frame.

3.132   intra coding [video]: Coding of a macroblock or picture that uses information only from that macroblock or picture.

3.133   ITU-T Rec. H.222.0 | ISO/IEC 13818 (multiplexed) stream [systems]: A bitstream composed of 0 or more elementary streams combined in the manner defined in ITU-T Rec. H.222.0 | ISO/IEC 13818-1.

3.134   joint stereo coding [audio]: Any method that exploits stereophonic irrelevance or stereophonic redundancy.

3.135   joint stereo mode [audio]: A mode of the audio coding algorithm using joint stereo coding.

3.136 layer [audio]: One of the levels in the coding hierarchy of the audio system defined in ISO/IEC 13818-3.

3.137 layer [systems]: One of the levels in the data hierarchy of the video and system specifications defined in ISO/IEC 13818 parts 1 and 2.

3.138 layer [video]: In a scalable hierarchy denotes one out of the ordered set of bitstreams and (the result of) its associated decoding process (implicitly including decoding of **all** layers below this layer).

3.139 layer bitstream [video]: A single bitstream associated to a specific layer (always used in conjunction with layer qualifiers, e. g. "enhancement layer bitstream").

3.140 level [video]: A defined set of constraints on the values which may be taken by the parameters of this specification within a particular profile. A profile may contain one or more levels. In a different context, level is the absolute value of a non-zero coefficient (see "run").

3.141 LFE [audio]: Low Frequency Enhancement channel. A limited bandwidth channel for low frequency audio effects in a multichannel system.

3.142 low frequency enhancement (LFE) channel [audio]: A limited bandwidth channel for low frequency audio effects in a multichannel system.

3.143 lower layer [video]: A relative reference to the layer immediately below a given enhancement layer (implicitly including decoding of **all** layers below this enhancement layer).

3.144 luminance component [video]: A matrix, block or single sample representing a monochrome representation of the signal and related to the primary colours in the manner defined in the bitstream. The symbol used for luminance is Y.

3.145 macroblock [video]: The four 8 by 8 blocks of luminance data and the two (for 4:2:0 chrominance format), four (for 4:2:2 chrominance format) or eight (for 4:4:4 chrominance format) corresponding 8 by 8 blocks of chrominance data coming from a 16 by 16 section of the luminance component of the picture. Macroblock is sometimes used to refer to the sample data and sometimes to the coded representation of the sample values and other data elements defined in the macroblock header of the syntax defined in this part of this specification. The usage is clear from the context.

3.146 main audio channels: All channels represented by either single_channel_element()'s or channel_pair_element()'s in one program.

3.147 mapping [audio]: Conversion of an audio signal from time to frequency domain by subband filtering and/or by MDCT.

3.148 masking [audio]: A property of the human auditory system by which an audio signal cannot be perceived in the presence of another audio signal.

3.149 masking threshold [audio]: A function in frequency and time below which an audio signal cannot be perceived by the human auditory system.

3.150 Mbit [video]: 1 000 000 bits.

3.151 MCP [video]: Motion Compensated Predictor.

3.152 modified discrete cosin transform (MDCT) [audio]: A transform which has the property of time domain aliasing cancellation.

3.153 mismatch [video]: Numerical discrepancy between the data reconstructed from the same coded bitstream by two decoding processes. With the exception of IDCT, the specification of ISO/IEC 13818-2 defines the decoding process absolutely unambiguously. Therefore, if both decoding processes are implemented according the specifications ISO/IEC 13818-2, mismatch can only be caused by different implementations of IDCT.

3.154 motion compensation [video]: The use of motion vectors to improve the efficiency of the prediction of sample values. The prediction uses motion vectors to provide offsets into the past and/or future reference frames or reference fields containing previously decoded sample values that are used to form the prediction error.

3.155 motion estimation [video]: The process of estimating motion vectors during the encoding process.

3.156   motion vector [video]: A two-dimensional vector used for motion compensation that provides an offset from the coordinate position in the current picture or field to the coordinates in a reference frame or reference field.

3.157   MS stereo [audio]: A method of exploiting stereo irrelevance or redundancy in stereophonic audio programmes based on coding the sum and difference signal instead of the left and right channels.

3.158   multichannel [audio]: A combination of audio channels used to create a spatial sound field.

3.159   multilingual [audio]: A presentation of dialogue in more than one language.

3.160   NIT [systems]: Network Information Table as defined in Table 2-23 of ISO/IEC 13818-1:2000.

3.161   non-intra coding [video]: Coding of a macroblock or picture that uses information both from itself and from macroblocks and pictures occurring at other times.

3.162   non-tonal component [audio]: A noise-like component of an audio signal.

3.163   Nyquist sampling: Sampling at or above twice the maximum bandwidth of a signal.

3.164   opposite parity [video]: The opposite parity of top is bottom, and vice versa.

3.165   P-field picture [video]: A field structure P-Picture.

3.166   P-frame picture [video]: A frame structure P-Picture.

3.167   P-picture; predictive-coded picture [video]: A picture that is coded using motion compensated prediction from past reference fields or frame.

3.168   pack [systems]: A pack consists of a pack header followed by zero or more packets. It is a layer in the system coding syntax described in 2.5.3.3 of ISO/IEC 13818-1:2000.

3.169   packet [systems]: A packet consists of a header followed by a number of contiguous bytes from an elementary data stream. It is a layer in the system coding syntax described in 2.4.3 of ISO/IEC 13818-1:2000.

3.170   packet data [systems]: Contiguous bytes of data from an elementary stream present in a packet.

3.171   packet identifier; PID [systems]: A unique integer value used to associate elementary streams of a program in a single or multi-program Transport Stream as described in 2.4.3 of ISO/IEC 13818-1:2000.

3.172   padding [audio]: A method to adjust the average length of an audio frame in time to the duration of the corresponding PCM samples, by conditionally adding a slot to the audio frame.

3.173   parameter: A variable within the syntax of this specification which may take one of a range of values. A variable which can take one of only two values is a flag or indicator and not a parameter.

3.174   parity (of field) [video]: The parity of a field can be top or bottom.

3.175   parser: Functional stage of a decoder which extracts from a coded bitstream series of bits representing coded elements (FLC or VLC).

3.176   past reference frame (field) [video]: A past reference frame(field) is a reference frame(field) that occurs at an earlier time than the current picture in display order.

3.177   PAT [systems]: Program Association Table as defined in subclause 2.4.4.3 of ISO/IEC 13818-1:2000.

3.178   payload [systems]: Payload refers to the bytes which follow the header bytes in a packet. For example, the payload of a Transport Stream packet includes the PES_packet_header and its PES_packet_data_bytes, or pointer_field and PSI sections, or private data; but a PES_packet_payload consists of only PES_packet_data_bytes. The Transport Stream packet header and adaptation fields are not payload.

3.179   PES [systems]: An abbreviation for Packetized Elementary Stream.

3.180   PES packet [systems]: The data structure used to carry elementary stream data. It consists of a PES packet header followed by PES packet payload and is described in 2.4.3.6 and 2.4.3.7 of ISO/IEC 13818-1:2000.

3.181   PES packet header[systems]: The leading fields in a PES packet up to and not including the PES_packet_data_byte fields, where the stream is not a padding stream. In the case of a padding stream the PES packet header is similarly defined as the leading fields in a PES packet up to and not including padding_byte fields.