TECHNICAL REPORT

ISO/IEC
TR 13818-5

First edition
1997-12-15

AMENDMENT 1
1999-07-01

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

Part 5:
Software simulation

AMENDMENT 1: Advanced Audio Coding (AAC)

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

Partie 5: Simulation de logiciel

AMENDEMENT 1: Codage audio avancé (AAC)

Reference number
ISO/IEC TR 13818-5:1997/Amd.1:1999(E)

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.

The main task of technical committees is to prepare International Standards, but in exceptional circumstances a technical committee may propose the publication of a Technical Report of one of the following types:

— type 1, when the required support cannot be obtained for the publication of an International Standard, despite repeated efforts;

— type 2, when the subject is still under technical development or where for any other reason there is the future but not immediate possibility of an agreement on an International Standard;

— type 3, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example).

Technical Reports of types 1 and 2 are subject to review within three years of publication, to decide whether they can be transformed into International Standards. Technical Reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.

Amendment 1 to ISO/IEC TR 13818-5:1997, which is a Technical Report of type 3, 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 — Generic coding of moving pictures and associated audio information — Part 5: Software simulation

AMENDMENT 1

Advanced Audio Coding (AAC)

1) *Add the following normative references to subclause 1.2:*

"
ISO/IEC 13818-3: 1998, *Information technology – Generic coding of moving pictures and associated audio information - Part 3: Audio* (Second Edition).

ISO/IEC 13818-7: 1997, *Information technology – Generic coding of moving pictures and associated audio information - Part 7: Advanced Audio Coding (AAC).*
"

2) *Replace the subclauses 5.2.1 (Readme.1st), 5.2.2(doc/readme.1st), by the following:*

"

5.2.1 Readme.1st for ISO/IEC 13818-3

```
*****************************************************************************
ISO MPEG Audio Subgroup Software Simulation Group (1997)
ISO/IEC 13818-3, Second Edition, 1997 MPEG-2 Audio Codec

$Id: readme.1st 1.10 1997/01/28 12:00:48 de Bont Exp $

$Log: readme.1st $
Revision 1.10  1997/01/19 23:00:48  de Bont
Distribution 10. Bug fixes and compliance to 13818-3, Second Edition, 1997

Revision 1.9  1997/01/19 23:00:48  rowlands
Distribution 09. Improved code robustness for some combinations of
parameters.

Revision 1.7  1996/02/14 06:08:44  rowlands
Distribution 07. Added much multichannel encoder and decoder
functionality. Added complete layer 3 to low sampling rate.

Revision 1.5  1995/07/14 08:14:16  rowlands
Added more audio channel configurations, fixed dynamic crosstalk
bugs, and added two-channel low sampling frequency support.

Revision 1.4  1995/06/22 01:25:45  rowlands
Distribution 04, with decoder dynamic crosstalk

Revision 1.3  1995/06/19 03:30:12  rowlands
Distribution 03, with decoder mods and bug fixes

Revision 1.2  1995/06/16 11:12:43  rowlands
Separated text documents

Revision 1.1  1995/06/16 10:58:27  rowlands
Initial revision

*****************************************************************************

MPEG-2 Audio Simulation Software Distribution 10
================================================
$Date: 1997/01/28 12:00:48 $

This package contains source code for the MPEG-2 audio encoder and decoder under development by the MPEG/audio software simulation ad-hoc group. The package includes the
multichannel and low sampling frequency extensions in MPEG-2 audio.

The following table indicates the operations supported by the multichannel software in this distribution. The multichannel encoder and decoder have been amended compared
to dist09. The bug fixes mostly fix combinations of parameters which caused reliability problems. Furthermore both encoder and decoder are now compliant to 13818-3,
Second Edition, 1997.

Feature         Encoder        Decoder
-------------------------------------------------------------------
Sampling_frequency (kHz)  32,44.1,48    32,44.1,48
Bit_rate (kb/s)     >=32    >=32
Bitstream format     ISO/IEC 13818-3,    ISO/IEC 13818-3,
        2nd Edition, 1997  2nd Edition, 1997
Extension bitstream Y      Y
Layer 2       1,2
Channel configuration      5/2,3/2,3/1,  5/2,3/2,3/1,
        3/0(+2/0),  3/0(+2/0),
        2/2,2/1,    2/2,2/1,
        2/0(+2/0),  2/0(+2/0),
        1/0(+2/0)   1/0(+2/0)
LFE       Y      Y
Multilingual Y      Y
Dematrix procedure  0,1,2,3      0,1,2,3
TC allocation Y      Y
Dynamic crosstalk   Y      Y
Prediction   Y      Y
Phantom_center      Y      Y
Ancillary data      Y      Y
File I/O    AIFF,raw    AIFF,raw

The following features are NOT supported by this distribution:
        * layers 1 or 3 wrt. the encoder
        * layer 3 wrt. the decoder

The decoder passes all multichannel compliance bitstreams except for the layer 3 bitstream.

The following table indicates the operations supported by the low sampling frequency software in this distribution. The noise allocation in the layer 3 encoding procedure
has been made more robust.

Feature         Encoder        Decoder
-------------------------------------------------------
MPEG- 1,2   1,2
Sampling_frequency (kHz)  16,22.05,24,  16,22.05,24,
        32,44.1,48  32,44.1,48
Bit_rate (kb/s)     8-448  8-448
Bitstream format    IS     IS
```

```
Layer  1,2,3  1,2,3
Ancillary data        N      N
File I/O       AIFF,raw    AIFF,raw
Sampling rate conversion   N      N

The following features are NOT supported by this distribution:
        * lower sampling frequencies for layer 3 in the encoder
        * psychoacoustic model 1 for lower sampling frequencies in the encoder
        * psychoacoustic model 1 for layer 3 in the encoder

The decoder passes all lower sampling frequency compliance bitstreams.

The package consists of the following tree of files. The contents of the RCS and tables directories are not listed for brevity.

dist10/
      Readme.1st
      doc/
              readme.1st
              readme.dp.01.txt
              readme.jmz.01.txt
              readme.jmz.02.txt
              readme.jmz.03.txt
              readme.jmz.04.txt
              readme.mc.01.txt
              readme.rb.01.txt
              readme.sn.01.txt
              readme.sr.01.txt
              readme.sr.02.txt
              readme.ss.01.txt

      lsf/
              decoder/
                      INSTALL
                      Makefile
                      Makefile.in
                      common.c
                      common.h
                      configure
                      decode.c
                      decoder.h
                      huffman.c
                      huffman.h
                      ieeefloat.c
                      ieeefloat.h
                      makefile.linux
                      makefile.unix
                      musicout.c
                      portableio.c
                      portableio.h
                      tables/
              encoder/
                      INSTALL
                      Makefile
                      Makefile.in
                      common.c
                      common.h
                      configure
                      encode.c
                      encoder.h
                      formatBitstream.c
                      formatBitstream.h
                      huffman.c
                      huffman.h
                      ieeefloat.c
                      ieeefloat.h
                      l3bitstream-pvt.h
                      l3bitstream.c
                      l3bitstream.h
                      l3psy.c
                      l3psy.h
                      l3side.h
                      loop-pvt.h
                      loop.c
                      loop.h
                      makefile.unix
                      mdct.c
                      mdct.h
                      musicin.c
                      portableio.c
                      portableio.h
                      psy.c
                      reservoir.c
                      reservoir.h
                      subs.c
                      tables/
                      tonal.c
      mc/
              decoder/
                      common.c
                      common.h
                      decode.c
                      decoder.h
                      makefile
                      musicout.c
                      tables/

              encoder/
                      common.c
                      common.h
                      dyn_cross.c
                      encode.c
                      encoder.h
                      lfe.c
                      lingual.c
                      makefile
                      musicin.c
                      predisto.c
                      psy.c
                      subs.c
                      tables/
                      tonal.c
      tool/
              pcm2aiff/
                      common.h
                      decoder.h
                      pcm2aiff.c
```

5.2.2 doc/readme.1st for ISO/IEC 13818-3

```
*****************************************************************
ISO MPEG Audio Subgroup Software Simulation Group (1997)
ISO/IEC 13818-3, Second Edition, 1997 MPEG-2 Audio Codec

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Bit_rate (kb/s)     >=32   >=32
Bitstream format    ISO/IEC 13818-3,    ISO/IEC 13818-3,
       2nd Edition, 1997  2nd Edition, 1997
Extension bitstream Y      Y
Layer  2       1,2
Channel configuration      5/2,3/2,3/1,  5/2,3/2,3/1,
       3/0(+2/0),   3/0(+2/0),
       2/2,2/1,     2/2,2/1,
       2/0(+2/0),   2/0(+2/0),
       1/0(+2/0)    1/0(+2/0)
LFE       Y      Y
Multilingual Y      Y
Dematrix procedure  0,1,2,3      0,1,2,3
TC allocation Y      Y
Dynamic crosstalk   Y      Y
Prediction   Y      Y
Phantom_center     Y      Y
Ancillary data      Y      Y
File I/O   AIFF,raw    AIFF,raw

The following features are NOT supported by this distribution:
       * layers 1 or 3 wrt. the encoder
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The following table indicates the operations supported by the low sampling frequency software in this distribution. The noise allocation in the layer 3 encoding procedure
has been made more robust.

Feature        Encoder     Decoder
----------------------------------------------------------
MPEG-  1,2   1,2
Sampling_frequency (kHz)  16,22.05,24,  16,22.05,24,
       32,44.1,48   32,44.1,48
Bit_rate (kb/s)     8-448 8-448
Bitstream format    IS     IS
Layer  1,2,3 1,2,3
Ancillary data      N      N
File I/O   AIFF,raw    AIFF,raw
Sampling rate conversion   N      N

The following features are NOT supported by this distribution:
       * lower sampling frequencies for layer 3 in the encoder
       * psychoacoustic model 1 for lower sampling frequencies in the encoder
       * psychoacoustic model 1 for layer 3 in the encoder

The decoder passes all lower sampling frequency compliance bitstreams.

The package consists of the following tree of files. The contents of the RCS and tables directories are not listed for brevity.

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       Readme.1st
       doc/
              readme.1st
              readme.dp.01.txt
              readme.jmz.01.txt
              readme.jmz.02.txt
              readme.jmz.03.txt
              readme.jmz.04.txt
              readme.mc.01.txt
              readme.rb.01.txt
              readme.sn.01.txt
              readme.sr.01.txt
              readme.sr.02.txt
              readme.ss.01.txt

       lsf/
              decoder/
                     INSTALL
                     Makefile
                     Makefile.in
                     common.c
                     common.h
                     configure
                     decode.c
                     decoder.h
                     huffman.c
                     huffman.h
                     ieeefloat.c
                     ieeefloat.h
                     makefile.linux
                     makefile.unix
                     musicout.c
                     portableio.c
                     portableio.h
                     tables/
              encoder/
                     INSTALL
                     Makefile
                     Makefile.in
                     common.c
                     common.h
                     configure
                     encode.c
                     encoder.h
                     formatBitstream.c
                     formatBitstream.h
                     huffman.c
                     huffman.h
                     ieeefloat.c
                     ieeefloat.h
                     l3bitstream-pvt.h
                     l3bitstream.c
                     l3bitstream.h
```

```
              l3psy.c
              l3psy.h
              l3side.h
              loop-pvt.h
              loop.c
              loop.h
              makefile.unix
              mdct.c
              mdct.h
              musicin.c
              portableio.c
              portableio.h
              psy.c
              reservoir.c
              reservoir.h
              subs.c
              tables/
              tonal.c

      mc/
          decoder/
              common.c
              common.h
              decode.c
              decoder.h
              makefile
              musicout.c
              tables/

          encoder/
              common.c
              common.h
              dyn_cross.c
              encode.c
              encoder.h
              lfe.c
              lingual.c
              makefile
              musicin.c
              predisto.c
              psy.c
              subs.c
              tables/
              tonal.c

      tool/
          pcm2aiff/
              common.h
              decoder.h
              pcm2aiff.c
```

3) *Replace all of subclause 5.5 (Audio multichannel encoder listings) with:*
    "
    The ISO/IEC TR 13818-5 multi-channel encoder software is included in electronic format with this document as aacenc.zip.
    "

4) *Replace all of subclause 5.6 (Audio multichannel decoder listings) with:*
    "
    The ISO/IEC TR 13818-5 multi-channel decoder software is included in electronic format with this document as aacdec.zip.
    "

5) *Add to the end of Annex A:*
    "

    The attached diskette contains C source code for Advanced Audio Coding (AAC) encoder and decoder.

    Diskette 1 of 1
    AAC encoder source code: aacenc.zip
    AAC decoder source code: aacdec.zip
    "

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