



IEC 61937-3

Edition 3.1 2020-09
CONSOLIDATED VERSION

INTERNATIONAL STANDARD



**Digital audio – Interface for non-linear PCM encoded audio bitstreams applying IEC 60958 –
Part 3: Non-linear PCM bitstreams according to the AC-3 and enhanced AC-3 formats**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 33.160.30

ISBN 978-2-8322-8910-5

Warning! Make sure that you obtained this publication from an authorized distributor.

REDLINE VERSION



**Digital audio – Interface for non-linear PCM encoded audio bitstreams applying IEC 60958 –
Part 3: Non-linear PCM bitstreams according to the AC-3 and enhanced AC-3 formats**

CONTENTS

FOREWORD	3
1 Scope	6
2 Normative references	6
3 Terms, definitions and abbreviated terms	6
3.7 Abbreviated terms	7
4 Mapping of the audio bitstream on to IEC 61937-1	7
4.1 General	7
4.2 AC-3 and enhanced AC-3 burst-info	7
5 Format of AC-3 and enhanced AC-3 data-bursts	8
5.1 General	8
5.2 Pause data-burst	8
5.3 Audio data-bursts	8
5.3.1 AC-3 data	8
5.3.2 Latency of AC-3 decoding	9
5.3.3 Enhanced AC-3 data	10
5.3.4 Latency of the enhanced AC-3 decoder	12
Bibliography	14
Figure 1 – AC-3 data-burst, with reference point R	8
Figure 2 – Latency of AC-3 decoding	9
Figure 3 – Enhanced AC-3 data-burst	11
Figure 4 – Latency of enhanced AC-3 decoding	12
Table 1 – Fields of burst-info	7
Table 2 – Repetition period of the pause data-bursts	8
Table 3 – Data-type-dependent information when data-type bits 0-4 = 1	9
Table 4 – Data-type-dependent information when data-type bits 0-4 = 21 and data-type bits 5-6 = 0	11
Table 5 – Maximum enhanced AC-3 burst-payload size and bitstream data rate per sampling frequency and IEC 60958 frame rate	12

INTERNATIONAL ELECTROTECHNICAL COMMISSION

DIGITAL AUDIO – INTERFACE FOR NON-LINEAR PCM ENCODED AUDIO BITSTREAMS APPLYING IEC 60958 –

Part 3: Non-linear PCM bitstreams according to the AC-3 and enhanced AC-3 formats

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

IEC 61937-3 edition 3.1 contains the third edition (2017-07) [documents 100/2720/CDV and 100/2934/RVC] and its amendment 1 (2020-09) [documents 100/3392/CDV and 100/3456/RVC].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

International Standard IEC 61937-3 has been prepared by subcommittee technical area 4: Digital system interfaces and protocols, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

This third edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) removal of support for enhanced AC-3 bitstreams with a sampling frequency of 32 kHz;
- b) updates to normative and informative references;
- c) clarification of pause data-burst usage for enhanced AC-3 bitstreams.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 61973 series, published under the general title *Digital audio – Interface for non-linear PCM encoded audio bitstreams applying IEC 60958*, can be found on the IEC website.

The committee has decided that the contents of the base publication and its amendment will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION to Amendment 1

This amendment to 61937-3:2017 is necessary to remove the last paragraph from the Enhanced AC-3 provisions that does not apply to Enhanced AC-3. It only applies to AC-3 and was inadvertently copied when Enhanced AC-3 was authored.

**DIGITAL AUDIO –
INTERFACE FOR NON-LINEAR PCM ENCODED AUDIO BITSTREAMS
APPLYING IEC 60958 –**

**Part 3: Non-linear PCM bitstreams according to the AC-3 and
enhanced AC-3 formats**

1 Scope

This part of IEC 61937 describes the method used to convey non-linear PCM bitstreams encoded according to the AC-3 and enhanced AC-3 formats.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

IEC 61937-1:2007, *Digital audio interface for non-linear PCM encoded audio bit streams applying IEC 60958 – Part 1: General*

IEC 61937-1:2007/AMD1:2011, *Digital audio interface for non-linear PCM encoded audio bit streams applying IEC 60958 – Part 1: General*

IEC 61937-2, *Digital audio interface for non-linear PCM encoded audio bit streams applying IEC 60958 – Part 2: Burst-info*

ETSI TS 102 366, *Digital Audio Compression (AC-3, Enhanced AC-3) Standard*

FINAL VERSION

**Digital audio – Interface for non-linear PCM encoded audio bitstreams applying IEC 60958 –
Part 3: Non-linear PCM bitstreams according to the AC-3 and enhanced AC-3 formats**



CONTENTS

FOREWORD	3
1 Scope	6
2 Normative references	6
3 Terms, definitions and abbreviated terms	6
3.7 Abbreviated terms	7
4 Mapping of the audio bitstream on to IEC 61937-1	7
4.1 General	7
4.2 AC-3 and enhanced AC-3 burst-info	7
5 Format of AC-3 and enhanced AC-3 data-bursts	8
5.1 General	8
5.2 Pause data-burst	8
5.3 Audio data-bursts	8
5.3.1 AC-3 data	8
5.3.2 Latency of AC-3 decoding	9
5.3.3 Enhanced AC-3 data	10
5.3.4 Latency of the enhanced AC-3 decoder	12
Bibliography	14
Figure 1 – AC-3 data-burst, with reference point R	8
Figure 2 – Latency of AC-3 decoding	9
Figure 3 – Enhanced AC-3 data-burst	11
Figure 4 – Latency of enhanced AC-3 decoding	12
Table 1 – Fields of burst-info	7
Table 2 – Repetition period of the pause data-bursts	8
Table 3 – Data-type-dependent information when data-type bits 0-4 = 1	9
Table 4 – Data-type-dependent information when data-type bits 0-4 = 21 and data-type bits 5-6 = 0	11
Table 5 – Maximum enhanced AC-3 burst-payload size and bitstream data rate per sampling frequency and IEC 60958 frame rate	12

INTERNATIONAL ELECTROTECHNICAL COMMISSION

DIGITAL AUDIO – INTERFACE FOR NON-LINEAR PCM ENCODED AUDIO BITSTREAMS APPLYING IEC 60958 –

Part 3: Non-linear PCM bitstreams according to the AC-3 and enhanced AC-3 formats

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

IEC 61937-3 edition 3.1 contains the third edition (2017-07) [documents 100/2720/CDV and 100/2934/RVC] and its amendment 1 (2020-09) [documents 100/3392/CDV and 100/3456/RVC].

This Final version does not show where the technical content is modified by amendment 1. A separate Redline version with all changes highlighted is available in this publication.

International Standard IEC 61937-3 has been prepared by subcommittee technical area 4: Digital system interfaces and protocols, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

This third edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) removal of support for enhanced AC-3 bitstreams with a sampling frequency of 32 kHz;
- b) updates to normative and informative references;
- c) clarification of pause data-burst usage for enhanced AC-3 bitstreams.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 61973 series, published under the general title *Digital audio – Interface for non-linear PCM encoded audio bitstreams applying IEC 60958*, can be found on the IEC website.

The committee has decided that the contents of the base publication and its amendment will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION to Amendment 1

This amendment to 61937-3:2017 is necessary to remove the last paragraph from the Enhanced AC-3 provisions that does not apply to Enhanced AC-3. It only applies to AC-3 and was inadvertently copied when Enhanced AC-3 was authored.

DIGITAL AUDIO – INTERFACE FOR NON-LINEAR PCM ENCODED AUDIO BITSTREAMS APPLYING IEC 60958 –

Part 3: Non-linear PCM bitstreams according to the AC-3 and enhanced AC-3 formats

1 Scope

This part of IEC 61937 describes the method used to convey non-linear PCM bitstreams encoded according to the AC-3 and enhanced AC-3 formats.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

IEC 61937-1:2007, *Digital audio interface for non-linear PCM encoded audio bit streams applying IEC 60958 – Part 1: General*

IEC 61937-1:2007/AMD1:2011, *Digital audio interface for non-linear PCM encoded audio bit streams applying IEC 60958 – Part 1: General*

IEC 61937-2, *Digital audio interface for non-linear PCM encoded audio bit streams applying IEC 60958 – Part 2: Burst-info*

ETSI TS 102 366, *Digital Audio Compression (AC-3, Enhanced AC-3) Standard*