



TECHNICAL SPECIFICATION

Guideline for synchronization of audio and video – Part 2: Methods for synchronization of audio and video systems

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 33.160.01

ISBN 978-2-8322-6188-0

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

CONTENTS

FOREWORD.....	3
INTRODUCTION.....	5
1 Scope.....	6
2 Normative references	6
3 Terms and definitions	6
4 System model.....	7
4.1 Audio and video system	7
4.2 System model	7
4.3 Audio and video device	7
4.4 Controller.....	9
4.5 Source device and display device	9
4.6 Controller function of audio and video device	10
5 Methods for synchronization	11
5.1 Information for synchronization	11
5.1.1 Time-code information	11
5.1.2 Latency information	11
5.1.3 Synchronization information.....	11
5.2 Methods for synchronization	12
5.2.1 General	12
5.2.2 Method with time-code information	13
5.2.3 Method with latency information.....	14
5.2.4 Method with synchronization information	14
5.3 Method with IEC 60958-3.....	14
5.4 Method with IEC 61883-6.....	14
5.5 Method with other interface specifications.....	15
Annex A (informative) Information for synchronization	16
A.1 Time-code information	16
A.2 Latency information	16
A.3 Synchronization information	16
Bibliography.....	17
Figure 1 – System model	7
Figure 2 – Audio and video device	8
Figure 3 – Information and control in audio and video device	9
Figure 4 – Source device	10
Figure 5 – Display device.....	10
Figure 6 – Audio amplifier	10
Figure 7 – Controller function of audio and video device	11
Figure 8 – Additional delay	12
Figure 9 – Multiple reproductions	13

INTERNATIONAL ELECTROTECHNICAL COMMISSION

GUIDELINE FOR SYNCHRONIZATION OF AUDIO AND VIDEO –

Part 2: Methods for synchronization of audio and video systems

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.

The main task of IEC technical committees is to prepare International Standards. In exceptional circumstances, a technical committee may propose the publication of a Technical Specification when

- the required support cannot be obtained for the publication of an International Standard, despite repeated efforts, or
- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical Specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC 62312-2, which is a technical specification, has been prepared by technical area 11: Quality for audio, video and multimedia systems, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

This second edition cancels and replaces the first edition published in 2007. This edition constitutes a technical revision.

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

- a) fingerprint is newly introduced;
- b) addition of the synchronization information from fingerprint (SMPTE spec.);
- c) addition of the method for using the above information.

The text of this Technical Specification is based on the following documents:

Draft TS	Report on voting
100/3049/DTS	100/3106/RVDTS

Full information on the voting for the approval of this Technical Specification can be found in the report on voting indicated in the above table.

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

The list of all the parts of IEC 62312, published under the general title *Guideline for synchronization of audio and video*, can be found on the IEC website.

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

- transformed into an International standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

INTRODUCTION

Audio, video and multimedia systems and equipment have begun to use digital technologies. Digital systems or equipment may cause delay of audio and video signals because digital signal processing causes latency and delay. The unevenness of the delay between audio and video can cause synchronization problems.

For instance, a digital broadcasting system uses signal compression of audio and video. A receiver has signal decoders, and this can cause unevenness of the delay between audio and video. Digital video signal processing of the display causes a significant delay in the reproduction time of the video image. Another example is an audio-video system consisting of a digital media player, an audio amplifier and a display. A digital media player outputs audio and video signals separately to the amplifier and display through digital interfaces. This may cause synchronization problems of audio and video when the processing time of each piece of equipment is different.

To solve synchronization problems of audio and video reproduction on the user side, this document gives guidelines for general methods for the synchronization of audio and video.

GUIDELINE FOR SYNCHRONIZATION OF AUDIO AND VIDEO –

Part 2: Methods for synchronization of audio and video systems

1 Scope

The IEC 62312 series gives guidelines for methods of synchronization of audio and video.

This part of IEC 62312 describes the system model and general methods for the synchronization of audio and video. The methods exclude the synchronization of the signal source and the spatial delay of audio reproduction.

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 60958-1, *Digital audio interface – Part 1: General*

IEC 60958-3:2006, *Digital audio interface – Part 3: Consumer applications*
IEC 60958-3:2006/AMD2:2015

IEC 61883-6, *Consumer audio/video equipment – Digital interface – Part 6: Audio and music data transmission protocol*

SMPTE 12M, *Television, Audio and Film – Time and Control Code*