

# INTERNATIONAL STANDARD

# IEC 61606-4

First edition  
2005-12

---

---

## Audio and audiovisual equipment – Digital audio parts – Basic measurement methods of audio characteristics –

### Part 4: Personal computer

© IEC 2005 — Copyright - all rights reserved

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Electrotechnical Commission, 3, rue de Varembe, PO Box 131, CH-1211 Geneva 20, Switzerland  
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: [inmail@iec.ch](mailto:inmail@iec.ch) Web: [www.iec.ch](http://www.iec.ch)



Commission Electrotechnique Internationale  
International Electrotechnical Commission  
Международная Электротехническая Комиссия

PRICE CODE

V

*For price, see current catalogue*

## CONTENTS

|   |    |
|---|----|
| FOREWORD.....   | 4  |
| 1 Scope.....  | 6  |
| 2 Normative references .....  | 6  |
| 3 Terms, definitions and abbreviated terms .....                                | 6  |
| 3.1 Terms and definitions .....   | 6  |
| 3.2 Abbreviated terms .....   | 8  |
| 3.3 Rated values .....  | 8  |
| 4 Measuring conditions.....   | 8  |
| 4.1 Environmental conditions .....  | 8  |
| 4.2 Power supplies.....   | 8  |
| 4.3 Test signal frequencies .....   | 9  |
| 4.4 Standard setting .....  | 10 |
| 4.5 Working setting .....   | 11 |
| 4.6 Preconditioning .....   | 12 |
| 5 Measuring instruments .....   | 12 |
| 5.1 Analogue signal generator.....  | 12 |
| 5.2 Analogue in-band level meter .....  | 12 |
| 5.3 Analogue low-pass filter .....  | 12 |
| 5.4 Analogue weighting filter .....   | 12 |
| 5.5 Standard medium .....   | 12 |
| 5.6 Recording medium .....  | 13 |
| 5.7 Software for digital data evaluation.....                                   | 13 |
| 5.8 Short-term distortion meter .....   | 14 |
| 5.9 Other instruments.....  | 14 |
| 6 Methods of measurement (digital-in/analogue-out) .....                        | 14 |
| 6.1 Input/output characteristics .....  | 15 |
| 6.2 Frequency response.....   | 16 |
| 6.3 Noise characteristics .....   | 17 |
| 6.4 Distortion characteristics .....  | 21 |
| 7 Methods of measurement (analogue-in/digital-out) .....                        | 23 |
| 7.1 Input/output characteristics .....  | 23 |
| 7.2 Frequency response.....   | 25 |
| 7.3 Noise characteristics .....   | 26 |
| 7.4 Distortion characteristics .....  | 29 |
| Figure 1 – Block diagram for maximum output amplitude measurement .....         | 15 |
| Figure 2 – Block diagram for gain difference between channels measurement ..... | 16 |
| Figure 3 – Block diagram for frequency-response measurement .....               | 16 |
| Figure 4 – Block diagram for signal-to-noise ratio measurement .....            | 17 |
| Figure 5 – Block diagram for dynamic range measurement .....                    | 18 |
| Figure 6 – Block diagram for channel separation measurement.....                | 20 |
| Figure 7 – Block diagram for distortion and noise measurement.....              | 21 |
| Figure 8 – Block diagram for short-term distortion measurement.....             | 22 |
| Figure 9 – Block diagram for maximum allowable input amplitude measurement..... | 23 |

|   |    |
|---|----|
| Figure 10 – Block diagram for gain difference between channel and tracking error measurement..... | 24 |
| Figure 11 – Block diagram for frequency response measurement.....                                 | 25 |
| Figure 12 – Block diagram for signal-to-noise ratio measurement .....                             | 26 |
| Figure 13 – Block diagram for dynamic range measurement .....                                     | 27 |
| Figure 14 – Block diagram for channel separation measurement.....                                 | 28 |
| Figure 15 – Block diagram for distortion and noise measurement.....                               | 29 |
| Figure 16 – Block diagram for short-term distortion measurement.....                              | 30 |
| Table 1 – Frequencies used in the measurement .....   | 9  |

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

### **AUDIO AND AUDIOVISUAL EQUIPMENT – DIGITAL AUDIO PARTS – BASIC MEASUREMENT METHODS OF AUDIO CHARACTERISTICS –**

#### **Part 4: Personal computer**

#### 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 provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
- 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.

International Standard IEC 61606-4 has been prepared by IEC technical committee 100: Audio, video and multimedia equipment and systems.

The text of this standard is based on the following documents:

| CDV         | Report on voting |
|-------------|------------------|
| 100/952/CDV | 100/1030/RVC     |

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

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

IEC 61606 consists of the following parts under the general title *Audio and audiovisual equipment – Digital audio parts – Basic measurement methods of audio characteristics*:

Part 1: General

Part 2: Consumer use

Part 3: Professional use<sup>1</sup>

Part 4: Personal computer

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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.

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

---

<sup>1</sup> Under consideration.

# AUDIO AND AUDIOVISUAL EQUIPMENT – DIGITAL AUDIO PARTS – BASIC MEASUREMENT METHODS OF AUDIO CHARACTERISTICS –

## Part 4: Personal computer

### 1 Scope

This part of IEC 61606 specifies the basic measurement methods of a linear PCM signal for an audio part of personal computers (PCs) and applies to both desktop and portable computers. The common measuring conditions and methods are described in IEC 61606-1. Specific conditions and methods of measurement for PCs are given in this standard.

NOTE 1 The methods described are mostly based on sampling frequencies from 8 kHz to 192 kHz and bit length from 8 bit to 24 bit.

NOTE 2 This standard describes tests for equipment which has digital input with analogue output and analogue input with digital output. Digital input data are provided from an internal HDD or other memory media and output digital data are recorded to an internal HDD or main memories.

NOTE 3 The methods specified in this standard are not applicable to systems incorporating bit-rate reduced digital audio signals that have data loss or to 1-bit signals. This part does not apply to analogue input with analogue output and digital input with digital output as described in IEC 61606-1.

NOTE 4 When a CPU in a PC is overloaded by tasks other than those for audio input/output, the PC may fail to record/reproduce the whole audio data. This standard applies only to the measurement in which input/output data are recorded/reproduced without such missing data. The performance of a PC with missing audio data may be evaluated by the short-term distortion measurement although such evaluation is not within the scope of this standard.

### 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.

IEC 60038, *IEC standard voltages*

IEC 60268-2, *Sound system equipment – Part 2: Explanation of general terms and calculation methods*

IEC 61606-1, *Audio and audiovisual equipment – Digital audio parts – Basic measurement methods of audio characteristics – Part 1: General*

IEC 61606-2, *Audio and audiovisual equipment – Digital audio parts – Basic measurement methods of audio characteristics – Part 2: Consumer use*

IEC 61672-1, *Electroacoustics – Sound level meters – Part 1: Specifications*