

AES information document for digital audio - Personal computer audio quality measurements

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Abstract

This document focuses on the measurement of audio quality specifications in a PC environment. Each specification listed has a definition and an example measurement technique. Also included is a detailed description of example test setups to measure each specification.

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Foreword

[This foreword is not a part of AES information document for digital audio — Personal computer audio quality measurements, AES-6id-2000.]

This document was prepared by a writing group of the SC-02-01 Working Group on Digital Measurement Techniques of the SC-02 Subcommittee on Digital Audio. Steven Harris headed the writing group.

The text of the Crystal Audio Division of Cirrus Logic, Inc. version 1.0 paper on measurement of PC audio was used to create the first proposed working group draft of this document. The working group felt that the wide-spread use of the Cirrus paper in the computer industry warranted the preparation of an AES document based on it. AES documents are subject to due process based on AES procedures and receive a public review. Their format is based on the IEC-ISO Directives, Part 3, which may be downloaded from www.iec.ch.

Initial discussions revealed that a full consensus on all provisions of the first proposed draft would not be possible. The group chose, therefore, to prepare an information document rather than a standard. An AES information document, while formatted in the same style as a standard, does not require full consensus for publication. Instead, public comments that cannot be resolved may be published in an informative annex to the document. In this manner, the information becomes quickly available for use in the industry while questions regarding particular provisions are made available for consideration by users. The comments are compiled in annex D at the end of this document.

The document remains under continuous review under project AES-6-id-R assigned to the SC-02-01 working group. It may be amended by following AESSC due-process procedures which require the same public review before publication as a new standard. Participation in this process is open to all directly and materially affected individuals who join the working group in the manner described at www.aes.org/standards/.

The document does not suggest performance limits. Such limits for some of these measurements are suggested in, for example, Microsoft PC-2001, Intel's AC '97, and in the MPC3 specification.

Richard Cabot, chair SC-02-01
Chris Travis, vice-chair SC-02-01
2000-02-20

Foreword to 2006 revision

There have been many improvements in PC audio since the original AES-6id document was published. This revision of AES-6id includes substantial updates that reflect the improvements in the PC sound sub-system, as well as some updates based on many real world measurements. I would like to thank Wayne Jones and Thomas Kite for their contributions to this revision, and all the SC-02-01 committee members who submitted valuable comments.

Steve Harris, Chair, SC-02-01
2006-08-13

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1 Scope

This document focuses on the measurement of audio quality specifications for devices used in or connected to a personal computer (PC). Each specification listed has a definition and an example measurement technique. Also included is a detailed description of example test setups to measure each specification. Information on signal paths and weighting filters is given in annexes.

2 Normative references

The following standard contains provisions which, through referenced in this text, constitute provisions of this document. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this document are encouraged to investigate the possibility of applying the most recent editions of the indicated standards.

AES17-1997, *AES standard method for digital audio engineering – Measurement of digital audio equipment*. NY: Audio Engineering Society, Inc., (1997, reaffirmed 2003).

3 Definitions

3.0 Personal Computer (PC)

A computer designed for use by an individual in the form of a desktop or notebook. In this context, a “PC audio device” is what is commonly called a “sound card”, which may be an externally-connected device, or a mother-board audio implementation.

3.1 Signal Paths

A PC audio device has several signal paths that should be characterized independently and in various combinations. The following definitions describe the common paths present in most PC audio devices. Also see annex B for a more detailed description of each path and block diagrams.

3.1.1 Playback (D-A) Path

The path from the internal PC bus routed through the digital-to-analog converter, the Playback Mixer, and out through the analog output amplifier. Digital signals may be present on the PC bus by playing or streaming a Wave file from hard disk or PC memory or by routing a signal from the digital input to the PC bus.

3.1.2 Analog Loop (A-A) Path

The path from the analog input amplifier, routed through the Playback Mixer, and back out through the analog output amplifier. Several analog inputs may exist such as: Line Input, Microphone Input, Auxiliary Input, CD Drive Input, Telephone Modem (TDA) Audio, and others.

3.1.3 Record (A-D) Path

The path from the analog input amplifier, routed through the Record Mixer, and through the analog-to-digital converter to the PC bus. The digital signal on the PC bus may reside in memory or be streamed to hard disk. Alternatively, the digital signal on the PC bus may be routed out to the digital output. Several analog inputs may exist such as: Line Input, Microphone Input, Auxiliary Input, CD Drive Input, Telephone Modem (TDA) Audio, and others.