SLOVENSKI STANDARD
SIST EN 60958:1999

01-julij-1999

Digital audio interface (IEC 60958:1989)

Digital audio interface

Digitalton-Schnittstelle

Interface audionumérique

Ta slovenski standard je istoveten z: **EN 60958:1990**

ICS:

33.160.30	Avdio sistemi	Audio systems
35.200	Vmesniška in povezovalna oprema	Interface and interconnection equipment

SIST EN 60958:1999 **en**

EUROPEAN STANDARD

NORME EUROPEENNE

EUROPÄISCHE NORM

EN 60958

November 1990

UDC 621.396.97:621.397.037.37:534.86

Descriptors: Sound recording, digital signal, equipment interconnection, interface, format, structure, characteristic, requirement

ENGLISH VERSION

DIGITAL AUDIO INTERFACE
(IEC 958:1989)

Interface audionumérique
(CEI 958:1989)

Digitalton-Schnittstelle
(IEC 958:1989)

This European Standard was approved by CENELEC on 1990-09-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B-1050 Brussels

FOREWORD

The CENELEC questionnaire procedure, performed for finding out whether or not the International Standard IEC 958:1989 could be accepted without textual changes, has shown that no CENELEC common modifications were necessary for the acceptance as European Standard.
The reference document was submitted to the CENELEC members for formal vote and acceptance by CENELEC as EN 60958 on 1990-09-01.

The following dates were fixed:

- latest date of publication of an identical national standard	(dop)	1991-09-15
- latest date of withdrawal of conflicting national standards	(dow)	1991-09-15

ENDORSEMENT NOTICE

The text of the International Standard IEC 958:1989 was approved by CENELEC as a European Standard without any modifications.

NORME INTERNATIONALE

INTERNATIONAL STANDARD

CEI
IEC
958

Première édition
First edition
1989-03

Interface audionumérique

Digital audio interface

Numéro de référence
Reference number
CEI/IEC 958: 1989

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

DIGITAL AUDIO INTERFACE

FOREWORD

1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.

2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.

3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

PREFACE

This standard has been prepared by Technical Committee No. 84: Equipment and systems in the field of audio, video and audiovisual engineering.

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

Six Months' Rule	Report on Voting	Two Months' Procedure	Report on Voting
84(CO)43	84(CO)53	84(CO)66	84(CO)70

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

DIGITAL AUDIO INTERFACE

1. Scope

This standard describes a serial, uni-directional, self-clocking interface for the interconnection of digital audio equipment for consumer and professional applications.

When used in a consumer digital processing environment, the interface is primarily intended to carry stereophonic programmes, with a resolution of up to 20 bits per sample, an extension to 24 bits per sample being possible.

When used in a broadcasting studio environment, the interface is primarily intended to carry monophonic or stereophonic programmes, at a 48 kHz sampling frequency and with a resolution of up to 24 bits per sample; it may alternatively be used to carry one or two signals sampled at 32 kHz.

In both cases, the clock references and auxiliary information are transmitted along with the programme. Provision is also made to allow the interface to carry data related to computer software.

2. Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreement based on this International Standard should apply the most recent editions of the standards listed below. Members of ISO and IEC maintain registers of currently valid International Standards.

IEC 268-11 (1987):	Sound system equipment, Part 11: Application of connectors for the interconnection of sound system components.
IEC 268-12 (1987):	Part 12: Application of connectors for broadcast and similar use.
IEC 841 (1988):	Audio recording — PCM encoder/decoder system.
IEC 908 (1987):	Compact disc digital audio system.
ISO 646-1983:	Information processing — ISO 7-bit coded character set for information interchange.
CCITT Recommendation J.17 (1972):	Pre-emphasis used on sound-programme circuits.
CCITT Recommendation V.11 (1976, 1980):	Electrical characteristics for balanced double-current interchange circuits for general use with integrated circuit equipment in the field of data communications.
CCIR Recommendation No. 647:	A digital audio interface for broadcasting studios.

3. Interface format

3.1 *Definitions*

For the purpose of this international standard the following definitions apply.

3.1.1 *Sampling frequency*

The sampling frequency is the frequency of the samples representing audio signals. When more than one signal is transmitted through the same interface, the sampling frequencies shall be identical.

3.1.2 *Audio sample word*

The audio sample word represents the amplitude of a digital audio sample. Representation is linear in 2's complement binary form. Positive numbers correspond to positive analogue voltages at the input of the ADC.

The number of bits allocated per word is either 24 or 20. If the source provides fewer bits than the interface format requires, the unused least significant bits of the audio sample word shall be set to the logical "0".

3.1.3 *Auxiliary sample bits*

The auxiliary sample bits can be used for auxiliary information or word length expansion of the audio sample word.

3.1.4 *Validity flag*

The validity flag is associated with each audio sample word and indicates whether its value is reliable or not.

3.1.5 *Channel status*

The channel status carries, in a fixed format, information associated with each audio channel which is decodable by any interface user.

Examples of information to be carried in the channel status are: length of audio sample words, pre-emphasis, sampling frequency, time codes, alphanumeric source and destination codes.

3.1.6 *User data*

The user data channel is provided to carry any other information.

3.1.7 *Parity bit*

The parity bit is provided to permit the detection of an odd number of errors resulting from malfunctions in the interface.

3.1.8 *Preambles*

Preambles are specific patterns used for synchronization. There are three different preambles (see 3.3.2).

3.1.9 *Sub-frame*

The sub-frame is the fixed structure used to carry the information described in 3.1.1 to 3.1.8 (see 3.2.1 and 3.2.2).

3.1.10 *Frame*

The frame is a sequence of sub-frames mentioned in the previous item.

3.1.11 *Block*

The block is a group of 192 consecutive frames providing, for each channel, the 192 channel status data bits and possibly providing a structure for 192 user data bits. The start of a block is designated by a special sub-frame preamble.

3.1.12 *Channel coding*

The channel coding describes the method of modulation by which the binary digits are represented for transmission through the interface.

3.2 *Structure of format*

3.2.1 *Sub-frame format*

Each sub-frame is divided into 32 time slots, numbered from 0 to 31 (see figure 1).

Time slots 0 to 3 carry one of the three permitted preambles (see figure 2). These are used to affect synchronization of sub-frames, frames and blocks (see 3.3.2).

Time slots 4 to 27 carry the audio sample word in linear 2's complement representation. The most significant bit is carried by time slot 27.

When a 24-bit coding range is used, the least significant bit is in time slot 4.

When a 20-bit coding range is sufficient, the least significant bit is in time slot 8 and time slots 4 to 7 may be used for other applications. Under these circumstances, the bits in the time slots 4 to 7 are designated auxiliary sample bits.

If the source provides fewer bits than the interface allows (24 or 20), the unused least significant bits shall be set to a logical "0". By this procedure, equipment using different numbers of bits may be connected together.

Time slot 28 carries the validity flag associated with the audio sample word. This flag is set to logical "0" if the audio sample is reliable. It is set to logical "1" if unreliable.

Time slot 29 carries one bit of the user data channel associated with the audio channel transmitted in the same sub-frame.

The default value of the user bit is logical "0".

Time slot 30 carries one bit of the channel status word associated with the audio channel transmitted in the same sub-frame.

Time slot 31 carries a parity bit such that time slots 4 to 31 inclusive will carry an even number of ones and an even number of zeros.

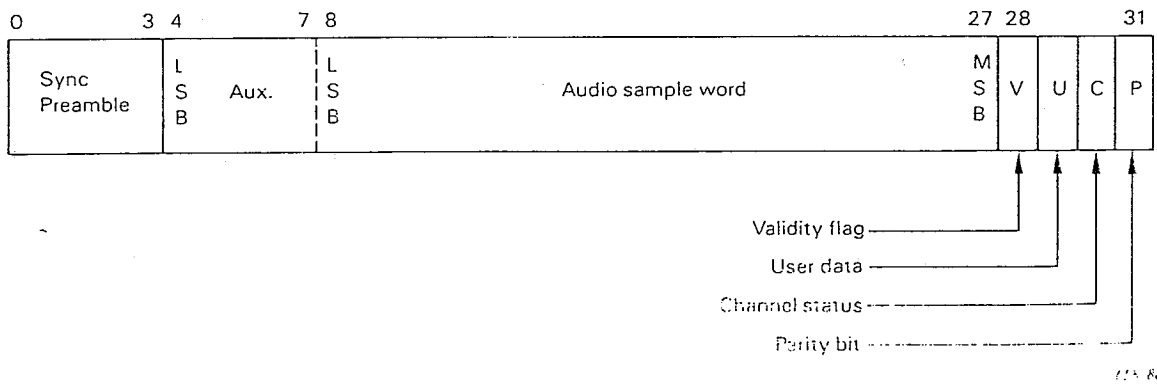

Figure 1 — Sub-frame format

3.2.2 *Frame format*

A frame is uniquely composed of two sub-frames (see figure 2). The rate of transmission of frames corresponds exactly to the source sampling frequency.

In the 2-channel operation mode, the samples taken from both channels are transmitted by time multiplexing in consecutive sub-frames. Sub-frames related to channel 1 (left or "A" channel in stereophonic operation and primary channel in monophonic operation) normally use preamble M. However, the preamble is changed to preamble B once every 192 frames. This defines the block structure used to organize the channel status information (see 3.1.5 and 4.). Sub-frames of channel 2 (right or "B" in stereophonic operation and secondary channel in monophonic operation) always use preamble W.

In the single channel operation mode in a broadcasting studio environment the frame format is equal to the 2-channel mode. Data is carried only in channel 1. In the sub-frames allocated to channel 2, time slot 28 (validity flag) shall be set to logical "1" (sample not valid).

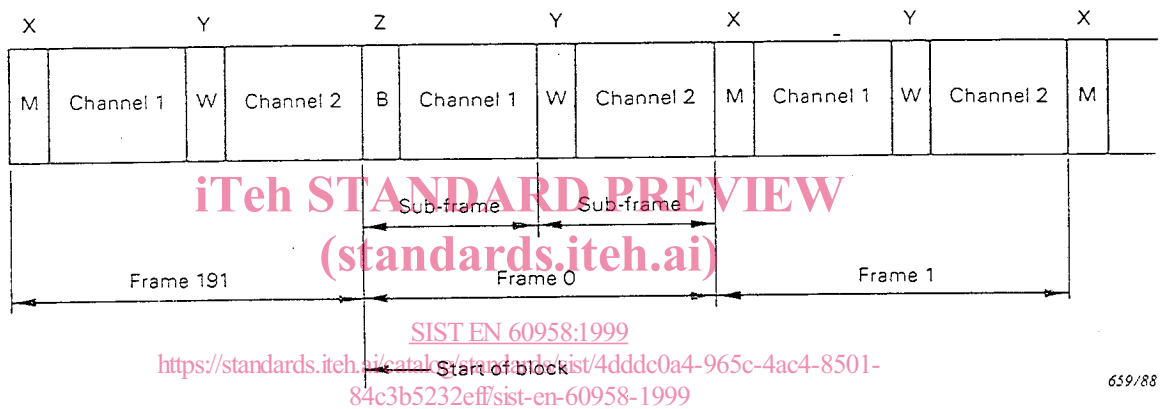

Figure 2 — Frame format

3.3 *Modulation*

3.3.1 *Channel coding*

To minimize the d.c. component on the transmission line, to facilitate clock recovery from the data stream and to make the interface insensitive to the polarity of connections, time slots 4 to 31 are encoded in biphase-mark.

Each bit to be transmitted is represented by a symbol comprising two consecutive binary states. The first state of a symbol is always different from the second state of the previous symbol. The second state of the symbol is identical to the first if the bit to be transmitted is logical "0", however it is different if the bit is logical "1" (see figure 3).