

# INTERNATIONAL STANDARD

# IEC 60728-9

First edition  
2000-11

---

---

## Cabled distribution systems for television and sound signals –

### Part 9: Interfaces of cabled distribution systems for digitally modulated signals

*Systèmes de distribution par câbles destinés  
aux signaux de radiodiffusion sonore et de télévision –*

*Partie 9:  
Interfaces des systèmes de distribution par câbles utilisant  
des signaux modulés numériques*

© IEC 2000 — 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 Varembé Geneva, Switzerland  
Telefax: +41 22 919 0300 e-mail: [inmail@iec.ch](mailto:inmail@iec.ch) IEC web site <http://www.iec.ch>



Commission Electrotechnique Internationale  
International Electrotechnical Commission  
Международная Электротехническая Комиссия

PRICE CODE

X

*For price, see current catalogue*

## CONTENTS

	Page
FOREWORD .....	3
INTRODUCTION .....	5
 Clause	
1 Scope .....	6
2 Normative references .....	6
3 Terms, definitions and abbreviations .....	7
3.1 Terms and definitions .....	7
3.2 Abbreviations .....	9
4 Interfaces for MPEG-2 data signals .....	10
4.1 Introduction .....	10
4.1.1 Application requirements .....	10
4.1.2 Interfaces .....	11
4.1.3 Packet length and contents .....	11
4.1.4 Compliance .....	12
4.1.5 System integration .....	12
4.2 Synchronous parallel interface (SPI) .....	12
4.2.1 Signal format .....	13
4.2.2 Clock signal .....	14
4.2.3 Electrical characteristics of the interface .....	15
4.2.4 Mechanical details of the connector .....	16
4.3 Synchronous Serial Interface (SSI) .....	17
4.4 Asynchronous Serial Interface (ASI) .....	17
4.5 3-Wire Interface (3WI) .....	17
 Annex A (normative) Synchronous Serial Interface (SSI) .....	 18
Annex B (normative) Asynchronous Serial Interface (ASI) .....	28
Annex C (informative) 8B/10B tables .....	36
Annex D (informative) Implementation guidelines and clock recovery from the Synchronous Serial Interface (SSI) .....	40
Annex E (informative) Implementation guidelines and deriving clocks from the MPEG-2 packets for the ASI .....	43
Annex F (informative) Implementation guidelines and specifications for the 3-Wire Interface (3WI) .....	47
 Bibliography .....	 50

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

---

**CABLED DISTRIBUTION SYSTEMS FOR TELEVISION  
AND SOUND SIGNALS –**
**Part 9: Interfaces of cabled distribution systems  
for digitally modulated signals**

## FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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 the 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 National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60728-9 has been prepared by subcommittee 100D: Cabled distribution systems, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

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

FDIS	Report on voting
100/158/FDIS	100/180/RVD

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 3.

Annexes A and B form an integral part of this standard.

Annexes C, D, E and F are for information only.

The committee has decided that the contents of this publication will remain unchanged until 2006. At this date, the publication will be

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

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

## INTRODUCTION

Standards of the IEC 60728 series deal with cable networks for television signals, sound signals and interactive services including equipment, systems and installations

- for headend reception, processing and distribution of television and sound signals and their associated data signals, and
- for processing, interfacing and transmitting all kinds of signals for interactive services using all applicable transmission media.

All kinds of networks like

- CATV-networks,
- MATV-networks and SMATV-networks,
- individual receiving networks

and all kinds of equipment, systems and installations installed in such networks, are within the scope of this series.

The extent of this standardization work goes from the antennas, special signal source inputs to the head-end, or other interface points to the network, up to the system outlet or the terminal input, where no system outlet exists.

The standardization of any user terminals (i.e. tuners, receivers, decoders, multimedia terminals, etc.) as well as of any coaxial and optical cables and accessories therefore is excluded.

# CABLED DISTRIBUTION SYSTEMS FOR TELEVISION AND SOUND SIGNALS –

## Part 9: Interfaces of cabled distribution systems for digitally modulated signals

### 1 Scope

This part of IEC 60728 describes physical interfaces for the interconnection of signal processing devices for professional CATV/SMATV headend equipment or for similar systems, such as in up-link stations. This standard, in particular, specifies the transfer of MPEG-2 data signals in the standardized transport layer format between devices of different signal processing functions.

RF interfaces and interfaces to telecom networks are not covered by this standard.

In addition references are made to all other parts of the IEC 60728 series and, in particular, for RF, video and audio interfaces, to IEC 60728-5.

For connections to telecom networks, special Data Communication Equipment (DCE) is necessary to adapt the serial or parallel interfaces specified in this document to the bitrates and transmission formats of the public Plesiochronic Digital Hierarchy (PDH) networks. Other emerging technologies such as Connectionless Broadband Data Services (CBDS), Synchronous Digital Hierarchy (SDH), Asynchronous Transfer Mode (ATM), etc. can be used for transmitting MPEG-2 Transport Streams (TS) between remote locations. ATM is particularly suitable for providing bandwidth on demand and it allows for high data rates.

### 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60728. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 60728 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60169-8:1978, *Radio-frequency connectors – Part 8: RF coaxial connectors with inner diameter of outer conductor 6,5 mm (0,256 in) with bayonet lock – Characteristic impedance 50 ohms (type BNC)*

IEC 60728 (all parts), *Cabled distribution systems for television and sound signals*

IEC 60728-5,— *Cabled distribution systems for television and sound signals – Part 5: Head-end equipment*<sup>1)</sup>

IEC 60728-6,— *Cabled distribution systems for television and sound signals – Part 6: Optical equipment*<sup>1)</sup>

IEC 60793-2:1998, *Optical fibres – Part 2: Product specifications*

---

<sup>1)</sup> To be published.

IEC 60874-14:1993, *Connectors for optical fibres and cables – Part 14: Sectional specification for fibre optic connector – Type SC*

ISO/IEC 13818-1:1996, *Information technology – Generic coding of moving pictures and associated audio information – Part 1: Systems*

ISO/IEC 13818-9:1996, *Information technology – Generic coding of moving pictures and associated audio information – Part 9: Extension for real time interface for systems decoders*

ISO/IEC 14165-111, *Information technology – Fibre Channel – Part 1: Physical and signalling interface (FC-PH)<sup>1)</sup>*

ISO 2110:1989, *Information technology – Data communication – 25-pole DTE/DCE interface connector and contact number assignments*

ITU-R Recommendation BT.656-4:1994, *Interfaces for digital component video signals in 525-line and 625-line television systems operating at the 4:2:2 level of Recommendation ITU-R BT.601 (Part A)*

ITU-T Recommendation G.654:1997, *Characteristics of a cut-off shifted single-mode optical fibre cable (Rev 1)*

ITU-T Recommendation G.703:1998, *Physical/electrical characteristics of hierarchical digital interfaces (Rev 1)*

ETS 300421:1994, *Digital broadcasting for television, sound and data services – Framing structure, channel coding and modulation for 11/12 GHz satellite services*

ETS 300429:1994, *Digital broadcasting for television, sound and data services – Framing structure, channel coding and modulation for cable systems*

---

<sup>1)</sup> To be published.