



IEC 60728-7-3

Edition 2.0 2009-10

INTERNATIONAL STANDARD



**Cable networks for television signals, sound signals and interactive services –
Part 7-3: Hybrid fibre coax outside plant status monitoring – Power supply to
transponder interface bus (PSTIB)**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

PRICE CODE

W

ICS 33.040; 33.160

ISBN 978-2-88910-263-1

CONTENTS

FOREWORD.....	5
INTRODUCTION.....	7
1 Scope.....	8
2 Normative references	9
3 Terms, definitions and abbreviations	9
3.1 Terms and definitions	9
3.2 Abbreviations	10
4 Reference architecture forward and return channel specifications	10
5 Power supply to transponder interface bus specification overview	11
5.1 General.....	11
5.2 Interface compliance	11
5.3 Implementation compliance	11
5.4 Revision control	12
6 Power supply to transponder interface bus – Physical layer specification	12
6.1 Interface requirements	12
6.1.1 Connector type	12
6.1.2 Communications interface	12
6.1.3 Connector signals.....	12
6.1.4 Transponder power.....	12
6.1.5 Line balance.....	13
6.1.6 Cable length	13
6.1.7 Data encoding	13
6.1.8 Bit rate	13
6.1.9 Duplex.....	13
6.1.10 Method of communications	13
6.1.11 Indicators	13
6.2 Interface diagram	14
7 Alternative power supply to transponder interface bus – Physical layer specification	15
7.1 Introduction to alternative	15
7.2 Interface requirements	15
7.2.1 Connector type	15
7.2.2 Communications interface	15
7.2.3 Connector signals.....	15
7.2.4 Transponder power.....	15
7.2.5 Line balance.....	16
7.2.6 Cable length	16
7.2.7 Data encoding	16
7.2.8 Bit rate	16
7.2.9 Duplex.....	16
7.2.10 Method of communication	16
7.2.11 Indicators	17
7.3 Interface diagram	17
8 Power supply to transponder interface bus – Data link layer specification.....	18
8.1 DLL packet structure	18

8.1.1	General	18
8.1.2	Start	18
8.1.3	Destination Address	18
8.1.4	Source Address	19
8.1.5	Identification.....	19
8.1.6	Datagram	19
8.1.7	End	19
8.1.8	Checksum	19
8.2	DLE sequence.....	19
8.3	Interface timing	20
8.3.1	Message synchronization and interaction	20
8.3.2	Transmission timing requirements	21
8.4	DLL datagrams.....	22
8.4.1	Structure	22
8.4.2	Resolution versus accuracy.....	23
8.4.3	DLL datagram types	23
Annex A (informative) HMS specification documents.....		37
Bibliography.....		38
Figure 1 – Reference architecture diagram		11
Figure 2 – Sample PSTIB RS-485 interface		14
Figure 3 – Sample PSTIB RS-485 interface		17
Figure 4 – DLL packet structure.....		18
Figure 5 – PSTIB data and timing diagram.....		21
Figure 6 – DLL datagram structure.....		22
Figure 7 – Battery string naming conventions.....		33
Table 1 – Transponder type classifications		8
Table 2 – RJ-45 Connector pin assignment.....		12
Table 3 – Sample PSTIB RS-485 interface – Reference signals.....		14
Table 4 – RJ-45 Connector pin assignment.....		15
Table 5 – Sample PSTIB RS-485 interface – Reference signals.....		17
Table 6 – Generic DLL packet structure		18
Table 7 – Reserved destination address ranges.....		19
Table 8 – PSTIB timing specifications		21
Table 9 – Generic DLL datagram structure.....		22
Table 10 – DLL datagrams.....		24
Table 11 – Command: Get_Configuration datagram.....		24
Table 12 – Response: Get_Configuration datagram		25
Table 13 – Response: Get_Configuration datagram variable binding (general).....		25
Table 14 – Response: Get_Configuration datagram variable binding (power supply).....		26
Table 15 – Response: Get_Configuration datagram ^a variable binding (generator)		29
Table 16 – Command: Get_Power_Supply_Data datagram		30
Table 17 – Response: Get_Power_Supply_Data datagram		30
Table 18 – Response: Get_Power_Supply_Data datagram variable binding		30

Table 19 – Command: Power_Supply_Control datagram.....	33
Table 20 – Command: Get_Generator_Data datagram.....	33
Table 21 – Response: Get_Generator_Data datagram	34
Table 22 – Response: Get_Generator_Data Datagram variable binding	34
Table 23 – Command: Generator_Control datagram	35
Table 24 – Response: Invalid_Request datagram	35
Table 25 – Response: Request_Processed datagram	36
Table A.1 – HMS document family	37

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**CABLE NETWORKS FOR TELEVISION SIGNALS,
SOUND SIGNALS AND INTERACTIVE SERVICES –****Part 7-3: Hybrid fibre coax outside plant status monitoring –
Power supply to transponder interface bus (PSTIB)**

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.

International Standard IEC 60728-7-3 has been prepared by technical area 5: Cable networks for television signals, sound signals and interactive services, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

This second edition cancels and replaces the first edition published in 2003 of which it constitutes a technical revision. This edition includes the following significant technical changes with respect to the previous edition:

- All changes from standard ANSI/SCTE 25-3 v1.0 to standard ANSI/SCTE 25-3 v1.1 (2005) have been taken into account in this second edition.
- Clause 7 is based on standard ANSI/SCTE 110 (2005).
- Addition of informative Annex A concerning hybrid management sub-layer.

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

CDV	Report on voting
100/1464/CDV	100/1599/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.

A list of all parts of the IEC 60728 series, under the general title *Cable networks for television signals, sound signals and interactive services*, can be found on the IEC website.

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.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

Standards of the IEC 60728 series deal with cable networks including equipment and associated methods of measurement for headend reception, processing and distribution of television signals, 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.

This includes

- CATV¹-networks;
- MATV-networks and SMATV-networks;
- individual receiving networks;

and all kinds of equipment, systems and installations installed in such networks.

The extent of this standardization work is from the antennas and/or special signal source inputs to the head-end or other interface points to the network up to the terminal input.

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

The following differences exist in some countries:

The Japanese *de facto* standard (NCTEA S-006) concerning requirements for the HFC outside plant management, which was published in 1995, has already been available in Japan. The purpose of this standard is to support the design and implementation of interoperable management systems for HFC cable networks used in Japan.

¹ This word encompasses the HFC networks used nowadays to provide telecommunications services, voice, data, audio and video both broadcast and narrowcast.

CABLE NETWORKS FOR TELEVISION SIGNALS, SOUND SIGNALS AND INTERACTIVE SERVICES –

Part 7-3: Hybrid fibre coax outside plant status monitoring – Power supply to transponder interface bus (PSTIB)

1 Scope

This part of IEC 60728 specifies requirements for the Hybrid Fibre Coax (HFC) Outside Plant (OSP) Power Supplies (PS). This standard is part of a series developed to support the design and implementation of interoperable management systems for evolving HFC cable networks. The purpose of the standards is to support the design and implementation of interoperable management systems for evolving HFC cable networks. The Power Supply to Transponder Interface Bus (PSTIB) specification describes the physical (PHY) interface and related messaging and protocols implemented at the Data Link Layer (DLL), layers 1 and 2 respectively in the 7-layer ISO-OSI reference model, that support communications between compliant transponders and the managed OSP power supplies and other related power equipment to which they interface.

This standard describes the PSTIB PHY and DLL layer requirements and protocols that shall be implemented to support reliable communications between all type 2 and type 3 compliant OSP transponders on the HFC plant and managed OSP power supplies and related hardware. Any exceptions to compliance with this standard will be specifically noted as necessary.

Transponder type classifications referenced within the HMS series of standards are defined in Table 1.

Table 1 – Transponder type classifications

Type	Description	Application
Type 0	Refers to legacy transponder equipment which is incapable of supporting the specifications	<ul style="list-style-type: none"> This transponder interfaces with legacy network equipment through proprietary means. This transponder could be managed through the same management applications as the other types through proxies or other means at the head-end.
Type 1	Refers to stand-alone transponder equipment (legacy or new), which can be upgraded to support the specifications	<ul style="list-style-type: none"> This transponder interfaces with legacy network equipment through proprietary means. Type 1 is a standards-compliant transponder (either manufactured to the standard or upgraded) that connects to legacy network equipment via a proprietary interface.
Type 2	Refers to a stand-alone, compliant transponder	<ul style="list-style-type: none"> This transponder interfaces with network equipment designed to support the electrical and physical specifications defined in the standards. It can be factory or field-installed. Its RF connection is independent of the monitored NE.
Type 3	Refers to a stand-alone or embedded, compliant transponder	<ul style="list-style-type: none"> This transponder interfaces with network equipment designed to support the electrical specifications defined in the standards. It may or may not support the physical specifications defined in the standards. It can be factory-installed. It may or may not be field-installed. Its RF connection is through the monitored NE.

A list of documents in the HMS specifications family is provided in informative Annex A.

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 60603-7, *Connectors for electronic equipment – Part 7: Detail specification for 8-way, unshielded, free and fixed connectors*