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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)

> <u>IEC 60728-7-3:2009</u> https://standards.iteh.ai/catalog/standards/sist/2eaebffa-a9c6-4d53-b3c6f412be2e7243/iec-60728-7-3-2009





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CONTENTS

FO	REWO	ORD		5		
INT	RODI	JCTION		7		
1	Scop	e		8		
2 Normative references						
3	Terms, definitions and abbreviations					
	3.1 Terms and definitions					
	3.2	Abbrev	riations	10		
4	Refe	rence ar	chitecture forward and return channel specifications	10		
5	Powe	er supply	y to transponder interface bus specification overview	11		
	5.1	Genera	al	11		
	5.2	Interfac	ce compliance	11		
	5.3	Implem	nentation compliance	11		
	5.4	Revisio	on control	12		
6	Powe	er supply	y to transponder interface bus – Physical layer specification	12		
	6.1	Interfac	ce requirements	12		
		6.1.1	Connector type	12		
		6.1.2	Communications interface	12		
		6.1.3	Connector signals AND ARD PREVIEW	12		
		6.1.4	Transponder power	12		
		6.1.5	Line balance.			
		6.1.6	Cable length			
		6.1.7	Dallass/standards/sist/2eaebffa-a9c6-4d53-b3c6-	13		
		0.1.0	Bit Tate	13		
		6 1 10	Method of communications	13		
		6 1 11		13		
	62	Interfa	ce diagram	10		
7	Alternative power supply to transponder interface bus – Physical laver					
	specification					
	7.1 Introduction to alternative		ction to alternative			
	7.2	Interfac	ce 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			
		7.2.8	Bit rate			
		7.2.9	Duplex			
		7.2.10		10		
	72	1.2.11	nulualuis	1/		
8	1.3 Powe		v to transponder interface hus – Data link laver specification	1/ 18		
5	Q 1		y të stanopondor internace bus – bata init layer specification pokat etructura	10		
	0.1	огг ра		10		

	8.1.1	General				
	8.1.2	Start				
	8.1.3	Destination Address				
	8.1.4	Source Address				
	8.1.5	Identification				
	0.1.0	Datagram				
	0.1.7 8.1.8		19			
8.2			19			
8.3	Interfa	ce timing	20			
0.0	8.3.1	Message synchronization and interaction				
	8.3.2	Transmission timing requirements				
8.4	DLL da	DLL datagrams				
	8.4.1	Structure	22			
	8.4.2	Resolution versus accuracy	23			
	8.4.3	DLL datagram types	23			
Annex A	(inform	ative) HMS specification documents				
Bibliogra						
Figure 1	– Refer	ence architecture diagram				
Figure 2	– Samo	le PSTIB RS-485 interface				
Figure 3	- Samp	le PSTIB RS-485 interfacerds.iteh.ai)				
Figure 4	– DLL r	packet structure				
Figure 5	– PSTI	B data and timing diagram	21			
Figure 6		Thtps://standards.iteh.ai/Catalog/standards/sist/2eaebfla-a9c6-4d53-b3c6-	22			
Figure 7	- Batte	ry string naming conventions				
riguic i	- Datte					
Table 1 -	- Transı	oonder type classifications	8			
Table 2	– R I-45	Connector pin assignment				
Table 3	Sampl	e DSTIR DS 185 interface - Deference signals	۲۲ 1۸			
	- Sampi		14			
	- RJ-45					
Table 5 -	- Sampi	e PSTIB RS-485 interface – Reference signals	17			
Table 6 -	– Gener	ic DLL packet structure				
Table 7 -	- Reser	ved destination address ranges				
Table 8 -	– PSTIB	timing specifications	21			
Table 9 -	– Gener	ic DLL datagram structure	22			
Table 10	– DLL	datagrams	24			
Table 11	– Com	mand: Get_Configuration datagram	24			
Table 12	– Resp	onse: Get_Configuration datagram				
Table 13	– Resp	onse: Get Configuration datagram variable binding (general)				
Table 14	– Resp	onse: Get_Configuration datagram variable binding (power supply)				
Table 15	– Resp	onse: Get Configuration datagram ^a variable binding (generator)	29			
Table 16 – Command: Get Power Supply Data datagram						
Table 17 – Response: Get Power Supply Data datagram						
Table 1º	- Reen	onse: Get Power Supply Data datagram variable hinding	۵۵ کړ			
Table 18 - Response: Get_Power_Supply_Data datagram variable binding						

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

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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)

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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.

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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. D PREVIEW

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 as edish dapana9c6-4d53-b3c6-

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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. https://standards.iteh.ai/catalog/standards/sist/2eaebffa-a9c6-4d53-b3c6-

f412be2e7243/iec-60728-7-3-2009 Table 1 – Transponder type classifications

Туре	Description	Application	
	Refers to legacy transponder equip- ment which is incapable of supporting the specifications	This transponder interfaces with legacy network equipment through proprietary means.	
Туре 0		 This transponder could be managed through the same management applications as the other types through proxies or other means at the head-end. 	
	Refers to stand-alone transponder equipment (legacy or new), which can be upgraded to support the specifica- tions	 This transponder interfaces with legacy network equipment through proprietary means. 	
Туре 1		 Type 1 is a standards-compliant transponder (either manufactured to the standard or upgraded) that con- nects to legacy network equipment via a proprietary interface. 	
-	Refers to a stand-alone, compliant transponder	 This transponder interfaces with network equipment designed to support the electrical and physical specifications defined in the standards. 	
Type 2		It can be factory or field-installed.	
		 Its RF connection is independent of the monitored NE. 	
	Refers to a stand-alone or embedded, compliant transponder	 This transponder interfaces with network equipment designed to support the electrical specifications de- fined in the standards. 	
Туре 3		 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

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the following definitions apply.

3.1.1

data link layer

DLL

layer 2 in the Open System Interconnection (OSI) architecture; the layer that provides services to transfer data over the physical transmission link between open systems

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3.1.2 network element NE

an active element in the outside plant (OSP) that is capable of receiving commands from a head-end element (HE) in the head-end and, as necessary, providing status information and alarms back to the HE^{st/standards.iteh.ai/catalog/standards/sist/2eaebla-a9c6-4d53-b3c6f412be2e7243/iec-60728-7-3-2009}

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3.1.3

open system interconnection OSI

framework of International Organization for Standardization (ISO) standards for communication between multi-vendor systems that organizes the communication process into seven different categories that are placed in a layered sequence based on the relationship to the user. Each layer uses the layer immediately below it and provides services to the layer above. Layers 7 through 4 deal with end-to-end communication between the message source and destination, and layers 3 through 1 deal with network functions

3.1.4 physical layer PHY

layer 1 in the Open System Interconnection (OSI) architecture; the layer that provides services to transmit bits or groups of bits over a transmission link between open systems and which entails electrical, mechanical and handshaking procedures

3.1.5

transponder

device that interfaces to outside plant (OSP) NEs and relays status and alarm information to the HE. It can interface with an active NE via an arrangement of parallel analogue, parallel digital and serial ports

3.2 Abbreviations

- CATV Community Antenna Television (network)
- DLE Data Link Escape
- DLL Data Link Layer
- EIA Electronic Industries Alliance
- EMS Element Management System
- ETX End of Text
- Gnd Ground
- HE Head-end Element
- HFC Hybrid Fibre Coax
- HMS Hybrid Management Sub-Layer
- ISO International Organization for Standardization
- LED Light Emitting Diode
- MAC Media Access Control
- MATV Master Antenna Television (network)
- MIB Management Information Base
- NE Network Element Open System Interconnection
- OSI
- (standards.iteh.ai) OSP Outside Plant
- PHY Physical
- IEC 60728-7-3:2009 PSTIB Power Supply to Transponder Interface Bus/2eaebffa-a9c6-4d53-b3c6-
- f412be2e7243/iec-60728-7-3-2009 RF Radio Frequency
- Receive Rx
- SNMP Simple Network Management Protocol
- STX Start of Text
- Тх Transmit
- Tx En Transmit Enable
- Transponder xpndr

Reference architecture forward and return channel specifications 4

The reference architecture for the series of specifications is illustrated in Figure 1.

RF

Status

Monitoring

Device

RF

RECEIVER



Headend

Status

Monitoring

Equipment

RF

RANSMITTER



Receiver

Laser

Combine

Figure 1 – Reference architecture diagram

All quantities relating to forward channel transmission or reverse channel reception are measured at point A in Figure 1. All quantities relating to forward channel reception or reverse channel transmission are measured at point B for two-port devices and point C for single-port devices as shown in Figure 1.

5 Power supply to transponder interface bus specification overview

5.1 General

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PSTIB specification defines a status monitoring topology intended to replace existing analog, discrete status monitoring interfaces used today for monitoring power supplies and other power-related equipment deployed in HFC networks. In this topology, the transponder is simplified by moving all measurements and sensors to the monitored equipment, i.e. power supply or other power equipment. The transponder interfaces to the monitored equipment through a single multi-conductor cable. Transponder power is also provided through this interface. The power supply or other monitored power equipment assumes responsibility for measuring battery parameters, voltages, and other data associated with the equipment installation. Status and commands are passed between transponder and monitored equipment via a serial data interface bus.

The data protocol and command set are simple enough to be implemented in a simple microcontroller. The communication protocol is open and expandable so that as new requirements are defined they can be easily added to new revisions of this specification.

5.2 Interface compliance

Transponder and power supply vendors meeting the mechanical and electrical interface requirements at the PHY layer and the packet and protocol message formats at the DLL layer that are defined within this specification are said to be interface compliant. A Get_Configuration command (see 8.4.3) enables the transponder to determine compliance with a particular revision of this standard for power supplies or other power equipment. Support for this capability is critical as the PSTIB specification is updated over time and power supply equipment supporting different revisions of this specification co-exists within the same network.

5.3 Implementation compliance

Not all vendors will support the complete data set defined throughout this standard. The Get Configuration response (see 8.4.3) provides the transponder or EMS with the specific status data that is and is not supported for each installation.