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Road vehicles — Media Oriented Systems Transport (MOST) —

Part 6: Data link layer

Véhicules routiers — Système de transport axé sur les médias —

Partie 6: Couche de liaison de données

Reference number
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Contents

Page

Foreword

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This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 31, *Data communication*.

A list of all parts in the ISO 21806 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The Media Oriented Systems Transport (MOST) communication technology was initially developed at the end of the 1990s in order to support complex audio applications in cars. The MOST Cooperation was founded in 1998 with the goal to develop and enable the technology for the automotive industry. Today, MOST[1)] enables the transport of high quality of service (QoS) audio and video together with packet data and real-time control to support modern automotive multimedia and similar applications. MOST is a function-oriented communication technology to network a variety of multimedia devices comprising one or more MOST nodes.

Figure 1 shows a MOST network example.

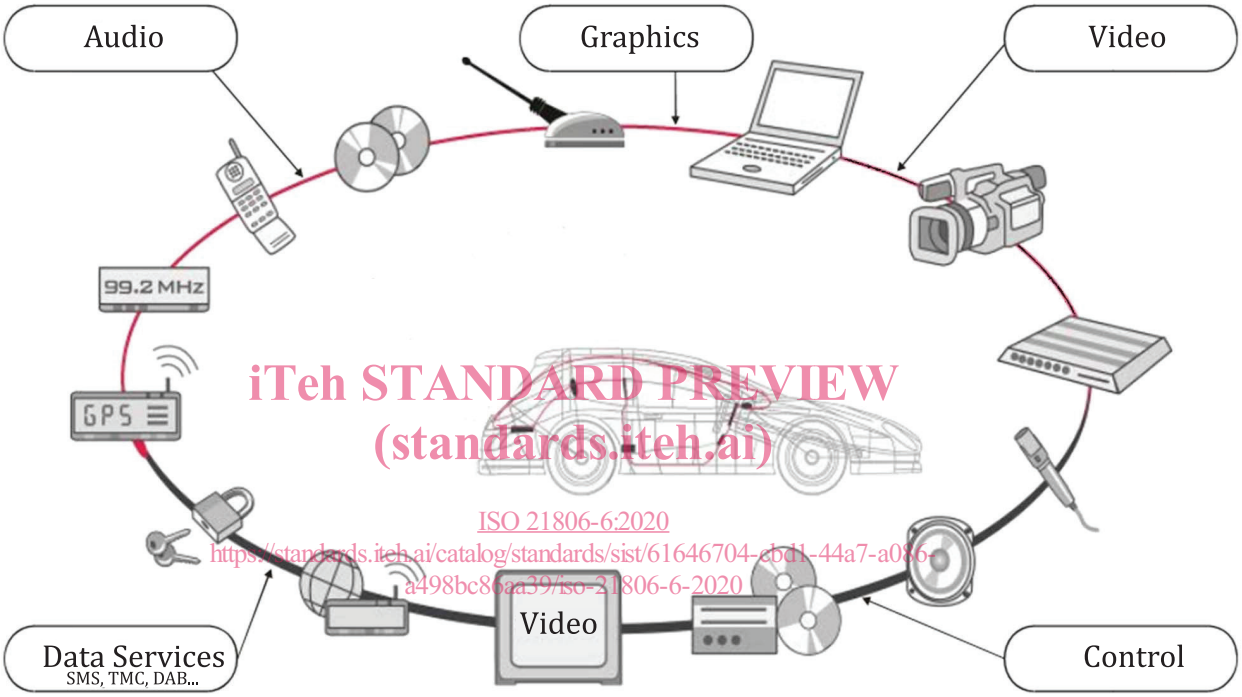

Figure 1 — MOST network example

The MOST communication technology provides

— synchronous and isochronous streaming,

— small overhead for administrative communication control,

— a functional and hierarchical system model,

— API standardization through a function block (FBlock) framework,

— free partitioning of functionality to real devices,

— service discovery and notification, and

— flexibly scalable automotive-ready Ethernet communication according to ISO/IEC/IEEE 8802-3[4].

MOST is a synchronous time-division-multiplexing (TDM) network that transports different data types on separate channels at low latency. MOST supports different bit rates and physical layers. The network clock is provided with a continuous data signal.

1) MOST® is the Registered Trademark of Microchip Technology Inc. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO.

Within the synchronous base data signal, the content of multiple streaming connections and control data is transported. For streaming data connections, bandwidth is reserved to avoid interruptions, collisions, or delays in the transport of the data stream.

MOST specifies mechanisms for sending anisochronous, packet-based data in addition to control data and streaming data. The transmission of packet-based data is separated from the transmission of control data and streaming data. None of them interfere with each other.

A MOST network consists of devices that are connected to one common control channel and packet channel.

In summary, MOST is a network that has mechanisms to transport the various signals and data streams that occur in multimedia and infotainment systems.

The ISO standards maintenance portal (https://standards.iso.org/iso/) provides references to MOST specifications implemented in today's road vehicles because easy access via hyperlinks to these specifications is necessary. It references documents that are normative or informative for the MOST versions 4V0, 3V1, 3V0, and 2V5.

The ISO 21806 series has been established in order to specify requirements and recommendations for implementing the MOST communication technology into multimedia devices and to provide conformance test plans for implementing related test tools and test procedures.

To achieve this, the ISO 21806 series is based on the open systems interconnection (OSI) basic reference model in accordance with ISO/IEC 7498-1[1] and ISO/IEC 10731[2], which structures communication systems into seven layers as shown in Figure 2. Stream transmission applications use a direct stream data interface (transparent) to the data link layer.

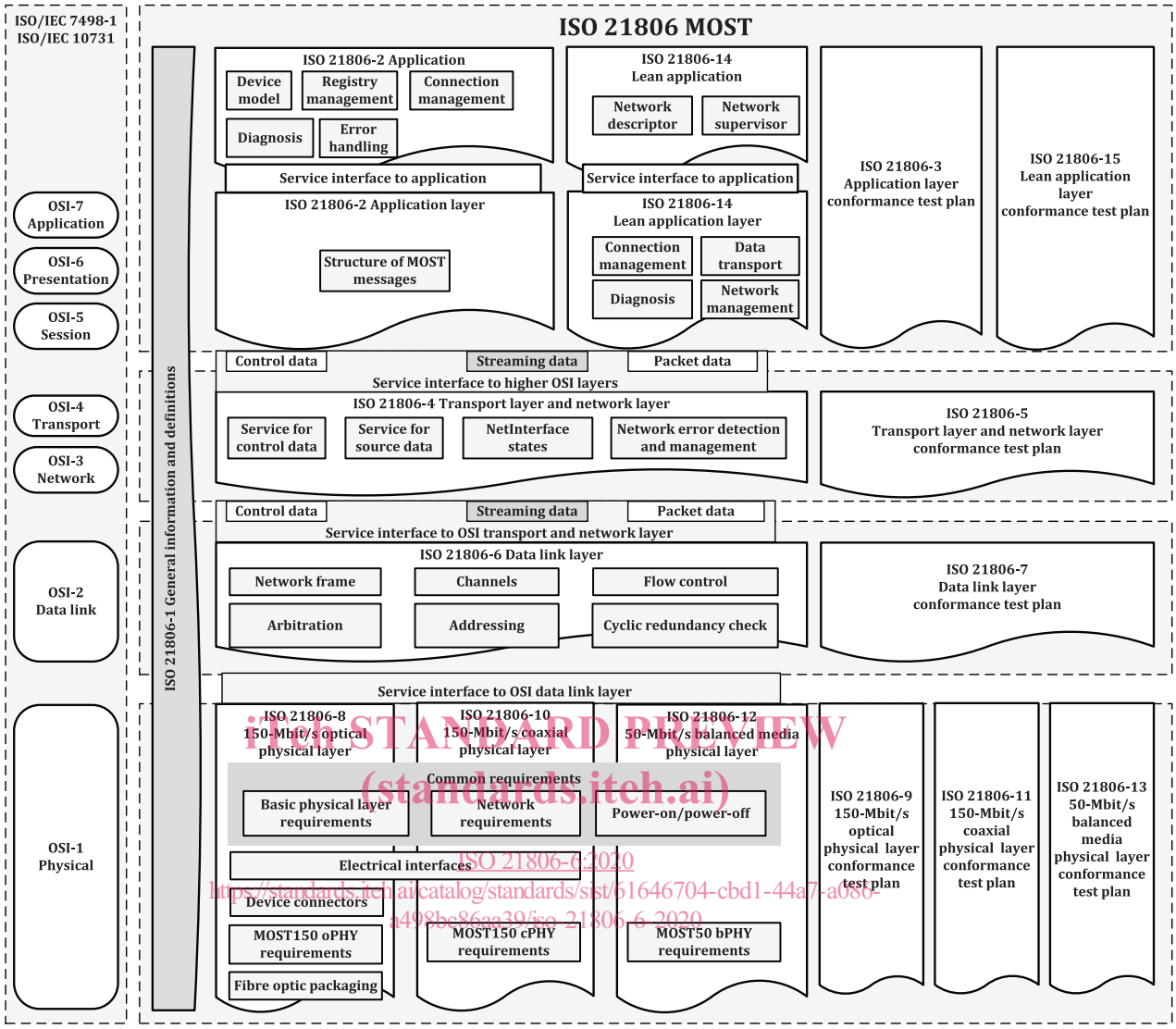

Figure 2 — The ISO 21806 series reference according to the OSI model

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Road vehicles — Media Oriented Systems Transport (MOST) —

Part 6: Data link layer

1 Scope

This document specifies technical requirements related to the MOST data link layer functionality.

A MOST network is comprised of two or more nodes connected through a physical layer. The data link layer functionality is provided by each node. On each network, all nodes are synchronised and one node provides the system clock. This node is the TimingMaster, while all other nodes are TimingSlaves. The timing configuration of the node (TimingMaster or TimingSlave) determines the tasks that need to be performed on the data link layer.

The data link layer specifies the following subjects:

— the service interface to the network layer;

— the network frame, its areas and indicators;

— the different network channels;

— the different flow control mechanisms;

— the load-adaptive arbitration and the round-robin arbitration;

— the different addressing options;

— the different cyclic redundancy checks, their usage and the CRC acknowledge;

— the frame indicators.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 21806-1, *Road vehicles — Media Oriented Systems Transport (MOST) — Part 1: General information and definitions*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 21806-1 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
diagnosis flag
flag that determines whether diagnosis is active

3.2
END
indicator for the end of a channel frame

3.3
Ethernet frame
frame according to ISO/IEC/IEEE 8802-3

3.4
isochronous frame
frame that consists of isochronous data

3.5
new allocation flag
flag that is set for newly allocated bytes

3.6
packet frame
frame that transports packet data with 16-bit addressing

3.7
PREAMBLE
indicator for the start of the network frame

3.8
protected system channel
channel that transports network status information

3.9
ring lock flag
flag that is set when the TimingMaster locks onto the incoming data stream

3.10
START
indicator for the start of a channel frame

3.11
static master flag
flag that determines whether the TimingMaster continuously sends network frames

3.12
synchronous frame
frame that is synchronous to the network clock and consists of unformatted data

3.13
timestamp channel
channel that is used to transport a CRC-protected timestamp

3.14
WAIT
indicator that is used for different purposes

4 Symbols and abbreviated terms

4.1 Symbols

<...>	range of bits, e.g. bit 7 to bit 0: <7:0>
...	and so on
---	empty cell/undefined
N_{PBC}	packet bandwidth control
N_{PBC_max}	maximum value of packet bandwidth control
$N_{SDBPFREST}$	remaining number of source data bytes per frame
N_{TNABPF}	total number of administrative bytes per frame
N_{TNBPF}	total number of bytes per frame
$N_{TNSDBPF}$	total number of source data bytes per frame

4.2 Abbreviated terms

alloc	allocation
Arb[X]	8-bit arbitration value
ARBVAL	arbitration value
CACK	CRC acknowledge
CF	channel frame
CL	connection label
CPos	calculated position of the END indicator
CRC	cyclic redundancy check
DLL	data link layer
LSb	least significant bit
MOST	Media Oriented Systems Transport
MSb	most significant bit
NC	node counter (used in tables and figures)
NF	network frame (used in tables and figures)
NOFFAD	number of frames for auto deblock
PACK	pre-emptive acknowledge
PDU	protocol data unit
SDBPF	source data bytes per frame

SOAF start of allocation frame

TM TimingMaster (used in figures)

TS TimingSlave (used in figures)

5 Conventions

This document is based on OSI service conventions as specified in ISO/IEC 10731[2].

6 DLL — Service interface to upper layers

6.1 DLL — Overview

The DLL service interface defines the abstract interface to the OSI transport layer and network layer (see ISO 21806-4[3]).

Figure 3 shows the service interface to upper layers.

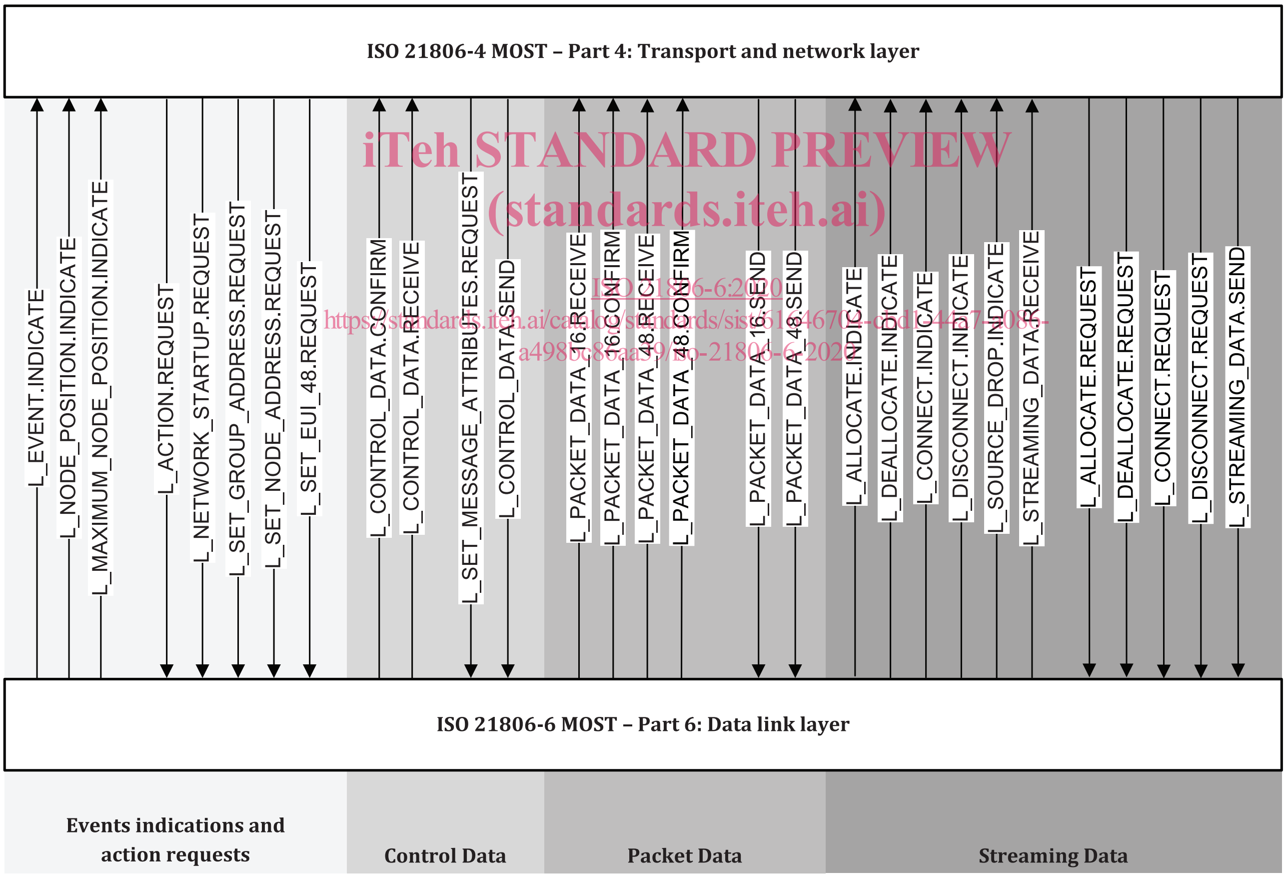

Figure 3 — Service interface to upper layers

6.2 DLL — Data type definitions

REQ	2.1 Service interface – DLL – Data type definitions
The data types shall be in accordance to:	

REQ	2.1 Service interface – DLL – Data type definitions
— `Enum`: 8-bit enumeration; — `Unsigned Byte`: 8-bit unsigned numeric value; — `Unsigned Word`: 16-bit unsigned numeric value; — `EUI-48`: 48-bit address value; — `Byte Array`: sequence of 8-bit aligned data.	

6.3 DLL — Parameters

6.3.1 DLL — Parameters – DLL to TL/NL

6.3.1.1 DLL — Overview

Table 1 provides an overview of the parameters that are used in the specified service interface and passed from DLL to TL/NL.

Table 1 — Parameters passed from DLL to TL/NL

Parameter	Data type	Description
`Network_Event`	`Enum {Unlock, Lock, Lock_Flag, Network_Change_Event, Shutdown_Flag, MOST_Output_Off, Network_Activity}`	An event that is reported to TL/NL.
`Node_Position`	`Unsigned Byte`	Node counter
`Maximum_Position`	`Unsigned Byte`	Visible nodes
`Transmission_Status`	`Enum {Success, Buffer_Full, CRC_Error, Wrong_Target}`	Transmission status that is reported back to the sender.

6.3.1.2 DLL — Network_Event

The `Network_Event` lists events that are used to notify TL/NL about changes in the DLL, which require no additional information.

REQ	2.2 Service interface – DLL – Parameters – DLL to TL/NL – DLL – Network_Event
The `Network_Event` parameter shall be of data type `Enum` and shall use the values defined in Table 2.	

Table 2 — Network_Event values

Enum value	Description
`Unlock`	Unlock event occurred
`Lock`	Lock reached
`Lock_Flag`	Lock flag detected
`Network_Change_Event`	The visible nodes value that is distributed by the TimingMaster has changed. Consequently, a network change event (NCE) is generated.
`Shutdown_Flag`	Shutdown flag detected
`Network_Activity_End`	Network activity ended
`Network_Activity`	Network activity detected