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MOST®

The Automotive Multimedia Network

from MOST25 to MOST150

FRANZIS

Preface to the second edition

The first edition of this book was released in March 2008 and based on the first generation MOST25 (MOST Specification 2.4). It operates at 25 Mbps. Now, the second edition covers additionally the second and the third generation. MOST is the abbreviation for *Media Oriented Systems Transport.*

With the MOST Specification Rev. 2.5 for MOST50 – the second generation – the MOST Cooperation doubles the bandwidth for automotive infotainment solutions from 25 to 50 Mbps. The MOST Specification of Electrical Physical Layer Rev. 1.1 is an additional key specification that enables data transmission over an unshielded twisted pair (UTP) of copper wires while meeting the stringent automotive electromagnetic compatibility requirements.

MOST150 is the third generation offering a bandwidth, of 150 Mbps. With the transmission over legacy POF/LED optical physical layer MOST150 offers a smooth migration from MOST25 and MOST50 allowing carmakers to continue to use POF and LEDs as light sources. In addition to higher bandwidth MOST150 features an isochronous transport mechanism to support extensive video applications, as well as an Ethernet channel for efficient transport of IP-based packet data. This channel carries legacy Ethernet packets (according to IEEE 802.3) without change. Thus, the new generation of MOST provides the automotive-ready physical layer for Ethernet in the car. This way, MOST will be open to a broad variety of IP based applications. It even allows to adjust the bandwidth of conventional streaming connection on the one hand and the IP communication on the other according to the corresponding requirements. Besides, MOST150 still supports the well-known asynchronous channel to ensure backward compatibility of MOST25 applications. With MOST150, audio and video signals can be transported with high bandwidth efficiency and without any overhead for addressing, collision detection/ recovery or broadcast. Multiple high definition (HD) video streams and multi-channel surround sound with premium quality of service can be transmitted, while simultaneously moving high loads of packet data around.

MOST network needs to support digital audio, video and data services equally:

- High QoS Synchronous (PCM audio …)
- High QoS Isochronous (MPEG Transport Streams, audio and video over IP …)
- High performance Packet with IP support
- Realtime Control

The number of vehicle models relying on the MOST infotainment backbone has now hit the one hundred mark. This fast implementation growth rate with a total of 100 vehicle models on the road today reflects the practical suitability and reliability of MOST. Only three years after the MOST Cooperation was founded in 1998, the first MOST car was introduced in 2001. The following year, 13 more models implemented the MOST infotainment backbone. In October 2007, the leading network technology had found its way into 50 car models, climbing to 68 models in March, 2009. Just one year later there are 50% more models on the road as MOST Technology spreads into the mass market.

Asian carmakers presented their first vehicles with MOST inside in 2007. Today, there are 22 models manufactured by Asian automakers with MOST built in. MOST Technology is now heading to the American continent with the first US carmaker working on future vehicles that incorporate the MOST network.

MOST25 Technology has established itself in the European and Korean markets. The Japanese and US markets prefer MOST50.

Now the newest Specification Rev. 3.0 for MOST150 is on the way to production. Audi and Daimler will be the first carmakers to integrate MOST150 into series production vehicles.

The second edition has a new structure. Whereas the first edition, MOST also ranks to the in-car communication systems, the second edition focuses solely on MOST.

Acknowledgements

I would like to thank my co-authors for spending their precious time to cooperate on this book and thus make it possible at all and to all members of the MOST Cooperation Steering Committee, who initiated and actively supported the second edition.

I also owe thanks to the coordinator of the MOST Cooperation, Mr. Wolfgang Bott for the comprehensive support and Mr. Renato Machelett for the complete proofreading of the script.

Finally, I would like to thank Franzis publishing house for their many ways of contributing to this book.

January 2011

Karlsruhe	Deggendorf
MOST Cooperation	Andreas Grzemba (Editor)

Preface to the first edition

The automotive industry can look back on nearly 20 years of experience using in-car communication systems. The development started with the CAN-Bus, which has been used in production vehicles since the 1990s. The infotainment sector in cars has developed rapidly within the last few years. Where an AM/FM tuner was initially sufficient, many vehicles are now equipped with high-grade sound and navigation systems. This also increases the number of devices involved – radio, cell phone, CD changer, navigation system, voice operation and an additional multi-channel amplifier supplement the primary systems. These devices must interact in concert with each other and can only be controlled via a central operating surface to ensure drivers are not unnecessarily distracted. The bandwidth of the CAN-Bus, which can only move control signals, but no audio and video signals, is no longer sufficient for these demands.

MOST, *Media Oriented Systems Transport*, a communication system with a new, flexible architecture, used by many different manufacturers, was developed to meet these demands. It can transmit audio signals synchronously, as in telephones, and is the most widely used multimedia system in cars today.

MOST technology is the result of the collaboration of car makers and suppliers, working to establish and refine a common standard within the MOST Cooperation. The founding fathers of the MOST Cooperation constitute the steering committee, the managing body. All companies interested in the system can, however, collaborate in working groups. Chapter 1 introduces the Cooperation.

The MOST system not only comprises all layers of the Open System Interconnect (OSI) Reference Model for communication and computer network design, but also standardizes the interfaces with the applications (e.g., an AM/FM tuner), which are defined as function blocks. Their implementation is described by example interaction models. In addition, the encoding of the audio and video signals is part of the specification. The system designer is thus able to design multi-media systems on a relatively high abstraction level.

This book is an introduction to the MOST technology. It cannot, however, replace the work with the specifications. The basis for this book is the MOST specification 2.4, taking into account further developments. The current specifications can be found at the MOST Cooperation website http://www.mostcooperation.com.

The book is divided into two parts.

Part 1 deals with the MOST standard. After introducing the structure of the MOST Cooperation, the communication architecture in the vehicle is presented for classifying the MOST Technology. Chapter 3, *System Architecture*, provides an introduction into the technology. The following chapters describe the most important aspects in detail.

Part 2 deals with the application of the MOST Technology. First, development tools are introduced. The next chapter explains the structure and implementation of a simple MOST system by means of these tools. This part then describes the basic structure of MOST gateways, the handling of MOST components and the use of MOST in current production vehicles. The last chapter describes the sound systems used in cars.

The **appendix** comprises a list of abbreviations, a glossary with the most important terms from the world of MOST, as well as a comparison between MOST, Ethernet and IEEE1394. A short survey of the other communication systems currently used in cars may contribute to a better understanding of the MOST technology. In the context of gateways, it is mainly the CAN-Bus and Bluetooth which are of interest.

I hope that this book will contribute to widely disseminating MOST Technology and that it will be a useful reference work for designers and users. MOST is a system which is subject to constant improvements and further developments. Ideas or comments concerning this book will be gratefully accepted at the e-mail address andreas.grzemba@fh-deggendorf.de.

Acknowledgements

I would like to thank my co-authors for spending their precious time to cooperate on this book and thus make it possible at all.

My further thanks go to all members of the MOST Cooperation Steering Committee, who initiated and actively supported the project.

I also owe thanks to Mr. Josef Berwanger of BMW for checking through chapter FlexRay, Mr. Roland Trißl of SMSC Europe for proof-reading chapter 9, Mr. Matthias Karcher of SMSC Europe, Dr. Carsten Kellner of Vector Informatik for cooperating on chapters 14 and 15, as well as Mr. Jochen Klaus-Wagenbrenner of Harman Automotive Division and Mr. Martin Arend of BMW for proof-reading chapter 16.

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I would also like to thank the translators for translating the book into English.

Finally, I would like to thank my wife Jana for the first thorough correction of the script and Mrs. Astrid Lehmann and her colleagues at Franzis publishing house for their many ways of contributing to this book.

Deggendorf, January 2008

Andreas Grzemba

(Editor)

Contents

2 Survey of the System Architecture

This chapter gives an overview of the system architecture and the basic characteristics of MOST, which are described in more detail in the following chapters.

2.1 MOST Layer Model

When the MOST system was developed, vehicle manufacturers had two basic demands with regard to the functionality of an infotainment bus system:

1. A simple system design based on a function-orientated point of view, and
2. the transmission of streaming and packet data, as well as control information.

The first demand resulted in the development of the MOST framework with *function blocks* being the essential part. Function blocks incorporate all properties and methods of a MOST device (e.g., a CD changer), which are necessary to control the device. Communication with these function blocks takes place over the application protocol, which consists of a self-explanatory mnemonic and does not require an address of the MOST device. Thus, a simple and fast system design of the infotainment domain is possible with a high abstraction level.

The function blocks constitute the interface with the application and therefore belong to layer 7 of the ISO/OSI model (fig. 2.1). They are introduced in section 2.2 together with the application protocol and explained in detail in chapter 3.

The second demand was achieved with the frame structure. It synchronously transports multimedia data, can transmit a great amount of data asynchronously without influencing the synchronous transmission and offers a Control Channel for control commands and status messages. The letter belongs to the application protocol.

The Data Link Layer is based, according to the above mentioned second demand, on a synchronous transmission of data frames. It is realized by the MOST Network Interface Controller. Besides the more common optical bit transmission layer, there is also an electrical physical layer available.

Section 2.4 gives a general survey of the Data Link Layer. This layer is presented in chapter 5. The Physical Layer is introduced in section 2.5. It is described in detail in chapter 6.

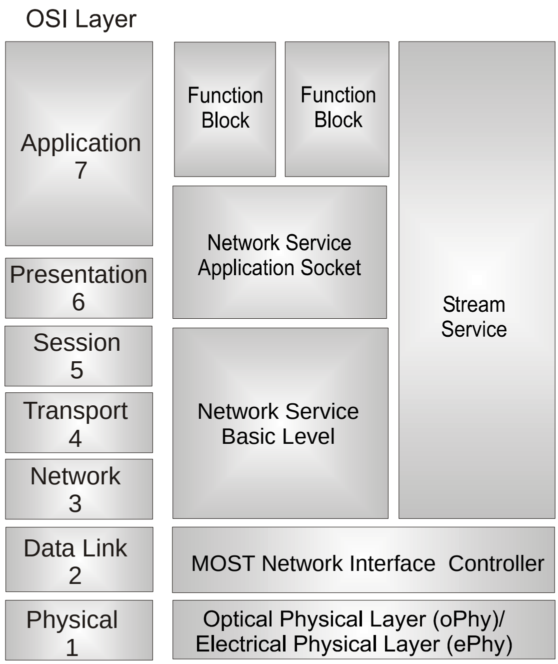

Fig. 2.1: MOST in the ISO-OSI model

The driver software of the MOST System, i.e., the Network Service, is a middleware between the function blocks and the Data Link Layer. It covers layer 3 up to parts of layer 7 of the ISO/OSI-Model. *NetServices* is the product name used by the company SMSC for the Network Service.

Due to the fact that the MOST system was developed for the synchronous transmission of audio and video data in particular, there are additional Stream Services used for their transport. They are shown in figure 2.1, but do not belong to the actual OSI model.

2.2 Application Framework

The key elements of the Application Framework are the above mentioned function blocks and their dynamic behavior.

A function block is an object for controlling dedicated functions in the MOST network. There are function blocks for controlling applications, such as the CD changer or audio amplifier, and function blocks for the network management. The function blocks provide comprehensive tools for implementing complex audio functions. They make it relatively easy for the application design engineer to create distributed audio applications on a highly abstracted level.

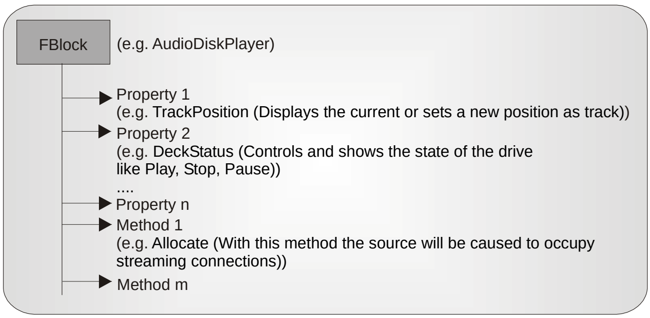

Fig. 2.2: Function block of the CD player (AudioDiskPlayer)

A function block defines the interface of an application to be controlled. It consists of properties and methods. The properties describe or change the condition of the function to be controlled and the methods execute actions which, after a specified period of time, achieve a result. The MOST specification uses the term “function” to include both properties and methods.

In order to be able to ensure a uniform implementation, every function block has an XML description used as an interchange format. This description can be edited with the MOST Editor (section 11.2.2).

Figure 2.2. shows an example with extracts of the properties and methods of the function block of a CD player (AudioDiskPlayer).

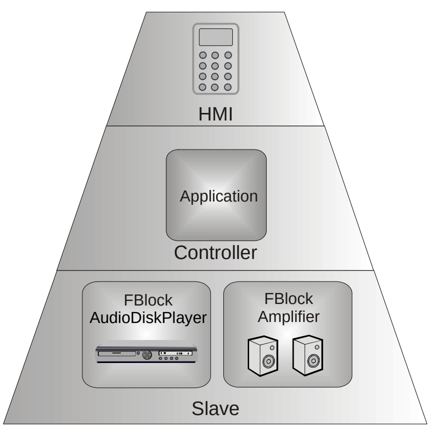

Fig. 2.3: Hierarchy in the MOST system (according to [Tutorial])

The MOST specification differentiates between three views of the interaction with function blocks (fig. 2.3):

- HMI
- Controller
- Slave

A *slave* is a MOST device, which is controlled by a Controller. It provides its functionalities by means of properties and methods of its function blocks. A slave has no system knowledge at all, i.e., information about other devices is not stored statically and consequently the slave does not control other slaves either (fig. 2.4). They can easily be added to or removed from a MOST system, without the software being modified or other slaves being influenced. This means that a CD changer or amplifier, can easily be used in different vehicle platforms, if they are implemented as slaves

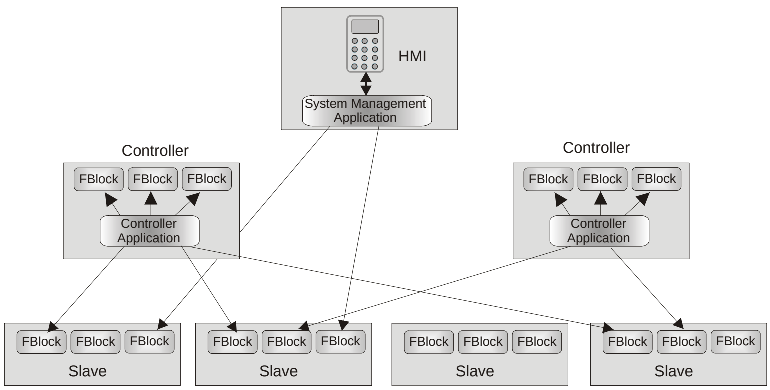

Fig. 2.4: Interactions in the MOST hierarchy (according to [Tutorial])

A *Controller* is an application for administration of a functional part of a MOST system, i.e., it controls the function blocks of one or more slaves (fig. 2.4). A tuner, for example, can control its corresponding amplifier. For this purpose, the Controller requires partial system knowledge, which means that it must know the function blocks to be controlled. A proxy (or stub) for a function block to which the Controller has access is also called the shadow of this function block. Apart from that, a Controller can also have function blocks of its own (see also section 4.1).

The *Human Machine Interface (HMI)* is the interface to the user of the MOST system and thus presents the system function on a high abstraction level. It coordinates the various Controllers.

The Controller uses an application protocol, introduced in section 4.2 (see also fig. 2.5), to control a function block. It is transmitted via the Control Channel or the MOST High Protocol in the Packet Data Channel. The device address of the addressed function block does not need to be known, as it is ascertained by the Network Service (see section 9.3.3).

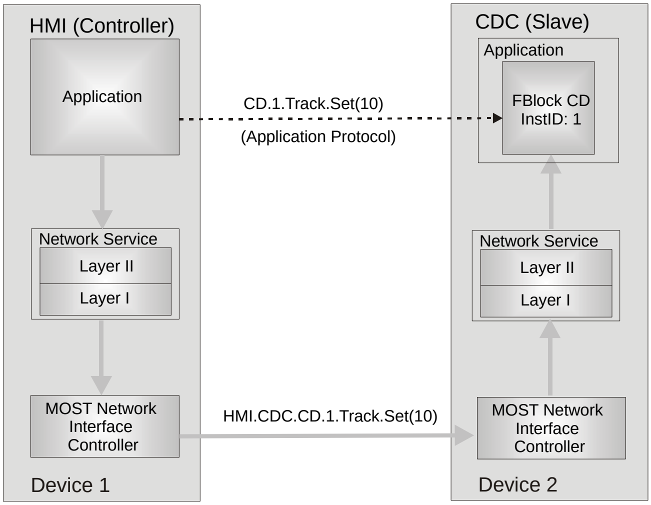

Fig. 2.5: Application protocol (according to [MOST 3.0])

The description language *Message Sequence Chart* (MSC) is used for describing the dynamic behavior and the use of the function blocks. MSC is a technical language which was defined by the International Telecommunications Union (ITU) for specifying and describing the communication behavior of system components among each other and with their surroundings. It is independent of the communication protocol used. The language is introduced in appendix A.

2.3 New isochronous transmission mechanisms for MOST150

MOST150 can handle three different isochronous mechanisms designed for different applications.

The **A/V Packetized Isochronous Streaming** permits transfers of video data streams that arrive without any reference to the MOST time base. The data is already consolidated in small data packets, which can optionally include a time stamp. MPEG data streams that are coded either with variable (VBR) or constant bit rates (CBR) are typical examples of this.

DiscreteFrame Isochronous streams contain data and additional time base information in parallel. The data is arranged in frames. They are not synchronized to the time base of MOST. All PCM streams fall into this category. Here, the PCM data is accompanied by a frame sync signal. An example is the transport of a 44.1 kHz signal over a 48 kHz MOST network.

QoS IP (Streaming) mode is used for packet transmission which allows for full quality of service requirements. Typically, resources on the Packet Data Channel are shared between all applications on the network. Certain scenarios require guaranteed bandwidth. For example, when transporting video data as an IP stream on the MOST Ethernet channel, the occurrence of sudden, high-volume data transfer would lower the available bandwidth for the video signal, affecting the video transmission. If it uses QoS IP (Streaming) mechanism, the sudden data transfer does not interfere with the video transmission, avoiding disturbances.

2.4 Network Services

Network Services are a standardized protocol stack for MOST, mapping level 3 up to level 7 of the OSI model. They are usually divided into two layers. The Network Services also include the transport protocol *MOST High Protocol*, the adaptation layer *MAMAC*, which maps the TCP/IP stack onto MOST (only MOST25 and MOST50) and accordingly a pure TCP/IP stack for MOST150, so-called Ethernet over MOST (see also chapter 5.7).

They are attached to the MOST Network Interface Controller and provide a programming interface for the application, which basically consists of the function blocks (fig. 2.10). They contain modules for the transfer of packet data in the Packet Data Channel and modules for the control of the network via the Control Channel. The Network-Services are implemented on an External Host Controller (EHC). The control of streaming connections is also part of the Network Services. However, the synchronous/isochronous data transmission is not.

2.5 MOST Data Link Layer

The Data Link Layer defines the basic transmission mechanisms of the MOST bus. This includes the definition of the structure of the data frames, as well as the function of the TimingMaster and the TimingSlave.

2.5.1 MOST Frame

The second requirement of the MOST system, i.e., the synchronous transmission of multimedia data, is directly reflected in the frame structure. A frame contains one channel for the synchronous or isochronous (only MOST150) transmission of streaming data, one channel for the asynchronous transmission of packet data, and one channel for the transmission of control data (fig. 2.6). In the Streaming Data Channel, static connections between a streaming source and one or several streaming sinks can be built up with the sampling rates 44.1 kHz (MOST25 and MOST50) and 48 kHz (MOST150).

The control of the connection set-up and disconnection, and the exchange of the control messages for the function blocks are effected via the Control Channel. The data for the commands transmitted via the Control Channel are distributed over several subsequent frames. A MOST25 frame provides two bytes in each frame for that purpose, and both MOST50 and MOST150 frame contain four bytes.

Packet data is transmitted in the Packet Data Channel without influencing the synchronous data transmission at all. It transports configuration data of the navigation system, for example. A data link layer protocol is used for that purpose, which covers the Packet Data Channel. It can transport pure Ethernet Data in MOST150.

The boundary between the Streaming and the Packet Data Channel can be set using the boundary descriptor.

As figure 2.6 shows, a MOST25 frame contains 64 bytes in total. MOST50 can transport 128 byte at the same time due to the double bandwidth, and MOST150 carries 384 bytes.

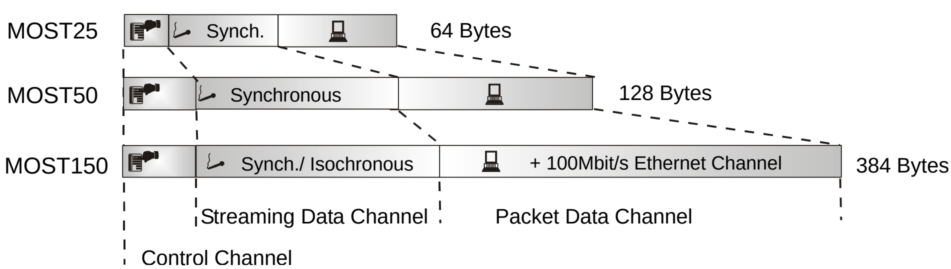

Fig. 2.6: Basic structure of a MOST frame

Chapter 5 gives a detailed introduction of the MOST protocols of the Data Link Layer.

2.5.2 TimingMaster, TimingSlave

As MOST is a point to multi-point data flow system (i.e., the streaming data has a source and any desired number of sinks), all devices share a common system clock pulse derived from the data stream. They are thus in phase with each other and can transmit all data synchronously, which makes any mechanisms for signal buffering and signal processing redundant.

The system clock is generated by the TimingMaster, which is integrated in one of the nodes. In a vehicle, it is usually located in the head unit of the infotainment system. All other nodes are synchronized onto this system clock pulse by means of a PLL connection and are thus referred to as TimingSlaves (fig. 2.7).

When the TimingMaster receives the frame again when it has traveled around the ring, it reclaims the signals by means of a PLL connection and subsequently generates the next frame.

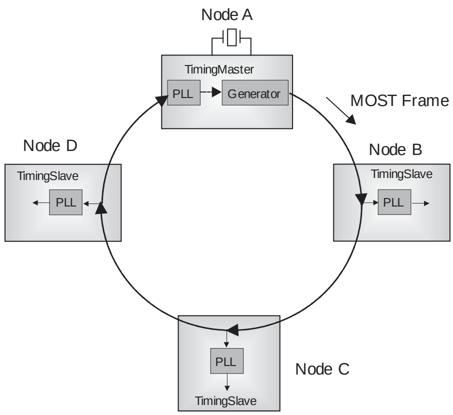

Fig. 2.7: MOST ring with a TimingMaster and TimingSlaves

Lock/Unlock

A TimingSlave is in a lock state if it receives a signal at the input onto which it can synchronize with the PLL; if not, it goes into unlock state.

The TimingMaster is in lock state if it can regenerate the frame from the signal that has traveled around the ring.

In the case of an optical Physical Layer, the lock state implies that the light is on in the ring (Light On).

A more detailed description is given in section 7.5.1.

2.6 Physical Layer

Table 2.1 summarizes the most important parameters of the Physical Layer. MOST25 stands for a bit rate of the data stream of about 25 Mbit/s and uses an optical Physical Layer. The exact data rate depends on the sampling rate of the system. At a sampling rate of 44.1 kHz, the MOST frame is transmitted 44,100 times per second, which results in a data rate of 22.58 Mbit/s at a frame length of 512 bits (see section 6.5.1). This also applies to MOST50. The frame here has a length of 1,024 bits, which results in twice the data rate at the same sampling rate. An electrical Physical Layer was additionally specified for MOST50.

The first generation of the Network Interface Controllers (NIC) can only be used for MOST25. The second generation Intelligent Network Interface Controllers (INICs) are available for MOST25, MOST50 and MOST150. In chapter 10, both generations of MOST Network Interface Controllers are introduced.

	MOST25	*MOST50*	*MOST150*
Bit rate	*circa 25 Mbit/s*	*circa 50 Mbit/s*	*circa 150 Mbit/s*
Physical Layer	Optical	Electrical Optical	Electrical (based on coax line drivers) Optical
NIC	OS8104; OS8104A	-	-
INIC	OS81050; OS81060	OS81082; OS81092	OS81110; OS81120

Table 2.1: Important parameters of the Physical Layer

2.6.1 Optical Physical Layer

MOST uses Plastic Optical Fiber (POF) as physical transmission medium and has therefore very good EMC properties.

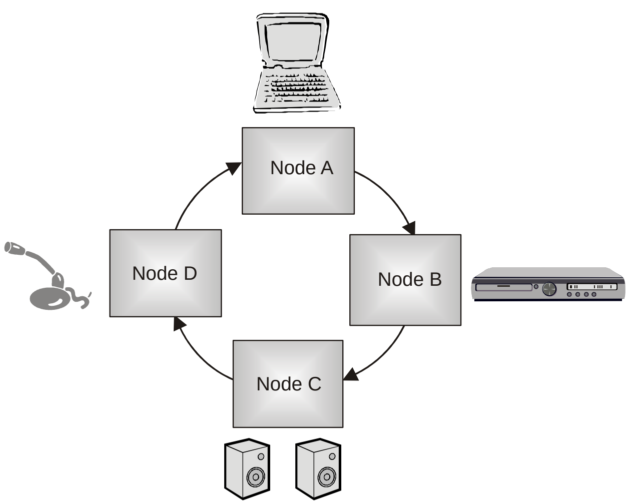

Fig. 2.8: Simple MOST ring

The basic architecture of a MOST network is a logical ring, which transmits the data from one device to another. The logical ring structure is usually realized as a physical ring (fig. 2.8). This is, however, not mandatory. A combined ring and star topology, for example, can be realized with one hub. In a star topology nodes can simply be added or removed without the rest of the network being influenced, which increases the system reliability.

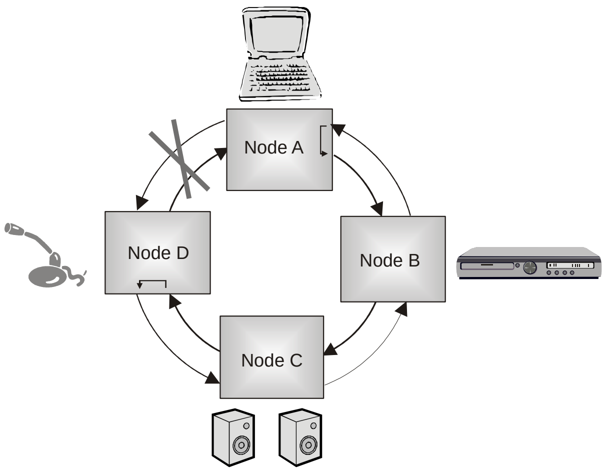

Fig. 2.9: Double ring struture

The principle of transmitting the data stream from one node to the next, which can be arranged in a star topology or any possible mixed form of ring and star, is always maintained.

In order to make MOST highly available in the case of errors, a double ring can be realized. For this purpose each node must have two optical receivers and two transmitters (see fig. 2.9). If there is a problem between two nodes, the ring can be closed via the redundant segments. The Bosch conference system *Praesideo* [Praesideo] uses such a double ring structure. It is employed in big complexes of buildings and complies with the European Safety Standard EN 60849.

The optical Physical Layer is introduced in detail in chapter 6.

2.6.2 Electrical Physical Layer

The electrical Physical Layers additionally specified for MOST50 and MOST150 based on coax line drivers are described in section 6.6.

2.7 MOST Device

The basic architecture of a MOST device, as it is shown in figure 2.10, can be deduced from figure 2.1. It shows a device with an optical Physical Layer (oPhy). The Fiber Optic Receiver (FOR) transforms the light signal into an electrical signal, which is transmitted to the Rx input of the Interface Controller. The Tx signal from the controller is retransformed into a light signal by the Fiber Optic Transmitter (FOX). Receiver and transmitter are called uniformly Fiber Optic Transceivers (FOT) or the physical interface.

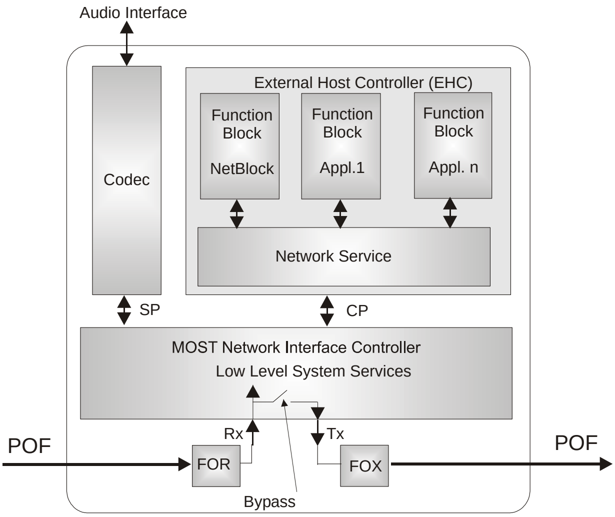

Fig. 2.10: MOST device model with an optical Physical Layer

The Data Link Layer is realized in the MOST Network Interface Controller, which controls the access to the three different channels. The Network Service and the function blocks are implemented on a microcontroller, which is also referred to as *External Host Controller* (EHC). The access from the EHC to the Packet Data Channel and the Control Channel is effected via the Control Port (CP) of the MOST Network Interface Controller.

Chapter 9 introduces the Network Service.

For the streaming services, a processor-free codec can be used in the simplest case or a signal processor in a high-grade system. The interface with the MOST Network Interface Controller is the Source Port (SP) (in the case of the NIC) or the Streaming Port (in the case of the INIC). In addition to this, the INIC offers a universal, efficient interface through MediaLB, which can address all channels (see section 10.11).

The MOST Network Interface Controller has an integrated bypass. It is closed (activated) or remains closed, if the controller is not in normal operation mode, and then transmits the incoming data stream nearly without delay and regeneration via Tx. This applies, for example, in the case of errors or when the device is started up.

2.8 Network Management

In addition to function blocks for application functions (such as CD changer or tuner), there are also a number of function blocks for network management functions, such as the *NetBlock*, *PowerMaster*, *NetworkMaster* and the *ConnectionMaster*. They are introduced in chapter 7.

The *NetBlock* must be implemented in every device. The other function blocks for network management are found only once in the system. The specification does not regulate, on which device these functions are implemented. They may be distributed in the system, but are usually found together in the head unit.

2.8.1 NetBlock

The *NetBlock* is responsible for the administration of a device. It has, for example, a list of all the function blocks implemented on the device, and manages all addresses of the device (node position address, logical address, group address). Section 4.3.4 goes into more detail.

2.8.2 PowerMaster

The *PowerMaster* defines the function of a selected device in the MOST network, which is responsible for starting up and shutting down the MOST network and supervises the status of the power supply. It does not have a function block specification of its own, but a function block identifier for identifying the device. The function block *PowerMaster* is introduced in section 4.3.4.

The network can be woken up by any node. A wake-up which was not initiated by the PowerMaster (e.g., by the gateway), is characterized as a slave wake-up.

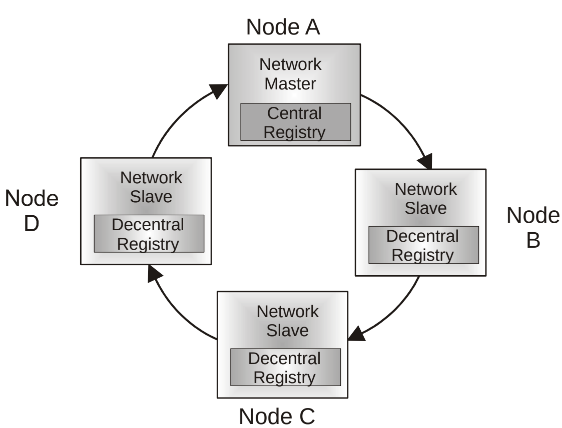

Fig. 2.11: NetworkMaster and NetworkSlave

2.8.3 NetworkMaster; NetworkSlave

The NetworkMaster starts up the system and administers the network status, as well as the Central Registry. The latter lists all function blocks existing in the network, and the respective address of each device, on which a function block is implemented.

All other devices in the ring are called *NetworkSlaves*. They may have a Decentralized Registry, a subset of the Central Registry. It comprises the function blocks of the communication partners of the device.

Figure 2.11 shows a MOST ring with the NetworkMaster and the Slaves.

The NetworkMaster function is the central part of chapter 7.

The respective function block is the *NetworkMaster* (section 4.3.4).

2.8.4 ConnectionMaster

The ConnectionMaster is the function block that contains the interface to the Connection Manager, which is responsible for set-up and disconnection of streaming connections. The implementation of the ConnectionMaster function block is optional (see also chapter 4.3.4).

Figure 2.12 shows the basic operational mode of the ConnectionMaster. An initiator orders the ConnectionMaster to establish a connection. Thereupon it reserves the necessary bandwidth in the synchronous area and reports the channel number of the data source and sink. The disconnection is carried out analogously.

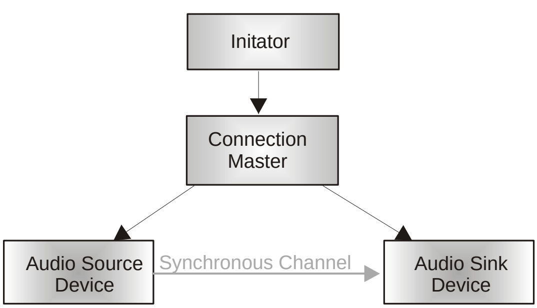

Fig. 2.12: Basic principle of the ConnectionMaster

2.9 Error Management and Diagnosis

MOST specifies a ring break diagnosis. It can locate broken POFs and delivers the result to a dedicated device. It includes also an optional Electrical Line Control. Chapter 8 goes into more detail.

The Diagnostic Protocols Adaption Specification [DPA] defines requirements for the adaption of diagnostic protocols, e.g., UDS (Unified Diagnostic Services) to MOST.

2.10 Transmission of Multimedia Data

For transmitting content through streaming connections, coding procedures have to be defined and the copy protection is to be ensured, particularly for commercial entertainment content, protected by some form of access method.

MOST uses current coding procedures, such as PCM and MPEG, the implementations of which are to be found in the *MOST Specification for Stream Transmission* [Stream].

MOST applies the Digital Transmission Content Protection (DTCP) standard for transmitting content protected by copyright. This technology comes from the *5C Group*, a cooperation of the five device manufacturers *Intel*, *Matsushita*, *Toshiba*, *Sony* and *Hitachi*. It is available on the website of Digital Transmission Licensing Administrator (DTLA) www.dtcp.com. DTCP was developed to ensure the safe transmission of signals from a set-top box to the DVD video recorder. The renowned Hollywood studios Sony and Warner also use this protection scheme in order to transport films in digital networks.

The MOST specification *MOST Content Protection Scheme DTCP Implementation* [ContProt] defines the necessary functions and services to enable the use of this technology.

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MOST®

THE AUTOMOTIVE MULTIMEDIA NETWORK

MOST (Media Oriented Systems Transport) is a multimedia network technology developed to enable an efficient transport of streaming, packet and control data in an automobile. It is the communication backbone of an infotainment system in a car. MOST can also be used in other product areas such as driver assistance systems and home applications.

MOST is a communication system with a new, flexible architecture, used by many different manufacturers. It is the most widely used multimedia network in the automotive industry.

In 2010, more than 100 car models are already equipped with MOST Technology. MOST defines the protocol, hardware, software and system layers that are necessary for the high-performance and cost effective transport of realtime data in a shared medium. MOST Technology is developed and standardized within the MOST Cooperation through a joint effort of carmakers and their suppliers. It is now evolving into a third generation with MOST150 Technology.

The MOST Cooperation commissioned this updated book with the goal of making it easier to understand and use MOST Technology. The authors of the book work for carmakers, suppliers and scientific institutes. The emphasis of the first part of the book is the MOST standard itself. After describing the organization of the MOST Cooperation, the general communication architecture of an automobile using MOST is presented. Then the chapter "Survery of the System Architecture" gives an overview of MOST Technology. The most important aspects of the technology are then presented in detail in subsequent chapters.

The book is aimed at engineers at suppliers and carmakers that want to get started with MOST Technology. It also provides an overview of an effective communication architecture to interested engineers outside the automotive industry.

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