



# Let there be light

## A premium producer implements optical transmission technology

Optical data transmission in automobiles was long regarded as a difficult proposition. Nevertheless, MOST has succeeded in establishing itself as an infotainment bus system. In an interview with Jens Kötz, responsible for electrical/electronic design, networking, energy systems and system safety at Audi, we hear where MOST is being used at present and where it is going in the future.

■ *Jens, where is Audi currently using MOST?*

**Jens Kötz:** Well, Audi first introduced the MOST infotainment network in 2002 in its A8 model. Since then the technology has gained a firm place as a communication network. In the Volkswagen group the MOST bus is currently being implemented in what's called the modular longitudinal power train or MLB, and as part of a top-down approach it's appearing in the Audi series A4, A5, Q5, A6, Q7 and A8. Series use in VW models has started with the Touareg. MOST is also scheduled to go into further series that

are nearing SOP like the Audi A1, Audi A7 and a Bentley model.

■ *What's your experience with MOST been like up to now?*

**Kötz:** MOST is a technology created by infotainment developers for infotainment applications, in other words precisely tailored to the requirements of this domain. The many years of involvement of series production developers guarantees a broad and stable de facto networking standard for premium infotainment systems.

The reservations that existed at the beginning about fiber optics in the auto-

mobile turned out to be unfounded. The processes are firmly in place, and the quality figures are of a very high level, despite the short innovation cycles common in the infotainment sector.

■ *Where does MOST go so far and no further? Are there any alternatives for certain purposes?*

**Kötz:** MOST shows to full advantage in infotainment applications like audio streaming. But MOST25 as a speed grade will soon reach its limit because of the increasing bandwidth demand we're going to see in premium infotainment systems. Speed grade MOST150 then offers interesting possibilities for solutions as well as performance reserves.

■ *So you're very positive in your assessment of MOST150?*

**Kötz:** The appearance of new infotainment functionality like video transmission, distributed HMI concepts and the integration of consumer electronics create a greater need for transmission bandwidth and communication services. MOST150 offers unique advantages as a speed grade through con-

sistent further development of the existing transmission technology. Infotainment applications place very different demands on the network infrastructure, and MOST150 gives you all the communication mechanisms over one interface, an all-in-one approach:

- ▶ Data rate is six times that of MOST25.
- ▶ Synchronous streaming to transmit audio data.
- ▶ Packet data transmission for navigation maps.
- ▶ Isochronous streaming for video transmission.
- ▶ Ethernet channel to tie in consumer electronics and online applications.
- ▶ Control channel to transmit control commands.
- ▶ Large potential for synergy in terms of process and investment, for example node costs identical to MOST25, plus high reusability of application software.

These unbeatable advantages form a basis for deciding to introduce MOST150 throughout the Volkswagen group. To back up first-time use at Audi we've prototyped all our planned applications on the network side based on two reference projects. Our findings, what we've learnt from this is that MOST150 is ready to take off.

■ **And when, to be concrete, are we going to see MOST150 from Audi?**

**Kötz:** First-time use of MOST150 will be with the SOP of the new Audi A3 series. After that the technology will roll out successively through each of the series in the Volkswagen group. That means all vehicles of the modular transverse matrix MQB and the modular longitudinal matrix MLB.

■ **What then is the current status of MOST150 implementation at Audi?**

**Kötz:** Basic validation of the technology for going into series has been successfully completed. And at the moment we're developing, translating MOST150 into an SOP status for the Audi A3.

■ **How big is Audi's very own share in MOST150?**

**Kötz:** Network management and basic MOST functionality set up 100 per-

cent on the MOST specification. In contrast to MOST25 technology we've worked with the MOST Cooperation in specifying communication for ring break diagnosis. Through this standardization we're expecting a further betterment in quality. Analogous to MOST25 the function blocks in particular feature Audi-specific enhancements.

■ **Where are the interfaces between Audi and VW on MOST150?**

**Kötz:** As part of a module strategy we're developing the VW group's cross-brand and cross-series modular infotainment platform MIB. MOST150 is the group's dedicated networking technology for the extra featured standard, high and premium equipment variants. Here Audi is responsible for basic MOST150 development in the

versatile in application, for us it's the next logical step in technology. Compared to Ethernet, MOST150 is a synchronous bus with an extra embedded Ethernet channel. Time-synchronized transmission of audio and video signals can be implemented at attractive cost. You would first have to modify Ethernet software and networking technology for these applications. Given such constraints there are neither functional nor commercial benefits in moving over to Ethernet. So, to begin with, Ethernet will make its way into other automotive domains. Solutions in vehicle diagnostics access DoIP are being discussed for example.

■ **Can you imagine seeing MOST150 in non-infotainment?**

**Kötz:** The technical advantages being as they are, MOST technology could

### About Jens Kötz, Dipl.-Ing.

Following technical college Jens Kötz started his career as a trainee communications electronics technician with Deutsche Telekom in Kempten. After that he studied electrical energy and automation technology at Konstanz university of applied science.

In 1999 he joined Audi AG in the course of his dissertation on the subject „Structure and analysis of an optical bus node (MOST)“. One year later he was given a position in Audi predevelopment and worked on the introduction of new networking concepts for the A3 and A8 models.



■ **Jens Kötz, responsible for electrical/electronic design, networking, energy systems, system safety**

In 2002 he moved to series development, focusing on the implementation of a networking architecture with central gateway. Parallel to this he expanded electrical/electronic architecture development at Audi. In mid-2005 he became manager of E/E architecture development/gateway. The focus here was on the definition of a modular E/E architecture within the modular longitudinal power train for the A4 family and FlexRay development for the new A8.

On January 1, 2009 Jens Kötz was appointed director of the division electrical/electronic design, networking, energy systems, system safety.

Volkswagen group. Group-wide development makes it essential to cooperate closely with our VW colleagues. In this way specification and validation of the technology were jointly driven and harmonized.

■ **How do you rate MOST150 compared to Ethernet for instance?**

**Kötz:** MOST150 currently presents the best potential for synergy, is more

well be used for other automotive applications like transmitting image or sensor data in driver assistant systems. A number of technical aspects have to be evaluated here when it comes to topology and reliability of transmission. We're looking at these questions at the moment as part of examining the concept.

*Jens Kötz was interviewed by  
Stephan Janouch/sj*