

## **electronica 2010 controlling cars on the data highway**

A navigation system with Google Earth – this is made possible not only by the new Audi A8 in which the technology is being used for the first time: state-of-the-art microcontrollers in cars now permit highly complex data processing and, thus, high-end applications which were only previously possible on home PCs. electronica 2010, the world's leading trade fair for electronic components, systems and applications, will feature the latest generation of microcontrollers and their fields of applications. Components from ROHM, Renesas, Texas Instruments, the Fraunhofer Institute for Integrated Circuits (IIS) and Freescale Semiconductors make cars a surf stick on four wheels.

The Internet in cars must be wireless and safe

The use of high-powered microcontrollers in sophisticated on-board networks is leading to a large number of special high-end functions in automobile electronics. Checking the latest fuel prices at filling stations, verifying the number of free parking spaces in a nearby underground garage, making inexpensive phone calls using Voice over IP and listening to Internet radio stations are just a few of the potential application areas. In order to produce the symbiosis between state-of-the-art features and to ensure compliance with safety regulations and intuitive operation, the load on increasingly more complex on-board network architecture must be reduced by microcontrollers. Efficient data processing and secure communication networks are therefore both a consequence and a prerequisite: the data must be transmitted in real time for troublefree reception of Internet radio stations. In order to connect devices such as smart phones and MP3 players in the vehicle, communication between the MOST on-board network and the standard Ethernet must be guaranteed. Scientists from the Fraunhofer Institute for Communication Systems (ESK) have tested two migration scenarios for the exchange of control messages to manage audio transmission in a prototype. These scenarios involved interworking between universal plug-and-play and MOST control messages, as well as transmission via a MOST over IP tunnel for integrating audio equipment in the Ethernet. For control purposes, synchronization of the network components and the predictability of the transmission times of streaming data were also analyzed. To this end, standard Ethernet/IP was compared with Ethernet Audio Video Bridging (AVB) using real-time protocols such as the Real Time Protocol (RTP) and the Precision Time Protocol (PTP). The comparison revealed the great potential offered by Ethernet AVB. By contrast with standard Ethernet/IP applications, however, the technology still contains some gaps in the series availability of individual network components. The results of the project show that both tested Ethernet variants are suitable for infotainment applications. Since, however, Ethernet AVB is currently still in the process of being standardized, its use in production vehicles is being delayed.

Management of communication networks by microcontrollers

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The American automobile manufacturer Ford Motor Company, Dearborn, is a pioneer in the networking of multimedia terminals in vehicles in cooperation with Microsoft Corporation, Redmond. The second generation of its SYNC System integrates notebooks, cell phones and MP3 players in the on-board electronics. They are then controlled via the steering wheel or voice input. The technology in this case is provided by Freescale Halbleiter Deutschland GmbH, Munich (Hall A6, Stand107). At Volkswagen AG in Wolfsburg engineers are currently working, for example, on coordinating different cell phones and VW on-board electronics.

### Synchronization of product lifecycles

The market for automotive Infotainment is characterized by portable consumer devices whose half life is significantly shorter than the technology in the automobile sector. On the one hand are motor vehicle manufacturers with long development and product cycles, and on the other the fast-moving IT industry which discontinues some products after just six months. Attempts are being made to bridge the gap by non-profit alliances such as the GENIVI Alliance, a joint industry association between the automobile and consumer electronics industries that is campaigning for the development and introduction of an open reference platform for infotainment in vehicles.

Jointly formulated standards relating to reference implementations, certifications and orientation towards open source developments are reducing the time it will take to create a successfully networked automobile. ROHM Semiconductor GmbH, Willich (Halle A5, Stand 542) and Renesas Technology Europe GmbH, Ratingen (Halle A6, Stand 143) are now members of the GENIVI Alliance together with the manufacturer Freescale (Halle A6, Stand 107) which has already found a solution for potent IVI (in-vehicle infotainment) with its i.MX Series.

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