

INFOTAINMENT

# Inova, Fujitsu, BMW team for automotive multimedia systems

By Christoph Hammerschmidt  
MUNICH, Germany – Fabless chip vendor Inova Semiconductors GmbH and Fujitsu Microelectronics Europe have joined forces to establish Inova's APIX serial communications technology as a standard for graphics display interconnects. And, boosting Inova's ambitions for the technology, car maker BMW has already indicated it is interested.

Inova developed APIX technology as a successor to its existing GigaStar consumer bus technology for transferring broadband video, graphics and other data from a central host to a peripheral display unit. It also can be used to directly couple CCD/CMOS video cameras to a processing instance. This is significant for automotive applications since increasingly vehicles are equipped with cameras - for simple rear view systems as well as for sophisticated lane departure warning systems. The technology is characterized by a low EMI profile and a bandwidth of 1-Gbit/s upstream plus 2 by 9-Mbit/s for bidirectional control signals, using sideband modulation.

In some cases, the distance between camera and processor can be several meters - and the cable can be led through the engine compartment, some of the most hostile environments imaginable for a high data rate signal, explained Inova technical director Roland Neumann.

The APIX system has been optimized for these environments - the physical layer provides self-adjustable drive current and pre-emphasis. In addition, a dynamic scrambling algorithm keeps

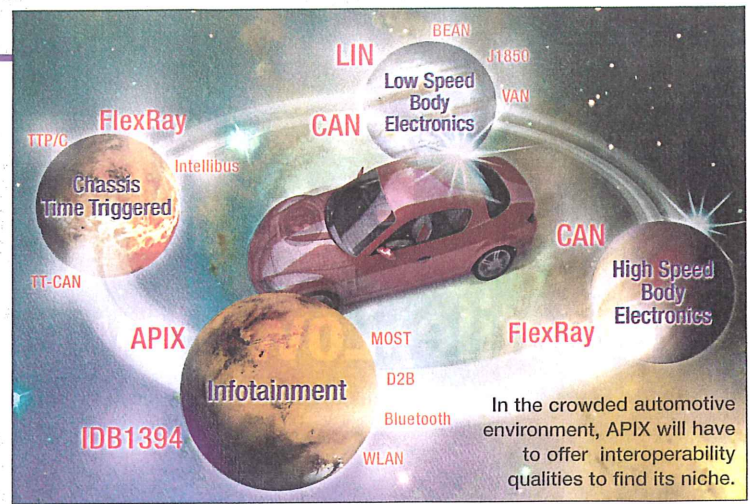
the spectral signal distribution even. "This helps to prevent EMI radiation and at the same time makes the signal path insusceptible to electromagnetic noise," Neumann said.

APIX offers a bandwidth of 1 Giga-bit/s upstream. Through independent modulation of the two sidebands, the system creates two separate channels for control signals with a bandwidth of up to 9 Mbit/s each.

Another feature is that APIX requires only two wire pairs for the communication, while competing technology DVI needs seven to eight pairs. This property is most welcome in cramped environments - apart from being cheaper and simpler.

The technology also is said to offer advantages over Ethernet which in some applications could be a possible contender. According to Neumann, the APIX protocol is far simpler than the Ethernet protocol stack, the bandwidth is higher and APIX is optimized for streaming video.

While the APIX technology has been around already for more than a year, the Munich-based startup has now joined forces with Fujitsu Microelectronics Europe (FME). The latter one has agreed to integrate the APIX technology into future graphic controller and microcontroller products.



In the crowded automotive environment, APIX will have to offer interoperability qualities to find its niche.

"Modern vehicles generally are equipped with multiple displays for navigation, driver information and entertainment," explained Markus Mierse, senior manager of the graphics business unit at FME. Over the past decade these screens have evolved

ble future 'virtual dashboards' of which FME showed a prototype during the APIX presentations.

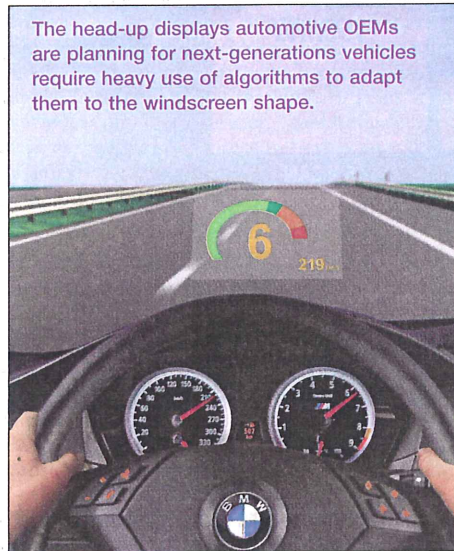
In order to establish the technology as a standard Inova plans to license the technology to other chip vendors. In addition, the analog IP contained in the PHY layer has been divided into several interoperable IP blocks to create more transparency, explained Neumann. The company intends to offer a flexible licensing model to enable second sourcing which is an important criterion in the automotive market.

The Inova/FME team has already found an ally in the automotive market. Car maker BMW plans to implement the technology in future display solutions including head-up displays. "For us, it is important to discuss these matters in a very early phase with chip manufacturers," said Robert Isele, director of driver information systems, display technology at BMW. "Thus, we can achieve more stability in the development process."

For BMW it was important that any solution should not interfere with radio reception. "We have to make sure all commercial radio bands can be received without interference. This is really a challenge," Isele said.

Another important criterion for BMW was the wiring. With the cable loom being the second-heaviest component of a modern car, every single wire that can be omitted is a step forward, Isele explained. A third important aspect for the car manufacturer was integration with other bus standards such as CAN or MOST. "Interoperability is a precondition," said Isele, with the interoperability to be managed by the controller chip.

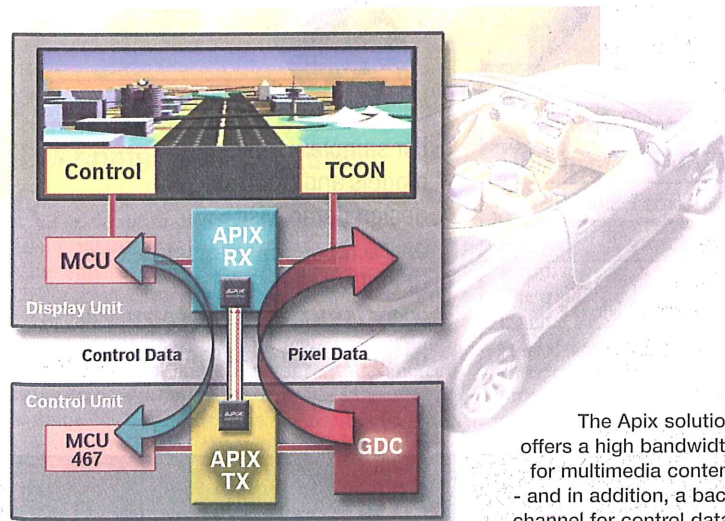
BMW plans to have cars with APIX on the road before 2013. In the meantime, however, Inova will already have rolled out the next APIX generation which is targeting support of data transfer rates of 2-Gbit/s, enabling the display of 1080 line progressive scan graphics in the car; plus the transmission of USB data over the same wire. ■



The head-up displays automotive OEMs are planning for next-generation vehicles require heavy use of algorithms to adapt them to the windscreen shape.

from analog QVGA to digital high-resolution displays. In the years ahead, FME also expects the automotive industry to equip the vehicles with 'dual view' displays which show different content from two different viewing angles. For instance, the driver would see navigation information while the front passenger could watch a video - both on the same display. Of course, such a display would require two different signals, effectively doubling the bandwidth requirements for the signal path.

FME intends to integrate the APIX interface and its protocol stack in 32-bit graphics controllers and microcontrollers for automotive use. Thus the company hopes to create an automotive graphics system platform that spans bus topologies ranging from LIN and CAN to FlexRay, MOST and IDB1394, the automotive version of the 'FireWire' bus. Applications targeted are multimedia distribution systems, processing and displaying intelligent sensor signals and general display solutions in cars such as possi-



The APIX solution offers a high bandwidth for multimedia content - and in addition, a back channel for control data.

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