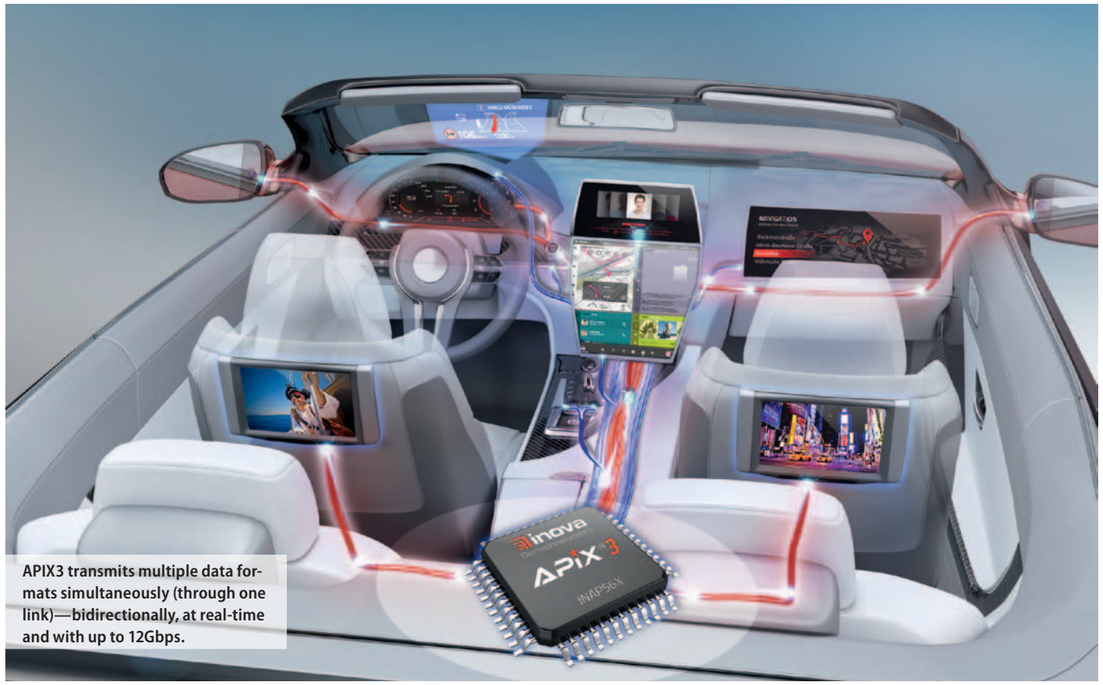


APIX3 transmits multiple data formats simultaneously (through one link)—bidirectionally, at real-time and with up to 12Gbps.

12Gbps in Automobiles

APIX3 Uses STP or Coaxial Cabling

In his interview with AUTOMOBIL-ELEKTRONIK Inova's General Manager Robert Kraus talks for the very first time about the new APIX3 chip which facilitates 12Gbps data transmission over shielded twisted pair or coaxial cable in automobiles.

Author: Alfred Vollmer

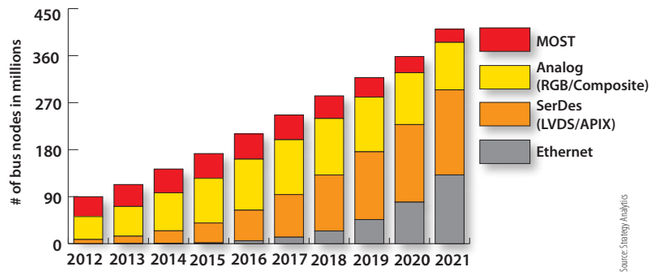
Since 2008, cars that use the APIX node have been on the road all over the world – that is to say, cars from BMW. As many as 30 million APIX nodes have been implemented by now, and APIX developers Inova Semiconductors announce the third generation of APIX.

At the initiative of BMW, the IP of the APIX interface is not only included in the interface ICs of APIX inventors Inova Semiconductors but, by means of a license model, also in the graphics controllers resp. graphics processors by Fujitsu Semiconductor (now Socionext), Toshiba, Analog Devices and Spansion/Cypress. About one third of the more than 30 million APIX nodes delivered so far are from Inova; the other two thirds are from license holders.

The APIX technology in all BMW models now provides the connection between the head unit and graphics displays or head-up display—initially, in devices by suppliers Bosch and Nippon Seiki and now also in those by companies like Johnson Controls (now Visteon), Continental, Harman and Magneti Marelli. Nine Japanese suppliers alone use APIX in their products today, amongst others, Panasonic, Mitsubishi, Alpine, Takata as well as Yasaki; another project also involves a Korean tier-1 corporation.

APIX has also proven successful in BMW's electric vehicles i3 and i8, according to Inova Semiconductors' General Manager Robert Kraus who also provides all other quotations in this article. "APIX is now also used in two brands of the Volkswagen Group—Bentley and Lamborghini. In addition, the new Jaguar Land Rover platform and the new Volvo SPA platform use APIX for the fast transmission of graphical data." Robert Kraus indicates that several other major OEMS – not only in Europe – are considering the use of APIX, and "quite seriously" so. "Another OEM is going to employ the APIX technology in the high volume segment by the end of the year".

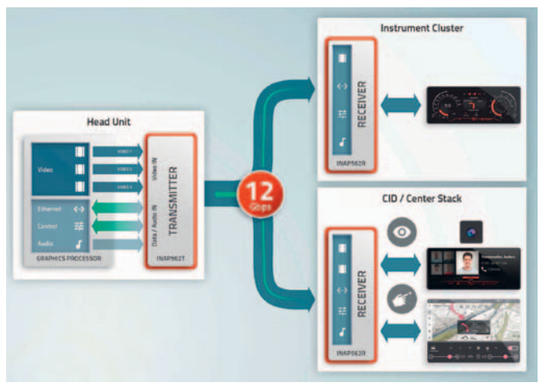
Development of fast bus nodes in automobiles based on a study by Strategy Analytics of February 2015.



APIX = Chip + Ecosystem

"We are in the process of establishing a real worldwide standard with APIX". In his opinion, the success of APIX is particularly due to the efficient combination of semiconductors and a suitable ecosystem that not only comprises the mere chip technology but also suitable cabling and connectors. "In the APIX domain, Inova is both the chip manufacturer and the center of the ecosystem. We also focus on aspects like testing, cabling and connectors. We make sure that APIX continues functioning properly even when the components show signs of deterioration." Telemotive, for example, offers a suitable device for testing, and Tektronix provides an oscilloscope with integrated APIX compliance measurement functionality. Keysight is launching a similar solution. "Specifically adapted cables and connectors from companies like Leoni or Rosenberger make sure that APIX works with these solutions, and we moreover commit our license partners through specific compliance specifications. After all, APIX is more than just a product. It's a system—almost a philosophy."

> *APIX is more than just a product. It's a system—and almost a philosophy.*
>
> **Robert Kraus, Inova**



The Next Generation

The new Inova APIX3 components facilitate the transmission of graphical data with up to 6Gbps via coaxial cable or even up to 12Gbps via shielded twisted pair cabling. "Even though cabling has been neglected for a long time, it is one of the most critical components in automobiles. By means of STP cable, we achieve a cable impedance that is consistent and required for transmitting high data rates of more than 10Gbps, even under the specific conditions in automobiles. And competition cannot counter the high data rates transmitted with APIX."

APIX3 uses an active equalizer to automatically measure the line individually installed in the car. The fully automatic equalizer is an element of the APIX3 IP, thus providing a plug-and-play connection. As the chip measures the bit error rate continuously, cable damage is detected at an early stage, i.e. long before the driver senses any potential decrease in performance. Consequently, Robert Kraus is considering the use of APIX in safety relevant applications according to ISO 26262. OEMs can benefit from this type of diagnostic functionality in many ways, even in the scope of their service programs. APIX2, the current high volume product, already facilitates the simultaneous transmission of the video/audio data stream and 100Mbit Ethernet in a data network via one single cable.

For the time being, APIX mainly serves to control instrument clusters, head-up displays, rear-seat entertainment, center-stack display and passenger display systems. However, Inova has more automotive applications on the roadmap for APIX, such as digital camera monitor systems. ■

Author
Dipl. Ing. Alfred Vollmer
is Editor at AUTOMOBIL-ELEKTRONIK. He wrote the story in German for the 7-8/2015 issue. The translation into English was provided by Inova Semiconductor.