

# Everything in View



Both the Federal Government and the EU in Brussels are considering having also private vehicles equipped with in-vehicle data recorders (black boxes). First cost-efficient models with Inova Semiconductors' APIX link technology are already coming into the market. They not only accurately record the traffic situation in the driver's range of vision, along with the current car position and journey data like speed, acceleration, deceleration or crash, but they also feature a second camera that simultaneously records the traffic situation behind the car.

Such black boxes not only make it easier to determine the cause of an accident; experts also expect them to promote more attentive driving and thus a higher level of safety in road traffic. Many issues such as data privacy still need to be resolved, and professional devices are still relatively expensive.

For quite some time, accessory suppliers have been offering simple "one-box" devices that are attached to the windshield. Far East manufacturers are now launching more sophisticated models using the APIX technology by Inova Semiconductors. They record the traffic situation in the driver's range of vision, along with the car position and trip data like speed, acceleration, deceleration or crash, and also have a second camera for the

simultaneous recording of the traffic situation behind the car – and are available at a price of about 200 US\$.

### Driver Assistance Systems

Besides basic convenience features like cruise control, parking assist or adaptive lighting systems, especially camera-based driver assistance systems are on the rise. Using advanced megapixel sensors with ever increasing resolution and a wide contrast range, they now deliver high-definition images even under difficult lighting conditions. Distance, collision and lane departure warning systems are thus getting more and more sophisticated and reliable. And, like with navigation systems, the trend is towards retrofittable driver assistance systems – the devices are cost-efficient and can be installed in the car without much effort.

### Black Box

Whereas demand is high for retrofittable lane departure warning systems (LDW) in the United States, a different driver assistance system is drawing attention in Germany and Europe – the black box for use in the car.

It records journey data continuously and, in the case of an accident, provides significant data about the last minutes and seconds before the crash. The German Bundestag already advocated the introduction of such data recorders in May, and by end of 2012, the EU Parliament in Brussels intends to present a schedule for the successive introduction of the black box, starting with rental vehicles, followed by commercial and then private vehicles.

Especially in Asian countries with high road traffic volume, these retrofittable drive recorders are already very popular. In the case of an accident, the driver, who is often by himself, now has an ‘electronic co-driver’ to consistently document the driving situation. In addition, these drive recorders offer other features like route tracking to record the route or a holiday journey such that the recording can be reviewed later at home on a PC using the supplied software.

### Robust Gigabit Technology

While the more basic models are mostly attached to the windshield with a suction cup as all-in-one boxes with only one forward camera, the more sophisticated devices have a front and a rear camera, i.e. they are of dual-camera design. The two modules can be connected through a loss-free digital video link over a distance of up to 6 meters. Of course, the production costs for these separate systems with two housings and a video link with cables, sockets and

connectors are higher than for all-in-one models. Some Asian manufacturers therefore take extraordinary measures so as to reduce the market price for the higher-quality drive recorders with two cameras to about 200 US\$. As retrofit devices are not subject to the same EMC standards as devices permanently integrated in the vehicle, Asian manufacturers use a particularly low-cost cable with audio jacks from consumer electronics for this Gigabit link. Even under such difficult conditions, the robust physical layer of the APIX link facilitates faultless transmission. Thanks to its numerous options to adapt to the cable (image 1), the data rate of 1 Gbps can be transmitted reliably over the required distance of 6 meters – even with a low-cost cable.

### Complete APIX Camera Solutions

Such drive recorders from the Far East are the first systems to use the new APIX2 camera link devices INAP378T/R that are also the pioneers of the new APIX2 “ecoline” series. This new camera link is a derivative of the “big” APIX2 link

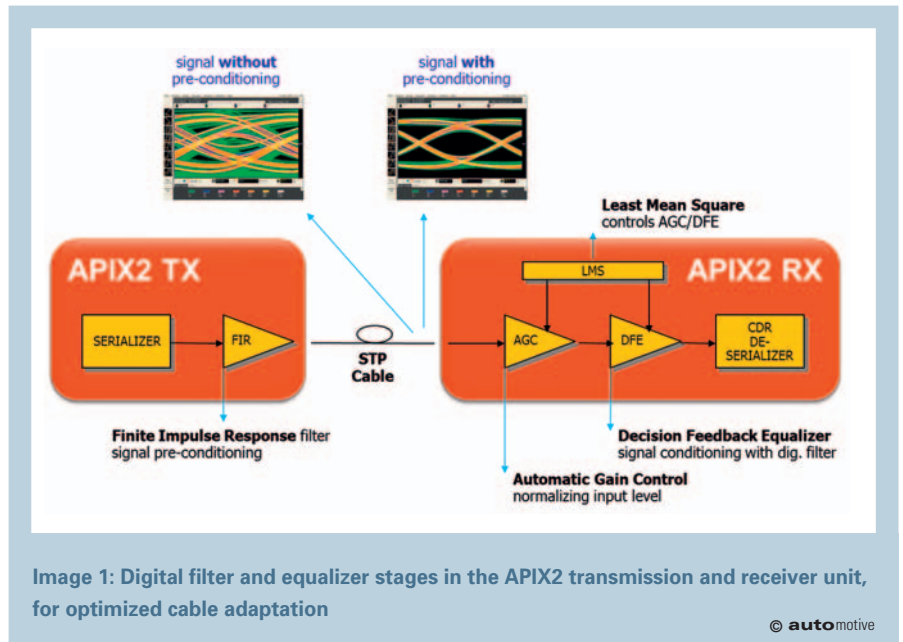
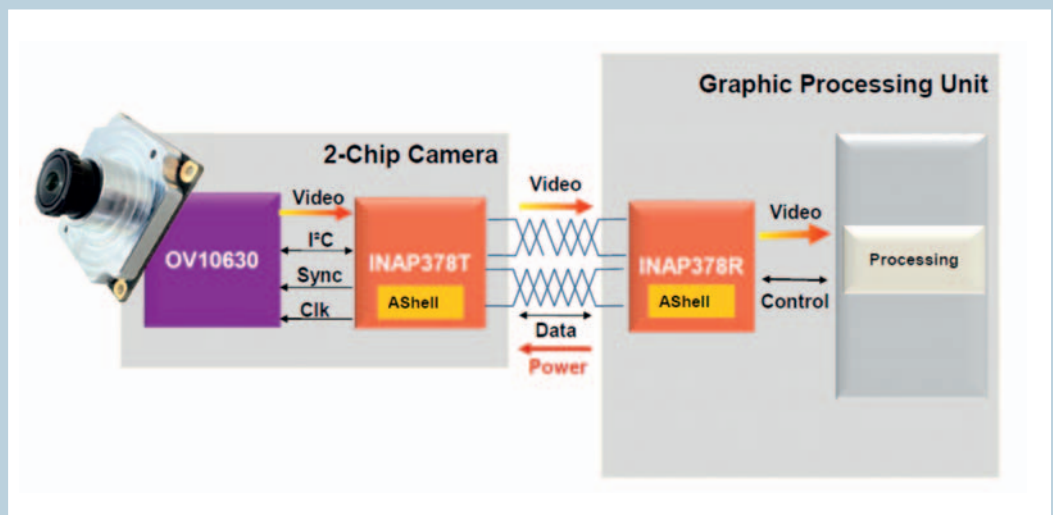


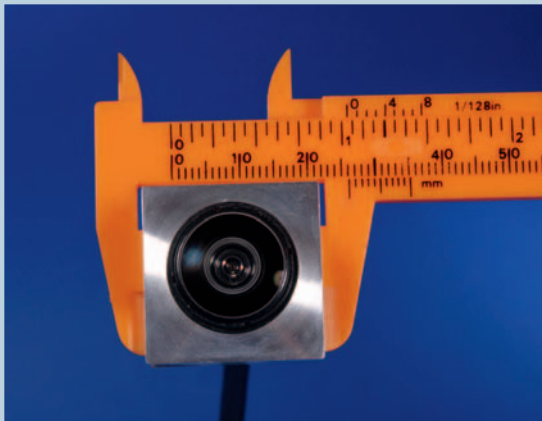
Image 1: Digital filter and equalizer stages in the APIX2 transmission and receiver unit, for optimized cable adaptation

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Image 2: Block diagram of the new APIX2 camera link with INAP378T and INAP378R

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**Image 3: Ultra-compact camera module by SMS Dresden with HD sensor and INAP378T**

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INAP375T/R and is fully compatible with the latter. However, in addition to the 500, 1000 and 3000 Mbps data rates available so far, it also features a 1.5 Gbps mode. This mode is tailored to the requirements of advanced megapixel HD sensors and, compared to the 3 Gbps mode, reduces power consumption significantly. It moreover facilitates transmission over a distance of approximately 25 meters which clearly exceeds the 12 meters feasible in the 3 Gbps mode. Additional features like a fault protected I2C communication and real-time sensor synchronization through the control unit complement the characteristics of the new APIX2 camera link (**image 2**).

However, the most striking further development compared to the current APIX2 INAP375T/R is the aQFN housing that

will also be used for future products of the APIX2 "ecoline". With a size of 8 x 8 mm, it is about 75% smaller than the current APIX2 INAP375T/R housing and thus extremely suitable for use in highly compact camera modules. Dresden-based camera specialists Silicon Micro Sensors GmbH (SMS) will present a first module featuring the new APIX camera device INAP378T at electronica in November. The module is fully compatible for use in vehicles, has an edge length of as little as 25 x 25 mm<sup>2</sup> and is available with HD sensors from various manufacturers, such as Aptina or Omnivision. In any case, depending on the sensor configuration and operating mode, the total power consumption of the module will be clearly below 1 W (**image 3**).

At electronica, Inova Semiconductors will not only present their new APIX2 camera devices but also applications tools for the development of camera systems with APIX2. Amongst others, they are specifically adapted to the demo systems "Panther Tools" by Omnivision respectively "DevWare" by Aptina. Inova will also disclose more details on the new APIX2 "ecoline" at electronica (hall A6, booth 213). (oe)

Translated by Inova Semiconductors GmbH



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