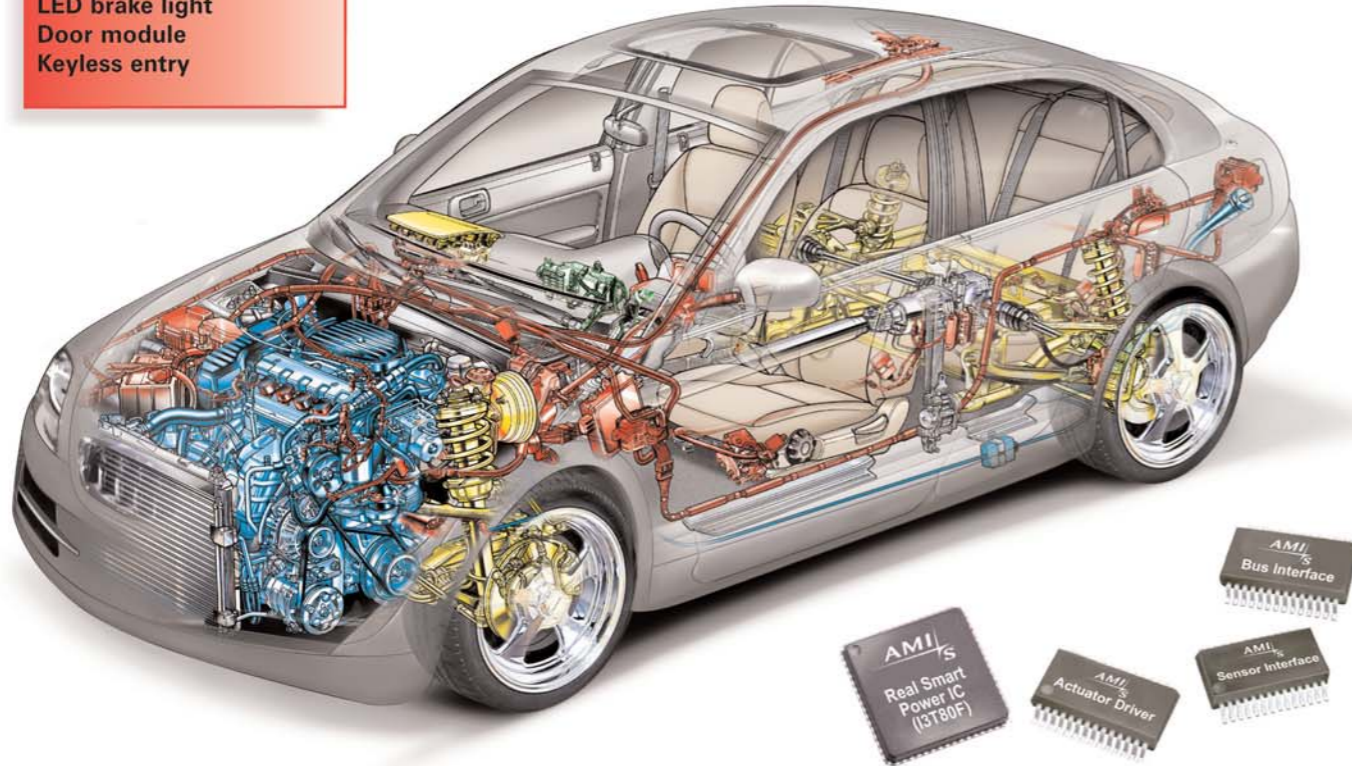


**Safety & Convenience including:**  
Stability sensing  
Pedal positioning  
X-by-wire

**Body Electronics including:**  
LED brake light  
Door module  
Keyless entry

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**Powertrain including:**  
Injection control  
Oil level sensing  
Air flow

**Driver Information including:**  
Dashboard controller  
Navigation information  
Compass

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Vol. 185 • Issue 6

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## Search for alternative fuels

## The rise of logistics hubs in the East

## Cafta as an engine for growth

### Christine King

President and CEO, AMI Semiconductor

**“Auto manufacturers recognise that mixed-signal technology differentiates their products in many ways including performance, safety and convenience”**

# Mixing signals **but not messages**

Auto manufacturers recognise that mixed-signal technologies differentiate their products in many ways including performance, safety and convenience.



**Christine King**

President and CEO of AMI Semiconductor.

MIXED-SIGNAL TECHNOLOGIES that combine both analog and digital functionality are vital to the automotive industry because cars are full of signals that need sensing, amplifying and converting – all analog functions. At the same time, complex control and computational functions provided by digital circuitry are needed to improve the total driver experience.

Automotive Industries (AI) discusses the technology with Christine King, president and CEO of AMI Semiconductor (AMIS).

**King:** Mixed-signal technology requires real engineering talent to combine digital with analog and produce a design that works well and meets the many specifications that the automotive sector requires. Our company has been highly successful for many years designing technology that solves the real world problems that auto manufacturers face, such as harsh environments and the need

for product longevity. Mixed-signal technologies control the most elemental and important operations in an automobile. For instance, without the work of AMIS, and many other companies, anti-lock braking systems would not exist. This technology uses mixed-signal circuits to ‘capture’ the sensor signal, convert it to a digital signal, and then compare it to millions of patterns in its computer memory. The brakes are then applied in the most effective way to achieve the shortest possible stopping distance without loss of control of the vehicle. While the intricacies of this technology may not be a concern for most consumers, it is certainly something that everyone I know would want in their car – especially in icy or rainy conditions that we all experience from time to time.

I also think that the statistics speak volumes about how important mixed-signal technology is in automotive design.

According to Strategy Analytics, a leading research firm following this market, more than 800 million mixed-signal chips will be used worldwide in automotive applications this year with demand expected to continue growing at an average of over 10% per year for the next 5 years, reaching over 1.25 billion units by 2010.

**AI: Where is the future of mixed-signal technology?**

**King:** As I previously said, mixed-signal technology is powering some of the most elemental features in automotive operation and auto manufacturers recognise that mixed-signal technology differentiates their products in many ways including performance, safety and convenience. They are constantly seeking new and better ways to bring value to consumers. This gives mixed-signal companies a tremendous opportunity for innovation and growth in this market. Some of the most recent examples of the latest innovations powered by mixed-signal technology include automatic wiper systems that sense rain pressure and timing; tire pressure monitoring systems that alert the driver when tires are low on air, preventing a potential flat tire; and “bending” headlights that follow the curving and twisting of the road ahead of the driver through a connection with the steering wheel. AMIS is one of the companies making these functions possible by finding new ways to combine our microcomputers and analog on a single chip with software to produce amazing results for car makers.



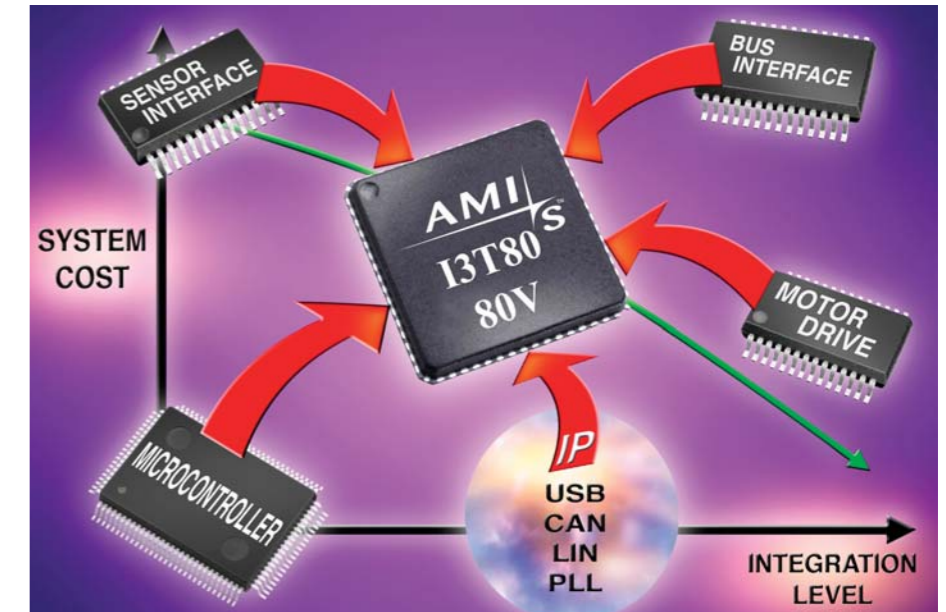
An operator in one of the AMIS facilities

In addition, semiconductor companies are working to make cars smarter, meaning that we want the electronic components of the car to ‘talk’ to each other. We achieve this by using an automotive standard called the controller area network (CAN) standard, which allows information transmission at one million bits per second (1Mbits/sec). This is vital because in the future, it will allow video to be distributed around the car, and also make drive-by-wire a possibility. With drive-by-wire a central computer controls the steering, suspension and brakes to give the car better handling, especially in bad road conditions. It is estimated that 640 million network nodes will be installed in cars this year alone and that number will increase to more than 1.1 billion by 2010. This poses a huge opportunity for mixed-signal semiconductor companies to provide innovative sensor technologies to further speed them CAN networks and innovate other uses for them throughout the automobile.

**AI: What are you doing to ensure that the systems you design can be maintained and adjusted once they are fitted to the vehicles?**

**King:** Many semiconductor chips act just like the hard drive on your CPU, meaning that they can be programmed with software after installation. Like hard drives, they are built to understand the commands of software coding. These types of chips are

Any new safety or convenience features can be enabled right up to the moment before the car is put on show floors or lots.



A typical in-vehicle array.

called programmable systems. The chip can be installed anywhere in the car and then an updated program can be installed in the chip’s memory so that any new safety or convenience features can be enabled right up to the moment before the car is put on show floors or lots. This allows the car manufacturer to easily upgrade the car specification, without having to change the hardware.

AMI Semiconductor is one of only two chip designers that enable this field programmability. We combine our high-voltage analog, digital logic and cost effective ‘Flash’ memory, all specified and characterized for high temperature operation, on a single chip. This enables the auto manufacturer to easily upgrade safety capabilities and adjust for different market and climate conditions. This is a tremendous cost and time-to-market

savings for car makers, enabling them to stay competitive. Many car makers are taking advantage of this capability to plan their feature upgrades over a model’s life span. **AI**

AMI Semiconductor is a leading supplier of specialized semiconductor chips for the automotive market, and is actively engaged with all major manufacturers in the US, Europe and Japan. AMIS provides dedicated resources, backed by an intensive commitment and understanding of international standards, to meet the demanding needs of the automotive market worldwide. The company provides long product lifecycles, sub 1ppm quality and high reliability.

