Carnectivity: Simplifying the complex in automotive electronics

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In the previous installment of this blog, I discussed the tremendous growth of electronics in the car. The drivers (no pun intended) of this growth vary from consumers demanding more information-entertainment ("infotainment") and connectivity — the term carnectivity has emerged as a catch-all descriptor -- while on the road to governmental mandates intended to make cars safer, given all the new whiz-bang but potentially distracting features being added to vehicles. Let's now turn our attention to some of the trends in infotainment and carnectivity, what's being done to simplify these complex system designs.

Infotainment, Dashboard Clusters

Earlier this millennium, automotive-electronics makers endeavored to converge audio, video and navigation systems into a single infotainment center stack. In recent years, the trend has been to combine the dashboard cluster (speedometer, tachometer and various critical gauges) and infotainment system into a single display. Automakers' objective, then, has been to display as much information in a minimalist method to reduce driver distractions.

These converged systems have large displays that bring information in from every aspect of the car. Besides input critical to a vehicles safe and smooth operation, there are radio/entertainment and navigation systems; Advanced Driver Assistance Systems (ADAS), which encompass forward and rear cameras and proximity radar; and comfort controls. Adding to the complexity, many new systems are designed to connect smart phones seamlessly. The connected car, or carnectivity, will mirror a smart phone onto its multi-touch display, providing the driver direct access to his/her smart-phone applications, such as stored or streaming music and mapping. Within the next five years, many cars will use the smart phone as a local WiFi for passengers in the car, find local point-of-interest locations, use mapping applications instead of navigation systems, and make hands-free phone calls. The emerging LTE/4G cellular standard will increase adoption of such usage by allowing faster access to the cloud, quicker downloads of recent maps and improved network stability.

Of course, these complex systems cannot be developed without collaboration

among silicon vendors addressing the automotive-electronics market, in parallel with the design of a new generation of microcontrollers, system-on-a-chip (SoC) and advanced memories devices such as Flash. These chips must meet stringent domestic and international automotive requirements, ISO/TS16949 and AEC-Q100 qualifications among them. They also must meet the performance, space, cost and longevity needs of the automotive market. From my experience at Winbond, it's clear that Flash and DRAM suppliers are beginning to work more closely with chip-set suppliers to both ensure that their devices operate seamlessly with microcontrollers and SoCs toward achieving automotive requirements, and help simplify an otherwise complex carnectivity environment.

Next, we'll look at ADAS and how a new generation of automotive electronics is helping to reduce driving distraction.

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