

Edited by **Kevin Jost**

Voice, portability emerge in automakers' CES push

The recent Consumer Electronics Show (CES) in Las Vegas highlighted the increasingly close links between consumer and automotive technologies, as a number of system, chip, and software providers touted their wares. Voice recognition and wireless technologies are making big strides, while chip and system suppliers continue to make infotainment systems in autos a rival for home units.

The presence of major automakers and Tier 1 suppliers at CES, a show that had minimal automotive activity at the start of the decade, was even more notable since the show dates conflicted with the North American International Auto Show in Detroit.

Voice interfaces made a major step forward, prompting expectations of strong growth. **Strategy Analytics** predicts that 13.6 million voice-controlled infotainment systems will ship in 2012.

Ford is teaming with **Microsoft** to add voice recognition to a dozen vehicles this year. The Sync system lets drivers link digital music players, cell phones, and other portable products into the automotive infotainment system, controlling them with voice commands. Along with voice control, the system improves synchronization with a broader range of portables.

Joint agreements linked to voice were common at the show. **NXP Semiconductors**, the **Philips** spinoff, is linking with voice control provider **Nuance Communications**, **Gracenote** of content-management fame, and **Ordina**, which provides DVB-T (digital video broadcasting-terrestrial) reception. Together they will address a number of multimedia functions, focusing on easy access.

The addition of voice comes with continued advances that help users manage infotainment options without taking their eyes off the road. That includes the task of determining which songs they want to hear.

"With MP3s, there's a lot of metadata that's not normalized, like Rolling Stones and Stones showing up as different bands," said Steven White, Senior Director of Product Management at Gracenote. "We normalize that and make it simpler for drivers to select a single song or artist and create a playlist by saying 'more like this.'"

Johnson Controls is teaming with **IBM** to add voice to its HomeLink



The 2008 Ford Focus will be one of the first Ford vehicles to feature Sync, which the company says brings a new level of in-car communications and entertainment convenience to consumers.



Wireless Control System, which lets drivers remotely operate garage doors, locks, home security, and lighting systems.

XM Satellite Radio's linkup with **VoiceBox** underscored one of the reasons voice technology is starting to emerge as a technique for reducing driver distraction by simplifying control of the many electronic systems in vehicles. "A key difference is we've pushed the conversational aspect to new levels, improving the context to provide a better experience," said Larry Baldwin, Senior Voice User Experience Designer at VoiceBox Technologies. "People who couldn't connect a Bluetooth phone can now do it."

Portables proliferate

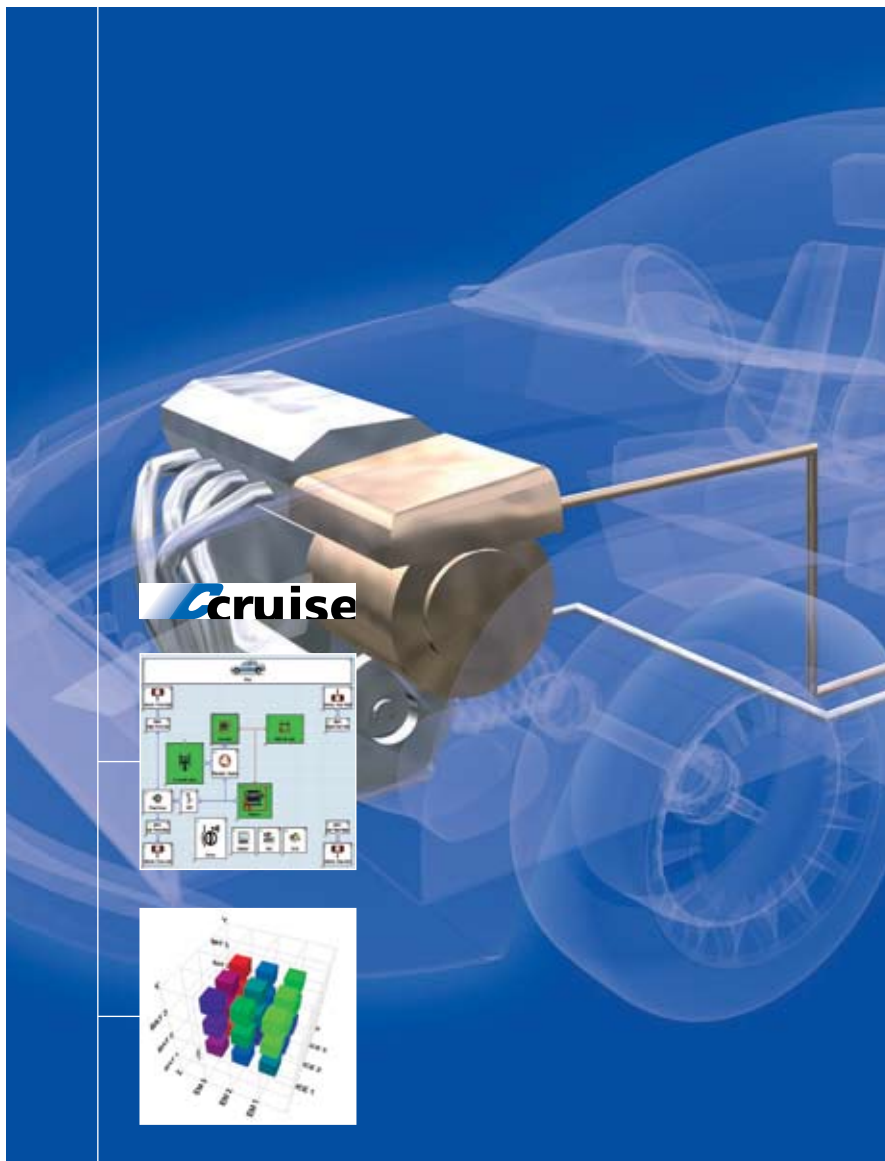
The plethora of devices that consumers bring into their vehicles is helping fuel the demand for voice control. One of the most prevalent is the MP3 player, which has been making huge inroads in vehicles as automakers provide connections for iPods and other digital music players.



Multi-core chips are making it easier to add infotainment options, according to Freescale.

As these portables become more common, the need for physical connections may fade away. Wireless technologies company **PEIKER acoustic** touted its BluetoothMusic technology, which lets drivers play MP3s stored on a mobile phone using Bluetooth A2DP (asynchronous data delivery protocol).

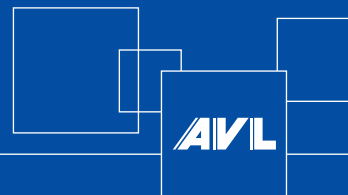
While many CES announcements focused on MP3 players, **Visteon** targeted the emerging digital radio market, unveiling a portable HD Radio receiver. Its HD Jump docks into cradles in both vehicles and in the home, helping cost-conscious consumers make the push to digital radio.



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CONNECTING EXPERIENCE



Visteon's portable HD Jump makes HD Radio accessible from the vehicle and in homes.

Portable navigation systems are making it easier for drivers to find their way around in cars that do not have built-in systems. **LG Electronics** and **Mio Technology** both unveiled handheld navigation systems, citing automotive as a key application. Content providers including **NAVTEQ** also upgraded their maps and navigation technologies.

Visteon also addressed another aspect of bringing all these portables into the vehicle: the challenge of keeping all these

portables charged without lugging a separate briefcase full of power cables into the car. The company unveiled a charger that transmits power to portables without cords. It uses electromagnetic induction to charge portable devices at a rate comparable to a plug-in power cord.

Core technology

Many attendees at CES pay little attention to the underlying technologies that make all these advances possible. But engineers and others could also look under the hood to see the semiconductor technologies that let automakers provide an array of infotainment options.

Chipmakers highlighted a number of devices that are targeted at both consumer and automotive applications. A growing number of these chips are using the multi-core technology that is changing the performance levels of the PC industry.

In infotainment applications, digital signal processing (DSP) is a key requirement. Some vendors are blending DSPs and microcontrollers to let a single chip handle multiple tasks.

"We allocate the heavy DSP tasks to the DSP core, using an ASRM microcontroller to handle tasks like voice recognition," said Torsten Lehmann, Strategy

Director for NXP Semiconductors Car Entertainment Solutions. He noted that the chip also makes it possible to provide two video streams for navigation and movies, for example.

Others are focusing more on DSPs.

Freescale is targeting its multi-core Symphony DSP line at emerging high-definition technologies such as Blu-Ray, high-definition radio, and others. The dual-core capability makes it possible to handle multiple data streams so drivers can listen to music while passengers watch movies.

"As more and more multimedia systems [are added], you can put a complete system on a core. That keeps it clean from an architectural challenge," said Sujata Neidig, Product Marketing, Multimedia Applications Division, Freescale Wireless and Mobile Systems Group.

Other chipmakers also used the Vegas show floor to highlight multimedia capabilities. **Xilinx** added a 3-D hardware accelerator core to its XA automotive line of field programmable gate arrays. **Texas Instruments** highlighted its position in both consumer electronics and automotive, noting that the links are getting tighter.

Terry Costlow

Updating automotive software on the fly

Automobiles are becoming ever smarter, having dozens of computers and many lines of software. Some people look at cars as mobile computers, thinking they should act and be serviced like desktop computers and allow for software updates to be installed by the user.

"While this also holds great promise for the dozens of embedded computers in each vehicle, this approach is not yet

common in the automotive world since the downloaded software itself must be of the expected quality," said Robert Gee, of **Continental** Automotive Systems Division. "Nevertheless," he added, "the benefits of low-cost updates are not lost on vehicle OEMs and may drive changes to OEM practices to ensure software configuration tracking across the millions of vehicles in the field."

Automotive control-system hardware once did not allow for software-only updates. Storage of data and instructions in onboard electronic control units (ECUs) is now predominantly via Flash EPROMs. Flash memory can be updated without physically removing the unit.

Coupled with programmable memories is the current trend for more electronic interaction of an automobile with its environment. It is becoming common for offboard exchange of data, if not software functionality, for such functions as navigation and entertainment.

For example, according to Adam Thomas, Marketing Vice President for **Clarion** Corp. of America, many of its products can be updated. For some of its products in the portable navigation space, updates, including software, are provided directly through USB ports on the device as well as via CD-ROM. Map data can be updated automatically in some navigation systems via wireless connections.



OnStar's Vehicle Diagnostics demonstrates the trend toward a vehicle's electronics interacting with its environment. Currently, diagnostic data are sent every 30 days or upon customer request.

OnStar, the wholly owned subsidiary of **General Motors**, has pioneered a new use of offboard communication by sending electronic messages to vehicle owners telling them of the diagnostic condition of certain vital car components (such as engines, transmissions, and OnStar systems). The technique can affect vehicle functions as varied as remote door unlocking or allow a request for an on-demand diagnostic check initiated by the owner. If this trend becomes widespread, updating software functionality without user intervention may become practical.

If updating is feasible, even desirable,

for noncritical applications such as navigation and infotainment, what about critical system applications such as powertrain control?

Updating such software is occurring currently in dealerships equipped with special tools. This could involve calibration updates to improve fuel economy or emissions compliance, according to Gary English, Manager of Core Software Architecture and Building Blocks for **Delphi Electronics & Safety**. This experience, however, is not the same as when one boots up their PC in the morning and their operating system automatically

searches and installs updates. It requires a special trip to the dealer, and for this class of operationally critical software in the vehicle, it may be the only practical approach for the foreseeable future.

Because infotainment is not critical for operation, and because the development cycles for phones, PDAs, and navigation systems are so much faster than the typical 5-10 year life cycle of an automobile, it can be expected that mechanisms for updating of this software may be developed.

Bruce Morey



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C-XF boasts LCD, sound innovations

The advancing role of an information screen as an integrated dashboard system was underlined at the NAIAS in Detroit with **Alpine's** Dual View system fitted to the **Jaguar C-XF** concept. While split screen presentations are common, divided screens, allowing the front passenger and driver to see entirely different presentations, are an emerging technol-



Distinctive speaker styling on the rear deck panel of the Jaguar C-XF concept is part of Bowers & Wilkins' sound system.

ogy. Alpine's Dual View LCD allows the passenger to watch a DVD or game, while the driver's view is dedicated to onboard systems or navigation.

"Dual View allows designers to make the screen a more prominent feature of the in-car experience because the front-seat passenger can have full functionality while the driver is restricted to a safe level of vehicle information," said Alpine UK Managing Director, Dave Sheen. "I can see possibilities offering a gaming environment or in-car cinema, features previously only available to rear-seat occupants."

Sheen explained that by using a parallax barrier, light from the backlight is divided into individual viewing cones for passenger and driver. The Jaguar installation uses a 262,144-color amorphous silicon TFT (thin film transistor) screen that is 7-in across. The technology has been designed to be flexible and to suit all HMI (human machine interface) scenarios. It is switchable to allow a single image (e.g., navigation) to be shown. Development work is now under way to create an HMI able to handle touch-screen inputs on the same LCD by driver and passenger viewing different menus.

The Dual View system could be ready for volume production within two years, said Sheen.

With in-car infotainment sound per-

formance now an established key quality criterion, pitching to a volume OEM and successfully catching its corporate ear has become a challenge for established system suppliers. So for a company that has never before supplied to an automaker to be selected for a high-profile concept car is unusual to the point of being unlikely. But that is what UK-based **Bowers & Wilkins** achieved when Jaguar invited it to join a technical collaboration for the audio system in the C-XF concept.

Bowers & Wilkins is a specialist loudspeaker manufacturer and has pioneered the use of Kevlar and diamond. Its systems are used in major recording studios worldwide, and it recently established an automotive division.

"The automotive environment has taken on a new importance as the place where consumers really enjoy music," said the division's Senior Business Development Manager, Martin Lindsay. "High-quality sound has become as essential in the car as it is in the home." Consumers now understand more precisely what makes a good sound system. When the company initially considered entering the automotive market, it decided that rebranding an existing system and not having control of speaker locations, materials, and size were not options.

"Restricted space, differing materials, and the need to satisfy multiple entertainment needs pose unique and often conflicting requirements," said Lindsay. The company decided that ideally it needed to be involved at the start of a project to define speaker positions, installation angles, and the type of components to be used.

For the Jaguar C-XF, Bowers & Wilkins' engineers developed a complete in-car system, featuring Micro-Matrix speaker panels, Bass Beam low-frequency driver technology, Kevlar cone mid-range speakers, diamond-dome tweeters, selective directivity arrays in the rear of the passenger compartment, and a rear deck panel featuring centrally mounted bass driver and two flanking wide-dispersion drivers. As they are for a Jaguar, the honeycomb deck speakers have cat's eye styling.

"The technologies demonstrated on the C-XF concept are production-capable," said Lindsay.

Stuart Birch



The Alpine Dual View LCD fitted to the C-XF concept allows a passenger to watch a DVD while the driver's view is dedicated to onboard systems or navigation.

Hughes enters telematics field with Chrysler

Hughes Telematics formally entered the telematics market late last year, then announced the **Chrysler** Group as its first customer early in 2007. Hughes is leveraging its broad technology portfolio to provide what it calls end-to-end telematics solutions.

Chrysler did not immediately divulge any details about the breadth or speed of its adoption plans other than to say the systems will be a standard in future vehicles.

"Outside of **GM**, the market is wide open," said Erik Goldman, President of Hughes Telematics. **OnStar** is GM's telematics solution.

A key to Hughes' strategy is to provide services for consumers, dealers, and automakers as well as hardware. "We provide hardware from the geosynchronous satellite to a receiver with the form factor of a cell phone," Goldman said. This one-stop approach is what the company calls end-to-end telematics.

Though Hughes Telematics is an independent company, it will leverage its close associations with **Hughes Communications** and **Hughes Network Systems**, which provide satellite services for a broad range of customers.

Hughes will have five business lines. Telematic services for consumers, fleets, and OEMs-dealers are three, while data services and intellectual-property (IP) licensing round out the strategy, Goldman said. IP licensing includes a product and patent portfolio that will bring revenues in the future, he explained.

Consumer services will include traffic information and navigation, as well as multicasting that can be targeted to narrow audiences. Like **Inrix** and other service providers, Hughes will monitor its subscribers to determine traffic patterns and provide real-time traffic information.

The dealer and OEM services are handled in part by **Networkcar**, acquired by Hughes last year. The company markets aftermarket telematics solutions for vehicle fleets, providing GPS tracking and diagnostic monitoring. "Local fleets are largely an untapped market," Goldman said.

Networkcar can pull diagnostic information from vehicles, performing remote emissions tests and monitoring the vehicle for maintenance. Goldman noted that this could evolve into a service used by local auto dealers.

For Chrysler and other OEMs, close integration with vehicle networks makes it possible to provide many services and monitor vehicle usage. "OEMs will come to realize that they need to be connected to each vehicle to perform fault analysis and understand what features and services consumers actually use. Plugging into the CAN bus lets you see what's being used," Goldman said. OEMs could also use the links to update flash memory up to the point of sale or even beyond, he added.

"Hughes Telematics is in a position to provide a more cost-effective and easier-to-implement alternative for vehicle manufacturers," said Thilo Koslowskian, an analyst at **Gartner**. He added that the company may become a gateway for third-party content and service providers such as real-time traffic data providers.

However, Koslowskian noted that "the success of Hughes Telematics' offering will depend on the company's ability to provide innovative, cost-effective, and flexible solutions." These solutions must let OEMs and dealers provide brand differentiation, he said.

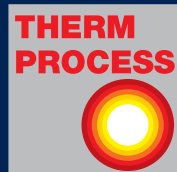
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