

by John H. Day

Contributing Editor

## NEW FEATURES, LOWER COSTS FOR AUTOMOTIVE MULTIMEDIA

Automotive multimedia systems are keeping pace with consumer electronics, which means that they are likely to transform the driving experience.

**F**aced with rapidly falling prices and the need for integrated solutions, suppliers of automotive multimedia products and services are forming partnerships in hopes of gaining metaphorical high ground in a market with enormous potential.

“The prices of consumer electronic products have been dropping and the same is true for automotive multimedia,” said Mark Peters, who heads the automotive multimedia business at Robert Bosch Corporation.

“OEMs have seen price reductions of 30% to 40% in the past two or three years for radios and navigation systems,” said Peters. “Products that were stand-alone are now being integrated with other products. Today, for example, satellite radios require a separate tuner, but in next-generation systems, satellite tuners are being integrated with radio/CD head units. The same is true for HD radio.”

Peters added that integration is occurring in rear seat entertainment systems. “Some OEMs are including a DVD drive in their head unit so that someone in the front seat can

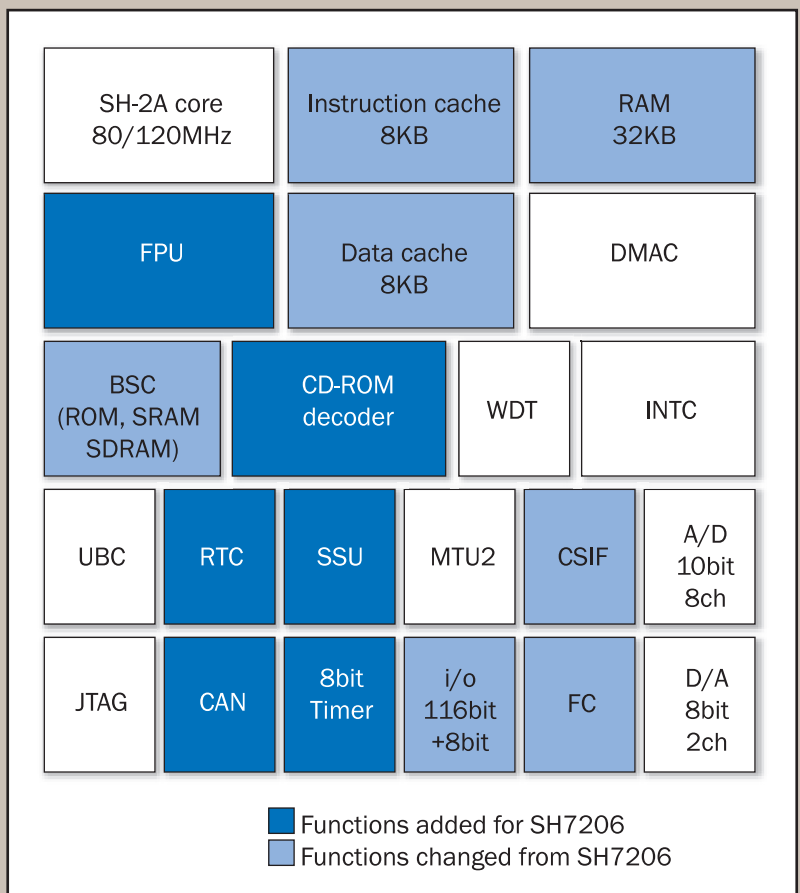
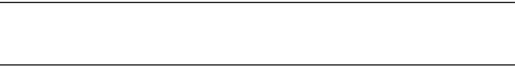


Figure 1. Renesas' new 32-bit SH7261 series microcontroller is tailored for car audio applications.



control content delivered to monitors in the rear, while other OEMs prefer to install a DVD player in the rear seat area," he noted. Bosch's Blaupunkt unit has integrated a DVD player with a navigation system for Volkswagen's Taurig, Jetta and Passat models.

Growth areas for automotive multimedia include satellite radio, rear-seat video, and navigation, according to Robert Schumacher, business line executive for integrated media systems at Delphi Automotive Systems.

"As recently as 2000, the best available multimedia technology was AM/FM radio and a CD," he said.

Now, Delphi and other tier-one suppliers are integrating entertainment with data and productivity applications, the latter including navigation and telematics.

"Navigation is growing rapidly in North America, following Europe and Japan," Schumacher said. "Lots of people in North America may say they don't need navigation because of the grid patterns common to many cities, unlike Europe and Japan. But what will really drive navigation will be the integration of live traffic information. It's penetrating luxury vehicles at a high rate and moving into medium-size vehicles."

Schumacher noted that drivers

in North America can hear traffic reports on the radio; however, the information they hear is often so old that by the time a driver gets to a reported trouble spot, the accident or stalled vehicle has been cleared.

NAVTEQ aggregates traffic data from multiple sources, including commercial traffic data providers, government departments of transportation, police and emergency services, road sensors, cameras, and airborne reports. It tracks planned incidents such as highway construction, unplanned incidents such as accidents and disabled vehicles, and traffic speed. The data is then linked to a local map for wireless delivery to a navigation system.

Partnering with NAVTEQ, Sirius Satellite Radio late last month introduced real-time traffic data service in 22 metropolitan areas. Initially, the service will be available via the SiriusConnect SIR-ALP10T tuner, which interfaces with Alpine Electronics' NVE-N872A Satellite Traffic Ready navigation system.

Rival satellite service provider XM Radio also paired up with NAVTEQ and launched its real-time traffic service last fall. It's currently available on the Acura RL and Cadillac CTS, and user feedback is positive, according to Paul Kirsch, XM's vice president, OEM. Three more OEMs intend to offer the service within the next 12 months, Kirsch said. Real-time traffic is expected to be available in 50 metro areas by 2007, and coverage will be expanded within the metro areas where the service is currently available.

"Users can program their destination on a touch panel, and with real-time traffic, the computer can calculate the shortest route to a destination based on actual traffic conditions," Schumacher explained, adding that Delphi has sold more

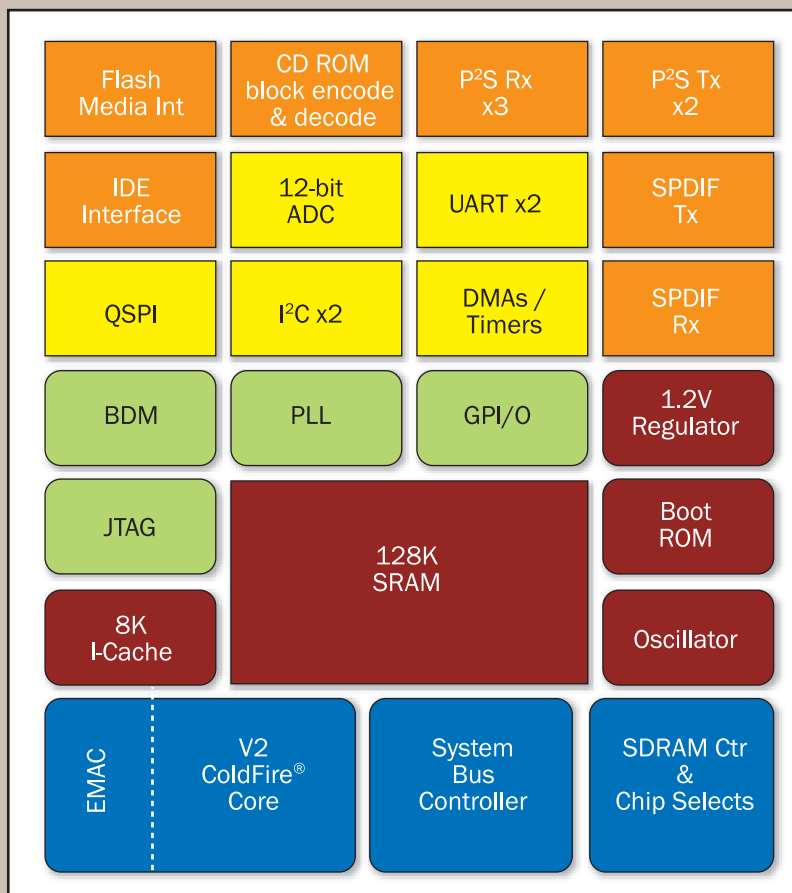


Figure 2. Freescale Semiconductor's 32-bit SCF5250 processor, recently enhanced with additional software libraries, supports CD and HDD-based systems.



than six million XM Radio receivers.

Aftermarket systems will play a role in the evolution of automotive navigation. Cobra Electronics last month introduced the NAV ONE 4500, a portable device that features real-time traffic. Cobra is partnering with Clear Channel Radio and Tele Atlas and provides information on traffic incidents, congested roads and construction zones in 48 metropolitan areas. The system's receiver obtains continuously updated traffic data through an FM radio feed via Tele Atlas and Clear Channel Radio's Total Traffic Network.

"The key to the navigation market is to keep driving costs down," Schumacher continued. "A system may have a large color display, a map database, a fairly powerful onboard computer, and memory to process the data. We can take some of the cost

out and still provide navigation. We're looking at lower-cost navigation solutions such as smaller displays and smaller databases. We could have a smaller monochrome display with passive LCD. We could provide turn-by-turn directions vs. displaying routes on a map, and we could move the map database offboard."

Smaller display screens won't fly as high in the rear seat entertainment (RSE) category. Screens are increasing in size and number, according to Schumacher. In a recent survey, J.D. Power and Associates ranked Panasonic's RSE system for the Lexus GX 470 first in customer satisfaction. According to the survey, more than half of current RSE owners want RSE in the next vehicle they buy.

While Panasonic still dominates the market, several other manufacturers are entering the arena with

their own rear-seat entertainment systems, fully equipped with innovative features, according to Lawrence Wu, J.D. Powers' senior director of automotive emerging technologies.

"New to the market is the nine-inch screen on the Honda Odyssey's RSE system. Honda's decision to equip the Odyssey with the largest screen available is a hit with consumers," Wu said. "Given that almost two-thirds of consumers in the study are willing to pay for a larger screen size, we expect to see others following Honda's lead."

Wu added that nine out of 10 RSE system owners would rather have wireless headphones, independent volume adjustment and system controls in the rear seat area in their next vehicle. More than one-half of consumers also report that they or their passengers use the headphones for

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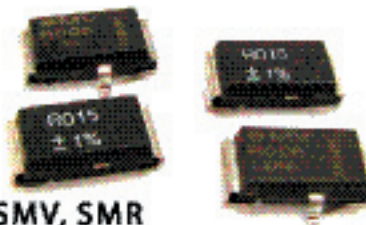
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the radio or CDs. Along with wireless headphones, built-in monitors in headrests are also high in consumer demand. Almost half of RSE owners consider a remote control to be the best method for operating the system.

"Content today comes in on a CD or DVD disk," he said. "With the advent of WiFi and the use of hard drives, which are already being used in Japan, entertainment or navigation content can be brought in through the head unit. Music, games and software can be delivered directly into a vehicle over high-speed Internet without ever pressing a plastic disk. It can be downloaded to a car, stored in a hard drive and played back."

Schumacher predicted that some day a user may be able to drive into a gas station and fill up his or her "bit tank"—a hard disk drive—buying

virtual CDs or renting movies. Partnering with Comcast, Delphi demonstrated that capability at the Consumer Electronics Show in January.

Delphi has also demonstrated streaming video to vehicles with both XM and Sirius. "Ultimately, XM and Sirius are going to be more than music and talk," Schumacher said. "They provide a low cost way to push individually targeted data to vehicles. It's the perfect infrastructure for national broadcast video. It's not HDTV; high resolution isn't needed on a seven- or eight-inch screen for news, weather, cartoon channels and movies."

"Our vision for the future is any entertainment, any time, any where: WiFi, streaming video over satellite digital audio radio service (SDARS), or small files over a 3G cell phone. What makes all this possible are advances in portable hard drives,

digital file compression, and wireless infrastructures."

Earlier this year Delphi signed an agreement with WorldSpace to make mobile satellite radio available in Asia for the first time. The companies will market Delphi-WorldSpace Mobile Satellite Audio receivers in India, and later in China. The WorldSpace satellite radio network currently provides more than 35 radio stations across India broadcasting news, sports, music, brand name content and education programming

XM Radio's Kirsch said that most of the technology needed to achieve the any time/any where vision is available today and can be deployed wherever an OEM develops a business case.

OEMs must also consider connectivity for consumer electronic devices and data, including music,



#### PBH, PBV, PSB

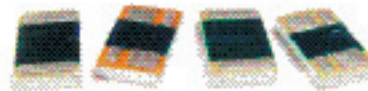
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and addresses for navigation systems, said Bosch's Peters. "This could be in the form of .mp3 files on a CD, or music or data files on a USB stick, in a PDA or other Bluetooth-compatible device, or in a hard drive product like the iPod," he said. "Consumers will want to carry files from their home to their vehicle. For that purpose, we're starting to look at FireWire, because of its wide bandwidth, but right now there are some electromagnetic compatibility (EMC) issues."

### SEMICONDUCTOR SOLUTIONS

Semiconductor firms are targeting automotive multimedia applications. Renesas Technology America Inc., for example, recently introduced four 32-bit SH7261 series microcontrollers for car and home audio products (Figure 1). Because the MCUs have audio data playback functions compatible with MP3, WMA and AAC compression standards, and can replace the system controller and the DSP and LSI chips traditionally required for digital audio processing, the powerful SuperH RISC devices simplify system design. Based on a CPU core with a built-in floating-point unit, the chips execute two instructions per clock cycle for higher performance per operating frequency. Each device features an on-chip CD-ROM decoder and a dual-channel serial sound interface. To shorten product development time and enhance system versatility, the new RISC MCUs accommodate middleware for various audio formats (MP3, WMA, AAC, etc.). Also, their high levels of processing allow coder-decoders to be implemented in software.

Among NEC Electronics America's multimedia offerings are satellite radio, rear-seat DVD systems and display interfaces. The company's V850ES/Sx series of 32-bit microcon-

trollers are optimized for audio applications through the use of anti-EMI techniques that are said to provide heightened audio fidelity and optimized internal circuitry to deliver low-power operation.

Targeting automotive audio applications that require interdevice connectivity, Freescale Semiconductor's 32-bit SCF5250 processor, recently enhanced with additional software libraries, supports CD and HDD-based systems (Figure 2). The chip is based on a ColdFire core with an enhanced multiply and accumulate (EMAC) unit that's said to improve performance and code density for both control code and signal processing in compressed audio decode, file management, and system control. The chip offers more than 107 Dhrystone 2.1 MIPS at 120 MHz performance, and can do the work of both an MCU and a DSP in some applications.

"People increasingly want to have the same entertainment choices in their cars as they have on their portable devices and at home," said Joanne Blight, director, automotive practice at Strategy Analytics research and consultant firm. "Single-platform technologies that support an easy interface between car and portable devices will be key to meeting both consumer and automotive requirements."

Analog Devices Inc. last fall demonstrated a rear-seat display chipset on a video display node for the media oriented system transport (MOST) bus. The chipset, based on the firm's Blackfin technology, is a programmable multiformat video output and display system that decodes VDM video streams and MPEG-2 system streams (PS/TS) at full resolution and frame rate. It decodes local audio for headphones and central audio with audio

amplifier. A Blackfin in-vehicle entertainment (iVE) platform reference design for an RSE system features a hard disk-based automotive "jukebox" with 32-bit audio processing and support for a variety of multichannel decoders including Dolby Digital, DTS, SRS WOW XT, Microsoft WMA and MP3 playback.

For navigation applications, Atmel's Antaris chipset, developed with u-blox, features a 16-channel architecture that's said to enable fast time-to-first fix figures, increased sensitivity, and faster position tracking. The chipset, consisting of the ATR0600 RF receiver IC, ATR0610 LNA and ATR0620 baseband IC, consumes as little as 100 mW. The chipset is also said to provide excellent jamming immunity and maximum integration to minimize board space requirements.

"We're already seeing the basis for a multimedia explosion," said Delphi's Schumacher. "Each platform will evolve to provide more sophisticated features and functions as well as to transfer incredible amounts of data. Consumer demand for this continues to be amazing. People are realizing what consumer electronics can do to make their lives more entertaining and productive. People are spending more time on the road and are becoming more demanding about the technology in their vehicles." ■

### ABOUT THE AUTHOR

*John Day writes regularly about automotive electronics and other technology topics. He holds a BA degree in liberal arts from Northeastern University and an MA in journalism from Penn State. He is based in Michigan and can be reached at [jhday12@sbcglobal.net](mailto:jhday12@sbcglobal.net).*