

November 2005

Subject line: **QNX Automotive Newsletter**

Welcome to the quarterly QNX Software Systems Automotive Newsletter, your source for the latest technology and market trends driving the future of in-car applications. Thank you for subscribing.

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TECHNOLOGY IN FOCUS

QNX Competitive Advantage

QNX Software Systems has built solid partnerships with dozens of vendors that specialize in the embedded market for noise cancellation, voice recognition, Bluetooth, processors, and other key building blocks. Consequently, customers can quickly assemble everything from simple hands-free kits to complex, dynamically scalable systems that employ Java and OSGi. Moreover, customers have choices. When it comes to speech technology, for instance, customers can select from not one, but six vendors - all of them offering QNX-compatible products.

To fully understand the power of the QNX ecosystem, you must also consider how QNX's technology complements the rich offerings of its technology partners. For instance, QNX is only RTOS vendor to offer native support for both 3D graphics and multi-layer interfaces - two essential technologies for the navigation and infotainment segments.

QNX also provides instant-on technology (which eliminates expensive communication processors), an extensible multimedia framework, and a unique power management framework, all of which can significantly reduce the cost of designing in-car devices. For more on these technologies, see our Horizon award submission.

Another innovation on the QNX list is an application-driven power management framework. This revolutionary technology, which won the Embedded World 2004 innovation award, gives telematics developers far more control over power consumption than traditional power management solutions. Rather than provide pre-defined power policies — the conventional method — the QNX power management framework offers highly flexible mechanisms to control how and when devices consume power. Telematics developers can, as a result, achieve finer-grained control over power consumption, address a wider range of in-car power management scenarios, and allow a greater number of telematics devices to draw on a limited power supply.

Moreover, QNX Neutrino is the only microkernel RTOS for Telematics. As such, it provides a highly modular architecture that allows Tier 1 suppliers to quickly plug in any partner technologies they need. In fact, QNX microkernel architecture even allows wireless stacks, middleware applications, and other partner technologies to be added or upgraded on the fly.

By leveraging the QNX innovative technology and modular partner ecosystem, Tier 1 suppliers and automakers are able to target a variety of feature sets, price points, and geographic markets - all from a single software platform. These companies have the freedom to quickly integrate new technologies as they come down the line.

Open GL ES Certification

Open GL ES is a vendor-independent, royalty-free, cross-platform Application Programming Interface (API) for advanced 3D graphics on embedded systems. This new standard makes it easy and affordable to offer a variety of advanced 3D graphics and games across all major mobile and embedded platforms, including consoles, phones, appliances, and vehicles.

Since its release in 2003, OpenGL ES has gained phenomenal support in the industry. An independent and open standards body called the [Khronos group](#) helps to manage the OpenGL ES specification and certification processes. Among the Khronos group consortium members are ARM, ATI, Intel, Motorola, Nokia, Nvidia, PalmSource, Renesas, Sun, Texas Instruments, and QNX Software Systems.

Being the first RTOS vendor to implement native support for the OpenGL ES standard and the first vendor to receive full Open GL ES certification, QNX is once again demonstrating its technological foresight, helping developers build applications/systems of outstanding quality in less time and with less effort.

Instant-On Technology for In-car Telematics and Infotainment

Overview

In a nutshell, QNX instant-on technology is the first solution that allows the full-featured operating systems employed in today's telematics systems to satisfy the strict timing requirements of in-vehicle communication buses. In the past, the only solution was to add silicon - an expensive workaround.

A typical embedded system will boot by copying operating system components from Flash storage to SDRAM and then executing kernel initialization code and application code from SDRAM. Depending on the read throughput of Flash devices and the speed of the CPU, this process can take many tens of milliseconds. This becomes a problem when the embedded system must respond to hardware events within milliseconds of a cold boot.

QNX® Instant-On Technology is based on a simple concept: to make a peripheral device usable throughout the entire booting process. To provide this instant-on capability, QNX has developed the concept of a 'mini-driver'. This is a small piece of driver code that is loaded and executed as soon as the processor comes out of reset. Multiple mini-drivers can be run at the same time and may perform various tasks: drawing a graphical splash screen, reading and writing to CAN bus etc.

The mini-driver consists of two fundamental components:

- **Handler function** — Performs read-write access to the peripheral hardware and implements any other logic related to the mini-driver, such as reading, buffering, storing and responding to messages
- **Data storage** — A block of memory that allows the mini-driver handler function to store any data it receives. This data can subsequently be retrieved by user applications or by a full-featured device driver later on in the boot cycle.

Once a mini-driver is created, its handler function is called throughout the boot process to ensure that data from hardware is never missed. To trigger the handler function, the system may use the following mechanisms:

- **Polling** — The system polls the mini-driver handler function at various times during the boot sequence to determine if the peripheral has received any data. To enable this polling, the boot code may make calls to the handler function at user-defined intervals. This polling period is tunable by the system designer and can range from microseconds to milliseconds.
- **Timer interrupt-based polling** — The mini-driver handler function is attached to a hardware timer interrupt and the handler is called at a fixed interval.
- **Device interrupt** — The device interrupt mechanism attaches the mini-driver handler function directly to the device's interrupt source. The boot process may a system may

switch triggering mechanisms when moving from one phase of the boot process to another.

Major Benefits

- **Save money** - Eliminate the cost of additional microcontrollers (ex: Star or H8) to make automotive applications more cost effective and broadly deployable.
- **Enhance the functionality of systems** - Some implementations miss important messages running on the vehicle bus while the operating system and applications are booting. With QNX Instant-On technology you can act on these messages as soon as they are received. For example, a navigation system that has dead reckoning software will need to receive important bus messages from a gyro immediately after boot in order to make proper location decisions. The alternative is to stay in 'Off Road' state while waiting for satellite synchronization: an unacceptable behavior.
- **Meet critical OEM requirements** - Respond to the vehicle bus in required timings.

For more information on the QNX Instant-On Technology, please refer to the White Papers and Featured Articles section below.

COMPANY DEVELOPMENTS

Partnership with Akita Electronics Systems

A veteran in the real-time operating system (RTOS) market, QNX Software Systems boasts the status of the leading operating system vendor in the global in-car Telematics and infotainment market. The QNX real-time operating system Neutrino® is already used by Acura, Audi, Daimler-Chrysler, Hyundai, Saab, and other major automotive companies.

On October 26, 2005, QNX Software Systems announced that it has been selected for several new car-information system development projects in Japan by Akita Electronics Systems, a systems integrator for the automotive electronics industry and a subsidiary of Hitachi. The agreement with QNX enables local engineering resources of Akita Electronics Systems to bring those projects to market quickly and with minimum cost. The relationship with Akita Electronics Systems allows QNX to better service its existing automotive customers in Japan and positions the company to scale for rapid growth.

In addition to Akita Electronics Systems, QNX works with a growing list of technology partners in Japan, including Access, IBM, Intel, Freescale, Renesas, and Texas Instruments. In recent years, QNX Neutrino has emerged as the RTOS of choice for several brand name companies in Japan, including Epson, JVC, Matsushita, and Sumitomo.

Additional information:

- [JVC chooses QNX, offers DVD playback, 5.1 audio, and innovative dual-zone capability](#)

Throughout more than seventy-five years, the JVC brand name has been associated with the very best in entertainment, music, and sporting events. JVS has chosen the QNX real-time operating system Neutrino® to power a new DVD receiver and monitor for in-car use.

EVENTS AND WEB SEMINARS

Telematics Update Show in San Jose, Nov. 30 – Dec. 1, 2005

<http://www.telematicsupdate.com/navigation2005/programme.shtml>

During the show, QNX Software Systems will introduce its latest graphics offering for next generation 2D and 3D navigation systems. Currently not available through any other vendor, the QNX navigation graphics offering incorporates OpenGL ES, specially optimized for the QNX Neutrino RTOS. Coupled with state-of-the-art video hardware on the Freescale Media5200 platform, the QNX graphics solution provides developers with ability to build applications of outstanding quality while investing minimum development time, effort, and costs. To learn more about this technology, register to attend/view our free webinar described below.

Next Generation 2D and 3D Navigation Made Easy: Taking Complexity out of Developing Next Generation 2D and 3D Navigation Systems.

Join QNX Software Systems and Freescale Semiconductor for a one-hour webinar at 1:00 PM EST on December 7, 2005 and learn how to build next generation 2D and 3D navigation systems using the world's most advanced automotive graphics solutions.

QNX Software System's latest graphics offering incorporates OpenGL ES, specially optimized for the QNX Neutrino RTOS. Coupled with state-of-the-art video hardware on the Freescale Media5200 platform, the QNX graphics solution provides developers with ability to build applications of outstanding quality while investing minimum development time, effort, and costs.

DATE: December 7, 2005 (Wednesday)
TIME: 1:00 PM Eastern Standard Time
DURATION: 1 hour
REGISTRATION: http://www.qnx.com/news/web_seminars/

ANALYSTS REPORTS

Telematics Update Selects QNX for the Best Solution Award

<http://www.telematicsupdate.com/>

Telematics Update has selected QNX's Telematics partner ecosystem as a finalist for the Best Solution Award.

The Telematics Update Best Solution Award recognizes the best end-to-end telematics solution,

namely one that delivers the most cost-effective benefits, quality, and functionality. The nominated QNX solution has been used by many of the world's leading automakers and Tier 1 suppliers, including Audi, Acura, DaimlerChrysler, Delphi, Ford, General Motors, Harman/Becker, Hyundai, Johnson Controls, JVC, LG Electronics, and Saab. More: http://www.qnx.com/news/pr_1342_2.html

QNX Brings 3D Graphics to Telematics

<http://www.electronicstalk.com/news/qnx/qnx118.html>

QNX Software Systems has demonstrated its latest innovation for automotive computing: OpenGL ES 3D technology running on the new Freescale Media5200 development platform.

'Until now, 3D user interfaces were simply too difficult or too costly to deploy in most automotive systems', said Andrew Poliak, Automotive Business Manager, QNX Software Systems. 'But QNX Neutrino's optimized OpenGL ES offering, coupled with state-of-the-art video hardware on the Freescale Media5200 platform, clears the path for mass deployment of high-end graphics across a wide range of in-car multimedia and navigation devices'.

As the first RTOS vendor to implement native support for OpenGL ES, QNX is poised to enhance both the user experience and market adoption of navigation units, DVD receivers, and other graphics-intensive in-car applications.

WHITE PAPERS AND FEATURED ARTICLES

Instant-On Technology for In-Car Telematics and Infotainment Systems

http://pegasus.ott.qnx.com/download/download/10386/instant-on_mini-driver_whitepaper.pdf

Mini-drivers are based on a simple concept: to make a peripheral device usable throughout the booting process.

Application-Driven Power Management for In-car Telematics and Infotainment Devices

http://pegasus.ott.qnx.com/download/download/10026/qnx_power_management_for_telematics_white_paper.pdf

A framework that allows customizable user-space processes, enables system designers to create a power policy for each system they deploy and ensure faster response times, a wider range of operational scenarios, and longer battery life.

3D Graphics for In-Car Navigation

<http://www.qnx.com/download/feature.html?programid=12218>

The allure of 3D hasn't been lost on automakers and Tier 1 auto suppliers. Already, several have introduced, or plan to introduce, navigation systems based on 3D technology. In fact, many of these companies believe the "coolness factor" of 3D interfaces will help drive market demand for such systems, especially among early adopters and younger buyers.

INDUSTRY NEWS

European Auto Industry Embraces New Technologies

The European automotive industry is looking to electronics and entertainment devices to differentiate their new models, according to Telematics Research Group (TRG), a US and Germany-based automotive research company.

TRG dispatched its researchers at the recently concluded International Auto Show in Frankfurt, Germany. TRG surveyed 225 models, representing 36 brands of light passenger vehicles (not counting the ultra luxury or the super car segment). Of the 225 production autos on display, 186 of them featured GPS navigation systems as standard or optional equipment. "Automakers have been more successful at selling navigation systems in Europe than in the US," says TRG analyst Phil Magney. "They have also done a good job of bringing navigation down to the high-volume segment with low-cost solutions."

The Next Generation Navigation, Real-Time Traffic Going 3D

Added functionality — such as 3D building and topography views — is contributing to the rapid adoption of navigation technology.

By the end of the decade, portable and OEM-installed navigation shipments in the U.S. will exceed 16 million units annually, according to Telematics Research Group (TRG).

And yet, only a handful of navigation devices support real-time traffic data, but those that do provide a critical added value. TRG cites Acura's real-time traffic solution as an example of the latest OEM technology. The Acura system includes incidents and freeway flow speeds and displays it on the navigation system map. It responds to voice commands – e.g., "display traffic incidents" – and a list of all events in the surrounding neighborhood are displayed on the screen.

More: <http://www.telematicsresearch.com/>

Navigation Catches On

A market research firm CSM Worldwide estimates the global market for factory-installed systems will grow to \$5.4 billion by 2010, up from \$3.2 billion today. The biggest market is Japan, where 16 percent of cars produced have them, compared to 6 percent in Western Europe and less than 2 percent in North America. But the two market laggards will see the biggest growth in the next five years, according to CSM Worldwide.

Navigation based on the Global Positioning System (GPS), which allows devices to pinpoint specific vehicle locations, keeps growing as prices keep dropping—from \$3,000 to \$1,000 or even less in the last two years, according to one estimate—and factory-installed systems start overtaking after-market purchases.

More: <http://www.redherring.com/Article.aspx?a=14215&hed=Navigation+Catches+On>

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