

SOUND INNOVATION™



Welcome to *Sound Innovation*™, the quarterly newsletter created by Akustica to keep you abreast of technology advancements that can help you deliver the voice improvements demanded by your customers. Each quarter, we explore topics affecting voice communications and provide you with leading-edge information that will help you understand emerging trends and evaluate new offerings.

AKUSTICA SUPPORTS A NEW ERA IN MOBILE COMMUNICATIONS



The laptop has come a long way from the early days when its key task was strictly computing. Today's generation of laptop is now focused on Real Time Communications (RTC) and the overall user experience. In particular, companies such as Skype™ have been able to take advantage of the widespread availability of broadband internet connectivity to provide users with a Video and Voice over Internet Protocol (VoIP) application, allowing quick and simple connectivity among people around the world.

To ensure that the user can make the most of these types of new RTC applications, industry leaders such as Microsoft and Intel are working together to provide new software (Microsoft's Windows Vista™) and hardware (Intel's next generation Centrino Pro platform codenamed "Santa Rosa") solutions that support seamless connectivity anywhere and everywhere. Additionally, PC manufacturers are being required to improve the voice and video quality/capability of their designs to offer a superior user experience.

The previous issue of *Sound Innovation* recommended guidelines to laptop PC manufacturers on how to design the highest performance integrated microphone arrays in laptops to support RTC applications. This issue will focus on how Akustica is helping to move this industry forward by releasing new products, reference-designs, and industry certification programs that directly support the upcoming RTC platforms.

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NEWS and ARTICLES

- Akustica Certification Program Speeds Design of Digital Microphone Arrays
- Akustica Expands Single-Chip Digital Microphone Family
- Article: Design low-noise microphones for laptops
- Microsoft includes built-in Acoustic Echo Cancellation and Microphone Array Processing in Vista
- *Sound Innovation* Vol. 2, No.2 - Designing a High Quality Microphone System for a Laptop

WHAT OTHERS ARE SAYING

- *Red Herring*: Hear This.
- *Machine Design*: Hear this-CMOS Microphones on a Chip
- *Micro/Nano*: Trade Journals Hail Akustica's Microphone Chip as 'Technology of Tomorrow'
- *Microsoft*: Update How to Build and Use Microphone Arrays for Windows Vista

INDUSTRY EVENTS

- **MEMS Executive Congress**
November 5-7
- **Electronica 2006**
November 14-17
- **International CES**
January 8-11

[➔ Click here to meet with Akustica at any of these events](#)

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**AKUSTICA SUPPORTS A NEW ERA IN MOBILE COMMUNICATIONS**

By Ed Pawlak and Dr. Marcie Weinstein

The shift in the primary role of the laptop from computing to communications follows major advances in communication technology which allow high quality collaboration and sharing of multimedia information over Internet Protocol (IP) networks. In the past, the predominant technology for communication was the analog modem. Its bandwidth limitations made it difficult to transfer more than small files in a reasonable amount of time. Today's technology, through the use of Wi-Fi, Bluetooth, and Cellular, provides the wider bandwidth needed for a quality Real-Time-Communication (RTC) solution available to the user anywhere at anytime. The first laptop to use a digital microphone array for Voice-over-IP (VoIP), the Fujitsu Q2010, was released in the Spring of 2006.



SYSTEMS: Intel's Centrino Pro platform (codename Santa Rosa) will support numerous wireless connectivity standards and aims to make the internet a mobile and personal experience. Microsoft's Windows Vista will be the first time that collaboration and communication has been driven by the Operating System (OS). Video conferencing, online communities, and content sharing are key components of the Vista OS. With the introduction of these two products, Intel and Microsoft are promoting the development of new laptop platforms that can efficiently support RTC.



MICROPHONES: The RTC features offered by Microsoft and Intel will only become truly ubiquitous if both the voice and the video quality experienced by the user during an IP collaboration experience is as good or better than with Plain Old Telephone Service (POTS). Akustica supports this vision and introduced three digital microphone products in 2006 which are ideal for use in integrated microphone arrays in laptop and tablet PCs as well as LCD monitors. The AKU2000, AKU2001, and the AKU2004 are designed to provide high quality voice-input performance despite the hostile audio environment typically found in a PC. Since they are virtually immune to all forms of radio frequency interference/electromagnetic interference (RFI/EMI) as well as power line artifacts, they decrease design complexity and improve time-to-market for the equipment manufacturer. The AKU2004 is Akustica's latest product and is shown in the photo. With its top port design and surface mountability, the AKU2004 is ideal for

use in module applications that use an automated assembly process for a single-sided printed circuit board (PCB), such as a camera module integrated into a laptop display bezel.

SOFTWARE: Windows Vista also contains audio algorithms that enhance voice input for clear performance by using the inputs of multiple microphones to perform echo cancellation, noise suppression, and beam forming. To take full advantage of these algorithms and the voice quality benefits they can enable, the laptop manufacturer must integrate a microphone array. All Akustica digital microphones are highly phase-matched which will enable the highest performance of the noise cancellation and beamforming algorithms that are part of Vista.

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MODULES: In addition to supporting voice input with HD Audio reference design partners like IDT, Akustica has partnered with RICOH to bring the first fully integrated audio/video Universal Serial Bus (USB2.0) camera module reference design to the market. The camera module reference design pairs an array of Akustica's new AKU2004 digital microphones with Ricoh's new R5U872 USB2.0 audio/video interface controller. Together, the interference-free Akustica digital microphones and the USB2.0 audio/video interface controller from Ricoh speed time-to-market for notebook PC and LCD monitor manufacturers who are designing platforms that aim to support VVoIP applications. The output of the R5U872 is an integrated audio/video USB interface which leverages the Vista audio signal processing and USB class drivers.



QUALITY ASSURANCE: This fall, Akustica announced its "Akustica Certified" CODEC program, the industry's first certification program that ensures manufacturers a straightforward and seamless implementation of digital microphone arrays. The program is designed to validate all of the functionality required for successful customer integration of digital microphones. This includes hardware compatibility with the digital microphone interface as well as driver compatibility in areas such as proper identification of left/right microphones in an array. By looking for the Akustica certified logo when selecting a CODEC, the laptop manufacturer is guaranteed out-of-the-box interoperability and significantly reduced design time when used with Akustica digital microphones.



As the industry and many have recognized, Akustica's focus on providing complete solutions that are high performance and manufacturable has helped drive the improvement of voice-input quality in the laptop PC. Thus, allowing the user to take full advantage of the capabilities built-into next generation laptops based on Intel's Santa Rosa platform and the Windows Vista OS.