

Kopin Golden-i® Head-Mounted Display Delivers True Hands-free Mobility



Sci-fi Inspired Device Shows Future of Mobile Computing

Imagine a powerful PC embedded inside a head-mounted display that gives you hands-free wireless access to all other computing or communications devices around you. You interact using your voice, hand or head gestures, with the micro display positioned below your normal line of sight. In active mobile use, when you glance down a 15-inch color display with PC resolution and DVD quality appears. Built around the most advanced embedded technologies available, including the Microsoft® Windows® Embedded CE 6.0 R2 operating system and TI OMAP 3530 mobile dual processor, the Kopin Golden-i® is bringing us the future of mobile computing today.

Situation

Kopin has shipped more than 30 million ultra-small LCD displays for a variety of consumer and military applications, including digital cameras, personal video eyewear, camcorders, weapon sights, and night vision systems. But Kopin has an even bigger idea: to enable spontaneous, hands-free mobile communications and computing using a head-mounted display and voice/gesture recognition technology.

"Our vision was to build a 2 ounce "Hands-Free" wireless computer system built into a Bluetooth headset that houses all the electronics, including the micro display," recalls Jeffrey J. Jacobsen, Senior Advisor to the CEO, Kopin. "Imagine the natural voice recognition heads-up display system in the movie Iron Man and you start to get the picture. Kopin has accumulated 20 years of in-house expertise in micro displays, optics and human factors, but we needed access to the world's most advanced computer hardware and software systems in development."

After several months of Linux development, company officials concluded that a new, Windows-based embedded operating system complimentary with PCs and enterprise servers was needed. "Unlike Microsoft Windows CE, Linux has limited support across the latest business and enterprise computing systems. Kopin required an embedded OS for interface with the world's general computing platforms, and one that enhanced TI's most advanced low power chipset performance and lower energy consumption," says Jacobsen. "Also, we believe professionals and consumers want a rich visual experience, broad connectivity, and easy access Windows-based devices and Office applications. Unfortunately, we discovered Linux is not a well controlled environment, and most third-party hardware and software either needs to be highly modified or may not work with Linux at all."

Solution

Kopin selected the Microsoft Windows Embedded CE 6.0 operating system. Kopin's silicon vendor, Texas Instruments, and

Company: Kopin

Web Site: www.kopin.com

Country or Region: United States

Industry: Manufacturing, Electronics

Company Profile

Kopin produces lightweight, power-efficient, ultra-small liquid crystal displays (LCDs) and heterojunction bipolar transistors (HBTs) that are revolutionizing the way people around the world see, hear, and communicate.

Software and Services

- Microsoft Windows CE 6.0

Hardware

- 65nm CMOS Texas Instruments OMAP 3530 mobile dual processor (a flexible 400MHz to 1GHz ARM Cortex 8 with a flexible 32-bit 300 to 600MHz DSP) with a ball grid package-on package (POP) high speed, low power nonvolatile memory and supports up to 32GB removable MicroSD cards
- 2Gb NAND, plus 1Gb mobile DDR RAM, or 2Gb NAND, plus 2Gb mobile DDR RAM, or 4Gb NAND, plus 2Gb mobile DDR RAM

For more information about other Microsoft customer successes, please visit:

www.microsoft.com/casestudies
www.microsoft.com/embedded

"The richness of the Windows experience simply cannot be matched by Linux on any level."

Jeff Jacobsen, Kopin

Systems Integrators, BSQUARE and Ittiam Software, gave developers early access to their CE 6.0 Board Support Package (BSP) for the TI OMAP 3530 mobile dual processor. The pre-configured, pre-tested BSP and CODECs accelerated the project by providing boot loader source code, an OEM Adaptation Layer, and device drivers with source code for peripherals.

"All of our major product development partners, such as Motorola, and TI were extremely pleased when we had migrated from Linux to Windows CE 6.0," states Jacobsen. "The move to Windows dramatically simplified software development and allowed us to easily leverage complex pieces of Windows Vista technology, like SideShow, Gadgets, and Silverlight media."

Kopin also developed a Win32 API-based Software Development Kit (SDK) to enable customers and third parties to build applications for the device. "Customers tell us they have more Microsoft-experienced software technicians and application programmers who are already familiar with developing software applications for Windows platforms," reports Jacobsen.

After saving months of development time thanks to the rich partner community and online resources of Windows Embedded, Kopin is about to introduce Golden-i evaluation units at Microsoft's 2009 Tech Ed Embedded Developers Conference.

Benefits

Kopin's Golden-i is a lightweight wireless Bluetooth headset that integrates a near-eye, full-color, high-resolution micro display, which the user sees as a virtual 15-inch diagonal screen in 24-bit full color with DVD quality video, creating a virtual display image that appears 18 inches in front of the user when viewed.

Golden-i® is controlled with natural speech recognition or with any host device touch screen display, keyboard or wireless mouse. An embedded six-axis solid-state head tracker, with near pixel for pixel accuracy, adds advanced display gesture control for the on-screen cursor. Users can zoom in or out, pan, and scroll with either speech commands or head movements. For

example, a user literally turns her head to pan and see the rest of an enlarged drawing, schematic, or image.

Golden-i controls up to seven other independent devices simultaneously, making it the perfect mobile companion device for connecting to the "cloud." It pairs up with cell phones, PCs, handhelds, industrial equipment, entertainment products, and networks via Bluetooth wireless interface. The user can remotely control all the functions, applications and features of other devices using natural speech or gesture. Thus, a mobile user wearing Golden-i can instantaneously and remotely wake up and control a hibernating PC anywhere in the world with a few spoken words.

Supported by built-in Windows Embedded multimedia technologies, Golden-i can stream real-time video at 720 x 480 progressive scan at 30 frames per second over standard Bluetooth 2.0. Initial customers for Golden-i are expected to be mobile users in the industrial, logistics, distribution, and military fields who require hands-free access to detailed information with a familiar PC experience.

"Windows Embedded CE gave us and our customer base immediate access to an incredibly large and rich universe of software applications for users in virtually any business or market," Jacobsen concludes. "The richness of the Windows experience simply cannot be matched by Linux on any level. It was also very important to have a device that someone can use right out of the box, so the familiarity of the Windows experience helps users and application developers get comfortable with this new kind of device quickly."

Keyword: Connected Media Devices, Automation Devices



Kopin Golden-i® Industrial Head-Mounted Display (*patents pending*).

"The move to Windows dramatically simplified software development and allowed us to easily leverage complex pieces of Windows Vista technology, like SideShow, Gadgets, and Silverlight media."

Jeff Jacobsen, Senior Advisor to the CEO, Kopin



Kopin Golden-i® provides clear mobile vision (*patents pending*).