

Microchips found in most mundane of places

December 23 2010, By Steve Johnson

To help make football a little safer, Intel officials last month proposed having players' helmets outfitted with microprocessors that would wirelessly alert doctors if the athletes suffered a hit hard enough to cause head injuries.

And why not? Besides being installed in everything from ATMs and airport check-in kiosks to pacemakers and ocean monitoring sensors, microchips also are going into a staggering array of items that were once decidedly low-tech - from gravestones and running shoes to fish lures and writing pens.

The potential market is huge. Chip sales of all types generate about \$300 billion a year in sales worldwide, with personal computers and smart phones accounting for a third to half of that, according to some experts. That means \$150 billion to \$200 billion in sales come from so-called embedded semiconductors, which go into pretty much anything a person can think of. And that segment is growing fast.

In the future, "where won't we find chips?" asked Jordan Selburn, principal analyst for consumer electronics at research firm iSuppli. "The answer is: Pretty close to nowhere."

Moreover, due to the sophistication of the chips being used, the difference between PCs and many formerly mundane products is quickly narrowing.

"The term 'embedded' used to refer to a low-level, limited-function

semiconductor and nobody needed to pay attention to it," said Shane Rau, a chip expert at the market research firm IDC. "Now these devices are taking on more intelligence. They're becoming more programmable, they're getting faster and they're getting communications functions built into them."

Consider these examples:

-Intelligent pens: Livescribe of Oakland, Calif., sells a chip-powered ink pen equipped with a camera and audio recorder that's designed to help people remember precisely what was said when they review their handwritten notes. It synchronizes its voice recording with the pictures it takes of the words as they are jotted down. Then, if the pen is later tapped on one of the scribbled words, it replays what was said when that note was taken.

-Computerized commodes: AquaOne Technologies of Westminster, Calif., has introduced a toilet containing chips that automatically shut off the water when it springs a leak or starts to overflow. And the Japanese company Toto reportedly has developed an intelligent potty that gathers health-related data from the user's urine and automatically sends the information to their doctor's office.

-Fish beware: A number of fishing reels, including those made by Shimano of Japan, now have chips in them to help control how fast the spool of line spins. Some enthusiasts of the sport say that results in longer, smoother casts. Pro-Troll of Concord, Calif., also puts chips in its lures. The result, the company claims, "duplicates the electrical nerve discharge of a wounded bait fish," prompting other fish to bite it.

-Smart shoes: Adidas was widely hailed five years ago as the first company to outfit a running shoe with a chip, which automatically adjusts the shoe's cushioning to the person's weight and running style.

Nike then followed with its own running shoe featuring a chip that fed data on the person's pace, distance traveled and calories burned to an Apple iPod or iPhone.

-Tombstone tech: A Waynesburg, Pa., company sells a coin-size, stainless steel-encased microchip for grave stone markets. Called the Memory Medallion, it tells the dead person's story in text, photos, video or audio histories, which visitors can access by pointing their Internet-enabled cell phones at it. The company says it has sold thousands of the medallions, which recently were installed at a New York cemetery's memorial to the Sept. 11, 2001, terrorist attacks.

-Digitized pets: Million of cats and dogs have been equipped with chips the size of a grain of rice, which contain their owners' contact information in case the animals get lost. Taking that concept a step further, a British company sells a SureFlap cat door that opens for pets whose [microchip](#) it recognizes, but stays locked for other animals.

-Precocious dolls: Sunnyvale, Calif., chipmaker Sensory says its microcircuits have enabled Furby dolls to communicate in seven international languages, and to use "facial expressions and synchronized body motions to display his emotions." Its chips also have been used in the Amazing Amanda doll, touted as being able to recognize its owner's voice, pout when told "no" and remind a child of upcoming holidays.

-Unmanned mowers: Belrobotics of Belgium offers a computerized mower that autonomously trims lawns. It's equipped with a sonar system so that when it approaches an obstacle, it slows to a point where it makes "very slight initial contact," and then turns away. The mower's blades can't inflict serious wounds, the company insists, and pets get so used to it they "consider the robot almost as a companion."

The trend is easing life for everyone by enabling consumer gadgets to

make decisions that once had to be made by people, said Lori Dolnick, a spokeswoman for the German company Miele, whose household appliances are outfitted with semiconductors as well as wireless features. As an example, she described what happens when a Miele washing machine detects a problem.

"It could be a misuse of detergent, a door left open or - on the very rare side - a part failure," she said. "These faults are sent to the wireless communication module called RemoteVision and that will alert Miele. Miele then calls or e-mails or texts the customer to offer a solution or a repair to their problem - often before they even know it's a problem."

For a machine to do all that requires sophisticated chips, which is why Intel - which is known for its brainy microprocessors-believes it has a chance to grab a big share of the surging embedded market, said Ton Steenman, general manager of the Santa Clara, Calif., company's embedded and communication's group.

Intel isn't wasting time looking for ways to take advantage of its technology. Among other ideas it has in works, it's conferring with farm-equipment manufacturers on the possibility of using its chips to make remotely controlled tractors that would let farmers till their fields, plant seeds, dispense fertilizer and harvest crops from their office desks.

"The possibilities," noted Steenman, "are pretty much endless."

FROM TOILETS TO TOMBSTONES:

Already a key component in personal computers and [smart phones](#), microchips are making their way into an ever-expanding array of other items, from fishing lures and running shoes to toilets and grave markers.

The market for these so-called embedded chips is estimated at \$150 billion or more. But that's expected to grow as companies increasingly explore ways to make common household appliances and other products access the Internet, communicate with one another and perform new functions for consumers.

-Adidas 1: An embedded chip adjusts shoe's cushioning to the person's weight and running style.

-Echo dictation pen: Livescribe of Oakland sells a chip-powered ink pen equipped with a camera and audio recorder that's designed to help people remember precisely what was said when they review handwritten notes.

-Pro-troll lures: A chip in fishing lures sets off an electrical pulse which "duplicates the electric nerve discharge of a wounded bait fish," prompting other fish to bite it.

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