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DEVELOPMENTS TO WATCH

SPEAKERS THIN AS WALLPAPER

IMAGINE A LOUDSPEAKER so thin that it can fold from the lid of a notebook computer. Or so flexible it can be formed into a lampshade. That's what MZX Inc., a startup in Newbury Park, Calif., has developed.

It's a new type of electrostatic speaker. Such speakers are often found hanging on walls because they're no thicker than a painting.

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But MZX's are more like wallpaper. They can be as thin as 10 thousandths of an inch, says MZX founder Claus E. Zimmermann. Their construction is simple: Two sheets of conductive film, such as metallized plastic, surround a nonconductive layer, which can be rubber or even a smear of Vaseline. Stretch this sandwich in a frame and attach thin, perforated-aluminum electrodes. Voila! When an audio signal is fed to the electrodes, the sound "leaks" from the perforations and generates hi-fi vibrations in the speaker.

Zimmermann's company was awarded its initial patent last year. Now, several computer and cell-phone makers are getting ready to unveil new products featuring the ultrathin speakers.

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KEEPING CHIPS FROM BLOWING THEIR COOL

THE FASTER CHIPS RUN, THE HOTTER THEY GET. WITHOUT little cooling fans mounted on top, Intel Corp.'s Pentium-chip "brains" would suffer a heat stroke. Trouble is, fans can remove only about 40 watts of heat per square centimeter. But when future chips get up to speeds of more than 250 megahertz--Pentiums now top out at 166--they'll need to be cooled by 50 watts or more.

To prepare for that day, Purdue University's Issam Mudawar, a professor of mechanical engineering, has developed a technique to embed thermal microchannels in printed circuit boards. Hundreds of watts of heat can be sucked away by a special liquid flowing in the channels. Mudawar has constructed prototype systems for the Air Force that are 10 times cooler than the air-cooled avionics in today's warbirds.

Meanwhile, at the mid-February Uniforum 96 computer show in San Francisco, Superconductor Technologies Inc. showed off a frosty concept that chills chips to -55C or below, using a small cryogenic cooler. Heat is siphoned out through a so-called heat pipe, or heat exchanger. At such temperatures, microchips outdo themselves because transistors switch on and off faster. The Santa Barbara (Calif.) company says its device can boost the speed of computers by 50% or more. Commercial Data Servers Inc. in Sunnyvale, Calif., has ordered the coolers for a line of superfast "cold-computing" mainframes.

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AS MICROCIRCUIT LINES SHRINK, ELECTRONS WHIZZING along the edges of ultratiny circuits could scrape away surrounding silicon atoms, much like streams dislodging rocks from mountainsides. This already happens, but in today's fatter lines, most electrons flow in the center, so it takes years for electron erosion to cause a failure. With tomorrow's wispy lines, however, glitches might occur in just months.

Researchers at the University of Illinois' Beckman Institute believe they've found a simple fix: Use deuterium instead of hydrogen for the so-called annealing step. Normal annealing puts silicon-hydrogen patches on atomic-level defects that occur during some chipmaking operations. But silicon-deuterium bonds turn out to be 10 to 50 times stronger--an unexpected result, since deuterium is just an isotope of hydrogen. The university has applied for a patent, and chipmakers are lining up to use the technology.

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INNOVATIONS

-- Low-fat french fries? That may not be an oxymoron. Ranjit Kadan, a food technologist with the Agriculture Dept.'s Southern Regional Research Center in New Orleans, has developed "nice fries." They're really rice fries--fortified rice flour extruded like big, square spaghetti. Surprisingly, they cook up with only half the fat of the potato variety. Kadan is not sure why. But their taste still needs work, he admits.

-- While studying dental disease in baboons, researchers at Johns Hopkins University discovered that bone-morphogenic proteins--substances that promote bone growth--can also help heal damaged gums. This unexpected finding suggests the proteins may be useful in treating gum disease. Among older people, gum disease is a leading cause of tooth loss.

-- With the abundance of chemicals in manufacturing plants, it's all too easy to inadvertently mix up a noxious brew. So the American Institute of Chemical Engineers twisted arms at Dow Chemical Co., and the two organizations plan a March unveiling for ChemPat, an expert-system software package developed by Dow for internal use. ChemPat knows about the compatibility of chemicals and has been a valuable tool for Dow in developing safe chemical processes.

-- People tired of Canada geese dropping you-know-what might want to drop some grapelike flavoring on the grass. Wildlife experts

at Cornell University say that the geese are put off by grass sprayed with methyl anthranilate.

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