

# The WINNERS of EDN's Innovator/Innovation Competition

*Your Web votes have been tallied in EDN's annual campaign to recognize the most innovative people and products of the year. At a black-tie-optional dinner on April 22, EDN's editors honored the winners and all the finalists from this year's competition.*

## INNOVATOR OF THE YEAR

### Bozena Kaminska

Bozena Kaminska, co-founder and chief technology officer of Opmaxx Inc, is the Innovator of the Year for R&D that led to commercially available analog design and test automation (ADTA) tools. Opmaxx's ADTA tools offer a comprehensive, structured approach for design analysis and automated testing of analog and mixed-signal systems. Kaminska's accomplishments allow analog design to join digital design as part of mainstream ASIC technology.

Known for her research in digital testing, Kaminska began analog and mixed-signal

investigations in 1991. She has made significant contributions in testability of analog and mixed-signal ICs and systems; design for testability and BIST; reliability sensors for online and offline monitoring; high-level synthesis and synthesis with testability; gigahertz-range mixed-signal design; and optical interconnects. Kaminska holds a PhD in microelectronics from Warsaw Technical University (Poland). In 1994, she founded hfOPTEX Inc, a high-frequency-IC-design company, and two years later co-founded Opmaxx.



Opmaxx Inc, Beaverton, OR. [www.opmaxx.com](http://www.opmaxx.com)

## DIGITAL IC

### AM29DL800 Simultaneous Read/Write Flash Memory

The AM29DL800 addresses one short-coming of all previous flash memories: the inability to access locations within the array while you're writing or erasing other locations, even if they're in separate sectors. This drawback forced you to copy update algorithms to a redundant second memory and execute from that device while updating flash-memory contents. It also precluded interrupt servicing during updates, forcing you to take equipment offline unless you used awkward and nondeterministic suspend and resume routines.



AMD divides the 8-Mbit array into two internal banks. Bank 1 includes two 16-kbyte, two 32-kbyte, and four 8-kbyte blocks, and Bank 2 comprises 14 64-kbyte blocks. You can read from any block in one bank while programming or erasing a block in the other bank. Possible operating scenarios include reading an algorithm from the boot block while updating code segments or executing system code while rewriting data. The 29DL800 is in production, and its price is \$9.05 (10,000).

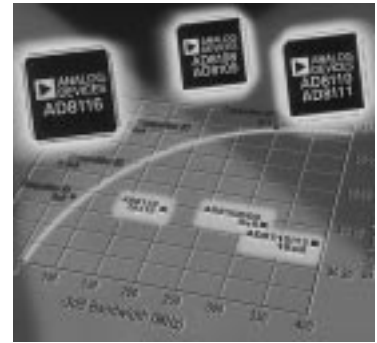
AMD Corp, Sunnyvale, CA. [www.amd.com](http://www.amd.com)

## ANALOG IC

### AD8116 16×16 Video Crosspoint Switch

Traditionally, the size, complexity, and cost of a crosspoint switch increases exponentially with the number of channels it handles, and performance factors, such as bandwidth, suffer. The AD8116 uses an array of 256 transconductance stages organized as 16 16-to-1 multiplexers, fed by a common 16-line analog-input bus. You program the desired input-to-output path via an 80-bit serial

word. The 3-dB bandwidth of the switch is 200 MHz, and the 0.1-dB bandwidth is 60 dB; differential gain and phase errors are 0.01% and 0.01°, respectively. Because the 128-lead TQFP device incorporates input and output buffers on all channels, you can cascade it to create larger arrays without compromising bandwidth or fidelity. The IC's outputs can drive loads as low as 150Ω. It costs \$105 (100).



▶ Analog Devices Inc, Norwood, MA. [www.analog.com](http://www.analog.com)

## MICROPROCESSOR/DSP

### TMS320C6x VLIW DSP

Texas Instruments' TMS320C6x DSP is the first general-purpose, programmable, very-long-instruction-word (VLIW) DSP. The C6x is also the first code-compatible fixed- and floating-point DSP architecture. The fixed-point TMS320C62x core comprises eight parallel functional units. To build the floating-point C6x, the C67x, TI added IEEE floating-point support to six of the C62x's eight functional units. Therefore, the C67x instruction set is a superset of the C62x fixed-point instruction set; thus, the C67x



runs unmodified C62x instructions. "VLIW" can mean large code, but TI overcame this drawback by developing instruction packing techniques. Execution begins when the CPU fetches an eight-instruction, 256-bit-wide fetch packet. The CPU need not simultaneously execute all eight instructions in the fetch packet; instead, the CPU partitions fetch packets into multiple execution packets that each comprise one to eight parallel instructions. The C6x is also the first DSP to run at 200 MHz.

▶ Texas Instruments, Stafford, TX. [www.ti.com](http://www.ti.com)

## COMPUTER/PERIPHERAL

### GF-1000 Rewritable DVD-RAM Drive

Hitachi's GF-1000 rewritable DVD drive can record 2.6 Gbytes of data on each side of a CD-sized disc. The drive costs \$750 (internal unit) and \$850 (external unit), as the company hopes customers will consider a rewritable drive rather than a DVD-ROM drive. The drive can read a variety of media, including DVD-ROM, CD-ROM, CD-R (record-once CD media) and CD-RW (rewritable) disks. To offer such support, Hitachi developed a dual-lens/dual-laser optical head. The drive senses

the type of media inserted and rotates a lens into place to focus the laser for the media type. A second 780-nm laser allows the drive to read CD-R and CD-RW disks. The GF-1000 features an access time of just 22 msec. A 1-Mbyte, on-drive buffer and spin rates comparable with 24x CD-ROM drives result in a data-transfer rate of 1.38 Mbytes/sec when working with DVD-RAM media. The drive complies with the DVD-RAM standard established by the DVD Forum.



▶ Hitachi America Ltd, Brisbane, CA. 1-415-589-8300

## EMBEDDED DEVELOPMENT

### Rhapsody Software-Development Tool



The Rhapsody software-development tool allows real-time designers to analyze, design, develop, and verify the behavior of embedded-systems software using object-oriented techniques. Rhapsody eliminates the coding phase of the project by automatically generating complete C++ code from the designer's graphic model. The tool is based on the Unified Modeling Language (UML). Users select from a palette of UML design ele-

ments. Message-sequence charts describe interactions between objects and the environment, object-model diagrams define the structure of the system, and state charts model the system's event-driven behavior. While debugging the target code, Rhapsody can display execution behavior. You select software instrumentation to cause executable code to animate the application's operation. Prices start at \$2495 per seat.

▶ i-Logix Inc, Andover, MA. 1-508-682-2100

## TEST AND MEASUREMENT

### Infinium Digital Oscilloscopes

HP's \$9995 to \$29,995 Infinium DSOs feature changes to the operator interface. Because most users are skeptical at first about controlling a DSO with a mouse, HP designed the Infinium series with an analog-scopelike front panel from which you can perform all operations without using the mouse. The DSOs let you turn inputs on and off with pushbuttons that glow green when the channel is on. Each channel also has its own set of position and gain

controls, and each channel's knob color matches that of the corresponding trace. The design eliminates the need for soft keys and the associated menus. The mouse lets you reposition a waveform simply by dragging it around the screen. Behind the bright, sharp, 7.5-in.-diagonal, color LCD is Windows 95. A Pentium-class  $\mu$ P speeds screen updates to around 700 updates/sec.



Hewlett-Packard Co, Loveland, CO. 1-800-452-4844

## COMPONENT, HARDWARE, INTERCONNECT

### Amorphous-Silicon X-ray Detector



EG&G's amorphous-silicon X-ray detector is a digital X-ray imaging system that comprises a scintillation screen for converting X-rays to visible light, a large-scale photodiode imaging array, and associated drive and readout electronics. The company produces amorphous-silicon ICs containing as many as 4 million elements on substrates as large as  $41 \times 41$  cm. The array captures and stores X-ray images for medical and industrial uses. Each photodiode produces an output signal proportional to the intensi-

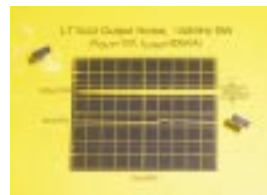
ty of visible light emerging locally from the scintillation screen. Collated and digitized by readout ASICs, the photodiode signals become picture elements for a digital X-ray image. According to EG&G, the array represents the first practical, commercial application of amorphous-silicon-based technology. The MX1024 1024 $\times$ 1024-pixel imaging array costs \$25,000; the RID 512-400 complete, real-time X-ray camera offers 512 $\times$ 512-pixel resolution and costs \$35,000.

EG&G Amorphous Silicon, Santa Clara, CA. 1-408-565-0850

## POWER SOURCE

### LT1533 Low-Noise Switching Regulator

The LT1533 switching-regulator IC from Linear Technology allows you to configure dc/dc converters that have essentially no output, radiated, or reflected noise. It eliminates noise by restricting the harmonic content of the switched power. It controls its output power switches in a closed-loop feedback configuration. The feedback controls the transition (slew) rate at which the switches turn on and off. The closed-loop control of the transition slew rate greatly reduces harmonic content, resulting in near-



theoretical noise levels. The LT1533 maintains the advantages of conventional switching regulators while cutting the switching noise to essentially nothing. The slowed switching transitions result in some efficiency loss, typically 2 to 5%, but noise-sensitive applications can usually tolerate slightly compromised efficiency. The LT1533 costs \$4.95 (1000).

Linear Technology Corp, Milpitas, CA. 1-408-432-1900

## EDA

### FormalCheck Model Checker for Complex Chips

FormalCheck is a formal-verification tool you use without test vectors to verify design functionality. You use the tool at the RTL before synthesis on entire chips or on embedded cores. You first enter your design in synthesizable Verilog or VHDL. You then fill in a query template that, along with the design's RTL model, FormalCheck translates into a mathematical property that proves to be either true under all possi-

ble conditions or false under at least one condition. Because FormalCheck has a simple pass/fail response for each property checked, if the property passes (is true), there are no design bugs relating to that property. If the tool finds an error for a query, it shows you the error in a simulationlike waveform with automatic traceback to the problem line of HDL code. FormalCheck costs \$150,000.



Lucent Technologies, Bell Labs Design Automation, Murray Hill, NJ. 1-908-582-4083