

EDN's 2000 Innovation winners

YOUR WEB VOTES HAVE BEEN TALLIED IN EDN'S ANNUAL COMPETITION TO RECOGNIZE THE MOST INNOVATIVE PEOPLE AND PRODUCTS OF THE YEAR. AT AN APRIL 9 RECEPTION AT THE PAN PACIFIC HOTEL IN SAN FRANCISCO, EDN'S EDITORS HONORED THE WINNERS AND THE FINALISTS AND PRESENTED INNOVATOR OF THE YEAR CASIMER DECUSATIS WITH A \$10,000 SCHOLARSHIP TO DONATE TO THE COLLEGE OR UNIVERSITY OF HIS CHOICE.

Entries for this year's competition are already being accepted. Check out the Innovation link on our home page at www.ednmag.com and help us honor our industry's remarkable designs and engineering minds.

INNOVATORS

CASIMER DECUSATIS, PhD



Casimer DeCusatis, a senior engineer for IBM and team leader for a group of 12 engineers designing fiber-optic-network systems, most recently developed the IBM 2029 Fiber

Saver. This DWDM system for data communications allows one pair of optical fibers to transmit as many as 32 wavelengths of light and each wavelength to carry one or more duplex channels at a maximum speed of 2.5 Gbps. It uses innovations that greatly increase traffic capacity, simplify network installation, and increase reliability while reducing cost.

DeCusatis holds a BS in Engineering Science from Pennsylvania State University and MS and PhD degrees from Rensselaer Polytechnic Institute. He is one of IBM's most prolific inventors. **IBM**, 1-845-435-7232, www.ibm.com.

COMPUTERS, BOARDS, AND BUSES



ENCORE PLUG-IN CPU SUBSYSTEM.

Ampro's EnCore technology replaces a large and difficult portion of embedded-product design with a standardized, off-the-shelf

processor subsystem module. EnCore defines an interface standard for a family of modules that provides core-level computing functions, including CPU, memory subsystem, and basic I/O functions (serial, parallel, USB, floppy, and IDE) along with advanced peripherals, such as 10/100BaseT Ethernet, 3-D graphics, and sound. The ENC-500, the first EnCore module, is based on a 266-MHz mobile Pentium processor and costs less than \$500 (volume quantities). **Ampro Computers Inc**, 1-408-360-0200, www.ampro.com.

COMPONENTS, HARDWARE, AND INTERCONNECT



FBAR (FILM-BULK-ACOUSTIC-RESONATOR) DEVICES

An innovative semiconductor technology from Agilent Technologies offers an attractive alternative to ceramic in frequency-shaping applications.

FBAR (film-bulk-acoustic-resonator) devices are much less bulky than ceramic resonators. FBAR technology enables the creation of a miniature, semiconductor-based duplexer that can operate from 500 MHz to 10 GHz. The company claims that an FBAR duplexer has less than 10% of the volume of a conventional ceramic SAW device. **Agilent Technologies**, 1-408-727-0700, www.agilent.com.

EDA TOOLS



VCC (VIRTUAL COMPONENT CO-DESIGN) ENVIRONMENT.

The VCC (Virtual Component Co-Design) product from Cadence Design Systems provides an environment that allows a design team to confirm critical architectural decisions, such as hardware and software partitioning, early in the design. VCC introduces a new level of abstraction for design. The VCC environment is the first commercial implementation that applies function-architecture co-design to platform-based design methodologies. **Cadence Design Systems**, 1-800-746-6332, www.cadence.com.

EMBEDDED-DEVELOPMENT SYSTEMS AND TOOLS



VISUALDSP SOFTWARE DEVELOPMENT TOOLS PACKAGE.

Analog Devices' VisualDSP Software Development

Tools package offers DSP programmers statistical profiling data to pinpoint software bottlenecks without degrading system performance. The VisualDSP debugger can noninvasively poll the DSP while it is running a program to enable programmers to visually observe which routines are consuming most of the processor's performance. The full VisualDSP++ development environment costs \$2995. **Analog Devices Inc**, 1-781-461-3090, www.analog.com.

COMMUNICATIONS

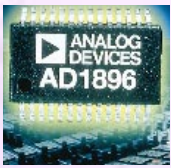


"WIRELESS ENGINE" CHIP SET.

The "wireless engine" chip set from Radiata operates at 5 GHz and supports the 802.11a standard (54

Mbps) using CMOS. The chip set can support multiple high-bandwidth multimedia streams and uses COFDM to resist multipath problems. The R-RF5 transceiver chip has an on-chip 32-bit μ P, including algorithms, that dynamically biases individual modules to overcome the typical inadequacies of using CMOS at 5 GHz. The R-M11a modem chip has switchable digital I-Q upconverters and downconverters. **Radiata**, 1-408-938-5740, www.radiata.com.

DIGITAL ICs



AD1896 SAMPLE-RATE CONVERTER.

When tackling 24-bit-per-channel audio samples that theoretically can reach a 144-dB signal-to-noise dynamic range, no vendor wants to be the weak link in the chain transmitting that acoustic purity to listeners. Yet, digital-audio information comes in a range of legacy and leading-edge sampling frequencies. With its \$11.30 (1000) AD1896, Analog Devices believes it's created a means of enabling these bit streams to coexist in auto, home, portable, and other listening environments. **Analog Devices**, 1-781-326-8703, www.analog.com.

POWER SOURCES AND CONTROLLERS



NET1 POWER SUPPLIES.

The NET1 series of power supplies from Power-One offers an industry-leading current density of 2.6A/in.³. Other power supplies of similar ratings can deliver only 0.7 to 0.9A/in.³. The company claims that the NET1 is the first ac/dc power supply that combines four low-voltage outputs; a high-current capability; and a low-profile, 1U package. The supply measures 7×4.5×1.35 in. and costs \$375 (100). **Power-One Inc**, 1-805-987-8741, www.power-one.com.

MICROPROCESSORS/MICROCONTROLLERS



TC1775 32-BIT PROCESSOR.

The TC1775 provides a high level of autonomy, flexibility, and careful partitioning, especially in the power train. The company divided the processor into a 32-bit superscalar processor; a 32-bit peripheral-control processor with extensive DMA performing at the transfer level; and a physical level with a flexible general-purpose timer array, analyzing and controlling time- and event-driven real-world digital and analog I/O signals. The TC1775 costs \$20 (1000). **Infineon**, 1-408-501-6000, www.infineon.com.

MULTIMEDIA FUNCTIONS



GeFORCE2 GRAPHICS PROCESSOR.

Nvidia's GeForce2 GTS, introduced in the spring, contains a hardware transform-and-lighting engine, four pixel-rendering pipelines, and a 2-to-1 texture-to-rendering pipeline ratio (eight total texture pipelines). The 32-Mbyte GeForce2 GTS-based graphics boards retail for approximately \$200. GeForce2 GTS's Ultra variant runs at 250 MHz and interfaces to 230-MHz synchronous DRAM. GeForce2 MX is a lower cost version of GeForce2 GTS. **Nvidia**, 1-408-615-2500, www.nvidia.com.

SOFTWARE



FILTER DESIGN TOOLBOX 2.0.

This collection of software tools offers you advanced techniques for defining, designing, simulating, and analyzing digital filters. Unlike other tools, it lets you investigate fixed-point filters, with word lengths of 2 to 53 bits, in addition to offering floating-point-filter analysis. A graphical user interface lets users visually investigate designs. You can analyze quantization effects of digital filters, as well as other critical factors affecting filter design. Filter Design Toolbox 2.0 costs \$1000. **The Mathworks**, 1-508-647-7000, www.mathworks.com.

DIGITAL-SIGNAL PROCESSORS



C55X FIXED-POINT DSP.

This C55x fixed-point device combines selective enabling/disabling of six functional units with an automatic turn-on/turn-off mechanism (transparent to the user) for peripherals and on-chip memory. A 32-bit program reduces the number of internal and external fetches by minimizing memory accesses, and a cache with burst-fill minimizes off-chip accesses. Increased parallelism and double actions per cycle minimize cycle counts per task, and the device can turn off its multiplier unit when its simpler arithmetic unit can perform desired math operations. **Texas Instruments**, 1-800-336-5236, www.ti.com.

PERIPHERALS



STOWAWAY PORTABLE PDA KEYBOARD.

Using a stylus and an alphabet that only a computer could love may be fine for occasionally entering a phone number or an address into your PDA, but for long e-mails or real data entry, forget it. Think Outside has created a compact, portable accessory for your PDA that expands into a full-sized keyboard equal to that of any laptop. It sells for \$99. **Think Outside**, 1-760-431-9090, www.thinkoutside.com.

TEST & MEASUREMENT



TDS7000 DIGITAL-PHOSPHOR OSCILLOSCOPES.

In the TDS7000 series (from \$19,500), the latest generation of its DPOs (digital-phosphor oscilloscopes), Tektronix uses SiGe technology to bring the single-channel-mode real-time sampling rate to an industry-leading 20G samples/sec and the bandwidth to an industry-leading 4 GHz. Maximum memory depth is 32M samples. VocalLink, a software package that runs on the scopes, now provides additional convenience when probing dense pc boards. **Tektronix Inc**, 1-800-426-2200, www.tektronix.com.

ANALOG ICs AND DISCRETE SEMICONDUCTORS



SP508 TRANSCEIVER.

Serial ports can easily switch between popular signaling protocols without taking up a lot of board area and design time with "partys" multiprotocol implementations. Sipex's SP508 needs only a 5V supply and four 1-μF capacitors to support EIA-530, EIA-530A, RS-232, RS-449, V.28, V.35, V.36, and X.21 in either DTE or DCE configurations. A 3-bit protocol-selection word configures the eight drivers, eight receivers, and on-chip termination resistors. The SP508 costs \$17.25 (10,000). **Sipex**, 1-978-570-9001, www.sipex.com.