The Search IS OVER THE 2002 TOP PRODUCTS ARE HERE

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THOUSANDS OF NEW ELECTRONIC PRODUCTS come along every year. All, no doubt, are useful, and many are innovative, yet only a relative few generate real excitement. At *EDN*, we've noted that our readers respond in a really big way to about a hundred new products each year. Thus was born our year-end feature, the *EDN* Top 100 Products. Take a look at what's new this year.

▶Communications

PHYSICAL-LAYER CHIPS COVER LONG DISTANCES AT HIGH SPEEDS. Mysticom's 10/100/1000 Ethernet MY1001 physical-layer chip operates on 140m of cable within standard bit-error rates. The device has a power consumption of 1.8W; wake-on-LAN and energy-detect-power-down modes; and a power-optimizer function, which optimizes power consumption based on operating mode and cable quality. Additionally, the device employs real-time adaptive line conditioning. The $20 (1000) MY1001 is available in a 128-pin, 14×20-mm PQFP. Mysticom's MY3004 10G physical-layer chip is $85 (1000).
▶**Mysticom**, 1-650-210-8080, www.mysticom.com.◎Enter No. 400

DESIGN KIT BOASTS FOUR 3.125-GBPS LINKS. Xilinx derived the RocketIO design kit for Cadence SpecctraQuest from the Rocket I/O design kit that Teradyne develops and markets. A key component of the design kit, the XAUI (10-Gbps attachment-unit interface)-compliant backplane for FPGAs, provides connectivity at 10-Gbps data rates and includes four 3.125-Gbps links. The product also includes single-pair coupled connector models for Teradyne's VHDM-HSDTM connectors to provide a serial backplane operating as fast as 3.125 Gbps on one channel. The high-speed, serial signaling approach is compatible not only with backplanes, such as XAUI and Xilinx's Aurora, but also with connectivity standards.
▶**Xilinx**, 1-408-559-7778, www.xilinx.com.◎Enter No. 401

SERDES CHIP SET TARGETS OC-768 APPLICATIONS. Sierra Monolithics manufactures its SIM4021/31 serializer/deserializer chip set using a silicon-germanium process technology. The SIM4021 16-to-1 multirate multiplexer integrates a clock-multiplier unit and a 10-layer-deep FIFO buffer to handle timing drift and wander between the data and reference clocks. The SIM4031 1-to-16 multirate demultiplexer integrates a clock-and-data-recovery unit that operates at 37 to 46 Gbps. $3400 (10,000).
▶**Sierra Monolithics**, 1-310-379-2005, www.monolithics.com.◎Enter No. 402

PRODUCT-INDEPENDENT SWITCH FABRIC SCALES TO SUPPORT FASTER TRAFFIC RATES. Agere's PI-40 is a family of multistage, multiterabit OC-768c-capable switch fabrics. The PI-40X integrates 40 2.5-Gbps, full-duplex serializer/deserializer I/O ports and a clock-and-data-recovery unit. The PI-40C has 64 2.5-Gbps ports. Both the PI-40X and PI-40C consume 1W/Gbps of switching and support linear scalability of 80 Gbps to 2.5 Tbps. The PI-40X costs $1100 (1000), and the PI-40C costs $1230 (1000).
▶**Agere**, 1-800-372-2447, www.agere.com.◎Enter No. 403

DEVICE OFFLOADS IPSEC. Corrent's CR7120 IPsec (Internet Protocol-security) processor handles complete IPsec packet handling at speeds as high as 3 Gbps with an average packet greater than 500 bytes. The device concurrently performs all IPsec processing, including

encryption and decryption, at full-duplex, gigabit-IP data rates with worst-case 64-byte packets. It simultaneously executes as many as 2300 main-mode tunnel setups/sec using the Diffie-Hellman/RSA-sign method. $350 (1000).
▶**Corrent**, 1-480-648-2300, www.corrent.com.◎Enter No. 404

DEVICE BRIDGES HYPERTRANSPORT, PCI-X. PLX Technology's PLX PowerDrive HT7520 HyperTransport-tunnel-to-dual-PCI-X bridge features two 133-MHz PCI-X bridges, a 16-bit HyperTransport link running at 800 MHz, a DDR scheme for 6.4-Mbps bandwidth, and a HyperTransport tunnel with a second 8-bit HyperTransport link. You can daisy-chain as many as 31 HT7520s with support for double-hosted chains. The dual PCI-X architecture allows as many as 10 PCI masters. Because the PCI-X is limited to the slowest device on the bus, you can also optimize system performance by placing high-speed devices on one PCI-X bus and grouping relatively lower speed devices on the other bus to enable the high-speed devices to run at full rate. The HT7520 costs less than $100 (high volumes).
▶**PLX Technology**, 1-800-759-3735, www.plxtech.com.◎Enter No. 405

INFINIBAND SWITCH CHIP RUNS AT 10 GBPS ON EIGHT PORTS. The HDMP-2840 InfiniBand switch, which RedSwitch developed with Agilent Technologies, has eight full-duplex ports running at 10 Gbps, or 4×. You can use each port as a 4× port or as one 1× port. Each port has a 20-kbyte input buffer and 5-kbyte output buffer per port. An internal 16-kbyte unicast routing table holds as many as 16,383 entries. The device also has a 512-byte multicast table. It supports eight virtual lanes programmable to one, two, four, or eight lanes in addition to a management lane. Virtual-lane arbitration supports 32 of each high and low priority weight pairs. Built-in self-test and power-on self-test blocks provide additional testing. Worst-case power consumption is 18W. The device costs $600 (1000).
▶**RedSwitch**, 1-408-719-4888, www.redswitch.com.◎Enter No. 406

CHIP SET SUPPORTS ULTRAWIDEBAND. XtremeSprectrum's Trinity chip set comprises three complementary CMOS ICs with a silicon-germanium low-noise amplifier as the front end. Their implementation uses a patented biphase-modulation method that provides greater power efficiency and higher data rates at a given distance than do other modulation methods. In addition to the XSI 102 receiver low-noise amp with its selectable gain of 0/20 dB and noise figure of 5.6 dB, the Trinity chip set includes the XSI 112, RF transceiver with transmit, receive, bias/control, and timing functions; the XSI 122 digital baseband IC with a MAC (media-access-controller) interface, baseband PHY, and an ADC; and the XSI 141 MAC for streaming-media applications based on the emerging TDMA-based IEEE 802.15.3 standard. The chip set costs $19.95 (100,000).
▶**XtremeSpectrum**, 1-703-269-3000, www.xtremespectrum.com.
◎Enter No. 407

▶Components, hardware, and interconnect

PROGRAMMABLE DISPLAY DRIVER TARGETS LARGE, OUTDOOR LED SCREENS. Micrel's MIC5400 digitally programmable display driver has 16 outputs arranged in two banks of eight channels. Each bank has its own 4-bit, coarse-brightness-control DAC, and each output has a 10-bit, fine-intensity PWM control. Outputs can each sink as much as 30 mA, and you normally use four outputs per pixel cluster—two for red, one for green, and one for blue. (You use two red LEDs for each green and blue LED to equalize perceived brightness.) You can daisy-chain the serial-interface, 28-lead SOICs for large displays. To minimize supply transients, each output of the IC switches with 8.3-nsec delay with respect to adjacent outputs. $4.70 (1000).
▶**Micrel Inc**, 1-408-944-0800, www.micrel.com.◎Enter No. 408

FIVE-CORE MAGNETIC MODULE PROVIDES ETHERNET MATCH. The H0026 magnetic module from Pulse packs a quintet of cores into a small, surface-mountable package, with a 1:1 turns ratio to match the requirements of many physical-layer ICs as well as the 10/100 BaseT Ethernet specifications. Measuring just 0.39×0.50 and 0.088 in. high (9.8×12.6×2.24 mm) and sporting 1.5-dB insertion loss from 100 kHz to 100 MHz, the J-lead H0026 is suitable for 10/100-Gbps PC Card LAN and Cardbus Ethernet applications. Prices begin at $2.53 (10,000).
▶**Pulse Engineering**, 1-858-674-8100, www.pulseeng.com.◎Enter No. 409

SOLID-STATE RELAY FEATURES DUAL MOSFETs FOR OUTPUT FLEXIBILITY. Solid-state relays from Fairchild Semiconductor give you the benefits of optical coupling along with a flexible output structure. Targeting telecomm applications, all of the units feature an aluminum-gallium-arsenide infrared LED feeding a photodetector that drives power MOSFETs. The six-hole packages have 4000V rms isolation. The four models—HSR312, HSR412, HSR213L, and HSR412L—are functionally identical but differ in specs such as load voltage rating (250 versus 400V) and other factors. Prices begin at 85 cents (1000).
▶**Fairchild Semiconductor**, 1-207-775-8100, www.fairchildsemi.com.
◎Enter No. 410

SURFACE-MOUNT DEVICE PROVIDES CURRENT PROTECTION. By using a new formulation of its PPTC (polymeric positive-temperature-coefficient) material, Tyco's Raychem Division has produced a nonlinear thermistorlike device that simplifies circuit protection in telecom line cards and power supplies. The surface-mount Polyswitch TSM-600-250 provides overcurrent protection for DSL and similar needs with two closely matched channels in a space-saving

package, providing balanced protection for tip-and-ring circuits. The devices cost 80 cents (100,000).
▶**Tyco Electronics, Raychem Circuit Protection**, 1-650-361-6900, www.tycopowercomponents.com.◎Enter No. 411

BATTERIES CHARGE IN JUST 15 MINUTES. Rayovac Corp's In-Cell Charging Control is a new approach to popular fast-charging NiMH batteries. The approach relies on a clever integral pressure switch within the cell's top to monitor and then terminate charging when internal pressure, which indicates charge status, reaches a limit. Unlike conventional techniques, this pressure-based method offers full charging in 15 minutes; a lower cost charger unit; and, due to nonobvious internal-recombination factors, an improved anode/cathode material ratio for about 20% increased cell capacity. You can recharge the batteries as many as 1000 times, and they incorporate several additional safety mechanisms in addition to the basic pressure switch to avoid overcharging and cell rupture. Overall, the charger plus cells will cost about the same as today's slower charging, lower-capacity products.
▶**Rayovac Corp**, 1-608-275-3340, www.rayovac.com.◎Enter No. 412

LIGHT SENSOR PROVIDES SMBUS OUTPUT. Designed to sense ambient light and then control screen backlighting to reduce power consumption, the TSL2550 from Texas Advanced Optoelectronics Solutions provides a digital output via an SMBus interface. The IC combines the output of its two photodetectors—one for visible light to match the eye's response and one for infrared light. The infrared photodetector compensates for the perceived influence of the infrared light within the ambient light. This technique eliminates the need for optical filters and lets you determine the type of ambient light and thus the amount of backlighting you need. The eight-pin TSL2550 costs $1.59 (1000).
▶**Texas Advanced Optoelectronics Solutions**, 1-972-673-0759, www.taosinc.com.◎Enter No. 413

LOW-VOLTAGE CURRENT PROTECTION IN A SMALL PACKAGE. A series of chip fuses from Cooper Bussman gives you overcurrent protection in a 0603/1608 (0.06×0.03-in./1.6×0.8-mm) footprint. The 0603FA series has a voltage rating of 32V dc (250 mA to 2A) or 24V dc (2.5 to 5A) and opens at 200% of their rated current. The company prints these fuses on a ceramic substrate and then encapsulates them in glass, so they don't burn or char when they pop; other fuses on the market use an epoxy-covered glass-matte material with lower flashpoint.
▶**Cooper Bussman**, 1-561-742-1178, www.cooperet.com.◎Enter No. 414

SAW RESONATORS SUIT SMALLEST UNITS. For small, low-cost units, such as remote-keyless-entry or tire-pressure-monitor devices, the frequency-determining elements constitute a major design consideration. Murata Electronics claims that its SARCC series of SAW resonators are the smallest in

the industry, initially providing a choice among oscillation frequencies of 304.30, 315, 423.22, 433.87, 433.92, and 434.15 MHz and four tolerances of ±50 to ±100 kHz. These 32-mg units have a 3×3-mm footprint and 1.15-mm height, so their footprint, volume, and weight are respectively 45%, 30%, and 50% less than their equivalent parameters in existing Murata units. Price in volume quantities is less than $1.
▶**Murata Electronics North America**, 1-770-436-1300, www.murata.com.
◎Enter No. 415

CONNECTORS SMOOTH WAY FOR 3.125-GBPS PATH VIA FR-4 BASE. Fujitsu's matched-impedance MicroGiGaCN series includes a board-to-board, right-angle socket that mates with a plug connector. Available in 12-, 24-, or 36-pair versions, the connector allows differential LVDS transmission at 3.125 Gbps and higher rates, using standard FR-4 pc-board material. Each signal pair is shielded internally, resulting in tight 10% impedance matching, along with near-end crosstalk of less than 4% at 50-psec rise time. The connector has a 0.75-mm signal-to-ground and 1.5-mm signal-to-signal contact pitches, with 0.5-mm SMT lead pitch. The FCN260 costs $5.50 (10,000).
▶**Fujitsu Components America**, 1-408-745-4900, www.fcai.fujitsu.com.
◎Enter No. 416

▶Analog ICs and discretes

NOVEL ARCHITECTURE IMPROVES RMS-TO-DC CONVERSION. Linear Technology's ΔΣ-based LTC1966 converter accepts single-ended or differential inputs with peak amplitudes as large as 1V and crest factors as high as four. Its nonlinearity is 0.15% maximum over −40 to +85°C. Additionally, the converter's bandwidth, ±1% at 6 kHz and −3 dB at 800 kHz, does not vary with signal amplitude, as the log/antilog types do. You can power the chip from single supplies of 2.7 to 5.5V or from bipolar supplies of ±1.35 to ±5V. The $2.95 (1000) LTC1966 fits into an MSOP8.
▶**Linear Technology**, 1-408-432-1900, www.linear.com.◎Enter No. 417

LVDS REPEATER UPS SPEED BY 33%, IMPROVES MODELING OUTLOOK. A quartet of LVDS-interface ICs from Fairchild Semiconductor targets switched-fabric interconnects. The devices, which include 1:1, 2:2, 4:4, and 8:8 configurations, provide the requisite signal-level translation and buffering for backplane or cable installations. Receiver inputs are compatible with LVPECL, HSTL, and SSTL-2 signals. Random jitter is 3.5 psec, maximum deterministic jitter is 135 psec, maximum propagation delay is less than 1.5 nsec, and interchannel skew is less than 35 psec. The devices feature power-off, 6-kV ESD (human-body model), and open- and short-circuit protection. From 90 cents to $5.95 (1000).
▶**Fairchild Semiconductor International**, 1-207-775-8100, www.fairchildsemi.com.◎Enter No. 418

MEMS-BASED OPTICAL EQUALIZER MANAGES GAIN WITHOUT PAIN. The Model 2200 dynamic gain equalizer from the Silicon Light Machines simplifies maintaining signal-strength flatness over the bandwidth of the numerous wavelengths of a DWDM system. A proprietary MEMS GLV (grating light valve) in the Model 2200 uses an electronically controllable comb of moving, fingerlike ribbons to implement optical diffraction principles in a well-defined way. The unit also includes electronic, mechanical, and optical components in a sophisticated configuration. The assembly comes in a metal enclosure that measures approximately 98×

110×20 mm. An external pc board that is slightly smaller than the box provides additional control electronics. Approximately $8000.
▶**Silicon Light Machines**, 1-408-541-1990, www.siliconlight.com.
◎Enter No. 419

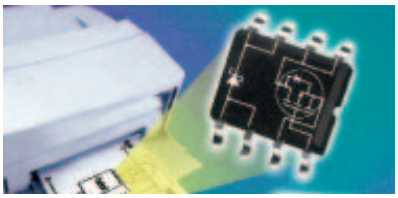
ADSL LINE DRIVER RUNS COOL ON SINGLE SUPPLY. The AD8393 from Analog Devices, optimized for operation with a 1-to-1.2 transformer ratio, reduces line-driver power dissipation to 575 mW for nonoverlapped (19.8-dBm) and 624 mW for overlapped (20.4-dBm) applications. To do so, the driver must deliver a peak signal greater than 18V—a tall order for a part running on a unipolar 12V or bipolar 6V supply. The 8393 sources its peak output voltage by means of a clever linear charge pump. Unlike clocked pumps, which maintain a fixed ratio between the pump voltage and the supply, the AD8393's linear charge pump acts only when the signal exceeds the dynamic range afforded by the 12V rail. $3.95 (1000).
▶**Analog Devices**, 1-781-329-4700, www.analog.com.◎Enter No. 420

INTEGRATED AUDIO AMP DELIVERS HIGH-QUALITY OUTPUT POWER. National Semiconductor's LM4851—a tiny, 12-bump micro-SMD, three-channel amplifier—routes one monophonic and one stereophonic input to an on-chip monophonic-speaker amplifier or stereo-headphone amplifier in any combination. The same 3-bit "output-mode" configuration word shuts down those amplifiers that a particular task does not need. The part can adjust its stereo input gain from −45.5 to 6 dB in 1.5-dB increments. National Semiconductor designed the monophonic input for cell-phone modules with their own volume controls, so the signal paths from the mono input to the headphone and speaker outputs give 0 and 6 dB of gain, respectively. $1.10 (1000).
▶**National Semiconductor**, 1-800-272-9959, www.national.com.
◎Enter No. 421

TRANSMITTER/RECEIVER PAIR MEETS OPTICAL-SWITCH-MARKET BANDWIDTH NEEDS. Picolight's Magnus

family includes the PL-TCP-00-Sxx series of 12-fiber transmitters based on 850-nm VCSEL arrays and the PL-RCP-00-Sxx family of mating receivers. Individual models operate with data rates to 1.6, 2.5, or 2.7 Gbps for an aggregate bandwidth as high as 32 Gbps in less than an inch of board-edge space. The module's footprint is only twice that of industry-standard small-form-factor modules that operate single 1-Gbps strands. The 12 channels operate asynchronously for VSR rack-to-rack and switch-to-switch connections. From $1500 (low OEM volumes).
▶**Picolight**, 1-303-530-3189, www.picolight.com.◎Enter No. 422

MOSFET PLUS SCHOTTKY DIODE REDUCE SPACE AND COST. Expanding on its FETKY family, International Rectifier has introduced two p-channel MOSFETs, copackaged with Schottky diodes on the same heat spreader, in SO-8 packaging. The copackaging also reduces stray inductance and pc-board resistance, thus reducing voltage spikes



and inefficiency. Both the IRF5803D2 and the IRF7342D2 target use in buck-converter designs and use 60% less board space than discrete implementations. The devices cost 37 and 46 cents (10,000), respectively.
▶**International Rectifier Corp**, www.irf.com.◎Enter No. 423

THREE-PIN HOT-SWAP CONTROLLER REQUIRES ONE EXTERNAL PART. The Supertex HV100 hot-swap controller automatically adapts to the pass FET's operating characteristics, despite widely differing C_{ISS} and R_{ON}. The HV100 prevents excessive inrush current during module swaps in 48, −48, and 24V applications, including telecomm, datacomm, and industrial control. The SOT-223 version has an undervoltage-lockout threshold of 15V. The MLP-3 has a 37V undervoltage-lockout threshold. The power-on-reset circuit resets a 3-msec timer any time during the reset interval when the undervoltage-lockout threshold detects a low input-supply voltage.
▶**Supertex**, 1-408-744-0100, www.supertex.com.◎Enter No. 424

▶Digital ICs

HIGH-SPEED DRAM FINE-TUNES ITS FOCUS. Toshiba's 0.13-micron fast-cycle RAMs deliver application-tailored feature optimizations. The parts offer 18-bit data buses and corresponding 288-Mbit densities (subdivided into four banks), supplying integrated 2-bit parity support for system-level error detection and correction on noise-prone high-speed buses. The 2.5V TC59LM-818DMB operates as fast as 333 MHz (albeit at extended initial latencies), with a corresponding 20-nsec random-access time. The DDR interface delivers 666-Mbps peak transfer rates. The device costs $45 (one).
▶**Toshiba**, 1-949-455-2000, http://fcram.toshiba.com.◎Enter No. 425

FPGA TAKES A CLEAN-SLATE APPROACH TO LOW PRICES. Altera's focus with its Cyclone family is on lower densities, lower speeds, and a more restricted set of features than that of the high-end Stratix family. Altera builds Cyclone on a detuned and one-metal-layer-reduced variant of Stratix's 0.13-micron copper process, at foundry partner TSMC. The Cyclone logic-cell structure appears to synthesis tools similar to the cell of other Altera FPGAs. But internal optimizations have made it 30% smaller than the Stratix logic cell. Cyclone comes with a lower memory-to-logic ratio than Stratix, the embedded memory runs at lower speeds (estimated at 200 MHz maximum), and Altera has removed support for dedicated FIFO circuitry, full dual-port capability without density tradeoffs, and other specialty-memory features. $4 to $40 (250,000).
▶**Altera**, 1-408-544-6879, www.altera.com.◎Enter No. 426

CPLD MINIMIZES POWER CONSUMPTION, MAINTAINS PERFORMANCE. Xilinx's CoolRunner-II is a single-chip, nonvolatile, and in-system-updateable CPLD on an EEPROM platform. Xilinx claims less-than-100-μA standby current for CoolRunner-II, along with 7.2 mW typical active power draw. Propagation delays are as low as 3.5 nsec for the 32-macrocell version and 6 nsec for the 512-macrocell part, coupled with 300-MHz clock frequencies. All family members offer 2× clock multipliers at each macrocell; 128-macrocell and larger CoolRunner-II devices also include a 2× to 16× on-chip clock divider. The 64-macrocell part costs $1.90 (100,000).
▶**Xilinx**, 1-408-559-7778, www.xilinx.com.◎Enter No. 427

ROUTING REVAMP HIGHLIGHTS FPGA REFRESH. Stratix—Altera's most significant programmable-logic overhaul in a decade—supports three route lengths and widths, none of them spanning an entire device, in consistent lengths and proportions across a range of device densities, and with uniformity that's tuned for block-based design. Stratix offers three onboard-memory structures, each with application-optimized array numbers, densities, and bus widths. The chips' 0.13-micron process has nine layers of copper—two for power and ground, one for the flip-chip interface, and six for routing and control. The process boosts the interconnect and routing speeds and capacities. The 2003 production price for the EP1S25 is $125 (50,000).
▶**Altera**, 1-408-544-7000, www.altera.com.◎Enter No. 428

FPGAs-PLUS-CPUs EXTEND DESIGN BOUNDARIES. Four of the five devices in the Virtex-II Pro family offer one or more 300-MHz, 420-Dhrystone-MIPS PowerPC 405GP microprocessor cores with 16-kbyte instruction and data caches. Virtex-II Pro's ASIC-housed peripheral set contains only timers and trace and debugging logic. Xilinx sur-

rounds each CPU core with FPGA tiles. The CPU interface to the rest of the chip occurs through partner IBM's CoreConnect bus standard. Xilinx also includes as many as 16 RocketIO high-speed serial transceivers. Running at 622 Mbps to 3.125 Gbps per two-wire-pair channel, the RocketIO transceivers offer multichannel bonding, on-chip terminations, 8B/10B encoders and decoders, clock and data recovery, and flexible serializer/deserializer interfaces to wider, slower internal buses. Xilinx intends to price the chips at no more than a 10 to 15% premium over the company's CPU- and RocketIO-less counterparts with equivalent amounts of FPGA logic.
▶**Xilinx**, 1-408-559-7778, www.xilinx.com.◎Enter No. 429

MLC-FLASH MEMORY OFFERS LARGE DENSITY. Toshiba's MLC (multilevel-cell) variant of the 512-Mbit NAND flash memory is available in 512-Mbit and MLC-enabled 1-Gbit devices that offer the variations you've come to expect from other MLC technologies, such as Intel's NOR-based StrataFlash: larger blocks, slower per-byte programming times, and delayed random-read cycles. The 2.7 to 3.6V, $80 (one) TC58010FT comes in 48-lead TSOP packaging.
▶**Toshiba,** 1-949-455-2000, www.toshiba.com/taec.◎Enter No. 430

FLASH BREAKTHROUGH DOUBLES DENSITY. Advanced Micro Systems' 0.23-micron, MirrorBit flash memory offers 90-nsec random and 25-nsec page-mode-per-word read speeds for a 4-word-per-read page and 6-μsec page-mode-per word programming for a 16-word program page. It also provides 0.1-sec erase times for each 64-kbyte block, 1-μA standby current at 3V, 20-year data retention at 125°C, and guaranteed 100,000-erase-cycle endurance with 1 million-cycle testing in progress. The $7.95 (10,000), 64-Mbit MirrorBit is available in multiple BGAs and TSOPs packaging options.
▶**Advanced Micro Devices**, 1-408-732-2400, www.amd.com.◎Enter No. 431

RAM-TRANSFORMED LOGIC BUILDS ON A NO-BATTERIES FOUNDATION. Lattice's ispXPLD architecture is a combination of SRAM-based CPLD routing and logic cells, with nonvolatile configuration storage. Each ispXPLD multifunction block, when in product-term mode, is reminiscent of Lattice's SuperWide ispLSI5000 devices with 68 inputs and 32 macrocells. Alternatively, the multifunction block can construct an 8-kbit dual-port RAM, 16-kbit single-port or pseudo (one read/write port, one read-only port) dual-port RAM, 16-kbit FIFO with built-in control logic, or 128×48-bit ternary content-addressable memory. Because you can preload all of the memory structures at power-up, you can alternatively use them as ROMs. The $17.75 (1000) ispXPLD5512MC comes in a 256-bump fine-pitch BGA.
▶**Lattice Semiconductor**, 1-503-268-8000, www.latticesemi.com.
◎Enter No. 432

EMBEDDED MEMORY YIELDS HIGH RELIABILITY. MoSys' 1T-SRAM, a DRAM derivative, comes in an ultra-high-reliability variant. Because MoSys' partners manufacture 1T-SRAM on metal-rich logic processes rather than polysilicon-prevalent DRAM processes, 1T-SRAMs have historically delivered slightly lower cell capacitance and, therefore, lower reliability than true DRAMs. At first glance, 1T-SRAM-R might appear to be a step backward, because the company has shrunk the cell and, therefore, the capacitor size by 20% from the 1T-SRAM predecessor. However, the silicon area this approach frees up means that MoSys can include ECC bits and associated Hamming Code logic with no overall increase in array size and a significant overall increase in reliability compared with both the 1T-SRAM and the DRAM alternatives. MoSys prices 1T-SRAM-R with an incremental licensing fee but no incremental per-unit royalty payments over 1T-SRAM.
▶**MoSys**, 1-408-731-1800, www.mosys.com.◎Enter No. 433

▶EDA

SUITE INTEGRATES RF AND DSP ANALYSIS. Applied Wave Research Inc's VSS2002 communication-design suite enables system engineers to perform top-down analysis of analog and digital communications systems. The company integrates the product with its Microwave office 2002 circuit-design suite, enabling bottom-up analysis when you incorporate transistor-level effects at the system level. The VSS2002 interactive tool models, analyzes, and optimizes analog- and digital-communication systems. It enables users to build graphical block diagrams and analyze the performance using built-in measurements and signal generators that support virtually any modulation scheme. Prices for perpetual licenses are $15,000 to $33,000, depending on simulation capabilities. VSS2002 is a free upgrade for existing customers of Acolade with valid maintenance agreements.
▶**Applied Wave Research Inc**, 1-310-726-3000, www.appwave.com.
◎Enter No. 434

TOOL LETS YOU SPY ON YOUR DESIGN. Version 3.0 of Atrenta's SpyGlass predictive-analysis tool employs a proprietary fast-synthesis engine that allows it to examine the hierarchy in the design and check for issues with inferred objects. The tool then flattens the hierarchical gate-level structure, looking for problems that simulation often overlooks. Version 3.0 offers a new GUI that can display a schematic of the synthesized logic so that designers can cross-probe between their RTL code and the schematic. The tool highlights violations and the corresponding RTL code on the schematics. Prices start at $60,000 for a yearly license.
▶**Atrenta**, 1-408-453-3333, www.atrenta.com.◎Enter No. 435

SIMULATOR SOLVES RF, HIGH-SPEED, AND COMMUNICATION PROBLEMS. The Ansoft Designer integrates electromagnetic, circuit, and system simulators for RF, high-speed, and communication design. It lets engineers determine the

electrical behavior of a device based on its physical attributes, eliminating the need to develop electrical models through measurement and creating equivalent circuits based on empirical fitting. The software ties this electromagnetic modeling into a general circuit or system-level design environment with a seamless link to layout. The product provides communication-system engineers with flexible behavioral modeling and baseband models with properties that comply with communication standards. From $5000.
▶**Ansoft**, 1-412-261-3200, www.ansoft.com.◎Enter No. 436

SYSTEM TARGETS DESIGN SHARING AND REUSE. Novas Software's Verdi System combines behavior-based debugging capabilities with the features of Novas' Debussy knowledge-based debugger. Verdi analyzes the behavior of a design by automatically inferring its logic functions from the RTL or the gate-level description. The tool also interprets simulation results to generate an internal model of actual design behavior over time. It shows how control and data flow through the design with register-and statement-flow graphs. You can isolate active logic paths to reveal the root causes of design behavior, and you can trace signals back through time to show how an unfamiliar design works. Prices for an annual subscription license that supports Verilog, VHDL, and mixed-language designs start at $14,000.
▶**Novas Software**, 1-408-467-7888, www.novas.com.◎Enter No. 437

TOOL SIMULATES FULL CHIP AT CIRCUIT LEVEL. Nassda's full-chip, circuit-level Lexsim simulator provides postlayout verification of large ICs and their associated power networks. Lexsim simulates the effects of both the power network and the signal interconnects. It employs techniques that reduce power-network parasitics to manageable levels with only a slight degradation in accuracy. It also addresses IR-drop failure in large ICs by incorporating interconnect parasitics it extracts from postlayout design to the prelayout design netlist. Prices for Lexsim start at $180,000 for a time-based license. It runs on Solaris, HP-UX, Windows NT/2000, and Linux platforms.
▶**Nassda**, 1-408-562-9168, www.nassda.com.◎Enter No. 438

SOFTWARE TOOL OFFERS NEW APPROACH TO ANALOG, MIXED-SIGNAL DESIGN. Creative Genius builds a database of circuits from a transistor-level netlist, testbenches, objectives, process and environmental variations, and variables. The netlist comes from a schematic created using editors from either Mentor Graphics or Cadence. Designers directly supply testbenches and objectives. Engineers can also define variations imposed by either the operating environment or the process. Creative Genius generates a number of circuits by simultaneously considering all of the input specifications that could meet a designer's goals. Engineers can then evaluate the results and choose one. Creative Genuis costs $80,000 to $180,000, depending on capabilities.
▶**Analog Design Automation**, 1-408-741-8288, www.analogsynthesis.com.
◎Enter No. 439

HIERARCHICAL FLOORPLANNER SUPPORTS TIME-BUDGET DEVELOPMENTS. Time Builder is a hierarchical gate-level floorplanner that complements InTime Software's Time Architect. It uses the floorplan that the company's Time Planner RTL planning product generates as its starting point and places any combination of gates, blocks, cells, and RTL. Time Builder has all of the capabilities of Time Planner and adds hierarchy and more powerful interactive capabilities that enable designers to traverse the design hierarchy and perform edits even inside a hard block. When blocks move, power and ground move with them and are updated on the fly. Prices for an annual time-based license for Time Builder start $175,000.
▶**InTime Software**, 1-408-565-0111, www.intimesw.com.◎Enter No. 440

IC-ANALYSIS TOOL SUPPORTS WINDOWS AND UNIX PLATFORMS. Release 2002 of the IC-CAP (IC-characterization-and-analysis program) from Agilent runs on Windows 2000 and NT 4.0 and on Unix operating systems. The IC-CAP software environment provides a platform for data management, GUI, data display, and custom programming with IC-CAP-parameter-extraction language. IC-CAP includes several internal simulation engines, as well as links to external simulators. It also provides dc-to-RF extraction routines for industry-standard models; Agilent-developed, nonlinear, high-frequency models; an easy-to-use, window-style user interface; a large data-handling capability; and an open interface to a variety of instruments and simulators. The Agilent 85199A IC-CAP software environment module is a free upgrade to registered customers; otherwise, prices start at $13,000.
▶**Agilent Technologies**, 1-650-752-5000, www.agilent.com/eesof-eda.
◎Enter No. 441

▶Multimedia

IMAGE SENSOR DELIVERS TRIPLE VISION. Taking advantage of the fact that silicon absorbs red, green, and blue light at different depths, X3-technology sensors embed three photodetectors per pixel—one at each of these depths. The resulting arrangement has twice as many green detectors and four times as many red and blue detectors as a Bayer pattern has, along with accurate per-pixel captured data across the entire visible color spectrum. The company's F07-35X3-A25 is the image-capture foundation of Sigma's less-than-$3000 SD9 digital camera. The sensor's specifications include a 9-micron pixel; a 2304×1536-pixel matrix, of which 3,429,216 are optically active; and a 25-mm-diagonal sensor. The cost-optimized F10-14X3-D08 offers 5-micron pixels; a 1344×1024-pixel matrix, of which 1,228,800 are active; and an 8-mm-diagonal sensor.
▶**Foveon**, 1-408-350-5100, www.foveon.net.◎Enter No. 442

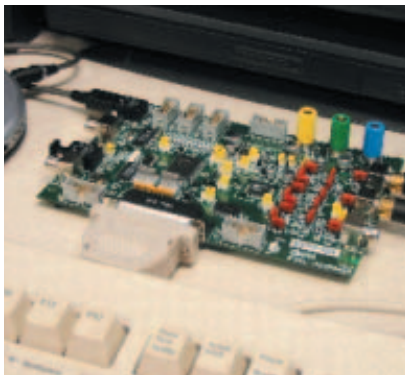
MEDIA PROCESSOR SUITS PIXEL-BASED PARALLEL-PROCESSING TASKS. Atsana Semiconductor's J2210 media processor resurrects array-processing techniques with a 96-processor matrix and companion Virage Logic-developed, 384-kbyte, embedded-SRAM array, focusing on still- and video-image encoding and decoding. The chip also integrates a companion ARM 9 CPU for system control; audio processing in CELP, AMR, G.723.1, G.726a, G.729, and other formats; and portions of mulitpixel-interactive functions, such as blur, sharpen, and other filtering and blending operations. The J2210 supports precompression image-processing tasks, such as Bayer pattern decoding and component video-to-RGB transformations, and it interfaces to a broad range of CMOS sensors, according to the manufacturer. $19.
▶**Atsana Semiconductor**, 1-613-224-9926, www.atsana.com.
◎Enter No. 443

POWER-ATTENTIVE COPROCESSOR SHOOTS FOR A CLEAR PICTURE. MediaQ's MQ-1168 extends the MQ-1100's intelligent upscaling and downscaling to encompass a digital-video input at resolutions ranging from less than QCIF to VGA, along with front- and back-end color-space conversion between RGB and YUV formats. It enhances the MQ-1132's DMA functions, and it expands the output-resolution and graphics-acceleration capabilities of the cellular-phone-targeted MQ-2074. By offloading memory- and data-intensive multimedia applications from the CPU, MediaQ anticipates that the MQ-1168 will reduce overall system-power consumption. The MQ-1168 interfaces to PCI and to multiple CPUs, and it supports both the Palm and the Windows CE operating systems. It costs $11.50 (10,000 per month).
▶**MediaQ**, 1-408-733-0080, www.mediaq.com.◎Enter No. 444

GRAPHICS ACCELERATOR TARGETS DESKTOP AND NOTEBOOK PCs. Trident's XP4, which has four pixel pipelines, exploits tiling techniques to minimize back-and-forth data shuffling between graphics chip and the frame buffer, reducing power consumption that such data traffic generates and minimizing the required frame-buffer site with little-to-no performance tradeoffs. XP4 comes in a 612-bump BGA package and in T1, T2, and T3 versions. T1 and T2 both internally run at 250 MHz. T1 has a 64-bit bus and with 250-MHz DDR (500-MHz data) SDRAM achieves 4-Gbps peak-memory bandwidth. T2's 128-bit bus doubles T1's peak-memory bandwidth. T3 specifies a 300-MHz core and 350-MHz DDR (700-MHz data) 128-bit interface to as much as 256 Mbytes of SDRAM. The $30.95 (100,000) T1, $34.95 T2, and $39.95 T3 have, respectively, $29 (32-Mbyte, 400-MHz), $79 (64-Mbyte, 500-MHz), and $99 (128-Mbyte, 700-MHz) estimated retail-board prices.
▶**Trident Microsystems**, 1-408-991-8800, www.tridentmicro.com.
◎Enter No. 445

AUDIO-PROCESSING ALGORITHMS SUPPRESS AMBIENT NOISE. Analog Devices' next-generation SoundMax Cadenza software integrates Andrea Electronics' PureAudio and DSDA noise-cancellation algorithms. PureAudio detects and deletes repetitive background noise. You can apply this algorithm to any microphone. DSDA works in reverse, suppressing audio information that isn't common to both channels and thereby creating a narrow reception cone of microphone sensitivity. DSDA focuses on a user's voice and cancels out repetitive or random noise outside that signal. You can apply the approach to videoconferencing, Internet telephony, voice recognition, and other audio-input-centric computer applications. The software is available for no cost when it is running on a codec priced at $1.80 (single-channel codec variant, 100,000).
▶**Andrea Electronics**, 1-631-719-1800, www.andreaelectronics.com.
◎Enter No. 446

DAC-INCLUSIVE DSP ENCOURAGES A DIGITAL CONVERSION. Analog Devices' 25-MIPS, 26-bit (48-bit with double precision) AD1954 SigmaDSP processor accepts multiple digital input sources and integrates an SPI-controlled front-end multiplexer and three back-end, 112-dB (at 48 kHz sampling rate) delta-sigma DACs. The SPI port lets you modify the ROM-stored parameter and program-RAM values, which you generate using Windows-based development software. Coefficients in the



parameter RAM control the seven-band IIR equalization filters, the dual-band dynamic-range compressor and limiter, delay values to alter the perceived speaker locations, and settings for the PhatStereo image-spreading algorithm. The 5V AD1954 costs $5 (10,000).
▶**Analog Devices**, 1-781-329-4700, www.analog.com.◎Enter No. 447

CODEC COMPREHENDS A PLETHORA OF APPLICATIONS. Audio enhancements to Version 9 of Microsoft's Windows Media algorithms include both dual-channel, Consumer and surround, Professional lossy codecs, along with a lossless-audio codec for degradation-free archival purposes. Variable-bit-rate lossy encoding makes optimum use of the available download bandwidth and storage capacity. An enhanced speech codec dynamically alters its characteristics when it senses music in the mix—during commercials, for example—for improved quality at narrowband streaming bit rates. Video developments, along with the now-predictable quality improvements at each bit rate also comprehend real-time frame interpolation at resolutions as high as CIF, beginning at roughly 500-MHz CPU performance levels. Version 9 is free when you use it with a Microsoft OS.
▶**Microsoft**, 1-425-882-8080, www.microsoft.com/windowsmedia.
◎Enter No. 448

▶Processors

CHIP GIVES YOU HOTTER JAVA WITHOUT THE EXTRA HEAT. Nazomi Communications' JA108 Java-accelerator chip can accelerate software-interpreted Java code by 15 to 60 times, and it conserves battery life in a design. You insert the JA108 between the processor and the SRAM/flash. The chip looks and interfaces like an external 16-bit SRAM/flash device; is transparent to legacy software; and preserves a design team's choice of microprocessor, operating system, and Java virtual machine. In spite of increased Java performance, the chip does not affect system-clock frequency. You do not need additional memory or new tools, and you need not port the software. The JA108 directly executes all Java byte codes with 169 byte codes implemented in hardware and the remaining 33 byte codes executed on-chip via software. The approach consumes as much as 95% less power than does Java executed in software. $5.59 (10,000).
▶**Nazomi Communications**, 1-408-654-8988, www.nazomi.com.
◎Enter No. 449

CHIPS INTEGRATE HIGH-PERFORMANCE ANALOG AND DSP. Analog Devices' ADSP-2199x family of mixed-signal DSPs integrates high-performance analog and DSP technologies in a single general-purpose device. These devices target mixed-signal embedded-control and signal-processing applications. They integrate high-performance analog functions with a 16-bit, fixed-point, ADSP-219x multiply-accumulate core and, as a result, are code-compatible with ADSP-21xx and ADMC devices. The ADSP-21990 integrates the 219x DSP core with an eight-channel, 14-bit, 20 million-sample/sec ADC core with a typical SNR of 70 dB on one chip. The $18.45 (10,000) ADSP-21990 is available in 196-ball mini-BGA and 176-pin TQFP packages and supports operation across −40 to +85°C. The $21.95 (10,000) ADSP-21991 is pin-for-pin compatible with the ADSP-21990.
▶**Analog Devices**, www.analog.com.
◎Enter No. 450

IMAGING GETS INTEGRATED DSP AND CONTROL PROCESSING. Oak Technology has integrated a quad-processor DSP core with the ARM946E-S CPU core into the OTI-4110 single-chip system targeting PC-independent, personal-imaging, and printing applications. The ARM9 core includes a 4-kbyte instruction cache and 4-kbyte data cache and operates as fast as 160 MHz. The Quatro DSP core has a 4-kbyte instruction cache and a 32-kbyte embedded data memory and operates as fast as 210 MHz. To avoid stalling the DSP engine by waiting for data, the 128-bit bus between the Quatro DSP core's registers and data memory can sustain data rates of 3.36 Mbytes/sec. A 260-ball BGA package costs less than $15 (10,000).
▶**Oak Technology**, www.oaktech.com.
◎Enter No. 451

RISC-BASED VISUAL-SIGNAL PROCESSOR TARGETS REAL-TIME IMAGE PROCESSING. Chipwrights' fully C-programmable CW4011 system targets real-time video, MP@ML (main-profile-at-main-level) MPEG-2 encoding for battery-operated digital image-capture devices and offers an alternative to fixed-function-ASIC and high-end, very-long-instruction-word DSP devices. It can perform real-time MPEG-4 video encoding and VGA MPEG-4 streams at 30 frames/sec. It also supports simultaneous real-time CIF MPEG-4 (I+P frames) encoding and decoding for low-bit-rate video applications. The very-dense-instruction-word architecture supports a single programming target that supports the CW4011's eight parallel DSP-execution unit and can support future devices with as many as 16 parallel DSP units. The vector features include strided and scatter-gather memory accesses, uniform memory, conditional operations, and code independence from the number of datapaths. The 208-pin device is available in a PQFP or BGA packaging, and the 200-MHz part costs less than $20 (10,000).
▶**Chipwrights**, 1-617-928-0100, www.chipwrights.com.◎Enter No. 452

BRIDGING DSP TO A RISC ENVIRONMENT. Texas Instruments' dual-core OMAP5910 embedded processor integrates a TI TMS320C55x DSP with an ARM925 core in one device to target traditionally RISC-based development. Its interprocessor communication bridge allows developers to harness the signal processing and power efficiency of the DSP core as an abstracted coprocessor. In addition to the Texas Instruments' DSP/BIOS, the OMAP-5910 supports operating systems for the ARM core. Using standard APIs, the developer has an abstracted access, through the interprocessor communication bridge, to the algorithm library loaded on the DSP core. The $32 (10,000) dual-core system includes 192 kbytes of RAM; a USB 1.1 host and client; and an MMC/SD card interface.

▶**Texas Instruments**, 1-800-336-5236, www.ti.com.◎Enter No. 453

MULTIPROCESSOR-SOC-DESIGN ADVANCES. Enhancements to Tensilica's Xtensa V architecture include support for multicycle and nondeterministic devices through the XLMI (Xtensa local-memory interface). Another interface enhancement enables Xtensa to simultaneously execute instructions and handle read and writes to the processor's local data memory from external agents. A new write-back cache option can reduce system-bus traffic for systems that use shared-memory architectures. The instruction-set architecture includes a new processor-ID register that can uniquely identify each processor in an SOC design without any external logic or synchronization mechanisms. Price is a licensing fee per processor instance plus royalties based upon the volume of processors manufactured. The licensing fee for a single processor configuration, including a complete, configured Gnu-based software-development tool set, starts at $350,000. The standard license deliverables include source Verilog or VHDL RTL plus supporting EDA-tool scripts, a test suite, placement guidelines, and the customized software tool set.
▶**Tensilica**, 1-408-986-8000, www.tensilica.com.◎Enter No. 454

CORE GOES SUPER. SuperH's SH5-100 series 64-bit processor core has a floating-point unit, SIMD instructions, and on-chip debugging. It targets interactive multimedia applications running an operating system such as Windows CE, VxWorks, Linux, QNX, Nucleus+, OS-9, and JavaOS. The core supports dual-mode operation using 16- and 32-bit instructions and can dynamically switch between these modes on a branch instruction. The detachable IEEE-754 single- and double-precision floating-point-unit coprocessor within the general core includes separate floating-point registers that you can configure as 64 single-precision, 32 double-precision, or 16 single-precision vector registers. Pricing is a licensing fee plus royalty based on volume of cores. The license fee for a per-design license starts at $450,000.
▶**SuperH**, 1-408-456-2034, www.superh.com.◎Enter No. 455

▶Network Processors

DEVICE SPEEDS SEARCHES AS WIDE AS 576 BITS. Performing as many as 100 million database look-ups/sec, Integrated Device Technology's full-ternary search accelerators support searches as wide as 576 bits. The device also enables dynamic control of power consumption through the use of context databases. A reissue feature reduces the number of clock cycles associated with data re-entry during multiple database look-ups and enables searches at sustained maximum speed. The 32×72- and 64×72-bit configurations cost $60 and $105 (100,000). A 128×72-bit configuration costs $225 (100,000).
▶**Integrated Device Technology**, 1-800-345-7015, www.idt.com.
◎Enter No. 456

LICENSE SPI 4.2 FOR YOUR ICs. Silicon Access Networks licenses its SPI 4.2 technology as IP (intellectual property). SPI 4.2 is the chip-to-chip interface that the OIF recommends for datapath semiconductors, such as network processors and framers running at 10-Gbps data rates. The company will license the IP as SPI 4.2 Link Layer (named iSPI-Link and delivered as encrypted Verilog) and LVDS physical layer (named iSPI-PHY and delivered as a hard macro for a 0.13-micron TSMC process) blocks.
▶**Silicon Access Networks**, 1-408-545-1100, www.siliconaccess.com.
◎Enter No. 457

10-GBPS NETWORK PROCESSOR SUPPORTS A VARIETY OF PROTOCOLS. Terago's proNP 5010 performs multiservice classification, provisioning, and forwarding functions, supporting ATM, FAST, Point to Point Protocol, and Ethernet virtual-LAN data links with MPLS, IPv4, and IPv6 protocols. The device allows per-flow policing, packet editing for MPLS edge and tunneling applications, hard policing to reduce the impact of denial-of-service attacks, and peer-statistics gathering. The development environment includes a drag-and-drop configuration of various protocol and data formats, as well as per-flow performance profiling. The proNP 5010 costs $695 (10,000).
▶**Terago**, 1-408-941-9664, www.terago.com.◎Enter No. 458

SOFTWARE BLOCKS TARGET NETWORK PROCESSING. Teja Technologies' NP 2.2 supports Intel's IXA portability framework for the IZP2400 and IXP2800 network processors. Additionally, four new foundation applications are available: TCP Termination, IPv4 Forwarding, ATM, and Layer 2 Transparent Bridging. Price for the Teja platform is $12,500 per seat. One-time, project-based prices for source code for the application blocks cost $25,000 to $100,000 per block.
▶**Teja Technologies**, 1-408-288-2560, www.teja.com.◎Enter No. 459

10-GBPS NETWORK PROCESSOR TAKES IPV6 TO WIRE SPEED. The X10 family of network processors from Xelerated offers multiple 10-Gbps ports on a single chip. The devices use the PISC (packet-instruction-set-computer) architecture, which provides deterministic processing through a multistage packet-editing engine, operating on packets as they progress through the pipeline. On-chip acceleration engines handle classification counting, metering, and load balancing, and error-correcting code on all memories provides higher reliability. Four programmable low-voltage CMOS interfaces enable the device to gluelessly connect to various TCAM and SRAM devices and to coprocessors. The $500 (10,000) X10 has one 10-Gbps port and supports a guaranteed packet rate of 25 million packets/sec. The $850 (10,000) X10d offers two 10-Gbps ports for a total data rate of 50 million packets/sec), and the $1400 (10,000) X10q has four 10-Gbps ports for a total data rate of 100 million packets/sec.
▶**Xelerated**, www.xelerated.com.
◎Enter No. 460

▶Software

SOFTWARE RELEASE PROVIDES SCORES OF NEW PACKAGES AND FEATURES. The Mathworks offers (on a set of CDs and as downloads) new versions of all of its titles, of which the best known are Matlab, a high-performance math package with broad applicability, and Simulink, a block-diagram tool for modeling, simulating, and optimizing dynamic systems. The product line and the CD set include many other packages, however. Users who obtain even one package on CD get all of the packages. In fact, you can order a CD set even if you have never licensed Mathworks software but think that you might do so now. CD recipients can install any or (if they have enough hard-disk space) all of the packages and, for a limited trial period, use packages that they haven't licensed. A user who orders one package and then decides to license additional ones arranges for payment on the Web, via phone, or by submitting

a purchase order. US pricing for Matlab begins at $1900.
▶**The Mathworks**, 1-508-647-7274, www.mathworks.com.◎Enter No. 461

SOFTWARE PACKAGE MANAGES SWITCH MATRICES FROM SEVERAL VENDORS. National Instruments' $1995 Switch Executive works with the vendor's LabView and TestStand, as well as with languages such as Visual Basic and C and controls signal-switching hardware from any vendor that accompanies its modules or systems with IVI (interchangeable-virtual-instrument) driver software. Switch Executive allows you to assign meaningful names to your signals and provides a convenient, spreadsheetlike screen for entering information on which signals connect to which loads at each point in your test protocol. You can even create reusable "subroutines." Property windows for each switching device allow you to enter detailed information on withstand voltage, carry and break current, closure time, and others. Your setup can mix modules from different manufacturers.
▶**National Instruments**, 1-800-258-7022, www.ni.com.◎Enter No. 462

ANALYZE YOUR PRODUCTS IN HEAT OR COLD. Version 6.0 of CFdesign from Blue Ridge Numerics provides advanced computational fluid dynamic analysis in an easy-to-use package for fluid-flow and heat-transfer simulation. The PC-based tool uses native 3-D component and assembly models from standard mechanical CAD packages, as well as CAD systems using ACIS or the Parasolid modeling kernel. In addition to showing localized thermal analysis using a user-defined resolution grid, the software lets you do dynamic visualization to see your design from other perspectives and to zoom, rotate, and pan simulation. For design review and discussion, you can e-mail the graphical analysis to others on the team and to suppliers, and they can add comments to your own notes. CFdesign sells for $15,000 to $20,000 per seat.
▶**Blue Ridge Numerics Inc**, 1-434-977-2764 www.cfdesign.com.
◎Enter No. 463

DEVELOPMENT ENVIRONMENT TARGETS WEB. Visual Studio.NET (VS.NET) is Microsoft's language- and (largely) platform-independent development environment for Web-centric (and other) applications. Associated with Visual Studio.NET are several new languages, including Visual Basic.NET. Visual Basic.NET will be the successor to Visual Basic V6, and C# (pronounced C-sharp), which is Microsoft's answer to Java. VS.NET demands more system resources than other approaches but provides greater data security, more bulletproof code, and a friendlier environment. It is available for around $1100.
▶**Microsoft**, 1-425-882-8080, www.microsoft.com.◎Enter No. 464

▶Power Sources

24-PIN ISOLATED CONVERTERS FURNISH 10W. Joining the One-SMarT line of dc/dc converters is the NDS series, capable of producing 10W of output power from a 24-pin dual-in-line surface-mount package with a profile of just 8.5 mm. These isolated converters, which operate at temperatures of as much as 100°C, accommodate an input voltage range of 36 to 75V and provide single outputs of 1.5 to 5.5V. NDS series converters cost $29 (500).
▶**Power-One Inc**, 1-805-987-8741, www.power-one.com.◎Enter No. 465

DC/DC CONVERTERS PACK 30A INTO 1/8-BRICK PACKAGE. Converters in the ERS/ESS series deliver as much as 30A of nominal output current at an output voltage of 2.0V or less. Their 1/8-brick form factor measures 2.30×0.89 in. with a height of 0.37 in. Offered in both through-hole and surface-mount versions, the converters are available with output voltages of 1.0 to 12.0V and accept input voltages of 36 to 75V. Efficiency ratings reach 91% (3.3V at 20A). An ERS 3.3V, 20A model costs $49 (1000).
▶**NetPower Technologies Inc**, 1-972-509-2700, www.netpowercorp.com.
◎Enter No. 466

6-IN.^{3} DSP-BASED MODULE CONTROLS 15-KW AC AND DC MOTORS. International Rectifier's Intero series PIIPM-50P12B004's palmtop-sized module controls the speed, acceleration, and deceleration of ac (induction) and brushless-dc motors that have input-power ratings as high as 15 kW. The module, whose typical efficiency is 99%, can dissipate 350W at 25°C case temperature and 130W at 100°C. You can download custom control programs into the unit's onboard flash memory via an optically isolated, 2.5-Mbps serial port that complies with the IEEE 1149.1 boundary-scan standard. The module contains six non-punch-through IGBTs rated at 1200V and 50A as well as Hall-effect output-current sensors and diodes that protect the IGBTs against reverse voltage. When the unit controls an ac motor, the output is variable-voltage, variable-frequency, three-phase ac. The module costs $500 (500), but the vendor can omit features to produce lower priced variations.
▶**International Rectifier**, 1-310-252-7105, www.irf.com.◎Enter No. 467

20A DC/DC CONVERTERS FURNISH 1.5 TO 3.3V OUTPUT. Units in the UNR open-frame series of dc/dc converters provide a single nonisolated output of 1.5 or 1.8V at 20A or 2.5 or 3.3V at 15 or 20A. Each converter comes in a 2×2×0.49-in. open-frame package with an integral heat sink. Specifications include operating efficiencies to 91%, a step response of 50 μsec, and a noise rating of just 75 mV p-p. Prices start at $33 (10,000).
▶**Datel Inc**, 1-508-339-3000, www.datel.com.◎Enter No. 468

►Computers, boards and buses

64-BIT PCI BOARD SUITS REAL-TIME, EMBEDDED SYSTEMS. Cyclone Microsystems' 64-bit SB-923 PCI system board targets designers of embedded and real-time systems. The Mini ATX-form-factor board features eight slots that can accommodate off-the-shelf 64-bit PCI I/O cards on two independent buses. The PCI bus supports peak transfer rates of 264 Mbytes/sec and supplies PCI-configuration resources, such as interrupts and mailbox and doorbell registers. The SB-923 also comes with as much as 128 Mbytes of SDRAM and 2 Mbytes of sector-programmable flash ROM. The BX-923 includes the SB-923 system board, a 100W power supply, eight PCI I/O-card locations, mounting locations for 3.5- and 5.25-in. peripherals, and reset and power switches. The SB-923 and BX-923 with 128 Mbytes of SDRAM start at $821 and $4421 (1000), respectively.
►**Cyclone Microsystems Inc**, 1-203-786-5536, www.cyclone.com.
◎Enter No. 469

SCALABLE PCI SYSTEM DELIVERS 128-GFLOPS PROCESSING POWER. With as many as 32 500-MHz PowerPC "G4" processors operating in unison, Mercury Computer Systems' Race11 Series VantageRT 7410 can deliver 128 GFlops in a single PCI chassis. Its processing power and scalability provides support for new medical-imaging applications. The VantageRT combines processing power with I/O flexibility, driving onboard Ultra SCSI and PMC devices, as well as other PCI modules you insert into the system. Each PCI module has two computation nodes with 256 Mbytes of SDRAM and 2 Mbytes of L2 cache, a Race++ crossbar, two over-the-top Race++ ports, a PCI-64 connector on the bottom, a PMC connector, and a SCSI III connector. US volume discount price start at $13,200.
►**Mercury Computer Systems Inc**, 1-978-256-0052, www.mc.com.
◎Enter No. 470

OCTAL DSP DELIVERS 19,200 MIPS. Pentek's Model 4293 6U VME board features both a PMC and VIM interface. The VIM interface eliminates data-flow bottlenecks by delivering 1200 Mbytes/sec of I/O data directly to the processors to take maximum advantage of the 19,200-MIPS peak processing power of the eight C6203 DSPs. DMA controllers within the C6203 transfer data to SDRAM and peripherals over dual 32-bit external data buses at rates as high as 600 Mbytes/sec. From $23,995.
►**Pentek Inc**, 1-201-818-5900, www.pentek.com.◎Enter No. 471

MEZZANINE CARD HOSTS 16 FDM RECEIVERS. The ICS-554 from Interactive Circuits and Systems targets high-performance software-radio applications and offers designers increased channel density and signal-processing power in a PMC form factor. The ICS-554 includes four 14-bit ADCs, each supporting a sample rate as high as 105 MHz, an SNR greater than 74 dB, and a spurious-free dynamic range approaching 100 dB. A quad GC4016 programmable-tuner device follows each ADC for wideband- and narrowband-signal downconversions. A switch network in front of the tuners allows any or all of the 16 FDM signal tuners to be assigned to any ADC output. Prices begin at $3995.
►**Interactive Circuits and Systems**, 1-613-749-9241, www.ics-ltd.com.
◎Enter No. 472

$99 CONTROLLER INCLUDES HARDWARE, LANGUAGE. The IsoPod from New Micros offers designers of embedded systems a complete controller system with a built-in high-level-language and a parallel-processing operating system. The hardware features 16 digital I/O lines; RS-232, RS-422/485, CAN Bus, and SPI interfaces; eight channels of 12-bit analog-to-digital conversion; and eight general-purpose timers on a 1.2×3.3-in. board. In addition, the module has 12 pulse-width-modulation outputs. New Micros based the built-in programming language, IsoMax, on state-machine-programming concepts, and software development is interactive through the RS-232 port. Programming real-time tasks amounts to describing virtual machines that sense conditions, take actions, and move to new states. The IsoMax architecture lets you install more than one machine as background processes, which run independently in a

virtually parallel fashion.
▶**New Micros Inc**, 1-214-339-2204, www.newmicros.com.◎Enter No. 473

SWITCH-FABRIC CARD TARGETS HIGH-SPEED APPLICATIONS. The StarLink PMC module from DY4 Systems allows users to easily add datapaths with a sustained bandwidth of 400 Mbytes/sec. Each PMC incorporates a six-port fabric switch, eliminating the need for a separate external switching card. Prices for the StarLink PMC start at $2000.
▶**DY 4 Systems Inc**, 1-613-599-9191, www.dy4.com.◎Enter No. 474

I/O CARD COMBINES ADC WITH RECONFIGURABLE FPGA. Barracuda-PMC+ is a high-speed analog input card that provides data capture for two 14-bit, 105-MHz ADC channels. The device then buffers samples from the two ADC channels in a bank of as much as 512 Mbytes of SDRAM or streams them directly out via SHARC link ports available on the PMC+ interface. The 64-bit, 66-MHz PCI interface, along with the large sample buffer, fits high-bandwidth, data-buffering applications. When you couple it with one of Bitt-Ware's Tiger family baseboards, the Barracuda-PMC+ can continuously stream data at 420 Mbytes/sec via the PMC+ link ports. $1995 (OEM qty).
▶**BittWare Inc**, 1-603-226-0404, www.bittware.com.◎Enter No. 475

TINY TRANSMITTER FITS REMOTE APPLICATIONS. MaxStream's 9TXStream embedded transmitter module provides low-cost, frequency-hopping, spread-spectrum communications for one-way applications. The 9TX-Stream wireless module operates in the 900-MHz ISM transmission band and is available in 1200, 9600, or 19,200 bps over-the-air baud rates. Interface data rates range from 1200 to 57,600 baud. The 9TXStream also features low-power operation for remote and handheld applications. Prices start at $39 (1000).
▶**MaxStream Inc**, 1-801-765-9885, www.maxstream.net.◎Enter No. 476

▶Test & Measurement

2-GHz ACTIVE PROBE SIMULTANEOUSLY DRIVES DSO AND LOGIC ANALYZER. The Tektronix TLA7Axx family of logic-analyzer plug-ins powers and accepts signals from a 2-GHz-bandwidth, high-density, multichannel active probing system. The plug-ins use the probe-output signals for logic analysis and incorporate a 2-GHz-bandwidth analog multiplexer that enables users to easily choose which of the signals also go to a separate scope's inputs. Wideband SiGe amplifiers at the probes' inputs provide the buffering that is key to these capabilities. Two 1.25×1.15×0.25-in. versions of the probe modules each contain 34 amplifiers. The $2000 P6860 provides 34 single-ended inputs. You can configure the $4000 P6810 to provide either 34 single-ended or 17 differential inputs. The $4000 P6880 pairs two probe modules to provide 34 differential-input channels, each with a single-ended output.
▶**Tektronix Inc**, 1-800-426-2200, www.tektronix.com/la.◎Enter No. 477

6½-DIGIT DMM TURNS INTO WEB-BASED LOGGER. Keithley's 2701 is a 6½-digit integrating-DMM-based data-acquisition unit that includes 10/100 BaseT Ethernet with TCP/IP support and a built-in Web server. It also accepts multiple relay-switching cards. Prices start at $40/point for systems that can contain as many as 80 channels. The 2701 offers 500-channel/sec measurement speed and 1000V channel-to-channel ohmic isolation.The unit also includes a battery-backed memory that, during power outages, can store 450,000 time-stamped readings. Another key feature is the highly flexible built-in signal conditioning.
▶**Keithley Instruments**, 1-800-552-1115, www.keithley.com.◎Enter No. 478

$3300 UNIT DISTRIBUTES NANOSECOND-ACCURATE TIME TO NETWORKS. A starting price of $3300 gets you a compact, highly configurable, field-upgradeable networked time-distribution system that can deliver less than 30-nsec-rms uncertainty with respect to UTC (coordinated universal time). TrueTime, calls the product the XLi time-and-frequency system.Within the 1U-high, rack-mountable enclosure is

space for a variety of plug-in modules, including power supplies, oscillators, pulse generators, and telecommunications interfaces. If your application demands redundancy to meet reliability requirements, you can choose multiple modules of the same type.
▶**TrueTime**, 1-707-528-1230, www.truetime.com.◎Enter No. 479

6-GHz-BANDWIDTH, REAL-TIME-SAMPLING DSO HAS DEEP MEMORY. With prices that start at $63,750, LeCroy's WaveMaster 8600 costs about 10% more than its competition, but the incrementally higher price buys order-of-magnitude improvements in memory depth and speed. The standard version offers enough acquisition memory to store 100-μsec records on each active channel at the fastest acquisition rate. You can equip it with optional additional memory to increase the record duration at the highest sampling rate to 2.4 msec. The 8600, with its Pentium III processor and proprietary architecture, can transform signals into displays that reveal information that remains hidden in other scope presentations.
▶**LeCroy Corp**, 1-800-453-2769, www.lecroy.com.◎Enter No. 480

MODULAR SIGNAL ANALYZER MAKES MEASUREMENTS QUICKLY. National Instruments' PXI-5660, a modular, 2.7-GHz signal analyzer, breaks many of the rules for instruments of this type. It comprises a pair of 3U-height PXI modules: a three-slot frequency-converter and a single-slot, 14-bit-resolution, 64M-sample/sec digitizer with 16M words (32M bytes) of digitizer memory (expandable to 32M words for $2000 more). SFDR (spurious-free dynamic range) is 80 dB, but you can trade off measurement speed to achieve greater dynamic range. The two modules together are much smaller than instrument-level products that perform similar functions, but the modules don't constitute a complete analyzer. They plug into a PXI card cage, which accommodates the necessary CPU module and includes the necessary power supply. $12,995.
▶**National Instruments**, 1-800-258-7022, www.ni.com.◎Enter No. 481

$60,000 BENCHTOP SYSTEM VALIDATES DFT SOC IC DESIGNS. Teseda's validation tester solves some of the traditional problems of DFT by providing lower cost validation of digital-IC designs than do functional-test programs that run on large, costly, production-oriented ATE systems. The $60,000 Validator 500 is a relatively small benchtop unit including software but not including the Windows 2000-based host PC, which you provide. In addition to 256 DFT pins, the unit provides eight clock-drive pins and eight scan-enable pins. You can vary the test-clock periods from 20 to 200 nsec in 5-nsec increments.
▶**Teseda Corp**, 1-503-223-3315, www.teseda.com.◎Enter No. 482

$995 VGA DISPLAY CLIPS ONTO EYEGLASS FRAME. MicroOptical's $995 SV-3 instrument viewer eases the problems of probing fine-pitch IC leads. The MicroOptical device lets you probe leads simply by refocusing your gaze—without moving your head. The device's 640×480-pixel, full-color VGA display clips onto the earpiece of your eyeglass frame. If you are concerned about whether this viewer technology will work for you, don't worry; MicroOptical guarantees to refund the price if, within 30 days of your purchase, you return the unit in good condition.
▶**MicroOptical Corp**, 1-877-326-8111, www.microoptical.net.◎Enter No. 483

SINGLE-ENDED AND DIFFERENTIAL ACTIVE PROBES WORK IN TIGHT SPACES. Agilent's Infiniimax probe family includes differential active probes with bandwidths as high as 7 GHz. Although the probe family includes both single-ended and differential units, the differential probes also work as single-ended devices with the second input left open. You need not ground the unused input. The probes' input resistance is 25 kΩ in the single-ended mode and 50 kΩ in the differential mode. Differential-mode input capacitance is as low as 0.3 pF depending on the probe's physical configuration. Single-ended-mode input capacitance ranges from 0.48 to 0.7 pF. Note, however, that at 6 GHz, the reactance of 0.7 pF is less than 40Ω. Prices for the 7-GHz versions of the Infiniimax probing system are $6500 to $9950. The 5-GHz versions cost $5100 to $8550.
▶**Agilent Technologies**, 1-800-452-4844, www.agilent.com.◎Enter No. 484

PROTOCOL ANALYZER TACKLES 4X INFINIBAND. With its IBtracer 4×, Computer Access Technology Corp provides the protocol-analysis and -debugging tools that designers and users of 4× products need. The 4× version uses four lanes. A lane is a dual, half-duplex, point-to-point datapath that provides bidirectional communication between a device and the switch fabric. The InfiniBand physical medium can take the form of wires, optical fibers, or pc-board traces. At InfiniBand's high data rates, time skew among the multiple lanes easily corrupts data. Although few companies currently provide 4× InfiniBand-test tools, Computer Access Technology and several other companies make analyzers for many protocols. The portable, benchtop-mounted IBtracer 4× costs $75,000.
▶**Computer Access Technology Corp**, 1-800-909-2282, 1-408-727-6600, www.catc.com.◎Enter No. 485

▶Peripherals

GRAPHICS ACCELERATOR ENHANCES DEVELOPER CREATIVITY. Nvidia's high-end GeForce4 consumer-graphics accelerator includes two vertex-shader processors. The chip's 0.15-micron process, 63 million transistors, and higher speed DRAMs deliver a substantial performance boost. The device's 300-MHz core and 325-MHz DDR memory clock frequencies translate to 86 million-vertex/sec processing muscle and 10.4-Gbyte/sec bandwidth to the frame buffer, which can be as large as 128 Mbytes. To optimize the chip's use of available memory bandwidth, Nvidia has improved GeForce4's occluded polygon-culling algorithm. Approximately $300.
▶**Nvidia**, Santa Clara, CA, 1-408-486-2000, www.nvidia.com.◎Enter No. 486

CORE-LOGIC CHIP SETS ALTERNATIVE FOR INTEL CPU-BASED SYSTEMS. ATI offers variants of its 3x0x north-bridge IGP chip. The IGP 320 targets AMD's Duron processor, and the 320M targets mobile Athlon and Duron CPUs. The IGP 330 works with Intel's 400-MHz-local-bus Pentium 4, and the 340 and low-power 340M interface to either the first-generation Pentium 4 with a 400-MHz local bus or the second-generation Pentium 4 with a 533-MHz local bus. All parts employ a unified-memory architecture with a 64-bit interface to 1 Gbyte max of PC2100 (133-MHz clock, 266-MHz data) or PC1600 (100-MHz clock, 200-MHz data) DDR SDRAM on one or two unbuffered DIMMs. ATI also offers two variants of its IXP south-bridge chip. The IXP 200 and 250 support ATA-100 mass storage and offer six USB 2.0 ports and a five-initiator PCI-expansion bus. Two-chip desktop version prices cost less than $40 (100,000).
▶**ATI Technologies**, 1-905-882-2600, www.ati.com.◎Enter No. 487

CONTROLLER SMOOTHES MASS-STORAGE TRANSITION. The $8.80 (10,000) SiI 3112 PCI-to-serial-ATA host controller targets PC motherboards, and its two channels run off a common single PLL. It also targets add-in cards in much the same spirit as today's USB 2.0 and ATA-100 and ATA-133 upgrades. The Sil 3112 runs internally at 1.8V with 3.3V I/O buffers.
▶**Silicon Image**, 1-408-616-4000, www.siimage.com.◎Enter No. 488

OPTICAL DRIVE ENDEAVORS TO ATTAIN FORMAT NIRVANA. Pioneer's $499 DVR-A04 makes incremental, albeit notable, improvements over its DVR-A03 predecessor. It reads DVD-ROM, CD-R, and CD-RW media at 6, 24, and 24× CAV 16× rates for its predecessor. Pioneer has added both CD-buffer-underrun support and the 33.3-Mbyte/sec UltraDMA-interface mode to the DVR-A04. The company also reduced initializing and loading times, more than halved power consumption to 3.1W, and boosted the audio-line output's SNR to more than 75 dB and its channel separation to more than 65 dB.
▶**Pioneer Electronics**, 1-310-952-2000, www.pioneerelectronics.com.
◎Enter No. 489

GRAPHICS ACCELERATOR BRINGS VERTEX AND PIXEL-SHADER PROCESSING TO NOTEBOOKS. ATI's Mobility Radeon 9000 supports all of the 2-D, DirectX 8.1-compatible 3-D, and video-processing capabilities of the conventional Radeon 9000, and it incorporates features befitting its notebook-PC role: fine-grained, highly flexible power-management "hooks"—for such tasks as clock throttling on a per-subsystem basis, voltage scaling, and color-depth reduction—and a dual-channel LVDS transmitter. The 9000 comes in three frame-buffer variants: discrete; integrated 32-Mbyte, 64-bit DDR SDRAM with external expansion capability; and integrated, 64-Mbyte, 128-bit DDR SDRAM.
▶**ATI Technologies**, 1-905-882-2600, www.ati.com.◎Enter No. 490

GRAPHICS ACCELERATOR IS DIRECTX9 API COMPATIBLE. ATI's Radeon 9700 has twice as many rendering pipelines as its Radeon 8500 predecessor and retains 10-bit per-color precision throughout the processing pipeline and frame buffer, whose interface is, at 256 bits, twice as wide as its predecessor's. The pixel shaders deliver 128-bit floating-point precision for full DirectX 9 API compatibility and they also handle video-processing functions, such as

motion compensation and adaptive deinterlacing. An integrated TV encoder, 166-MHz DVI transmitter, and dual 400-MHz DACs provide numerous display options. A 128-Mbyte board based on a 9700 with a 325-MHz core and a 300-MHz DDR memory is $399. ▶**ATI Technologies**, 1-905-882-2600, www.ati.com.◎Enter No. 491

▶Embedded development tools

EMBEDDED OS IS COMPONENT VERSION OF WINDOWS XP. Windows XP Embedded allows designers to choose from more than 10,000 components to build small-footprint embedded operating systems. It supports headless systems and flexible boot and storage options to meet the unique requirements of embedded devices. Windows XP Embedded allows for footprints of 4.8 Mbytes for a minimum configuration; 14 Mbytes for a basic Win32 system; 25 Mbytes for a basic Win32 system with security infrastructure; and 70 Mbytes for the full Win32 API set with the user interface, Web browser, media player, terminal-server client, USB support, and SNMP support. You can get the full version of Windows XP Embedded tool suite for a promotional price of $995. ▶**Microsoft Corp**, 1-425-882-8080, www.microsoft.com/embedded. ◎Enter No. 492

EMBEDDED OS OFFERS WEB SERVICES. Windows CE.NET offers developers a small-footprint, deterministic, real-time OS with improved networking, multimedia, and Web-browsing capabilities. It includes support for both 802.11 and Bluetooth-wireless networking. New .NET-core OS features include real-time communication messaging and voice over IP between any two enabled devices. Developers can choose kernel components to customize the OS for their hardware designs. You can order a 120-day evaluation version of CE.NET at the Microsoft Web site. The software on CD-ROM is free, but you must pay a nominal shipping fee. ▶**Microsoft Corp**, 1-425-882-8080, www.microsoft.com.◎Enter No. 493

RTOS TARGETS DSP, MULTIPROCESSOR CONFIGURATIONS. WindRiver's VSPWorks supports real-time applications and provides pre-emptive multitasking and high-speed interrupt support. It manages interprocessor communication and allows processors to communicate through a host server to integrate with VxWorks features and middleware. The processing layers for interrupt handling flank the nanokernel at the heart of the system. Interrupt-service routines below the nanokernel handle high-speed interrupts; the microkernel sits above the nanokernel and handles pre-emptive, multitasking C/C++ tasks. The VSPWorks project manager defines system objects and creates all the system files and basic header and source files an application requires. From $9950 and $19,950 for the single- and multiple-processor applications. ▶**WindRiver**, 1-510-748-4100, www.windriver.com.◎Enter No. 494

KIT EMBEDS SPEECH RECOGNITION. The Fluent Speech software-development kit from Sensory allows developers to easily integrate speech recognition into consumer devices. The company based the kit on the speaker-independent Fluent Speech engine, which can recognize several thousand words or phrases. The kit allows you to dynamically build recognition vocabularies directly from text, even on the device. The phonemic-recognition engine requires no user training and provides continuous digit recognition, word spotting, grammar-based vocabularies, N-best results, and noise robustness. It's available for devices using StrongARM processors running Windows CE as well as for Windows PCs. $1995. ▶**Sensory Inc**, 1-408-327-9000, www.sensoryinc.com.◎Enter No. 495

GRAPHICS-CODE GENERATOR DELIVERS VIRTUAL PROTOTYPES. Altia claims that with its DeepScreen 2.0—a graphics-code generator for embedded, real-time displays—you can substitute weeks of hand coding with a few hours' work. It creates graphical prototypes, letting you focus on the application code. With DeepScreen, embedded-system developers can generate code for a variety of target RTOSs and processors. Because it generates C code, it is easy to modify the code to work on any target system, including "homegrown," proprietary RTOSs. Altia also provides specific code generators for popular processors that require no modifications. From $25,000 for single node-locked licenses. ▶**Altia Inc**, 1-719-598-4299, www.altia.com.◎Enter No. 496

DEVELOPMENT KIT LETS YOU BUILD BLUETOOTH INTO APPLICATIONS. Widcomm's BTW-CE development kit speeds the development of Bluetooth wireless applications for Windows CE-based Pocket PCs. It complies with Bluetooth specification 1.1 and offers a rich set of APIs for maximum development flexibility. The $1495 kit offers an intuitive programmer interface and complete documentation. It includes two Bluetooth CompactFlash cards for both ends of the wireless exchange and an API library and sample applications. ▶**Widcomm Inc**, 1-858-453-8400, www.widcomm.com.◎Enter No. 497

SUITE TARGETS COMMERCIAL LINUX DEVELOPMENT. Metrowerks' complete development suite for embedded and small-footprint implementations of Linux uses PowerPC and MIPS processors. The suite includes an application-level CodeWarrior debugger that provides multithread debugging and enables debugging of shared libraries. The tool suite uses the GNU compiler, linker, and assembler. The suggested retail price for the CodeWarrior development studio is $4595 per license. ▶**Metrowerks**, 1-512-997-4700, www.metrowerks.com.◎Enter No. 498

FLASH-MANAGEMENT SOFTWARE SUPPORTS WINDOWS CE. Flash FX V5.0 simplifies the configuration of resident flash-memory arrays in Windows CE-based devices. It takes care of intricate hardware interactions and provides the capability to boot Windows CE from the flash device and to save and restore the Windows CE registry in nonvolatile flash, simplifying the creation of highly reliable Windows CE devices more simple. $2500. ▶**Datalight**, 1-425-951-8086, www.datalight.com.◎Enter No. 499