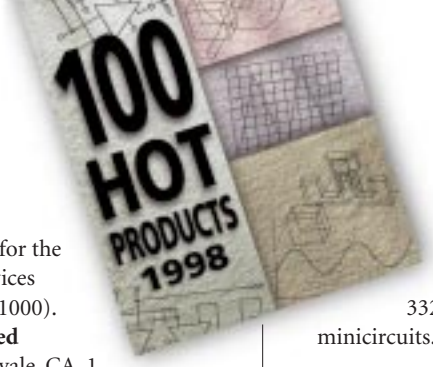
special**section**

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, in 1993, a year-end feature, the *EDN* Hot 100 Products. This year, we present our sixth annual installment.

EDN's Hot 100 Products of 1998 are exciting, and it's an honor for a product to make the list. Our purpose, though, isn't to bestow honors but to report on the year's accomplishments and show the current state of the art. In our fast-moving world, products that made last year's Hot 100 already look quaint, and this year's products will probably look dated a year from now. Right now, though, the Hot 100 Products of 1998 show you where we are and where we're going. So don't lose your way. Take a look.



SURFACE-MOUNT THYRISTORS THWART VOLTAGE SURGES.

A series of crowbar-type, silicon-thyristor diodes switches from high to low impedance to shunt transient-voltage surges away from sensitive electronic components. The SiBar devices complement the company's line of PolySwitch polymer-based, resettable fuses. The SiBar protectors spec nominal breakover voltages of 230, 280, and 330V and a peak-pulse current rating of 50A.

After a surge current from an overvoltage condition drops below the SiBar's hold current, the device automatically resets to high impedance. Typical price is $0.35 (OEM). **Raychem Corp**, Menlo Park, CA. 1-800-227-7040, fax 1-800-611-2323, www.raychem.com. Circle No. 440

A/D CONVERTER PROVIDES SYNCHRONIZED 14-BIT CONVERSIONS FOR POWER, PHASE ANALYSIS.

When you're looking at phase-related information, such as in motor control or power-line monitoring, you need A/D conversions that are simultaneous across several channels. The MAX125 provides 14-bit resolution on four channels at a maximum throughput group rate of 76k samples/sec. Four synchronized track-and-hold circuits within the device feed a single higher speed converter. Two multiplexed inputs precede each T/H circuit, providing a total of eight single-ended inputs. You can use the internal ±2.5V reference or an external reference for the converter. The device stores conversion results in internal registers that your system can access via a bidirectional parallel interface. Maximum conversion rate on a single channel is 250k samples/sec, and you can specify how many of the four channels you want included in the sampling. Prices for the 36-pin SSOP devices begin at $13.95 (1000). **Maxim Integrated Products**, Sunnyvale, CA. 1-408-737-7600, fax 1-408-737-7194, www.maxim-ic.com. Circle No. 441

TRIBAND GSM CHIP SET ACHIEVES EFFICIENCY BY AVOIDING DSP CORE.

Worldphone communication-processor ASIC and adjunct three-band transceiver IC use a cluster of optimized hardware subsystems, each of which implements specific functions such as a matched filter, a synchronization correlator, an interleaver, a CRC checker, and a data and control interface. You can shut down each of these functions, which operate independently of the others, to save power when you don't need them. Unlike a DSP-based approach, this implementation involves no Mflops parameter. Using the 2.7V CQT2210AEB processor and CQT2230AET transceiver, which together cost less than $25 (OEM), you can develop a triband GSM phone with a total bill-of-materials cost of less than $70. The resultant phone has a current drain of less than 2 mA in idle mode and 90 mA in active mode, translating to eight days of standby operation and 12 hours of talk time, using a 3.6V/1200-mAhr battery. **CommQuest Technologies Inc**, Encinitas, CA. 1-760-633-1618, fax 1-760-633-1677, www.cqt.com. Circle No. 442

NOVEL RF PACKAGING CUTS COST, BOOSTS PERFORMANCE.

A new packaging technology reduces size and cost and improves performance for RF components, such as mixers, splitters, couplers, and transformers. The package has a profile as low as 0.078 in. high and preserves the same footprint as other components. In conventional packages, a bottom pc board mounts parts and makes internal connections. With the new technique, the circuit mounts inside the cover. Terminations attach to the top of the case, and welded connections are close to the package leads. The result is improved in high-frequency performance because of the shorter connections. Turning the module upside down provides coplanarity with connections on the customer's board. **Mini-Circuits**, Brooklyn, NY. 1-718-934-4500, fax 1-718-332-4661, www.minicircuits.com. Circle No. 443

IC CONNECTS ATM TRANSCEIVERS TO TELEPHONY-BASED BACKPLANES.

The M590500 IC works in asynchronous-transfer mode (ATM), the Adaptation Layer 1 (AAL1), and the segmentation-and-reassembly (SAR) layer. The IC simultaneously processes as many as 1024 bidirectional ATM virtual-channel connections to terminate 1024 full-duplex, 64-kbps voice channels. This device enables ATM edge switches, ATM access concentrators, and private branch exchanges to connect ATM to the time-division-multiplexed (TDM) environment of the Public Switched Telephone Network (PSTN). With the MT90500, designers can concentrate telephone connections originating from 42 T1 or 32 E1 TDM lines into one chip for ATM processing. A selection of clock-recovery options allows flexibility for processing timing between legacy telephony-based TDM networks and ATM networks. The $150.45 (1000) MT90500 is available in 240-pin PQFPs. **Mitel Semiconductor**, Kanata, ON, Canada. 1-613-592-2122, fax 1-613-592-6909, www.semicon.mitel.com. Circle No. 444

TINY MULTIMEDIACARD GAINS SUPPORT; FLASH CAPACITY SKYROCKETS.

The MultiMediaCard (MMC), a much lower cost and smaller memory module than CompactFlash, supports applications such as music and audio storage and even data storage in ultraportable devices. The MMC differs from CompactFlash in that MMC relies on a much cheaper serial interface and measures only 32×24×1.4 mm—about one-fifth the size of a CompactFlash card. You can also stack as many as 30 MMCs to boost storage capacity. As partners, SanDisk and Siemens hope to establish the MMC as a standard component in mobile phones, pagers, ultraportable audio players, and other applications. SanDisk will offer flash-based MMCs, and Siemens will offer lower cost ROM-based MMCs. Prices of the flash modules will start at approximately $26 in high volume for a 2-Mbyte MMC. **SanDisk Corp**, Sunnyvale, CA. 1-408-542-0500, www.sandisk. com. Circle No. 445

COUNT ON TALISMAN FOR GRAPHICS GOOD LUCK.

Fujitsu will soon make its first Talisman-based graphics chip, the Marquis 2000, available for sampling and slates full production for mid-1999. Marquis 2000 varies from Microsoft's original vision in a few areas; it has no separate media processor or 1394 interface, for example. However, the company has made one key enhancement that will increase its potential for success: a baseline "virtual-frame-buffer" compatibility mode that lets the device run DirectX and OpenGL applications without alteration. Anticipated compatibility-mode specifications are nothing to scoff at. They include a 2× AGP sideband interface; full DVD decoding (which Fujitsu may omit in future versions to cut costs in this era of software-based DVD); and an integrated RAMDAC that provides 1600×1200-pixel, true-color resolution at 85 Hz. The company targets less than $40 (10,000) for production silicon. This price could go lower if the production stepping also involves shrinking the lithography. **Fujitsu Microelectronics**, San Jose, CA. 1-408-922-9000, fax 1-408-943-0403, www.fujitsu.com. Circle No. 446

CHIP GIVES SCORCHING GRAPHICS.

The single-chip Voodoo Banshee 2- and 3-D graphics accelerator is software-compatible with the company's Graphics, Rush, Voodoo and Voodoo 2 3-D-only chips which run under the Glide, DirectX and OpenGL application-programming interfaces. Banshee boasts a 100-MHz operating frequency compared with Voodoo 2's 90 MHz. However, Banshee does not support Voodoo 2's dual-chip scan-line interleaving mode and contains only one texture engine compared with Voodoo 2's two; 3Dfx devoted the silicon area instead to 2-D graphics and digital-video functions. This omission means that games that can use single-pass multitexturing when available run slower on Banshee, although the higher clock rate should improve its WinBench scores. All Banshee graphics subsystems are 128 bits, as is the 100-MHz external-memory interface to 4- to 16-Mbyte SDRAM or synchronous graphics RAM. The company is shipping the first-generation, $38 (10,000) Banshee with a 230- or 250-MHz RAMDAC and a 1× Advanced Graphics Port (AGP) sideband interface. The company schedules a second-generation spin of the device to be available for sampling by year's end; that version will move to 2× AGP and a 125-MHz operating frequency. **3Dfx Interactive**, San Jose, CA. 1-408-935-4400, fax 1-408-262-8874, www.3dfx.com. Circle No. 447

LOW FET RESISTANCE AND GATE CHARGE BOOST EFFICIENCY IN SWITCHERS.

A family of HexFET power MOSFETs lays claim to the industry's lowest on-resistance and gate charge. The 500 to 650V devices, intended for offline switching power supplies, claim on-resistance ratings as much as 50% lower and gate charge approximately 33% lower than previous FETs. They can thus reduce switching, conductance, and drive losses by as much as 30% in a power supply, thereby allowing you to use smaller heat sinks or coolers within a thermal system. The MOSFETs have topology-specific data sheets that provide ratings of interest to switching-power-supply designers. Prices start at 60 cents (100,000). **International Rectifier**, El Segundo, CA. 1-310-252-7105, fax 1-310-252-7903, www.irf.com. Circle No. 448

SRAMs TAKE A NEW APPROACH.

Hiding inside MoSys' low-power SRAMs is something you might not expect—DRAM. The company constructs its memory arrays not of six-transistor or four-transistor/two-resistor SRAM cells, as do most other SRAM manufacturers, but of one-transistor, one-capacitor DRAM structures. Advantages of this approach include lower cost per bit at equivalent process lithographies and manufacturing volumes and reduced active-power consumption. However, because MoSys' memories are fundamentally DRAM, they still require refresh, resulting in higher standby-current draw than some ultralow-power SRAM alternatives. Devices now available for sampling are the 3.3V, $7 (100,000) MC80364K64, a 64k×64-bit pipeline-burst SRAM (PB-SRAM) in a 128-pin QFP, and the $5 (100,000), 3.3V MC803128K32, a 128k×32-bit PBSRAM in a 100-pin QFP. Operating speeds reach 133 MHz, and the company plans variants with as much as 166-MHz speed and flow-through output as well as no-latency versions of its devices (known as NoBL or ZBT by other manufacturers) with first availability by the end of this year; higher densities should follow in 1999. **MoSys Inc**, Sunnyvale, CA. 1-408-731-1826, fax 1-408-731-1893, www.mosys.com. Circle No. 449

DEBUGGING TOOLS COMBINE LOGIC ANALYSIS, EMULATION.

The 16600/16700 series logic-analysis systems integrate processor emulation, software analysis, signal measurement, and pattern generation. Both logic-analysis systems provide a graphical, X-windows interface to set up measurements and display multiple time-correlated views of system characteristics. Both systems accept most

of the measurement modules from the HP 16500C logic-analysis system and emulate the MPC 500/800, PowerPC 600/700, Pentium, Pentium Pro, CPU-32, ARM, M.CORE, NEC V83X, and Hitachi SH3/SH4 µP families. The $9900 HP 16700A is an expandable mainframe with five slots for measurement modules and two slots for emulation modules. The $5000 HP 16701A expansion mainframe doubles the slot count for large systems. The HP 16600 series is a preconfigured logic-analysis system with one measurement slot, one emulation slot, and as many as 204 state/timing channels. Prices for the HP 16600 series start at $10,040 for the 68-channel 16603A. Prices of emulation probes and modules start at $2995. **Hewlett-Packard Co**, Palo Alto, CA. 1-800-452-4844, ext 5645, www.hp.com/go/logicanalyzer. Circle No. 450

TIMING-MODEL GENERATORS BOOST STATIC-TIMING ACCURACY.

Two new EDA tools produce Spice-accurate timing models for input into static-timing analysis tools. DynaBlock and DynaCore build timing models based on transistor-level netlists and include all a design's timing paths. Both timing generators can handle blocks containing more than 500,000 transistors and can produce a 100,000-transistor model in about an hour. DynaBlock and DynaCore cost $72,500 and $82,500, respectively. Both are available for Unix and Windows NT platforms. **Circuit Semantics**, San Jose, CA. 1-408-885-9250, fax 1- 408-885-1067, www. circuitsemantics.com.

Circle No. 451

HARDWARE, SOFTWARE ADVANCE PC-GRAPHICS REALISM.

The Riva TNT's dual parallel 32-bit pipelines can process two pixels and apply two textures to a polygon in one clock cycle. This logic complexity requires more than 7 million transistors and a 12-kbyte cache but results in a peak fill rate of 250 million pixels/sec. It includes an on-chip, 250-MHz Palette-DAC that can drive a true-color, 24-bit display with resolution as high as 1600×1200 pixels at 85 Hz; a 24-bit Z-buffer; and an 8-bit stencil buffer. The Riva TNT supports high-quality, eight-tap

anisotropic filtering (but not as a single-cycle operation) and fully implements the Advanced Graphics Port 2X bus, including sideband addressing and pipelining. Frame-buffer sizes range from 4 to 16 Mbytes, and memory options include standard and double-data-rate synchronous DRAM and synchronous-graphics RAM as fast as 200 MHz. $45 (1000). **Nvidia Corp**, Sunnyvale, CA. 1-408-617-4000, fax 1-408-617-4100, www.nvidia.com.

Circle No. 452

HIGH-DENSITY CPLD PUSHES INTO FPGA APPLICATIONS.

The 960-macrocell, 3.3V PZ3960 XPLA2 device blends PAL and PLA structures in each macrocell. Within a fast module comprising the local Zero-power Interconnect Array (ZIA) routing multiplexer and four logic blocks, each with 20 macrocells, pin-to-pin combinatorial timings are 7.5 or 9 nsec, depending on whether you use the available PLA resources. Corresponding register-setup times are 4 or 5.5 nsec with a 6-nsec clock-to-out latency. If your design needs to use the global ZIA routing matrix, add 4 nsec to each timing number. Each logic block has 32 dedicated I/O pins and two of eight total clocks. Philips estimates the application-dependent PZ3960 gate count at 10,000 to 50,000. The PZ3960 comes in a 492-bump BGA package with 384 I/O signals and costs $98 (25,000) or $170 (1000). **Philips Semiconductors**, Albuquerque, NM. 1-505-822-7629, fax 1-505-822-7804, www.philips.com.

Circle No. 453

CHIP INTEGRATES T1/E1/J1 FRAMER, ANALOG LINE INTERFACE.

The single-channel T1, E1, and J1 PM4351 framer integrates an analog line-interface unit. The PM4351, or COMET (COMbined E1 and T1), facilitates a single-board design for North American, European, and Japanese telecomm applications, such as wireless transceiver base stations, digital loop carriers, frame relay, and Internet access. The global primary-rate framing and short- and long-haul line-interface parameters are software-selectable. A COMET application design guide is available on PMC-Sierra's Web site. COMET integrates three HDLC controllers, each with 128-byte transmit and receive buffers to support ITU-T G.964's V5.1 interface for E1. It uses a 14×14-mm, 80-pin PQFP and meets –40 to +85°C operating-range specifications. The PM4351 uses a 3.3V power supply and costs $15 (10,000). **PMC-Sierra**, Vancouver, BC, Canada. 1-604-415-6000, www.pmc-sierra.com.

Circle No. 454

ADSL DRIVER/RECEIVER PUMPS UP THE CURRENT WITH FAST-SLEWING DRIVE.

Featuring two drivers and two receivers, the THS6002 has a 200-MHz driver bandwidth and 1000V/µsec slew rate at gain of 2. It can drive a 50Ω load with a peak current as high as 400 mA and supports a differential output voltage as high as 40V. On the receiver side, bandwidth and slew rate are the same as for the drivers, and THD is –70 dB at 1 MHz. To minimize crosstalk at these high speeds and current levels, each of the four amplifiers on the THS6002 has individual power-supply pins, allowing you to bypass each one separately. All of the IC's pins are active; none are devoted exclusively to heat sinking. This configuration allows the $5.67 (1000) device to fit into a 20-pin package. **Texas Instruments Inc**, Dallas, TX. 1-800-477-8924, ext 4500, www.ti.com.

Circle No. 455

MONOLITHIC CASCODE AMPLIFIER FULFILLS CASCADE OF RF NEEDS.

Two related cascode devices for 100-MHz to 2.5-GHz operation save board space by integrating all requisite bias circuitry and by using a four-pin SOT-143 surface-mount package. The MRFIC-0916 provides 18.5-dB typical and 20.5-dB maximum gain at 850 MHz with a 2.7V supply, although it can operate from a 5V supply. The similar MRFIC0915 operates at 2.5-mA maximum bias current, thus saving power, but consequently has reduced isolation performance of 38 dB. The devices' data sheets list scattering parameters for each 100-MHz point in their operating range, easing modeling and design. The MRFIC0915 and 0916 cost $0.75 and $0.90, respectively (10,000). **Motorola Semiconductor Products Sector**, Phoenix, AZ. 602-413-4991; fax: 1-602-413-7986, www.motorola.com/wireless-semi.

Circle No. 456

DIGITAL VIDEO-INTERFACE CHIP SET SCALES FROM VGA TO SXGA.

Two chips join the PanelLink digital-interface family for flat-panel monitors having resolutions of 640×480 (VGA) to 1280×1064 pixels (SXGA). The PanelLink digital-interface standard is the basis of the Video Electronics Standards Association's Plug and Display standard and the Digital Flat Panel initiative specification. The new chip set is backward-compatible with previous PanelLink devices. The SiI 150 universal transmitter and the SiI 151 receiver CMOS devices accommodate an operating-frequency range of 25 MHz for VGA resolution to 112 MHz for SXVA. The transmitter translates and multiplexes 24-bit color digital signals onto three

differential pairs plus a clock pair for transmission to the display. The SiI 151 receiver in a flat-panel display automatically detects connection or disconnection of the interconnection cable and then synchronizes to the incoming signal whether it is from the SiI 150 or from previous-generation SiI 140 and SiI 100 transmitters. The SiI 150 costs $7, and the SiI 151 costs $11 (10,000). **Silicon Image**, Cupertino, CA. 1-408-873-3111, fax 1-408-873-0446, www.siimage.com.
Circle No. 457

SUPPLY REGULATOR CORRALS DSP CONUNDRUM.

As DSP supply currents dropped from 50 mA/MIPS in the early 1980s to their current value of about 1 mA/MIPS, overall currents have risen because the DSP capabilities have increased disproportionately, despite lower supply voltages. To address the needs of systems using the TMS32062x, TMS320C67x, and multiple TMS320C54 DSPs, the TPS56xx family of synchronous buck-regulator ICs can power both the DSP functions as well as other subsystems in the larger product. Proper use of the controller, which can directly drive 2A MOSFETs, lets you achieve typical and maximum efficiencies of 90 and 95%, respectively. Load transients are a major factor affecting supply design for DSPs—and µPs—so this family varies its nominal 500-kHz oscillator frequency for fastest response while maintaining high efficiency. Evaluation modules and demonstration boards are also available for this $3.59 (1000) IC. **Texas Instruments Inc**, Dallas, TX. 1-800-477-8924, www.ti.com.
Circle No. 458

HIGH-DENSITY CPLD PUSHES INTO FPGA APPLICATIONS.

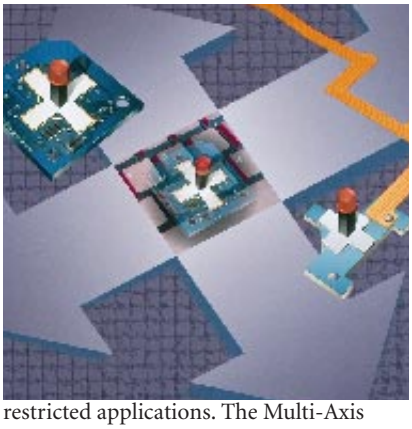
The 3.3V PZ3960 XPLA2 device has a 960-macrocell count, which may push the device's application base into areas that FPGAs previously served. Like the first-generation XPLA CoolPLDs, the PZ3960 blends PAL and PLA structures in each macrocell. Within a fast module comprising the local Zero-power Interconnect Array (ZIA) routing multiplexer and four logic blocks, each with 20 macrocells, pin-to-pin combinatorial timings are 7.5 or 9 nsec, depending on whether you use the available PLA resources. Corresponding register-setup times are 4 or 5.5 nsec with a 6-nsec clock-to-out latency. If your design needs to use the global ZIA routing matrix, add 4 nsec to each timing number. The PZ3960 comes in a 492-bump BGA package with 384 I/O signals and costs $98 (25,000) or $170 (1000). **Philips Semiconductors**, Albuquerque, NM. 1-505-822-7629, fax 1-505-822-7804, www. philips.com.
Circle No. 459

TEST/DEBUGGING PACKAGE CONNECTS TO µBGA PACKAGES.

The Signal Access Tool (SAT) from Emulation Technology helps you reap the benefits of the new µBGA chip-size package. The SAT provides access for testing purposes to individual signals on the candidate pc board and µBGA package. The tool fits directly onto the pc board's land-pad site; you thus need not redesign the board. Each $595 kit contains three SAT units and ten of the company's MicroGripper pincer-type grippers. **Emulation Technology**, Santa Clara, CA, 1-408-370-4888, fax 1-408-982-0664, www.emulation.com.
Circle No. 460

NO-MOVING-PARTS SENSOR MAKES IDEAL POINTING DEVICE.

Two- and three-axis force sensors form the heart of subminiature pointing systems in notebook computers and other space-restricted applications. The Multi-Axis Force Sensor is a solid, ceramic, three-axis force sensor based on thick-film technology. It provides a linear output in all three axes. A perpendicular post attached to the ceramic substrate causes substrate deflection, producing strain coupling in areas of the substrate. The magnitude of the strain in the X, Y, and Z axes defines the direction and rate of motion. Two versions are available, each using a stand-alone sensor or the Integrated Block reference design. A miniature version, Aurora, is suitable for laptop and notebook keyboards; a robust system, Supra, targets desktop and stand-alone cursor-control packages. From $3.50 (100,000). **Bourns Inc**, Riverside, CA. 1-801-786-6315, fax 1-801-786-6203, www.bourns. com.
Circle No. 461



DSP CHIP INCORPORATES L2 CACHE.

The most interesting feature of the $25 (25,000) TMS320C6211 is the 64-kbyte L2 cache, which program and data share. The L2 cache is organized as four 64-bit-wide banks; you can lock each bank for critical code or data. Experiments at Texas Instruments have determined that the L2 cache delivers about 80% of the performance of a C62x with infinite memory. You can configure the L2 cache to be direct-mapped or user- configurable for scratchpad RAM or for peripheral data storage on chip. The C6211 has the same peripheral set as the C6201, including two T1/E1 serial ports, two 32-bit timers, and a host-port interface, but lacks an enhanced DMA. Whereas the DMA controller on the 6201 has four programmable channels and a fifth auxiliary channel, the enhanced DMA has 16 programmable channels, as well as a RAM space to hold multiple configurations for future transfers. The 6211 also has a direct, 100-MHz interface to SDRAM. **Texas Instruments Inc**, Dallas, TX. 1-800-477-8924, ext 4500, www.ti.com.
Circle No. 462

FAST 8-BIT MICROCONTROLLER RUNS "VIRTUAL PERIPHERALS" IN SOFTWARE.

The 8-bit SX18/28BC microcontroller provides a new option for executing DSP and other parallel-processing tasks that might otherwise require a medium-performance DSP or one or more programmable-logic ICs. The 100-MHz chip provides one instruction per clock cycle and executes complex functions as software modules, or "virtual peripherals." The single-cycle execution provides a deterministic response so that the chip services all interrupts in 30 nsec, enabling signal processing without introducing jitter. The device lets you perform general-purpose embedded-control algorithms and task-specific functions on one processor. You can also execute functions such as digital filtering as software-callable modules. The vendor asserts that a fourth-

order, finite-duration FIR takes less than 10 µsec. **Scenix Semiconductor**, Santa Clara, CA. +1 408 327 8888 www.scenix. com.

Circle No. 463

MIPS ARCHITECTURE FOR EMBEDDED SYSTEMS. The RM5700, or Alpine, embedded-processor family features a split internal-bus structure. The MIPS standard internal bus multiplexes the address and data bus. The split-bus structure allows the core to start a new address cycle during every CPU cycle. To prevent bus-throughput bottlenecks, QED implements a buffer pool-a cross between a multiported register file and a crossbar switch. The buffer size is 512 bytes, or 16 cache lines, and multiple masters on the RM5700's internal bus can simultaneously send data to the buffer. The multiported nature of the buffer pool eliminates the need for masters to arbitrate bus bandwidth. The first two devices in the RM5700 family include the RM5710 and RM5730, implementing single and dual PCI buses, respectively. Instead of implementing a standard CAM approach for translating PCI addresses, the RM5700 uses a type of memory-management unit (MMU). The MMU includes a translation-look-aside buffer with attribute fields. This approach allows you to set up a single PCI-based device with different priorities. **Quantum Effect Design Inc**, Santa Clara, CA. 1-408-565-0300, www.qedinc.com.

Circle No. 464

EDA TOOL LETS YOU DO VERILOG CODE-COVERAGE ANALYSIS. HDLScore combines finite-state-machine extraction and HDL-code coverage. You use the tool on behavioral-level RTL, and gate-level Verilog code to determine as many as six types of coverage: block, path, and expression for Verilog code, and states, transitions, and state sequences for state machines. HDLScore provides text reports or graphical windows to view coverage results. Available now for Verilog simulators with standard APIs, the tool costs $22,000. **Summit Design**, Beaverton, OR. 1-503-643-9281, fax 1-503-646-4954, www.summit-design.com. Circle No. 465

SPLITTERLESS ADSL CHIP SET ELIMINATES µP AND MEMORY. The ADSL Apollo 2 chip set slashes implementation costs by eliminating the need for a dedicated µP and memory and complies with the ANSI T1.413 standard. The chip set also supports the so-called splitterless flavor of ADSL, which eliminates the need for subscribers to rewire their home or office. The Apollo 2 consists of a PCI-bus-based controller, a digital DMT (discrete-multitone)/ATM framer IC, and an analog front end. The digital IC performs not only the DMT modulation, but also Reed-Solomon encoding, bit interleaving, and 4-D trellis coding. The design targets motherboard, add-in card, and even external ADSL modem applications with downstream data rates of 6 Mbps and upstream rates of 640 kbps. The three-chip set costs $65 (1000). **Integrated Telecom Express Inc**, Santa Clara, CA, 1-408-980-8831, www.itexinc.com. Circle No. 466

PRML ICs SOLVE MIXED-SIGNAL PROBLEM IN PURE DIGITAL CMOS. The 88C3000, 88C3100 and 88C4100 advanced PRML (partial-response maximum-likelihood) read-channel ICs target disk-drive designs with raw data rates as high as 500 Mbps. A pure digital read-channel implementation results in extremely low power dissipation, which is key because thermal issues have become a problem in drives with 10,000-rpm and faster spin rates. The 88C3000 dissipates 1W at 350 Mbps, the 88C3100 dissipates 1W at 300 Mbps, and the 88C4100 dissipates 1.1W at 500 Mbps. The family supports noise predictive and PR4 Viterbi detection schemes and includes 8/9- and 16/17-bit encoder/decoders. The 88C3000 offers a slightly smaller die size than the 88C3100, which offers more robust trellis-coding capability. All family members target drive designs with magnetoresistive and giant-magnetoresistive heads. **Marvell Semiconductor Inc**, Sunnyvale, CA, 1-408-524-2488, www.marvell.com.

Circle No. 467

CMOS IMAGERS SLASH PRICE AND POWER RELATIVE TO CCDs. One of a family of CMOS image sensors, the Ri0960A captures 960×720-pixel images and the digital IC operates from a single 3.3V supply, whereas typical CCDs need 5 to 15V swings on clocks and control signals. Other family members support resolutions ranging from 352×288 to 640×480 to 800×600 pixels. Targeting applications from still cameras to security cameras and video devices, the imagers integrate an ADC and AGC support. The ICs output RGB data and support the 30-fps rate required for video applications. You can deploy the CMOS ICs in a range of light conditions with 50- to 10,000-lux light sensitivity in a camera with an f/2.0 lens. Prices range from $18 to $63. The company also offers companion controller and pixel-processor ICs. **Rockwell Semiconductor Systems**, Newport Beach, CA, 1-714-221-6996, www.rss.rockwell.com.

Circle No. 468

ACTIVE SINK HELPS BIG ICs PLAY IT COOL. The Pocket Coolers family of fan heat sinks provides 1.5°C/W heat removal for Socket 7 CPUs and high-power BGA devices. The 7- to 15-mm-high heat sinks use ball-bearing fans with a minimum

lifetime of 50,000 hours at 25°C. The clip-mounted Model 3680 targets Socket-7 CPUs and other ICs (the i960, for example). Model 3681, designed for large BGAs, uses brass pushpins that offer high immunity to shock and vibration. The 3682 is a low-profile blower with an aluminum base, designed to cool various embedded µPs that cannot use traditional cooling. Prices are $9.92, $13.75, and $9.23 (1000), respectively. **Aavid Thermal Technologies**, Laconia, NH. 1-603-224-9988, fax 1-603-223-1738, www.aavid.com.

Circle No. 469

PCI AUDIO IC SUPPORTS AC '97 AND 3-D SOUND. The Vortex 2 audio processor stands ready for designers to move audio from the ISA bus to PCI as Microsoft and Intel have mandated. Vortex 2 complies with the Intel-driven AC '97 (Audio Codec '97) standard, which partitions digital and analog audio processing and links the two functions with the AC Link interface. The Vortex 2 also supports the vendor's A3D 3-D sound technology,

which has proven extremely popular among game and multimedia software developers. It can also support Microsoft's DirectSound3D API and software written to that standard. The IC includes a hardware-based graphic equalizer with 10 bands per channel, providing stereo equalization with 96-dB SNR. Vortex can drive A3D playback on stereo systems and on 5.1 or 7.1 home-theater speaker configurations. Such PCI audio ICs sell for $10 to $15 in PC-industry volumes. **Aureal Semiconductor**, Fremont, CA, 1-510-252-4245, www.aureal.com. Circle No. 470

PCI-BASED FIBRE CHANNEL CONTROLLER INCLUDES COPPER TRANSCEIVER.

Fibre Channel promises to be the future ubiquitous high-end storage interface, and the ISP2100A embraces that trend by lowering cost through integration. The IC builds on the ISP2100, which was the first Fibre Channel IC with an integrated transceiver for copper media. The ISP2100A adds support for the 64-bit, 66-MHz PCI bus, which is widely used in high-end systems that are also early homes for Fibre Channel. The IC can handle PCI rates as fast as 528 Mbytes/sec and supports 100-Mbyte/sec Fibre Channel transfers. You can also bypass the internal transceiver and use external devices to support optical media for long-cable-length applications. The company claims the IC can sustain data rates greater than 97 Mbytes/sec and I/O execution rates in excess of 10,500 I/O operations/sec. In evaluation quantities, the IC starts at around $150, and the vendor offers host adapters starting at $750. **QLogic Corp**, Costa Mesa, CA, 1-714-438-2200, www.qlc.com. Circle No. 471

MCORE-BASED IC INTEGRATES 12-SUBMINIATURE MOSFET RELAYS SUIT PCMCIA SYSTEMS.

Measuring only 4.2×6.5×2.1 mm, the G3VM solid-state-relay family has a low enough profile to fit onto PC Cards in PCMCIA systems.

The MOSFET-based relays are available in four-, six-, and eight-pin versions. They offer a variety of continuous-load current connections—ac, dc single, and dc parallel—at 120, 150, and 200 mA. G3VM relays spec output voltages to 350V dc, 50-mA input current, –350 to +350V output-load voltage, and maximum load resistance of 35Ω. The devices are available in industry-standard surface-mount and through-hole configurations. Prices start at $1.35 (1000). **Omron Electronics Inc**, Schaumburg, IL. 1-800-556-6766, fax 1-847-843-8081. Circle No. 472

CHANNEL GPS CORRELATOR. With GPS (Global Positioning System) applications exploding, the MMC2003 brings a 12-channel GPS correlator together with the widely-used MCore RISC microcontroller. The resulting MMC2003 IC provides all of the features of the general-purpose MC2001 microcontroller, including a 16-MHz, 15-MIPS core; 32 kbytes of SRAM; and a variety of peripherals. Together, the MMC2003 and PSRF1111A RF module comprise the MGPSCS-A1 chip set and offer the highest level of integration yet for GPS-centric devices. Moreover, the GPS task takes less than 10% of the on-chip processing power, leaving ample bandwidth for other applications. The vendor claims that it will ramp the clock speed to 33 MHz and has actually already done so in the MMC2001. With 12-channel capabilities, the IC can handle demanding applications, such as precision surveying equipment, yet its cost will also suit it to low-end consumer handheld devices. The MGPSCS-A1 sells for around $45 (10,000), and you can buy an evaluation kit for less than $1000. **Motorola**, Austin, TX 1-888-298-5217, www.mot. com/sps.

Circle No. 473

SINGLE CHIP IMPLEMENTS CABLE MODEM. This QAMLink cable-modem IC, the BCM3300, is the only chip needed to implement a cable modem, integrating all media-access control (MAC) and physical layer (PHY) transmission functions. It's compliant with Multimedia Cable Network Systems (MCNS) Data Over Cable Service Interface Specifications (DOCSIS) version 1.0. The chip includes a 64/256-QAM receiver, a 4/16-QAM transmitter, and an MCNS/DOCSIS 1.0 MAC. The receiver allows downstream data rates up to 56 Mbps; the transmitter allows upstream rates up to 20 Mbps. The MAC includes baseline privacy encryption and decryption for Internet security with 56-bit DES cipher block chaining. The 256-pin ball-grid-array BCM3300 costs $50 (10,000). **Broadcom Corp**, Irvine, CA. 1-949-450-8700, www.broadcom.com.

Circle No. 474

"BULLETPROOF" DATA-ACQUISITION UNIT CAPTURES "ANY" SIGNAL. Considering what it does and the punishment it withstands, the eight-channel, 1.52×7.29×9-in. DI-730

data-acquisition unit is reasonably priced: $2995 for the version with a parallel-port interface. At $1195, the unit's 32-channel stable mate, the DI-720, which lacks the DI-730's 1000V differential-overvoltage protection and channel-to-channel isolation, offers a per-channel price of $37.

Enter 4 at www.ednmag.com/InfoAccess

Kilovolt differential or common-mode overloads cause no damage to the DI-730, even on the most sensitive range. The analog inputs are ohmically isolated from each other, from the output, and from the chassis. The inputs are unusual, too, because of their greater-than-10-kHz bandwidth, high common-mode rejection (thanks to the ohmic isolation, typically more than 160 dB at dc), and wide range of full-scale inputs. **Dataq Instruments**, Akron, OH. 1-800-533-9006, 1-330-668-1444, fax 1-330-666-5434, info@dataq.com, www.dataq. com.

Circle No. 475

HDTV DECODER SAVES MEMORY.

The STi7000 IC enables full decoding and display of HDTV pictures with only 64 Mbits of external memory. Integrating an MP@HL MPEG-2 decoder with an advanced display and format converter, the chip supports all 18 formats defined by the Advanced Television Systems Committee (ATSC). It's also suitable for subsets of these standards, such as HD0. It supports video rates up to 1920×1088×30 Hz interlaced or 1280×720×60 Hz progressive. The chip provides two compression modes. High-quality mode reduces necessary external SDRAM by 50%; standard mode cuts memory needs by 75%. The STi7000 includes interfaces for a host µP, local SDRAM, standard or high-definition video output, and standard digitized video input. **STMicroelectronics**, Lexington, MA. 1-781-861-2650, www.st. com.

Circle No. 476

IC ALLOWS HOME NETWORKING OVER PHONE LINES.

21145 Phoneline/Ethernet LAN controller enables home networking over existing telephone lines. Suited for LAN-on-motherboard and adapter-card implementations, the chip uses a phoneline physical-layer interface for 1-Mbps networking via standard telephone jacks. It also has an integrated 10-Mbps Ethernet physical interface that will allow home users to benefit from broadband devices such as UADSL and cable modems. The IC automatically senses whether a PC is connected to phone-line-based home network or to an Ethernet-based network. The chip is available with either a PCI or a CardBus interface, and it meets network device class power-management requirements under the OnNow architecture for PC 98 and PC 99. The 21145 costs $xx. **Intel Corp**, Santa Clara, CA. 1-800-628-8686, www.intel.com.

Circle No. 477

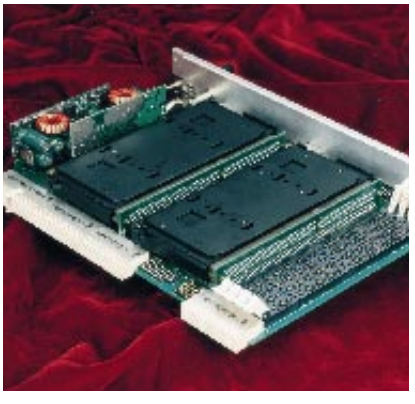
CHIP ENABLES LOW-COST FAST ETHERNET SWITCHES.

The GT-48313 switch-controller IC fits in designs of price-sensitive unmanaged Fast Ethernet switches. The $50 (10,000) chip was designed specifically for 8-port stand-alone unmanaged switches, and it omits expansion and stacking capability to keep costs down. The chip integrates eight full-duplex 100Base-TX ports and a wire-speed switching engine. With its ability to support more than 12,000 MAC addresses, it's suitable for use as a desktop switch. It supports packet-buffer and control memory with interfaces to 4 Mbytes of high-performance packet SDRAM and to 1 Mbyte of SGRAM for control structures and address table. **Galileo Technology**, San Jose, CA. 1-415-451-1400, www.galileot. com.

Circle No. 478

DUAL 450-MHz PENTIUMS SUPERCHARGE FASTEST BOARD COMPUTER.

In the race for the fastest processor in computationally intensive applications, General Micro Systems has zoomed to the forefront with a new 450-MHz, dual Pentium II available in both VME64 (V2P2) and CompactPCI (C2P2) versions. In addition to their blazing speed, the boards provide space for 1 Gbyte of



100-MHz main DRAM plus 1 Mbyte of Level 2 cache. For embedded applications requiring no hard disk, the V2P2 and C2P2 provide 72 Mbytes of M-Systems' (www.msys.com) Disk-On-Chip flash memory and as much as 750 Mbytes of SanDisk (www.sandisk.com) 1.5-in. flash IDE. M-Systems provides software to emulate a hard disk. Prices for the V2P2 and C2P2 start at $7200 with 0.5-Gbyte main memory and two 400-MHz Pentium processors. **General Micro Systems**, Rancho Cucamonga, CA. 1-909-980-4863, fax 1-909-987-4863, www.gms4vme.com.

Circle No. 479

CHIP ENABLES 11-MBPS WIRELESS LAN.

The HFA3860 baseband processor joins Harris's Prism radio chip set family to enable 11-Mbps data rates in Ethernet-equivalent wireless-LAN applications. The HFA3860 provides all the baseband transmit-and-receive functions required for the 2.4-GHz Industrial, Scientific, and Medical (ISM) unlicensed band on a single chip. It can also achieve fallback rates to 5.5 Mbps, to extend range, or to 1- and 2-Mbps rates for compatibility with IEEE 802.11-compliant systems. The HFA3860 easily replaces the 2-Mbps baseband processor in existing Prism applications. The Prism 11-Mbps specification provides for a working range of 100 ft at 100 mW RF power. The HFA3860 costs $9.92 (10,000). **Harris Semiconductor**, Melbourne, FL. 1-800-442-7747 ext 7687, www.semi.harris.com.

Circle No. 480

RDRAMs TRANSFER DATA AT 1.6 GBYTES/SEC.

The interface for Direct Rambus DRAM (Direct RDRAM) devices uses an 800-MHz clock on a 16-bit bus to achieve memory-transfer rates of 1.6 Gbytes/sec per chip in PC main memory. Ganging RDRAM devices further increases the rate. Base and Concurrent RDRAMs transfer address, data, and control information in packets via pins that are synchronized with the clock by careful impedance and trace-length matching. Data transfers occur on both clock edges, and the clock travels sequentially from chip to chip. An oscillator is on one end of the clock path, a terminator pullup resistor is on the other, and the memory controller is in the middle. Each chip resynchronizes the clock with an onboard PLL. For PC main memory, a Direct Rambus memory system fits within the same physical, power, and thermal profiles of a similarly configured 100-MHz synchronous DRAM memory system. Memory chips using the RDRAM technology are available from a variety of vendors. **Rambus**, Mountain View, CA. 1-650-944-8000, www.rambus. com.

Circle No. 481

8-MBIT SRAM DELIVERS DATA AT 600 MHz.

IBM's 8-Mbit double-data-rate SRAM transfers data on both edges of the input clock, providing transfer rates up to 600 MHz. In workstations, servers, switches and routers, upgrading cache to the new 8-Mbit devices from 4-Mbit devices boosts performance by almost a factor of two. For systems that don't support double data rates, the new SRAM supports the "late write" architecture, providing backward compatibility with existing 1-Mbit and 4-Mbit late-write SRAMs. Late-write applications can migrate to the 8-Mbit SRAMs with up to a 330-MHz cycle-time operation. The chip costs $xx. **IBM Microelectronics**, Armonk, NY.1-914-765-1900, www.chips.ibm.com. Circle No. 482

TOOL FOR ON-SPEED CIRCUIT TEST.

BISTMaxx, based on OpMaxx's oscillation BIST technology, tests analog, digital, and mixed-signal circuits. By making a circuit oscillate and measuring the frequency, you can do on-speed testing with minimally intrusive, low-area-overhead techniques. BISTMaxx works on converters, oscillators, PLLs, amplifiers, high-speed-digital timing paths, and interconnects. BISTMaxx licenses start at $25,000 per design. **Opmaxx**, Beaverton, OR. 1-503-520-9200, fax 1- 503-520-1636 www.opmaxx.com. Circle No. 483

WORKSTATION INCORPORATES XEON PROCESSOR.

The Professional Workstation SP700 combines support for Intel's fastest 450-MHz Slot-2 Xeon processor with the second generation of Compaq's HPSA (Highly Parallel System Architecture). The HPSA includes parallel memory buses capable of 1.6Gbyte/sec peak bandwidth and dual-peer PCI buses offering 267Mbytes/ sec of aggregate bandwidth. The systems also include AGP 2X support and Compaq offers a range of storage and graphics options. From $3599. **Compaq Computer Corp**, Houston, TX. 1-800-345-1518, www.compaq.com. Circle No. 484

DISK DRIVES PUMP UP STORAGE.

The Ultrastar 9LZX and 18ZX disk drives rotate at 10,020-rpm and offer 9.1 and 18.2 Gbytes storage capacities, 5.6-msec seek times, and media transfer rates as fast as 23 Mbytes/sec. IBM offers the drives in Ultra2 SCSI LVD (low voltage differential), SSA (Serial Storage Architecture), and FC-AL (Fibre Channel Arbitrated Loop) interface flavors with the SCSI drives supporting 80-Mbyte/sec interface rates and the FC-AL drives supporting 200-Mbyte/sec interface rates. Other features include the Drive-TIP processor that monitors internal drive temperatures, 4-Mbyte buffers, MRX heads, and a PRML read channel. **IBM**, San Jose, CA. 1-408-256-8000, www.ibm.com/ storage. Circle No. 485

AUDIO-AMP ICs GET D IN CLASS YET STILL EXCEL.

A trio of monolithic Class D power amplifiers—rated at 10, 18, and 25W output power with 10% THD into a 4Ω load—operate from supplies as high as ±25V and include standby and mute functions and protection against overvoltage, output-short-circuit, and thermal-overload conditions. Available in a 20-pin power DIP with a copper, heat-spreading lead frame, the 10W TDA7480 requires no heat sinking. The 18W TDA7481 and 25W TDA7482 are available in 15-lead packages with heat-sinking tabs. Prices range from $2.40 to $3 (10,000); the vendor is working on stereo and quad versions as well. **STMicroelectronics**, Lexington, MA. 1-781-861-2650, fax 1-781-861-2678, www.st.com. Circle No. 486

10- AND 20-GBYTE DRIVES HAVE SCSI INTERFACE.

Terastor has produced the first fruits of its NFR (near field recording) research with the introduction of 10- and 20-Gbyte drives that fit the half-height 5¼-in. form factor. The drives feature 18-msec access times and include a SCSI interface. Maximum media transfer rates are 6 Mbytes/sec for the 10-Gbyte model and 11 Mbytes/sec for the 20-Gbyte model. The NFR scheme combines flying-head technology from hard disk drives with magneto-optical-like recording technology. **Terastor Corp**, San Jose, CA. 1-408-914-4000, www.terastor.com. Circle No. 487

MOTHERBOARD SUPPORTS SLOT 1 CPUs.

This highly integrated motherboard brings Pentium II processors to the sub-$1000 PC market. The Tigercub 100 is smaller than the MicroATX mechanical standard and can fit inside a MicroATX or standard ATX chassis. It supports Slot 1 CPUs ranging from the low-end Intel Celeron family up to 450-MHz Pentium IIs. The board includes an AGP port, two PCI slots, integrated audio support, two USB ports, Ultra DMA 33 disk interface, and PS/2 mouse and keyboard connections. **Tyan Computer Corp**, Fremont, CA. 1-510-651-8868, www.tyan. com. Circle No. 488

MONITORS FOR WORK AND PLAY.

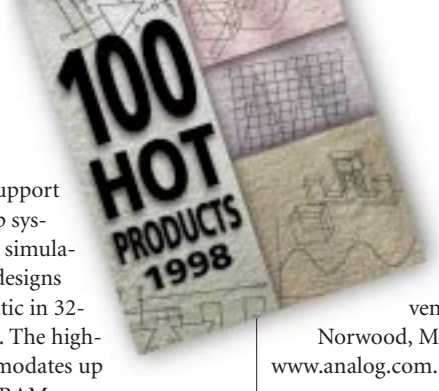
The 19-in. 446Xpro and 446Xt monitors serve the professional and consumer markets at estimated street prices of $799 and $1099, respectively. The pro version features a 21-mm pitch, 107-kHz horizontal line frequency, and 1600×1200 resolution. The 446Xt tops out at 96-kHz line frequency and supports Windows 9x plug-n-play using VESA's DDC (display data channel). **Nokia Display Products Inc**, Sausalito, CA. 1-415-331-4244, www.nokia.com. Circle No. 489

MICRODRIVE STORES 40 MBYTES.

Capable of storing 40 Mbytes on a credit-card size diskette, Clik! drives target applications such as digital cameras, PDAs, and other mobile products. A stand-alone portable Clik! drive weighs less than six ounces and is 4½ inches long. Iomega predicts the diskette prices will drop below $10 by the end of 1998. **Iomega Corp**, Roy, UT. 1-800-697-8833, www.iomega.com. Circle No. 490

WORKSTATIONS HOST DUAL 236-MHz μPs.

HP's line of B-, C-, and J-Class PA-RISC-based workstations start with a single 132-MHz processor and top out with dual 236-MHz processors. Moreover, HP began shipping its HP-UX 11, 64-bit version of Unix with the systems at mid



year. The 64-bit support allows the desktop systems to host large simulations and circuit designs that are problematic in 32-bit address spaces. The high-end J2240 accommodates up to 3.75 Gbytes of RAM. **Hewlett-Packard Co**, Santa Clara, CA. 1-408-246-4300, www.hp.com/go/technical.

Circle No. 491

CMOS PROCESSING PROVIDES COMPLETE PROGRAMMABILITY IN HALL-EFFECT SENSOR.

The MLX-90215VA offers complete digital programmability of every useful parameter in a linear Hall-effect sensor: quiescent output voltage, magnetic sensitivity, and temperature coefficient. The IC contains PROM, RAM, and three DACs. It accepts 37 bits of data through its supply and output pins. The data programs the on-chip DACs. You can adjust the offset voltage in 4.8-mV increments, thereby eliminating the need to make position adjustments for the associated magnet. Sensitivity is programmable from 0.5 to 16 mV/gauss. You can also program the temperature coefficient from 0 to 2500 ppm/°C with 5-bit (one part in 32) resolution. An automotive-grade sensor costs $3 (10,000). **Melexis Inc**, Webster, MA. 1-508-943-0487. www.melexis.com.

Circle No. 492

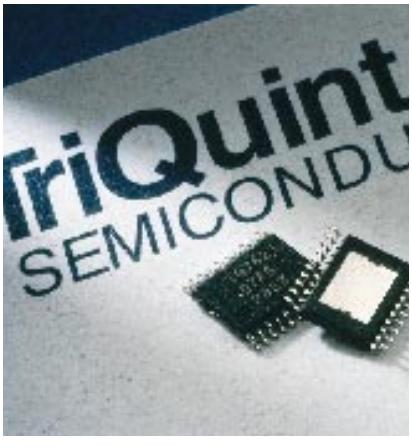
$10 FLOATING-POINT DSP APPROACHES FIXED-POINT PRICE.

The $10 (100,000) ADSP-21065L floating-point DSP comes close to fixed-point-device prices, which can be less than $5. The low price point should attract system designers, most of whom prefer to use a floating-point rather than a fixed-point DSP for the floating-point devices' better performance, easier-to-write software, more precise results, and wider availability of application libraries. The 21065L has the same basic core as every other SHARC, but the vendor made some trade-offs to hit the low price. First, with 544 kbits of dual-ported SRAM, this DSP has a little more than half the memory of the 21061. Unlike other SHARC family members, which target multiprocessor applications, the 21065L lacks link ports for distributed arbitration. This DSP still has a cluster-interface bus that allows it to transfer data as fast as 120 Mbytes/sec between other devices. Furthermore, because the 21065 has an optimized core design and a 60-MHz clock speed, the device runs 30% faster than other SHARC devices claims the vendor. **Analog Devices**, Norwood, MA. 1-781-329-4700, www.analog.com.

Circle No. 493

QUINTET OF 3.6V POWER AMPS MESH WITH CELL-PHONE DEMANDS.

Five GaAs power amplifiers, each complying with a different cell-phone standard and also adaptable to ISM systems, minimize power consumption and space needs. For GSM applications, you can choose between the TQ7541 for 1710- to 1785-MHz European DCS-1800 specifications and the TQ7641 for the 1850- to 1910-MHz US PCS-1900 requirements. Both offer 32-dBm output, and minimum efficiencies for the 7541 and 7641 are 40 and 37%, respectively. Cell phones supporting Advanced Mobile Phone Services (AMPS) IS-19 and TDMA IS-136 operation in the 824- to 849-MHz



band can use the TQ7121 with 50% AMPS efficiency; phones supporting TDMA PCS for 1850- to 1910-MHz operation can use the TQ7621. The TQ7111 targets use in AMPS IS-19 operation from 824 to 849 MHz; it too boasts a minimum efficiency of 50%. You can use the devices with 3 to 5V supplies. **Triquint Semiconductor Inc**, Hillsboro, OR. 1-503-615-9000, fax 1-503-615-8900, www.triquint.com.

Circle No. 494

32-BIT RISC CPU FEATURES 2 MBYTES OF DRAM.

The M32Rx/D family comprises the M32R/D and the new superscalar M32Rx/D architectures. Both architectures are instruction-set-compatible and comprise a combination of 16- and 32-bit-wide instruction formats with six addressing modes. The devices include 16 32-bit, general-purpose registers and two 56-bit accumulators. The M32R/D CPU executes most instructions in one clock cycle, using an instruction-fetch, decode, execute, memory-access, and write-back pipeline. The decode stage dispatches instructions in order, and the remaining stages execute them out of order to hide memory-access latency. The MAC unit contains a single-cycle, 32×16-bit multiplier and a 56-bit adder.$10.01 to $25. **Mitsubishi Electronics America Inc**, Sunnyvale, CA. 1-408-730-5900, fax 1-408-732-9382, www.mitsubishichips.com.

Circle No. 495

SLOT 1 PROCESSOR HAS DEDICATED BACKSIDE L2-CACHE BUS.

Intel's Slot 1-compatible Pentium II barely resembles the Pentium or any other x86 processor. With a decoupled 12-stage pipeline, the Pentium II trades less work per pipe stage for more stages. The Pentium II comprises three independent engines: fetch/decode, dispatch/execute, and retire. The fetch/decode engine converts instructions into one or more micro-operations (mops). The mops improve performance by representing fixed-length, fixed-field, easy-to-execute operations. You can individually schedule the mops, facilitating the Pentium II's out-of-order execution of instructions. Because of Intel's patent on the Slot 1 processor's CPU interface, the company is the sole source of these processors, primarily characterized by their dedicated backside L2-cache bus. Separate buses to main memory and L2 cache allow the CPU to access the L2 cache at 200 MHz, one-half the core-processor speed. Slot 1 provides Intel's GTL+ bus protocol, which is helpful in multiprocessor systems. $500.01 to $750. **Intel**, Santa Clara, CA. 1-800-628-8686. www.intel.com

Circle No. 496

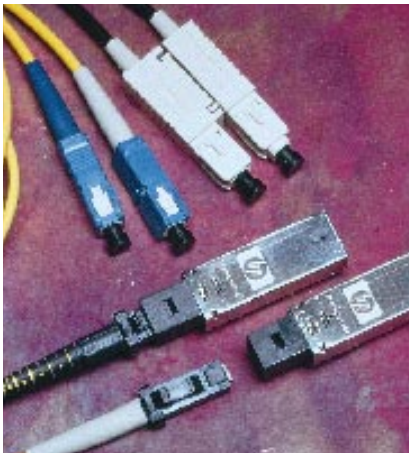
25-YEAR-OLD Z8 GETS AN OVERHAUL.

The Z8Plus, a new beefed-up core, is software-compatible with the traditional Z8. The vendor expects the Z8Plus to outrun the Z8 by as much 50%. This performance improvement results primarily from a reduced system clock and a fixed instruction-cycle time. All instructions on the Z8Plus execute in five system clocks; the minimum instruction cycle time for the Z8 is six system clocks, and some instructions require as many as 20 clocks.

The fixed-length instruction time not only yields higher performance, but also helps you write more deterministic software. Another advantage of the Z8Plus is its lower power consumption, which results from having fewer clocks per instruction than the previous design, as well as other design improvements. Although the family's devices differ from each other in peripherals and memory, Zilog specifies the first Z8Plus part at 6 mA (5.5V and 10 MHz). Compare this with 20 mA for the similarly featured Z86E04 running at 5.5V and 12 MHz. The Z8E520 is Zilog's first product to contain the Z8Plus core. This device includes USB logic and targets USB, PS/2, and serial-mouse designs. It contains 6 kbytes of ROM and fits into a 20-pin DIP, SOIC, or SSOP. It sells for $2.50 (5000). **Zilog**, Campbell, CA. 1-408-370-8000. www.zilog.com. Circle No. 497

OPTICAL TRANSCEIVERS SUPPORT INCREASED PORT DENSITY.

Several fiber-optic-component vendors are employing the new MT-RJ modular cabling system, which brings many of the benefits of the RJ-45 modular plug-and-jack system to fiber optics. The MT-RJ transceiver is about half the size of the standard SC fiber-based transceiver, allowing designers to double the port density. The MT-RJ system supports single-mode and multimode fiber applications.



The first 1300-nm, LED-based MT-RJ transceivers come from Hewlett-Packard. They support Fast Ethernet, asynchronous-transfer-mode OC-3, and fiber-distributed data-interface applications. The transceivers use a 3.3V power supply, halving the power consumption and board space. Samples of the 125- and 155-Mbps MT-RJ transceivers cost less than $40 (10,000). **Hewlett-Packard**, Palo Alto, CA. www.hp. com/go/fiber.

Circle No. 498

YOU NEVER OUTGROW THE NEED FOR ANALOG FILTERS—EVEN IN THE DIGITAL WORLD.

For filtering digital video waveforms after they pass through their reconstruction DACs, the ML6428 active-filter IC eliminates as many as 16 discrete components as well as the aggravation associated with filter design and implementation. The $1.50 (1000), eight-lead SOIC accepts $1V_{p-p}$ Y and C video inputs (known as S-video), and its outputs include amplified, filtered Y and C signals as well as composite video formed by summing the Y and C signals. The S-video outputs can drive $2V_{p-p}$ into a 150Ω load, and the composite output can drive a 75Ω load to the same amplitude span; internal gain for the filter is 32 for all outputs. **Micro Linear Corp**, San Jose, CA. 1-4081-433-5200, www.microlinear.com.

Circle No. 499

DIGITAL SCOPES MIMIC ANALOGS' LIVE DISPLAYS.

The digital-phosphor oscilloscope (DPO) really does emulate analog-scopes' intensity-modulated displays. More remarkable, it does so without postprocessing delays. DPO's store a 21-bit-deep record of each pixel contained in the screen's 500-pixel-wide-by-200-pixel-high waveform area. DPOs also eliminate aliasing. The family ranges in price from $9760 to $22,495. **Tektronix**, Beaverton, OR, 1-800-479-4490, fax 1-503-222-1542, www.tek.com/Measurement. Circle No. 500

WAVEFORM GENERATOR BASED ON DIRECT DIGITAL SYNTHESIS.

The Model 625 uses DDS technology only to produce a sine wave. The sine wave is available as an output but also drives an analog comparator, which produces a square wave. Like the sine wave, the square wave is available as an output. However, the square wave also serves as a clock that drives a true ARB. The $995 waveform gneerator produces sine and square waves from 0 to 20 MHz with 0.1-Hz frequency resolution. **Berkeley Nucleonics Corp**, San Rafael, CA, 1-800-234-7858, fax 1-415-453-9956, www.berkeleynucleonics.com.

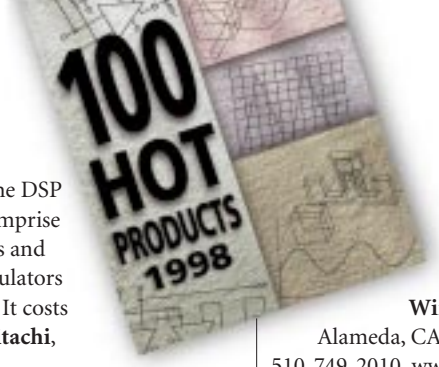
Circle No. 501

HELP ARRIVES FOR CHIP VERIFICATION AND TEST.

icBIST 3.0 is designed for at-speed testing and diagnosing digital- and mixed-signal chips. The tool suite is a compilation of previously released digital logic, memory, and analog-block built-in self-test (BIST) and logic-scan tools with a few enhancements. The enhancements include legacy intellectual-property (IP)-core support, improved at-speed tests of high-speed logic, and improved logic- and memory-BIST diagnostics. You use icBIST for functional testing of your system-on-chip design. The tool produces Verilog or VHDL RTL soft cores that reside on a chip, typically taking 2000 to 10,000 gates of logic. These cores implement BIST logic for at-speed testing of digital-logic, SRAM, DRAM, and ROM blocks along with analog-logic PLL and ADC blocks. The tool assembles the test bloaks into a scan chain that you access with 1149.1 boundary scan. The icBIST tool also does at-speed testing of board-level SRAM and DRAM chips along with board-level interconnects. The product is available on a per-chip-design basis with prices starting at $30,000. The price includes logic BIST, 1149.1 boundary scan, and full-scan automatic test-pattern-generation (ATPG). **LogicVision**, San Jose, CA. 1-408-453-0146, fax 1-408-467-1180, www.logicvision.com. Circle No. 502

µP GETS A COMPLETE DSP.

Although some µP vendors add multiply-accumulate (MAC) units to their devices to allow them to perform basic digital-signal processing, Hitachi grafts a complete DSP to the SH µP. The SH's DSP unit shares the five-stage pipeline with the integer unit; the DSP is not a coprocessor. The CPU contains a fetch and decode unit, which manages the single instruction stream for both the integer and DSP units, routing instructions to the appropriate unit. The integer unit of the SH-DSP comprises and enhanced SH-2 core that supports the DSP unit. One enhancement is 32-bit DSP instructions; the RISC portion of the SH-DSP still operates on only 16-bit instructions. The SH-DSP has four internal buses and a register file that's separate from the integer



unit's registers. The DSP unit's registers comprise six 32-bit registers and two 32-bit accumulators with 8 guard bits. It costs $25.01 to $50. **Hitachi**, Brisbane, CA. www.hitachi.com

Circle No. 503

SOFTWARE LEVERAGES IDE FOR EMBEDDED-APPLICATION DEVELOPMENT. Nucleus EDE Version 2.0—an add-on to the Microsoft Developer's Studio IDE—lets you use Studio's project-managing, editing, and building facilities for embedded applications. Together, the two programs provide development and cross-development tools that allow you to edit, build, debug, and test cycles within one environment under either Windows 95 or NT. Version 2.0 of Nucleus EDE offers easier installation and support for project- and file-specific building options. Closer integration within the Developer's Studio (for example, the ability to use the Build menu) alleviates the numerous button clicks necessary to invoke Nucleus EDE. Licenses start at $695. **Accelerated Technology Inc**, Mobile, AL. 1-334-661-5770, fax 1-334-661-5788, www.atinucleus.com.

Circle No. 504

GUI SOFTWARE SUITE SIMPLIFIES EMBEDDED GRAPHICS. Two new hypertext-markup-language (HTML) graphics-development products ease GUI development. One product, eNavigator, is a full Web browser targeting information-retrieval appliances, such as kiosks, televisions, set-top-boxes, and handheld devices. Wind River based eNavigator on Netscape (www.netscape.com) technology. It includes a user interface, an HTML parsing/layout engine, support for JavaScript, and e-mail. Users can customize eNavigator to create a company-unique user interface. The other product, HTMLworks, is a set of HTML and JavaScript components for applications running the VxWorks real-time operating system. HTMLworks includes a reference interface that developers modify to implement complex interactive GUIs for network-connected embedded devices that require no general Web-browsing function. Netscape's LiveConnect technology provides the link between the user interface and the underlying application code without interfering with the real-time operation of the device. The eNavigator is $10,000 and HTMLworks is $8000. **Wind River Systems**, Alameda, CA. 1-510-748-4100, fax 1-510-749-2010, www.wrs.com.

Circle No. 505

MPEG CODEC YIELDS LOWER COST, NONLINEAR VIDEO EDITING. The single-chip DVxpress MPEG-2 encoder and decoder with the DVxpress 7112 chip targets professional-level, nonlinear-editing (NLE) applications; the 7110 targets prosumer (high-end consumer) NLE applications. Digital NLE maintains a single MPEG-2 domain for storage, editing, and distribution while protecting video quality. The DVxpress enables cost-effective NLE by integrating multiple-stream decoding capability, real-time special effects, and the first silicon

implementation of C-Cube's Frame-Accurate MPEG Editing (FAME). The DVxpress 7110 supports ML@MP (Main Level at Main Profile) for prosumer applications and costs $175 (20,000). The DVxpress 7112 adds ML@4:2:2 (Main Level at 4:2:2 Profile) support and dual-MPEG-stream output. The 7112 costs $300 (5000). **C-Cube Microsystems**, Milpitas, CA. 1-408-490-6300, www. c-cube.com.

Circle No. 506

SIMULATION PLATFORM SPEEDS ADVANCED DSP DESIGN. This version of the DSP Workshop, an integrated software environment comprising Matlab, Simulink, DSP Blockset, and the Signal Processing Toolbox, offers faster simulations, a tighter migration path between tools, improvements in design efficiency, and the ability to simulate an entire system-level design. Support for frame-based processing in DSP Blockset allows you to process blocks of data, as well as individual data samples, within a time-driven simulation. Simulink simulates DSP designs at speeds previously available only in data-flow simulators, enabling a more natural mapping to real-time implementation. DSP Workshop runs on Windows 95/NT, Sun, HP, IBM, Silicon Graphics, and DEC Alpha platforms. Prices start at $5900. **The MathWorks Inc**, Natick, MA. 1-508-647-7000, fax 1-508-647-7001, www.mathworks.com

Circle No. 507

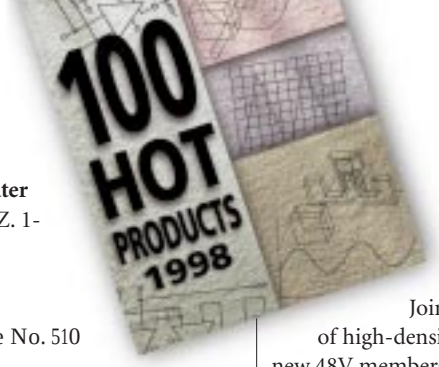
COMPACT DAUGHTERBOARD TURNS OUT 2.66 GFLOPS. Packing four 333-MHz PowerPC 604e µPs on a 6×6-in. circuit board, the Excalibur 333 accelerator plugs into a 6U VMEbus motherboard to deliver 2.66 Gflops of computing performance. Four Excalibur 333 daughtercards on a 9U VME motherboard provides 10.66 Gflops, with total performance in a single VME chassis of 170 Gflops. The Excalibur uses the 320-Mbyte/sec Skychannel to connect to the motherboard and is available for Skybolt II 6U and 9U VME accelerators, the Skystation II desktop accelerator, and the Skypack compact embedded system. Prices start at $39,500. **Sky Computers Inc**, Chelmsford, MA. 1-978-250-1920, fax 1-978-250-0036, www.sky.com.

Circle No. 508

CARD CRAMS MOST FUNCTIONS OF A STANDARD MOTHERBOARD INTO A SMALLER PACKAGE. With the addition of a LCD screen, a keyboard and memory, the CardPC runs standard Windows 95 and NT. The ISA-compatible micromotherboard includes the 200-MHz Pentium processor with MMX technology and the Intel 430TX-system controller. You can install up to 128 Mbytes of DRAM via a 144-pin DIMM socket. $899 (1000). **Cell Computing Inc**, San Jose, CA. 1-408-967-8800, www.cellcomputing.com.

Circle No. 509

COMPACTPCI BOARD IMPLEMENTS SCALEABLE µP SYSTEMS. With the MCPN750 CompactPCI processor board, you are no longer limited to one processor board running in the system slot of a CompactPCI backplane. MCPN750 boards operate in nonsystem slots, allowing you to configure loosely coupled µP systems. Each MCPN750 board comes with a PowerPC 750 processor, as much as 128 Mbytes of ECC-protected DRAM, 5 Mbytes of flash memory, a 10/100BaseTX Ethernet interface, USB host/hub interface, real-time clock, and four serial ports. The MCPN750 runs under Tornado/VxWorks and LynxOS. Prices start at $2095.



Motorola Computer Group, Tempe, AZ. 1-800-759-1107, www.mot.com/computer.

Circle No. 510

FORMAL-VERIFICATION TOOLS BOAST ENHANCED DESIGN DEBUGGING.

The Tuxedo-LEC logic-equivalence checker includes RTL extraction, letting you compare designs before and after logic synthesis. You then continue to use the tool to compare designs before and after gate-level modifications, such as adding design-for-test features, and after placement-and-routing with a circuit-extraction tool. Tuxedo-LDD logic-debugging and diagnostic tool identifies and displays error candidates (differences between two versions of a design). You can place constraints on the comparison to eliminate known differences that the tool should not flag. When it detects differences, the tool highlights those differences on a schematic window for graphical debugging, along with a textual listing of mapped and compared points. Tuxedo-LEC and Tuxedo-LDD cost $80,000 and $25,000, respectively. **Verplex Systems**, Santa Clara, CA. 1-408-980-8300, fax 408-980-8215, www.verplex.com.

Circle No. 511

DSO OFFERS 16M-SAMPLE MEMORY.

The LC584AXL DSO offers memory depths that are twice those of the deepest memory scopes: 4M samples/channel on four channels, 8M samples/channel on two channels, and 16M samples on one channel. The scope's full memory is usable in all trigger modes. In addition, four ADCs each take 2G samples/sec. When you use two channels, the scope interleaves the ADCs to double the sample rate to 4G samples/sec, and when you use one channel, the real-time sampling rate jumps to 8G samples/sec. That sampling rate is more than adequate for real-time capture of signals at the full 1-GHz bandwidth. An optional jitter- and timing-analysis (JTA) package allows jitter measurements that are repeatable to 400 fsec—that's 0.4 psec. The LC584AXL costs $39,990. The JTA package adds $1875. **LeCroy Corp**, Chestnut Ridge, NY. 1-800-453-2769, 1-914-425-2000, www. lecroy.com.

Circle No. 512

48V DC/DC CONVERTERS COME IN MAXI, MINI, MICRO SIZES.

Joining a second generation of high-density dc/dc converters, 23 new 48V members target telecommunications applications. The converters have power densities of 80 to 100W/in.^{3}. Three package sizes are available: the MaxiMOD, measuring 4.6×2.2×0.5 in. (117×56×12.7 mm) with output power of 200 to 500W; the MiniMOD, measuring 2.28×2.2×0.5 in. (68×56×12.7 mm) with output power of 100 to 250W; and the MicroMOD, measuring 2.28×1.45×0.5 in. (68×37×12.7 mm) with output power of 50 to 150W. The packages have a stepped profile that allows you to recess them into a board cutout to achieve an above-board height of only 0.43 in. (10.9 mm). Unit prices range from $200 to $235 for MaxiMOD converters, $130 to $147 for MiniMOD devices, and $95 to $112 for MicroMOD units. **Vicor Corp**, Andover, MA, 1-978-470-2900, fax 1-978-475-6715, www.vicr.com.

Circle No. 513

QUICK FPGA CONVERSION WITHOUT NRE CHARGES.

Say you want to convert an Altera programmable-logic device into an ASIC. These laser-configured ASICs

(LASICs) convert an FPGA design directly from a bit stream into an ASIC. According to the vendor, the converted device is functionally identical to the Altera part, including internal timing and pinout, eliminating any redesign or re-simulation (although resimulating is always a good idea). Rather than convert a coarse-grained FPGA architecture into a fine-grained gate array, each LASIC architecture matches an Altera FPGA-family architecture. Laser implementation of the LASIC devices eliminates photo masks, giving you prototypes in one week and production quantities in three to four weeks. No mask cost also allows the company to eliminate NRE charges for your conversion. LASIC devices support all six Altera configuration modes, allowing LASICs to be pin-compatible with the FPGAs they replace in all applications. You can currently get only the CL8000 family of LASIC devices for Altera Flex 8000 conversions. As an example of typical pricing, a 4000-gate CL8452A device in a 100-pin TQFP package costs $10.40 (100). **Clear Logic**, Santa Clara, CA. 1-408-492-8585, fax 1-408-988-5632.

Circle No. 514

SUPPLY CONTROLLER SLASHES LOSS, SIZE, PARTS COUNT IN RECHARGER CIRCUITS.

The latest members of the Tinyswitch family, which function as the core/controller of isolated, line-operated dc supplies, can reduce consumption by 10 to 20 times. The devices can also cut size and cost for less-than-10W supplies under light- or no-load conditions. For example, a member of the series in the external "brick" can power the ubiquitous Iomega Zip storage drive, letting you cut supply volume and weight by about 75%. In operation, a supply based on the Tinyswitch TNY253, 54, and 55 yields the same energy with every cycle. All the ICs come in eight-pin DIP and surface-mount packages and cost 75 to 81 cents (10,000). **Power Integrations Inc**, Sunnyvale, CA. 1-408-523-9200, fax 1-408-523-9300, www.powerint.com.

Circle No. 515

IMAGE COMPRESSION CATCHES A WAVELET.

The ADV611 and ADV612 wavelet-compression chips differ in their operating temperature ranges—0 to 70°C for the ADV611 and –25 to +85°C for the ADV612; the ADV612 also uses a more temperature-tolerant version of the ADV611's 120-pin TQFP. For use in digital-video-surveillance and closed-circuit-television (CCTV) applications, the ADV611 and ADV612 add several key features. A size-programmable quality box within the video frame lets you capture fine image detail while lowering the rest of the image's contrast, thus retaining high compression rates. Motion detection retains high-frequency wavelet-luminance coefficients that compression normally discards and passes them to the system via on-chip registers for analysis. The quality

box and motion detection work together to enable the video system to track an intruder or other object on the move. The ADV611 costs $18.95 (10,000); the ADV612 costs $42.95 (10,000); and the evaluation board is $399.95. **Analog Devices Inc**, Wilmington, MA. 1-781-937-1428, fax 1-781-821-4273, www.analog.com.

Circle No. 516

HIGHLY INTEGRATED PC-GRAPHICS CHIP SET JOSTLES THE COMPETITION.

Samples of the SiS530 Socket 7 chip set and the SiS620 Slot 1 chip set cost $29 (10,000). The chips integrate a feature-enhanced but performance-detuned version of the company's SiS6236AGP graphics chip, specified at 800 million polygons/ sec. The devices feature 64-bit local-memory and SDRAM buses operating as fast as 100 MHz, ensuring high-fill-rate bandwidth and a fast pathway to the shared system memory. The companion chip to both the SiS530 and SiS620, the SiS5595 PCI system controller, comes in a 208-pin PQFP. **Silicon Integrated Systems Corp**, Sunnyvale, CA. 1-408-730-5600, fax 1-408-730-5639, www.sis.com.tw.

Circle No. 517

PCI AND COMPACTPCI BOARDS SPORT "ULTIMATE" ADC.

PCI and CompactPCI data-acquisition boards that National Instruments (NI) expects to introduce late this year or early in 1999 will feature a unique ADC. The converter achieves a spurious-free dynamic range (SFDR) of 26 bits (equivalent to approximately eight decimal digits) at 10,000 conversions/sec. Moreover, as you reduce the signal level, the unit maintains its SFDR, even with signals that represent a small fraction of full scale. The ADC can also take 100 million samples/sec with 8-bit resolution. As you decrease the conversion rate to less than about 15 million samples/ sec, the resolution increases. At 5 million samples/sec, for example, resolution is 16 bits. The ADC boards to cost less than $10,000—probably by a significant amount. **National Instruments**, Austin, TX. 1-800-258-7022, fax 1-512-683-8411, www.natinst.com.

Circle No. 518

PROCESSOR FAMILY IS "QUICC" TO INCLUDE HIGH INTEGRATION.

The MPC8260 PowerQUICC II can process data as fast as 710 Mbps. The MPC860 and MPC8260 series devices integrate many of the same peripherals. Both series contain a core processor that performs general supervisory functions and software-driven protocol processing and a separate communication-processor module (CPM) that is dedicated to processing communication protocols. The MPC860's core runs at only 66 MHz compared with the 100- to 200-MHz MPC8260's EC603e core. Its low-power EC603e is a 32-bit, multi-issue core. It has a 64-bit interface allowing it to pipeline two 32-bit instructions for execution. The PowerQUICC II contains a system-interface unit (SIU) for system-control and glue-logic functions, including a memory controller. The memory controller

supports as many as 12 memory banks of SRAM, EPROM, EEPROM, flash, and most DRAMs. The first device from this family runs at 133 MHz (core and CPM) and 2V. $105 (10,000). **Motorola**, www.mot.com/mpc8260, 1-512-895-6082.

Circle No. 519

TRIPLE ADC FOCUSES ON RGB-TO-LCD FRONT END.

The AD-9483 triple 8-bit converter aims at digitizing RGB signals and supports display resolutions as high as 1280×1024 pixels at a 75-Hz refresh rate, compatible with SXGA LCD monitors. The converter accepts three differential 1V pk-pk analog signals and encodes them at 140M samples/ sec; full-power bandwidth is 300 MHz. The IC is available in a 100-pin PQFP and includes a 2.5V reference and track/hold circuitry. You need provide only a clock and a 5V power supply, and you can power the three-state CMOS output buff-ers separately from 3.3V to reduce dissipation. The $25.50 (1000) converter requires less than 1.5W of power. **Analog Devices Inc**, Norwood, MA. 1-781-937-1428, fax 1-781-821-4273, www.analog.com.

Circle No. 520

ARCHITECTURAL EFFICIENCIES SPEED μP PERFORMANCE.

MCore uses a four-stage pipeline to execute two-thirds of its 95 basic instructions in one clock. Similar to Hitachi's 32-bit SuperH architecture, MCore uses 16-bit, fixed-length instructions and a register file with 16 general-purpose registers and an alternative register file for context switches. Unlike SuperH, which shadows only eight of its general-purpose registers, MCore shadows all 16. MCore implements only 86% of its operation-code space, allowing some instruction head room for future generations. The 16-bit instruction size forces MCore to use two operand instructions—4 bits per register. Motorola claims that the lack of three operand instructions causes a 2 to 7% code bloat in key applications. Motorola also offers the MCore V1 evaluation system (EVS) that comprises a μC-memory board, an I/O-personality board, and a test-interface board. $10.01 to $25. **Motorola**, Austin, TX. www.motorola.com.

Circle No. 521

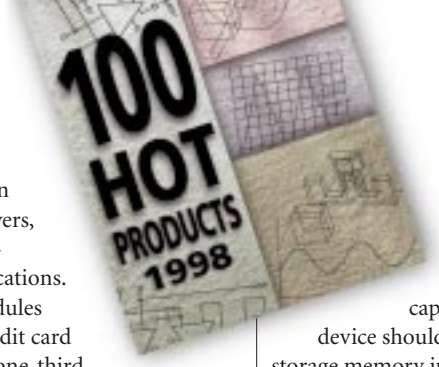
AUDIO DACs EXTEND FOUR R'S: RESOLUTION, RATE, RANGE, AND RATIO.

High-end digital-versatile-disk and CD players, as well as digital audio studios, need performance beyond what most audio DACs can provide. The PCM1704 fills that niche with 24-bit resolution and an 8×-oversampling, 96k-sample/sec sampling rate. The 20-pin SOIC also provides commensurate dynamic range and SNR specs of 112 and 120 dB, respectively. THD plus noise is typically 0.0008% for this ±5V device. The BiCMOS IC includes a sign-magnitude architecture that quashes glitch and other nonlinearities around the zero point. Maximum current output is ±1.2 mA; settling time to 0.0003% for a full- current step is 200 nsec. You can also use this $12.95 (1000) DAC for nonaudio applications, such as waveform-synthesis systems. **Burr-Brown Corp**, Tucson, AZ. 1-520-746-1111, fax 1-520-746-7401, www.burr-brown.com.

Circle No. 522

TINY MODULES PROVIDE BIG COMPUTER POWER.

The Titania series of power modules provides point-of-load



regulated power in workstations, servers, laptops, and data-networking applications. They include modules smaller than a credit card and occupy only one-third the space that voltage-regulator modules (VRMs) designed for µPs require. The modules' 5 million-hour MTBF is also an order of magnitude greater than that of traditional VRMs. The Titania supplies use a standard, low-cost, 50-pin connector. The nonisolated power modules are available with an input range of 3.3 to 48V dc and with output voltages of 1.3 to 3.5V at 16 to 20A. $25.10 (10,000). **Lucent Technologies**, Mesquite, TX. 1-972-284-3350, fax 1-972-284-2175, www. lucent.com. Circle No. 523

LOW-END UHF RANGE FURTHER SUCCUMBS TO SYSTEM-ON-A-CHIP RECEIVERS. The single-chip MICRF01 receiver/data demodulator for 300- to 450-MHz operation is an on/off keyed-modulation receiver that needs few external components. The IC includes complete RF and IF tuning plus demodulation circuitry, providing an antenna-in-through-data-out signal path. A patent-pending design in the IC eliminates the need for manual tuning and trimming, SAW filters, or inductors; an external 3-MHz, ±5%-accurate ceramic resonator is the typical frequency reference. The device's antenna RF reradiation, which can cause design hassles, is within regulatory limits. For a transmitter, you can use an inexpensive, inductor/capacitor-based architecture and achieve a typical range of 100 to 150m using a monopole receiver antenna and data rates as high as 4.8 kbps. Receiver output is a CMOS-logic-level demodulated signal, which you can directly interface to your system processor or decoder. $3 (1000). **Micrel Inc**, San Jose, CA. 1-408-944-0800, fax 1-408-944-0970, www. micrel.com. Circle No. 524

MULTILEVEL-CELL MEMORIES OFFER THE "WRITE" TOUCH. First-generation multilevel-cell (MLC) flash memories deliver cost savings over standard flash-memory alternatives. Hitachi's 256-Mbit MLC memory, based on AND technology, degrades less than its competition with the addition of MLC circuits. The flash memory also offers hard-disk-drive, clusterlike block sizes, fast block erase, and high cycling capability; therefore, the device should be a more useful storage memory in applications such as digital cameras. Compared with the company's 1-bit-per-cell 64-Mbit flash memory, this 256-Mbit device increases both the erase-block size and the internal-RAM page-buffer size (from 512+16 bytes to 2048+64 bytes in both cases). The 256-Mbit MLC flash memory in a 48-lead TSOP costs $90 (1000), and Hitachi also offers 192-Mbyte, $600 (1000) and 640-Mbyte, $2400 (1000) CompactFlash cards. **Hitachi Semiconductor**, Brisbane, CA. 1-650-589-8300, fax 1-650-583-4207, www. hitachi.com/semiconductor.

Circle No. 525

MULTICHANNEL DIGITAL DELAY ISOLATOR IMMUNIZES I/O FROM SIGNAL AILMENTS. The ISO508 IC uses capacitive barrier isolation to yield significantly lower power consumption and pc-board-area demands. The eight-channel, 24-pin DIP operates synchronously or asynchronously at data-transfer rates as high as 2M words/sec. It offers 1500V isolation and a double-buffered internal design with three-state outputs to simplify system integration and eliminate timing-skew problems. Typical power consumption is less than 12 mW per channel. The ISO508 costs $8.19 (1000). **Burr-Brown Corp**, Tucson, AZ. 1-520-746-1111, fax 1-520-746-7401, www.burr-brown. com.

Circle No. 526

DESIGNERS ADVANCE IN THE QUEST FOR THE PERFECT MOSFET. The FDS6680A features maximum 9.5-mΩ $R_{DS(ON)}$ at V_{GS} of 10V, along with typical gate charge of 37 nC. These 30V, 12.5A n-channel devices—fabricated in a trench process to keep capacitance constant per

Enter 66 at www.ednmag.com/InfoAccess

unit area while on-resistance decreases—are available in eight-lead SOIC packages and have high switching speeds, commensurate with the approximately 300-kHz speeds that PWM switching applications require. On-delay, rise, off-delay, and fall times are 8, 32, 42, and 14 nsec, respectively, for the FDS6680A MOSFETs, which cost $1.75 (1000). These devices join Fairchild's new FDR4420A MOSFET, a 30V, 11A device with 9-mΩ $R_{DS(ON)}$ and 41-nC typical gate charge for switching at approximately 1 MHz. **Fairchild Semiconductor**, Sunnyvale, CA. 1-408-822-2152, fax 1-408-822-2104, www.fairchildsemi.com.

Circle No. 527

SOFTWARE-ENHANCED UPS SYSTEMS SUIT DEPARTMENTAL LAN SERVERS.

By bundling PowerChute Plus power-management software with each UPS, the Smart-UPS 420 and 620 offer a cost-effective option for server power protection. The software performs automatic unattended-system shutdown, as well as important management and diagnostic functions, such as UPS testing/status and remote UPS management, for servers running Novell NetWare, Windows NT, Windows 3.x, Windows 95, and SCO Unix. Supplies accept input voltages of 74 to 154V without transferring to battery. The SU420NET and SU620NET cost $325 and $399, respectively. **American Power Conversion**, West Kingston, RI. 1-401-789-5735, fax 1-401-789-3710.

Circle No. 528

IC'S DUAL-SUPPLY MANAGEMENT SOLVES NOT-SO-SIMPLE PROBLEM.

It should be straightforward in principle to manage switchover when you have two dc supplies that can source your rail: Just use a series diode for each so the supply at higher potential supply is active. But when you look at the details and drawbacks of this simple technique, you soon find that you need a more complex circuit to do the job correctly. The LT1579 eases the challenge, though. This 16-lead IC accepts two dc inputs; provides uninterruptible output between the two with smooth switching action, even if you suddenly remove one supply; protects against reverse battery installation; and includes comparators and flag bits to monitor and indicate the status of each supply. The device can source as much as 300-mA output current with a dropout voltage of 0.5V and 3% output-voltage tolerance over line, load, and temperature variations. $3.40 (1000). **Linear Technology**, Milpitas, CA. 1-408-432-1900, fax 1-408-434-6441, www.linear-tech.com.

Circle No. 529

BUS-POWERED HUB SUPPLIES FOUR USB PORTS.

The pentiMate hub expands one Universal Serial Port (USB) port to four ports. Adding a new USB device to a PC is as simple as plugging it into the pentiMate hub; the computer automatically does the rest. The device needs no screwdrivers, software drivers, jumpers, or IRQ/DMA settings. The computer supplies all power that the hub and the four connected USB devices require. PentiMate also protects against shorts, automatically disconnecting the faulty device. The hub accommodates both slow (1.5-Mbps) and fast (12-Mbps) USB devices and costs $55 (OEM). **Methode Electronics Inc, dataMate Division**, Chicago, IL. 1-708-867-9600, fax 1-708-867-0346, www.methode.com.

Circle No. 530

SRAM-BASED FPGAs FEATURE 36,000 GATES.

The SRAM-based VF1 family devices have 12,000 to 36,000 logic gates. They integrate 3584 to 6144 bits of high-speed RAM, which the company does not include in its logic-gate counting. Vantis optimized the RAM and associated dedicated logic for dual-port configurations (one read and one read/write) and divided it into 128-bit (32×4-bit) blocks. VF1's variable-grain architecture is conceptually reminiscent of the flexible granularity of QuickLogic's (Sunnyvale, CA) pASIC2 and pASIC3 antifuse FPGAs. The lowest level building block, a microcombinatorial element, or μCE, comprises a three-input look-up table and decoding logic. Two μCEs plus a multiplexer form a configurable combinatorial element (CCE). Add a configurable sequential element (CSE) (essentially, a D flip-flop plus decoding logic), and you get a configurable building block (CBB). The $46 VF1012 commercial-temperature version comes in a 144-pin TQFP. **Vantis Corp**, Sunnyvale, CA. 1-408-732-0055, fax 1-408-774-8461, www.vantis.com.

Circle No. 531

ASIC+FPGA=FAST, WIDE PCI.

The OR3TP12 combines ASIC and programmable logic on one die. The vendor begins with its 3.3V OR3T55 FPGA, replacing 72 programmable-logic cells (PLCs) with a 64-bit initiator/target PCI hard core implemented in gate-array ASIC and capable of zero-wait-state perform-ance as fast as 66 MHz. The core also includes large on-chip read and write FIFO buffers of 2 kbits each for initiator configurations and 1 kbit each for targets. The OR3TP12 retains 252 PLCs of user-programmable logic, which Lucent estimates supports a 30,000- to 60,000-gate design. By replacing 72 PLCs (7776 typical gates) with 85,000 gates of ASIC, the company claims to deliver logic complexity comparable with, performance higher than, and price less than half that of its OR3T125. Lucent's FPGA-based PCI core currently supports only 50-MHz operation with much smaller FIFO buffers and no 64-bit option. The OR3TP12, at $79.80 (25,000), is also only 10% more expensive than the OR3T55 on which it is based. **Lucent Technologies**, Allentown, PA. 1-610-712-4331, fax 1-610-712-4209, www.lucent.com.

Circle No. 532

PRODUCT MERGES CHIP HARDWARE AND SOFTWARE DESIGN.

The Mercury verification system combines a new hardware platform with proprietary software for multilevel, multilanguage chip verification. With both simulation and emulation capabilities, Mercury lets you verify your chip from initial design

partitioning through system-level integration. Significant features in Mercury include the SimServer mixed-level simulation engine; a multilevel memory architecture to handle various levels of design complexity; and IMPX, a unique custom-interconnect-chip architecture to quickly steer signals within Mercury. It comes in two basic hardware configurations: The SE series, ranging from 500,000 to 2 million gates, and the E Series, spanning 1 million to 10 million gates. The lowest level configuration (500,000 gates) costs $395,000. **Quickturn Design Systems**, San Jose, CA. 1-408-914-6000, fax 1-408-914-6001, www.quickturn. com.

Circle No. 533

ALKALINE BATTERIES POWER HIGH-DRAIN PRODUCTS LONGER.

Lasting as much as 50% longer than ordinary alkaline batteries, the vendor's Ultra AA and AAA alkaline batteries meet the power demands of such devices as cellular phones, digital and flash cameras, MiniDisc players, and camcorders. High-conductivity coatings on the electrodes and imporvements in internal construction increase the battery's efficiency at high currents and enhance its performance, service life, and shelf life. PowerCheck, an on-battery fuel-gauge tester, has been recalibrated for use in high-tech devices. An Ultra AA four-pack costs $4.99. **Duracell Inc**, Bethel, CT. 1-203-796-4094, www.duracell.com.

Circle No. 534

LAN-SWITCH ICs DISTRIBUTE INTELLIGENCE.

Enterprise LANs have quickly moved to switch-based technologies to maximize bandwidth. In turn, semiconductor vendors have rolled out an array of switching ICs for hubs, switches, and routers. MMC Networks is now taking the next logical step: moving switching intelligence closer to the LAN ports and making the ICs programmable so that manufacturers can update equipment to match the constant parade of new network standards. The core of the company's new AnyFlow offering for wiring-closet switches is the nP5400 switch-fabric IC. It performs wire-speed switching with an aggregate bandwidth of 20 Gbps. A single 5400 IC can support 24 Fast Ethernet ports and 2 Gigabit Ethernet ports or a variety of other combinations. Moreover, you can gang four of the ICs using the company's ViX time-division-multiplexed (TDM) bus. To feed the 5400 via the ViX bus, MMC offers four-channel Ethernet-port-interface (EPIF) ICs with integrated media-access controllers (MACs). The OEM cost of the architecture will be less than $200 per port. **MMC Networks**, Sunnyvale, CA. 1-408-731-1600, www.mmcnet.com.

Circle No. 535

POWER CONTROLLER MANAGES TELECOMM POWER PLANTS.

The WLMPMC power-management controller from Lambda Electronics provides precise monitoring and control of the front-end supplies in distributed-architecture telecommunications power systems. The µP-based system can monitor and control as many as 60 high-power rectifiers and associated batteries. The Windows 95-based

WLMPMC works with Lambda's WLR5600 switch-mode rectifier, which delivers 100A at 48V. If you connect 20 WLR5600 units in parallel, they can deliver 2000A from a rack only 2.2 mm high. The WLMPMC measures 44 mm high (1U in rack terms), 485 mm deep, and 280 mm wide. It offers front-panel programming, remote-alarm capability via modem, and a back-lit LCD. The controller has UL, CSA, BABT, and CE-Mark certification. The unit price is $800. **Lambda Electronics**, Melville, NY. 1-516-694-4200, ext 279, fax 1-516-752-2627, www.lambdapower.com.

Circle No. 536

PRECISION OP AMP SHRUGS OFF PROBLEM OF Y2K—AND BEYOND.

Analog components are inherently immune to the pervasive millennium software bug, but their stability is subject to the drift impact of time and temperature. Countering this drawback, the LMC2001 guarantees key performance parameters over 10 years, most notably with less-than-5-µV long-term offset-error drift. The op amp, for strain gauges, weigh scales, and monitoring equipment, homes in on an offset voltage of less than 40 µV within 15 msec of power-up. Temperature performance is similarly stable with typical offset drift less than 0.015 µV/°C. An innovative architecture and internal signal-processing technique for this IC results in *no* $^{1}/_{f}$ input-voltage noise—a frustrating source of error in low-bandwidth transducer circuitry. $1.20 (1000). **National Semiconductor Corp**, Santa Clara, CA. 1-800-272-9959, www.national.com/pf/LM/LMC2001.html.

Circle No. 537

SMALL UNINTERRUPTIBLE POWER SUPPLIES WIELD BIG BACKUP CLOUT.

The miniature uninterruptible power supplies come in three miniature form factors. The PowerCard is an internal UPS with self-contained NiCd batteries on a full-sized ISA or PCI PC card. It offers all-around power protection for a complete computer system—PC, monitor, peripheral equipment, and telephone/data lines. The PowerCard Split is an internal UPS on a half-sized card. A tether connects the external NiCd battery pack to the UPS. This UPS targets OEM custom development for use in bundling full-time UPS and surge-suppression functions in small PCs, retail point-of-sale terminals, or telephone systems. The PowerGuard is a mini external UPS that you can mount flat, upright, or on the wall. All three models offer 420-VA (250W) backup capacity and spec 94% conversion efficiency during battery-backup periods. $199 (estimated street price). **Guardian On Board**, Austin, TX. 1-512-236-0503, www.guardian-ups.com.

Circle No. 538

TOOL EASES DEVELOPMENT OF EMBEDDED APPLICATIONS.

IX for Windows CE (starting at $495) simplifies development of embedded applications by enabling developers to graphically drag and drop operating system modules and applications into their project. IX includes component modeling, visualization, and analysis capabilities that extend the Windows CE Embedded toolkit (ETK) for Visual C++. **Intrinsyc Software**, Kirkland, WA. 1-425-739-2009, www.intrinsyc.com.

Circle No. 539