leading edge

What's hot in the design community

Edited by Fran Granville

'Scuse me while I kiss the screen

"There is nothing like trying to get two Sims to kiss when they are both not in the mood."

–a *Sims* user on *Sims*, the massively time-consuming obsession and biggest selling PC game of all time, in *Wired*, July 2, 2003

Solid-state relay switches high-frequency test signals

By Joshua Israelsohn

International Rectifier's PVY116 solid-state relay boasts a typical off-capacitance/on-resistance product of 9.1 pF-Ω for switching applications, such as high-speed ATE (automatic-test equipment), in which a small SOP4 package offers substantial space savings over reed relays. The relay's internal gallium-aluminum-arsenide LED requires a minimum 2-mA drive current and can withstand reverse voltages as large as 7V.

The PVY116 solid-state switch features a low off-capacitance/on-resistance product and small footprint for dense ATE, instrumentation, and data-acquisition applications.

The SPST-NO switch is rated for 40V and can pass continuous currents as large as 250 mA or 420 mA pulsed with a 10% duty cycle. The switch's off-state leakage is 1 nA maximum at 20V at room temperature and follows the typical MOS-exponential-temperature dependence, roughly doubling every 10°C.

The $2.40 (50,000) PVY116 is suitable for switching signals as fast as about 450 MHz. With an ESD tolerance of 2 kV (human-body model), it is robust enough for exposed applications, such as on removable ATE boards.

►**International Rectifier**, 1-310-322-3331, www.irf.com.

IBM introduces Web-based design verification

As geometry features become smaller with every new advance in manufacturing processes, the number of potential problem areas that designers must verify increases. Using state-of-the-art processes often requires designers to obtain input from the semiconductor foundry, the EDA vendor, or both to solve some of the verification issues in a design. To address this problem, IBM has launched an on-demand collaboration environment. The service also provides designers with temporary product licenses, making verification tools quickly and easily available.

Engineers will no longer need to purchase, house, or maintain the latest computer systems and software for chip design. The portal offers "pay-as-you-go" services that allow engineers to collaborate using a Web browser on Unix, Linux, or Windows platforms. Designers can debug and fix design problems with other users in a secure environment. IBM employs a robust, high-performance, mechanism to protect sessions from network instability. The formal-verification tool supports the industry-standard Accellera PSL (Property Specification Language), which is based on IBM's Sugar 2.0 language.—by Gabe Moretti

►**IBM Corp**, www.ibm.com/technology.

$109, palm-sized USB device handles analog, digital I/O, packs 32-bit counter

Measurement Computing Corp (formerly ComputerBoards) is probably best known for its low-cost data-acquisition boards, which are form- and function-compatible with more expensive, competitive products. The cost of one of its new products, the $109 (one) or $79 (25) PMD-1208LS, will undoubtedly also attract attention. In addition, the unit is bound to invite comparisons with USB data-acquisition peripherals from companies such as Data Translation (www.datx.com) and National Instruments (www.ni.com), which long ago announced such products and continue to do so.

The PMD-1208LS communicates via USB 1.1 but is fully compatible with USB 2.0 in the so-called standard-speed mode. The bus-powered unit sports screw terminals for all user connections except the bus, which uses a standard USB connector, and provides eight single-ended or four differential, 12-bit-resolution analog inputs; two 10-bit analog outputs; 16 digital I/O lines; and a 32-bit counter/timer.

The company's plans are not only to keep the prices of its PMDs (personal measurement devices) well below those of competitive units, but also to build units that are much smaller than those of its competitors. The emphasis on size and price necessitates some compromises in performance, but company officials believe that a large market exists for moderate-performance data-acquisition hardware in cost-sensitive applications.

In the case of the PMD-1208LS, the ADC's maximum sampling rate is only 1.2k samples/sec. This leisurely pace minimizes the cost of the USB interface, which need not support USB's full- or high-speed modes. A companion product, the PMD-1024LS is a $99 (one) or $75 (25), 24-channel digital-I/O module. Like the PMC-1208LS, it is available in a 3.25×3.125×1-in. housing with screw terminals along its edges. The company provides a variety of software to support the PMD line, including modules for its own SoftWire application-development environment as well as for NI's LabView.

—by Dan Strassberg

▶**Measurement Computing Corp**, 1-508-946-5100, www.measurementcomputing.com.

The first two low-cost data-acquisition modules in the PMD family are in palm-sized 3.25×3.125×1-in. housings with screw terminals along their edges.

TRANSIENT VOLTAGE SUPPRESSION NOW HAS A LOW PROFILE

If you need a low-profile, flat-lead, lead-free replacement for the established SOD-123 JEDEC DO219 footprint of TVS (transient-voltage-suppression) devices, On Semiconductor may have your drop-in answer. The company has put 50 TVS devices, including Schottky diodes, in the SOD-123FL package, which offers far better thermal impedance performance and better power handling with a 1-mm-high package that is 25% lower than the SOD-123 package. The 100%-tin finish meets environmental requirements of certain markets; the devices sell for approximately 15 cents (10,000).—by Bill Schweber

▶**On Semiconductor**, www.onsemi.com.

Get the protection you need in low-profile, lead-free, drop-in replacements with TVS and Schottky diodes from On Semiconductor.

DILBERT *By Scott Adams*

▶ **A May 2003 survey by Goldman Sachs shows that 72% of dial-up users who plan to switch to broadband in the next year will do so for higher speed, whereas only 2% will do so for easier music and software downloading.**

Rate-agile, I/O-agnostic CDR ICs offer adaptive equalization

Mindspeed Technologies' new family of four CDR (clock- and data-recovery) ICs cover the spectrum from 42 Mbps to 3.2 Gbps for Ethernet, Fibre Channel, InfiniBand, SONET, and backplane applications. The M21001, M21011, and M21012 comprise four independent CDR ICs that operate at 42 to 800 Mbps, 1 to 3.2 Gbps, and 42 Mbps to 3.2 Gbps, respectively. The octal M21050 shares the M21011's range. The CDR ICs offer CML, InfiniBand, LVDS, and LVPECL I/O compatibility as user-selectable options.

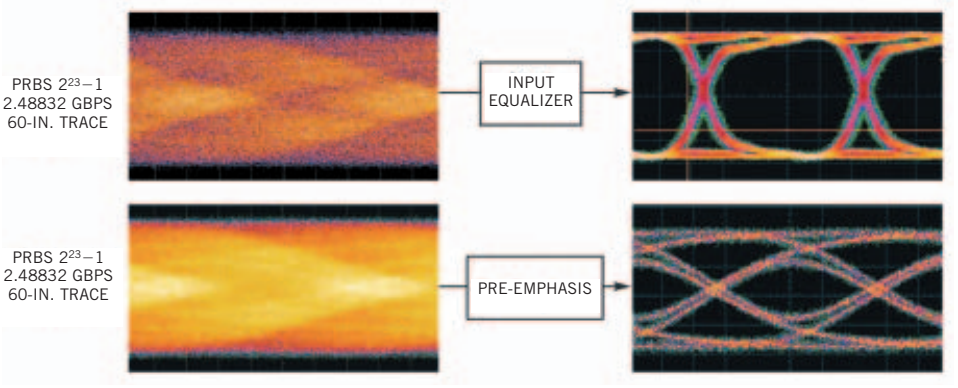
Adaptive input equalization improves the receiver-channel performance and mitigates the effects of inexpensive board materials. Output pre-emphasis allows you to drive pc-board traces as long as 60 in. The multichannel, multirate CDR ICs feature an on-chip frequency synthesizer so that you can operate heterogeneous channels from a single reference clock. Alternatively, the CDR ICs can acquire channel frequency without an external time reference. Jitter tolerance is 0.65 UI (unit interval); jitter generation is 2.5 million UIs.

You can configure the devices either by pin-strapping or through an I^2C interface. The quad devices operate from 1.8, 2.5, or 3.3V supplies; the octal CDR IC requires 1.8 or 2.5V. The M21011 and 12 dissipate 340 mW with all channels running; the octal M21050 dissipates 1W.

Price for the CDR ICs are $31.95 for the M21001, $64.95 for the M21011, and $84.95 for the M21012 or M21050 (OEM quantities).

—by Joshua Israelsohn

▶**Mindspeed Technologies**, www.mindspeed.com.



Mindspeed's input-equalization and pre-emphasis circuits support 2.5-Gbps rates on traces as long as 60 in.

Next-generation DSP delivers performance, cost, and size benefits

Analog Devices' next generation TigerSHARC processors, the ADSP-TS201, ADSP-TS202, and ADSP-TS203, provide a software-programmable, multiprocessor platform for developers to build high-performance, memory-intensive signal-processing and imaging applications. These devices increase the amount of integrated on-chip memory, from 6 Mbits of SRAM as integrated in the ADSP-TS101S to 24 Mbits of IBM's zero-leakage embedded DRAM without increasing the die size. The ADSP-TS202 and ADSP-TS203 integrate 12 and 4 Mbits of eDRAM, respectively. The memory space is organized as six memory blocks to optimize data access and transfer bandwidth through the four internal 128-bit buses.

The multiprocessor-link port interface, which provides a glueless point-to-point connection between TigerSHARC devices, now uses full-duplex LVDS that can support as much as 4 Gbytes/sec for the ADSP-TS201 and ADSP-TS202 devices. The cluster bus that supports as many as eight TigerSHARC devices working together, supports data transfers as fast as 1 Gbyte/sec for the ADSP-TS201 and ADSP-TS202. The link-port interface and cluster bus on the ADSP-TS203 both support data transfers as fast as 0.5 Gbyte/sec.

The ADSP-TS201 includes a communications-logic unit that provides accelerated instructions for speech and chip-rate processing. The instruction-based acceleration can perform as many as 154 complex GMAC (giga-multiply-accumulate) operations/sec to support reconfigurable, soft-baseband applications.

All three devices are currently available for sampling, and production is scheduled for May 2004. They are all pin-compatible and are available in a 25×25-mm, 576-ball BGA package. All three devices are available at 500 MHz; the ADSP-TS201 is also available at 600 MHz. The per-unit prices for the 500-MHz ADSP-TS201, TS202, and TS203 are $299, $149, and $34.95, respectively (10,000).

—by Robert Cravotta

▶**Analog Devices**, 1-781-329-4700, www.analog.com.

▶ **Sales of optical microelectrical-mechanical systems into segments other than telecommunications are forecast to grow at a compound-annual-growth rate of 15.8% over the next five years, according to InStat/MDR.**

Probes, software, accessories broaden DSO and logic-analyzer support

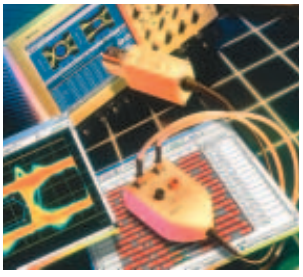
Tektronix has unveiled several products that enhance its digital scopes' and logic analyzers' usefulness for debugging (usually differential) serial buses that transmit data at 2.5 Gbps and faster.

On the scope side, one of the products is the $7200 P7350SMA, a version of the company's 5-GHz-bandwidth differential probe that is configured to work with target boards on which the designer provides SMA connectors. The other scope-related product, the RT (real-time)-Eye serial-data-analysis and compliance software package, is available as an option on the company's TDS6000- and 7000-series scopes and its CSA7000 series of communications-signal-analyzer scopes. RT-Eye costs $7495. Compliance modules for the InfiniBand and PCI Express standards add $995 each. Future modules will cover additional standards, including FibreChannel, Serial ATA, and XAUI.

Although scopes such as the TDS6000 and TDS/CSA7000 units have enough bandwidth to capture serial data at rates as high as 3.2 Gbps, many engineers prefer to construct eye diagrams with sequential-sampling scopes, even though such scopes—despite their exceptional bandwidth—capture waveforms much more slowly than do real-time units. RT-Eye enables real-time scopes to quickly construct eye diagrams with less than 1-psec JNF (jitter-noise factor) without using hardware clock-recovery circuits, such as those that equivalent-time-sampling scopes use for making eye measurements.

The logic-analyzer-based tool, which includes both software and an external hardware unit, is the $60,000 to $70,000 (depending on configuration) TMS817 PCI Express support package. The package, which works with logic-analyzer modules such as the TLA7Ax4, acquires PCI Express data at 2.5 Gbps; recovers the clock—including spread-spectrum clocks; triggers on packet attributes; filters out unwanted data in real time; deskews, decodes, and descrambles the data; searches through the data; and displays results in user-selectable formats.—by Dan Strassberg

▶**Tektronix Inc**, 1-800-426-2200, www.tektronix.com.



RT-Eye data-compliance and analysis software works with TDS6000 and 7000 scopes and CSA7000 communications signal analyzers to turn the instruments into debugging tools for multigigahertz differential serial buses. The 5-GHz-bandwidth P7350SMA differential probe works with target boards on which the designer has placed SMA connectors.

System, algorithms, and circuitry simplify motor-control development

Power-component vendors are moving up the integration ladder, answering users' plea to "please, do more of my design." For example, International Rectifier now offers its iMotion integrated design platform with a development system, the IRMCS203, along with the IRMCO203 intellectual-property library of motion-control algorithms. The products target sensorless control of permanent-magnet motors, which reduce cost and enhance reliability. Applications include home appliances and high-speed spindle motor control, such as 100,000-rpm dental drives.

For requisite signal-processing speed, the development system's digital-control section uses a configurable, FPGA-based control engine for parallel processing, with PWM carrier frequencies and computational update rates as high as 50 kHz. Another library, the IRMCO201, targets encoder-based servos with closed-loop torque-control bandwidth greater than 5 kHz. The Windows-based configuration tool lets you map the internal registers to configure motor and control parameters and limits.

Get your motion-control application turning quickly with software, libraries, and processing accelerator, plus analog-interface circuitry, using the IRMCO201or IRMCO203 development systems.

You can use the development systems, which sell for $2500, for either encoder-based or encoder-free architectures. They come with a 1-kW servoamplifier and motor so that you can quickly begin serious designing and testing. You arrange licensing of the object code for production as a separate cost.—by Bill Schweber

▶**International Rectifier Corp**, http://imotion.irf.com.

▶ **The convenience of portable DVD players spurred sales of more than 260,000 units last year, according to a recent study by the Consumer Electronics Association.**