



ROTTEN APPLE

"People who like the tenure system are people who have retired in place."

TJ Rodgers, founder, president, and chief executive officer, Cypress Semiconductor

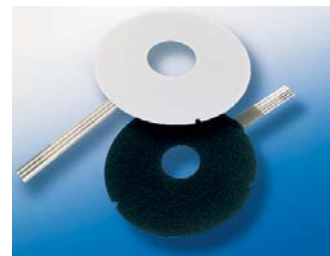
Force-sensing resistor enables designs for the "ring" cycle

By Bill Schweber

APPLE'S IPOD form factor and user interface have made the scroll wheel the user input of choice for many handheld devices. With the MicroNav

Ring from Interlink Electronics, you get a resistance-based alternative transducer for similar applications. The 43-mm-diameter force-sensing resistor, with a 13-mm center hole for click-switch placement, provides 360° of coverage. It survives 2 million taps of 500g and the same number of complete apparent revolutions and yields angle measurement to $\pm 3^\circ$. Through software interpretation, it functions as an absolute and a relative positive sensor.

Power consumption is critical in most of the target applications, and the sensor looks like an open circuit in the untouched state. Further, according to Keith M Roberts, director of corporate communications, "Unlike a capacitive device, this does not have moisture issues, and it is a lot more energy-efficient, because it does not have to support an electric field." For example, the transducer samples current consumption 40 times/sec at a peak rate of 0.3 mA and an average rate of 0.1



Sensing round and round in iPod-like fashion, the MicroNav Ring force-sensing resistive transducer consumes at micropower levels and offers ruggedness and long life.

μ A. The ring sells for \$1 to \$2 (OEM quantities). The vendor supplies the software to synthesize any series of sequential resistance readings into a coherent statement of the user's intentions.

► **Interlink Electronics**, www.interlinkelectronics.com.

Algorithm-modeling tool adds verification and validation

FURTHERING THE MATHWORKS' push into the system-level segment of the EDA market, the company has announced its Simulink verification and validation add-on. In the last couple of years, the MathWorks' technology has moved from being popular in the DSP- and embedded-system markets to also becoming an IC-system-level hardware-modeling tool allowing users to create algorithms representing IC-system functions and then partitioning those functions for hardware or software implementations.

Arun Mulpur, DSP-product-marketing manager at The MathWorks, says that the add-on will help system designers and test engineers perform continuous testing and verification throughout the development process. With the tool, engineers can produce a validated executable specification by formally testing systems and algorithms during the modeling and simulation phase. Users can generate coverage reports to view

untested design elements and identify errors early in the cycle before partitioning the system to hardware and software.

"By adding verification and validation at the Simulink level, even without writing a single line of VHDL, you can plan how to test your system design," says Mulpur. The tool tells you how much of the model the test suite is covering, he says. The generated reports provide industry-standard metrics and displays them in the model, allowing users to traverse the model for missing coverage and to navigate trouble spots.

Users can also include Simulink verification and validation comments in embedded code that the Real-Time Workshop embedded coder generates. It allows users to keep track of the design and validation path and reduces code-traceability analysis. The Simulink verification and validation add-on sells for \$1000.—by Michael Santarini

► **The MathWorks**, www.mathworks.com.

Devices optimize packet-based networking and VOIP

FREESCALE'S MPC8360E PowerQuicc II Pro processor family targets the converged packet-network market, and the MSC7119 and MSC7118 DSPs optimize system reliability for performance-driven VOIP (voice-over-Internet Protocol) and general-purpose signal-processing

applications. Freescale based the MPC8360E and the MPC-8358E processors on the e300 PowerPC SOC (system-on-chip) platform. The E designation indicates that these processors include on-chip encryption support. The MPC-8360E family's Quicc Engine technology features two RISC processors, each operating as fast as 500 MHz, which can deliver a combined full-duplex data throughput as fast as 1.2 Gbps, including interworking. Eight internal unified communication controllers provide support for Gigabit Ethernet, HDLC (high-level data-link control), and UTOPIA (universal test and operations physical interface for ATM)/

POS (packet over SONET) at speeds as high as OC-12. The technology supports as many as 256 subscribers for IP DSLAMs (digital-subscriber-line-access multiplexers) or more than 2000 voice channels.

The e300 PowerPC core can operate as fast as 667 MHz, and the e300 core and Quicc Engine technology can operate at different clock speeds. The integrated security engine includes a public-key accelerator and an on-chip random-number generator to support DES (Data Encryption Standard), 3DES (Triple DES), MD-5, SHA (Secure Hash Algorithm)-1, AES (Advanced Encryption Standard), and ARC-4 encryption algo-

ritms. The MPC8360E supports high-speed memory access through one 64-bit, DDR-memory controller or two 32-bit controllers at speeds as high as 333 MHz and a 133-MHz local system bus. The devices support MII (media-independent interface), RMII (reduced MII), GMII (Gigabit MII), TBI (10-bit interface), dual-UART, dual-I²C, dual-SPI, full- and low-speed USB, and PCI. The MPC8360E family is software-compatible with previous PowerQuicc communication-processor generations. The MPC8360E and MPC-8358E processors will become available for sampling in the next quarter.

Freescale based the MSC-7119 and MSC7118 DSPs on the StarCore architecture, and they target the requirements for performance-driven VOIP and general-purpose signal-processing designs. They increase the top-end performance of Freescale's MSC711x DSP family to 1200 MMACs (millions of multiply/accumulates) at 300 MHz and in-

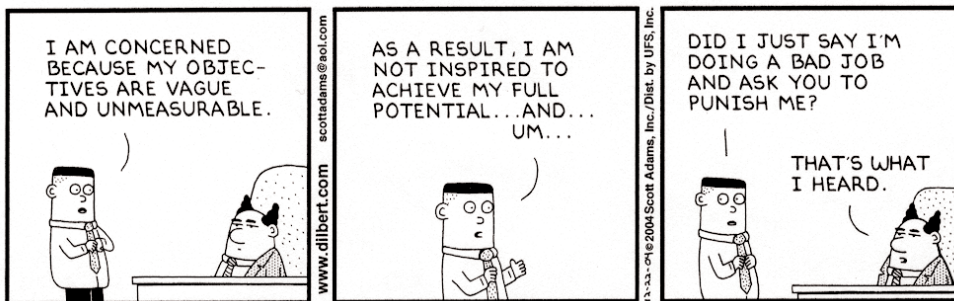
crease the on-chip M1 memory to 256 kbytes. The MSC7118's SC1400 core integrates three 128-bit TDM (time-division-multiplexing) interfaces, a 32-channel DMA controller, a DDR external-memory interface, and a 16-bit enhanced host port. The MSC7119 is the same as the MSC7118 except that the 7119 substitutes a low-cost 10/100-bit Ethernet MAC (media-access controller) for one fewer TDM interface. At 300 MHz, both devices have a typical power consumption of 400 to 500 mW. These devices include fieldBIST (built-in-system-test) hardware diagnostics that can report the partial or complete device operability by identifying errors in the six memory blocks, including ROM; the PLL; and logic errors at the top, extended-core, and peripheral layers.

The MSC7116, MSC7115, MSC7113, MSC7112, and MSC7110 devices are all available in production quantities. The MSC7119 and MSC7118 will be available for sampling in the second quarter with production planned for early in the third quarter. The devices are available in lead-free and lead-bearing, 17x17-mm, 400-pin, 0.8-mm-pitch MAPBGA packages. Prices for the MSC7118 and MSC-7119 range from \$33 to \$35 (10,000).

—by Robert Cravotta

► **Freescale Semiconductor**,
1-800-521-6274, www.freescale.com.

DILBERT *By Scott Adams*



► **The DVD-recorder market, not including units connected to PCs, doubled in size in 2004 and will grow by 87% in 2005, according to In-Stat/MDR (www.instat.com). DVD-player unit shipments grew in all regions in 2004, with the exception of Japan, where DVD-player shipments declined, and DVD-recorder shipments grew by more than 100%.**

Protocol analyzer/exerciser handles ASI switched-fabric architecture

AGILENT TECHNOLOGIES claims that its E2980A is the first protocol-test system to handle the new PCI Express-based ASI (Advanced Switching Interconnect)

switched-fabric architecture. Approximately 60 companies in the ASI SIG (special interest group, www.asi-sig.org) are promoting this architecture as perhaps *the* best way to build high-speed, high-performance, computing-intensive systems, such as the hardware at the heart of SANs (storage-area networks).

At the core of ASI is the high-speed serial PCI Express bus. Unlike the host-centric PCI Express, however, ASI allows for peer-to-peer communication, which, in large systems, enables unrelated messages to flow simultaneously between multiple device pairs, dramatically speeding system operation. Moreover, by encapsulating their message packets within its own, ASI can subsume multiple high-speed protocols, such as

Gigabit Ethernet and Fibre-Channel. What's more, ASI adds not only a facility for simultaneously broadcasting messages to multiple devices, but also 12- and 32-lane structures to PCI Express' one-, two-, four-, eight-, and 16-lane configurations.

Because of this impressive list of capabilities, testing and verification of ASI-based system designs are big challenges. To meet those challenges, Agilent has called upon its modular N2X platform. The portable and benchtop N2X system units house two and four modules, respectively. The modules can function as protocol exercisers or analyzers, and typical systems contain both types. The basic functions of the analyzers, whose prices start at \$58,000, are to acquire data, to



The E2980A takes on a challenging assignment: exercising and analyzing the performance of computing and mass-storage systems based on the ASI switched-fabric architecture.

search—both in real time and after the fact—for anomalous conditions, and to provide numerous metrics of system performance. Because so many ASI systems will contain multiple buses of different types, the analyzers incorporate extensive cross-domain-triggering capabilities. The exercisers, whose prices start at \$62,000, can fill in for system components that don't yet ex-

ist in hardware form and can predictably and repeatedly inject into a system under test conditions that may cause misbehavior. Owners of the manufacturer's E2960A PCI Express protocol-test systems can upgrade their systems to E2980As at a cost of \$29,000 per module.

—by Dan Strassberg

► **Agilent Technologies**, www.agilent.com.

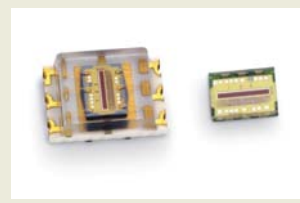
Light converter transforms intensity to digital

TARGETING DISPLAY-PANEL-backlighting-control applications, the single-chip TSL2560 and similar TSL2561 devices from Texas Advanced Optoelectronic Solutions handle wide ambient-light range and a broadband spectrum. The TSL2560 features an SMBus interface, well-matched to notebook and tablet PCs, and the TSL2561 uses the I²C interface, which is more common in LCD monitors, flat-panel TVs, and cell phones.

Both devices incorporate a broadband diode for the visible-light spectrum and some IR sensitivity, plus a mostly IR photodiode, and they then simultaneously integrate and digitize the currents from each sensor using two A/D converters, which also reject 50/60-Hz lighting ripple. This channel-and-converter pairing yields 20-bit dynamic range—with 16-bit resolution but without a relatively costly optical filter—over 0.1 to 40,000 lux. The single-supply, 2.7 to 3.3V ICs support an interrupt feature, whereby the system processor need not poll for the latest intensity value; instead, the IC interrupts when there is a significant, user-defined change.

The six-pin devices are available in a 1.7×1.2×0.7-mm chip-scale version or in a 3.8×2.6×1.4-mm, transfer-molded board variation for \$1.29 (1000).—by Bill Schweber

► **Texas Advanced Optoelectronic Solutions**, www.taosinc.com.



Save system-backlighting power and CPU overhead by monitoring and quantifying impinging ambient light, using either the SMBus TSL2560 or I²C TSL2561 light-to-digital converters, which come in a transfer-molded board version (left) and chip-scale version (right).

Low-cost USB data-acquisition modules include instrument-panel software

THE ECONSERIES mini-instruments, the latest additions to Data Translation's range of high-accuracy, low-cost data-acquisition modules, plug into any PC's USB port without requiring an external power supply. Signals connect directly to the modules' built-in screw terminals. To support the boards, the company ships with them the new ready-to-measure Go! application-software package. The software provides an instrument-panel interface that requires no programming. "These compact, low-cost modules allow accurate measurements anywhere at any time," says Fred Molinari, the company's president and chief executive officer. "The instrumentlike software and PC connectivity via USB make

good on the promise of serious portable measurements on the go."

Go! turns the Econseries into eight mini instruments in one intuitive, easy-to-navigate application. The package includes oscilloscope, chart-recorder, voltmeter, waveform-generator, file-viewer, digital-I/O, counter/timer, and rate-generator functions. For more advanced requirements, the modules come with an extensive range of software tools as well as an evaluation copy of the manufacturer's Measure Foundry software.

The Econseries includes a 28-channel, \$149, digital-I/O unit and three units that each provide eight single-ended analog inputs. A \$149, 10-bit, 25k-sample/sec unit has a 0 to



The instrumentlike Go! software that accompanies the Econseries USB-connected data-acquisition modules enables the modules to perform a variety of functions without programming.

2.44V analog-input range and 20 digital-I/O points. Two 12-bit, 40k-sample/sec units each have eight digital inputs, eight digital outputs, and two analog outputs. Of these two modules, a \$229 unit provides

a 0 to 2.5V analog-input range, and a \$299 unit offers a $\pm 10V$ analog-input range.

—by Dan Strassberg

► **Data Translation Inc.**, 1-508-481-3700, www.datatranslation.com.

Device integration drives down USB cost

CYPRESS SEMICONDUCTOR based its new enCoRe II (enhanced component-reduction) CY7C633xx, CY7C638xx, and CY7C639xx microcontroller lines on the M8 architecture. The devices integrate features and external components that target low-speed USB applications. These features include an on-chip oscillator, internal USB pullup resistors, wake-up circuitry, and a 3.3V regulator. The flash-based, 24-MHz devices integrate a USB transceiver and conform to USB Specification Version 2.0 and USB HID (host-interface-device) Specification Version 1.1. The devices support one control endpoint, two data endpoints, and one low-speed USB-device address.

These devices include as much as 8 kbytes of flash that supports EEPROM emulation and as much as 256 bytes of RAM, and they require no external components to switch between supporting PS/2 and USB interfaces. Typical power consumption for these devices is 10 mA at 6 MHz and is as low as 10 μA in sleep mode. The internal 125-mA, 3.3V voltage regulator can power external 3.3V devices. To sim-

plify the interface to RF inputs for wireless designs, these devices provide a two-channel, 8-bit or one-channel, 16-bit capture timer that stores both rising- and falling-edge times.

The CY7C639xx controllers enable a lower component count for keyboard designs. The CY7C638xx products target high-end optical-mice and wireless-dongle designs. The CY7C633xx devices target low-end optical- and optomechanical-mice designs. All of these devices support an operating-temperature range of 0 to 70°C and are available for sampling; production units will become available in April. CY7C633xx devices are available in 16-pin PDIP and SOIC packages. CY7C638xx controllers are available in PDIP, SOIC, and QSOP packages, and CY7C639xx products are available in 40-pin PDIP and 28/48-pin SSOP packages. Prices for these devices start at 85 cents, 90 cents, and \$1.30 (100,000) for the CY7C633xx, CY7C638xx, and CY7C639xx, respectively.—by Robert Cravotta

► **Cypress Semiconductor**, 1-408-943-2600, www.cypress.com.

► **Since 1995, when the top-selling Sony PlayStation first hit the market, manufacturers worldwide have sold nearly 3 billion video-game and leisure-software units. In 2002, they sold 30 million Sony PlayStation 2, Microsoft Xbox, and Nintendo GameCube systems, according to Research and Markets (www.researchandmarkets.com).**

Source/measure device-test instruments get smarter, faster

THE SERIES 2600 SOURCEMETER instruments from Keithley aim to lower the cost of test for producers of such electronic components as silicon and compound semiconductors. According to the manufacturer, the new instruments place

the industry's highest throughput SMU (source-measure unit) into a scalable form factor, allowing seamless integration into systems that include one to 16 SMU channels. The \$5495, single-channel Model 2601 and the \$7995, dual-channel Model 2602 allow users to configure scalable ATE (automated-test-equipment) systems that perform precision dc, pulse, and low-frequency-ac tests.

Keithley officials say that the instruments provide two to four times the throughput of competitive units, because the Keithley instruments include an embedded TSP (test-script processor), which lets users program sequences of test commands and execute high-speed automated test sequences independently of a PC operating system. Unlike products that lack this sequencing capability or can only queue and execute commands, the 2600 series units can stand alone as complete automated, one- to 16-channel component-test instruments, which source, measure, make pass/fail decisions, store data, and control test-sequence flow and binning.

Applications include three-terminal device test, parallel-component test, L-I-V (light-current-voltage) sweep, and two-terminal device test. Flexible triggering and flow-control capabilities enable the TSP to control other instruments, component handlers, and probers via digital-I/O and RS-232 ports.

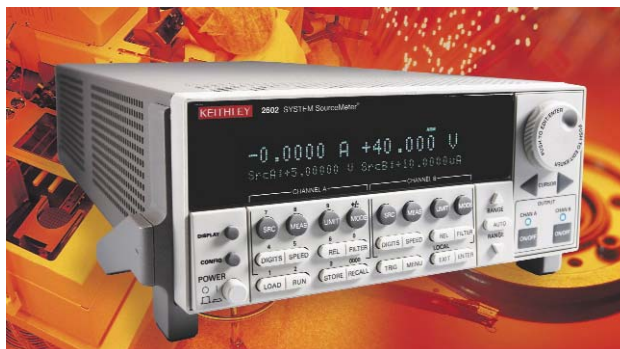
Each channel offers a 40W, 3A, precision, four-quadrant SMU with accurate voltage and current readback and 1-pA resolution that designers can configure as a precision power supply, current source, bipolar bias source, 5.5-digit DMM (digital multimeter), low-frequency arbitrary-wave-

form generator with measurement, or electronic load. The 100-Mbps TSP-Link serial bus interconnects as many as 16 units without the need for hubs or bulky cables. The protocol is optimized for short messages, making it significantly faster than Ethernet for communication among SMUs.

The instruments include Test Script Builder application-development software, whose simple graphical user interface lets you develop, modify, and debug high-speed TSP programs. Each unit also features a built-in suite of prewritten TSP programs that you can quickly modify for specific applications. LabTracer 2.0 software enables easy instrument control, data acquisition, and curve tracing during device characterization in the lab.

—by Dan Strassberg

►Keithley Instruments Inc, 1-800-688-9951, www.keithley.com.



Series 2600 instruments offer what the manufacturer calls the industry's highest SourceMeter rack density with one or two channels in a single half-rack, 2U chassis.

DAA HELPS CALLER ID ACCOMPLISH FOREIGN EXCHANGE

Using the CPC5622A Litelink from Ixys subsidiary Clare, designers of telephone-related products gain access to features that are compatible with international-telephony and FXO (foreign-exchange-office) specifications. The IC provides the DAA (data-access-arrangement) interface for modem speeds as high as V.92 standards, as well as voice support, with simultaneous ringing detection and CID (caller-ID) monitoring. Both full- and half-wave ring detection provides flexibility, and transmission power can be as high as 10 dBm into 600Ω. The device provides 3-kV rms isolation through on-chip optical components.

According to Steve Andrezyk, Clare's director of marketing, the virtues of the line-powered, 32-pin IC are universality and size. "The additional control features to handle country-specific CID and ringing requirements help OEMs reduce costs and board-space real estate," he says. The 3.3 to 5V device needs only a few external components and supports ac- and dc-line terminations, switch-hook detection, a two- and four-wire-hybrid function, and full-time on-hook transmission ability. The CPC5622A sells for \$2.41 (10,000).

—by Bill Schweber

►Clare Inc, 1-978-524-6700, www.clare.com.

►According to IDC (www.idc.com), the worldwide storage-software market grew 15% year over year to \$2.2 billion in the fourth quarter of 2004. For the full year 2004, storage-software revenue grew 16.1% year over year to \$7.9 billion, injecting more than \$1 billion of new revenue into the market.