

# leading edge

What's hot  
in the  
design  
community

Edited by  
Fran Granville



## Photo op

"I...secured a new cell phone that, in addition to being a phone, receives e-mail and takes extremely low-quality photographs....Now, when I'm not using my phone's cell-phone feature ('Hello? Hello? Hello?'), I can use the camera feature... ('Here's a picture of my daughter's ballet recital. Or, the Grand Canyon')."

—Dave Barry,  
*The Miami Herald*,  
July 18, 2004

## Isolated, eighth-brick dc/dc converters deliver 100W

By Dan Strassberg

**A**RTESYN'S TYPHOON SERIES, a family of high-efficiency, 100W-output, low-profile, open-frame, single-board, isolated dc/dc converters in industry-standard eighth-brick packages, is pin-

compatible with quarter-brick packages. The units deliver high output currents at low voltages, meeting the needs of modern high-performance applications. The series features an input-voltage range of 36 to 75V dc and is available with output voltages of 1.2, 1.5, 1.8, 2.5, 3.3, and 5V. The output voltage is

adjustable from 80 to 110% of the nominal value. The series also provides a remote on/off capability. Overcurrent, over-voltage, and overtemperature protection are standard features. Full international safety approval, including EN60950 VDE and UL/cUL60950, reduces compliance costs and time to market. The price is



The manufacturer calls the Typhoon series the first to deliver 100W from eighth-brick packages.

\$64.90 (1000).

► **Artesyn Technologies**, 1-888-283-3122, [www.artesyn.com/powergroup/products.htm](http://www.artesyn.com/powergroup/products.htm).

## Complete fob trims your RKE-design effort



Don't worry about the key fob electronics and enclosure of your RKE link and concentrate instead on the embedded portion, by using the OKW Electronics key fob with a Microchip Technology Keeloq encoder.

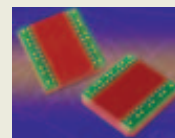
WHEN USING RKE (remote keyless entry) in your product design, you need to provide both the product itself and the key fob with an encoder. The OKW AM-110 Series of encoder transmitters simplifies your task, because it implements the entire remote function, including the enclosure. Operating at 315 MHz, the 10-mW, FCC-compliant unit includes an LED to indicate transmission in progress, with typical range to about 100m (300 ft).

The RKE unit uses the 64-bit code-hopping Keeloq protocol from Microchip Technology ([www.microchip.com](http://www.microchip.com)) and works with corresponding Microchip Keeloq decoders. OKW offers three rugged molded-plastic enclosures with one, two, or three switches to match your application requirements. Prices begin at \$12.—by Bill Schweber  
► **OKW Electronics**, 1-800-965-9872, [www.okw-electronics.com](http://www.okw-electronics.com).

## BGA RELAY LETS YOU GO WITH THE (RE)FLOW

Electromechanical relays—the antithesis of ICs—are still vital for many applications, such as automatic test equipment and RF-signal steering. The B41 series from Coto Technology gives you four form-A reed relays in a BGA package, simplifying layout and routing. These 50Ω, controlled-impedance devices have a 3-dB roll-off of 8 GHz and -40-dB interchannel crosstalk at 1 GHz. Measuring 12×13×4 mm, the four-channel B41 sells for \$62.15 (1000).—by Bill Schweber

► **Coto Technology**, 1-401-943-2686, [www.cotorelay.com](http://www.cotorelay.com).



The four-channel B41 series of RF reed relays comes in a compact BGA package.

## DSO aims to become standard for evaluating 2- to 12.5-Gbps serial data

**T**EKTRONIX'S NEW TDS-8200 modular (sequential equivalent-time) sampling oscilloscope and 82A04 phase-reference module allow bandwidths as great as 70 GHz. The company claims that the products incorporate the only single-ended and differential clock-recovery system that covers all current and emerging serial-data standards that transmit at bit rates of 50 Mbps to 12.6 Gbps. The company also says the prod-

ucts incorporate the industry's only clock-recovery system for 3- to 6-Gbps differential and single-ended signals. At these data rates, the measuring system's jitter is less than 200 fsec rms.

Characterizing serial-data signals that contain embedded clocks has historically presented significant challenges. Standards such as XAUI (10-Gbps attachment-unit interface) at 3.125 Gbps, double-speed XAUI at 6.25

Gbps, and SATA2 (serial-advanced-technology attachment 2), require instruments that can acquire and precisely characterize these complex, ultrahigh-data-rate signals, which are now typically differential.

When measuring in the low-jitter-timebase phase-reference mode, the TDS8200 acquires data at speeds as great as 25 times those of competing instruments. Using its proprietary FrameScan acquisition mode, the TDS-8200 can also quantify random and deterministic jitter. When you combine it with an 80E0x electrical-signal-acquisition module, the measurement system provides complete clock recovery and electrical-signal analysis for differential and single-ended signals.

The acquisition module permits users to specify custom bit rates to test devices, modules, and systems that run at emerging and nonstandard rates. The wide clock-recovery range and single-module support for user-specified bit-rates provides complete

clock recovery for testing a variety of computer- and communications-signaling rates and standards. The TDS8200 sampling scope costs \$20,490; the 82A04 reference module costs \$28,990.

—by Dan Strassberg

► **Tektronix Inc**, 1-800-426-2200, [www.tektronix.com](http://www.tektronix.com).



The modular TDS8200 sequential equivalent-time sampling oscilloscope and 82A04 phase-reference module allow bandwidths as great as 70 GHz, incorporate a single-ended and differential clock-recovery system, and exhibit less-than-200-fsec-rms jitter.

### DILBERT *By Scott Adams*



► **HP and Office Depot** announced that, from July 18 through Sept 6, 2004, consumers can drop off any IT product for free disposal—at the rate of one product per customer per day—at more than 850 Office Depot locations in the continental United States. HP facilities will handle the recycling, which will involve dismantling or destroying the devices, rather than refurbishing and reselling.

### GaAs DRIVER POWER AMP FITS MULTIBAND BASE-STATION NEEDS

Handsets may get all the glamour, but base stations are equally important for mobile, wireless access. The RF3800 series of six driver power amplifiers from RF Micro Devices, which are GaAs (gallium-arsenide) HBT (hetero-junction-bipolar-transistor) devices, covers bands of 450 to 2170 MHz. Power gain is 14 to 20 dB, and output power is as high as 37 dBm, depending on device. The critical third-order intercept is 48 to 50 dB, and efficiency spans 31 to 45%.

The amplifiers come in thermally enhanced aluminum-nitride LCC-8 packages that are footprint-compatible with the common SOIC-8 package. The vendor claims that the packages are better choices in this power and efficiency zone than plastic and cost less than flange-mount packaging. These devices sell for less than \$10 (5000).—by Bill Schweber  
► **RF Micro Devices**, [www.rfmd.com](http://www.rfmd.com).

# Low-power microcontroller integrates 16-bit, dual 1-MHz ADCs

**S**ILICON LABORATORIES has extended its precision mixed-signal-microcontroller product line, combining a 25-MIPS 8051 core with dual

independent, 16-bit, 1M-sample/sec ADCs. The C8051F064 family's typical THD and spurious-free dynamic range are 96 and 97 dB, respectively, with a 10-kHz single-ended input and 7 dB better with a differential source. The converters' maximum differential

nonlinearity and differential integral nonlinearity are  $\pm 1$  LSB. In addition to the two low-power ADCs, the F064 family devices include three programmable comparators and a voltage reference.

Converter performance is noise-limited to 86- and 89-

dB SNR for single-ended and differential connections, respectively. Silicon Laboratories also offers a \$24.95 (one) C8051F064EK evaluation kit that connects to a PC through its USB port, which also provides power to the board. The evaluation kit includes a "test-drive" copy of the software-development environment that is part of the complete \$299 (one) prototyping and development system.

The four family members provide 32 or 64 kbytes of flash memory and 24 or 59 digital-I/O pins. The manufacturer packages the devices in TQFP64s and TQFP100s depending on the digital-I/O configuration. On-chip JTAG circuitry provides full-speed in-system debugging without an emulator.

The typical current consumption, 18 mA with a 25-MHz clock, falls to 0.7 mA at 1 MHz and 20  $\mu$ A at 32 kHz for polled or event-triggered applications in portable instrumentation. Prices start at \$9.98 (5000).

—by Joshua Israelsohn  
**►Silicon Laboratories**, 1-512-416-8500, www.silabs.com.

## REDUCE LOGIC IN LOW-POWER DEVICES

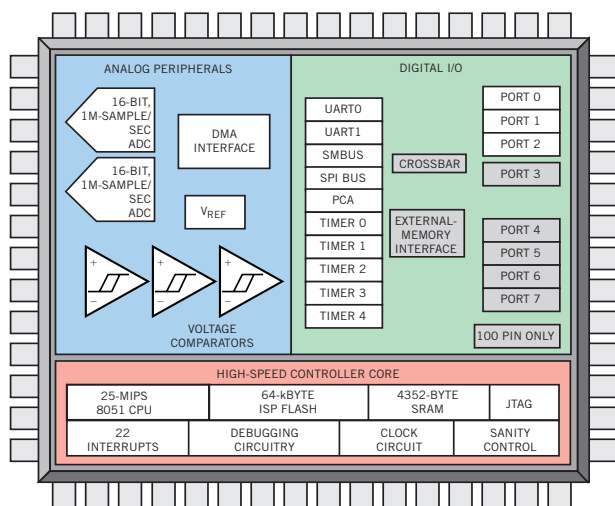
Fairchild has introduced several 4-, 6-, and 8-bit, low-voltage logic functions in ultracompact DQFN (depopulated-very-thin-quad-flatpack-with-no-leads) packaging, which is as much as 75% smaller than similar TSSOP devices. The devices facilitate adding features to next-generation cell phones, digital cameras, camera phones, and other portable, battery-powered devices.

DQFN devices run cooler than leaded packages because of an exposed die-attachment paddle and offer reduced noise and crosstalk due to lower capacitance and inductance. Visible solder joints ease inspection. Devices are second-sourced and come in 3000-piece tape reels, and prices start at 18 cents (10,000).

—by Nicholas Cravotta  
**►Fairchild Semiconductor**, 1-207-775-8100, www.fairchildsemi.com.



**Fairchild's DQFN logic devices are 75% smaller than similar TSSOP devices.**



**The C8051F064 integrates a pair of 16-bit, 1-MHz ADCs; a voltage reference; and a trio of comparators with a host of digital-I/O facilities and an 8051 core.**

## Optocoupler uses light, ignores heat

OPTOCOUPLERS ARE useful for digital-signal isolation, but they have temperature limitations. Vishay claims that its single- and dual-channel units are the first that are rated for 100°C, due to design and packaging enhancements. The 10-Mbps units, 6N137 and SFH6741 through SFH6752, have typical propagation delay of less than 50 nsec, pulse-width distortion of 2.9 nsec, and common-mode rejection of 10 kV/ $\mu$ sec.

They include an internal shield for enhanced common-mode transient immunity of 5 or 10 kV/ $\mu$ sec, depending on model. Package choices include surface-mount and DIP versions. Prices start at 75 cents (10,000) for a single-channel optocoupler.—by Bill Schweber

**►Vishay Intertechnology Inc**, www.vishay.com.

**►According to a study by the FCC Media Bureau, enabling TV viewers in the United States to partially pick their cable channels "à la carte" could cost the cable industry \$17 billion to \$34 billion, pushing up cable prices by 7 to 15%. The study assumed that cable operators would need to deploy a digital set-top box for every TV hooked up to cable at a cost of \$185 per box.**

## Universal RF transmitter targets low-rate wireless connectivity

**A**NALOG DEVICES has announced three single-chip RF transceivers for low-rate wireless-connectivity applications. The low-power ADF7012 UHF-transmitter IC operates at 50 MHz to 1 GHz and enables multiple-frequency implementations

for transmitting applications, such as RF remote controls, remote keyless entry, and wireless sensors. With a fractional-N PLL at its core, it runs at 2.3 to 3.3V, consumes 10 mA at 315 MHz (0 dBm), has an on-chip voltage regulator to stabilize performance, has output power programmable

in 0.4-dB steps from -16 to +14 dBm, and supports data rates as high as 150 kbps.

The ADF7020 and ADF7025 ISM (industrial, scientific, and medical)-band transceiver ICs operate at 433 to 928 MHz with few external components and target use in wireless video and audio for

alarm, sensor, and security systems; automatic meter reading; and remote-transducer applications. The low-IF ADF7020 transceiver supports data rates of 0.3 to 200 kbps, FSK (frequency-shift keying) of 0.3 to 64 kbps, and ASK (amplitude-shift keying). Receiver sensitivity is -117.5 dBm at 1 kbps FSK, -110.5 dBm at 9.6 kbps FSK, and -106.5 dBm at 9.6 kbps ASK. Current consumption is 19 mA in receiving mode and 22 mA in transmitting mode with 10-dBm output.

Other features include an on-chip VCO; a fractional-N PLL, on-chip, 7-bit ADC; dig-

ital RSSI (received-signal-strength indication); a temperature sensor;  $\pm 1$ -ppm RF-output-frequency accuracy; and less-than-1- $\mu$ A leakage current in power-down mode. The zero-IF FSK/GFSK (Gaussian FSK) ADF7025 transceiver complies with FCC 15.247 specifications.

Currently available for sampling, the ADF7012 comes in 24-lead TSSOPs for \$1.50 (10,000), and the ADF7020 and ADF7025 come in 48-pin LFCSPs for \$3.99 each (10,000).

—by Nicholas Cravotta

► **Analog Devices Inc.**, 1-781-329-4700, [www.analog.com](http://www.analog.com).

## RFID family provides secure, low-cost access control and tracking

A FAMILY OF HIGH-FREQUENCY RFID standard products based on 13.56-MHz technology supports cryptographic capabilities for applications requiring enhanced security, such as security and access control, time and attendance tracking, and asset management. The EM Microelectronic family, which includes the EM4035, EM4135, EM4034, and EM4094, complies with the ISO15693 standard and can typically read 20 to 40 tags/sec at a distance as far as 1m.

The EM4035 includes an ISO18000-3 Mode 1-compliant cryptoalgorithm with a 96-bit secret key for symmetrical challenge and response, useful for applications requiring a secure, universal card for multiple access points. The 3.2-kbit EEPROM is organized as 50 words of 64 bits that you can irreversibly lock. On-chip memory contains a 64-bit UID (unique identifier), with a 6-bit chip-type identifier and a unique, custom-programmed, 10-bit code. Price is 80 cents (10,000).

For low-cost logistics and ultradense-tracking applications, the EM4135 and EM4034 include no cryptographic logic and offer only 2.3 kbits and 448 bits of user memory, respectively. The devices' bonding pads allow for flip-chip assembly, and the self-contained units re-

quire no external capacitors, instead deriving their power from the RF energy from one antenna connection. Prices are 70 and 60 cents (10,000), respectively.

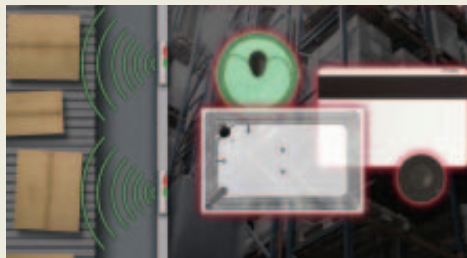
The EM4904 universal-RFID-reader IC is compatible with most 13.56-MHz RFID tags, including ISO15693 and ISO14443A&B, as well as proprietary protocols. Using a serial, three-wire microcontroller interface, the device provides as much as 200-mW modulation output from a 5V supply. The versatile EM4094 has amplitude- and pulse-mode demodulation; a 400-kHz to 1-MHz lowpass filter; a 100-, 200-, or 300-kHz highpass filter; selectable receiver gain; and power-down mode. It is compatible with Manchester or BPSK (binary-phase-shift-keying) subcarrier coding and has multiple-subcarrier capability of 212, 424, and 848 kHz. Multiple receiver inputs provide redundant

or diversity antenna arrangements for enhanced communications reliability. Price is \$5 (1000).

Available now, the EM4035/34 and EM4135 come as sawn wafers with or without bumps. The EM4094 comes in SO20 or SO16 packaging in sticks or tapes and reels. All parts operate at -40 to +85°C.

—by Nicholas Cravotta

► **EM Microelectronic**, +41.32.755-5111, [www.emmicroelectronic.com](http://www.emmicroelectronic.com).



**The EM4035 RFID offers enhanced security at distances as far as 1m.**