

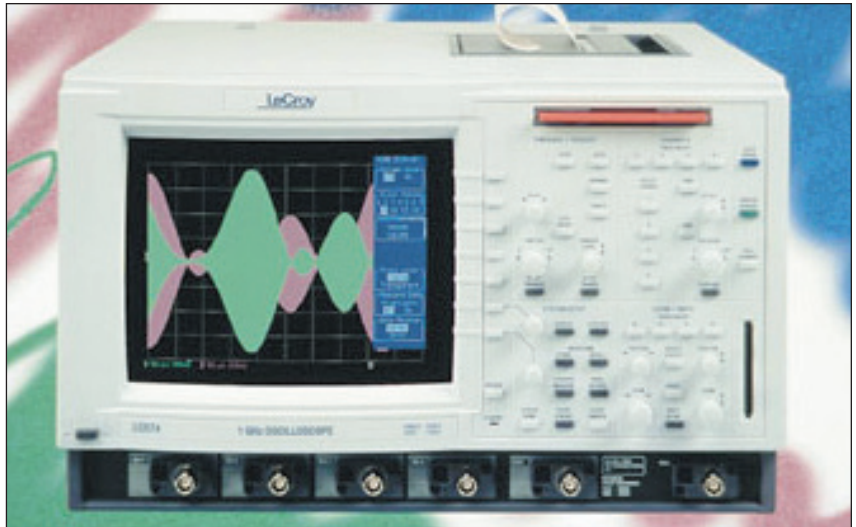
EEs' tools & toys

Fast-sampling scope grabs 8 MB at a time

It seems only yesterday that LeCroy Corp. announced its LC family of oscilloscopes [*IEEE Spectrum*, October 1996, pp. 59–60]. Yet the company is already adding new members, along with a series of enhancements to the earlier instruments.

The main difference between the new LC574 scopes and the earlier LC534 and LC334 instruments is the former's higher sampling rate—1 gigasample per second on each of four channels, meaning that two channels can be combined for a rate of 2 gigasamples per second, or all four may be tied together to form a single-channel scope with 4-gigasample-per-second sampling. The earlier machines could achieve only half those speeds.

The new units have a maximum vertical sensitivity of 2 millivolts per division compared with 5 mV/div for the older ones. The improved sensitivity is also available on enhanced A versions of the



The LC574AL oscilloscope from LeCroy Corp. is a four-channel instrument with a front-end bandwidth of 1 GHz, a maximum sampling rate of 1 gigasample per second on each channel, and 2 MB of acquisition memory behind each input port. When configured as a single-channel scope, therefore, it can acquire 8 million continuous samples at the rate of 4 billion per second. Priced at US \$37 490, the scope comes standard with 64 MB of processing RAM, an internal printer, and software packages for generating histograms, calculating frequency spectra, and performing other advanced waveform calculations.

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earlier scopes. Besides the increased capture sensitivity, both the new and the enhanced scopes offer much higher zoom resolution—40 $\mu\text{V}/\text{div}$, versus a mere 5 mV/div for the earlier units.

The new scopes are four-channel units with a front-end bandwidth of 1 GHz and a choice of acquisition memory behind each channel: 100 kilobytes for the LC574A, 500 kB for the LC574AM, and 2000kB for the LC574AL.

Included with each new scope, at no extra cost, are a built-in graphic printer and a parameter diagnostic package for generating histograms (\$890 and \$1250 options, respectively, on the earlier models). The extra-cost options include packages for disk drive measurements, partial response maximum likelihood analyses, and optical recording measurements; a PCMCIA hard drive; a PCMCIA memory card; and 1-GHz active FET probes.

Bundled in with every LC scope are passive probes, a floppy disk drive, a spectrum-analysis package, an advanced math package, and a SmartMemory management system, among other items.

The price of the 574A is US \$26 490,

while the AM sells for \$29 490 and the AL for \$37 490. The AL includes 64 MB of processing RAM—a \$2000 option on all other models. Contact: LeCroy Corp., 700 Chestnut Ridge Rd., Chestnut Ridge, NY 10977; 914-425-2000; fax, 914-578-5985; Web, <http://www.lecroy.com/tm/TechData/LC574/LC574.htm>; or circle 105.

components

Electrolytics snap in and lap up high ripple currents

Two lines of high-performance snap-in electrolytic capacitors—one rated for use up to 85 °C, and the other rated at up to 105 °C—have been launched by UPE/RIFA Electrolytics AB. Thanks to their superior thermal design and low equivalent series resistance (ESR), the units in the PEH300 family are capable of handling up to twice the current of snap-in capacitors that in other respects are comparable.

To illustrate, a 470- μF capacitor rated for 85 °C and 400 Vdc has a maximum ESR of 150 $\text{m}\Omega$ (at 100 Hz and 20 °C). Consequently, it can handle 2.7 A of ripple current at 85 °C and 100 Hz, or 9.3 A at 40 °C and 20 kHz.

Similarly, a 2200- μF unit rated for

105 °C and 100 Vdc has a maximum ESR of 51 $\text{m}\Omega$ (also at 100 Hz and 20 °C) and therefore handles up to 2.8 A of ripple current at 105 °C and 100 Hz, or 13.4 A at 40 °C and 20 kHz.

Contact: David Basista, UPE Inc., 3401 Brecksville Rd., Suite 110, Richfield, OH 44286; 216-659-9287; fax, 216-659-3580; e-mail, david@upeinc.com; Web, <http://www.upeinc.com>; or circle 106.

instrumentation

'Custom' car panel gauges

The latest series of all-solid-state speedometers and tachometers to come from Curtis Instruments feature a 10-segment multicolor analog light-emitting diode (LED) display and a proprietary IC—one that enables the original-equipment manufacturer to specify the programming of a variety of function parameters. An additional numeric display can show either hours of engine use (on the tachometer) or mileage (on the speedometer).

Among the choices made possible by the proprietary IC are having the display's LEDs light up either singly or cumulatively; setting up a value at which a red LED not only lights up, but also flashes; and deciding whether a tachometer's optional

UNIVERSITY OF WUPPERTAL, GERMANY

The Faculty of Electrical Engineering invites applications for the permanent position of a

Full Professor (Universitätsprofessor C4) in Electrical Machines and Drives

starting September 1, 1998 (succeeding Prof. Dr. Joachim Holtz).

The applicant is expected to teach undergraduate courses in Fundamentals of Electrical Engineering and graduate courses in Electrical Machines/Drives and Power Electronics.

Successful candidates are expected to have an outstanding research record, a potential for successful teaching and should have demonstrated research leadership qualities. The faculty is particularly interested in individuals with industrial/experimental experience in one or more of the following areas: 1) variable speed drives, 2) power electronics, 3) electronic energy conversion, 4) high performance server drives for roboter and machine tools.

Applicants must satisfy the legal requirements of the state of Northrhine-Westfalia for the above appointment, i.e. an outstanding Ph.D., Habilitation or equivalent scientific merits or degrees. They should send their curriculum vitae, a summary of their scientific career and teaching experiences, a list of publications and a 1-2 page statement of research and teaching goals to the Dean of the Faculty of Electrical Engineering, University of Wuppertal, Fuhlrottstr. 10, D-42097 Wuppertal, Germany.

To receive full consideration, application should be handed in before April 25, 1997, but the search will continue until the position is filled. Qualified women and individuals with disabilities are strongly encouraged to apply.

competitive solutions and products for tomorrow being prepared today



The Carinthian Tech Research Institute (CTR) was established in January 1997 to support the development of competitive solutions and products in the field of

INTELLIGENT SENSOR SYSTEMS.

CTR is a new Austrian research centre in Villach, a city located in the beautiful lake district of Carinthia in the centre of an up-and-coming economic region with leading companies in the electronics and microelectronics industry. Munich, Salzburg, Vienna and Venice can be reached from Villach within a 3 hours' drive.

CTR invites innovative, dedicated and customer-oriented researchers with good project development and management skills, a university degree and a minimum industrial related experience of 3 years to apply for a position as

- Member of Technical Staff
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- Development of complete sensors including sensor design, sensor electronics and data processing
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- Development and application of microsensors and actuators

Successful candidates will be offered a competitive salary, continuous learning opportunities, a casual workplace and an attractive benefits package. Qualified applicants should send a comprehensive curriculum vitae to:

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Richard Wagner Strasse 19
A-9500 Villach
Austria
Fax, ++43 (0) 4242 2004 400
Email Info@CTR.ac.at



You are kindly requested to indicate clearly the position, field of interest and source of advertisement in your application. Only shortlisted candidates will be notified

hour meter should record all engine-use time or only the time during which the engine runs above a specified speed. The chip also allows the meters to work with any common sensor.

Perhaps most important, thanks to the IC, the LED scale may



Both the tachometer and speedometer from Curtis Instruments Inc. employ multicolored light-emitting diodes to display speed on a segmented analog scale and to highlight critical portions of the speed range. The tachometer's integral numeric display records engine-use time; the one in the speedometer is an odometer.

be compressed or expanded to boost the resolution of a selected portion of the displayed range. Contact Curtis Instruments Inc., 200 Kisco Ave., Mount Kisco, NY 10549; 914-666-2971; fax, 914-666-2188; or circle 107.

Frequency counters cost little

Leader Instruments has introduced two inexpensive, yet versatile, frequency counters for laboratory and production-line applications. Both units have a time base accuracy of ± 3 parts per million and an eight-digit LED display. The Model LF 826 spans the frequency range from 0.1 Hz to 550 MHz and costs \$495. Its sibling, the Model LF827, covers 0.1 Hz to 1.3 GHz and sells for \$995.

Both meters supplement the usual frequency- and period-measuring capabilities with revolution-per-minute and totalizer functions. They are also equipped to measure changes with respect to a stored reference and have LO-GO-HI indicators that may be used in conjunction with stored reference values in production situations. The instruments employ reciprocal counting below 10 MHz—they measure period and calculate its inverse to get frequency—to obtain high accuracy in a short measuring interval. In addition, each has an auto-trigger mode that optimizes the trigger level to keep the effects of noise and hysteresis to a minimum.

The instruments have two inputs: a 1-M Ω port that can span 0.1 Hz to 100 MHz and withstands root-mean-square voltages up to 100 V; and a 50- Ω port that covers the range from 80 MHz on upwards and has a maximum rms voltage rating of 5 V. The high-frequency, 50- Ω input uses prescaling and has an rms sensitivity of 10 mV. The high-impedance input uses direct counting over the 10–100-MHz range, and reciprocal counting below 10 MHz, as mentioned earlier. Its rms sensitivity is 15 mV.

Both frequency counters are available from stock. Contact: Leader Instruments Corp., 380 Oser Ave., Hauppauge, NY 11788; 516-231-6900; toll-free, 800-645-5104; fax, 516-231-5295; or circle 108.

NIST offers T and f courses

The National Institute of Standards and Technology will be conducting two time-and-frequency seminars in Boulder, Colo., this June. The first (Level I) seminar is intended to teach the fundamentals of characterizing high-performance time and frequency systems. It will be taught on June 23–24.

The Level II seminar, intended for people already involved with time and frequency equipment, will be given on June 25–27. It will include such topics as the theory and application of time and frequency measurements, precision oscillator and standards technolo-

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Research and develop methods and models for general-purpose circuit and system simulation software. Requires a M.S. or Ph.D. in E.E., knowledge of high frequency modeling, and min. 1 year experience with C or FORTRAN. Positions are available in the following areas (job code SME):

- Harmonic-balance analysis
- EM analysis using the method-of-moments or FEM
- EM analysis using full-wave planar circuit methods
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Semiconductor Modeling Engineers

Research and development of advanced technology models for semiconductor devices. Requires an M.S. or Ph.D. in EE. Experience with FET, BJT and/or HBT models and their high frequency characteristics is a must. Circuit parameter extraction and C or FORTRAN experience is also desirable. (job code SDE):

Software Engineers

Develop engineering applications in C/C++ under the Windows 95/NT and/or UNIX Motif environments. Positions are available for both entry and senior levels in the following areas (job code SE):

- Schematic capture and framework development
- User interface design for CAD applications
- Parsing and data management development
- Network and software security management

Application Engineers

Engineers with a diverse set of skills in high-frequency circuit design or wireless communication systems are sought. Responsibilities include development of application notes, design solutions, and contributing to tool design. Candidates should have a B.S.E.E. or M.S.E.E. and 1+ years experience in design of RF/microwave circuits or systems. Must have excellent communication skills. Staff and senior level positions are available. (Job code: AE)



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gy, and the specification of a variety of synchronization techniques, including the use of global positioning satellites.

The Level I seminars cost \$450 and Level II, \$900. Class size is limited; admission is on a first-come, first-served basis. Contact: Wendy Ortega, NIST/Div. 847, 325 Broadway, Boulder, CO 80303; 303-497-3693; fax, -6461; e-mail, ortegaw@boulder.nist.gov; Web, <http://www.boulder.nist.gov/timefreq/>; or circle 109.

communications

A paging-system protector

The growing popularity of radio paging and pager-Internet connectivity has already led to incidents of pager system overload, and in all likelihood will do so with increasing frequency in the future. So to deal with its share in the problem, Real Time Strategies Inc. has developed a plug-in enhancement for its Advantage radio-paging infrastructure products. The Load Sentry, as the unit is called, can in addition work as a stand-alone messaging gateway.

The Load Sentry monitors incoming traffic to identify such anomalies as abrupt

changes in usage patterns; messages of excessive length; an unusual number of messages entered from any source; and an unusual number of messages sent to any subscriber. Identified anomalies may then be flagged for administrator intervention; trickled out so as to prevent instantaneous overload; segmented into multiple transmissions; or deferred until off-peak periods. Contact: Real Time Strategies Inc., 960 South Broadway, Suite 118C, Hicksville, NY 11801; 516-939-6655; fax, 516-939-6189; Web, http://www.rts-inc.com/rts/rts_home; or circle 110.

new & noteworthy

American Microsystems Inc., Pocatello, Idaho, has begun sampling its SX049 direct-sequence spread-spectrum (DSSS) transceiver chip, which incorporates the baseband circuitry of a DSSS radio. The transceiver IC handles data rates from 100 b/s to 16 Mb/s and pseudonoise code lengths of up to 2047 chips per second. Expected pricing of the SX049 is \$23.05 in quantities of 10 000 pieces. Contact: 208-234-6920; Web, <http://www.amis.com>; or circle 111.

A series of 15-W dc-dc converters from Polytron Devices Inc., Paterson, N.J., has a

very wide input-voltage range (9–36 V and 20–72 V), along with good regulation (± 0.5 percent line and load), six-sided continuous shielding, excellent I/O isolation (1 G Ω and 1500 V), and the ability to withstand short circuits indefinitely. Peak-to-peak output ripple and noise are no more than 75 mV. The units are housed in 41-by-51-by-10-mm packages and sell for \$33 each in large quantities. Contact: 201-345-5885; or circle 112.

The Model IR6 disk and blank substrate flatness inspection system from Wyko Corp., Tucson, Ariz., is a non-contacting instrument that can assess the flatness and parallelism of both sides of a disk in a single pass. Using a dual-beam laser-optic measuring system that operates at a wavelength of 10.6 μm , the system can make measurements even on rough surfaces, like unpolished aluminum, with runout to 53 μm across one radius. The system requires no vibration isolation; it can be adapted for use on automated production lines where it can test 24 disks per minute. The IR6 handles disks with diameters as large as 130 mm. Contact: 520-741-1044; Web, <http://www.wyko.com>; or circle 113.

MICHAEL J. RIEZENMAN, *Editor*